

FINAL REPORT NUMBER: SINCAP-TRC-17-005

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

**DAIMLER AG STUTTGART
2017 Mercedes-Benz E-Class Sedan
NHTSA NUMBER: M20174302**

**PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
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Report Date: January 19, 2017

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE, Room W43-410
Washington, D.C. 20590**

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Report Prepared By: ILO Project Operations Group

Report Approved By: 

John Shultz

Approval Date: January 19, 2017

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

1. Report No. SINCAP-TRC-17-005	2. Government Accession No.	3. Recipient's Catalog No.																																																									
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2017 Mercedes-Benz E-Class Sedan, NHTSA No.: M20174302		5. Report Date January 19, 2017																																																									
		6. Performing Organization Code TRC Inc.																																																									
7. Author(s) John Shultz, Project Manager		8. Performing Organization Report Number 161207																																																									
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.																																																									
		11. Contract or Grant No. DTNH22-14-D-00354																																																									
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report December 7, 2016 – January 19, 2017																																																									
		14. Sponsoring Agency Code NRM-110																																																									
15. Supplemental Notes																																																											
16. Abstract This 55 / 28 km/h 90° Moving Deformable Barrier SINCAP Side Impact Test was conducted on the subject 2017 Mercedes-Benz E-Class 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 December 7, 2016. The impact velocity of the Moving Deformable Barrier (MDB) was 61.84 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 20.6° C. The target vehicle post-test maximum crush was 154 mm at Level 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>132</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>27.4</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>661.4</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-991.8</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>25.4</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>215</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>46.1</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>2640.8</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>10.7</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>4.0</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	132	Maximum Thoracic Rib Deflection	mm	44	27.4	Total Abdominal Force	N	2500	661.4	Pubic Symphysis Force	N	6000	-991.8	Lower Spine Acceleration	G	82*	25.4	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	215	Lower Spine Resultant Acceleration	g's	82	46.1	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2640.8	Maximum Thoracic Rib Deflection	mm	38*	10.7	Maximum Abdominal Rib Deflection	mm	45*	4.0
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19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 215	22. Price																																																								

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4
<u>Appendix</u>		
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Performance Calibration Test Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	8
3	Dummy Longitudinal Clearance Dimensions	11
4	Dummy Lateral Clearance Dimensions	12
5	Camera and Instrumentation Data	13
6	Test Vehicle Accelerometer Locations	14
7	MDB Accelerometer Locations	15
8	Post-Test Observations	16
9	MDB Summary of Results	18
10	Test Vehicle Profile Measurements	19
11	Test Vehicle Exterior Crush Measurements	20
12	MDB Exterior Static Crush Measurements	23
13	Vehicle and MDB Damage Distances	24
14	FMVSS No. 301 Static Rollover Results	25
15	Dummy/Vehicle Temperature and Humidity Stabilization	26

SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2017 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00354. The purpose of this test is to generate comparative side impact performance in a 2017 Mercedes-Benz E-Class Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2017 Mercedes-Benz E-Class 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 61.84 km/h (38.43 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 December 7, 2016. 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 October 2015. 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. APPENDIX D of this report contains the test equipment and instrumentation calibration data.

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	132
Maximum Thoracic Rib Deflection	mm	44	27.4
Combined Abdominal Force	N	2500	661.4
Pubic Symphysis Force	N	6000	-991.8
Lower Spine (T12) Resultant Acceleration	G	82*	25.4

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	215
Lower Spine (T12) Resultant Acceleration	G	82	46.1
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2,640.8
Maximum Thoracic Rib Deflection	mm	38*	10.7
Maximum Abdominal Rib Deflection	mm	45*	4.0

* Proposed IARV

Supplemental Restraint Information is given below:

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20174302
Model Year	2017
Make	Mercedes-Benz
Model	E300
Body Style	Sedan
VIN	WDDZF4JB1HA021285
Body Color	Piedmont Green Metallic
Odometer Reading (km/mi)	394 mi
Engine Displacement (L)	2.0
Type/No. Cylinders	Inline/4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	9
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	Sunroof
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	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Passenger Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Passenger Load Limiter	No
Other Safety Restraint	No

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	DAIMLER AG STUTTGART
Date of Manufacture	04/16
Vehicle Type	Passenger Car

GVWR (kg)	2290
GAWR Front (kg)	1055
GAWR Rear (kg)	1235

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

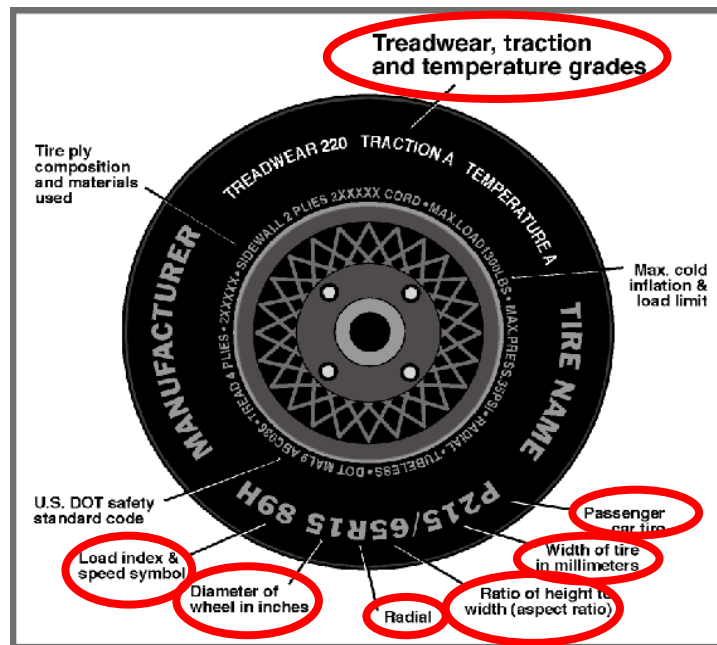
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				485
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				144.8

VEHICLE SEAT TYPE

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

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Program: SINCAP Side Impact

Test Date: 12/7/16

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	260	310
Recommended Tire Size	245/45R18	245/45R18
Tire Size on Vehicle	245/45R18	245/45R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Eagle Sport	Eagle Sport
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	100V	100V
Tire Material	Polyester/Polyamide/Steel	Polyester/Polyamide/Steel
DOT Safety Code Left	DM8V JAAR 0516	DM8V JAAR 0616
DOT Safety Code Right	DM8V JAAR 0916	DM8V JAAR 0816

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

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	190	190	190	190
Tire Placard	kPa	260	260	310	310
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	260	260	310	310

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21 kPa	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	458.2	419.8		500.0	536.4		507.6	551.0	
Right	kg	464.8	414.4		462.8	521.0		456.0	503.6	
Ratio	%	52.5	47.5		47.7	52.3		47.7	52.3	
Totals	kg	923.0	834.2	1757.2	962.8	1057.4	2020.2	963.6	1054.6	2018.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1757.2	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	144.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2027.0	(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	727	726	Yes
RF	mm	734	731	Yes
RR	mm	705	700	Yes
LR	mm	698	695	Yes
Vehicle CG (Aft of Front Axle)	mm	1539	1541	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+40	+21	

***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".

Test height adjustable suspension setting, if applicable:

N/A

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in cargo area	64.7
Removed: None	0.0

DATA SHEET NO. 2

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

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174302

Test Program: SINCAP Side Impact

Test Date: 12/7/16

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	22.4	13.3	17.8
Front Passenger Seat	N/A	N/A	17.5
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	19.1
Non-Struck Side Rear Seat	N/A	N/A	19.3
Rear Center Seat*	N/A	N/A	16.0

* 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	17.8	111	Max	167	182	192
			Mid	131	146	156
			Min	95	111	121
Front Passenger Seat	17.5	106	Max	166	173	181
			Mid	134	144	151
			Min	95	106	121
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	19.1	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	19.3	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*	16.0	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: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174302

Test Program: SINCAP Side Impact

Test Date: 12/7/16

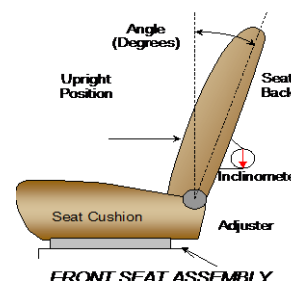
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	262	N/A	131	N/A
Front Passenger Seat	262	N/A	131	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

* If applicable

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents	Degrees	Detent
Driver Seat w/ Seated Dummy	55.9	N/A	19.5	N/A
Front Passenger Seat	54.8	N/A	19.5	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	N/A	N/A
Non-Struck Side Rear Seat	Fixed	N/A	N/A	N/A
Rear Center Seat*	Fixed	N/A	N/A	N/A

* If applicable

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	5, Numbered from 0 to 4	4, Uppermost
Rear Seat	1, Fixed	1, Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	Power (50 mm travel)	Highest & forward most
Rear Seat	5, Numbered from 0 to 4	0 (lowermost)

DATA SHEET NO. 2 (CONTINUED)

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

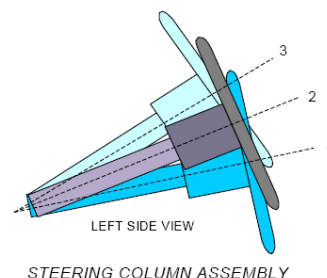
Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16

STEERING COLUMN ADJUSTMENT

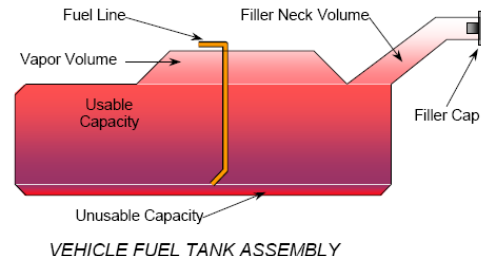
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	23.5	
Geometric Center, Position No. 2	21.4	
Uppermost, Position No. 3	19.3	
Telescoping Steering Wheel Travel		55
Test Position	21.4	27



FUEL PUMP

The fuel pump is in operation if the ignition is switched to the "ON" position. After about 15 seconds the pump switches back to standby mode, if the engine is not started.



FUEL TANK CAPACITY

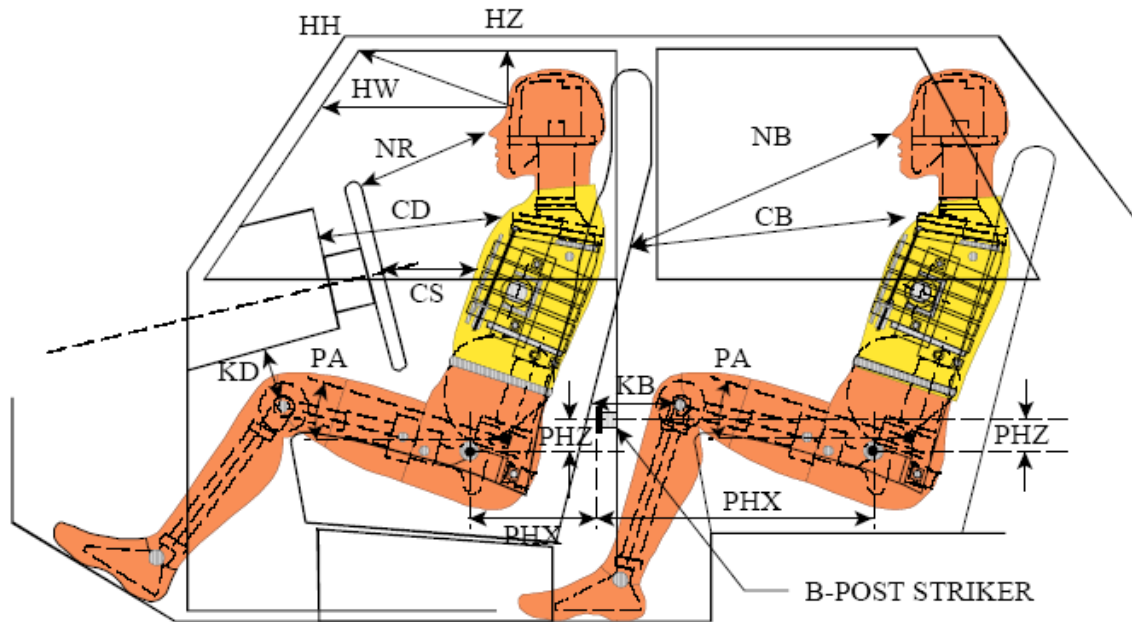
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	65.9
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	66.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	61.3
Actual Amount of Solvent Used in Test	61.3
1/3 of Usable Capacity	21.9

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: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16



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

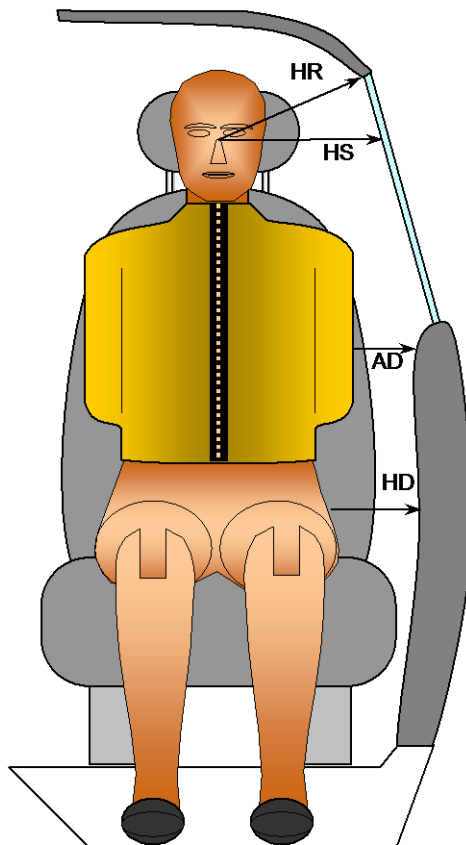
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	379			
HW		Header to Windshield	668			
HZ	HZ	Head to Roof Liner	162		240	
NR	NB	Nose to Rim/Seat Back	432		585	
CD	CB	Chest to Dash/Seat Back	582		524	
CS		Chest to Steering Wheel	336			
KD(L)/KDA(L) ^o	KB(L)/KBA(L) ^o	Left Knee to Dash/Seat Back	190	45.8	267	0.0
KD(R)/KDA(R) ^o	KB(R)/KBA(R) ^o	Right Knee to Dash/Seat Back	168	46.0	264	0.0
PAX ^o	PAX ^o	Pelvic Tilt Angle X		0.8		0.3
	PAY ^o	Pelvic Tilt Angle Y				21.7
PHX	PHX	Hip Point to Striker (X-Axis)	141		145	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	240		183	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16



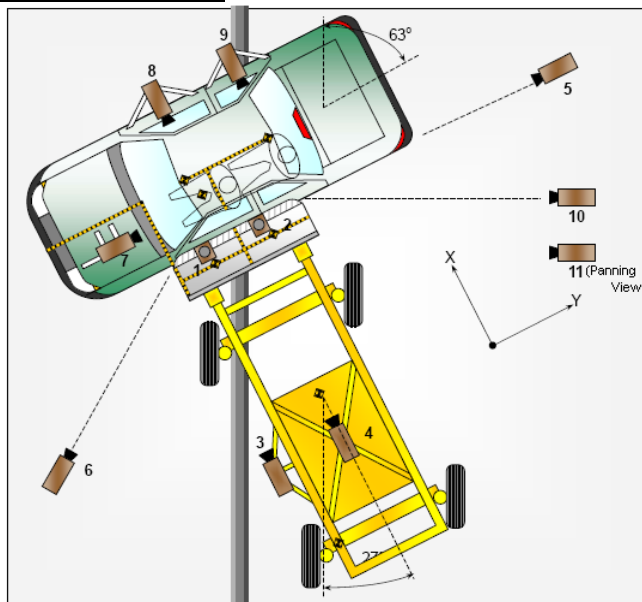
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	215	240
HS	Head to Side Window	mm	337	364
AD	Arm to Door	mm	85	162
HD	H-Point to Door	mm	165	196

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-160	1150	5692	8.5	1000
2	Overhead Close-up	0	770	5692	16	1000
3	Left Impact Point (MDB)	1811	890	860	25	1000
4	Side Overall (MDB)	2625	0	1500	12.5	1000
5	Rear	0	7054	1080	20	1000
6	Left Front	2663	-4594	950	25	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	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: Camera 3 and 4 failed to record useable images during the test due to a camera power failure.

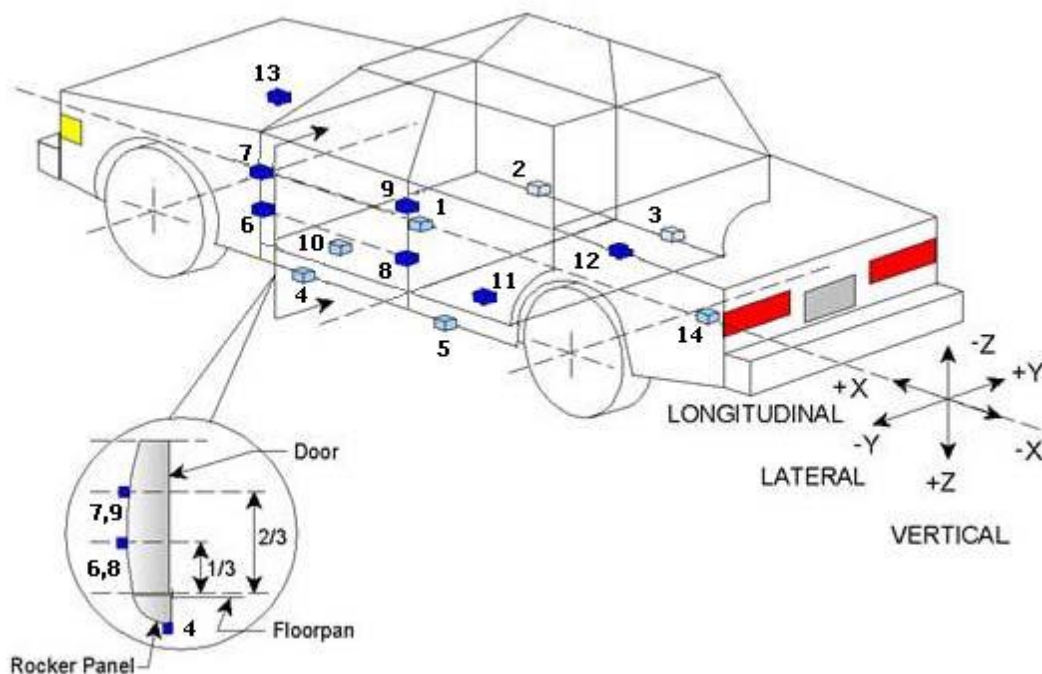
INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MBD Accelerometers	5
TOTAL	60

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16



TEST VEHICLE ACCELEROMETER LOCATIONS

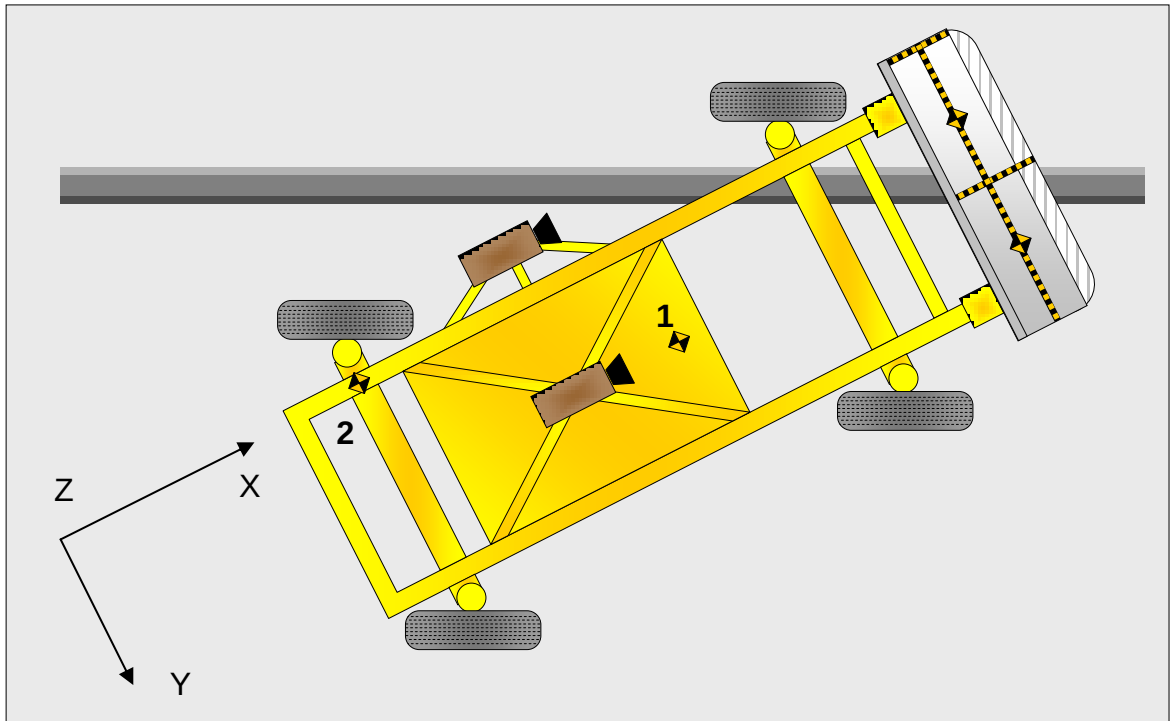
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2892	181	-458
2	Right Sill at Front Seat	2882	730	-336
3	Right Sill at Rear Seat	1965	720	-320
4	Left Sill at Front Door	2995	-730	-328
5	Left Sill at Rear Door	1694	-720	-315
6	A-Post Lower	3323	-815	-460
7	A-Post Middle	3325	-815	-785
8	B-Post Lower	2237	-817	-495
9	B-Post Middle	2248	-817	-860
10	Front Seat Track	2636	-596	-290
11	Rear Seat Structure	1973	452	-450
12	Right Rear Occ. Compartment	1570	387	-425
13	Engine Block	4230	0	-846
14	Rear Above Axle	870	0	-417

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: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16



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: 2017 Mercedes-Benz E-Class Sedan
Test Program: SINCAP Side Impact

NHTSA No.: M20174302
Test Date: 12/7/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	SCAB	SCAB
Top of Head	SCAB	SCAB
Left Side of Head	SCAB	SCAB
Back of Head	SCAB	SCAB
Left Shoulder	Door panel	Door panel
Upper Torso	Seat back bolster, SAB	Seat back bolster
Lower Torso	Seat back bolster	Seat back bolster
Left Hip	SAB	Seat cushion bolster
Left Knee	None	Door panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	N/A	No	N/A
Seat Disengagement from Floor pan	No	N/A	No	N/A
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	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	Rear passenger window broken out
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16

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/Pelvis Airbag	Yes	Yes	No	N/A
Side Pelvis Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Unknown	No	N/A
Seat Belt Buckle Pretensioner	Yes	Yes	No	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2945
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		516
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-8
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-6

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
Test Program: SINCAP Side Impact

NHTSA No.: M20174302
Test Date: 12/7/16

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel Base of Framework Carriage	2591
C.G. Location aft of Front Axle	1109

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	414.8	262.6	677.4
Right	kg	364.8	320.6	685.4
Ratio	%	57.2	42.8	100.0
Totals	kg	779.6	583.2	1362.8

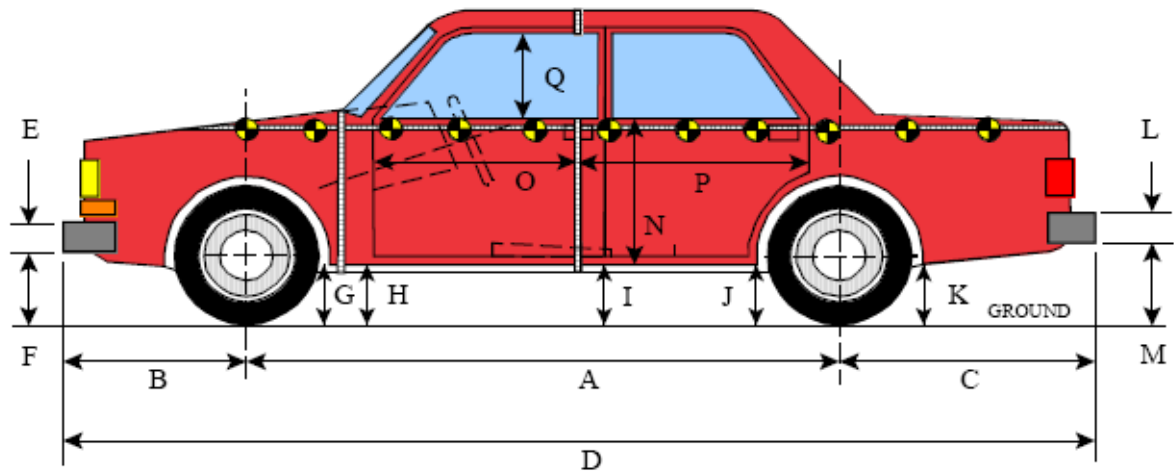
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.84
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.82
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16

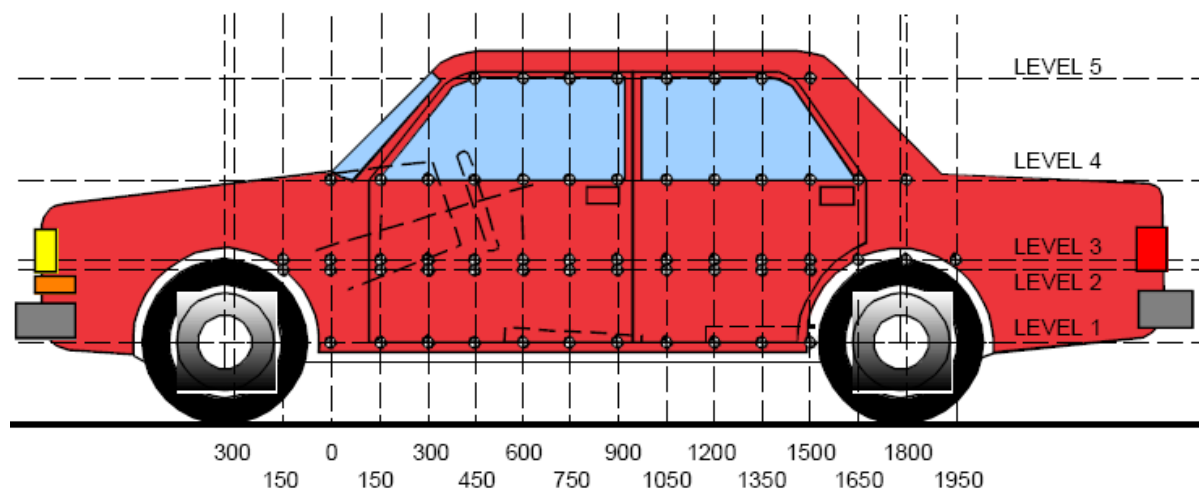


LEFT SIDE VIEW

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	2945	2933	12
B	Front Axle to Front Surface of Vehicle	867	849	18
C	Rear Axle to Rear Surface of Vehicle	1138	1148	-10
D	Total Length at Centerline	4950	4930	20
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	420	420	0
G	Sill Height at Front Wheel Well	205	226	-21
H	Sill Height at Front Door Leading Edge	210	227	-17
I	Sill Height at B-Pillar	210	235	-25
J1	Sill Height at Rear Wheel Well	210	227	-17
J2	Pinch Weld Height at Rear Wheel Well	135	167	-32
K	Sill Height Aft of Rear Wheel Well	282	330	-48
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	455	505	-50
N	Sill Height to Window Bottom Sill	770	735	35
O	Front Door Leading Edge to Impact CL	691	685	6
P	Rear Door Trailing Edge to Impact CL	1480	1443	37
Q	Front Window Opening	423	432	-9
R	Right Side Length	4767	4735	32
S	Left Side Length	4767	4765	2
T	Vehicle Width	1855	1855	0

DATA SHEET NO. 11**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**Test Vehicle: 2017 Mercedes-Benz E-Class SedanNHTSA No.: M20174302Test Program: SINCAP Side ImpactTest Date: 12/7/16**LEFT SIDE VIEW****MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	328	96	1350
2	Driver Hip Point	485	145	1650
3	Mid-Door	641	154	1650
4	Window Sill	921	93	1650
5	Window Top	1398	-3	1200

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: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16

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	928	727	0	0	0	941	738	0	0	0	-13	-11	0
-150	0	923	922	773	0	0	944	928	783	0	0	-21	-6	-10	0
0	905	915	922	804	0	910	902	916	813	0	-5	13	6	-9	0
150	905	912	922	827	0	873	843	860	819	0	32	69	62	8	0
300	904	911	923	838	0	873	831	851	822	0	31	80	72	16	0
450	904	911	924	848	0	865	818	837	826	0	39	93	87	22	0
600	904	912	925	858	0	862	812	809	827	0	42	100	116	31	0
750	904	913	926	865	0	858	814	780	824	0	46	99	146	41	0
900	903	913	926	869	0	851	818	780	827	0	52	95	146	42	0
1050	902	913	925	872	0	843	794	789	829	0	59	119	136	43	0
1200	901	913	925	878	595	833	801	819	830	598	68	112	106	48	-3
1350	899	913	923	879	603	803	806	822	814	604	96	107	101	65	-1
1500	898	913	923	881	605	824	774	801	799	605	74	139	122	82	0
1650	897	913	923	880	604	835	768	769	787	604	62	145	154	93	0
1800	896	913	921	879	599	858	824	789	801	599	38	89	132	78	0
1950	895	912	920	877	582	875	878	866	830	584	20	34	54	47	-2
2100	0	0	923	862	0	0	0	920	844	0	0	0	3	18	0
2250	0	0	0	870	0	0	0	0	880	0	0	0	0	-10	0
2400	0	0	0	863	0	0	0	0	856	0	0	0	0	7	0
2550	0	0	0	855	0	0	0	0	851	0	0	0	0	4	0
2700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

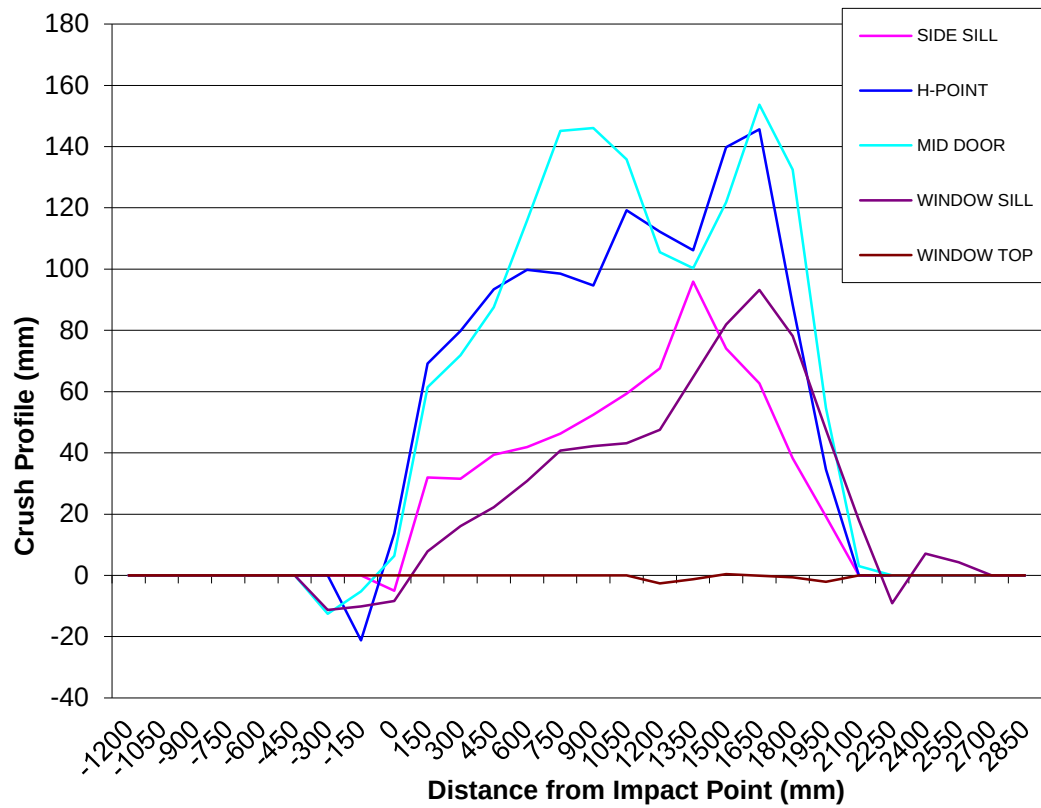
NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
Test Program: SINCAP Side Impact

NHTSA No.: M20174302
Test Date: 12/7/16



DATA SHEET NO. 12

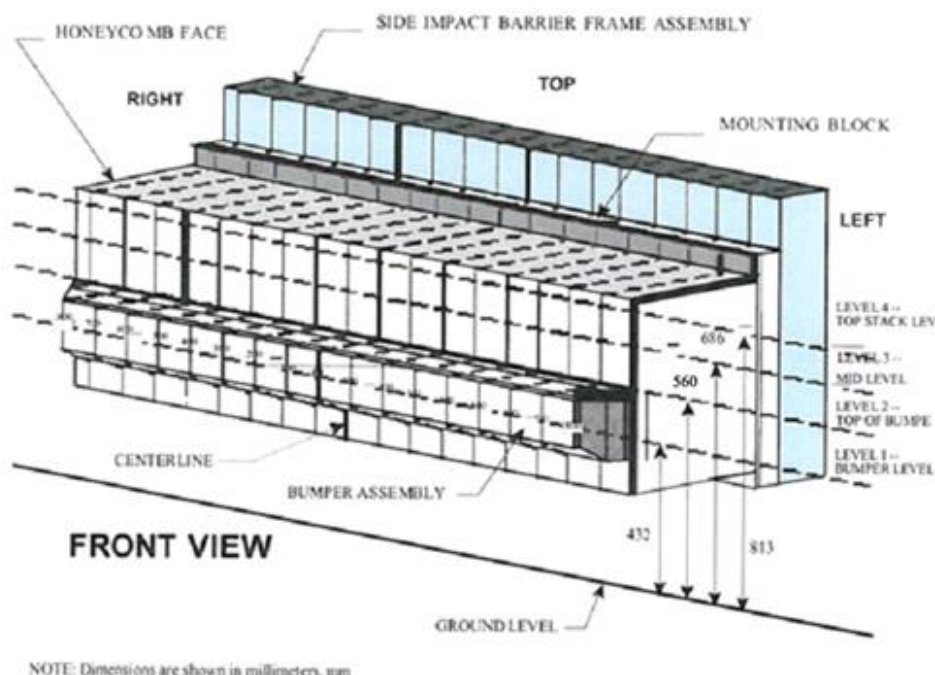
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174302

Test Program: SINCAP Side Impact

Test Date: 12/7/16



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	254
B	Top of Bumper	560	800	Left	167
C	Mid-Level	686	800	Left	185
D	Top of Stack	813	800	Left	180

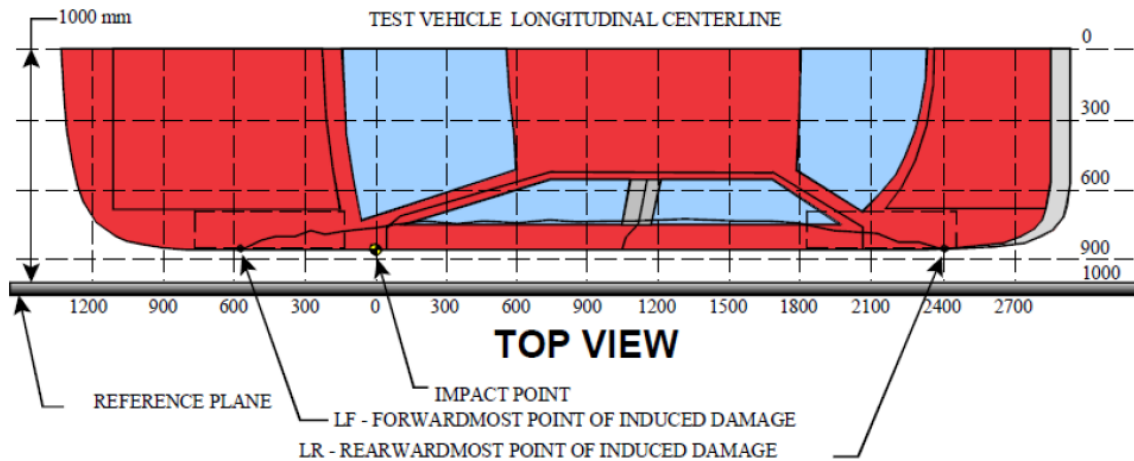
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center									C/L	Distance Left of Center								
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800		
1	230	231	235	243	254	236	228	226	226	227	228	229	231	232	238	244	238		
2	155	156	160	163	161	152	147	147	144	144	146	147	148	150	153	159	167		
3	98	96	131	145	156	147	108	84	72	67	69	76	89	110	136	163	185		
4	92	76	90	126	163	140	108	94	97	90	91	104	112	121	137	154	180		

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20174302
 Test Date: 12/7/16



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2550	4	851	855	4
2	2100	4	844	862	18
3	1500	2	774	913	139
4	1050	3	789	925	136
5	450	2	818	911	93
6	0	2	902	915	0

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm Left of Center	1	231	468	238
2	500 mm Left of Center	1	252	484	232
3	200 mm Left of Center	1	256	484	228
4	200 mm Right of Center	1	257	485	228
5	500 mm Right of Center	1	242	485	243
6	800 mm Right of Center	1	242	470	230

¹ DPD 6 defined as zero crush since the crush does not extend to the end of the vehicle.

