FINAL REPORT NUMBER: SINCAP-TRC-13-006

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

Fuji Heavy Industries LTD.
2013 Subaru Impreza Station Wagon
NHTSA NUMBER: MD5502

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

Report Date: March 20, 2013

FINAL REPORT

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

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Prepared By: ILO Project Operations Team

Approved By: _____

Approval Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date:_____

_____

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

Date:_____

Technical Report Documentation Page

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7. Author(s) Margaret Susan, Project Manager		8. Performing Organization Report Number 130306
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 March 6 – March 20, 2013 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 2013 Subaru Impreza Station Wagon 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 March 6, 2013.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.02 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 22° C. The target vehicle post-test maximum crush was 229 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})	NA	1000	138
Maximum Thoracic Rib Deflection	mm	44	25.5
Total Abdominal Force	N	2500	741.5
Pubic Symphysis Force	N	6000	1844.1

Passenger ATD (SID-IIs)

Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC_{36})	NA	1000	271
Lower Spine Resultant Acceleration	g's	82	58.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2462.1
Maximum Thoracic Rib Deflection	mm	38*	38.3
Maximum Abdominal Rib Deflection	mm	45*	31.0

* 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

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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2013 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00125. The purpose of this test is to generate comparative side impact performance in a 2013 Subaru Impreza Station Wagon. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2012.

SECTION 2

SUMMARY OF TEST RESULTS

A 2013 Subaru Impreza Station Wagon 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 62.02 km/h (38.54 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, OH, on March 6, 2013. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

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

The dummies were instrumented in the following manner:

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

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

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	138
Maximum Thoracic Rib Deflection	mm	44	25.5
Combined Abdominal Force	N	2500	741.5
Pubic Symphysis Force	N	6000	1844.1

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	271
Lower Spine (T12) Resultant Acceleration	G	82	58.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2462.1
Maximum Thoracic Rib Deflection	mm	38*	38.3
Maximum Abdominal Rib Deflection	mm	45*	31.0

* 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	NA
Knee Airbag	Yes	NA	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Yes	No	NA
Other	NA	NA	NA	NA

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact or the static rollover test which followed. Injury values for both ATDs were within the established performance thresholds. The restraint system performed as expected.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD5502
Model Year	2013
Make	Subaru
Model	Impreza
Body Style	Station Wagon
VIN	JF1GPAC63DG829423
Body Color	Dark Red
Odometer Reading (km/mi)	5.2 mi
Engine Displacement (L)	2.0
Type/No. Cylinders	4
Engine Placement	Front
Transmission Type	Standard
Transmission Speeds	5
Overdrive	No
Final Drive	AWD
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)	No
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	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? No

DATA FROM CERTIFICATION LABEL

Manufactured By	Fuji Heavy Industries LTD
Date of Manufacture	12/12
Vehicle Type	Passenger Car

GVWR (kg)	1950
GAWR Front (kg)	900
GAWR Rear (kg)	1000

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

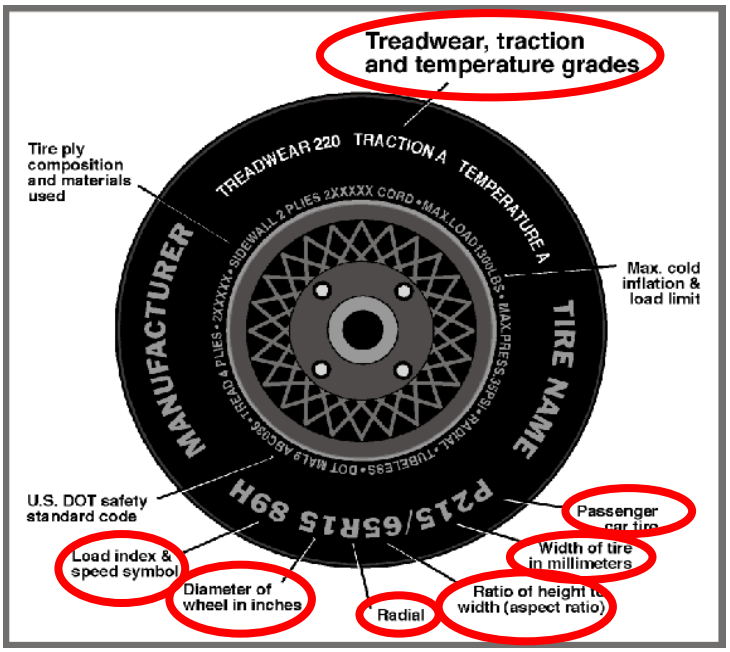
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	0	5
Capacity Weight (VCW) (kg)				408
DSC x 68.08 (kg)				340.2
Cargo Weight (RCLW) (kg)				67.8

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes	No	No		No	Yes	No
Rear or Second Row Seat	No	No	Yes	Yes	Yes	No	No
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: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	220
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	YOKOHAMA	YOKOHAMA
Tire Model	AVID S30	AVID S30
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	89V	89V
Tire Material	Polyester-Steel-Nylon	Polyester-Steel-Nylon
DOT Safety Code Left	FD8K-PEM 4912	FD8K-PEM 4912
DOT Safety Code Right	FD8K-PEM 4912	FD8K-PEM 4912

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

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	230	220	220
Tire Placard	kPa	230	230	220	220
Owner's Manual	kPa	230	230	220	220
As Tested	kPa	230	230	220	220

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	398.0	280.8		444.8	334.4		449.6	378.8	
Right	kg	384.2	267.8		408.4	329.8		391.8	329.8	
Ratio	%	58.8	41.2		56.2	43.8		54.3	45.7	
Totals	kg	782.2	548.6	1330.8	853.2	664.2	1517.4	841.4	708.6	1550.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1330.8	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	67.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1523.6	(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	670	665	Yes
RF	mm	682	674	Yes
RR	mm	660	653	Yes
LR	mm	645	648	Yes
Vehicle CG (Aft of Front Axle)	mm	1214	1162	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+52	+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 (if any) None	0.0
Rear Hatch Cover Trim, Rear Bumper Cover, Right Tail Light, Rear Wiper Motor	8.4

DATA SHEET NO. 2

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

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	15.8	11.8	13.8
Front Passenger Seat	N/A	N/A	14.8
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	17.6
Non-Struck Side Rear Seat	N/A	N/A	17.5
Rear Center Seat*	N/A	N/A	12.4

* 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	13.8	160	Max	N/A	N/A	N/A
			Mid	150	160	172
			Min	N/A	N/A	N/A
Front Passenger Seat	14.8	Fixed	Max	N/A	N/A	N/A
			Mid	149	160	170
			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	Fixed	N/A	Max	N/A	N/A	N/A
			Mid	N/A	Fixed	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Max	N/A	N/A	N/A
			Mid	N/A	Fixed	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	Fixed	N/A	Max	N/A	N/A	N/A
			Mid	N/A	Fixed	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: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

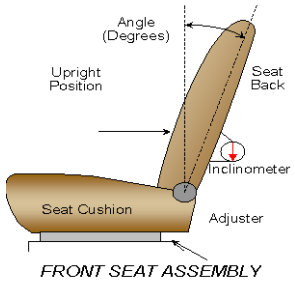
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	25	120	12
Front Passenger Seat	240	25	120	12
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	0	Fixed	0	Fixed
Non-Struck Side Rear Seat	0	Fixed	0	Fixed
Rear Center Seat*	0	Fixed	0	Fixed

* If applicable.

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	56.1	28	10.0	5
Front Passenger Seat	55.3	26	10.6	5
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	25.4	Fixed	25.4	Fixed
Non-Struck Side Rear Seat	22.5	Fixed	22.5	Fixed
Rear Center Seat*	25.4	Fixed	25.4	Fixed

* If applicable.

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	4	2
Rear Seat	1	1

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.

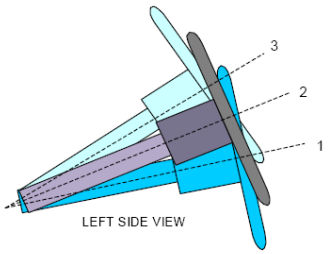
	Total # of Positions	Placed in Position #
Driver Seat	3	Highest & Full Forward
Rear Seat	1	1

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

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

STEERING COLUMN ADJUSTMENT

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



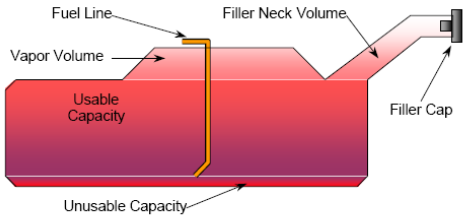
STEERING COLUMN ASSEMBLY

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	22.2	20
Geometric Center, Position No. 2	23.9	20
Uppermost, Position No. 3	25.6	20
Telescoping Steering Wheel Travel	N/A	40
Test Position	23.9	20

FUEL PUMP

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

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



VEHICLE FUEL TANK ASSEMBLY

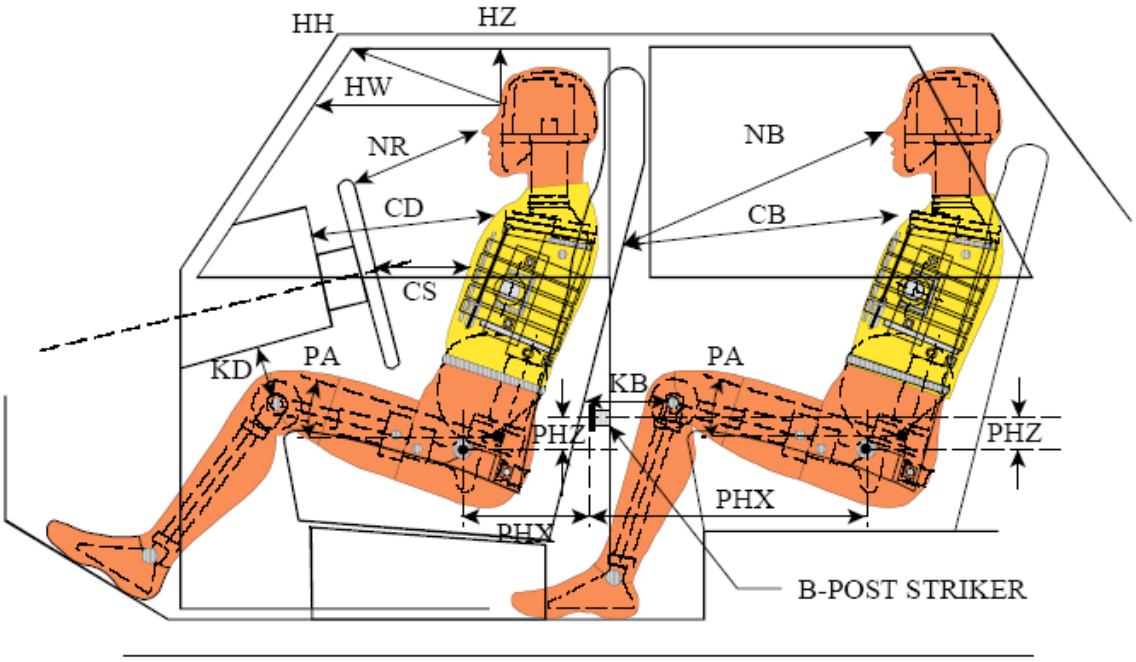
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	54.89
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	55.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	51.0
Actual Amount of Solvent Used in Test	51.0
1/3 of Usable Capacity	18.30

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: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



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

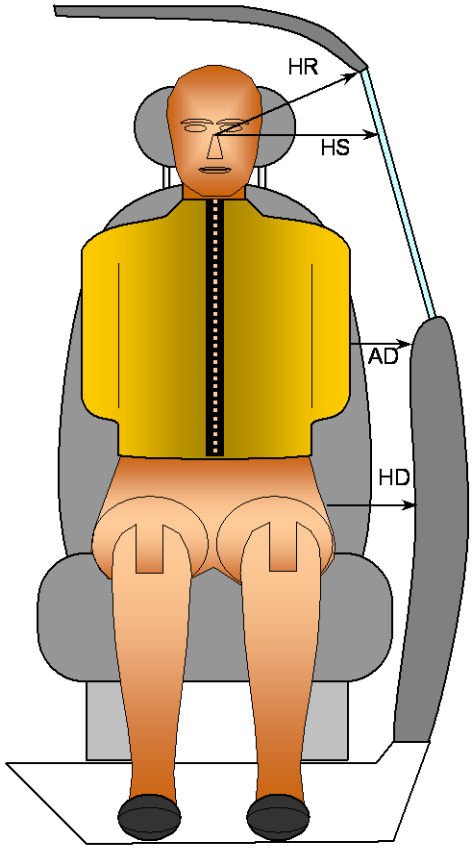
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	311			
HW		Header to Windshield	576			
HZ	HZ	Head to Roof Liner	159		260	
NR	NB	Nose to Rim/Seat Back	402		588	
CD	CB	Chest to Dash/Seat Back	543		552	
CS		Chest to Steering Wheel	278			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	159	25.0	303	20.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	142	31.0	302	20.2
PAX°	PAX°	Pelvic Tilt Angle X		0.7		0.3
	PAY°	Pelvic Tilt Angle Y				21.5
PHX	PHX	Hip Point to Striker (X-Axis)	221		307	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	190		308	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

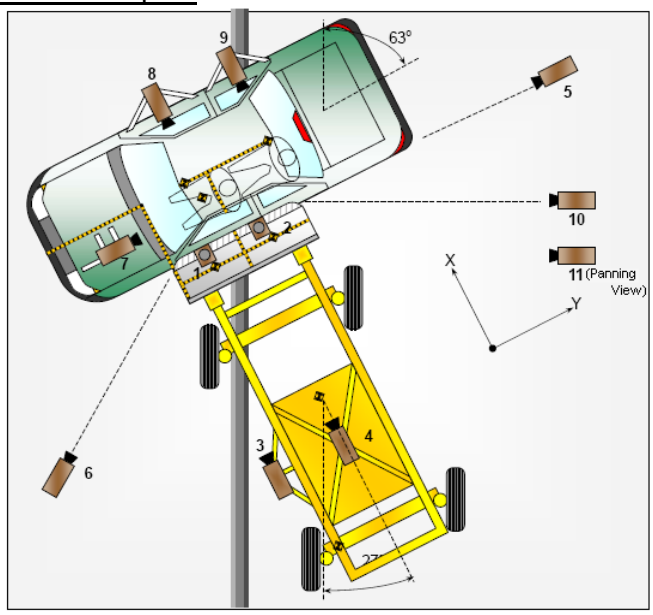


FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	211	245
HS	Head to Side Window	mm	333	343
AD	Arm to Door	mm	99	122
HD	H-Point to Door	mm	150	158

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-100	955	-5689	6	1000
2	Overhead Close-up	-100	700	-5703	16	1000
3	Left Impact Point (MDB)	1789	-845	-817	12.5	1000
4	Side Overall (MDB)	2373	0	-1438	6	1000
5	Rear	335	6091	-945	25	1000
6	Left Front	1994	-4146	-1128	12.5	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				8.5	1000
9	Passenger Side (OB)				8.5	1000
10	Real-time Left Rear				zoom	30
11	Real-time Inrun				zoom	30

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

*All measurements accurate to ± 6 mm.

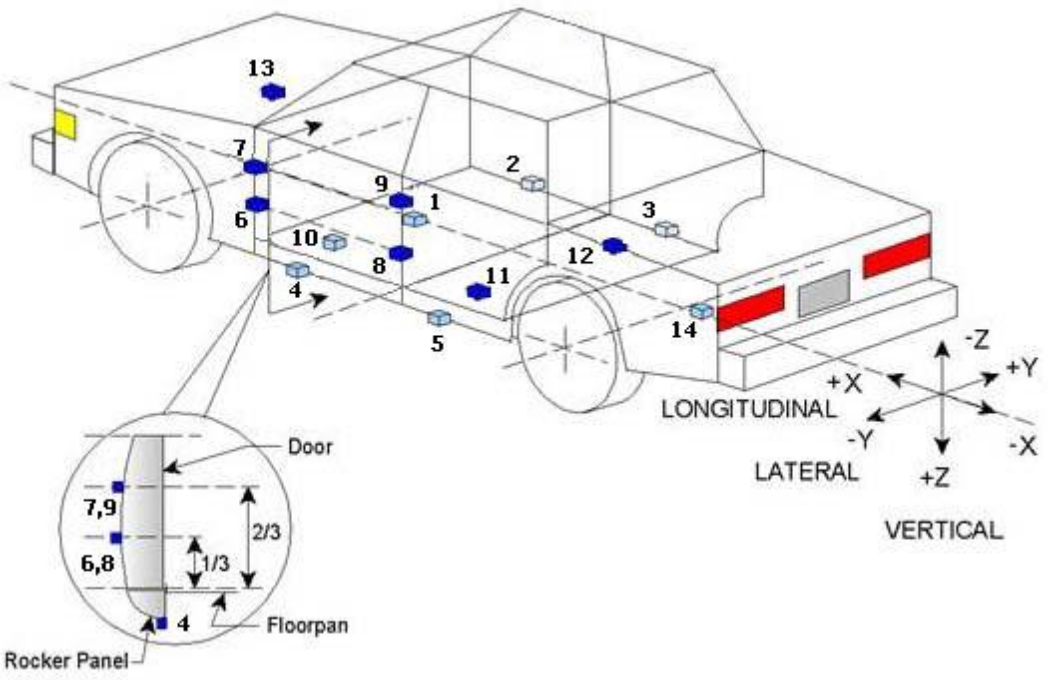
If applicable, explain why camera(s) did not operate as intended:

INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



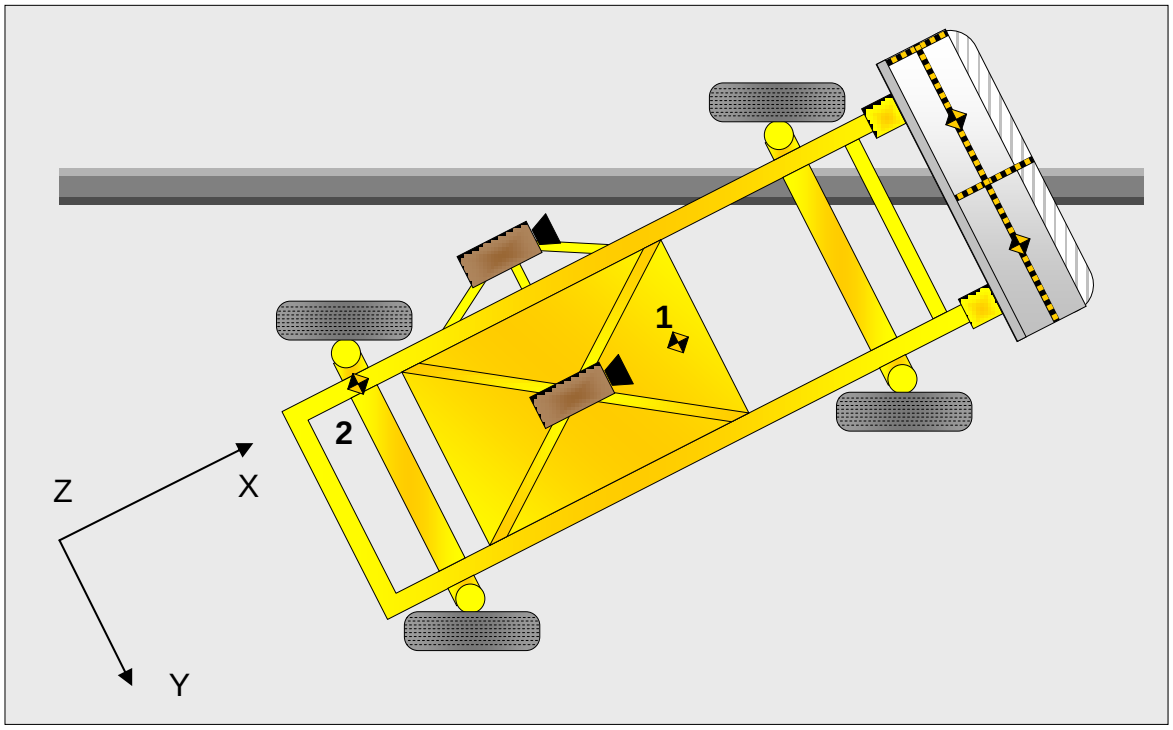
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2935	135	-250
2	Right Sill at Front Seat	2920	675	-237
3	Right Sill at Rear Seat	2112	675	-260
4	Left Sill at Front Door	2940	-675	-260
5	Left Sill at Rear Door	2096	-675	-261
6	A-Post Lower	3365	-802	-455
7	A-Post Middle	3395	-780	-805
8	B-Post Lower	2305	-795	-485
9	B-Post Middle	2255	-787	-863
10	Front Seat Track	2554	-550	-274
11	Rear Seat Structure	1685	-430	-364
12	Right Rear Occ. Compartment	2025	590	-252
13	Engine Block	4195	0	-590
14	Rear Above Axle	1120	0	-377

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: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	-2260	0	-520
2	MDB Rear	-3703	-677	-625

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	Side Curtain Airbag	Side Curtain Airbag
Top of Head	Side Curtain Airbag	Side Curtain Airbag
Left Side of Head	Side Curtain Airbag	Side Curtain Airbag
Back of Head	Head Restraint, Side Curtain Airbag	None
Left Shoulder	Side Curtain Airbag	Door Panel
Upper Torso	Torso/Pelvis Airbag	Door Panel
Lower Torso	Torso/Pelvis Airbag	Door Panel
Left Hip	Door Panel, Side Curtain Airbag	Door Panel
Left Knee	Door Panel	Door Panel

POST TEST DOOR PERFORMANCE

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

* Indicate “Yes”, “No”, or “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

* Indicate “Yes”, “No”, or “N/A”.

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2655
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		387
Actual Impact Point (Aft of Front Axle)	mm		389
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-2
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-3

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

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	1109

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	421.4	263.4	
Right	kg	359.4	323.0	
Ratio	%	57.1	42.9	
Totals	kg	780.8	586.4	1367.2

SPEED AND IMPACT ANGLE DATA

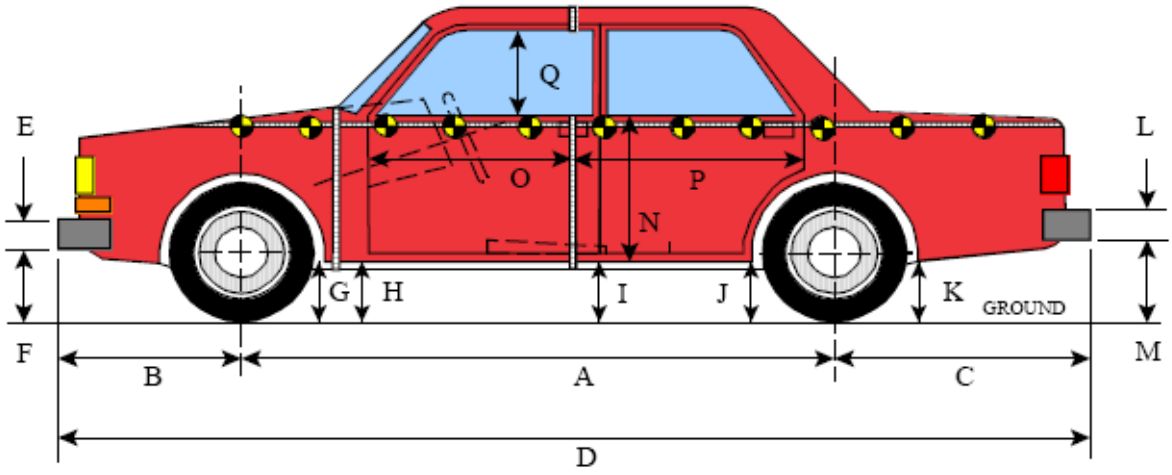
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.02
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.95
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.5
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	28

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	-200
B	Top of Bumper	533	600	Left	-371
C	Mid-Level	686	800	Right	-145
D	Top of Stack	813	800	Right	-149

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



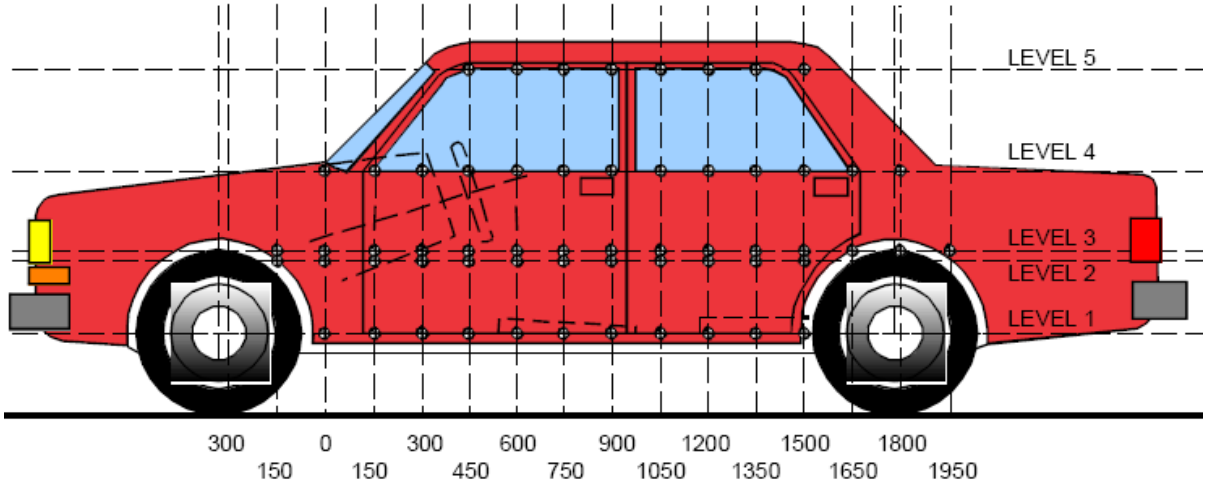
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2655	2660	-5
B	Front Axle to Front Surface of Vehicle	950	950	0
C	Rear Axle to Rear Surface of Vehicle	815	815	0
D	Total Length at Centerline	4420	4420	0
E	Front Bumper Thickness	128	128	0
F	Front Bumper Bottom to Ground	390	405	-15
G	Sill Height at Front Wheel Well	200	212	-12
H	Sill Height at Front Door Leading Edge	205	210	-5
I	Sill Height at B-Pillar	195	285	-90
J1	Sill Height at Rear Wheel Well	191	267	-76
J2	Pinch Weld Height at Rear Wheel Well	127	195	-68
K	Sill Height Aft of Rear Wheel Well	265	311	-46
L	Rear Bumper Thickness	177	177	0
M	Rear Bumper Bottom to Ground	382	425	-43
N	Sill Height to Window Bottom Sill	712	625	87
O	Front Door Leading Edge to Impact CL	775	730	45
P	Rear Door Trailing Edge to Impact CL	1405	1370	35
Q	Front Window Opening	383	355	28
R	Right Side Length	4300	4315	-15
S	Left Side Length	4300	4295	5
T	Vehicle Width at B Pillar	1280	1195	85

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	300	100	450
2	Driver Hip Point	515	229	900
3	Mid-Door	584	210	1800
4	Window Sill	878	177	1500
5	Window Top	1392	1	1650

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

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

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	0	0	782	0	0	0	0	785	0	0	0	0	-3	0
-150	0	0	871	794	0	0	0	872	798	0	0	0	-1	-4	0
0	846	868	868	795	0	860	867	859	797	0	-14	1	9	-2	0
150	835	864	864	801	0	764	690	710	783	0	71	174	154	18	0
300	836	863	865	840	0	742	649	671	N/D[1]	0	94	214	194	N/A[1]	0
450	835	864	867	814	0	735	643	665	724	0	100	221	202	90	0
600	835	864	868	820	0	735	644	675	711	0	100	220	193	109	0
750	834	865	869	827	0	736	640	664	696	0	98	225	205	131	0
900	833	864	869	832	583	741	635	678	680	592	92	229	191	152	-9
1050	832	863	868	837	598	746	638	688	707	605	86	225	180	130	-7
1200	831	861	867	836	601	743	632	683	717	604	88	229	184	119	-3
1350	831	860	866	836	603	757	642	676	670	604	74	218	190	166	-1
1500	830	859	864	834	602	761	644	672	657	602	69	215	192	177	0
1650	831	859	863	832	599	763	645	666	668	598	68	214	197	164	1
1800	839	862	863	829	592	785	670	653	683	592	54	192	210	146	0
1950	0	866	868	840	582	0	783	788	737	584	0	83	80	103	-2
2100	0	0	0	837	565	0	0	0	784	568	0	0	0	53	-3
2250	0	0	0	818	537	0	0	0	789	539	0	0	0	29	-2
2400	0	0	0	813	0	0	0	0	795	0	0	0	0	18	0
2550	0	0	0	804	0	0	0	0	796	0	0	0	0	8	0
2700	0	0	0	793	0	0	0	0	792	0	0	0	0	1	0
2850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

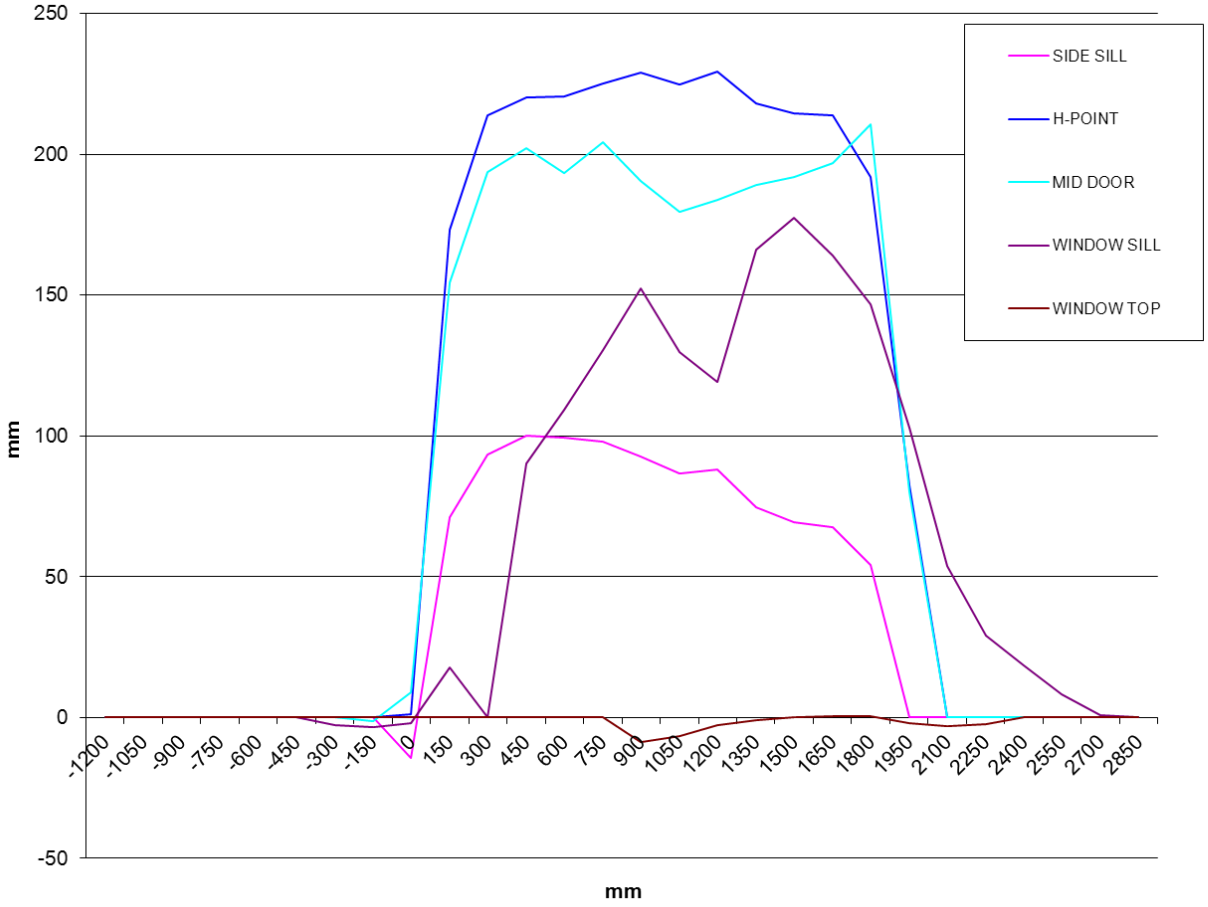
[1] **Post-test point not determined, difference not available**

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.

