FINAL REPORT NUMBER: SINCAP-TRC-14-001

NEW CAR ASSESSMENT PROGRAM (NCAP)
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST

General Motors LLC
2014 Chevrolet Impala 4-Door Sedan
NHTSA NUMBER: M20140102

PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319

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
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Report Prepared By: ILO Project Operations Group

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:

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

Date:

Technical Report Documentation Page

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15. Supplemental Notes		

16. Abstract

This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2014 Chevrolet Impala 4-door sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on June 20, 2013.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.53 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 22° C. The target vehicle post-test maximum crush was 206 mm at Level 3. The test vehicle's performance was as follows:

Driver ATD (ES-2re)

Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC_{36})	NA	1000	75
Maximum Thoracic Rib Deflection	mm	44	32.9
Total Abdominal Force	N	2500	800.7
Pubic Symphysis Force	N	6000	1478.5

Passenger ATD (SID-IIs)

Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC_{36})	NA	1000	150
Lower Spine Resultant Acceleration	g's	82	39.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3804.6
Maximum Thoracic Rib Deflection	mm	38*	22.7
Maximum Abdominal Rib Deflection	mm	45*	20.2

* Proposed IARV

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

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TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2014 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. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2012.

SECTION 2

SUMMARY OF TEST RESULTS

A 2014 Chevrolet Impala 4-door sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.53 km/h (38.23 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, OH, on June 20, 2013. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated September 2012. The side impact event was documented by 10 cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (T12) tri-axial accelerometers
Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)
Primary and redundant head CG triaxial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen upper rib and lower rib y-axis displacement potentiometers
Lower spine (T12) tri-axial accelerometers
Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	75
Maximum Thoracic Rib Deflection	mm	44	32.9
Combined Abdominal Force	N	2500	800.7
Pubic Symphysis Force	N	6000	1478.5

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	150
Lower Spine (T12) Resultant Acceleration	G	82	39.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3804.6
Maximum Thoracic Rib Deflection	mm	38*	22.7
Maximum Abdominal Rib Deflection	mm	45*	20.2

* 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		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	No	No	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	No
Knee Airbag	Yes	No	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Unknown	No	NA
Other	NA	NA	NA	NA

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact or the static rollover test which followed. Injury values for both ATDs were within the established performance thresholds. The restraint system performed as expected. The photo placard in photos 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 96, 97, 98, 100, and 101 incorrectly identifies the model year of the vehicle as a 2013. The actual vehicle model year is 2014.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20140102
Model Year	2014
Make	Chevrolet
Model	Impala
Body Style	4-Door
VIN	1G11Y5SL4EU100628
Body Color	Silver
Odometer Reading (km/mi)	20 mi
Engine Displacement (L)	2.5
Type/No. Cylinders	4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	Yes
Rear Pass. Torso/Pelvis Airbag	No
Rear Passenger Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Passenger Load Limiter	No
Other Safety Restraint	N/A

Does owner's manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	4/13
Vehicle Type	Pass Car

GVWR (kg)	2103
GAWR Front (kg)	1050
GAWR Rear (kg)	1053

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

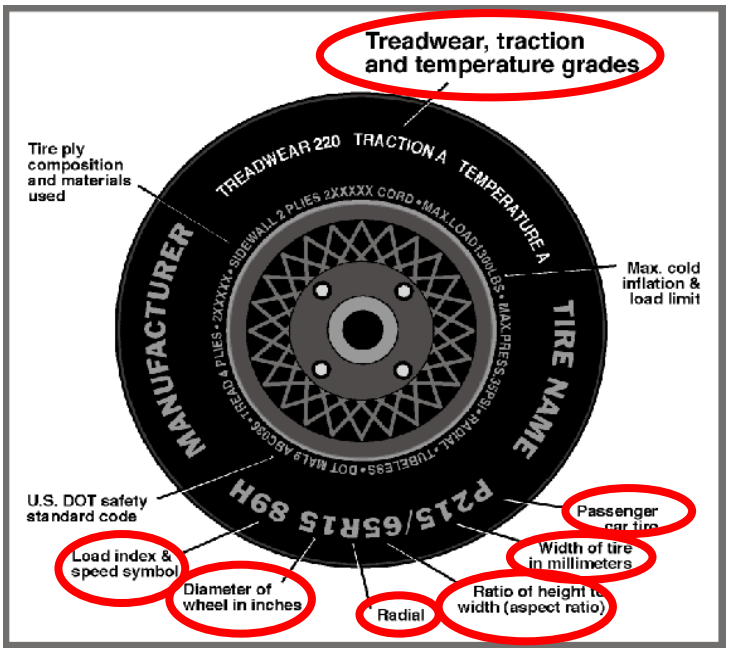
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	0	5
Capacity Weight (VCW) (kg)				428
DSC x 68.08 (kg)				340.2
Cargo Weight (RCLW) (kg)				87.8

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes	N/A	N/A		N/A	Yes	N/A
Rear or Second Row Seat	No	N/A	Yes	N/A	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 NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



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	Poly, Steel, Nylon	Poly, Steel, Nylon
DOT Safety Code Left	8XPM FCH 1013	8XPM FCH 1013
DOT Safety Code Right	8XPM FCH 1013	8XPM FCH1013

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

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

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

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	207	207	207	207

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	484.0	351.8		518.4	431.2		529.2	461.2	
Right	kg	476.0	329.4		487.8	412.0		478.8	416.2	
Ratio	%	58.5	41.5		54.4	45.6		53.5	46.5	
Totals	kg	960.0	681.2	1641.2	1006.2	843.2	1849.4	1008.0	877.4	1885.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1641.2	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	87.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1854.0	(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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	724	723	Yes
RF	mm	732	730	Yes
RR	mm	721	726	Yes
LR	mm	716	719	Yes
Vehicle CG (Aft of Front Axle)	mm	1319.3	1292.6	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+38.7	+20.6	

***The "As Tested" vehicle attitude measurements must be equal to or within ± 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirement".

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast : Steel plate weight mounted in cargo area.	43.1

DATA SHEET NO. 2

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

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

SEAT POSITIONING

The driver seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, 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	24.5	14.2	19.3
Front Passenger Seat	23.4	18.7	21.1
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	13.5
Non-Struck Side Rear Seat	N/A	N/A	13.8
Rear Center Seat*	N/A	N/A	12.1

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	19.3	103	Max	146	152	160
			Mid	122	128	136
			Min	98	103	112
Front Passenger Seat	21.1	113	Max	N/A	N/A	N/A
			Mid	100	113	124
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	13.5	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	13.8	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	12.1	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

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

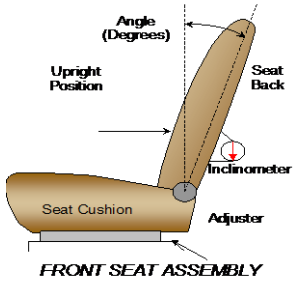
Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	240	N/A	120	N/A
Front Passenger Seat	244	55	122	28
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

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated seat back angle. 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 seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as 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	87.4	N/A	15.5	N/A
Front Passenger Seat	89.9	N/A	16.9	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	19.3	N/A
Non-Struck Side Rear Seat	Fixed	N/A	19.3	N/A
Rear Center Seat*	Fixed	N/A	20.2	N/A

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	5	0, Uppermost
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

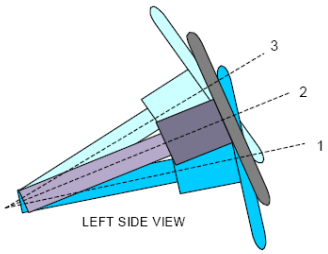
	Total # of Positions	Placed in Position #
Driver Seat	9	0, Uppermost
Rear Seat	5	4, Lowermost

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.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

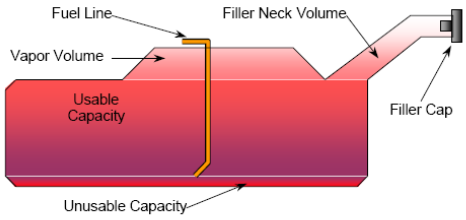


STEERING COLUMN ASSEMBLY

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	20.3	26
Geometric Center, Position No. 2	22.6	26
Uppermost, Position No. 3	24.8	26
Telescoping Steering Wheel Travel		52
Test Position	22.6	26

FUEL PUMP

Pump operates a few seconds after ignition switch is turned ON. After that, pump operates only while engine is running.



VEHICLE FUEL TANK ASSEMBLY

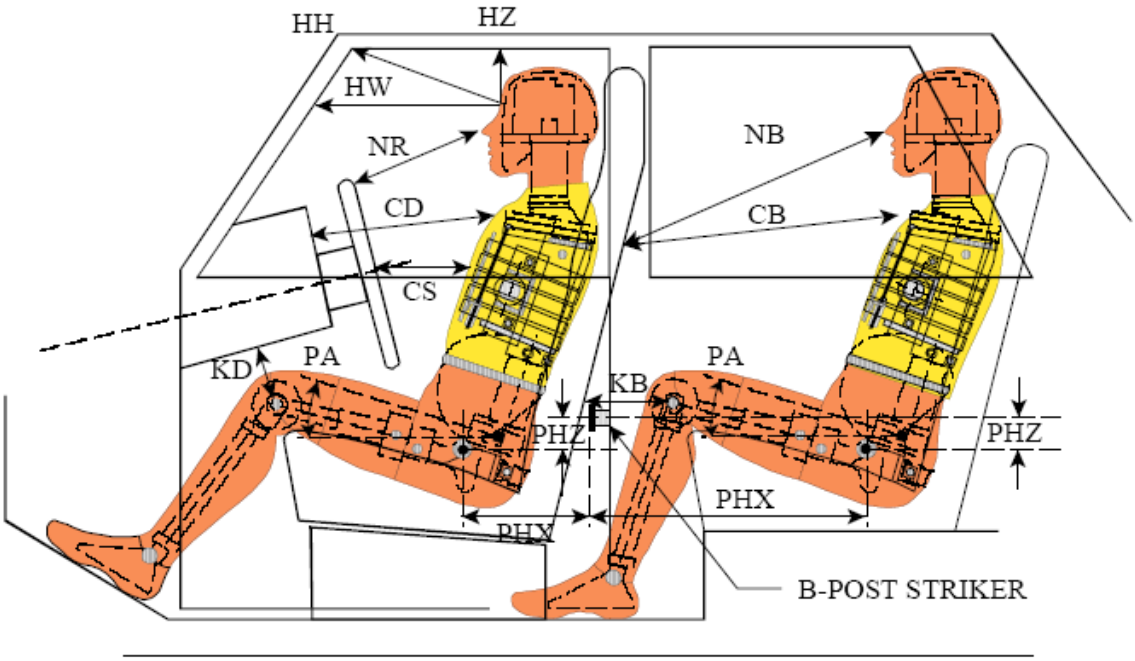
FUEL TANK CAPACITY

	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)	NA
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 in on Form No. 1? ☒ YES ☐ NO

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



NOTE: 2-DOOR VEHICLE SHOWN. REAR DUMMY PHX & PHZ MEASUREMENTS FOR A 4-DOOR VEHICLE WOULD USE THE C-POST STRIKER AS A REFERENCE POINT

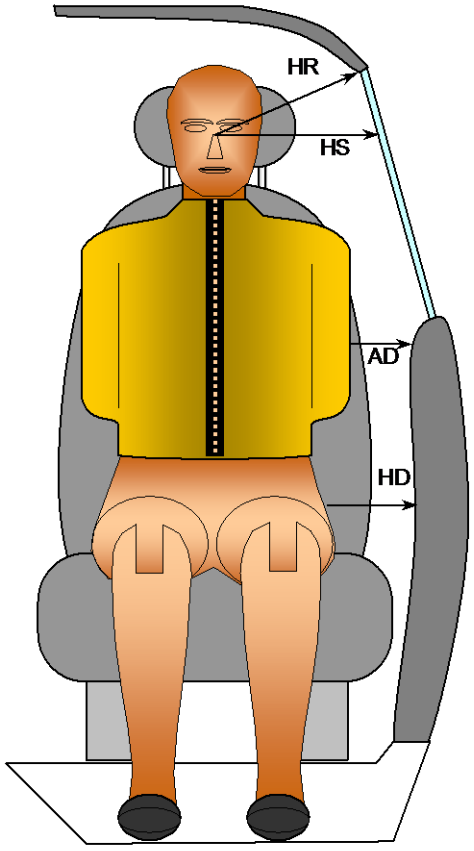
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	469			
HW		Header to Windshield	732			
HZ	HZ	Head to Roof Liner	246		257	
NR	NB	Nose to Rim/Seat Back	493		603	
CD	CB	Chest to Dash/Seat Back	615		564	
CS		Chest to Steering Wheel	288			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	236	26.5	315	0.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	184	34.0	312	0.0
PAX°	PAX°	Pelvic Tilt Angle X		1.0		0.9
	PAY°	Pelvic Tilt Angle Y				23.8
PHX	PHX	Hip Point to Striker (X-Axis)	151		216	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	199		254	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

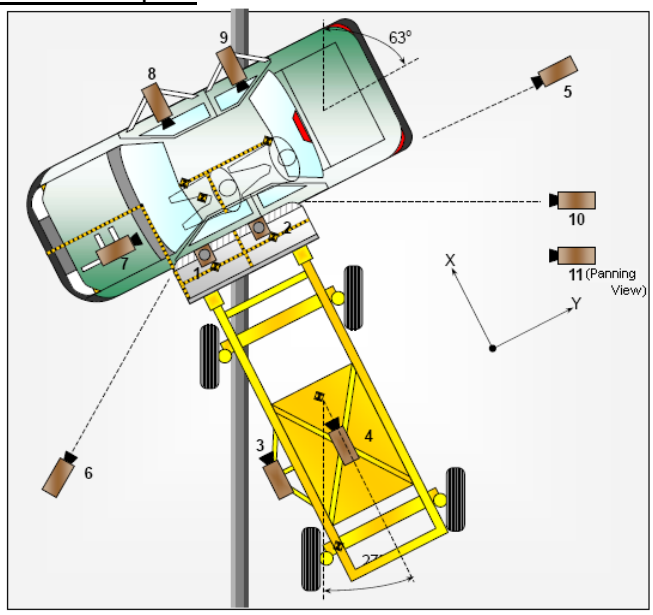


FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	257	244
HS	Head to Side Window	mm	374	396
AD	Arm to Door	mm	118	157
HD	H-Point to Door	mm	170	175

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	1260	-5754	8.5	1000
2	Overhead Close-up	0	865	-5754	16	1000
3	Left Impact Point (MDB)	-1766	-845	-831	12.5	1000
4	Side Overall (MDB)	-2351	0	-1445	8.5	1000
5	Rear	0	7647	-1181	8.5	1000
6	Left Front	-2260	-3202	-1111	12.5	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				8.5	1000
9	Passenger Side (OB)				8.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

Reference: Impact Point projected to Ground; +X = To Front of MDB +Y = To Right of MDB; +Z = Down

*All measurements accurate to ± 6 mm.

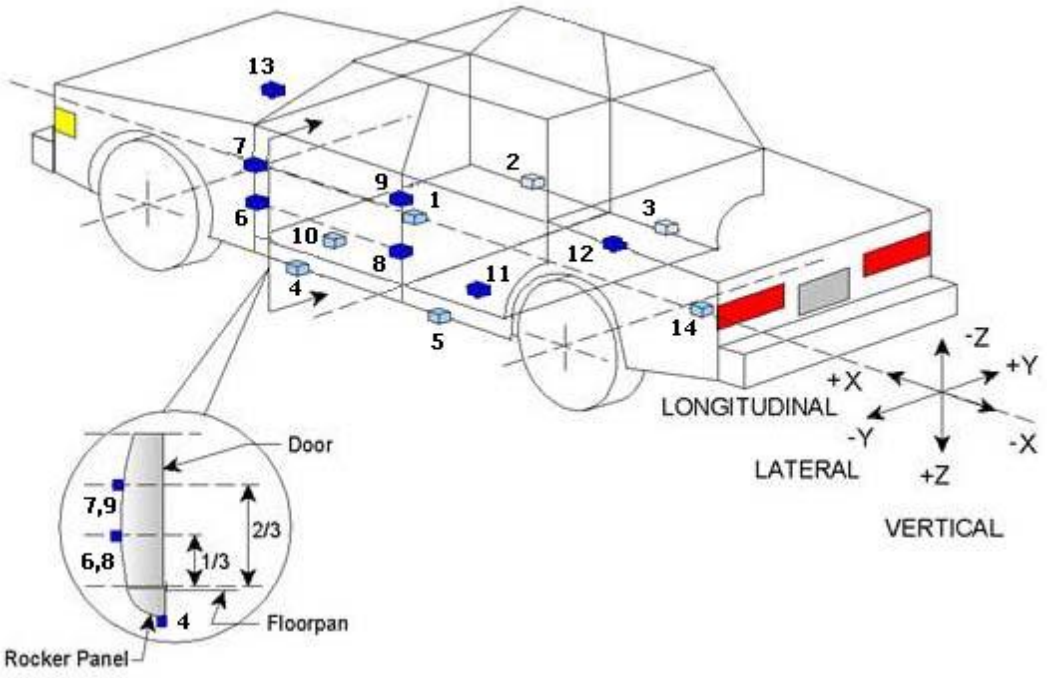
If applicable, explain why camera(s) did not operate as intended:

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MBD Accelerometers	7
TOTAL	62

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



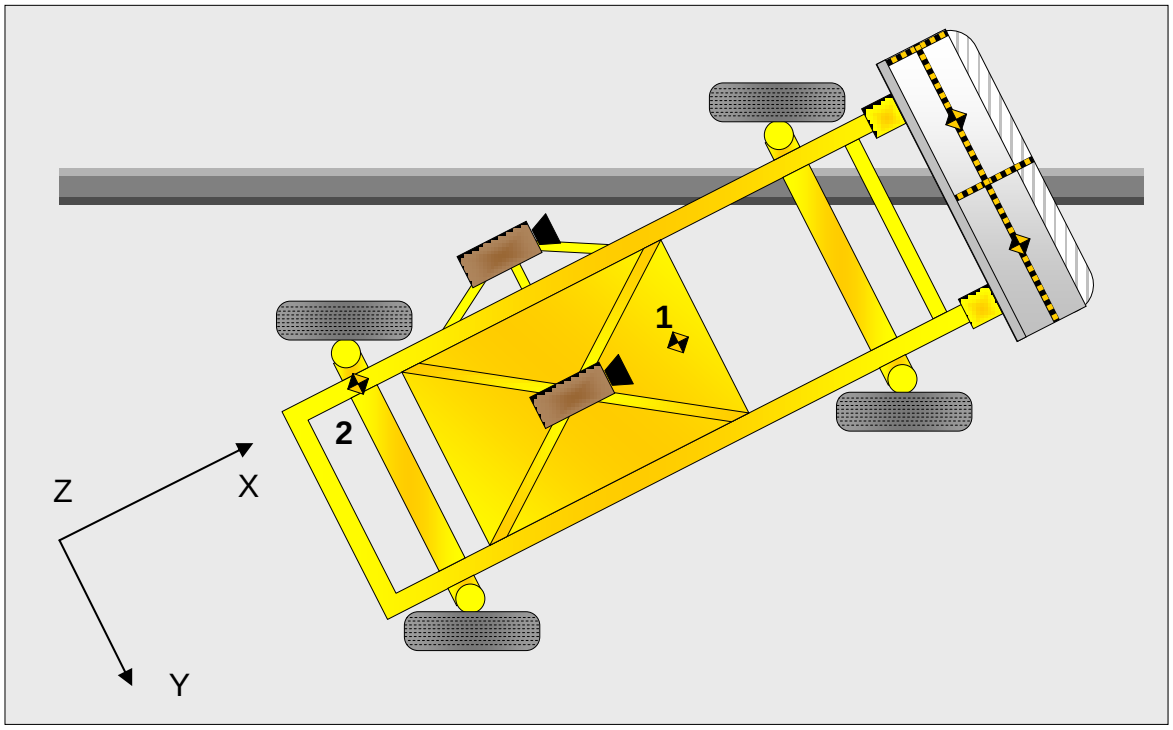
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3202	105	-330
2	Right Sill at Front Seat	3197	660	-308
3	Right Sill at Rear Seat	2297	660	-323
4	Left Sill at Front Door	3197	-660	-315
5	Left Sill at Rear Door	2287	-660	-312
6	A-Post Lower	3604	-846	-490
7	A-Post Middle	3606	-836	-872
8	B-Post Lower	2497	-820	-550
9	B-Post Middle	2472	-810	-890
10	Front Seat Track	2760	-575	-400
11	Rear Seat Structure	1807	-720	-410
12	Right Rear Occ. Compartment	2087	630	-361
13	Engine Block	4085	5	-785
14	Rear Above Axle	1232	0	-487

Reference: X - Rear surface of vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	-2179	0	-505
2	MDB Rear	-3648	-650	-618

Reference : X - Face of MDB (+ forward)
Y - MDB Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	Side Curtain Airbag	C-Pillar, Door Panel
Top of Head	Side Curtain Airbag	Side Curtain Airbag, C-Pillar
Left Side of Head	Side Curtain Airbag	Door Panel
Back of Head	Side Curtain Airbag, Head Restraint	C-Pillar, Head Restraint
Left Shoulder	Torso/Pelvis Airbag, Door Panel	Torso Airbag
Upper Torso	Torso/Pelvis Airbag	Torso Airbag
Lower Torso	Torso/Pelvis Airbag	Torso Airbag
Left Hip	Torso/Pelvis Airbag ,Door Panel	Door Panel
Left Knee	Door Panel	Door Panel

POST TEST DOOR PERFORMANCE

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

POST TEST SEAT PERFORMANCE

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Major Deformation
Sill Separation	None
Windshield Damage	None
Side Window Damage	Cracked and Partially Ejected
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2835
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		478
Actual Impact Point (Aft of Front Axle)	mm		484
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-6
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	0

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel Base of Framework Carriage	2590
C.G. Location aft of Front Axle	1108

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	410.6	274.4	685.0
Right	kg	372.4	310.4	682.3
Ratio	%	57.2	42.8	100.0
Totals	kg	782.0	584.8	1367.8

SPEED AND IMPACT ANGLE DATA

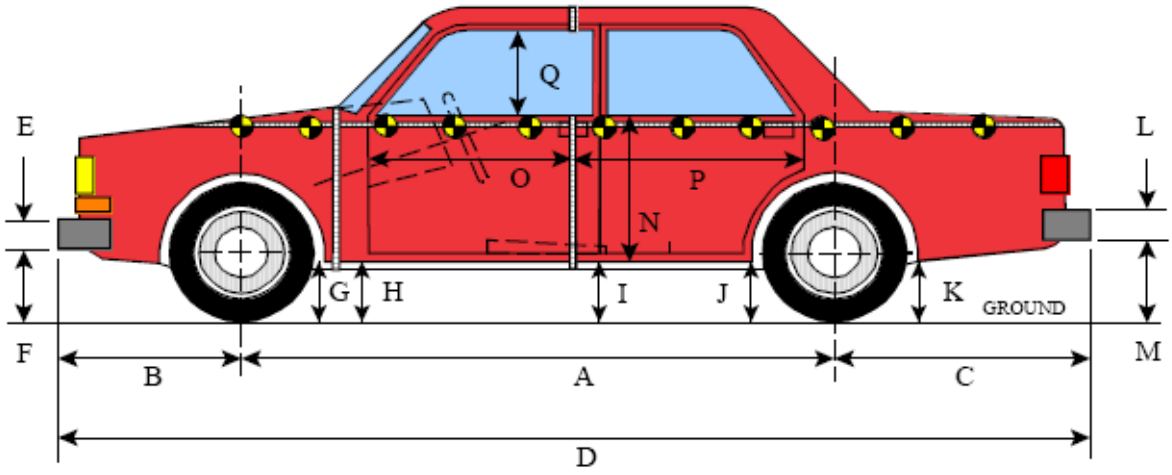
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.53
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.52
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.5
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	28.0

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Right	-240
B	Top of Bumper	533	200	Right	-373
C	Mid-Level	686	0	---	-95
D	Top of Stack	813	100	Right	-124

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



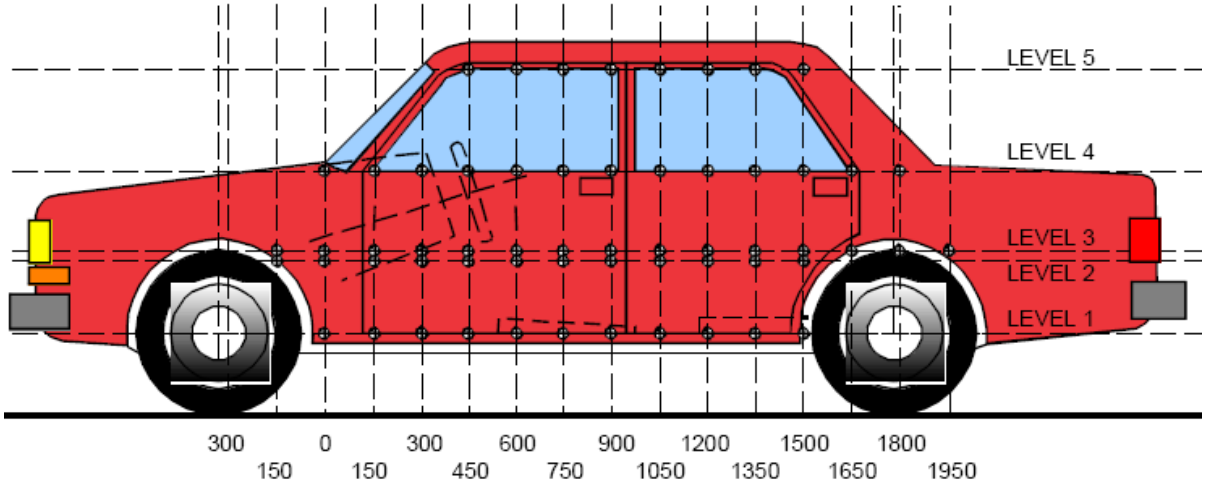
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2835	2835	0
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	5120	5
E	Front Bumper Thickness	135	135	0
F	Front Bumper Bottom to Ground	413	410	3
G	Sill Height at Front Wheel Well	223	238	-15
H	Sill Height at Front Door Leading Edge	233	262	-29
I	Sill Height at B-Pillar	253	308	-55
J1	Sill Height at Rear Wheel Well	263	311	-48
J2	Pinch Weld Height at Rear Wheel Well	183	214	-31
K	Sill Height Aft of Rear Wheel Well	298	338	-40
L	Rear Bumper Thickness	184	184	0
M	Rear Bumper Bottom to Ground	475	520	-45
N	Sill Height to Window Bottom Sill	790	718	72
O	Front Door Leading Edge to Impact CL	844	755	89
P	Rear Door Trailing Edge to Impact CL	1183	1070	113
Q	Front Window Opening	403	406	-3
R	Right Side Length	4805	4801	4
S	Left Side Length	4805	4801	4
T	Vehicle Width at B Pillar	1860	1860	0

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	391	120	1500
2	Driver Hip Point	515	99	1500
3	Mid-Door	629	206	1800
4	Window Sill	960	99	1500
5	Window Top	1430	-13	900

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

DATA SHEET NO. 11 (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-150	0	0	922	818	0	0	0	865	826	0	0	0	57	-8	0
0	903	910	911	830	0	904	892	917	848	0	-1	18	-6	-18	0
150	901	904	907	839	0	801	769	799	827	0	100	135	108	12	0
300	901	901	907	848	0	790	717	721	836	0	111	184	186	12	0
450	902	901	908	857	0	785	723	713	835	0	117	178	195	22	0
600	903	900	909	865	0	788	739	717	838	0	115	161	192	27	0
750	905	901	908	871	0	790	754	732	826	0	115	147	176	45	0
900	907	901	907	868	596	793	750	736	811	609	114	151	171	57	-13
1050	909	900	906	877	604	802	759	779	834	614	107	141	127	43	-10
1200	909	899	904	879	606	798	761	763	820	615	111	138	141	59	-9
1350	909	898	901	879	607	794	748	751	799	613	115	150	150	80	-6
1500	907	898	900	878	608	787	762	719	779	615	120	136	181	99	-7
1650	904	901	902	876	603	787	742	706	778	611	117	159	196	98	-8
1800	903	908	909	892	594	802	737	703	798	601	101	171	206	94	-7
1950	902	914	918	891	571	897	881	819	830	580	5	33	99	61	-9
2100	0	0	0	881	0	0	0	0	847	0	0	0	0	34	0
2250	0	0	0	878	0	0	0	0	872	0	0	0	0	6	0
2400	0	0	0	871	0	0	0	0	867	0	0	0	0	4	0
2550	0	0	0	863	0	0	0	0	861	0	0	0	0	2	0
2700	0	0	0	852	0	0	0	0	853	0	0	0	0	-1	0
2850	0	0	0	838	0	0	0	0	842	0	0	0	0	-4	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.

[1]Post-Test measurement point was not available

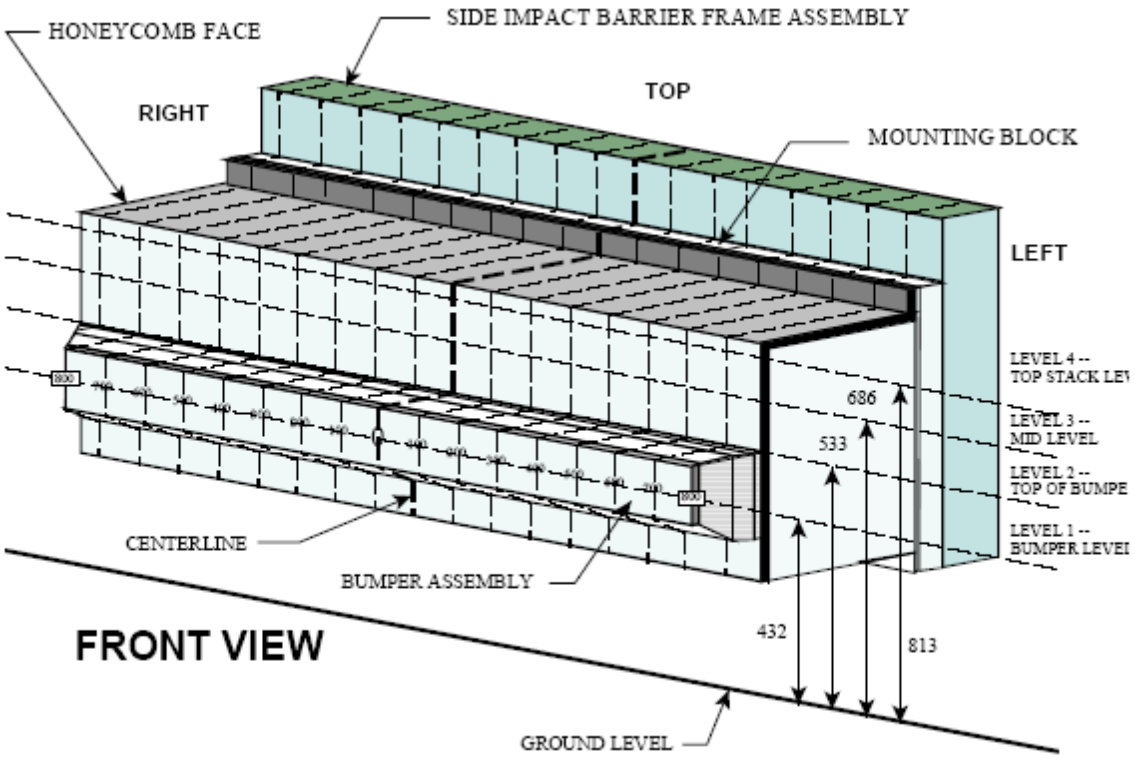
DATA SHEET NO. 11 (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	-239	-240	-236	-232	-231	-224	-220	-214	-210	-205	-198	-194	-190	-186	-182	-182	-185
2	-142	-139	-137	-130	-373	-373	-373	-373	-373	-373	-100	-99	-90	-86	-81	-78	-88
3	-58	-48	-46	-49	-58	-68	-86	-93	-95	-57	-35	-27	-24	-26	-34	-49	-96
4	-41	-33	-32	-38	-48	-65	-104	-124	-94	-57	-42	-43	-46	-49	-55	-67	-106

DATA SHEET NO. 13
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13

Test Time: 14:25 **Temperature:** 21.2

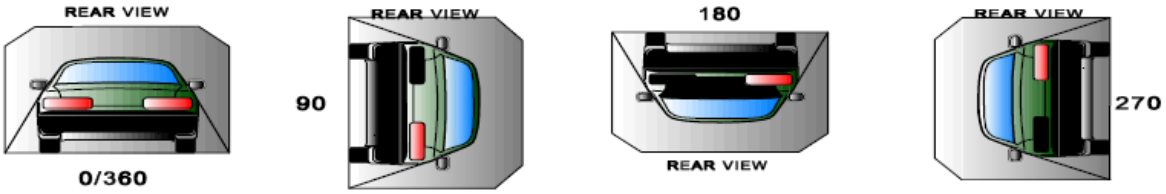
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

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

C. For the following 25 minutes: 0 oz.
(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

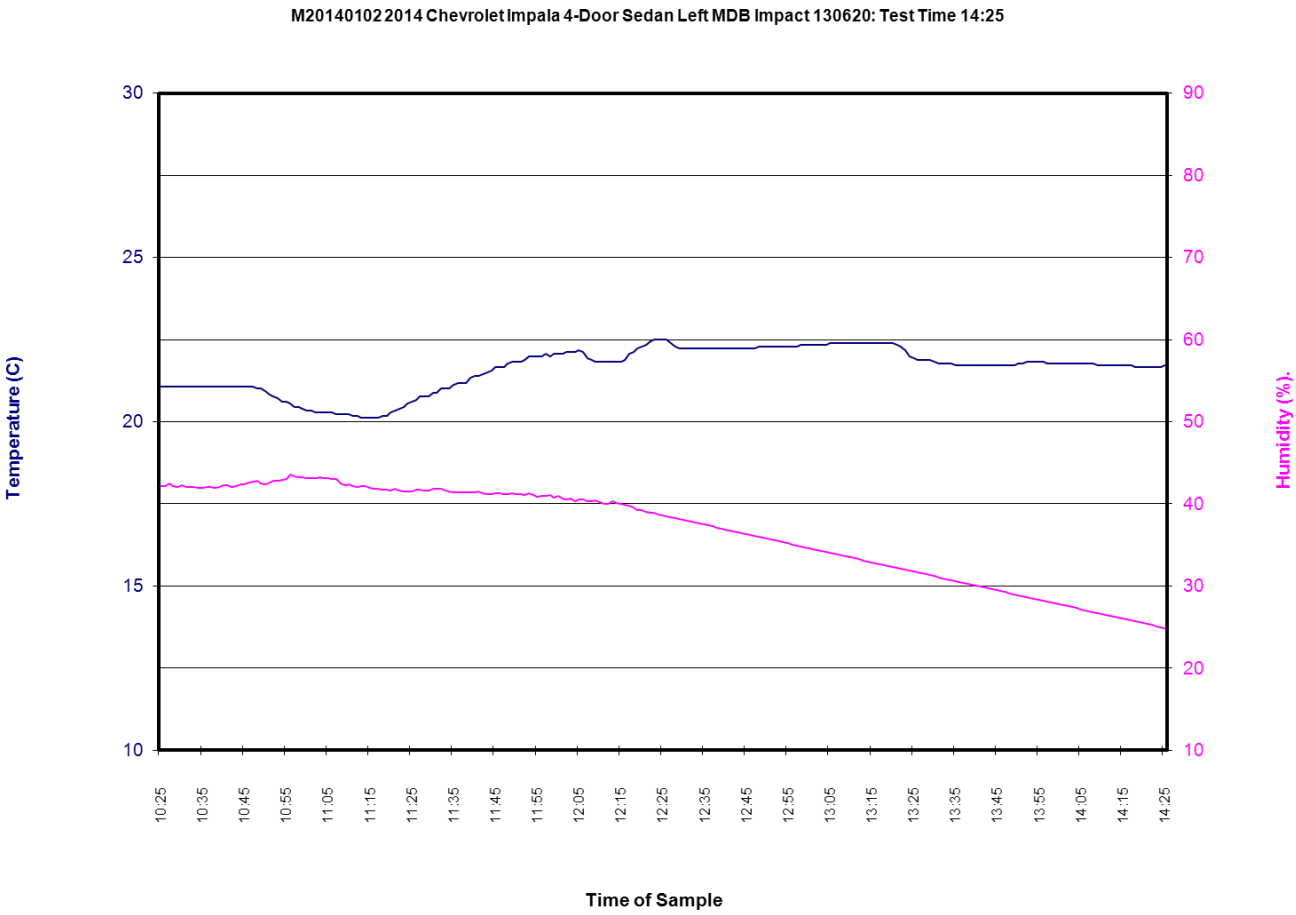
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

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. 14
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan NHTSA No.: M20140102
Test Program: NCAP Side Impact Test Date: 06/20/13



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

[1]The photo incorrectly identifies the model year of the vehicle as a 2013. The actual vehicle model year is 2014.

