

FINAL REPORT NUMBER: SINCAP-TRC-14-002

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

**Daimler AG Stuttgart
2014 Mercedes-Benz E-350 4-Door Sedan
NHTSA NUMBER: M20144302**

**PREPARED BY:
Transportation Research Center Inc.
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Report Date: December 19, 2013

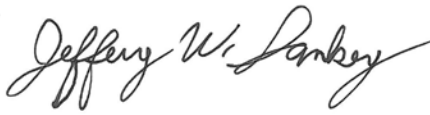
FINAL REPORT

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

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Report Approved By: 
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Approval Date: December 19, 2013

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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16. Abstract This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2014 Mercedes-Benz E-350 4-door sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on November 15, 2013. The impact velocity of the Moving Deformable Barrier (MDB) was 61.47 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 22° C. The target vehicle post-test maximum crush was 129 mm at Level 3. The test vehicle's performance was as follows: Driver ATD (ES-2re) <table border="1"> <thead> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>92</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>9.8</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>530.4</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>1972.6</td></tr> </tbody> </table> Passenger ATD (SID-IIs) <table border="1"> <thead> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>244</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>60.1</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>3830.3</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>27.3</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>26.4</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	92	Maximum Thoracic Rib Deflection	mm	44	9.8	Total Abdominal Force	N	2500	530.4	Pubic Symphysis Force	N	6000	1972.6	Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	244	Lower Spine Resultant Acceleration	g's	82	60.1	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3830.3	Maximum Thoracic Rib Deflection	mm	38*	27.3	Maximum Abdominal Rib Deflection	mm	45*	26.4
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SECTION 1

TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2014 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00125. The purpose of this test is to generate comparative side impact performance in a 2014 Mercedes-Benz E-350 4-door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A 2014 Mercedes-Benz E-350 4-door sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.47 km/h (38.20 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on November 15, 2013. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated September 2013. The side impact event was documented by 11 cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen forward, middle, and rear y-axis load cells

Lower spine (T12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG triaxial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	92
Maximum Thoracic Rib Deflection	mm	44	9.8
Combined Abdominal Force	N	2500	530.4
Pubic Symphysis Force	N	6000	1972.6

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	244
Lower Spine (T12) Resultant Acceleration	G	82	60.1
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3830.3
Maximum Thoracic Rib Deflection	mm	38*	27.3
Maximum Abdominal Rib Deflection	mm	45*	26.4

* Proposed IARV

Supplemental Restraint Information is given below:

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

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact or the static rollover test which followed. Injury values for both ATDs were within the established performance thresholds. The restraint system performed as expected. The vehicle had secondary impact with the cart on the left front bumper and fender.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20144302
Model Year	2014
Make	Mercedes-Benz
Model	E-350
Body Style	4-door
VIN	WDDHF5KB3EA860950
Body Color	Grey
Odometer Reading (km/mi)	23 mi
Engine Displacement (L)	3.5
Type/No. Cylinders	6
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

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

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Daimler AG Stuttgart
Date of Manufacture	07/13
Vehicle Type	Passenger Car

GVWR (kg)	2300
GAWR Front (kg)	1095
GAWR Rear (kg)	1235

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

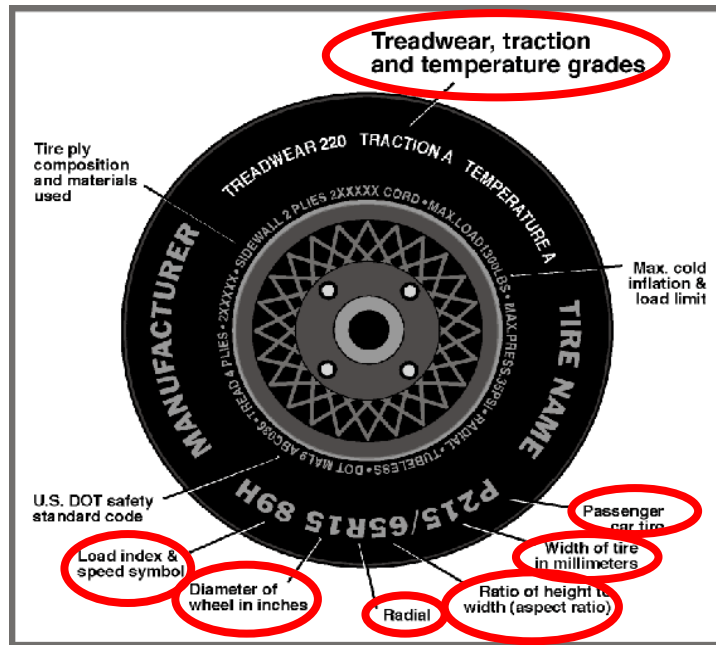
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	0	5
Capacity Weight (VCW) (kg)				375
DSC x 68.08 (kg)				340.4
Cargo Weight (RCLW) (kg)				34.6

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes	N/A	N/A		N/A	N/A	Yes
Rear or Second Row Seat	N/A	Yes	N/A	Yes	Yes	N/A	N/A
Third Row Seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	290
Recommended Tire Size	245/40R18 Extra Load	245/40R18 Extra Load
Tire Size on Vehicle	245/40R18 Extra Load	245/40R18 Extra Load
Tire Manufacturer	Continental	Continental
Tire Model	ContiProContact	ContiProContact
Treadwear	400	400
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	5	5
Load Index/Speed Symbol	97V	97V
Tire Material	Rayon, steel & polyamide	Rayon, steel & polyamide
DOT Safety Code Left	HW2P N1H6 2713	HW2P N1H6 2513
DOT Safety Code Right	HW2P N1H6 2713	HW2P N1H6 2613

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

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	221	220	221	221
Tire Placard	kPa	240	240	290	290
Owner's Manual	kPa	240	240	290	290
As Tested	kPa	240	240	290	290

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	448.2	432.4		493.8	477.8		490.8	508.8	
Right	kg	470.8	425.4		485.4	474.8		476.2	474.2	
Ratio	%	51.7	48.3		50.7	49.3		49.6	50.4	
Totals	kg	919.0	857.8	1776.8	979.2	952.6	1931.8	967.0	983.0	1950.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1776.8	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	34.6	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1936.4	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	669	665	Yes
RF	mm	674	665	Yes
RR	mm	677	680	Yes
LR	mm	668	673	Yes
Vehicle CG (Aft of Front Axle)	mm	1452	1420	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+20	+5	

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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast : None	0.0
Removed: Trunk lid and liner and right tail light	13.6

DATA SHEET NO. 2

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

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	20.0	8.5	14.3
Front Passenger Seat	20.2	8.8	14.5
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	17.0
Non-Struck Side Rear Seat	Fixed	N/A	17.2
Rear Center Seat*	Fixed	N/A	17.9

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	14.3	155	Max	160	178	196
			Mid	136	155	173
			Min	110	131	149
Front Passenger Seat	14.5	138	Max	142	161	179
			Mid	118	138	156
			Min	94	113	131
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	17.0	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	17.2	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	17.9	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

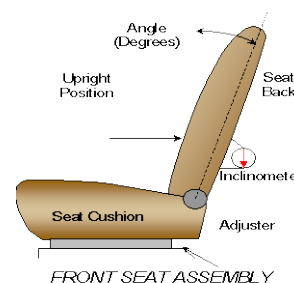
Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	274	N/A	137	N/A
Front Passenger Seat	274	N/A	137	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents	Degrees	Detent
Driver Seat w/ Seated Dummy	90+	N/A	21.0	N/A
Front Passenger Seat	90+	N/A	21.0	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	25.1	N/A	N/A	N/A
Non-Struck Side Rear Seat	25.1	N/A	N/A	N/A
Rear Center Seat*	22.0	N/A	N/A	N/A

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4, Numbered from 0 to 3	0, Uppermost
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	Power	Uppermost
Rear Seat	5, Numbered from 0 to 4	4, Lowermost

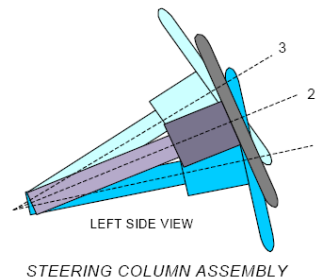
DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

STEERING COLUMN ADJUSTMENT

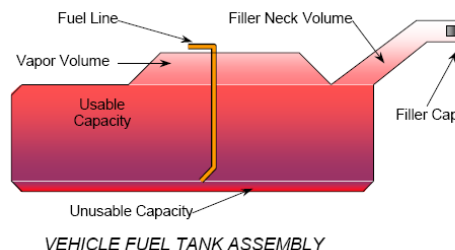
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.



	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	69.3	200
Geometric Center, Position No. 2	67.3	200
Uppermost, Position No. 3	65.2	200
Telescoping Steering Wheel Travel		248
Test Position	67.3	224

FUEL PUMP

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



FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	80.0
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	80.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	74.4
Actual Amount of Solvent Used in Test	74.4
1/3 of Usable Capacity	26.7

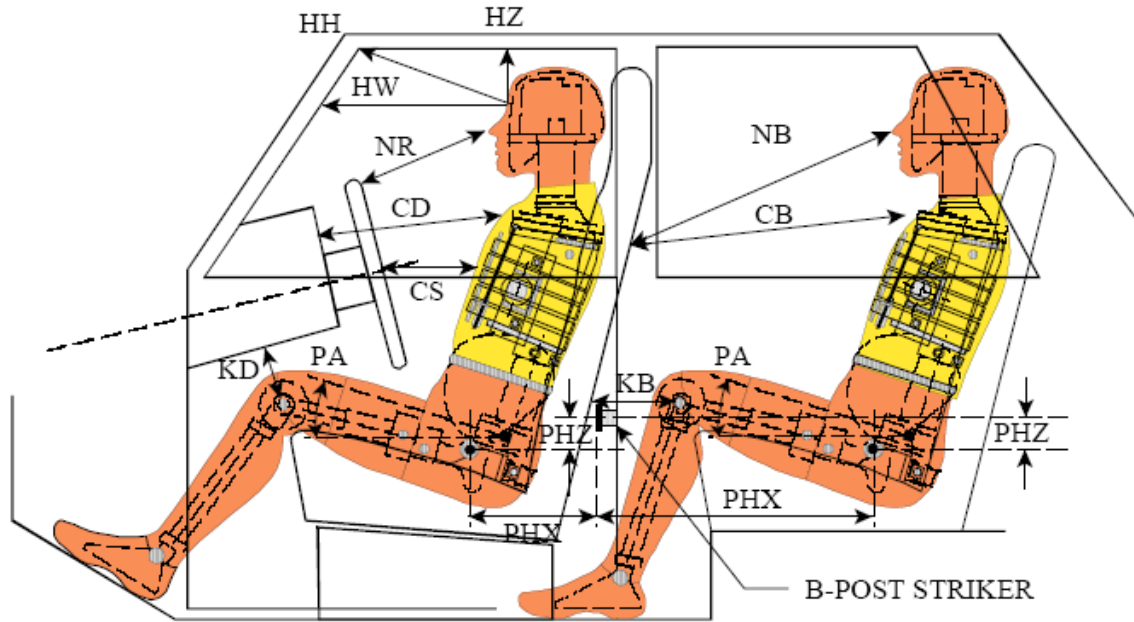
Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in on Form No. 1? ☒ YES ☐ NO

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan
Test Program: NCAP Side Impact

NHTSA No.: M20144302
Test Date: 11/15/13



LEFT SIDE VIEW

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

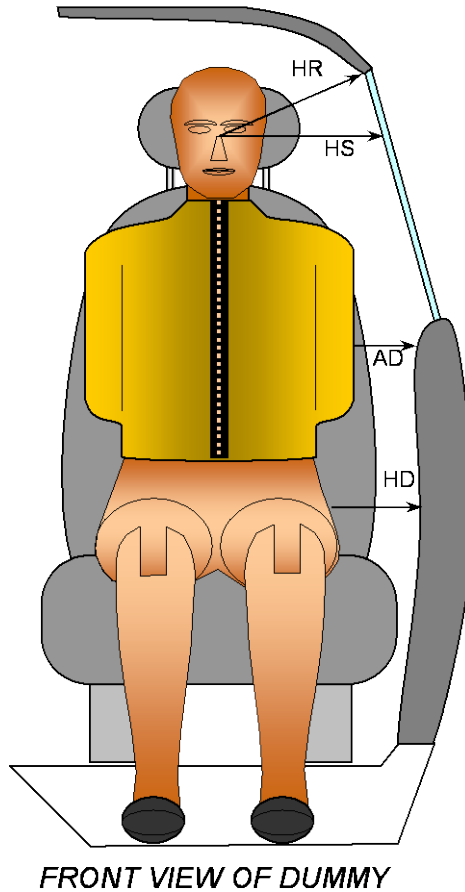
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	356			
HW		Header to Windshield	572			
HZ	HZ	Head to Roof Liner	169		281	
NR	NB	Nose to Rim/Seat Back	443		544	
CD	CB	Chest to Dash/Seat Back	556		529	
CS		Chest to Steering Wheel	433			
KD(L)/KDA(L) ⁰	KB(L)/KBA(L) ⁰	Left Knee to Dash/Seat Back	200	42	260	5.2
KD(R)/KDA(R) ⁰	KB(R)/KBA(R) ⁰	Right Knee to Dash/Seat Back	195	40	263	5.0
PAX ⁰	PAX ⁰	Pelvic Tilt Angle X		20.7		20.7
	PAY ⁰	Pelvic Tilt Angle Y				1.8
PHX	PHX	Hip Point to Striker (X-Axis)	151		238	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	215		275	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan
 Test Program: NCAP Side Impact

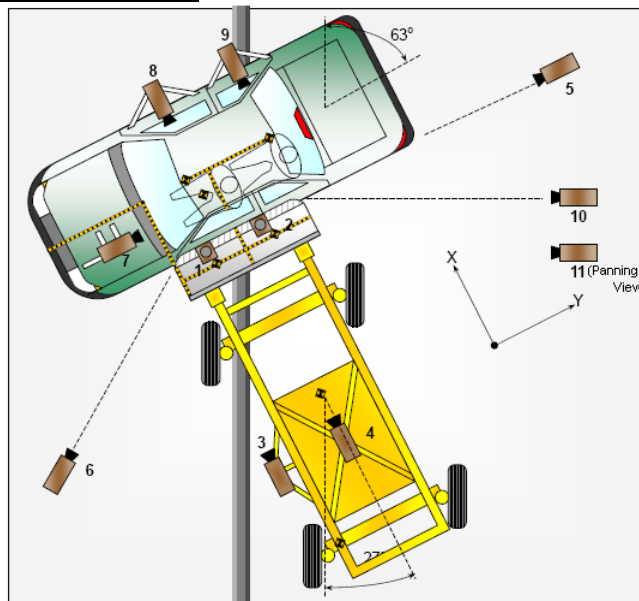
NHTSA No.: M20144302
 Test Date: 11/15/13



Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	201	283
HS	Head to Side Window	mm	342	414
AD	Arm to Door	mm	97	183
HD	H-Point to Door	mm	160	171

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	1220	-5758	8.5	1000
2	Overhead Close-up	0	840	-5758	16	1000
3	Left Impact Point (MDB)	1819	-855	-819	25	1000
4	Side Overall (MDB)	2501	0	-1447	6	1000
5	Rear	-115	8394	-1156	Zoom	1000
6	Left Front	3021	-5637	-1128	Zoom	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				8.5	1000
9	Passenger Side (OB)				8.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

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

*All measurements accurate to ± 6 mm.

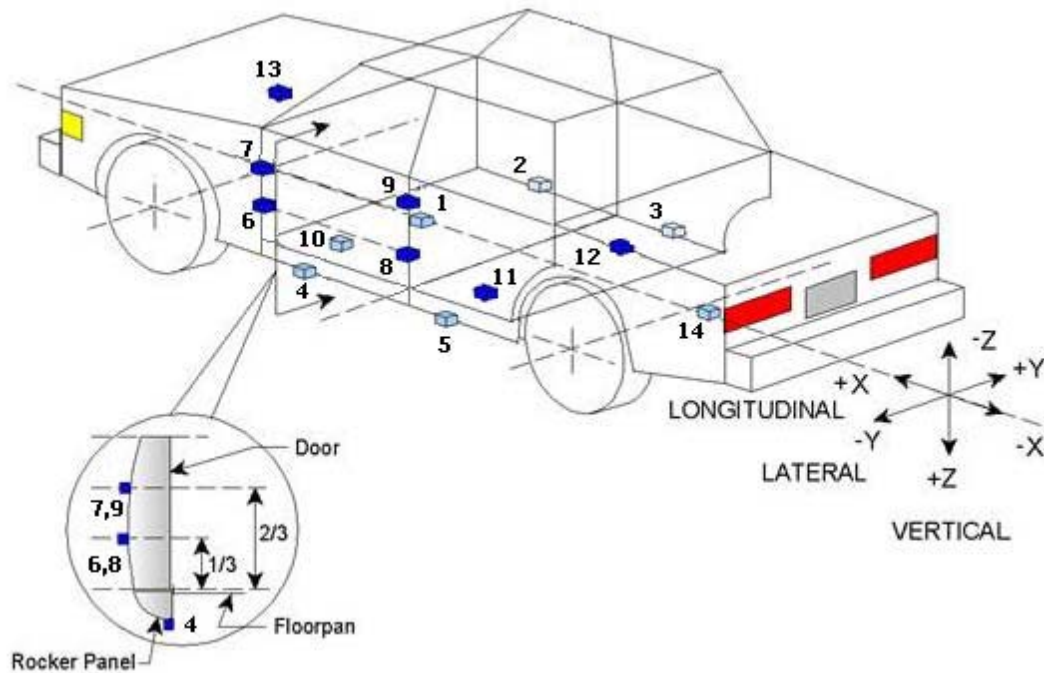
If applicable, explain why camera(s) did not operate as intended:

INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
Test Program: NCAP Side Impact Test Date: 11/15/13



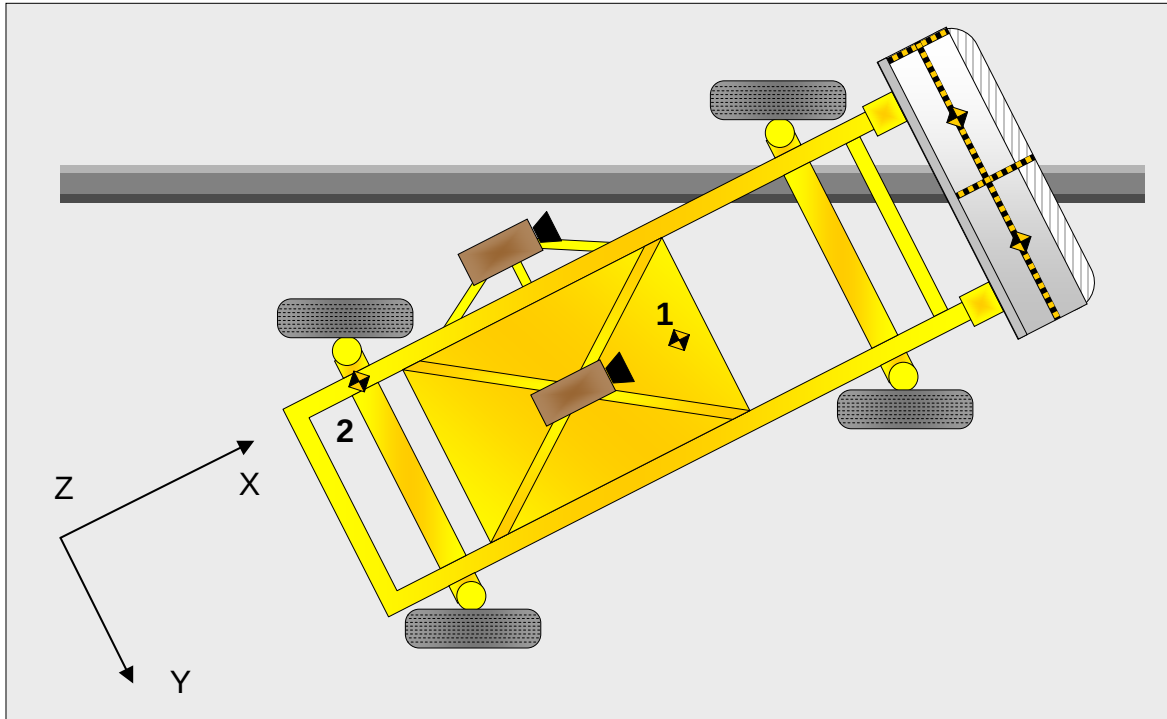
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3325	-125	-364
2	Right Sill at Front Seat	3435	710	-307
3	Right Sill at Rear Seat	2535	710	-272
4	Left Sill at Front Door	3445	-710	-300
5	Left Sill at Rear Door	2502	-710	-280
6	A-Post Lower	3815	-830	-500
7	A-Post Middle	3815	-830	-825
8	B-Post Lower	2752	-830	-560
9	B-Post Middle	2717	-830	-875
10	Front Seat Track	3032	-565	-238
11	Rear Seat Structure	2115	-590	-367
12	Right Rear Occ. Compartment	2398	435	-433
13	Engine Block	4315	-25	-856
14	Rear Above Axle	1475	0	-492

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13



MDB ACCELEROMETER LOCATIONS

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

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
Test Program: NCAP Side Impact Test Date: 11/15/13

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST TEST DOOR PERFORMANCE

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

POST TEST SEAT PERFORMANCE

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Slight Deformation
Sill Separation	None
Windshield Damage	None
Side Window Damage	Broken
Other Notable Effects	Secondary impact with cart on left front bumper and fender

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2880
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		498
Actual Impact Point (Aft of Front Axle)	mm		498
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-4

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
Test Program: NCAP Side Impact Test Date: 11/15/13

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel Base of Framework Carriage	2591
C.G. Location aft of Front Axle	1107

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	408.4	274.6	683.0
Right	kg	374.6	310.0	684.6
Ratio	%	57.3	42.7	100.0
Totals	kg	783.0	584.6	1367.6

SPEED AND IMPACT ANGLE DATA

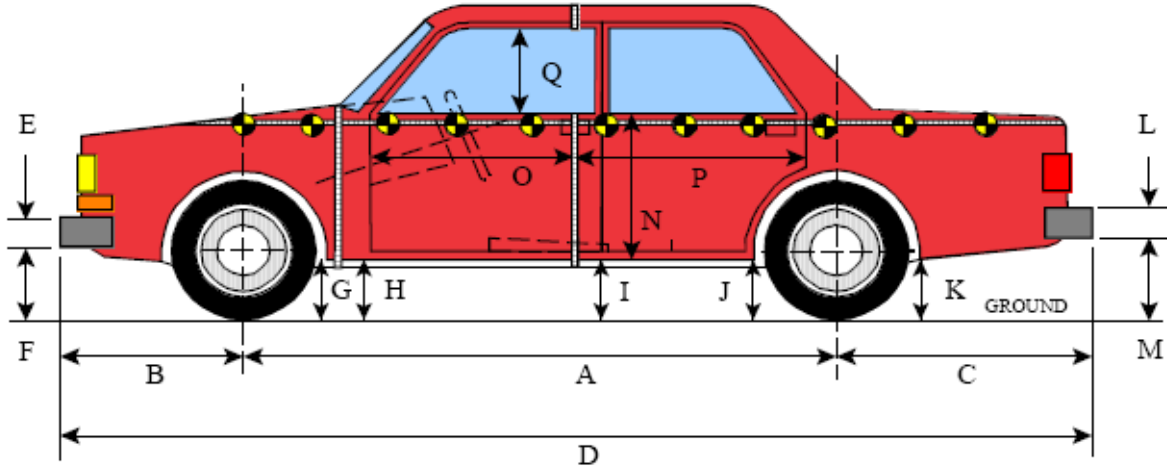
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.47
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.44
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.0

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	400	Right	-276
B	Top of Bumper	533	400	Right	-206
C	Mid-Level	686	800	Left	-216
D	Top of Stack	813	800	Left	-198

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
Test Program: NCAP Side Impact Test Date: 11/15/13

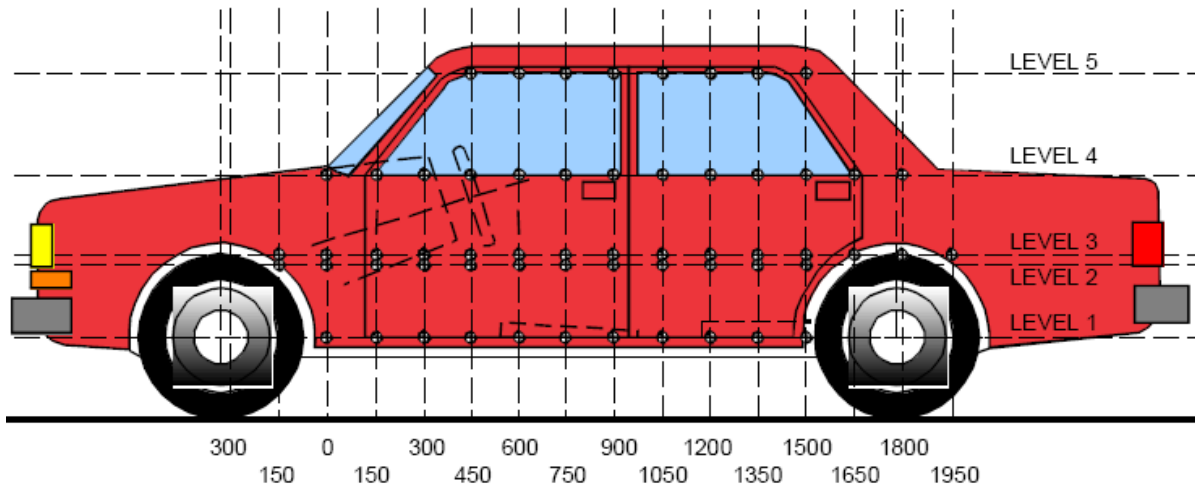


LEFT SIDE VIEW

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

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2880	2875	5
B	Front Axle to Front Surface of Vehicle	830	905	-75
C	Rear Axle to Rear Surface of Vehicle	1170	1155	15
D	Total Length at Centerline	4880	1943	2937
E	Front Bumper Thickness	803	803	0
F	Front Bumper Bottom to Ground	382	388	-6
G	Sill Height at Front Wheel Well	183	209	-26
H	Sill Height at Front Door Leading Edge	186	199	-13
I	Sill Height at B-Pillar	210	204	6
J1	Sill Height at Rear Wheel Well	236	256	-20
J2	Pinch Weld Height at Rear Wheel Well	160	180	-20
K	Sill Height Aft of Rear Wheel Well	280	304	-24
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	475	495	-20
N	Sill Height to Window Bottom Sill	720	695	25
O	Front Door Leading Edge to Impact CL	721	722	-1
P	Rear Door Trailing Edge to Impact CL	1558	1188	370
Q	Front Window Opening	395	380	15
R	Right Side Length	4700	4725	-25
S	Left Side Length	4700	4800	-100
T	Vehicle Width at B Pillar	1835	1870	-35

DATA SHEET NO. 11**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedanNHTSA No.: M20144302Test Program: NCAP Side ImpactTest Date: 11/15/13**LEFT SIDE VIEW****MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	334	78	1350
2	Driver Hip Point	492	120	1500
3	Mid-Door	614	129	1650
4	Window Sill	870	97	1800
5	Window Top	1414	3	1650

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

DATA SHEET NO. 11 (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

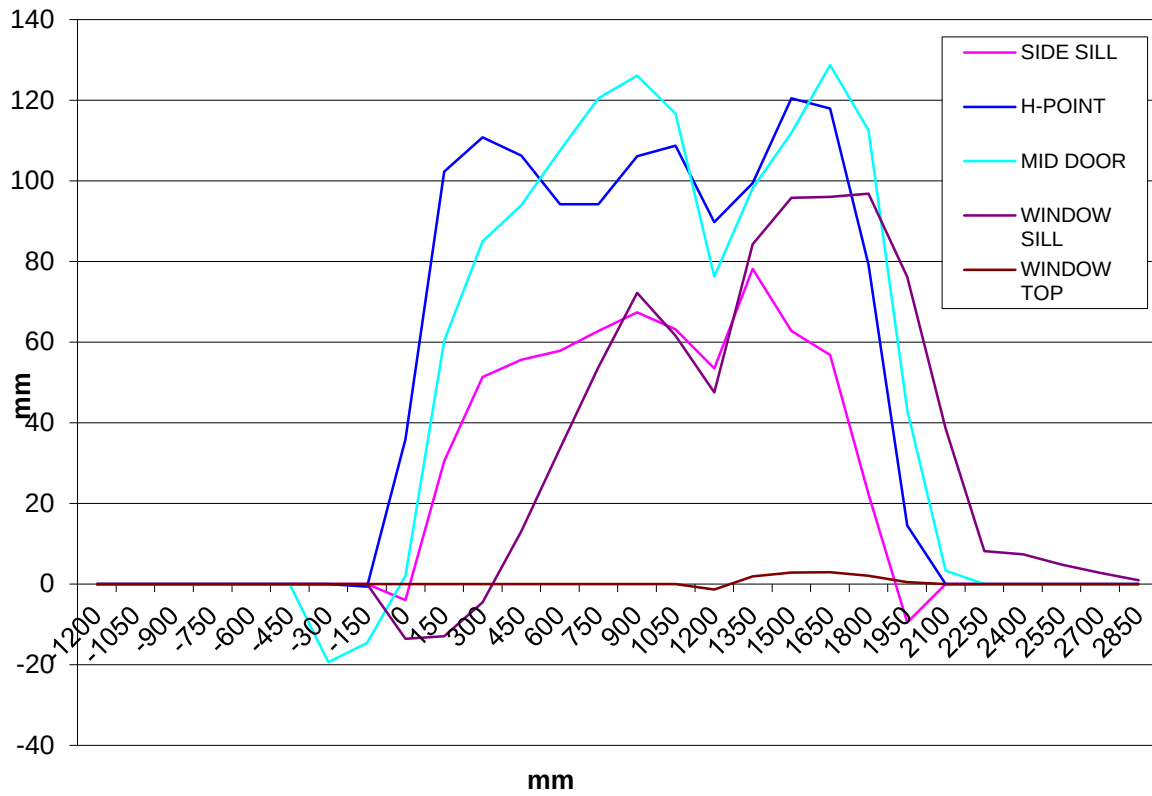
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	0	919	0	0	0	0	938	0	0	0	0	-19	0	0
-150	0	913	912	0	0	0	914	926	0	0	0	-1	-14	0	0
0	890	907	911	838	0	894	871	909	851	0	-4	36	2	-13	0
150	888	906	914	844	0	858	804	853	857	0	30	102	61	-13	0
300	886	907	916	855	0	835	796	831	859	0	51	111	85	-4	0
450	885	907	918	865	0	829	801	824	852	0	56	106	94	13	0
600	882	908	919	874	0	824	813	812	841	0	58	95	107	33	0
750	881	907	920	883	0	818	813	800	830	0	63	94	120	53	0
900	879	907	920	890	0	812	801	794	818	0	67	106	126	72	0
1050	878	906	919	889	0	815	798	803	827	0	63	108	116	62	0
1200	878	906	917	899	597	824	816	841	852	598	54	90	76	47	-1
1350	877	905	914	901	599	799	805	815	817	597	78	100	99	84	2
1500	878	904	912	903	598	815	784	800	807	595	63	120	112	96	3
1650	880	904	910	899	597	824	786	781	803	594	56	118	129	96	3
1800	885	904	909	894	595	863	825	796	797	593	22	79	113	97	2
1950	892	907	908	889	587	902	893	865	813	586	-10	14	43	76	1
2100	0	0	925	888	0	0	0	921	850	0	0	0	4	38	0
2250	0	0	0	890	0	0	0	0	882	0	0	0	0	8	0
2400	0	0	0	891	0	0	0	0	883	0	0	0	0	8	0
2550	0	0	0	886	0	0	0	0	881	0	0	0	0	5	0
2700	0	0	0	877	0	0	0	0	874	0	0	0	0	3	0
2850	0	0	0	863	0	0	0	0	862	0	0	0	0	1	0

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

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

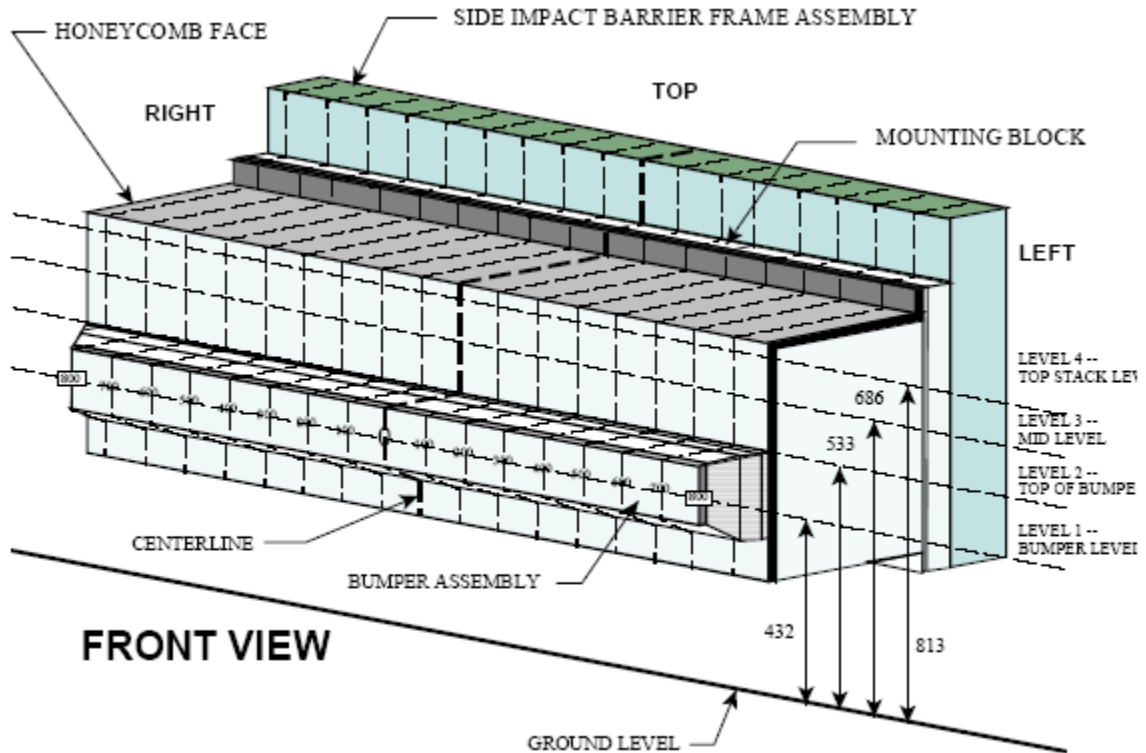
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2014 Mercedes-Benz E-350 4-door sedan	NHTSA No.:	M20144302
Test Program:	NCAP Side Impact	Test Date:	11/15/13



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	-150	-123	-118	-125	-169	-149	-113	-107	-95	-99	-110	-116	-132	-132	-147	-165	-198
2	-155	-128	-122	-130	-162	-166	-129	-101	-89	-82	-79	-82	-89	-101	-127	-162	-216
3	-192	-195	-198	-201	-206	-189	-172	-157	-149	-144	-147	-148	-150	-153	-157	-167	-192
4	-260	-250	-253	-260	-276	-259	-242	-226	-213	-209	-210	-212	-213	-215	-220	-240	-232

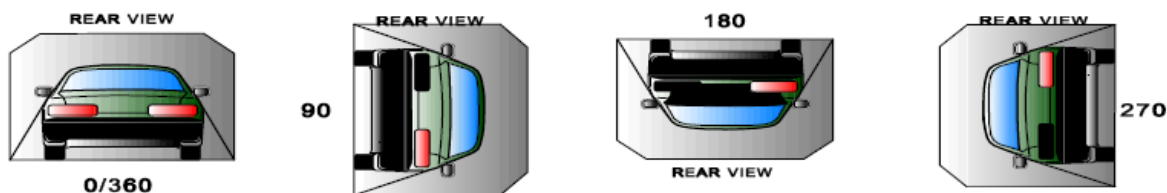
DATA SHEET NO. 13
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
 Test Program: NCAP Side Impact Test Date: 11/15/13

Test Time: 15:00 **Temperature:** 21.5

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

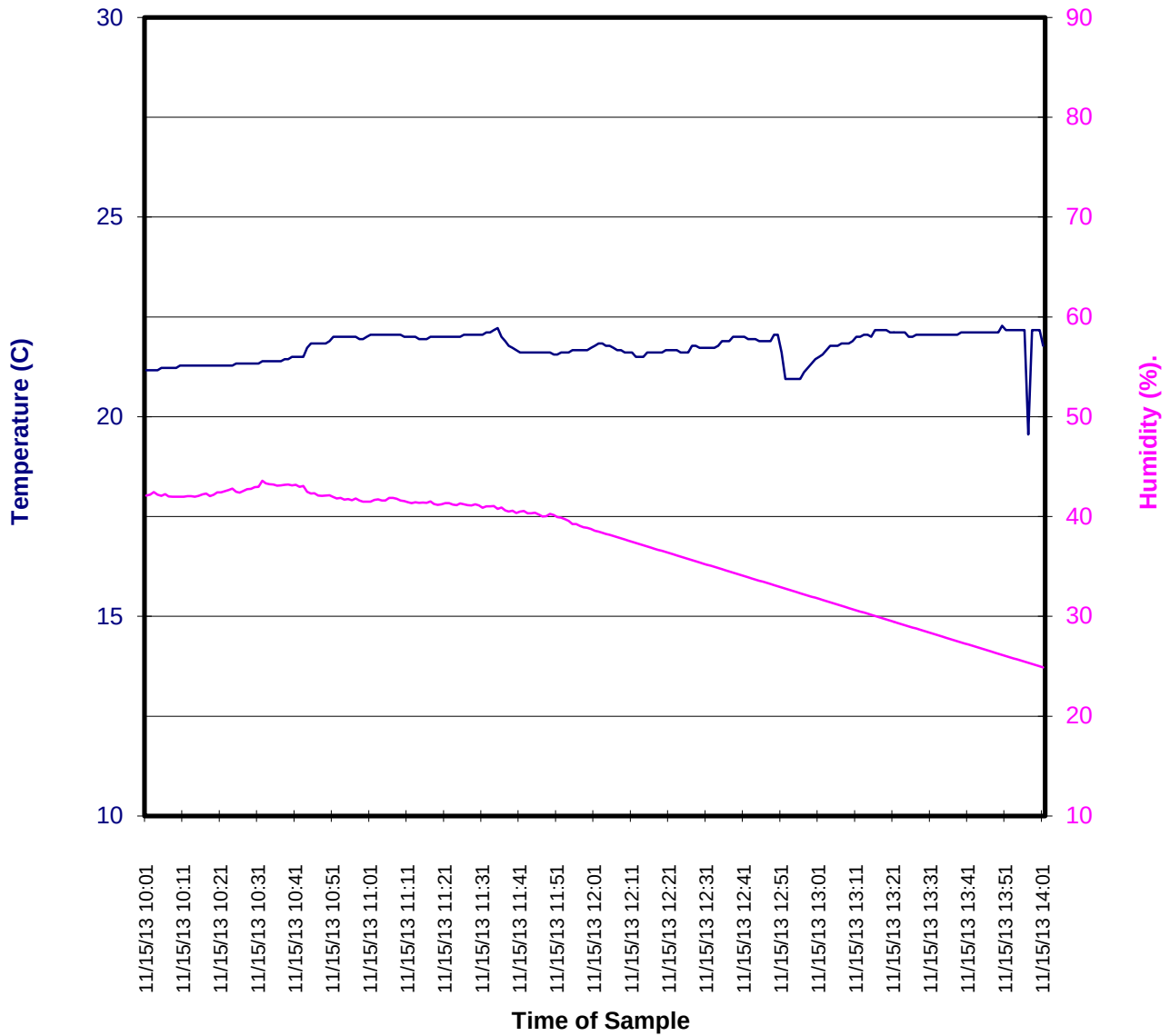
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2014 Mercedes-Benz E-350 4-door sedan NHTSA No.: M20144302
Test Program: NCAP Side Impact Test Date: 11/15/13