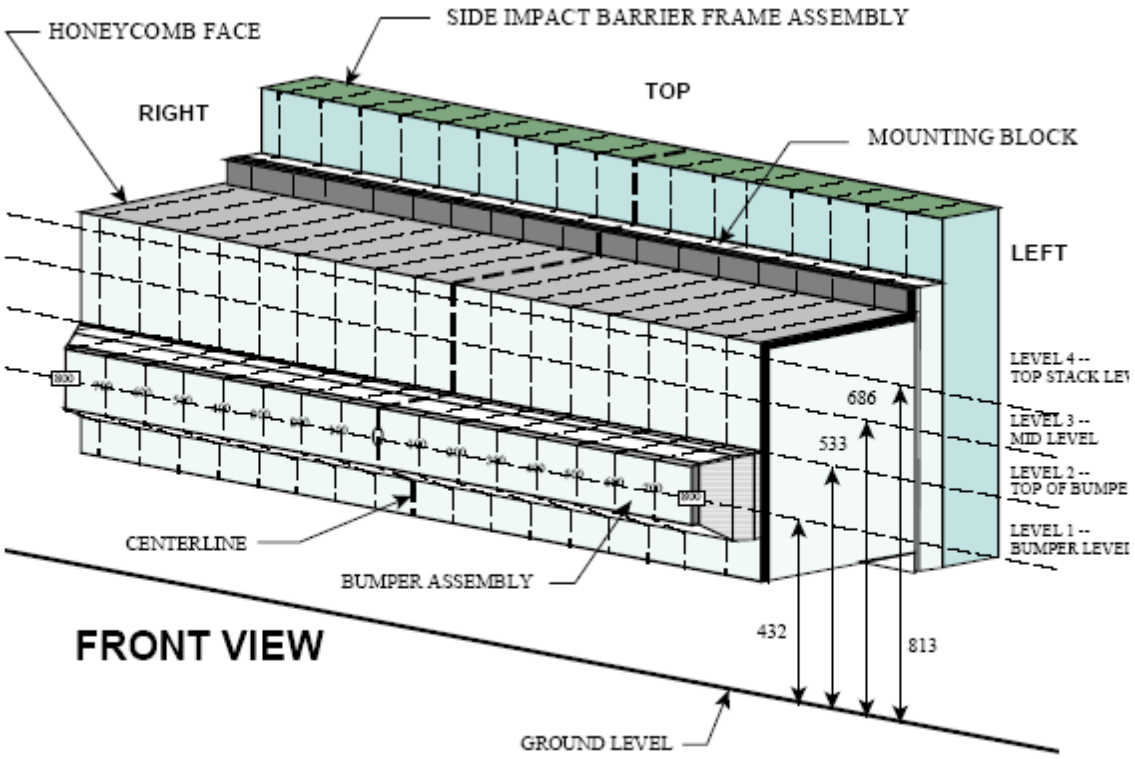
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	-69	-47	-35	-30	-43	-79	-114	-91	-57	-39	-44	-56	-65	-76	-97	-136	-149
2	-69	-37	-24	-28	-32	-48	-65	-66	-45	-33	-26	-21	-25	-32	-46	-86	-145
3	-88	-87	-371	-371	-371	-371	-371	-371	-371	-371	-371	-70	-72	-71	-74	-81	-94
4	-200	-194	-183	-178	-175	-175	-169	-160	-154	-150	-145	-142	-140	-137	-137	-150	-167

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

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13

Test Time: 17:01 **Temperature:** 22

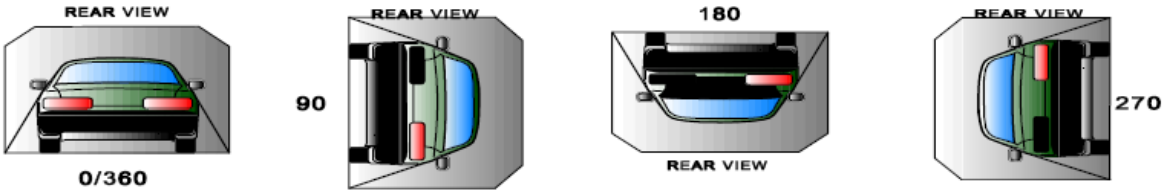
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

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

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

D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

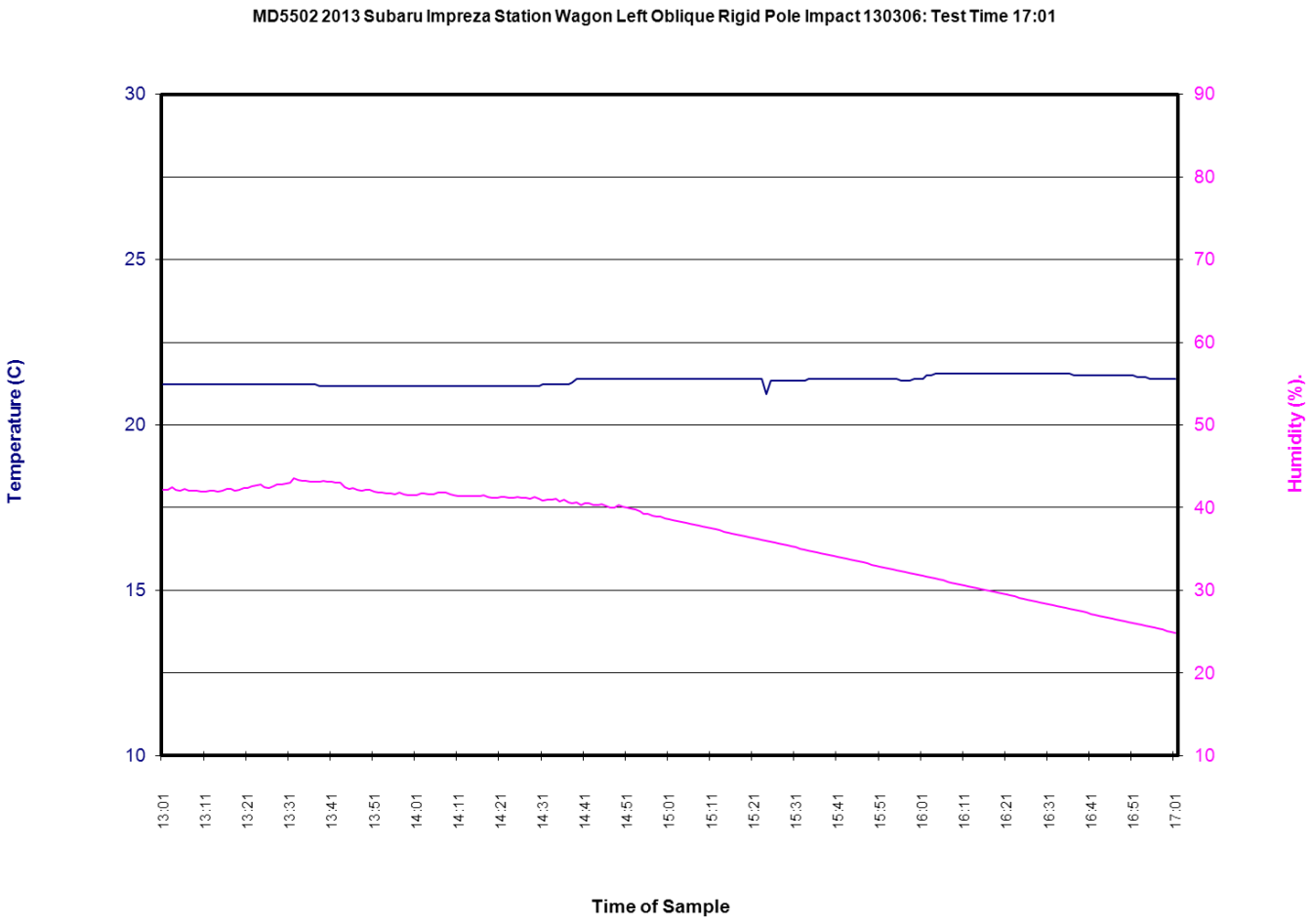
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 14
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2013 Subaru Impreza Station Wagon NHTSA No.: MD5502
Test Program: NCAP Side Impact Test Date: 03/06/13



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

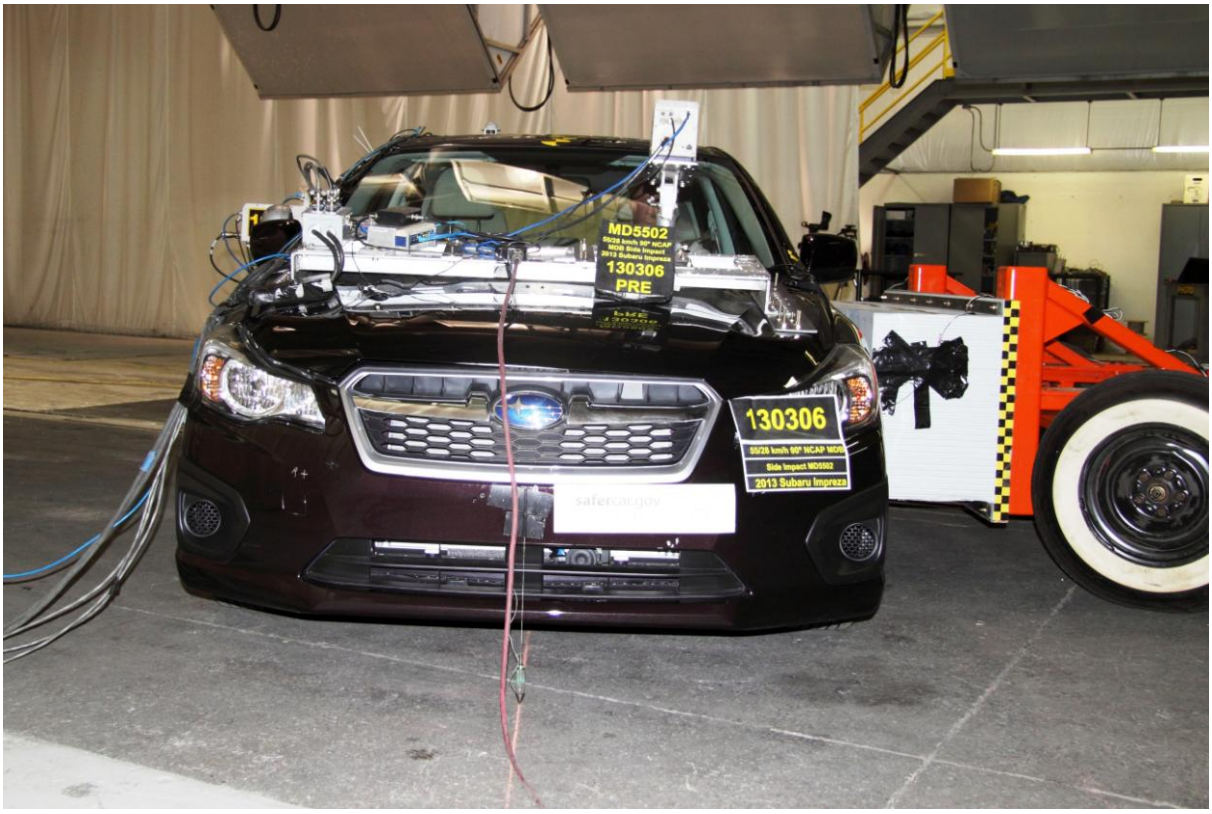
TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

001 As-Delivered Right Front ¾ View of Test Vehicle

002 As-Delivered Left Rear ¾ View of Test Vehicle



003 Pre-Test Front View of Test Vehicle

004 Post-Test Front View of Test Vehicle

005 Pre-Test Left Front ¾ View of Test Vehicle

006 Post-Test Left Front ¾ View of Test Vehicle

007 Pre-Test Left Side View of Test Vehicle

008 Post-Test Left Side View of Test Vehicle

009 Pre-Test Left Rear ¾ View of Test Vehicle

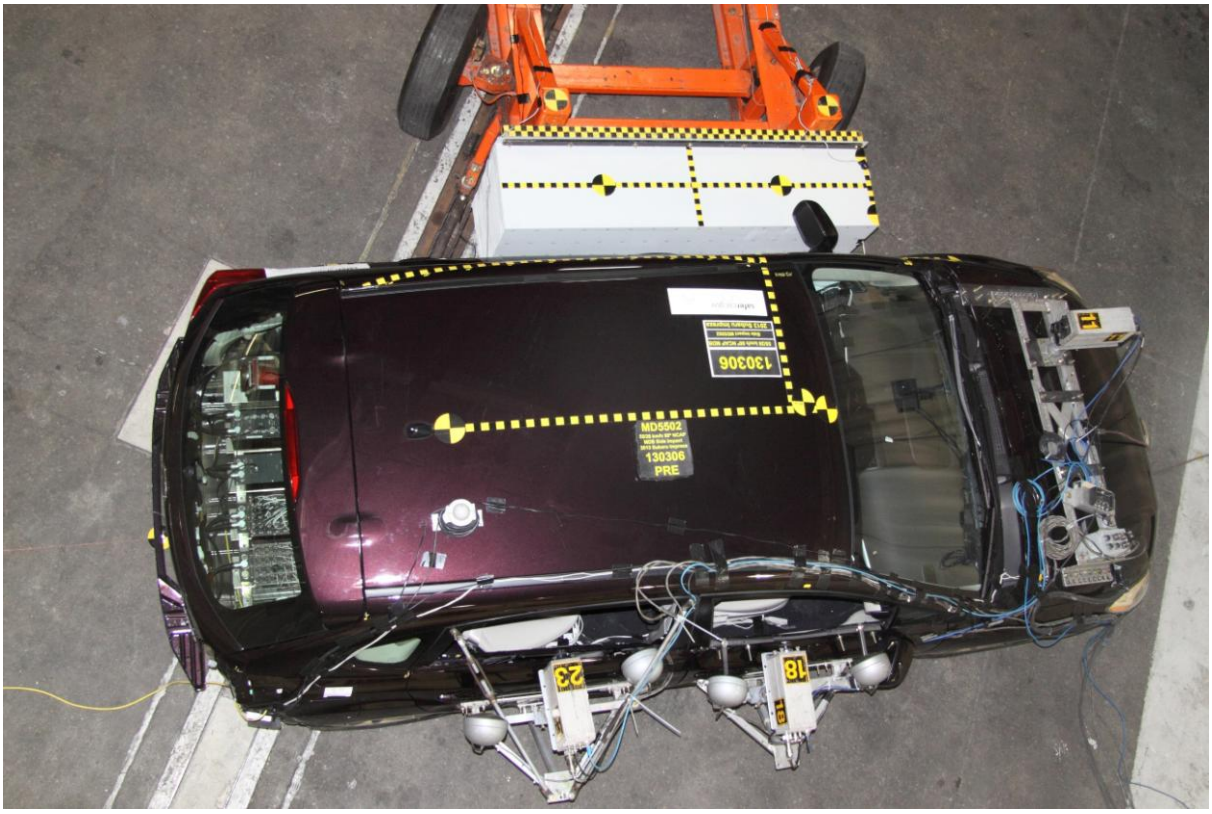
010 Post-Test Left Rear ¾ View of Test Vehicle

011 Pre-Test Rear View of Test Vehicle

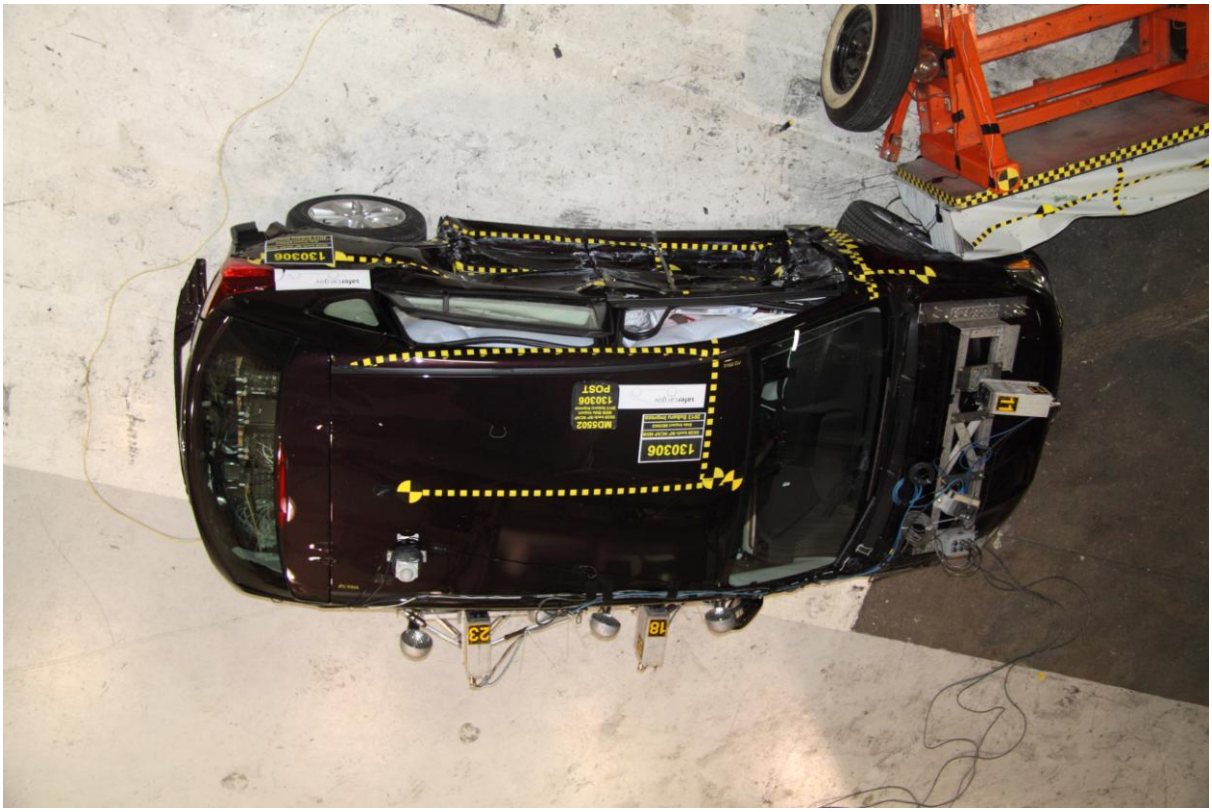
012 Post-Test Rear View of Test Vehicle

013 Pre-Test Right Side View of Test Vehicle

014 Post-Test Right Side View of Test Vehicle

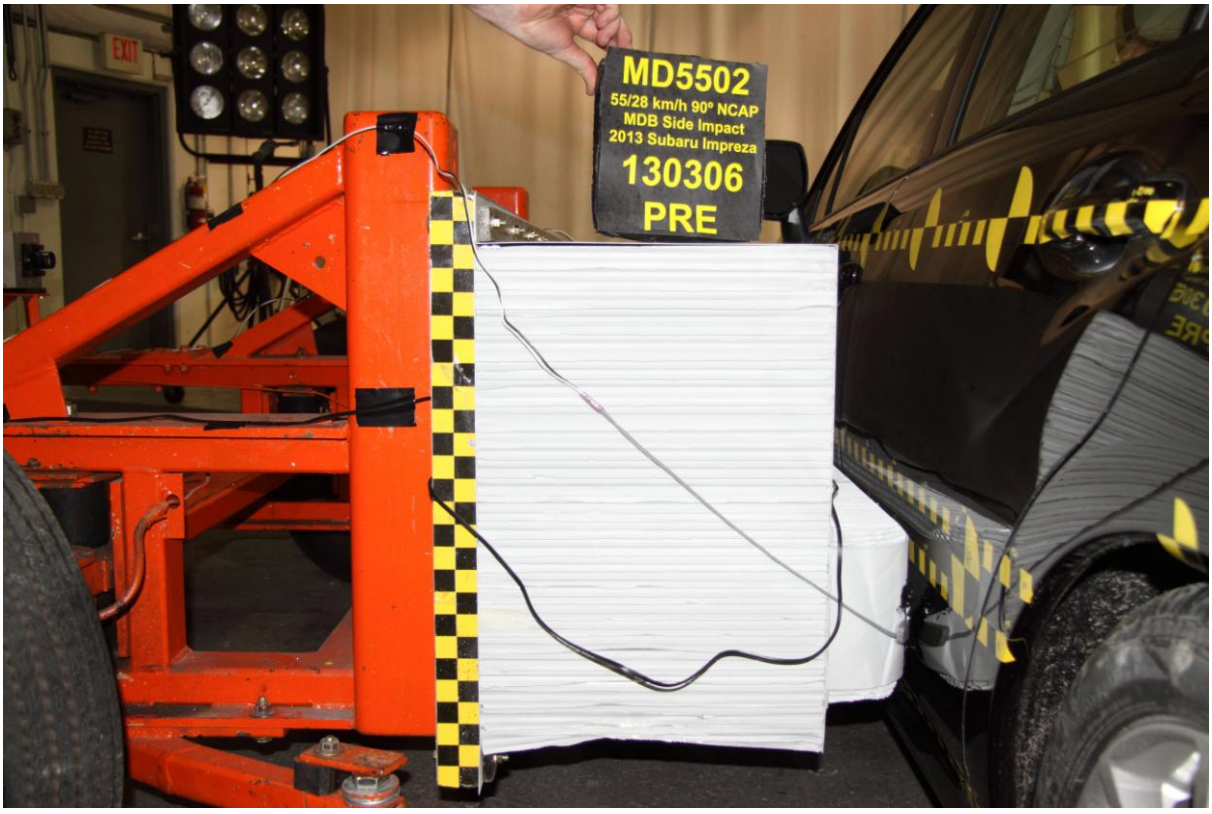


015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area

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



018 Pre-Test Right Side View 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

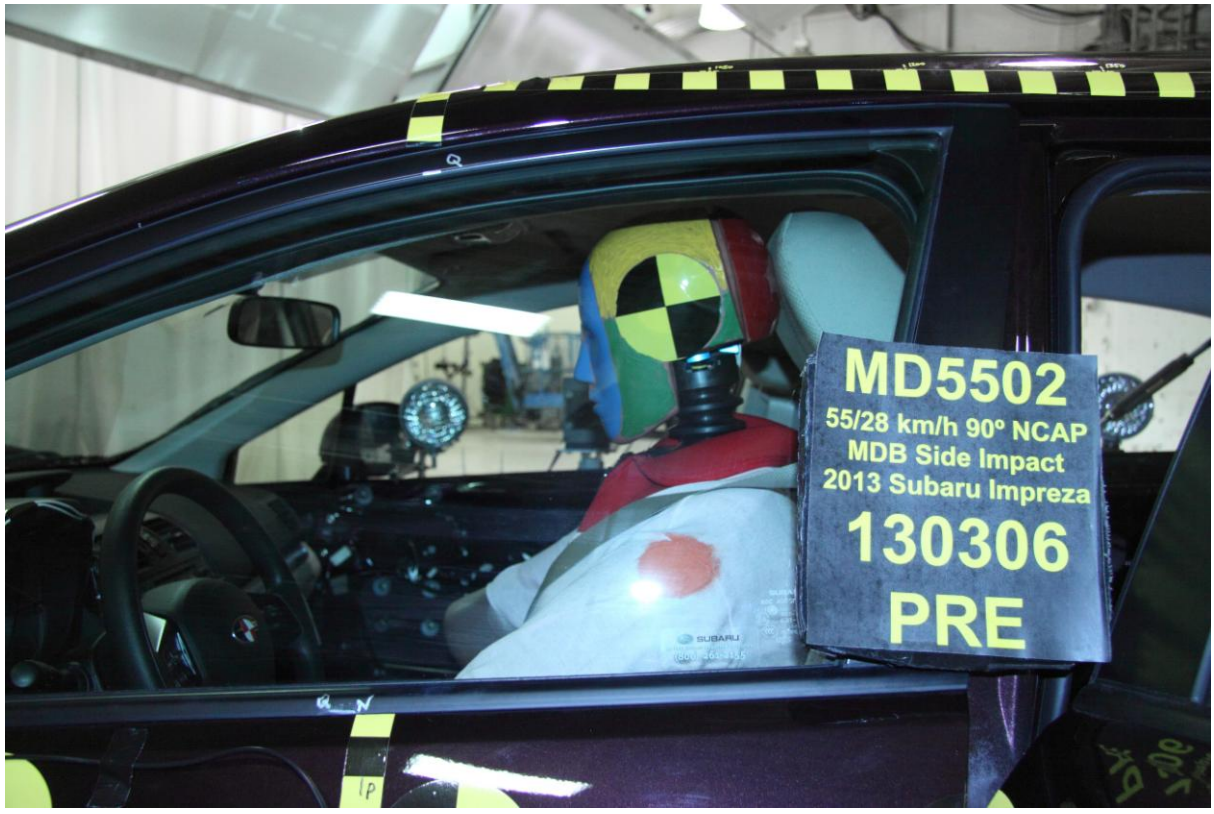
023 Pre-Test Left Rear Door Latch Close-up

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

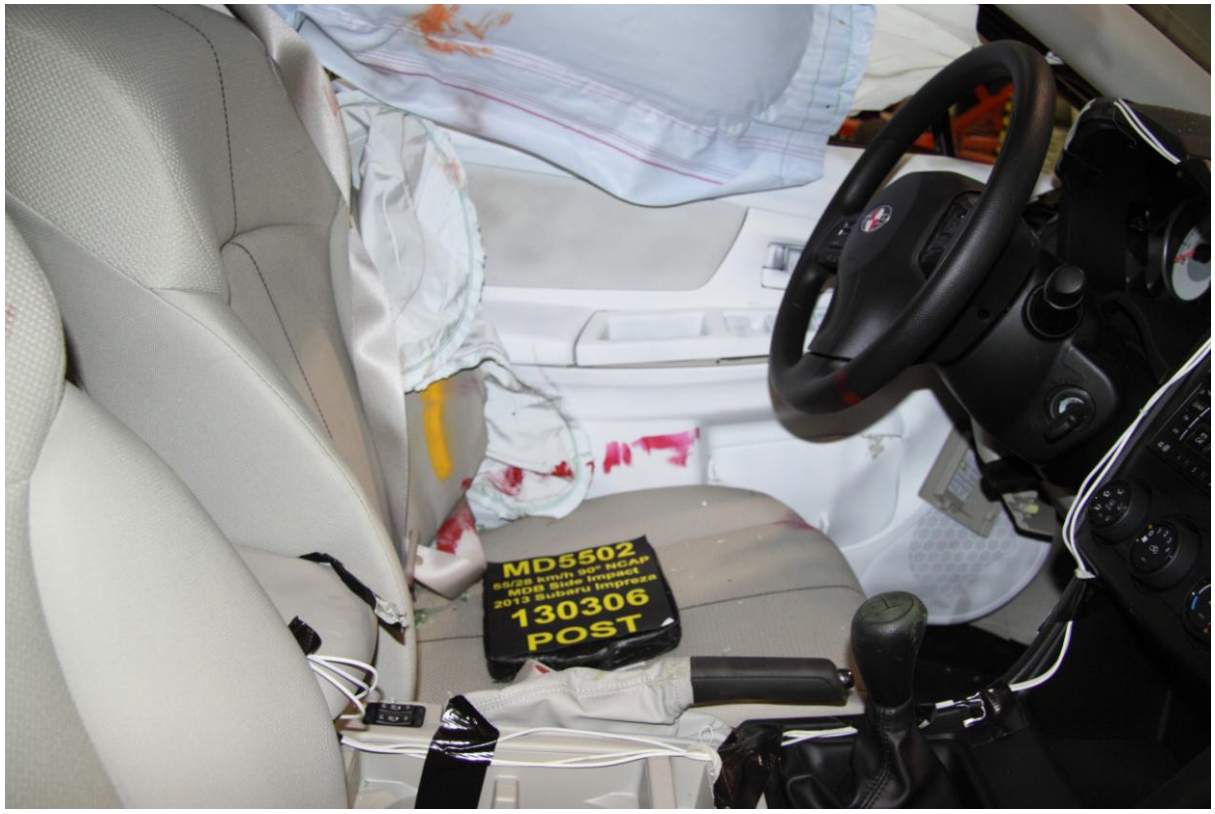
042 Pre-Test Driver Dummy and Door Clearance View

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

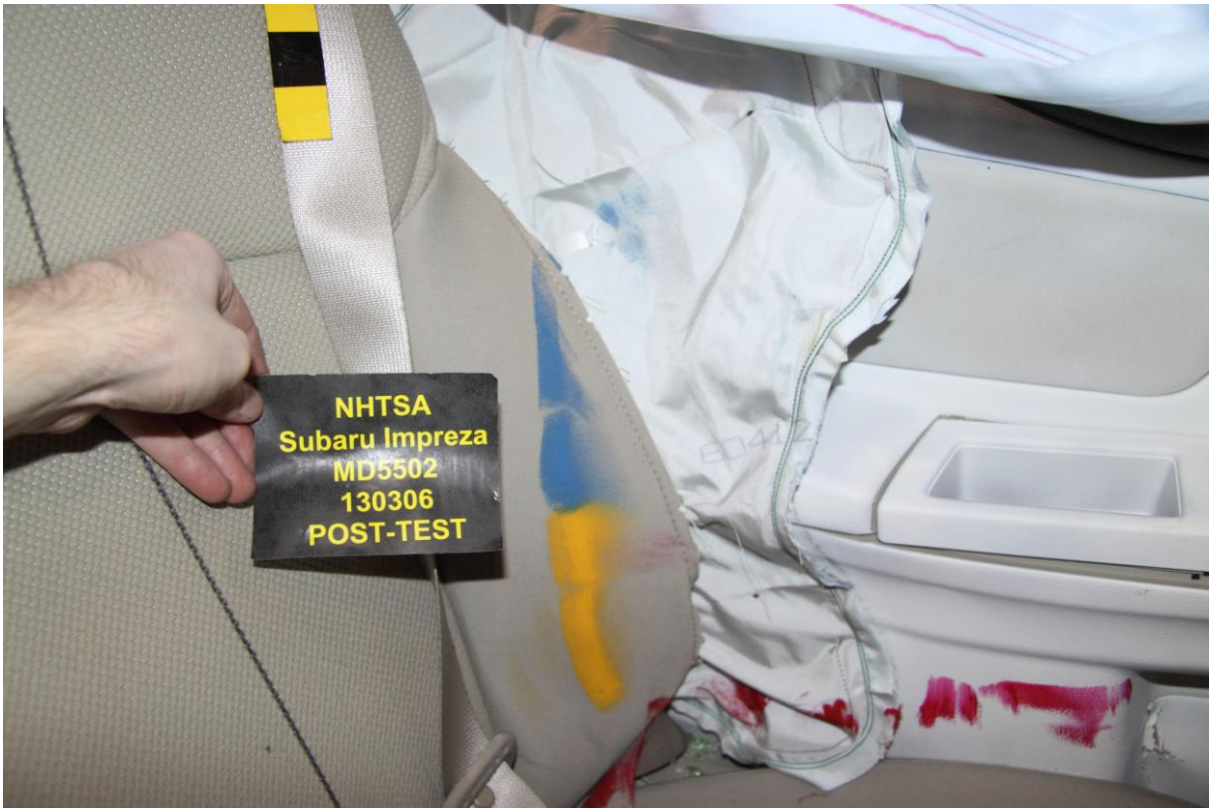
046 Pre-Test Driver Inner Door Panel View



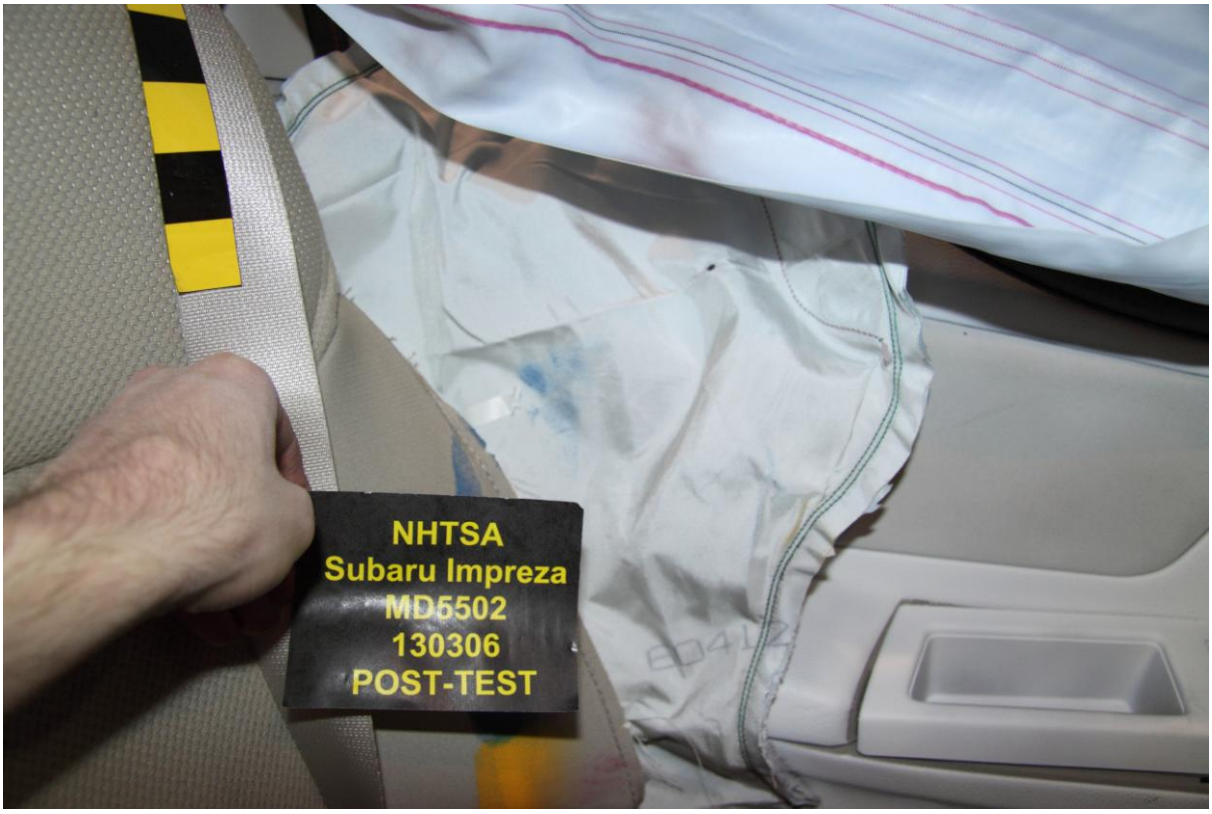
047 Post-Test Driver Inner Door Panel View

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

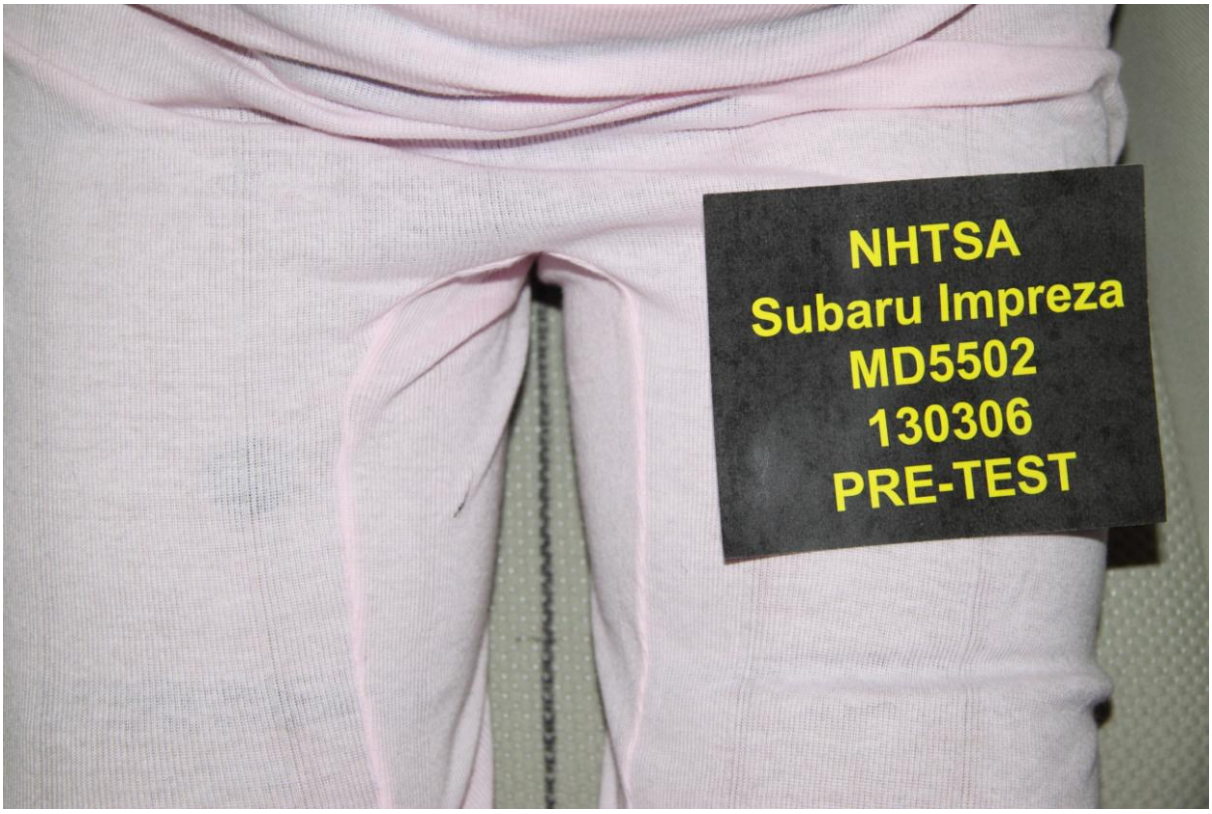
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View

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

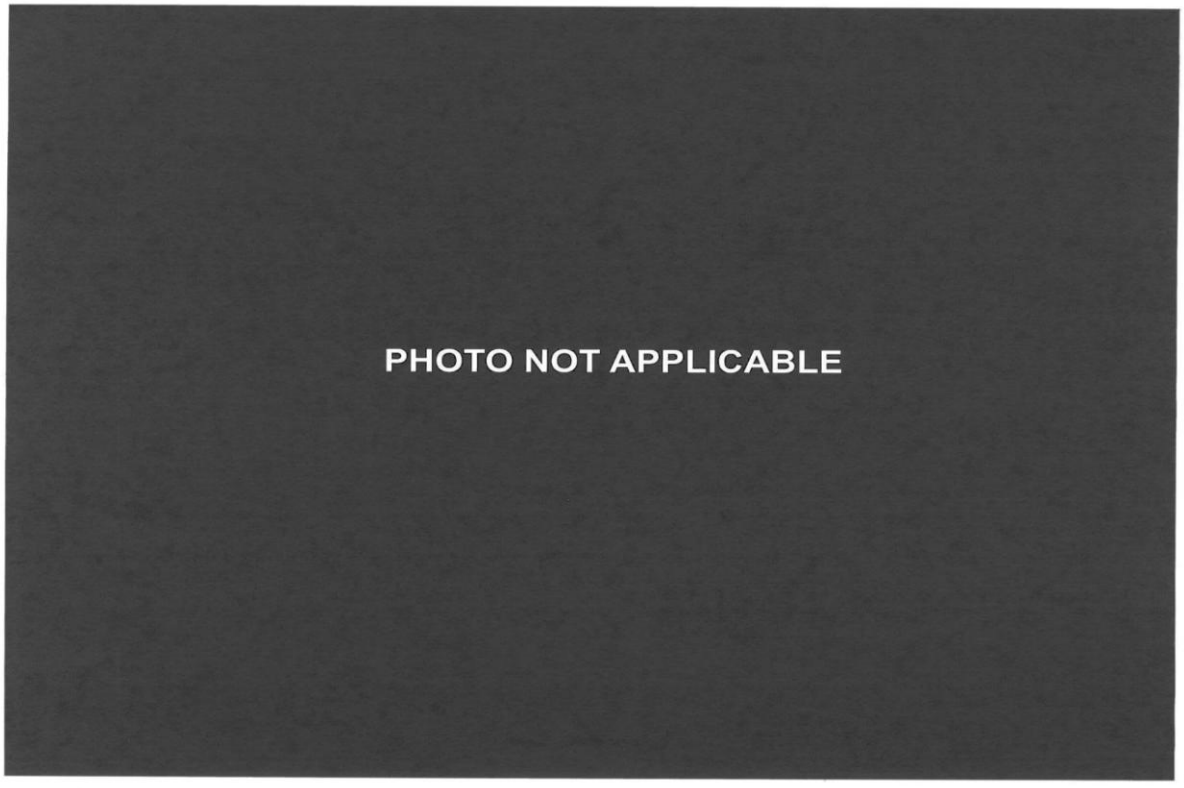
073 Pre-Test Passenger Inner Door Panel View

074 Post-Test Passenger Inner Door Panel View

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

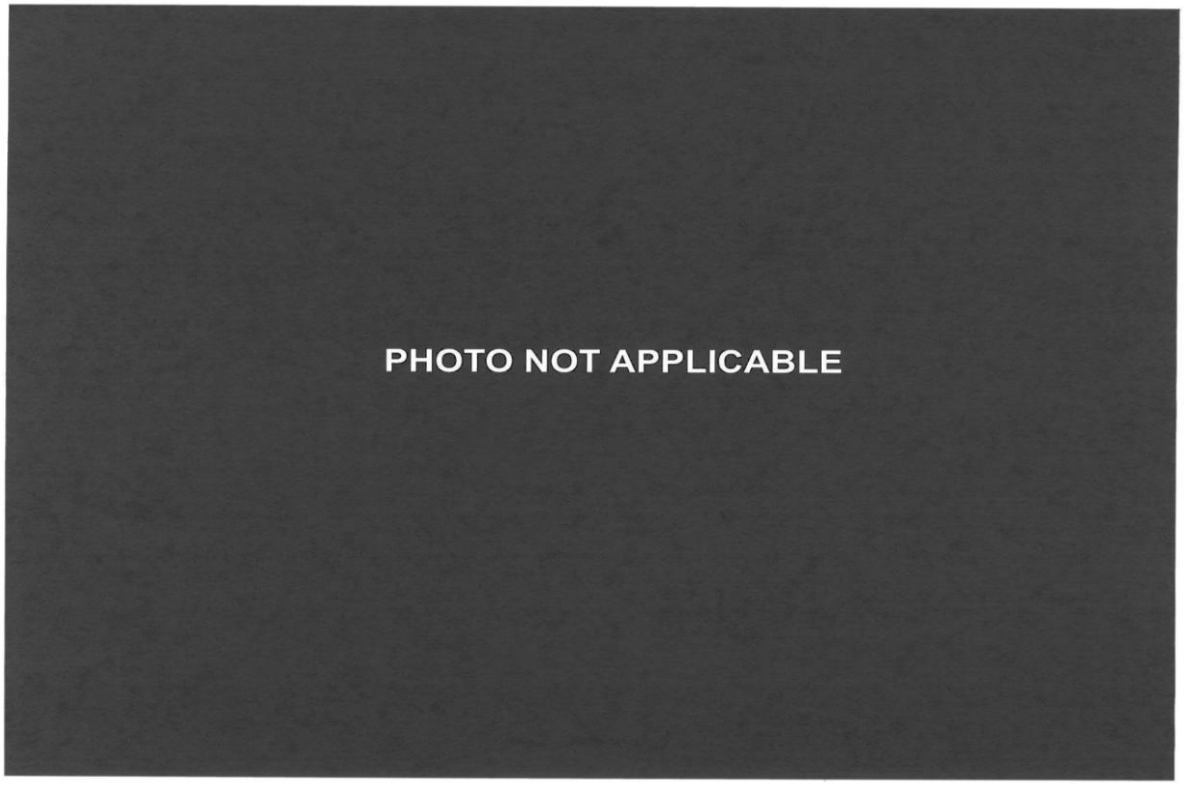
076 Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