001 As-Delivered Right Front ¾ View of Test Vehicle

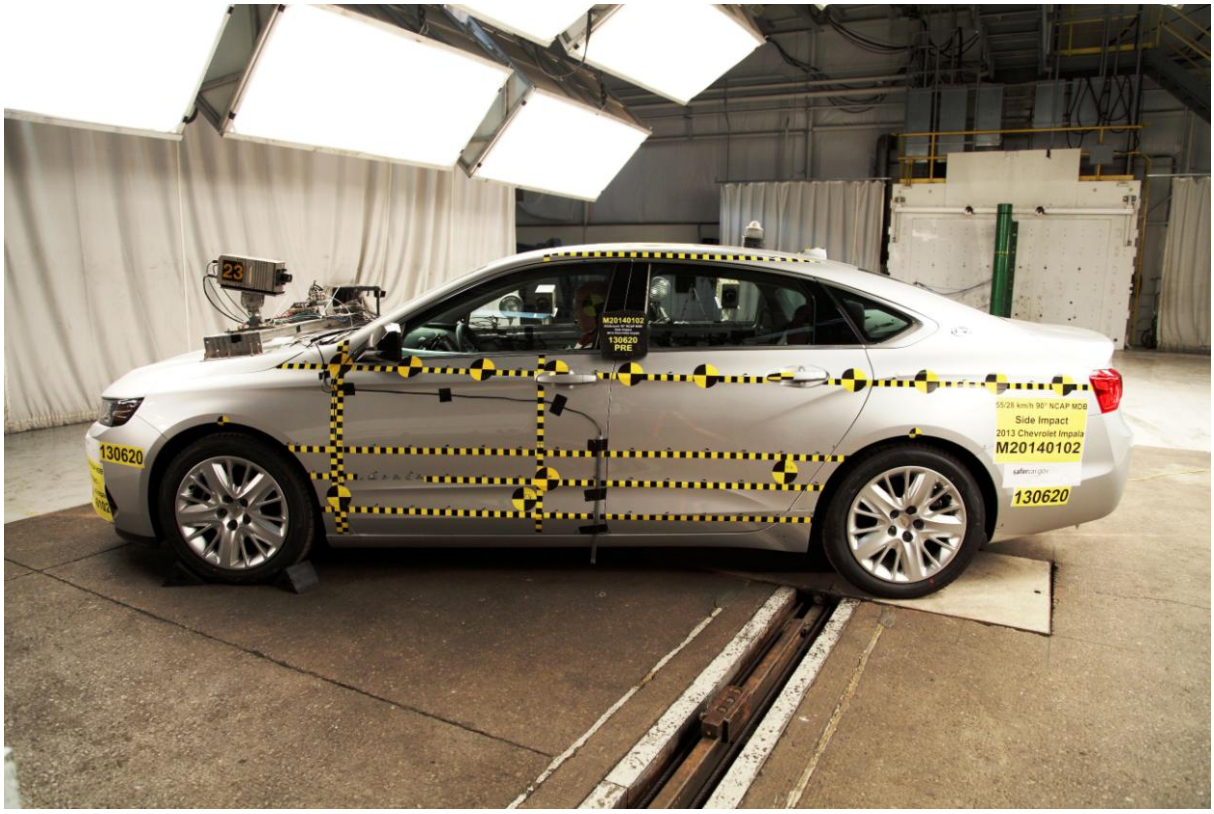
002 As-Delivered Left Rear ¾ View of Test Vehicle

003 Pre-Test Front View of Test Vehicle

004 Post-Test Front View of Test Vehicle

005 Pre-Test Left Front ¾ View of Test Vehicle

006 Post-Test Left Front ¾ View of Test Vehicle



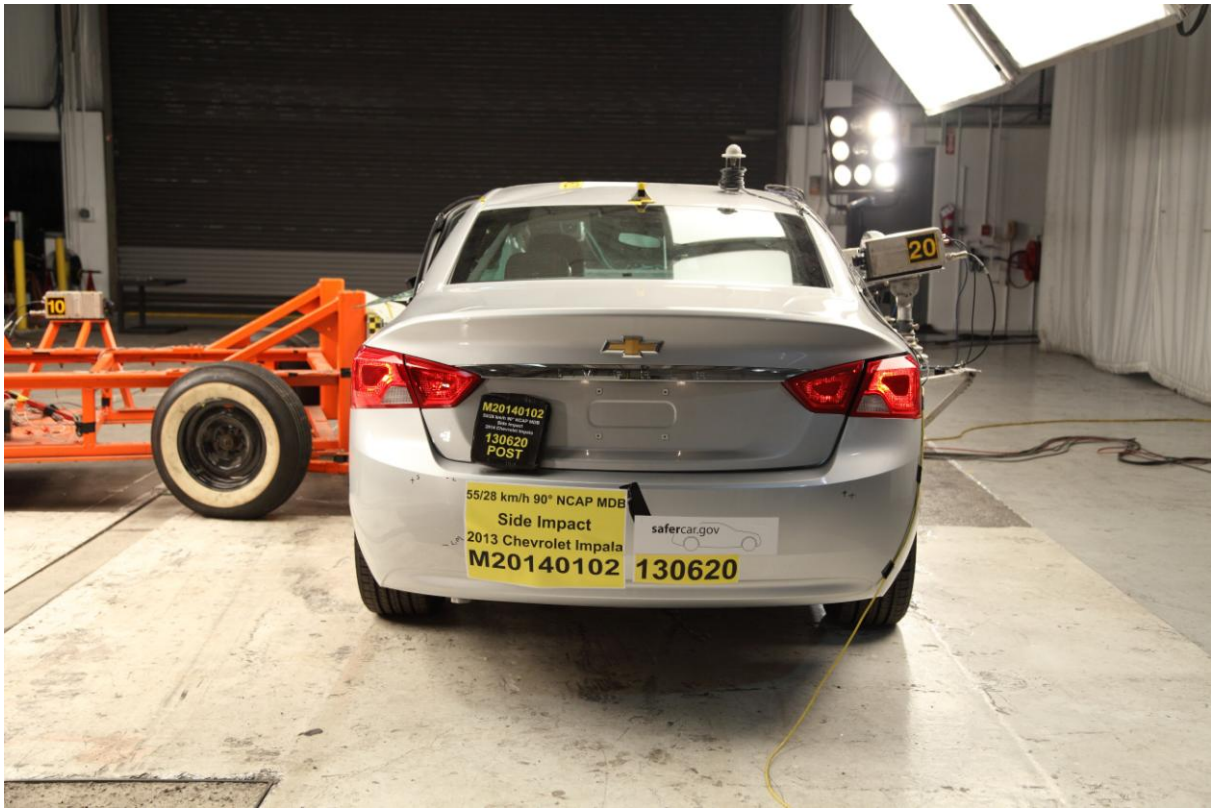
007 Pre-Test Left Side View of Test Vehicle

008 Post-Test Left Side View of Test Vehicle

009 Pre-Test Left Rear ¾ View of Test Vehicle

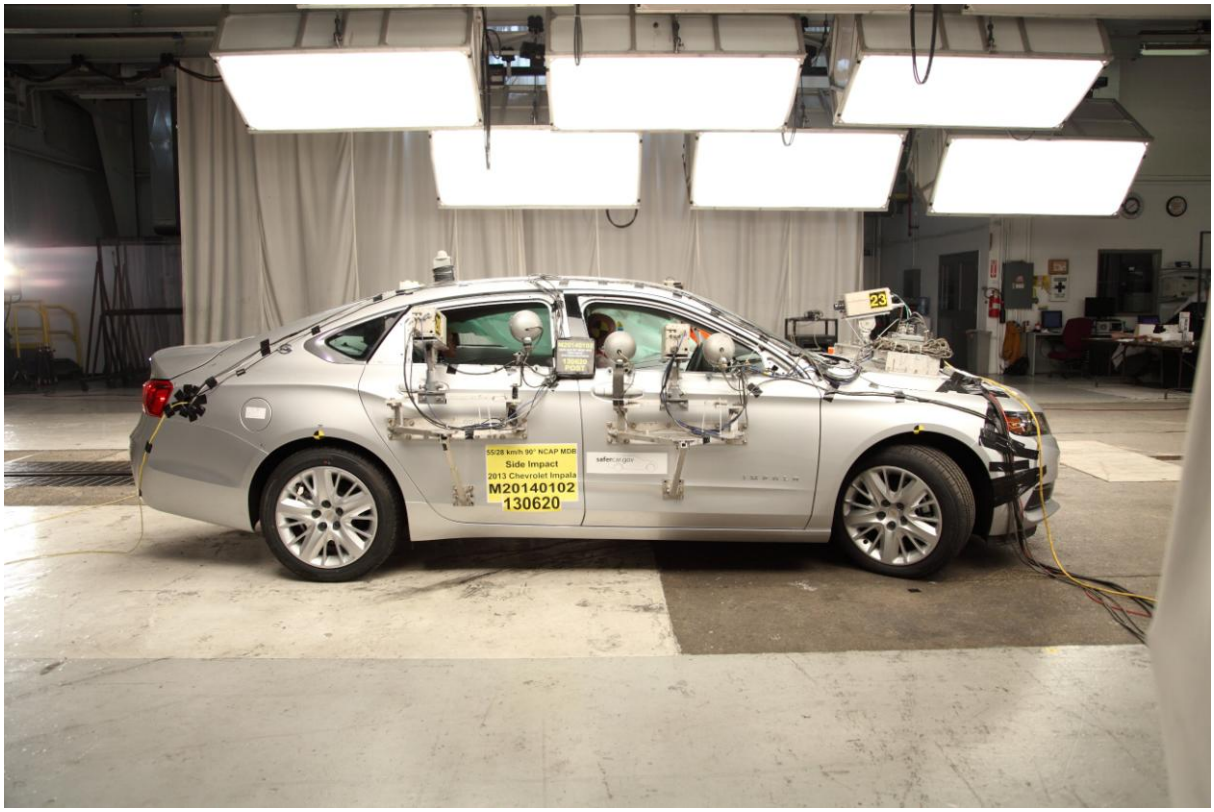
010 Post-Test Left Rear ¾ View of Test Vehicle

011 Pre-Test Rear View of Test Vehicle



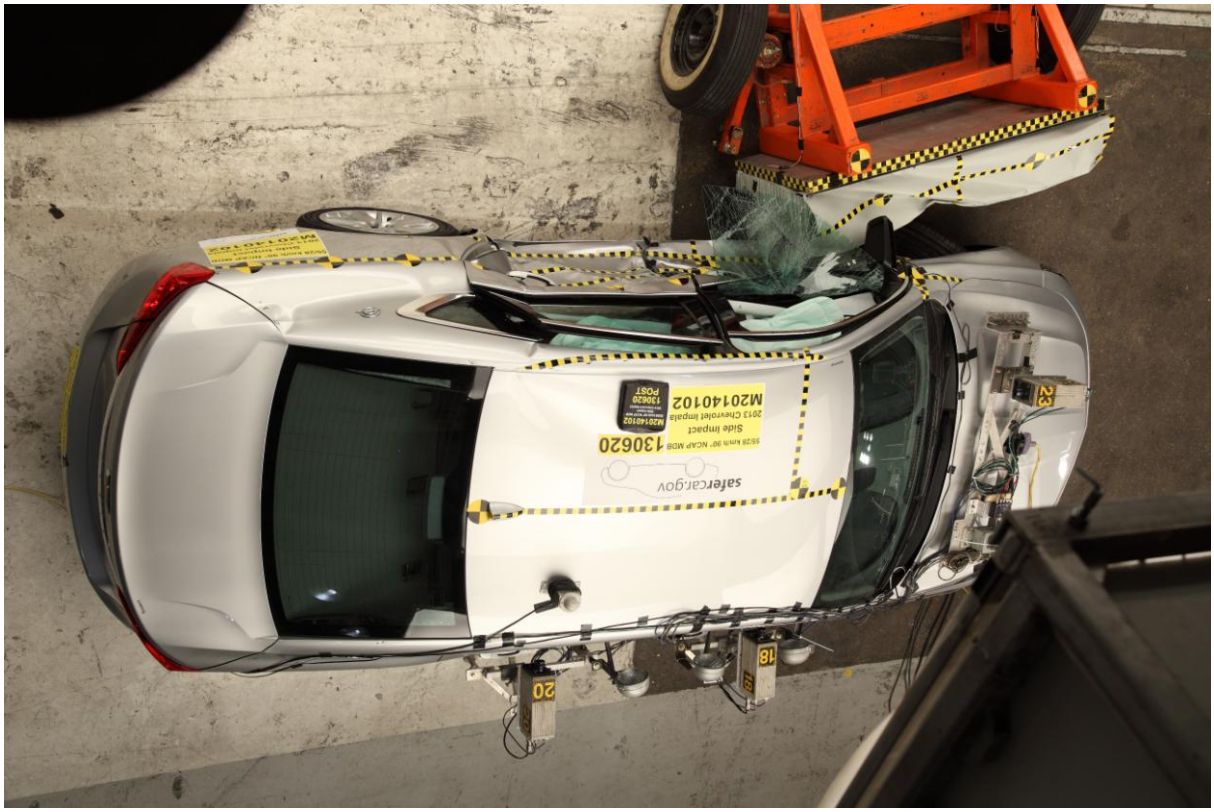
012 Post-Test Rear View of Test Vehicle

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 MDB Positioned Against Side of Test Vehicle

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

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

020 Post-Test Close-up View of Impact Point Target

021 Pre-Test Left Front Door Latch Close-up

022 Post-Test Left Front Door Latch Close-up

023 Pre-Test Left Rear Door Latch Close-up

024 Post-Test Left Rear Door Latch Close-up

025 Pre-Test Front Close-up View of Driver Dummy

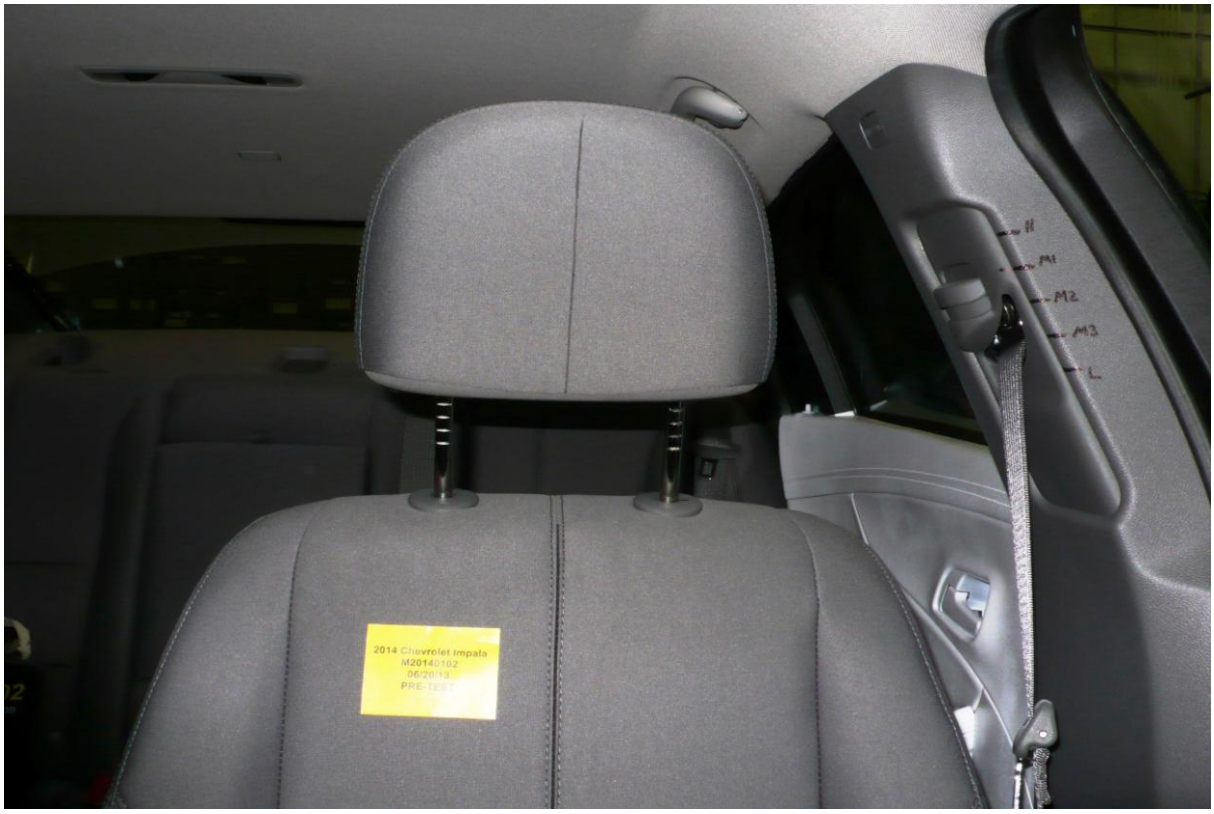
026 Post-Test Front Close-up View of Driver Dummy

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

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

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

030 Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



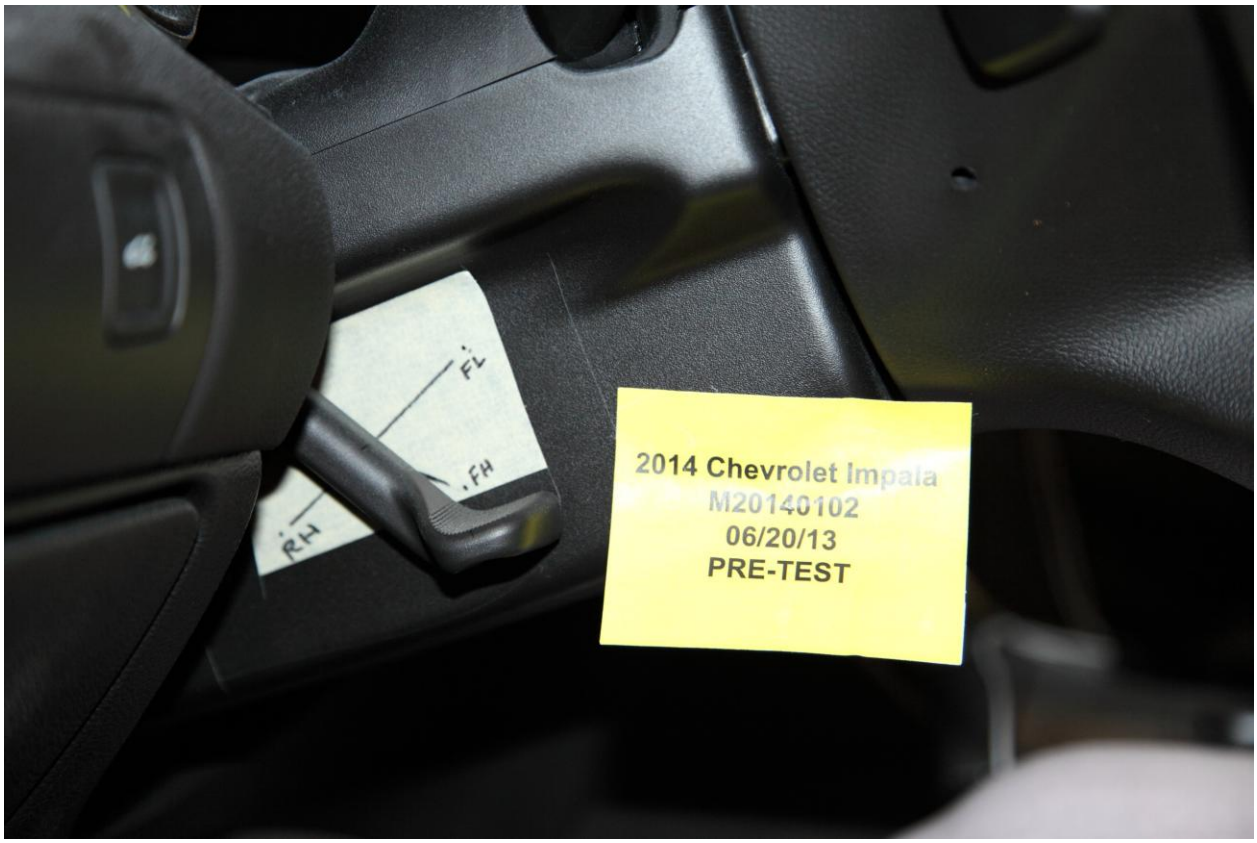
031 Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint

032 Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning

033 Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan

034 Pre-Test Placement of Driver Dummy Feet

035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel

037 View of Disengaged Parking Brake

038 Pre-Test View of Parking Brake

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

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

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

042 Pre-Test Driver Dummy and Door Clearance View

043 Post-Test Driver Dummy and Door Clearance View

Intentionally Left Blank

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

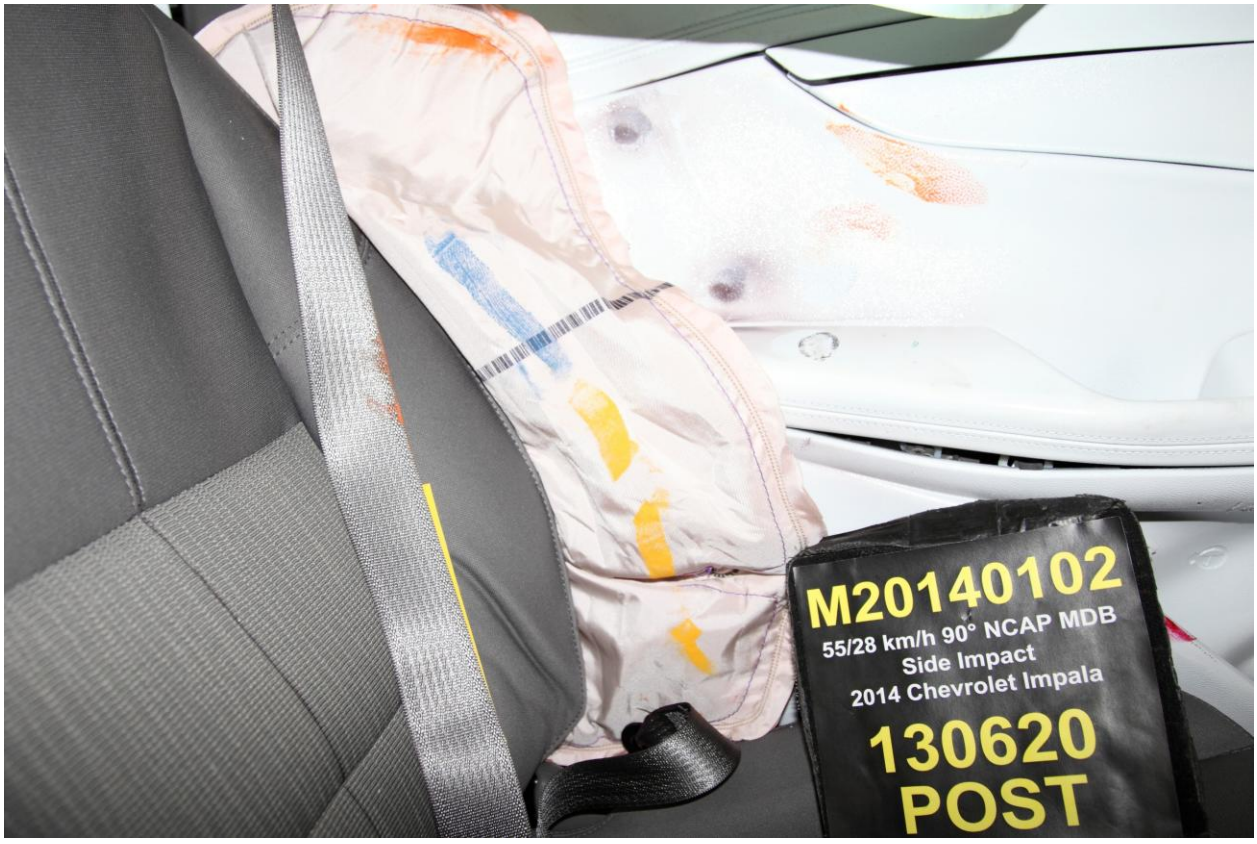
045 Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment

046 Pre-Test Driver Inner Door Panel View

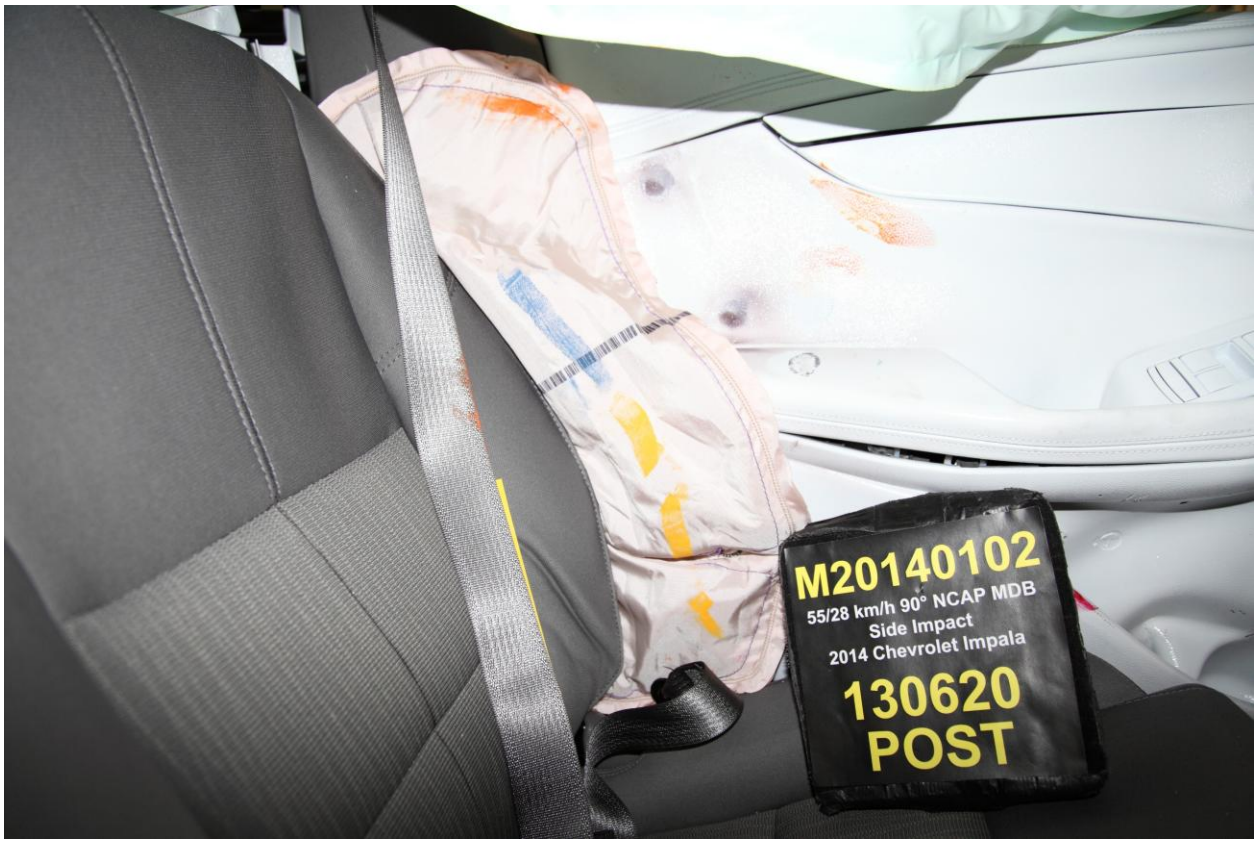
047 Post-Test Driver Inner Door Panel View

048 Post-Test Driver Dummy Close-Up Head Contact with Vehicle View

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



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



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

052 Post-Test Driver Dummy Close-Up Pelvis Contact View

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

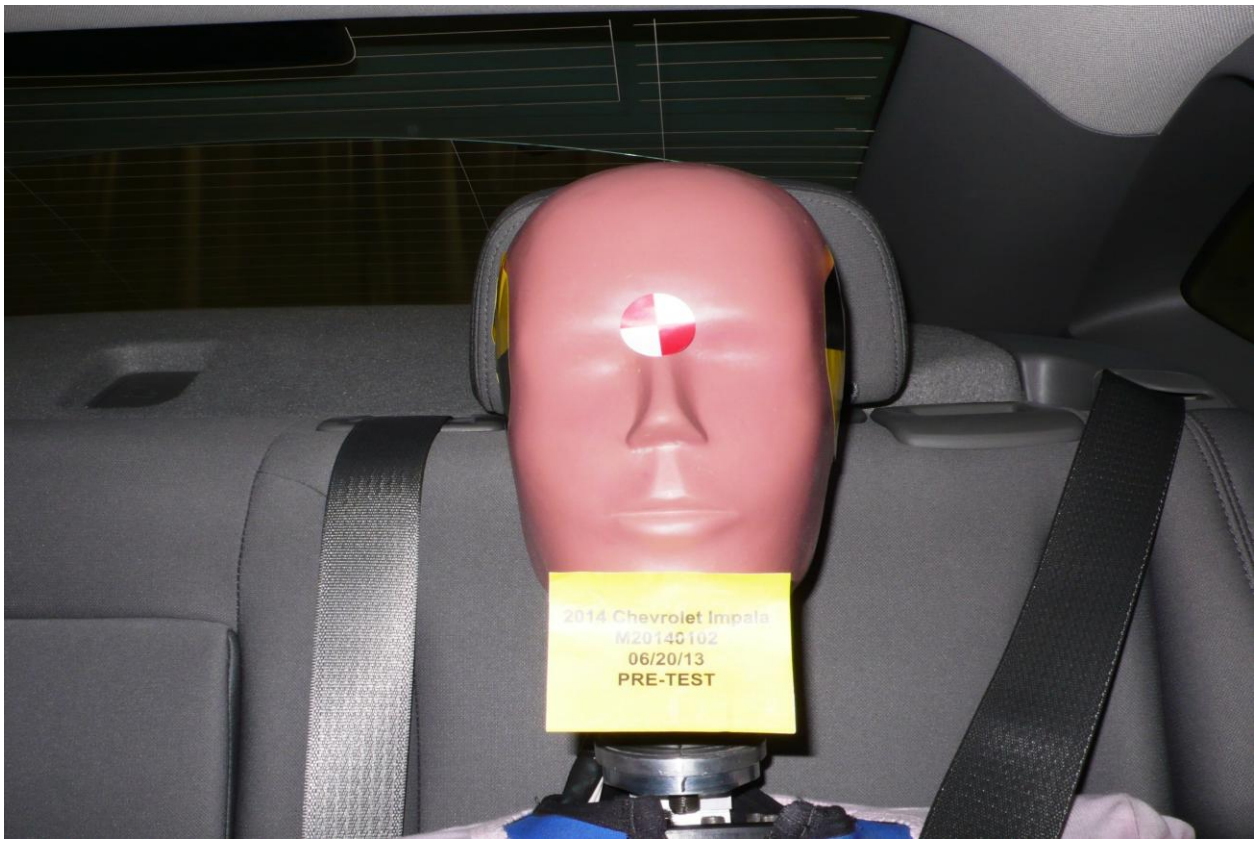
054 Post-Test Driver Dummy Close-Up Knee Contact View

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

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

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

058 Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



059 Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

060 Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

061 Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

062 Pre-Test View of Rear Passenger Dummy Neck Showing Position of Adjustable Neck Bracket

063 Pre-Test View of Rear Passenger Dummy Head Showing Dummy Head is Level

064 Pre-Test Placement of Rear Passenger Dummy Feet

065 Pre-Test View of Belt Anchorage for Rear Passenger Dummy

066 Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

067 Pre-test Close-Up Left Side View of Rear Passenger Seat Back

068 Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint

Intentionally Left Blank

069 Pre-Test Passenger Dummy and Door Clearance View

070 Post-Test Passenger Dummy and Door Clearance View

071 Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

072 Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

073 Pre-Test Passenger Inner Door Panel View

074 Post-Test Passenger Inner Door Panel View

075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

075a Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

076 Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

078 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View

079 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

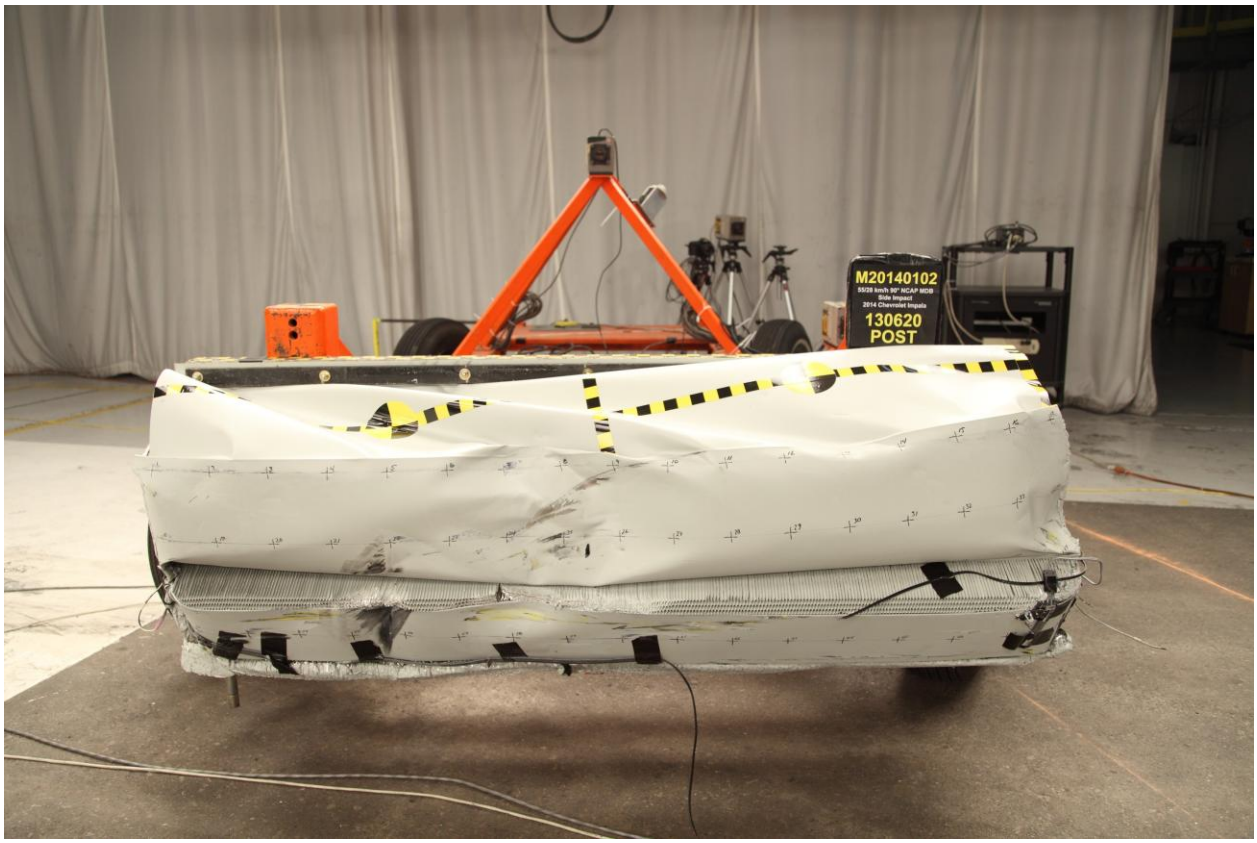
080 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

081 Post-Test Rear Passenger Dummy Close-Up Knee Contact View

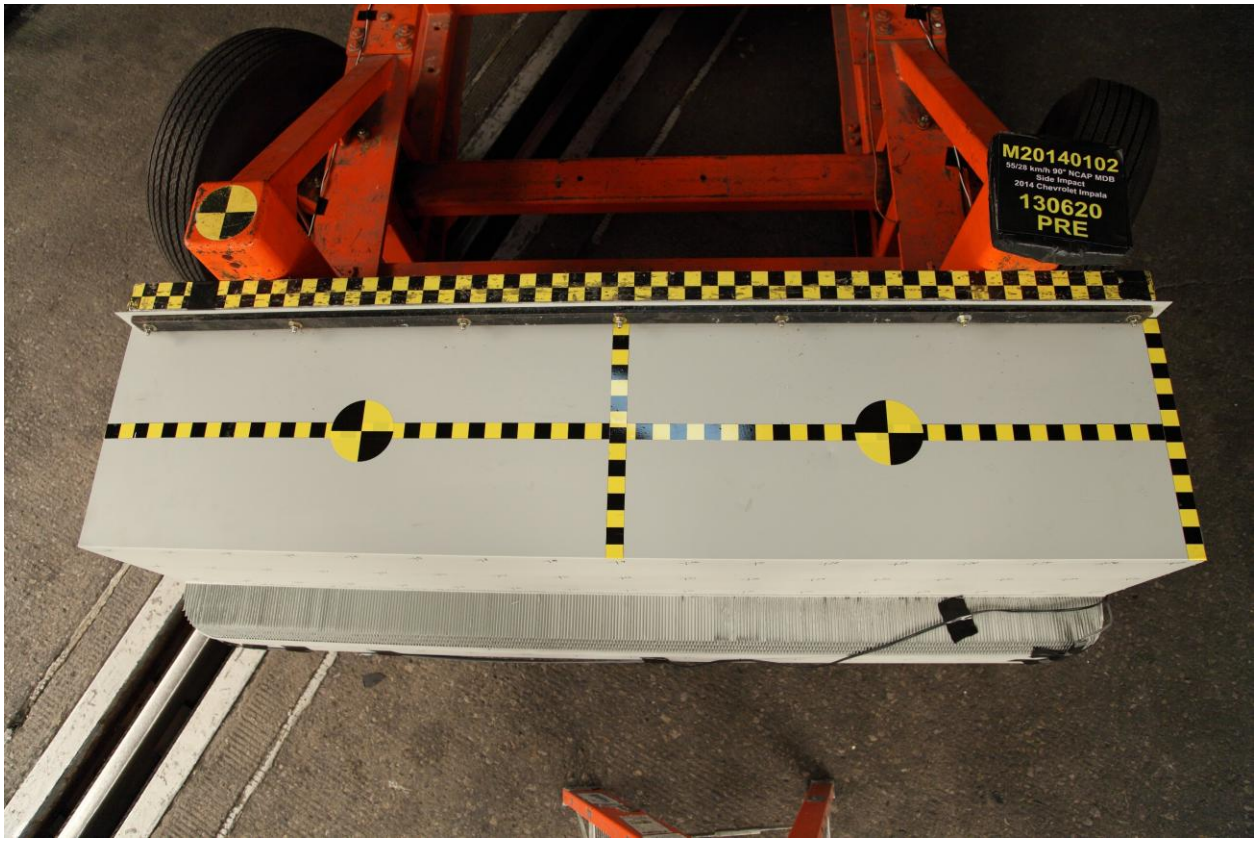
082 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

