

DRAFT REPORT NUMBER: SINCAP-TRC-17-003

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

**Ford Motor Co.
2017 Ford F-250 SuperCab
NHTSA NUMBER: M20170209**

**PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
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Report Date: March 27, 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: March 27, 2017

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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16. Abstract This 55 / 28 km/h 90° Moving Deformable Barrier SINCAP Side Impact Test was conducted on the subject 2017 Ford F-250 SuperCab, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on November 10, 2016. The impact velocity of the Moving Deformable Barrier (MDB) was 62.20 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.3° C. The target vehicle post-test maximum crush was 248 mm at Level 1. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>16</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>15.7</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>491.3</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-490.6</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>21.2</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>38</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>17.4</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>471.8</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>3.3</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>5.0</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	16	Maximum Thoracic Rib Deflection	mm	44	15.7	Total Abdominal Force	N	2500	491.3	Pubic Symphysis Force	N	6000	-490.6	Lower Spine Acceleration	G	82*	21.2	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	38	Lower Spine Resultant Acceleration	g's	82	17.4	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	471.8	Maximum Thoracic Rib Deflection	mm	38*	3.3	Maximum Abdominal Rib Deflection	mm	45*	5.0
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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2017 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00354. The purpose of this test is to generate comparative side impact performance in a 2017 Ford F-250 SuperCab. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2017 Ford F-250 SuperCab was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.20 km/h (38.65 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on November 10, 2016. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated October 2015. The side impact event was documented by 11 cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

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

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

Lower spine (T12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG triaxial accelerometers

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

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	16
Maximum Thoracic Rib Deflection	mm	44	15.7
Combined Abdominal Force	N	2500	491.3
Pubic Symphysis Force	N	6000	-490.6
Lower Spine (T12) Resultant Acceleration	G	82*	21.2

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	38
Lower Spine (T12) Resultant Acceleration	G	82	17.4
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	471.8
Maximum Thoracic Rib Deflection	mm	38*	3.3
Maximum Abdominal Rib Deflection	mm	45*	5.0

* Proposed IARV

Supplemental Restraint Information is given below:

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

GENERAL COMMENTS

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20170209
Model Year	2017
Make	Ford
Model	F-250
Body Style	Truck
VIN	1FT7X2A60HEB24678
Body Color	Magnetic
Odometer Reading (km/mi)	9 mi
Engine Displacement (L)	6.2
Type/No. Cylinders	Inline/6
Engine Placement	Front/Longitudinal
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	08/16
Vehicle Type	Truck

GVWR (kg)	4536
GAWR Front (kg)	1792
GAWR Rear (kg)	2876

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	3	3	0	6
Capacity Weight (VCW) (kg)				1811
DSC x 68.04 (kg)				408.2
Cargo Weight (RCLW) (kg)				1402.8

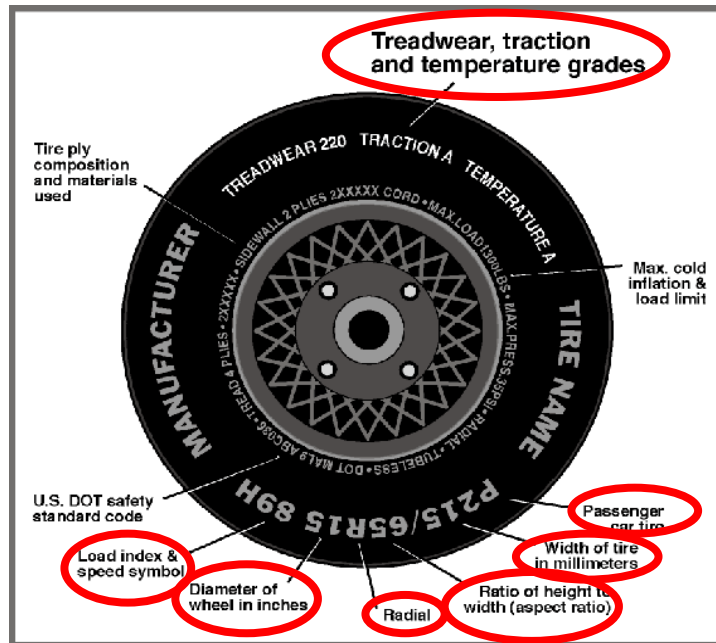
VEHICLE SEAT TYPE

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	Yes	Yes	N/A	N/A
Third Row Seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	550	550
Cold Pressure (kPa)	450	550
Recommended Tire Size	LT245/75R17	LT245/75R17
Tire Size on Vehicle	LT245/75R17	LT245/75R17
Tire Manufacturer	Michelin	Michelin
Tire Model	LTX M/S ²	LTX M/S ²
Treadwear	N/A	N/A
Traction	N/A	N/A
Temperature Grades	N/A	N/A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	121/118R E	121/118R E
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	M3 43 007X 3316	M3 43 007X 3216
DOT Safety Code Right	M3 43 007X 3316	M3 43 007X 3216

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

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	427	427	550	545
Tire Placard	kPa	450	450	550	550
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	450	450	550	550

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21 kPa	207	207	207	207

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	765.4	589.2		816.0	681.6		826.4	694.6	
Right	kg	768.8	583.2		794.0	670.2		779.6	666.8	
Ratio	%	56.7	43.3		54.4	45.6		54.1	45.9	
Totals	kg	1534.2	1172.4	2706.6	1610.0	1351.8	2961.8	1606.0	1361.4	2967.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2706.6	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2967.6	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	946	948	Yes
RF	mm	950	946	Yes
RR	mm	1043	1041	Yes
LR	mm	1034	1040	Yes
Vehicle CG (Aft of Front Axle)	mm	1727	1718	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	+22	+10	

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

Test height adjustable suspension setting, if applicable:

N/A

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in truck bed	52.0
Removed: None	0.0

¹ Rated cargo and luggage weight limited to 136 kg or 300 lbs.

DATA SHEET NO. 2

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

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	N/A	N/A	12.3
Front Passenger Seat	N/A	N/A	12.1
Front Center Seat*	N/A	N/A	5.2
Struck Side Rear Seat	N/A	N/A	14.3
Non-Struck Side Rear Seat	N/A	N/A	15.6
Rear Center Seat*	N/A	N/A	14.1

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	12.3	338	Max	N/A	N/A	N/A
			Mid	335	338	342
			Min	N/A	N/A	N/A
Front Passenger Seat	12.1	341	Max	N/A	N/A	N/A
			Mid	339	341	346
			Min	N/A	N/A	N/A
Front Center Seat*	5.2	Fixed	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	14.3	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	15.6	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	14.1	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2017 Ford F-250 SuperCab

NHTSA No.: M20170209

Test Program: SINCAP Side Impact

Test Date: 11/10/16

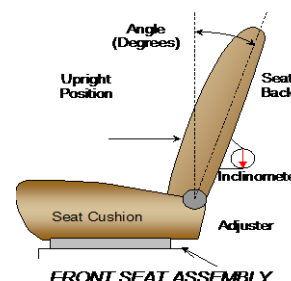
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	254	38	127	19
Front Passenger Seat	254	38	127	19
Front Center Seat*	Fixed	N/A	Fixed	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* If applicable

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents	Degrees	Detent
Driver Seat w/ Seated Dummy	50.8	28	3.3	9
Front Passenger Seat	50.5	28	3.3	9
Front Center Seat*	Fixed	N/A	Fixed	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* If applicable

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4, Numbered from 0 to 3	3 (uppermost)
Rear Seat	1, Fixed	1, Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	3, Numbered from 0 to 2	2, Uppermost
Rear Seat	1, Fixed	1, Fixed

DATA SHEET NO. 2 (CONTINUED)

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

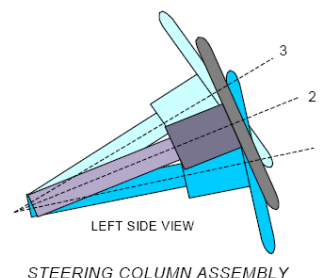
Test Vehicle: 2017 Ford F-250 SuperCab
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STEERING COLUMN ADJUSTMENT

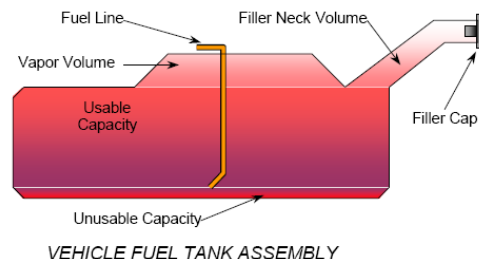
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	19.5	
Geometric Center, Position No. 2	21.3	
Uppermost, Position No. 3	23.1	
Telescoping Steering Wheel Travel		40
Test Position	21.3	20



FUEL PUMP

The electric fuel pump operates for 3 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 3 seconds following ignition actuation the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls the fuel pump is deactivated. Also, the fuel pump is shut-off by the restraint control module to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.



FUEL TANK CAPACITY

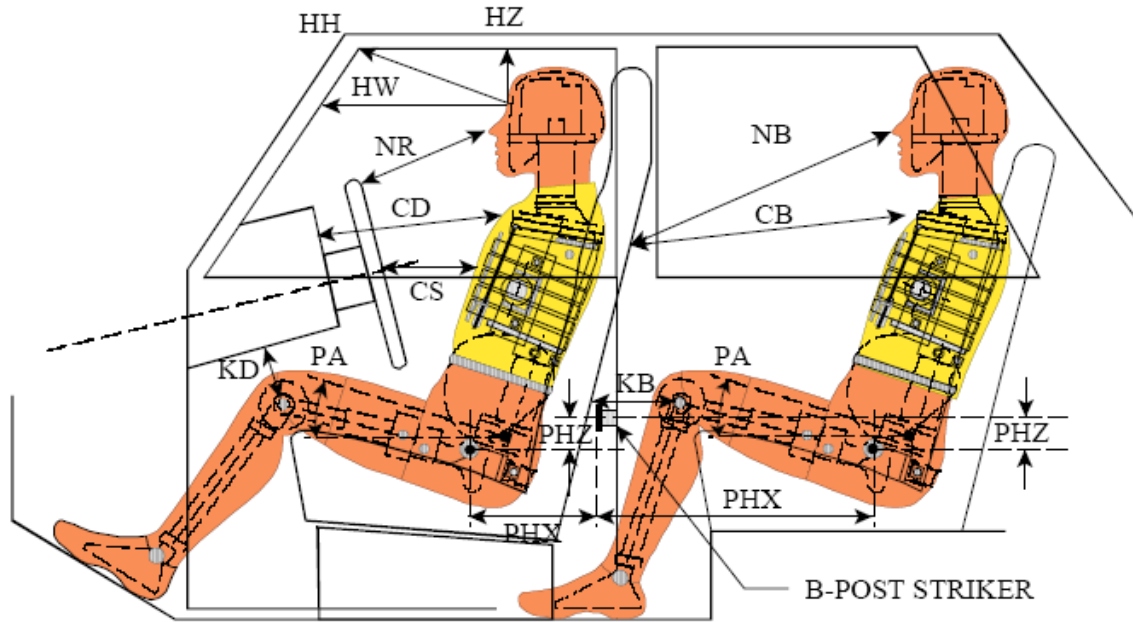
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	128.7
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	128.7
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	119.7
Actual Amount of Solvent Used in Test	119.7
1/3 of Usable Capacity	42.9

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



LEFT SIDE VIEW

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

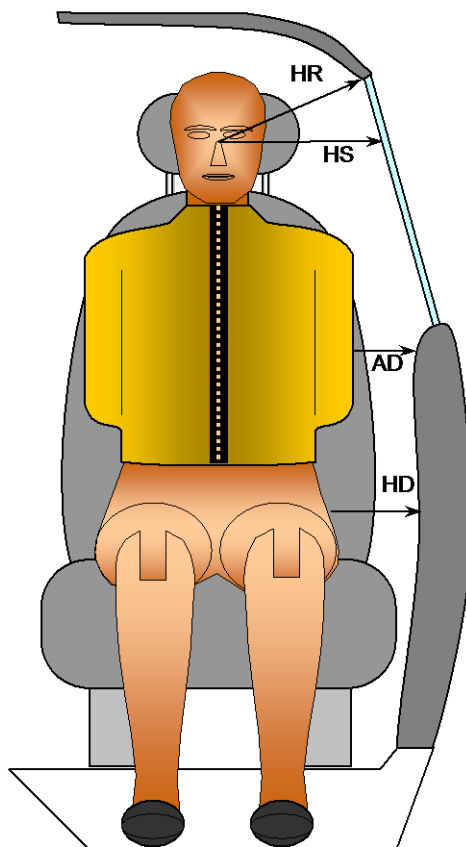
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	478			
HW		Header to Windshield	718			
HZ	HZ	Head to Roof Liner	202		321	
NR	NB	Nose to Rim/Seat Back	447		543	
CD	CB	Chest to Dash/Seat Back	615		500	
CS		Chest to Steering Wheel	370			
KD(L)/KDA(L) ⁰	KB(L)/KBA(L) ⁰	Left Knee to Dash/Seat Back	153	24.2	204	0.0
KD(R)/KDA(R) ⁰	KB(R)/KBA(R) ⁰	Right Knee to Dash/Seat Back	138	27.0	201	0.0
PAX ⁰	PAX ⁰	Pelvic Tilt Angle X		0.4		0.5
	PAY ⁰	Pelvic Tilt Angle Y				18.3
PHX	PHX	Hip Point to Striker (X-Axis)	306		-500	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	-57		-9	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



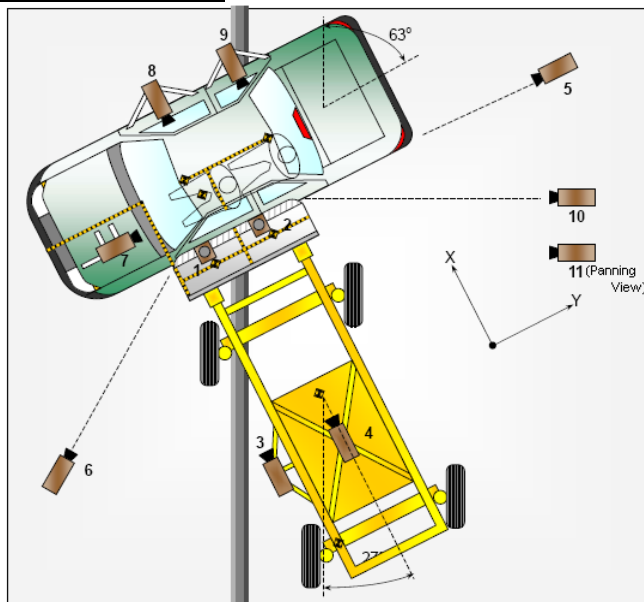
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	195	283
HS	Head to Side Window	mm	356	390
AD	Arm to Door	mm	121	170
HD	H-Point to Door	mm	154	176

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-160	1150	5692	8.5	1000
2	Overhead Close-up	0	770	5692	16	1000
3	Left Impact Point (MDB)	1811	890	860	25	1000
4	Side Overall (MDB)	2625	0	1500	12.5	1000
5	Rear	0	6757	1320	20	1000
6	Left Front	2208	-4023	1490	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

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

*All measurements accurate to ± 6 mm.

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

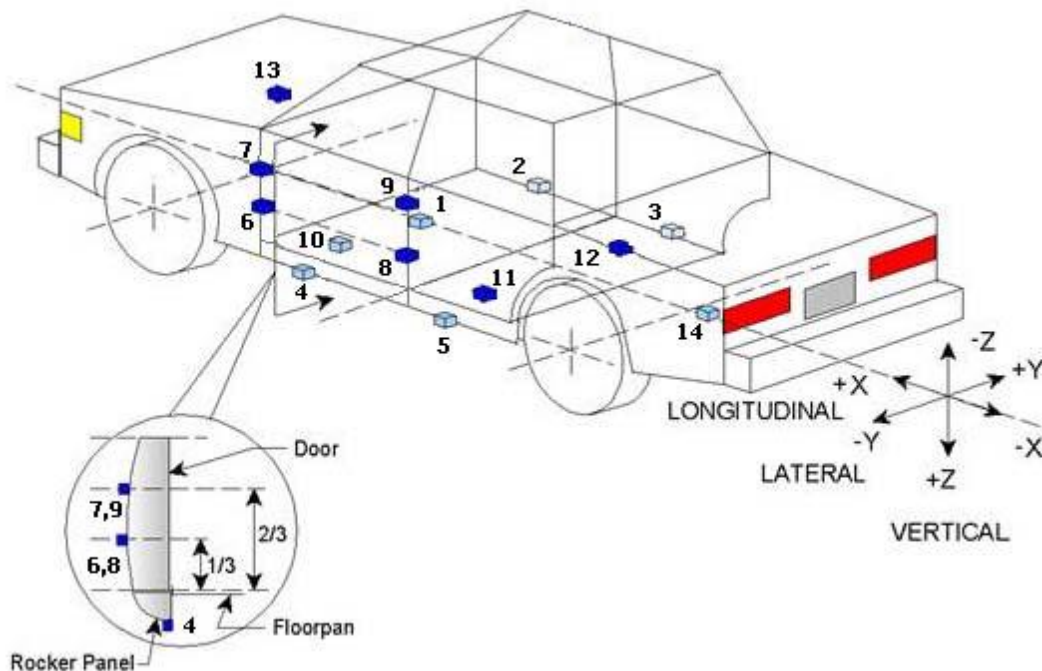
INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



TEST VEHICLE ACCELEROMETER LOCATIONS

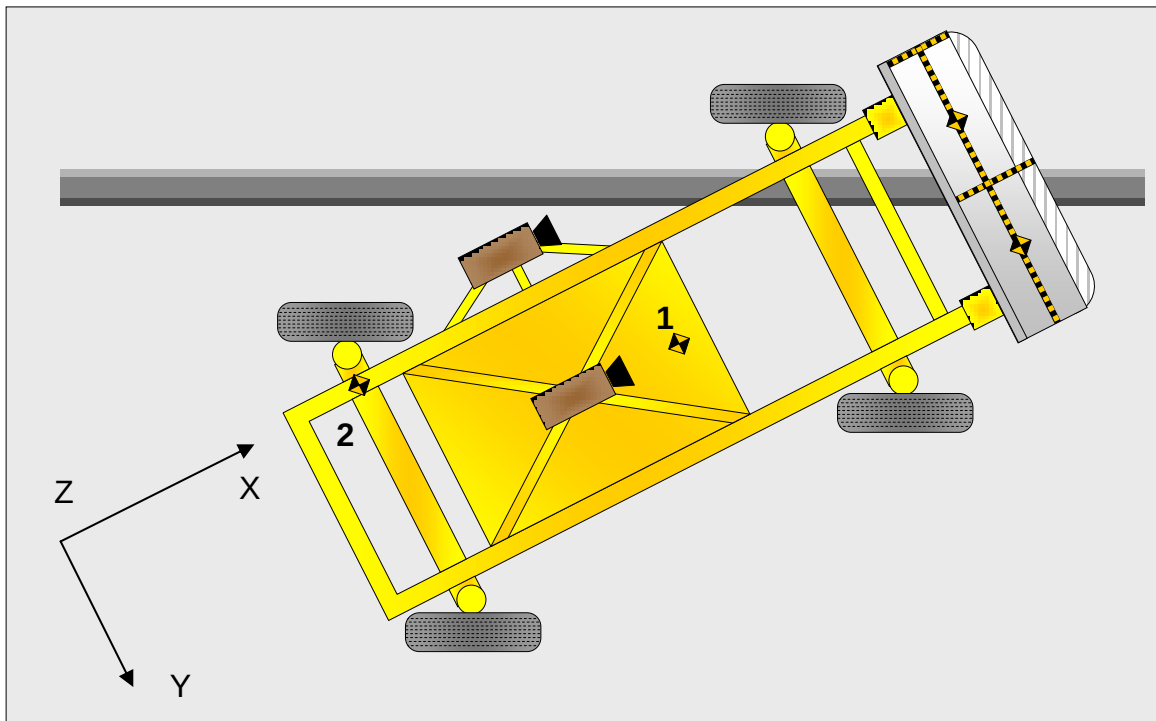
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3962	0	-765
2	Right Sill at Front Seat	4054	702	-619
3	Right Sill at Rear Seat	2901	750	-673
4	Left Sill at Front Door	3999	-745	-621
5	Left Sill at Rear Door	2934	-350	-667
6	A-Post Lower	4385	-925	-688
7	A-Post Middle	4375	-925	-1193
8	B-Post Lower	2542	-910	-925
9	B-Post Middle	2542	-910	-1205
10	Front Seat Track	3608	-665	-765
11	Rear Seat Structure	2918	-372	-661
12	Right Rear Occ. Compartment	2901	430	-713
13	Engine Block	5000	-162	-1044
14	Rear Above Axle	1390	0	-895

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



MDB ACCELEROMETER LOCATIONS

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

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

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

Test Vehicle: 2017 Ford F-250 SuperCab
Test Program: SINCAP Side Impact

NHTSA No.: M20170209
Test Date: 11/10/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	SCAB, Head liner	SCAB
Top of Head	Head liner	SCAB, C-Pillar trim
Left Side of Head	SCAB, Head liner	SCAB, C-Pillar trim
Back of Head	Head liner	C-Pillar trim
Left Shoulder	SCAB	SCAB, Door panel
Upper Torso	Seat back bolster	Door panel
Lower Torso	Seat back bolster	Door panel
Left Hip	Seat cushion bolster, Door panel	Door panel
Left Knee	Door panel	Door panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	Slight cracking
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3765
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		505
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+3
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-5

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Ford F-250 SuperCab
Test Program: SINCAP Side Impact

NHTSA No.: M20170209
Test Date: 11/10/16

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel Base of Framework Carriage	2591
C.G. Location aft of Front Axle	1110

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	427.2	251.2	678.4
Right	kg	352.2	332.8	685.0
Ratio	%	57.2	42.8	100.0
Totals	kg	779.4	584.0	1363.4

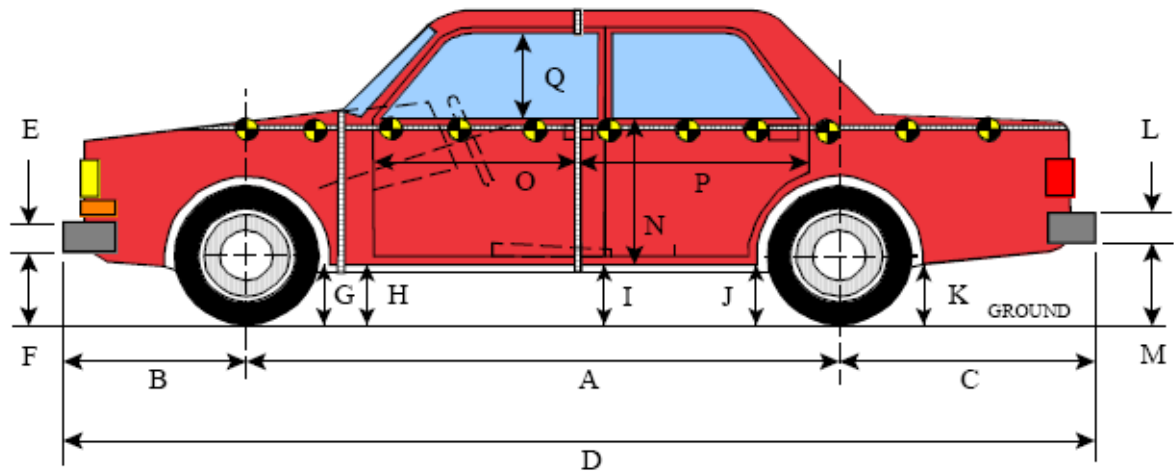
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.20
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.22
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

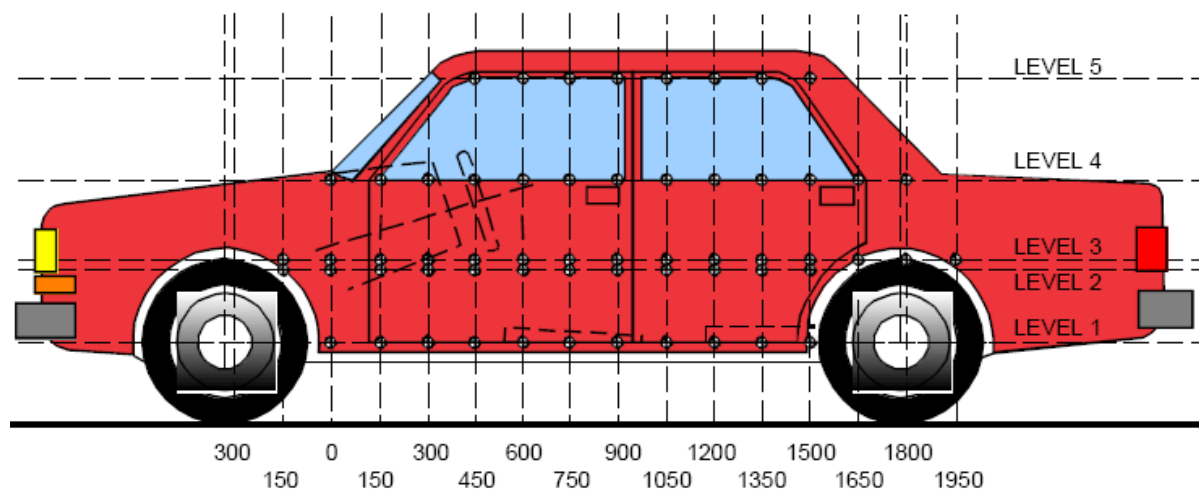


LEFT SIDE VIEW

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

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3765	3760	5
B	Front Axle to Front Surface of Vehicle	965	963	2
C	Rear Axle to Rear Surface of Vehicle	1335	1338	-3
D	Total Length at Centerline	6065	6061	4
E	Front Bumper Thickness	235	235	0
F	Front Bumper Bottom to Ground	395	403	-8
G	Sill Height at Front Wheel Well	510	525	-15
H	Sill Height at Front Door Leading Edge	510	530	-20
I	Sill Height at B-Pillar	545	558	-13
J1	Sill Height at Rear Wheel Well	572	595	-23
J2	Pinch Weld Height at Rear Wheel Well	481	505	-24
K	Sill Height Aft of Rear Wheel Well	768	782	-14
L	Rear Bumper Thickness	155	155	0
M	Rear Bumper Bottom to Ground	545	550	-5
N	Sill Height to Window Bottom Sill	850	810	40
O	Front Door Leading Edge to Impact CL	697	835	-138
P	Rear Door Trailing Edge to Impact CL	1235	1045	190
Q	Front Window Opening	487	472	15
R	Right Side Length	5942	5960	-18
S	Left Side Length	5940	5961	-21
T	Vehicle Width	2022	2022	0

DATA SHEET NO. 11**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**Test Vehicle: 2017 Ford F-250 SuperCabNHTSA No.: M20170209Test Program: SINCAP Side ImpactTest Date: 11/10/16**LEFT SIDE VIEW****MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	608	248	1650
2	Driver Hip Point	984	208	1800
3	Mid-Door	852	235	1650
4	Window Sill	1207	146	1650
5	Window Top	1888	63	2100

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

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

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	1017	0	960	0	0	976	0	937	0	0	41	0	23	0
-150	0	1007	1016	967	0	0	959	950	938	0	0	48	66	29	0
0	1001	998	1007	974	0	891	942	935	939	0	110	56	72	35	0
150	990	1002	998	980	0	850	937	919	958	0	140	65	79	22	0
300	990	1004	999	984	0	810	917	872	946	0	180	87	127	38	0
450	991	1006	1000	988	0	780	880	863	946	0	211	126	137	42	0
600	992	1008	1002	992	0	773	873	833	946	0	219	135	169	46	0
750	992	1009	1002	995	0	766	879	826	942	0	226	130	176	53	0
900	992	1010	1003	998	717	768	882	834	934	686	224	128	169	64	31
1050	992	1011	1004	1000	727	784	864	802	924	693	208	147	202	76	34
1200	991	1012	1004	1000	734	793	858	787	911	695	198	154	217	89	39
1350	990	1012	1005	1004	737	772	842	791	902	694	218	170	214	102	43
1500	988	1009	1003	1003	738	749	825	776	869	720	239	184	227	134	18
1650	987	1009	1003	1003	741	739	806	768	857	740	248	203	235	146	1
1800	985	1008	1002	1003	744	744	800	769	860	759	241	208	233	143	-15
1950	984	1007	1001	1003	746	771	863	833	899	777	213	144	168	104	-31
2100	0	1005	998	1002	723	0	911	899	918	660	0	94	99	84	63
2250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

DATA SHEET NO. 11 (CONTINUED)

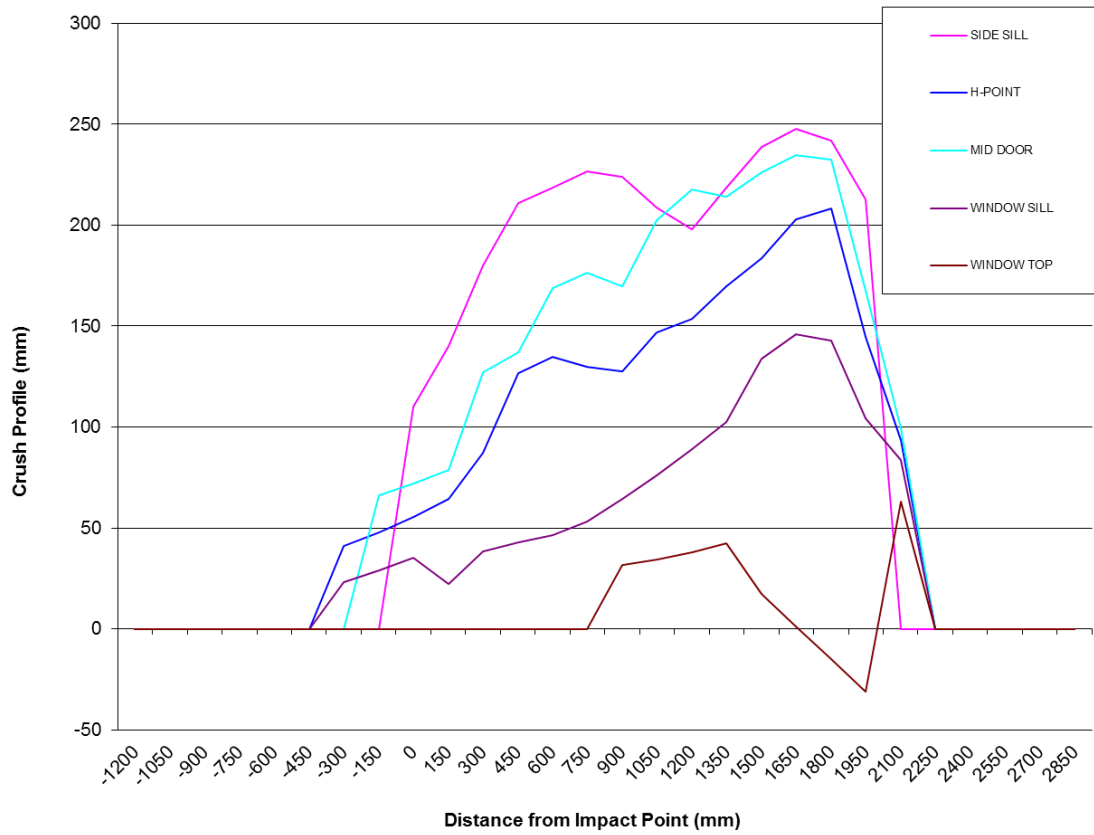
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Ford F-250 SuperCab

NHTSA No.: M20170209

Test Program: SINCAP Side Impact

Test Date: 11/10/16

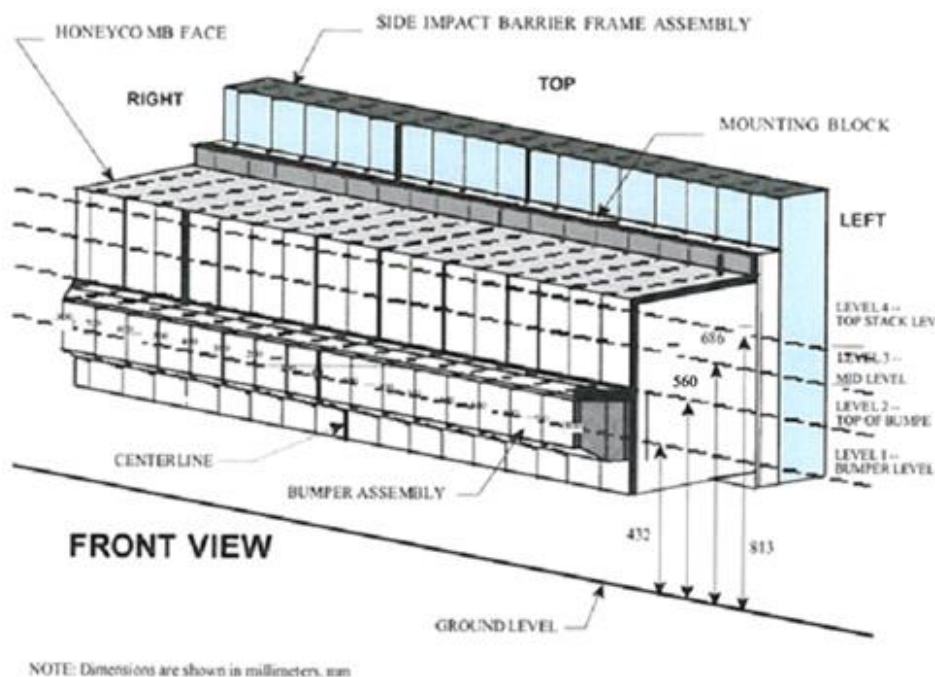


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Left	100
B	Top of Bumper	560	800	Right	144
C	Mid-Level	686	800	Right	207
D	Top of Stack	813	800	Right	243

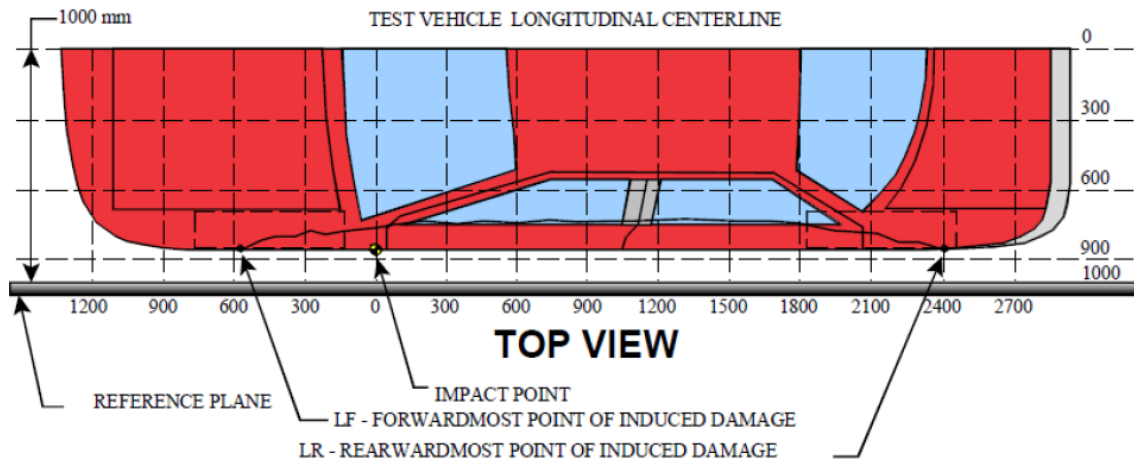
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	96	96	86	83	81	80	83	83	86	87	88	91	90	91	93	100	106
2	144	116	111	109	107	105	107	113	115	116	116	117	118	120	125	127	131
3	207	186	167	152	142	149	146	162	161	149	143	141	142	149	151	157	185
4	243	193	163	150	166	180	171	179	160	142	134	134	139	149	165	186	225

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2100	3	899	998	99
2	1650	1	739	987	248
3	1200	3	787	1004	217
4	600	1	773	992	219
5	150	1	850	990	140
6	-300	2	976	1017	41

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm Left of Center	4	158	383	225
2	500 mm Left of Center	3	235	384	149
		4	235	384	149
3	200 mm Left of Center	3	241	384	143
4	200 mm Right of Center	4	213	384	171
5	500 mm Right of Center	3	232	384	152
6	800 mm Right of Center	4	141	384	243

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

Test Vehicle: 2017 Ford F-250 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20170209
 Test Date: 11/10/16