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

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



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

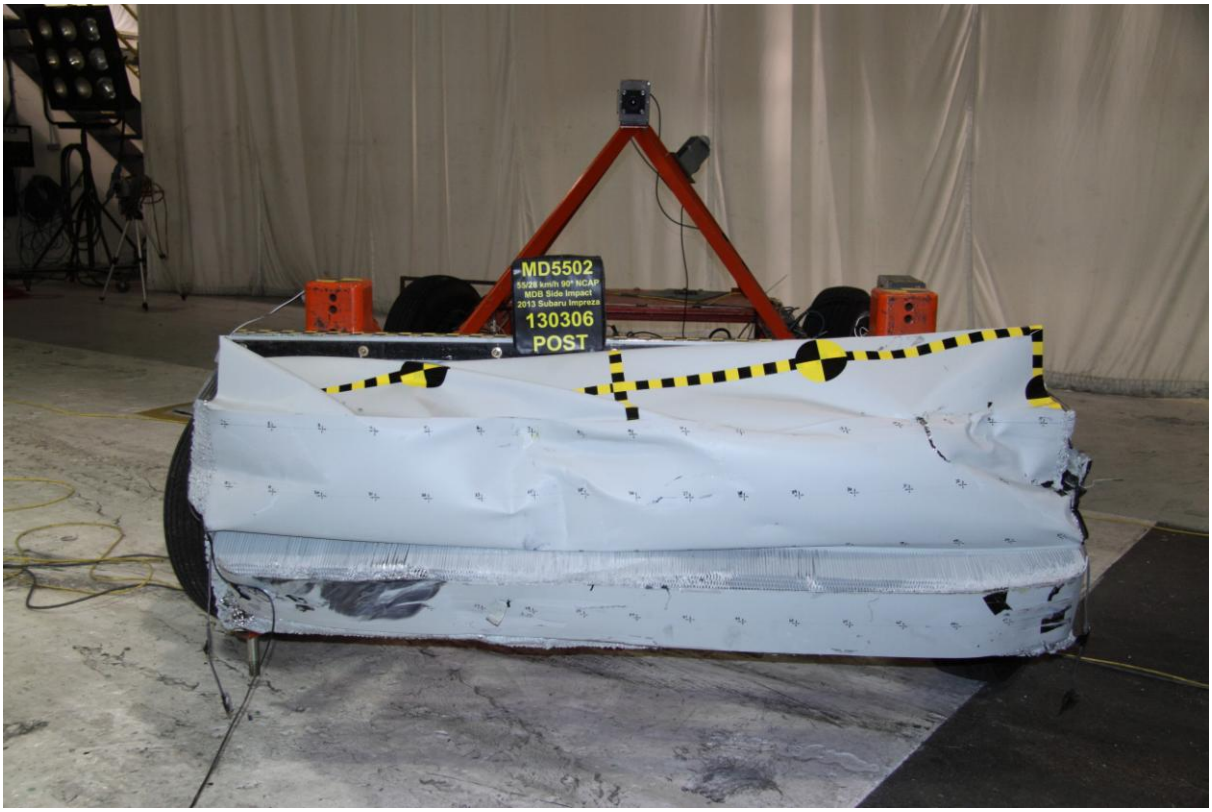
081 Post-Test Rear Passenger Dummy Close-Up Knee Contact View

Intentionally Left Blank

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



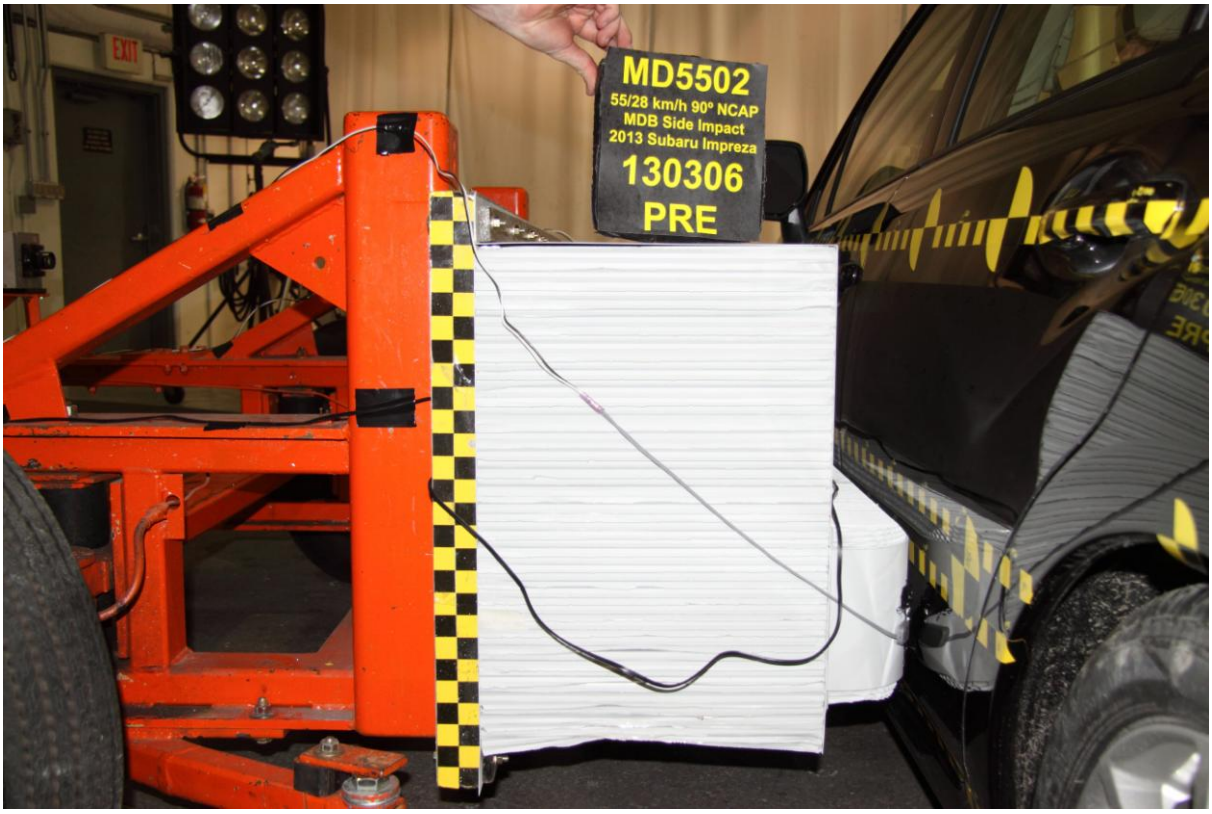
085 Post-Test Front View of MDB Impactor Face

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

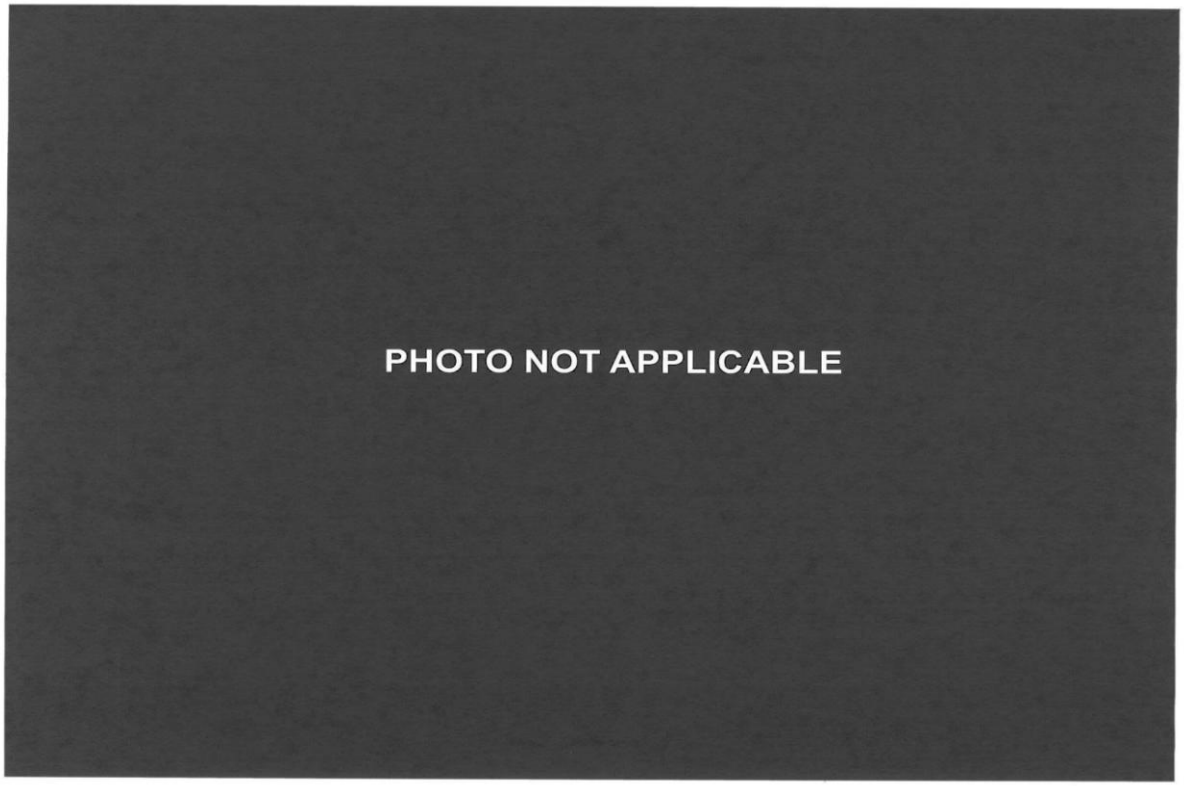


090 Pre-Test Right Side View of MDB Impactor Face

091 Post-Test Right Side View of MDB Impactor Face

092 Close-Up View of Vehicle Certification Label

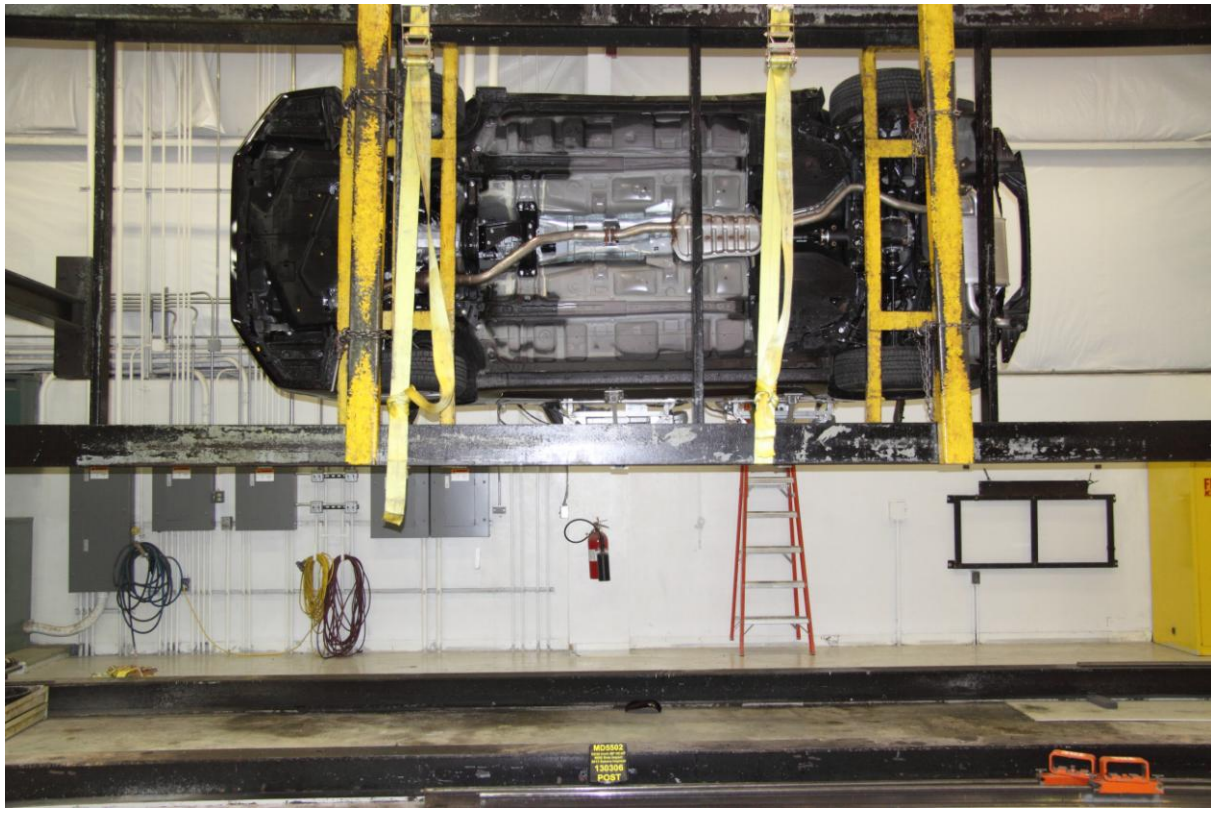
093 Close-Up View of Vehicle Tire Information Placard or Label



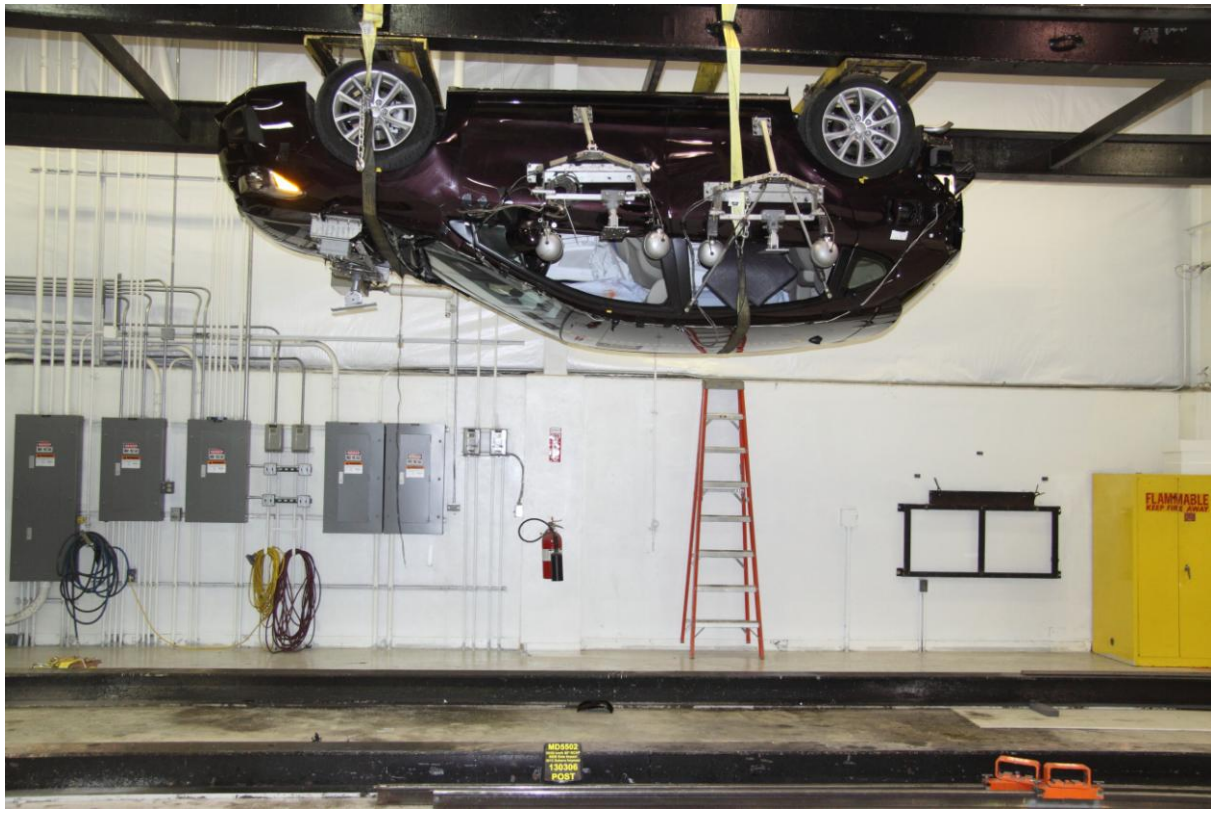
094 Pre-Test Ballast View

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

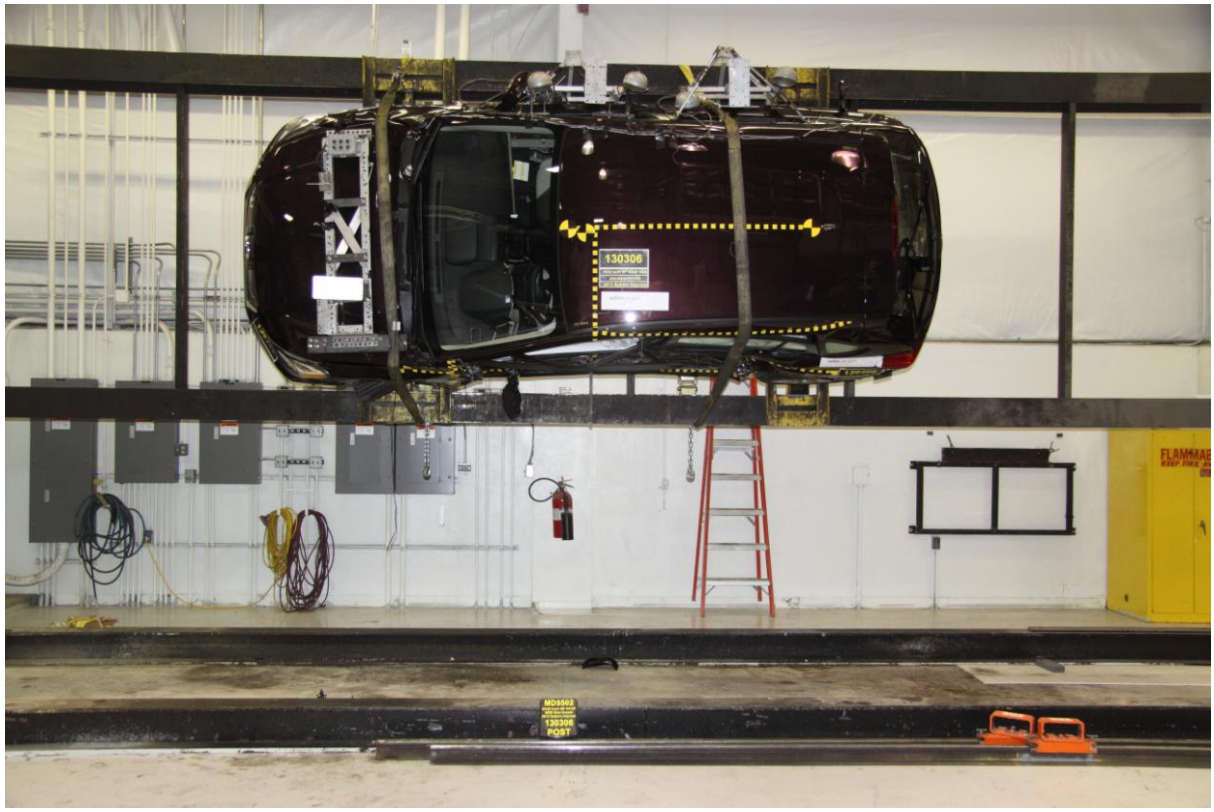
096 FMVSS No. 301 Static Rollover 0 Degrees



097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees

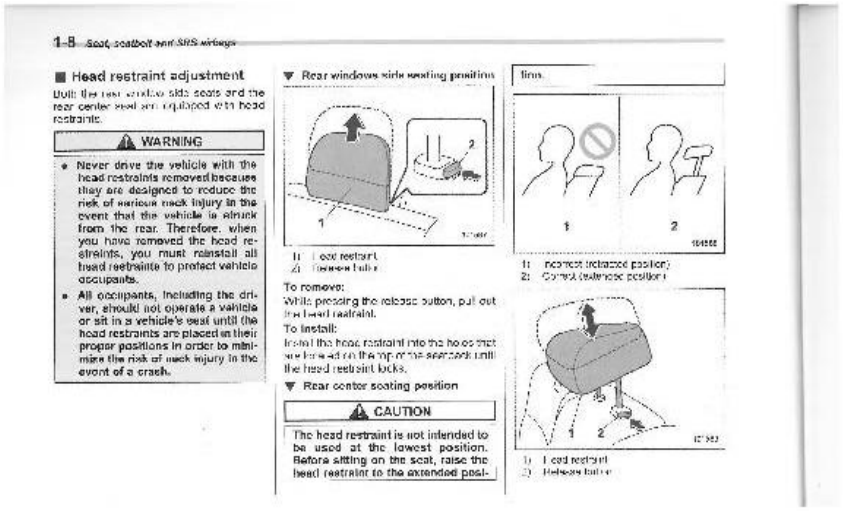


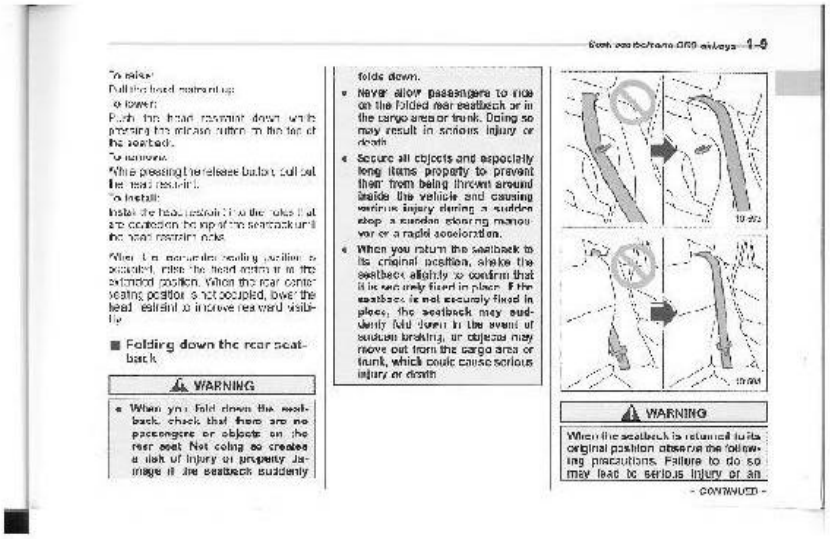
099 FMVSS No. 301 Static Rollover 270 Degrees

100 FMVSS No. 301 Static Rollover 360 Degrees

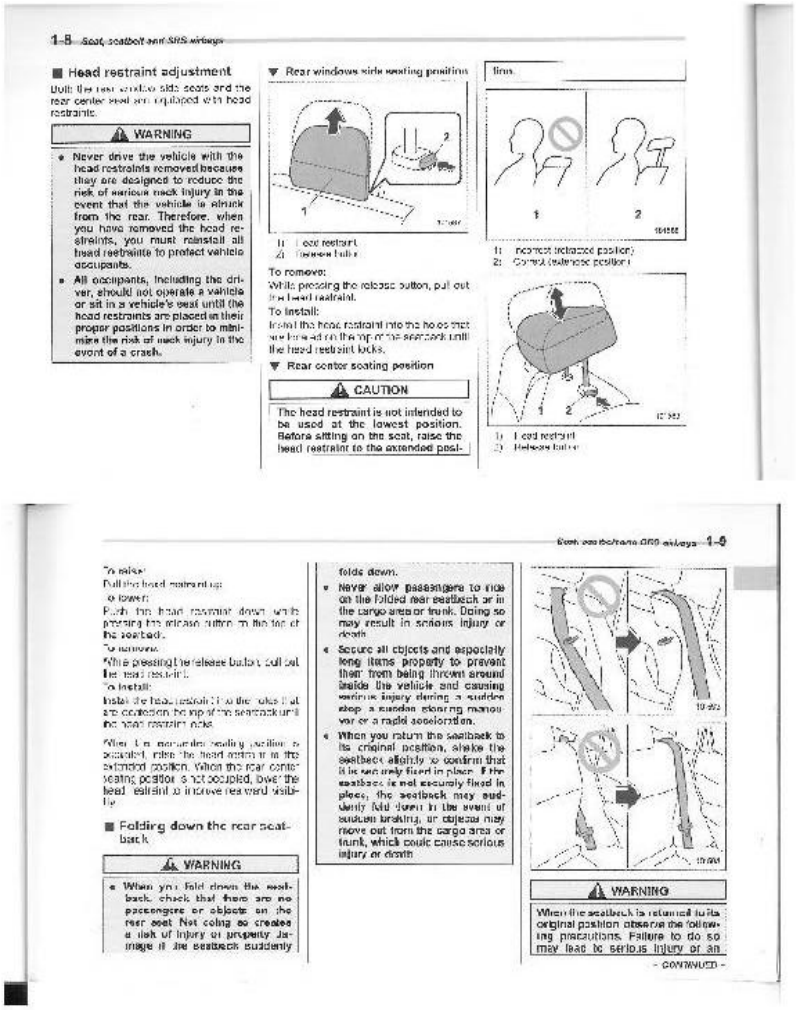
101 Impact Event

102 Monroney Label





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



1-8 Seat, seatbelt and SRS airbags

■ Head restraint adjustment

Both the rear outboard side seats and the rear center seat are equipped with head restraints.

⚠ WARNING

- Never drive the vehicle with the head restraints removed because they are designed to reduce the risk of serious neck injury in the event that the vehicle is struck from the rear. Therefore, when you have removed the head restraints, you must reinstall all head restraints to protect vehicle occupants.
- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.

▼ Rear windows side seating position

1) Head restraint
2) Release button

To remove:
While pressing the release button, pull out the head restraint.

To install:
Insert the head restraint into the holes that are located on the top of the seatback until the head restraint locks.

▼ Rear center seating position

⚠ CAUTION

The head restraint is not intended to be used at the lowest position. Before sitting on the seat, raise the head restraint to the extended posi-

tions.

1) Correct (retracted position)
2) Correct (extended position)

1) Head restraint
2) Release button

Seat, seatbelt and SRS airbags 1-9

To raise:
Pull the head restraint up.

To lower:
Push the head restraint down while pressing the release button on the top of the seatback.

To remove:
While pressing the release button, pull out the head restraint.

To install:
Install the head restraint into the holes that are located on the top of the seatback until the head restraint locks.

When the rear center seating position is extended, raise the head restraint to the extended position. When the rear center seating position is not occupied, lower the head restraint to improve rearward visibility.

■ Folding down the rear seatback

⚠ WARNING

- When you fold down the seatback, check that there are no passengers or objects on the rear seat. Not doing so creates a risk of injury or property damage if the seatback suddenly folds down.
- Never allow passengers to ride on the folded rear seatback or in the cargo area or trunk. Doing so may result in serious injury or death.
- Secure all objects and especially long items properly to prevent them from being thrown around inside the vehicle and causing serious injury during a sudden stop, a sudden steering maneuver or a rapid acceleration.
- When you return the seatback to its original position, shake the seatback slightly to confirm that it is securely fixed in place. If the seatback is not securely fixed in place, the seatback may suddenly fold down in the event of sudden braking, or objects may move out from the cargo area or trunk, which could cause serious injury or death.

⚠ WARNING

When the seatback is returned to its original position observe the following precautions. Failure to do so may lead to serious injury or an

- CONTINUED -

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

Test Date: 03/06/2013

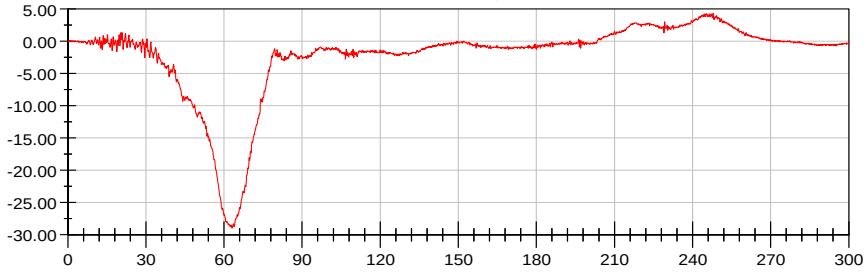
Test Lab: CTF

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

Test Number: 130306 (MD5502)

Position #4 SID IIs Dummy (305)

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



<Max>

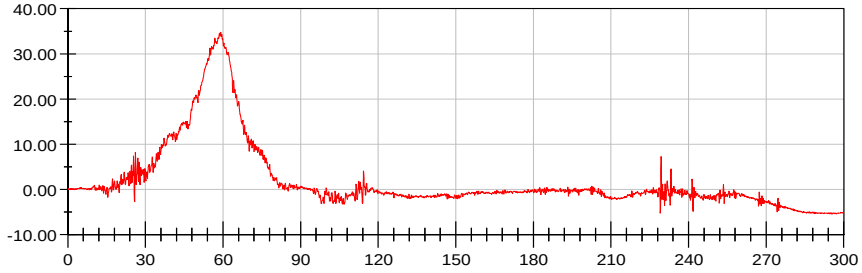
4.36 g at 247.92 ms

<Min>

-28.98 g at 63.12 ms

CFC_1000

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



<Max>

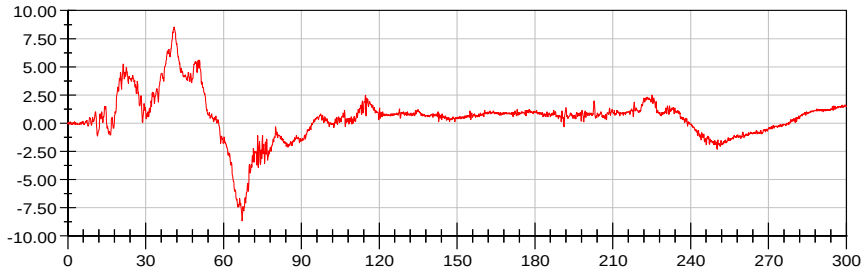
34.80 g at 59.12 ms

<Min>

-5.51 g at 294.64 ms

CFC_1000

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



<Max>

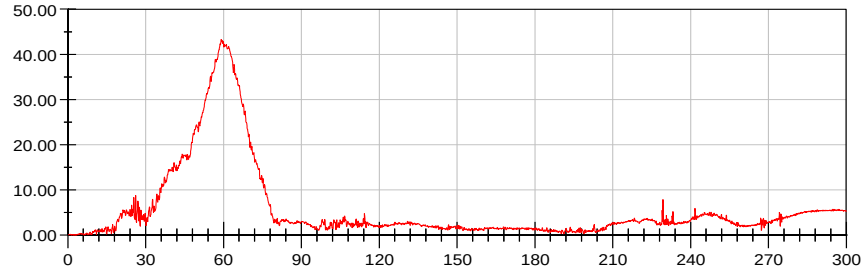
8.54 g at 40.96 ms

<Min>

-8.67 g at 67.20 ms

CFC_1000

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



<Max>

43.28 g at 59.12 ms

<Min>

0.02 g at 2.64 ms

CFC_1000

NHTSA

Test Date: 03/06/2013

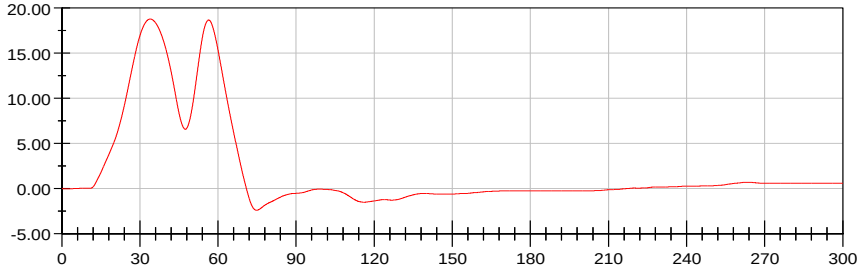
Test Lab: CTF

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

Test Number: 130306 (MD5502)

Position #4 SID IIs Dummy (305)

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



<Max>

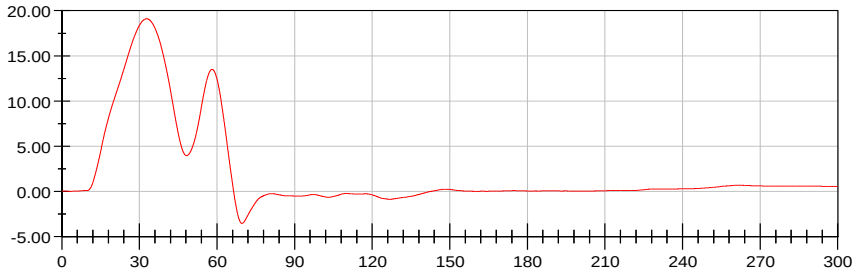
18.78 mm at 33.92 ms

<Min>

-2.39 mm at 74.80 ms

CFC_180

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



<Max>

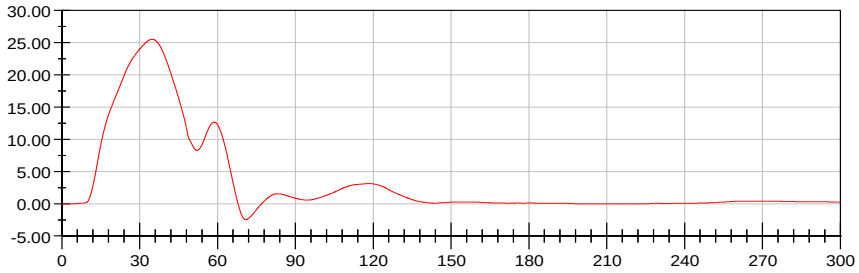
19.10 mm at 32.80 ms

<Min>

-3.57 mm at 69.68 ms

CFC_180

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



<Max>

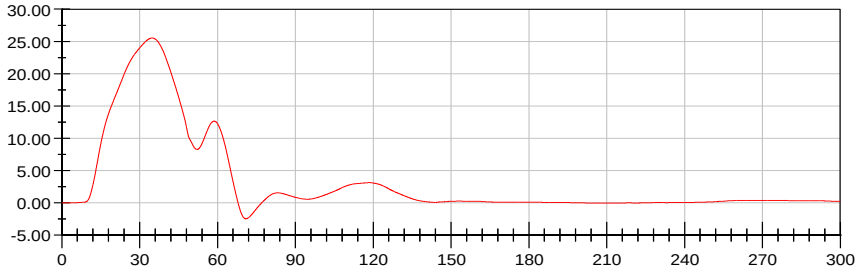
25.54 mm at 34.80 ms

<Min>

-2.46 mm at 70.96 ms

CFC_180

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



<Max>

25.54 mm at 34.80 ms

<Min>

-2.46 mm at 70.96 ms

CFC_180

NHTSA

Test Date: 03/06/2013

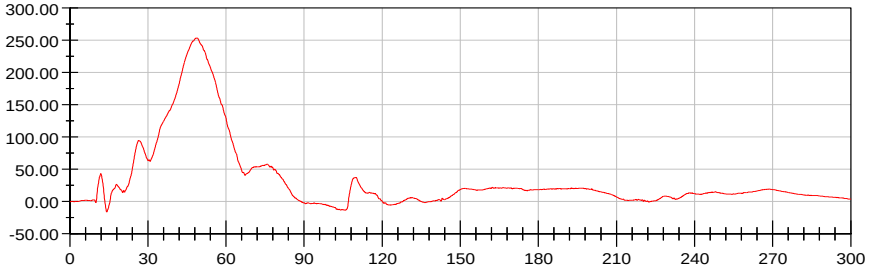
Test Lab: CTF

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

Test Number: 130306 (MD5502)

Position #4 SID IIs Dummy (305)

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



<Max>

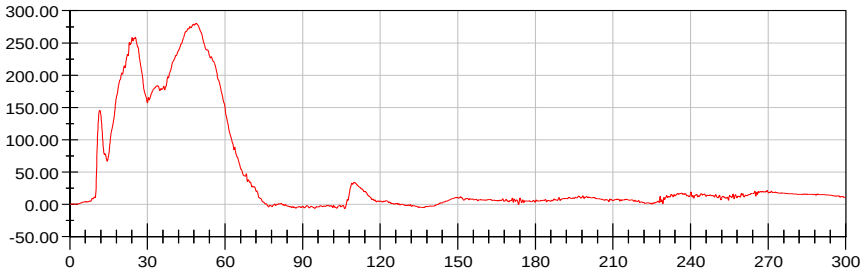
253.44 N at 48.48 ms

<Min>

-16.26 N at 14.16 ms

CFC_600

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



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280.08 N at 48.96 ms

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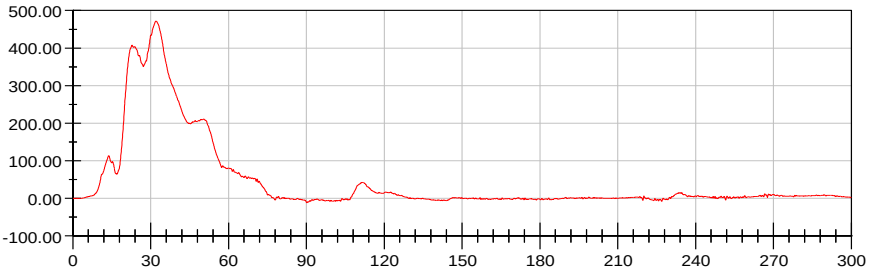
-6.83 N at 106.32 ms