084 Pre-Test Front View of MDB Impactor Face



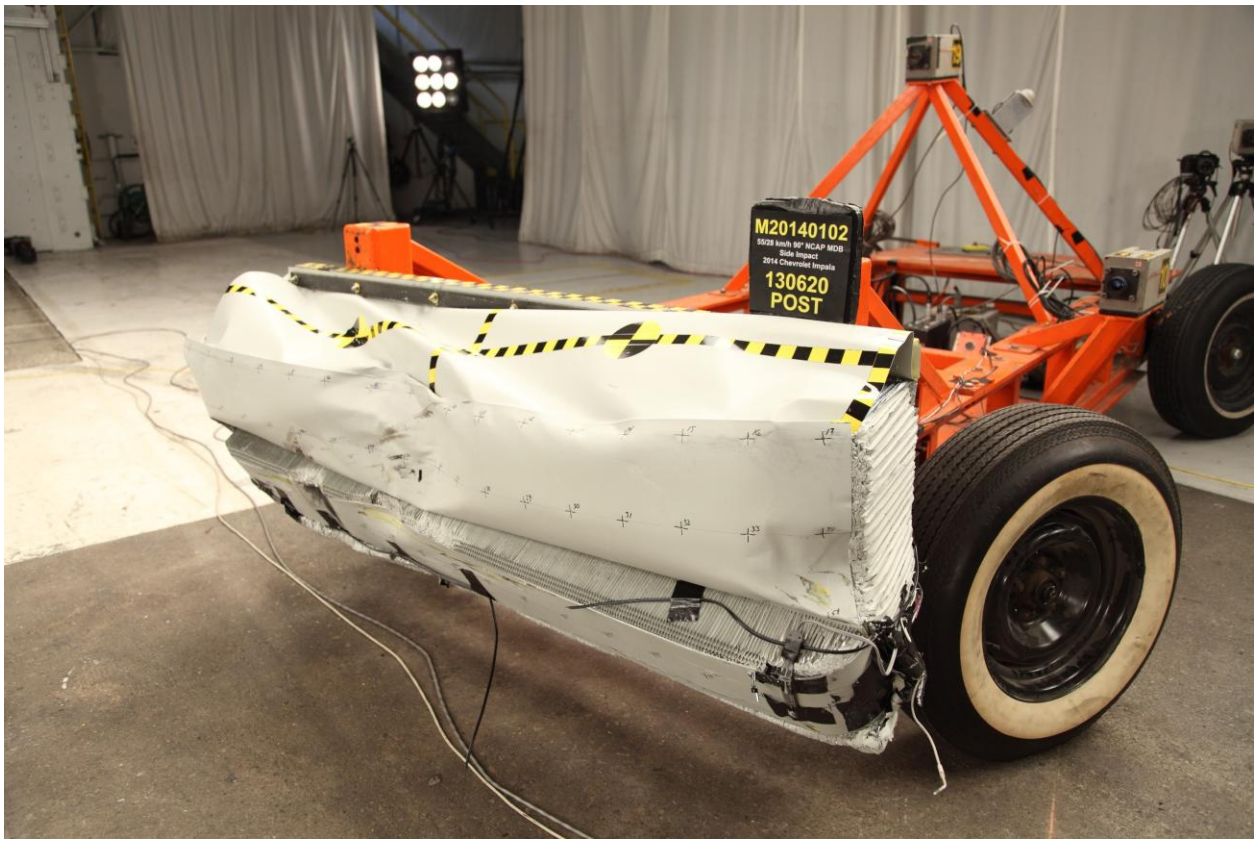
085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face

087 Post-Test Top View of MDB Impactor Face

088 Pre-Test Left Side View of MDB Impactor Face



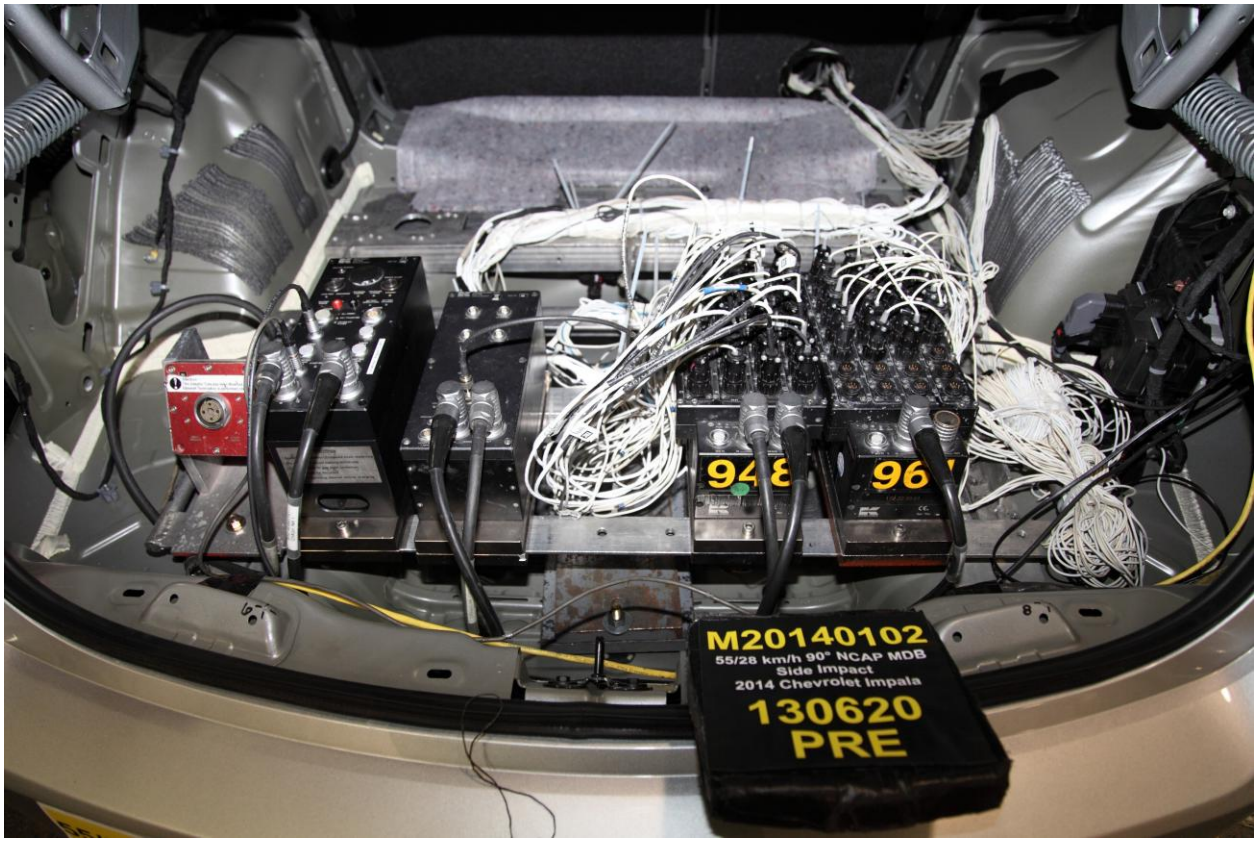
089 Post-Test Left Side View of MDB Impactor Face

090 Pre-Test Right Side View of MDB Impactor Face

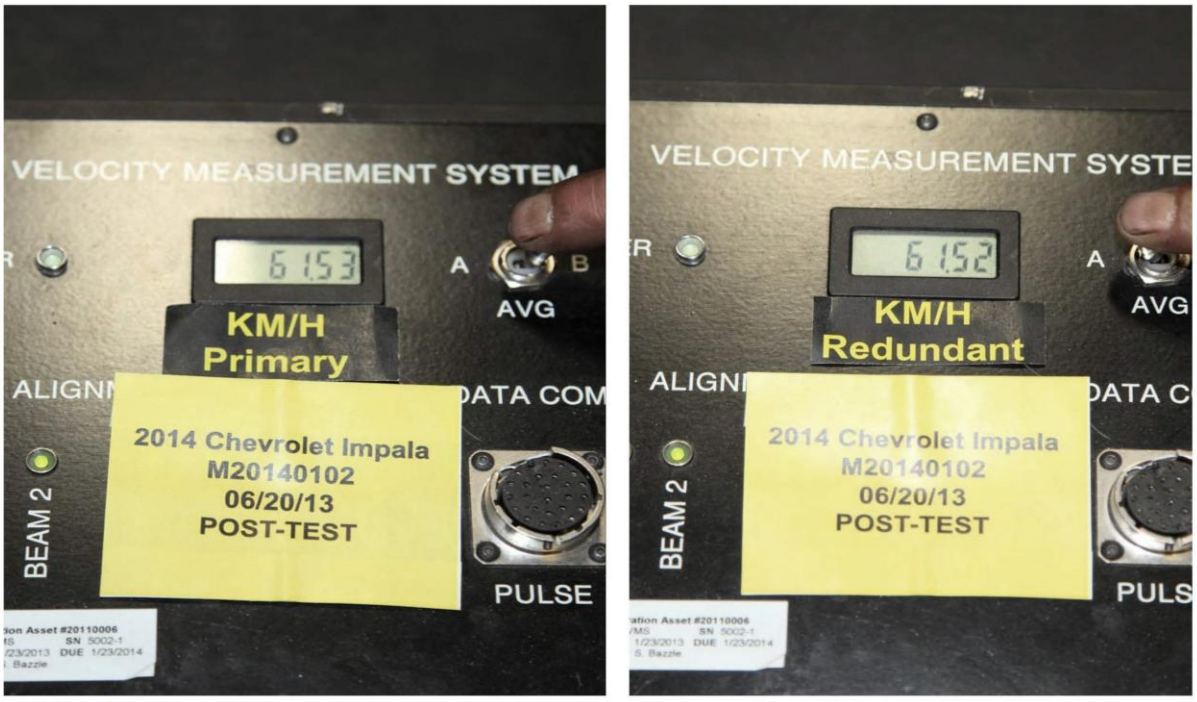
091 Post-Test Right Side View of MDB Impactor Face

092 Close-Up View of Vehicle Certification Label

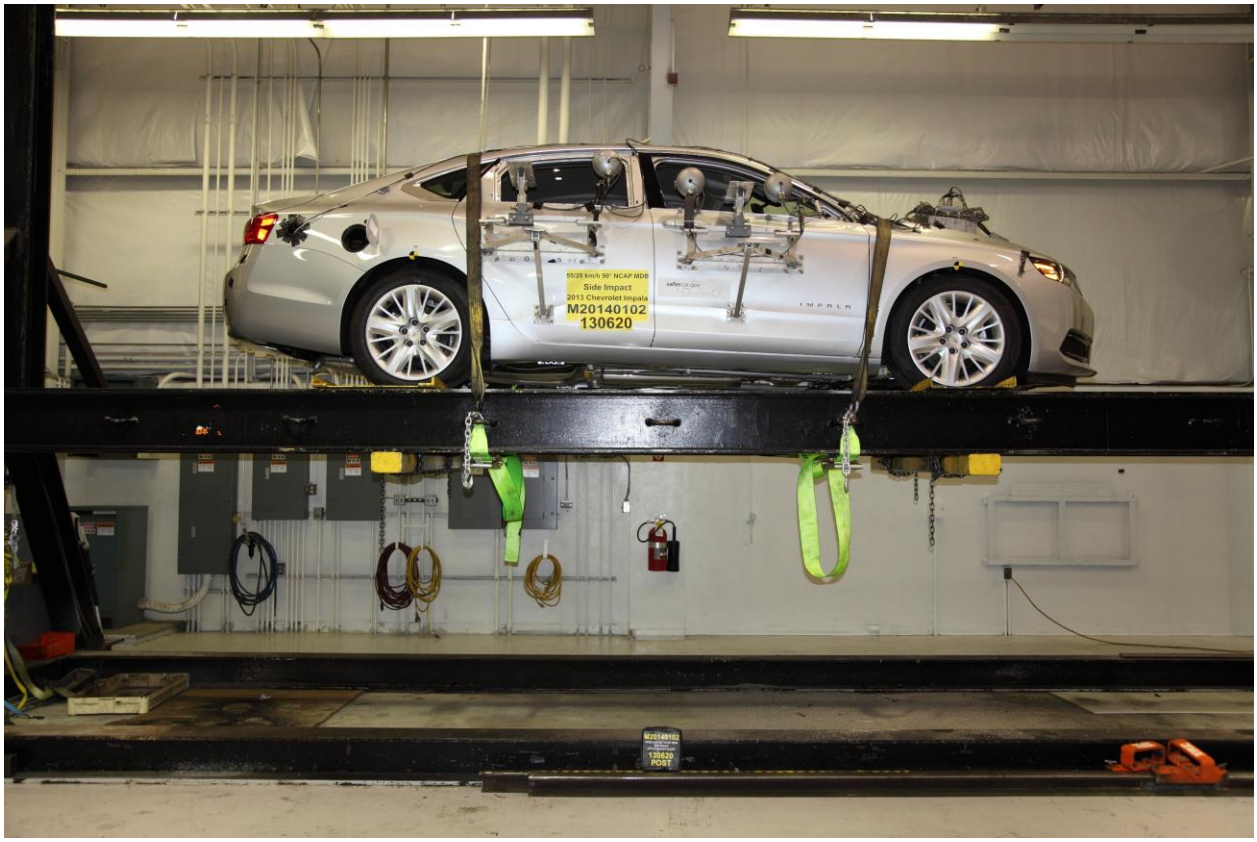
093 Close-Up View of Vehicle Tire Information Placard or Label



094 Pre-Test Ballast View

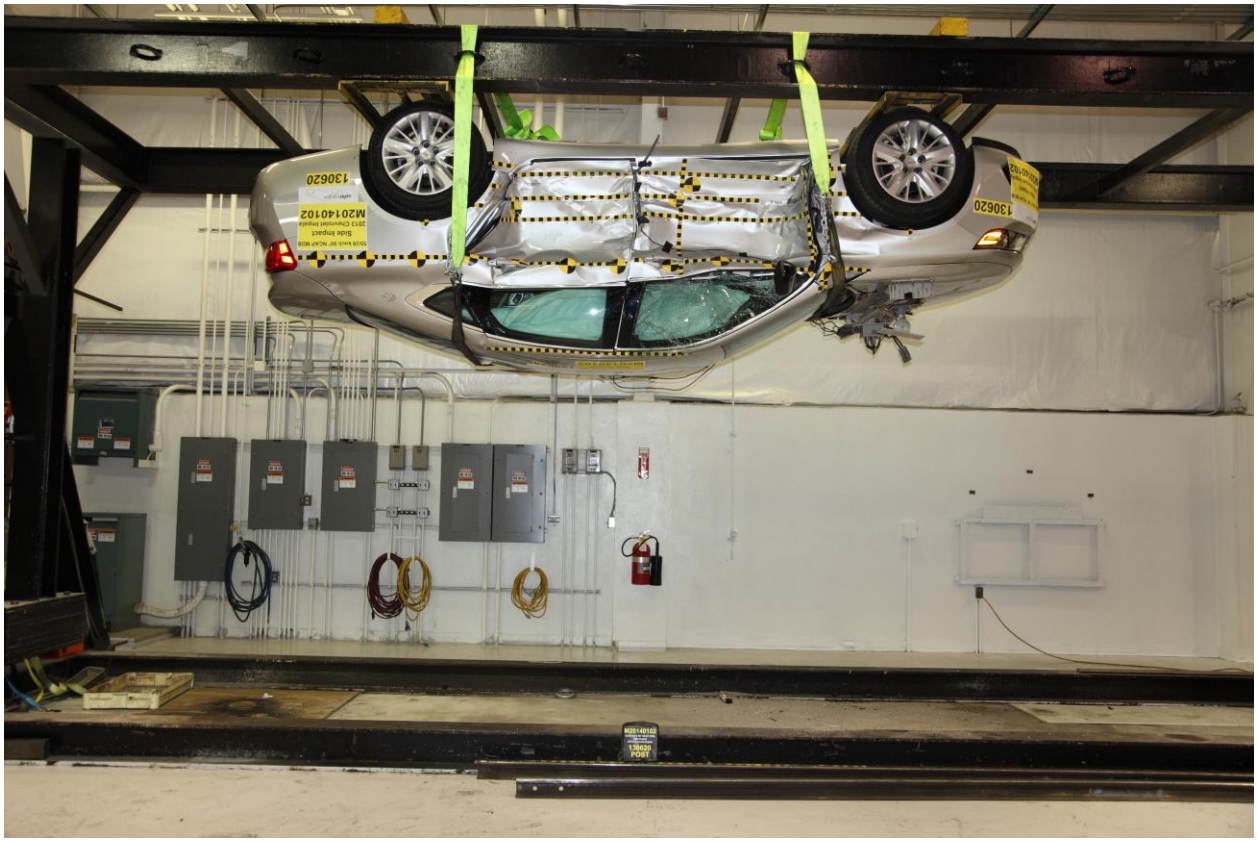


095 Post-Test Primary Speed Trap Read-Out



096 FMVSS No. 301 Static Rollover 0 Degrees

097 FMVSS No. 301 Static Rollover 90 Degrees

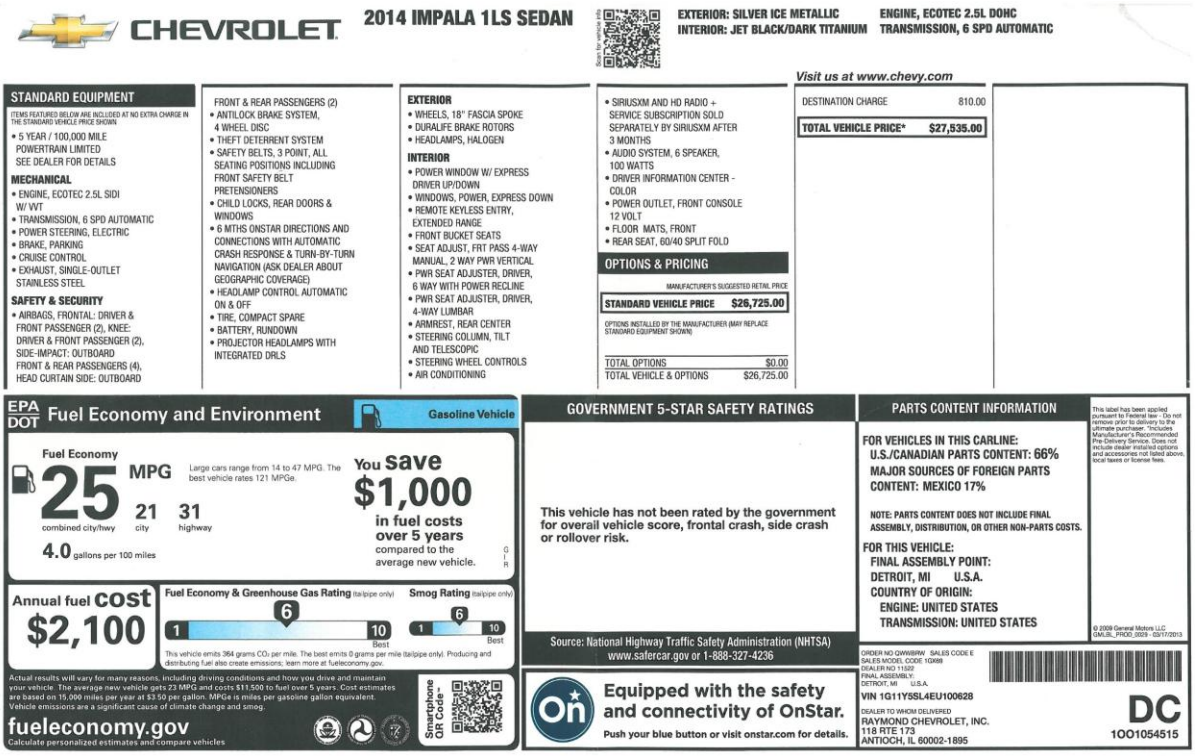


098 FMVSS No. 301 Static Rollover 180 Degrees

099 FMVSS No. 301 Static Rollover 270 Degrees

100 FMVSS No. 301 Static Rollover 360 Degrees

101 Impact Event



CHEVROLET 2014 IMPALA 1LS SEDAN

EXTERIOR: SILVER ICE METALLIC
INTERIOR: JET BLACK/DARK TITANIUM

ENGINE, ECOTEC 2.5L DOHC
TRANSMISSION, 6 SPD AUTOMATIC

Visit us at www.chevy.com

STANDARD EQUIPMENT

ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN

- 5 YEAR / 100,000 MILE POWERTRAIN LIMITED SEE DEALER FOR DETAILS

MECHANICAL

- ENGINE, ECOTEC 2.5L SIDI W/ VVT
- TRANSMISSION, 6 SPD AUTOMATIC
- POWER STEERING, ELECTRIC
- BRAKE, PARKING
- CRUISE CONTROL
- EXHAUST, SINGLE-OUTLET STAINLESS STEEL

SAFETY & SECURITY

- AIRBAGS, FRONTAL: DRIVER & FRONT PASSENGER (2), KNEE: DRIVER & FRONT PASSENGER (2), SIDE-IMPACT: OUTBOARD FRONT & REAR PASSENGERS (4), HEAD CURTAIN SIDE: OUTBOARD FRONT & REAR PASSENGERS (2)
- ANTILOCK BRAKE SYSTEM, 4 WHEEL DISC
- THEFT DETERRENT SYSTEM
- SAFETY BELTS, 3 POINT, ALL SEATING POSITIONS INCLUDING FRONT SAFETY BELT PRETENSIONERS
- CHILD LOCKS, REAR DOORS & WINDOWS
- 6 MTHS ONSTAR DIRECTIONS AND CONNECTIONS WITH AUTOMATIC CRASH RESPONSE & TURN-BY-TURN NAVIGATION (ASK DEALER ABOUT GEOGRAPHIC COVERAGE)
- HEADLAMP CONTROL AUTOMATIC ON & OFF
- TIRE, COMPACT SPARE
- BATTERY, RUNDOWN
- PROJECTOR HEADLAMPS WITH INTEGRATED DRLS

EXTERIOR

- WHEELS, 18" FASCIA SPOKE
- DURALIFE BRAKE ROTORS
- HEADLAMPS, HALOGEN

INTERIOR

- POWER WINDOW W/ EXPRESS DRIVER UP/DOWN
- WINDOWS, POWER, EXPRESS DOWN
- REMOTE KEYLESS ENTRY, EXTENDED RANGE
- FRONT BUCKET SEATS
- SEAT ADJUST, FRT PASS 4-WAY MANUAL, 2 WAY PWR VERTICAL
- PWR SEAT ADJUSTER, DRIVER, 6 WAY WITH POWER RECLINE
- PWR SEAT ADJUSTER, DRIVER, 4-WAY LUMBAR
- ARMREST, REAR CENTER
- STEERING COLUMN, TILT AND TELESCOPIC
- STEERING WHEEL CONTROLS
- AIR CONDITIONING
- SIRIUSXM AND HD RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM AFTER 3 MONTHS
- AUDIO SYSTEM, 6 SPEAKER, 100 WATTS
- DRIVER INFORMATION CENTER - COLOR
- POWER OUTLET, FRONT CONSOLE 12 VOLT
- FLOOR MATS, FRONT
- REAR SEAT, 60/40 SPLIT FOLD

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE	$26,725.00

OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)

TOTAL OPTIONS	$0.00
TOTAL VEHICLE & OPTIONS	$26,725.00
DESTINATION CHARGE	810.00
TOTAL VEHICLE PRICE*	$27,535.00

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
25 MPG
combined city/hwy
21 city
31 highway
4.0 gallons per 100 miles

Large cars range from 14 to 47 MPG. The best vehicle rates 121 MPGe.

You save $1,000 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $2,100

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 6 (1 – 10, Best)
Smog Rating (tailpipe only): 6 (1 – 10, Best)

This vehicle emits 364 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs $11,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.50 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

Equipped with the safety and connectivity of OnStar.
Push your blue button or visit onstar.com for details.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 66%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 17%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
DETROIT, MI U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

This label has been applied pursuant to Federal law - Do not remove prior to delivery to the ultimate purchaser. "Includes Manufacturer's Recommended Pre-Delivery Service. Does not include dealer installed options and accessories not listed above, local taxes or license fees.

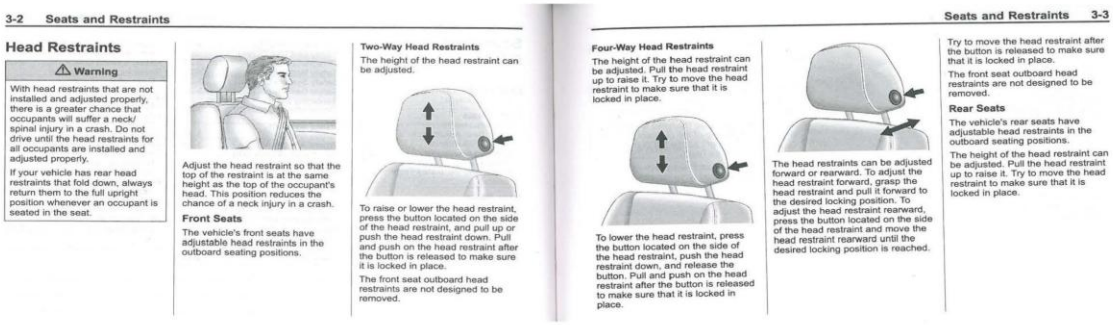
ORDER NO QWWBRW SALES CODE E
SALES MODEL CODE 1GH69
DEALER NO 11522
FINAL ASSEMBLY:
DETROIT, MI U.S.A.

VIN 1G11Y5SL4EU100628

DEALER TO WHOM DELIVERED
RAYMOND CHEVROLET, INC.
118 RTE 173
ANTIOCH, IL 60002-1895

DC
1OO1054515

102 Monroney Label



3-2 Seats and Restraints

Head Restraints

Warning

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

If your vehicle has rear head restraints that fold down, always return them to the full upright position whenever an occupant is seated in the seat.

Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.

Front Seats

The vehicle's front seats have adjustable head restraints in the outboard seating positions.

Two-Way Head Restraints

The height of the head restraint can be adjusted.

To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down. Pull and push on the head restraint after the button is released to make sure it is locked in place.

The front seat outboard head restraints are not designed to be removed.

Seats and Restraints 3-3

Four-Way Head Restraints

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

To lower the head restraint, press the button located on the side of the head restraint, push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The head restraints can be adjusted forward or rearward. To adjust the head restraint forward, grasp the head restraint and pull it forward to the desired locking position. To adjust the head restraint rearward, press the button located on the side of the head restraint and move the head restraint rearward until the desired locking position is reached.

Try to move the head restraint after the button is released to make sure that it is locked in place.

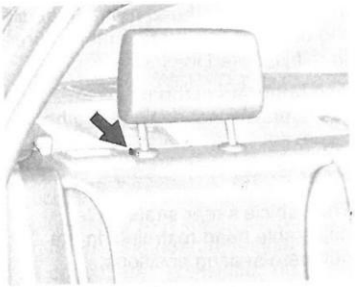
The front seat outboard head restraints are not designed to be removed.

Rear Seats

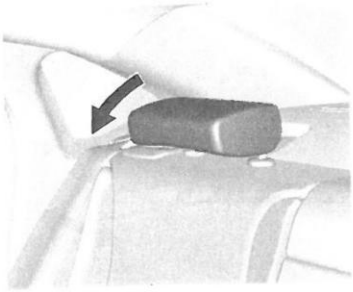
The vehicle's rear seats have adjustable head restraints in the outboard seating positions.

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

103 Driver Head Restraint Use and Adjustment Information from Vehicle Owner Manual



To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.



On some models, the rear head restraints can be folded forward to allow for better visibility when the rear seat is unoccupied. To fold the head restraint, grasp the top of the head restraint and pull the head restraint forward and down until it locks in place.

When an occupant or child restraint is in the seat, always return the head restraint to the full upright position. Push down on the head restraint to release the locking mechanism. Then, pull the head restraint up and push it rearward until it is in the full upright position.

Always adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head.

Rear outboard head restraints are not designed to be removed.

104 Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner Manual

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

The following additional data can be obtained from the Research and Development section of the NHTSA website (http://www.nhtsa.dot.gov)

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Structure Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

NHTSA

Test Date: 06/20/2013

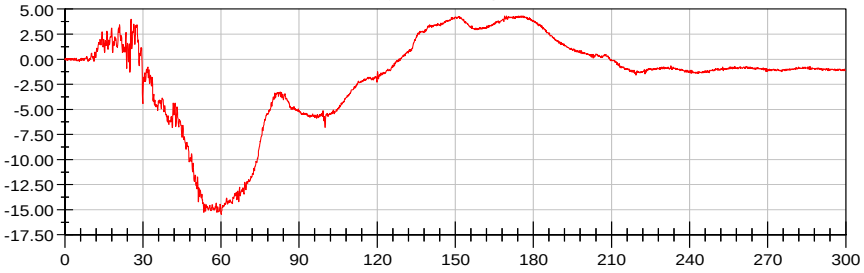
Test Lab: CTF

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Number: 130620 (M20140102)

Position #4 SID IIs Dummy (305)

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



<Max>

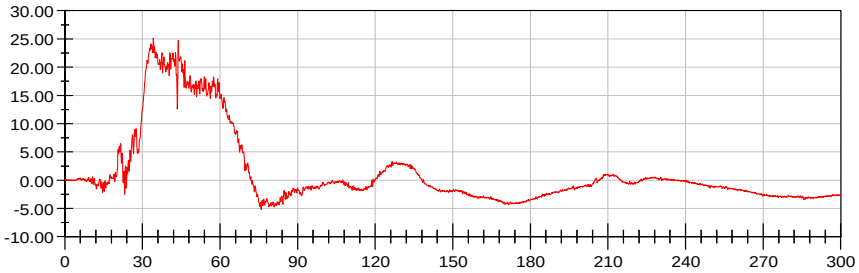
4.32 g at 168.88 ms

<Min>

-15.46 g at 60.08 ms

CFC_1000

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



<Max>

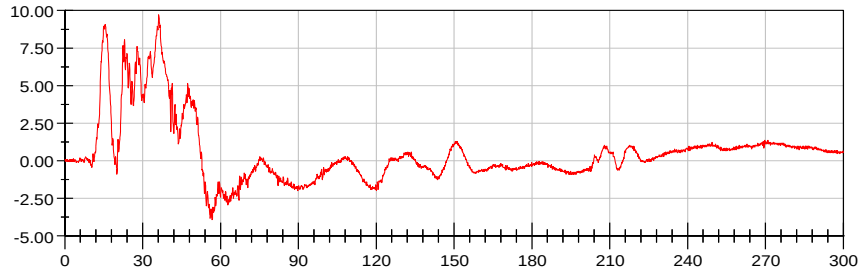
25.17 g at 34.24 ms

<Min>

-5.26 g at 75.92 ms

CFC_1000

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



<Max>

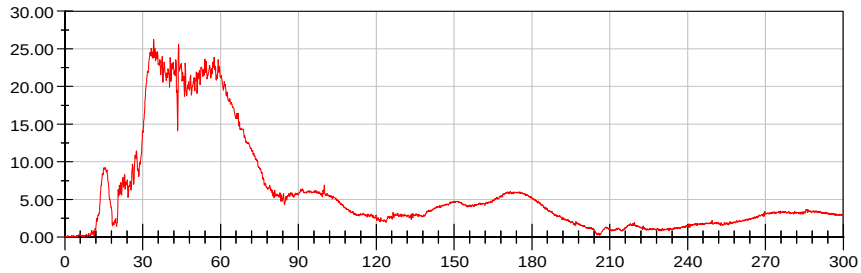
9.72 g at 36.16 ms

<Min>

-3.91 g at 56.72 ms

CFC_1000

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



<Max>

26.23 g at 34.24 ms

<Min>

0.04 g at 0.72 ms

CFC_1000

NHTSA

Test Date: 06/20/2013

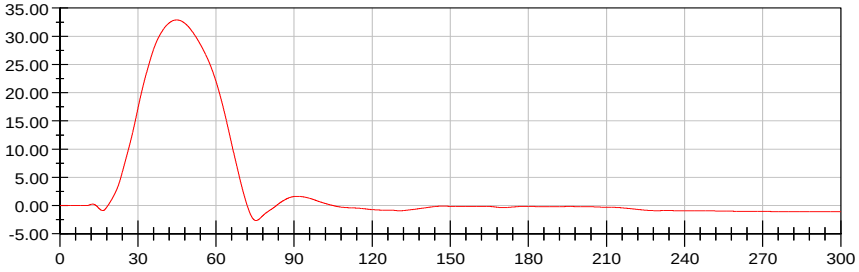
Test Lab: CTF

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Number: 130620 (M20140102)

Position #4 SID IIs Dummy (305)

Driver Upper Thorax Rib Deflection (Y) vs. Time (mm) vs. Time [ms]



<Max>

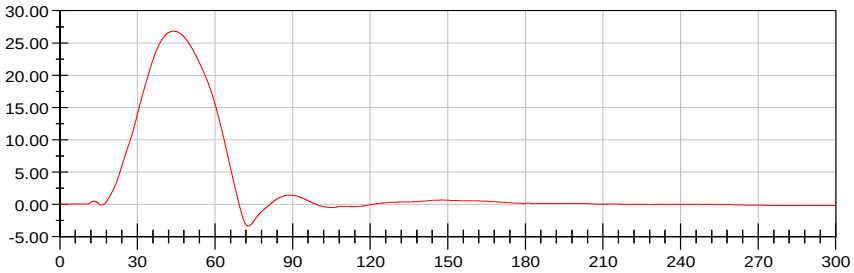
32.89 mm at 44.88 ms

<Min>

-2.66 mm at 75.36 ms

CFC_180

Driver Middle Thorax Rib Deflection (Y) vs. Time (mm) vs. Time [ms]



<Max>

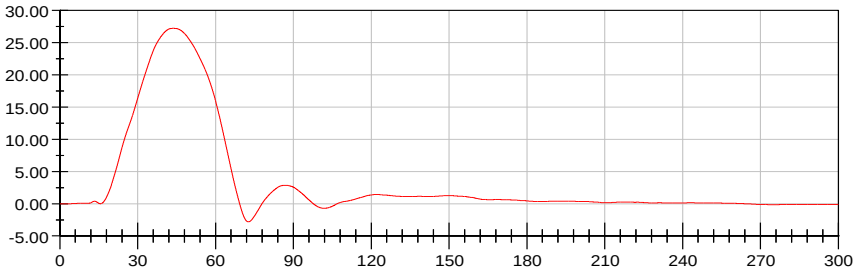
26.82 mm at 44.00 ms

<Min>

-3.41 mm at 72.88 ms

CFC_180

Driver Lower Thorax Rib Deflection (Y) vs. Time (mm) vs. Time [ms]



<Max>

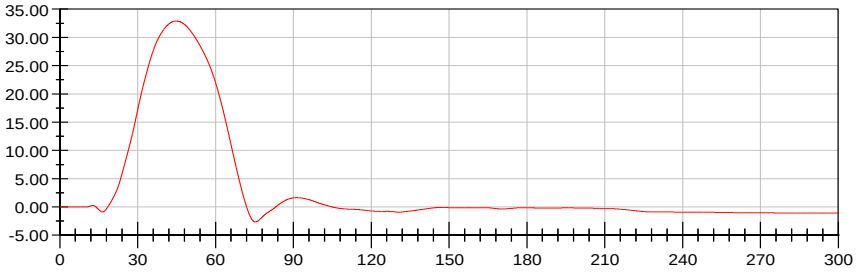
27.23 mm at 43.76 ms

<Min>

-2.81 mm at 72.64 ms

CFC_180

Driver Thorax Rib Deflection Maximum vs. Time (mm) vs. Time [ms]



<Max>

32.89 mm at 44.88 ms

<Min>

-2.66 mm at 75.36 ms

CFC_180

NHTSA

Test Date: 06/20/2013

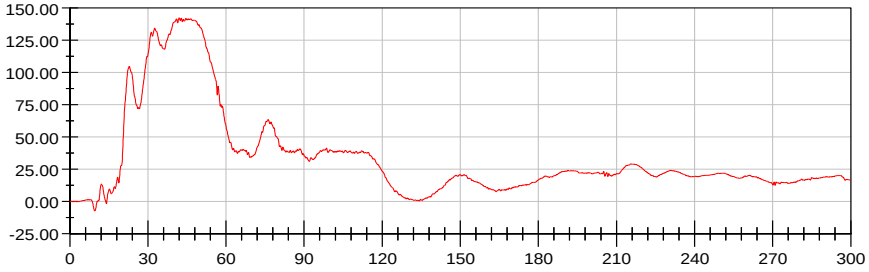
Test Lab: CTF

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Number: 130620 (M20140102)

Position #4 SID IIs Dummy (305)

Driver Anterior Abdominal Force (Y) vs. Time (N) vs. Time [ms]



<Max>

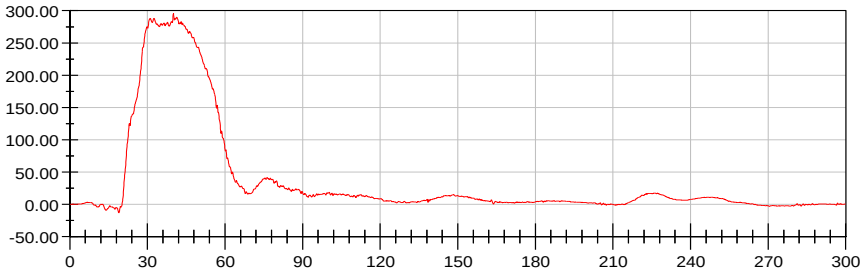
142.27 N at 42.00 ms

<Min>

-7.23 N at 9.60 ms

CFC_600

Driver Middle Abdominal Force (Y) vs. Time (N) vs. Time [ms]



<Max>

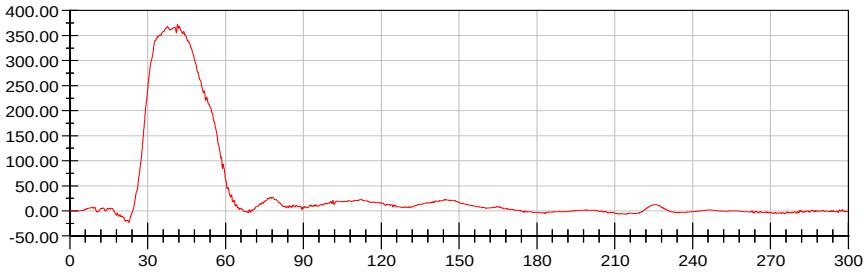
295.48 N at 40.08 ms

<Min>

-13.40 N at 18.96 ms

CFC_600

Driver Posterior Abdominal Force (Y) vs. Time (N) vs. Time [ms]



