

FINAL REPORT NUMBER: SINCAP-TRC-14-002

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

**Fuji Heavy Industries
2014 Subaru Forester 2.5i MPV
NHTSA Number: O20145502**

**PREPARED BY:
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Report Date: August 13, 2013

FINAL REPORT

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

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Report Approved By: 
Jeffery W. Sankey, Project Manager

Approval Date: August 13, 2013

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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16. Abstract This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2014 Subaru Forester 2.5i MPV 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 July 30, 2013. The impact velocity of the Moving Deformable Barrier (MDB) was 62.26 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21° C. The target vehicle post-test maximum crush was 218 mm at Level 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>NA</td> <td>1000</td> <td>106</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>15.95</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>666.46</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1397.93</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>NA</td> <td>1000</td> <td>235</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>g's</td> <td>82</td> <td>52.46</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2661.12</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>16.01</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>16.70</td> </tr> </tbody> </table> * 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.				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	NA	1000	106	Maximum Thoracic Rib Deflection	mm	44	15.95	Total Abdominal Force	N	2500	666.46	Pubic Symphysis Force	N	6000	1397.93	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	NA	1000	235	Lower Spine Resultant Acceleration	g's	82	52.46	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2661.12	Maximum Thoracic Rib Deflection	mm	38*	16.01	Maximum Abdominal Rib Deflection	mm	45*	16.70
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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 2014 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00125. The purpose of this test is to generate comparative side impact performance in a 2014 Subaru Forester 2.5i MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2012.

SECTION 2

SUMMARY OF TEST RESULTS

A 2014 Subaru Forester 2.5i MPV 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 62.26 km/h (38.69 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 July 30, 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	106
Maximum Thoracic Rib Deflection	mm	44	15.95
Combined Abdominal Force	N	2500	666.46
Pubic Symphysis Force	N	6000	1397.93

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	235
Lower Spine (T12) Resultant Acceleration	G	82	52.46
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2661.12
Maximum Thoracic Rib Deflection	mm	38*	16.01
Maximum Abdominal Rib Deflection	mm	45*	16.70

* Proposed IARV

Supplemental Restraint Information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Knee Airbag	Yes	No	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other	N/A	N/A	N/A	N/A

GENERAL COMMENTS

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20145502
Model Year	2014
Make	Subaru
Model	Forester 2.5i
Body Style	MPV
VIN	JF2SJAAC3EG425474
Body Color	Green
Odometer Reading (km/mi)	72 mi
Engine Displacement (L)	2.5
Type/No. Cylinders	4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
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	No
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	No

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	3/13
Vehicle Type	MPV

GVWR (kg)	2032
GAWR Front (kg)	1048
GAWR Rear (kg)	1093

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

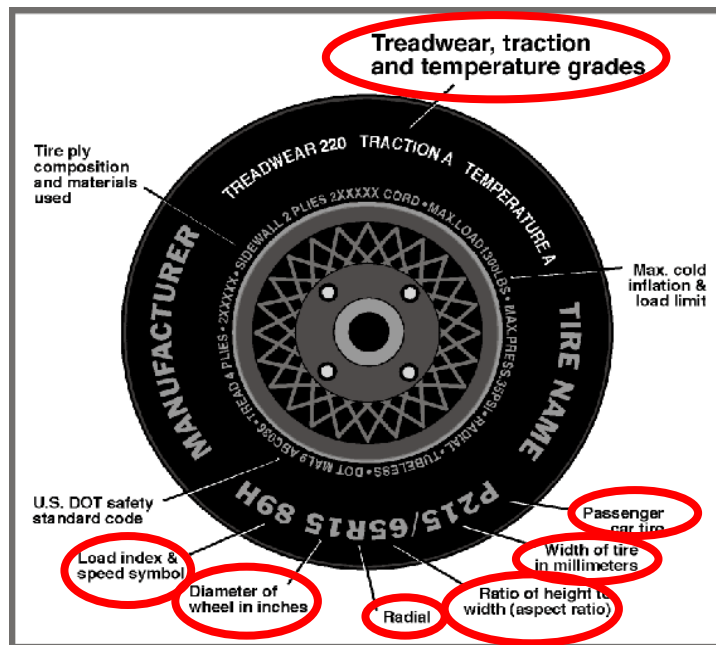
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	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: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	210	200
Recommended Tire Size	P225/60R17	P225/60R17
Tire Size on Vehicle	P225/60R17	P225/60R17
Tire Fuji Heavy Industries	Yokohama	Yokohama
Tire Model	Geolander G91	Geolander G91
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	4	4
Load Index/Speed Symbol	98H	98H
Tire Material	Polyester & Steel	Polyester & Steel
DOT Safety Code Left	FDFC-PE21013	FDFC-PE21013
DOT Safety Code Right	FDFC-PE21013	FDFC-PE21013

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: O20145502
Test Date: 07/30/2013

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	269	262	269	269
Tire Placard	kPa	210	210	200	200
Owner's Manual	kPa	210	210	200	200
As Tested	kPa	210	210	200	200

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	428.6	332.0		475.0	389.2		480.6	428.6	
Right	kg	415.0	317.4		443.8	372.8		420.6	391.0	
Ratio	%	56.5	43.5		54.7	45.3		52.4	47.6	
Totals	kg	843.6	649.4	1493.0	918.8	762.0	1680.8	901.2	819.6	1720.8

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1493.0	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	125	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	67.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1685.8	(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	760	761	Yes
RF	mm	768	762	Yes
RR	mm	773	777	Yes
LR	mm	760	770	Yes
Vehicle CG (Aft of Front Axle)	mm	1151	1200	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	15	22	

***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)	0.0
Parts removed: Rear tail lights, rear fascia, interior hatch trim, rear wiper and motor.	12.2

DATA SHEET NO. 2

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

Test Vehicle: 2014 Subaru Forester 2.5i MPV

NHTSA No.: O20145502

Test Program: NCAP Side Impact

Test Date: 07/30/2013

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	11.0	7.0	9.0
Front Passenger Seat	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	13.1
Non-Struck Side Rear Seat	Fixed	N/A	13.4
Rear Center Seat*	Fixed	N/A	11.1

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	9.0	190	Max	207	212	216
			Mid	182	190	195
			Min	167	170	174
Front Passenger Seat	9.3	190	Max	N/A	N/A	N/A
			Mid	182	190	197
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	13.1	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	13.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	11.1	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

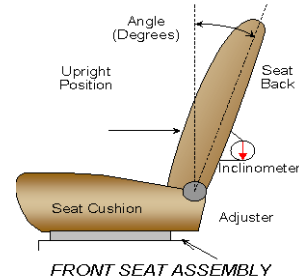
NHTSA No.: O20145502
 Test Date: 07/30/2013

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	260	27, Numbered from 0 to 26	130	13
Front Passenger Seat	260	27, Numbered from 0 to 26	130	13
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the Fuji Heavy Industries'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	64.2	33	2.2 on Head Restraint	6
Front Passenger Seat	69.0	33	2.2 on Head Restraint	6
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	24.0	N/A	Fixed	N/A
Non-Struck Side Rear Seat	23.4	N/A	Fixed	N/A
Rear Center Seat*	21.1	N/A	Fixed	N/A

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4 Numbered from 0 to 3	1
Rear Seat	Fixed	N/A

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	5 Numbered from 0 to 4	4
Rear Seat	Fixed	N/A

DATA SHEET NO. 2 (CONTINUED)

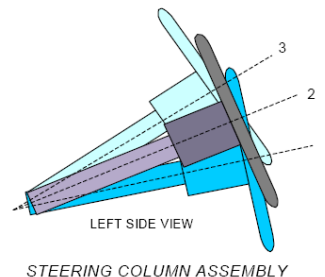
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

STEERING COLUMN ADJUSTMENT

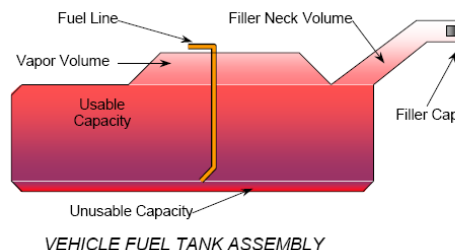
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.



	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	25.8	20
Geometric Center, Position No. 2	27.3	20
Uppermost, Position No. 3	28.7	20
Telescoping Steering Wheel Travel		40
Test Position	27.3	20

FUEL PUMP

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



FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	60.2
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	60.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	56.0
Actual Amount of Solvent Used in Test	56.0
1/3 of Usable Capacity	18.7

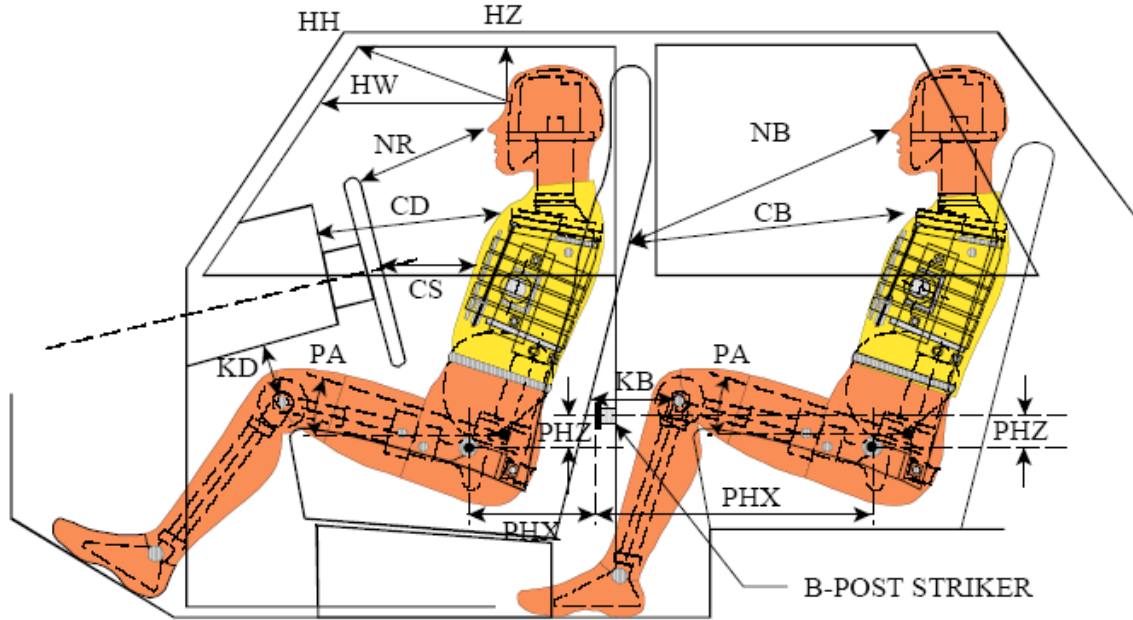
Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in on Form No. 1? ☒ YES ☐ NO

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: O20145502
Test Date: 07/30/2013



LEFT SIDE VIEW

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

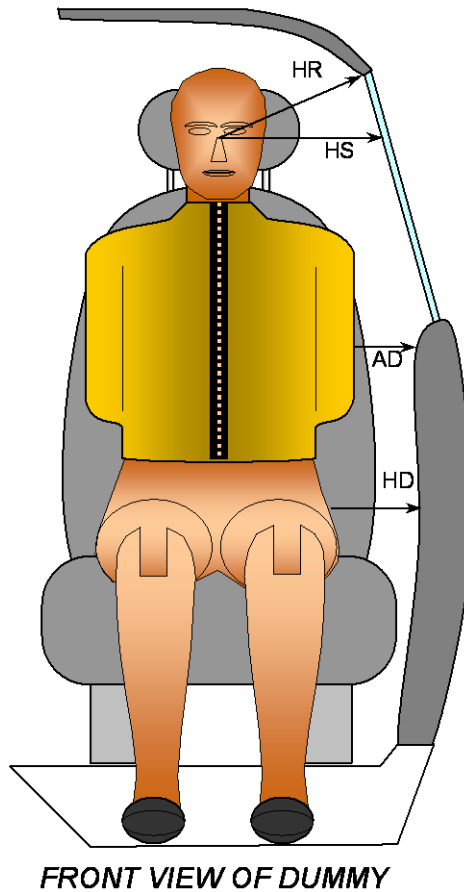
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	406			
HW		Header to Windshield	636			
HZ	HZ	Head to Roof Liner	214		316	
NR	NB	Nose to Rim/Seat Back	444		607	
CD	CB	Chest to Dash/Seat Back	556		568	
CS		Chest to Steering Wheel	305			
KD(L)/KDA(L) ⁰	KB(L)/KBA(L) ⁰	Left Knee to Dash/Seat Back	176	24.0	315	13.0
KD(R)/KDA(R) ⁰	KB(R)/KBA(R) ⁰	Right Knee to Dash/Seat Back	170	25.0	324	13.0
PAX ⁰	PAX ⁰	Pelvic Tilt Angle X		0.7		1.3
	PAY ⁰	Pelvic Tilt Angle Y				20.5
PHX	PHX	Hip Point to Striker (X-Axis)	210		251	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	186		294	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

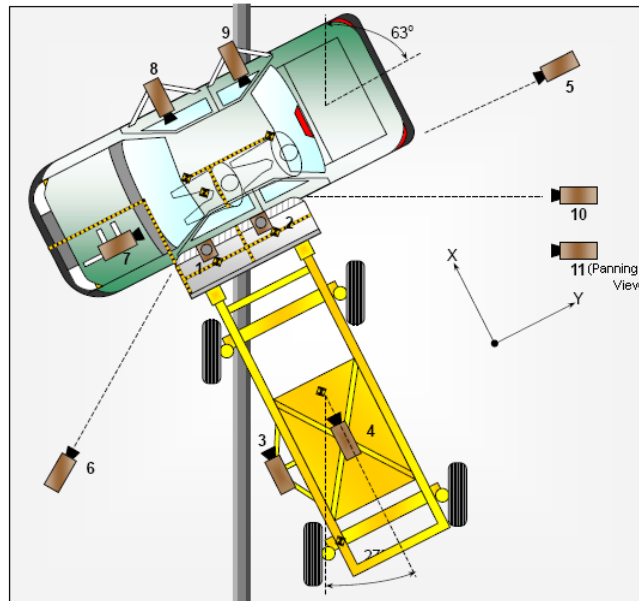


Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	229	289
HS	Head to Side Window	mm	348	387
AD	Arm to Door	mm	108	164
HD	H-Point to Door	mm	149	176

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	880	-5752	8.5	1000
2	Overhead Close-up	0	430	-5752	16	1000
3	Left Impact Point (MDB)	1804	-845	-822	25	1000
4	Side Overall (MDB)	2491	0	-1439	8.5	1000
5	Rear	0	8195	-1246	12.5	1000
6	Left Front	2832	-5079	-1218	16	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				8.5	1000
9	Passenger Side (OB)				8.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

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

*All measurements accurate to ± 6 mm.

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

INSTRUMENTATION

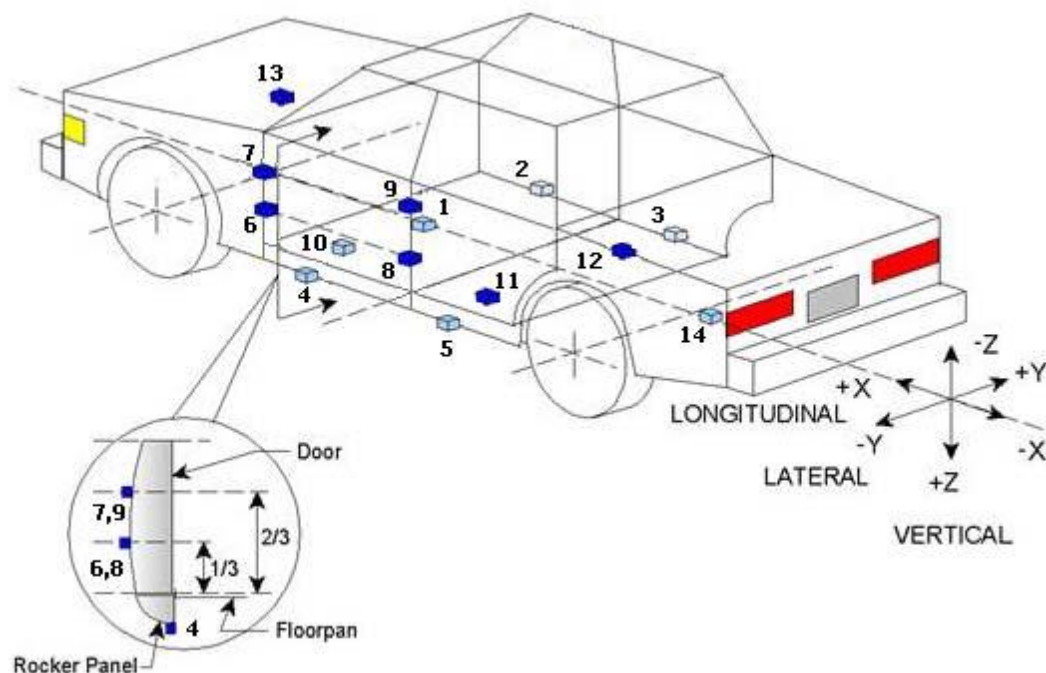
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MBD Accelerometers	7
TOTAL	62

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013



TEST VEHICLE ACCELEROMETER LOCATIONS

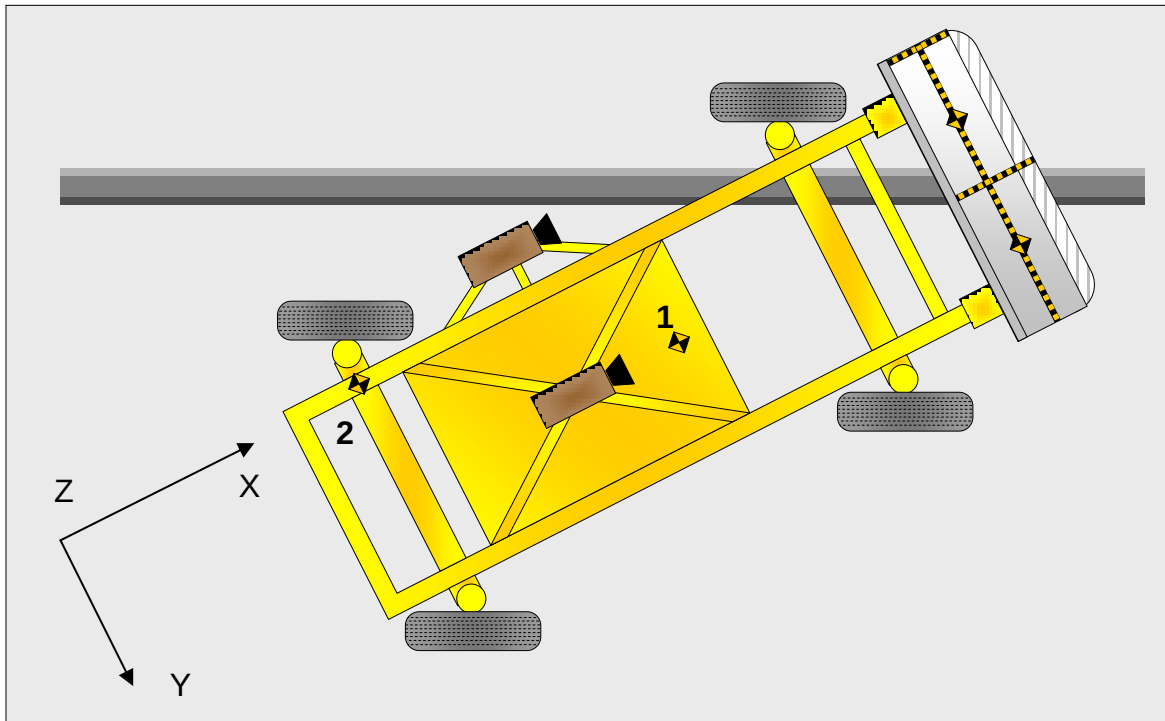
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2700	130	-384
2	Right Sill at Front Seat	2665	720	-385
3	Right Sill at Rear Seat	1800	695	-366
4	Left Sill at Front Door	2672	-705	-398
5	Left Sill at Rear Door	1818	-695	-398
6	A-Post Lower	3155	-790	-562
7	A-Post Middle	3170	-790	-954
8	B-Post Lower	2085	-800	-550
9	B-Post Middle	2038	-807	-1018
10	Front Seat Track	2275	-550	-430
11	Rear Seat Structure	1560	-540	-427
12	Right Rear Occ. Compartment	1705	650	-369
13	Engine Block	3960	5	-663
14	Rear Above Axle	1068	-25	-610

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	-2186	0	-497
2	MDB Rear	-3642	-650	-615

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: O20145502
Test Date: 07/30/2013

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST TEST DOOR PERFORMANCE

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

POST TEST SEAT PERFORMANCE

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

POST TEST STRUCTURAL OBSERVATIONS

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

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Knee Airbag	Yes	No	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other	N/A	N/A	N/A	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2647
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		383
Actual Impact Point (Aft of Front Axle)	mm		383
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-4

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: O20145502
Test Date: 07/30/2013

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	1106

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	412.4	270.0	682.4
Right	kg	371.4	313.8	685.2
Ratio	%	57.3	42.7	100
Totals	kg	783.8	583.8	1367.6

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.26
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.24
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.0

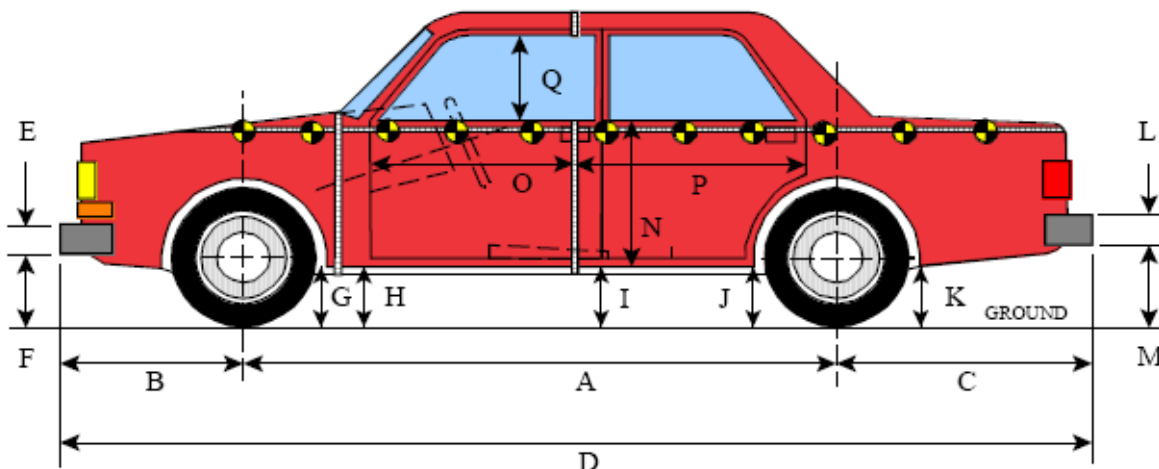
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	218
B	Top of Bumper	533	800	Right	126
C	Mid-Level	686	800	Left	105
D	Top of Stack	813	800	Left	124

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

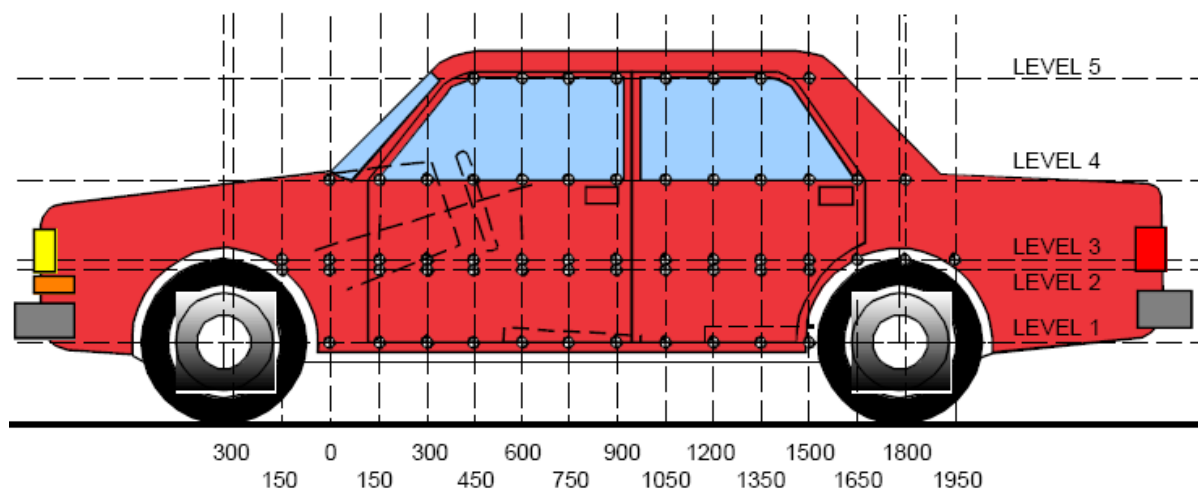


LEFT SIDE VIEW

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

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2647	2630	17
B	Front Axle to Front Surface of Vehicle	940	940	0
C	Rear Axle to Rear Surface of Vehicle	994	994	0
D	Total Length at Centerline	4586	4586	0
E	Front Bumper Thickness	185	185	0
F	Front Bumper Bottom to Ground	518	515	3
G	Sill Height at Front Wheel Well	358	370	-12
H	Sill Height at Front Door Leading Edge	363	395	-32
I	Sill Height at B-Pillar	377	448	-71
J1	Sill Height at Rear Wheel Well	392	465	-73
J2	Pinch Weld Height at Rear Wheel Well	229	265	-36
K	Sill Height Aft of Rear Wheel Well	433	470	-37
L	Rear Bumper Thickness	107	107	0
M	Rear Bumper Bottom to Ground	523	547	-24
N	Sill Height to Window Bottom Sill	904	770	134
O	Front Door Leading Edge to Impact CL	833	760	73
P	Rear Door Trailing Edge to Impact CL	1260	1310	-50
Q	Front Window Opening	472	468	4
R	Right Side Length	4440	4425	15
S	Left Side Length	4440	4410	30
T	Vehicle Width at B Pillar	1790	1695	95

DATA SHEET NO. 11**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**Test Vehicle: 2014 Subaru Forester 2.5i MPVNHTSA No.: O20145502Test Program: NCAP Side ImpactTest Date: 07/30/2013**LEFT SIDE VIEW****MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	387	133	900
2	Driver Hip Point	687	211	1050
3	Mid-Door	713	218	1350
4	Window Sill	1018	90	1350
5	Window Top	1609	7	2250

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

DATA SHEET NO. 11 (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

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	-6	0	0	0	0	-6	0	0	0	0	-6	0
-150	0	0	-2	-2	0	0	0	-2	-2	0	0	0	-2	-2	0
0	0	9	8	-4	0	0	9	8	-4	0	0	9	8	-4	0
150	80	112	111	-3	0	80	112	111	-3	0	80	112	111	-3	0
300	111	158	159	16	0	111	158	159	16	0	111	158	159	16	0
450	123	174	178	23	0	123	174	178	23	0	123	174	178	23	0
600	127	188	195	33	0	127	188	195	33	0	127	188	195	33	0
750	128	200	207	44	0	128	200	207	44	0	128	200	207	44	0
900	133	204	214	54	-8	133	204	214	54	-8	133	204	214	54	-8
1050	119	211	214	66	-6	119	211	214	66	-6	119	211	214	66	-6
1200	119	188	194	79	-4	119	188	194	79	-4	119	188	194	79	-4
1350	113	211	218	90	-2	113	211	218	90	-2	113	211	218	90	-2
1500	105	210	209	80	-2	105	210	209	80	-2	105	210	209	80	-2
1650	105	182	184	72	-1	105	182	184	72	-1	105	182	184	72	-1
1800	70	162	168	68	0	70	162	168	68	0	70	162	168	68	0
1950	0	74	85	44	-1	0	74	85	44	-1	0	74	85	44	-1
2100	0	0	0	23	-1	0	0	0	23	-1	0	0	0	23	-1
2250	0	0	0	31	7	0	0	0	31	7	0	0	0	31	7
2400	0	0	0	21	3	0	0	0	21	3	0	0	0	21	3
2550	0	0	0	9	0	0	0	0	9	0	0	0	0	9	0
2700	0	0	0	3	0	0	0	0	3	0	0	0	0	3	0
2850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

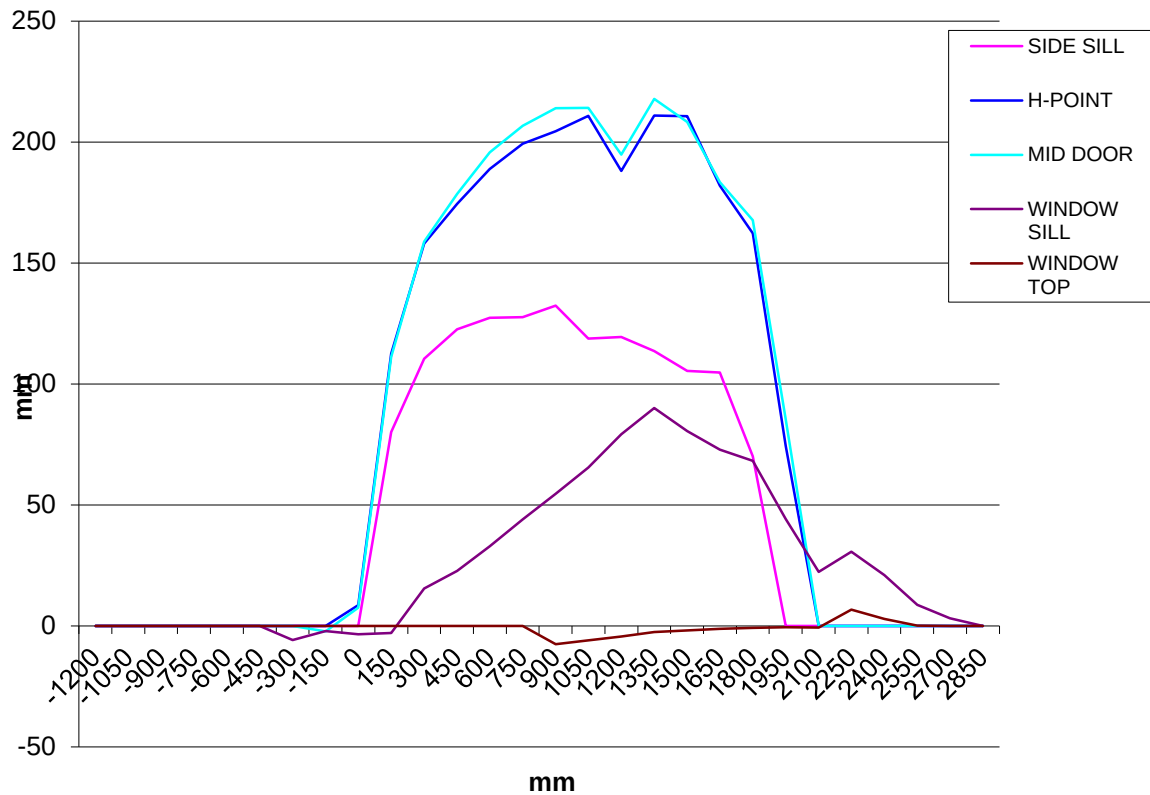
NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition.

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

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

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: O20145502
Test Date: 07/30/2013

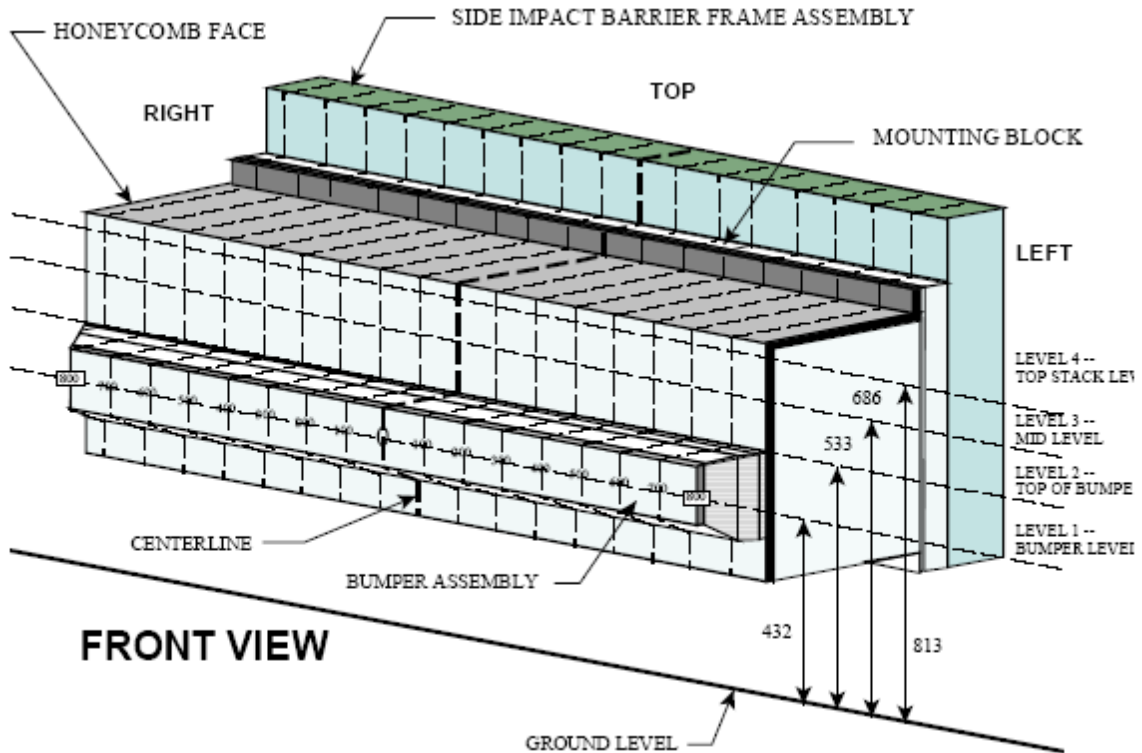


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: Q20145502
Test Date: 07/30/2013



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
1	-218	-211	-203	-201	-199	-196	-193	-188	-182	-180	-178	-175	-173	-171	-172	-192	-196
2	-126	-123	-118	-115	-112	-108	-103	-99	-94	-91	-89	-84	-82	-80	-78	-84	-104
3	-84	-51	-39	-39	-42	-55	-38	-29	-25	-23	-22	-22	-27	-36	-48	-62	-105
4	-66	-50	-36	-29	-26	-43	-62	-41	-41	-45	-48	-53	-56	-65	-78	-97	-124

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

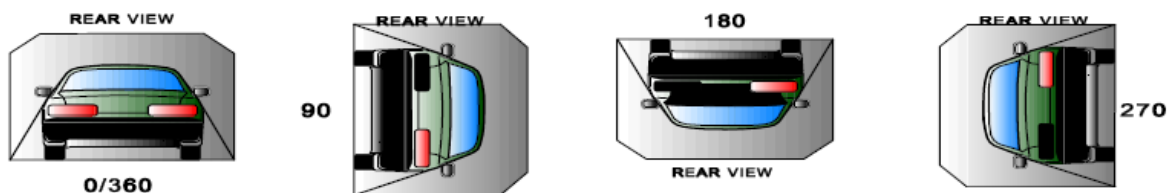
Test Vehicle: 2014 Subaru Forester 2.5i MPV
 Test Program: NCAP Side Impact

NHTSA No.: O20145502
 Test Date: 07/30/2013

Test Time: 13:18 **Temperature:** 69.4

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum allowable is 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (Maximum allowable is 1 ounce/minute)
- D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	90	330	420
90 to 180	90	330	840
180 to 270	90	330	1260
270 to 360	90	330	1680

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

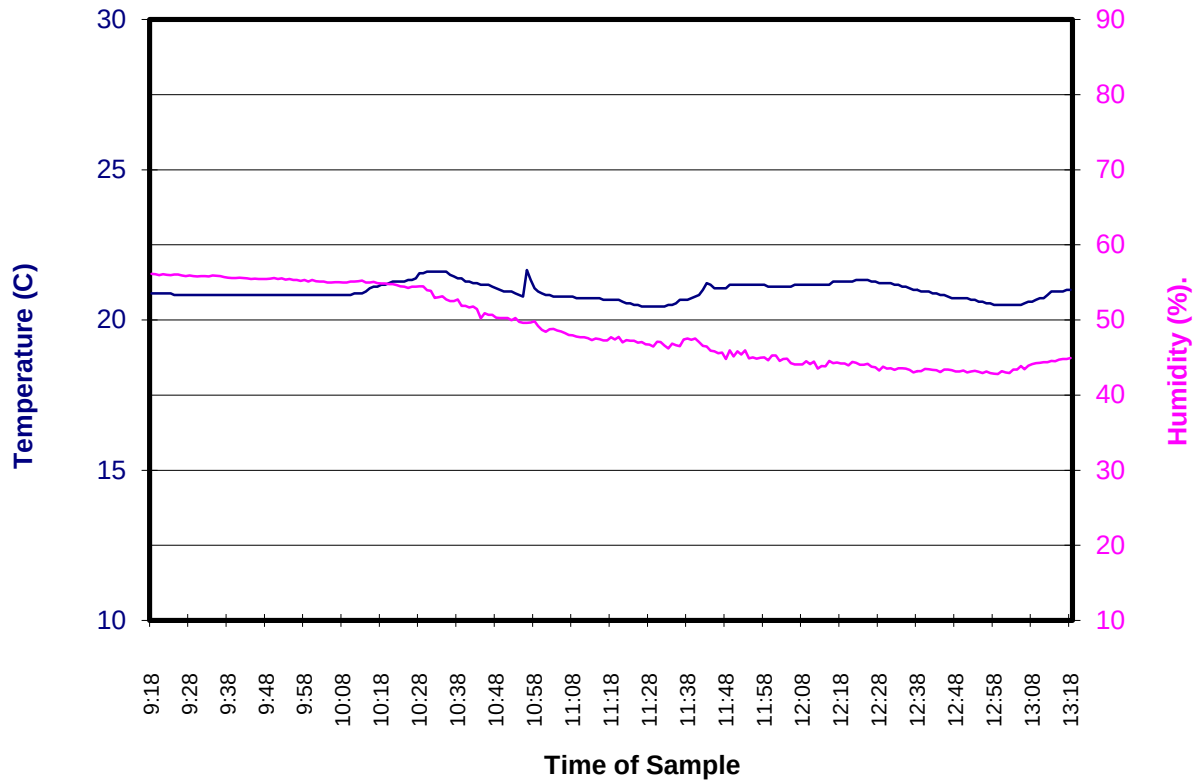
DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2014 Subaru Forester 2.5i MPV
Test Program: NCAP Side Impact