CFC_600

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



<Max>

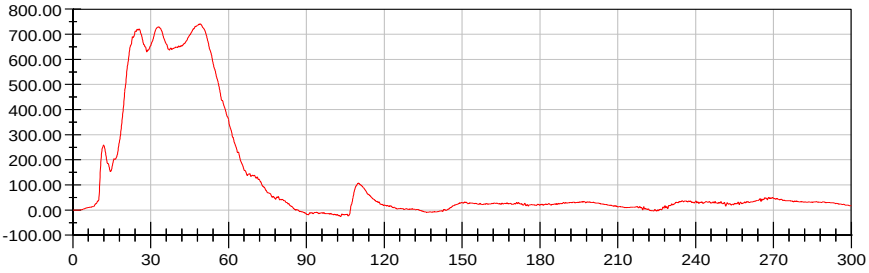
471.65 N at 32.00 ms

<Min>

-11.40 N at 90.16 ms

CFC_600

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



<Max>

741.54 N at 49.12 ms

<Min>

-26.24 N at 103.20 ms

CFC_600

NHTSA

Test Date: 03/06/2013

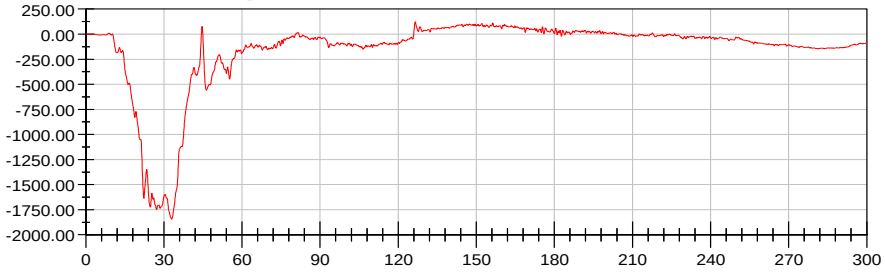
Test Lab: CTF

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

Test Number: 130306 (MD5502)

Position #4 SID IIs Dummy (305)

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



<Max>

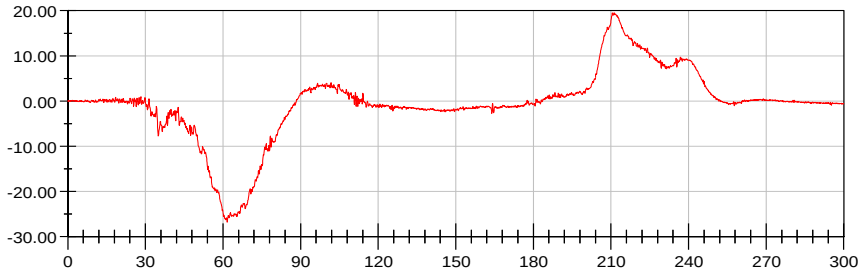
121.66 N at 126.56 ms

<Min>

-1,844.06 N at 33.04 ms

CFC_600

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



<Max>

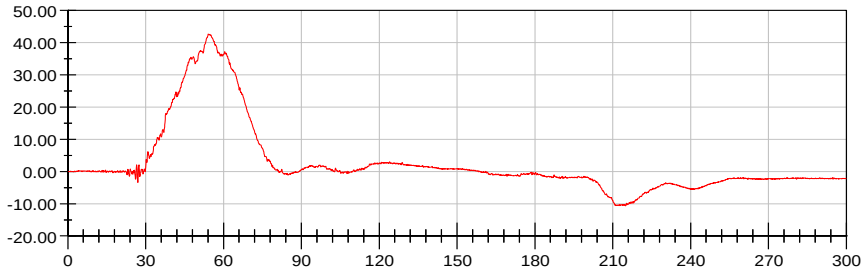
19.53 g at 210.56 ms

<Min>

-26.86 g at 61.60 ms

CFC_1000

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



<Max>

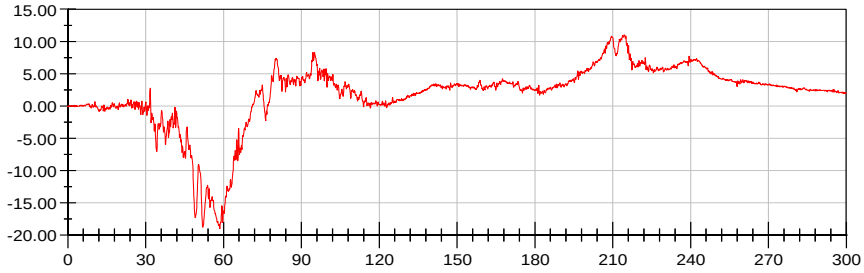
42.67 g at 54.08 ms

<Min>

-10.68 g at 214.96 ms

CFC_1000

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



<Max>

11.05 g at 214.40 ms

<Min>

-18.97 g at 58.56 ms

CFC_1000

NHTSA

Test Date: 03/06/2013

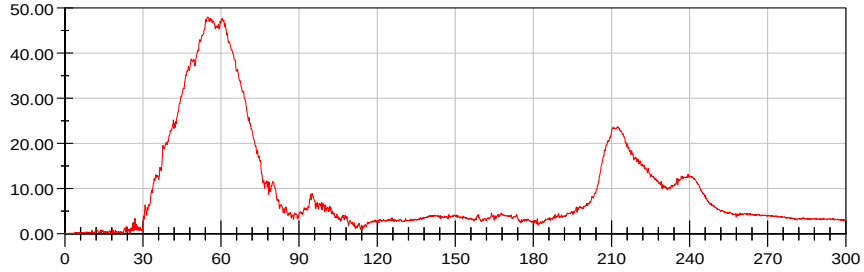
Test Lab: CTF

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

Test Number: 130306 (MD5502)

Position #4 SID IIs Dummy (305)

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



<Max>

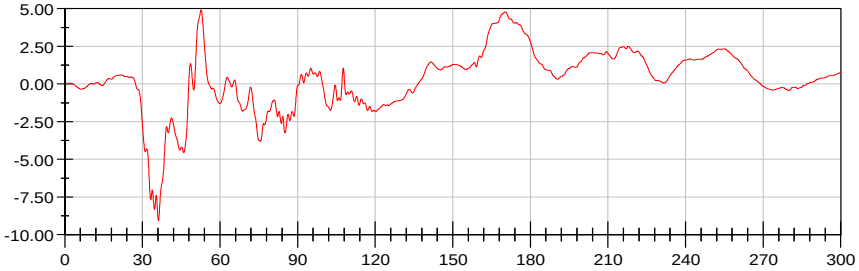
48.02 g at 54.80 ms

<Min>

0.02 g at 0.72 ms

CFC_1000

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



<Max>

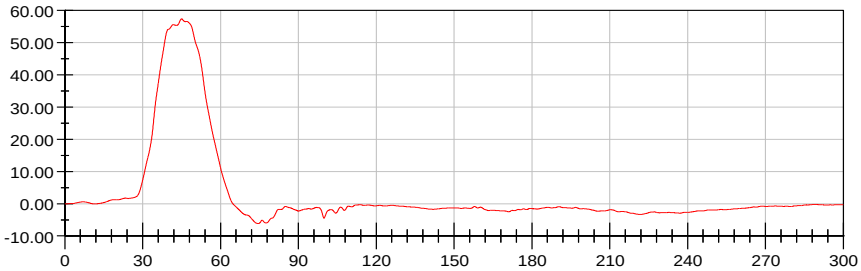
4.91 g at 52.64 ms

<Min>

-9.09 g at 36.16 ms

CFC_180

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



<Max>

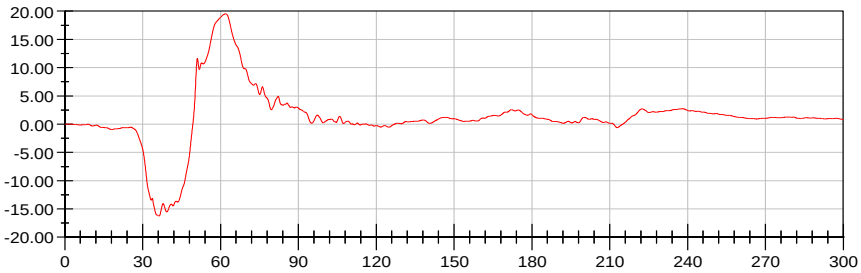
57.39 g at 44.96 ms

<Min>

-6.17 g at 74.56 ms

CFC_180

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



<Max>

19.52 g at 61.92 ms

<Min>

-16.25 g at 36.24 ms

CFC_180

NHTSA

Test Date: 03/06/2013

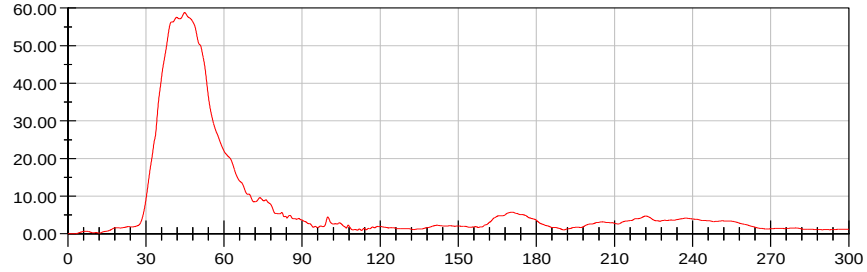
Test Lab: CTF

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

Test Number: 130306 (MD5502)

Position #4 SID IIs Dummy (305)

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



<Max>

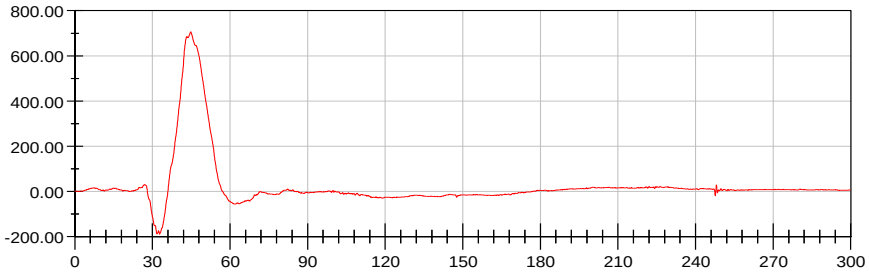
58.79 g at 44.88 ms

<Min>

0.02 g at 0.00 ms

CFC_180

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



<Max>

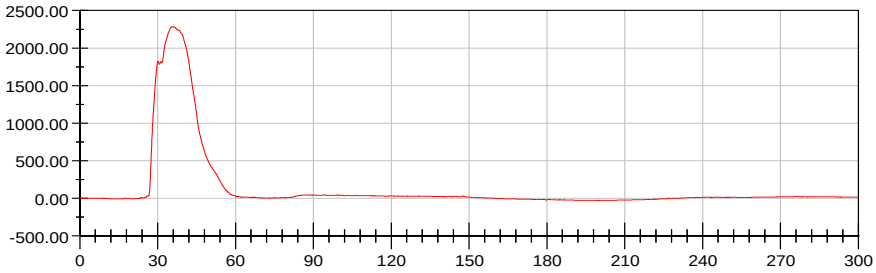
705.87 N at 44.80 ms

<Min>

-189.74 N at 32.80 ms

CFC_600

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



<Max>

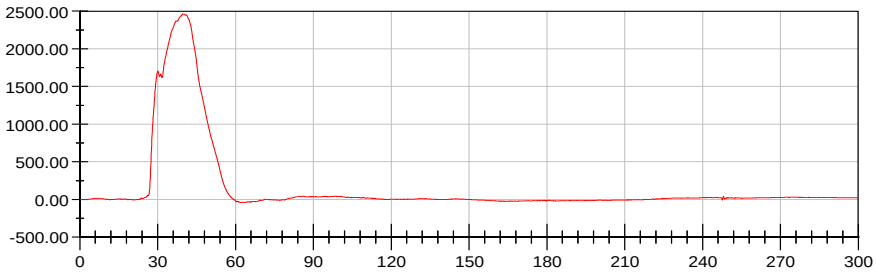
2,285.12 N at 35.76 ms

<Min>

-28.05 N at 200.00 ms

CFC_600

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



<Max>

2,462.11 N at 39.68 ms

<Min>

-40.73 N at 62.32 ms

CFC_600

APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

EuroSid-2re
Serial No. F030
Calibration No. 12

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

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	27 %	Yes
Peak Resultant Acceleration	125 - 155 g	126.4 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

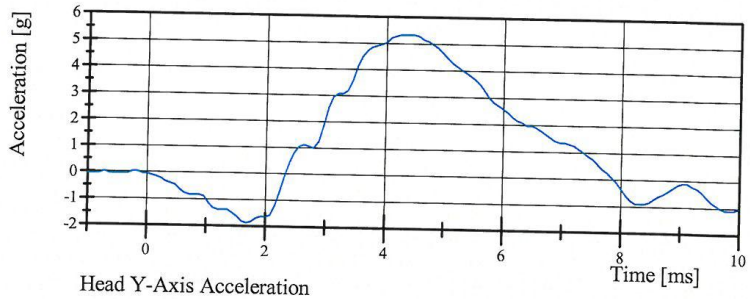
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:28:39 323

Transportation Research Center Inc.

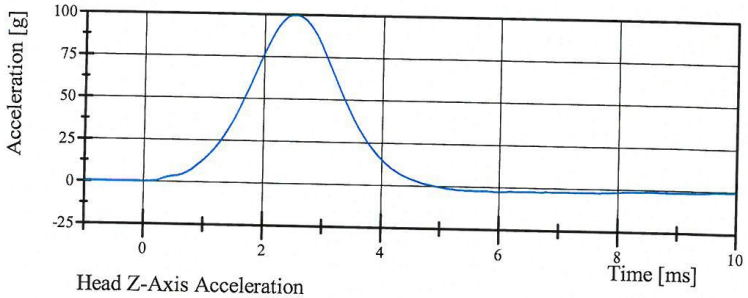
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Head X-Axis Acceleration



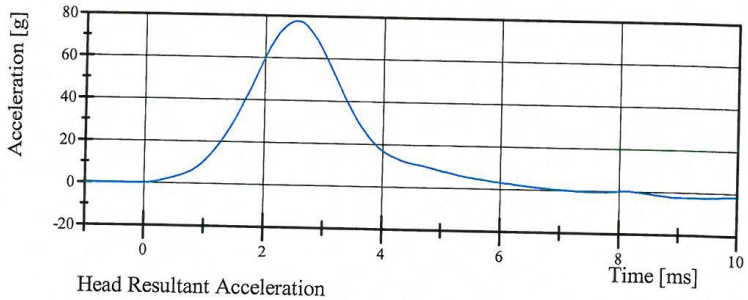
Filter Class: CFC_1000
Max: 5.3 g at 4.2 ms
Min: -1.9 g at 1.7 ms

Head Y-Axis Acceleration



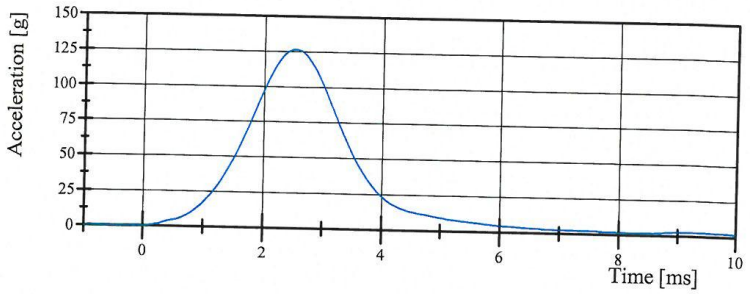
Filter Class: CFC_1000
Max: 99.8 g at 2.5 ms
Min: -2.4 g at 6.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 77.6 g at 2.6 ms
Min: -2.4 g at 9.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 126.4 g at 2.6 ms
Min: 0.0 g at -0.7 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:28:46 323

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	34 %	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	-53.4 deg	Yes
Time of Peak	54 - 66 ms	59.5 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	64.1 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

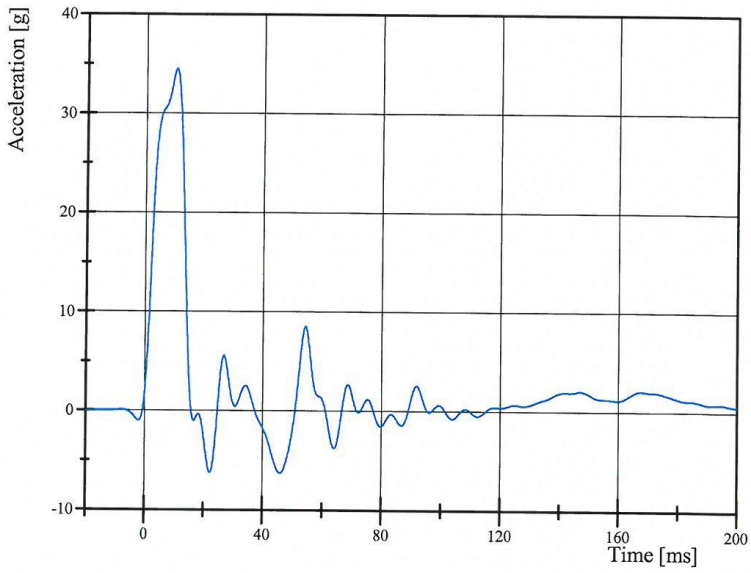
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:30:09 1276

Transportation Research Center Inc.

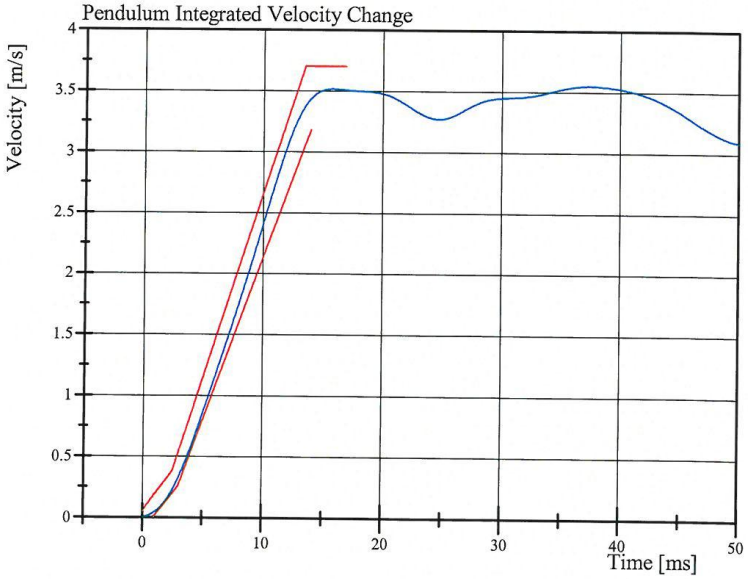
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 34.4 g at 10.2 ms
Min: -6.3 g at 45.9 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.5 m/s at 37.4 ms
Min: 0.0 m/s at 0.0 ms

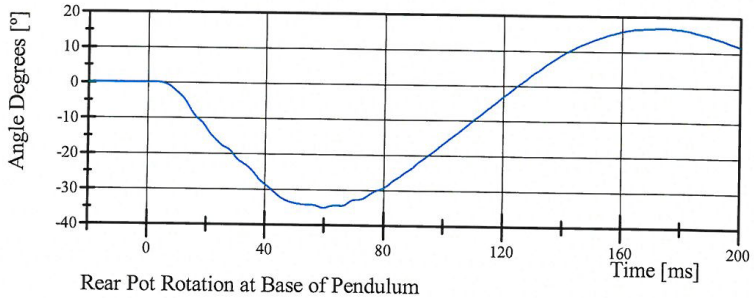
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:30:17 1276

Transportation Research Center Inc.

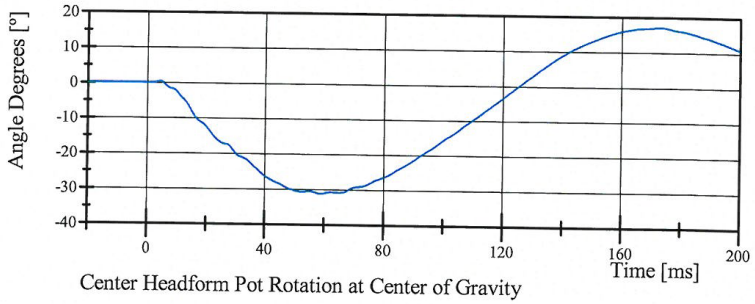
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Forward Pot Rotation at Base of Pendulum



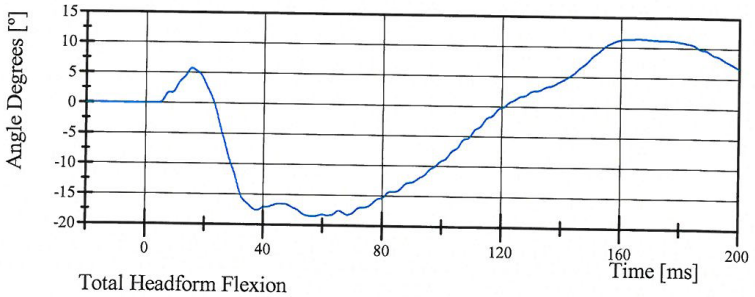
Filter Class: CFC_180
Max: 16.7 ° at 175.5 ms
Min: -35.1 ° at 59.8 ms

Rear Pot Rotation at Base of Pendulum



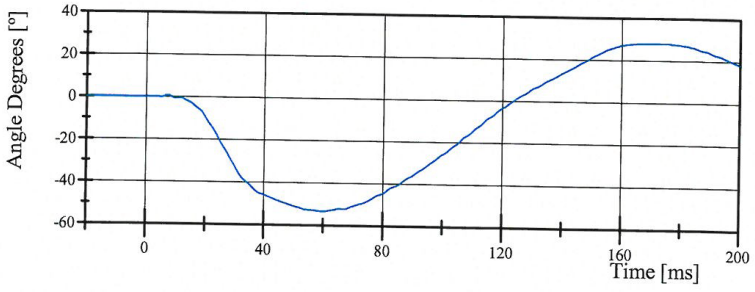
Filter Class: CFC_180
Max: 17.1 ° at 173.0 ms
Min: -31.2 ° at 58.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.5 ° at 165.4 ms
Min: -18.5 ° at 56.6 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 28.0 ° at 168.6 ms
Min: -53.4 ° at 59.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:30:18 1276

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.48 g	Yes

Test meets specifications.

Comments:

Technician

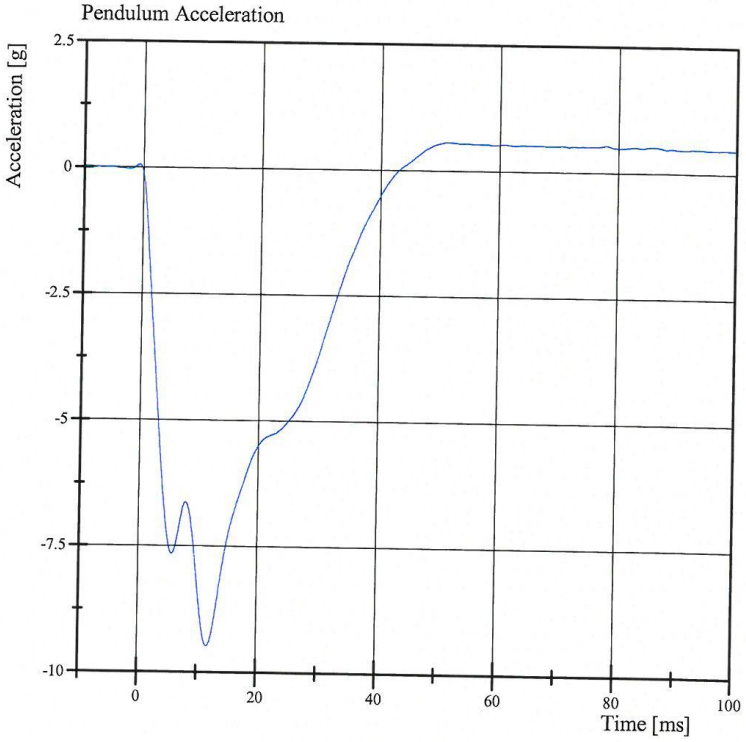
Approved

Specification Source: NHTSA final rule 8/15/2008

03.20.2013 10:31:36 572

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 0.6 g at 51.2 ms
Min: -9.5 g at 11.7 ms

Specification Source: NHTSA final rule 8/15/2008

03.20.2013 10:31:42 572

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

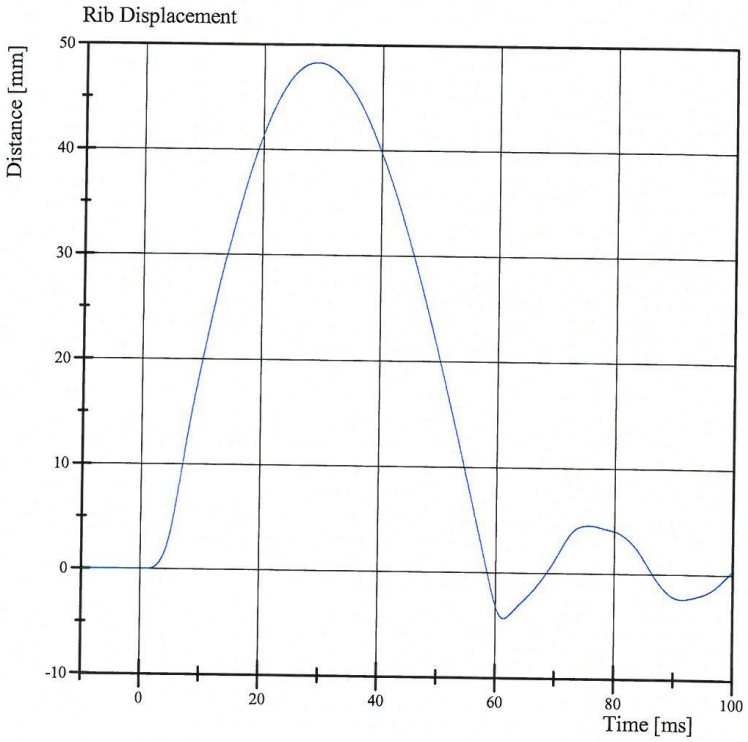
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:32:47 695

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 48.3 mm at 29.0 ms
Min: -4.4 mm at 61.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 10:32:55 695

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	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

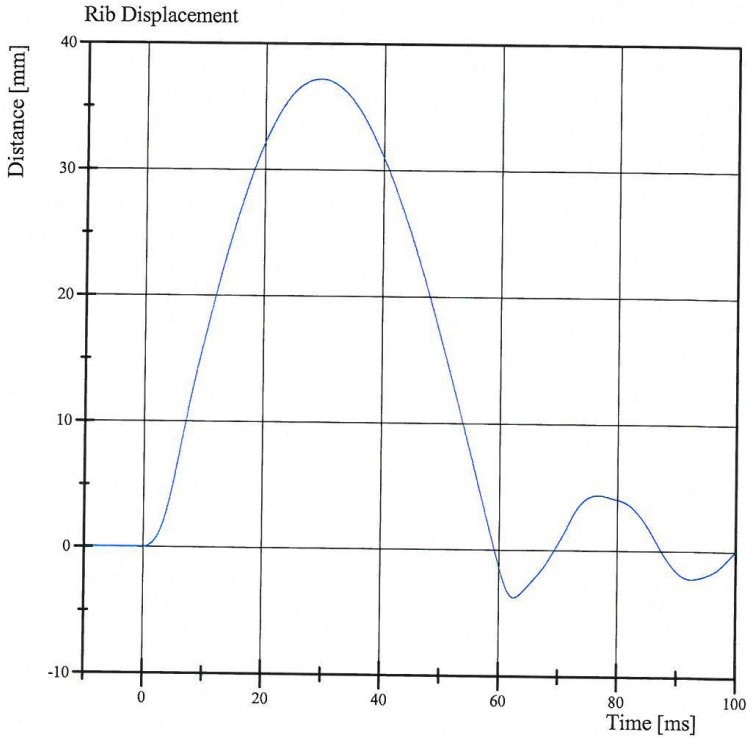
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:02:17 916

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 37.2 mm at 29.4 ms
Min: -3.8 mm at 62.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:02:24 916

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	31 %	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

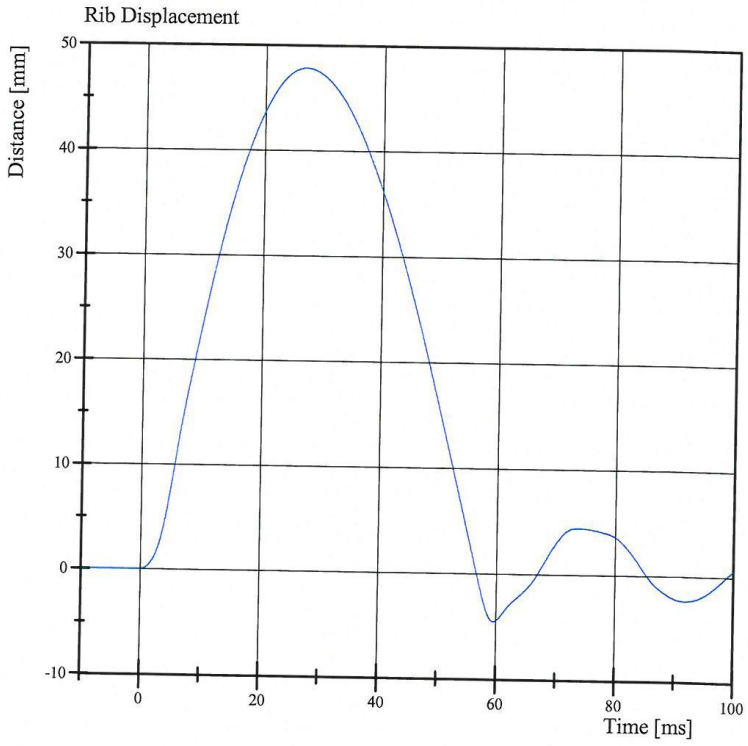
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:04:34 704

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 47.8 mm at 26.9 ms
Min: -4.5 mm at 59.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:04:42 704

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	30 %	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

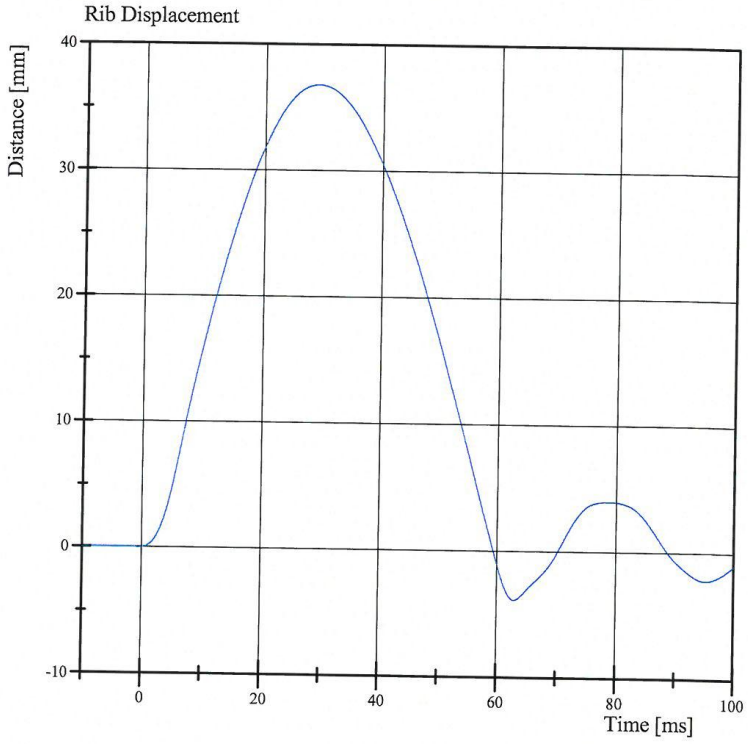
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:05:37 899

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 36.8 mm at 29.0 ms
Min: -3.9 mm at 62.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:05:44 899

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

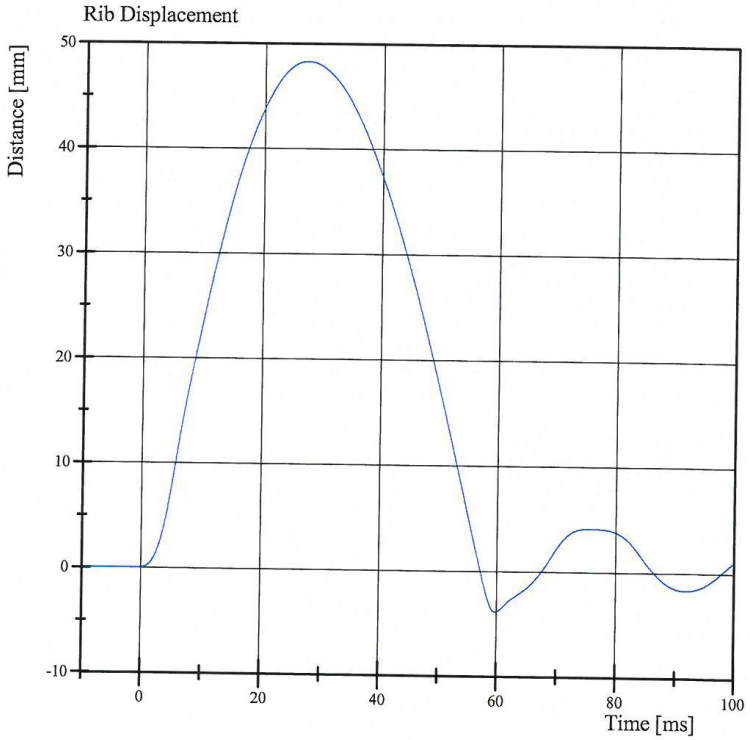
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:07:01 700

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 48.3 mm at 27.1 ms
Min: -3.9 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:07:08 700

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	29 %	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

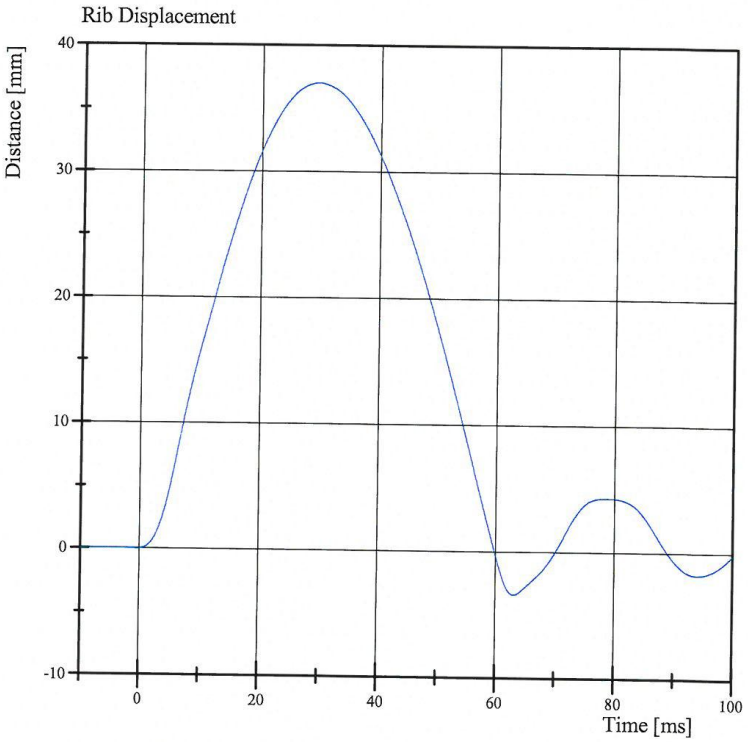
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:08:09 887

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 37.0 mm at 29.4 ms
Min: -3.4 mm at 63.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:08:19 887

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.463 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,505.3 N	Yes
Upper Rib Displacement	34 - 41 mm	38.2 mm	Yes
Center Rib Displacement	37 - 45 mm	41.3 mm	Yes
Lower Rib Displacement	37 - 44 mm	42.5 mm	Yes

Test meets specifications.

Comments:

Technician

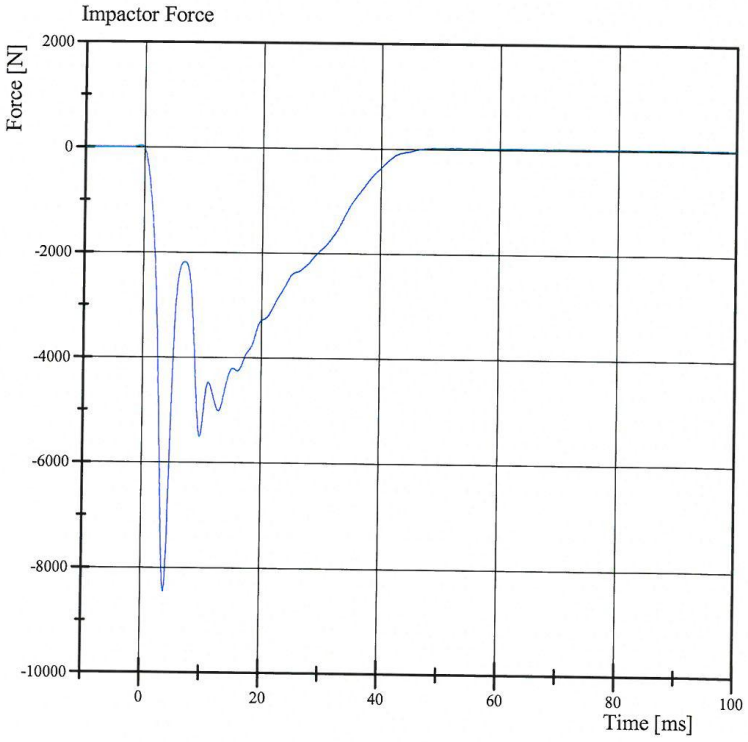
Approved

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

03.20.2013 11:10:05 465

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013



Filter Class: CFC_180
Max: 29.0 N at -0.6 ms
Min: -8,458.5 N at 3.9 ms

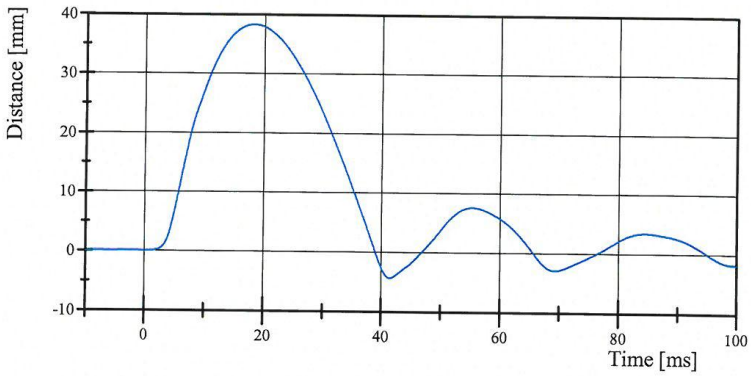
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

03.20.2013 11:10:13 465

Transportation Research Center Inc.

