

FINAL REPORT NUMBER: SINCAP-TRC-14-005

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

**Mazda Motor Corporation
2014 Mazda 3 4-Door Sedan
NHTSA NUMBER: M20145405**

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



Report Date: April 4, 2014

FINAL REPORT

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement.

Report Prepared By: ILO Project Operations Group

Report Approved By: 

Jeffery W. Sankey, Manager, Project Operations

Approval Date: April 4, 2014

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

1. Report No. SINCAP-TRC-14-005	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2014 Mazda 3 4-door Sedan NHTSA No.: M20145405		5. Report Date April 4, 2014	
		6. Performing Organization Code TRC Inc.	
7. Author(s) Jeffery W. Sankey, Manager, Project Operations		8. Performing Organization Report Number 140122	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-09-D-00125	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report January 22 2014 – April 4, 2014	
		14. Sponsoring Agency Code NVS-111	
15. Supplemental Notes			
16. Abstract This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2014 Mazda 3 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 January 22, 2014. The impact velocity of the Moving Deformable Barrier (MDB) was 62.14 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21° C. The target vehicle post-test maximum crush was 198 mm at Level 2. The test vehicle's performance was as follows:			
Driver ATD (ES-2re)			
Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	245
Maximum Thoracic Rib Deflection	mm	44	31.8
Total Abdominal Force	N	2500	1229.7
Pubic Symphysis Force	N	6000	-2066.9
Passenger ATD (SID-IIs)			
Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	245
Lower Spine Resultant Acceleration	g's	82	72.0
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2558.3
Maximum Thoracic Rib Deflection	mm	38*	32.3
Maximum Abdominal Rib Deflection	mm	45*	42.0
* 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	
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 210	22. Price

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4
 <u>Appendix</u>		
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Performance Calibration Test Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1
 <u>Data Sheet No.</u>		
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	8
3	Dummy Longitudinal Clearance Dimensions	11
4	Dummy Lateral Clearance Dimensions	12
5	Camera and Instrumentation Data	13
6	Test Vehicle Accelerometer Locations	14
7	MDB Accelerometer Locations	15
8	Post-Test Observations	16
9	MDB Summary of Results	18
10	Test Vehicle Profile Measurements	19
11	Test Vehicle Exterior Crush Measurements	20
12	MDB Exterior Static Crush Measurements	23
13	FMVSS No. 301 Static Rollover Results	24
14	Dummy/Vehicle Temperature and Humidity Stabilization	25

SECTION 1
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 Mazda 3 4-door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A 2014 Mazda 3 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 62.14 km/h (38.61 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, Ohio, on January 22, 2014. 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 2013. The side impact event was documented by 11 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	245
Maximum Thoracic Rib Deflection	mm	44	31.8
Combined Abdominal Force	N	2500	1229.7
Pubic Symphysis Force	N	6000	-2066.9

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	245
Lower Spine (T12) Resultant Acceleration	G	82	72.0
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2558.3
Maximum Thoracic Rib Deflection	mm	38*	32.3
Maximum Abdominal Rib Deflection	mm	45*	42.0

* 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/Pelvis Airbag	Yes	Yes	No	N/A
Knee Airbag	No	NA	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	No	No	N/A
Other	N/A	N/A	N/A	N/A

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 vehicle had secondary impact with the cart on the left front bumper and fender.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20145405
Model Year	2014
Make	Mazda
Model	3
Body Style	Sedan
VIN	JM1BM1T78E1125406
Body Color	Silver
Odometer Reading (km/mi)	5 mi
Engine Displacement (L)	2.0
Type/No. Cylinders	4
Engine Placement	Front/Transverse
Transmission Type	Manual
Transmission Speeds	6
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
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	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
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? Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	10/13
Vehicle Type	Passenger Car

GVWR (kg)	1772
GAWR Front (kg)	925
GAWR Rear (kg)	855

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				385
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				44.8

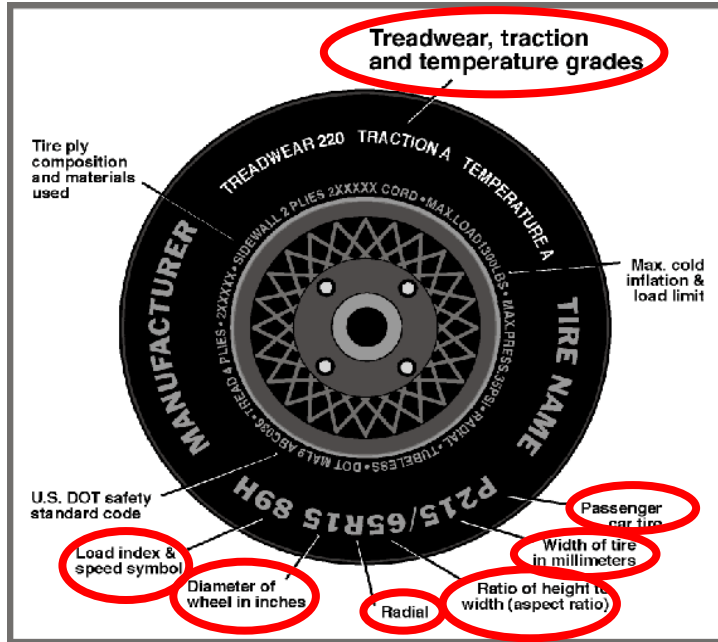
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes	N/A	N/A		N/A	Yes	N/A
Rear or Second Row Seat	N/A	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 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	250	250
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Yokohama	Yokohama
Tire Model	AVID S34	AVID S34
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	3	3
Load Index/Speed Symbol	91 H	91 H
Tire Material	Polyester & Steel	Polyester & Steel
DOT Safety Code Left	FD20-PHY3813	FD20-PHY3813
DOT Safety Code Right	FD20-PHY3813	FD20-PHY3813

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

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	207	250	207
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	207	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	389.4	260.8		420.6	322		421.6	343.4	
Right	kg	373.8	258.6		399.6	305.6		391.0	301.2	
Ratio	%	59.5	40.5		56.7	43.3		55.8	44.2	
Totals	kg	763.2	519.4	1282.6	820.2	627.6	1447.8	812.6	644.6	1457.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1282.6	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1452.4	(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	682	681	Yes
RF	mm	682	682	Yes
RR	mm	695	695	Yes
LR	mm	685	685	Yes
Vehicle CG (Aft of Front Axle)	mm	1194	1170	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	+39	+20	

***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: None	0.0
Removed: Front and rear fascia, muffler, trunk liner, tail lights, and horns.	26.6

DATA SHEET NO. 2

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

Test Vehicle: 2014 Mazda 3 4-door Sedan

NHTSA No.: M20145405

Test Program: NCAP Side Impact

Test Date: 1/22/14

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	20.5	16.3	18.4
Front Passenger Seat	N/A	N/A	18.4
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	12.1
Non-Struck Side Rear Seat	Fixed	N/A	12.7
Rear Center Seat*	Fixed	N/A	5.9

* 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	18.4	152	Max	N/A	N/A	N/A
			Mid	138	152	164
			Min	N/A	N/A	N/A
Front Passenger Seat	18.4	146	Max	N/A	N/A	N/A
			Mid	133	146	158
			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	12.1	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	12.7	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*	5.9	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 Mazda 3 4-door Sedan

NHTSA No.: M20145405

Test Program: NCAP Side Impact

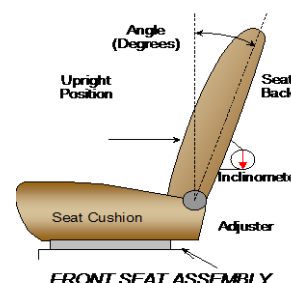
Test Date: 1/22/14

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	260	27	130	14
Front Passenger Seat	260	27	130	14
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	63.8	40	6.4 rwd	6
Front Passenger Seat	63.4	40	3.8 rwd	6
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	19.6	Fixed
Non-Struck Side Rear Seat	Fixed	N/A	19.7	Fixed
Rear Center Seat*	Fixed	N/A	27.3	Fixed

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	3, Numbered from 0 to 2	0, Uppermost
Rear Seat	1	1, 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	3, Numbered from 0 to 2	0, Uppermost
Rear Seat	1	0, Fixed

DATA SHEET NO. 2 (CONTINUED)

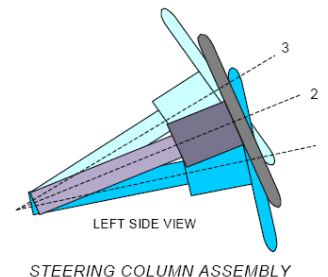
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14

STEERING COLUMN ADJUSTMENT

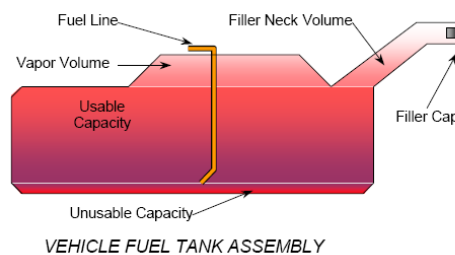
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.



	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	25.2	50
Geometric Center, Position No. 2	22.9	50
Uppermost, Position No. 3	20.5	50
Telescoping Steering Wheel Travel		50
Test Position	22.9	25

FUEL PUMP

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



FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	50.0
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	50.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	46.5
Actual Amount of Solvent Used in Test	46.5
1/3 of Usable Capacity	16.7

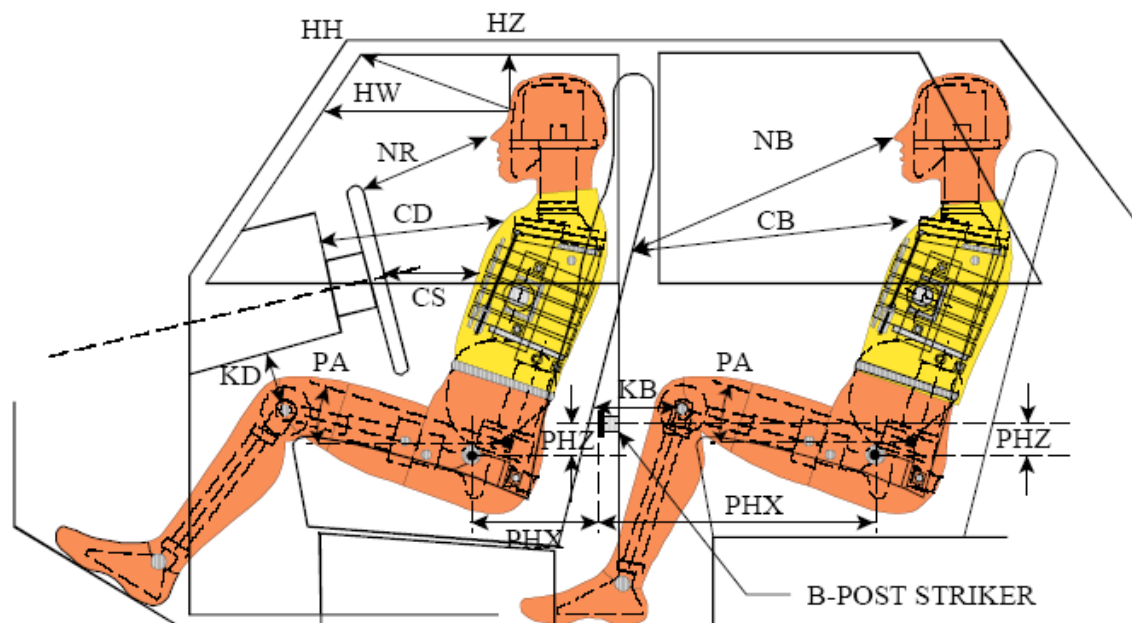
Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in on Form No. 1? YES NO

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14



LEFT SIDE VIEW

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

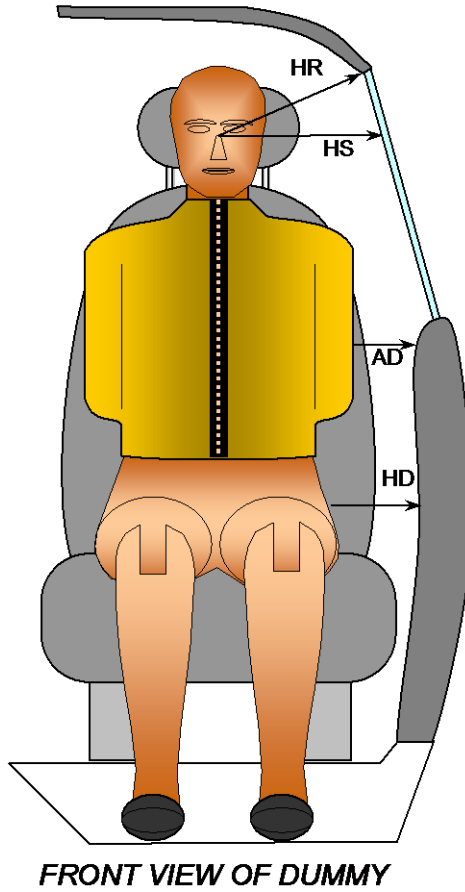
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	374			
HW		Header to Windshield	618			
HZ	HZ	Head to Roof Liner	170		257	
NR	NB	Nose to Rim/Seat Back	471		482	
CD	CB	Chest to Dash/Seat Back	568		481	
CS		Chest to Steering Wheel	301			
KD(L)/KDA(L) ^o	KB(L)/KBA(L) ^o	Left Knee to Dash/Seat Back	143	25	257	17
KD(R)/KDA(R) ^o	KB(R)/KBA(R) ^o	Right Knee to Dash/Seat Back	135	25	250	17
PAX ^o	PAX ^o	Pelvic Tilt Angle X		.05		1.0
	PAY ^o	Pelvic Tilt Angle Y				20.2
PHX	PHX	Hip Point to Striker (X-Axis)	188		222	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	174		318	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14

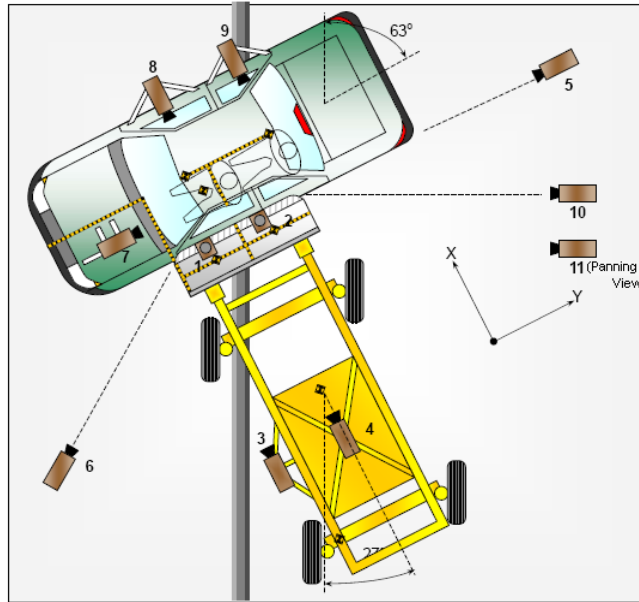


Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	205	249
HS	Head to Side Window	mm	327	363
AD	Arm to Door	mm	103	124
HD	H-Point to Door	mm	162	187

**DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2014 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	385	-5724	8.5	1000
2	Overhead Close-up	0	840	-5724	25	1000
3	Left Impact Point (MDB)	-1791	-853	-821	25	1000
4	Side Overall (MDB)	-2458	0	-1438	8.5	1000
5	Rear	-820	7408	-1310	Zoom	1000
6	Left Front	-4007	-2933	-1348	Zoom	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:

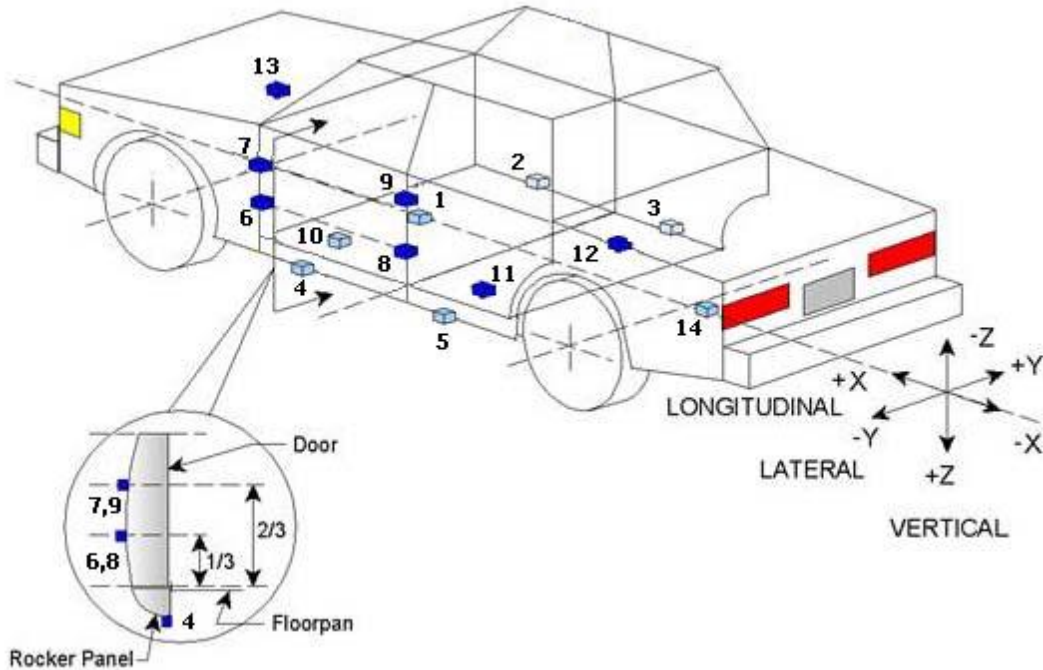
INSTRUMENTATION

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 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14



TEST VEHICLE ACCELEROMETER LOCATIONS

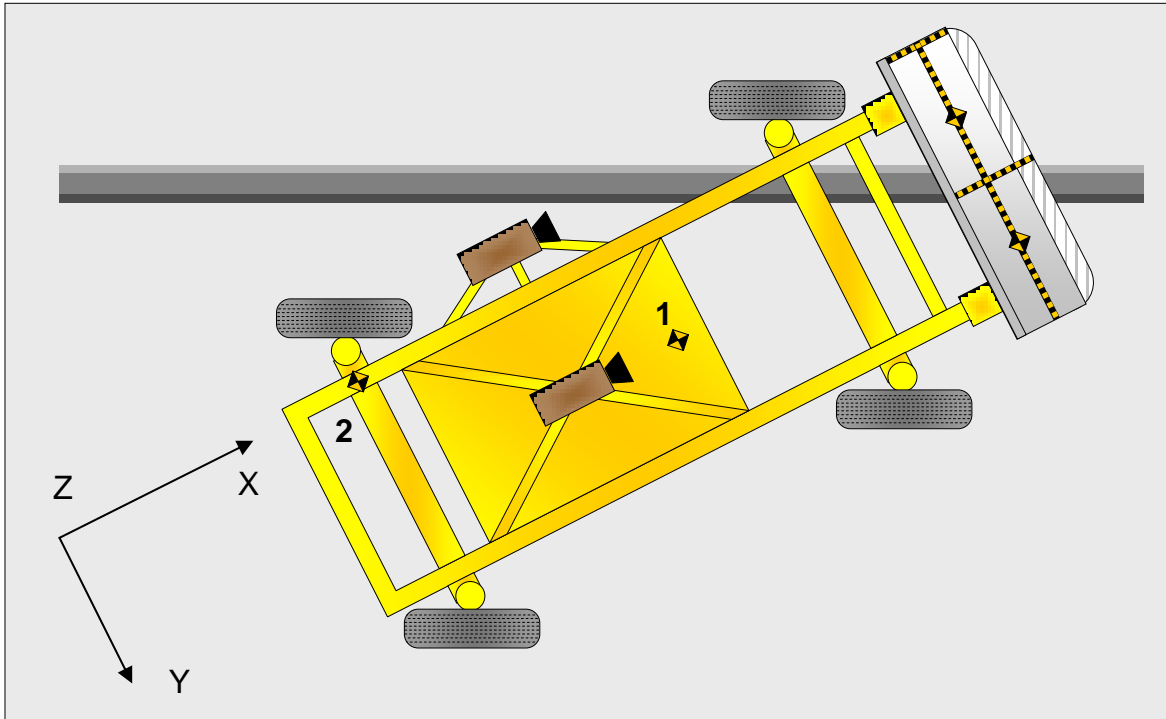
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2750	110	-325
2	Right Sill at Front Seat	2733	675	-280
3	Right Sill at Rear Seat	1815	675	-282
4	Left Sill at Front Door	2741	-675	-282
5	Left Sill at Rear Door	1833	-675	-290
6	A-Post Lower	3128	805	-435
7	A-Post Middle	3120	-810	-793
8	B-Post Lower	2072	-785	-530
9	B-Post Middle	2012	-785	-880
10	Front Seat Track	2477	-575	-295
11	Rear Seat Structure	1535	-440	-395
12	Right Rear Occ. Compartment	1680	655	-330
13	Engine Block	3725	-10	-828
14	Rear Above Axle	1135	0	-530

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 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14



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 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	SCAB	SCAB
Top of Head	SCAB, Headliner	SCAB
Left Side of Head	SCAB	SCAB
Back of Head	SCAB, Headliner	None
Left Shoulder	Torso/Pelvis Bag	Door Panel
Upper Torso	Torso/Pelvis Bag	Door Panel
Lower Torso	Seat Side Bolster	Door Panel
Left Hip	Torso/Pelvis Bag	Seat Bolster
Left Knee	None	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 Visible
Windshield Damage	None
Side Window Damage	Rear Shattered
Other Notable Effects	N/A

**DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS**

Test Vehicle: 2014 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	N/A		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	No	No	N/A
Other	No	N/A	No	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2700
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		408
Actual Impact Point (Aft of Front Axle)	mm		413
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-5
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-2

**DATA SHEET NO. 9
MDB SUMMARY OF RESULTS**

Test Vehicle: 2014 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel Base of Framework Carriage	2591
C.G. Location aft of Front Axle	1115

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	380.6	301.8	682.4
Right	kg	399.8	285.6	685.4
Ratio	%	57.1	42.9	100.0
Totals	kg	780.4	587.4	1367.8

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.14
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.14
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.0

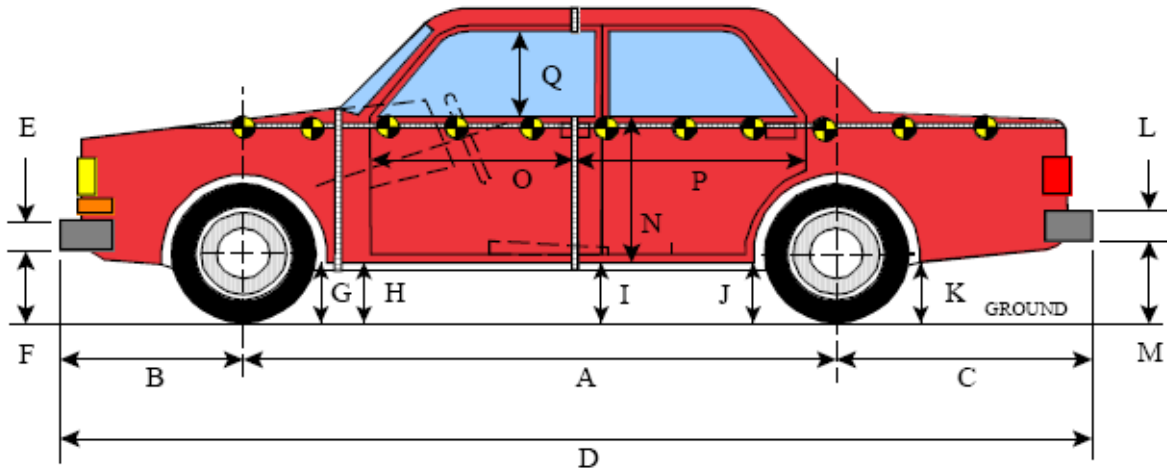
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Row	Vertical Location		From Centerline		Maximum Crush
	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	207
B	Top of Bumper	533	0	Right	372
C	Mid-Level	686	800	Left	149
D	Top of Stack	813	800	Left	163

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14



LEFT SIDE VIEW

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

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

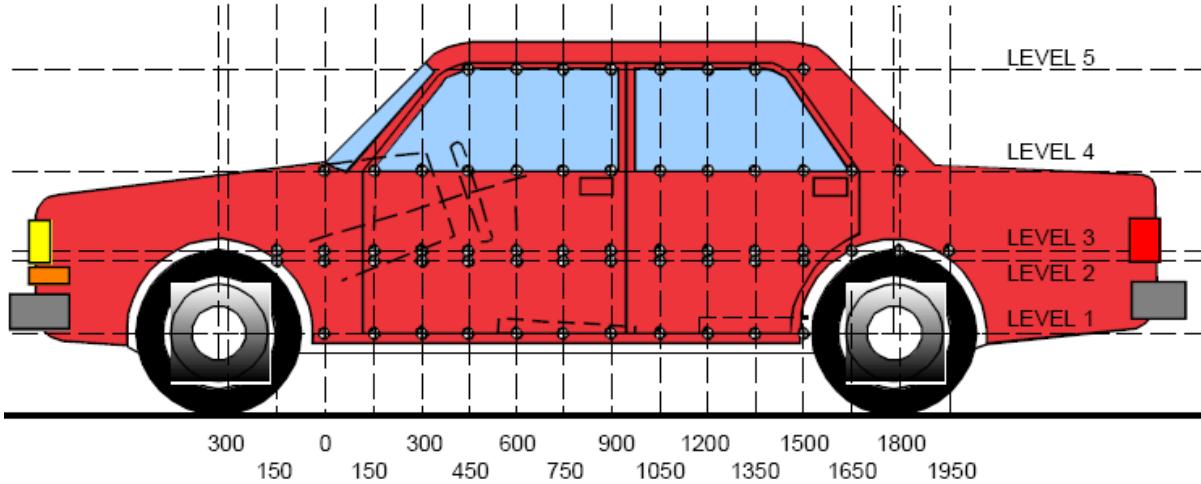
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2700	2692	8
B	Front Axle to Front Surface of Vehicle	925	928	-3
C	Rear Axle to Rear Surface of Vehicle	950	950	0
D	Total Length at Centerline	4570	4567	3
E	Front Bumper Thickness	108	108	0
F	Front Bumper Bottom to Ground	422	426	-4
G	Sill Height at Front Wheel Well	253	265	-12
H	Sill Height at Front Door Leading Edge	255	269	-14
I	Sill Height at B-Pillar	261	324	-63
J1	Sill Height at Rear Wheel Well	276	314	-38
J2	Pinch Weld Height at Rear Wheel Well	165	205	-40
K	Sill Height Aft of Rear Wheel Well	302	349	-47
L	Rear Bumper Thickness	207	207	0
M	Rear Bumper Bottom to Ground	405	452	-47
N	Sill Height to Window Bottom Sill	705	643	62
O	Front Door Leading Edge to Impact CL	730	719	11
P	Rear Door Trailing Edge to Impact CL	1408	1111	297
Q	Front Window Opening	375	370	5
R	Right Side Length	4395	4387	8
S	Left Side Length	4390	4375	15
T	Vehicle Width at B Pillar	1780	1790	-10

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	358	136	900
2	Driver Hip Point	512	198	300
3	Mid-Door	623	182	900
4	Window Sill	918	149	1800
5	Window Top	1366	6	1350

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 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14

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	895	0	0	0	0	860	0	0	0	0	35	0	0
0	882	892	891	786	0	865	862	854	783	0	17	30	37	3	0
150	877	890	891	798	0	787	709	768	786	0	90	181	123	12	0
300	877	890	892	805	0	766	692	742	791	0	111	198	150	14	0
450	879	889	892	896	0	756	693	738	848	0	123	196	154	48	0
600	881	888	892	814	0	754	701	728	780	0	127	187	164	34	0
750	884	887	890	819	0	752	714	716	778	0	132	173	174	41	0
900	888	885	889	824	607	752	719	707	773	614	136	166	182	51	-7
1050	892	883	887	829	625	758	709	718	772	628	134	174	169	57	-3
1200	889	881	885	833	627	770	712	720	766	624	119	169	165	67	3
1350	884	879	883	833	625	779	704	710	737	619	105	175	173	96	6
1500	879	878	881	834	622	787	708	712	713	616	92	170	169	121	6
1650	876	877	879	836	616	807	716	718	724	611	69	161	161	112	5
1800	878	881	881	836	605	864	765	726	687	602	14	116	155	149	3
1950	0	893	895	836	588	0	845	772	773	588	0	48	123	63	0
2100	0	0	0	836	0	0	0	0	846	0	0	0	0	-10	0
2250	0	0	0	836	0	0	0	0	822	0	0	0	0	14	0
2400	0	0	0	829	0	0	0	0	823	0	0	0	0	6	0
2550	0	0	0	819	0	0	0	0	817	0	0	0	0	2	0
2700	0	0	0	802	0	0	0	0	802	0	0	0	0	0	0
2850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

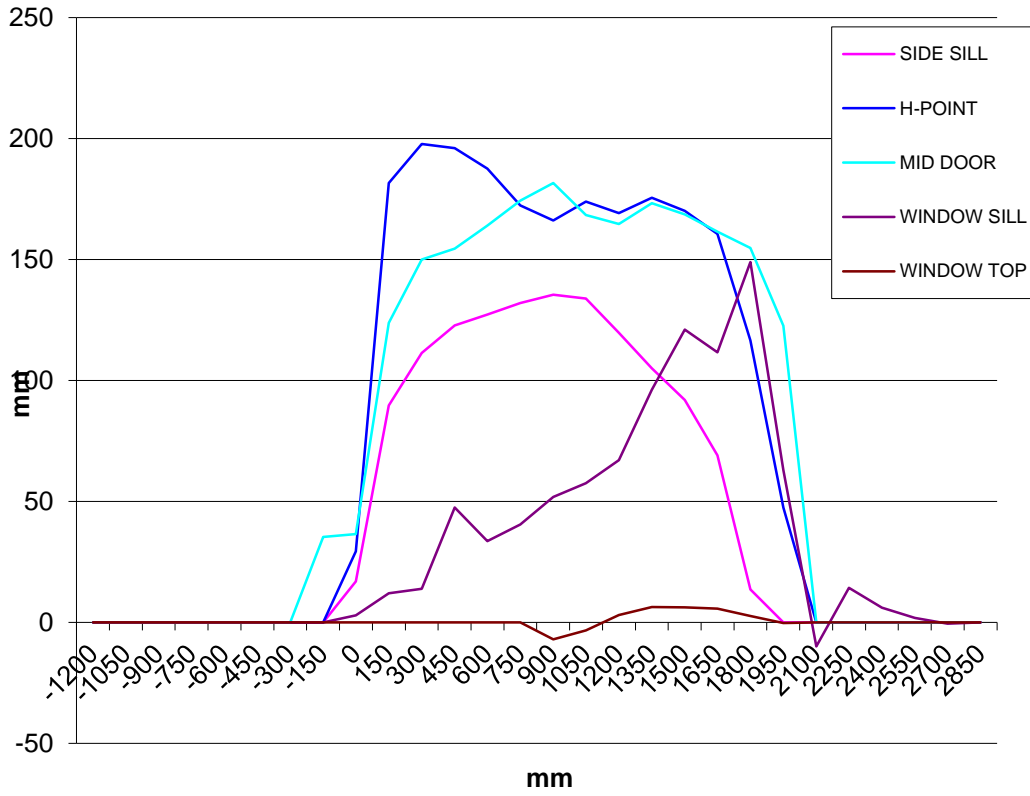
NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition.

Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14

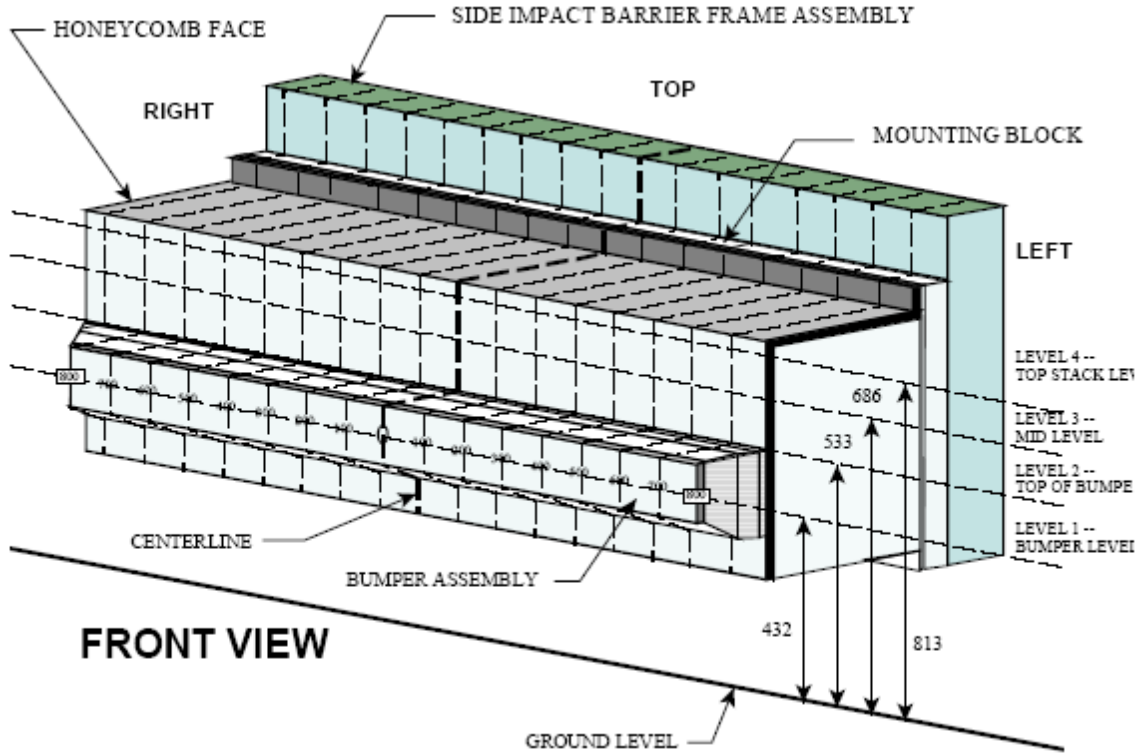


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14



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	-11	-4	-12	-26	-54	-97	-91	-65	-52	-59	-63	-73	-79	-93	-101	-121	-163		
2	-30	-23	-25	-29	-34	-66	-73	-50	-32	-25	-25	-28	-35	-46	-63	-92	-149		
3	-108	-105	-102	-98	-96	-372	-372	-372	-372	-82	-76	-73	-71	-70	-69	-75	-97		
4	-207	-202	-194	-189	-186	-185	-180	-177	-173	-171	-168	-164	-162	-160	-162	-181	-176		

¹ Measurement point missing post-test

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

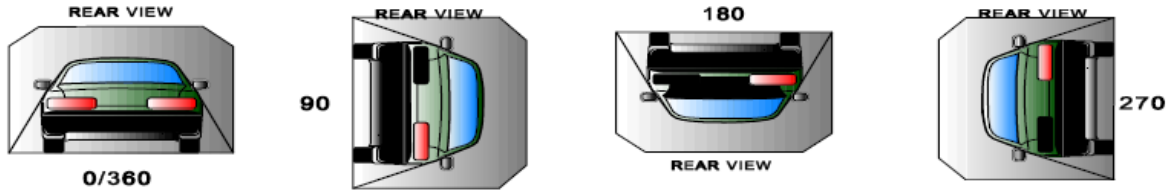
Test Vehicle: 2014 Mazda 3 4-door Sedan
 Test Program: NCAP Side Impact

NHTSA No.: M20145405
 Test Date: 1/22/14

Test Time: 14:56 Temperature: 20.5°C

- 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	90	330	420
90 to 180	90	330	840
180 to 270	90	330	1260
270 to 360	90	330	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

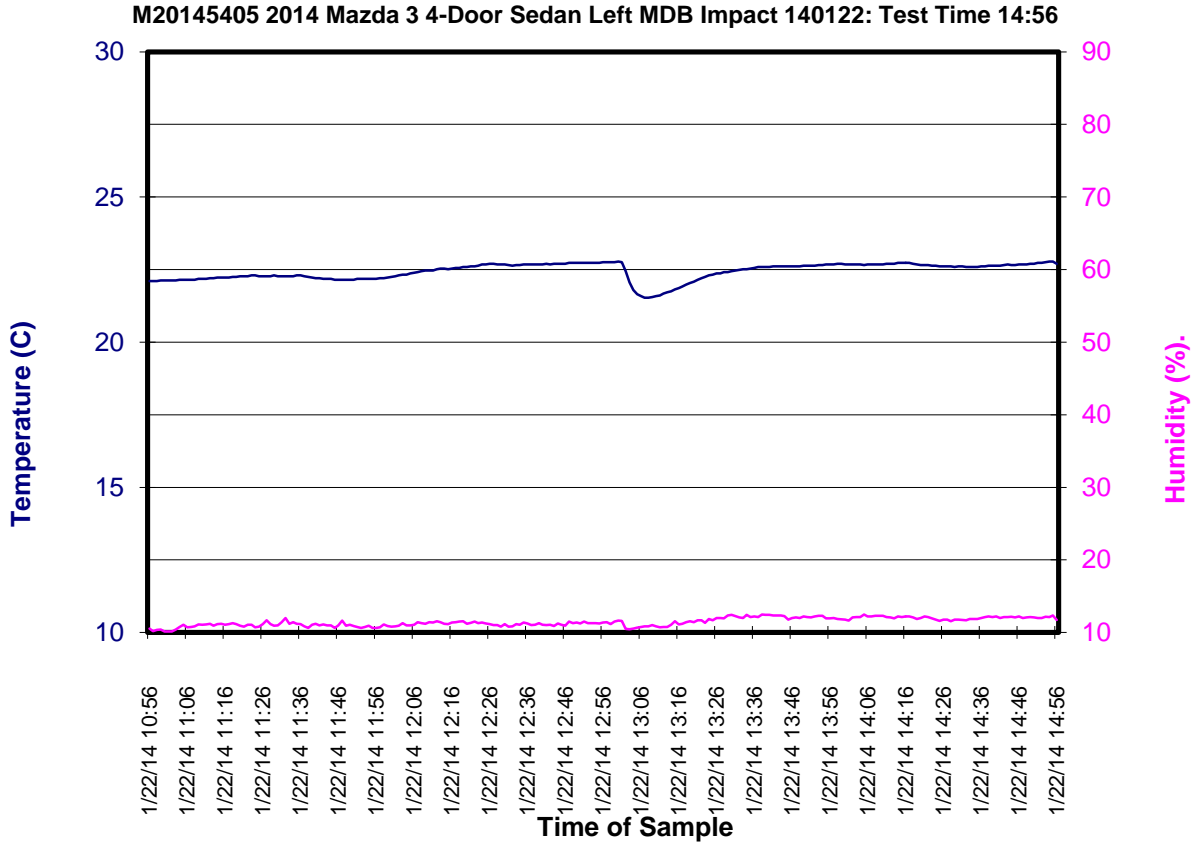
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2014 Mazda 3 4-door Sedan
Test Program: NCAP Side Impact

NHTSA No.: M20145405
Test Date: 1/22/14



**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

No.	Description	Page
001	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-6
002	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-6
003	Pre-Test Front View of Test Vehicle	A-7
004	Post-Test Front View of Test Vehicle	A-7
005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
006	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
007	Pre-Test Left Side View of Test Vehicle	A-9
008	Post-Test Left Side View of Test Vehicle	A-9
009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
010	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
011	Pre-Test Rear View of Test Vehicle	A-11
012	Post-Test Rear View of Test Vehicle	A-11
013	Pre-Test Right Side View of Test Vehicle	A-12
014	Post-Test Right Side View of Test Vehicle	A-12
015	Pre-Test Overhead View of Test Area	A-13
016	Post-Test Overhead View of Test Area	A-13
017	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-14
018	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-14
019	Pre-Test Close-up View of Impact Point Target	A-15
020	Post-Test Close-up View of Impact Point Target	A-15
021	Pre-Test Left Front Door Latch Close-up	A-16
022	Post-Test Left Front Door Latch Close-up	A-16
023	Pre-Test Left Rear Door Latch Close-up	A-17
024	Post-Test Left Rear Door Latch Close-up	A-17
025	Pre-Test Front Close-up View of Driver Dummy	A-18
026	Post-Test Front Close-up View of Driver Dummy	A-18
027	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-19
028	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top	A-19
029	Post-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
030	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-20
031	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-21
032	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-21
033	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-22
034	Pre-Test Placement of Driver Dummy's Feet	A-22
035	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
036	Pre-Test Left Side View of Steering Wheel	A-23

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
037	View of Disengaged Parking Brake	A-24
038	Pre-Test View of Parking Brake	A-24
039	Pre-Test Close-Up Left Side View of Driver Seat Track	A-25
040	Pre-Test Close-Up Left Side View of Driver Seat Back	A-25
041	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-26
042	Pre-Test Driver Dummy and Door Clearance View	A-26
043	Post-Test Driver Dummy and Door Clearance View	A-27
044	Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-27
045	Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-28
046	Pre-Test Driver Inner Door Panel View	A-28
047	Post-Test Driver Inner Door Panel View	A-29
048	Post-Test Driver Dummy Close-Up Head Contact with Vehicle View	A-29
049	Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View	A-30
050	Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View	A-30
051	Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View	A-31
052	Post-Test Driver Dummy Close-Up Pelvis Contact View	A-31
053	Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View	A-32
054	Post-Test Driver Dummy Close-Up Knee Contact View	A-32
055	Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking	A-33
056	Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View	A-33
057	Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View	A-34
058	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-34
059	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-35
060	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-35
061	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-36
062	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-36
063	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-37
064	Pre-Test Placement of Rear Passenger Dummy's Feet	A-37
065	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-38
066	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-38
067	Pre-test Close-Up Left Side View of Rear Passenger Seat Back	A-39