**M20144302 2014 Mercedes-Benz E-350 4-Door Sedan Left MDB Impact 131115:
Test Time 14:01**



APPENDIX A
PHOTOGRAPHS

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102	Monroney Label	A-56
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-57
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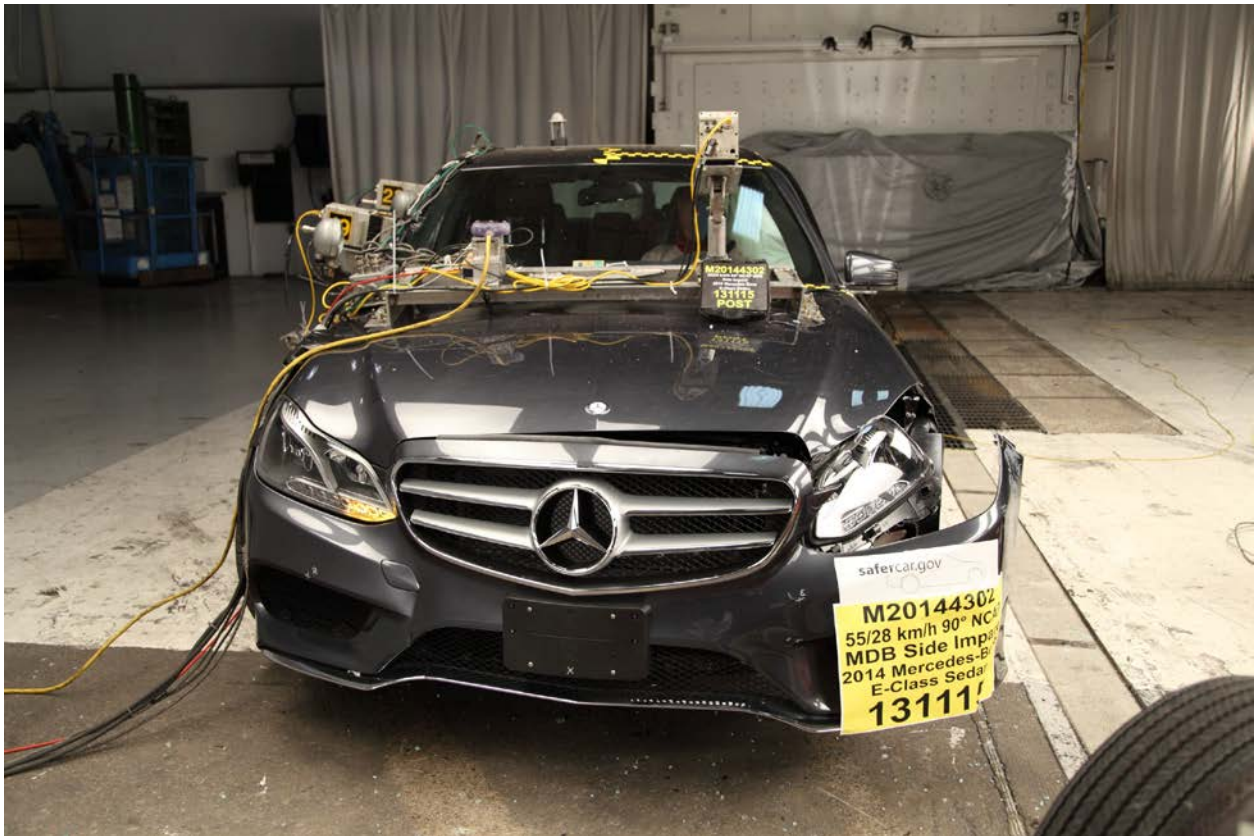
001 As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



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



003 Pre-Test Front View of Test Vehicle



004 Post-Test Front View of Test Vehicle



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



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



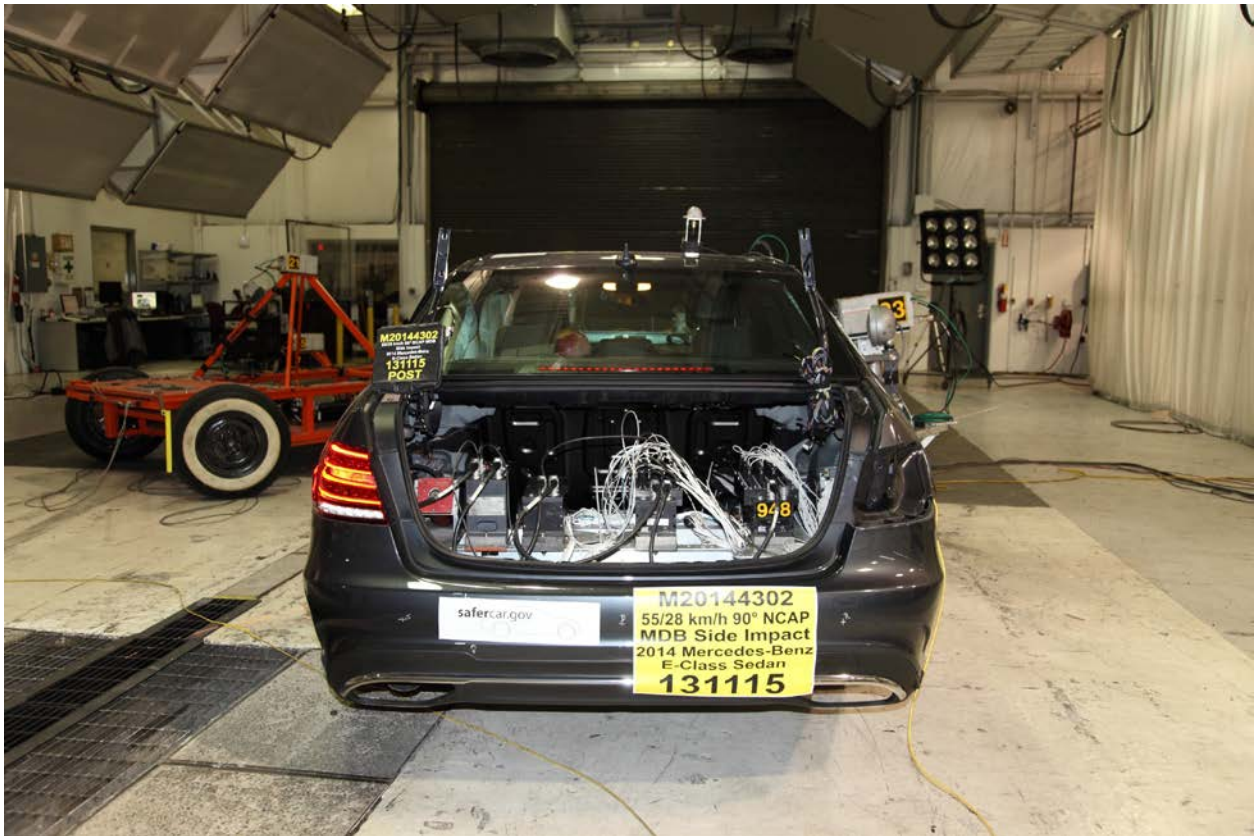
009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



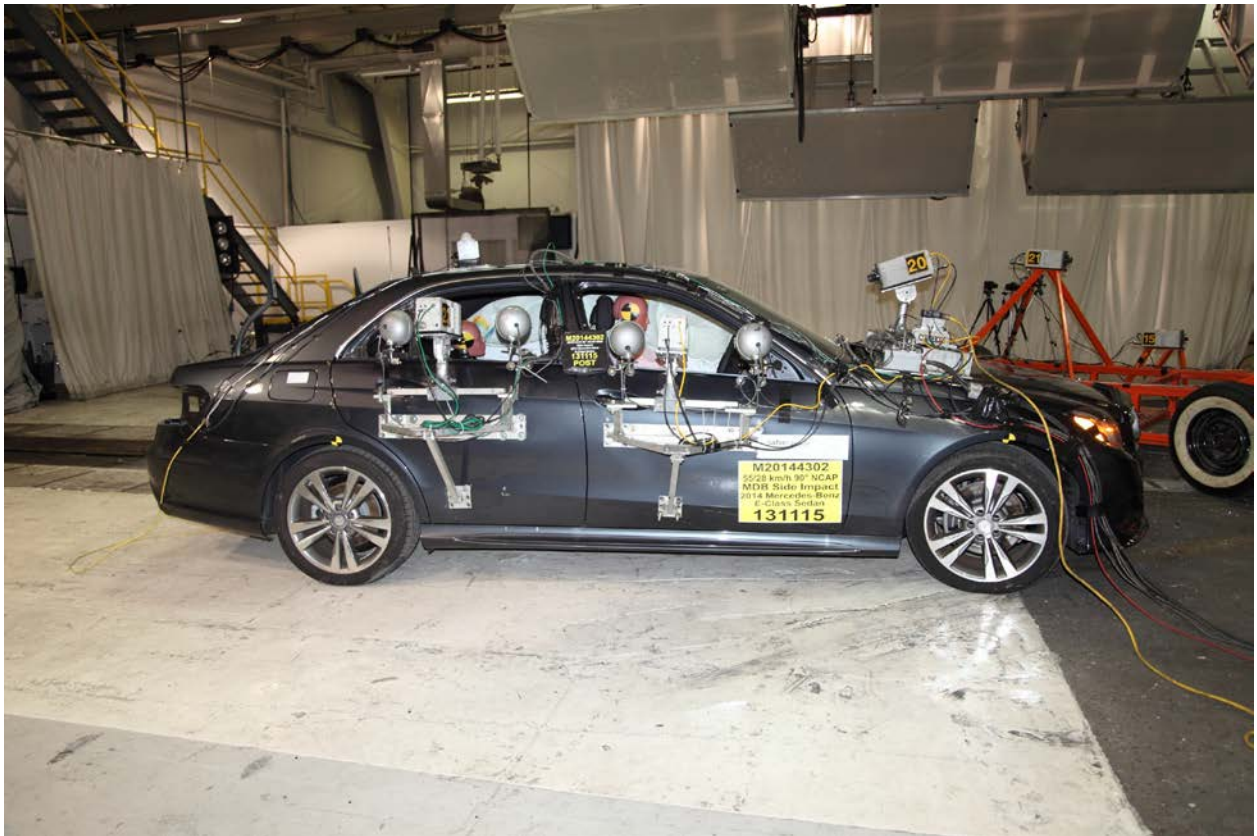
011 Pre-Test Rear View of Test Vehicle



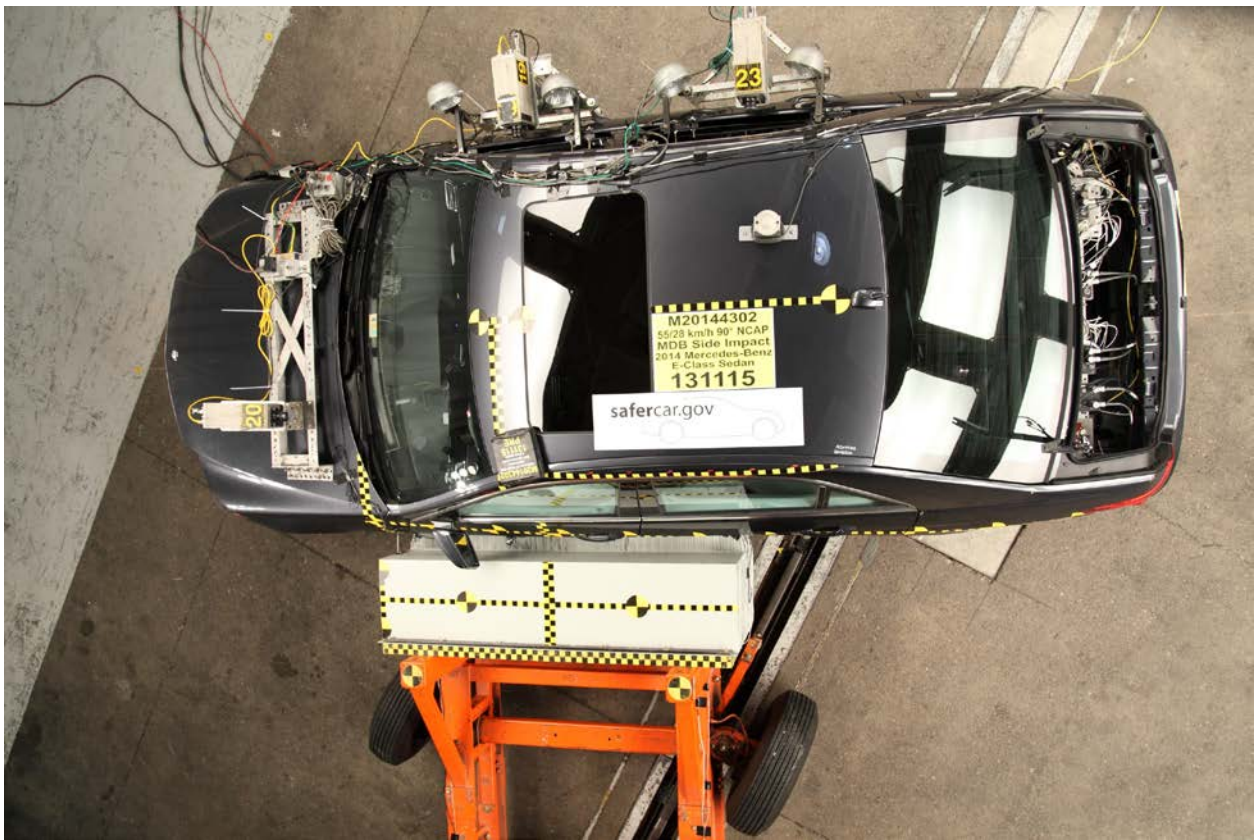
012 Post-Test Rear View of Test Vehicle



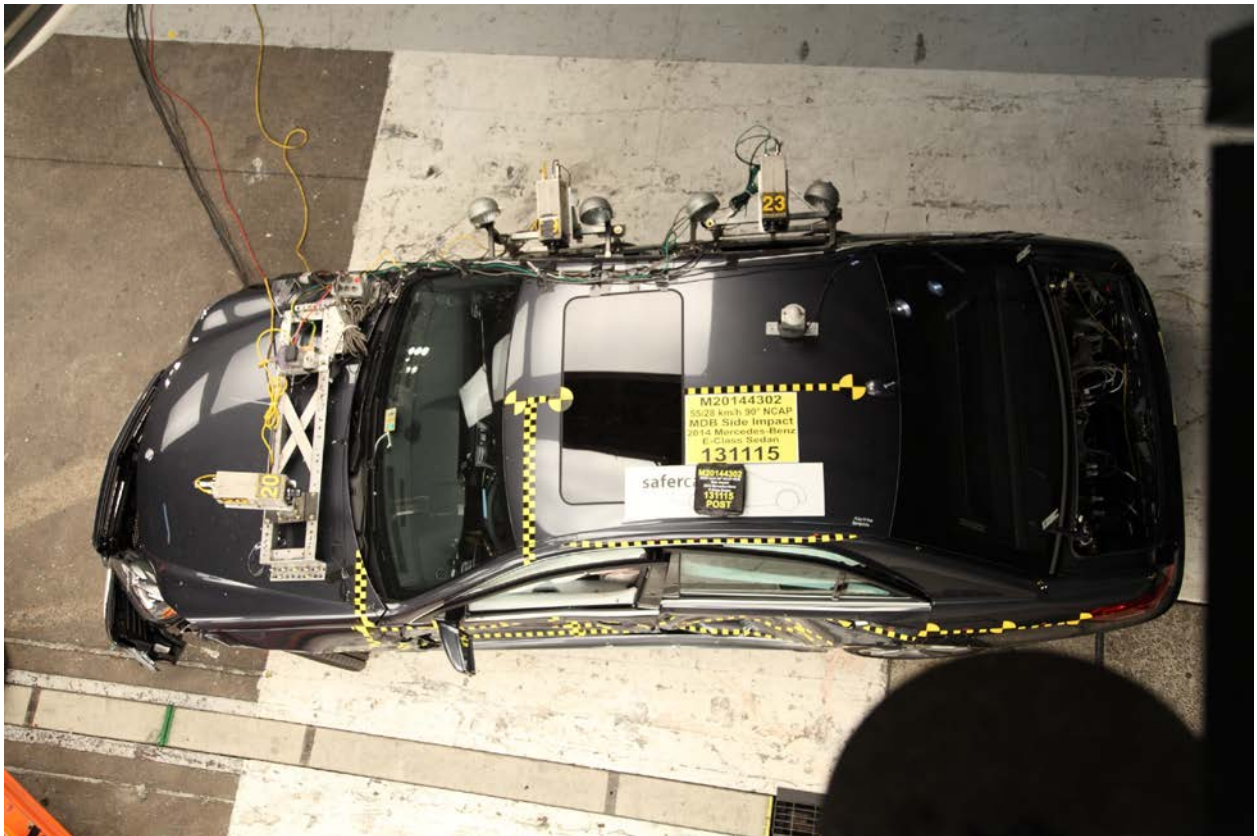
013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



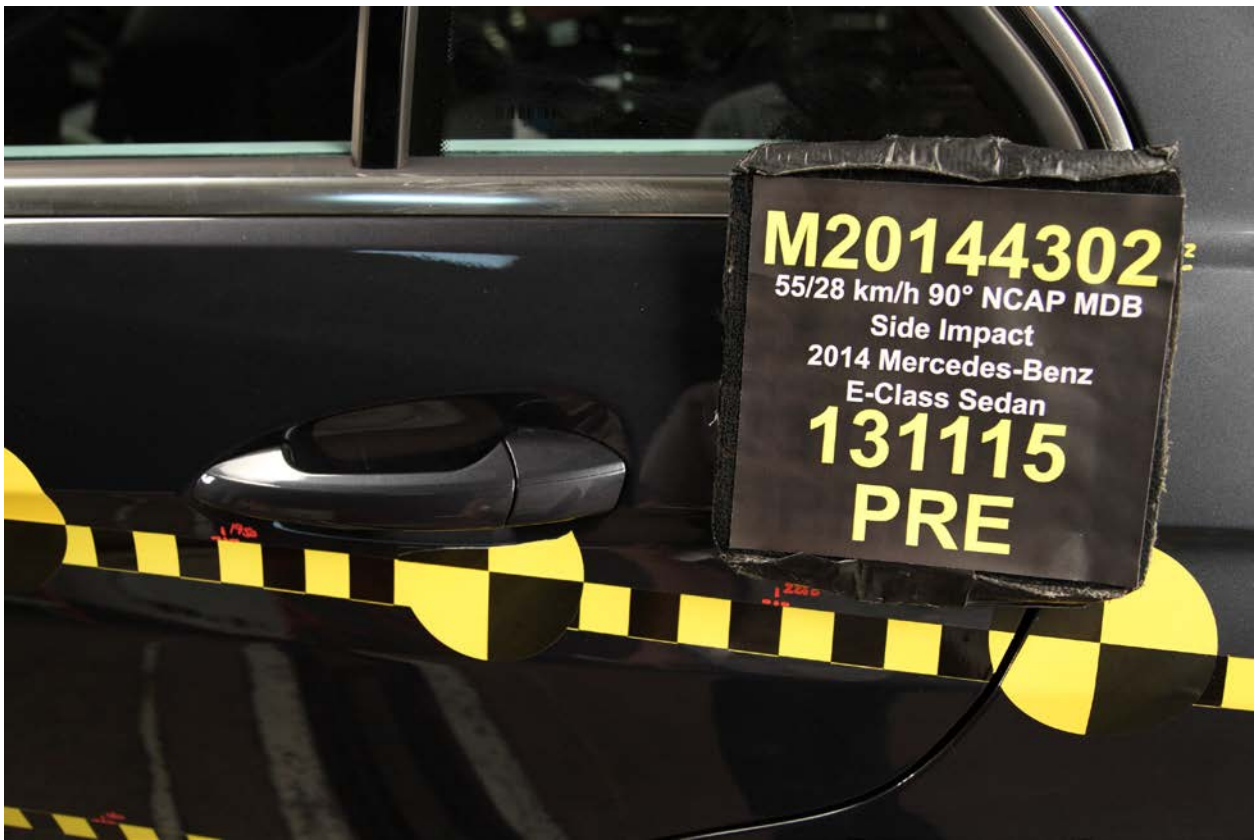
020 Post-Test Close-up View of Impact Point Target



021 Pre-Test Left Front Door Latch Close-up



022 Post-Test Left Front Door Latch Close-up



023 Pre-Test Left Rear Door Latch Close-up



024 Post-Test Left Rear Door Latch Close-up



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



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



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



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



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



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



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



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



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



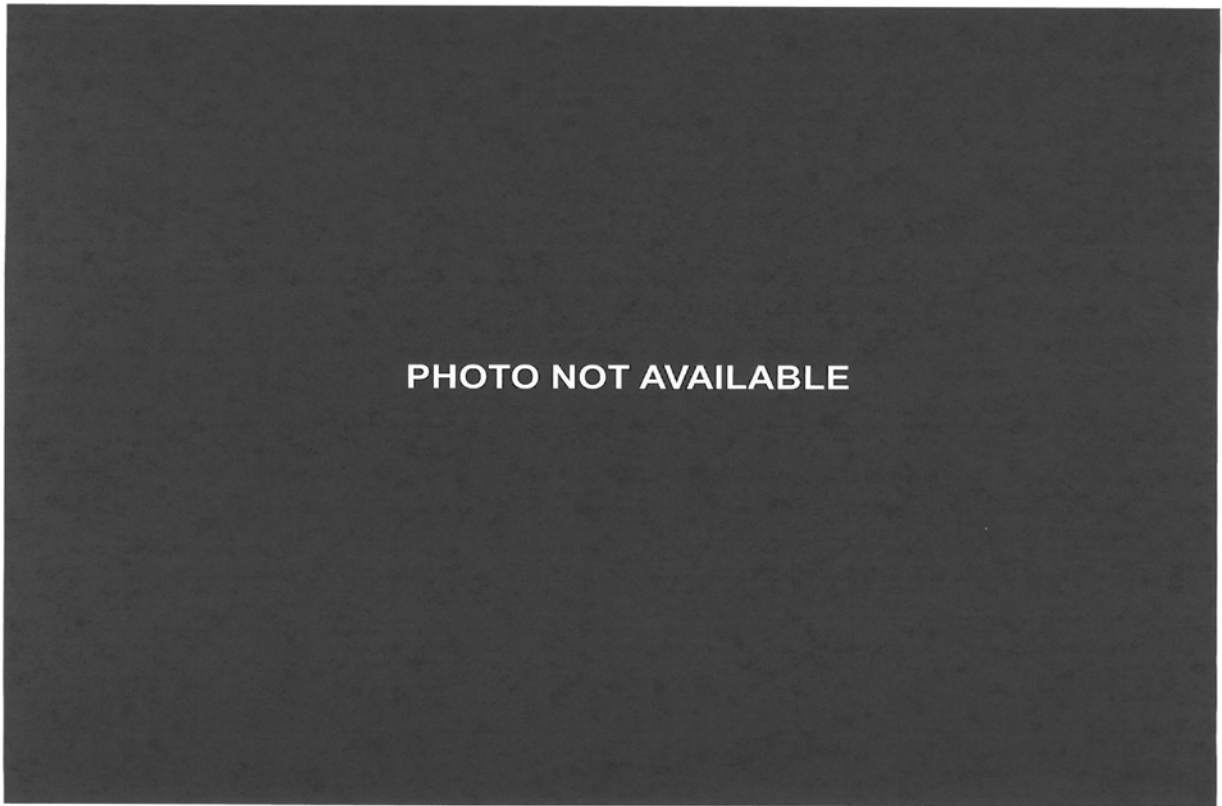
034 Pre-Test Placement of Driver Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



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



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



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



042 Pre-Test Driver Dummy and Door Clearance View



043 Post-Test Driver Dummy and Door Clearance View



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



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



046 Pre-Test Driver Inner Door Panel View



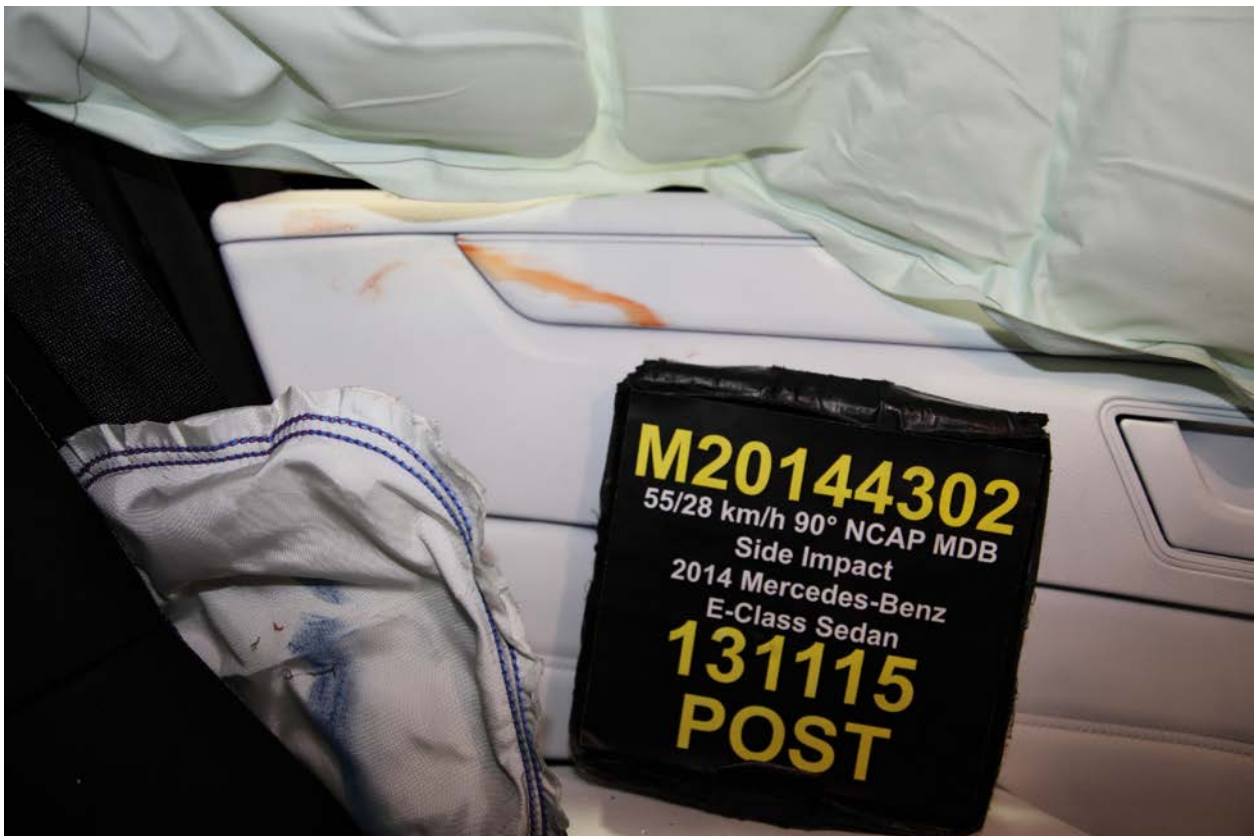
047 Post-Test Driver Inner Door Panel View



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



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



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



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



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



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



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



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



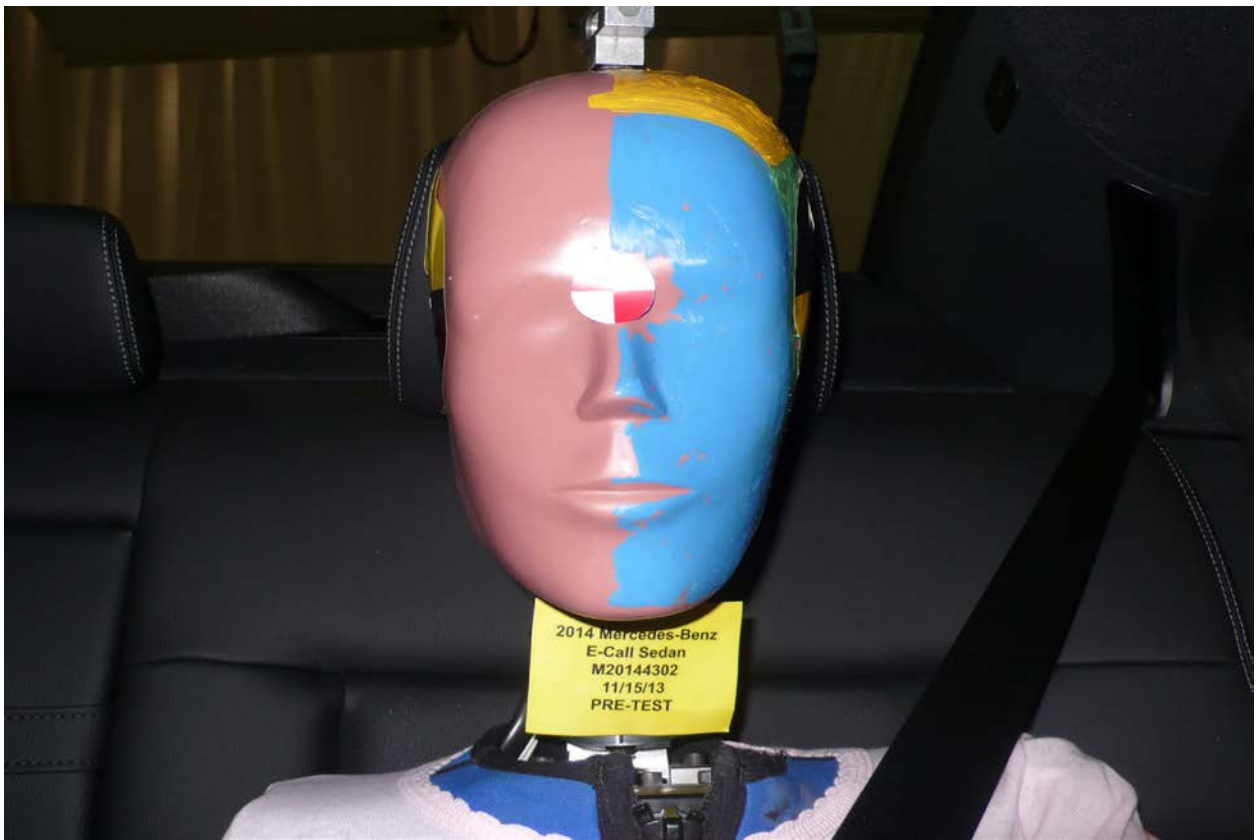
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



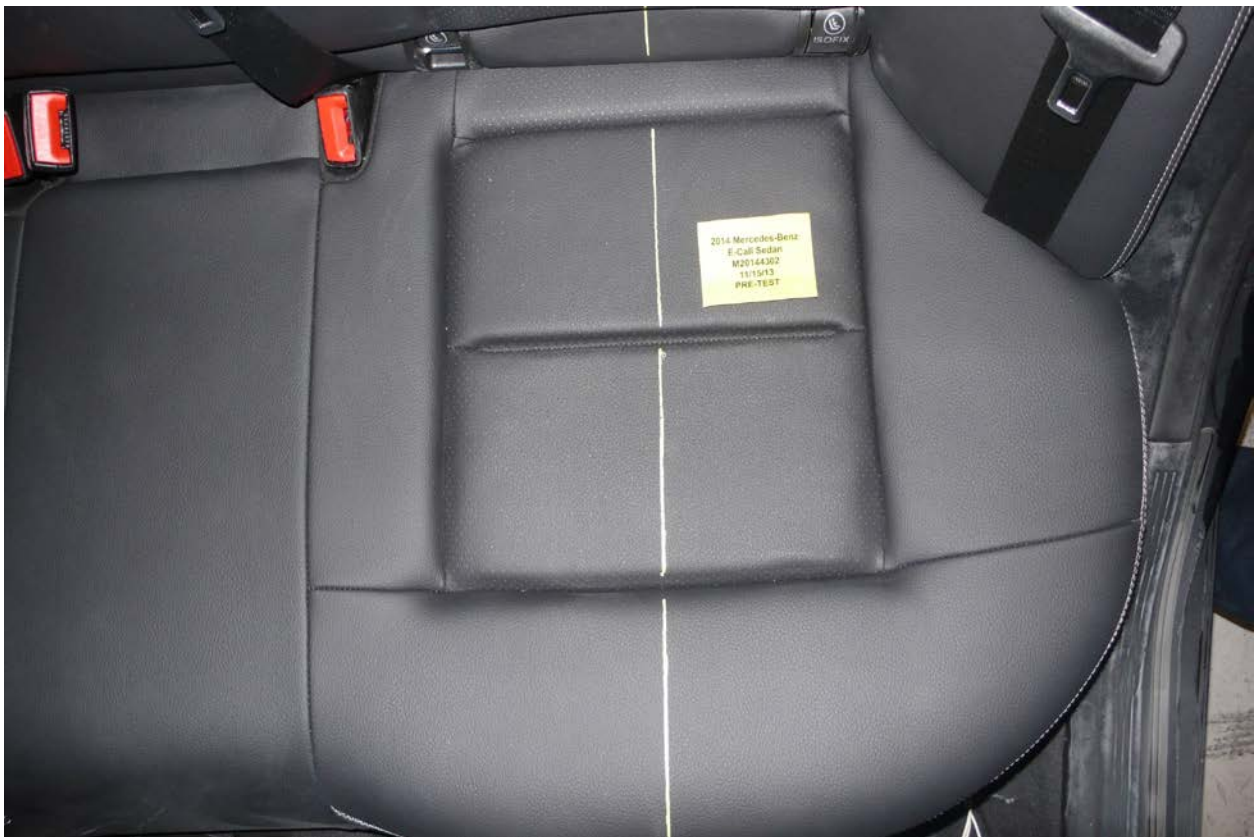
057 Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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



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



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



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



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



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



064 Pre-Test Placement of Rear Passenger Dummy Feet



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



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



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



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



069 Pre-Test Passenger Dummy and Door Clearance View



070 Post-Test Passenger Dummy and Door Clearance View



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



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



073 Pre-Test Passenger Inner Door Panel View



074 Post-Test Passenger Inner Door Panel View

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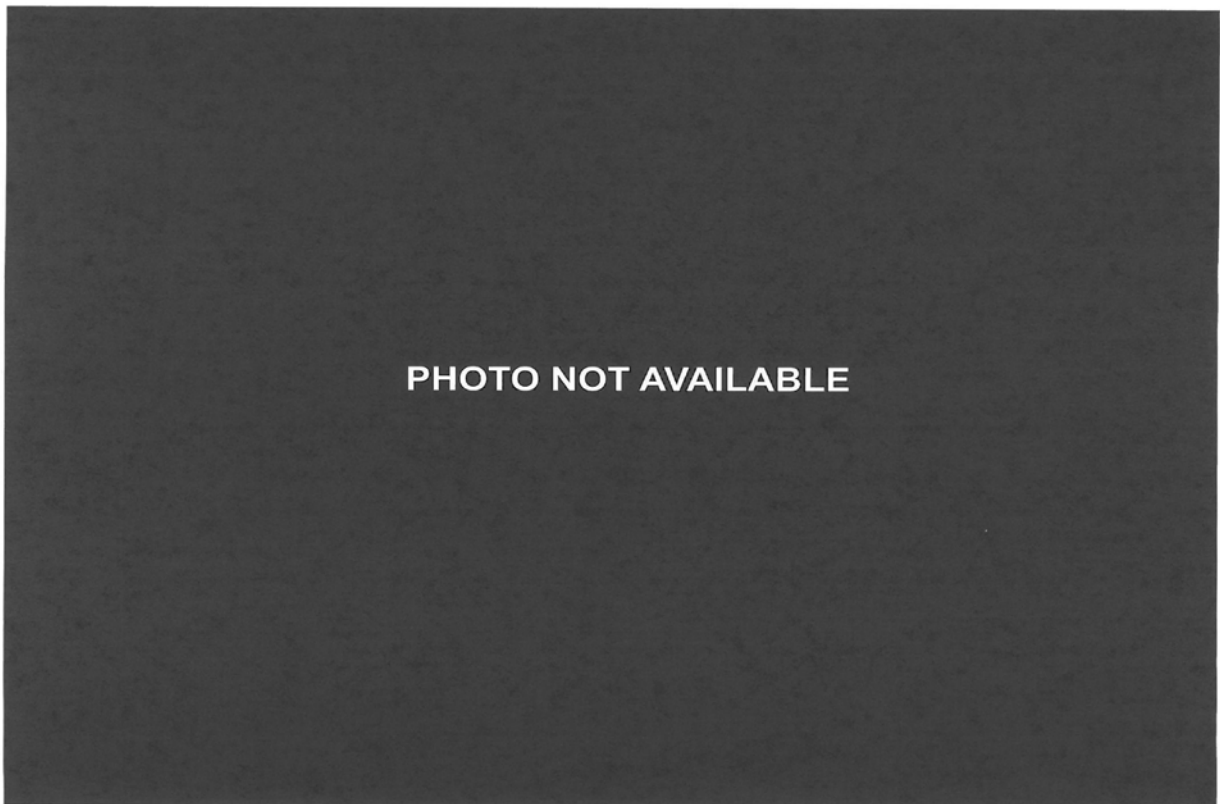
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



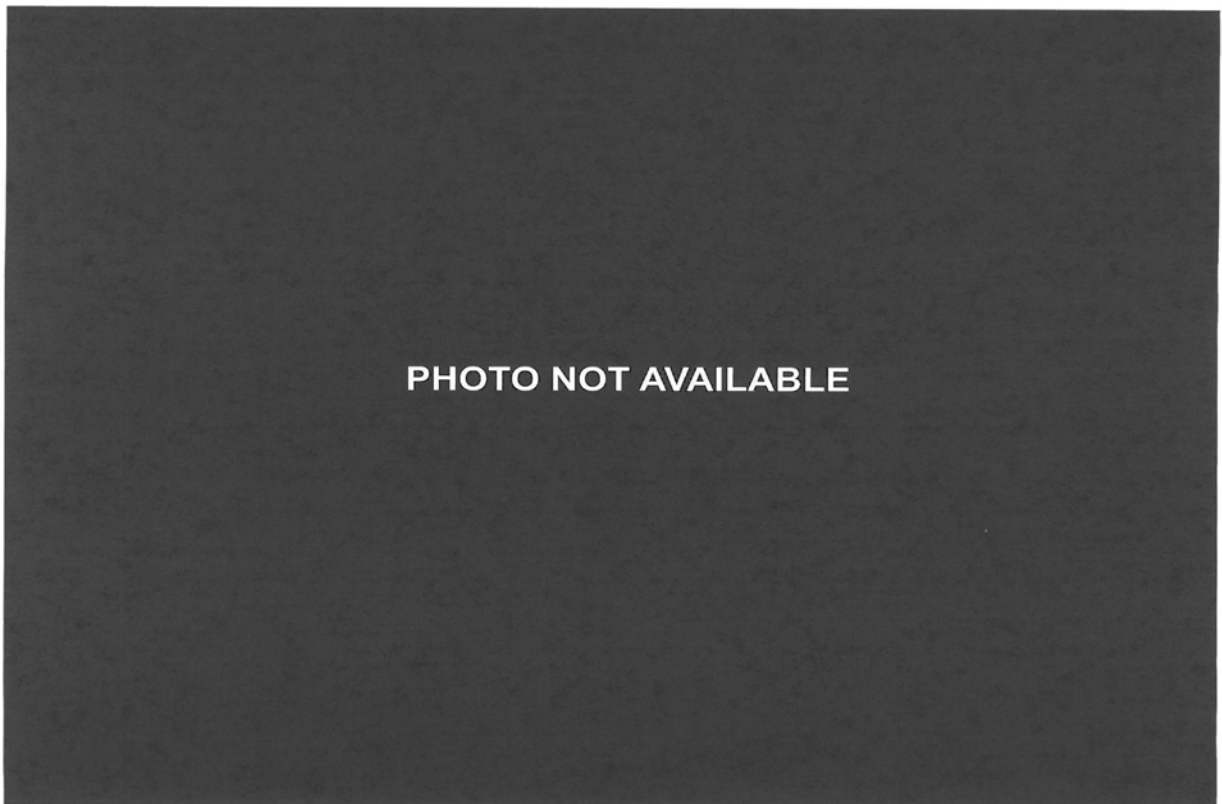
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



