

**FINAL REPORT NUMBER: SINCAP-TRC-12-001**

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

**Chrysler Group LLC  
2012 Dodge Durango SUV  
NHTSA NUMBER: MC0323**

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



**Report Date: January 19, 2012**

**FINAL REPORT**

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

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Prepared By: IL Project Operations Team

Approved By: *Margaret Swan*

Approval Date: January 19, 2012

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: \_\_\_\_\_

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

Date: \_\_\_\_\_

Technical Report Documentation Page

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15. Supplemental Notes																																																							
16. Abstract <p>This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2012 Dodge Durango SUV 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 November 21, 2011.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 61.3 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22° C. The target vehicle post-test maximum crush was 198 mm at Level 3. The test vehicle's performance was as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>36</sub>)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">25</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">26.6</td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">822.7</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">978.7</td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4" style="text-align: center;">Passenger ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>36</sub>)</td> <td style="text-align: center;">NA</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">120</td> </tr> <tr> <td>Lower Spine Acceleration</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">82</td> <td style="text-align: center;">34.7</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">1181.8</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38*</td> <td style="text-align: center;">9.8</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45*</td> <td style="text-align: center;">26.3</td> </tr> </tbody> </table> <p>* Proposed IARV</p> <p>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. The vehicle rolled 90° after the impact.</p>				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	25	Maximum Thoracic Rib Deflection	mm	44	26.6	Total Abdominal Force	N	2500	822.7	Pubic Symphysis Force	N	6000	978.7	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC <sub>36</sub> )	NA	1000	120	Lower Spine Acceleration	g's	82	34.7	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1181.8	Maximum Thoracic Rib Deflection	mm	38*	9.8	Maximum Abdominal Rib Deflection	mm	45*	26.3
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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 2012 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 2012 Dodge Durango SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated August 2011.

## SECTION 2

### SUMMARY OF TEST RESULTS

A 2012 Dodge Durango SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.3 km/h (38.09 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 November 21, 2011. Pre-test and post-test photographs of the test vehicle and the MDB, and the dummies (ES-2re 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 August 2011. 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-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	25
Maximum Thoracic Rib Deflection	mm	44	26.6
Combined Abdominal Force	N	2500	822.7
Pubic Symphysis Force	N	6000	978.7

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	120
Lower Spine (T12) Resultant Acceleration	G	82	34.7
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1181.8
Maximum Thoracic Rib Deflection	mm	38*	9.8
Maximum Abdominal Rib Deflection	mm	45*	26.3

\* Proposed IARV

Supplemental Restraint Information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	No		
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	No	No
Side Airbag 3	No	No	No	No
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	No	No	No	No

### GENERAL COMMENTS

The driver door did not become unlatched or open during impact. No fuel spillage occurred during or following impact and the rollover test. Injury values did not exceed thresholds. Vehicle rolled 90° after impact.

**SECTION 3**  
**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET NO. 1  
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	MC0323	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	Yes
Make	Dodge	Automatic Door Locks (ADL)	Yes
Model	Durango	Power Window Auto-Reverse	N/A
Body Style	SUV	Other Optional Feature	N/A
VIN	1C4RDHAG1CC113769	Driver Frontal Airbag	Yes
Body Color	Grey Metallic	Driver Curtain Airbag	Yes
Odometer Reading (miles)	7	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.6	Driver Torso Airbag	No
Number of Cylinders	6	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Longitudinally-placed	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	5	Rear Passenger Curtain Airbag	Yes
Overdrive	No	Rear Pass. Head/Torso Airbag	No
Final Drive	RWD	Rear Passenger Torso Airbag	No
Roof Rack	Yes	Rear Pass. Torso/Pelvis Airbag	No
Sunroof / T-Top	No	Rear Passenger Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rr. Pass. Seat Belt Pretensioner	Yes
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Passenger Load Limiter	Yes
All-Wheel Drive (AWD)	No	Other Safety Restraint	No

Does owner's manual provide instructions to turn off automatic door locks? Yes

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Chrysler Group LLC	GVWR (kg)	2949
Date of Manufacture	8/11	GAWR Front (kg)	1452
Vehicle Type	SUV	GAWR Rear (kg)	1770

**VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	2	7	
Capacity Weight (VCW) (kg)				544	(A)
DSC x 68.08 (kg)				7	(B)
Cargo Weight (RCLW) (kg)				68.00	(A+B)

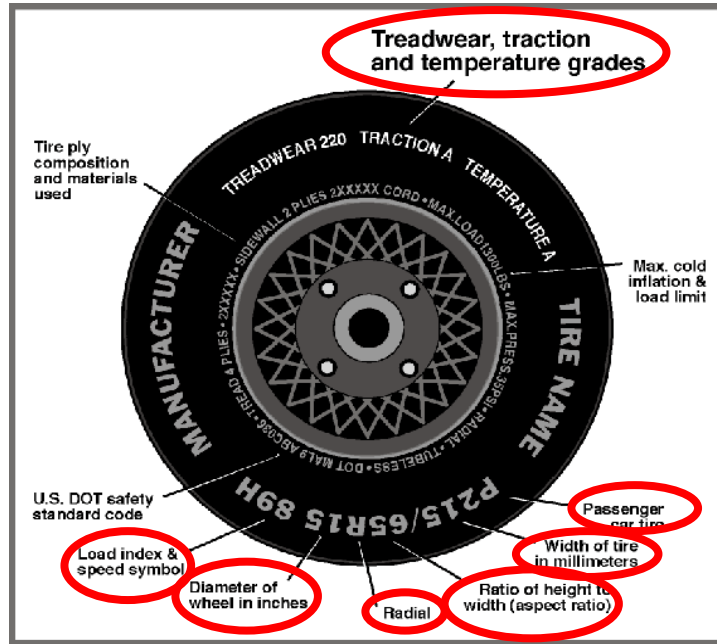
**VEHICLE SEAT TYPE**

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/Lever	w/Knob
Front Seat	Yes	No	No		No	Yes	No
Rear or Second Row Seat	No	No	Yes		No	Yes	No
Third Row Seat	No	No	Yes		No	Yes	No

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

Test Vehicle: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11



**TIRE PLACARD INFORMATION**

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	228	228
Recommended Tire Size	P265/60R18	P265/60R18

**TIRE SIDEWALL INFORMATION**

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	P265/60R18	P265/60R18
Tire Manufacturer	Michelin	Michelin
Tire Name	Latitude Tour	Latitude Tour
Tire Type	All Season	All Season
Tire Width	265	265
Aspect Ratio	60	60
Radial	Yes	Yes
Wheel Diameter	30.5	30.5
Load Index/Speed Symbol	109T	109T
Treadwear	720	720
Traction Grade	A	A
Temperature Grade	B	B
Tire Material	Rubber	Rubber

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

Test Vehicle: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11

**TIRE PRESSURES**

	Units	LF	RF	LR	RR
As Delivered	kPa	N/A	N/A	N/A	N/A
Tire Placard	kPa	228	228	228	228
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	228	228	228	228

**MDB TIRE SPECIFICATIONS**

	Units	Requirement	LF	RF	LR	RR
Tire Size		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	527.6	580.4		557.6	632.6		564.8	624.0	
Right	kg	546.4	544.8		570.6	622.6		532.0	646.4	
Ratio	%	48.8	51.2		47.3	52.7		46.3	53.7	
Totals	kg	1074.0	1125.2	2199.2	1128.2	1255.2	2383.4	1096.8	1270.4	2367.2

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2199.2	(A)
Actual Weight of 2 P572 ATDs Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	68.0	(C)
Calculated Vehicle Target Weight (TVT <sub>W</sub> )	kg	2392.2	(A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)?       YES       NO

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

Component Description	Weight (kg)
Steel plate mounted in rear cargo area	40.0

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

Test Vehicle: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11

**TEST VEHICLE ATTITUDES AND CG**

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	852	852	Yes
RF	mm	848	848	Yes
RR	mm	860	860	Yes
LR	mm	855	855	Yes
Vehicle CG (Aft of Front Axle)	mm	1558	1603	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	3.6	-1.0	

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

**DATA SHEET NO. 2**

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

Test Vehicle: 2012 Dodge Durango  
 Test Program: SPNCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11

**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 passengers' seats should be set to the rear-most, lowest, mid-angle position.

**SCRL ANGLE RANGE**

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	N/A	N/A	N/A
Front Passenger Seat	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A

\* 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	Mid <sup>1</sup>	Mid <sup>1</sup>	Max.	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min.	N/A	N/A	N/A
Front Passenger Seat	Mid <sup>1</sup>	Mid <sup>1</sup>	Max.	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			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	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
Non-Struck Side Rear 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
Rear 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

\* If applicable.

<sup>1</sup> Measurements were not recorded.

**DATA SHEET NO. 2 (CONTINUED)**

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

Test Vehicle: 2012 Dodge Durango  
 Test Program: SPNCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11

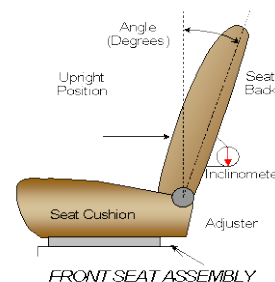
**SEAT FORE/AFT POSITION**

Seat	Total Fore/Aft Travel.		Test Position from Forwardmost Position	
	Mm	Detents*	mm	Detent*
Driver Seat	278	42	139	22
Front Passenger Seat	278	42	139	22
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A	N/A

\* If applicable.

**SEAT BACK ANGLE ADJUSTMENT**

The driver's seat back is positioned to the manufacturer's designated seat back angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat w/Seated Dummy	N/A	N/A	14 deg	N/A
Front Passenger Seat	N/A	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/Seated Dummy	N/A	N/A	11.5	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A	N/A
Rear Center Seat*	N/A	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: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11

**SEAT BELT ANCHORAGE ADJUSTMENT**

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

	Total # of Positions	Placed in Position #
Driver Seat	5	3
Rear Seat	Fixed	Fixed

**HEAD RESTRAINT ADJUSTMENT**

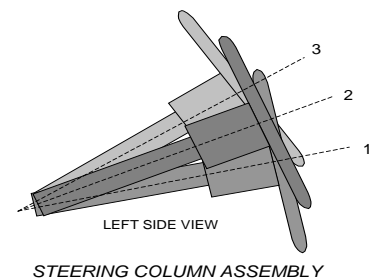
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

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

**STEERING COLUMN ADJUSTMENT**

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

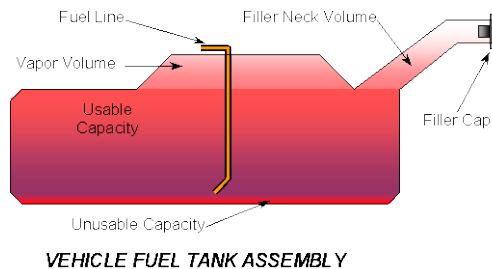
	Degrees	Fore/Aft Position, mm
Lowermost - Position 1	19.8	0
Geometric Center - Position 2	22.0	27.5
Uppermost - Position 3	24.2	55
Telescoping Steering Wheel Travel		27.5
Test Position	22.0	27.5



**FUEL PUMP**

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

The fuel tank is in front of the rear axle between the left and right side frame rails. The fuel filler enters at left rear corner of tank. The fuel filler cap is on the left rear quarter panel. The fuel lines run along the inside of left frame rail.



**DATA SHEET NO. 2 (CONTINUED)**

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

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

**FUEL TANK CAPACITY**

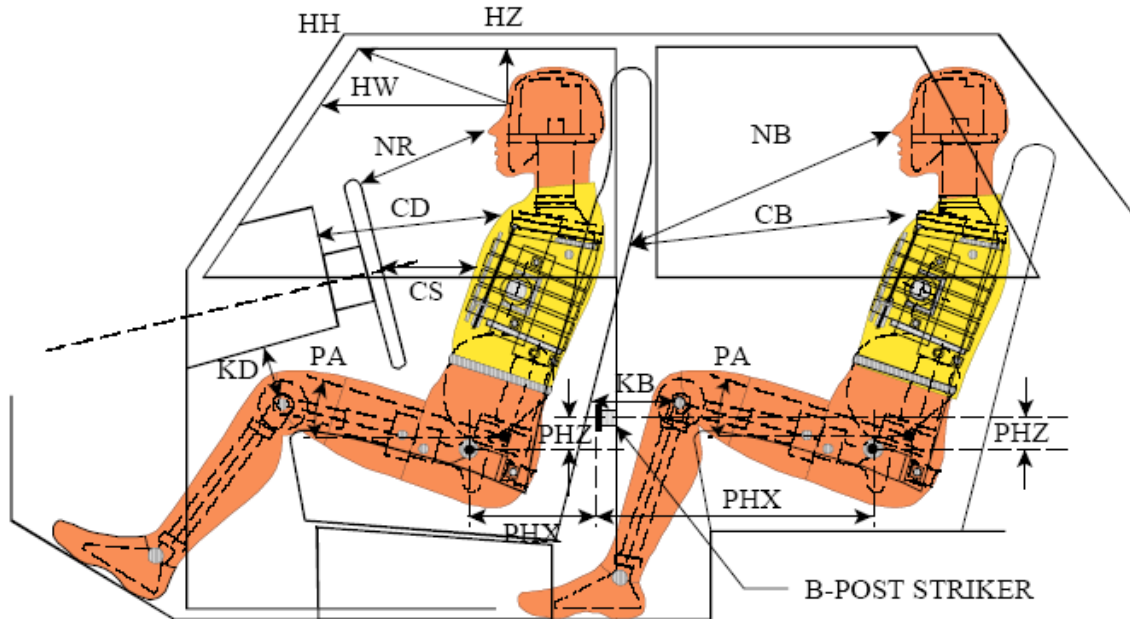
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	93.1
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	93.1
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	86.6
Actual Amount of Solvent Used in Test	87.1
1/3 of Usable Capacity	28.9

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

**DATA SHEET NO. 3  
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11



**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

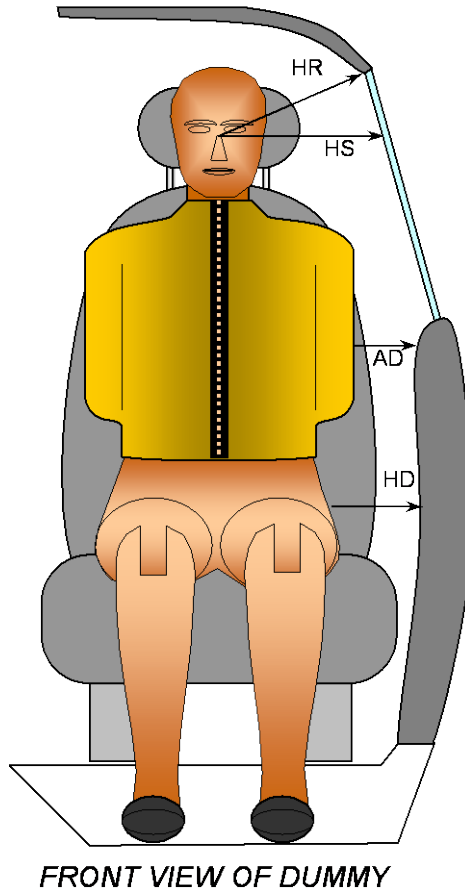
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Head to Header	454			
HW		Head to Windshield	642			
HZ	HZ	Head to Roof Liner	177		303	
NR	NB	Nose to Rim/Seat Back	493		485	
CD	CB	Chest to Dash/Seat Back	606		496	
CS		Chest to Steering Wheel	338			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	203	33.7	225	0.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	200	34.0	230	0.0
PAX°	PAX°	Pelvic Tilt Angle X		19.2		22.8
	PHY°	Pelvic Tilt Angle Y				0.0
PHX	PHX	Hip Point to Striker (X-Axis)	193		369	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	65		176	

**DATA SHEET NO. 4  
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

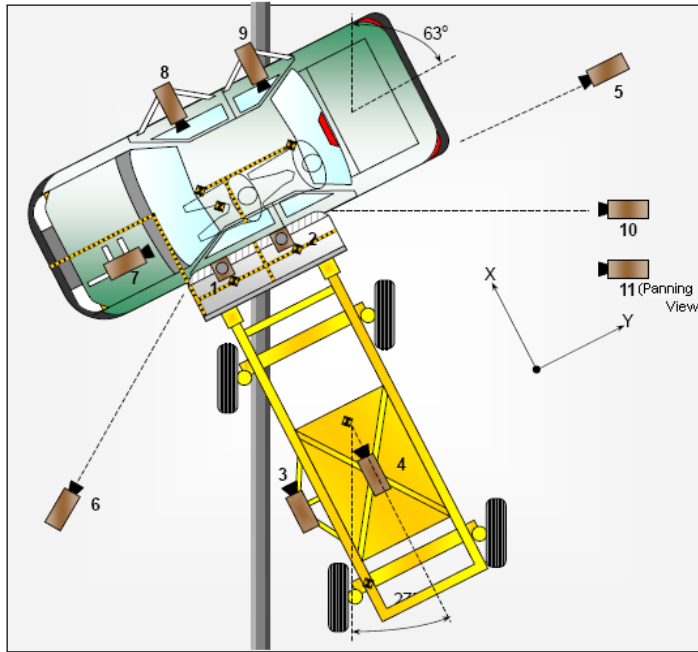


Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	205	257
HS	Head to Side Window	mm	342	361
AD	Arm to Door	mm	91	156
HD	H-Point to Door	mm	182	178

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

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	0	1600	8.5	1000
2	Overhead Close-up	0	200	1600	16	1000
3	Left Impact Point (MDB)	1700	0	820	25	1000
4	Side Overall (MDB)	2400	-770	1440	12.5	1000
5	Rear	4300	7400	1340	12.5	1000
6	Left Front	3000	3400	1320	12.5	1000
7	Driver Front (OB)				16	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  $\pm 6$  mm.

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

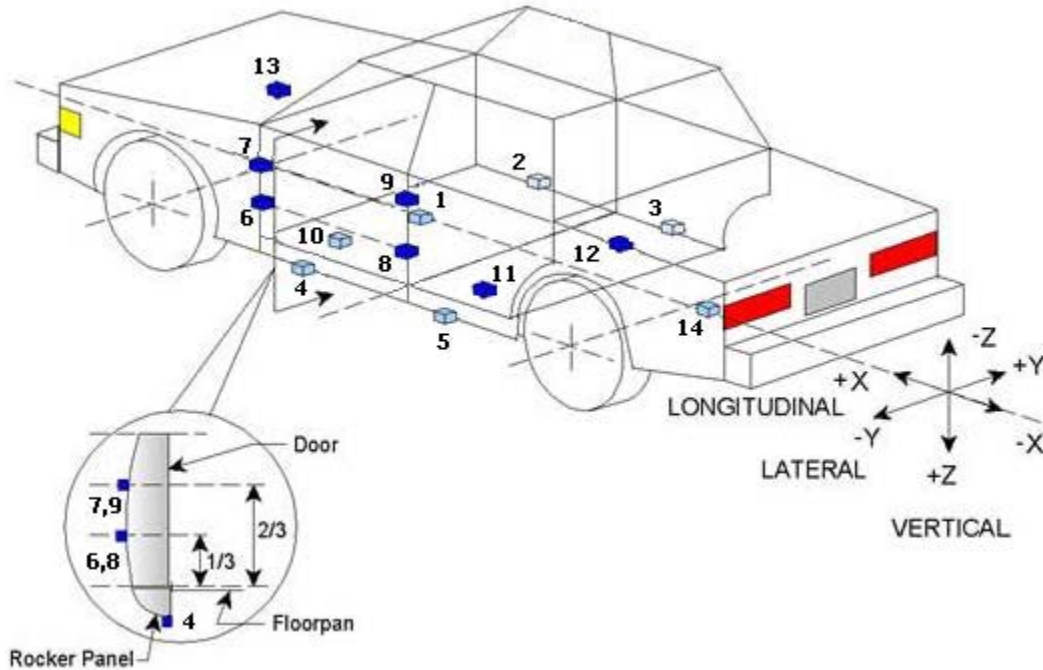
**INSTRUMENTATION**

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	25
MDB Accelerometers	7
<b>TOTAL</b>	<b>64</b>

**DATA SHEET NO. 6  
TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11



**TEST VEHICLE ACCELEROMETER LOCATIONS**

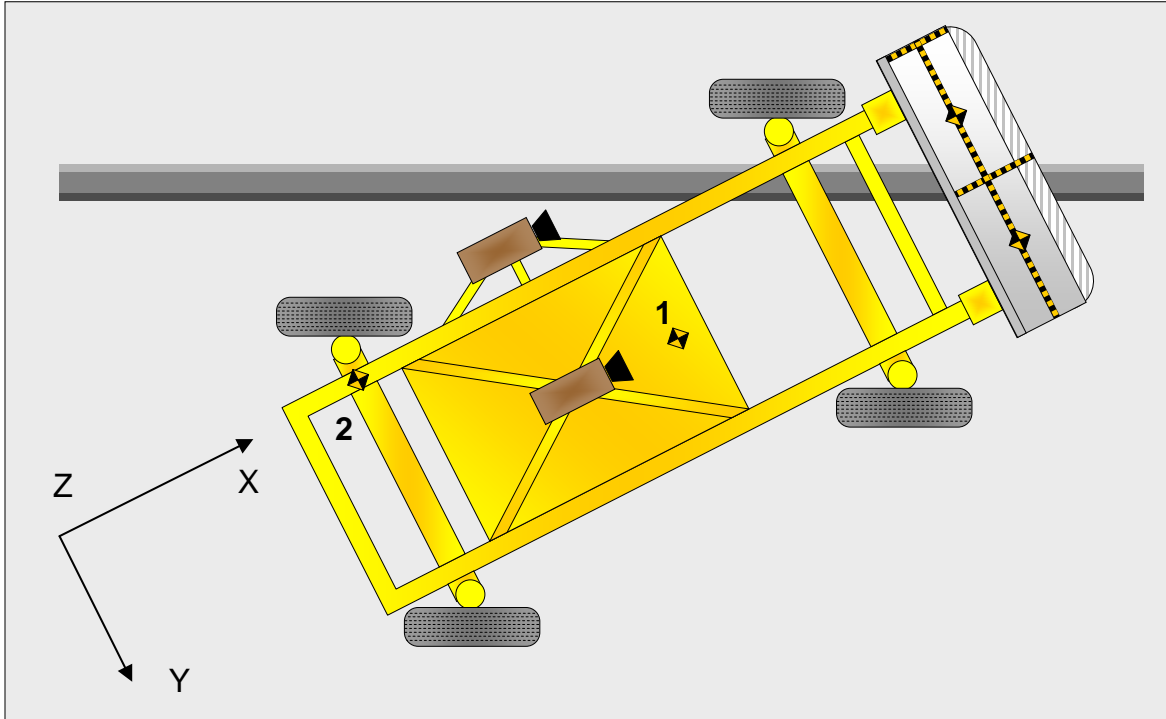
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3220	0	-684
2	Right Sill at Front Seat	3365	745	-444
3	Right Sill at Rear Seat	2355	745	-464
4	Left Sill at Front Door	3340	-745	-456
5	Left Sill at Rear Door	2305	-745	-457
6	A-Post Lower	3745	-860	-728
7	A-Post Middle	3720	-865	-1087
8	B-Post Lower	2660	-855	-709
9	B-Post Middle	2635	-855	-1106
10	Front Seat Track	2900	-555	-511
11	Rear Seat Structure	2100	-560	-524
12	Right Rear Occ. Compartment	2300	610	-514
13	Engine Block	4886	-120	-1126
14	Rear Above Axle	1105	0	-598

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: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11



**MDB ACCELEROMETER LOCATIONS**

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

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

**DATA SHEET NO. 8  
POST-TEST OBSERVATIONS**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

**TEST DUMMY INFORMATION AND CONTACT POINTS<sup>1</sup>**

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	N/A	N/A
Top of Head	Headliner	N/A
Left Side of Head	Side curtain airbag	Side curtain airbag
Back of Head	Head restraint	N/A
Left Shoulder	N/A	N/A
Upper Torso	Seatback, SAB	Door panel
Lower Torso	Seatback, SAB	Door panel
Left Hip	N/A	N/A
Left Knee	Door panel	Door panel

<sup>1</sup> Please note that post-test interior contact locations may reflect contact that occurred during the tip-over event.

**POST-TEST DOOR PERFORMANCE**

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	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

\* Indicate "Yes", "No", or "N/A".

**POST-TEST SEAT PERFORMANCE**

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

\* Indicate "Yes", "No", or "N/A".

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Intact
Sill Separation	No
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	N/A

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

Test Vehicle: 2012 Dodge Durango  
Test Program: SPNCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Struck Side (Driver)		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	No	No		
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	No	No
Side Airbag 1	N/A	N/A	N/A	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	N/A	N/A	N/A	N/A

**IMPACT POINT LOCATION DATA**

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3045
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		514
Horizontal Offset ( + forward / - rearward)	mm	+/- 50 of Intended Impact point	6
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-4

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

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

**MDB SPECIFICATIONS**

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Frame	4115
Wheel Base of Framework Carriage	2591
CG Location of Front Axle	1104

**MDB WEIGHTS**

	Units	Front Axle	Rear Axle	Total
Left	kg	422.8	258.8	
Right	kg	359.2	323.8	
Ratio	%	57.3	42.7	
Totals	kg	782.0	582.6	1364.6

**SPEED AND IMPACT ANGLE DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.3
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

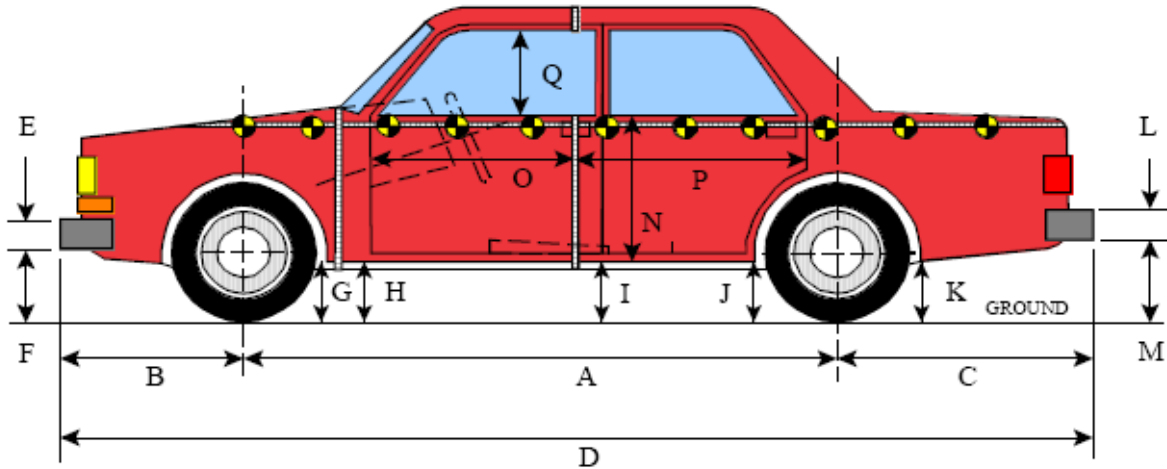
**MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE**

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	280
B	Top of Bumper	533	700	Right	176
C	Mid-Level	686	800	Left	173
D	Top of Stack	813	800	Right	233

**DATA SHEET NO. 10  
TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11



**LEFT SIDE VIEW**

All MEASUREMENTS IN (mm) WITH TOLERANCE OF  $\pm 3$ mm

**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

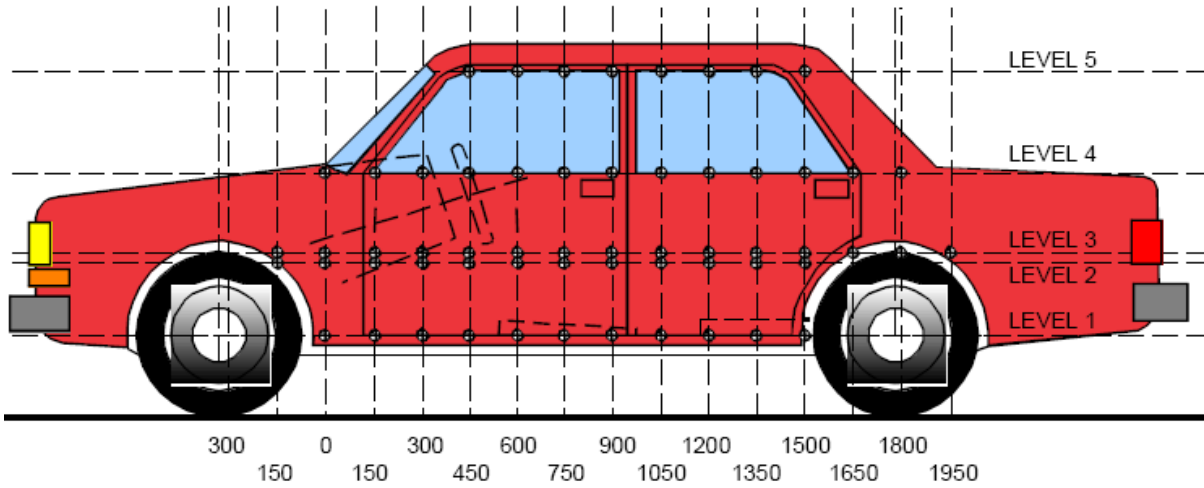
Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3045	3040	5
B	Front Axle to Front Surface of Vehicle	870	870	0
C	Rear Axle to Rear Surface of Vehicle	1155	1155	0
D	Total Length at Centerline	5070	5070	0
E	Front Bumper Thickness	175	175	0
F	Front Bumper Bottom to Ground	515	535	-20
G	Sill Height at Front Wheel Well	364	380	-16
H	Sill Height at Front Door Leading Edge	345	360	-15
I	Sill Height at B-Pillar	355	370	-15
J1	Sill Height at Rear Wheel Well	363	355	8
J2	Pinch Weld Height at Rear Wheel Well	255	255	0
K	Sill Height Aft of Rear Wheel Well	424	429	-5
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	587	590	-3
N	Sill Height to Window Bottom Sill	860	820	40
O	Front Door Leading Edge to Impact CL	727	708	19
P	Rear Door Trailing Edge to Impact CL	1548	1548	0
Q	Front Window Opening	437	450	-13
R	Right Side Length	4855	4805	50
S	Left Side Length	4870	4900	-30
T	Vehicle Width at B Pillar	1390	1332	58

**DATA SHEET NO. 11**

**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11



**LEFT SIDE VIEW**

**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	470	109	1650
2	Driver Hip Point	772	184	1500
3	Mid-Door	808	198	1500
4	Window Sill	1170	39	1350
5	Window Top	1675	-1	2700

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

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

Test Vehicle: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11

**EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL**

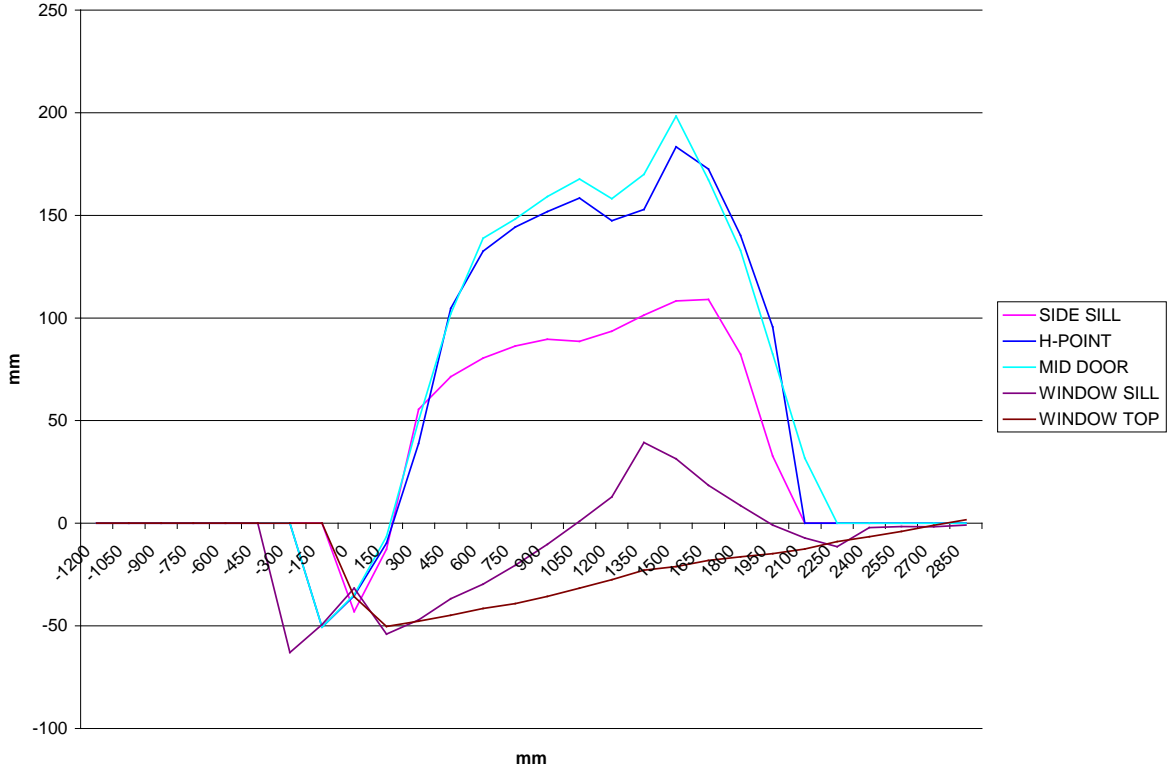
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	0	0	853	0	0	0	0	916	0	0	0	0	-63	0
-150	0	957	955	862	0	0	1007	1005	912	0	0	-51	-51	-49	0
0	911	952	950	869	850	954	987	985	901	886	-43	-35	-35	-32	-36
150	906	944	942	872	806	919	953	948	926	856	-13	-10	-6	-54	-50
300	907	939	937	875	776	852	900	887	922	824	56	39	50	-47	-48
450	910	936	934	878	744	839	831	832	915	788	71	105	102	-37	-45
600	912	933	933	880	709	832	801	794	910	751	80	133	139	-30	-42
750	913	932	932	882	681	827	787	784	903	720	86	144	148	-20	-39
900	914	931	933	884	665	824	779	774	894	701	90	152	159	-10	-36
1050	913	931	934	886	659	825	773	766	885	690	89	158	168	1	-32
1200	913	933	935	887	653	819	785	777	874	681	94	147	158	13	-28
1350	910	931	935	887	649	809	779	765	848	672	101	153	170	39	-23
1500	907	933	936	888	648	799	749	738	857	669	108	183	198	31	-21
1650	903	935	938	889	647	794	763	771	871	666	109	173	167	19	-18
1800	899	939	941	891	645	817	799	808	882	662	82	140	133	9	-16
1950	905	945	945	893	642	872	850	863	894	657	33	96	82	-1	-15
2100	0	954	955	896	640	0	913	923	904	653	0	41	32	-7	-13
2250	0	0	0	901	639	0	0	0	912	648	0	0	0	-11	-9
2400	0	0	0	903	637	0	0	0	905	644	0	0	0	-2	-7
2550	0	0	0	901	635	0	0	0	902	639	0	0	0	-2	-4
2700	0	0	0	893	631	0	0	0	894	632	0	0	0	-2	-1
2850	0	0	0	880	626	0	0	0	881	624	0	0	0	-1	2

**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: 2012 Dodge Durango  
Test Program: NCAP Side Impact

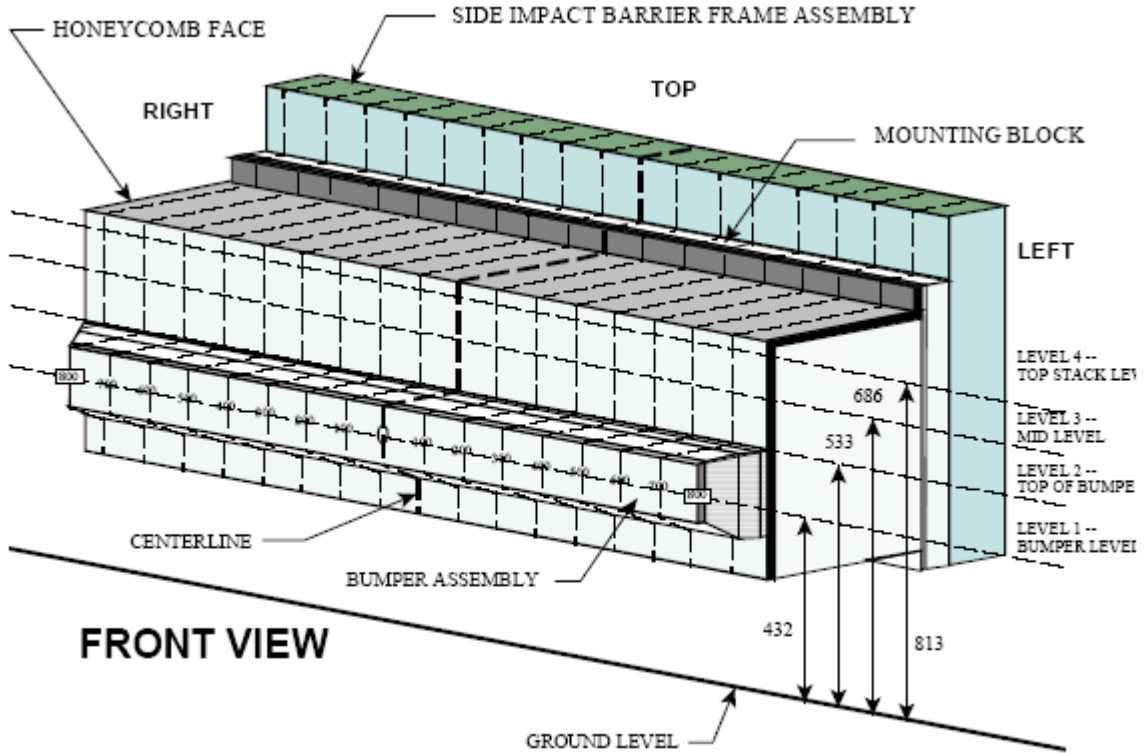
NHTSA No.: MC0323  
Test Date: 11/21/11



**DATA SHEET NO. 12**  
**MDB EXTERIOR STATIC CRUSH MEASUREMENTS**

Test Vehicle: 2012 Dodge Durango  
 Test Program: NCAP Side Impact

NHTSA No.: MC0323  
 Test Date: 11/21/11



NOTE: Dimensions are shown in millimeters, mm

**DEFORMABLE BARRIER STATIC CRUSH**

Stack Level	Distance Right of Center									C/L	Distance Left of Center								
	800	700	600	500	400	300	200	100	0		100	200	300	400	500	600	700	800	
1	-163	-126	-96	-93	-105	-131	-100	-68	-68	-75	-78	-87	-94	-108	-136	-186	-233		
2	-173	-125	-92	-94	-122	-154	-138	-112	-91	-103	-108	-104	-93	-88	-103	-142	-205		
3	-169	-167	-169	-170	NA	NA	NA	NA	NA	-155	-151	-148	-146	-145	-144	-148	-176		
4	-280	-272	-269	-267	-264	-262	-260	-258	-256	-254	-252	-249	-246	-244	-242	-245	-244		

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

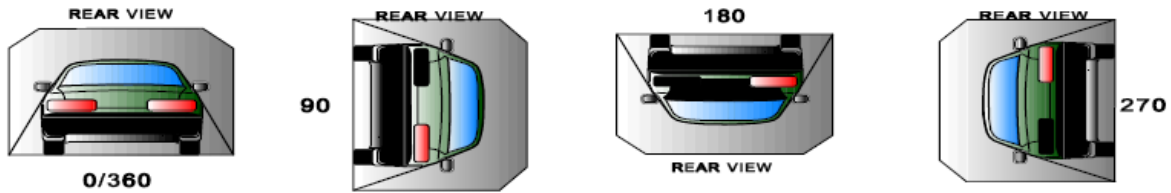
Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

Test Time: 15:57 Temperature: 22

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

**FMVSS 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

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

**FMVSS NO. 301 ROLLOVER SPILLAGE TABLE**

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

**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

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

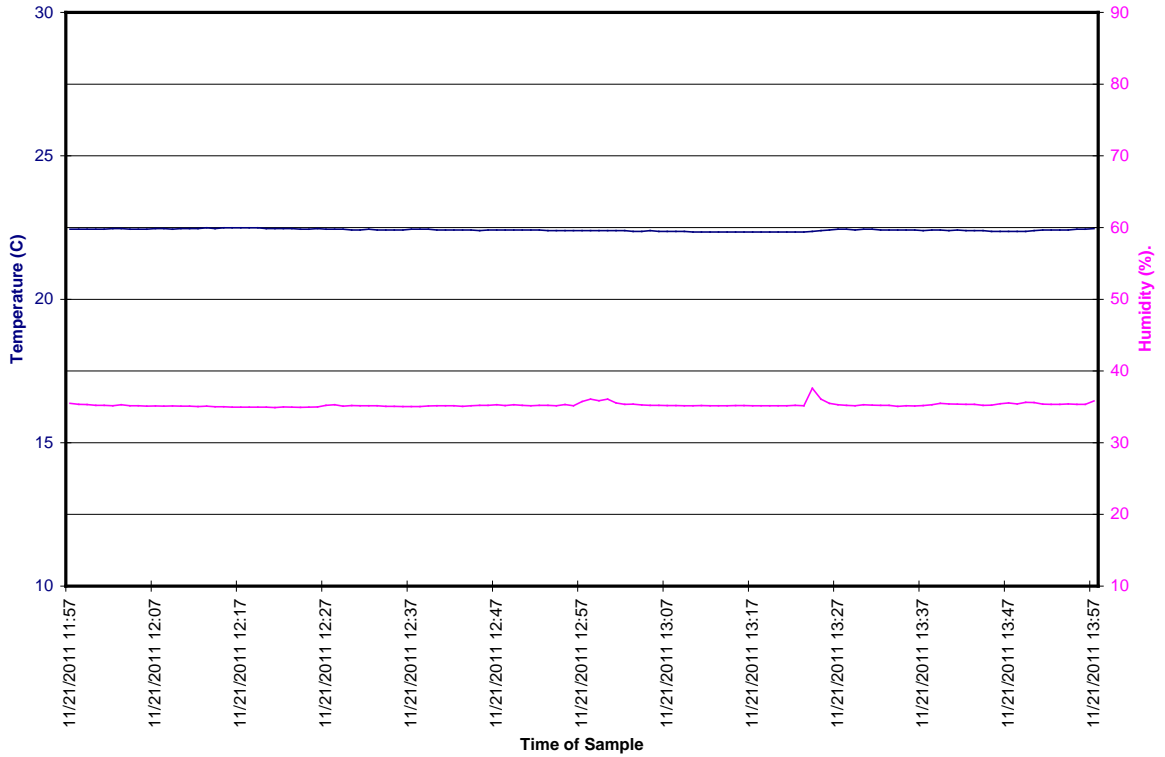
**DATA SHEET NO. 14**

**DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2012 Dodge Durango  
Test Program: NCAP Side Impact

NHTSA No.: MC0323  
Test Date: 11/21/11

MC0323 61 km/h Side NCAP 27 Degree MDB Impact 111121; Test Time 15:57



**APPENDIX A  
PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

<b>No.</b>	<b>Description</b>	<b>Page</b>
<b>001</b>	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	<b>A-6</b>
<b>002</b>	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	<b>A-6</b>
<b>003</b>	Pre-Test Front View of Test Vehicle	<b>A-7</b>
<b>004</b>	Post-Test Front View of Test Vehicle	<b>A-7</b>
<b>005</b>	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	<b>A-8</b>
<b>006</b>	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	<b>A-8</b>
<b>007</b>	Pre-Test Left Side View of Test Vehicle	<b>A-9</b>
<b>008</b>	Post-Test Left Side View of Test Vehicle	<b>A-9</b>
<b>009</b>	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	<b>A-10</b>
<b>010</b>	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	<b>A-10</b>
<b>011</b>	Pre-Test Rear View of Test Vehicle	<b>A-11</b>
<b>012</b>	Post-Test Rear View of Test Vehicle	<b>A-11</b>
<b>013</b>	Pre-Test Right Side View of Test Vehicle	<b>A-12</b>
<b>014</b>	Post-Test Right Side View of Test Vehicle	<b>A-12</b>
<b>015</b>	Pre-Test Overhead View of Test Area	<b>A-13</b>
<b>016</b>	Post-Test Overhead View of Test Area	<b>A-13</b>
<b>017</b>	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	<b>A-14</b>
<b>018</b>	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	<b>A-14</b>
<b>019</b>	Pre-Test Close-up View of Impact Point Target	<b>A-15</b>
<b>020</b>	Post-Test Close-up View of Impact Point Target	<b>A-15</b>
<b>021</b>	Pre-Test Left Front Door Latch Close-up	<b>A-16</b>
<b>022</b>	Post-Test Left Front Door Latch Close-up	<b>A-16</b>
<b>023</b>	Pre-Test Right Front Door Latch Close-up	<b>A-17</b>
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<b>025</b>	Pre-Test Front Close-up View of Driver Dummy	<b>A-18</b>
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<sup>1</sup> The Tip-over event may have affected post-test dummy positioning.