NHTSA No.: O20145502
Test Date: 07/30/2013

O20145502 Subaru Forester 2.5i MPV Left MDB Impact 130730: Test Time 13:18



APPENDIX A
PHOTOGRAPHS

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099	FMVSS No. 301 Static Rollover 270 Degrees	A-56
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001 As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



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



003 Pre-Test Front View of Test Vehicle



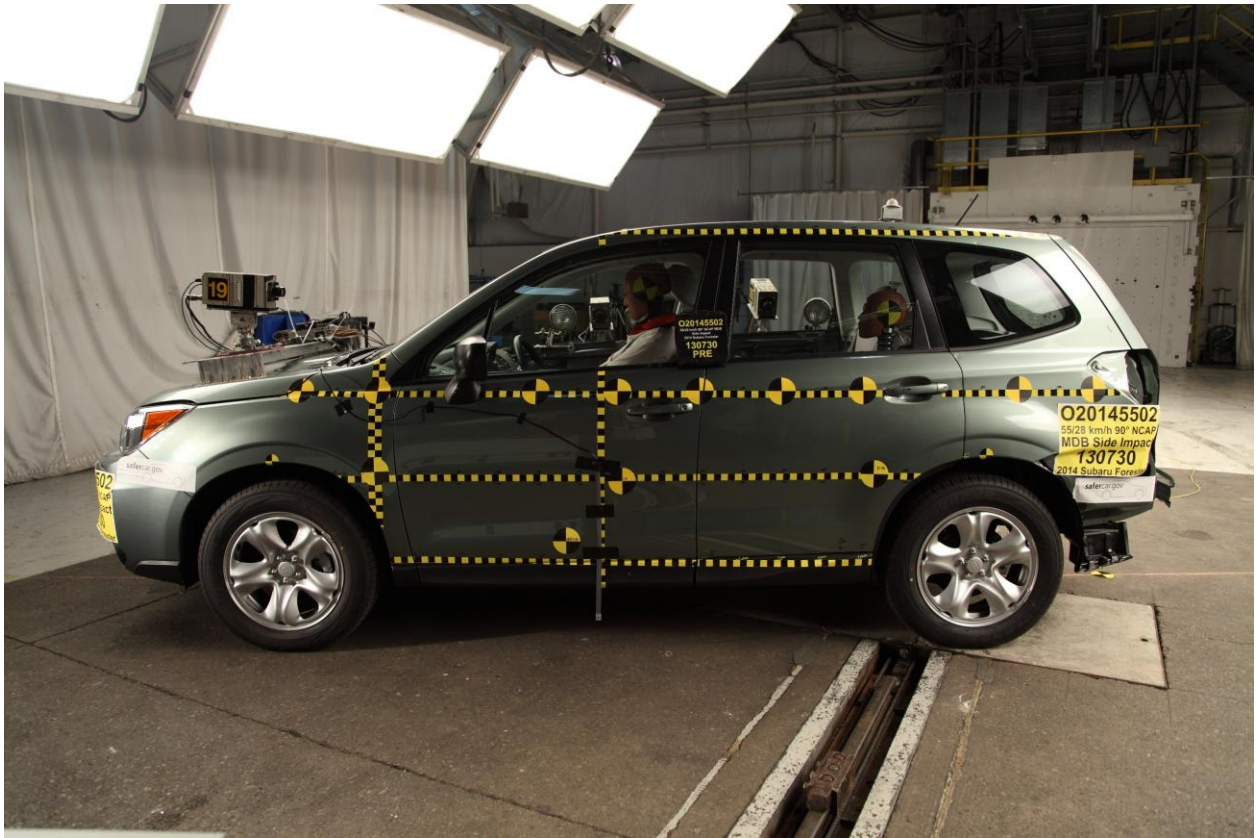
004 Post-Test Front View of Test Vehicle



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



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



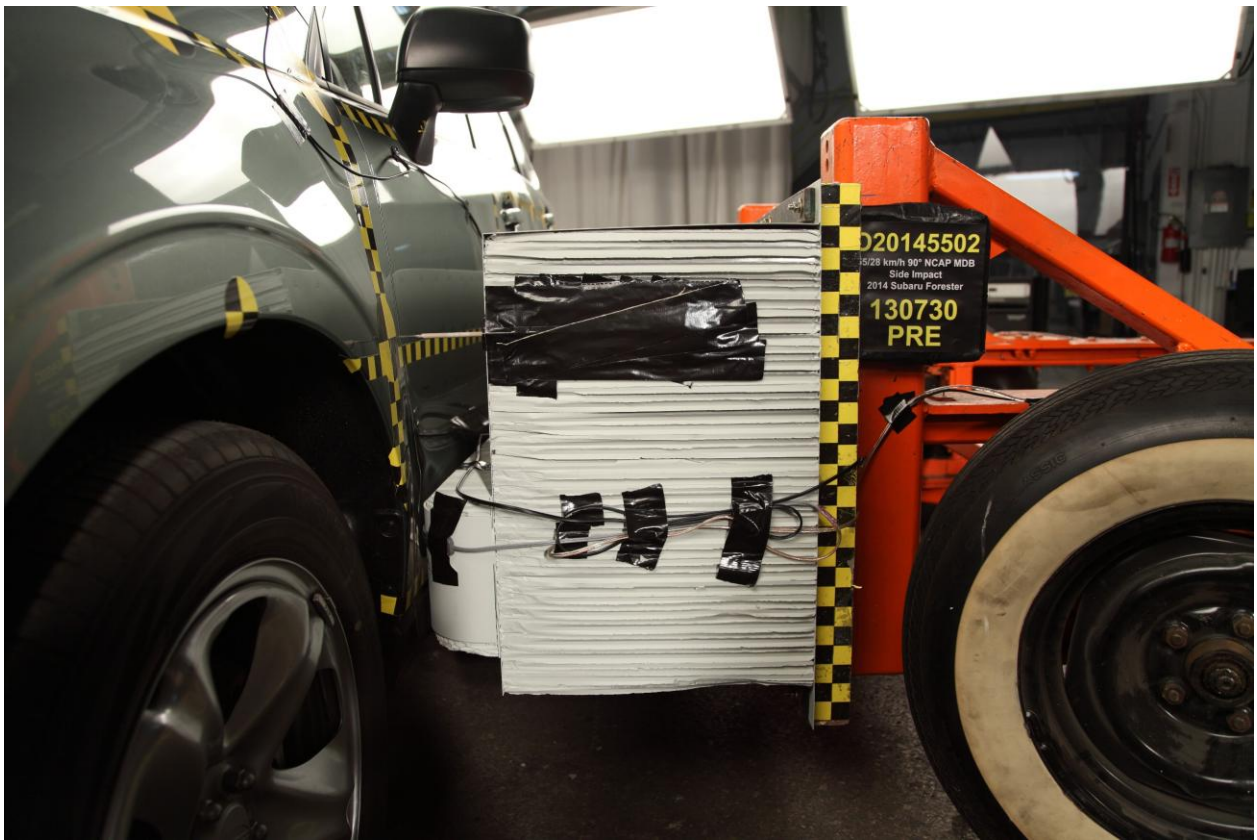
014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



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



021 Pre-Test Left Front Door Latch Close-up



022 Post-Test Left Front Door Latch Close-up



023 Pre-Test Left Rear Door Latch Close-up



024 Post-Test Left Rear Door Latch Close-up



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



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



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



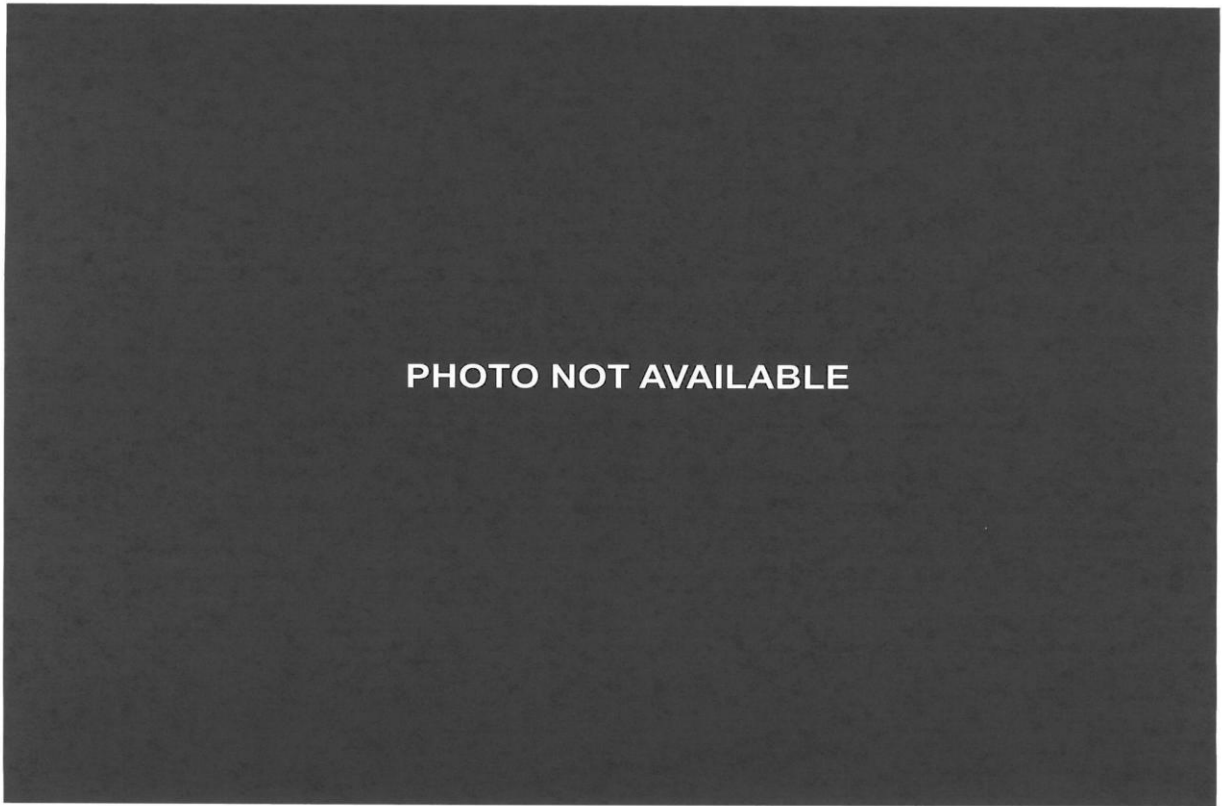
028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



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



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



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



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



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



034 Pre-Test Placement of Driver Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



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



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



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



042 Pre-Test Driver Dummy and Door Clearance View



043 Post-Test Driver Dummy and Door Clearance View

Intentionally Left Blank



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



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



046 Pre-Test Driver Inner Door Panel View



047 Post-Test Driver Inner Door Panel View

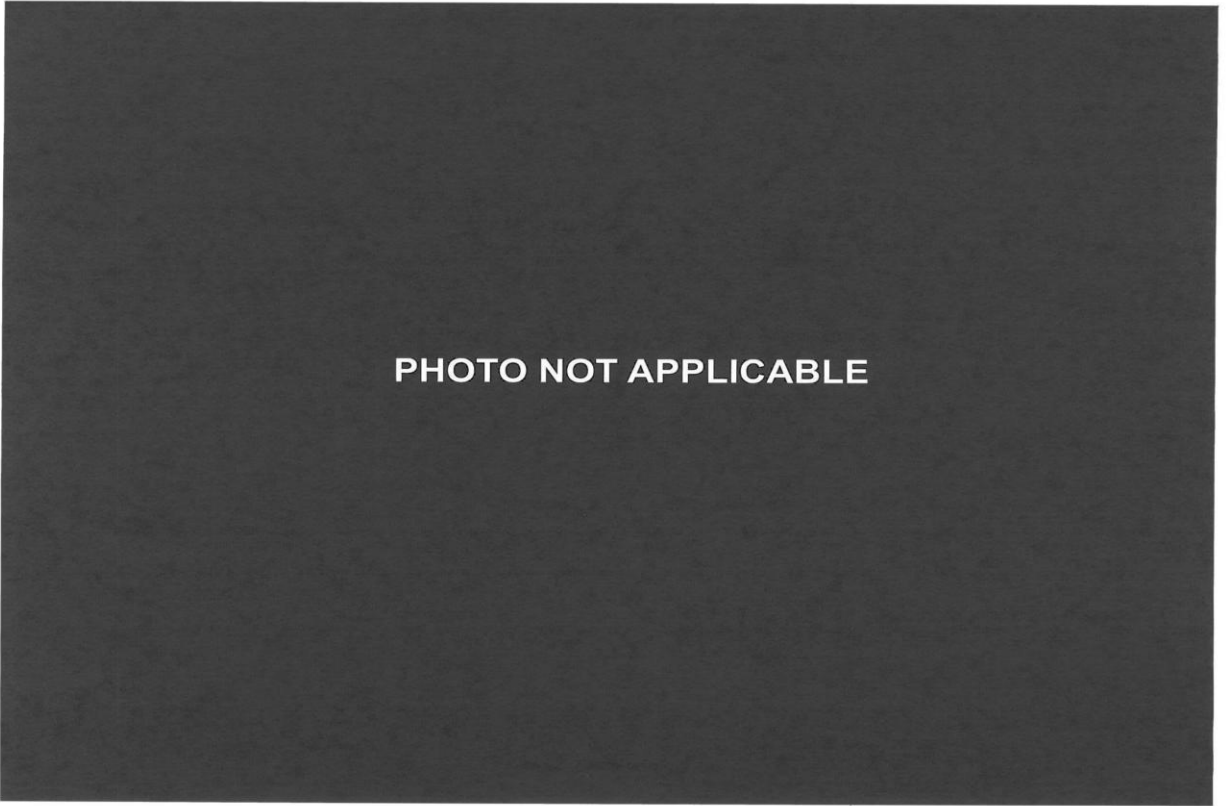


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048 Post-Test Driver Dummy Close-Up Head Contact with Vehicle View

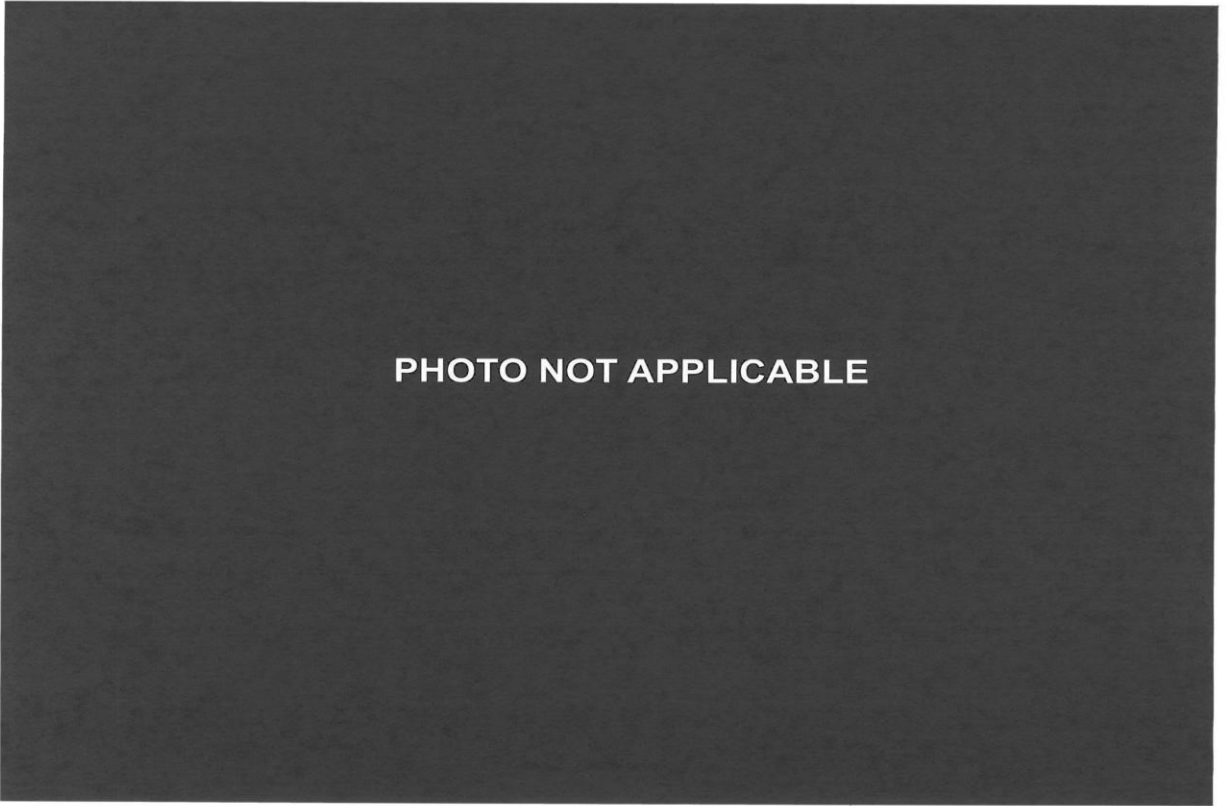


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049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

PHOTO NOT APPLICABLE

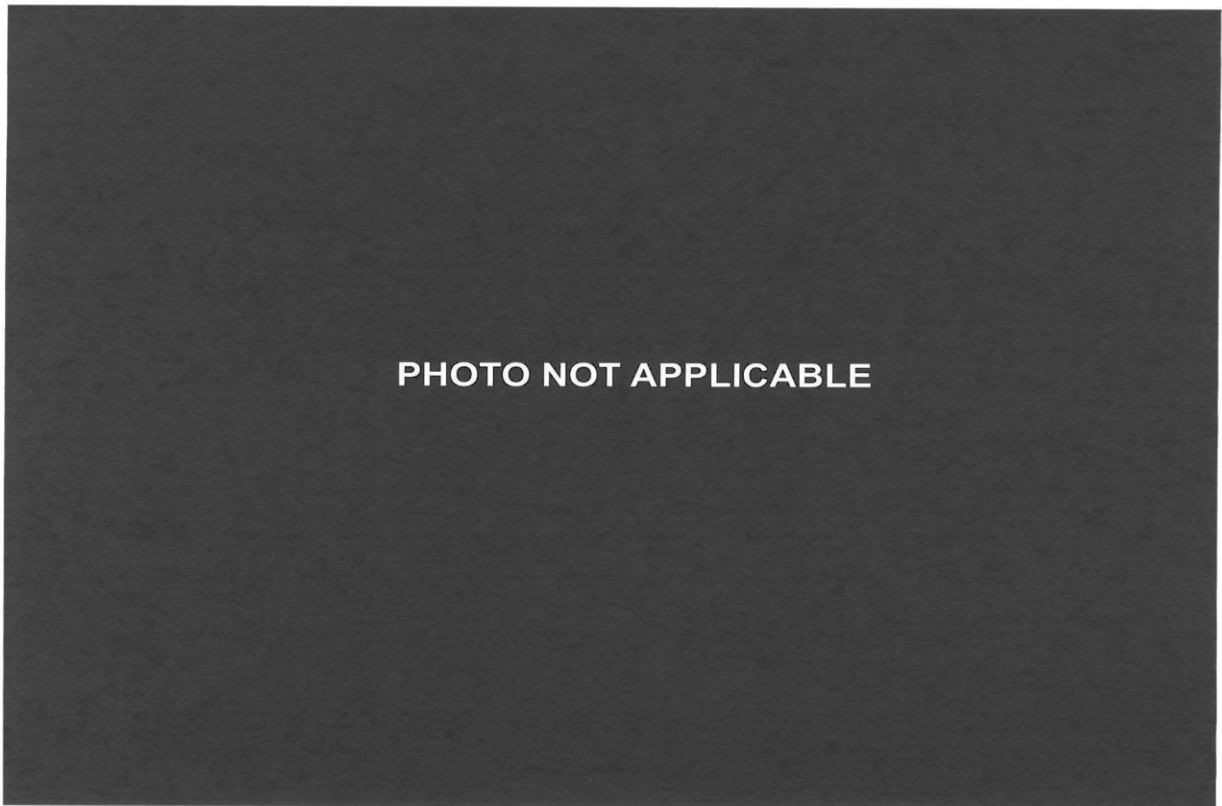
050 Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



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



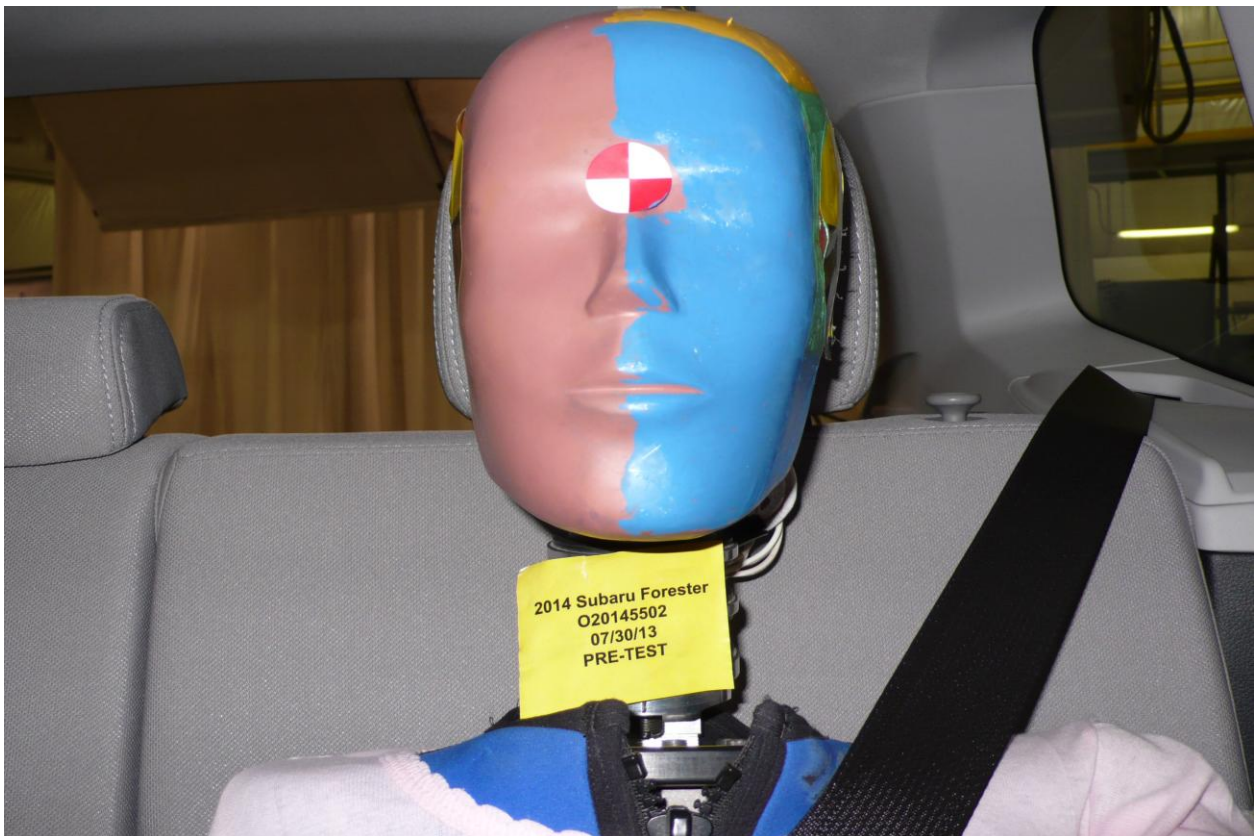
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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



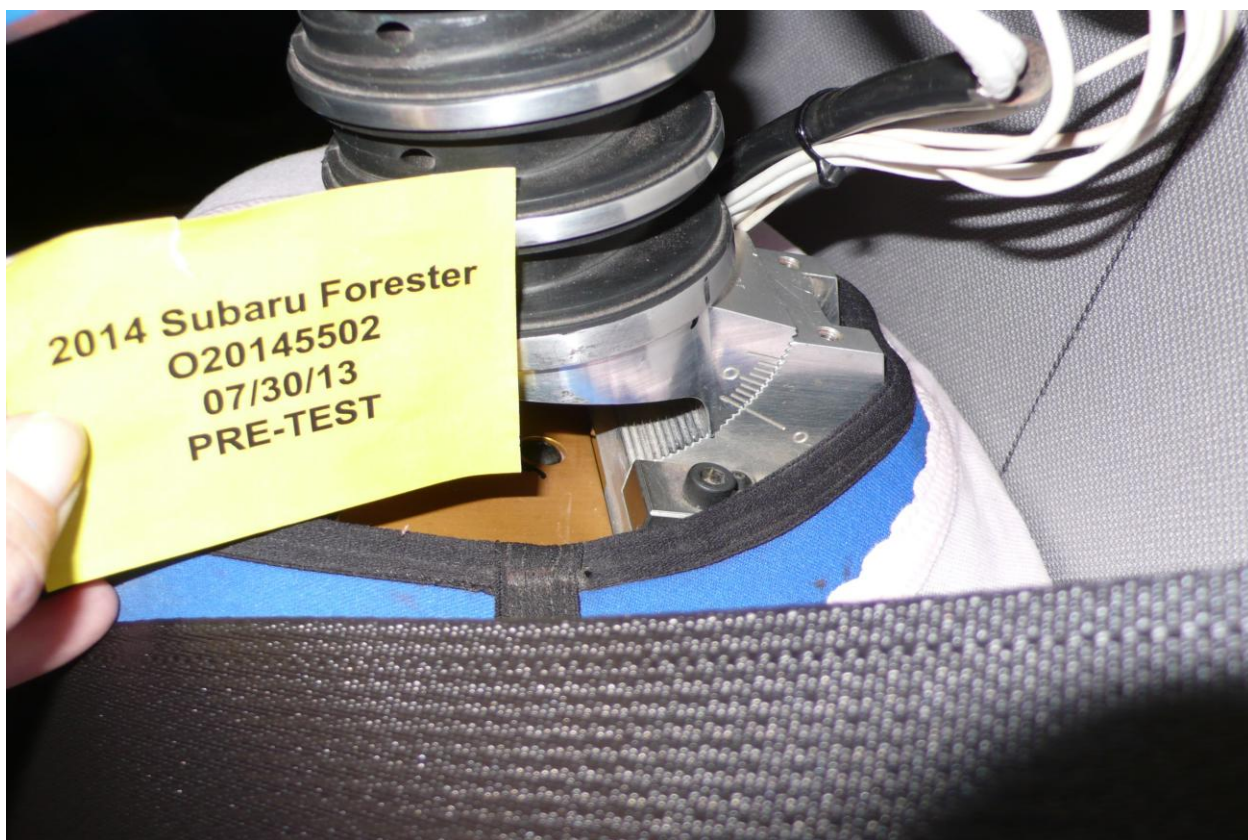
059 Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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

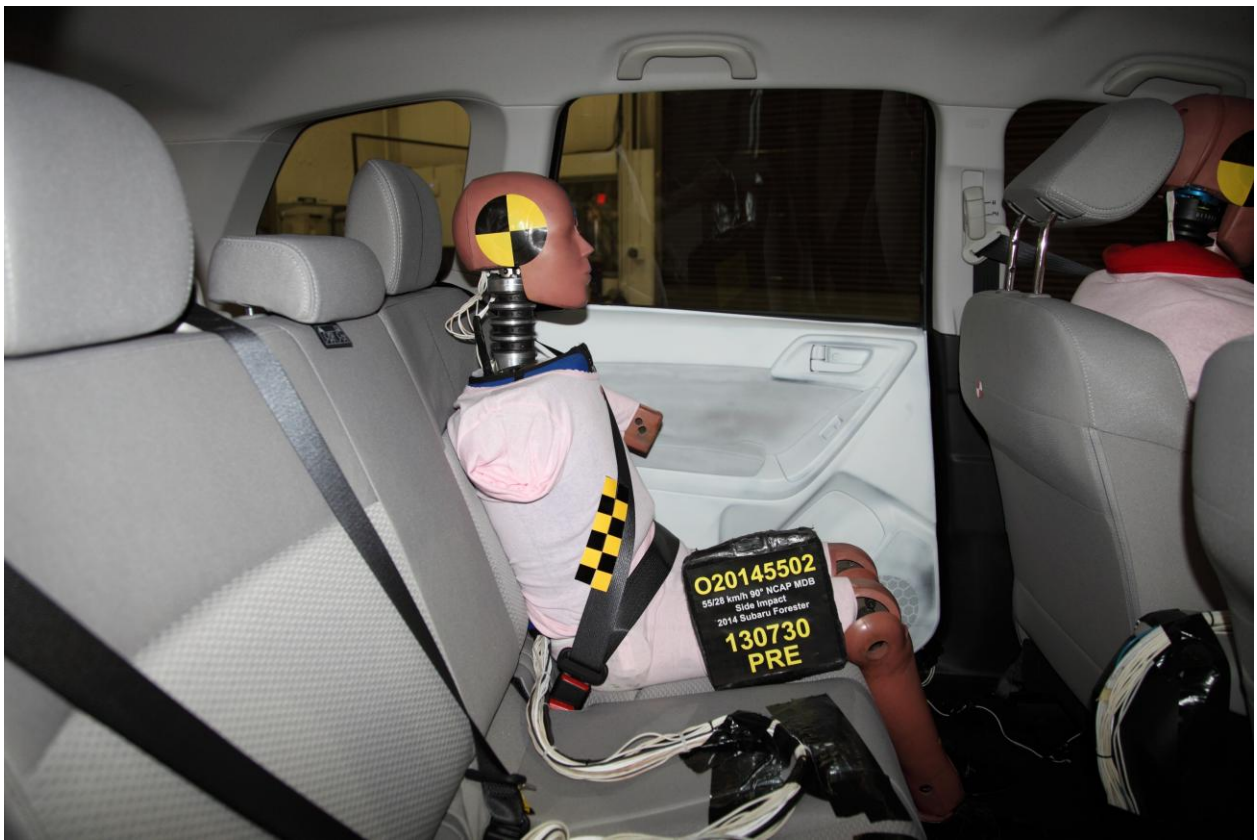
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069 Pre-Test Passenger Dummy and Door Clearance View



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

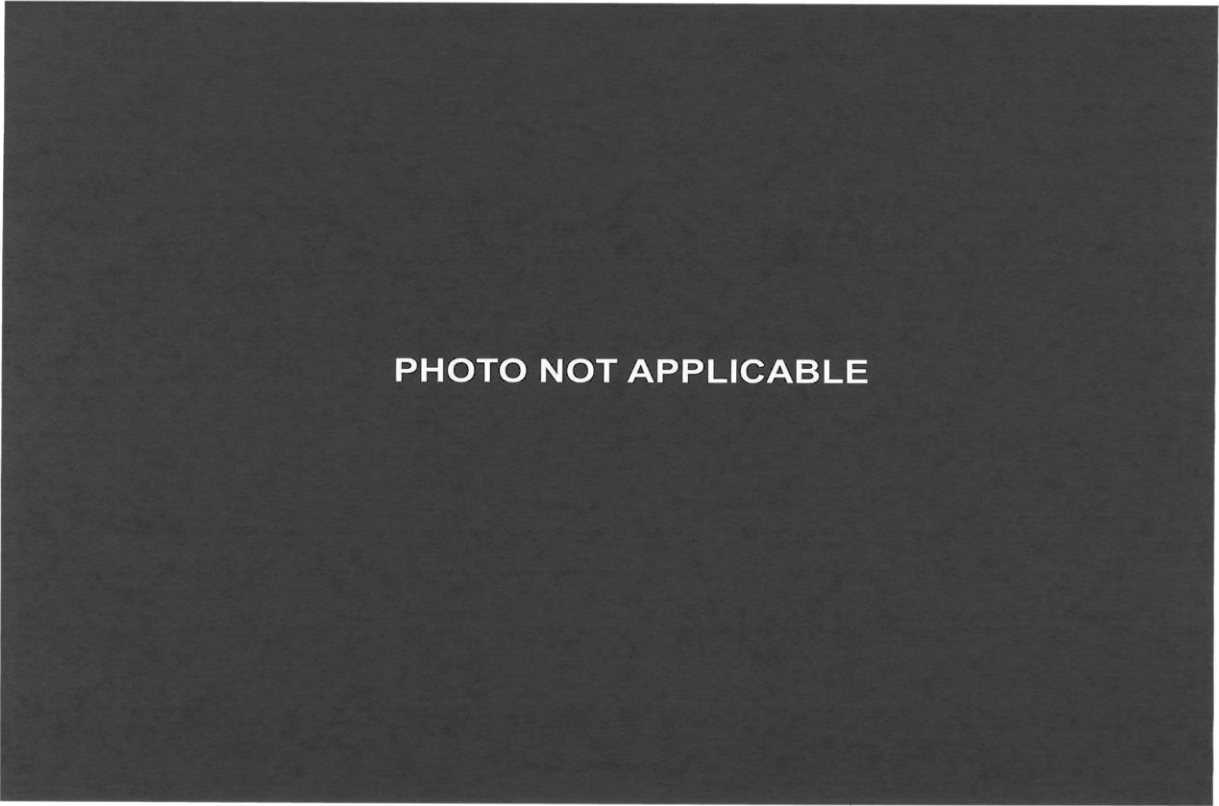


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075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

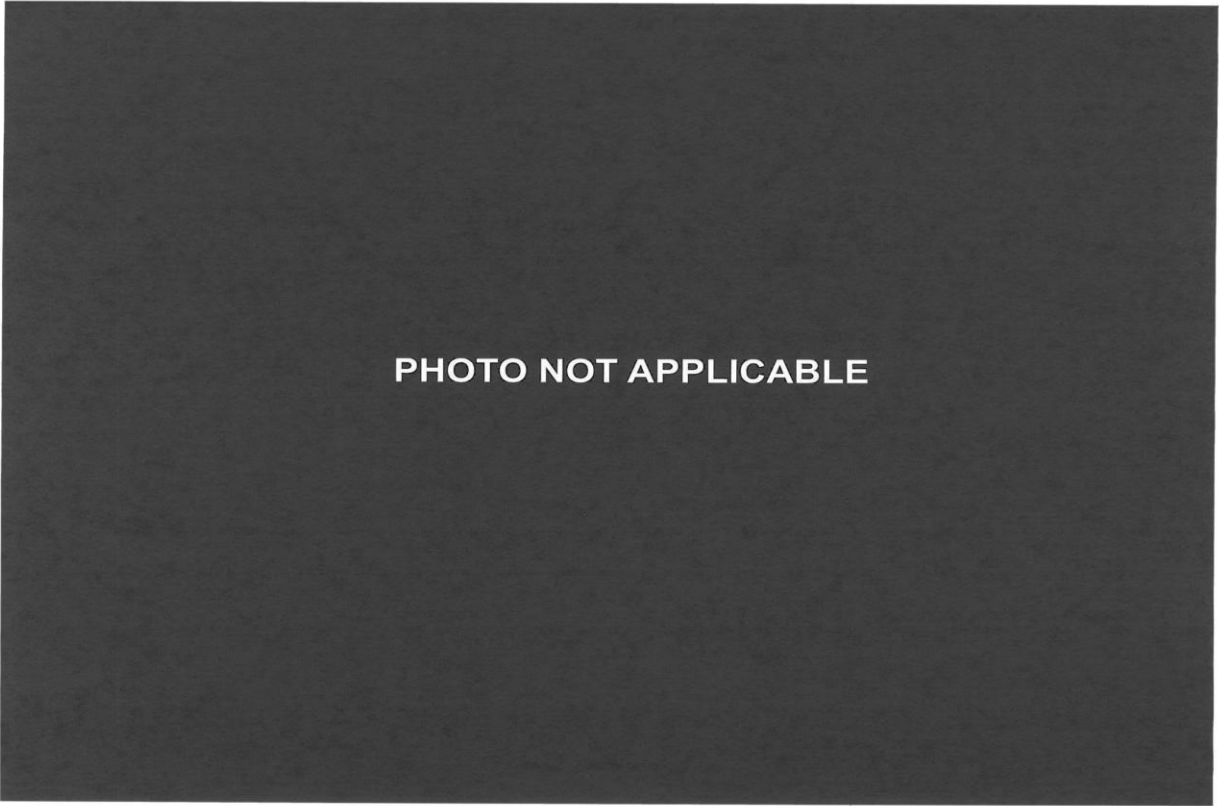


PHOTO NOT APPLICABLE

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



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



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

PHOTO NOT APPLICABLE

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

PHOTO NOT APPLICABLE

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



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



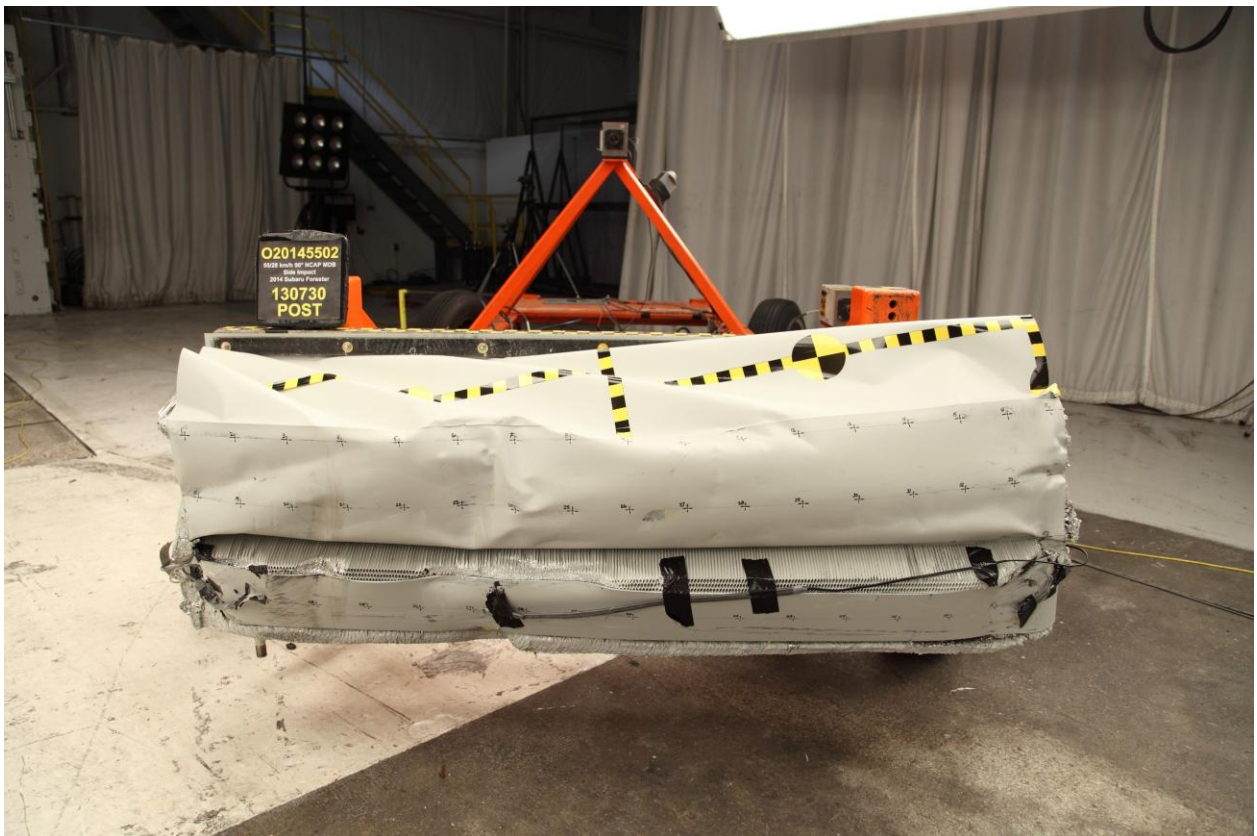
082 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