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
068	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-39
069	Pre-Test Passenger Dummy and Door Clearance View	A-40
070	Post-Test Passenger Dummy and Door Clearance View	A-40
071	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-41
072	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-41
073	Pre-Test Passenger Inner Door Panel View	A-42
074	Post-Test Passenger Inner Door Panel View	A-42
075	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	A-43
076	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View	A-43
077	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-44
078	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	A-44
079	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	A-45
080	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	A-45
081	Post-Test Rear Passenger Dummy Close-Up Knee Contact View	A-46
082	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-46
083	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-47
084	Pre-Test Front View of MDB Impactor Face	A-47
085	Post-Test Front View of MDB Impactor Face	A-48
086	Pre-Test Top View of MDB Impactor Face	A-48
087	Post-Test Top View of MDB Impactor Face	A-49
088	Pre-Test Left Side View of MDB Impactor Face	A-49
089	Post-Test Left Side View of MDB Impactor Face	A-50
090	Pre-Test Right Side View of MDB Impactor Face	A-50
091	Post-Test Right Side View of MDB Impactor Face	A-51
092	Close-Up View of Vehicle's Certification Label	A-51
093	Close-Up View of Vehicle's Tire Information Placard or Label	A-52
094	Pre-Test Ballast View	A-52
095	Post-Test Primary and Redundant Speed Trap Read-Out	A-53

TABLE OF PHOTOGRAPHS (CONTINUED)

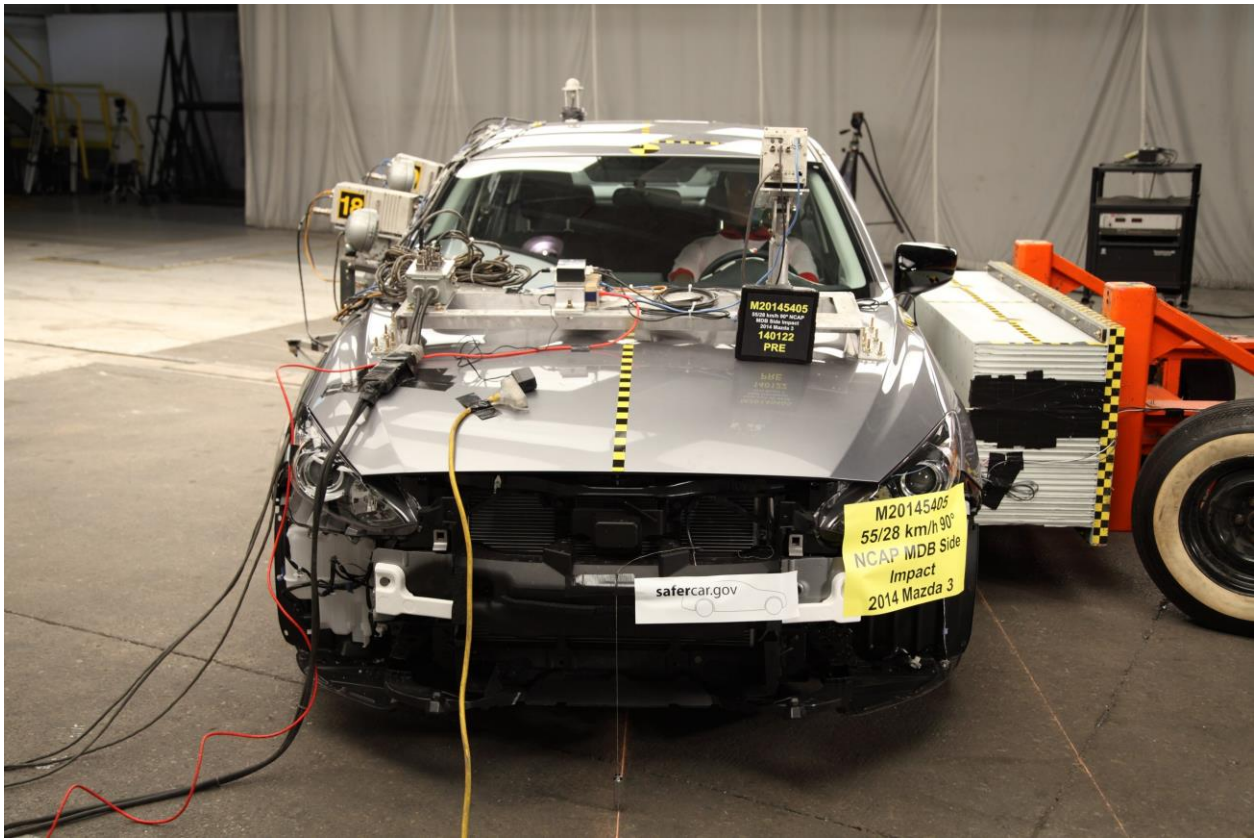
No.	Description	Page
096	FMVSS No. 301 Static Rollover 0 Degrees	A-53
097	FMVSS No. 301 Static Rollover 90 Degrees	A-54
098	FMVSS No. 301 Static Rollover 180 Degrees	A-54
099	FMVSS No. 301 Static Rollover 270 Degrees	A-55
100	FMVSS No. 301 Static Rollover 360 Degrees	A-55
101	Impact Event	A-56
102	Monroney Label	A-56
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-57
104	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-57



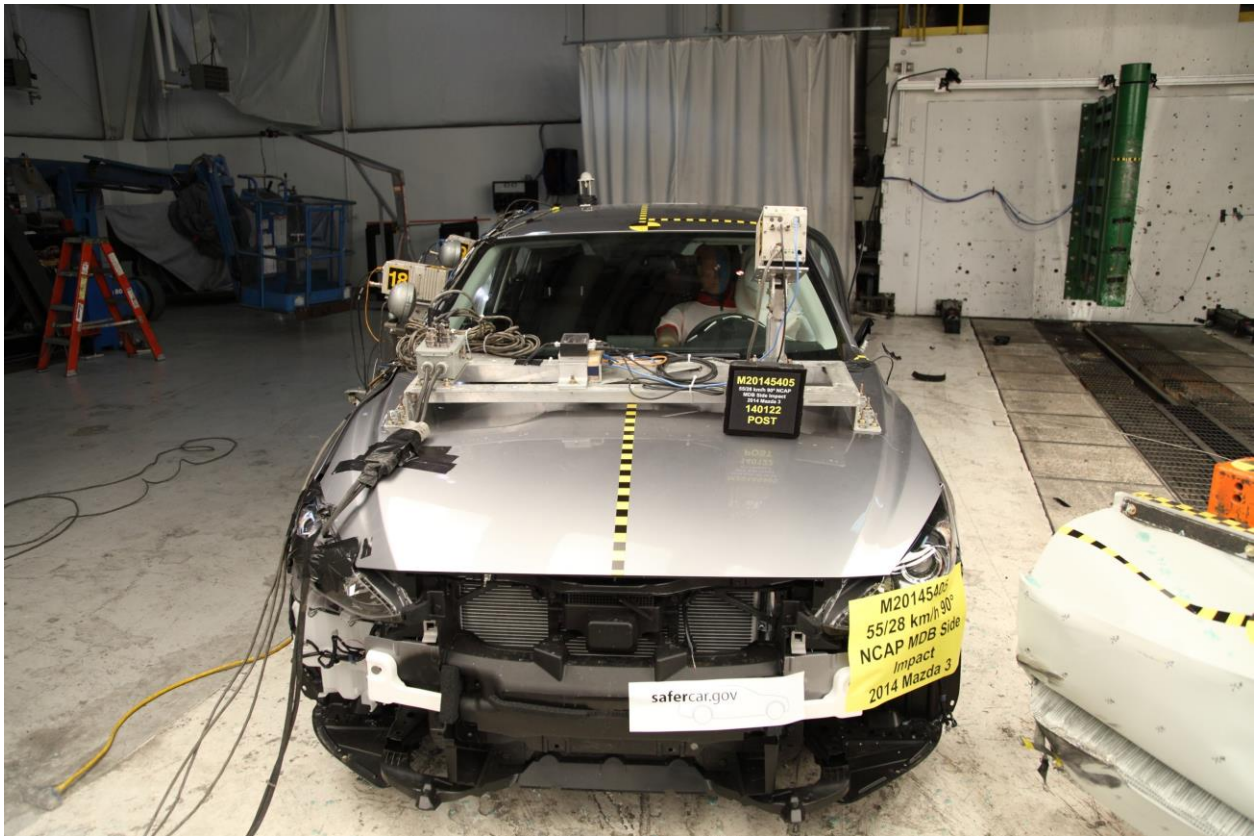
001 As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



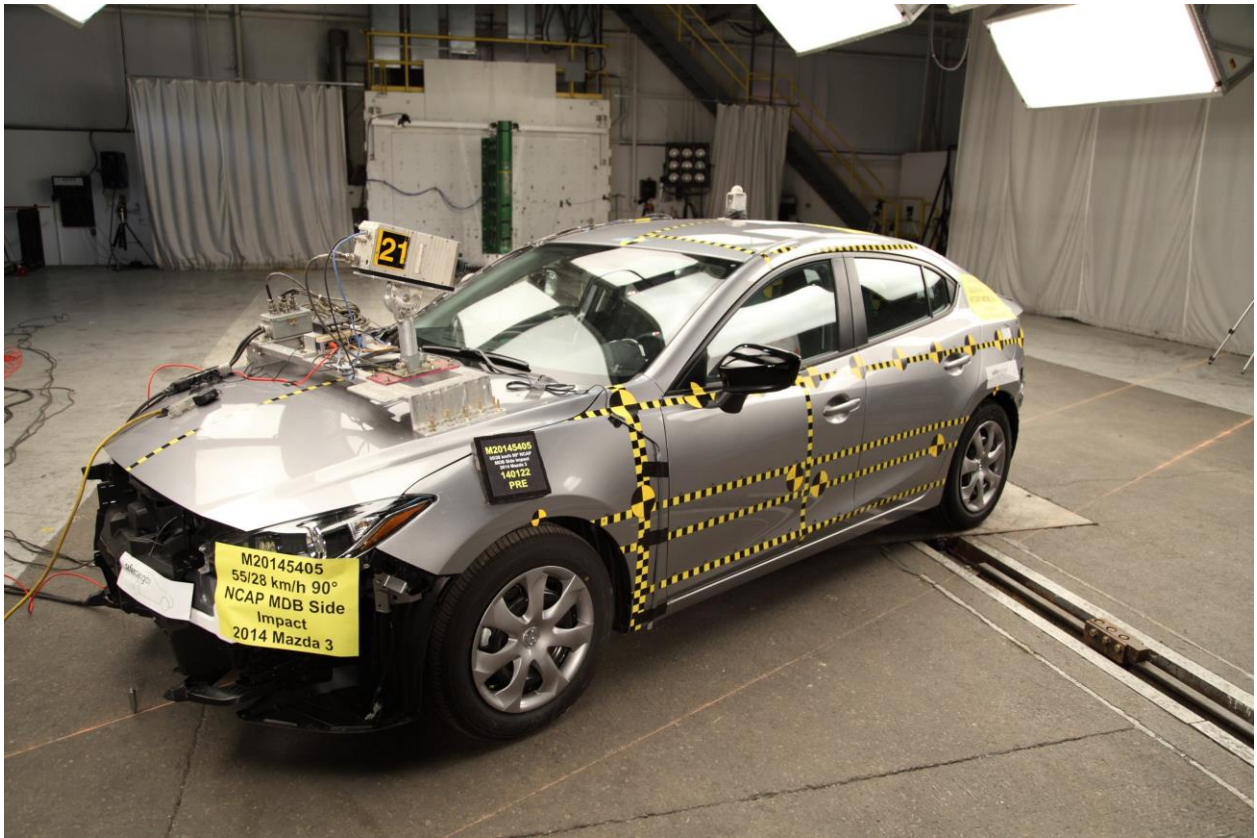
002 As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



003 Pre-Test Front View of Test Vehicle



004 Post-Test Front View of Test Vehicle



005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



006 Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



007 Pre-Test Left Side View of Test Vehicle



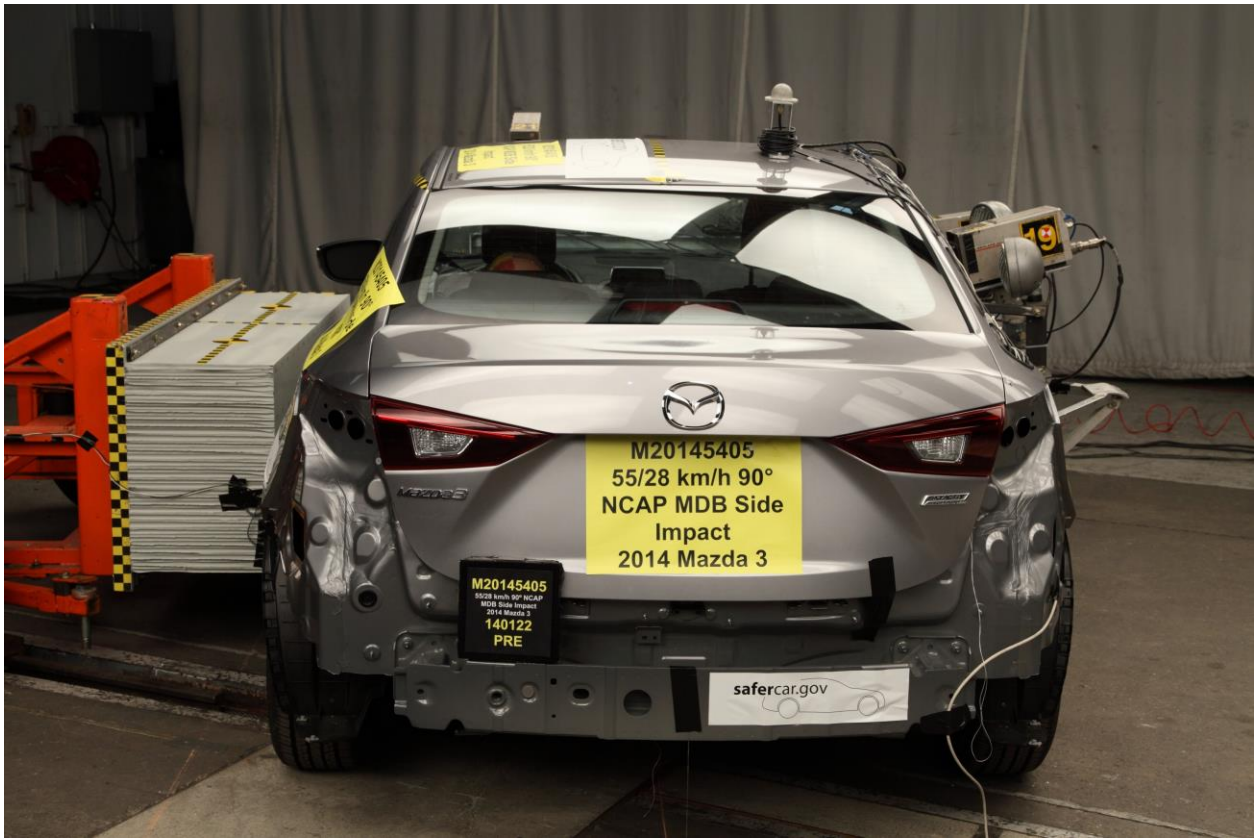
008 Post-Test Left Side View of Test Vehicle



009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



010 Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



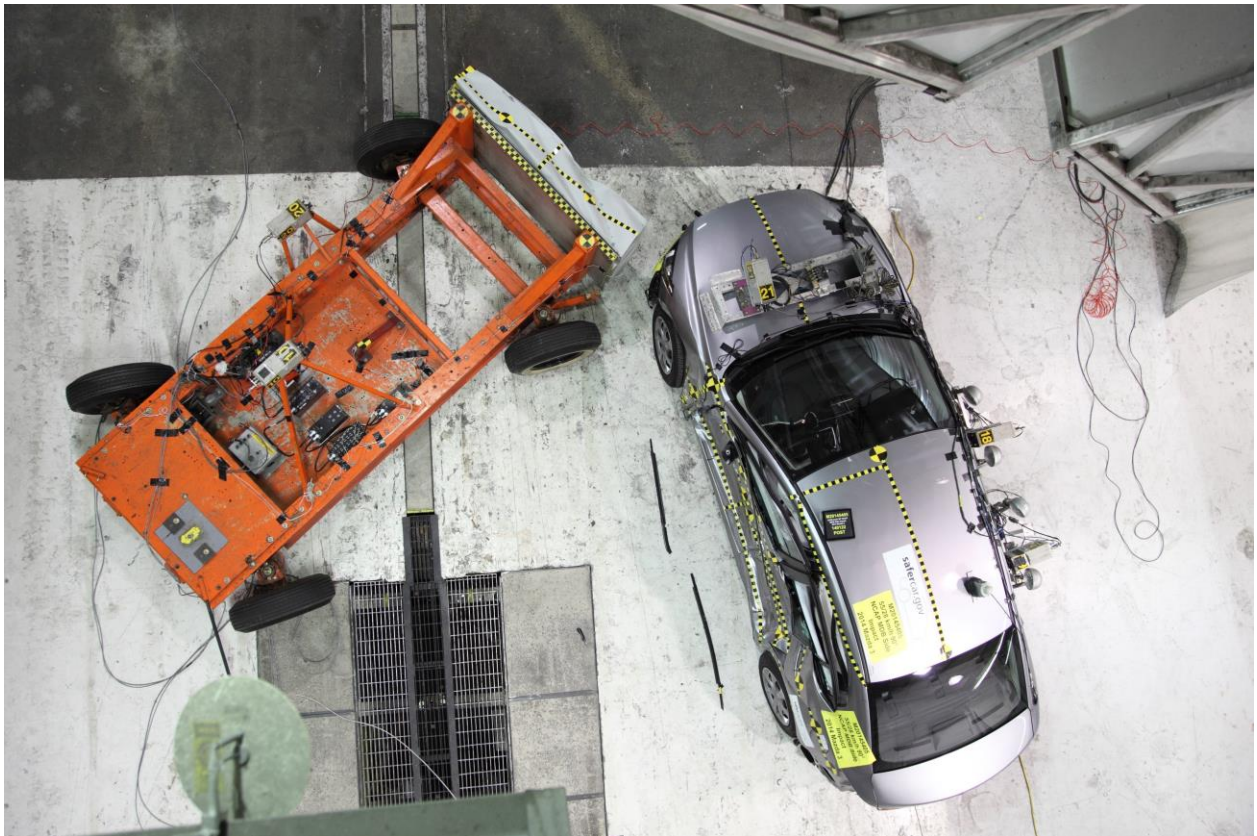
013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



018 Pre-Test Right Side View of 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



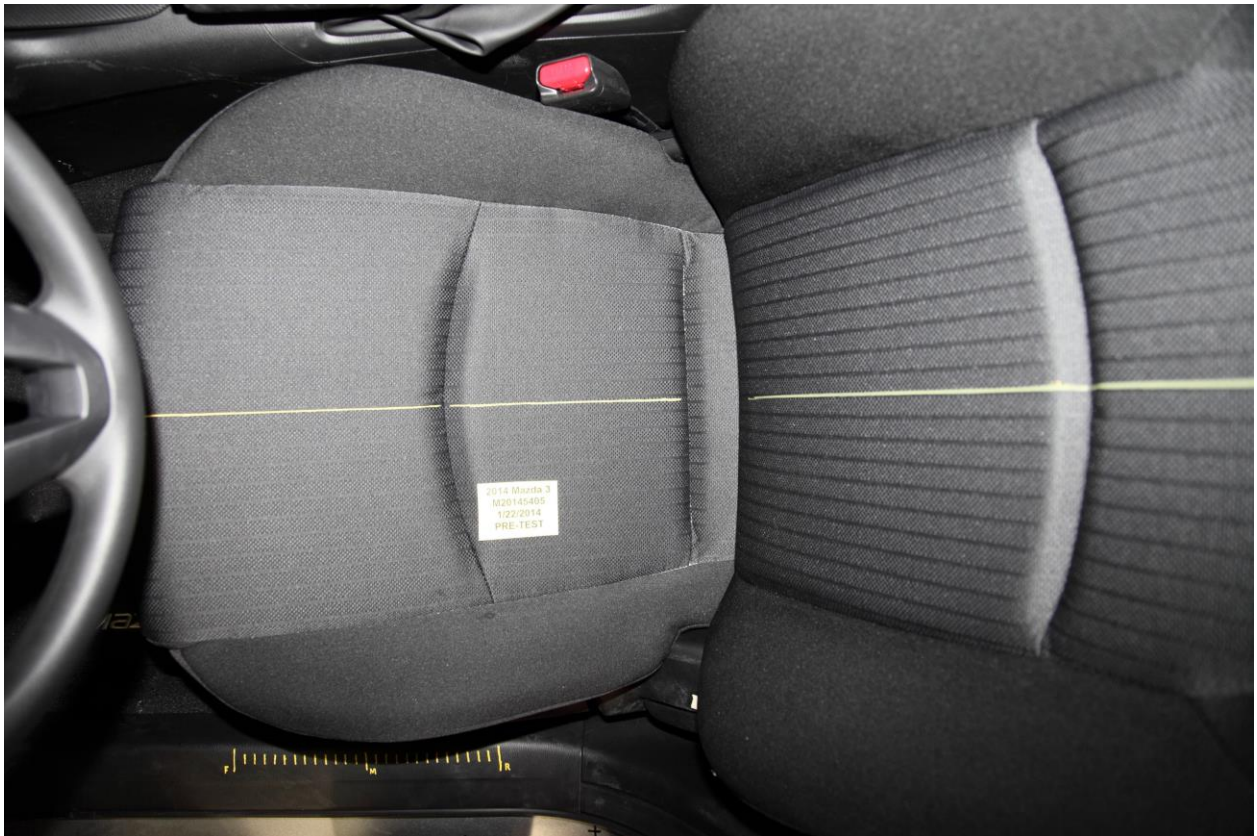
029 Post-Test Left Side View of Driver Dummy Shoulder and Door Top



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



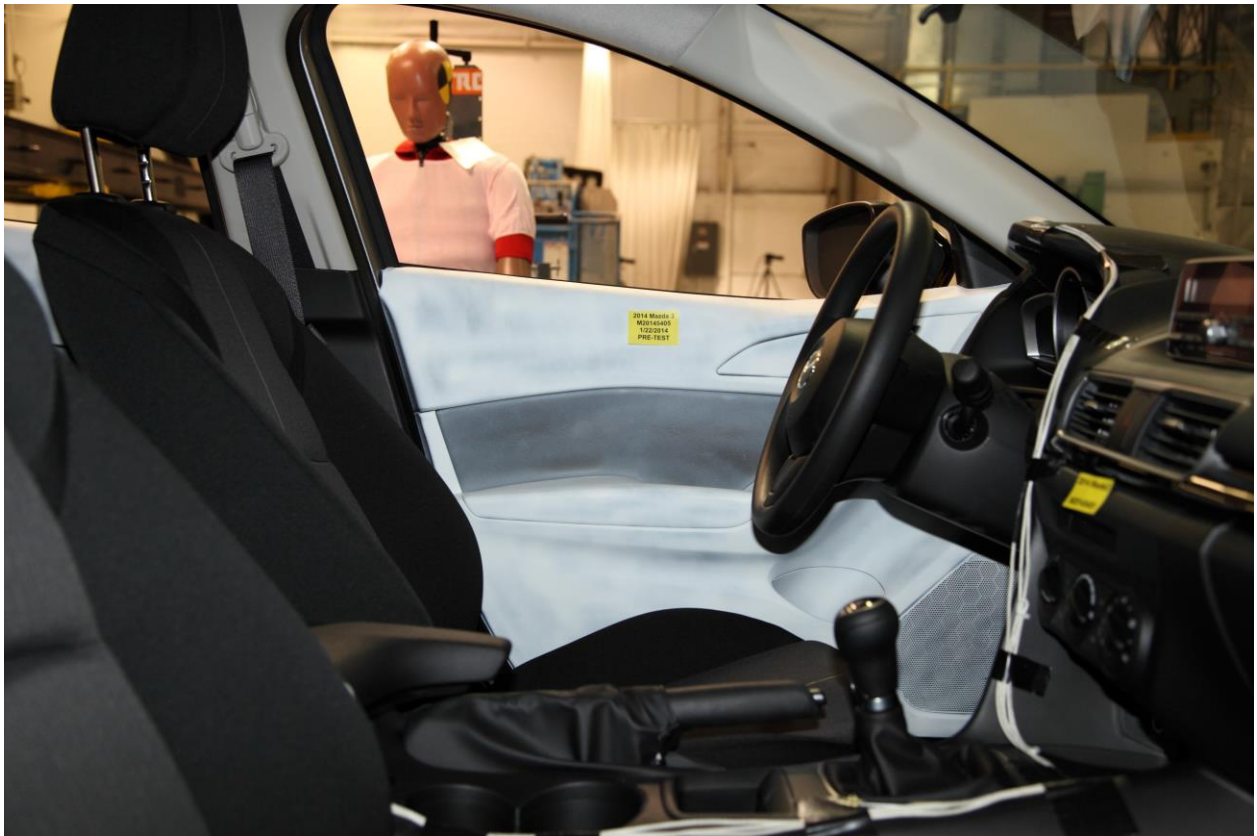
043 Post-Test Driver Dummy and Door Clearance View



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



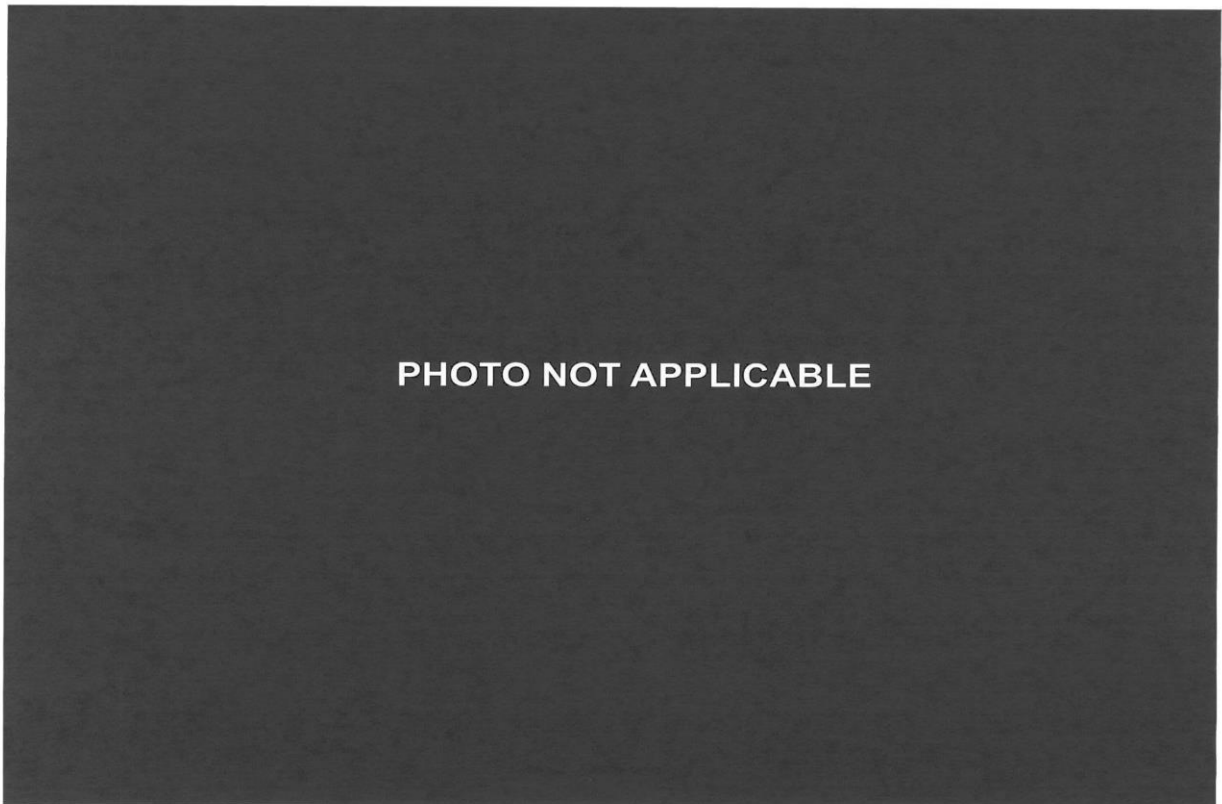
045 Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



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



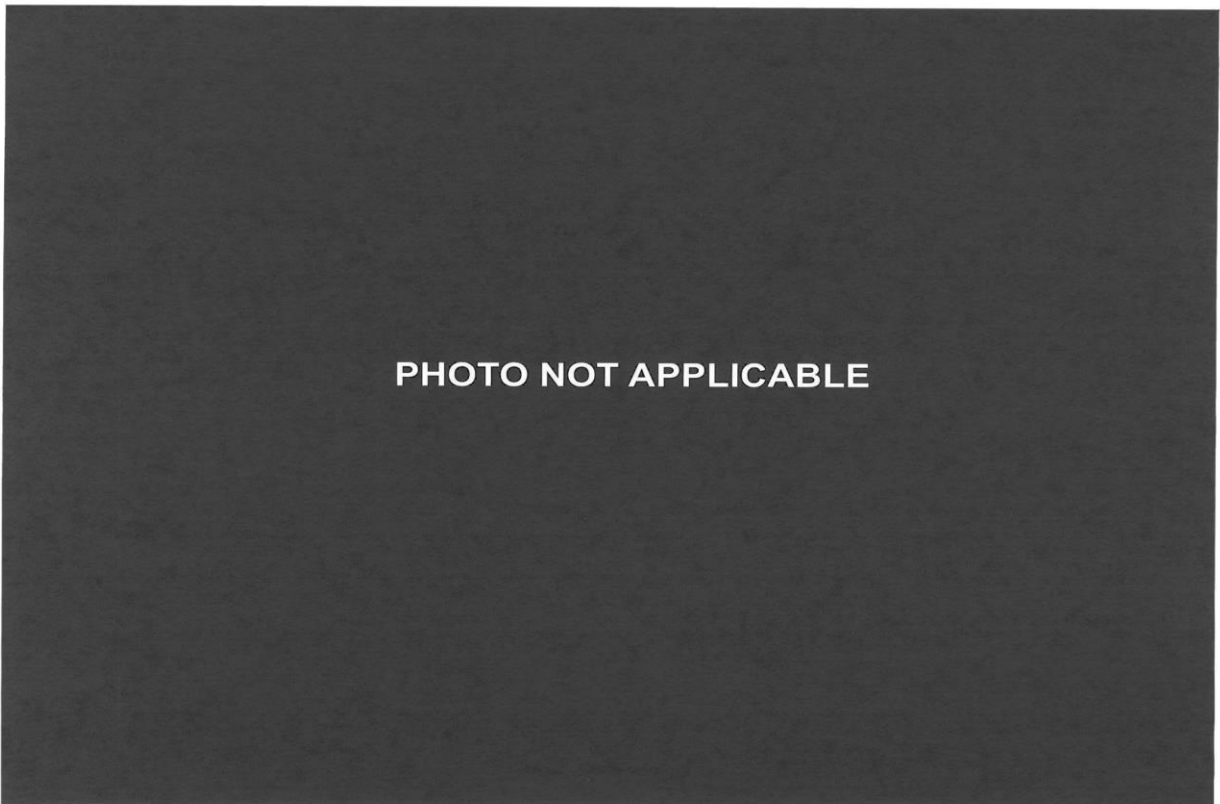
049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



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



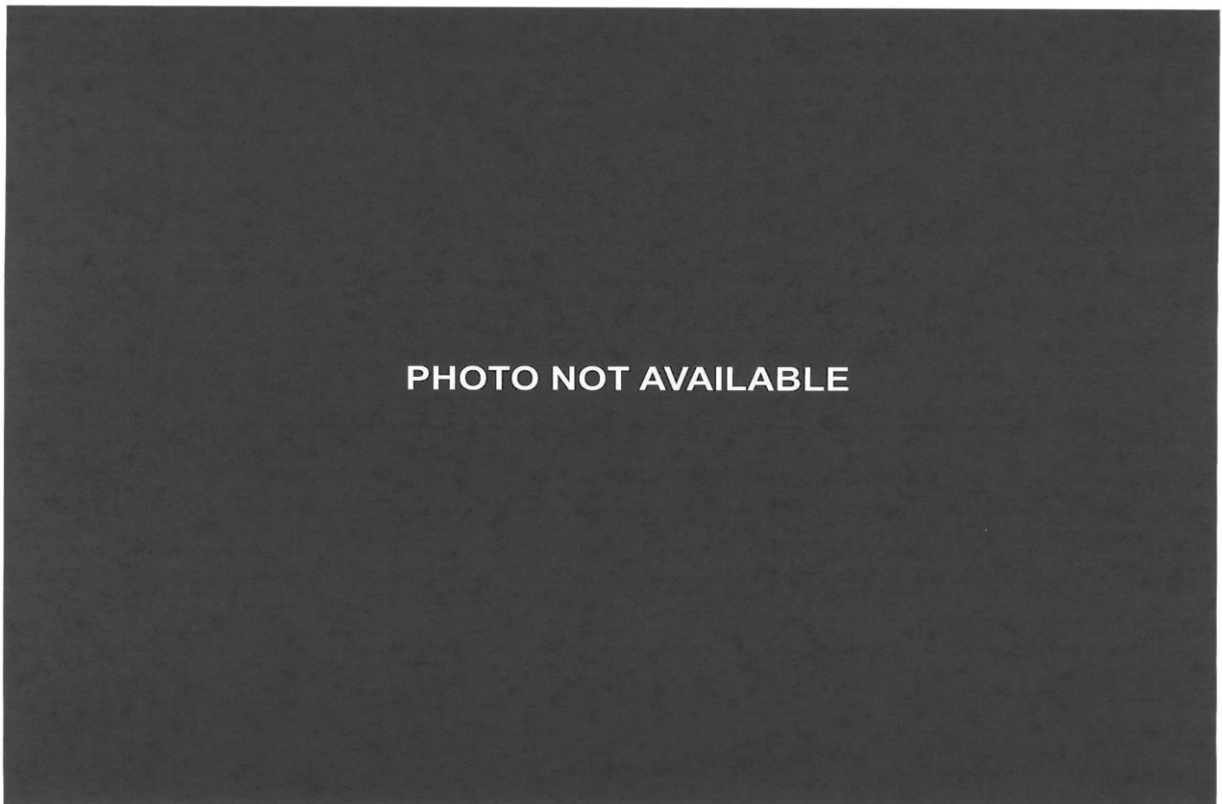
051 Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



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



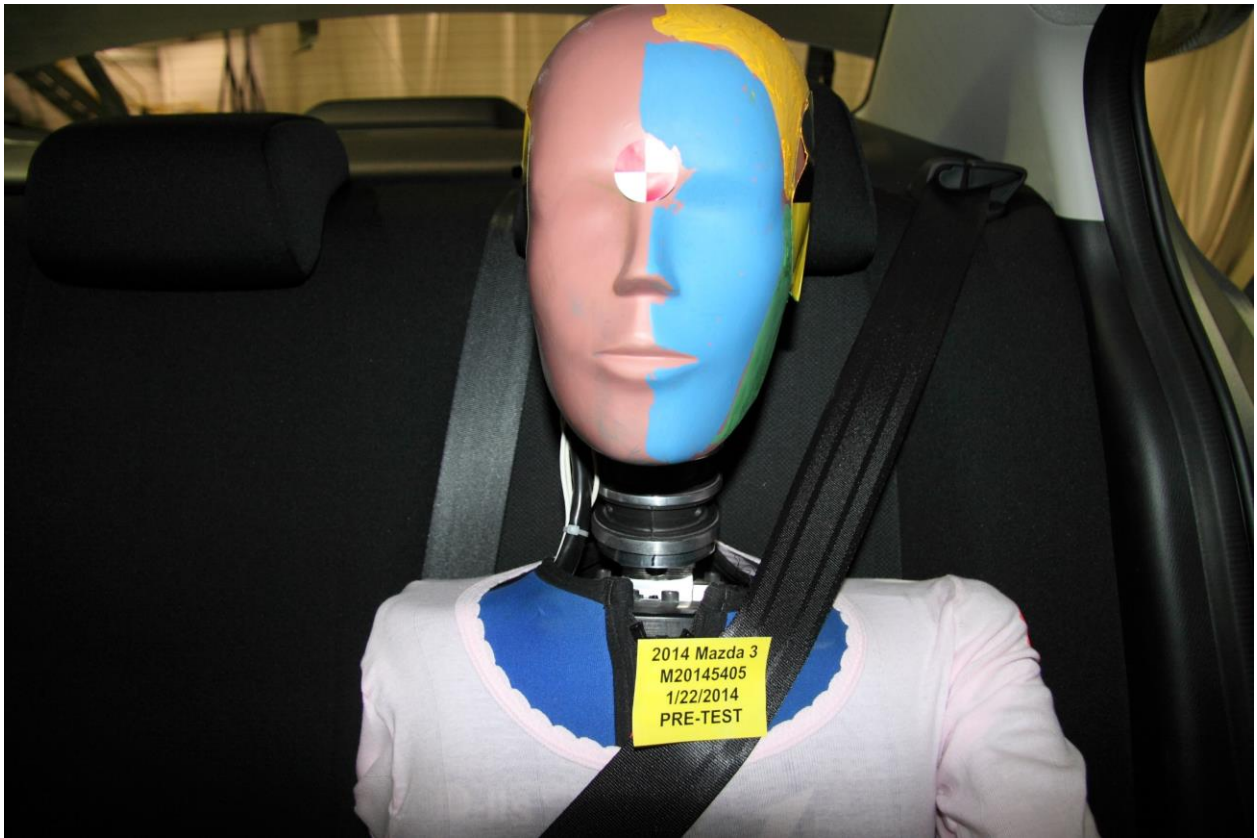
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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



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



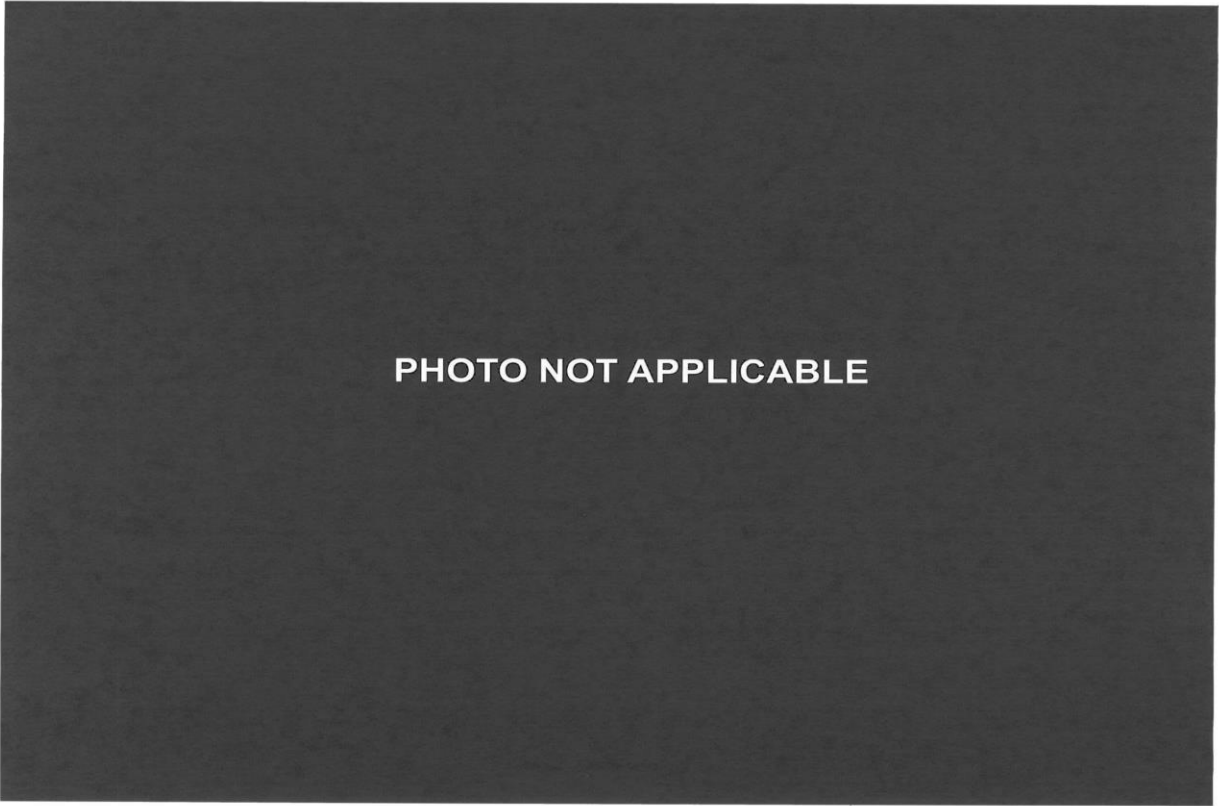
072 Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