Test Time: 16:50 **Temperature:** 21.1°C

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

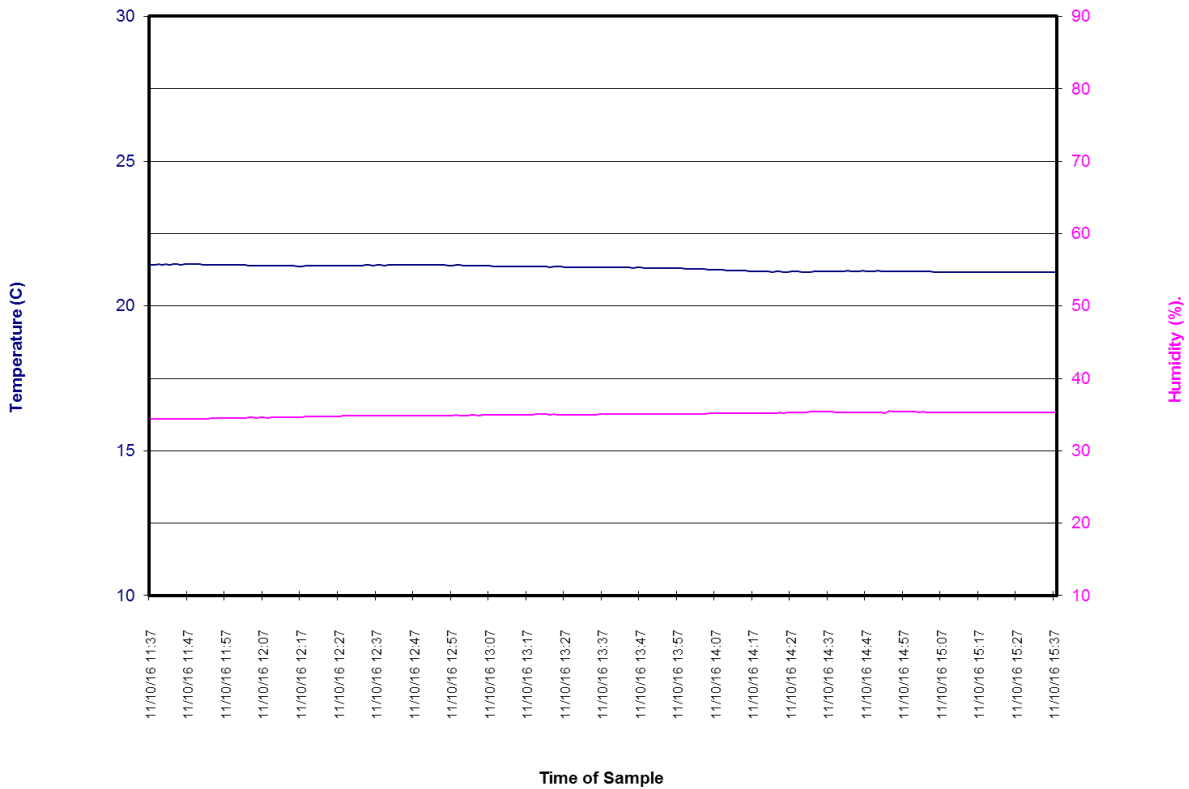
Test Vehicle: 2017 Ford F-250 SuperCab

NHTSA No.: M20170209

Test Program: SINCAP Side Impact

Test Date: 11/10/16

M20170209 2017 Ford F-250 SuperCrew Left MDB Impact 161110: Test Time 15:37



APPENDIX A
PHOTOGRAPHS

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



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



003 Pre-Test Frontal View of Test Vehicle



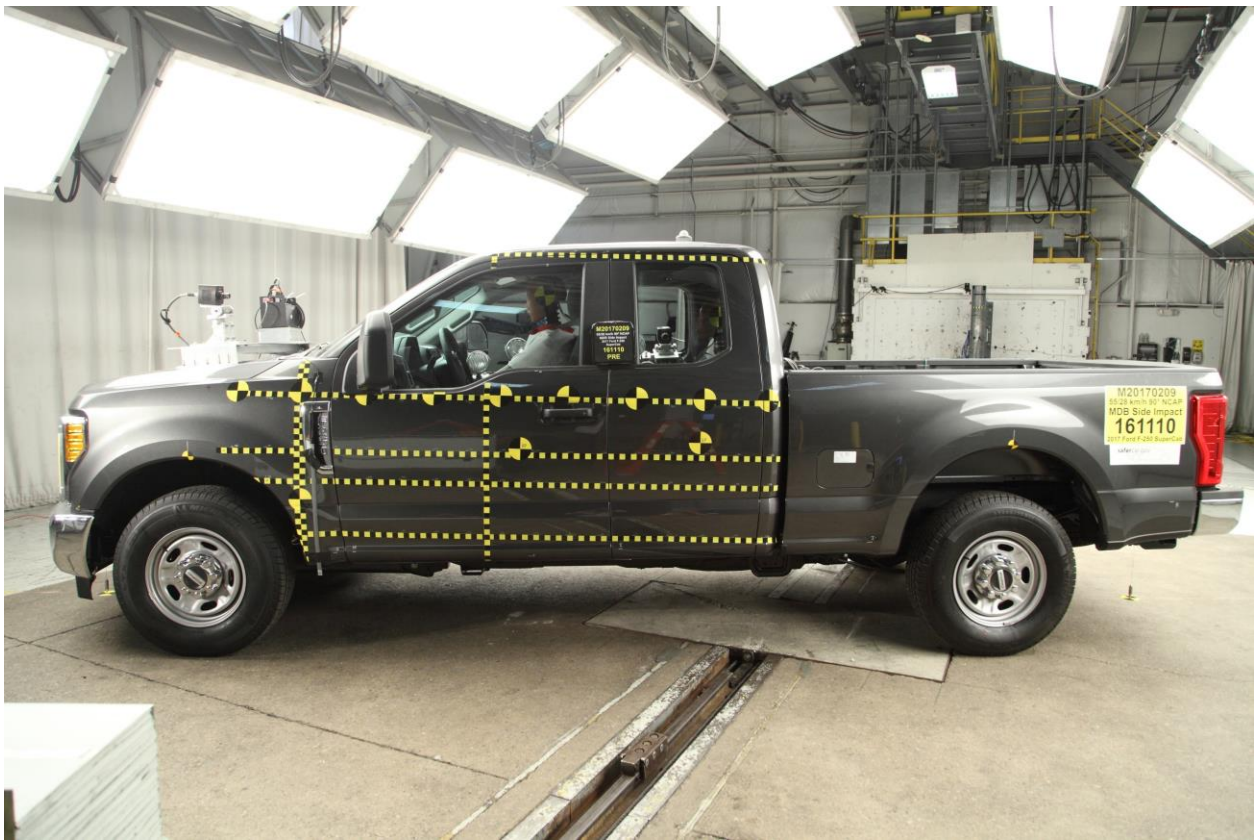
004 Post-Test Frontal View of Test Vehicle



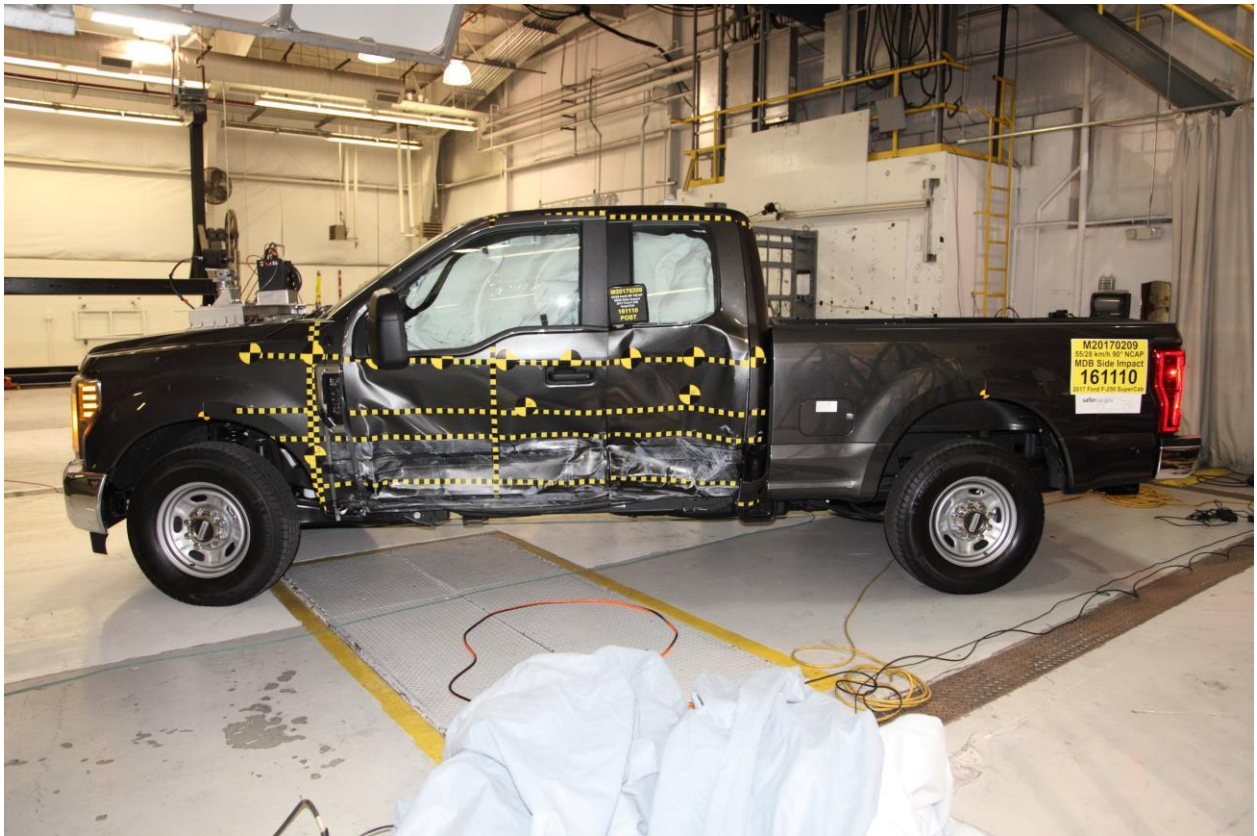
005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



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



021 Pre-Test Left Front Door Latch Close-Up



022 Post-Test Left Front Door Latch Close-Up

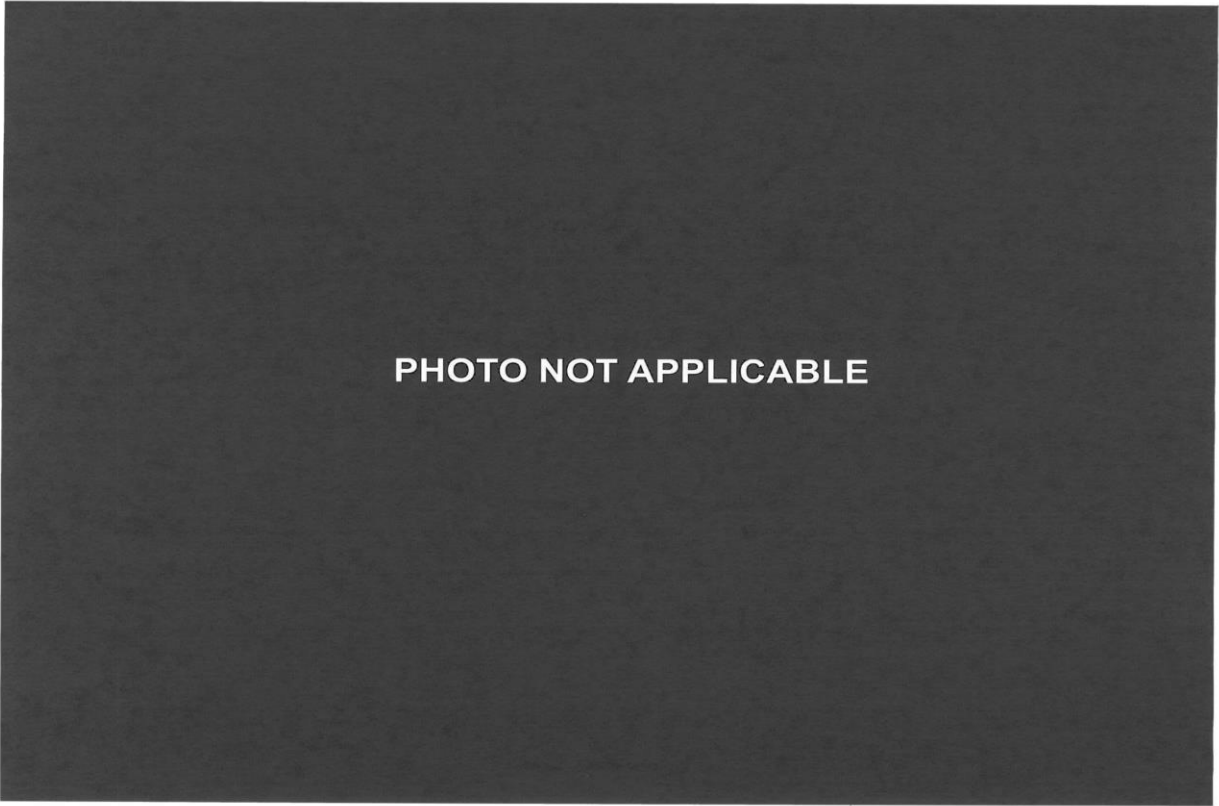


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023 Pre-Test Left Rear Door Latch Close-Up

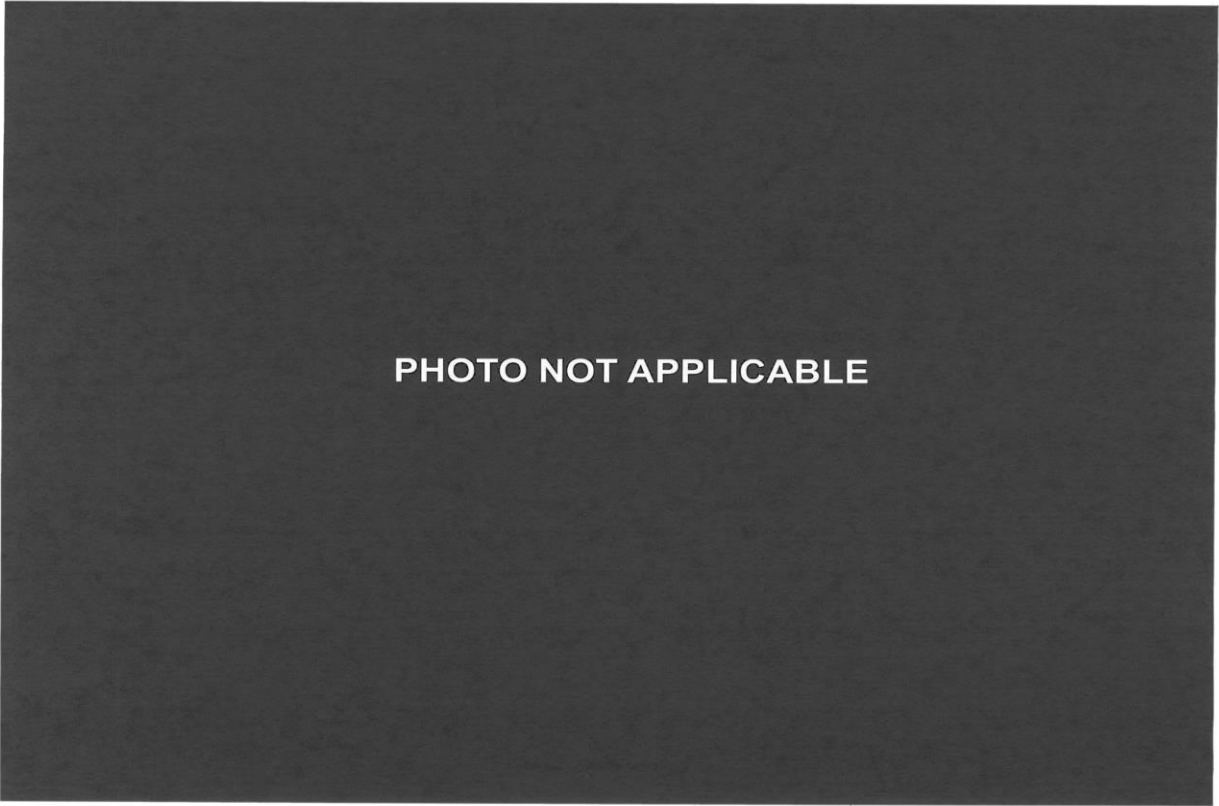


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024 Post-Test Left Rear Door Latch Close-Up



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



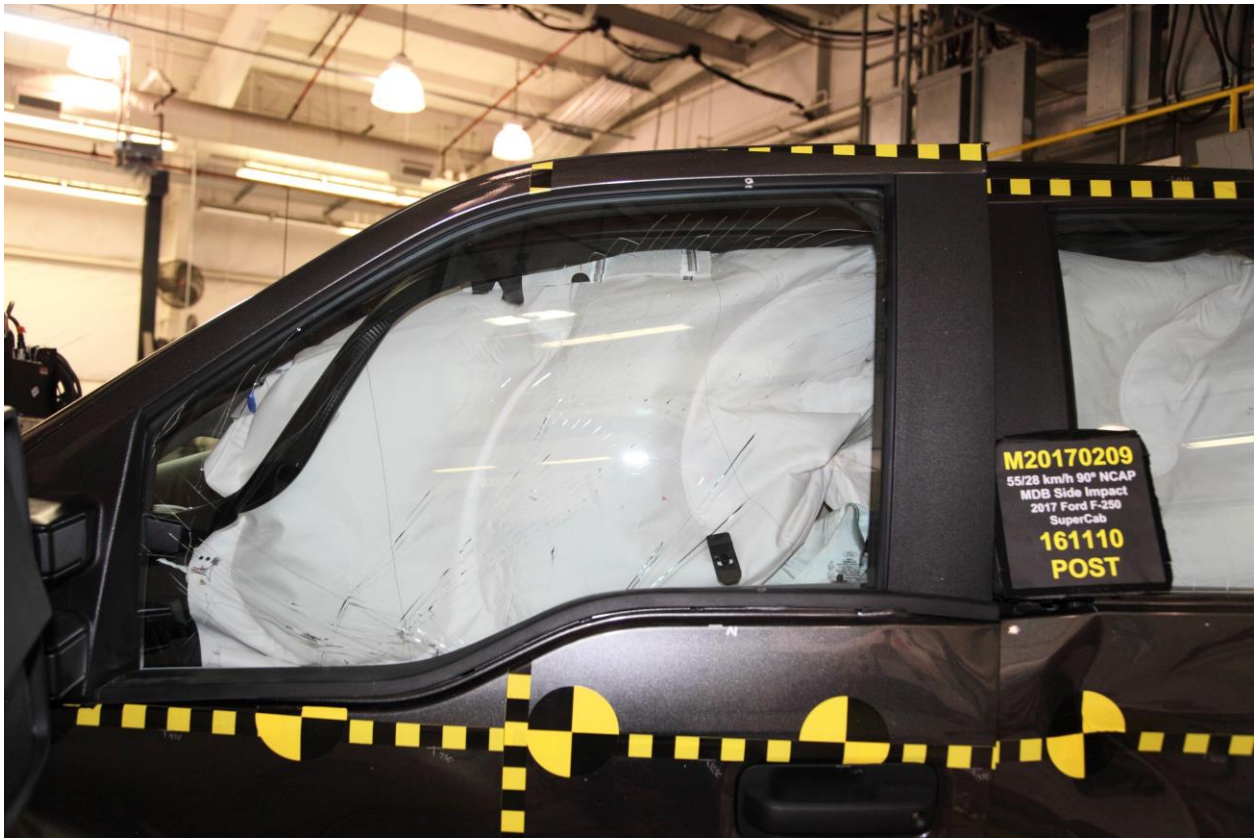
026 Post-Test Front Close-Up View of Driver Dummy



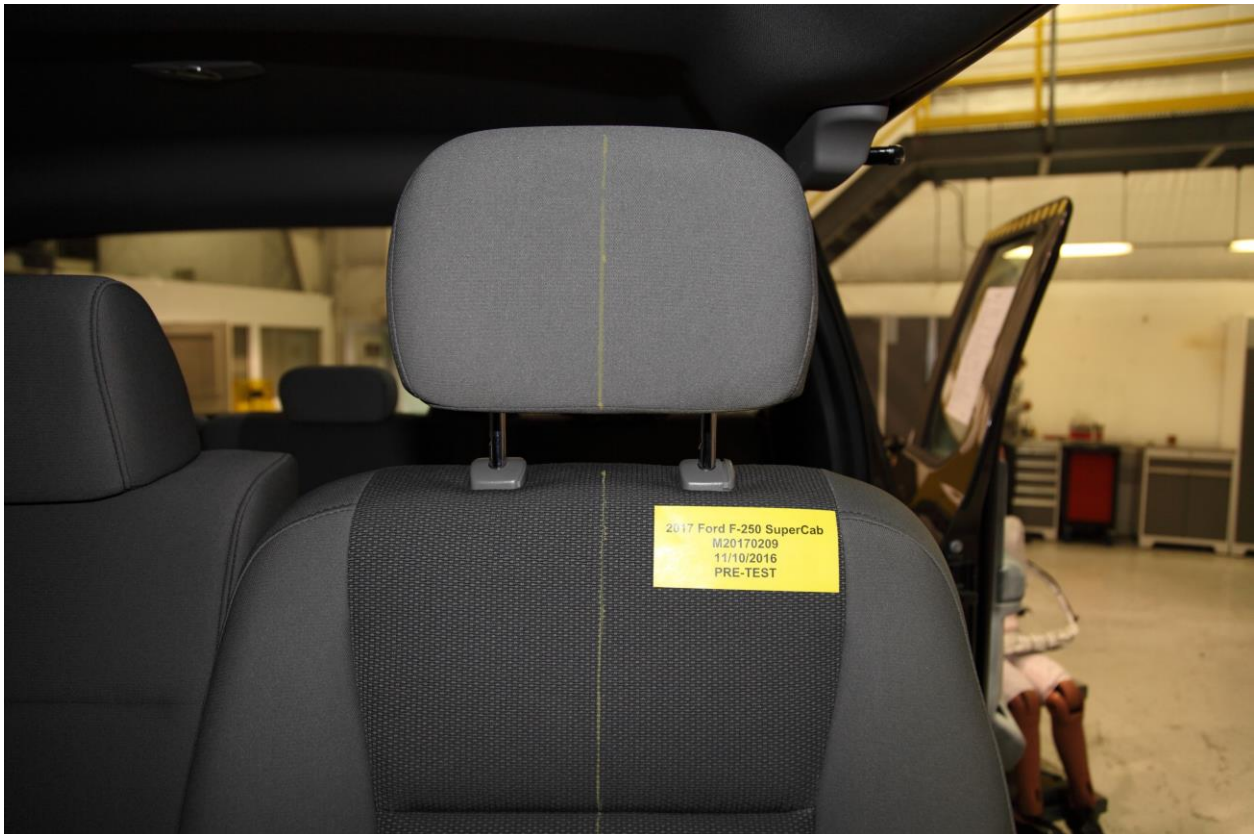
027 Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



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



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



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



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



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



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



034 Pre-Test Placement of Driver Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



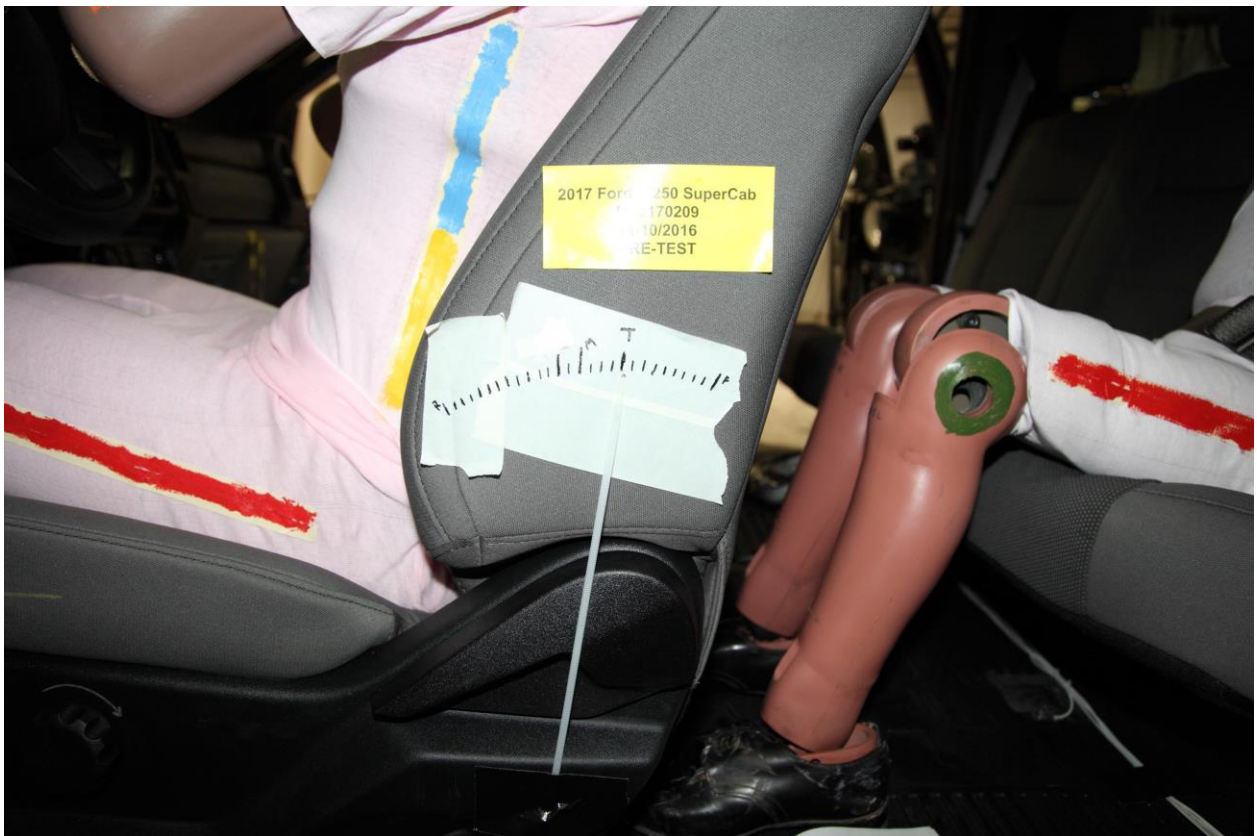
037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



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



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



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



042 Pre-Test Driver Dummy and Door Clearance View



043 Post-Test Driver Dummy and Door Clearance View



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



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



046 Pre-Test Driver Inner Door Panel View



047 Post-Test Driver Inner Door Panel View



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



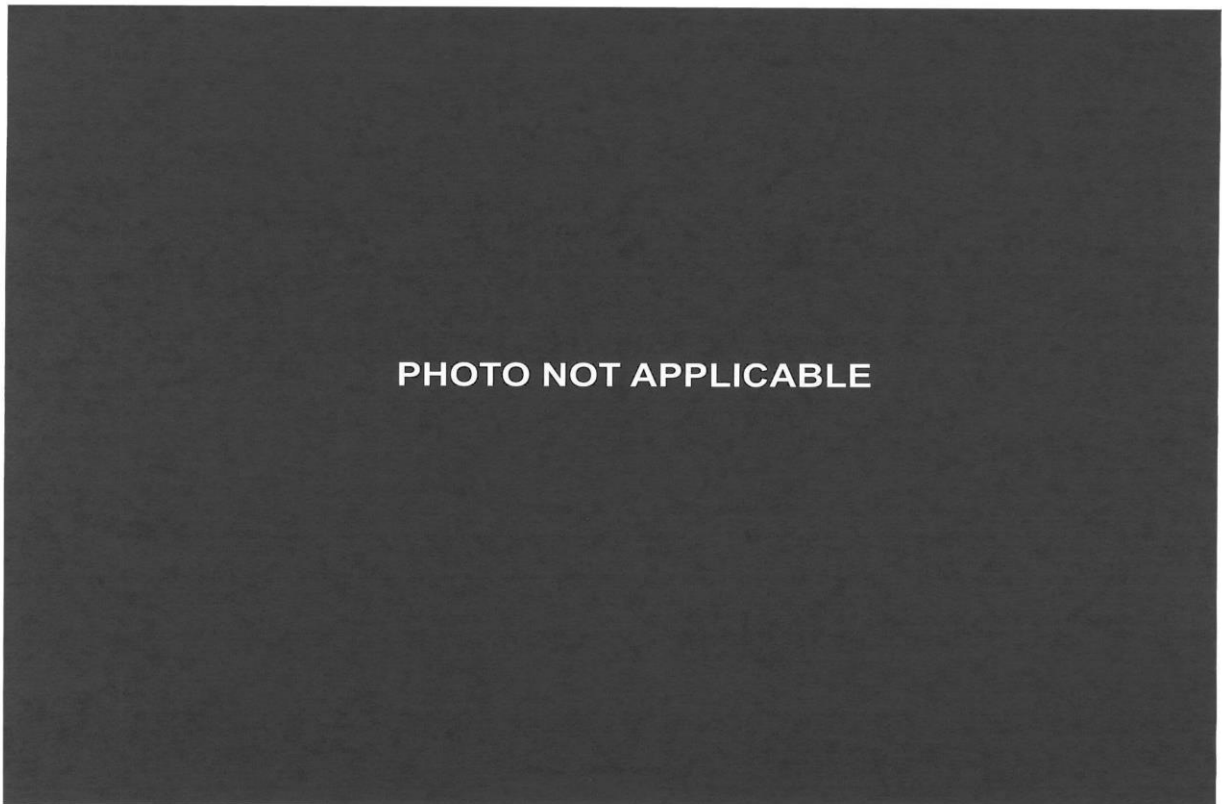
049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



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



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



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

PHOTO NOT APPLICABLE

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



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



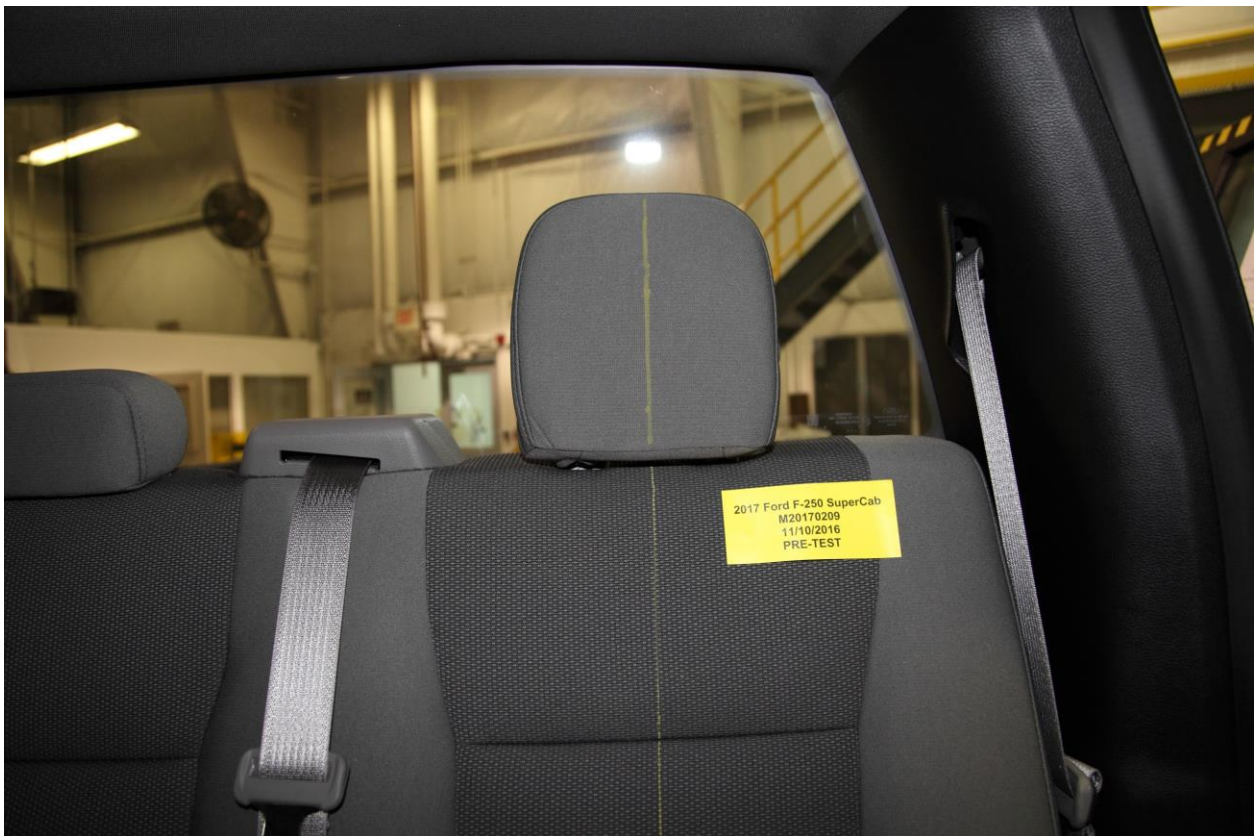
055 Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking



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



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



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

PHOTO NOT AVAILABLE

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



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



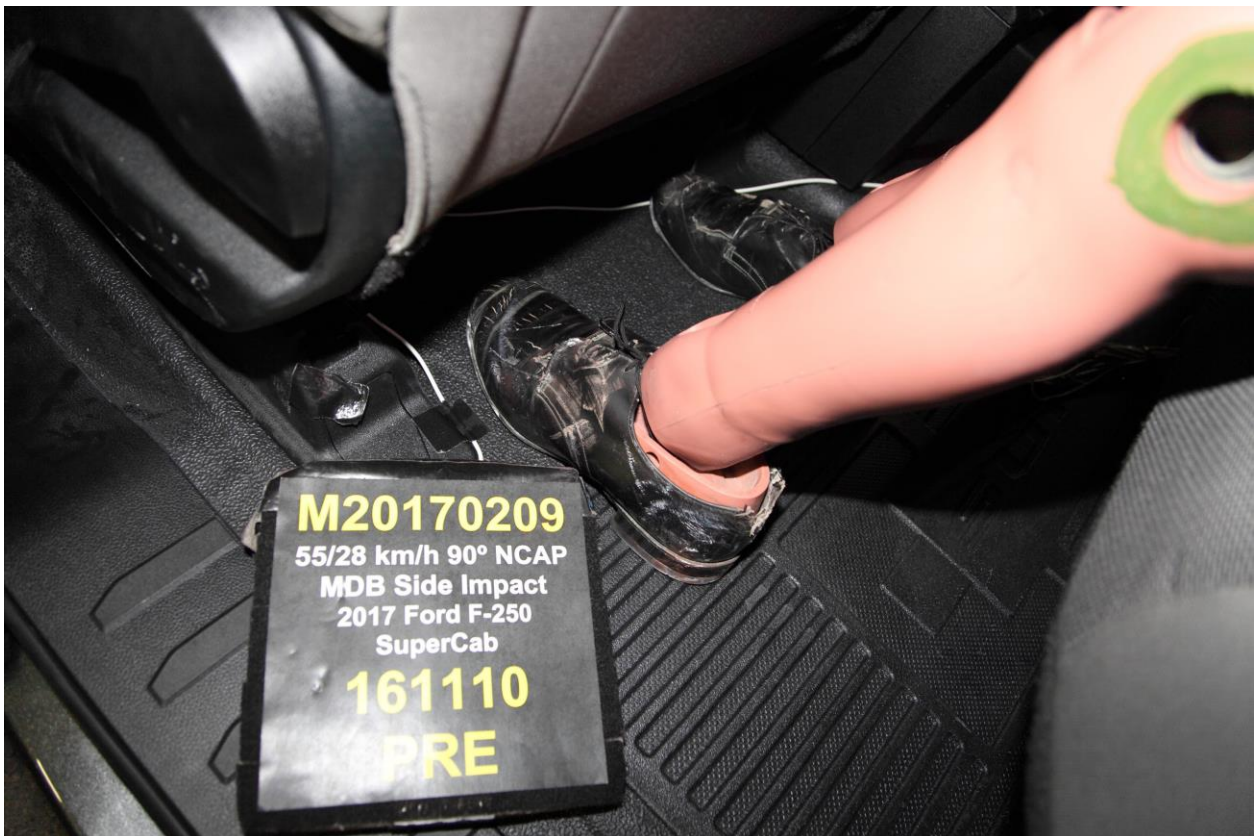
061 Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



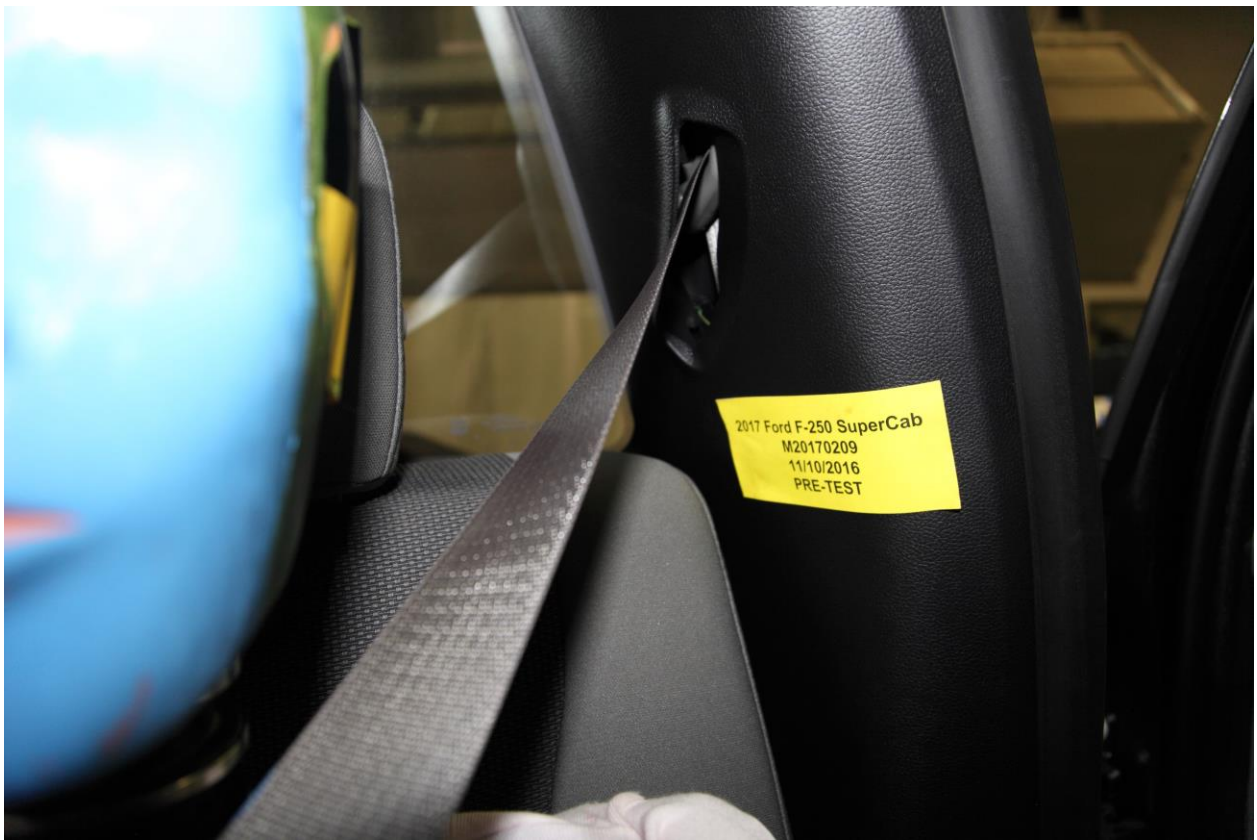
062 Pre-Test View of Rear Passenger Dummy Neck Showing Position of Adjustable Neck Bracket



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



064 Pre-Test Placement of Rear Passenger Dummy Feet



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



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



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



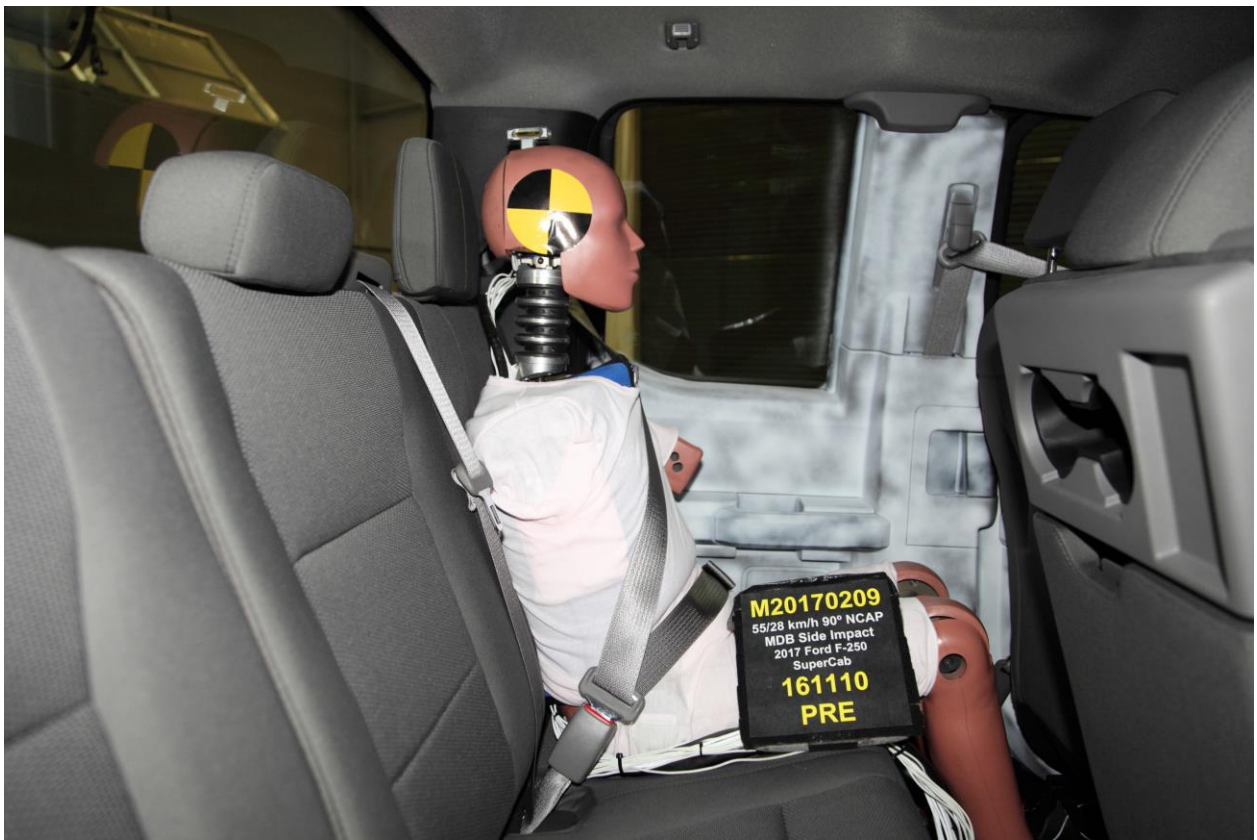
068 Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



