

FINAL REPORT NUMBER: SPNCAP-TRC-17-005

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**DAIMLER AG STUTTGART
2017 Mercedes-Benz E-Class Sedan
NHTSA NUMBER: M20174301**

**PREPARED BY:
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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: _____

FINAL REPORT ACCEPTANCE BY OCWS:

COTR, New Car Assessment Program
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Date: _____

Technical Report Documentation Page

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16. Abstract A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject vehicle, a 2017 Mercedes-Benz E-Class Sedan, in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on December 6, 2016. The impact velocity was 32.05 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 test vehicle's post-test maximum crush was 282 mm at Level 3. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th><th>Unit</th><th>Threshold</th><th>Front SID-IIs</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆):</td><td>NA</td><td>1000</td><td>326</td></tr> <tr> <td>Resultant Lower Spine Acceleration:</td><td>g's</td><td>82</td><td>42.9</td></tr> <tr> <td>Total Pelvic Force:</td><td>N</td><td>5525</td><td>3719.7</td></tr> <tr> <td>(sum of acetabular and iliac forces)</td><td></td><td></td><td></td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>18.0</td></tr> <tr> <td>Maximum Abdomen Rib Deflection</td><td>mm</td><td>45*</td><td>21.4</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					Unit	Threshold	Front SID-IIs	Head Injury Criteria (HIC ₃₆):	NA	1000	326	Resultant Lower Spine Acceleration:	g's	82	42.9	Total Pelvic Force:	N	5525	3719.7	(sum of acetabular and iliac forces)				Maximum Thoracic Rib Deflection	mm	38*	18.0	Maximum Abdomen Rib Deflection	mm	45*	21.4
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																													
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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 17 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 manufactured by DAIMLER AG STUTTGART. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a model year 2017 Mercedes-Benz E-Class Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.05 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on December 6, 2016. Pre-test and post-test photographs of the test vehicle and the side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Primary and Redundant Head CG Triaxial Accelerometers
- Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
- Abdomen Upper and Lower Rib Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Iliac Load Cell
- Acetabulum Load Cell

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 contains the test equipment and instrumentation calibration data.

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	NA	1000	326
Lower Spine Acceleration Resultant	G	82	42.9
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3719.7
Maximum Thoracic Rib Deflection	mm	38*	18.0
Maximum Abdominal Rib Deflection	mm	45*	21.4

* Proposed IARV

Supplemental restraint information is given below:

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

GENERAL COMMENTS

None

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: SPNCAP Side Impact

NHTSA No.: M20174301
Test Date: 12/6/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20174301
Model Year	2017
Make	Mercedes-Benz
Model	E300
Body Style	Sedan
VIN	WDDZF4JB5HA012363
Body Color	Lunar Blue Metallic
Odometer Reading (km/mi)	27 mi
Engine Displacement (L)	2.0 T
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	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	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 Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. 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 Manufacturer	03/16
Vehicle Type	Passenger Car

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

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Vehicle Capacity Weight (VCW) (kg)				485
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				144.8

VEHICLE SEAT TYPE

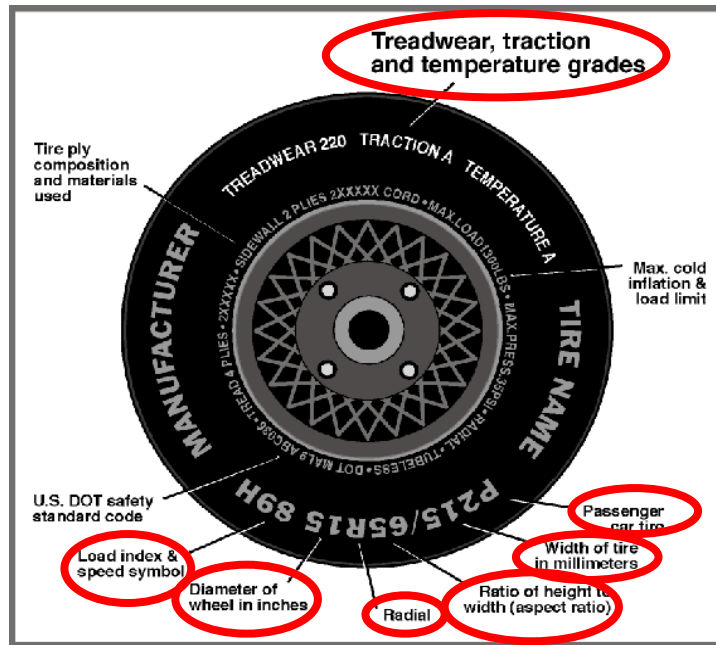
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	Yes	N/A	N/A		N/A	Yes	N/A
Rear or Second Row Seat	N/A	N/A	Yes	N/A	Yes	N/A	N/A
Third row seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

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

NHTSA No.: M20174301
 Test Date: 12/6/16



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	260	310
Recommended Tire Size	245/45R19	275/35R19
Tire Size on Vehicle	245/45R19	275/35R19
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Eagle F1	Eagle F1
Treadwear	300	300
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	98Y	100Y
Tire Material	Polyester/Steel/Polyamide	Polyester/Steel/Polyamide
DOT Safety Code Left	DM66 KB1R 0816	DMBN JJ1R 0916
DOT Safety Code Right	DM66 KB1R 0816	DMBN JJ1R 0916

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174301

Test Program: SPNCAP Side Impact

Test Date: 12/6/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	180	190	180	180
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

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	465.8	418.4		471.0	510.2		472.8	510.2	
Right	kg	460.8	417.6		460.6	506.6		462.4	502.2	
Ratio	%	53.0	47.0		47.8	52.2		48.0	52.0	
Totals	kg	926.6	836.0	1762.6	931.6	1016.8	1948.4	935.2	1012.4	1947.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total As Delivered Weight (UVW)	kg	1762.6
Actual Weight of 1 P572V ATD (SID-1Is) Dummy Used	kg	49.0
Rated Cargo/Luggage Weight (RCLW)	kg	144.8
Calculated Vehicle Target Weight (TVTW)	kg	1956.4

(A)

(B)

(C)

(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

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.6	-0.2	+0.7	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.3	-0.2	+0.8	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	0	0	0	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	0	0	0	Yes
Vehicle CG (Aft of Front Axle)	mm	1394	1534	1528	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+3	+6	+8	

*ND=Nose Down (-), NU=Nose Up (+) **LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for "Meets Requirements".

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in cargo area	80.7
Components removed: None	0.0

Test height adjustable suspension setting, if applicable:

N/A

DATA SHEET NO. 2

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

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174301

Test Program: SPNCAP Side Impact

Test Date: 12/6/16

SEAT POSITIONING

The driver seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, 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	22.1	12.2	17.1
Front Passenger Seat	21.8	11.4	16.6
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	17.1	146	Max	159	171	182
			Mid	121	132	146
			Min	83	96	110
Front Passenger Seat	16.6	158	Max	169	181	194
			Mid	132	145	158
			Min	96	109	122
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

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: SPNCAP Side Impact

NHTSA No.: M20174301
 Test Date: 12/6/16

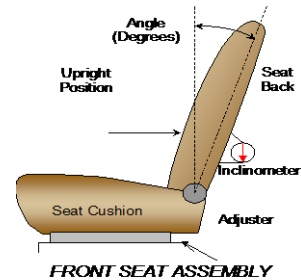
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	257	N/A	0	N/A
Front Passenger Seat	257	N/A	0	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A	N/A

* If applicable.

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. 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 passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1. For the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match 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	63.5	N/A	13.2	N/A
Front Passenger Seat	63.0	N/A	13.4	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A	N/A

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	5, numbered from 0 to 4	4, Uppermost

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	Power (50 mm travel)	Lowest & forwardmost

DATA SHEET NO. 2 (CONTINUED)

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

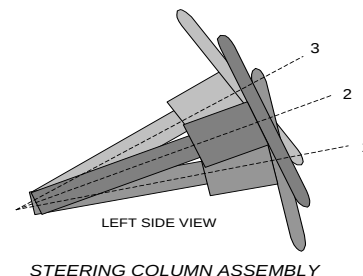
Test Vehicle: 2017 Mercedes-Benz E-Class Sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20174301
 Test Date: 12/6/16

STEERING COLUMN ADJUSTMENT

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

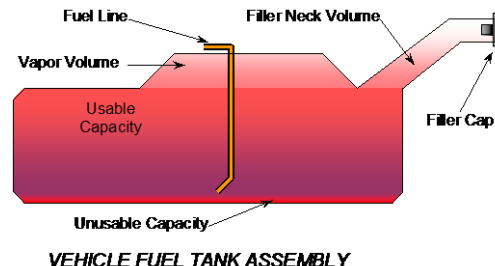
	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	18.4	
Geometric Center, Position No. 2	20.6	
Uppermost, Position No. 3	22.1	
Telescoping Steering Wheel Travel		54
Test Position	20.6	27



FUEL PUMP

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

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

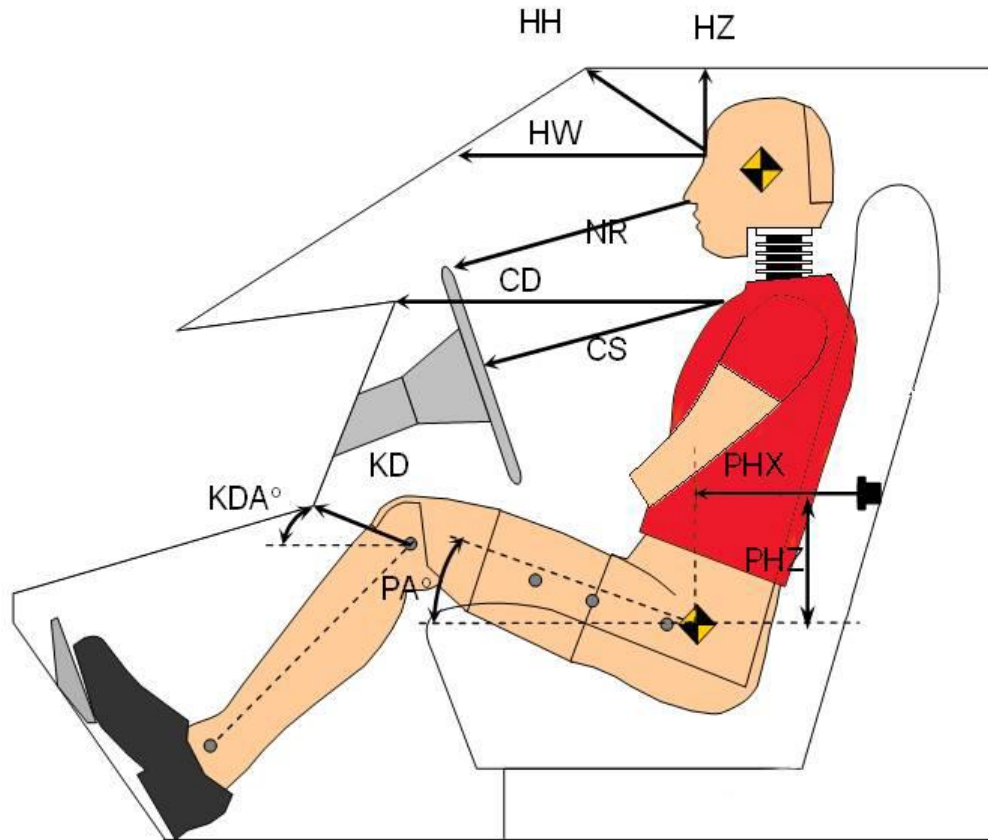
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	65.9
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	66.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	61.3
Actual Amount of Solvent Used in Test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

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

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

NHTSA No.: M20174301
 Test Date: 12/6/16

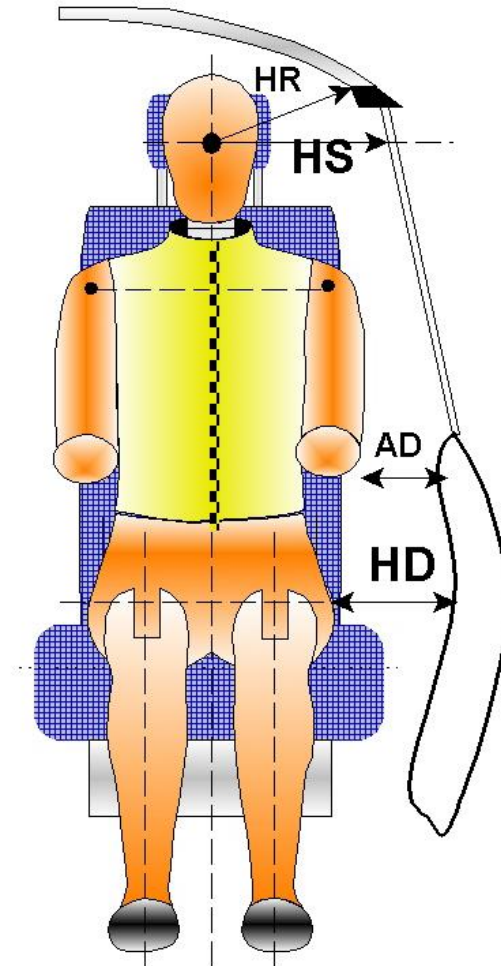


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	242	
HW	Head to Windshield	506	
HZ	Head to Visor	144	
NR	Nose to Rim	220	
CD	Chest to Dashboard	389	
CS	Chest to Steering Wheel	163	
KDL/KDLA°	Left Knee to Dash	133	36.5
KDR/KDRA°	Right Knee to Dash	128	35.7
PAX°	Pelvic Tilt Angle (X-axis)		0.4
PAY°	Pelvic Tilt Angle (Y-axis)		20.6
PHX	Hip Point to Striker (X-Axis)	302	
PHZ	Hip Point to Striker (Z-Axis)	198	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

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

NHTSA No.: M20174301
Test Date: 12/6/16

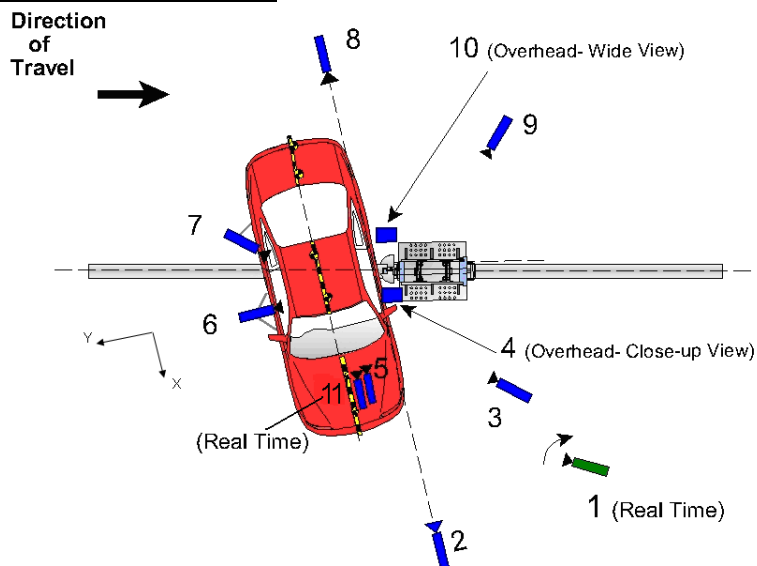


Code	Measurement Description	Length (mm)
HR	Head to Side Header	124
HS	Head to Side Window	368
AD	Arm to Door	132
HD	Hip Point to Door	161

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

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

NHTSA No.: M20174301
 Test Date: 12/6/16



REFERENCE: (from point of impact for X and Y; from ground for Z)
 + X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real time (24-30 fps) pan view of impact				Zoom	30
2	Front ground level – impact view	0	4108	1230	25	1000
3	Impact side 45° – forward pole view	1063	5280	1240	20	1000
4	Overhead Close-up view of impact	0	0	5700	50	1000
5	Onboard – dummy front view				25	1000
6	Onboard – dummy side view				12.5	1000
7	Onboard – dummy rear oblique view				8.5	1000
8	Rear ground level – impact view	0	-4942	1220	20	1000
9	Impact side 45° – rearward pole view	2546	-4260	1180	20	1000
10	Overhead wide view of impact	-150	410	5703	18	1000
11	Real time dummy front view				Zoom	30

All measurements accurate to +/- 6 mm.

NOTE: Vehicle was at a 75° angle to the rigid pole.

If applicable, explain why camera(s) did not run: Not Applicable

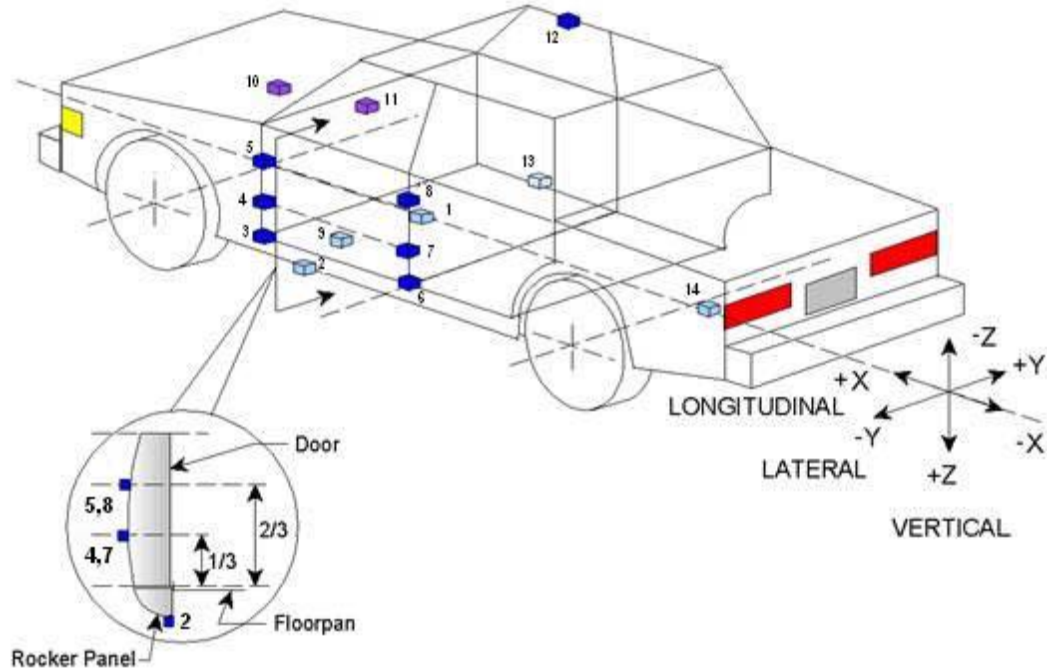
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
TOTAL	42

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

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

NHTSA No.: M20174301
 Test Date: 12/6/16



Accelerometer/Sensor Location				
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3070	185	-340
2	Left Floor Sill	2965	-733	-353
3	A-Pillar Sill	3260	-718	-345
4	A-Pillar Low	3340	-803	-502
5	A-Pillar Mid	3330	-803	-800
6	B-Pillar Sill	2140	-723	-286
7	B-Pillar Low	2290	-983	-505
8	B-Pillar Mid	2247	-963	-865
9	Driver Seat Track	2512	-578	-305
10	Engine Top	4225	-15	-864
11	Firewall	3755	0	-890
12	Right Roof	2180	55	-1422
13	Right Floor Sill	2980	733	-352
14	Rear Floorpan	890	-7	-455

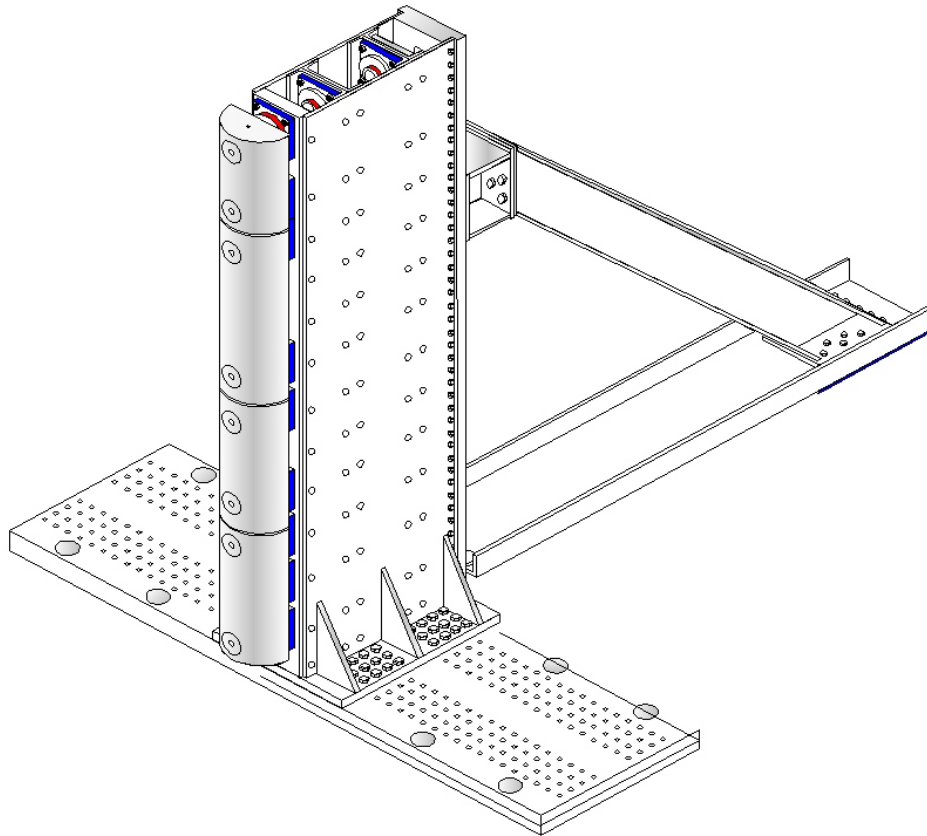
Reference: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

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

NHTSA No.: M20174301
Test Date: 12/6/16

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Top of Carrier (mm)
1	87
2	468
3	648
4	978
5	1168
6	1651
7	1816
8	2057

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

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

NHTSA No.: M20174301
Test Date: 12/6/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	SCAB
Top of Head	SCAB
Left Side of Head	SCAB
Back of Head	SCAB, Head restraint
Left Shoulder	SAB, Door panel
Upper Torso	Seat back bolster, SAB
Lower Torso	Seat back bolster
Left Hip	Seat cushion bolster, SAB, Door panel
Left Knee	Door panel

POST-TEST DOOR PERFORMANCE

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

* Indicate "Yes", "No", or "NA".