073 Pre-Test Passenger Inner Door Panel View



074 Post-Test Passenger Inner Door Panel View



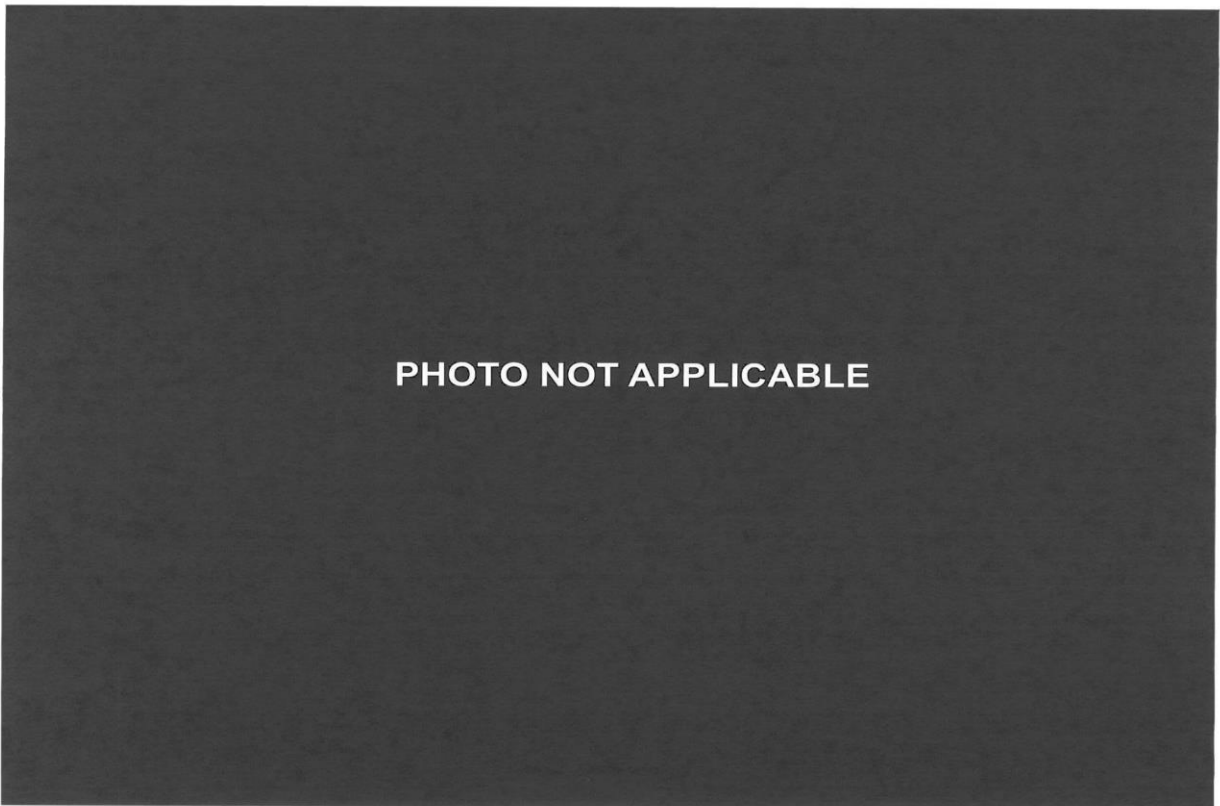
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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

PHOTO NOT APPLICABLE

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

PHOTO NOT APPLICABLE

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



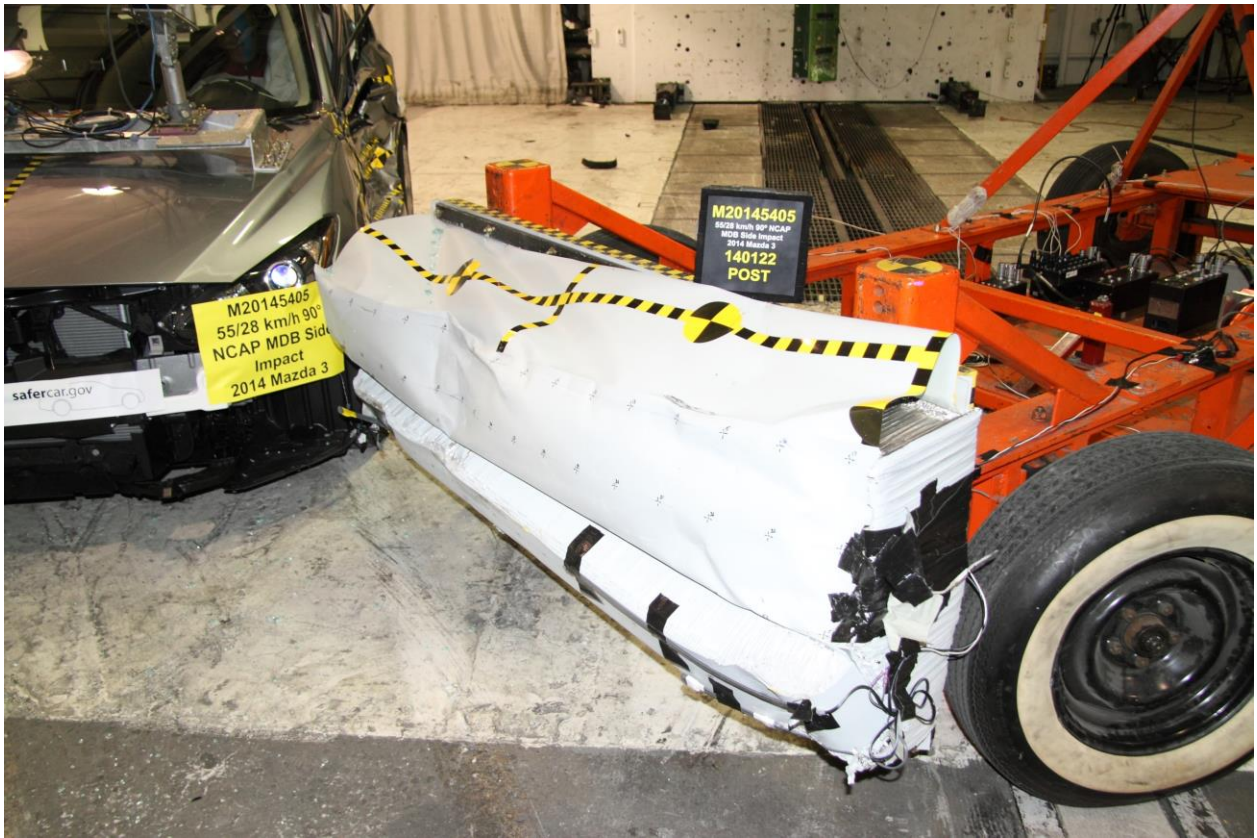
086 Pre-Test Top View of MDB Impactor Face



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



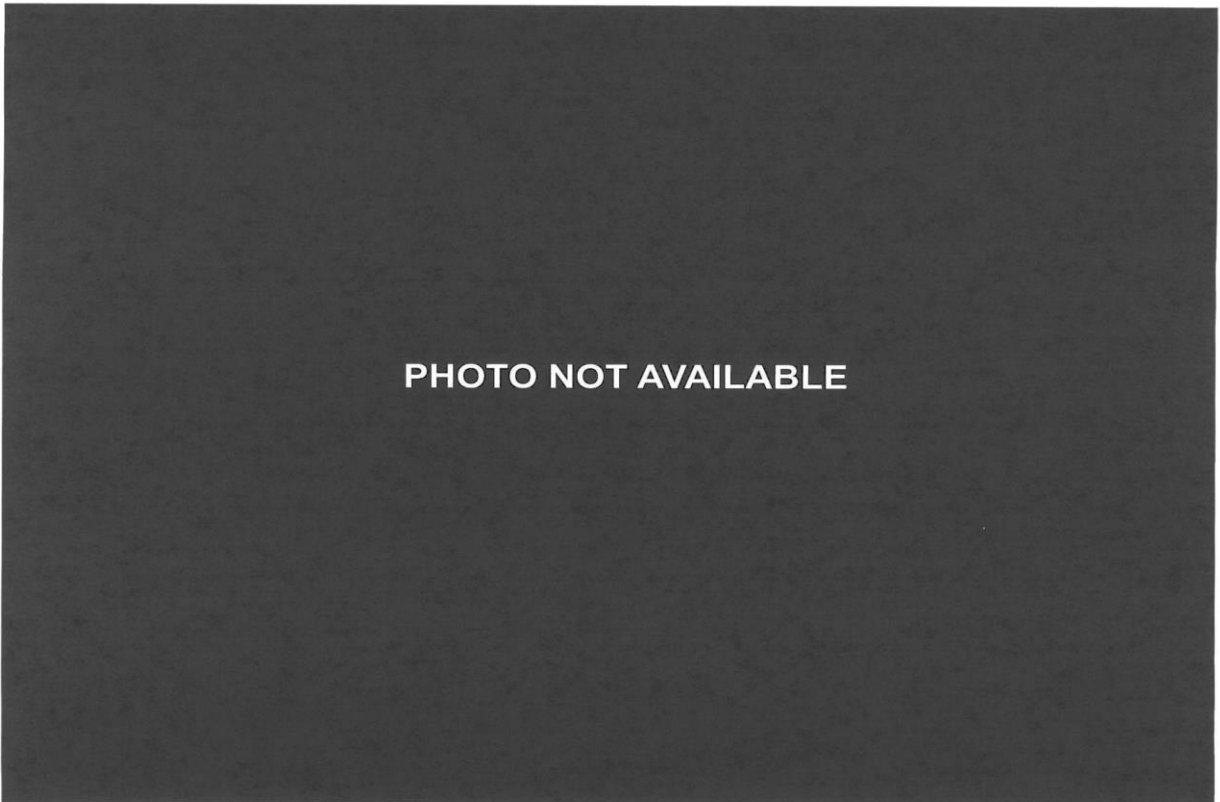
091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle Certification Label



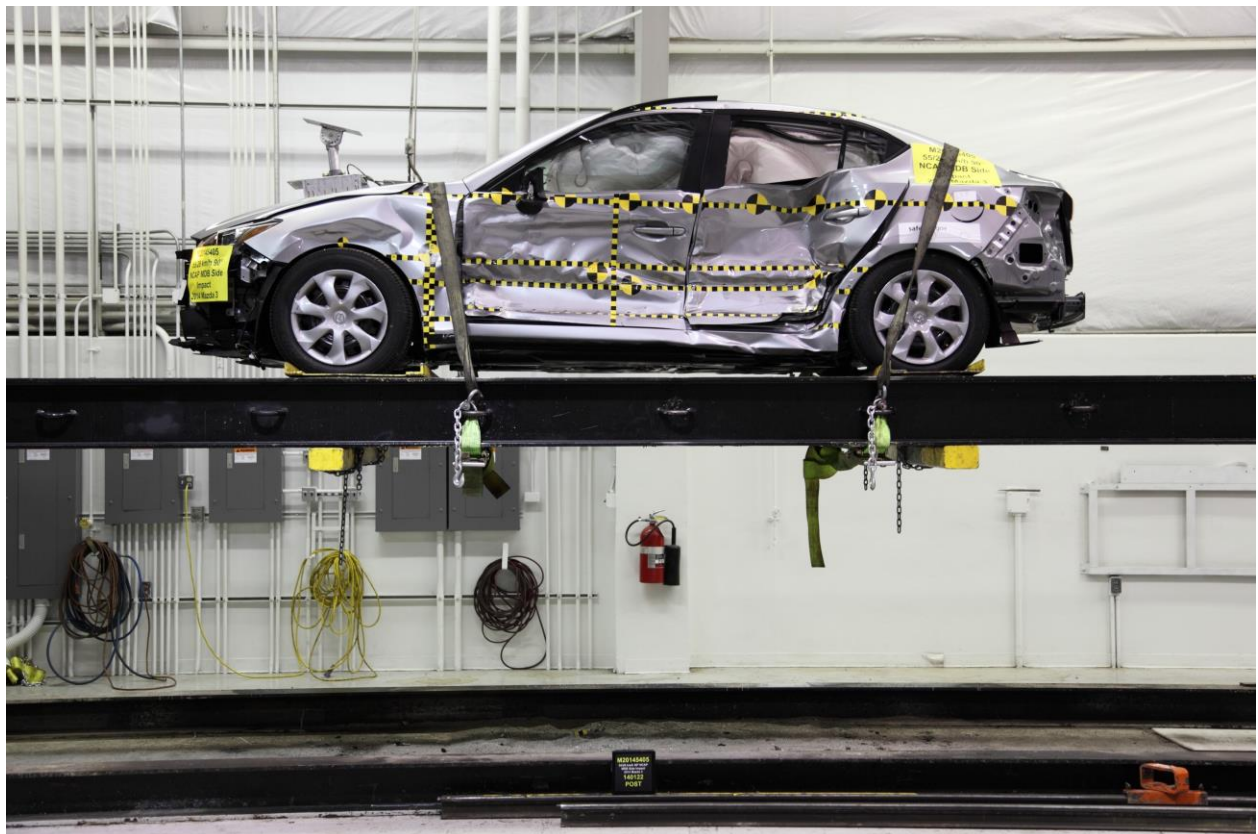
093 Close-Up View of Vehicle Tire Information Placard or Label



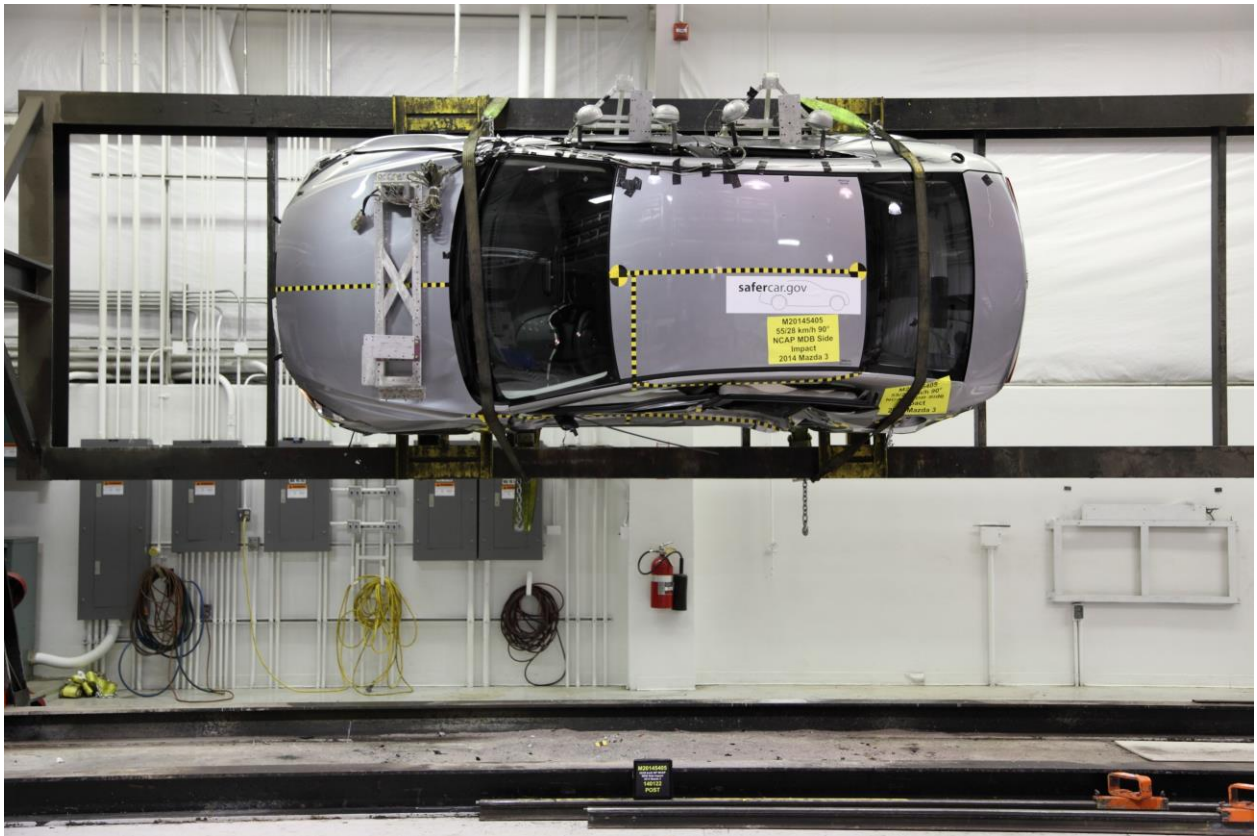
094 Pre-Test Ballast View



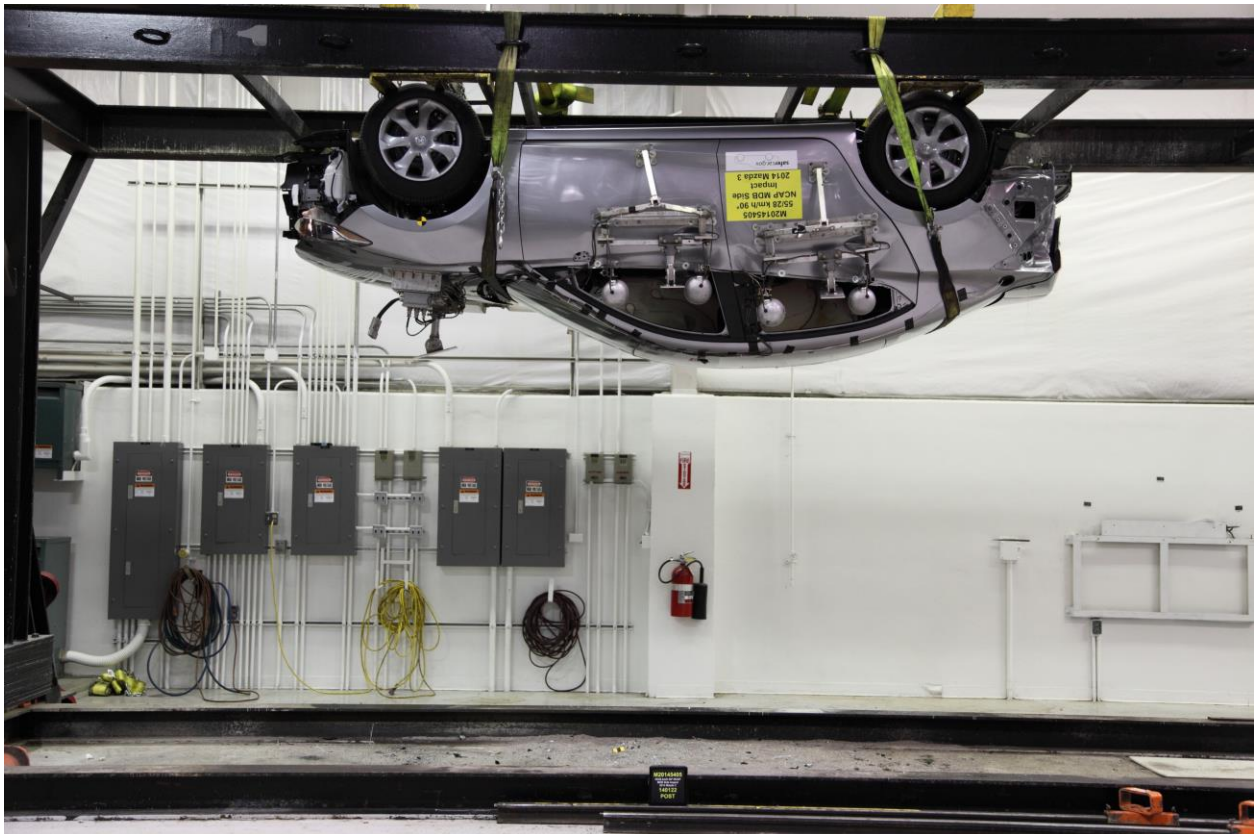
095 Post-Test Primary Speed Trap Read-Out



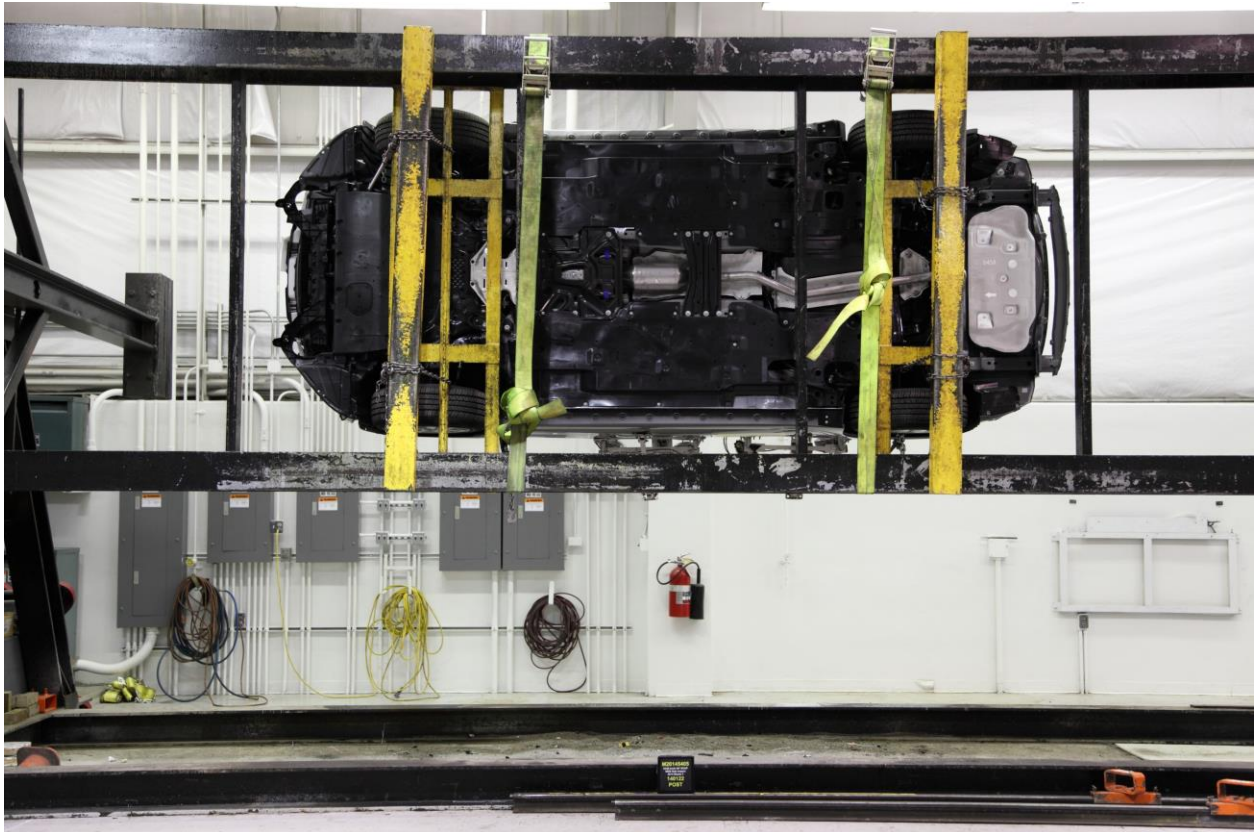
096 FMVSS No. 301 Static Rollover 0 Degrees



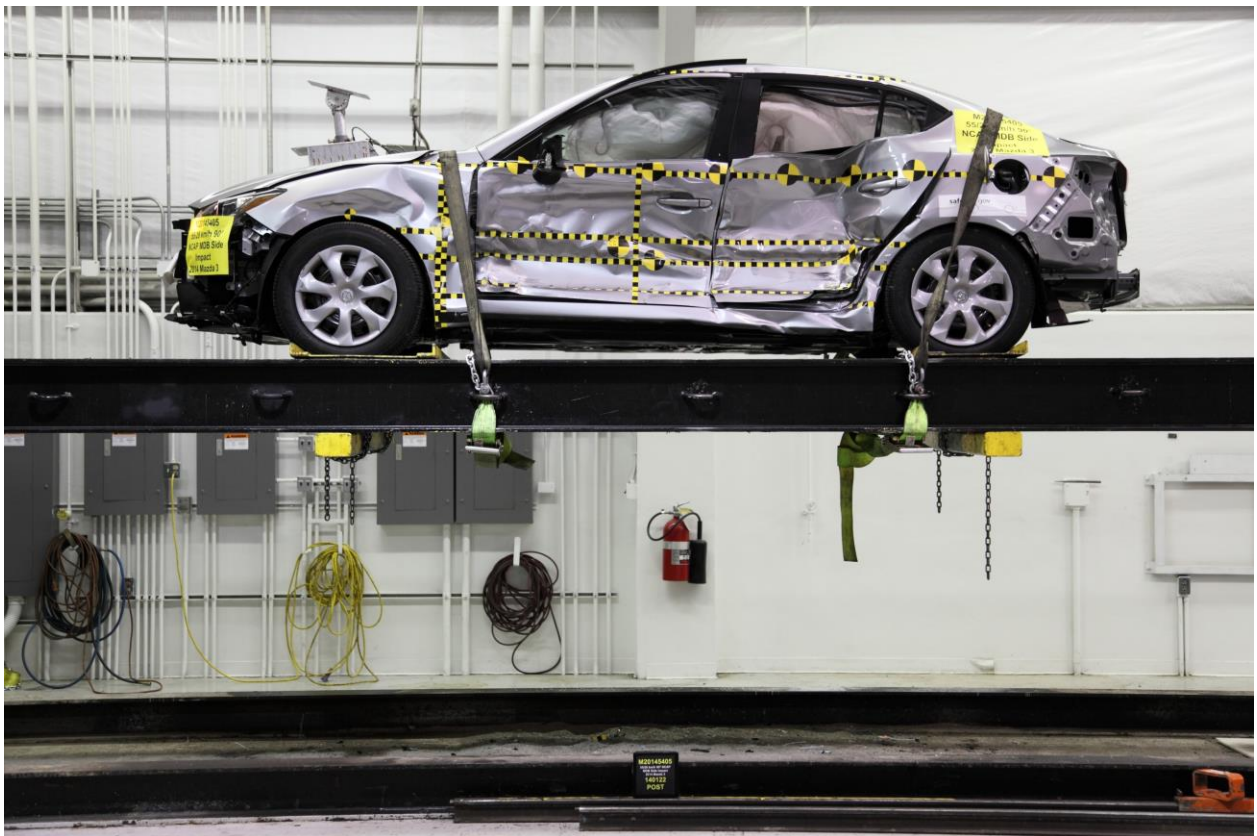
097 FMVSS No. 301 Static Rollover 90 Degrees



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

Fuel Economy and Environment

33 MPG combined city/hwy
 29 city
 41 highway
 3.0 gallons per 100 miles

You Save \$3,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,600

Fuel Economy & Greenhouse Gas Rating (EPA only) **Smog Rating** (EPA only)

This vehicle emits 265 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions, learn more at fuelconomy.gov

fuelconomy.gov

2014 Mazda3

Model: 2014 MAZDA3 I4-DOOR SV
 Exterior Color: LIQUID SILVER METALLIC
 Interior Color: BLACK

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES

- SKYACTIV-G 2.5L DOHC 4-CYL ENGINE
- SKYACTIV-MT 6-SPEED MANUAL TRANS
- 155 HORSEPOWER, 150 LB-FT TORQUE
- INDEPENDENT FRONT/REAR SUSPENSION

EXTERIOR FEATURES

- 16-INCH STEEL WHEELS
- 125/60R16 ALL-SEASON TIRES
- VARIABLE INTERMITTENT WIPERS
- GLOSS BLACK DUAL-POWER MIRRORS

INTERIOR FEATURES

- CLOTH-TRIMMED SPORT SEATS
- 6-WAY MANUAL DRIVERS SEAT
- AIR CONDITIONING W/POLLEN FILTER
- POWER AUTOMATIC DOOR LOCKS
- POWER WINDOWS W/DRIVER ONE-TOUCH
- REMOTE KEYLESS ENTRY
- PUSH BUTTON ENGINE START
- FOLD-DOWN REAR SEAT
- CENTER ARMREST W/COVERED STORAGE
- DRIVER/PASSENGER VANITY MIRRORS

SAFETY AND SECURITY FEATURES

- 36-MONTH/50,000 MILE "BUMPER-TO-BUMPER" WARRANTY
- 60 MONTH/100,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 6-POINT SAFETY BELTS
- LATCH CHILD SAFETY SEAT ANCHORS
- ANTI-THEFT ENGINE IMMOBILIZER
- SKYACTIV-BODY RING STRUCTURE

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 0%

MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 85%

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

FOR THIS VEHICLE: FINAL ASSEMBLY POINT: HOFU, JAPAN
 COUNTRY OF ORIGIN: ENDO, JAPAN
 TRANSMISSION: JAPAN

This label is affixed pursuant to the Federal Automobile Dealers' Act, Gasoline, License and Tire Fees, State and Local Taxes, and Dealer Installed Options are not included.

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
 Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver Passenger	Not Rated
Side Crash	Front seat Rear seat	Not Rated
Rollover		Not Rated

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236

MSRP \$16,945
 Total Vehicle and Options Delivery, Processing and Handling Fee \$16,945 \$795
Total MSRP \$17,740

0/3
 2

OLD TO: 34638
 MAZDA
 1717 SHIPLEY ROAD
 KY 40222

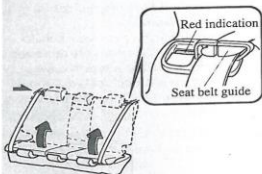
SHIP TO: 34638 MM
 OXMOOR MAZDA
 8107 SHIPLEY ROAD
 LOUISVILLE, KY 40222

JM1BM1T79E1125406

MAZDAUSA.COM

102 Monroney Label

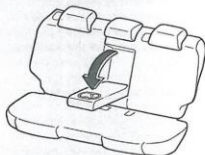
(5-Door)



2. Press the seatback rearward and lock it in place. After returning the seatback to its upright position, make sure it is securely locked.

▼ Armrest*

The rear armrest in the center of the rear seatback can be used (no occupant in the center seat) or placed upright.



⚠ WARNING

Never put your hands and fingers around the moving parts of the seat and armrest:

Putting your hands and fingers around the moving parts of the seat and armrest is dangerous as they could get injured.

2-10 *Some models.

Head Restraints

Your vehicle is equipped with head restraints on all outboard seats and the rear center seat. The head restraints are intended to help protect you and the passengers from neck injury.

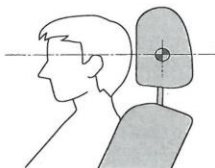
⚠ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted:

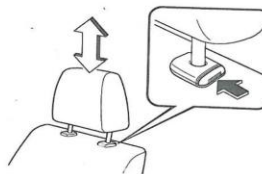
Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

Height adjustment

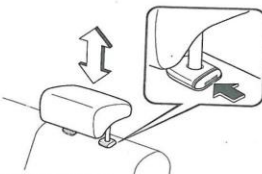
To raise a head restraint, pull it up to the desired position.
To lower the head restraint, press the stop-catch release, then push the head restraint down.
Adjust the head restraint so that the center is even with the top of the passenger's ears.



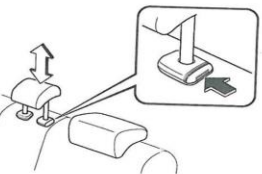
Front outboard seat



Rear outboard seat



Rear center seat*



Removal/Installation

To remove the head restraint, pull it up while pressing the stop-catch.
To install the head restraint, insert the legs into the holes while pressing the stop-catch.

⚠ WARNING

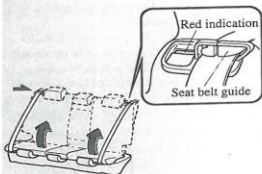
Always drive with the head restraints installed when seats are being used and make sure they are properly installed:

Driving with the head restraints not installed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

*Some models. 2-11

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

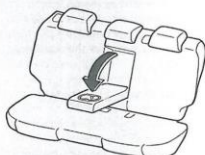
(5-Door)



2. Press the seatback rearward and lock it in place. After returning the seatback to its upright position, make sure it is securely locked.

▼ Armrest*

The rear armrest in the center of the rear seatback can be used (no occupant in the center seat) or placed upright.



⚠ WARNING

Never put your hands and fingers around the moving parts of the seat and armrest:

Putting your hands and fingers around the moving parts of the seat and armrest is dangerous as they could get injured.

2-10 *Some models.

Head Restraints

Your vehicle is equipped with head restraints on all outboard seats and the rear center seat. The head restraints are intended to help protect you and the passengers from neck injury.

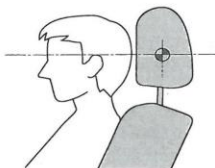
⚠ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted:

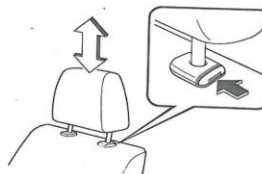
Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

Height adjustment

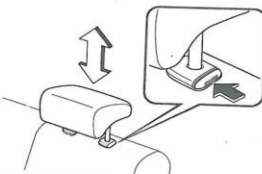
To raise a head restraint, pull it up to the desired position.
To lower the head restraint, press the stop-catch release, then push the head restraint down.
Adjust the head restraint so that the center is even with the top of the passenger's ears.



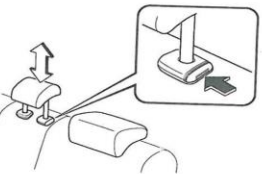
Front outboard seat



Rear outboard seat



Rear center seat*



Removal/Installation

To remove the head restraint, pull it up while pressing the stop-catch.
To install the head restraint, insert the legs into the holes while pressing the stop-catch.

⚠ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly installed:

Driving with the head restraints not installed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

*Some models. 2-11

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

No.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-5
2	Driver Head Acceleration (Y) Primary vs. Time	B-5
3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
8	Driver Thorax Rib Deflection Maximum vs. Time	B-6
9	Driver Anterior Abdominal Force (Y) vs. Time	B-7
10	Driver Middle Abdominal Force (Y) vs. Time	B-7
11	Driver Posterior Abdominal Force (Y) vs. Time	B-7
12	Driver Total Abdominal Force (Y) vs. Time	B-7
13	Driver Pubic Symphysis Force (Y) vs. Time	B-8
14	Passenger Head Acceleration (X) Primary vs. Time	B-8
15	Passenger Head Acceleration (Y) Primary vs. Time	B-8
16	Passenger Head Acceleration (Z) Primary vs. Time	B-8
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-9
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

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

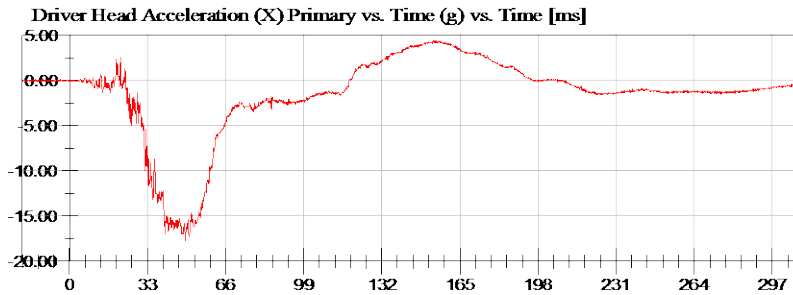
Test Lab: CTF

Test Number: 140122 (M20145405)

Test Date: 01/22/2014

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

Position #4 SID IIs Dummy (305)



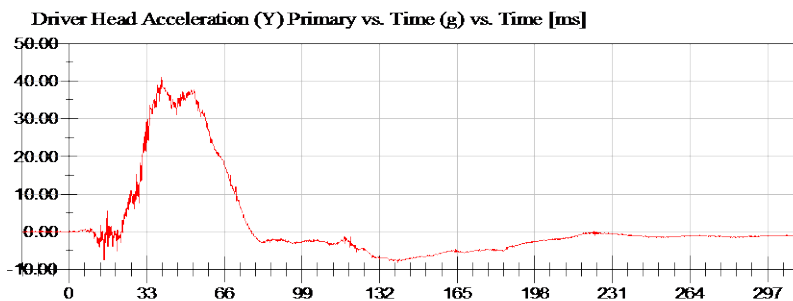
<Max>

4.42 g at 154.08 ms

<Min>

-17.75 g at 49.04 ms

CFC_1000



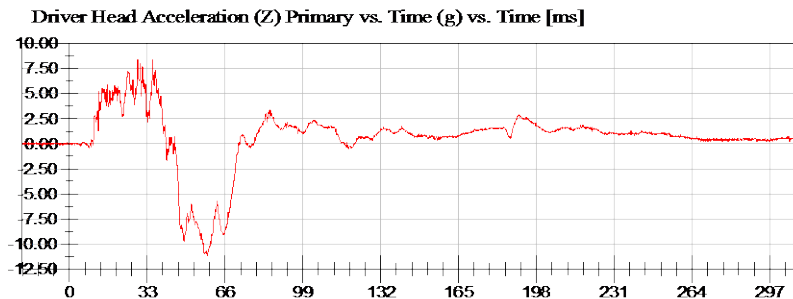
<Max>

41.01 g at 39.36 ms

<Min>

-8.14 g at 139.76 ms

CFC_1000



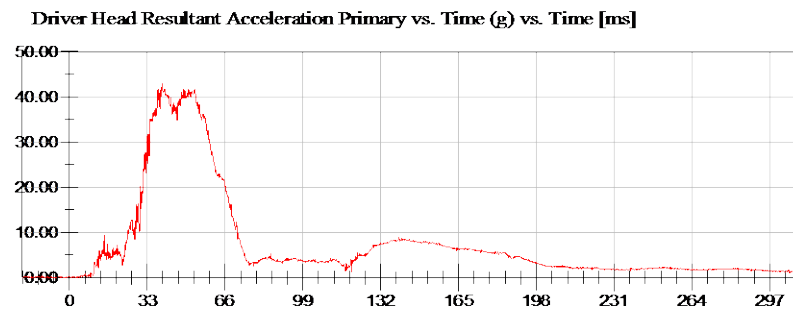
<Max>

8.41 g at 29.04 ms

<Min>

-11.18 g at 58.48 ms

CFC_1000



<Max>

43.01 g at 39.36 ms

<Min>

0.03 g at -20.00 ms

CFC_1000



NHTSA

Test Lab: CTF

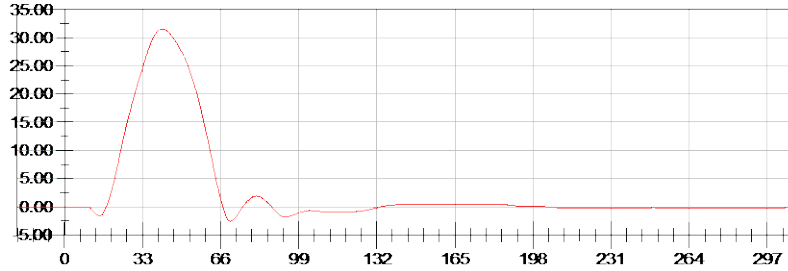
Test Number: 140122 (M20145405)

Test Date: 01/22/2014

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

Position #4 SID IIs Dummy (305)

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



<Max>

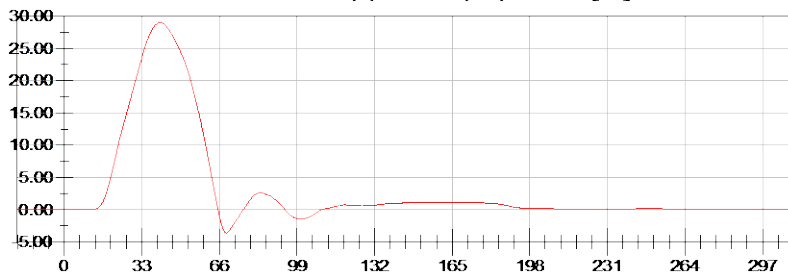
31.56 mm at 41.36 ms

<Min>

-2.52 mm at 70.08 ms

CFC 180

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



<Max>

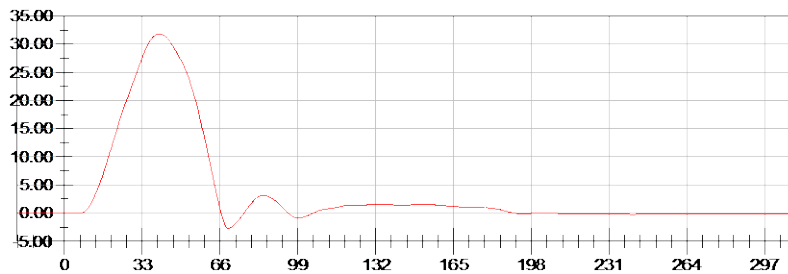
28.94 mm at 40.88 ms

<Min>

-3.61 mm at 68.88 ms

CFC 180

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



<Max>

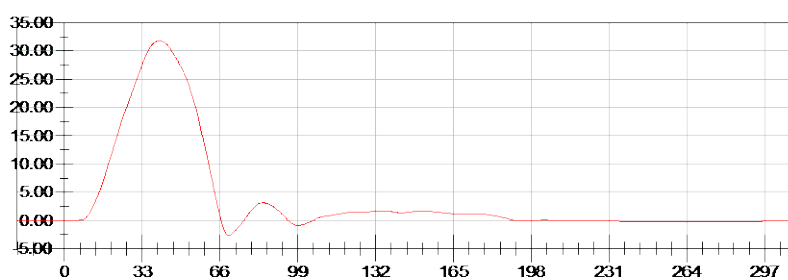
31.76 mm at 40.24 ms

<Min>

-2.70 mm at 69.68 ms

CFC 180

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



<Max>

31.76 mm at 40.24 ms

<Min>

-2.70 mm at 69.68 ms

CFC 180



NHTSA

Test Lab: CTF

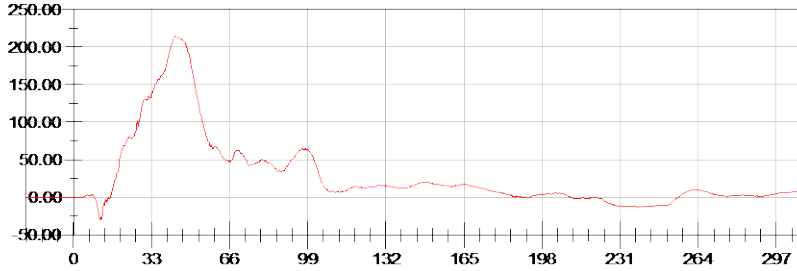
Test Number: 140122 (M20145405)