069 Pre-Test Passenger Dummy and Door Clearance View



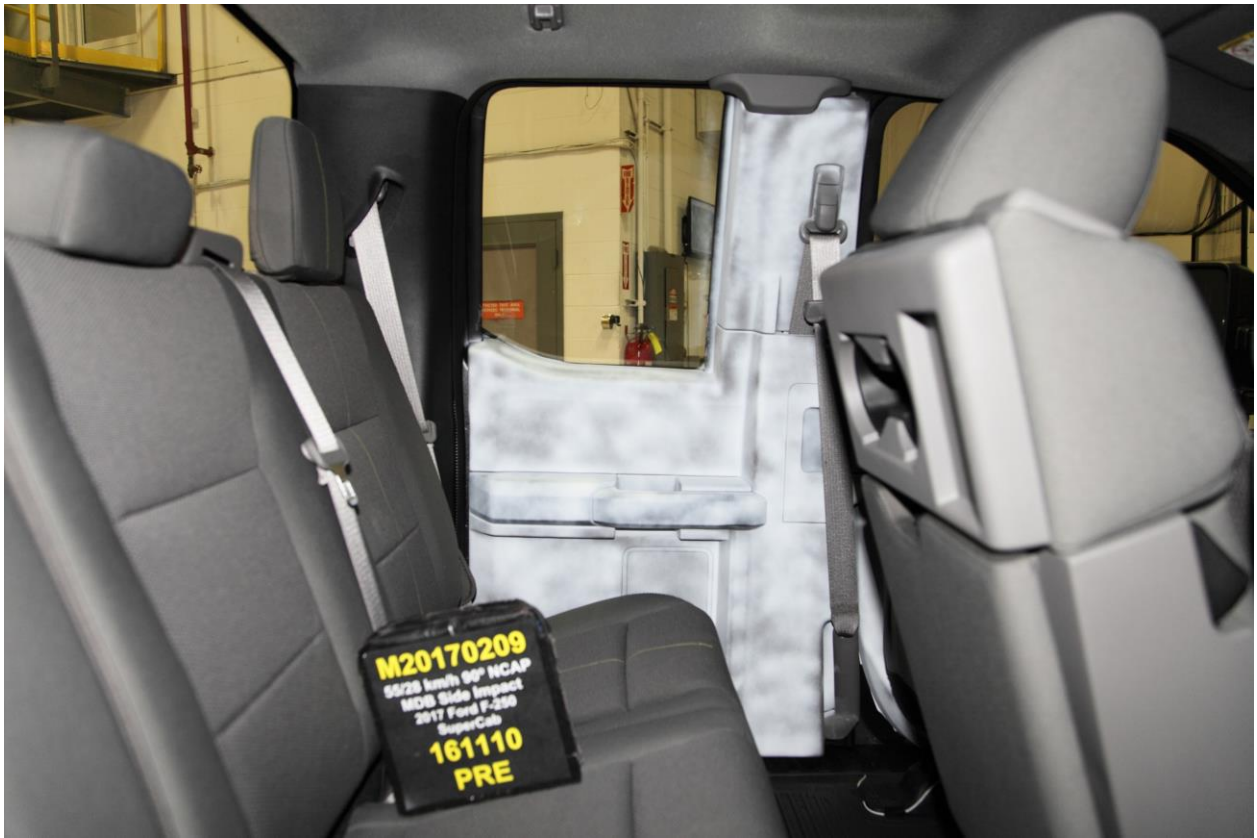
070 Post-Test Passenger Dummy and Door Clearance View



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



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



073 Pre-Test Passenger Inner Door Panel View



074 Post-Test Passenger Inner Door Panel View



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



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



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



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

PHOTO NOT APPLICABLE

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

PHOTO NOT APPLICABLE

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



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

Intentionally Left Blank



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



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



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



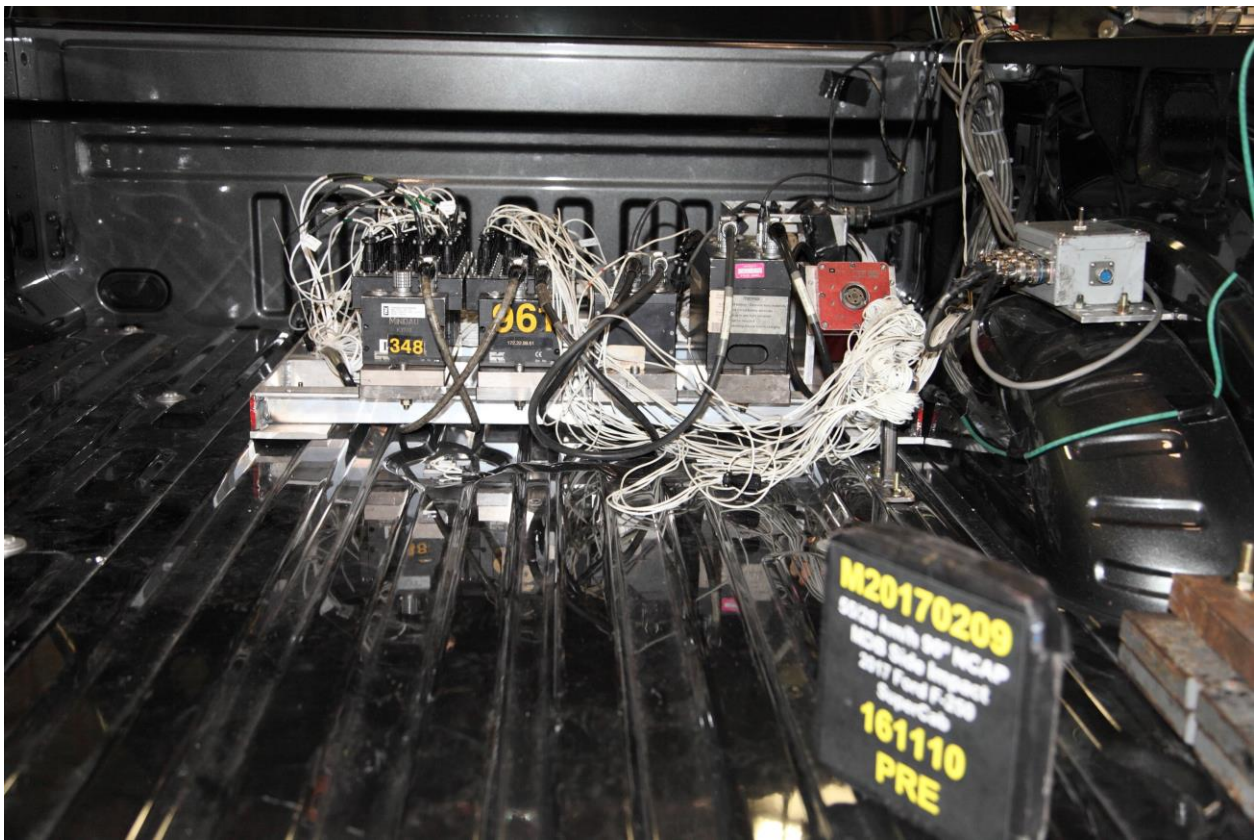
091 Post-Test Right Side View of MDB Impactor Face



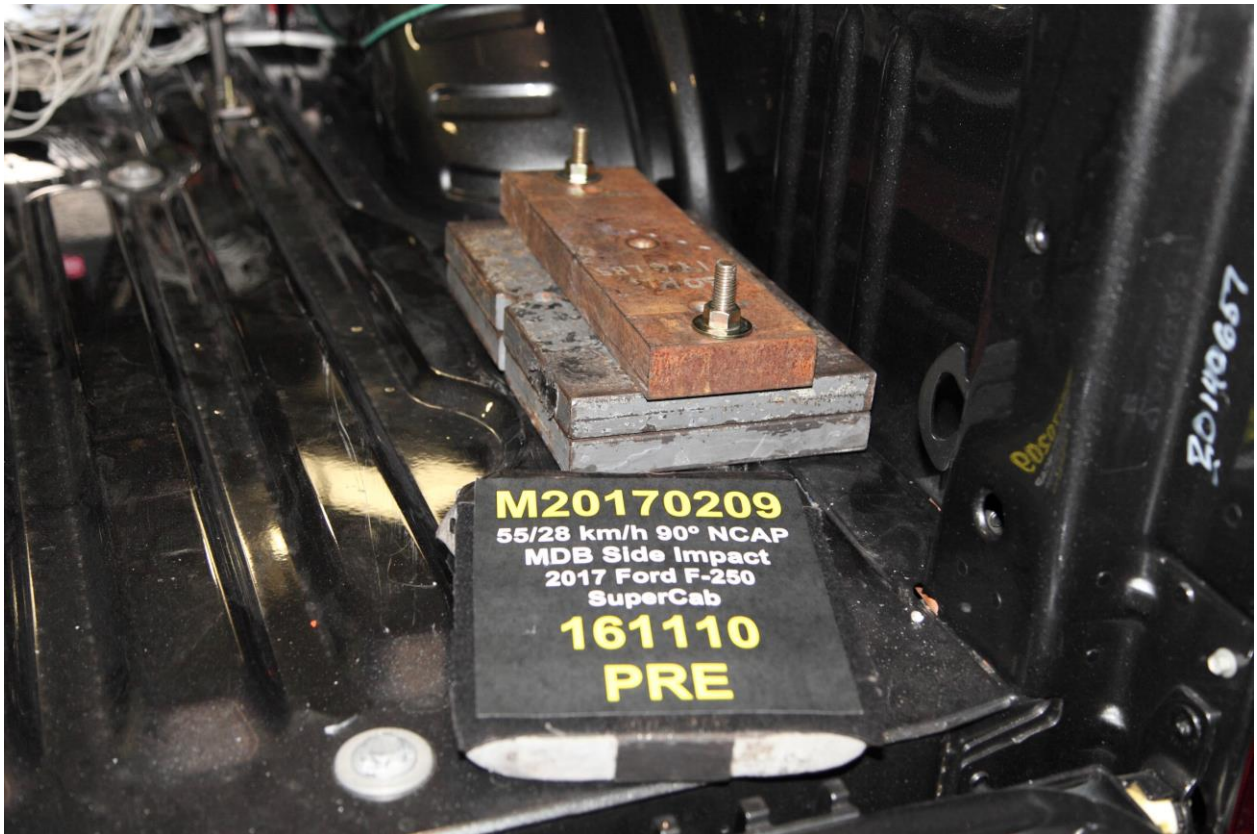
092 Close-Up View of Vehicle Certification Label



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



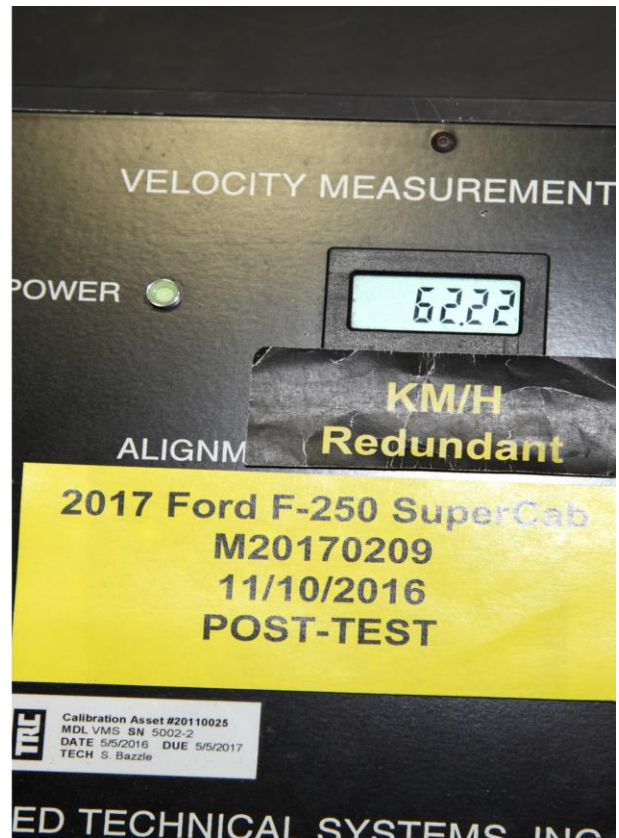
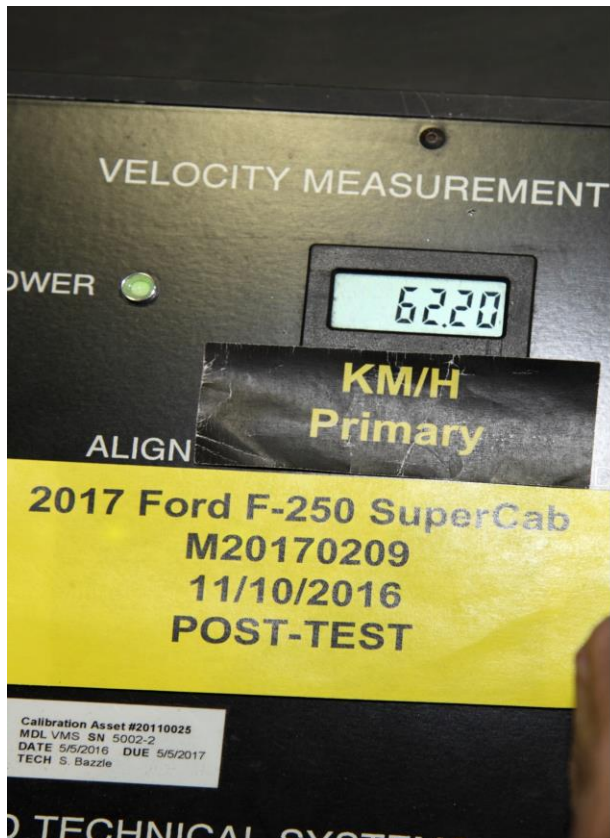
094 Pre-Test Ballast View 1



094a Pre-Test Ballast View 2



094b Pre-Test Ballast View 3



095 Post-Test Primary Speed Trap Read-Out



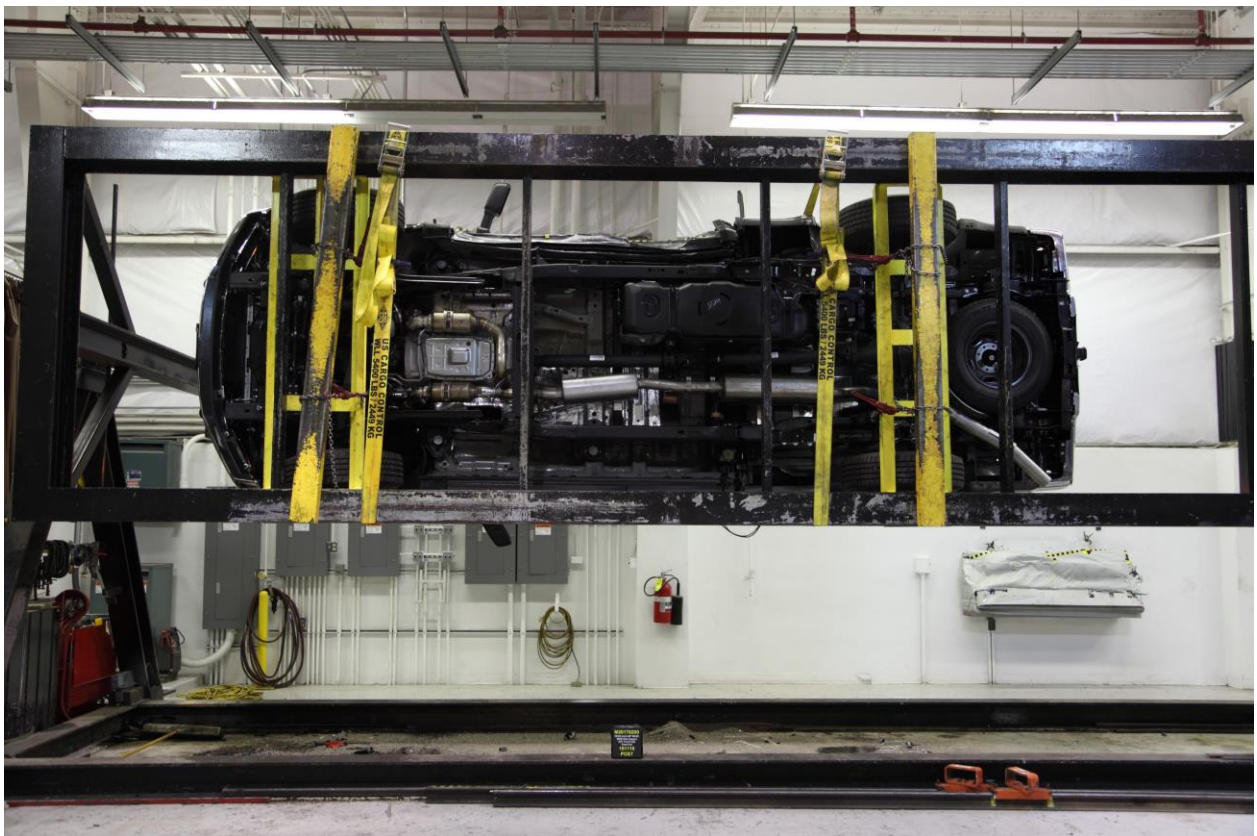
096 FMVSS No. 301 Static Rollover 0 Degrees



097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees



099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees



101 Impact Event

Go Further
ford.com

VEHICLE DESCRIPTION

SUPER DUTY

2017 F250 SRW 4X2 SUPERCAB
XL 140" WB STYLE SIDE
6.2L EFI V-8 ENGINE
6 SPEED AUTOMATIC TRANS G

EXTERIOR
MAGNETIC
INTERIOR
MEDIUM EARTH GRAY CLOTH

HE **B24678**

EPA DOT Fuel Economy and Environment

FUEL ECONOMY RATINGS NOT REQUIRED ON THIS VEHICLE

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR

- BOX RAIL/TAILOATE MOLDINGS
- DOOR HANDLES - BLACK
- HEADLAMPS - WIPER ACTIVATED
- LOCKING REMOVABLE TAILGATE
- WILFT ASST -NA W/BOX DLT
- PICKUP BOX, TIE DOWN HOOKS -NA W/BOX DLT
- SPARE TIRE AND WHEEL LOCK -NA W/BOX DLT
- TOW HOOKS
- TRAILER SWAY CONTROL

INTERIOR

- 60/40 FOLD-UP REAR BENCH SEAT
- AIR COND, MANUAL FRONT
- DRIVER SEAT-MANUAL LUMBAR
- OUTSIDE TEMP DISPLAY
- PARTICULATE AIR FILTER
- TILT/TELESCOPE STR COLUMN
- VINYL SUN VISORS

FUNCTIONAL

- 4-WHEEL ANTI-LOCK DISC BRAKING SYSTEM
- HILL START ASSIST
- JEWEL EFFECT HEADLAMPS
- MYKEY
- TWIN I-BEAM INDEPENDENT FRT SUSPENSION W/STAB BAR

SAFETY/SECURITY

- ADVANCETRAIC WITH RSC
- AIRBAGS - SAFETY CANOPY
- BELT-MINDER CHIME
- DRIVER/PASSENGER AIR BAGS
- SECURLOCK PASS ANTI THEFT
- SOS POST CRASH ALERT SYS

WARRANTY

- 3YR/36,000 BUMPER / BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST

INCLUDED ON THIS VEHICLE (MSRP)

OPTIONAL EQUIPMENT/OTHER

PREFERRED EQUIPMENT PKG 650A
6 SPEED AUTOMATIC TRANS G
3.73 ELECTRONIC LOCKING AXLE
XL DECOR PACKAGE
1000OH OWNV PACKAGE
ENGINE BLOCK HEATER
50 STATE EMISSIONS
SPARE TIRE AND WHEEL
JACK
CLOTH 40/20/40 SEAT
XL VALUE PACKAGE
AM/FM STEREO CD/CLK

NO CHARGE
390.00
NO CHARGE
NO CHARGE
NO CHARGE
NO CHARGE
100.00
720.00

PRICE INFORMATION
BASE PRICE
TOTAL OPTIONS/OTHER
TOTAL VEHICLE & OPTIONS/OTHER
DESTINATION & DELIVERY

\$34,875.00
1,210.00
36,085.00
1,195.00

BOLD TO

Ferrario Ford Lincoln
2472 Corning Road
Elmira NY 14903

RAMP ONE
RA46

RAMP TWO
RA46

DEALER NO.
13V 529

FINAL ASSEMBLY PLANT
KENTUCKY

ITEM #: 13-D005 O/T VN

SPECIAL ORDER

GH151 N RB 2X 725 001354 08 15 16

TOTAL MSRP \$37,275.00

This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.

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 Not Rated

Side Crash Front seat Rear seat Not Rated Not Rated

Rollover Not Rated

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

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Standard messaging & data plan rates may apply.

102 Monroney Label

Seats

SITTING IN THE CORRECT POSITION

WARNINGS

⚠️ Sitting improperly, out of position or with the seatback reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a crash. Always sit upright against your seat back, with your feet on the floor.

⚠️ Do not recline the seatback as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a crash.

⚠️ Do not place objects higher than the seatback to reduce the risk of serious injury in the event of a crash or during heavy braking.

E68595

When you use them properly, the seat, head restraint, safety belt and airbags will provide optimum protection in the event of a crash.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seatback more than 30 degrees.
- Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 in (25 cm) between your breastbone and the airbag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

⚠️ Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraint when your vehicle is moving.

⚠️ The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. An improperly adjusted head restraint may not adequately protect an occupant during an impact from the rear.

Seats

WARNINGS

⚠️ Install the head restraint properly to help minimize the risk of neck injury in the event of a crash.

Note: Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.

Front Seat Head Restraint

E138642

Rear Seat Outboard Head Restraints

E168700

The head restraints may consist of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and release button.
- D Guide sleeve unlock and remove button.
- E Fold button.

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Press and hold buttons C and D.
2. Pull the head restraint up.

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Folding the Head Restraint

Note: The rear seat outboard head restraints may fold forward for improved visibility.

1. Press and hold button E.
2. Pull it back up to reset.

Front Row Center and Rear Seat Center (Crew Cab) Head Restraints

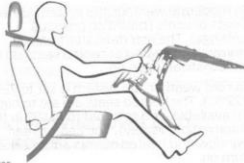
Note: The SuperCab has rear outboard head restraints that are not removable and are bolted to the back wall.

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

SITTING IN THE CORRECT POSITION

WARNINGS

-  Sitting improperly, out of position or with the seatback reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a crash. Always sit upright against your seat back, with your feet on the floor.
-  Do not recline the seatback as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a crash.
-  Do not place objects higher than the seatback to reduce the risk of serious injury in the event of a crash or during heavy braking.



E68595
When you use them properly, the seat, head restraint, safety belt and airbags will provide optimum protection in the event of a crash.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seatback more than 30 degrees.
- Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 in (25 cm) between your breastbone and the airbag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

-  Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraint when your vehicle is moving.
-  The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. An improperly adjusted head restraint may not adequately protect an occupant during an impact from the rear.

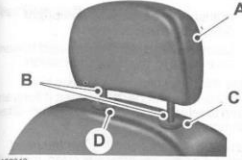
152

WARNINGS

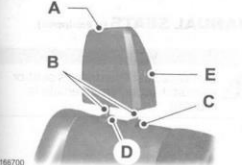
-  Install the head restraint properly to help minimize the risk of neck injury in the event of a crash.

Note: Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.

Front Seat Head Restraint



Rear Seat Outboard Head Restraints



The head restraints may consist of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and release button.
- D Guide sleeve unlock and remove button.
- E Fold button.

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Press and hold buttons C and D.
2. Pull the head restraint up.

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Folding the Head Restraint

Note: The rear seat outboard head restraints may fold forward for improved visibility.

1. Press and hold button E.
2. Pull it back up to reset.

Front Row Center and Rear Seat Center (Crew Cab) Head Restraints

Note: The SuperCab has rear outboard head restraints that are not removable and are bolted to the back wall.

153

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

Test Lab: CTF

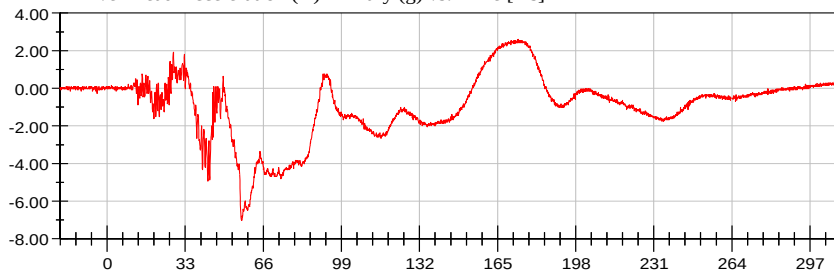
Test Number: 161110 (M20170209)

Test Date: 11/10/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

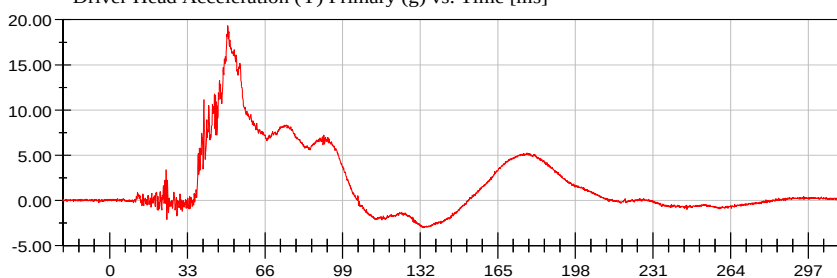
2.61 g at 173.60 ms

<Min>

-7.03 g at 56.80 ms

CFC_1000

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



<Max>

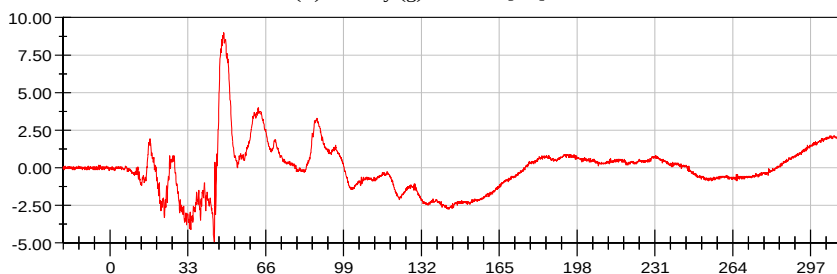
19.35 g at 50.16 ms

<Min>

-3.02 g at 132.96 ms

CFC_1000

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



<Max>

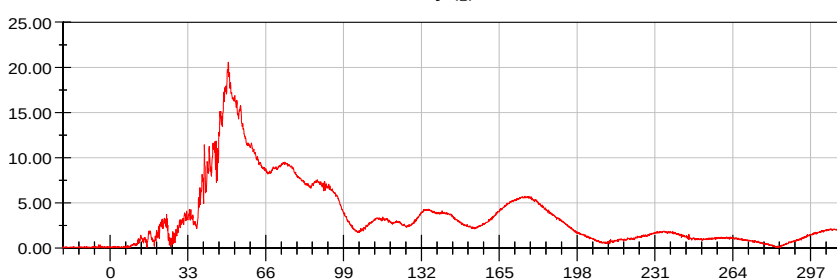
8.99 g at 48.24 ms

<Min>

-4.93 g at 44.24 ms

CFC_1000

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



<Max>

20.56 g at 50.16 ms

<Min>

0.03 g at -19.68 ms

CFC_1000



NHTSA

Test Lab: CTF

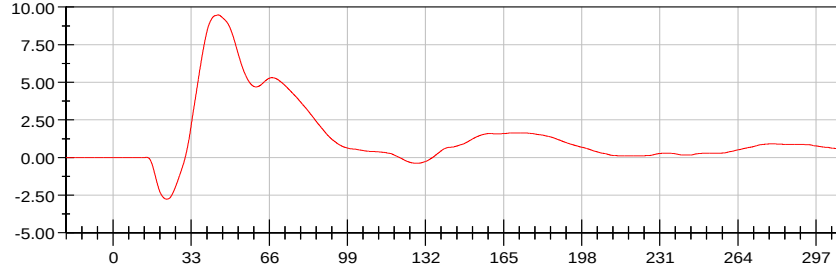
Test Number: 161110 (M20170209)

Test Date: 11/10/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

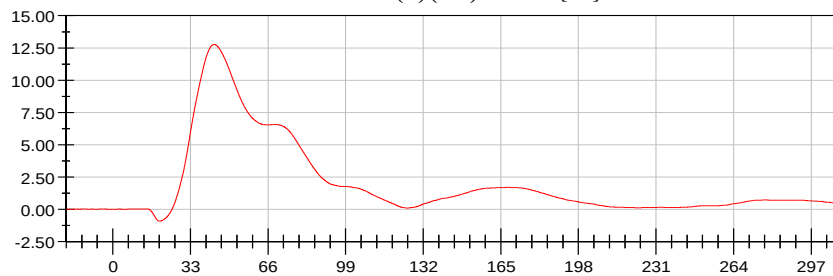
9.48 mm at 44.40 ms

<Min>

-2.76 mm at 22.64 ms

CFC_180

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



<Max>

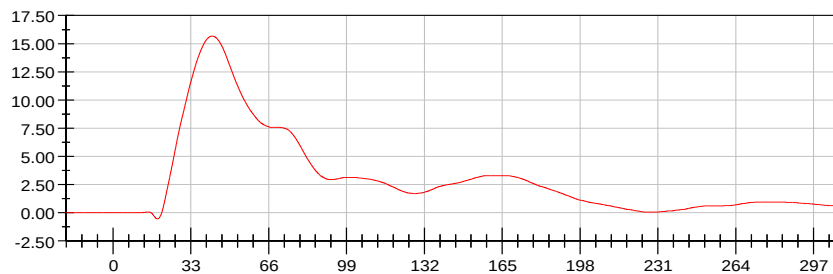
12.77 mm at 43.12 ms

<Min>

-0.93 mm at 19.92 ms

CFC_180

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



<Max>

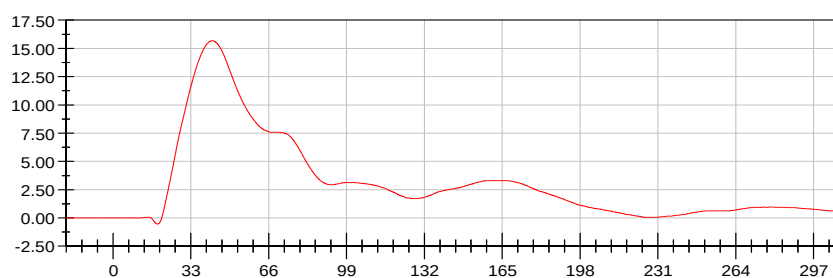
15.67 mm at 42.08 ms

<Min>

-0.54 mm at 18.88 ms

CFC_180

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



<Max>

15.67 mm at 42.08 ms

<Min>

-0.54 mm at 18.88 ms

CFC_180



NHTSA

Test Lab: CTF

Test Number: 161110 (M20170209)

Test Date: 11/10/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

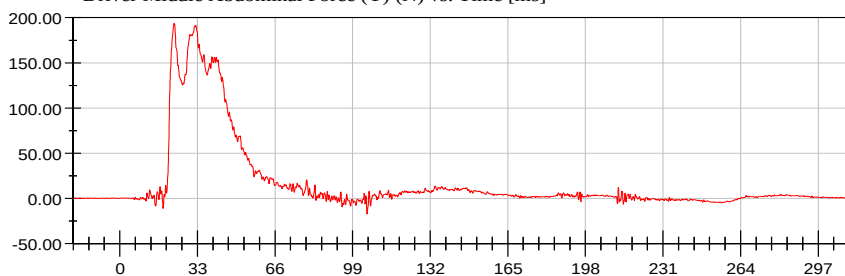
171.38 N at 40.80 ms

<Min>

-20.62 N at 16.40 ms

CFC_600

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



<Max>

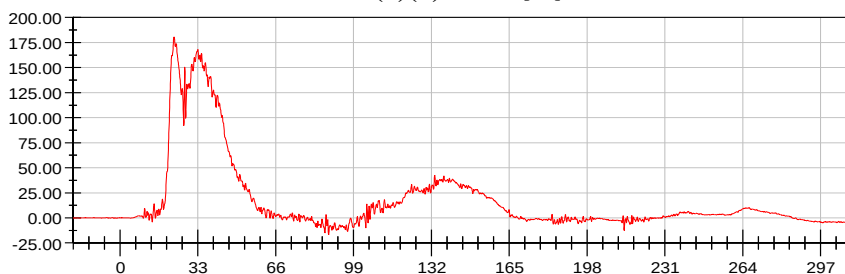
193.66 N at 23.12 ms

<Min>

-17.29 N at 105.12 ms

CFC_600

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



<Max>

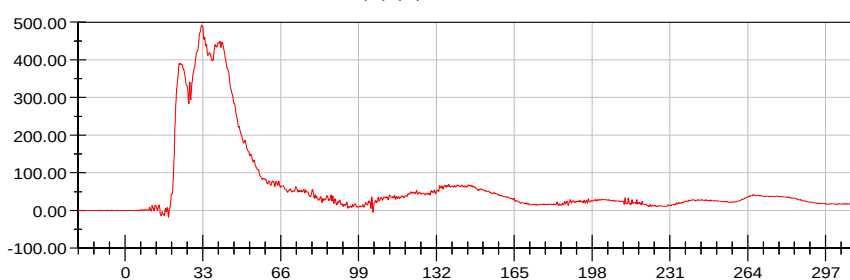
180.69 N at 22.88 ms

<Min>

-16.78 N at 88.48 ms

CFC_600

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



<Max>

491.31 N at 32.48 ms

<Min>

-18.01 N at 18.48 ms

CFC_600



NHTSA

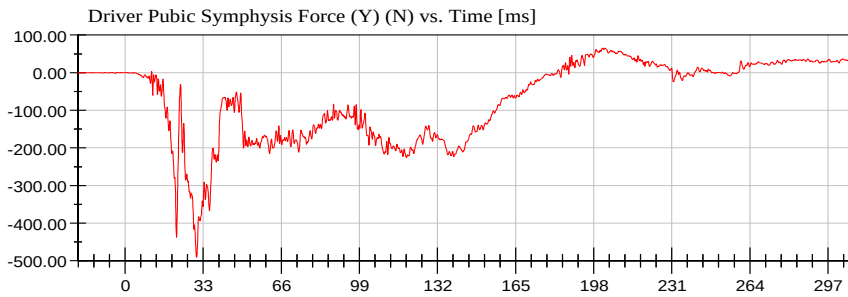
Test Lab: CTF

Test Number: 161110 (M20170209)

Test Date: 11/10/2016

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

Position #4 SID IIs Dummy (305)



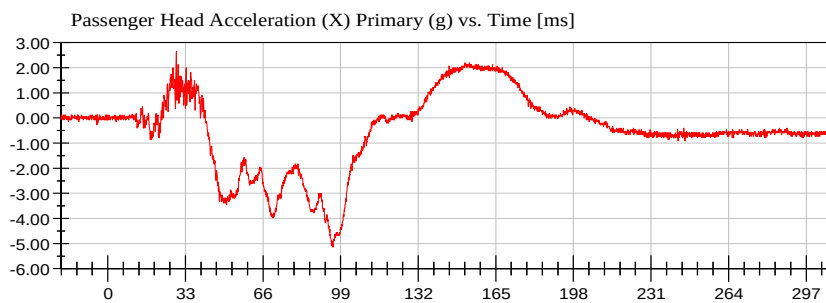
<Max>

64.98 N at 201.60 ms

<Min>

-490.56 N at 30.16 ms

CFC_600



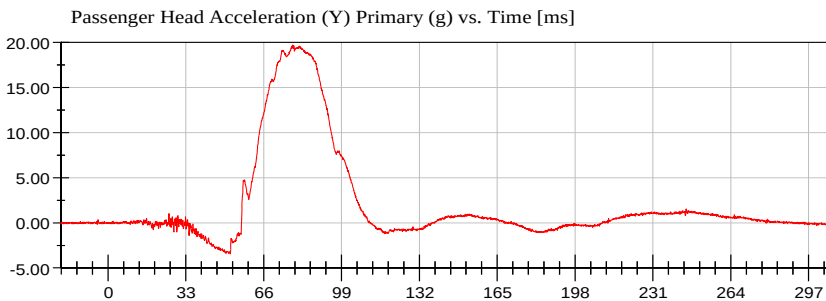
<Max>

2.65 g at 29.12 ms

<Min>

-5.16 g at 95.76 ms

CFC_1000



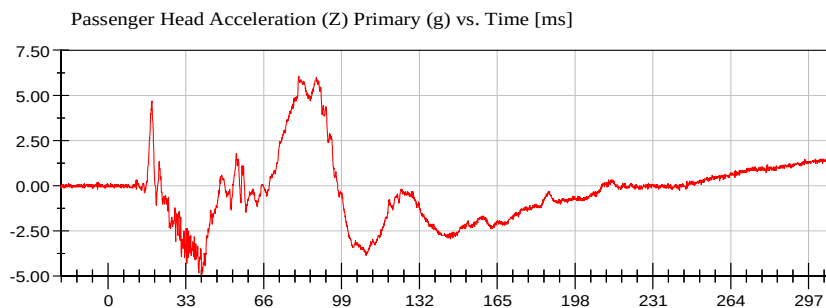
<Max>

19.71 g at 78.24 ms

<Min>

-3.46 g at 51.84 ms

CFC_1000



<Max>

6.04 g at 80.88 ms

<Min>

-4.94 g at 39.76 ms

CFC_1000



NHTSA

Test Lab: CTF

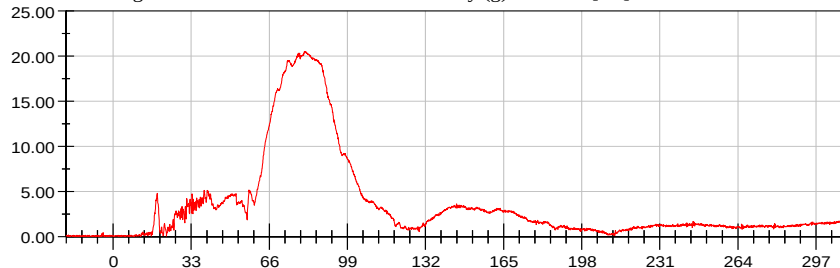
Test Number: 161110 (M20170209)