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



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



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



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



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



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



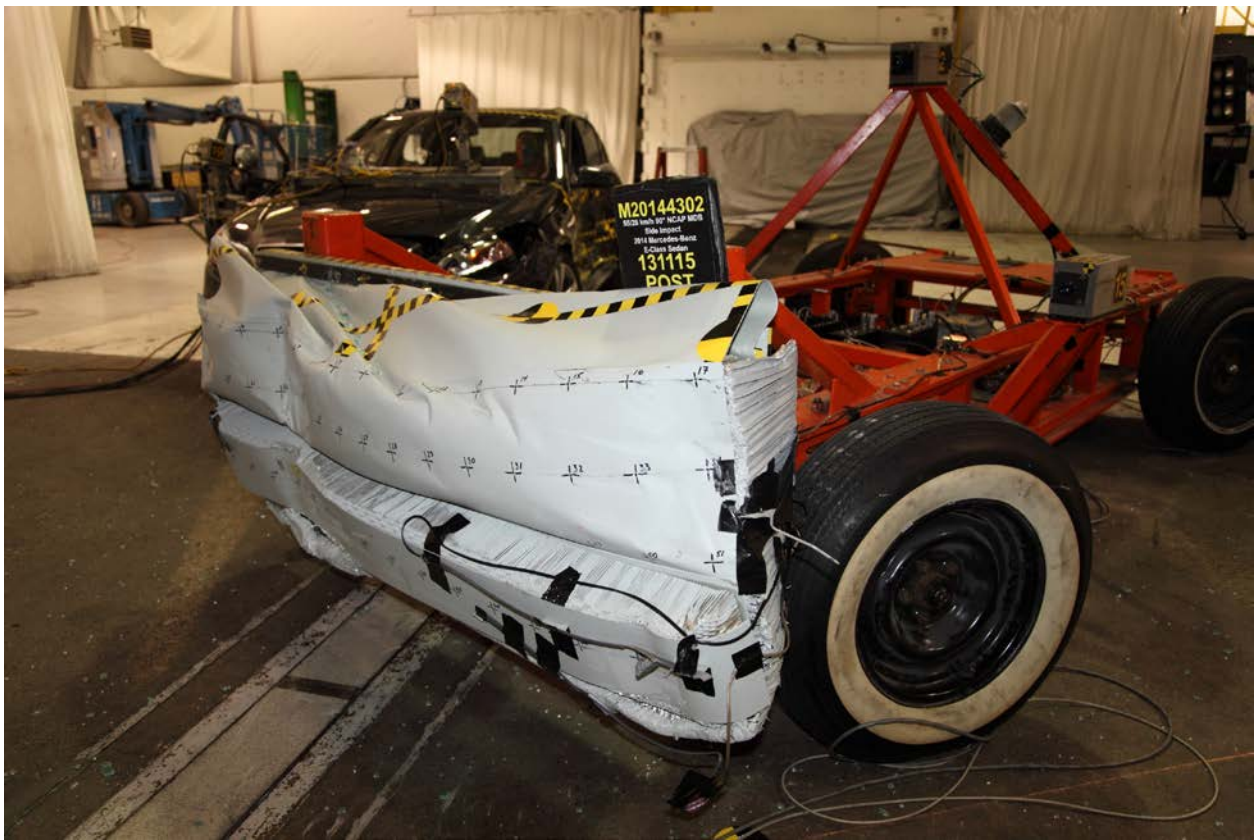
086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



089 Post-Test Left Side View of MDB Impactor Face



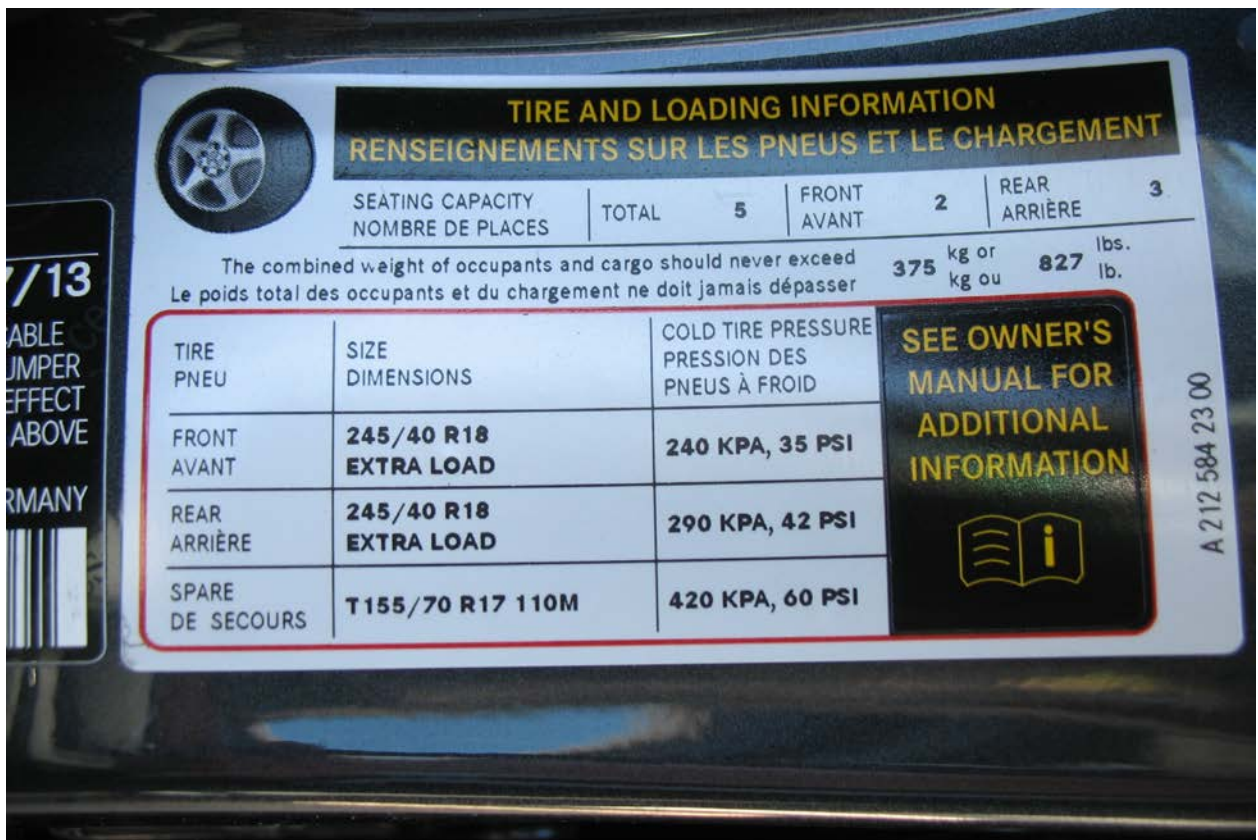
090 Pre-Test Right Side View of MDB Impactor Face



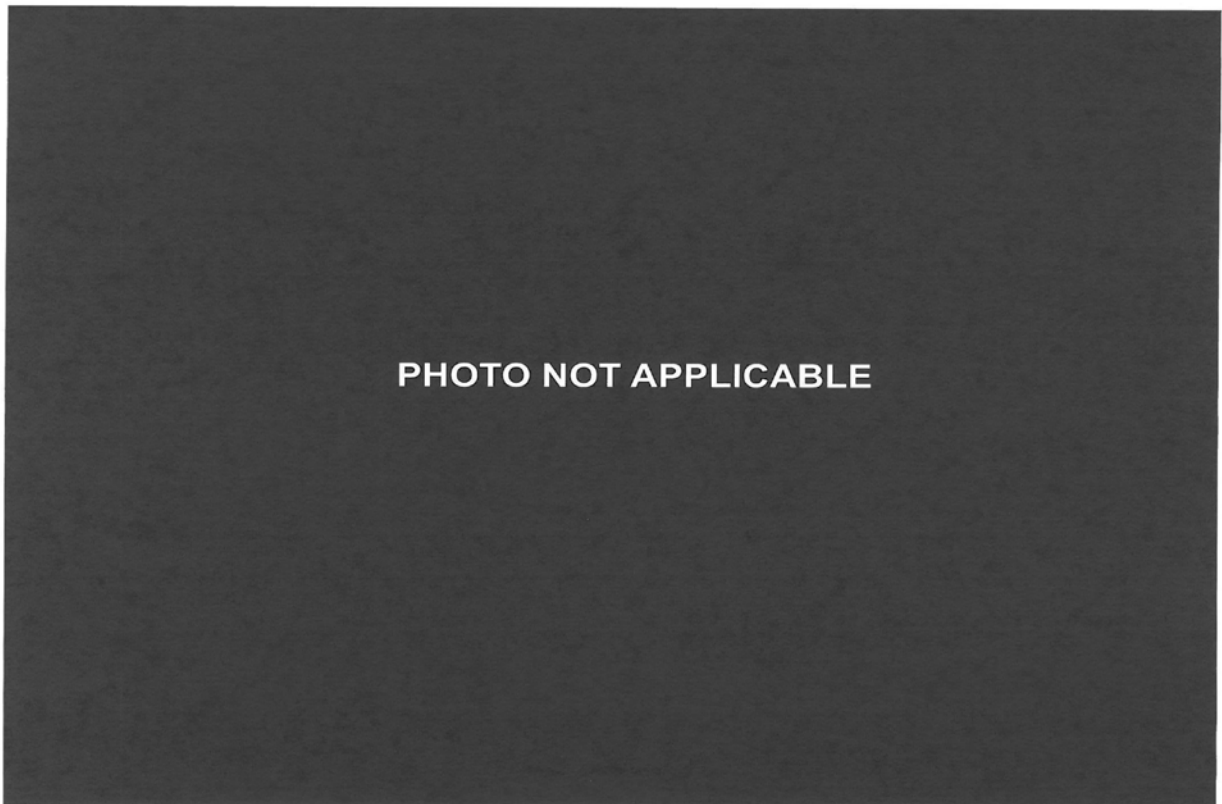
091 Post-Test Right Side View of MDB Impactor Face



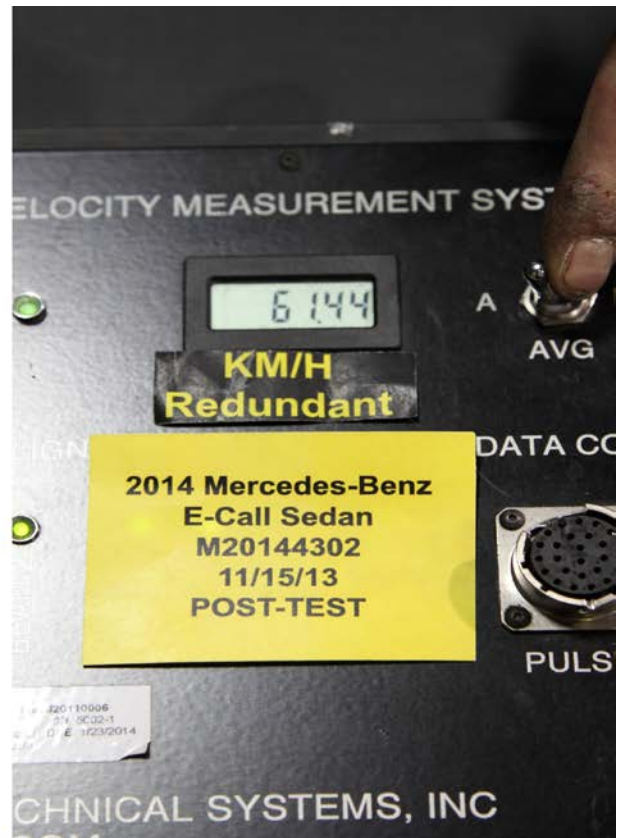
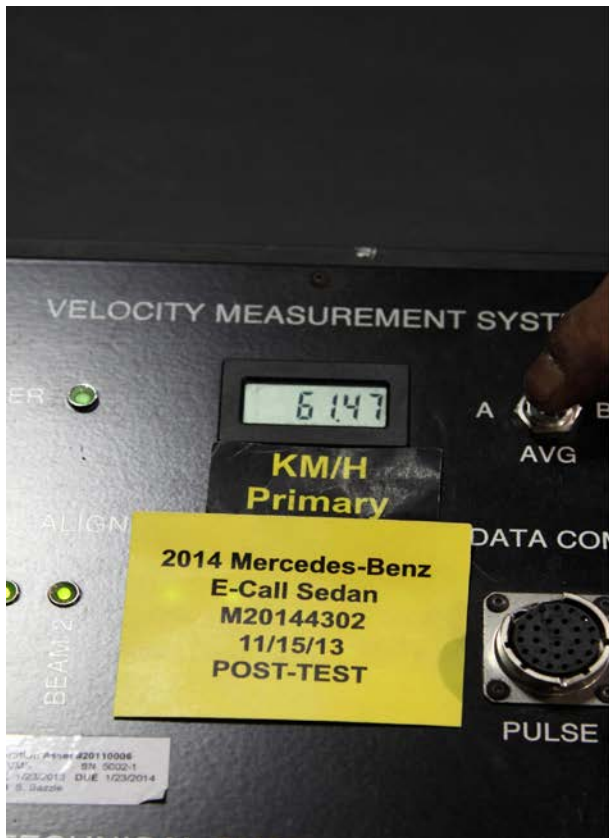
092 Close-Up View of Vehicle Certification Label



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



094 Pre-Test Ballast View



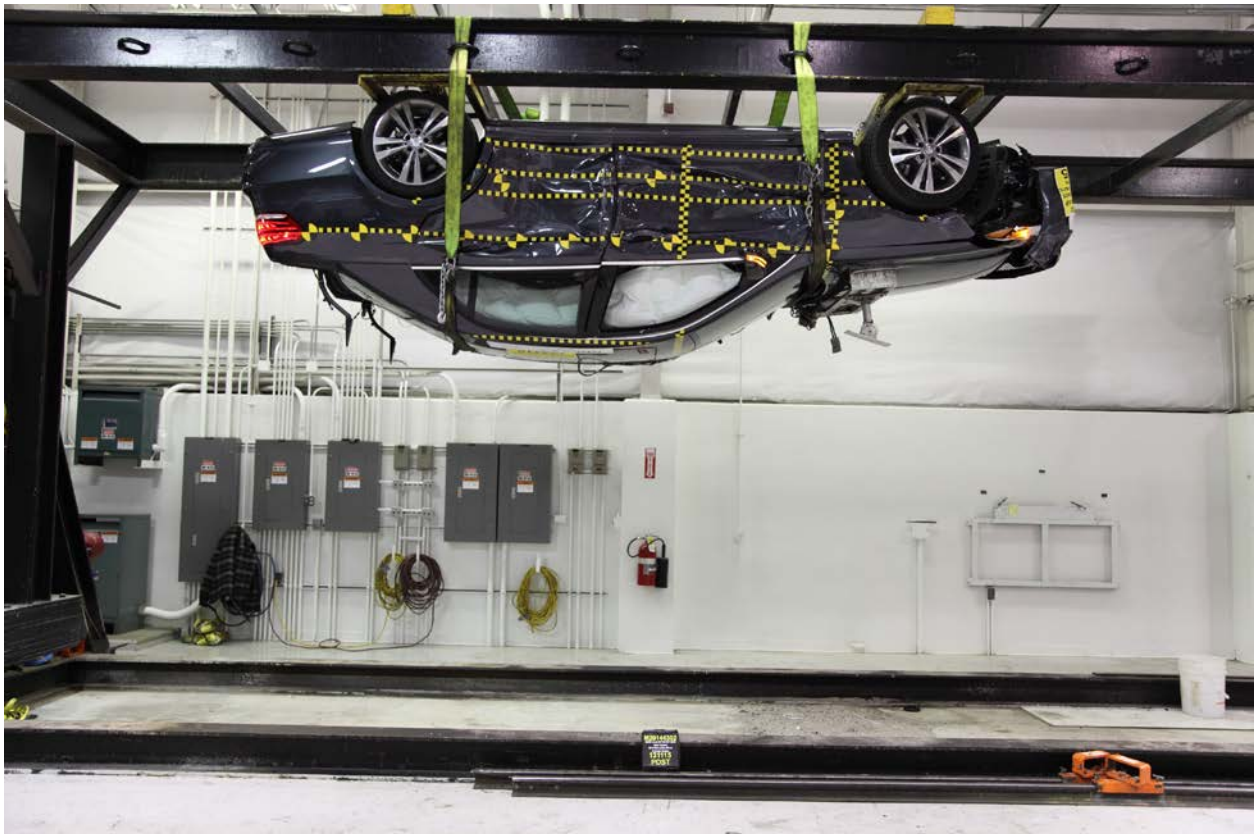
095 Post-Test Primary Speed Trap Read-Out



096 FMVSS No. 301 Static Rollover 0 Degrees



097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees



099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees



101 Impact Event

2014 E350 Sedan

PO#: 0470546748
VIN: WDDHF5KB3EA860950

Mercedes-Benz

www.MBUSA.com

Standard Features	Suggested Retail Price	\$51,900
PERFORMANCE/HANDLING	PAINT/UPHOLSTERY & TRIM	
3.5 Liter V6 Engine with Direct Injection	751 Steel Gray	720.00
302 Horsepower	111 Black MB-Tex	N/C
273 hp 8 Torque	238 Black Ash Wood Trim	N/C
7-Speed Automatic Transmission	OPTIONAL EQUIPMENT AND VALUE ADDED PACKAGES	
ECO Start/Stop System	818 18 Inch 5-Spoke Spoke Wheels	N/C
17 Inch Wheels	180 115V AC Power Outlet	115.00
COMFORT/CONVENIENCE	873 Blended Wood Grain	N/C
Power 10/10 Steering	P01 Premium 1 Package COMAND® System with Navigation, MB App-Store™, Voice Control, Burmester® 100W/200W Surround Sound System, SiriusXM Radio, Traffic, Weather w. 6 mos. service, Mounted Front	3,070.00
Ambient Lighting	Seat, Power Rear Window Sunshade, Rearview Camera	N/C
Dual-Zone Automatic Climate Control	321 Sport Package: Lowered Sport Suspension, Sport Bodykit/ling	825.00
MB-Tex Upholstery	Total Retail Price	\$57,530.00
Carbon Door Opener		
Floor Mats		
Driver's Side and Interior		
Auto Dimming Mirrors		
COMAND® System		
CD/DVD Video Audio Player		
Bluetooth® Connectivity		
Media Interface		
Mercedes® w. trial period by Verizon Telematics		

SAFETY/SECURITY

New Vehicle 4 Year/50,000 Mile Warranty

24-Hour Roadside Assistance Program

ATTENTION ASSIST®

COLLISION PREVENTION ASSIST

PRE-SAFE®

LED Overhead Reading Lights

Electronic Stability Program (ESP®)

ADAPTIVE BRAKE Technology

Anti-Lock Braking System (ABS)

Brake Assist System (BAS)

Advanced Safety Protection System

EPA DOT Fuel Economy and Environment

Fuel Economy

24 MPG combined city/hwy
21 city
31 highway
4.2 gallons per 100 miles

You spend \$250 more in fuel costs over 5 years

Annual fuel cost \$2,350

Fuel Economy & Greenhouse Gas Rating

Smog Rating

fuueleconomy.gov

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score

Not Rated

Frontal Crash

Driver Passenger

Not Rated

Side Crash

Front seat Rear seat

Not Rated

Rollover

PARTS CONTENT INFORMATION

For vehicles in this carline:
U.S./Canadian Parts Content:
0 %

Major Sources of Foreign Parts Content:
GERMANY: 73 %

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

For this vehicle:
Final Assembly Point:
SINDELINGEN, GERMANY
Country of Origin:
Engine: GERMANY
Transmission: GERMANY

Ship To:
1111 WOODBURN BLVD
SUITE 100
Ft. Worth, TX 76109

Part of Entry: Brunswick
Transport:

102 Monroney Label

WARNING

If head restraints are not installed and adjusted correctly, they cannot provide protection as intended. There is an increased risk of injury in the head and neck area, e.g. in the event of an accident or when braking. Always drive with the head restraints installed. Before driving off, make sure for every vehicle occupant that the center of the head restraint supports the back of the head at about eye level.

General notes

Observe the important safety notes regarding the seats (> page 109).

Do not rotate the head restraints of the front and rear seats. Otherwise, you cannot adjust the height and angle of the head restraints to the correct position.

Adjusting the angle of the head restraints



Example: Sedan

► Push or pull the lower edge of the head restraint in the direction of the arrow.

Adjusting the height of the head restraints electrically



► To adjust the head restraint height: slide switch for head restraint adjustment ① up or down in the direction of the arrow.

Adjusting the luxury head restraints



► To adjust the side bolsters of the head restraint: push or pull right and/or left-hand side bolster ① into the desired position.

► To adjust the angle of the head restraint: push or pull the head restraint in the direction of arrow ②.

③ Adjust the head restraint so that the back of your head is as close to the head restraint as possible.

Seats, steering wheel and mirrors

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

Rear seat head restraints

Lowering the rear seat head restraints from the front



► Turn the SmartKey to position 2 in the ignition lock (> page 159).

► Press button ①.

Adjusting the rear seat head restraint height



Example: Sedan

► To raise: pull the head restraint up to the desired position.

► To lower: press release catch ① and push the head restraint down until it is in the desired position.

③ If you pull the head restraint forward slightly, you will require less effort when making adjustments.

Adjusting the rear seat head restraint angle



Example: Sedan

► Pull or push the top of the head restraint until it is in the desired position.

Removing and installing the rear seat head restraints

WARNING

If head restraints are not installed and adjusted correctly, they cannot provide protection as intended. There is an increased risk of injury in the head and neck area, e.g. in the event of an accident or when braking. Always drive with the head restraints installed. Before driving off, make sure for every vehicle occupant that the center of the head restraint supports the back of the head at about eye level.



Example: Sedan

The rear head restraints can only be removed and re-installed on vehicles with the through-loading facility.

Seats, steering wheel and mirrors

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

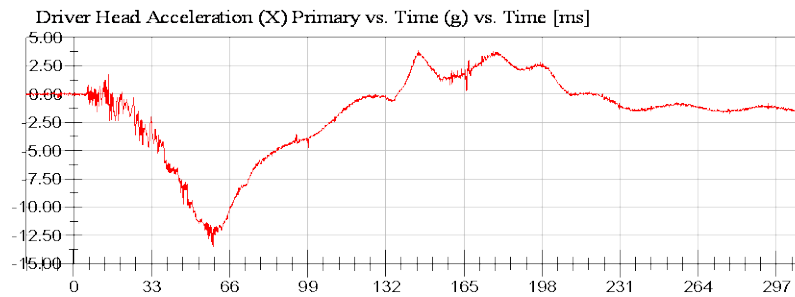
Test Lab: CTF

Test Number: 131115 (M20144302)

Test Date: 11/15/2013

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

Position #4 SID II's Dummy (305)



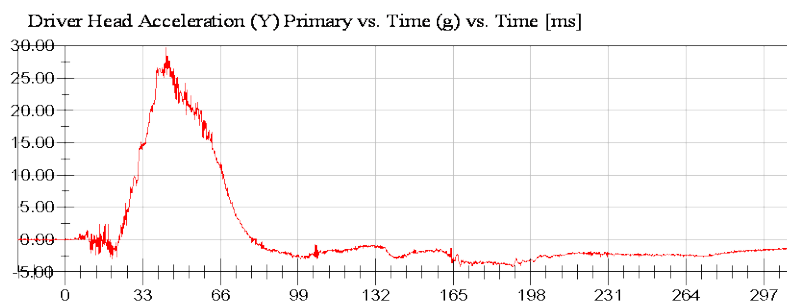
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-13.47 g at 59.04 ms

CFC_1000



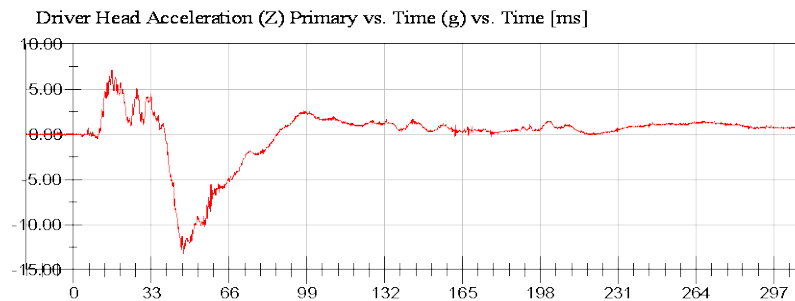
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29.80 g at 42.88 ms

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-4.30 g at 190.32 ms

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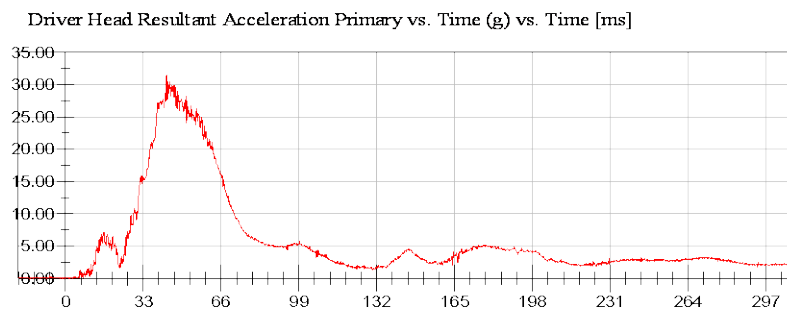
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7.14 g at 16.40 ms

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-13.24 g at 46.80 ms

CFC_1000



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CFC_1000



NHTSA

Test Lab: CTF

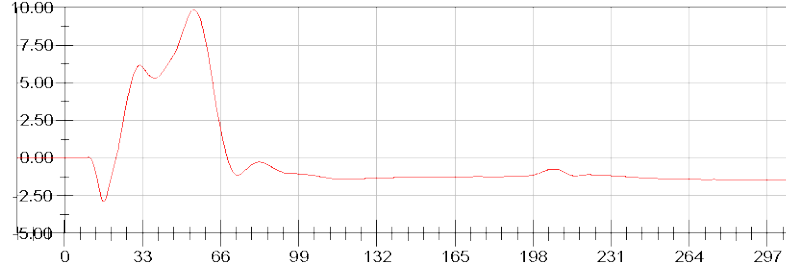
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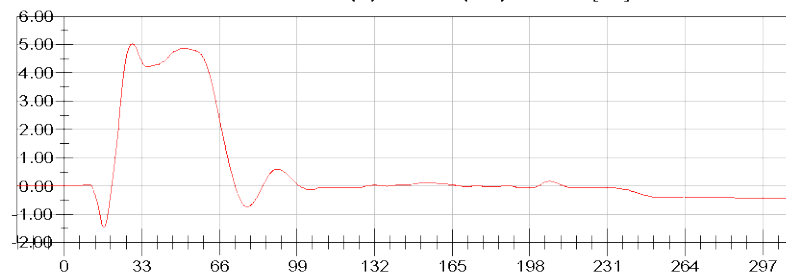
Position #1 ES-2 Dummy with Rib Extension (F030)

Position #4 SID IIs Dummy (305)

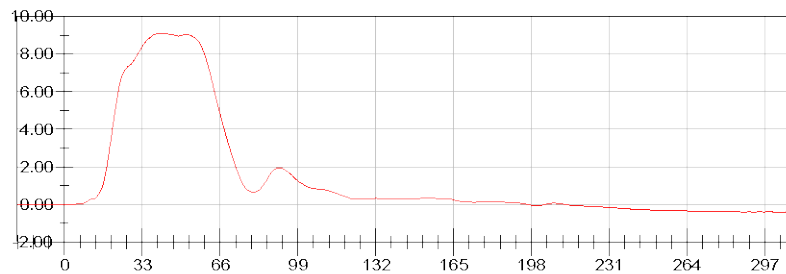
Driver Upper Thorax Rib Deflection (Y) vs. Time (mm) vs. Time [ms]



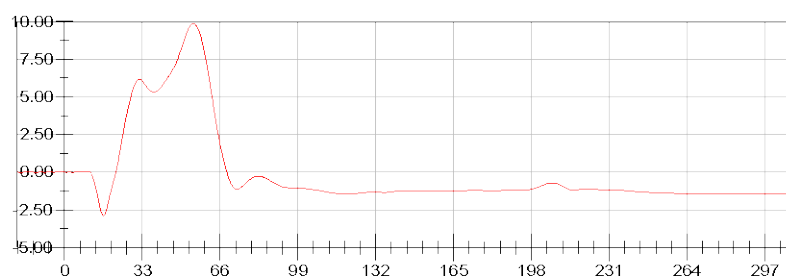
Driver Middle Thorax Rib Deflection (Y) vs. Time (mm) vs. Time [ms]



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



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



NHTSA

Test Lab: CTF

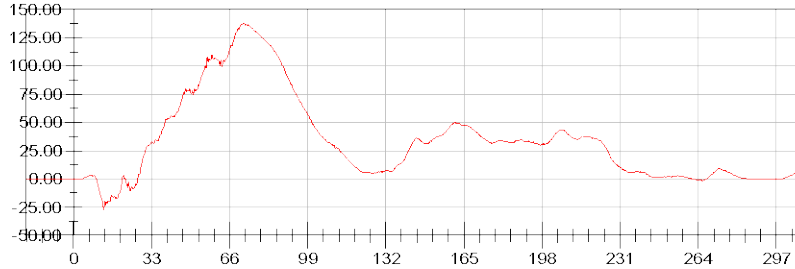
Test Number: 131115 (M20144302)

Test Date: 11/15/2013

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

Position #4 SID IIs Dummy (305)

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



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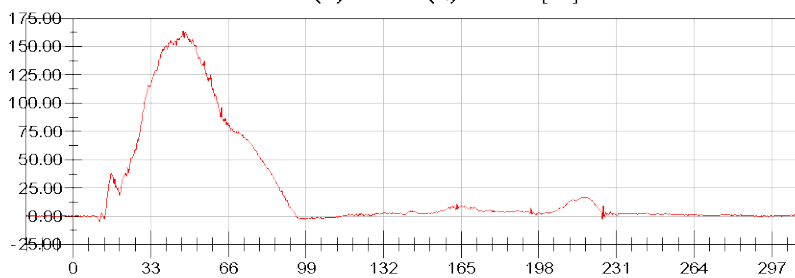
137.69 N at 71.92 ms

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-27.17 N at 12.80 ms

CFC_600

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



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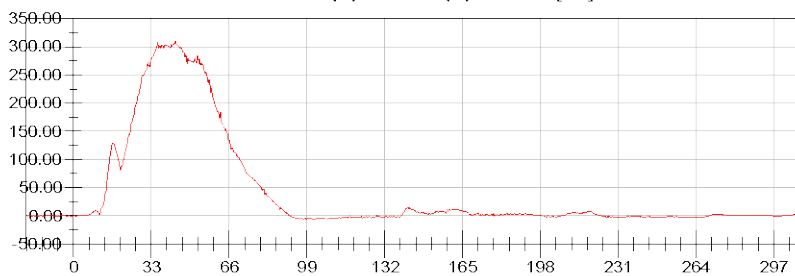
164.01 N at 46.72 ms

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-4.99 N at 11.12 ms

CFC_600

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



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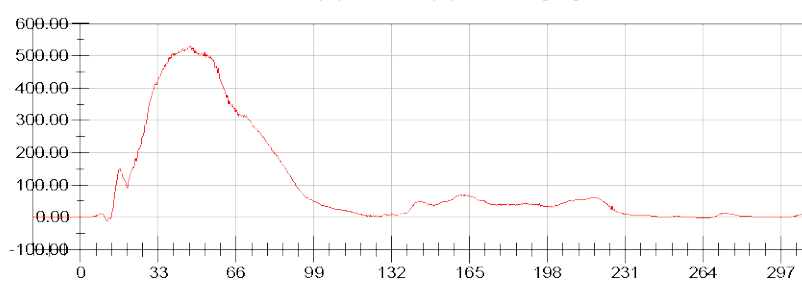
309.47 N at 43.28 ms

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-5.54 N at 98.72 ms

CFC_600

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



<Max>

530.39 N at 46.72 ms

<Min>

-14.03 N at 11.20 ms

CFC_600



NHTSA

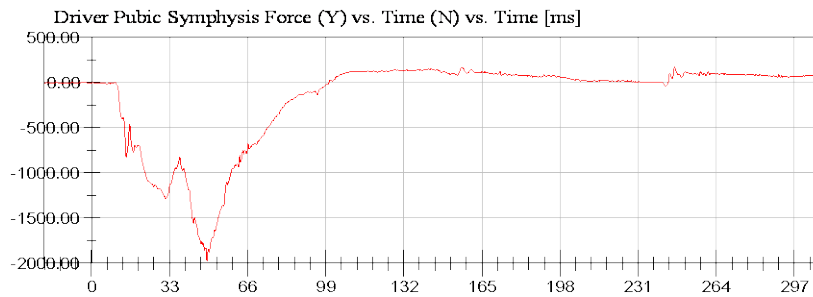
Test Lab: CTF

Test Number: 131115 (M20144302)

Test Date: 11/15/2013

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

Position #4 SID IIs Dummy (305)



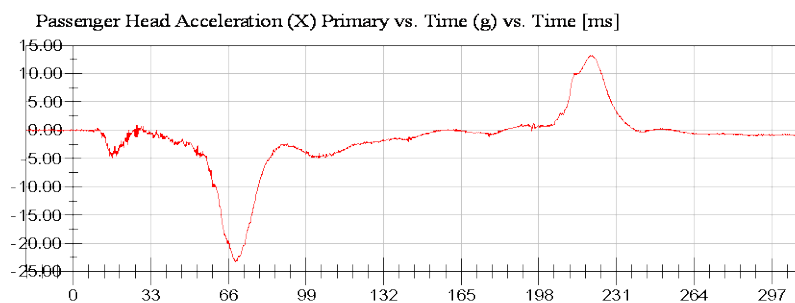
<Max>

172.07 N at 156.80 ms

<Min>

-1,972.56 N at 48.88 ms

CFC_600



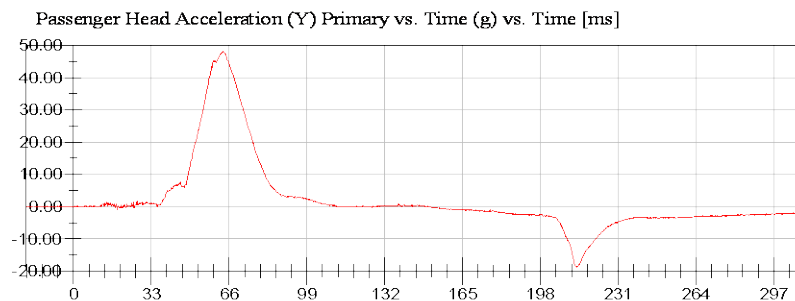
<Max>

13.22 g at 220.00 ms

<Min>

-23.35 g at 69.12 ms

CFC_1000



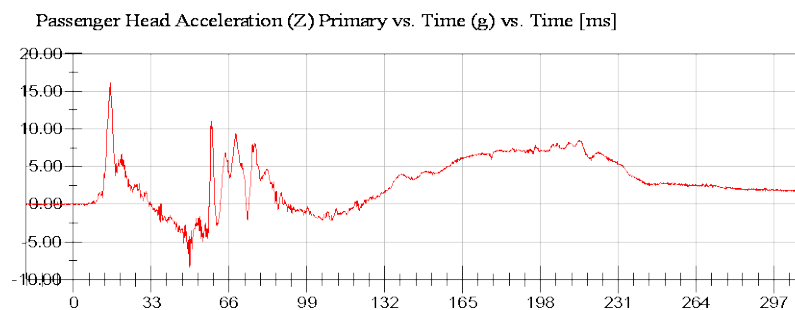
<Max>

48.16 g at 63.44 ms

<Min>

-18.80 g at 213.28 ms

CFC_1000



<Max>

16.17 g at 15.68 ms

<Min>

-8.43 g at 49.36 ms

CFC_1000



NHTSA

Test Lab: CTF

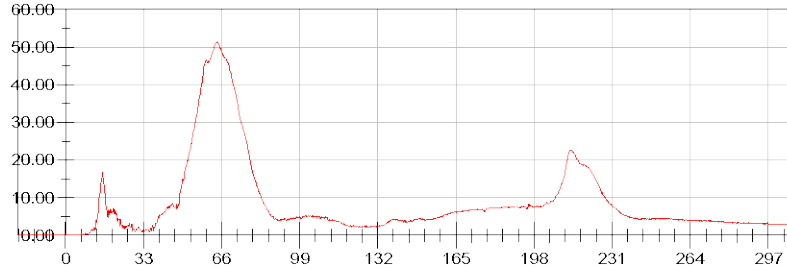
Test Number: 131115 (M20144302)

Test Date: 11/15/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

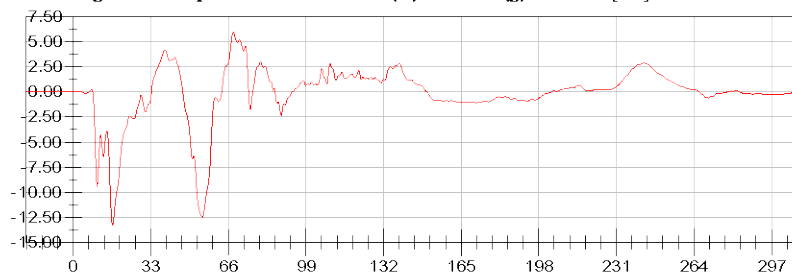
51.39 g at 64.16 ms

<Min>

0.02 g at -15.84 ms

CFC_1000

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



<Max>

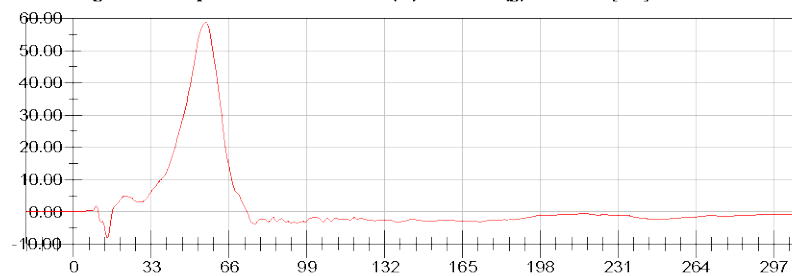
5.91 g at 68.08 ms

<Min>

-13.28 g at 16.80 ms

CFC_180

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



<Max>

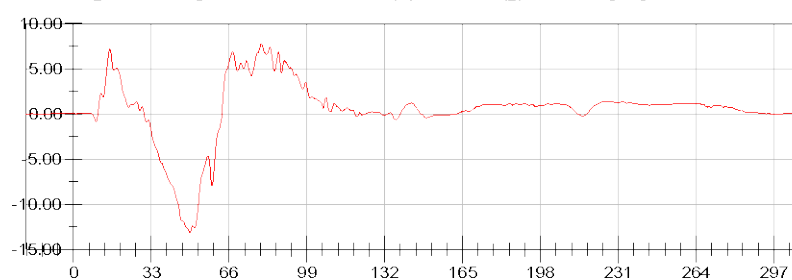
58.78 g at 56.24 ms

<Min>

-8.12 g at 14.48 ms

CFC_180

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



<Max>

7.74 g at 79.68 ms

<Min>

-13.10 g at 49.44 ms

CFC_180



NHTSA

Test Lab: CTF

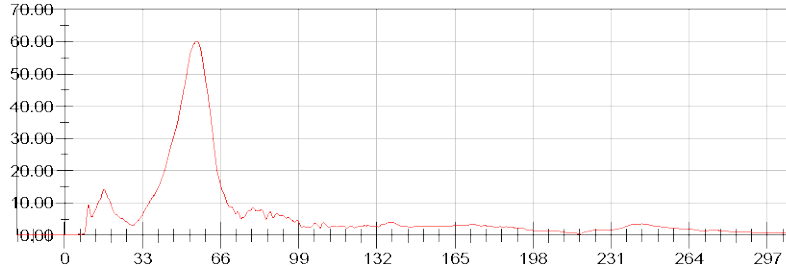
Test Number: 131115 (M20144302)