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	N/A	No	N/A
Seat Back Collapse	No	No	No	N/A

* Indicate "Yes", "No", or "NA".

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Moderate Deformation
Sill Separation	None
Windshield Damage	Shattered across entire width
Side Window Damage	Driver 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: SPNCAP Side Impact

NHTSA No.: M20174301
 Test Date: 12/6/16

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

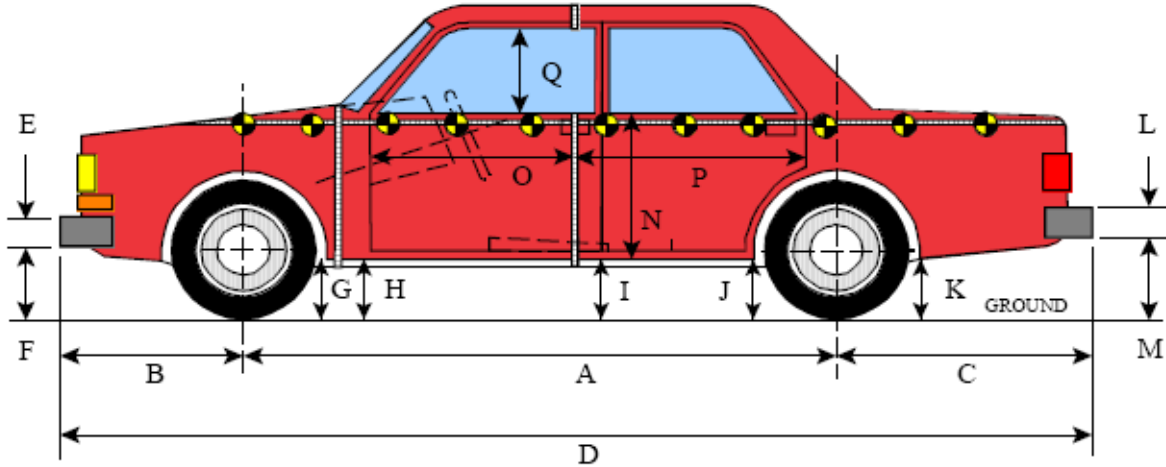
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1350
Actual Impact Point (Aft of Front Axle)	mm		1348
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	+2
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.05
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.05

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

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

NHTSA No.: M20174301
 Test Date: 12/6/16



LEFT SIDE VIEW

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

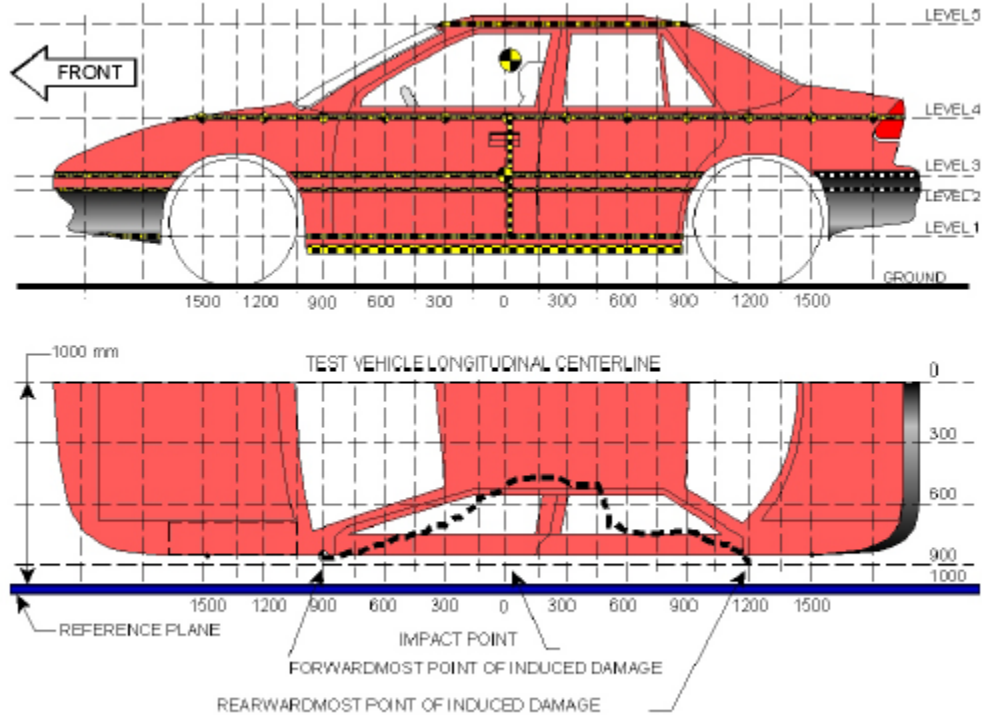
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2940	2912	28
B	Front Axle to Front Surface of Vehicle	850	850	0
C	Rear Axle to Rear Surface of Vehicle	1155	1155	0
D	Total Length at Centerline	4945	4915	30
E	Front Bumper Thickness	117	117	0
F	Front Bumper Bottom to Ground	415	436	-21
G	Sill Height at Front Wheel Well	212	225	-13
H	Sill Height at Front Door Leading Edge	220	230	-10
I	Sill Height at B-Pillar	225	237	-12
J1	Sill Height at Rear Wheel Well	223	267	-44
J2	Pinch Weld Height at Rear Wheel Well	160	180	-20
K	Sill Height Aft of Rear Wheel Well	304	331	-27
L	Rear Bumper Thickness	100	100	0
M	Rear Bumper Bottom to Ground	483	512	-29
N	Sill Height to Bottom of Front Window Sill	755	755	0
O	Front Door Leading Edge to Impact CL	680	582	98
P	Rear Door Trailing Edge to Impact CL	1581	1532	49
Q	Front Window Opening	420	381	39
R	Right Side Length	4765	4767	-2
S	Left Side Length	4765	4745	20
T	Vehicle Width at B-Pillars	1860	1782	78

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

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

NHTSA No.: M20174301
 Test Date: 12/6/16



NOTE: All measurements are in millimeters (mm)

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	342	226	-150 to 0
2	Occupant H-Point	534	259	0
3	Mid-Door	651	282	-150
4	Window Sill	933	257	-150
5	Window Top	1410	58	150

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

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

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

NHTSA No.: M20174301
 Test Date: 12/6/16

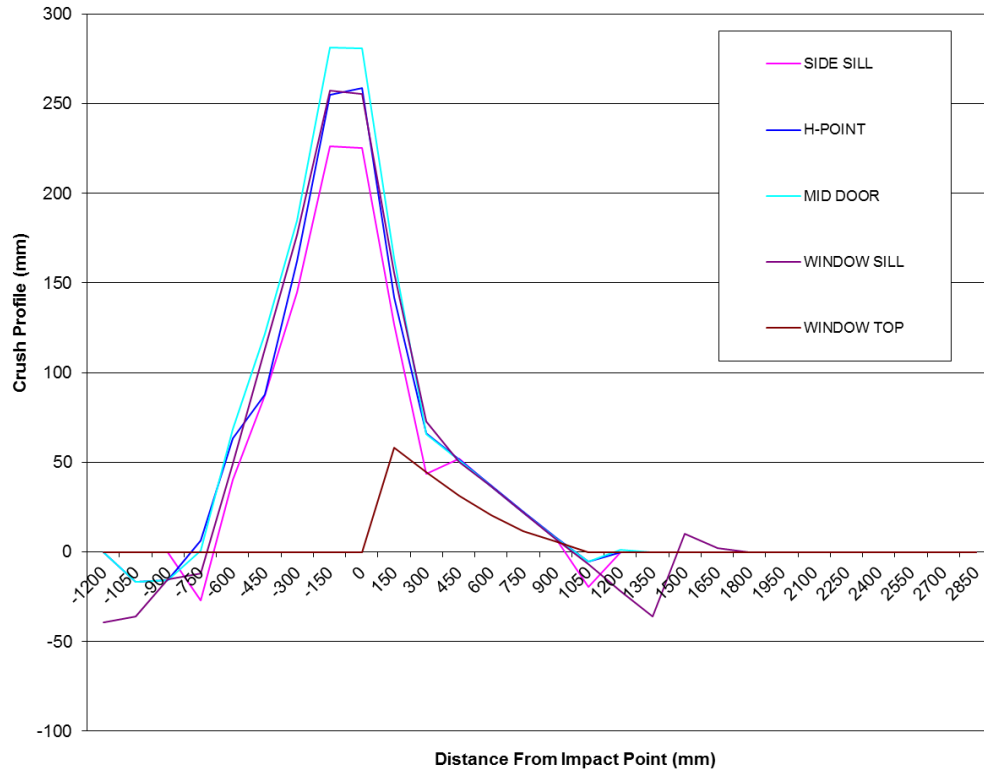
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1200	0	0	919	747	0	0	0	937	786	0	0	0	-18	-39	0
-1050	900	914	915	785	0	935	931	932	821	0	-35	-17	-17	-36	0
-900	899	911	916	812	0	918	926	932	828	0	-19	-15	-16	-16	0
-750	900	909	916	825	0	927	902	916	837	0	-27	7	0	-12	0
-600	900	909	918	835	0	860	846	849	786	0	40	63	69	49	0
-450	900	910	919	847	0	813	822	797	734	0	87	88	122	113	0
-300	900	911	920	856	0	756	748	735	679	0	144	163	185	177	0
-150	900	911	921	862	0	674	656	639	605	0	226	255	282	257	0
0	900	911	921	868	0	674	652	640	612	0	226	259	281	256	0
150	899	911	921	864	569	772	769	757	708	511	127	142	164	156	58
300	899	910	919	875	592	855	844	854	802	548	44	66	65	73	44
450	897	911	919	875	597	845	859	868	825	566	52	52	51	50	31
600	896	911	919	876	598	859	874	883	839	578	37	37	36	37	20
750	895	911	919	876	597	873	889	897	854	585	22	22	22	22	12
900	894	910	917	875	587	886	902	910	868	581	8	8	7	7	6
1050	892	914	919	871	551	911	919	924	878	552	-19	-5	-5	-7	-1
1200	0	0	923	858	0	0	0	922	880	0	0	0	1	-22	0
1350	0	0	0	863	0	0	0	0	899	0	0	0	0	-36	0
1500	0	0	0	857	0	0	0	0	846	0	0	0	0	11	0
1650	0	0	0	847	0	0	0	0	845	0	0	0	0	2	0
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2250	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. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

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

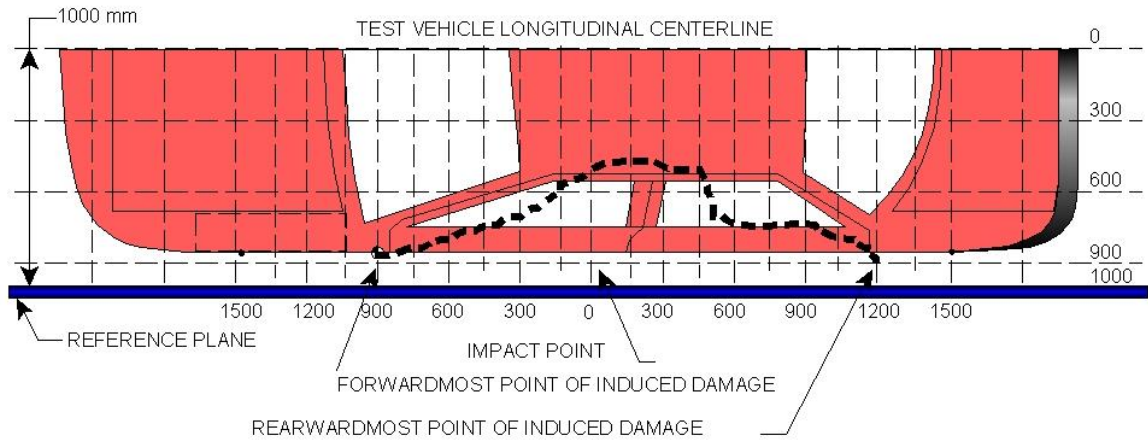
NHTSA No.: M20174301
Test Date: 12/6/16



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

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

NHTSA No.: M20174301
 Test Date: 12/6/16



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	1650	4	845	847	2
2	1200	3	922	923	1
3	750	1	873	895	22
		2	889	911	22
		3	897	919	22
		4	854	876	22
4	150	3	757	921	164
5	-300	3	735	920	185
6	-750	2	902	909	0

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

DATA SHEET NO. 12

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2017 Mercedes-Benz E-Class Sedan

NHTSA No.: M20174301

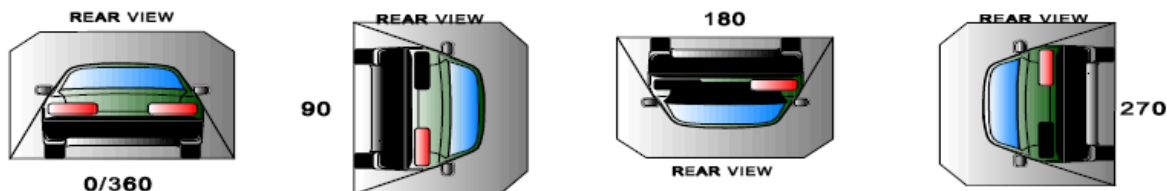
Test Program: SPNCAP Side Impact

Test Date: 12/6/16

Test Time: 15:30 Temperature: 21.3°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
(Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0
(Maximum allowable is 1 ounce/minute)
- D. Spillage Data1LS: 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	0
90 to 180	0	0	0	0
180 to 270	0	0	0	0
270 to 360	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

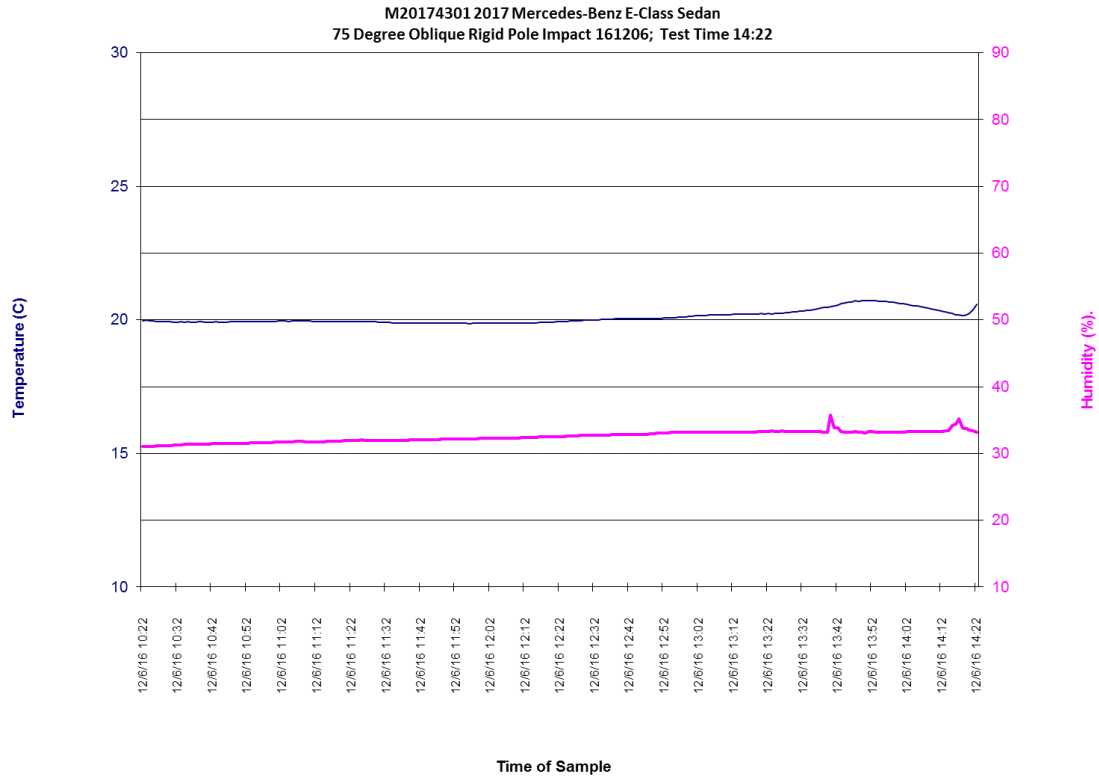
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

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

NHTSA No.: M20174301
Test Date: 12/6/16



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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2	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-6
6	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-6
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21	Pre-Test Front Close-Up View of Dummy Head and Chest	A-14
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23	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-15
24	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-16
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27	Pre-Test Front View of Dummy Head and Shoulders in Relation to Head Restraint	A-17
28	Pre-Test Front View of Seat Pan Prior to Dummy Positioning	A-18
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-18
30	Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-19
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39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
40	Pre-Test Dummy and Door Clearance View	A-24
41	Post-Test Dummy and Door Clearance View	A-24
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49	Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-29
50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-29
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-30
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-30
53	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-31
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66	FMVSS No. 301 Static Rollover 270 Degrees	A-37
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71	Post-Test View of Shattered Vehicle Inner Door Panel	A-40



No. 001 As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



No. 002 As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 003 Pre-Test Frontal View of Test Vehicle



No. 004 Post-Test Frontal View of Test Vehicle



No. 005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



No. 006 Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



No. 007 Pre-Test Left Side View of Test Vehicle



No. 008 Post-Test Left Side View of Test Vehicle



No. 009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 010 Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 011 Pre-Test Rear View of Test Vehicle