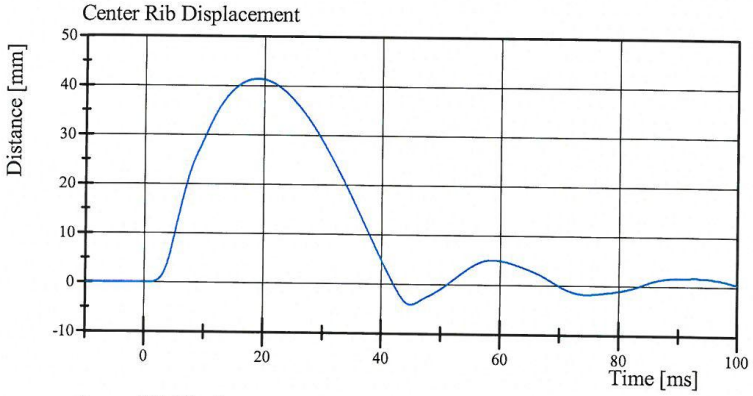
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Upper Rib Displacement



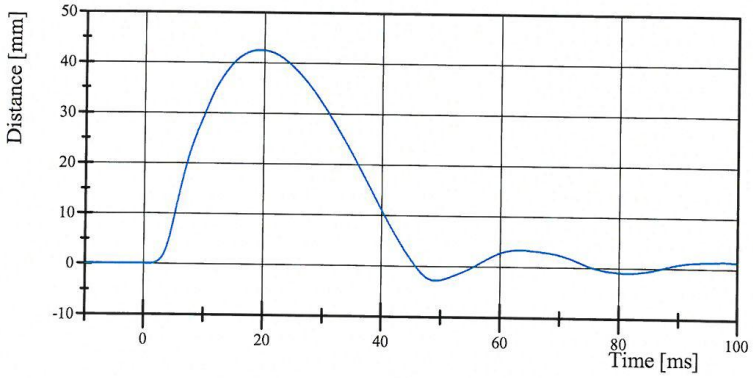
Filter Class: CFC_180
Max: 38.2 mm at 18.2 ms
Min: -4.4 mm at 41.4 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 41.3 mm at 19.0 ms
Min: -4.1 mm at 45.0 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 42.5 mm at 19.4 ms
Min: -2.8 mm at 49.2 ms

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

03.20.2013 11:10:14 465

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °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	4,156.6 N	Yes
Time of Peak	10.6 - 13.0 ms	10.64 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,571.2 N	Yes
Time of Peak	10.0 - 12.3 ms	10.08 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

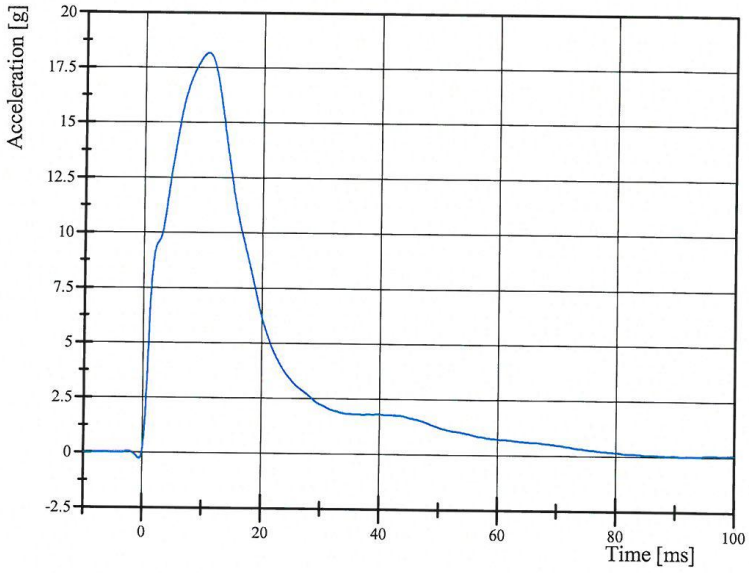
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:12:55 549

Transportation Research Center Inc.

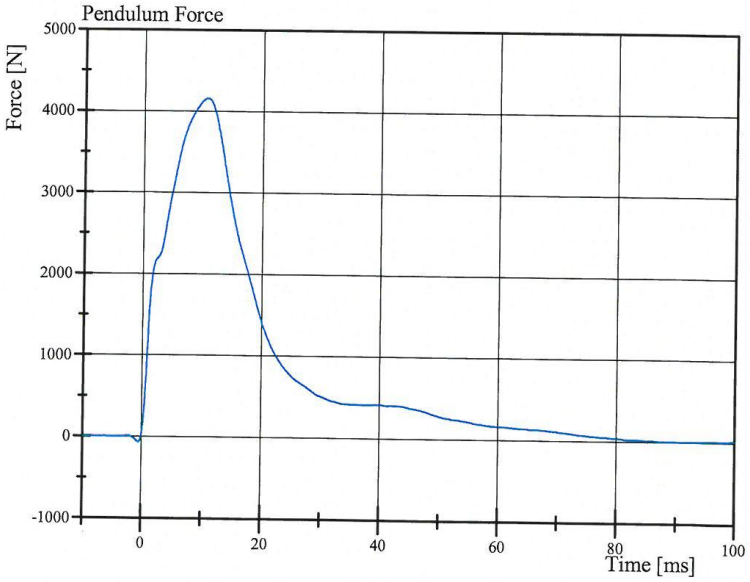
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.1 g at 10.6 ms
Min: -0.3 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,156.6 N at 10.6 ms
Min: -65.4 N at -0.6 ms

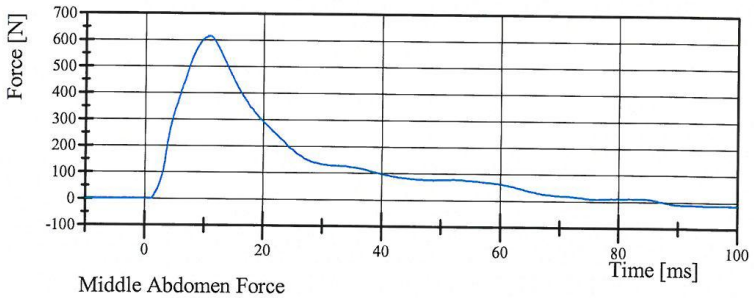
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:13:03 549

Transportation Research Center Inc.

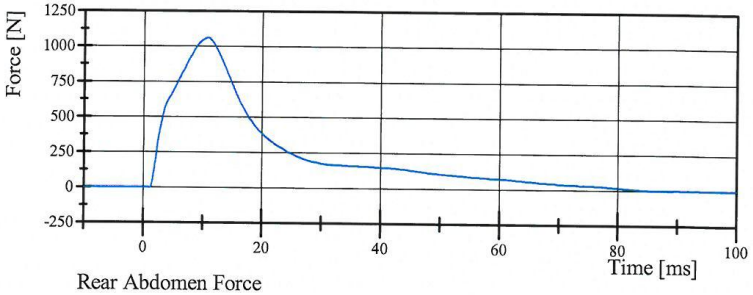
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Front Abdomen Force



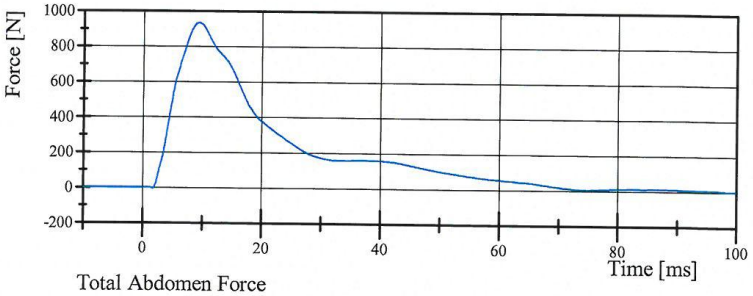
Filter Class: CFC_600
Max: 614.5 N at 10.9 ms
Min: -13.0 N at 99.4 ms

Middle Abdomen Force



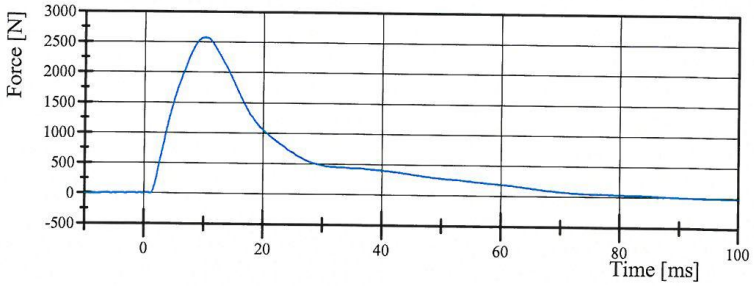
Filter Class: CFC_600
Max: 1,057.7 N at 10.8 ms
Min: -2.5 N at 1.1 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 932.6 N at 9.3 ms
Min: -5.7 N at 1.7 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,571.2 N at 10.1 ms
Min: -12.6 N at 99.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:13:03 549

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.024 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-51.2 deg	Yes
Time of Peak	39 - 53 ms	45.4 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	39.0 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

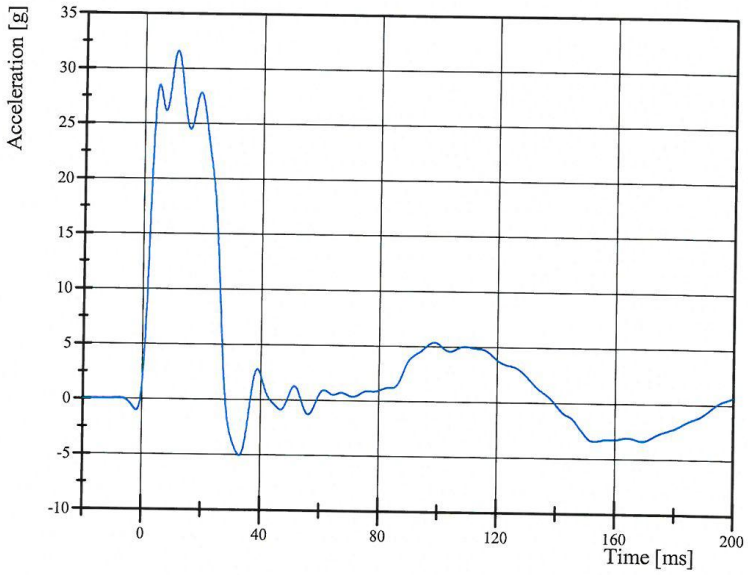
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:58:15 543

Transportation Research Center Inc.

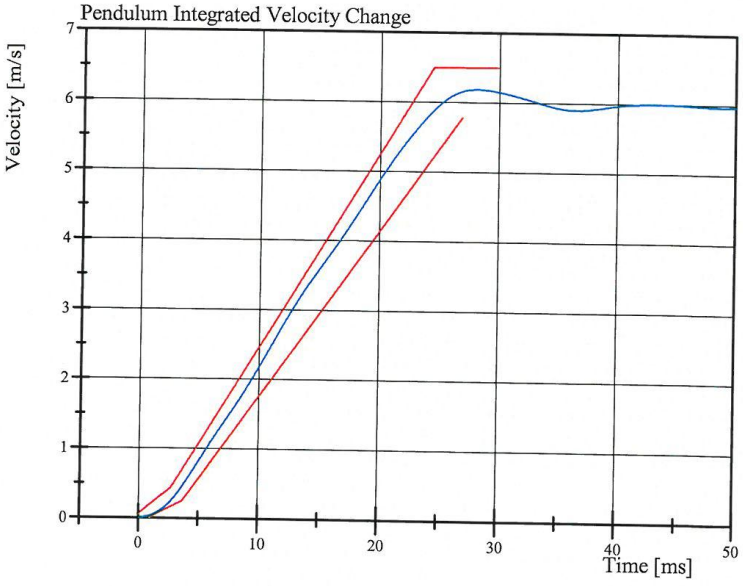
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 31.6 g at 11.0 ms
Min: -5.0 g at 33.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.2 m/s at 28.1 ms
Min: 0.0 m/s at 0.0 ms

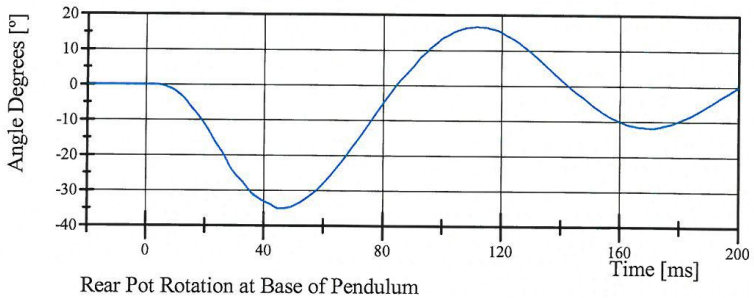
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:58:22 543

Transportation Research Center Inc.

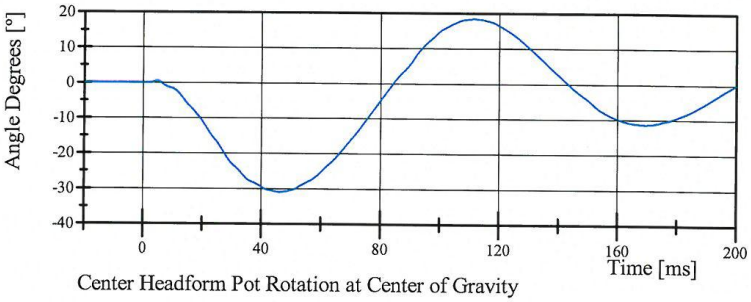
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Forward Pot Rotation at Base of Pendulum



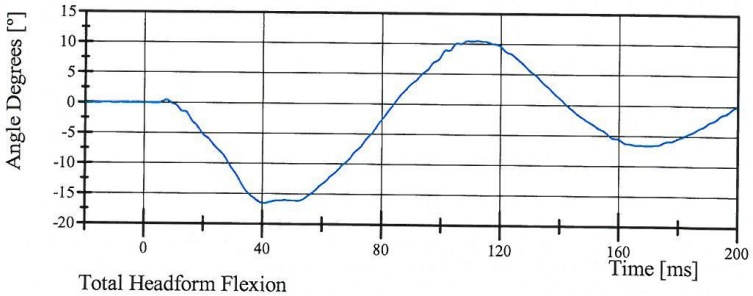
Filter Class: CFC_180
Max: 16.7 ° at 111.6 ms
Min: -35.1 ° at 45.4 ms

Rear Pot Rotation at Base of Pendulum



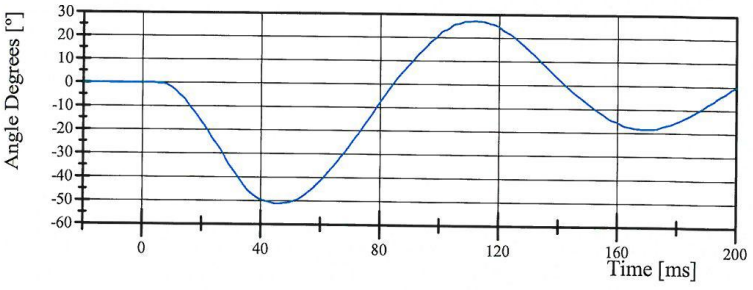
Filter Class: CFC_180
Max: 18.4 ° at 111.5 ms
Min: -30.9 ° at 46.2 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 10.6 ° at 112.1 ms
Min: -16.5 ° at 40.5 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 27.2 ° at 111.9 ms
Min: -51.2 ° at 45.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:58:23 543

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,037.7 N	Yes
Time of Peak	11.8 - 16.1 ms	12.80 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,341.0 N	Yes
Time of Peak	12.2 - 17.0 ms	12.56 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

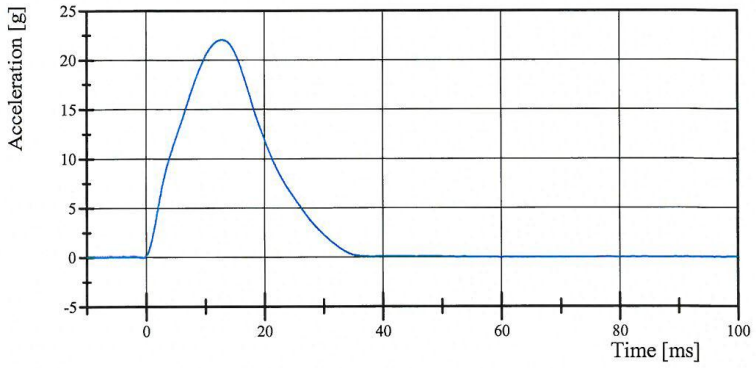
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:11:36 534

Transportation Research Center Inc.

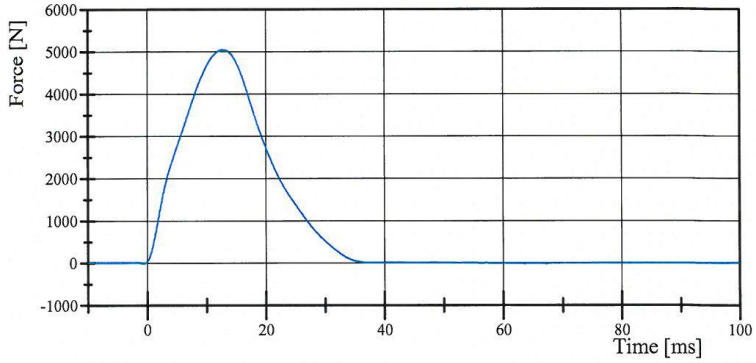
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 12-1
Test Date: 1/15/2013

Pendulum Acceleration



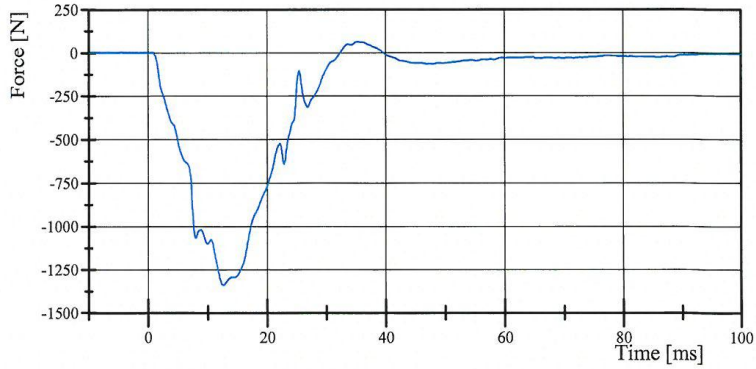
Filter Class: CFC_180
Max: 22.0 g at 12.8 ms
Min: -0.1 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,037.7 N at 12.8 ms
Min: -12.1 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 63.5 N at 35.4 ms
Min: -1,341.0 N at 12.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 11:11:43 534

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 12
Date: 01/15/13

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	446	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	472	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	604	Yes

Technician

Approved

Baseline 10/07/05

Driver S/N F030

Post-Test Calibration Sheets

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

EuroSid-2re
Serial No. F030
Calibration No. 13

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

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	27 %	Yes
Peak Resultant Acceleration	125 - 155 g	130.0 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.6 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

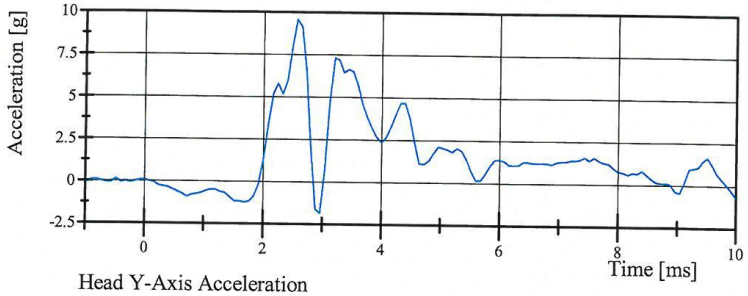
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:33:38 359

Transportation Research Center Inc.

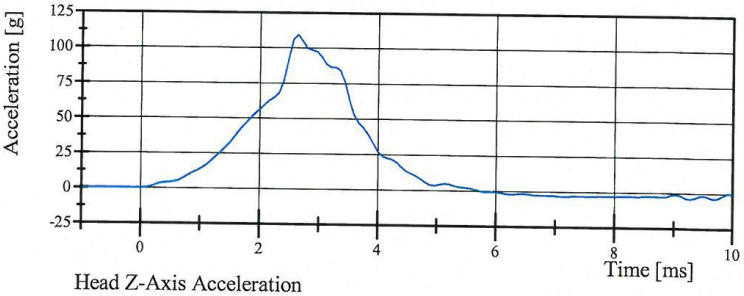
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Head X-Axis Acceleration



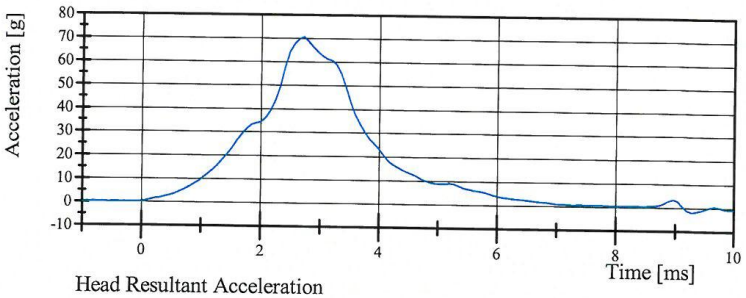
Filter Class: CFC_1000
Max: 9.6 g at 2.6 ms
Min: -1.9 g at 3.0 ms

Head Y-Axis Acceleration



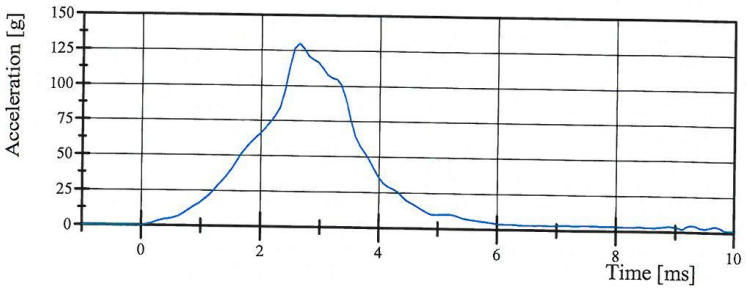
Filter Class: CFC_1000
Max: 109.3 g at 2.6 ms
Min: -4.2 g at 9.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 70.6 g at 2.7 ms
Min: -2.1 g at 9.3 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 130.0 g at 2.6 ms
Min: 0.1 g at -0.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:33:45 359

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	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	-50.1 deg	Yes
Time of Peak	54 - 66 ms	57.8 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	63.8 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

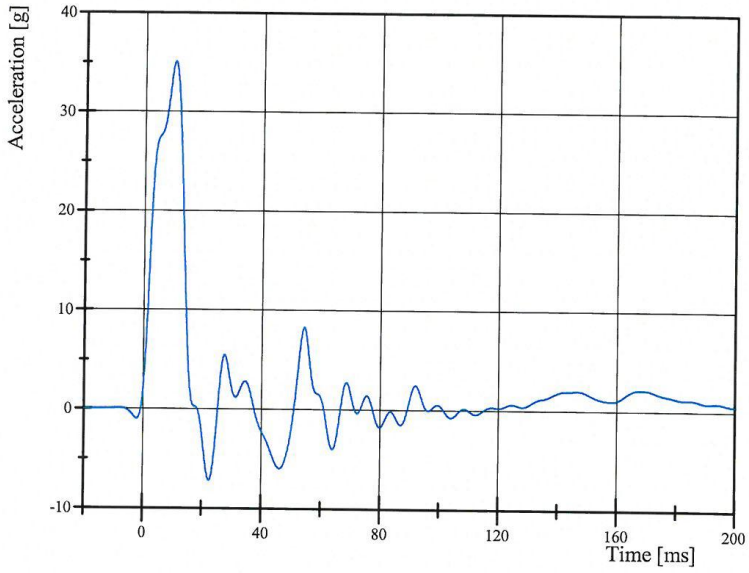
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:34:57 1309

Transportation Research Center Inc.

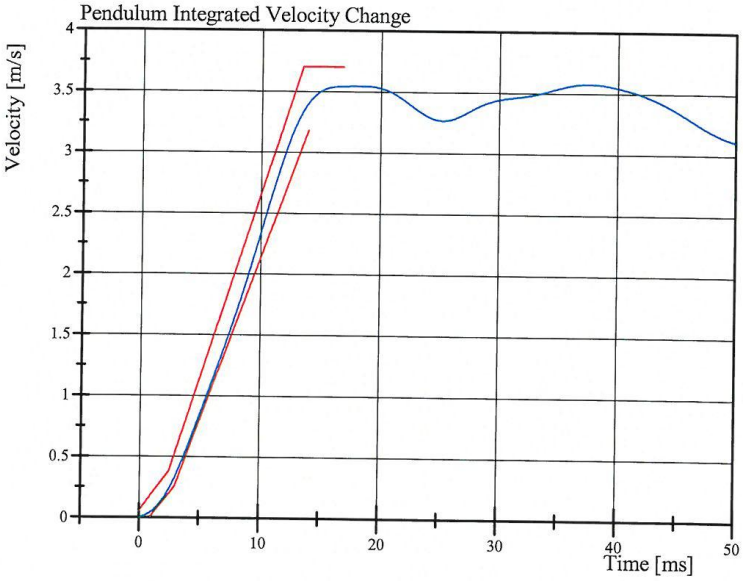
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 35.0 g at 10.1 ms
Min: -7.2 g at 22.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 37.5 ms
Min: 0.0 m/s at 0.0 ms

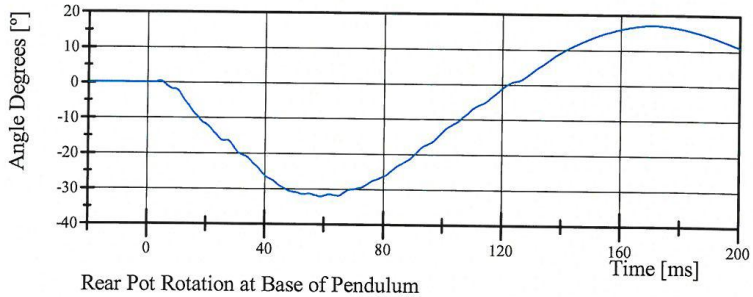
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:35:04 1309

Transportation Research Center Inc.

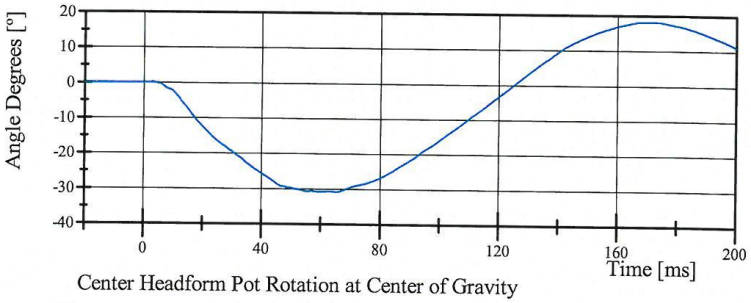
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Forward Pot Rotation at Base of Pendulum



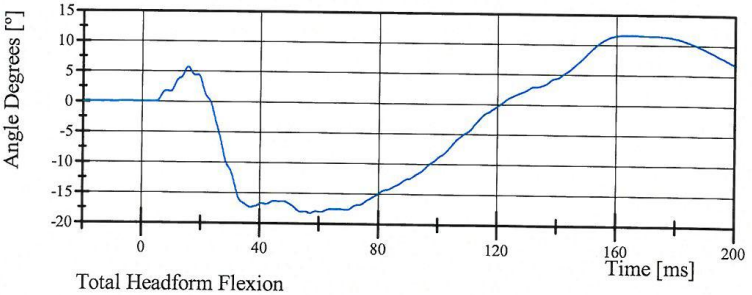
Filter Class: CFC_180
Max: 17.0 ° at 169.2 ms
Min: -32.1 ° at 58.8 ms

Rear Pot Rotation at Base of Pendulum



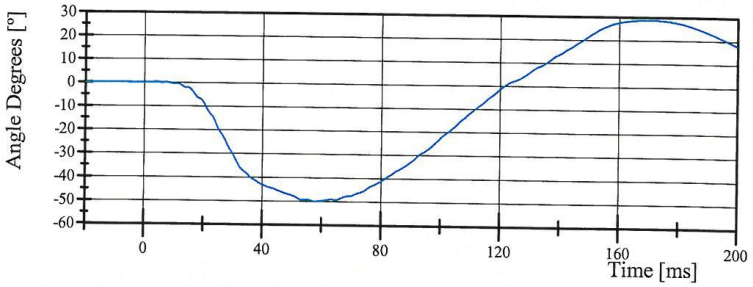
Filter Class: CFC_180
Max: 18.1 ° at 169.9 ms
Min: -30.8 ° at 65.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.6 ° at 163.4 ms
Min: -18.3 ° at 57.0 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 28.6 ° at 168.6 ms
Min: -50.1 ° at 57.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:35:05 1309

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.65 g	Yes

Test meets specifications.

Comments:

Technician

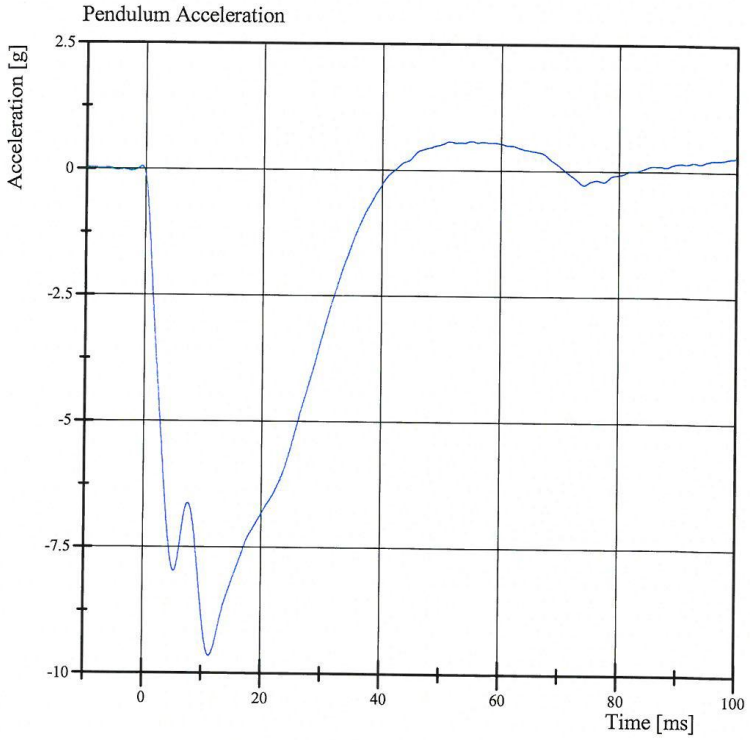
Approved

Specification Source: NHTSA final rule 8/15/2008

03.20.2013 12:36:24 560

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 0.6 g at 55.0 ms
Min: -9.7 g at 11.3 ms

Specification Source: NHTSA final rule 8/15/2008

03.20.2013 12:36:31 560

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

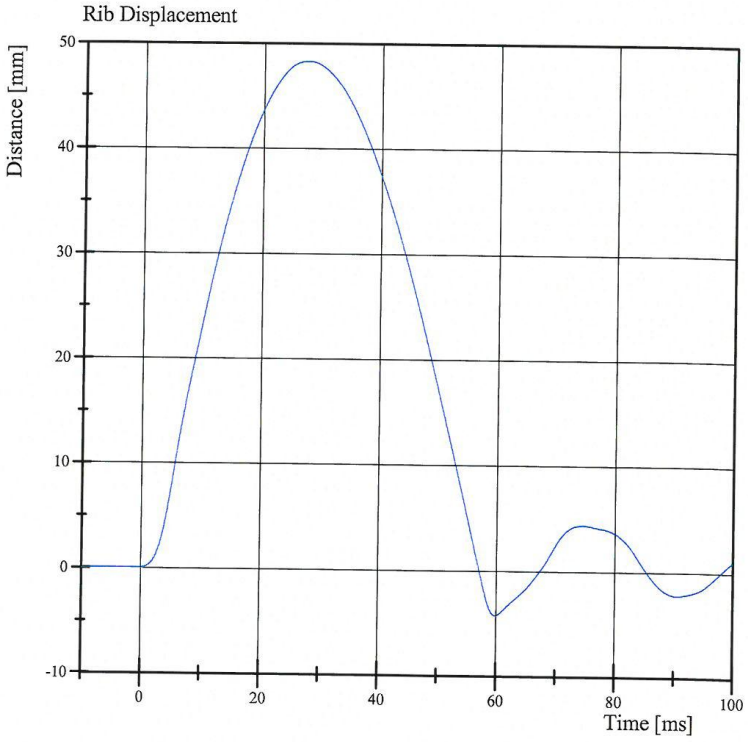
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:38:00 734

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 48.3 mm at 27.4 ms
Min: -4.3 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:38:11 734

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

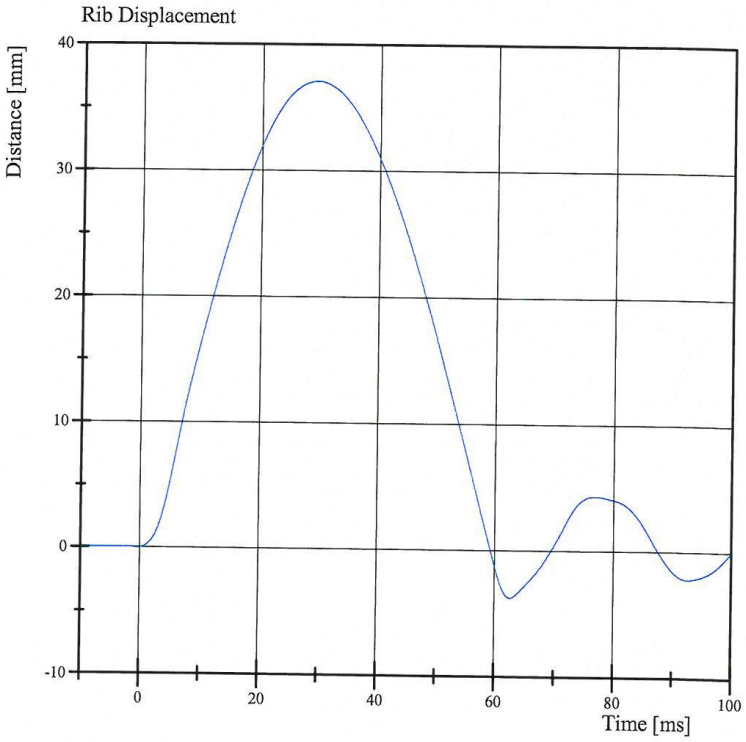
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:39:34 913

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 37.1 mm at 29.4 ms
Min: -3.7 mm at 62.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:39:45 913

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

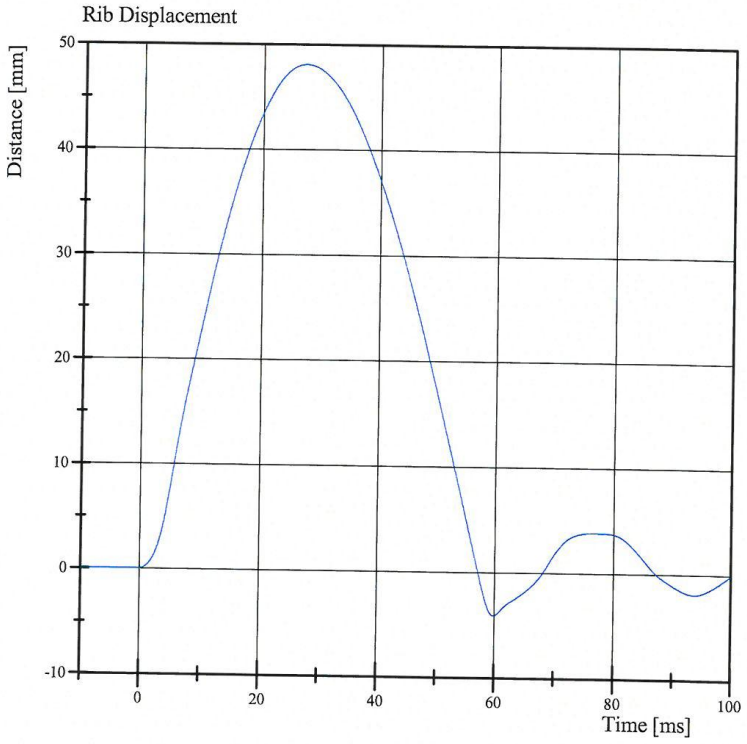
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:41:45 732

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 48.1 mm at 27.3 ms
Min: -4.1 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:41:53 732

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	31 %	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

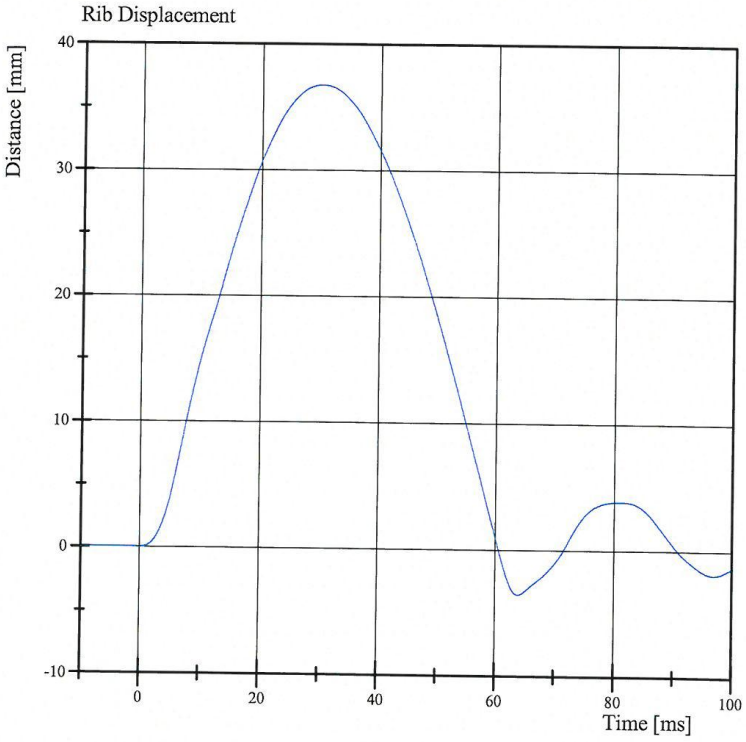
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:42:49 920

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 36.7 mm at 30.1 ms
Min: -3.5 mm at 63.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:42:58 920

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

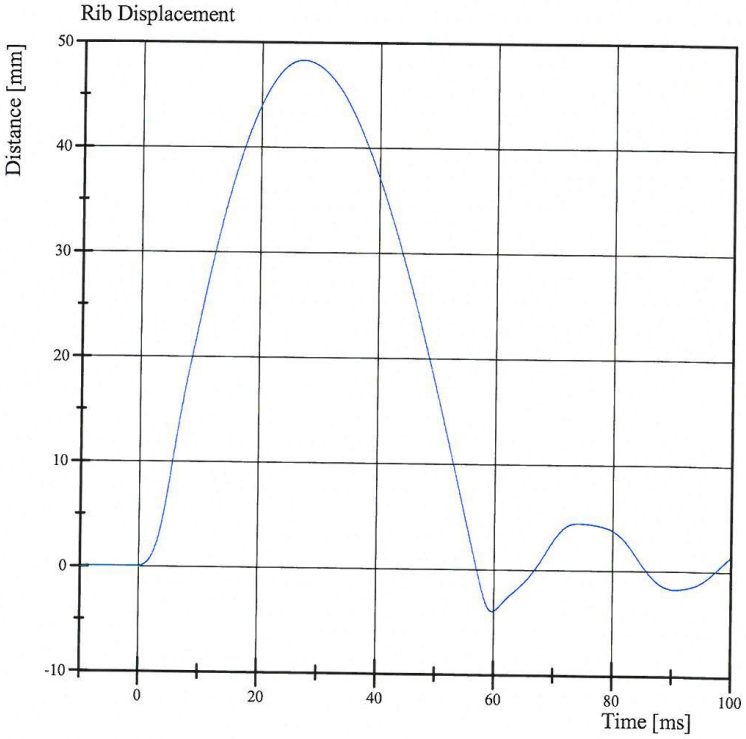
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:44:11 727

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 48.3 mm at 27.0 ms
Min: -4.0 mm at 59.7 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:44:25 727

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

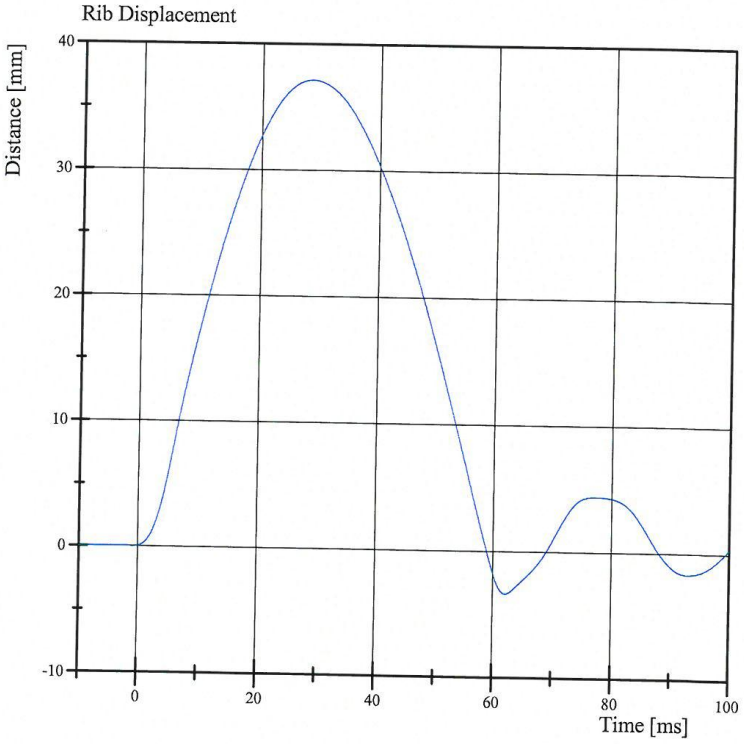
Approved

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:45:44 934

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 37.1 mm at 28.5 ms
Min: -3.4 mm at 62.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:45:51 934

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.471 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,444.1 N	Yes
Upper Rib Displacement	34 - 41 mm	36.9 mm	Yes
Center Rib Displacement	37 - 45 mm	40.5 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.7 mm	Yes

Test meets specifications.

