FINAL REPORT NUMBER: SINCAP-TRC-17-006

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

FORD MOTOR CO.
2017 Ford F-250 Crew Cab 4-Dr Pickup
NHTSA NUMBER: M20170206

PREPARED BY:
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Report Date: February 2, 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
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Report Approved By:

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Approval Date: February 2, 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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15. Supplemental Notes		

16. Abstract

This 55 / 28 km/h 90° Moving Deformable Barrier SINCAP Side Impact Test was conducted on the subject 2017 Ford F-250 Crew Cab 4-Dr Pickup, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on December 12, 2016.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.37 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.4° C. The target vehicle post-test maximum crush was 201 mm at Level 1. The test vehicle's performance was as follows:

Driver ATD (ES-2re)

Measurement Description	**Units**	**IARV**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	11
Maximum Thoracic Rib Deflection	mm	44	18.6
Total Abdominal Force	N	2500	541.6
Pubic Symphysis Force	N	6000	-510.5
Lower Spine Acceleration	G	82*	20.5

Passenger ATD (SID-IIs)

Measurement Description	**Units**	**IARV**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	37
Lower Spine Resultant Acceleration	g's	82	14.5
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	449.1
Maximum Thoracic Rib Deflection	mm	38*	5.8
Maximum Abdominal Rib Deflection	mm	45*	1.2

* 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.

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This 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 Crew Cab 4-Dr Pickup. 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 Crew Cab 4-Dr Pickup 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 62.37 km/h (38.75 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on December 12, 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 instrumenation 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	11
Maximum Thoracic Rib Deflection	mm	44	18.6
Combined Abdominal Force	N	2500	541.6
Pubic Symphysis Force	N	6000	-510.5
Lower Spine (T12) Resultant Acceleration	G	82*	20.5

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	37
Lower Spine (T12) Resultant Acceleration	G	82	14.5
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	449.1
Maximum Thoracic Rib Deflection	mm	38*	5.8
Maximum Abdominal Rib Deflection	mm	45*	1.2

* 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 Safety Restraint	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.

Placard Titles say SuperCrew and should be Crew Cab.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20170206
Model Year	2017
Make	Ford
Model	F-250 SRW 4x2 Crew Cab
Body Style	Truck
VIN	1FT7W2A63HEB24676
Body Color	Magnetic
Odometer Reading (km/mi)	5
Engine Displacement (L)	6.2
Type/No. Cylinders	V8
Engine Placement	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	No
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

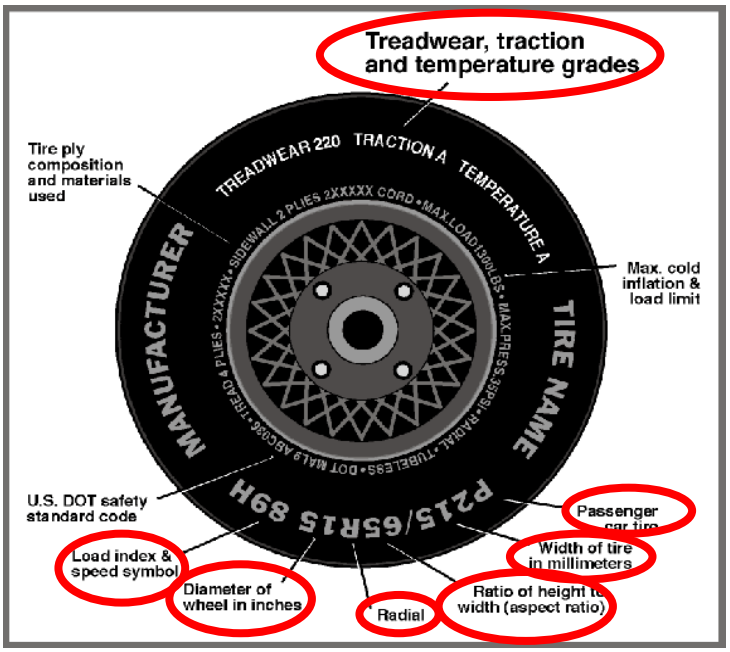
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity DSC)	3	3	N/A	6
Capacity Weight (VCW) (kg)				1756
DSC x 68.04 (kg)				408.24
Cargo Weight (RCLW) (kg)				1347.8

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	N/A	N/A	Yes		N/A	Yes	N/A
Rear or Second Row Seat	N/A	Yes	N/A	N/A	Yes	N/A	N/A
Third Row Seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	550	550
Cold Pressure (kPa)	450	550
Recommended Tire Size	LT245/75R1E	LT245/75R1E
Tire Size on Vehicle	LT245/75R1E	LT245/75R1E
Tire Manufacturer	Michelin	Michelin
Tire Model	LTX M/S2	LTX M/S2
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	Load Range E	Load Range E
Tire Material	Polyester, steel, polyamide	Polyester, steel, polyamide
DOT Safety Code Left	M343 007X 2816	M343 007X 2816
DOT Safety Code Right	M343 007X 2816	M343 007X 2816

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

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	460	460	560	560
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	776.0	600.4		840.0	690.0		850.2	710.2	
Right	kg	789.2	585.4		789.2	685.2		794.0	657.6	
Ratio	%	57	43		54.2	45.8		54.6	45.4	
Totals	kg	1565.2	1185.8	2751.0	1629.2	1375.2	3004.4	1644.2	1367.8	3012

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2751	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125	(B)
Rated Cargo/Luggage Weight (RCLW)[1]	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	3012	(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	976	976	Yes
RF	mm	974	970	Yes
RR	mm	1074	1071	Yes
LR	mm	1070	1068	Yes
Vehicle CG (Aft of Front Axle)	mm	1843	1858	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+31	+16	

***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	61.9
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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

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	12.4
Front Passenger Seat	N/A	N/A	12.2
Front Center Seat*	N/A	N/A	5.5
Struck Side Rear Seat	N/A	N/A	13.5
Non-Struck Side Rear Seat	N/A	N/A	14.0
Rear Center Seat*	N/A	N/A	13.2

* 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	12.4	332	Max	N/A	N/A	N/A
			Mid	329	332	336
			Min	N/A	N/A	N/A
Front Passenger Seat	12.2	334	Max	N/A	N/A	N/A
			Mid	331	334	339
			Min	N/A	N/A	N/A
Front Center Seat*	5.5	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	13.5	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	14.0	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*	13.2	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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

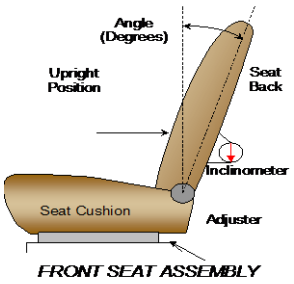
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	254	38	130	19
Front Passenger Seat	254	38	130	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	51.0	28	3.0	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.

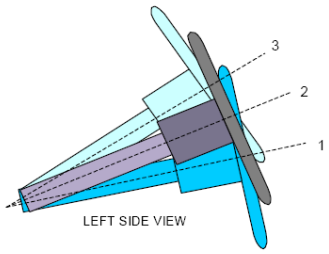
	Total # of Positions	Placed in Position #
Driver Seat	3, Numbered from 0 to 2	2, Uppermost
Rear Seat	1, Fixed	1, Fixed

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

STEERING COLUMN ADJUSTMENT

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

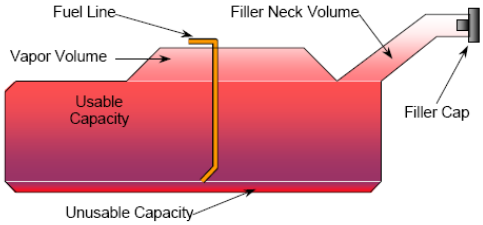


STEERING COLUMN ASSEMBLY

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	21.3	
Geometric Center, Position No. 2	23.3	
Uppermost, Position No. 3	25.3	
Telescoping Steering Wheel Travel		40
Test Position	23.3	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.



VEHICLE FUEL TANK ASSEMBLY

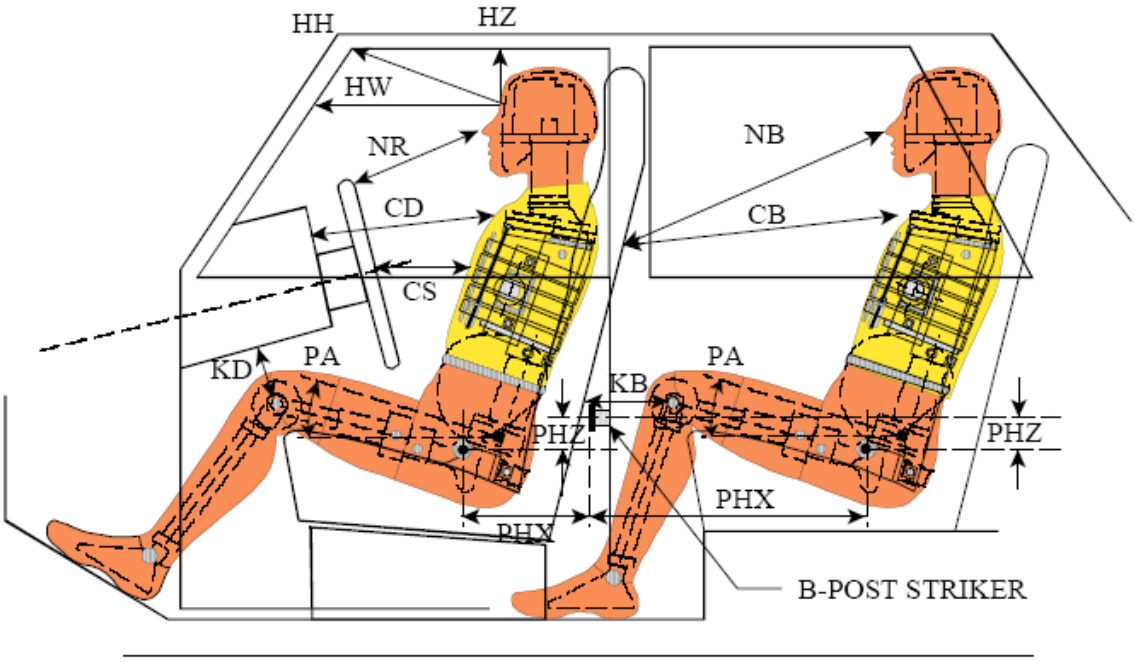
FUEL TANK CAPACITY

	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% ± 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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



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

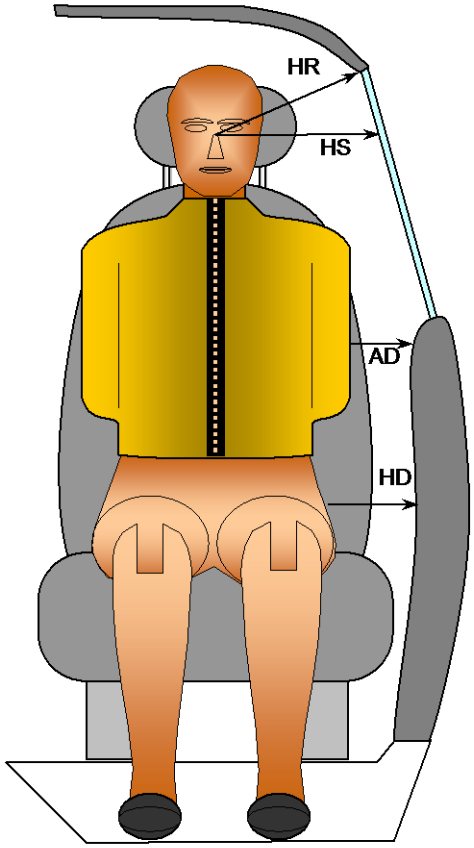
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	516			
HW		Header to Windshield	710			
HZ	HZ	Head to Roof Liner	211		323	
NR	NB	Nose to Rim/Seat Back	483		765	
CD	CB	Chest to Dash/Seat Back	640		727	
CS		Chest to Steering Wheel	355			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	148	32.0	425	0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	132	32.2	431	0
PAX°	PAX°	Pelvic Tilt Angle X		0.6		0.2
	PAY°	Pelvic Tilt Angle Y				19.4
PHX	PHX	Hip Point to Striker (X-Axis)	308		201	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	54		45	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

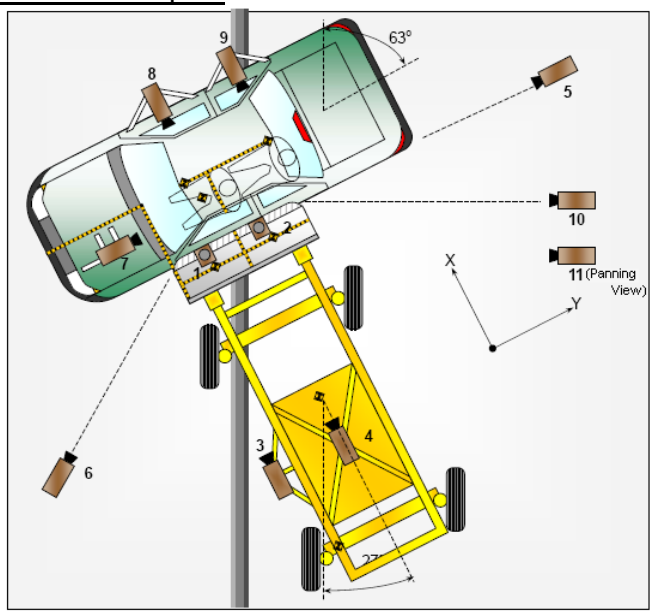


FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	200	283
HS	Head to Side Window	mm	337	391
AD	Arm to Door	mm	126	175
HD	H-Point to Door	mm	158	204

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



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	7705	1320	20	1000
6	Left Front	2905	5302	1310	25	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				16	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

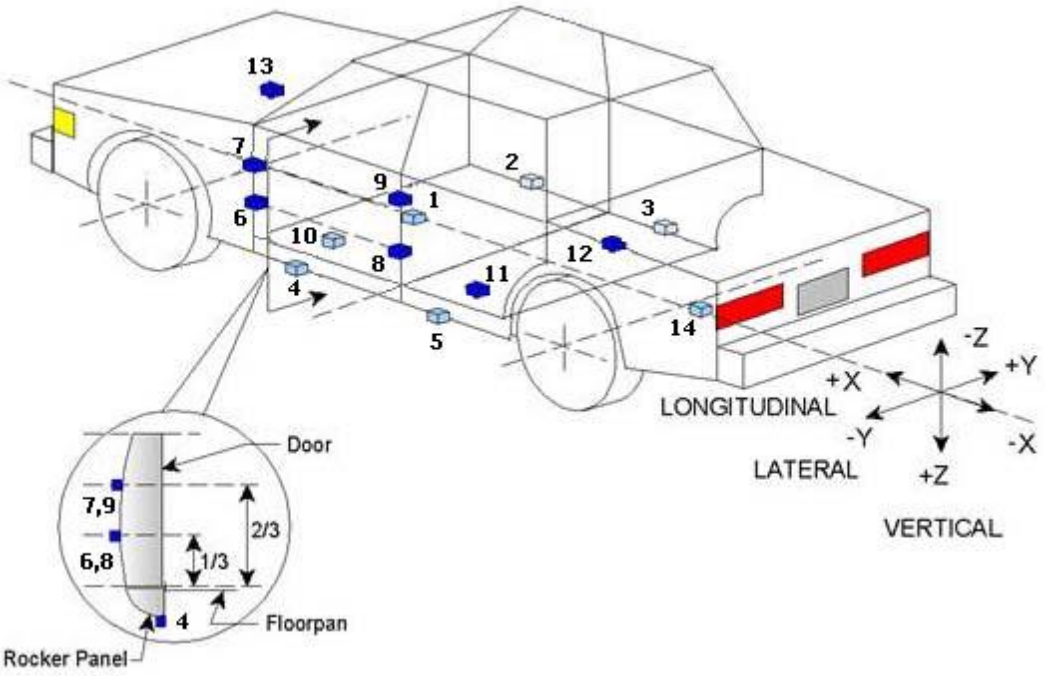
Reference: Impact Point projected to Ground; +X = To Front of MDB +Y = To Right of MDB; +Z = Down
*All measurements accurate to ± 6 mm.
If applicable, explain why camera(s) did not operate as intended: Camera 3 and 4 triggered early.

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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



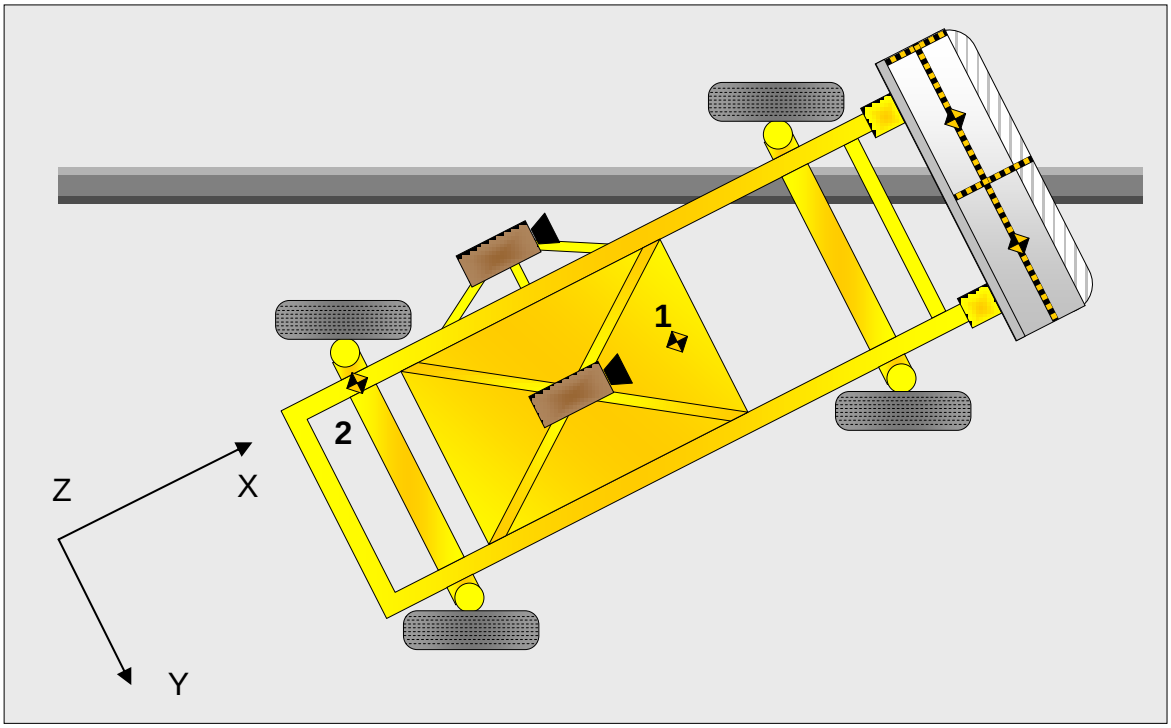
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	4280	-25	-762
2	Right Sill at Front Seat	4135	740	-565
3	Right Sill at Rear Seat	2850	750	-685
4	Left Sill at Front Door	4085	-740	-565
5	Left Sill at Rear Door	2865	-730	-600
6	A-Post Lower	4690	-920	-683
7	A-Post Middle	4705	-910	-1185
8	B-Post Lower	3470	-910	-835
9	B-Post Middle	3470	-910	-1280
10	Front Seat Track	4015	-645	-655
11	Rear Seat Structure	2815	-450	-704
12	Right Rear Occ. Compartment	2850	450	-705
13	Engine Block	5250	-150	-1039
14	Rear Above Axle	1245	0	-871

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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	Head liner, SCAB	SCAB
Top of Head	Head liner	SCAB
Left Side of Head	Head liner, SCAB	SCAB
Back of Head	Head liner, SCAB, head rest	C-pillar trim
Left Shoulder	SCAB, door panel	SCAB, door panel
Upper Torso	Seat back bolster, SCAB	Door panel
Lower Torso	Seat back bolster	Door panel
Left Hip	Seat cushion bolster, SAB, 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	Moderate Deformation
Sill Separation	None
Windshield Damage	None
Side Window Damage	Driver window shattered, remained in place
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

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	Yes	Yes	No	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		4060
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		500
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+8
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

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	1106

MDB WEIGHTS

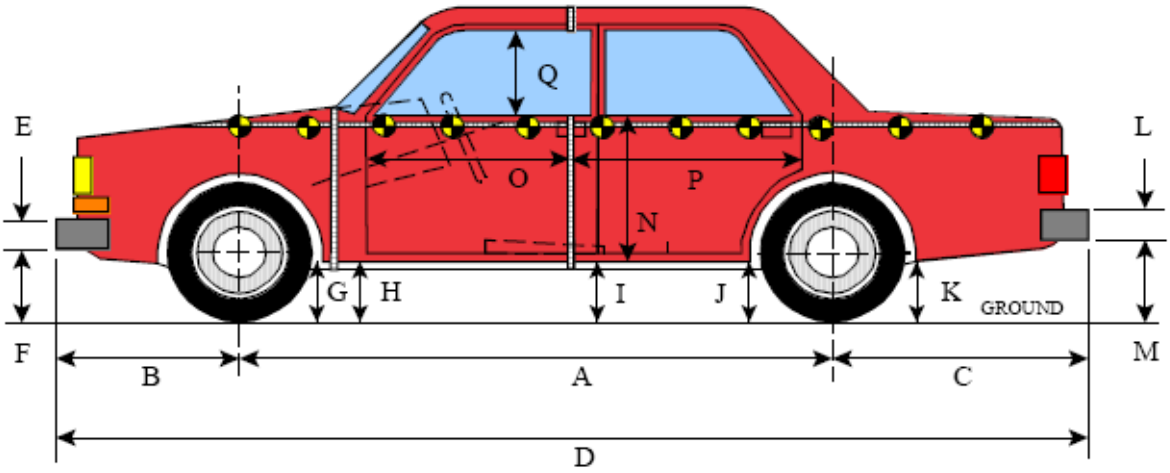
	Units	Front Axle	Rear Axle	Total
Left	kg	414.2	263.6	677.8
Right	kg	366.4	318.0	684.4
Ratio	%	57.3	42.7	100.0
Totals	kg	780.6	581.6	1362.2

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.37
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.37
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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



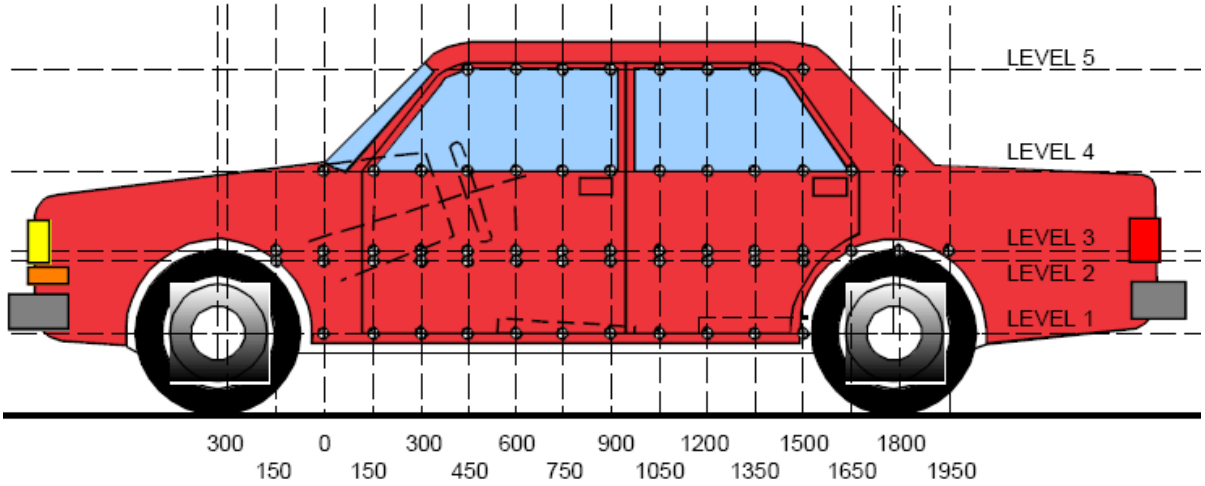
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	4060	4060	0
B	Front Axle to Front Surface of Vehicle	950	950	0
C	Rear Axle to Rear Surface of Vehicle	1330	1330	0
D	Total Length at Centerline	6340	6340	0
E	Front Bumper Thickness	244	244	0
F	Front Bumper Bottom to Ground	400	397	3
G	Sill Height at Front Wheel Well	507	515	-8
H	Sill Height at Front Door Leading Edge	511	540	-29
I	Sill Height at B-Pillar	540	575	-35
J1	Sill Height at Rear Wheel Well	550	570	-20
J2	Pinch Weld Height at Rear Wheel Well	485	510	-25
K	Sill Height Aft of Rear Wheel Well	620	630	-10
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	620	630	-10
N	Sill Height to Window Bottom Sill	860	850	10
O	Front Door Leading Edge to Impact CL	695	690	5
P	Rear Door Trailing Edge to Impact CL	1535	1500	35
Q	Front Window Opening	520	532	-12
R	Right Side Length	6180	6180	0
S	Left Side Length	6180	6160	20
T	Vehicle Width	2022	2022	0