**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



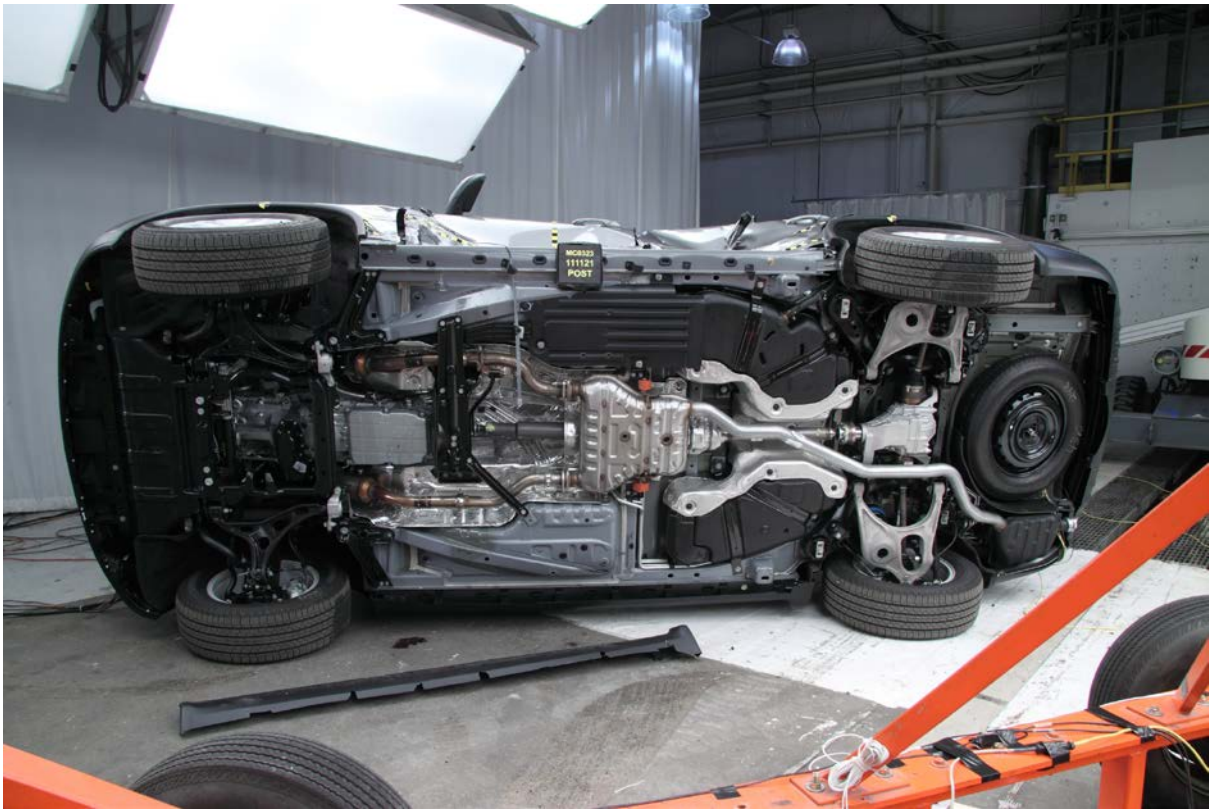
**006** Post-Test Left Front  $\frac{3}{4}$  View of Test Vehicle



**006a** Post-Test Left Front ¾ View of Test Vehicle



**007** Pre-Test Left Side View of Test Vehicle



**008** Post-Test Left Side View of Test Vehicle



**008a** 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



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



**011** Pre-Test Rear View of Test Vehicle



**012** Post-Test Rear View of Test Vehicle



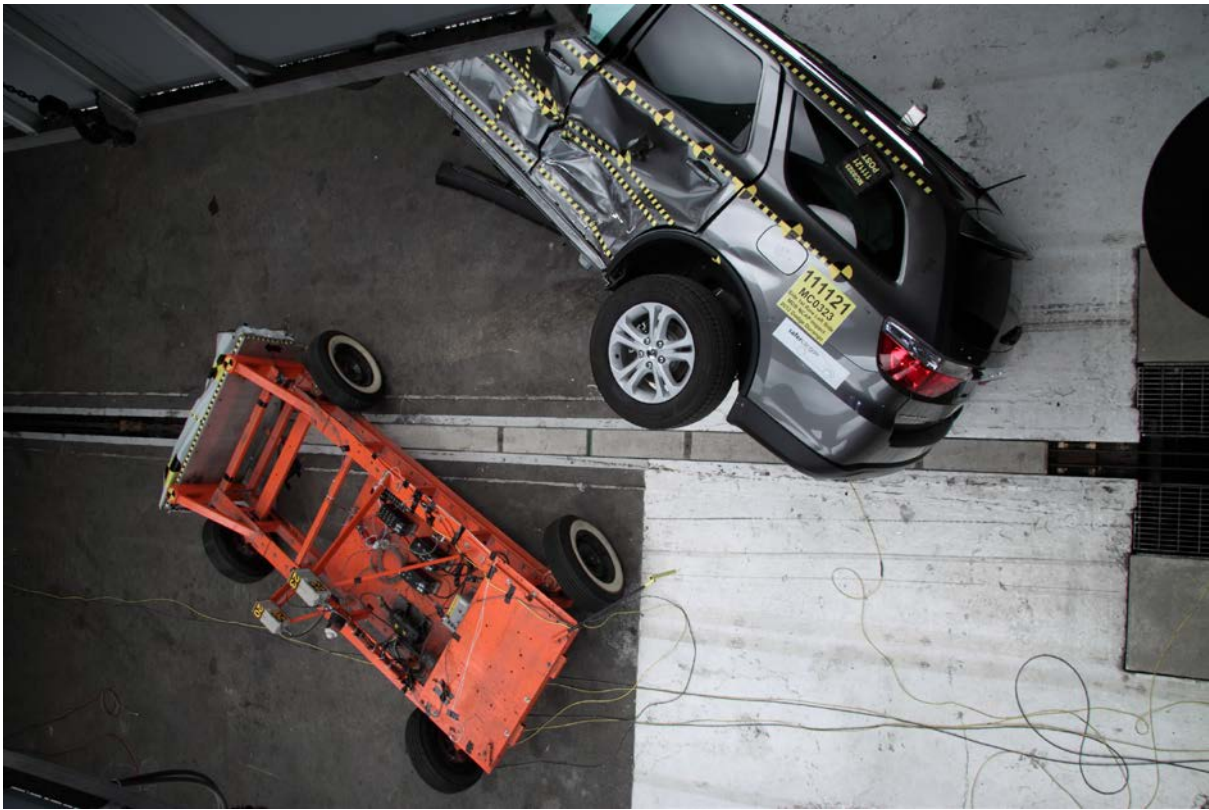
**013** Pre-Test Right Side View of Test Vehicle



**014** Post-Test Right Side View of Test Vehicle



**015** Pre-Test Overhead View of Test Area



**016** Post-Test Overhead View of Test Area



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



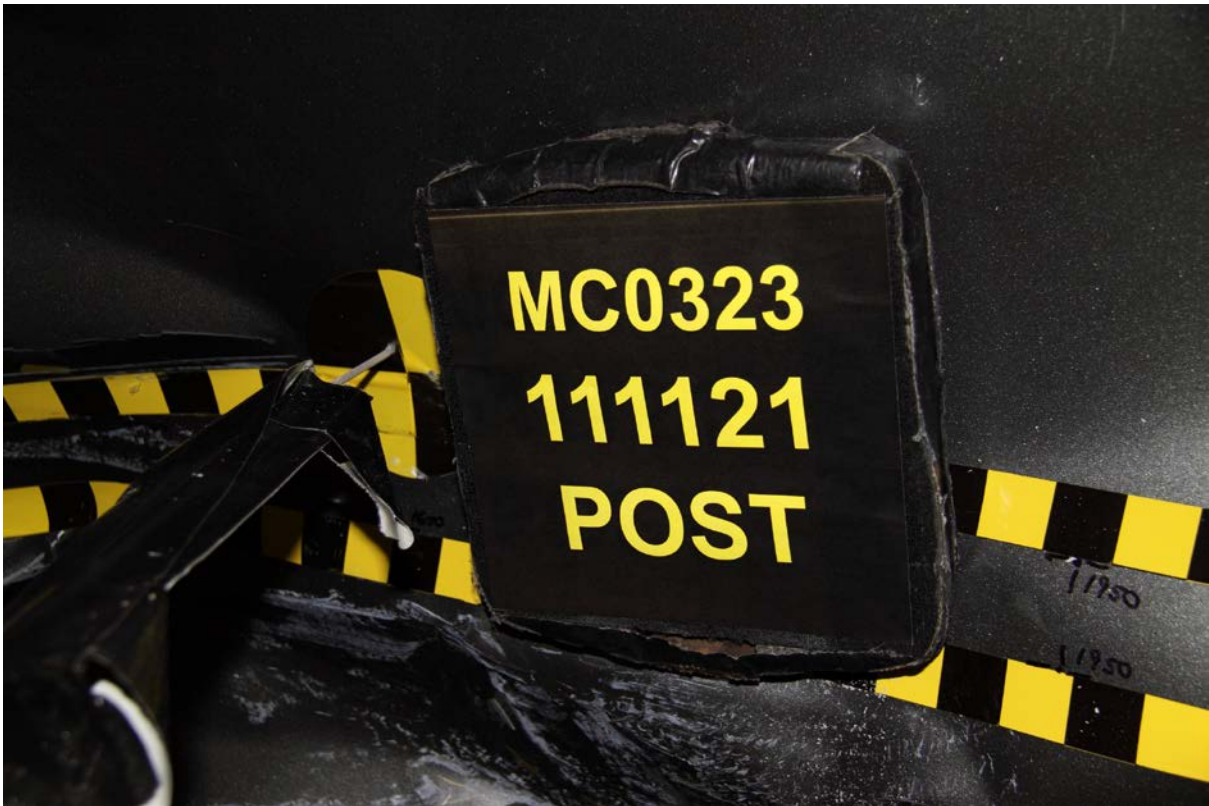
**018** Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



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



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



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



**020a** 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 Right Front Door Latch Close-up



**024** Post-Test Right Front 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



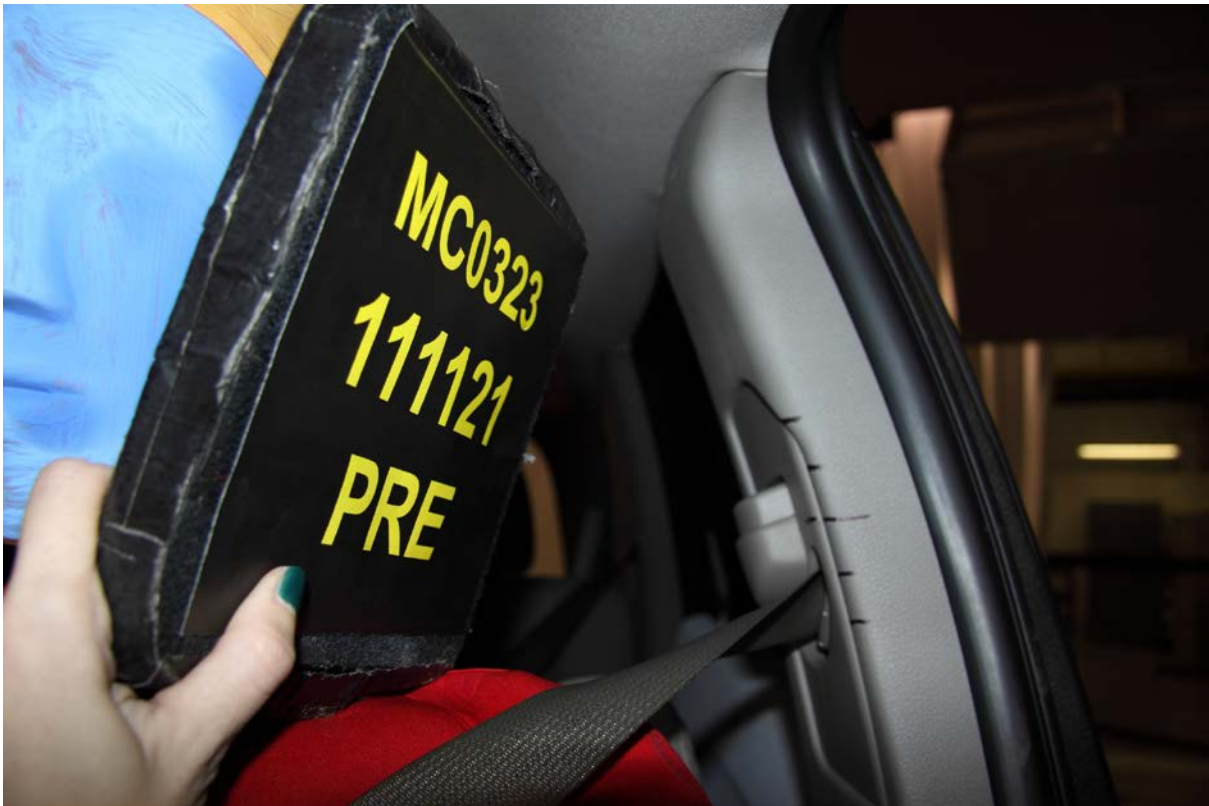
**032** Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



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



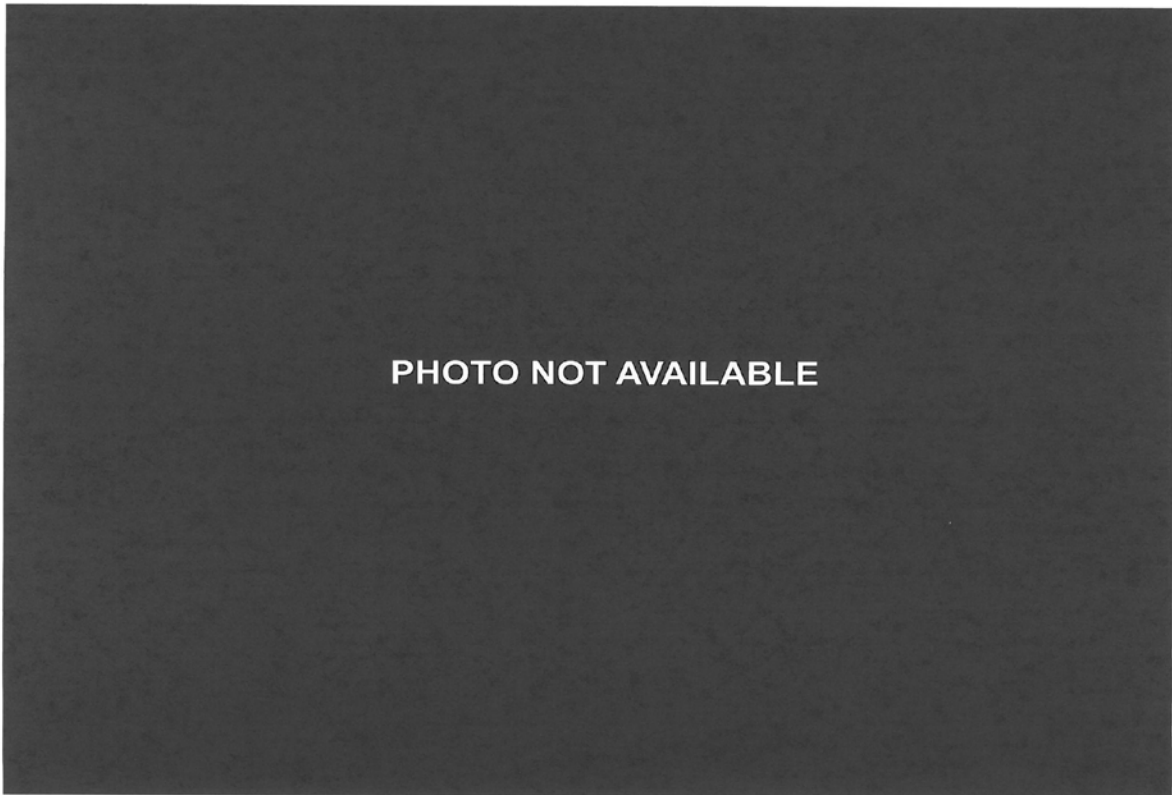
**034** Pre-Test Placement of Driver Dummy's Feet



**035** Pre-Test View of Belt Anchorage for Driver Dummy



**036** Pre-Test Left Side View of Steering Wheel



**037** View of Disengaged Parking Brake



**038** Pre-Test View of Parking Brake



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



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



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



**042** Pre-Test Driver Dummy and Door Clearance View



**043** Post-Test Driver Dummy and Door Clearance View



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



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



**046** Pre-Test Driver Inner Door Panel View



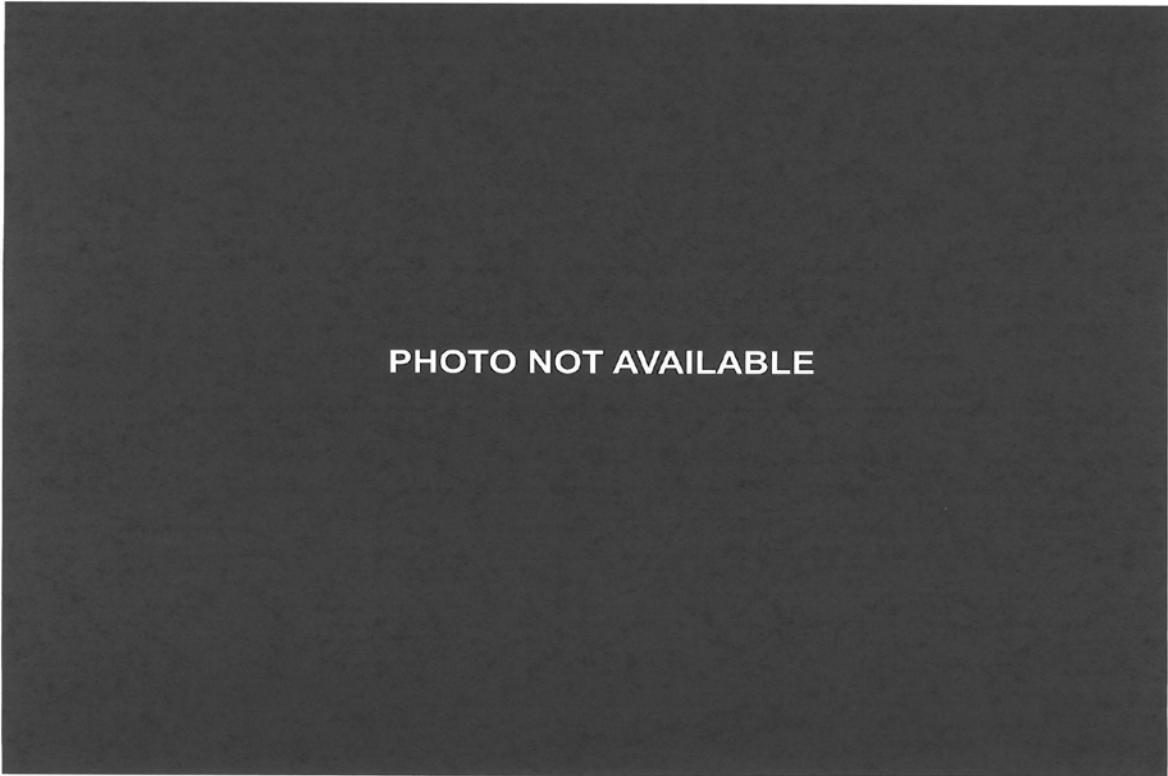
**047** Post-Test Driver Inner Door Panel View



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



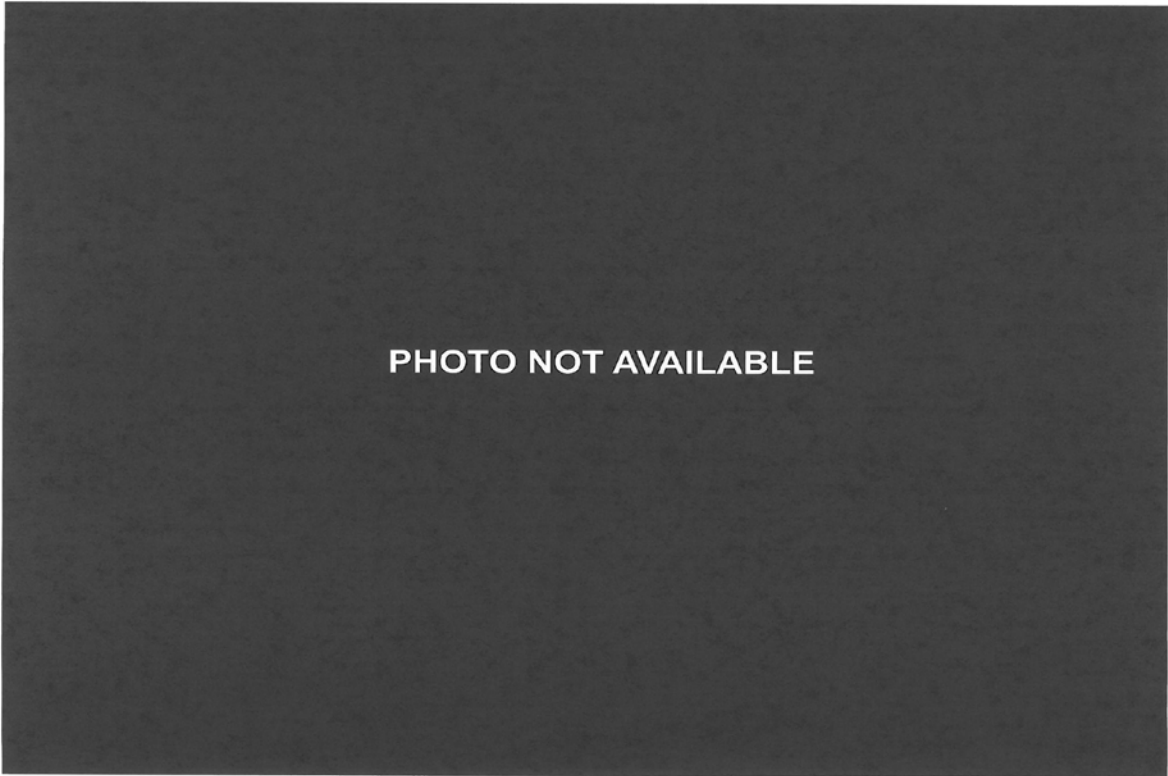
**049** Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



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



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



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



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



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



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



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



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



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



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



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



**061** Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



**062** Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



**063** Pre-Test Placement of Rear Passenger Dummy's Feet



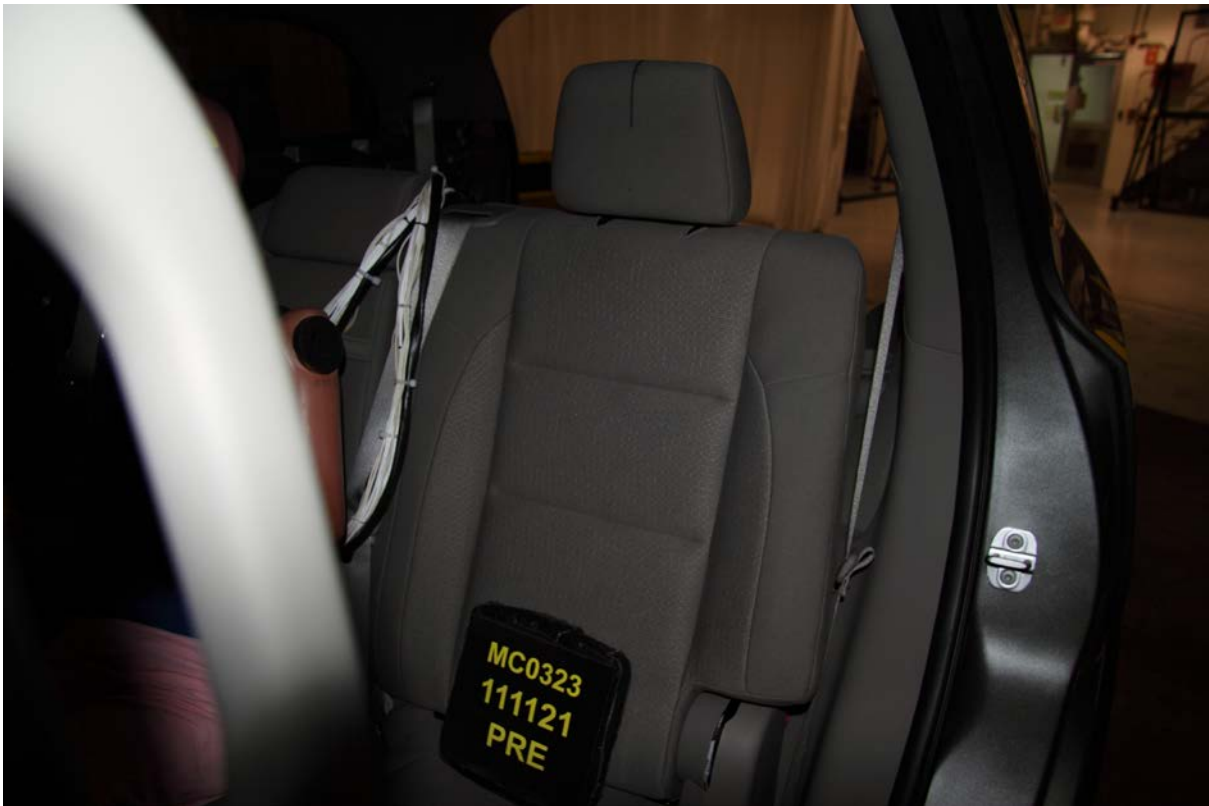
**064** Pre-Test View of Belt Anchorage for Rear Passenger Dummy



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



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



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



**068** Pre-Test Passenger Dummy and Door Clearance View



**069** Post-Test Passenger Dummy and Door Clearance View



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



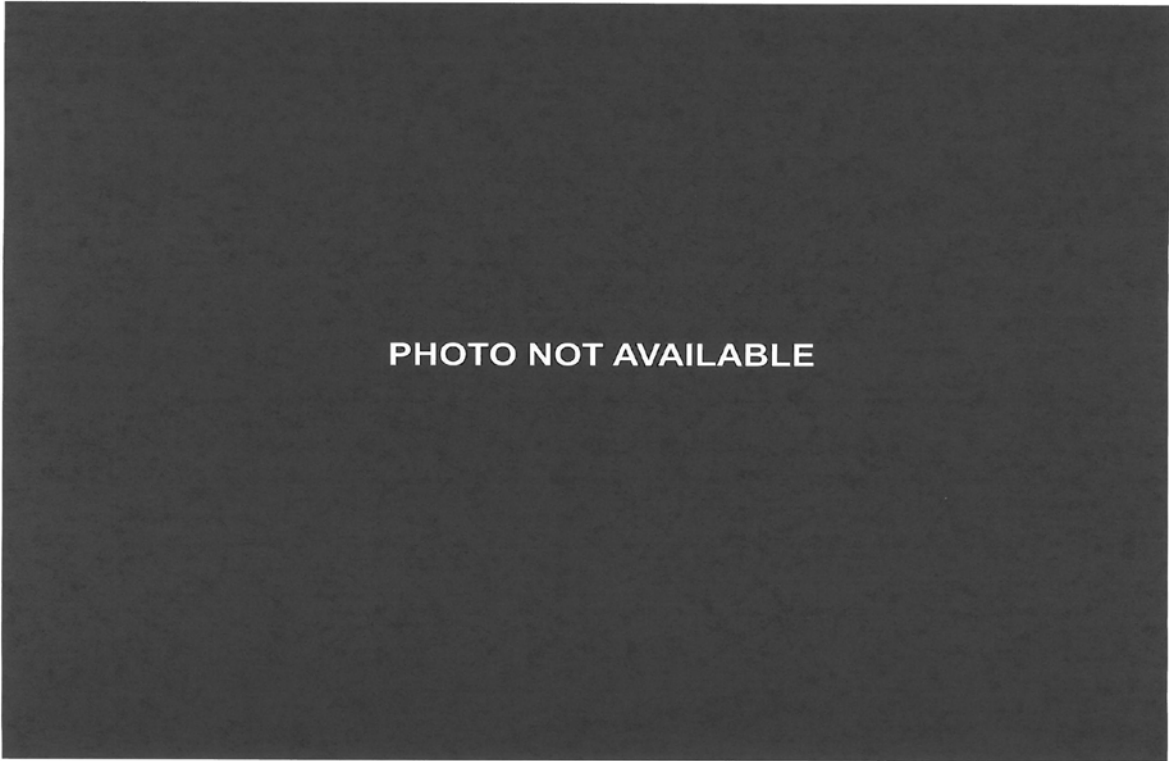
**071** Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



**072** Pre-Test Passenger Inner Door Panel View



**073** Post-Test Passenger Inner Door Panel View



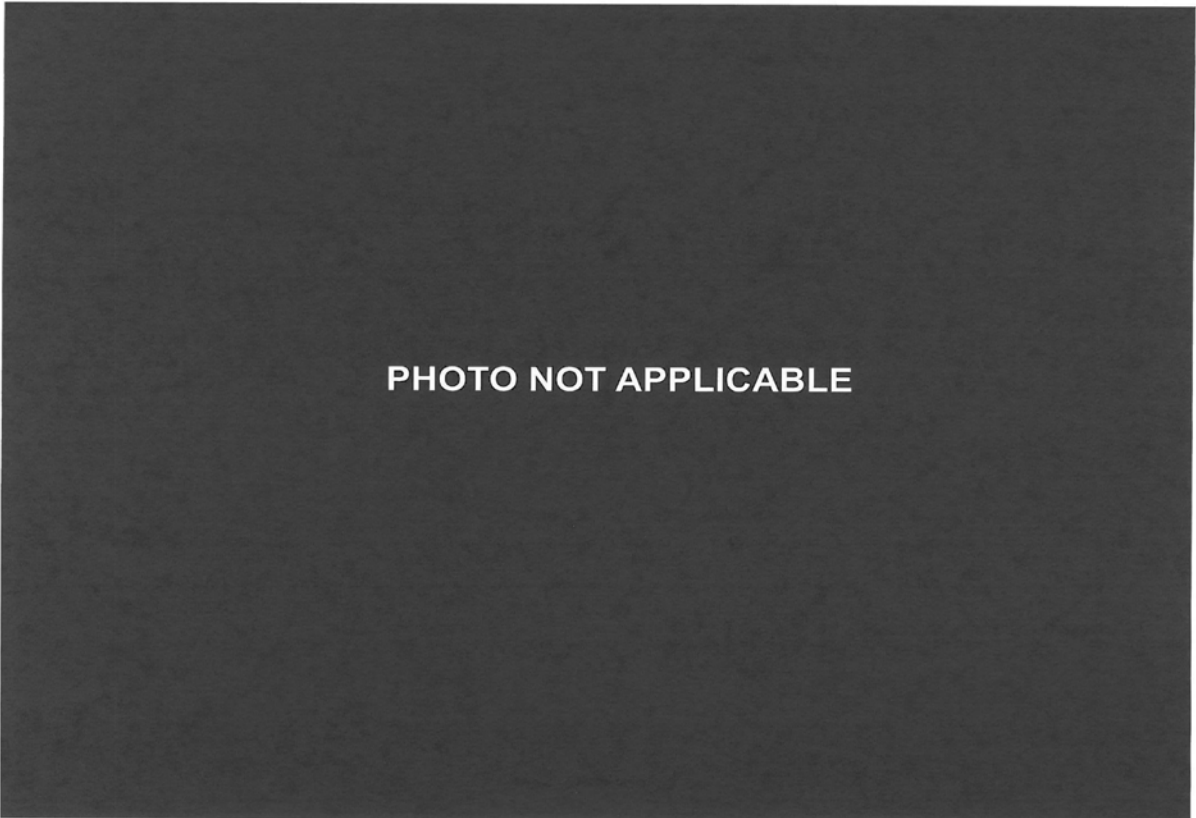
**074** Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



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



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



PHOTO NOT AVAILABLE

**078** Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View



PHOTO NOT AVAILABLE

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



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



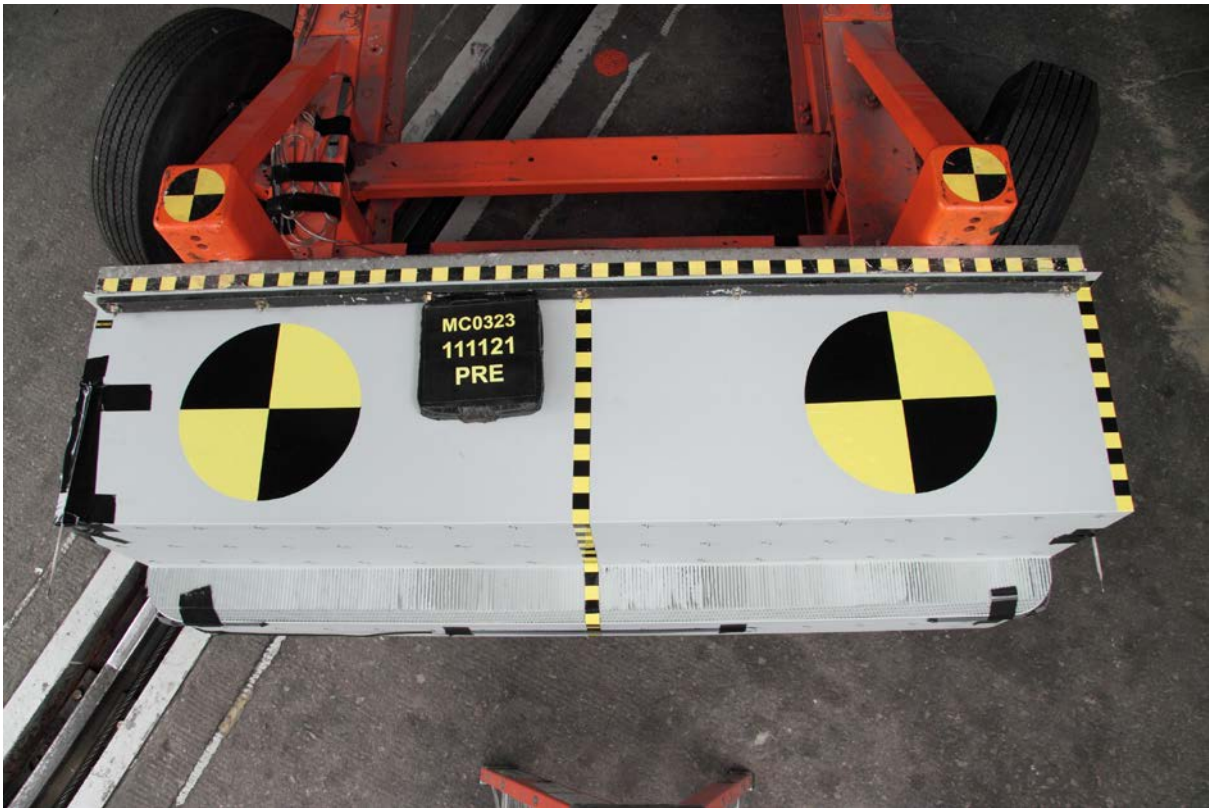
081 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