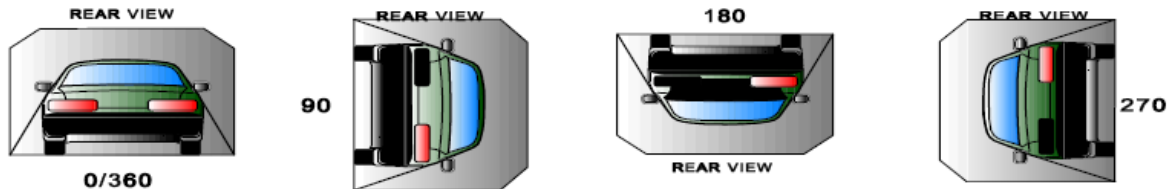
DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan NHTSA No.: M20174302
 Test Program: SINCAP Side Impact Test Date: 12/7/16

Test Time: 14:57 **Temperature:** 21.4°C

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

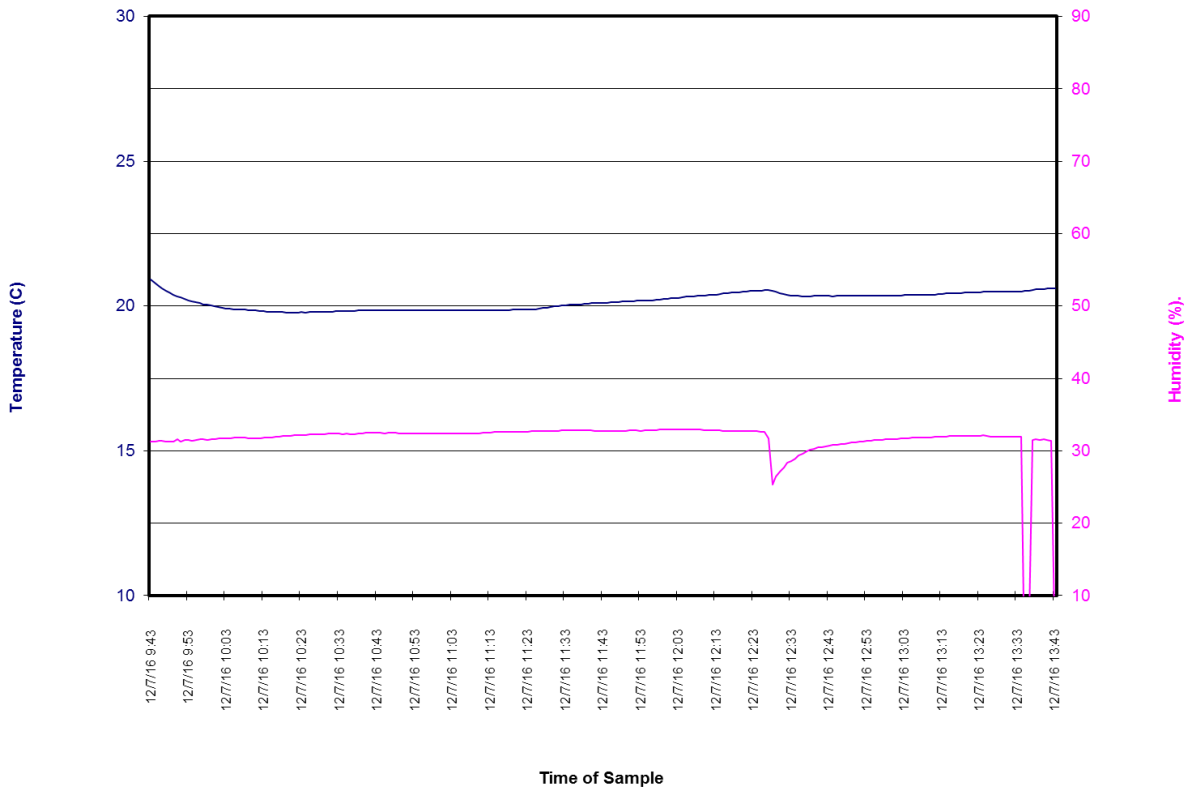
Test Vehicle: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174302

Test Program: SINCAP Side Impact

Test Date: 12/7/16

M20174302 2017 Mercedes-Benz E-Class Sedan Left MDB Impact 161207: Test Time 13:43



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

No.	Description	Page
001	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-6
002	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-6
003	Pre-Test Frontal View of Test Vehicle	A-7
004	Post-Test Frontal View of Test Vehicle	A-7
005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
006	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
007	Pre-Test Left Side View of Test Vehicle	A-9
008	Post-Test Left Side View of Test Vehicle	A-9
009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
010	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
011	Pre-Test Rear View of Test Vehicle	A-11
012	Post-Test Rear View of Test Vehicle	A-11
013	Pre-Test Right Side View of Test Vehicle	A-12
014	Post-Test Right Side View of Test Vehicle	A-12
015	Pre-Test Overhead View of Test Area	A-13
016	Post-Test Overhead View of Test Area	A-13
017	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-14
018	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-14
019	Pre-Test Close-Up View of Impact Point Target	A-15
020	Post-Test Close-Up View of Impact Point Target	A-15
021	Pre-Test Left Front Door Latch Close-Up	A-16
022	Post-Test Left Front Door Latch Close-Up	A-16
023	Pre-Test Left Rear Door Latch Close-Up	A-17
024	Post-Test Left Rear Door Latch Close-Up	A-17
025	Pre-Test Front Close-Up View of Driver Dummy	A-18
026	Post-Test Front Close-Up View of Driver Dummy	A-18
027	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-19
028	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
029	Post-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
030	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-21
031	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-21
032	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-22
033	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-22
034	Pre-Test Placement of Driver Dummy's Feet	A-23
035	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
036	Pre-Test Left Side View of Steering Wheel	A-24

TABLE OF PHOTOGRAPHS (CONTINUED)

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

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
064	Pre-Test Placement of Rear Passenger Dummy's Feet	A-38
065	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-38
066	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-39
067	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-39
068	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-40
069	Pre-Test Passenger Dummy and Door Clearance View	A-41
070	Post-Test Passenger Dummy and Door Clearance View	A-41
071	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-42
072	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-42
073	Pre-Test Passenger Inner Door Panel View	A-43
074	Post-Test Passenger Inner Door Panel View	A-43
075	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	A-44
076	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View	A-44
077	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-45
078	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	A-45
079	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	A-46
080	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	A-46
081	Post-Test Rear Passenger Dummy Close-Up Knee Contact View	A-47
082	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-48
083	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-48
084	Pre-Test Front View of MDB Impactor Face	A-49
085	Post-Test Front View of MDB Impactor Face	A-49
086	Pre-Test Top View of MDB Impactor Face	A-50
087	Post-Test Top View of MDB Impactor Face	A-50
088	Pre-Test Left Side View of MDB Impactor Face	A-51
089	Post-Test Left Side View of MDB Impactor Face	A-51
090	Pre-Test Right Side View of MDB Impactor Face	A-52
091	Post-Test Right Side View of MDB Impactor Face	A-52

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
092	Close-Up View of Vehicle's Certification Label	A-53
093	Close-Up View of Vehicle's Tire Information Placard or Label	A-53
094	Pre-Test Ballast View	A-54
095	Post-Test Primary and Redundant Speed Trap Read-Out	A-54
096	FMVSS No. 301 Static Rollover 0 Degrees	A-55
097	FMVSS No. 301 Static Rollover 90 Degrees	A-55
098	FMVSS No. 301 Static Rollover 180 Degrees	A-56
099	FMVSS No. 301 Static Rollover 270 Degrees	A-56
100	FMVSS No. 301 Static Rollover 360 Degrees	A-57
101	Impact Event	A-57
102	Monroney Label	A-58
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-58
104	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-59

PHOTO NOT AVAILABLE

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

PHOTO NOT AVAILABLE

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



003 Pre-Test Frontal View of Test Vehicle



004 Post-Test Frontal 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



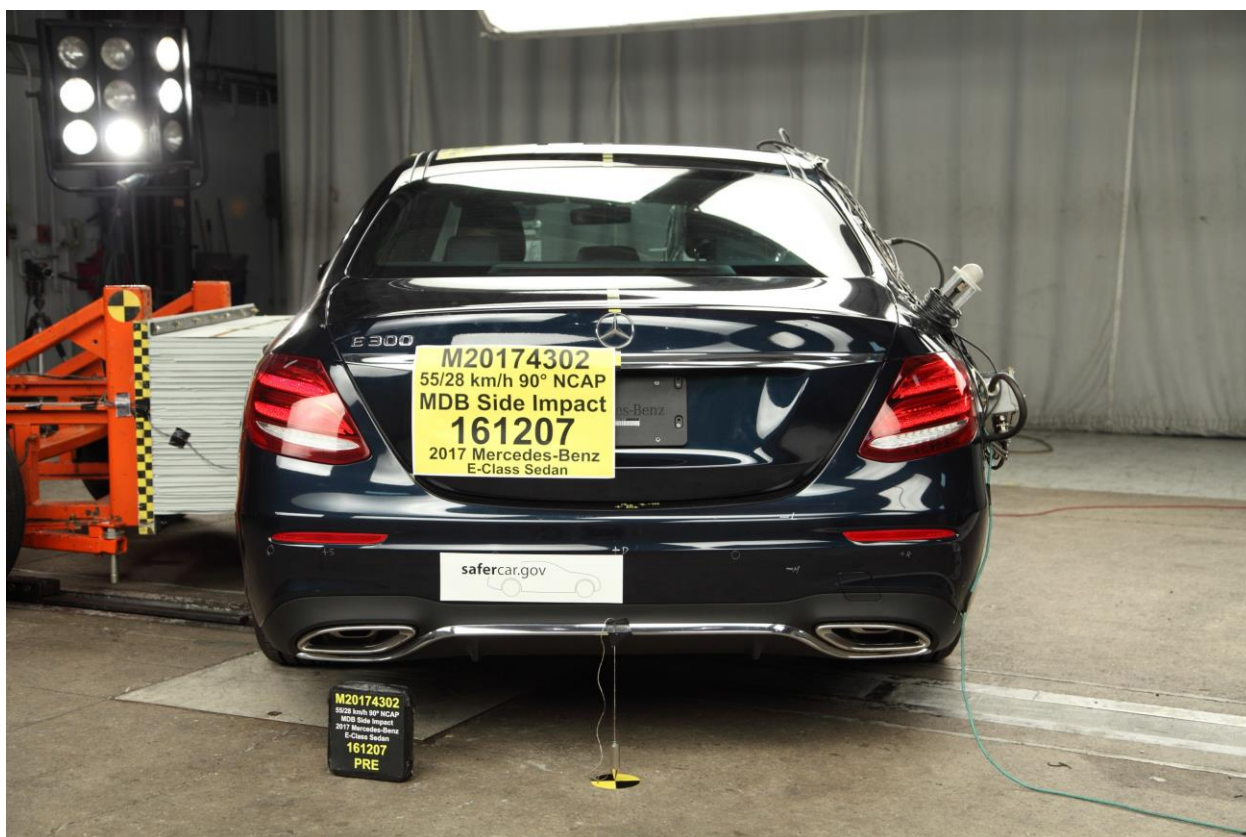
008 Post-Test Left Side View of Test Vehicle



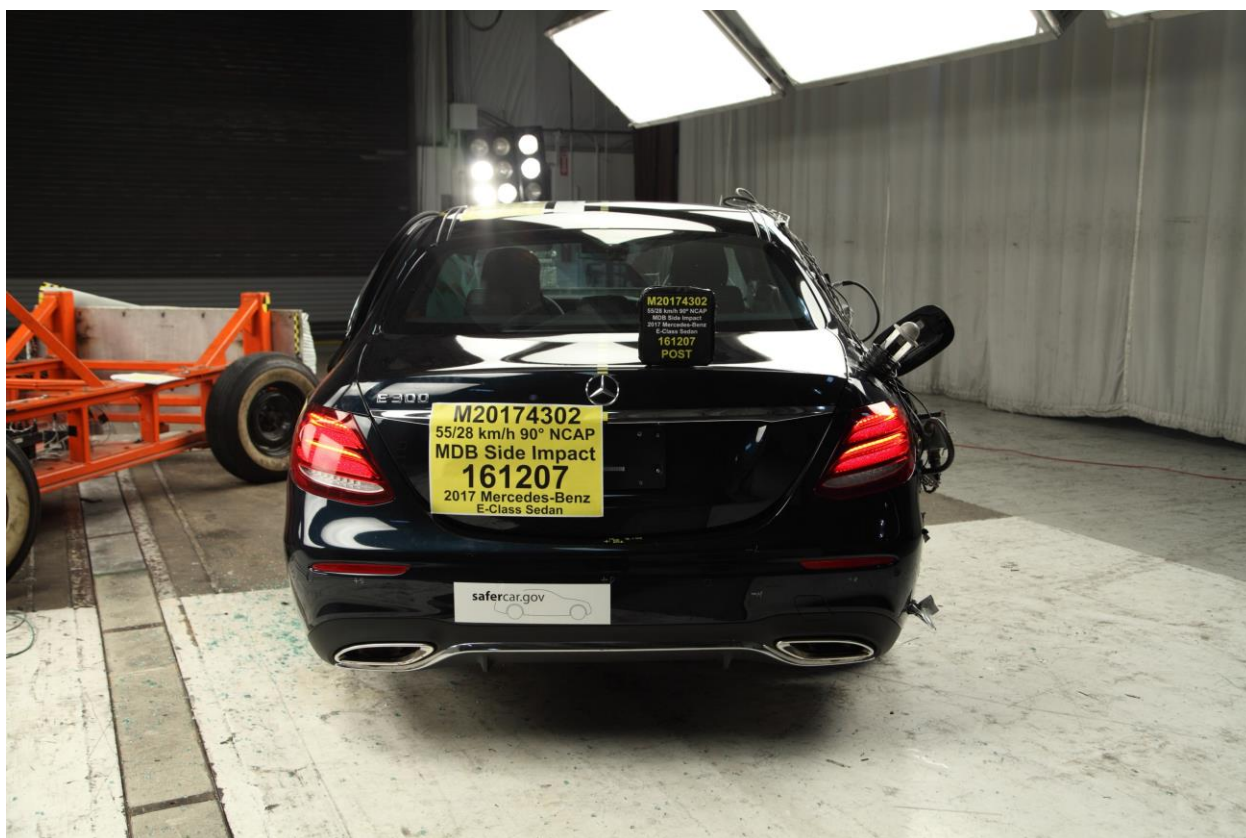
009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



011 Pre-Test Rear View of Test Vehicle



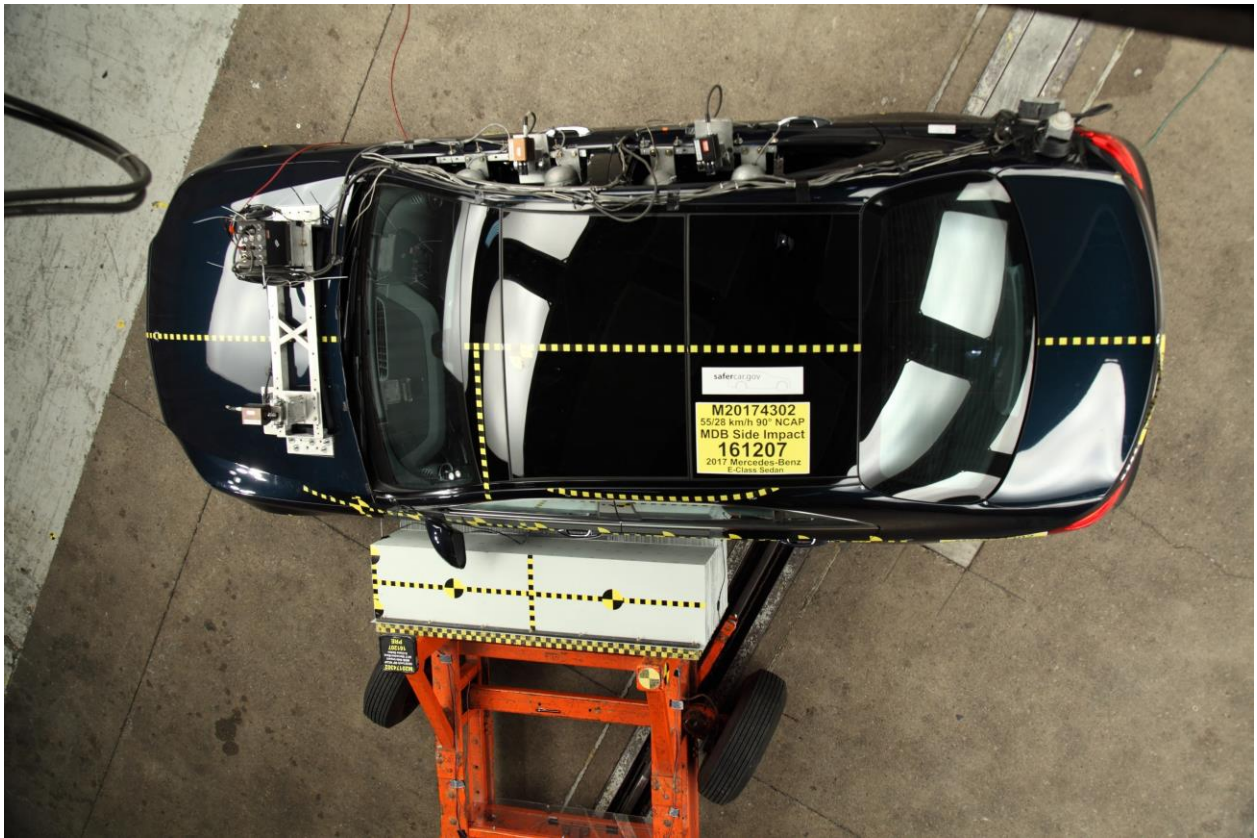
012 Post-Test Rear View of Test Vehicle



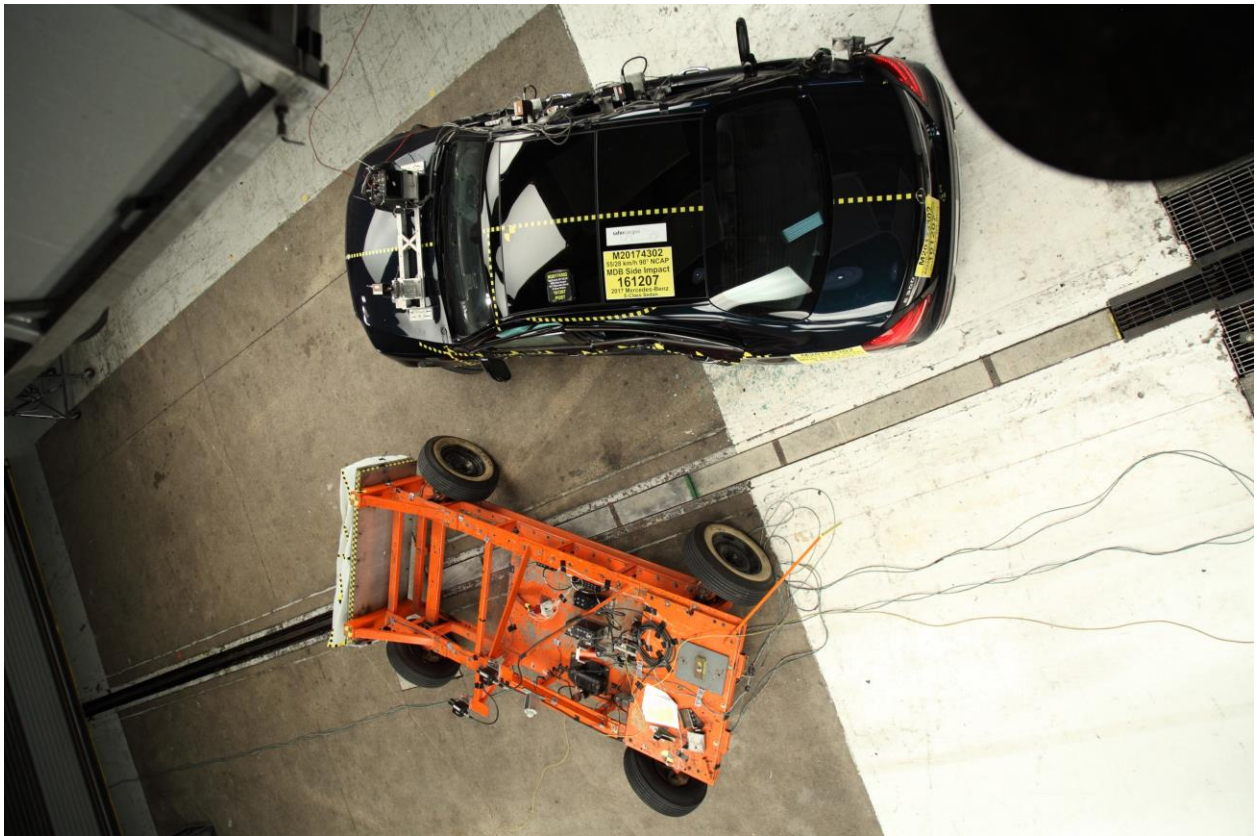
013 Pre-Test Right Side View of Test Vehicle



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

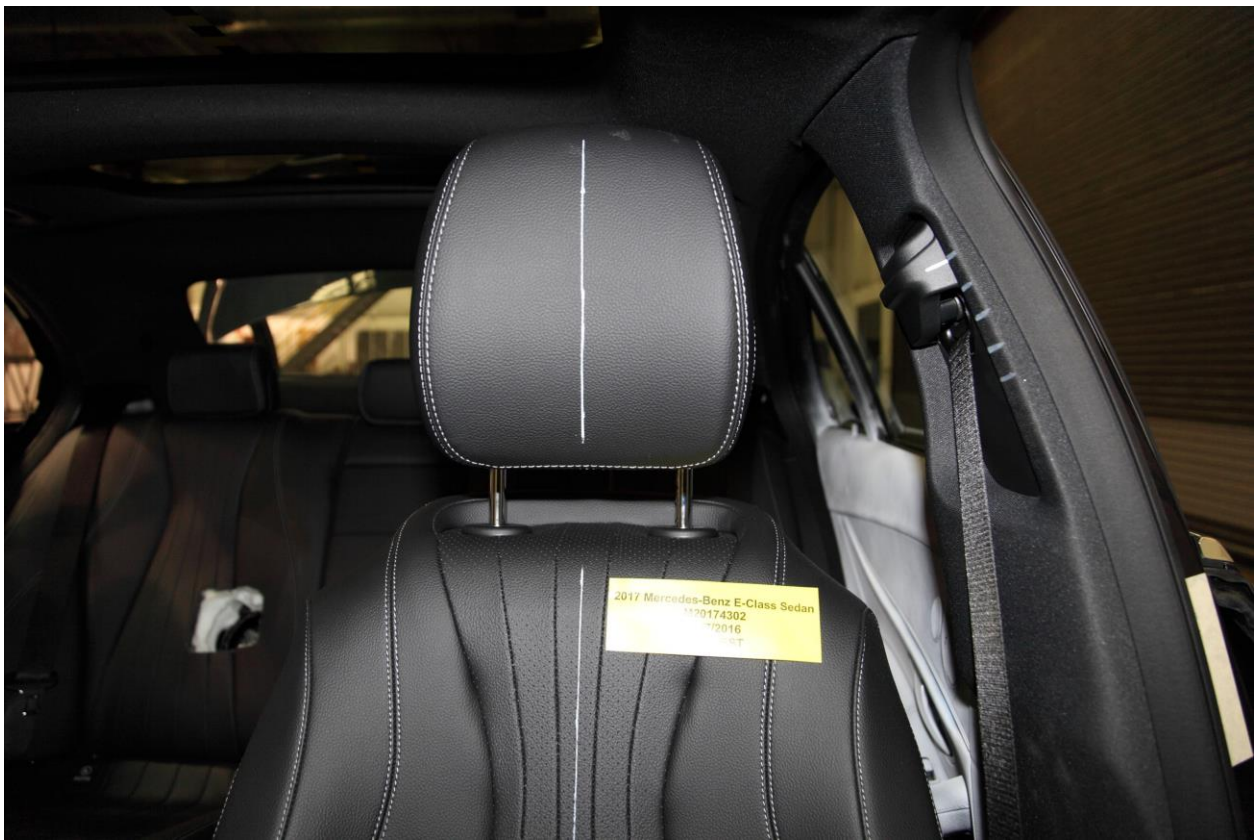
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028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



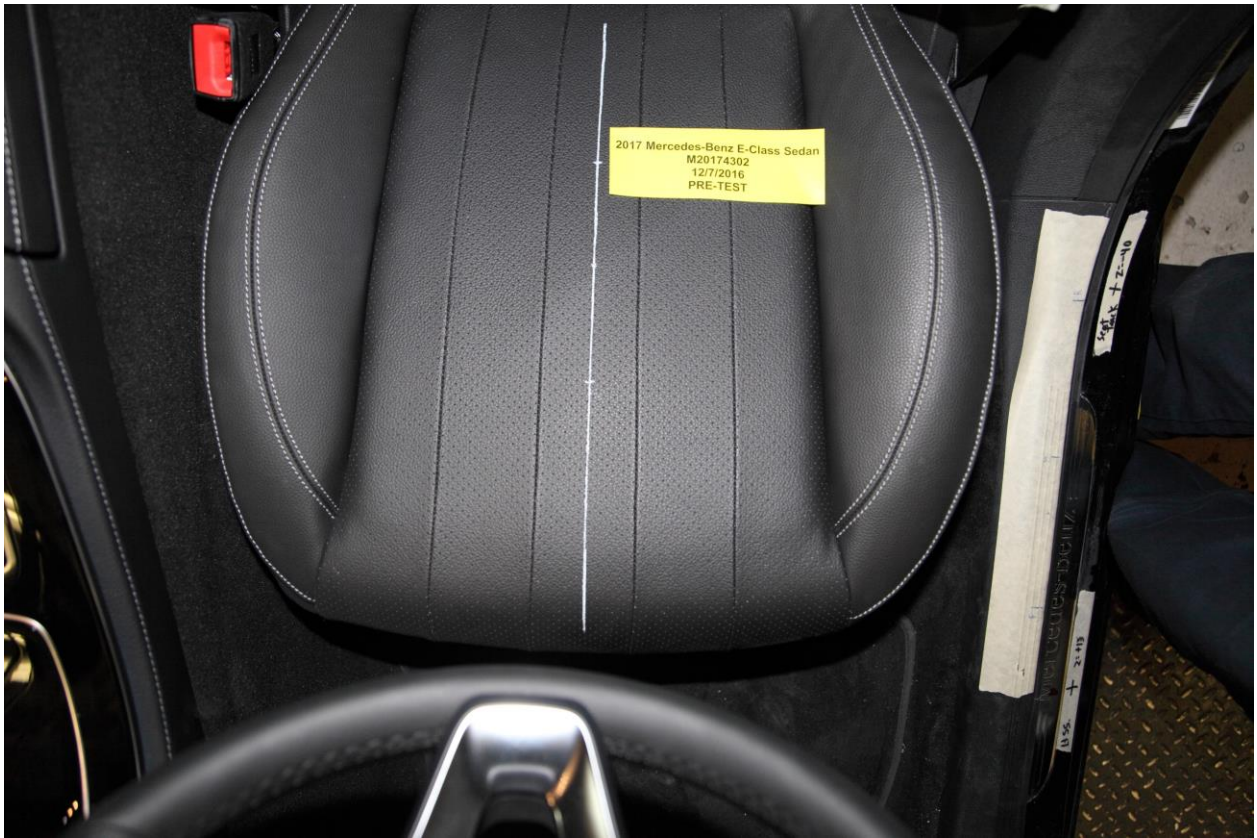
029 Post-Test Left Side View of Driver Dummy Shoulder and Door Top



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



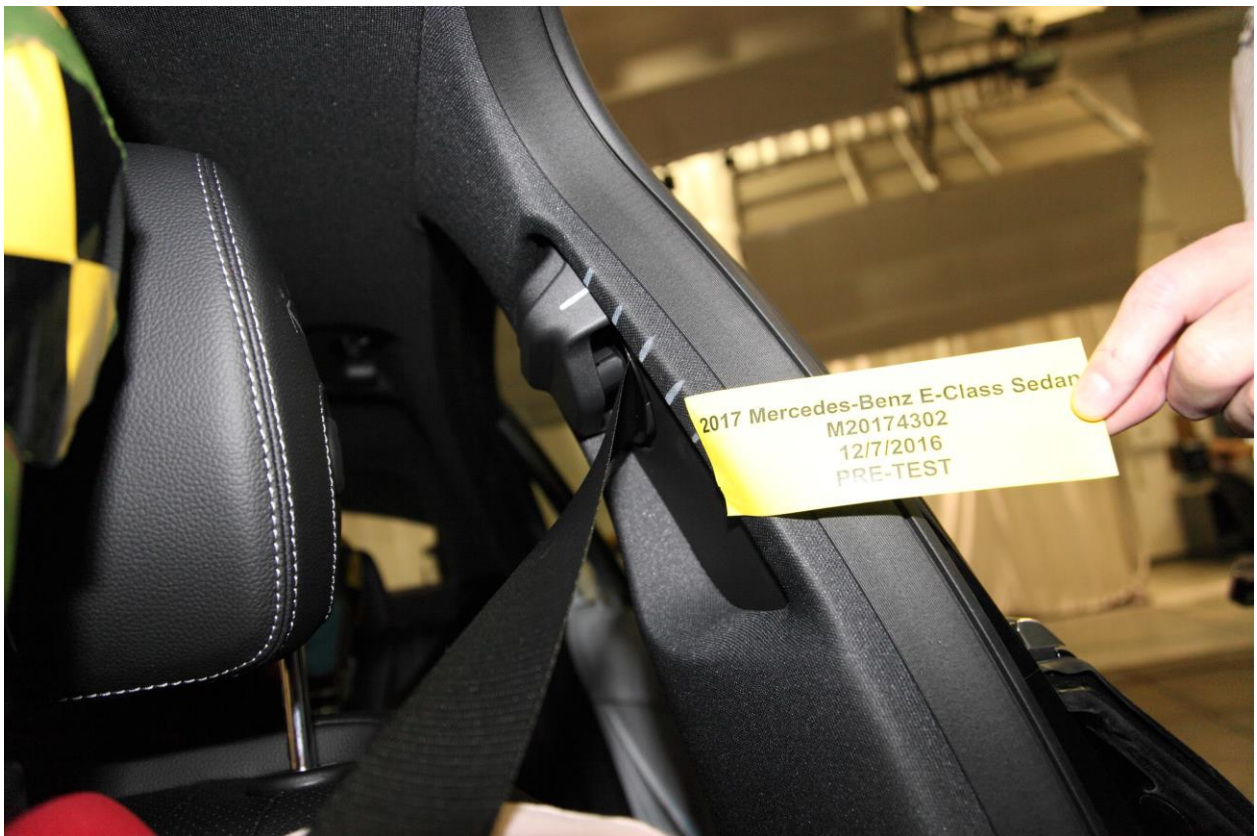
032 Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



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



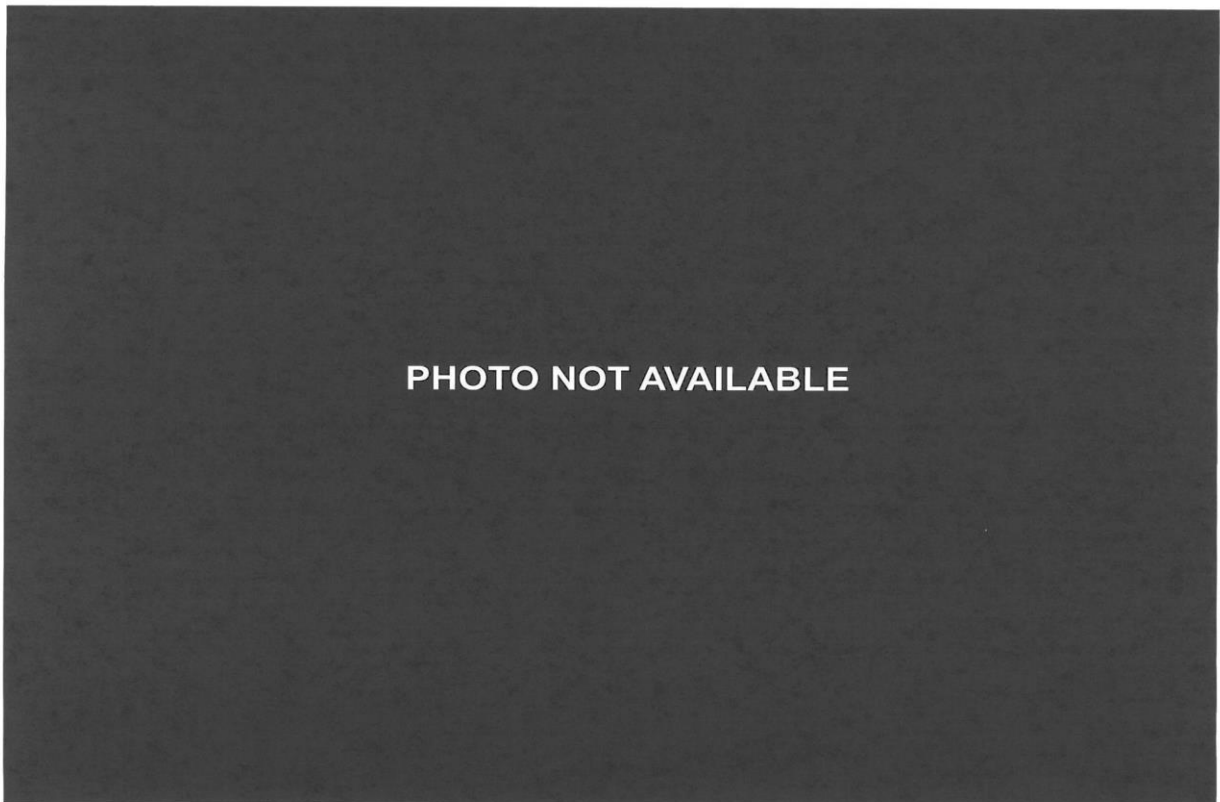
034 Pre-Test Placement of Driver Dummy Feet



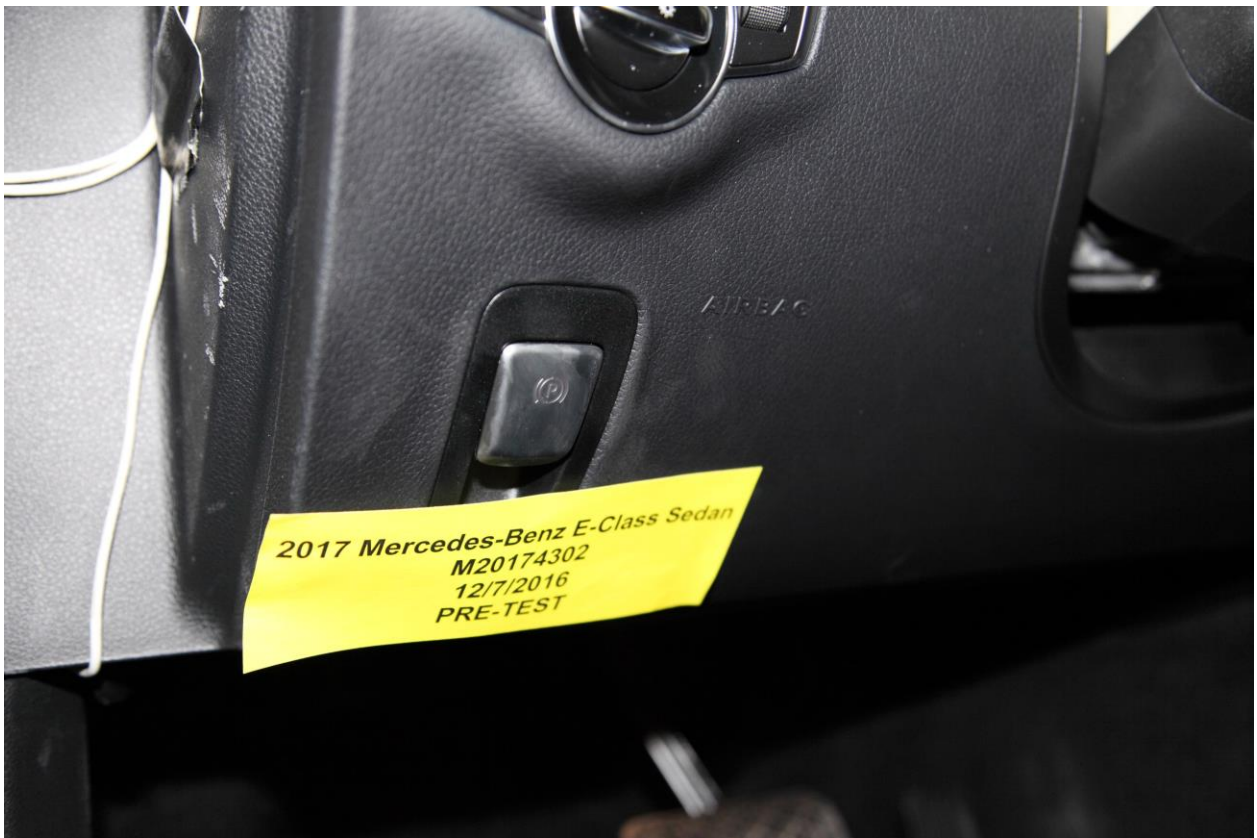
035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



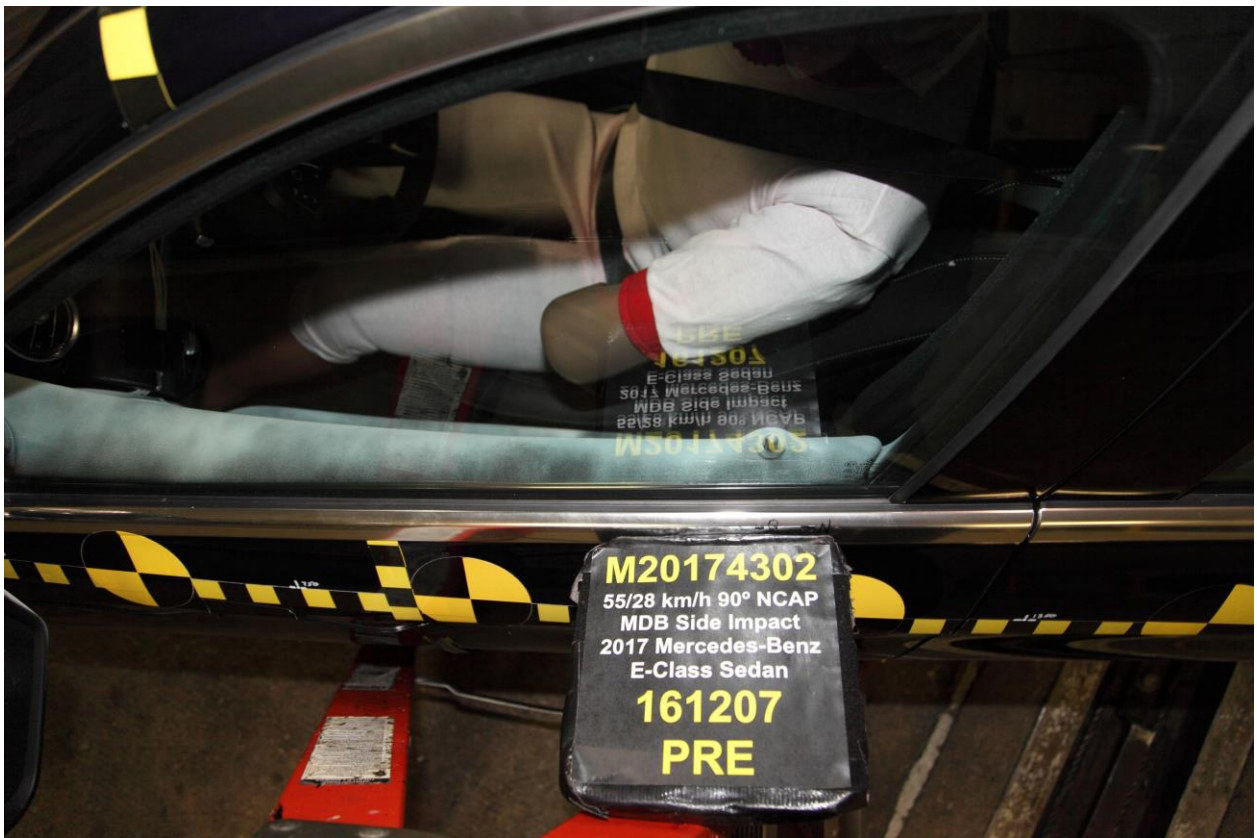
039 Pre-Test Close-Up Left Side View of Driver Seat Track

PHOTO NOT AVAILABLE

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 Showing Driver Dummy Contact Locations

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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



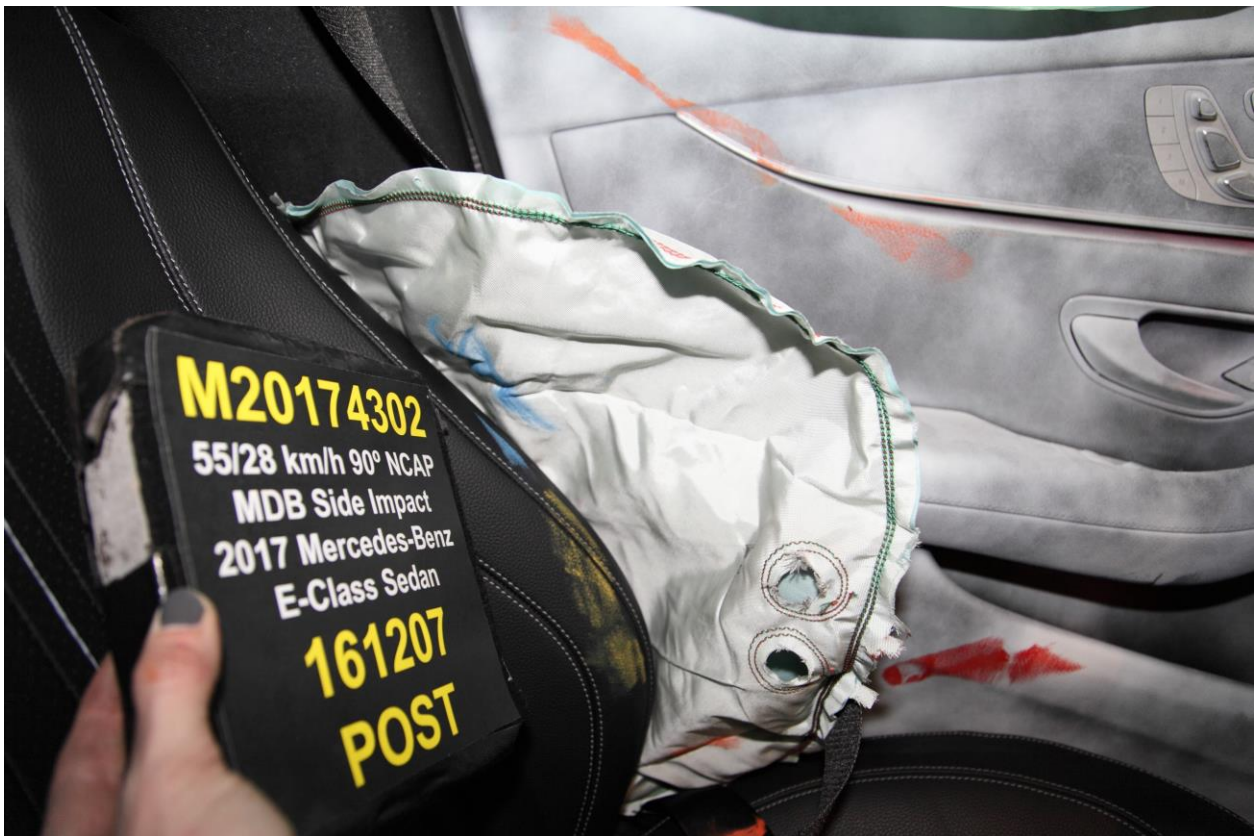
050 Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