Test Date: 01/22/2014

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

Position #4 SID IIs Dummy (305)

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



<Max>

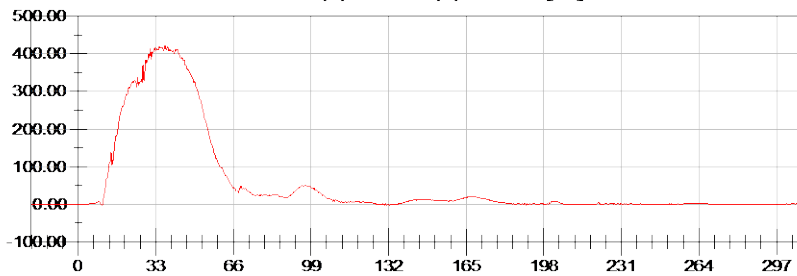
215.23 N at 43.20 ms

<Min>

-30.48 N at 11.28 ms

CFC 600

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



<Max>

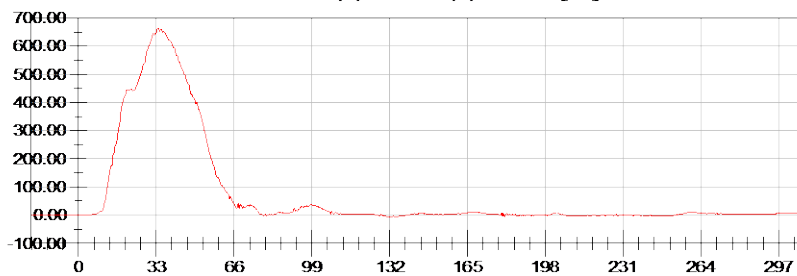
421.67 N at 36.88 ms

<Min>

-3.58 N at 10.16 ms

CFC 600

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



<Max>

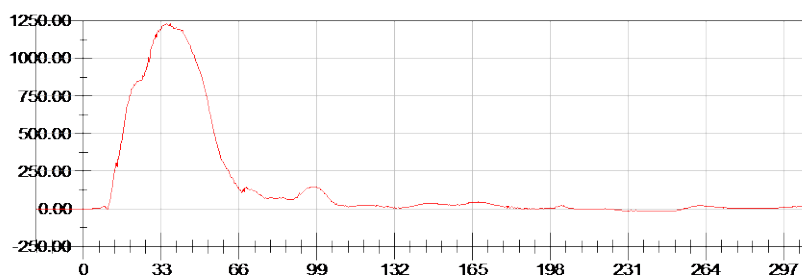
662.39 N at 34.08 ms

<Min>

-6.63 N at 131.68 ms

CFC 600

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



<Max>

1,229.74 N at 36.88 ms

<Min>

-14.91 N at 243.76 ms

CFC 600



NHTSA

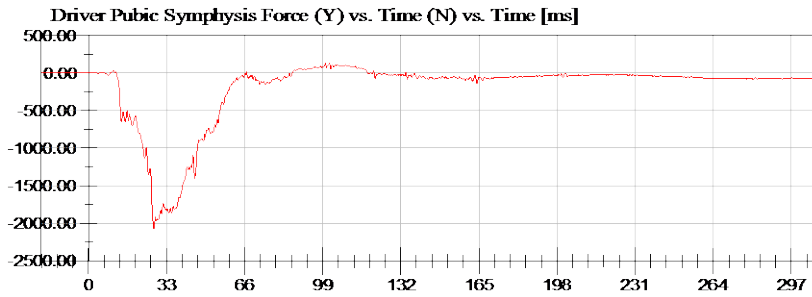
Test Lab: CTF

Test Number: 140122 (M20145405)

Test Date: 01/22/2014

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

Position #4 SID IIs Dummy (305)



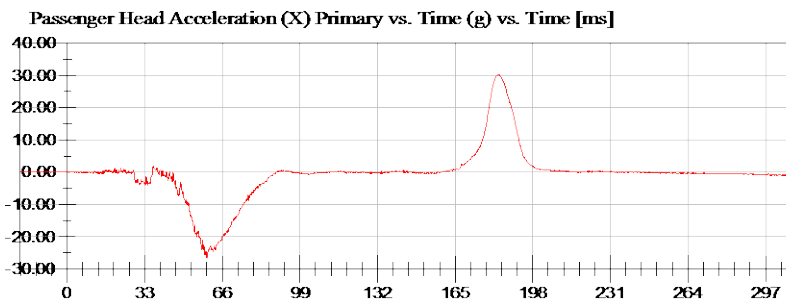
<Max>

130.94 N at 101.76 ms

<Min>

-2,066.91 N at 27.60 ms

CFC_600



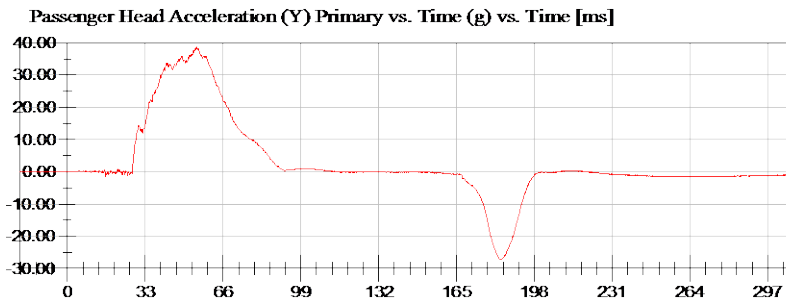
<Max>

30.30 g at 183.28 ms

<Min>

-26.67 g at 59.44 ms

CFC_1000



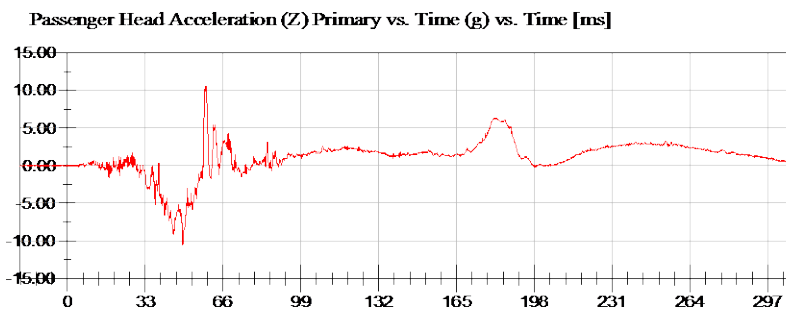
<Max>

38.97 g at 54.88 ms

<Min>

-27.25 g at 183.20 ms

CFC_1000



<Max>

10.60 g at 58.72 ms

<Min>

-10.59 g at 48.96 ms

CFC_1000



NHTSA

Test Lab: CTF

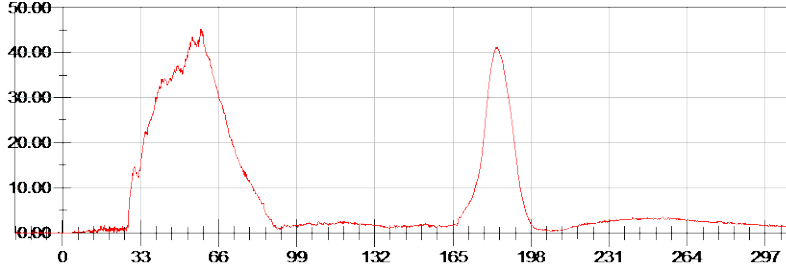
Test Number: 140122 (M20145405)

Test Date: 01/22/2014

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

Position #4 SID IIs Dummy (305)

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



<Max>

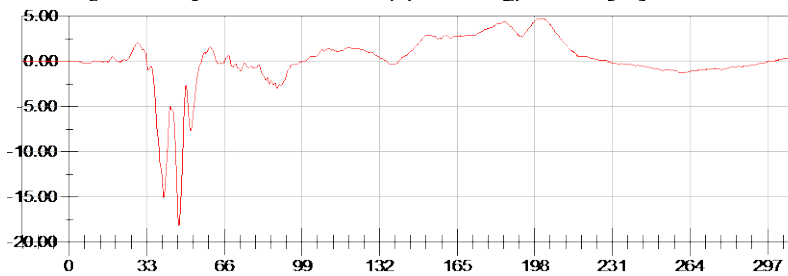
45.32 g at 58.80 ms

<Min>

0.04 g at -19.20 ms

CFC 1000

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



<Max>

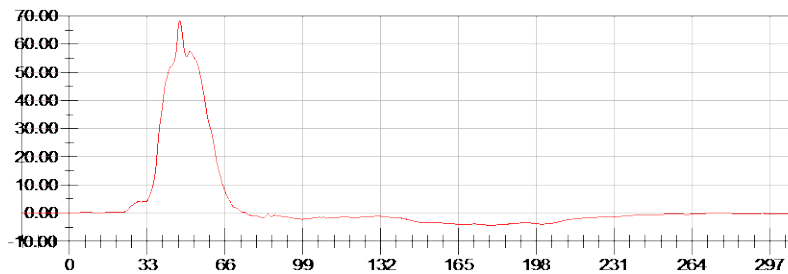
4.71 g at 200.64 ms

<Min>

-18.19 g at 46.72 ms

CFC 180

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



<Max>

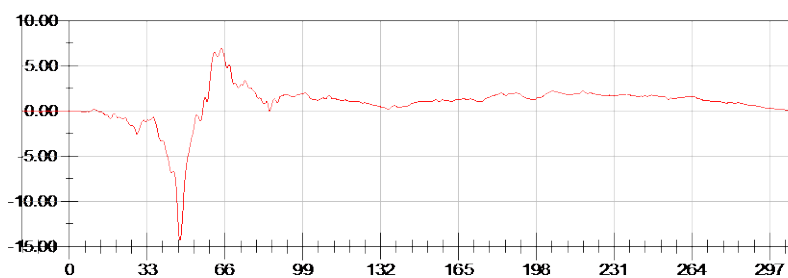
68.19 g at 46.72 ms

<Min>

-4.23 g at 180.08 ms

CFC 180

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



<Max>

6.98 g at 64.56 ms

<Min>

-14.33 g at 46.96 ms

CFC 180



NHTSA

Test Lab: CTF

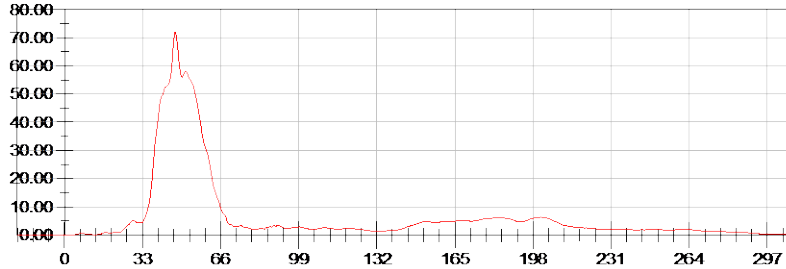
Test Number: 140122 (M20145405)

Test Date: 01/22/2014

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

Position #4 SID IIs Dummy (305)

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



<Max>

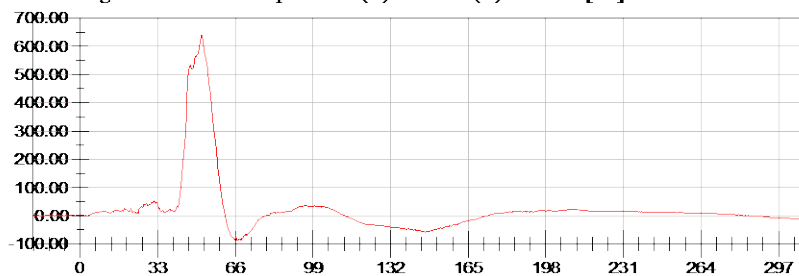
71.98 g at 46.72 ms

<Min>

0.01 g at -0.80 ms

CFC 180

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



<Max>

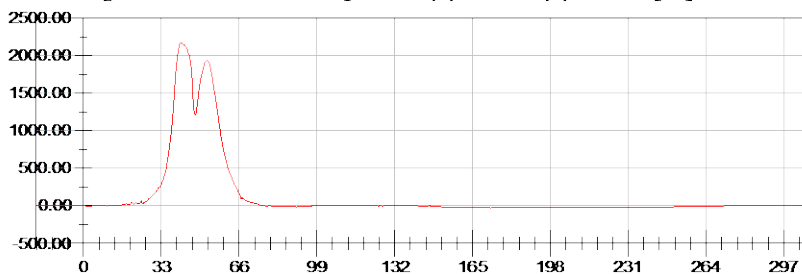
641.68 N at 51.68 ms

<Min>

-89.25 N at 68.40 ms

CFC 600

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



<Max>

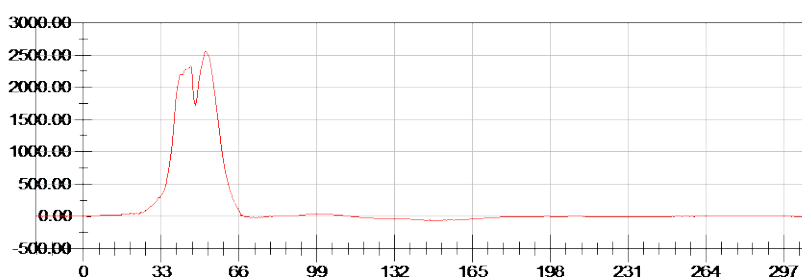
2,167.31 N at 41.60 ms

<Min>

-29.21 N at 172.72 ms

CFC 600

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



<Max>

2,558.26 N at 51.92 ms

<Min>

-64.79 N at 150.00 ms

CFC 600



APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3 Neck Pendulum Test

- Pendulum Velocity (m/s) vs. Time (ms)
- Flexion Angle (°) vs. Time (ms)
- Potentiometer A (°) vs. Time (ms)
- Potentiometer B (°) vs. Time (ms)
- Potentiometer C (°) vs. Time (ms)

Table 4. Shoulder Impact Test

- Impactor Acceleration (G's) vs. Time (ms)

Table 5. Thorax – Upper Rib Drop Test

- Upper Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
- Upper Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 6. Thorax – Middle Rib Drop Test

- Middle Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
- Middle Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 7. Thorax – Lower Rib Drop Test

- Lower Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
- Lower Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 8. Thorax – Full Body Impact Test

- Pendulum Acceleration (G's) vs. Time (ms)
- Impactor Force (kN) vs. Time (ms)
- Upper Rib Displacement (mm) vs. Time (ms)
- Middle Rib Displacement (mm) vs. Time (ms)
- Lower Rib Displacement (mm) vs. Time (ms)

Table 9. Abdomen Impact Test

- Impactor Force (kN) vs. Time (ms)
- Total Abdomen Force (kN) vs. Time (ms)
- Front Abdomen Force (kN) vs. Time (ms)
- Middle Abdomen Force (kN) vs. Time (ms)
- Rear Abdomen Force (kN) vs. Time (ms)

Table 10. Lumbar Spine Flexion Test

- Pendulum Velocity (m/s) vs. Time (ms)
- Spine Flexion Angle (°) vs. Time (ms)
- Potentiometer A (°) vs. Time (ms)
- Potentiometer B (°) vs. Time (ms)
- Potentiometer C (°) vs. Time (ms)

Table 11. Pelvis Impact Test

- Pendulum Acceleration (G's) vs. Time (ms)
- Impactor Force (kN) vs. Time (ms)
- Pubic Symphysis (Y) Force (kN) vs. Time (ms)

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3. Lateral Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax (With Arm) Impact Test

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

Table 6. Thorax (Without Arm) Impact Test

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

Table 7. Abdomen Impact Test

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

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

Table 9. Pelvis Acetabulum Impact Test

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

Table 10. Pelvis Iliac Impact Test

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

**Pre-Test Calibration Sheets
Driver S/N F030**

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 20
01/21/14

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	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	471	Yes
8	Thorax Width	322.0 - 332.0	326	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	267	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	606	Yes

Technician



Approved



Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 20-1

Test Date: 1/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Resultant Acceleration	125 - 155 g	144.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	6.1 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

01.20.2014 13:56:27 360

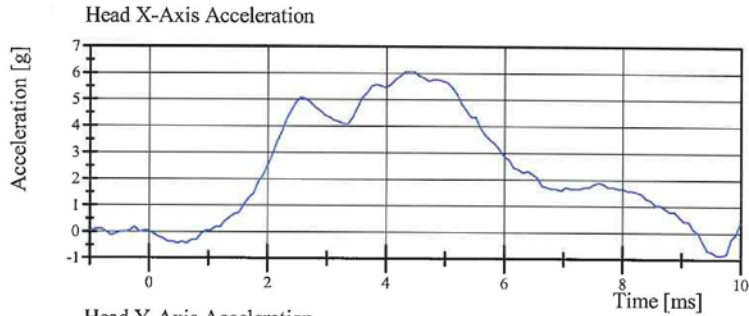


Transportation Research Center Inc.

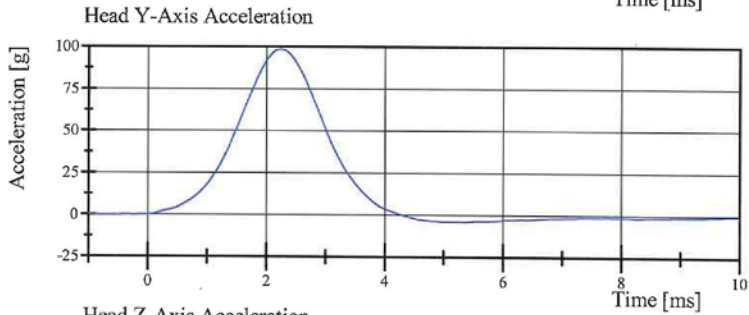
Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 20-1

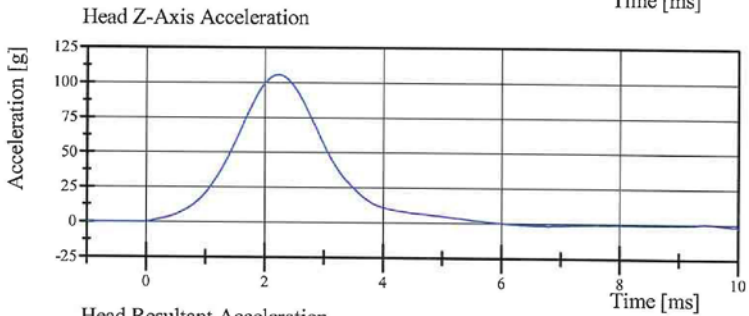
Test Date: 1/20/2014



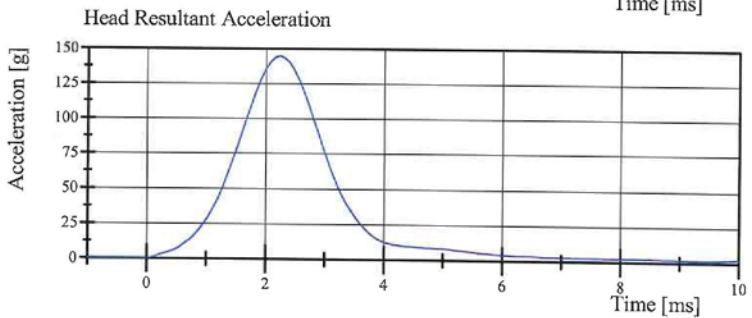
Filter Class: CFC_1000
Max: 6.1 g at 4.3 ms
Min: -0.9 g at 9.6 ms



Filter Class: CFC_1000
Max: 98.7 g at 2.2 ms
Min: -4.0 g at 5.4 ms



Filter Class: CFC_1000
Max: 105.7 g at 2.2 ms
Min: -2.0 g at 10.0 ms



Filter Class: CFC_1000
Max: 144.7 g at 2.2 ms
Min: 0.0 g at -0.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.20.2014 13:56:37 360



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 20-1

Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	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	-53.2 deg	Yes
Time of Peak	54 - 66 ms	55.7 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	67.0 ms	Yes


Test meets specifications.

Comments:

Technician



Approved



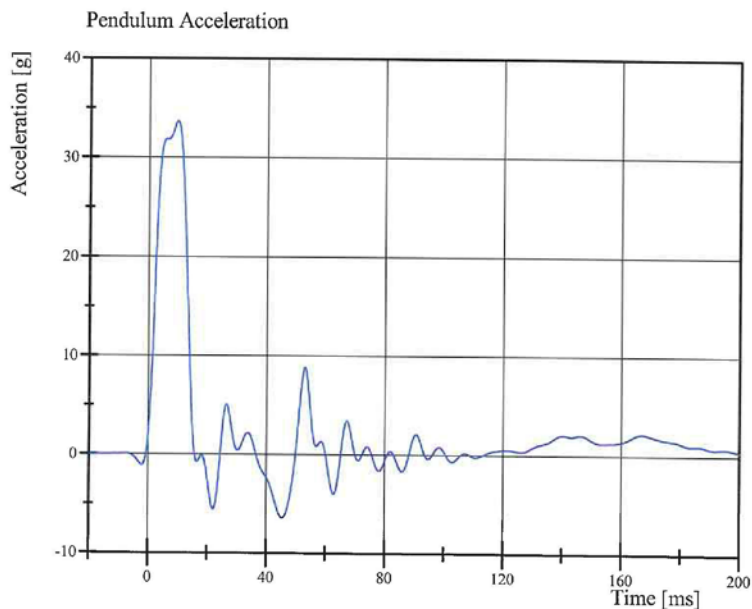
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 09:17:39 1306

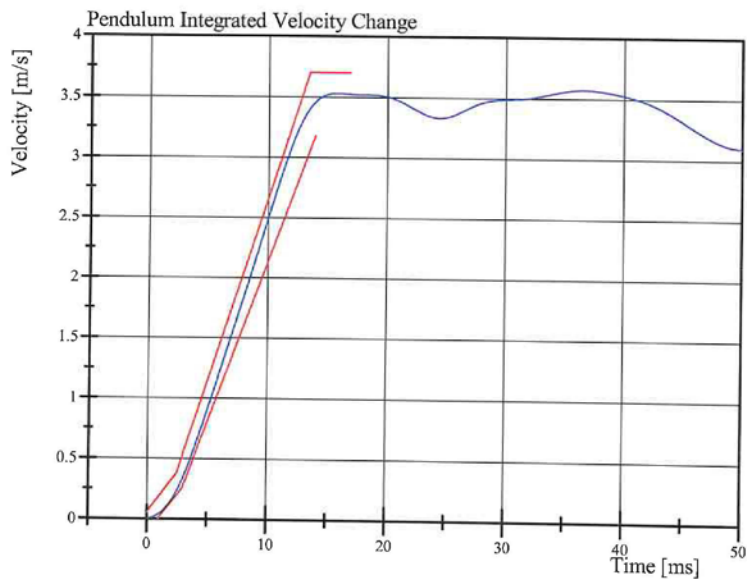


Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_60
Max: 33.6 g at 9.7 ms
Min: -6.4 g at 45.4 ms



Filter Class: CFC_60
Max: 3.6 m/s at 36.6 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 09:17:48 1306

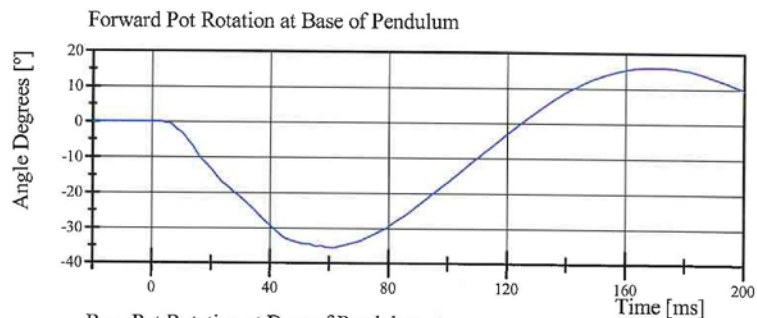


Transportation Research Center Inc.

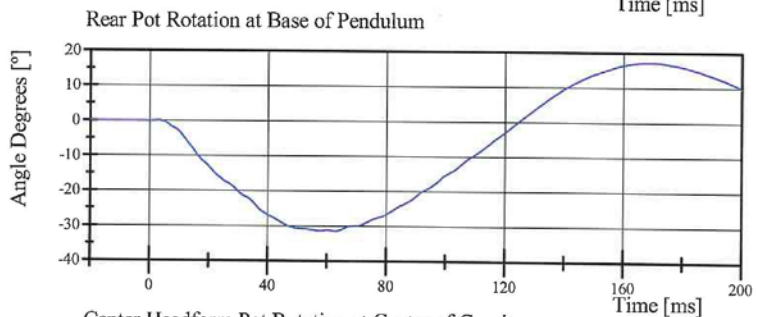
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 20-1

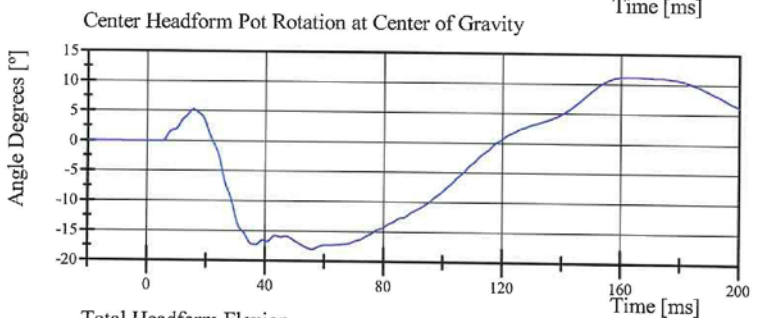
Test Date: 1/21/2014



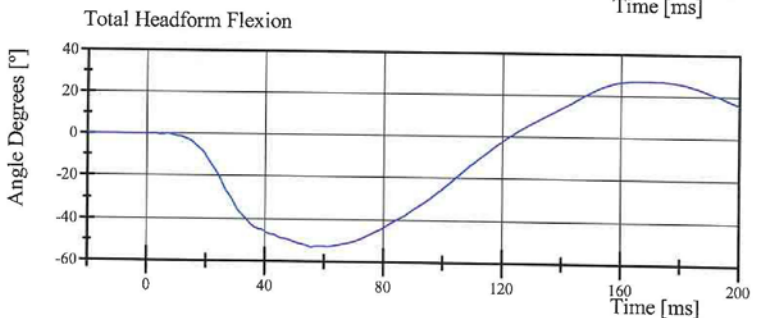
Filter Class: CFC_180
Max: 15.9 ° at 168.8 ms
Min: -35.6 ° at 61.0 ms



Filter Class: CFC_180
Max: 17.2 ° at 169.3 ms
Min: -31.5 ° at 63.0 ms



Filter Class: CFC_180
Max: 11.2 ° at 163.0 ms
Min: -18.0 ° at 55.8 ms



Filter Class: CFC_180
Max: 27.0 ° at 166.8 ms
Min: -53.2 ° at 55.7 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 09:17:49 1306



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 20-1

Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.84 g	Yes

Test meets specifications.

Comments:

Technician



Approved



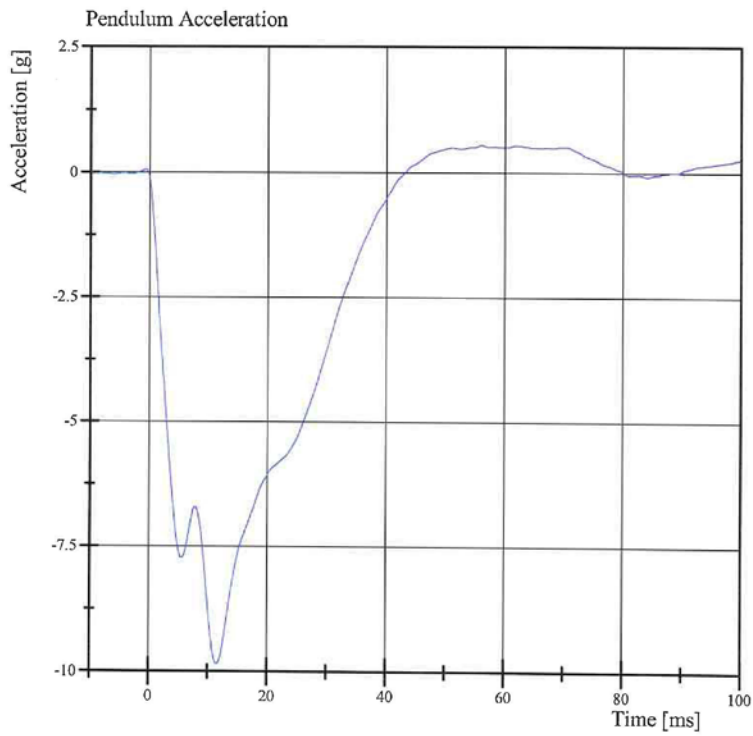
Specification Source: NHTSA final rule 8/15/2008

01.21.2014 13:02:12 533



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 0.6 g at 56.1 ms
Min: -9.8 g at 11.5 ms

Specification Source: NHTSA final rule 8/15/2008

01.21.2014 13:02:18 533



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014


Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	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



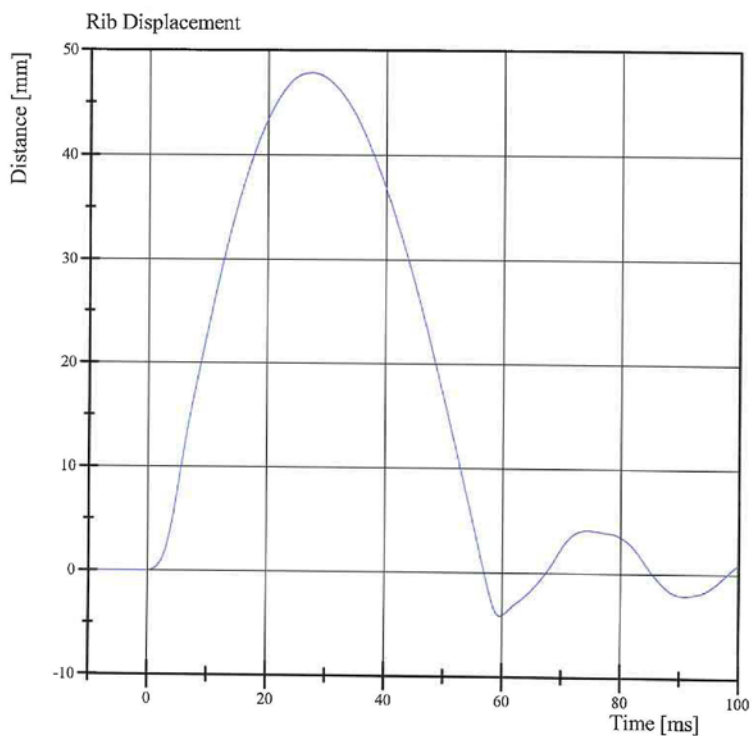
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 10:52:02 742



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 47.8 mm at 27.3 ms
Min: -4.2 mm at 59.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 10:52:10 742



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	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



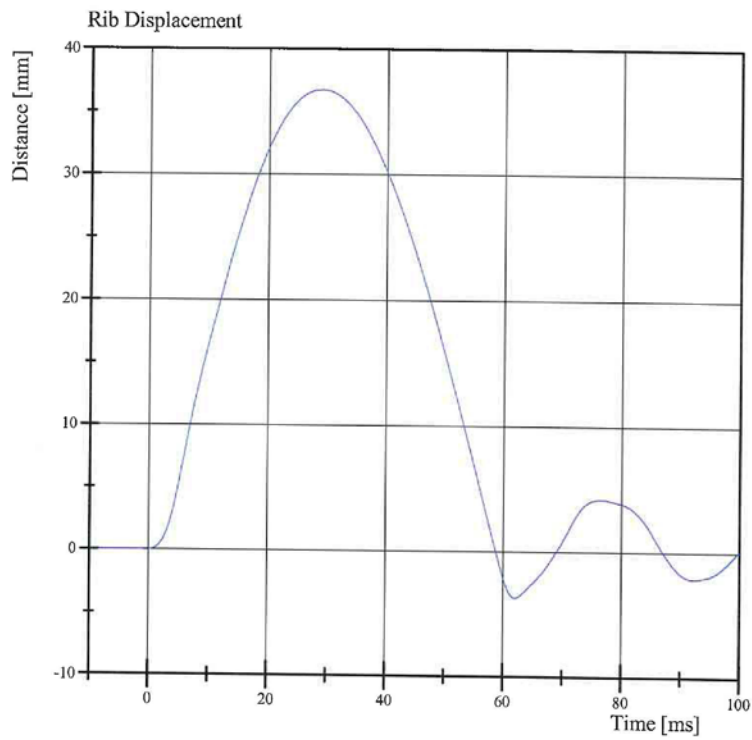
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 10:58:11 923



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 36.7 mm at 28.9 ms
Min: -3.7 mm at 62.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 10:58:21 923



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.2 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician



Approved



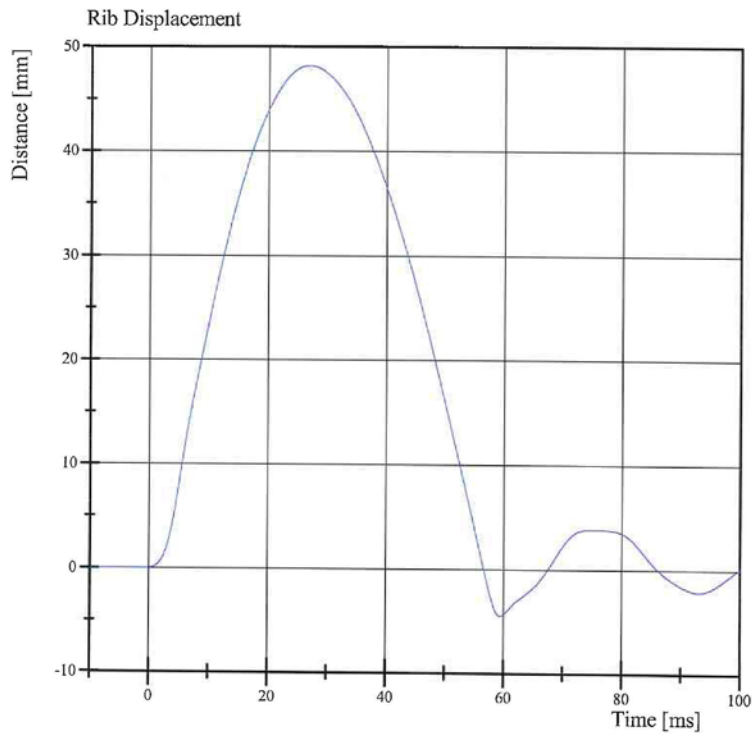
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:02:14 740



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 48.2 mm at 26.9 ms
Min: -4.5 mm at 59.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:02:21 740



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.2 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



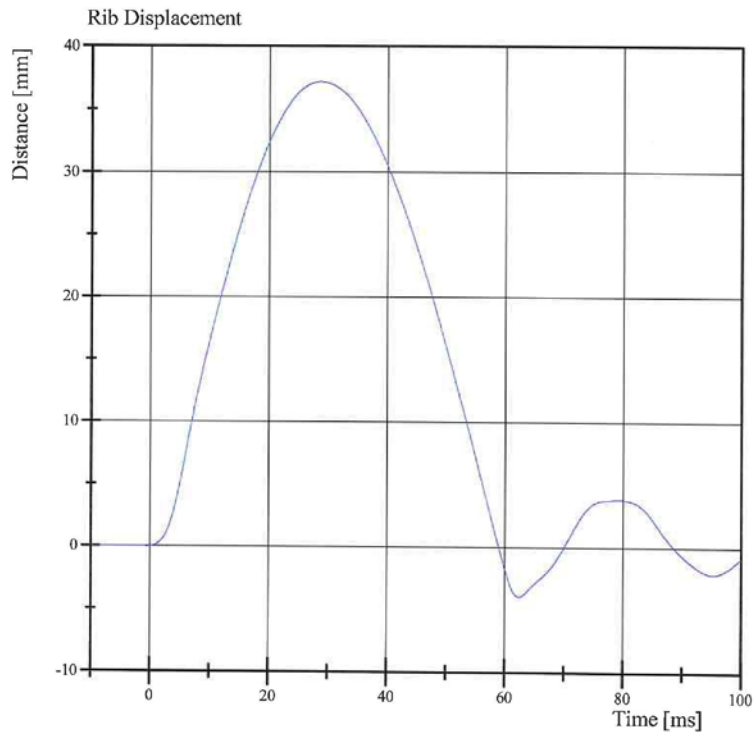
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:08:06 930



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 37.2 mm at 28.6 ms
Min: -4.0 mm at 62.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:08:20 930



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	35 %	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



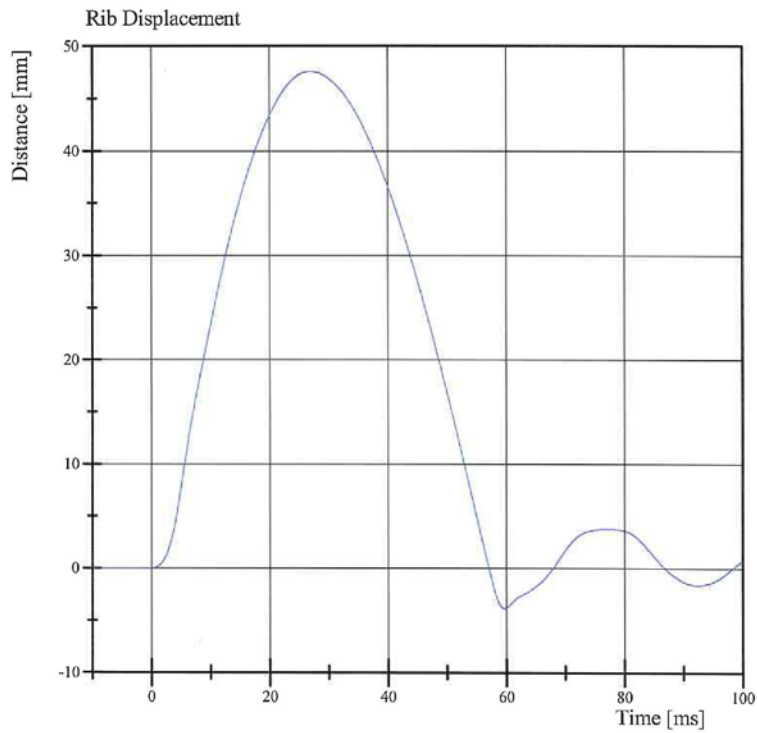
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:12:24 744



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 47.6 mm at 27.0 ms
Min: -3.9 mm at 59.7 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:12:31 744



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	33 %	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



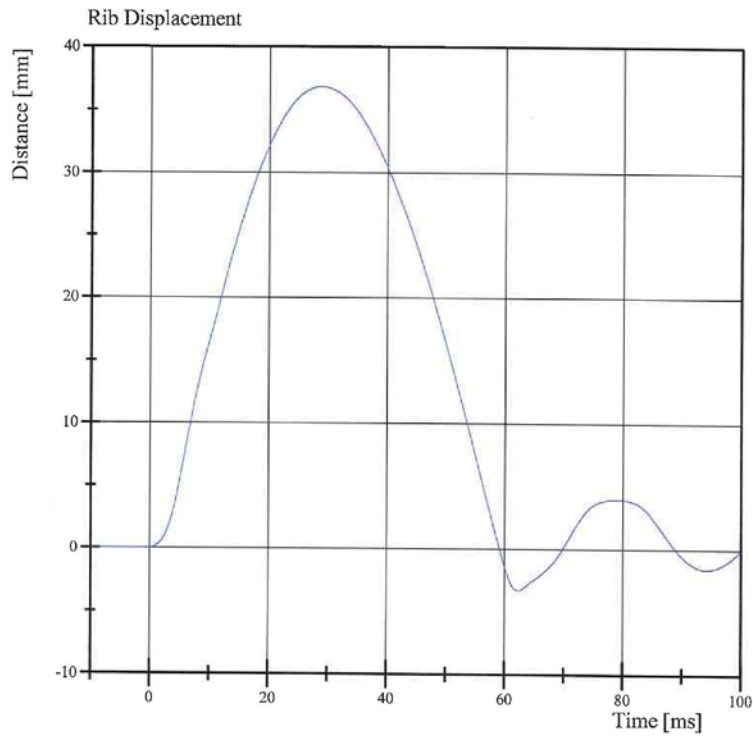
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:17:54 936



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 36.8 mm at 28.7 ms
Min: -3.3 mm at 62.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 11:18:05 936



Transportation Research Center Inc.


Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.456 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,485.6 N	Yes
Upper Rib Displacement	34 - 41 mm	37.2 mm	Yes
Center Rib Displacement	37 - 45 mm	40.7 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.0 mm	Yes

Test meets specifications.