<Max>

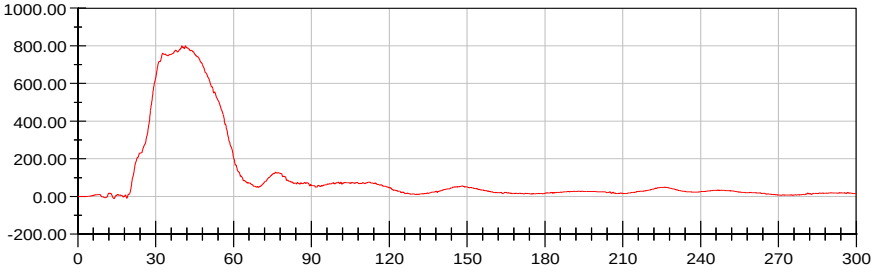
372.17 N at 41.52 ms

<Min>

-22.58 N at 22.80 ms

CFC_600

Driver Total Abdmoninal Force (Y) vs. Time (N) vs. Time [ms]



<Max>

800.70 N at 40.08 ms

<Min>

-10.13 N at 14.00 ms

CFC_600

NHTSA

Test Date: 06/20/2013

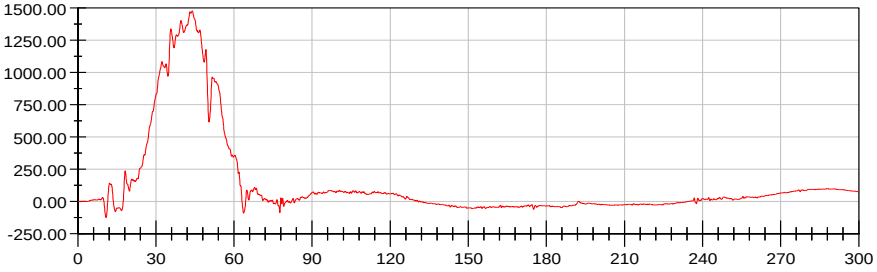
Test Lab: CTF

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Number: 130620 (M20140102)

Position #4 SID IIs Dummy (305)

Driver Pubic Symphysis Force (Y) vs. Time (N) vs. Time [ms]



<Max>

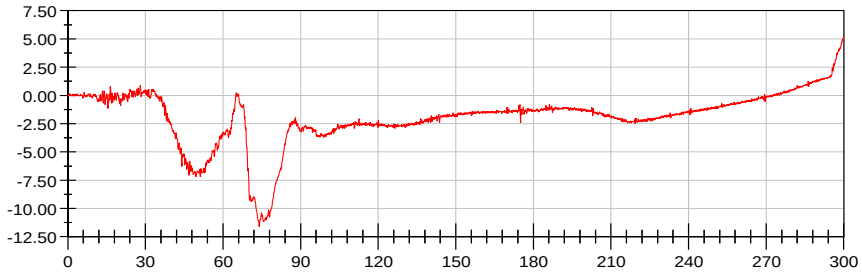
1,478.53 N at 44.00 ms

<Min>

-124.01 N at 10.88 ms

CFC_600

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



<Max>

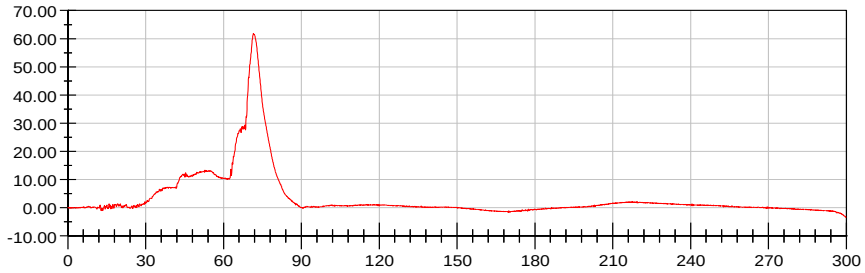
5.28 g at 300.00 ms

<Min>

-11.64 g at 74.00 ms

CFC_1000

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



<Max>

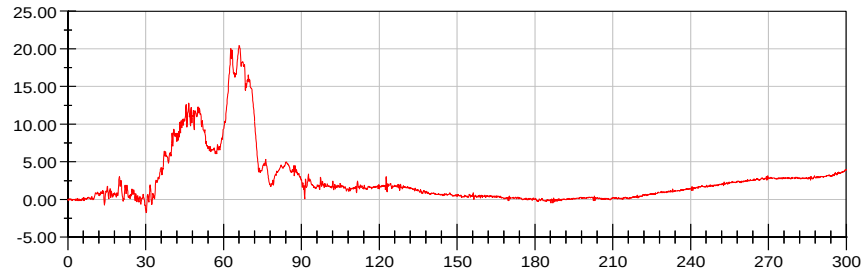
61.80 g at 71.52 ms

<Min>

-3.39 g at 299.68 ms

CFC_1000

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



<Max>

20.42 g at 66.00 ms

<Min>

-1.74 g at 30.24 ms

CFC_1000

NHTSA

Test Date: 06/20/2013

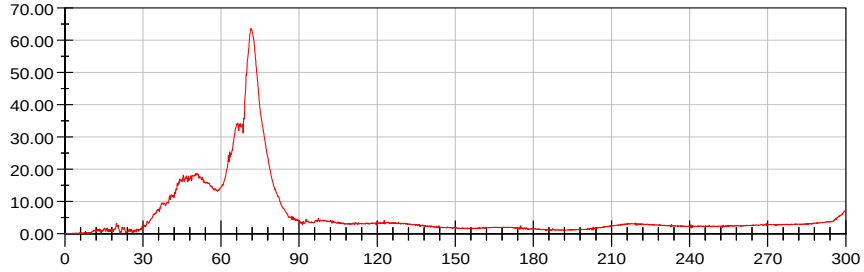
Test Lab: CTF

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Number: 130620 (M20140102)

Position #4 SID IIs Dummy (305)

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



<Max>

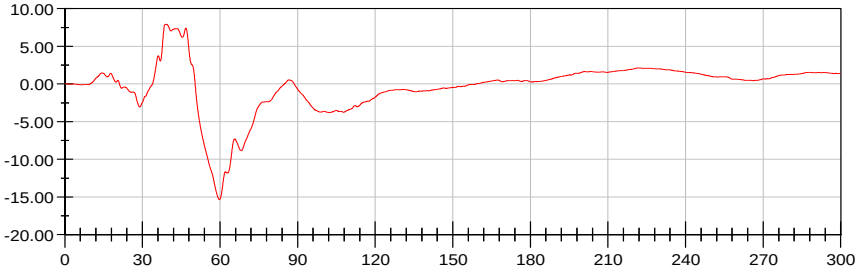
63.70 g at 71.52 ms

<Min>

0.04 g at 1.36 ms

CFC_1000

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



<Max>

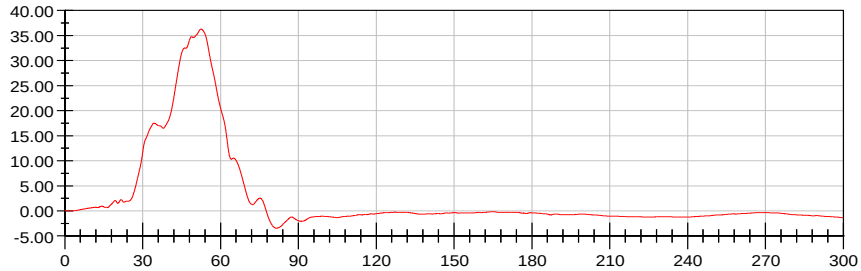
7.92 g at 38.96 ms

<Min>

-15.37 g at 59.76 ms

CFC_180

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



<Max>

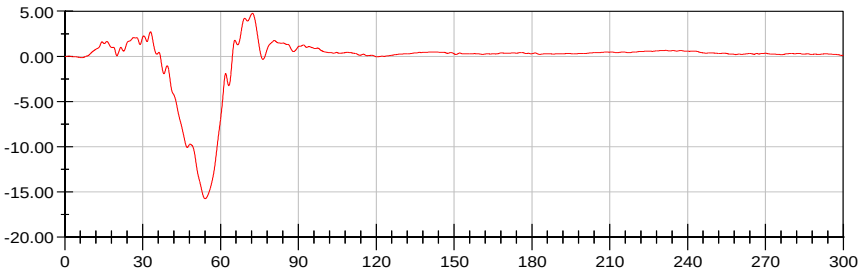
36.30 g at 52.48 ms

<Min>

-3.45 g at 81.52 ms

CFC_180

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



<Max>

4.76 g at 72.32 ms

<Min>

-15.74 g at 54.08 ms

CFC_180

NHTSA

Test Date: 06/20/2013

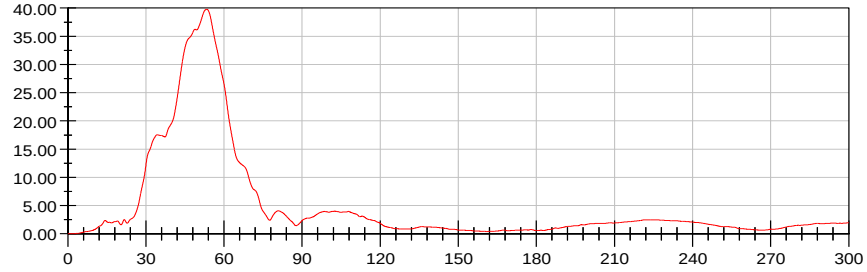
Test Lab: CTF

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Number: 130620 (M20140102)

Position #4 SID IIs Dummy (305)

Passenger Lower Spine T12 Resultant Acceleration vs. Time (g) vs. Time [ms]



<Max>

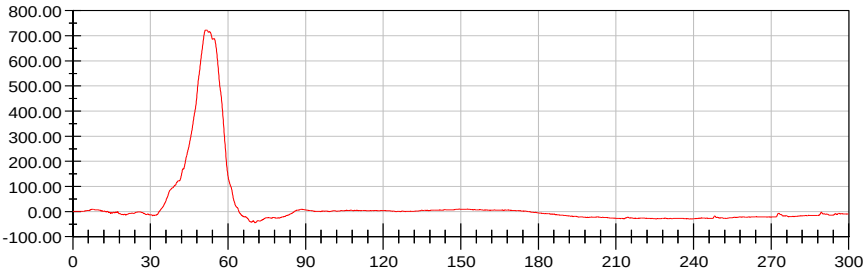
39.78 g at 53.28 ms

<Min>

0.02 g at 0.96 ms

CFC_180

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



<Max>

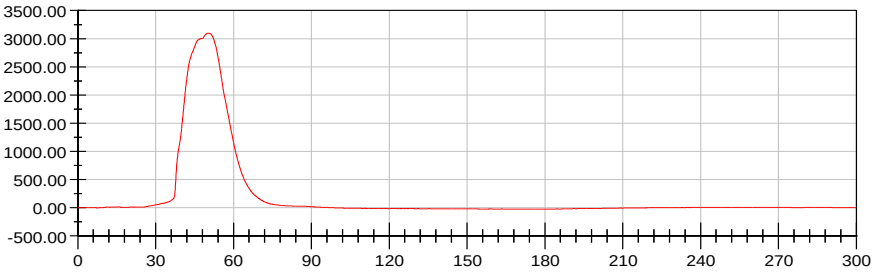
722.73 N at 51.76 ms

<Min>

-45.31 N at 70.48 ms

CFC_600

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



<Max>

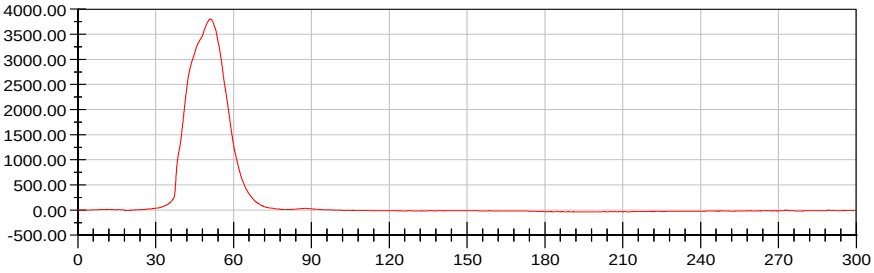
3,095.72 N at 50.00 ms

<Min>

-26.24 N at 180.72 ms

CFC_600

Passenger Total Pelvic Force on Impact Side (Y) vs. Time (N) vs. Time [ms]



<Max>

3,804.63 N at 51.04 ms

<Min>

-37.43 N at 198.64 ms

CFC_600

APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

EuroSid-2re
Serial No. F030
Calibration No. 14

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

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Resultant Acceleration	125 - 155 g	155.0 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	6.6 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

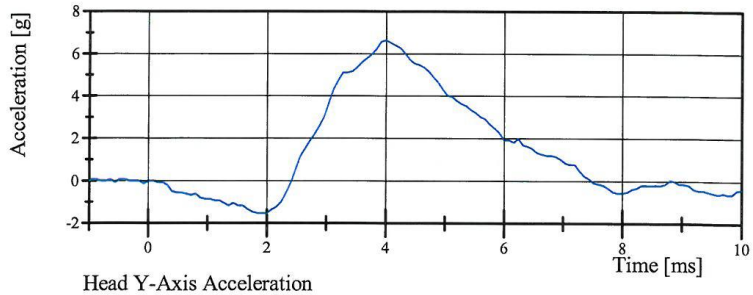
Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 13:36:09 359

Transportation Research Center Inc.

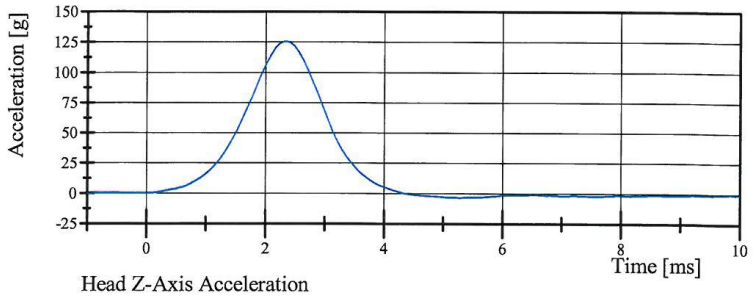
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/7/2013

Head X-Axis Acceleration



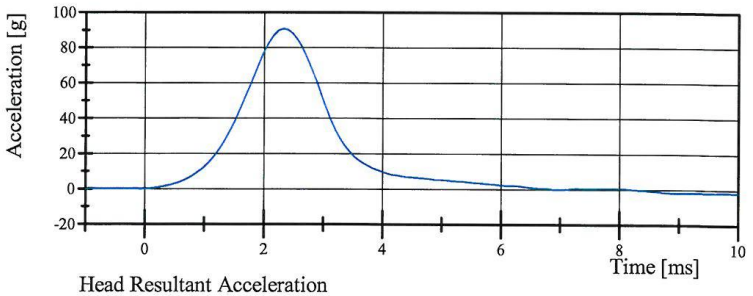
Filter Class: CFC_1000
Max: 6.6 g at 4.0 ms
Min: -1.6 g at 1.8 ms

Head Y-Axis Acceleration



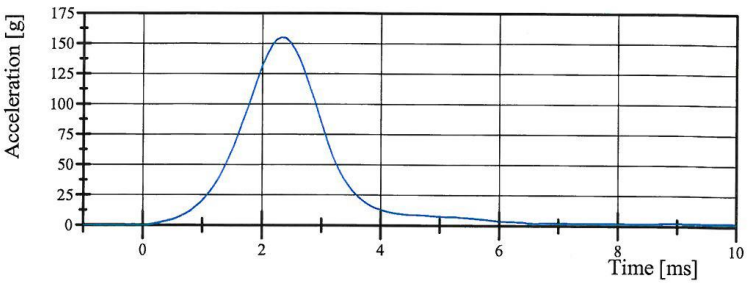
Filter Class: CFC_1000
Max: 125.7 g at 2.3 ms
Min: -3.6 g at 5.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 90.6 g at 2.3 ms
Min: -2.0 g at 9.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 155.0 g at 2.3 ms
Min: 0.0 g at -0.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 13:36:44 359

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-53.4 deg	Yes
Time of Peak	54 - 66 ms	61.8 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	62.1 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

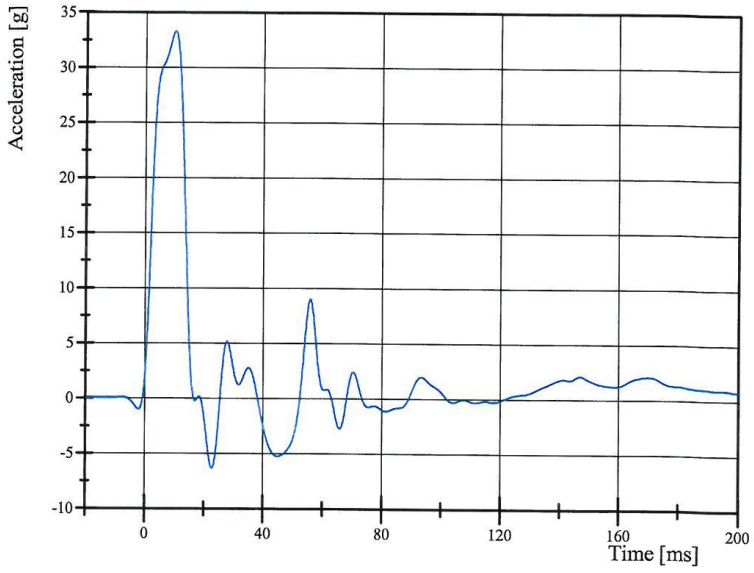
Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 14:11:52 1308

Transportation Research Center Inc.

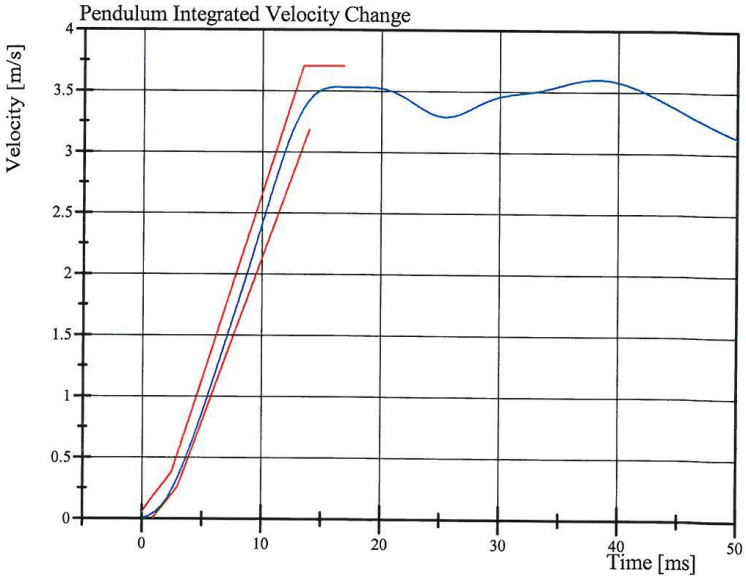
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/7/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.2 g at 9.9 ms
Min: -6.4 g at 22.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 38.2 ms
Min: 0.0 m/s at 0.0 ms

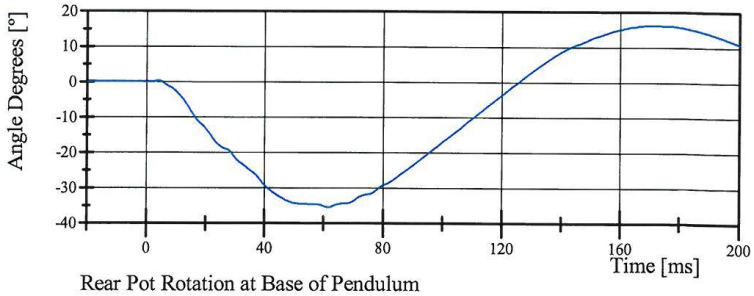
Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 14:11:59 1308

Transportation Research Center Inc.

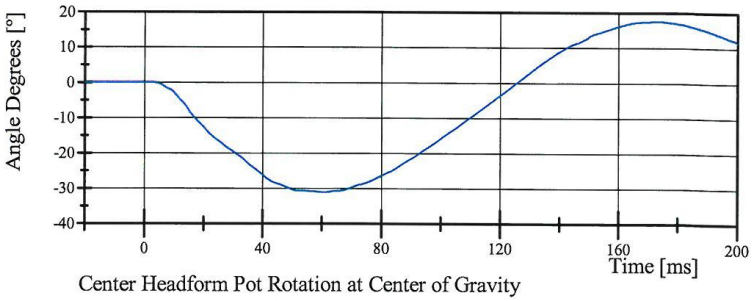
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/7/2013

Forward Pot Rotation at Base of Pendulum



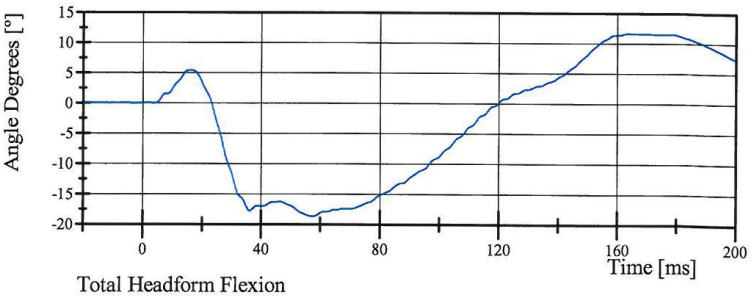
Filter Class: CFC_180
Max: 16.2 ° at 170.6 ms
Min: -35.5 ° at 61.6 ms

Rear Pot Rotation at Base of Pendulum



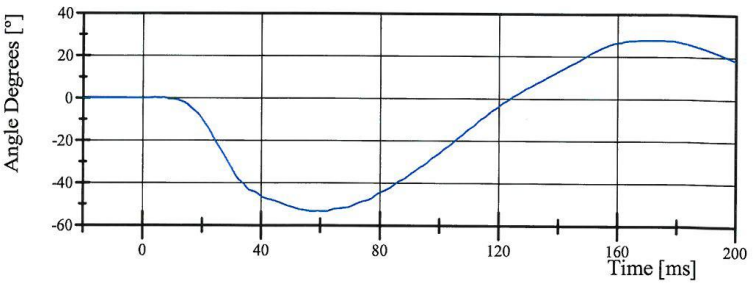
Filter Class: CFC_180
Max: 17.5 ° at 173.0 ms
Min: -31.2 ° at 60.5 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.7 ° at 163.7 ms
Min: -18.7 ° at 57.4 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 27.8 ° at 170.2 ms
Min: -53.4 ° at 61.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 14:12:00 1308

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.47 g	Yes

Test meets specifications.

Comments:

Technician

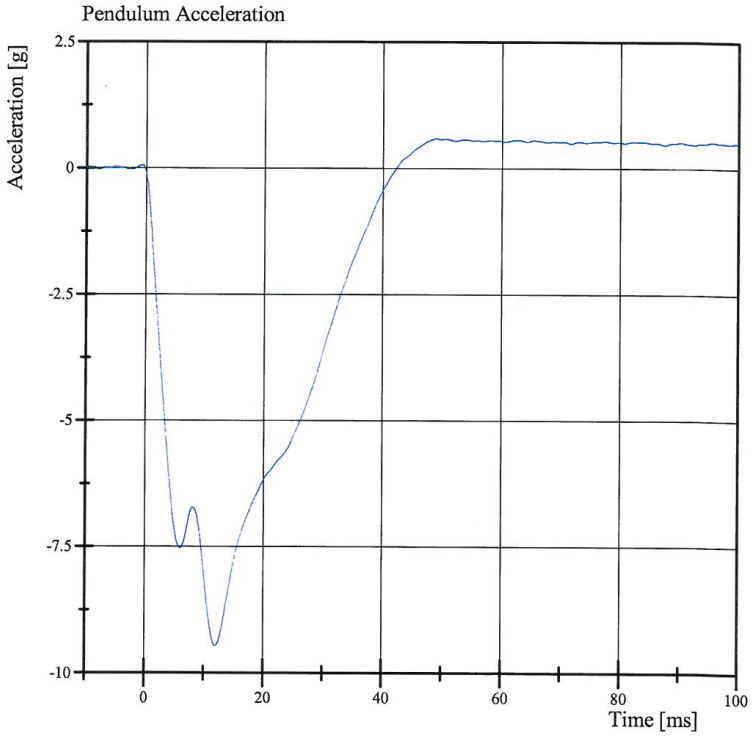
Approved

Specification Source: NHTSA final rule 8/15/2008

06.10.2013 11:15:07 535

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 0.6 g at 49.0 ms
Min: -9.5 g at 12.0 ms

Specification Source: NHTSA final rule 8/15/2008

06.10.2013 11:15:15 535

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

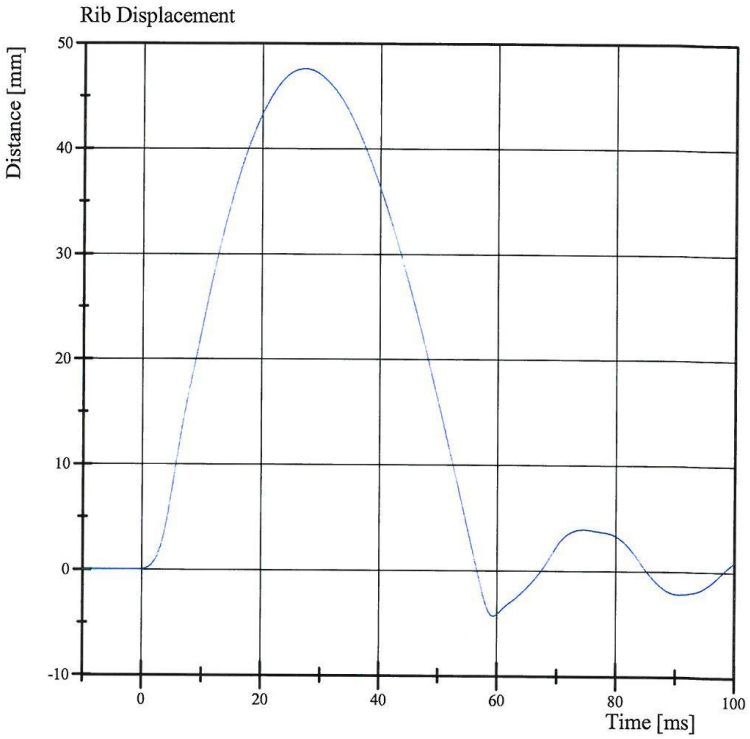
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 08:45:43 728

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 47.6 mm at 27.2 ms
Min: -4.3 mm at 59.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 08:45:51 728

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.6 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

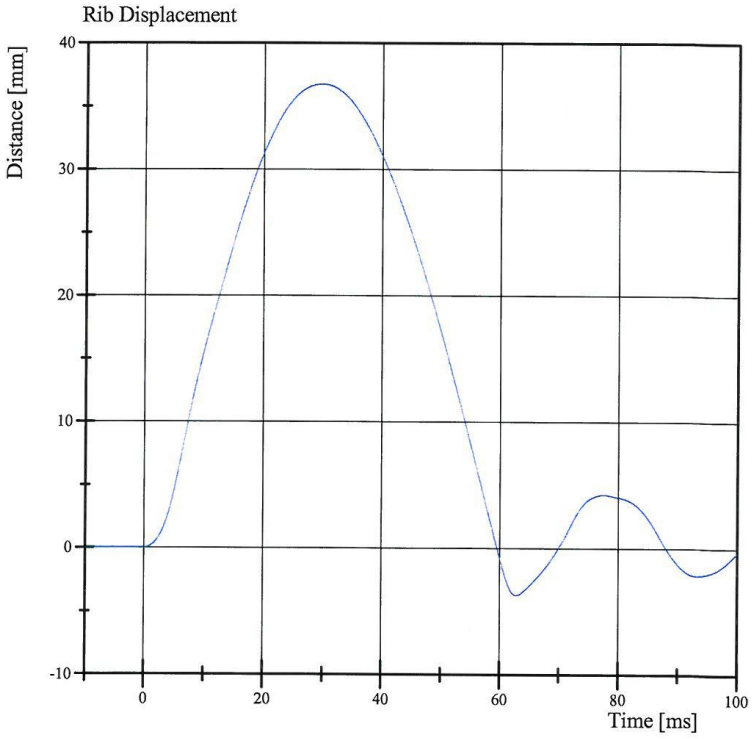
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 08:52:07 912

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 36.7 mm at 29.8 ms
Min: -3.7 mm at 62.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 08:52:17 912

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

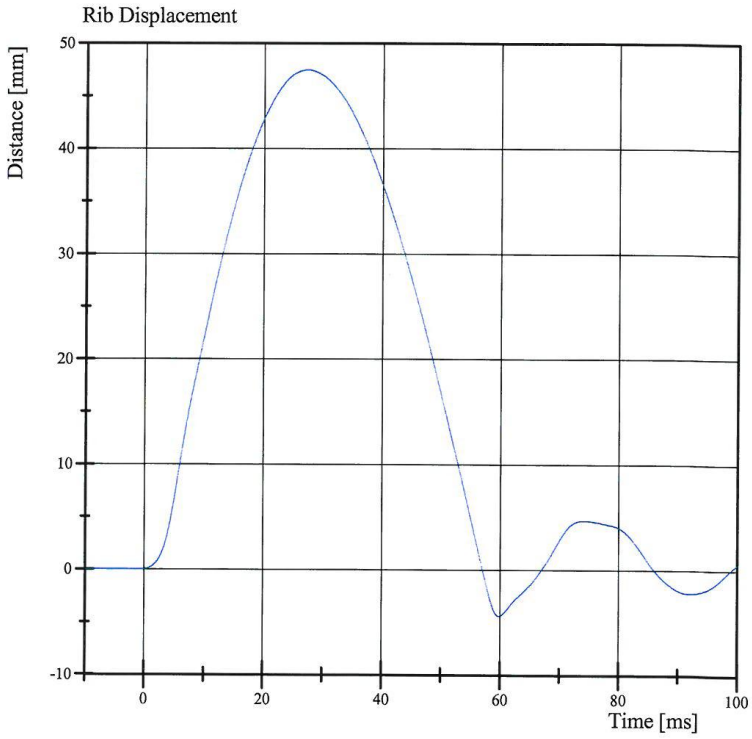
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 08:56:34 722

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 47.5 mm at 27.3 ms
Min: -4.4 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 08:56:41 722

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

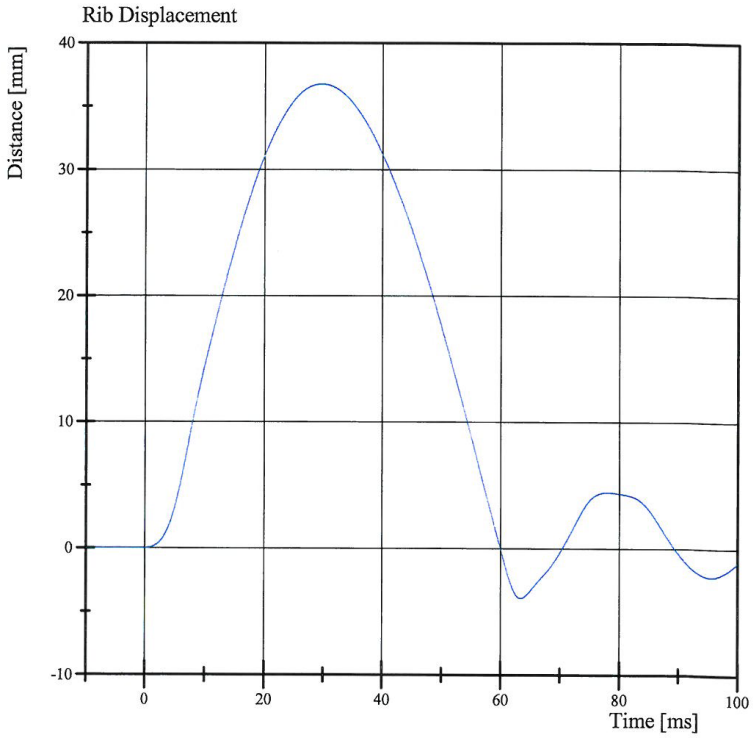
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 09:07:41 916

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 36.8 mm at 29.7 ms
Min: -3.9 mm at 63.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 09:07:52 916

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

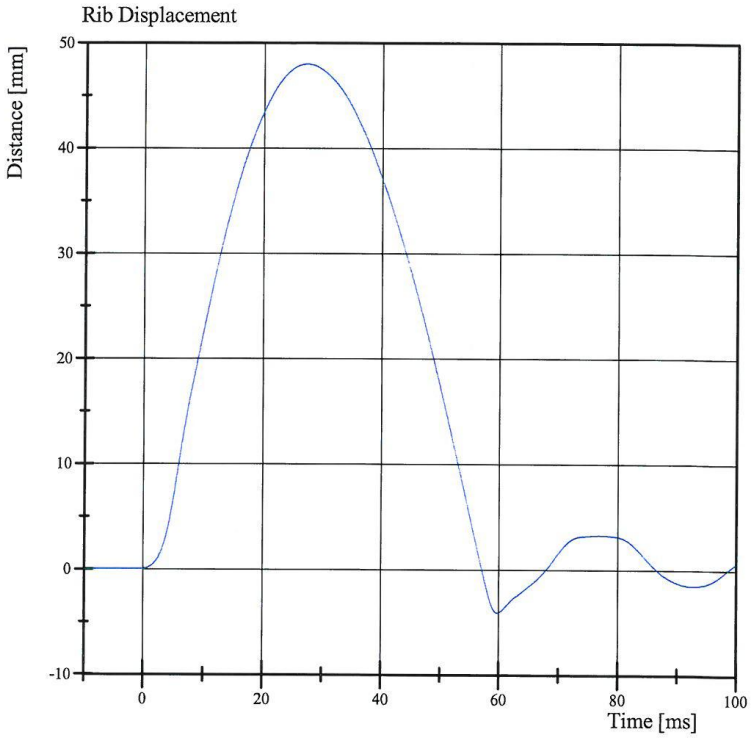
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 09:14:39 725

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 48.0 mm at 27.2 ms
Min: -4.1 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 09:14:47 725

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

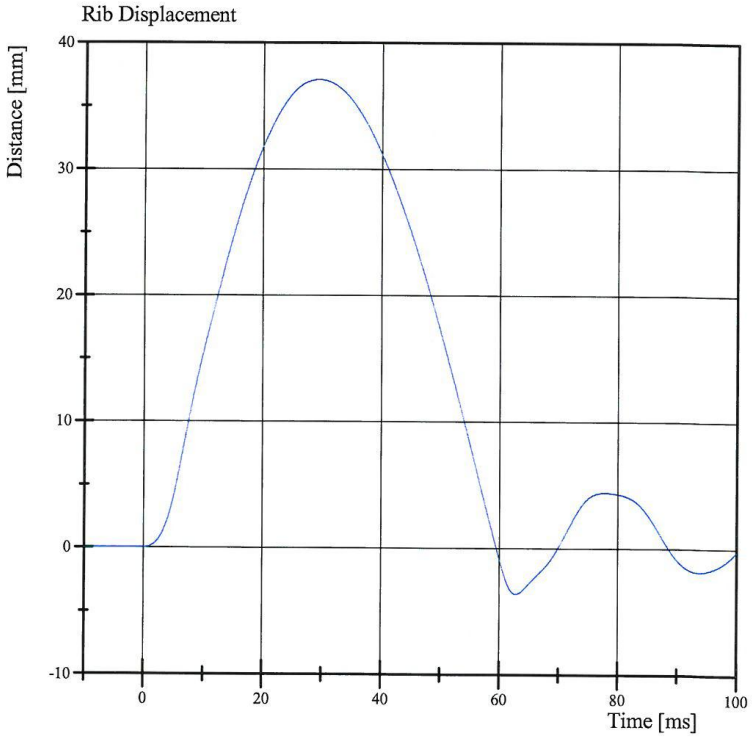
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 09:24:14 901

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 37.1 mm at 29.3 ms
Min: -3.6 mm at 62.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 09:24:21 901

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.479 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,394.5 N	Yes
Upper Rib Displacement	34 - 41 mm	36.6 mm	Yes
Center Rib Displacement	37 - 45 mm	40.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.2 mm	Yes

Test meets specifications.

Comments:

Technician

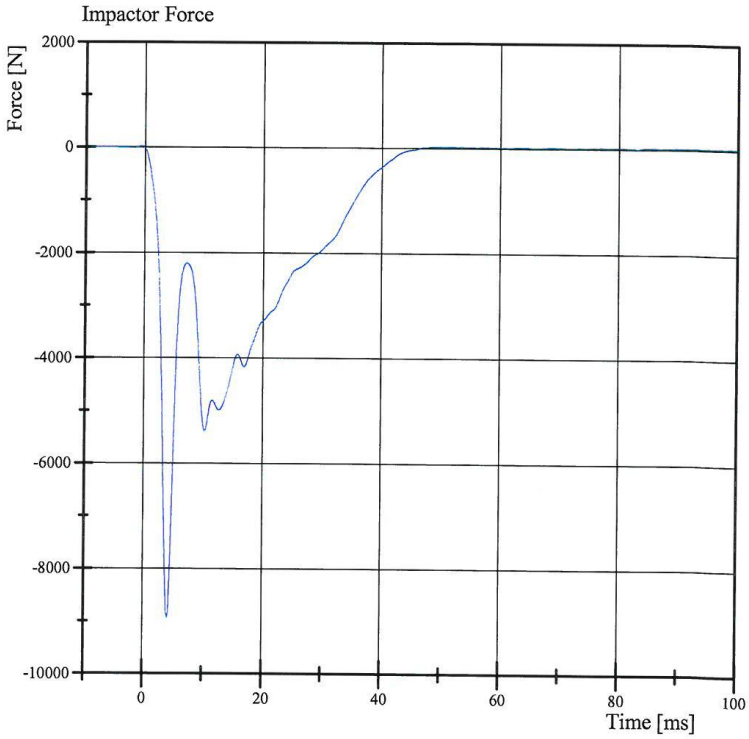
Approved

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

06.10.2013 11:25:06 434

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013



Filter Class: CFC_180
Max: 28.3 N at 53.4 ms
Min: -8,952.8 N at 4.2 ms

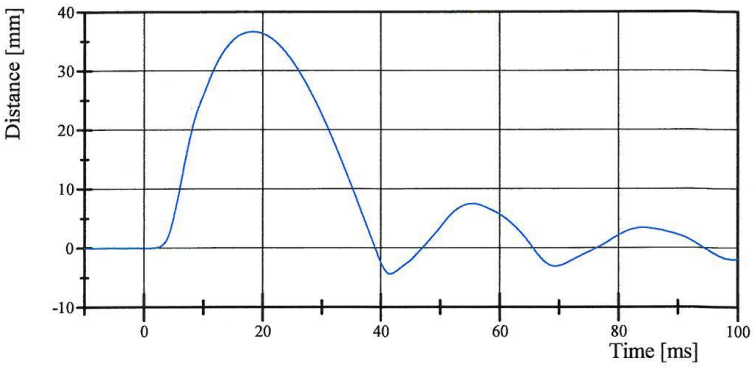
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

06.10.2013 11:25:13 434

Transportation Research Center Inc.