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

PHOTO NOT APPLICABLE

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



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



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



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



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



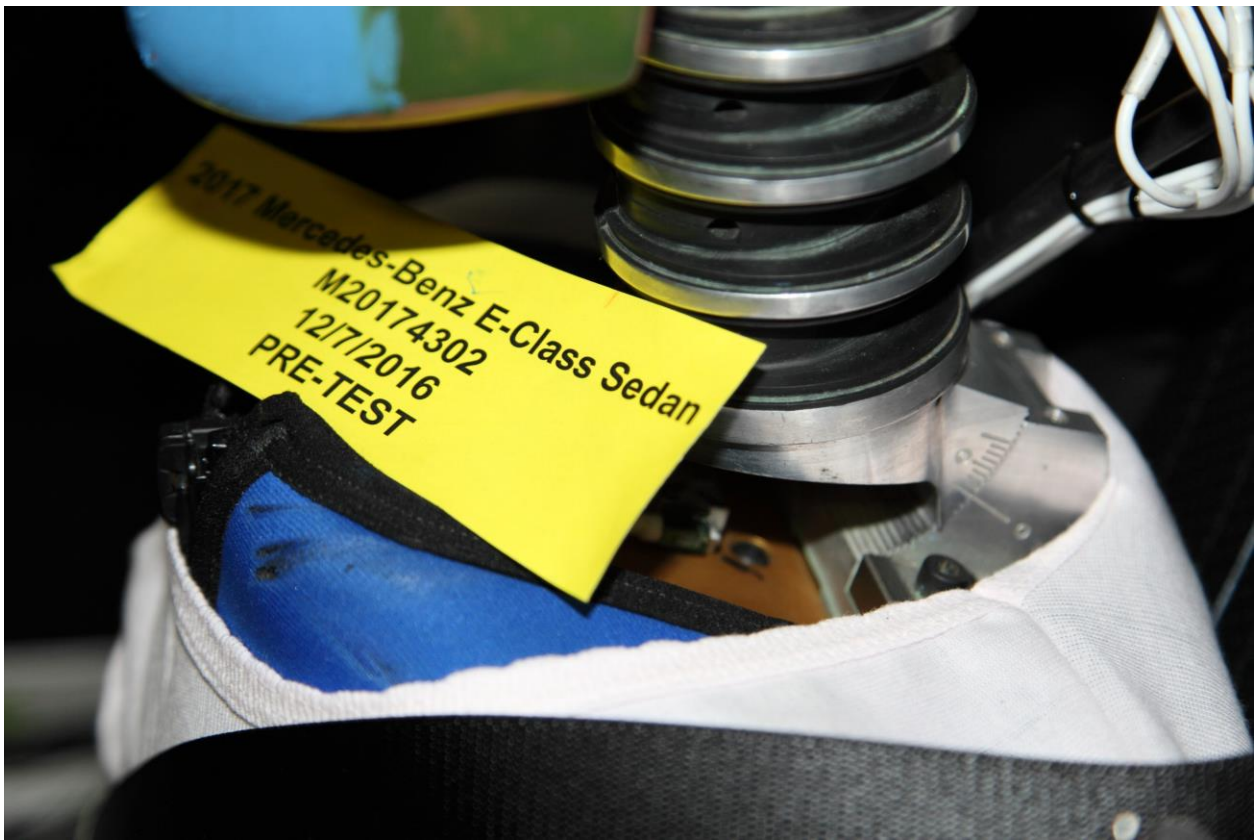
059 Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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



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



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



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



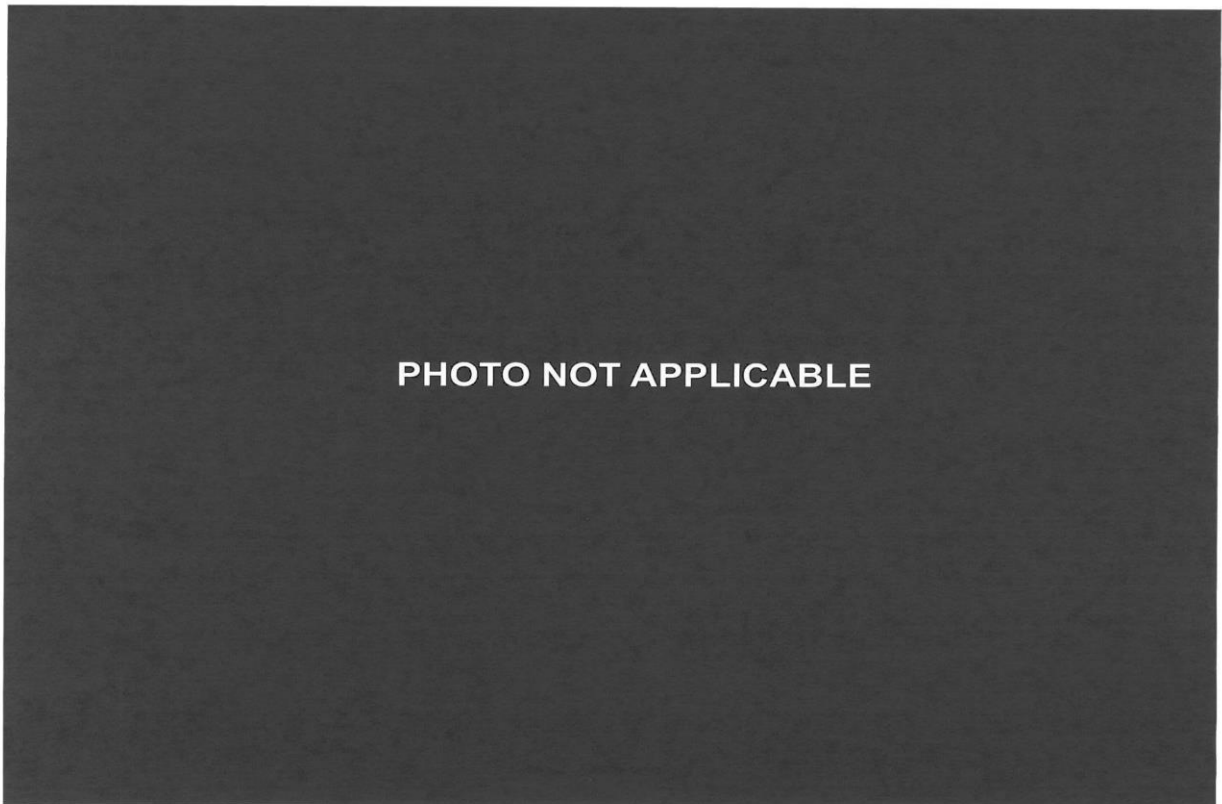
064 Pre-Test Placement of Rear Passenger Dummy Feet



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



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



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



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

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069 Pre-Test Passenger Dummy and Door Clearance View



070 Post-Test Passenger Dummy and Door Clearance View



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



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



073 Pre-Test Passenger Inner Door Panel View



074 Post-Test Passenger Inner Door Panel View

PHOTO NOT APPLICABLE

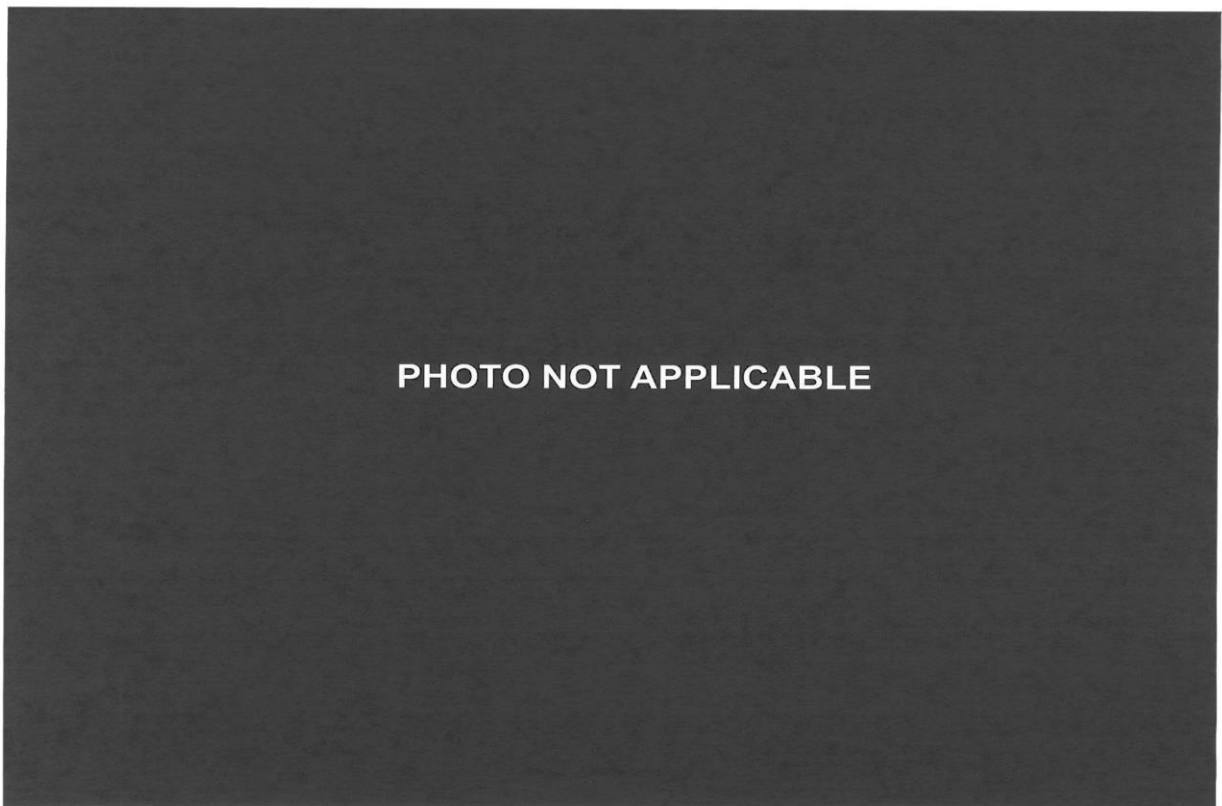
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



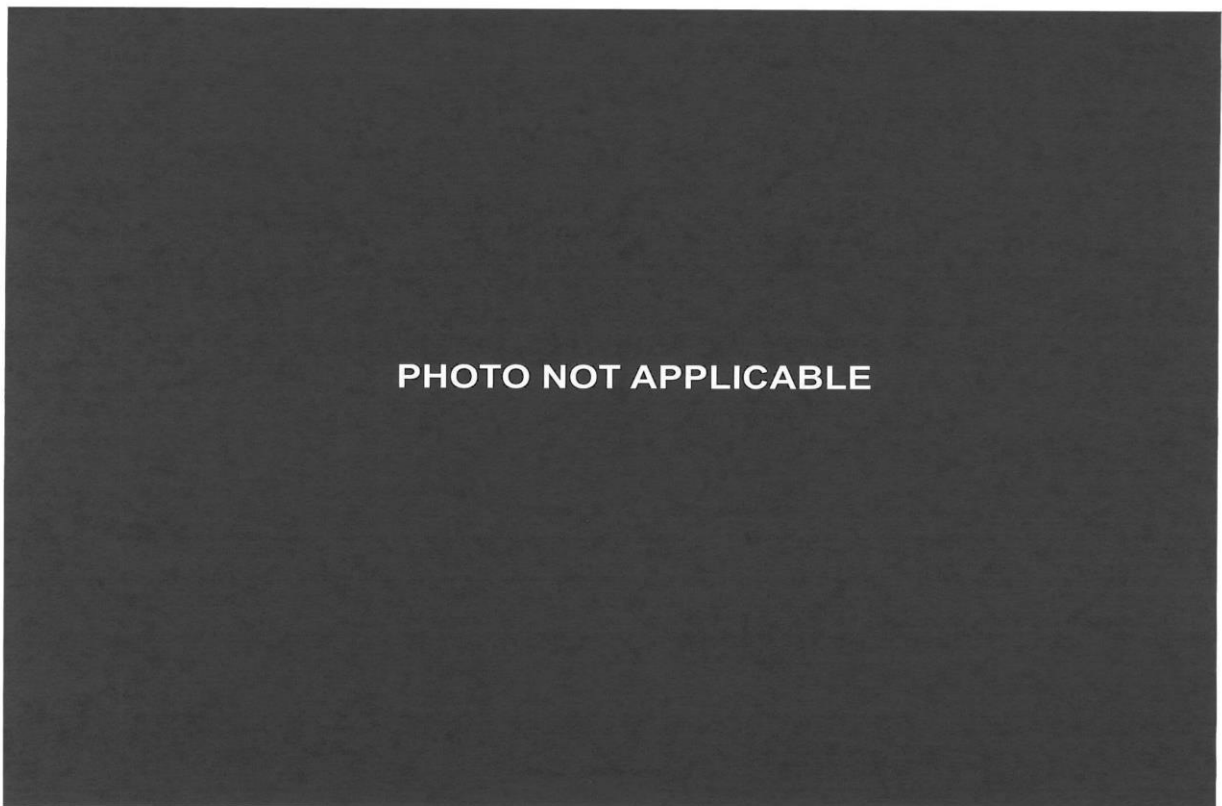
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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

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

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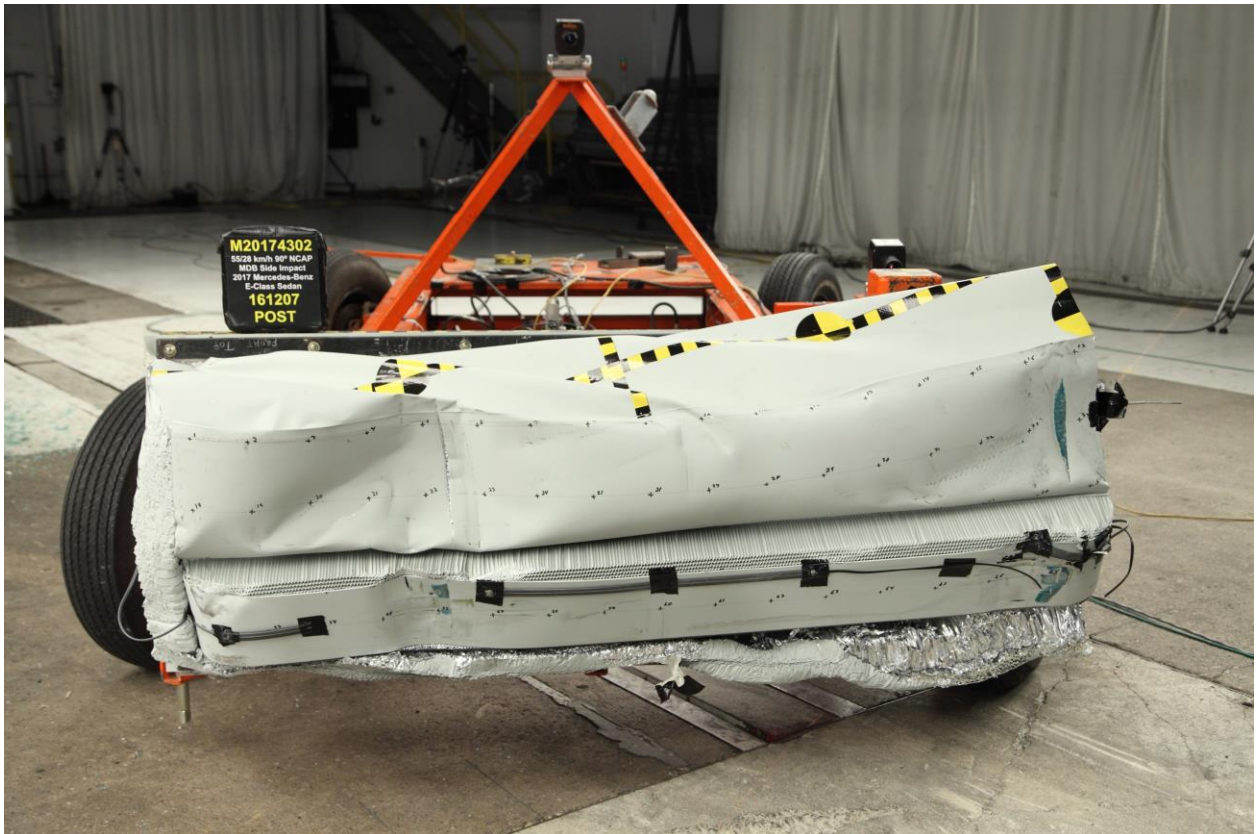
082 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



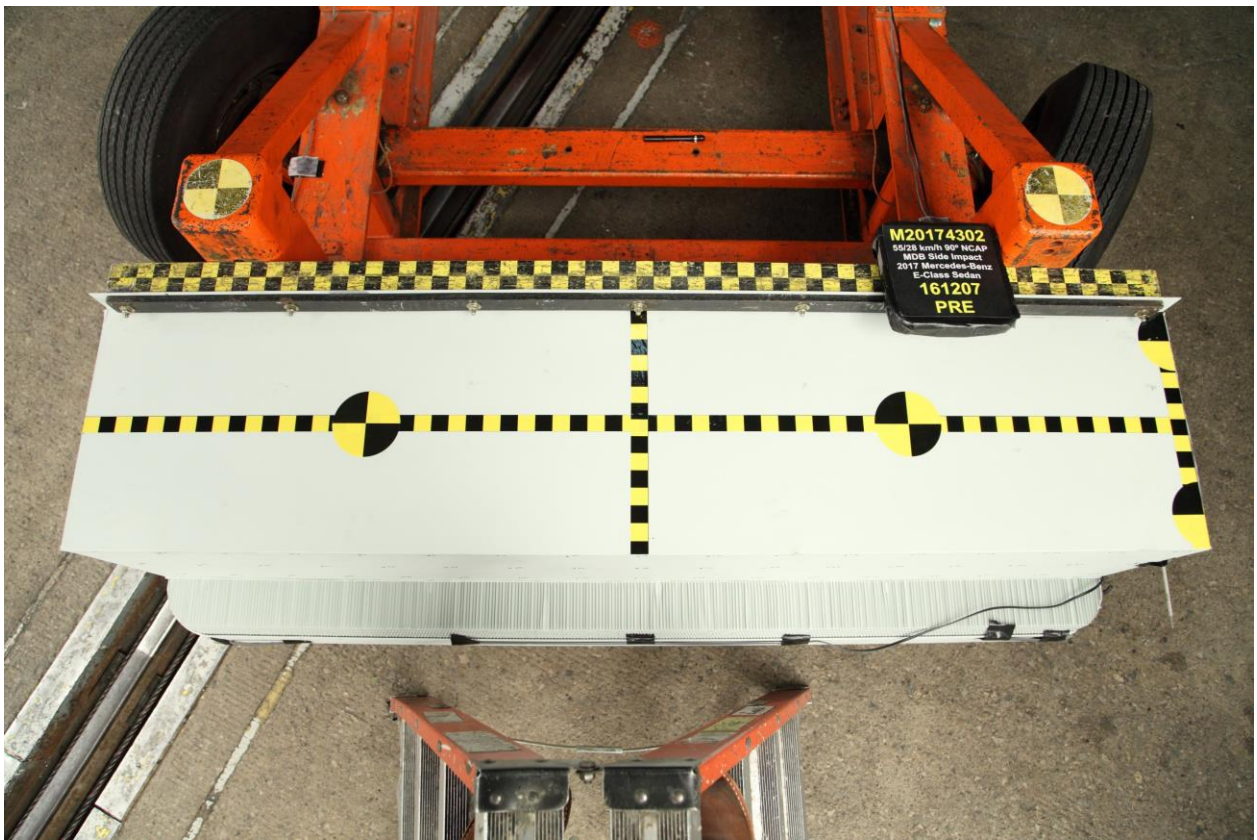
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



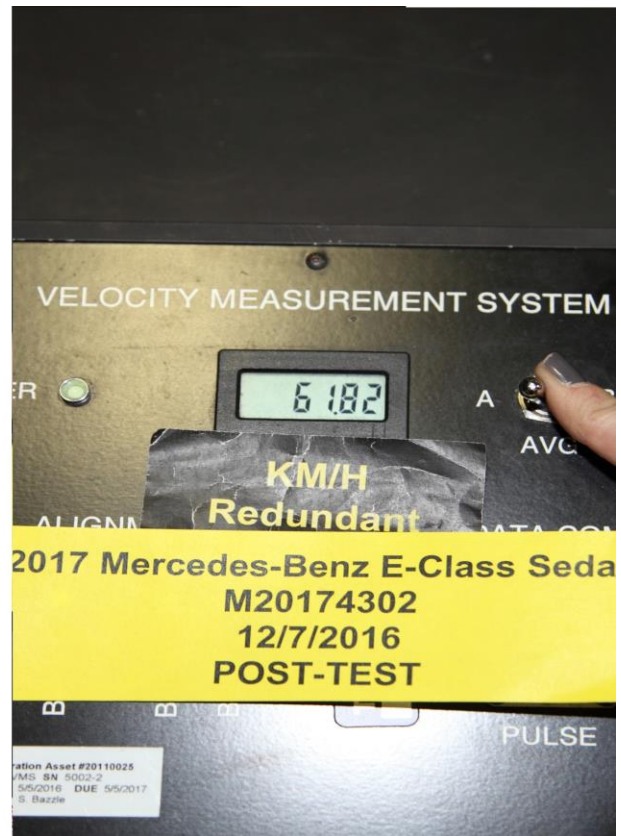
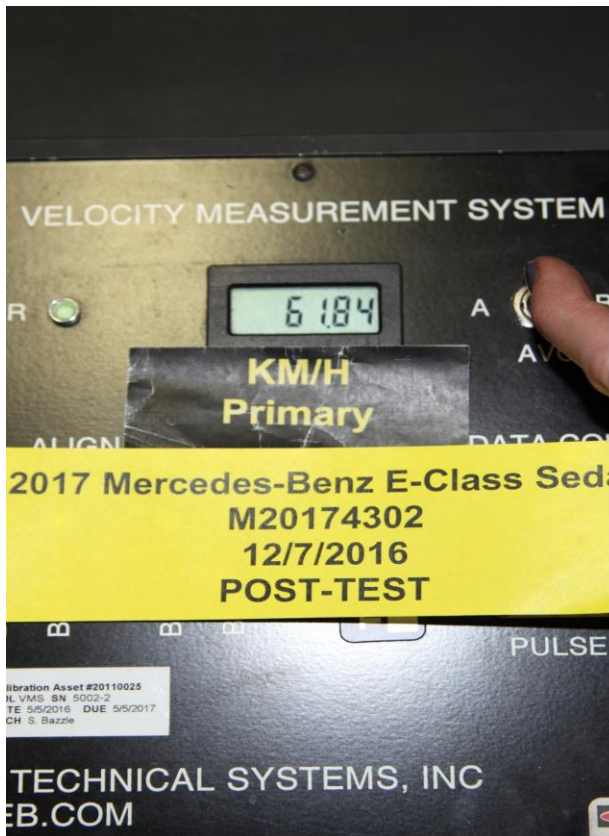
092 Close-Up View of Vehicle Certification Label



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



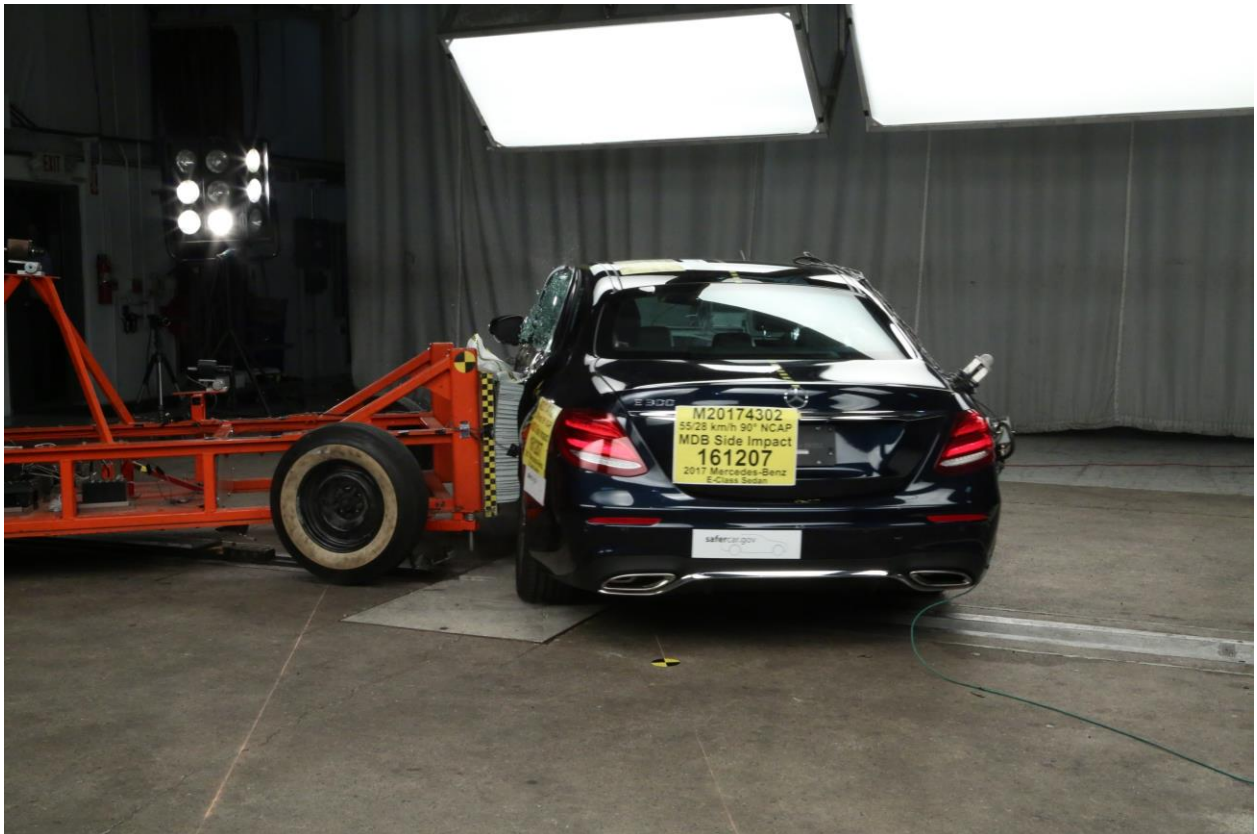
098 FMVSS No. 301 Static Rollover 180 Degrees



099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees



101 Impact Event



2017 E300 Sedan

PO#: 0771717360
VIN: WDDZF4J1HA021285

Mercedes-Benz

www.MBUSA.com

Fuel Economy and Environment

These estimates reflect new EPA methods beginning with 2017 models.

Fuel Economy

25 MPG
combined city/hwy

4.0 gallons per 100 miles

22 MPG
city

30 MPG
highway

Midsize cars range from 13 to 114 MPG.
The best vehicle rates 119 MPG.

You spend \$1,500 more in fuel costs over 5 years compared to the average new vehicle.

Standard Features

PERFORMANCE/HANDLING

- 2.0L Inline 4 Turbo Engine
- 241 Horsepower
- 271 hp Torque
- 9G-TRONIC 7-Speed Automatic Transmission
- DYNAMIC SELECT
- KEYLESS-START
- ECO Start/Stop System

COMFORT/CONVENIENCE

- Power 10/Spinning Steering
- Bluetooth® Connectivity
- Power Front Seats with Memory & Lumbar Support
- Split Folding Rear Seats
- Dual-Zone Automatic Climate Control
- Rain-Sensing Intermittent Windshield Wipers
- Ambient Lighting
- Steering Wheel w/ Touch Control Buttons
- Power-Folding Mirrors
- Touchpad w/ Central Controller
- 12.3 inch High-Resolution COMAND® Display
- Driver's Side and Interior Auto-Dimming Mirrors
- COMAND Navigation w/ Map Updates incl. for 3 years
- Live Traffic provided for 3 years
- miracast® w/ Trial Period for Verizon Telematics (subscription required thereafter)
- Apple CarPlay™ & Android Auto

SAFETY/SECURITY

- New Vehicle 4-year/50,000 Mile Warranty
- 24-hour Roadside Assistance Program
- Advanced Airbag Protection System
- ATTENTION ASSIST®
- Active Brake Assist
- Crosswind Assist
- LED Headlamps w/ LED Daytime Running Lights
- Ped LED Tailgate
- Rear Door Child Safety Locks
- Anti-Lock Braking System (ABS)
- PRE-SAFE® Predictive Occupant-Protection System
- PRE-SAFE® Sound
- ISOFIX Child Seat Anchor System
- Brake Assist System (BAS®)
- Electronic Stability Program (ESP®)
- Anti-Theft Alarm System

Suggested Retail Price

\$52,150

PAINT/UPHOLSTERY & TRIM

- 997 Piedmont Green Metallic 720.00
- 121 Black MB-Tex N/C
- 736 Natural Grain Black Ash Wood N/C

OPTIONAL EQUIPMENT AND VALUE ADDED PACKAGES

- L3C 3-Spoke Multifunction Steering Wheel N/C
- ROM 18" AMG 5-Spoke Wheels 1,090.00
- 413 Panorama Starroof N/C
- 677 Lowered Suspension with Selective Damping 850.00
- 810 Burmester® Surround Sound System 3,100.00
- P01 Premium 1 Package:** Rearview Camera, Parking Pilot, NFC Wireless Charging, KEYLESS-GO with HANDS-FREE ACCESS, Electronic Trunk Closure, Blind Spot Assist, SiriusXM® Radio with Free Trial Period, Heated Front Seats 650.00
- 421 Sport Package II:** Sport Body Styling, Mercedes-Benz Star in Grille, Perforated Front Brake Discs, Front Brake Calipers with "Mercedes-Benz" Lettering, Sport Wheels 925.00

Destination and Delivery 925.00

Total Retail Price **\$59,485.00**

Annual fuel cost

\$1,700

This vehicle emits 361 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fuel-economy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.80 per gallon. 60¢ is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuel-economy.gov
Calculate personalized estimates and compare vehicles.

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score **Not Rated**

Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal	Driver Passenger	Not Rated
Crash	Not Rated	Not Rated

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side	Front seat	Not Rated
Crash	Rear seat	Not Rated

Based on the risk of injury in a side impact.

Rollover **Not Rated**

Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (*****), with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4265

PARTS CONTENT INFORMATION

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

Major Sources of Foreign Parts Content:
GERMANY: 68 %

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:
STONER MOTOR CO., INC.
2515 WILSON BLVD
SANDHURST
GA 30086

Port of Entry: Brunswick
Transport

Special Messages:
* Bluetooth is a registered trademark of Bluetooth SIG, Inc. * Prepaid Maintenance Plan available for this vehicle, see dealer for details. * This vehicle is equipped with bumpers that can withstand an impact of 2.5 miles per hour with no damage to the vehicle's body and safety systems, although the bumper and related components may sustain damage. The bumper system on this vehicle conforms to the current federal bumper standard of 2.5 miles per hour.

102 Monroney Label

86 Seats and stowing

WARNING Risk of injury due to head restraints which are not installed or are adjusted incorrectly

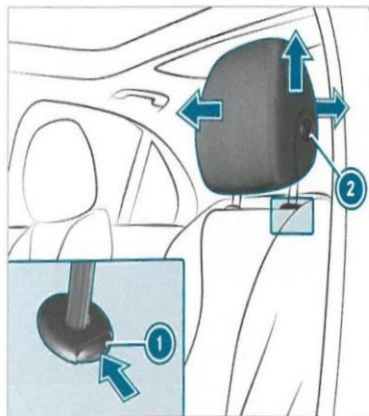
If head restraints are not installed or are adjusted incorrectly, the head restraints cannot provide protection as intended.

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.

Do not interchange the head restraints of the front and rear seats. Otherwise, you cannot adjust the height and angle of the head restraints correctly.

Adjust the head restraint fore-and-aft position so that it is as close as possible to the back of your head.



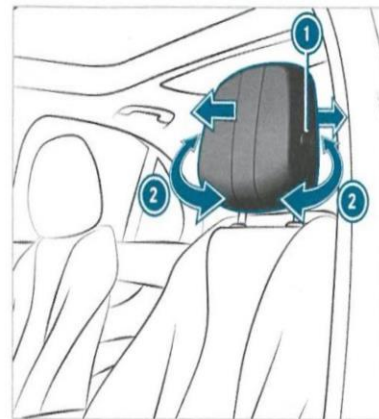
- ▶ **To raise:** pull the head restraint up.
- ▶ **To lower:** press release knob ① in the direction of the arrow and push the head restraint down.

Adjusting the gap between the head restraint and the back of your head:

- ▶ **To move forwards:** pull the head restraint forwards.

- ▶ **To move backwards:** press release knob ② and push the head restraint backwards.

Adjusting the front seat luxury head restraints



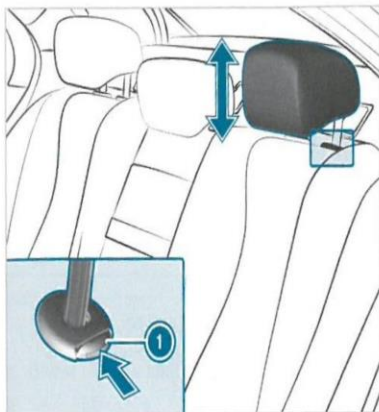
- ▶ **To adjust the side bolsters of the head restraint:** pull or push right or left-hand side bolster ②.

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

Adjusting the gap between the head restraint and the back of your head:

- ▶ **To move forwards:** pull the head restraint forwards.
- ▶ **To move backwards:** press release knob ❶ and push the head restraint backwards.

Adjusting the rear seat head restraints



- ▶ **To raise:** pull the head restraint up.
- ▶ **To lower:** press release knob ❶ in the direction of the arrow and push the head restraint down.

The head restraints can only be removed on vehicles with folding rear seat backrests.

- ▶ Release the rear seat backrest and fold it slightly forwards.
- ▶ **To remove:** pull the head restraint up to the stop.
- ▶ Push release knob ❶ in the direction of the arrow and pull out the head restraint.
- ▶ **To install:** insert the head restraint so that the notches on the bar are on the left when viewed in the direction of travel.
- ▶ Push the head restraint down until it engages.
- ▶ Fold the rear seat backrest back until it engages.

Configuring the seat adjustment

Multimedia system:

➔ Vehicle ➔ Seats

- ▶ Select Driver's Seat or Front Passenger.

Adjusting the backrest side bolsters

- ▶ Select Side Bolsters.
- ▶ Select the setting.

Adjusting the seat contour in the lumbar region of the seat backrest

- ▶ Select Lumbar.
- ▶ Adjust the air cushion.
- ▶ Save the settings with the memory function (→ page 93).

Adjusting the dynamic multicontour seat

Multimedia system:

➔ Vehicle ➔ Seats

The dynamic lateral cornering support can be adjusted using this function.

- ▶ Select Driver's Seat or Front Passenger.