Test Date: 11/15/2013

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

Position #4 SID IIs Dummy (305)

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



<Max>

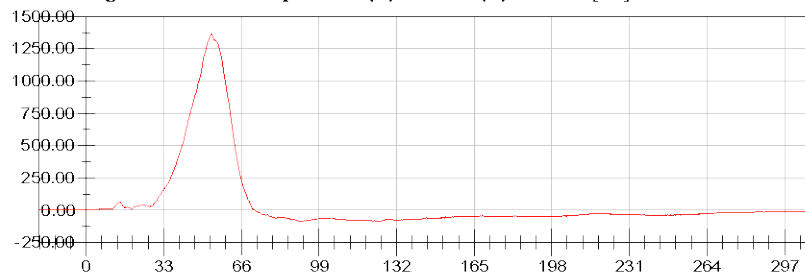
60.11 g at 55.92 ms

<Min>

0.01 g at -15.28 ms

CFC_180

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



<Max>

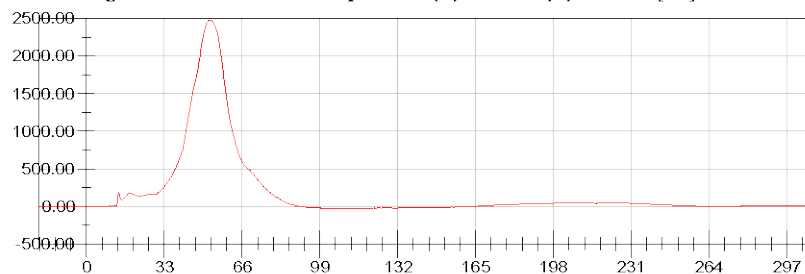
1,365.12 N at 53.44 ms

<Min>

-88.69 N at 91.52 ms

CFC_600

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



<Max>

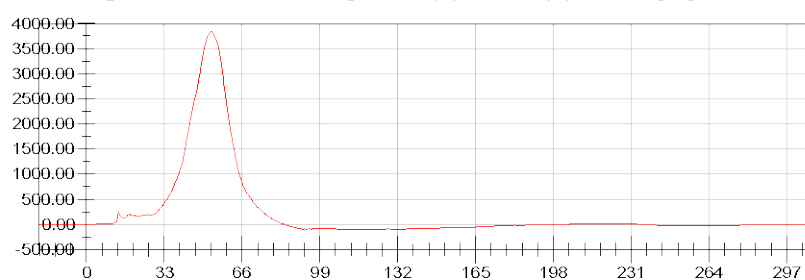
2,482.40 N at 52.40 ms

<Min>

-25.21 N at 110.64 ms

CFC_600

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



<Max>

3,830.32 N at 53.28 ms

<Min>

-106.82 N at 124.16 ms

CFC_600



APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

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

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

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

Table 3 Neck Pendulum Test

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

Flexion Angle (°) vs. Time (ms)

Potentiometer A (°) vs. Time (ms)

Potentiometer B (°) vs. Time (ms)

Potentiometer C (°) vs. Time (ms)

Table 4. Shoulder Impact Test

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

Table 5. Thorax – Upper Rib Drop Test

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

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

Table 6. Thorax – Middle Rib Drop Test

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

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

Table 7. Thorax – Lower Rib Drop Test

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

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

Table 8. Thorax – Full Body Impact Test

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

Impactor Force (kN) vs. Time (ms)

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

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

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

Table 9. Abdomen Impact Test

Impactor Force (kN) vs. Time (ms)

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

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

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

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

Table 10. Lumbar Spine Flexion Test

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

Spine Flexion Angle (°) vs. Time (ms)

Potentiometer A (°) vs. Time (ms)

Potentiometer B (°) vs. Time (ms)

Potentiometer C (°) vs. Time (ms)

Table 11. Pelvis Impact Test

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

Impactor Force (kN) vs. Time (ms)

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

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

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

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

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

Table 3. Lateral Neck Pendulum Test

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

Flexion Angle (°) vs. Time (ms)

Moment About Occipital Condyle (Nm) vs. Time (ms)

Table 4. Shoulder Impact Test

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

Shoulder Displacement (mm) vs. Time (ms)

Upper Spine Acceleration (G's) vs. Time (ms)

Table 5. Thorax (With Arm) Impact Test

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

Shoulder Displacement (mm) vs. Time (ms)

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

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

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

Upper Spine Acceleration (G's) vs. Time (ms)

Lower Spine Acceleration (G's) vs. Time (ms)

Table 6. Thorax (Without Arm) Impact Test

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

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

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

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

Upper Spine Acceleration (G's) vs. Time (ms)

Lower Spine Acceleration (G's) vs. Time (ms)

Table 7. Abdomen Impact Test

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

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

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

Lower Spine Acceleration (G's) vs. Time (ms)

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

Table 9. Pelvis Acetabulum Impact Test

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

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

Acetabulum Force (N) vs. Time (ms)

Table 10. Pelvis Iliac Impact Test

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

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

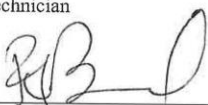
Iliac Force (N) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N F030

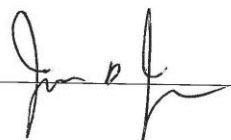
Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 17
Date: 10/22/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	447	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	471	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Technician



Approved



Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Peak Resultant Acceleration	125 - 155 g	152.5 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	6.6 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 09:23:35 360

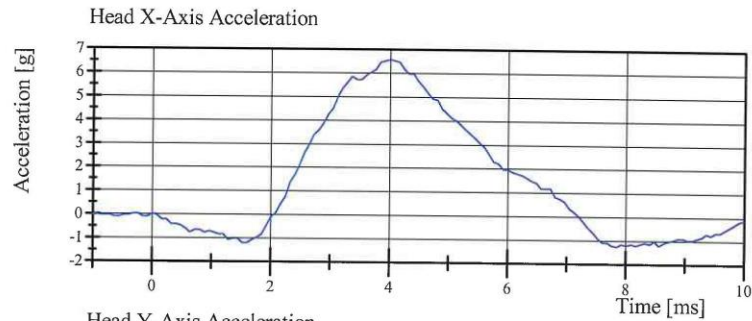


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 17-1

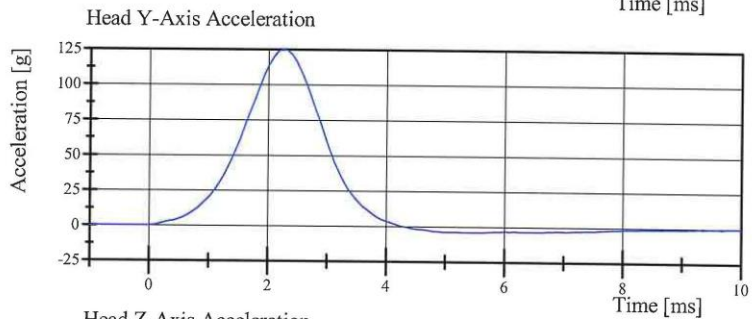
Test Date: 10/22/2013



Filter Class: CFC_1000

Max: 6.6 g at 4.0 ms

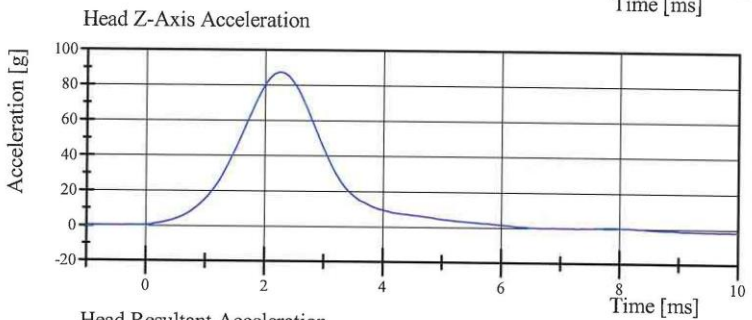
Min: -1.3 g at 7.8 ms



Filter Class: CFC_1000

Max: 125.0 g at 2.2 ms

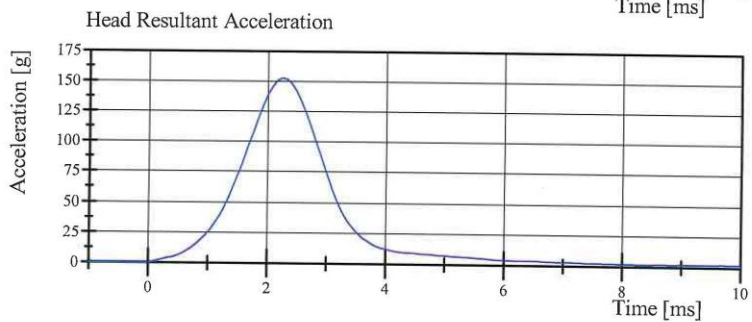
Min: -3.9 g at 5.4 ms



Filter Class: CFC_1000

Max: 87.4 g at 2.2 ms

Min: -1.9 g at 9.7 ms



Filter Class: CFC_1000

Max: 152.5 g at 2.2 ms

Min: 0.0 g at -1.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 09:23:41 360



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	25 %	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	-52.3 deg	Yes
Time of Peak	54 - 66 ms	58.3 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	65.4 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 09:00:02 1308



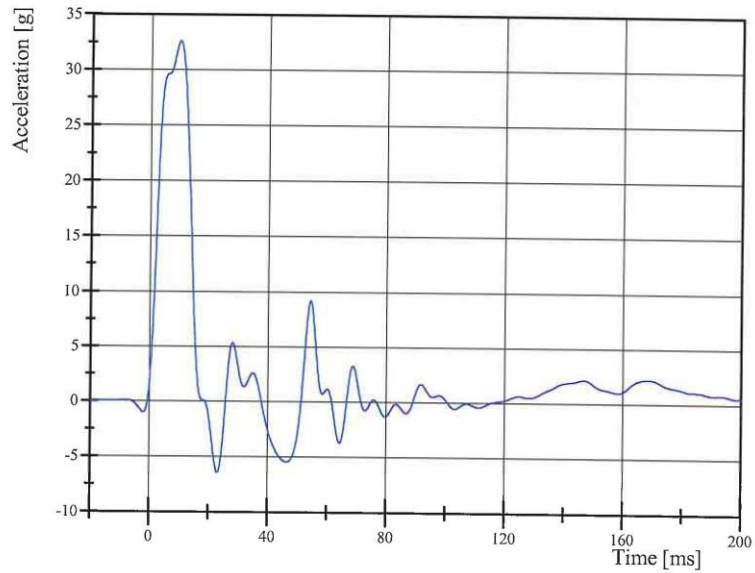
Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 17-1

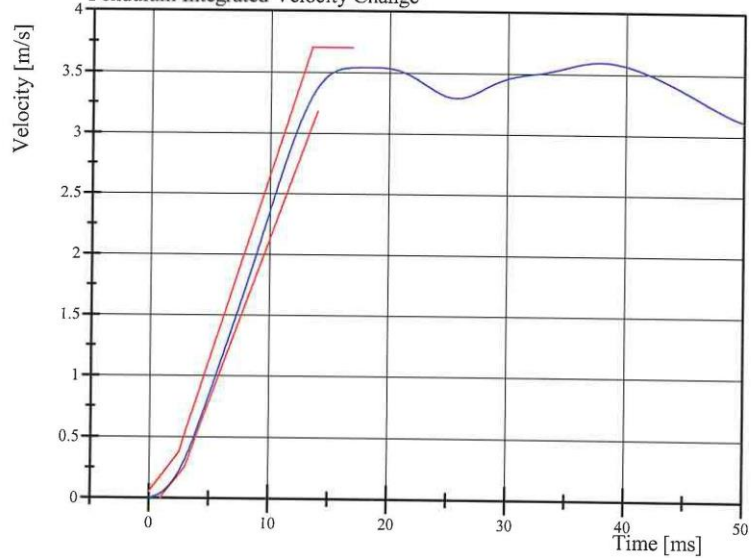
Test Date: 10/22/2013

Pendulum Acceleration



Filter Class: CFC_60
Max: 32.6 g at 9.8 ms
Min: -6.5 g at 23.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 37.8 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 09:00:09 1308

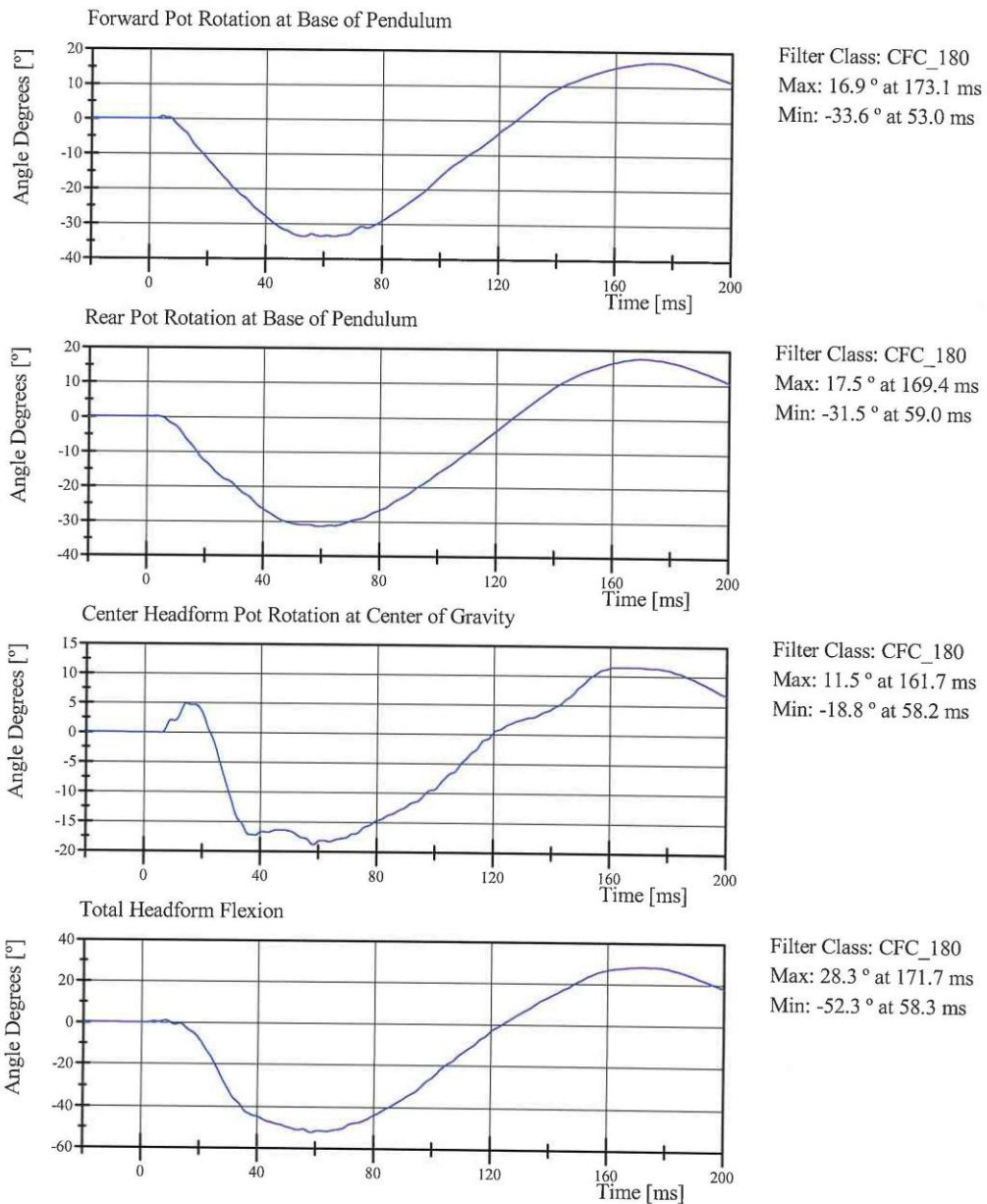


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013



Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 09:00:10 1308



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 17-1

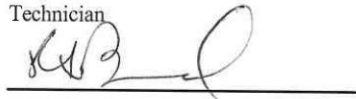
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.01 g	Yes

Test meets specifications.

Comments:

Technician



Approved



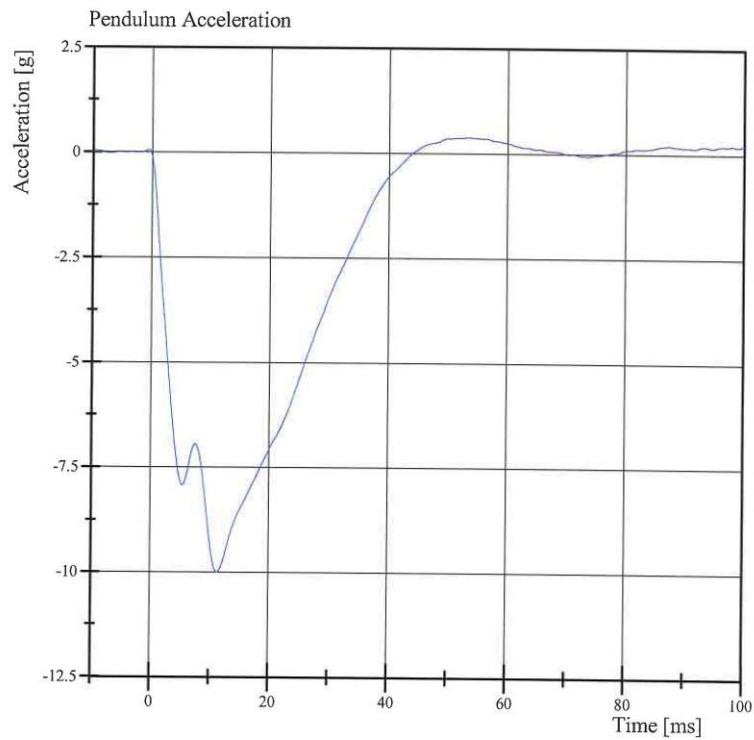
Specification Source: NHTSA final rule 8/15/2008

10.22.2013 12:21:24 534



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 0.4 g at 53.1 ms
Min: -10.0 g at 11.3 ms

Specification Source: NHTSA final rule 8/15/2008

10.22.2013 12:21:33 534



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician



Approved



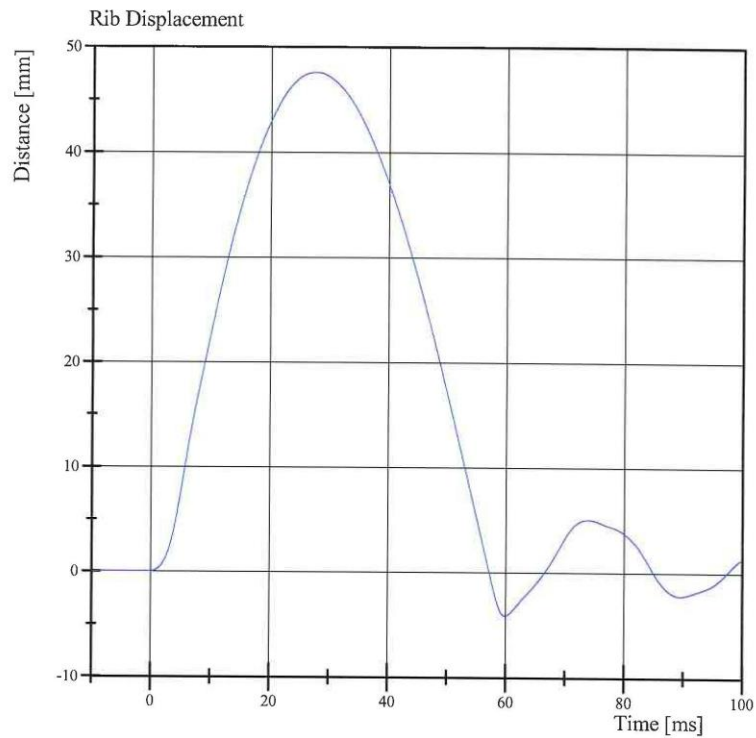
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:13:08 731



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 47.6 mm at 27.6 ms
Min: -4.1 mm at 59.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:13:20 731



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.6 mm	Yes

Test meets specifications.

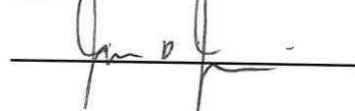
Comments:

Drop Height: 462

Technician



Approved



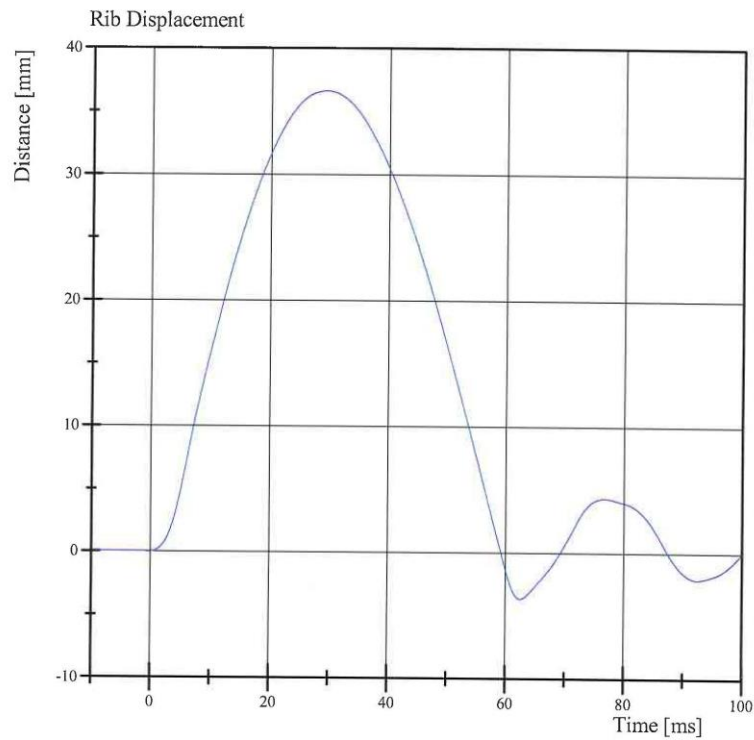
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:20:53 934



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 36.6 mm at 29.4 ms
Min: -3.7 mm at 62.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:21:02 934



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013

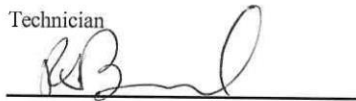
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician



Approved



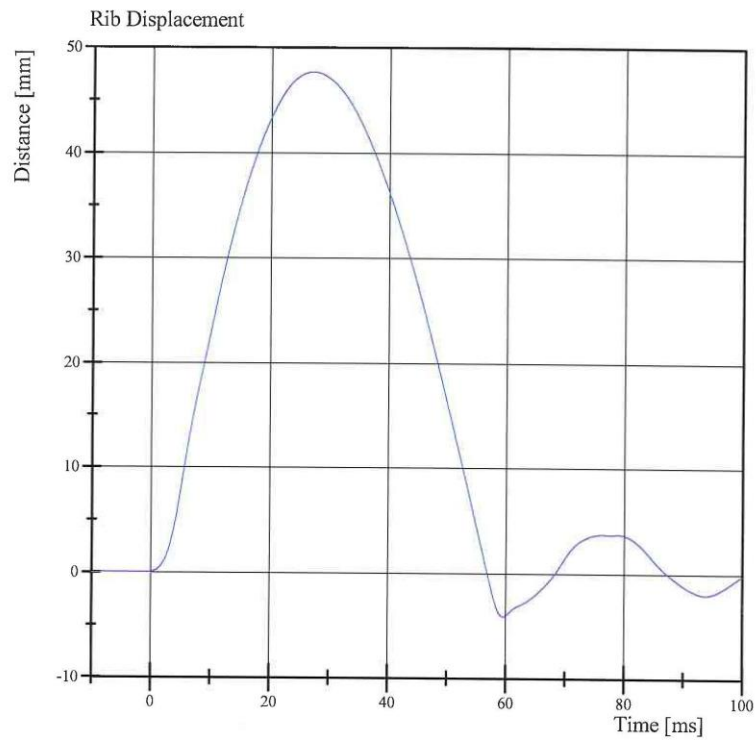
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:33:07 739



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 47.6 mm at 27.0 ms
Min: -4.1 mm at 59.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:33:14 739



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



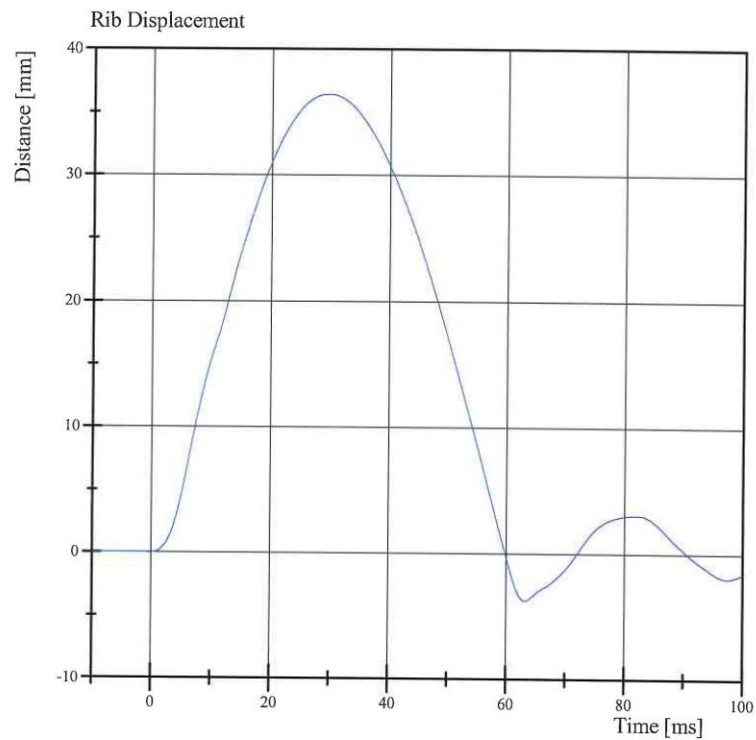
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:39:24 924



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 36.4 mm at 29.5 ms
Min: -3.7 mm at 63.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:39:33 924



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

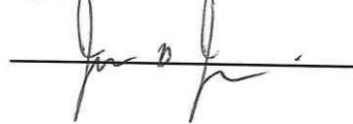
Comments:

Drop Height: 816

Technician



Approved



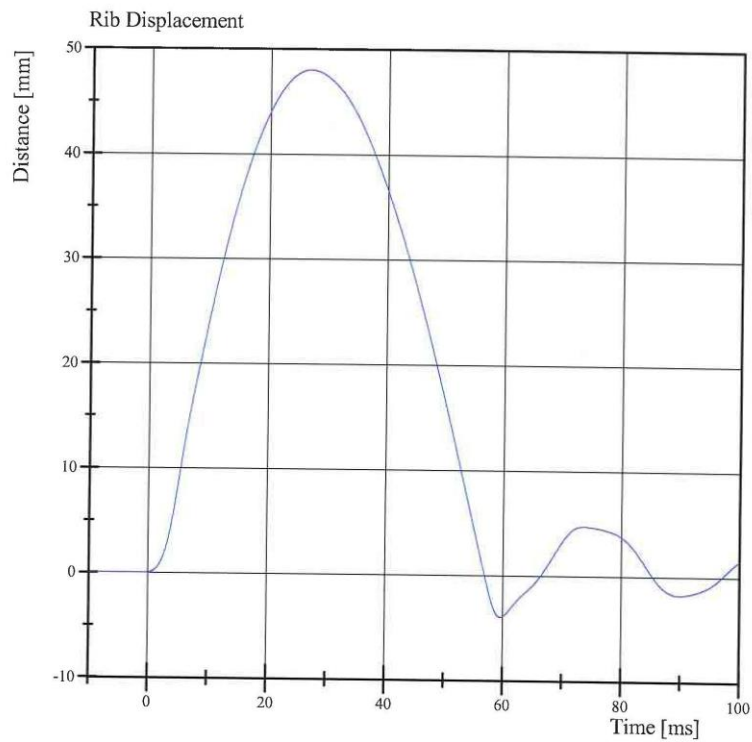
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:44:10 736



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 48.0 mm at 26.8 ms
Min: -4.0 mm at 59.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:44:17 736



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.2 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



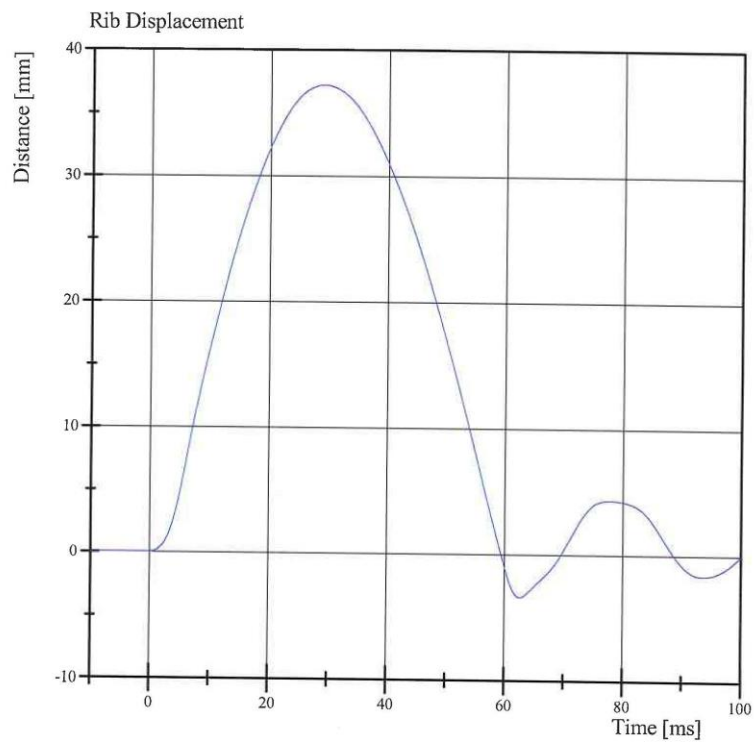
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:50:34 928



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Filter Class: CFC_180
Max: 37.2 mm at 29.0 ms
Min: -3.4 mm at 62.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 10:50:43 928



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 17-1

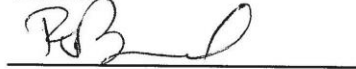
Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.466 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,416.9 N	Yes
Upper Rib Displacement	34 - 41 mm	36.7 mm	Yes
Center Rib Displacement	37 - 45 mm	40.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.9 mm	Yes

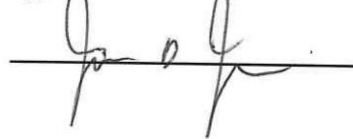
Test meets specifications.

Comments:

Technician



Approved



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

10.22.2013 12:30:08 444

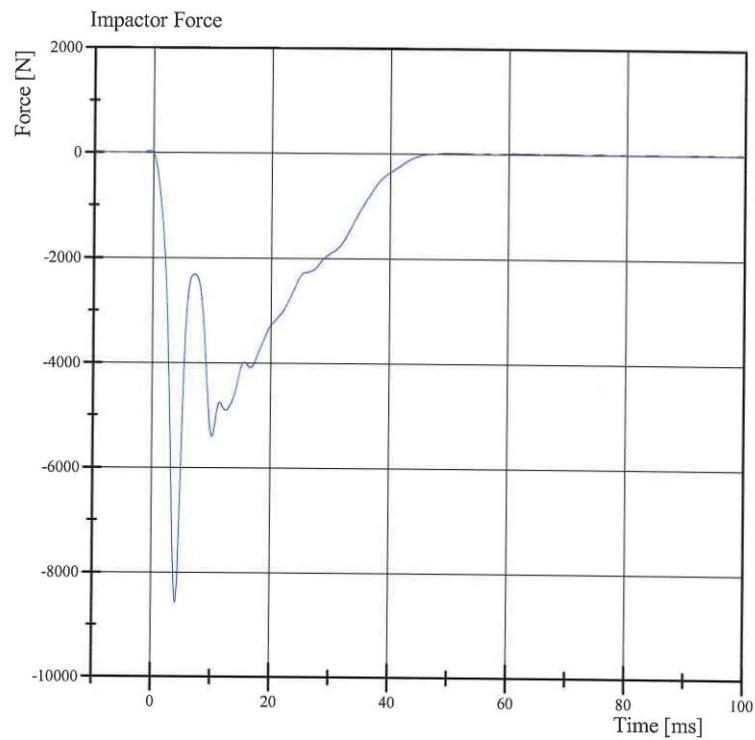


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013



Filter Class: CFC_180

Max: 28.1 N at -0.6 ms

Min: -8,581.1 N at 4.1 ms

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

10.22.2013 12:30:15 444

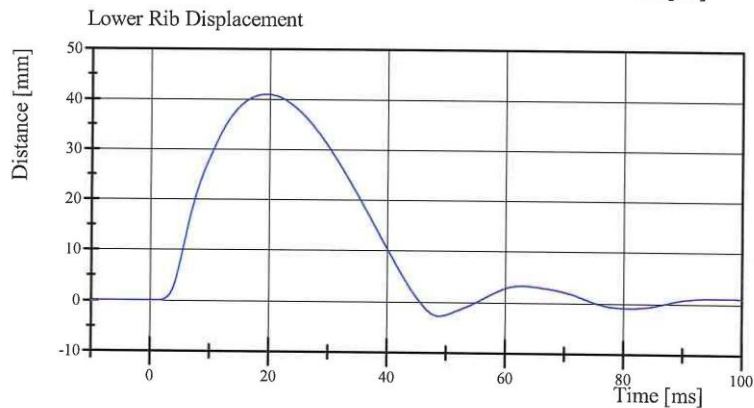
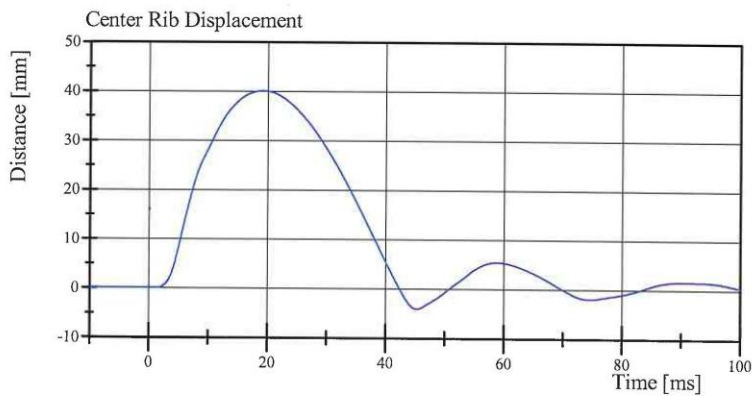
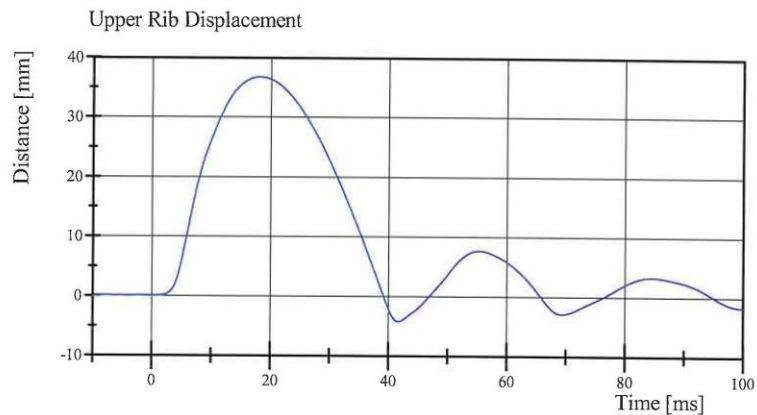


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013



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

10.22.2013 12:30:16 444



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.94 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,074.3 N	Yes
Time of Peak	10.6 - 13.0 ms	10.96 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,549.7 N	Yes
Time of Peak	10.0 - 12.3 ms	10.80 ms	Yes

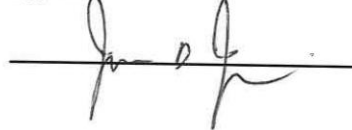
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 12:46:07 561

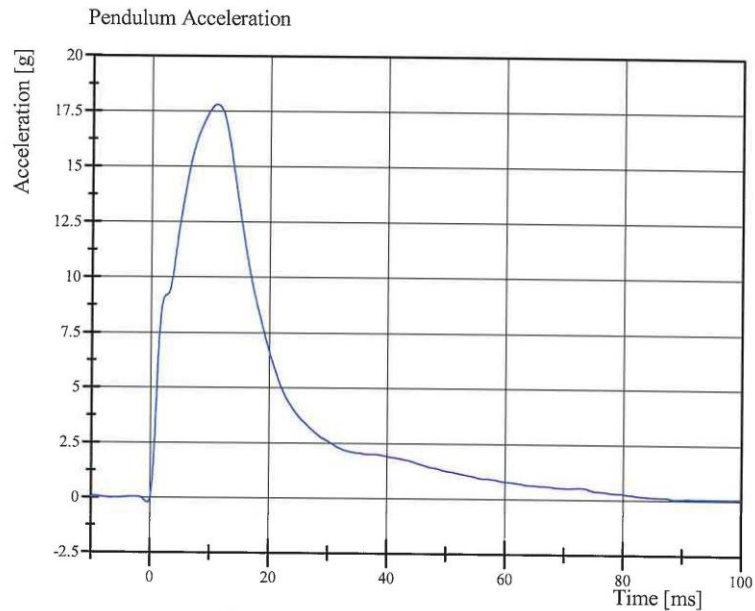


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 17-1

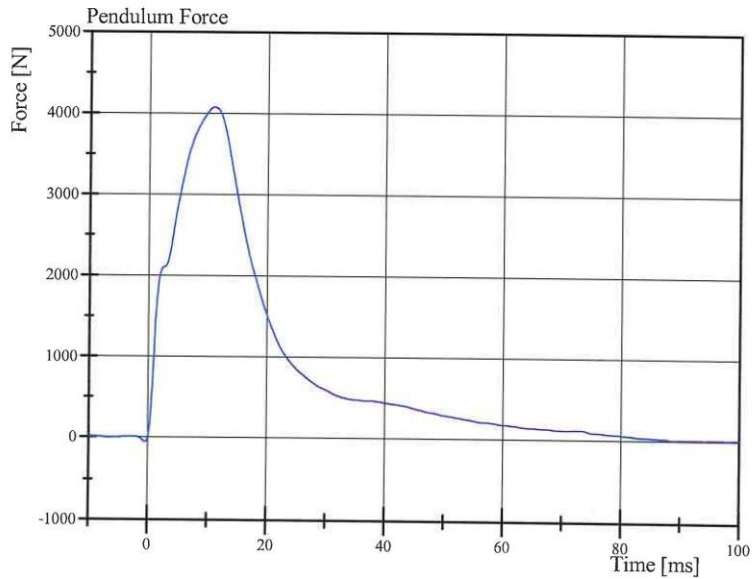
Test Date: 10/22/2013



Filter Class: CFC_180

Max: 17.8 g at 11.0 ms

Min: -0.2 g at -0.5 ms



Filter Class: CFC_180

Max: 4,074.3 N at 11.0 ms

Min: -57.2 N at -0.5 ms

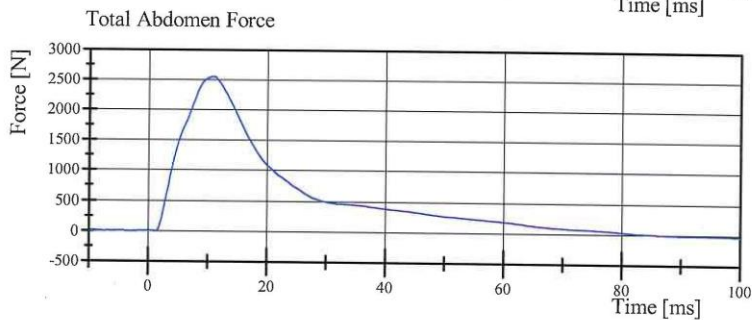
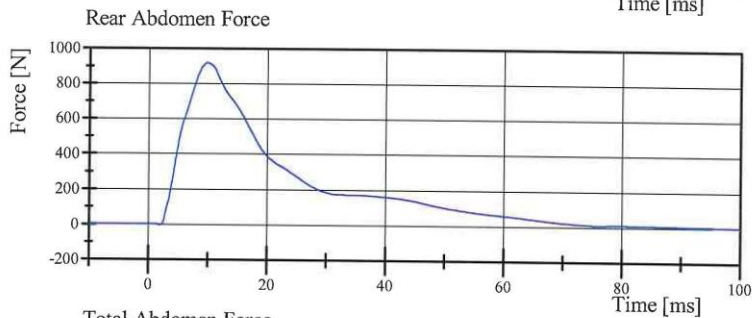
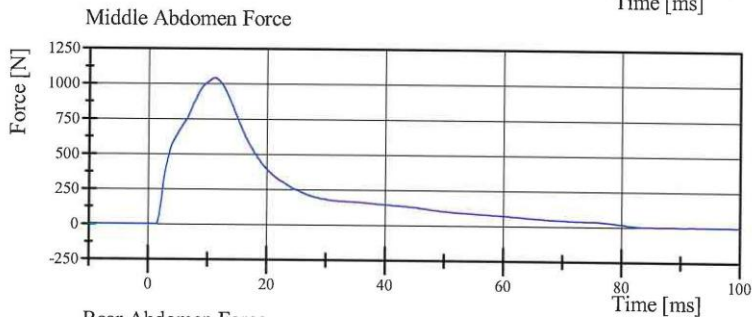
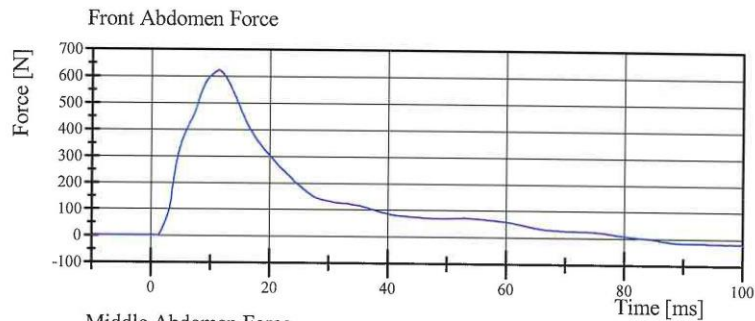
Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 12:46:13 561



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 17-1
Test Date: 10/22/2013



Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 12:46:14 561



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 17-3

Test Date: 10/21/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.038 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.1 deg	Yes
Time of Peak	39 - 53 ms	46.2 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.0 ms	Yes

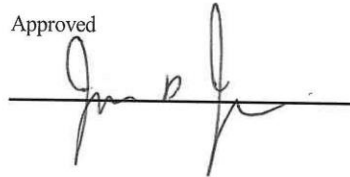
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

10.21.2013 15:10:47 578

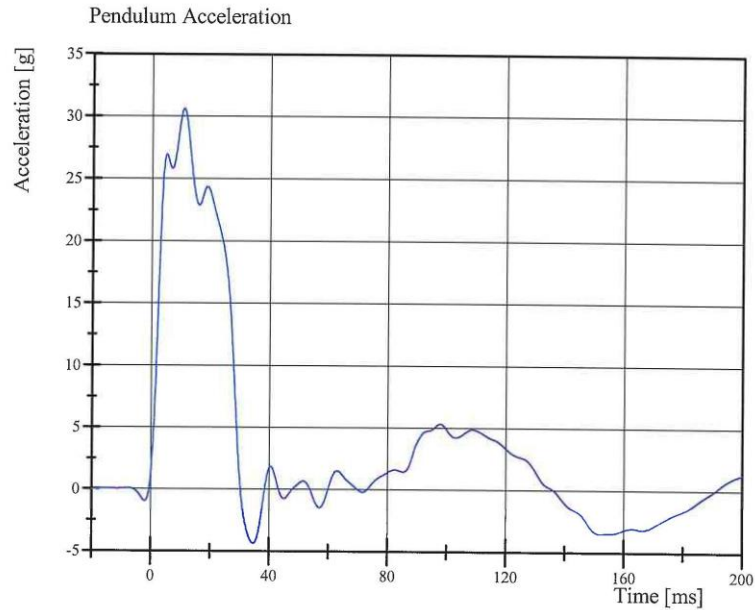


Transportation Research Center Inc.