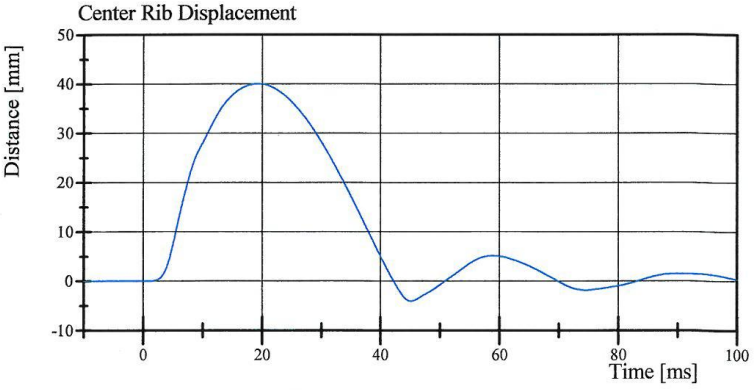
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Upper Rib Displacement



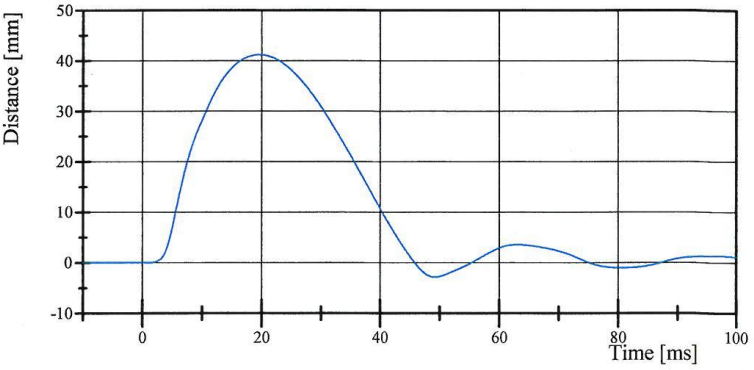
Filter Class: CFC_180
Max: 36.6 mm at 18.3 ms
Min: -4.4 mm at 41.6 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 40.1 mm at 19.3 ms
Min: -4.1 mm at 45.2 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 41.2 mm at 19.6 ms
Min: -2.9 mm at 49.2 ms

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

06.10.2013 11:25:14 434

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 14-2
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.96 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,076.3 N	Yes
Time of Peak	10.6 - 13.0 ms	12.00 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,645.4 N	Yes
Time of Peak	10.0 - 12.3 ms	11.44 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

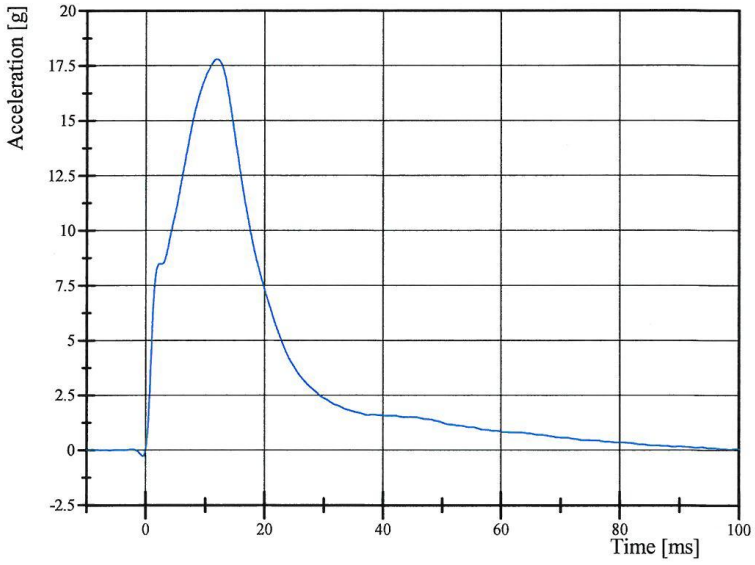
Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 13:11:05 568

Transportation Research Center Inc.

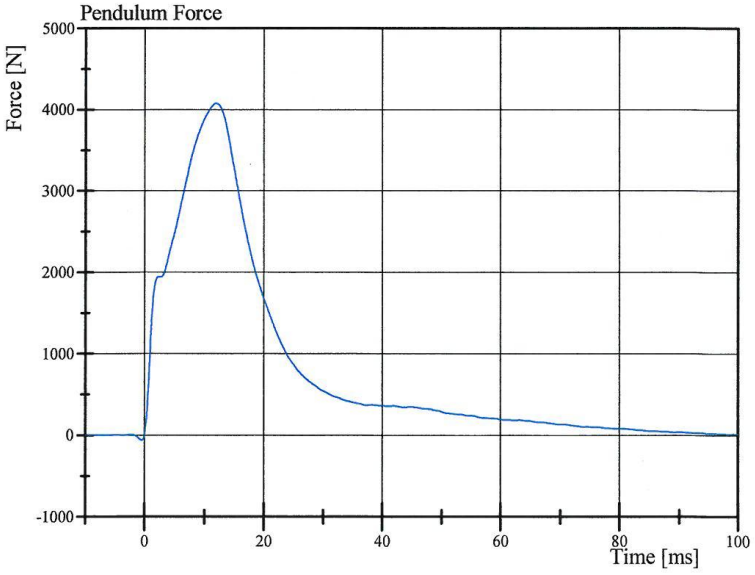
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 14-2
Test Date: 6/10/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 17.8 g at 12.0 ms
Min: -0.3 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,076.3 N at 12.0 ms
Min: -60.5 N at -0.5 ms

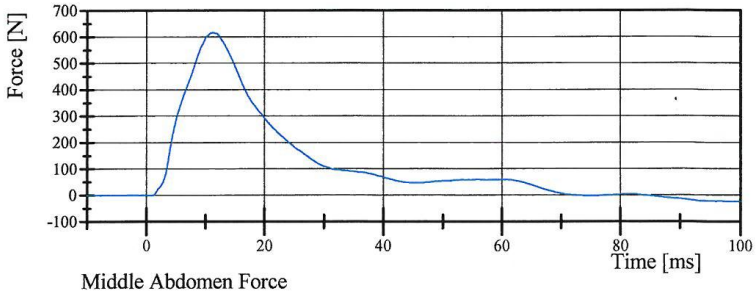
Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 13:11:13 568

Transportation Research Center Inc.

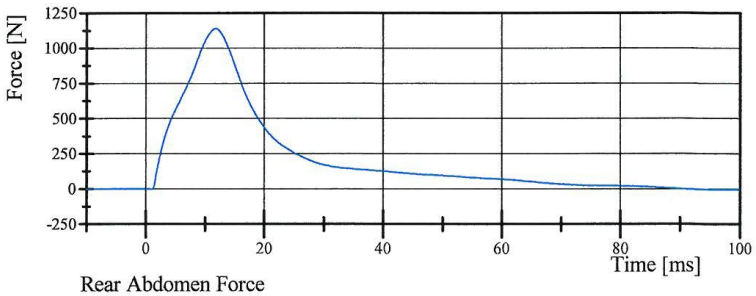
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 14-2
Test Date: 6/10/2013

Front Abdomen Force



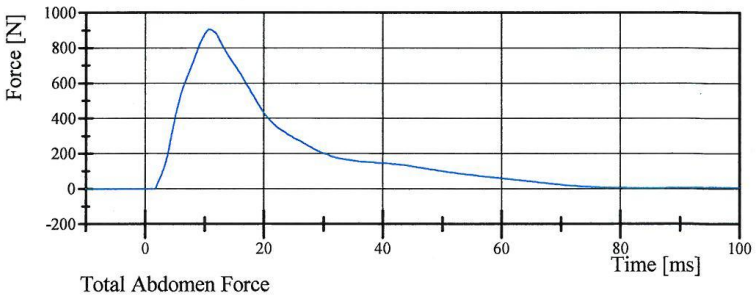
Filter Class: CFC_600
Max: 615.6 N at 11.3 ms
Min: -23.3 N at 99.6 ms

Middle Abdomen Force



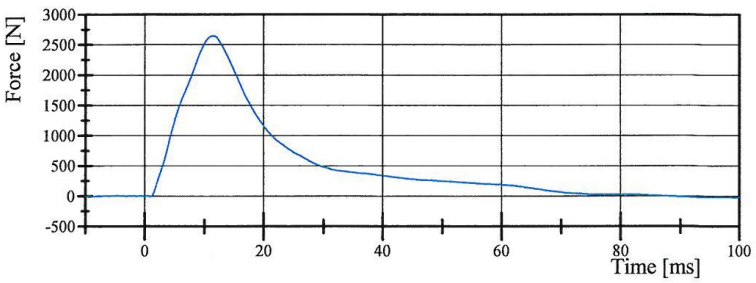
Filter Class: CFC_600
Max: 1,139.8 N at 11.9 ms
Min: -5.0 N at 99.8 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 905.4 N at 10.9 ms
Min: -0.8 N at 1.5 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,645.4 N at 11.4 ms
Min: -21.0 N at 99.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 13:11:13 568

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 14-2
Test Date: 6/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.029 m/s	Yes
Maximum Headform Flexion Peak	(-45) - (-55) deg	-47.7 deg	Yes
Time of Peak	39 - 53 ms	44.8 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	37.3 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

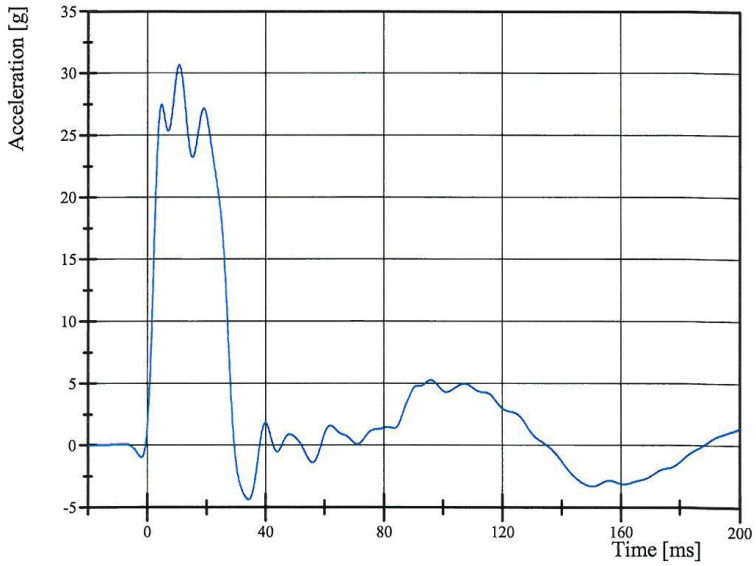
Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 13:45:01 577

Transportation Research Center Inc.

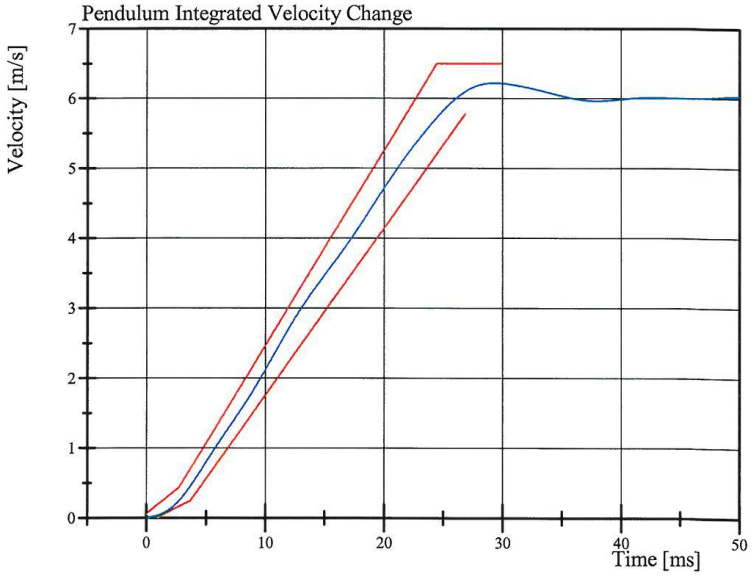
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 14-2
Test Date: 6/7/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 30.6 g at 10.7 ms
Min: -4.4 g at 34.2 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.2 m/s at 29.4 ms
Min: 0.0 m/s at 0.0 ms

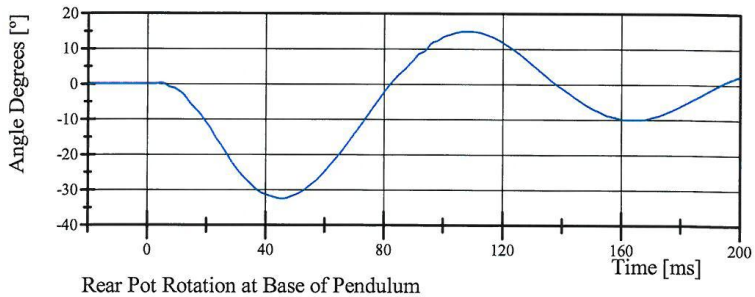
Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 13:45:11 577

Transportation Research Center Inc.

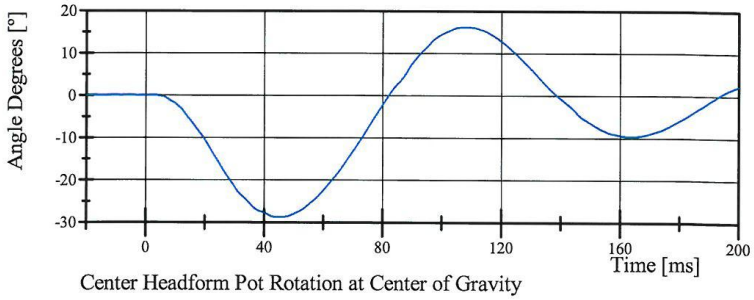
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 14-2
Test Date: 6/7/2013

Forward Pot Rotation at Base of Pendulum



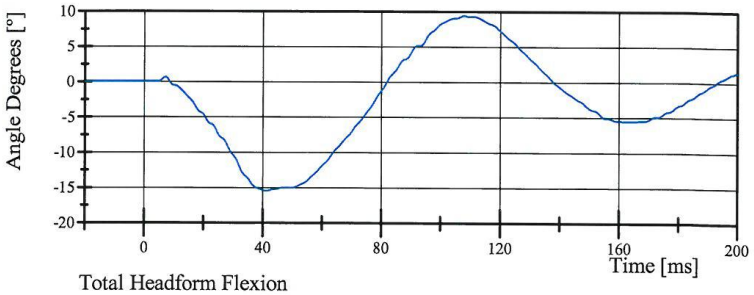
Filter Class: CFC_180
Max: 14.9 ° at 107.4 ms
Min: -32.5 ° at 45.5 ms

Rear Pot Rotation at Base of Pendulum



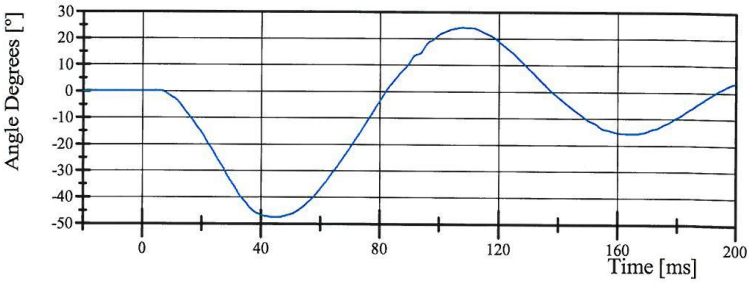
Filter Class: CFC_180
Max: 16.2 ° at 108.1 ms
Min: -28.8 ° at 43.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.4 ° at 107.8 ms
Min: -15.5 ° at 41.0 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 24.3 ° at 107.8 ms
Min: -47.7 ° at 44.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.07.2013 13:45:12 577

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,106.8 N	Yes
Time of Peak	11.8 - 16.1 ms	13.60 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,245.1 N	Yes
Time of Peak	12.2 - 17.0 ms	12.88 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

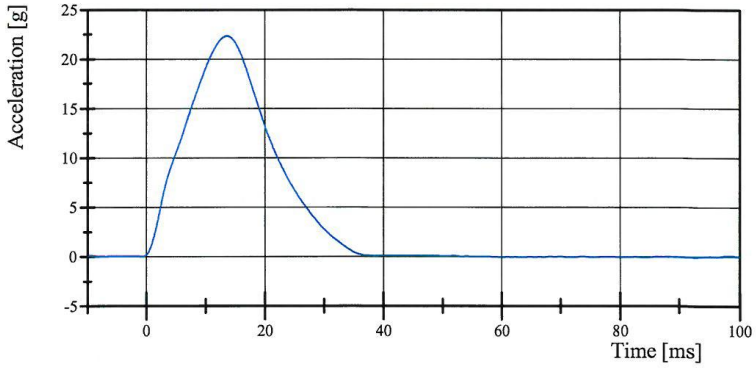
Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 12:50:51 527

Transportation Research Center Inc.

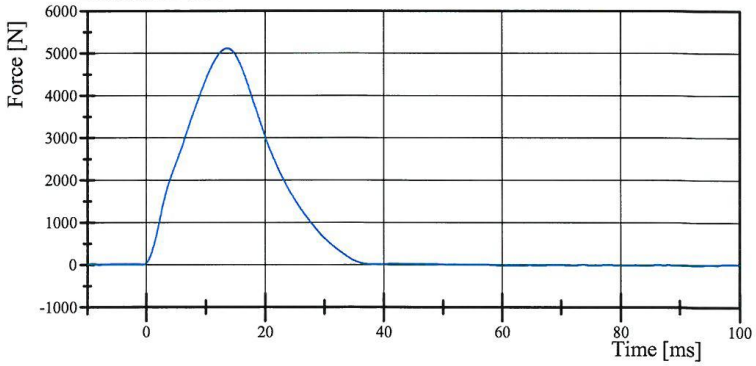
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 14-1
Test Date: 6/10/2013

Pendulum Acceleration



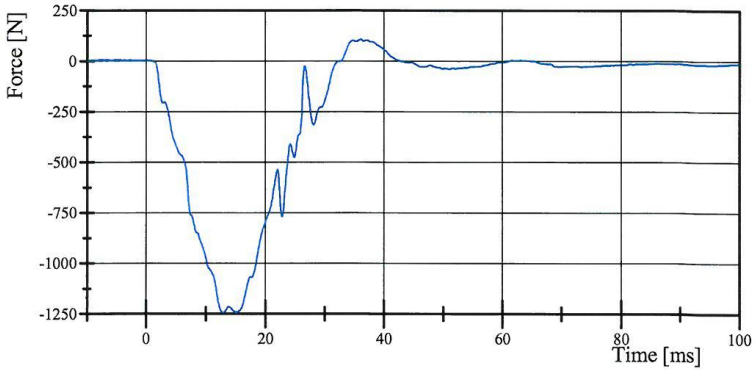
Filter Class: CFC_180
Max: 22.3 g at 13.6 ms
Min: -0.1 g at 84.2 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,106.8 N at 13.6 ms
Min: -19.2 N at 84.2 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 104.7 N at 36.1 ms
Min: -1,245.1 N at 12.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.10.2013 12:50:57 527

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 14
Date: 06/10/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	446	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	472	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Technician

Approved

Baseline 10/07/05

Driver S/N F030

Post-Test Calibration Sheets

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

EuroSid-2re
Serial No. F030
Calibration No. 15

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

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Peak Resultant Acceleration	125 - 155 g	147.5 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	6.8 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

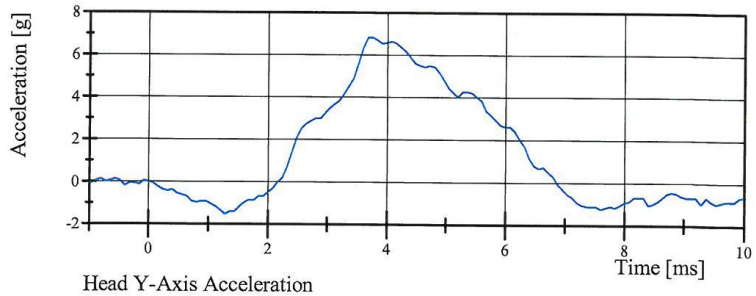
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 08:44:15 360

Transportation Research Center Inc.

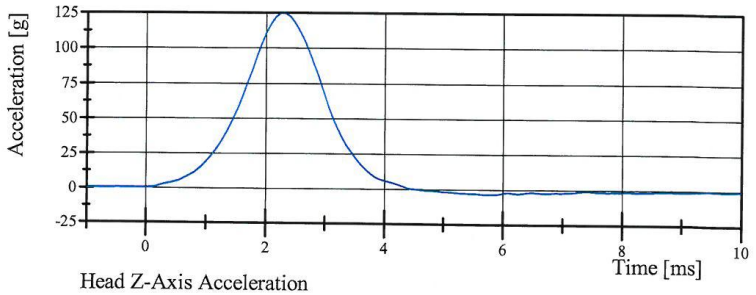
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Head X-Axis Acceleration



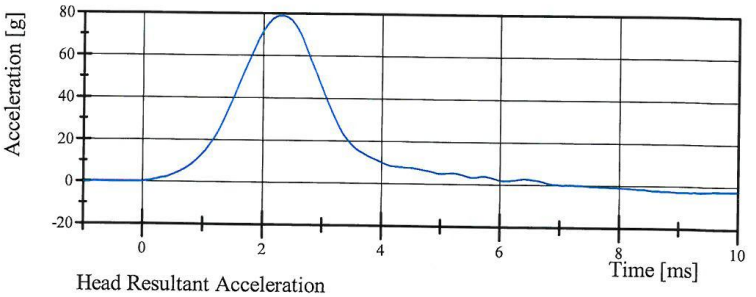
Filter Class: CFC_1000
Max: 6.8 g at 3.7 ms
Min: -1.5 g at 1.3 ms

Head Y-Axis Acceleration



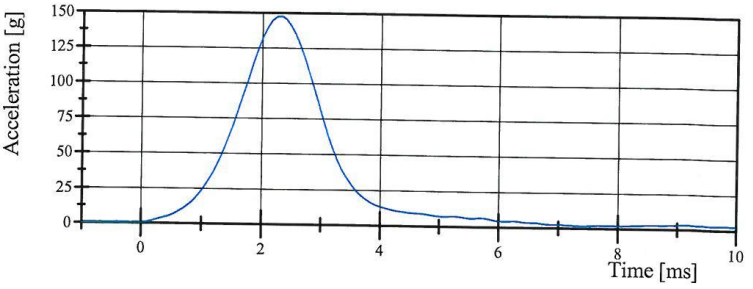
Filter Class: CFC_1000
Max: 124.6 g at 2.3 ms
Min: -3.7 g at 5.7 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 79.0 g at 2.3 ms
Min: -2.7 g at 9.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 147.5 g at 2.3 ms
Min: 0.0 g at -0.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 08:44:22 360

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.35 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-53.9 deg	Yes
Time of Peak	54 - 66 ms	59.5 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	65.0 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

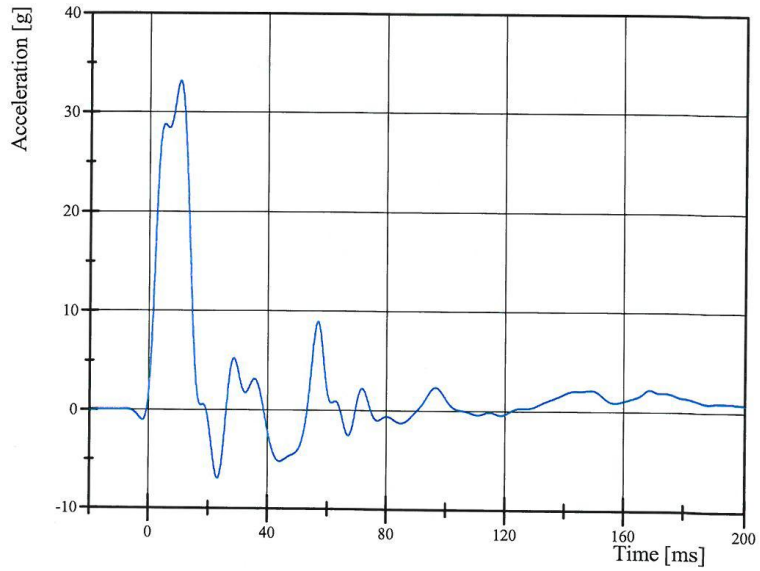
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 10:08:52 1313

Transportation Research Center Inc.

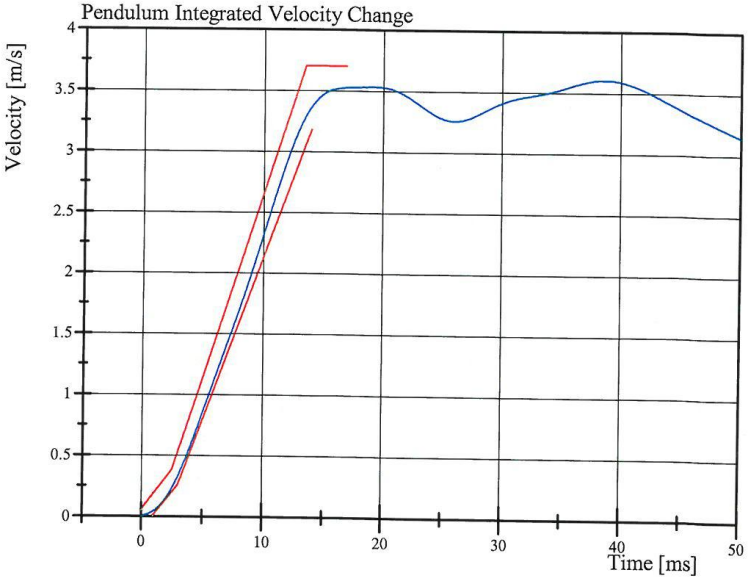
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.1 g at 10.3 ms
Min: -7.0 g at 23.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 38.6 ms
Min: 0.0 m/s at 0.0 ms

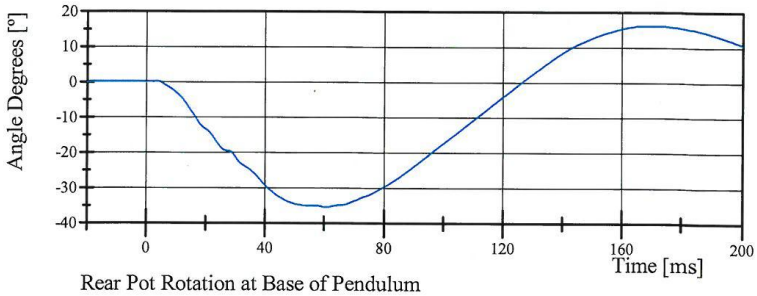
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 10:09:02 1313

Transportation Research Center Inc.

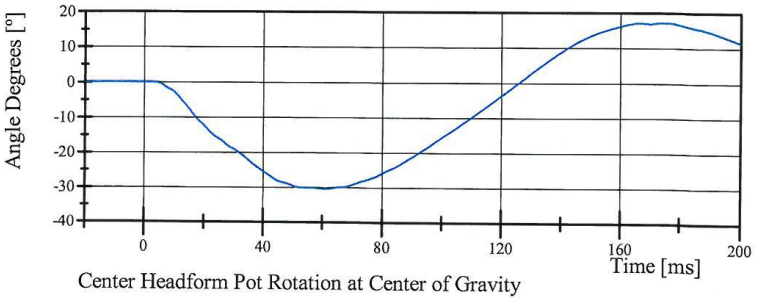
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Forward Pot Rotation at Base of Pendulum



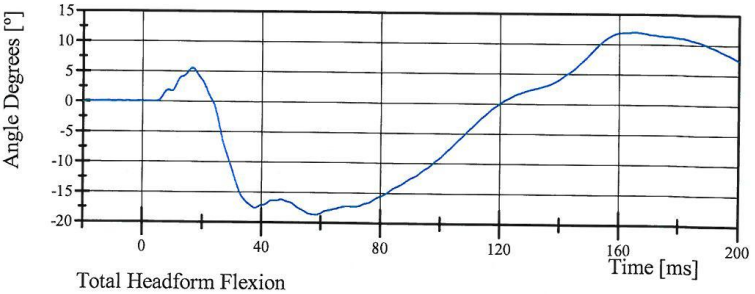
Filter Class: CFC_180
Max: 16.1 ° at 173.0 ms
Min: -35.5 ° at 60.6 ms

Rear Pot Rotation at Base of Pendulum



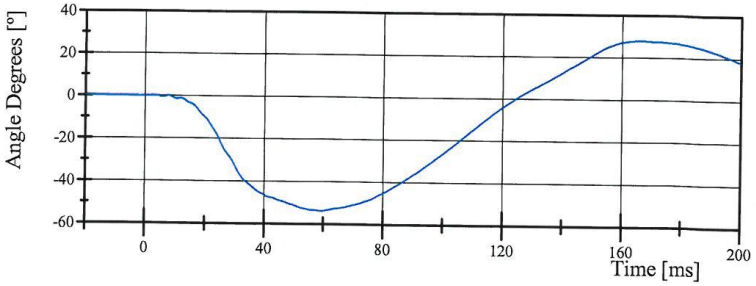
Filter Class: CFC_180
Max: 17.2 ° at 173.7 ms
Min: -30.5 ° at 61.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 12.0 ° at 165.0 ms
Min: -18.6 ° at 58.6 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 28.0 ° at 165.8 ms
Min: -53.9 ° at 59.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 10:09:03 1313

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.21 g	Yes

Test meets specifications.

Comments:

Technician

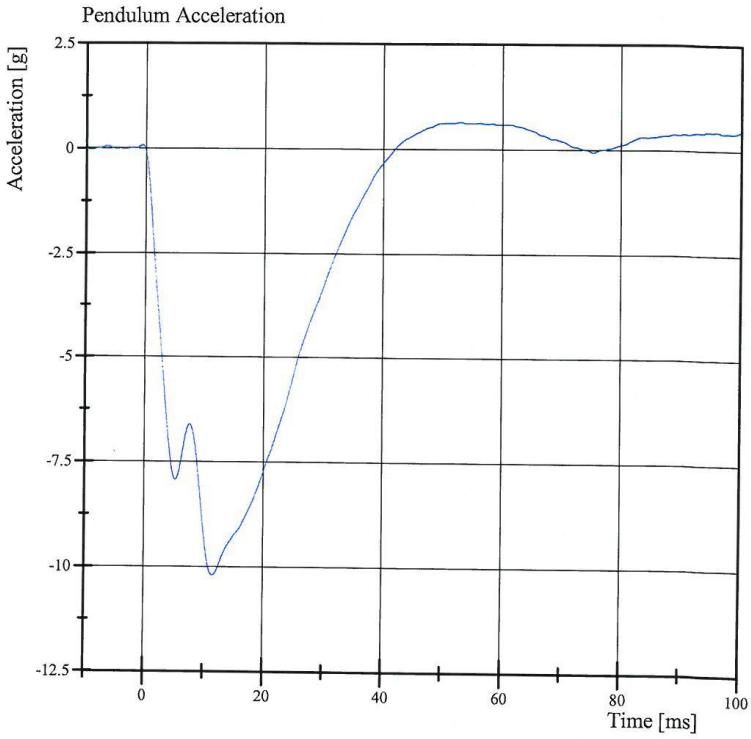
Approved

Specification Source: NHTSA final rule 8/15/2008

06.21.2013 11:03:23 550

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 0.6 g at 53.0 ms
Min: -10.2 g at 11.5 ms

Specification Source: NHTSA final rule 8/15/2008

06.21.2013 11:03:32 550

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

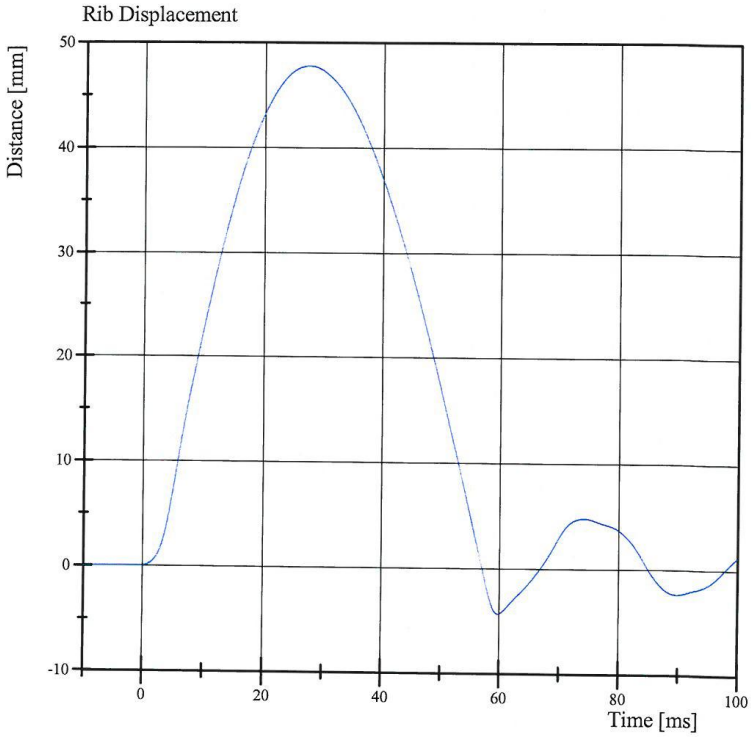
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:18:33 712

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 47.8 mm at 27.4 ms
Min: -4.3 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:18:44 712

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

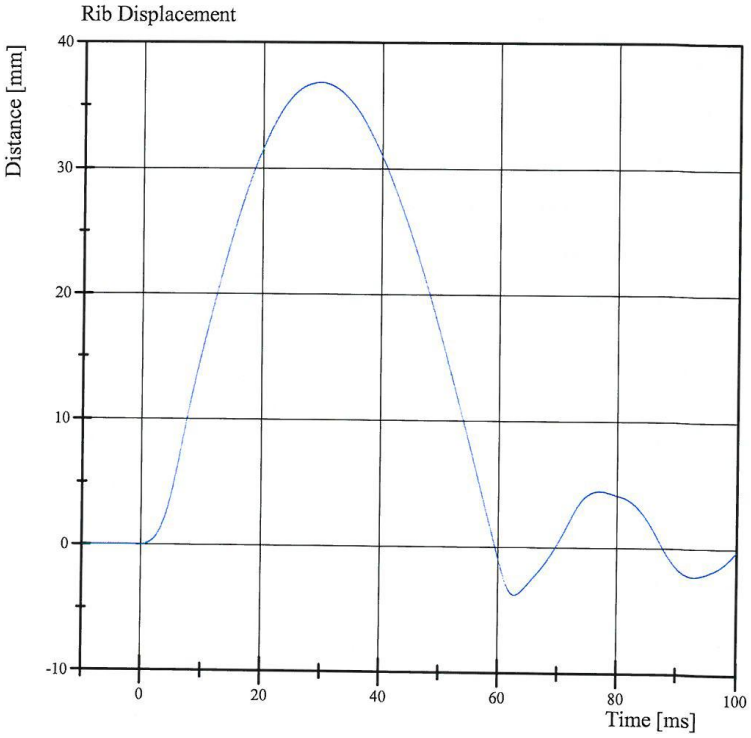
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:25:11 892

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 36.8 mm at 29.6 ms
Min: -3.8 mm at 62.7 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:25:24 892

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

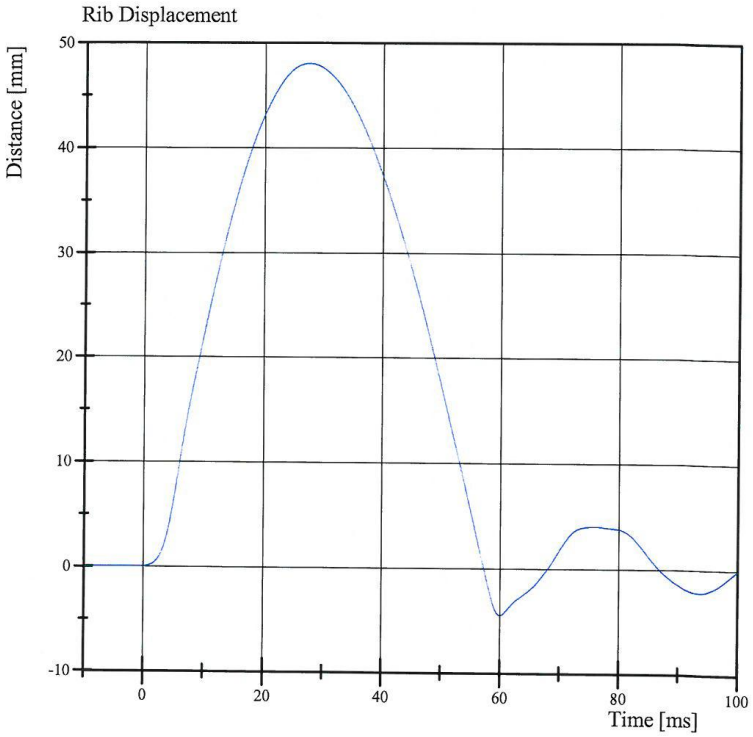
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:30:25 700

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 48.0 mm at 27.5 ms
Min: -4.5 mm at 60.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:30:35 700