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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-9
15	Passenger Head Acceleration (Y) Primary vs. Time	B-9
16	Passenger Head Acceleration (Z) Primary vs. Time	B-9
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-10
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-10
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-10
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-11
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-11
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-11

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

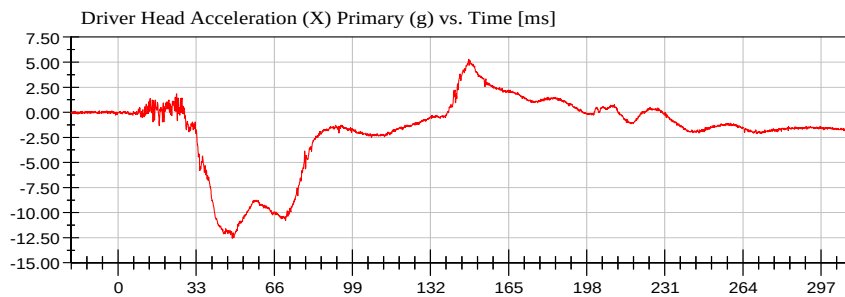
Test Lab: CTF

Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)



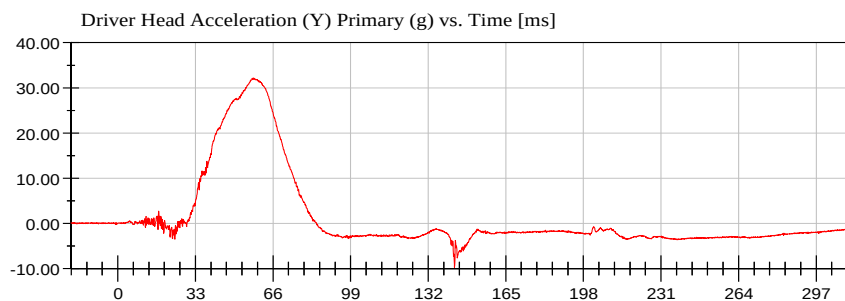
<Max>

5.30 g at 148.16 ms

<Min>

-12.56 g at 48.24 ms

CFC_1000



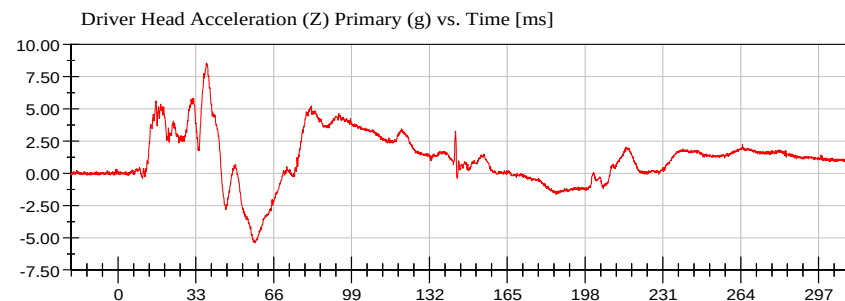
<Max>

32.20 g at 57.60 ms

<Min>

-9.77 g at 143.20 ms

CFC_1000



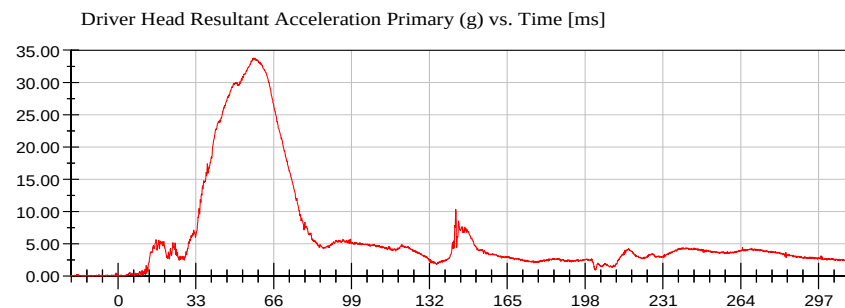
<Max>

8.56 g at 37.44 ms

<Min>

-5.36 g at 57.68 ms

CFC_1000



<Max>

33.82 g at 57.60 ms

<Min>

0.02 g at -17.92 ms

CFC_1000



NHTSA

Test Lab: CTF

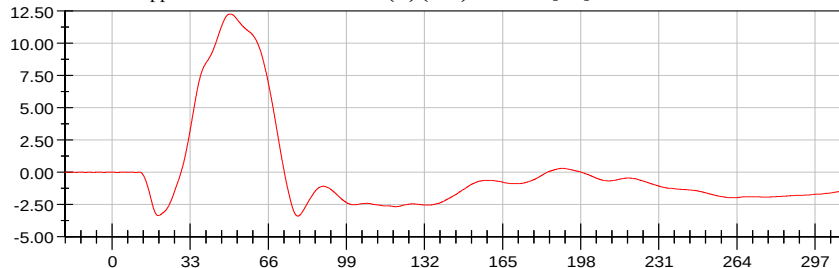
Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

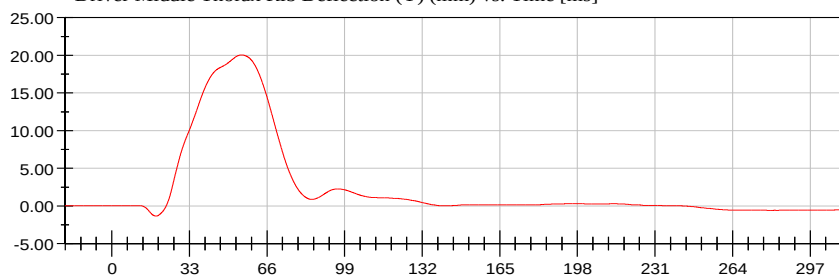
12.27 mm at 49.84 ms

<Min>

-3.39 mm at 78.48 ms

CFC_180

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



<Max>

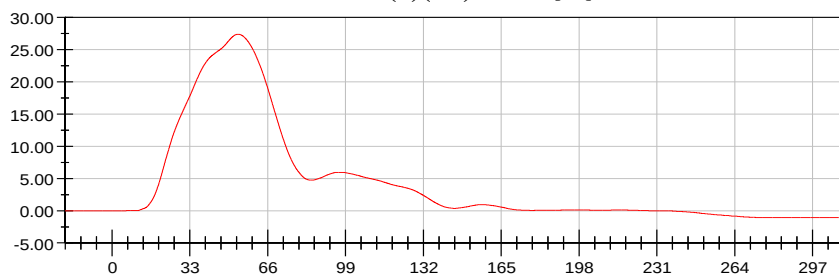
20.04 mm at 55.20 ms

<Min>

-1.37 mm at 18.80 ms

CFC_180

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



<Max>

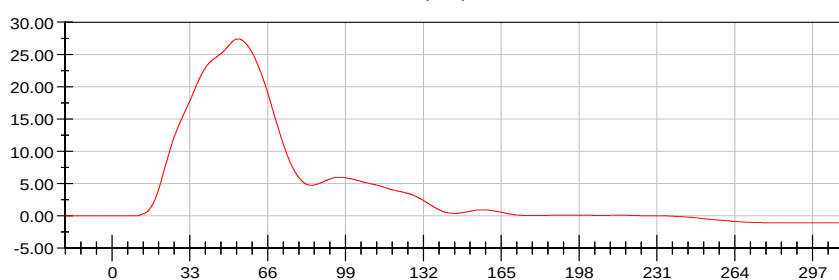
27.40 mm at 53.52 ms

<Min>

-1.06 mm at 300.48 ms

CFC_180

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



<Max>

27.40 mm at 53.52 ms

<Min>

-1.06 mm at 300.48 ms

CFC_180



NHTSA

Test Lab: CTF

Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

163.49 N at 32.08 ms

<Min>

-26.31 N at 12.64 ms

CFC_600

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



<Max>

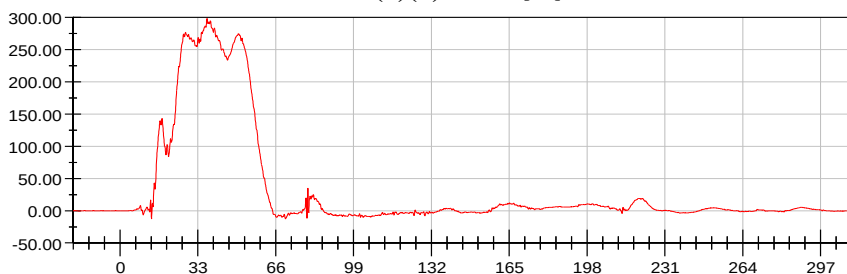
248.67 N at 27.12 ms

<Min>

-31.24 N at 12.32 ms

CFC_600

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



<Max>

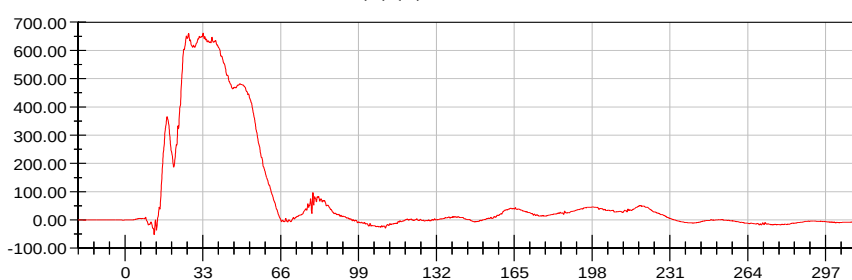
298.55 N at 36.88 ms

<Min>

-12.54 N at 70.16 ms

CFC_600

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



<Max>

661.35 N at 33.12 ms

<Min>

-51.41 N at 12.40 ms

CFC_600



NHTSA

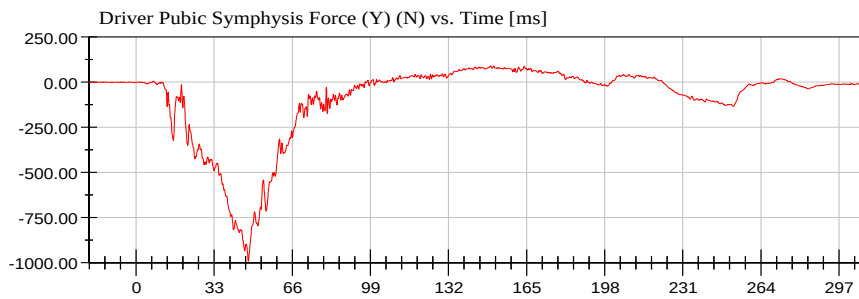
Test Lab: CTF

Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)



<Max>

90.17 N at 151.12 ms

<Min>

-991.79 N at 47.44 ms

CFC_600



NHTSA

Test Lab: CTF

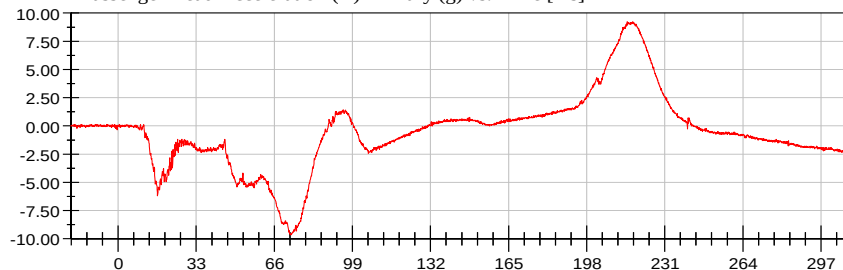
Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

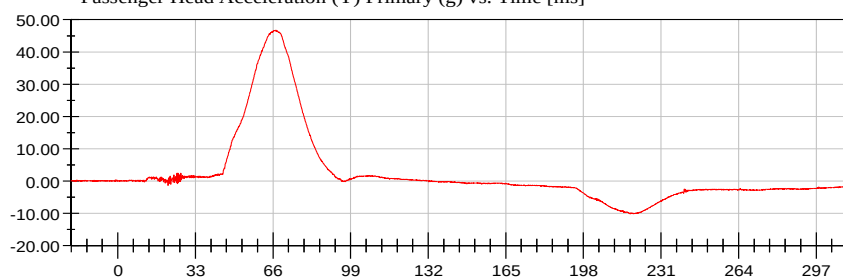
9.23 g at 215.12 ms

<Min>

-9.65 g at 72.80 ms

CFC_1000

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



<Max>

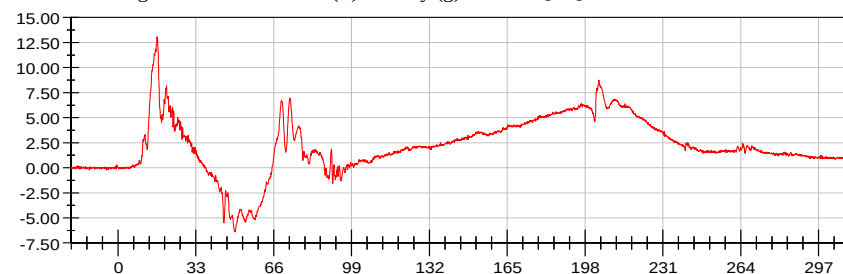
46.81 g at 67.20 ms

<Min>

-10.19 g at 217.84 ms

CFC_1000

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



<Max>

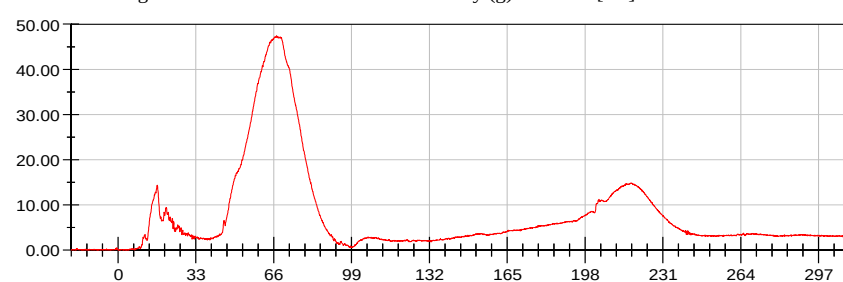
13.07 g at 16.56 ms

<Min>

-6.40 g at 49.52 ms

CFC_1000

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



<Max>

47.44 g at 67.20 ms

<Min>

0.03 g at -19.76 ms

CFC_1000



NHTSA

Test Lab: CTF

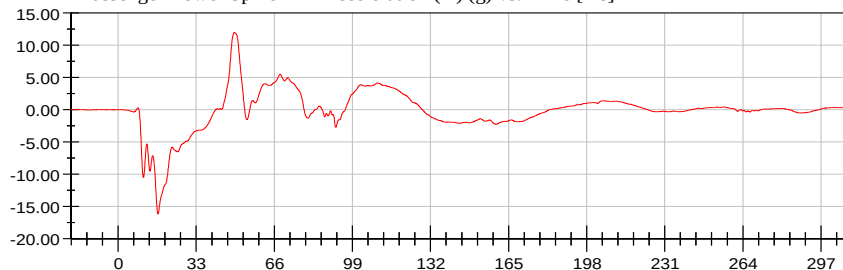
Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

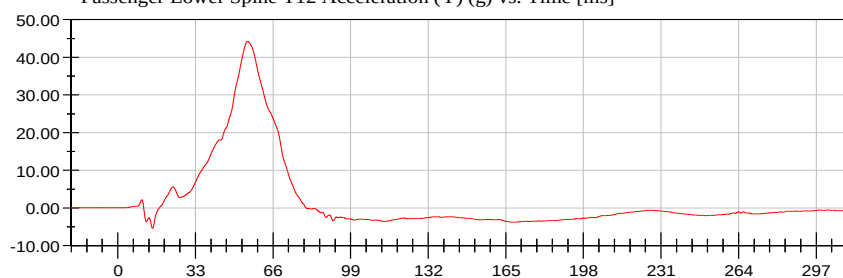
11.98 g at 49.12 ms

<Min>

-16.15 g at 16.88 ms

CFC_180

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



<Max>

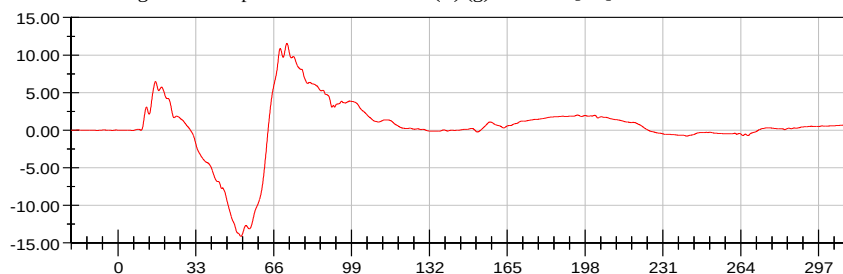
44.23 g at 55.20 ms

<Min>

-5.45 g at 14.72 ms

CFC_180

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



<Max>

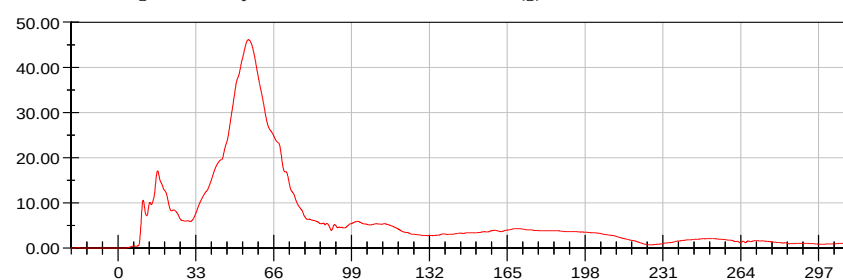
11.56 g at 71.60 ms

<Min>

-14.14 g at 52.16 ms

CFC_180

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



<Max>

46.11 g at 55.28 ms

<Min>

0.00 g at -13.60 ms

CFC_180



NHTSA

Test Lab: CTF

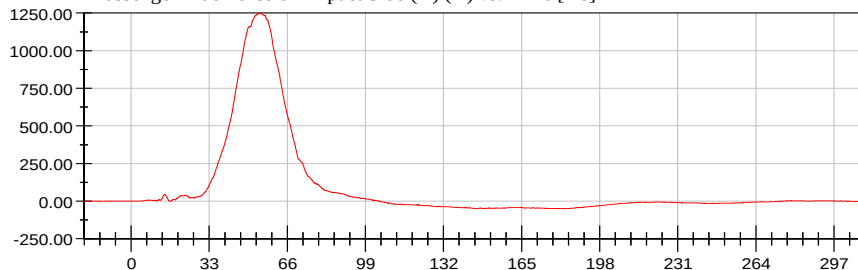
Test Number: 161207 (M20174302)

Test Date: 12/07/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

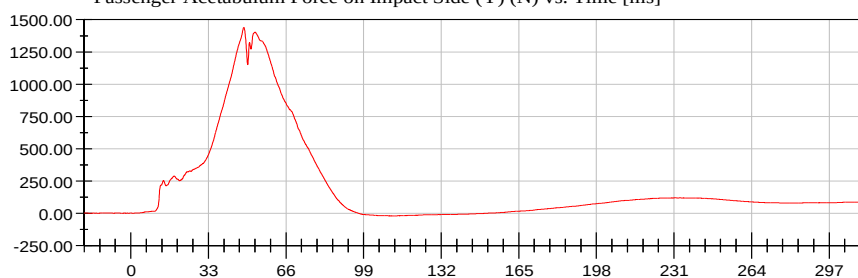
1,248.26 N at 54.80 ms

<Min>

-50.15 N at 183.60 ms

CFC_600

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



<Max>

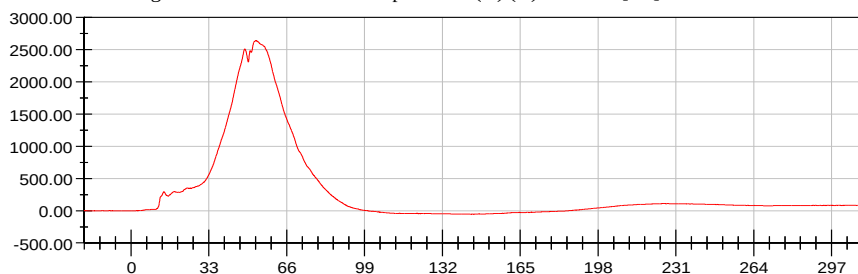
1,440.12 N at 48.08 ms

<Min>

-21.23 N at 112.80 ms

CFC_600

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



<Max>

2,640.80 N at 53.04 ms

<Min>

-54.39 N at 145.20 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

Head (X) Acceleration (G's) vs. Time (ms)
Head (Y) Acceleration (G's) vs. Time (ms)
Head (Z) Acceleration (G's) vs. Time (ms)
Resultant Head 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)
Front Abdomen Force (kN) vs. Time (ms)
Middle Abdomen Force (kN) vs. Time (ms)
Rear Abdomen Force (kN) vs. Time (ms)
Total 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

- Head (X) Acceleration (G's) vs. Time (ms)
- Head (Y) Acceleration (G's) vs. Time (ms)
- Head (Z) Acceleration (G's) vs. Time (ms)
- Resultant Head 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. 43

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	559	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	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	326	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	263	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	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 43-3

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Resultant Acceleration	125 - 155 g	139.4 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.5 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.18.2016 10:12:15 362

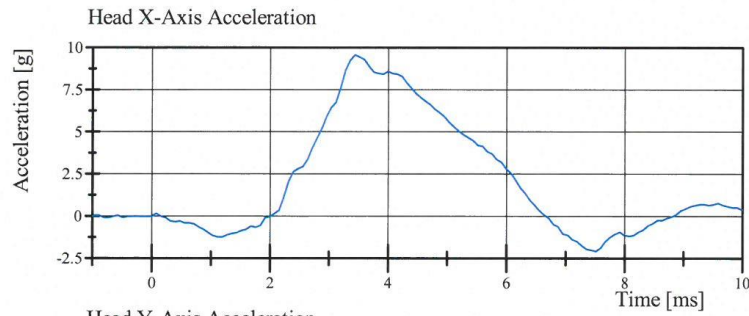


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 43-3

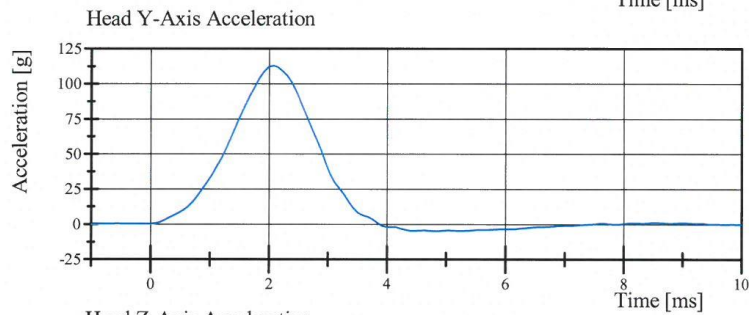
Test Date: 11/18/2016



Filter Class: CFC_1000

Max: 9.5 g at 3.4 ms

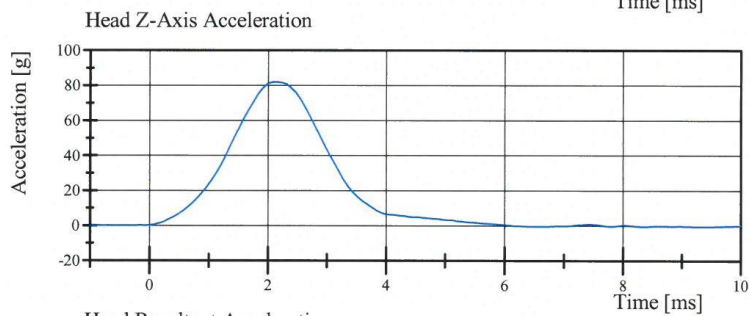
Min: -2.1 g at 7.5 ms



Filter Class: CFC_1000

Max: 112.8 g at 2.1 ms

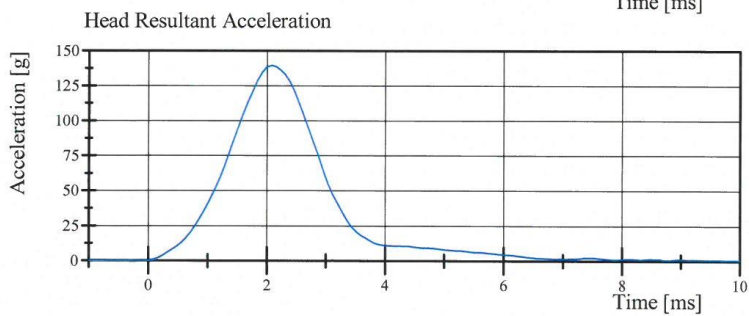
Min: -5.1 g at 4.8 ms



Filter Class: CFC_1000

Max: 81.9 g at 2.1 ms

Min: -0.4 g at 6.6 ms



Filter Class: CFC_1000

Max: 139.4 g at 2.1 ms

Min: 0.0 g at -0.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.18.2016 10:12:27 362



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	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	-55.9 deg	Yes
Time of Peak	54 - 66 ms	56.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	67.4 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:21:12 1493

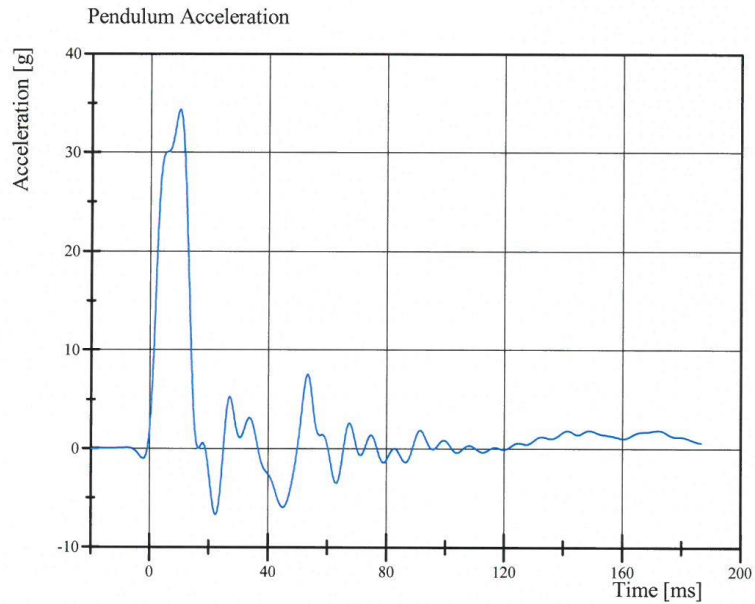


Transportation Research Center Inc.

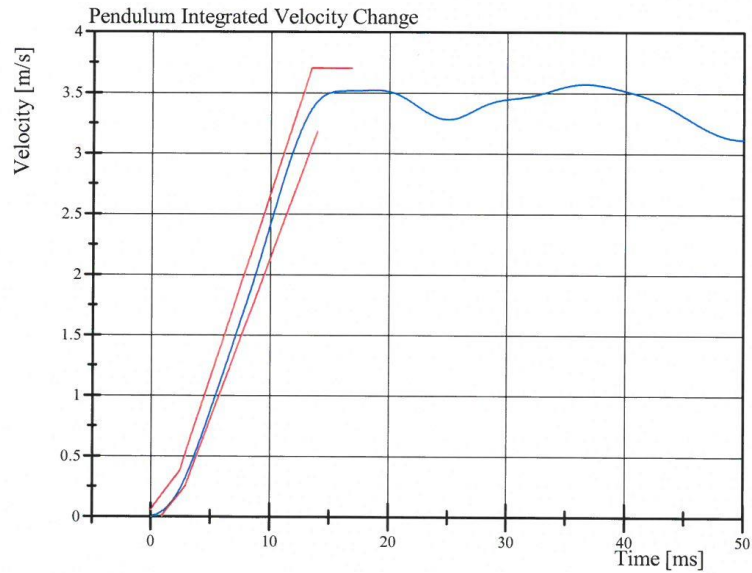
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Filter Class: CFC_60
Max: 34.3 g at 10.1 ms
Min: -6.8 g at 22.4 ms



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

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:21:22 1493

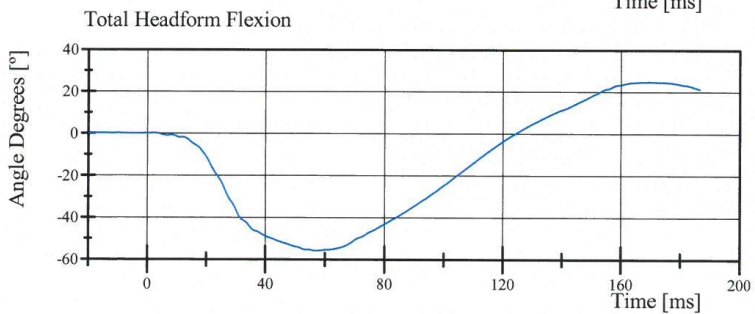
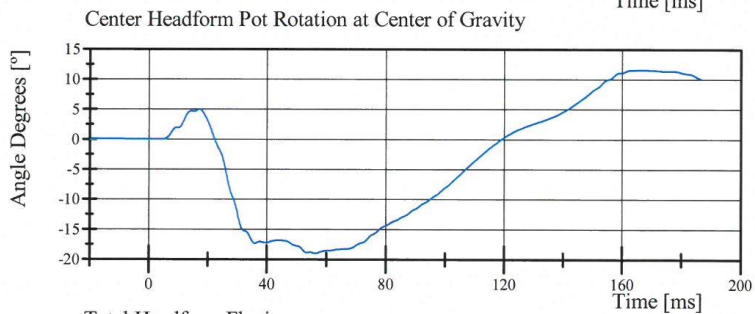
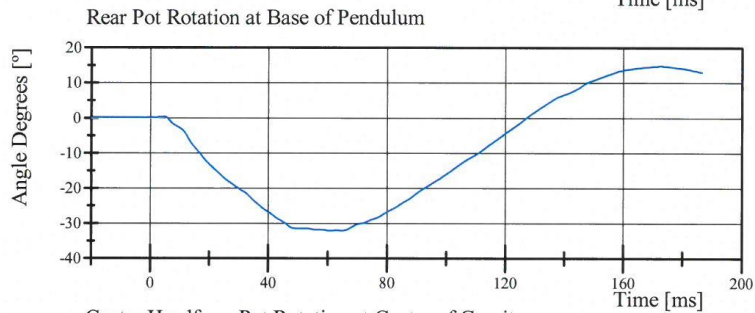
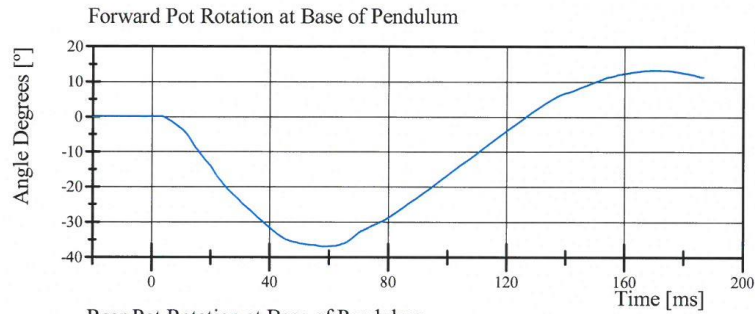


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:21:23 1493



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.79 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:22:38 541

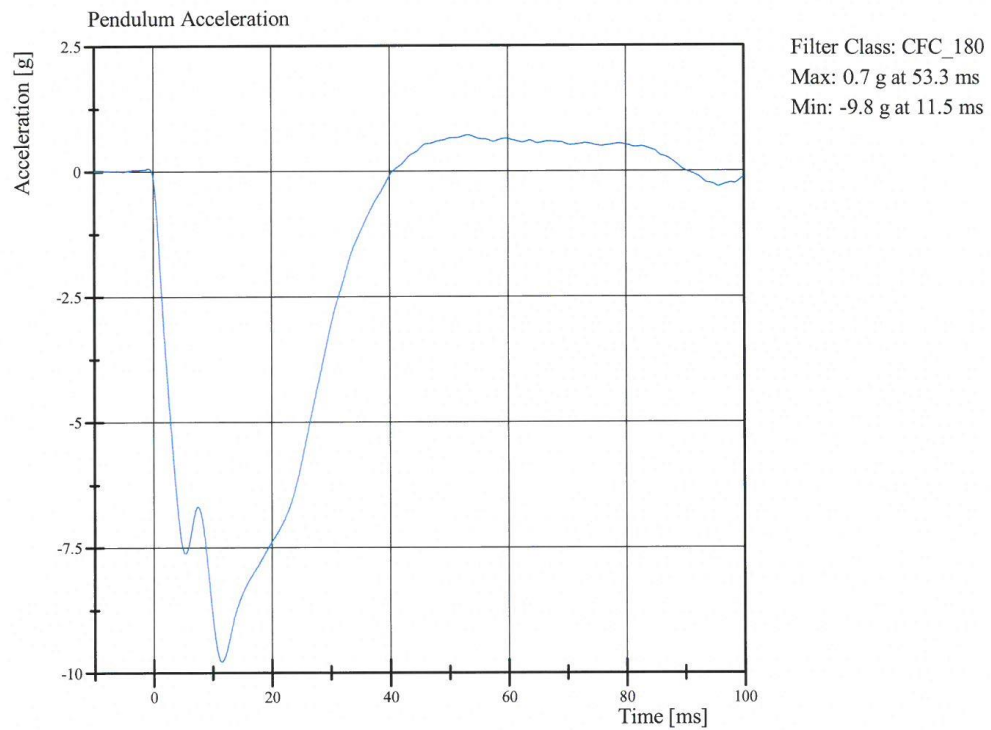


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:23:14 541



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

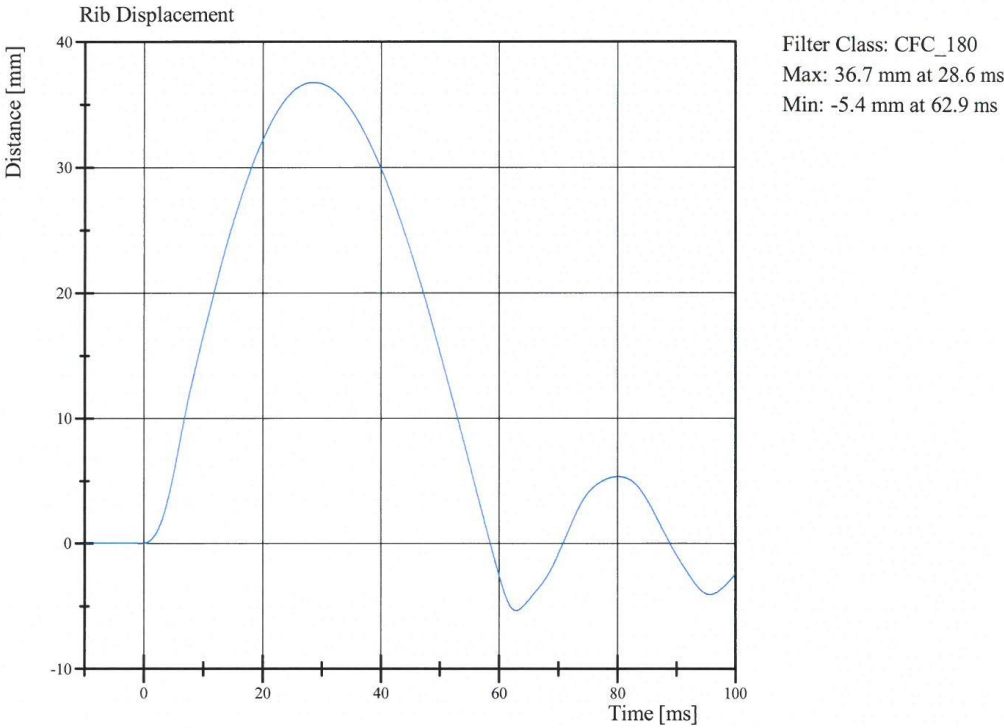
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:45:10 869



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:45:23 869



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module

ES-2re Serial No. F030 Certification No. 43-2

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

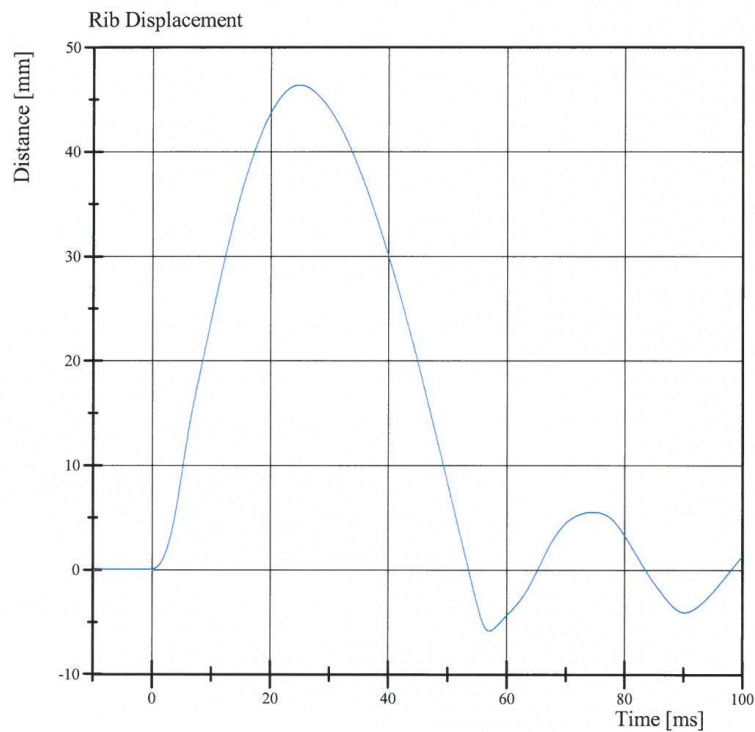
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:35:45 699



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 43-2
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 46.3 mm at 25.0 ms
Min: -5.9 mm at 57.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:36:27 699



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

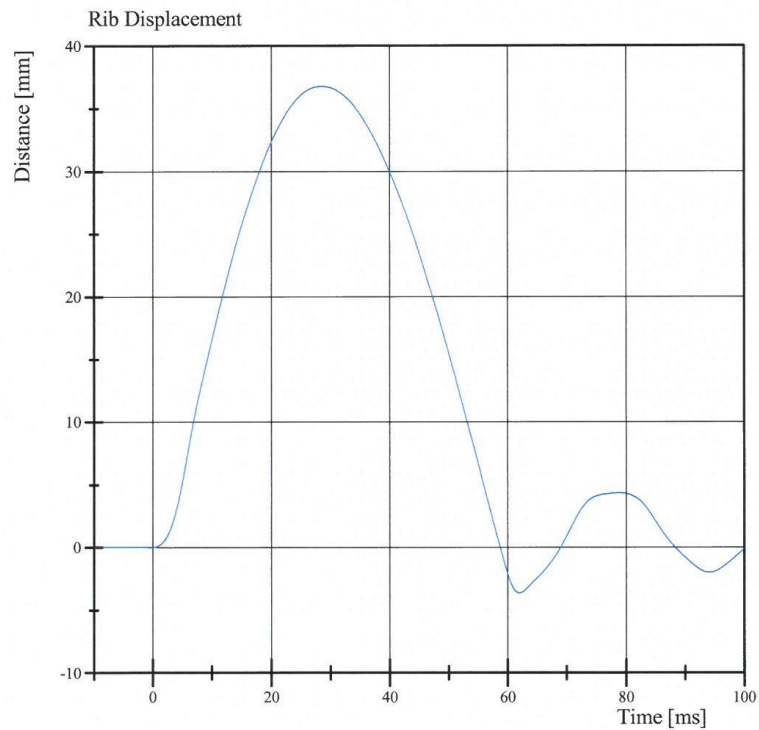
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:57:16 890



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 36.8 mm at 28.5 ms
Min: -3.6 mm at 62.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:57:23 890



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.2 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

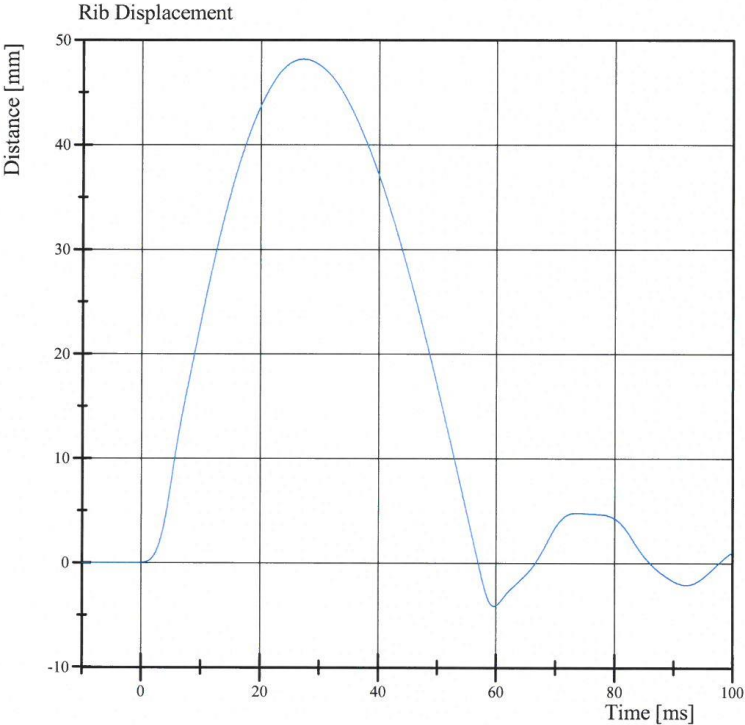
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:51:44 702



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 48.2 mm at 27.2 ms
Min: -4.1 mm at 59.7 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:51:53 702



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

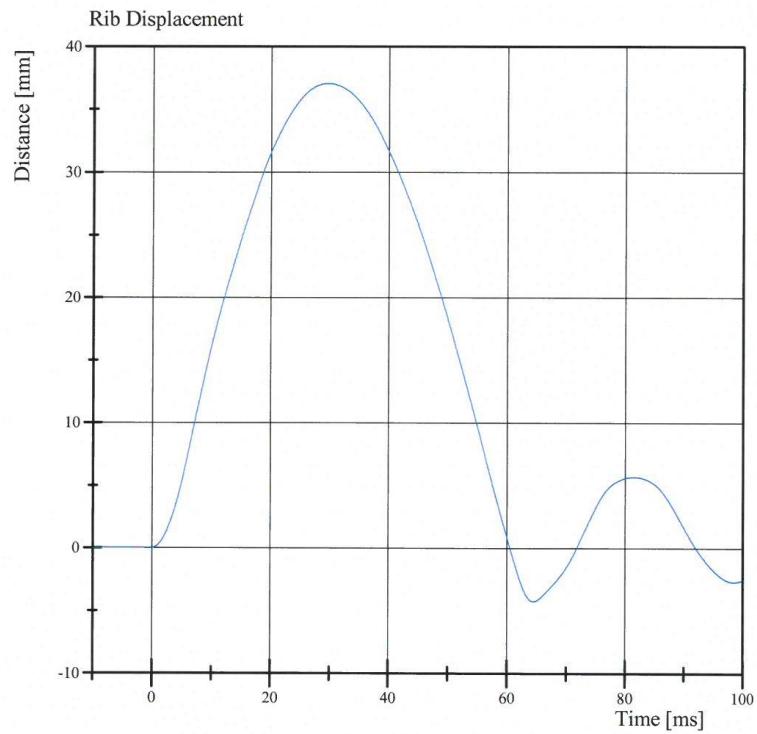
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:11:03 866



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 37.0 mm at 29.6 ms
Min: -4.2 mm at 64.5 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:11:14 866



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	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

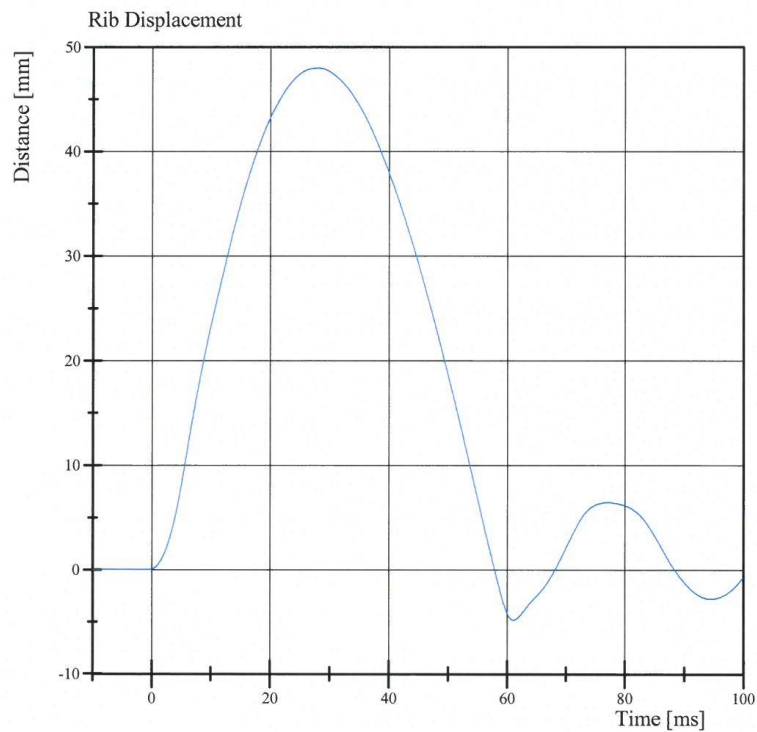
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:03:17 697



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 48.0 mm at 28.0 ms
Min: -4.8 mm at 61.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:03:29 697



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.547 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,172.6 N	Yes
Upper Rib Displacement	34 - 41 mm	37.7 mm	Yes
Center Rib Displacement	37 - 45 mm	42.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.9 mm	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:29:07 445

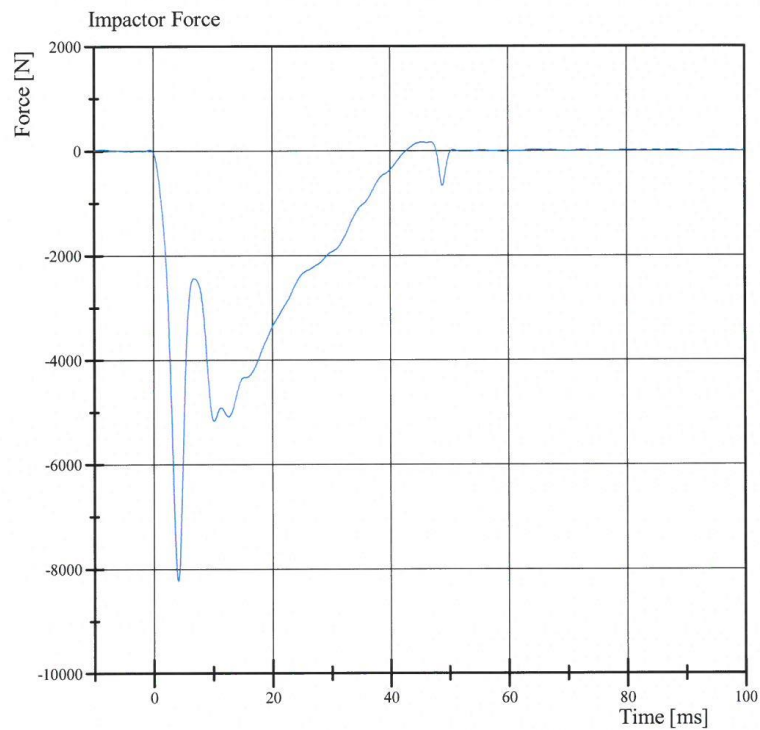


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Filter Class: CFC_180
Max: 164.2 N at 46.9 ms
Min: -8,241.4 N at 4.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:29:53 445

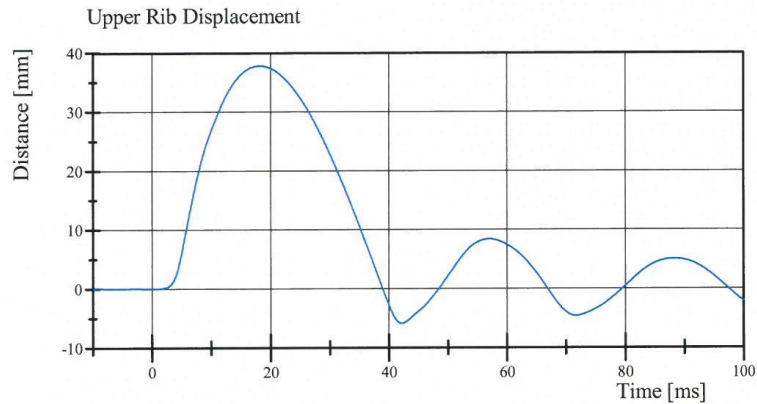


Transportation Research Center Inc.