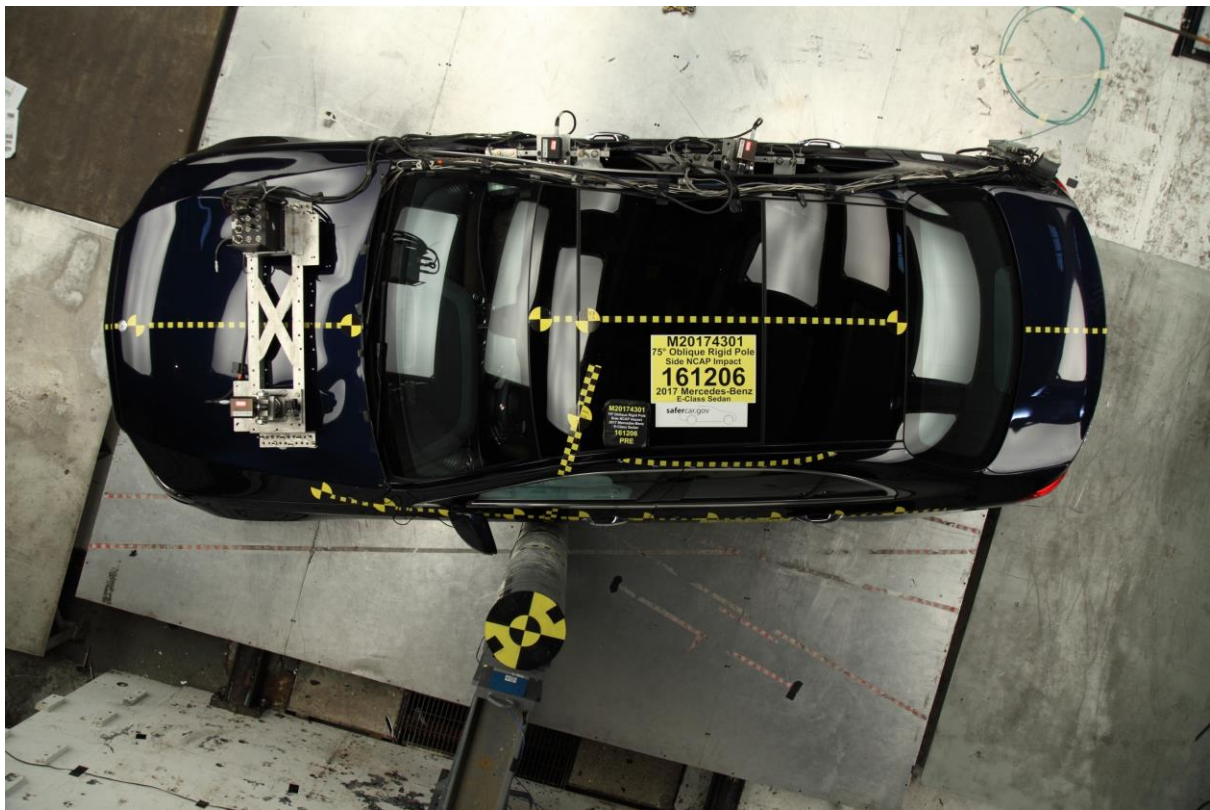
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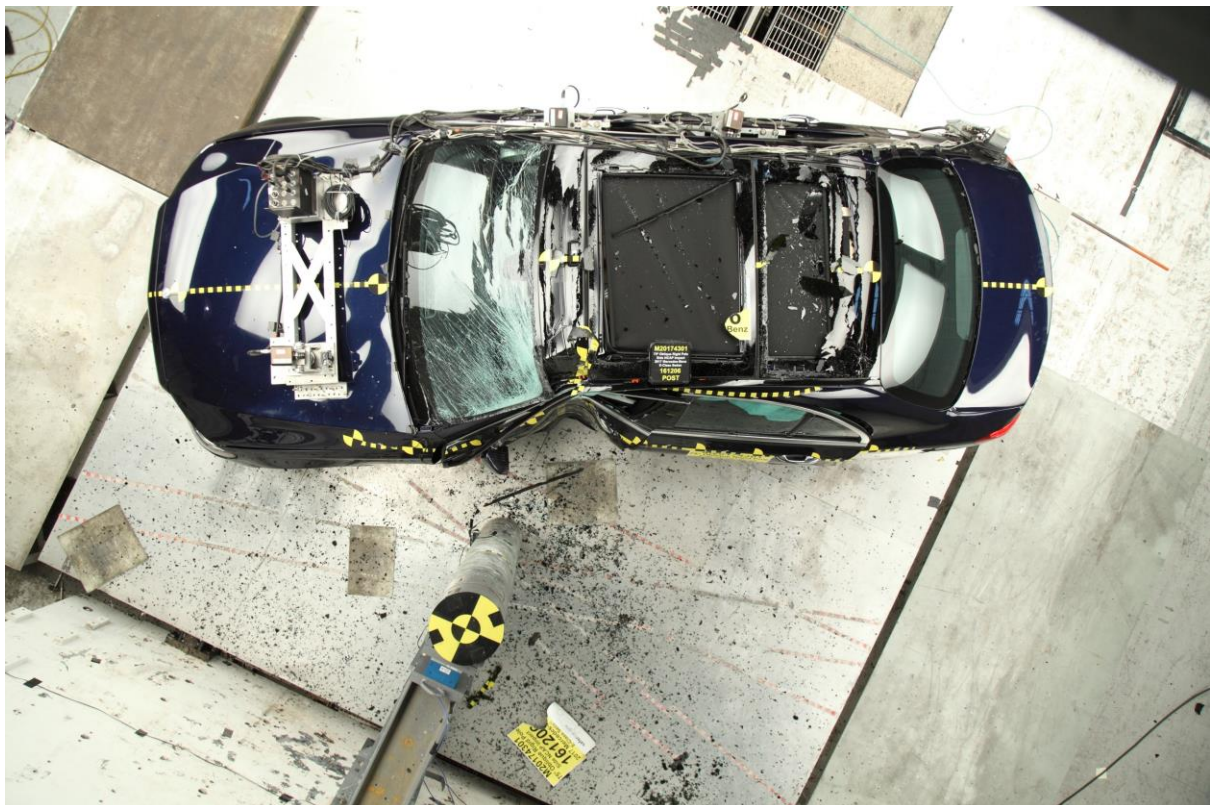
No. 013 Pre-Test Right Side View of Test Vehicle



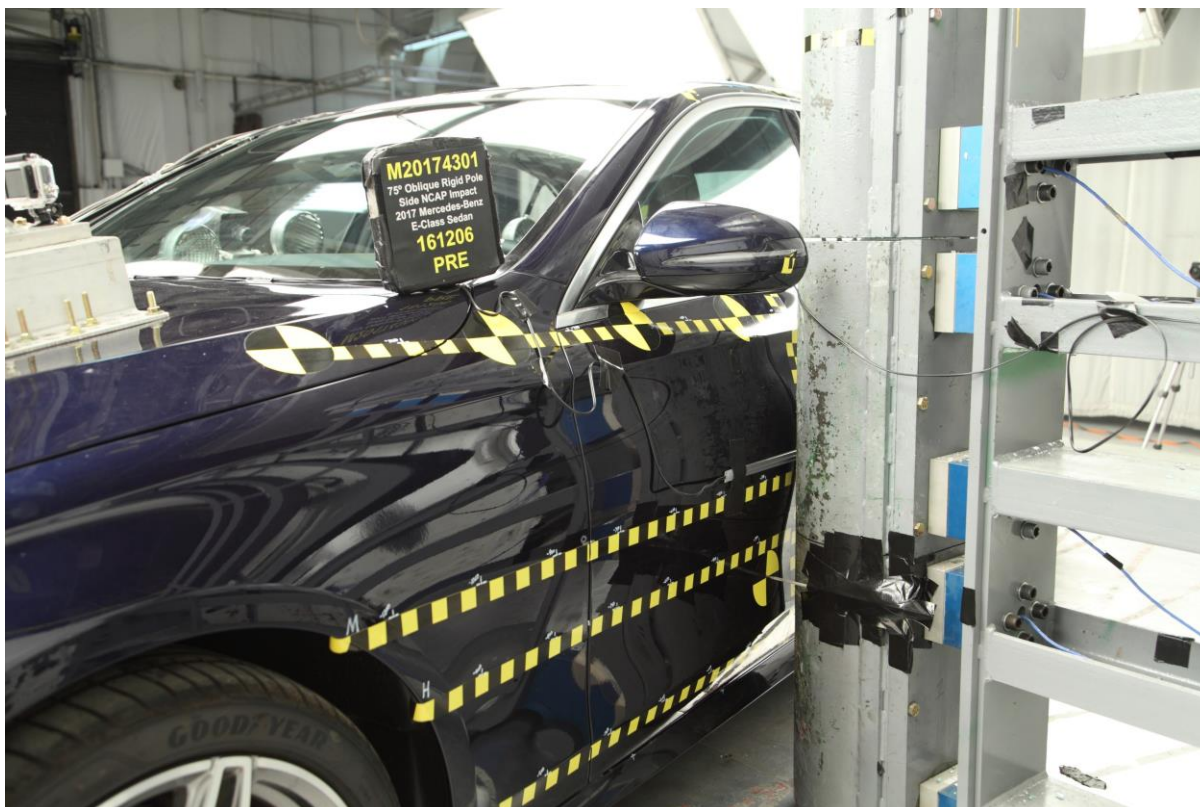
No. 014 Post-Test Right Side View of Test Vehicle



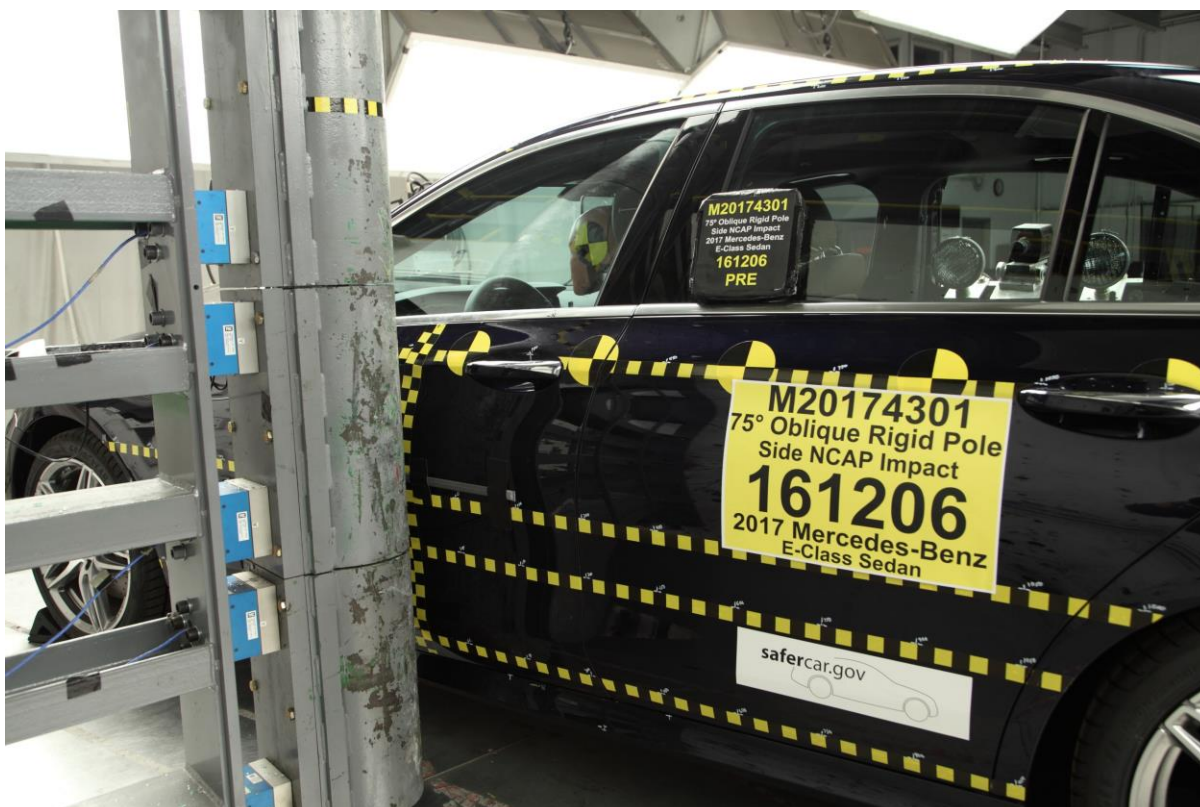
No. 015 Pre-Test Overhead View of Test Area



No. 016 Post-Test Overhead View of Test Area



No. 017 Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



No. 018 Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



No. 019 Pre-Test Close-Up View of Impact Point Target



No. 020 Post-Test Close-Up View of Impact Point Target Showing Impact Location



No. 021 Pre-Test Front Close-Up View of Dummy Head and Chest



No. 022 Post-Test Front Close-Up View of Dummy



No. 023 Pre-Test Left Side View of Dummy Showing Belt and Chalking

Intentionally Left Blank



No. 024 Pre-Test Left Side View of Dummy Shoulder and Door Top View



No. 025 Post-Test Left Side View of Dummy Shoulder and Door Top View



No. 026 Pre-Test Front View of Seat Back Prior to Dummy Positioning



No. 027 Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



No. 028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning



No. 029 Pre-Test Overhead View of Dummy Thighs on Seat Pan



No. 030 Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket



No. 031 Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level



No. 032 Pre-Test Placement of Dummy Feet



No. 033 Pre-Test View of Belt Anchorage for Dummy



No. 034 Pre-Test Left Side View of Steering Wheel



No. 035 Pre-Test View of Disengaged Parking Brake



No. 036 Pre-Test View of Parking Brake



No. 037 Pre-Test Close-Up Left Side View of Driver Seat Track



No. 038 Pre-Test Close-Up Left Side View of Driver Seat Back



No. 039 Pre-Test Close-Up View of Driver Seat Back or Head Restraint



No. 040 Pre-Test Dummy and Door Clearance View



No. 041 Post-Test Dummy and Door Clearance View



No. 042 Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



No. 043 Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



No. 044 Pre-Test Inner Door Panel View



No. 045 Post-Test Inner Door Panel View Showing Dummy Contact Location

PHOTO NOT APPLICABLE

No. 046 Post-Test Dummy Close-Up Head Contact with Vehicle Interior View

Intentionally Left Blank



No. 047 Post-Test Dummy Close-Up Head Contact with Side Airbag View



No. 048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



No. 049 Post-Test Dummy Close-Up Torso Contact with Side Airbag View



No. 050 Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



No. 051 Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



No. 052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



No. 053 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



No. 054 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



No. 055 Close-Up View of Vehicle Certification Label



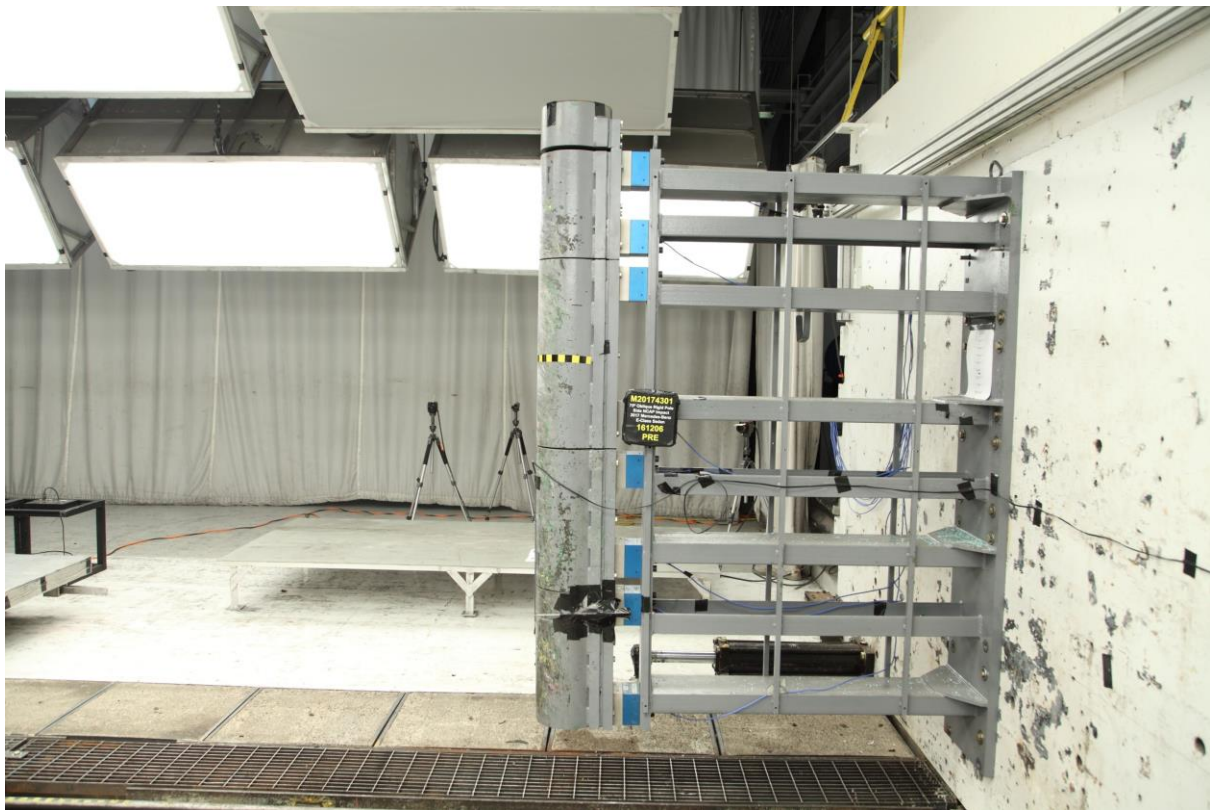
No. 056 Close-Up View of Vehicle Tire Information Placard or Label



No. 057 Pre-Test Pole Barrier Front View



No. 058 Post-Test Pole Barrier Front View



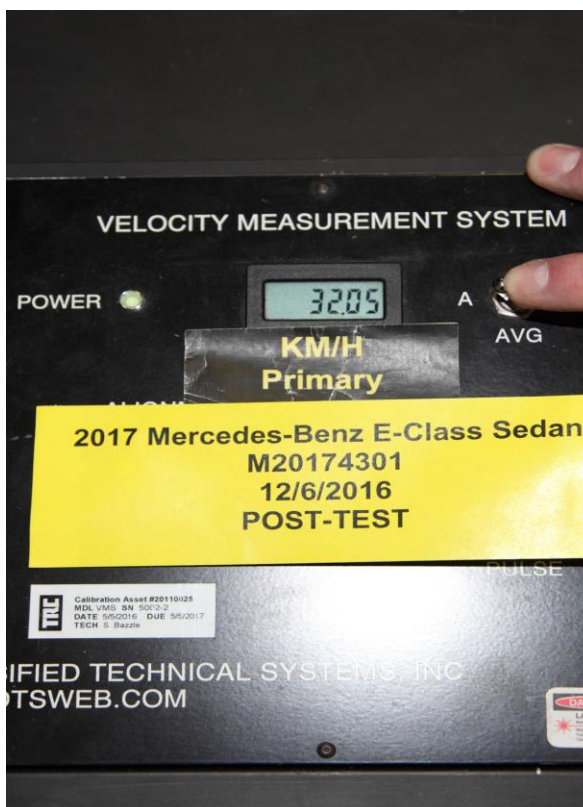
No. 059 Pre-Test Pole Barrier Side View



No. 060 Post-Test Pole Barrier Side View



No. 061 Pre-Test Ballast View



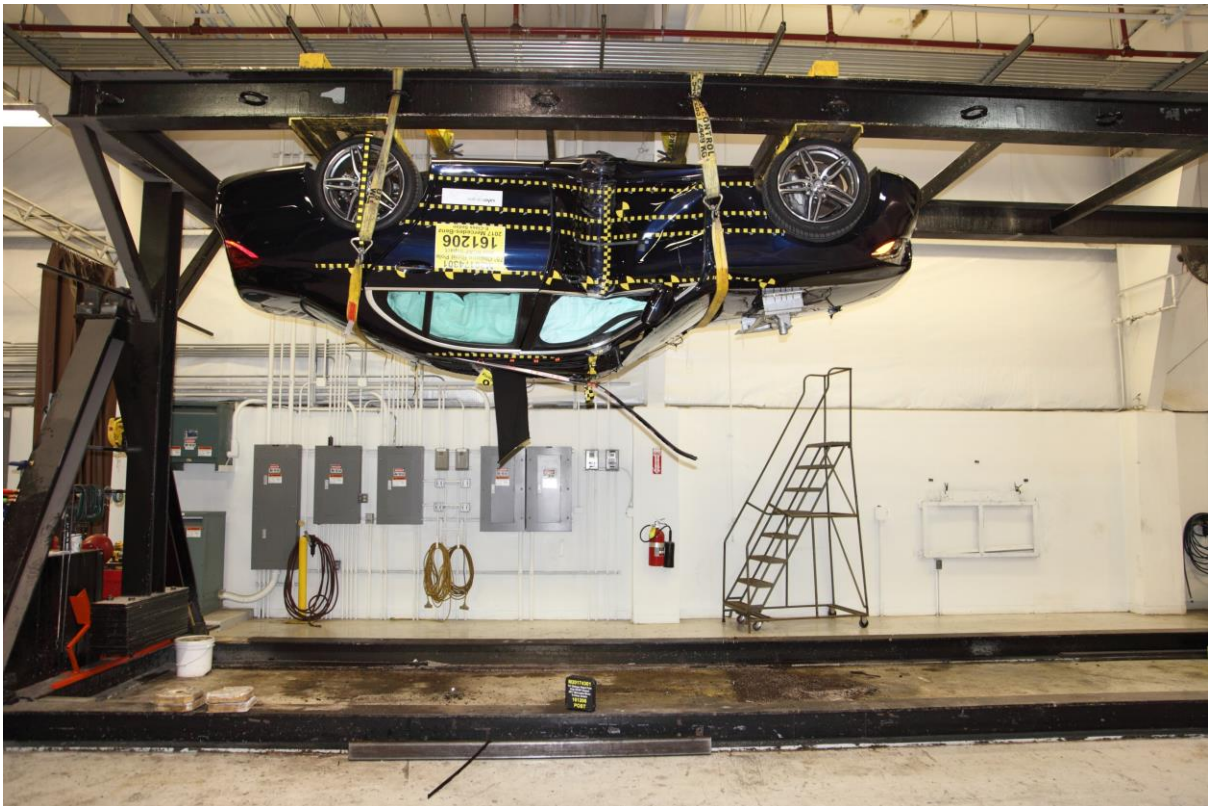
No. 062 Post-Test Primary and Redundant Speed Trap Read Out



No. 063 FMVSS No. 301 Static Rollover 0 Degrees



No. 064 FMVSS No. 301 Static Rollover 90 Degrees



No. 065 FMVSS No. 301 Static Rollover 180 Degrees



No. 066 FMVSS No. 301 Static Rollover 270 Degrees



No. 067 FMVSS No. 301 Static Rollover 360 Degrees



No. 068 Impact Event

2017 E300 Sedan

PO#: 0771718920
VIN: WDDZF4JB5HA012363

Mercedes-Benz

www.MBUSA.com

Standard Features

PERFORMANCE/HANDLING

2.0L Inline-4 Turbo Engine
241 Horsepower
273 hp & Torque
95/100MPH 8-Speed Automatic Transmission
DYNAMIC SELECT
KEYLESS-START
ECO Start/Stop System

COMFORT/CONVENIENCE

Power Tilt/Sliding Sunroof
Bluetooth® Connectivity
Power Front Seats with Memory & Lumbar Support
Slede 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
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
Full LED Taillights
Rear Door Child Safety Locks
Anti-Lock Braking System (ABS)
PRE-SAFE® Predictive Occupant Protection System
PRE-SAFE® Second
SIRTE® Child Seat Anchor System
Brake Assist System (BASR)
Electronic Stability Program (ESP®)
Auto Theft Alarm System

Suggested Retail Price

PAINT/UPHOLSTERY & TRIM

090 Lunar Blue Metallic 720.00
124 Nui Brown/ Black MB-Tex N/C
809 Natural Grain Brown Ash Wood N/C

OPTIONAL EQUIPMENT AND VALUE ADDED PACKAGES

1.8 3-Spoke Multifunction Steering Wheel N/C
RTD 19" AMG Twin 5-Spoke Wheels (SPC) 500.00
413 Panorama Sunroof 1,000.00
677 Lowered Suspension with Selective Damping N/C
810 Burmester® Surround Sound System 850.00
801 High-Performance Tires (SPC) N/C
SPC Special Order 250.00
P63 Premium 1 Package: Rearview Camera, Parking Pilot, NFC Wireless Charging, KEYLESS-GO® with HANDS-FREE ACCESS, Electronic Trunk Closer, Blind Spot Assist, SiriusXM Radio with Free Trial Period, Heated Front Seats 1,100.00

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

Total Retail Price \$60,235.00

EPA DOT Fuel Economy and Environment

Fuel Economy

25 MPG
combined city/hwy

22 MPG
city

30 MPG
highway

4.0 gallons per 100 miles

Mobile 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.