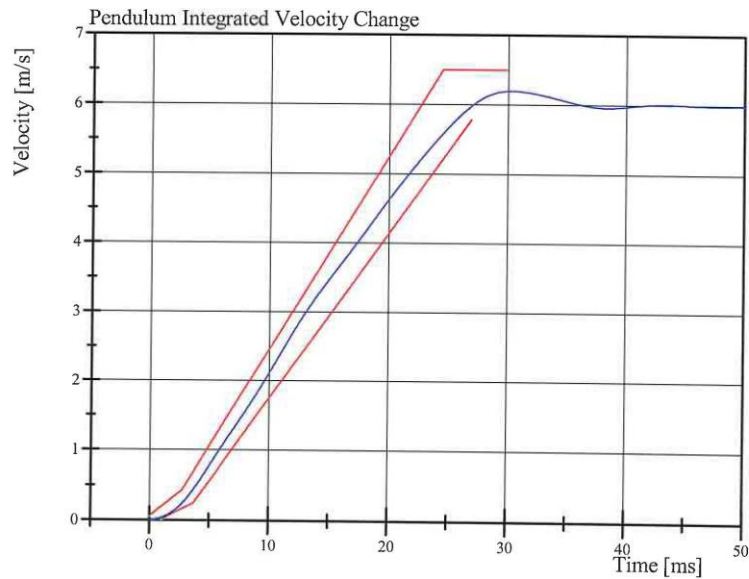
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 17-3

Test Date: 10/21/2013



Filter Class: CFC_60
Max: 30.6 g at 10.6 ms
Min: -4.4 g at 34.6 ms



Filter Class: CFC_60
Max: 6.2 m/s at 30.2 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.21.2013 15:10:55 578

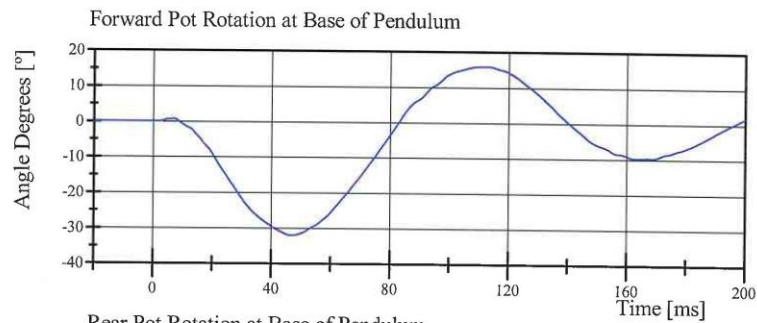


Transportation Research Center Inc.

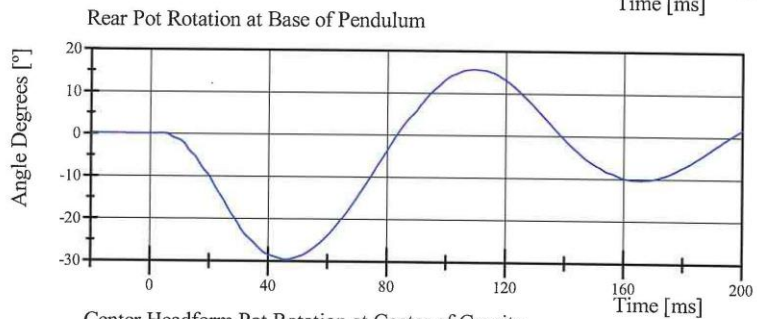
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 17-3

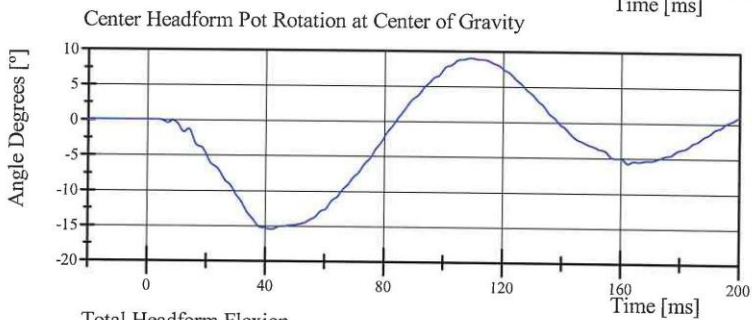
Test Date: 10/21/2013



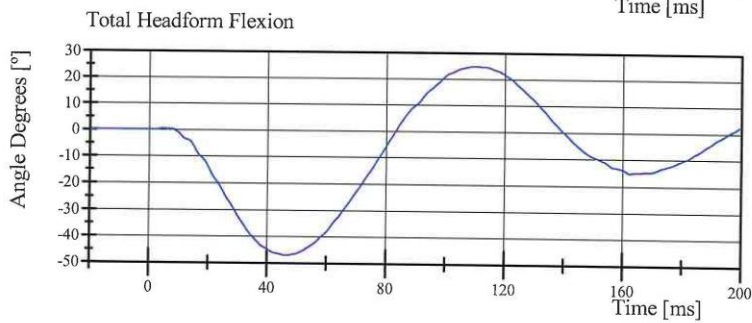
Filter Class: CFC_180
Max: 15.9 ° at 112.2 ms
Min: -32.1 ° at 47.0 ms



Filter Class: CFC_180
Max: 15.6 ° at 109.0 ms
Min: -29.7 ° at 45.8 ms



Filter Class: CFC_180
Max: 9.0 ° at 109.0 ms
Min: -15.5 ° at 41.8 ms



Filter Class: CFC_180
Max: 24.8 ° at 109.5 ms
Min: -47.1 ° at 46.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.21.2013 15:10:56 578



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,019.1 N	Yes
Time of Peak	11.8 - 16.1 ms	12.48 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,293.7 N	Yes
Time of Peak	12.2 - 17.0 ms	12.32 ms	Yes

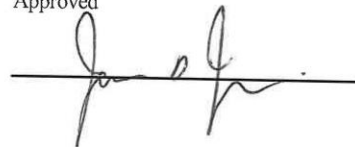
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 12:55:24 545



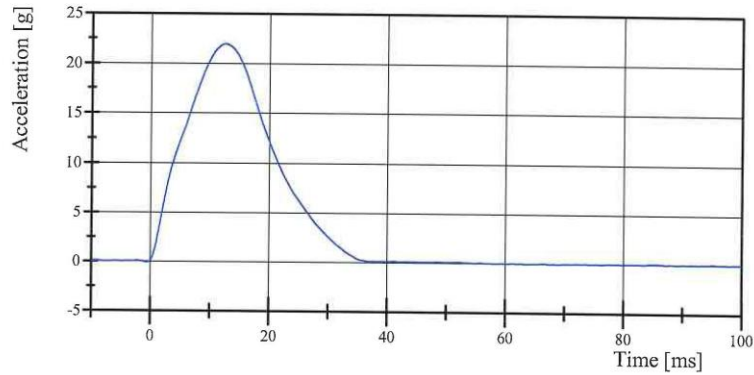
Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 17-1

Test Date: 10/22/2013

Pendulum Acceleration

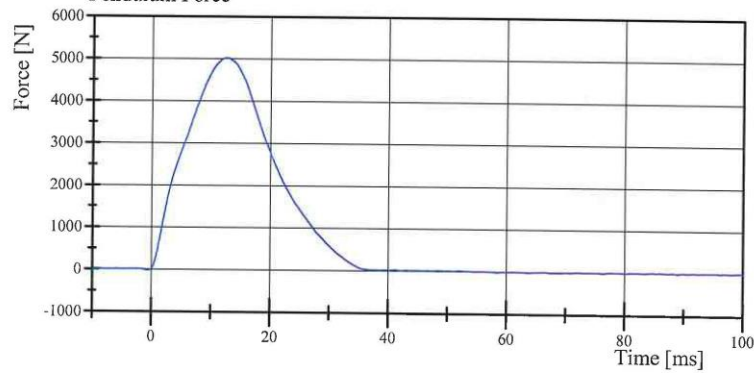


Filter Class: CFC_180

Max: 21.9 g at 12.5 ms

Min: -0.1 g at -0.6 ms

Pendulum Force

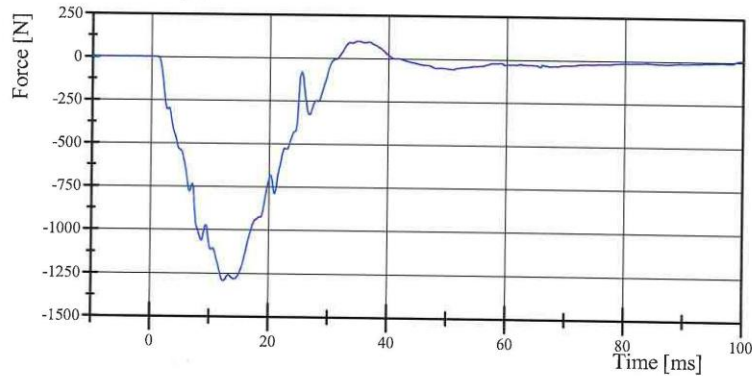


Filter Class: CFC_180

Max: 5,019.1 N at 12.5 ms

Min: -26.5 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600

Max: 100.5 N at 34.8 ms

Min: -1,293.7 N at 12.3 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.22.2013 12:55:31 545



Driver S/N F030

Post-Test Calibration Sheets

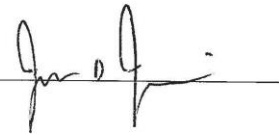
Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 18
11/16/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	447	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	470	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	282	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	200	Yes
12	Thorax Depth	262.0 - 272.0	268	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	159	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Technician



Approved



Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Resultant Acceleration	125 - 155 g	145.1 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	-6.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

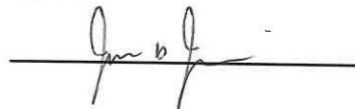
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 07:19:42 360

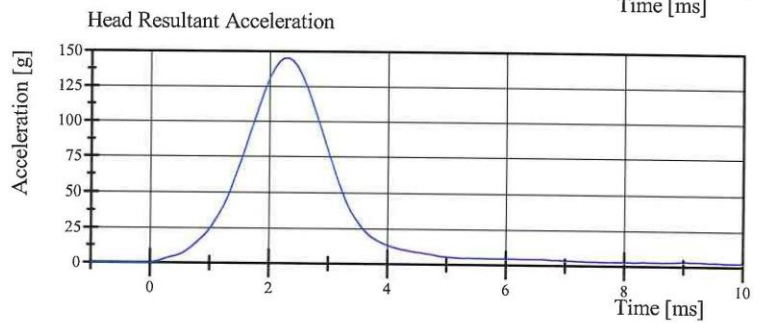
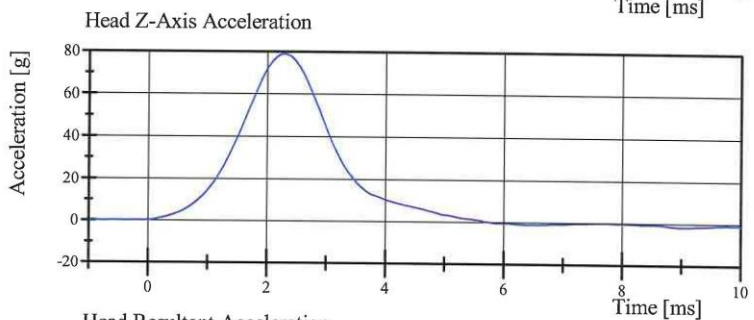
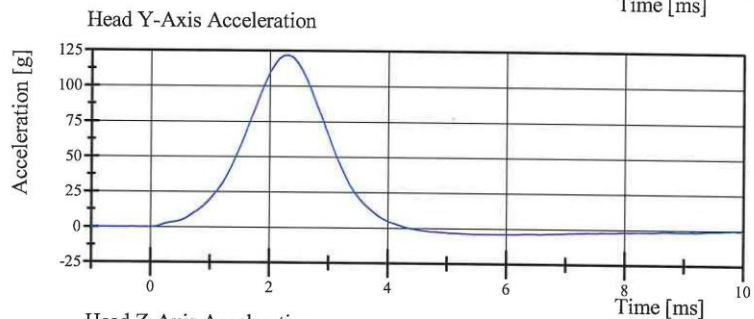
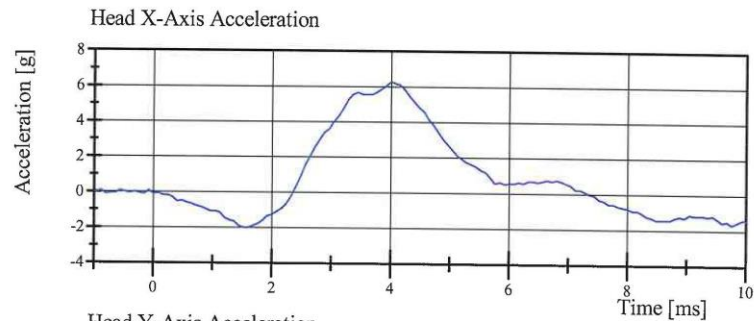


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 07:19:48 360



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	39 %	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	-52.6 deg	Yes
Time of Peak	54 - 66 ms	59.0 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	64.3 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 09:03:18 1310

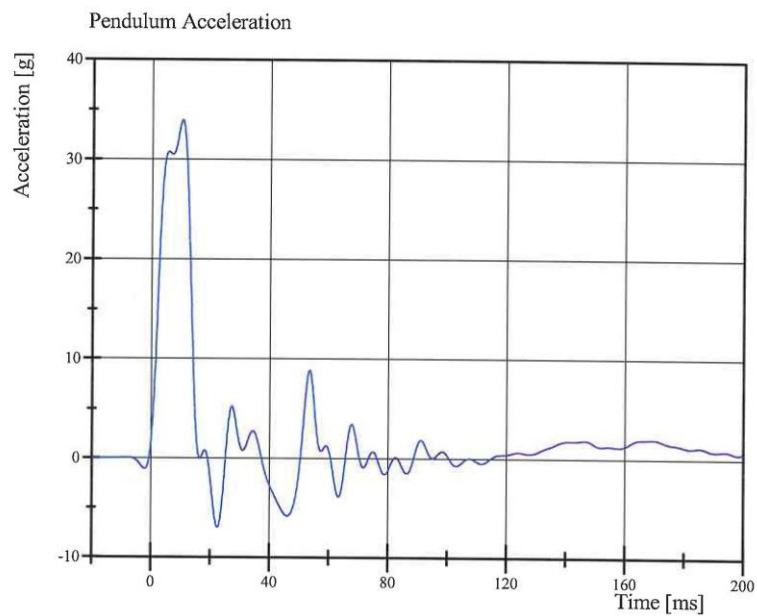


Transportation Research Center Inc.

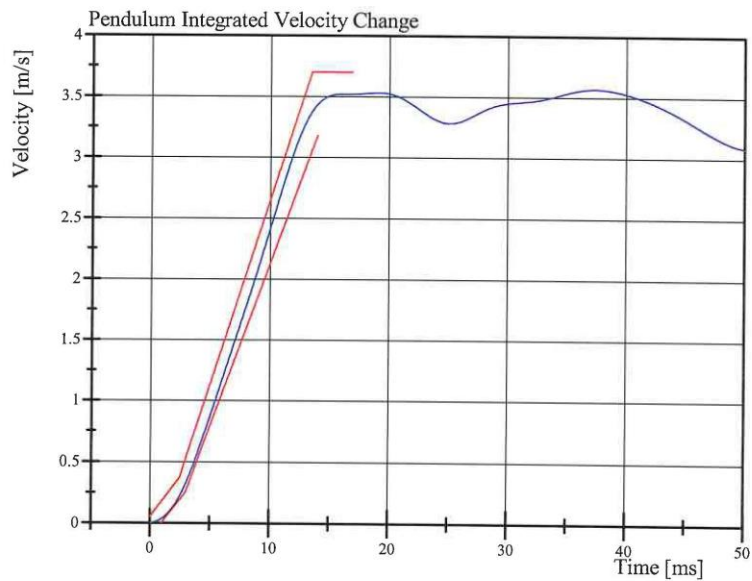
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013



Filter Class: CFC_60
Max: 33.9 g at 10.2 ms
Min: -7.0 g at 22.5 ms



Filter Class: CFC_60
Max: 3.6 m/s at 37.3 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 09:03:25 1310

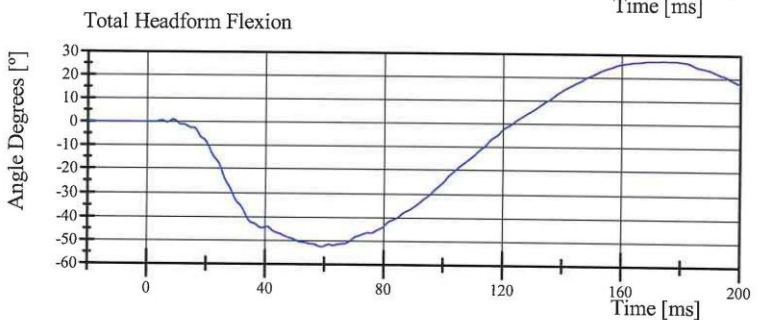
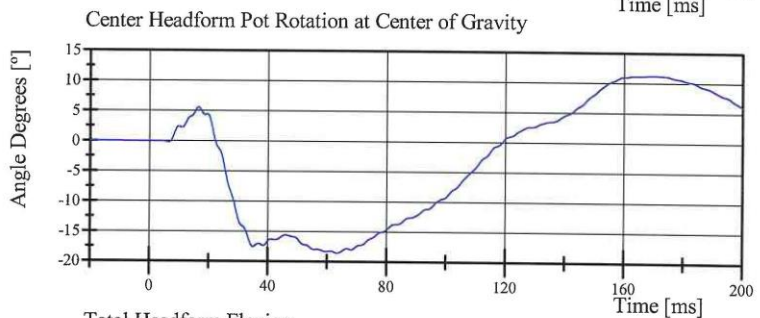
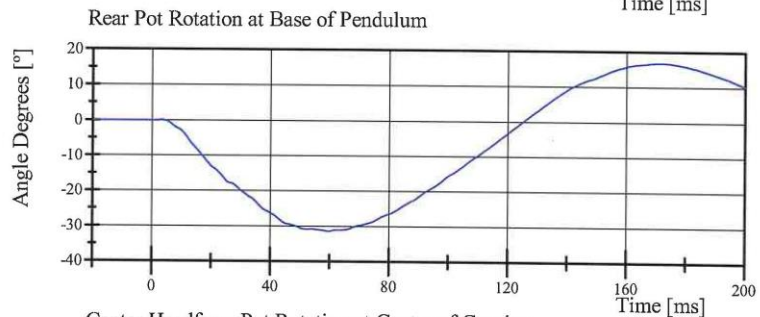
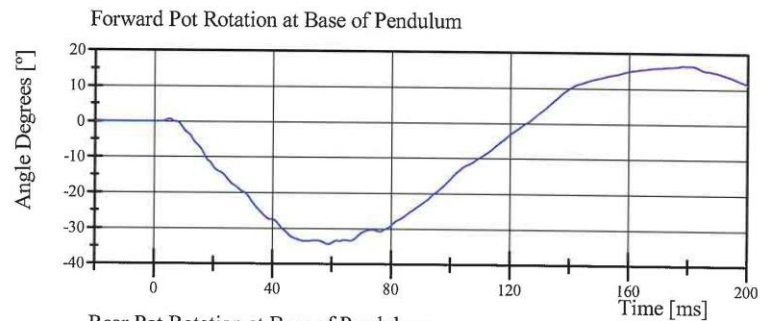


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 09:03:26 1310



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.28 g	Yes

Test meets specifications.

Comments:

Technician



Approved



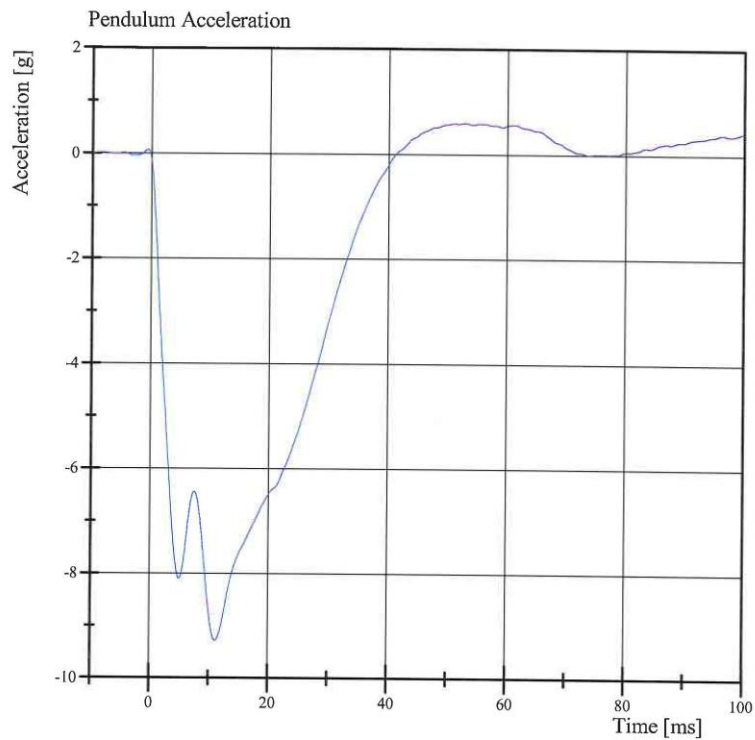
Specification Source: NHTSA final rule 8/15/2008

11.16.2013 10:49:26 586



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 0.6 g at 52.7 ms
Min: -9.3 g at 11.1 ms

Specification Source: NHTSA final rule 8/15/2008

11.16.2013 10:49:36 586



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician



Approved



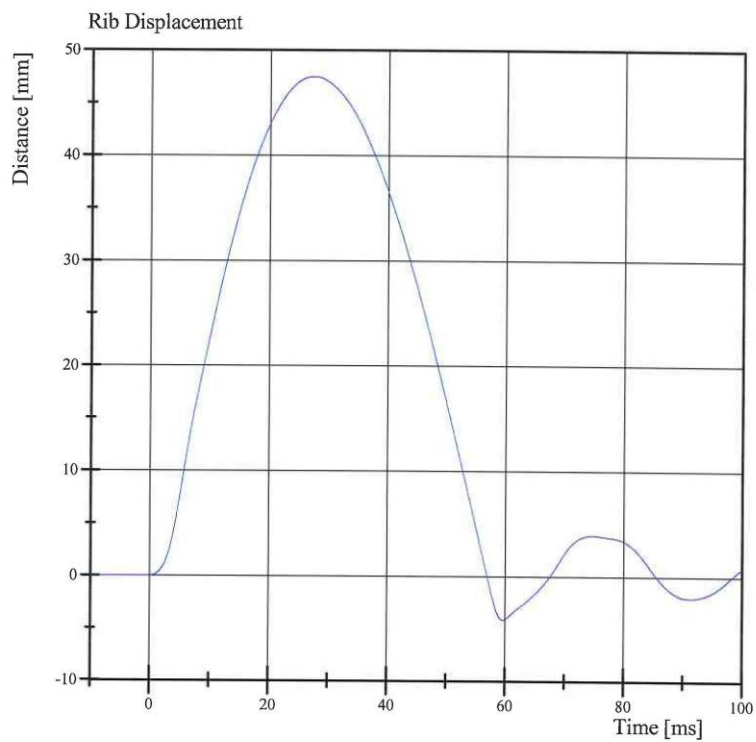
Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:04:14 735



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 47.5 mm at 27.4 ms
Min: -4.2 mm at 59.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:04:22 735



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



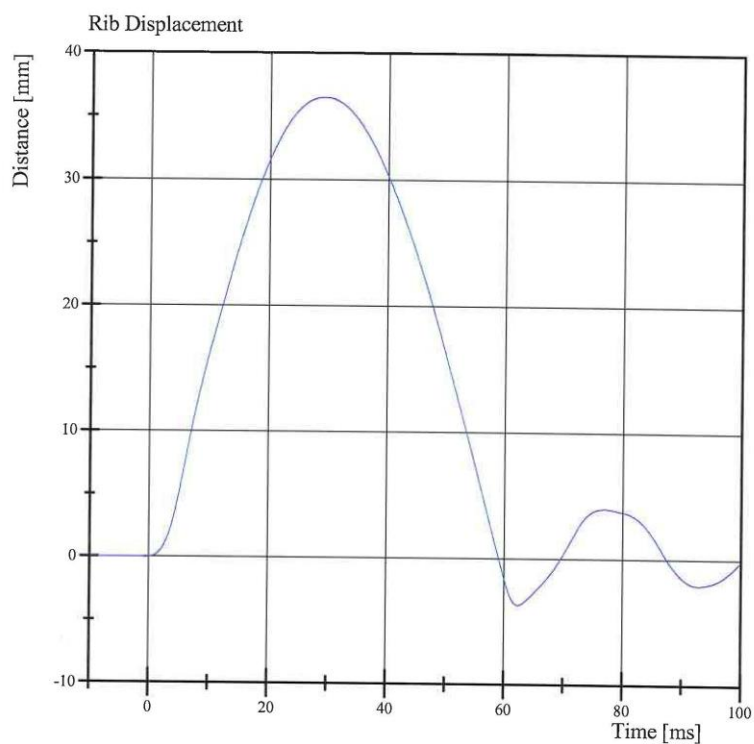
Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:09:46 932



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 36.5 mm at 29.2 ms
Min: -3.7 mm at 62.3 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:09:53 932



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician



Approved



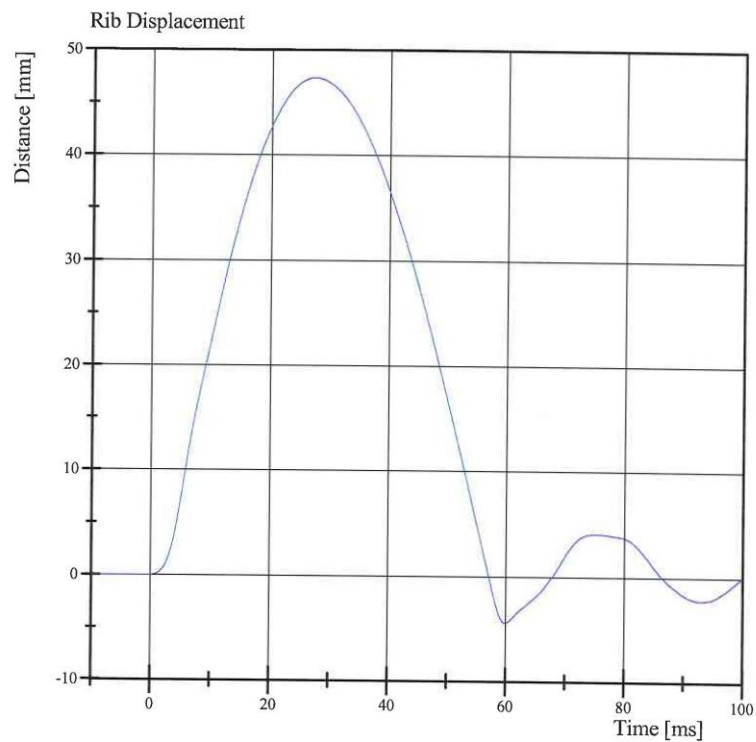
Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:14:03 738



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 47.4 mm at 27.3 ms
Min: -4.4 mm at 59.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:14:11 738



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician



Approved



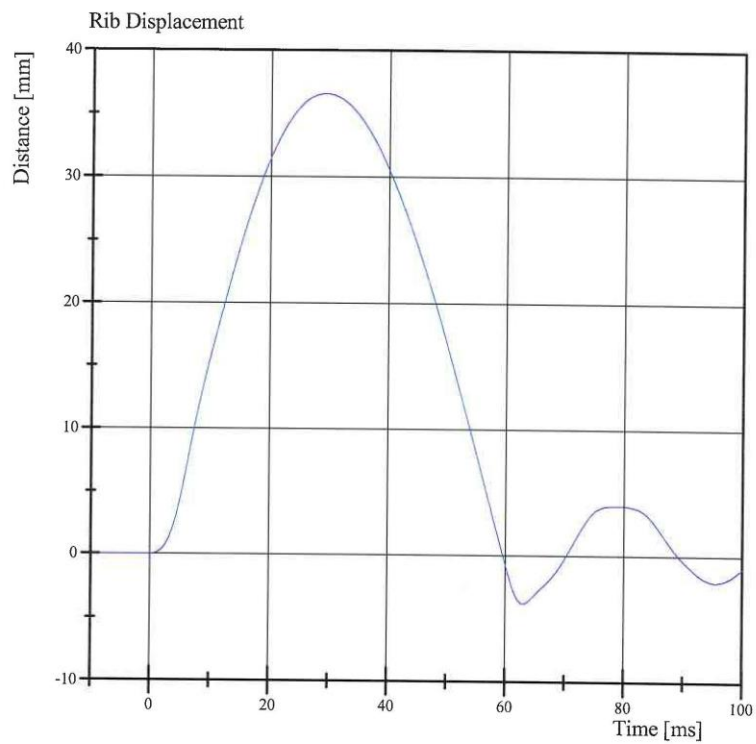
Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:20:43 924



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 36.6 mm at 29.2 ms
Min: -3.8 mm at 63.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:20:51 924



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

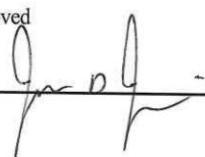
Comments:

Drop Height: 816

Technician



Approved



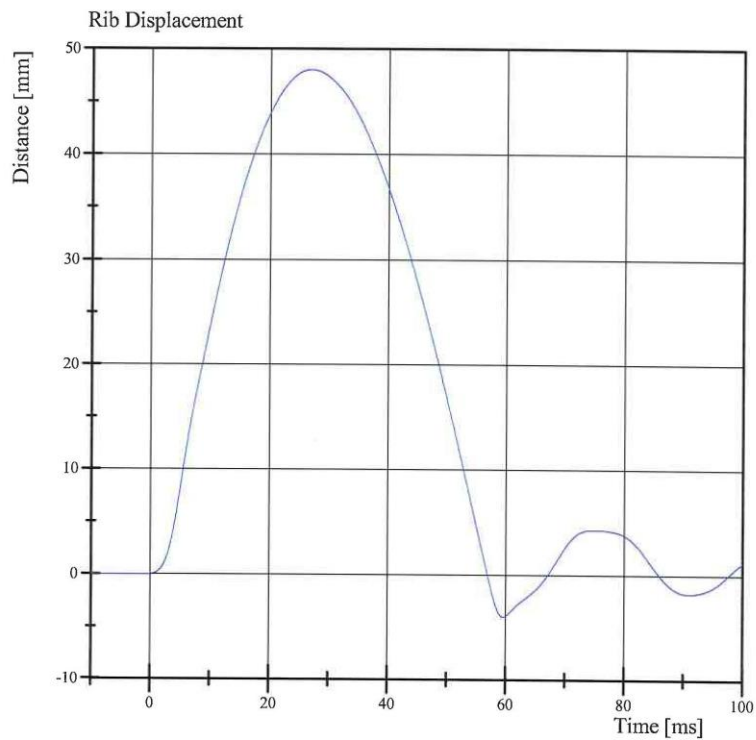
Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:24:52 739



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 48.0 mm at 26.9 ms
Min: -4.0 mm at 59.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:25:00 739



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °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



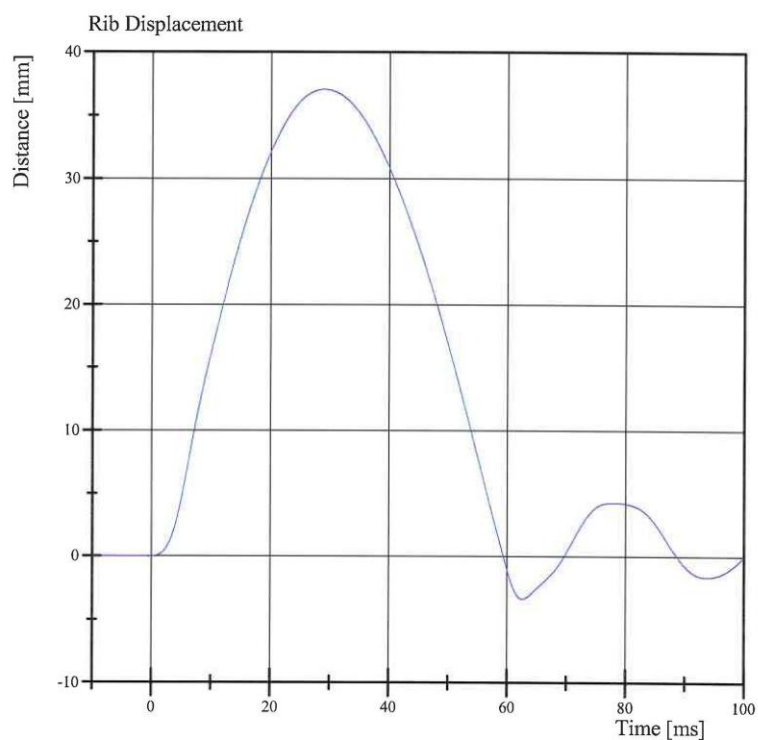
Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:30:34 929



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 37.1 mm at 29.0 ms
Min: -3.4 mm at 62.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 08:30:46 929



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 18-1

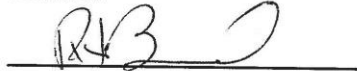
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.468 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,457.0 N	Yes
Upper Rib Displacement	34 - 41 mm	37.1 mm	Yes
Center Rib Displacement	37 - 45 mm	40.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.7 mm	Yes

Test meets specifications.

Comments:

Technician



Approved



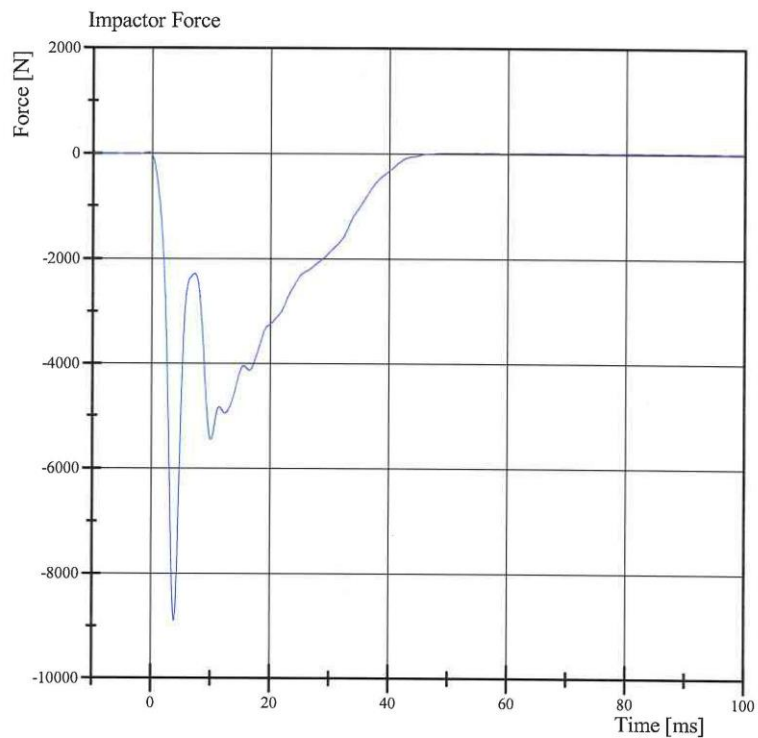
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

11.16.2013 11:02:27 486



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 18-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 26.4 N at 67.4 ms
Min: -8,905.0 N at 3.8 ms

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

11.16.2013 11:02:41 486

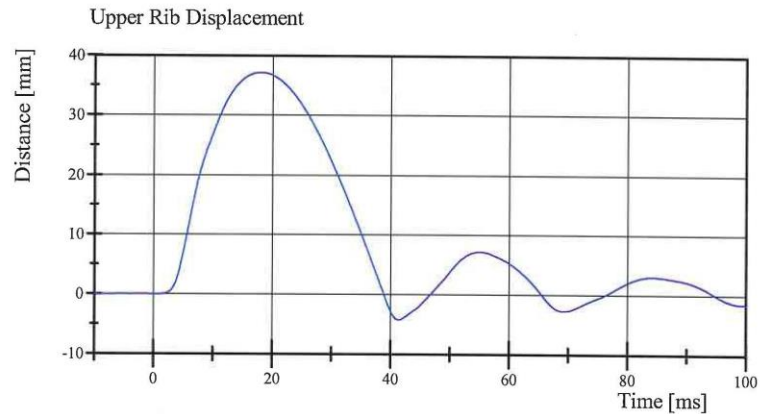


Transportation Research Center Inc.