Test Date: 11/10/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

20.54 g at 81.12 ms

<Min>

0.03 g at -19.12 ms

CFC_1000

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



<Max>

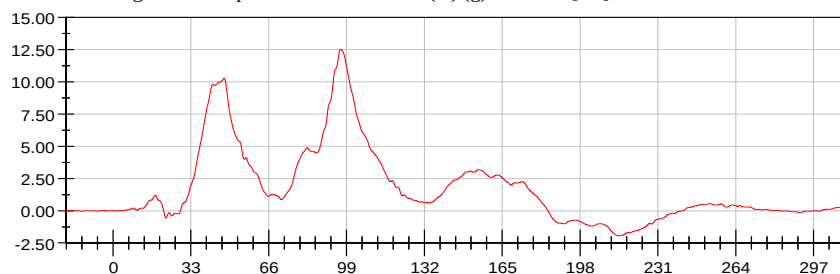
6.79 g at 47.44 ms

<Min>

-12.01 g at 87.28 ms

CFC_180

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



<Max>

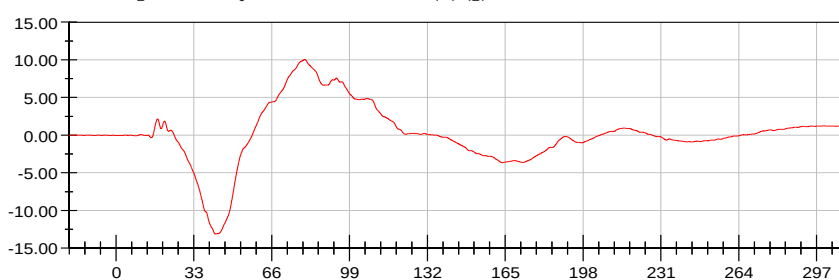
12.53 g at 96.48 ms

<Min>

-1.94 g at 214.24 ms

CFC_180

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



<Max>

10.03 g at 80.00 ms

<Min>

-13.12 g at 42.16 ms

CFC_180



NHTSA

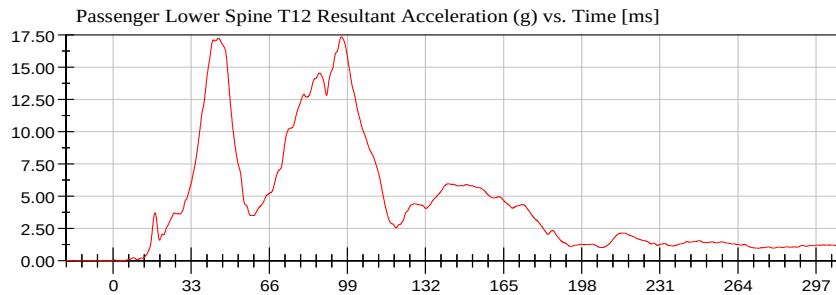
Test Lab: CTF

Test Number: 161110 (M20170209)

Test Date: 11/10/2016

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

Position #4 SID IIs Dummy (305)



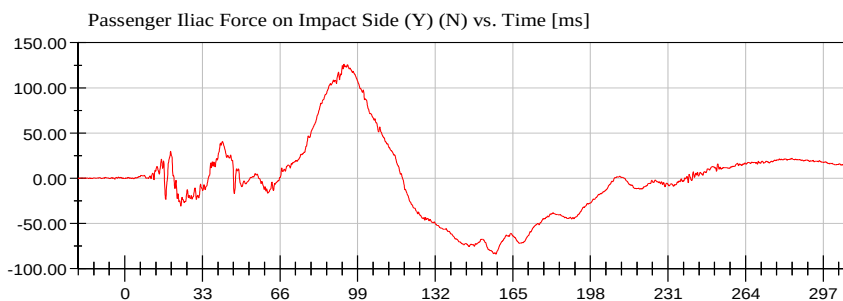
<Max>

17.36 g at 96.40 ms

<Min>

0.01 g at -15.04 ms

CFC_180



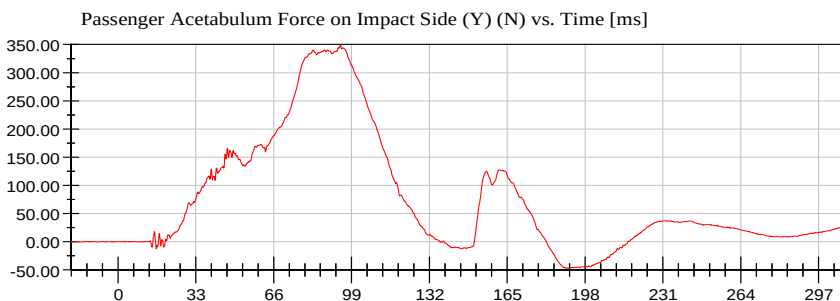
<Max>

126.12 N at 93.20 ms

<Min>

-84.12 N at 157.84 ms

CFC_600



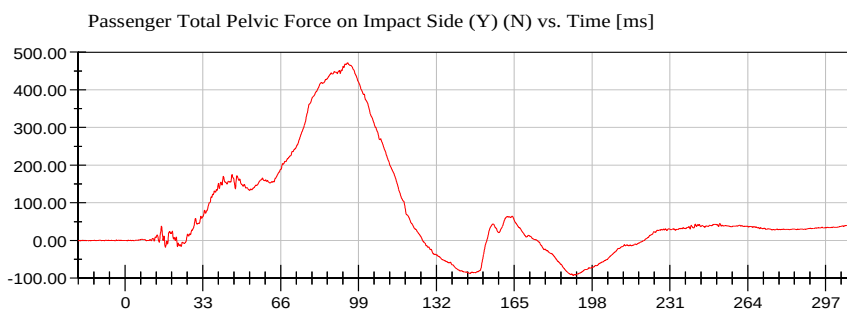
<Max>

348.80 N at 94.32 ms

<Min>

-47.09 N at 190.08 ms

CFC_600



<Max>

471.77 N at 94.40 ms

<Min>

-92.24 N at 190.08 ms

CFC_600



APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3 Neck Pendulum Test

Pendulum Velocity (m/s) vs. Time (ms)
Flexion Angle (°) vs. Time (ms)
Potentiometer A (°) vs. Time (ms)
Potentiometer B (°) vs. Time (ms)
Potentiometer C (°) vs. Time (ms)

Table 4. Shoulder Impact Test

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

Table 5. Thorax – Upper Rib Drop Test

Upper Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
Upper Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 6. Thorax – Middle Rib Drop Test

Middle Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
Middle Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 7. Thorax – Lower Rib Drop Test

Lower Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
Lower Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 8. Thorax – Full Body Impact Test

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

Table 9. Abdomen Impact Test

Impactor Force (kN) vs. Time (ms)
Front Abdomen Force (kN) vs. Time (ms)
Middle Abdomen Force (kN) vs. Time (ms)
Rear Abdomen Force (kN) vs. Time (ms)
Total Abdomen Force (kN) vs. Time (ms)

Table 10. Lumbar Spine Flexion Test

Pendulum Velocity (m/s) vs. Time (ms)
Spine Flexion Angle (°) vs. Time (ms)
Potentiometer A (°) vs. Time (ms)
Potentiometer B (°) vs. Time (ms)
Potentiometer C (°) vs. Time (ms)

Table 11. Pelvis Impact Test

Pendulum Acceleration (G's) vs. Time (ms)
Impactor Force (kN) vs. Time (ms)
Pubic Symphysis (Y) Force (kN) vs. Time (ms)

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3. Lateral Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax (With Arm) Impact Test

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

Table 6. Thorax (Without Arm) Impact Test

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

Table 7. Abdomen Impact Test

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

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

Table 9. Pelvis Acetabulum Impact Test

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

Table 10. Pelvis Iliac Impact Test

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

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 41

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	558	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 41-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Peak Resultant Acceleration	125 - 155 g	139.8 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.3 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

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

10.07.2016 11:23:19 361

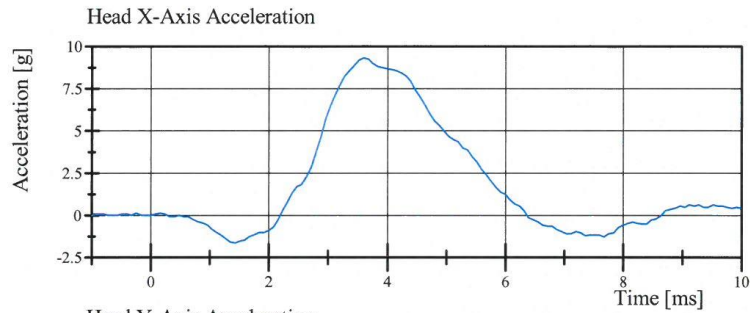


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 41-1

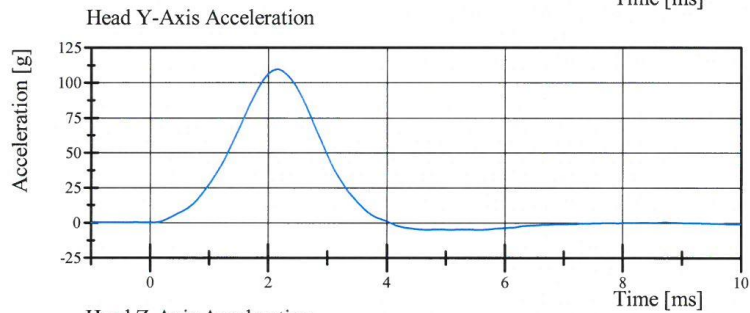
Test Date: 10/7/2016



Filter Class: CFC_1000

Max: 9.3 g at 3.6 ms

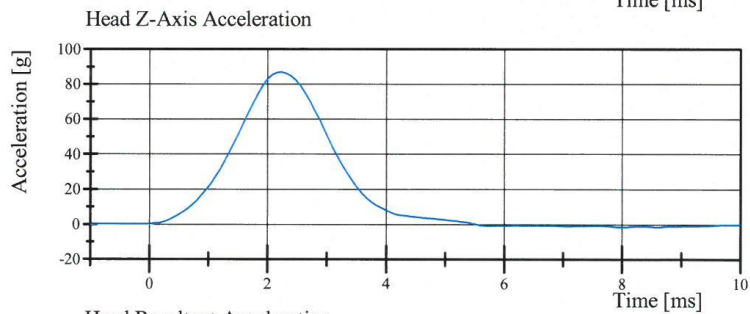
Min: -1.7 g at 1.4 ms



Filter Class: CFC_1000

Max: 109.7 g at 2.2 ms

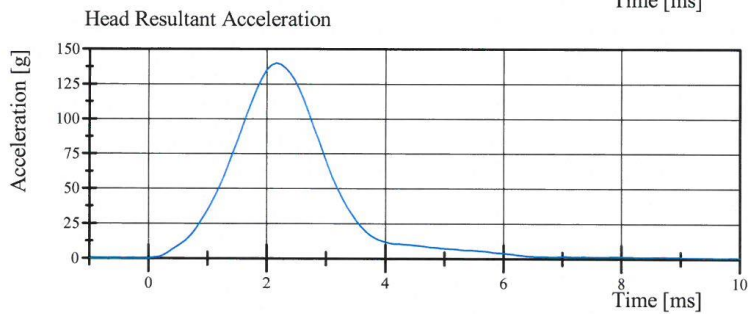
Min: -5.0 g at 4.6 ms



Filter Class: CFC_1000

Max: 86.8 g at 2.2 ms

Min: -1.5 g at 7.9 ms



Filter Class: CFC_1000

Max: 139.8 g at 2.2 ms

Min: 0.0 g at -0.6 ms

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

10.07.2016 11:23:29 361



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 41-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.38 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-56.1 deg	Yes
Time of Peak	54 - 66 ms	55.1 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	66.6 ms	Yes

Test meets specifications.

Comments:

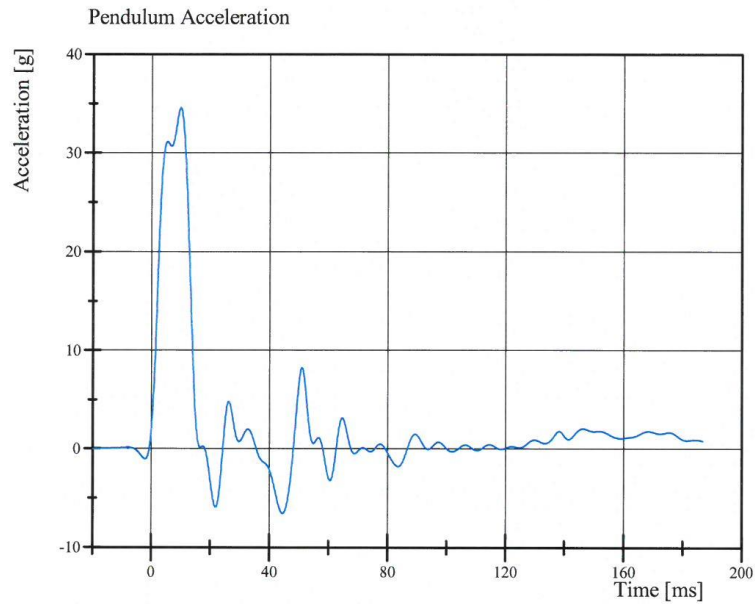
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

10.07.2016 09:20:17 1489

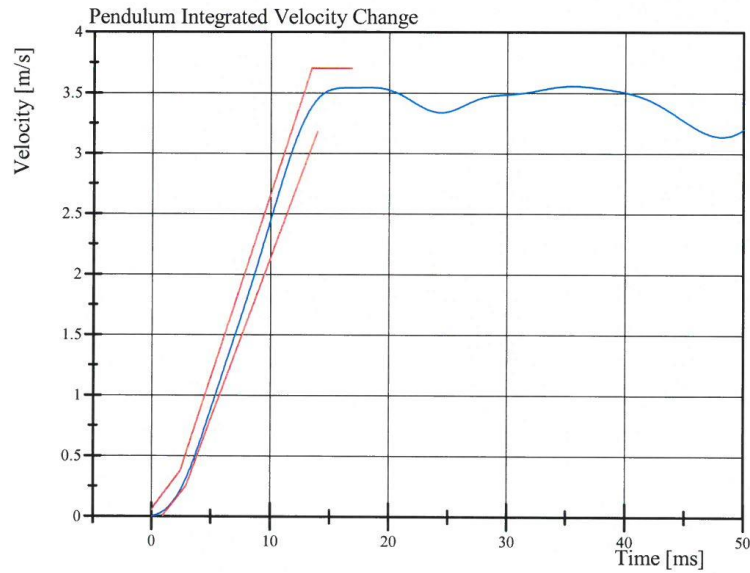


Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 41-1
Test Date: 10/7/2016



Filter Class: CFC_60
Max: 34.5 g at 9.9 ms
Min: -6.6 g at 44.6 ms



Filter Class: CFC_60
Max: 3.6 m/s at 35.6 ms
Min: 0.0 m/s at 0.0 ms

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

10.07.2016 09:20:27 1489



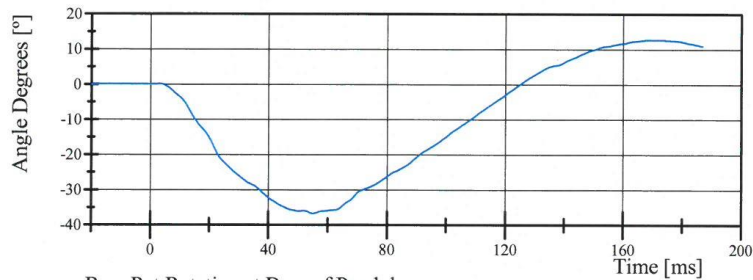
Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 41-1

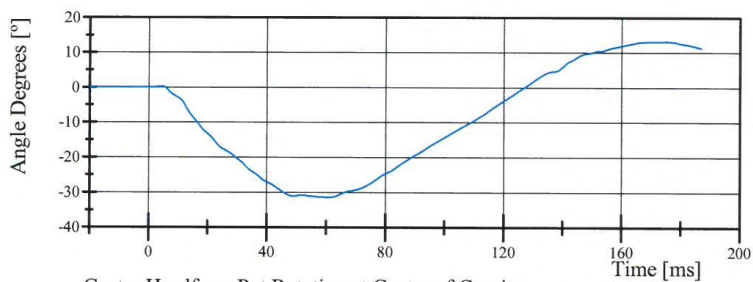
Test Date: 10/7/2016

Forward Pot Rotation at Base of Pendulum



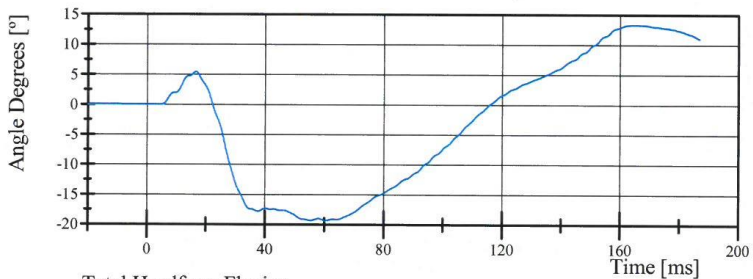
Filter Class: CFC_180
Max: 12.7 ° at 168.6 ms
Min: -36.8 ° at 55.0 ms

Rear Pot Rotation at Base of Pendulum



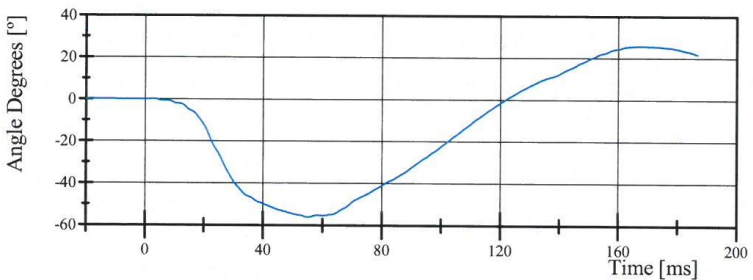
Filter Class: CFC_180
Max: 13.2 ° at 175.2 ms
Min: -31.5 ° at 60.6 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 13.4 ° at 164.6 ms
Min: -19.3 ° at 60.6 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 26.0 ° at 168.0 ms
Min: -56.1 ° at 55.1 ms

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

10.07.2016 09:20:28 1489



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 41-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.66 g	Yes

Test meets specifications.

Comments:

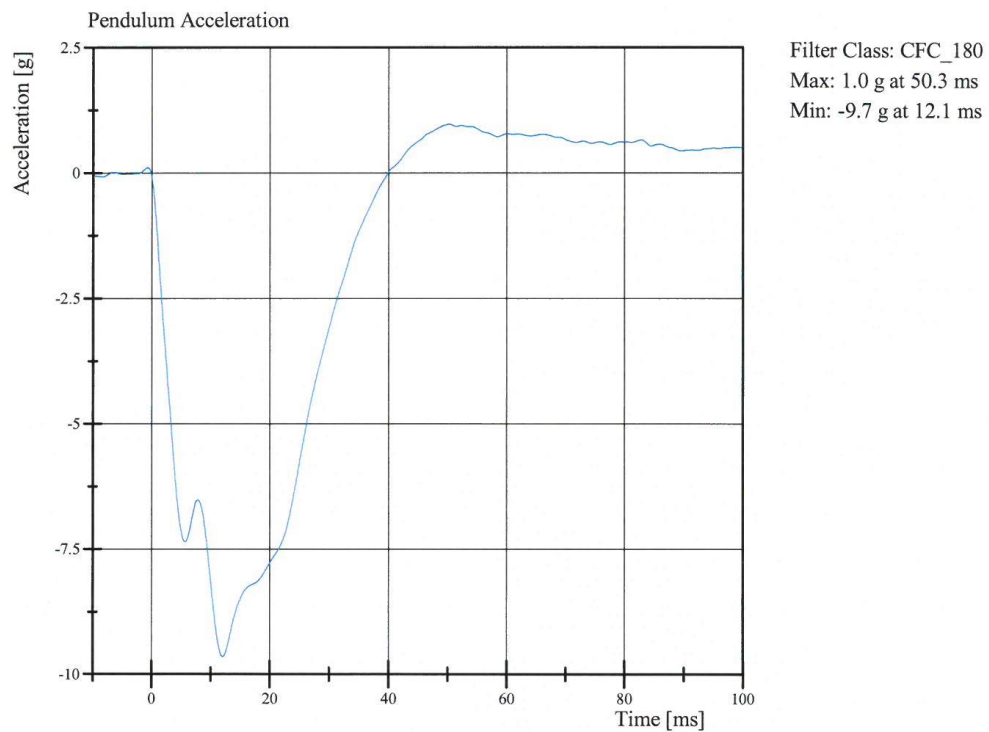
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

10.07.2016 12:44:53 610



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 41-1
Test Date: 10/7/2016



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

10.07.2016 12:45:06 610



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

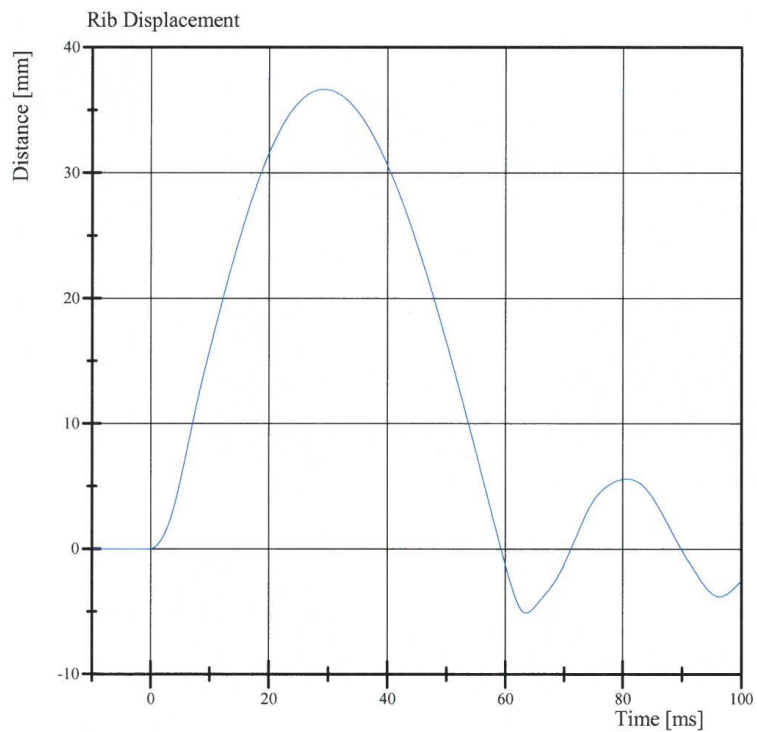
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.07.2016 15:36:57 845



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016



Filter Class: CFC_180
Max: 36.7 mm at 29.2 ms
Min: -5.1 mm at 63.6 ms

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

11.07.2016 15:37:09 845



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.9 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

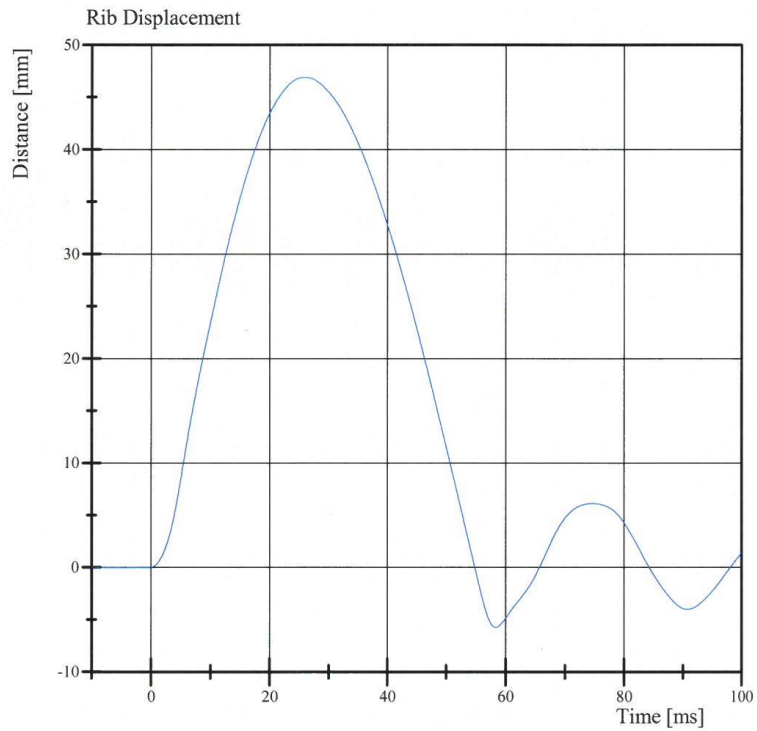
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.07.2016 15:28:53 651



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016



Filter Class: CFC_180
Max: 46.9 mm at 25.9 ms
Min: -5.7 mm at 58.4 ms

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

11.07.2016 15:29:11 651



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.9 mm	Yes

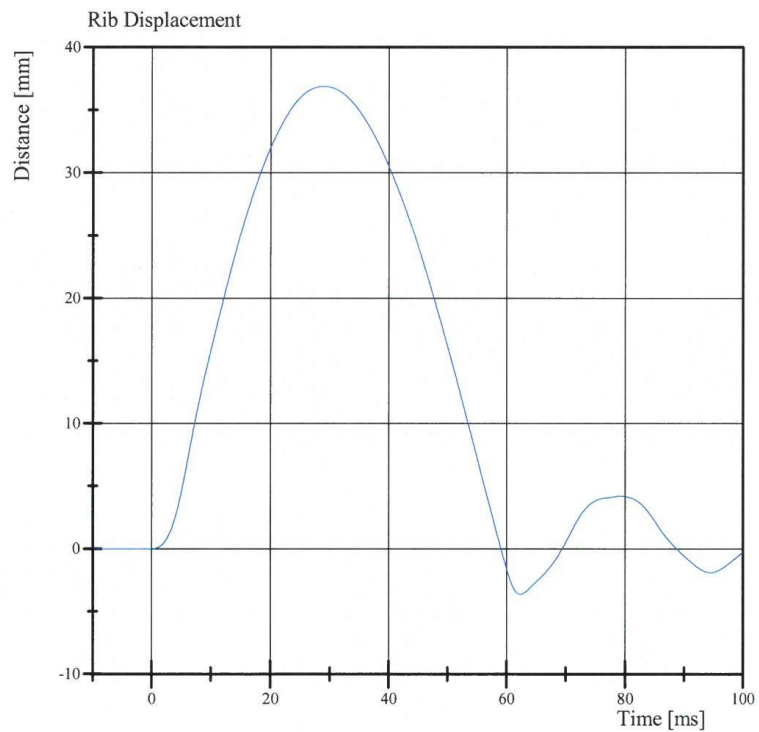
Test meets specifications.

Comments:

Drop Height: 462

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016



Filter Class: CFC_180
Max: 36.9 mm at 29.0 ms
Min: -3.6 mm at 62.4 ms

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

11.07.2016 15:56:31 830



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

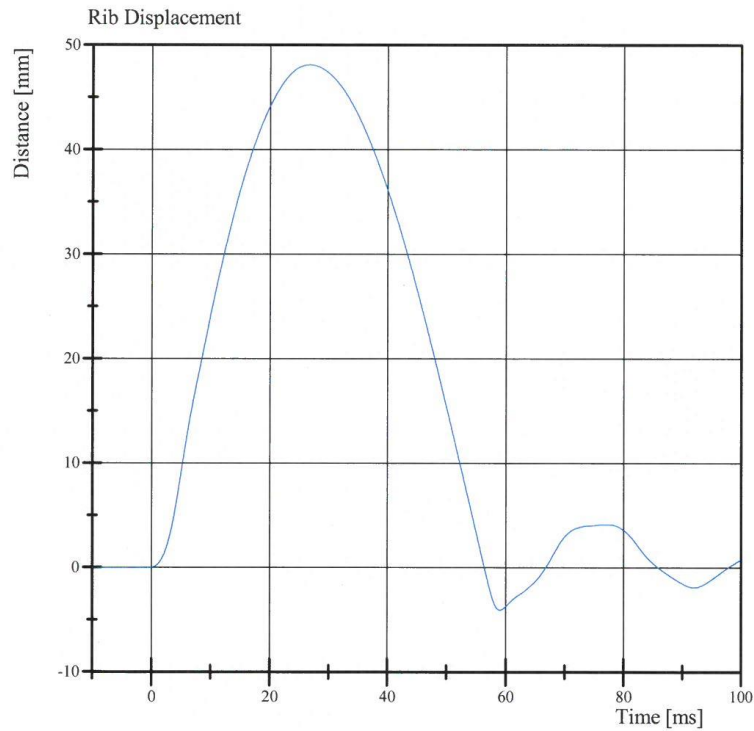
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.07.2016 15:47:49 663



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016



Filter Class: CFC_180
Max: 48.1 mm at 26.6 ms
Min: -4.0 mm at 59.0 ms

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

11.07.2016 15:48:06 663



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.5 mm	Yes

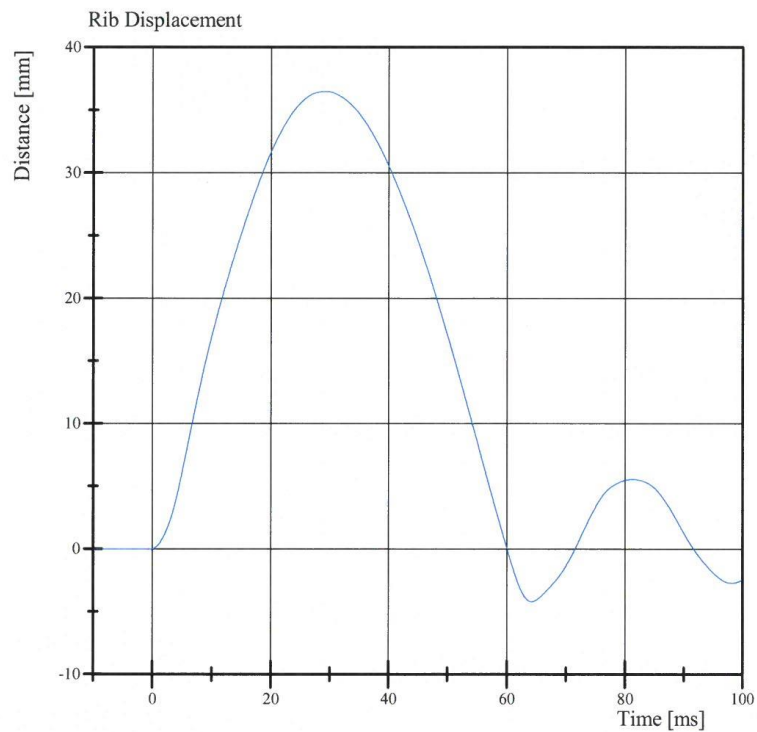
Test meets specifications.

Comments:

Drop Height: 462

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016



Filter Class: CFC_180
Max: 36.5 mm at 29.2 ms
Min: -4.2 mm at 64.2 ms

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

11.07.2016 16:22:37 833



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 41-2

Test Date: 11/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

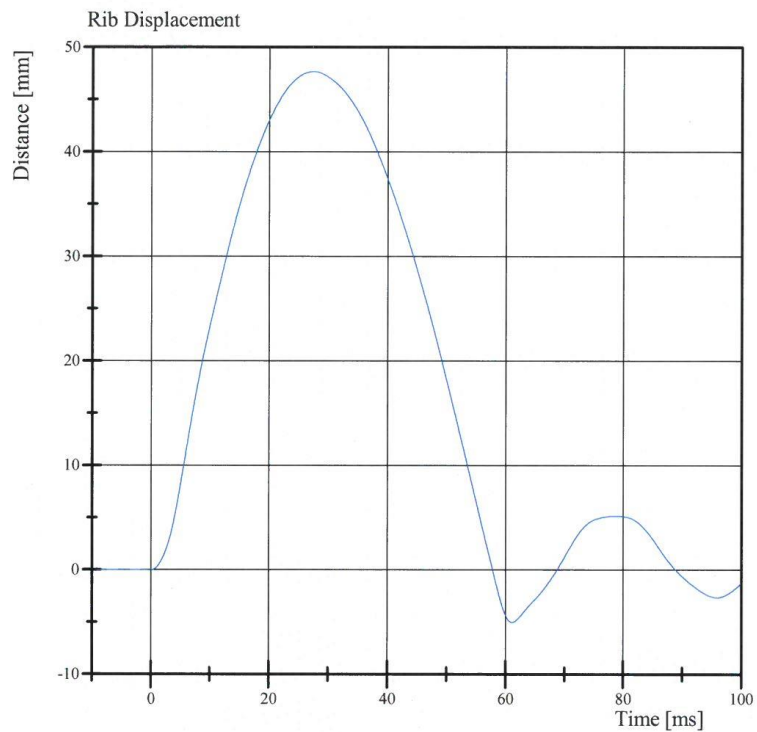
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.07.2016 16:16:14 664



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 41-2
Test Date: 11/7/2016



Filter Class: CFC_180
Max: 47.7 mm at 27.4 ms
Min: -5.0 mm at 61.1 ms

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

11.07.2016 16:16:29 664



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 41-3

Test Date: 11/8/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.541 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,187.3 N	Yes
Upper Rib Displacement	34 - 41 mm	37.8 mm	Yes
Center Rib Displacement	37 - 45 mm	42.2 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.9 mm	Yes

Test meets specifications.

Comments:

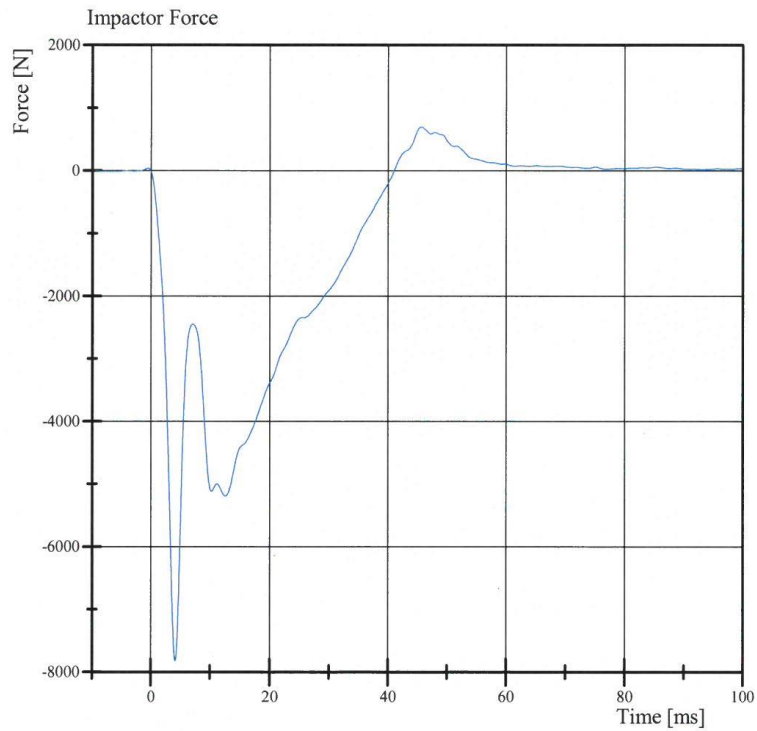
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.08.2016 09:10:23 426



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 41-3
Test Date: 11/8/2016



Filter Class: CFC_180
Max: 698.6 N at 45.6 ms
Min: -7,817.4 N at 4.2 ms

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

11.08.2016 09:10:36 426

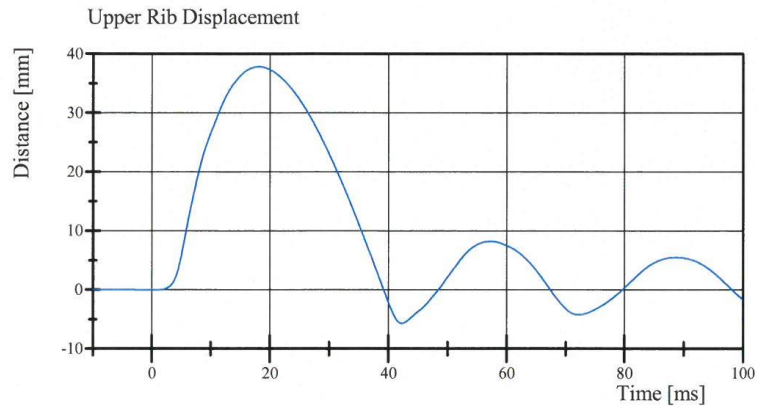


Transportation Research Center Inc.

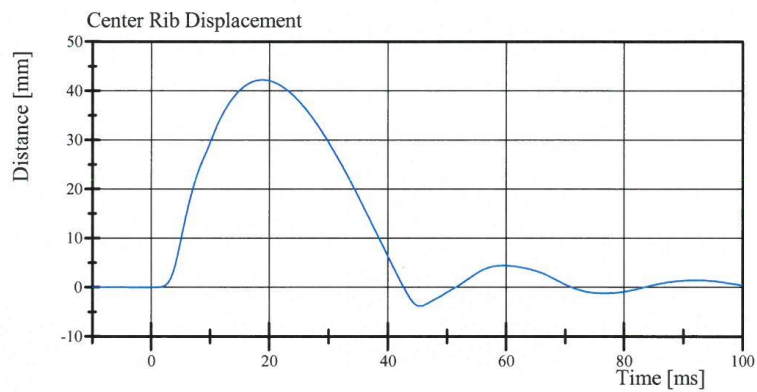
Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 41-3

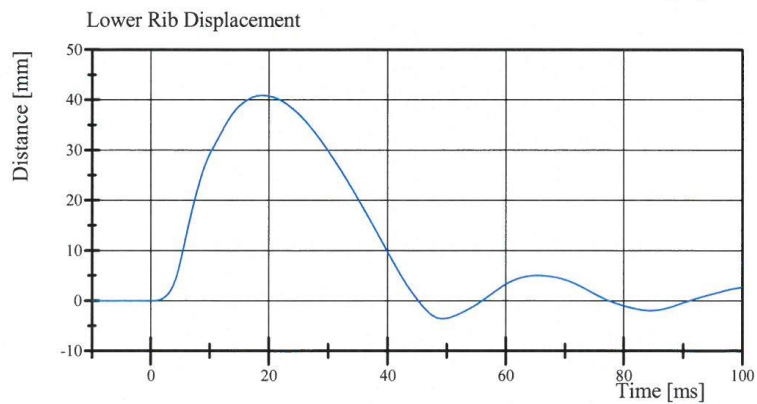
Test Date: 11/8/2016



Filter Class: CFC_180
Max: 37.8 mm at 18.1 ms
Min: -5.7 mm at 42.3 ms



Filter Class: CFC_180
Max: 42.2 mm at 18.9 ms
Min: -3.8 mm at 45.4 ms



Filter Class: CFC_180
Max: 40.9 mm at 19.0 ms
Min: -3.6 mm at 49.4 ms

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

11.08.2016 09:10:37 426



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 41-1
Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.04 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,044.9 N	Yes
Time of Peak	10.6 - 13.0 ms	12.48 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,435.1 N	Yes
Time of Peak	10.0 - 12.3 ms	11.44 ms	Yes

Test meets specifications.