**082** Pre-Test Front View of MDB Impactor Face



**083** Post-Test Front View of MDB Impactor Face



**084** Pre-Test Top View of MDB Impactor Face



**085** Post-Test Top View of MDB Impactor Face



**086** Pre-Test Left Side View of MDB Impactor Face



**087** Post-Test Left Side View of MDB Impactor Face



**088** Pre-Test Right Side View of MDB Impactor Face



**089** Post-Test Right Side View of MDB Impactor Face



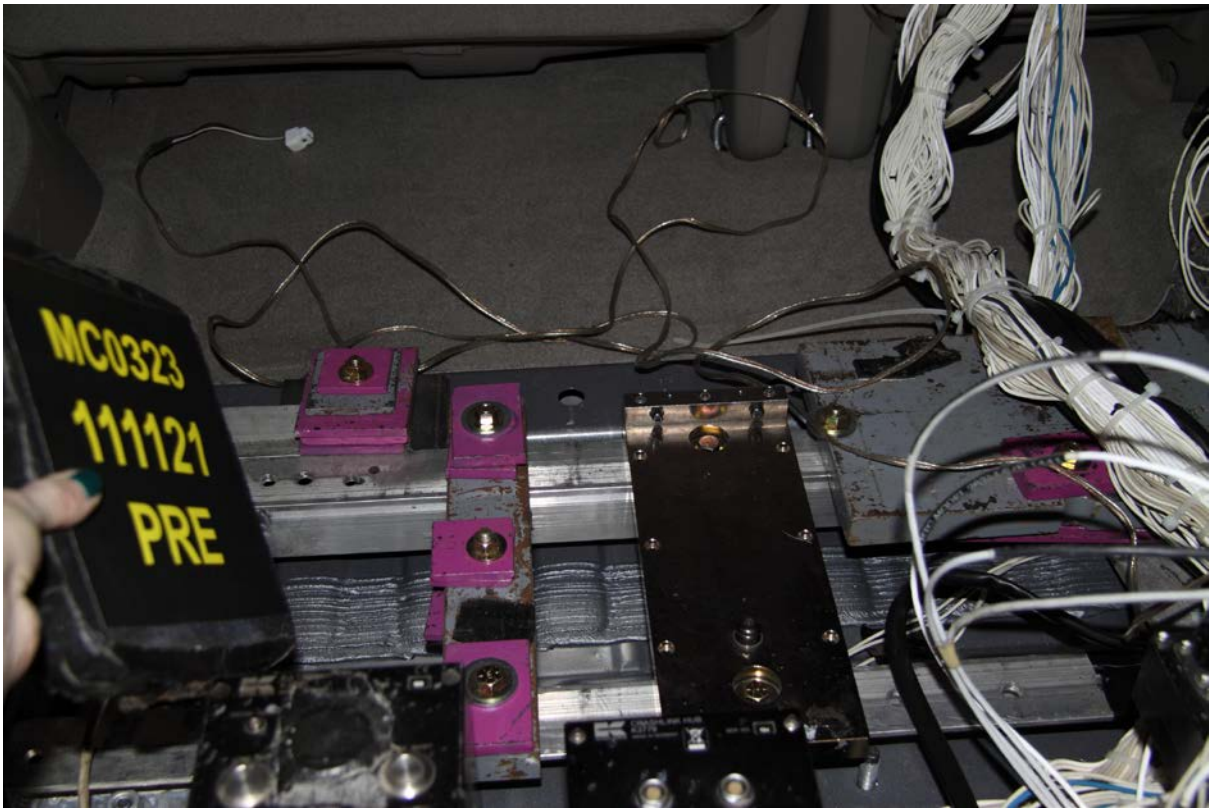
090 Close-Up View of Vehicle's Certification Label



091 Close-Up View of Vehicle's Tire Information Placard or Label



092 Pre-Test Ballast View



092a Pre-Test Ballast View



**093** Post-Test Primary Speed Trap Read-Out



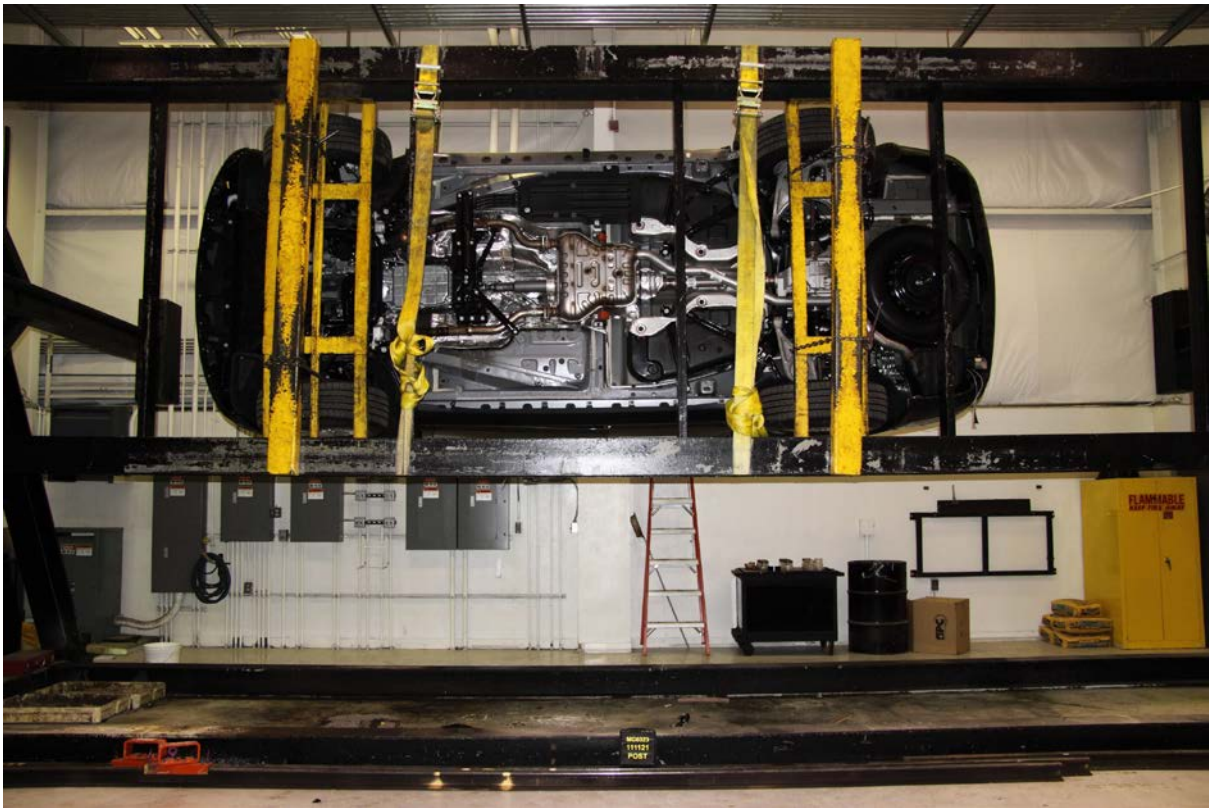
**094** FMVSS No. 301 Static Rollover 0 Degrees



**095** FMVSS No. 301 Static Rollover 90 Degrees



**096** FMVSS No. 301 Static Rollover 180 Degrees



**097** FMVSS No. 301 Static Rollover 270 Degrees



**098** FMVSS No. 301 Static Rollover 360 Degrees



099 Impact Event

**2010 DODGE DURANGO SXT RWD**

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

**MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION**

Base Price: **\$28,995**

**DODGE DURANGO SXT RWD**  
 Exterior Color: Silver Metallic / Clear Coat Exterior Paint  
 Interior Color: Dark Graystone / Medium Graystone Interior Colors  
 Interior: Cloth Low-Back Bucket Seats  
 Engine: 3.6 Liter V6 24-Valve VTEC Engine  
 Transmission: 5-Speed Automatic Transmission

**STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)**

**FUNCTIONAL SAFETY FEATURES**  
 Advanced Multi-Stage Front Air Bags  
 Supplemental Side Curtain Air Bags in All Rows  
 Supplemental Front Seat-Mounted Side Air Bags  
 Active Head Restraints  
 Child Seat Anchor System-LATCH Ready  
 Antilock 4-Wheel Disc Brakes  
 Electronic Stability Control  
 Tire Pressure Monitor with Warning Lamp  
 Hill Start Assist  
 Trailer Sway Control  
 Sentry Key, Theft Deterrent System  
 Remote Keyless Entry  
 Speed Control

**INTERIOR FEATURES**  
 Air Conditioning with Heater  
 Power Front Windows One-Touch Up and Down Feature  
 Front Passenger Side Side-Fold Seat  
 Second-Row 60/40 Tilt and Tumble Seat  
 3rd Row 2-Position Bench Seat  
 Three-Axis Remote Headrest Clamping  
 In-Motion Spinning Radio w/ 116 Radio Substation  
 For More Information, Call 1-888-239-7474  
 Media Center: 130 CD/MP3  
 8 Speakers  
 Audio Jack Input for Mobile Devices  
 Steering Wheel-Mounted Audio Controls  
 Electronic Vehicle Information Center  
 TR / Telescope Steering Column  
 Door Trim Panel with Ambient Lighting  
 Illuminated Cup Holders  
 Front and Rear Interior LED Lamps  
 Interior Removable / Rechargeable Lamp  
 Premium Front and Rear Floor Mats  
 Third-Row Floor Mat  
 Auxiliary 12 Volt Power Outlets  
 Full Length Floor Console

**EXTERIOR FEATURES**  
 18" x 8.5" Aluminum Wheels

Assembly Plant/Point of Entry: DETROIT, MICHIGAN, U.S.A.

1014 RDH46ECC-11376D 11/10/10 1580

SALES TAX, TITLE, LICENSE, REGISTRATION, AND OTHER LOCAL FEES ARE NOT INCLUDED IN THIS PRICE. DEALER PRICE MAY VARY. ©2010 CHRYSLER GROUP LLC. ALL RIGHTS RESERVED. CHRYSLER GROUP LLC IS THE REGISTERED OWNER OF THIS ADVERTISING MATERIAL.

For more information visit: [www.dodge.com](http://www.dodge.com) Chrysler Group LLC  
 or call 1-800-4ADODGE

**EPA Fuel Economy Estimates**

These estimates reflect new EPA methods beginning with 2008 models.

<b>GASOLINE CITY MPG</b>  <b>16</b>  <small>Expected range for most drivers 13 to 19 MPG</small>  <small>*All estimates given assuming an 88% city and 20% highway mix. See Fuel Economy Guide for more information.</small>	<b>Dual Fuel Vehicle* Gasoline-Ethanol (E85)</b> <b>Estimated Annual Fuel Cost</b> <b>\$2,367</b> <small>based on 15,000 miles at \$3.00 per gallon of gasoline</small>	<b>GASOLINE HIGHWAY MPG</b>  <b>23</b>  <small>Expected range for most drivers 19 to 27 MPG</small>  <small>Your actual mileage will vary depending on how you drive and maintain your vehicle.</small>
--	--	---

**Combined Gasoline Fuel Economy**  
 This vehicle **19**  
AT 80 MPH

See the FREE Fuel Economy Guide at dealers or [www.fueleconomy.gov](http://www.fueleconomy.gov)

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**GOVERNMENT SAFETY RATINGS**

This vehicle has not been rated by the government for frontal crash, side crash or rollover risk.  
 Source: National Highway Traffic Safety Administration (NHTSA).

[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

---

**PARTS CONTENT INFORMATION**

FOR VEHICLES IN THIS CLASS: U.S./CANADIAN PARTS CONTENT: 69%  
 NOTE: PARTS CONTENT FIGURES MAY INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

**FOR THIS VEHICLE:**  
 FINAL ASSEMBLY POINT: DETROIT, MICHIGAN, U.S.A.  
 COUNTRY OF ORIGIN: ENGINES: MEXICO  
 TRANSMISSION: GERMANY

100 Monroney Label

**Supplemental Active Head Restraints (AHR)**

These head restraints are passive, adjustable components, and vehicles with this equipment cannot be equipped with a head restraint. The head restraint is located behind the seat back and is used to support the head and neck in the event of a rear impact. The head restraint will be used in the event of a rear impact, with the front seat back folded down and the back seat being upright.

**Note:** For more information on properly adjusting and positioning the head restraints, refer to "Adjusting Active Head Restraints in 'Understanding The Features Of Your Vehicle'."

**Resetting Active Head Restraints (AHR)**

If the Active Head Restraints are triggered in an accident, you must reset the head restraint on the driver and front passenger seats. You can do this by pulling down on the top of the head restraint. The head restraint will be reset to its original position. However, if you have been involved in an accident, you should have the head restraint checked by a qualified specialist at an authorized dealer.

1. Grab the deployed AHR from the rear seat.

**Head Positioning Points On AHR**

2. Position the hands on the top of the deployed AHR at a comfortable position.

3. Pull down the restraint towards the rear of the vehicle then down to engage the locking mechanism.

4. Pull down the restraint towards the rear of the vehicle then down to engage the locking mechanism.

**AHR in Rest Position**

5. If you have difficulties or problems resetting the Active Head Restraints, see an authorized dealer.

6. For safety reasons, have the Active Head Restraints checked by a qualified specialist at an authorized dealer.

**Active Head Restraint (AHR) Components**

1—Need Restraint Front Half (Soft Foam) 2—Seat Backrest 3—Need Restraint Back Half (Decorative Plastic Head Cover) 4—Head Restraint Guide Tubes

1—Downward Movement 2—Retracted Movement

3—Final Downward Movement To Engage Locking Mechanism

4. The AHR head rest lower and then half should lock into the back decorative plastic head.

## 101 Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

**Supplemental Active Head Restraints (AHR)**

These head restraints are passive, adjustable components, and vehicles with this equipment cannot be equipped with a head restraint. The head restraint is located behind the seat back and is used to support the head and neck in the event of a rear impact. The head restraint will be used in the event of a rear impact, with the front seat back folded down and the back seat being upright.

**Note:** For more information on properly adjusting and positioning the head restraints, refer to "Adjusting Active Head Restraints in 'Understanding The Features Of Your Vehicle'."

**Resetting Active Head Restraints (AHR)**

If the Active Head Restraints are triggered in an accident, you must reset the head restraint on the driver and front passenger seats. You can do this by pulling down on the top of the head restraint. The head restraint will be reset to its original position. However, if you have been involved in an accident, you should have the head restraint checked by a qualified specialist at an authorized dealer.

1. Grab the deployed AHR from the rear seat.

**Head Positioning Points On AHR**

2. Position the hands on the top of the deployed AHR at a comfortable position.

3. Pull down the restraint towards the rear of the vehicle then down to engage the locking mechanism.

4. Pull down the restraint towards the rear of the vehicle then down to engage the locking mechanism.

**AHR in Rest Position**

5. If you have difficulties or problems resetting the Active Head Restraints, see an authorized dealer.

6. For safety reasons, have the Active Head Restraints checked by a qualified specialist at an authorized dealer.

**Active Head Restraint (AHR) Components**

1—Need Restraint Front Half (Soft Foam) 2—Seat Backrest 3—Need Restraint Back Half (Decorative Plastic Head Cover) 4—Head Restraint Guide Tubes

1—Downward Movement 2—Retracted Movement

3—Final Downward Movement To Engage Locking Mechanism

4. The AHR head rest lower and then half should lock into the back decorative plastic head.

## 102 Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

**APPENDIX B**  
**VEHICLE AND DUMMY RESPONSE DATA PLOTS**

## TABLE OF DATA PLOTS

### Driver & Passenger Dummy Instrumentation Plots

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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**

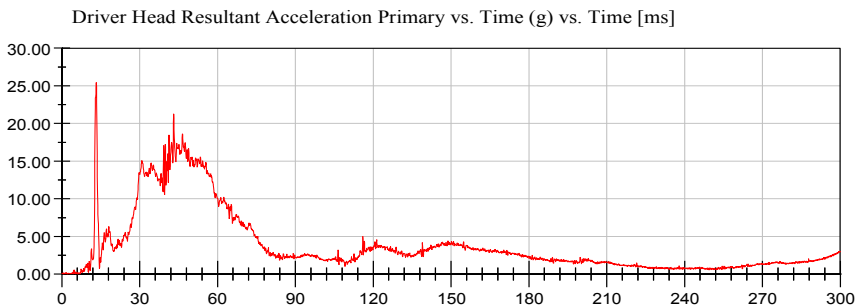
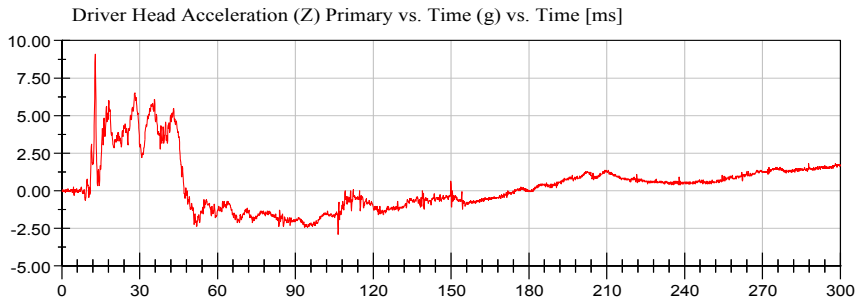
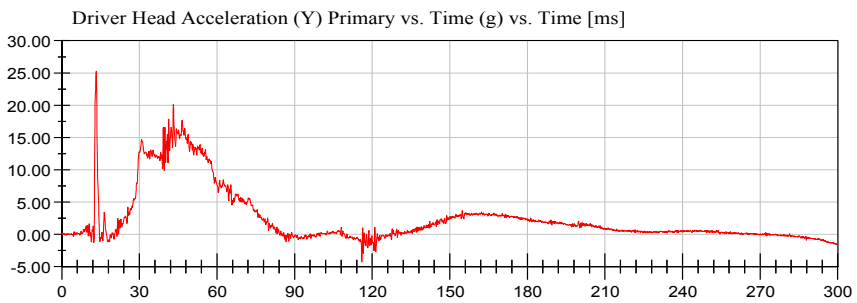
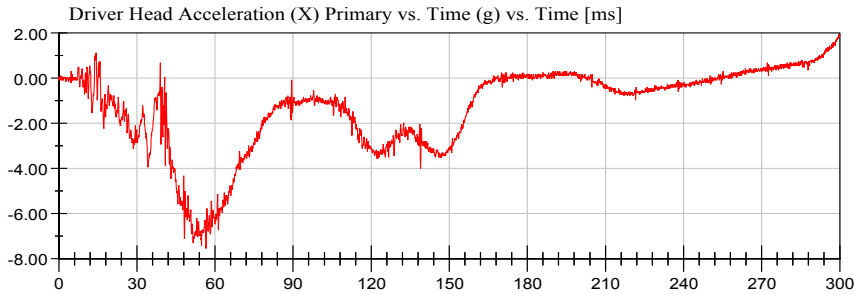
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Test Number: 111121 (MC0323)

Test Date: 11/21/2011

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

Position #4 SID IIs Dummy (033)



# NHTSA

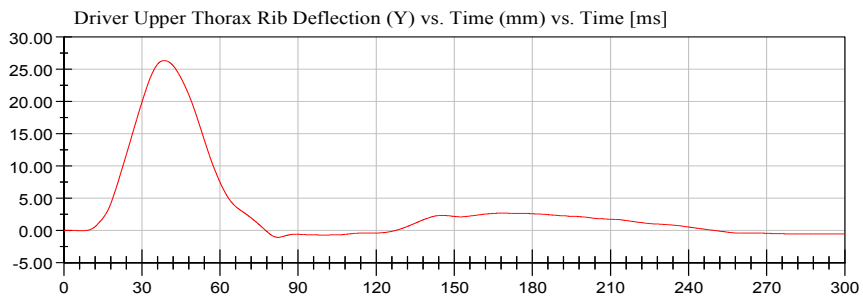
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Test Number: 111121 (MC0323)

Test Date: 11/21/2011

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

Position #4 SID IIs Dummy (033)



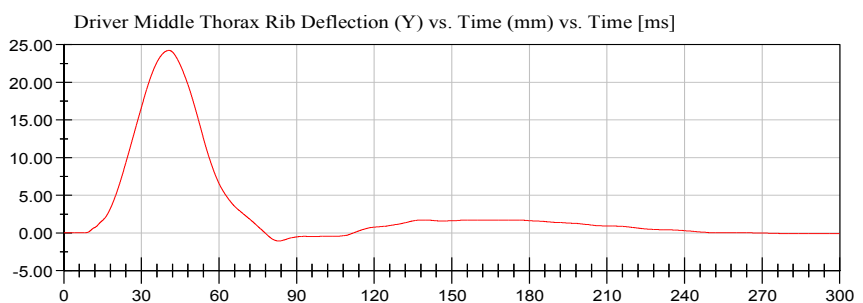
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-1.05 mm at 82.32 ms

CFC\_180



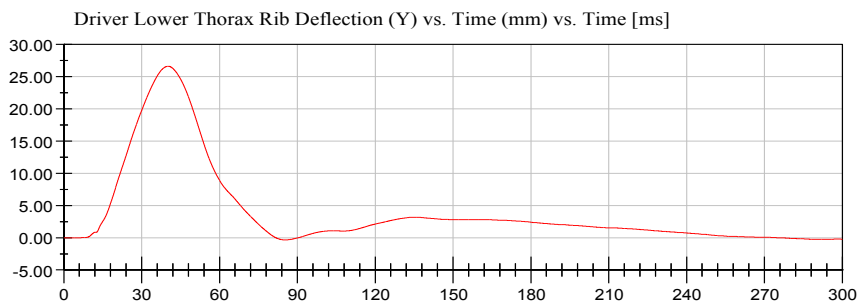
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CFC\_180



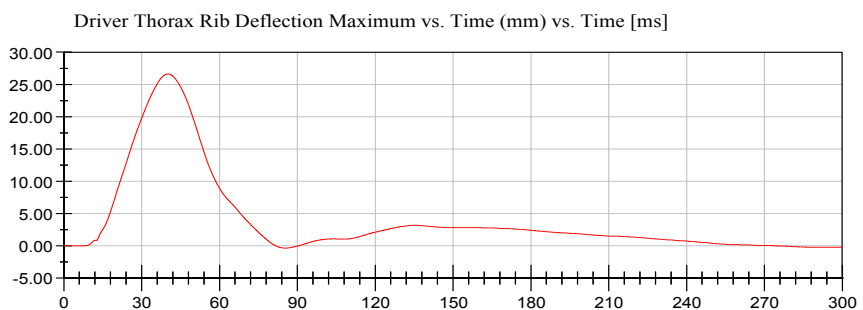
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-0.34 mm at 85.36 ms

CFC\_180



<Max>

26.62 mm at 40.24 ms

<Min>

-0.34 mm at 85.36 ms

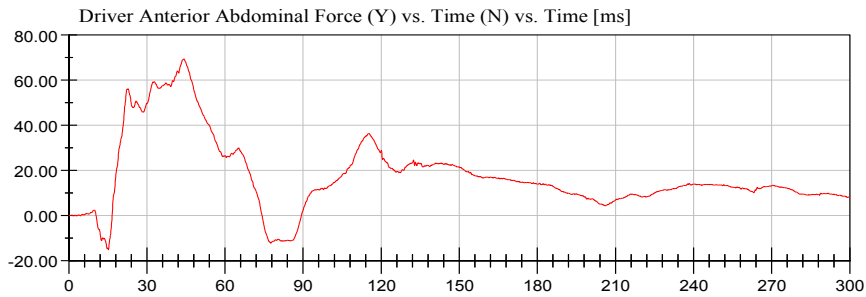
CFC\_180



# NHTSA

Test Lab: CTF  
Test Number: 111121 (MC0323)

Test Date: 11/21/2011  
Position #1 ES-2 Dummy with Rib Extension (F030)  
Position #4 SID IIs Dummy (033)

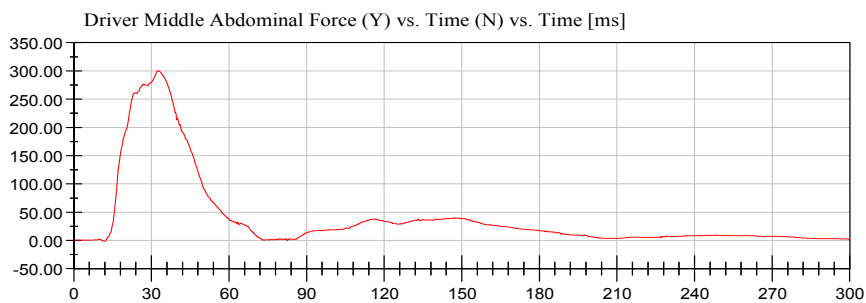


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69.38 N at 44.16 ms

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-15.07 N at 15.20 ms

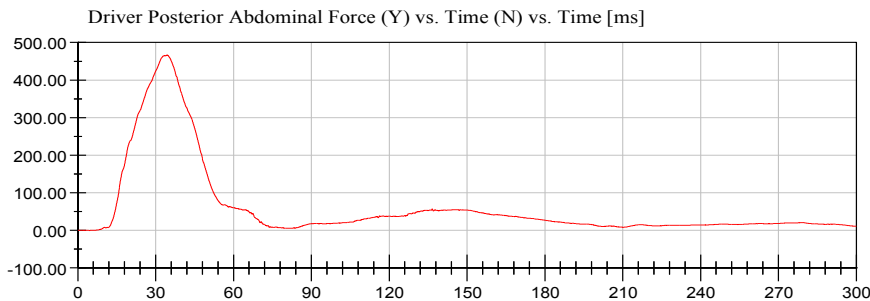


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300.13 N at 32.24 ms

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-2.10 N at 11.92 ms

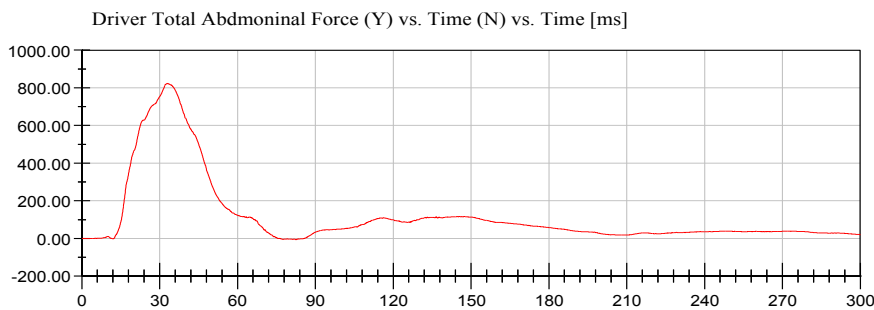


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466.50 N at 34.40 ms

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-0.28 N at 4.48 ms



<Max>

822.67 N at 32.88 ms

<Min>

-6.68 N at 82.64 ms



**NHTSA**

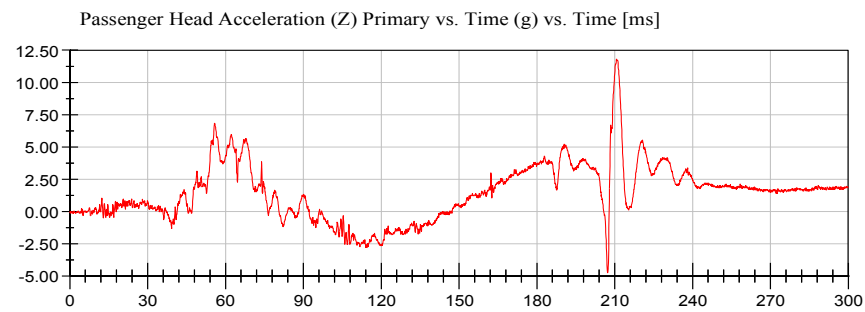
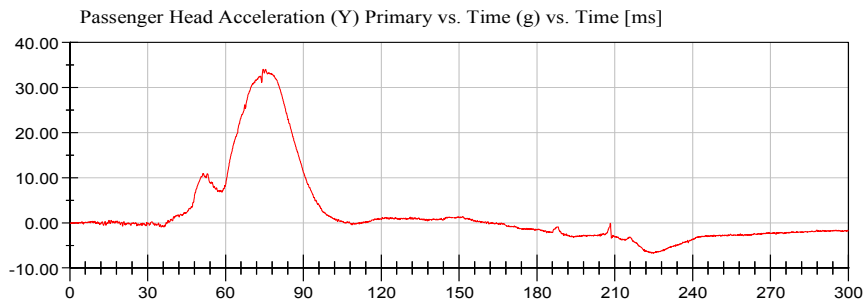
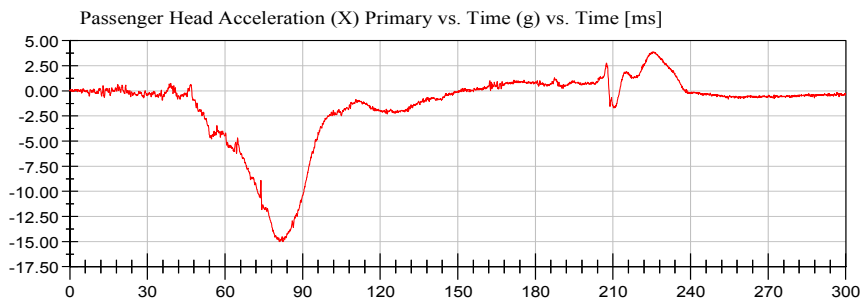
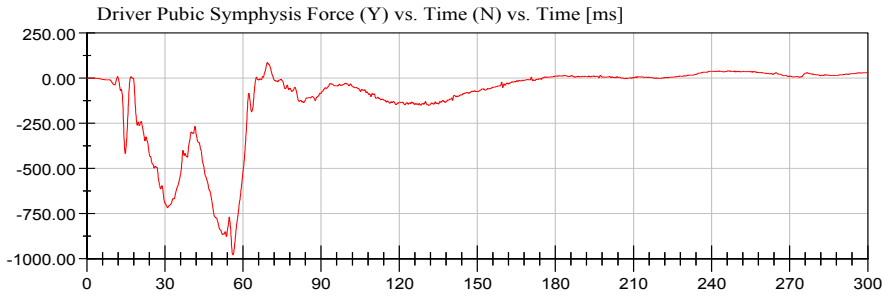
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Test Date: 11/21/2011

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

Position #4 SID IIs Dummy (033)



# NHTSA

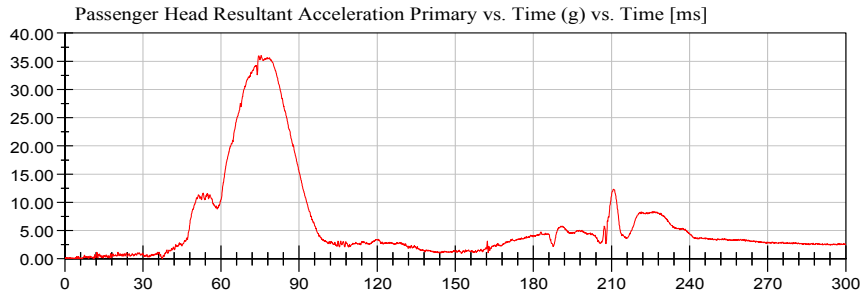
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Test Number: 111121 (MC0323)

Test Date: 11/21/2011

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

Position #4 SID IIs Dummy (033)

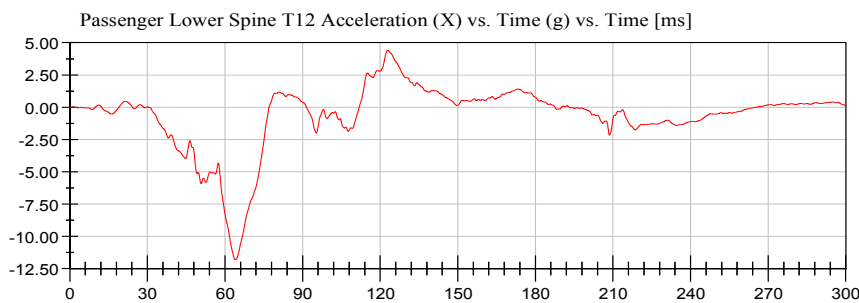


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<Min>

0.03 g at 5.84 ms

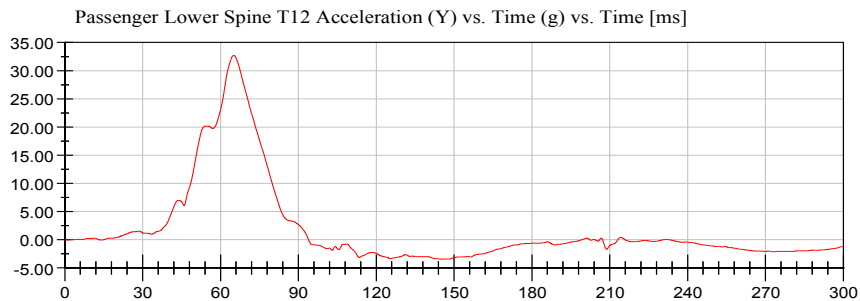


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4.41 g at 122.88 ms

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-11.83 g at 64.00 ms

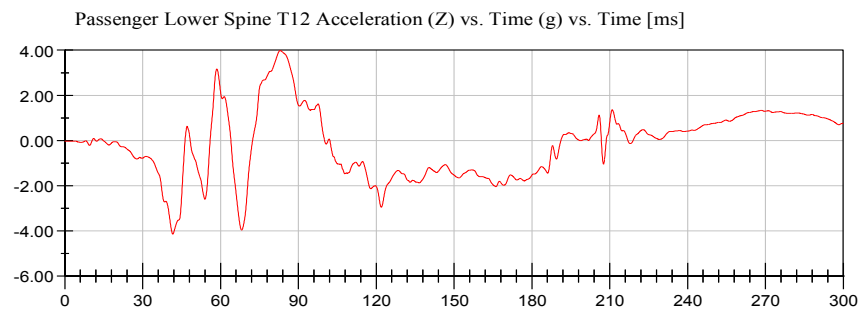


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32.70 g at 65.12 ms

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-3.44 g at 145.20 ms



<Max>

3.98 g at 82.96 ms

<Min>

-4.13 g at 41.60 ms



# NHTSA

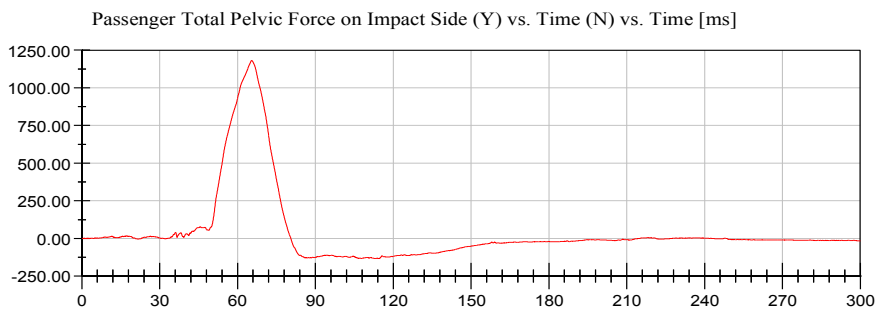
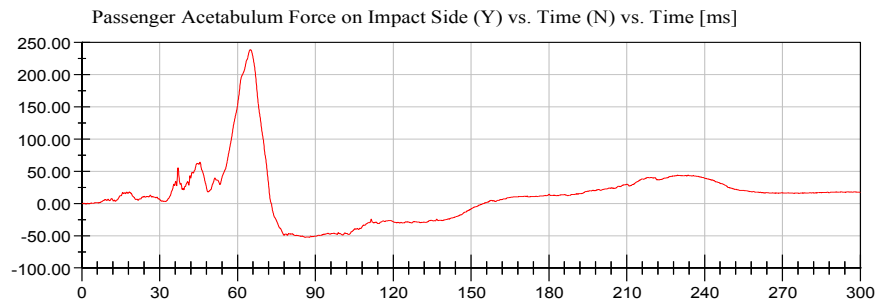
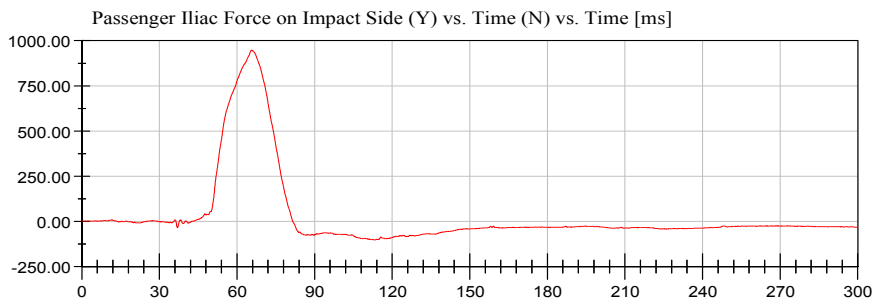
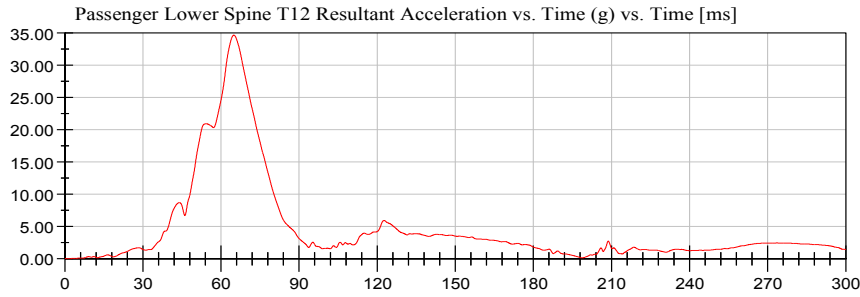
Test Lab: CTF

Test Number: 111121 (MC0323)

Test Date: 11/21/2011

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

Position #4 SID IIs Dummy (033)



**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 Dummy F030**

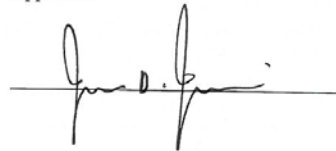
**Transportation Research Center Inc.**  
**572U ES-2re Dummy**  
**External Dimensions**  
**Serial No. F030 Calibration No. 01**  
**Date: 09/21/11**

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	100	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	474	Yes
8	Thorax Width	322.0 - 332.0	323	Yes
9	Abdomen Width	273.0 - 287.0	281	Yes
10	Pelvis Lap Width	359.0 - 373.0	370	Yes
11	Head Depth	196.0 - 206.0	199	Yes
12	Thorax Depth	262.0 - 272.0	270	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	602	Yes

Technician



Approved



Baseline 10/07/05



# Transportation Research Center Inc.

Left Lateral Head Drop

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

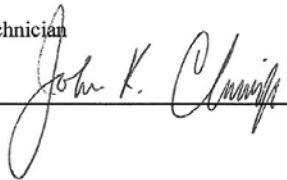
Test Date: 11/17/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Peak Resultant Acceleration	125 - 155 g	148.3 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.3 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

**Test meets specifications.**

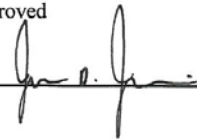
**Comments:**

Technician



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Approved



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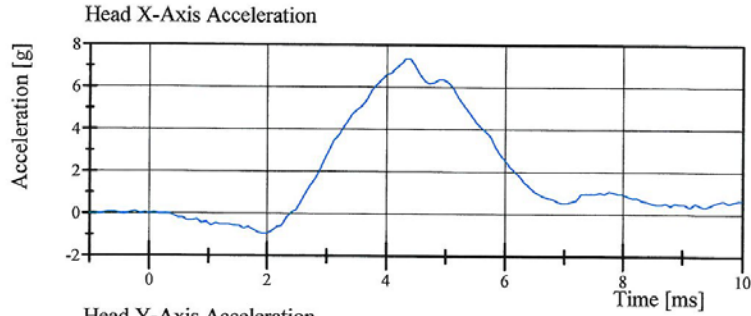
Specification Source: NHTSA Final Rule 8/15/2008

11.17.2011 13:22:22 356

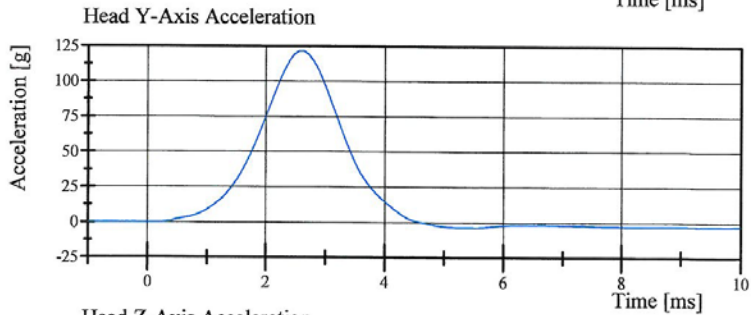


# Transportation Research Center Inc.

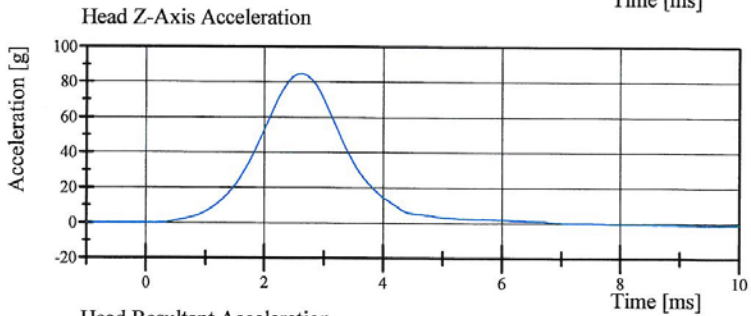
Left Lateral Head Drop  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/17/2011