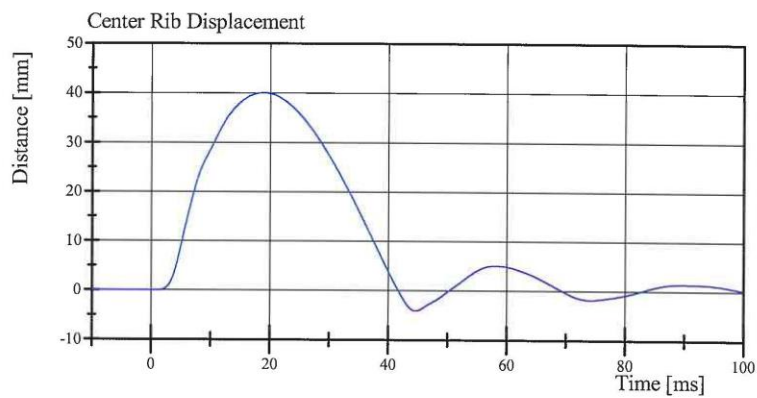
Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 18-1

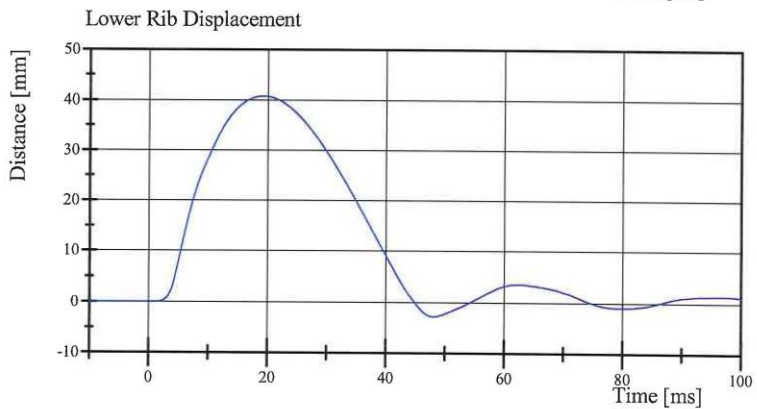
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 37.1 mm at 18.0 ms
Min: -4.3 mm at 41.4 ms



Filter Class: CFC_180
Max: 40.1 mm at 18.9 ms
Min: -4.1 mm at 44.6 ms



Filter Class: CFC_180
Max: 40.7 mm at 19.3 ms
Min: -2.8 mm at 48.1 ms

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

11.16.2013 11:02:42 486



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 18-3

Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.93 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,223.2 N	Yes
Time of Peak	10.6 - 13.0 ms	10.64 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,656.8 N	Yes
Time of Peak	10.0 - 12.3 ms	10.08 ms	Yes

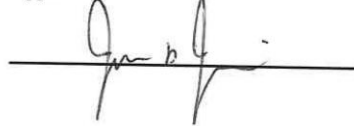
Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 12:52:42 569



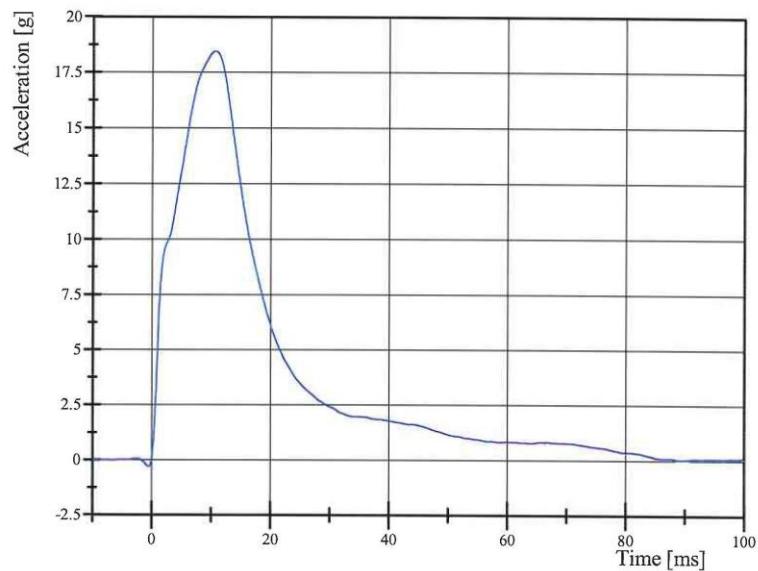
Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 18-3

Test Date: 11/16/2013

Pendulum Acceleration

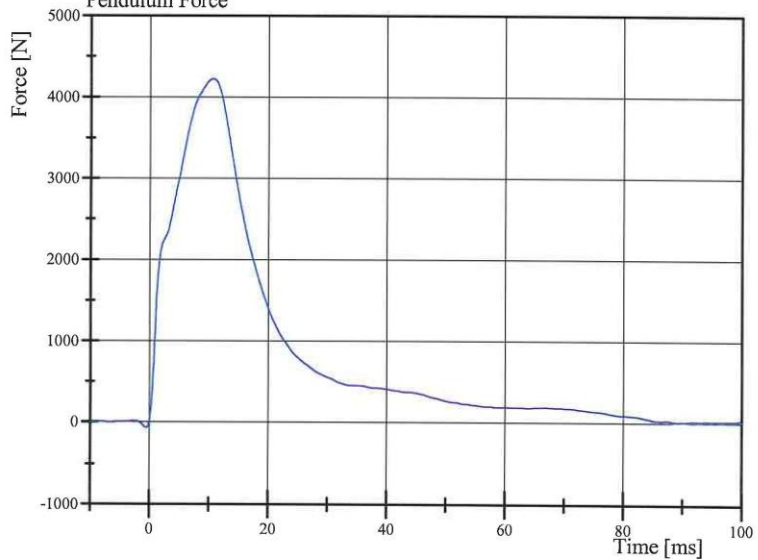


Filter Class: CFC_180

Max: 18.4 g at 10.6 ms

Min: -0.3 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180

Max: 4,223.2 N at 10.6 ms

Min: -71.5 N at -0.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 12:52:55 569

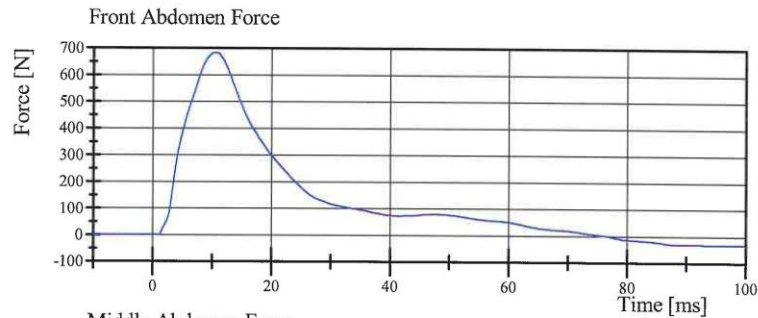


Transportation Research Center Inc.

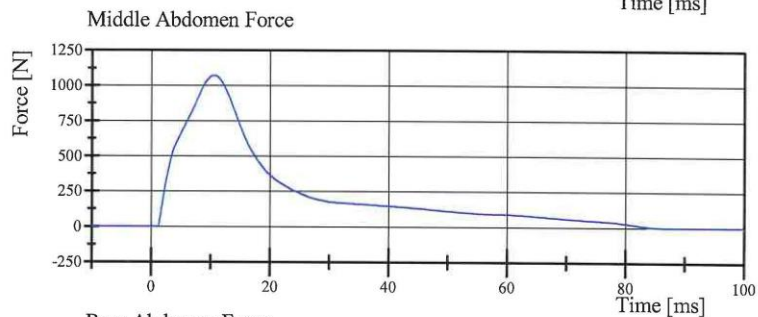
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 18-3

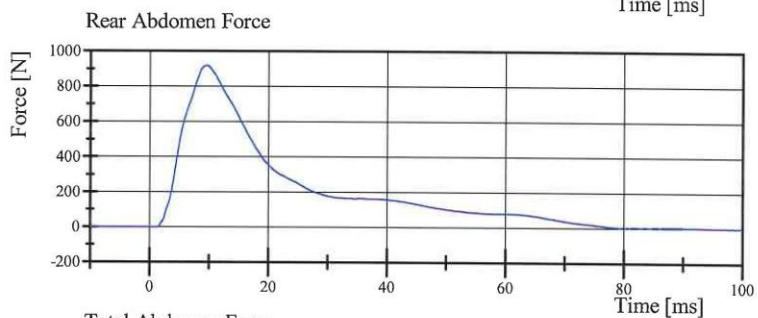
Test Date: 11/16/2013



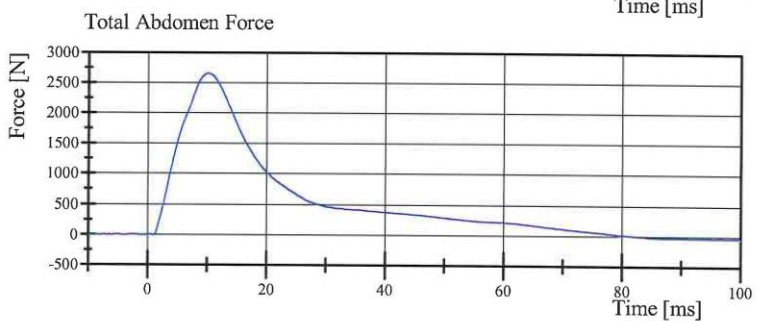
Filter Class: CFC_600
Max: 681.9 N at 10.3 ms
Min: -33.5 N at 100.0 ms



Filter Class: CFC_600
Max: 1,072.0 N at 10.4 ms
Min: -5.7 N at 97.6 ms



Filter Class: CFC_600
Max: 917.9 N at 9.6 ms
Min: -3.4 N at 99.3 ms



Filter Class: CFC_600
Max: 2,656.8 N at 10.1 ms
Min: -42.4 N at 99.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 12:52:57 569



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 18-4

Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.027 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.3 deg	Yes
Time of Peak	39 - 53 ms	46.3 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.0 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 09:22:04 579

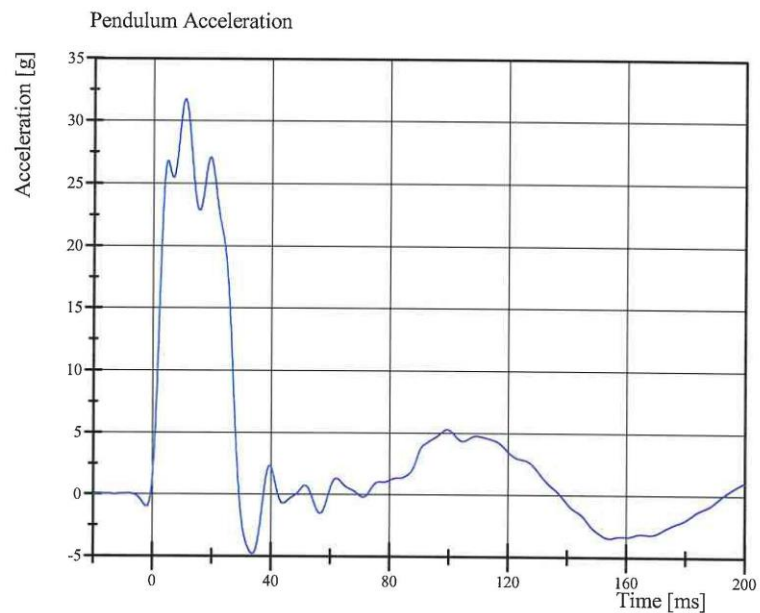


Transportation Research Center Inc.

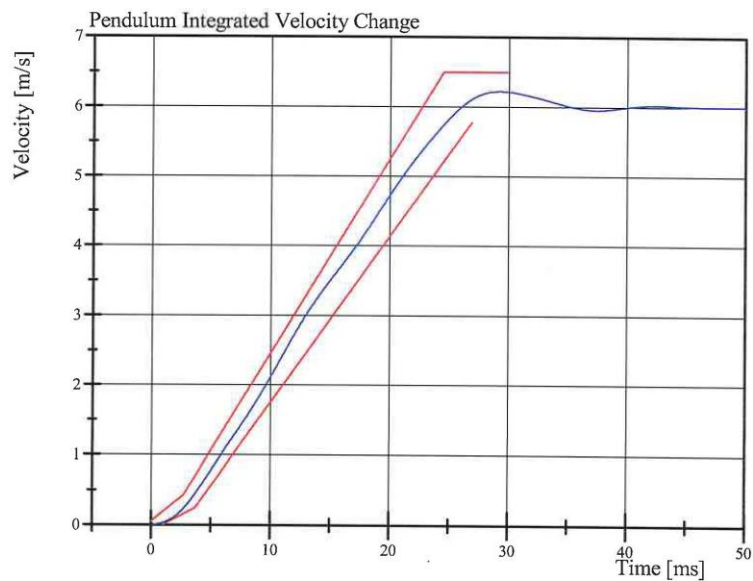
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 18-4

Test Date: 11/16/2013



Filter Class: CFC_60
Max: 31.7 g at 10.7 ms
Min: -4.8 g at 33.8 ms



Filter Class: CFC_60
Max: 6.2 m/s at 29.2 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 09:22:14 579



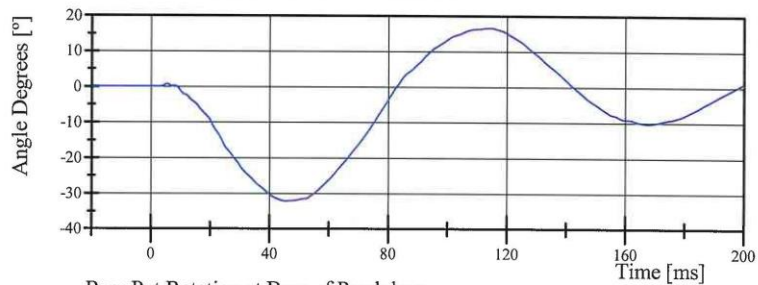
Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 18-4

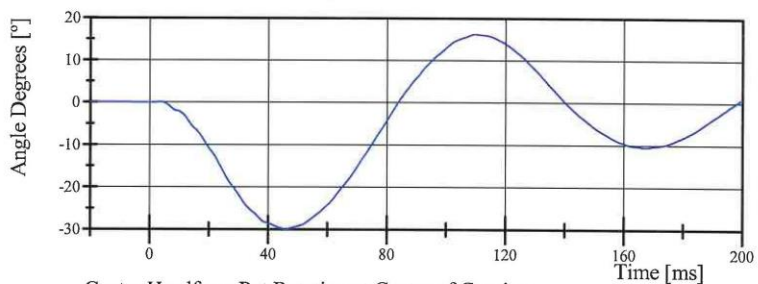
Test Date: 11/16/2013

Forward Pot Rotation at Base of Pendulum



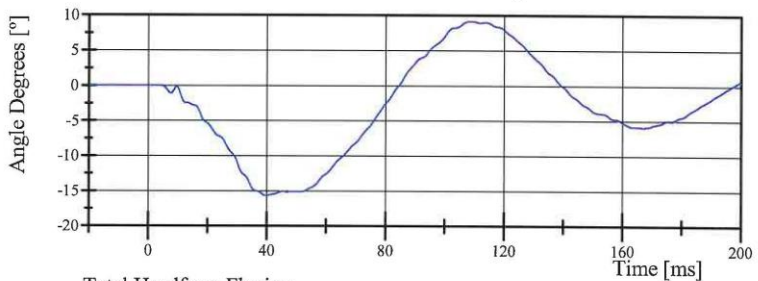
Filter Class: CFC_180
Max: 16.5 ° at 114.5 ms
Min: -32.2 ° at 45.6 ms

Rear Pot Rotation at Base of Pendulum



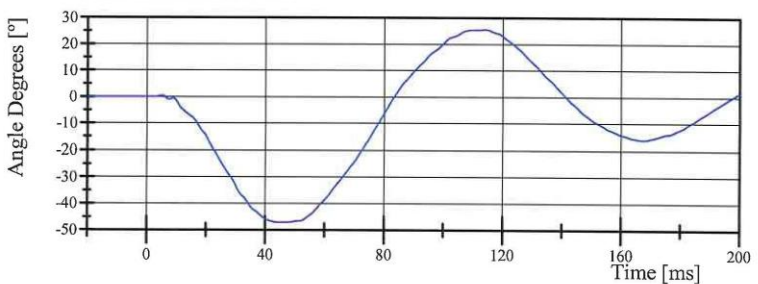
Filter Class: CFC_180
Max: 16.2 ° at 109.8 ms
Min: -30.0 ° at 45.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.1 ° at 108.6 ms
Min: -15.6 ° at 39.6 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.4 ° at 113.8 ms
Min: -47.3 ° at 46.3 ms

Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 09:22:15 579



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 18-1

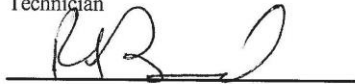
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,176.9 N	Yes
Time of Peak	11.8 - 16.1 ms	13.04 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,291.8 N	Yes
Time of Peak	12.2 - 17.0 ms	14.00 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: NHTSA Final Rule 8/15/2008

11.16.2013 11:35:43 537



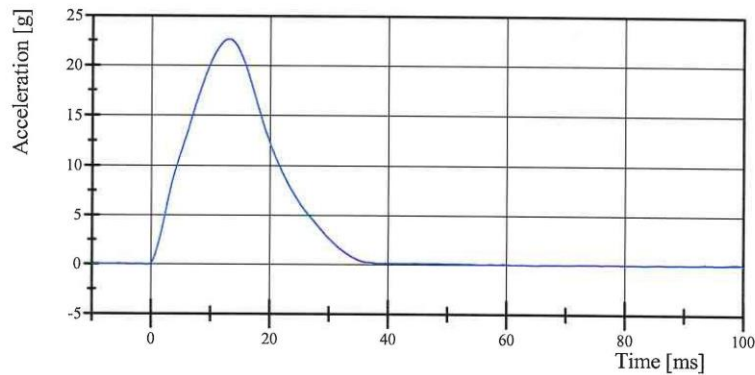
Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 18-1

Test Date: 11/16/2013

Pendulum Acceleration

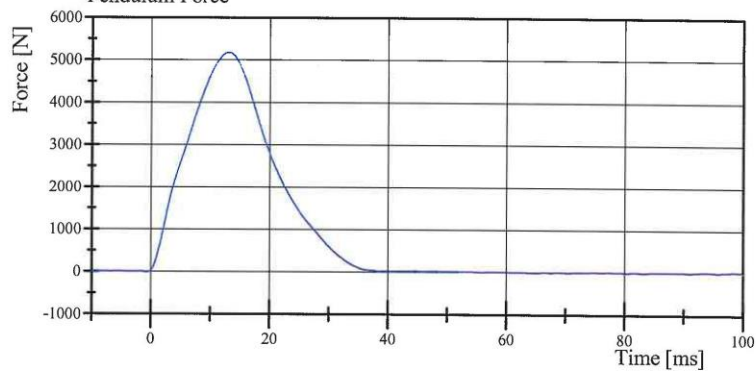


Filter Class: CFC_180

Max: 22.6 g at 13.0 ms

Min: -0.1 g at -0.6 ms

Pendulum Force

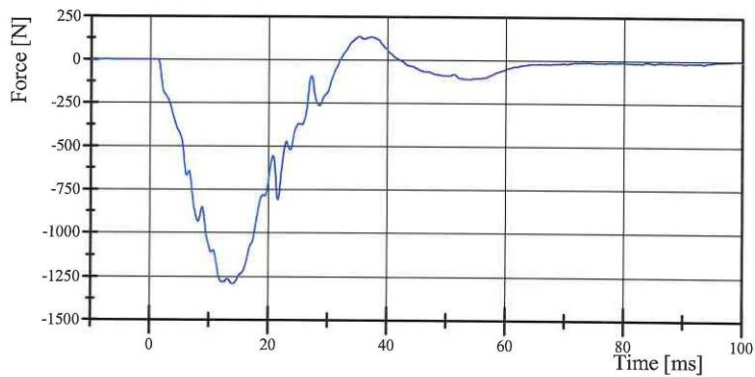


Filter Class: CFC_180

Max: 5,176.9 N at 13.0 ms

Min: -13.3 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600

Max: 136.0 N at 35.2 ms

Min: -1,291.8 N at 14.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

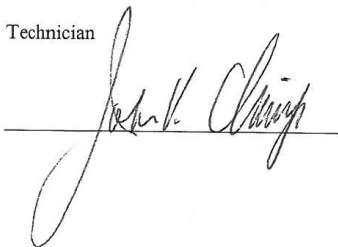
11.16.2013 11:35:53 537

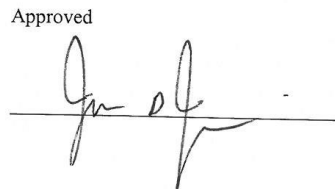


Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.022

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	443	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	317	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	348	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	866	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician


Approved


Revised 9/29/2005



Transportation Research Center Inc.

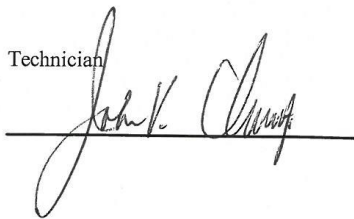
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/24/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.3 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

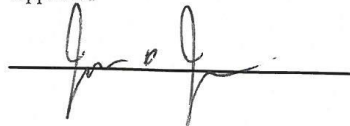
Test meets specifications.

Comments:

Technician



Approved



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

10.24.2013 11:21:42 229

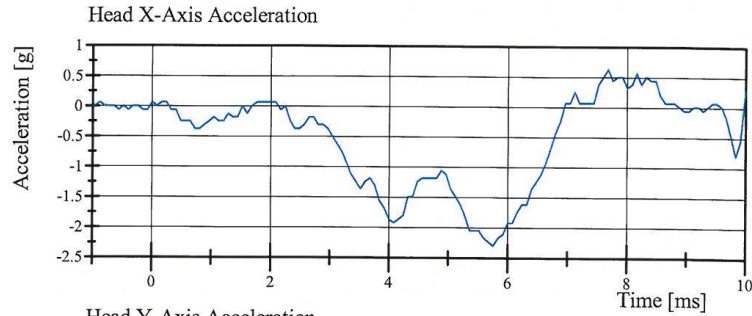


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIa Serial No. 305 Certification No. 22-1

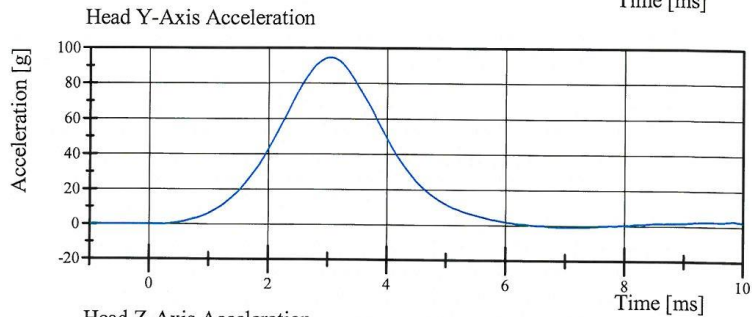
Test Date: 10/24/2013



Filter Class: CFC_1000

Max: 0.6 g at 7.7 ms

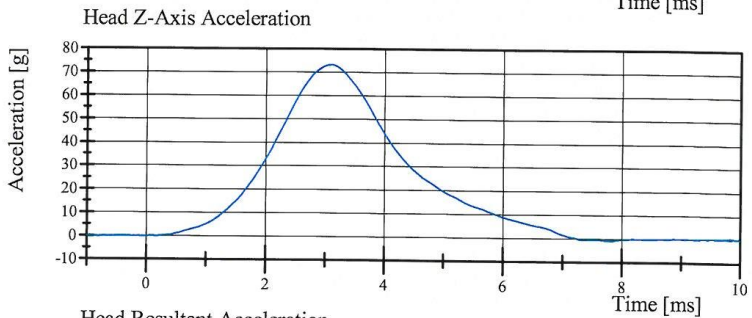
Min: -2.3 g at 5.8 ms



Filter Class: CFC_1000

Max: 94.7 g at 3.0 ms

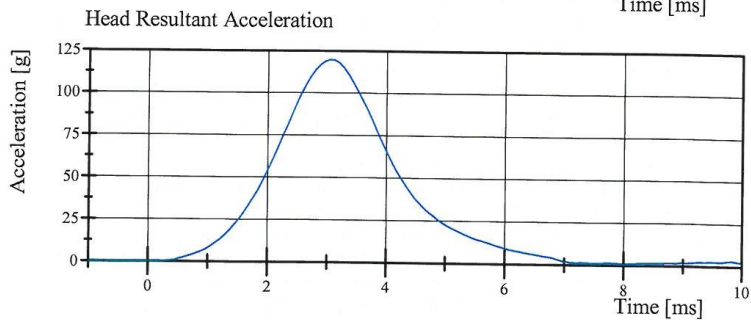
Min: -1.1 g at 7.3 ms



Filter Class: CFC_1000

Max: 73.2 g at 3.1 ms

Min: -0.9 g at 7.8 ms



Filter Class: CFC_1000

Max: 119.7 g at 3.0 ms

Min: 0.0 g at -0.2 ms

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

10.24.2013 11:22:01 229



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 22-1

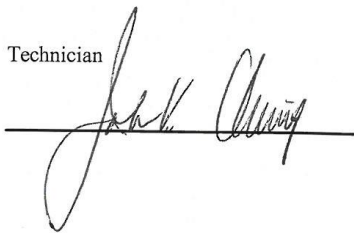
Test Date: 10/24/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	23 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.611 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.453 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.673 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.879 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.799 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.824 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	64.9 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.4 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	120.2 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



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

10.24.2013 15:31:44 635

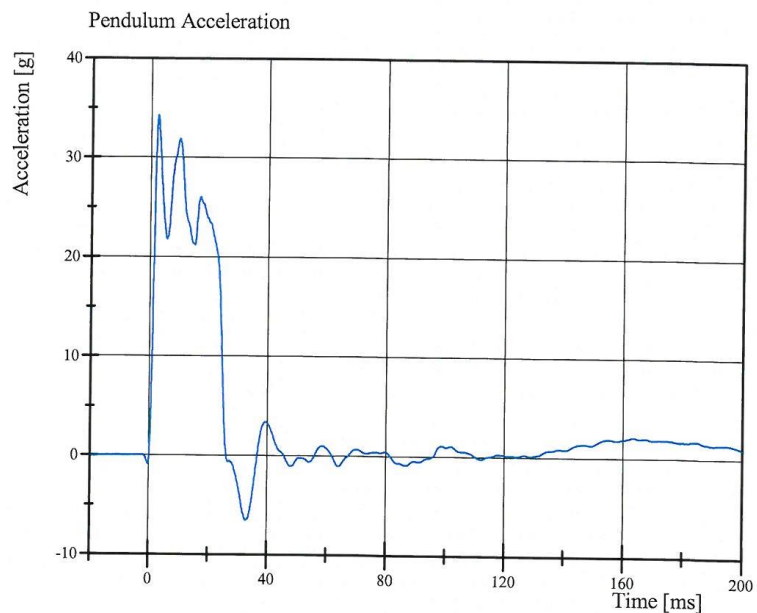


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 22-1

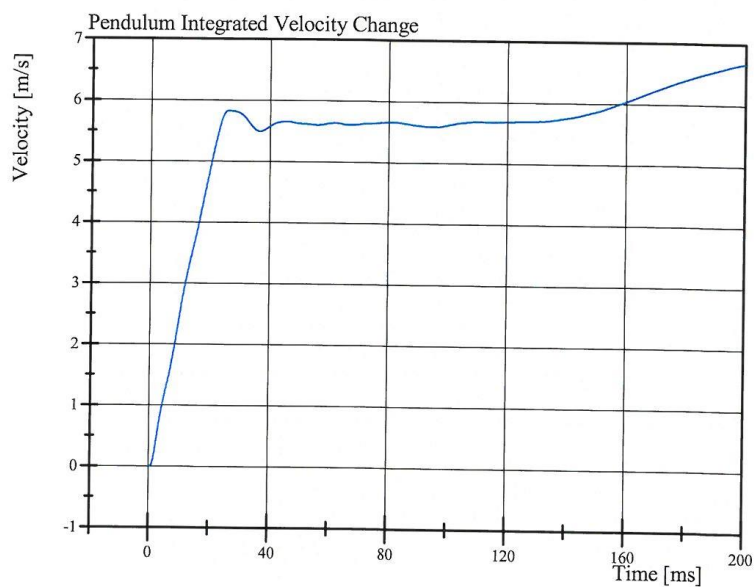
Test Date: 10/24/2013



Filter Class: CFC_180

Max: 34.2 g at 2.4 ms

Min: -6.5 g at 32.8 ms



Filter Class: CFC_180

Max: 6.7 m/s at 200.0 ms

Min: -0.0 m/s at 0.1 ms

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

10.24.2013 15:31:55 635

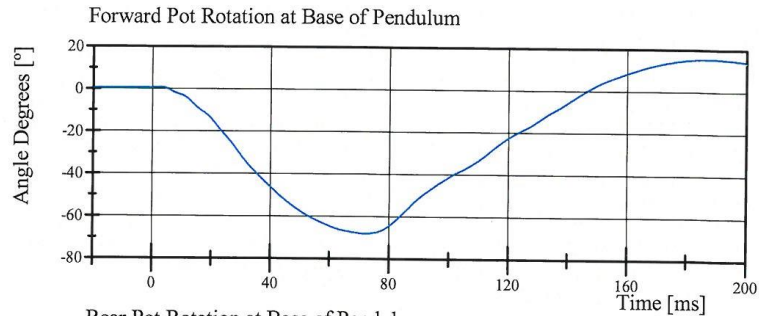


Transportation Research Center Inc.

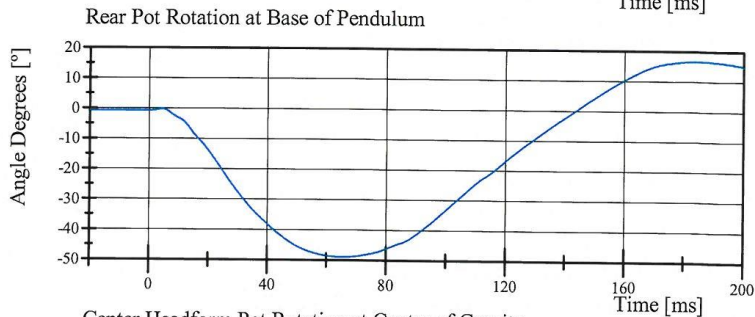
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 22-1

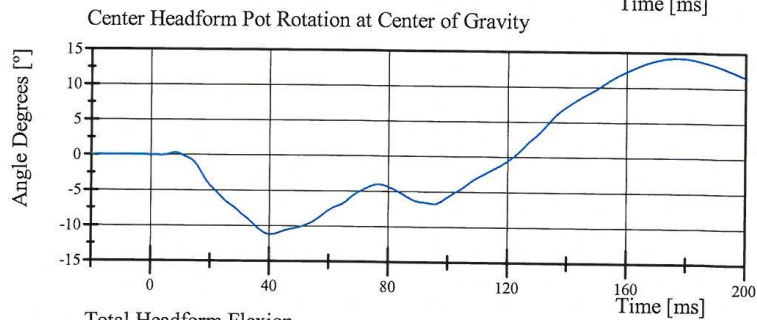
Test Date: 10/24/2013



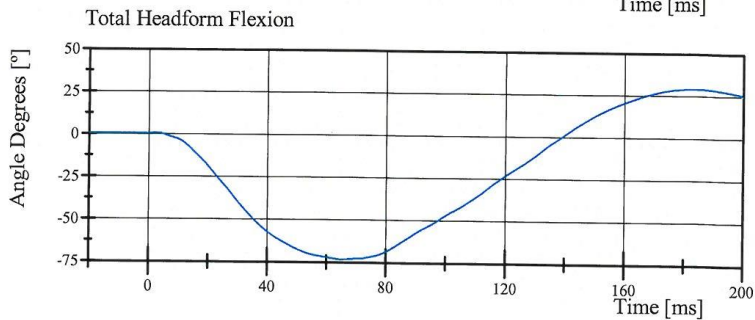
Filter Class: CFC_60
Max: 15.2 ° at 187.3 ms
Min: -68.0 ° at 71.8 ms



Filter Class: CFC_60
Max: 16.5 ° at 184.7 ms
Min: -49.0 ° at 65.4 ms



Filter Class: CFC_60
Max: 14.2 ° at 177.3 ms
Min: -11.2 ° at 40.4 ms



Filter Class: CFC_60
Max: 28.9 ° at 183.7 ms
Min: -73.4 ° at 64.9 ms

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

10.24.2013 15:31:55 635

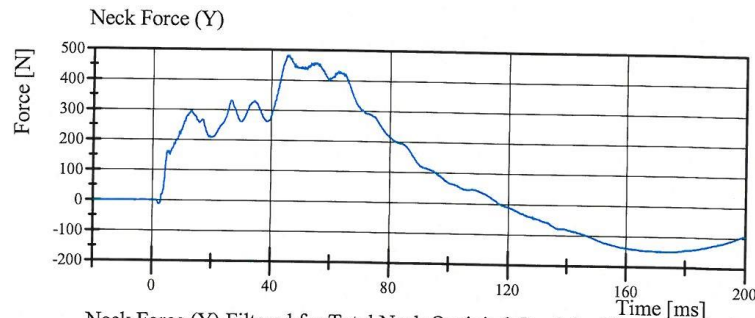


Transportation Research Center Inc.

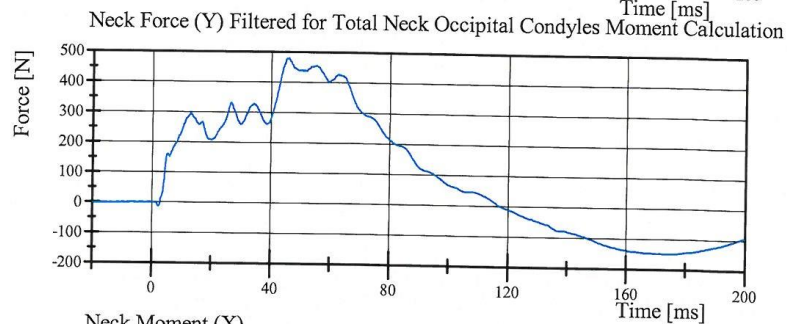
Left Lateral Neck

SID II_s Serial No. 305 Certification No. 22-1

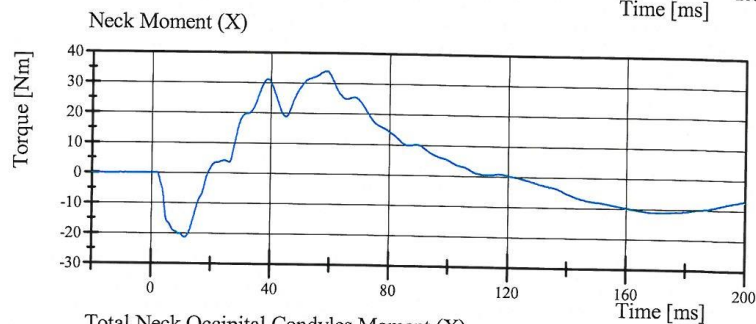
Test Date: 10/24/2013



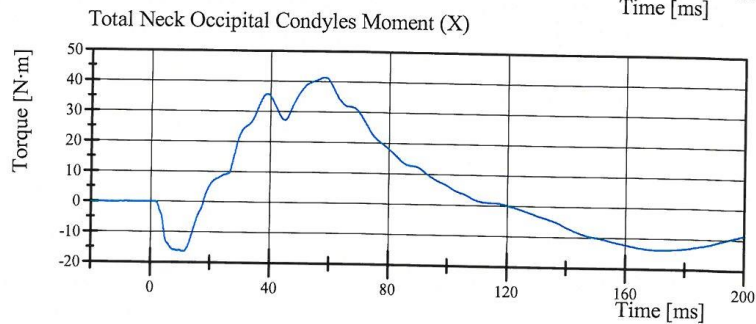
Filter Class: CFC_1000
Max: 481.7 N at 45.8 ms
Min: -150.4 N at 174.5 ms



Filter Class: CFC_600
Max: 480.3 N at 45.8 ms
Min: -150.0 N at 174.6 ms



Filter Class: CFC_600
Max: 34.0 Nm at 59.0 ms
Min: -21.4 Nm at 11.4 ms



Filter Class: Without (Consta
Max: 41.4 N·m at 58.0 ms
Min: -16.5 N·m at 11.2 ms

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

10.24.2013 15:31:56 635



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 22-1

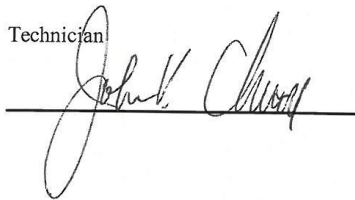
Test Date: 10/25/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.1 g	Yes
Shoulder Displacement	28 - 37 mm	30.8 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.5 g	Yes

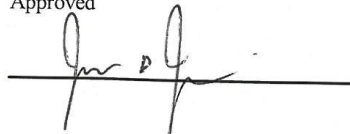
Test meets specifications.

Comments:

Technician



Approved



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

10.25.2013 12:57:26 859

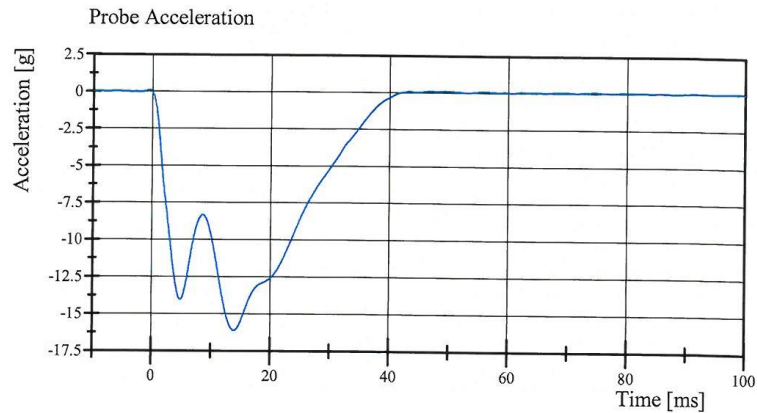


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 22-1

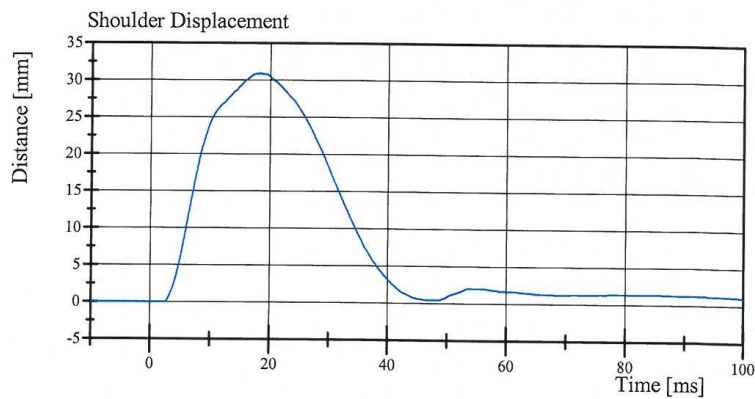
Test Date: 10/25/2013



Filter Class: CFC_180

Max: 0.1 g at 49.2 ms

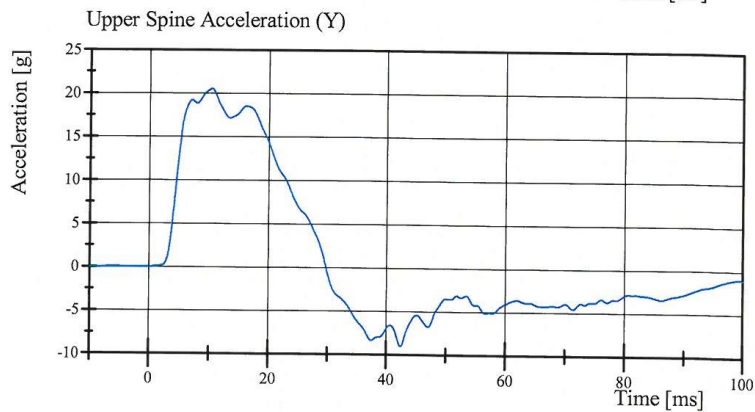
Min: -16.1 g at 13.9 ms



Filter Class: CFC_600

Max: 30.8 mm at 18.2 ms

Min: -0.0 mm at 2.2 ms



Filter Class: CFC_180

Max: 20.5 g at 10.3 ms

Min: -9.0 g at 42.4 ms

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

10.25.2013 12:57:35 859



Transportation Research Center Inc.