Comments:

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

10.07.2016 12:59:26 639

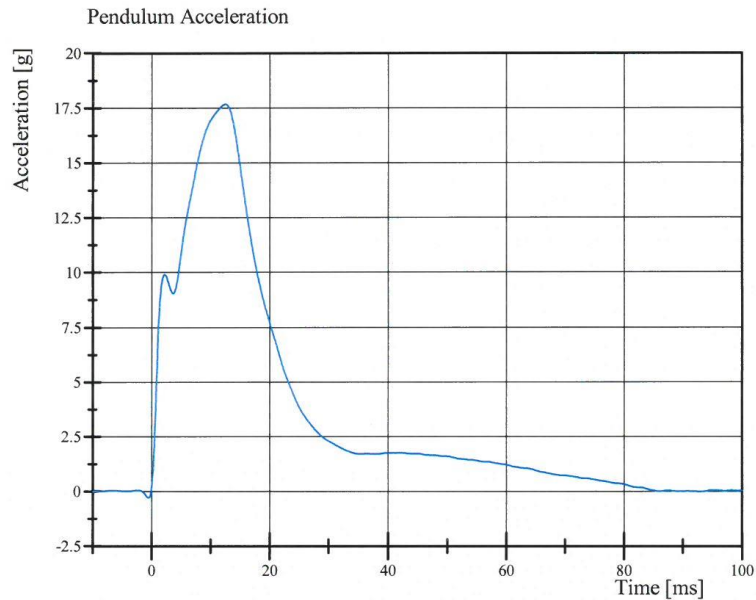


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 41-1

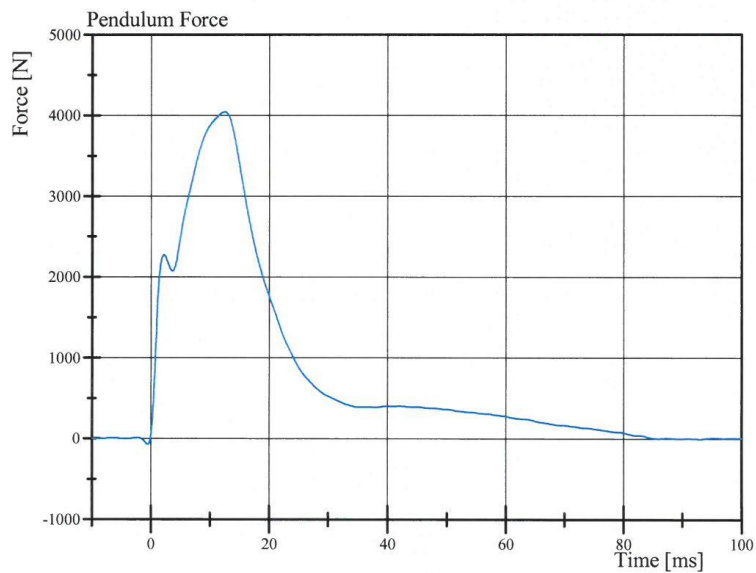
Test Date: 10/7/2016



Filter Class: CFC_180

Max: 17.7 g at 12.5 ms

Min: -0.3 g at -0.6 ms



Filter Class: CFC_180

Max: 4,044.9 N at 12.5 ms

Min: -75.3 N at -0.6 ms

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

10.07.2016 12:59:36 639

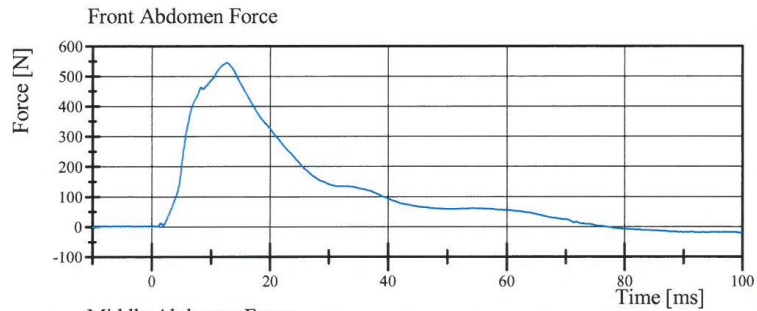


Transportation Research Center Inc.

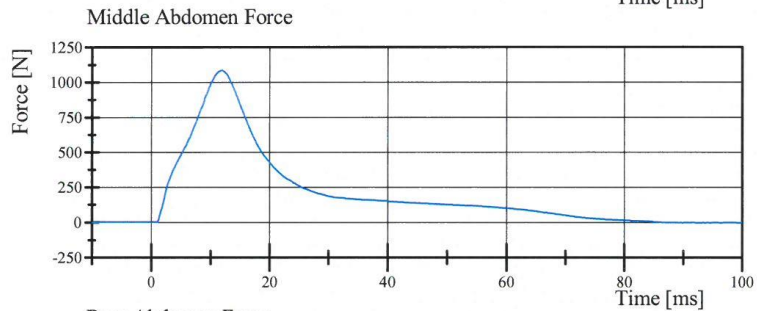
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 41-1

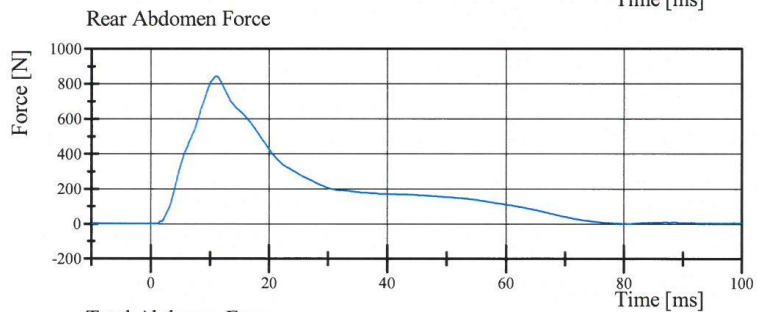
Test Date: 10/7/2016



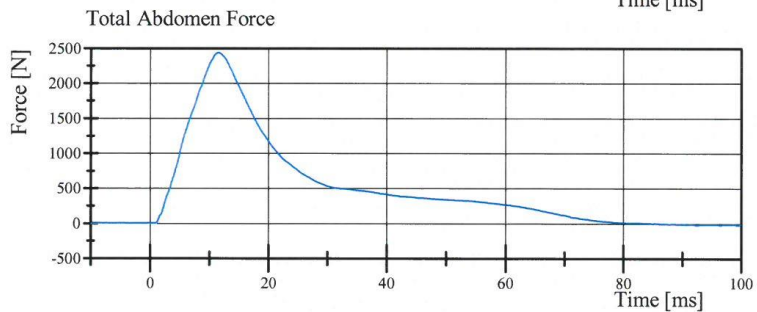
Filter Class: CFC_600
Max: 543.3 N at 12.7 ms
Min: -19.5 N at 99.5 ms



Filter Class: CFC_600
Max: 1,083.1 N at 11.8 ms
Min: -3.4 N at 92.2 ms



Filter Class: CFC_600
Max: 841.5 N at 11.0 ms
Min: -0.4 N at 1.0 ms



Filter Class: CFC_600
Max: 2,435.1 N at 11.4 ms
Min: -17.5 N at 92.6 ms

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

10.07.2016 12:59:37 639



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 41-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.066 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-53.0 deg	Yes
Time of Peak	39 - 53 ms	45.7 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.4 ms	Yes

Test meets specifications.

Comments:

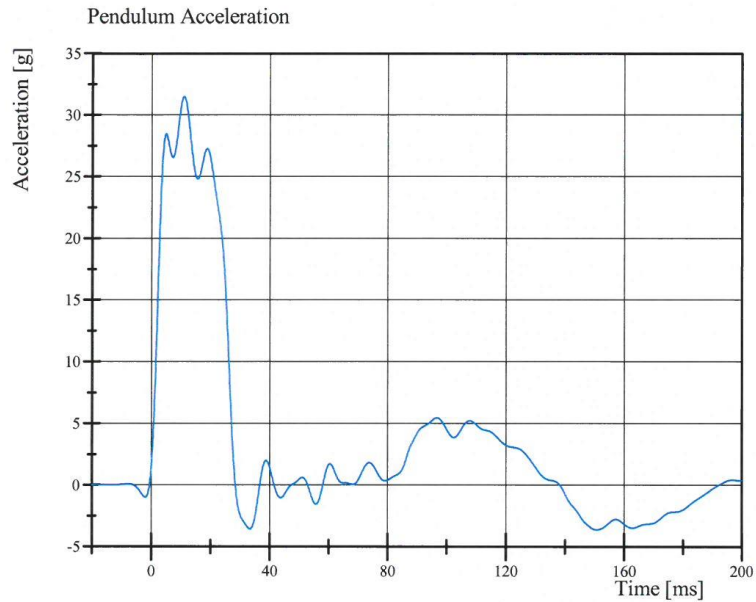
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

10.07.2016 09:01:35 674

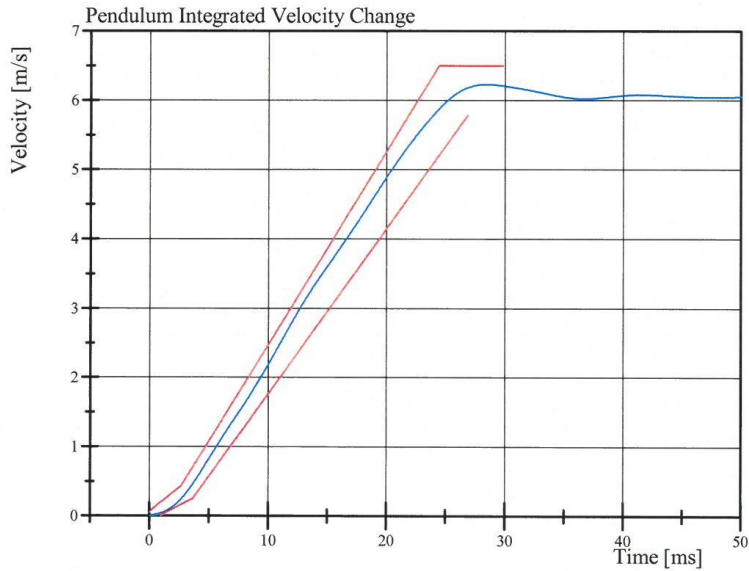


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 41-1
Test Date: 10/7/2016



Filter Class: CFC_60
Max: 31.4 g at 11.0 ms
Min: -3.6 g at 150.6 ms



Filter Class: CFC_60
Max: 6.2 m/s at 28.5 ms
Min: 0.0 m/s at 0.0 ms

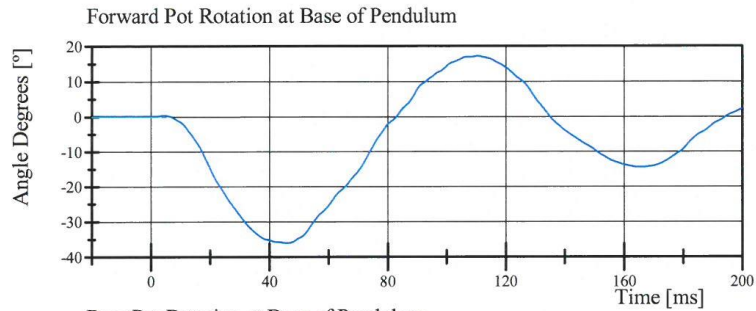
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

10.07.2016 09:01:48 674

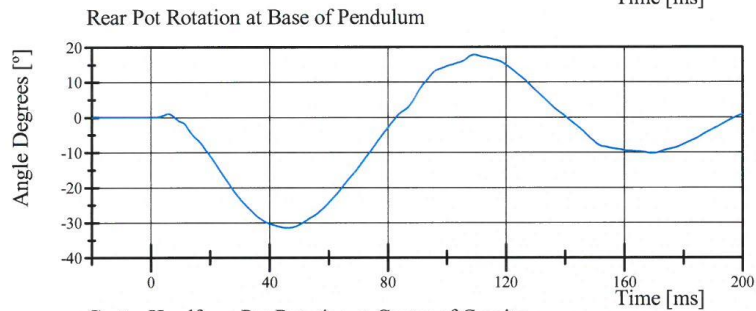


Transportation Research Center Inc.

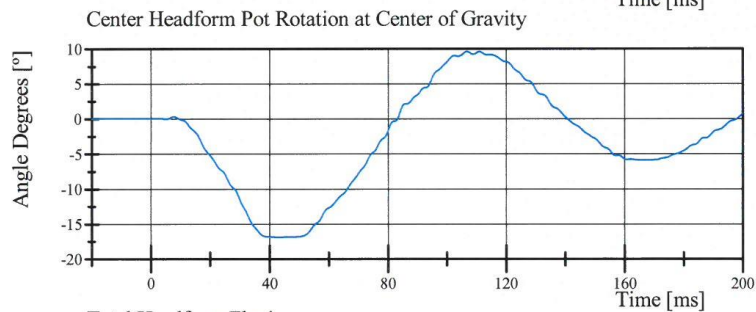
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 41-1
Test Date: 10/7/2016



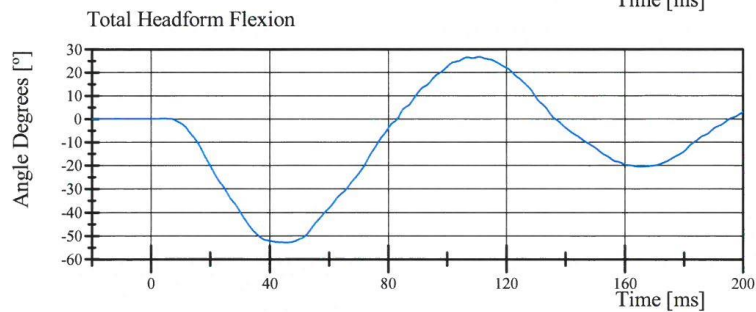
Filter Class: CFC_180
Max: 17.1 ° at 110.6 ms
Min: -36.1 ° at 45.8 ms



Filter Class: CFC_180
Max: 17.8 ° at 109.4 ms
Min: -31.5 ° at 45.9 ms



Filter Class: CFC_180
Max: 9.6 ° at 106.8 ms
Min: -16.9 ° at 43.4 ms



Filter Class: CFC_180
Max: 26.7 ° at 110.9 ms
Min: -53.0 ° at 45.7 ms

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

10.07.2016 09:01:50 674



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 41-2

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,178.5 N	Yes
Time of Peak	11.8 - 16.1 ms	14.08 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,279.4 N	Yes
Time of Peak	12.2 - 17.0 ms	14.16 ms	Yes

Test meets specifications.

Comments:

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

10.07.2016 13:51:17 552

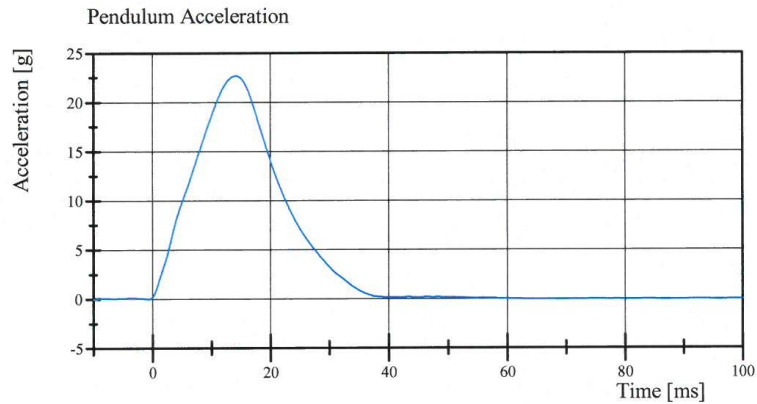


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 41-2

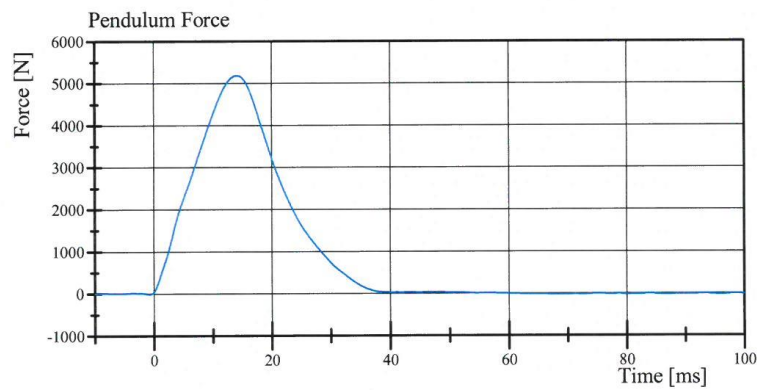
Test Date: 10/7/2016



Filter Class: CFC_180

Max: 22.6 g at 14.1 ms

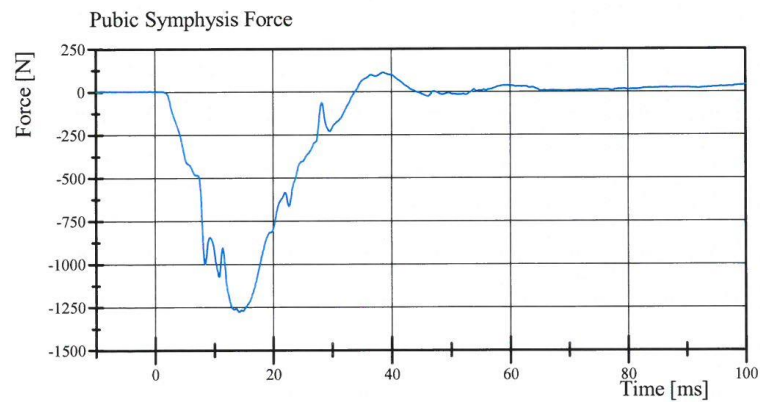
Min: -0.1 g at 86.7 ms



Filter Class: CFC_180

Max: 5,178.5 N at 14.1 ms

Min: -20.4 N at 86.7 ms



Filter Class: CFC_600

Max: 110.8 N at 38.7 ms

Min: -1,279.4 N at 14.2 ms

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

10.07.2016 13:51:23 552



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 42

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	559	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	326	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	263	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes



Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 42-4

Test Date: 11/15/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Peak Resultant Acceleration	125 - 155 g	142.0 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.5 g	Yes
Is Resultant Acceleration Curve			
Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

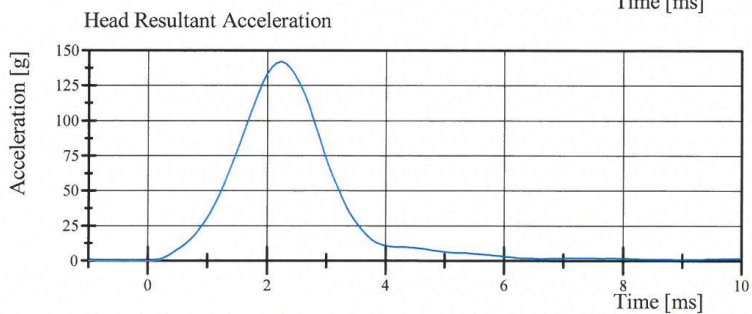
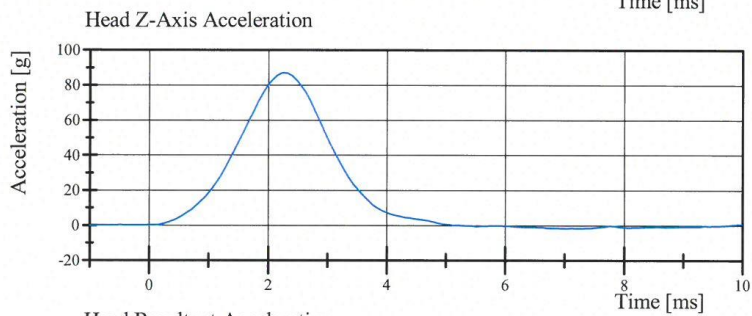
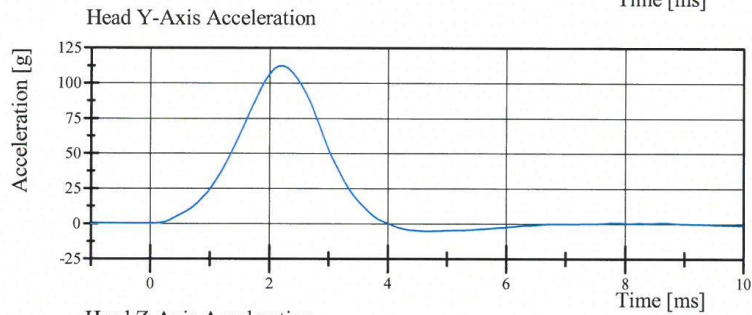
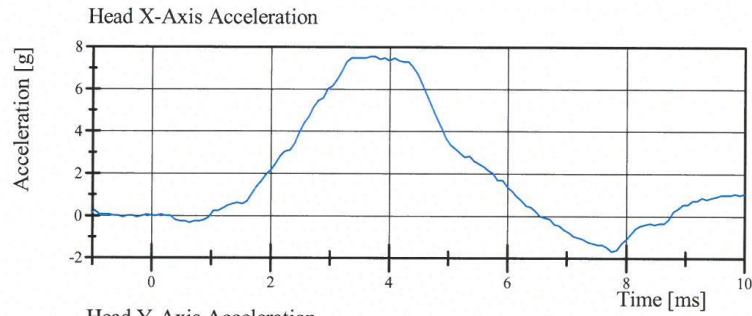
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.15.2016 10:10:09 361



Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 42-4
Test Date: 11/15/2016



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

11.15.2016 10:10:18 361



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	23 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-54.1 deg	Yes
Time of Peak	54 - 66 ms	60.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	63.8 ms	Yes

Test meets specifications.

Comments:

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

11.14.2016 14:42:03 1494



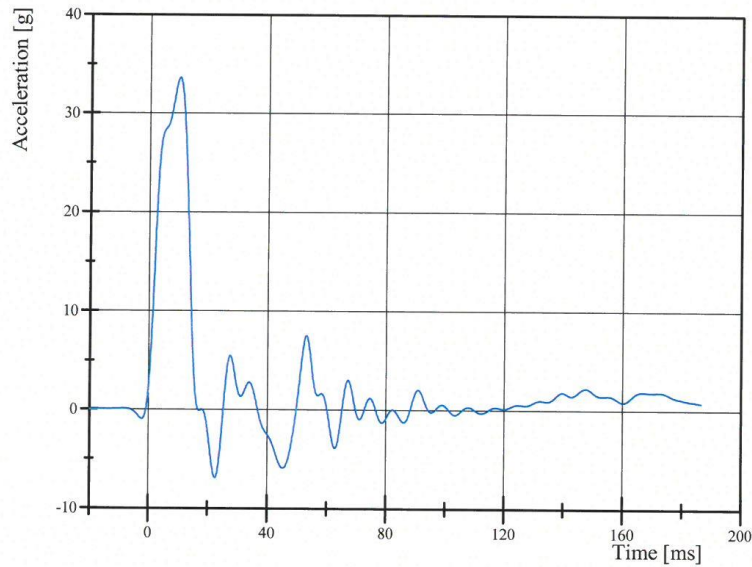
Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 42-1

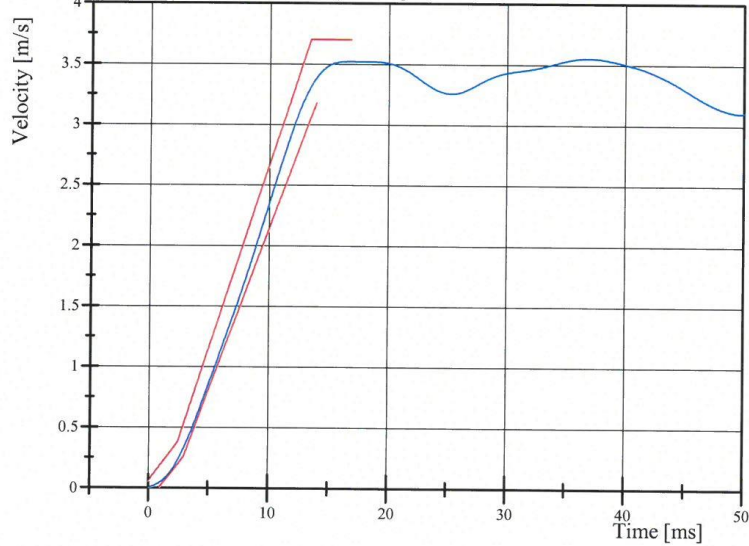
Test Date: 11/14/2016

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.6 g at 10.1 ms
Min: -7.0 g at 22.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 36.8 ms
Min: 0.0 m/s at 0.0 ms

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

11.14.2016 14:42:34 1494



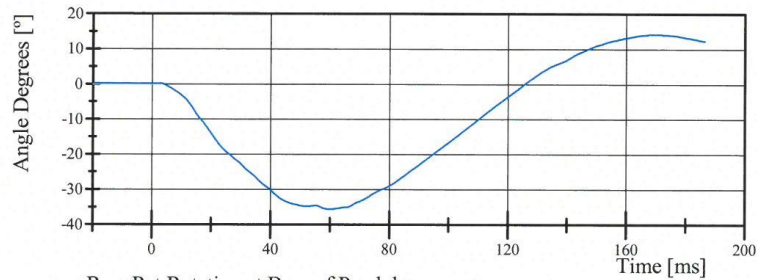
Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 42-1

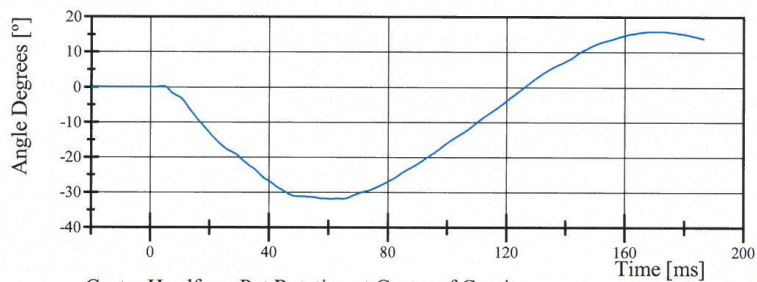
Test Date: 11/14/2016

Forward Pot Rotation at Base of Pendulum



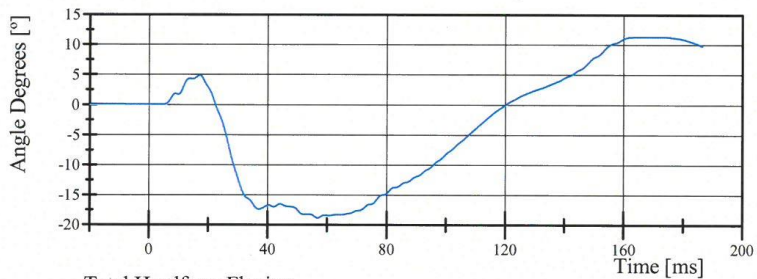
Filter Class: CFC_180
Max: 14.1 ° at 169.0 ms
Min: -35.7 ° at 60.0 ms

Rear Pot Rotation at Base of Pendulum



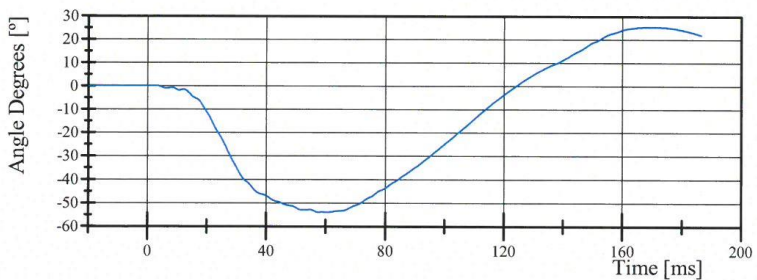
Filter Class: CFC_180
Max: 16.0 ° at 170.8 ms
Min: -31.9 ° at 61.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.3 ° at 169.6 ms
Min: -18.9 ° at 56.9 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.5 ° at 169.1 ms
Min: -54.1 ° at 60.4 ms

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

11.14.2016 14:42:35 1494



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.29 g	Yes

Test meets specifications.

Comments:

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

11.14.2016 15:38:15 542

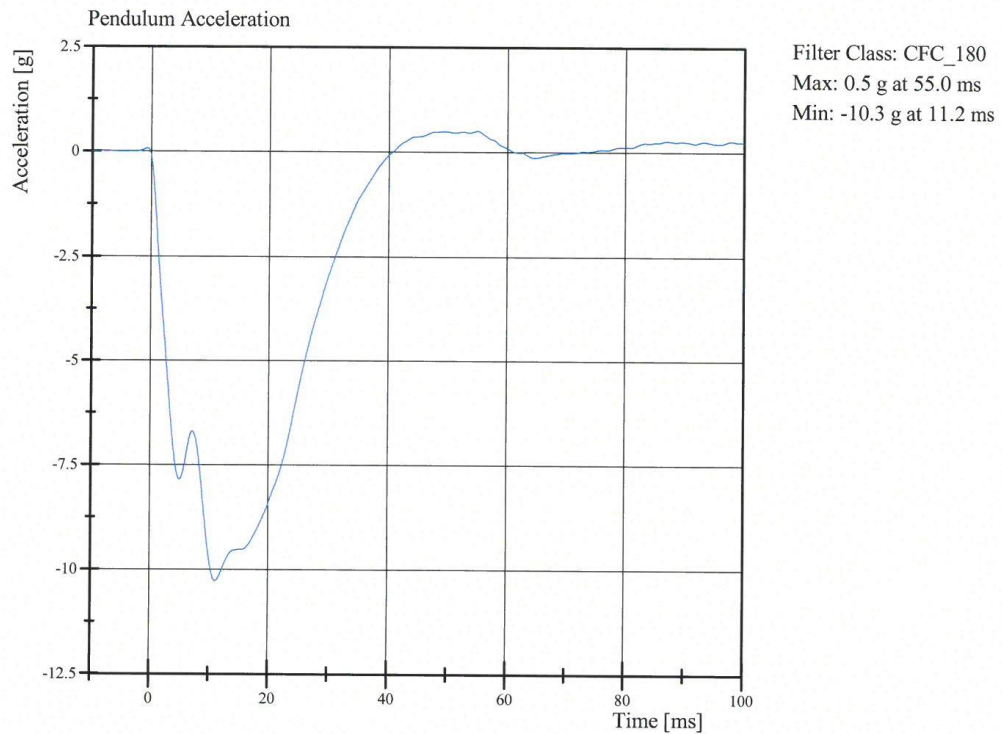


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016



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

11.14.2016 15:38:56.542



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

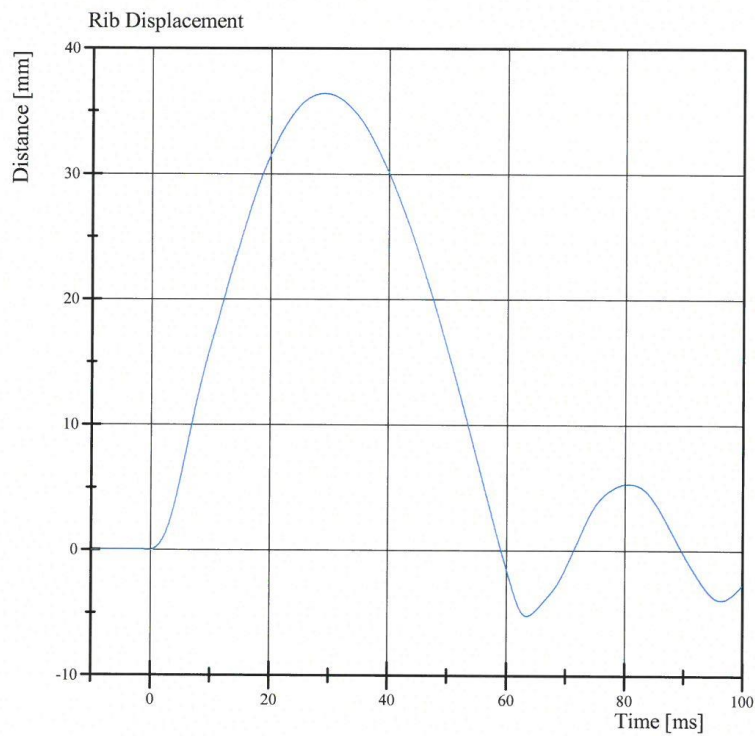
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 12:58:57 859



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.4 mm at 29.0 ms
Min: -5.2 mm at 63.5 ms

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

11.14.2016 12:59:32 859



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

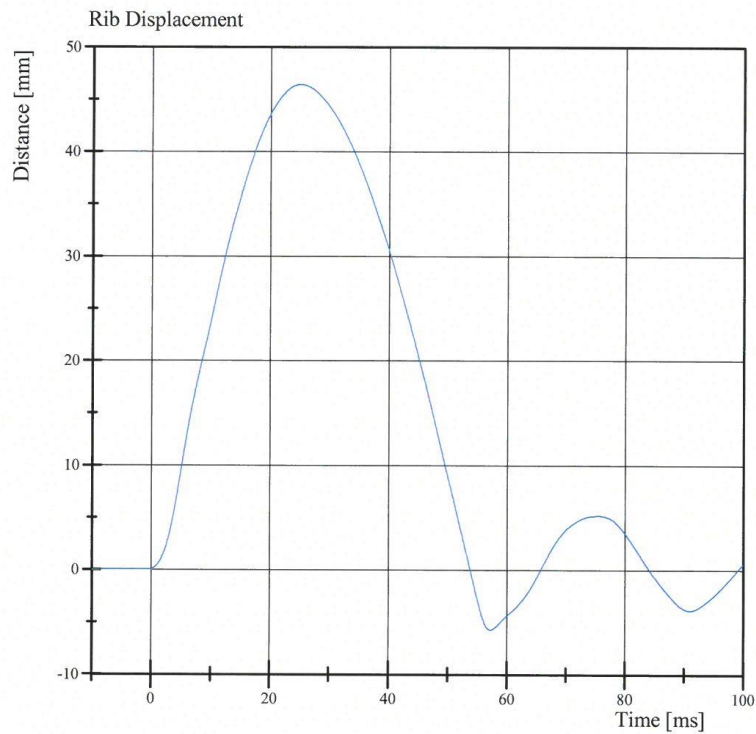
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 12:51:54 703



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 46.4 mm at 25.1 ms
Min: -5.7 mm at 57.3 ms

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

11.14.2016 12:52:32 703



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

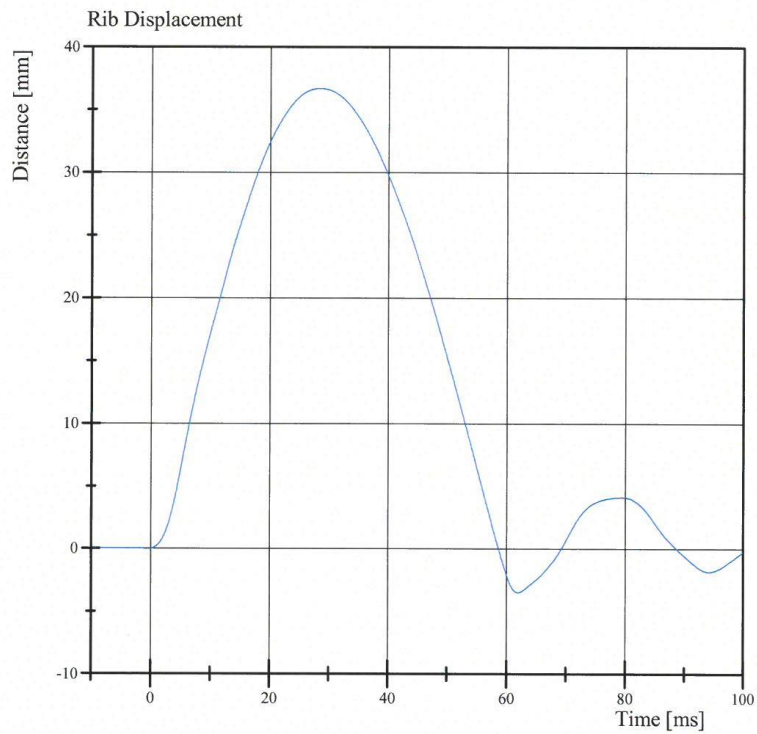
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:16:16 879



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.7 mm at 28.5 ms
Min: -3.5 mm at 62.0 ms

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

11.14.2016 13:16:52 879



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.9 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

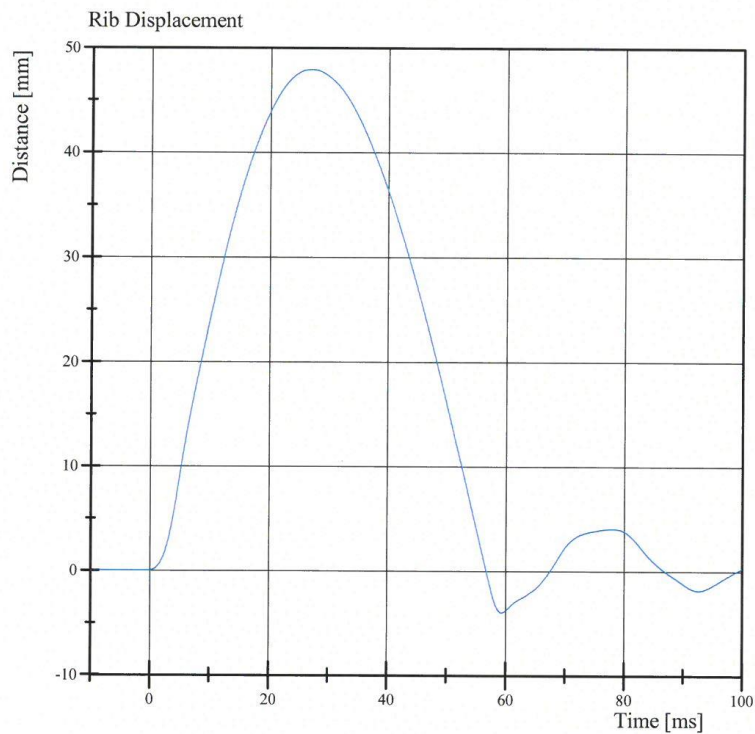
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:08:32 693



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 47.9 mm at 26.9 ms
Min: -3.9 mm at 59.4 ms

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

11.14.2016 13:09:05 693



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

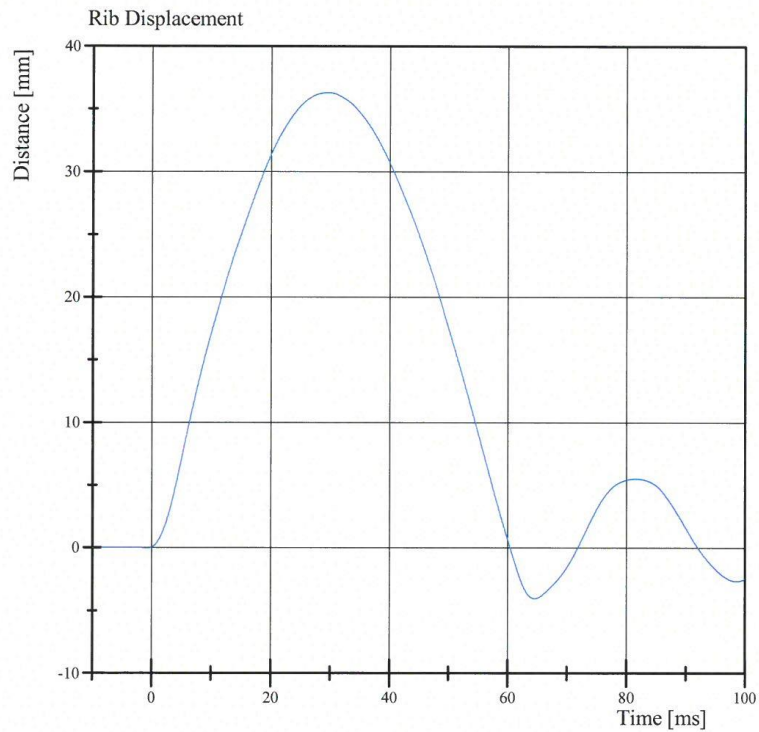
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:32:56 870



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.3 mm at 29.6 ms
Min: -4.0 mm at 64.6 ms

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

11.14.2016 13:33:39 870



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

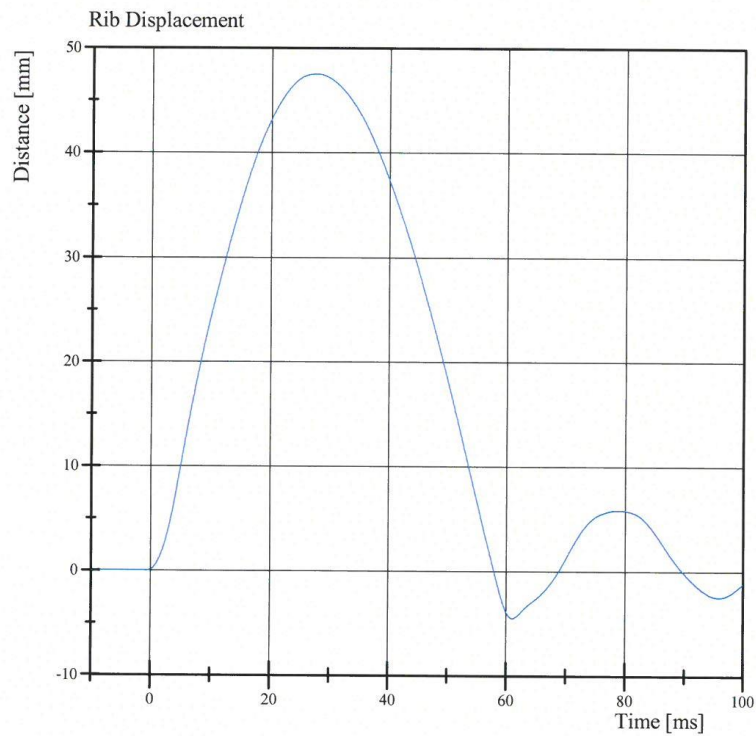
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:24:18 679



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 47.5 mm at 27.6 ms
Min: -4.5 mm at 61.1 ms

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

11.14.2016 13:25:14 679



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.553 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,172.6 N	Yes
Upper Rib Displacement	34 - 41 mm	36.8 mm	Yes
Center Rib Displacement	37 - 45 mm	41.9 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.1 mm	Yes

Test meets specifications.