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	620	201	1500
2	Driver Hip Point	889	121	1500
3	Mid-Door	854	159	1650
4	Window Sill	1212	59	1500
5	Window Top	1868	-5	900

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 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

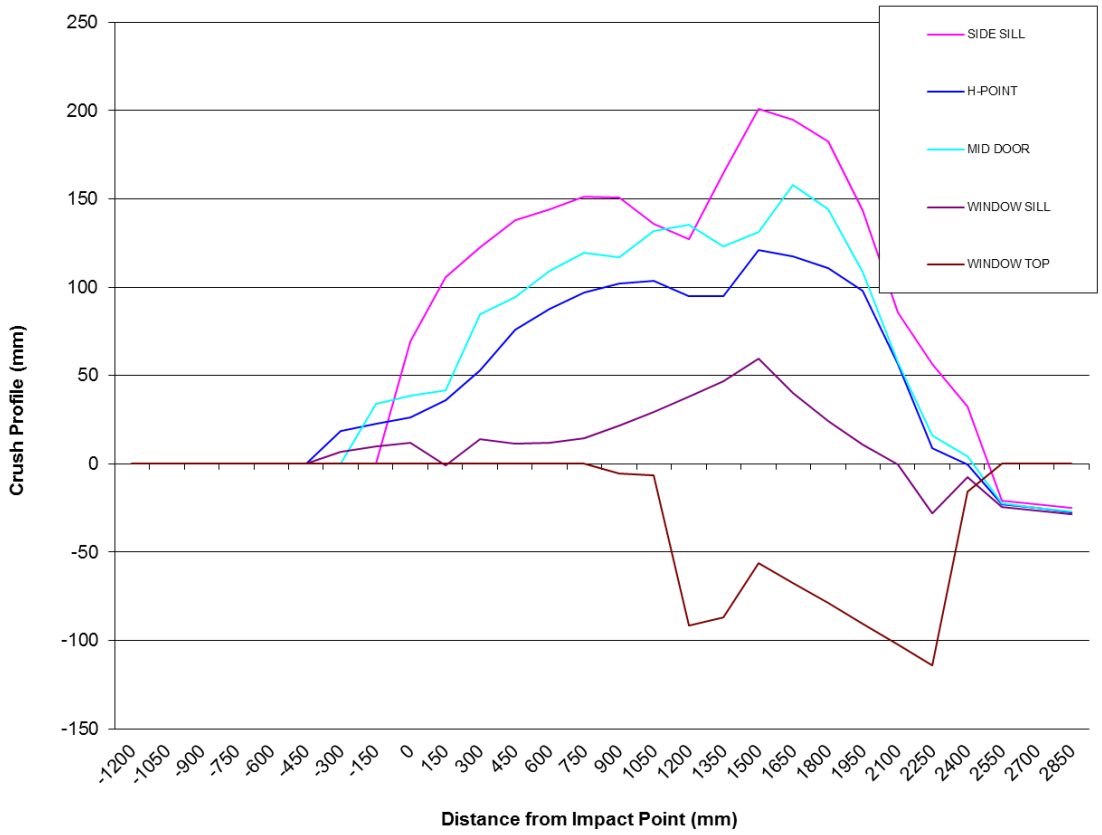
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-300	0	1015	0	958	0	0	997	0	952	0	0	18	0	6	0
-150	0	1009	1015	966	0	0	986	981	956	0	0	23	34	10	0
0	997	996	1007	972	0	927	970	968	960	0	70	26	39	12	0
150	984	999	997	978	0	878	963	955	979	0	106	36	42	-1	0
300	980	1002	998	982	0	857	949	913	968	0	123	53	85	14	0
450	982	1005	1000	986	0	844	929	905	975	0	138	76	95	11	0
600	984	1007	1001	990	0	840	919	892	978	0	144	88	109	12	0
750	986	1009	1003	993	0	834	912	883	979	0	152	97	120	14	0
900	987	1010	1005	997	737	836	908	888	975	742	151	102	117	22	-5
1050	988	1012	1006	999	741	852	909	874	970	747	136	103	132	29	-6
1200	988	1013	1007	1002	744	861	918	872	964	836	127	95	135	38	-92
1350	988	1014	1009	1004	746	823	920	886	957	833	165	94	123	47	-87
1500	987	1012	1005	1003	749	786	891	874	944	805	201	121	131	59	-56
1650	988	1012	1006	1004	752	793	895	847	964	819	195	117	159	40	-67
1800	988	1013	1006	1005	754	806	902	862	980	833	182	111	144	25	-79
1950	989	1013	1006	1005	756	845	915	897	994	847	144	98	109	11	-91
2100	989	1013	1006	1001	758	903	956	949	1002	860	86	57	57	-1	-102
2250	989	1012	1006	1003	760	933	1003	990	1031	874	56	9	16	-28	-114
2400	988	1010	1004	1005	735	956	1011	1000	1012	750	32	-1	4	-7	-15
2550	983	1004	998	1000	0	1004	1027	1020	1025	0	-21	-23	-22	-25	0
2700	986	1003	997	1001	0	1009	1028	1022	1028	0	-23	-25	-25	-27	0
2850	992	1017	998	1004	0	1017	1032	1025	1030	0	-25	-15	-27	-26	0
3000	1009	1037	1015	1008	0	1037	1037	1044	1030	0	-28	0	-29	-22	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.

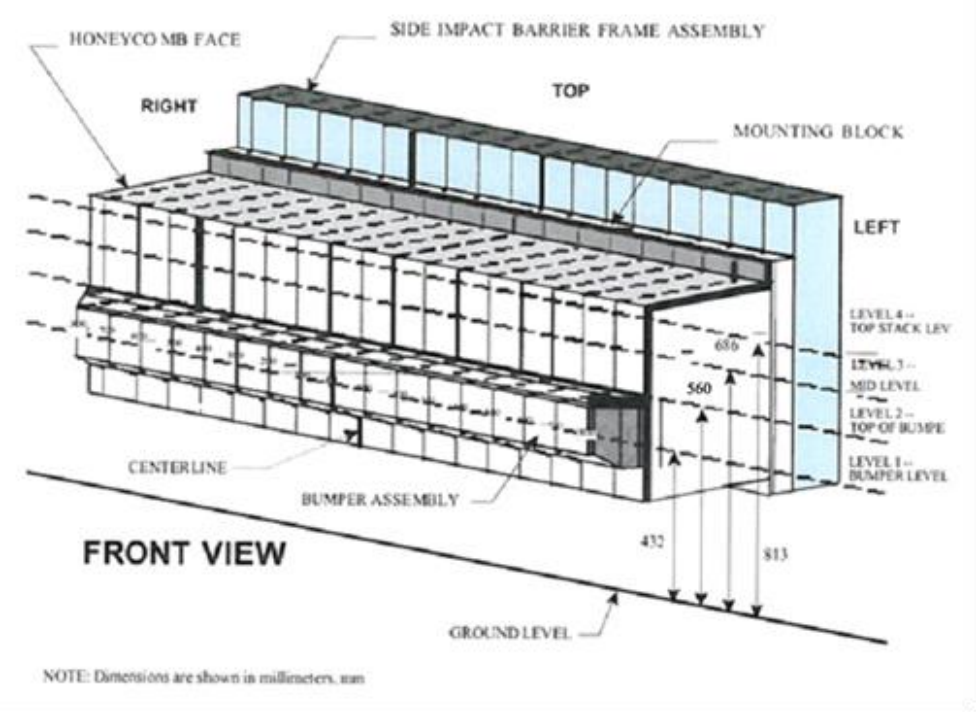
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

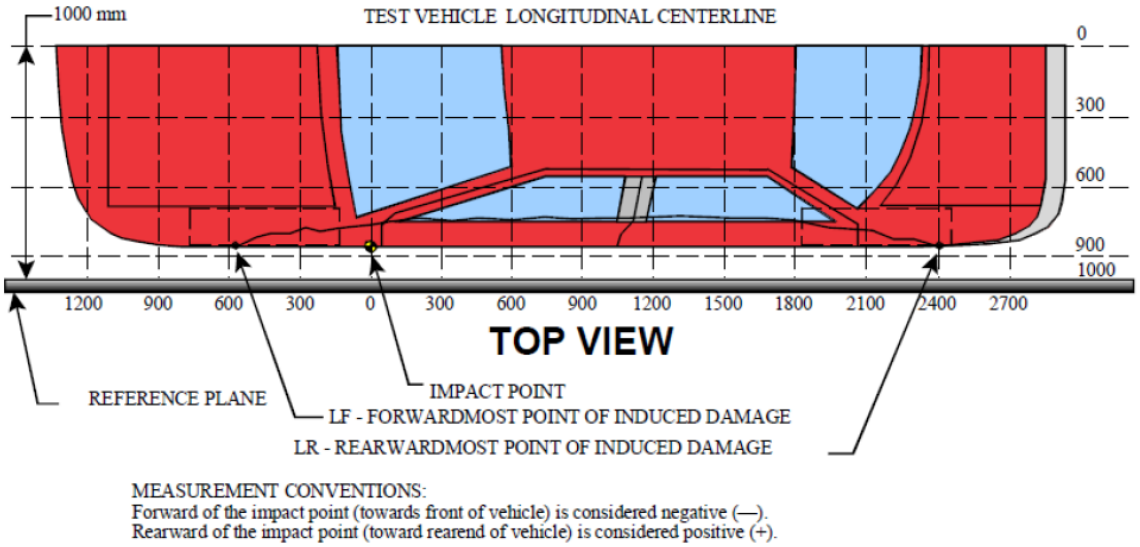
Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Right	116
B	Top of Bumper	560	800	Right	179
C	Mid-Level	686	800	Right	205
D	Top of Stack	813	800	Right	240

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	114	116	110	104	99	94	93	91	90	89	89	86	85	83	82	85	83
2	179	139	121	113	113	119	118	116	112	111	109	107	108	109	111	113	114
3	205	176	156	135	141	145	175	172	154	137	137	132	135	135	133	138	165
4	240	201	183	173	203	189	197	177	160	149	143	134	134	135	150	182	216

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (—).
Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

VEHICLE DAMAGE PROFILE DISTANCES[1]

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2400	1	956	988	32
2	1800	1	806	988	182
3	1350	1	823	988	165
4	750	1	864	986	152
5	300	1	857	980	123
6	-300	2	997	1015	18

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	166	382	216
2	500 mm Left of Center	3	247	383	135
		4	248	383	135
3	200 mm Left of Center	4	241	384	143
4	200 mm Right of Center	4	187	384	197
5	500 mm Right of Center	4	211	385	173
6	800 mm Right of Center	4	145	385	240

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

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

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16

Test Time: 16:33 **Temperature:** 21.4°C

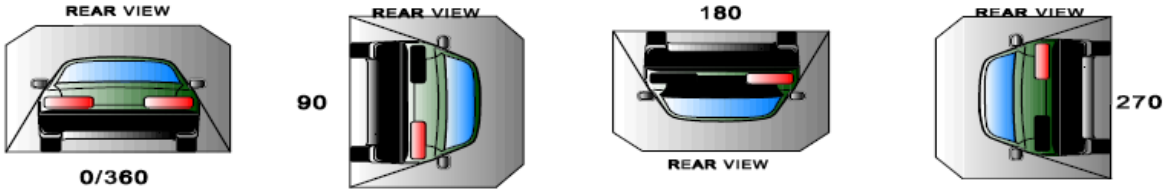
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable is 5 ounces)

C. For the following 25 minutes: 0 oz.
(Maximum allowable is 1 ounce/minute)

D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

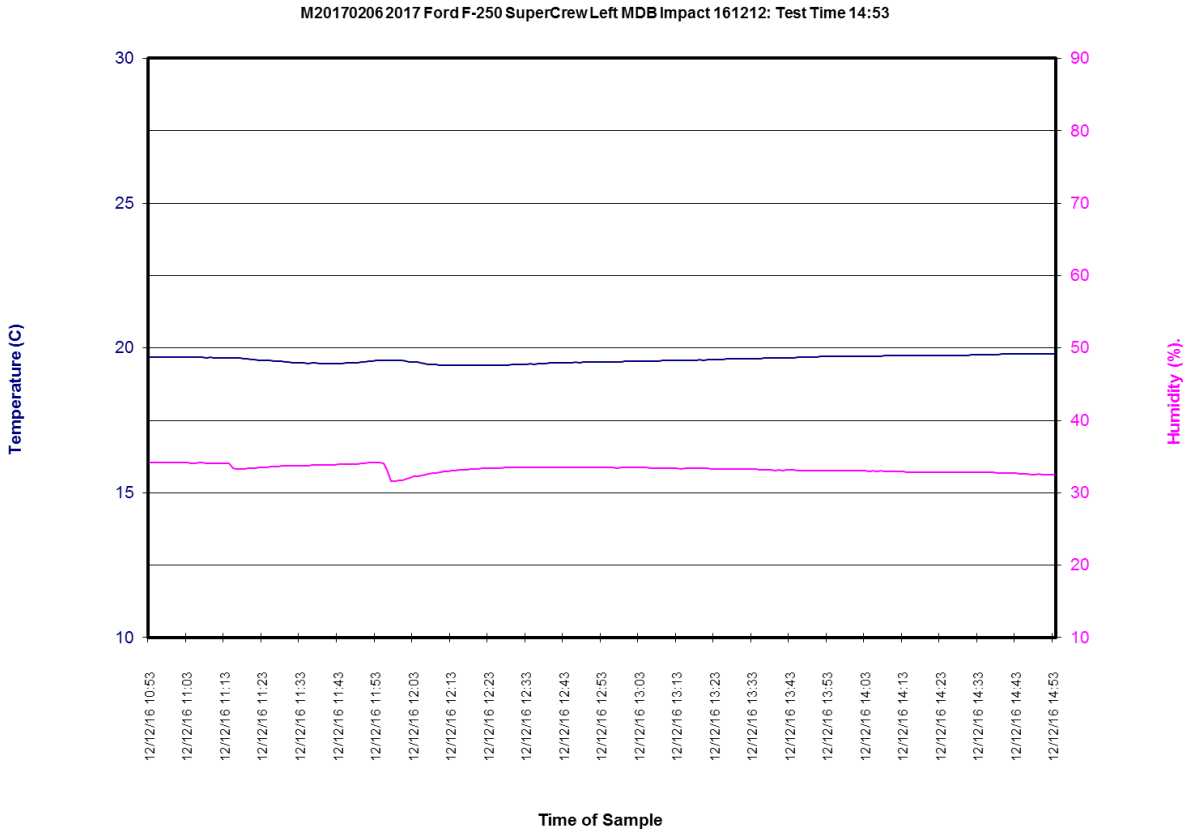
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2017 Ford F-250 Crew Cab 4-Dr Pickup NHTSA No.: M20170206
Test Program: SINCAP Side Impact Test Date: 12/12/16



APPENDIX A[1]

PHOTOGRAPHS

[1]Placard Titles say SuperCrew and should be Crew Cab throughout Appendix A.

TABLE OF PHOTOGRAPHS

No.	Description	Page
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004	Post-Test Frontal View of Test Vehicle	**A-7**
005	Pre-Test Left Front ¾ View of Test Vehicle	**A-8**
006	Post-Test Left Front ¾ View of Test Vehicle	**A-8**
007	Pre-Test Left Side View of Test Vehicle	**A-9**
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009	Pre-Test Left Rear ¾ View of Test Vehicle	**A-10**
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012	Post-Test Rear View of Test Vehicle	**A-11**
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014	Post-Test Right Side View of Test Vehicle	**A-12**
015	Pre-Test Overhead View of Test Area	**A-13**
016	Post-Test Overhead View of Test Area	**A-13**
017	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	**A-14**
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019	Pre-Test Close-Up View of Impact Point Target	**A-15**
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032	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	**A-22**
033	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	**A-22**
034	Pre-Test Placement of Driver Dummy's Feet	**A-23**
035	Pre-Test View of Belt Anchorage for Driver Dummy	**A-23**
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039	Pre-Test Close-Up Left Side View of Driver Seat Track	**A-25**
040	Pre-Test Close-Up Left Side View of Driver Seat Back	**A-26**
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001 As-Delivered Right Front ¾ View of Test Vehicle

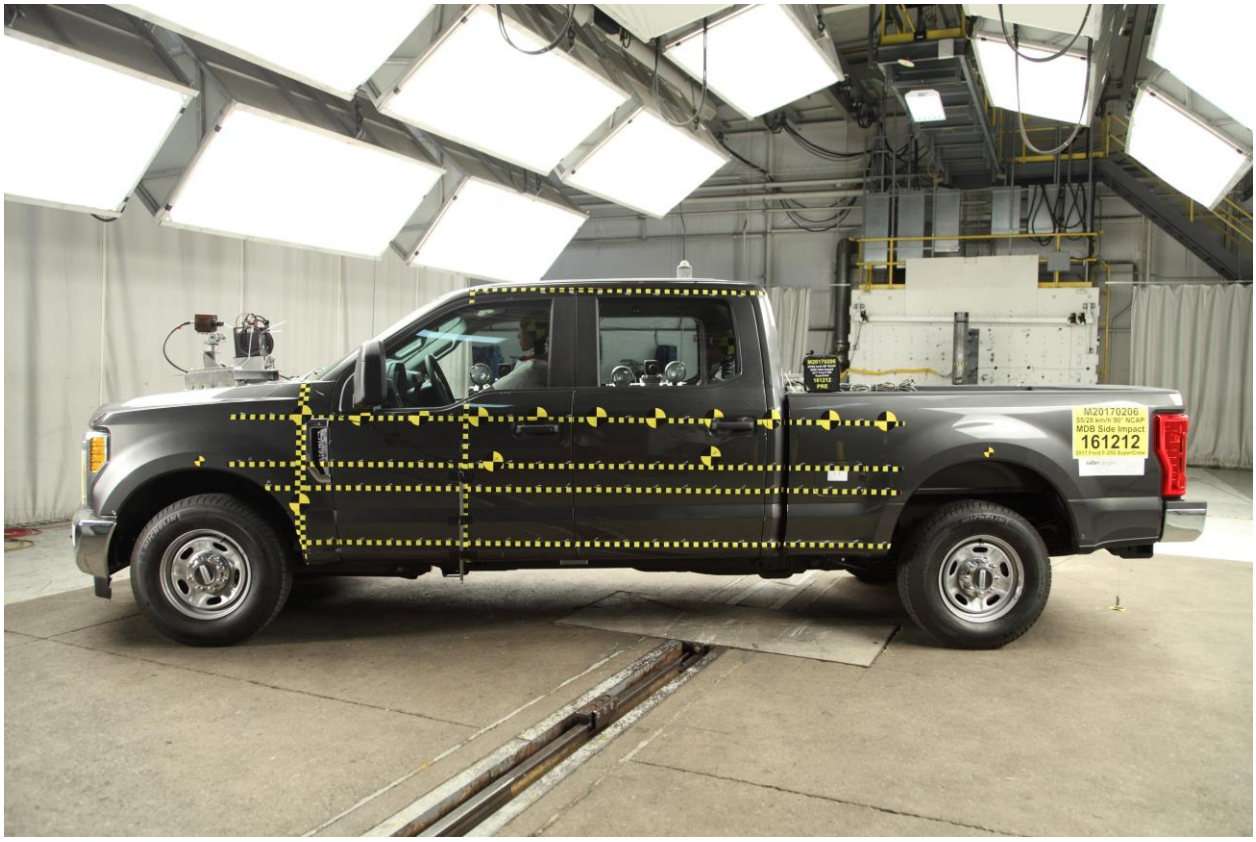
002 As-Delivered Left Rear ¾ View of Test Vehicle

003 Pre-Test Frontal View of Test Vehicle

004 Post-Test Frontal View of Test Vehicle

005 Pre-Test Left Front ¾ View of Test Vehicle

006 Post-Test Left Front ¾ View of Test Vehicle



007 Pre-Test Left Side View of Test Vehicle

008 Post-Test Left Side View of Test Vehicle

009 Pre-Test Left Rear ¾ View of Test Vehicle

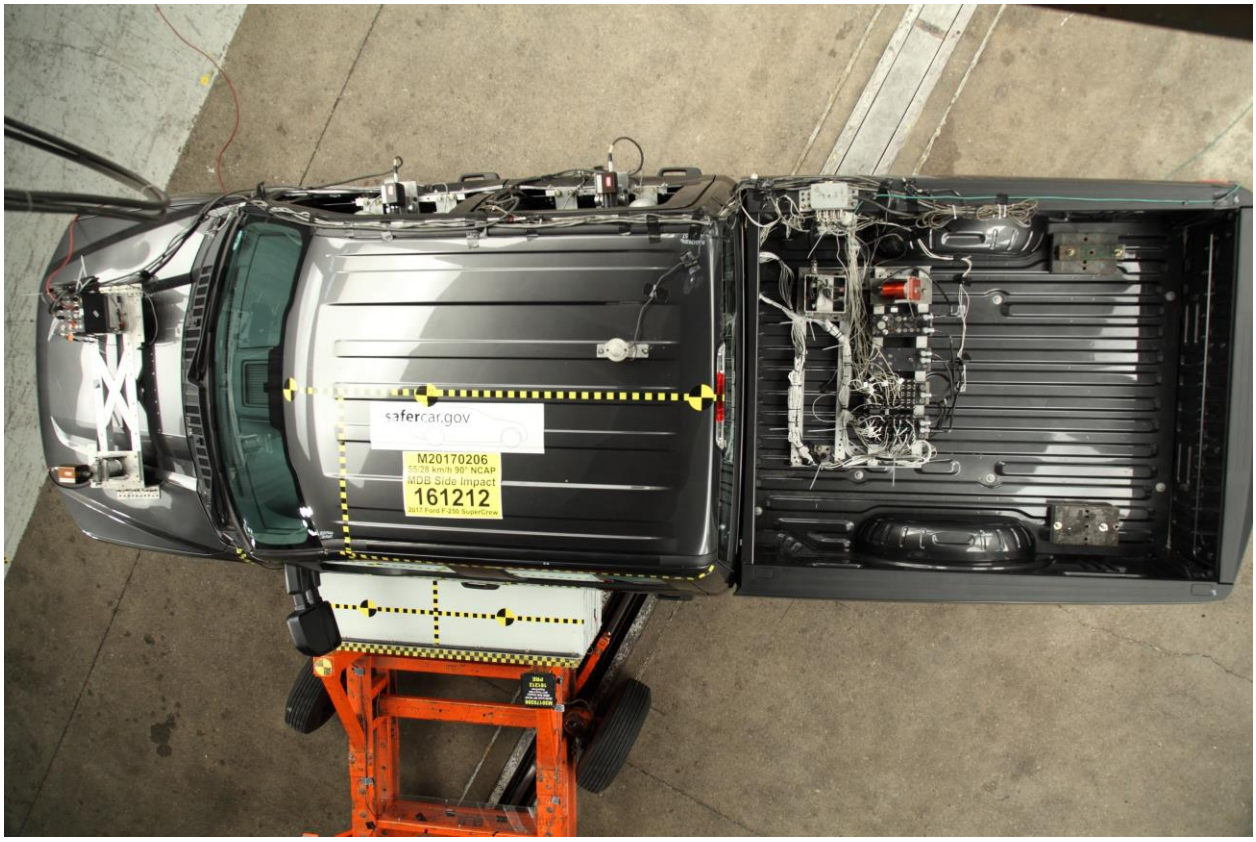
010 Post-Test Left Rear ¾ View of Test Vehicle