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



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle Certification Label



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

PHOTO NOT APPLICABLE

094 Pre-Test Ballast View



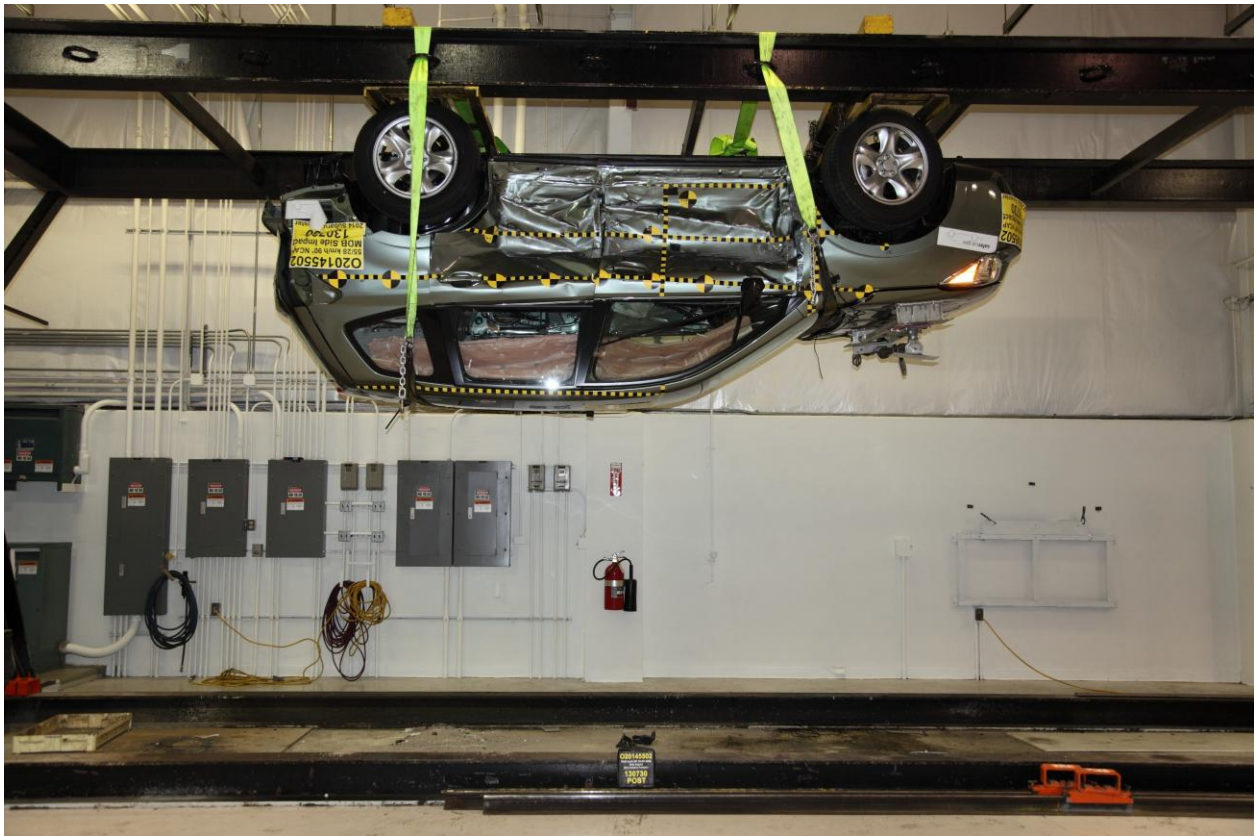
095 Post-Test Primary Speed Trap Read-Out



096 FMVSS No. 301 Static Rollover 0 Degrees



097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees



099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees



101 Impact Event

FORESTER

VIN: JF2SJAA3C3EG425474
Model/Code: 2014 Subaru Forester 2.5i / EFA
Exterior Color: Jasmine Green Metallic
Port / Assembly: Vancouver, WA
Deliver by / Carrier: Truck / 601-601061

SHIP TO: 070464
BYERS MAZDA SUBARU
 2455 BILLINGSLEY RD
 COLUMBUS, OH 43235

SOLD TO: 070464
BYERS MAZDA SUBARU
 2455 BILLINGSLEY RD
 COLUMBUS, OH 43235

SUBARU
Confidence in Motion

STANDARD EQUIPMENT

SAFETY
 Symmetrical All-Wheel Drive (AWD)
 Vehicle Dynamics Control (VDC)
 4-Wheel Disc Brakes w/Brake Assist
 Anti-Lock Braking System (ABS)
 Electronic Brake-Force Distribution
 Brake Override System
 Driver's Side Knee Airbag
 Subaru Advanced Frontal Air Bag System
 Front Seat Side (Pelvic/Torso) Airbags
 Side Curtain Air Bags w/Rollover Sensor
 Anti-Theft Alarm & Immobilizer System
 Daytime Running Lights

Whiplash Protection Front Seats
PERFORMANCE AND EXTERIOR
 2.5L Horizontally-Opposed DOHC Engine
 17-Inch Steel Wheels w/ Center Caps
 Variable Intermittent Windshield Wipers
 Electric Power-Assisted Steering

COMFORT, CONVENIENCE AND INTERIOR
 Air Conditioning w/Air Filtration System
 AM/FM Stereo w/ CD Player & Aux. Jack
 USB Port with iPod Connectivity

Steering Wheel: Bluetooth/Audio Switches
 Bluetooth Hands-Free Phone Connectivity
 Bluetooth Audio Streaming Connectivity
 Cruise Control/Tilt/Telescopic Steering
 Power Door Locks & Dual Power Mirrors
 Remote Keyless Entry System
 Power Windows With Driver's Auto Down
 60/40 Split Fold-Down Rear Seatback
 Overhead Console w/ Dual Map Lights
 Multi-Function Trip Computer
 12V Outlet in Dash, Console & Cargo Area

LIMITED WARRANTY/ROADSIDE ASSISTANCE
 3 Years / 36,000 Miles Basic
 5 Years / 60,000 Miles Powertrain
 5 Yrs/Unlimited Mileage Rust Perforation
 3 Yrs / 36,000 24/7 Roadside Assistance
 See Owner Info Kit/Warranty For Details

OPTIONAL EQUIPMENT AND OTHER ITEMS
 Manufacturer's Suggested Retail Price \$21,995.00
Option Package: 01 - STANDARD PACKAGE
 Full Tank of Gas INCLD
Partial Zero Emission (Pzev)
 Super-Ultra Low Emission Veh
 Pzev Certified Where Required
 Pzev Warranty State Specific

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.		
Frontal	Driver	Not Rated
Crash	Passenger	Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
Side	Front seat	Not Rated
Crash	Rear seat	Not Rated
Based on the risk of injury in a side impact.		
Rollover		Not Rated
Based on the risk of rollover in a single-vehicle crash.		

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

Fuel Economy and Environment Gasoline Vehicle

Fuel Economy **24** MPG
 combined city/hwy

Small SUV's cars range from 16 to 30 MPG. The best vehicle rates 121 MPG.

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

Annual fuel cost \$ 2,200

Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only)

This vehicle emits 366 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions, learn more at fuelconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$11,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
 Calculate personalized estimates and compare vehicles

PART CONTENTS INFORMATION
 FOR VEHICLES IN THIS COUNTRY:
 U.S./CANADIAN PARTS CONTENT: 0%
 MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN: 90%

FOR THIS VEHICLE:
 FINAL ASSEMBLY POINT: OTA GUNMA, JAPAN
 COUNTRY OF ORIGIN:
 ENGINE: JAPAN
 TRANSMISSION: JAPAN

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

Destination and Delivery \$825.00
Total Suggested Retail Price \$22,820.00

Additional protection is available on this vehicle from Subaru:
ADDED SECURITY
SUBARU

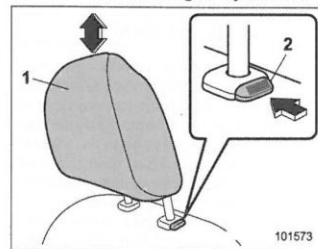
Always Insist on Genuine Subaru Products
 • Added Security® protects your investment
 • Mechanical and Maintenance plans available
 • Coverage up to 100,000 miles
 • Genuine Subaru replacement parts
 • Towing & Rental car benefits
 • Trip Interruption and Tire Hazard benefits available
 • Transferable

THE ONLY EXTENDED SERVICE PLAN BACKED AND ENDORSED BY SUBARU FOR OVER 30 YEARS!

102 Monroney Label

1-6 Seat, seatbelt and SRS airbags

▼ Head restraint height adjustment



- 1) Head restraint
- 2) Release button

Each head restraint should be adjusted so that the center of the head restraint is closest to the top of the occupant's ears.

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:

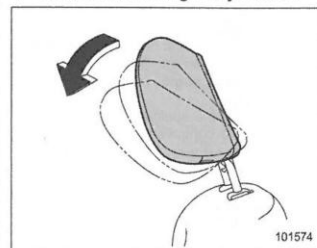
While pressing the release button, pull out the head restraint.

To install:

Install the head restraint into the holes that

are located on the top of the seatback until the head restraint locks. Press and hold the release button to lower the head restraint.

▼ Head restraint angle adjustment



The angle of the head restraint can be adjusted in several steps. While maintaining a suitable driving posture, adjust the head restraint to a position where the back of your head is as close to the head restraint as possible.

To tilt:

Tilt the head restraint by hand to the preferred position. A click will be audible when the head restraint is locked.

To return:

Tilt the head restraint once as far forward as it can go. The head restraint will

automatically return to the fully upright position. Then, adjust the head restraint again to the preferred angle.

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

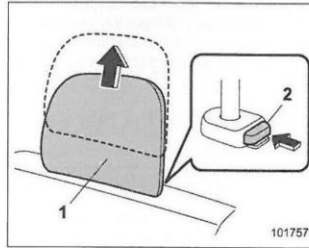
■ Head restraint adjustment

Both the rear window 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:

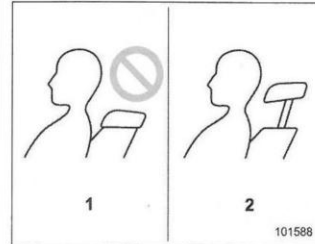
Install the head restraint into the holes that are located on the top of the seatback until the head restraint locks. Press and hold the release button to lower the head restraint.

After installing the head restraint, make sure it is securely locked.

▼ 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 position.



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

– 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

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

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

Test Lab: CTF

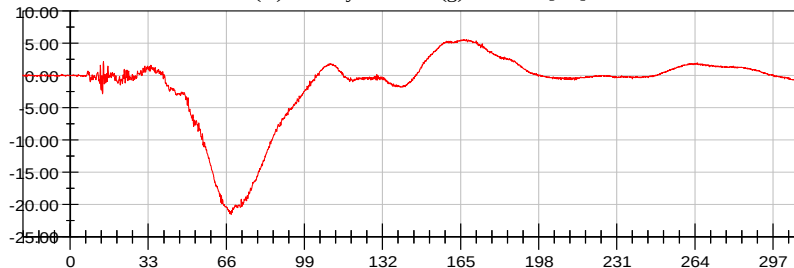
Test Number: 130730 (O20145502)

Test Date: 07/30/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

5.58 g at 166.40 ms

<Min>

-21.57 g at 68.00 ms

CFC_1000

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



<Max>

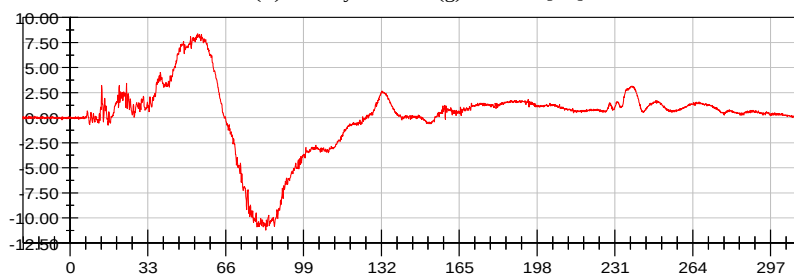
31.42 g at 72.32 ms

<Min>

-7.35 g at 110.48 ms

CFC_1000

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



<Max>

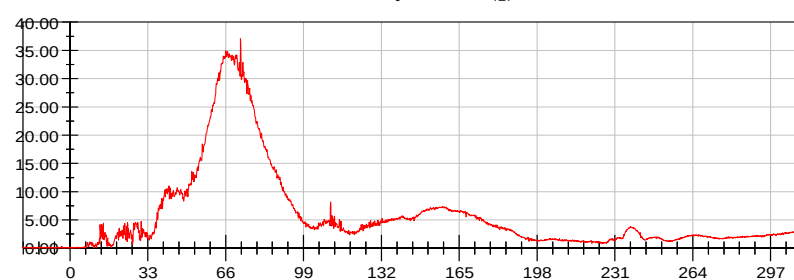
8.38 g at 54.16 ms

<Min>

-11.23 g at 82.96 ms

CFC_1000

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



<Max>

37.08 g at 72.32 ms

<Min>

0.04 g at -18.80 ms

CFC_1000



NHTSA

Test Lab: CTF

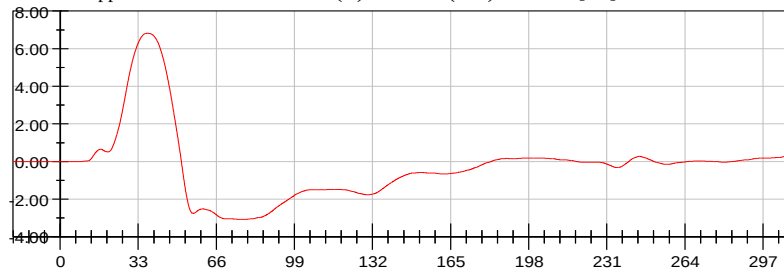
Test Number: 130730 (O20145502)

Test Date: 07/30/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

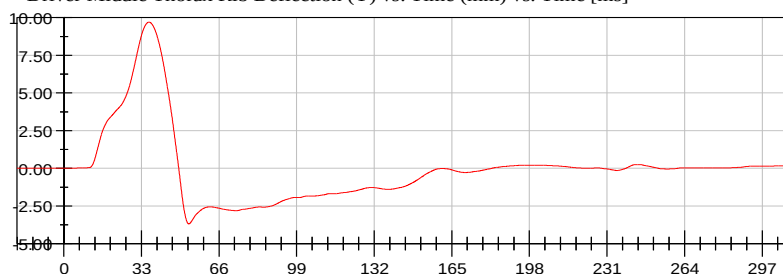
6.82 mm at 36.88 ms

<Min>

-3.07 mm at 76.96 ms

CFC_180

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



<Max>

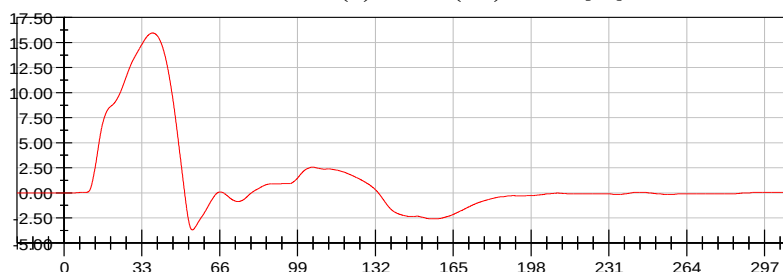
9.70 mm at 36.24 ms

<Min>

-3.70 mm at 53.12 ms

CFC_180

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



<Max>

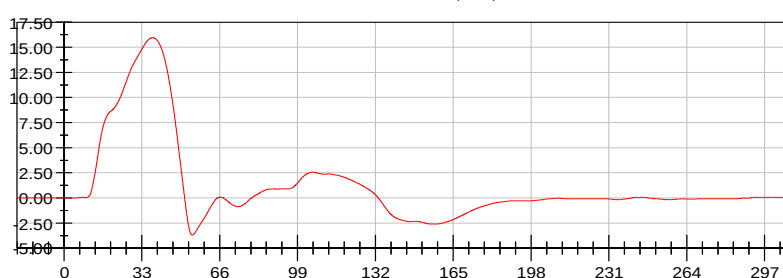
15.96 mm at 37.60 ms

<Min>

-3.70 mm at 54.40 ms

CFC_180

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



<Max>

15.96 mm at 37.60 ms

<Min>

-3.70 mm at 54.40 ms

CFC_180



NHTSA

Test Lab: CTF

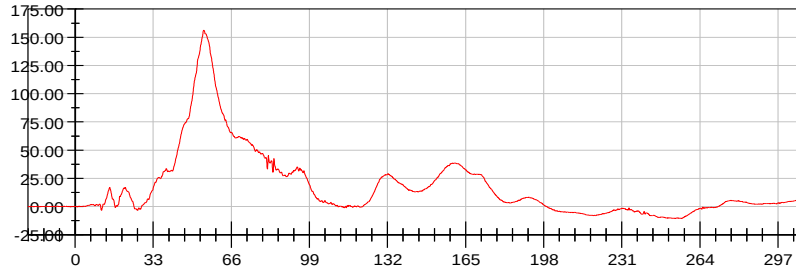
Test Number: 130730 (O20145502)

Test Date: 07/30/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

156.26 N at 54.32 ms

<Min>

-10.49 N at 253.60 ms

CFC_600

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



<Max>

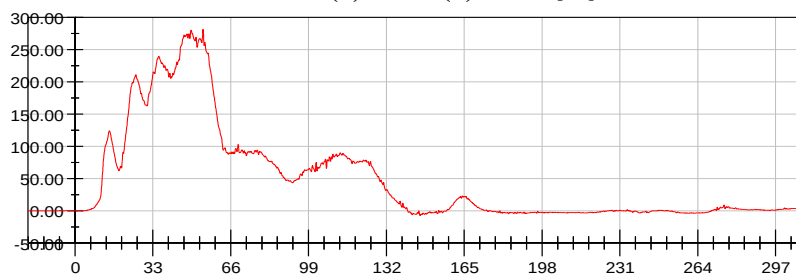
235.95 N at 54.64 ms

<Min>

-7.79 N at 129.76 ms

CFC_600

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



<Max>

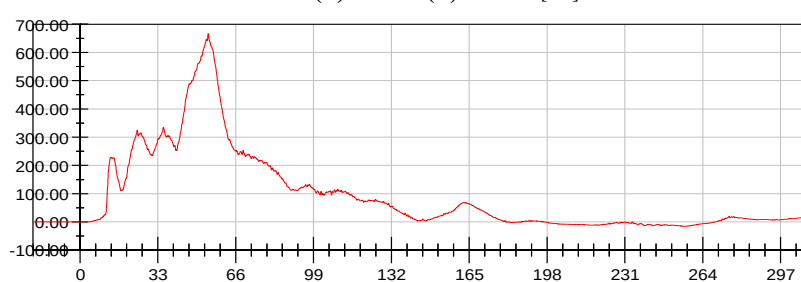
281.58 N at 54.32 ms

<Min>

-7.37 N at 146.24 ms

CFC_600

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



<Max>

666.46 N at 54.32 ms

<Min>

-15.73 N at 256.24 ms

CFC_600



NHTSA

Test Lab: CTF

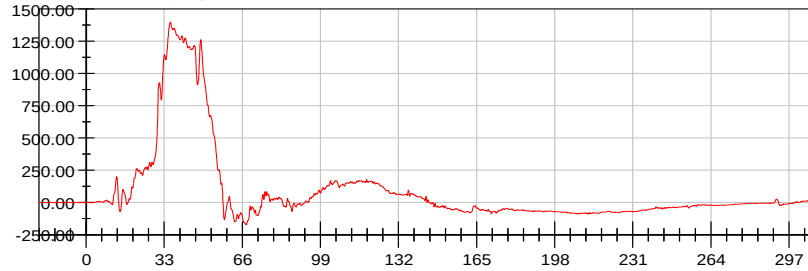
Test Number: 130730 (O20145502)

Test Date: 07/30/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

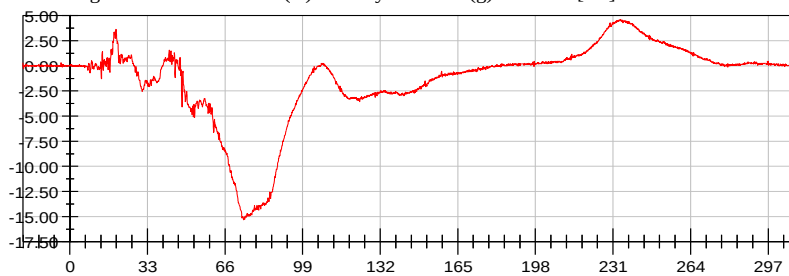
1,397.93 N at 35.60 ms

<Min>

-171.67 N at 67.60 ms

CFC_600

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



<Max>

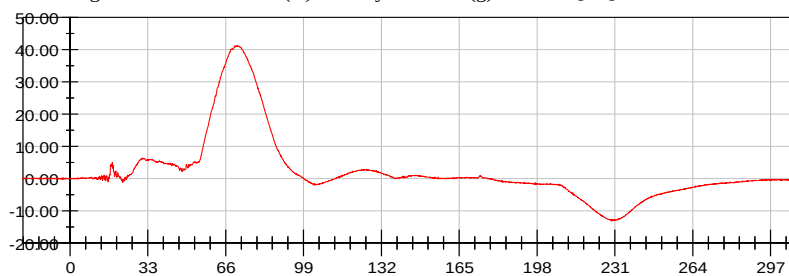
4.61 g at 233.92 ms

<Min>

-15.36 g at 73.84 ms

CFC_1000

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



<Max>

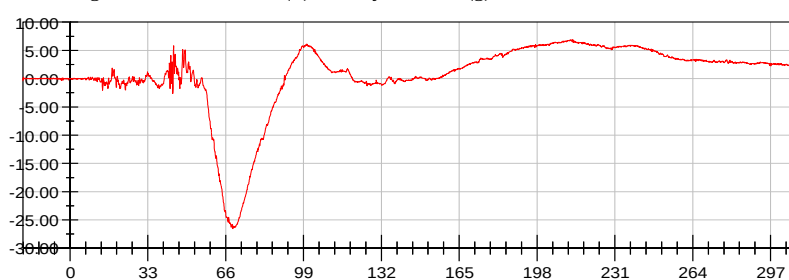
41.24 g at 70.00 ms

<Min>

-13.22 g at 229.52 ms

CFC_1000

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



<Max>

6.89 g at 212.32 ms

<Min>

-26.53 g at 69.04 ms

CFC_1000



NHTSA

Test Lab: CTF

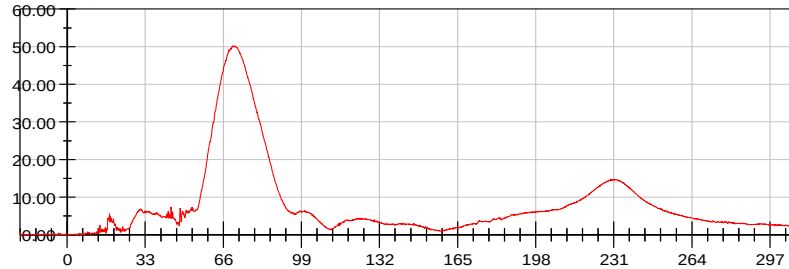
Test Number: 130730 (O20145502)

Test Date: 07/30/2013

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

Position #4 SID IIs Dummy (305)

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



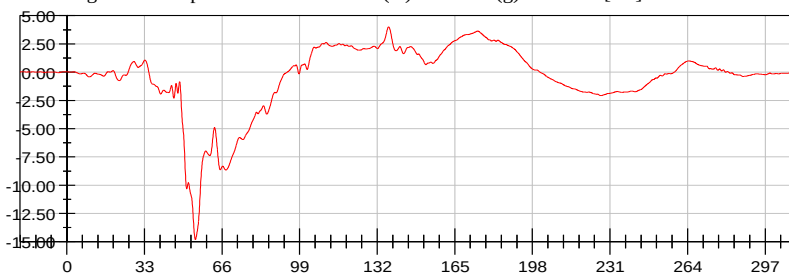
<Max>

50.24 g at 70.00 ms

<Min>

0.01 g at -18.88 ms

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



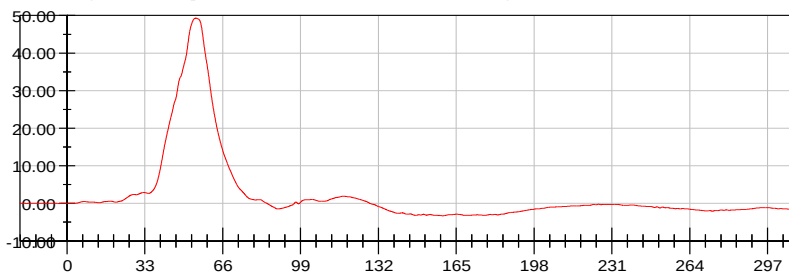
<Max>

4.00 g at 136.88 ms

<Min>

-14.84 g at 54.64 ms

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



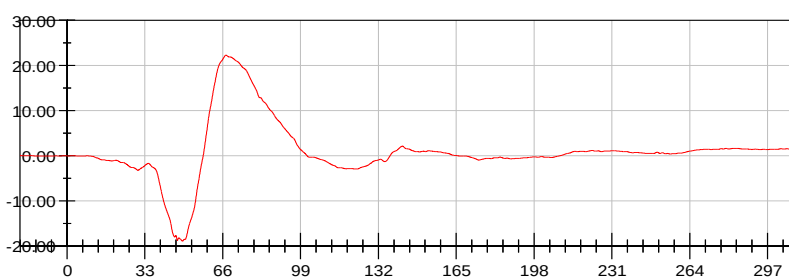
<Max>

49.30 g at 54.56 ms

<Min>

-3.30 g at 159.28 ms

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



<Max>

22.26 g at 67.36 ms

<Min>

-18.86 g at 49.04 ms



NHTSA

Test Lab: CTF

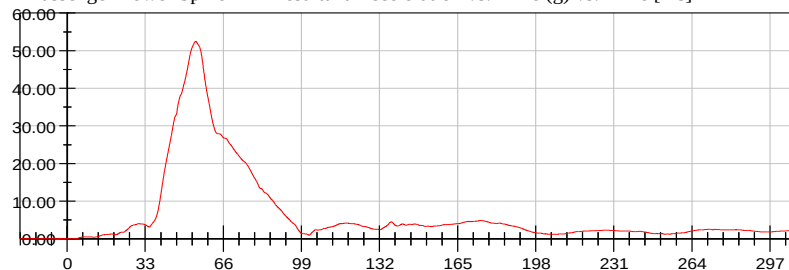
Test Number: 130730 (O20145502)

Test Date: 07/30/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

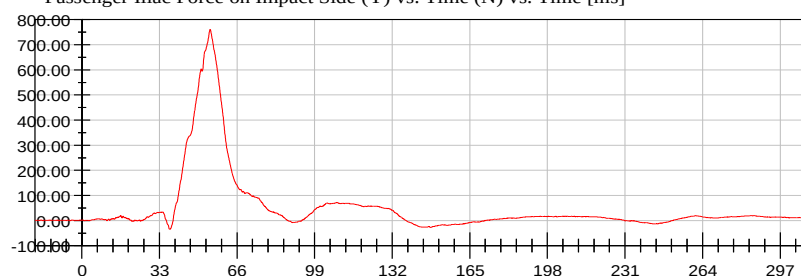
52.46 g at 54.32 ms

<Min>

0.01 g at 2.24 ms

CFC_180

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



<Max>

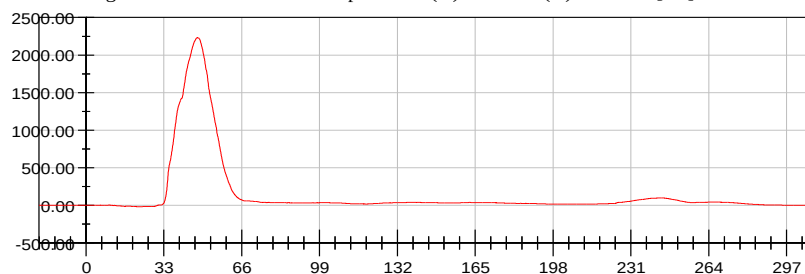
760.51 N at 54.56 ms

<Min>

-35.44 N at 37.28 ms

CFC_600

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



<Max>

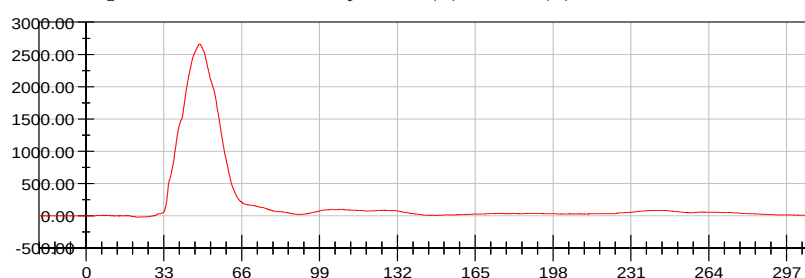
2,231.03 N at 47.20 ms

<Min>

-17.43 N at 23.28 ms

CFC_600

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



<Max>

2,661.12 N at 48.16 ms

<Min>

-20.92 N at 21.92 ms

CFC_600



APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

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

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

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

Table 3 Neck Pendulum Test

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Potentiometer A (°) vs. Time (ms)

Potentiometer B (°) vs. Time (ms)

Potentiometer C (°) vs. Time (ms)

Table 4. Shoulder Impact Test

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

Table 5. Thorax – Upper Rib Drop Test

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

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

Table 6. Thorax – Middle Rib Drop Test

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

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

Table 7. Thorax – Lower Rib Drop Test

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

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

Table 8. Thorax – Full Body Impact Test

Pendulum Acceleration (G's) vs. Time (ms)

Impactor Force (kN) vs. Time (ms)

Upper Rib Displacement (mm) vs. Time (ms)

Middle Rib Displacement (mm) vs. Time (ms)

Lower Rib Displacement (mm) vs. Time (ms)

Table 9. Abdomen Impact Test

Impactor Force (kN) vs. Time (ms)

Total Abdomen Force (kN) vs. Time (ms)

Front Abdomen Force (kN) vs. Time (ms)

Middle Abdomen Force (kN) vs. Time (ms)

Rear Abdomen Force (kN) vs. Time (ms)

Table 10. Lumbar Spine Flexion Test

Pendulum Velocity (m/s) vs. Time (ms)

Spine Flexion Angle (°) vs. Time (ms)

Potentiometer A (°) vs. Time (ms)

Potentiometer B (°) vs. Time (ms)

Potentiometer C (°) vs. Time (ms)

Table 11. Pelvis Impact Test

Pendulum Acceleration (G's) vs. Time (ms)

Impactor Force (kN) vs. Time (ms)

Pubic Symphysis (Y) Force (kN) vs. Time (ms)

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3. Lateral Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax (With Arm) Impact Test

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

Table 6. Thorax (Without Arm) Impact Test

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

Table 7. Abdomen Impact Test

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

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

Table 9. Pelvis Acetabulum Impact Test

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

Table 10. Pelvis Iliac Impact Test

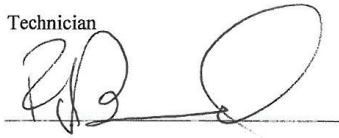
Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Iliac Force (N) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N F030

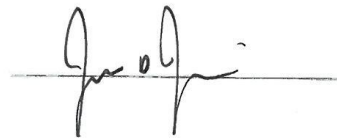
Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 15
Date: 06/21/13

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

Technician



Approved



Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 15-1

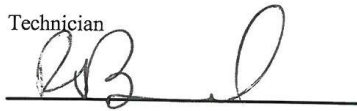
Test Date: 6/21/2013

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

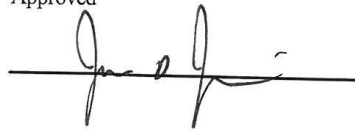
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 08:44:15 360

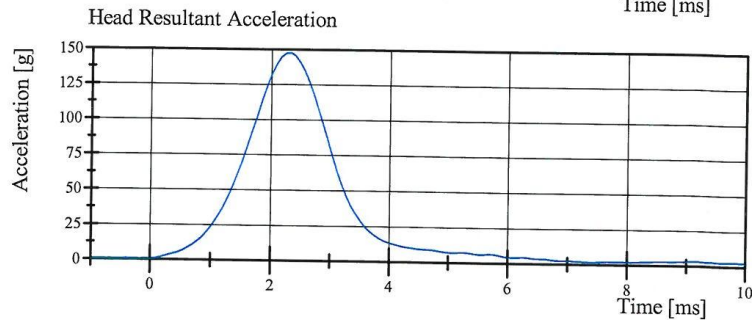
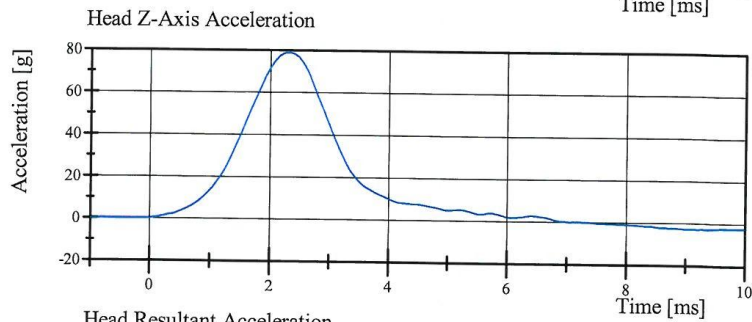
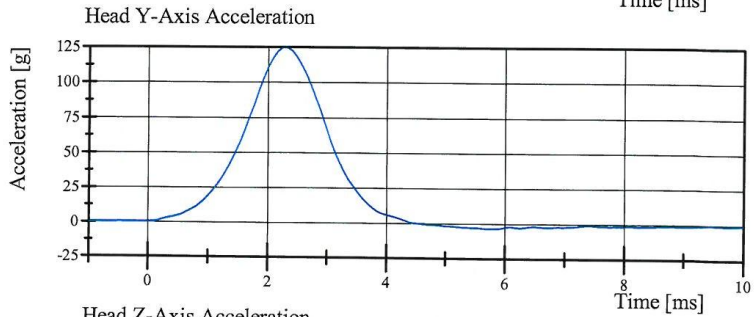
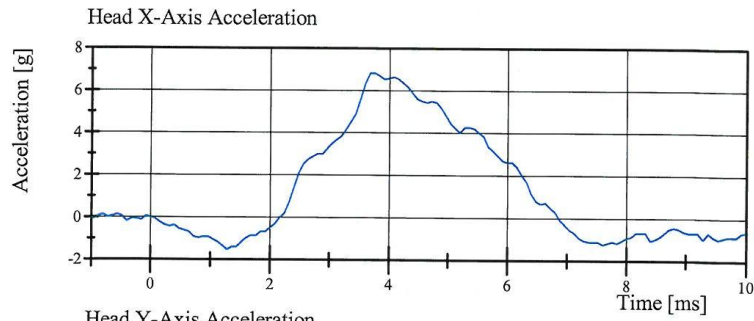


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013



Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 08:44:22 360



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 10:08:52 1313

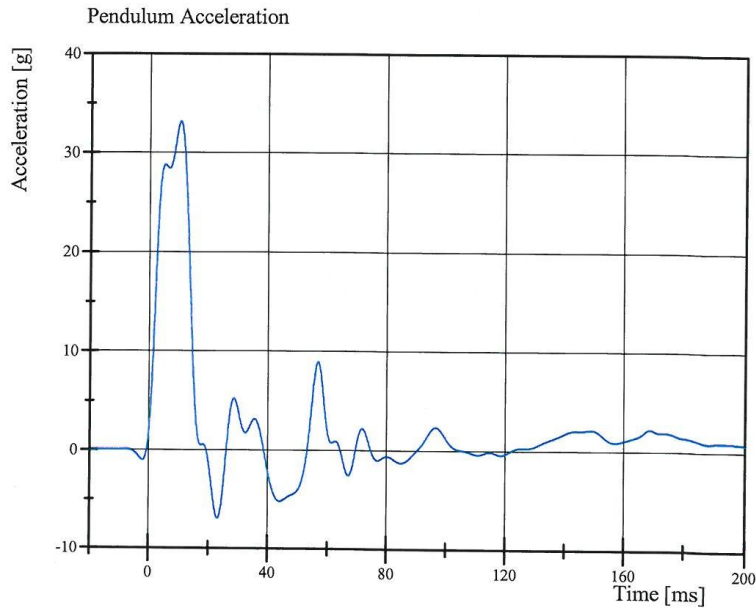


Transportation Research Center Inc.