Comments:

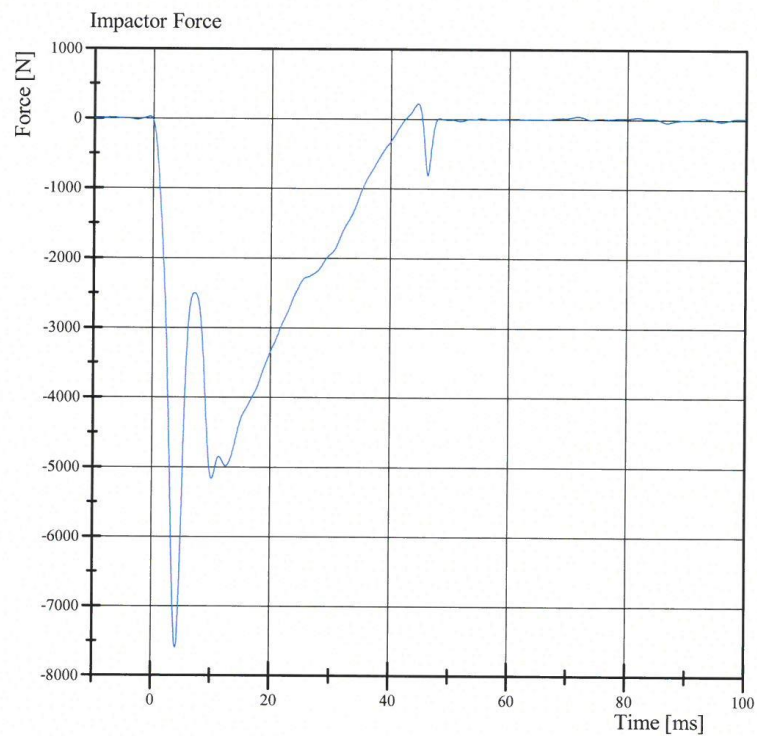
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:47:03 432



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 220.1 N at 44.6 ms
Min: -7,608.6 N at 4.2 ms

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

11.14.2016 15:47:53 432

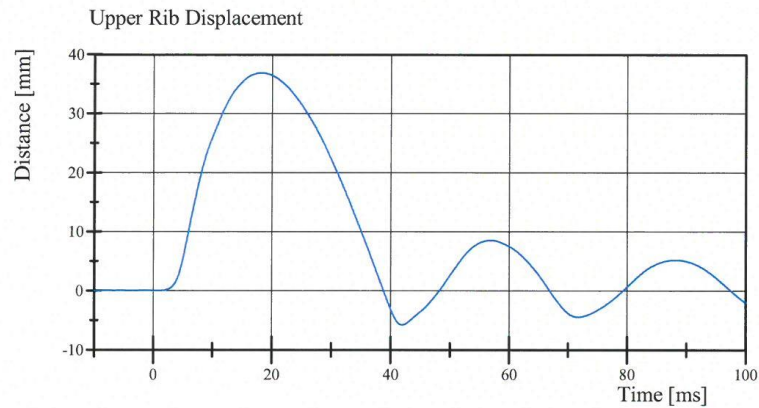


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 42-1

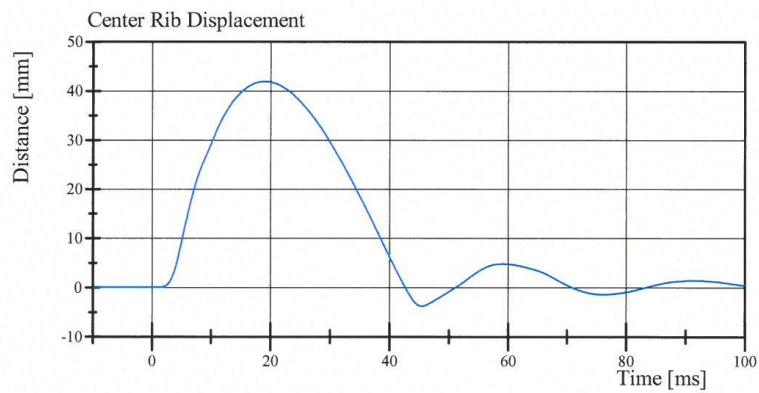
Test Date: 11/14/2016



Filter Class: CFC_180

Max: 36.8 mm at 18.2 ms

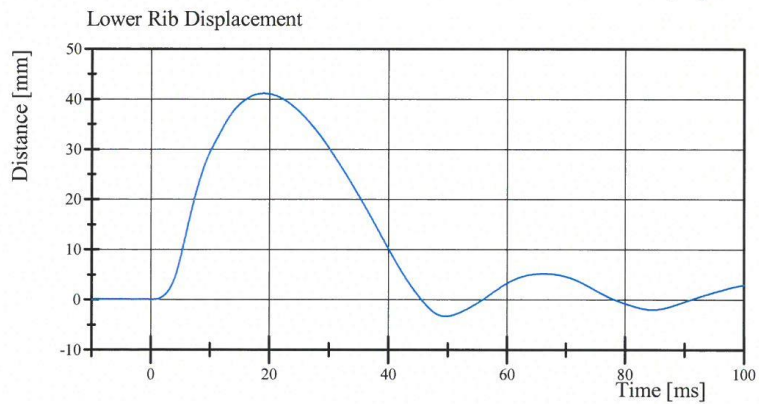
Min: -5.8 mm at 42.0 ms



Filter Class: CFC_180

Max: 41.9 mm at 19.0 ms

Min: -3.8 mm at 45.4 ms



Filter Class: CFC_180

Max: 41.1 mm at 19.1 ms

Min: -3.3 mm at 49.7 ms

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

11.14.2016 15:47:55 432



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

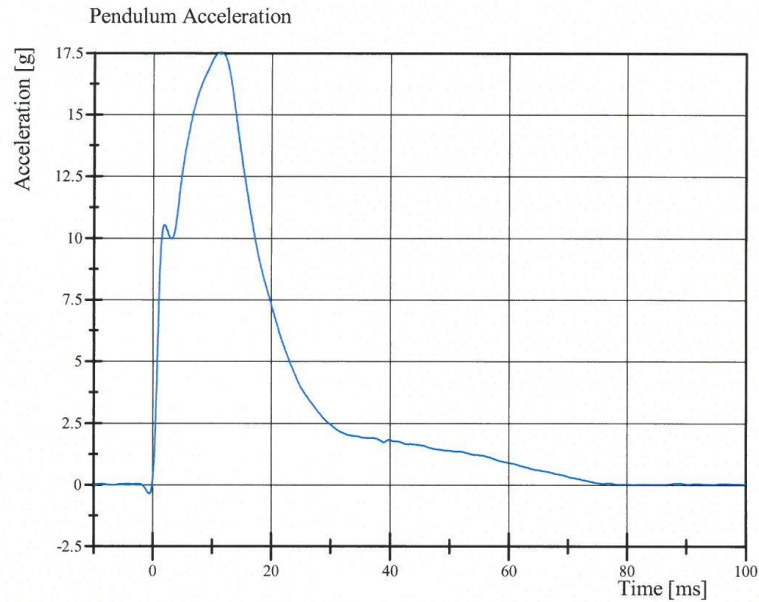
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,010.6 N	Yes
Time of Peak	10.6 - 13.0 ms	11.36 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,382.3 N	Yes
Time of Peak	10.0 - 12.3 ms	11.04 ms	Yes

Test meets specifications.

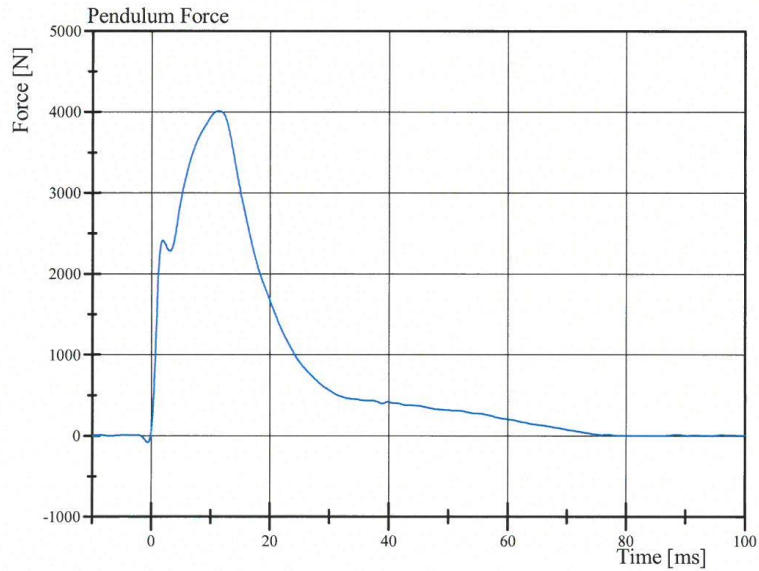
Comments:

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 17.5 g at 11.4 ms
Min: -0.4 g at -0.6 ms



Filter Class: CFC_180
Max: 4,010.6 N at 11.4 ms
Min: -85.7 N at -0.6 ms

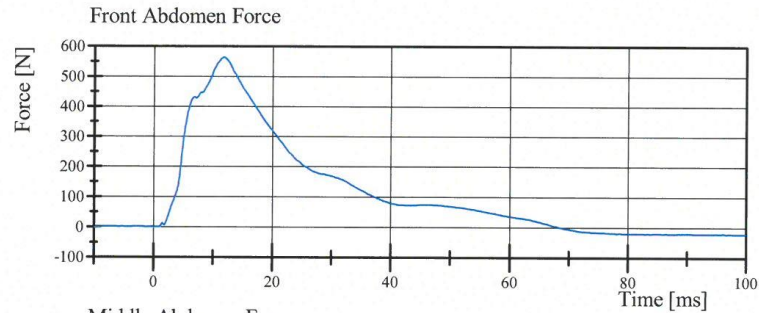
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:56:49 552

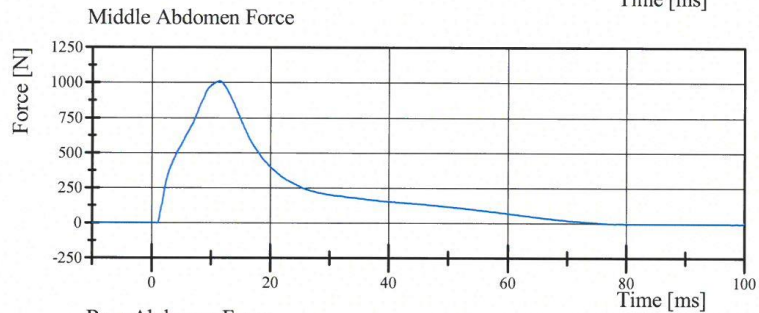


Transportation Research Center Inc.

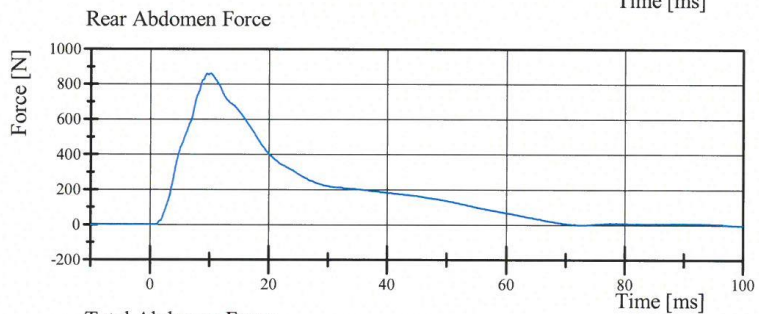
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



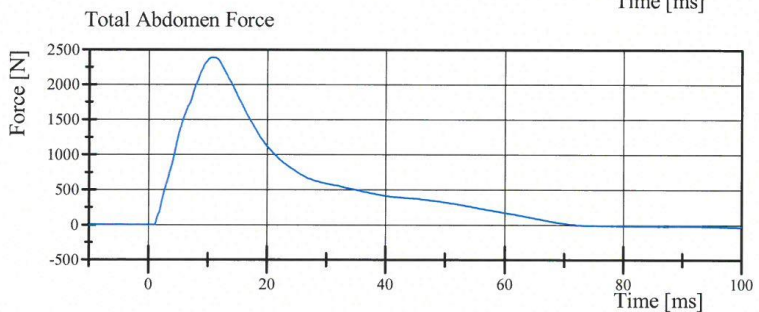
Filter Class: CFC_600
Max: 562.8 N at 11.8 ms
Min: -21.6 N at 98.1 ms



Filter Class: CFC_600
Max: 1,008.7 N at 11.4 ms
Min: -3.8 N at 99.2 ms



Filter Class: CFC_600
Max: 860.4 N at 10.2 ms
Min: -4.2 N at 100.0 ms



Filter Class: CFC_600
Max: 2,382.3 N at 11.0 ms
Min: -29.1 N at 99.6 ms

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

11.14.2016 15:56:51 552



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 42-6

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.114 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-51.2 deg	Yes
Time of Peak	39 - 53 ms	45.5 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.1 ms	Yes

Test meets specifications.

Comments:

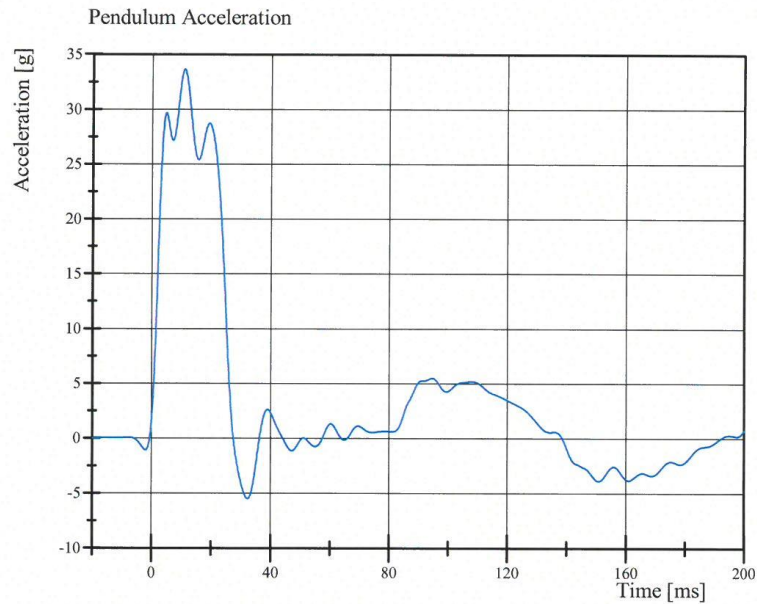
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 14:29:44 668

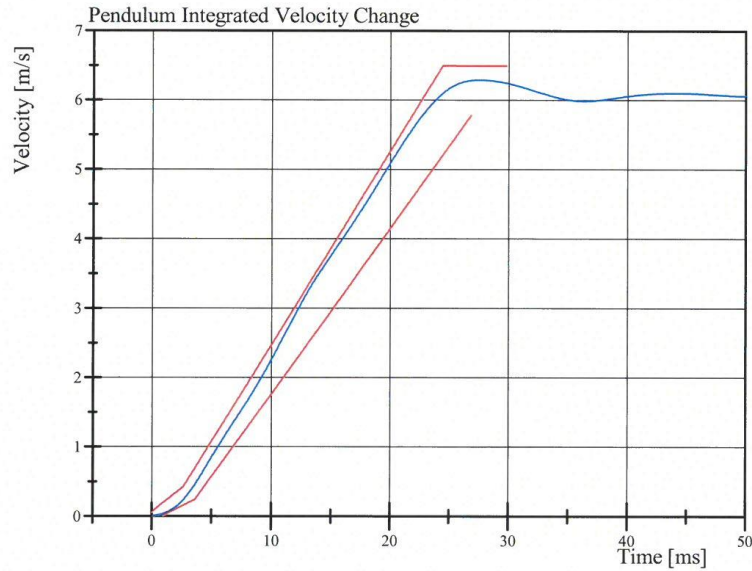


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 42-6
Test Date: 11/14/2016



Filter Class: CFC_60
Max: 33.6 g at 11.0 ms
Min: -5.5 g at 32.4 ms



Filter Class: CFC_60
Max: 6.3 m/s at 27.6 ms
Min: 0.0 m/s at 0.0 ms

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

11.14.2016 14:30:14 668

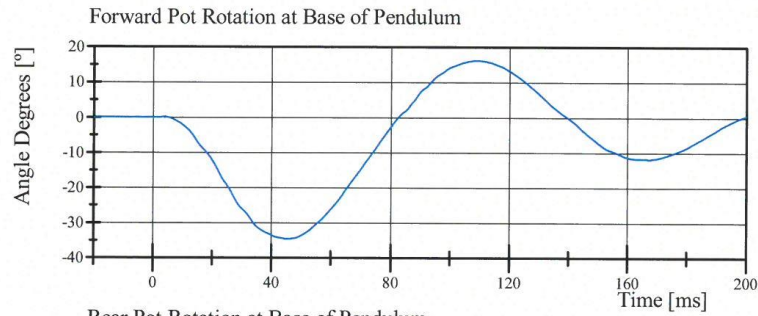


Transportation Research Center Inc.

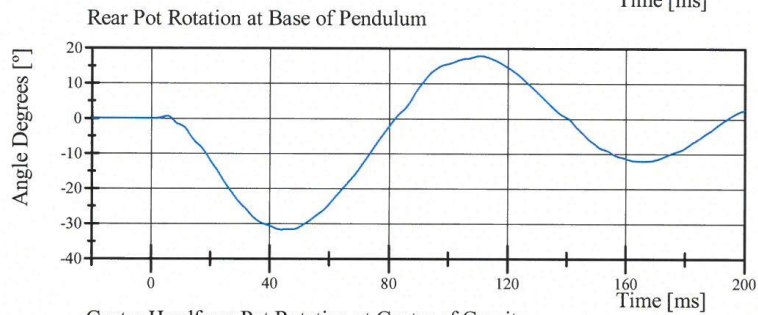
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 42-6

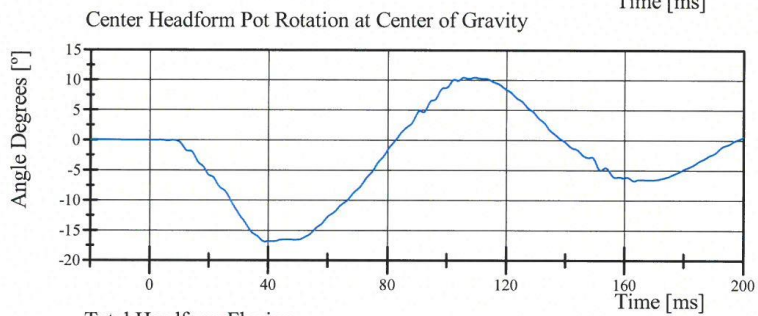
Test Date: 11/14/2016



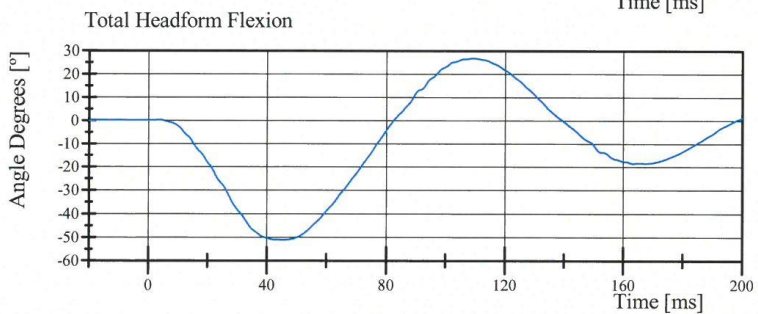
Filter Class: CFC_180
Max: 16.3 ° at 108.9 ms
Min: -34.6 ° at 45.4 ms



Filter Class: CFC_180
Max: 17.9 ° at 110.8 ms
Min: -31.7 ° at 44.0 ms



Filter Class: CFC_180
Max: 10.5 ° at 109.4 ms
Min: -16.9 ° at 39.0 ms



Filter Class: CFC_180
Max: 26.7 ° at 109.2 ms
Min: -51.2 ° at 45.5 ms

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

11.14.2016 14:30:15 668



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,118.4 N	Yes
Time of Peak	11.8 - 16.1 ms	12.80 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,297.4 N	Yes
Time of Peak	12.2 - 17.0 ms	13.28 ms	Yes

Test meets specifications.

Comments:

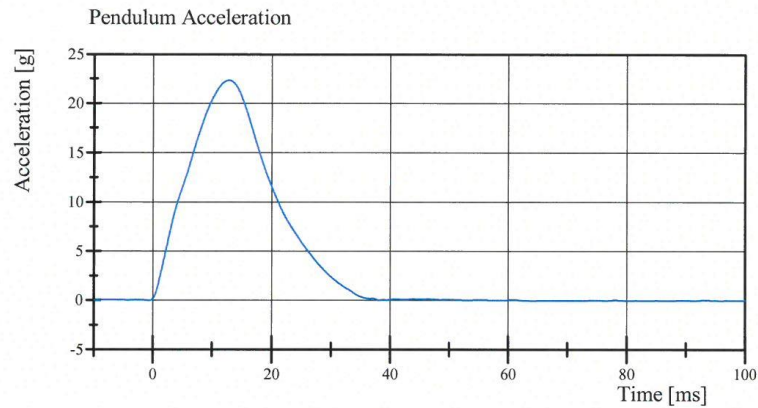
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 16:01:58 524

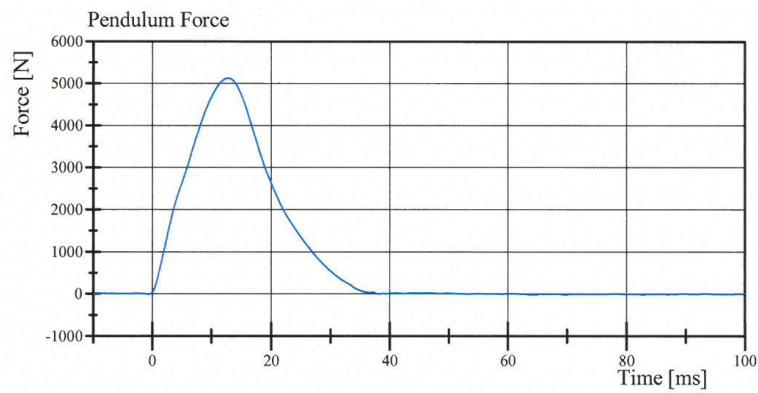


Transportation Research Center Inc.

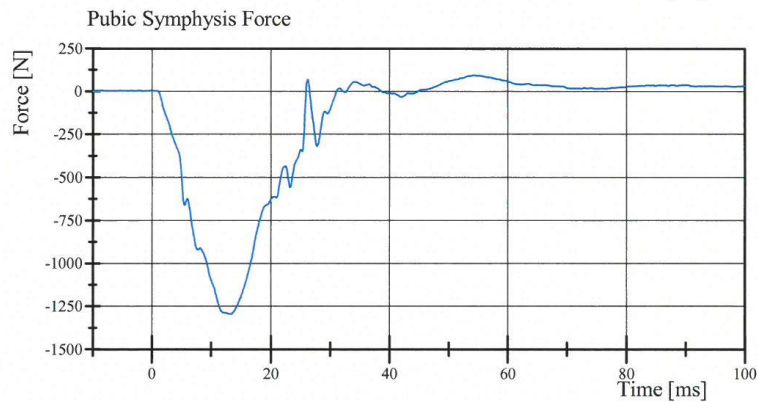
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 22.3 g at 12.8 ms
Min: -0.1 g at 64.2 ms



Filter Class: CFC_180
Max: 5,118.4 N at 12.8 ms
Min: -13.0 N at 64.2 ms



Filter Class: CFC_600
Max: 93.0 N at 54.4 ms
Min: -1,297.4 N at 13.3 ms

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

11.14.2016 16:02:48 524



Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.47

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

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 47-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	124.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.4 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

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

10.07.2016 09:12:10 232

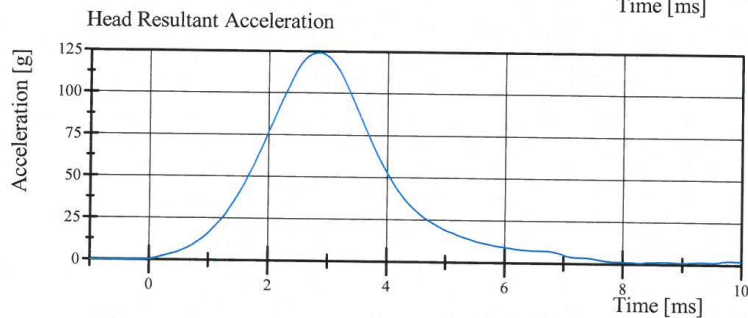
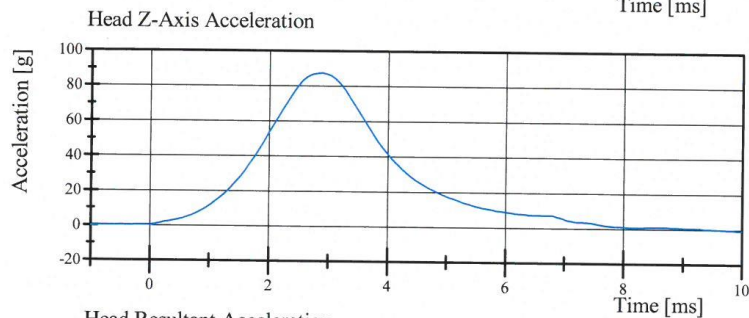
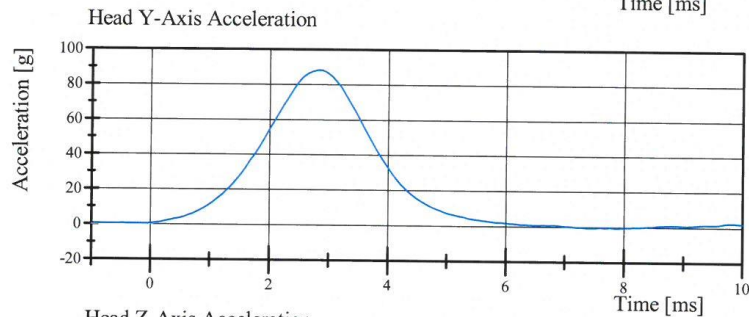
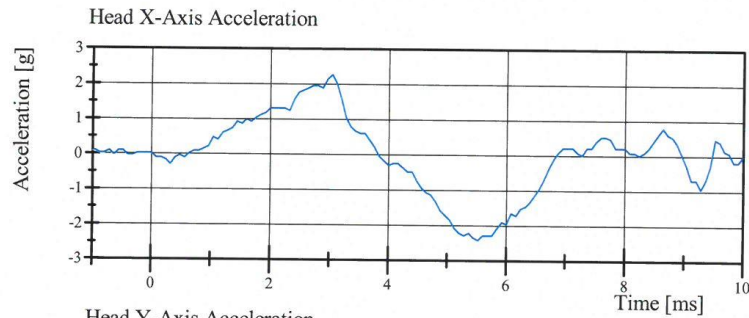


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 47-1

Test Date: 10/7/2016



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

10.07.2016 09:12:20 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 47-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.622 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.481 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.748 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.054 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.826 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.826 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-79.6 deg	Yes
Time of Peak	50 - 70 ms	60.9 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.9 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	114.5 ms	Yes

Test meets specifications.

Comments:

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

10.07.2016 09:51:41 743

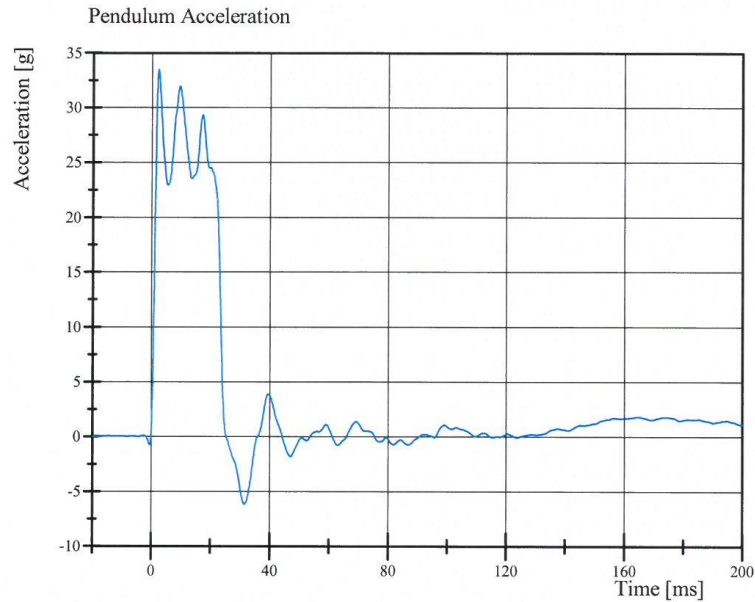


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 47-1

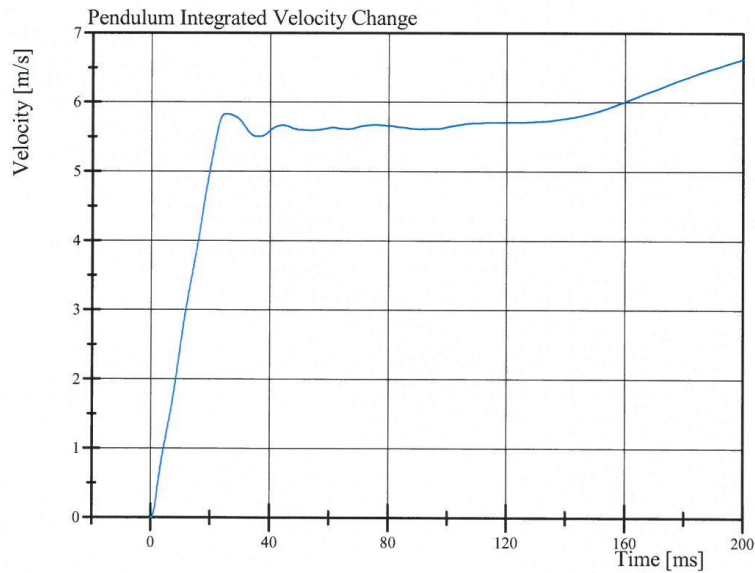
Test Date: 10/7/2016



Filter Class: CFC_180

Max: 33.4 g at 2.3 ms

Min: -6.2 g at 31.4 ms



Filter Class: CFC_180

Max: 6.6 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

10.07.2016 09:51:52 743

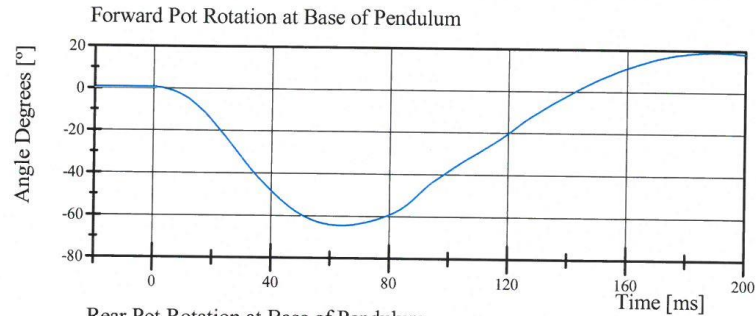


Transportation Research Center Inc.

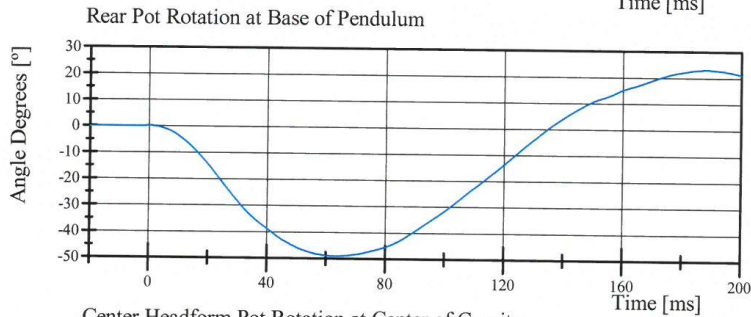
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 47-1

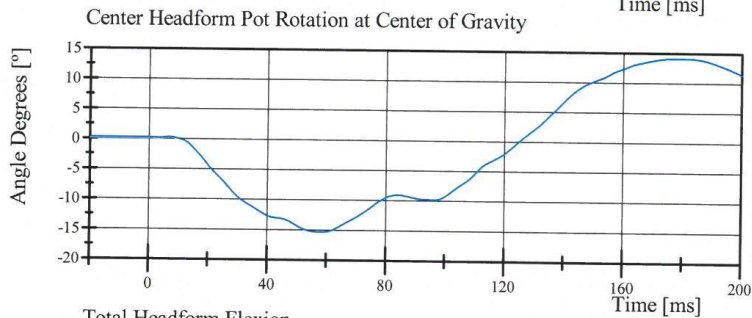
Test Date: 10/7/2016



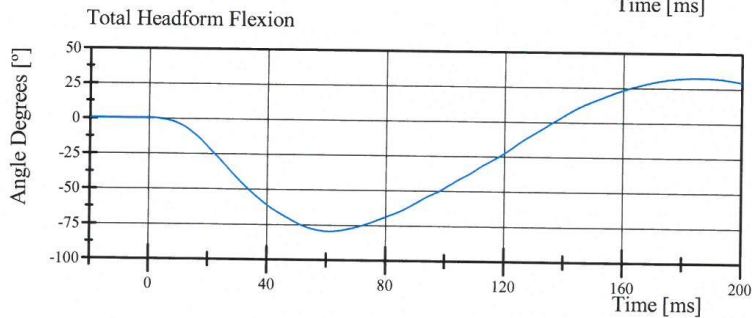
Filter Class: CFC_60
Max: 19.1 ° at 191.0 ms
Min: -64.6 ° at 63.8 ms



Filter Class: CFC_60
Max: 23.1 ° at 188.2 ms
Min: -49.2 ° at 63.1 ms



Filter Class: CFC_60
Max: 14.1 ° at 177.8 ms
Min: -15.4 ° at 58.0 ms



Filter Class: CFC_60
Max: 32.8 ° at 186.1 ms
Min: -79.6 ° at 60.9 ms

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

10.07.2016 09:51:54 743

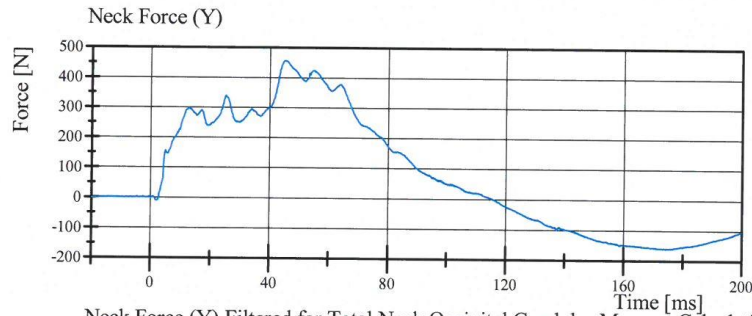


Transportation Research Center Inc.