011 Pre-Test Rear View of Test Vehicle

012 Post-Test Rear View of Test Vehicle

013 Pre-Test Right Side View of Test Vehicle

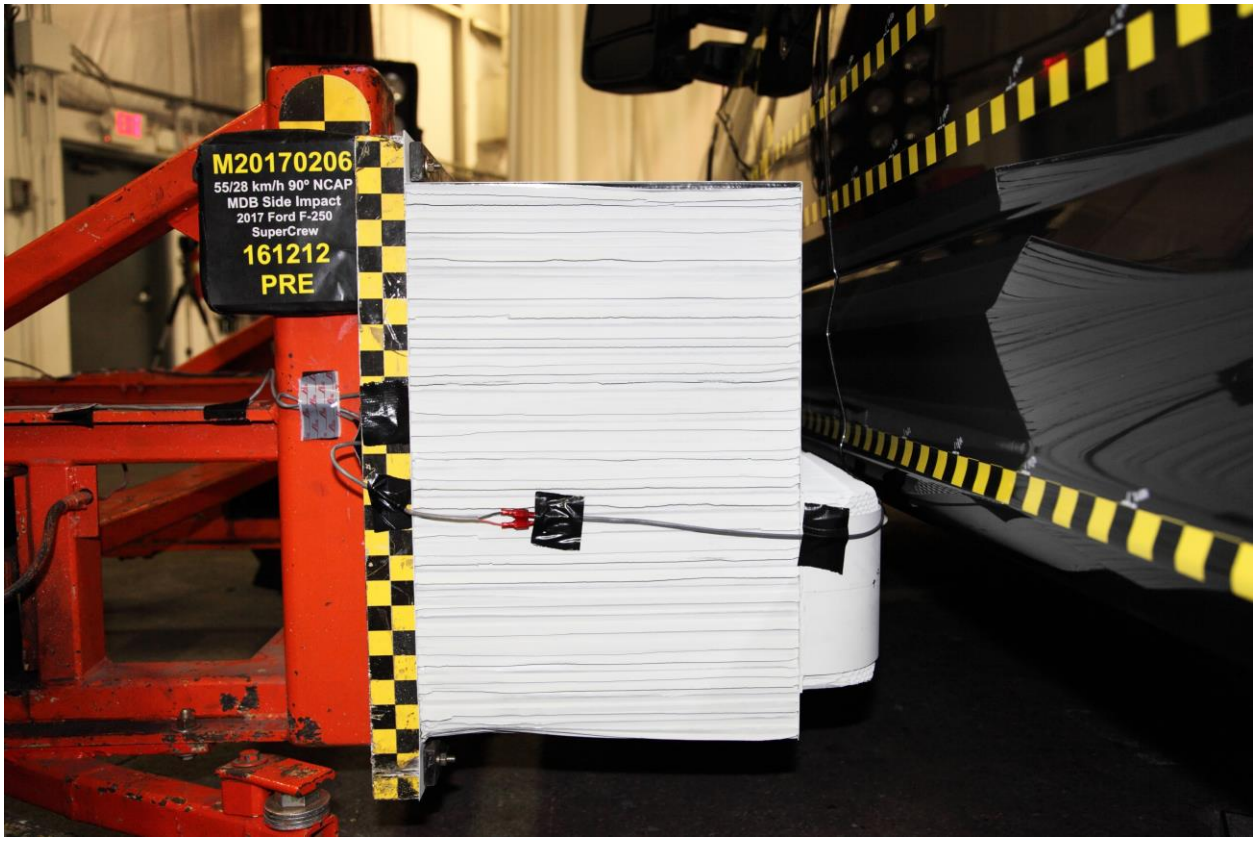
014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area

016 Post-Test Overhead View of Test Area

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



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

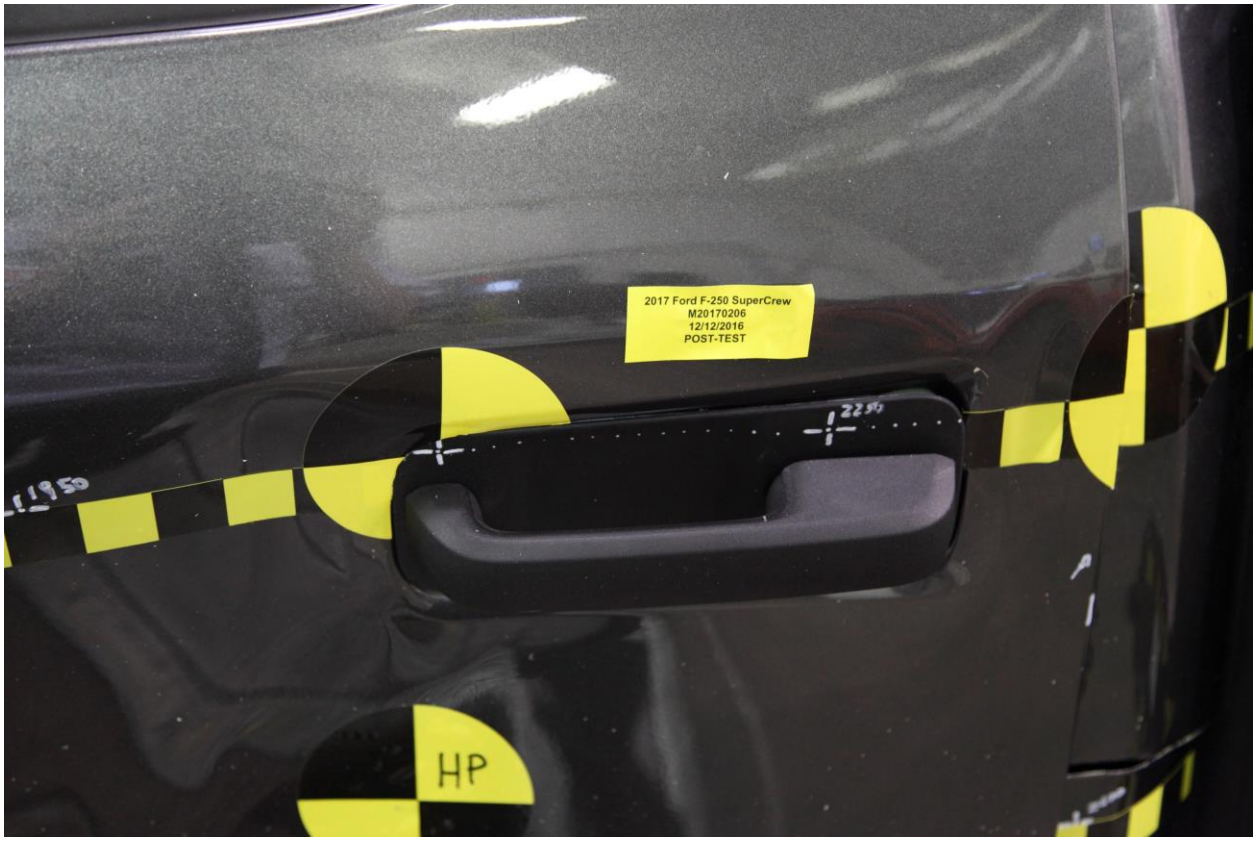
019 Pre-Test Close-Up View of Impact Point Target

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

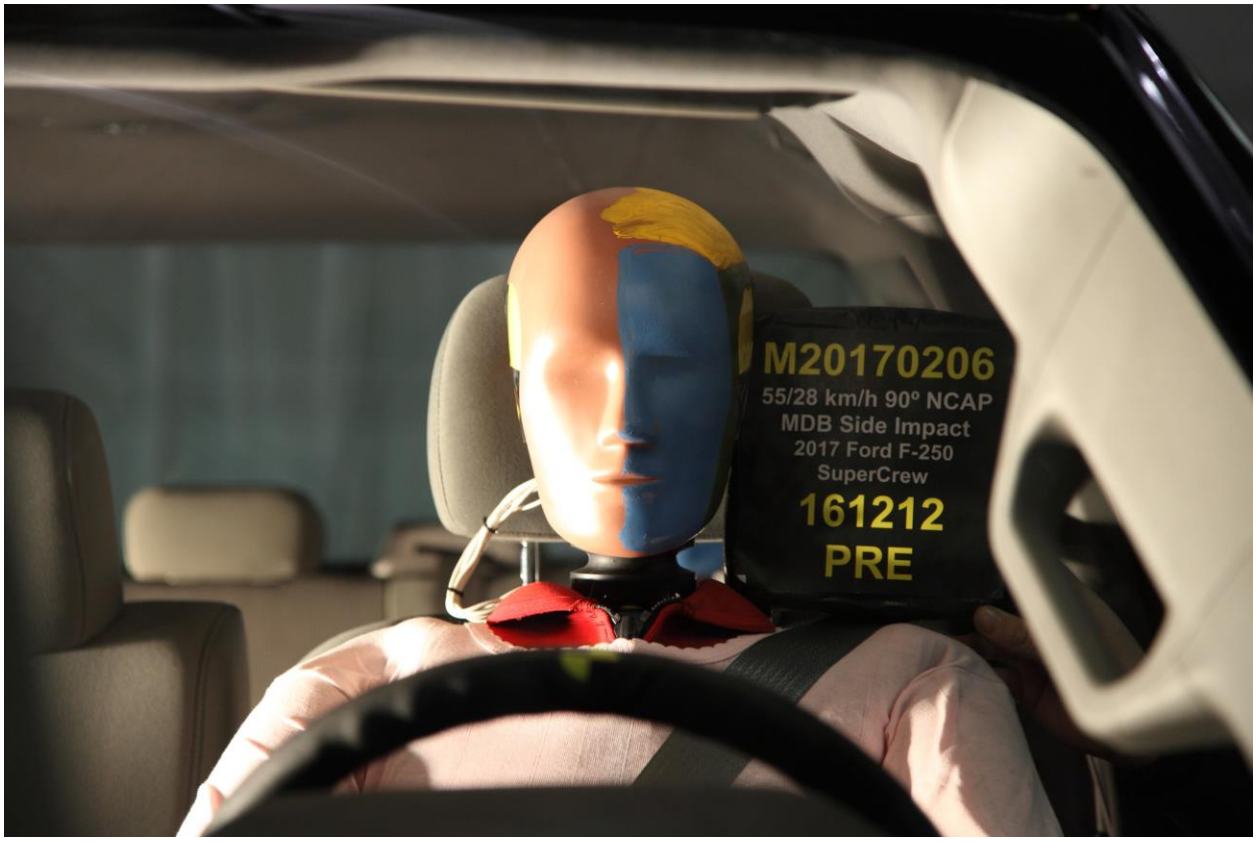
021 Pre-Test Left Front Door Latch Close-Up

022 Post-Test Left Front Door Latch Close-Up

023 Pre-Test Left Rear Door Latch Close-Up



024 Post-Test Left Rear Door Latch Close-Up



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

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

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

Intentionally Left Blank

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

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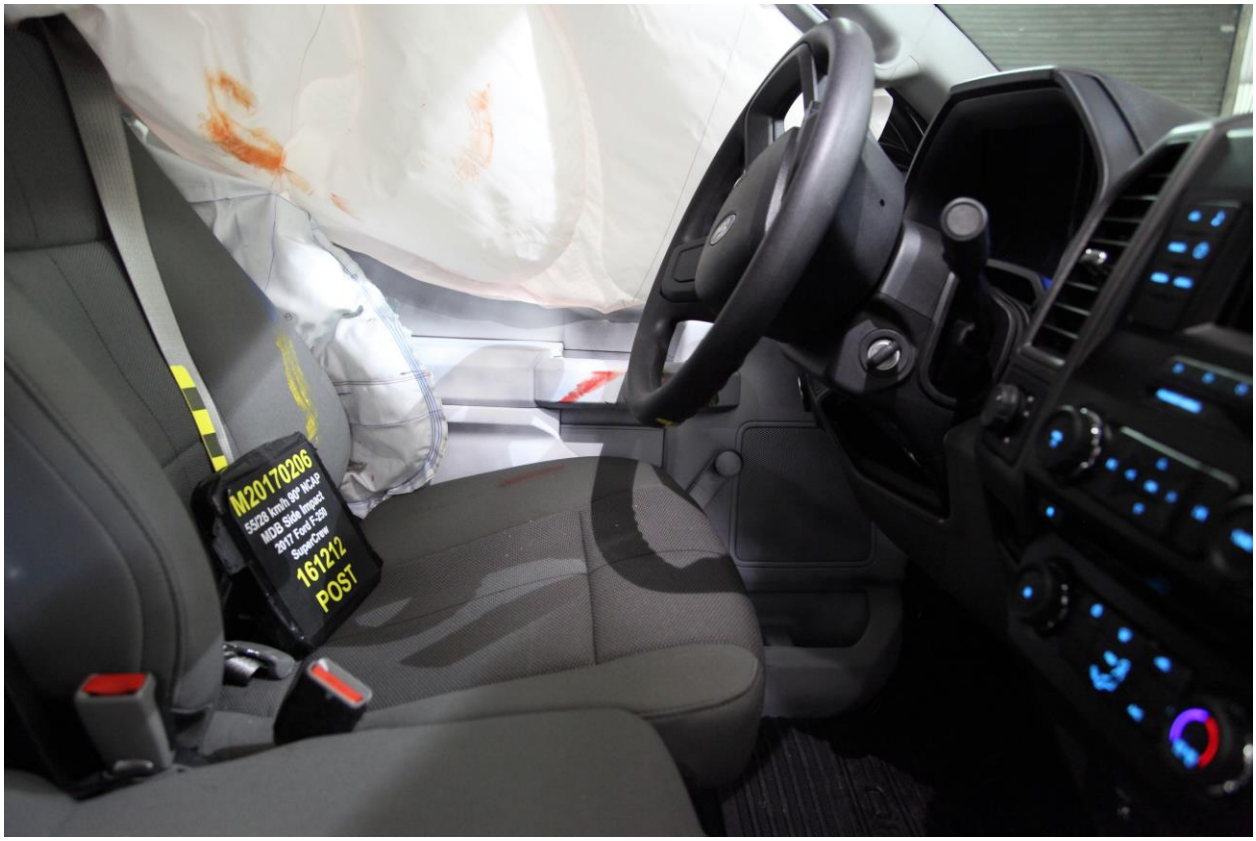
042 Pre-Test Driver Dummy and Door Clearance View

043 Post-Test Driver Dummy and Door Clearance View

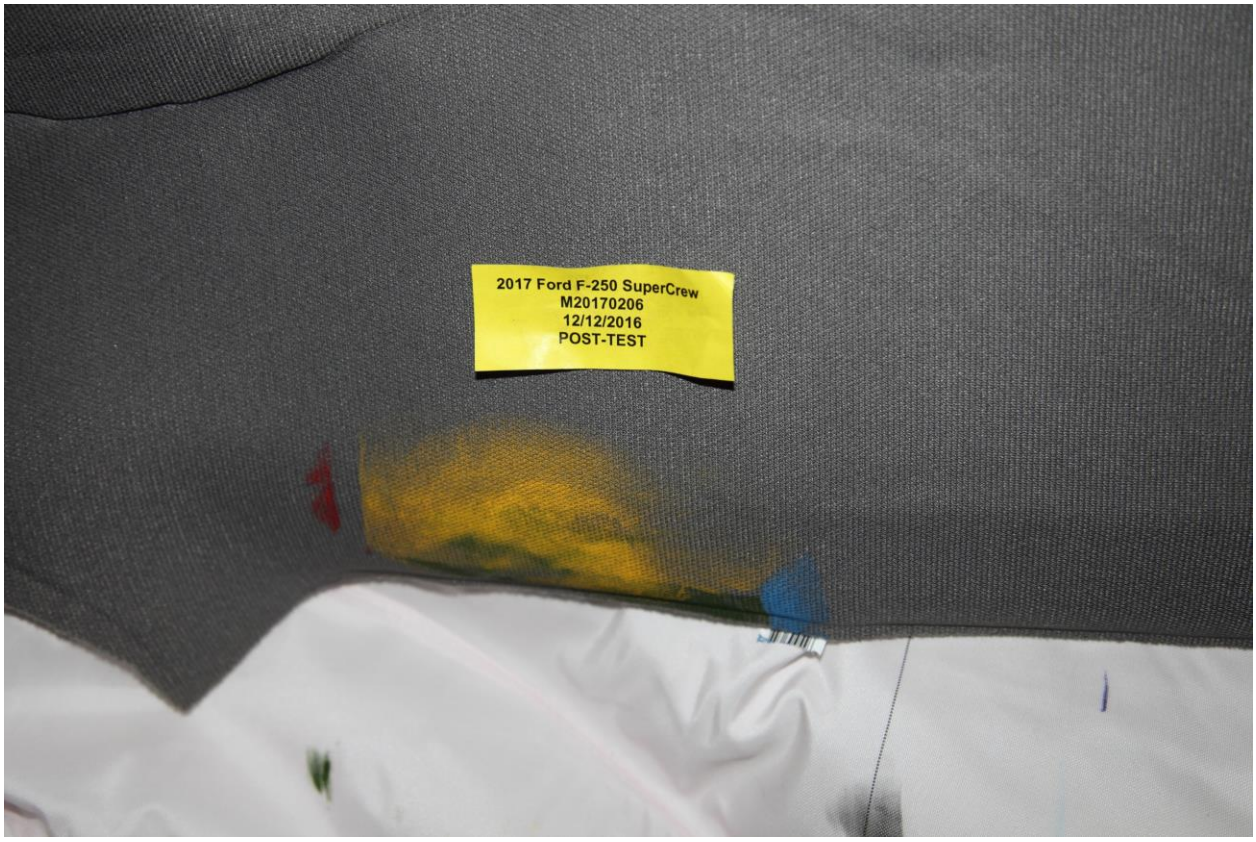
044 Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment

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

046 Pre-Test Driver Inner Door Panel View



047 Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations

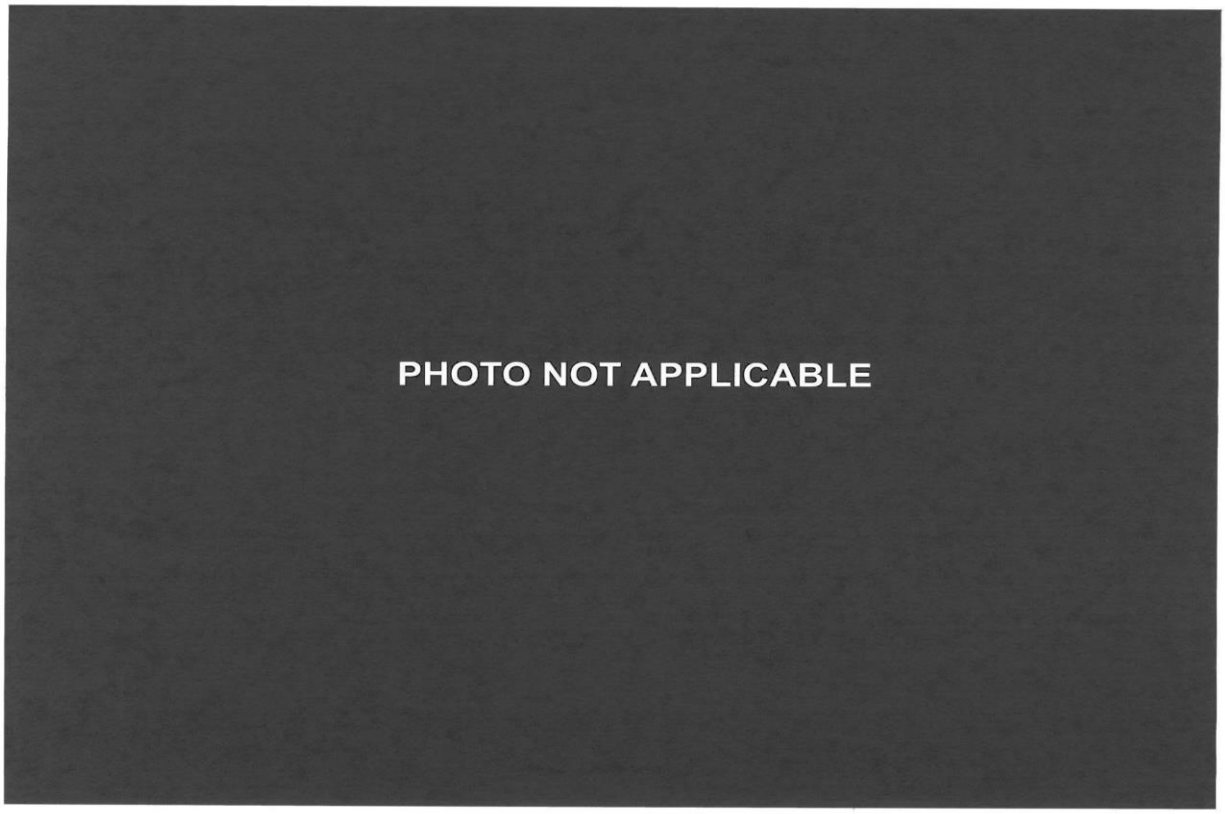


048 Post-Test Driver Dummy Close-Up Head Contact with Vehicle View

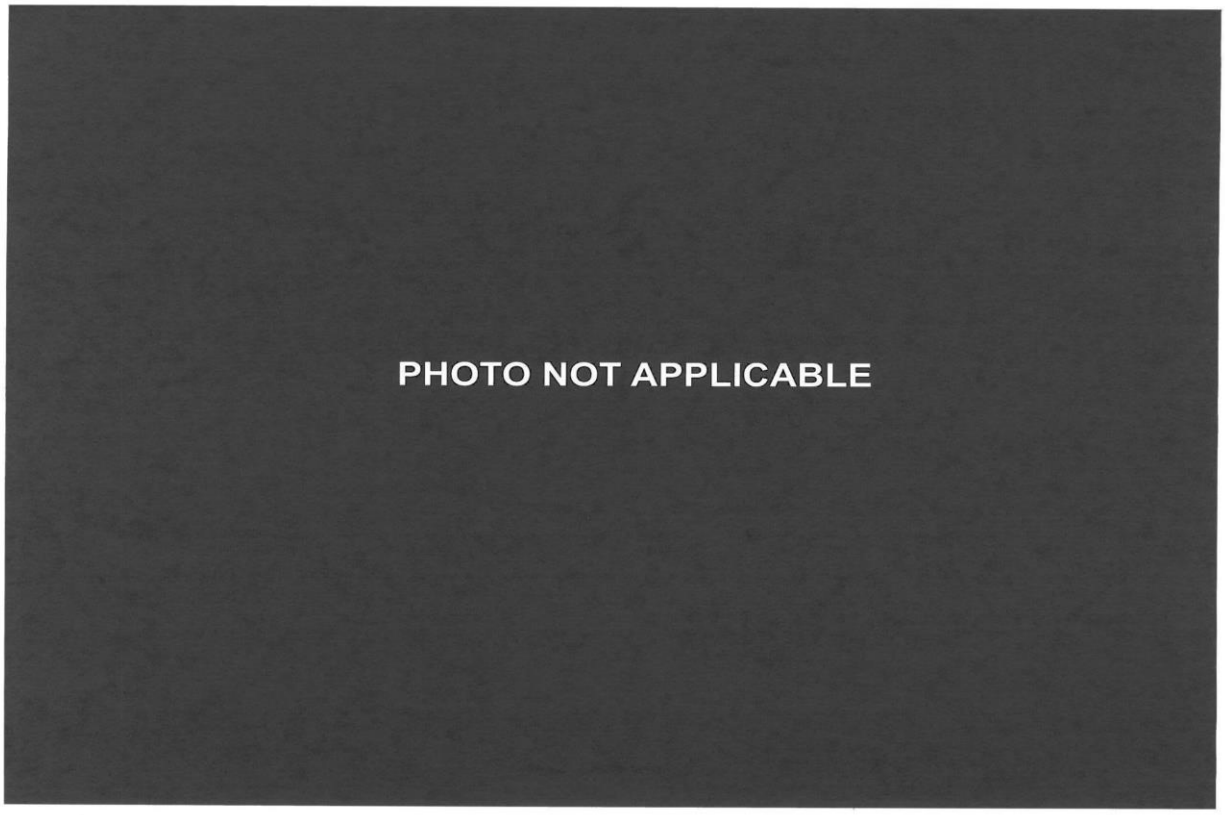
049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