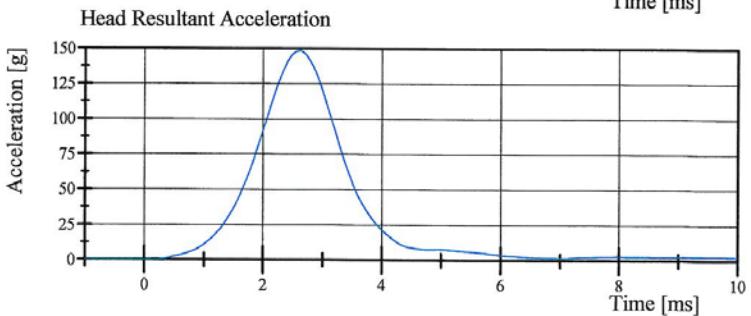
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Max: 7.3 gn at 4.3 ms  
Min: -0.9 gn at 1.9 ms



Filter Class: CFC\_1000  
Max: 121.7 gn at 2.6 ms  
Min: -3.5 gn at 5.4 ms



Filter Class: CFC\_1000  
Max: 84.8 gn at 2.6 ms  
Min: -0.9 gn at 9.4 ms



Filter Class: CFC\_1000  
Max: 148.3 gn at 2.6 ms  
Min: 0.0 gn at -0.4 ms

# Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 1-8

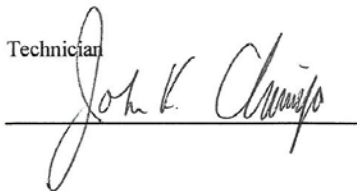
Test Date: 11/19/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	29 %	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	-49.5 deg	Yes
Time of Peak	54 - 66 ms	56.1 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	59.3 ms	Yes

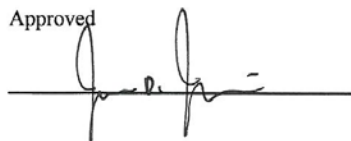
**Test meets specifications.**

**Comments:**

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

11.19.2011 14:29:29 1309

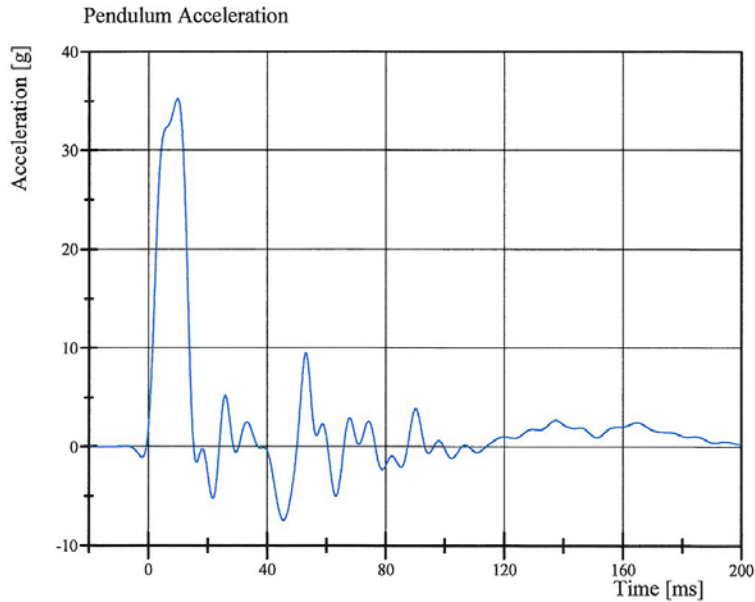


# Transportation Research Center Inc.

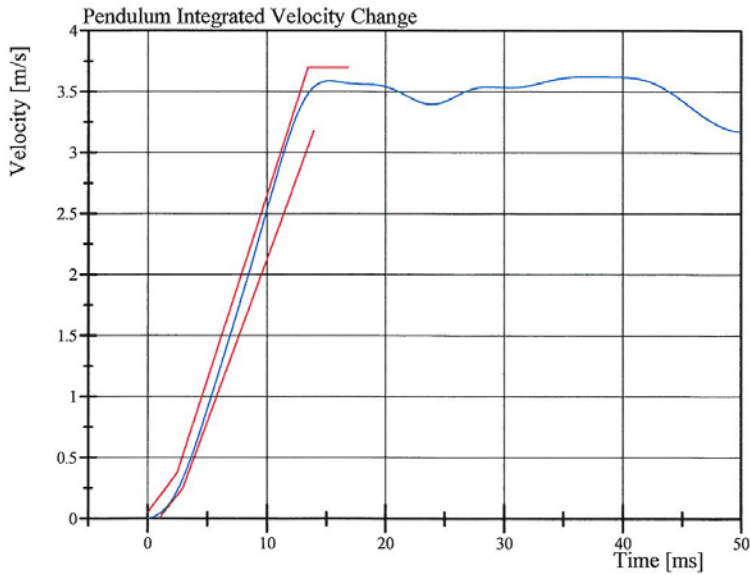
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 1-8

Test Date: 11/19/2011



Filter Class: CFC\_60  
Max: 35.2 gn at 9.8 ms  
Min: -7.4 gn at 45.5 ms



Filter Class: CFC\_60  
Max: 3.6 m/s at 36.9 ms  
Min: 0.0 m/s at 0.0 ms

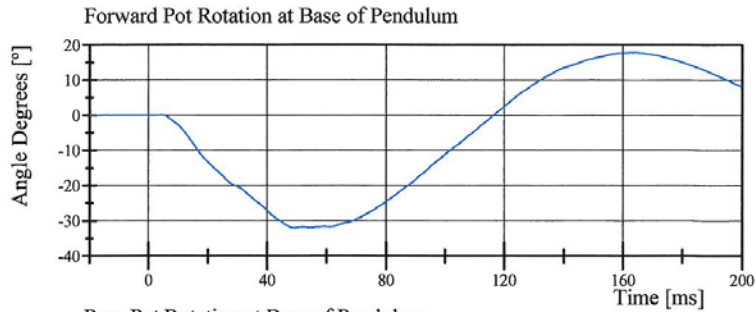


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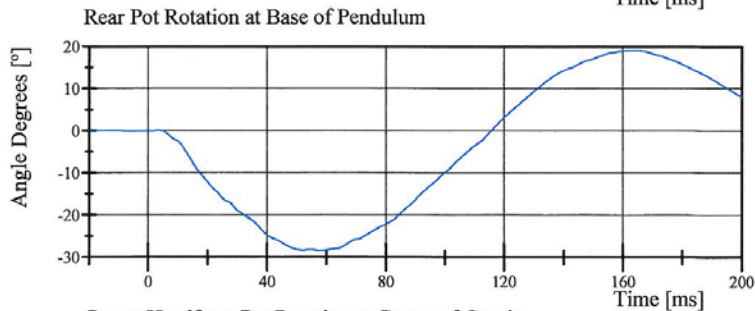
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 1-8

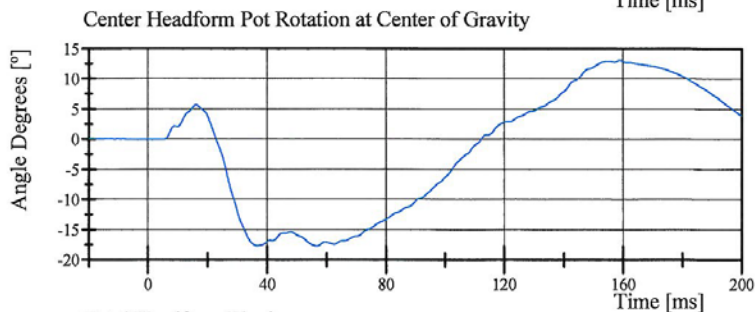
Test Date: 11/19/2011



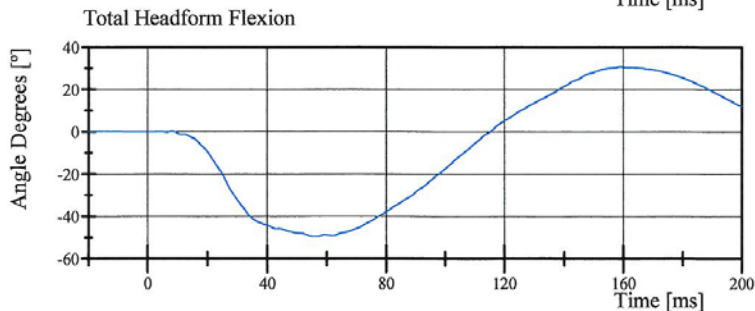
Filter Class: CFC\_180  
Max: 17.8 ° at 164.1 ms  
Min: -32.0 ° at 49.0 ms



Filter Class: CFC\_180  
Max: 19.1 ° at 164.2 ms  
Min: -28.4 ° at 57.7 ms



Filter Class: CFC\_180  
Max: 13.1 ° at 159.0 ms  
Min: -17.7 ° at 56.7 ms



Filter Class: CFC\_180  
Max: 30.8 ° at 159.1 ms  
Min: -49.5 ° at 56.1 ms



# Transportation Research Center Inc.

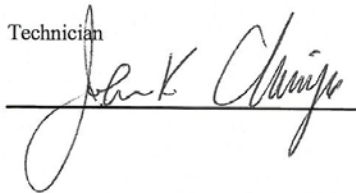
Left Lateral Shoulder  
ES-2re Serial No. F030 Certification No. 1-3  
Test Date: 11/20/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.83 g	Yes

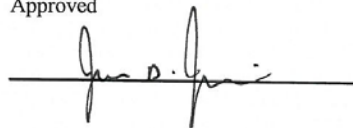
**Test meets specifications.**

**Comments:**

Technician



Approved



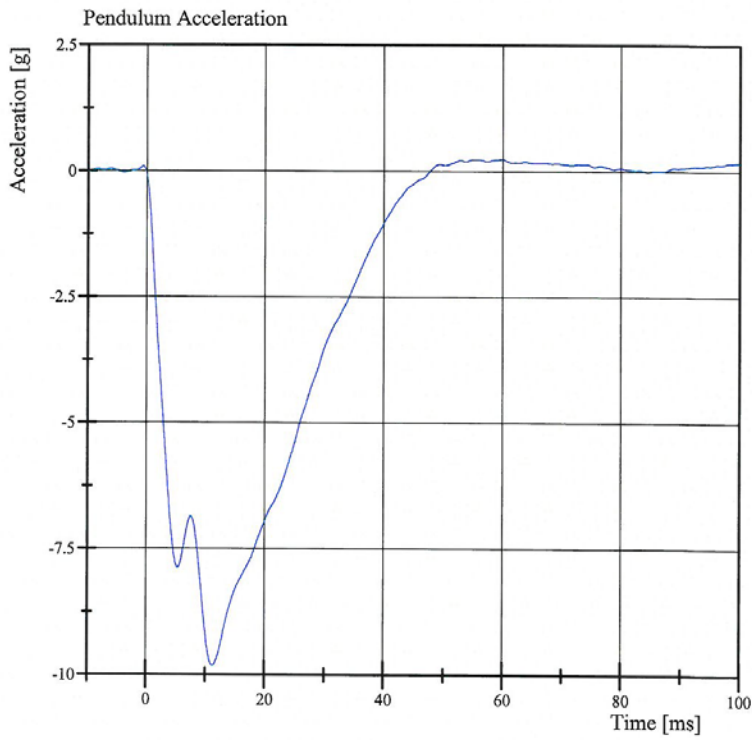
Specification Source: NHTSA final rule 8/15/2008

11.20.2011 15:38:47 546



# Transportation Research Center Inc.

Left Lateral Shoulder  
ES-2re Serial No. F030 Certification No. 1-3  
Test Date: 11/20/2011



Filter Class: CFC\_180  
Max: 0.2 gn at 59.8 ms  
Min: -9.8 gn at 11.2 ms

# Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/17/2011

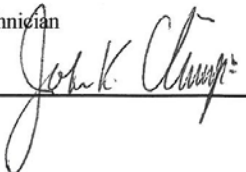
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	19 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.6 mm	Yes

**Test meets specifications.**

**Comments:**

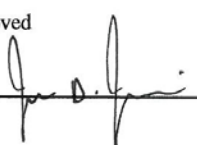
Drop Height: 816

Technician



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Approved



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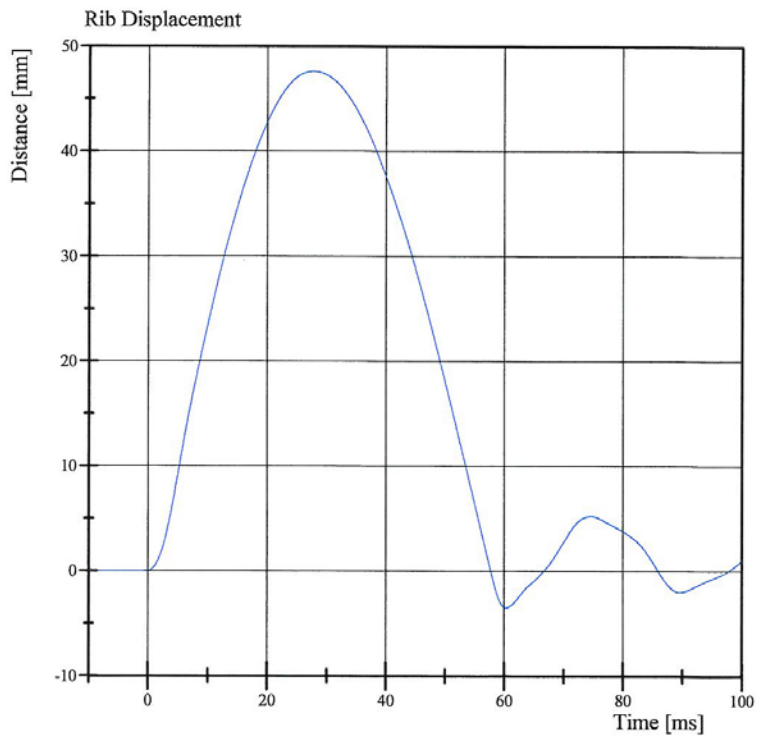
Specification Source: NHTSA Final Rule 8/15/2008

11.17.2011 18:57:08 725



# Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/17/2011



Filter Class: CFC\_180  
Max: 47.6 mm at 27.8 ms  
Min: -3.5 mm at 60.3 ms



# Transportation Research Center Inc.

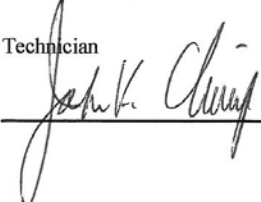
3.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/17/2011

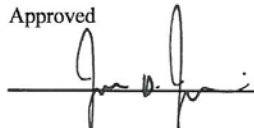
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.3 mm	Yes

**Test meets specifications.**

**Comments:**

Drop Height: 462

Technician  
  
\_\_\_\_\_

Approved  
  
\_\_\_\_\_

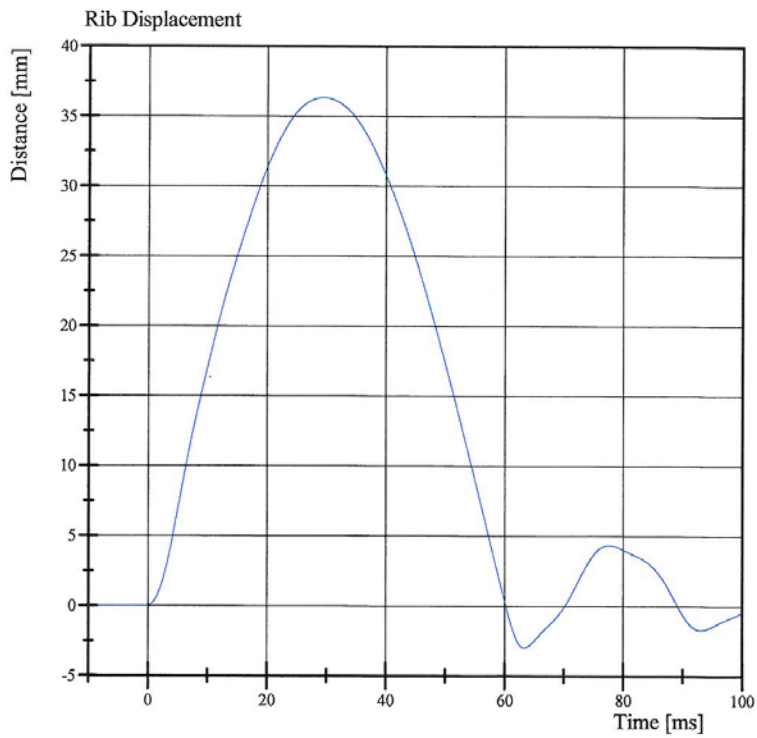
Specification Source: NHTSA Final Rule 8/15/2008

11.17.2011 19:03:58 926



# Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/17/2011



Filter Class: CFC\_180  
Max: 36.3 mm at 29.4 ms  
Min: -3.0 mm at 63.3 ms



# Transportation Research Center Inc.

4.0 m/s Center Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/18/2011


Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.7 mm	Yes

**Test meets specifications.**

**Comments:**

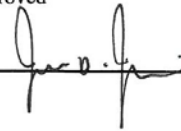
Drop Height: 816

Technician



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Approved



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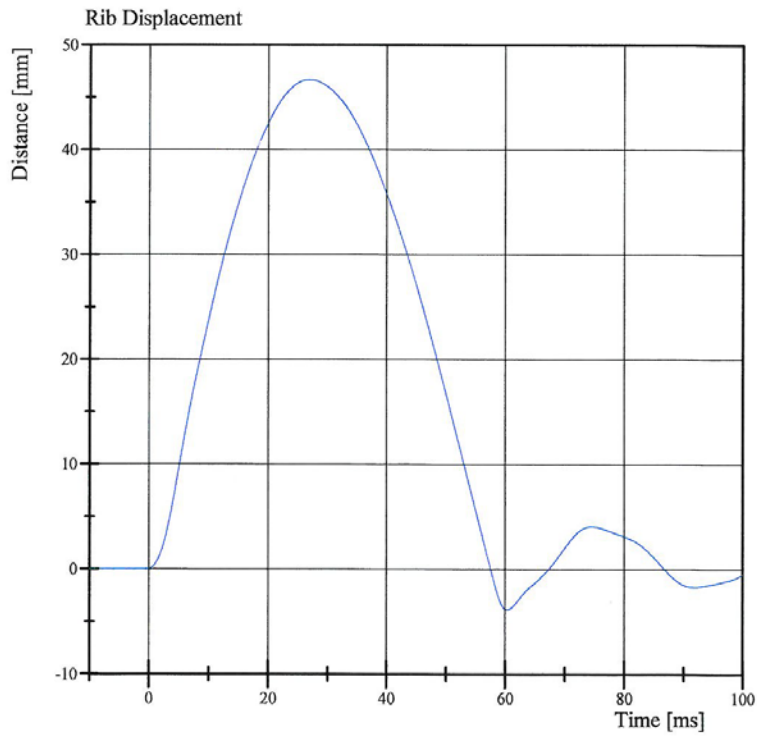
Specification Source: NHTSA Final Rule 8/15/2008

11.18.2011 15:12:39 739



# Transportation Research Center Inc.

4.0 m/s Center Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/18/2011



Filter Class: CFC\_180  
Max: 46.7 mm at 26.9 ms  
Min: -3.9 mm at 60.3 ms



# Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/18/2011

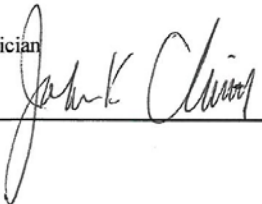
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.3 mm	Yes

**Test meets specifications.**

**Comments:**

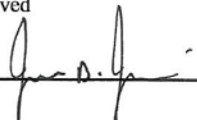
Drop Height: 462

Technician



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Approved



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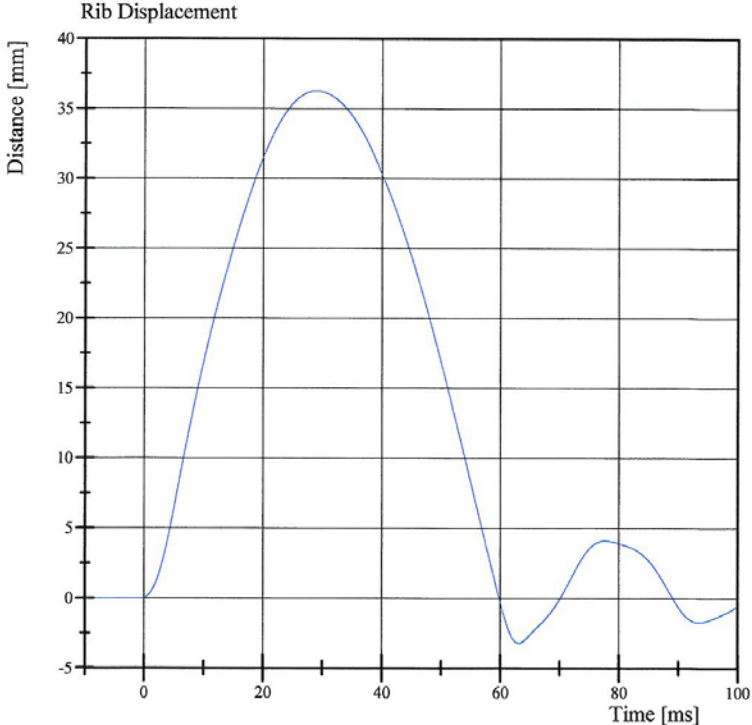
Specification Source: NHTSA Final Rule 8/15/2008

11.18.2011 16:13:06 921



# Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/18/2011



Filter Class: CFC\_180  
Max: 36.3 mm at 29.0 ms  
Min: -3.2 mm at 63.1 ms



## Transportation Research Center Inc.

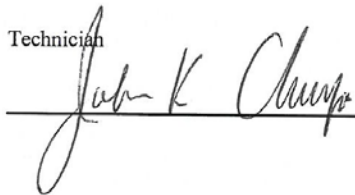
Left Lateral Thorax  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.459 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,523.1 N	Yes
Upper Rib Displacement	34 - 41 mm	37.2 mm	Yes
Center Rib Displacement	37 - 45 mm	40.3 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.8 mm	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



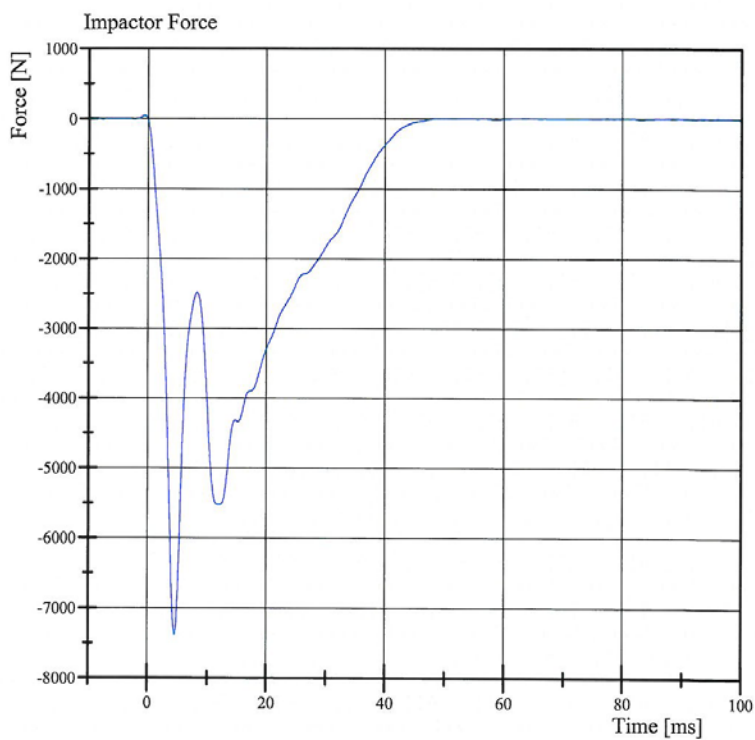
Specification Source: Procedures based on Final Rule dated 8/15/2008.  
Polarity in accordance with SAE J211.

11.20.2011 14:34:13 427



# Transportation Research Center Inc.

Left Lateral Thorax  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011



Filter Class: CFC\_180  
Max: 40.4 N at -0.6 ms  
Min: -7,389.6 N at 4.6 ms

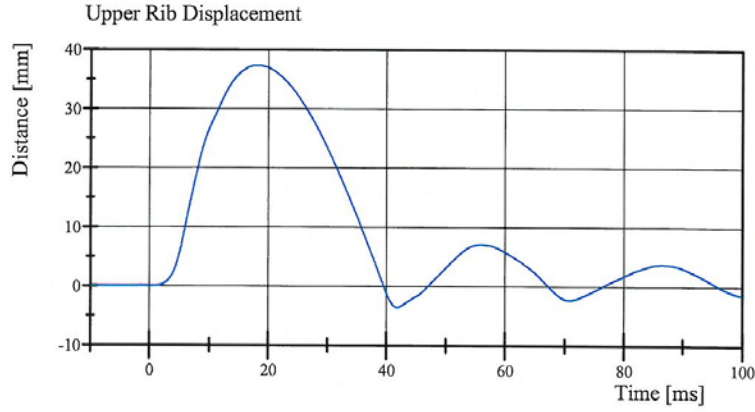
Specification Source: Procedures based on Final Rule dated 8/15/2008.  
Polarity in accordance with SAE J211.

11.20.2011 14:34:48 427

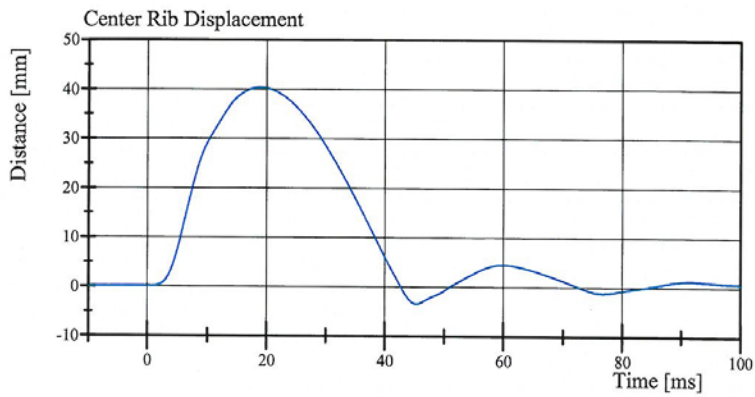


# Transportation Research Center Inc.

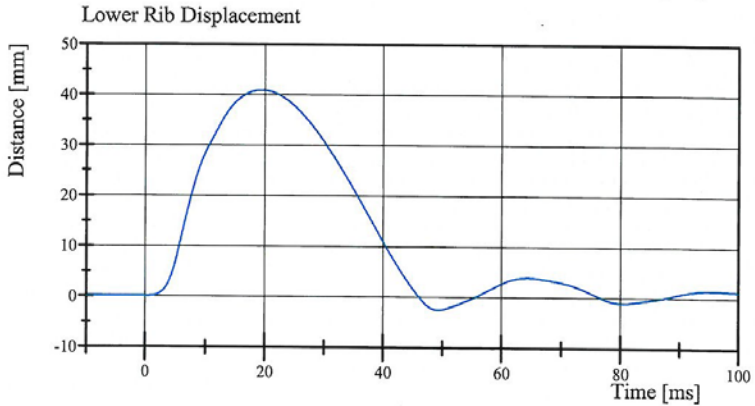
Left Lateral Thorax  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011



Filter Class: CFC\_180  
Max: 37.2 mm at 18.1 ms  
Min: -3.6 mm at 41.8 ms



Filter Class: CFC\_180  
Max: 40.3 mm at 18.9 ms  
Min: -3.5 mm at 45.3 ms



Filter Class: CFC\_180  
Max: 40.8 mm at 19.4 ms  
Min: -2.5 mm at 49.3 ms

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

11.20.2011 14:34:49 427



# Transportation Research Center Inc.

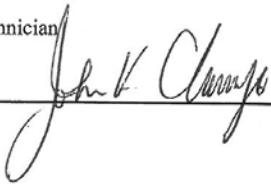
Left Lateral Lumbar  
ES-2re Serial No. F030 Certification No. 1-9  
Test Date: 11/20/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.022 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.5 deg	Yes
Time of Peak	39 - 53 ms	48.5 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	48.6 ms	Yes

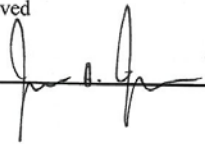
**Test meets specifications.**

**Comments:**

Technician



Approved



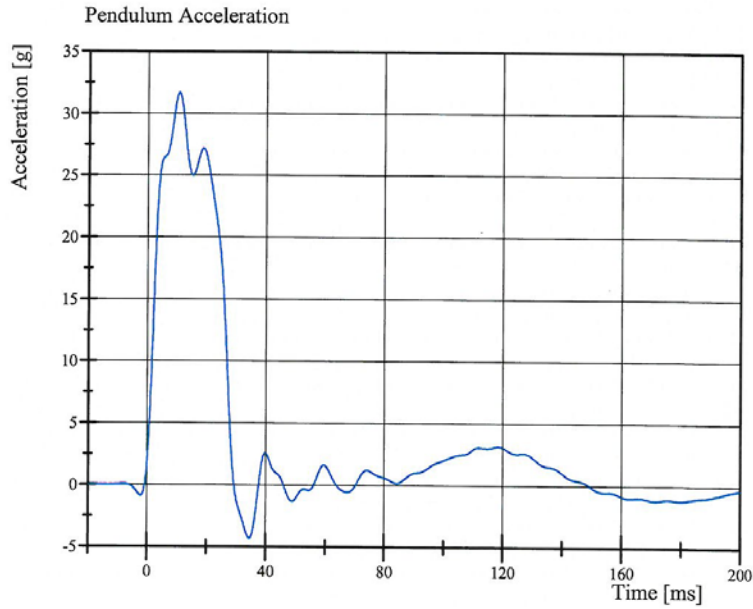
Specification Source: NHTSA Final Rule 8/15/2008

11.20.2011 11:45:04 580

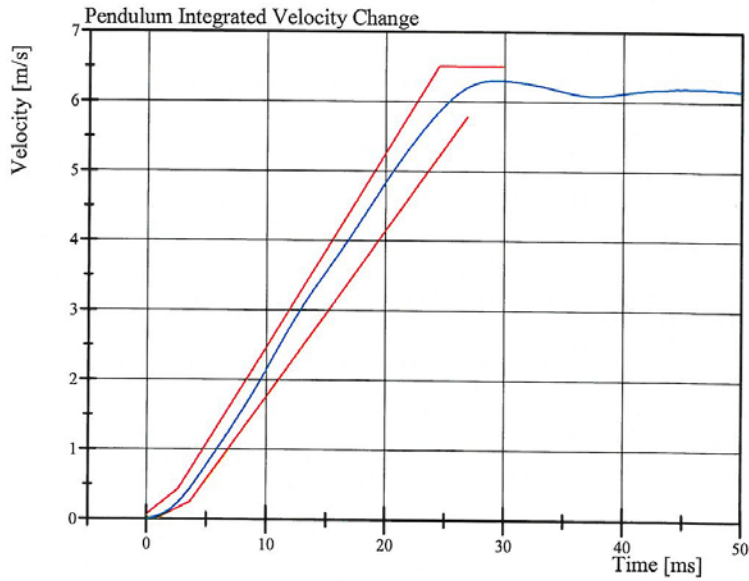


# Transportation Research Center Inc.

Left Lateral Lumbar  
ES-2re Serial No. F030 Certification No. 1-9  
Test Date: 11/20/2011



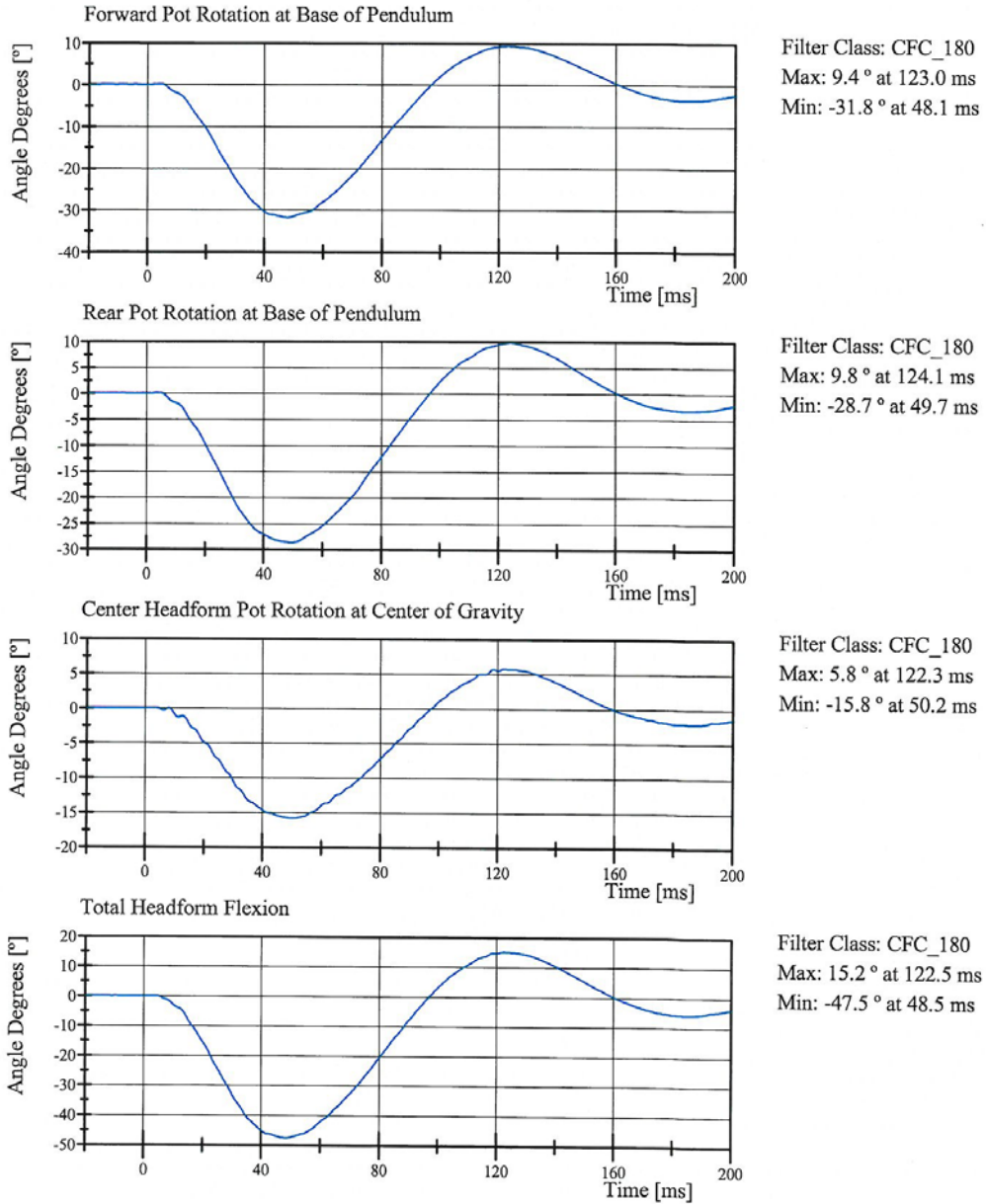
Filter Class: CFC\_60  
Max: 31.6 gn at 10.5 ms  
Min: -4.3 gn at 34.5 ms



Filter Class: CFC\_60  
Max: 6.3 m/s at 29.3 ms  
Min: 0.0 m/s at 0.0 ms

# Transportation Research Center Inc.

Left Lateral Lumbar  
ES-2re Serial No. F030 Certification No. 1-9  
Test Date: 11/20/2011



Specification Source: NHTSA Final Rule 8/15/2008

11.20.2011 11:45:44 580



# Transportation Research Center Inc.

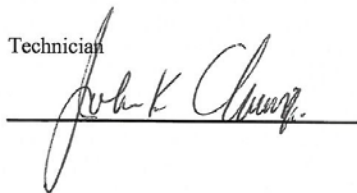
Left Lateral Abdomen  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.93 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,093.7 N	Yes
Time of Peak	10.6 - 13.0 ms	10.96 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,633.2 N	Yes
Time of Peak	10.0 - 12.3 ms	10.56 ms	Yes

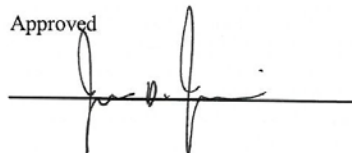
**Test meets specifications.**

**Comments:**

Technician



Approved



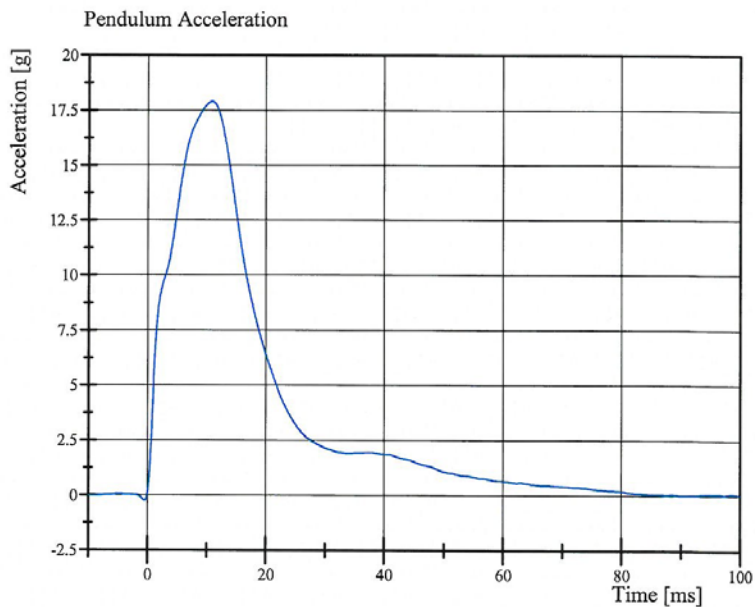
Specification Source: NHTSA Final Rule 8/15/2008

11.20.2011 15:09:54 577

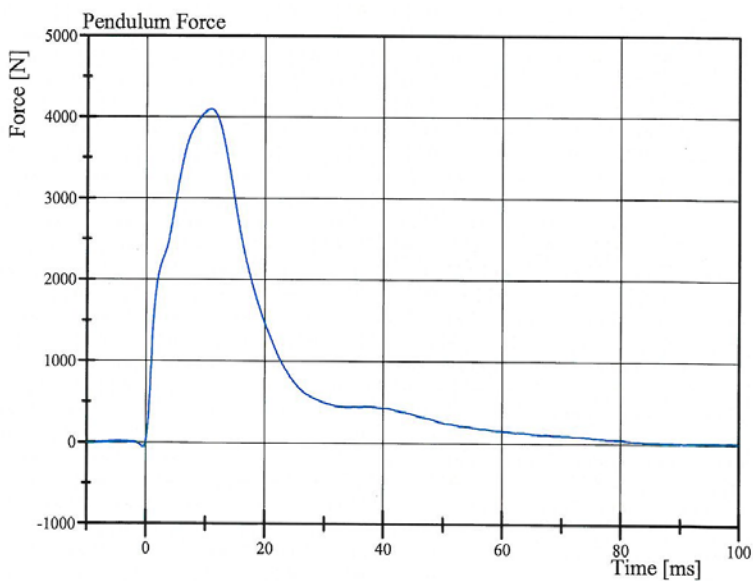


# Transportation Research Center Inc.

Left Lateral Abdomen  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011



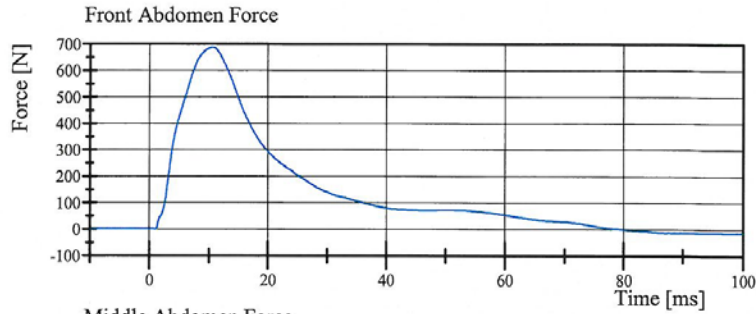
Filter Class: CFC\_180  
Max: 17.9 gn at 11.0 ms  
Min: -0.3 gn at -0.6 ms