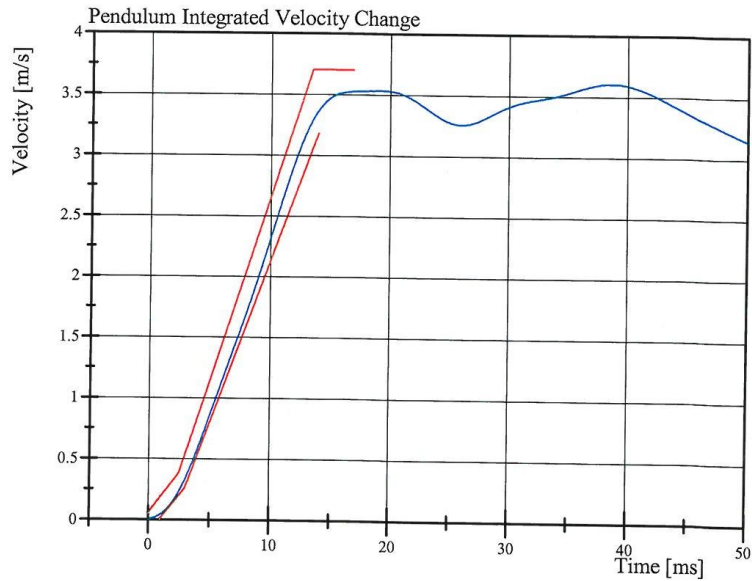
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013



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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 10:09:02 1313

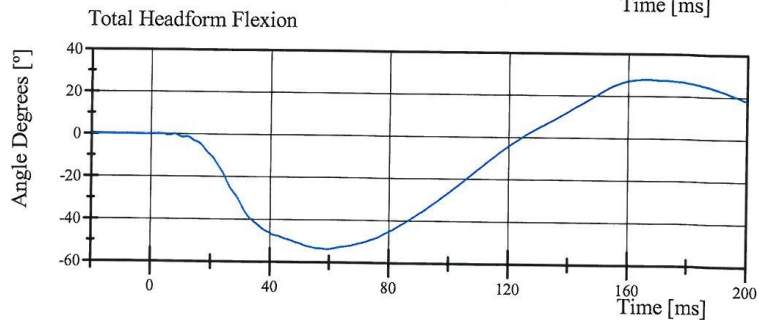
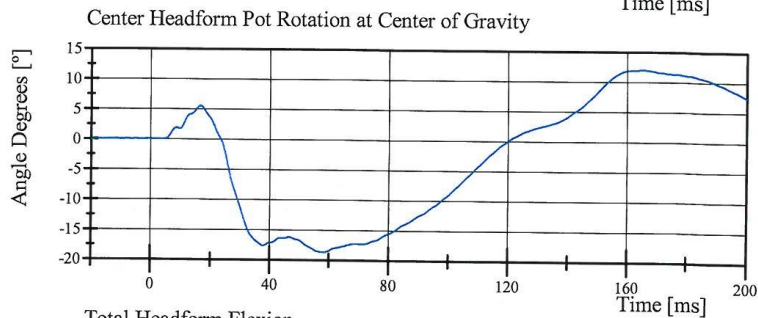
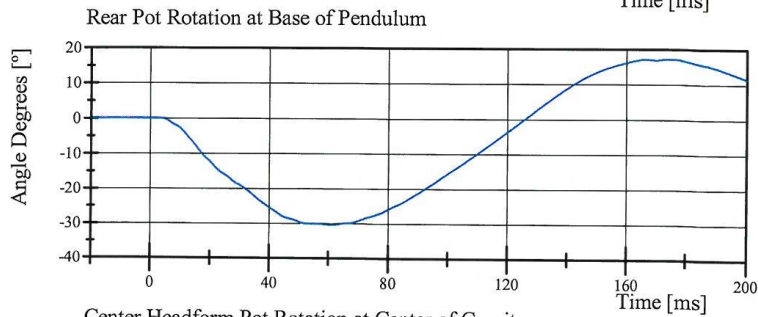
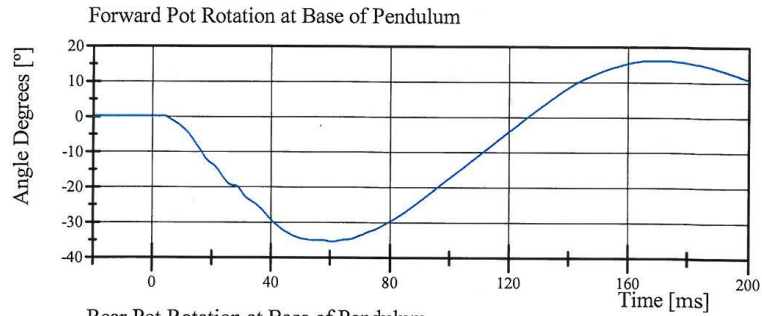


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013



Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 10:09:03 1313



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 15-1

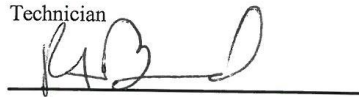
Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



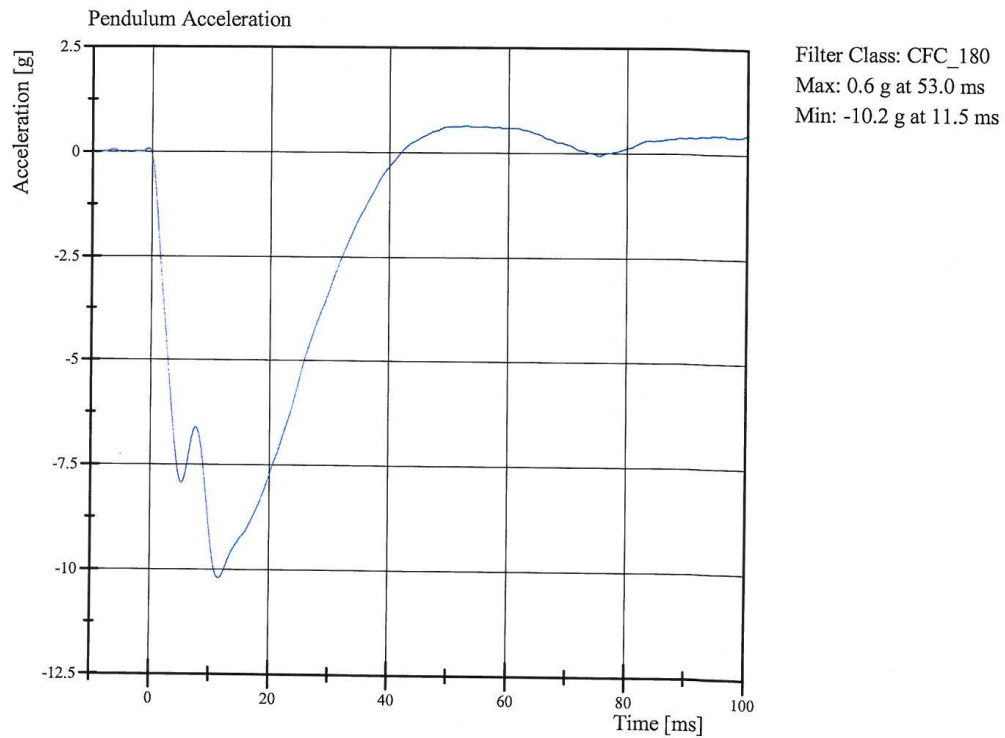
Specification Source: NHTSA final rule 8/15/2008

06.21.2013 11:03:23 550



Transportation Research Center Inc.

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



Specification Source: NHTSA final rule 8/15/2008

06.21.2013 11:03:32 550



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Drop Height: 816

Technician



Approved



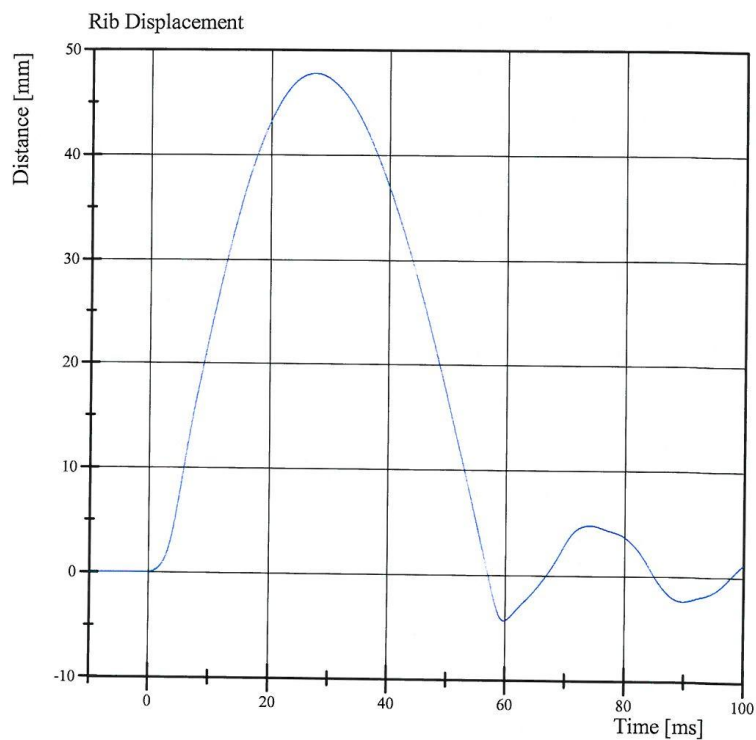
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:18:33 712



Transportation Research Center Inc.

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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:18:44 712



Transportation Research Center Inc.

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

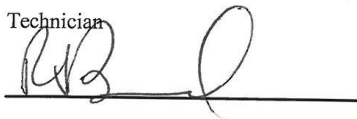
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

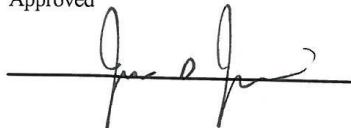
Comments:

Drop Height: 462

Technician



Approved



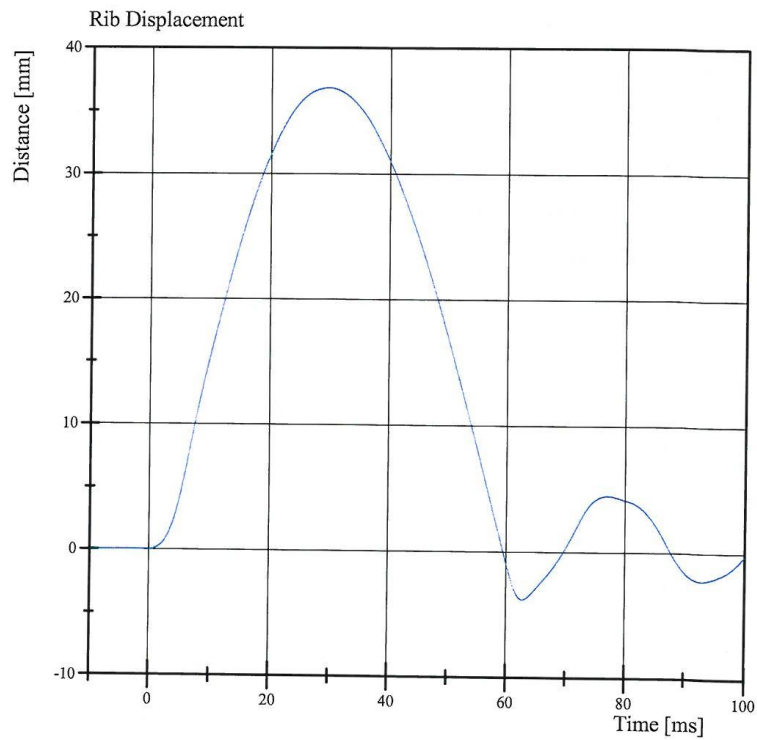
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:25:11 892



Transportation Research Center Inc.

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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:25:24 892



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

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

Test meets specifications.

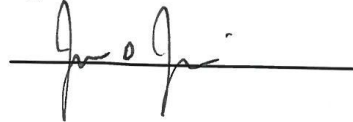
Comments:

Drop Height: 816

Technician



Approved



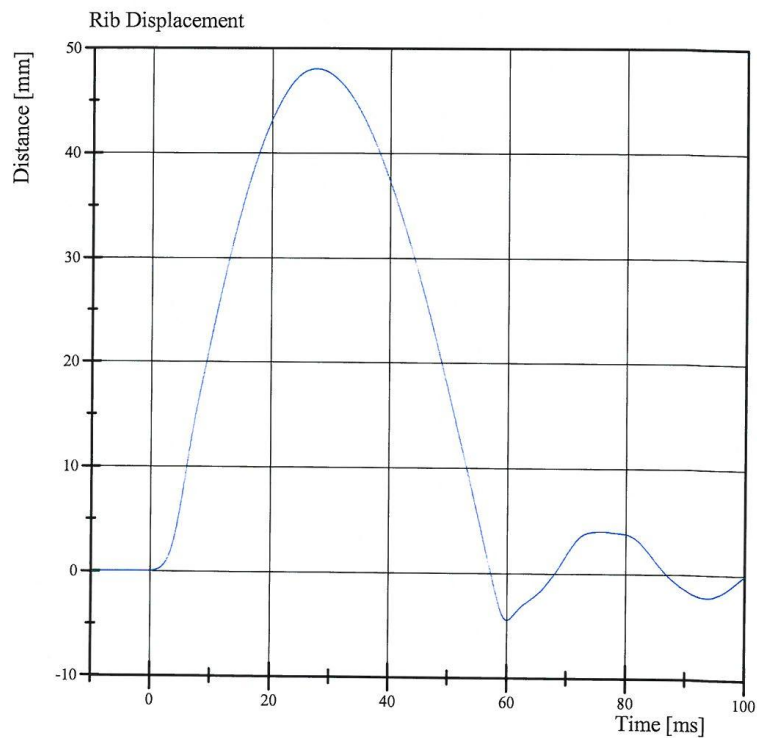
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:30:25 700



Transportation Research Center Inc.

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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:30:35 700



Transportation Research Center Inc.

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

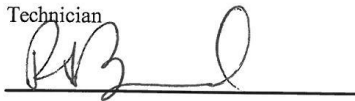
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

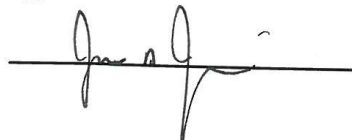
Comments:

Drop Height: 462

Technician



Approved



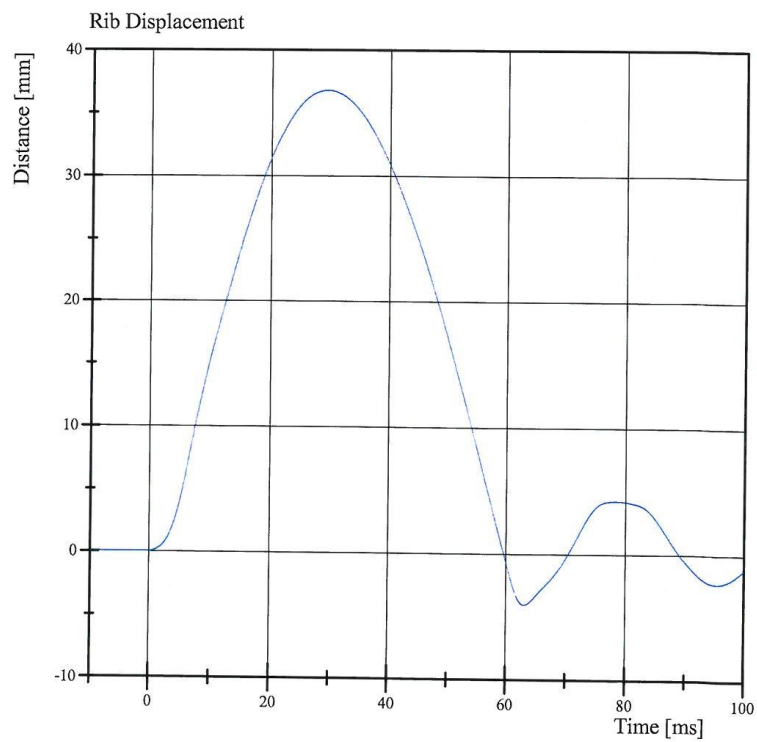
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:40:36 885



Transportation Research Center Inc.

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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:40:43 885



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

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

Test meets specifications.

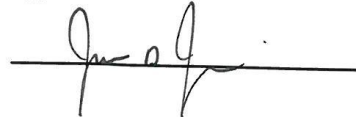
Comments:

Drop Height: 816

Technician



Approved



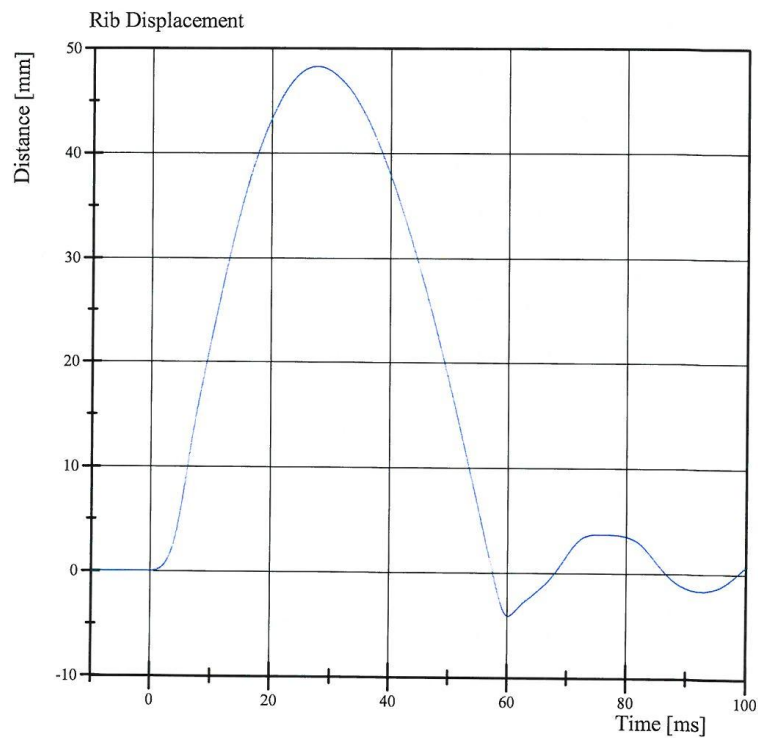
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:45:28 699



Transportation Research Center Inc.

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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:45:36 699



Transportation Research Center Inc.

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

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

Test meets specifications.

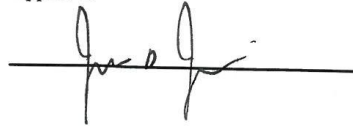
Comments:

Drop Height: 462

Technician



Approved



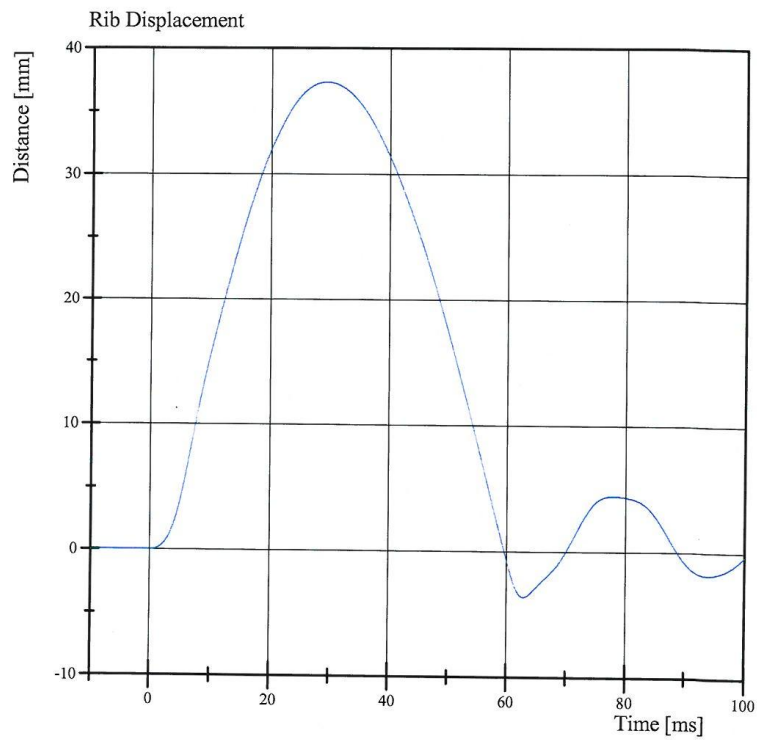
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:53:55 894



Transportation Research Center Inc.

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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 07:54:33 894



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



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

06.21.2013 11:08:56 426

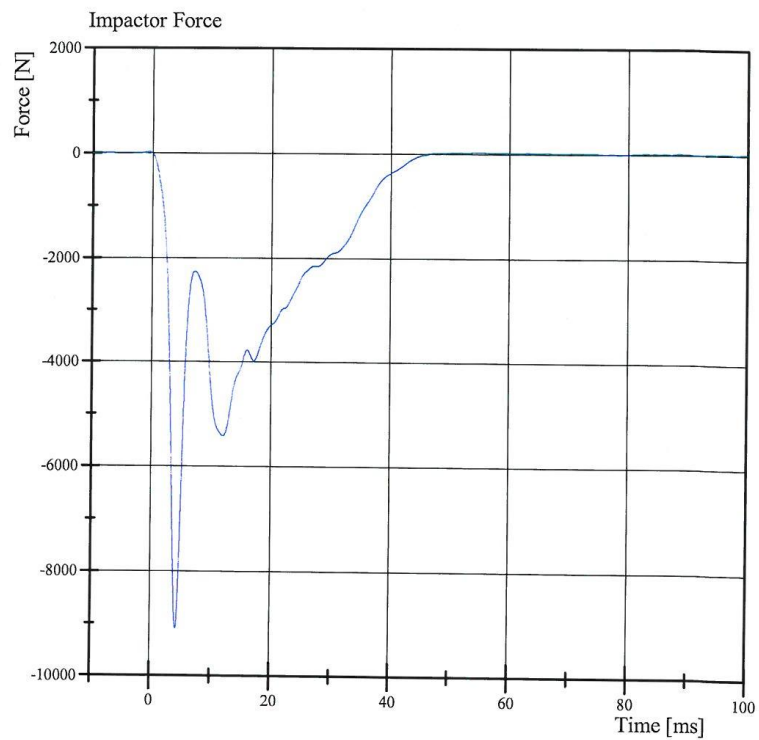


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013



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

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

06.21.2013 11:09:06 426

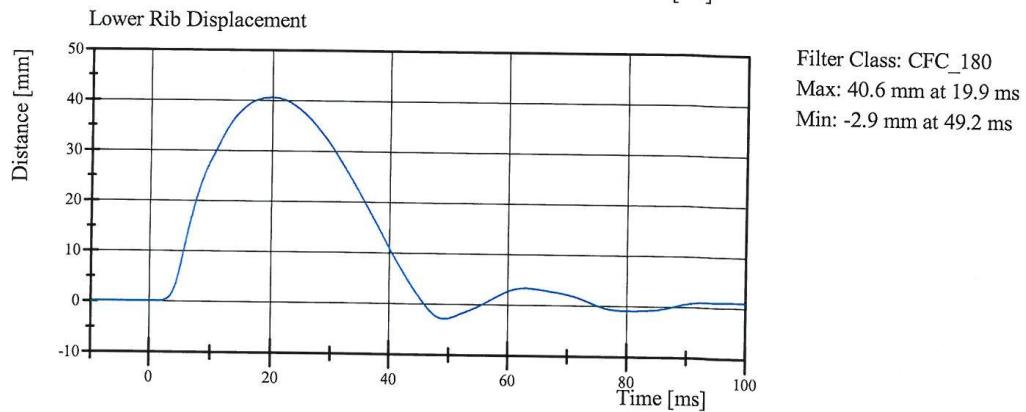
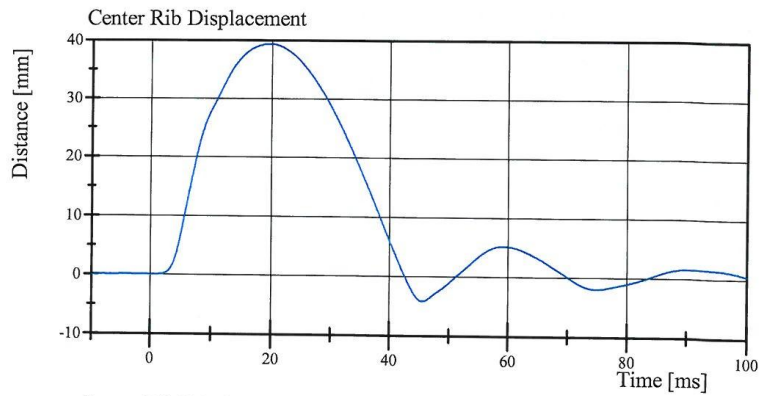
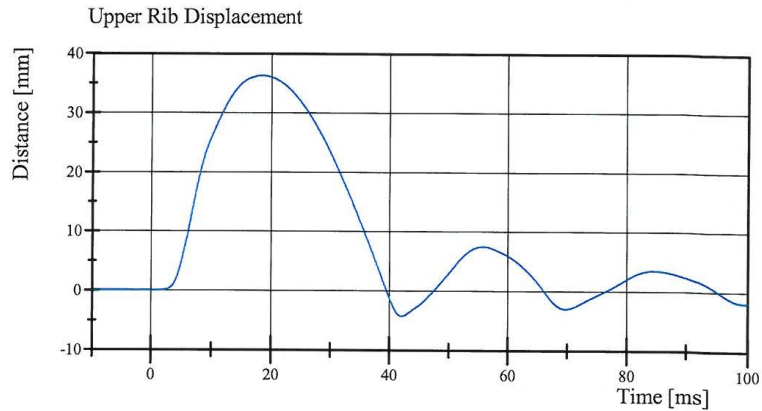


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013



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

06.21.2013 11:09:06 426



Transportation Research Center Inc.

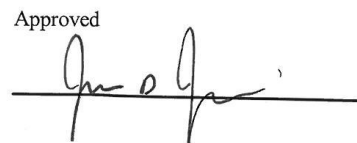
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician


Approved


Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 11:15:41 588



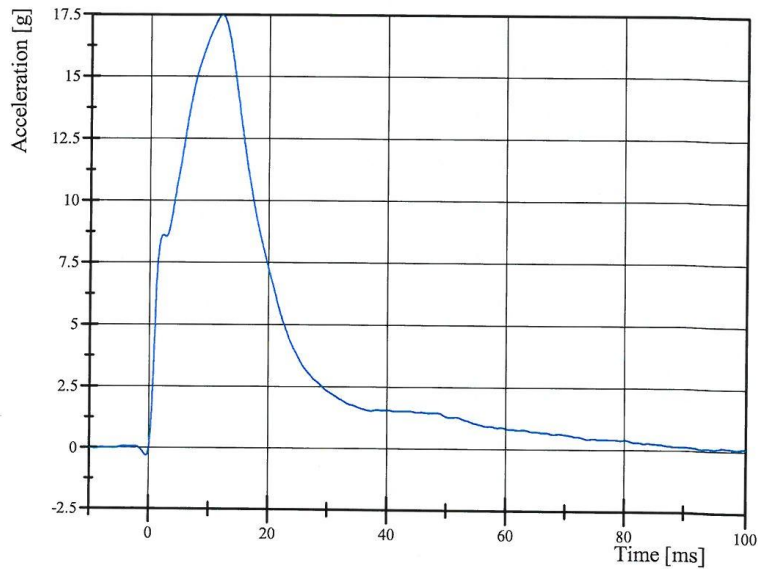
Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

Pendulum Acceleration

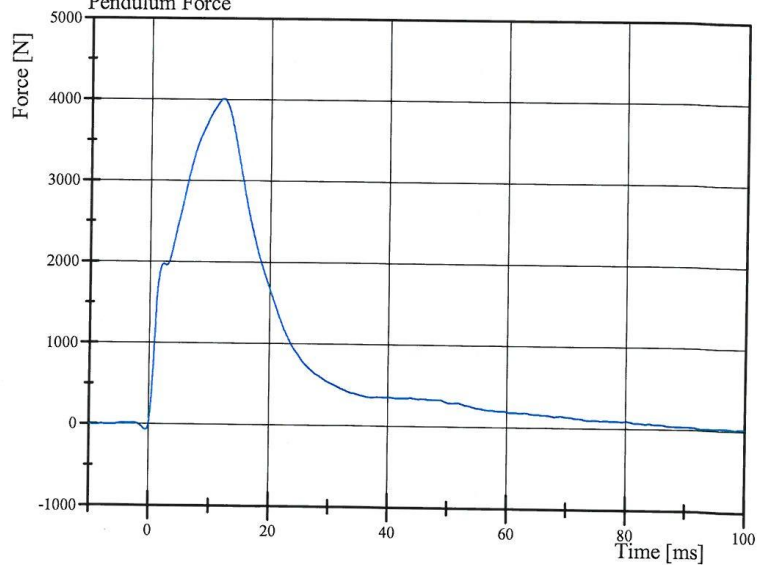


Filter Class: CFC_180

Max: 17.5 g at 12.0 ms

Min: -0.3 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180

Max: 4,005.0 N at 12.0 ms

Min: -73.1 N at -0.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 11:15:50 588

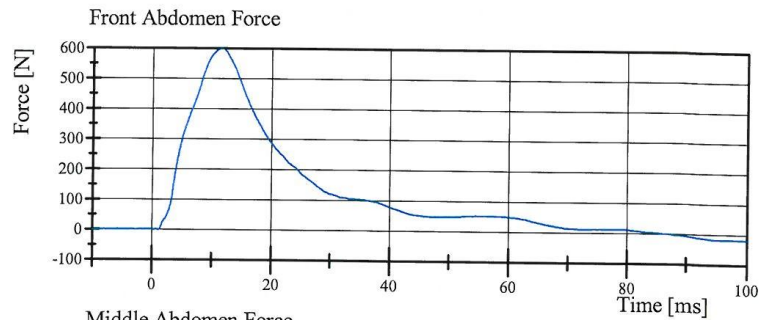


Transportation Research Center Inc.

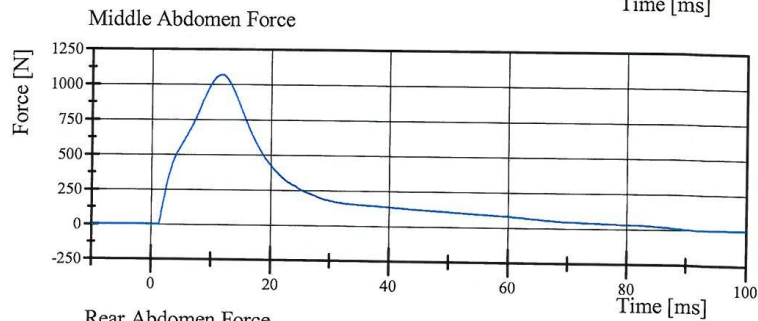
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 15-1

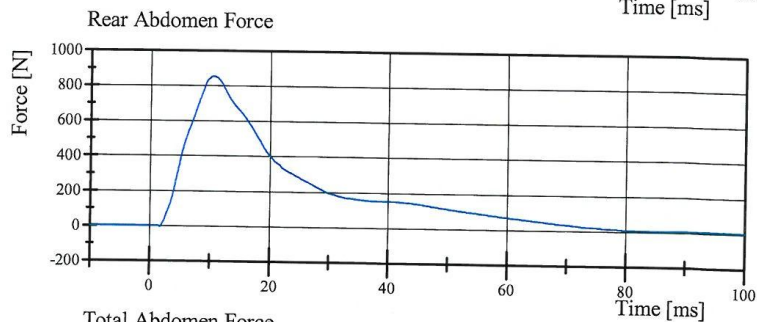
Test Date: 6/21/2013



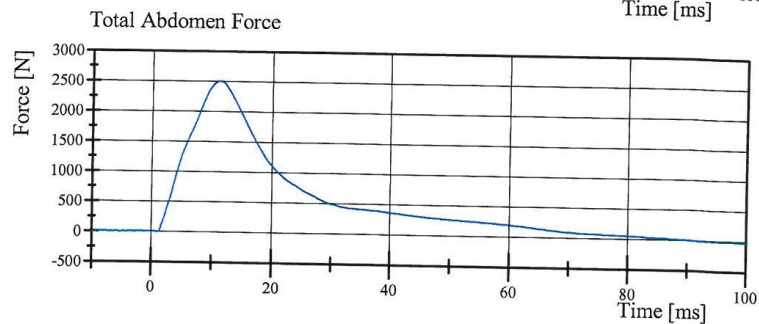
Filter Class: CFC_600
Max: 599.0 N at 11.6 ms
Min: -18.4 N at 99.4 ms



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



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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 11:15:51 588



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 15-1

Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 09:16:40 578



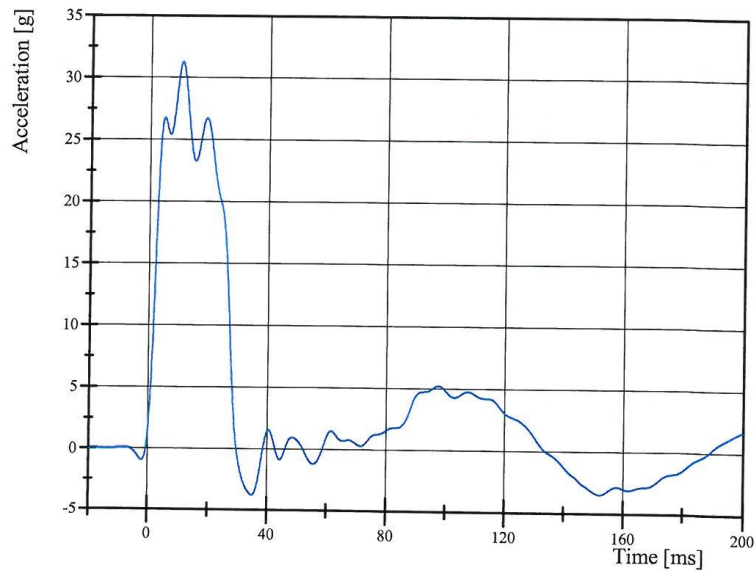
Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 15-1

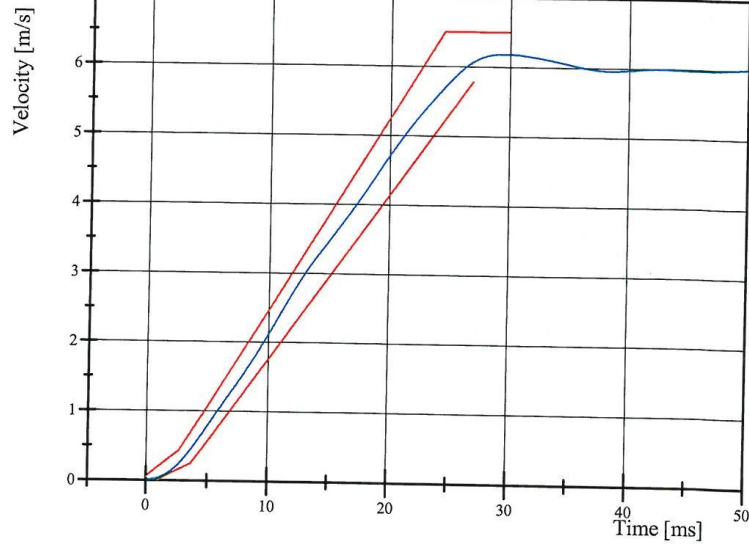
Test Date: 6/21/2013

Pendulum Acceleration



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

Pendulum Integrated Velocity Change



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

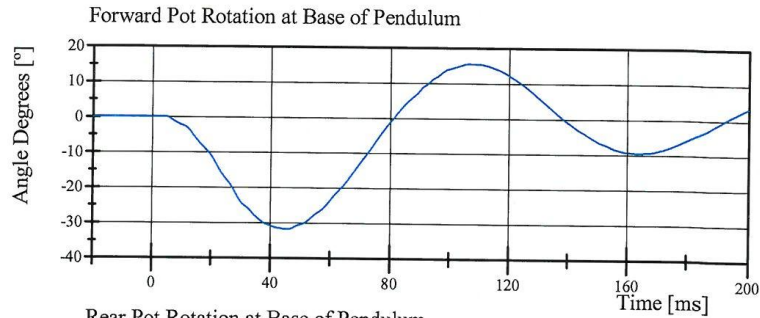
Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 09:16:47 578

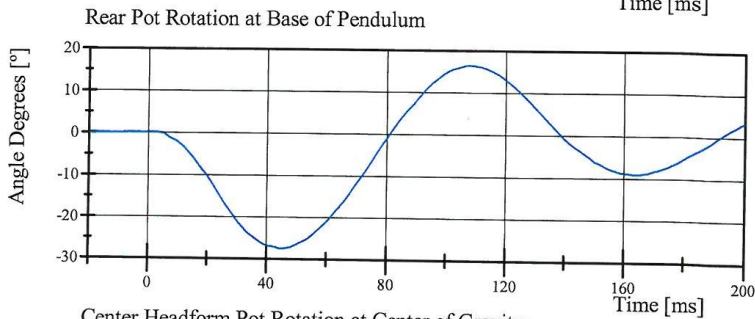


Transportation Research Center Inc.