Annual fuel COST \$1,700

Fuel Economy & Greenhouse Gas Rating (subject only)

Smog Rating (subject only)

This vehicle emits 351 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 24.3 MPG and costs \$2,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.40 per gallon. MPGe is miles per gasoline 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 Crash Driver Passenger Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash Front seat Rear seat Not Rated
Based on the risk of injury in a side impact.

Rollover Not Rated
Based on the risk of rollover in a single-vehicle crash.

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

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: SINDELFINGEN, GERMANY
Country of Origin: GERMANY
Engine: GERMANY
Transmission: GERMANY

Ship To: YOUNG & RUBICAM INC. 12500 WILLOW BLVD. CLAYTON, OH 44029

Port of Entry: Brunswick
Transport:

No. 069 Monroney Label

86 Seats and stowing

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

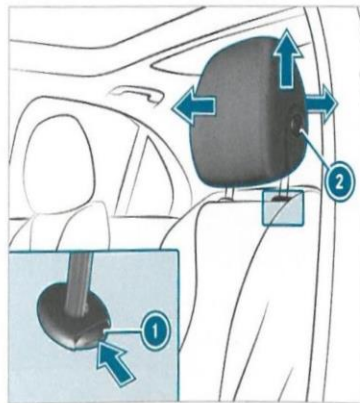
If head restraints are not installed or are adjusted incorrectly, the head restraints cannot provide protection as intended.

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.



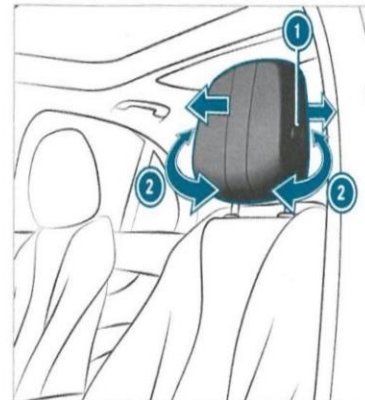
- ▶ To raise: pull the head restraint up.
- ▶ To lower: press release knob ① in the direction of the arrow and push the head restraint down.

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.

No. 070 Head Restraint Use and Adjustment Information from Vehicle Owner Manual

PHOTO NOT APPLICABLE

No. 071 Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

No.	Description	Page
1	Driver Head Acceleration (X) vs. Time	B-4
2	Driver Head Acceleration (Y) vs. Time	B-4
3	Driver Head Acceleration (Z) vs. Time	B-4
4	Driver Head Acceleration Resultant vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Acceleration Resultant vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at:

www.nhtsa.dot.gov.

Additional Driver Dummy Instrumentation Data

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

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
 Left Floor Sill Acceleration (Y)
 Left A-Pillar Sill Acceleration (Y)
 Left Lower A-Pillar Acceleration (Y)
 Left Mid A-Pillar Acceleration (Y)
 Left B-Pillar Sill Acceleration (Y)
 Left Lower B-Pillar Acceleration (Y)
 Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
 Engine Top Acceleration (X)
 Engine Top Acceleration (Y)
 Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (X)
Load Cell Pole Barrier #2 Force (X)
Load Cell Pole Barrier #3 Force (X)
Load Cell Pole Barrier #4 Force (X)
Load Cell Pole Barrier #5 Force (X)
Load Cell Pole Barrier #6 Force (X)
Load Cell Pole Barrier #7 Force (X)
Load Cell Pole Barrier #8 Force (X)

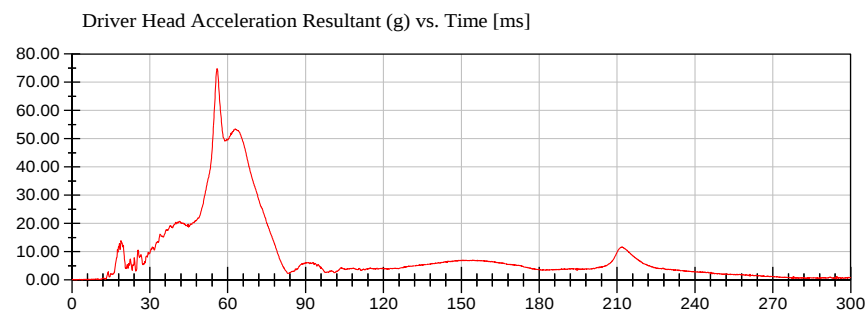
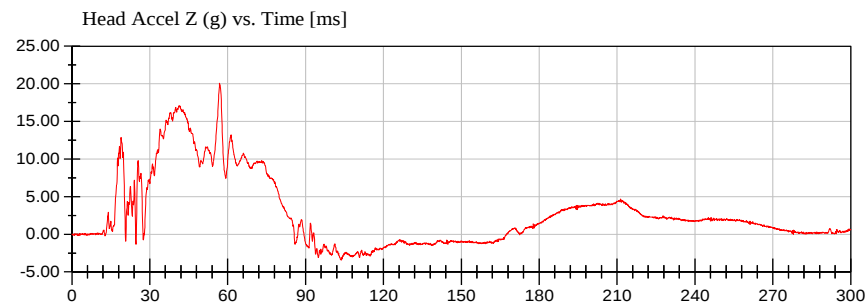
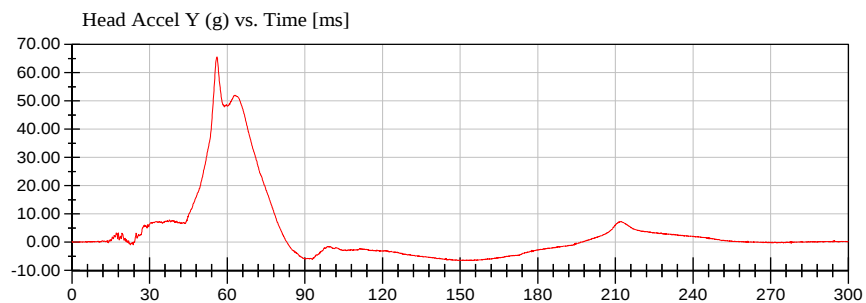
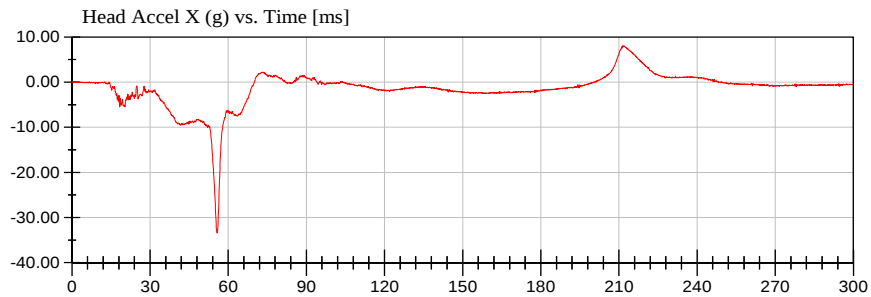
NHTSA

Position #1 SID IIs Dummy (297)

Test Date: 12/06/2016

Test Lab: CTF

Test Number: 161206 ()



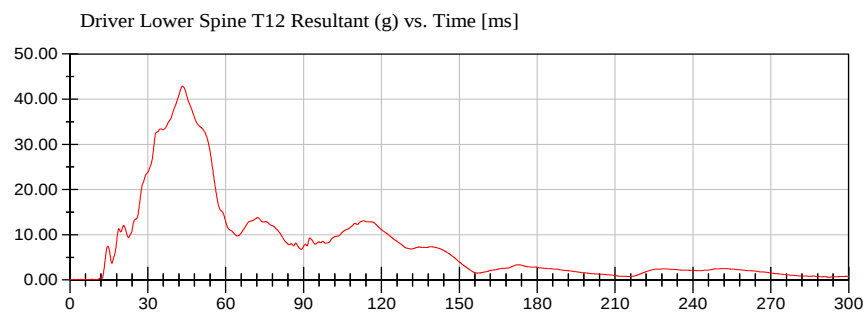
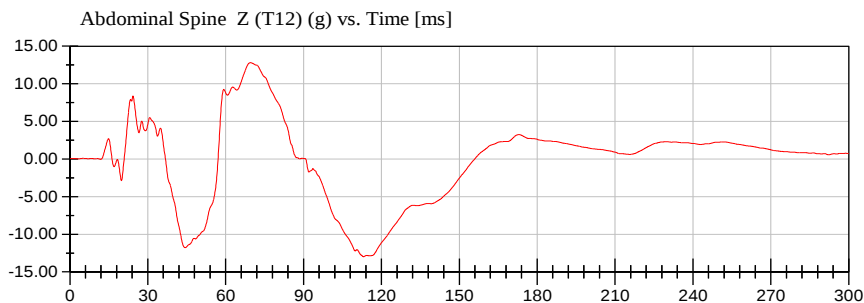
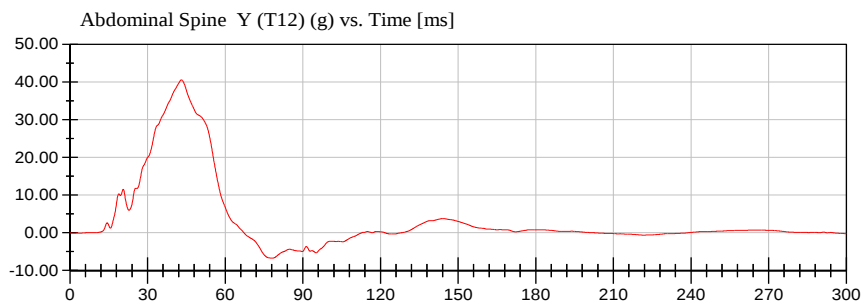
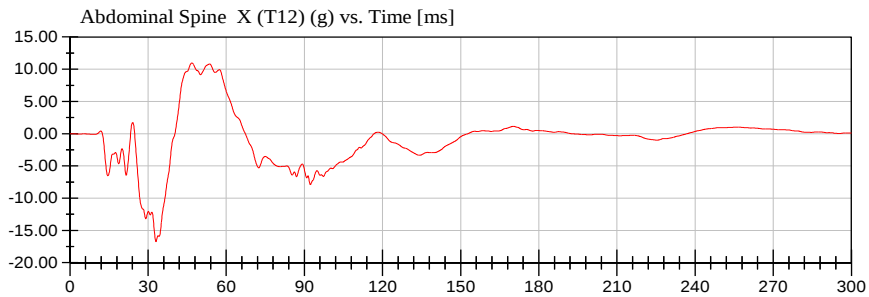
NHTSA

Position #1 SID IIs Dummy (297)

Test Date: 12/06/2016

Test Lab: CTF

Test Number: 161206 ()



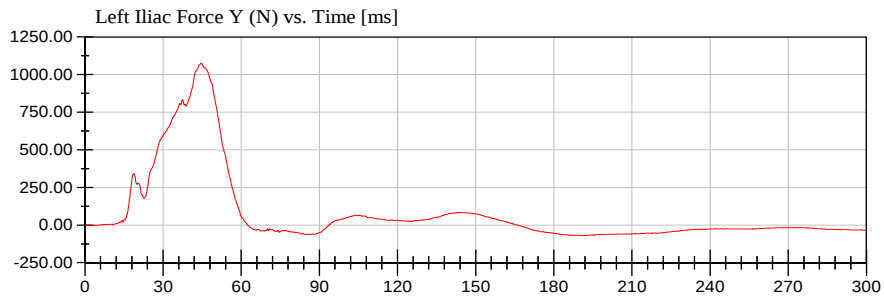
NHTSA

Test Lab: CTF

Test Number: 161206 ()

Position #1 SID IIs Dummy (297)

Test Date: 12/06/2016



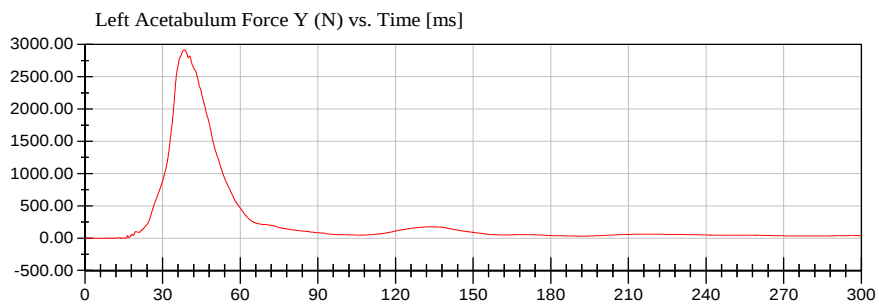
<Max>

1,074.71 N at 44.72 ms

<Min>

-70.13 N at 191.20 ms

CFC_600



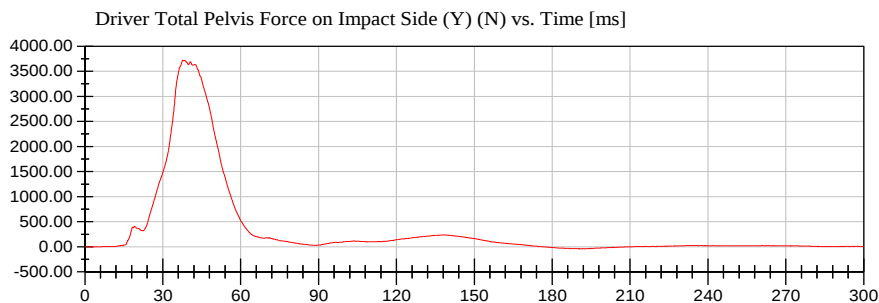
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2,915.55 N at 38.32 ms

<Min>

-1.67 N at 15.92 ms

CFC_600



<Max>

3,719.71 N at 38.40 ms

<Min>

-39.97 N at 191.12 ms

CFC_600



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS
SID-IIs (Driver) Dummy
Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3. 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 297

Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. 297 Calibration No.13

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	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	44	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	221	Yes
P	Foot Length (left)	216.0 - 232.0	221	Yes
Q	Hip Breadth	313.0 - 323.0	319	Yes
R	Arm Length	249.0 - 259.0	254	Yes
S	Knee Joint to seat Back	478.0 - 493.0	487	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	869	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 297 Certification No. 13-1

Test Date: 11/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	131.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-1.6 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

11.16.2016 12:57:56 232

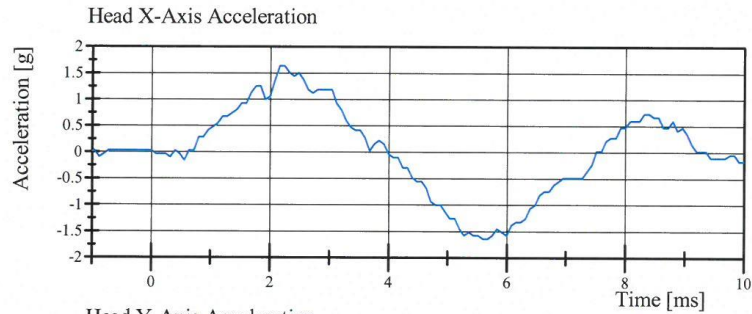


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 297 Certification No. 13-1

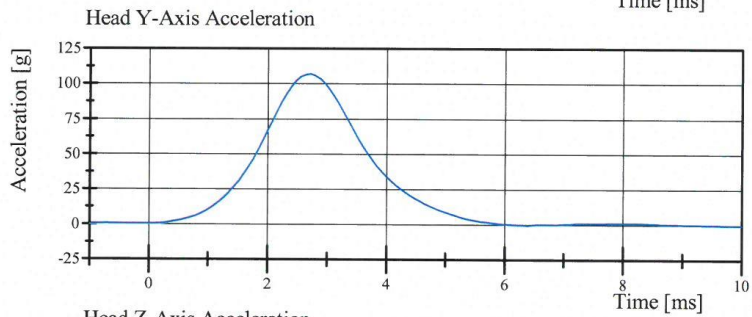
Test Date: 11/16/2016



Filter Class: CFC_1000

Max: 1.6 g at 2.2 ms

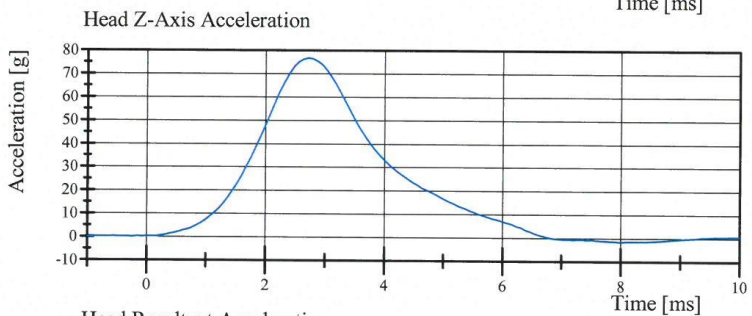
Min: -1.6 g at 5.6 ms



Filter Class: CFC_1000

Max: 106.7 g at 2.7 ms

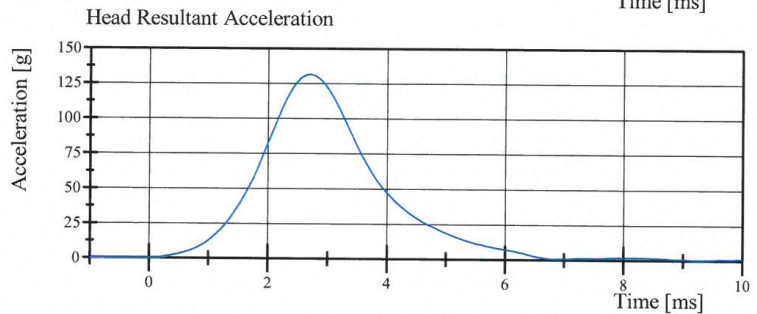
Min: -0.6 g at 6.4 ms



Filter Class: CFC_1000

Max: 76.6 g at 2.7 ms

Min: -1.5 g at 8.0 ms



Filter Class: CFC_1000

Max: 131.3 g at 2.7 ms

Min: 0.0 g at -0.5 ms

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

11.16.2016 12:58:09 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 297 Certification No. 13-1

Test Date: 11/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.609 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.697 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	4.049 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.348 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.793 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.797 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.3 deg	Yes
Time of Peak	50 - 70 ms	60.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.7 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	115.2 ms	Yes

Test meets specifications.

Comments:

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

11.16.2016 13:41:56 744

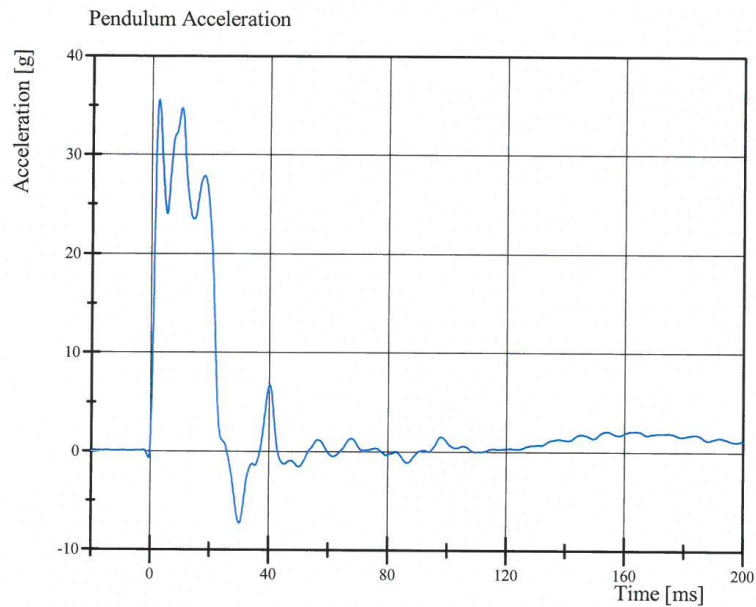


Transportation Research Center Inc.