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

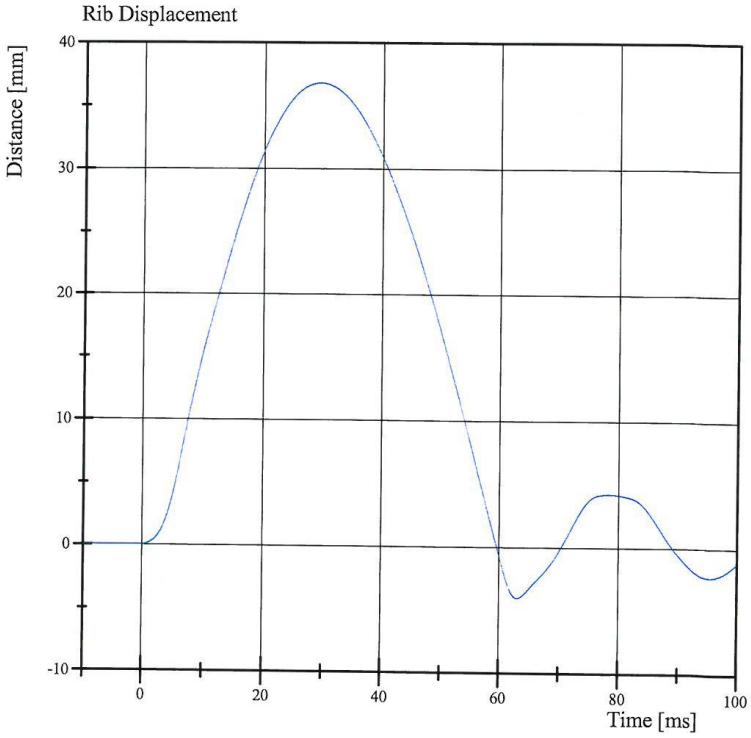
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:40:36 885

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 36.8 mm at 29.4 ms
Min: -4.0 mm at 63.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:40:43 885

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

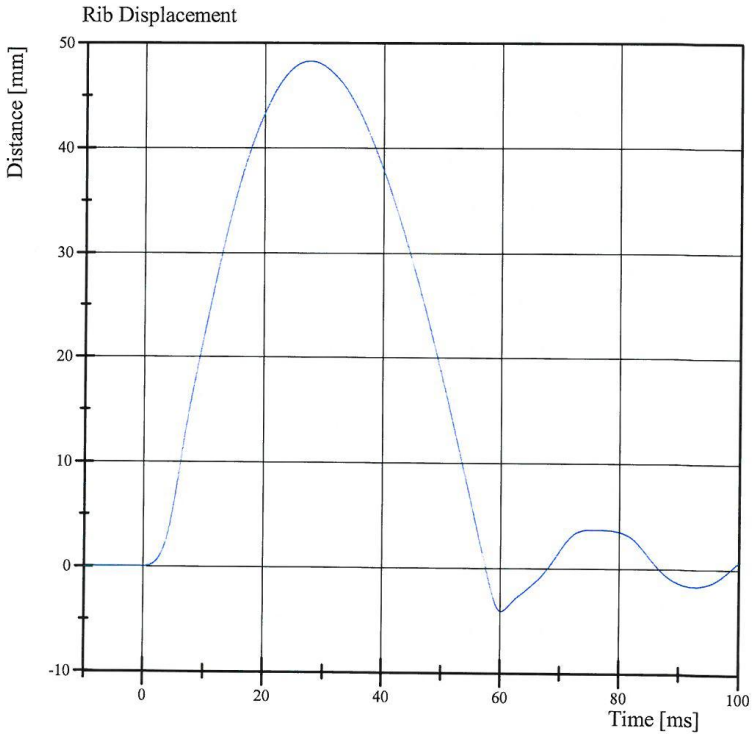
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:45:28 699

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 48.3 mm at 27.5 ms
Min: -4.1 mm at 60.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:45:36 699

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

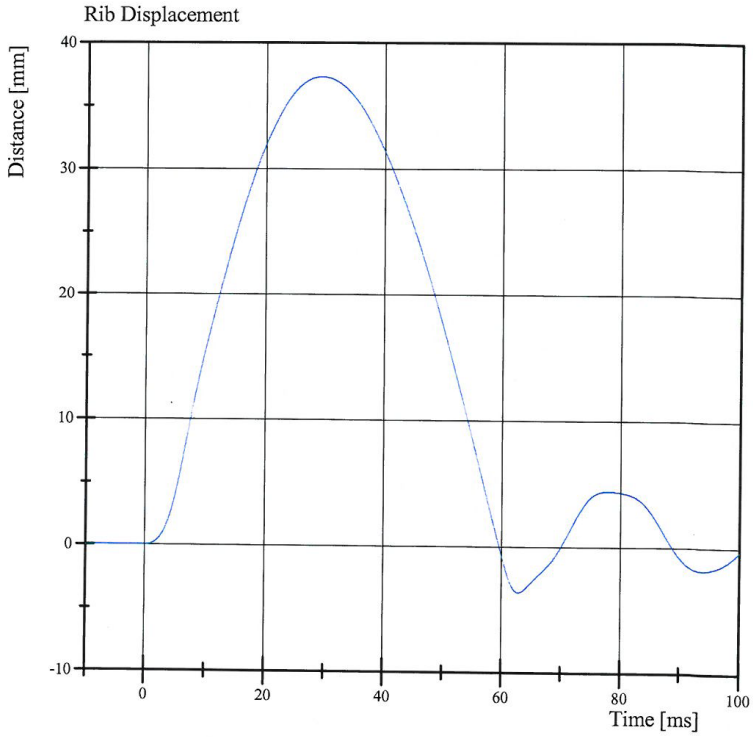
Approved

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:53:55 894

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 37.3 mm at 29.4 ms
Min: -3.6 mm at 62.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:54:33 894

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.476 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,423.6 N	Yes
Upper Rib Displacement	34 - 41 mm	36.2 mm	Yes
Center Rib Displacement	37 - 45 mm	39.3 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.6 mm	Yes

Test meets specifications.

Comments:

Technician

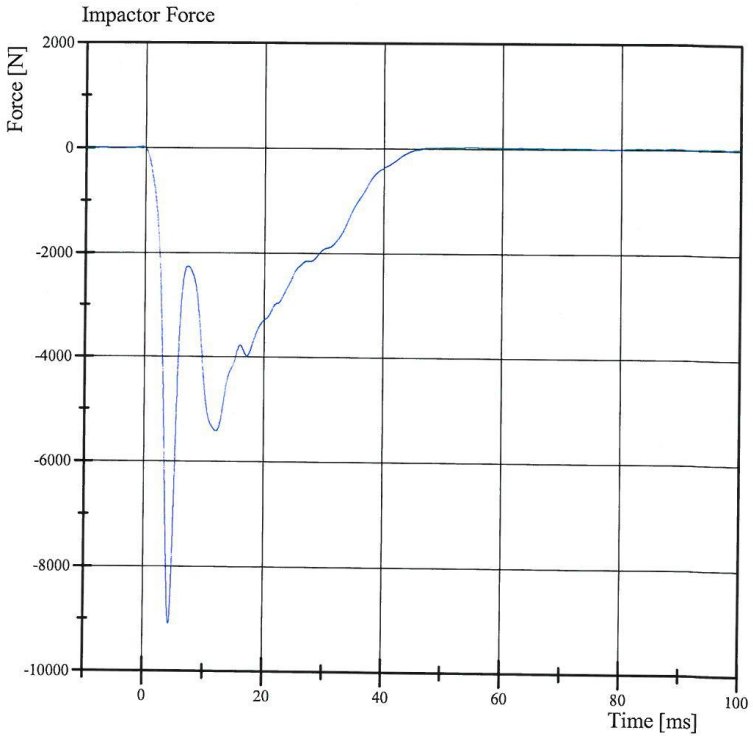
Approved

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

06.21.2013 11:08:56 426

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



Filter Class: CFC_180
Max: 31.7 N at 54.3 ms
Min: -9,109.1 N at 4.2 ms

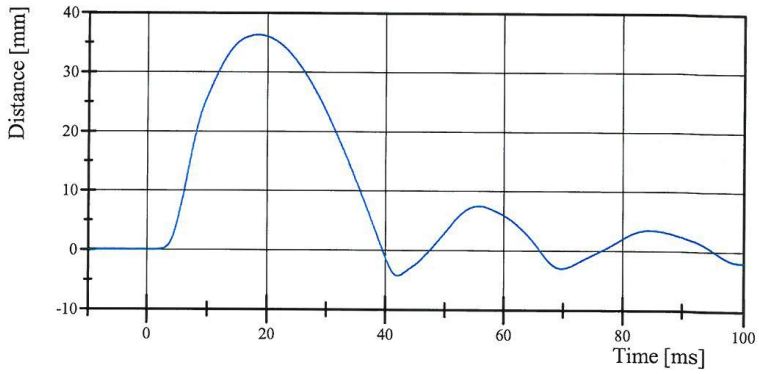
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

06.21.2013 11:09:06 426

Transportation Research Center Inc.

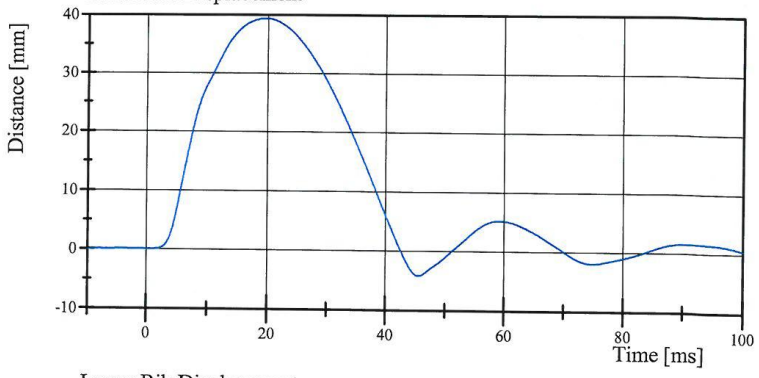
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Upper Rib Displacement



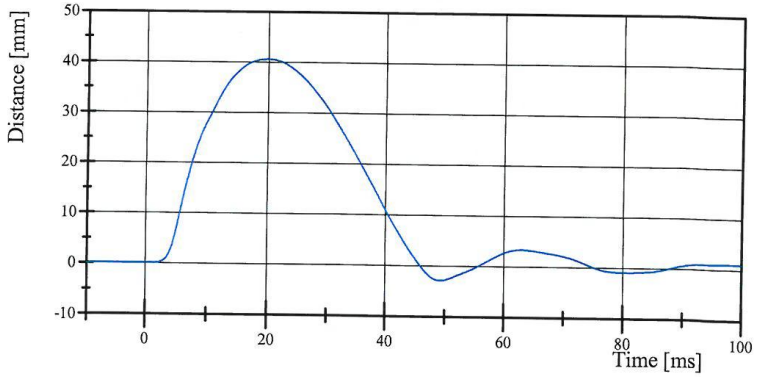
Filter Class: CFC_180
Max: 36.2 mm at 18.4 ms
Min: -4.3 mm at 42.0 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 39.3 mm at 19.6 ms
Min: -4.2 mm at 45.5 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 40.6 mm at 19.9 ms
Min: -2.9 mm at 49.2 ms

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

06.21.2013 11:09:06 426

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.92 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,005.0 N	Yes
Time of Peak	10.6 - 13.0 ms	12.00 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,501.6 N	Yes
Time of Peak	10.0 - 12.3 ms	11.20 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

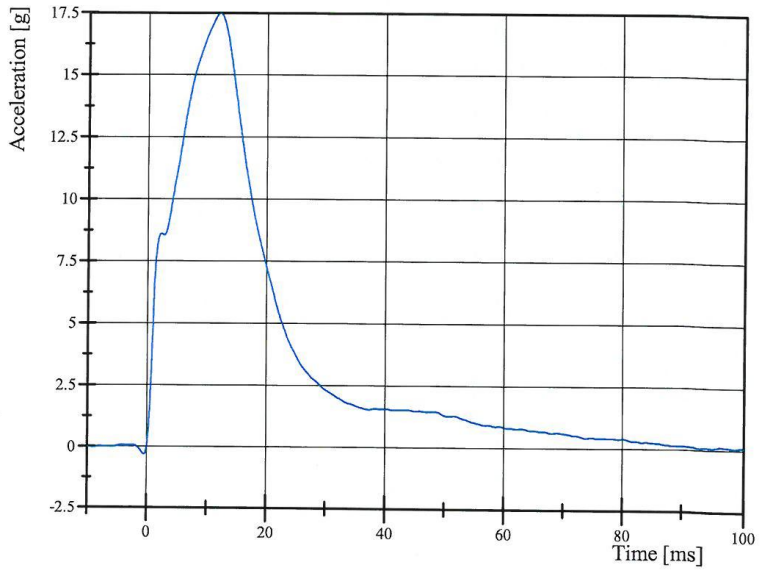
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 11:15:41 588

Transportation Research Center Inc.

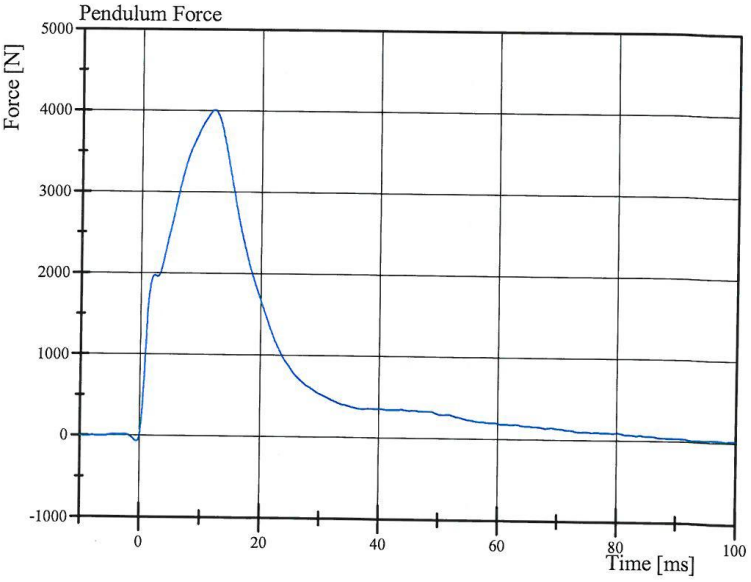
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 17.5 g at 12.0 ms
Min: -0.3 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,005.0 N at 12.0 ms
Min: -73.1 N at -0.5 ms

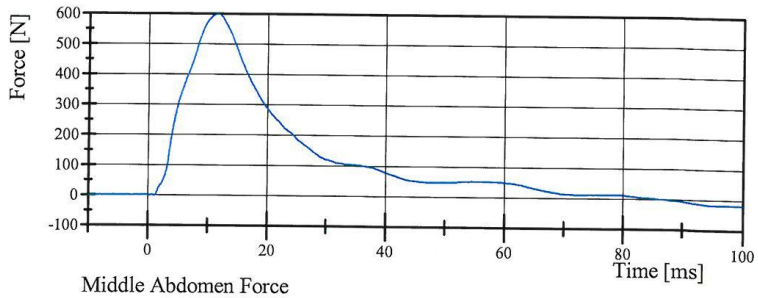
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 11:15:50 588

Transportation Research Center Inc.

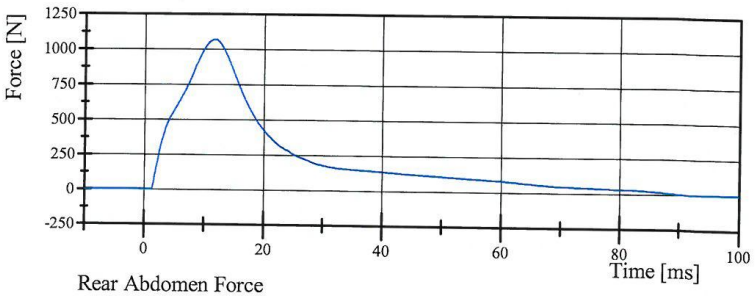
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Front Abdomen Force



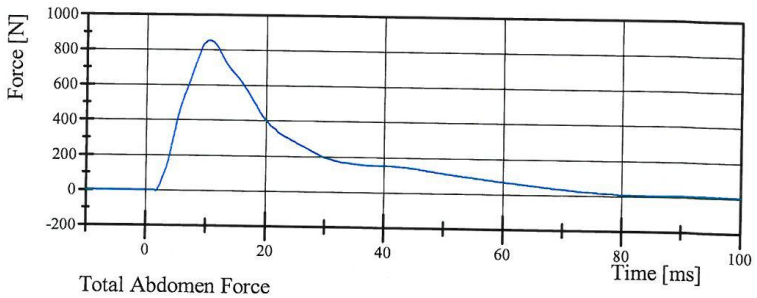
Filter Class: CFC_600
Max: 599.0 N at 11.6 ms
Min: -18.4 N at 99.4 ms

Middle Abdomen Force



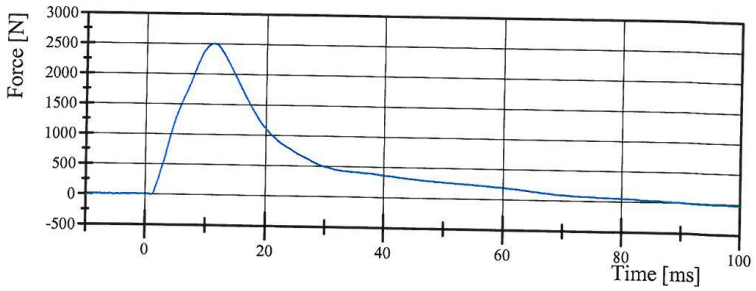
Filter Class: CFC_600
Max: 1,070.0 N at 11.7 ms
Min: -2.6 N at 1.1 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 851.8 N at 10.5 ms
Min: -5.5 N at 1.7 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,501.6 N at 11.2 ms
Min: -16.7 N at 99.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 11:15:51 588

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.028 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-46.6 deg	Yes
Time of Peak	39 - 53 ms	42.5 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	38.6 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

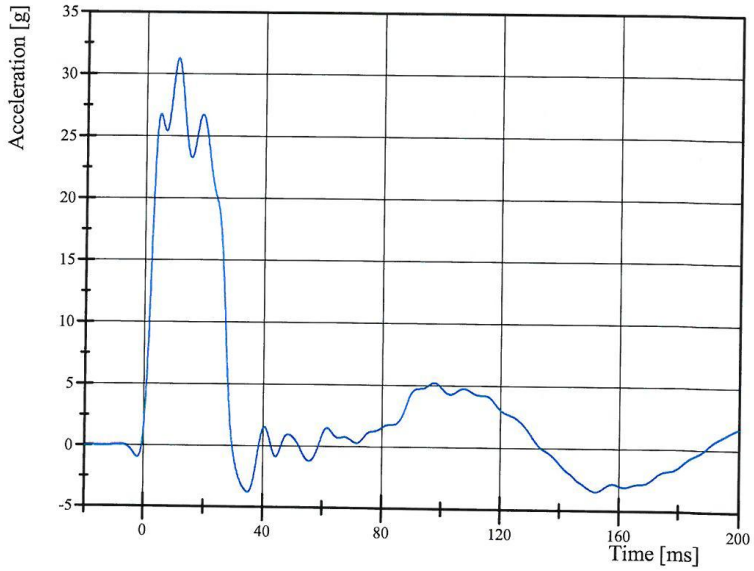
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 09:16:40 578

Transportation Research Center Inc.

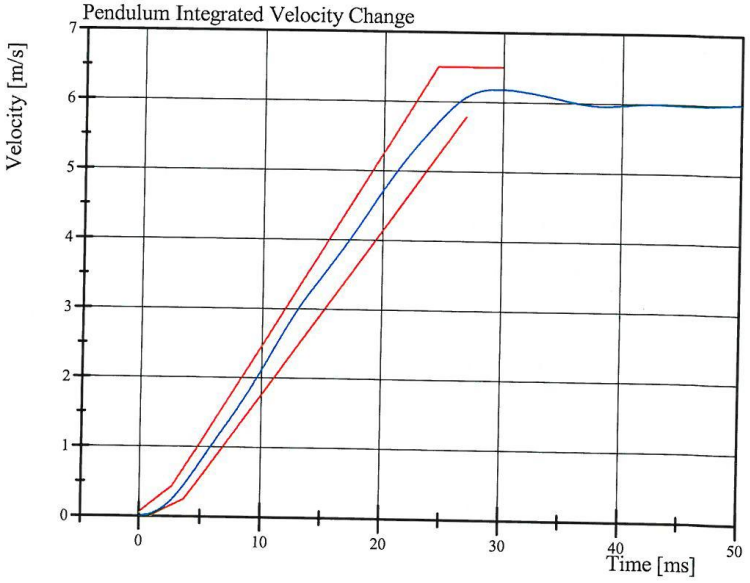
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 31.2 g at 10.6 ms
Min: -3.8 g at 34.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.2 m/s at 29.5 ms
Min: 0.0 m/s at 0.0 ms

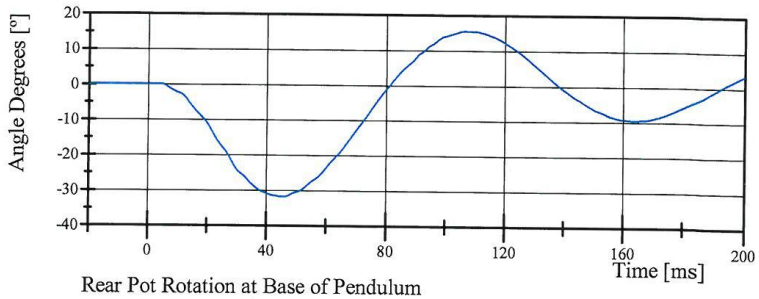
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 09:16:47 578

Transportation Research Center Inc.

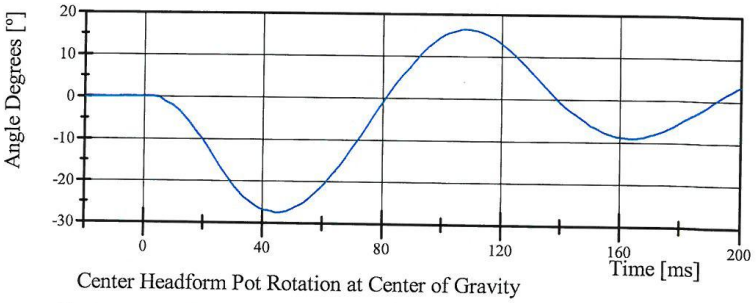
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

Forward Pot Rotation at Base of Pendulum



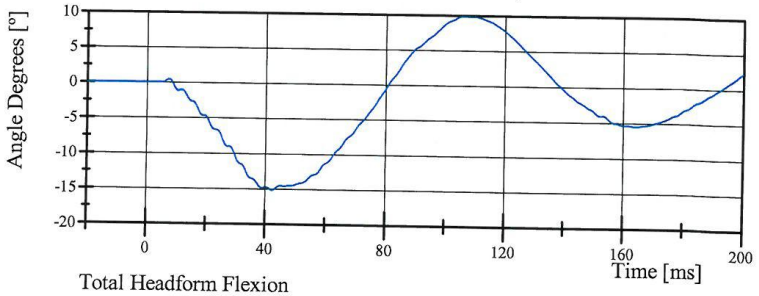
Filter Class: CFC_180
Max: 15.5 ° at 106.3 ms
Min: -31.8 ° at 45.5 ms

Rear Pot Rotation at Base of Pendulum



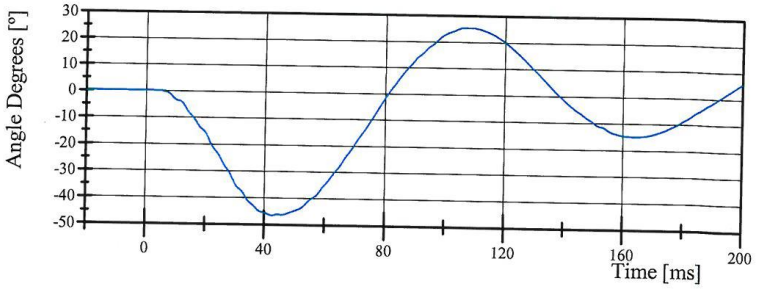
Filter Class: CFC_180
Max: 16.4 ° at 107.6 ms
Min: -27.6 ° at 44.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.9 ° at 106.0 ms
Min: -15.2 ° at 42.2 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.4 ° at 106.3 ms
Min: -46.6 ° at 42.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 09:16:48 578

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 15-2
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,072.3 N	Yes
Time of Peak	11.8 - 16.1 ms	13.52 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,279.0 N	Yes
Time of Peak	12.2 - 17.0 ms	13.92 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

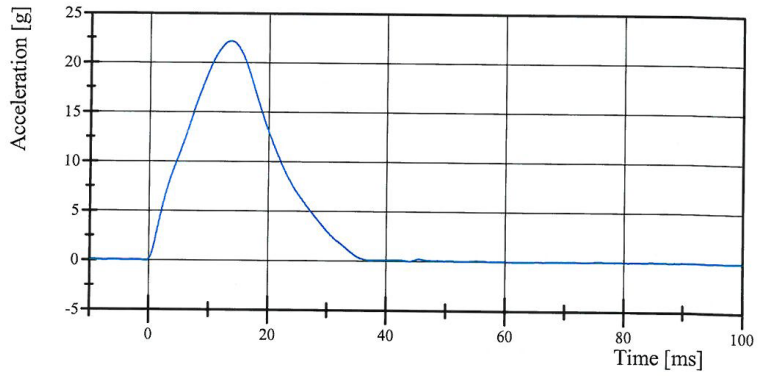
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 13:28:11 528

Transportation Research Center Inc.

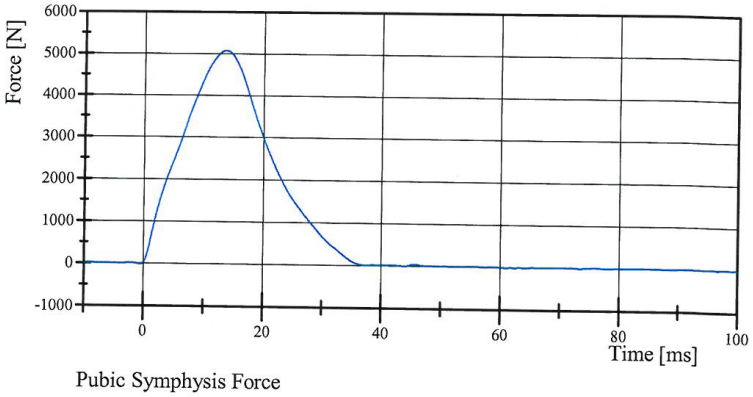
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 15-2
Test Date: 6/21/2013

Pendulum Acceleration



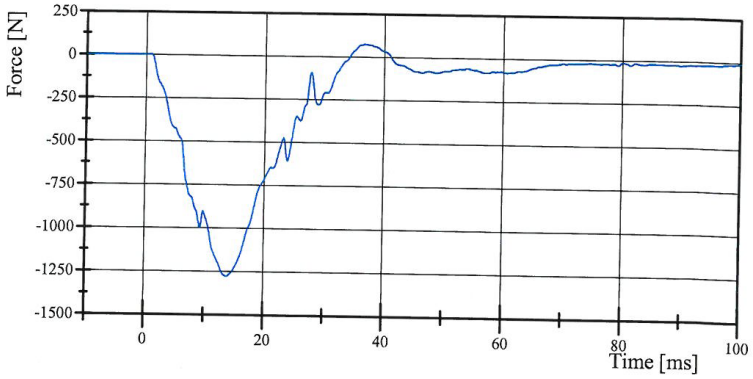
Filter Class: CFC_180
Max: 22.1 g at 13.5 ms
Min: -0.1 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,072.3 N at 13.5 ms
Min: -19.3 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 73.6 N at 36.9 ms
Min: -1,279.0 N at 13.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 13:28:18 528

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 15
Date: 06/21/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	97	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	445	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	470	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Technician

Approved

Baseline 10/07/05

Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

SID-IIs Dummy
Serial No. 305
Calibration No. 19

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

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 19-3
Test Date: 6/12/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

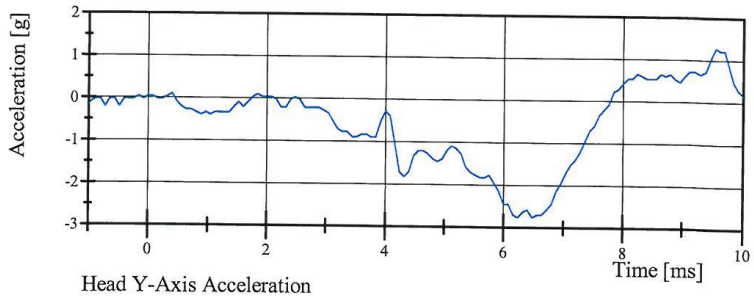
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.12.2013 12:29:21 227

Transportation Research Center Inc.

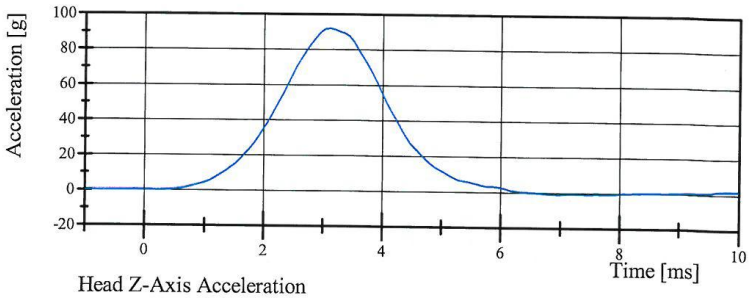
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 19-3
Test Date: 6/12/2013

Head X-Axis Acceleration



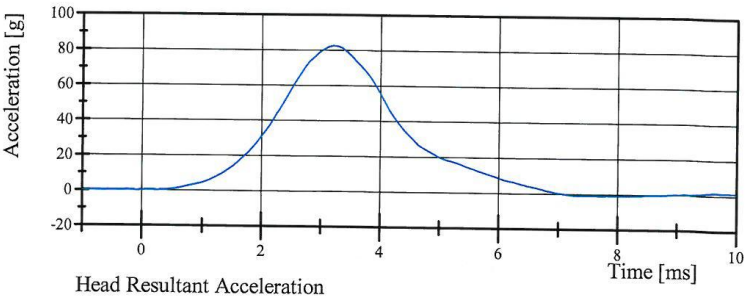
Filter Class: CFC_1000
Max: 1.3 g at 9.5 ms
Min: -2.8 g at 6.2 ms

Head Y-Axis Acceleration



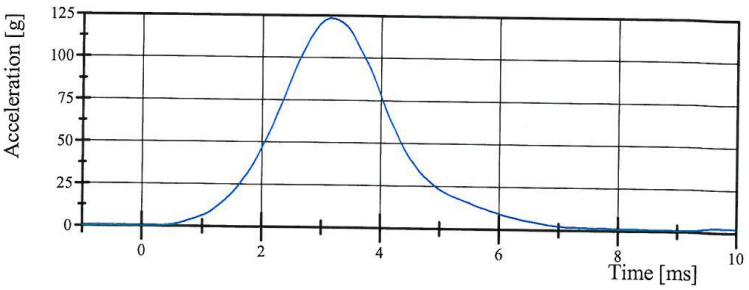
Filter Class: CFC_1000
Max: 91.9 g at 3.1 ms
Min: -1.0 g at 7.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 82.4 g at 3.2 ms
Min: -1.1 g at 7.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 123.1 g at 3.1 ms
Min: 0.0 g at -0.3 ms

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

06.12.2013 12:29:31 227

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 19-1
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 %	52 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.612 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.560 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.687 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.879 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.762 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.801 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.8 deg	Yes
Time of Peak	50 - 70 ms	67.7 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.9 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	124.2 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

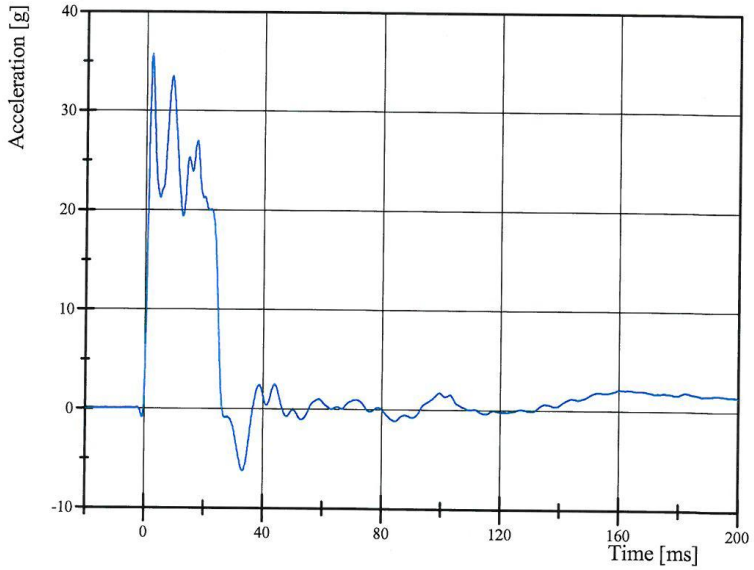
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.11.2013 14:12:32 639

Transportation Research Center Inc.

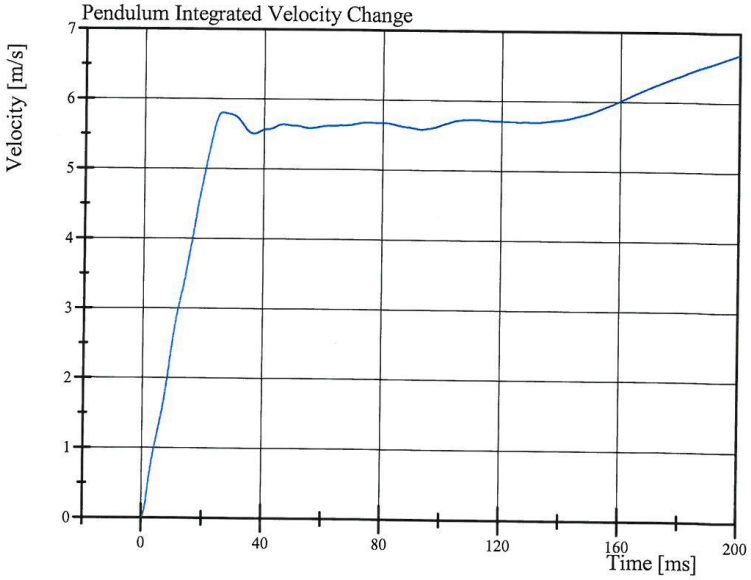
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/11/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 35.6 g at 1.9 ms
Min: -6.3 g at 33.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.7 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

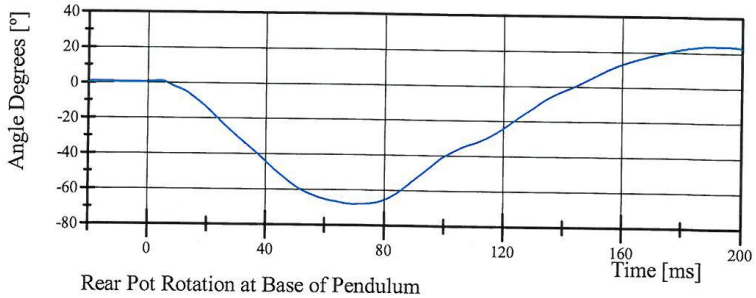
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.11.2013 14:12:42 639

Transportation Research Center Inc.

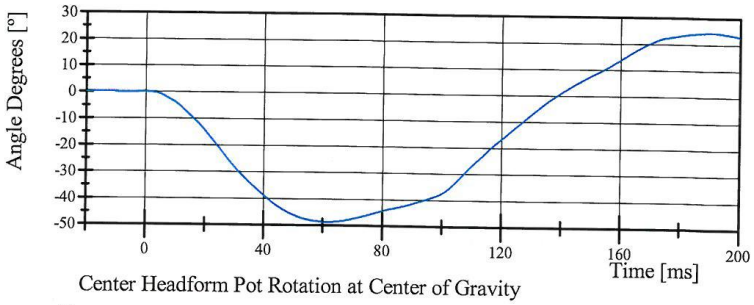
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/11/2013

Forward Pot Rotation at Base of Pendulum



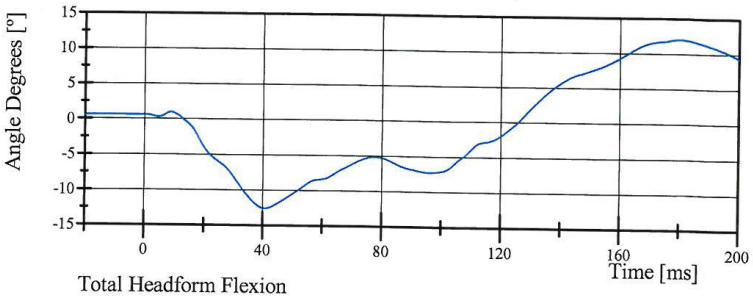
Filter Class: CFC_60
Max: 23.6 ° at 189.4 ms
Min: -68.2 ° at 69.7 ms

Rear Pot Rotation at Base of Pendulum



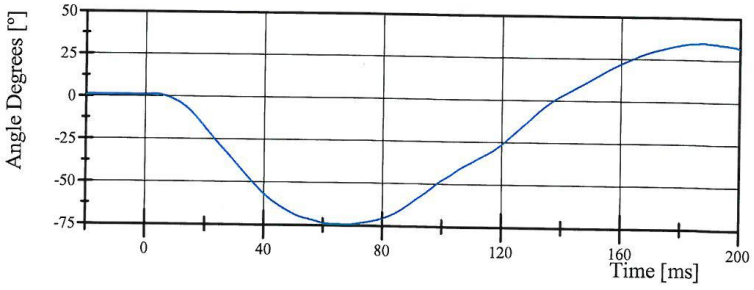
Filter Class: CFC_60
Max: 24.4 ° at 190.2 ms
Min: -48.8 ° at 61.9 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 12.0 ° at 179.9 ms
Min: -12.6 ° at 40.7 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 34.9 ° at 187.6 ms
Min: -74.8 ° at 67.7 ms

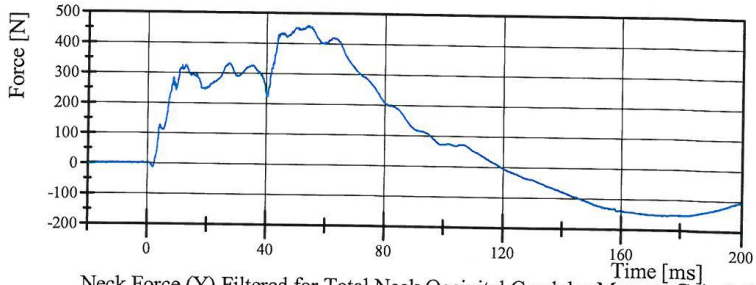
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.11.2013 14:12:42 639

Transportation Research Center Inc.