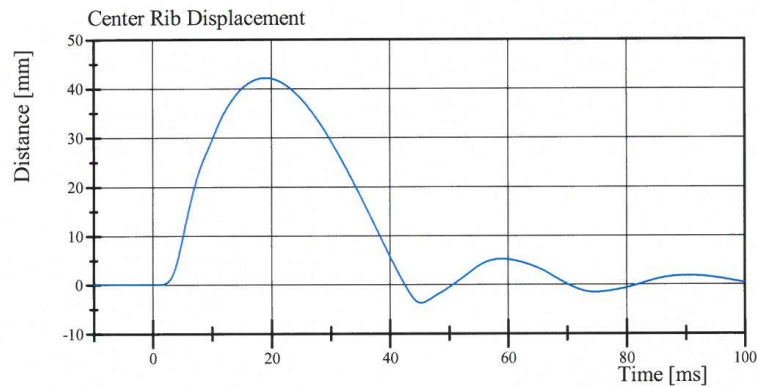
Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 43-1

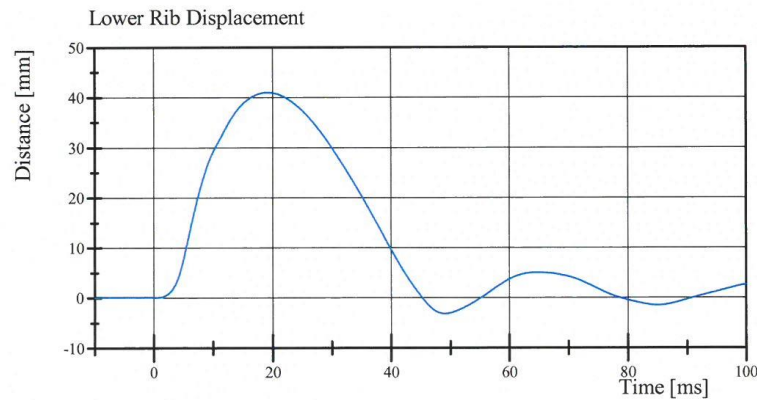
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 37.7 mm at 18.2 ms
Min: -5.9 mm at 42.2 ms



Filter Class: CFC_180
Max: 42.1 mm at 19.0 ms
Min: -3.8 mm at 45.2 ms



Filter Class: CFC_180
Max: 40.9 mm at 19.2 ms
Min: -3.2 mm at 49.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:29:54 445



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,006.9 N	Yes
Time of Peak	10.6 - 13.0 ms	12.16 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,418.1 N	Yes
Time of Peak	10.0 - 12.3 ms	10.64 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:36:22 576

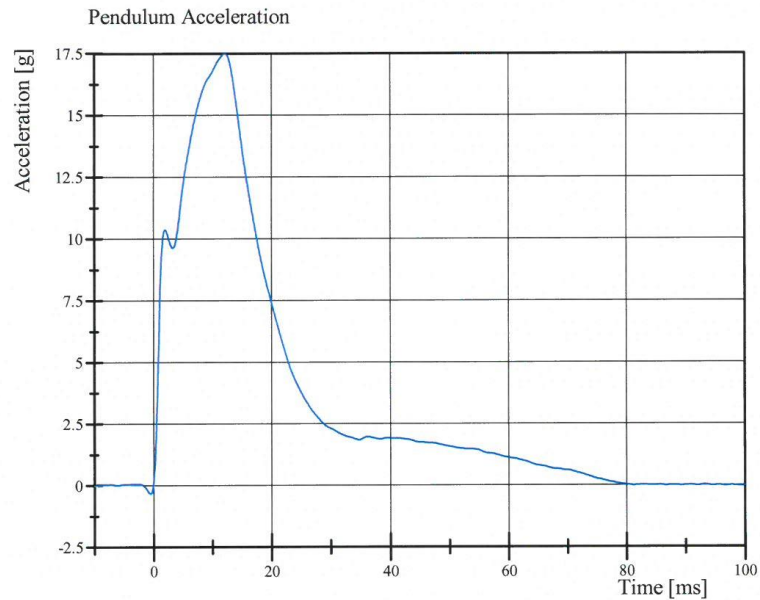


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 43-1

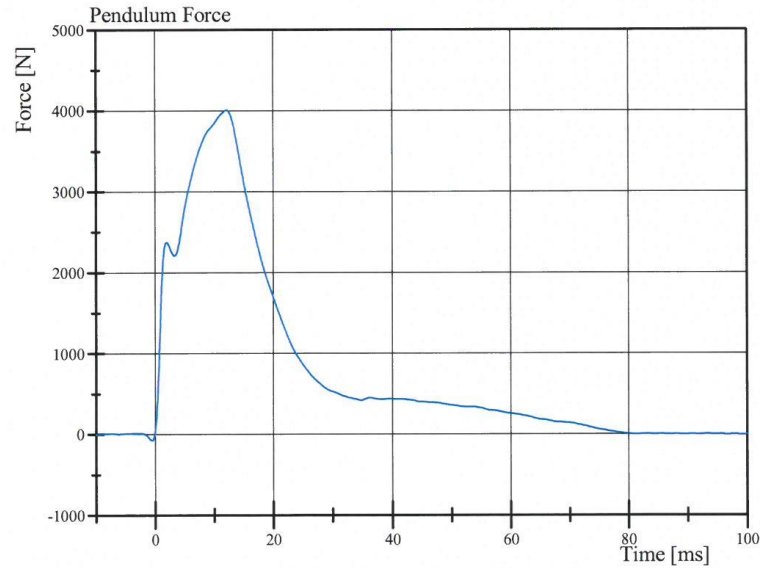
Test Date: 11/17/2016



Filter Class: CFC_180

Max: 17.5 g at 12.2 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,006.9 N at 12.2 ms

Min: -81.5 N at -0.5 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:36:52 576

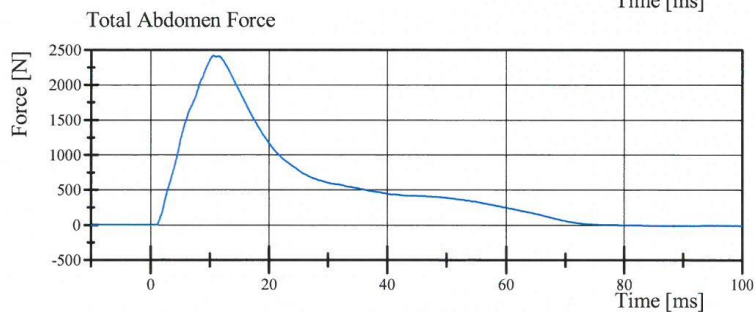
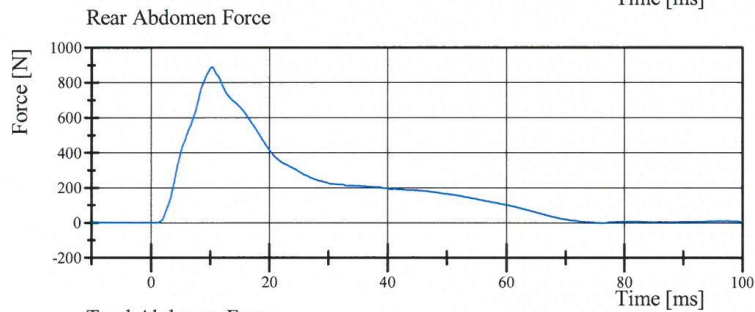
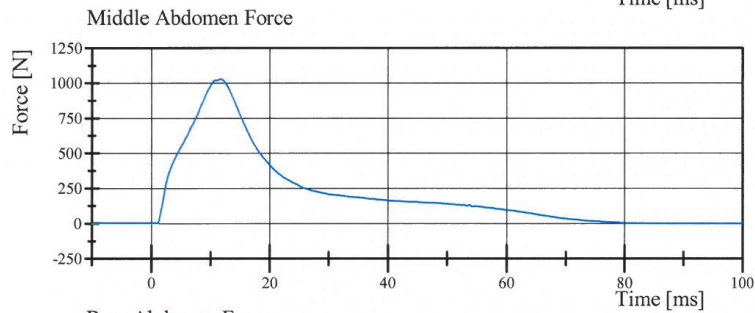
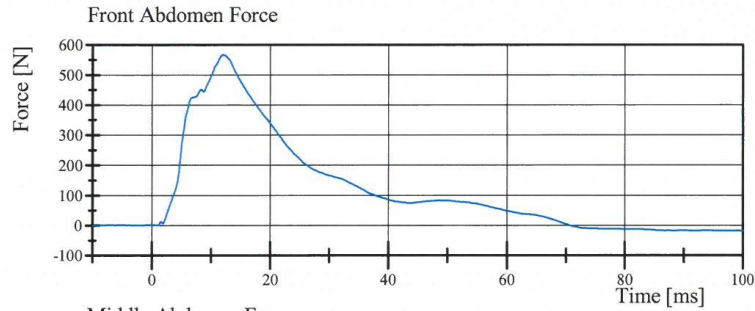


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:36:52 576



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.105 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-52.7 deg	Yes
Time of Peak	39 - 53 ms	44.7 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	38.7 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:32:09 669

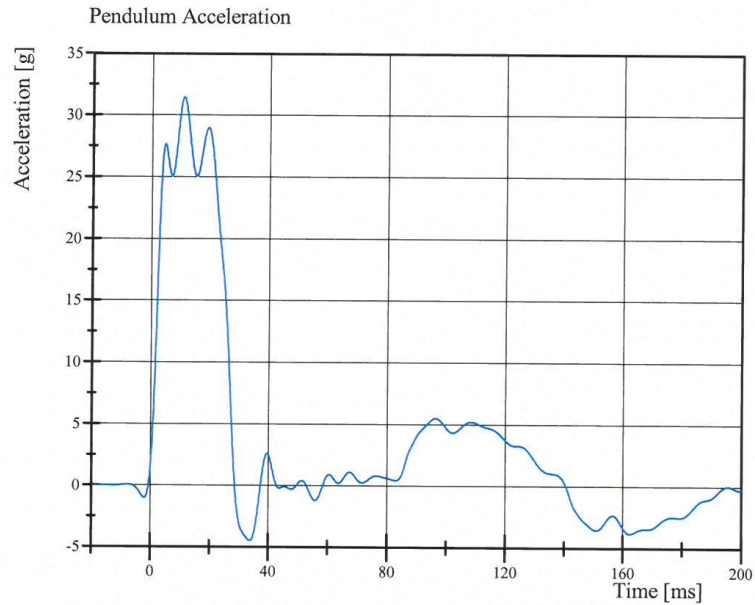


Transportation Research Center Inc.

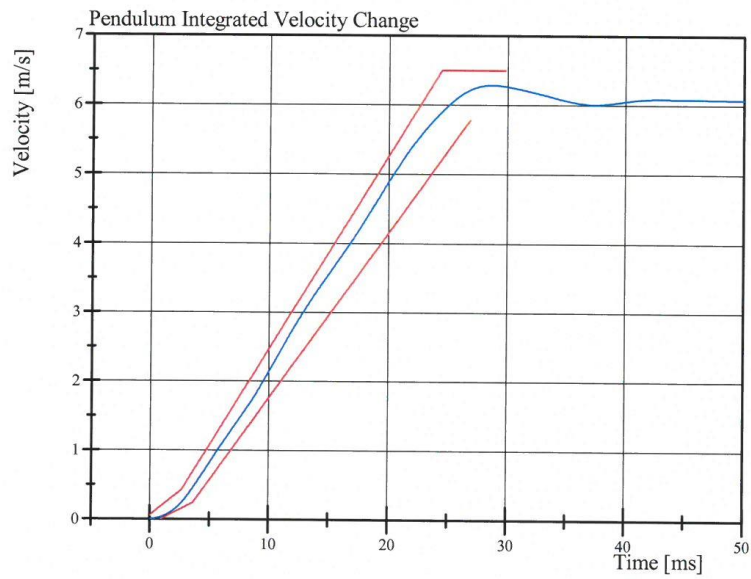
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Filter Class: CFC_60
Max: 31.4 g at 10.9 ms
Min: -4.5 g at 33.8 ms



Filter Class: CFC_60
Max: 6.3 m/s at 28.6 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:32:24 669

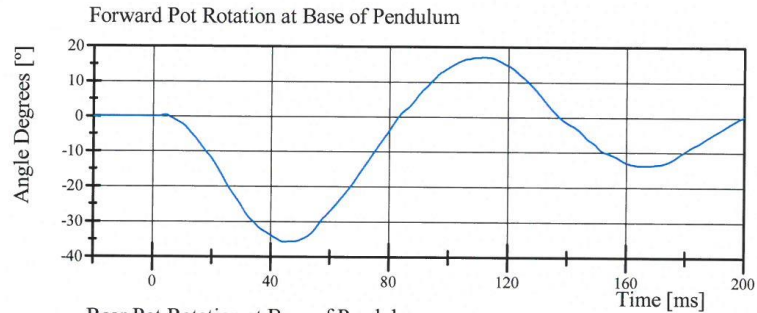


Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 43-1

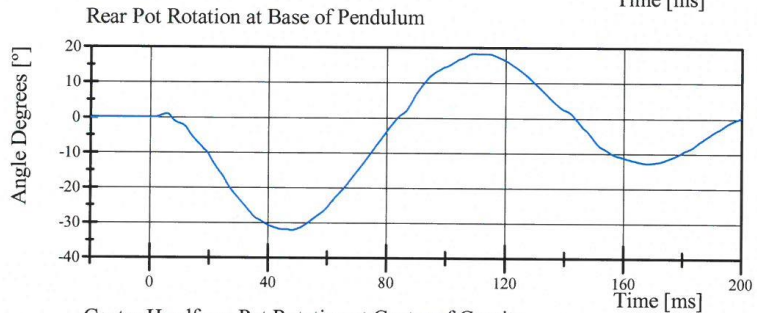
Test Date: 11/17/2016



Filter Class: CFC_180

Max: 17.0 ° at 111.9 ms

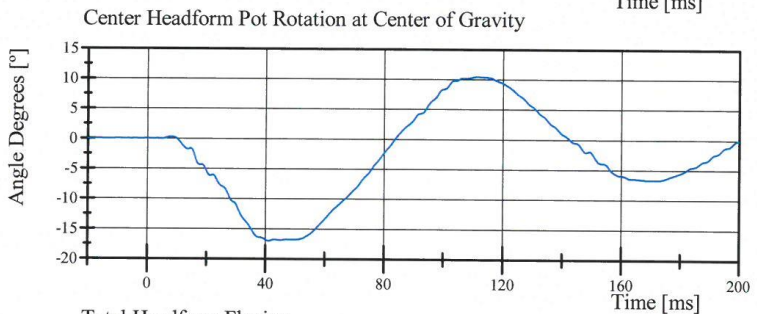
Min: -35.8 ° at 44.6 ms



Filter Class: CFC_180

Max: 18.3 ° at 109.4 ms

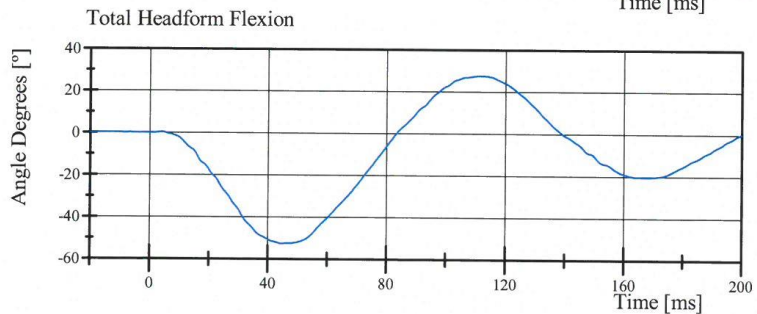
Min: -32.1 ° at 48.2 ms



Filter Class: CFC_180

Max: 10.5 ° at 111.4 ms

Min: -17.0 ° at 41.1 ms



Filter Class: CFC_180

Max: 27.5 ° at 111.6 ms

Min: -52.7 ° at 44.7 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:32:25 669



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,166.1 N	Yes
Time of Peak	11.8 - 16.1 ms	13.44 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,262.0 N	Yes
Time of Peak	12.2 - 17.0 ms	13.12 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:41:15 557

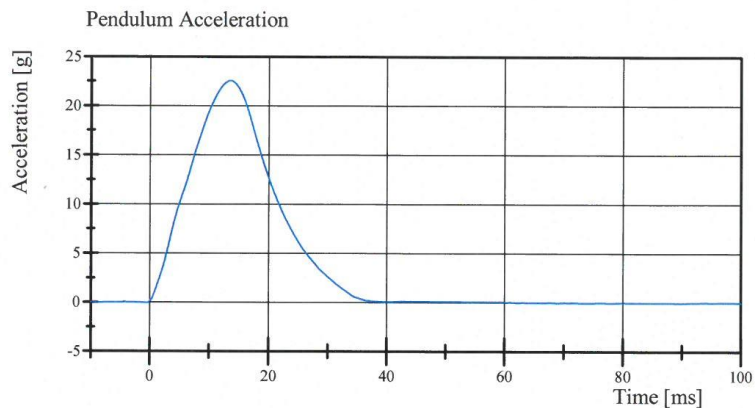


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 43-1

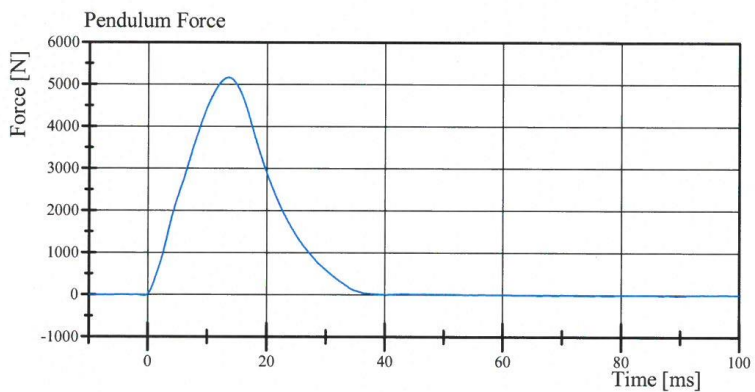
Test Date: 11/17/2016



Filter Class: CFC_180

Max: 22.5 g at 13.4 ms

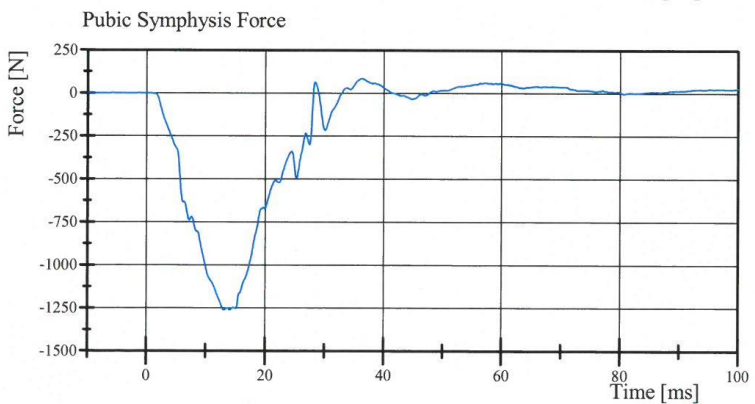
Min: -0.1 g at 89.4 ms



Filter Class: CFC_180

Max: 5,166.1 N at 13.4 ms

Min: -15.3 N at 89.4 ms



Filter Class: CFC_600

Max: 85.1 N at 36.2 ms

Min: -1,262.0 N at 13.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 15:41:44 557



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 44

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	559	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	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	326	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	263	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	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes



Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 44-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Resultant Acceleration	125 - 155 g	137.9 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	11.8 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 10:40:22 363

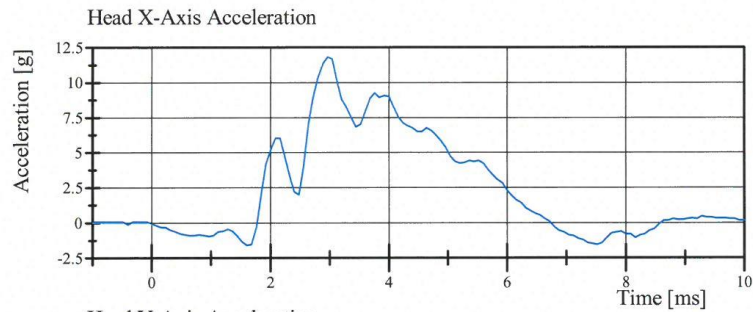


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 44-1

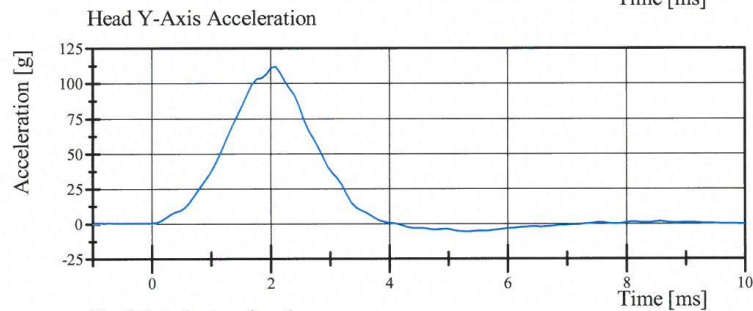
Test Date: 12/8/2016



Filter Class: CFC_1000

Max: 11.8 g at 3.0 ms

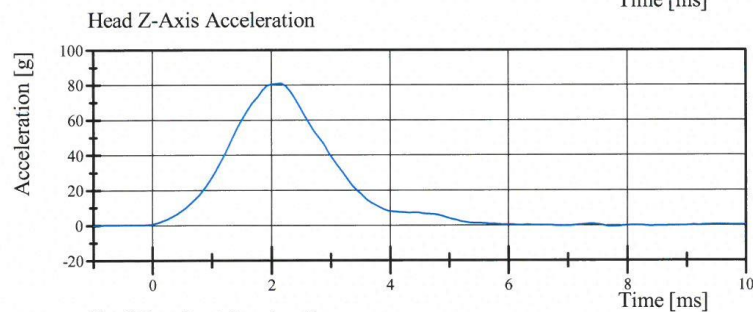
Min: -1.6 g at 1.6 ms



Filter Class: CFC_1000

Max: 111.8 g at 2.1 ms

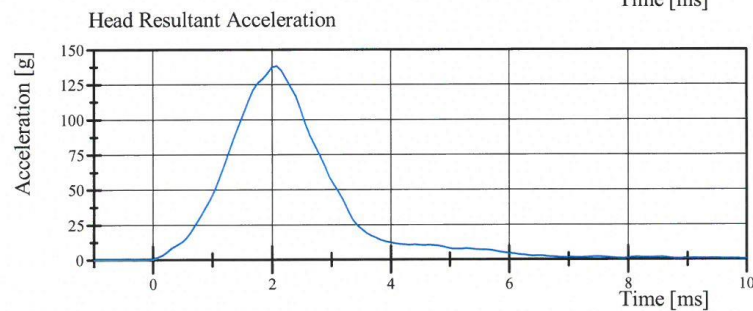
Min: -5.9 g at 5.3 ms



Filter Class: CFC_1000

Max: 81.0 g at 2.2 ms

Min: -0.6 g at 7.8 ms



Filter Class: CFC_1000

Max: 137.9 g at 2.1 ms

Min: 0.0 g at -1.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 10:40:32 363



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 44-2

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	18 %	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	-51.7 deg	Yes
Time of Peak	54 - 66 ms	55.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	70.3 ms	Yes

Test meets specifications.

Comments:

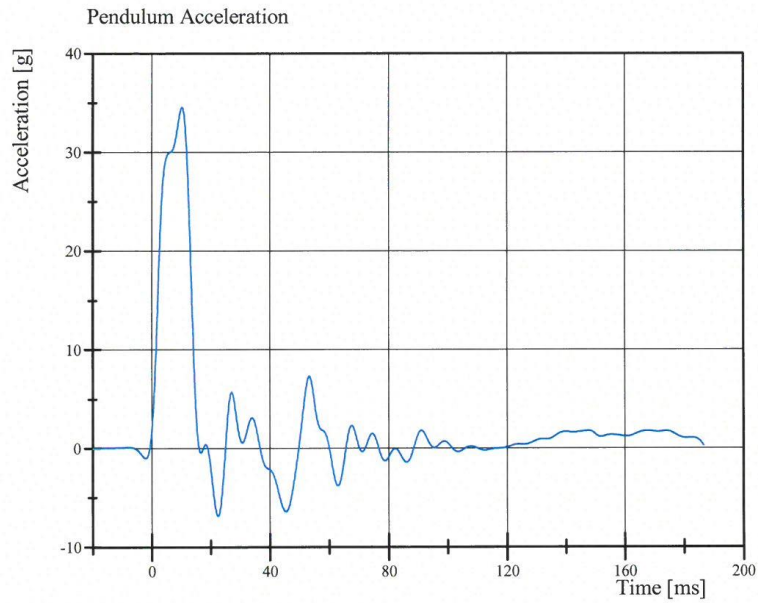
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 15:37:45 1494

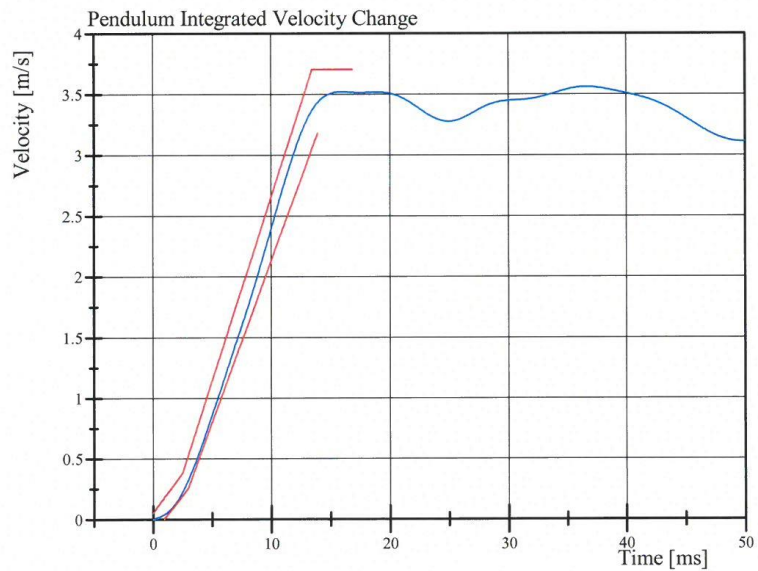


Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 44-2
Test Date: 12/8/2016



Filter Class: CFC_60
Max: 34.5 g at 10.2 ms
Min: -6.9 g at 22.4 ms



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

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 15:38:28 1494

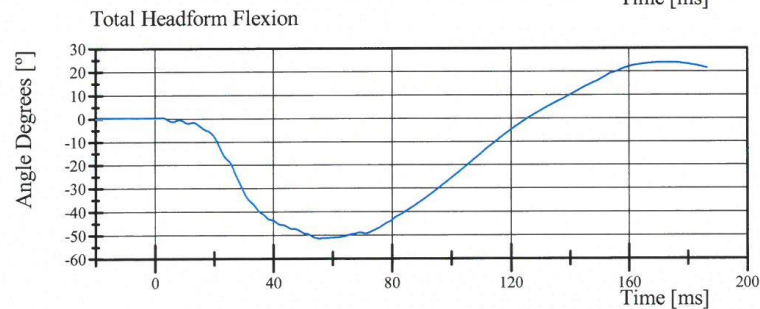
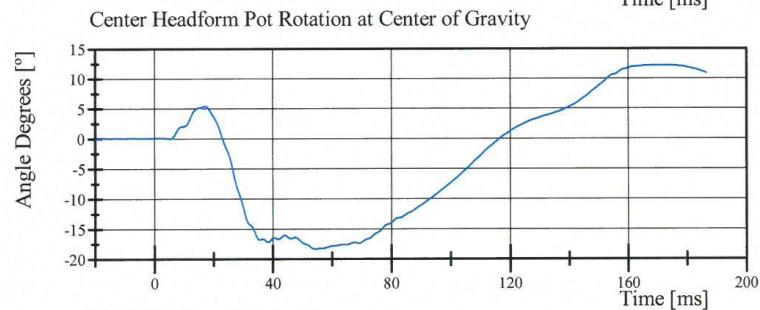
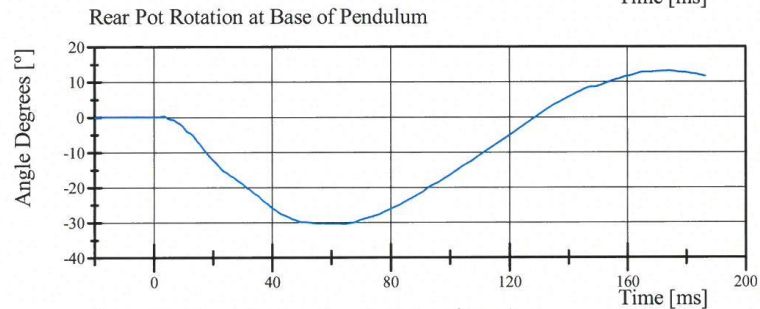
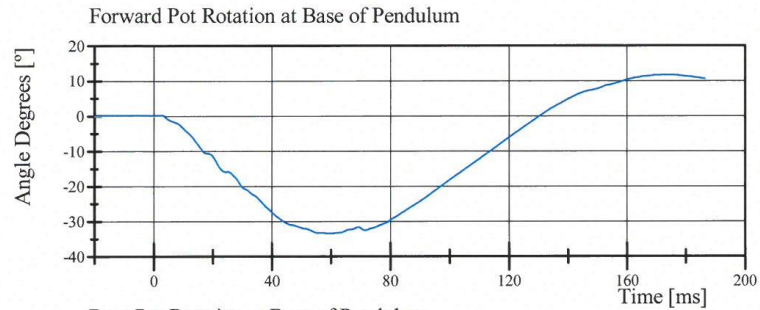


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 44-2

Test Date: 12/8/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 15:38:28 1494



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 44-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.49 g	Yes

Test meets specifications.

Comments:

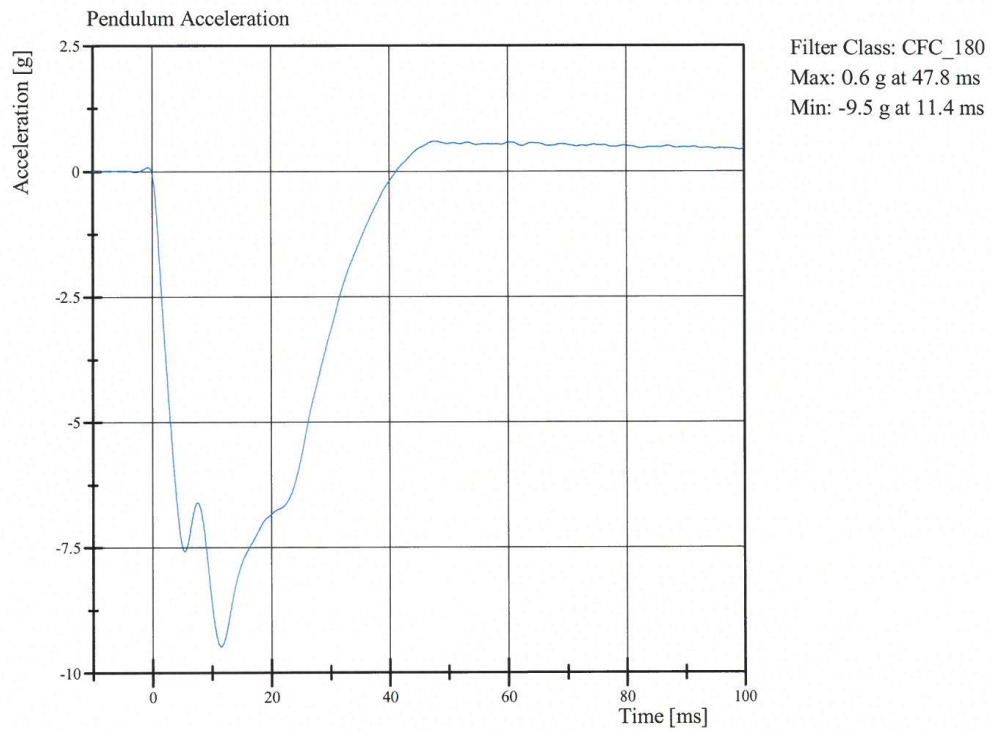
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:05:34 566



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:05:42 566



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

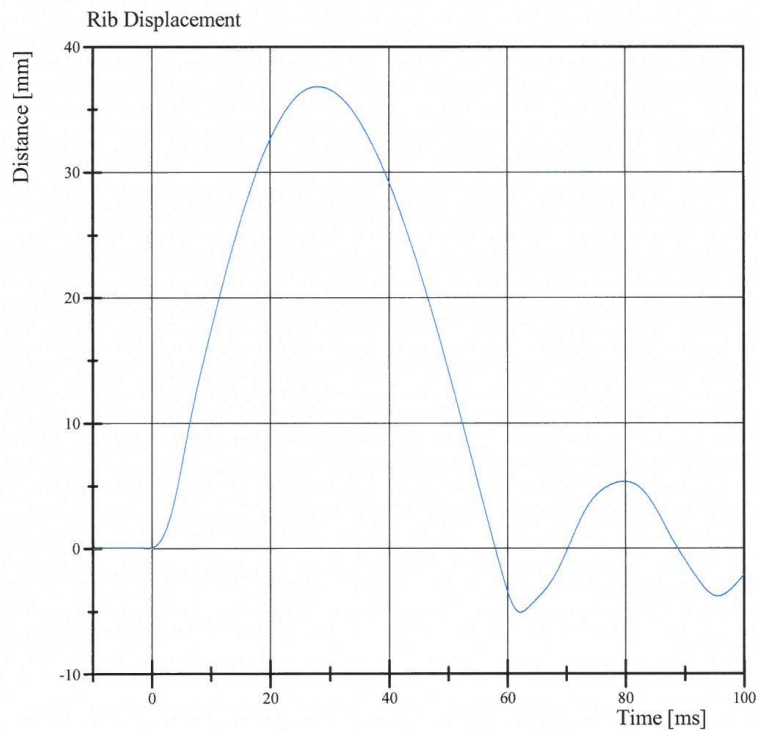
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 08:52:10 880



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 36.8 mm at 28.0 ms
Min: -5.1 mm at 62.2 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 08:52:27 880



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

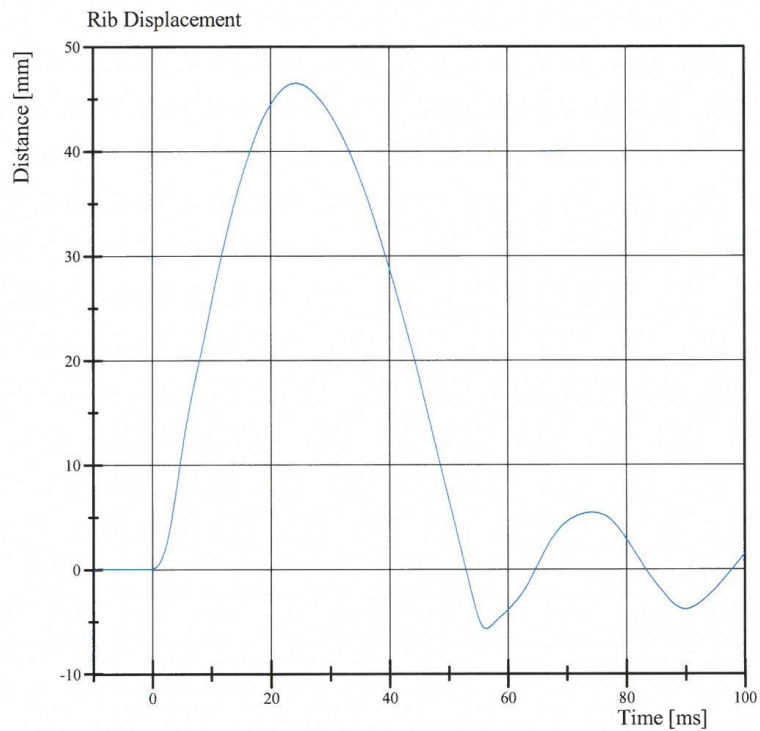
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 08:44:57 716



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 46.5 mm at 24.2 ms
Min: -5.7 mm at 56.2 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 08:45:13 716