Left Lateral Neck

SID II's Serial No. 297 Certification No. 13-1

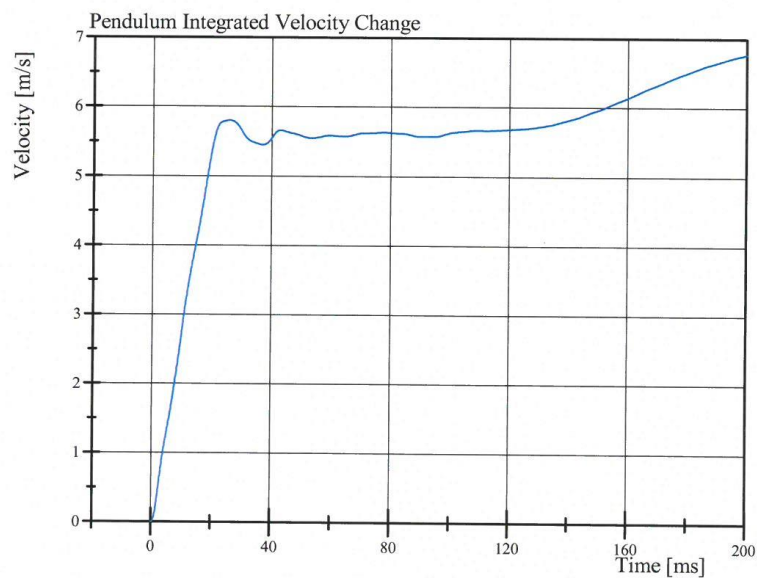
Test Date: 11/16/2016



Filter Class: CFC_180

Max: 35.5 g at 2.5 ms

Min: -7.3 g at 30.2 ms



Filter Class: CFC_180

Max: 6.8 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

11.16.2016 13:42:07 744

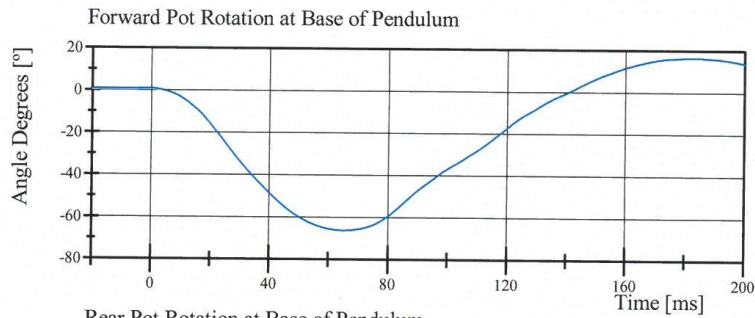


Transportation Research Center Inc.

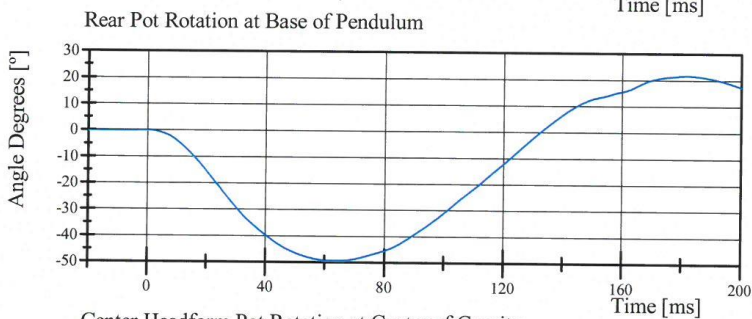
Left Lateral Neck

SID IIs Serial No. 297 Certification No. 13-1

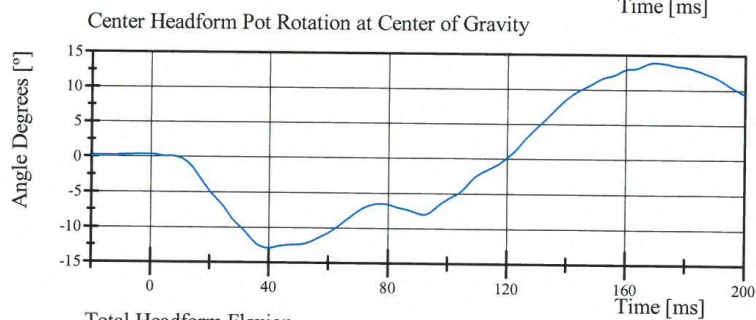
Test Date: 11/16/2016



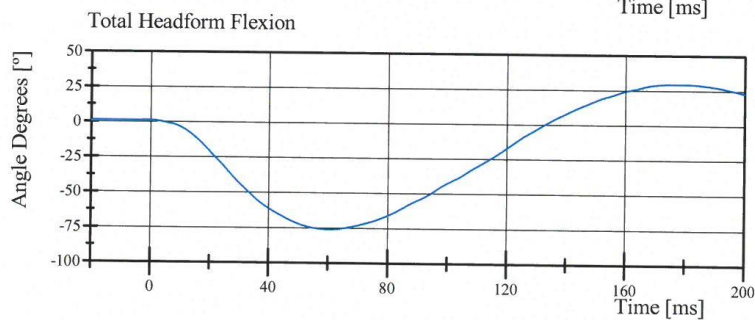
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Max: 16.4 ° at 181.7 ms
Min: -66.3 ° at 65.0 ms



Filter Class: CFC_60
Max: 21.7 ° at 181.8 ms
Min: -49.5 ° at 62.5 ms



Filter Class: CFC_60
Max: 13.9 ° at 169.7 ms
Min: -12.9 ° at 39.8 ms



Filter Class: CFC_60
Max: 29.6 ° at 180.2 ms
Min: -76.3 ° at 60.4 ms

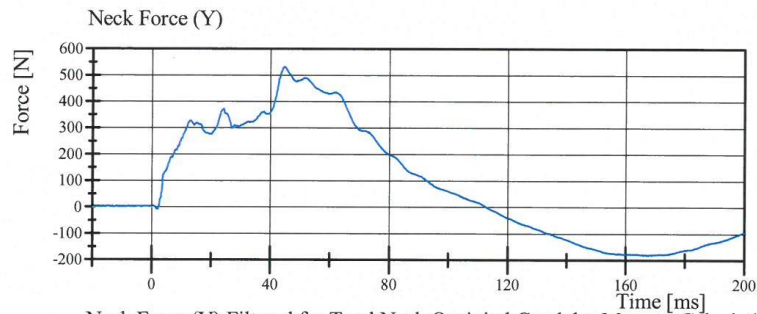
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

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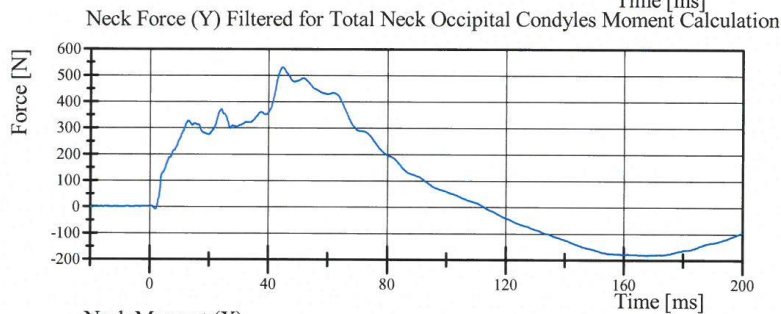


Transportation Research Center Inc.

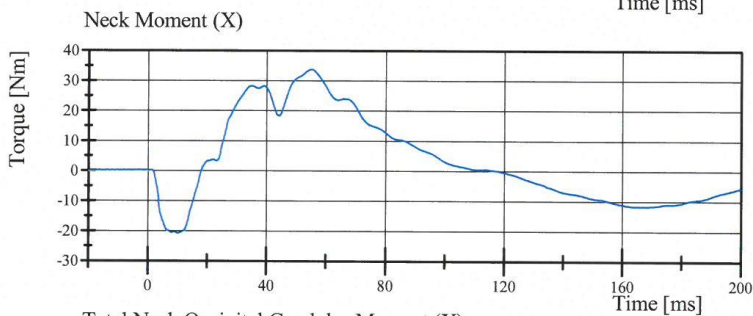
Left Lateral Neck
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016



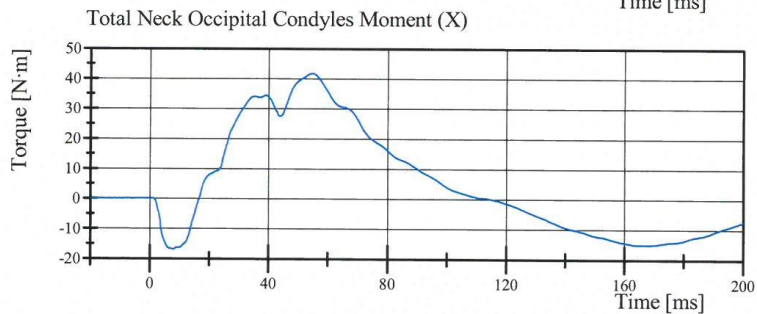
Filter Class: CFC_1000
Max: 530.8 N at 44.8 ms
Min: -181.5 N at 167.7 ms



Filter Class: CFC_600
Max: 529.8 N at 44.8 ms
Min: -181.4 N at 167.8 ms



Filter Class: CFC_600
Max: 33.7 Nm at 55.4 ms
Min: -21.0 Nm at 10.2 ms



Filter Class: Without_(Consta
Max: 41.7 N·m at 54.7 ms
Min: -16.9 N·m at 7.9 ms

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

11.16.2016 13:42:09 744



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 297 Certification No. 13-1

Test Date: 11/16/2016

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	4.35 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.3 g	Yes
Shoulder Displacement	28 - 37 mm	29.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.1 g	Yes

Test meets specifications.

Comments:

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

11.16.2016 13:21:13 844

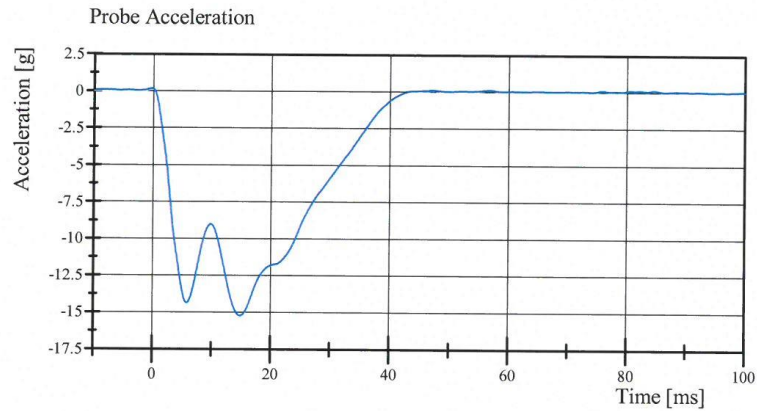


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 297 Certification No. 13-1

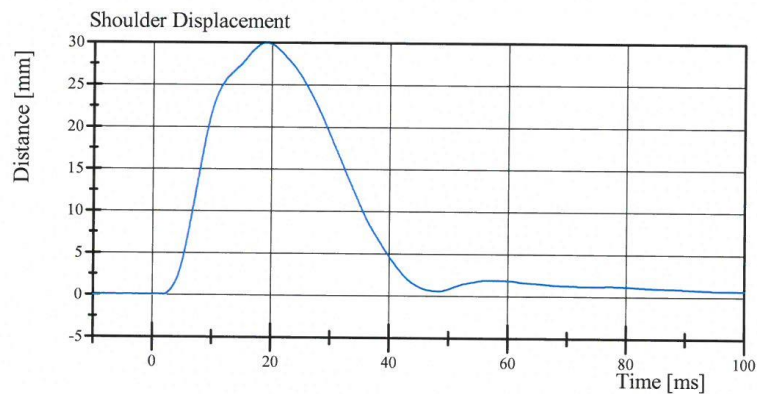
Test Date: 11/16/2016



Filter Class: CFC_180

Max: 0.1 g at -0.2 ms

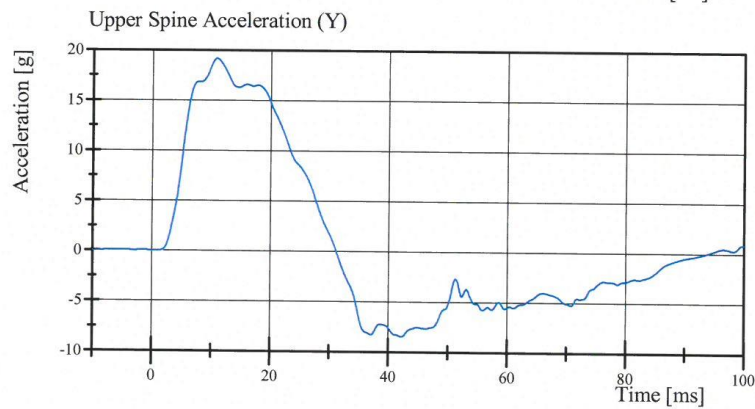
Min: -15.3 g at 14.9 ms



Filter Class: CFC_600

Max: 29.9 mm at 19.0 ms

Min: -0.0 mm at 2.0 ms



Filter Class: CFC_180

Max: 19.1 g at 10.9 ms

Min: -8.5 g at 42.2 ms

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

11.16.2016 13:21:23 844



Transportation Research Center Inc.

Left Lateral Thorax with Arm

SID IIs Serial No. 297 Certification No. 13-1

Test Date: 11/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.759 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.1 g	Yes
Shoulder Displacement	31 - 40 mm	35.6 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.4 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.4 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.2 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	36.3 g	Yes

Test meets specifications.

Comments:

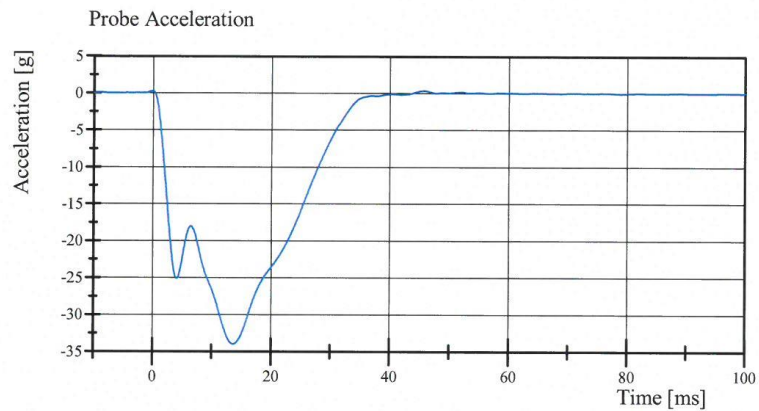
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.16.2016 14:31:48 621

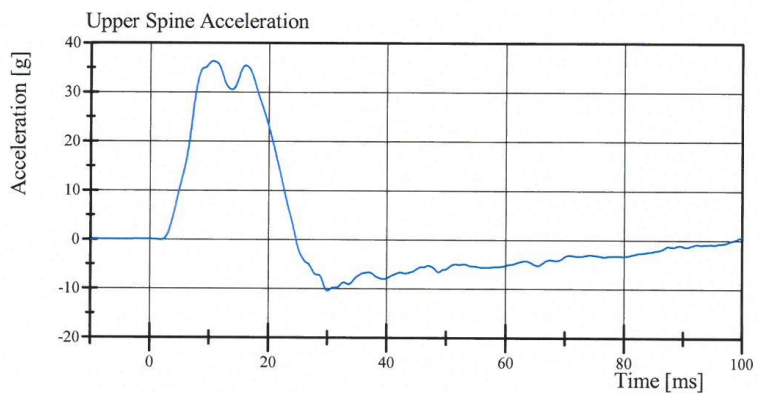


Transportation Research Center Inc.

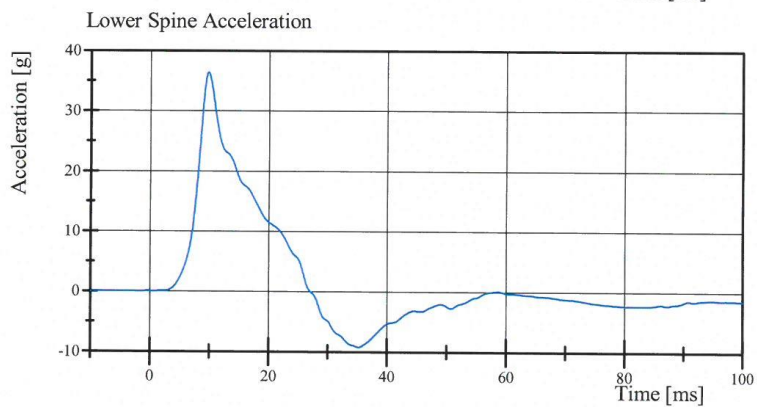
Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016



Filter Class: CFC_180
Max: 0.3 g at 45.8 ms
Min: -34.1 g at 13.7 ms



Filter Class: CFC_180
Max: 36.2 g at 10.6 ms
Min: -10.4 g at 30.0 ms



Filter Class: CFC_180
Max: 36.3 g at 9.8 ms
Min: -9.2 g at 35.4 ms

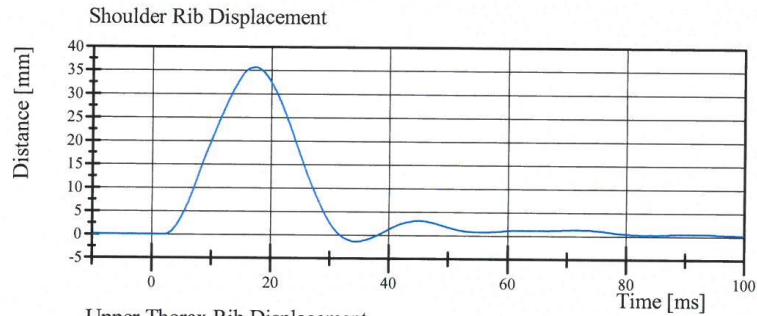
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.16.2016 14:31:58 621

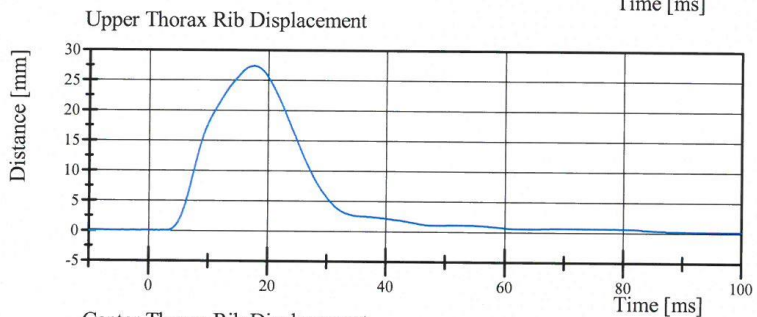


Transportation Research Center Inc.

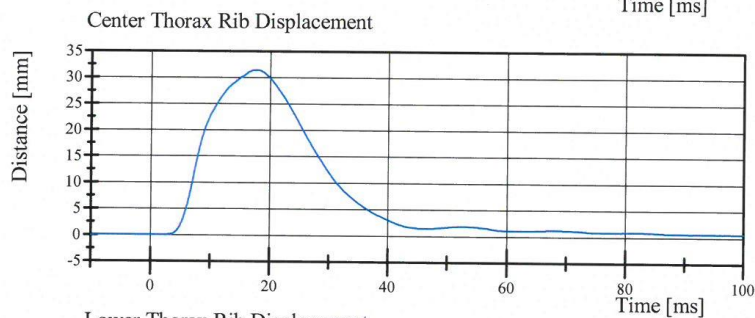
Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016



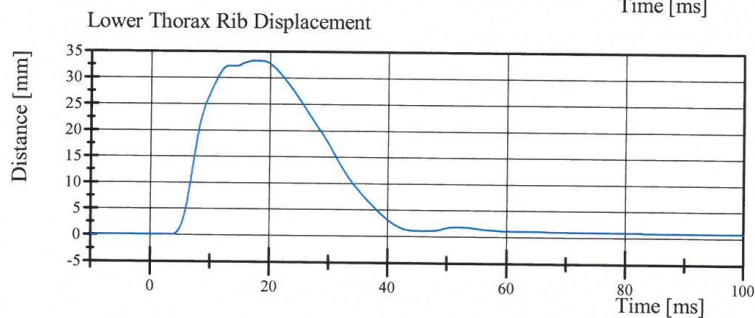
Filter Class: CFC_600
Max: 35.6 mm at 17.4 ms
Min: -1.4 mm at 34.3 ms



Filter Class: CFC_600
Max: 27.4 mm at 17.7 ms
Min: -0.0 mm at -3.7 ms



Filter Class: CFC_600
Max: 31.4 mm at 17.5 ms
Min: -0.0 mm at -8.3 ms



Filter Class: CFC_600
Max: 33.2 mm at 17.4 ms
Min: -0.0 mm at 3.8 ms

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

11.16.2016 14:31:59 621



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.349 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.7 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.0 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.1 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:

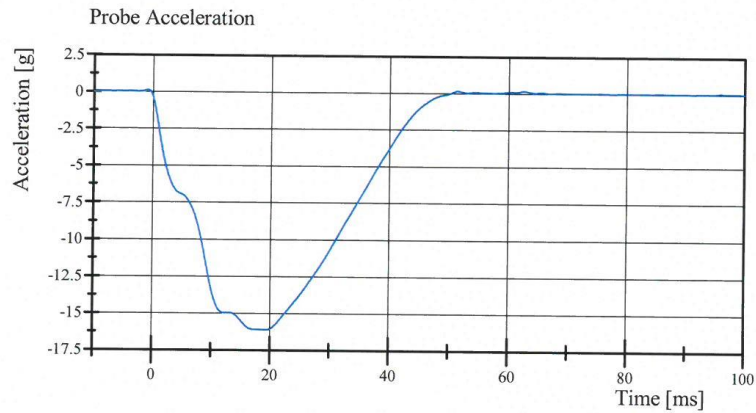
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.16.2016 13:58:02 847

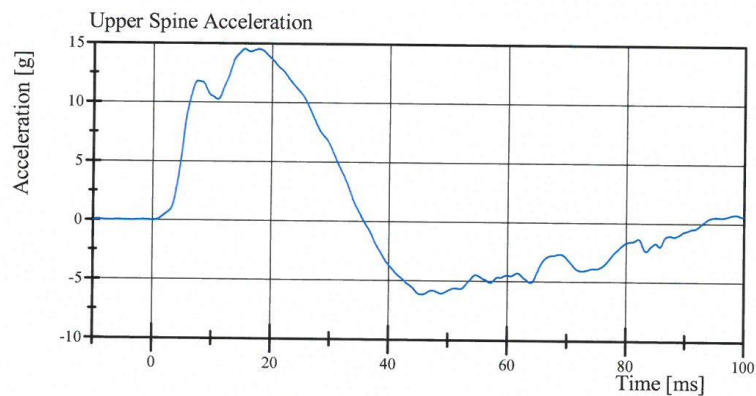


Transportation Research Center Inc.