Comments:

Technician



Approved



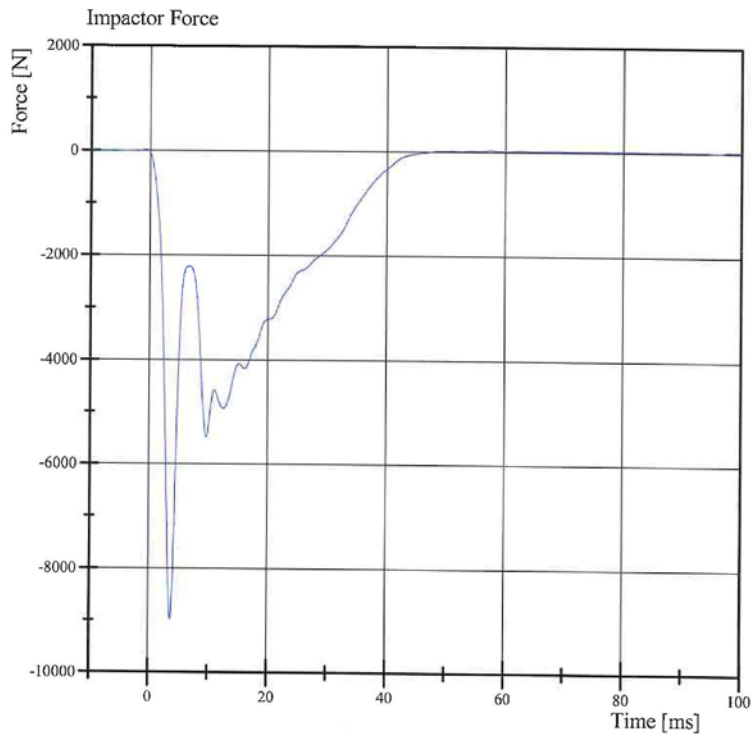
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

01.21.2014 13:08:12 435



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 34.6 N at 57.5 ms
Min: -8,988.2 N at 3.8 ms

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

01.21.2014 13:08:20 435

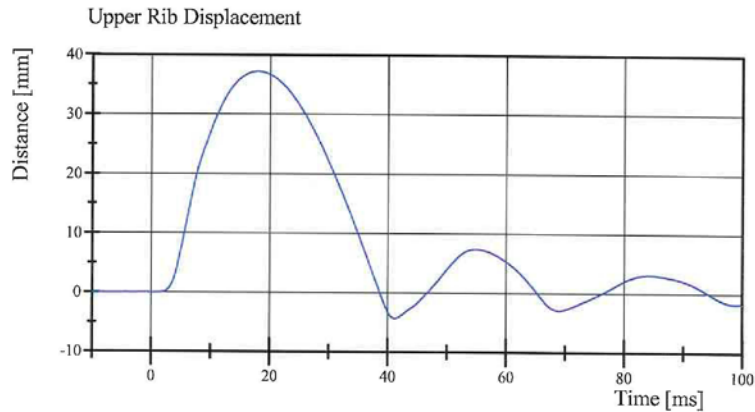


Transportation Research Center Inc.

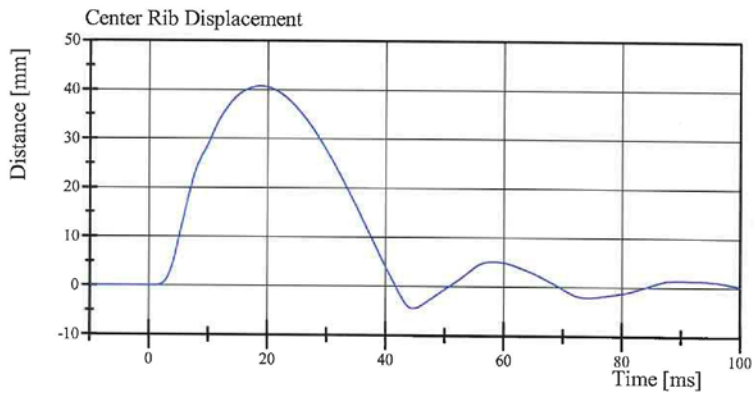
Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 20-1

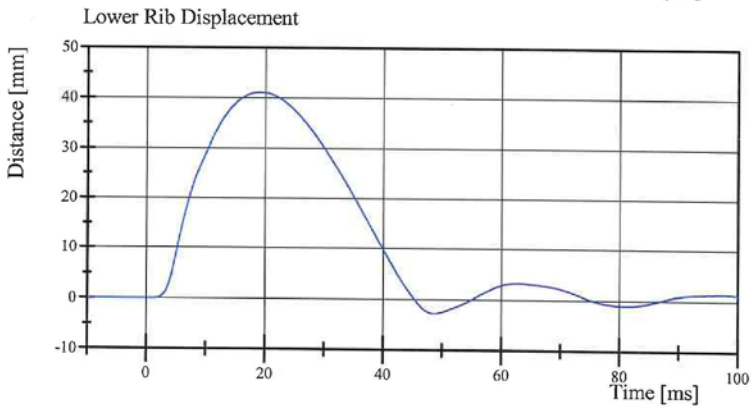
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 37.2 mm at 17.9 ms
Min: -4.3 mm at 41.2 ms



Filter Class: CFC_180
Max: 40.7 mm at 18.8 ms
Min: -4.5 mm at 44.7 ms



Filter Class: CFC_180
Max: 41.0 mm at 19.1 ms
Min: -2.8 mm at 48.6 ms

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

01.21.2014 13:08:20 435



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 20-2
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.93 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,110.2 N	Yes
Time of Peak	10.6 - 13.0 ms	11.28 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,687.3 N	Yes
Time of Peak	10.0 - 12.3 ms	10.40 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 13:57:04 626

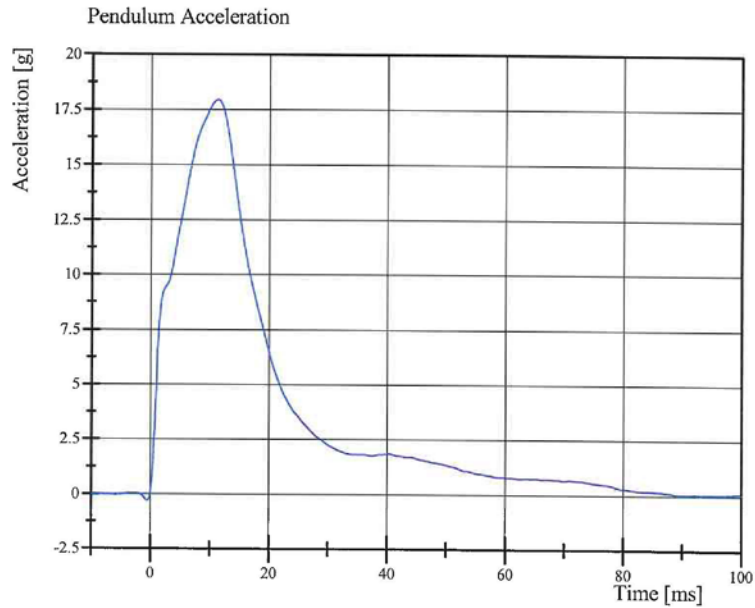


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 20-2

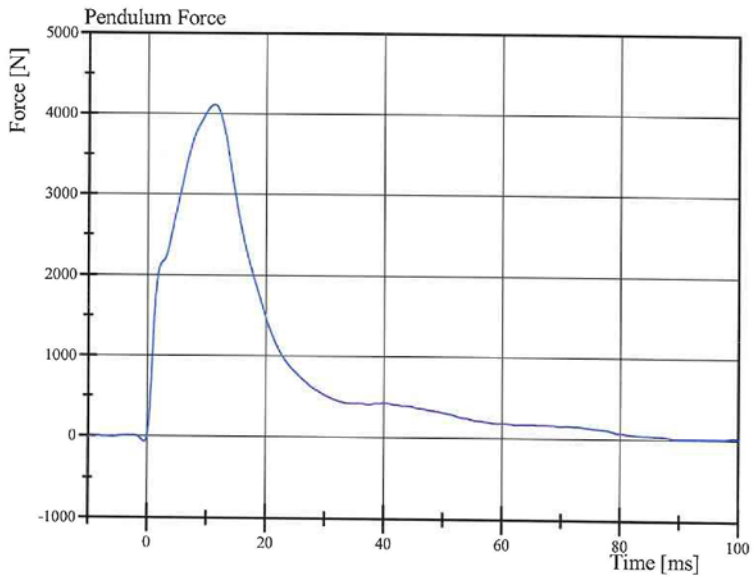
Test Date: 1/21/2014



Filter Class: CFC_180

Max: 17.9 g at 11.3 ms

Min: -0.3 g at -0.5 ms



Filter Class: CFC_180

Max: 4,110.2 N at 11.3 ms

Min: -67.5 N at -0.5 ms

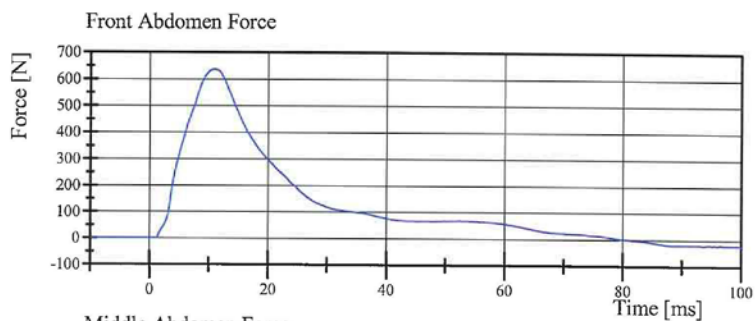
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 13:57:11 626

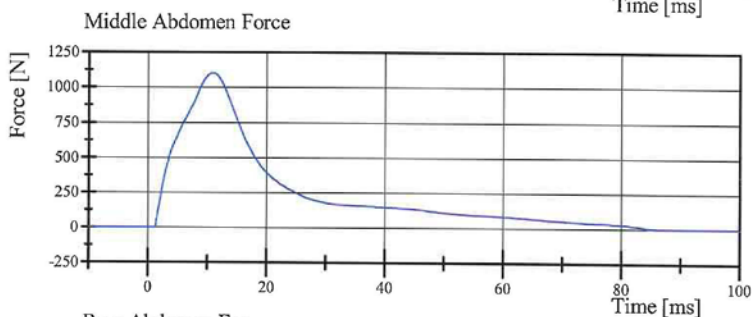


Transportation Research Center Inc.

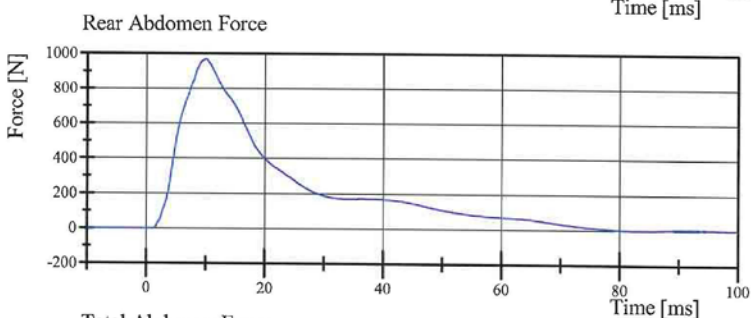
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 20-2
Test Date: 1/21/2014



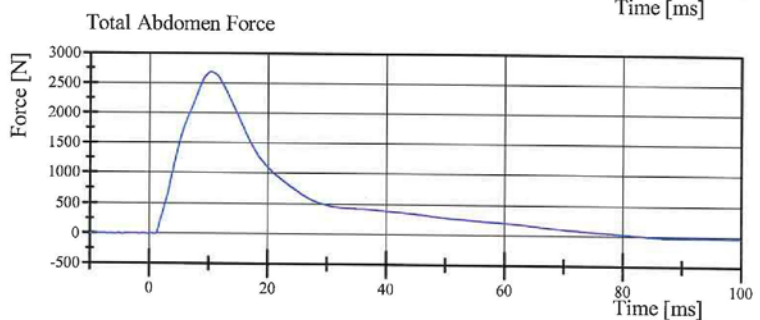
Filter Class: CFC_600
Max: 636.9 N at 10.7 ms
Min: -23.1 N at 99.6 ms



Filter Class: CFC_600
Max: 1,099.5 N at 10.9 ms
Min: -3.6 N at 99.5 ms



Filter Class: CFC_600
Max: 968.1 N at 10.0 ms
Min: -2.4 N at 82.6 ms



Filter Class: CFC_600
Max: 2,687.3 N at 10.4 ms
Min: -28.6 N at 99.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 13:57:12 626



Transportation Research Center Inc.

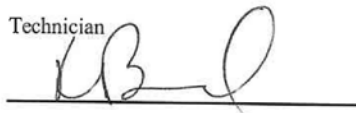
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 20-3
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.017 m/s	Yes
Maximum Headform Flexion Peak	(-45) - (-55) deg	-46.6 deg	Yes
Time of Peak	39 - 53 ms	44.6 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	38.3 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



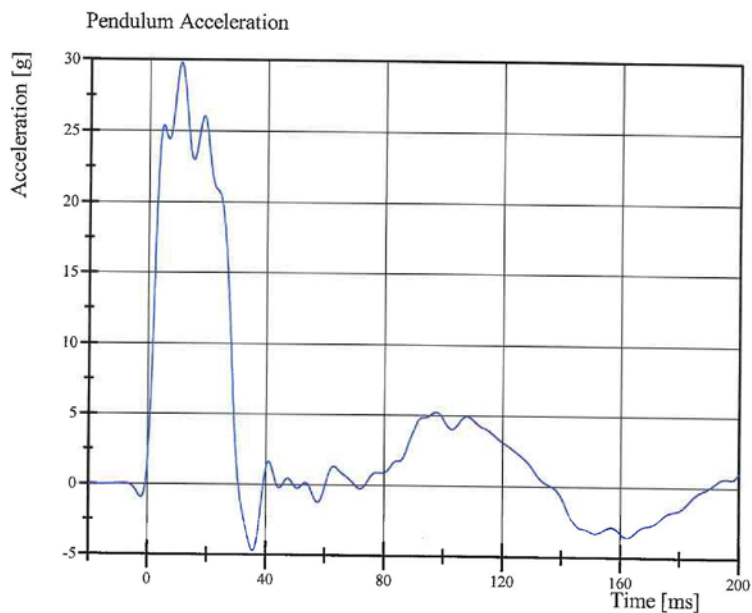
Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 08:54:44 580

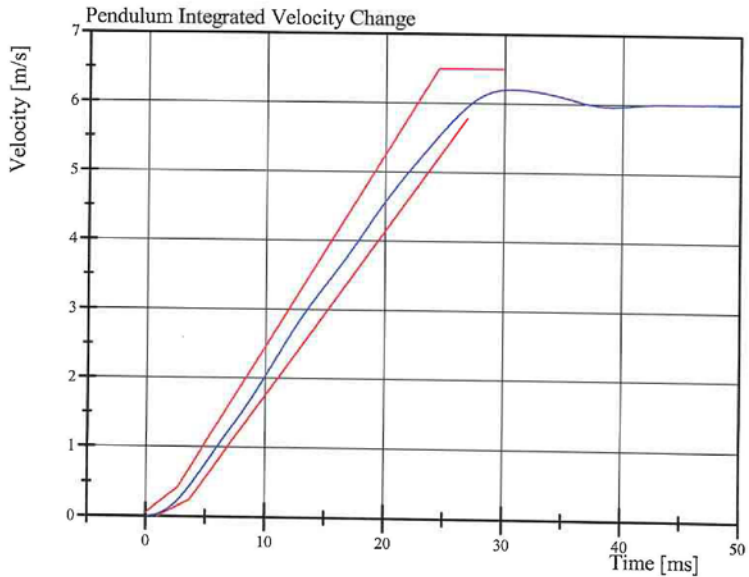


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 20-3
Test Date: 1/21/2014



Filter Class: CFC_60
Max: 29.8 g at 10.7 ms
Min: -4.7 g at 35.7 ms



Filter Class: CFC_60
Max: 6.2 m/s at 30.7 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 08:54:51 580

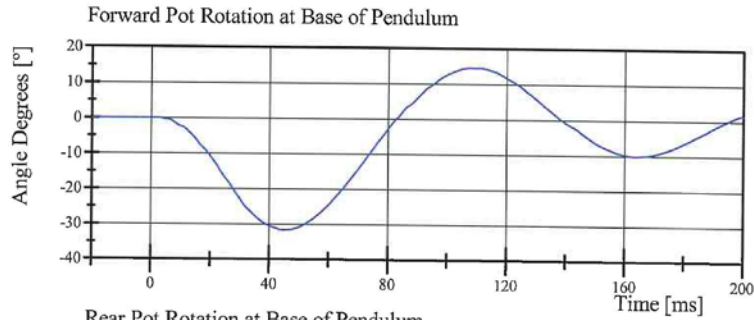


Transportation Research Center Inc.

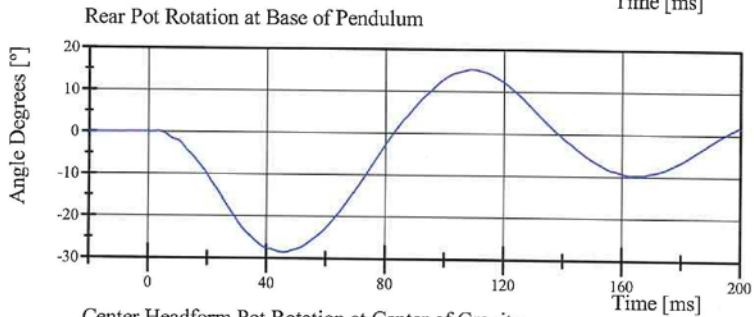
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 20-3

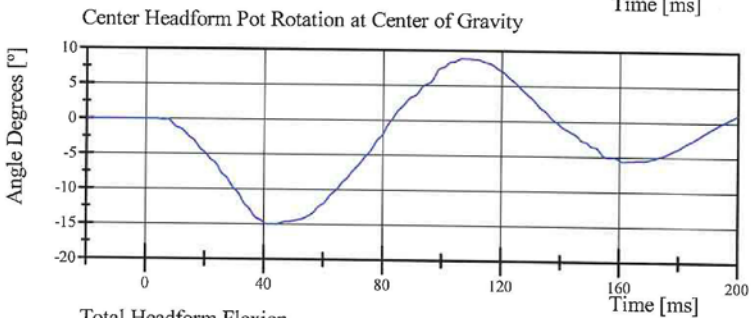
Test Date: 1/21/2014



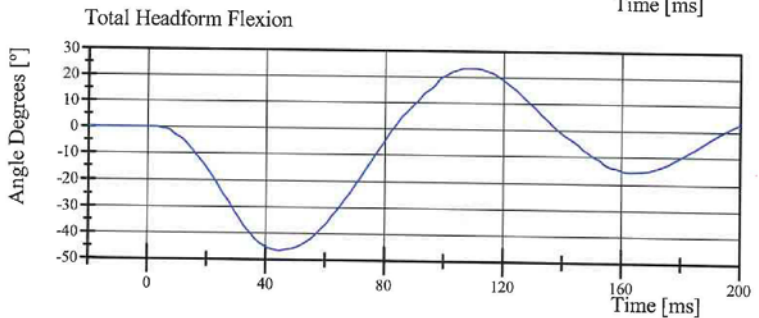
Filter Class: CFC_180
Max: 14.5 ° at 107.6 ms
Min: -31.6 ° at 44.8 ms



Filter Class: CFC_180
Max: 15.3 ° at 109.3 ms
Min: -28.6 ° at 45.8 ms



Filter Class: CFC_180
Max: 8.9 ° at 106.7 ms
Min: -15.0 ° at 41.4 ms



Filter Class: CFC_180
Max: 23.4 ° at 107.0 ms
Min: -46.6 ° at 44.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 08:54:52 580



Transportation Research Center Inc.

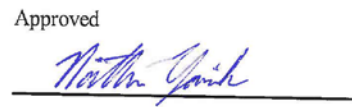
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 20-1
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,030.8 N	Yes
Time of Peak	11.8 - 16.1 ms	12.56 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,268.6 N	Yes
Time of Peak	12.2 - 17.0 ms	12.56 ms	Yes

Test meets specifications.

Comments:

Technician


Approved


Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 13:32:03 597

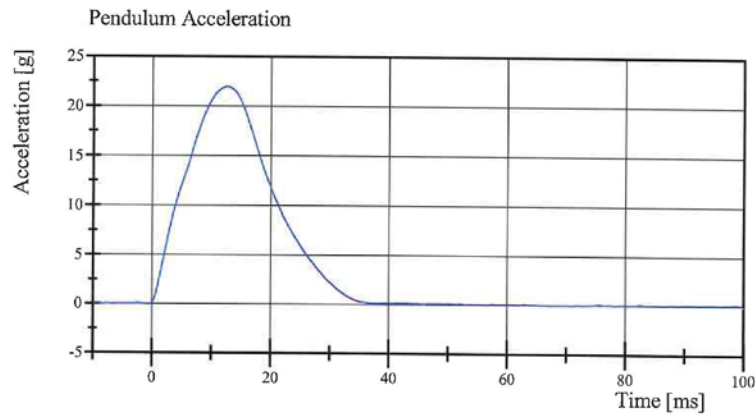


Transportation Research Center Inc.

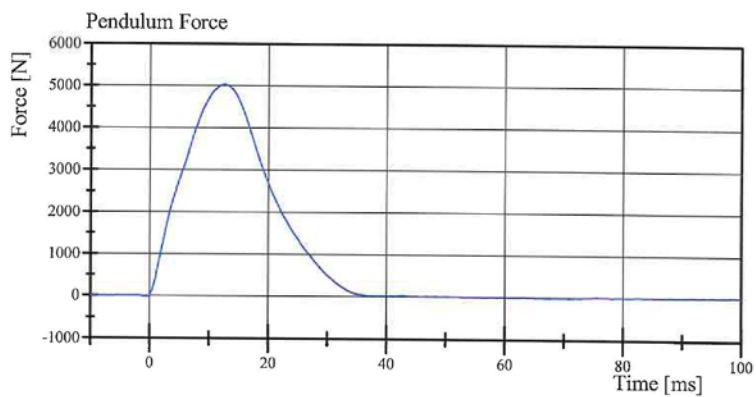
Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 20-1

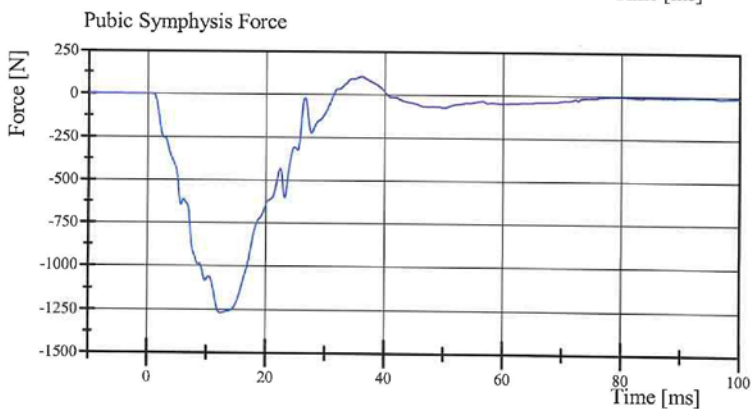
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 22.0 g at 12.6 ms
Min: -0.1 g at 67.4 ms



Filter Class: CFC_180
Max: 5,030.8 N at 12.6 ms
Min: -18.9 N at 67.4 ms



Filter Class: CFC_600
Max: 104.0 N at 36.0 ms
Min: -1,268.6 N at 12.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.21.2014 13:32:10 597



Driver S/N F030

Post-Test Calibration Sheets

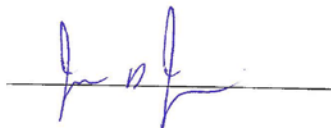
Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 21
01/23/14

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	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	447	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	471	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	267	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	606	Yes

Technician



Approved



Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Peak Resultant Acceleration	125 - 155 g	132.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	5.3 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

01.23.2014 09:18:08 359

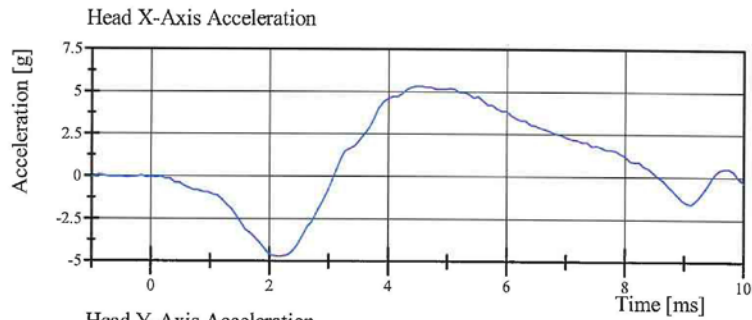


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 21-1

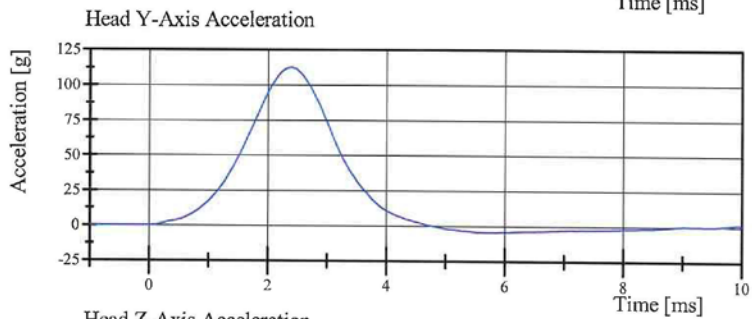
Test Date: 1/23/2014



Filter Class: CFC_1000

Max: 5.3 g at 4.5 ms

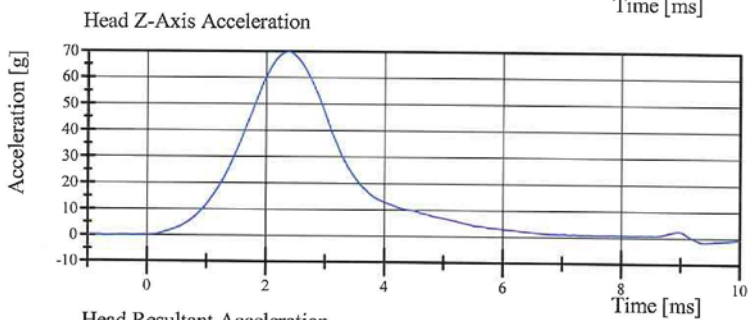
Min: -4.7 g at 2.2 ms



Filter Class: CFC_1000

Max: 112.7 g at 2.4 ms

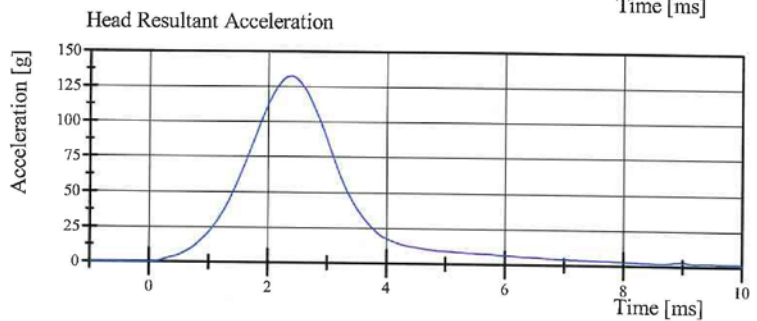
Min: -4.6 g at 5.8 ms



Filter Class: CFC_1000

Max: 69.9 g at 2.4 ms

Min: -1.8 g at 9.4 ms



Filter Class: CFC_1000

Max: 132.7 g at 2.4 ms

Min: 0.0 g at -0.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 09:18:15 359



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 21-1

Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-52.5 deg	Yes
Time of Peak	54 - 66 ms	59.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	62.4 ms	Yes

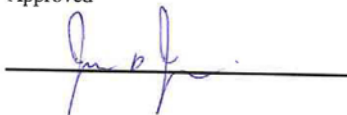
Test meets specifications.

Comments:

Technician



Approved



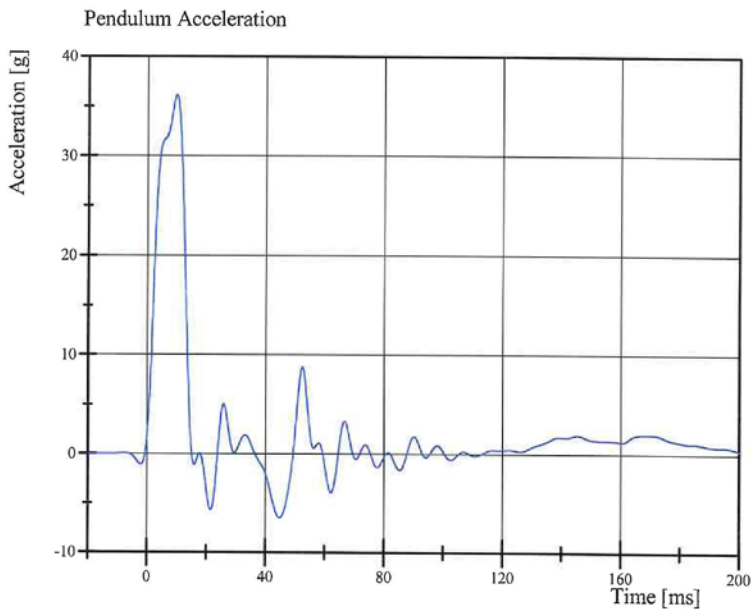
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 08:44:27 1310

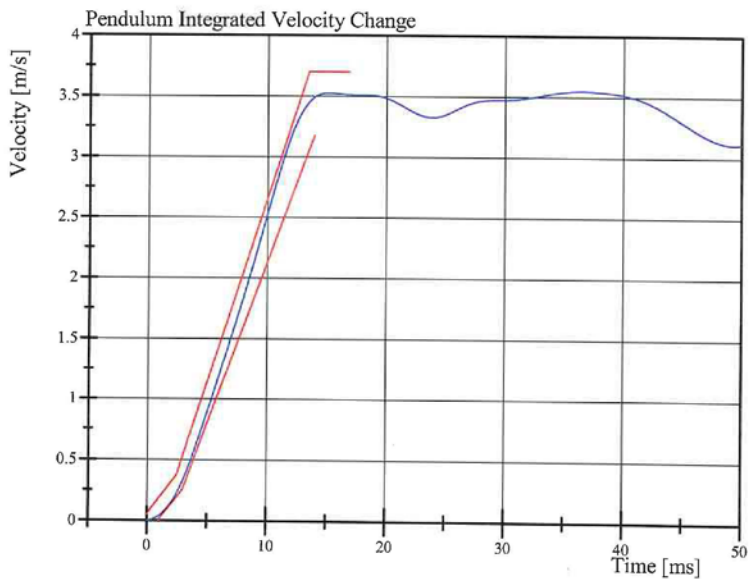


Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



Filter Class: CFC_60
Max: 36.1 g at 9.8 ms
Min: -6.5 g at 44.8 ms



Filter Class: CFC_60
Max: 3.5 m/s at 36.4 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 08:44:34 1310

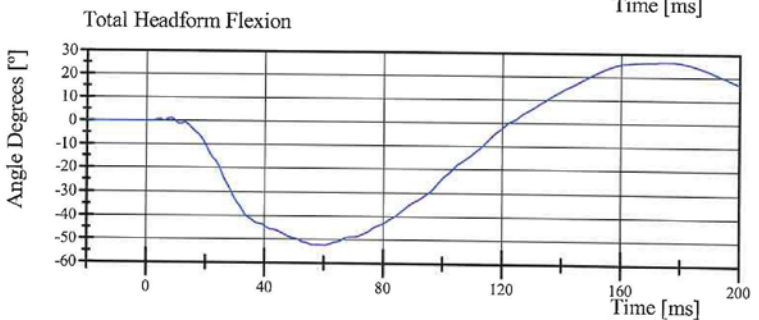
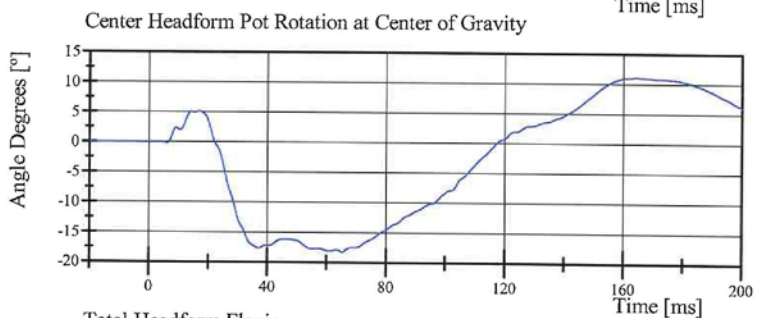
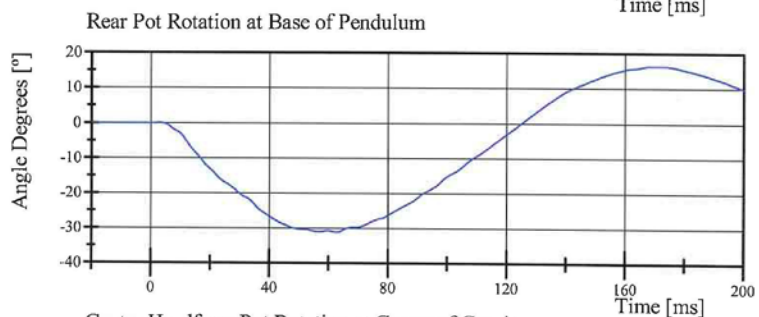
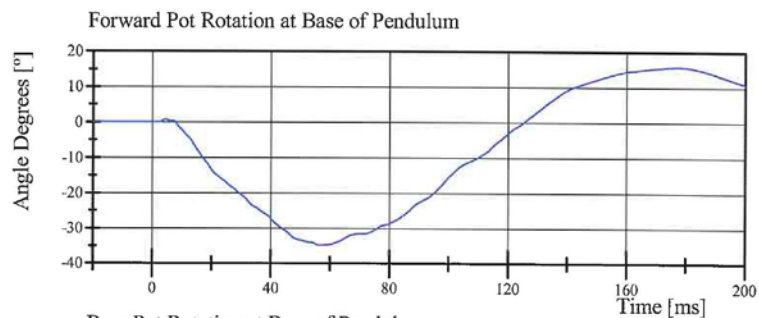


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 21-1

Test Date: 1/23/2014



Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 08:44:35 1310



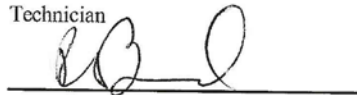
Transportation Research Center Inc.

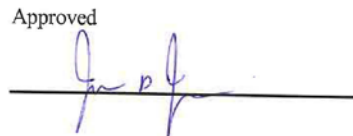
Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.17 g	Yes

Test meets specifications.

Comments:

Technician


Approved


Specification Source: NHTSA final rule 8/15/2008

01.23.2014 13:51:01 533

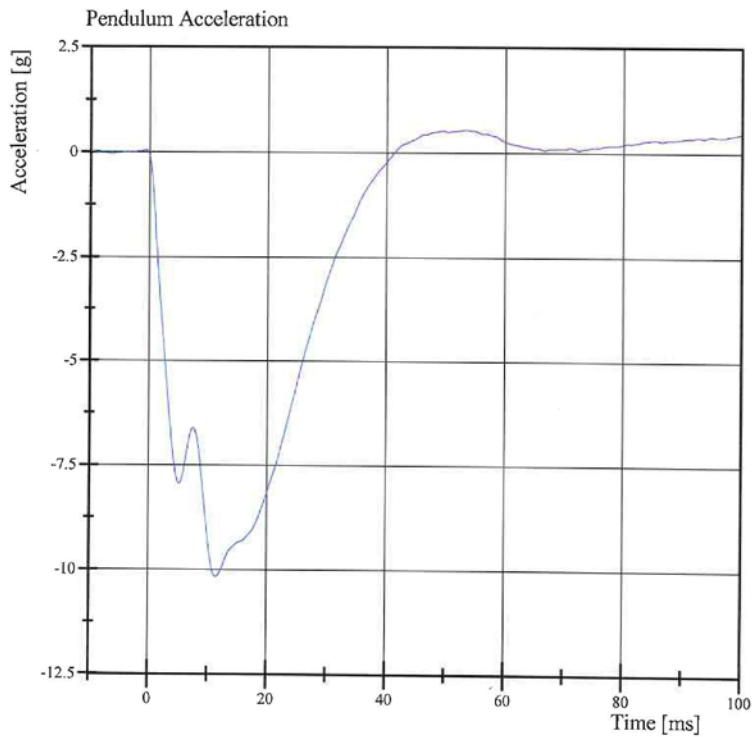


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 21-1

Test Date: 1/23/2014



Filter Class: CFC_180
Max: 0.5 g at 53.4 ms
Min: -10.2 g at 11.4 ms

Specification Source: NHTSA final rule 8/15/2008

01.23.2014 13:51:07 533



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 21-7
Test Date: 1/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician


Approved

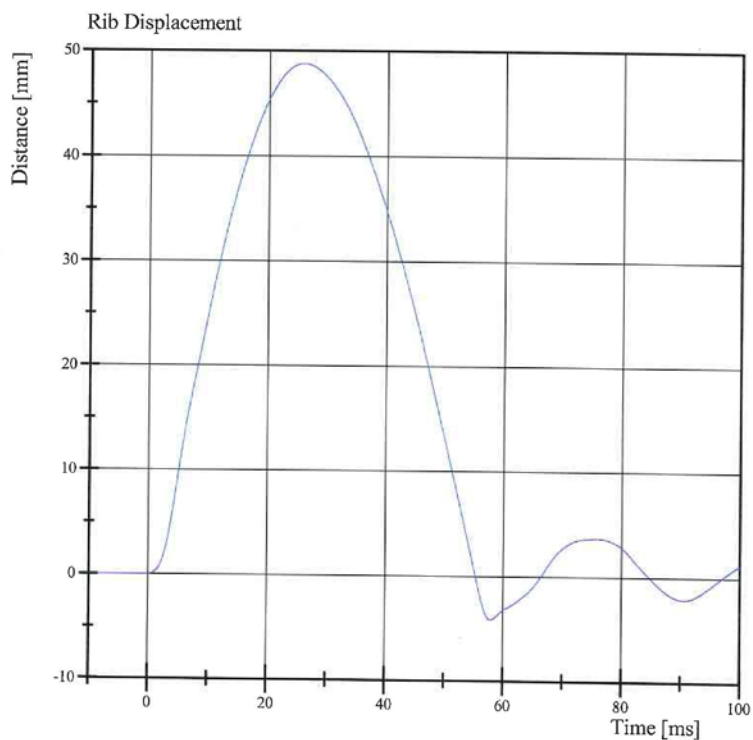

Specification Source: NHTSA Final Rule 8/15/2008

01.27.2014 15:51:19 733



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 21-7
Test Date: 1/27/2014



Filter Class: CFC_180
Max: 48.8 mm at 25.8 ms
Min: -4.1 mm at 57.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.27.2014 15:51:28 733



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 21-2
Test Date: 1/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.9 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



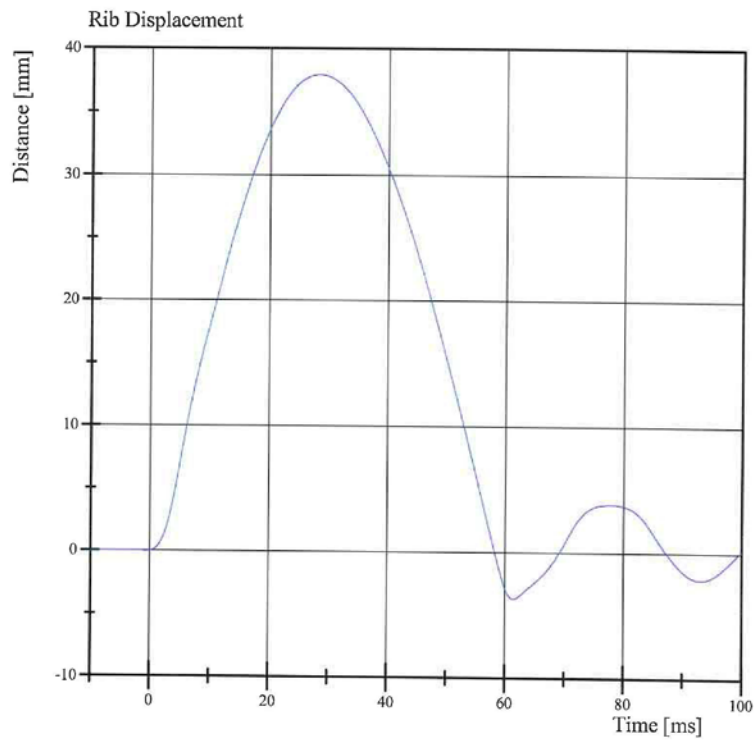
Specification Source: NHTSA Final Rule 8/15/2008

01.27.2014 16:01:25 919



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 21-2
Test Date: 1/27/2014



Filter Class: CFC_180
Max: 37.9 mm at 28.2 ms
Min: -3.7 mm at 61.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.27.2014 16:01:35 919



Transportation Research Center Inc.


4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

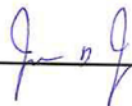
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician


Approved


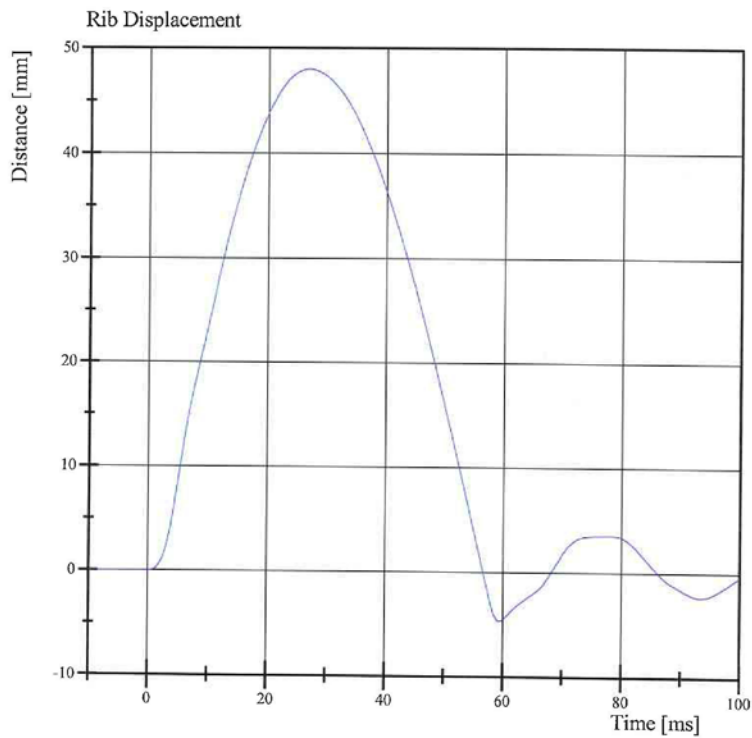
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 12:51:18 738



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



Filter Class: CFC_180
Max: 48.0 mm at 26.8 ms
Min: -4.7 mm at 59.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 12:51:25 738



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.0 mm	Yes

Test meets specifications.