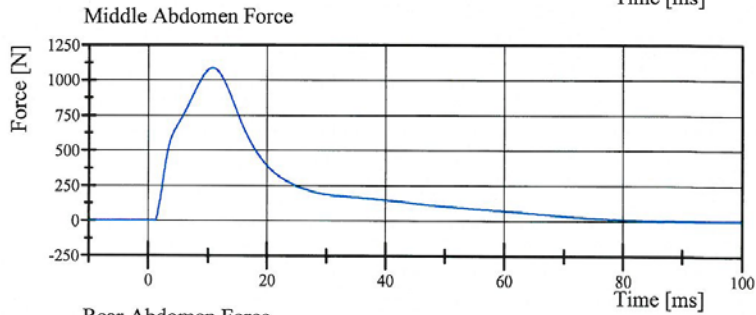
Filter Class: CFC\_180  
Max: 4,093.7 N at 11.0 ms  
Min: -61.0 N at -0.6 ms

# Transportation Research Center Inc.

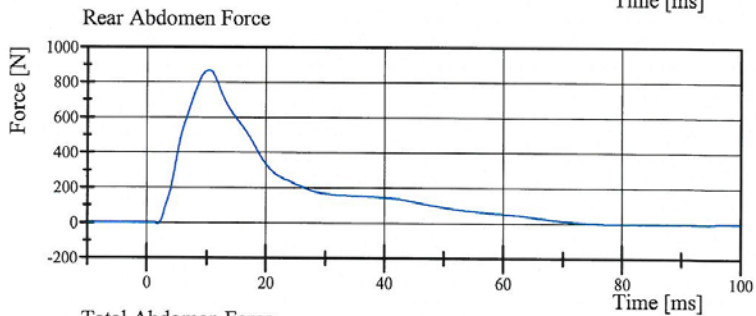
Left Lateral Abdomen  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011



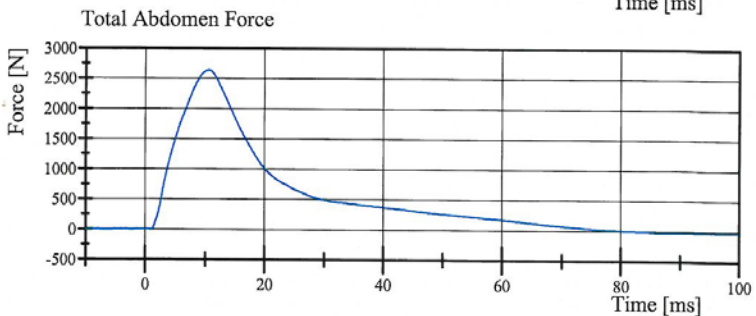
Filter Class: CFC\_600  
Max: 686.8 N at 10.6 ms  
Min: -16.1 N at 97.3 ms



Filter Class: CFC\_600  
Max: 1,084.1 N at 10.8 ms  
Min: -2.6 N at 1.1 ms



Filter Class: CFC\_600  
Max: 863.5 N at 10.4 ms  
Min: -8.1 N at 1.8 ms



Filter Class: CFC\_600  
Max: 2,633.2 N at 10.6 ms  
Min: -18.9 N at 93.1 ms



# Transportation Research Center Inc.

Left Lateral Pelvis  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.22 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,178.6 N	Yes
Time of Peak	11.8 - 16.1 ms	13.04 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,423.6 N	Yes
Time of Peak	12.2 - 17.0 ms	13.68 ms	Yes

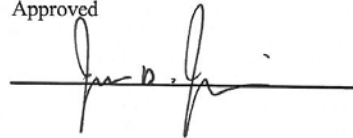
**Test meets specifications.**

**Comments:**

Technician



Approved



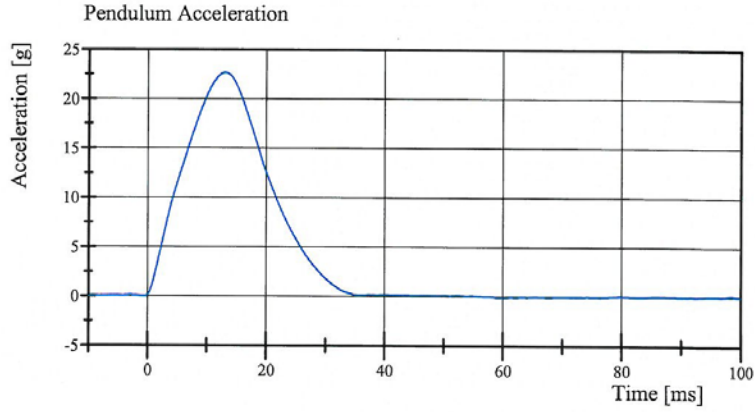
Specification Source: NHTSA Final Rule 8/15/2008

11.20.2011 15:26:36 611

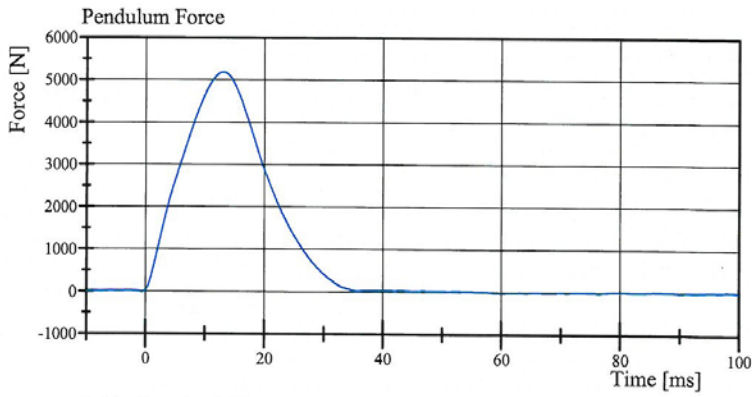


# Transportation Research Center Inc.

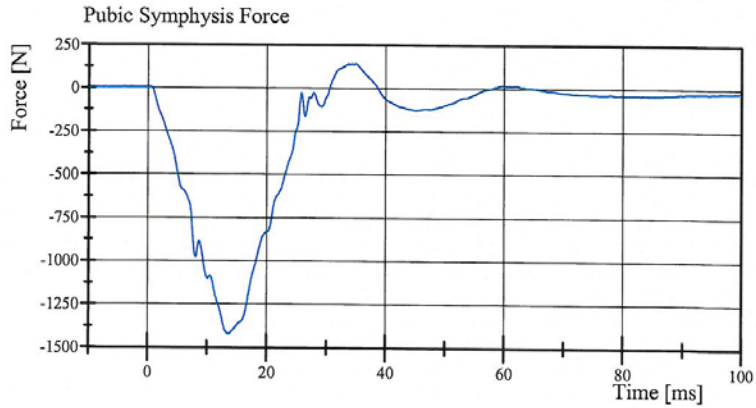
Left Lateral Pelvis  
ES-2re Serial No. F030 Certification No. 1-1  
Test Date: 11/20/2011



Filter Class: CFC\_180  
Max: 22.6 gn at 13.0 ms  
Min: -0.1 gn at 60.2 ms



Filter Class: CFC\_180  
Max: 5,178.6 N at 13.0 ms  
Min: -24.4 N at 60.2 ms



Filter Class: CFC\_600  
Max: 138.4 N at 35.0 ms  
Min: -1,423.6 N at 13.7 ms

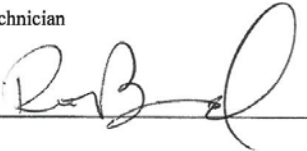


**Post-Test Calibration Sheets  
Driver Dummy F030**

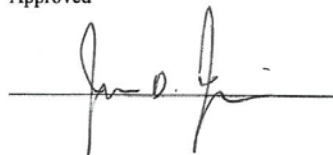
**Transportation Research Center Inc.**  
**572U ES-2re Dummy**  
**External Dimensions**  
**Serial No. F030 Calibration No. 02**  
**Date: 12/01/11**

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	100	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	474	Yes
8	Thorax Width	322.0 - 332.0	323	Yes
9	Abdomen Width	273.0 - 287.0	281	Yes
10	Pelvis Lap Width	359.0 - 373.0	370	Yes
11	Head Depth	196.0 - 206.0	199	Yes
12	Thorax Depth	262.0 - 272.0	270	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	602	Yes

Technician



Approved



Baseline 10/07/05



## Transportation Research Center Inc.

Left Lateral Head Drop

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

Test Date: 11/28/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Resultant Acceleration	125 - 155 g	139.3 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	-6.4 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

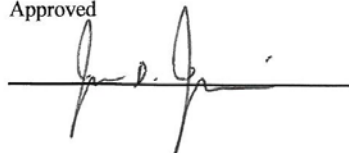
**Test meets specifications.**

**Comments:**

Technician



Approved



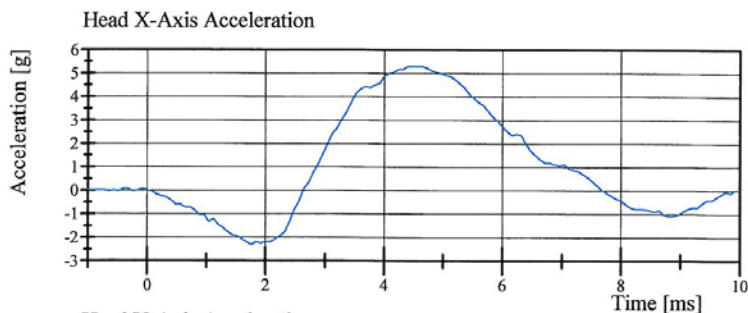
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 14:30:45 359

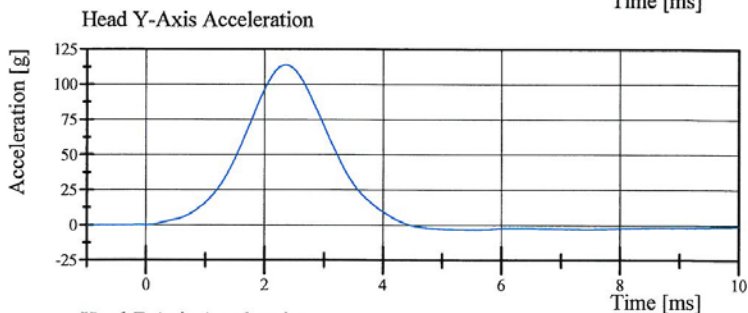


# Transportation Research Center Inc.

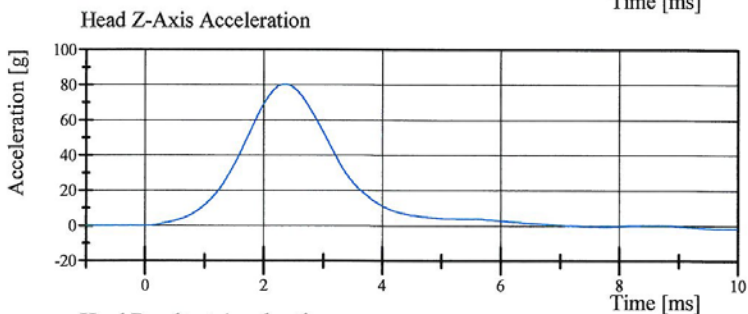
Left Lateral Head Drop  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



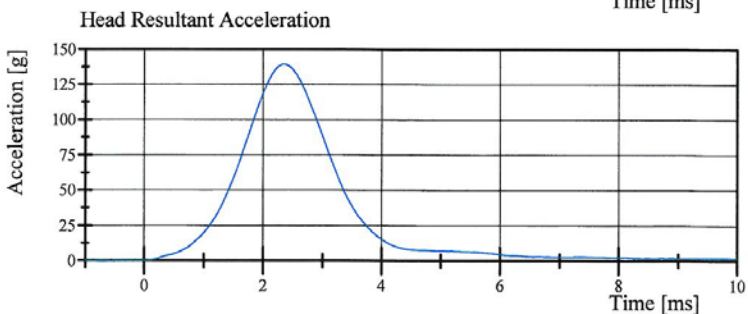
Filter Class: CFC\_1000  
Max: 5.3 gn at 4.4 ms  
Min: -2.3 gn at 1.8 ms



Filter Class: CFC\_1000  
Max: 113.8 gn at 2.3 ms  
Min: -3.2 gn at 5.4 ms



Filter Class: CFC\_1000  
Max: 80.3 gn at 2.3 ms  
Min: -1.6 gn at 9.7 ms



Filter Class: CFC\_1000  
Max: 139.3 gn at 2.3 ms  
Min: 0.0 gn at -1.0 ms



# Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 2-5

Test Date: 12/1/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-50.3 deg	Yes
Time of Peak	54 - 66 ms	57.0 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	58.9 ms	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 10:15:01 1311

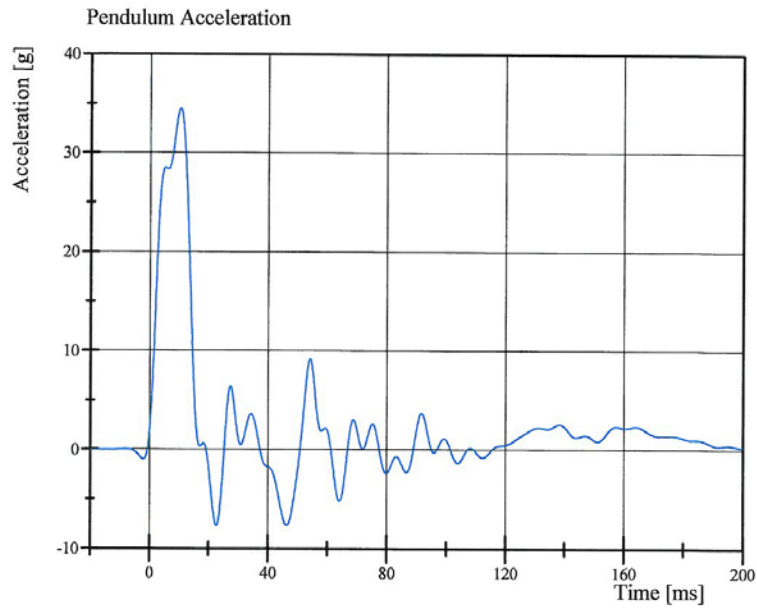


# Transportation Research Center Inc.

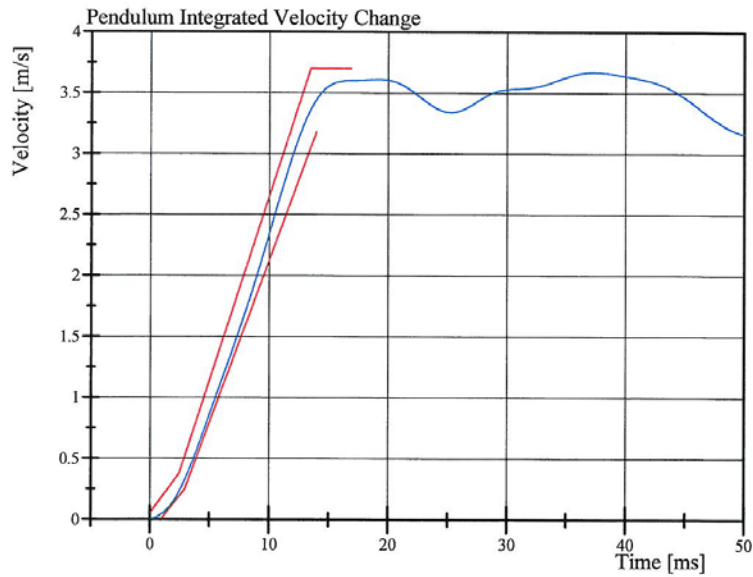
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 2-5

Test Date: 12/1/2011



Filter Class: CFC\_60  
Max: 34.5 gn at 10.3 ms  
Min: -7.7 gn at 22.7 ms



Filter Class: CFC\_60  
Max: 3.7 m/s at 37.4 ms  
Min: 0.0 m/s at 0.0 ms

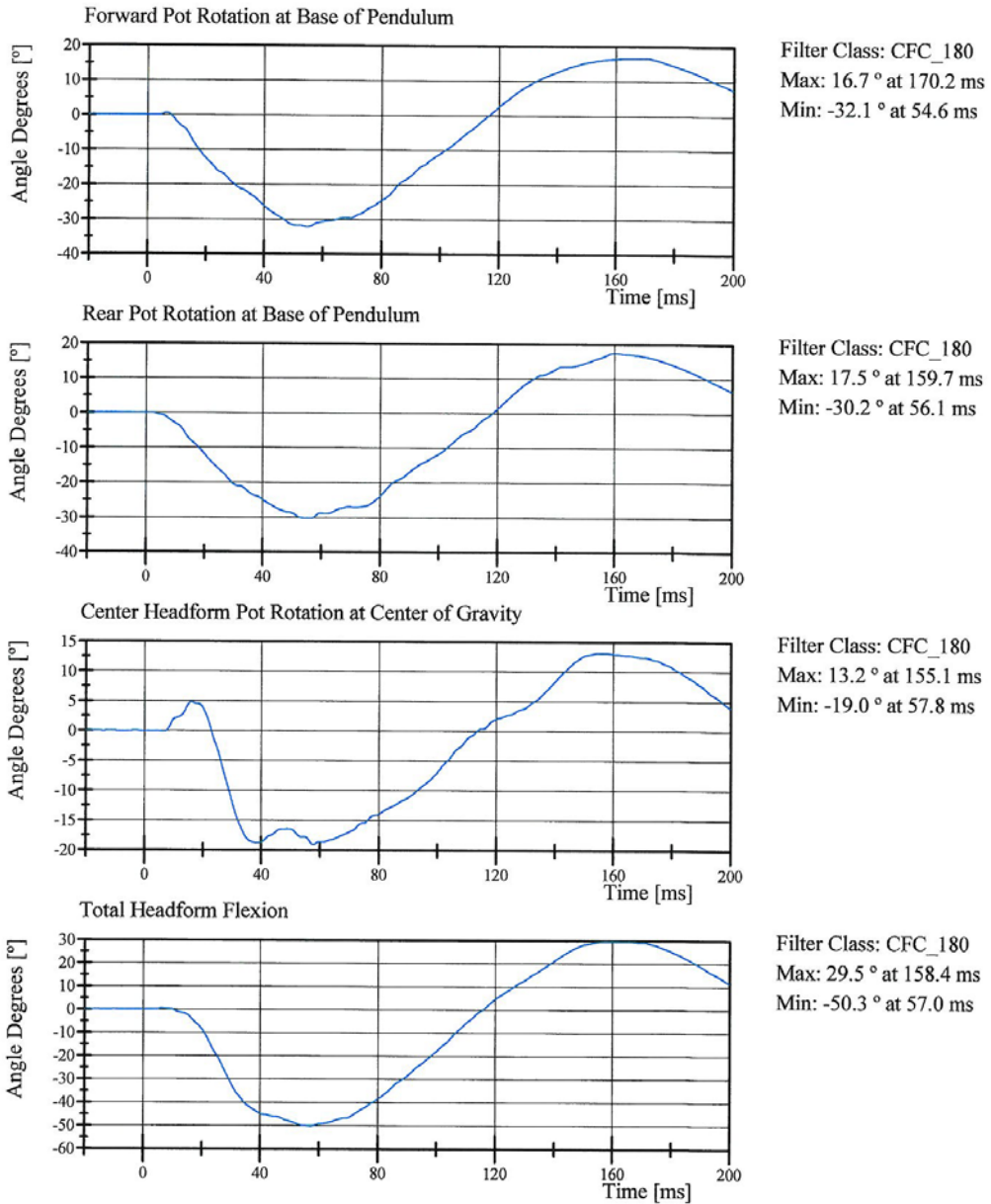
Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 10:15:09 1311



# Transportation Research Center Inc.

Left Lateral Neck  
ES-2re Serial No. F030 Certification No. 2-5  
Test Date: 12/1/2011



Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 10:15:09 1311



# Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011

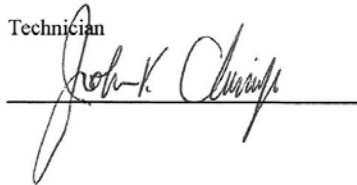
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.6 mm	Yes

**Test meets specifications.**

**Comments:**

Drop Height: 816

Technician



Approved



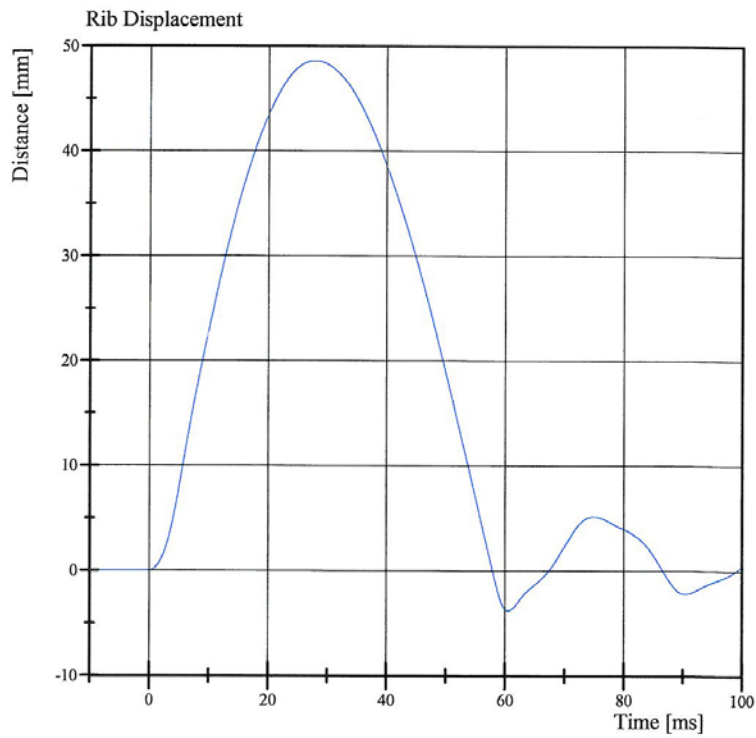
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 15:20:28 747



# Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 48.6 mm at 27.8 ms  
Min: -3.8 mm at 60.5 ms

# Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011

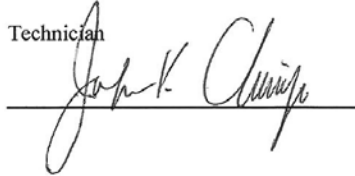
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

**Test meets specifications.**

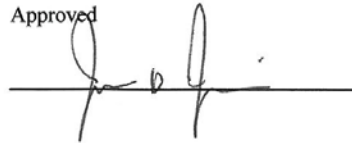
**Comments:**

Drop Height: 462

Technician



Approved



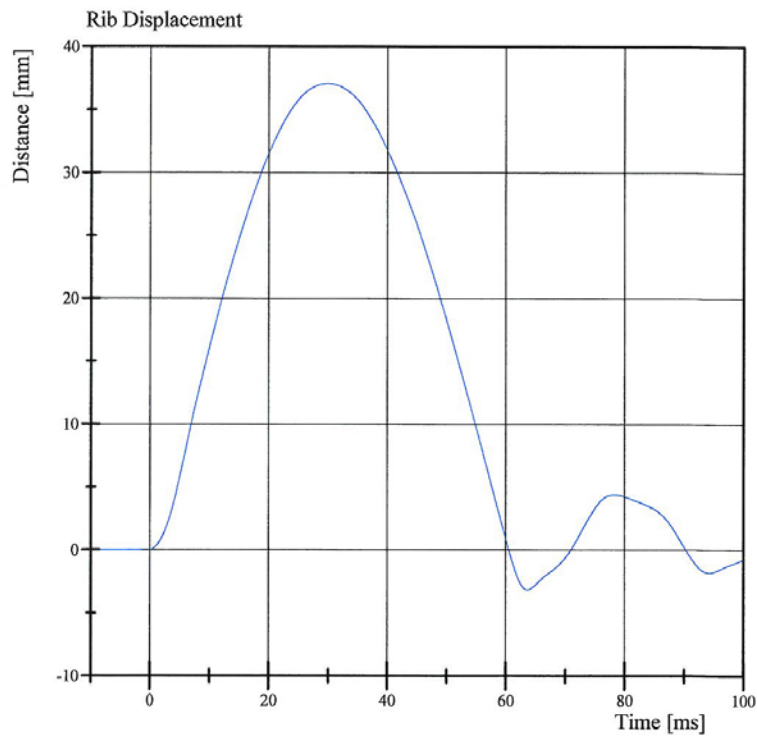
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 15:27:54 956



# Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 37.1 mm at 29.8 ms  
Min: -3.1 mm at 63.6 ms



# Transportation Research Center Inc.

4.0 m/s Center Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011

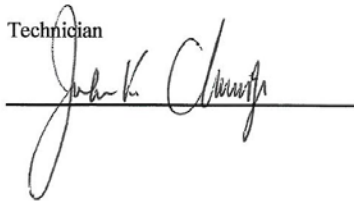
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.4 mm	Yes

**Test meets specifications.**

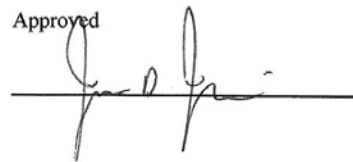
**Comments:**

Drop Height: 816

Technician



Approved



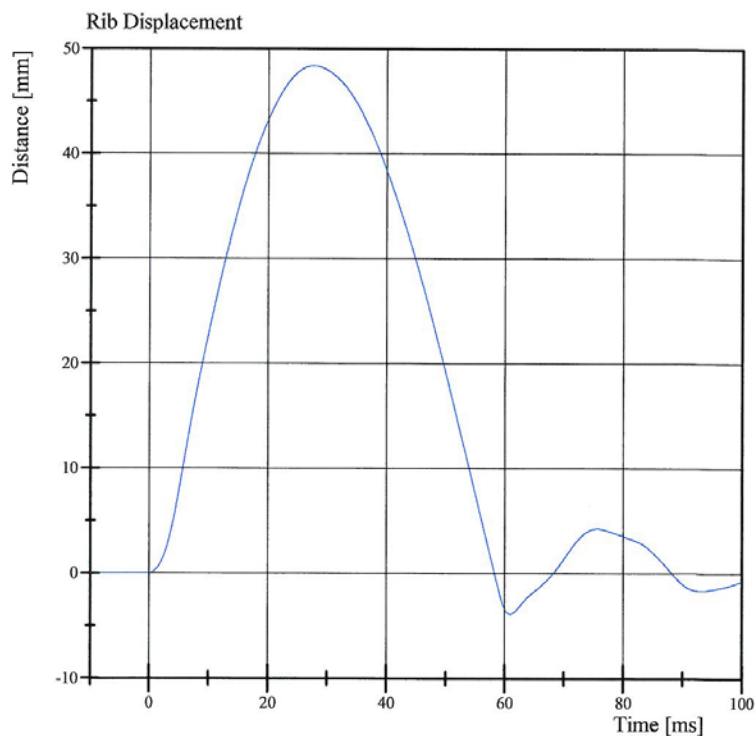
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 15:39:39 741



# Transportation Research Center Inc.

4.0 m/s Center Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 48.4 mm at 27.6 ms  
Min: -3.9 mm at 60.9 ms



# Transportation Research Center Inc.

3.0 m/s Center Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011

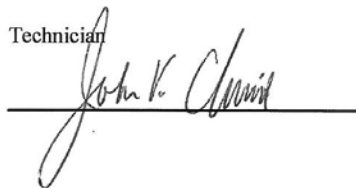
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.0 mm	Yes

**Test meets specifications.**

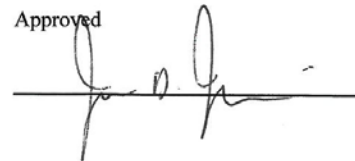
**Comments:**

Drop Height: 462

Technician



Approved



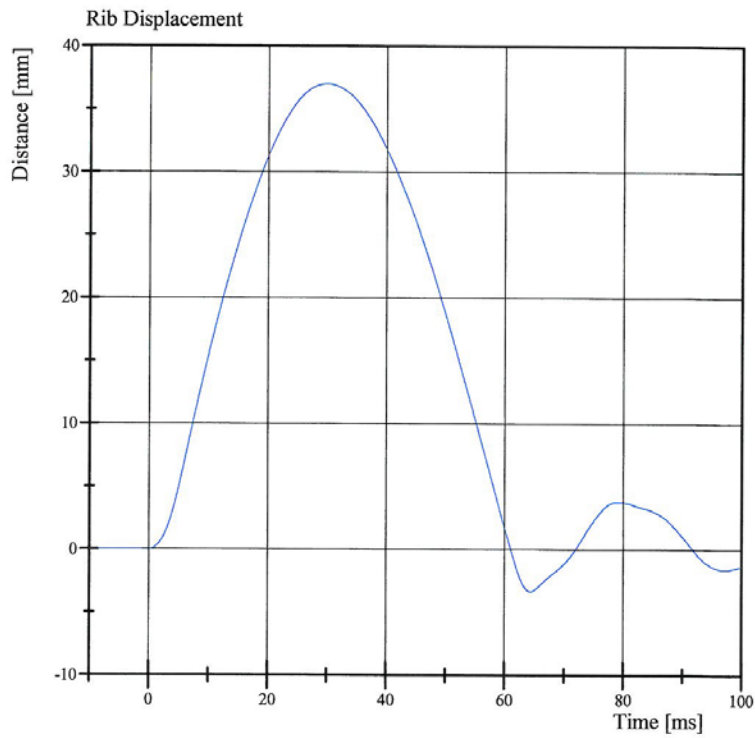
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 15:49:31 938



# Transportation Research Center Inc.

3.0 m/s Center Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 37.0 mm at 29.8 ms  
Min: -3.3 mm at 64.3 ms

# Transportation Research Center Inc.

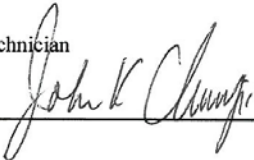
4.0 m/s Lower Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011

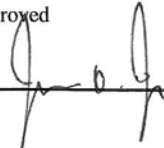
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.9 mm	Yes

**Test meets specifications.**

**Comments:**

Drop Height: 816

Technician  
  
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Approved  
  
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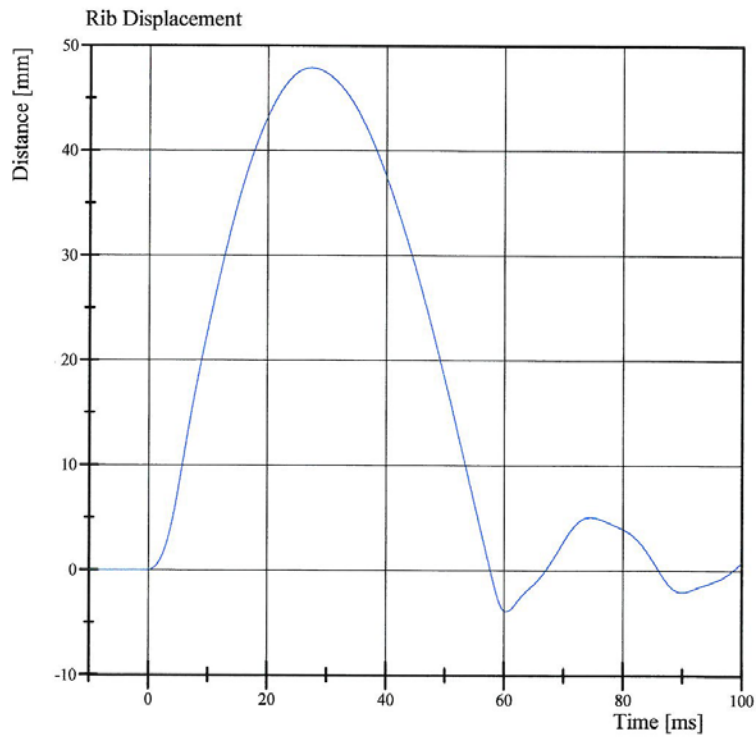
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 16:19:54 750



# Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 47.9 mm at 27.4 ms  
Min: -3.9 mm at 60.3 ms

# Transportation Research Center Inc.

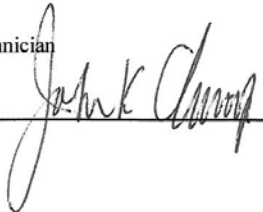
3.0 m/s Lower Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011

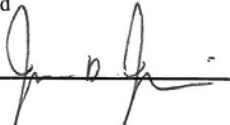
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

**Test meets specifications.**

**Comments:**

Drop Height: 462

Technician  
  
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Approved  
  
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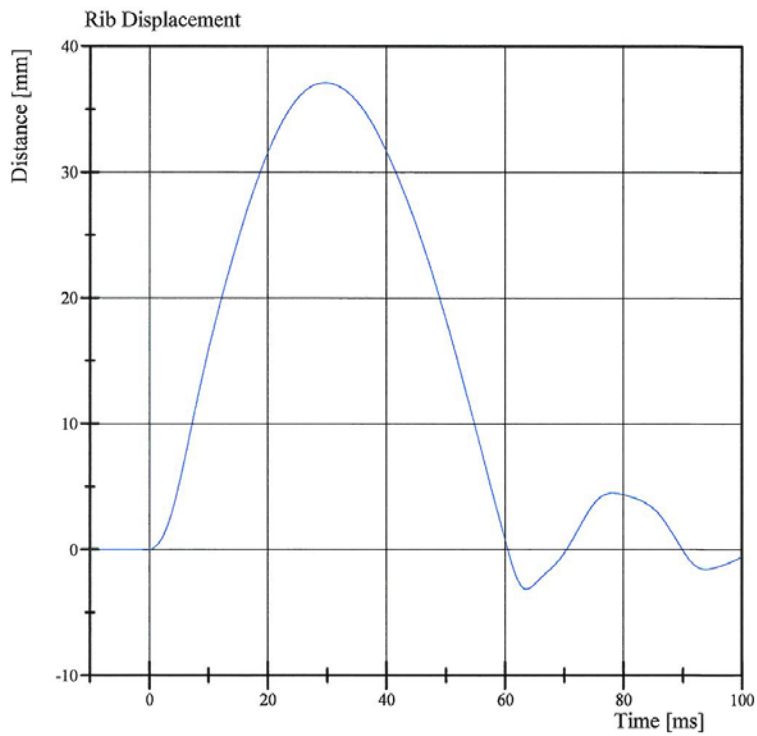
Specification Source: NHTSA Final Rule 8/15/2008

11.28.2011 16:27:13 937



# Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 37.1 mm at 29.7 ms  
Min: -3.2 mm at 63.6 ms

# Transportation Research Center Inc.

Left Lateral Shoulder

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

Test Date: 12/1/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.58 g	Yes

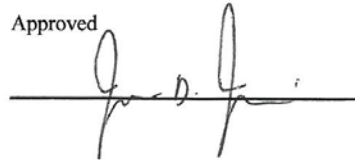
**Test meets specifications.**

**Comments:**

Technician



Approved



Specification Source: NHTSA final rule 8/15/2008

12.01.2011 16:39:25 585

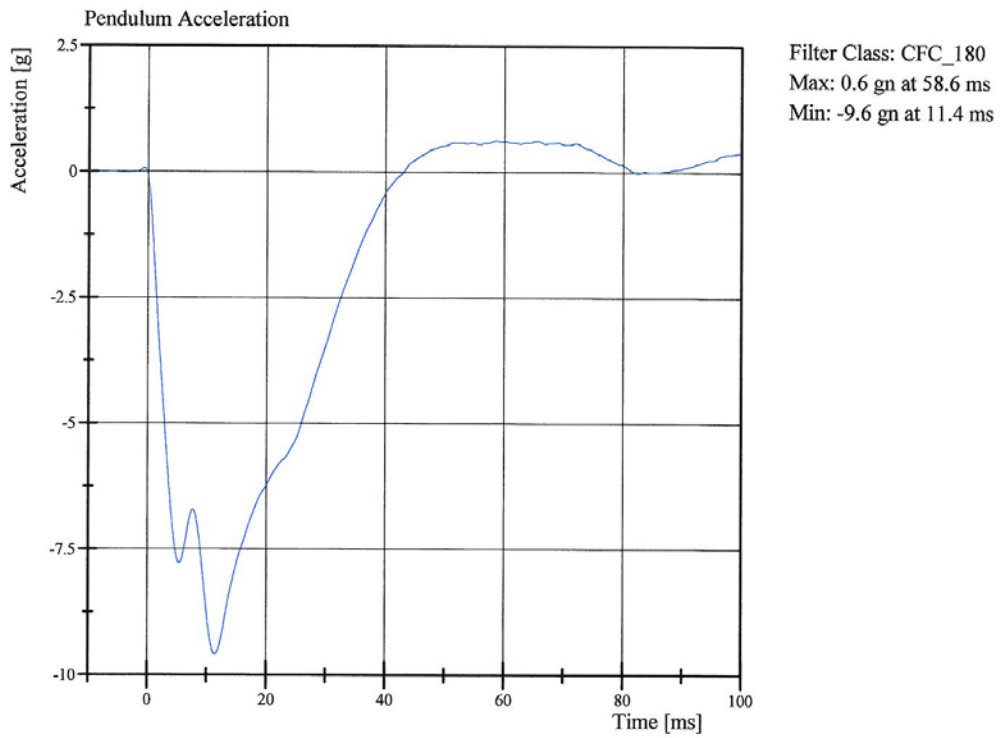


# Transportation Research Center Inc.

Left Lateral Shoulder

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

Test Date: 12/1/2011



Specification Source: NHTSA final rule 8/15/2008

12.01.2011 16:39:32 585



# Transportation Research Center Inc.

Left Lateral Thorax

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

Test Date: 12/1/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.460 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,452.0 N	Yes
Upper Rib Displacement	34 - 41 mm	35.8 mm	Yes
Center Rib Displacement	37 - 45 mm	39.2 mm	Yes
Lower Rib Displacement	37 - 44 mm	39.9 mm	Yes

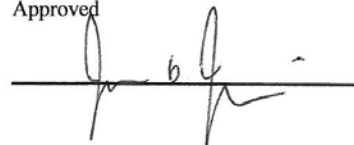
**Test meets specifications.**

**Comments:**

Technician



Approved



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

12.01.2011 16:52:27 449

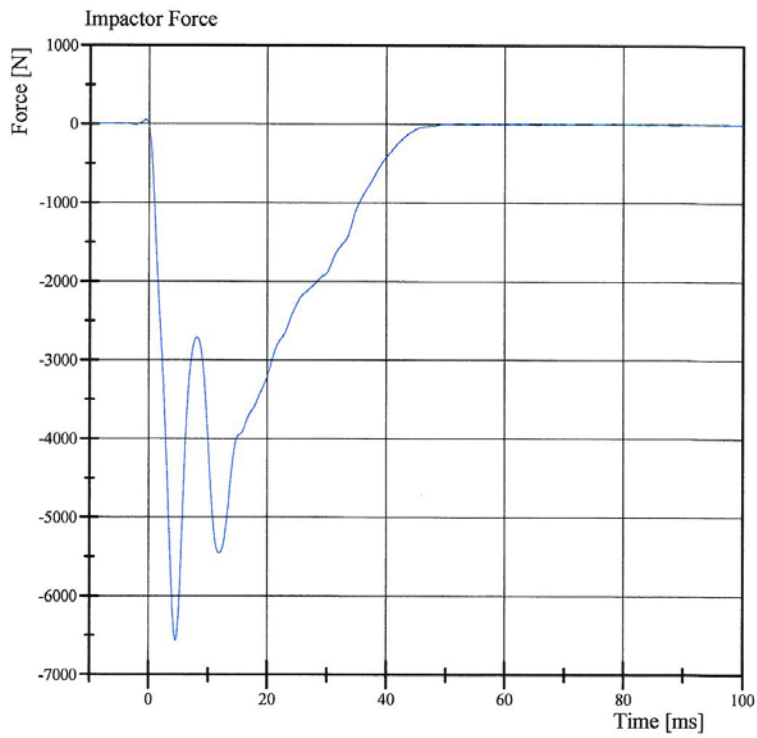


# Transportation Research Center Inc.

Left Lateral Thorax

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

Test Date: 12/1/2011



Filter Class: CFC\_180  
Max: 56.1 N at -0.6 ms  
Min: -6,573.0 N at 4.6 ms

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

12.01.2011 16:52:35 449

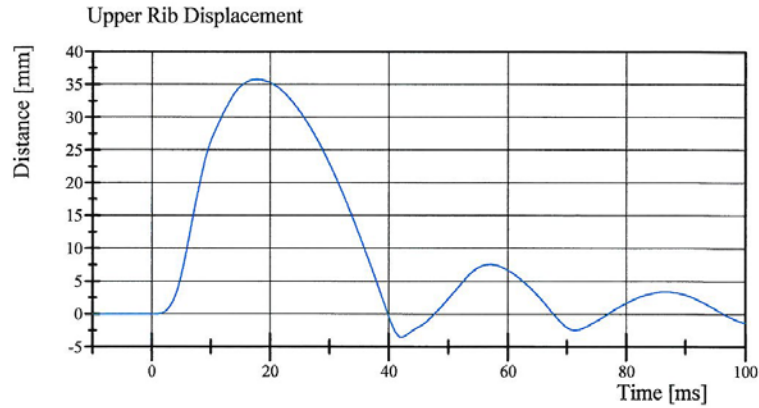


# Transportation Research Center Inc.

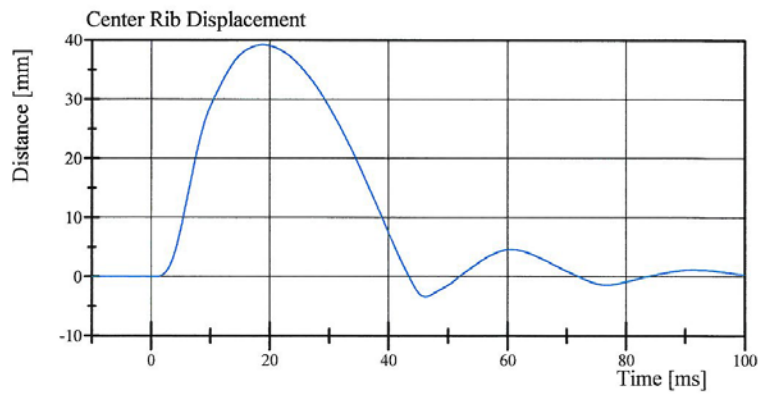
Left Lateral Thorax

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

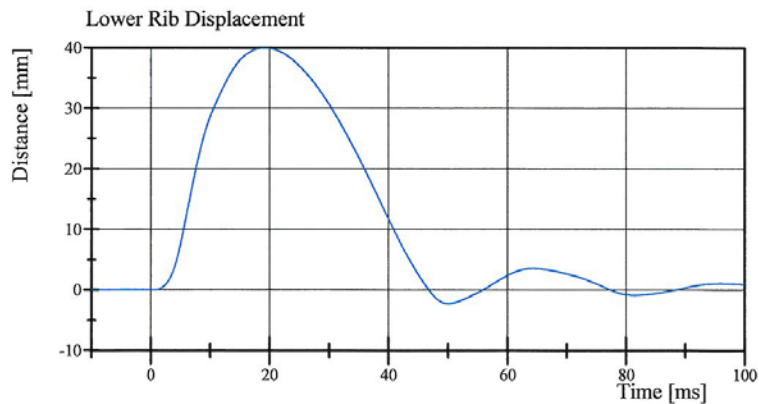
Test Date: 12/1/2011



Filter Class: CFC\_180  
Max: 35.8 mm at 17.7 ms  
Min: -3.5 mm at 42.2 ms



Filter Class: CFC\_180  
Max: 39.2 mm at 18.8 ms  
Min: -3.4 mm at 46.2 ms



Filter Class: CFC\_180  
Max: 39.9 mm at 19.1 ms  
Min: -2.3 mm at 50.1 ms

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

12.01.2011 16:52:36 449



# Transportation Research Center Inc.

Left Lateral Lumbar  
ES-2re Serial No. F030 Certification No. 2-3  
Test Date: 12/1/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.049 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.5 deg	Yes
Time of Peak	39 - 53 ms	44.6 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.8 ms	Yes