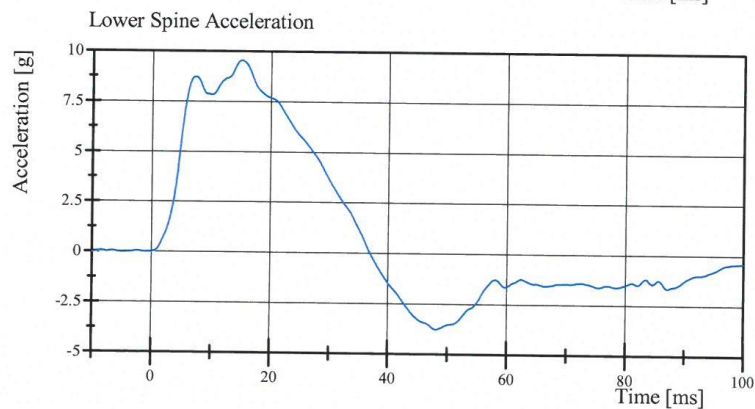
Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016



Filter Class: CFC_180
Max: 0.2 g at 62.6 ms
Min: -16.1 g at 19.2 ms



Filter Class: CFC_180
Max: 14.5 g at 15.4 ms
Min: -6.1 g at 45.5 ms



Filter Class: CFC_180
Max: 9.5 g at 15.1 ms
Min: -3.8 g at 48.2 ms

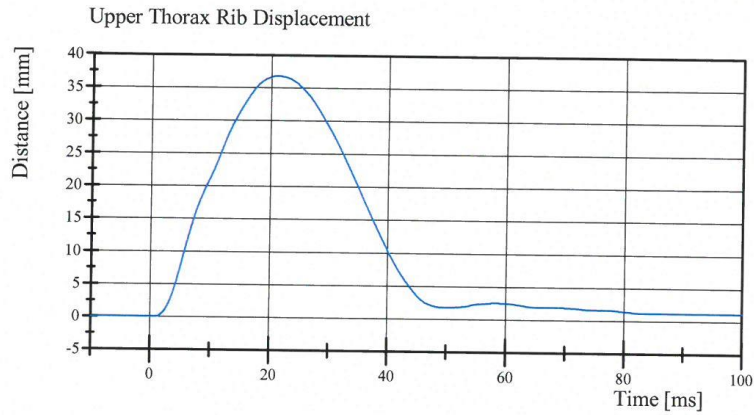
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.16.2016 13:58:32 847

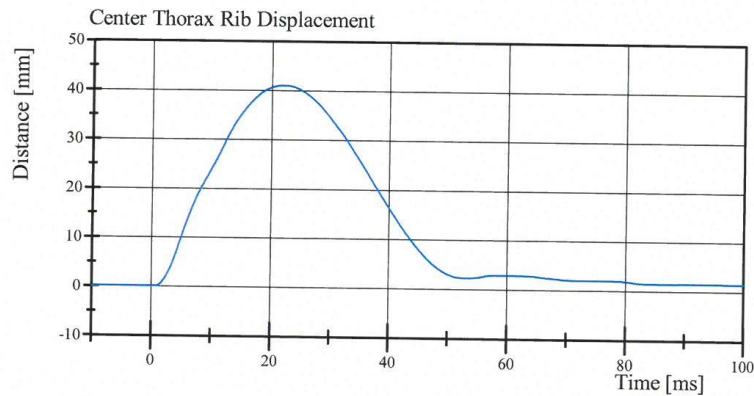


Transportation Research Center Inc.

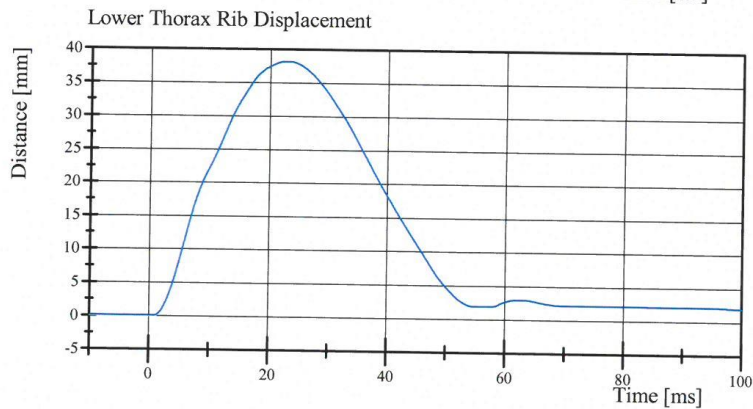
Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016



Filter Class: CFC_600
Max: 36.7 mm at 21.2 ms
Min: -0.0 mm at -4.9 ms



Filter Class: CFC_600
Max: 41.0 mm at 22.2 ms
Min: -0.0 mm at 0.6 ms



Filter Class: CFC_600
Max: 38.1 mm at 22.6 ms
Min: -0.0 mm at -1.3 ms

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

11.16.2016 13:58:33 847



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 297 Certification No. 13-1

Test Date: 11/16/2016

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	4.35 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	41.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.2 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.20 g	Yes

Test meets specifications.

Comments:

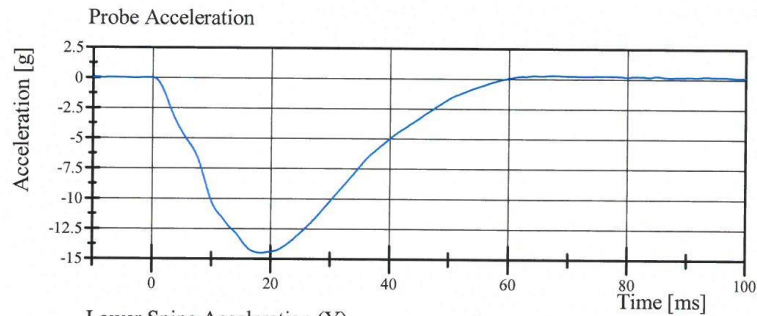
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.16.2016 13:34:00 645

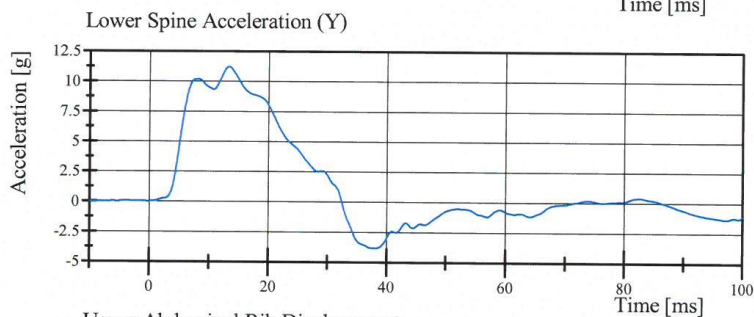


Transportation Research Center Inc.

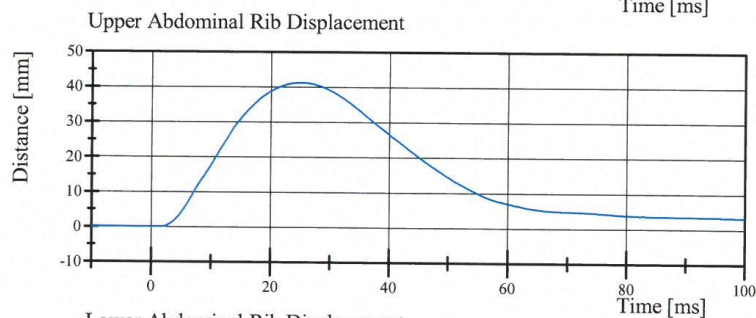
Left Lateral Abdomen
SID IIs Serial No. 297 Certification No. 13-1
Test Date: 11/16/2016



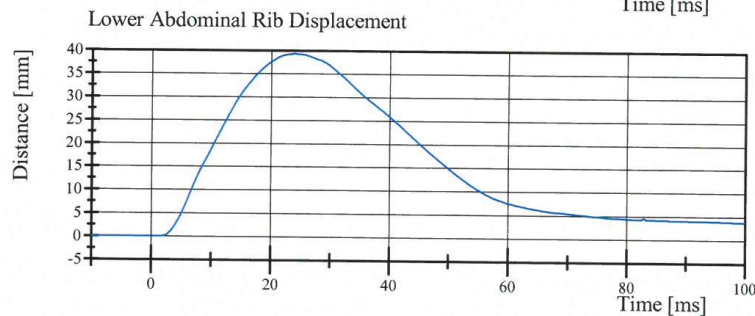
Filter Class: CFC_180
Max: 0.3 g at 67.3 ms
Min: -14.5 g at 18.3 ms



Filter Class: CFC_180
Max: 11.2 g at 13.4 ms
Min: -3.8 g at 38.1 ms



Filter Class: CFC_600
Max: 41.2 mm at 25.0 ms
Min: -0.0 mm at 1.8 ms



Filter Class: CFC_600
Max: 39.2 mm at 23.9 ms
Min: -0.0 mm at -5.1 ms

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

11.16.2016 13:34:12 645



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 297 Certification No. 13-3
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 %	30 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.66 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.73 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,655.2 N	Yes

Test meets specifications.

Comments: Pelvis Pug #11023

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

11.17.2016 07:31:43 463

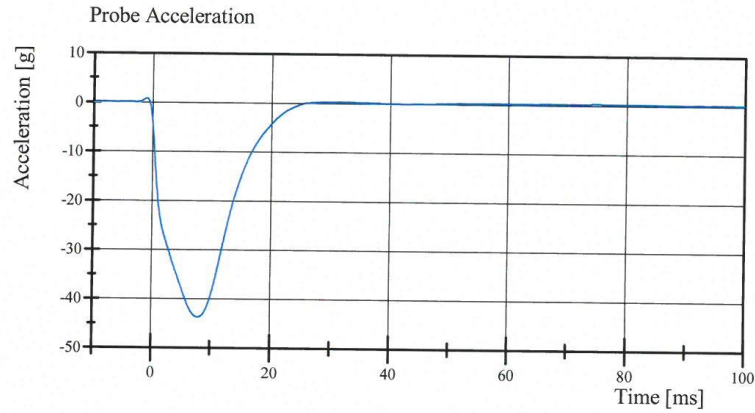


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 297 Certification No. 13-3

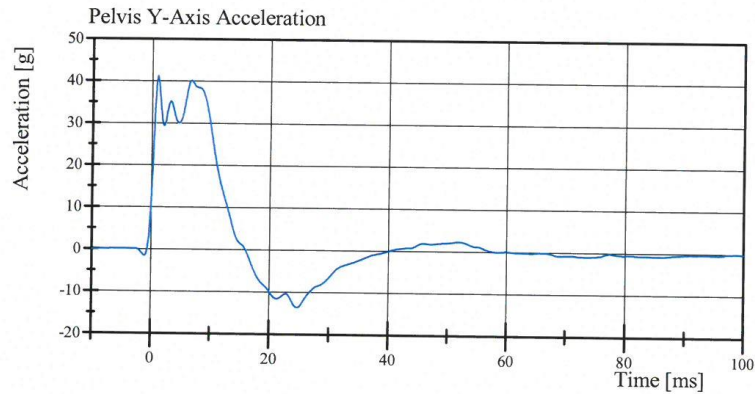
Test Date: 11/17/2016



Filter Class: CFC_180

Max: 0.6 g at -1.0 ms

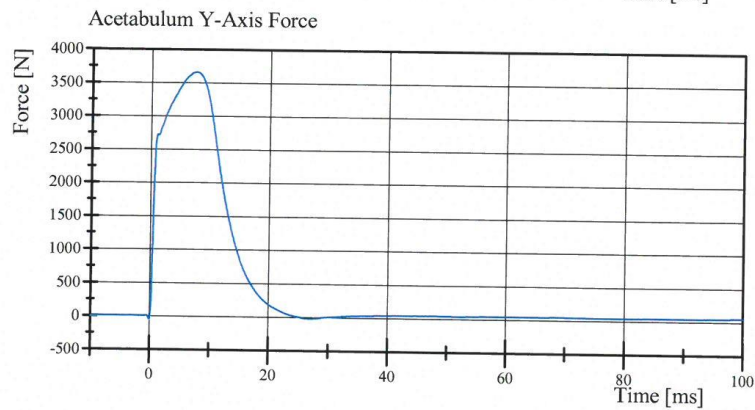
Min: -43.7 g at 8.0 ms



Filter Class: CFC_180

Max: 41.2 g at 1.0 ms

Min: -13.7 g at 24.8 ms



Filter Class: CFC_600

Max: 3,655.2 N at 7.6 ms

Min: -56.8 N at 0.0 ms

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

11.17.2016 07:32:40 463



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 13-1

Test Date: 11/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-44.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.9 g	Yes
Iliac Force	4,100 - 5,100 N	5,065.8 N	Yes

Test meets specifications.

Comments:

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

11.16.2016 13:02:31 623

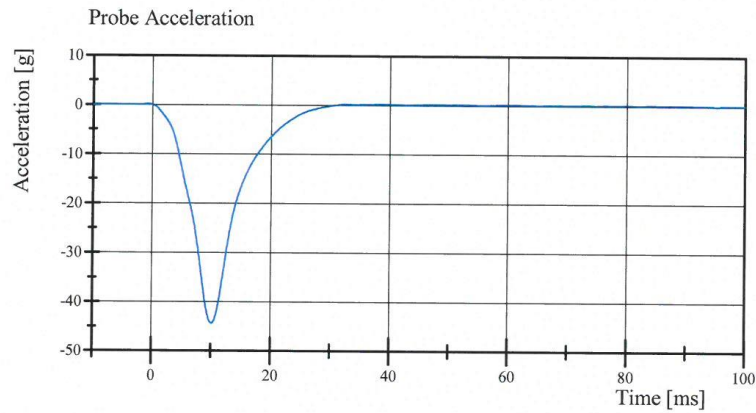


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 13-1

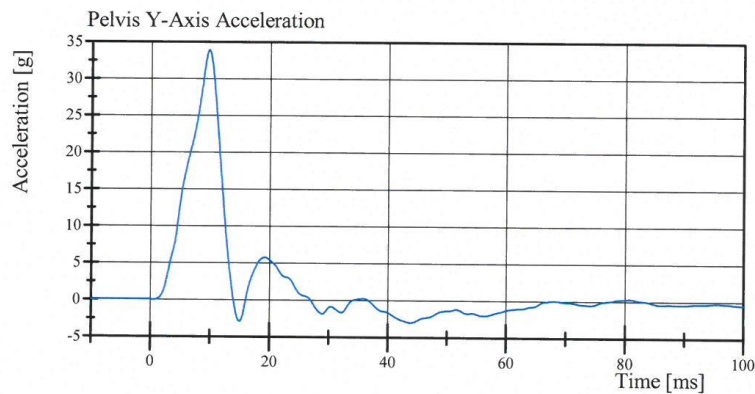
Test Date: 11/16/2016



Filter Class: CFC_180

Max: 0.2 g at 47.0 ms

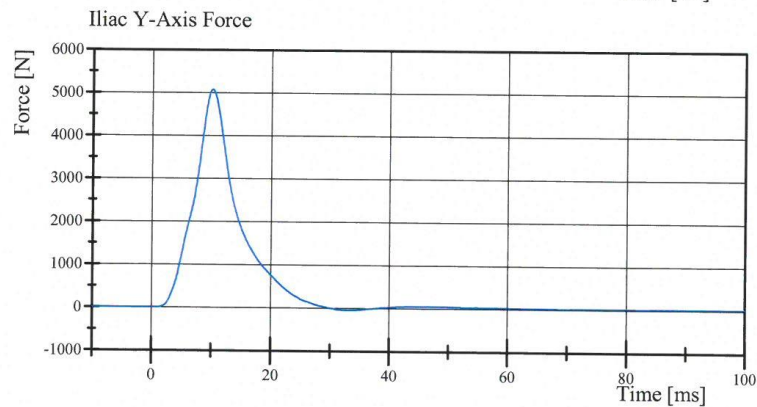
Min: -44.5 g at 10.2 ms



Filter Class: CFC_180

Max: 33.9 g at 9.8 ms

Min: -3.0 g at 43.8 ms



Filter Class: CFC_600

Max: 5,065.8 N at 10.2 ms

Min: -44.1 N at 33.0 ms

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

11.16.2016 13:02:43 623



Post-Test Calibration Sheets
Driver S/N 297

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 297 Calibration No.14

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	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	44	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	221	Yes
P	Foot Length (left)	216.0 - 232.0	221	Yes
Q	Hip Breadth	313.0 - 323.0	319	Yes
R	Arm Length	249.0 - 259.0	254	Yes
S	Knee Joint to seat Back	478.0 - 493.0	487	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	869	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	130.4 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	4.4 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

12.07.2016 09:44:58 232

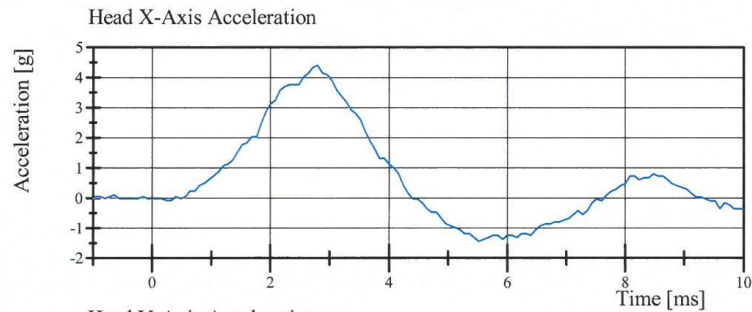


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 297 Certification No. 14-1

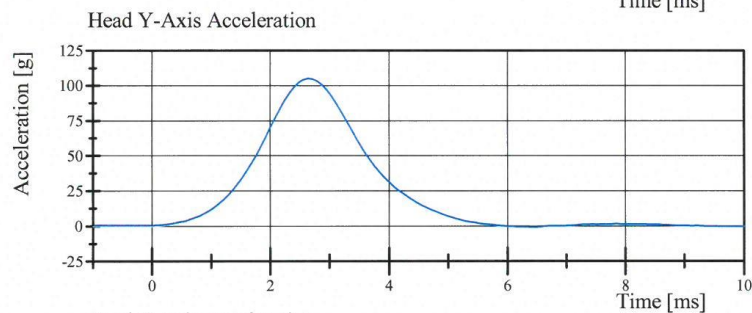
Test Date: 12/7/2016



Filter Class: CFC_1000

Max: 4.4 g at 2.8 ms

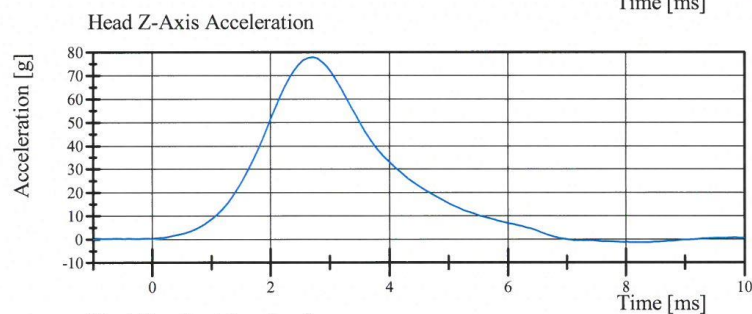
Min: -1.5 g at 5.5 ms



Filter Class: CFC_1000

Max: 104.8 g at 2.6 ms

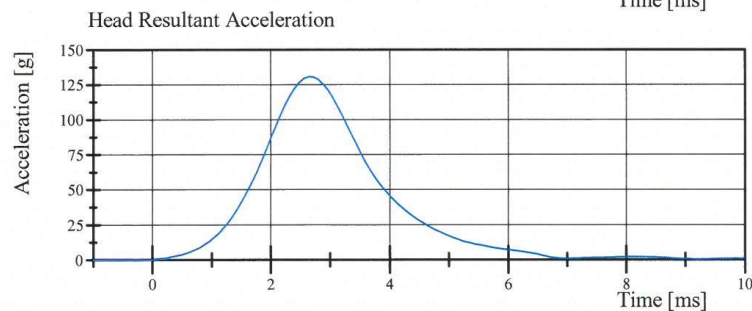
Min: -0.9 g at 6.4 ms



Filter Class: CFC_1000

Max: 77.8 g at 2.7 ms

Min: -1.5 g at 8.2 ms



Filter Class: CFC_1000

Max: 130.4 g at 2.6 ms

Min: 0.1 g at -0.2 ms

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

12.07.2016 09:45:08 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 297 Certification No. 14-1

Test Date: 12/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.618 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.694 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.961 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.308 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.827 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.829 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.3 deg	Yes
Time of Peak	50 - 70 ms	60.8 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	43.0 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	113.7 ms	Yes

Test meets specifications.