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

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

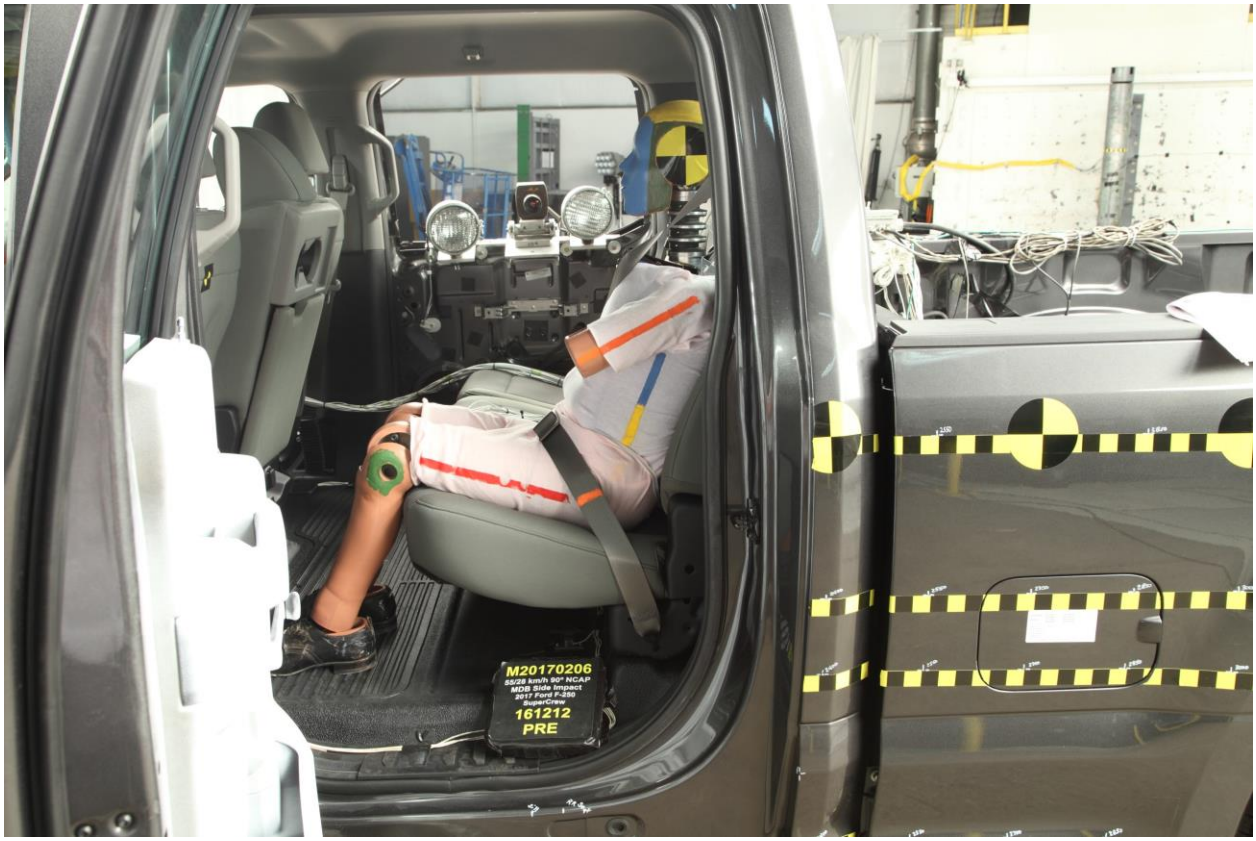


052 Post-Test Driver Dummy Close-Up Pelvis Contact View



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

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



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

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

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

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

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

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

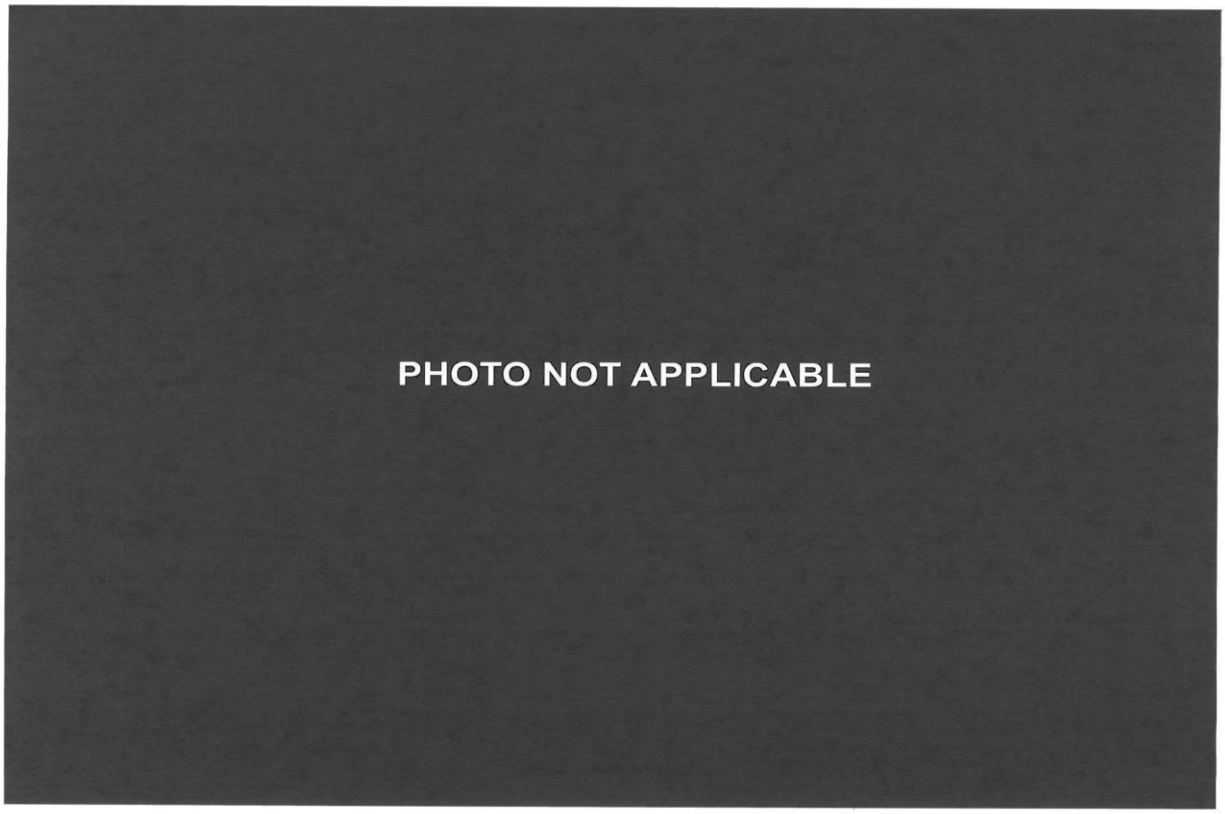
061 Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

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

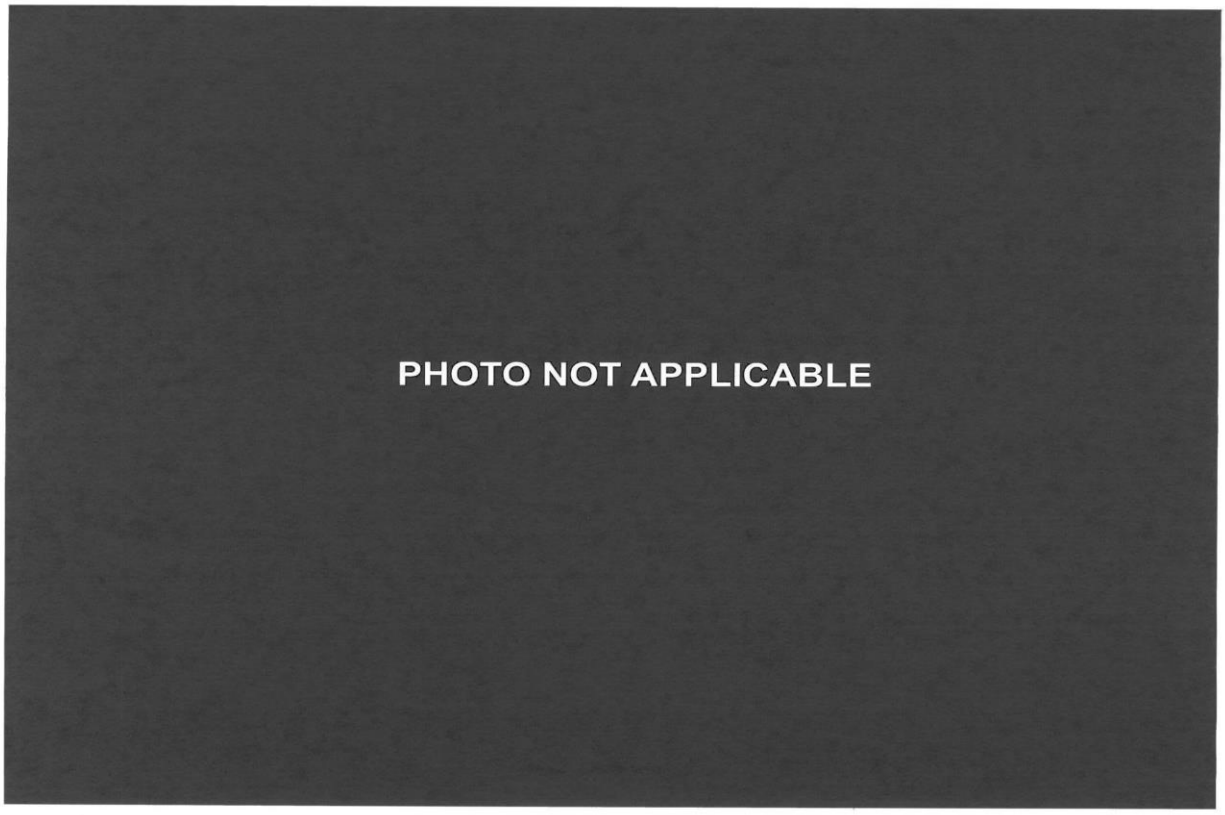
063 Pre-Test View of Rear Passenger Dummy Head Showing Dummy Head is Level

064 Pre-Test Placement of Rear Passenger Dummy Feet

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



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



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

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

Intentionally Left Blank

069 Pre-Test Passenger Dummy and Door Clearance View

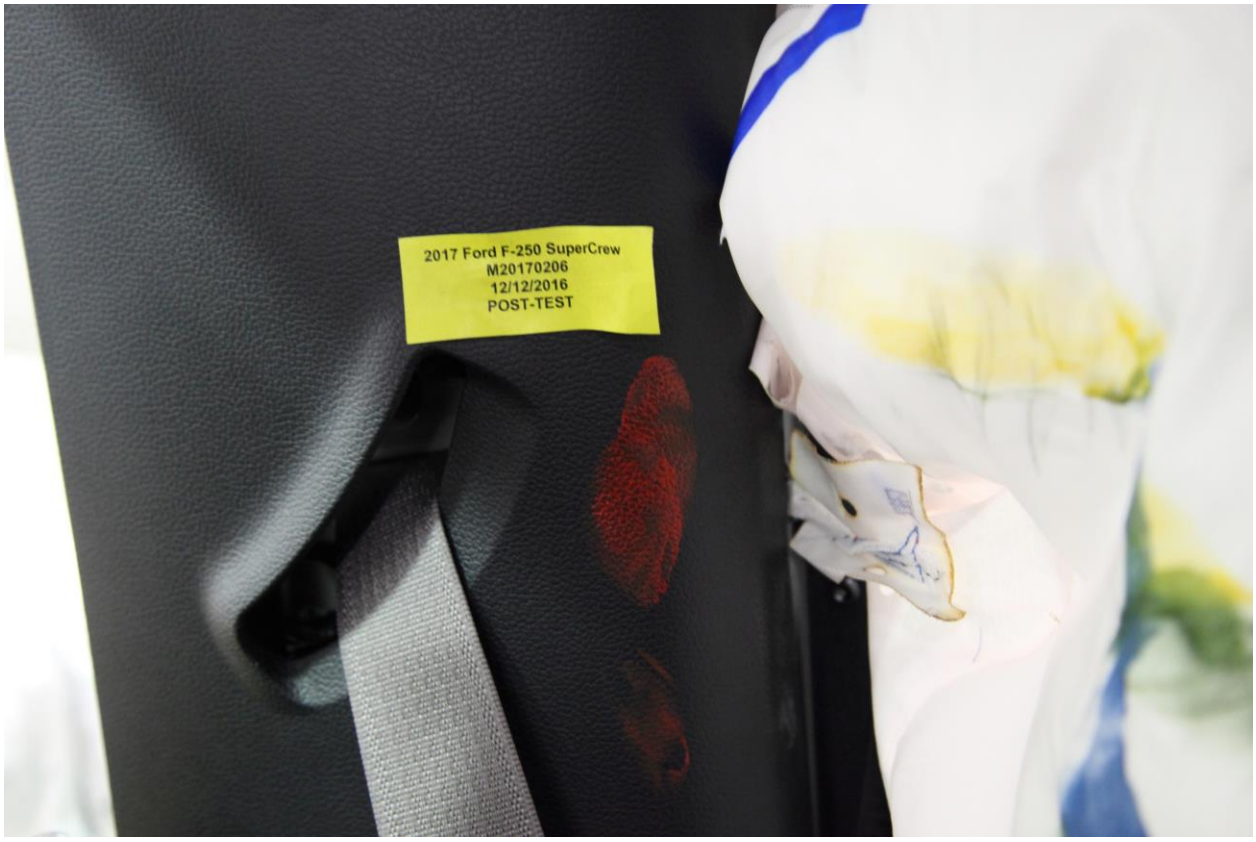
070 Post-Test Passenger Dummy and Door Clearance View

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

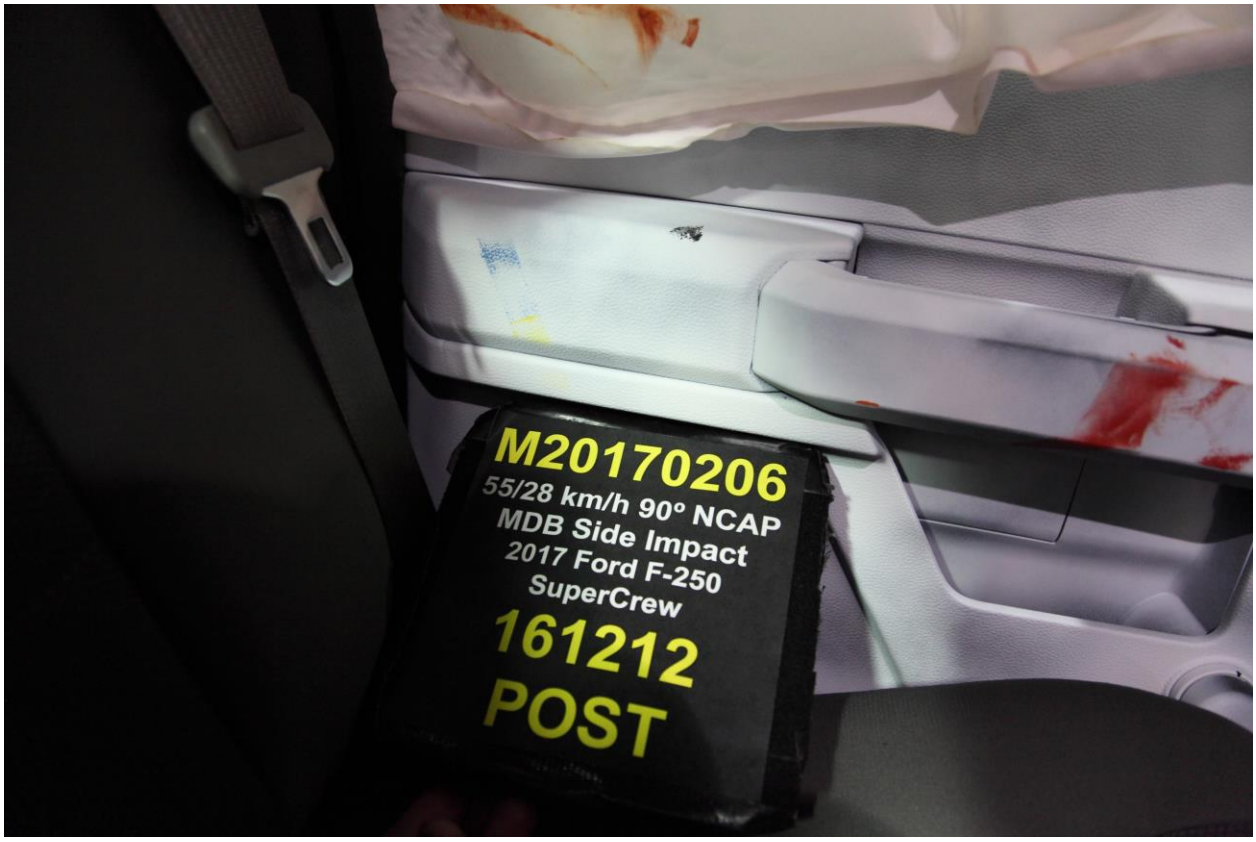
073 Pre-Test Passenger Inner Door Panel View

074 Post-Test Passenger Inner Door Panel View



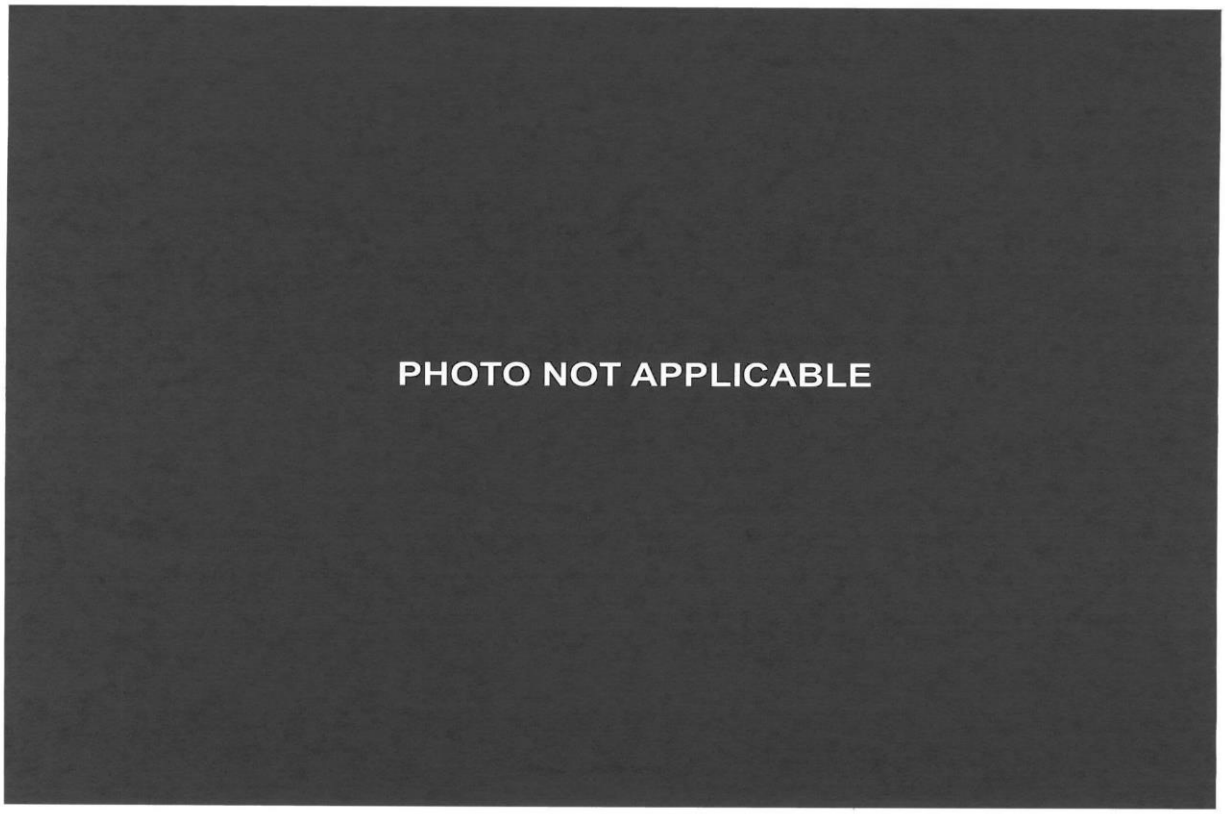
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