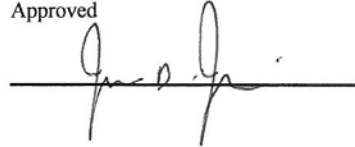
**Test meets specifications.**

**Comments:**

Technician



Approved



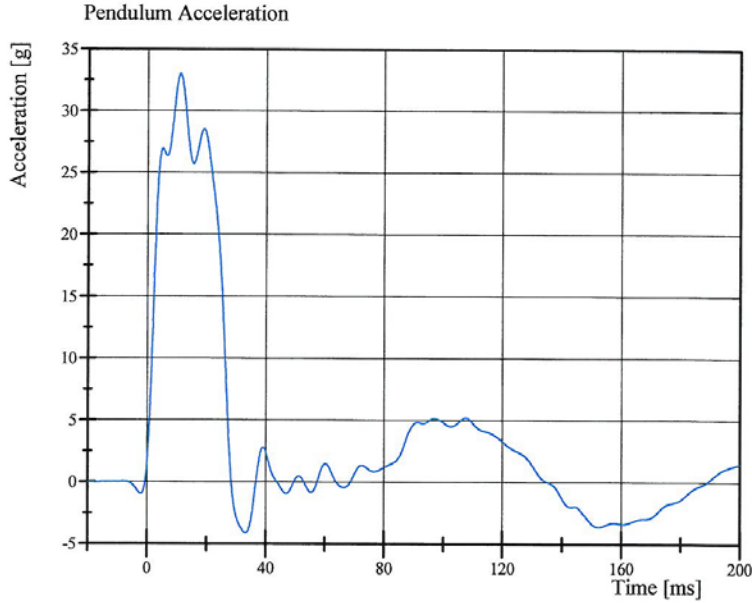
Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 12:01:24 576

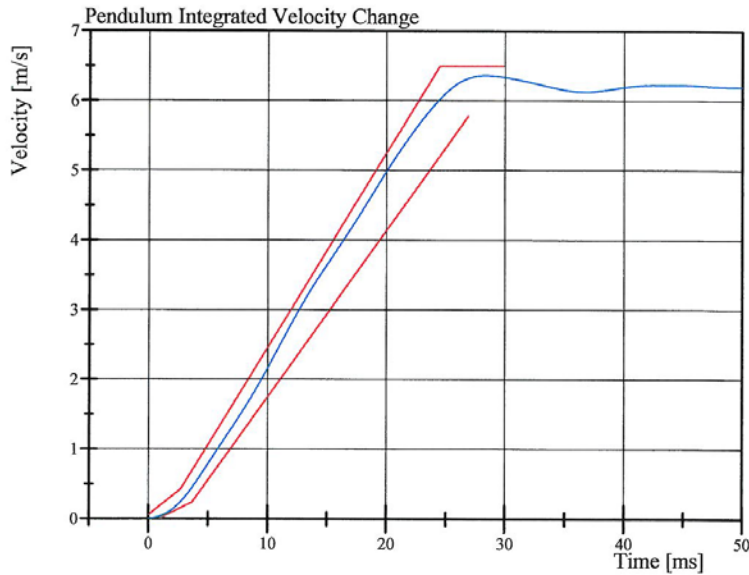


# Transportation Research Center Inc.

Left Lateral Lumbar  
ES-2re Serial No. F030 Certification No. 2-3  
Test Date: 12/1/2011



Filter Class: CFC\_60  
Max: 33.0 gn at 11.0 ms  
Min: -4.1 gn at 33.3 ms

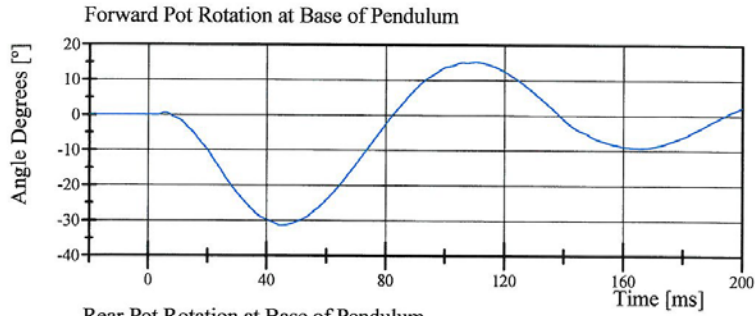


Filter Class: CFC\_60  
Max: 6.4 m/s at 28.4 ms  
Min: 0.0 m/s at 0.0 ms

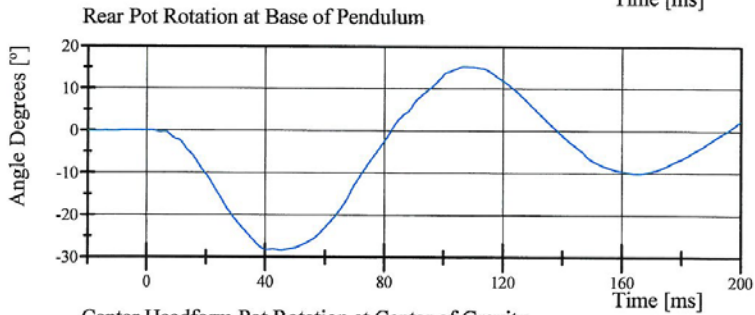


# Transportation Research Center Inc.

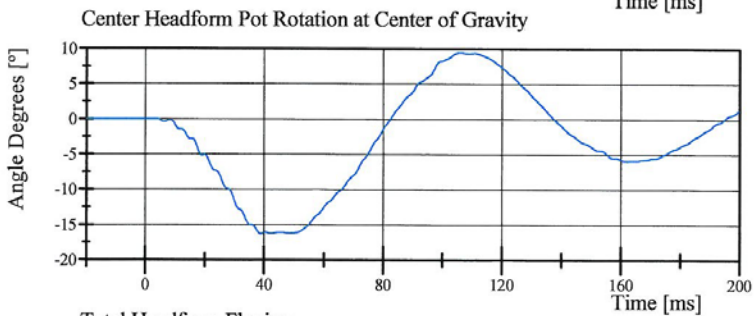
Left Lateral Lumbar  
ES-2re Serial No. F030 Certification No. 2-3  
Test Date: 12/1/2011



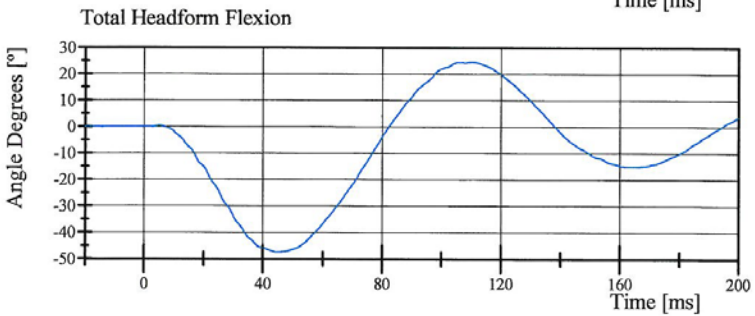
Filter Class: CFC\_180  
Max: 15.2 ° at 110.3 ms  
Min: -31.4 ° at 44.6 ms



Filter Class: CFC\_180  
Max: 15.3 ° at 106.8 ms  
Min: -28.4 ° at 45.3 ms



Filter Class: CFC\_180  
Max: 9.5 ° at 105.8 ms  
Min: -16.3 ° at 38.9 ms



Filter Class: CFC\_180  
Max: 24.6 ° at 110.5 ms  
Min: -47.5 ° at 44.6 ms

# Transportation Research Center Inc.

Left Lateral Abdomen

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

Test Date: 12/1/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.93 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,081.5 N	Yes
Time of Peak	10.6 - 13.0 ms	10.96 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,595.9 N	Yes
Time of Peak	10.0 - 12.3 ms	10.00 ms	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 17:05:01 598

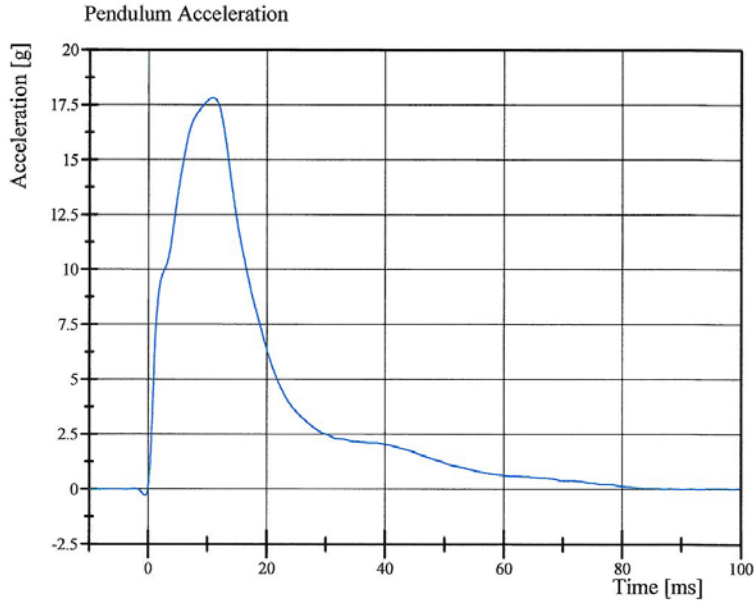


# Transportation Research Center Inc.

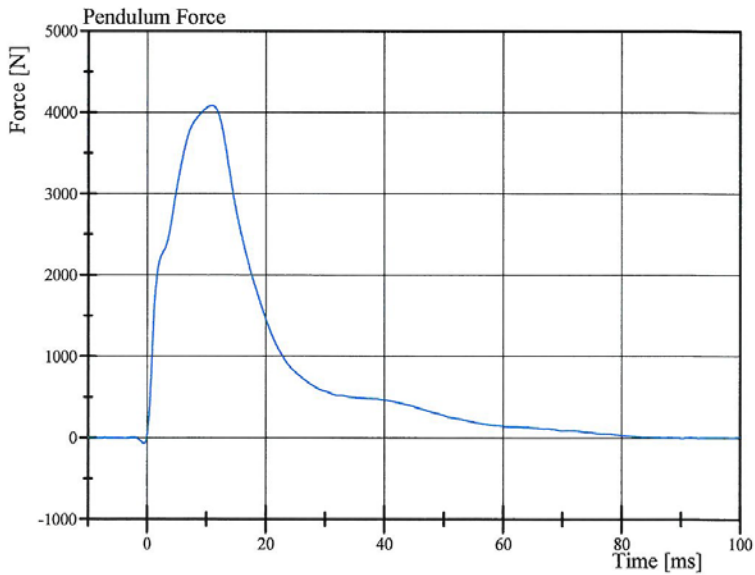
Left Lateral Abdomen

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

Test Date: 12/1/2011



Filter Class: CFC\_180  
Max: 17.8 gn at 11.0 ms  
Min: -0.3 gn at -0.6 ms

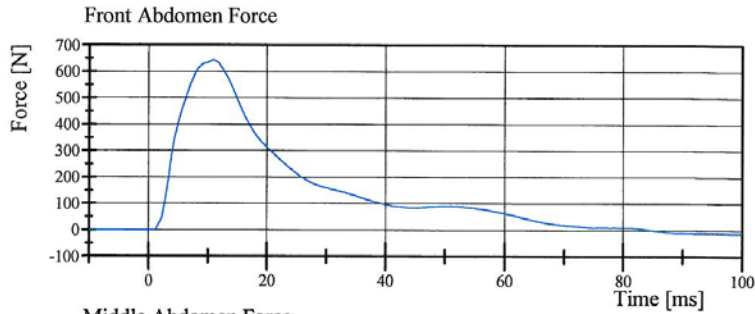


Filter Class: CFC\_180  
Max: 4,081.5 N at 11.0 ms  
Min: -67.4 N at -0.6 ms

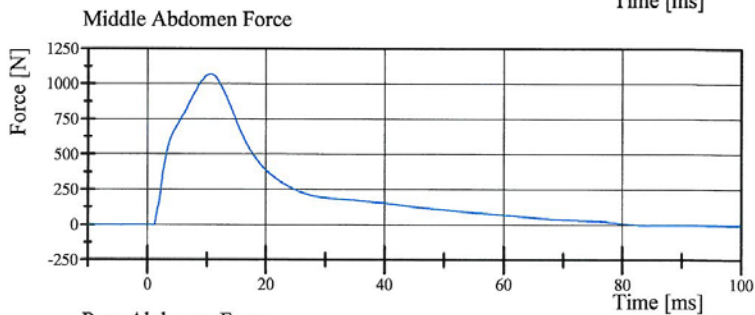


# Transportation Research Center Inc.

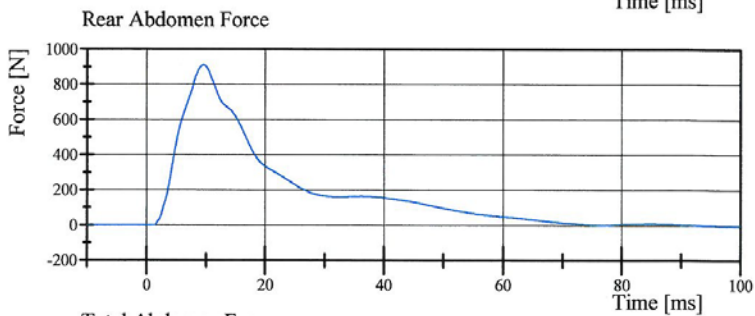
Left Lateral Abdomen  
ES-2re Serial No. F030 Certification No. 2-1  
Test Date: 12/1/2011



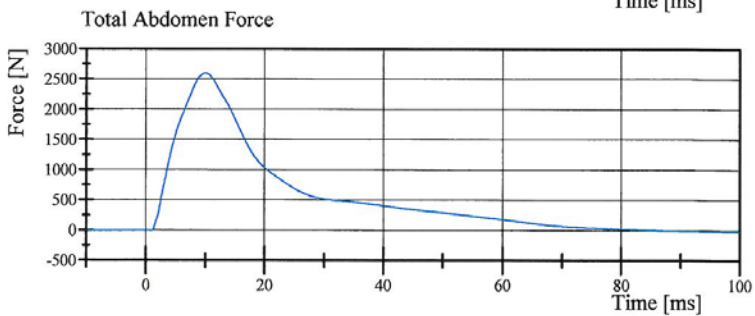
Filter Class: CFC\_600  
Max: 643.1 N at 10.8 ms  
Min: -11.6 N at 99.3 ms



Filter Class: CFC\_600  
Max: 1,069.8 N at 10.6 ms  
Min: -2.6 N at 1.0 ms



Filter Class: CFC\_600  
Max: 909.9 N at 9.5 ms  
Min: -2.8 N at 100.0 ms



Filter Class: CFC\_600  
Max: 2,595.9 N at 10.0 ms  
Min: -16.5 N at 99.1 ms



# Transportation Research Center Inc.

Left Lateral Pelvis

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

Test Date: 12/1/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.22 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,058.8 N	Yes
Time of Peak	11.8 - 16.1 ms	12.64 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,345.6 N	Yes
Time of Peak	12.2 - 17.0 ms	12.88 ms	Yes

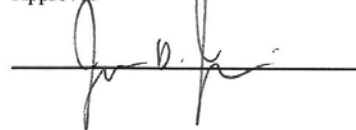
**Test meets specifications.**

**Comments:**

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 17:32:22 524

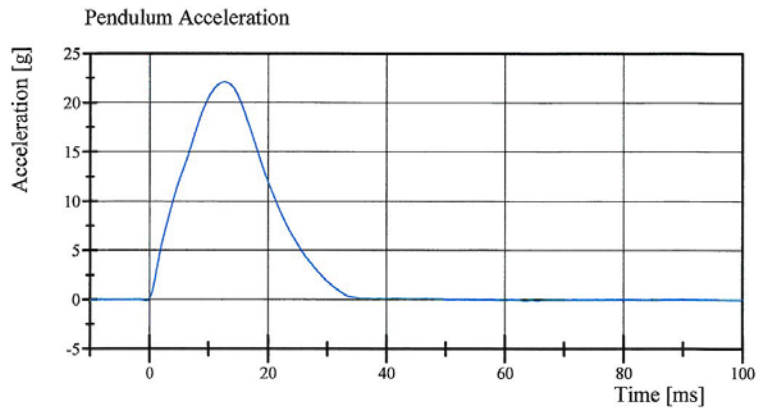


# Transportation Research Center Inc.

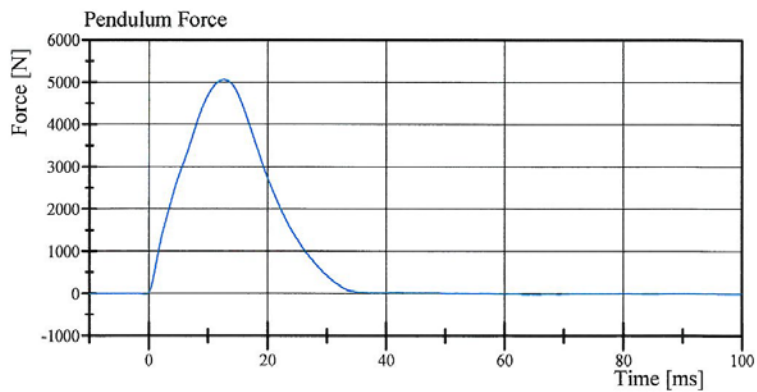
Left Lateral Pelvis

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

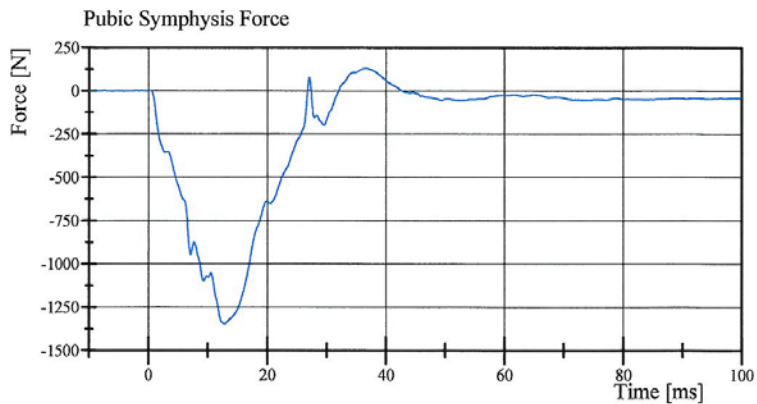
Test Date: 12/1/2011



Filter Class: CFC\_180  
Max: 22.1 gn at 12.6 ms  
Min: -0.1 gn at -0.6 ms



Filter Class: CFC\_180  
Max: 5,058.8 N at 12.6 ms  
Min: -21.0 N at -0.6 ms



Filter Class: CFC\_600  
Max: 130.9 N at 36.6 ms  
Min: -1,345.6 N at 12.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

12.01.2011 17:32:29 524

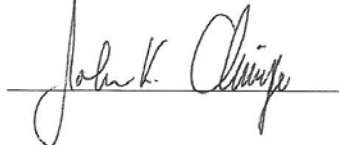


**Pre-Test Calibration Sheets**  
**Left Rear Passenger Dummy 033**

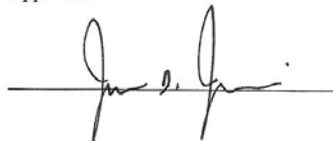
**Transportation Research Center Inc.**  
**SIDIIs Dummy - Level D**  
**External Dimensions**  
**Serial No. 033 Calibration No.06**  
**Date: 11/16/11**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	439	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	133	Yes
G	Head Breadth	140.0 - 148.0	144	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	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	533	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	401	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	207	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	481	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	352	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	869	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

Technician



Approved




Revised 9/29/2005

# Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs SBLD Final Rule 6-09 Serial No. 033 Certification No. 6-1

Test Date: 9/21/2011

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	62 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	126.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.4 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.

09.21.2011 09:30:26 230

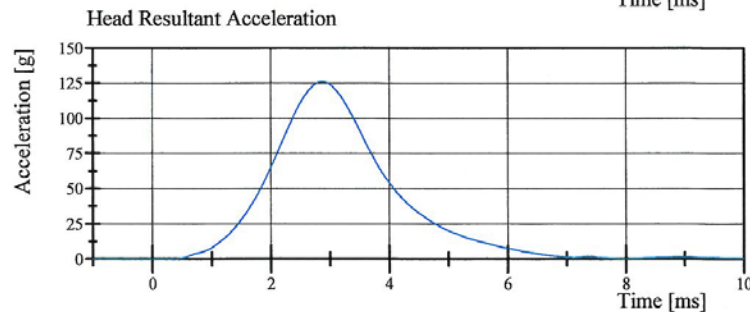
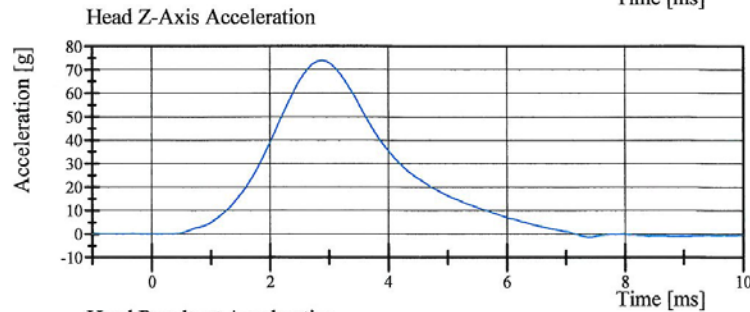
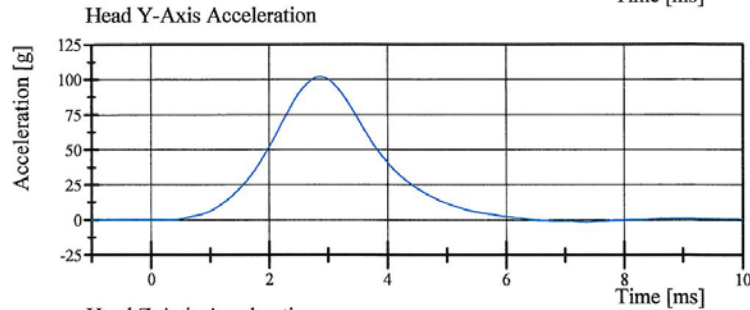
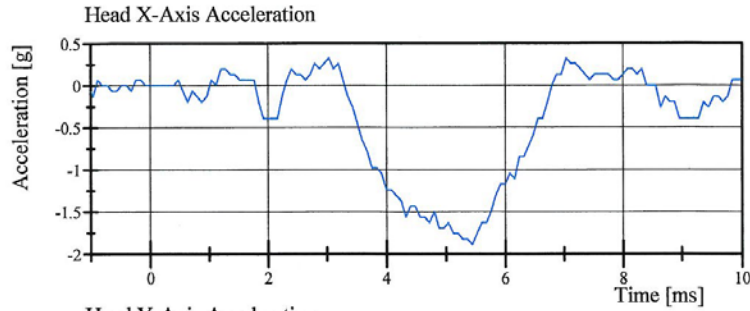


# Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs SBLD Final Rule 6-09 Serial No. 033 Certification No. 6-1

Test Date: 9/21/2011



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

09.21.2011 09:30:33 230



# Transportation Research Center Inc.

Left Lateral Neck

SID IIs SBLD Final Rule 6-09 Serial No. 033 Certification No. 6-6

Test Date: 9/22/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.582 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.379 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.543 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.755 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.702 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.920 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-71.8 deg	Yes
Time of Peak	50 - 70 ms	60.8 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.7 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	114.1 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.

09.22.2011 08:51:23 662

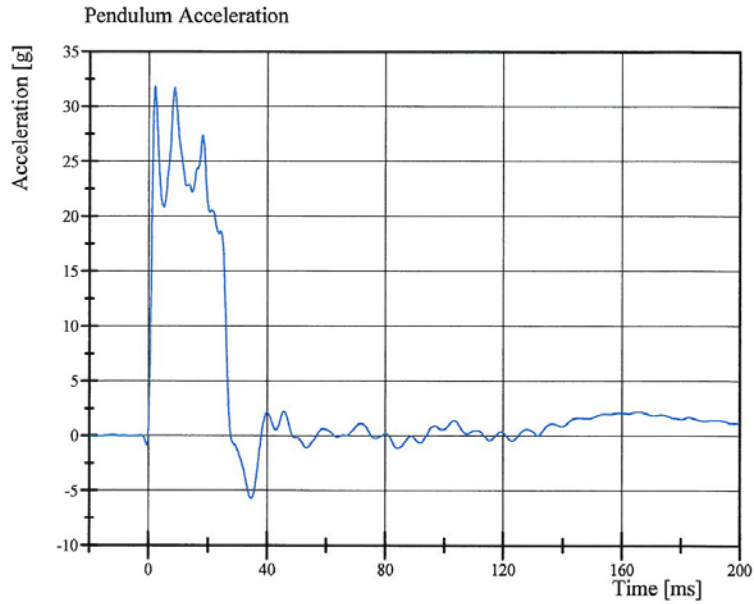


# Transportation Research Center Inc.

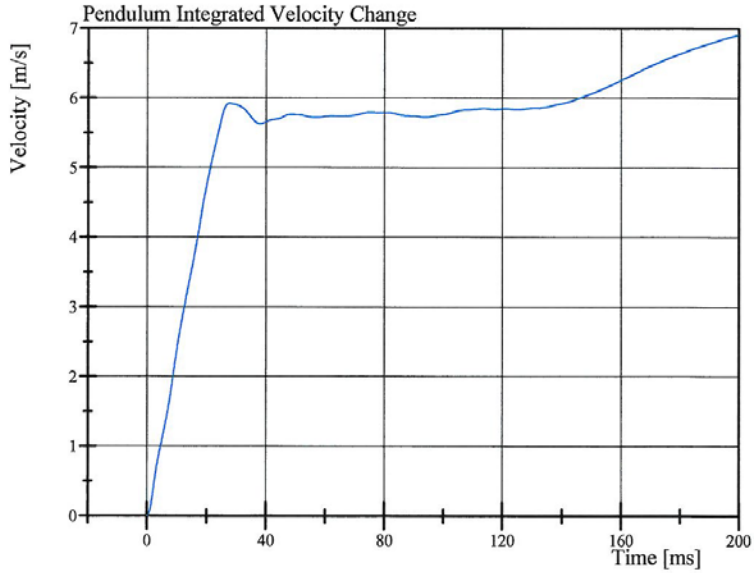
Left Lateral Neck

SID IIs SBLD Final Rule 6-09 Serial No. 033 Certification No. 6-6

Test Date: 9/22/2011



Filter Class: CFC\_180  
Max: 31.8 gn at 2.2 ms  
Min: -5.7 gn at 34.6 ms



Filter Class: CFC\_180  
Max: 6.9 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.

09.22.2011 08:51:34 662

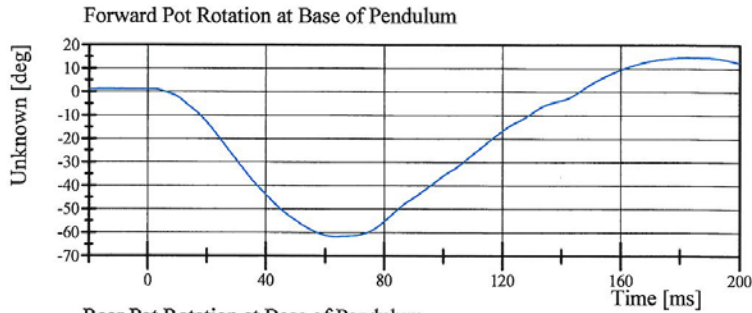


# Transportation Research Center Inc.

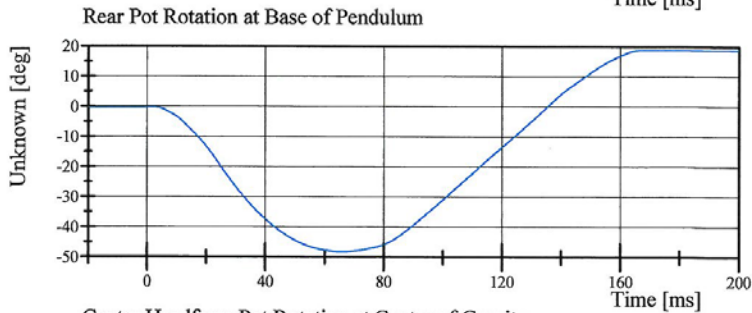
Left Lateral Neck

SID IIs SBLD Final Rule 6-09 Serial No. 033 Certification No. 6-6

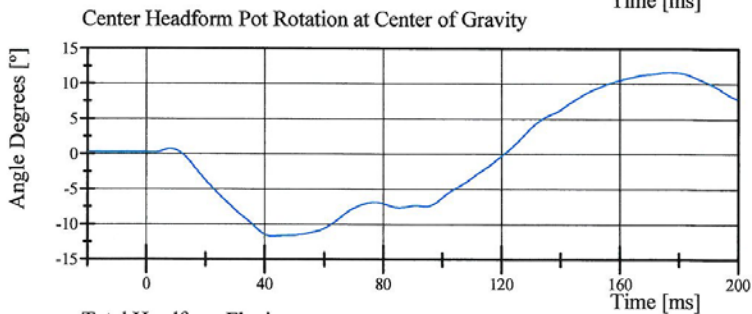
Test Date: 9/22/2011



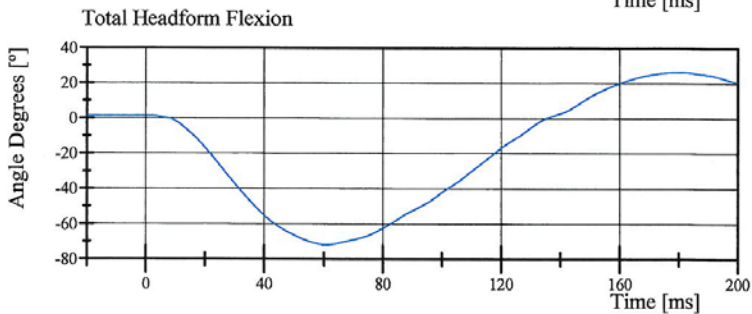
Filter Class: CFC\_60  
Max: 14.9 deg at 182.4 ms  
Min: -61.7 deg at 63.6 ms



Filter Class: CFC\_60  
Max: 18.9 deg at 200.0 ms  
Min: -48.2 deg at 65.8 ms



Filter Class: CFC\_60  
Max: 11.7 ° at 176.8 ms  
Min: -11.7 ° at 42.7 ms



Filter Class: CFC\_60  
Max: 26.4 ° at 180.2 ms  
Min: -71.8 ° at 60.8 ms

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

09.22.2011 08:51:34 662

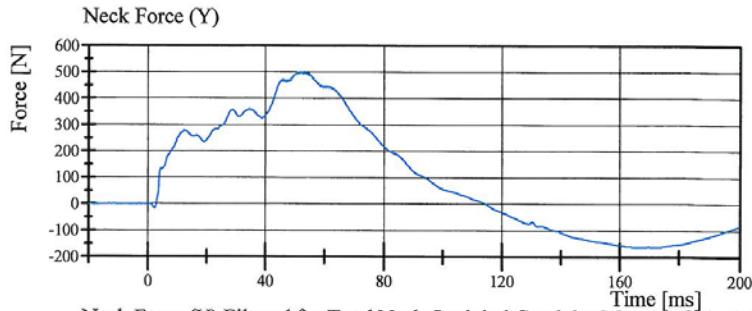


# Transportation Research Center Inc.

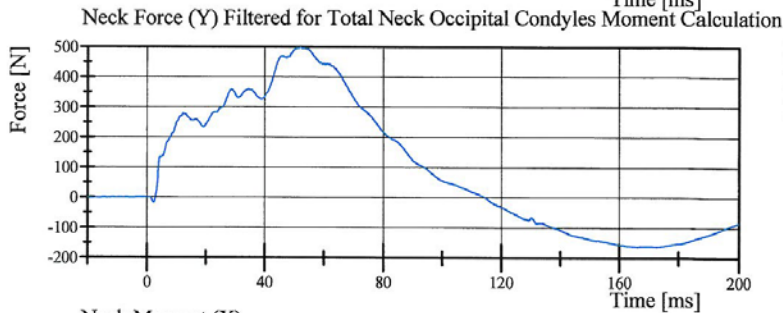
Left Lateral Neck

SID IIs SBLD Final Rule 6-09 Serial No. 033 Certification No. 6-6

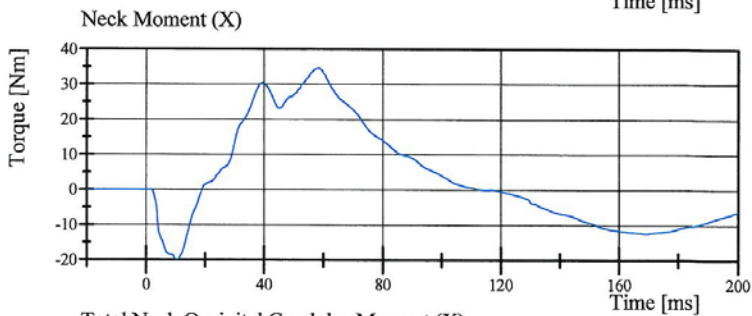
Test Date: 9/22/2011



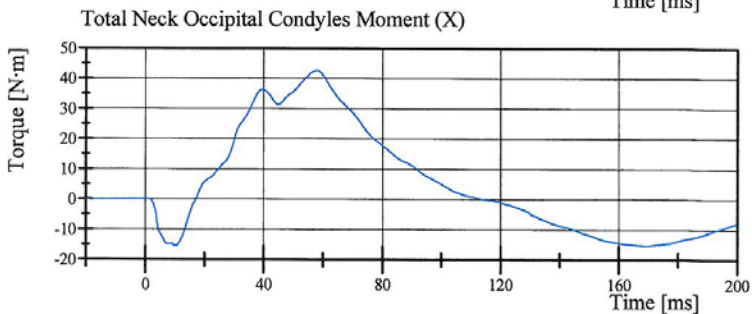
Filter Class: CFC\_1000  
Max: 501.6 N at 53.1 ms  
Min: -162.4 N at 165.1 ms



Filter Class: CFC\_600  
Max: 499.7 N at 52.0 ms  
Min: -162.1 N at 165.1 ms



Filter Class: CFC\_600  
Max: 34.7 Nm at 58.6 ms  
Min: -19.9 Nm at 10.3 ms



Filter Class: Without\_(Consta  
Max: 42.7 N·m at 58.4 ms  
Min: -15.4 N·m at 10.2 ms

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

09.22.2011 08:51:35 662



# Transportation Research Center Inc.

Left Lateral Shoulder

Copy of SID IIs Serial No. 033 Certification No. 6-2

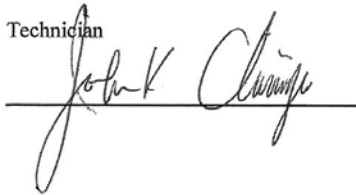
Test Date: 11/18/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-17.3 g	Yes
Shoulder Displacement	28 - 37 mm	29.5 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.6 g	Yes

Test meets specifications.