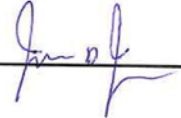
Comments:

Drop Height: 462

Technician



Approved



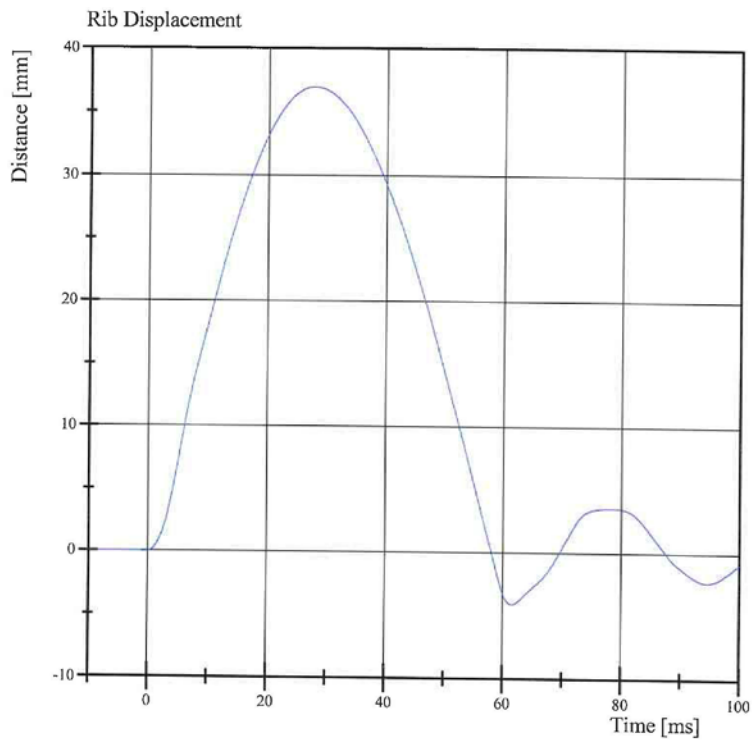
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 12:57:05 953



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



Filter Class: CFC_180
Max: 37.0 mm at 27.7 ms
Min: -4.1 mm at 61.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 12:57:12 953



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.7 mm	Yes

Test meets specifications.

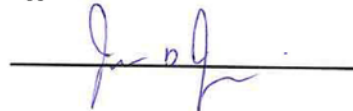
Comments:

Drop Height: 816

Technician



Approved



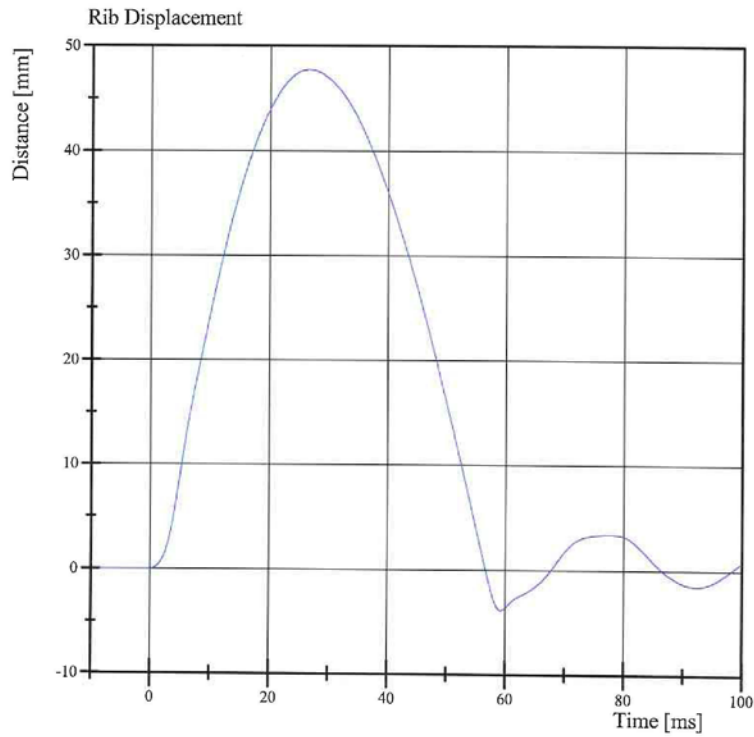
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 13:04:57 746



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



Filter Class: CFC_180
Max: 47.7 mm at 26.6 ms
Min: -3.9 mm at 59.3 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 13:05:05 746



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

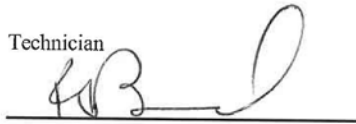
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

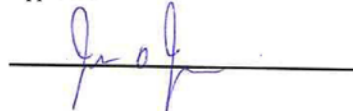
Comments:

Drop Height: 462

Technician



Approved



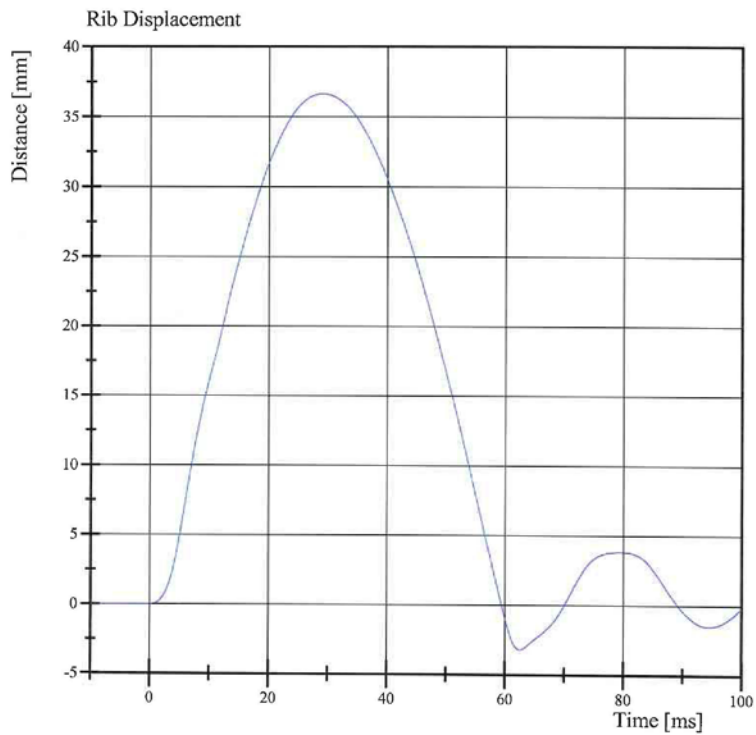
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 13:11:17 938



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



Filter Class: CFC_180
Max: 36.7 mm at 29.0 ms
Min: -3.2 mm at 62.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 13:11:24 938



Transportation Research Center Inc.

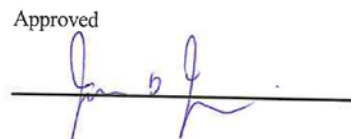
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.473 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,439.5 N	Yes
Upper Rib Displacement	34 - 41 mm	37.3 mm	Yes
Center Rib Displacement	37 - 45 mm	40.8 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.6 mm	Yes

Test meets specifications.

Comments:

Technician


Approved


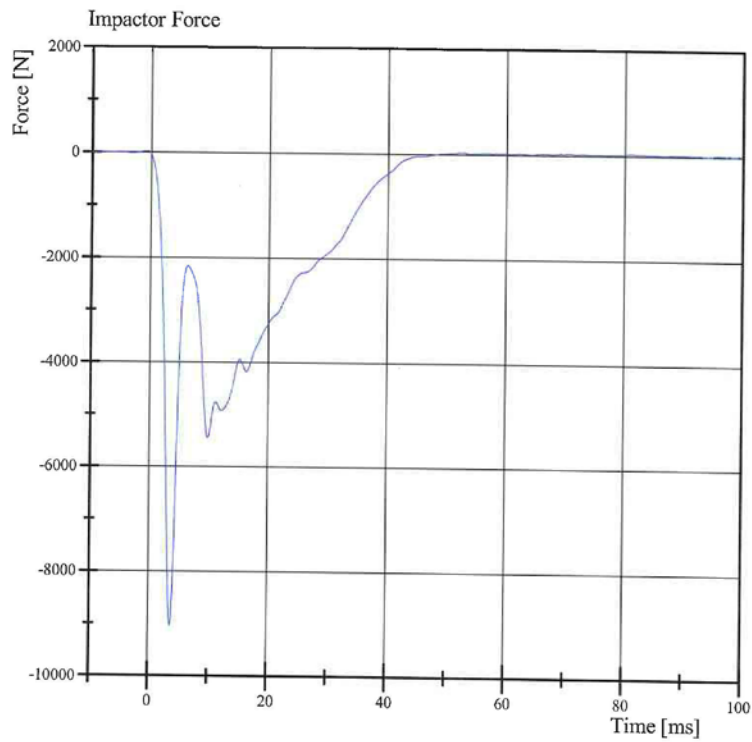
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

01.27.2014 16:35:03 453



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/27/2014



Filter Class: CFC_180
Max: 37.7 N at 52.4 ms
Min: -9,037.7 N at 3.7 ms

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

01.27.2014 16:35:09 453

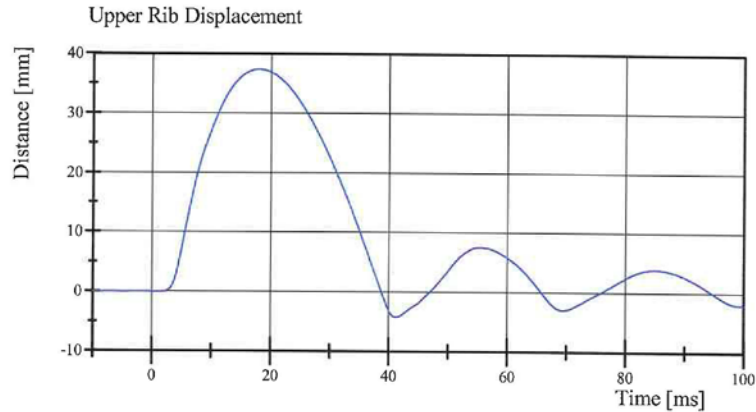


Transportation Research Center Inc.

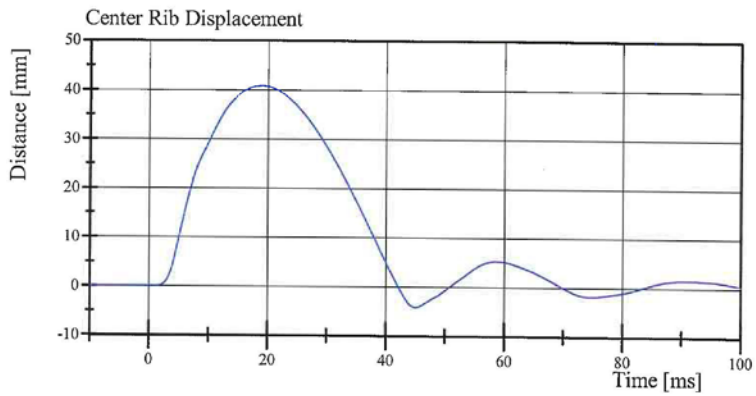
Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 21-1

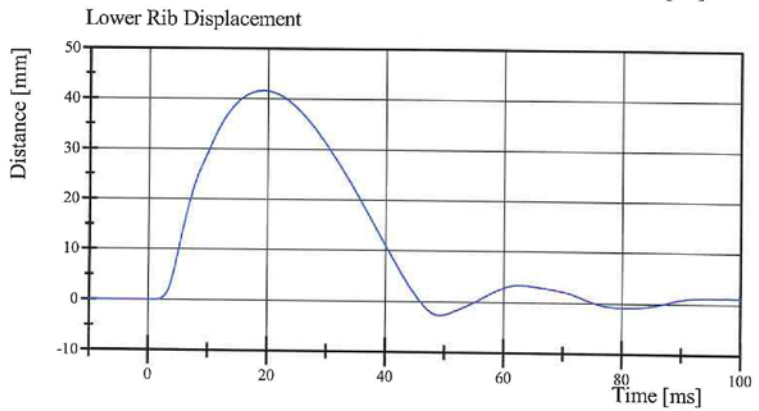
Test Date: 1/27/2014



Filter Class: CFC_180
Max: 37.3 mm at 18.0 ms
Min: -4.2 mm at 41.2 ms



Filter Class: CFC_180
Max: 40.8 mm at 18.9 ms
Min: -4.2 mm at 45.0 ms



Filter Class: CFC_180
Max: 41.6 mm at 19.2 ms
Min: -2.7 mm at 49.2 ms

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

01.27.2014 16:35:10 453



Transportation Research Center Inc.

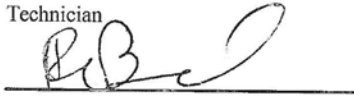
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 21-2
Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.94 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,004.3 N	Yes
Time of Peak	10.6 - 13.0 ms	11.84 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,687.7 N	Yes
Time of Peak	10.0 - 12.3 ms	11.20 ms	Yes

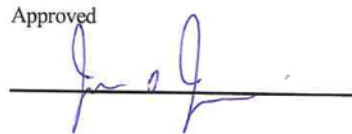
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 15:47:54 580

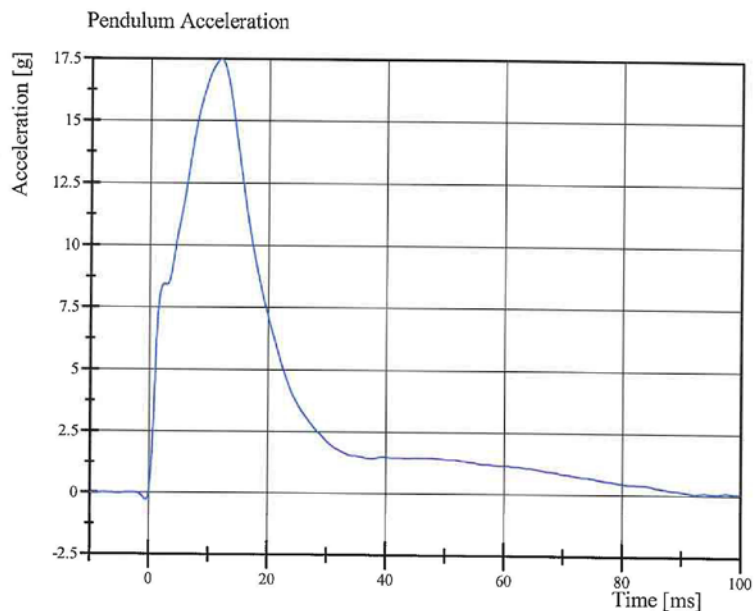


Transportation Research Center Inc.

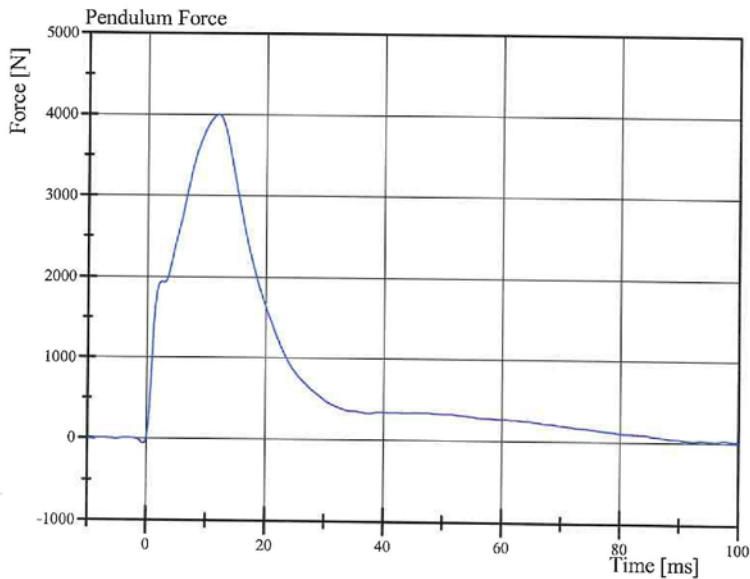
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 21-2

Test Date: 1/23/2014



Filter Class: CFC_180
Max: 17.5 g at 11.8 ms
Min: -0.3 g at -0.5 ms



Filter Class: CFC_180
Max: 4,004.3 N at 11.8 ms
Min: -62.7 N at -0.5 ms

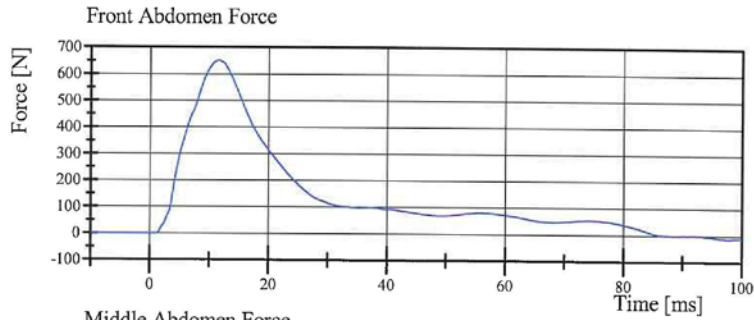
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 15:48:00 580

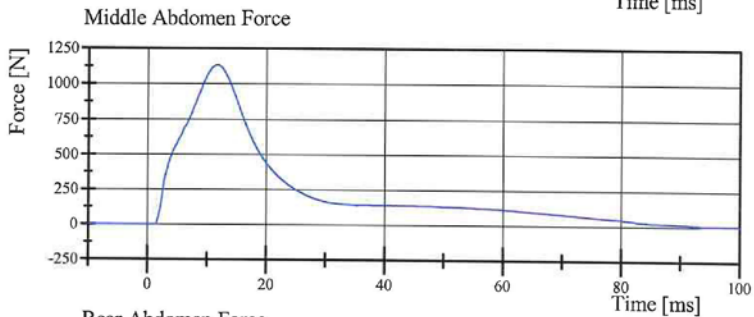


Transportation Research Center Inc.

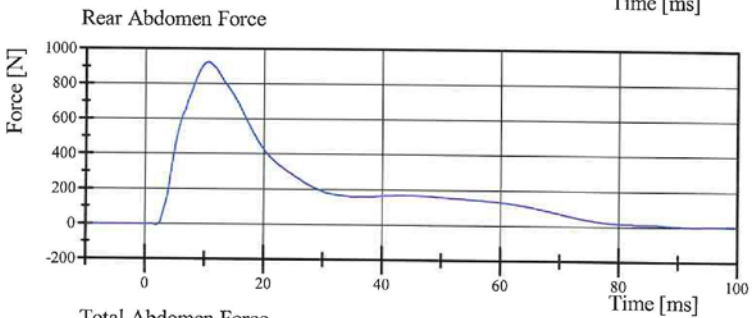
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 21-2
Test Date: 1/23/2014



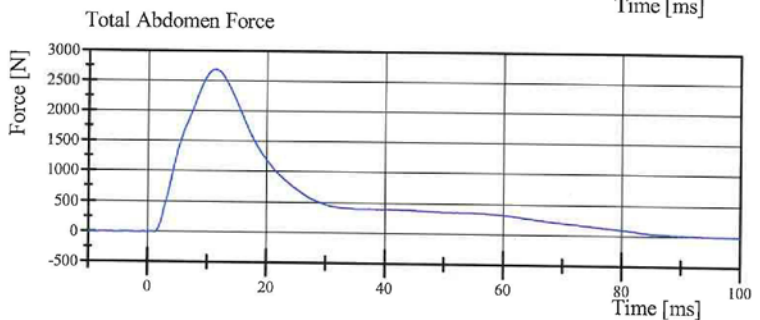
Filter Class: CFC_600
Max: 650.3 N at 11.5 ms
Min: -12.3 N at 97.9 ms



Filter Class: CFC_600
Max: 1,134.5 N at 11.7 ms
Min: -1.1 N at 1.2 ms



Filter Class: CFC_600
Max: 923.4 N at 10.6 ms
Min: -7.4 N at 1.8 ms



Filter Class: CFC_600
Max: 2,687.7 N at 11.2 ms
Min: -9.6 N at 97.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 15:48:01 580



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.017 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.0 deg	Yes
Time of Peak	39 - 53 ms	46.1 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.5 ms	Yes

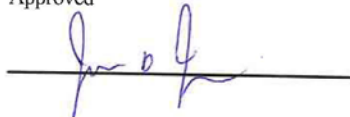
Test meets specifications.

Comments:

Technician



Approved



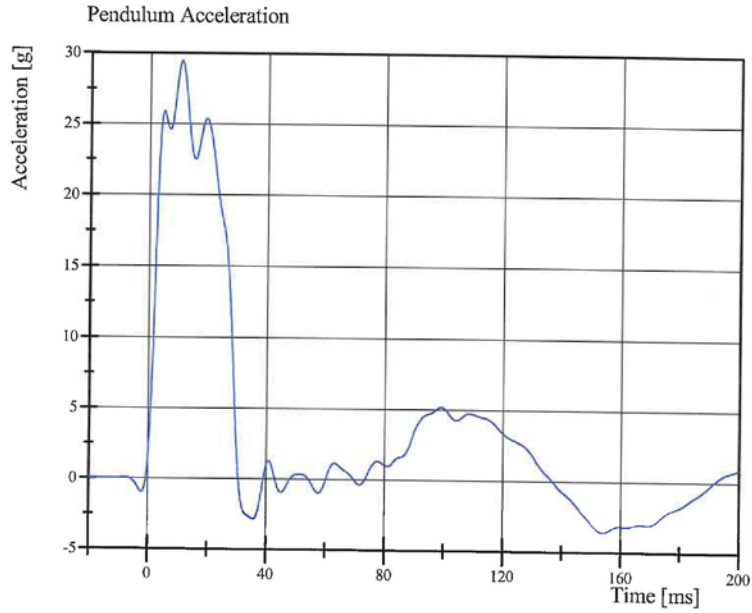
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 08:27:33 580

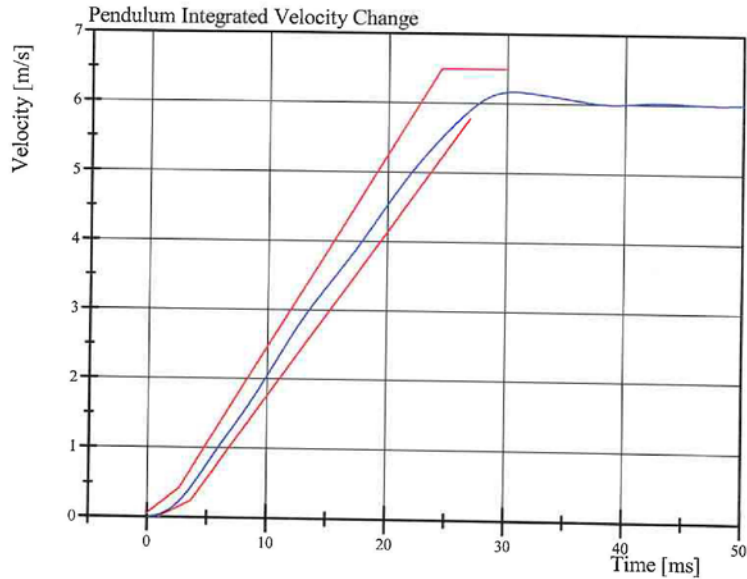


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



Filter Class: CFC_60
Max: 29.4 g at 10.7 ms
Min: -3.6 g at 154.0 ms



Filter Class: CFC_60
Max: 6.2 m/s at 30.6 ms
Min: 0.0 m/s at 0.0 ms

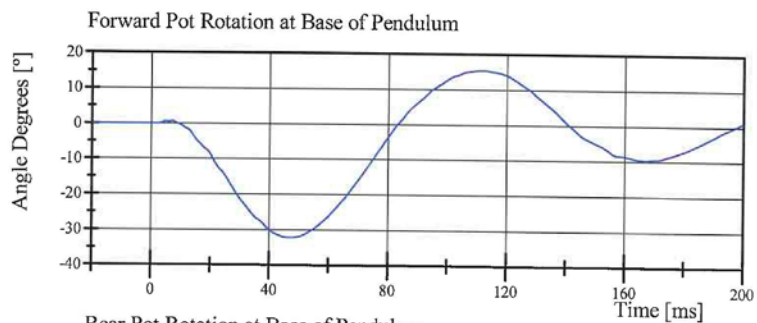
Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 08:27:40 580

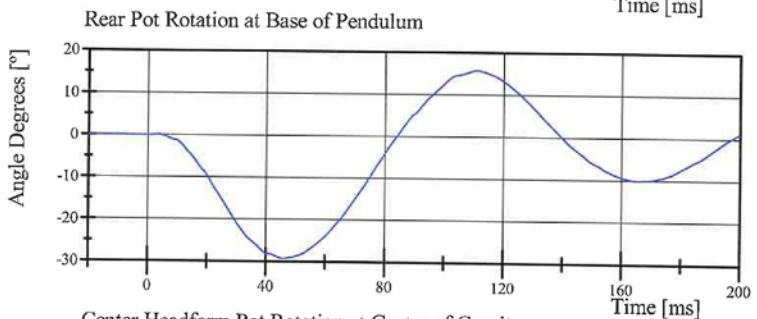


Transportation Research Center Inc.

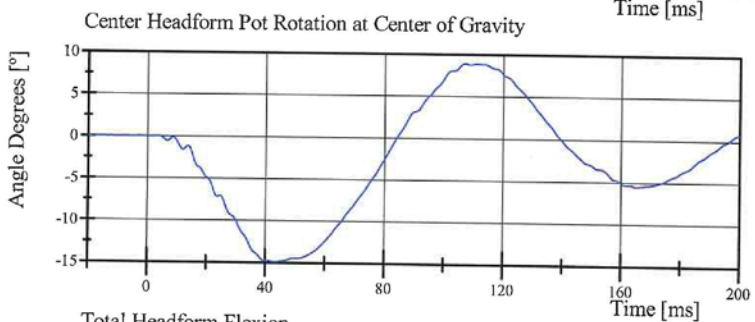
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 21-1
Test Date: 1/23/2014



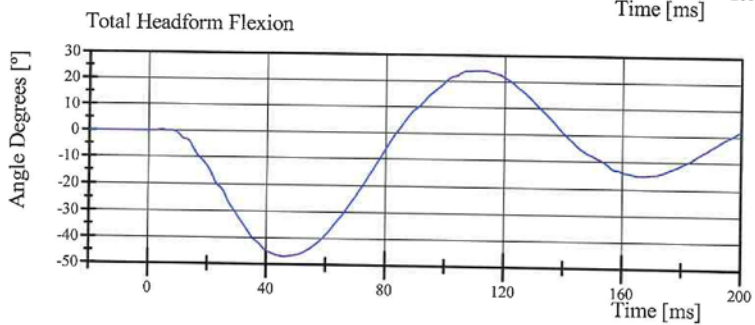
Filter Class: CFC_180
Max: 15.4 ° at 111.2 ms
Min: -32.3 ° at 46.5 ms



Filter Class: CFC_180
Max: 15.7 ° at 110.9 ms
Min: -29.3 ° at 45.9 ms



Filter Class: CFC_180
Max: 8.9 ° at 107.0 ms
Min: -14.9 ° at 43.2 ms



Filter Class: CFC_180
Max: 24.3 ° at 111.3 ms
Min: -47.0 ° at 46.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 08:27:41 580



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 21-1

Test Date: 1/23/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,087.5 N	Yes
Time of Peak	11.8 - 16.1 ms	12.64 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,280.1 N	Yes
Time of Peak	12.2 - 17.0 ms	12.80 ms	Yes

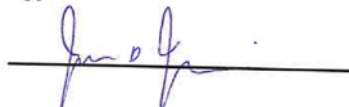
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

01.23.2014 15:14:28 567

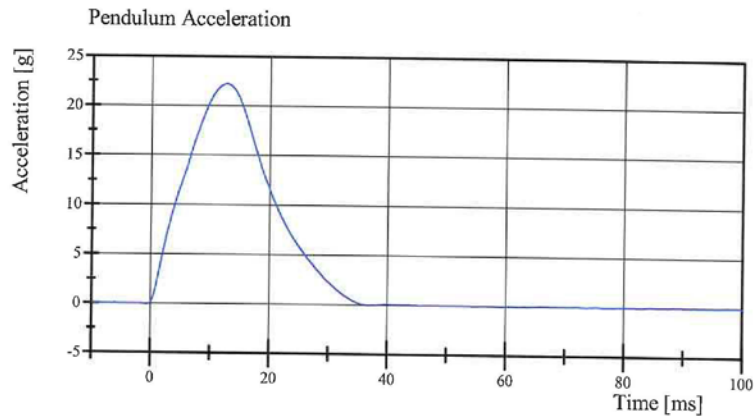


Transportation Research Center Inc.

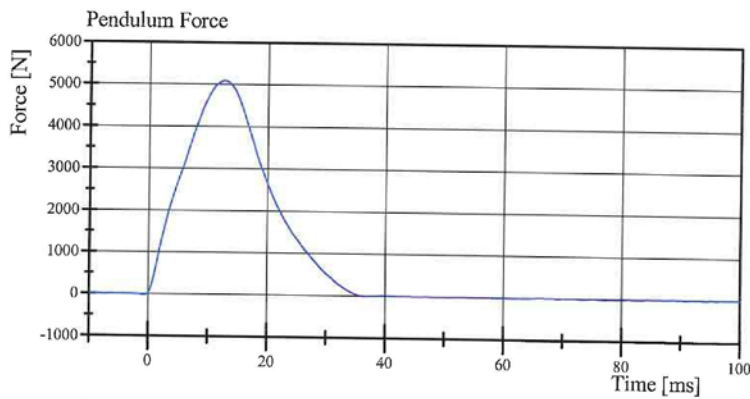
Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 21-1

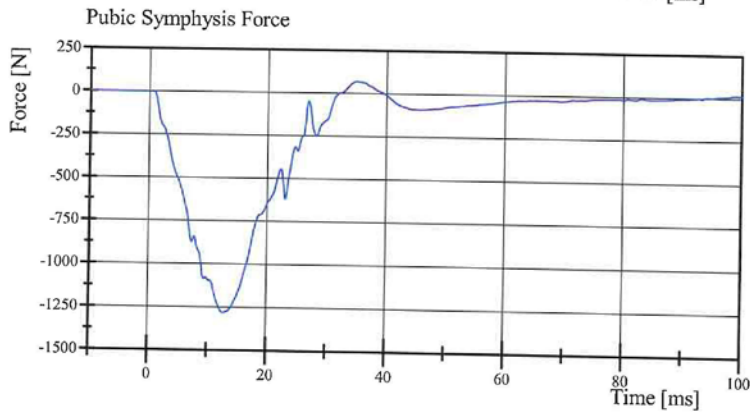
Test Date: 1/23/2014



Filter Class: CFC_180
Max: 22.2 g at 12.6 ms
Min: -0.1 g at -0.6 ms



Filter Class: CFC_180
Max: 5,087.5 N at 12.6 ms
Min: -20.6 N at -0.6 ms



Filter Class: CFC_600
Max: 69.8 N at 34.9 ms
Min: -1,280.1 N at 12.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

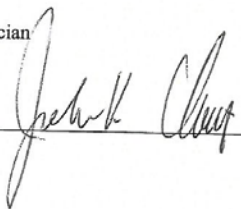
01.23.2014 15:14:35 567

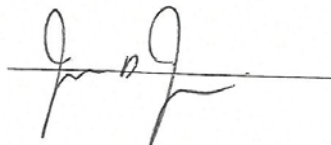


**Pre-Test Calibration Sheets
Passenger S/N 305**

Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.025

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	Yes
C	H-Point Height	79.0 - 89.0	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	128	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	527	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	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	318	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	348	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	778	Yes

Technician


Approved


Revised 9/29/2005



Transportation Research Center Inc.

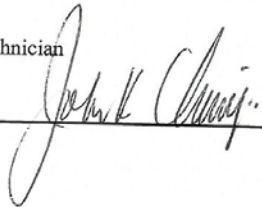
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 25-1
Test Date: 1/16/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.0 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



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

01.16.2014 11:41:42 232

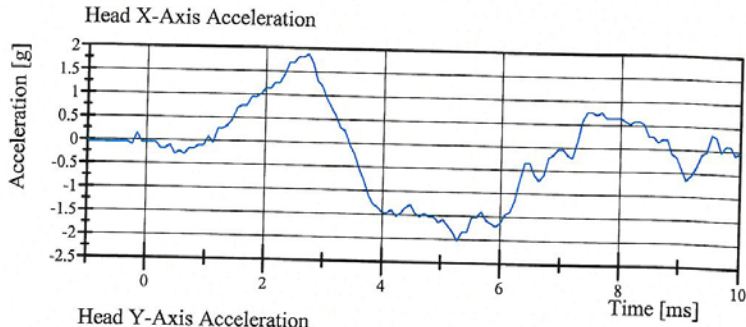


Transportation Research Center Inc.

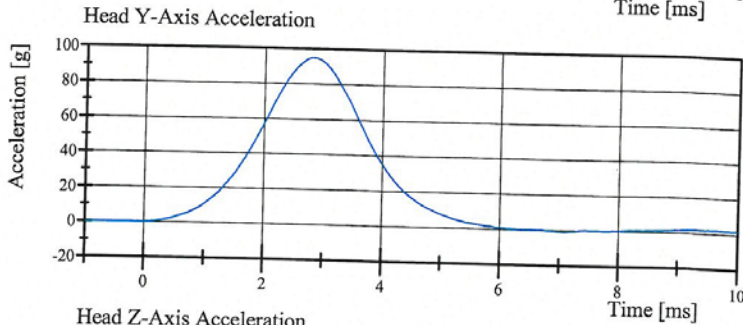
Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 25-1

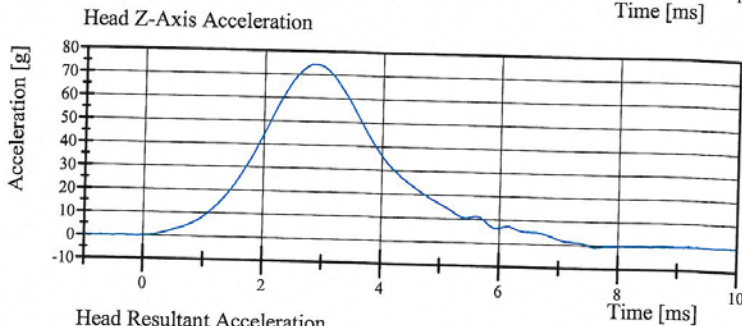
Test Date: 1/16/2014



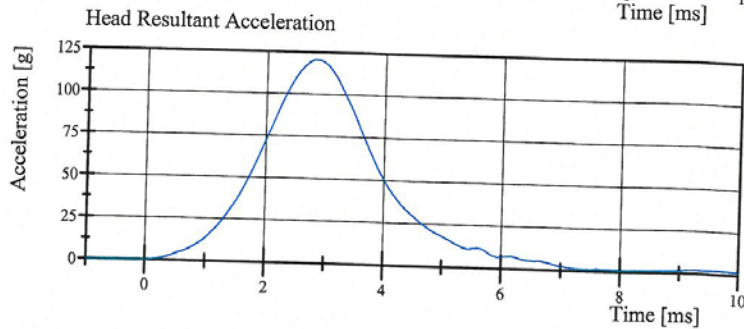
Filter Class: CFC_1000
Max: 1.9 g at 2.7 ms
Min: -2.0 g at 5.3 ms



Filter Class: CFC_1000
Max: 94.9 g at 2.8 ms
Min: -0.9 g at 7.0 ms



Filter Class: CFC_1000
Max: 74.3 g at 2.9 ms
Min: -0.9 g at 7.6 ms



Filter Class: CFC_1000
Max: 120.6 g at 2.8 ms
Min: 0.0 g at -0.1 ms

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

01.16.2014 11:41:52 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 25-1

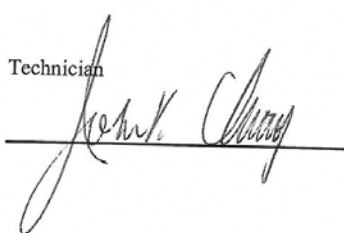
Test Date: 1/16/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.609 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.456 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.531 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.718 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.676 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.794 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-77.5 deg	Yes
Time of Peak	50 - 70 ms	69.6 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	38.1 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	118.6 ms	Yes

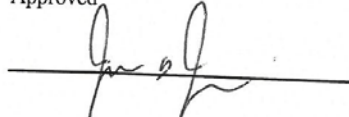
Test meets specifications.

Comments:

Technician



Approved



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

01.16.2014 12:28:27 642

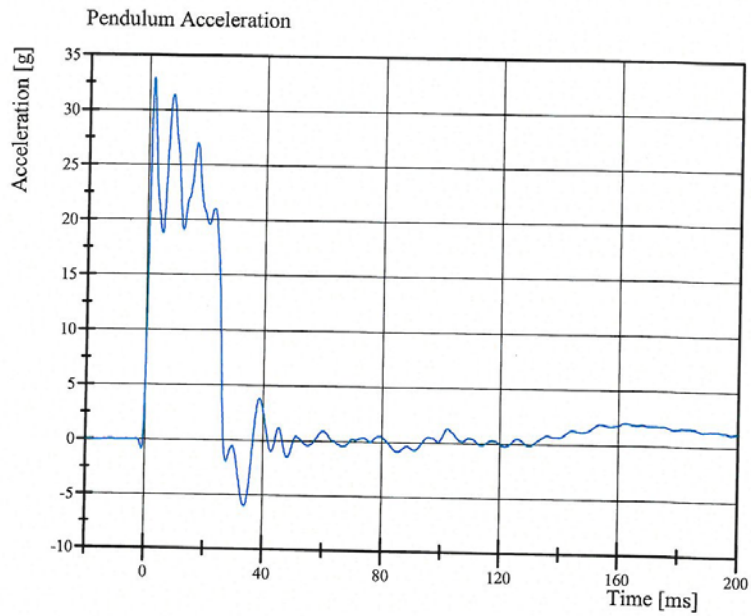


Transportation Research Center Inc.

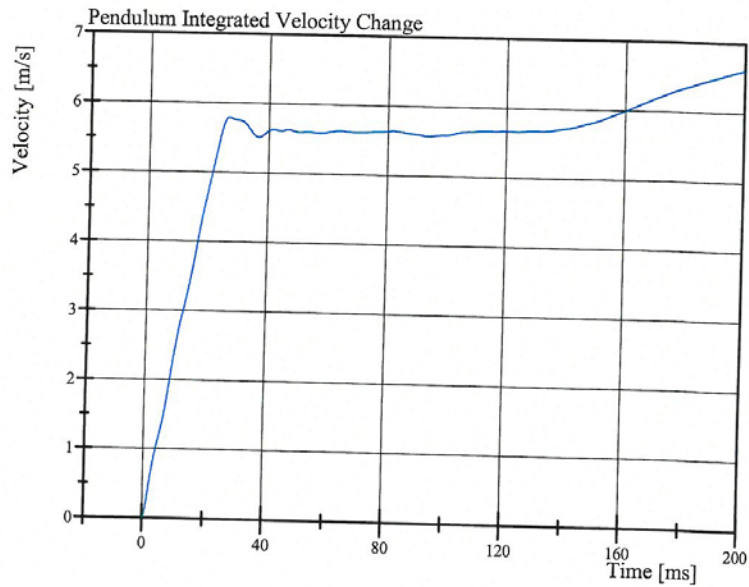
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 25-1

Test Date: 1/16/2014



Filter Class: CFC_180
Max: 32.9 g at 1.8 ms
Min: -6.0 g at 34.0 ms



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.