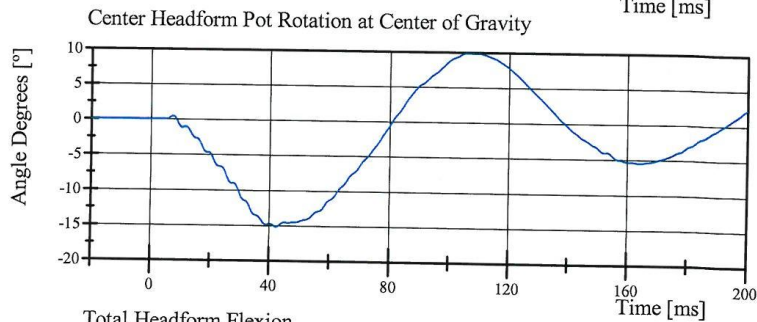
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 15-1
Test Date: 6/21/2013



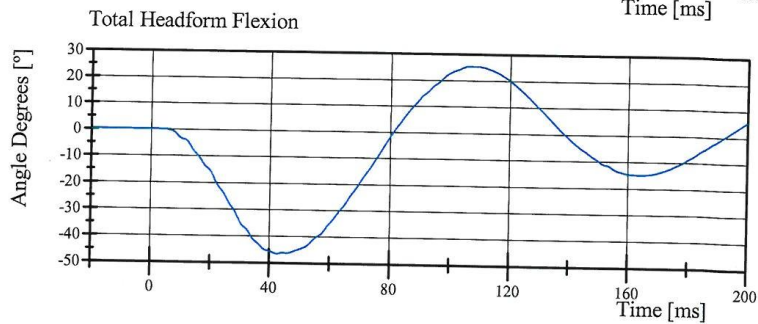
Filter Class: CFC_180
Max: 15.5 ° at 106.3 ms
Min: -31.8 ° at 45.5 ms



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



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



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 09:16:48 578



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 15-2

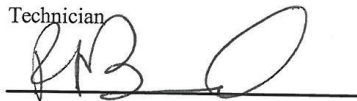
Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 13:28:11 528



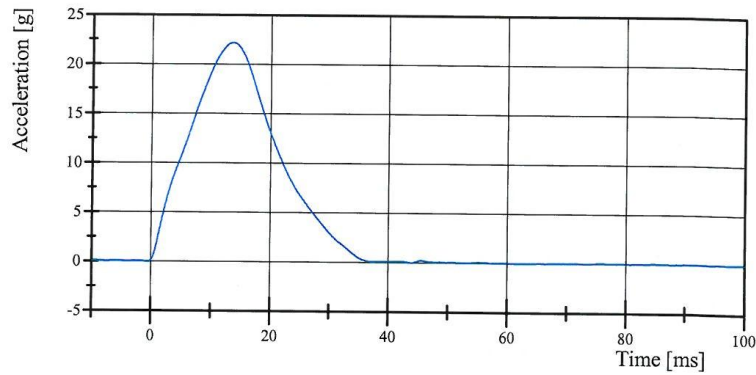
Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 15-2

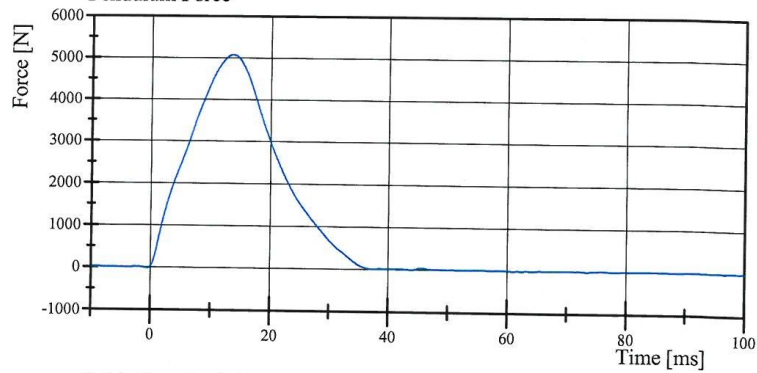
Test Date: 6/21/2013

Pendulum Acceleration



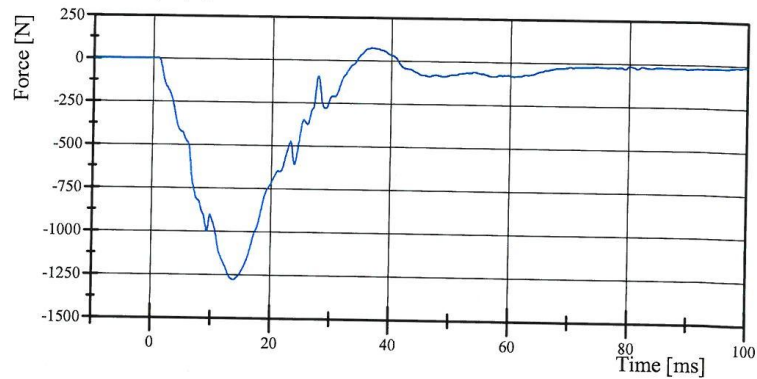
Filter Class: CFC_180
Max: 22.1 g at 13.5 ms
Min: -0.1 g at -0.6 ms

Pendulum Force



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

Pubic Symphysis Force



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

Specification Source: NHTSA Final Rule 8/15/2008

06.21.2013 13:28:18 528



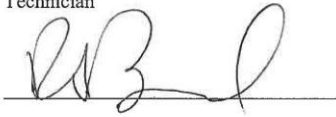
Driver S/N F030

Post-Test Calibration Sheets

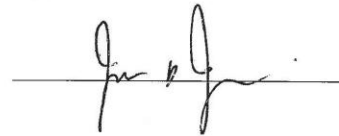
Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 16
Date: 07/31/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	97	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	447	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	470	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Technician



Approved




Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Peak Resultant Acceleration	125 - 155 g	141.5 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.0 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

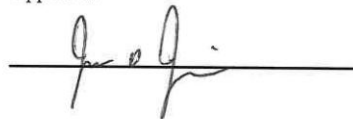
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 09:32:59 360

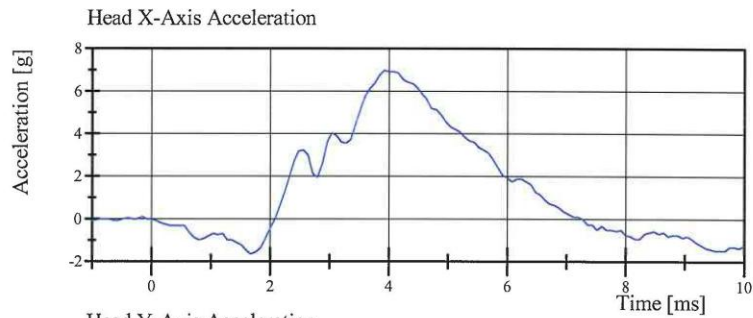


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 16-1

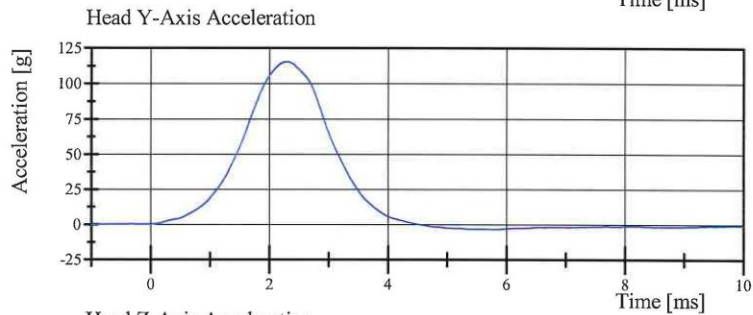
Test Date: 7/31/2013



Filter Class: CFC_1000

Max: 7.0 g at 3.9 ms

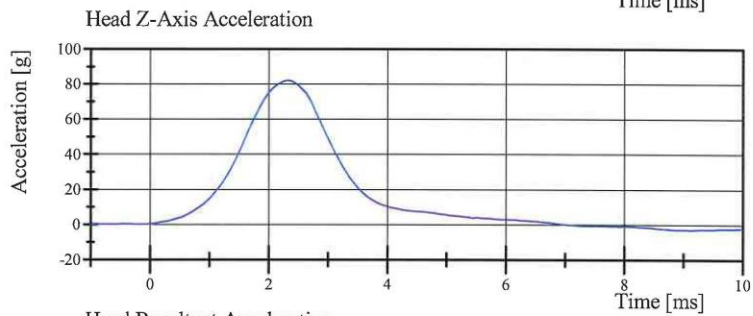
Min: -1.7 g at 1.7 ms



Filter Class: CFC_1000

Max: 115.2 g at 2.3 ms

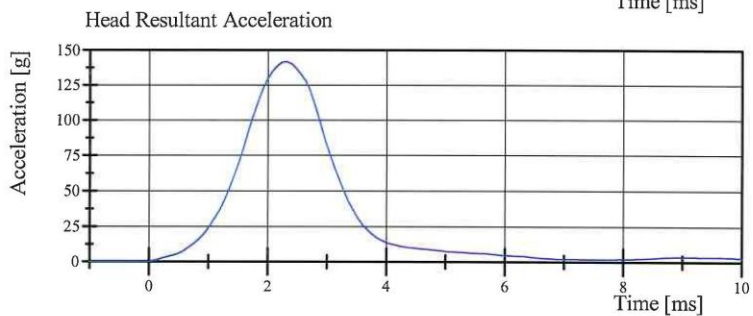
Min: -3.4 g at 5.8 ms



Filter Class: CFC_1000

Max: 82.0 g at 2.3 ms

Min: -3.1 g at 9.1 ms



Filter Class: CFC_1000

Max: 141.5 g at 2.3 ms

Min: 0.0 g at -0.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 09:33:38 360



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 16-1

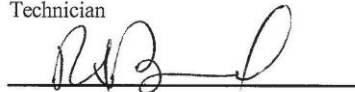
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-53.6 deg	Yes
Time of Peak	54 - 66 ms	59.1 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	66.2 ms	Yes

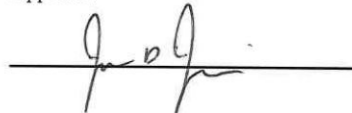
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 10:38:24 1308

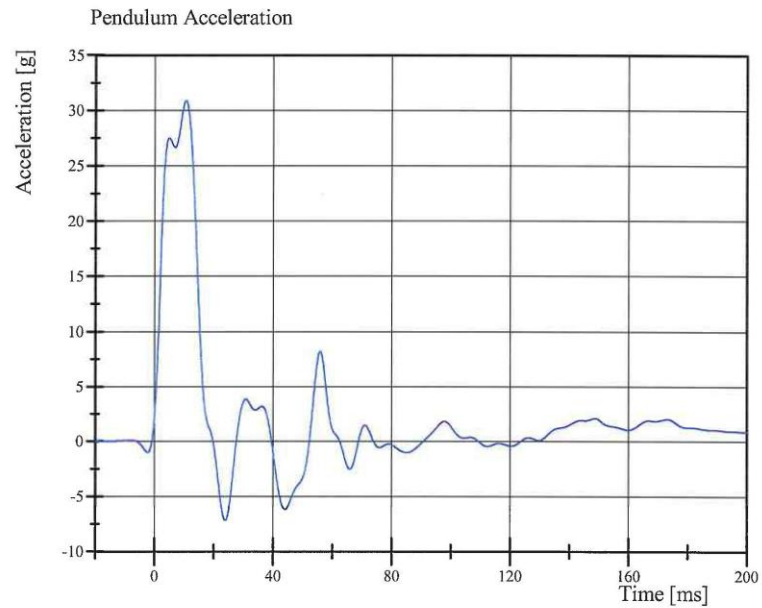


Transportation Research Center Inc.

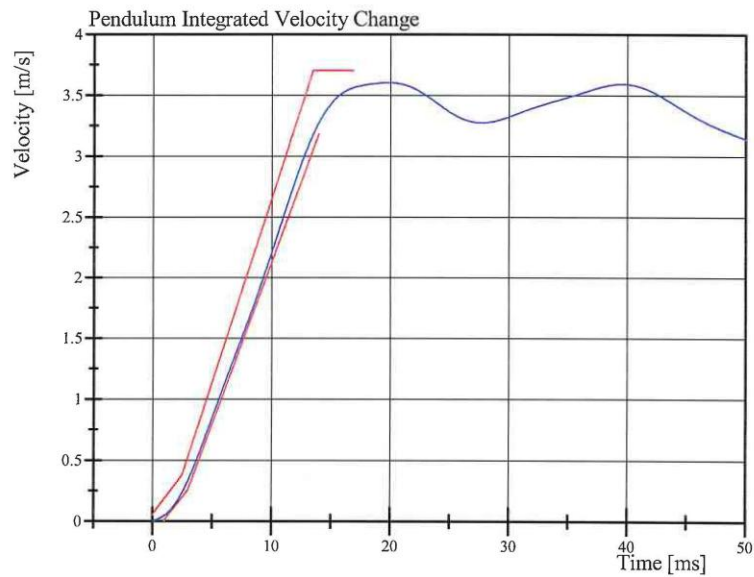
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013



Filter Class: CFC_60
Max: 30.9 g at 10.6 ms
Min: -7.2 g at 23.9 ms



Filter Class: CFC_60
Max: 3.6 m/s at 19.8 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 10:38:31 1308

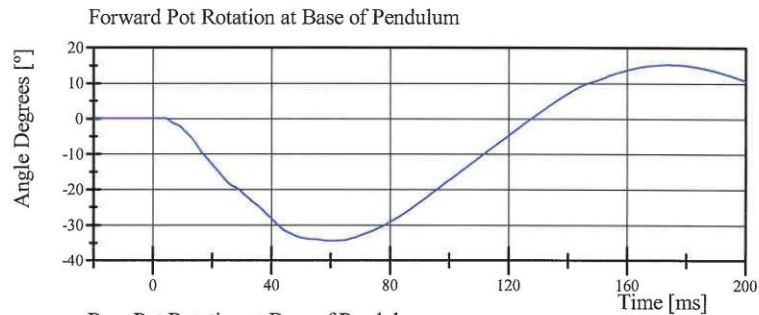


Transportation Research Center Inc.

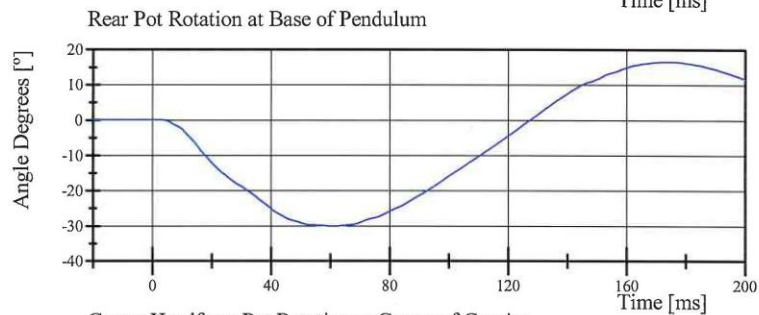
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 16-1

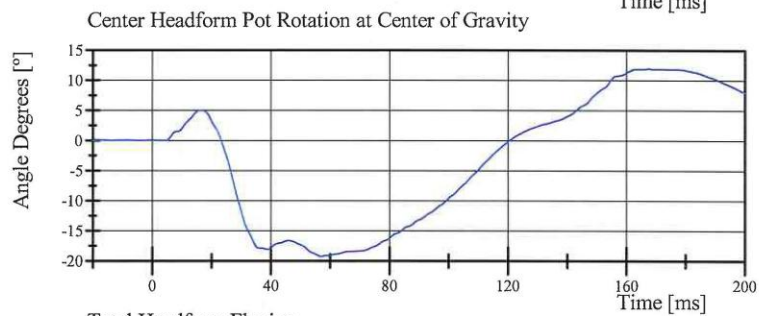
Test Date: 7/31/2013



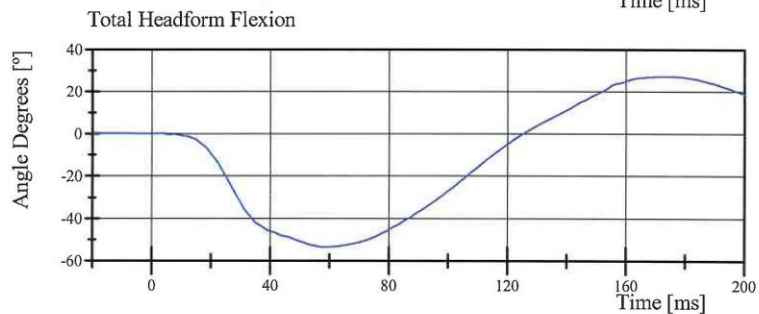
Filter Class: CFC_180
Max: 15.2 ° at 173.4 ms
Min: -34.5 ° at 59.4 ms



Filter Class: CFC_180
Max: 16.5 ° at 173.9 ms
Min: -30.1 ° at 61.4 ms



Filter Class: CFC_180
Max: 11.9 ° at 167.3 ms
Min: -19.3 ° at 57.0 ms



Filter Class: CFC_180
Max: 27.1 ° at 172.7 ms
Min: -53.6 ° at 59.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 10:38:31 1308



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.47 g	Yes

Test meets specifications.

Comments:

Technician



Approved



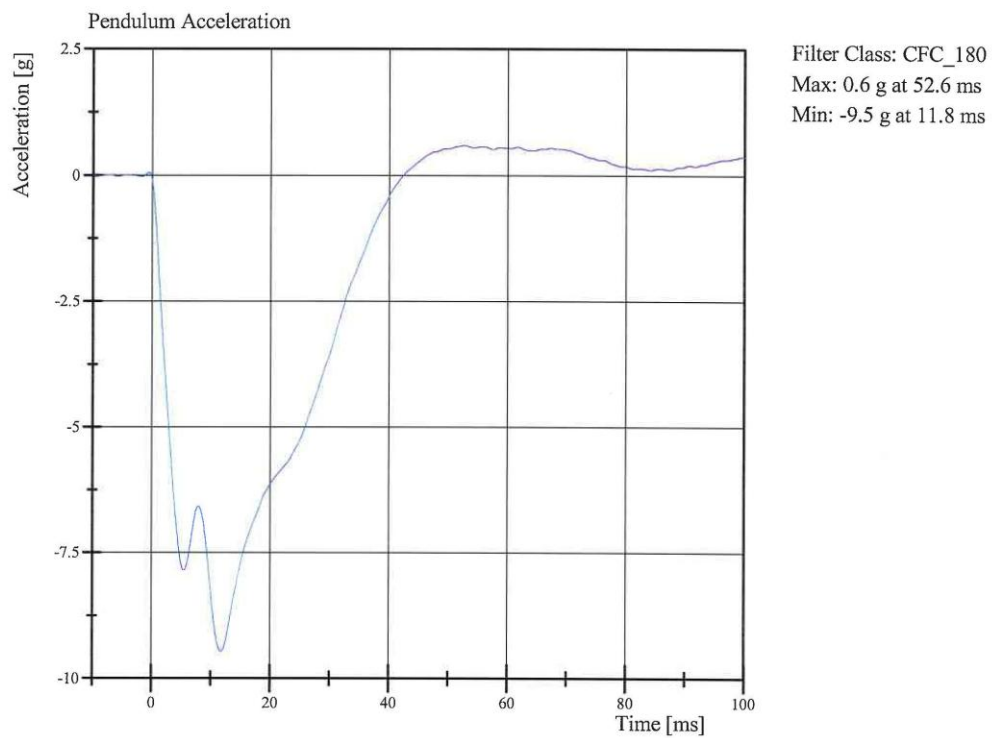
Specification Source: NHTSA final rule 8/15/2008

07.31.2013 12:50:30 566



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Specification Source: NHTSA final rule 8/15/2008

07.31.2013 12:50:38 566



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

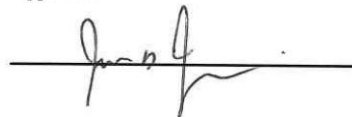
Comments:

Drop Height: 816

Technician



Approved



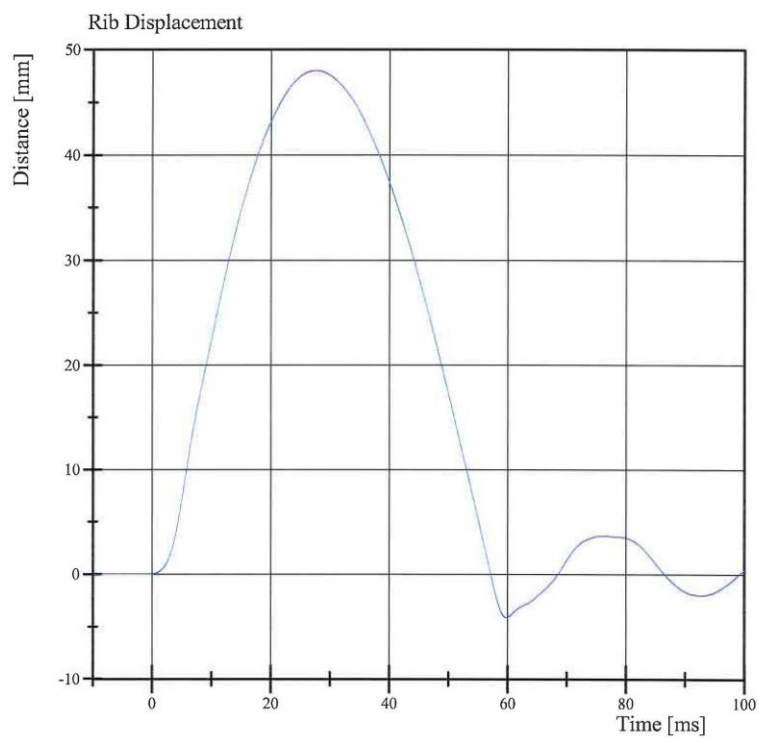
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 07:55:44 697



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Filter Class: CFC_180
Max: 48.0 mm at 27.7 ms
Min: -4.1 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 07:55:53 697



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

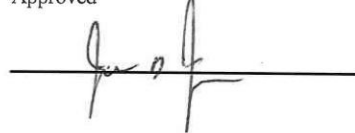
Comments:

Drop Height: 462

Technician



Approved



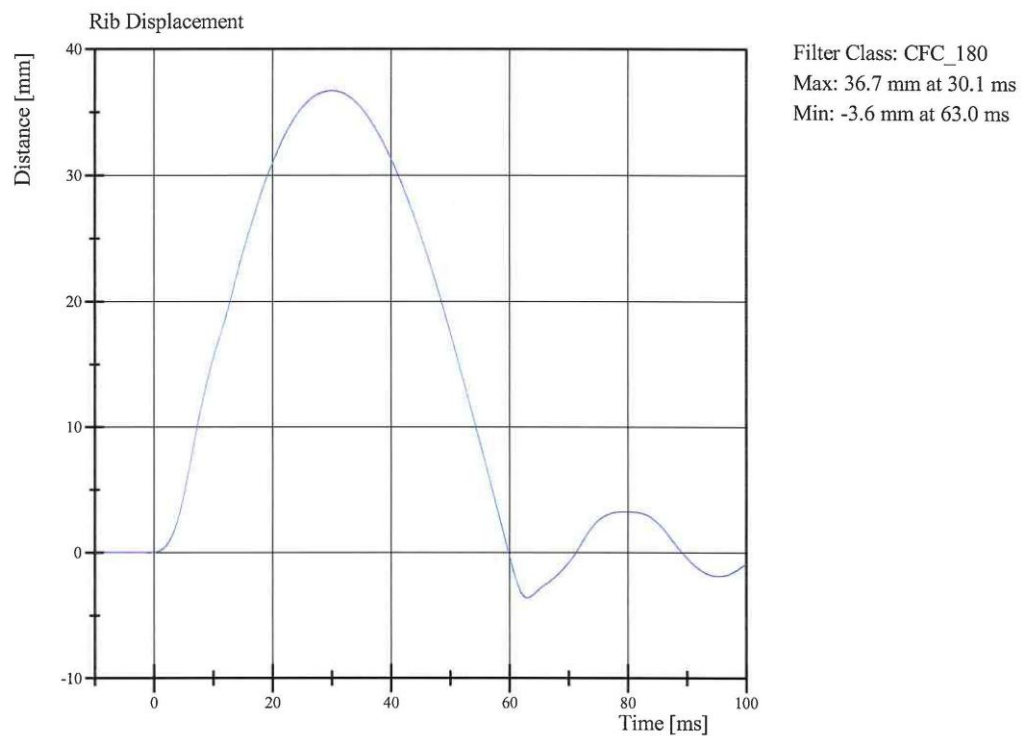
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:25:19 877



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:25:37 877



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.8 mm	Yes

Test meets specifications.

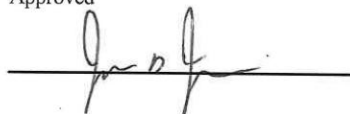
Comments:

Drop Height: 816

Technician



Approved



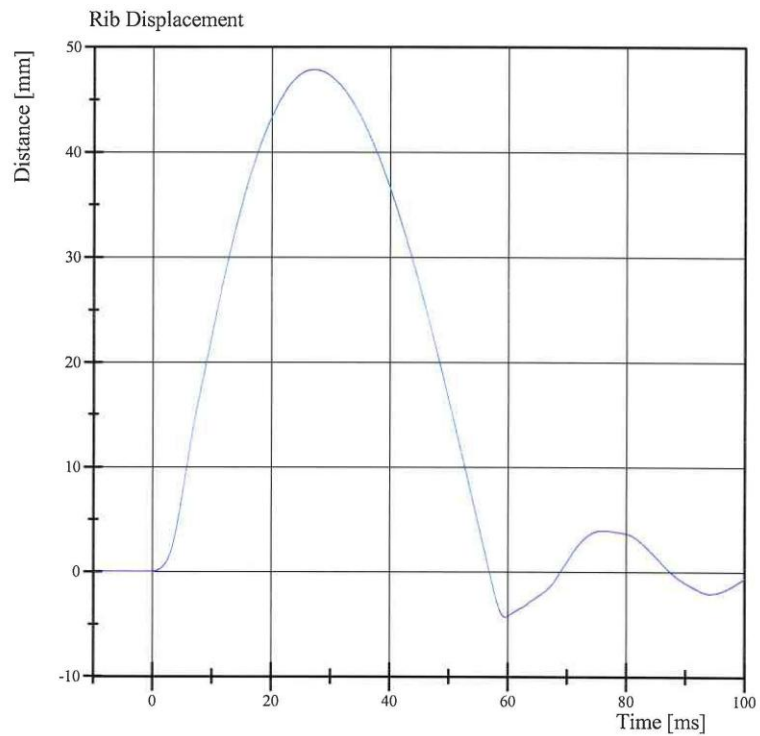
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:30:46 710



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Filter Class: CFC_180
Max: 47.8 mm at 27.1 ms
Min: -4.3 mm at 59.6 ms

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	57 %	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



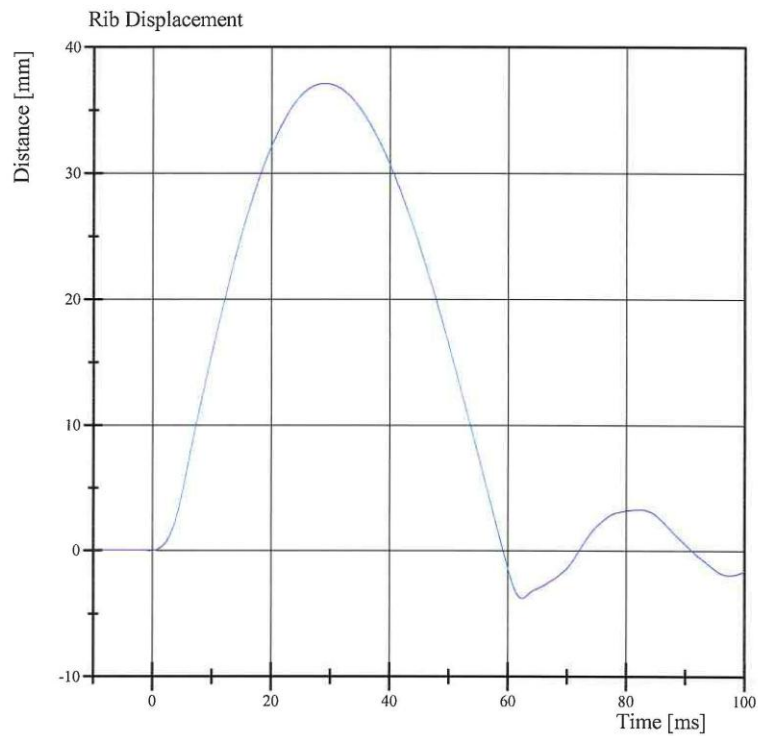
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:37:05 888



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Filter Class: CFC_180
Max: 37.1 mm at 29.0 ms
Min: -3.8 mm at 62.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:37:24 888



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

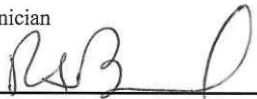
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.6 mm	Yes

Test meets specifications.

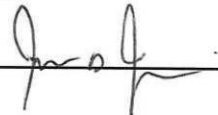
Comments:

Drop Height: 816

Technician



Approved



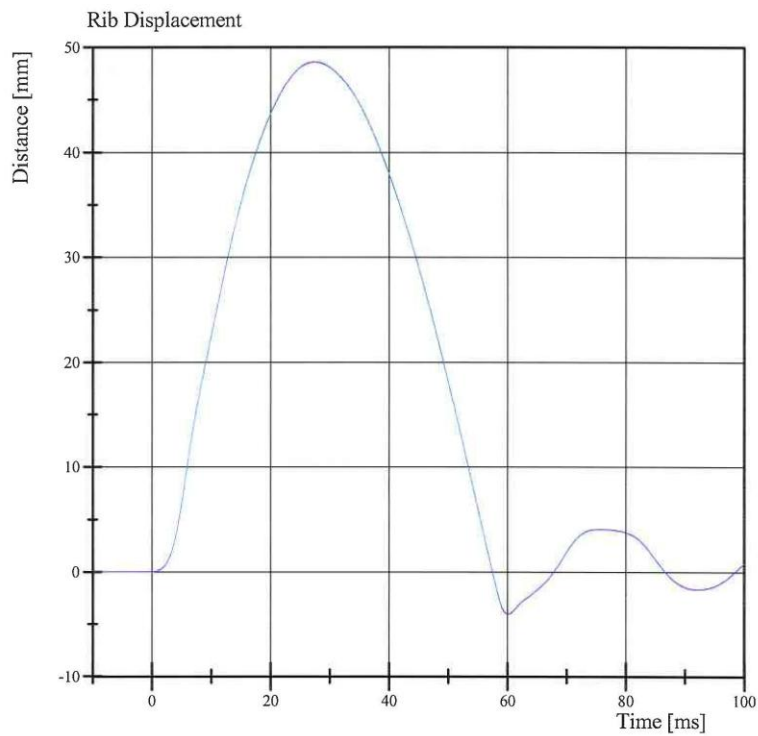
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:43:56 695



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Filter Class: CFC_180
Max: 48.6 mm at 27.4 ms
Min: -4.1 mm at 60.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:44:05 695



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



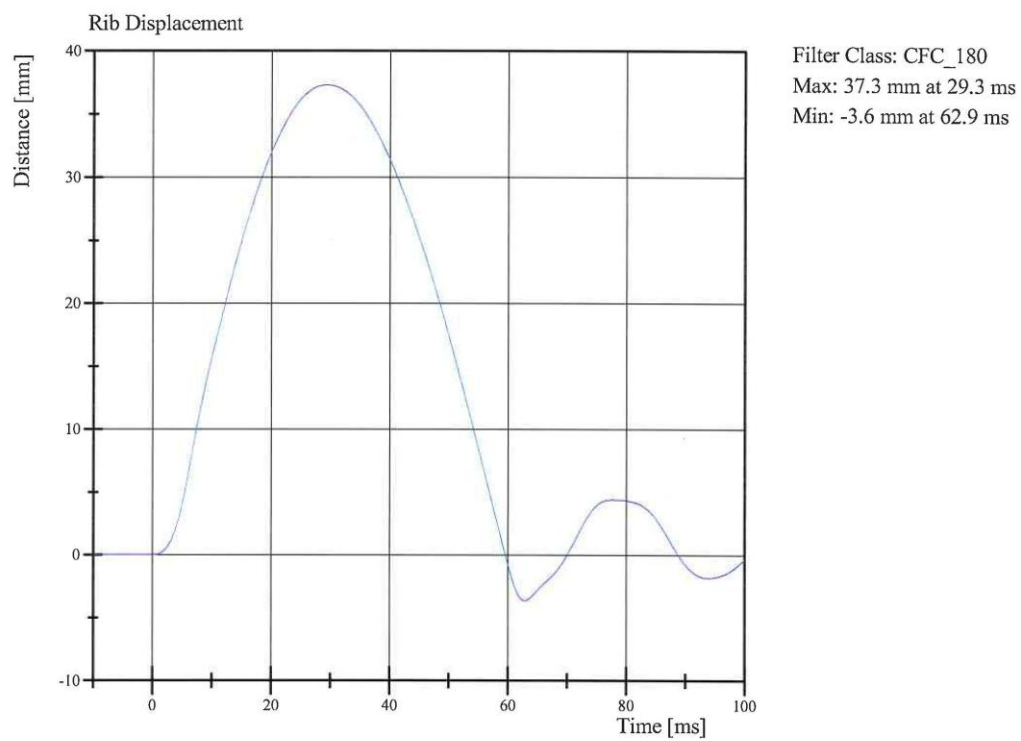
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:49:40 876



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:49:47 876



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



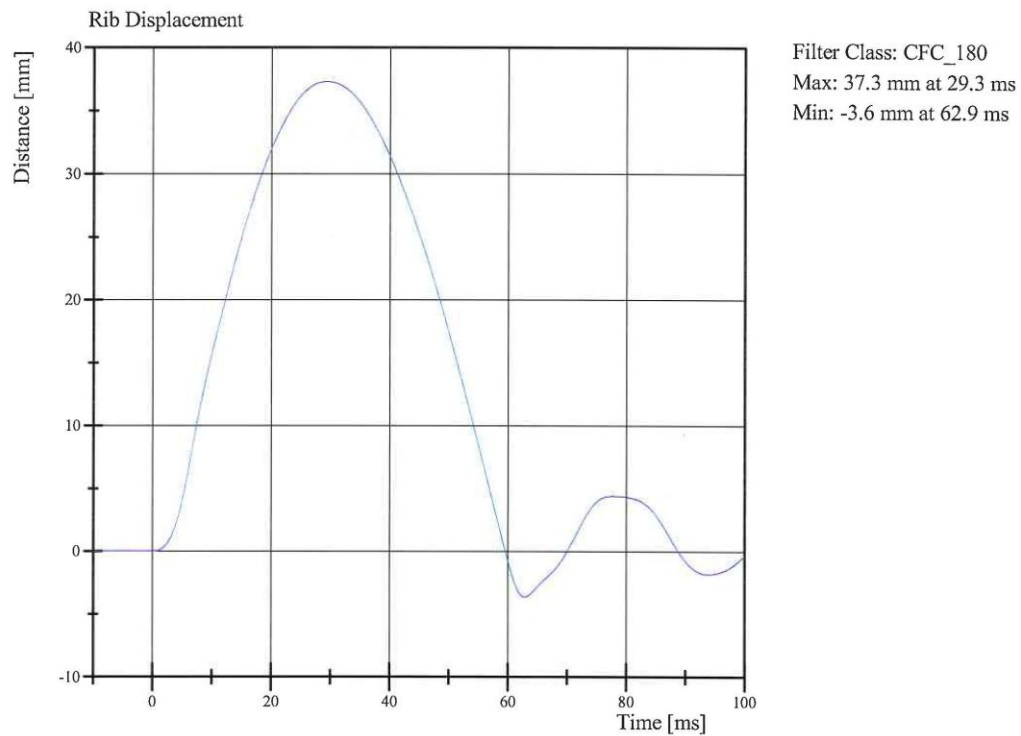
Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:49:40 876



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 08:49:47 876



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.507 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,581.1 N	Yes
Upper Rib Displacement	34 - 41 mm	38.2 mm	Yes
Center Rib Displacement	37 - 45 mm	41.0 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.6 mm	Yes

Test meets specifications.