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

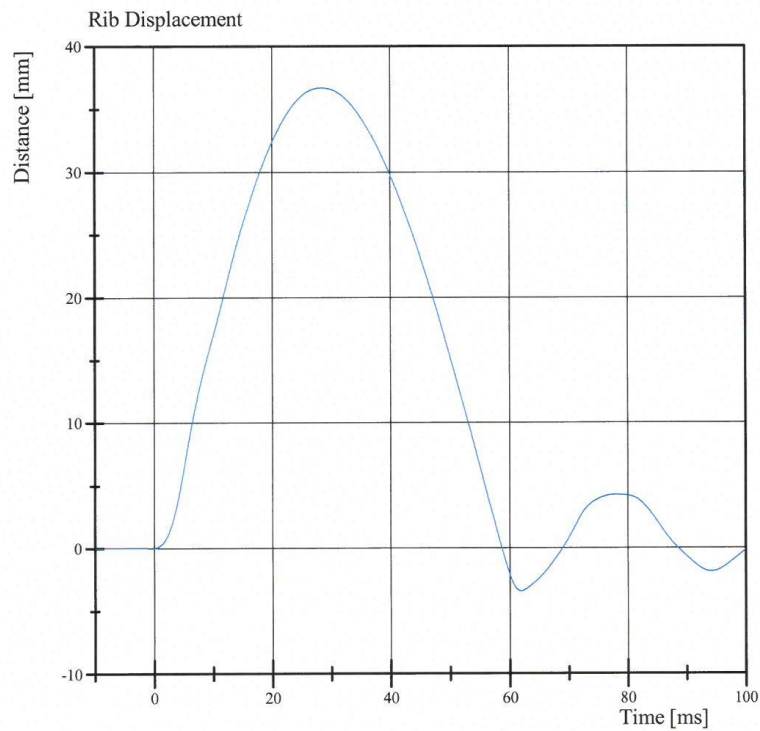
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 09:07:21 888



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 36.7 mm at 28.4 ms
Min: -3.4 mm at 61.8 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 09:07:43 888



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

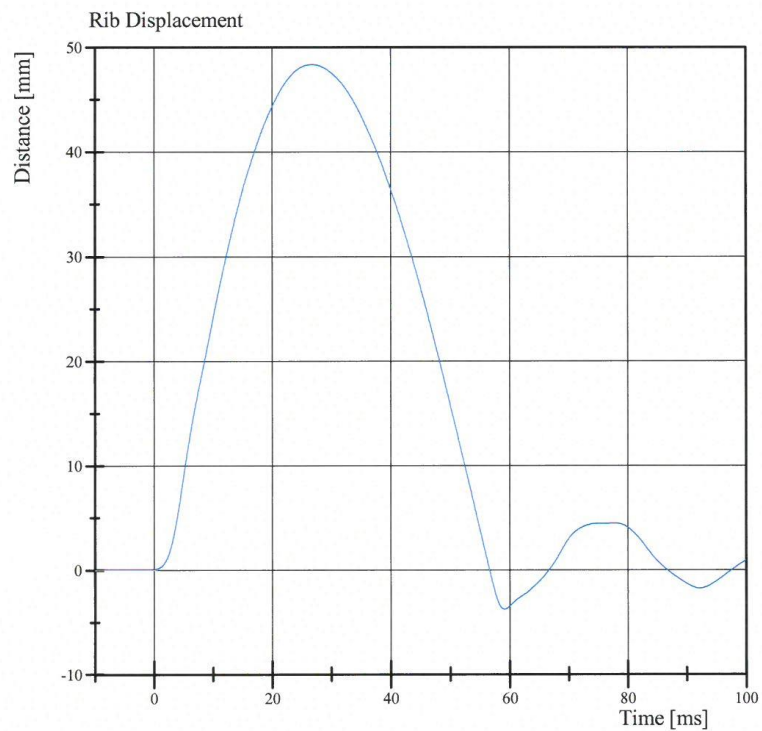
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 08:58:26 705



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 48.3 mm at 26.7 ms
Min: -3.8 mm at 59.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 08:58:37 705



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

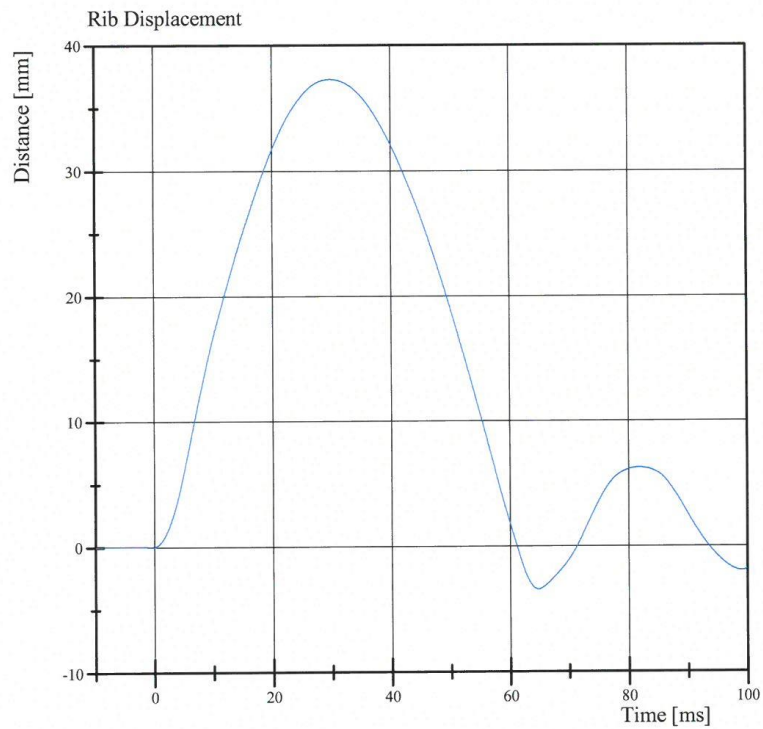
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 09:23:37 847



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 37.3 mm at 29.8 ms
Min: -3.4 mm at 64.7 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 09:24:32 847



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 44-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

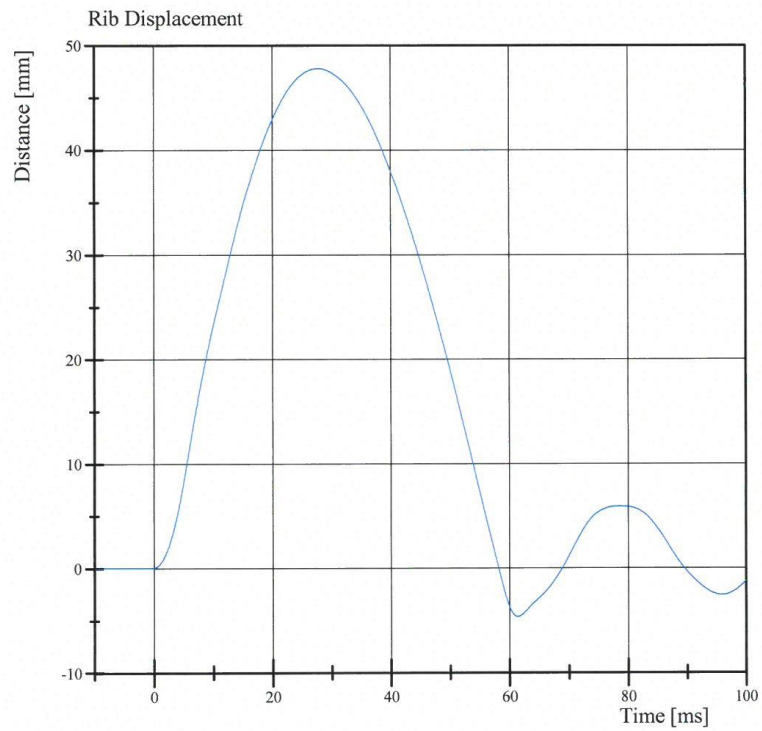
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 09:17:06 691



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 47.8 mm at 27.7 ms
Min: -4.7 mm at 61.4 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 09:17:20 691



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.536 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,178.1 N	Yes
Upper Rib Displacement	34 - 41 mm	36.3 mm	Yes
Center Rib Displacement	37 - 45 mm	41.7 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.0 mm	Yes

Test meets specifications.

Comments:

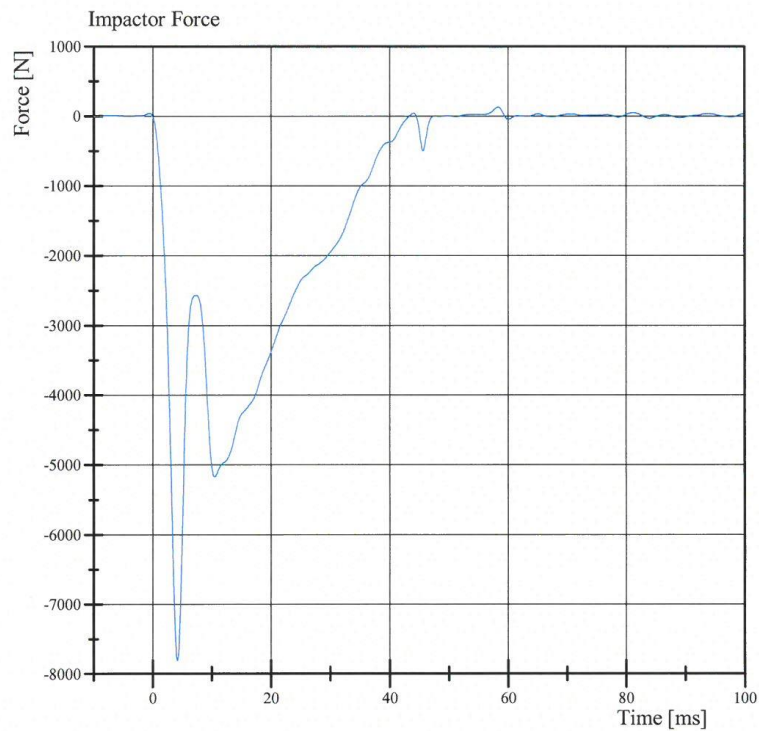
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:11:17 458



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 127.8 N at 58.2 ms
Min: -7,820.0 N at 4.2 ms

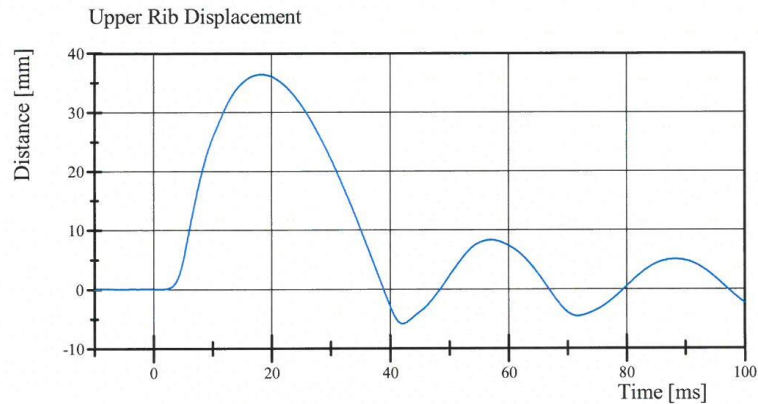
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:11:27 458

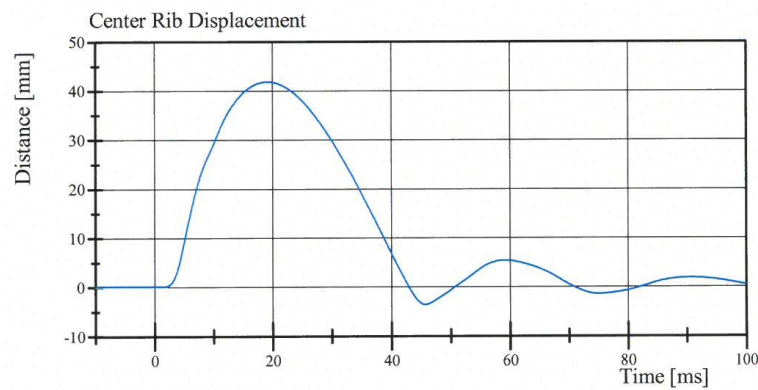


Transportation Research Center Inc.

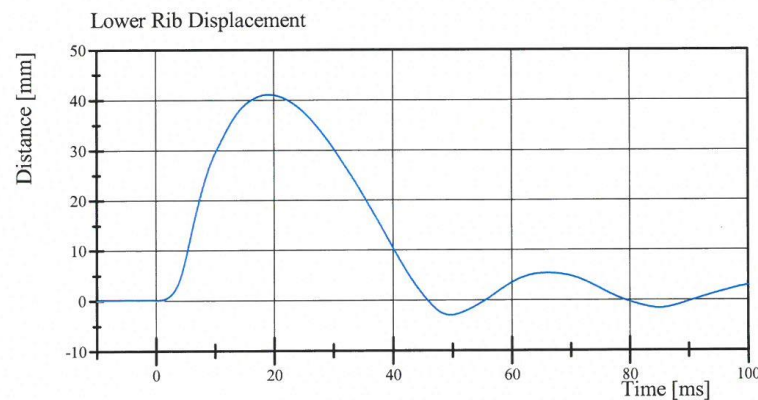
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 36.3 mm at 18.2 ms
Min: -5.9 mm at 42.1 ms



Filter Class: CFC_180
Max: 41.7 mm at 19.1 ms
Min: -3.6 mm at 45.6 ms



Filter Class: CFC_180
Max: 41.0 mm at 19.0 ms
Min: -3.0 mm at 49.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:11:28 458



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 44-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,035.0 N	Yes
Time of Peak	10.6 - 13.0 ms	11.04 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,390.4 N	Yes
Time of Peak	10.0 - 12.3 ms	10.80 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:17:23 604

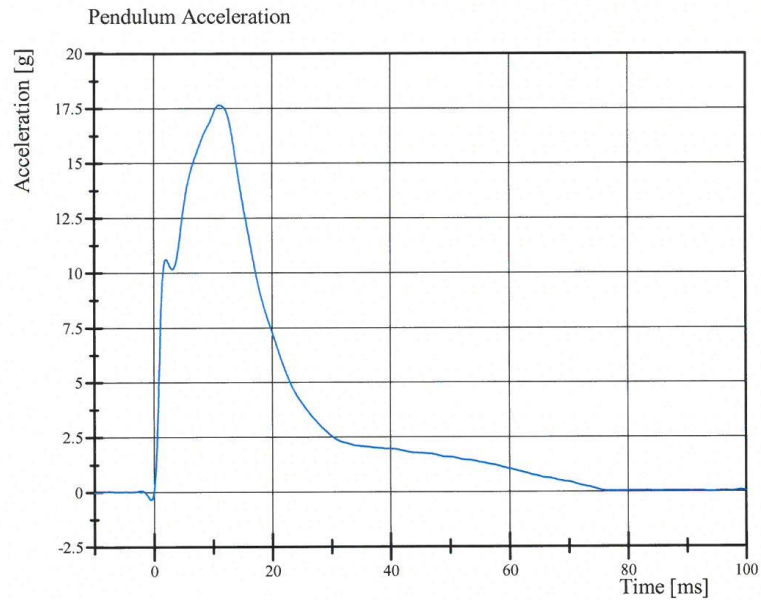


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 44-1

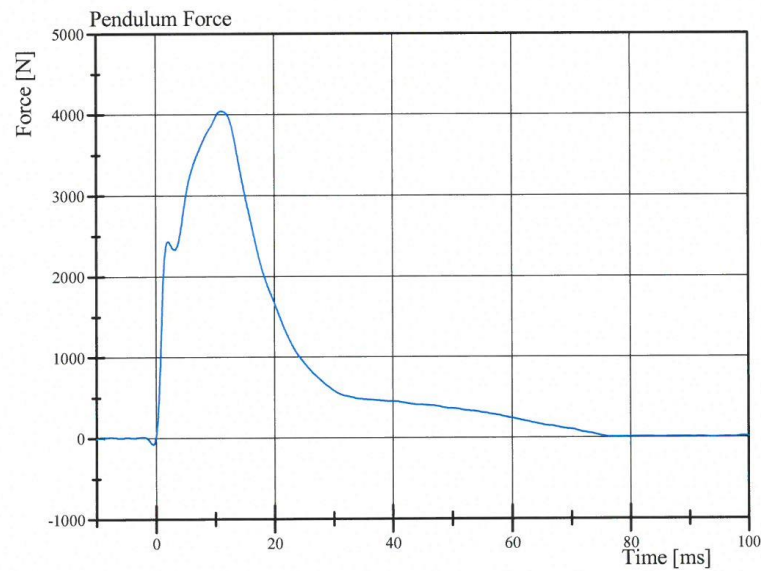
Test Date: 12/8/2016



Filter Class: CFC_180

Max: 17.6 g at 11.0 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,035.0 N at 11.0 ms

Min: -84.2 N at -0.5 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:17:34 604

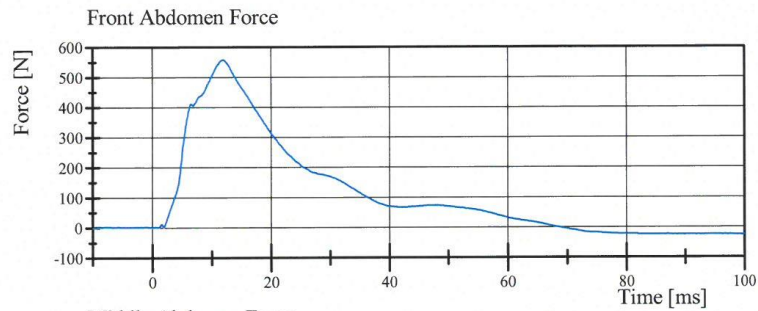


Transportation Research Center Inc.

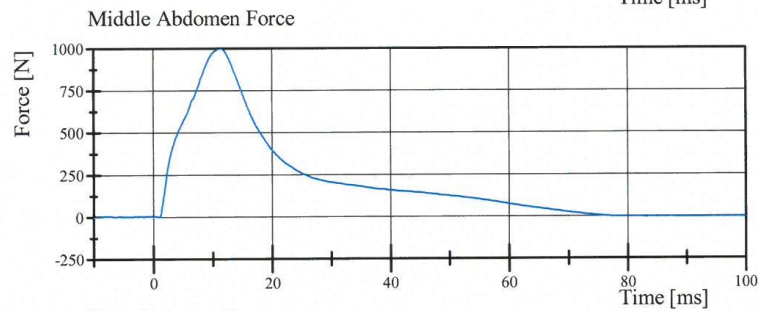
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 44-1

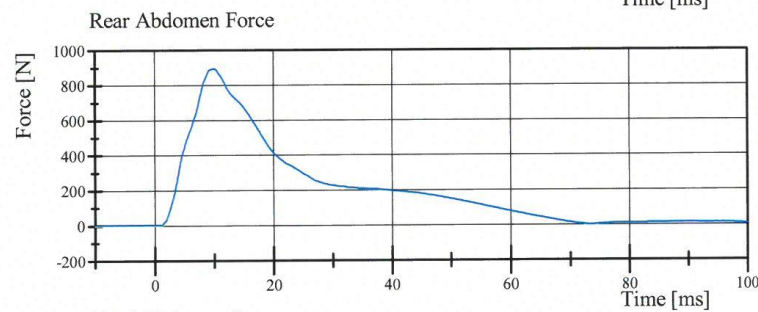
Test Date: 12/8/2016



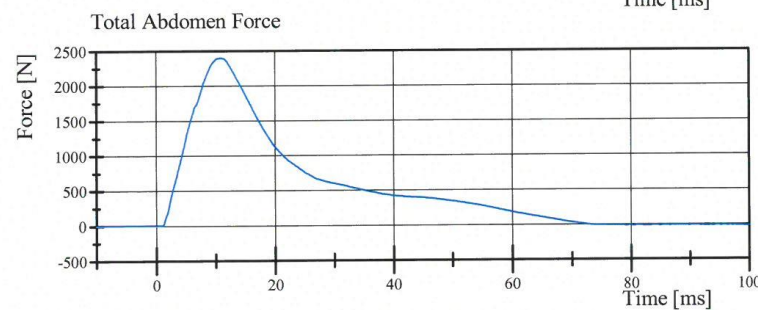
Filter Class: CFC_600
Max: 556.8 N at 11.8 ms
Min: -25.5 N at 99.6 ms



Filter Class: CFC_600
Max: 998.1 N at 11.4 ms
Min: -4.5 N at 83.0 ms



Filter Class: CFC_600
Max: 892.1 N at 10.0 ms
Min: -0.6 N at 73.5 ms



Filter Class: CFC_600
Max: 2,390.4 N at 10.8 ms
Min: -23.2 N at 99.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:17:35 604



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 44-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	18 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.100 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-49.8 deg	Yes
Time of Peak	39 - 53 ms	44.6 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	38.8 ms	Yes

Test meets specifications.

Comments:

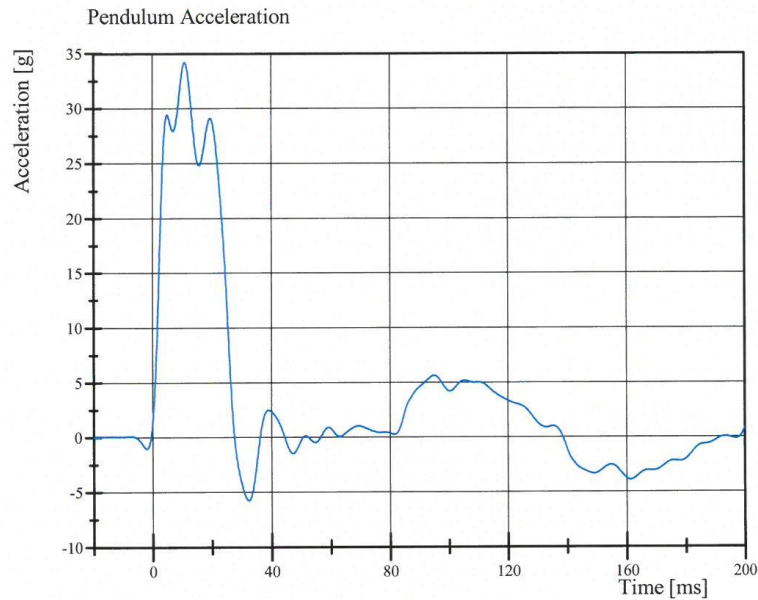
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 14:46:31 669

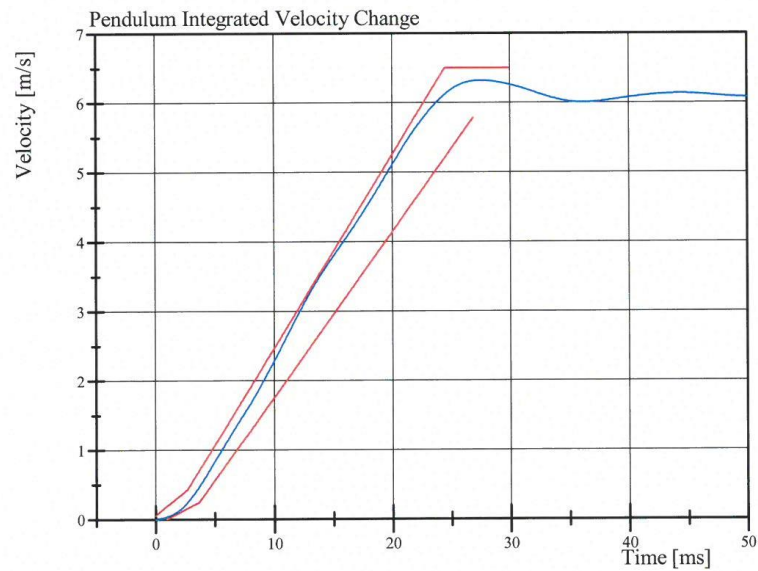


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016



Filter Class: CFC_60
Max: 34.1 g at 10.9 ms
Min: -5.8 g at 32.2 ms



Filter Class: CFC_60
Max: 6.3 m/s at 27.5 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 14:47:11 669

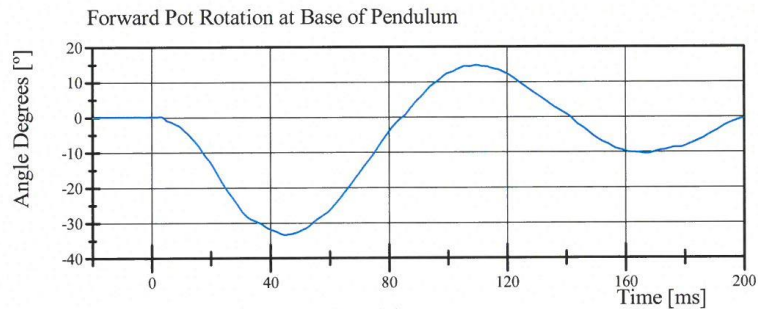


Transportation Research Center Inc.

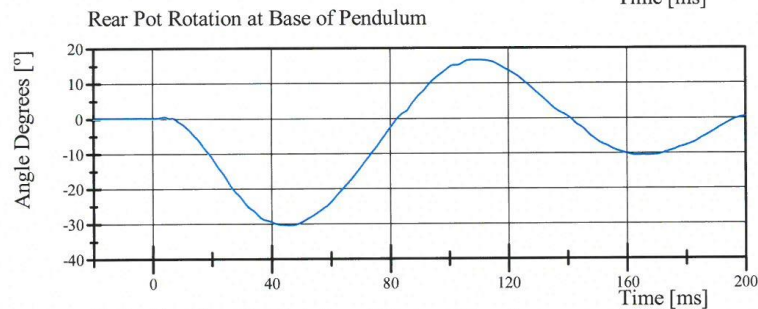
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 44-1

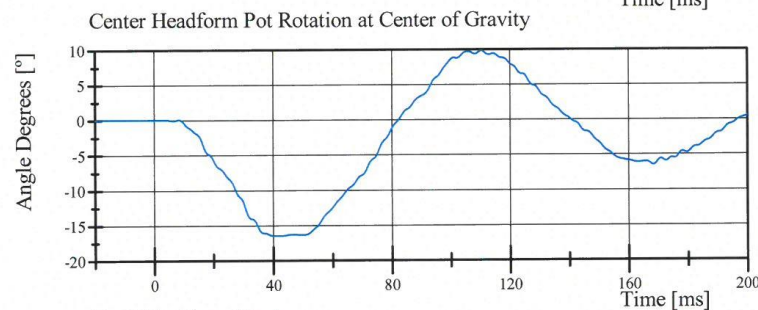
Test Date: 12/8/2016



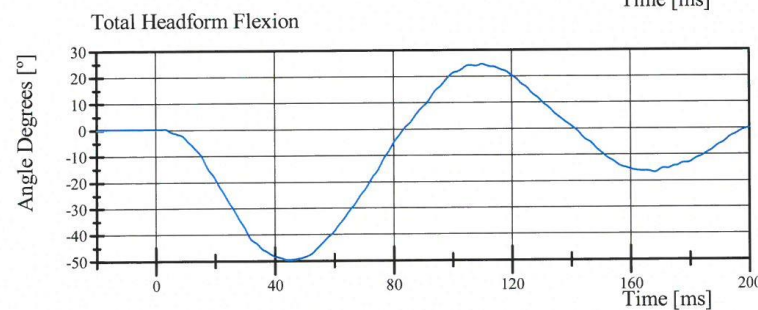
Filter Class: CFC_180
Max: 14.7 ° at 109.4 ms
Min: -33.4 ° at 45.0 ms



Filter Class: CFC_180
Max: 16.5 ° at 108.2 ms
Min: -30.5 ° at 46.4 ms



Filter Class: CFC_180
Max: 9.9 ° at 110.3 ms
Min: -16.5 ° at 40.3 ms



Filter Class: CFC_180
Max: 24.5 ° at 109.9 ms
Min: -49.8 ° at 44.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 14:47:13 669



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 44-3

Test Date: 12/9/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,204.6 N	Yes
Time of Peak	11.8 - 16.1 ms	12.88 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,300.0 N	Yes
Time of Peak	12.2 - 17.0 ms	12.24 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.09.2016 07:39:25 551

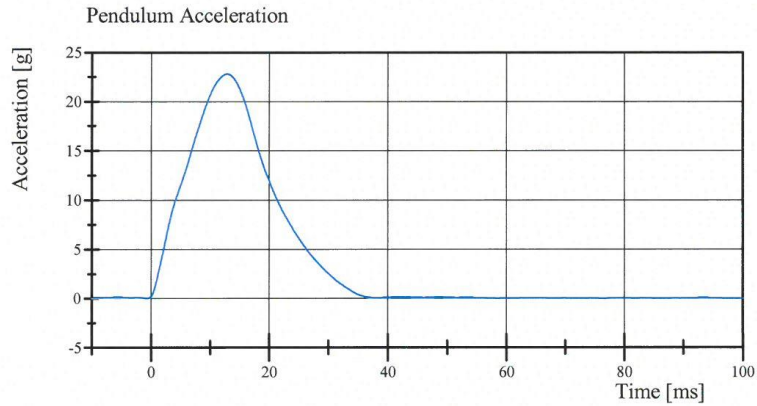


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 44-3

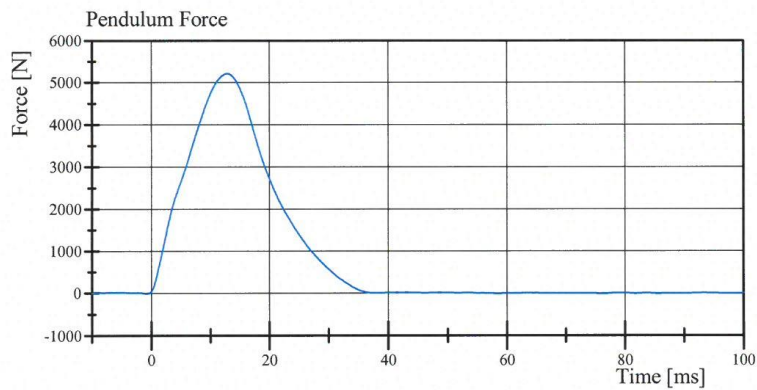
Test Date: 12/9/2016



Filter Class: CFC_180

Max: 22.7 g at 12.9 ms

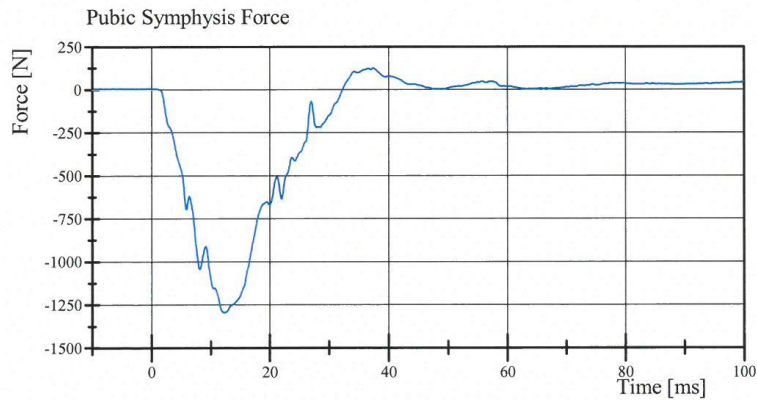
Min: -0.1 g at -0.7 ms



Filter Class: CFC_180

Max: 5,204.6 N at 12.9 ms

Min: -20.5 N at -0.7 ms



Filter Class: CFC_600

Max: 124.3 N at 37.4 ms

Min: -1,300.0 N at 12.2 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.09.2016 07:39:35 551



Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.50

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	777	Yes
B	Shoulder Pivot Height	437.0 - 453.0	447	Yes
C	H-Point Height	79.0 - 89.0	88	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	125	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	535	Yes
L	Popliteal Height	343.0 - 369.0	345	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	202	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	480	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	873	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 50-2

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.4 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 13:11:54 232

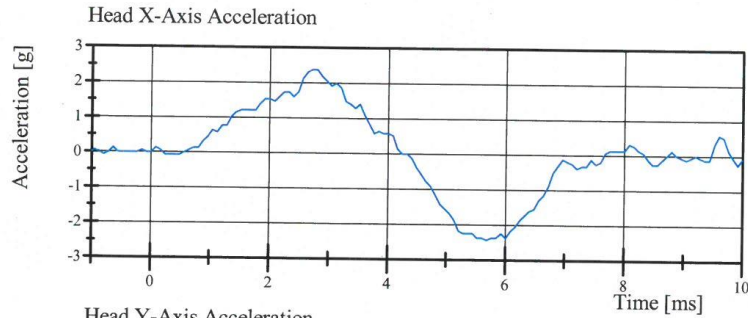


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 50-2

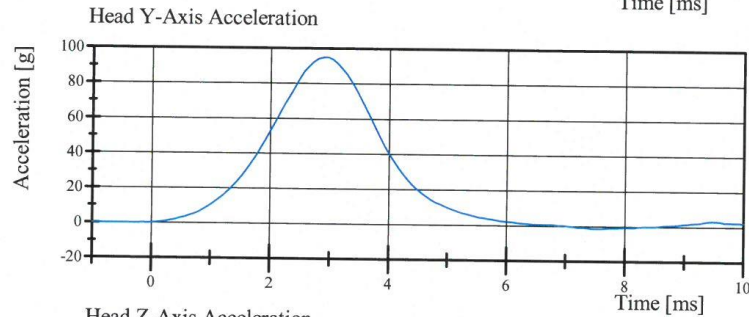
Test Date: 11/18/2016



Filter Class: CFC_1000

Max: 2.4 g at 2.7 ms

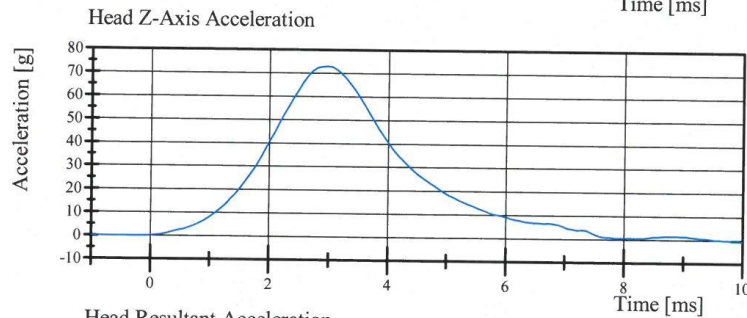
Min: -2.4 g at 5.7 ms



Filter Class: CFC_1000

Max: 94.9 g at 2.9 ms

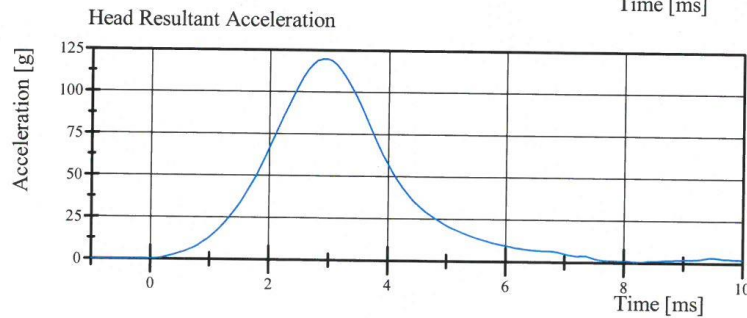
Min: -1.2 g at 7.5 ms



Filter Class: CFC_1000

Max: 73.0 g at 3.0 ms

Min: -0.5 g at 10.0 ms



Filter Class: CFC_1000

Max: 119.8 g at 3.0 ms

Min: 0.0 g at -0.5 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 13:12:00 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	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	2.665 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.967 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.318 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.783 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.784 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.8 deg	Yes
Time of Peak	50 - 70 ms	64.0 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.8 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	122.6 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:47:31 742

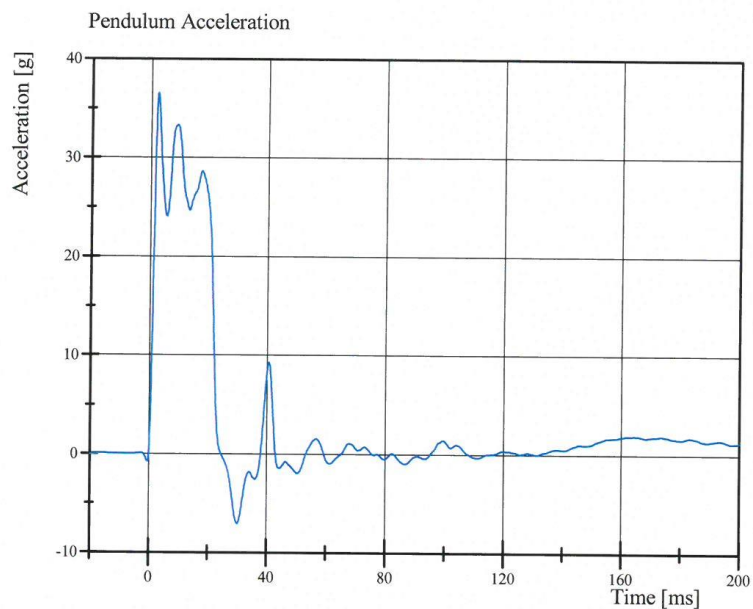


Transportation Research Center Inc.

Left Lateral Neck

SID II_s Serial No. 305 Certification No. 50-1

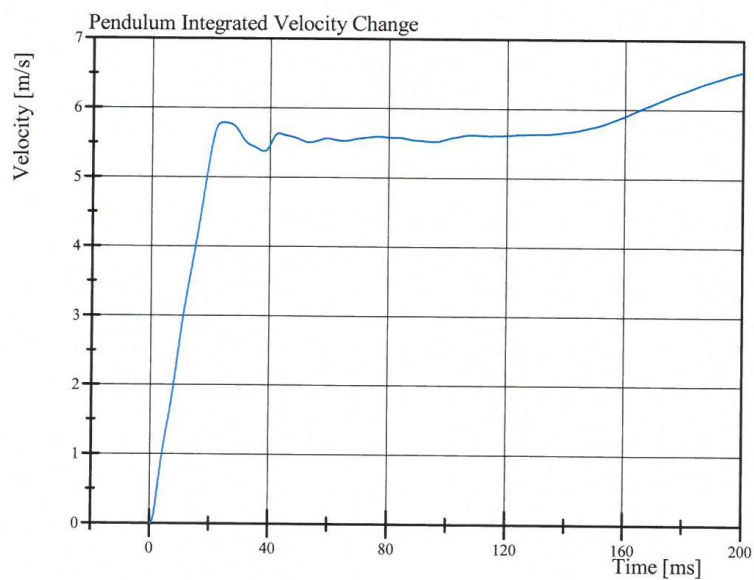
Test Date: 11/18/2016



Filter Class: CFC_180

Max: 36.5 g at 2.5 ms

Min: -7.1 g at 30.2 ms



Filter Class: CFC_180

Max: 6.5 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:47:42 742

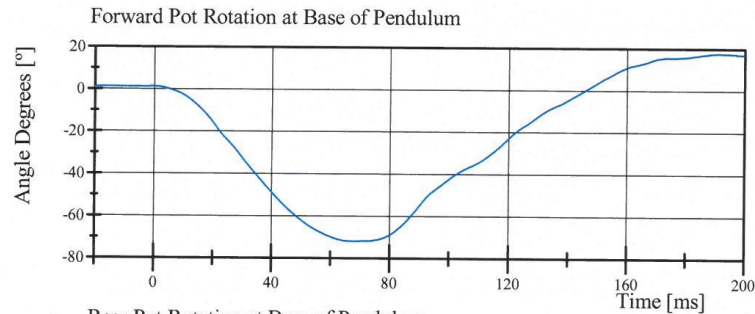


Transportation Research Center Inc.