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

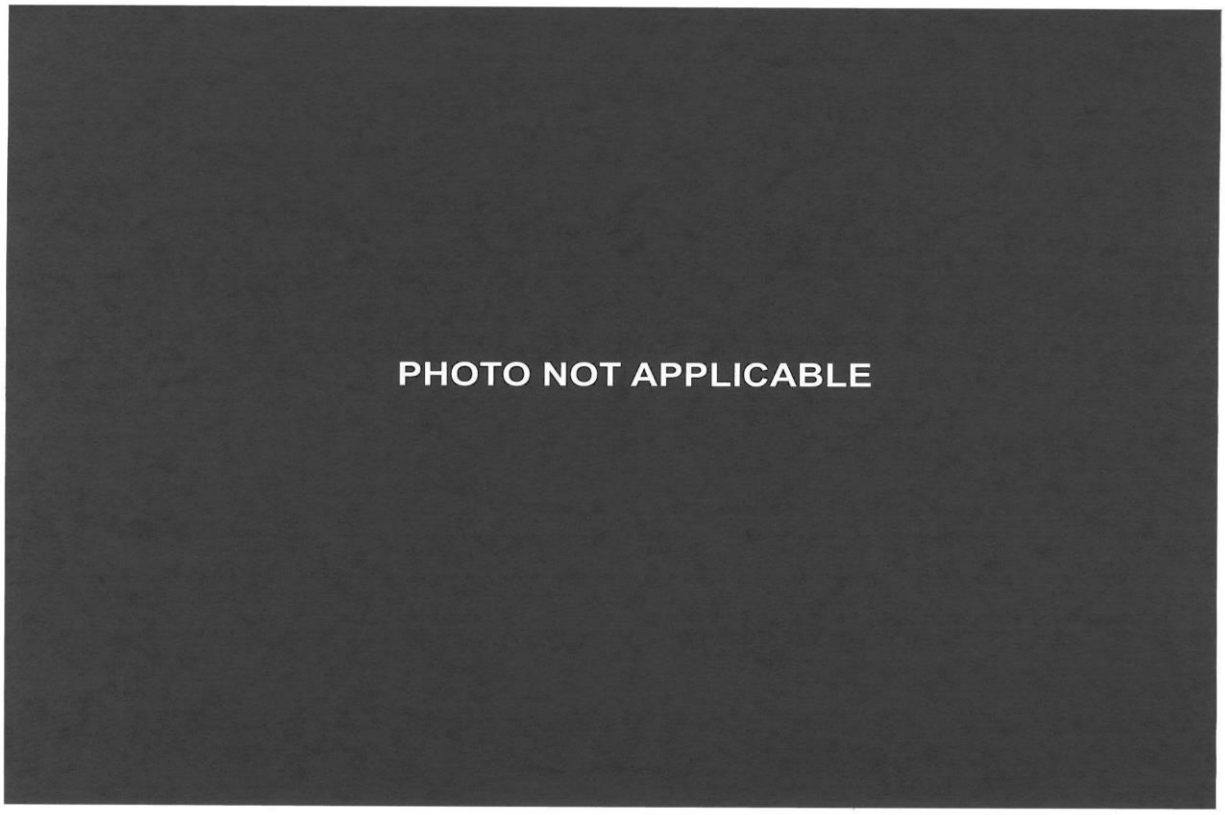


077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

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



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



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

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

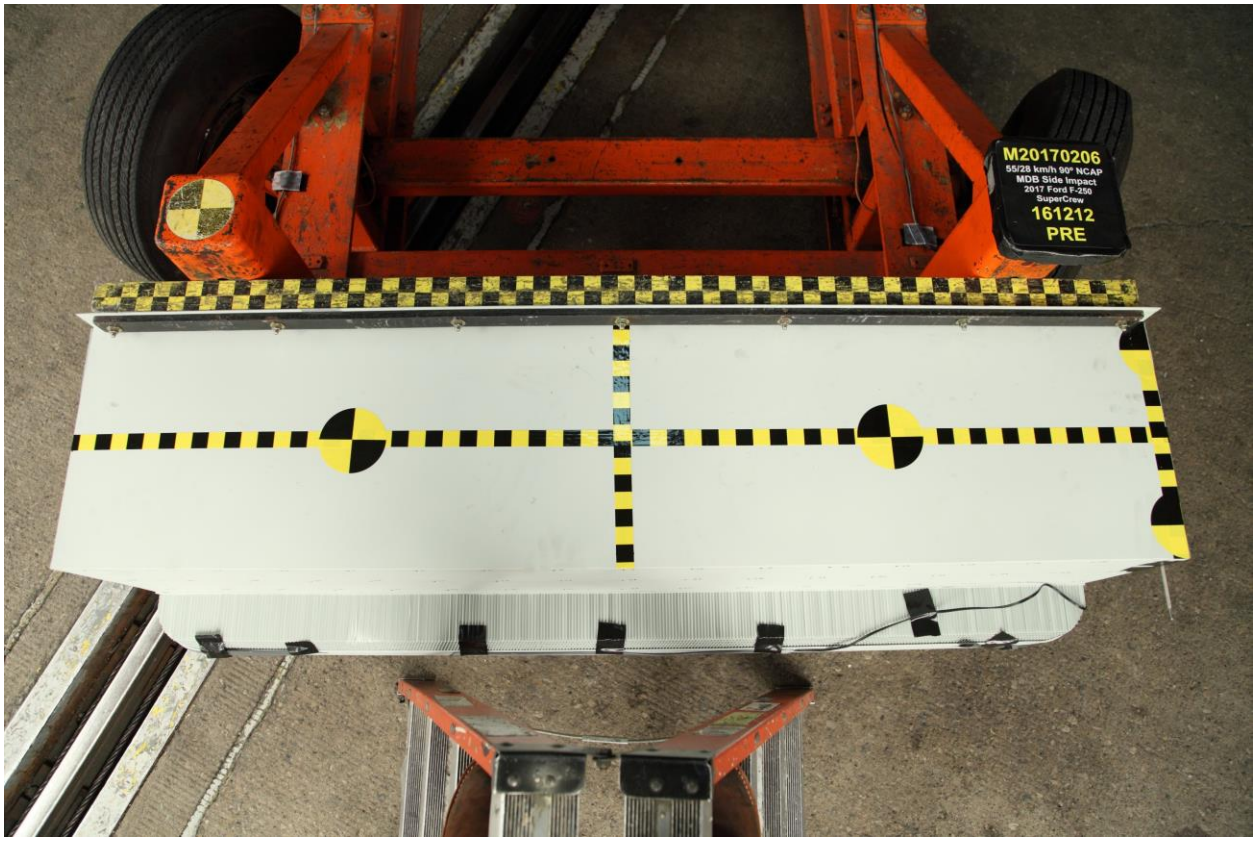
Intentionally Left Blank

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

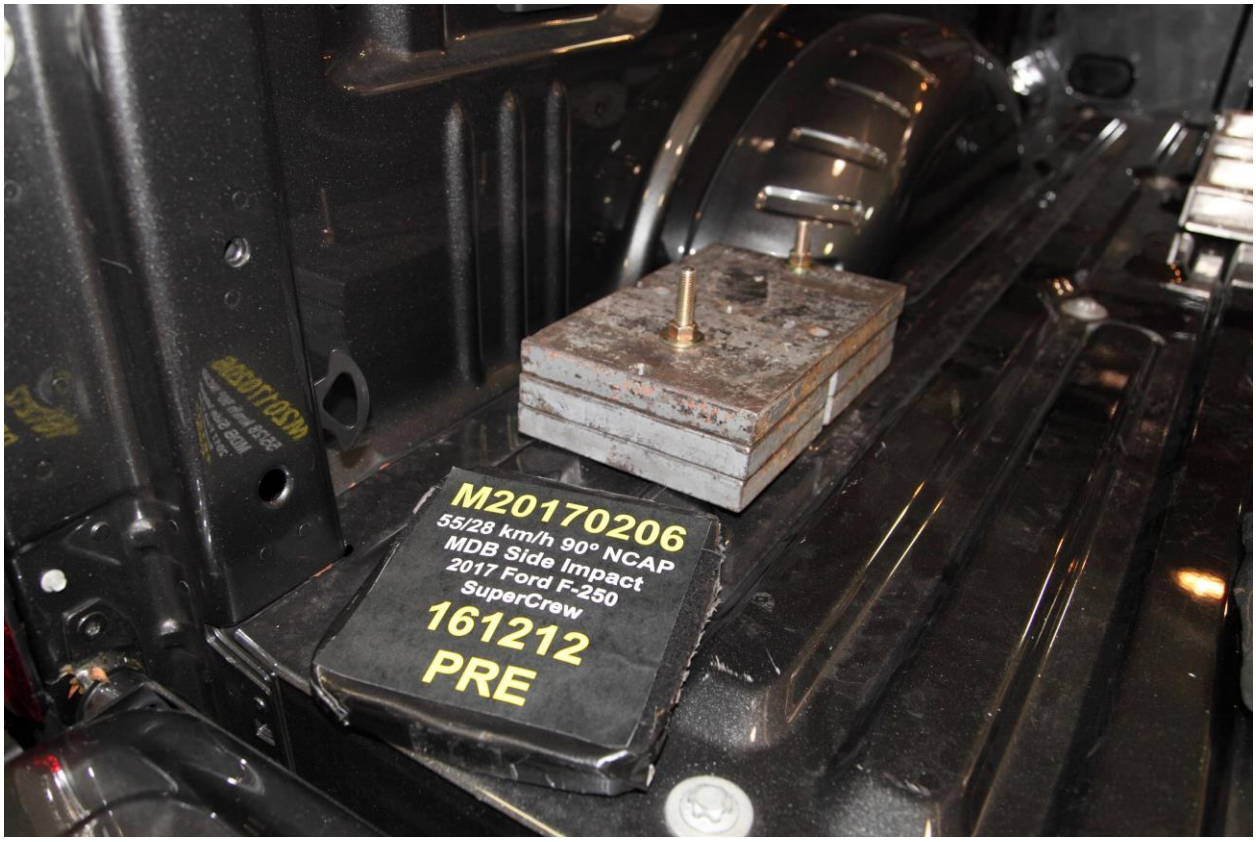
089 Post-Test Left Side View of MDB Impactor Face

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

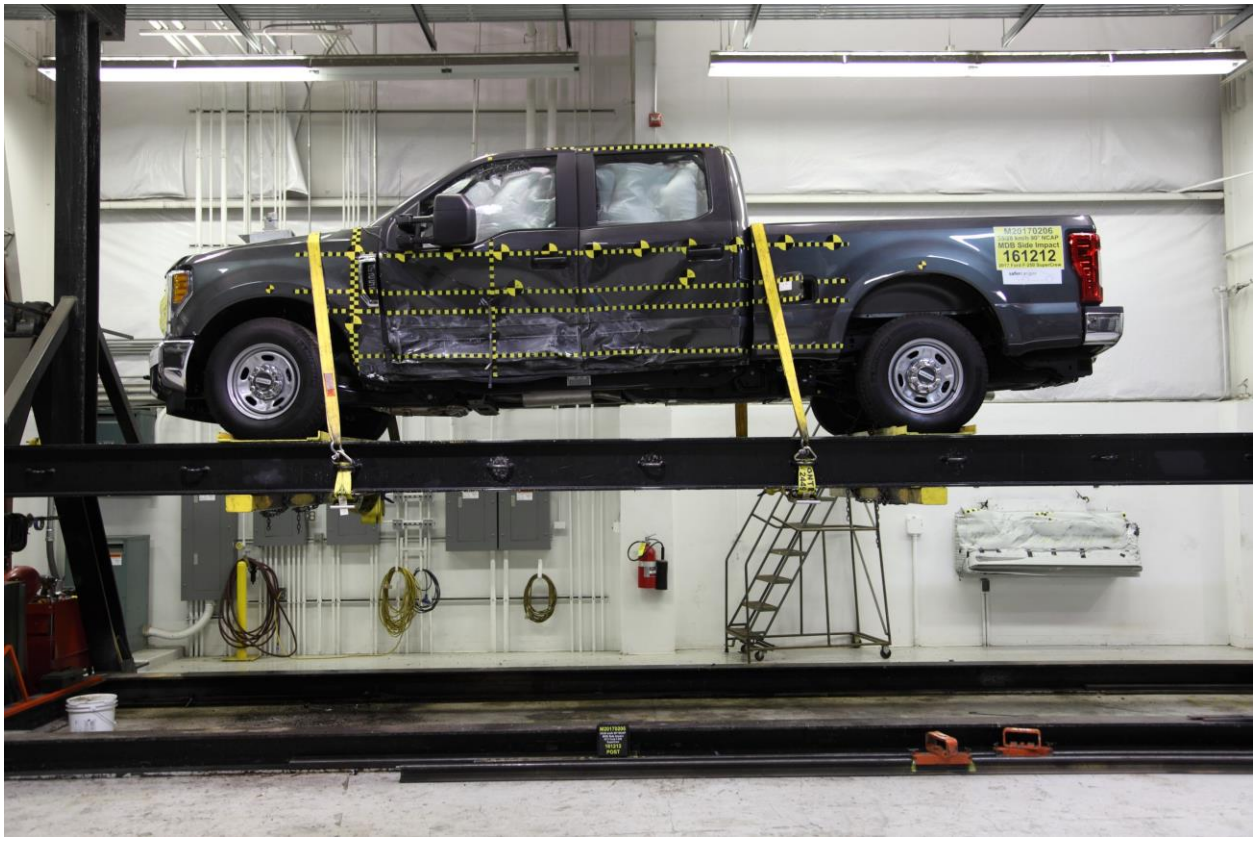
093 Close-Up View of Vehicle Tire Information Placard or Label



094 Pre-Test Ballast View

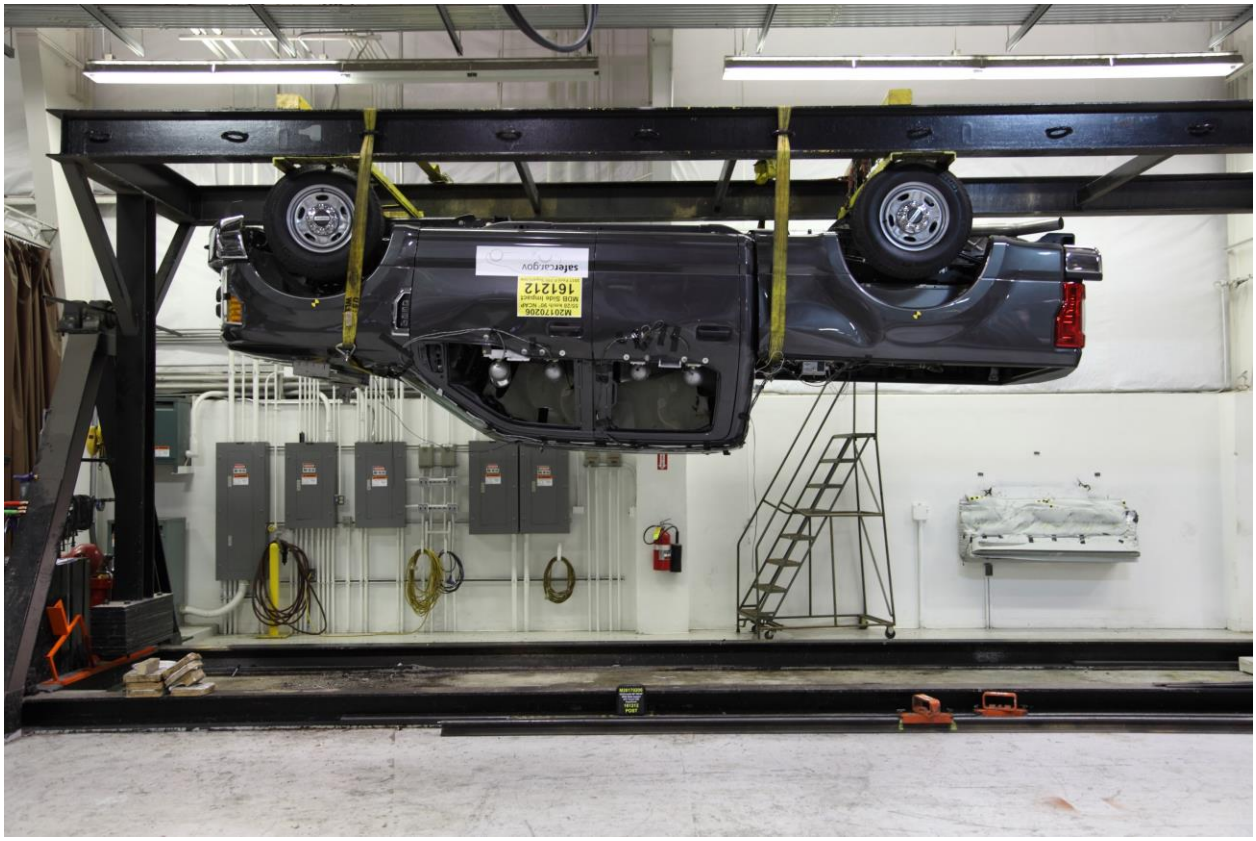
094a Pre-Test Ballast View

095 Post-Test Primary Speed Trap Read-Out



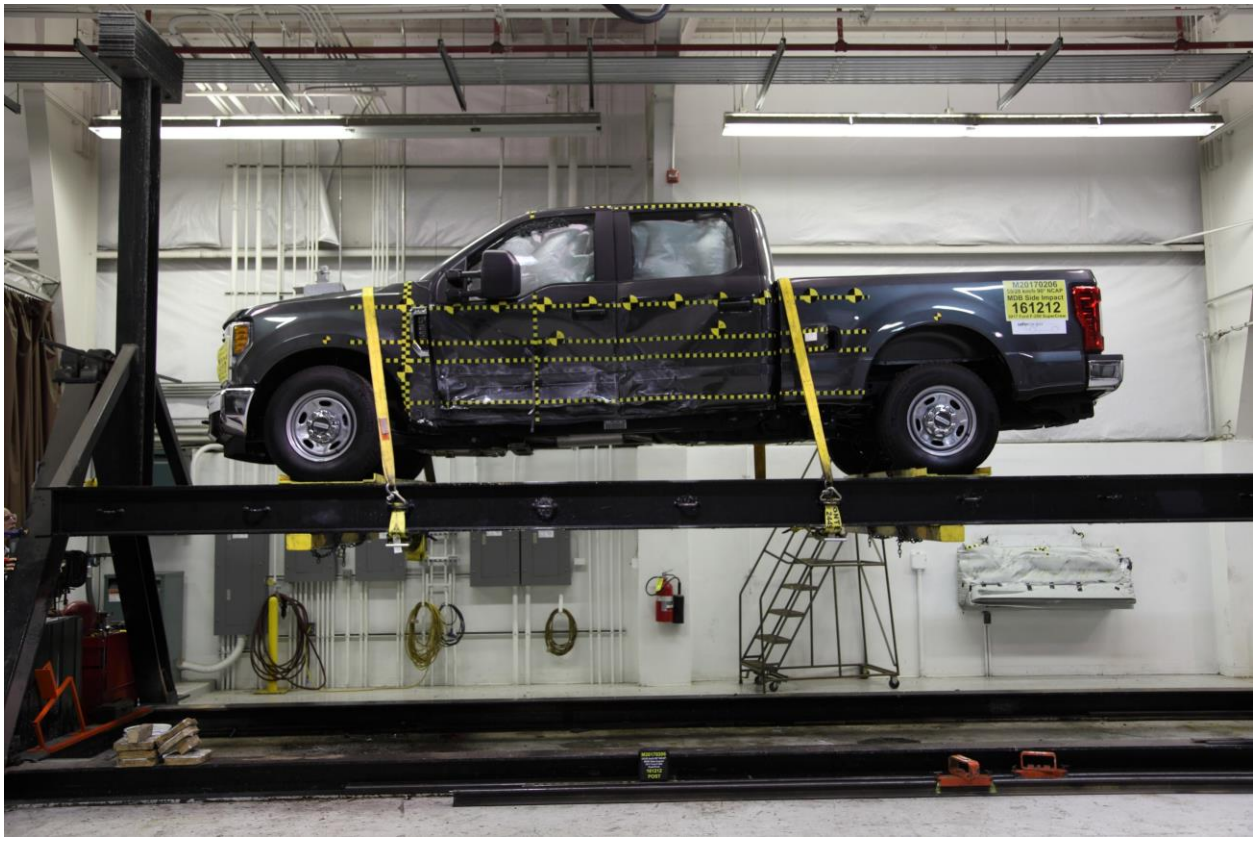
096 FMVSS No. 301 Static Rollover 0 Degrees

097 FMVSS No. 301 Static Rollover 90 Degrees



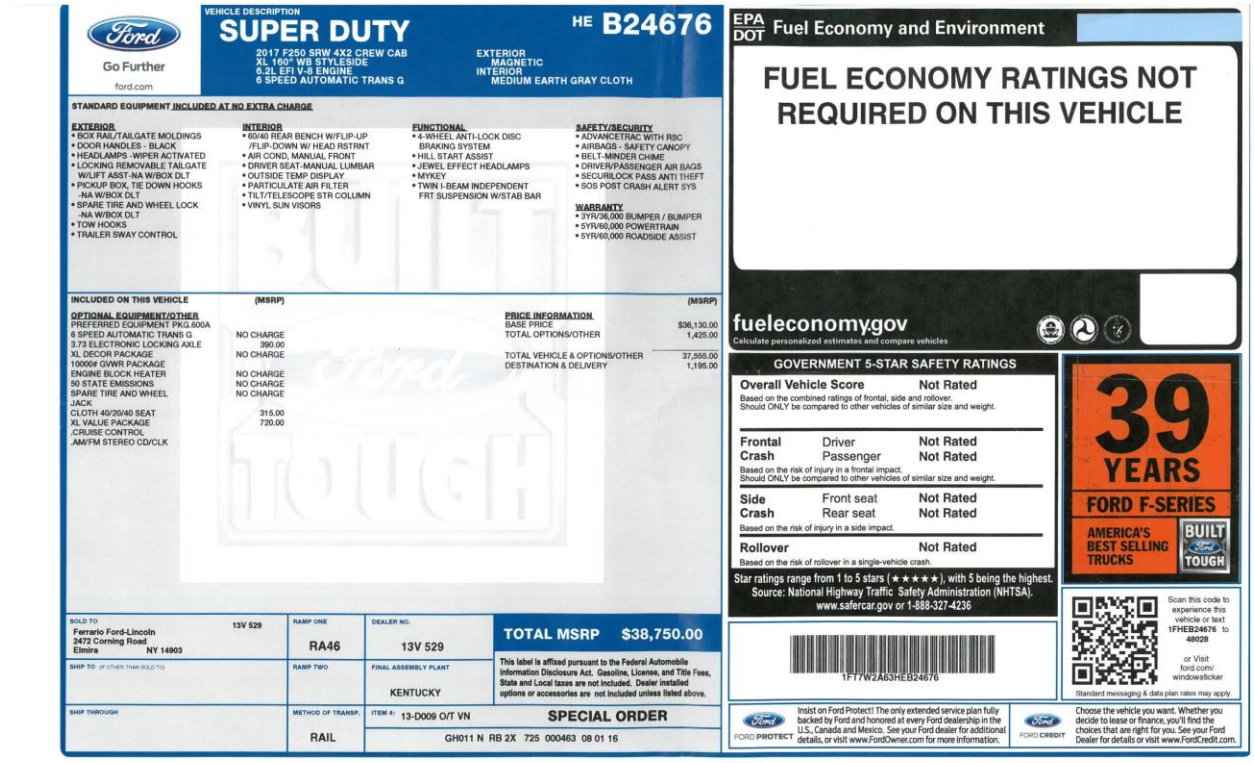
098 FMVSS No. 301 Static Rollover 180 Degrees

099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees

101 Impact Event



102 Monroney Label

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

E166700

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

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

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

E166700

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

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1	Driver Head Acceleration (X) Primary vs. Time	**B-5**
2	Driver Head Acceleration (Y) Primary vs. Time	**B-5**
3	Driver Head Acceleration (Z) Primary vs. Time	**B-5**
4	Driver Head Resultant Acceleration Primary vs. Time	**B-5**
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	**B-6**
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	**B-6**
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	**B-6**
8	Driver Thorax Rib Deflection Maximum vs. Time	**B-6**
9	Driver Anterior Abdominal Force (Y) vs. Time	**B-7**
10	Driver Middle Abdominal Force (Y) vs. Time	**B-7**
11	Driver Posterior Abdominal Force (Y) vs. Time	**B-7**
12	Driver Total Abdominal Force (Y) vs. Time	**B-7**
13	Driver Pubic Symphysis Force (Y) vs. Time	**B-8**
14	Passenger Head Acceleration (X) Primary vs. Time	**B-9**
15	Passenger Head Acceleration (Y) Primary vs. Time	**B-9**
16	Passenger Head Acceleration (Z) Primary vs. Time	**B-9**
17	Passenger Head Resultant Acceleration Primary vs. Time	**B-9**
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	**B-10**
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	**B-10**
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	**B-10**
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	**B-10**
22	Passenger Iliac Force on Impact Side (Y) vs. Time	**B-11**
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	**B-11**
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	**B-11**

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

Test Date: 12/12/2016

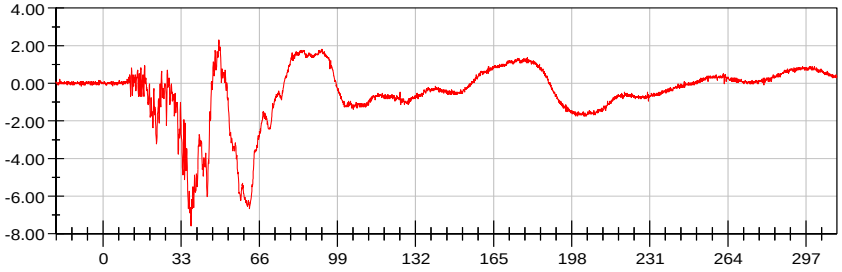
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

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



<Max>

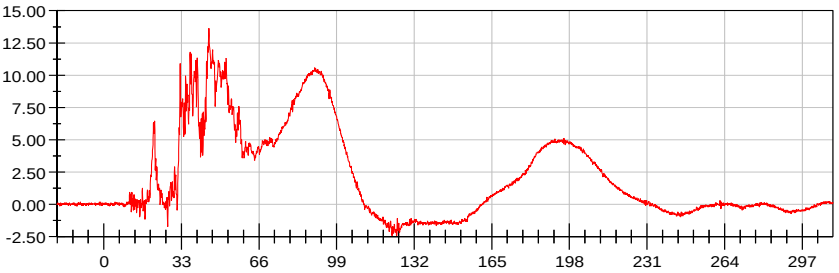
2.30 g at 48.88 ms

<Min>

-7.58 g at 37.12 ms

CFC_1000

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



<Max>

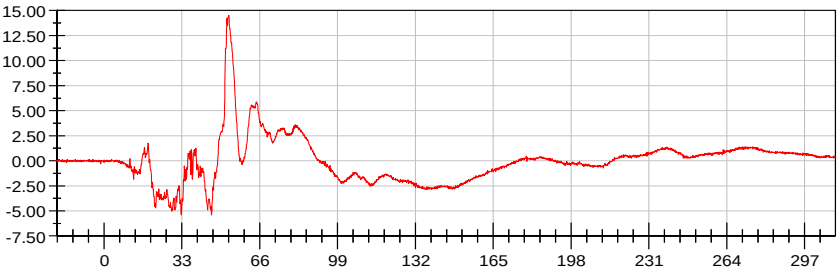
13.62 g at 44.64 ms

<Min>

-2.44 g at 122.56 ms

CFC_1000

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



<Max>

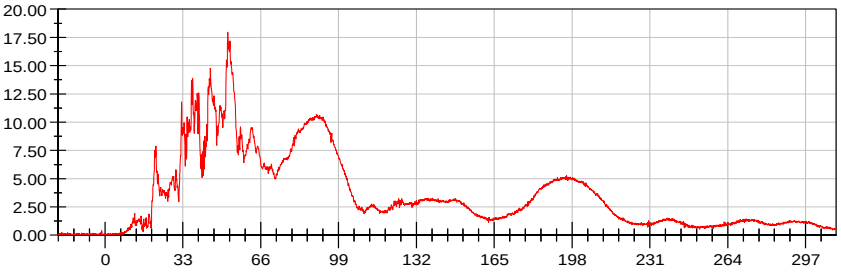
14.52 g at 52.88 ms

<Min>

-5.42 g at 32.80 ms

CFC_1000

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



<Max>

17.97 g at 52.08 ms

<Min>

0.04 g at -19.60 ms

CFC_1000

NHTSA

Test Date: 12/12/2016

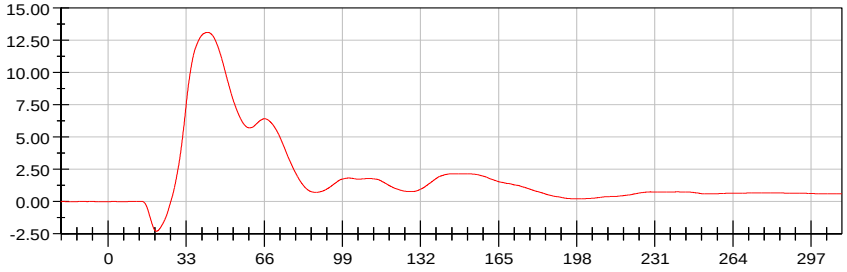
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