Comments:

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

12.07.2016 14:05:53 745

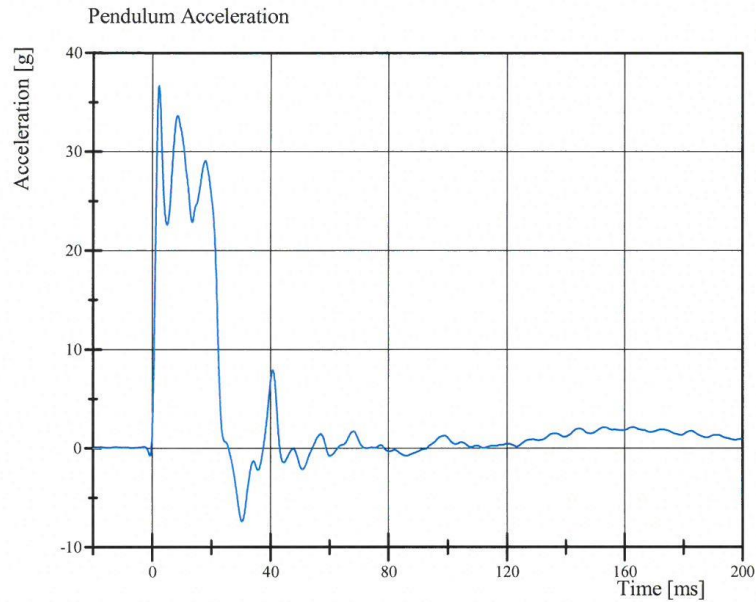


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 297 Certification No. 14-1

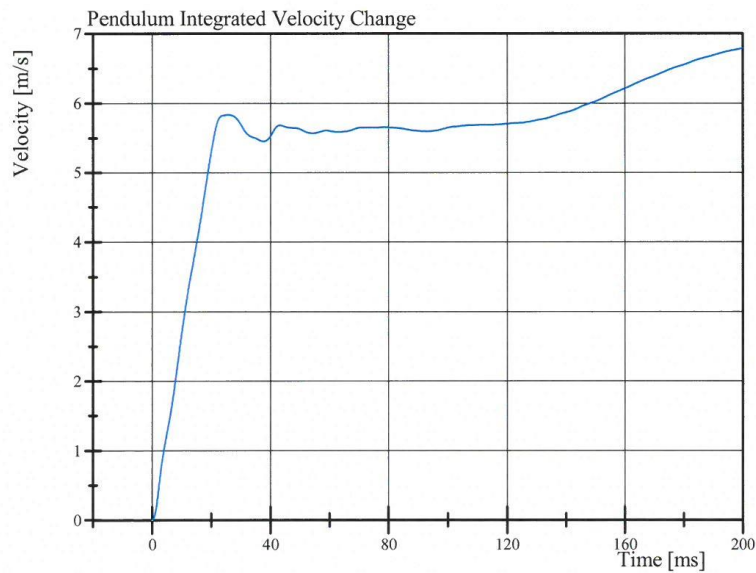
Test Date: 12/7/2016



Filter Class: CFC_180

Max: 36.6 g at 2.2 ms

Min: -7.5 g at 30.3 ms



Filter Class: CFC_180

Max: 6.8 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

12.07.2016 14:06:08 745

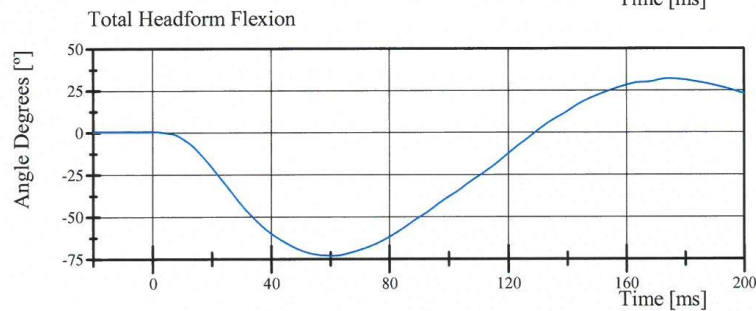
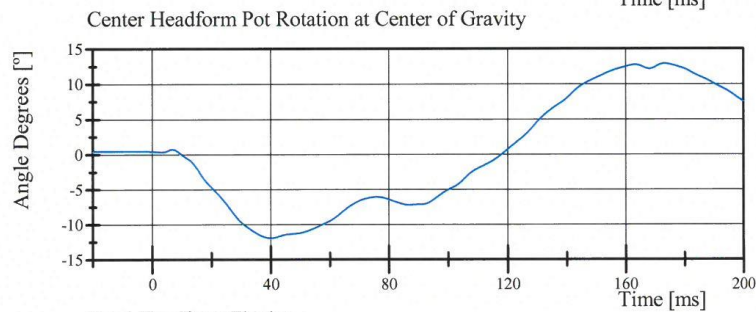
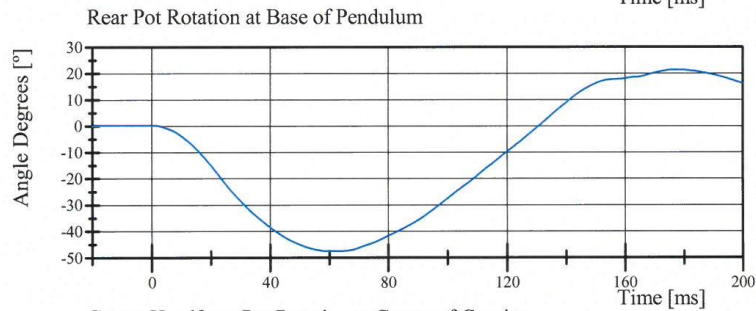
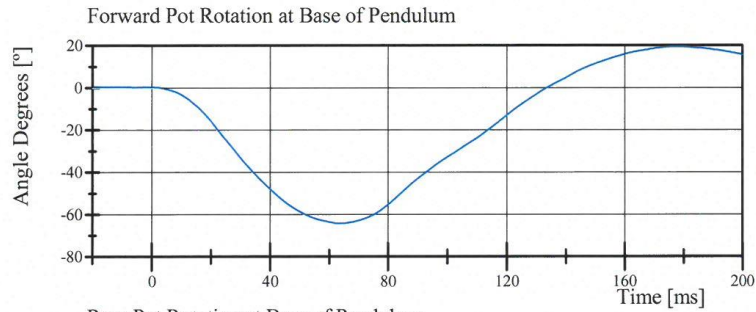


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 297 Certification No. 14-1

Test Date: 12/7/2016



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

12.07.2016 14:06:08 745

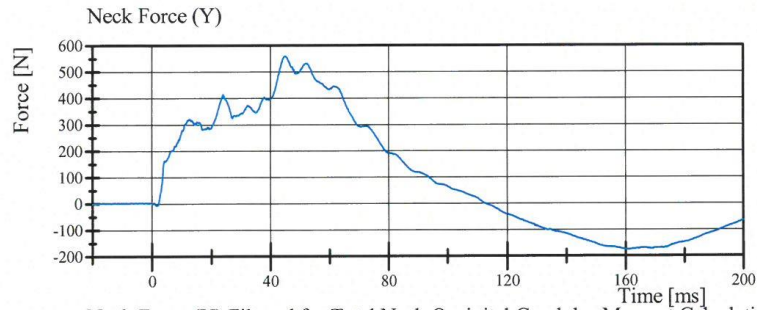


Transportation Research Center Inc.

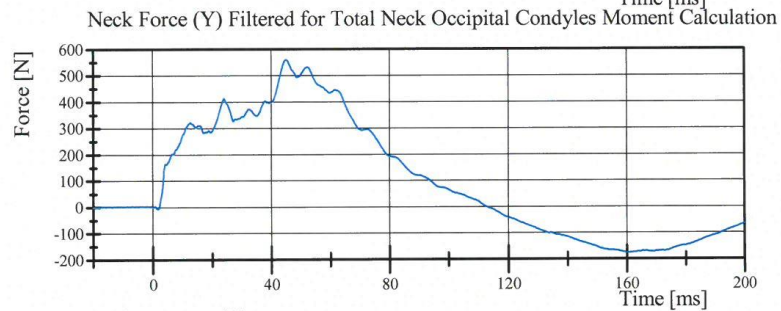
Left Lateral Neck

SID IIs Serial No. 297 Certification No. 14-1

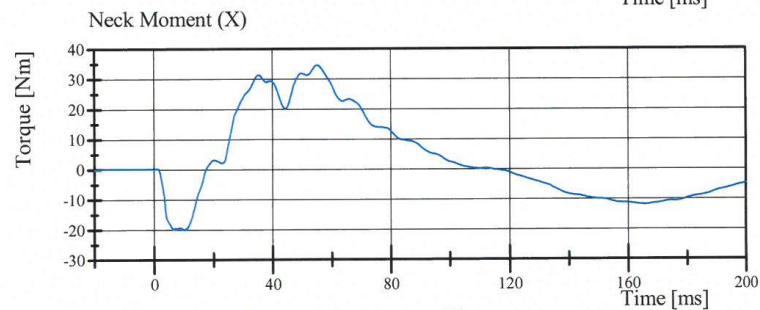
Test Date: 12/7/2016



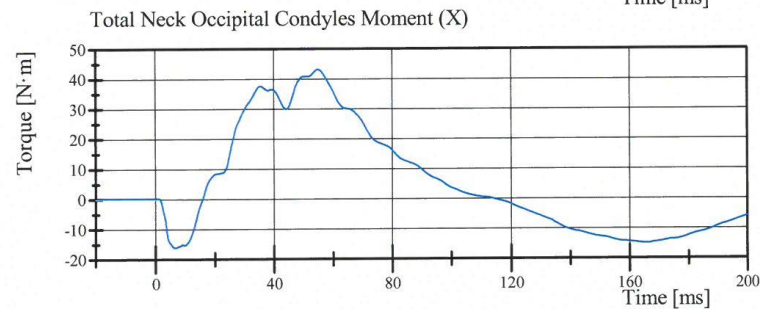
Filter Class: CFC_1000
Max: 557.4 N at 45.0 ms
Min: -176.7 N at 161.0 ms



Filter Class: CFC_600
Max: 557.1 N at 45.0 ms
Min: -176.3 N at 161.0 ms



Filter Class: CFC_600
Max: 34.5 Nm at 55.0 ms
Min: -20.3 Nm at 10.1 ms



Filter Class: Without_(Constar
Max: 43.0 N·m at 54.8 ms
Min: -16.3 N·m at 6.5 ms

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

12.07.2016 14:06:09 745



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 297 Certification No. 14-1

Test Date: 12/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.1 g	Yes
Shoulder Displacement	28 - 37 mm	30.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.9 g	Yes

Test meets specifications.

Comments:

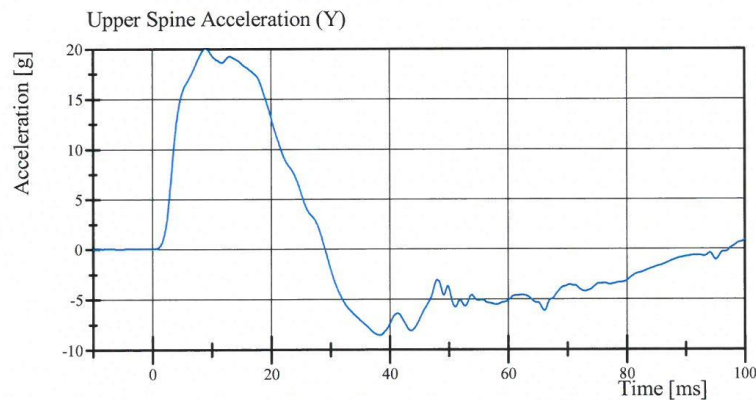
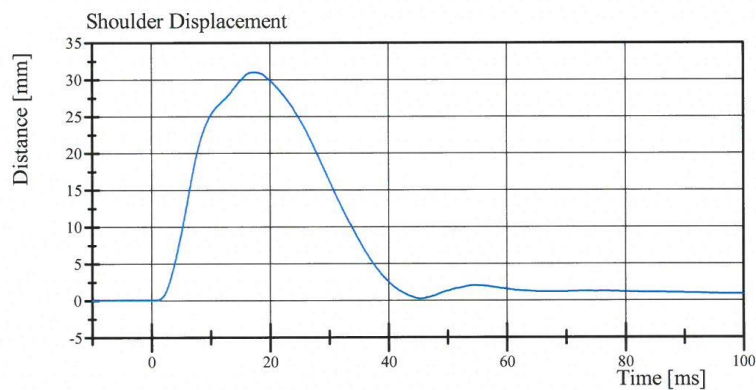
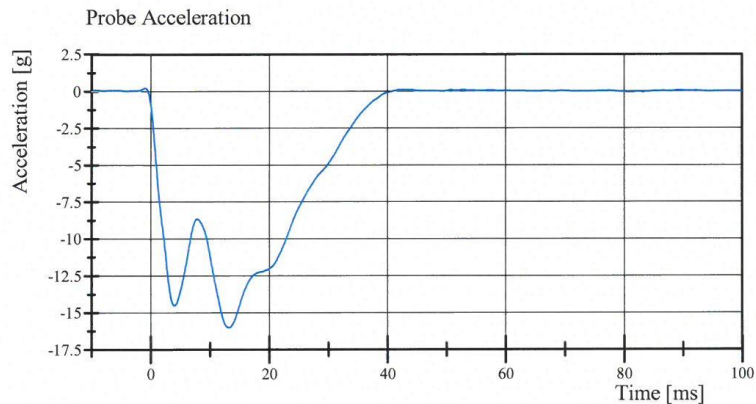
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.07.2016 15:49:52 857



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/7/2016



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

12.07.2016 15:50:02 857



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 14-1
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 %	33 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.723 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.7 g	Yes
Shoulder Displacement	31 - 40 mm	34.3 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.8 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.8 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.8 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.0 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.9 g	Yes

Test meets specifications.

Comments:

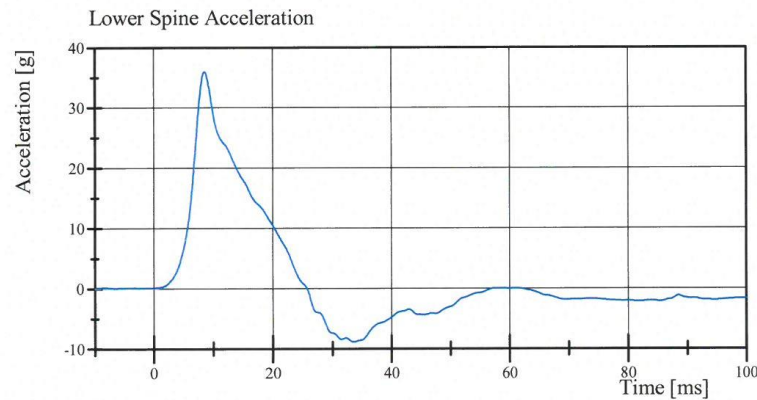
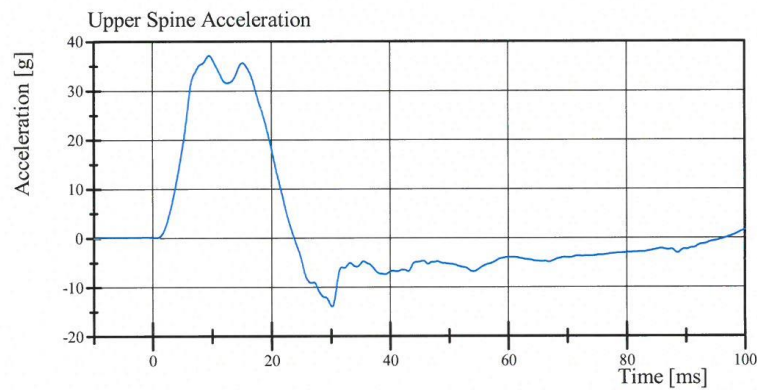
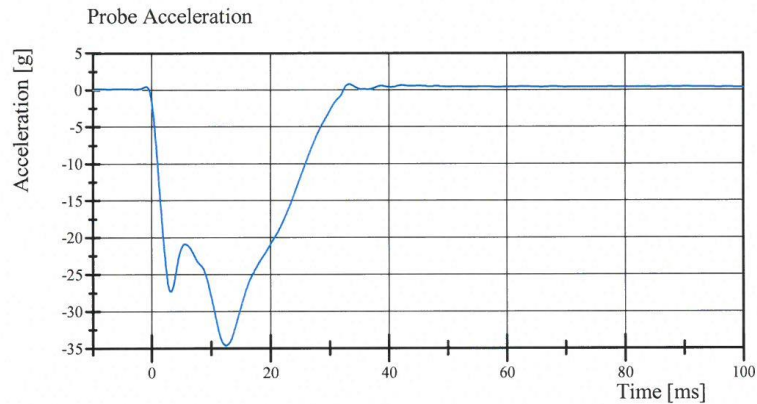
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 09:12:29 645



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/8/2016



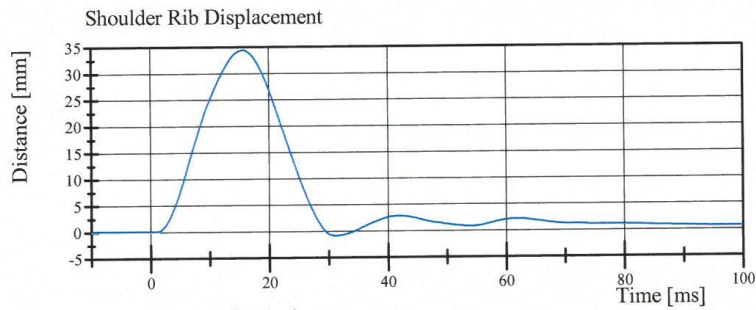
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 09:12:41 645

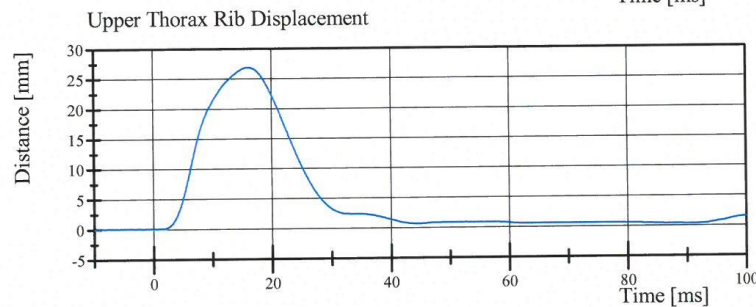


Transportation Research Center Inc.

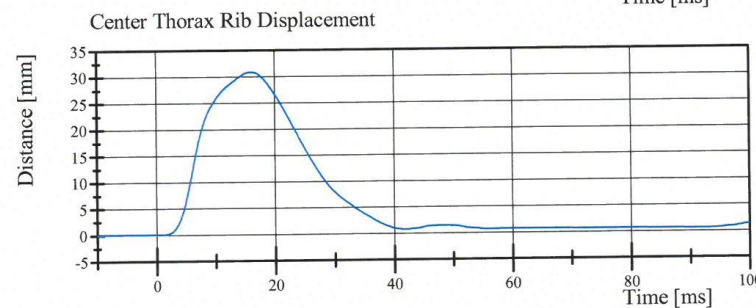
Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/8/2016



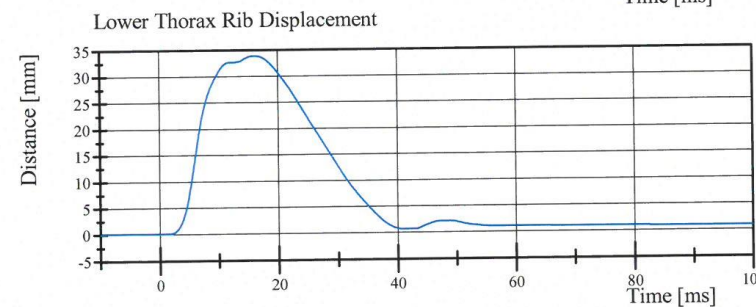
Filter Class: CFC_600
Max: 34.3 mm at 15.8 ms
Min: -0.9 mm at 31.1 ms



Filter Class: CFC_600
Max: 26.8 mm at 16.0 ms
Min: -0.0 mm at -9.5 ms



Filter Class: CFC_600
Max: 30.8 mm at 16.1 ms
Min: -0.0 mm at -10.0 ms



Filter Class: CFC_600
Max: 33.8 mm at 15.8 ms
Min: -0.0 mm at 1.4 ms

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

12.08.2016 09:12:42 645



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	19 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.353 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.6 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.5 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.8 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.5 g	Yes

Test meets specifications.