Comments:

Technician



Approved



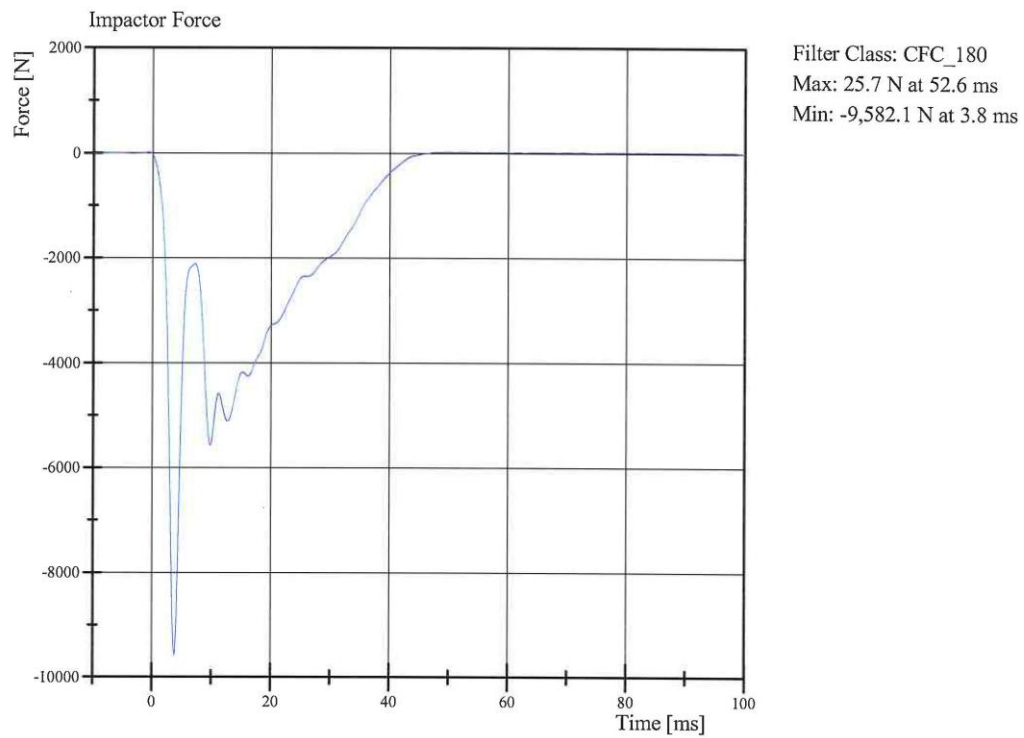
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

07.31.2013 13:04:13 466



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 16-1
Test Date: 7/31/2013



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

07.31.2013 13:04:20 466

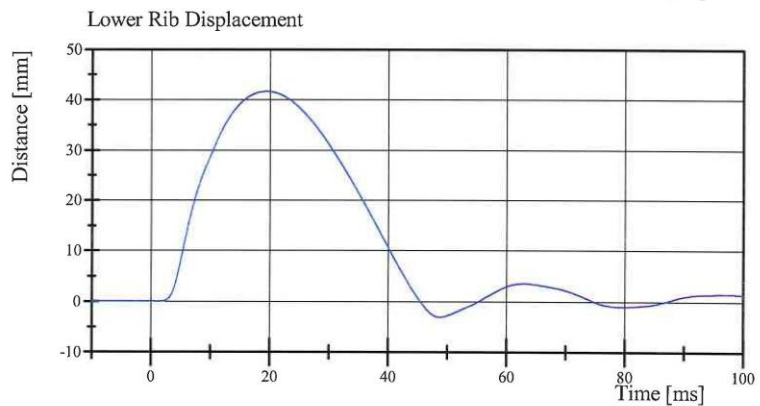
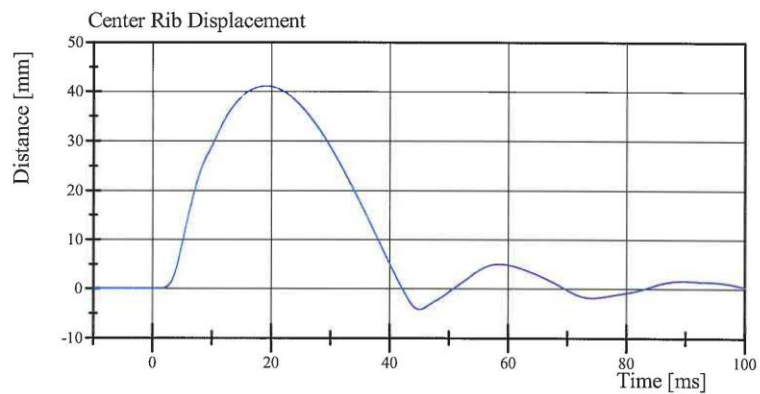
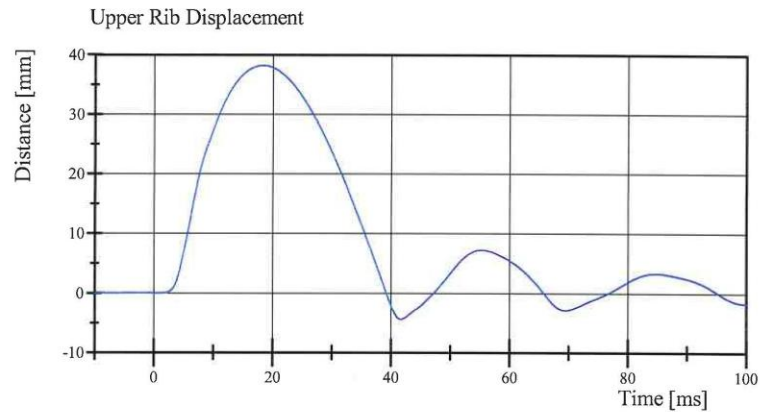


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013



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

07.31.2013 13:04:20 466



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.92 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,008.0 N	Yes
Time of Peak	10.6 - 13.0 ms	12.08 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,492.7 N	Yes
Time of Peak	10.0 - 12.3 ms	11.44 ms	Yes

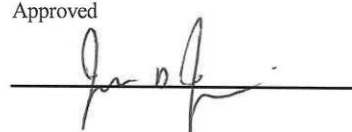
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 13:18:19 605

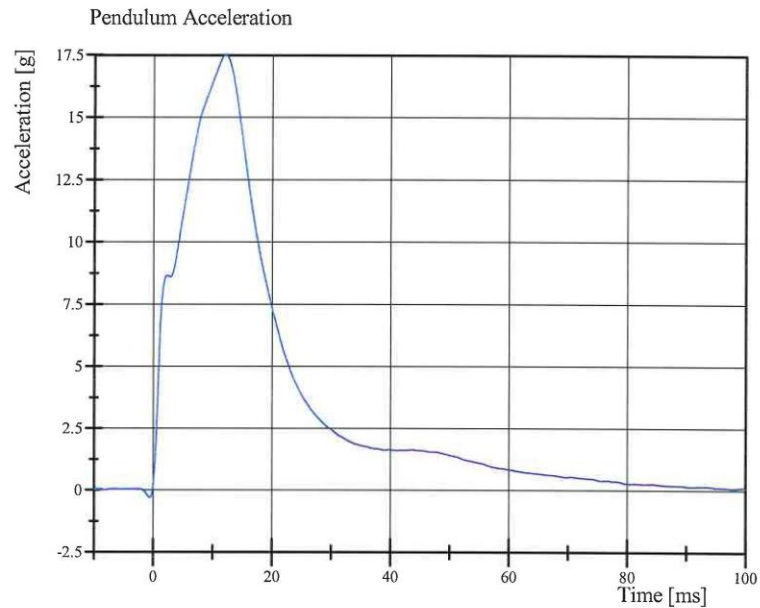


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 16-1

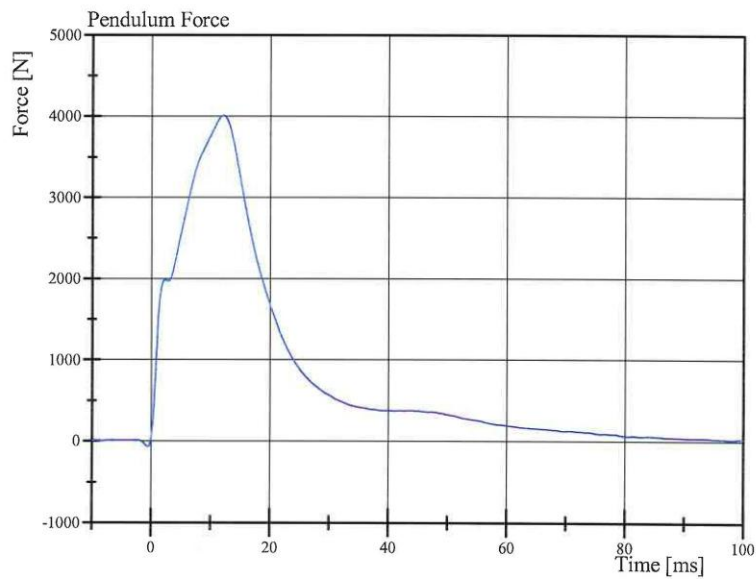
Test Date: 7/31/2013



Filter Class: CFC_180

Max: 17.5 g at 12.1 ms

Min: -0.3 g at -0.6 ms



Filter Class: CFC_180

Max: 4,008.0 N at 12.1 ms

Min: -71.9 N at -0.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 13:18:29 605

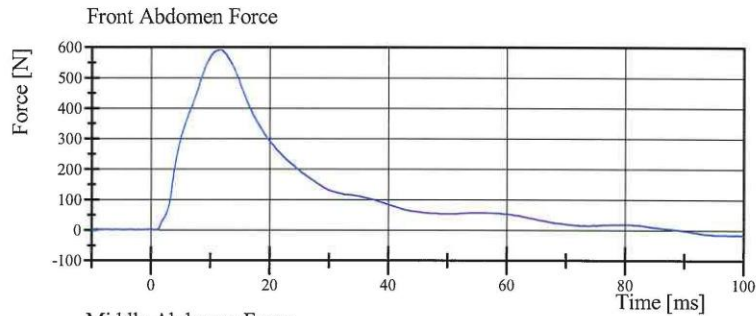


Transportation Research Center Inc.

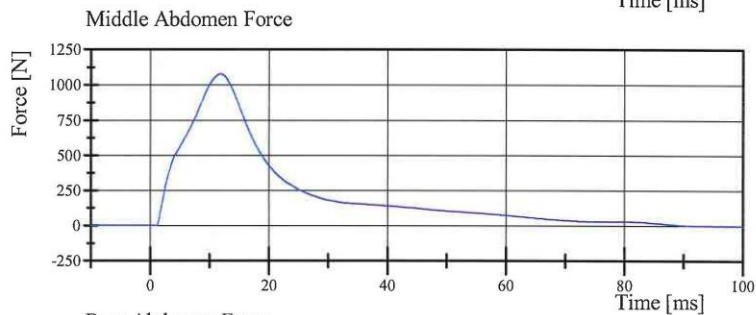
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 16-1

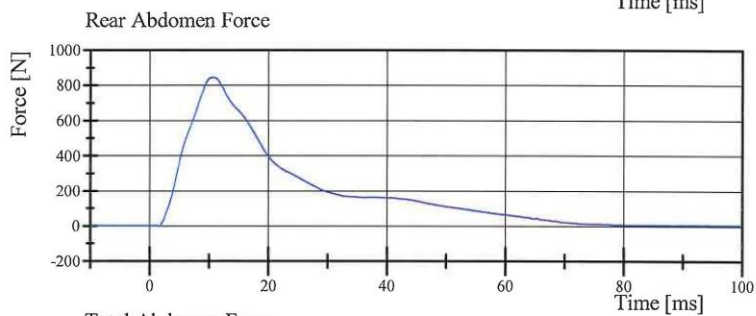
Test Date: 7/31/2013



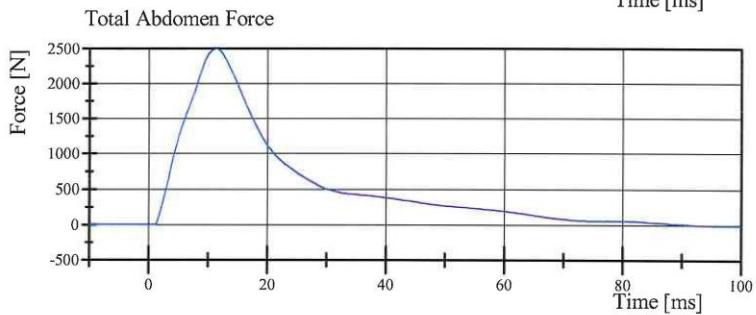
Filter Class: CFC_600
Max: 590.8 N at 11.7 ms
Min: -16.6 N at 99.9 ms



Filter Class: CFC_600
Max: 1,075.8 N at 11.8 ms
Min: -3.1 N at 99.7 ms



Filter Class: CFC_600
Max: 844.0 N at 10.7 ms
Min: -4.5 N at 1.6 ms



Filter Class: CFC_600
Max: 2,492.7 N at 11.4 ms
Min: -15.2 N at 99.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 13:18:30 605



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.034 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.0 deg	Yes
Time of Peak	39 - 53 ms	43.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	38.9 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 10:18:23 577



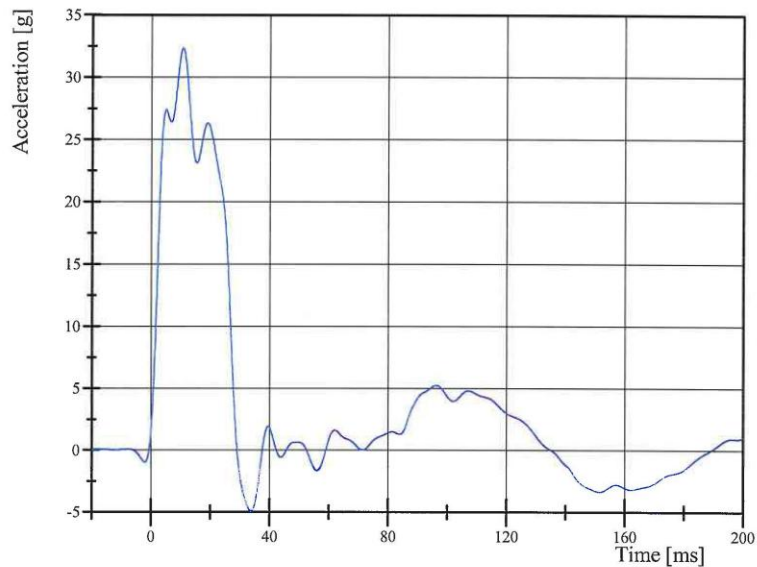
Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 32.3 g at 10.7 ms
Min: -4.9 g at 33.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.3 m/s at 29.0 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 10:18:30 577



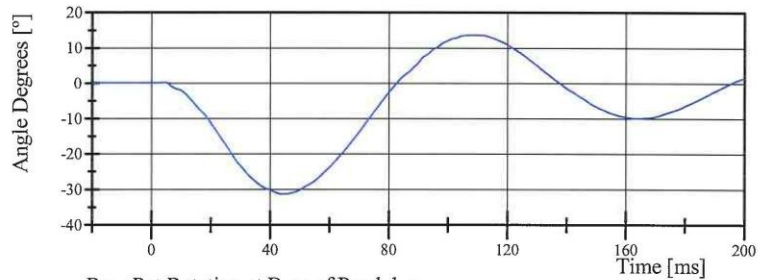
Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 16-1

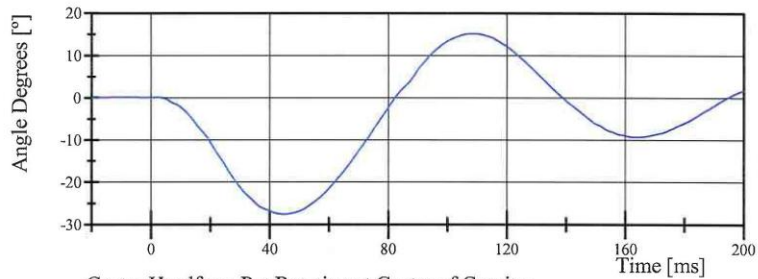
Test Date: 7/31/2013

Forward Pot Rotation at Base of Pendulum



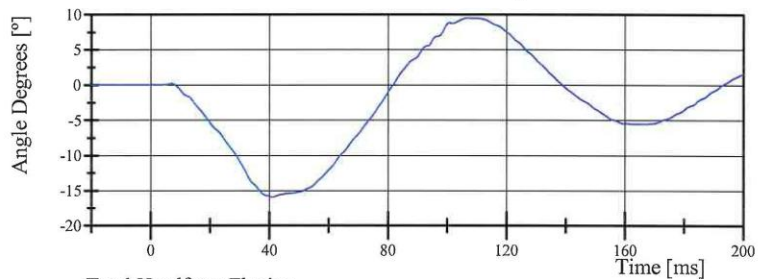
Filter Class: CFC_180
Max: 13.7 ° at 108.0 ms
Min: -31.4 ° at 44.1 ms

Rear Pot Rotation at Base of Pendulum



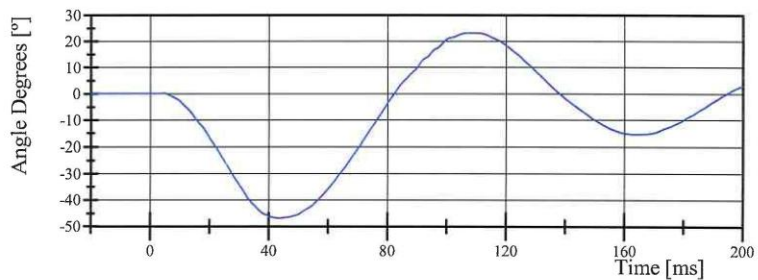
Filter Class: CFC_180
Max: 15.1 ° at 108.9 ms
Min: -27.6 ° at 44.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.5 ° at 106.8 ms
Min: -16.0 ° at 41.1 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 23.1 ° at 107.5 ms
Min: -47.0 ° at 43.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 10:18:30 577



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,048.3 N	Yes
Time of Peak	11.8 - 16.1 ms	13.84 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,231.7 N	Yes
Time of Peak	12.2 - 17.0 ms	13.20 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 13:37:00 546



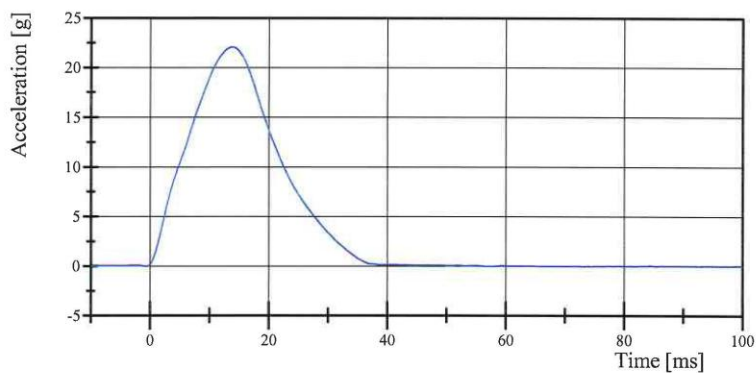
Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 16-1

Test Date: 7/31/2013

Pendulum Acceleration

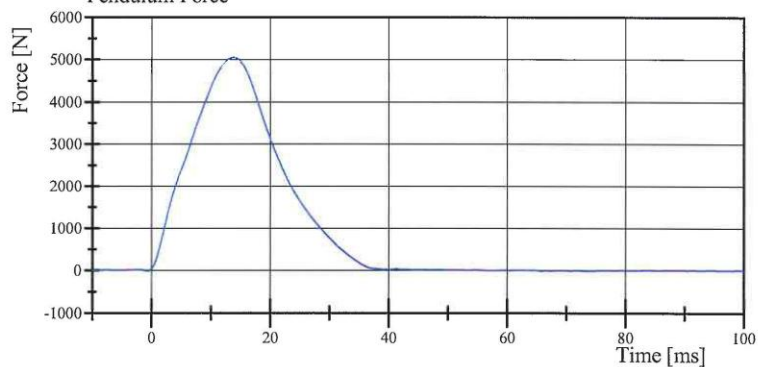


Filter Class: CFC_180

Max: 22.0 g at 13.8 ms

Min: -0.1 g at -0.6 ms

Pendulum Force

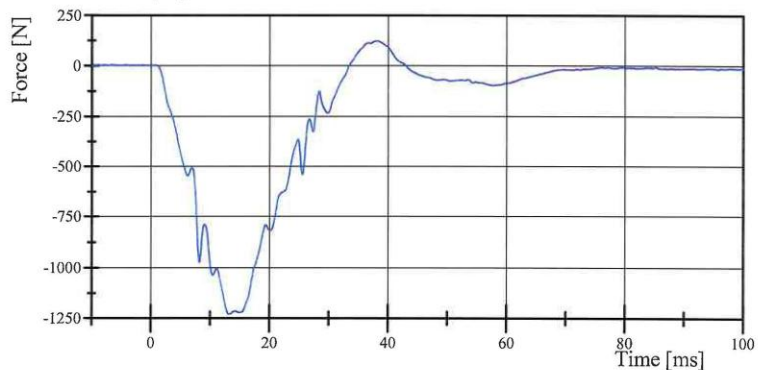


Filter Class: CFC_180

Max: 5,048.3 N at 13.8 ms

Min: -15.5 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600

Max: 121.7 N at 38.2 ms

Min: -1,231.7 N at 13.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

07.31.2013 13:37:16 546

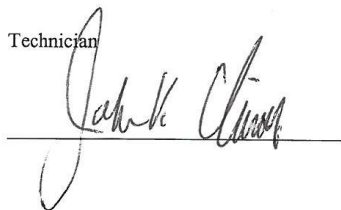


Pre-Test Calibration Sheets
Passenger S/N 305

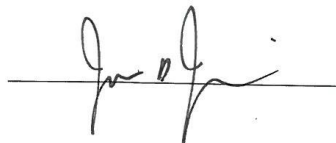
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.020

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	443	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	132	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	316	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	866	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 20-1

Test Date: 6/20/2013

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

Test meets specifications.

Comments:

Technician



Approved



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

06.21.2013 07:08:48 230

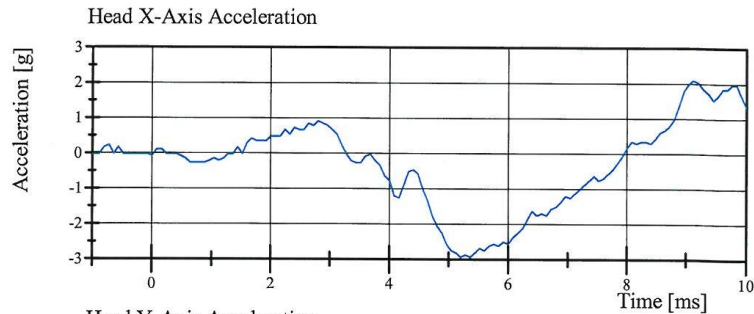


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 20-1

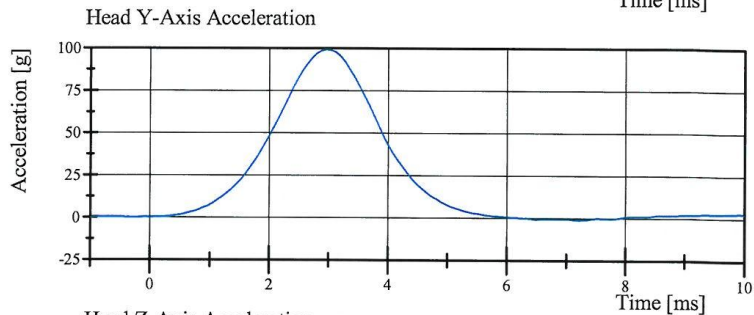
Test Date: 6/20/2013



Filter Class: CFC_1000

Max: 2.1 g at 9.1 ms

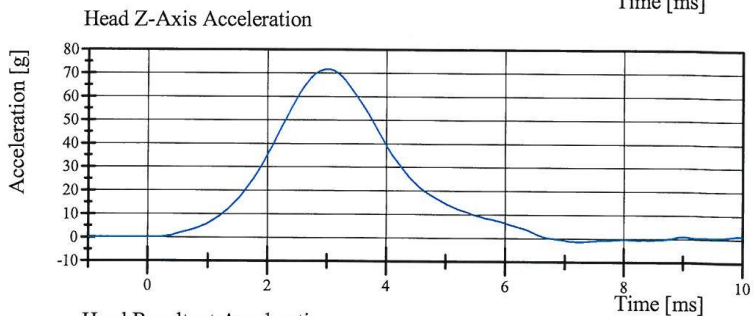
Min: -2.9 g at 5.2 ms



Filter Class: CFC_1000

Max: 99.1 g at 3.0 ms

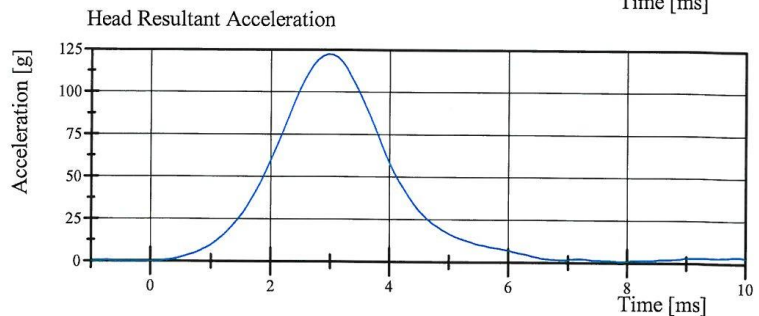
Min: -1.2 g at 7.2 ms



Filter Class: CFC_1000

Max: 71.5 g at 3.0 ms

Min: -1.5 g at 7.2 ms



Filter Class: CFC_1000

Max: 122.2 g at 3.0 ms

Min: 0.0 g at -0.9 ms

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

06.21.2013 07:08:55 230



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 20-1

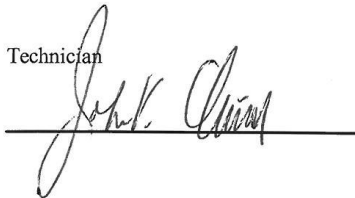
Test Date: 6/21/2013

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

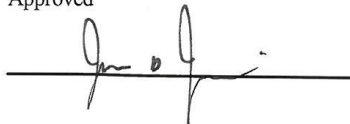
Test meets specifications.

Comments:

Technician



Approved



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

06.21.2013 08:51:32 637

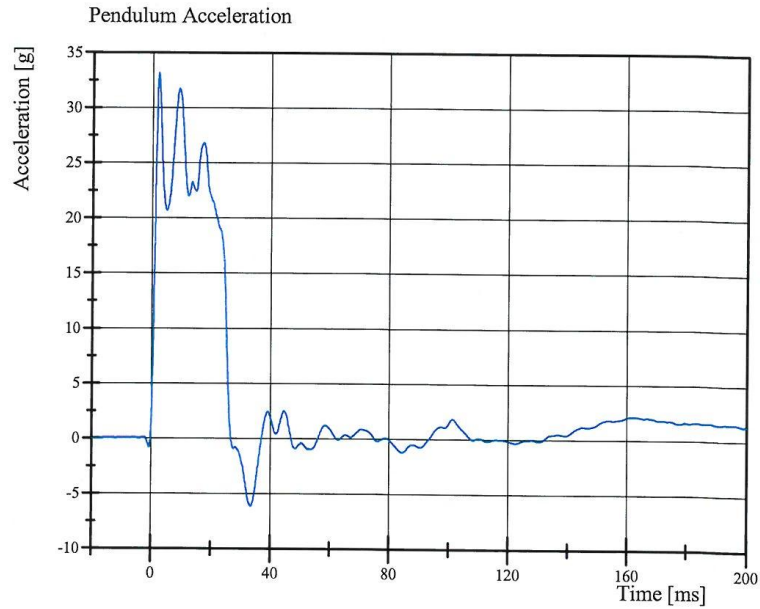


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 20-1

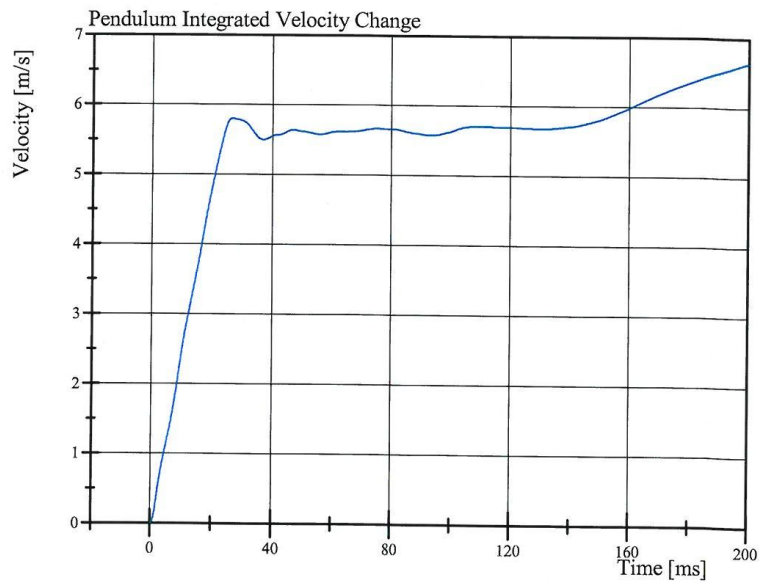
Test Date: 6/21/2013



Filter Class: CFC_180

Max: 33.1 g at 2.0 ms

Min: -6.2 g at 33.4 ms



Filter Class: CFC_180

Max: 6.6 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

06.21.2013 08:51:40 637

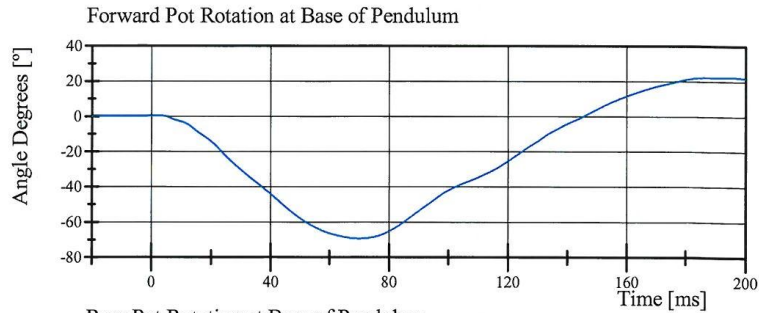


Transportation Research Center Inc.

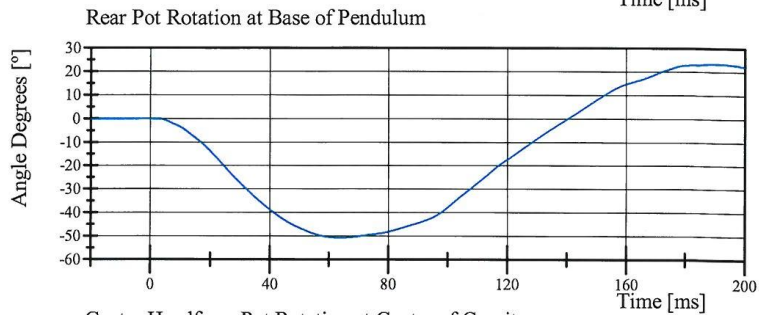
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 20-1

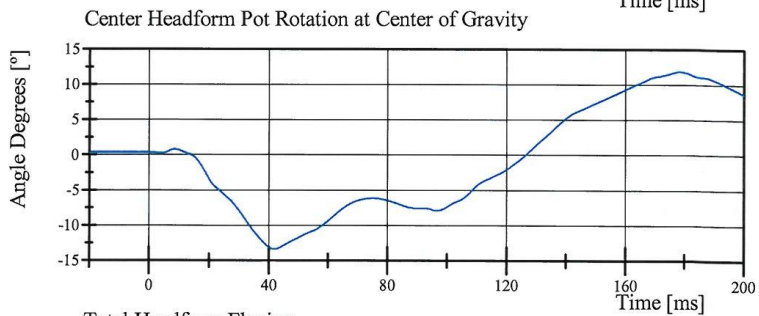
Test Date: 6/21/2013



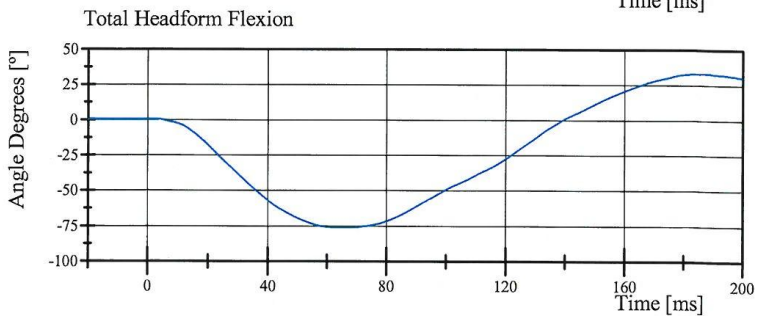
Filter Class: CFC_60
Max: 22.1 ° at 189.3 ms
Min: -69.4 ° at 70.0 ms



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



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



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

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

06.21.2013 08:51:41 637

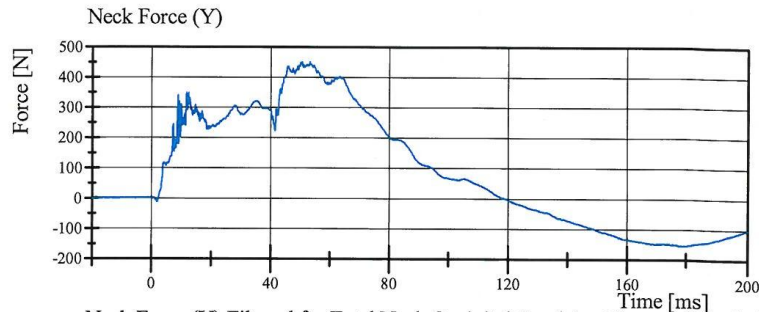


Transportation Research Center Inc.

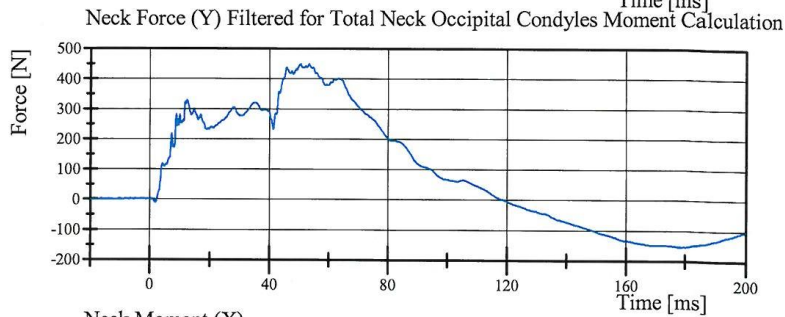
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 20-1

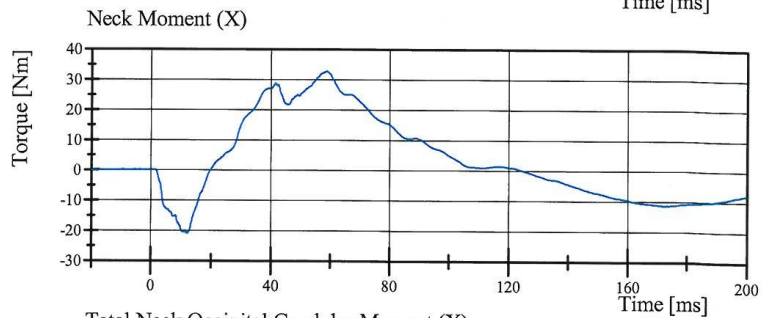
Test Date: 6/21/2013



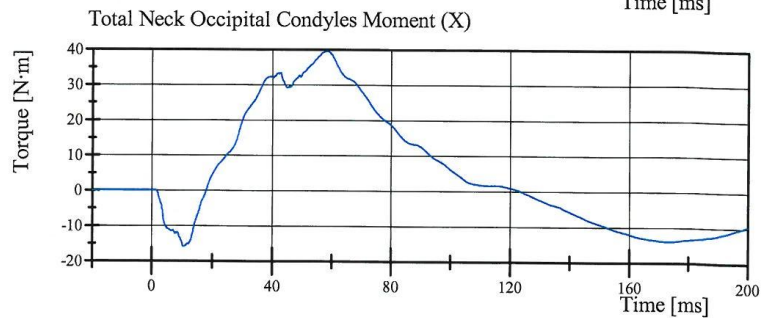
Filter Class: CFC_1000
Max: 451.5 N at 50.6 ms
Min: -154.9 N at 177.5 ms



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



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



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

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

06.21.2013 08:51:42 637



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 20-1

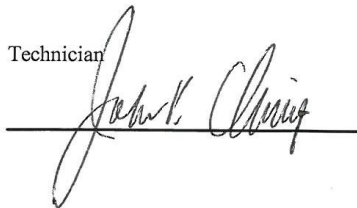
Test Date: 6/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	30.4 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.0 g	Yes

Test meets specifications.