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



<Max>

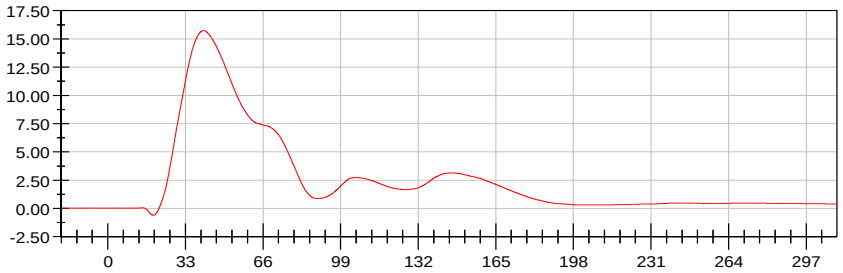
13.11 mm at 42.00 ms

<Min>

-2.30 mm at 20.40 ms

CFC_180

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



<Max>

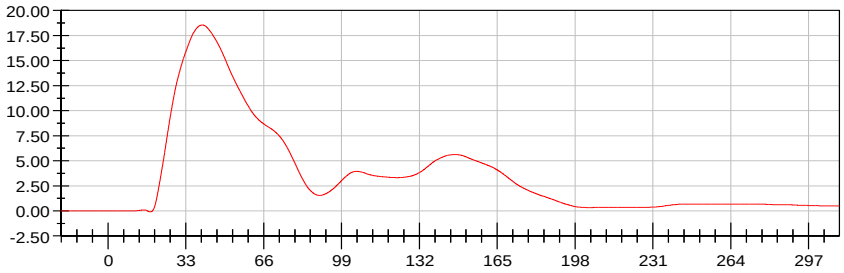
15.75 mm at 40.64 ms

<Min>

-0.62 mm at 19.36 ms

CFC_180

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



<Max>

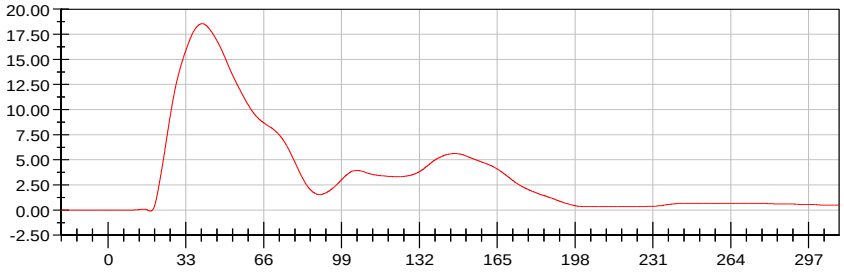
18.55 mm at 40.00 ms

<Min>

-0.10 mm at 18.00 ms

CFC_180

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



<Max>

18.55 mm at 40.00 ms

<Min>

-0.10 mm at 18.00 ms

CFC_180

NHTSA

Test Date: 12/12/2016

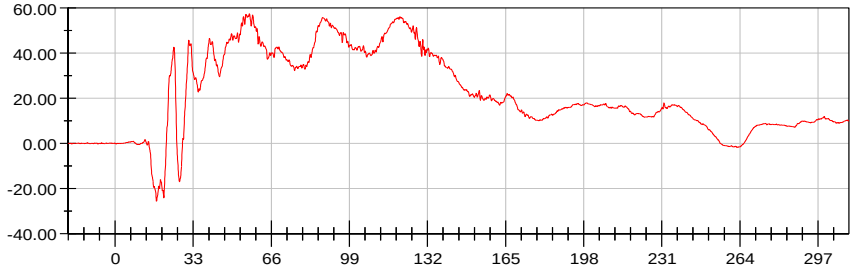
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

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



<Max>

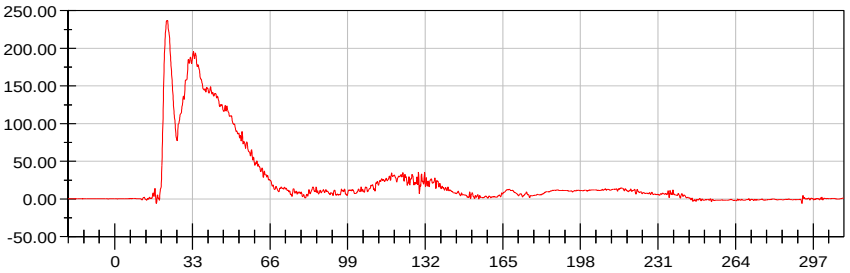
57.48 N at 56.72 ms

<Min>

-25.57 N at 17.52 ms

CFC_600

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



<Max>

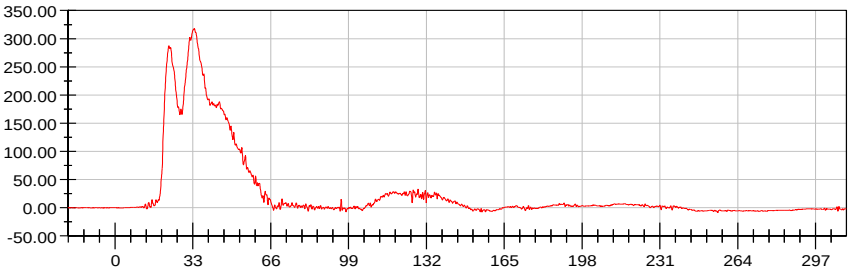
236.98 N at 22.40 ms

<Min>

-6.26 N at 292.24 ms

CFC_600

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



<Max>

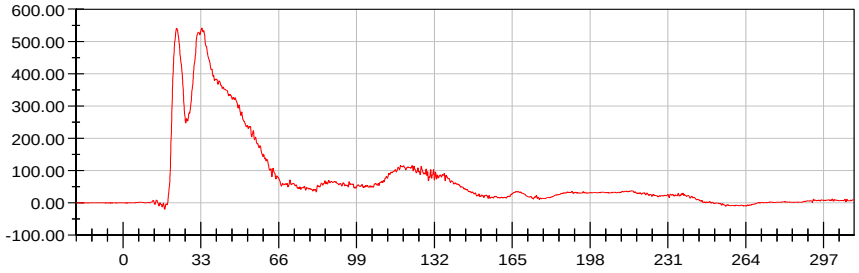
318.14 N at 33.60 ms

<Min>

-8.80 N at 255.52 ms

CFC_600

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



<Max>

541.58 N at 33.44 ms

<Min>

-19.60 N at 17.68 ms

CFC_600

NHTSA

Test Date: 12/12/2016

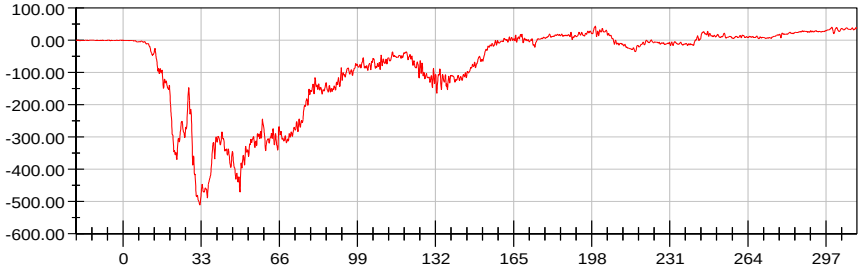
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

Driver Pubic Symphysis Force (Y) (N) vs. Time [ms]



<Max>

43.67 N at 199.52 ms

<Min>

-510.51 N at 32.40 ms

CFC_600

NHTSA

Test Date: 12/12/2016

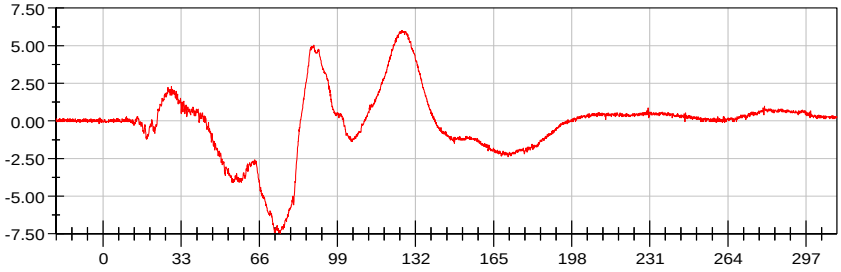
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

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



<Max>

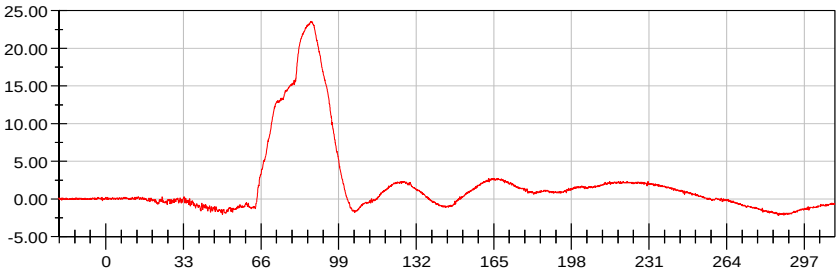
6.00 g at 126.16 ms

<Min>

-7.47 g at 74.80 ms

CFC_1000

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



<Max>

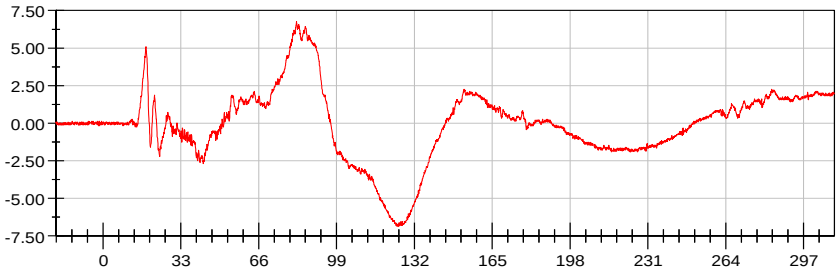
23.57 g at 87.12 ms

<Min>

-2.23 g at 286.16 ms

CFC_1000

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



<Max>

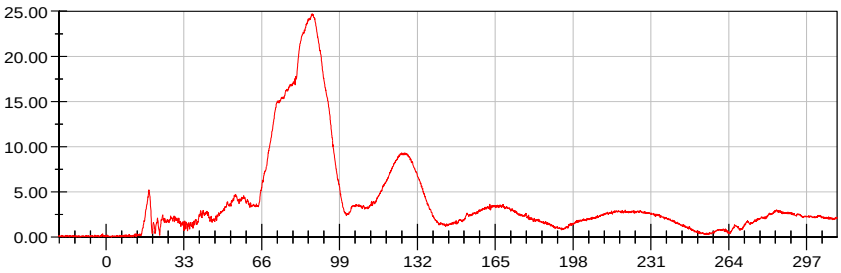
6.76 g at 82.00 ms

<Min>

-6.86 g at 124.64 ms

CFC_1000

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



<Max>

24.69 g at 87.52 ms

<Min>

0.02 g at -18.24 ms

CFC_1000

NHTSA

Test Date: 12/12/2016

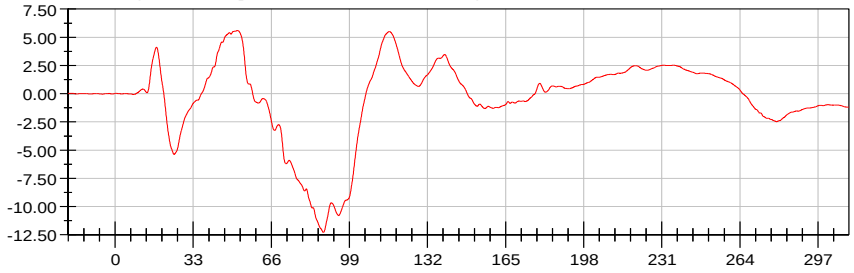
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

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



<Max>

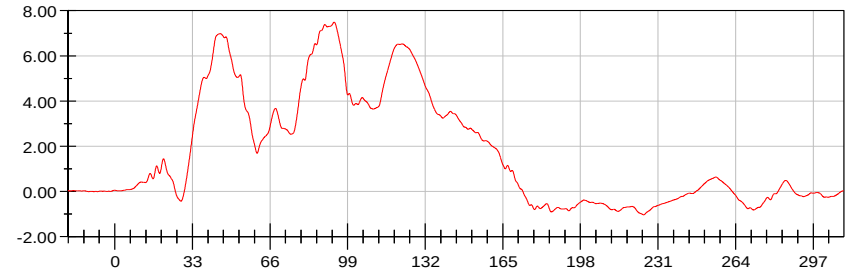
5.60 g at 51.76 ms

<Min>

-12.29 g at 88.00 ms

CFC_180

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



<Max>

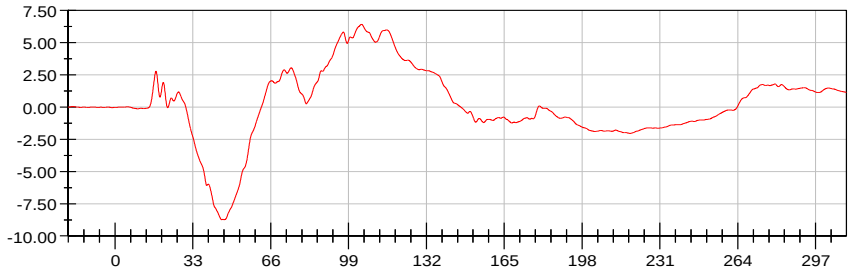
7.49 g at 93.28 ms

<Min>

-1.04 g at 224.88 ms

CFC_180

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



<Max>

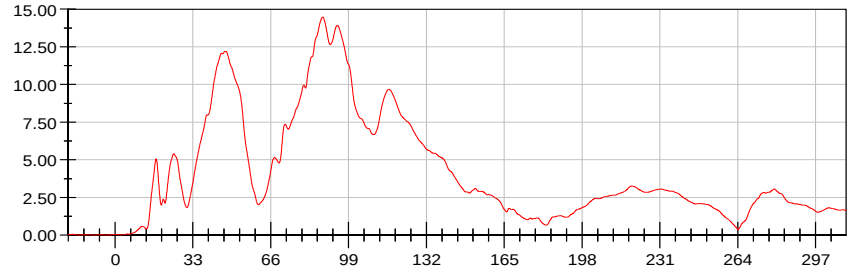
6.43 g at 104.56 ms

<Min>

-8.74 g at 46.32 ms

CFC_180

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



<Max>

14.48 g at 88.08 ms

<Min>

0.01 g at -8.24 ms

CFC_180

NHTSA

Test Date: 12/12/2016

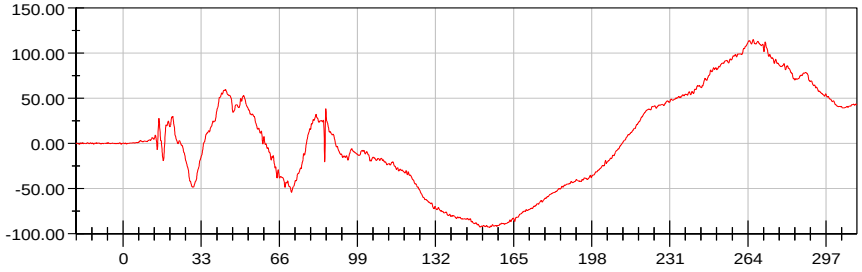
Test Lab: CTF

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

Test Number: 161212 (M20170206)

Position #4 SID IIs Dummy (305)

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



<Max>

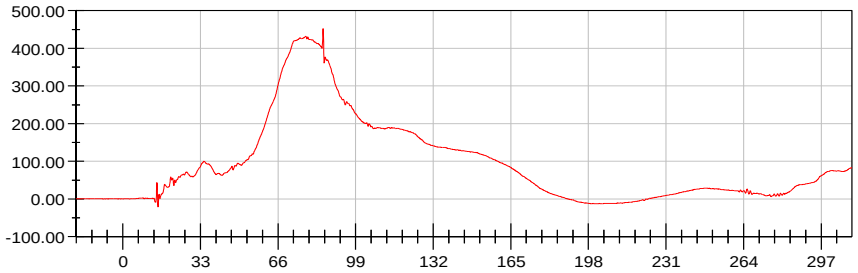
115.03 N at 266.24 ms

<Min>

-93.07 N at 154.80 ms

CFC_600

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



<Max>

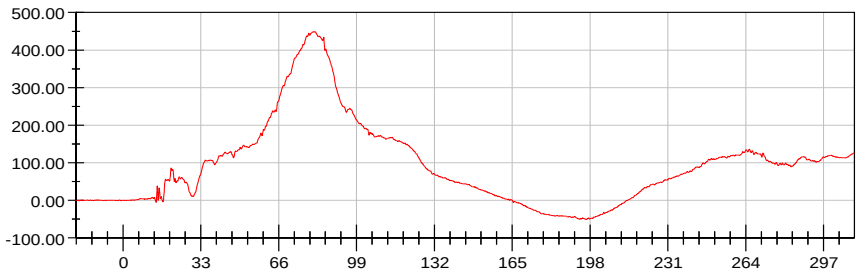
451.73 N at 85.20 ms

<Min>

-22.01 N at 14.96 ms

CFC_600

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



<Max>

449.05 N at 81.44 ms

<Min>

-51.08 N at 196.24 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. 44

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

Baseline 10/07/05

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

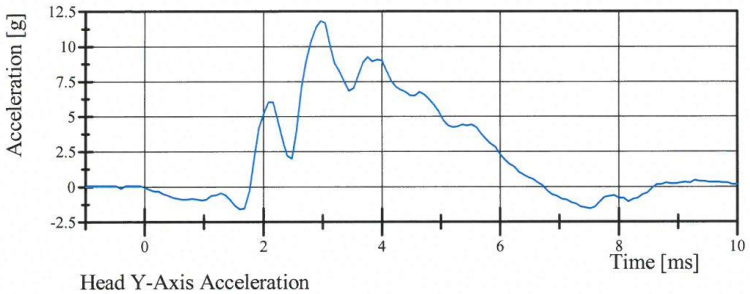
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.08.2016 10:40:22 363

Transportation Research Center Inc.

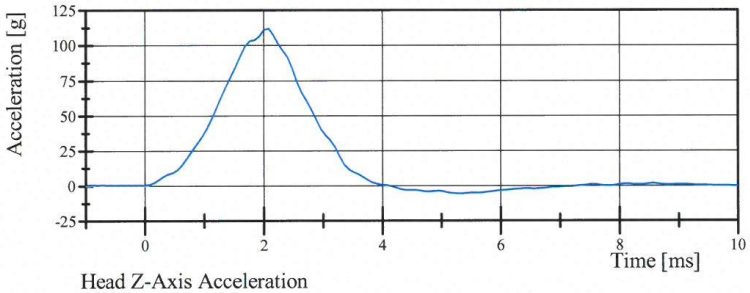
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Head X-Axis Acceleration



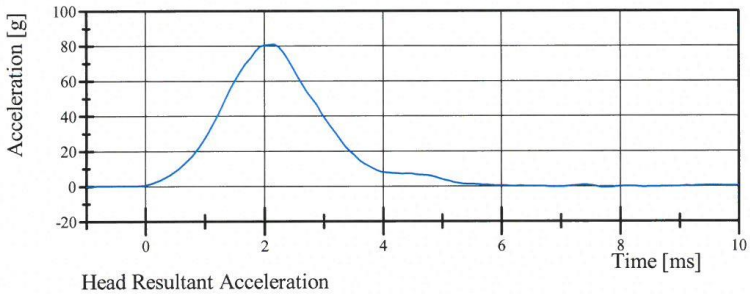
Filter Class: CFC_1000
Max: 11.8 g at 3.0 ms
Min: -1.6 g at 1.6 ms

Head Y-Axis Acceleration



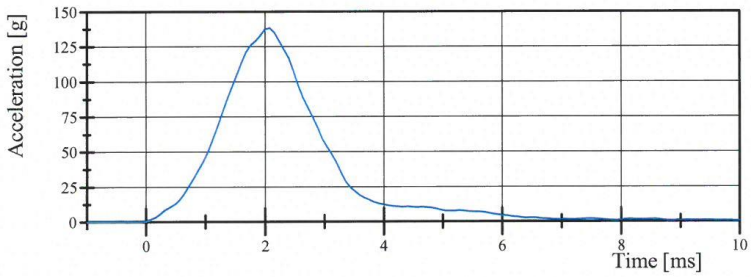
Filter Class: CFC_1000
Max: 111.8 g at 2.1 ms
Min: -5.9 g at 5.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 81.0 g at 2.2 ms
Min: -0.6 g at 7.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 137.9 g at 2.1 ms
Min: 0.0 g at -1.0 ms

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

12.08.2016 10:40:32 363

Transportation Research Center Inc.

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

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	18 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-51.7 deg	Yes
Time of Peak	54 - 66 ms	55.4 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	70.3 ms	Yes

Test meets specifications.

Comments:

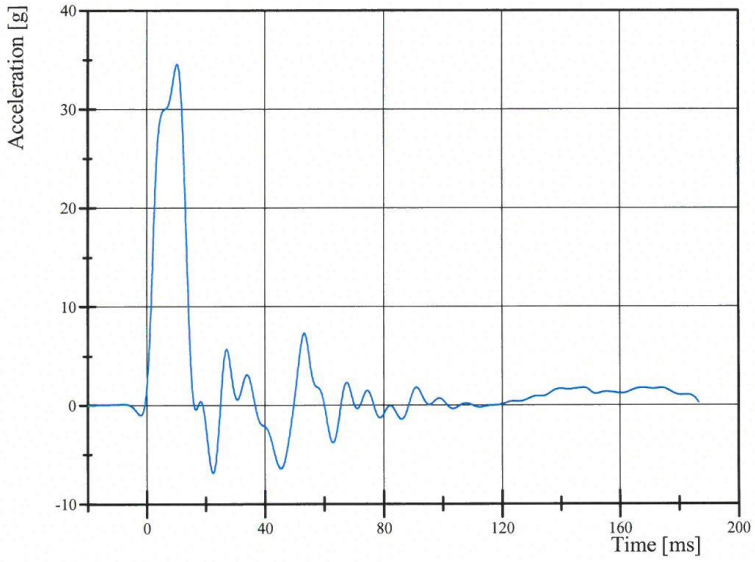
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.08.2016 15:37:45 1494

Transportation Research Center Inc.

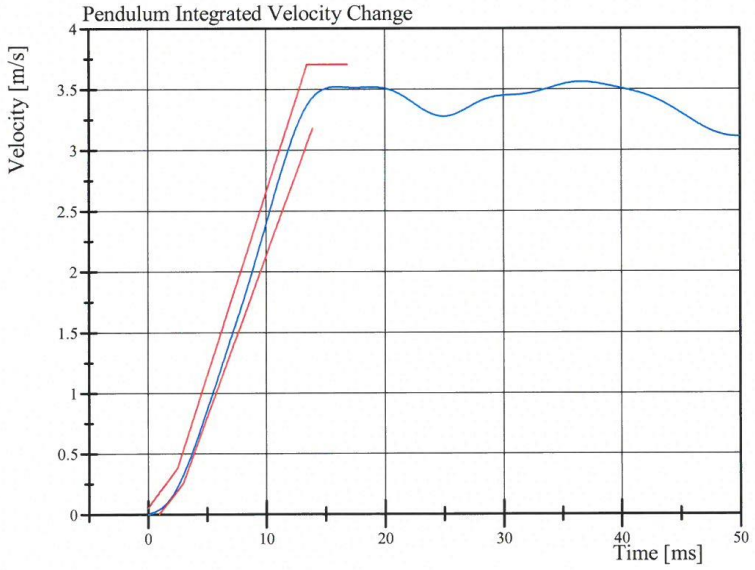
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 44-2
Test Date: 12/8/2016

Pendulum Acceleration



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

Pendulum Integrated Velocity Change



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

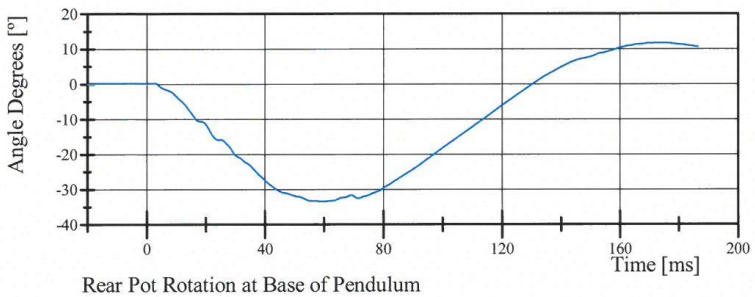
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 15:38:28 1494

Transportation Research Center Inc.