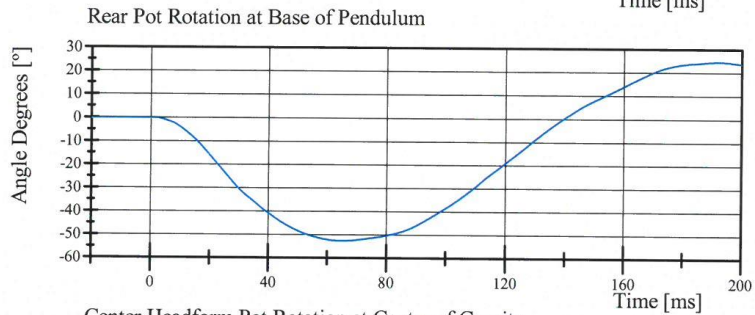
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 50-1

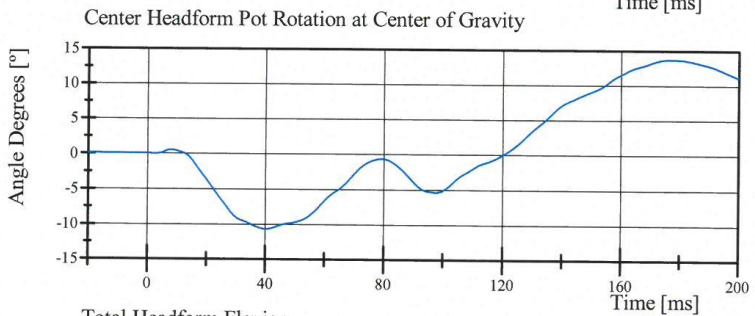
Test Date: 11/18/2016



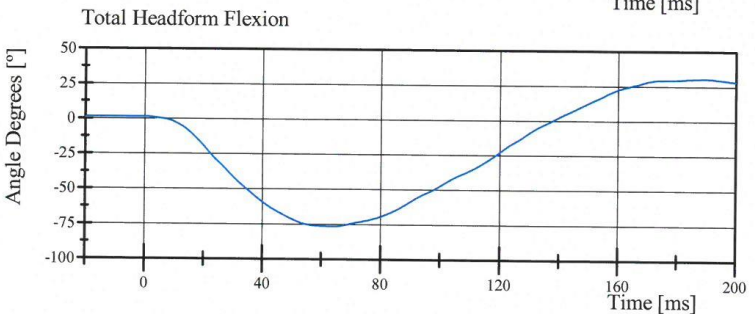
Filter Class: CFC_60
Max: 17.7 ° at 191.4 ms
Min: -71.9 ° at 67.6 ms



Filter Class: CFC_60
Max: 24.6 ° at 192.2 ms
Min: -52.7 ° at 64.7 ms



Filter Class: CFC_60
Max: 13.8 ° at 177.0 ms
Min: -10.7 ° at 40.3 ms



Filter Class: CFC_60
Max: 30.5 ° at 189.4 ms
Min: -76.8 ° at 64.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:47:43 742

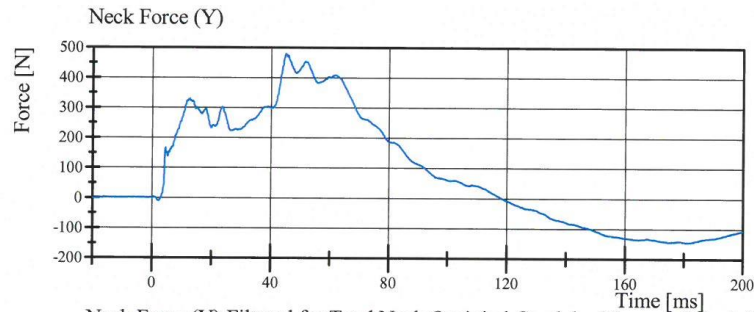


Transportation Research Center Inc.

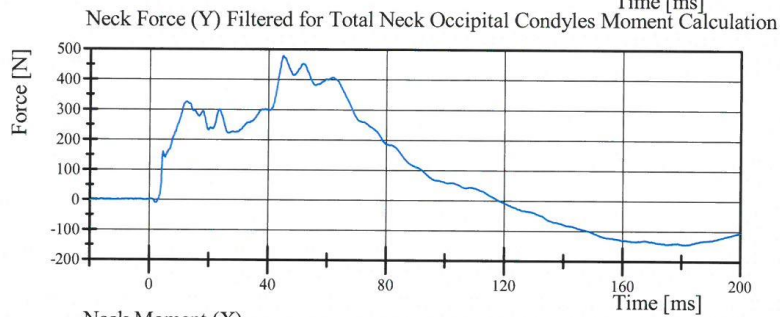
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 50-1

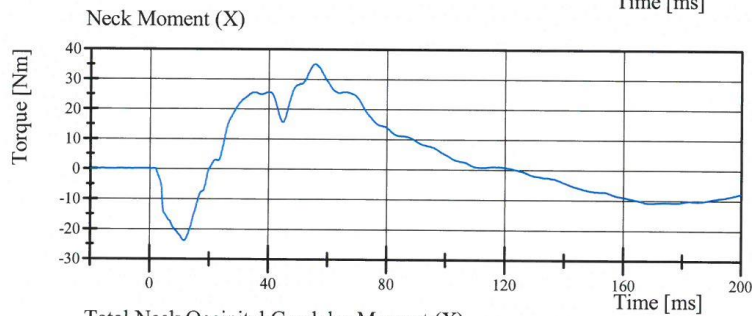
Test Date: 11/18/2016



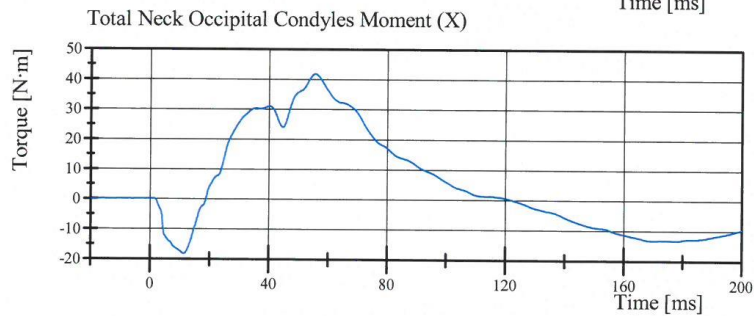
Filter Class: CFC_1000
Max: 478.2 N at 44.9 ms
Min: -143.8 N at 181.3 ms



Filter Class: CFC_600
Max: 477.8 N at 45.0 ms
Min: -143.7 N at 181.4 ms



Filter Class: CFC_600
Max: 35.0 Nm at 55.7 ms
Min: -23.9 Nm at 11.6 ms



Filter Class: Without_(Consta
Max: 41.8 N·m at 55.6 ms
Min: -18.3 N·m at 11.4 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:47:45 742



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.8 g	Yes
Shoulder Displacement	28 - 37 mm	30.6 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.0 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 08:45:43 868

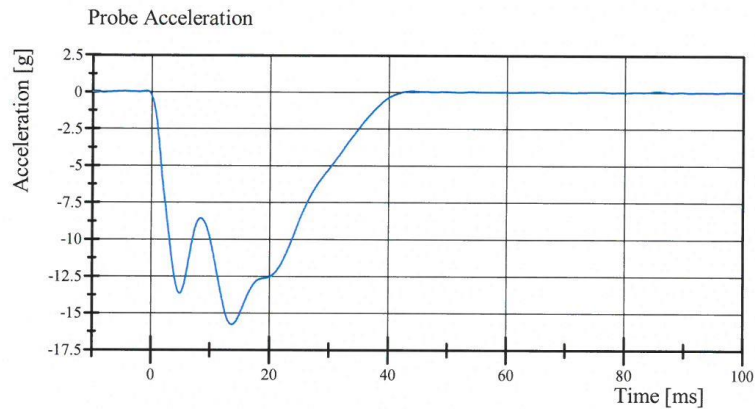


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 50-1

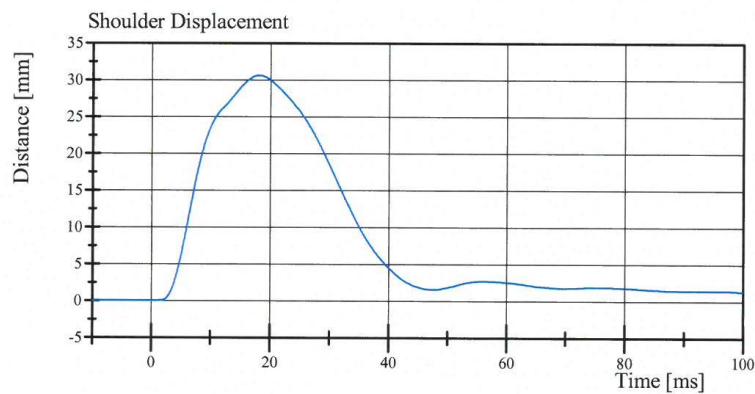
Test Date: 11/18/2016



Filter Class: CFC_180

Max: 0.1 g at 85.3 ms

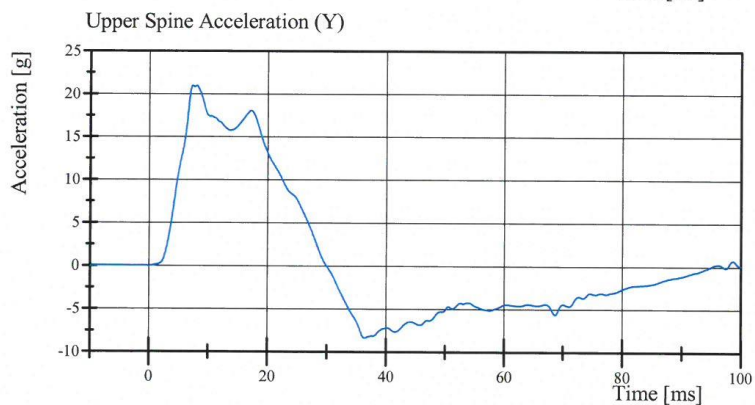
Min: -15.8 g at 13.7 ms



Filter Class: CFC_600

Max: 30.6 mm at 18.2 ms

Min: -0.0 mm at 0.3 ms



Filter Class: CFC_180

Max: 21.0 g at 7.4 ms

Min: -8.4 g at 36.5 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 08:45:52 868



Transportation Research Center Inc.

Left Lateral Thorax with Arm

SID IIs Serial No. 305 Certification No. 50-2

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.778 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-31.9 g	Yes
Shoulder Displacement	31 - 40 mm	33.2 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.5 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.5 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.6 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	30.3 g	Yes

Test meets specifications.

Comments:

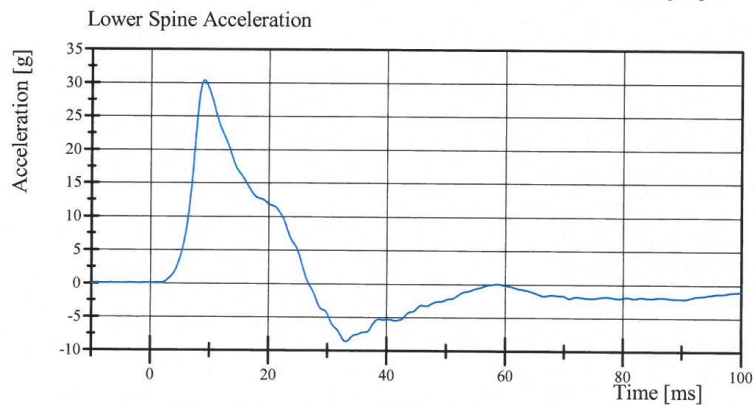
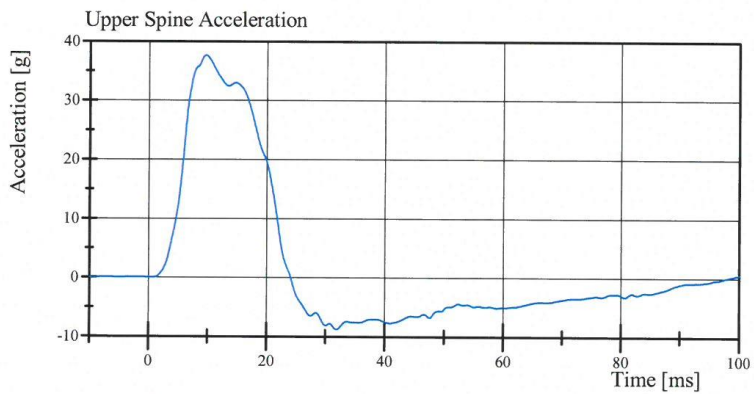
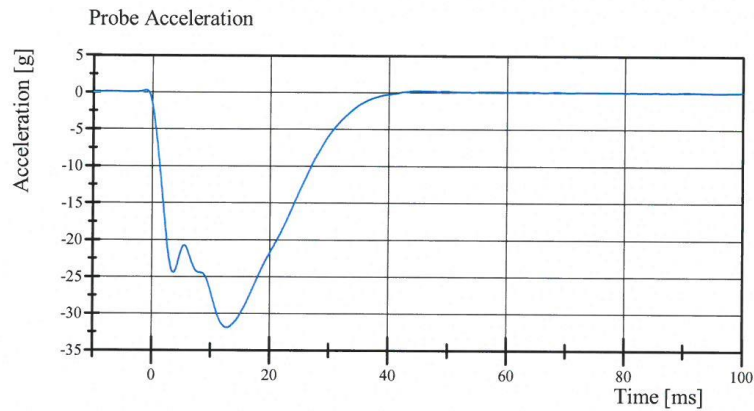
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:35:56 628



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 50-2
Test Date: 11/18/2016



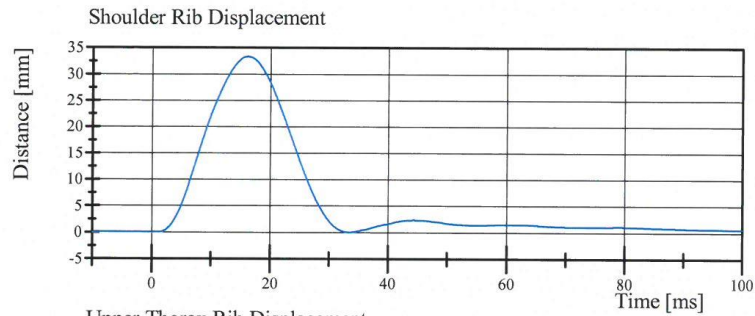
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:36:08 628

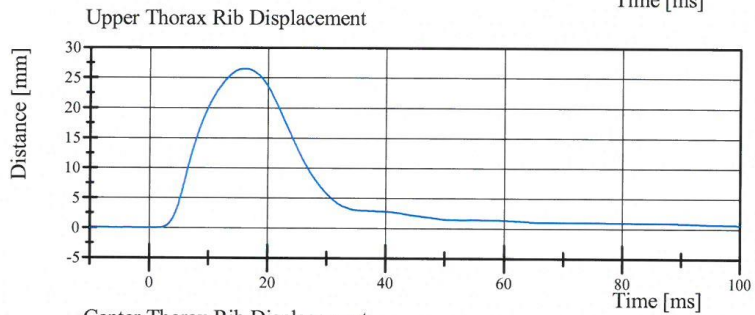


Transportation Research Center Inc.

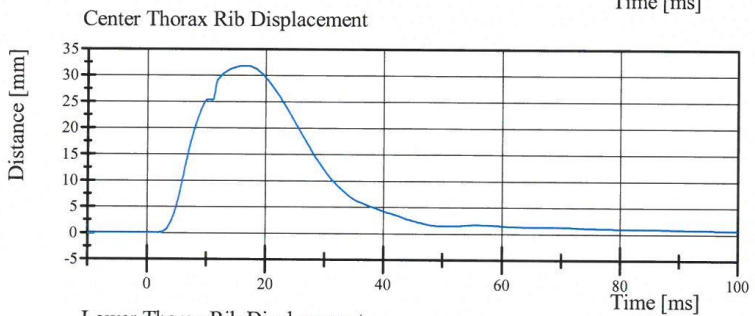
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 50-2
Test Date: 11/18/2016



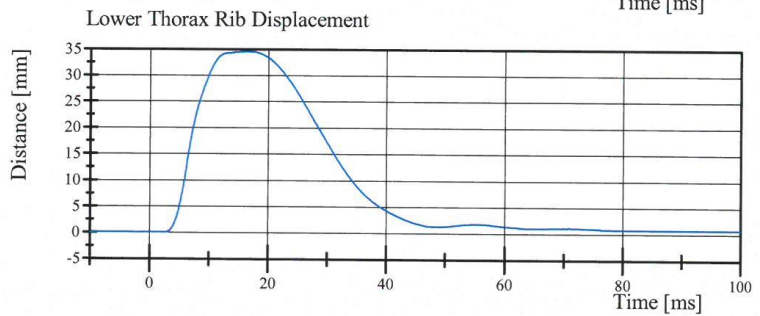
Filter Class: CFC_600
Max: 33.2 mm at 16.2 ms
Min: -0.0 mm at -1.0 ms



Filter Class: CFC_600
Max: 26.5 mm at 16.2 ms
Min: -0.0 mm at -2.0 ms



Filter Class: CFC_600
Max: 31.7 mm at 16.6 ms
Min: -0.0 mm at -6.2 ms



Filter Class: CFC_600
Max: 34.5 mm at 16.0 ms
Min: -0.0 mm at -1.3 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:36:09 628



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID II_s Serial No. 305 Certification No. 50-1
Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.355 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.5 g	Yes

Test meets specifications.

Comments:

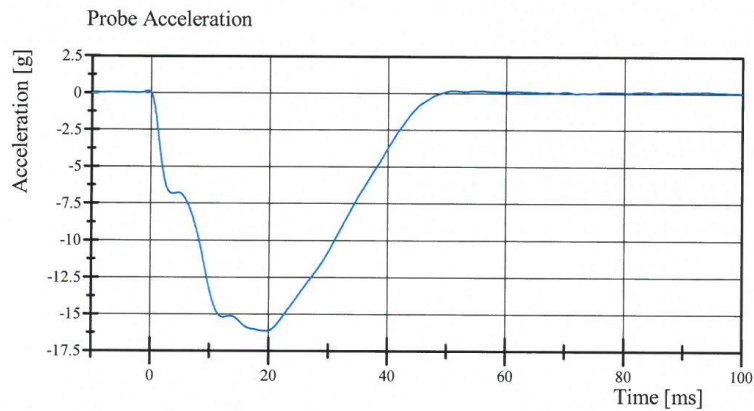
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 09:20:08 840

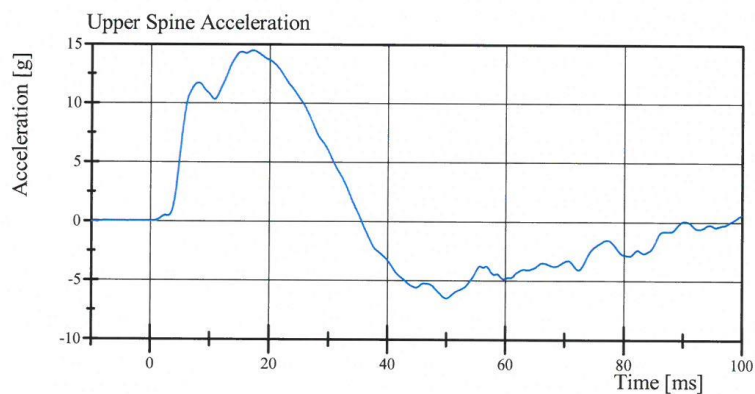


Transportation Research Center Inc.

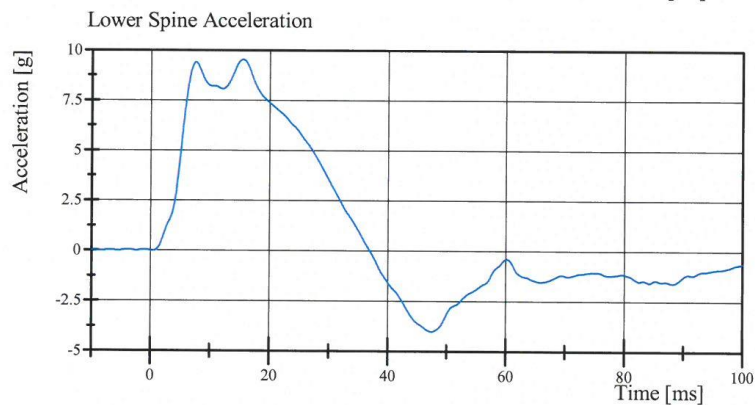
Left Lateral Thorax without Arm
SID IIIs Serial No. 305 Certification No. 50-1
Test Date: 11/18/2016



Filter Class: CFC_180
Max: 0.2 g at 55.8 ms
Min: -16.2 g at 19.4 ms



Filter Class: CFC_180
Max: 14.5 g at 17.2 ms
Min: -6.5 g at 50.0 ms



Filter Class: CFC_180
Max: 9.5 g at 15.5 ms
Min: -4.0 g at 47.4 ms

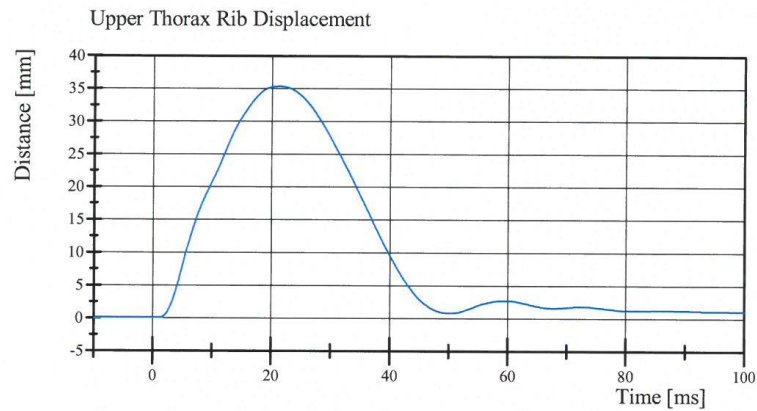
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 09:20:20 840

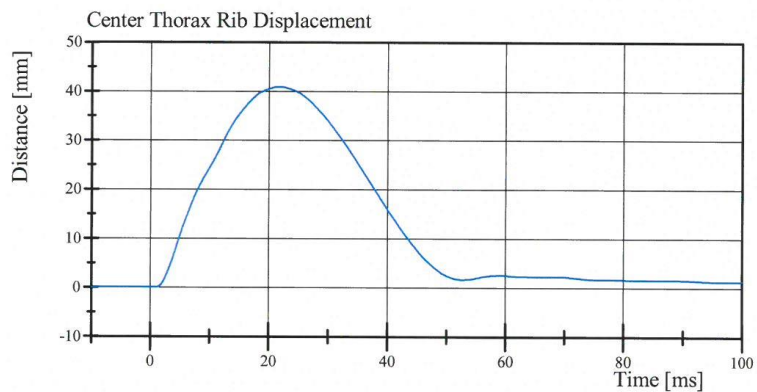


Transportation Research Center Inc.

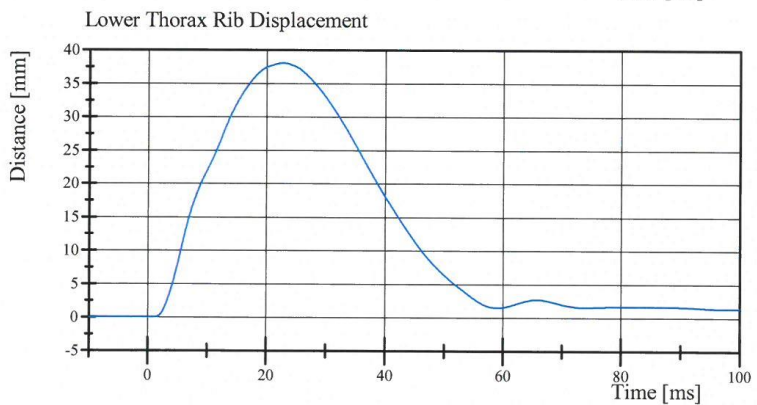
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 50-1
Test Date: 11/18/2016



Filter Class: CFC_600
Max: 35.3 mm at 21.3 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 40.8 mm at 21.7 ms
Min: -0.0 mm at 0.9 ms



Filter Class: CFC_600
Max: 38.0 mm at 22.9 ms
Min: -0.0 mm at -9.7 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 09:20:21 840



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.7 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.34 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 08:54:59 700

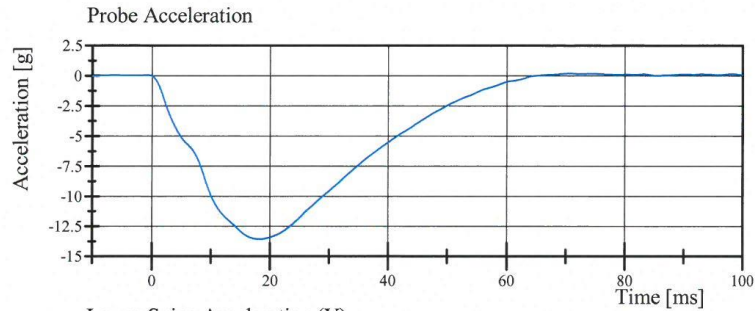


Transportation Research Center Inc.

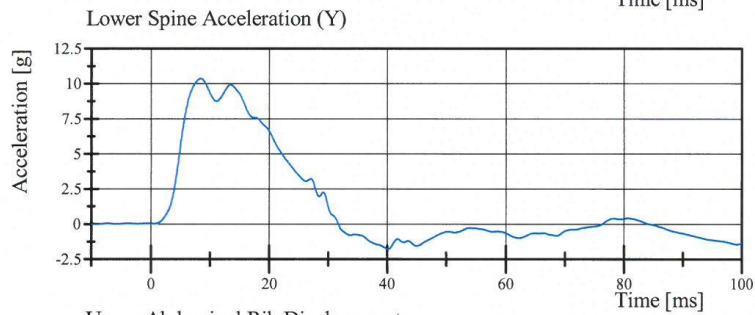
Left Lateral Abdomen

SID II_s Serial No. 305 Certification No. 50-1

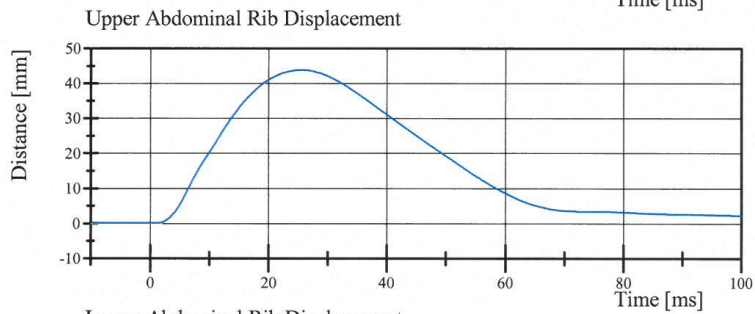
Test Date: 11/18/2016



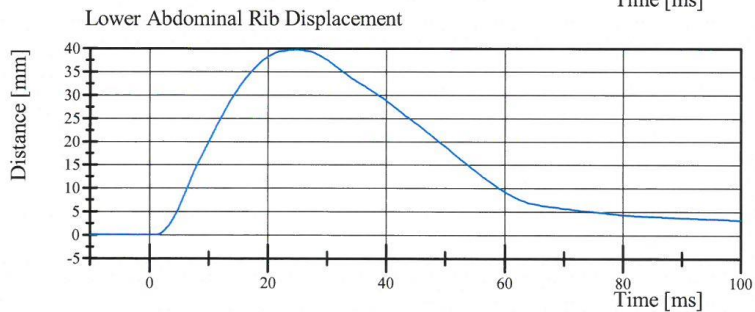
Filter Class: CFC_180
Max: 0.2 g at 70.7 ms
Min: -13.6 g at 18.3 ms



Filter Class: CFC_180
Max: 10.3 g at 8.5 ms
Min: -1.8 g at 40.2 ms



Filter Class: CFC_600
Max: 43.7 mm at 25.5 ms
Min: -0.0 mm at -9.8 ms



Filter Class: CFC_600
Max: 39.7 mm at 25.0 ms
Min: -0.0 mm at -5.5 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 08:55:09 700



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.15 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,862.0 N	Yes

Test meets specifications.

Comments: Pelvis Pulg#11026

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 08:28:07 447

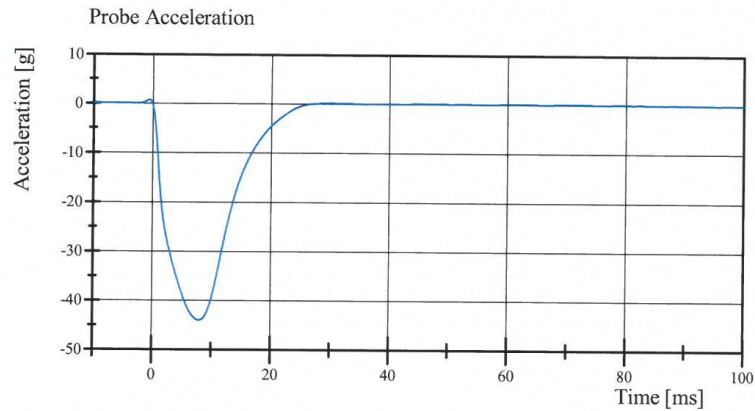


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 50-1

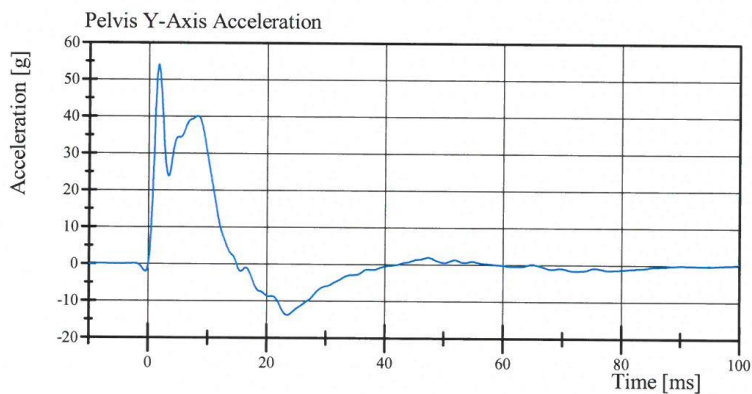
Test Date: 11/18/2016



Filter Class: CFC_180

Max: 0.6 g at -0.6 ms

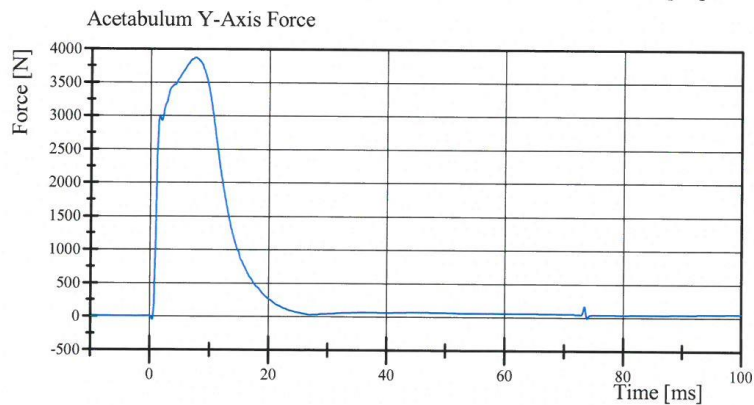
Min: -44.1 g at 8.0 ms



Filter Class: CFC_180

Max: 54.0 g at 1.7 ms

Min: -13.8 g at 23.5 ms



Filter Class: CFC_600

Max: 3,862.0 N at 7.6 ms

Min: -51.4 N at 0.5 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 08:29:42 447



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.5 g	Yes
Iliac Force	4,100 - 5,100 N	4,678.6 N	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 11:03:12 666

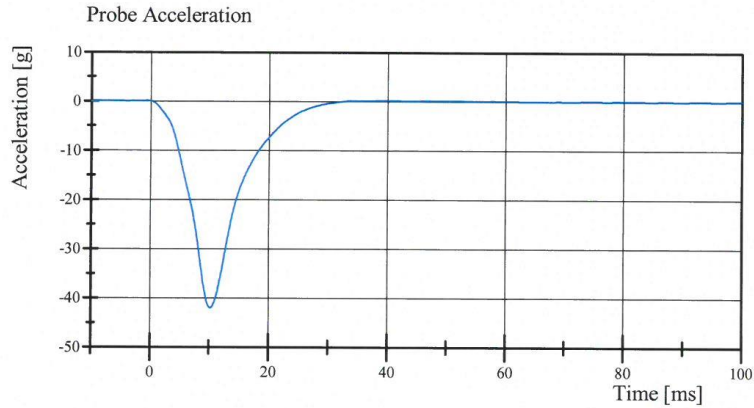


Transportation Research Center Inc.

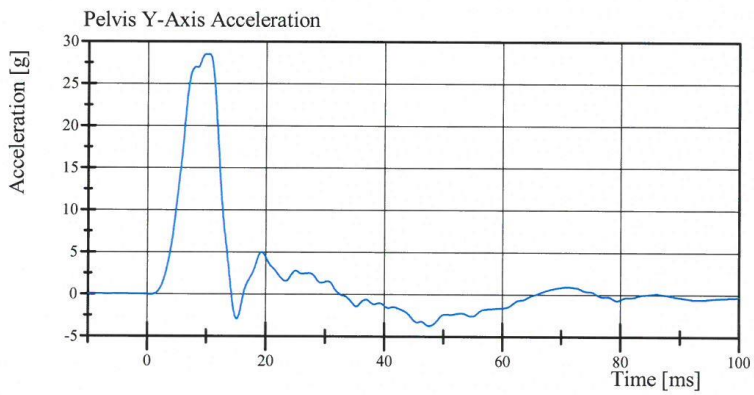
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 50-1

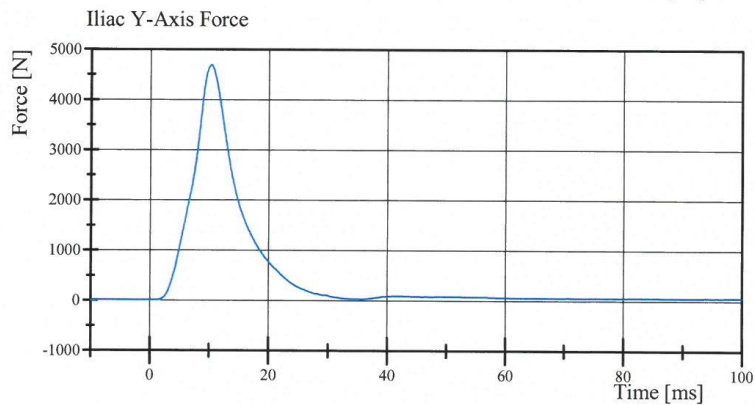
Test Date: 11/18/2016



Filter Class: CFC_180
Max: 0.1 g at 39.7 ms
Min: -42.1 g at 10.2 ms



Filter Class: CFC_180
Max: 28.5 g at 10.5 ms
Min: -3.7 g at 47.6 ms



Filter Class: CFC_600
Max: 4,678.6 N at 10.3 ms
Min: -0.9 N at -10.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 11:03:22 666



Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.51

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	88	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	128	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	535	Yes
L	Popliteal Height	343.0 - 369.0	345	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	480	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	873	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	17 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.4 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 14:38:11 233

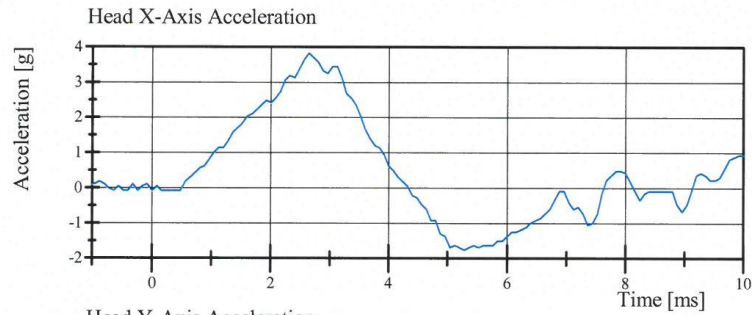


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 51-1

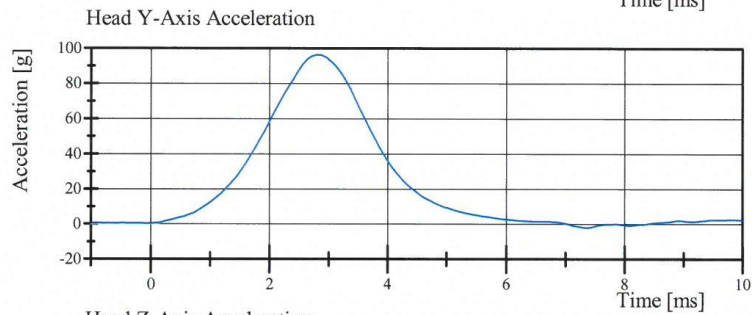
Test Date: 12/8/2016



Filter Class: CFC_1000

Max: 3.8 g at 2.6 ms

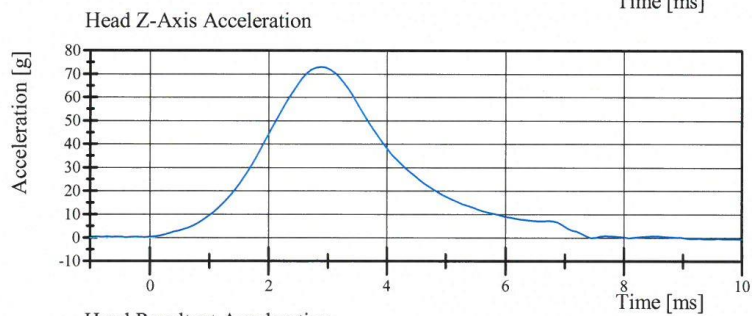
Min: -1.8 g at 5.3 ms



Filter Class: CFC_1000

Max: 96.1 g at 2.8 ms

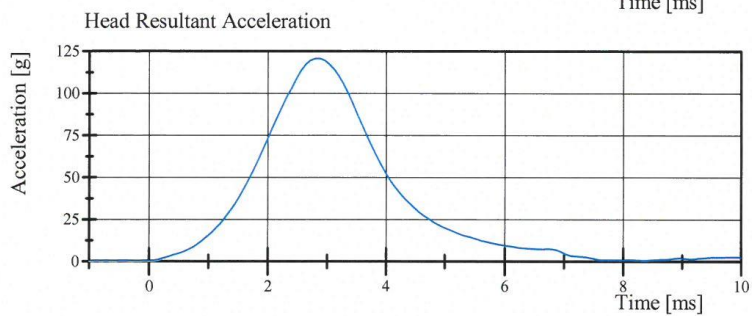
Min: -2.3 g at 7.4 ms



Filter Class: CFC_1000

Max: 72.7 g at 2.9 ms

Min: -0.7 g at 10.0 ms



Filter Class: CFC_1000

Max: 120.4 g at 2.8 ms

Min: 0.0 g at -0.2 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 14:38:21 233



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.621 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.618 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.964 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.339 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.815 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.825 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-78.5 deg	Yes
Time of Peak	50 - 70 ms	65.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.9 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	121.8 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:36:42 739

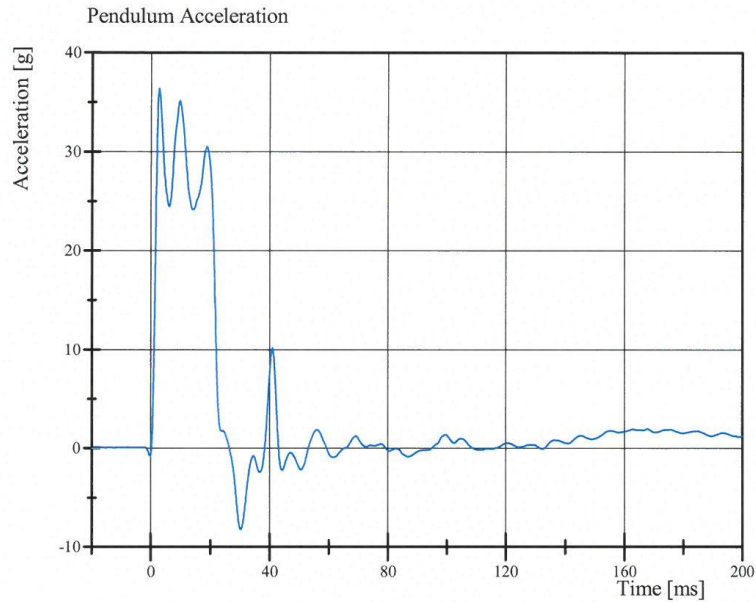


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 51-1

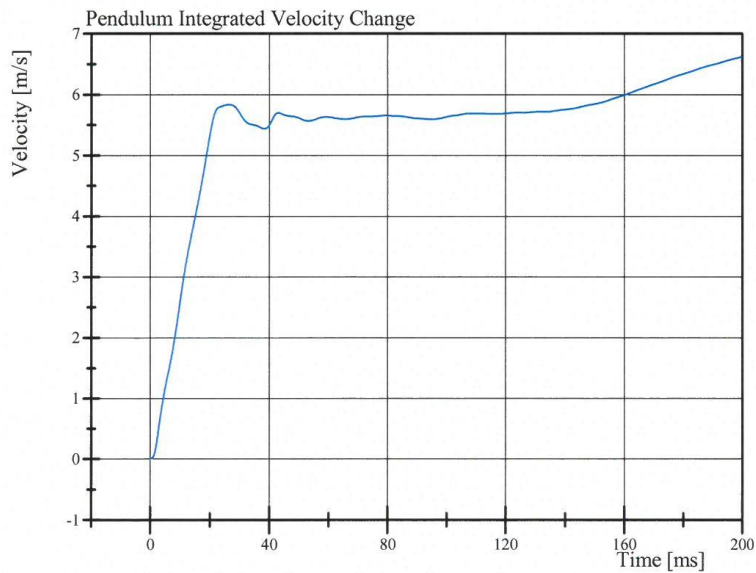
Test Date: 12/8/2016



Filter Class: CFC_180

Max: 36.3 g at 2.6 ms

Min: -8.3 g at 30.2 ms



Filter Class: CFC_180

Max: 6.6 m/s at 200.0 ms

Min: -0.0 m/s at 0.2 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:36:52 739

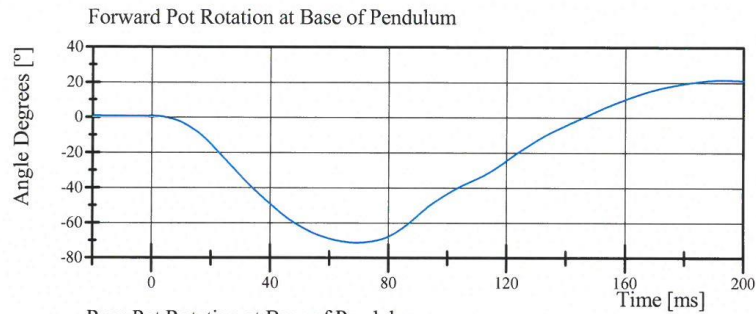


Transportation Research Center Inc.