01.16.2014 12:28:38 642

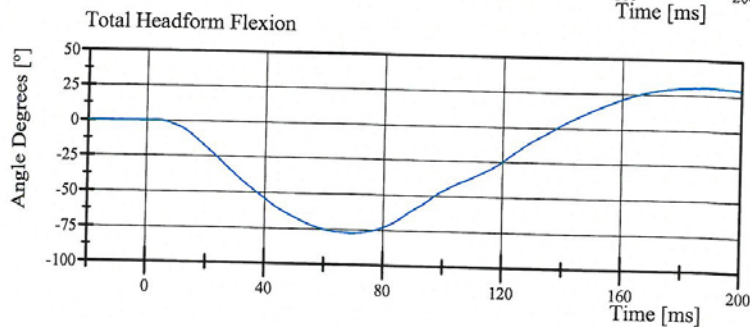
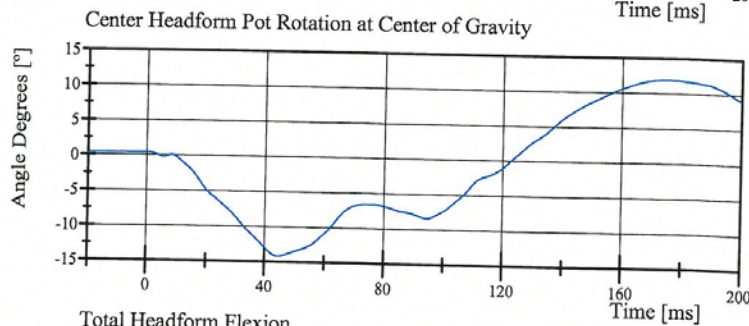
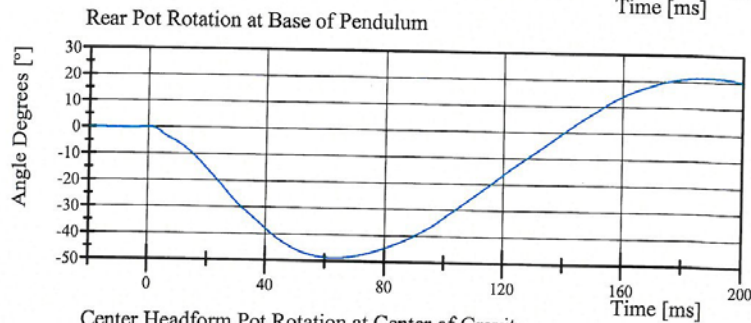
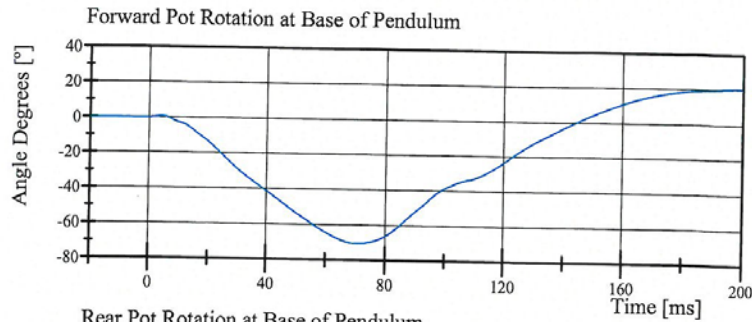


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 25-1

Test Date: 1/16/2014



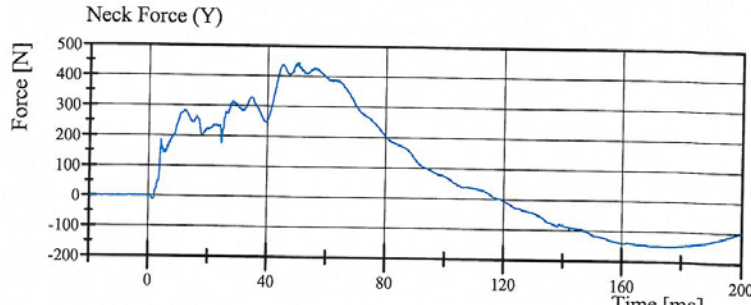
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.16.2014 12:28:38 642

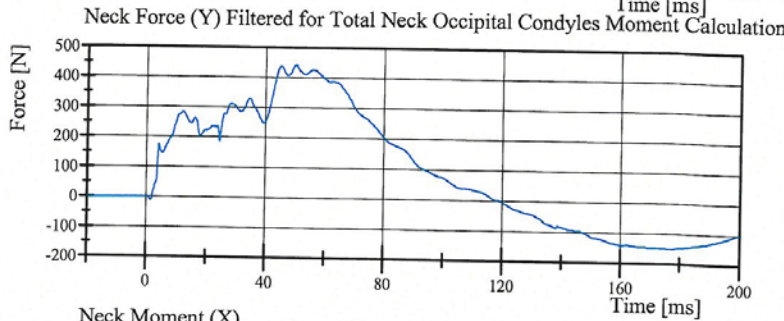


Transportation Research Center Inc.

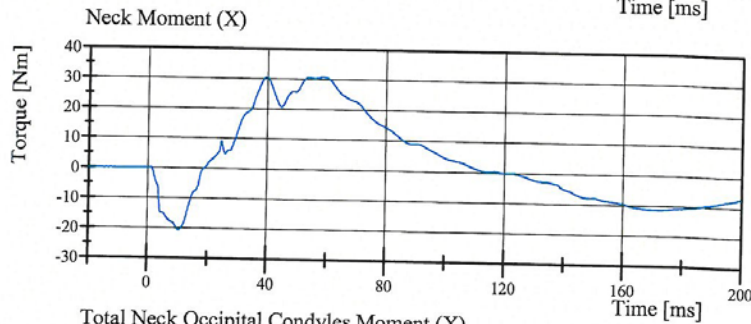
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 25-1
Test Date: 1/16/2014



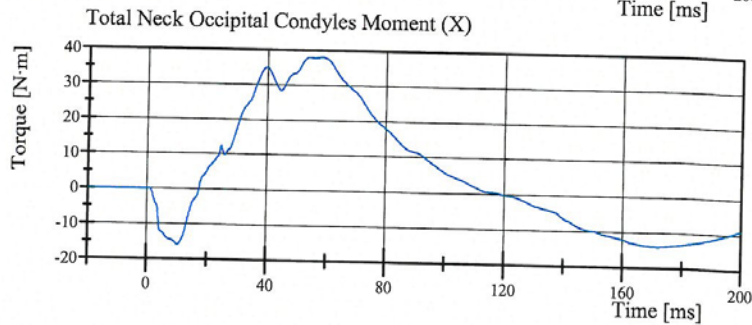
Filter Class: CFC_1000
Max: 445.9 N at 50.2 ms
Min: -151.4 N at 176.8 ms



Filter Class: CFC_600
Max: 442.2 N at 50.2 ms
Min: -150.8 N at 176.8 ms



Filter Class: CFC_600
Max: 30.9 Nm at 58.6 ms
Min: -20.7 Nm at 10.6 ms



Filter Class: Without_(Consta
Max: 38.1 N·m at 58.6 ms
Min: -15.9 N·m at 10.4 ms

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

01.16.2014 12:28:39 642



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 25-2
Test Date: 1/17/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.5 g	Yes
Shoulder Displacement	28 - 37 mm	29.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.2 g	Yes

Test meets specifications.

Comments:

Technician



Approved



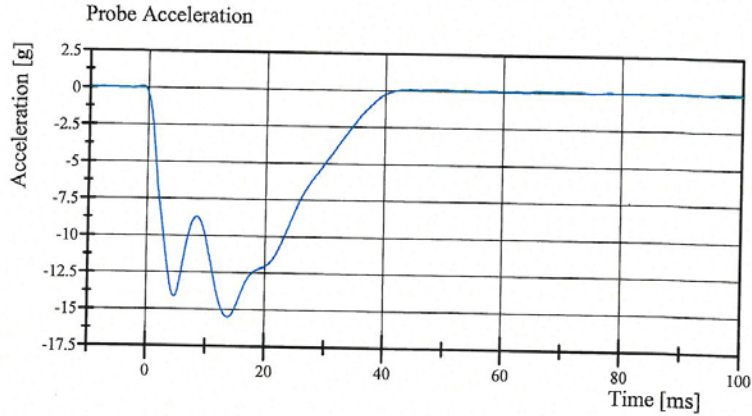
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.17.2014 12:40:56 833

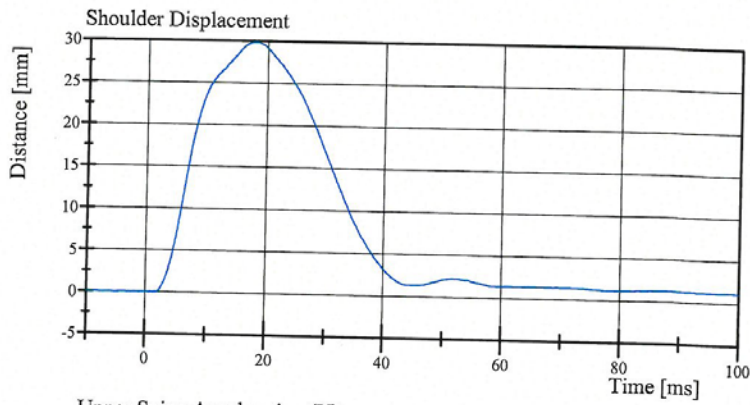


Transportation Research Center Inc.

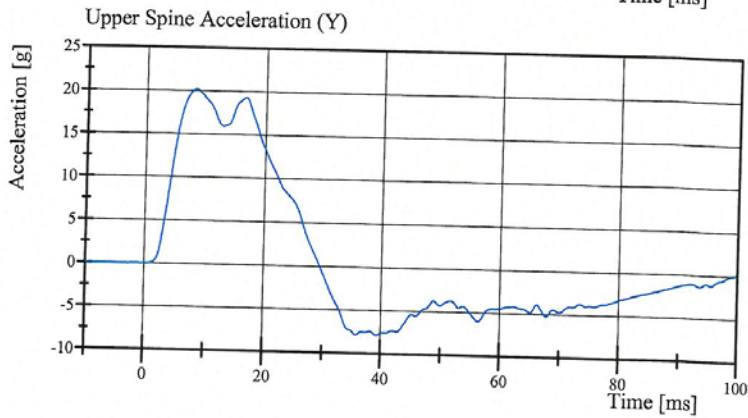
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 25-2
Test Date: 1/17/2014



Filter Class: CFC_180
Max: 0.1 g at 50.1 ms
Min: -15.5 g at 13.8 ms



Filter Class: CFC_600
Max: 29.9 mm at 18.1 ms
Min: -0.0 mm at -2.3 ms



Filter Class: CFC_180
Max: 20.2 g at 8.2 ms
Min: -7.9 g at 39.4 ms

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

01.17.2014 12:41:06 833



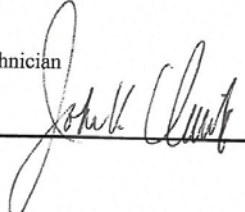
Transportation Research Center Inc.

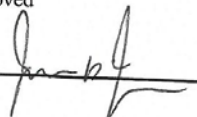
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 25-4
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.699 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.3 g	Yes
Shoulder Displacement	31 - 40 mm	33.1 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.2 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.6 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.7 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.4 g	Yes

Test meets specifications.

Comments:

Technician


Approved


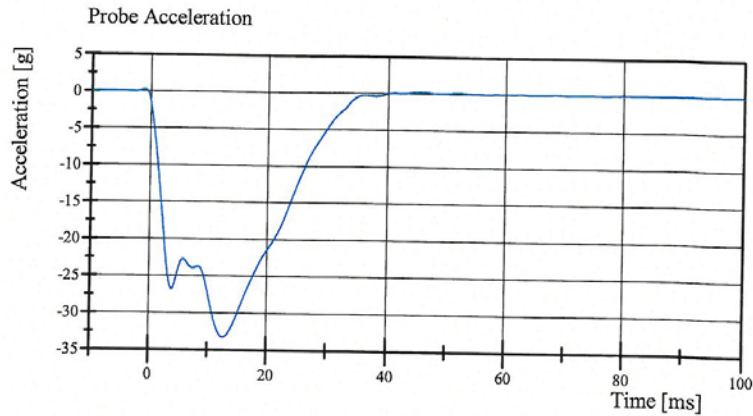
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.21.2014 13:22:22 615

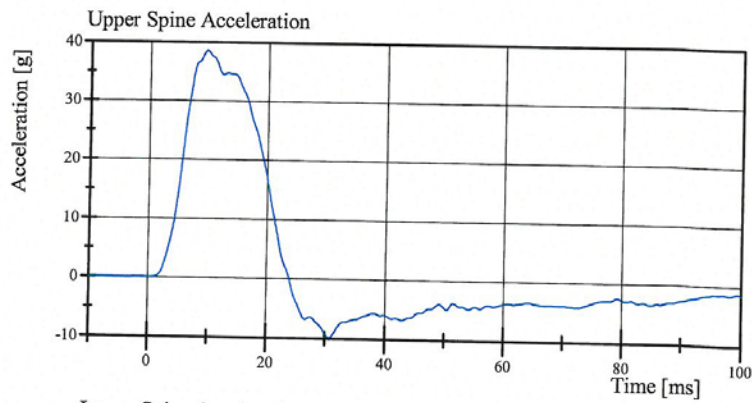


Transportation Research Center Inc.

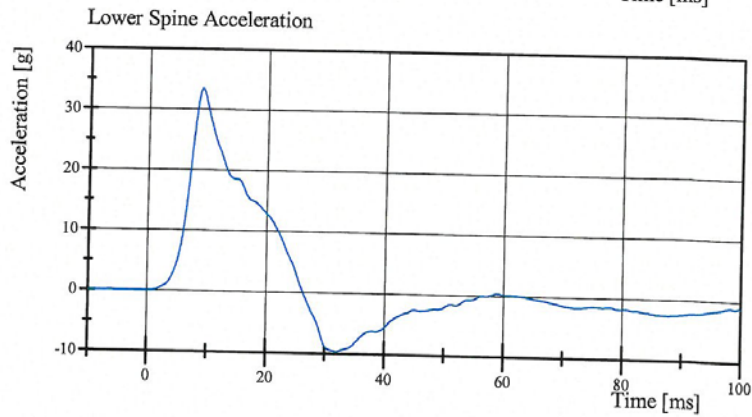
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 25-4
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 0.2 g at -1.0 ms
Min: -33.3 g at 12.6 ms



Filter Class: CFC_180
Max: 38.7 g at 9.5 ms
Min: -9.9 g at 30.7 ms



Filter Class: CFC_180
Max: 33.4 g at 9.0 ms
Min: -9.7 g at 32.0 ms

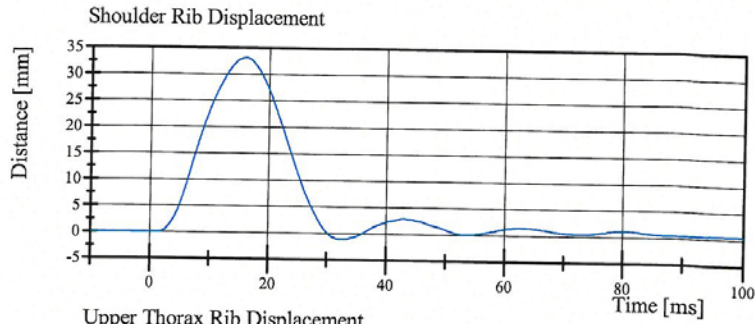
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.21.2014 13:22:34 615

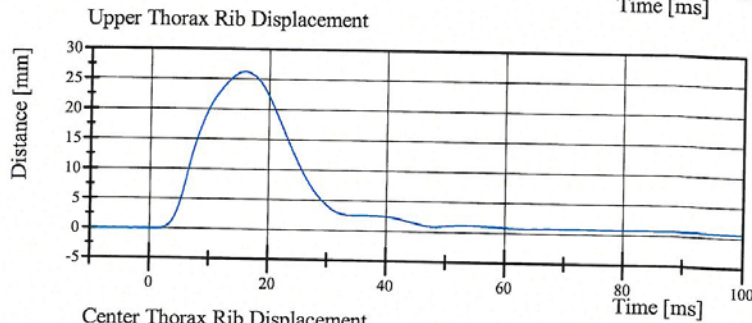


Transportation Research Center Inc.

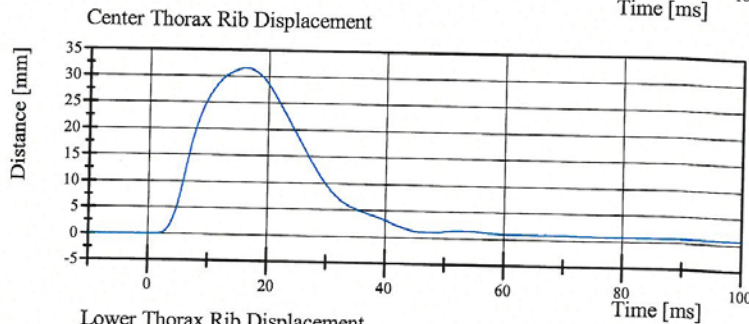
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 25-4
Test Date: 1/21/2014



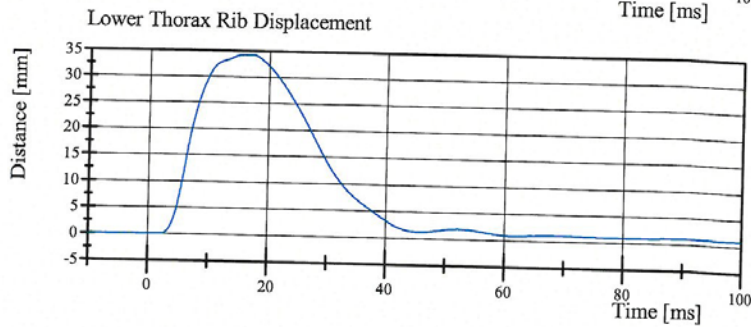
Filter Class: CFC_600
Max: 33.1 mm at 16.1 ms
Min: -1.1 mm at 33.0 ms



Filter Class: CFC_600
Max: 26.2 mm at 15.8 ms
Min: -0.0 mm at -1.6 ms



Filter Class: CFC_600
Max: 31.6 mm at 16.2 ms
Min: -0.0 mm at -5.2 ms



Filter Class: CFC_600
Max: 34.2 mm at 16.2 ms
Min: -0.0 mm at -0.2 ms

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

01.21.2014 13:22:35 615



Transportation Research Center Inc.

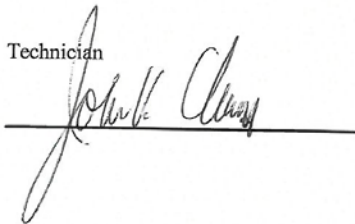
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 25-2
Test Date: 1/21/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.378 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.6 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.1 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.4 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.8 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.8 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.7 g	Yes

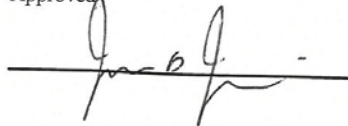
Test meets specifications.

Comments:

Technician



Approved



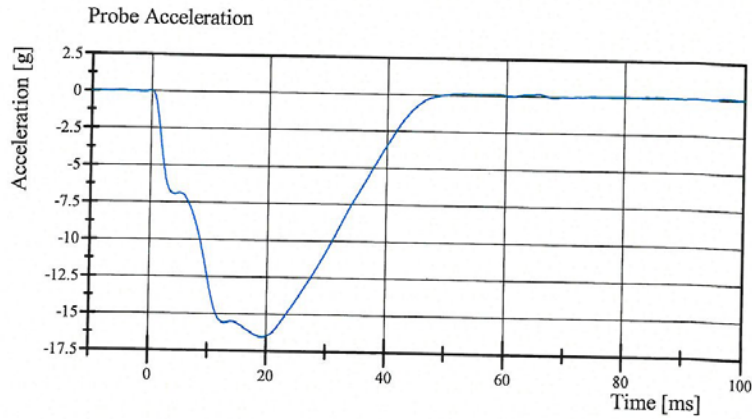
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.21.2014 12:45:45 819

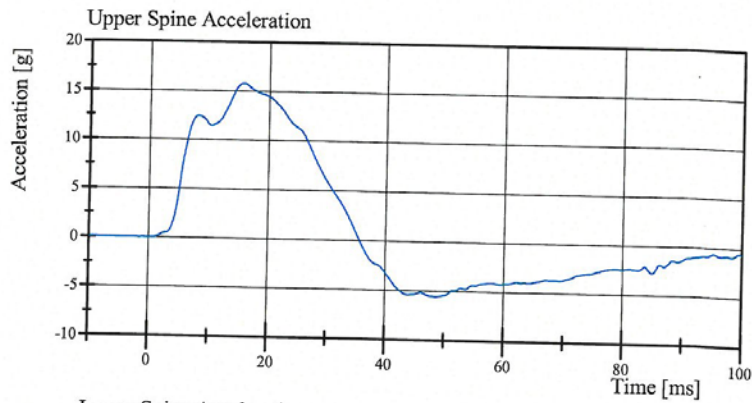


Transportation Research Center Inc.

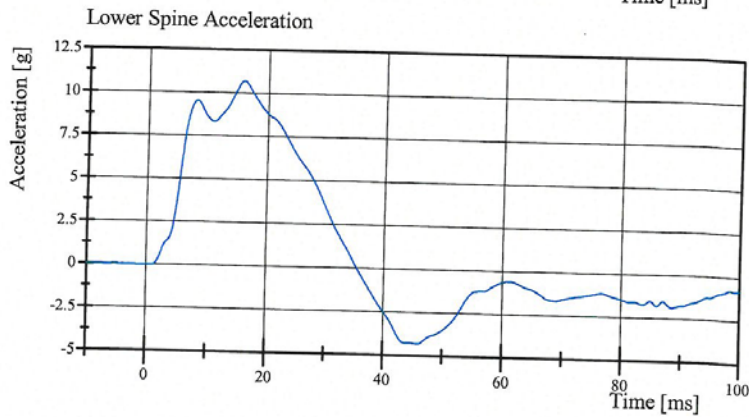
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 25-2
Test Date: 1/21/2014



Filter Class: CFC_180
Max: 0.1 g at 65.3 ms
Min: -16.6 g at 19.3 ms



Filter Class: CFC_180
Max: 15.8 g at 15.7 ms
Min: -5.6 g at 48.6 ms



Filter Class: CFC_180
Max: 10.7 g at 15.9 ms
Min: -4.3 g at 45.8 ms

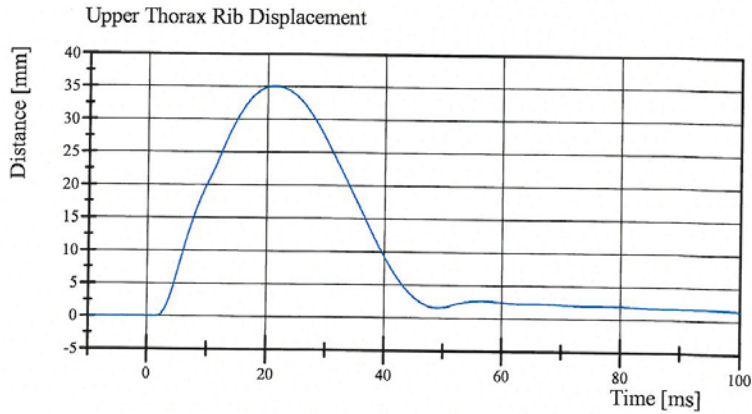
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.21.2014 12:45:57 819

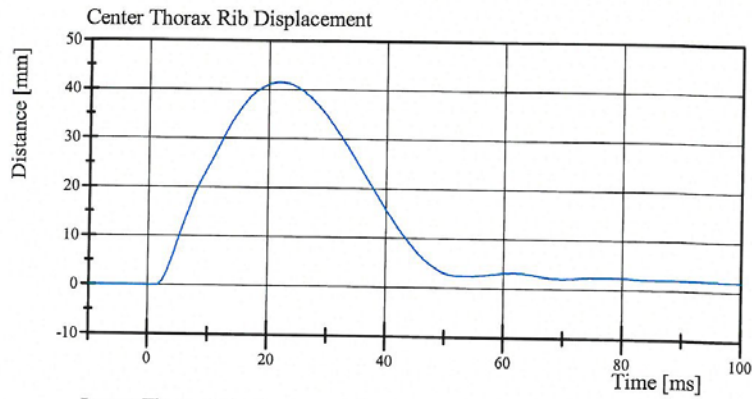


Transportation Research Center Inc.

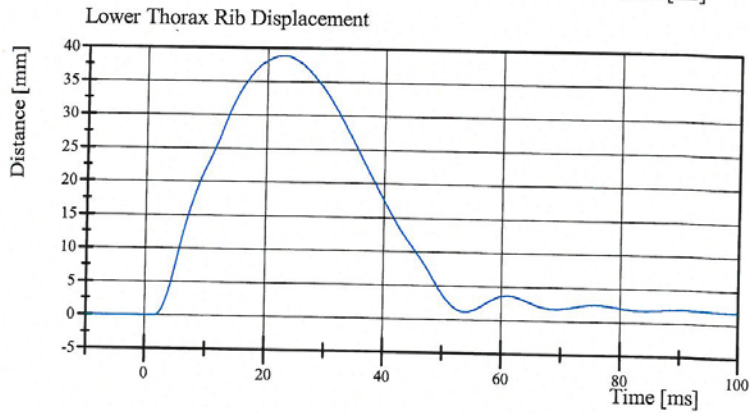
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 25-2
Test Date: 1/21/2014



Filter Class: CFC_600
Max: 35.1 mm at 21.3 ms
Min: -0.0 mm at -6.1 ms



Filter Class: CFC_600
Max: 41.4 mm at 21.8 ms
Min: -0.0 mm at -7.7 ms



Filter Class: CFC_600
Max: 38.8 mm at 22.8 ms
Min: -0.0 mm at -6.1 ms

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

01.21.2014 12:45:58 819



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 26-1

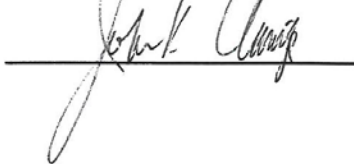
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.3 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.66 g	Yes

Test meets specifications.

Comments:

Technician



Approved



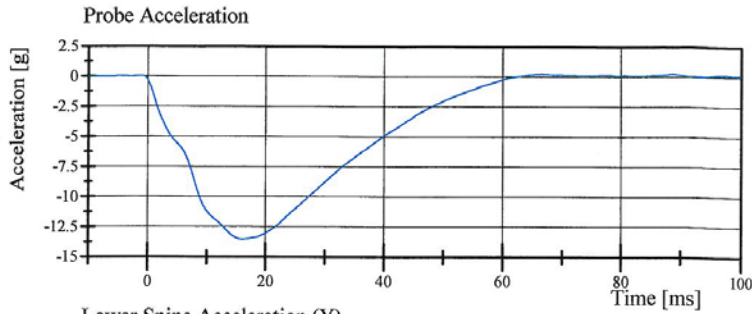
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 10:25:40 683

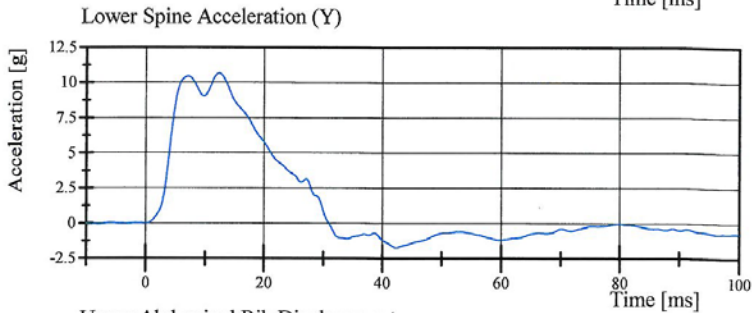


Transportation Research Center Inc.

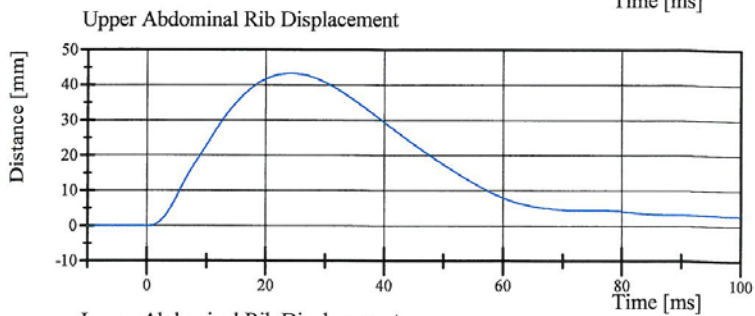
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



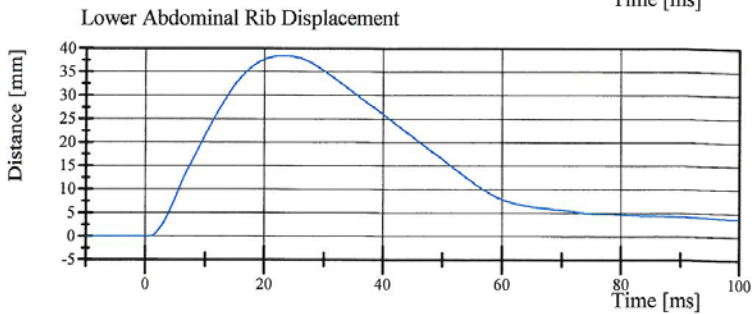
Filter Class: CFC_180
Max: 0.3 g at 88.7 ms
Min: -13.5 g at 16.1 ms



Filter Class: CFC_180
Max: 10.7 g at 12.3 ms
Min: -1.7 g at 42.3 ms



Filter Class: CFC_600
Max: 43.3 mm at 24.2 ms
Min: -0.0 mm at -8.2 ms



Filter Class: CFC_600
Max: 38.4 mm at 23.4 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.

01.24.2014 10:25:50 683



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 25-2

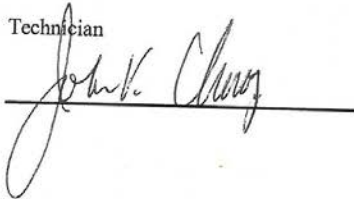
Test Date: 1/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-41.89 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	37.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,230.1 N	Yes

Test meets specifications.

Comments:

Technician



Approved



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

01.20.2014 10:15:47 425

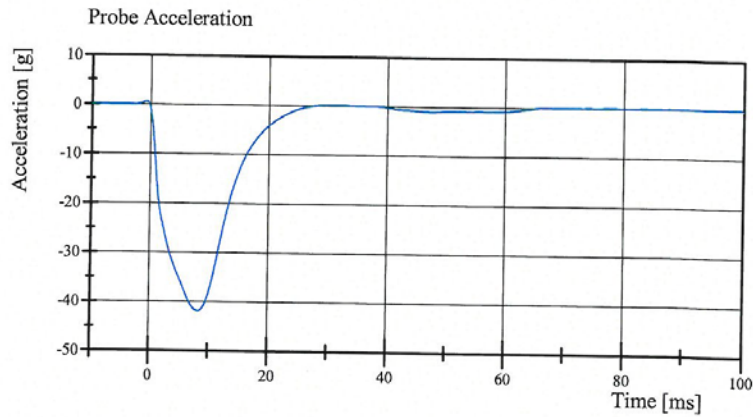


Transportation Research Center Inc.

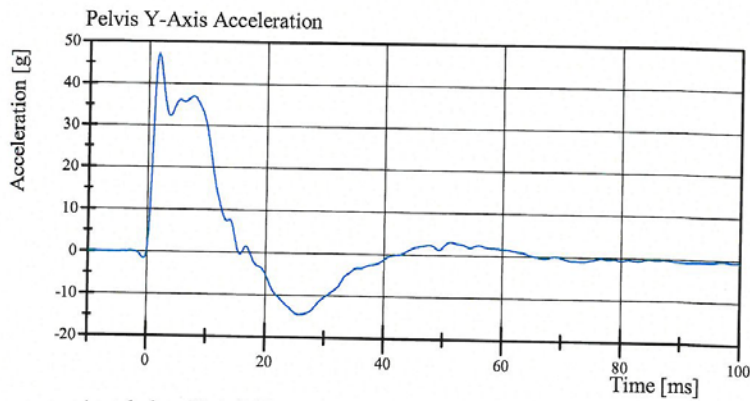
Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 25-2

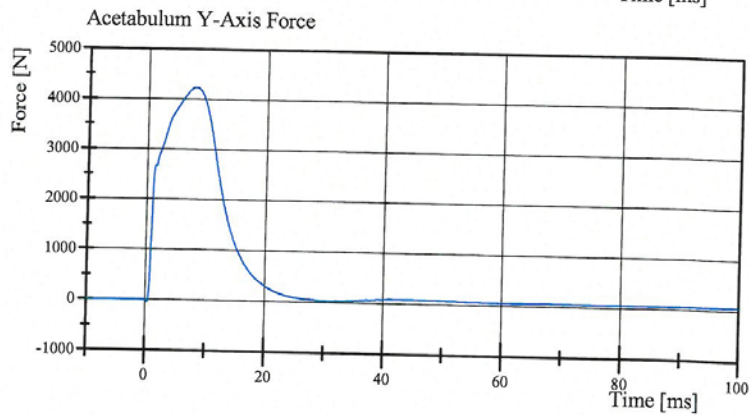
Test Date: 1/20/2014



Filter Class: CFC_180
Max: 0.5 g at -0.6 ms
Min: -41.9 g at 8.3 ms



Filter Class: CFC_180
Max: 47.1 g at 1.8 ms
Min: -14.6 g at 25.8 ms



Filter Class: CFC_600
Max: 4,230.1 N at 7.8 ms
Min: -46.9 N at 0.4 ms

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

01.20.2014 10:15:56 425



Transportation Research Center Inc.

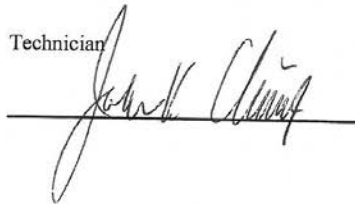
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 25-1
Test Date: 1/16/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.3 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	34.4 g	Yes
Iliac Force	4,100 - 5,100 N	5,082.9 N	Yes

Test meets specifications.

Comments:

Technician



Approved



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

01.16.2014 13:56:38 648

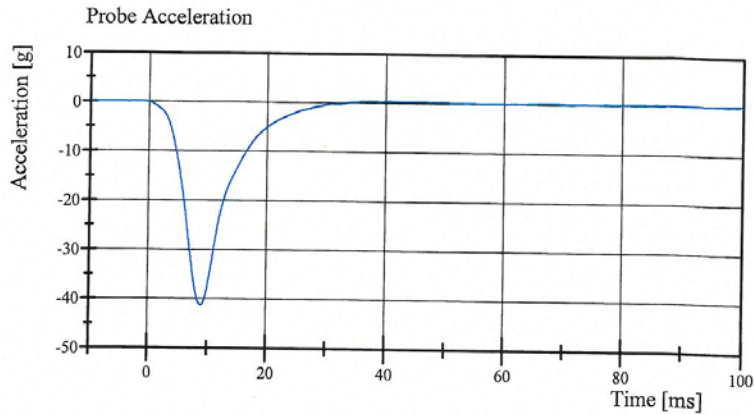


Transportation Research Center Inc.

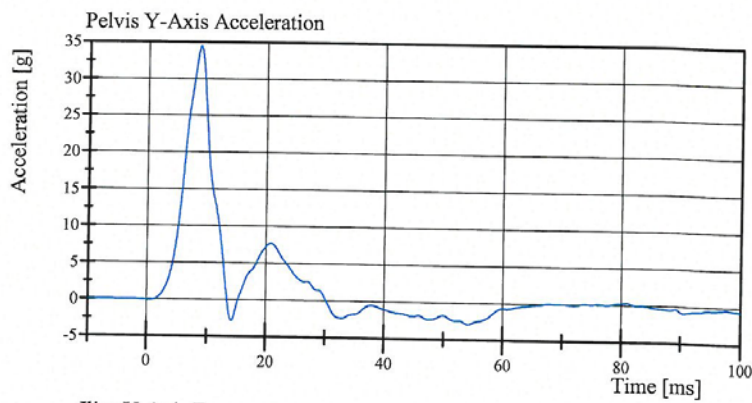
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 25-1

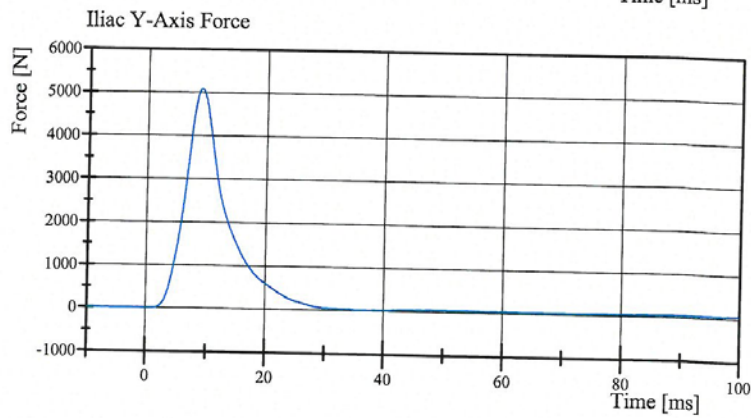
Test Date: 1/16/2014



Filter Class: CFC_180
Max: 0.2 g at 42.6 ms
Min: -41.3 g at 9.0 ms



Filter Class: CFC_180
Max: 34.4 g at 8.7 ms
Min: -2.9 g at 54.2 ms



Filter Class: CFC_600
Max: 5,082.9 N at 9.0 ms
Min: -0.7 N at -4.6 ms

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

01.16.2014 13:56:49 648



**Post-Test Calibration Sheets
Passenger S/N 305**

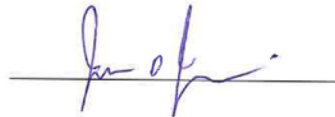
Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.026

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	Yes
C	H-Point Height	79.0 - 89.0	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	127	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	526	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	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	318	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	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	777	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	121.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

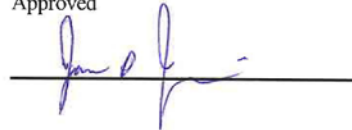
Test meets specifications.

Comments:

Technician



Approved



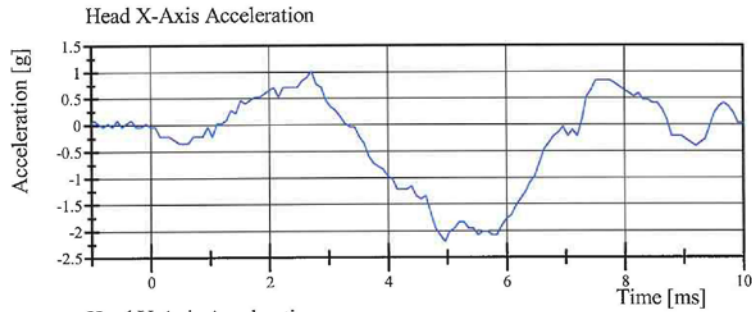
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 13:39:58 232

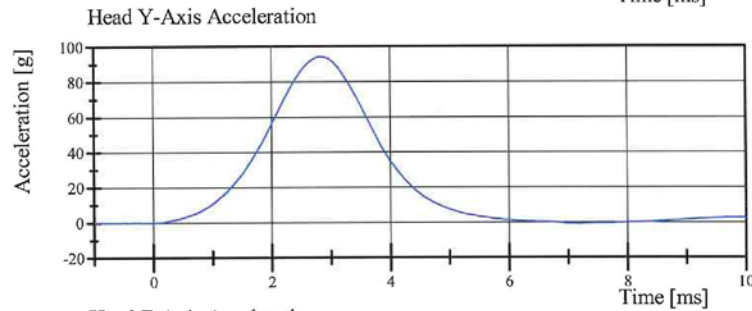


Transportation Research Center Inc.

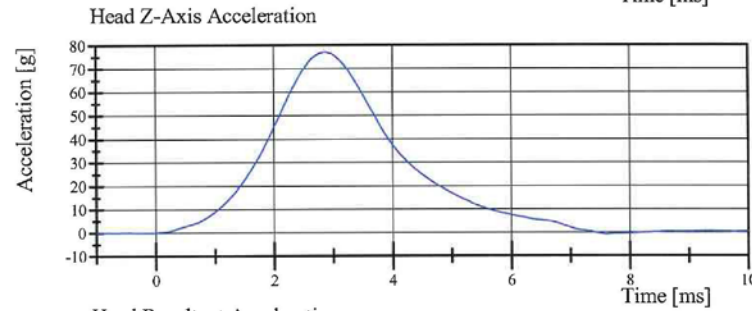
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



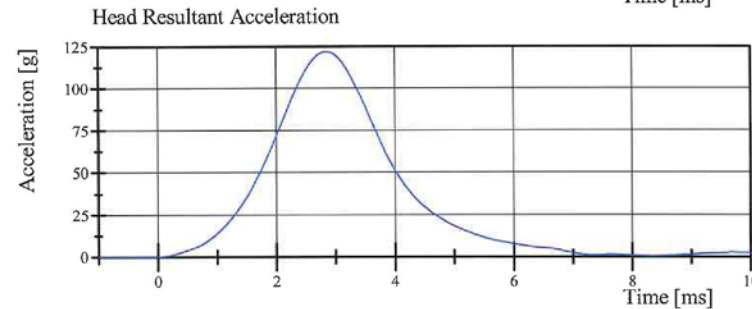
Filter Class: CFC_1000
Max: 1.0 g at 2.7 ms
Min: -2.2 g at 5.0 ms



Filter Class: CFC_1000
Max: 94.3 g at 2.8 ms
Min: -1.0 g at 7.2 ms



Filter Class: CFC_1000
Max: 77.1 g at 2.9 ms
Min: -0.9 g at 7.6 ms



Filter Class: CFC_1000
Max: 121.8 g at 2.9 ms
Min: 0.0 g at -0.2 ms

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

01.24.2014 13:40:08 232



Transportation Research Center Inc.


Left Lateral Neck
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.608 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.788 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	4.025 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.351 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.834 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.834 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-79.9 deg	Yes
Time of Peak	50 - 70 ms	69.9 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.1 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	120.9 ms	Yes

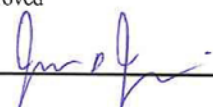
Test meets specifications.

Comments:

Technician



Approved



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

01.24.2014 15:29:18 640

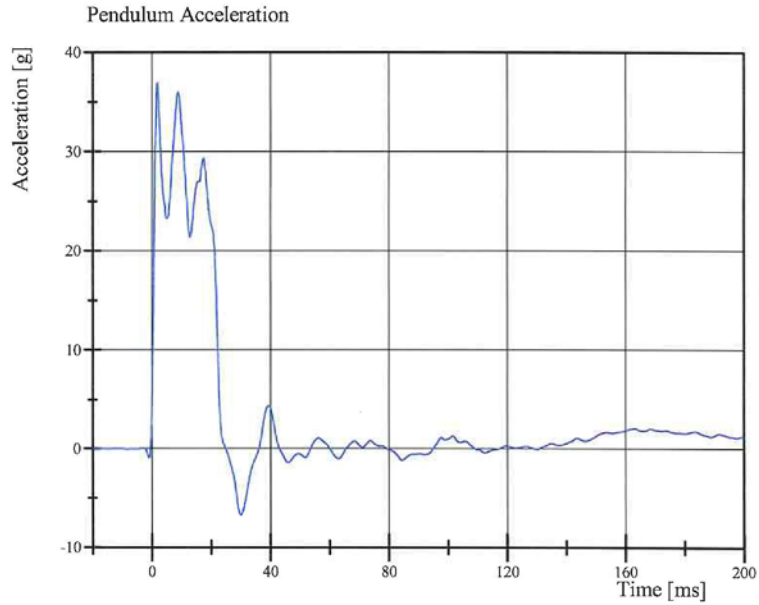


Transportation Research Center Inc.