Comments:

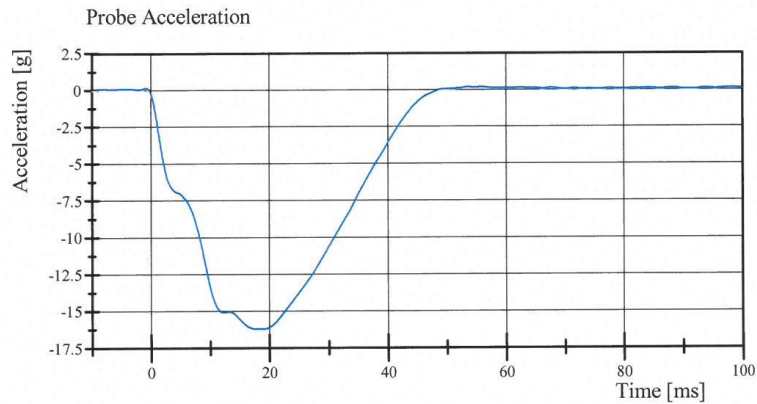
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.07.2016 17:02:18 865

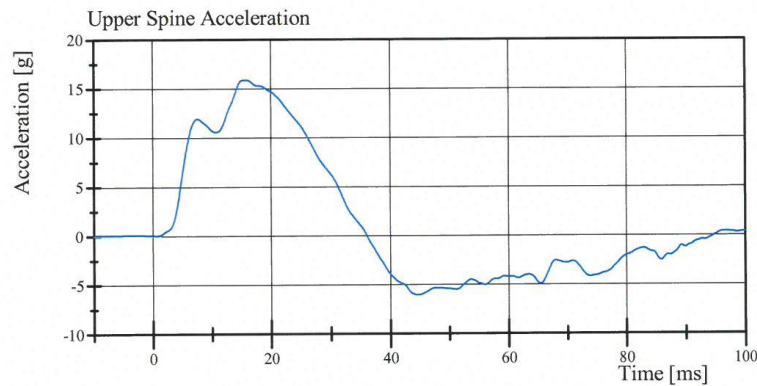


Transportation Research Center Inc.

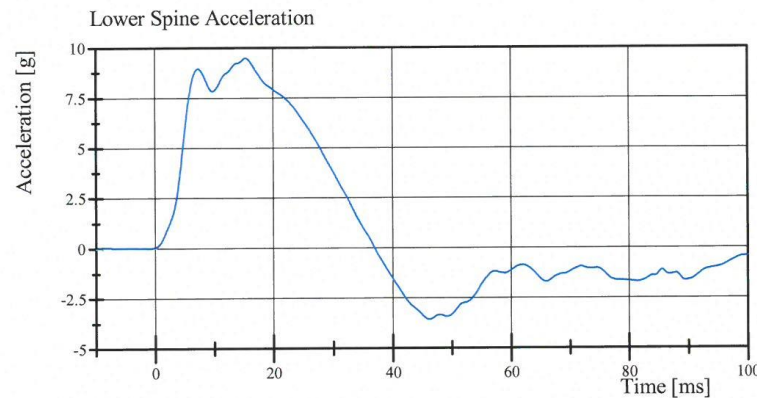
Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/7/2016



Filter Class: CFC_180
Max: 0.1 g at 53.6 ms
Min: -16.2 g at 18.7 ms



Filter Class: CFC_180
Max: 15.8 g at 15.7 ms
Min: -6.1 g at 44.6 ms



Filter Class: CFC_180
Max: 9.5 g at 15.4 ms
Min: -3.6 g at 46.2 ms

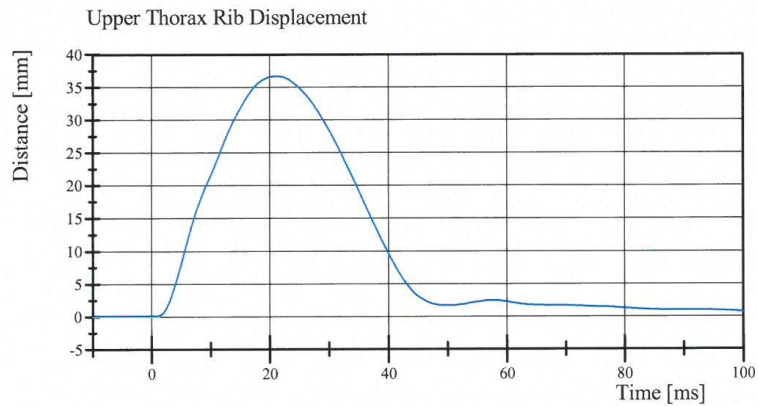
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.07.2016 17:02:31 865

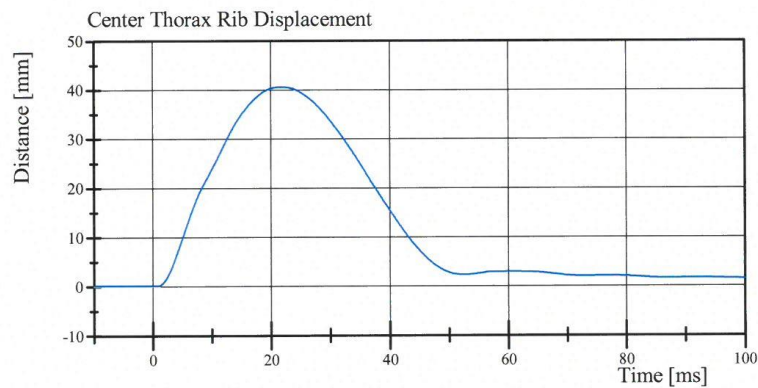


Transportation Research Center Inc.

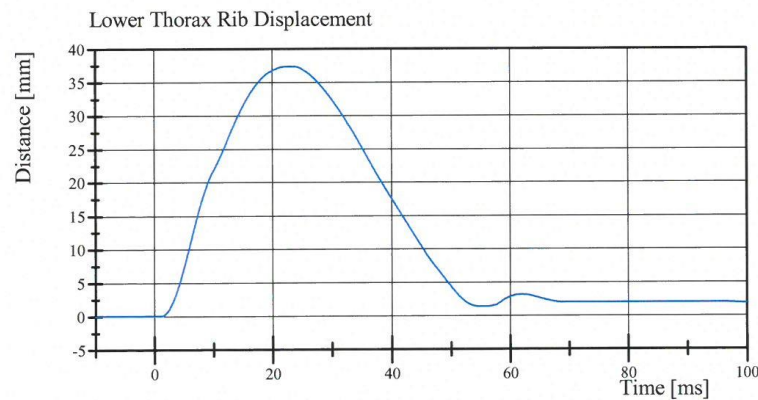
Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/7/2016



Filter Class: CFC_600
Max: 36.6 mm at 21.1 ms
Min: -0.0 mm at 0.9 ms



Filter Class: CFC_600
Max: 40.5 mm at 21.8 ms
Min: -0.0 mm at 0.7 ms



Filter Class: CFC_600
Max: 37.3 mm at 23.4 ms
Min: -0.0 mm at 1.0 ms

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

12.07.2016 17:02:32 865



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 297 Certification No. 14-1

Test Date: 12/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.8 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	41.1 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	37.3 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.00 g	Yes

Test meets specifications.

Comments:

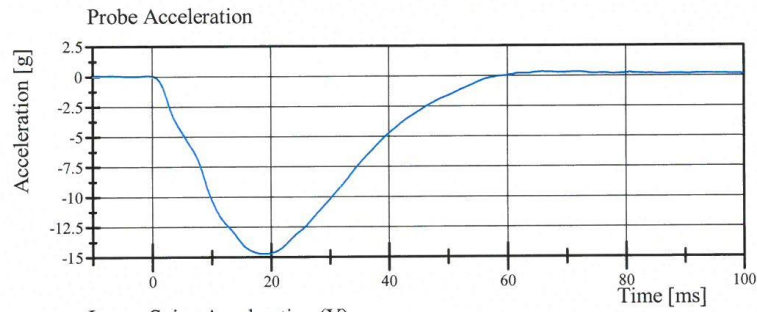
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.07.2016 16:32:06 659

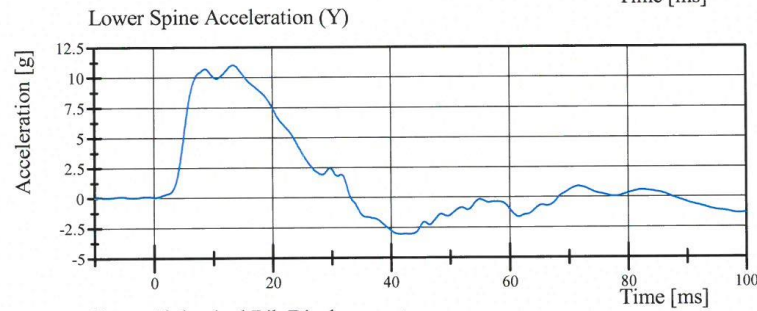


Transportation Research Center Inc.

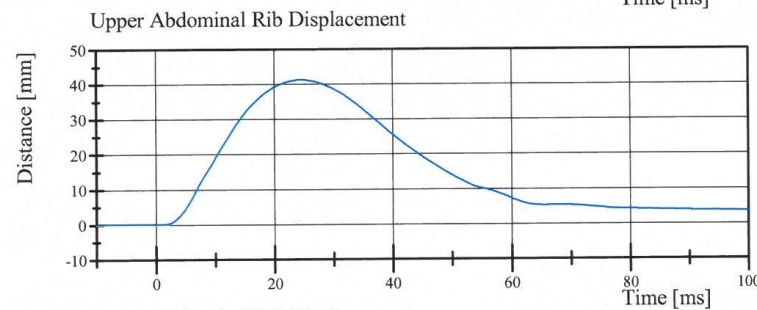
Left Lateral Abdomen
SID IIs Serial No. 297 Certification No. 14-1
Test Date: 12/7/2016



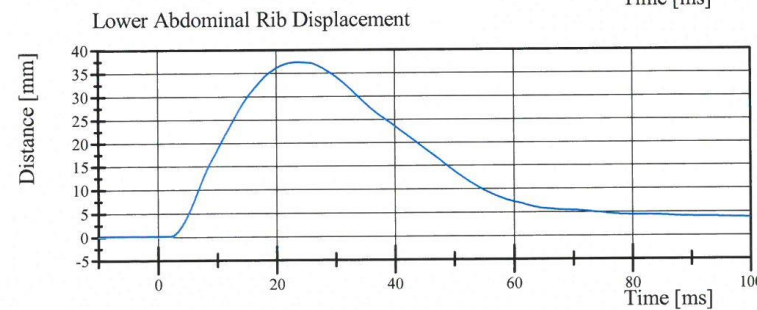
Filter Class: CFC_180
Max: 0.3 g at 65.8 ms
Min: -14.8 g at 18.9 ms



Filter Class: CFC_180
Max: 11.0 g at 13.4 ms
Min: -3.1 g at 41.6 ms



Filter Class: CFC_600
Max: 41.1 mm at 24.5 ms
Min: -0.0 mm at 0.0 ms



Filter Class: CFC_600
Max: 37.3 mm at 23.4 ms
Min: -0.0 mm at 2.1 ms

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

12.07.2016 16:32:16 659



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 297 Certification No. 14-3

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
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-46.78 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	42.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,761.1 N	Yes

Test meets specifications.

Comments:

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

12.08.2016 17:15:26 466

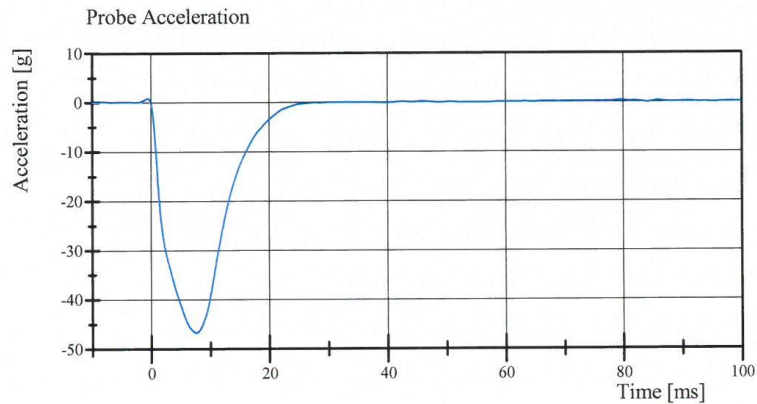


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 297 Certification No. 14-3

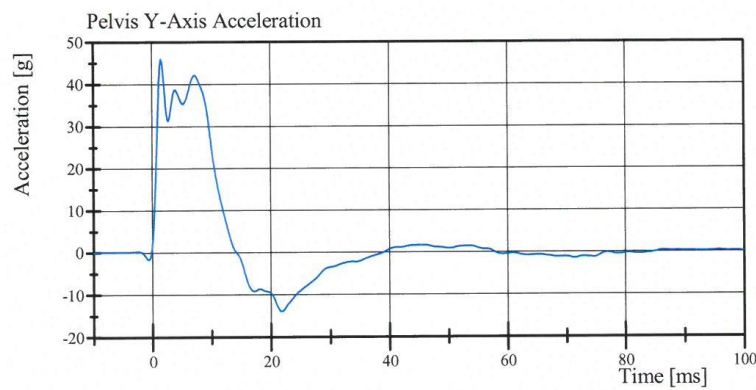
Test Date: 12/8/2016



Filter Class: CFC_180

Max: 0.7 g at -0.6 ms

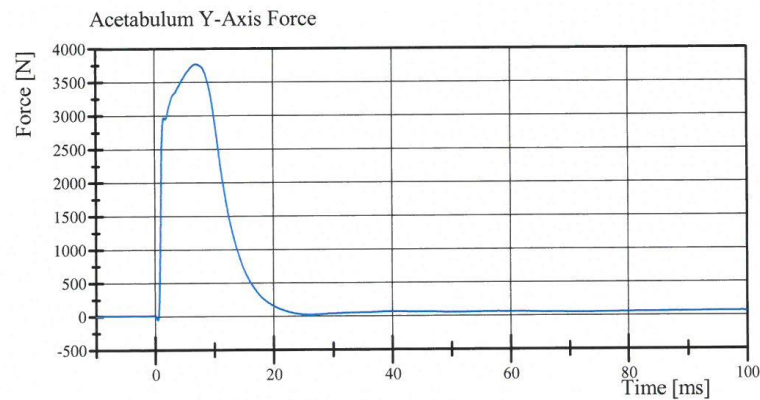
Min: -46.8 g at 7.6 ms



Filter Class: CFC_180

Max: 45.8 g at 1.4 ms

Min: -14.1 g at 21.8 ms



Filter Class: CFC_600

Max: 3,761.1 N at 7.1 ms

Min: -61.7 N at 0.4 ms

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

12.08.2016 17:15:43 466



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 14-1

Test Date: 12/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.8 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.5 g	Yes
Iliac Force	4,100 - 5,100 N	4,604.2 N	Yes

Test meets specifications.

Comments:

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

12.07.2016 15:14:28 690

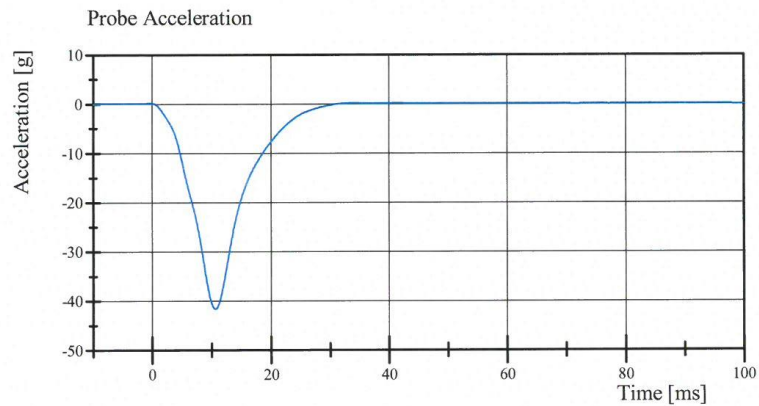


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 14-1

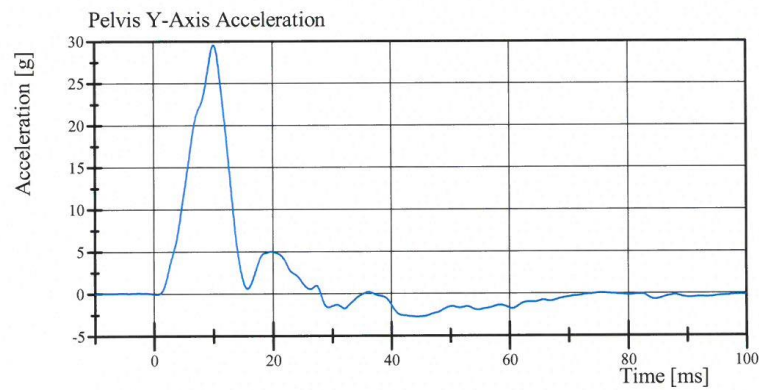
Test Date: 12/7/2016



Filter Class: CFC_180

Max: 0.1 g at 41.4 ms

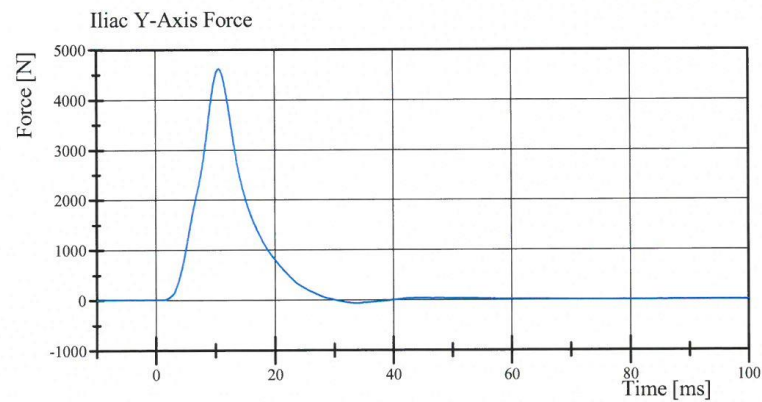
Min: -41.8 g at 10.6 ms



Filter Class: CFC_180

Max: 29.5 g at 10.1 ms

Min: -2.8 g at 44.3 ms



Filter Class: CFC_600

Max: 4,604.2 N at 10.6 ms

Min: -64.3 N at 33.9 ms

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

12.07.2016 15:14:39 690



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 297			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	P93539	Endevco	29-Sep-2016
				Y	P93549	Endevco	29-Sep-2016
				Z	P93776	Endevco	29-Sep-2016
Displacement Potentiometers	Shoulder			Y	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	047	Servo	29-Sep-2016	
		Middle	Y	01815	Servo	29-Sep-2016	
		Lower	Y	043	Servo	29-Sep-2016	
	Abdominal Rib	Upper	Y	01811	Servo	29-Sep-2016	
		Lower	Y	051	Servo	29-Sep-2016	
Lower Spine Accelerometers (T12)				X	P94425	Endevco	23-Aug-2016
				Y	P91522	Endevco	22-Aug-2016
				Z	P91511	Endevco	21-Sep-2016
Acetabulum Load Cell				Y	235-FY	FTSS	28-Oct-2016
Iliac Wing Load Cell				Y	113-FY	FTSS	27-Oct-2016
Pelvis Plug (struck side)					11013	SACO	6-Apr-2016
Pelvis Plug (non-struck side)					36505	FTSS	24-Aug-2010

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P94569	Endevco	3-Nov-2016
Vehicle Center of Gravity	Y	P94505	Endevco	3-Nov-2016
Vehicle Center of Gravity	Z	P94561	Endevco	3-Nov-2016
Left Floor Sill	Y	P75088	Endevco	10-Nov-2016
A-Pillar Sill	Y	P88034	Endevco	22-Sep-2016
A-Pillar Low	Y	P66749	Endevco	28-Sep-2016
A-Pillar Mid	Y	P94512	Endevco	2-Nov-2016
B-Pillar Sill	Y	P58534	Endevco	16-Nov-2016
B-Pillar Low	Y	P94562	Endevco	2-Nov-2016
B-Pillar Mid	Y	P94559	Endevco	2-Nov-2016
Driver Seat	Y	P91903	Endevco	16-Nov-2016
Engine Top	X	P33817	Endevco	25-Oct-2016
Engine Top	Y	P29093	Endevco	25-Oct-2016
Firewall	Y	P91959	Endevco	14-Nov-2016
Right Roof	Y	P87459	Endevco	18-Nov-2016
Right Floor Sill	Y	P85273	Endevco	5-Jul-2016
Rear Floor Pan	X	P91895	Endevco	25-Jul-2016
Rear Floor Pan	Y	P45023	Endevco	28-Sep-2016

TABLE 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	92-FX	Denton	29-Apr-2016
Load Cell 2	84-FX	Denton	29-Apr-2016
Load Cell 3	75-FX	Denton	20-Sep-2016
Load Cell 4	101-FX	Denton	28-Apr-2016
Load Cell 5	87-FX	Denton	29-Apr-2016
Load Cell 6	83-FX	Denton	5-Aug-2016
Load Cell 7	97-FX	Denton	29-Apr-2016
Load Cell 8	95-FX	Denton	26-Jul-2016