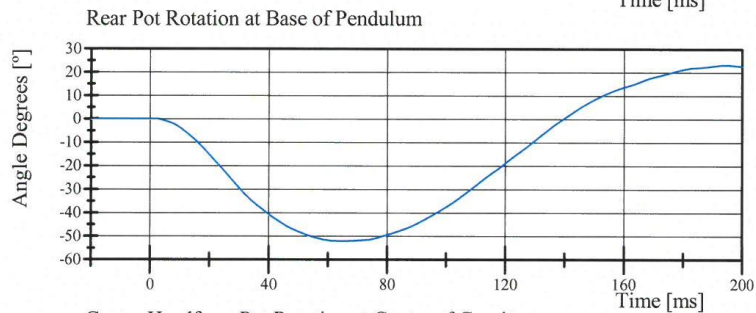
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 51-1

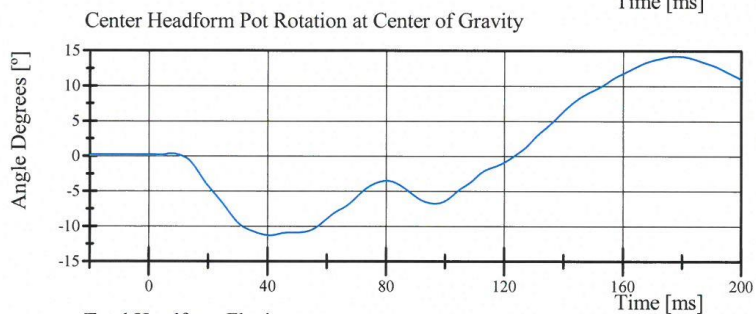
Test Date: 12/8/2016



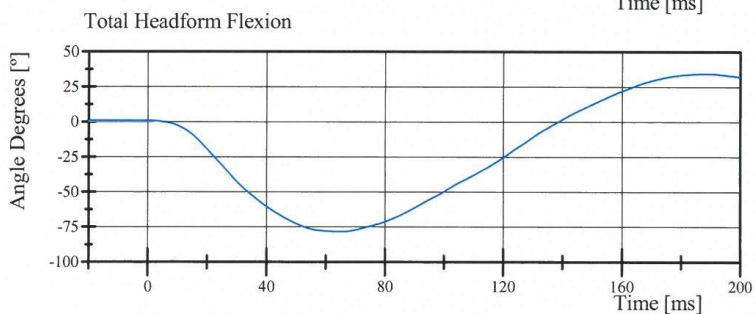
Filter Class: CFC_60
Max: 21.3 ° at 192.6 ms
Min: -71.6 ° at 69.0 ms



Filter Class: CFC_60
Max: 23.1 ° at 194.3 ms
Min: -52.3 ° at 65.0 ms



Filter Class: CFC_60
Max: 14.2 ° at 177.8 ms
Min: -11.4 ° at 40.8 ms



Filter Class: CFC_60
Max: 34.2 ° at 188.9 ms
Min: -78.5 ° at 65.4 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:36:53 739

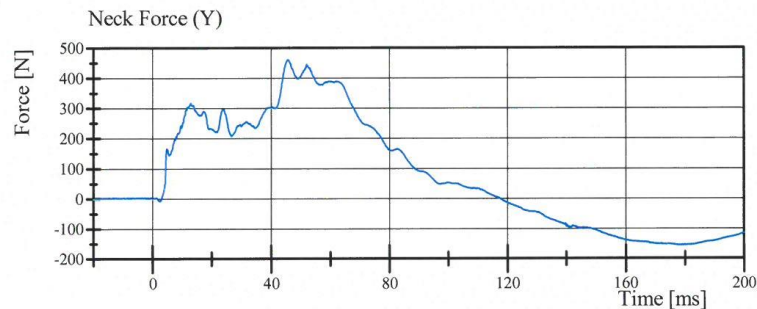


Transportation Research Center Inc.

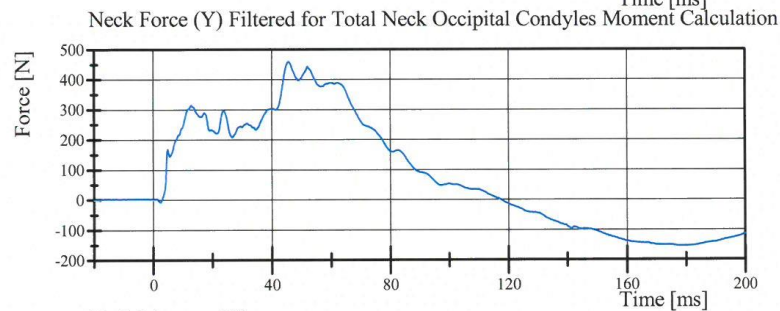
Left Lateral Neck

SID IIa Serial No. 305 Certification No. 51-1

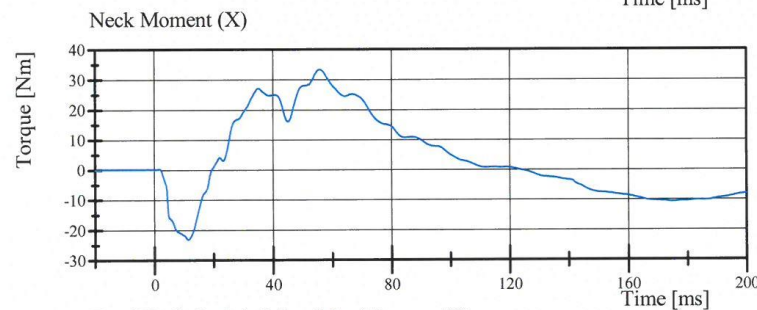
Test Date: 12/8/2016



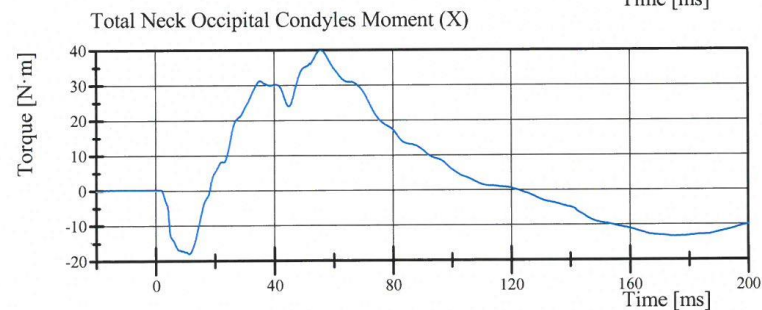
Filter Class: CFC_1000
Max: 458.5 N at 45.6 ms
Min: -156.0 N at 177.8 ms



Filter Class: CFC_600
Max: 458.2 N at 45.6 ms
Min: -155.5 N at 177.8 ms



Filter Class: CFC_600
Max: 33.1 Nm at 55.7 ms
Min: -23.3 Nm at 11.4 ms



Filter Class: Without_(Constar
Max: 39.9 N·m at 55.6 ms
Min: -18.1 N·m at 11.1 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:36:54 739



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.8 g	Yes
Shoulder Displacement	28 - 37 mm	29.6 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.2 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:43:41 856

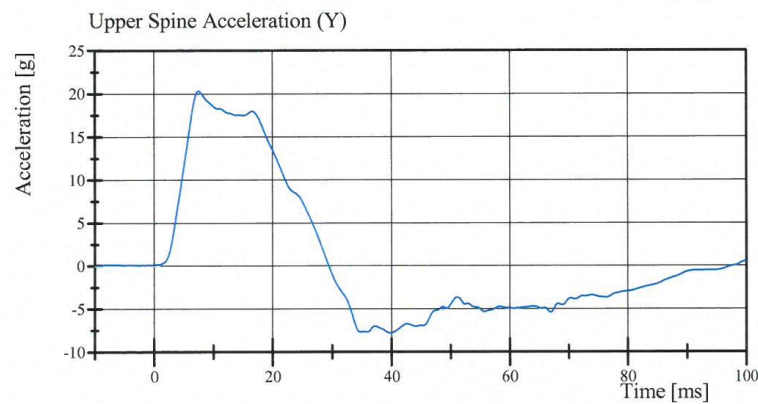
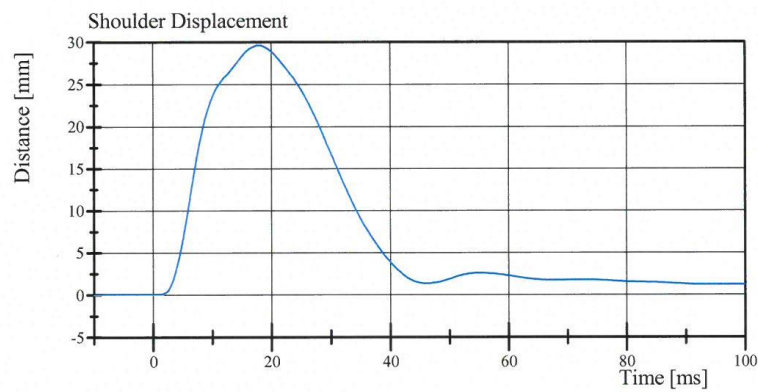
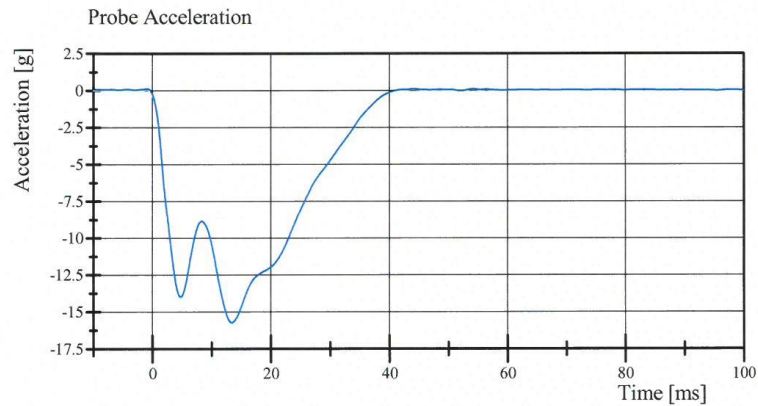


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016



Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:43:57 856



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.778 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.4 g	Yes
Shoulder Displacement	31 - 40 mm	33.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.4 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.9 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.7 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	32.1 g	Yes

Test meets specifications.

Comments:

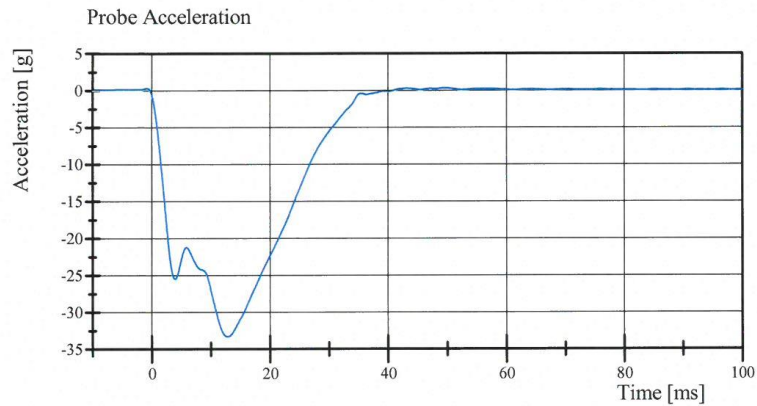
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:48:03 632

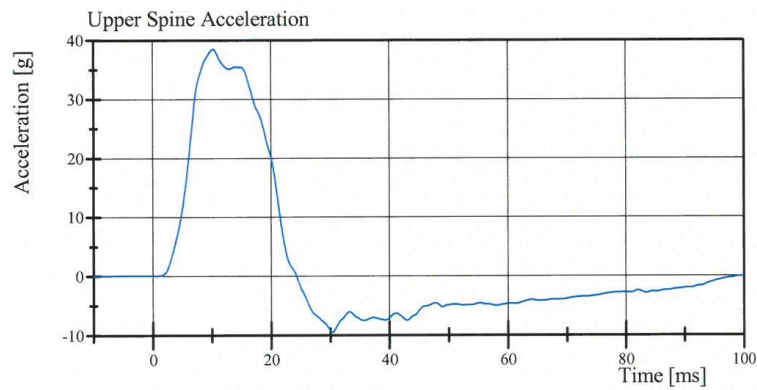


Transportation Research Center Inc.

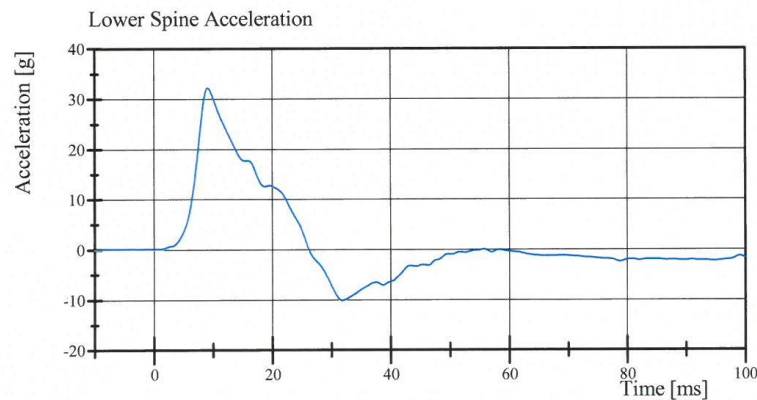
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 0.3 g at 49.7 ms
Min: -33.4 g at 12.8 ms



Filter Class: CFC_180
Max: 38.3 g at 10.2 ms
Min: -9.6 g at 30.4 ms



Filter Class: CFC_180
Max: 32.1 g at 9.1 ms
Min: -10.2 g at 31.9 ms

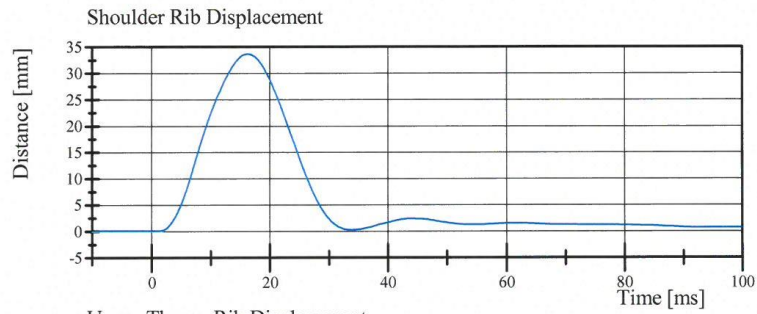
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:48:15 632

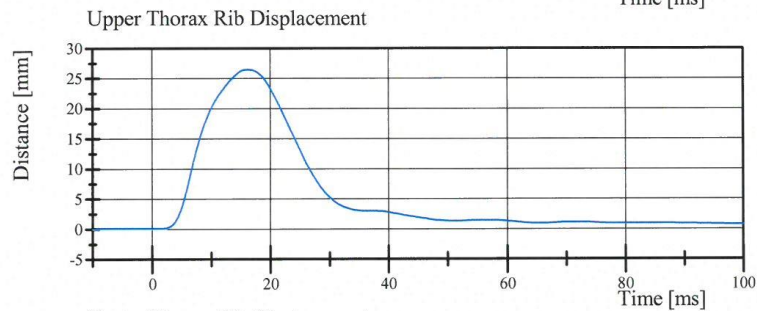


Transportation Research Center Inc.

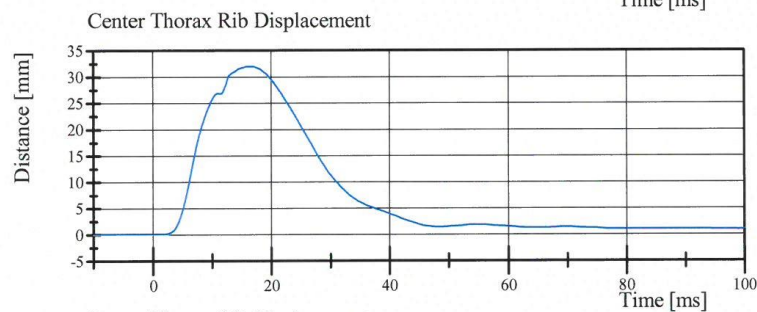
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016



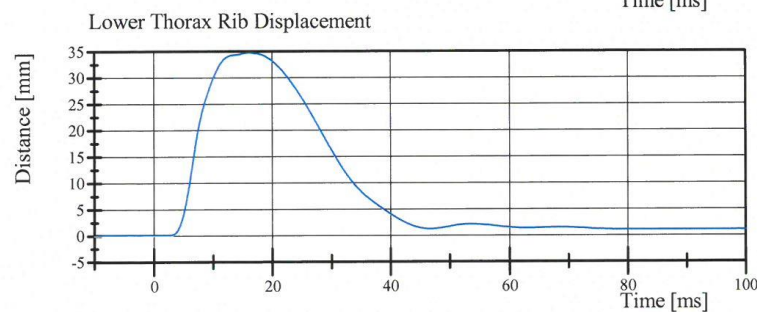
Filter Class: CFC_600
Max: 33.5 mm at 16.2 ms
Min: -0.0 mm at -9.0 ms



Filter Class: CFC_600
Max: 26.4 mm at 16.1 ms
Min: -0.0 mm at -0.6 ms



Filter Class: CFC_600
Max: 31.9 mm at 16.4 ms
Min: -0.0 mm at -5.7 ms



Filter Class: CFC_600
Max: 34.7 mm at 16.1 ms
Min: -0.0 mm at 1.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:48:16 632



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

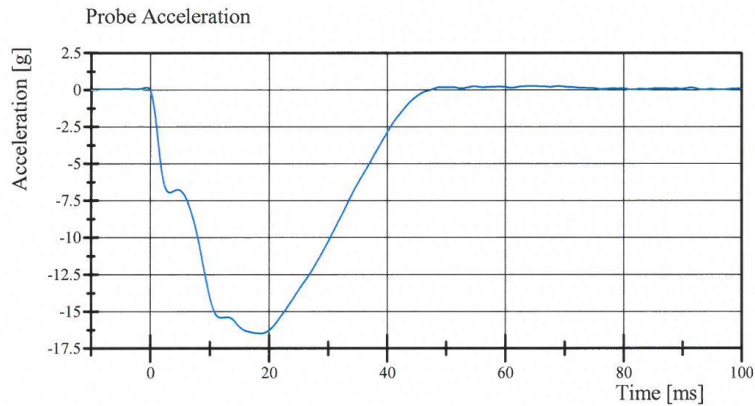
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.379 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.5 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.9 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.7 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.8 g	Yes

Test meets specifications.

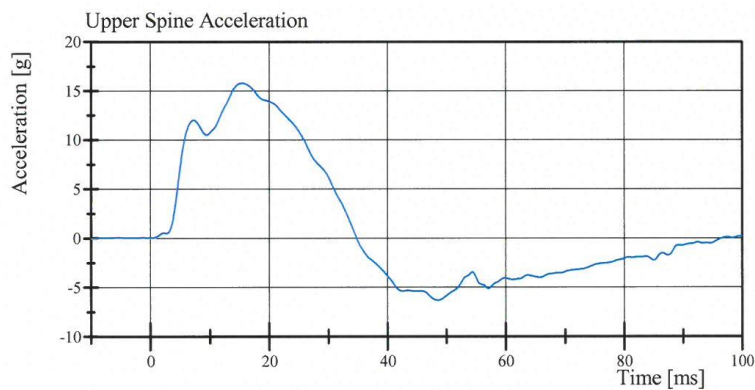
Comments:

Transportation Research Center Inc.

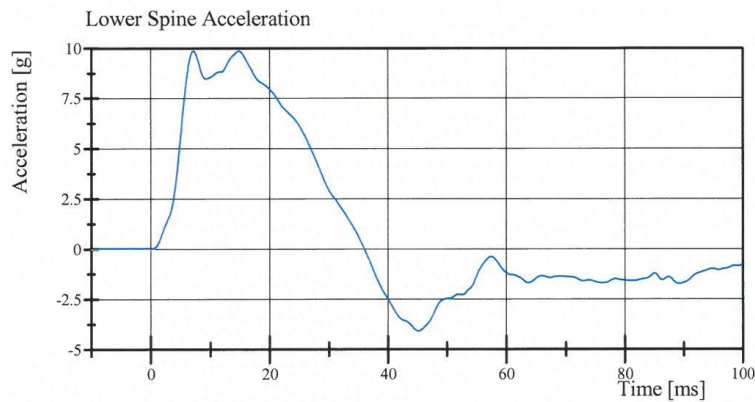
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016



Filter Class: CFC_180
Max: 0.2 g at 64.7 ms
Min: -16.5 g at 18.5 ms



Filter Class: CFC_180
Max: 15.7 g at 15.4 ms
Min: -6.4 g at 48.6 ms



Filter Class: CFC_180
Max: 9.8 g at 7.1 ms
Min: -4.1 g at 45.1 ms

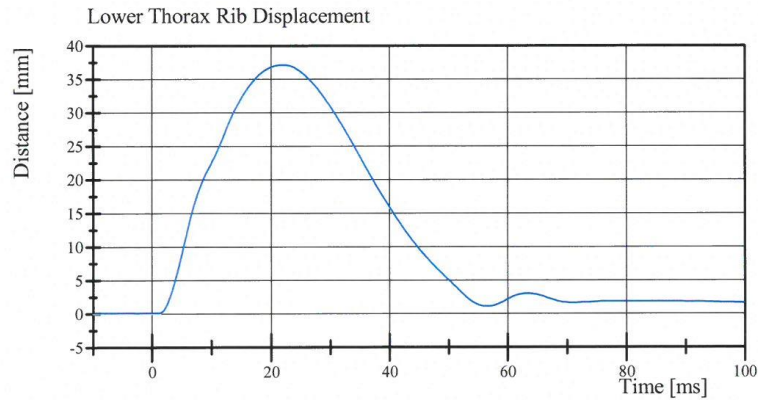
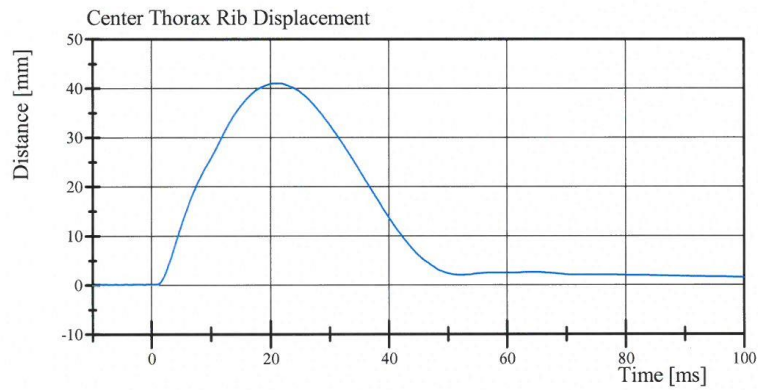
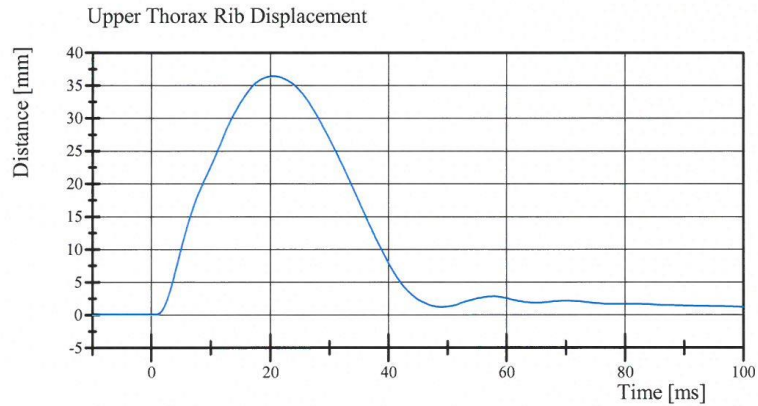
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:01:35 875



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016



Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:01:35 875



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.1 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.50 g	Yes

Test meets specifications.

Comments:

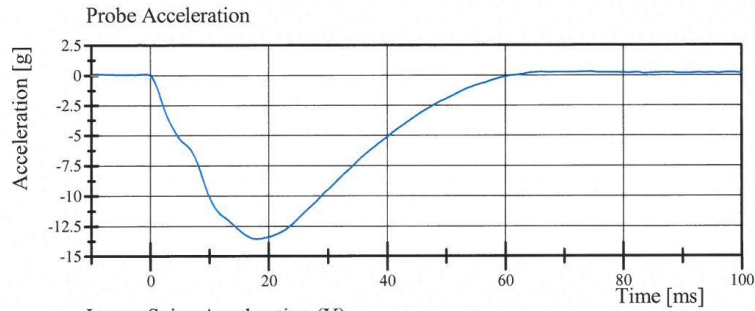
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:53:05 701

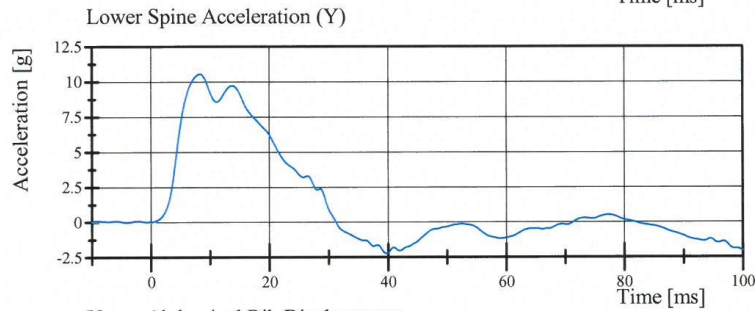


Transportation Research Center Inc.

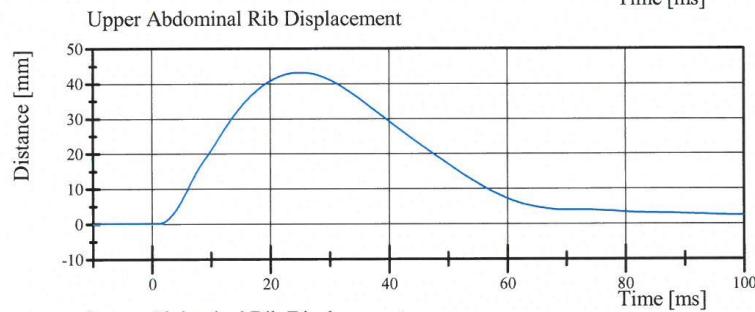
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016



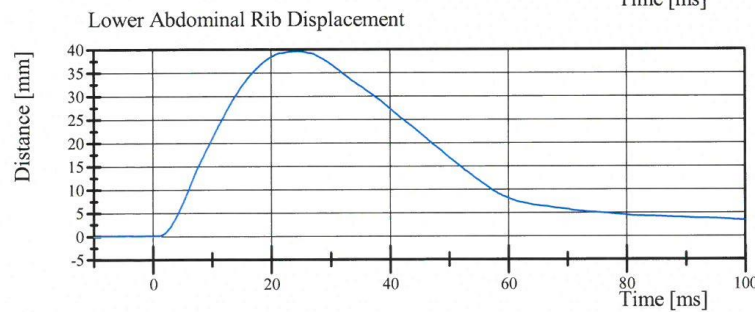
Filter Class: CFC_180
Max: 0.3 g at 74.5 ms
Min: -13.6 g at 17.9 ms



Filter Class: CFC_180
Max: 10.5 g at 8.3 ms
Min: -2.3 g at 39.6 ms



Filter Class: CFC_600
Max: 43.1 mm at 25.0 ms
Min: -0.0 mm at -4.3 ms



Filter Class: CFC_600
Max: 39.5 mm at 24.5 ms
Min: -0.0 mm at 0.9 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:53:22 701



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	16 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.32 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	41.5 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,887.2 N	Yes

Test meets specifications.

Comments: Pelvis Plug #11045

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:22:41 464

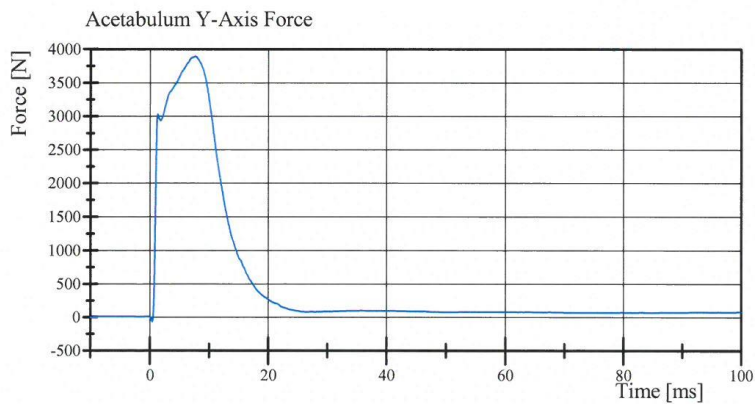
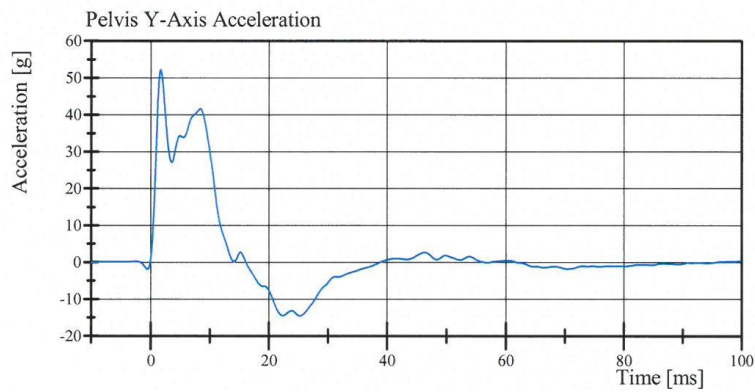
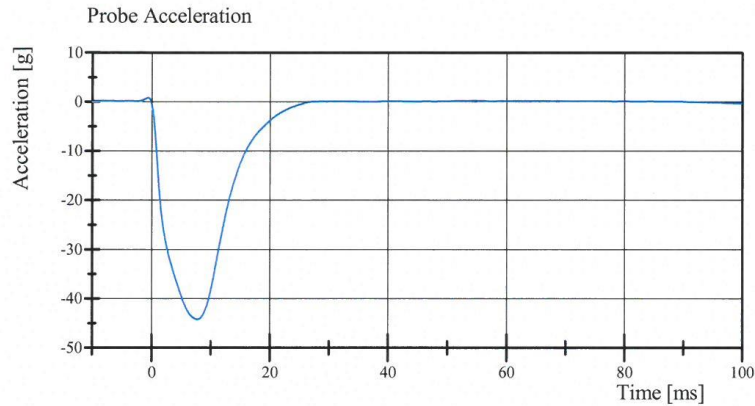


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/8/2016



Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:23:06 464



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 51-1

Test Date: 12/9/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.0 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.6 g	Yes
Iliac Force	4,100 - 5,100 N	4,468.6 N	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.09.2016 09:41:42 651

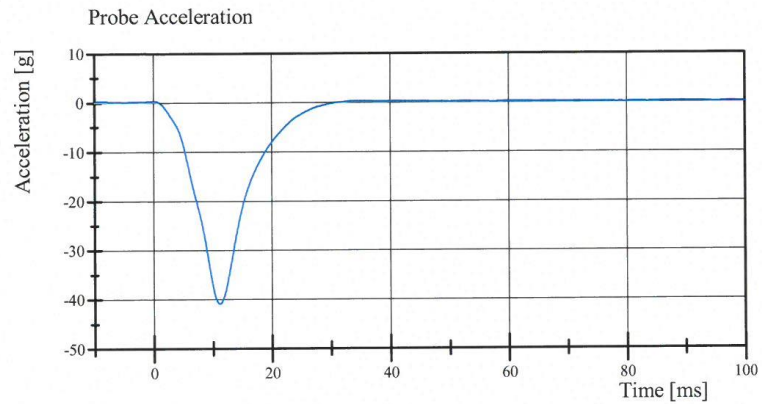


Transportation Research Center Inc.

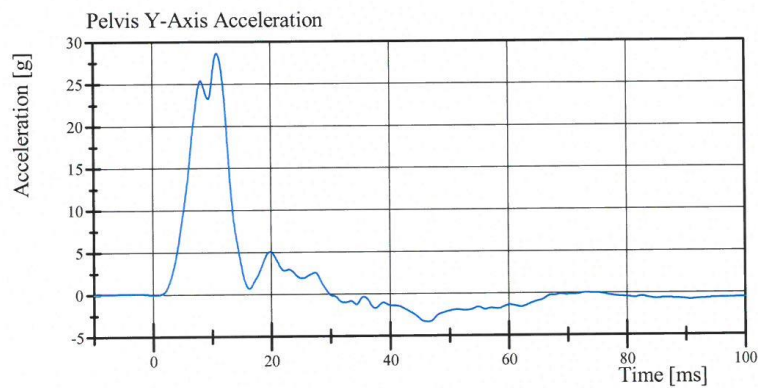
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 51-1

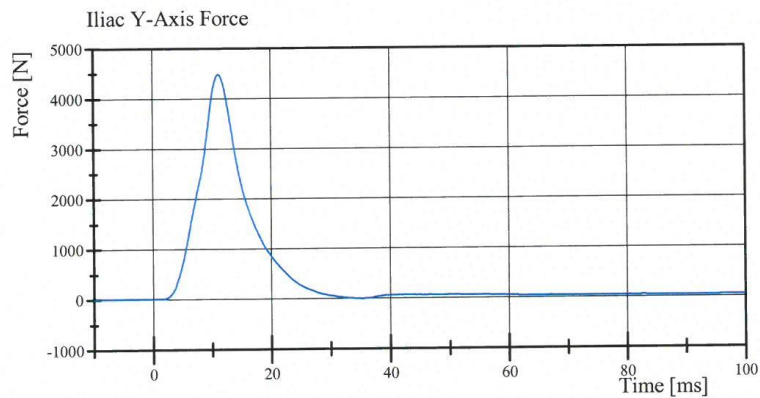
Test Date: 12/9/2016



Filter Class: CFC_180
Max: 0.2 g at 34.0 ms
Min: -41.0 g at 11.1 ms



Filter Class: CFC_180
Max: 28.6 g at 10.9 ms
Min: -3.4 g at 46.3 ms



Filter Class: CFC_600
Max: 4,468.6 N at 11.1 ms
Min: -8.0 N at 35.2 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.09.2016 09:41:53 651



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		P87680	Endevco	21-Sep-16
	Y		P66873	Endevco	10-Nov-16
	Z		P91950	Endevco	6-Oct-16
Redundant Head Accelerometers	X		P94566	Endevco	10-Nov-16
	Y		P94429	Endevco	1-Sep-16
	Z		P94483	Endevco	1-Sep-16
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	29-Sep-16
	Middle	Y	174	FTSS	29-Sep-16
	Lower	Y	173	FTSS	29-Sep-16
Abdomen Load Cells	Front	Y	1441	Denton	18-Mar-16
	Middle	Y	1436	Denton	18-Mar-16
	Rear	Y	1437	Denton	18-Mar-16
Lower Spine Accelerometers (T12)	X		P89126	Endevco	21-Sep-16
	Y		P87139	Endevco	21-Sep-16
	Z		P64884	Endevco	21-Sep-16
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	18-Mar-16

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P90267	Endevco	29-Sep-16
			Y	P93774	Endevco	01-Sep-16
			Z	P91566	Endevco	21-Sep-16
Redundant Head Accelerometers			X	P91615	Endevco	21-Sep-16
			Y	P93762	Endevco	01-Sep-16
			Z	P93761	Endevco	01-Sep-16
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	29-Sep-16
		Middle	Y	1161	Servo	29-Sep-16
		Lower	Y	037	Servo	29-Sep-16
	Abdominal Rib	Upper	Y	1295	Servo	29-Sep-16
		Lower	Y	1136	Servo	29-Sep-16
Lower Spine Accelerometers (T12)			X	P94545	Endevco	15-Sep-16
			Y	P94647	Endevco	21-Sep-16
			Z	P94530	Endevco	1-Sep-16
Acetabulum Load Cell			Y	103-FY	FTSS	13-Jun-16
Iliac Wing Load Cell			Y	287-FY	Denton	22-Mar-16
Pelvis Plug (struck side)				11034	SACO	08-Apr-16
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	P94511	Endevco	3-Nov-16
	Vehicle Center of Gravity	Y	P88548	Endevco	26-Oct-16
	Vehicle Center of Gravity	Z	P88463	Endevco	26-Oct-16
2	Right Sill at Front Seat	X	P94489	Endevco	31-Oct-16
	Right Sill at Front Seat	Y	P94550	Endevco	26-Jul-16
	Right Sill at Front Seat	Z	P94426	Endevco	26-Jul-16
3	Right Sill at Rear Seat	X	P46005	Endevco	20-Jul-16
	Right Sill at Rear Seat	Y	P93521	Endevco	25-Jul-16
	Right Sill at Rear Seat	Z	P93516	Endevco	25-Jul-16
4	Left Sill at Front Door	Y	P91186	Endevco	16-Nov-16
5	Left Sill at Rear Door	Y	P93551	Endevco	16-Nov-16
6	Left A-Post Lower	Y	P88468	Endevco	25-Jul-16
7	Left A-Post Middle	Y	P63151	Endevco	25-Jul-16
8	Left B-Post Lower	Y	P91196	Endevco	30-Sep-16
9	B-Post Middle	Y	P41252	Endevco	30-Sep-16
10	Front Seat Track	Y	P94555	Endevco	16-Nov-16
11	Rear Seat Track or Structure	Y	P41298	Endevco	10-Nov-16
12	Right Rear Occupant Compartment	Y	P34025	Endevco	16-Nov-16
13	Engine Block	X	P61285	Endevco	28-Sep-16
	Engine Block	Y	P82047	Endevco	28-Sep-16
14	Rear Floorpan Above Axle	X	P91184	Endevco	10-Nov-16
	Rear Floorpan Above Axle	Y	P94541	Endevco	26-Jul-16
	Rear Floorpan Above Axle	Z	P94424	Endevco	31-Oct-16

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P94552	Endevco	26-Jul-16
MDB Center of Gravity	Y	P94553	Endevco	26-Jul-16
MDB Center of Gravity	Z	P94546	Endevco	26-Jul-16
Left Frame Rail at Rear Axle Centerline	X	P93518	Endevco	25-Jul-16
Left Frame Rail at Rear Axle Centerline	Y	P93537	Endevco	25-Jul-16