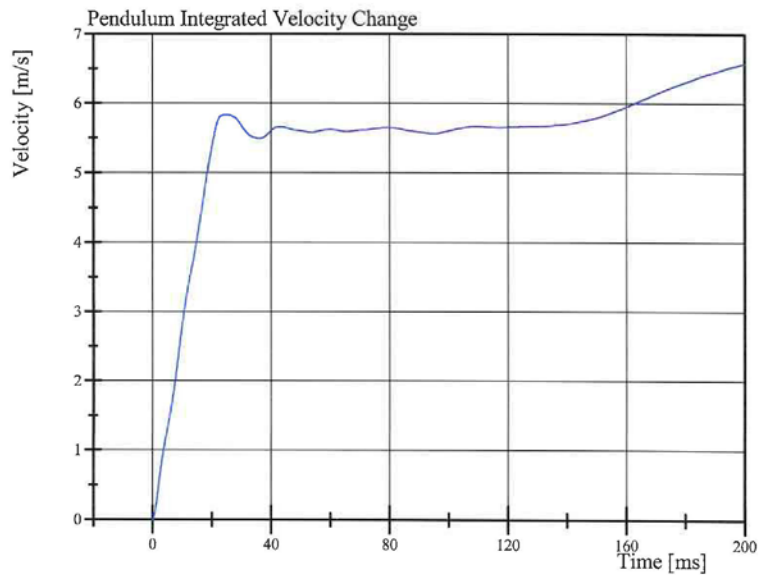
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 26-1

Test Date: 1/24/2014



Filter Class: CFC_180
Max: 36.9 g at 1.9 ms
Min: -6.7 g at 30.0 ms



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.

01.24.2014 15:29:27 640

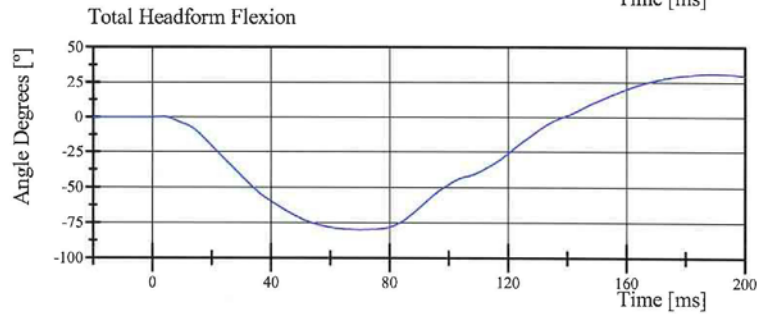
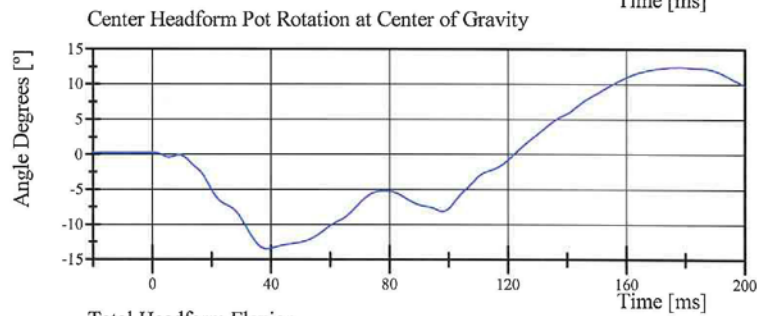
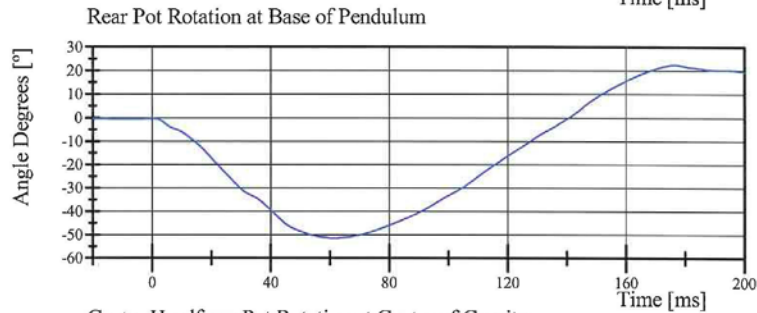
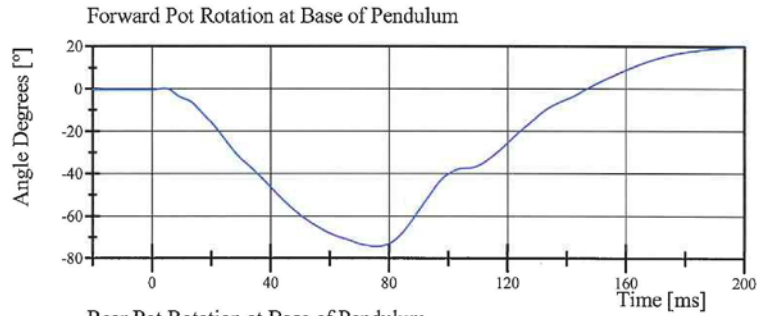


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 26-1

Test Date: 1/24/2014



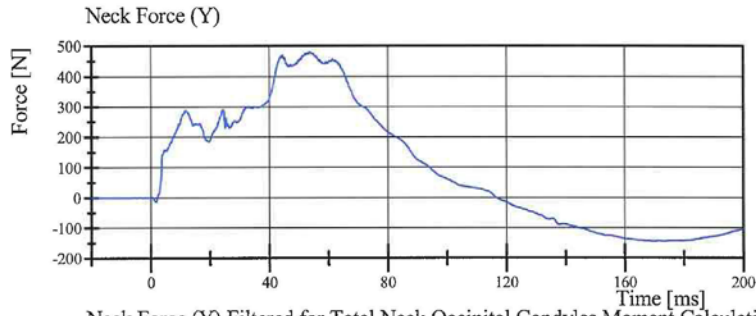
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 15:29:28 640

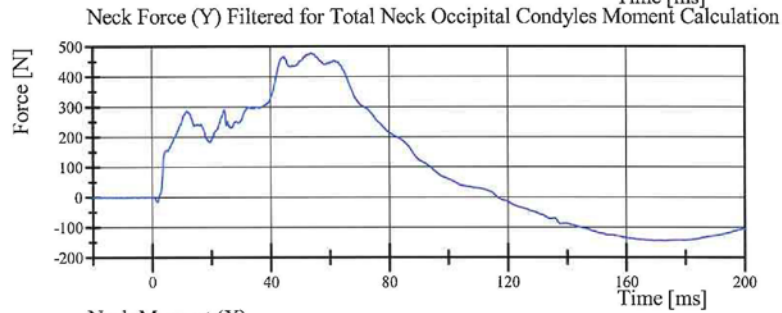


Transportation Research Center Inc.

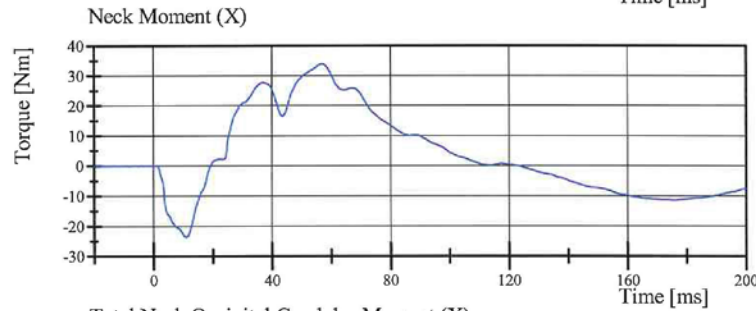
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



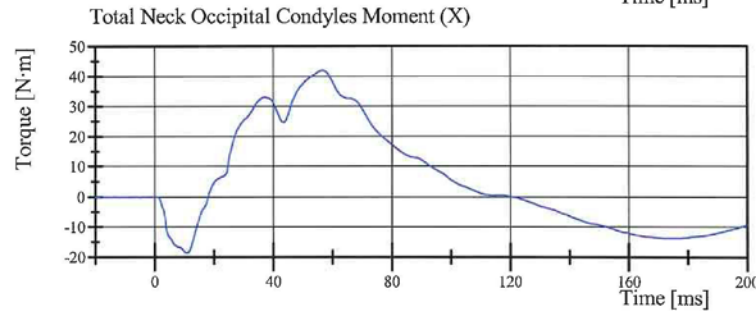
Filter Class: CFC_1000
Max: 480.3 N at 53.8 ms
Min: -146.3 N at 170.0 ms



Filter Class: CFC_600
Max: 479.6 N at 53.8 ms
Min: -145.9 N at 170.0 ms



Filter Class: CFC_600
Max: 34.0 Nm at 56.6 ms
Min: -23.5 Nm at 11.0 ms



Filter Class: Without_(Consta
Max: 42.1 N·m at 56.6 ms
Min: -18.6 N·m at 10.9 ms

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

01.24.2014 15:29:29 640



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	30.5 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.5 g	Yes

Test meets specifications.

Comments:

Technician



Approved



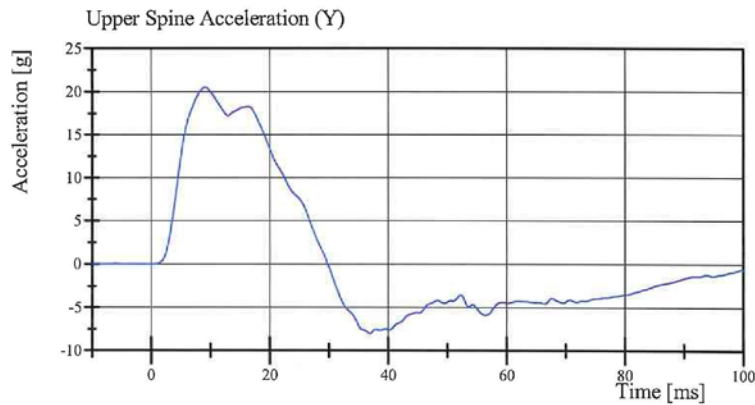
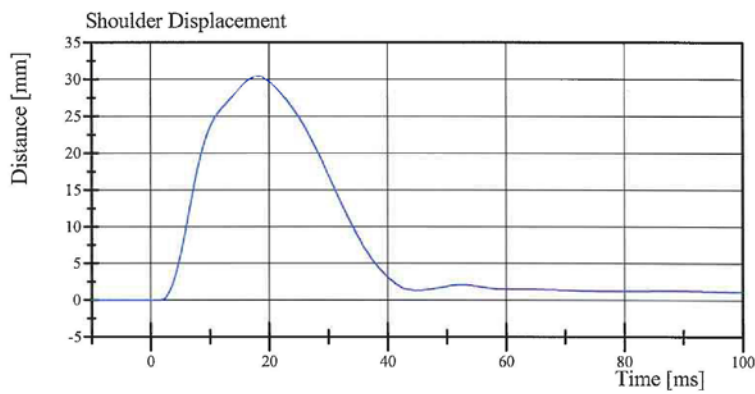
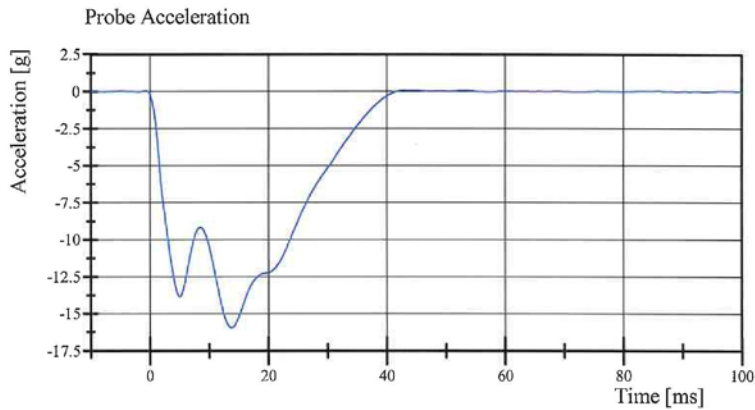
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 09:29:17 853



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



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

01.24.2014 09:29:27 853



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.706 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.9 g	Yes
Shoulder Displacement	31 - 40 mm	32.8 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.0 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.6 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.5 g	Yes


Test meets specifications.

Comments:

Technician



Approved



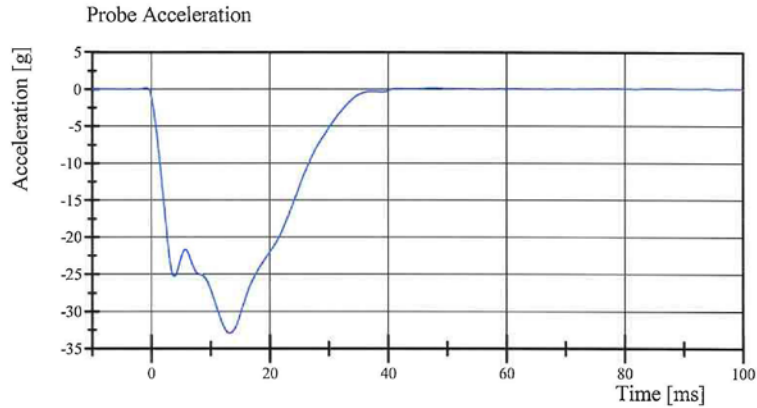
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 10:52:22 614

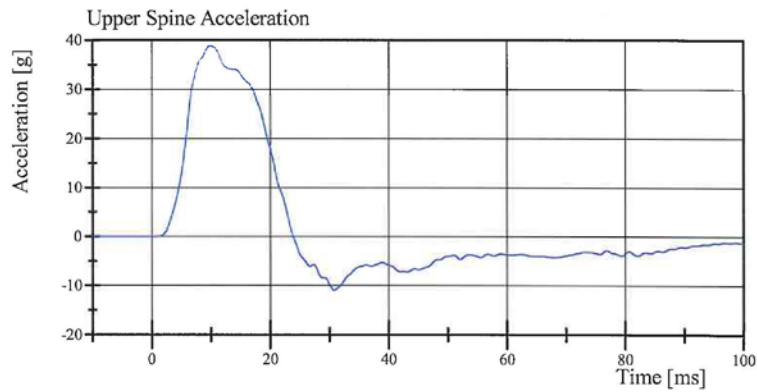


Transportation Research Center Inc.

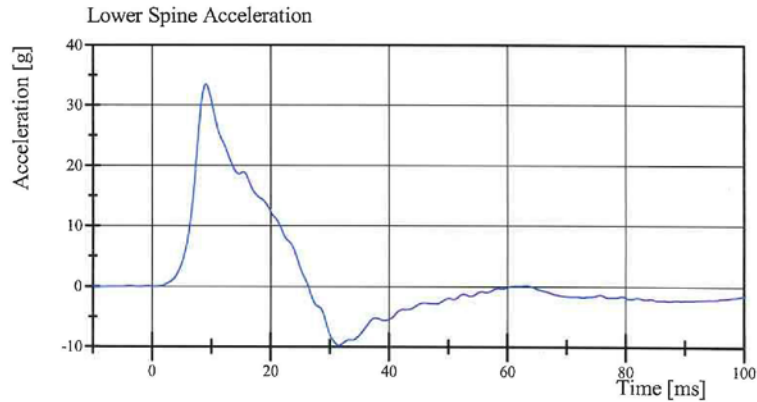
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



Filter Class: CFC_180
Max: 0.2 g at -0.9 ms
Min: -32.9 g at 13.3 ms



Filter Class: CFC_180
Max: 38.8 g at 9.9 ms
Min: -11.0 g at 30.8 ms



Filter Class: CFC_180
Max: 33.5 g at 9.1 ms
Min: -9.8 g at 31.6 ms

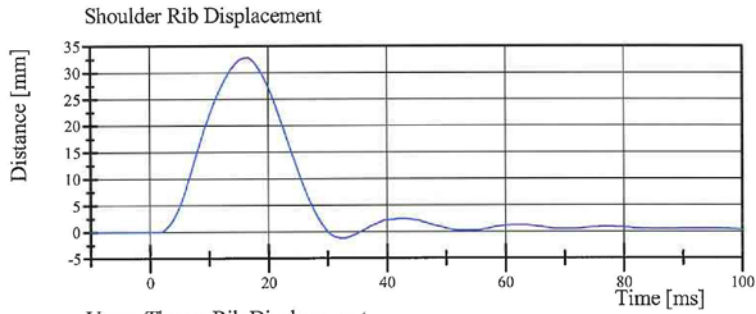
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 10:52:35 614

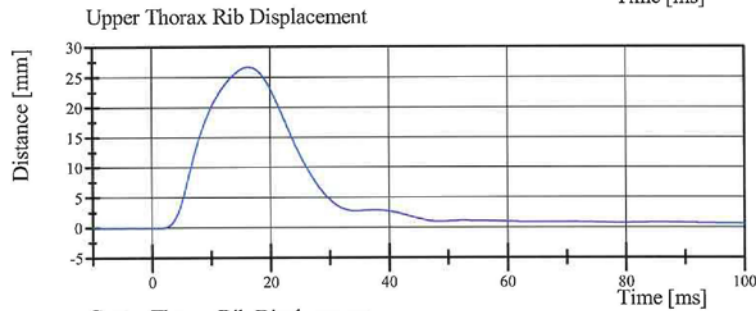


Transportation Research Center Inc.

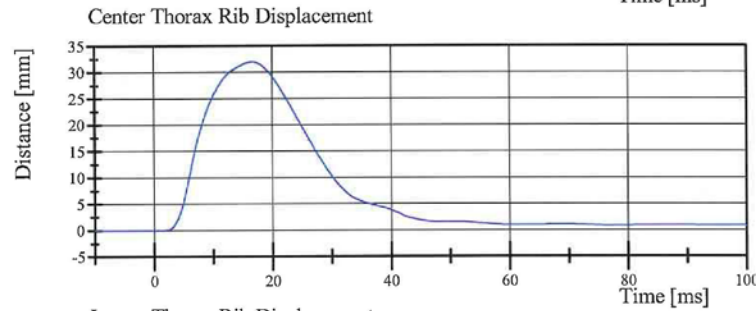
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



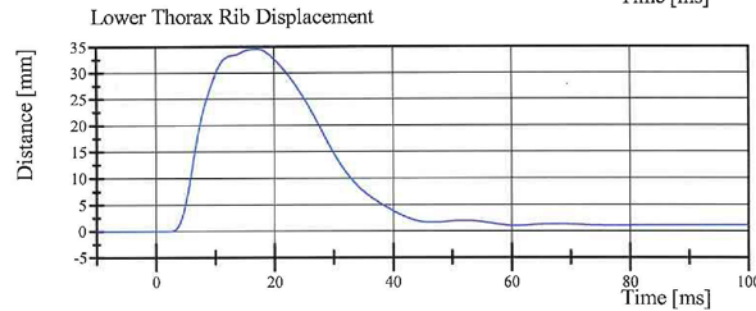
Filter Class: CFC_600
Max: 32.8 mm at 16.6 ms
Min: -1.2 mm at 32.4 ms



Filter Class: CFC_600
Max: 26.7 mm at 16.3 ms
Min: -0.0 mm at -7.1 ms



Filter Class: CFC_600
Max: 32.0 mm at 16.6 ms
Min: -0.0 mm at -9.0 ms



Filter Class: CFC_600
Max: 34.6 mm at 17.0 ms
Min: -0.0 mm at -9.0 ms

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

01.24.2014 10:52:35 614



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.382 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.3 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.0 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.8 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.2 g	Yes

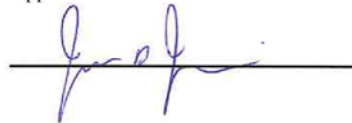
Test meets specifications.

Comments:

Technician



Approved



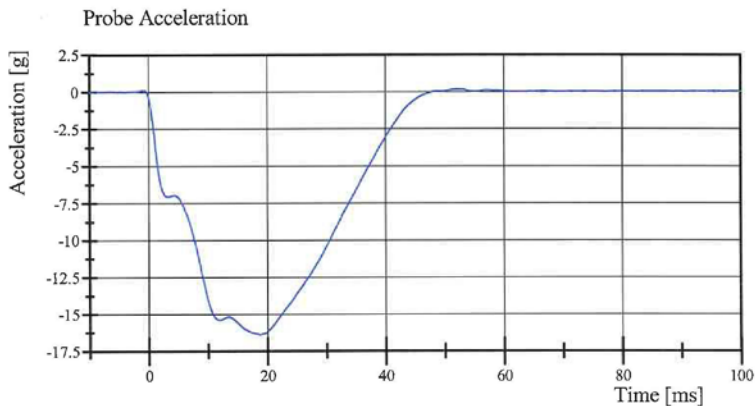
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 11:32:35 823

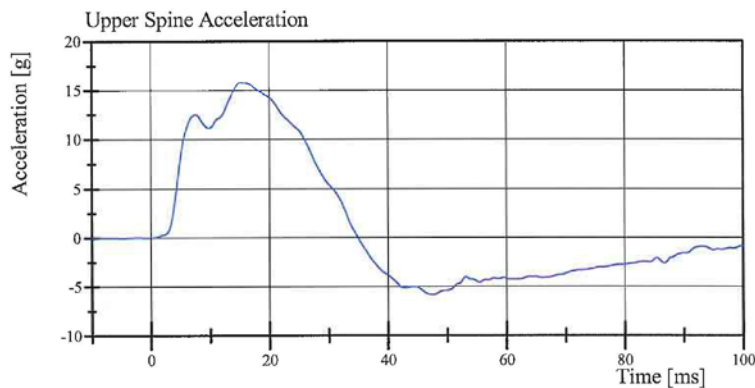


Transportation Research Center Inc.

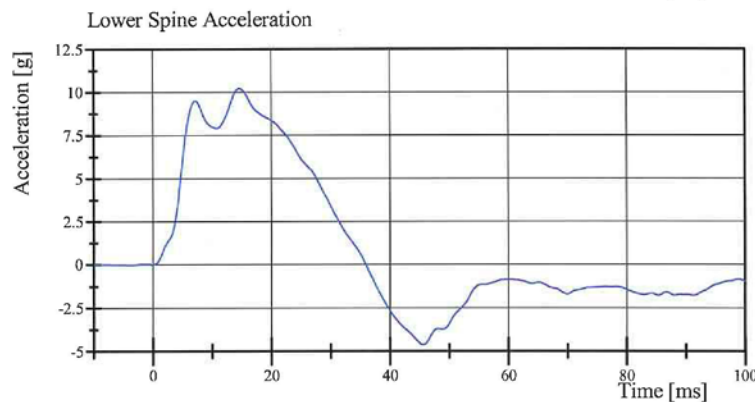
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



Filter Class: CFC_180
Max: 0.2 g at 52.6 ms
Min: -16.3 g at 18.8 ms



Filter Class: CFC_180
Max: 15.8 g at 15.2 ms
Min: -5.8 g at 47.5 ms



Filter Class: CFC_180
Max: 10.2 g at 14.6 ms
Min: -4.6 g at 45.6 ms

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

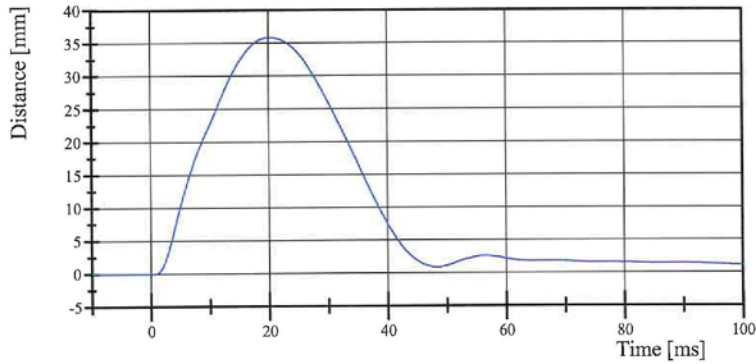
01.24.2014 11:32:45 823



Transportation Research Center Inc.

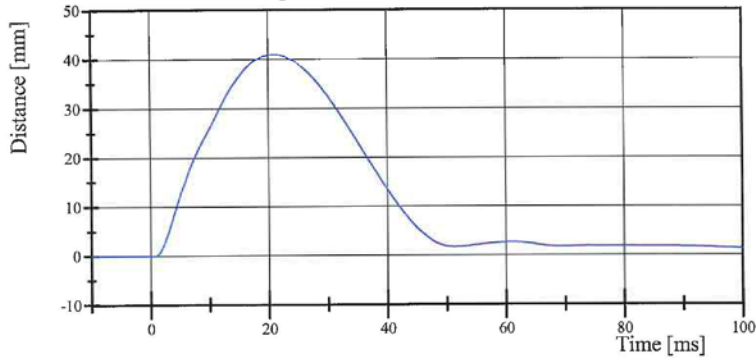
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Upper Thorax Rib Displacement



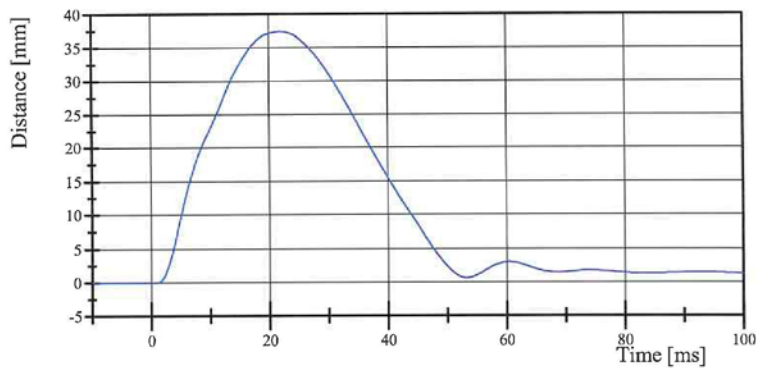
Filter Class: CFC_600
Max: 35.8 mm at 20.2 ms
Min: -0.0 mm at 0.6 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.0 mm at 21.0 ms
Min: -0.0 mm at -8.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.5 mm at 21.9 ms
Min: -0.0 mm at -8.9 ms

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

01.24.2014 11:32:46 823



Transportation Research Center Inc.

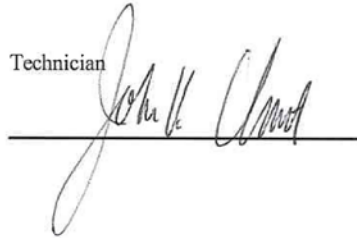
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.3 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.66 g	Yes

Test meets specifications.

Comments:

Technician



Approved



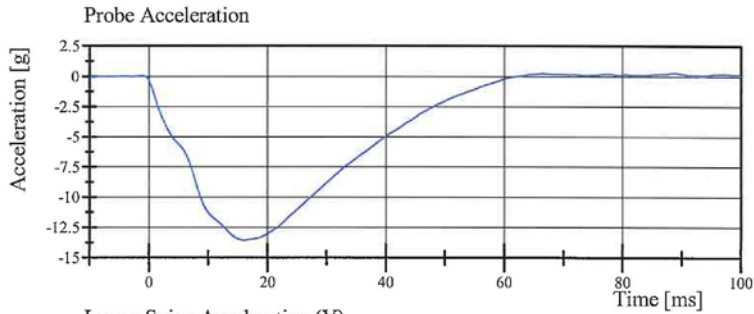
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.24.2014 10:25:40 683

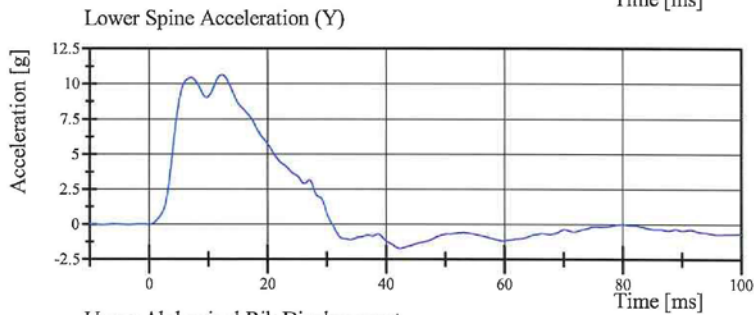


Transportation Research Center Inc.

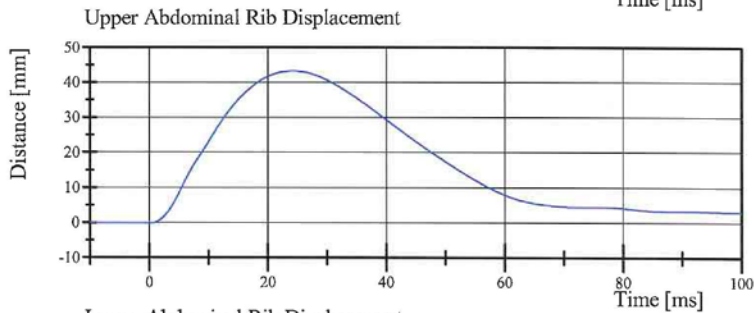
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014



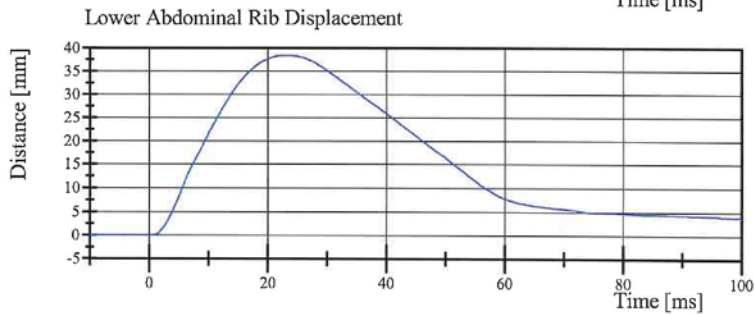
Filter Class: CFC_180
Max: 0.3 g at 88.7 ms
Min: -13.5 g at 16.1 ms



Filter Class: CFC_180
Max: 10.7 g at 12.3 ms
Min: -1.7 g at 42.3 ms



Filter Class: CFC_600
Max: 43.3 mm at 24.2 ms
Min: -0.0 mm at -8.2 ms



Filter Class: CFC_600
Max: 38.4 mm at 23.4 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.

01.24.2014 10:25:50 683



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 26-3
Test Date: 1/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-41.76 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,979.3 N	Yes


Test meets specifications.

Comments:

Technician



Approved



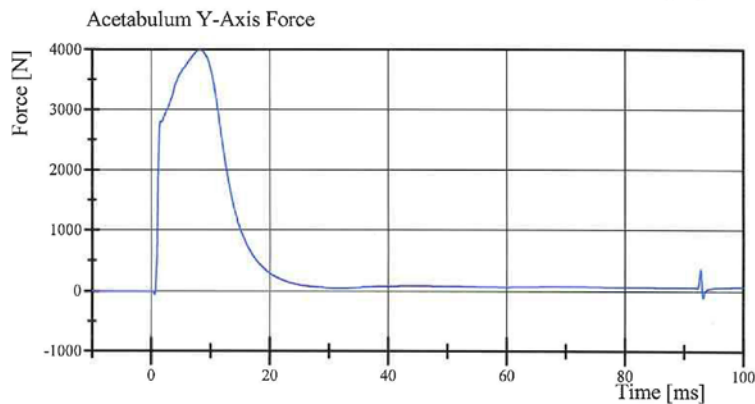
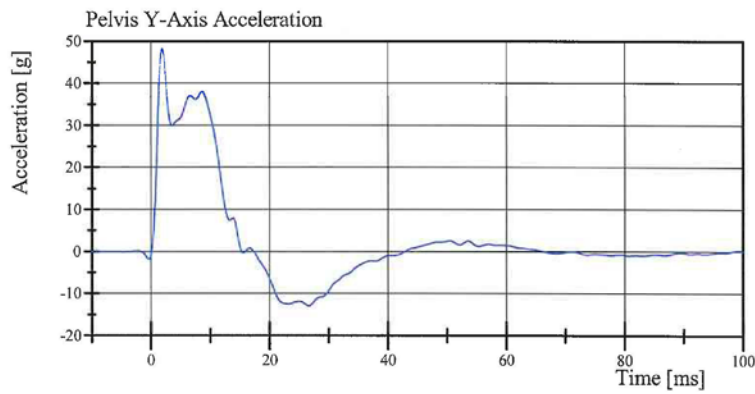
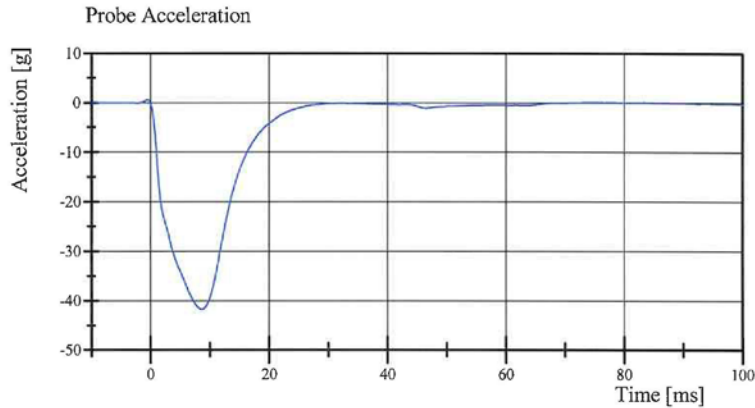
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.27.2014 08:12:34 440



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 26-3
Test Date: 1/27/2014



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

01.27.2014 08:13:47 440



Transportation Research Center Inc.

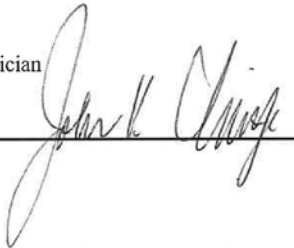
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 26-1
Test Date: 1/24/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-39.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	30.4 g	Yes
Iliac Force	4,100 - 5,100 N	4,699.3 N	Yes


Test meets specifications.

Comments:

Technician



Approved



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

01.24.2014 09:00:13 656

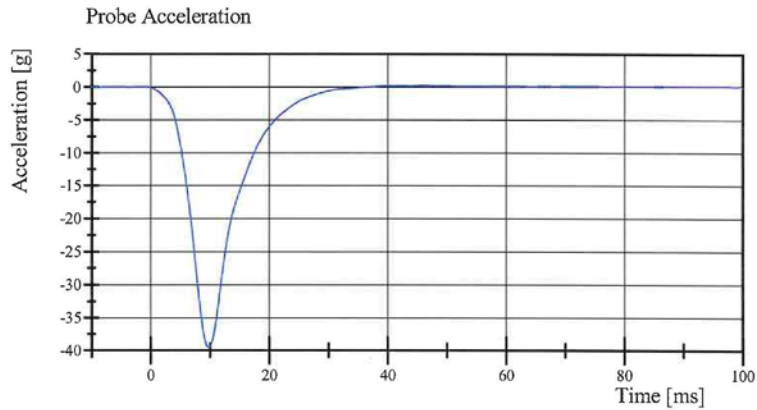


Transportation Research Center Inc.

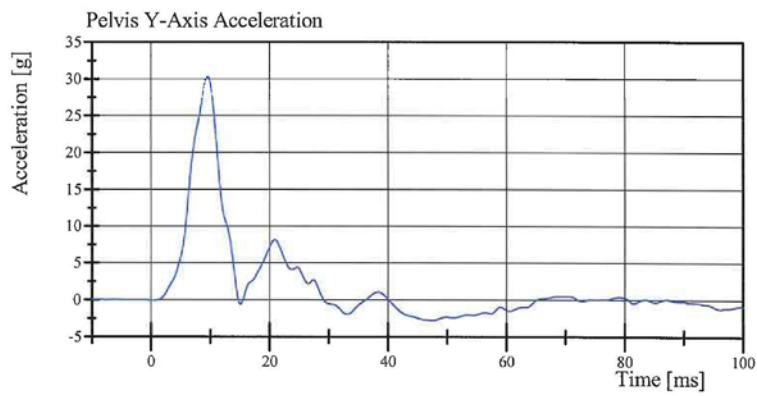
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 26-1

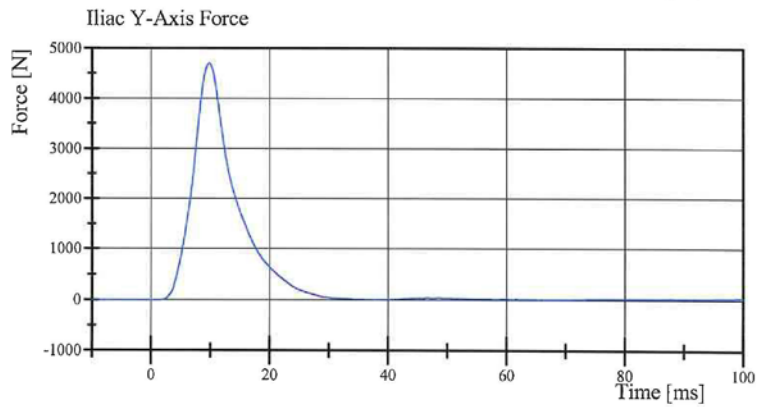
Test Date: 1/24/2014



Filter Class: CFC_180
Max: 0.2 g at 46.2 ms
Min: -39.5 g at 9.8 ms



Filter Class: CFC_180
Max: 30.4 g at 9.6 ms
Min: -2.8 g at 47.4 ms



Filter Class: CFC_600
Max: 4,699.3 N at 9.8 ms
Min: -0.5 N at -9.2 ms

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

01.24.2014 09:00:20 656



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	9-Dec-13
		Y	P51702	Endevco	9-Dec-13
		Z	P52083	Endevco	9-Dec-13
Thoracic Rib Displacement Potentiometers	Upper	Y	175	FTSS	10-Dec-13
	Middle	Y	174	FTSS	10-Dec-13
	Lower	Y	173	FTSS	10-Dec-13
Abdomen Load Cells	Upper	Y	1441	Denton	21-Oct-13
	Middle	Y	1436	Denton	21-Oct-13
	Lower	Y	1437	Denton	21-Oct-13
Lower Spine Accelerometers (T12)		X	P15954	Endevco	9-Dec-13
		Y	P68599	Endevco	9-Dec-13
		Z	P59005	Endevco	9-Dec-13
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	21-Oct-13

TABLE 2 – Dummy Instrumentation (SID-IIs)

		SID-IIs S/N 305				
		Serial Number	Manufacturer	Calibration Date		
Head Accelerometers		X	P51719	Endevco	11-Dec-13	
		Y	P51272	Endevco	11-Dec-13	
		Z	P58862	Endevco	11-Dec-13	
Displacement Potentiometers	Shoulder		Y	N/A	N/A	
	Thoracic Rib	Upper	Y	007	Servo	12-Dec-13
		Middle	Y	1161	Servo	12-Dec-13
		Lower	Y	037	Servo	21-Jan-14
	Abdominal Rib	Upper	Y	1295	Servo	12-Dec-13
		Lower	Y	1136	Servo	12-Dec-13
Lower Spine Accelerometers (T12)		X	P50068	Endevco	12-Dec-13	
		Y	P52051	Endevco	12-Dec-13	
		Z	P51710	Endevco	12-Dec-13	
Acetabulum Load Cell		Y	D14285-FY	FTSS	13-Jan-14	
Iliac Wing Load Cell		Y	287-FY	FTSS	28-Oct-13	
Pelvis Plug (struck side)			63394	FTSS	28-Jan-13	
Pelvis Plug (non-struck side)			36473	FTSS	23-Sep-10	

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P81534	Endevco	5-Nov-13
	Vehicle Center of Gravity	Y	P81021	Endevco	17-Sep-13
	Vehicle Center of Gravity	Z	P82051	Endevco	5-Nov-13
2	Right Sill at Front Seat	X	P81029	Endevco	5-Nov-13
	Right Sill at Front Seat	Y	MS23111	Measurement Specialties	16-Jan-14
	Right Sill at Front Seat	Z	P80454	Endevco	22-Sep-13
3	Right Sill at Rear Seat	X	MS23106	Measurement Specialties	16-Jan-14
	Right Sill at Rear Seat	Y	MS23135	Measurement Specialties	16-Jan-14
	Right Sill at Rear Seat	Z	MS23134	Measurement Specialties	16-Jan-14
4	Left Sill at Front Door	Y	P78116	Endevco	9-Jan-14
5	Left Sill at Rear Door	Y	P80709	Endevco	17-Sep-13
6	Left A-Post Lower	Y	P81537	Endevco	5-Nov-13
7	Left A-Post Middle	Y	P81096	Endevco	5-Nov-13
8	Left B-Post Lower	Y	P81080	Endevco	5-Nov-13
9	Left B-Post Middle	Y	P82006	Endevco	14-Nov-13
10	Front Seat Track	Y	P81657	Endevco	17-Nov-13
11	Rear Seat Track or Structure	Y	P81500	Endevco	5-Nov-13
12	Right Rear Occupant Compartment	Y	P79310	Endevco	12-Aug-13
13	Engine Block	X	P76403	Endevco	25-Sep-13
	Engine Block	Y	P81602	Endevco	13-Nov-13
14	Rear Floorpan Above Axle	X	MS23142	Measurement Specialties	16-Jan-13
	Rear Floorpan Above Axle	Y	MS23089	Measurement Specialties	16-Jan-13
	Rear Floorpan Above Axle	Z	MS23108	Measurement Specialties	16-Jan-13

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P78119	Endevco	1-Aug-13
MDB Center of Gravity	Y	P81546	Endevco	15-Nov-13
MDB Center of Gravity	Z	P80130	Endevco	22-Nov-13
Left Frame Rail at Rear Axle Centerline	X	P81992	Endevco	14-Nov-13
Left Frame Rail at Rear Axle Centerline	Y	P81493	Endevco	14-Nov-13