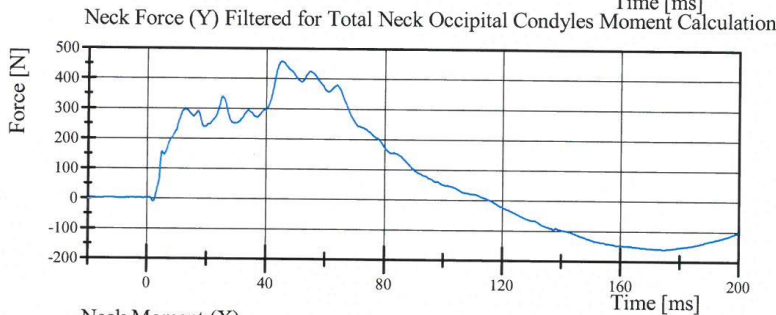
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 47-1

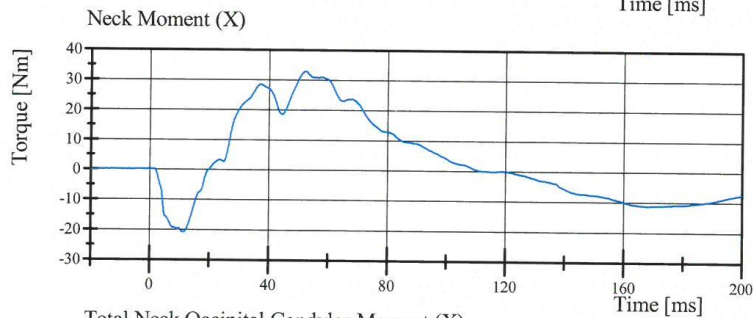
Test Date: 10/7/2016



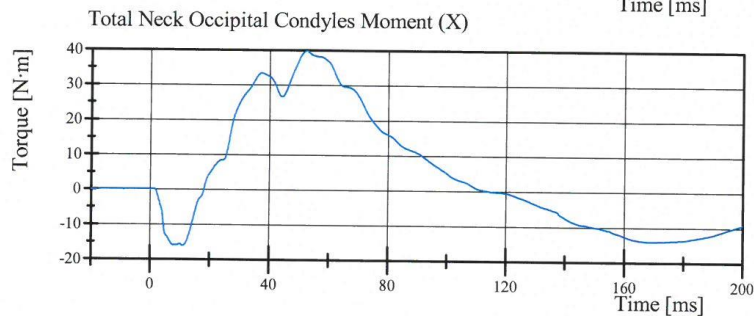
Filter Class: CFC_1000
Max: 456.1 N at 44.9 ms
Min: -160.5 N at 174.1 ms



Filter Class: CFC_600
Max: 456.2 N at 45.0 ms
Min: -159.5 N at 174.7 ms



Filter Class: CFC_600
Max: 32.9 Nm at 52.6 ms
Min: -21.0 Nm at 11.4 ms



Filter Class: Without (Consta
Max: 39.9 N·m at 52.6 ms
Min: -16.2 N·m at 11.0 ms

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

10.07.2016 09:51:55 743



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 47-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	30.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.4 g	Yes

Test meets specifications.

Comments:

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

10.07.2016 09:42:00 888

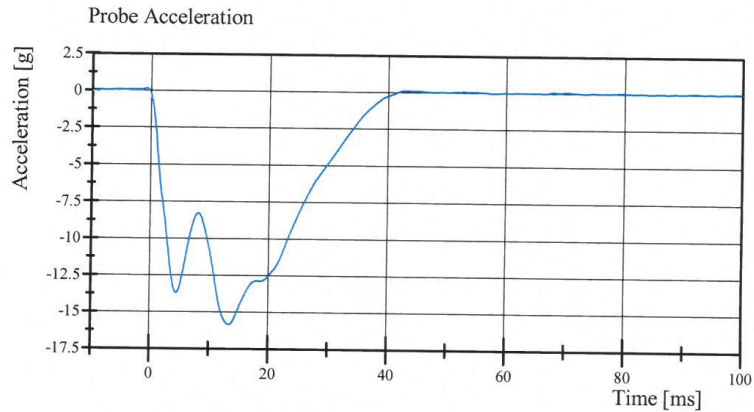


Transportation Research Center Inc.

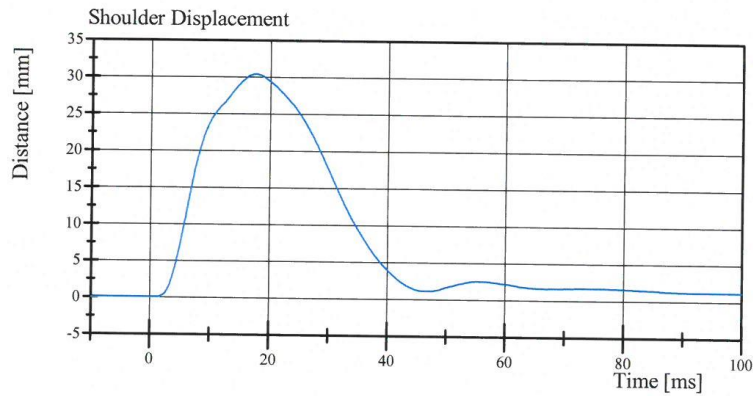
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 47-1

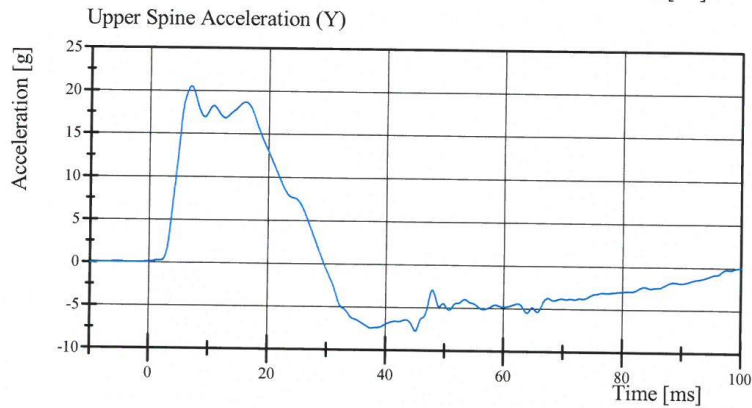
Test Date: 10/7/2016



Filter Class: CFC_180
Max: 0.1 g at -0.7 ms
Min: -15.9 g at 13.4 ms



Filter Class: CFC_600
Max: 30.3 mm at 17.6 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_180
Max: 20.4 g at 7.0 ms
Min: -7.8 g at 45.0 ms

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

10.07.2016 09:42:40 888



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 47-1
Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.779 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.2 g	Yes
Shoulder Displacement	31 - 40 mm	33.1 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.2 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.3 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.9 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.4 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.5 g	Yes

Test meets specifications.

Comments:

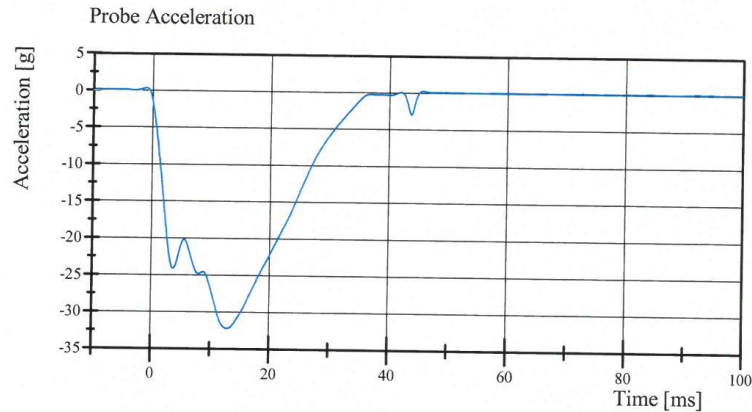
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

10.07.2016 14:04:07 613

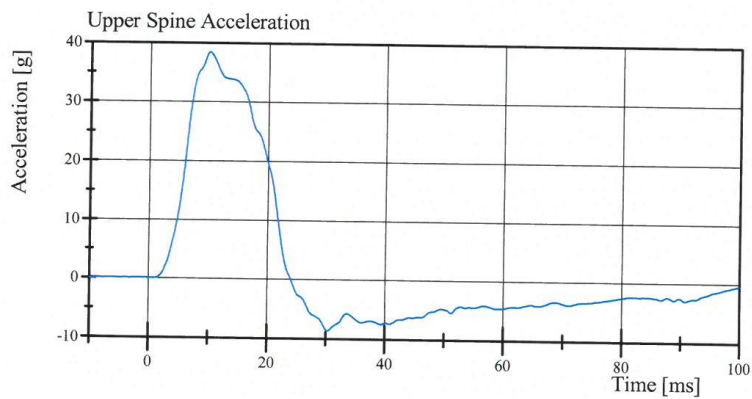


Transportation Research Center Inc.

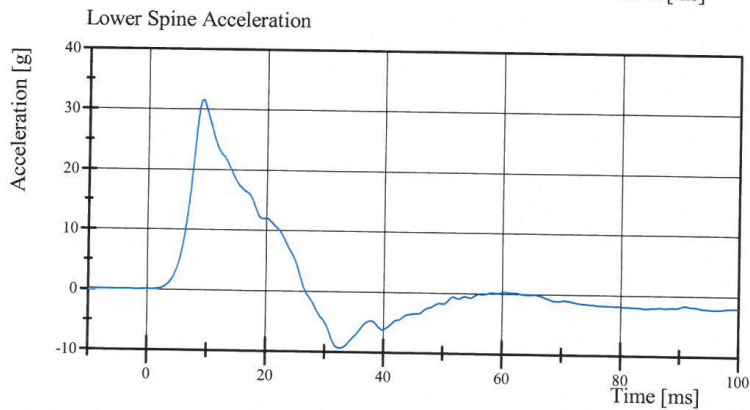
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 47-1
Test Date: 10/7/2016



Filter Class: CFC_180
Max: 0.2 g at -1.1 ms
Min: -32.2 g at 13.0 ms



Filter Class: CFC_180
Max: 38.4 g at 10.0 ms
Min: -8.7 g at 30.3 ms



Filter Class: CFC_180
Max: 31.5 g at 9.1 ms
Min: -9.4 g at 32.6 ms

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

10.07.2016 14:04:35 613

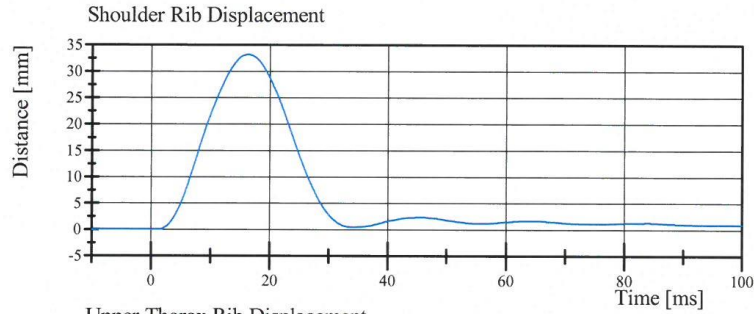


Transportation Research Center Inc.

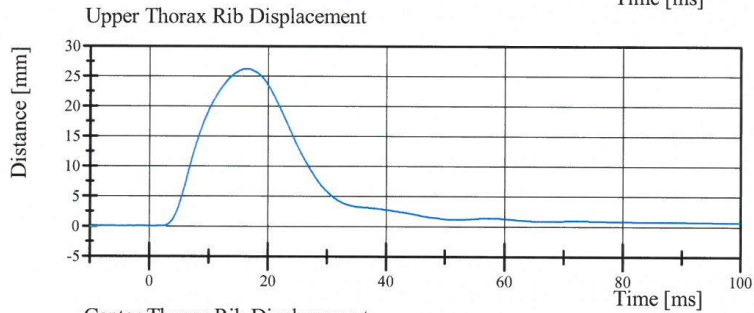
Left Lateral Thorax with Arm

SID IIs Serial No. 305 Certification No. 47-1

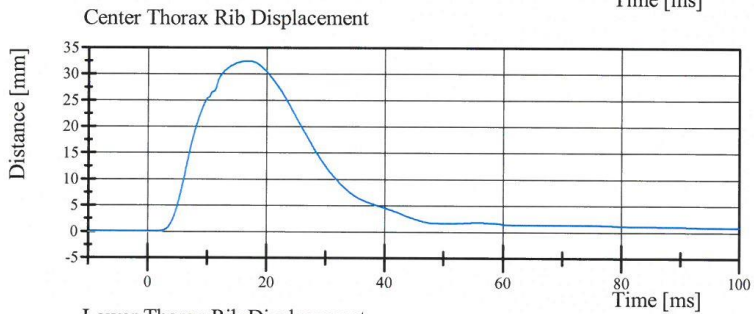
Test Date: 10/7/2016



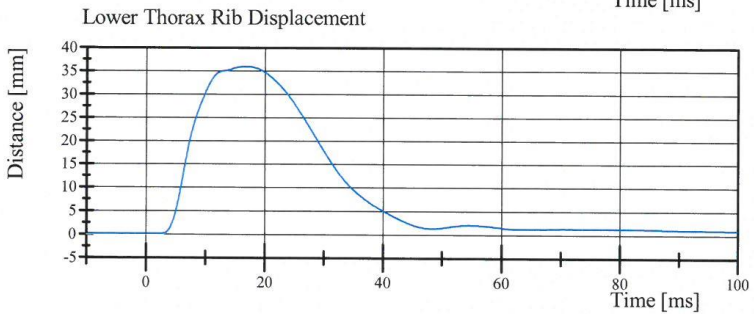
Filter Class: CFC_600
Max: 33.1 mm at 16.2 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_600
Max: 26.2 mm at 16.4 ms
Min: -0.0 mm at -4.3 ms



Filter Class: CFC_600
Max: 32.3 mm at 17.0 ms
Min: -0.0 mm at -9.2 ms



Filter Class: CFC_600
Max: 35.9 mm at 16.5 ms
Min: -0.0 mm at 1.0 ms

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

10.07.2016 14:04:36 613



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 47-1
Test Date: 10/7/2016

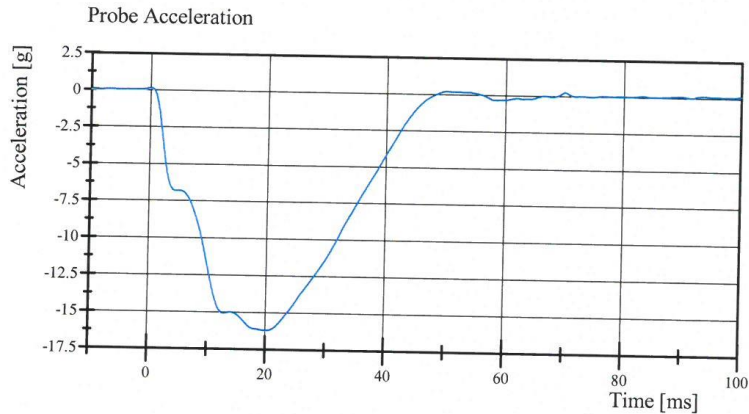
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.390 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.5 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.8 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.8 g	Yes

Test meets specifications.

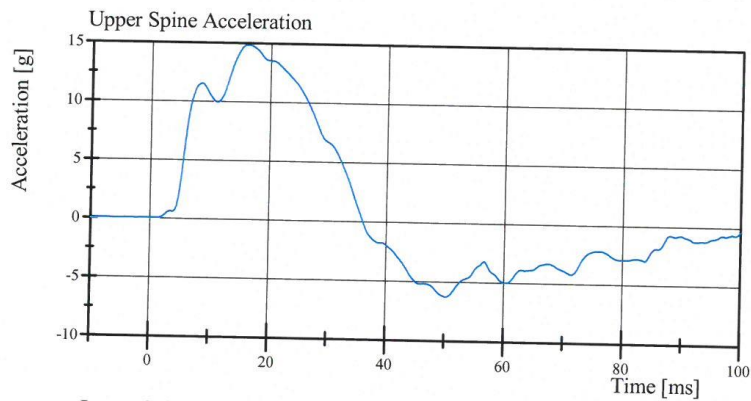
Comments:

Transportation Research Center Inc.

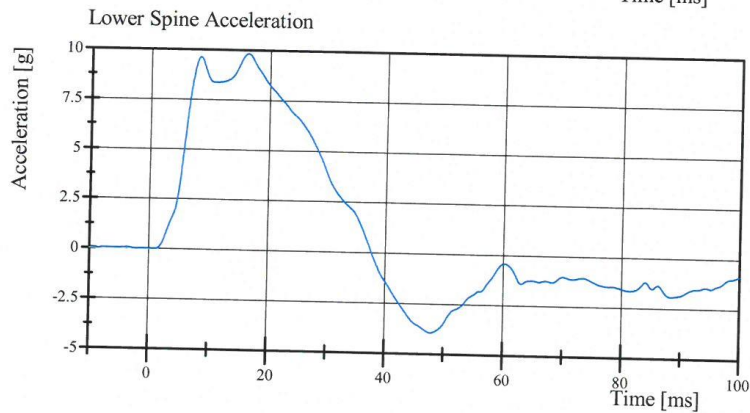
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 47-1
Test Date: 10/7/2016



Filter Class: CFC_180
Max: 0.2 g at 70.0 ms
Min: -16.2 g at 20.1 ms



Filter Class: CFC_180
Max: 14.8 g at 16.1 ms
Min: -6.3 g at 50.2 ms



Filter Class: CFC_180
Max: 9.8 g at 16.2 ms
Min: -3.9 g at 47.8 ms

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

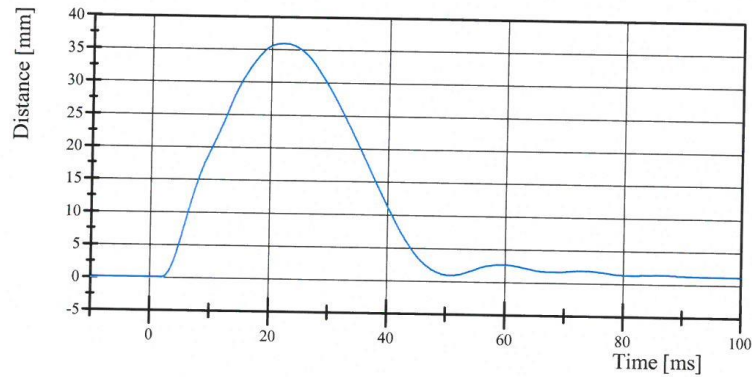
10.07.2016 13:11:32 821



Transportation Research Center Inc.

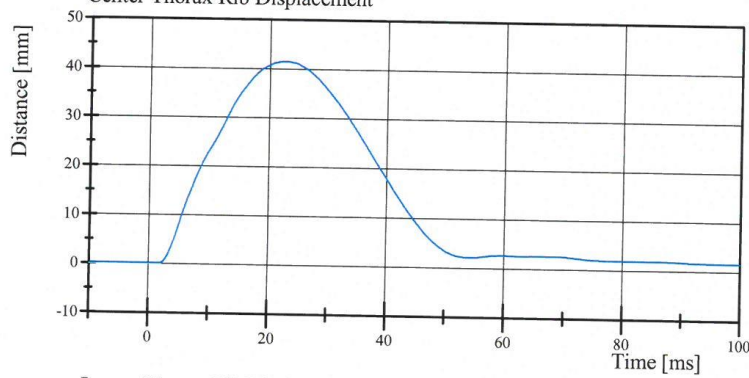
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 47-1
Test Date: 10/7/2016

Upper Thorax Rib Displacement



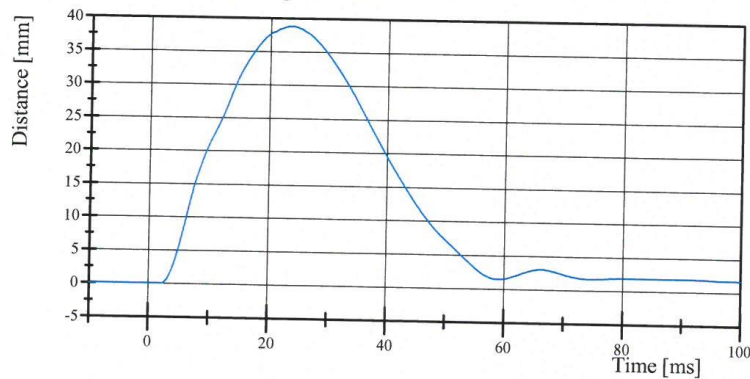
Filter Class: CFC_600
Max: 35.8 mm at 22.0 ms
Min: -0.0 mm at 1.8 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.5 mm at 22.6 ms
Min: -0.0 mm at 1.6 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.7 mm at 23.6 ms
Min: -0.0 mm at -5.7 ms

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

10.07.2016 13:11:33 821



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 48-1

Test Date: 11/2/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.7 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	42.9 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.9 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	14.93 g	No

Test does not meet specifications.

Comments:

Technician

Approved

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

11.02.2016 12:20:46 599

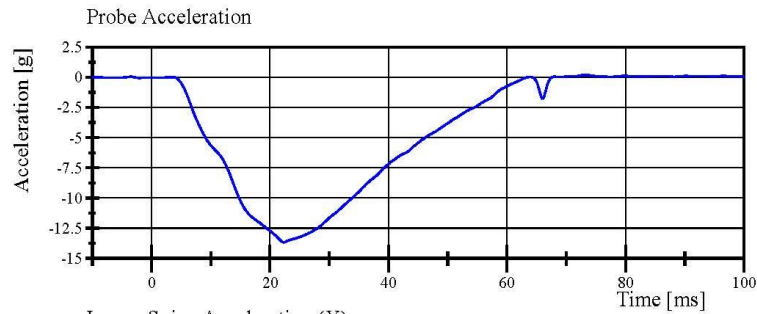


Transportation Research Center Inc.

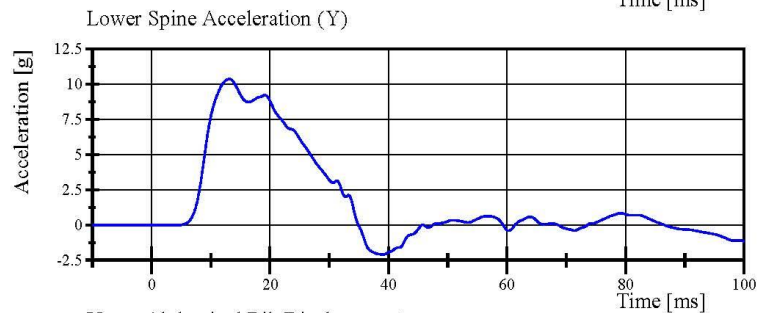
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 48-1

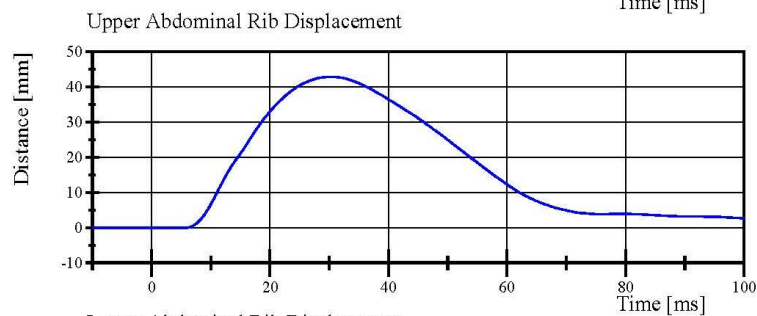
Test Date: 11/2/2016



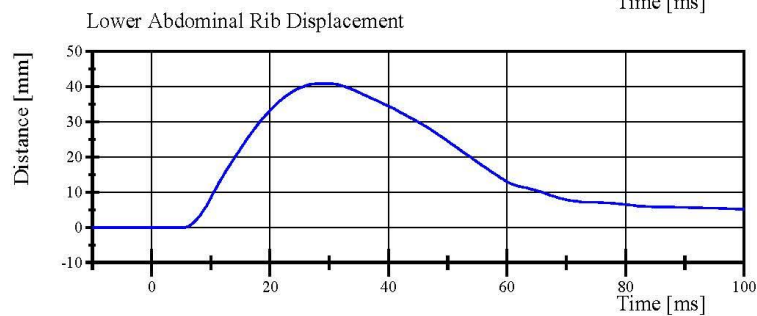
Filter Class: CFC_180
Max: 0.2 g at 73.3 ms
Min: -13.7 g at 22.3 ms



Filter Class: CFC_180
Max: 10.4 g at 13.1 ms
Min: -2.1 g at 39.0 ms



Filter Class: CFC_600
Max: 42.9 mm at 30.2 ms
Min: -0.0 mm at 5.1 ms



Filter Class: CFC_600
Max: 40.9 mm at 28.9 ms
Min: -0.0 mm at 5.4 ms

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

11.02.2016 12:21:16 599



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 47-1

Test Date: 10/7/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-45.22 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,232.7 N	Yes

Test meets specifications.

Comments: Pelvis plug #81013

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

10.07.2016 14:25:45 443

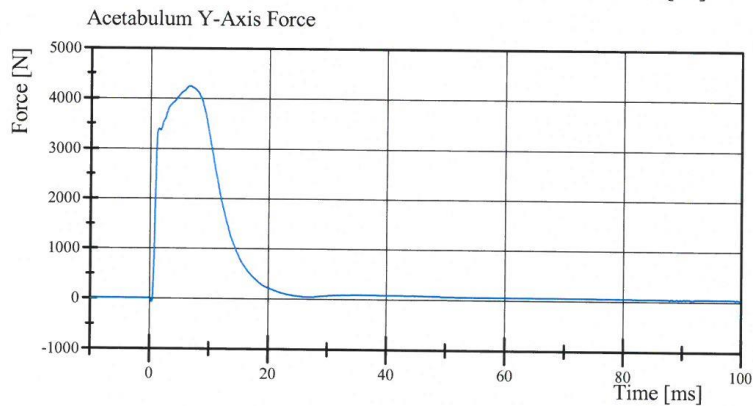
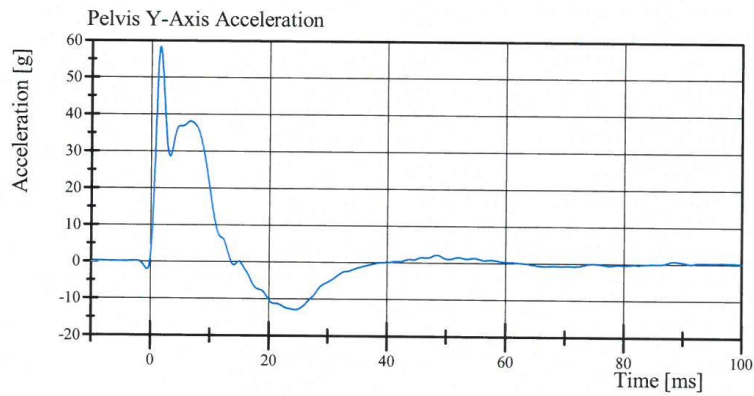
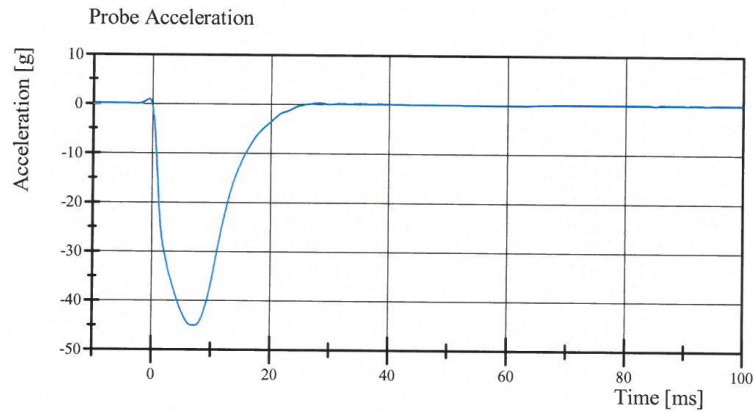


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 47-1

Test Date: 10/7/2016



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

10.07.2016 14:26:23 443



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 47-2

Test Date: 10/10/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.8 g	Yes
Iliac Force	4,100 - 5,100 N	4,578.4 N	Yes

Test meets specifications.

Comments:

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

10.10.2016 08:18:17 664

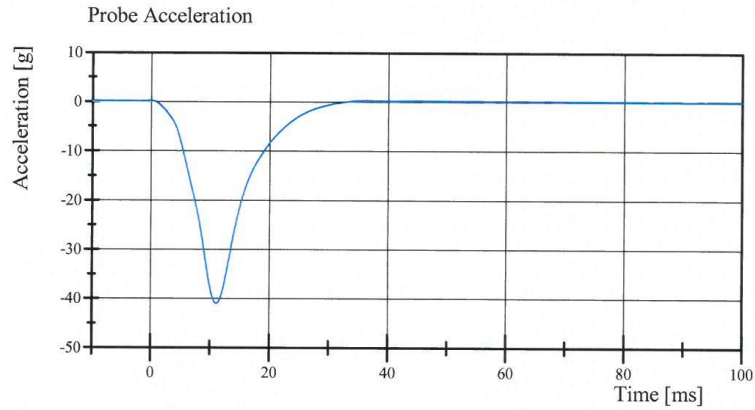


Transportation Research Center Inc.

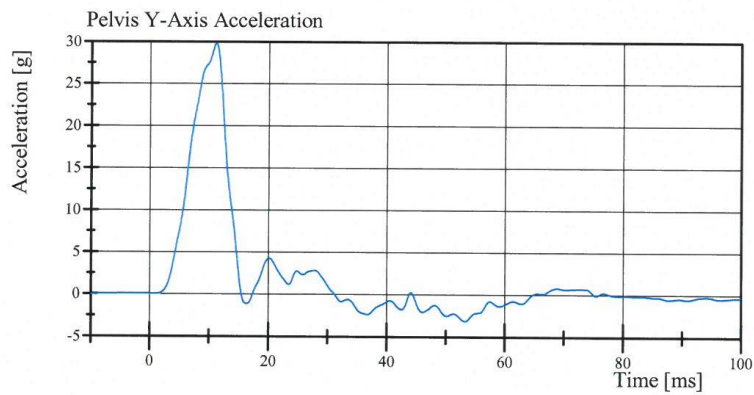
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 47-2

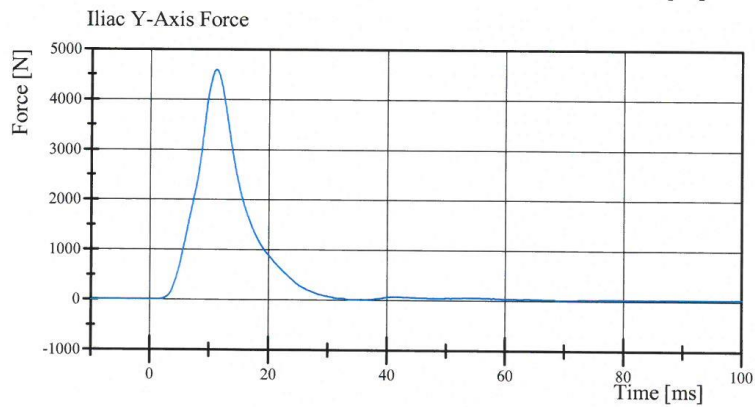
Test Date: 10/10/2016



Filter Class: CFC_180
Max: 0.2 g at 36.5 ms
Min: -41.1 g at 11.0 ms



Filter Class: CFC_180
Max: 29.8 g at 11.0 ms
Min: -3.1 g at 53.3 ms



Filter Class: CFC_600
Max: 4,578.4 N at 11.0 ms
Min: -0.7 N at -5.1 ms

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

10.10.2016 08:18:34 664



Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.49

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

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	118.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

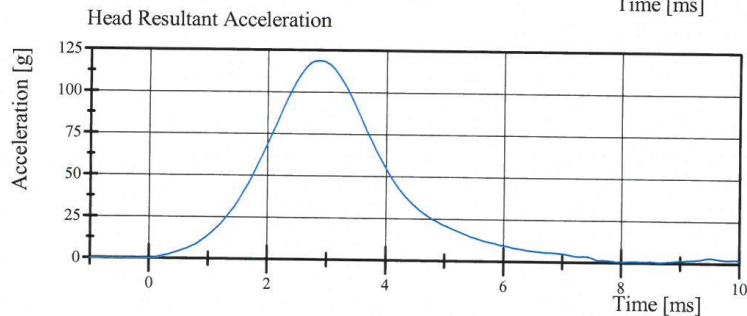
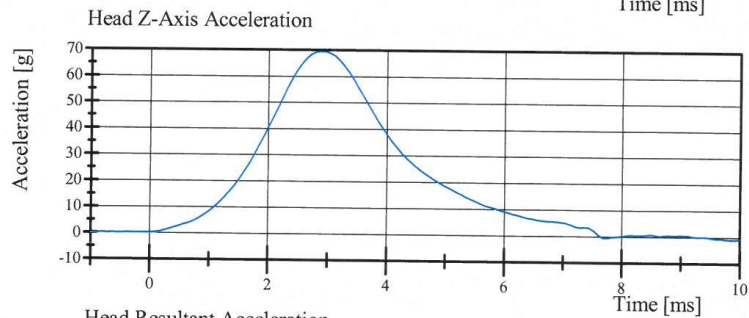
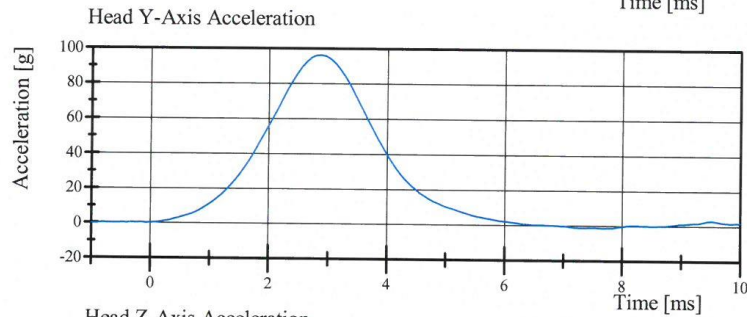
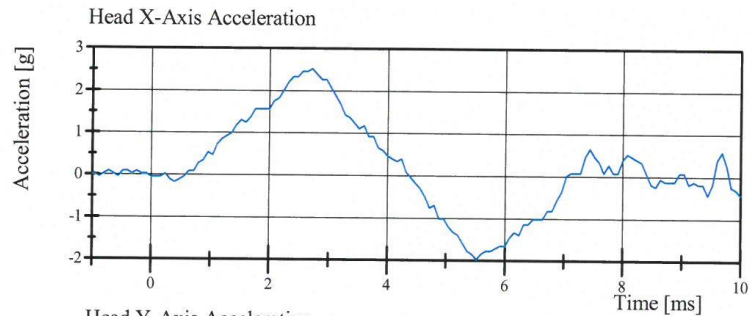
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.11.2016 11:35:52 232



Transportation Research Center Inc.

Left Lateral Head Drop
SID II_s Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



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

11.11.2016 11:36:00 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.610 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.629 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	4.014 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.395 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.788 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.790 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-77.3 deg	Yes
Time of Peak	50 - 70 ms	60.1 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	43.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	115.8 ms	Yes

Test meets specifications.

Comments:

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

11.11.2016 12:15:49 739

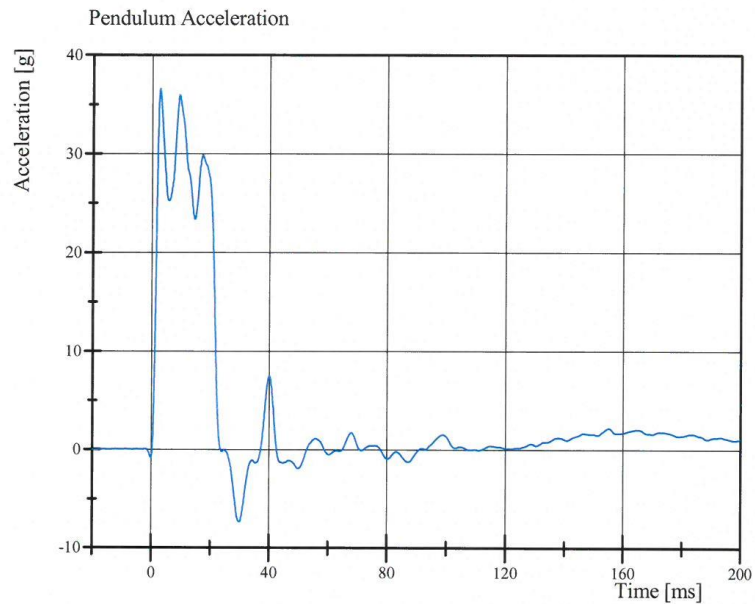


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 49-1

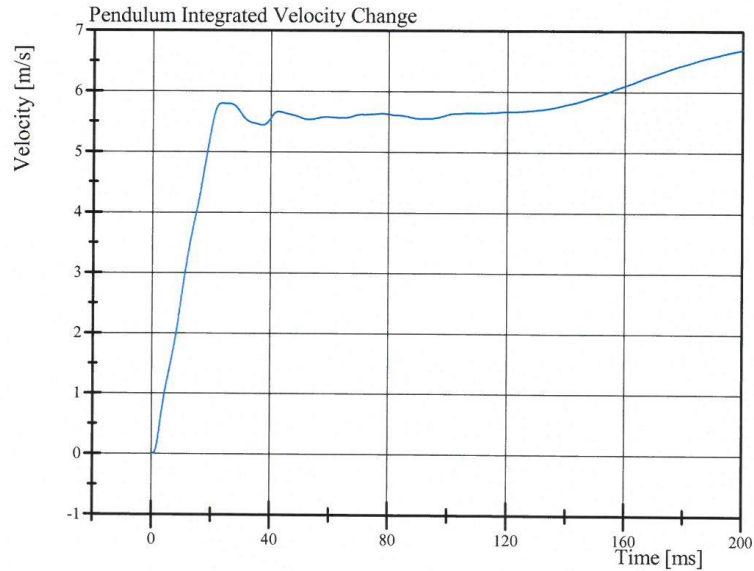
Test Date: 11/11/2016



Filter Class: CFC_180

Max: 36.5 g at 2.7 ms

Min: -7.4 g at 29.9 ms



Filter Class: CFC_180

Max: 6.7 m/s at 200.0 ms

Min: -0.0 m/s at 0.2 ms

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

11.11.2016 12:15:59 739

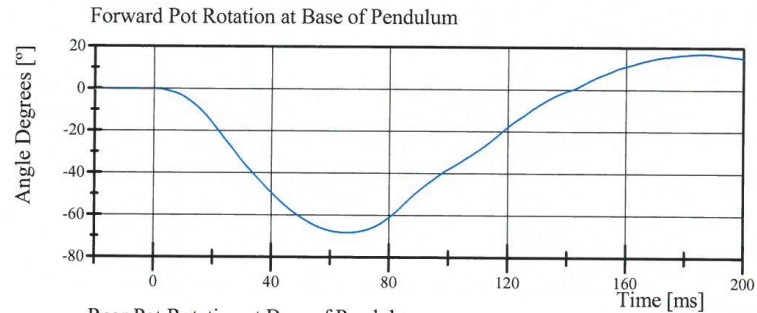


Transportation Research Center Inc.