Comments:

Technician

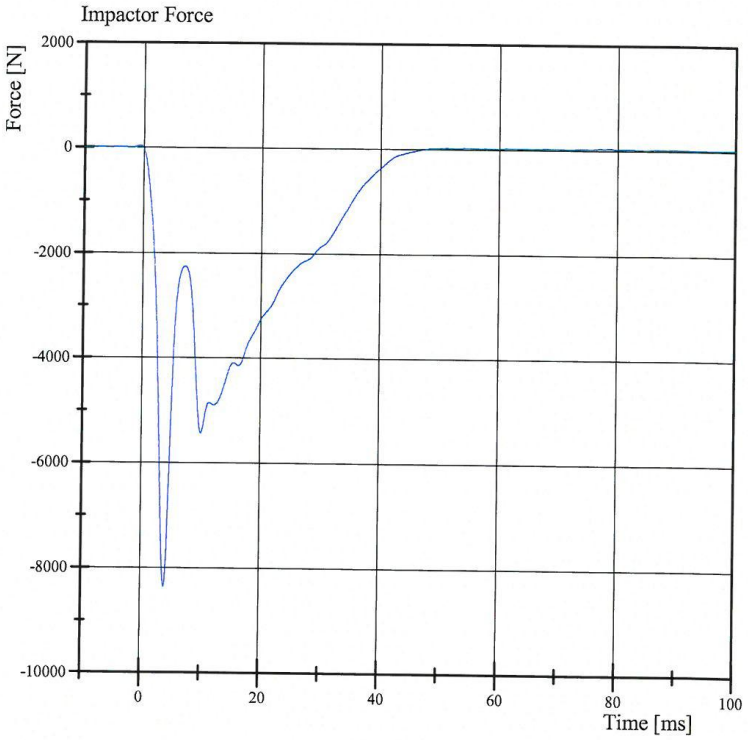
Approved

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

03.20.2013 12:47:01 446

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013



Filter Class: CFC_180
Max: 34.9 N at 78.6 ms
Min: -8,373.1 N at 4.0 ms

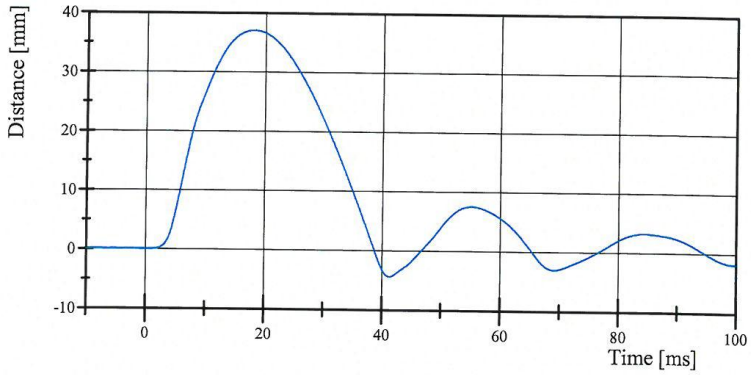
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

03.20.2013 12:47:08 446

Transportation Research Center Inc.

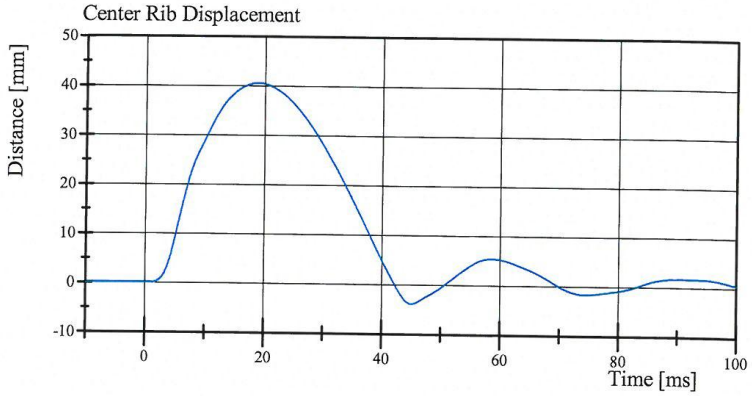
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Upper Rib Displacement



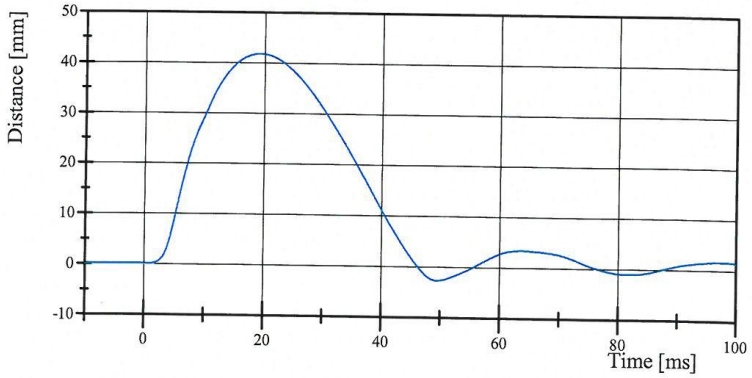
Filter Class: CFC_180
Max: 36.9 mm at 18.0 ms
Min: -4.4 mm at 41.3 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 40.5 mm at 18.9 ms
Min: -3.9 mm at 45.0 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 41.7 mm at 19.2 ms
Min: -2.7 mm at 49.5 ms

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

03.20.2013 12:47:09 446

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 13-2
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.93 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,192.5 N	Yes
Time of Peak	10.6 - 13.0 ms	10.80 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,699.8 N	Yes
Time of Peak	10.0 - 12.3 ms	10.16 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

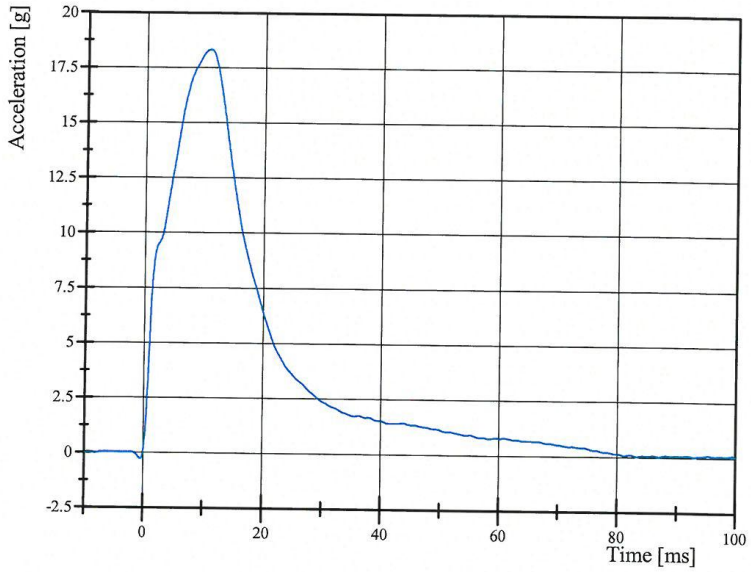
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:48:40 590

Transportation Research Center Inc.

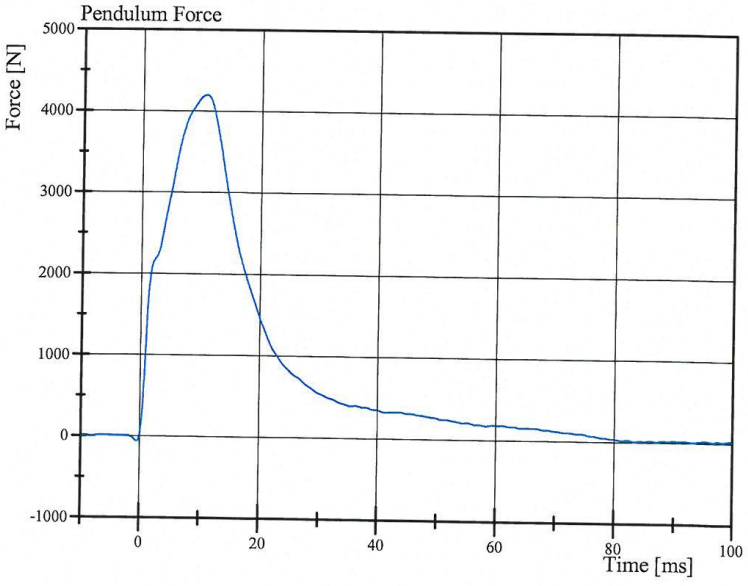
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 13-2
Test Date: 3/7/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.3 g at 10.8 ms
Min: -0.3 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,192.5 N at 10.8 ms
Min: -66.6 N at -0.5 ms

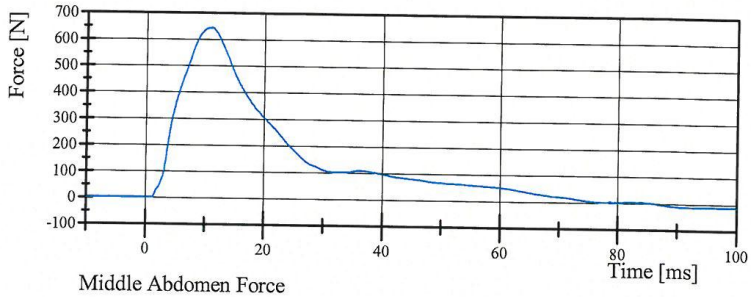
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:48:47 590

Transportation Research Center Inc.

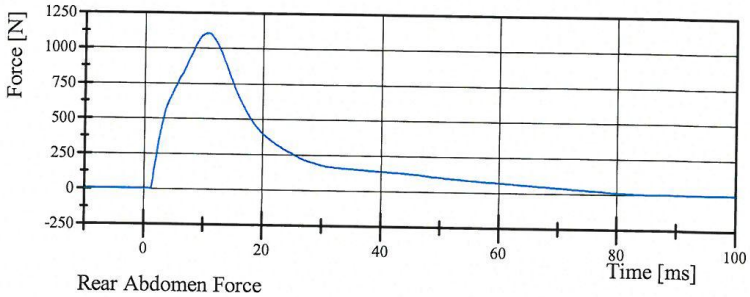
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 13-2
Test Date: 3/7/2013

Front Abdomen Force



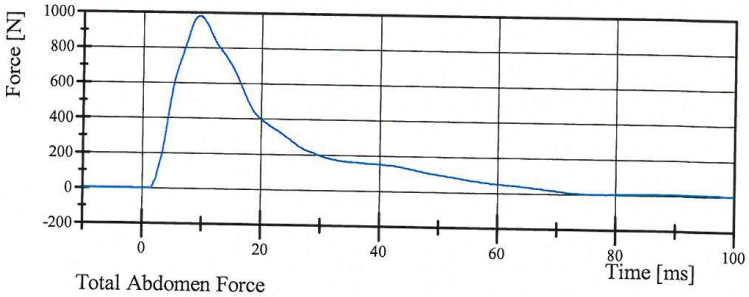
Filter Class: CFC_600
Max: 641.4 N at 11.1 ms
Min: -13.2 N at 98.7 ms

Middle Abdomen Force



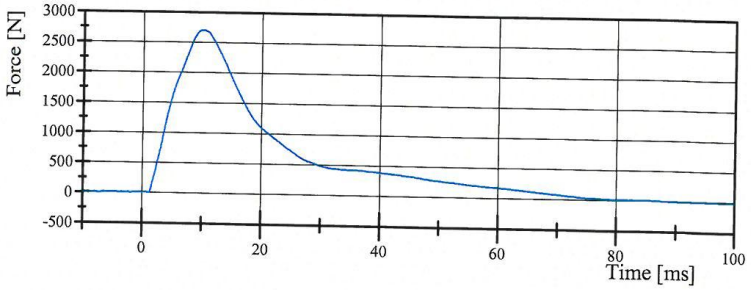
Filter Class: CFC_600
Max: 1,101.1 N at 10.4 ms
Min: -3.5 N at 1.0 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 978.3 N at 9.4 ms
Min: -2.0 N at 1.4 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,699.8 N at 10.2 ms
Min: -13.6 N at 100.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:48:47 590

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.022 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-45.7 deg	Yes
Time of Peak	39 - 53 ms	42.0 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	39.7 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

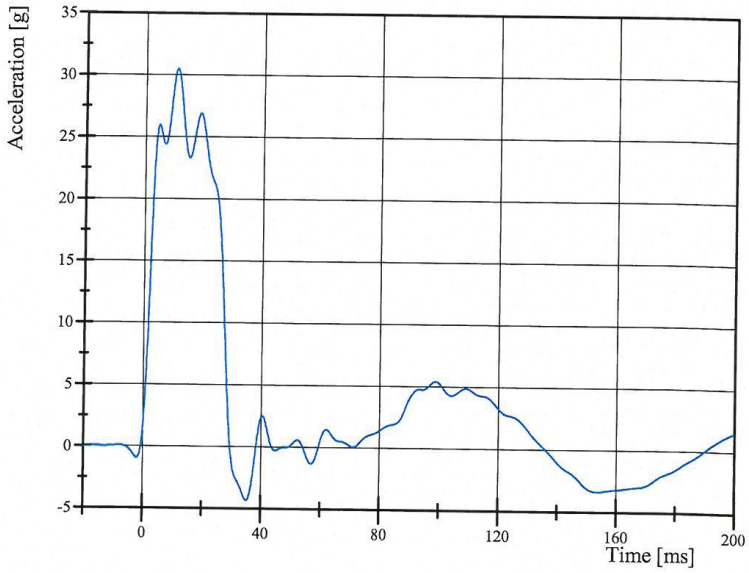
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:52:34 579

Transportation Research Center Inc.

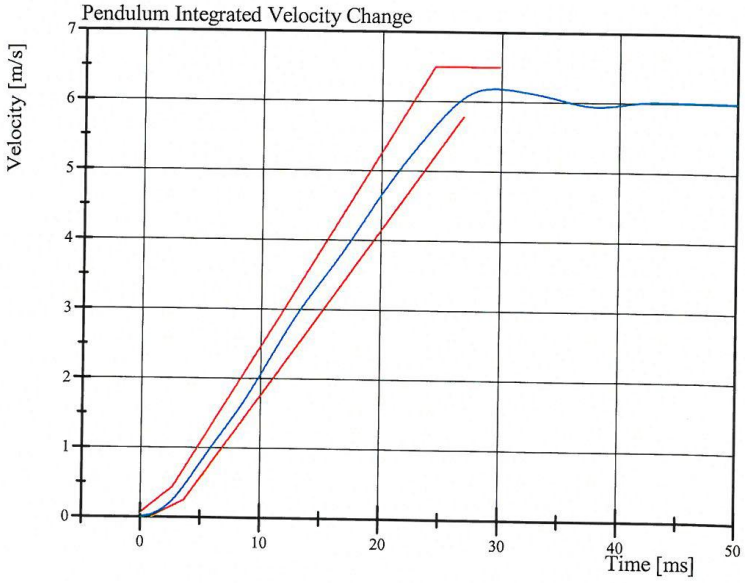
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 30.4 g at 10.7 ms
Min: -4.4 g at 35.1 ms

Pendulum Integrated Velocity Change



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

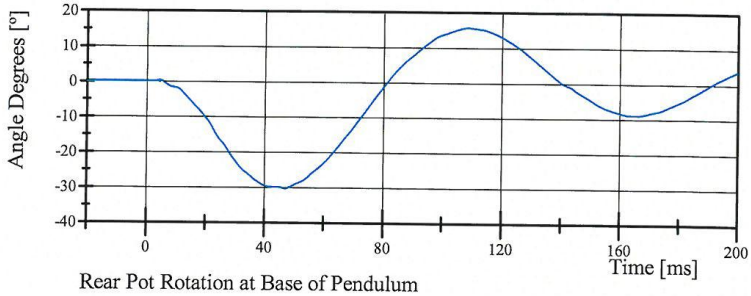
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:52:41 579

Transportation Research Center Inc.

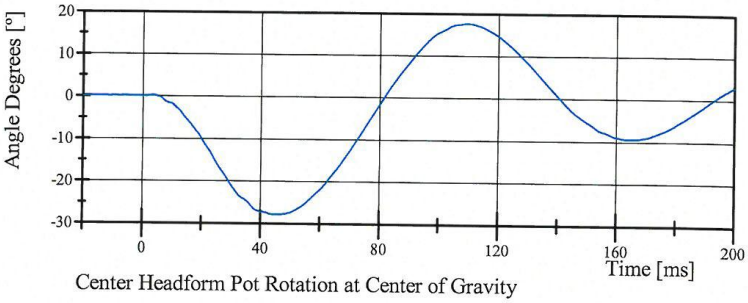
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 13-1
Test Date: 3/7/2013

Forward Pot Rotation at Base of Pendulum



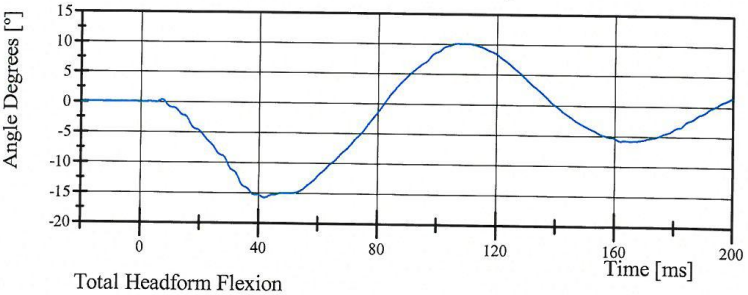
Filter Class: CFC_180
Max: 15.6 ° at 108.4 ms
Min: -30.4 ° at 47.0 ms

Rear Pot Rotation at Base of Pendulum



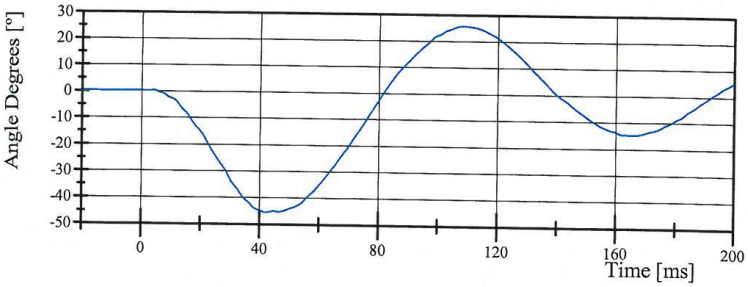
Filter Class: CFC_180
Max: 17.5 ° at 110.0 ms
Min: -27.9 ° at 44.6 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 10.1 ° at 109.2 ms
Min: -15.8 ° at 41.9 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.7 ° at 108.6 ms
Min: -45.7 ° at 42.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:52:42 579

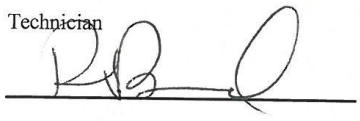
Transportation Research Center Inc.

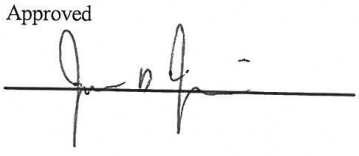
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 13-2
Test Date: 3/7/2013

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	4.33 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,293.7 N	Yes
Time of Peak	11.8 - 16.1 ms	12.88 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,304.5 N	Yes
Time of Peak	12.2 - 17.0 ms	13.60 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

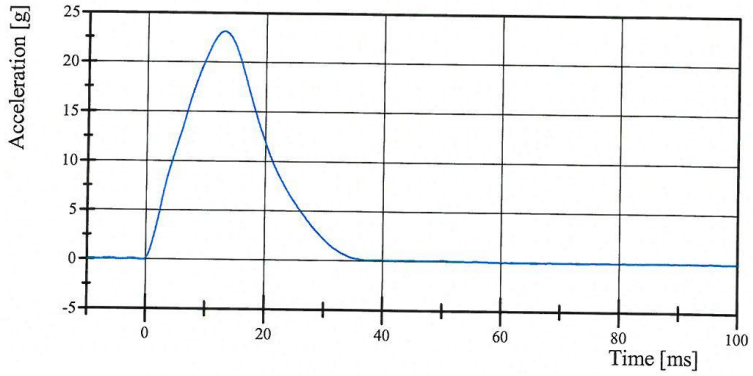
Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:50:06 557

Transportation Research Center Inc.

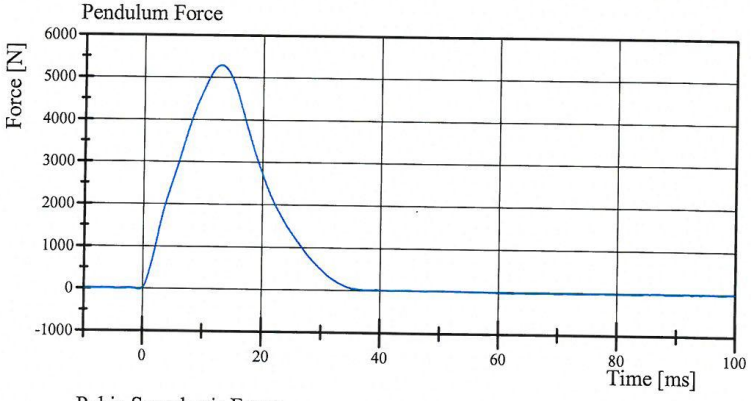
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 13-2
Test Date: 3/7/2013

Pendulum Acceleration



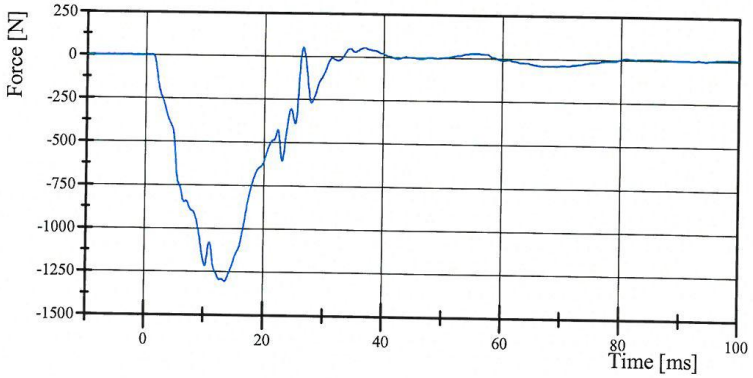
Filter Class: CFC_180
Max: 23.1 g at 12.9 ms
Min: -0.1 g at 65.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,293.7 N at 12.9 ms
Min: -20.0 N at 65.5 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 54.4 N at 36.8 ms
Min: -1,304.5 N at 13.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

03.20.2013 12:50:42 557

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 13
Date: 03/07/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	446	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	472	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	604	Yes

Technician

Approved

Baseline 10/07/05

Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

SID-IIs Dummy
Serial No. 305
Calibration No. 17

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

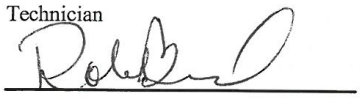
Transportation Research Center Inc.

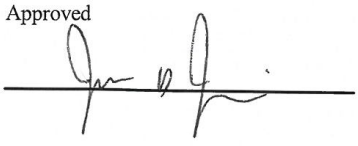
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	118.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician 

Approved 

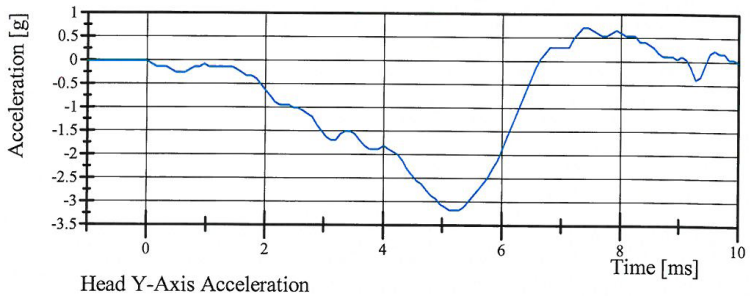
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:17:40 197

Transportation Research Center Inc.

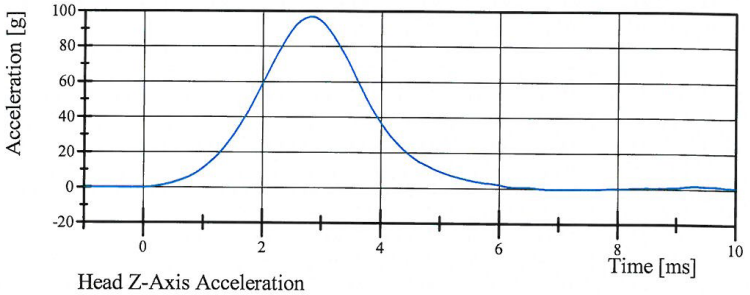
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Head X-Axis Acceleration



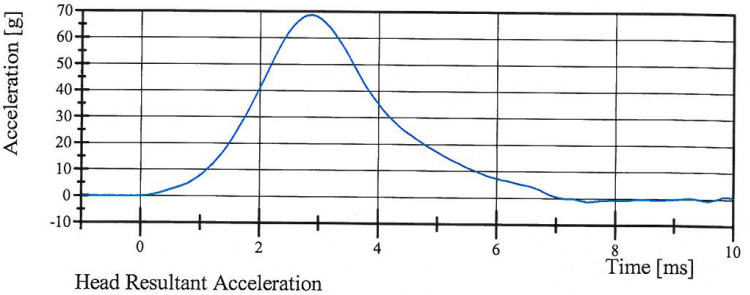
Filter Class: CFC_1000
Max: 0.7 g at 7.4 ms
Min: -3.2 g at 5.1 ms

Head Y-Axis Acceleration



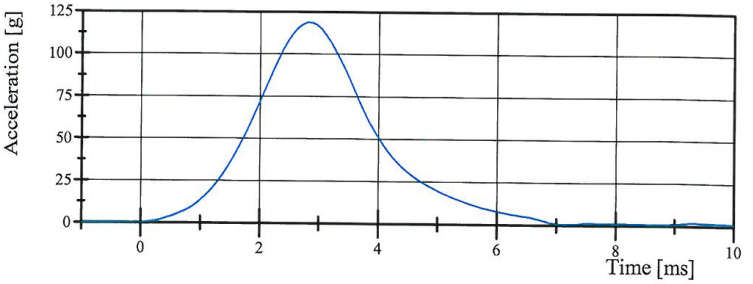
Filter Class: CFC_1000
Max: 96.8 g at 2.8 ms
Min: -0.4 g at 6.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 68.7 g at 2.9 ms
Min: -1.2 g at 7.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 118.6 g at 2.8 ms
Min: 0.0 g at -1.0 ms

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

03.20.2013 13:17:47 197

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.601 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.704 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.885 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.150 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.826 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.826 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-77.4 deg	Yes
Time of Peak	50 - 70 ms	69.9 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.2 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	120.6 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

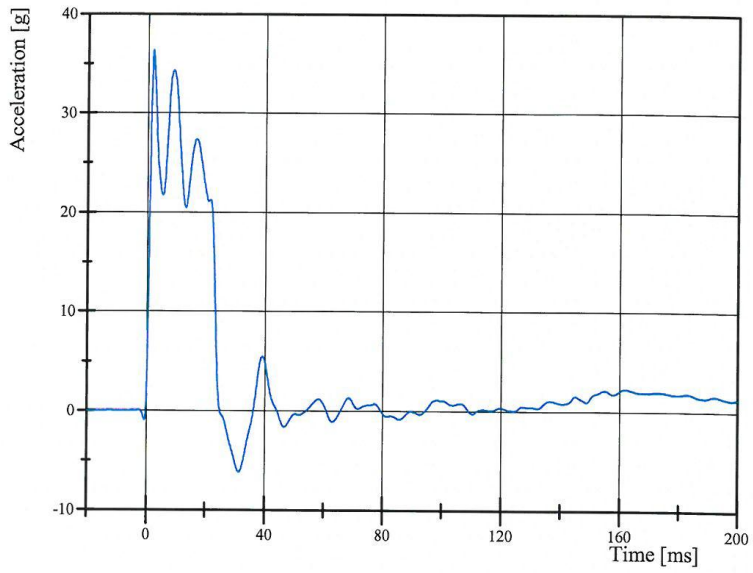
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:19:00 608

Transportation Research Center Inc.

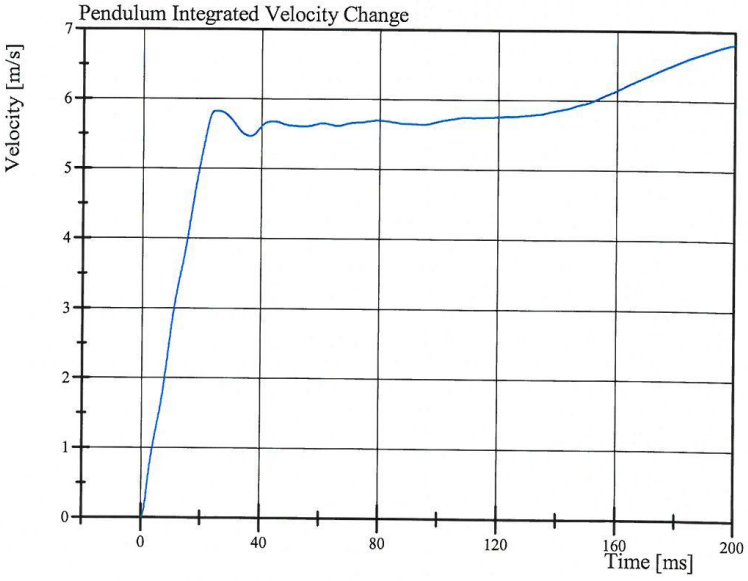
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 36.3 g at 1.8 ms
Min: -6.2 g at 31.4 ms

Pendulum Integrated Velocity Change



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

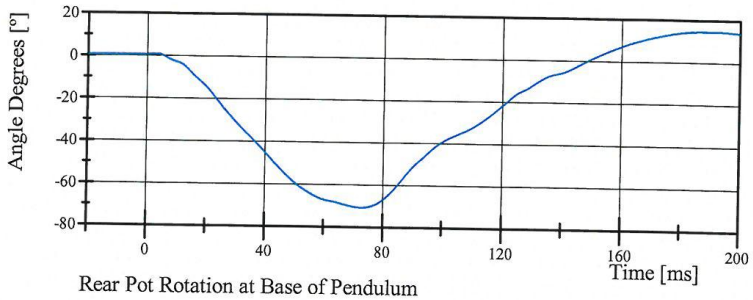
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:19:08 608

Transportation Research Center Inc.

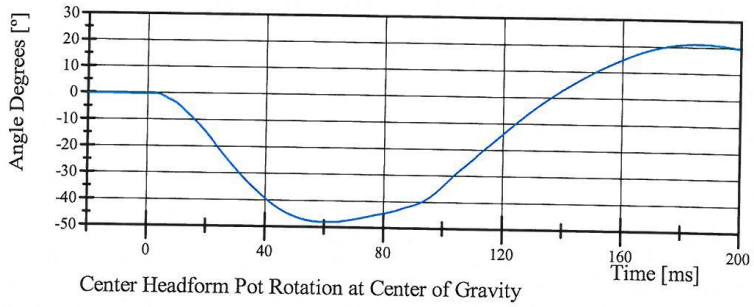
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Forward Pot Rotation at Base of Pendulum



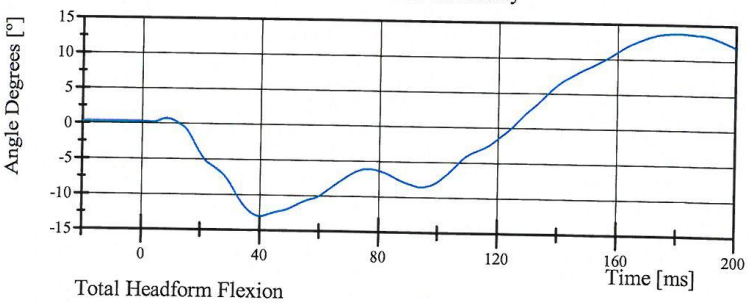
Filter Class: CFC_60
Max: 14.6 ° at 189.2 ms
Min: -70.8 ° at 72.7 ms

Rear Pot Rotation at Base of Pendulum



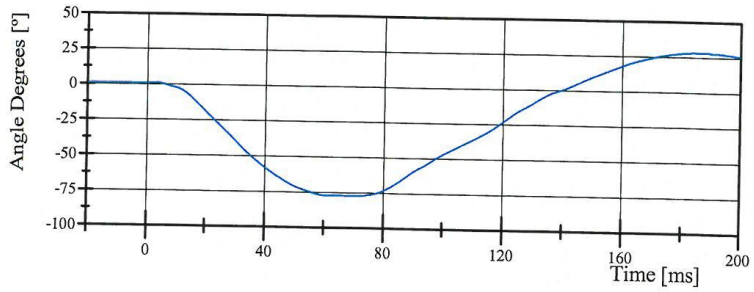
Filter Class: CFC_60
Max: 21.2 ° at 186.6 ms
Min: -48.2 ° at 61.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 13.8 ° at 180.6 ms
Min: -13.0 ° at 40.0 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 28.2 ° at 186.8 ms
Min: -77.4 ° at 69.9 ms

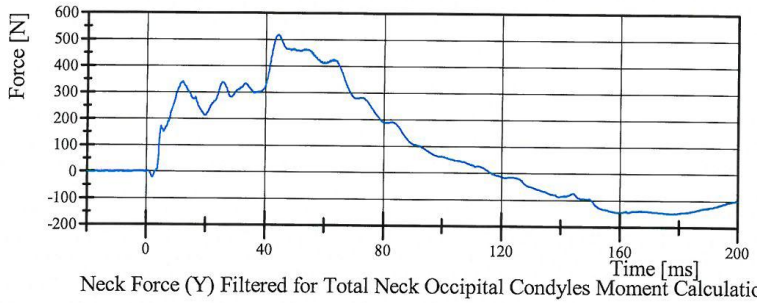
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:19:08 608

Transportation Research Center Inc.