Left Lateral Thorax with Arm

SID IIs Serial No. 305 Certification No. 22-1

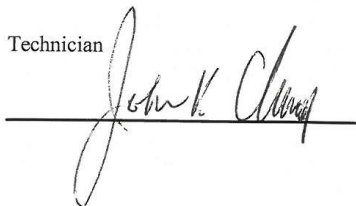
Test Date: 10/25/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.743 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.3 g	Yes
Shoulder Displacement	31 - 40 mm	35.0 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.6 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.2 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.6 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	40.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.2 g	Yes

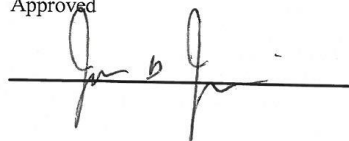
Test meets specifications.

Comments:

Technician



Approved



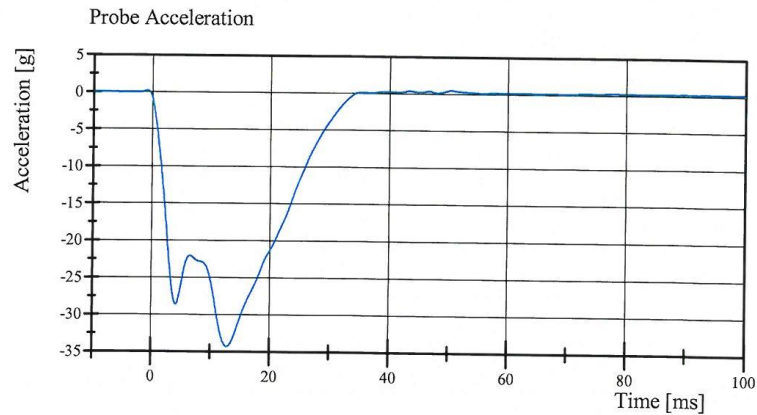
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.25.2013 13:29:14 605

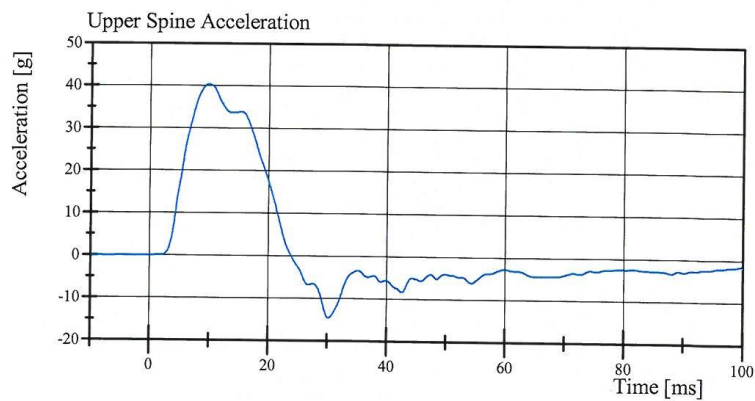


Transportation Research Center Inc.

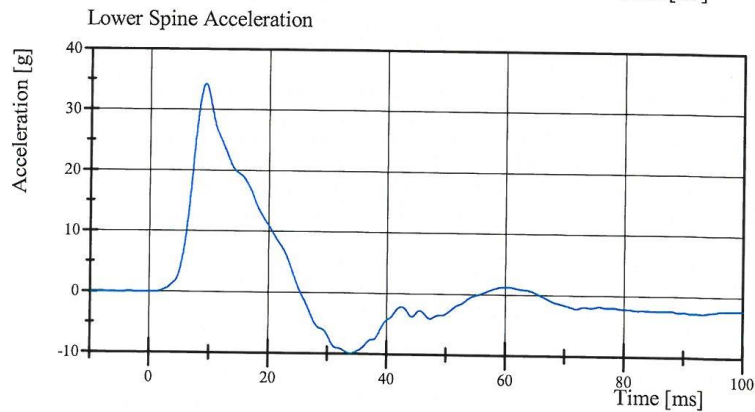
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/25/2013



Filter Class: CFC_180
Max: 0.4 g at 50.3 ms
Min: -34.3 g at 12.8 ms



Filter Class: CFC_180
Max: 40.3 g at 9.7 ms
Min: -14.6 g at 30.2 ms



Filter Class: CFC_180
Max: 34.2 g at 9.3 ms
Min: -10.0 g at 33.8 ms

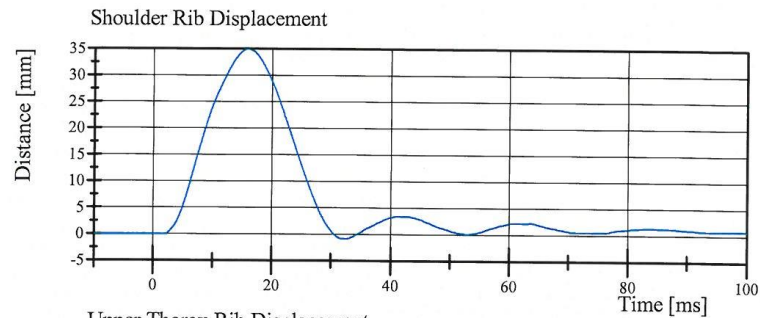
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.25.2013 13:29:30 605

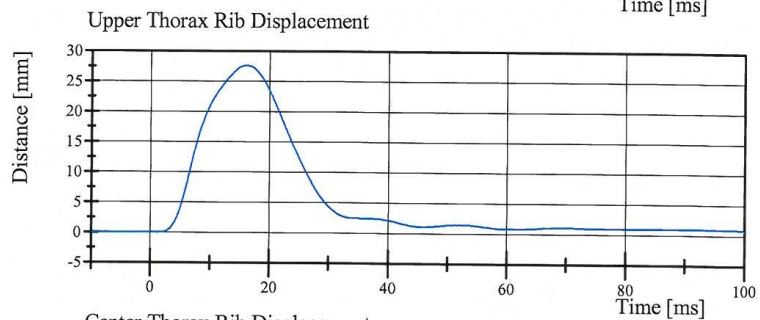


Transportation Research Center Inc.

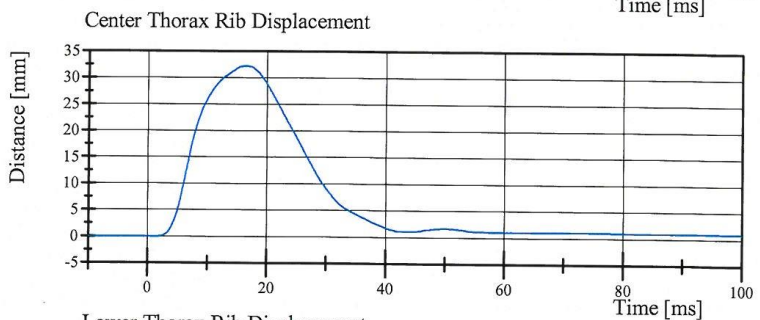
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/25/2013



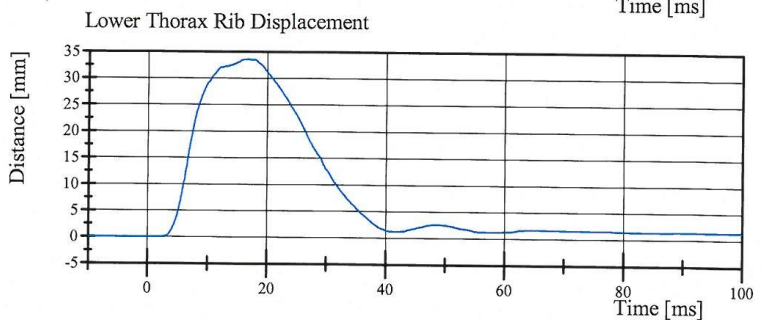
Filter Class: CFC_600
Max: 35.0 mm at 15.8 ms
Min: -0.9 mm at 32.2 ms



Filter Class: CFC_600
Max: 27.6 mm at 16.1 ms
Min: -0.0 mm at -6.6 ms



Filter Class: CFC_600
Max: 32.2 mm at 16.3 ms
Min: -0.0 mm at -6.1 ms



Filter Class: CFC_600
Max: 33.6 mm at 16.6 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.

10.25.2013 13:29:31 605



Transportation Research Center Inc.

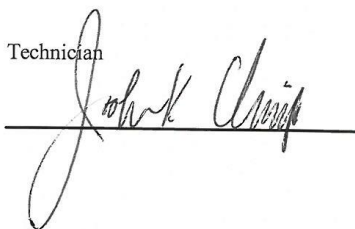
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/25/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.379 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.2 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.9 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	16.0 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.3 g	Yes

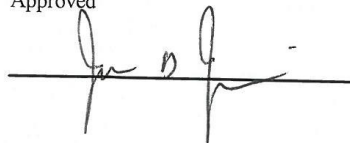
Test meets specifications.

Comments:

Technician



Approved



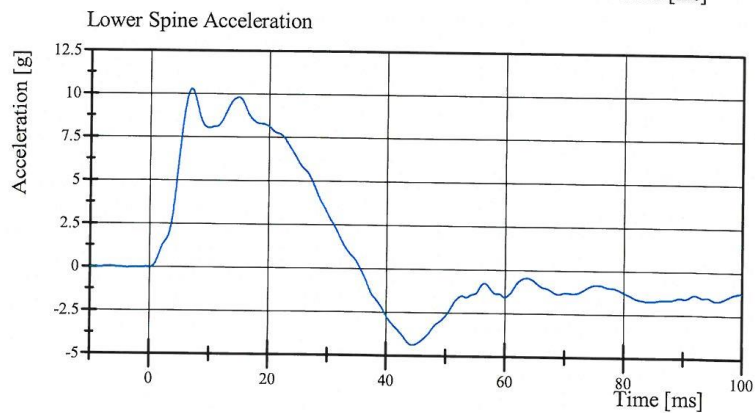
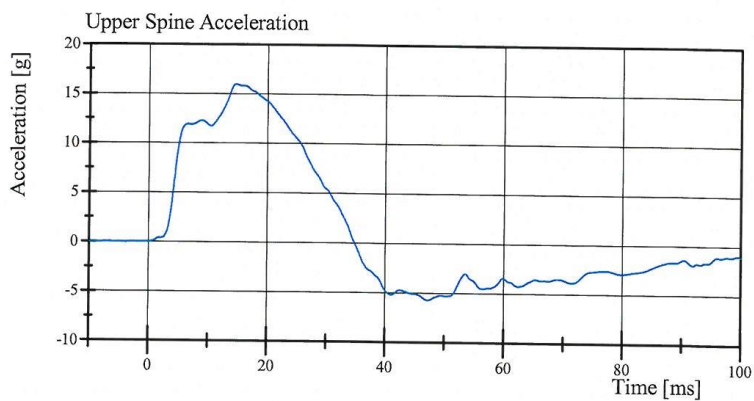
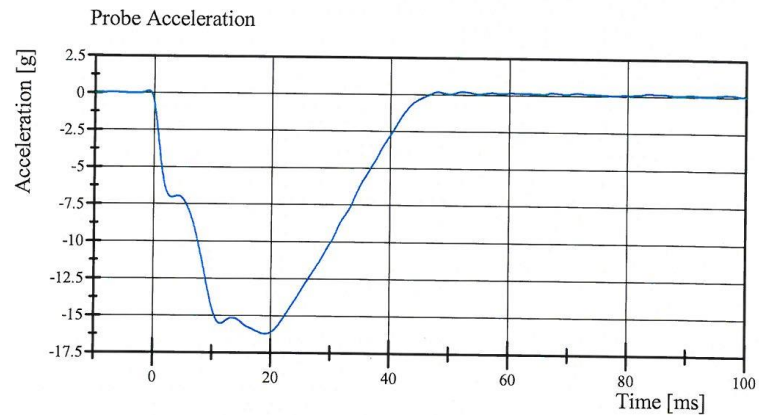
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.25.2013 14:01:46 839



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/25/2013



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

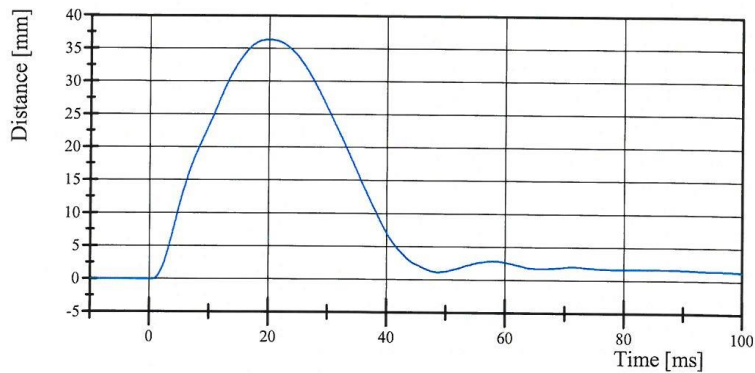
10.25.2013 14:01:56 839



Transportation Research Center Inc.

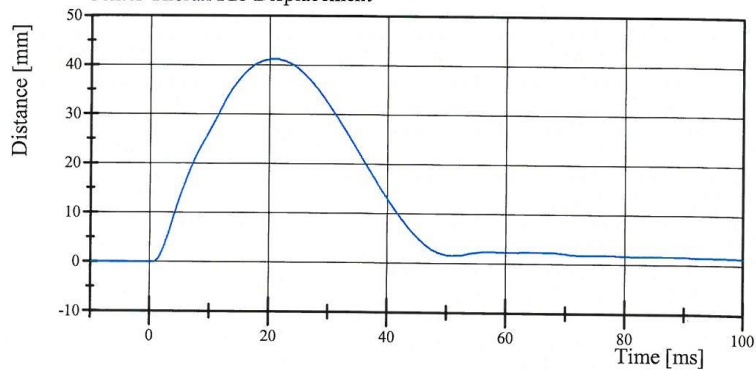
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/25/2013

Upper Thorax Rib Displacement



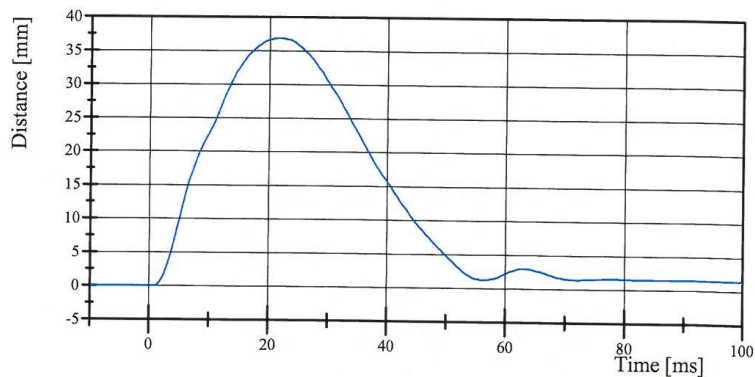
Filter Class: CFC_600
Max: 36.3 mm at 20.0 ms
Min: -0.0 mm at -3.9 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.2 mm at 20.8 ms
Min: -0.0 mm at -3.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.9 mm at 21.5 ms
Min: -0.0 mm at -3.9 ms

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

10.25.2013 14:01:57 839



Transportation Research Center Inc.

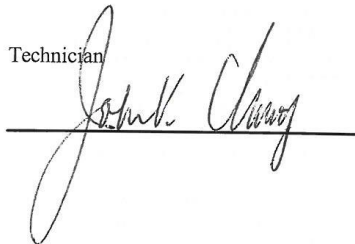
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 22-1
Test Date: 10/25/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.77 g	Yes

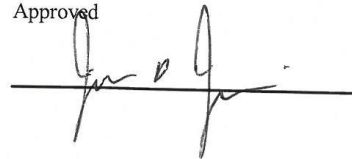
Test meets specifications.

Comments:

Technician



Approved



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

10.25.2013 15:09:42 677

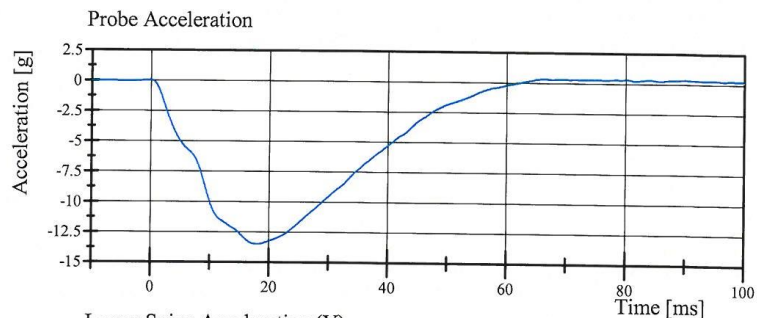


Transportation Research Center Inc.

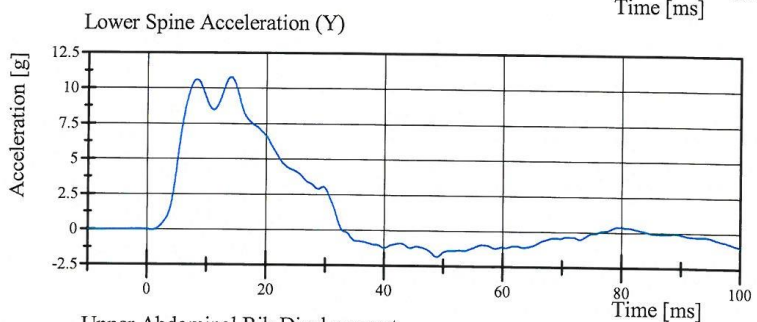
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 22-1

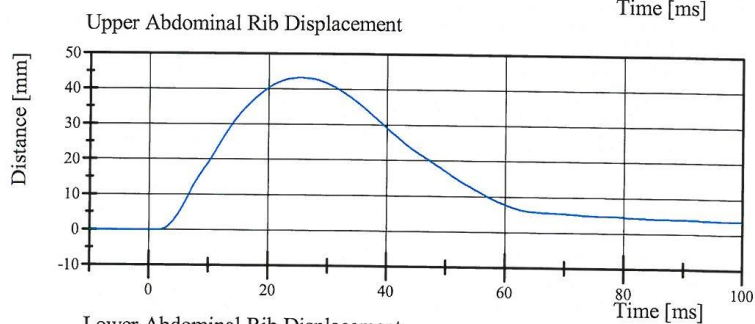
Test Date: 10/25/2013



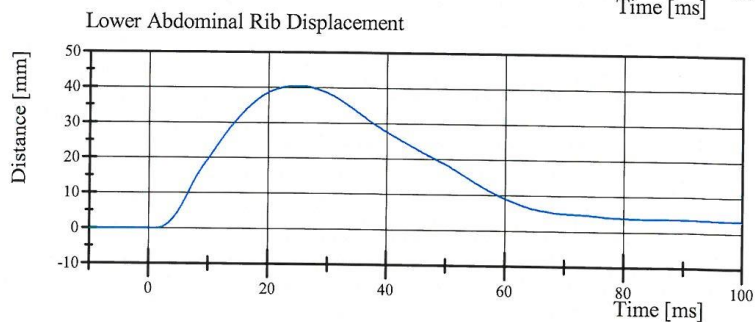
Filter Class: CFC_180
Max: 0.3 g at 80.2 ms
Min: -13.5 g at 17.9 ms



Filter Class: CFC_180
Max: 10.8 g at 14.0 ms
Min: -1.8 g at 48.9 ms



Filter Class: CFC_600
Max: 43.2 mm at 25.2 ms
Min: -0.0 mm at -8.3 ms



Filter Class: CFC_600
Max: 40.5 mm at 25.2 ms
Min: -0.0 mm at 1.4 ms

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

10.25.2013 15:09:53 677



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 22-3

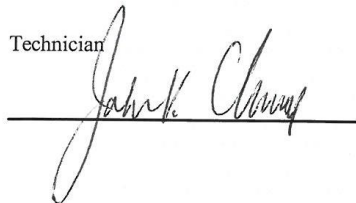
Test Date: 10/28/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.68 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-41.19 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.5 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,285.0 N	Yes

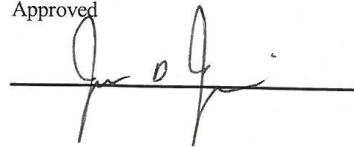
Test meets specifications.

Comments:

Technician



Approved



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

10.28.2013 15:34:09 438

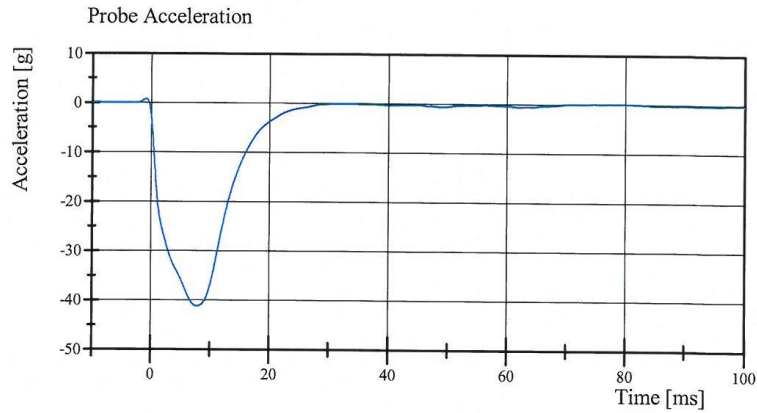


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 22-3

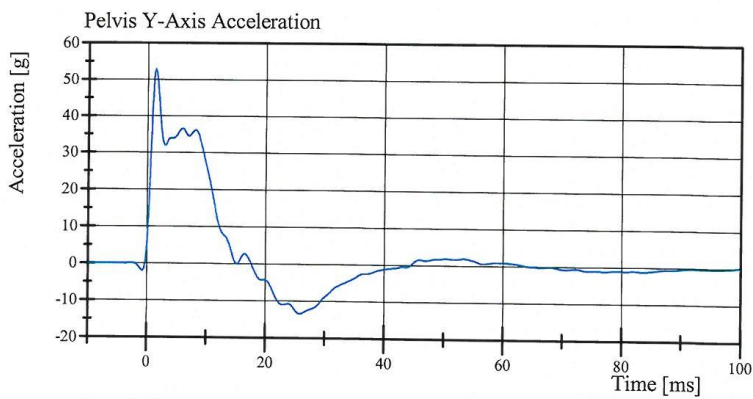
Test Date: 10/28/2013



Filter Class: CFC_180

Max: 0.7 g at -0.9 ms

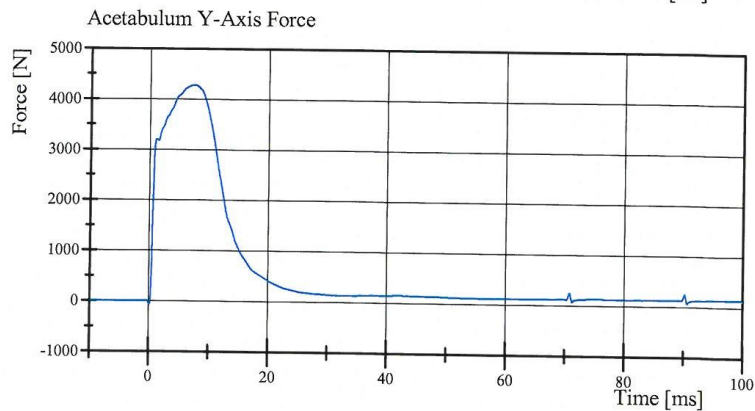
Min: -41.2 g at 7.8 ms



Filter Class: CFC_180

Max: 52.8 g at 1.4 ms

Min: -13.4 g at 25.8 ms



Filter Class: CFC_600

Max: 4,285.0 N at 7.4 ms

Min: -72.3 N at 0.1 ms

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

10.28.2013 15:34:17 438



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 22-1

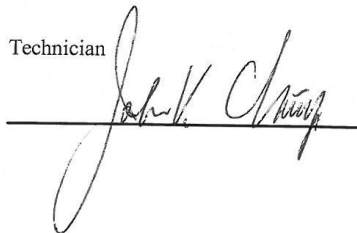
Test Date: 10/25/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.5 g	Yes
Iliac Force	4,100 - 5,100 N	4,971.2 N	Yes

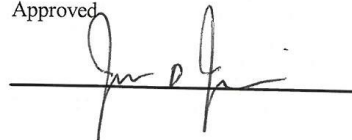
Test meets specifications.

Comments:

Technician



Approved



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

10.25.2013 15:59:42 695

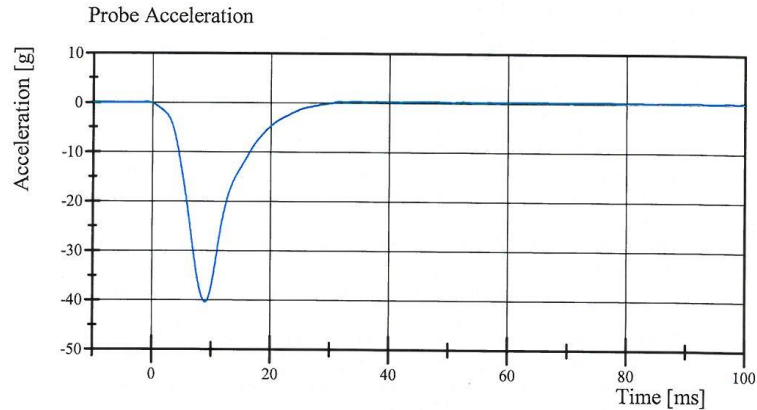


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 22-1

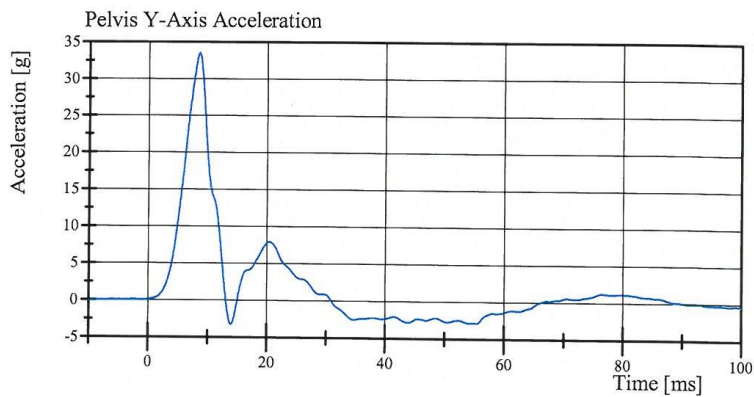
Test Date: 10/25/2013



Filter Class: CFC_180

Max: 0.2 g at 45.8 ms

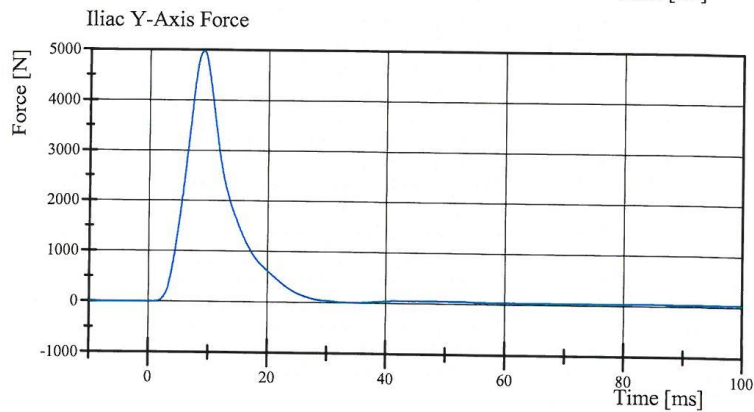
Min: -40.5 g at 9.0 ms



Filter Class: CFC_180

Max: 33.5 g at 8.5 ms

Min: -3.2 g at 13.9 ms



Filter Class: CFC_600

Max: 4,971.2 N at 9.0 ms

Min: -0.8 N at -4.6 ms

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

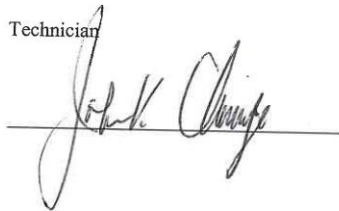
10.25.2013 15:59:54 695

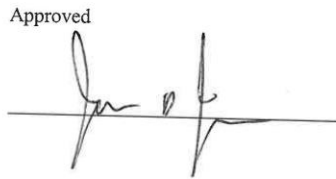


Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.023

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	317	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	348	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	867	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician


Approved


Revised 9/29/2005



Transportation Research Center Inc.

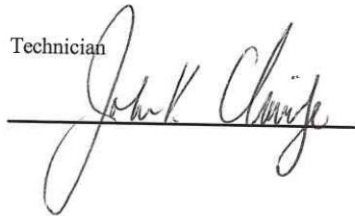
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 23-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	124.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

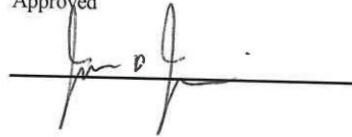
Test meets specifications.

Comments:

Technician



Approved



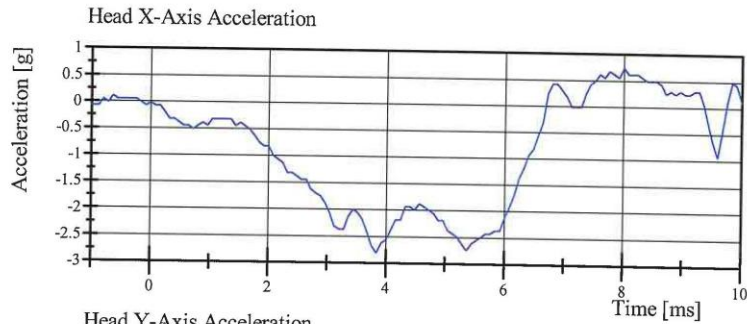
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

11.16.2013 13:48:25 232

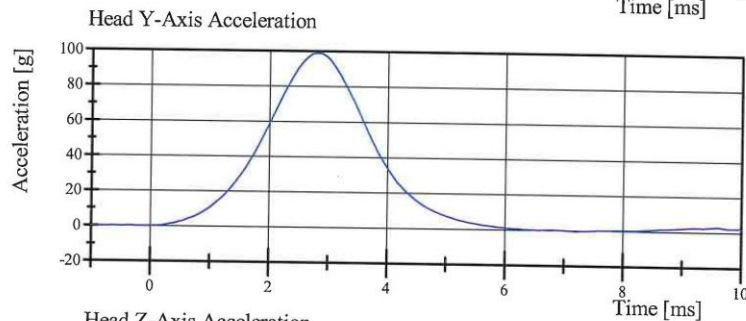


Transportation Research Center Inc.

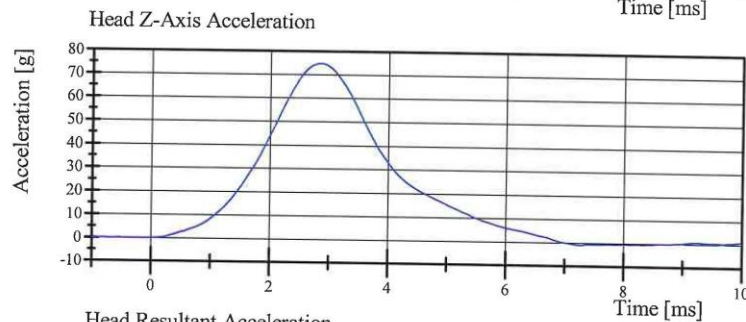
Left Lateral Head Drop
SID IIa Serial No. 305 Certification No. 23-1
Test Date: 11/16/2013



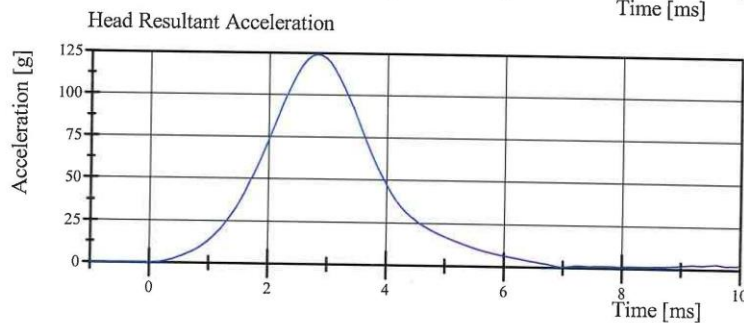
Filter Class: CFC_1000
Max: 0.7 g at 8.0 ms
Min: -2.8 g at 3.8 ms



Filter Class: CFC_1000
Max: 99.0 g at 2.8 ms
Min: -0.5 g at 7.2 ms



Filter Class: CFC_1000
Max: 74.8 g at 2.9 ms
Min: -1.1 g at 7.3 ms



Filter Class: CFC_1000
Max: 124.0 g at 2.8 ms
Min: 0.0 g at -0.7 ms

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

11.16.2013 13:48:34 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 23-1

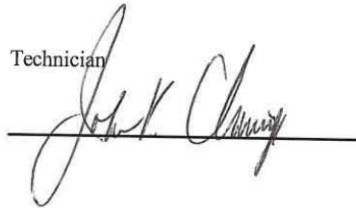
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.608 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.551 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.740 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.998 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.833 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.845 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-71.1 deg	Yes
Time of Peak	50 - 70 ms	66.5 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.7 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	120.5 ms	Yes

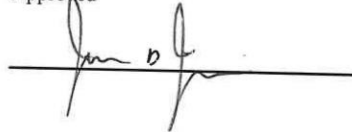
Test meets specifications.

Comments:

Technician



Approved



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

11.16.2013 14:30:13 640

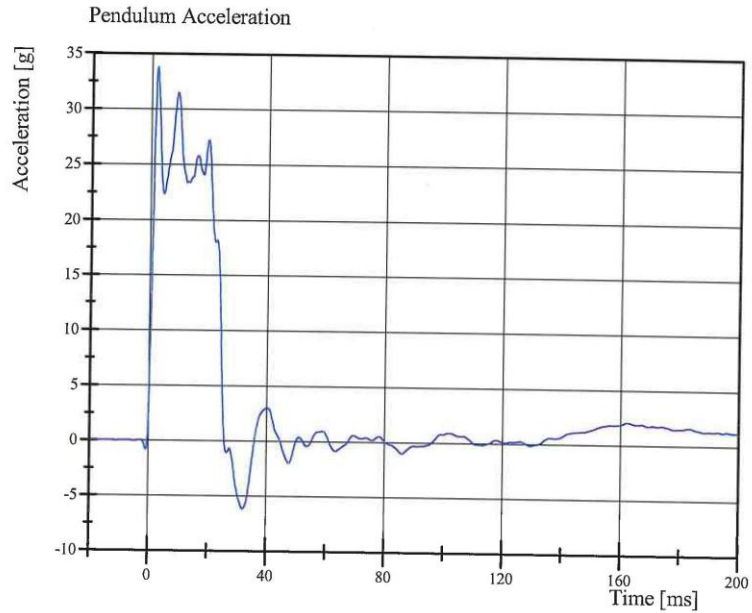


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 23-1

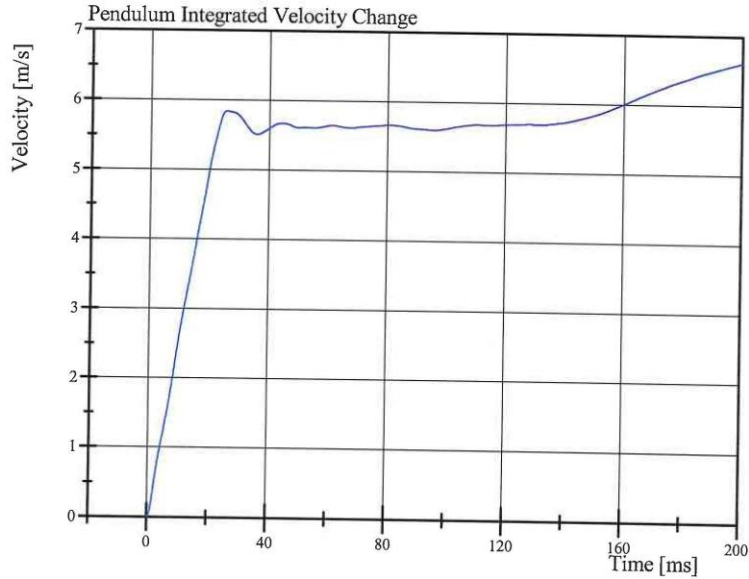
Test Date: 11/16/2013



Filter Class: CFC_180

Max: 33.8 g at 2.0 ms

Min: -6.2 g at 32.0 ms



Filter Class: CFC_180

Max: 6.6 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

11.16.2013 14:30:23 640

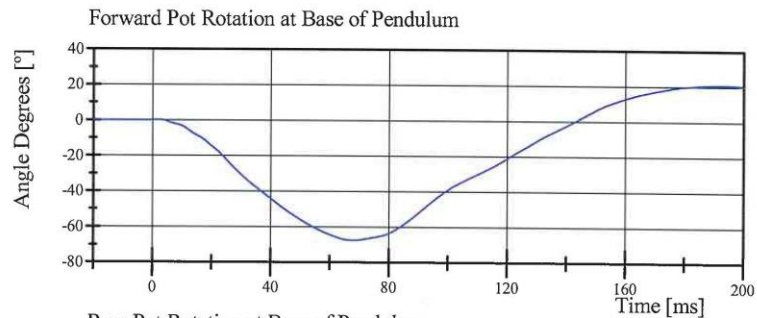


Transportation Research Center Inc.