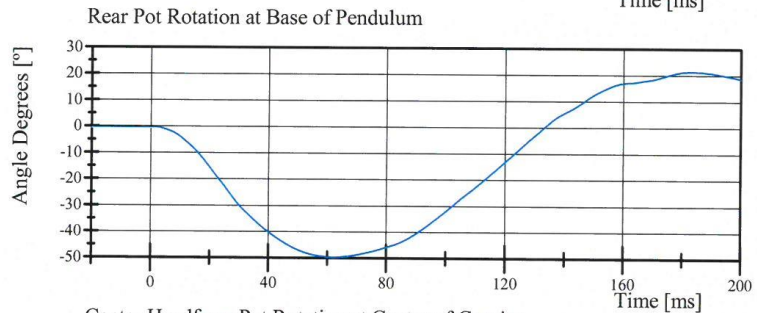
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 49-1

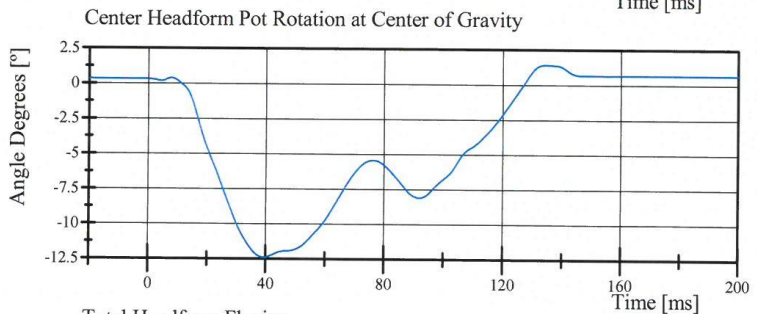
Test Date: 11/11/2016



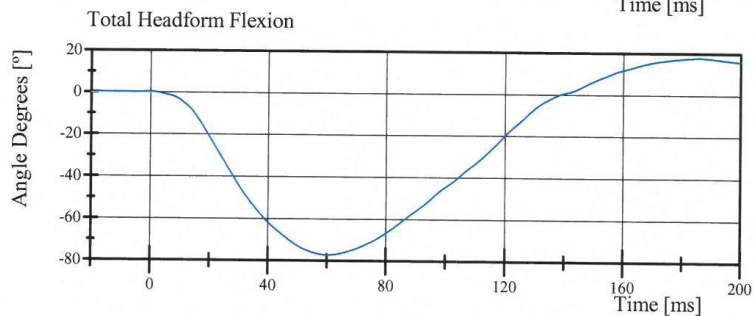
Filter Class: CFC_60
Max: 17.1 ° at 186.0 ms
Min: -68.4 ° at 65.6 ms



Filter Class: CFC_60
Max: 21.4 ° at 183.3 ms
Min: -49.7 ° at 62.0 ms



Filter Class: CFC_60
Max: 1.4 ° at 134.2 ms
Min: -12.4 ° at 39.3 ms



Filter Class: CFC_60
Max: 17.8 ° at 186.0 ms
Min: -77.3 ° at 60.1 ms

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

11.11.2016 12:16:00 739

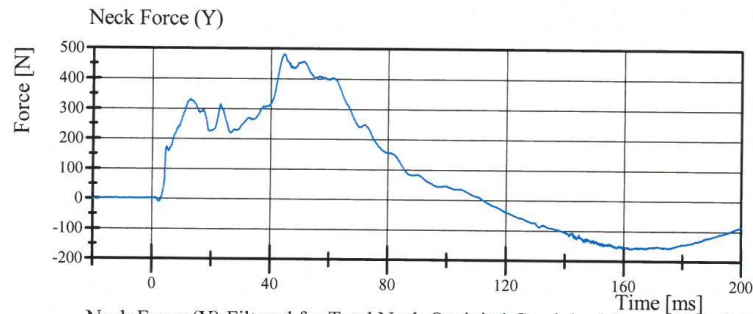


Transportation Research Center Inc.

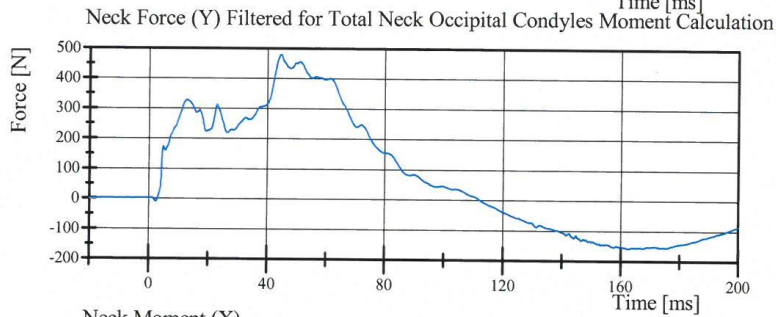
Left Lateral Neck

SID II_s Serial No. 305 Certification No. 49-1

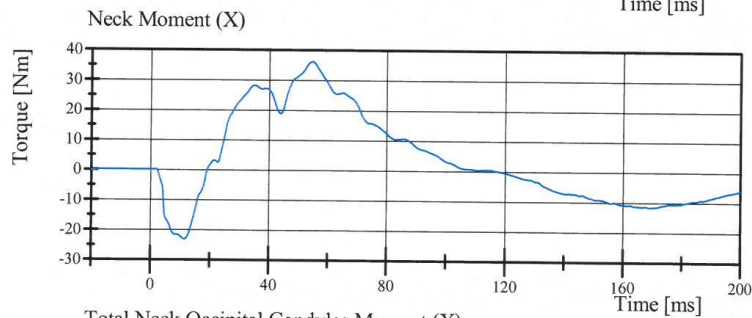
Test Date: 11/11/2016



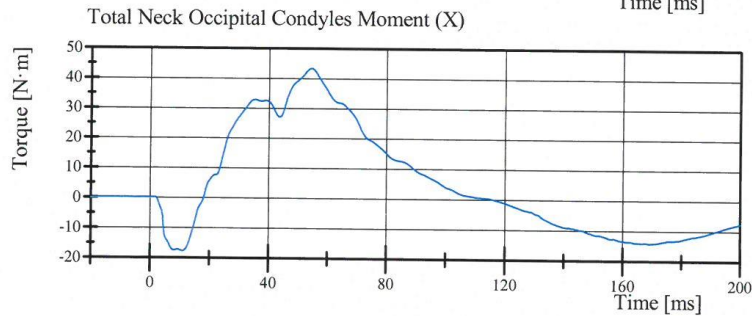
Filter Class: CFC_1000
Max: 479.8 N at 44.5 ms
Min: -160.2 N at 162.3 ms



Filter Class: CFC_600
Max: 479.1 N at 44.5 ms
Min: -158.9 N at 162.2 ms



Filter Class: CFC_600
Max: 36.1 Nm at 54.7 ms
Min: -23.2 Nm at 11.4 ms



Filter Class: Without_(Consta
Max: 43.3 N·m at 54.6 ms
Min: -17.9 N·m at 11.0 ms

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

11.11.2016 12:16:01 739



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.1 g	Yes
Shoulder Displacement	28 - 37 mm	30.6 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.1 g	Yes

Test meets specifications.

Comments:

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

11.11.2016 11:04:15 875

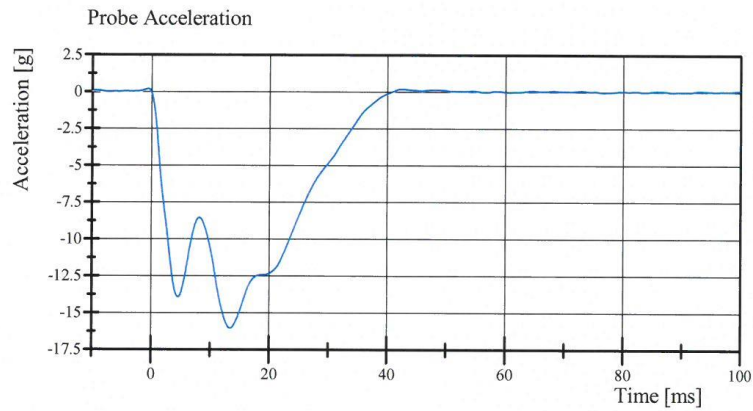


Transportation Research Center Inc.

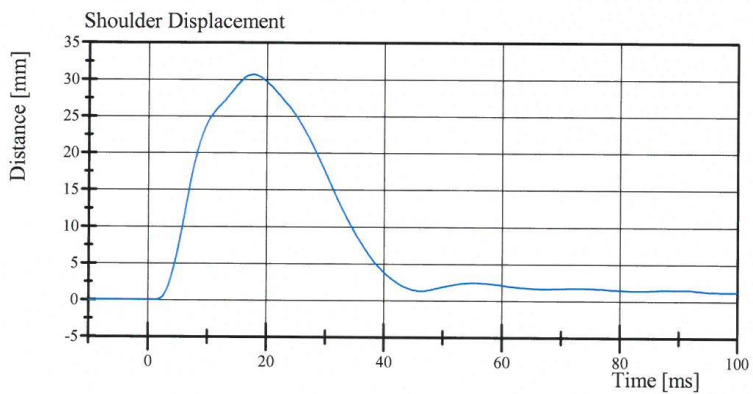
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 49-1

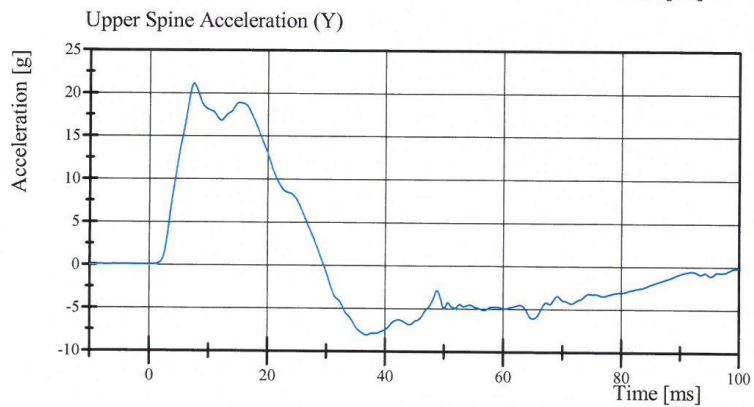
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.2 g at 42.4 ms
Min: -16.1 g at 13.4 ms



Filter Class: CFC_600
Max: 30.6 mm at 17.7 ms
Min: -0.0 mm at -6.9 ms



Filter Class: CFC_180
Max: 21.1 g at 7.4 ms
Min: -8.1 g at 36.8 ms



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

11.11.2016 11:04:24 875

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.793 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.2 g	Yes
Shoulder Displacement	31 - 40 mm	34.0 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.6 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.0 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.8 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	32.8 g	Yes

Test meets specifications.

Comments:

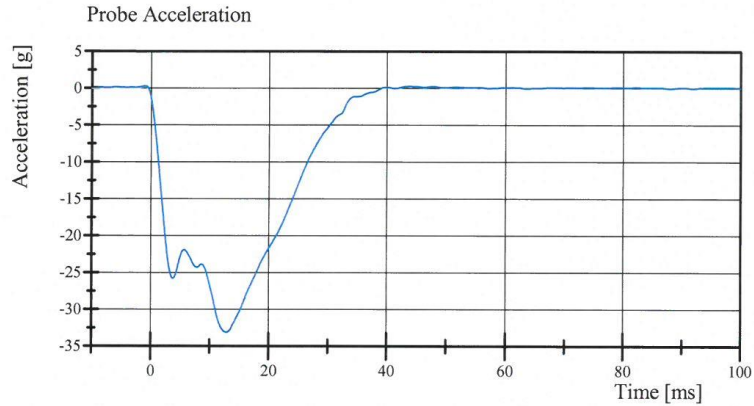
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.11.2016 12:10:29 640

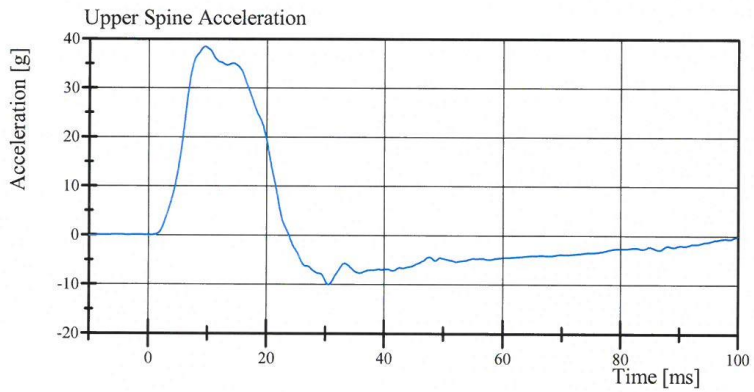


Transportation Research Center Inc.

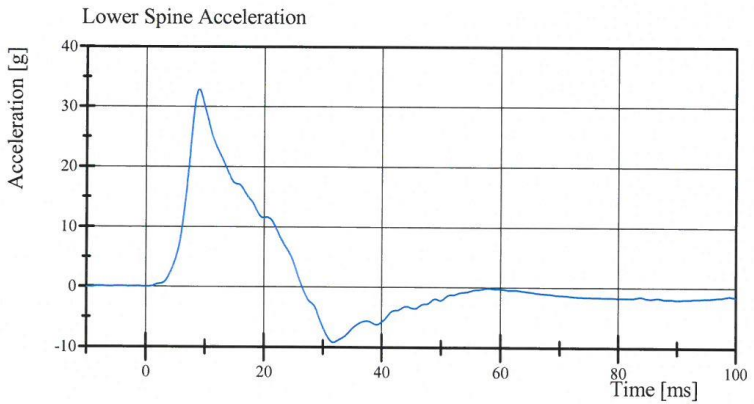
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.2 g at 43.8 ms
Min: -33.2 g at 12.9 ms



Filter Class: CFC_180
Max: 38.3 g at 9.5 ms
Min: -10.1 g at 30.6 ms



Filter Class: CFC_180
Max: 32.8 g at 9.0 ms
Min: -9.3 g at 31.8 ms

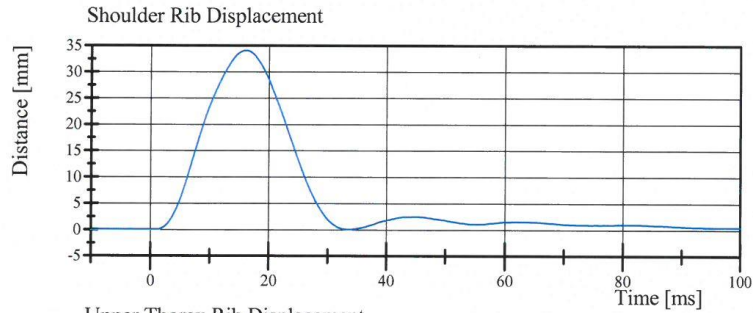


Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

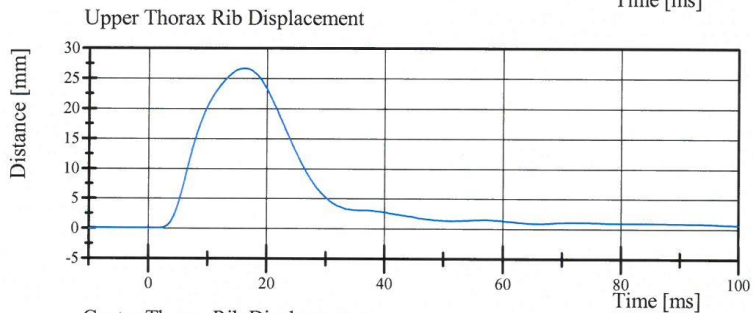
11.11.2016 12:10:40 640

Transportation Research Center Inc.

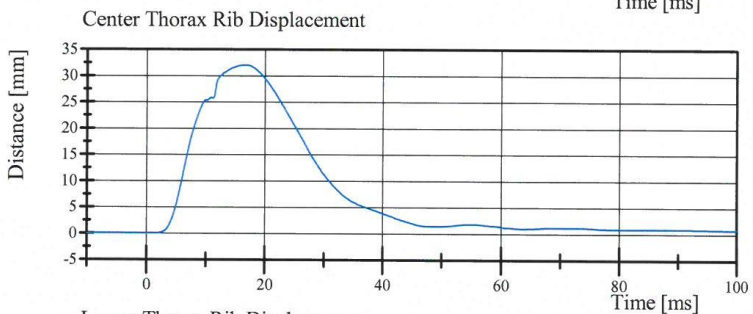
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



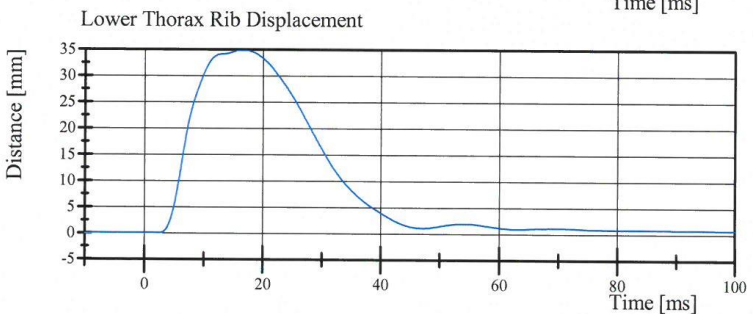
Filter Class: CFC_600
Max: 34.0 mm at 16.0 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_600
Max: 26.6 mm at 16.2 ms
Min: -0.0 mm at -0.9 ms



Filter Class: CFC_600
Max: 32.0 mm at 16.6 ms
Min: -0.0 mm at -10.0 ms



Filter Class: CFC_600
Max: 34.8 mm at 16.1 ms
Min: -0.0 mm at -10.0 ms

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

11.11.2016 12:10:40 640



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.384 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.0 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.6 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.3 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.3 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.7 g	Yes

Test meets specifications.

Comments:

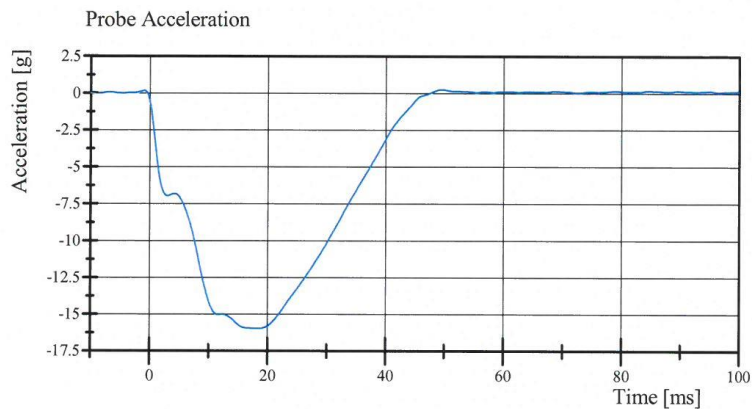
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.11.2016 11:25:49 868

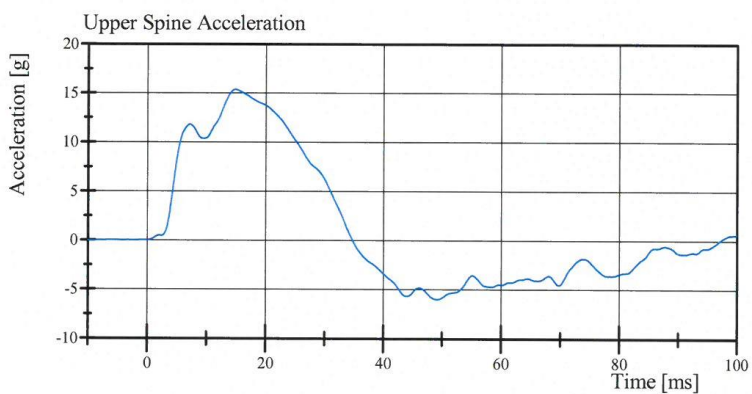


Transportation Research Center Inc.

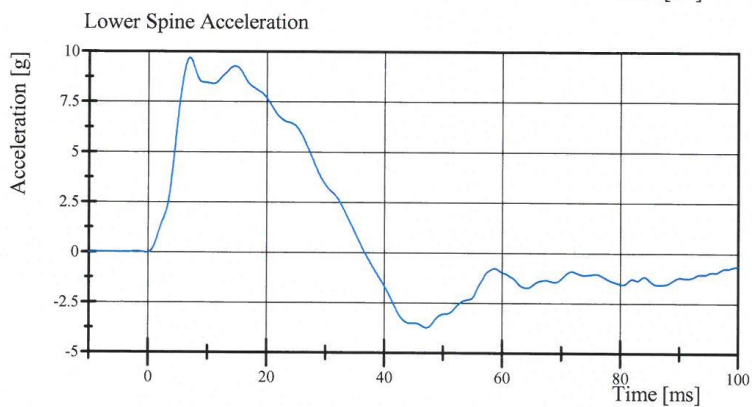
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.2 g at 49.5 ms
Min: -16.0 g at 18.3 ms



Filter Class: CFC_180
Max: 15.3 g at 14.8 ms
Min: -6.0 g at 49.2 ms



Filter Class: CFC_180
Max: 9.7 g at 7.0 ms
Min: -3.8 g at 47.2 ms

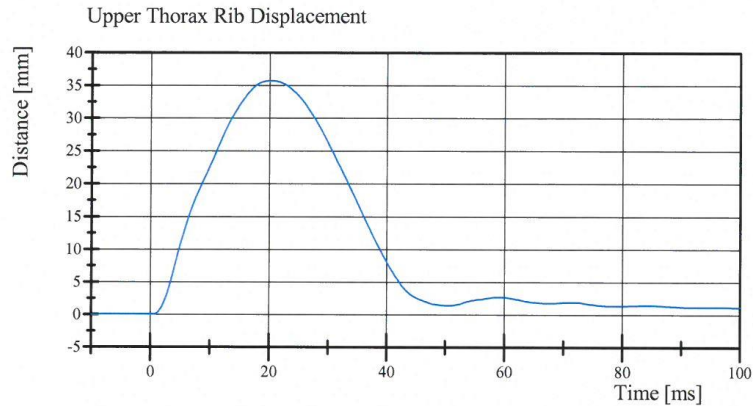


Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

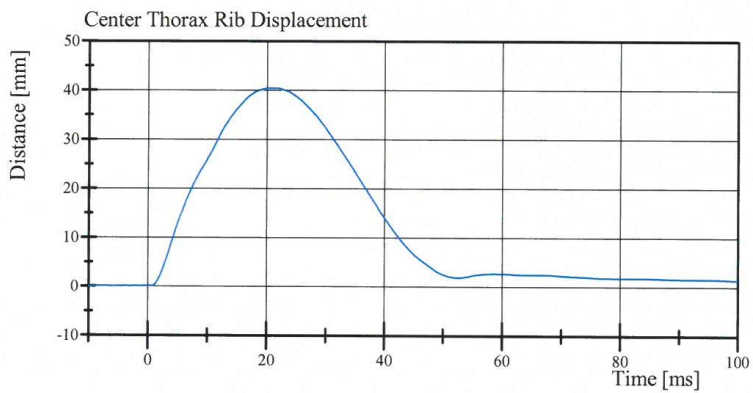
11.11.2016 11:26:00 868

Transportation Research Center Inc.

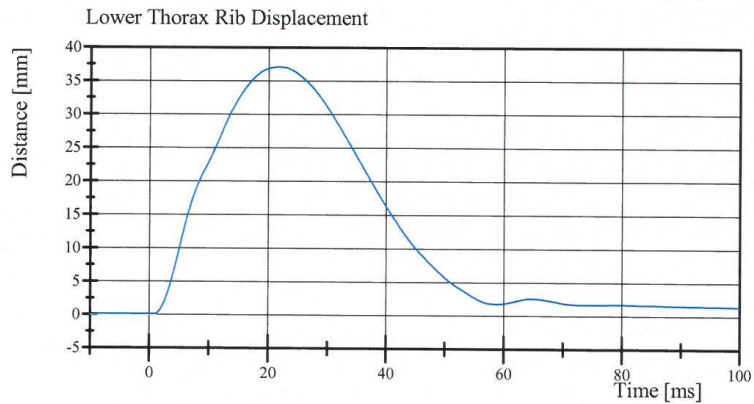
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



Filter Class: CFC_600
Max: 35.6 mm at 20.3 ms
Min: -0.0 mm at 0.5 ms



Filter Class: CFC_600
Max: 40.3 mm at 21.0 ms
Min: -0.0 mm at -6.2 ms



Filter Class: CFC_600
Max: 37.0 mm at 21.7 ms
Min: -0.0 mm at -4.6 ms



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

11.11.2016 11:26:00 868

Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.24 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	44.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.34 g	Yes

Test meets specifications.

Comments:

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

11.11.2016 11:15:27 720

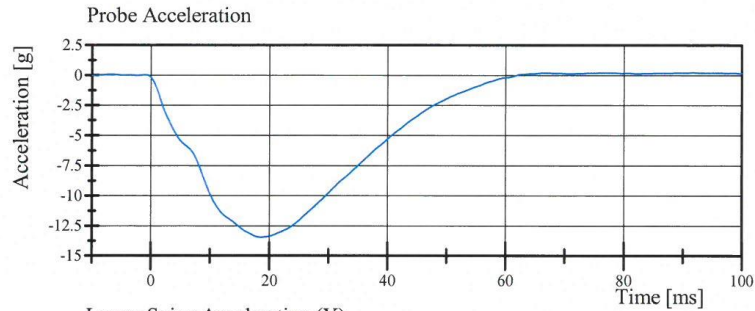


Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 49-1

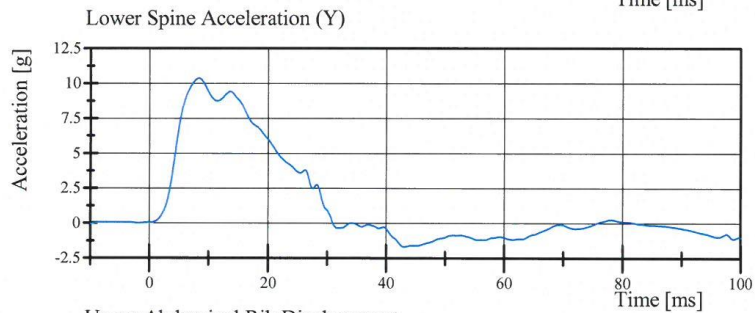
Test Date: 11/11/2016



Filter Class: CFC_180

Max: 0.3 g at 91.6 ms

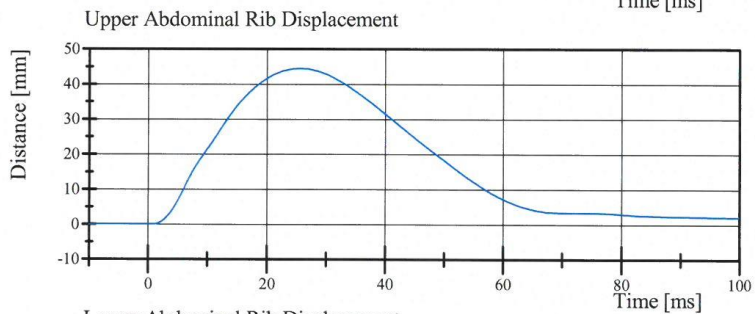
Min: -13.5 g at 18.6 ms



Filter Class: CFC_180

Max: 10.3 g at 8.3 ms

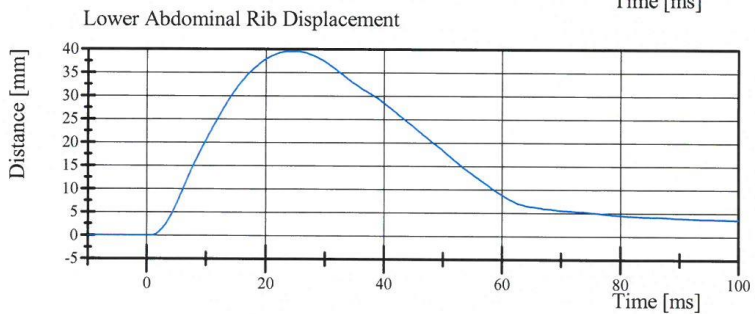
Min: -1.7 g at 43.0 ms



Filter Class: CFC_600

Max: 44.5 mm at 25.5 ms

Min: -0.0 mm at -5.4 ms



Filter Class: CFC_600

Max: 39.5 mm at 24.4 ms

Min: -0.0 mm at 0.8 ms

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

11.11.2016 11:15:42 720



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-46.72 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.2 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,163.3 N	Yes

Test meets specifications.

Comments:

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

11.11.2016 12:51:45 473

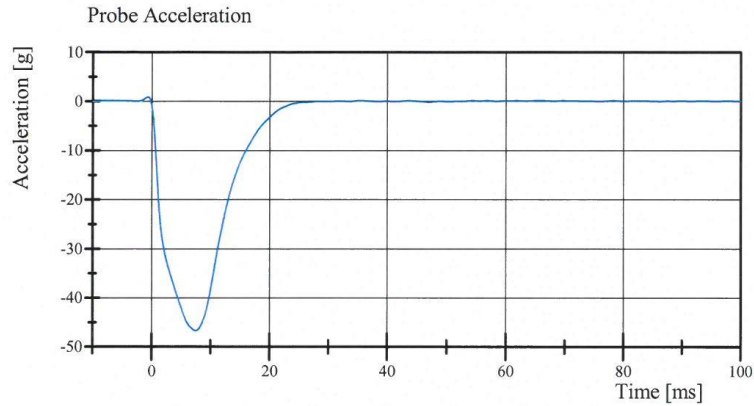


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 49-1

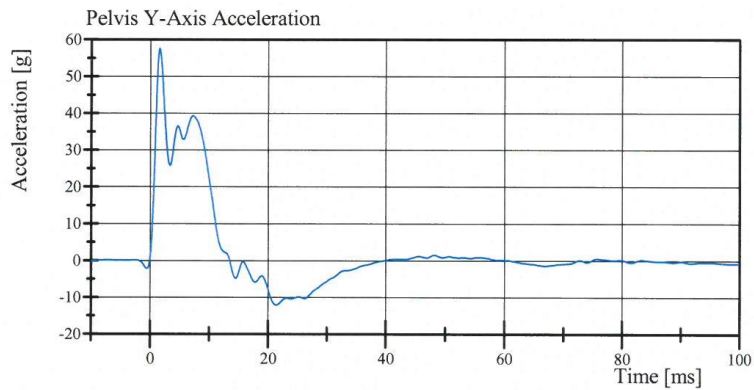
Test Date: 11/11/2016



Filter Class: CFC_180

Max: 0.8 g at -0.7 ms

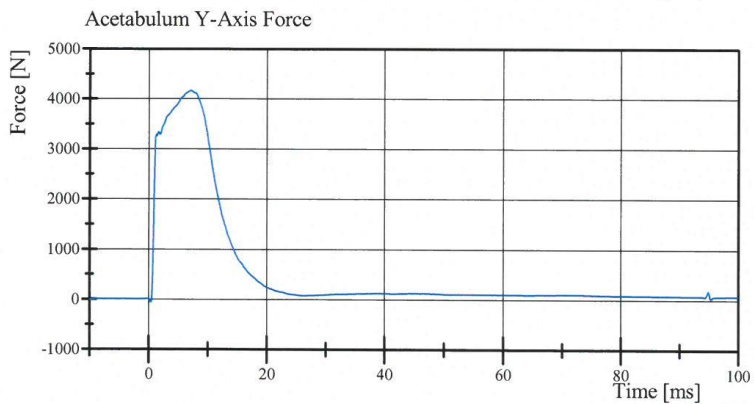
Min: -46.7 g at 7.4 ms



Filter Class: CFC_180

Max: 57.5 g at 1.6 ms

Min: -12.1 g at 21.4 ms



Filter Class: CFC_600

Max: 4,163.3 N at 7.1 ms

Min: -70.8 N at 0.3 ms



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

11.11.2016 12:52:10 473

Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.36 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.9 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,651.2 N	Yes

Test meets specifications.

Comments:

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

11.11.2016 10:52:49 678

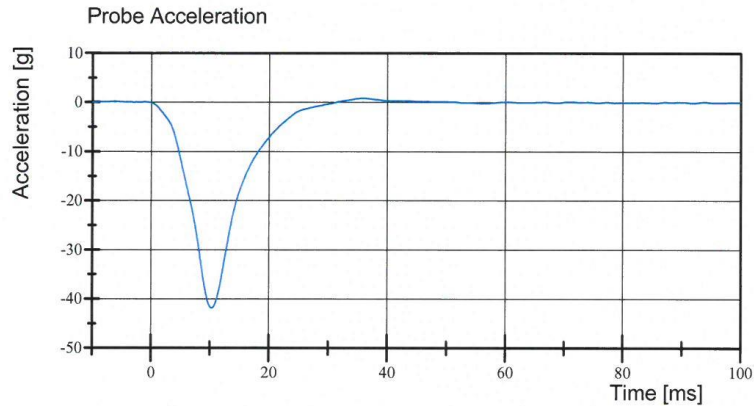


Transportation Research Center Inc.

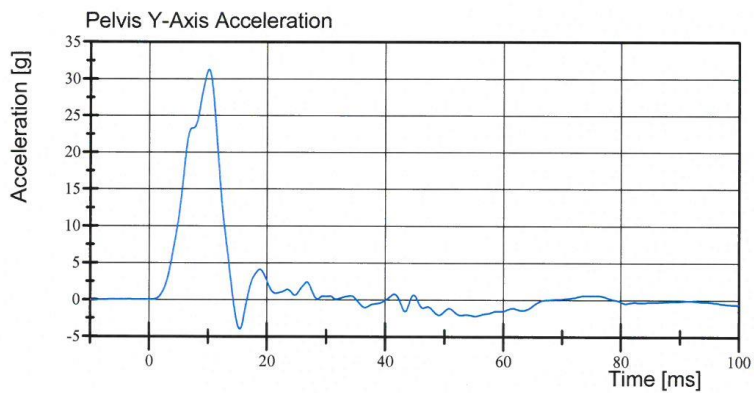
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 49-1

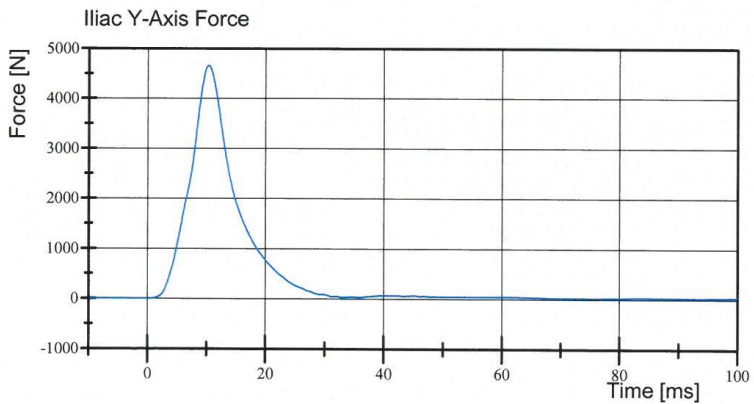
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.8 g at 35.9 ms
Min: -41.9 g at 10.3 ms



Filter Class: CFC_180
Max: 31.2 g at 10.1 ms
Min: -4.0 g at 15.4 ms



Filter Class: CFC_600
Max: 4,651.2 N at 10.3 ms
Min: -0.6 N at -3.0 ms



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

11.11.2016 10:52:59 678

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F030		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	X		P87680	Endevco	21-Sep-16
	Y		P87978	Endevco	21-Sep-16
	Z		P91950	Endevco	06-Oct-16
Redundant Head Accelerometers	X		P91617	Endevco	21-Sep-16
	Y		P94429	Endevco	01-Sep-16
	Z		P94483	Endevco	01-Sep-16
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	29-Sep-16
	Middle	Y	174	FTSS	29-Sep-16
	Lower	Y	173	FTSS	29-Sep-16
Abdomen Load Cells	Front	Y	1441	Denton	18-Mar-16
	Middle	Y	1436	Denton	18-Mar-16
	Rear	Y	1437	Denton	18-Mar-16
Lower Spine Accelerometers (T12)	X		P89126	Endevco	21-Sep-16
	Y		P87139	Endevco	21-Sep-16
	Z		P64884	Endevco	21-Sep-16
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	18-Mar-16

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P90267	Endevco	29-Sep-16
			Y	P93774	Endevco	01-Sep-16
			Z	P91566	Endevco	21-Sep-16
Redundant Head Accelerometers			X	P91615	Endevco	21-Sep-16
			Y	P93762	Endevco	01-Sep-16
			Z	P93761	Endevco	01-Sep-16
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	29-Sep-16
		Middle	Y	1161	Servo	29-Sep-16
		Lower	Y	037	Servo	29-Sep-16
	Abdominal Rib	Upper	Y	1295	Servo	29-Sep-16
		Lower	Y	1136	Servo	29-Sep-16
Lower Spine Accelerometers (T12)			X	P94545	Endevco	15-Sep-16
			Y	P94647	Endevco	21-Sep-16
			Z	P94530	Endevco	1-Sep-16
Acetabulum Load Cell			Y	103-FY	FTSS	13-Jun-16
Iliac Wing Load Cell			Y	287-FY	Denton	22-Mar-16
Pelvis Plug (struck side)				11008	SACO	06-Apr-16
Pelvis Plug (non-struck side)				36473	FTSS	23-Sep-10

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P93521	Endevco	25-Jul-16
	Vehicle Center of Gravity	Y	P46005	Endevco	20-Jul-16
	Vehicle Center of Gravity	Z	P93516	Endevco	25-Jul-16
2	Right Sill at Front Seat	X	P90856	Endevco	13-Oct-16
	Right Sill at Front Seat	Y	P94502	Endevco	10-Nov-16
	Right Sill at Front Seat	Z	P91966	Endevco	29-Sep-16
3	Right Sill at Rear Seat	X	P88463	Endevco	26-Oct-16
	Right Sill at Rear Seat	Y	P88548	Endevco	26-Oct-16
	Right Sill at Rear Seat	Z	P41298	Endevco	10-Nov-16
4	Left Sill at Front Door	Y	P61350	Endevco	26-Oct-16
5	Left Sill at Rear Door	Y	P85273	Endevco	5-Jul-16
6	Left A-Post Lower	Y	P94563	Endevco	3-Nov-16
7	Left A-Post Middle	Y	P94485	Endevco	3-Nov-16
8	Left B-Post Lower	Y	P94518	Endevco	3-Nov-16
9	B-Post Middle	Y	P94511	Endevco	3-Nov-16
10	Front Seat Track	Y	P94566	Endevco	10-Nov-16
11	Rear Seat Track or Structure	Y	P94523	Endevco	31-Oct-16
12	Right Rear Occupant Compartment	Y	P94492	Endevco	27-Jul-16
13	Engine Block	X	P34087	Endevco	12-Oct-16
	Engine Block	Y	P41055	Endevco	12-Oct-16
14	Rear Floorpan Above Axle	X	P94569	Endevco	3-Nov-16
	Rear Floorpan Above Axle	Y	P94561	Endevco	3-Nov-16
	Rear Floorpan Above Axle	Z	P94505	Endevco	3-Nov-16

TABLE 4 – MDB Instrumentation

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