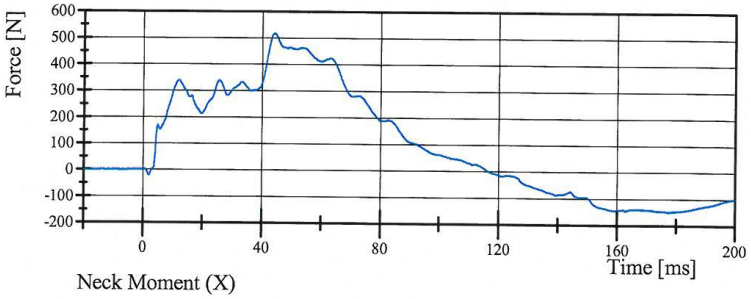
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Neck Force (Y)



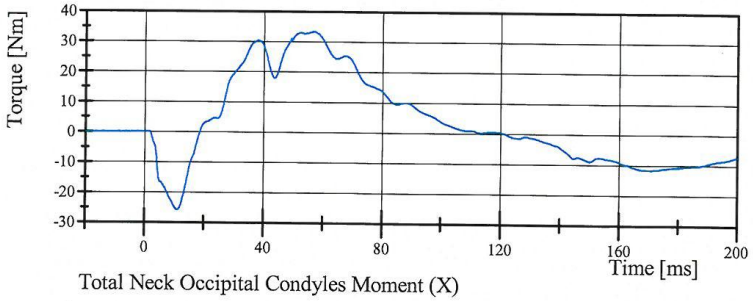
Filter Class: CFC_1000
Max: 516.6 N at 44.0 ms
Min: -148.6 N at 177.8 ms

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



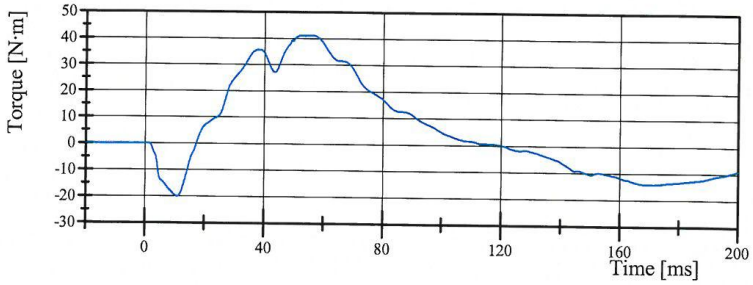
Filter Class: CFC_600
Max: 516.7 N at 44.1 ms
Min: -148.3 N at 177.8 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 33.4 Nm at 56.8 ms
Min: -25.9 Nm at 11.1 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constai
Max: 41.2 N·m at 52.5 ms
Min: -20.1 N·m at 11.0 ms

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

03.20.2013 13:19:09 608

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.6 g	Yes
Shoulder Displacement	28 - 37 mm	31.7 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.6 g	Yes

Test meets specifications.

Comments:

Technician

Approved

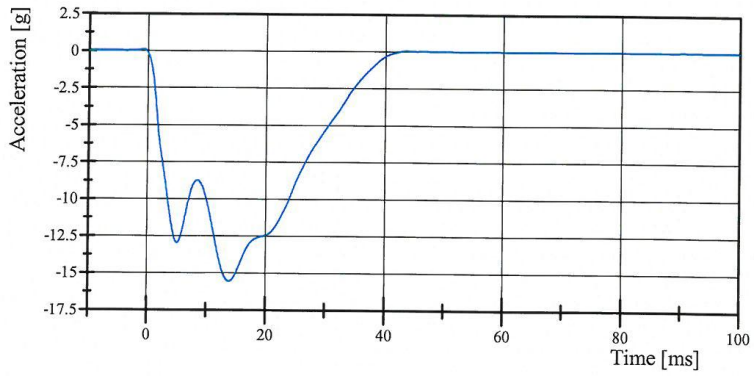
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:20:46 793

Transportation Research Center Inc.

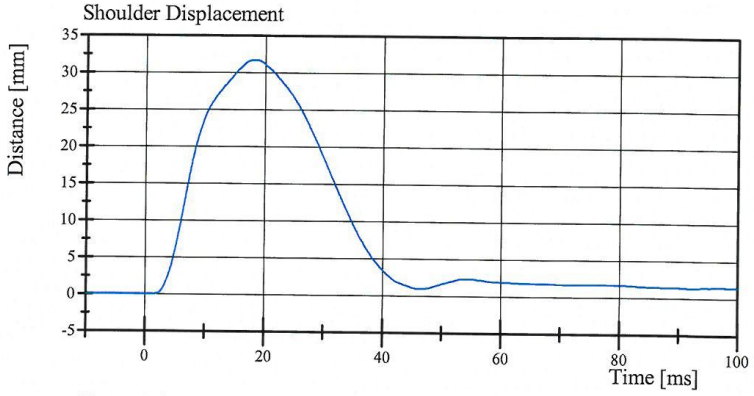
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Probe Acceleration



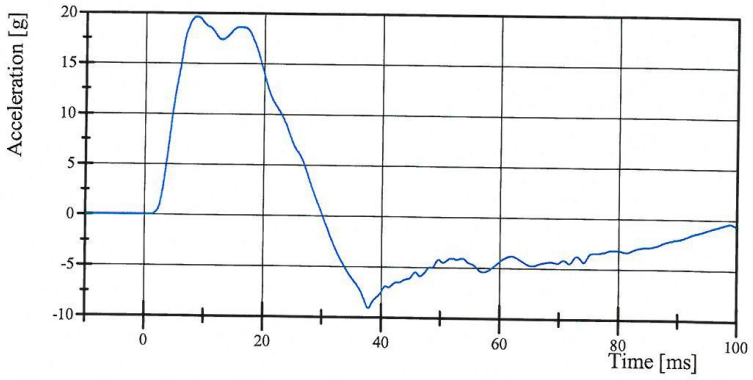
Filter Class: CFC_180
Max: 0.1 g at -0.8 ms
Min: -15.6 g at 13.8 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 31.7 mm at 18.2 ms
Min: -0.0 mm at 1.1 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 19.6 g at 8.6 ms
Min: -9.1 g at 37.8 ms

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

03.20.2013 13:20:54 793

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 17-6
Test Date: 1/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.738 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.7 g	Yes
Shoulder Displacement	31 - 40 mm	32.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	25.9 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.4 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.1 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	32.2 g	Yes

Test meets specifications.

Comments:

Technician

Approved

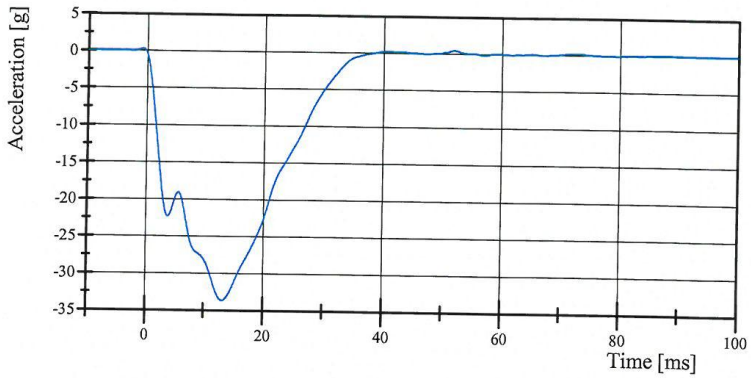
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:22:13 581

Transportation Research Center Inc.

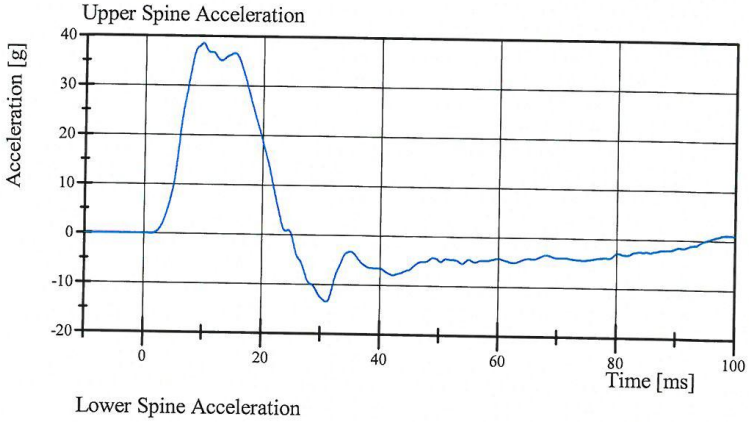
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 17-6
Test Date: 1/16/2013

Probe Acceleration



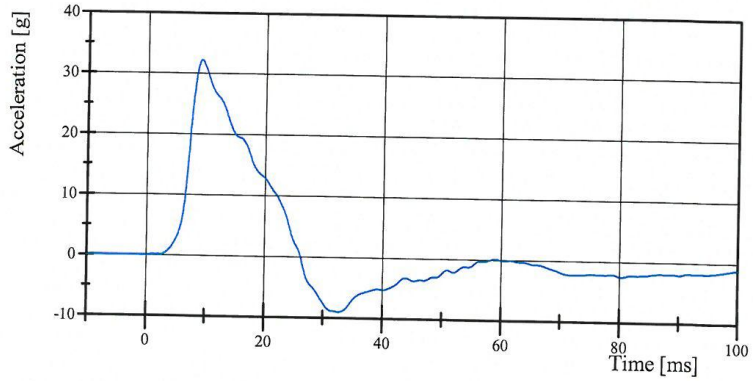
Filter Class: CFC_180
Max: 0.4 g at 51.8 ms
Min: -33.7 g at 13.1 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 38.5 g at 9.8 ms
Min: -13.5 g at 31.0 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 32.2 g at 9.1 ms
Min: -9.1 g at 32.6 ms

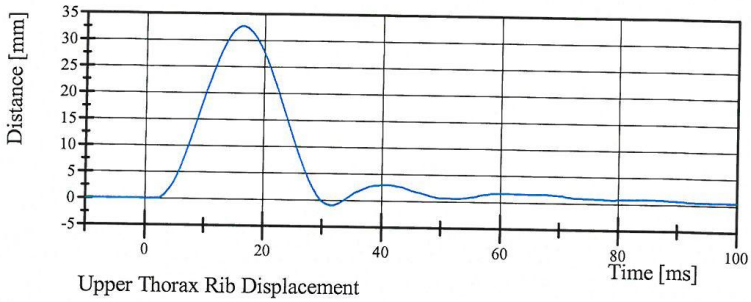
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:22:22 581

Transportation Research Center Inc.

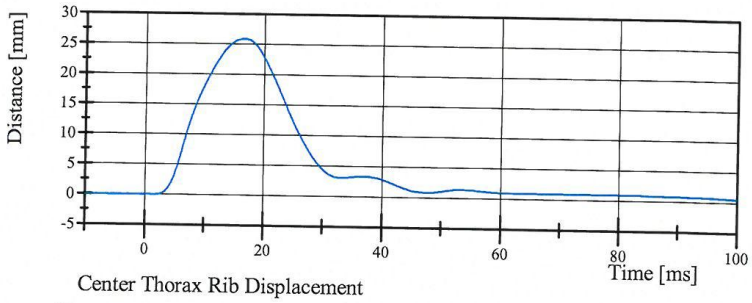
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 17-6
Test Date: 1/16/2013

Shoulder Rib Displacement



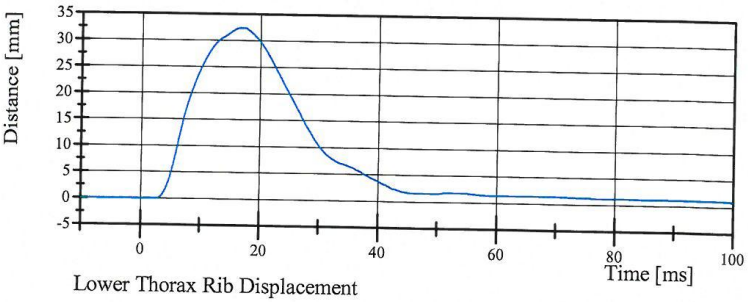
Filter Class: CFC_600
Max: 32.7 mm at 16.2 ms
Min: -0.9 mm at 31.7 ms

Upper Thorax Rib Displacement



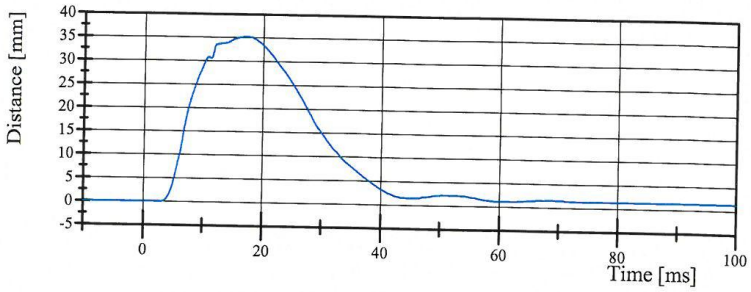
Filter Class: CFC_600
Max: 25.9 mm at 16.6 ms
Min: -0.0 mm at 1.7 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.4 mm at 16.8 ms
Min: -0.0 mm at 2.7 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 35.1 mm at 16.7 ms
Min: -0.0 mm at -5.5 ms

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

03.20.2013 13:22:23 581

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.365 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.1 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.7 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.4 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	16.3 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.8 g	Yes

Test meets specifications.

Comments:

Technician

Approved

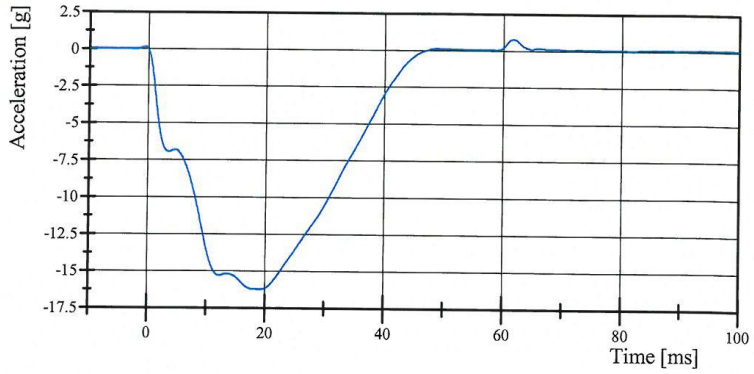
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:23:58 790

Transportation Research Center Inc.

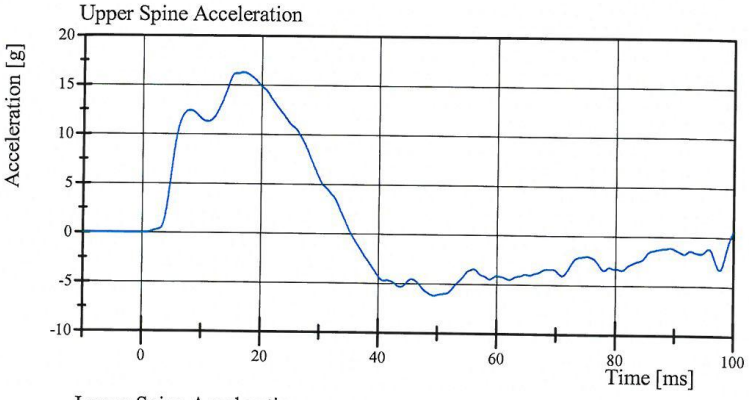
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Probe Acceleration



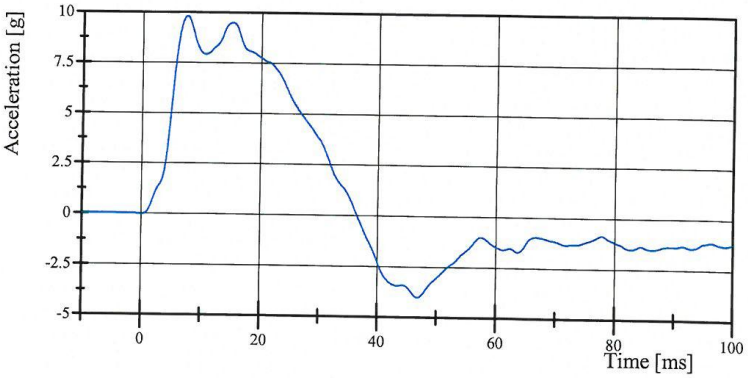
Filter Class: CFC_180
Max: 0.8 g at 61.6 ms
Min: -16.2 g at 19.0 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 16.3 g at 16.9 ms
Min: -6.2 g at 49.4 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.8 g at 7.4 ms
Min: -4.0 g at 46.8 ms

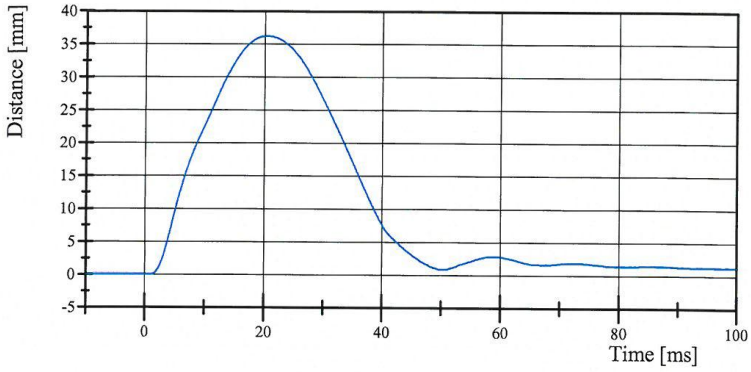
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:24:06 790

Transportation Research Center Inc.

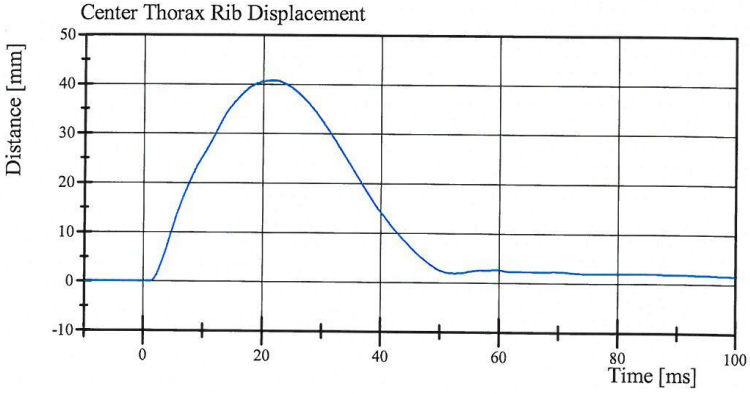
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Upper Thorax Rib Displacement



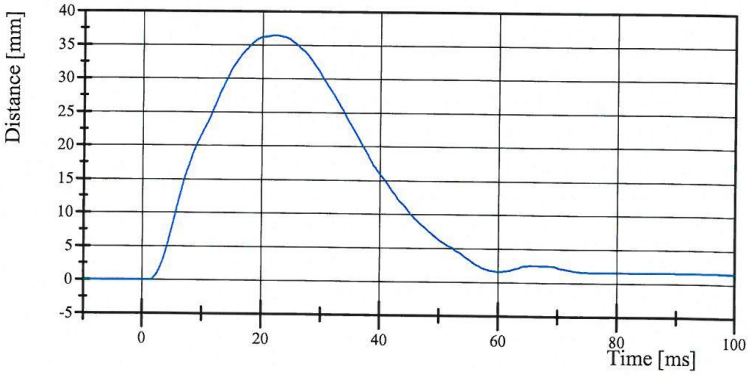
Filter Class: CFC_600
Max: 36.1 mm at 20.4 ms
Min: -0.0 mm at 1.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.7 mm at 22.2 ms
Min: -0.0 mm at 1.0 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.4 mm at 22.2 ms
Min: -0.0 mm at 1.1 ms

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

03.20.2013 13:24:07 790

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.9 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	41.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	35.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	12.53 g	Yes

Test meets specifications.

Comments:

Technician

Approved

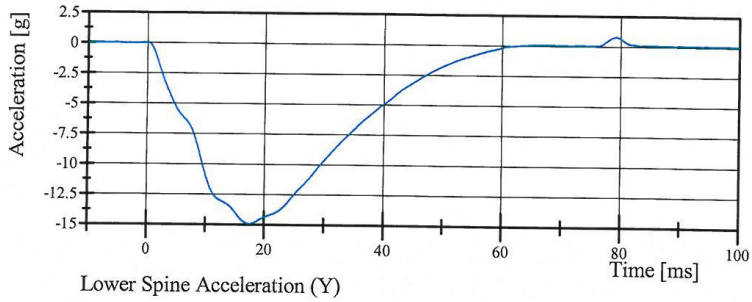
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:25:23 620

Transportation Research Center Inc.

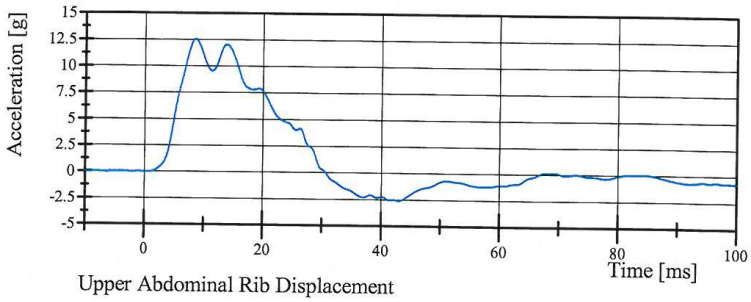
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Probe Acceleration



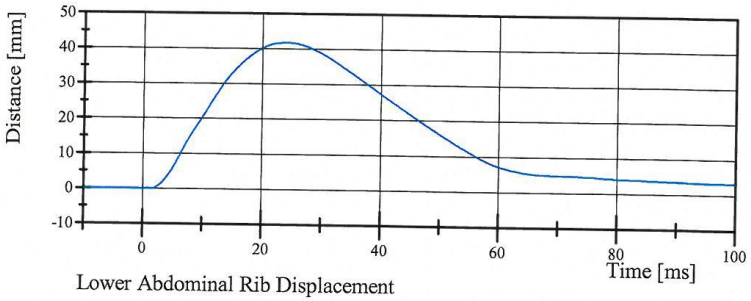
Filter Class: CFC_180
Max: 0.8 g at 79.2 ms
Min: -14.9 g at 17.4 ms

Lower Spine Acceleration (Y)



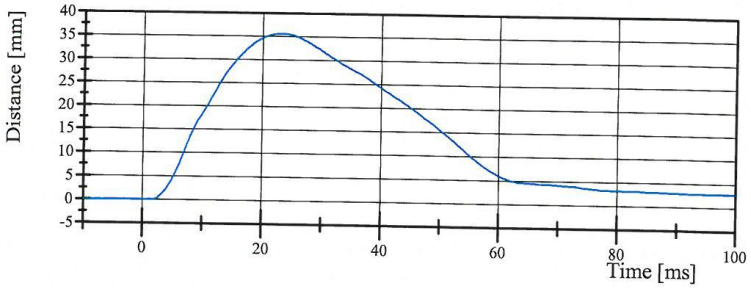
Filter Class: CFC_180
Max: 12.5 g at 8.5 ms
Min: -2.6 g at 43.0 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 41.7 mm at 24.1 ms
Min: -0.0 mm at -7.4 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 35.5 mm at 23.1 ms
Min: -0.0 mm at 1.6 ms

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

03.20.2013 13:25:31 620

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.07 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.9 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,168.9 N	Yes

Test meets specifications.

Comments:

Technician

Approved

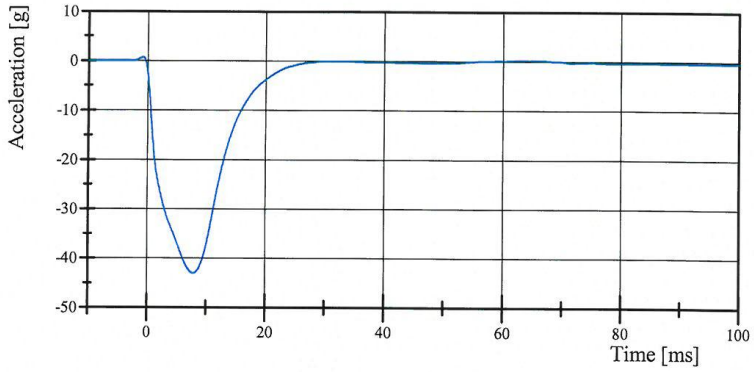
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:26:56 390

Transportation Research Center Inc.

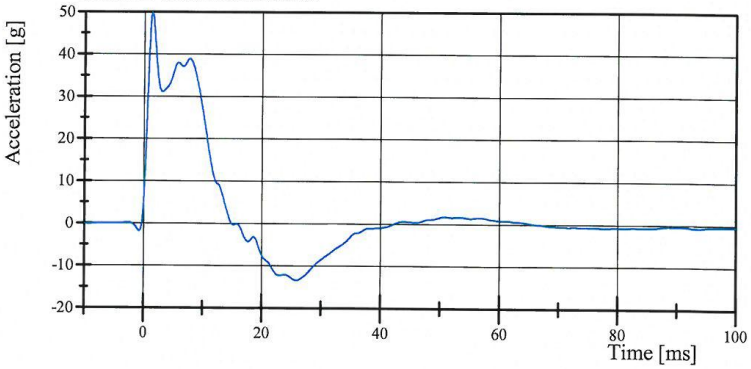
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Probe Acceleration



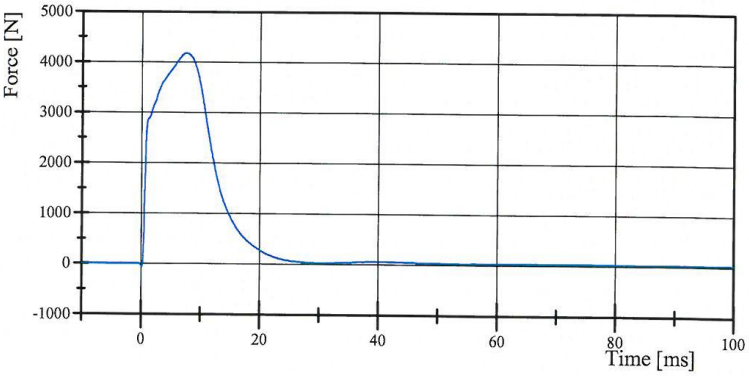
Filter Class: CFC_180
Max: 0.6 g at -0.9 ms
Min: -43.1 g at 7.8 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 49.9 g at 1.4 ms
Min: -13.4 g at 25.8 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,168.9 N at 7.6 ms
Min: -59.2 N at 0.1 ms

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

03.20.2013 13:27:04 390

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.9 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,992.1 N	Yes

Test meets specifications.

Comments:

Technician

Approved

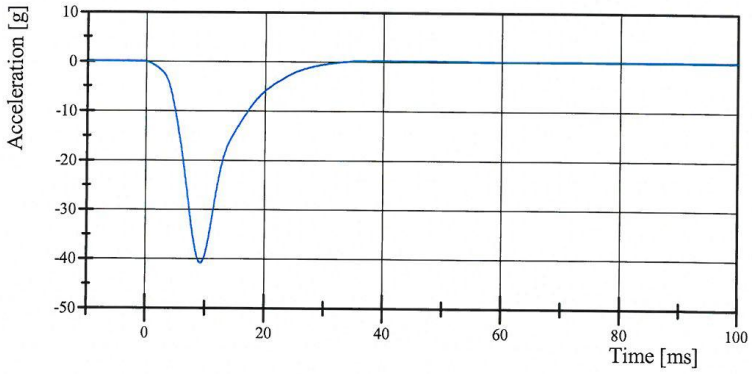
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:28:25 627

Transportation Research Center Inc.

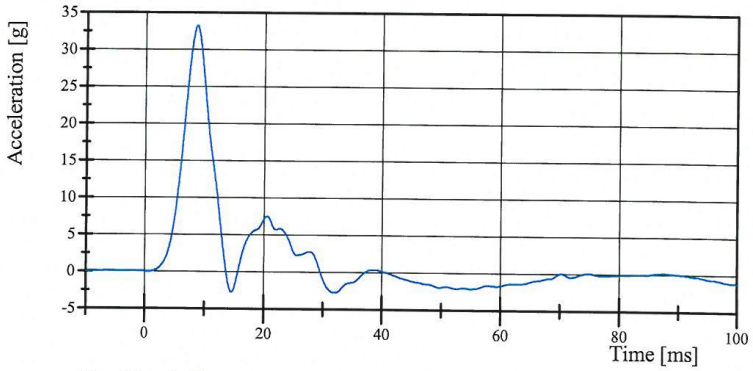
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 17-1
Test Date: 1/15/2013

Probe Acceleration



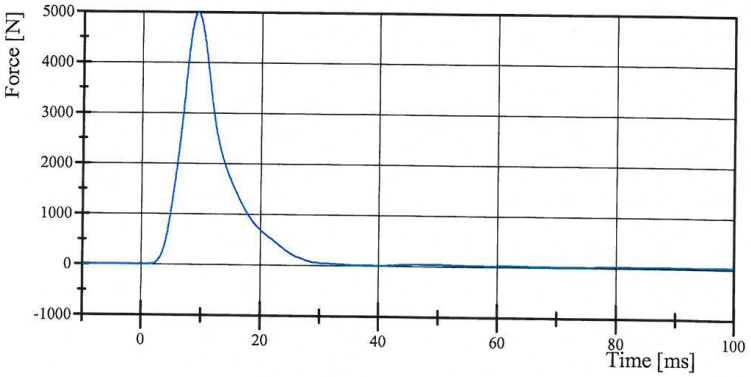
Filter Class: CFC_180
Max: 0.2 g at 41.8 ms
Min: -40.9 g at 9.3 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 33.2 g at 8.6 ms
Min: -2.8 g at 14.6 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,992.1 N at 9.3 ms
Min: -0.7 N at -3.8 ms

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

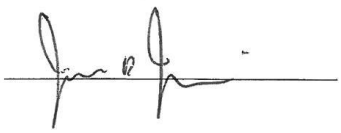
03.20.2013 13:28:32 627

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.017

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	777	Yes
B	Shoulder Pivot Height	437.0 - 453.0	441	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	144	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	135	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	530	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	314	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	482	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	866	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician

Approved



Revised 9/29/2005

Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

SID-IIs Dummy
Serial No. 305
Calibration No. 18

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

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-1.9 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

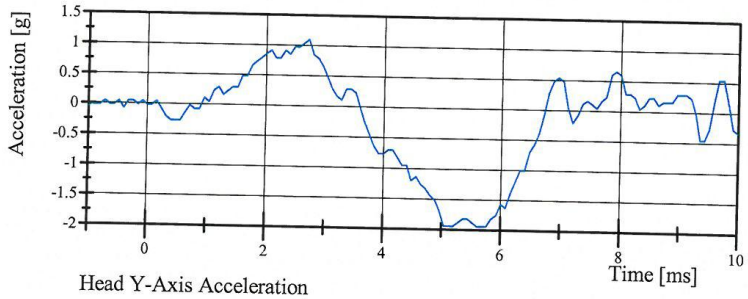
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:36:08 232

Transportation Research Center Inc.

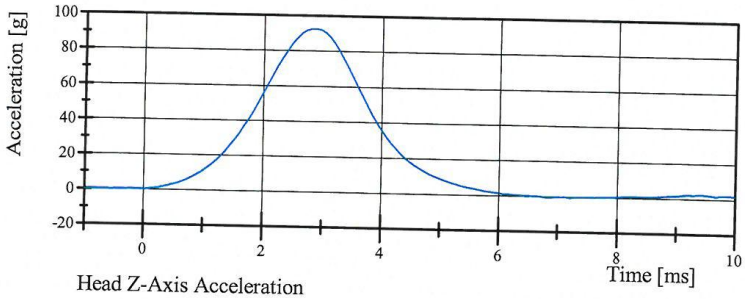
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Head X-Axis Acceleration



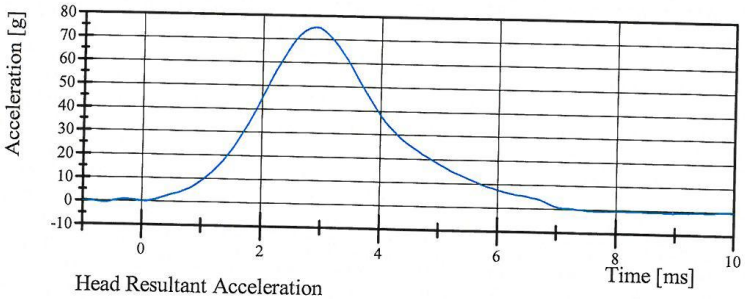
Filter Class: CFC_1000
Max: 1.1 g at 2.7 ms
Min: -1.9 g at 5.0 ms

Head Y-Axis Acceleration



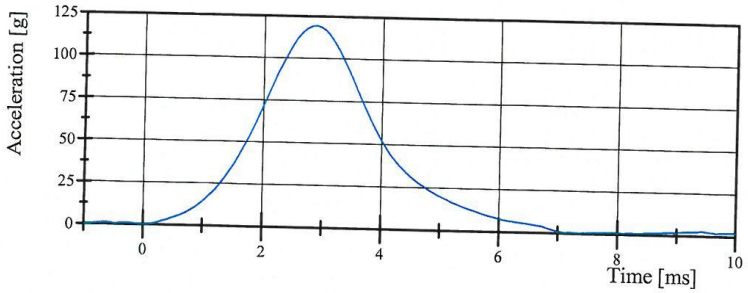
Filter Class: CFC_1000
Max: 92.4 g at 2.8 ms
Min: -0.5 g at 6.8 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 75.2 g at 2.9 ms
Min: -0.9 g at 9.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 119.2 g at 2.9 ms
Min: 0.0 g at 0.0 ms

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

03.20.2013 13:36:15 232

Transportation Research Center Inc.

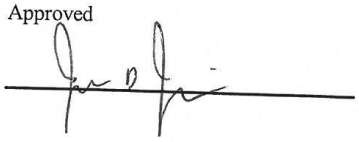
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.611 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.450 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.614 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.801 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.769 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.814 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.9 deg	Yes
Time of Peak	50 - 70 ms	63.9 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	119.7 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

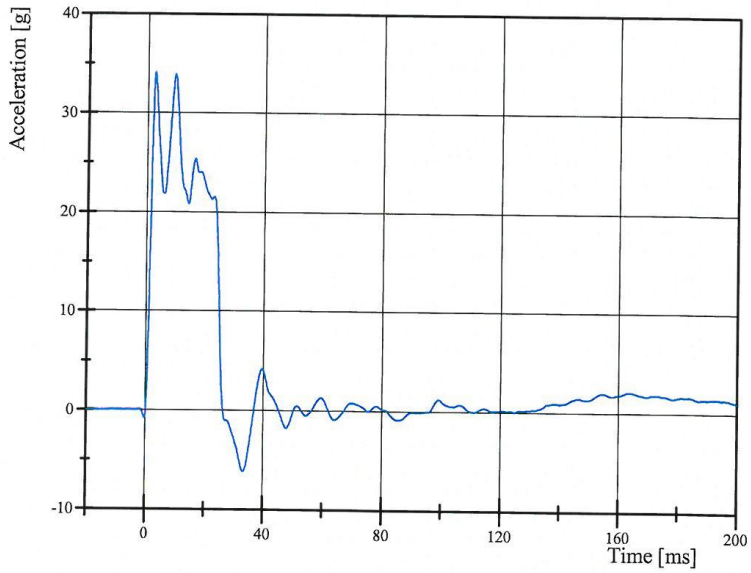
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:37:30 633

Transportation Research Center Inc.

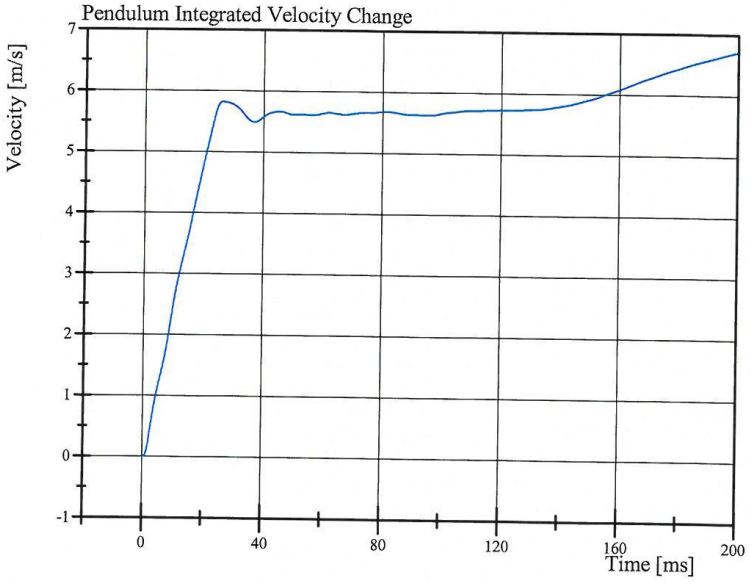
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Pendulum Acceleration



Filter Class: CFC_180
Max: 34.0 g at 2.5 ms
Min: -6.2 g at 33.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.7 m/s at 200.0 ms
Min: -0.0 m/s at 0.2 ms

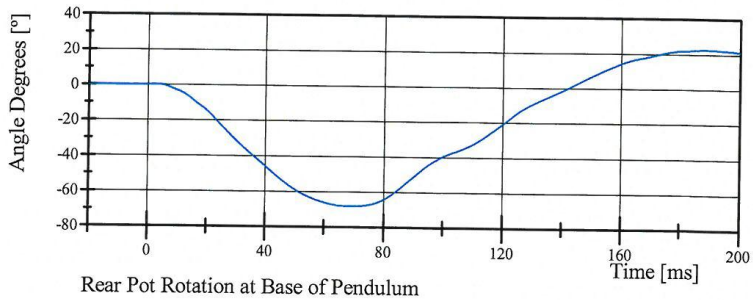
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:37:37 633

Transportation Research Center Inc.