Comments:

Technician



Approved



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

11.18.2011 10:48:33 824

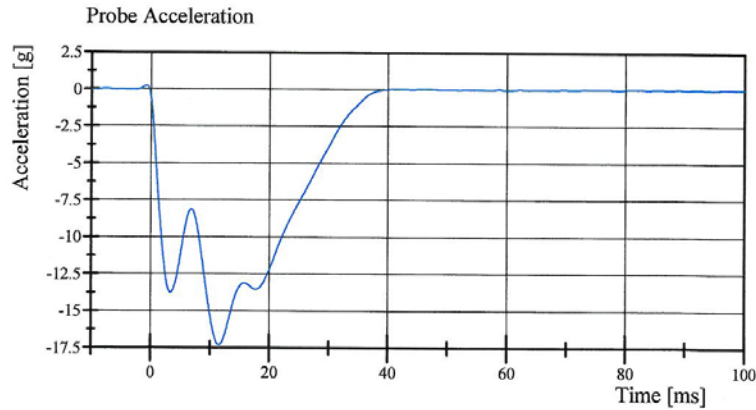


# Transportation Research Center Inc.

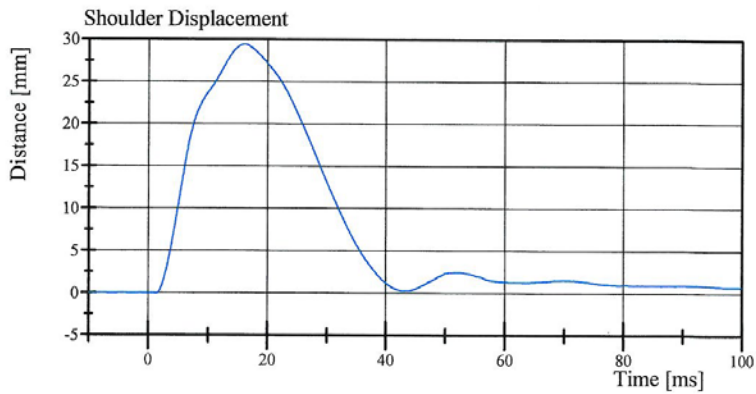
Left Lateral Shoulder

Copy of SID IIs Serial No. 033 Certification No. 6-2

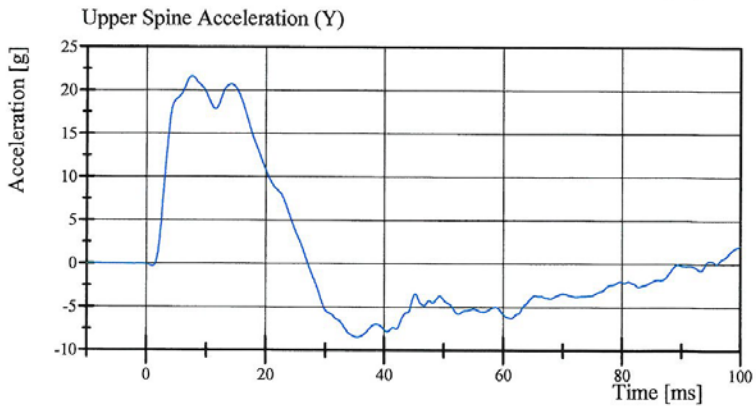
Test Date: 11/18/2011



Filter Class: CFC\_180  
Max: 0.2 gn at -0.7 ms  
Min: -17.3 gn at 11.5 ms



Filter Class: CFC\_600  
Max: 29.5 mm at 16.2 ms  
Min: -0.0 mm at 1.4 ms



Filter Class: CFC\_180  
Max: 21.6 gn at 7.6 ms  
Min: -8.5 gn at 35.4 ms

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

11.18.2011 10:48:51 824



# Transportation Research Center Inc.

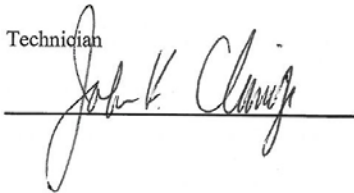
Left Lateral Thorax with Arm  
Copy of SID IIs Serial No. 033 Certification No. 6-8  
Test Date: 11/20/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.654 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.1 g	Yes
Shoulder Displacement	31 - 40 mm	32.2 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	25.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	41.9 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.8 g	Yes

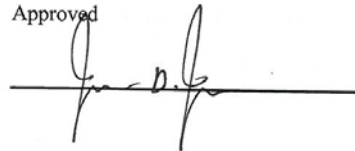
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.20.2011 08:49:53 623

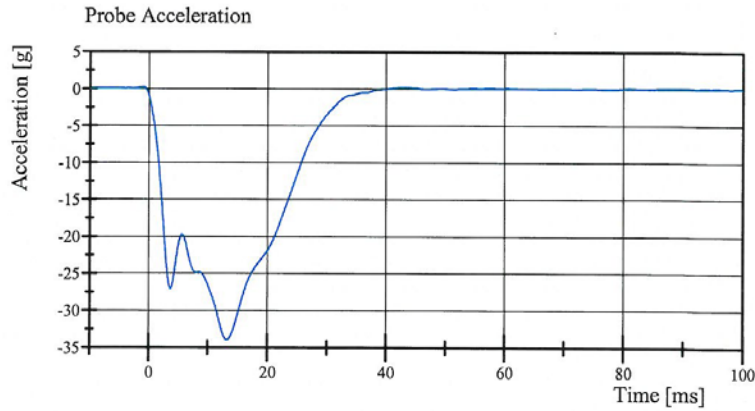


# Transportation Research Center Inc.

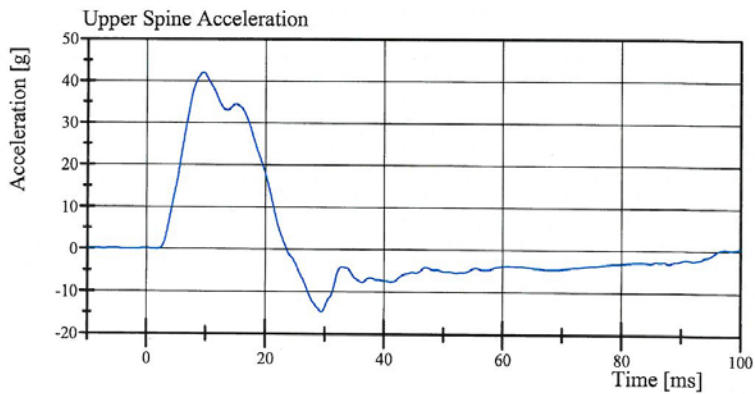
Left Lateral Thorax with Arm

Copy of SID IIs Serial No. 033 Certification No. 6-8

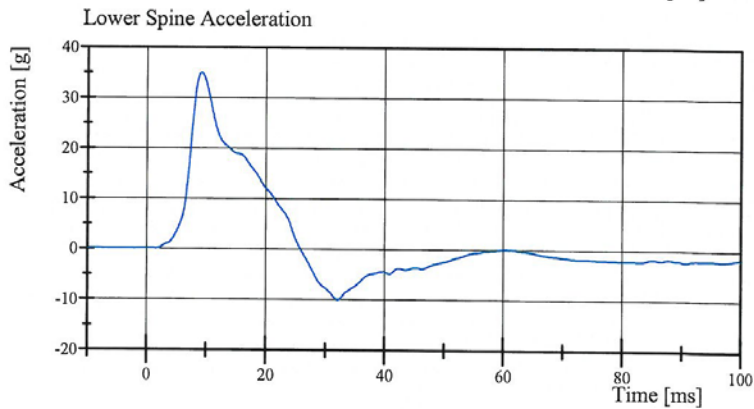
Test Date: 11/20/2011



Filter Class: CFC\_180  
Max: 0.2 gn at 42.8 ms  
Min: -34.1 gn at 13.3 ms



Filter Class: CFC\_180  
Max: 41.9 gn at 9.6 ms  
Min: -14.8 gn at 29.4 ms



Filter Class: CFC\_180  
Max: 34.8 gn at 9.2 ms  
Min: -10.1 gn at 32.1 ms

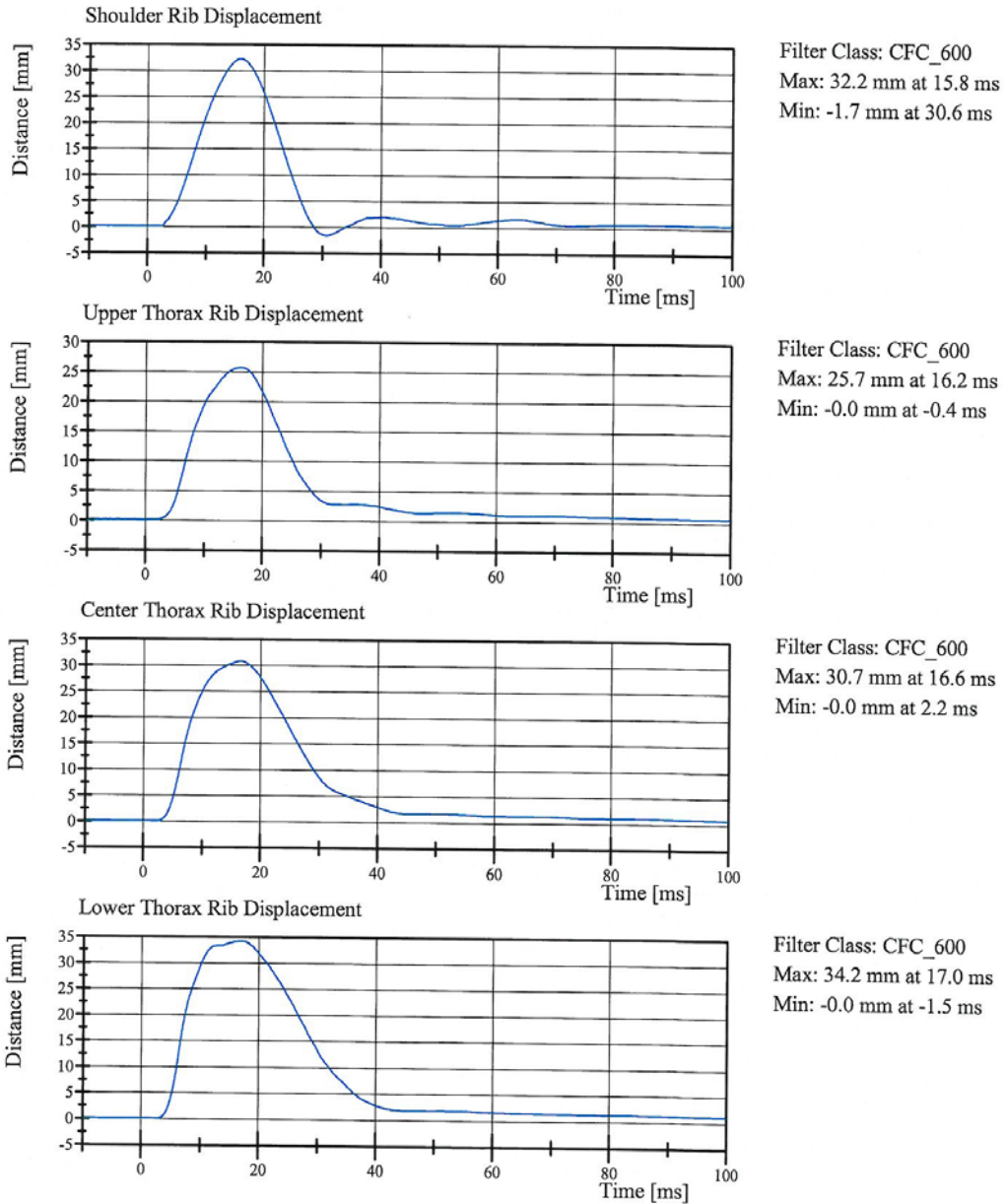
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.20.2011 08:50:11 623



# Transportation Research Center Inc.

Left Lateral Thorax with Arm  
Copy of SID IIs Serial No. 033 Certification No. 6-8  
Test Date: 11/20/2011



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

11.20.2011 08:50:12 623



# Transportation Research Center Inc.

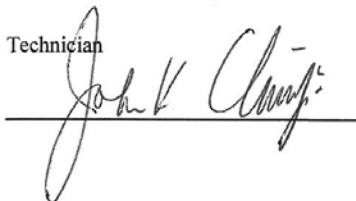
Left Lateral Thorax without Arm  
Copy of SID IIs Serial No. 033 Certification No. 6-1  
Test Date: 11/18/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	23 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.343 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.4 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	39.6 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	35.9 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	16.8 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.1 g	Yes

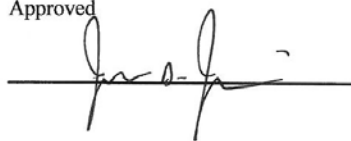
**Test meets specifications.**

**Comments:**

Technician



Approved



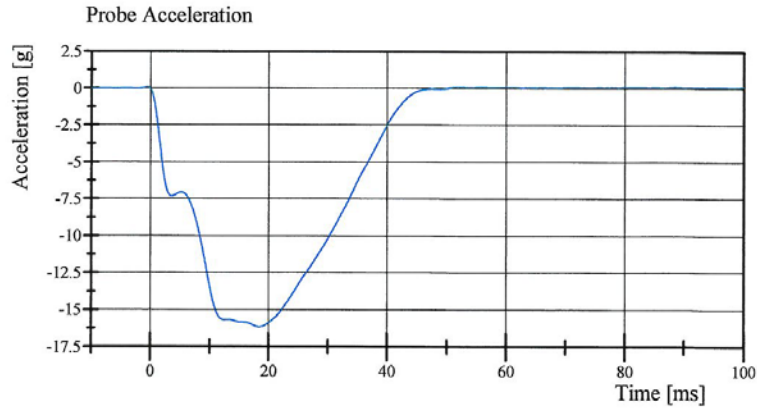
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.18.2011 13:02:08 783

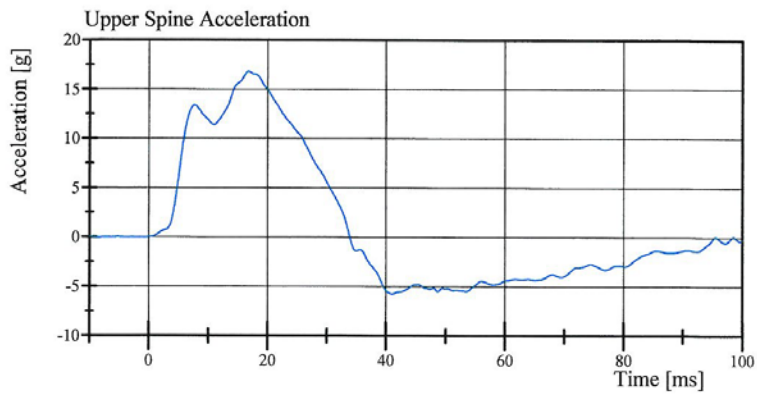


# Transportation Research Center Inc.

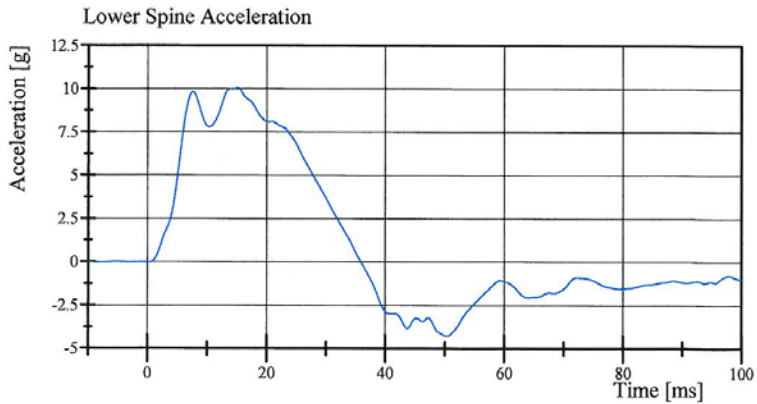
Left Lateral Thorax without Arm  
Copy of SID IIs Serial No. 033 Certification No. 6-1  
Test Date: 11/18/2011



Filter Class: CFC\_180  
Max: 0.1 gn at 100.0 ms  
Min: -16.2 gn at 18.4 ms



Filter Class: CFC\_180  
Max: 16.8 gn at 16.7 ms  
Min: -5.7 gn at 41.0 ms



Filter Class: CFC\_180  
Max: 10.1 gn at 15.1 ms  
Min: -4.3 gn at 50.2 ms

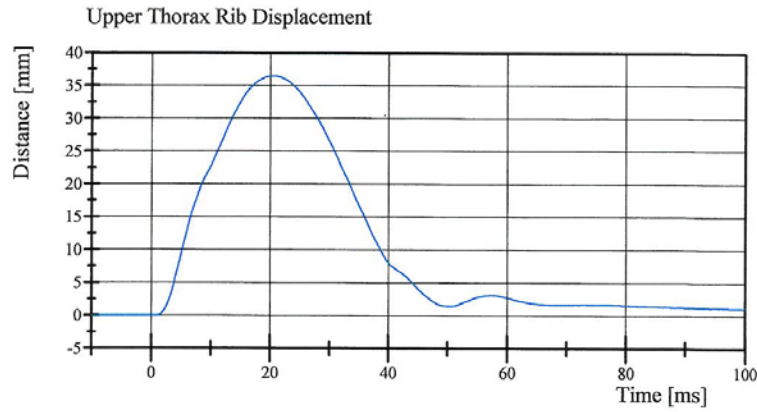
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.18.2011 13:02:20 783

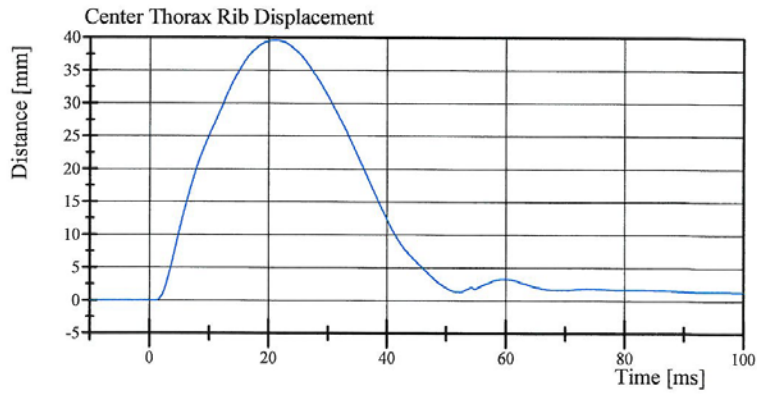


# Transportation Research Center Inc.

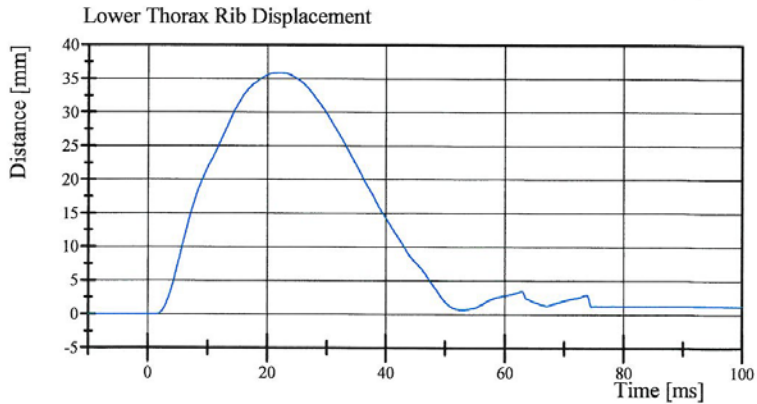
Left Lateral Thorax without Arm  
Copy of SID IIs Serial No. 033 Certification No. 6-1  
Test Date: 11/18/2011



Filter Class: CFC\_600  
Max: 36.4 mm at 20.4 ms  
Min: -0.0 mm at -1.0 ms



Filter Class: CFC\_600  
Max: 39.6 mm at 21.0 ms  
Min: -0.0 mm at 1.0 ms



Filter Class: CFC\_600  
Max: 35.9 mm at 22.2 ms  
Min: -0.0 mm at -8.2 ms

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

11.18.2011 13:02:20 783



# Transportation Research Center Inc.

Left Lateral Abdomen

Copy of SID IIs Serial No. 033 Certification No. 6-1


Test Date: 11/19/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.2 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	38.8 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	36.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.42 g	Yes

**Test meets specifications.**

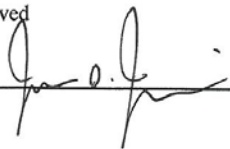
**Comments:**

Technician



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Approved



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

11.19.2011 11:20:22 627

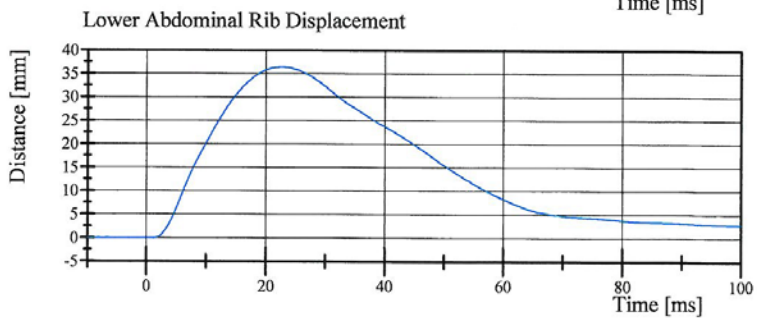
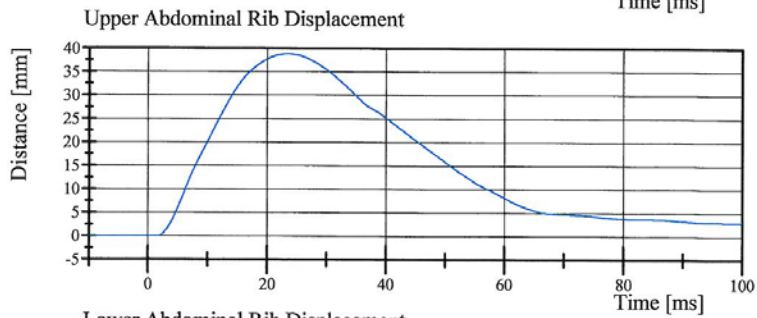
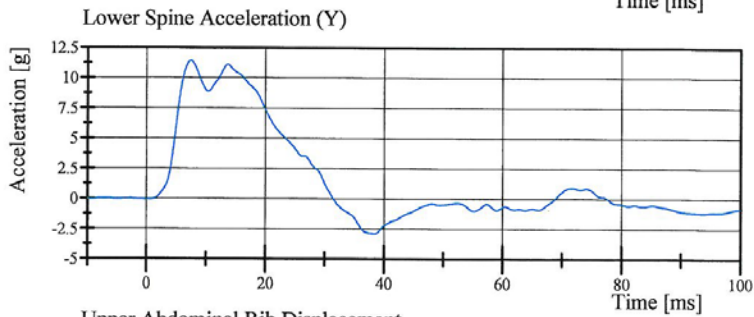
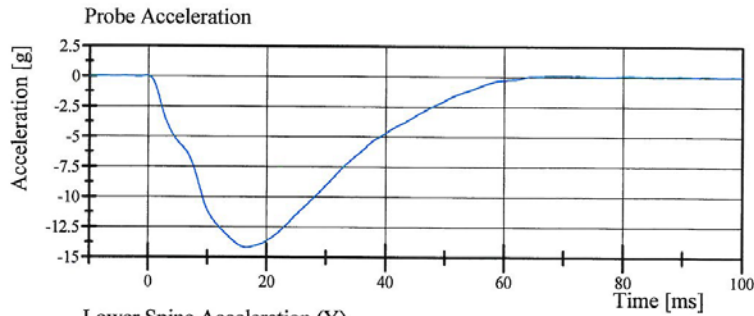


# Transportation Research Center Inc.

Left Lateral Abdomen

Copy of SID IIs Serial No. 033 Certification No. 6-1

Test Date: 11/19/2011



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

11.19.2011 11:20:35 627



# Transportation Research Center Inc.

Left Lateral Iliac

Copy of SID IIs Serial No. 033 Certification No. 6-4

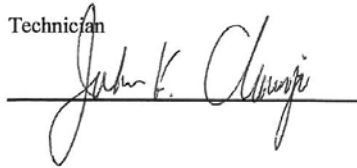
Test Date: 11/17/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.40 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-38.2 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.3 g	Yes
Iliac Force	4,100 - 5,100 N	4,432.5 N	Yes

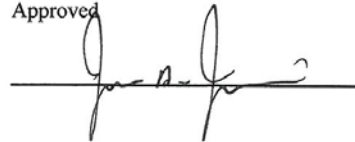
Test meets specifications.

Comments:

Technician



Approved



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

11.17.2011 18:24:18 640

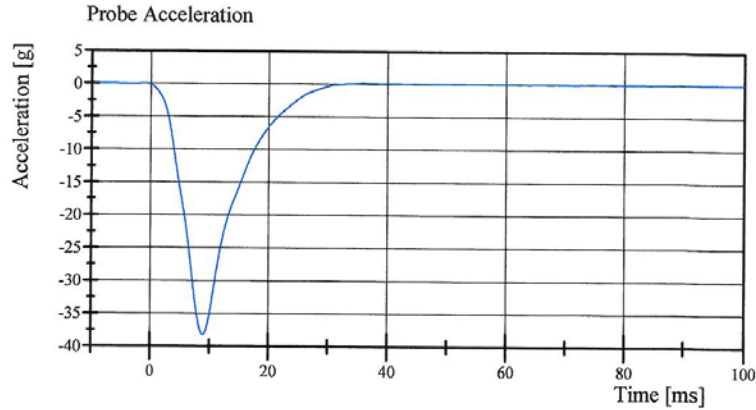


# Transportation Research Center Inc.

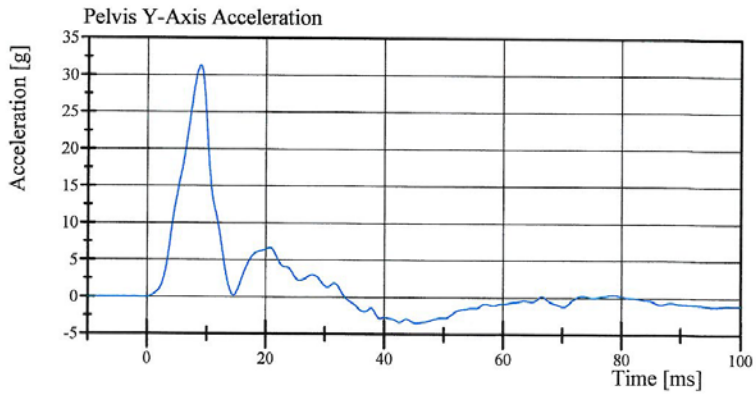
Left Lateral Iliac

Copy of SID IIs Serial No. 033 Certification No. 6-4

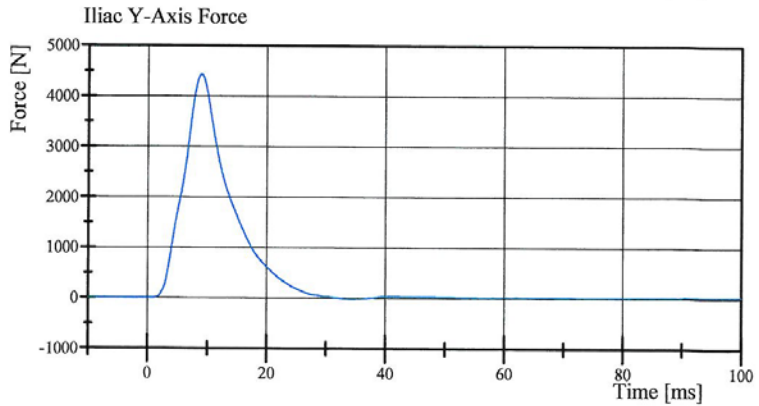
Test Date: 11/17/2011



Filter Class: CFC\_180  
Max: 0.2 gn at 35.8 ms  
Min: -38.2 gn at 8.9 ms



Filter Class: CFC\_180  
Max: 31.3 gn at 9.0 ms  
Min: -3.5 gn at 45.4 ms



Filter Class: CFC\_600  
Max: 4,432.5 N at 9.0 ms  
Min: -21.2 N at 34.4 ms

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

11.17.2011 18:24:33 640



# Transportation Research Center Inc.

Left Lateral Pelvis

Copy of SID IIs Serial No. 033 Certification No. 6-1

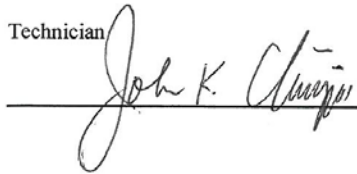
Test Date: 11/18/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.90 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.5 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,104.0 N	Yes

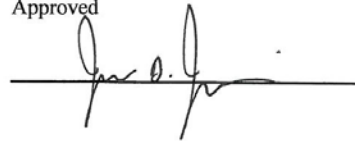
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.18.2011 11:31:58 428

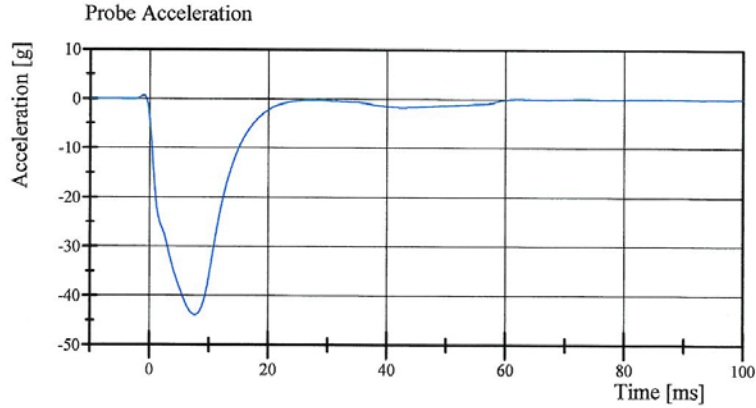


# Transportation Research Center Inc.

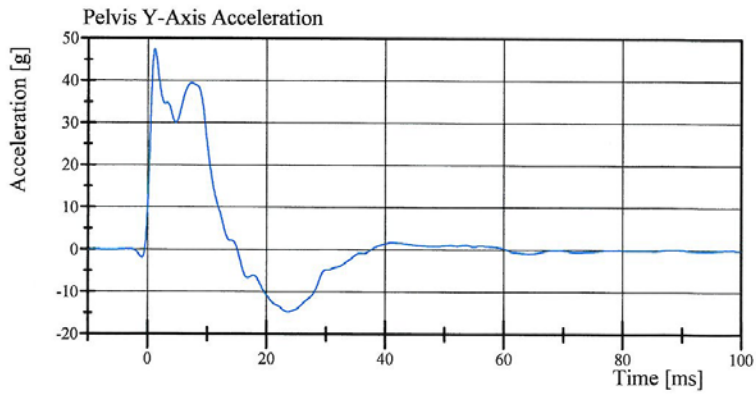
Left Lateral Pelvis

Copy of SID IIs Serial No. 033 Certification No. 6-1

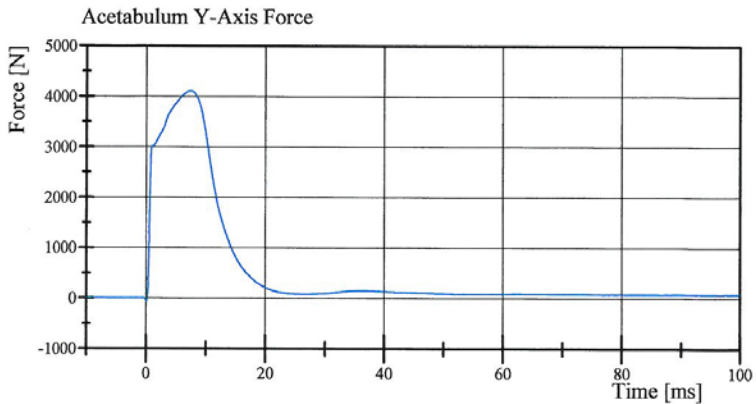
Test Date: 11/18/2011



Filter Class: CFC\_180  
Max: 0.6 gn at -1.0 ms  
Min: -43.9 gn at 7.7 ms



Filter Class: CFC\_180  
Max: 47.6 gn at 1.2 ms  
Min: -14.7 gn at 23.6 ms



Filter Class: CFC\_600  
Max: 4,104.0 N at 7.4 ms  
Min: -69.3 N at 0.1 ms

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

11.18.2011 11:32:10 428



**Post-Test Calibration Sheets**  
**Left Rear Passenger Dummy 033**

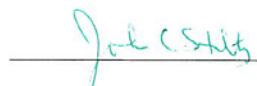
**Transportation Research Center Inc.**  
**SIDIIs Dummy - Level D**  
**External Dimensions**  
**Serial No. 033 Calibration No.07**  
**Date: 11/28/11**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	442	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	133	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	533	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	207	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	481	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	352	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	869	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

Technician

  
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Approved

  
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Revised 9/29/2005



# Transportation Research Center Inc.

Left Lateral Head Drop  
SID IIs Serial No. 033 Certification No. 7-1  
Test Date: 11/23/2011

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	129.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

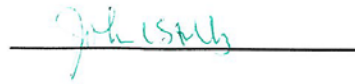
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.23.2011 17:09:20 234

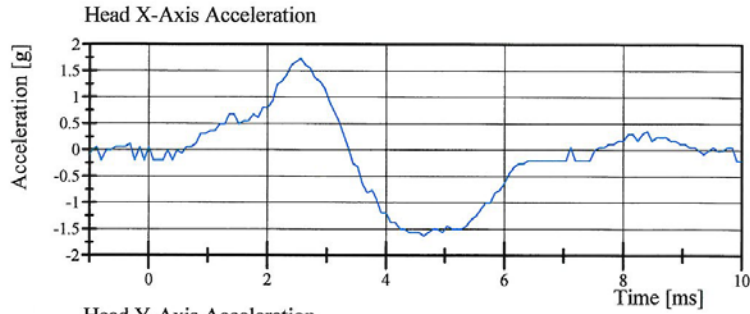


# Transportation Research Center Inc.

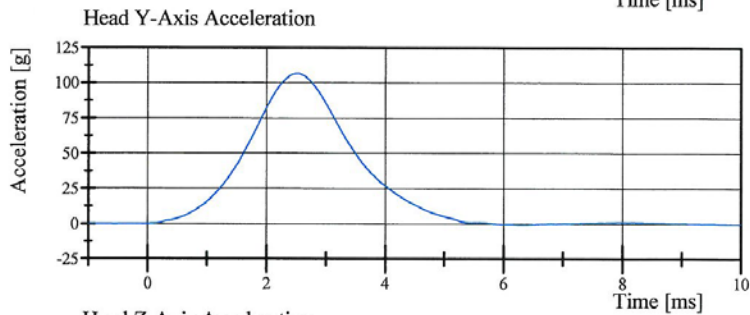
Left Lateral Head Drop

SID IIs Serial No. 033 Certification No. 7-1

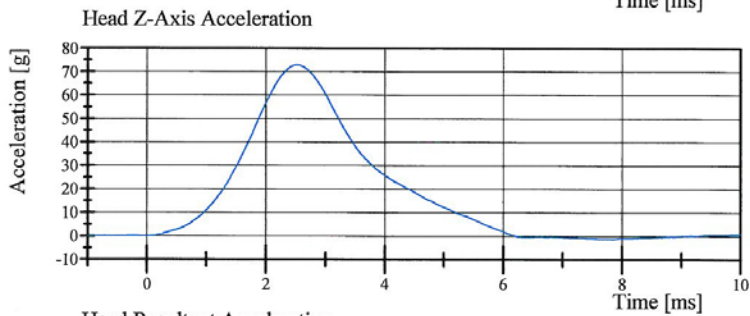
Test Date: 11/23/2011



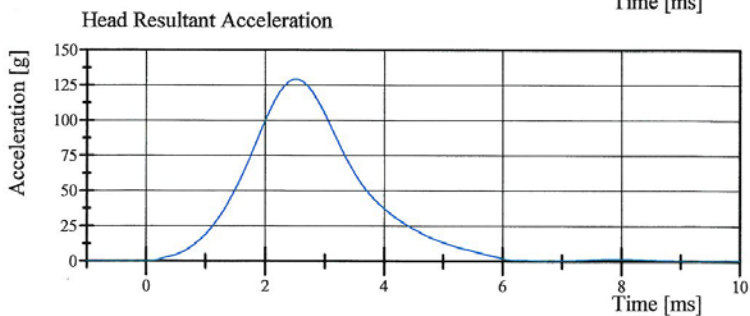
Filter Class: CFC\_1000  
Max: 1.7 gn at 2.6 ms  
Min: -1.6 gn at 4.6 ms



Filter Class: CFC\_1000  
Max: 106.7 gn at 2.5 ms  
Min: -0.7 gn at 6.3 ms



Filter Class: CFC\_1000  
Max: 72.9 gn at 2.6 ms  
Min: -1.3 gn at 7.8 ms



Filter Class: CFC\_1000  
Max: 129.2 gn at 2.5 ms  
Min: 0.0 gn at -0.6 ms

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

11.23.2011 17:09:33 234



# Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 7-2

Test Date: 11/25/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.585 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.351 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.503 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.727 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.693 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.877 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.4 deg	Yes
Time of Peak	50 - 70 ms	65.2 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	38.2 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	122.1 ms	Yes

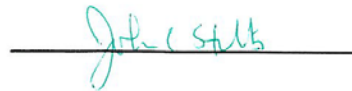
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.25.2011 06:23:07 639

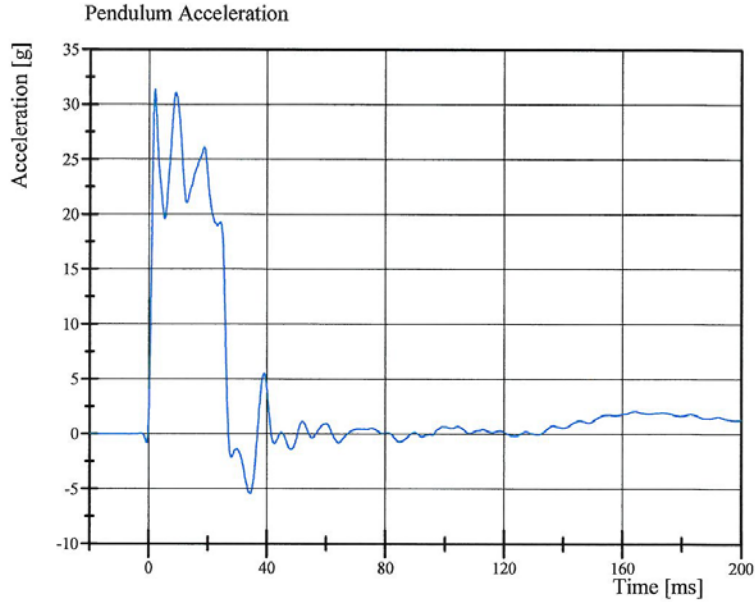


# Transportation Research Center Inc.

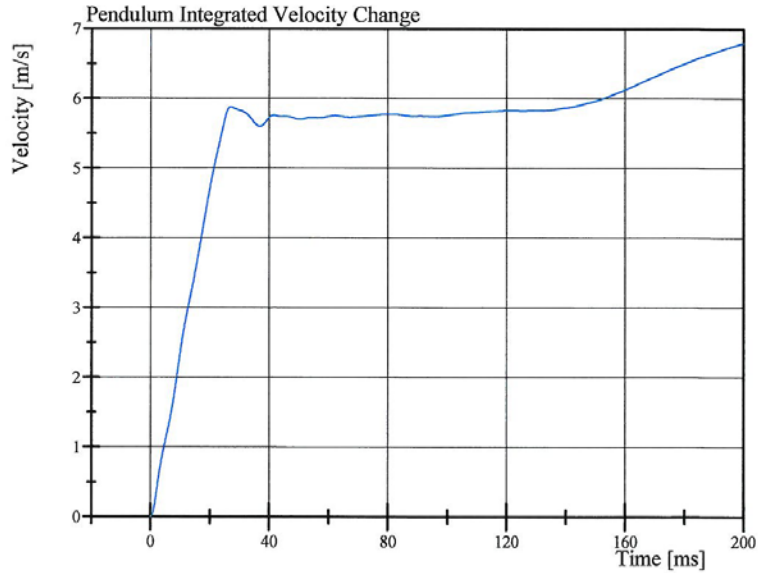
Left Lateral Neck

SID IIs Serial No. 033 Certification No. 7-2

Test Date: 11/25/2011



Filter Class: CFC\_180  
Max: 31.3 gn at 2.0 ms  
Min: -5.4 gn at 34.5 ms



Filter Class: CFC\_180  
Max: 6.8 m/s at 200.0 ms  
Min: 0.0 m/s at 0.0 ms

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

11.25.2011 06:23:17 639

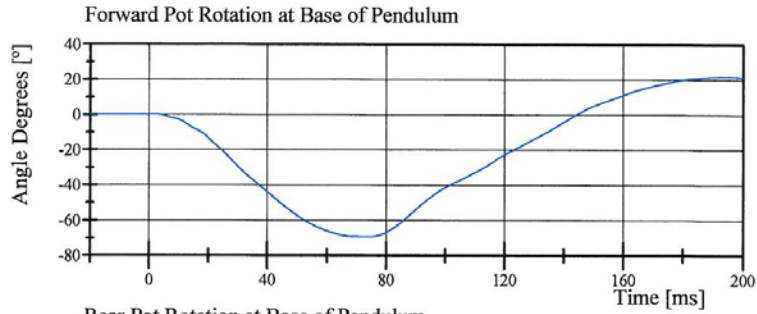


# Transportation Research Center Inc.

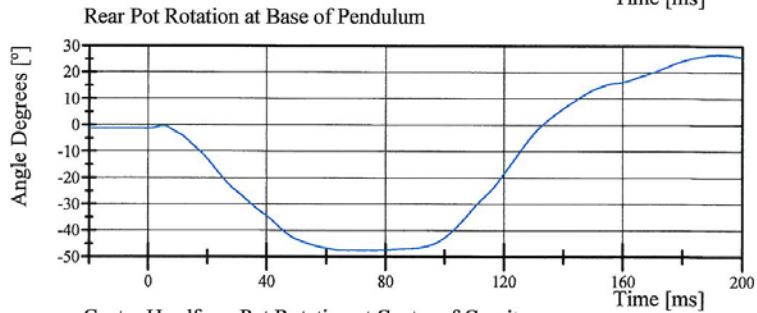
Left Lateral Neck

SID IIs Serial No. 033 Certification No. 7-2

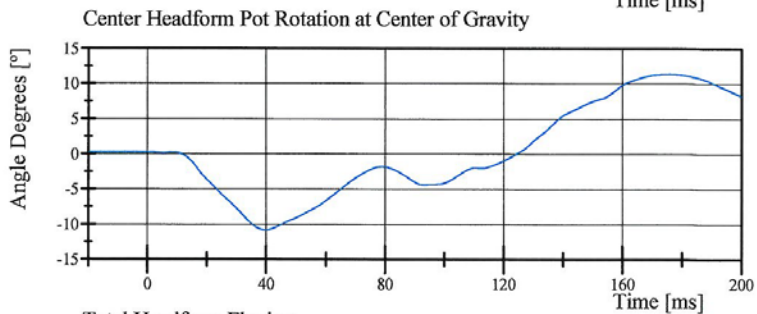
Test Date: 11/25/2011



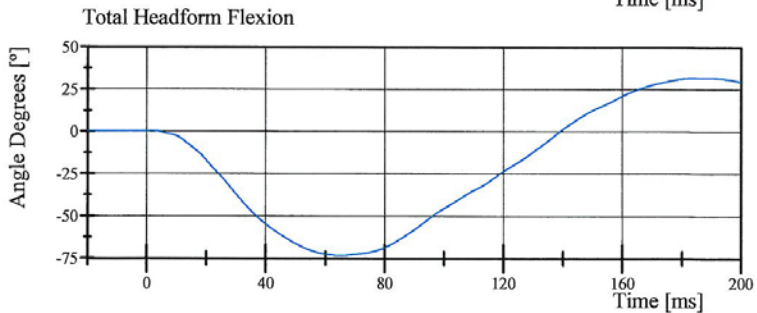
Filter Class: CFC\_60  
Max: 21.9 ° at 193.8 ms  
Min: -69.4 ° at 73.4 ms