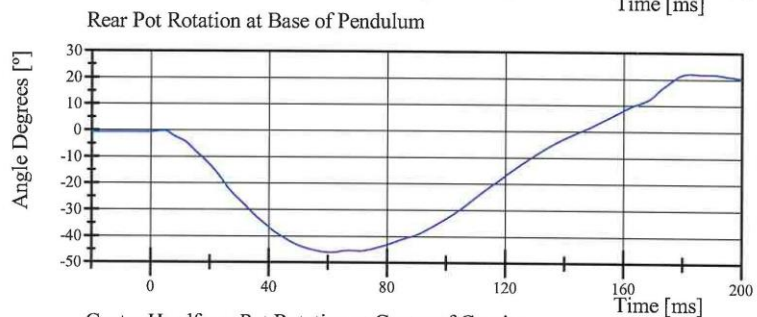
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 23-1

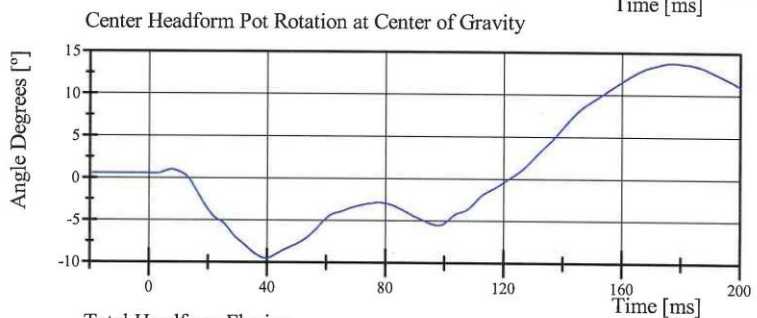
Test Date: 11/16/2013



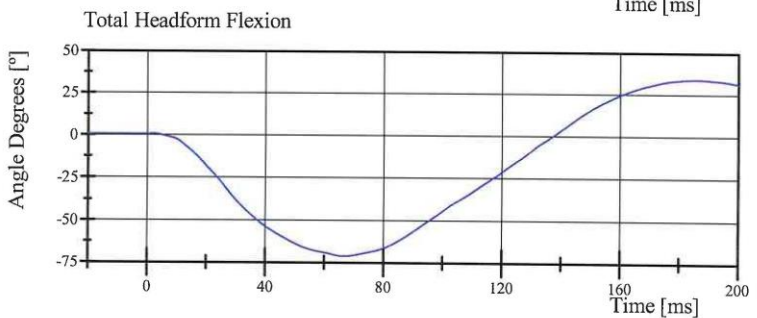
Filter Class: CFC_60
Max: 20.8 ° at 192.8 ms
Min: -67.5 ° at 67.8 ms



Filter Class: CFC_60
Max: 21.9 ° at 182.3 ms
Min: -46.1 ° at 60.9 ms



Filter Class: CFC_60
Max: 13.8 ° at 177.2 ms
Min: -9.5 ° at 39.5 ms



Filter Class: CFC_60
Max: 33.8 ° at 185.8 ms
Min: -71.1 ° at 66.5 ms

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

11.16.2013 14:30:24 640

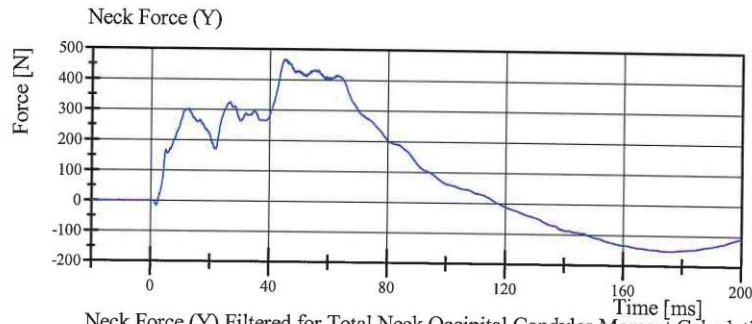


Transportation Research Center Inc.

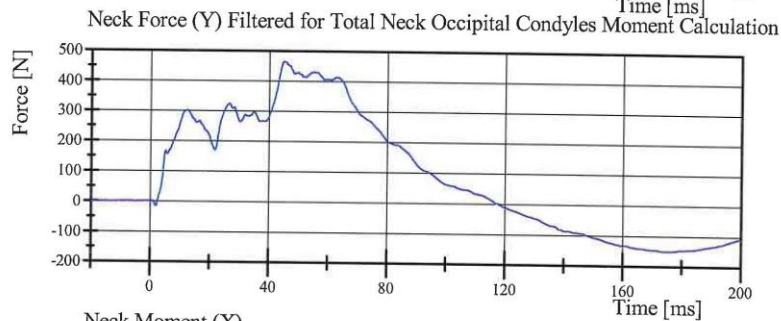
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 23-1

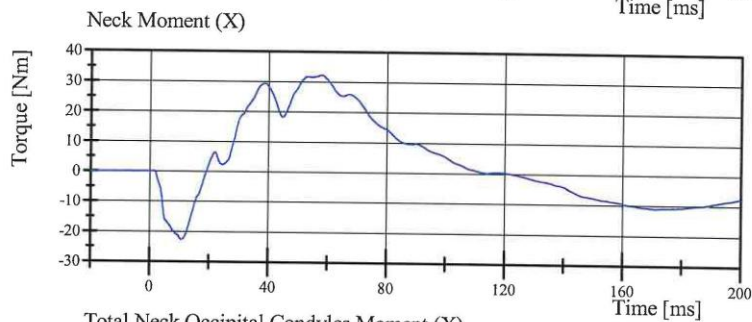
Test Date: 11/16/2013



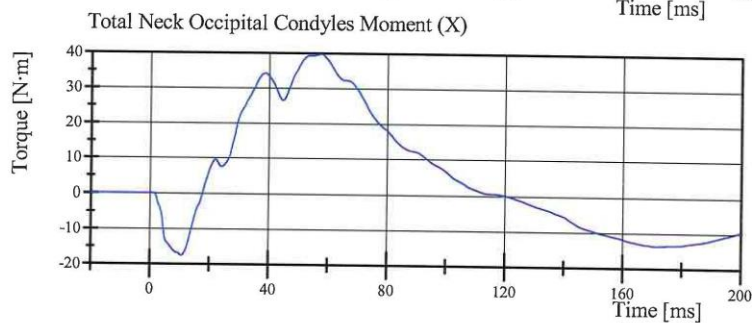
Filter Class: CFC_1000
Max: 465.9 N at 44.9 ms
Min: -152.9 N at 173.6 ms



Filter Class: CFC_600
Max: 465.0 N at 44.9 ms
Min: -152.7 N at 176.6 ms



Filter Class: CFC_600
Max: 32.3 Nm at 57.5 ms
Min: -22.7 Nm at 10.9 ms



Filter Class: Without_(Consta
Max: 39.7 N·m at 57.4 ms
Min: -17.6 N·m at 10.6 ms

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

11.16.2013 14:30:25 640



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 23-1

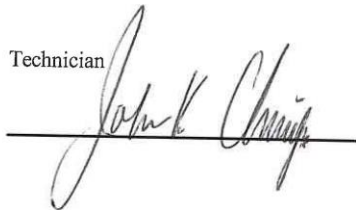
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	31.1 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.2 g	Yes

Test meets specifications.

Comments:

Technician



Approved



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

11.16.2013 09:32:27 824

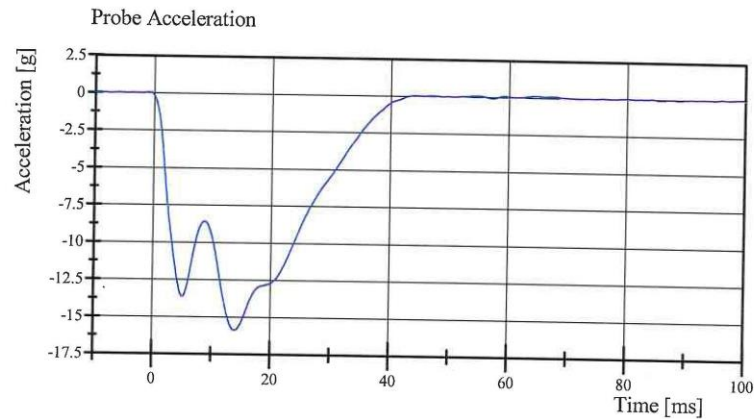


Transportation Research Center Inc.

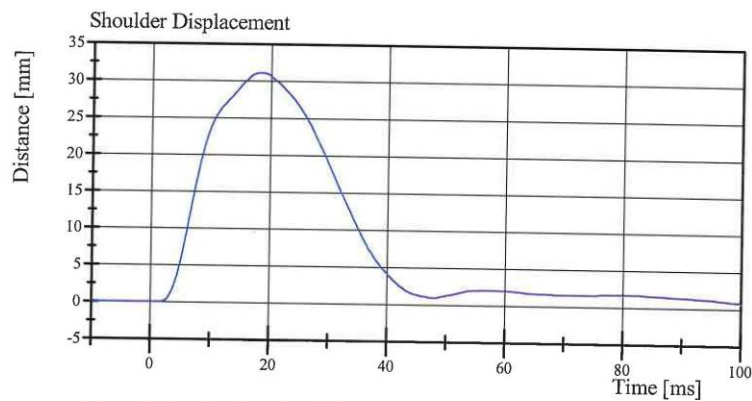
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 23-1

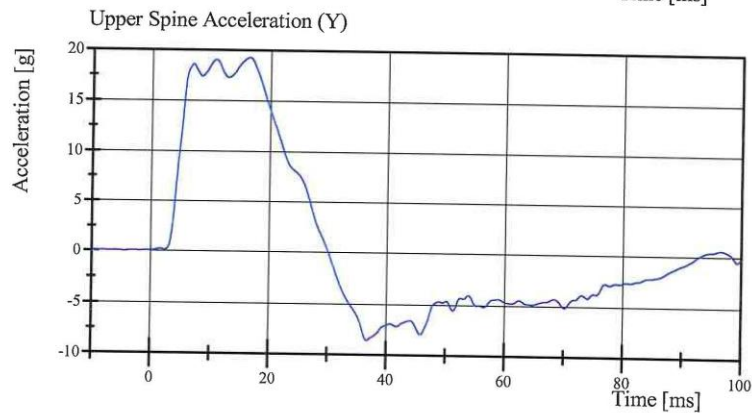
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 0.1 g at 64.4 ms
Min: -15.9 g at 13.9 ms



Filter Class: CFC_600
Max: 31.1 mm at 18.3 ms
Min: -0.0 mm at -3.7 ms



Filter Class: CFC_180
Max: 19.2 g at 16.4 ms
Min: -8.6 g at 36.7 ms

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

11.16.2013 09:32:38 824



Transportation Research Center Inc.

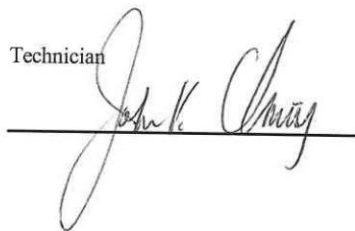
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 23-2
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.710 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.4 g	Yes
Shoulder Displacement	31 - 40 mm	35.1 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.3 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.2 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.5 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.9 g	Yes

Test meets specifications.

Comments:

Technician



Approved



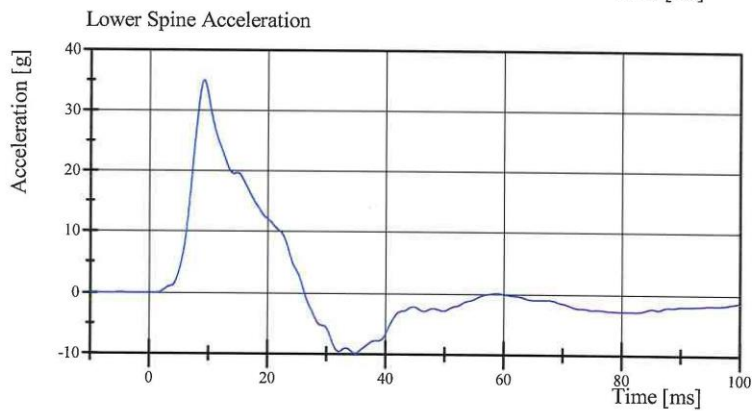
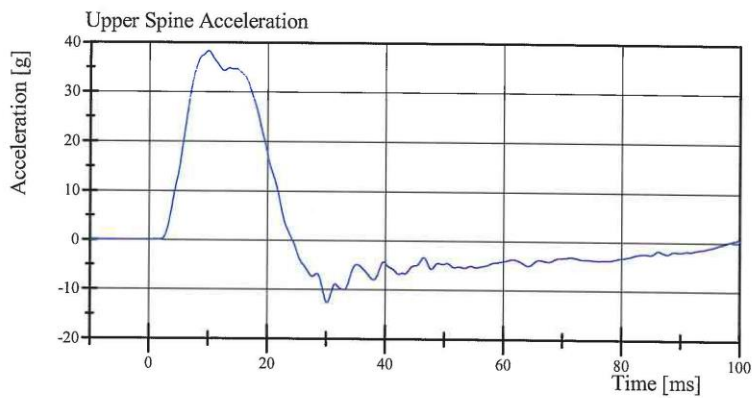
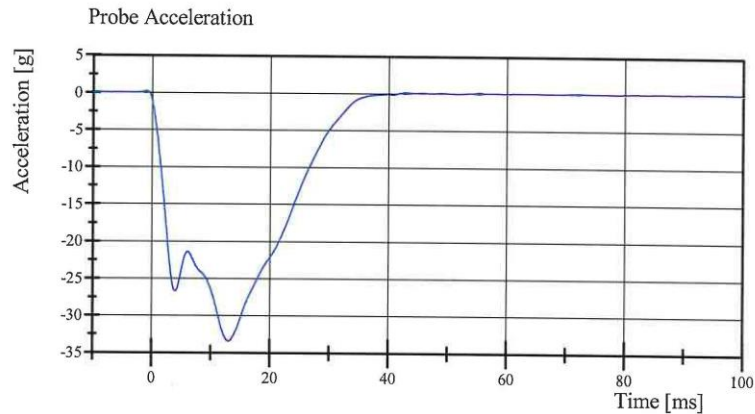
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

11.16.2013 11:29:12 601



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 23-2
Test Date: 11/16/2013



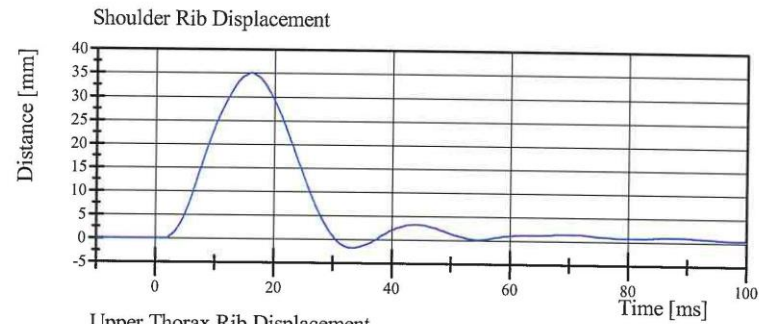
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

11.16.2013 11:29:34 601

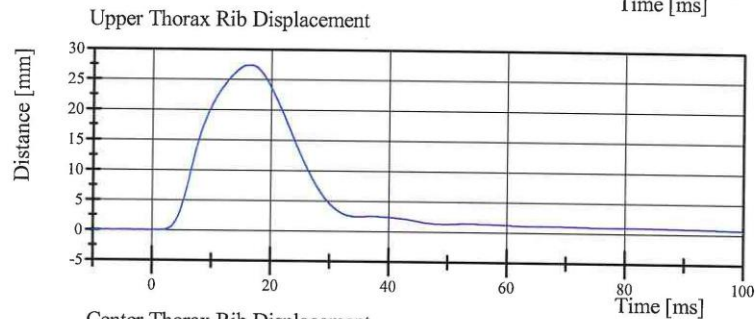


Transportation Research Center Inc.

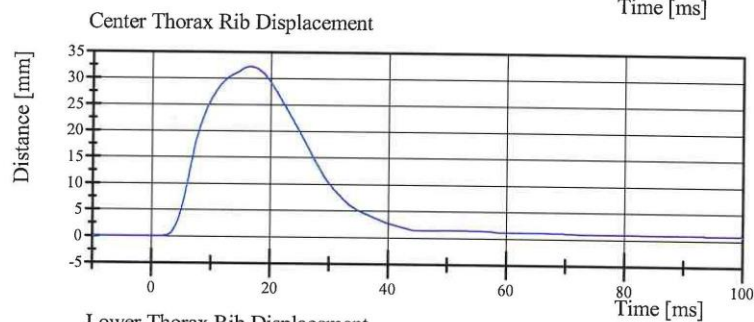
Left Lateral Thorax with Arm
SID II's Serial No. 305 Certification No. 23-2
Test Date: 11/16/2013



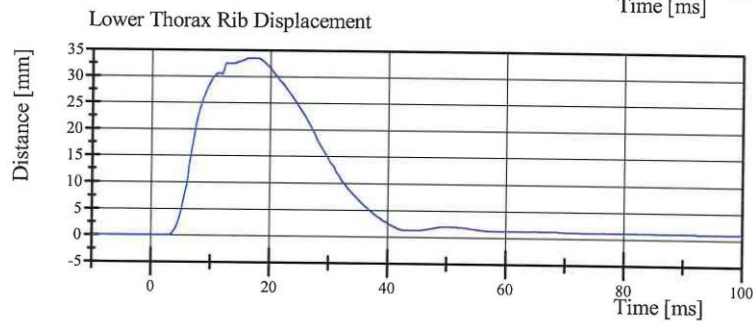
Filter Class: CFC_600
Max: 35.1 mm at 16.1 ms
Min: -1.8 mm at 33.2 ms



Filter Class: CFC_600
Max: 27.3 mm at 16.4 ms
Min: -0.0 mm at -0.8 ms



Filter Class: CFC_600
Max: 32.2 mm at 16.5 ms
Min: -0.0 mm at -0.9 ms



Filter Class: CFC_600
Max: 33.5 mm at 16.9 ms
Min: -0.0 mm at -0.8 ms

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

11.16.2013 11:29:35 601



Transportation Research Center Inc.

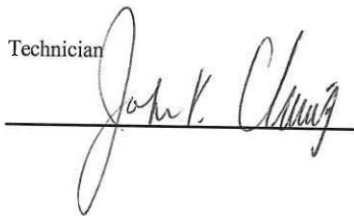
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 23-1
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.392 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.9 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.2 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.2 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	16.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.9 g	Yes

Test meets specifications.

Comments:

Technician



Approved



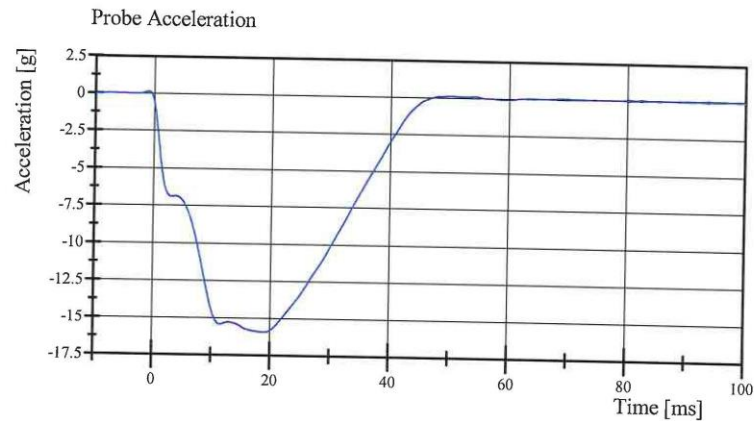
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

11.16.2013 11:45:07 823

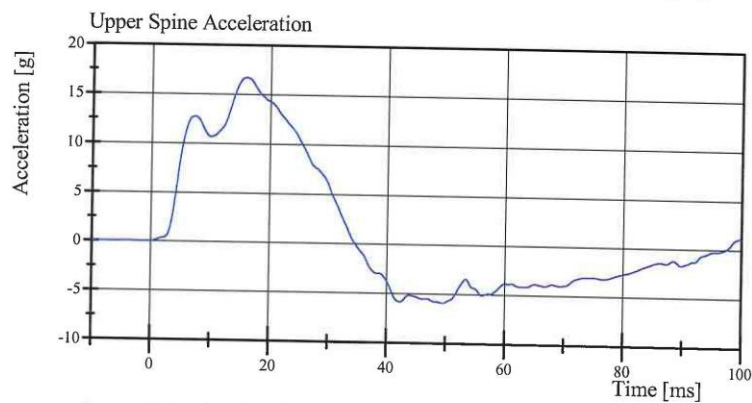


Transportation Research Center Inc.

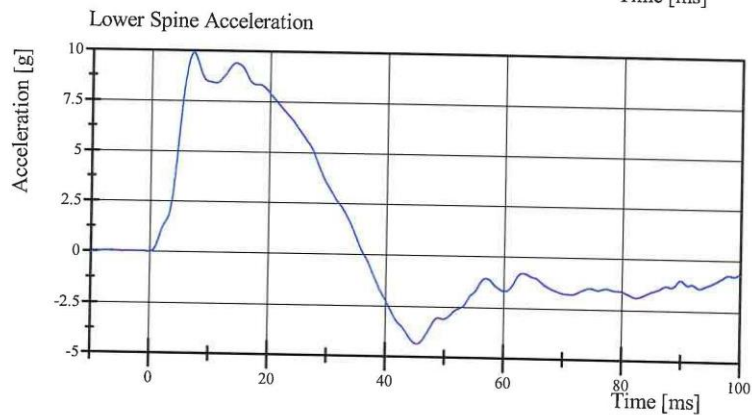
Left Lateral Thorax without Arm
SID IIa Serial No. 305 Certification No. 23-1
Test Date: 11/16/2013



Filter Class: CFC_180
Max: 0.1 g at -1.0 ms
Min: -15.9 g at 19.0 ms



Filter Class: CFC_180
Max: 16.6 g at 15.8 ms
Min: -5.9 g at 49.5 ms



Filter Class: CFC_180
Max: 9.9 g at 7.0 ms
Min: -4.4 g at 45.4 ms

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

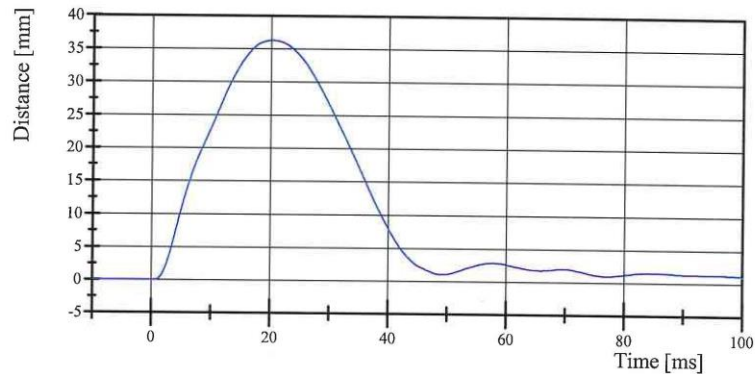
11.16.2013 11:45:21 823



Transportation Research Center Inc.

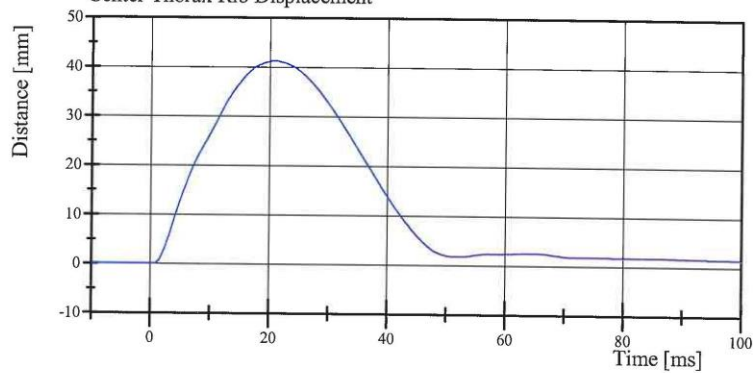
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 23-1
Test Date: 11/16/2013

Upper Thorax Rib Displacement



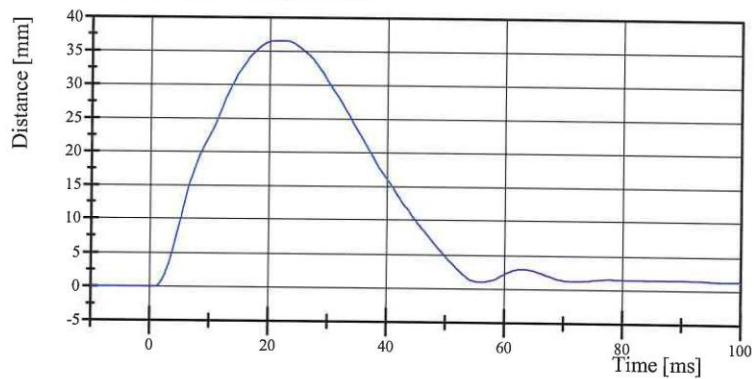
Filter Class: CFC_600
Max: 36.2 mm at 20.2 ms
Min: -0.0 mm at -4.4 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.2 mm at 20.8 ms
Min: -0.0 mm at -4.2 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.5 mm at 21.8 ms
Min: -0.0 mm at -6.2 ms

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

11.16.2013 11:45:22 823



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIa Serial No. 305 Certification No. 23-1

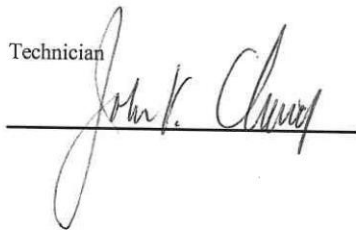
Test Date: 11/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.6 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.86 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.

11.16.2013 10:35:29 657

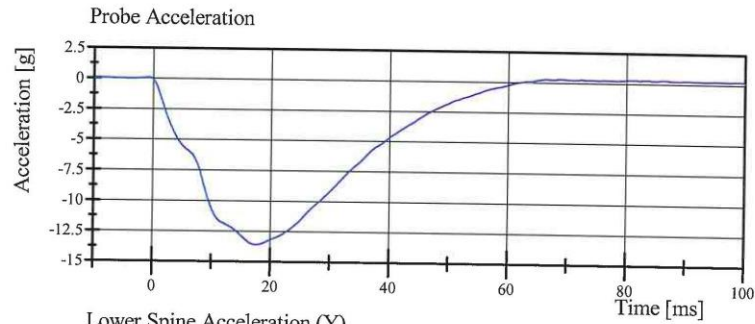


Transportation Research Center Inc.

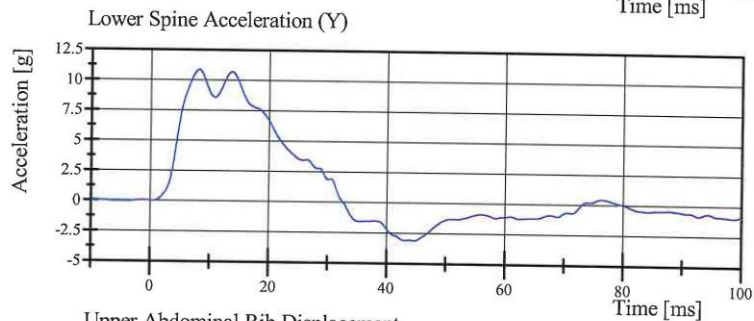
Left Lateral Abdomen

SID IIa Serial No. 305 Certification No. 23-1

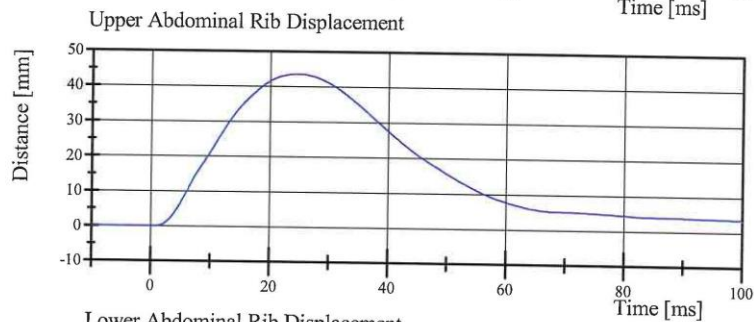
Test Date: 11/16/2013



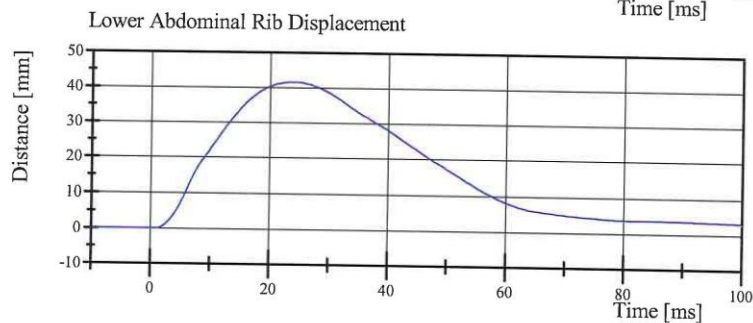
Filter Class: CFC_180
Max: 0.3 g at 68.8 ms
Min: -13.6 g at 17.5 ms



Filter Class: CFC_180
Max: 10.9 g at 8.1 ms
Min: -3.1 g at 44.6 ms



Filter Class: CFC_600
Max: 43.5 mm at 24.6 ms
Min: -0.0 mm at 0.6 ms



Filter Class: CFC_600
Max: 41.6 mm at 23.9 ms
Min: -0.0 mm at 1.0 ms

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

11.16.2013 10:35:42 657



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 23-3

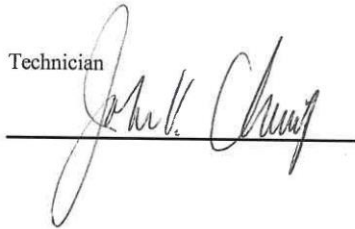
Test Date: 11/17/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-38.65 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	34.2 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,036.7 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.

11.17.2013 13:15:20 445

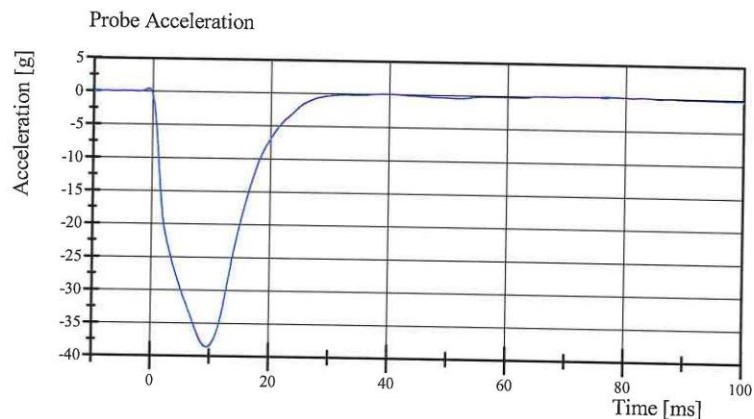


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 23-3

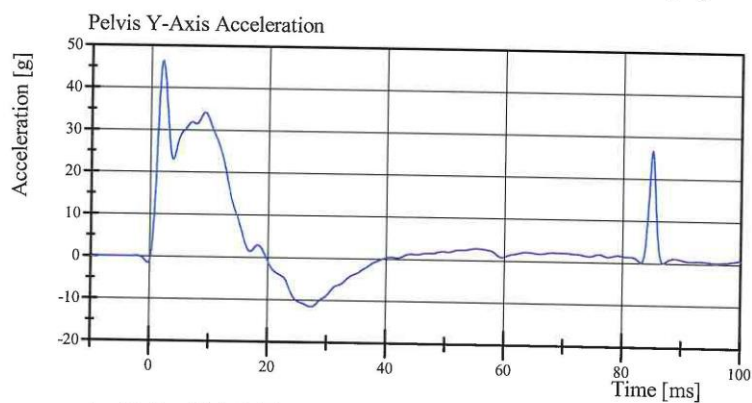
Test Date: 11/17/2013



Filter Class: CFC_180

Max: 0.4 g at -0.7 ms

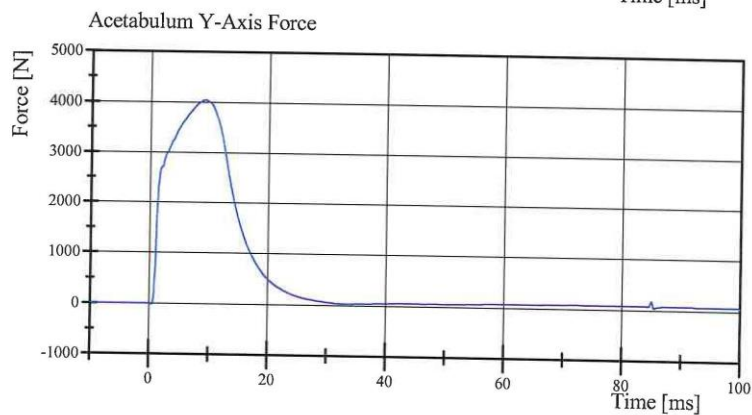
Min: -38.7 g at 9.5 ms



Filter Class: CFC_180

Max: 46.2 g at 1.9 ms

Min: -11.6 g at 27.4 ms



Filter Class: CFC_600

Max: 4,036.7 N at 9.1 ms

Min: -19.6 N at 0.4 ms

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

11.17.2013 13:15:37 445



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 23-1

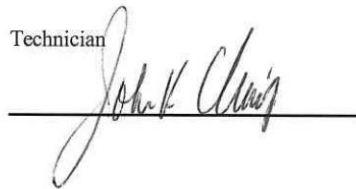
Test Date: 11/17/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-39.3 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	30.8 g	Yes
Iliac Force	4,100 - 5,100 N	4,826.6 N	Yes

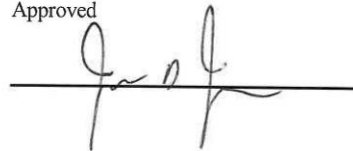
Test meets specifications.

Comments:

Technician



Approved



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

11.17.2013 15:35:05 698

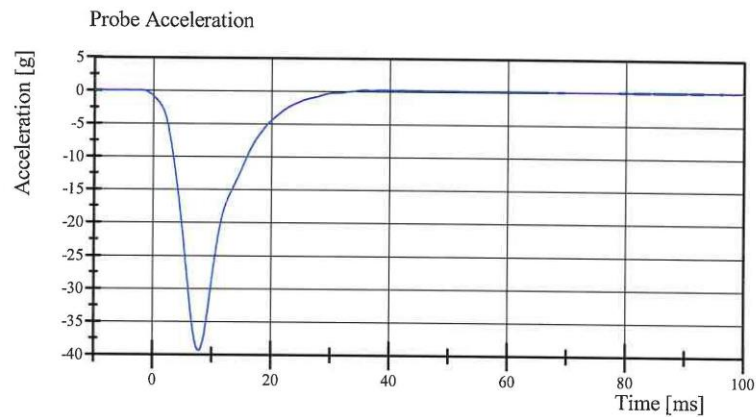


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 23-1

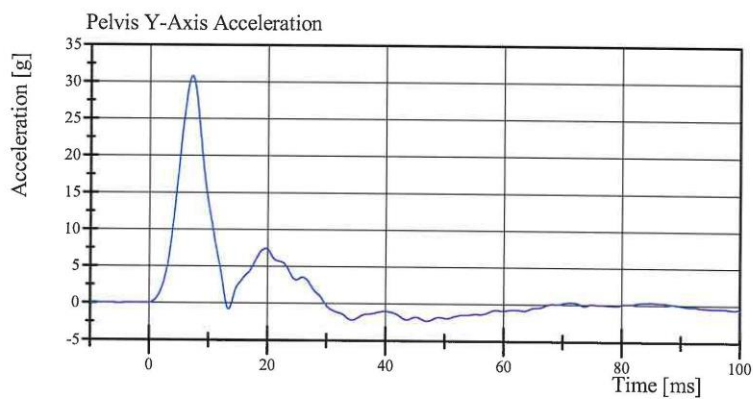
Test Date: 11/17/2013



Filter Class: CFC_180

Max: 0.3 g at 38.6 ms

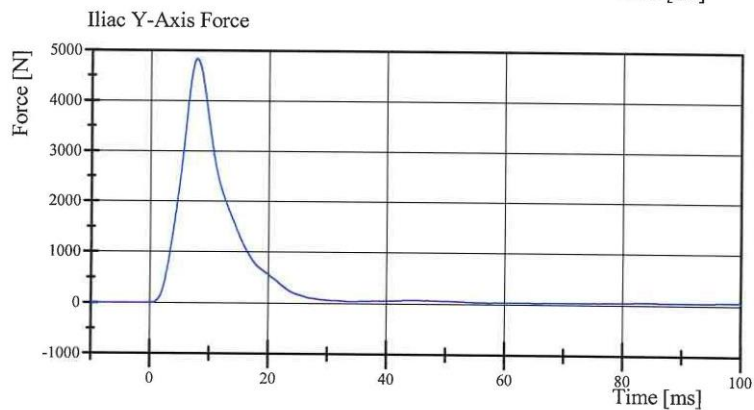
Min: -39.3 g at 7.8 ms



Filter Class: CFC_180

Max: 30.8 g at 7.2 ms

Min: -2.3 g at 47.0 ms



Filter Class: CFC_600

Max: 4,826.6 N at 7.8 ms

Min: -0.7 N at -5.0 ms

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

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APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F030		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	P58890	Endevco	7-Jun-13
		Y	P51702	Endevco	7-Jun-13
		Z	P52083	Endevco	7-Jun-13
Thoracic Rib Displacement Potentiometers	Upper	Y	175	FTSS	7-Jun-13
	Middle	Y	174	FTSS	7-Jun-13
	Lower	Y	173	FTSS	7-Jun-13
Abdomen Load Cells	Upper	Y	1441	Denton	21-Oct-13
	Middle	Y	1436	Denton	21-Oct-13
	Lower	Y	1437	Denton	21-Oct-13
Lower Spine Accelerometers (T12)		X	P68599	Endevco	7-Jun-13
		Y	P59002	Endevco	7-Jun-13
		Z	P59005	Endevco	7-Jun-13
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	21-Oct-13

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	P51719	Endevco	11-Jun-13
				Y	P51272	Endevco	11-Jun-13
				Z	P58862	Endevco	11-Jun-13
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A	
	Thoracic Rib	Upper	Y	007	Servo	11-Jun-13	
		Middle	Y	1161	Servo	11-Jun-13	
		Lower	Y	1279	Servo	11-Jun-13	
	Abdominal Rib	Upper	Y	1295	Servo	11-Jun-13	
		Lower	Y	1136	Servo	12-Jun-13	
Lower Spine Accelerometers (T12)				X	P50068	Endevco	11-Jun-13
				Y	P52051	Endevco	11-Jun-13
				Z	P51710	Endevco	11-Jun-13
Acetabulum Load Cell				Y	287-FY	FTSS	28-Oct-13
Iliac Wing Load Cell				Y	103-FY	FTSS	24-Oct-13
Pelvis Plug (struck side)					46930	FTSS	6-Oct-11
Pelvis Plug (non-struck side)					36473	FTSS	23-Sep-10

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P81532	Endevco	5-Nov-13
	Vehicle Center of Gravity	Y	P81994	Endevco	5-Nov-13
	Vehicle Center of Gravity	Z	P82270	Endevco	5-Nov-13
2	Right Sill at Front Seat	X	P81088	Endevco	5-Nov-13
	Right Sill at Front Seat	Y	P82279	Endevco	5-Nov-13
	Right Sill at Front Seat	Z	P81993	Endevco	5-Nov-13
3	Right Sill at Rear Seat	X	P81099	Endevco	5-Nov-13
	Right Sill at Rear Seat	Y	P81498	Endevco	5-Nov-13
	Right Sill at Rear Seat	Z	P82050	Endevco	5-Nov-13
4	Left Sill at Front Door	Y	P82280	Endevco	12-Nov-13
5	Left Sill at Rear Door	Y	P81603	Endevco	12-Nov-13
6	Left A-Post Lower	Y	P80491	Endevco	7-Aug-13
7	Left A-Post Middle	Y	P78151	Endevco	6-Feb-13
8	Left B-Post Lower	Y	P80136	Endevco	5-Aug-13
9	B-Post Middle	Y	P80142	Endevco	5-Aug-13
10	Front Seat Track	Y	P81989	Endevco	12-Nov-13
11	Rear Seat Track or Structure	Y	P81607	Endevco	12-Nov-13
12	Right Rear Occupant Compartment	Y	P81505	Endevco	12-Nov-13
13	Engine Block	X	P80485	Endevco	9-Aug-13
	Engine Block	Y	P80710	Endevco	17-Sep-13
14	Rear Floorpan Above Axle	X	P81084	Endevco	5-Nov-13
	Rear Floorpan Above Axle	Y	P81081	Endevco	5-Nov-13
	Rear Floorpan Above Axle	Z	P82046	Endevco	5-Nov-13

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P80602	Endevco	17-Sep-13
MDB Center of Gravity	Y	P81025	Endevco	17-Sep-13
MDB Center of Gravity	Z	P81041	Endevco	17-Sep-13
Left Frame Rail at Rear Axle Centerline	X	P78221	Endevco	14-Aug-13
Left Frame Rail at Rear Axle Centerline	Y	P80765	Endevco	17-Sep-13