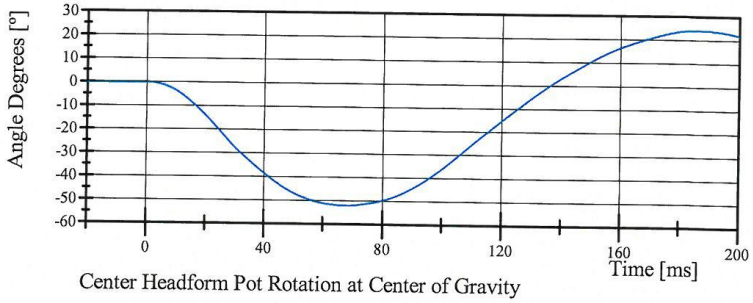
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Forward Pot Rotation at Base of Pendulum



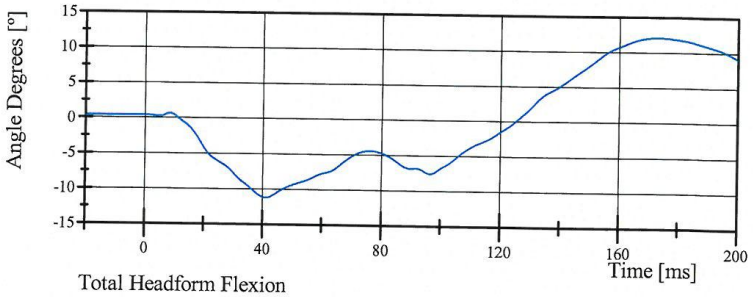
Filter Class: CFC_60
Max: 22.4 ° at 188.4 ms
Min: -68.3 ° at 69.0 ms

Rear Pot Rotation at Base of Pendulum



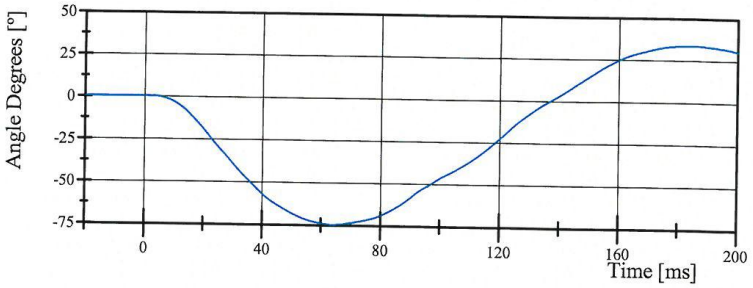
Filter Class: CFC_60
Max: 24.0 ° at 186.2 ms
Min: -52.2 ° at 68.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 12.1 ° at 173.3 ms
Min: -11.2 ° at 41.0 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 33.7 ° at 185.3 ms
Min: -74.9 ° at 63.9 ms

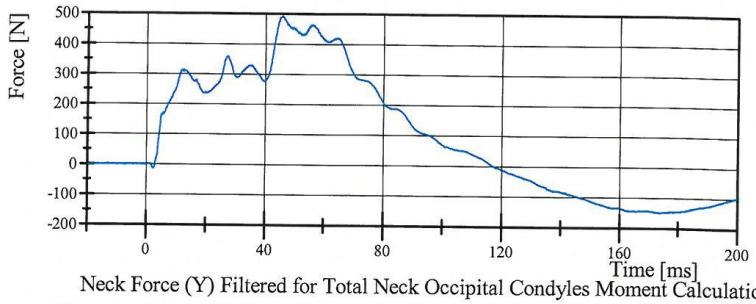
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:37:38 633

Transportation Research Center Inc.

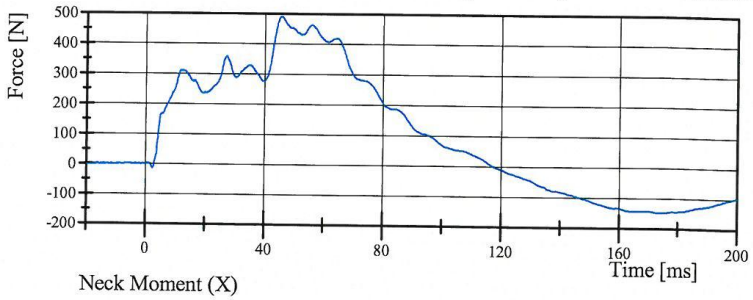
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Neck Force (Y)



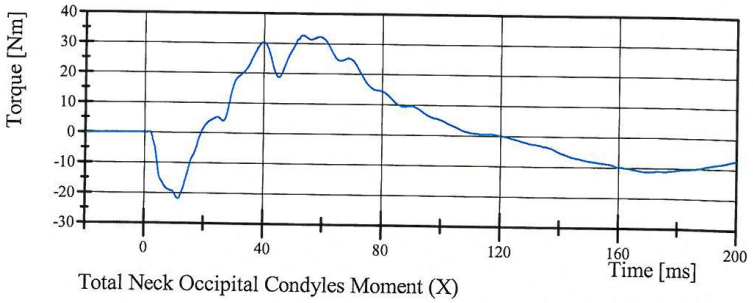
Filter Class: CFC_1000
Max: 491.2 N at 45.8 ms
Min: -148.7 N at 173.1 ms

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



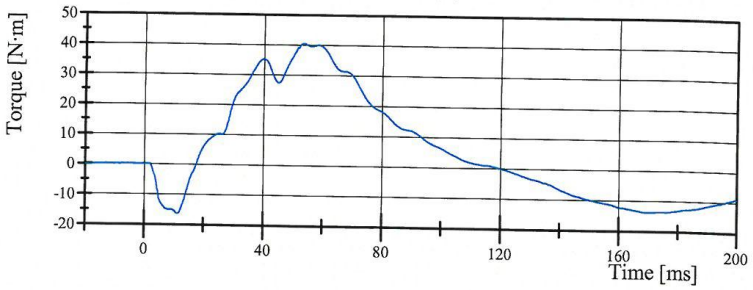
Filter Class: CFC_600
Max: 490.6 N at 45.7 ms
Min: -148.4 N at 173.9 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 32.7 Nm at 53.1 ms
Min: -21.9 Nm at 11.5 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constai
Max: 40.4 N·m at 53.2 ms
Min: -16.5 N·m at 11.4 ms

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

03.20.2013 13:37:39 633

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.7 g	Yes
Shoulder Displacement	28 - 37 mm	31.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.1 g	Yes

Test meets specifications.

Comments:

Technician

Approved

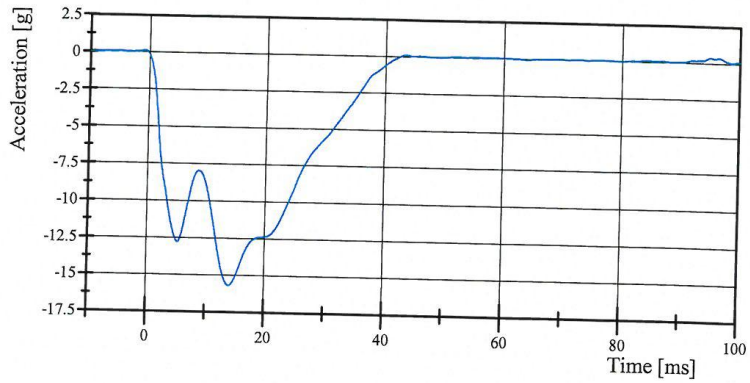
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:38:48 818

Transportation Research Center Inc.

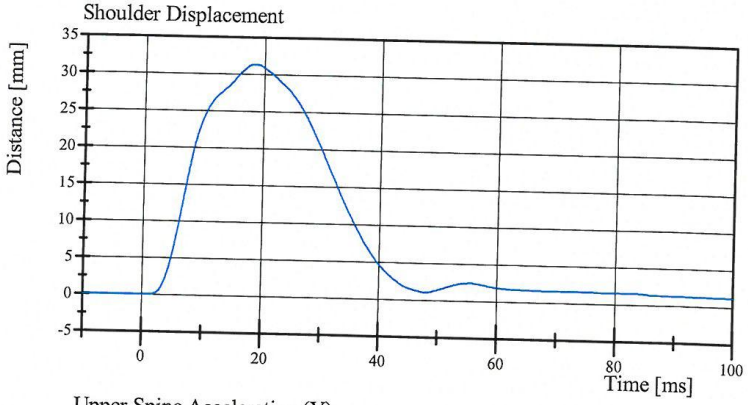
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Probe Acceleration



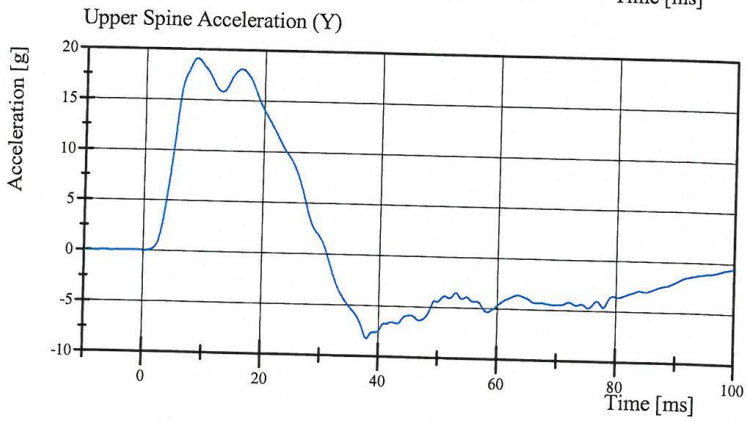
Filter Class: CFC_180
Max: 0.3 g at 96.5 ms
Min: -15.7 g at 14.1 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 31.3 mm at 18.3 ms
Min: -0.0 mm at -10.0 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 19.1 g at 8.5 ms
Min: -8.3 g at 38.0 ms

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

03.20.2013 13:38:56 818

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.734 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.3 g	Yes
Shoulder Displacement	31 - 40 mm	35.6 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.6 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.4 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	32.7 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.2 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.5 g	Yes

Test meets specifications.

Comments:

Technician

Approved

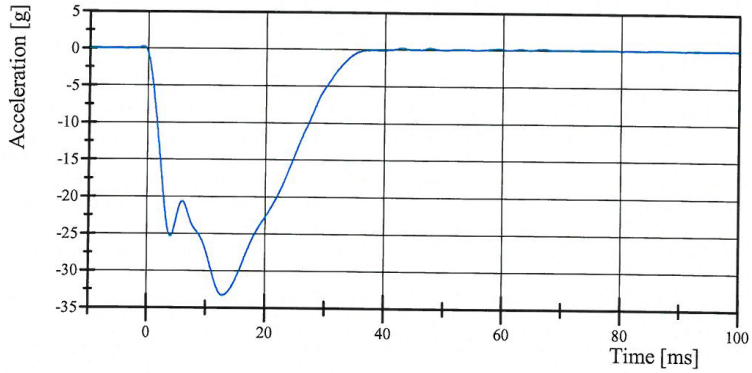
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:40:11 600

Transportation Research Center Inc.

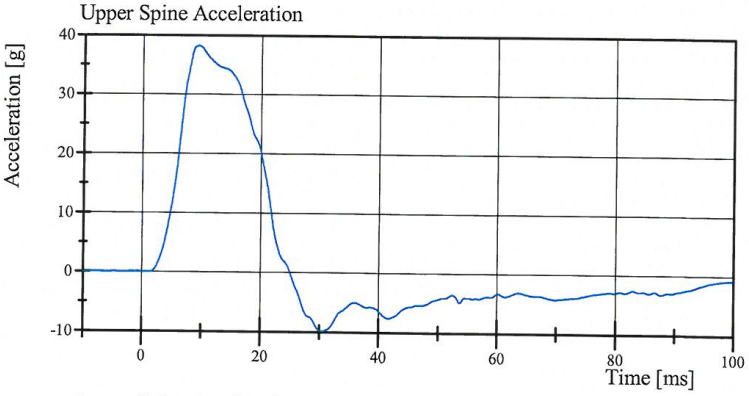
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Probe Acceleration



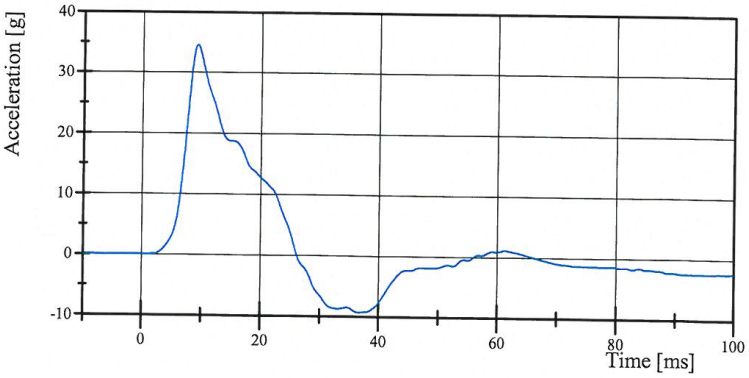
Filter Class: CFC_180
Max: 0.2 g at 47.5 ms
Min: -33.3 g at 12.9 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 38.2 g at 9.4 ms
Min: -9.9 g at 30.4 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 34.5 g at 9.2 ms
Min: -9.4 g at 36.7 ms

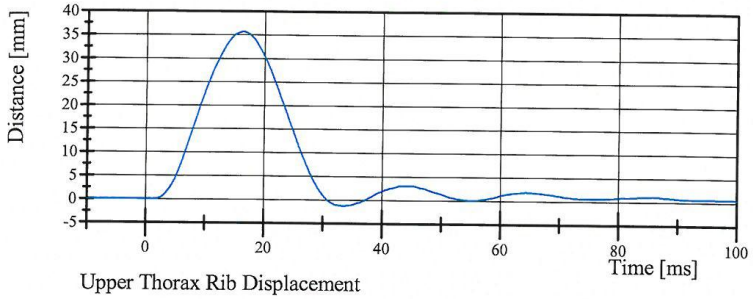
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:40:21 600

Transportation Research Center Inc.

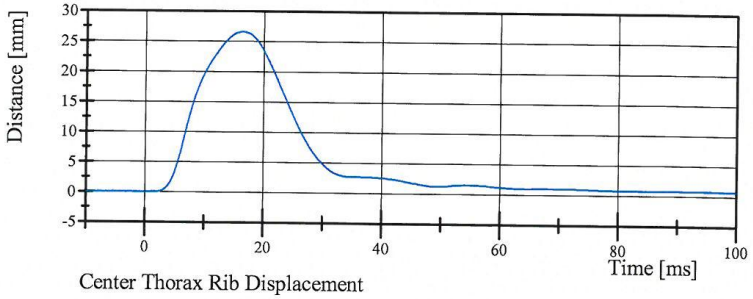
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 18-3
Test Date: 3/7/2013

Shoulder Rib Displacement



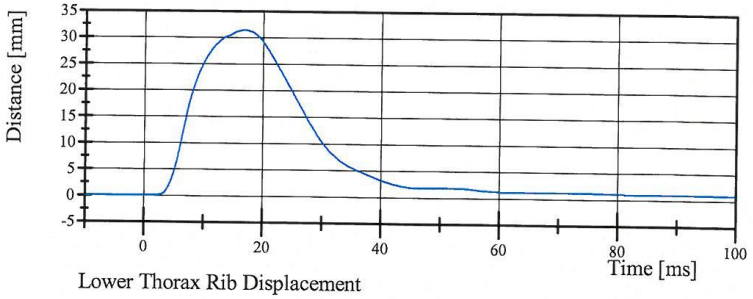
Filter Class: CFC_600
Max: 35.6 mm at 16.3 ms
Min: -1.2 mm at 33.5 ms

Upper Thorax Rib Displacement



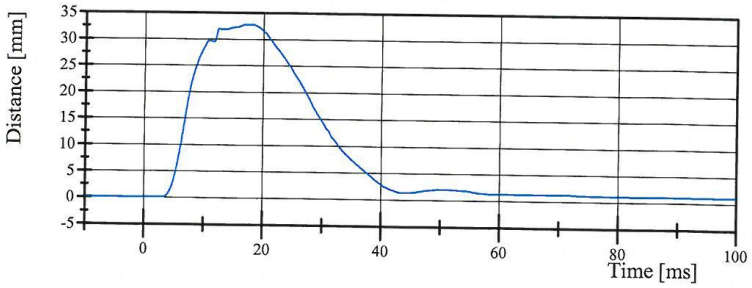
Filter Class: CFC_600
Max: 26.6 mm at 16.4 ms
Min: -0.0 mm at -6.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 31.4 mm at 16.9 ms
Min: -0.0 mm at -0.2 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.7 mm at 18.2 ms
Min: -0.0 mm at -0.3 ms

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

03.20.2013 13:40:21 600

Transportation Research Center Inc.

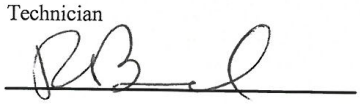
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.382 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.9 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.3 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	35.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	16.2 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.6 g	Yes

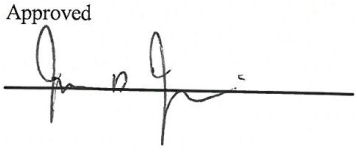
Test meets specifications.

Comments:

Technician



Approved



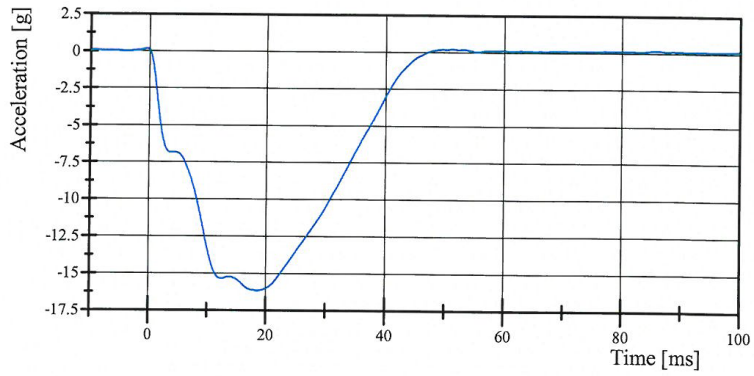
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:41:55 824

Transportation Research Center Inc.

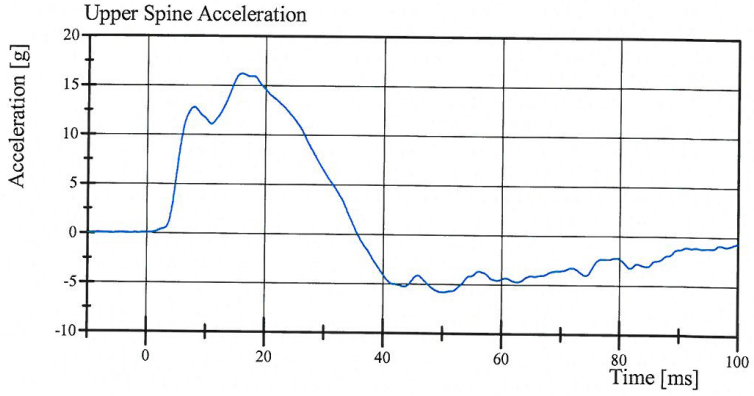
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Probe Acceleration



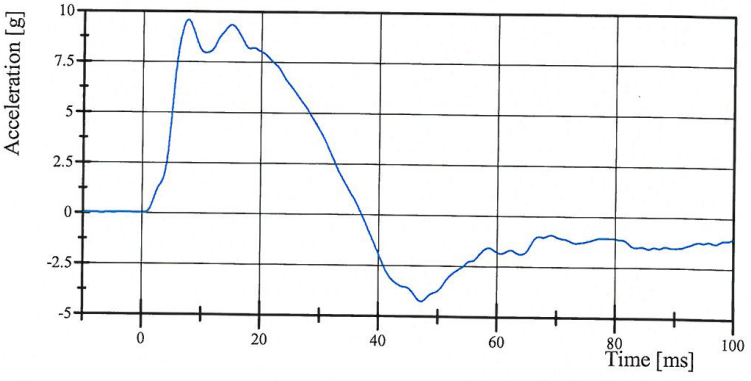
Filter Class: CFC_180
Max: 0.2 g at 51.1 ms
Min: -16.2 g at 18.6 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 16.2 g at 16.0 ms
Min: -5.8 g at 49.9 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.6 g at 7.5 ms
Min: -4.3 g at 47.2 ms

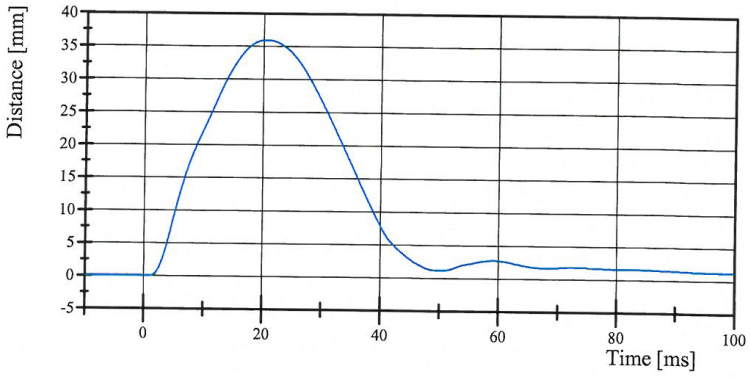
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:42:11 824

Transportation Research Center Inc.

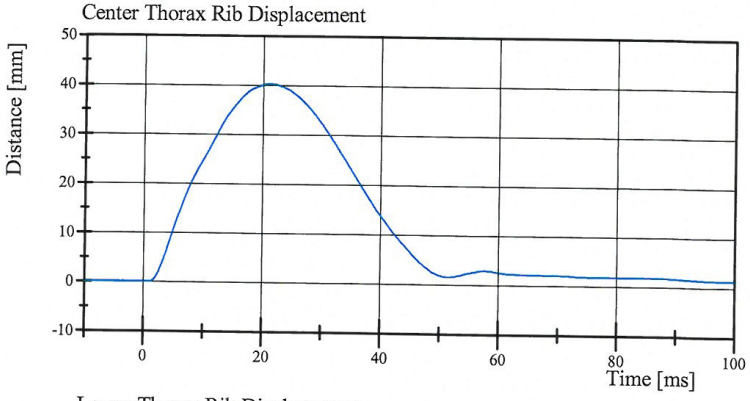
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Upper Thorax Rib Displacement



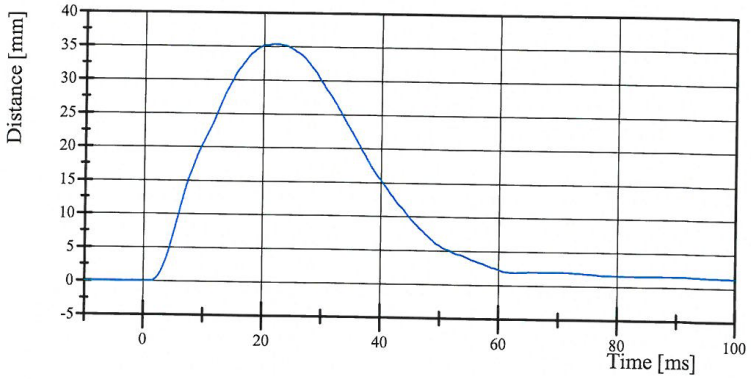
Filter Class: CFC_600
Max: 35.9 mm at 20.6 ms
Min: -0.0 mm at 1.1 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.3 mm at 21.0 ms
Min: -0.0 mm at -5.6 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 35.3 mm at 22.1 ms
Min: -0.0 mm at 1.1 ms

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

03.20.2013 13:42:12 824

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.9 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	35.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	12.24 g	Yes

Test meets specifications.

Comments:

Technician

Approved

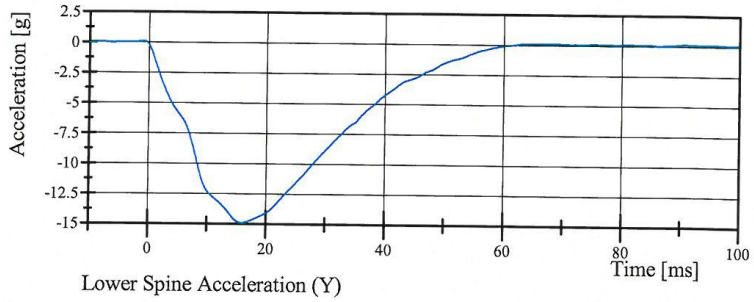
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:43:30 644

Transportation Research Center Inc.

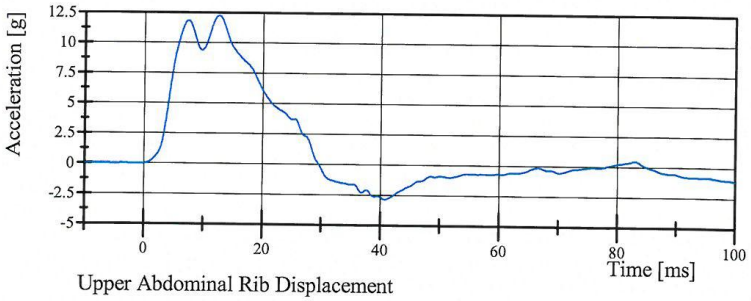
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Probe Acceleration



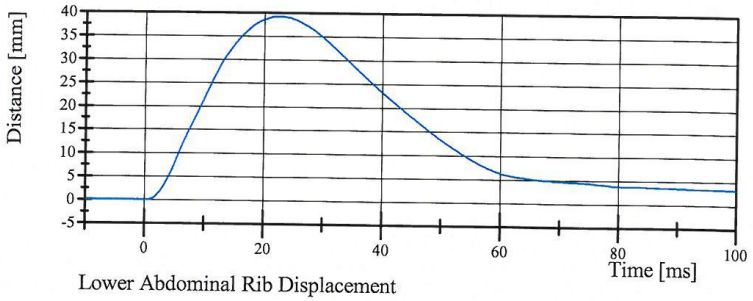
Filter Class: CFC_180
Max: 0.1 g at 90.7 ms
Min: -14.9 g at 15.8 ms

Lower Spine Acceleration (Y)



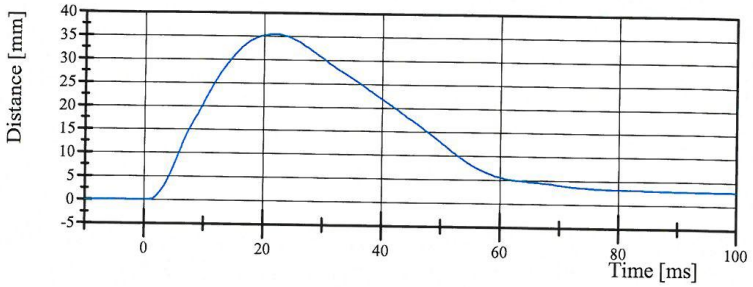
Filter Class: CFC_180
Max: 12.2 g at 12.5 ms
Min: -2.9 g at 40.7 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 39.2 mm at 22.5 ms
Min: -0.0 mm at -1.3 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 35.4 mm at 22.0 ms
Min: -0.0 mm at -5.2 ms

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

03.20.2013 13:43:38 644

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

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	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.67 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.8 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,015.3 N	Yes

Test meets specifications.

Comments:

Technician

Approved

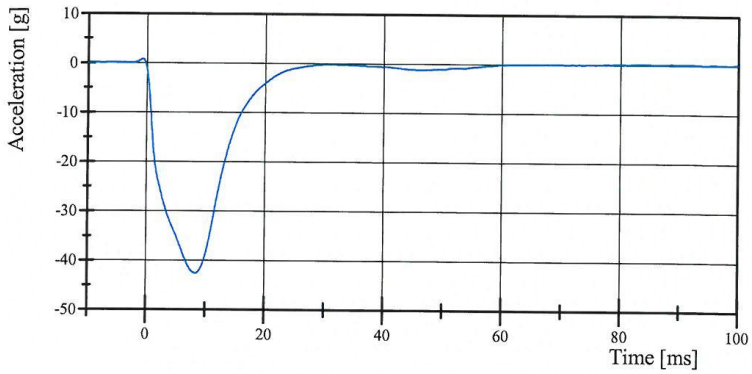
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:44:41 411

Transportation Research Center Inc.

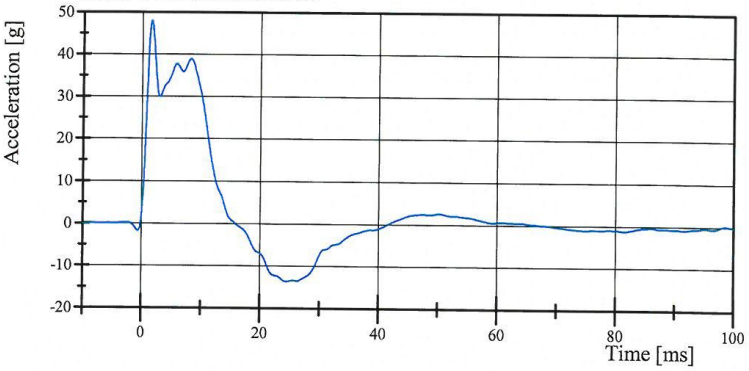
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Probe Acceleration



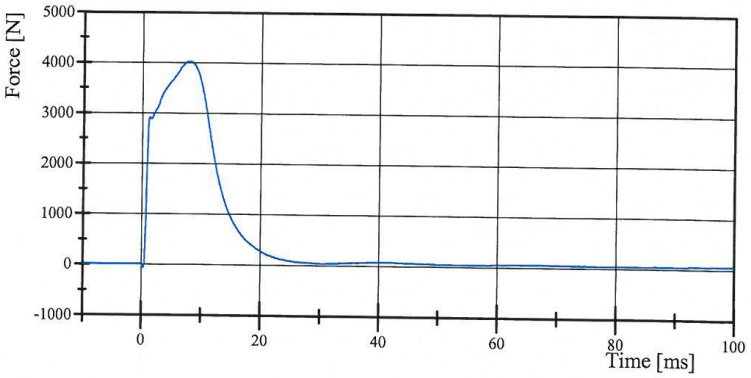
Filter Class: CFC_180
Max: 0.6 g at -0.7 ms
Min: -42.7 g at 8.3 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 47.9 g at 1.5 ms
Min: -13.7 g at 24.5 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,015.3 N at 7.9 ms
Min: -70.4 N at 0.3 ms

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

03.20.2013 13:44:48 411

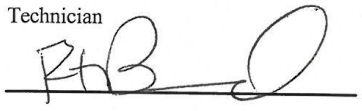
Transportation Research Center Inc.

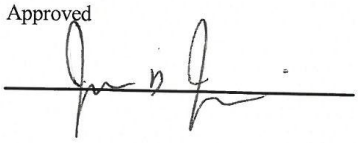
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.1 g	Yes
Iliac Force	4,100 - 5,100 N	4,963.3 N	Yes

Test meets specifications.

Comments:

Technician 

Approved 

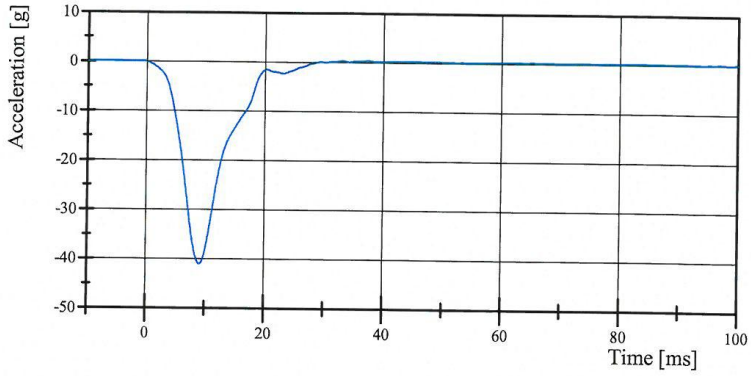
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

03.20.2013 13:46:02 658

Transportation Research Center Inc.

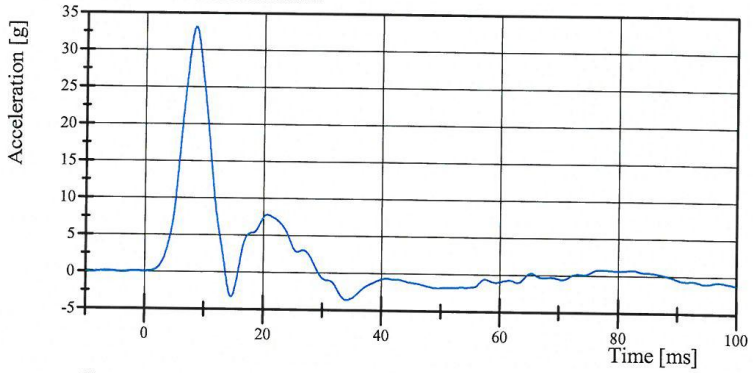
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 18-1
Test Date: 3/7/2013

Probe Acceleration



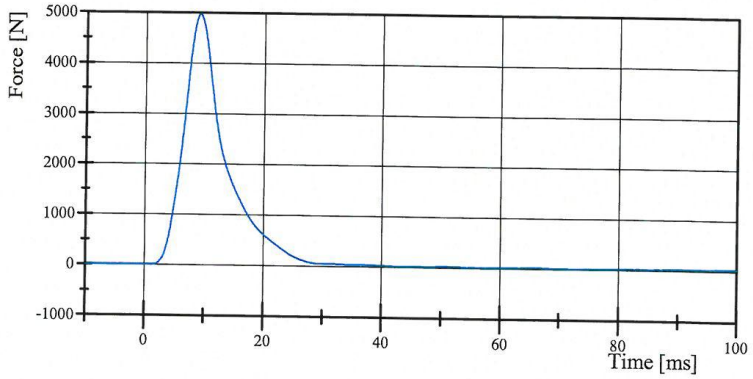
Filter Class: CFC_180
Max: 0.3 g at 37.3 ms
Min: -41.1 g at 9.1 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 33.1 g at 8.4 ms
Min: -3.6 g at 34.1 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,963.3 N at 9.1 ms
Min: -0.6 N at -9.8 ms

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

03.20.2013 13:46:10 658

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.018

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	777	Yes
B	Shoulder Pivot Height	437.0 - 453.0	441	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	144	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	134	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	315	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	865	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician

Approved

Revised 9/29/2005

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	28-Sep-12
		Y	P51702	Endevco	28-Sep-12
		Z	P52083	Endevco	28-Sep-12
Thoracic Rib Displacement Potentiometers	Upper	Y	175	FTSS	27-Sep-12
	Middle	Y	174	FTSS	27-Sep-12
	Lower	Y	173	FTSS	27-Sep-12
Abdomen Load Cells	Upper	Y	1441	Denton	28-Sep-12
	Middle	Y	1436	Denton	28-Sep-12
	Lower	Y	1437	Denton	28-Sep-12
Lower Spine Accelerometers (T12)		X	P68599	Endevco	19-Dec-12
		Y	P59002	Endevco	19-Dec-12
		Z	P59005	Endevco	28-Sep-12
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	28-Sep-12

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P51719	Endevco	27-Sep-12
			Y	P51272	Endevco	27-Sep-12
			Z	P58862	Endevco	27-Sep-12
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	27-Sep-12
		Middle	Y	1161	Servo	27-Sep-12
		Lower	Y	1279	Servo	27-Sep-12
	Abdominal Rib	Upper	Y	1295	Servo	27-Sep-12
		Lower	Y	1136	Servo	27-Sep-12
Lower Spine Accelerometers (T12)			X	P50068	Endevco	28-Sep-12
			Y	P52051	Endevco	28-Sep-12
			Z	P51710	Endevco	28-Sep-12
Acetabulum Load Cell			Y	287-FY	FTSS	27-Sep-12
Iliac Wing Load Cell			Y	103-FY	FTSS	27-Sep-12
Pelvis Plug (struck side)				45990	FTSS	
Pelvis Plug (non-struck side)				36500	FTSS	

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P75718	Endevco	14-Sep-2012
	Vehicle Center of Gravity	Y	P78096	Endevco	14-Feb-2013
	Vehicle Center of Gravity	Z	P74518	Endevco	17-Jan-2013
2	Right Sill at Front Seat	X	P74816	Endevco	25-Jan-2013
	Right Sill at Front Seat	Y	P72279	Endevco	25-Jan-2013
	Right Sill at Front Seat	Z	P76063	Endevco	7-Sep-2012
3	Right Sill at Rear Seat	X	P76187	Endevco	30-Oct-2012
	Right Sill at Rear Seat	Y	P74452	Endevco	31-Jan-2013
	Right Sill at Rear Seat	Z	P75515	Endevco	28-Jan-2013
4	Left Sill at Front Door	Y	P75993	Endevco	8-Feb-2013
5	Left Sill at Rear Door	Y	P78097	Endevco	1-Mar-2013
6	Left A-Post Lower	Y	P75011	Endevco	25-Feb-2013
7	Left A-Post Middle	Y	P80354	Endevco	25-Feb-2013
8	Left B-Post Lower	Y	P78120	Endevco	29-Jan-2013
9	B-Post Middle	Y	P74480	Endevco	24-Jan-2013
10	Front Seat Track	Y	P76409	Endevco	20-Feb-2013
11	Rear Seat Track or Structure	Y	P76210	Endevco	27-Nov-2012
12	Right Rear Occupant Compartment	Y	P75111	Endevco	19-Nov-2012
13	Engine Block	X	P75525	Endevco	29-Jan-2013
	Engine Block	Y	P74495	Endevco	17-Jan-2013
14	Rear Floorpan Above Axle	X	P75994	Endevco	27-Nov-2012
	Rear Floorpan Above Axle	Y	P78141	Endevco	10-Oct-2012
	Rear Floorpan Above Axle	Z	P75240	Endevco	14-Nov-2012

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P76342	Endevco	26-Sep-2012
MDB Center of Gravity	Y	P78122	Endevco	17-Jan-2013
MDB Center of Gravity	Z	P75110	Endevco	17-Oct-2012
Left Frame Rail at Rear Axle Centerline	X	P76109	Endevco	6-Feb-2013
Left Frame Rail at Rear Axle Centerline	Y	P75730	Endevco	6-Feb-2013