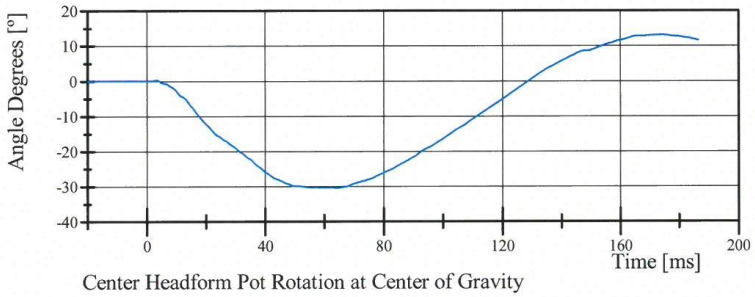
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 44-2
Test Date: 12/8/2016

Forward Pot Rotation at Base of Pendulum



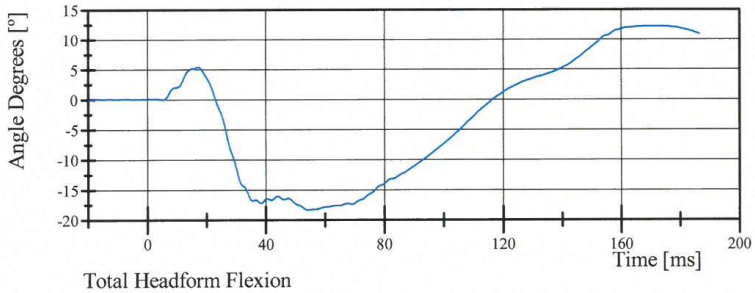
Filter Class: CFC_180
Max: 11.6 ° at 173.8 ms
Min: -33.4 ° at 58.9 ms

Rear Pot Rotation at Base of Pendulum



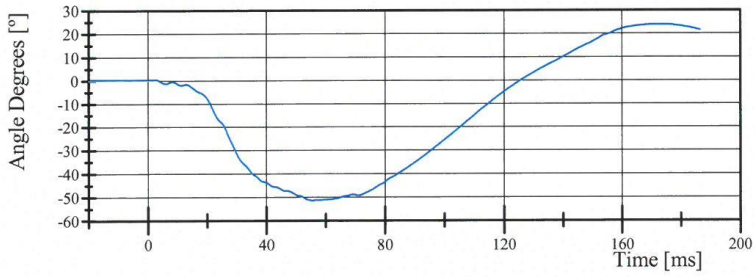
Filter Class: CFC_180
Max: 13.2 ° at 174.1 ms
Min: -30.6 ° at 64.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 12.2 ° at 170.4 ms
Min: -18.4 ° at 54.2 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 23.8 ° at 173.8 ms
Min: -51.7 ° at 55.4 ms

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

12.08.2016 15:38:28 1494

Transportation Research Center Inc.

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

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

Test meets specifications.

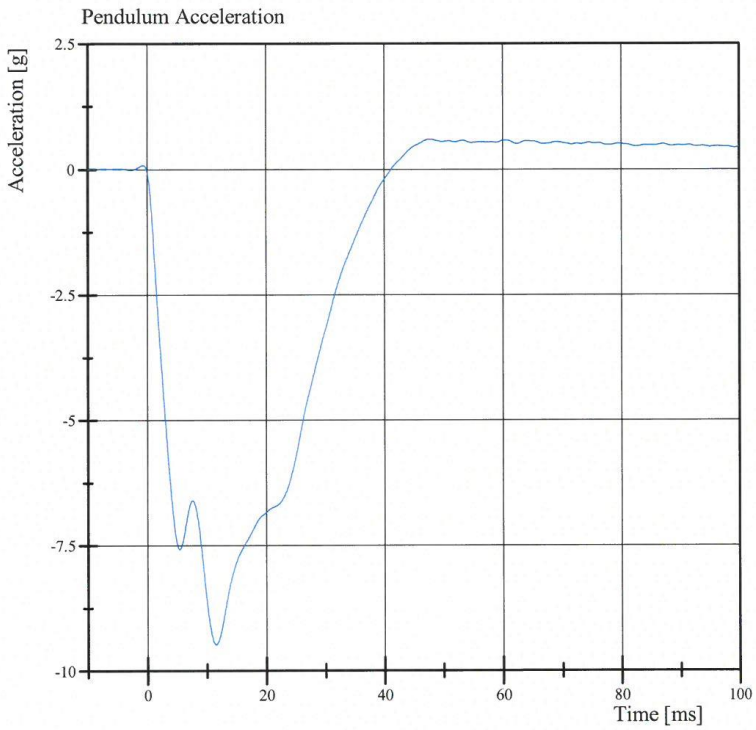
Comments:

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

12.08.2016 16:05:34 566

Transportation Research Center Inc.

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



Filter Class: CFC_180
Max: 0.6 g at 47.8 ms
Min: -9.5 g at 11.4 ms

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

12.08.2016 16:05:42 566

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

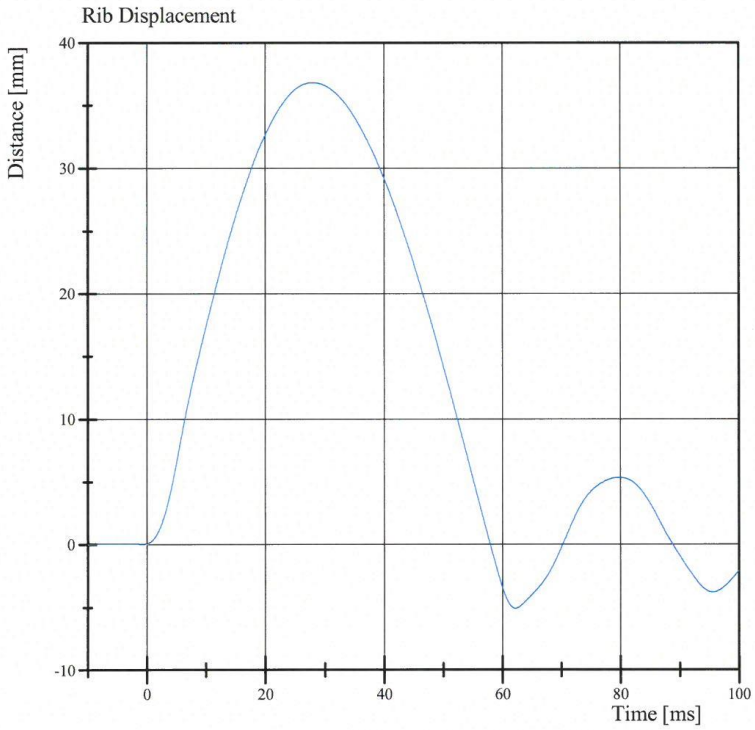
Drop Height: 462

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

12.08.2016 08:52:10 880

Transportation Research Center Inc.

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



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

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

12.08.2016 08:52:27 880

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

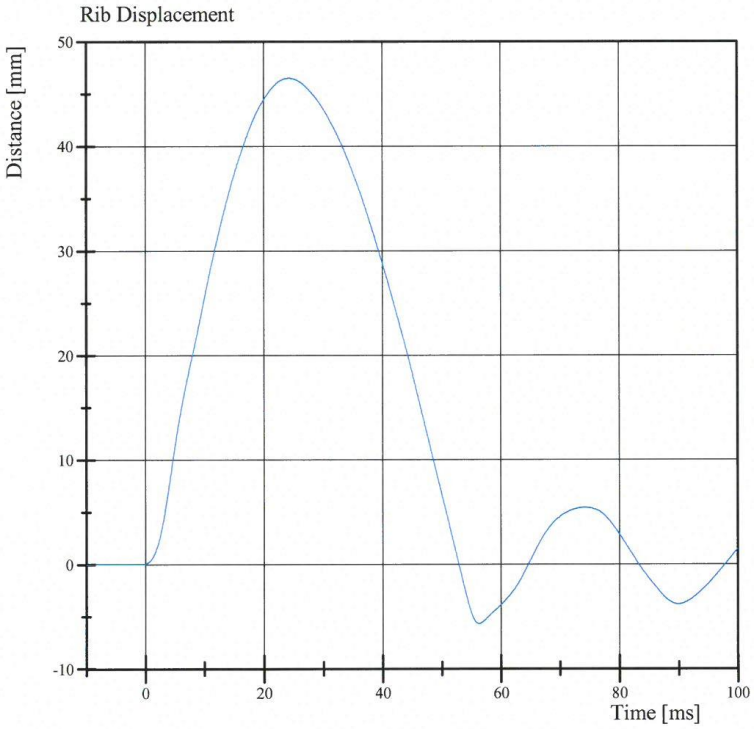
Drop Height: 816

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

12.08.2016 08:44:57 716

Transportation Research Center Inc.

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



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

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

12.08.2016 08:45:13 716

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

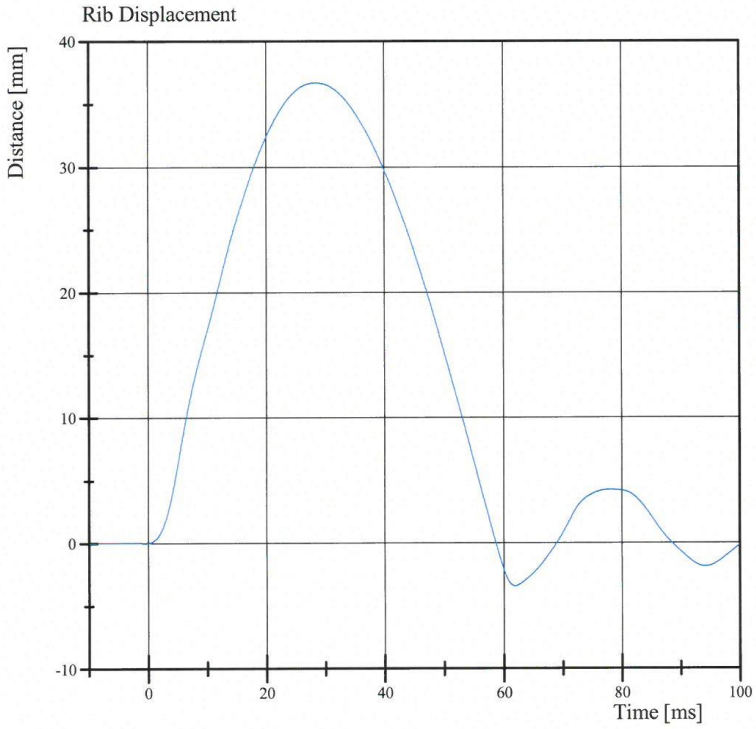
Drop Height: 462

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

12.08.2016 09:07:21 888

Transportation Research Center Inc.

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



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

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

12.08.2016 09:07:43 888

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

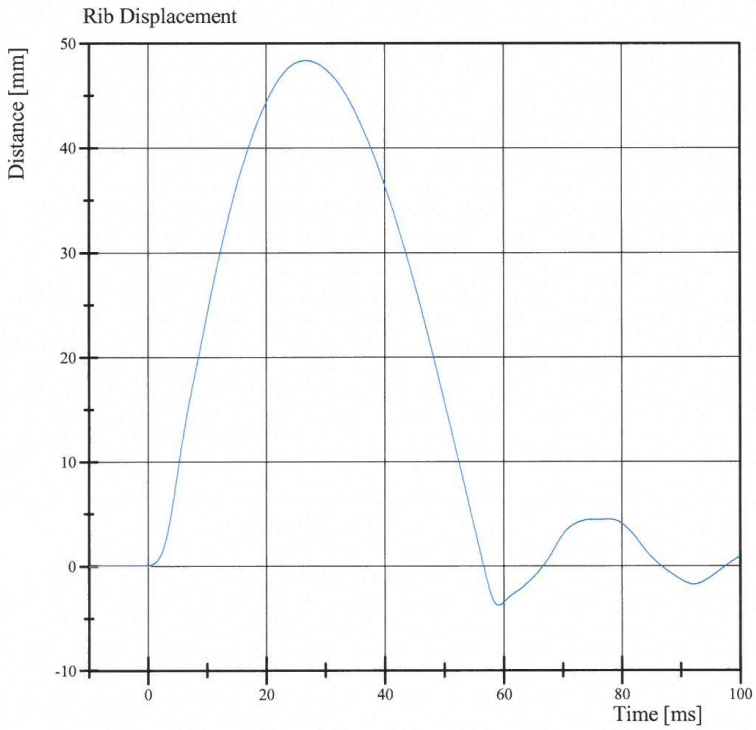
Drop Height: 816

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

12.08.2016 08:58:26 705

Transportation Research Center Inc.

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



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

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

12.08.2016 08:58:37 705

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

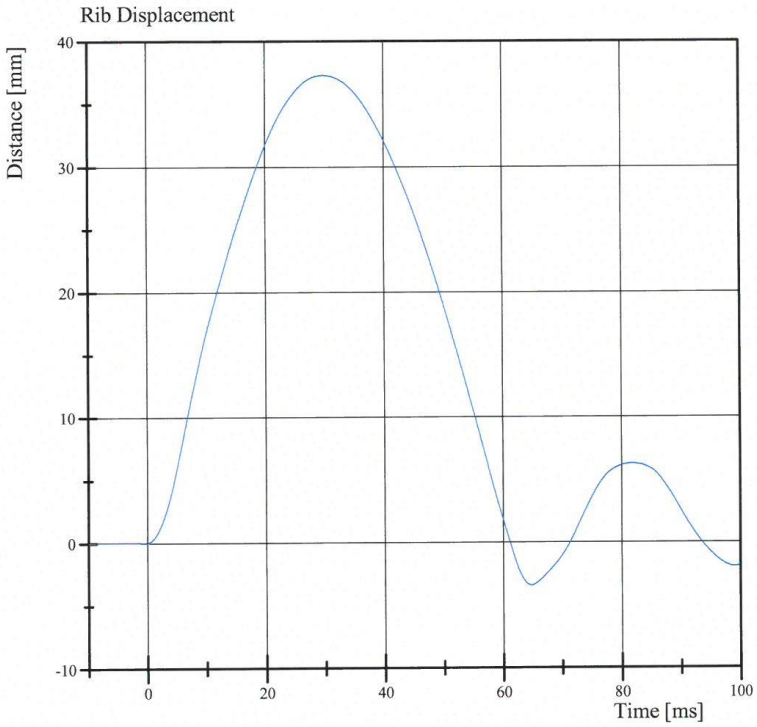
Drop Height: 462

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

12.08.2016 09:23:37 847

Transportation Research Center Inc.

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



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

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

12.08.2016 09:24:32 847

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

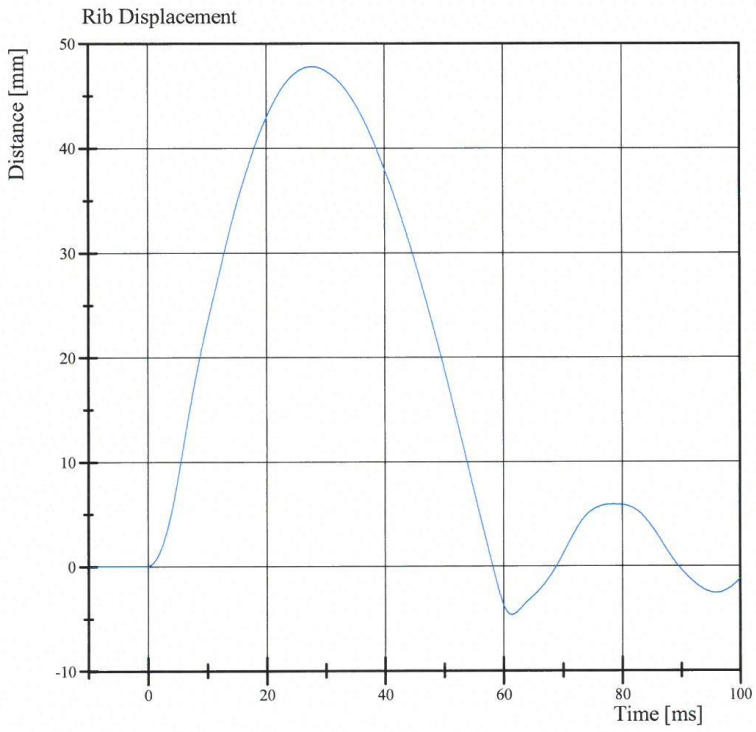
Drop Height: 816

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

12.08.2016 09:17:06 691

Transportation Research Center Inc.

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



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

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

12.08.2016 09:17:20 691

Transportation Research Center Inc.

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

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

Test meets specifications.

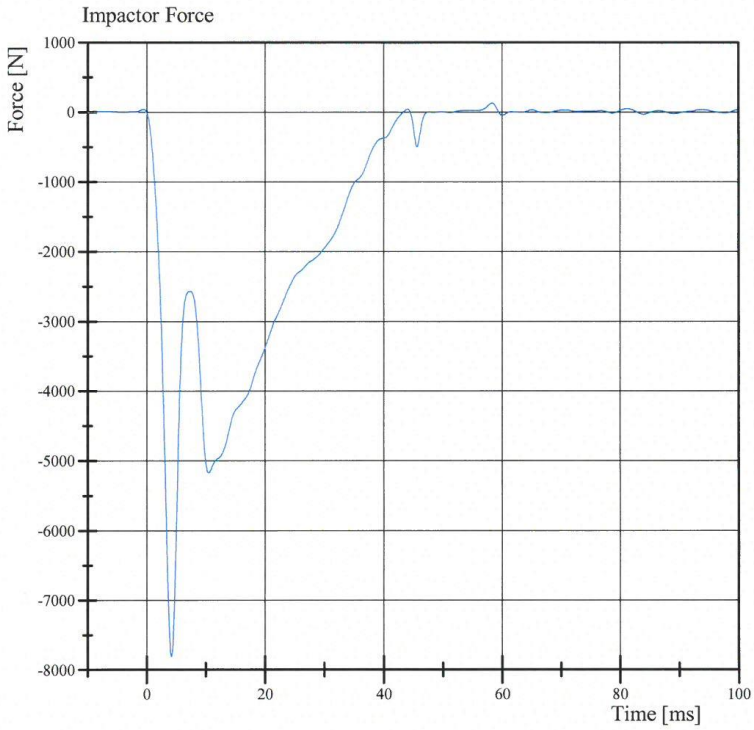
Comments:

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

12.08.2016 16:11:17 458

Transportation Research Center Inc.

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



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

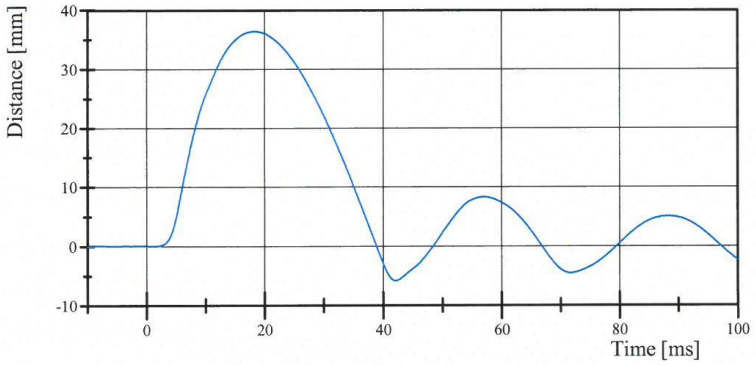
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:11:27 458

Transportation Research Center Inc.

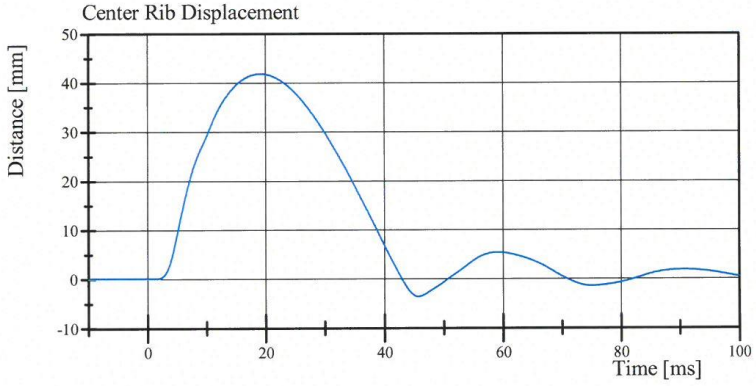
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Upper Rib Displacement



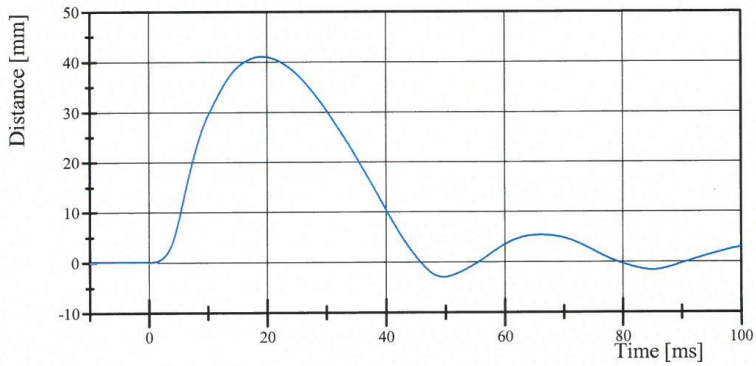
Filter Class: CFC_180
Max: 36.3 mm at 18.2 ms
Min: -5.9 mm at 42.1 ms

Center Rib Displacement



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

Lower Rib Displacement



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

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

12.08.2016 16:11:28 458

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

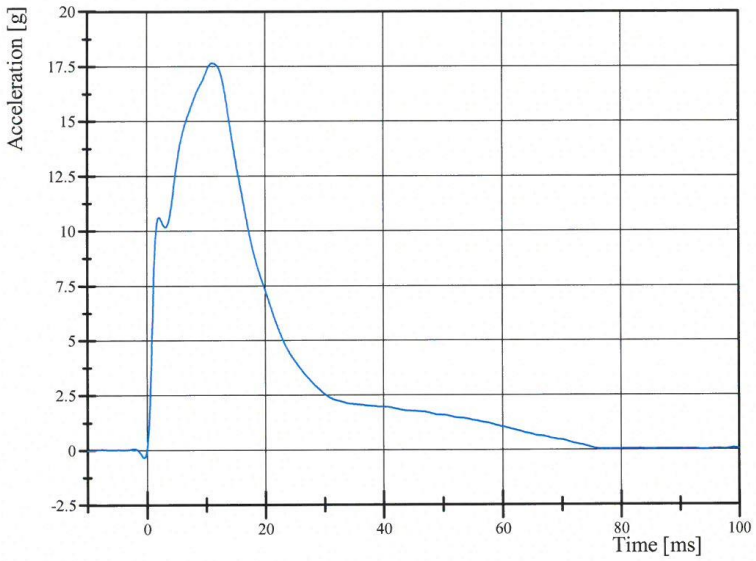
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:17:23 604

Transportation Research Center Inc.

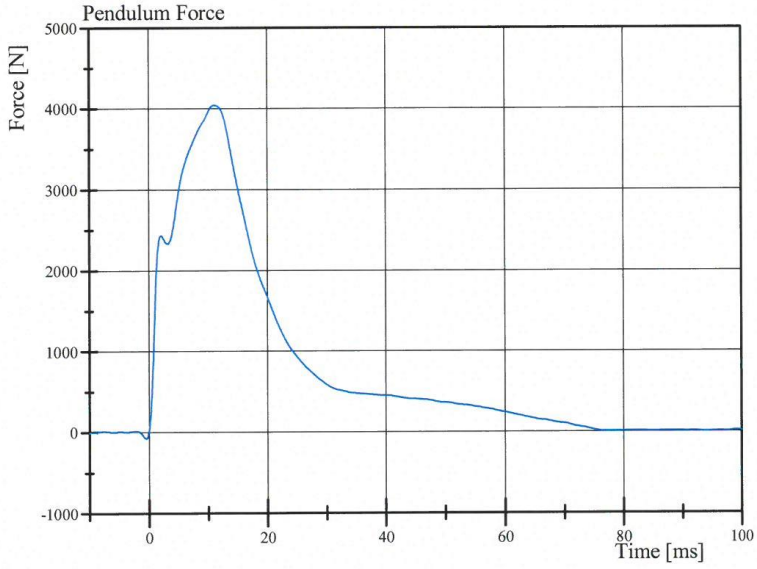
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Pendulum Acceleration



Filter Class: CFC_180
Max: 17.6 g at 11.0 ms
Min: -0.4 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,035.0 N at 11.0 ms
Min: -84.2 N at -0.5 ms

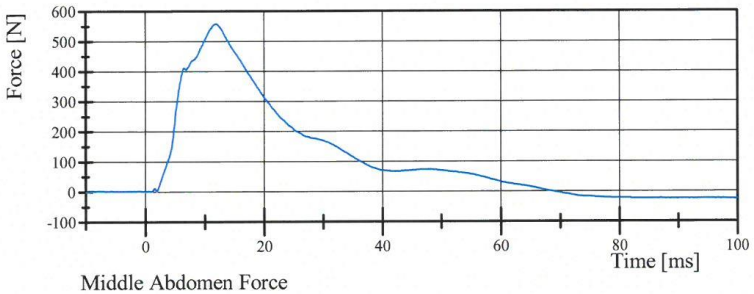
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 16:17:34 604

Transportation Research Center Inc.