Comments:

Technician



Approved



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

06.21.2013 10:28:59 845

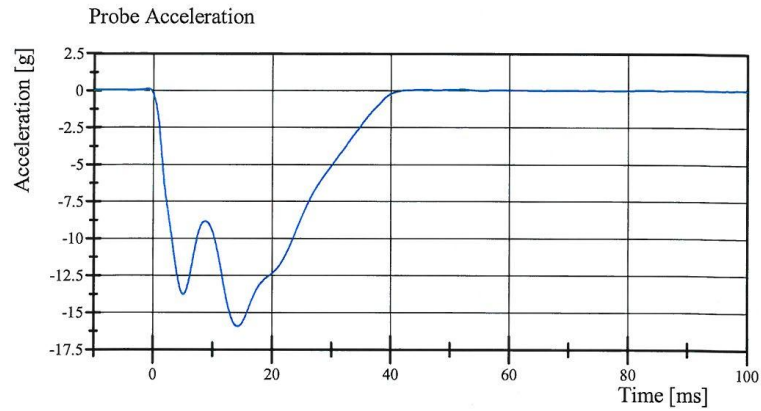


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 20-1

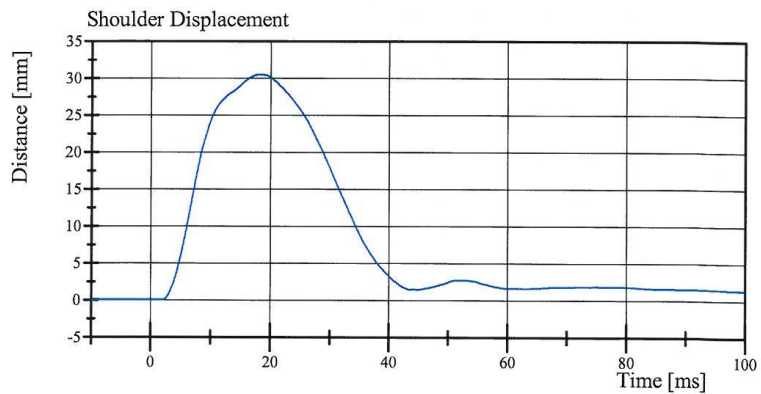
Test Date: 6/21/2013



Filter Class: CFC_180

Max: 0.1 g at -0.9 ms

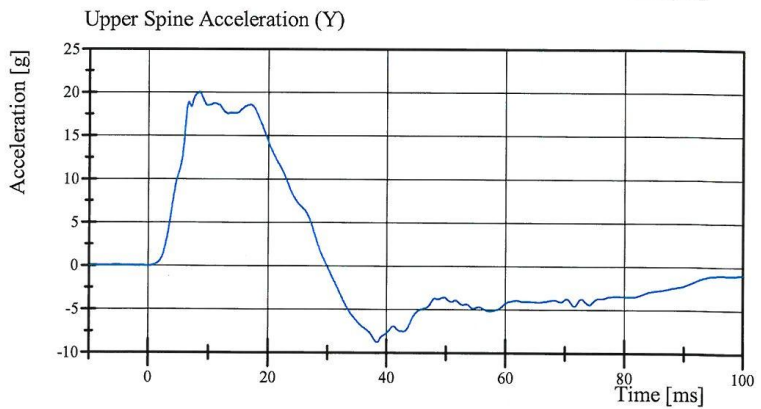
Min: -15.9 g at 14.2 ms



Filter Class: CFC_600

Max: 30.4 mm at 18.3 ms

Min: -0.0 mm at 1.9 ms



Filter Class: CFC_180

Max: 20.0 g at 8.5 ms

Min: -8.8 g at 38.3 ms

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

06.21.2013 10:29:08 845



Transportation Research Center Inc.

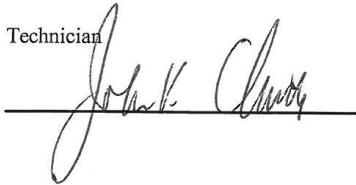
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



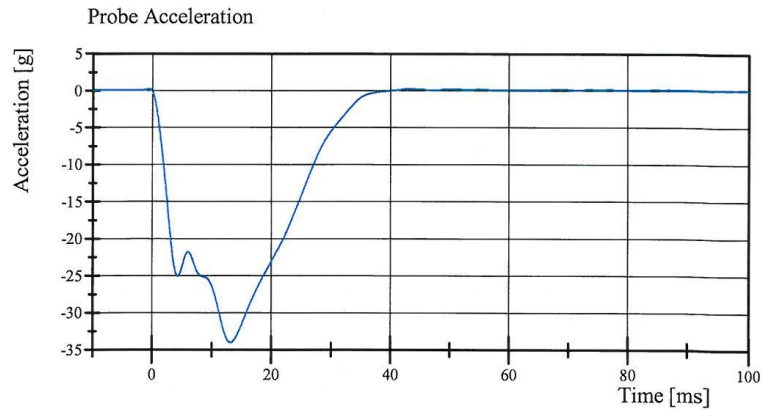
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 11:20:56 599

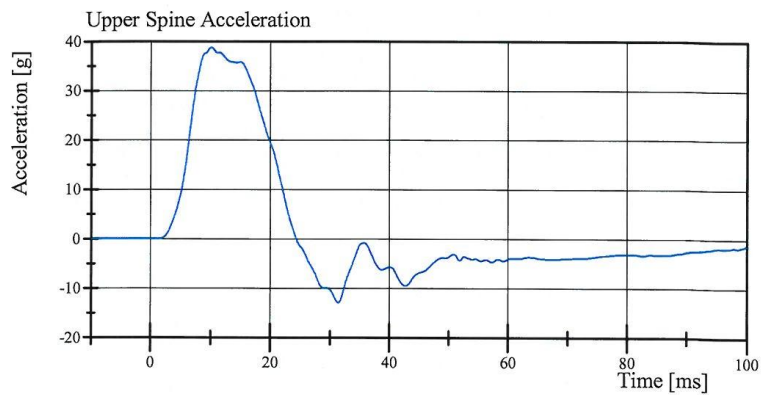


Transportation Research Center Inc.

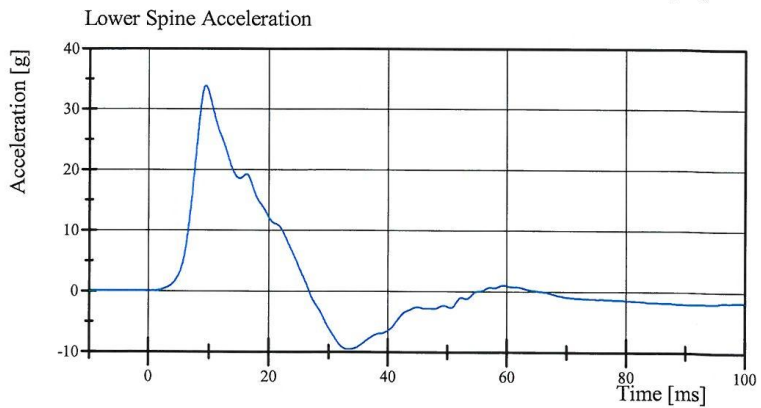
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013



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



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



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

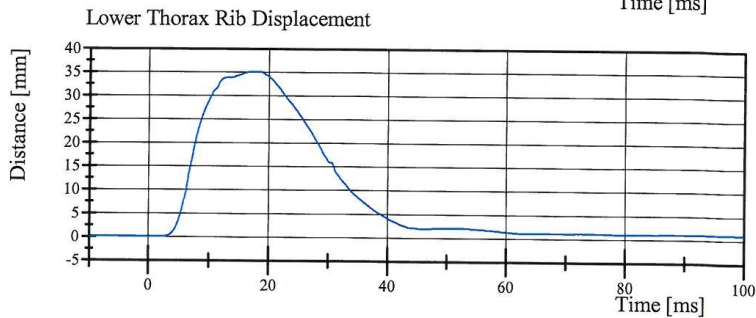
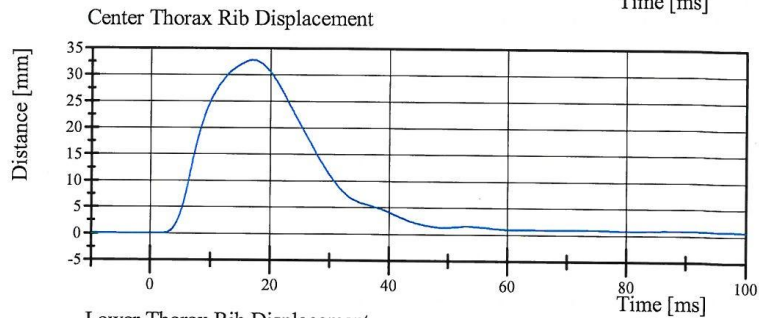
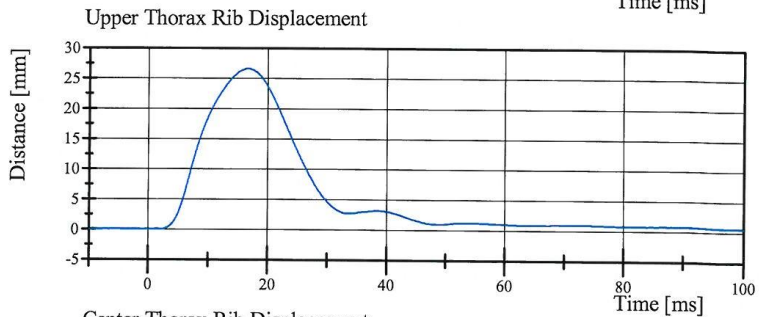
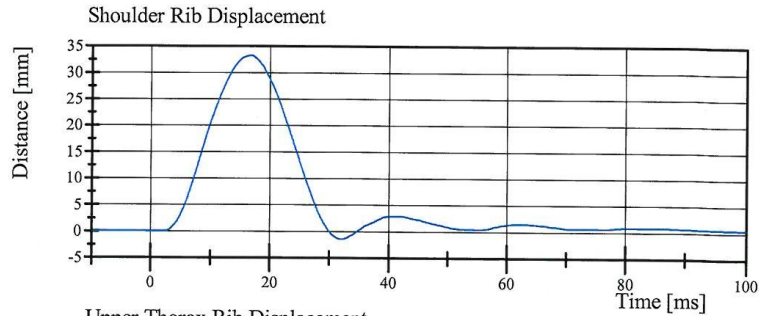
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 11:21:07 599



Transportation Research Center Inc.

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



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

06.21.2013 11:21:08 599



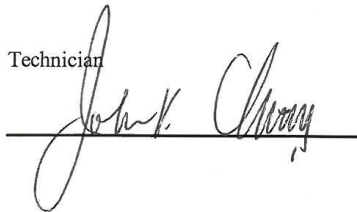
Transportation Research Center Inc.

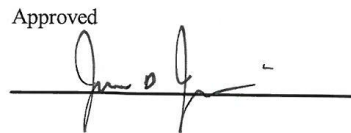
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician


Approved


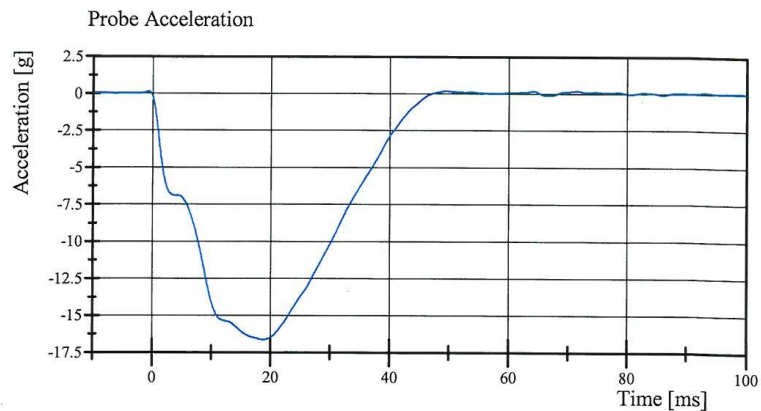
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 10:47:03 812

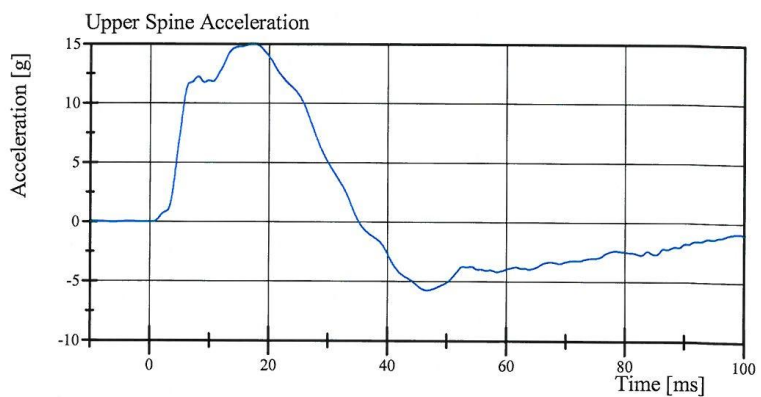


Transportation Research Center Inc.

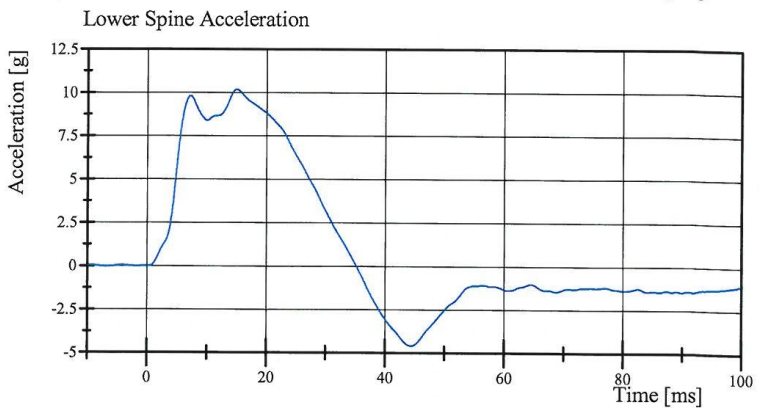
Left Lateral Thorax without Arm
SID IIa Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013



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



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



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

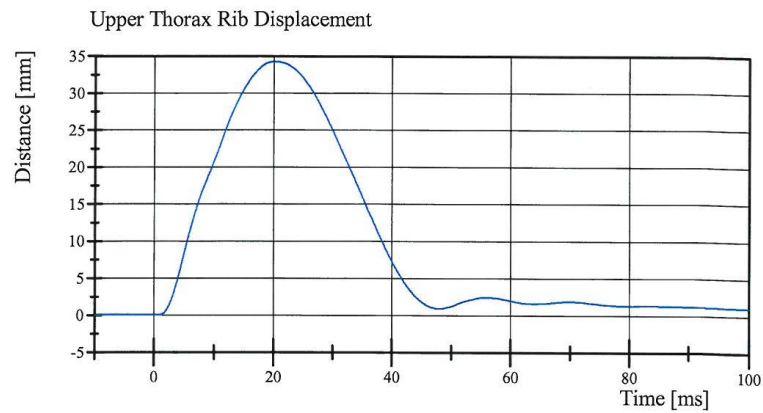
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.21.2013 10:47:23 812

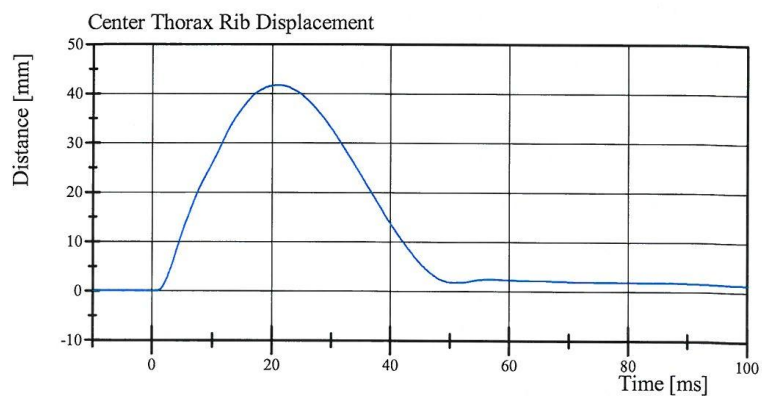


Transportation Research Center Inc.

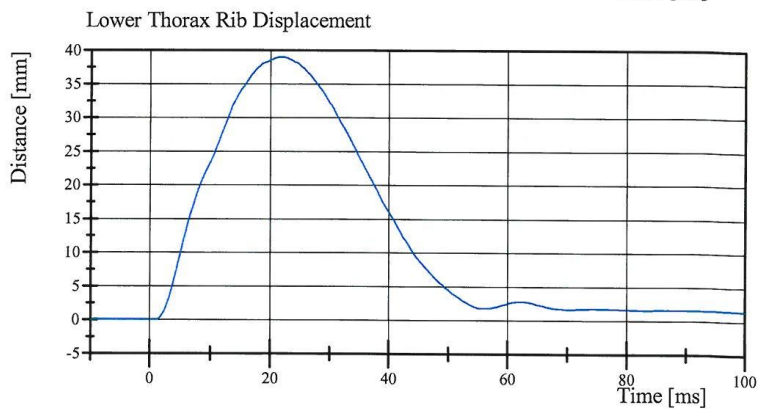
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 20-1
Test Date: 6/21/2013



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



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



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

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

06.21.2013 10:47:23 812



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 20-1

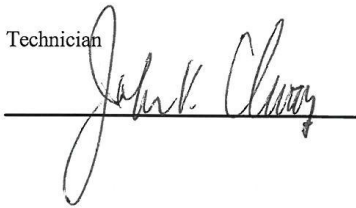
Test Date: 6/21/2013

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

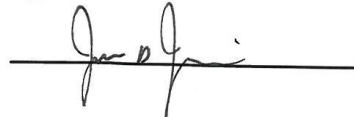
Test meets specifications.

Comments:

Technician



Approved



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

06.21.2013 11:34:03 665

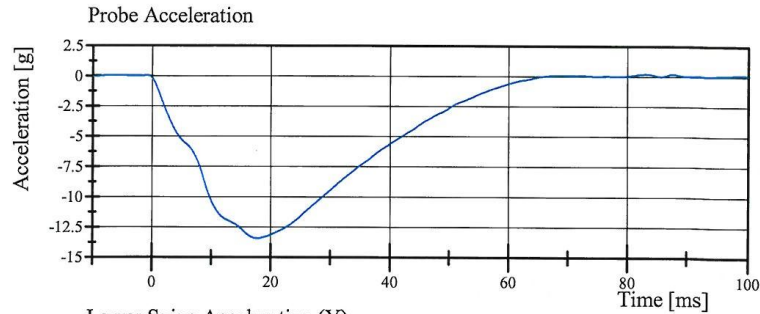


Transportation Research Center Inc.

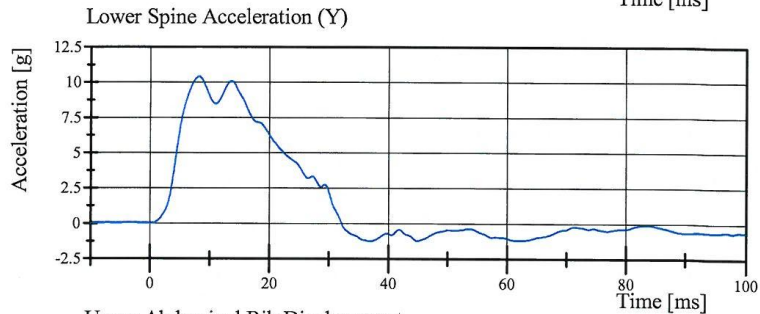
Left Lateral Abdomen

SID II_s Serial No. 305 Certification No. 20-1

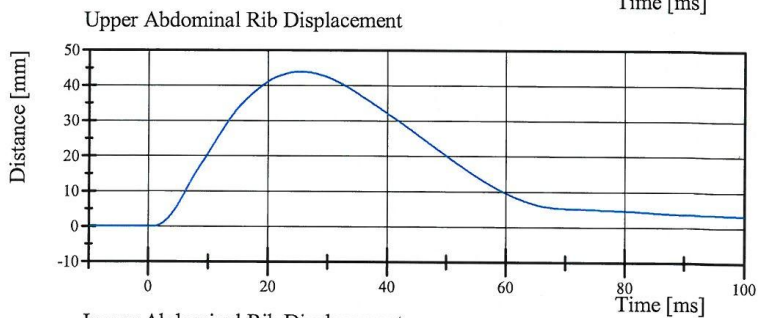
Test Date: 6/21/2013



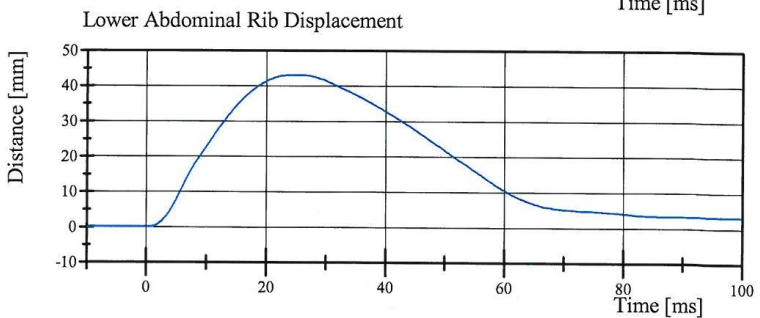
Filter Class: CFC_180
Max: 0.2 g at 87.6 ms
Min: -13.4 g at 17.8 ms



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



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



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

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

06.21.2013 11:34:12 665



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 20-5

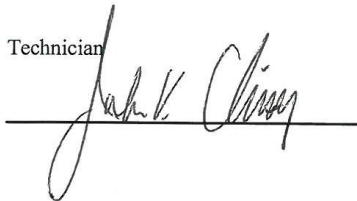
Test Date: 6/25/2013

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

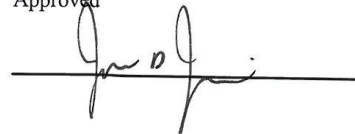
Test meets specifications.

Comments:

Technician



Approved



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

06.25.2013 09:06:03 461

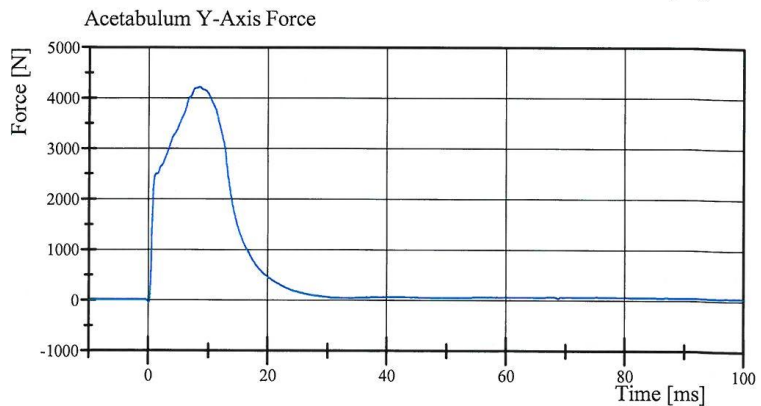
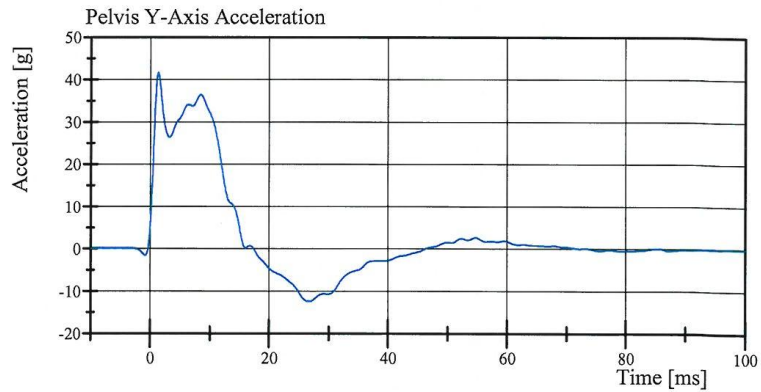
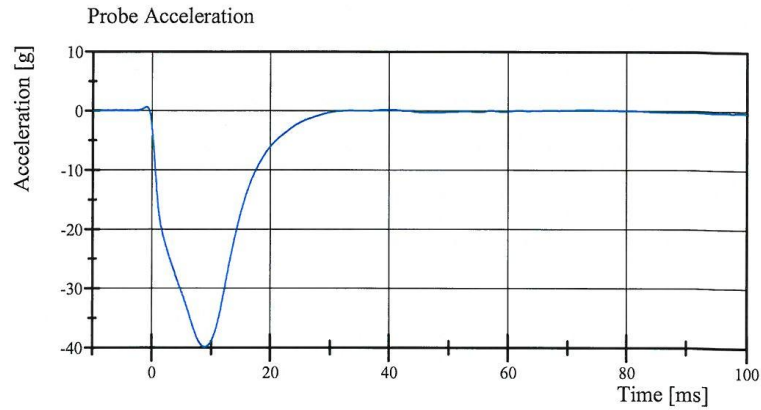


Transportation Research Center Inc.

Left Lateral Pelvis

SID II_s Serial No. 305 Certification No. 20-5

Test Date: 6/25/2013



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

06.25.2013 09:06:23 461



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 20-1

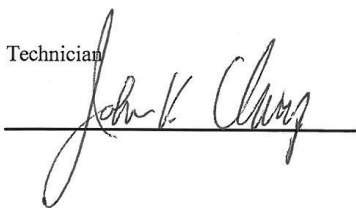
Test Date: 6/21/2013

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

Test meets specifications.

Comments:

Technician



Approved



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

06.21.2013 10:14:04 679

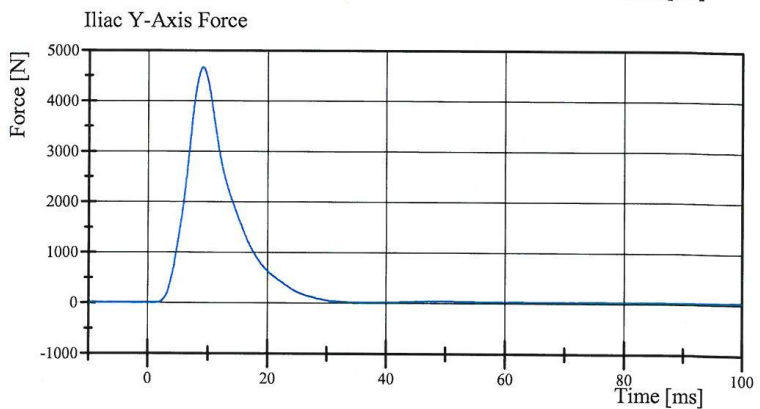
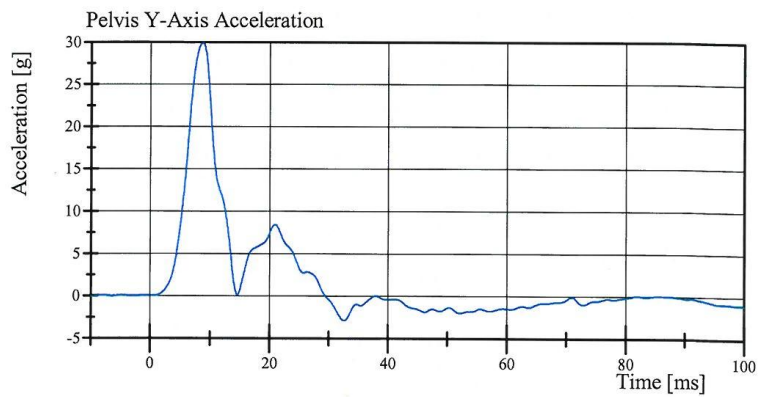
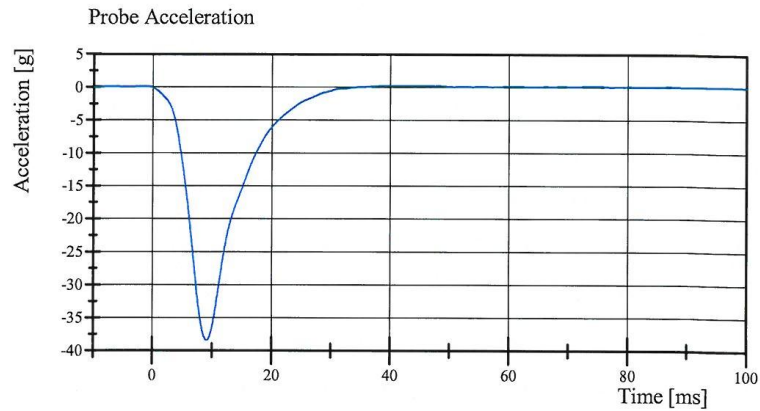


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 20-1

Test Date: 6/21/2013



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

06.21.2013 10:14:13 679

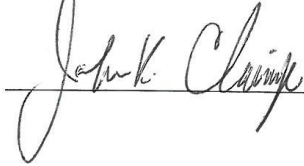


Post-Test Calibration Sheets
Passenger S/N 305

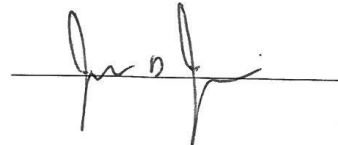
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.021

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	443	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	131	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	317	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	348	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	867	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

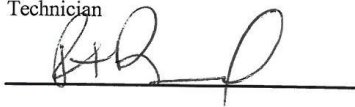
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.4 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

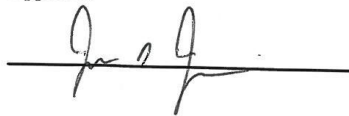
Test meets specifications.

Comments:

Technician



Approved



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

07.31.2013 10:49:50 231

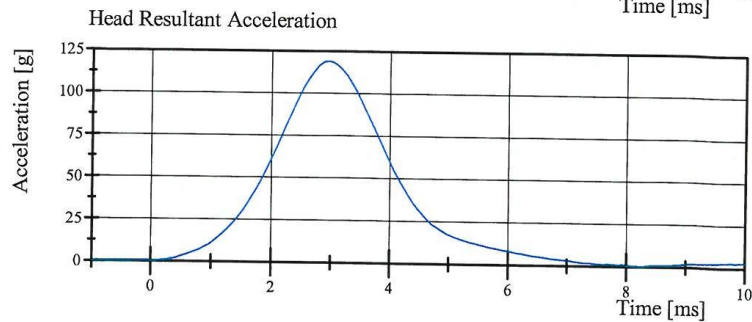
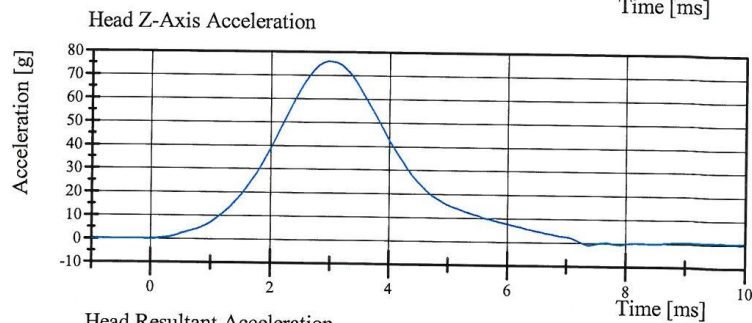
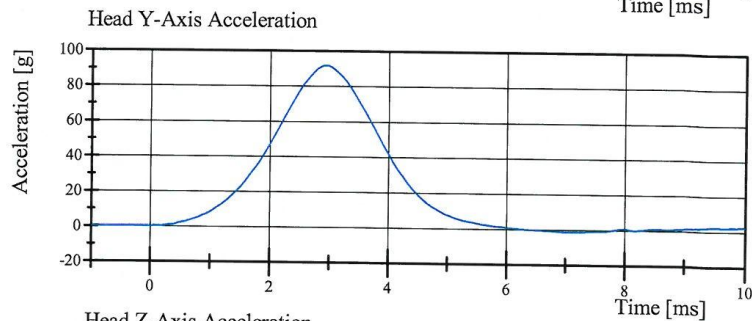
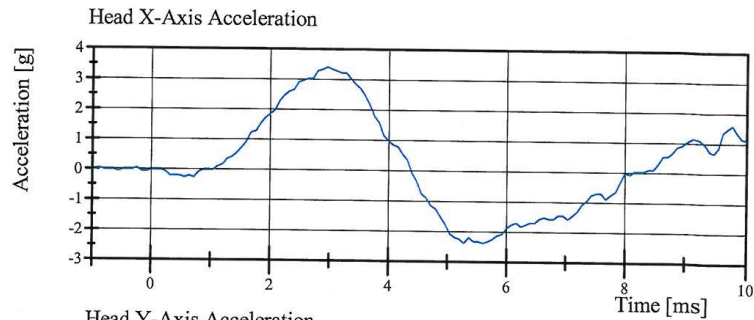


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 21-1

Test Date: 7/31/2013



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

07.31.2013 10:50:00 231



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 21-1

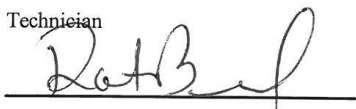
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.620 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.394 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.586 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.842 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.784 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.844 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	63.0 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.5 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	121.7 ms	Yes

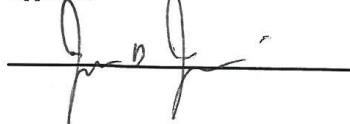
Test meets specifications.

Comments:

Technician



Approved



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

07.31.2013 11:25:06 634



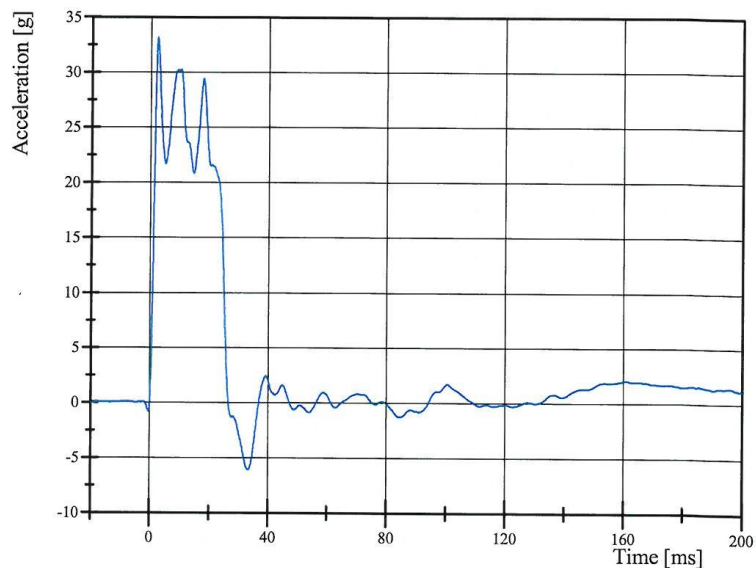
Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 21-1

Test Date: 7/31/2013

Pendulum Acceleration

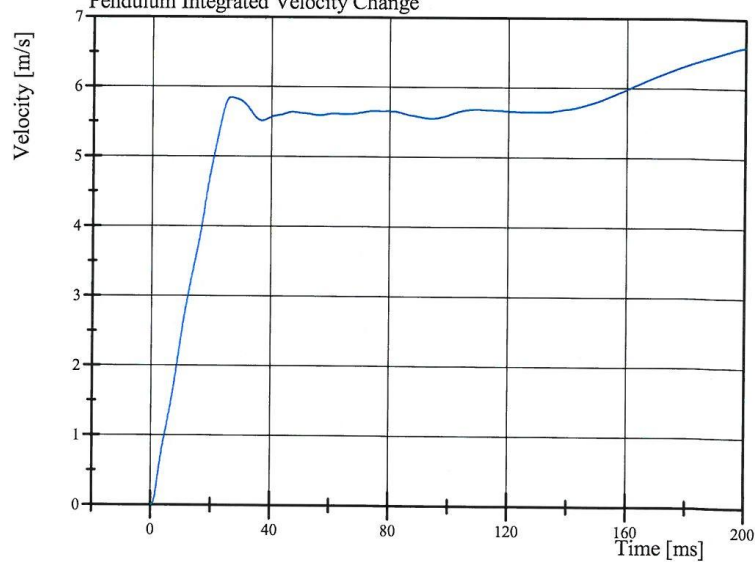


Filter Class: CFC_180

Max: 33.1 g at 2.3 ms

Min: -6.1 g at 33.4 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 6.6 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

07.31.2013 11:25:15 634

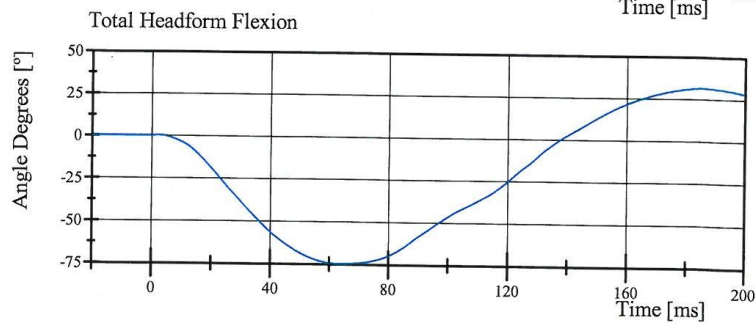
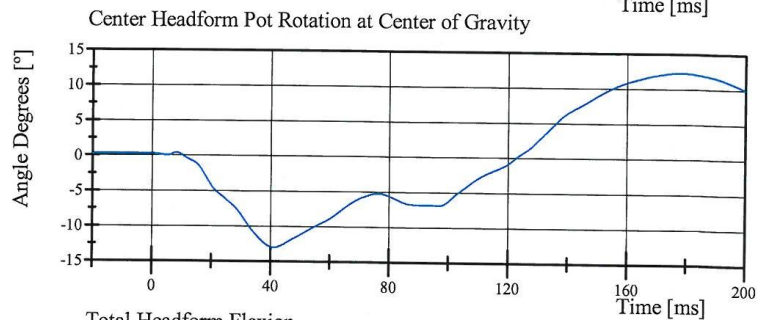
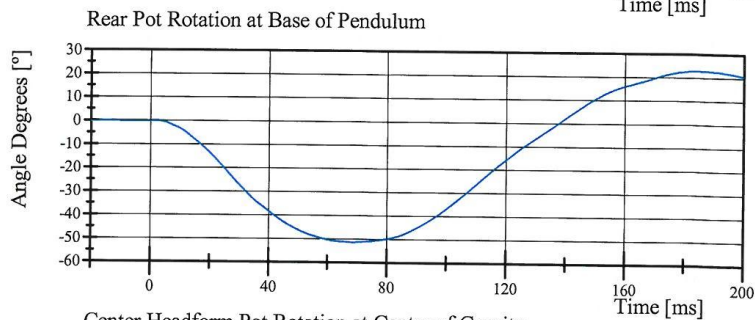
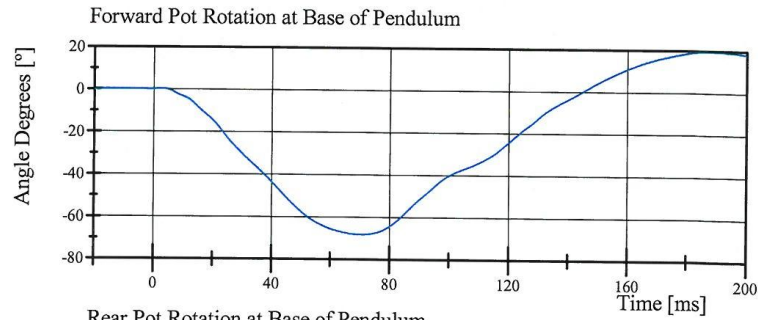


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 21-1

Test Date: 7/31/2013



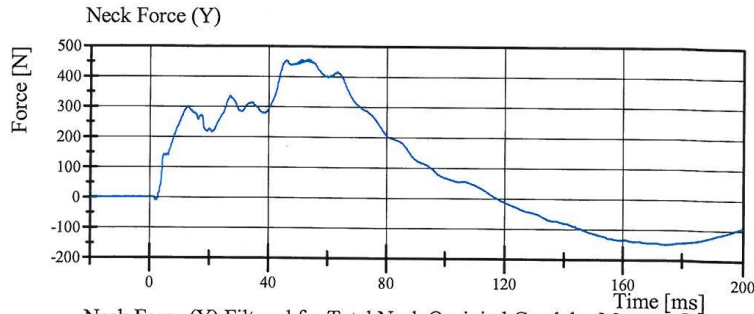
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

07.31.2013 11:25:16 634

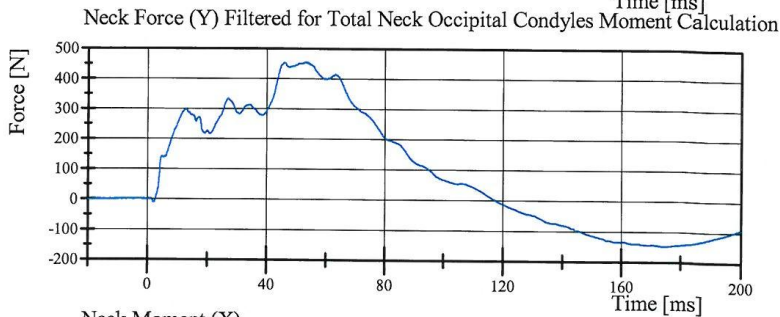


Transportation Research Center Inc.