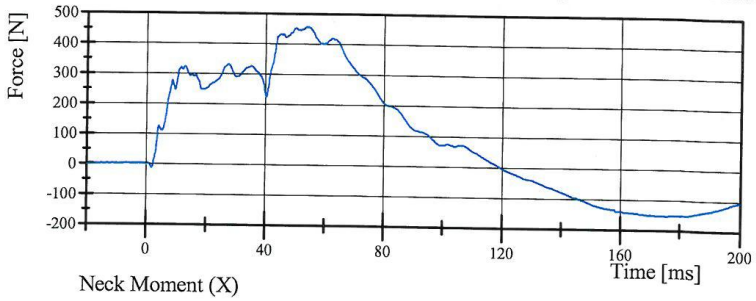
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/11/2013

Neck Force (Y)



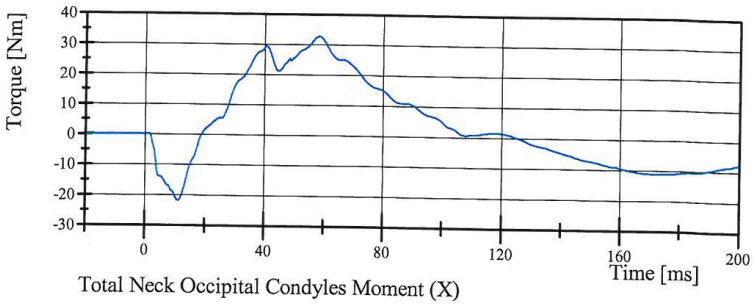
Filter Class: CFC_1000
Max: 458.0 N at 54.3 ms
Min: -153.3 N at 173.8 ms

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



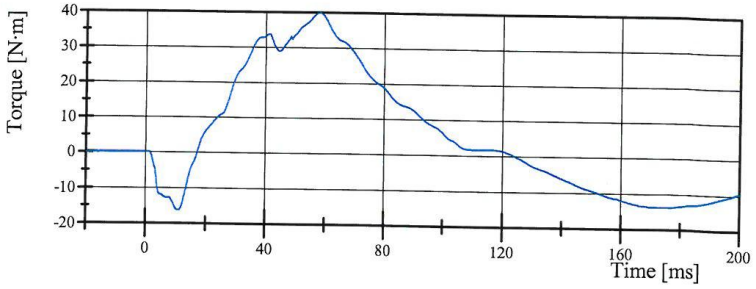
Filter Class: CFC_600
Max: 456.9 N at 53.7 ms
Min: -153.1 N at 175.5 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 32.8 Nm at 58.3 ms
Min: -22.0 Nm at 11.1 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constai
Max: 39.9 N·m at 58.2 ms
Min: -16.4 N·m at 11.1 ms

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

06.11.2013 14:12:43 639

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/12/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.2 g	Yes
Shoulder Displacement	28 - 37 mm	31.1 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.8 g	Yes

Test meets specifications.

Comments:

Technician

Approved

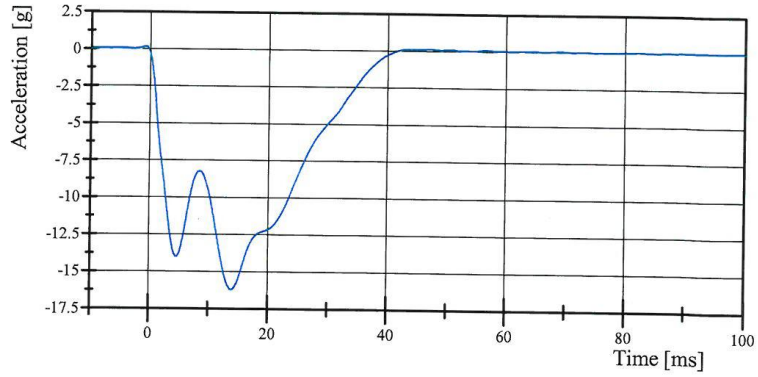
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.12.2013 13:52:32 821

Transportation Research Center Inc.

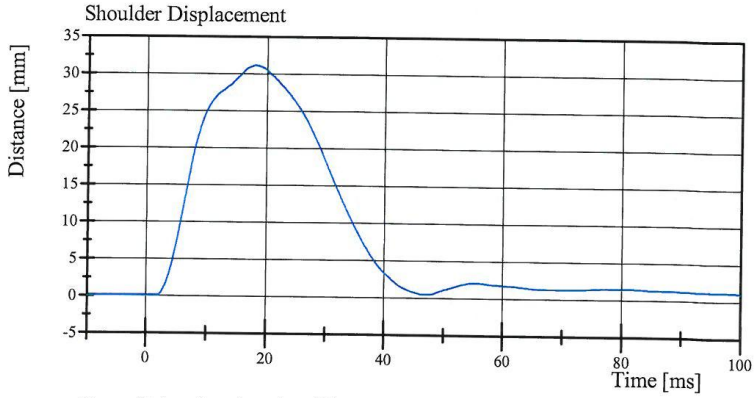
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/12/2013

Probe Acceleration



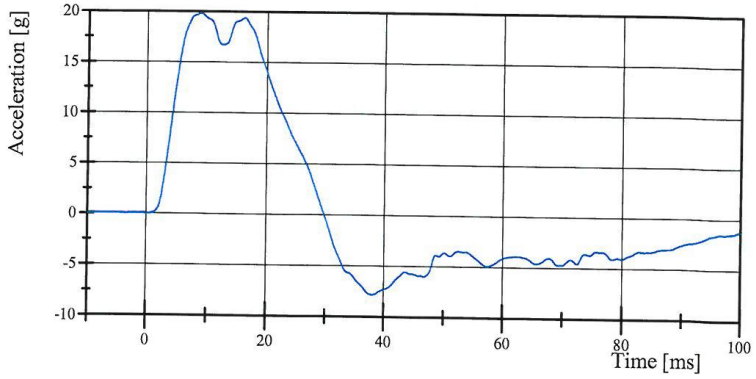
Filter Class: CFC_180
Max: 0.1 g at 47.0 ms
Min: -16.2 g at 13.9 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 31.1 mm at 18.0 ms
Min: -0.0 mm at -8.4 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 19.8 g at 8.8 ms
Min: -7.9 g at 38.1 ms

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

06.12.2013 13:52:40 821

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 19-2
Test Date: 6/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.738 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.5 g	Yes
Shoulder Displacement	31 - 40 mm	34.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.5 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.4 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.0 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.9 g	Yes

Test meets specifications.

Comments:

Technician

Approved

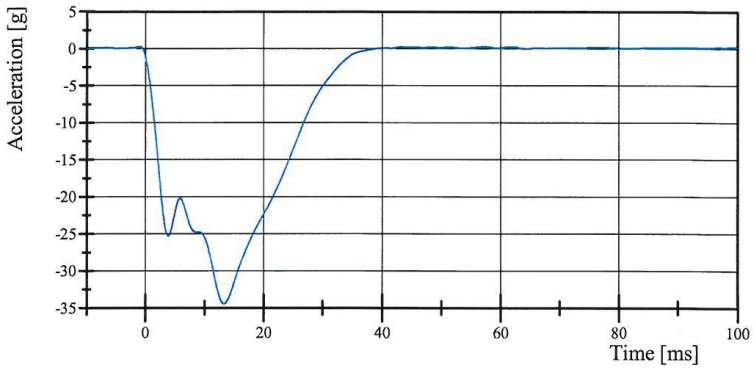
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.13.2013 08:07:59 604

Transportation Research Center Inc.

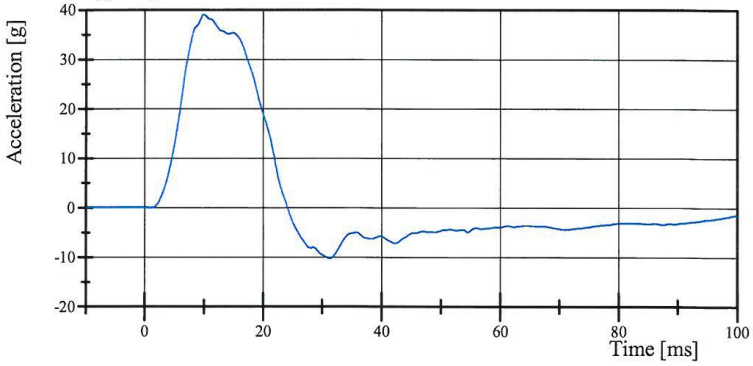
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 19-2
Test Date: 6/13/2013

Probe Acceleration



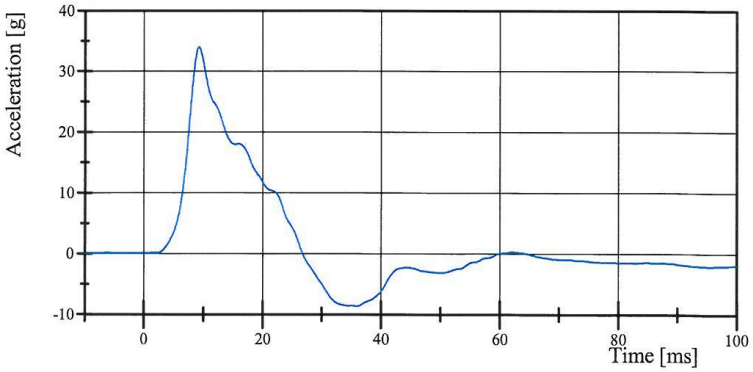
Filter Class: CFC_180
Max: 0.2 g at 57.1 ms
Min: -34.5 g at 13.3 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 39.0 g at 9.9 ms
Min: -10.3 g at 31.3 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 33.9 g at 9.3 ms
Min: -8.7 g at 35.9 ms

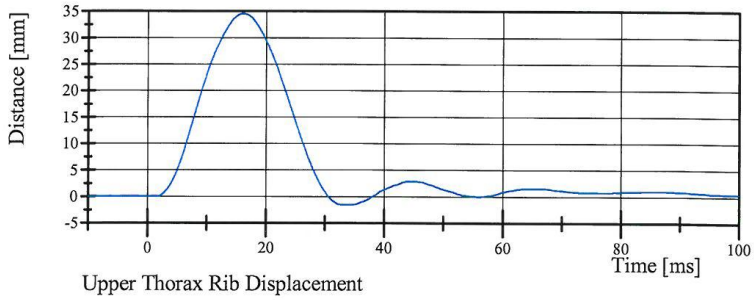
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.13.2013 08:08:09 604

Transportation Research Center Inc.

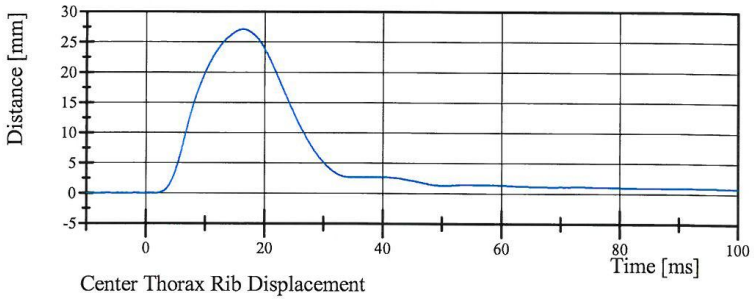
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 19-2
Test Date: 6/13/2013

Shoulder Rib Displacement



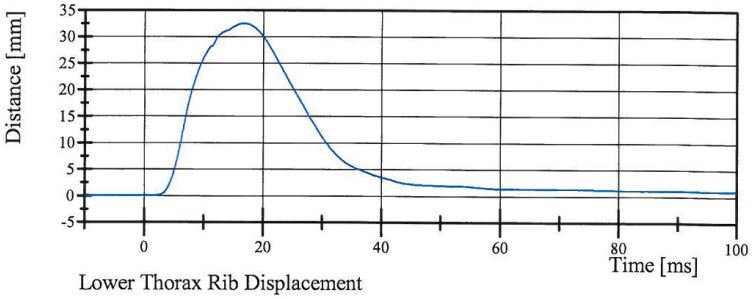
Filter Class: CFC_600
Max: 34.5 mm at 16.0 ms
Min: -1.6 mm at 34.4 ms

Upper Thorax Rib Displacement



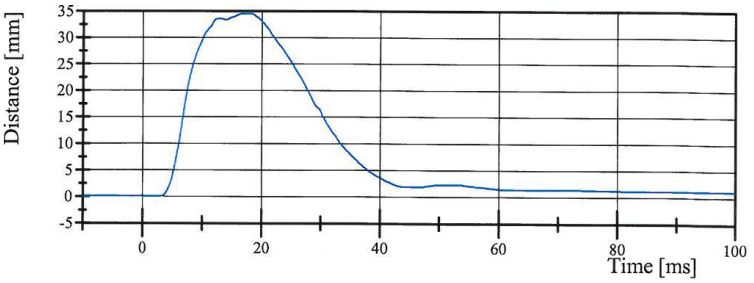
Filter Class: CFC_600
Max: 27.1 mm at 16.3 ms
Min: -0.0 mm at -5.5 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.5 mm at 16.7 ms
Min: -0.0 mm at -3.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 34.4 mm at 18.2 ms
Min: -0.0 mm at -5.4 ms

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

06.13.2013 08:08:09 604

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/12/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.387 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	42.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.8 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.7 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.6 g	Yes

Test meets specifications.

Comments:

Technician

Approved

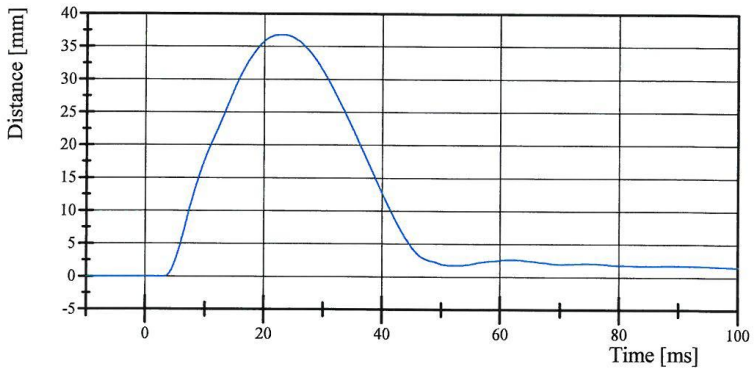
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.12.2013 15:24:40 795

Transportation Research Center Inc.

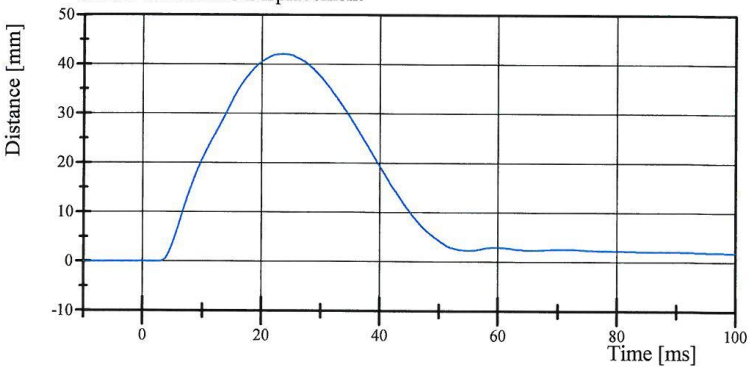
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/12/2013

Upper Thorax Rib Displacement



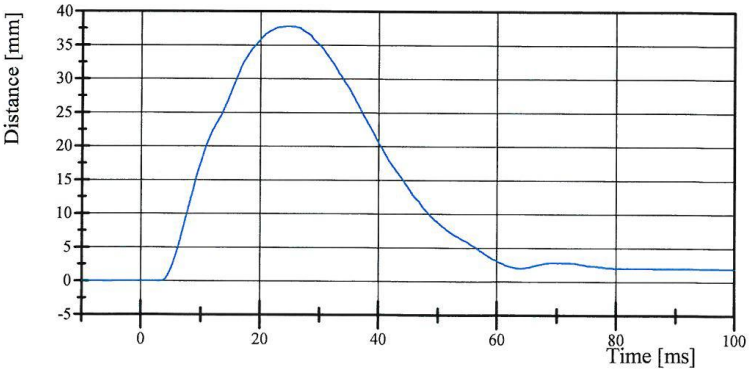
Filter Class: CFC_600
Max: 36.8 mm at 23.2 ms
Min: -0.0 mm at 3.1 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 42.1 mm at 23.5 ms
Min: -0.0 mm at -2.2 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.8 mm at 24.7 ms
Min: -0.0 mm at 2.2 ms

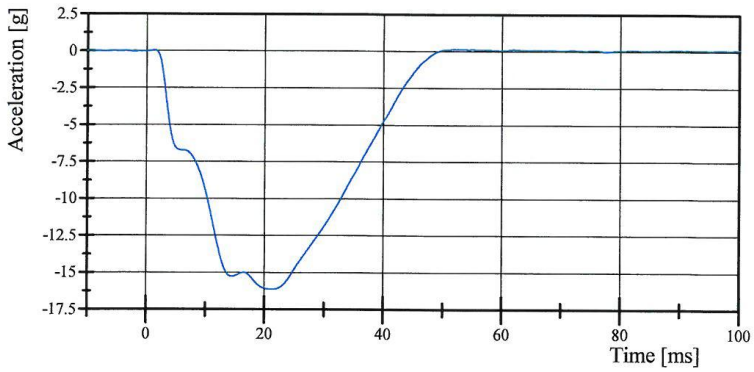
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.12.2013 15:24:49 795

Transportation Research Center Inc.

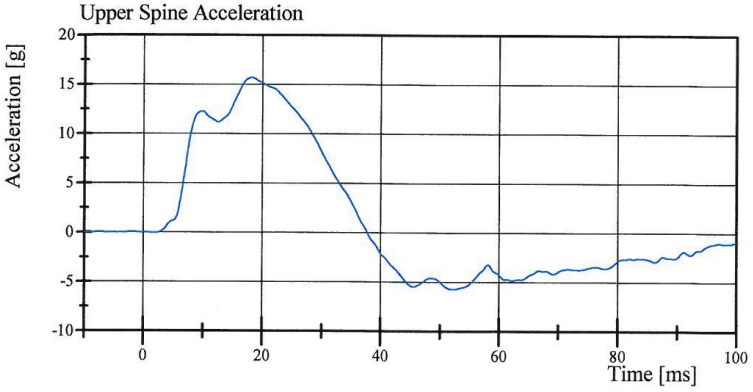
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/12/2013

Probe Acceleration



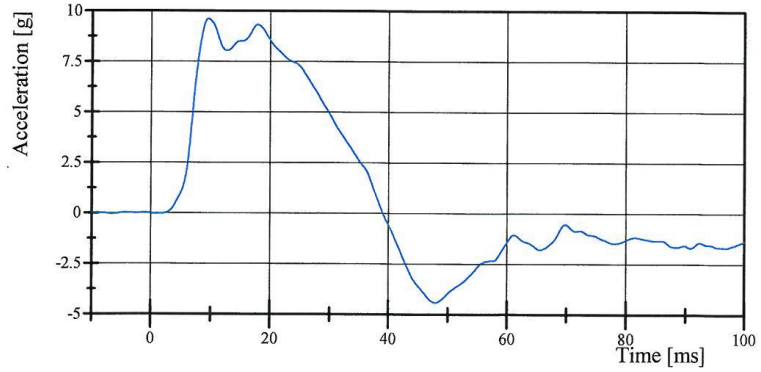
Filter Class: CFC_180
Max: 0.1 g at 52.2 ms
Min: -16.1 g at 21.3 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.7 g at 18.2 ms
Min: -5.7 g at 52.2 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.6 g at 9.6 ms
Min: -4.4 g at 47.9 ms

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

06.12.2013 15:24:48 795

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 19-2
Test Date: 6/12/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.2 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.4 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	42.1 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.51 g	Yes

Test meets specifications.

Comments:

Technician

Approved

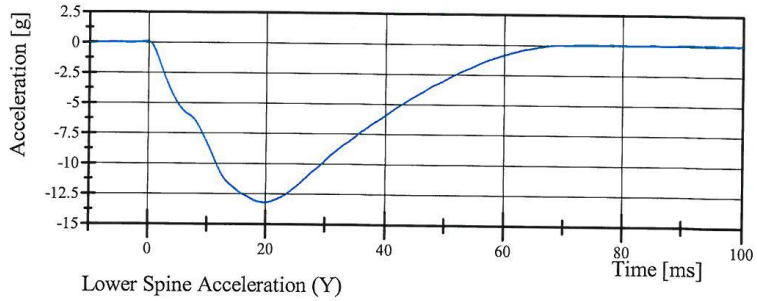
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.12.2013 14:51:06 652

Transportation Research Center Inc.

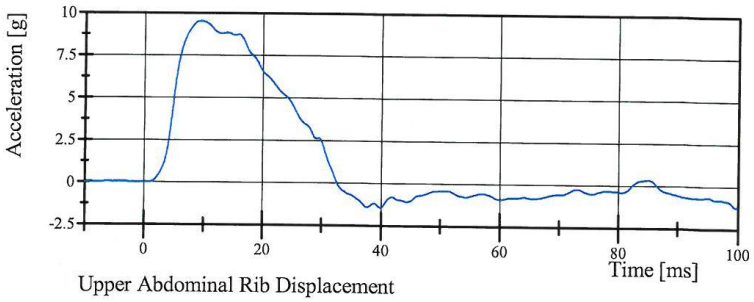
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 19-2
Test Date: 6/12/2013

Probe Acceleration



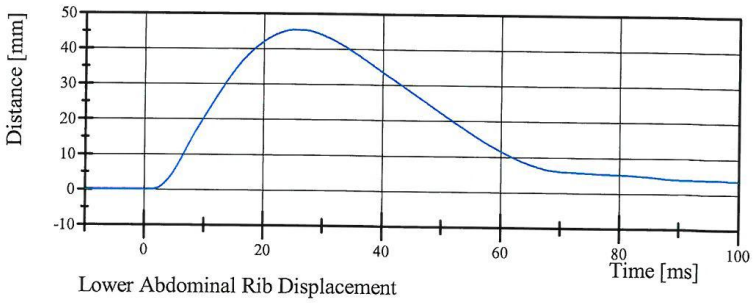
Filter Class: CFC_180
Max: 0.1 g at 91.4 ms
Min: -13.2 g at 19.8 ms

Lower Spine Acceleration (Y)



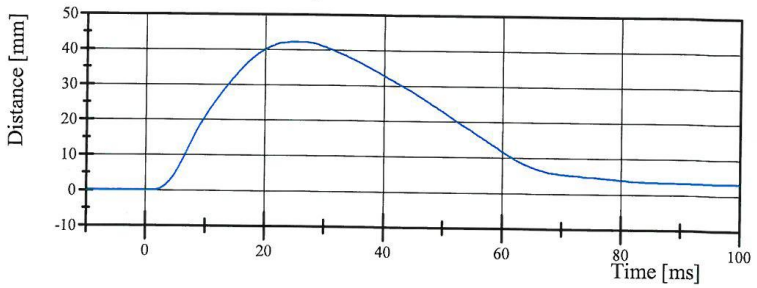
Filter Class: CFC_180
Max: 9.5 g at 9.4 ms
Min: -1.4 g at 39.8 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 45.4 mm at 25.6 ms
Min: -0.0 mm at -9.0 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 42.1 mm at 25.4 ms
Min: -0.0 mm at 1.5 ms

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

06.12.2013 14:51:20 652

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.45 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,163.6 N	Yes

Test meets specifications.

Comments:

Technician

Approved

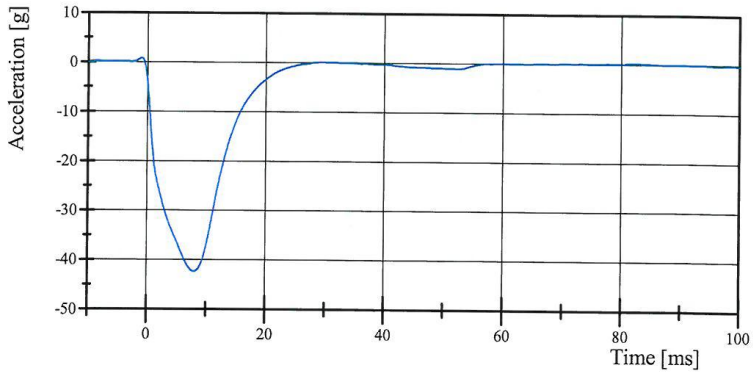
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.13.2013 10:50:19 449

Transportation Research Center Inc.

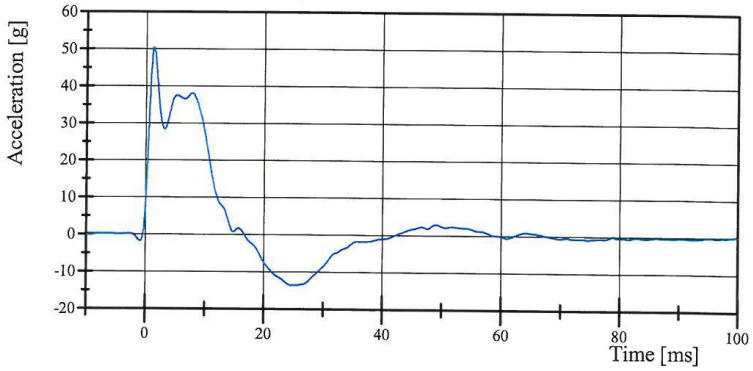
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/13/2013

Probe Acceleration



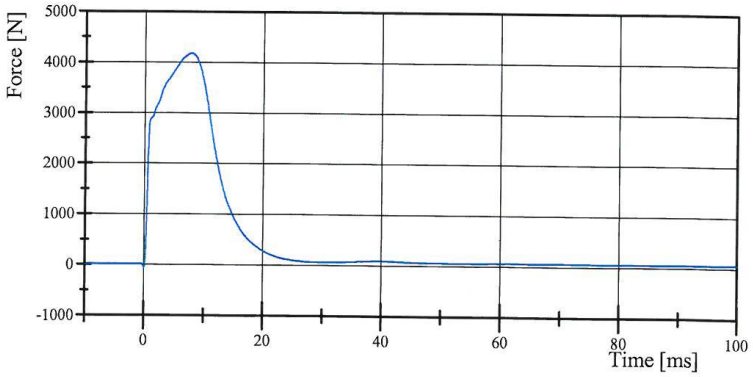
Filter Class: CFC_180
Max: 0.6 g at -1.0 ms
Min: -42.5 g at 7.9 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 50.3 g at 1.3 ms
Min: -13.7 g at 24.8 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,163.6 N at 7.8 ms
Min: -63.7 N at 0.0 ms

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

06.13.2013 10:53:33 449

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	34.6 g	Yes
Iliac Force	4,100 - 5,100 N	5,037.2 N	Yes

Test meets specifications.

Comments:

Technician

Approved

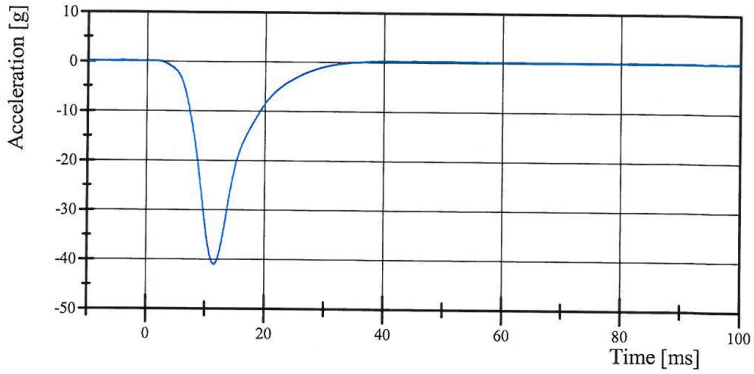
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.13.2013 08:21:34 640

Transportation Research Center Inc.

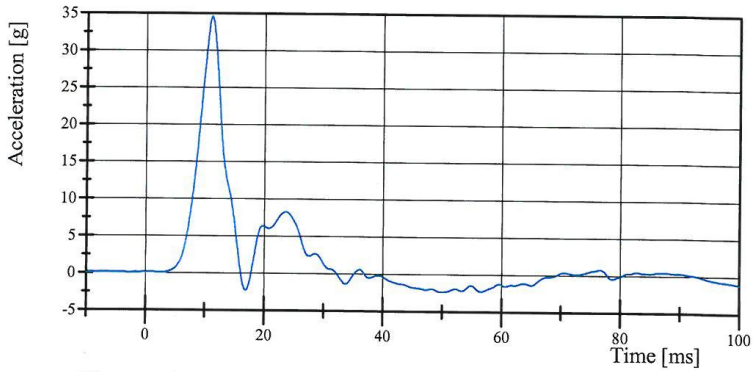
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 19-1
Test Date: 6/13/2013

Probe Acceleration



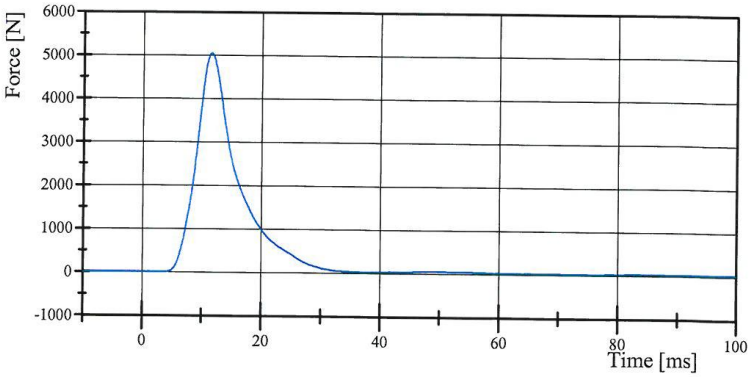
Filter Class: CFC_180
Max: 0.2 g at 45.0 ms
Min: -41.1 g at 11.5 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 34.6 g at 11.1 ms
Min: -2.4 g at 49.9 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 5,037.2 N at 11.6 ms
Min: -0.9 N at -6.3 ms

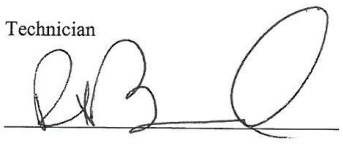
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.13.2013 08:21:42 640

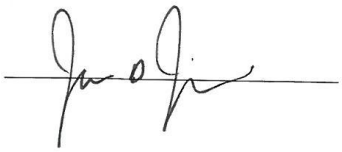
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.019

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	442	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	133	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	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	315	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	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	865	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician



Approved



Revised 9/29/2005

Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

SID-IIs Dummy
Serial No. 305
Calibration No. 20

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

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/20/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	122.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.9 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

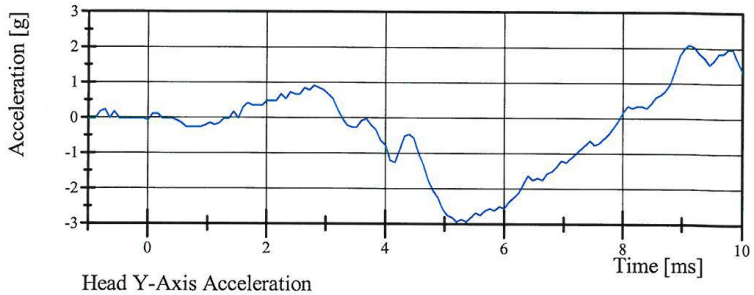
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 07:08:48 230

Transportation Research Center Inc.

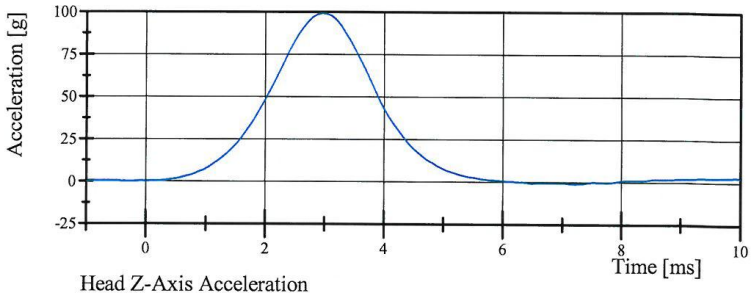
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/20/2013

Head X-Axis Acceleration



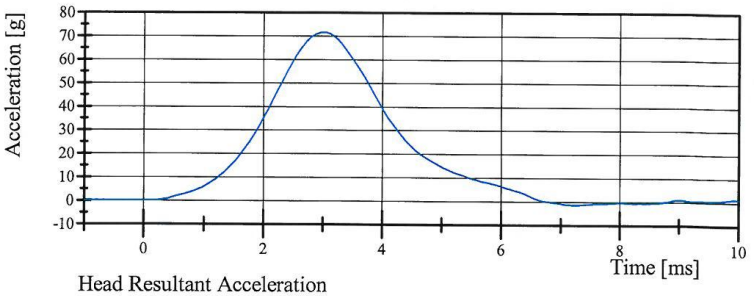
Filter Class: CFC_1000
Max: 2.1 g at 9.1 ms
Min: -2.9 g at 5.2 ms

Head Y-Axis Acceleration



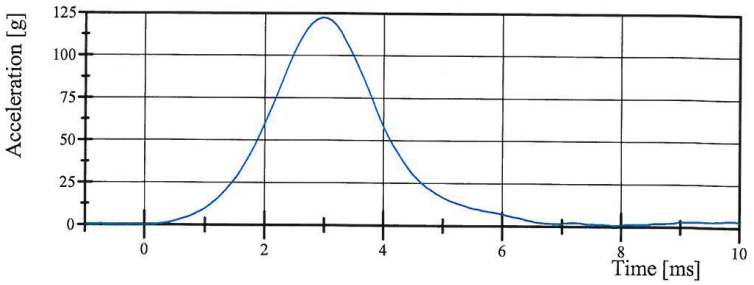
Filter Class: CFC_1000
Max: 99.1 g at 3.0 ms
Min: -1.2 g at 7.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 71.5 g at 3.0 ms
Min: -1.5 g at 7.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 122.2 g at 3.0 ms
Min: 0.0 g at -0.9 ms

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

06.21.2013 07:08:55 230

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.612 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.435 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.589 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.806 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.720 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.796 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.2 deg	Yes
Time of Peak	50 - 70 ms	65.8 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	123.6 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

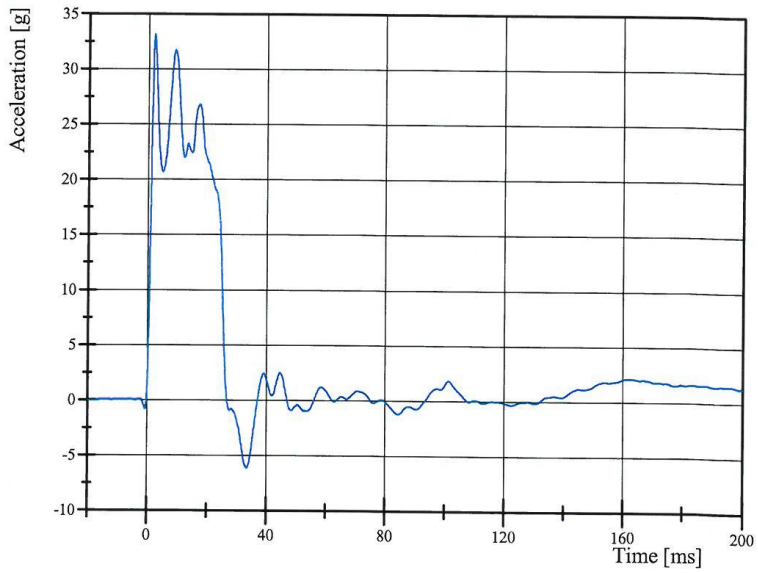
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 08:51:32 637

Transportation Research Center Inc.

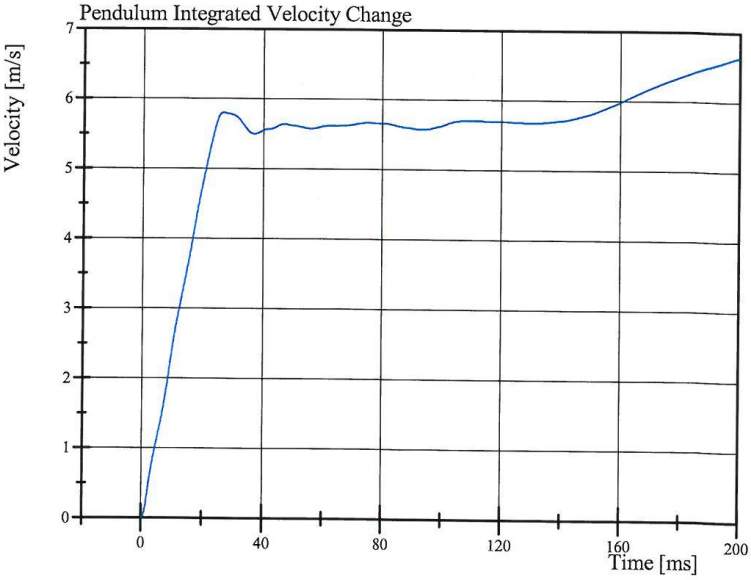
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 33.1 g at 2.0 ms
Min: -6.2 g at 33.4 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.6 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

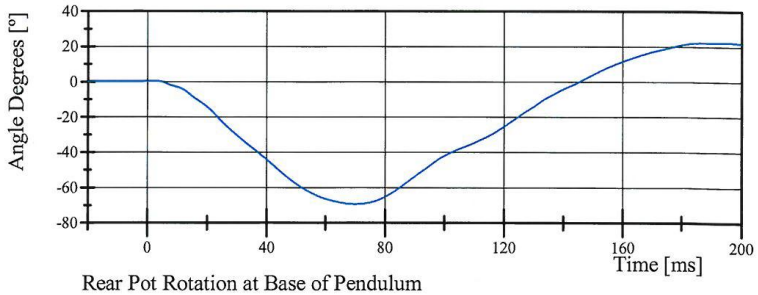
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 08:51:40 637

Transportation Research Center Inc.