Filter Class: CFC\_60  
Max: 26.8 ° at 191.9 ms  
Min: -47.6 ° at 66.3 ms



Filter Class: CFC\_60  
Max: 11.4 ° at 175.8 ms  
Min: -10.8 ° at 39.8 ms



Filter Class: CFC\_60  
Max: 32.0 ° at 186.6 ms  
Min: -73.4 ° at 65.2 ms

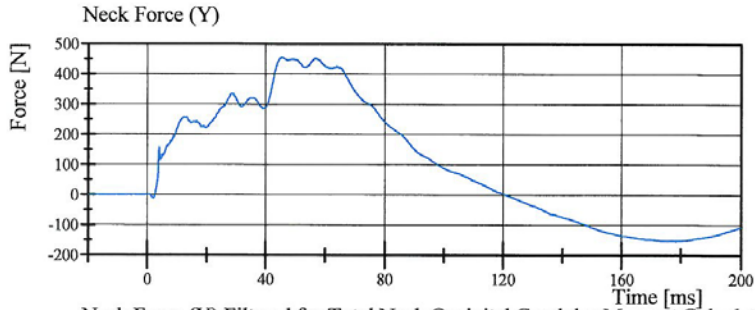
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 06:23:18 639

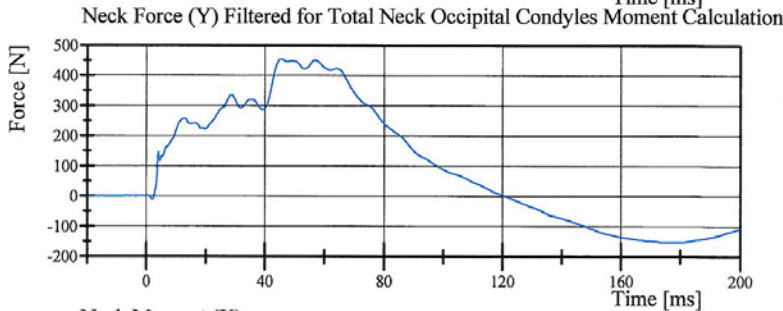


# Transportation Research Center Inc.

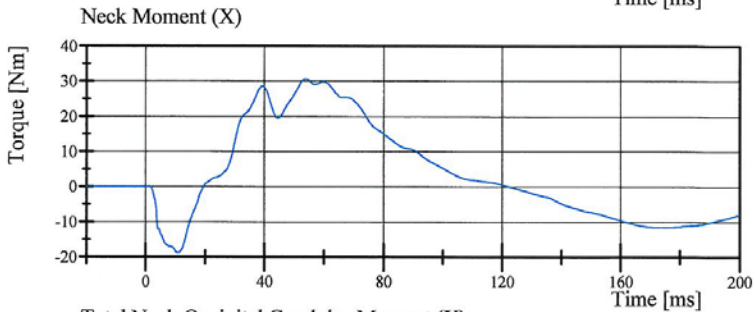
Left Lateral Neck  
SID IIs Serial No. 033 Certification No. 7-2  
Test Date: 11/25/2011



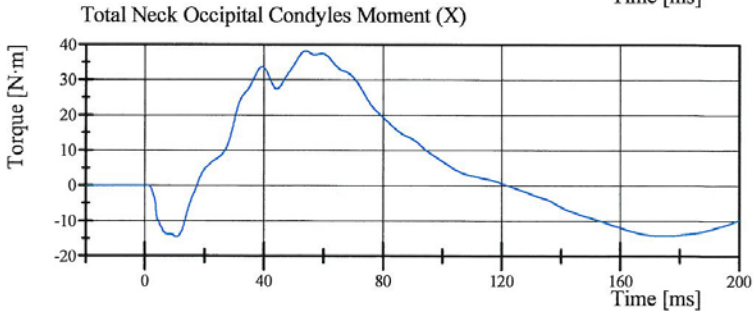
Filter Class: CFC\_1000  
Max: 456.5 N at 45.4 ms  
Min: -152.6 N at 178.3 ms



Filter Class: CFC\_600  
Max: 455.9 N at 45.4 ms  
Min: -151.9 N at 178.3 ms



Filter Class: CFC\_600  
Max: 30.7 Nm at 53.8 ms  
Min: -18.8 Nm at 10.9 ms



Filter Class: Without\_(Consta  
Max: 38.2 N·m at 53.8 ms  
Min: -14.6 N·m at 10.6 ms

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

11.25.2011 06:23:18 639



# Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 033 Certification No. 7-1

Test Date: 11/25/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.7 g	Yes
Shoulder Displacement	28 - 37 mm	29.7 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.5 g	Yes

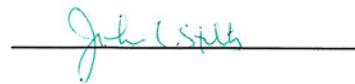
**Test meets specifications.**

**Comments:**

Technician



Approved



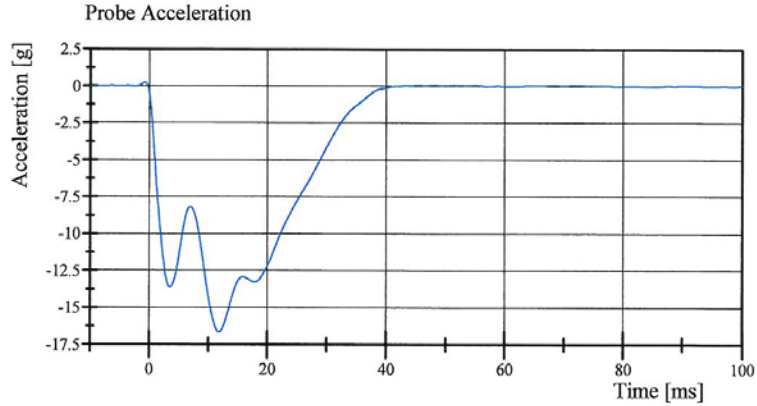
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 06:57:47 807

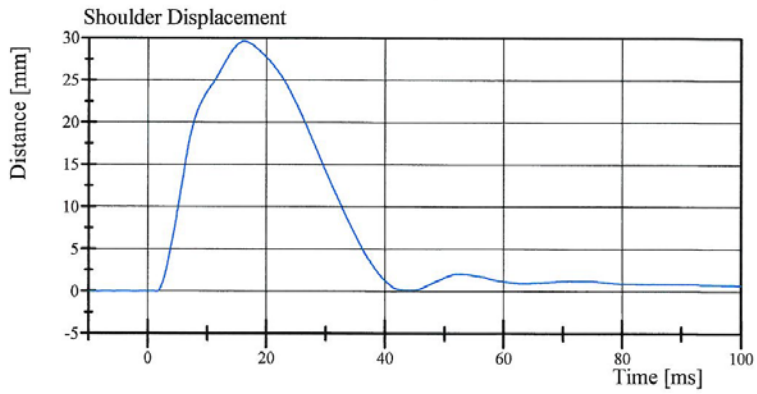


# Transportation Research Center Inc.

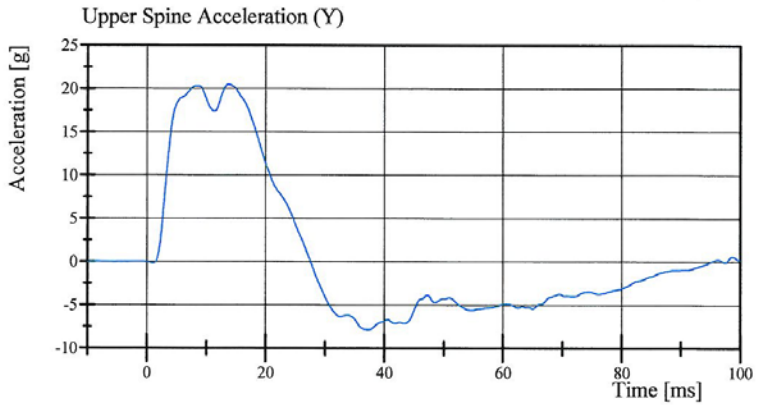
Left Lateral Shoulder  
SID IIs Serial No. 033 Certification No. 7-1  
Test Date: 11/25/2011



Filter Class: CFC\_180  
Max: 0.2 gn at -0.8 ms  
Min: -16.7 gn at 11.8 ms



Filter Class: CFC\_600  
Max: 29.7 mm at 16.2 ms  
Min: -0.0 mm at 1.5 ms



Filter Class: CFC\_180  
Max: 20.5 gn at 13.7 ms  
Min: -7.8 gn at 37.3 ms

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

11.25.2011 06:57:55 807



# Transportation Research Center Inc.

Left Lateral Thorax with Arm  
SID IIs Serial No. 033 Certification No. 7-6  
Test Date: 11/25/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.658 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.6 g	Yes
Shoulder Displacement	31 - 40 mm	33.1 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.1 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.8 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	37.0 g	Yes

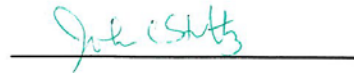
**Test meets specifications.**

**Comments:**

Technician



Approved



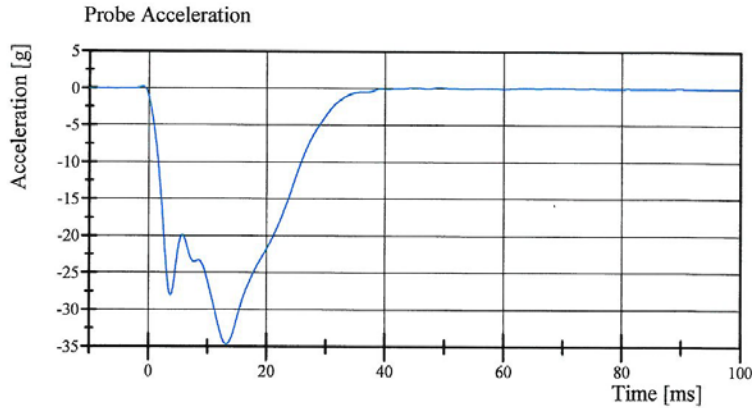
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 11:25:45 615

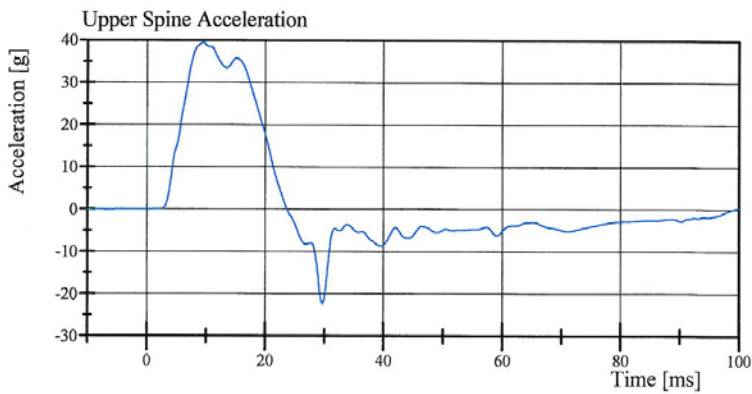


# Transportation Research Center Inc.

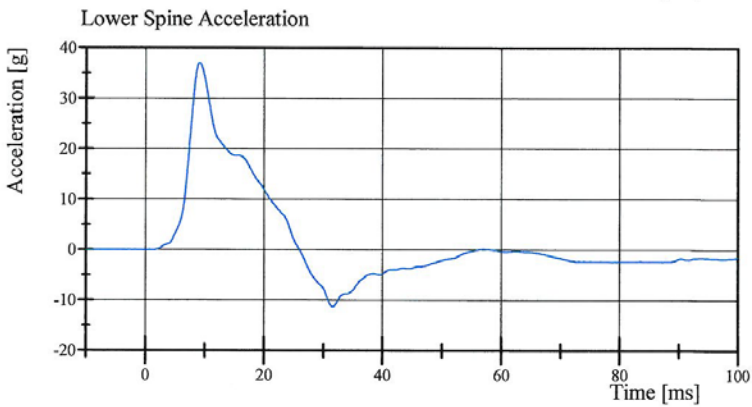
Left Lateral Thorax with Arm  
SID IIs Serial No. 033 Certification No. 7-6  
Test Date: 11/25/2011



Filter Class: CFC\_180  
Max: 0.2 gn at -1.0 ms  
Min: -34.6 gn at 13.2 ms



Filter Class: CFC\_180  
Max: 39.5 gn at 9.5 ms  
Min: -22.3 gn at 29.7 ms



Filter Class: CFC\_180  
Max: 37.0 gn at 9.1 ms  
Min: -11.3 gn at 31.6 ms

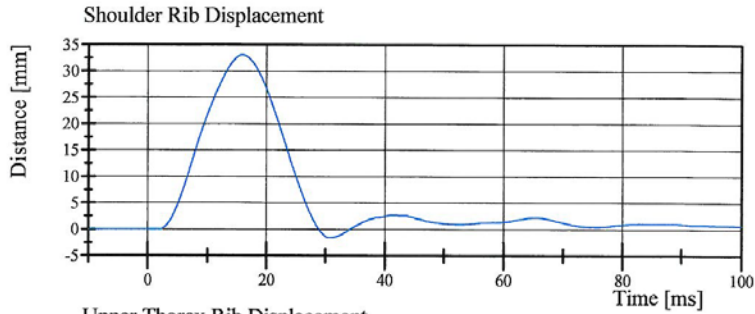
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 11:26:00 615

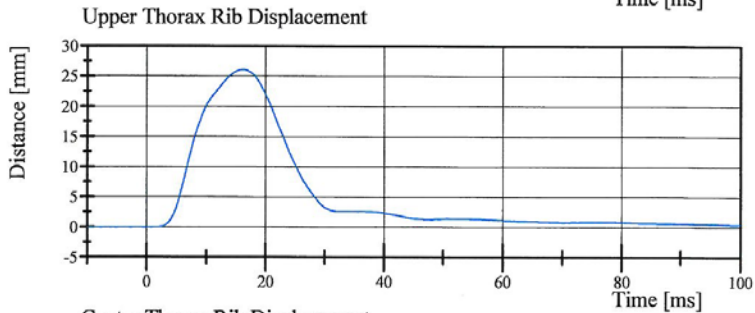


# Transportation Research Center Inc.

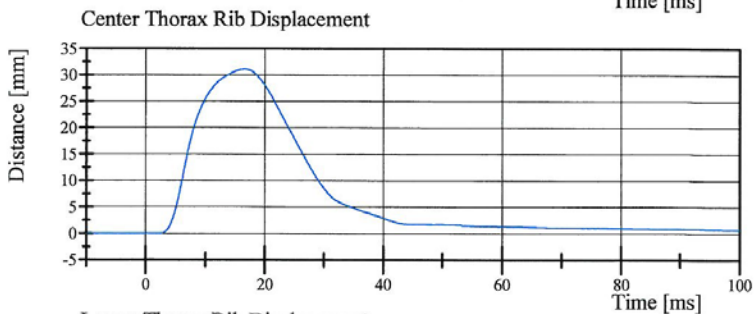
Left Lateral Thorax with Arm  
SID IIs Serial No. 033 Certification No. 7-6  
Test Date: 11/25/2011



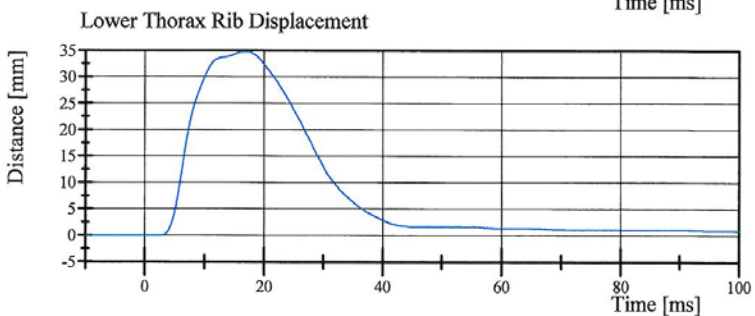
Filter Class: CFC\_600  
Max: 33.1 mm at 15.8 ms  
Min: -1.6 mm at 30.6 ms



Filter Class: CFC\_600  
Max: 26.1 mm at 16.2 ms  
Min: -0.0 mm at -2.7 ms



Filter Class: CFC\_600  
Max: 31.1 mm at 16.6 ms  
Min: -0.0 mm at -10.0 ms



Filter Class: CFC\_600  
Max: 34.8 mm at 16.6 ms  
Min: -0.0 mm at -3.8 ms

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

11.25.2011 11:26:01 615



## Transportation Research Center Inc.

Left Lateral Thorax without Arm  
SID IIs Serial No. 033 Certification No. 7-1  
Test Date: 11/25/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.358 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.9 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	33.7 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	39.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.9 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.2 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.8 g	Yes

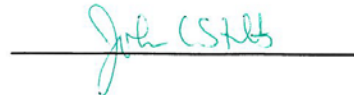
**Test meets specifications.**

**Comments:**

Technician



Approved



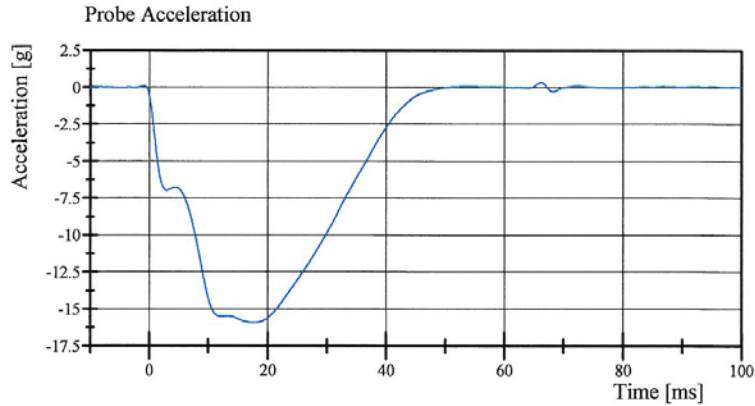
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 09:39:13 797

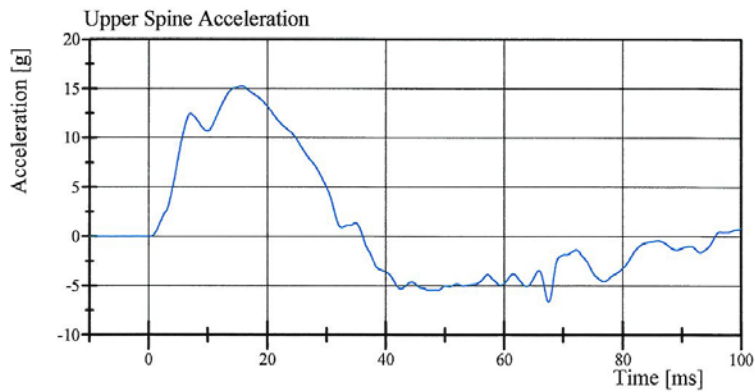


# Transportation Research Center Inc.

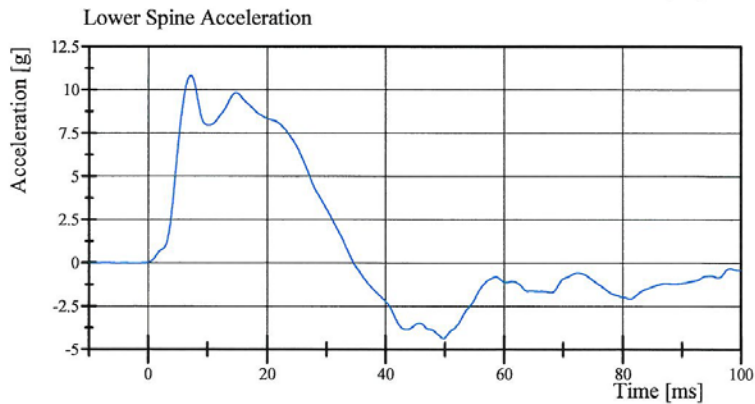
Left Lateral Thorax without Arm  
SID IIs Serial No. 033 Certification No. 7-1  
Test Date: 11/25/2011



Filter Class: CFC\_180  
Max: 0.3 gn at 66.2 ms  
Min: -15.9 gn at 17.8 ms



Filter Class: CFC\_180  
Max: 15.2 gn at 15.7 ms  
Min: -6.6 gn at 67.5 ms



Filter Class: CFC\_180  
Max: 10.8 gn at 7.2 ms  
Min: -4.4 gn at 49.8 ms

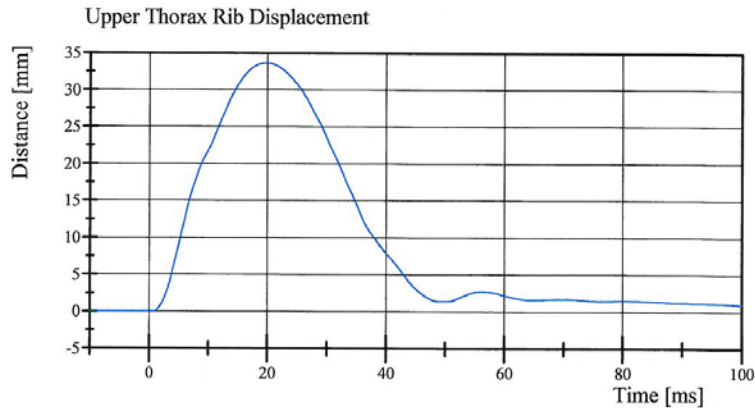
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 09:39:21 797

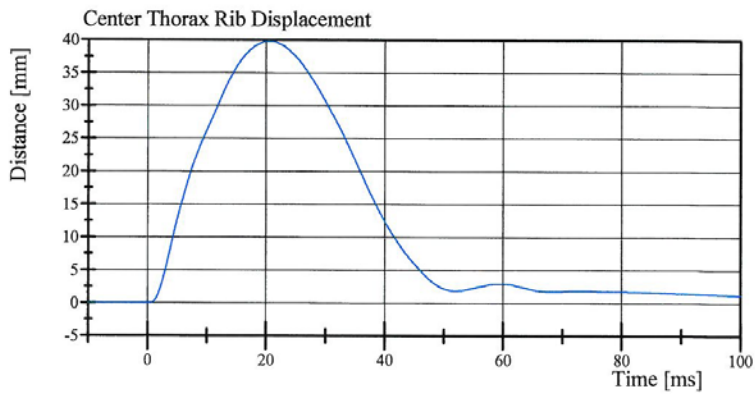


# Transportation Research Center Inc.

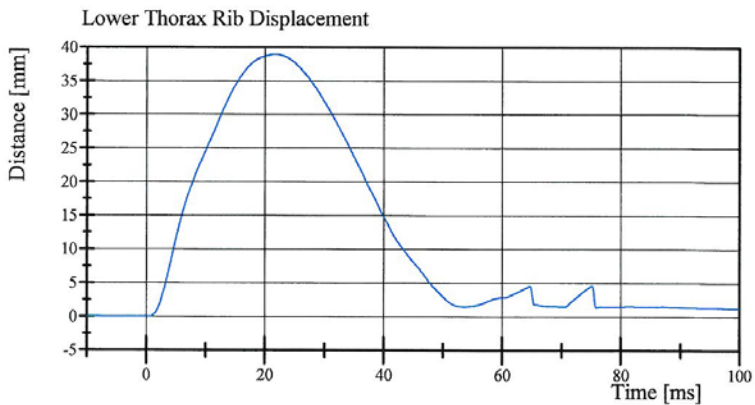
Left Lateral Thorax without Arm  
SID IIs Serial No. 033 Certification No. 7-1  
Test Date: 11/25/2011



Filter Class: CFC\_600  
Max: 33.7 mm at 19.8 ms  
Min: -0.0 mm at 0.6 ms



Filter Class: CFC\_600  
Max: 39.8 mm at 20.6 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 0.5 ms

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

11.25.2011 09:39:22 797



# Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 033 Certification No. 7-1

Test Date: 11/25/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.9 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.9 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.13 g	Yes

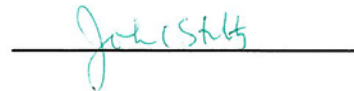
**Test meets specifications.**

**Comments:**

Technician



Approved



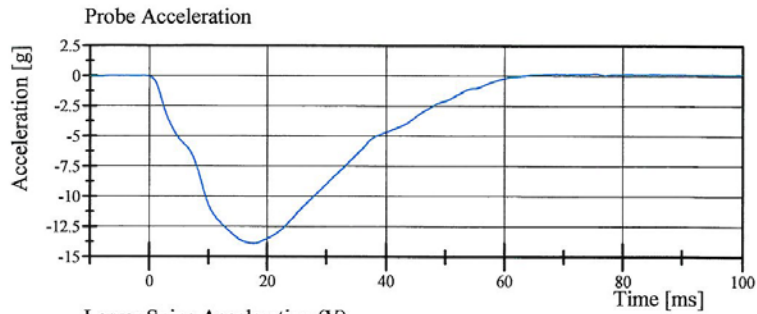
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 08:41:41 628

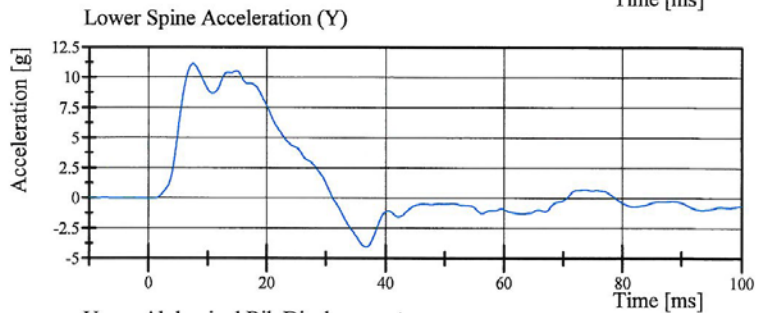


# Transportation Research Center Inc.

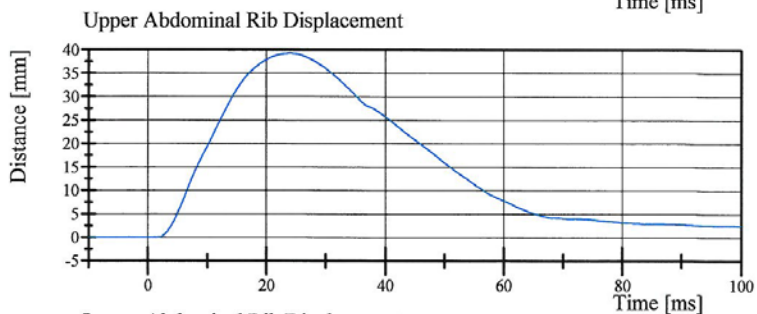
Left Lateral Abdomen  
SID IIs Serial No. 033 Certification No. 7-1  
Test Date: 11/25/2011



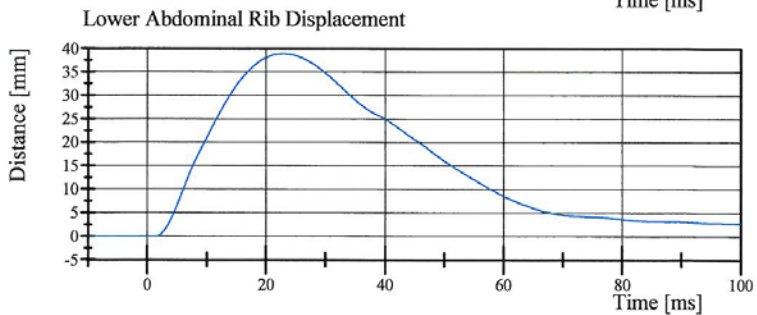
Filter Class: CFC\_180  
Max: 0.2 gn at 75.4 ms  
Min: -13.9 gn at 17.6 ms



Filter Class: CFC\_180  
Max: 11.1 gn at 7.4 ms  
Min: -4.0 gn at 36.8 ms



Filter Class: CFC\_600  
Max: 39.2 mm at 23.9 ms  
Min: -0.0 mm at 1.6 ms



Filter Class: CFC\_600  
Max: 38.9 mm at 22.9 ms  
Min: -0.0 mm at -9.0 ms

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

11.25.2011 08:41:48 628



## Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 033 Certification No. 7-3

Test Date: 11/25/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.60 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.25 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.3 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,148.3 N	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



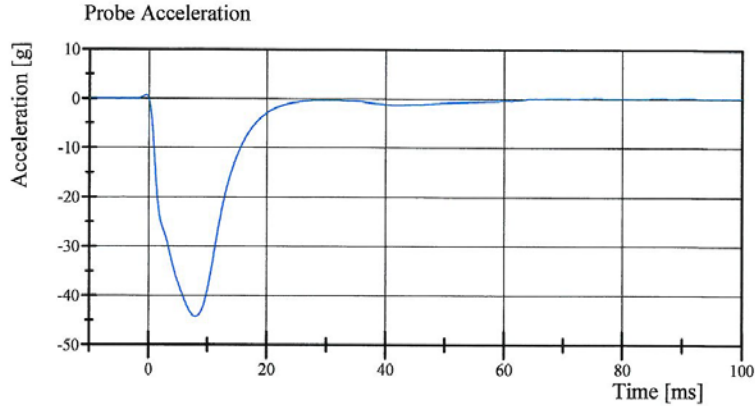
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.25.2011 15:07:10 432

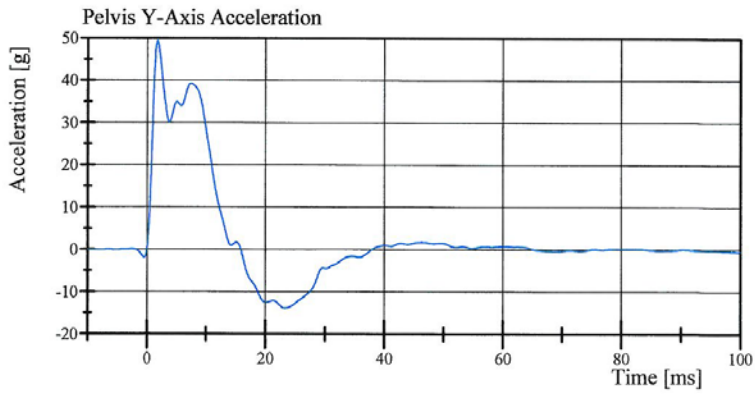


# Transportation Research Center Inc.

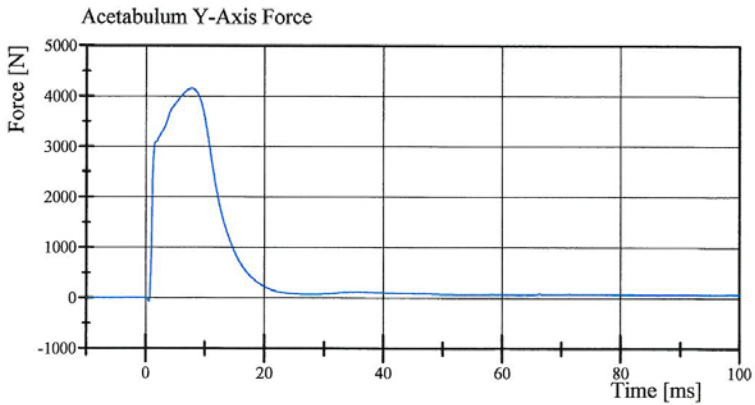
Left Lateral Pelvis  
SID IIs Serial No. 033 Certification No. 7-3  
Test Date: 11/25/2011



Filter Class: CFC\_180  
Max: 0.7 gn at -0.5 ms  
Min: -44.3 gn at 8.0 ms



Filter Class: CFC\_180  
Max: 49.4 gn at 1.8 ms  
Min: -13.9 gn at 23.3 ms



Filter Class: CFC\_600  
Max: 4,148.3 N at 7.8 ms  
Min: -67.9 N at 0.6 ms

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

11.25.2011 15:07:17 432



# Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 033 Certification No. 7-2

Test Date: 11/28/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.40 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-38.7 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.8 g	Yes
Iliac Force	4,100 - 5,100 N	4,414.1 N	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



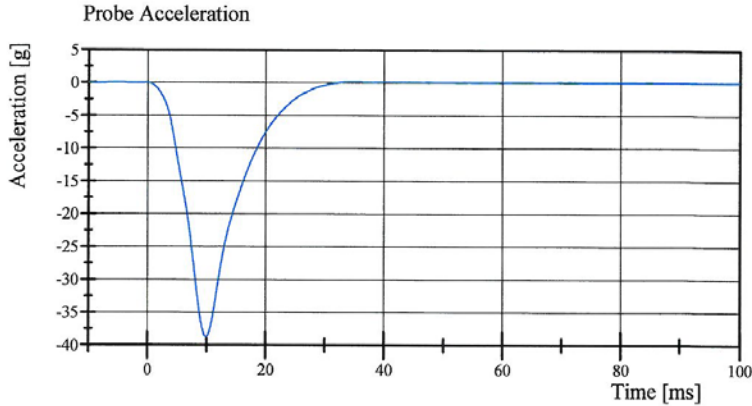
Specification Source: Procedures based on Final Rule effective 8/24/2009  
Polarity in accordance with SAE J211.

11.28.2011 07:32:32 632

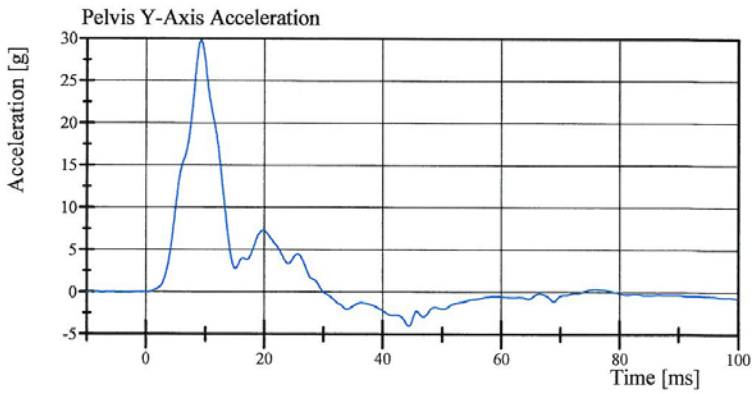


# Transportation Research Center Inc.

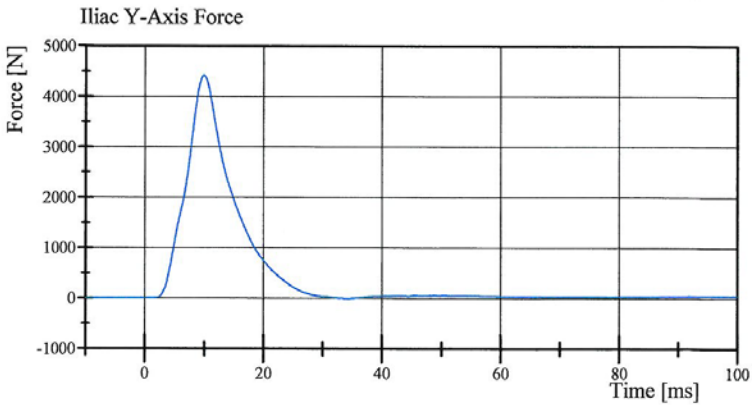
Left Lateral Iliac  
SID IIs Serial No. 033 Certification No. 7-2  
Test Date: 11/28/2011



Filter Class: CFC\_180  
Max: 0.2 gn at 34.6 ms  
Min: -38.7 gn at 9.9 ms



Filter Class: CFC\_180  
Max: 29.8 gn at 9.3 ms  
Min: -4.1 gn at 44.4 ms



Filter Class: CFC\_600  
Max: 4,414.1 N at 9.9 ms  
Min: -3.6 N at 34.1 ms

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

11.28.2011 07:32:42 632



**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	11/16/11
		Y	P51702	ENDEVCO	11/16/11
		Z	P52083	ENDEVCO	11/16/11
Thoracic Rib Displacement Potentiometers	Upper	Y	175	FTSS	11/16/11
	Middle	Y	174	FTSS	11/16/11
	Lower	Y	173	FTSS	11/16/11
Abdomen Load Cells	Upper	Y	1441	DENTON	11/16/11
	Middle	Y	1436	DENTON	11/16/11
	Lower	Y	1437	DENTON	11/16/11
Lower Spine Accelerometers (T12)		X	P73381	ENDEVCO	08/16/11
		Y	P73580	ENDEVCO	08/16/11
		Z	P59005	ENDEVCO	11/16/11
Acetabulum Load Cell		Y			
Pubic Symphysis Load Cell		Y	457-FY	DENTON	11/16/11

**TABLE 2 – Dummy Instrumentation (SID-IIs)**

			SID-IIs S/N 033			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers		X	J32214	ENDEVCO	11/16/11	
		Y	J27040	ENDEVCO	11/16/11	
		Z	AGAC4	ENDEVCO	11/16/11	
Displacement Potentiometers	Shoulder		Y			
	Thoracic Rib	Upper	Y	592	SERVO	11/16/11
		Middle	Y	213	SERVO	11/16/11
		Lower	Y	714	SERVO	11/16/11
	Abdominal Rib	Upper	Y	918	SERVO	11/16/11
		Lower	Y	904	SERVO	11/16/11
Lower Spine Accelerometers (T12)		X	00L13-F05	ENTRAN	11/16/11	
		Y	03D03D16-F04	ENTRAN	11/16/11	
		Z	04J04I20-A17	ENTRAN	11/16/11	
Acetabulum Load Cell		Y	235-FY	FTSS	11/16/11	
Iliac Wing Load Cell		Y	113-FY	FTSS	11/16/11	
Pelvis Plug (struck side)						
Pelvis Plug (non-struck side)						

**TABLE 3 – Vehicle Instrumentation**

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P54573	ENDEVCO	08/17/11
	Vehicle Center of Gravity	Y	P50890	ENDEVCO	08/17/11
	Vehicle Center of Gravity	Z	P54832	ENDEVCO	08/17/11
2	Right Sill at Front Seat	X	P73271	ENDEVCO	08/11/11
	Right Sill at Front Seat	Y	P73577	ENDEVCO	08/11/11
	Right Sill at Front Seat	Z	P61400	ENDEVCO	08/24/11
3	Right Sill at Rear Seat	X	P64893	ENDEVCO	05/31/11
	Right Sill at Rear Seat	Y	P63129	ENDEVCO	05/31/11
	Right Sill at Rear Seat	Z	P61270	ENDEVCO	08/17/11
4	Left Sill at Front Door	Y	P68551	ENDEVCO	06/02/11
5	Left Sill at Rear Door	Y	P69088	ENDEVCO	08/19/11
6	Left A-Post Lower	Y	P62664	ENDEVCO	11/10/11
7	Left A-Post Middle	Y	P63196	ENDEVCO	08/17/11
8	Left B-Post Lower	Y	P49880	ENDEVCO	08/17/11
9	Left B-Post Middle	Y	P46962	ENDEVCO	08/17/11
10	Front Seat Track	Y	P69071	ENDEVCO	08/11/11
11	Rear Seat Track or Structure	Y	P73618	ENDEVCO	08/11/11
12	Right Rear Occupant Compartment	Y	P73594	ENDEVCO	08/18/11
13	Engine Block	X	P73569	ENDEVCO	08/18/11
	Engine Block	Y	P73387	ENDEVCO	08/18/11
14	Rear Floorpan Above Axle	X	P73619	ENDEVCO	08/11/11
	Rear Floorpan Above Axle	Y	P69082	ENDEVCO	08/11/11
	Rear Floorpan Above Axle	Z	P73591	ENDEVCO	08/11/11

**TABLE 4 – MDB Instrumentation**

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P73375	ENDEVCO	08/18/11
MDB Center of Gravity	Y	P73623	ENDEVCO	08/16/11
MDB Center of Gravity	Z	P73382	ENDEVCO	08/18/11
Left Frame Rail at Rear Axle Centerline	X	P73621	ENDEVCO	08/16/11
Left Frame Rail at Rear Axle Centerline	Y	P73622	ENDEVCO	08/18/11