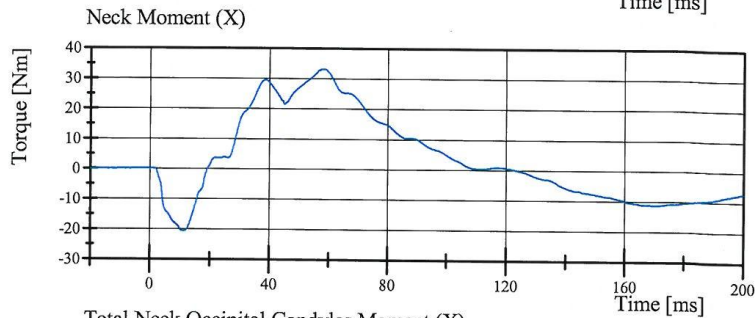
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013



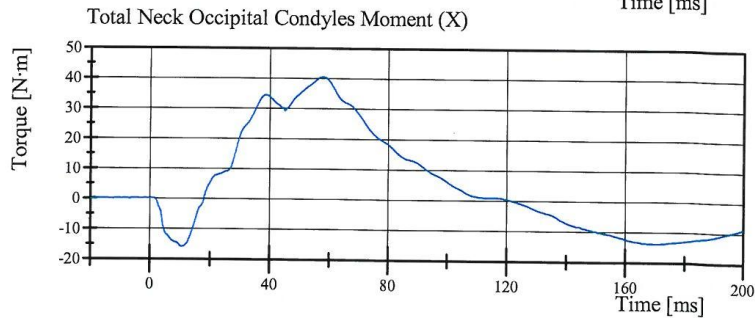
Filter Class: CFC_1000
Max: 457.8 N at 53.5 ms
Min: -148.7 N at 174.6 ms



Filter Class: CFC_600
Max: 454.4 N at 53.0 ms
Min: -148.2 N at 174.6 ms



Filter Class: CFC_600
Max: 33.2 Nm at 57.9 ms
Min: -20.7 Nm at 11.4 ms



Filter Class: Without_(Consta
Max: 40.5 N·m at 57.8 ms
Min: -16.0 N·m at 10.6 ms

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

07.31.2013 11:25:17 634



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 21-1

Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.2 g	Yes
Shoulder Displacement	28 - 37 mm	31.2 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.1 g	Yes

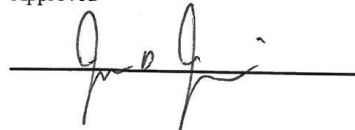
Test meets specifications.

Comments:

Technician



Approved



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

07.31.2013 13:09:06 823

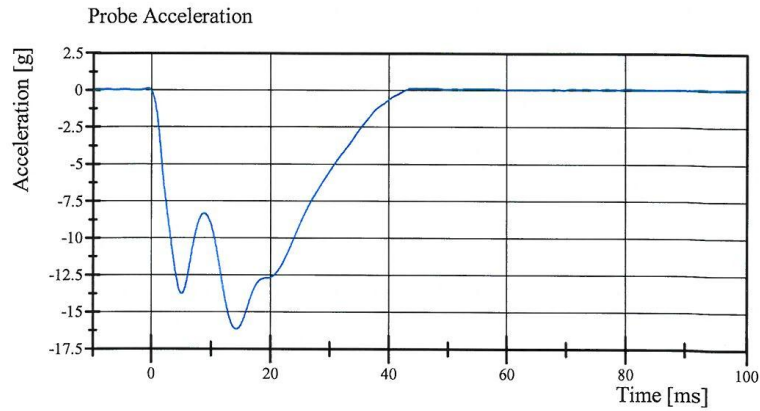


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 21-1

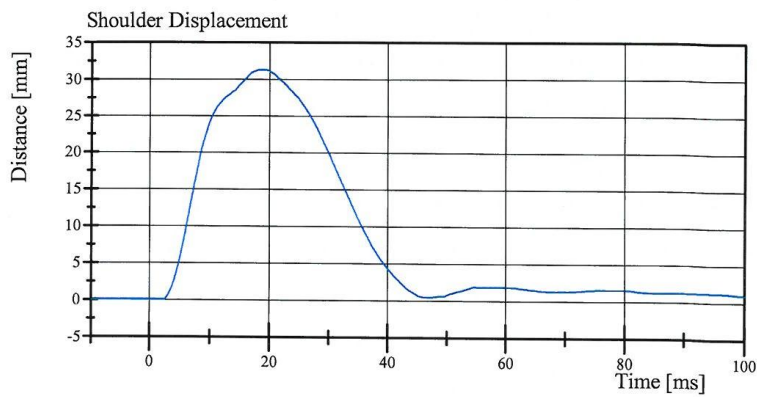
Test Date: 7/31/2013



Filter Class: CFC_180

Max: 0.1 g at 44.1 ms

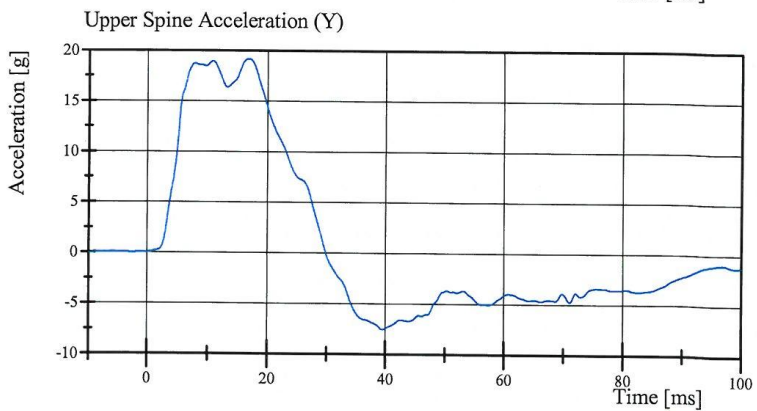
Min: -16.2 g at 14.2 ms



Filter Class: CFC_600

Max: 31.2 mm at 18.4 ms

Min: -0.0 mm at 2.3 ms



Filter Class: CFC_180

Max: 19.1 g at 16.8 ms

Min: -7.6 g at 39.5 ms

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

07.31.2013 13:09:15 823



Transportation Research Center Inc.

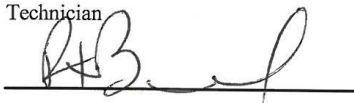
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.753 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.5 g	Yes
Shoulder Displacement	31 - 40 mm	34.4 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.5 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.4 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.0 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.0 g	Yes

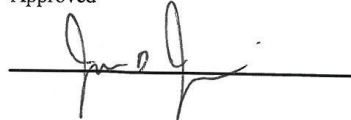
Test meets specifications.

Comments:

Technician



Approved



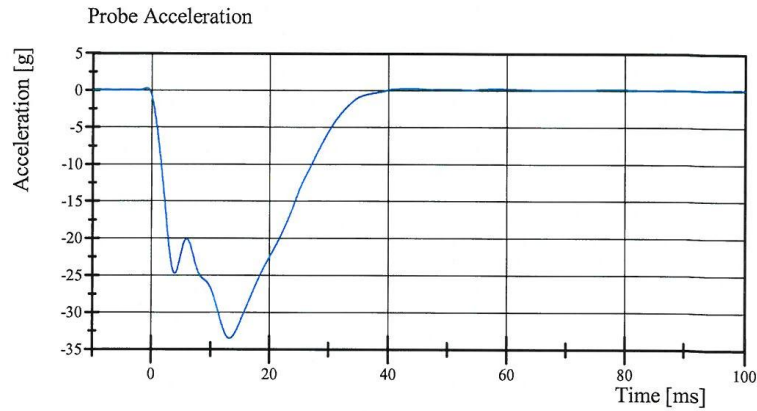
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

07.31.2013 14:32:43 620

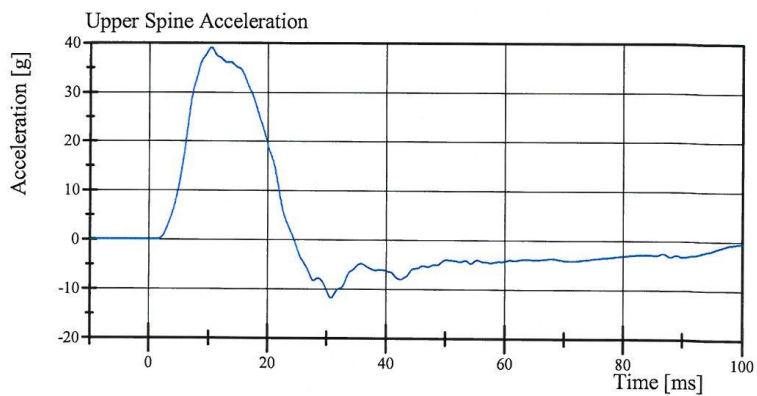


Transportation Research Center Inc.

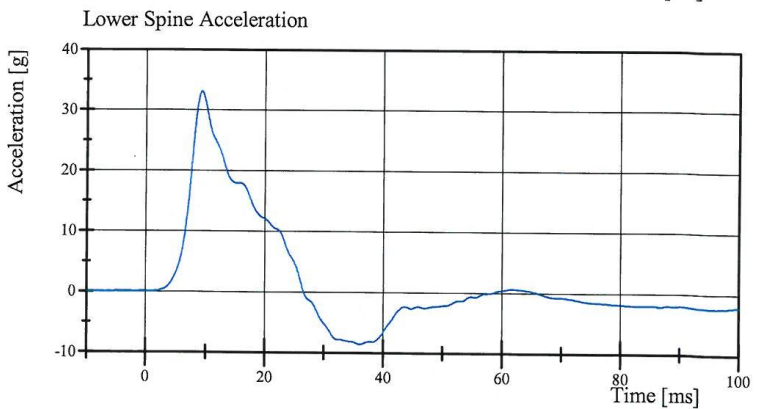
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013



Filter Class: CFC_180
Max: 0.2 g at 42.8 ms
Min: -33.5 g at 13.2 ms



Filter Class: CFC_180
Max: 39.0 g at 10.3 ms
Min: -11.8 g at 30.8 ms



Filter Class: CFC_180
Max: 33.0 g at 9.3 ms
Min: -8.6 g at 36.1 ms

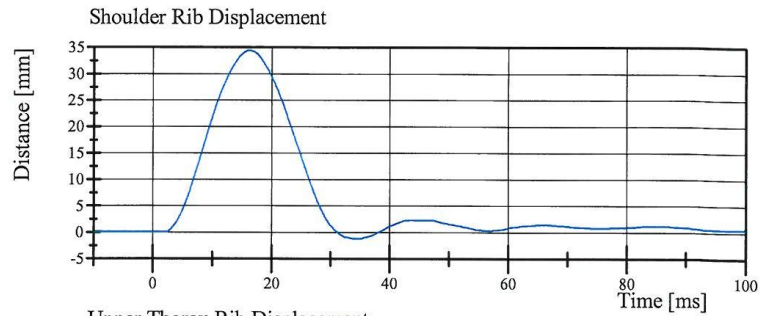
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

07.31.2013 14:32:53 620

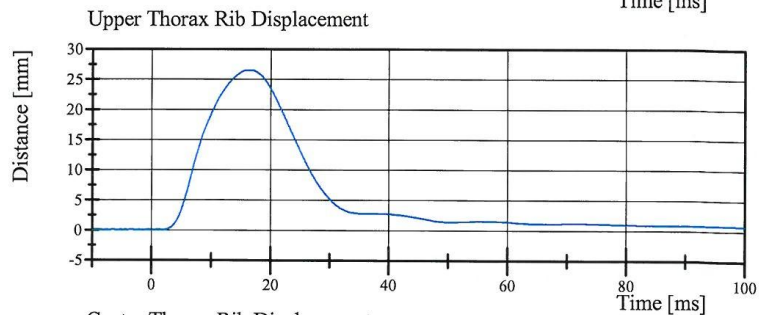


Transportation Research Center Inc.

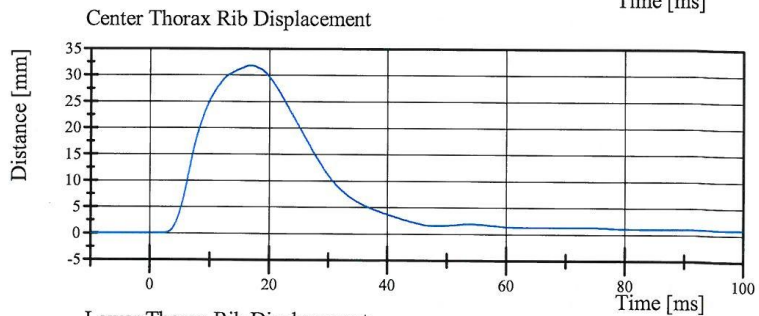
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013



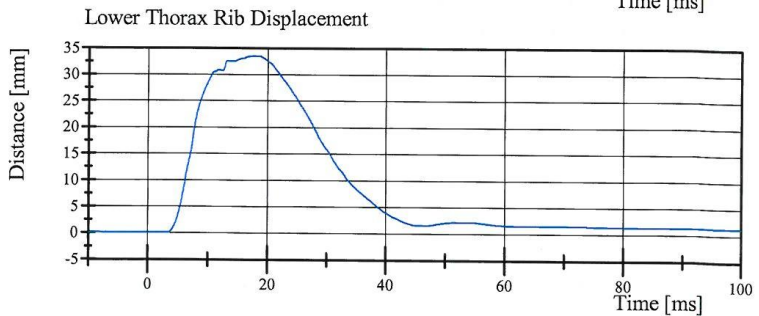
Filter Class: CFC_600
Max: 34.4 mm at 16.2 ms
Min: -1.3 mm at 34.7 ms



Filter Class: CFC_600
Max: 26.5 mm at 16.3 ms
Min: -0.0 mm at 1.9 ms



Filter Class: CFC_600
Max: 31.7 mm at 16.8 ms
Min: -0.0 mm at -8.2 ms



Filter Class: CFC_600
Max: 33.4 mm at 17.5 ms
Min: -0.0 mm at 3.2 ms

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

07.31.2013 14:32:54 620



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.384 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.6 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.7 g	Yes

Test meets specifications.

Comments:

Technician



Approved



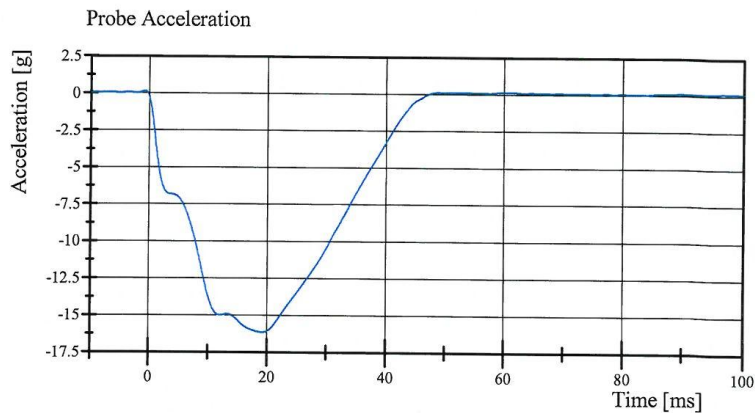
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

07.31.2013 15:05:05 801

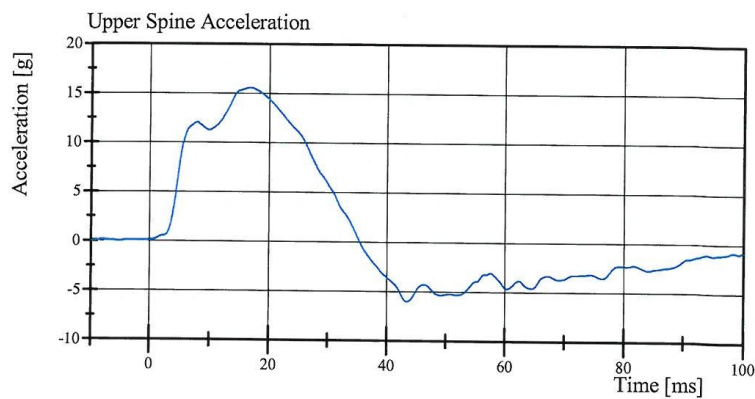


Transportation Research Center Inc.

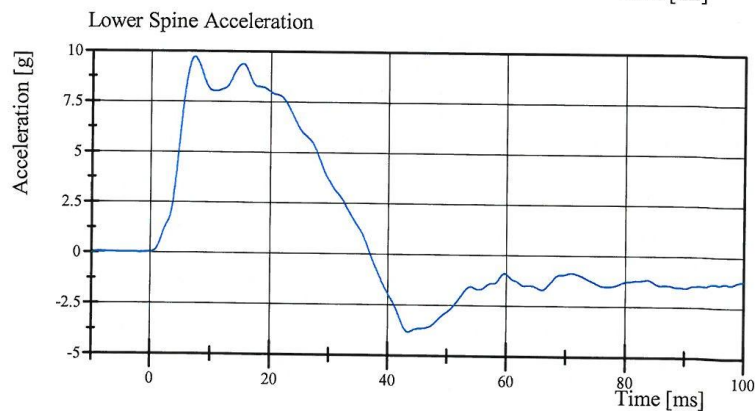
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013



Filter Class: CFC_180
Max: 0.1 g at 59.7 ms
Min: -16.2 g at 19.2 ms



Filter Class: CFC_180
Max: 15.5 g at 16.6 ms
Min: -6.0 g at 43.4 ms



Filter Class: CFC_180
Max: 9.7 g at 7.3 ms
Min: -3.8 g at 43.4 ms

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

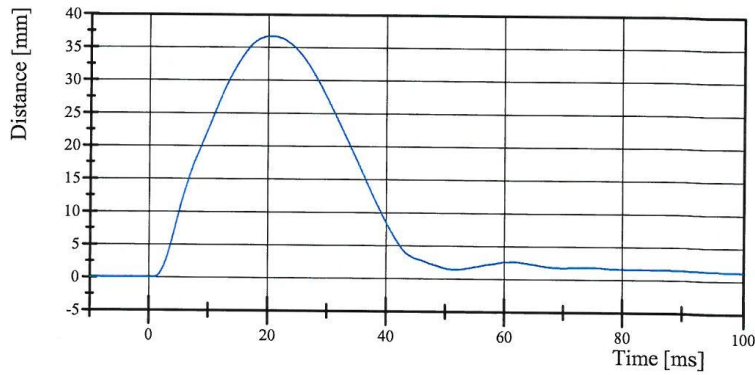
07.31.2013 15:05:15 801



Transportation Research Center Inc.

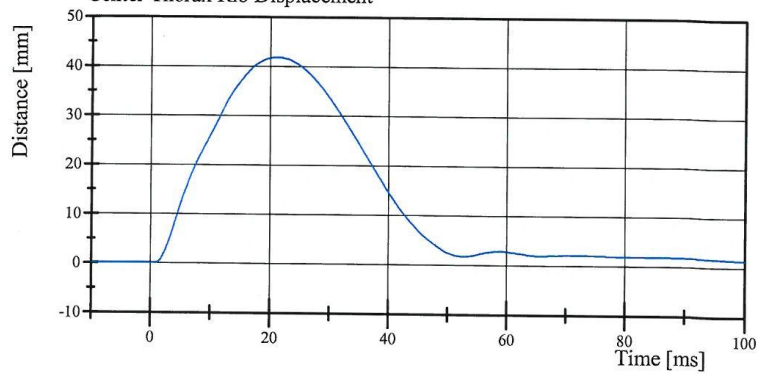
Left Lateral Thorax without Arm
SID II_s Serial No. 305 Certification No. 21-1
Test Date: 7/31/2013

Upper Thorax Rib Displacement



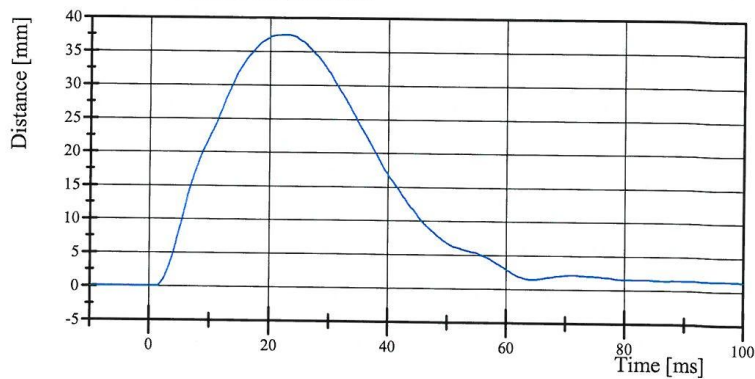
Filter Class: CFC_600
Max: 36.6 mm at 20.7 ms
Min: -0.0 mm at 0.9 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.8 mm at 21.2 ms
Min: -0.0 mm at -10.0 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.5 mm at 22.8 ms
Min: -0.0 mm at -5.3 ms

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

07.31.2013 15:05:16 801

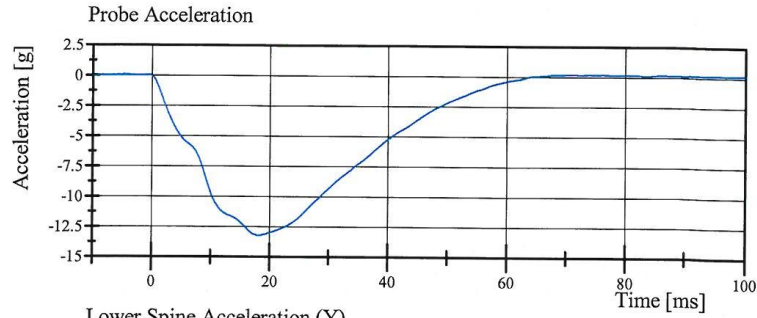


Transportation Research Center Inc.

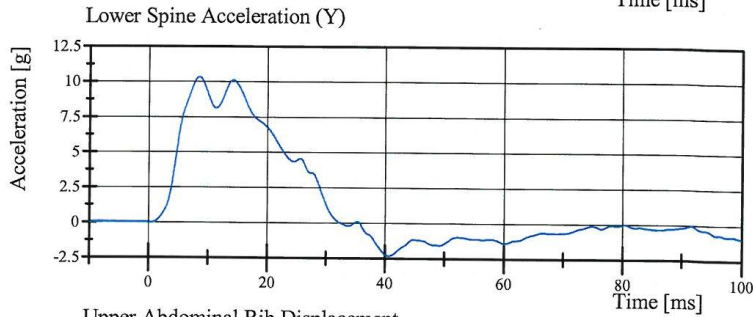
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 21-1

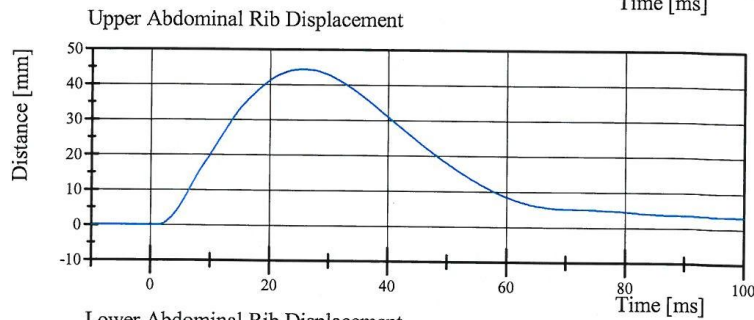
Test Date: 8/1/2013



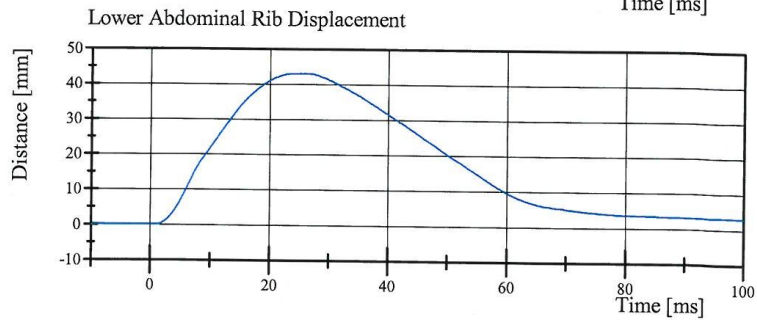
Filter Class: CFC_180
Max: 0.2 g at 70.8 ms
Min: -13.2 g at 18.1 ms



Filter Class: CFC_180
Max: 10.3 g at 8.5 ms
Min: -2.3 g at 40.6 ms



Filter Class: CFC_600
Max: 44.3 mm at 25.4 ms
Min: -0.0 mm at -6.8 ms



Filter Class: CFC_600
Max: 43.0 mm at 25.9 ms
Min: -0.0 mm at 1.2 ms

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

08.01.2013 08:09:07 641



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 21-1

Test Date: 8/1/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	34.5 g	Yes
Iliac Force	4,100 - 5,100 N	5,071.5 N	Yes

Test meets specifications.

Comments:

Technician



Approved



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

08.01.2013 15:49:59 683

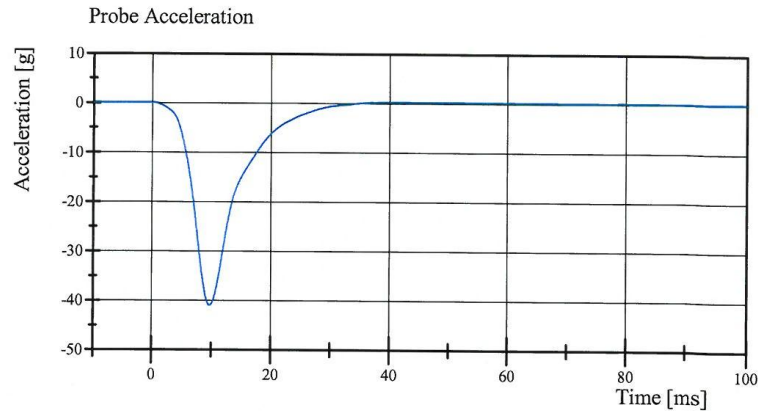


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 21-1

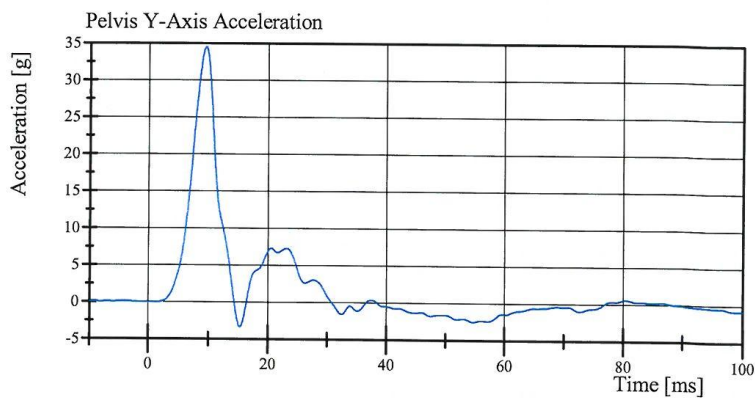
Test Date: 8/1/2013



Filter Class: CFC_180

Max: 0.2 g at 40.6 ms

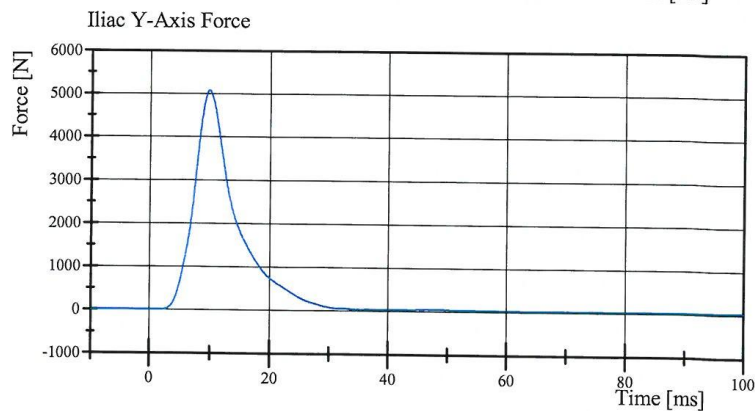
Min: -41.1 g at 9.8 ms



Filter Class: CFC_180

Max: 34.5 g at 9.5 ms

Min: -3.4 g at 15.4 ms



Filter Class: CFC_600

Max: 5,071.5 N at 9.8 ms

Min: -0.6 N at -5.3 ms

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

08.01.2013 15:50:09 683



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 21-2

Test Date: 8/1/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.68 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-40.91 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	37.7 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,220.0 N	Yes

Test meets specifications.

Comments:

Technician



Approved



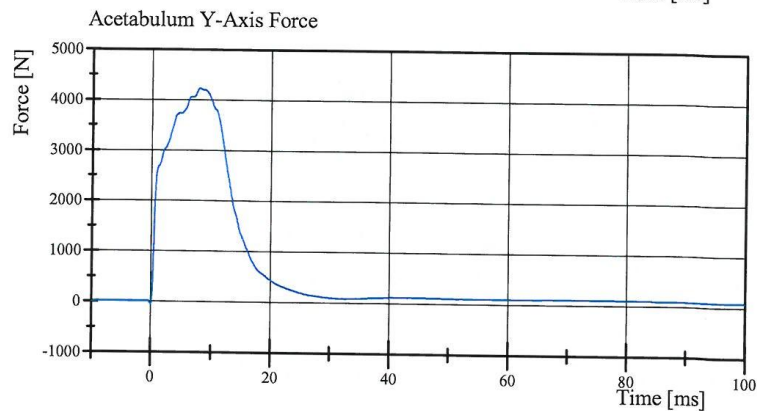
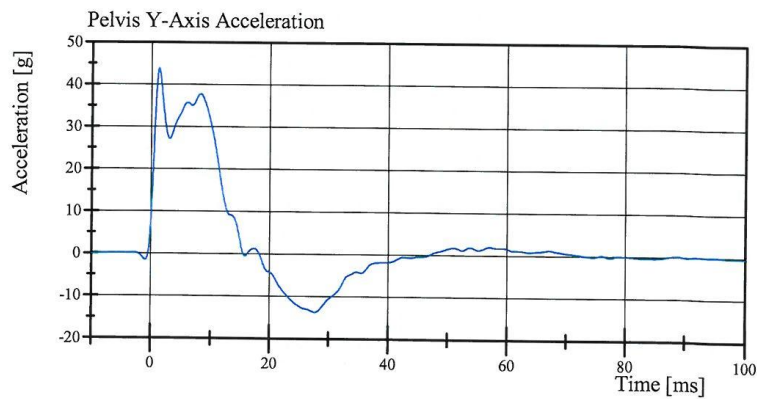
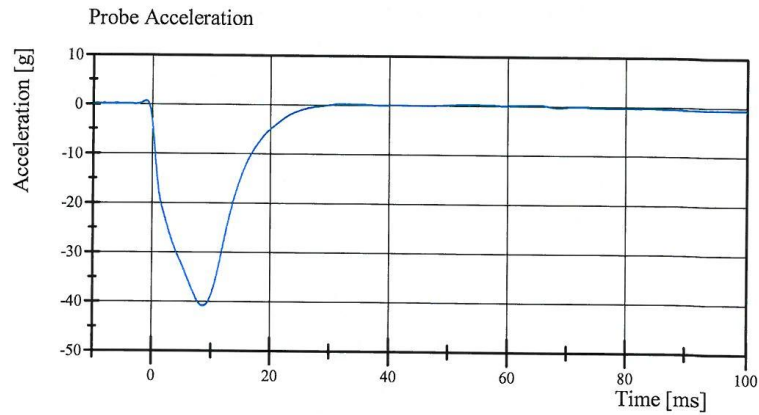
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

08.01.2013 14:47:39 433



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 21-2
Test Date: 8/1/2013



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

08.01.2013 14:48:01 433



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

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

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	P51719	Endevco	11-Jun-13
				Y	P51272	Endevco	11-Jun-13
				Z	P58862	Endevco	11-Jun-13
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A	
	Thoracic Rib	Upper	Y	007	Servo	11-Jun-13	
		Middle	Y	1161	Servo	11-Jun-13	
		Lower	Y	1279	Servo	11-Jun-13	
	Abdominal Rib	Upper	Y	1295	Servo	11-Jun-13	
		Lower	Y	1136	Servo	12-Jun-13	
Lower Spine Accelerometers (T12)				X	P50068	Endevco	11-Jun-13
				Y	P52051	Endevco	11-Jun-13
				Z	P51710	Endevco	11-Jun-13
Acetabulum Load Cell				Y	287-FY	FTSS	27-Sep-12
Iliac Wing Load Cell				Y	103-FY	FTSS	27-Sep-12
Pelvis Plug (struck side)					45999	FTSS	20-Sep-11
Pelvis Plug (non-struck side)					46874	FTSS	5-Oct-11

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P80154	Endevco	26-Feb-13
	Vehicle Center of Gravity	Y	P78140	Endevco	18-Apr-13
	Vehicle Center of Gravity	Z	P76098	Endevco	7-Feb-13
2	Right Sill at Front Seat	X	P75236	Endevco	15-Apr-13
	Right Sill at Front Seat	Y	P75765	Endevco	15-Apr-13
	Right Sill at Front Seat	Z	P76105	Endevco	15-Apr-13
3	Right Sill at Rear Seat	X	P79502	Endevco	14-May-13
	Right Sill at Rear Seat	Y	P80130	Endevco	8-May-13
	Right Sill at Rear Seat	Z	P79387	Endevco	14-May-13
4	Left Sill at Front Door	Y	P78138	Endevco	3-Apr-13
5	Left Sill at Rear Door	Y	P76342	Endevco	15-Apr-13
6	Left A-Post Lower	Y	P80453	Endevco	28-Mar-13
7	Left A-Post Middle	Y	P80474	Endevco	17-Apr-13
8	Left B-Post Lower	Y	P80477	Endevco	17-Apr-13
9	B-Post Middle	Y	P79378	Endevco	18-Apr-13
10	Front Seat Track	Y	P80360	Endevco	25-Feb-13
11	Rear Seat Track or Structure	Y	P77741	Endevco	17-Jul-13
12	Right Rear Occupant Compartment	Y	P78113	Endevco	13-Feb-13
13	Engine Block	X	P76450	Endevco	17-Jul-13
	Engine Block	Y	P76097	Endevco	7-Feb-13
14	Rear Floorpan Above Axle	X	P76063	Endevco	7-Mar-13
	Rear Floorpan Above Axle	Y	P74248	Endevco	26-Mar-13
	Rear Floorpan Above Axle	Z	P74816	Endevco	16-Jul-13

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P78108	Endevco	5-Feb-13
MDB Center of Gravity	Y	P76411	Endevco	8-May-13
MDB Center of Gravity	Z	P78112	Endevco	15-Apr-13
Left Frame Rail at Rear Axle Centerline	X	P75994	Endevco	14-May-13
Left Frame Rail at Rear Axle Centerline	Y	P75240	Endevco	14-May-13