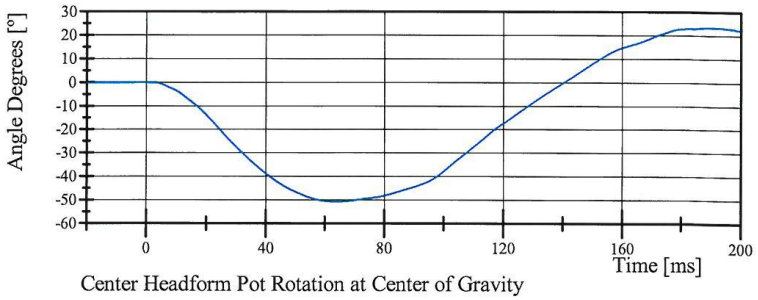
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Forward Pot Rotation at Base of Pendulum



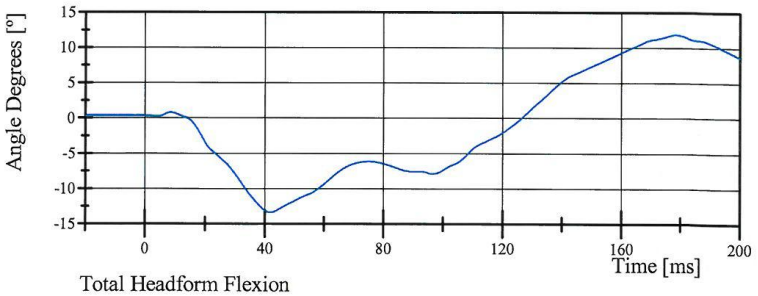
Filter Class: CFC_60
Max: 22.1 ° at 189.3 ms
Min: -69.4 ° at 70.0 ms

Rear Pot Rotation at Base of Pendulum



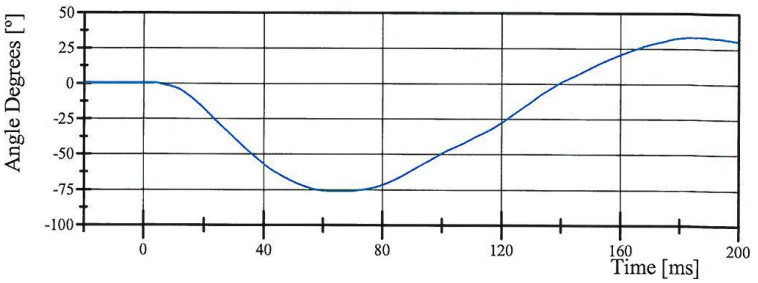
Filter Class: CFC_60
Max: 23.4 ° at 190.0 ms
Min: -50.8 ° at 63.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.8 ° at 178.3 ms
Min: -13.4 ° at 41.8 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 33.1 ° at 186.6 ms
Min: -76.2 ° at 65.8 ms

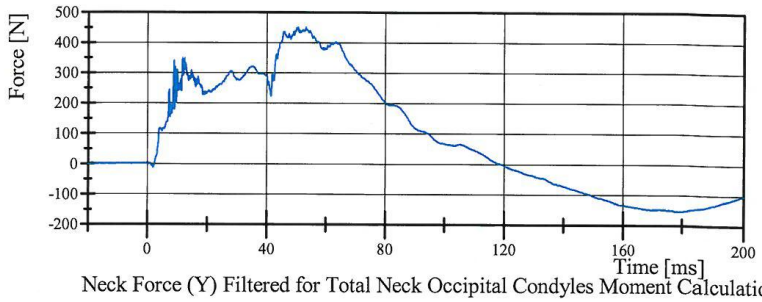
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 08:51:41 637

Transportation Research Center Inc.

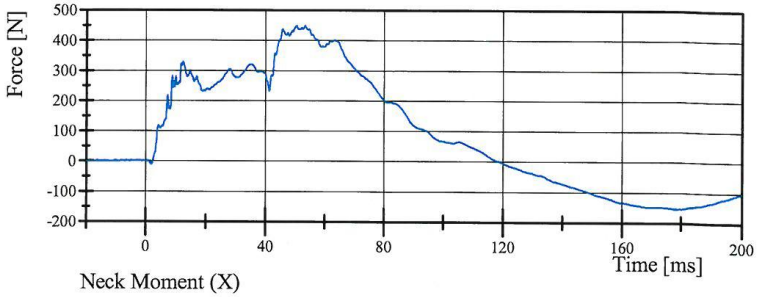
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Neck Force (Y)



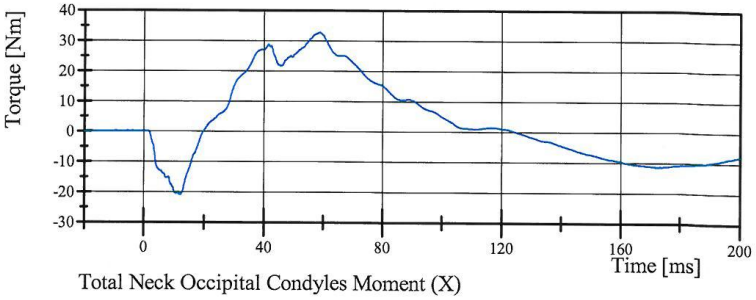
Filter Class: CFC_1000
Max: 451.5 N at 50.6 ms
Min: -154.9 N at 177.5 ms

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



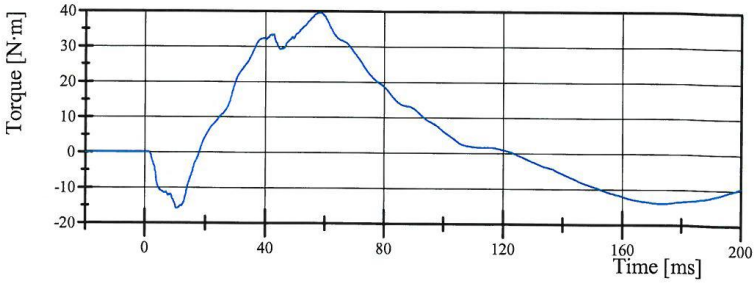
Filter Class: CFC_600
Max: 447.6 N at 53.3 ms
Min: -154.1 N at 178.6 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 32.8 Nm at 58.7 ms
Min: -20.9 Nm at 11.8 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constai
Max: 39.5 N·m at 58.6 ms
Min: -16.0 N·m at 10.6 ms

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

06.21.2013 08:51:42 637

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °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	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	30.4 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.0 g	Yes

Test meets specifications.

Comments:

Technician

Approved

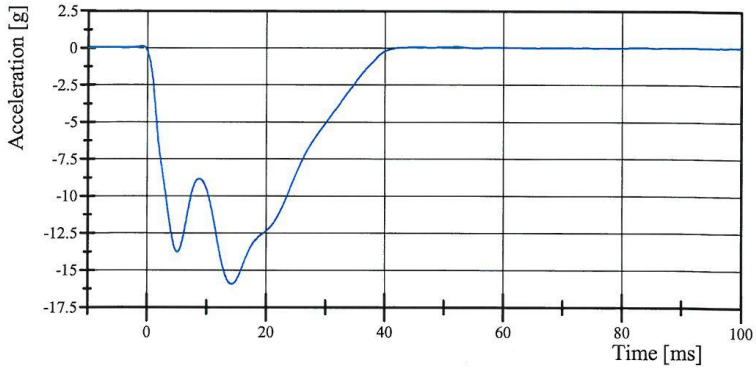
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 10:28:59 845

Transportation Research Center Inc.

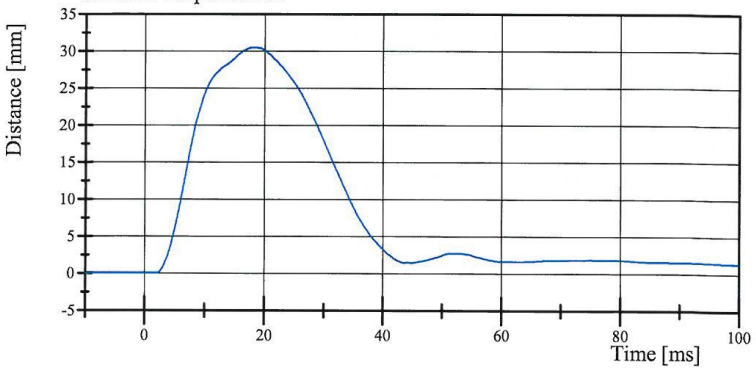
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Probe Acceleration



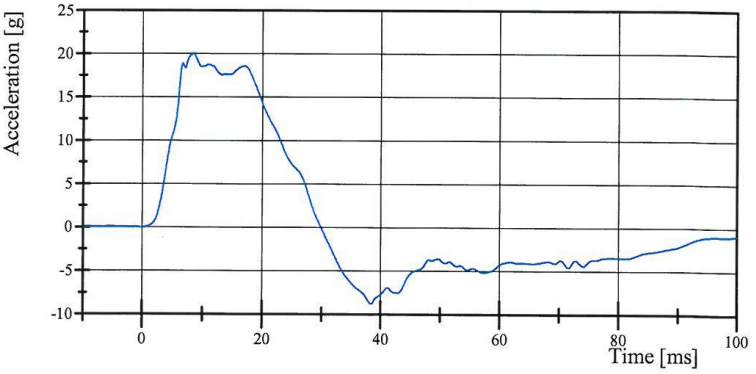
Filter Class: CFC_180
Max: 0.1 g at -0.9 ms
Min: -15.9 g at 14.2 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 30.4 mm at 18.3 ms
Min: -0.0 mm at 1.9 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 20.0 g at 8.5 ms
Min: -8.8 g at 38.3 ms

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

06.21.2013 10:29:08 845

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.745 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.1 g	Yes
Shoulder Displacement	31 - 40 mm	33.2 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.6 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.8 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.0 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.7 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.8 g	Yes

Test meets specifications.

Comments:

Technician

Approved

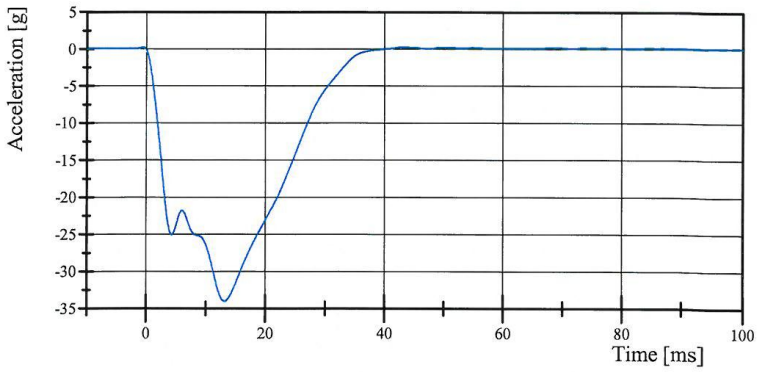
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 11:20:56 599

Transportation Research Center Inc.

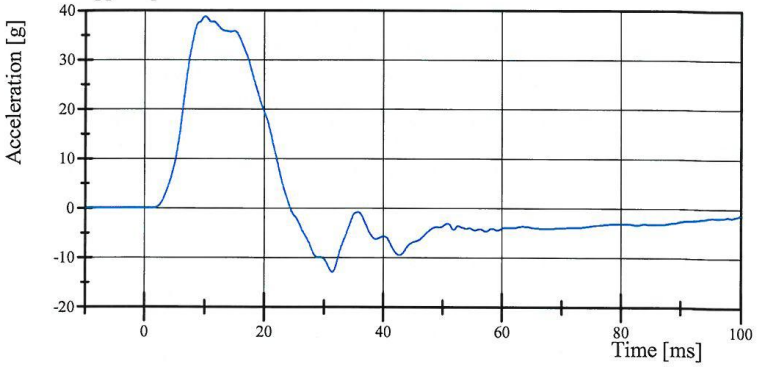
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Probe Acceleration



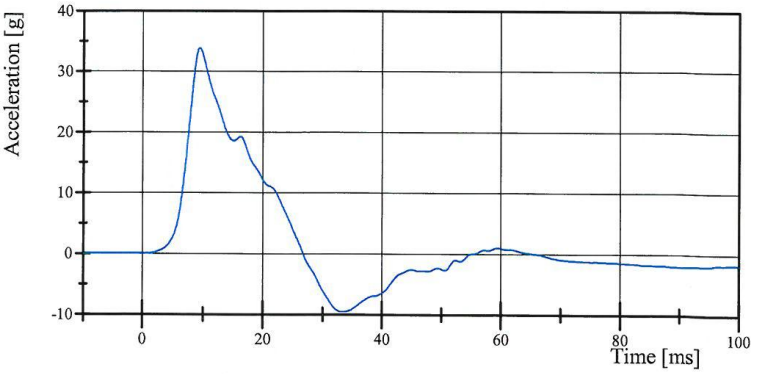
Filter Class: CFC_180
Max: 0.2 g at 43.1 ms
Min: -34.1 g at 13.1 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 38.7 g at 10.1 ms
Min: -12.9 g at 31.4 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 33.8 g at 9.4 ms
Min: -9.6 g at 33.4 ms

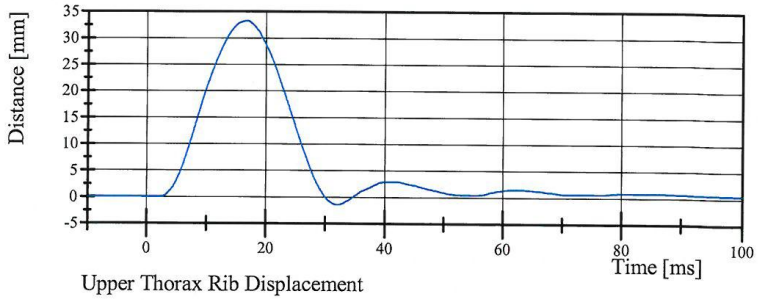
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 11:21:07 599

Transportation Research Center Inc.

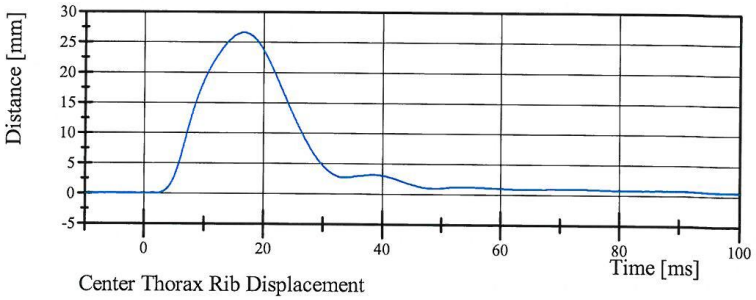
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Shoulder Rib Displacement



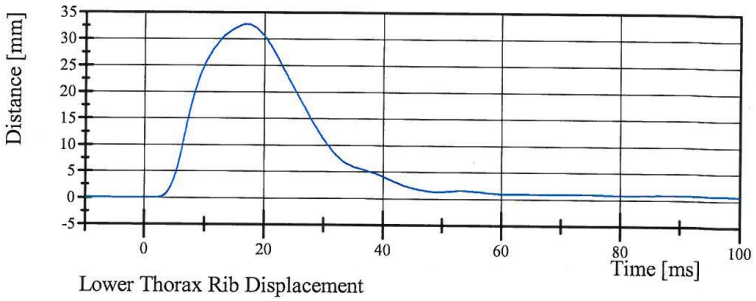
Filter Class: CFC_600
Max: 33.2 mm at 16.7 ms
Min: -1.4 mm at 32.0 ms

Upper Thorax Rib Displacement



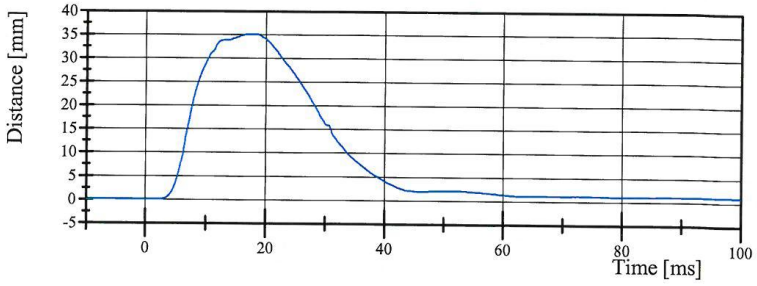
Filter Class: CFC_600
Max: 26.6 mm at 16.6 ms
Min: -0.0 mm at -7.9 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.8 mm at 17.0 ms
Min: -0.0 mm at -4.1 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 35.0 mm at 17.3 ms
Min: -0.0 mm at -4.5 ms

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

06.21.2013 11:21:08 599

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.387 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.7 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	34.2 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.7 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.9 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.0 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.2 g	Yes

Test meets specifications.

Comments:

Technician

Approved

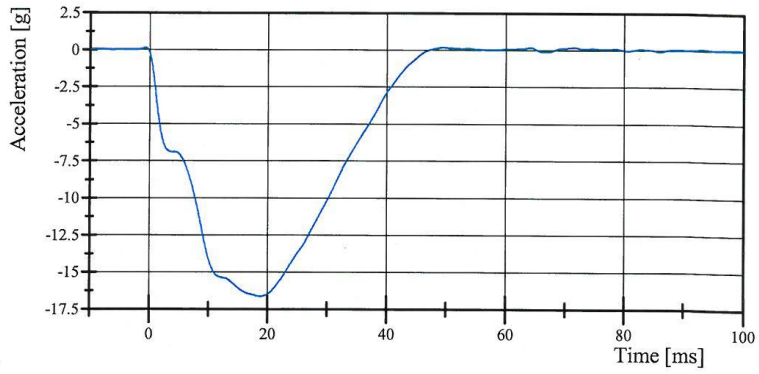
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 10:47:03 812

Transportation Research Center Inc.

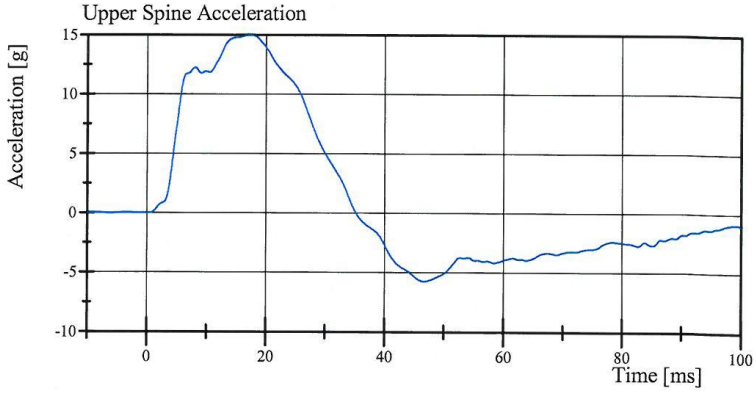
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Probe Acceleration



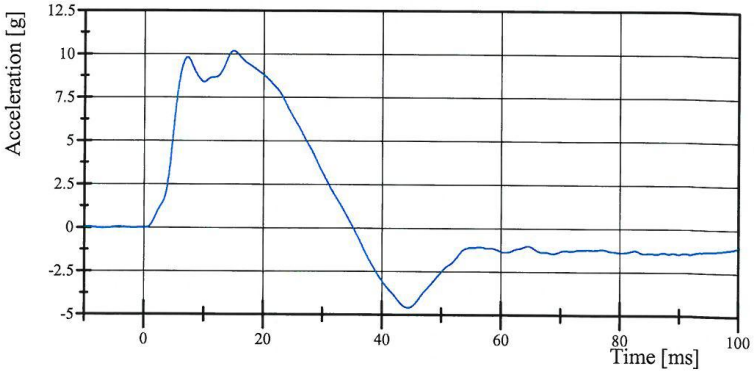
Filter Class: CFC_180
Max: 0.2 g at 71.5 ms
Min: -16.7 g at 18.7 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.0 g at 17.4 ms
Min: -5.7 g at 46.6 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 10.2 g at 15.0 ms
Min: -4.6 g at 44.4 ms

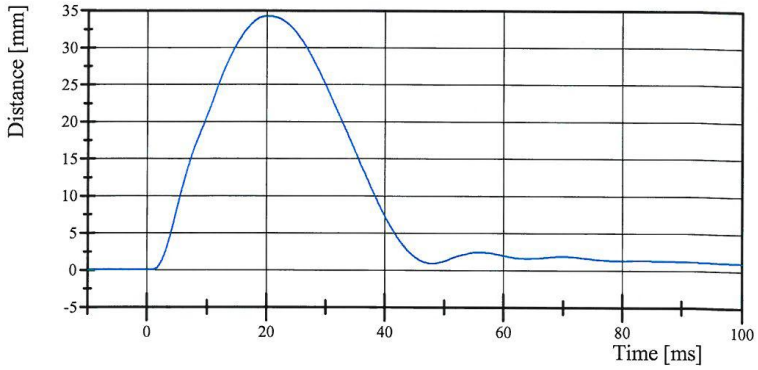
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 10:47:23 812

Transportation Research Center Inc.

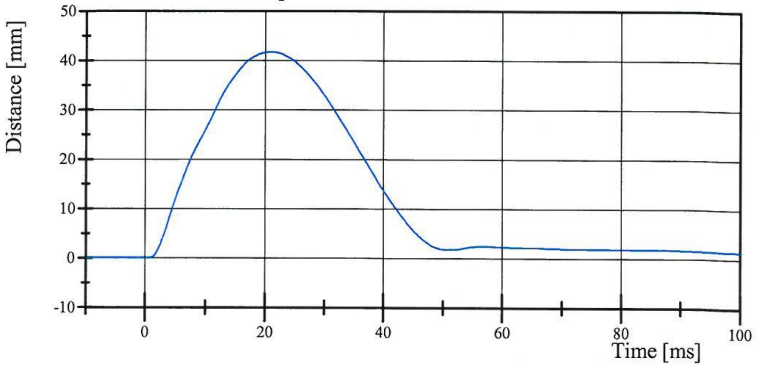
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Upper Thorax Rib Displacement



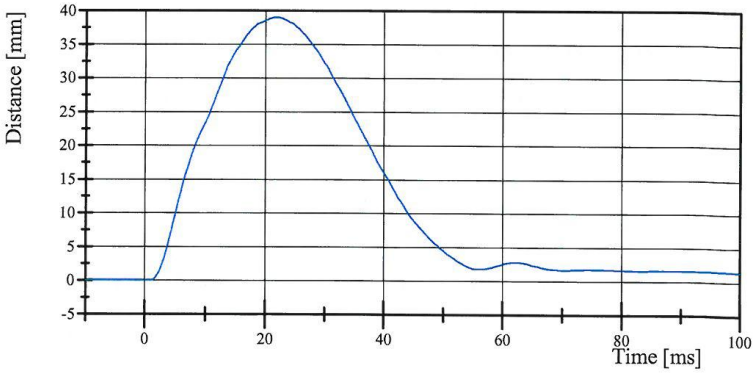
Filter Class: CFC_600
Max: 34.2 mm at 20.2 ms
Min: -0.0 mm at 0.9 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.7 mm at 21.0 ms
Min: -0.0 mm at 0.6 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.9 mm at 21.8 ms
Min: -0.0 mm at 1.0 ms

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

06.21.2013 10:47:23 812

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.4 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.8 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	43.0 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.38 g	Yes

Test meets specifications.

Comments:

Technician

Approved

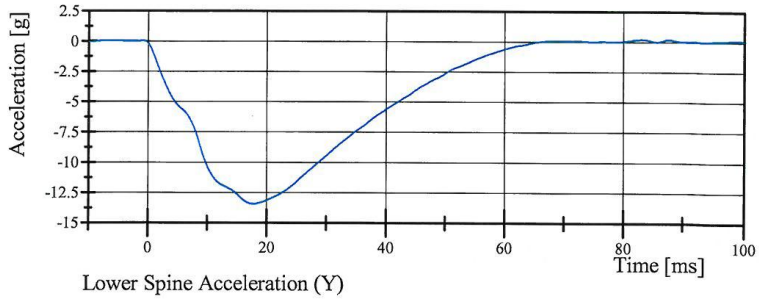
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 11:34:03 665

Transportation Research Center Inc.

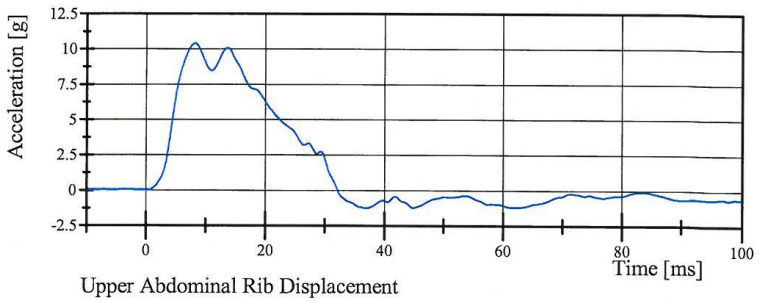
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Probe Acceleration



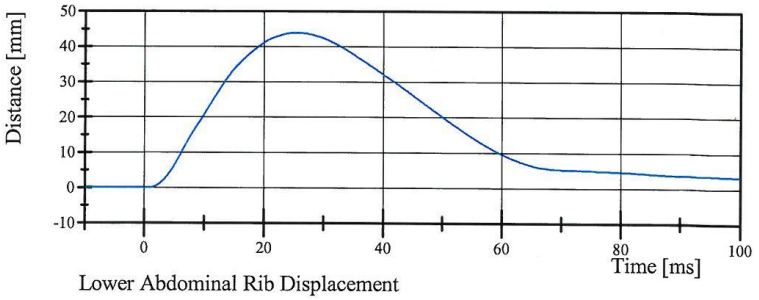
Filter Class: CFC_180
Max: 0.2 g at 87.6 ms
Min: -13.4 g at 17.8 ms

Lower Spine Acceleration (Y)



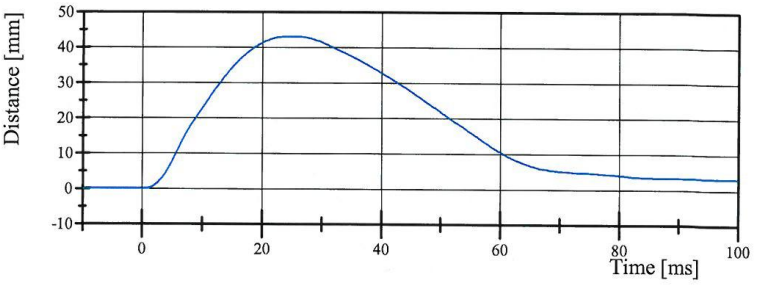
Filter Class: CFC_180
Max: 10.4 g at 8.2 ms
Min: -1.3 g at 36.9 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 43.8 mm at 25.1 ms
Min: -0.0 mm at -1.6 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 43.0 mm at 25.0 ms
Min: -0.0 mm at 0.6 ms

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

06.21.2013 11:34:12 665

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 20-5
Test Date: 6/25/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-39.95 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.3 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,206.5 N	Yes

Test meets specifications.

Comments:

Technician

Approved

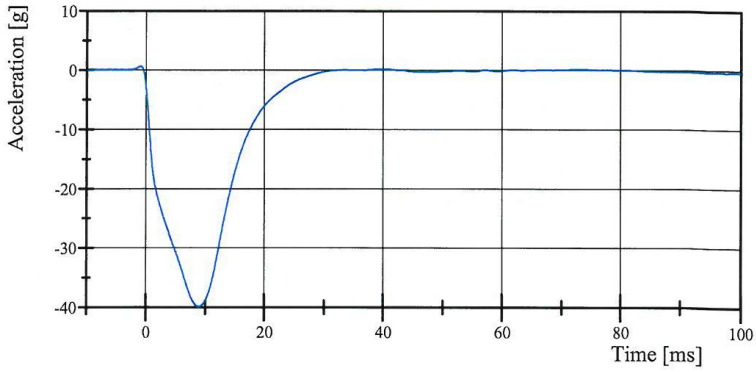
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.25.2013 09:06:03 461

Transportation Research Center Inc.

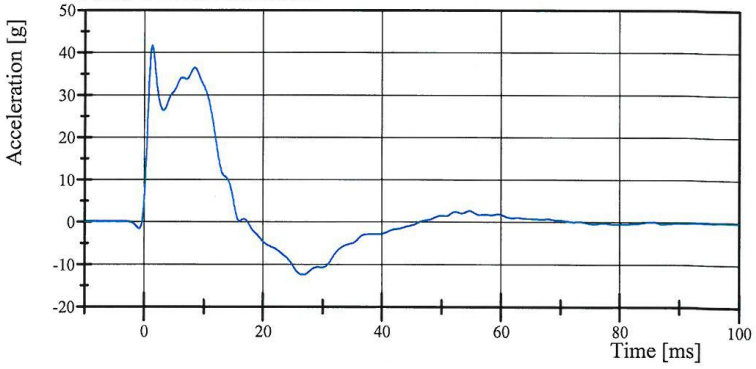
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 20-5
Test Date: 6/25/2013

Probe Acceleration



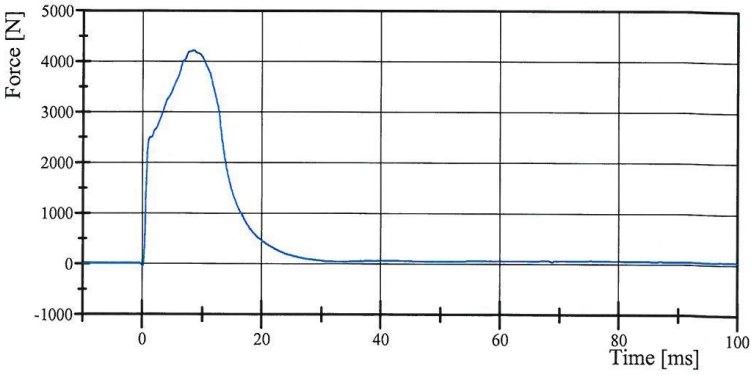
Filter Class: CFC_180
Max: 0.5 g at -1.0 ms
Min: -39.9 g at 9.0 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 41.5 g at 1.3 ms
Min: -12.5 g at 26.6 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,206.5 N at 8.5 ms
Min: -52.7 N at 0.1 ms

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

06.25.2013 09:06:23 461

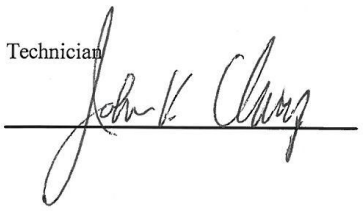
Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-38.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.9 g	Yes
Iliac Force	4,100 - 5,100 N	4,652.0 N	Yes

Test meets specifications.

Comments:

Technician 

Approved 

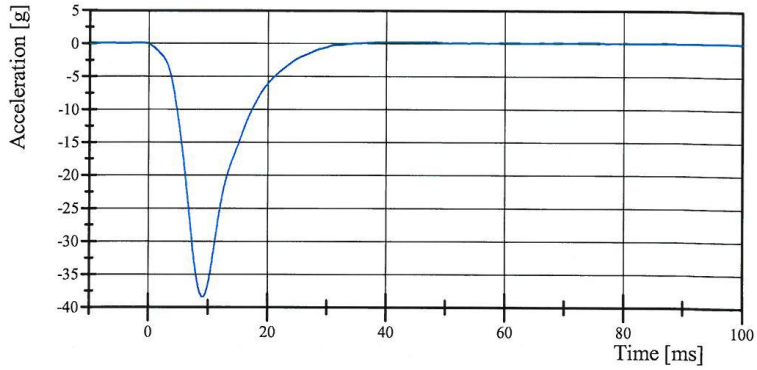
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 10:14:04 679

Transportation Research Center Inc.

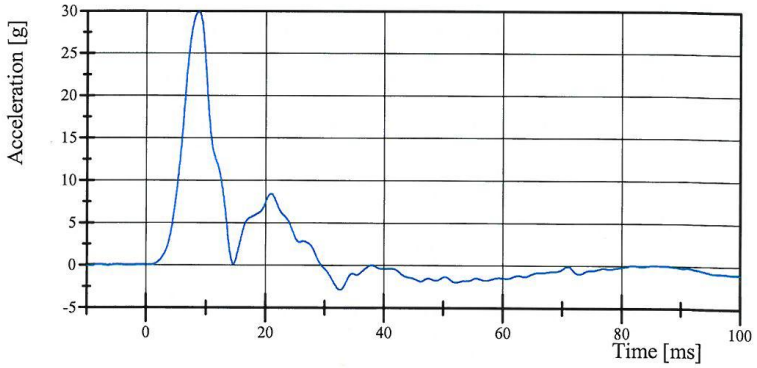
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

Probe Acceleration



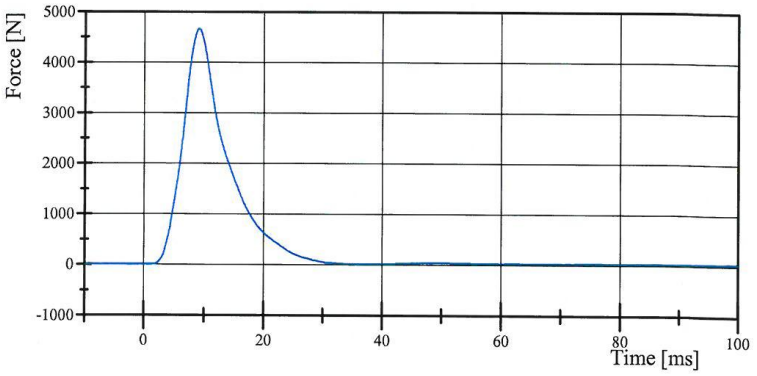
Filter Class: CFC_180
Max: 0.2 g at 42.9 ms
Min: -38.5 g at 9.1 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 29.9 g at 8.7 ms
Min: -2.9 g at 32.6 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,652.0 N at 9.0 ms
Min: -0.8 N at -6.4 ms

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

06.21.2013 10:14:13 679

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.020

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	443	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	132	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	316	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	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	866	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician

Approved

Revised 9/29/2005

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F030		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	P58890	Endevco	7-Jun-13
		Y	P51702	Endevco	7-Jun-13
		Z	P52083	Endevco	7-Jun-13
Thoracic Rib Displacement Potentiometers	Upper	Y	175	FTSS	7-Jun-13
	Middle	Y	174	FTSS	7-Jun-13
	Lower	Y	173	FTSS	7-Jun-13
Abdomen Load Cells	Upper	Y	1441	Denton	28-Sep-12
	Middle	Y	1436	Denton	28-Sep-12
	Lower	Y	1437	Denton	28-Sep-12
Lower Spine Accelerometers (T12)		X	P68599	Endevco	7-Jun-13
		Y	P59002	Endevco	7-Jun-13
		Z	P59005	Endevco	7-Jun-13
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	28-Sep-12

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P51719	Endevco	11-Jun-13
			Y	P51272	Endevco	11-Jun-13
			Z	P58862	Endevco	11-Jun-13
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	11-Jun-13
		Middle	Y	1161	Servo	11-Jun-13
		Lower	Y	1279	Servo	11-Jun-13
	Abdominal Rib	Upper	Y	1295	Servo	11-Jun-13
		Lower	Y	1136	Servo	12-Jun-13
Lower Spine Accelerometers (T12)			X	P50068	Endevco	11-Jun-13
			Y	P52051	Endevco	11-Jun-13
			Z	P51710	Endevco	11-Jun-13
Acetabulum Load Cell			Y	287-FY	FTSS	27-Sep-12
Iliac Wing Load Cell			Y	103-FY	FTSS	27-Sep-12
Pelvis Plug (struck side)				46083	FTSS	21-Aug-11
Pelvis Plug (non-struck side)				46874	FTSS	5-Oct-11

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P80161	Endevco	17-Apr-13
	Vehicle Center of Gravity	Y	P79351	Endevco	17-Apr-13
	Vehicle Center of Gravity	Z	P80479	Endevco	17-Apr-13
2	Right Sill at Front Seat	X	P80130	Endevco	8-May-13
	Right Sill at Front Seat	Y	P79387	Endevco	14-May-13
	Right Sill at Front Seat	Z	P79502	Endevco	14-May-13
3	Right Sill at Rear Seat	X	P78141	Endevco	14-May-13
	Right Sill at Rear Seat	Y	P75240	Endevco	14-May-13
	Right Sill at Rear Seat	Z	P75994	Endevco	14-May-13
4	Left Sill at Front Door	Y	P80458	Endevco	1-Apr-13
5	Left Sill at Rear Door	Y	P80474	Endevco	17-Apr-13
6	Left A-Post Lower	Y	P80136	Endevco	25-Feb-13
7	Left A-Post Middle	Y	P80142	Endevco	25-Feb-13
8	Left B-Post Lower	Y	P80462	Endevco	1-Apr-13
9	B-Post Middle	Y	P80472	Endevco	1-Apr-13
10	Front Seat Track	Y	P75714	Endevco	28-May-13
11	Rear Seat Track or Structure	Y	P80477	Endevco	17-Apr-13
12	Right Rear Occupant Compartment	Y	P79378	Endevco	18-Apr-13
13	Engine Block	X	P80456	Endevco	1-Apr-13
	Engine Block	Y	P80189	Endevco	28-Mar-13
14	Rear Floorpan Above Axle	X	P72558	Endevco	14-May-13
	Rear Floorpan Above Axle	Y	P74537	Endevco	14-May-13
	Rear Floorpan Above Axle	Z	P75109	Endevco	14-May-13

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P78103	Endevco	20-Feb-13
MDB Center of Gravity	Y	P76411	Endevco	8-May-13
MDB Center of Gravity	Z	P78112	Endevco	15-Apr-13
Left Frame Rail at Rear Axle Centerline	X	P76251	Endevco	13-Feb-13
Left Frame Rail at Rear Axle Centerline	Y	P75726	Endevco	13-Feb-13