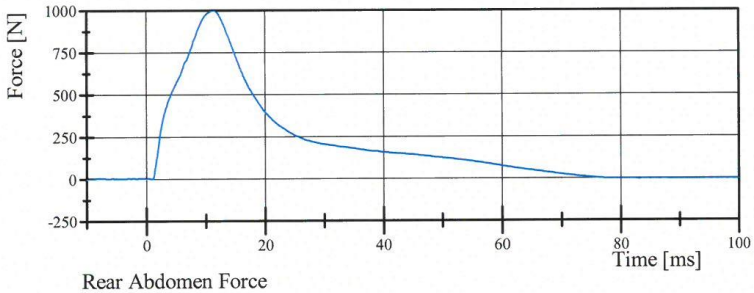
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Front Abdomen Force



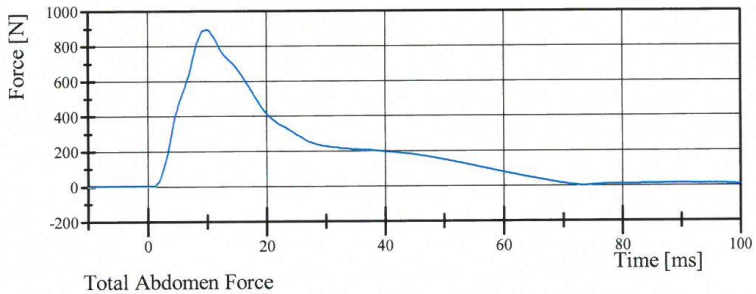
Filter Class: CFC_600
Max: 556.8 N at 11.8 ms
Min: -25.5 N at 99.6 ms

Middle Abdomen Force



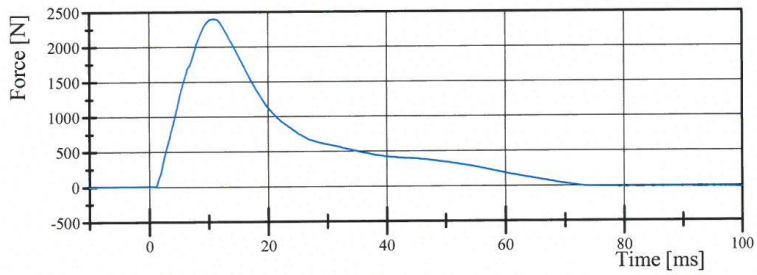
Filter Class: CFC_600
Max: 998.1 N at 11.4 ms
Min: -4.5 N at 83.0 ms

Rear Abdomen Force



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

Total Abdomen Force



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

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

12.08.2016 16:17:35 604

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

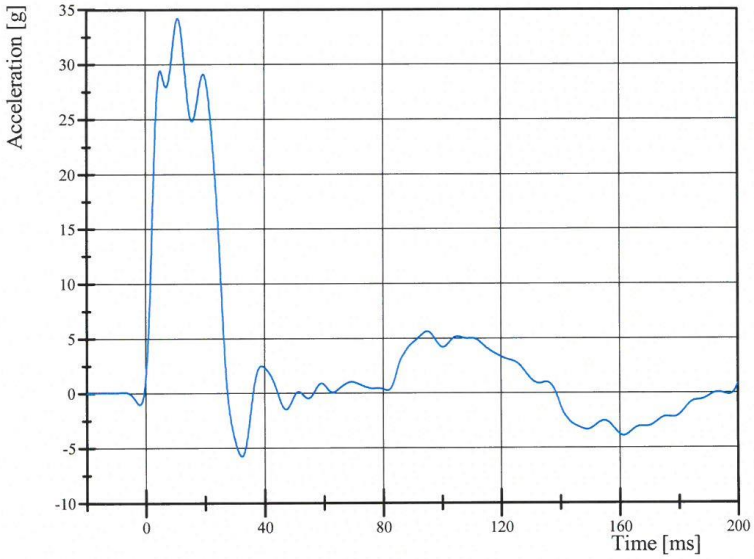
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.08.2016 14:46:31 669

Transportation Research Center Inc.

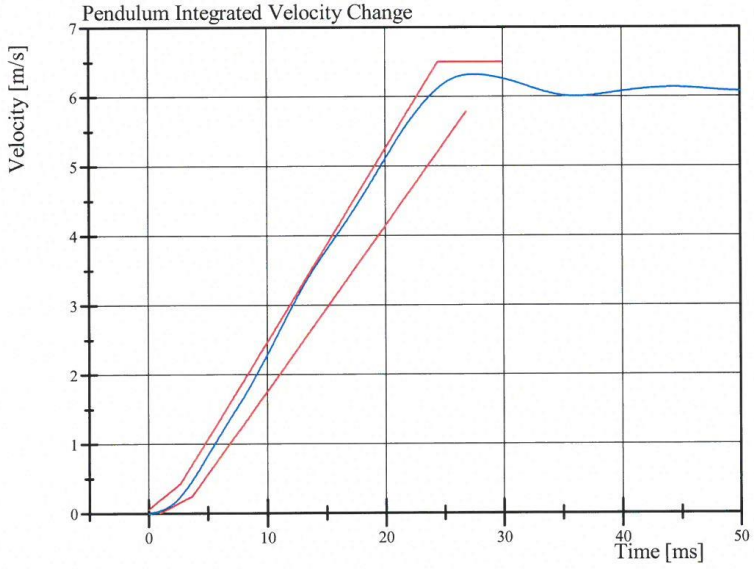
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Pendulum Acceleration



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

Pendulum Integrated Velocity Change



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

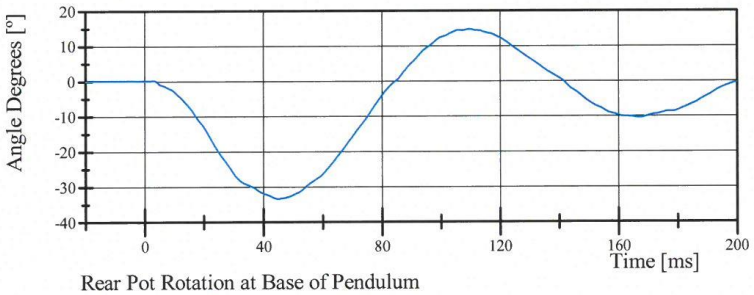
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.08.2016 14:47:11 669

Transportation Research Center Inc.

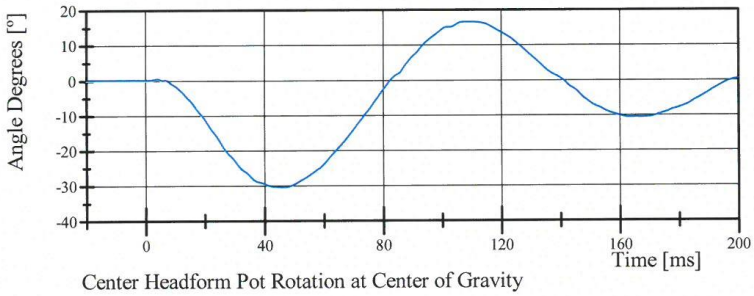
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 44-1
Test Date: 12/8/2016

Forward Pot Rotation at Base of Pendulum



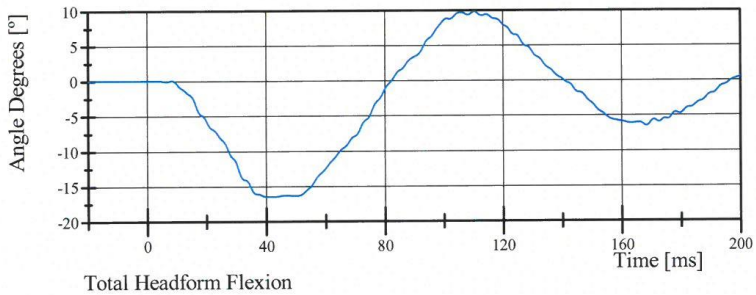
Filter Class: CFC_180
Max: 14.7 ° at 109.4 ms
Min: -33.4 ° at 45.0 ms

Rear Pot Rotation at Base of Pendulum



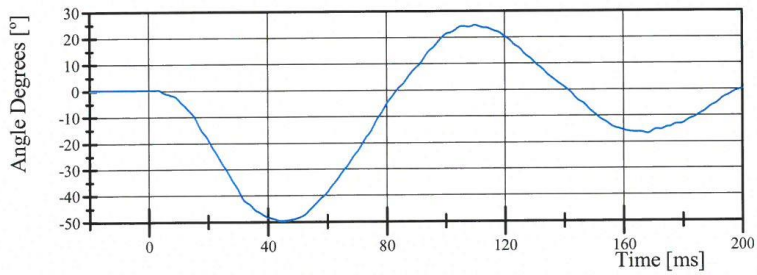
Filter Class: CFC_180
Max: 16.5 ° at 108.2 ms
Min: -30.5 ° at 46.4 ms

Center Headform Pot Rotation at Center of Gravity



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

Total Headform Flexion



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

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

12.08.2016 14:47:13 669

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 44-3
Test Date: 12/9/2016

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

Test meets specifications.

Comments:

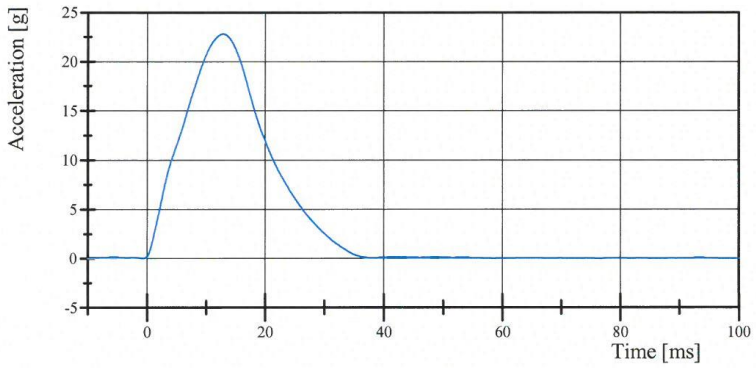
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.09.2016 07:39:25 551

Transportation Research Center Inc.

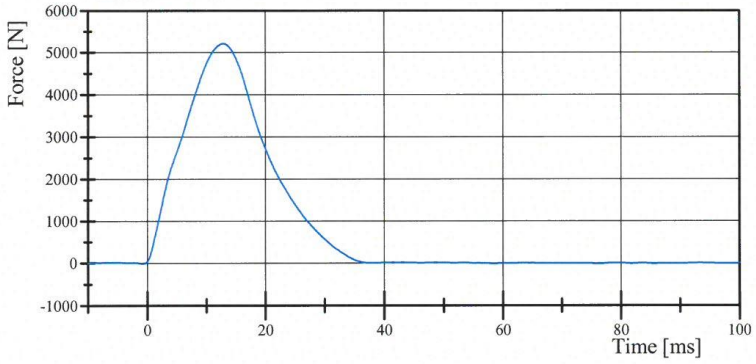
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 44-3
Test Date: 12/9/2016

Pendulum Acceleration



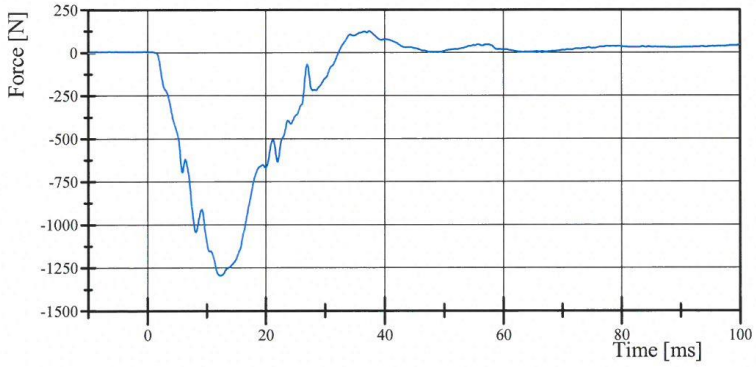
Filter Class: CFC_180
Max: 22.7 g at 12.9 ms
Min: -0.1 g at -0.7 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,204.6 N at 12.9 ms
Min: -20.5 N at -0.7 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 124.3 N at 37.4 ms
Min: -1,300.0 N at 12.2 ms

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

12.09.2016 07:39:35 551

Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 45

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. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Resultant Acceleration	125 - 155 g	143.3 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	11.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

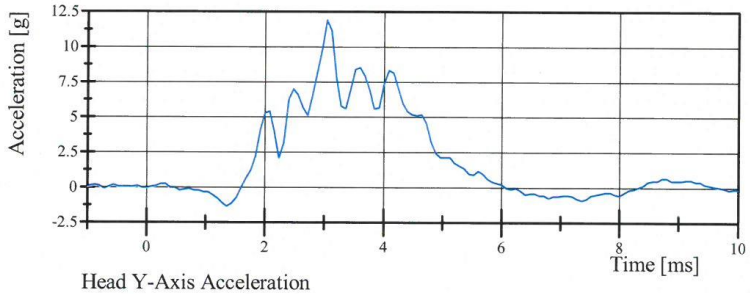
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.13.2016 10:41:23 362

Transportation Research Center Inc.

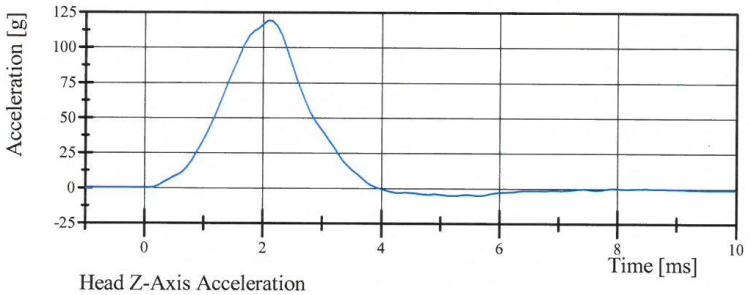
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Head X-Axis Acceleration



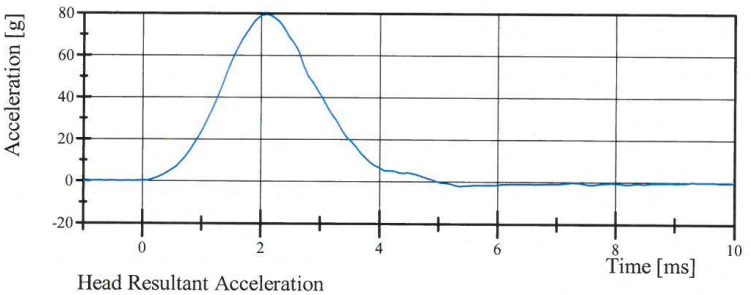
Filter Class: CFC_1000
Max: 11.9 g at 3.0 ms
Min: -1.4 g at 1.4 ms

Head Y-Axis Acceleration



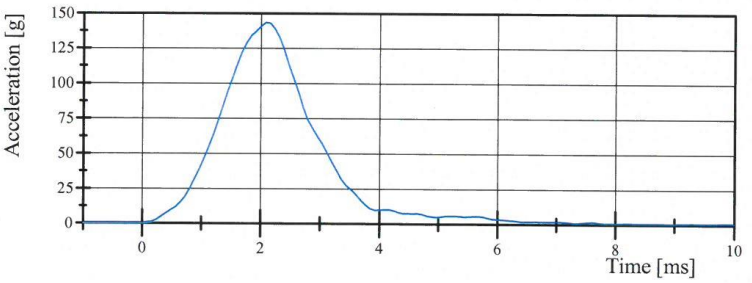
Filter Class: CFC_1000
Max: 119.2 g at 2.1 ms
Min: -5.3 g at 5.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 79.3 g at 2.1 ms
Min: -2.1 g at 5.4 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 143.3 g at 2.1 ms
Min: 0.0 g at -0.5 ms

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

12.13.2016 10:41:34 362

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-52.4 deg	Yes
Time of Peak	54 - 66 ms	57.2 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	69.3 ms	Yes

Test meets specifications.

Comments:

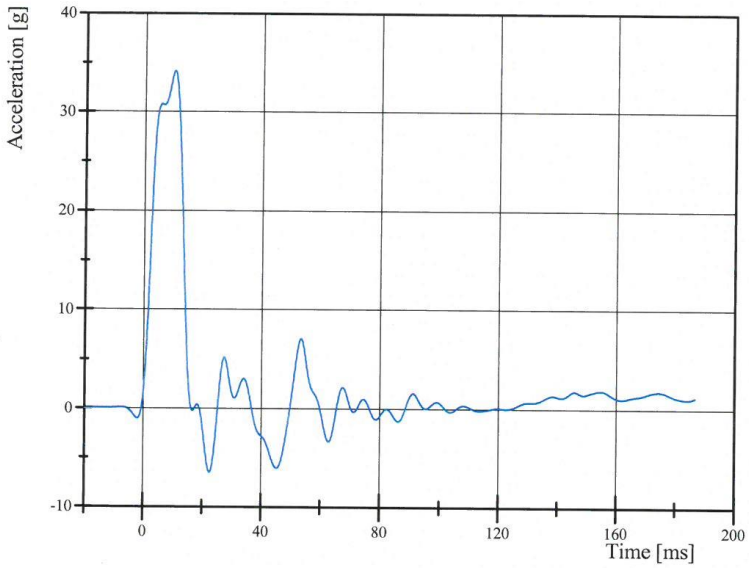
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.13.2016 09:38:03 1492

Transportation Research Center Inc.

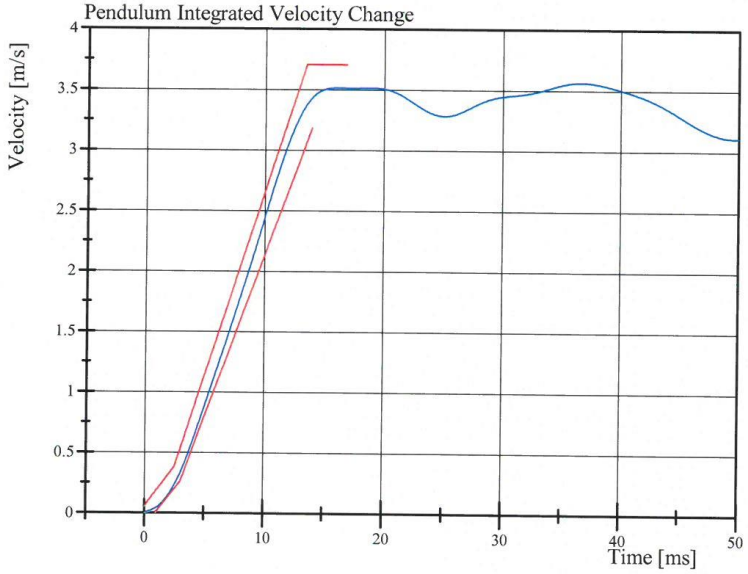
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Pendulum Acceleration



Filter Class: CFC_60
Max: 34.1 g at 9.9 ms
Min: -6.5 g at 22.5 ms

Pendulum Integrated Velocity Change



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

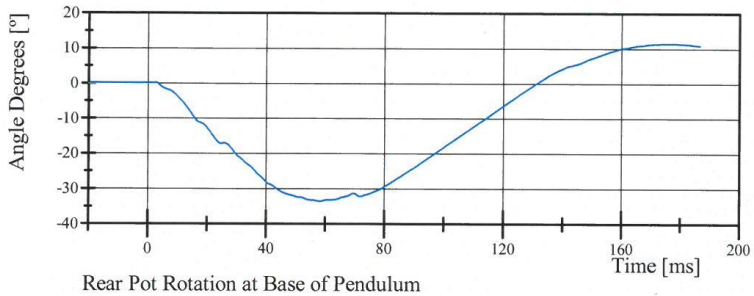
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.13.2016 09:38:14 1492

Transportation Research Center Inc.

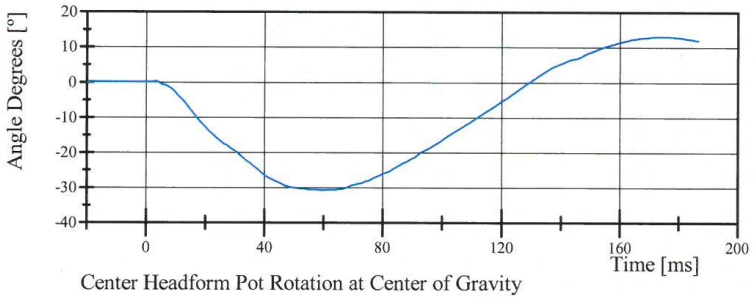
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Forward Pot Rotation at Base of Pendulum



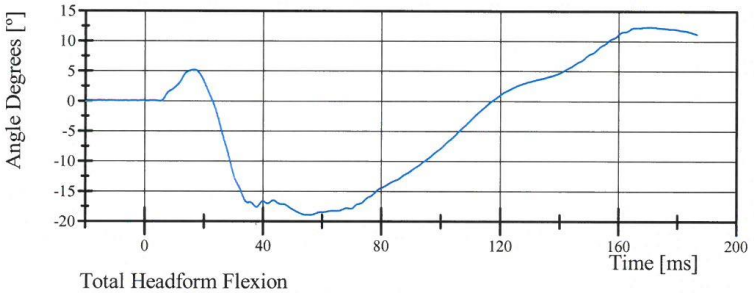
Filter Class: CFC_180
Max: 11.5 ° at 176.7 ms
Min: -33.6 ° at 58.1 ms

Rear Pot Rotation at Base of Pendulum



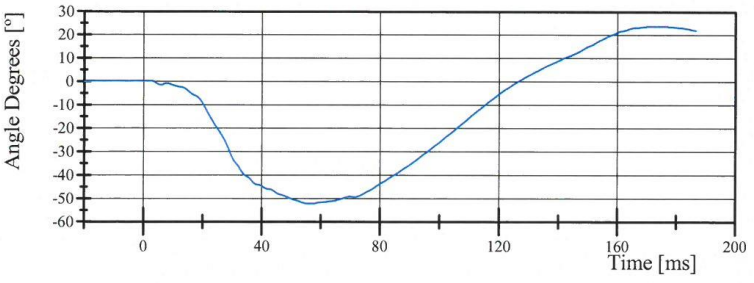
Filter Class: CFC_180
Max: 13.0 ° at 174.0 ms
Min: -30.8 ° at 59.5 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 12.4 ° at 170.5 ms
Min: -19.0 ° at 55.1 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 23.7 ° at 174.4 ms
Min: -52.4 ° at 57.2 ms

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

12.13.2016 09:38:14 1492

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.17 g	Yes

Test meets specifications.

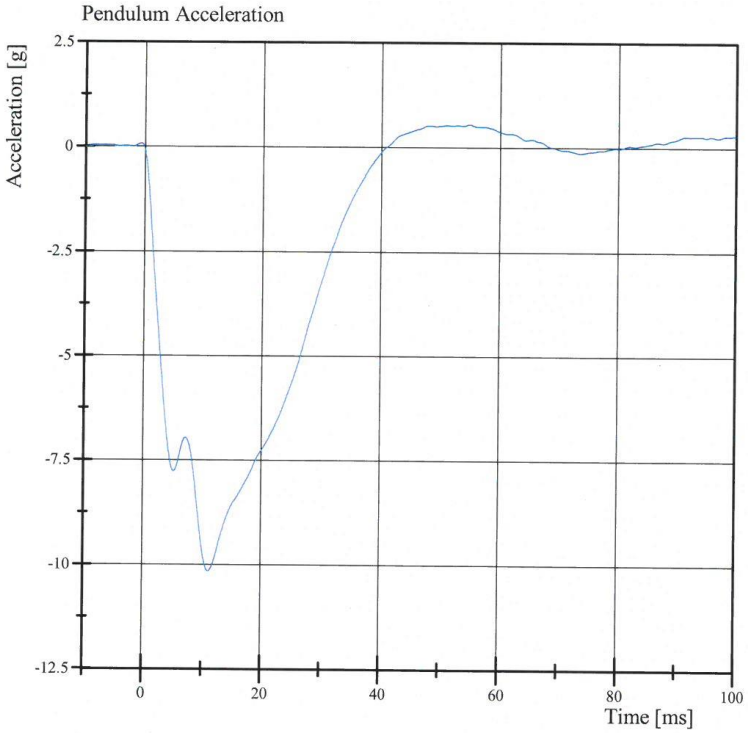
Comments:

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

12.13.2016 11:12:13 559

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 0.5 g at 54.8 ms
Min: -10.2 g at 11.1 ms

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

12.13.2016 11:12:23 559

Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

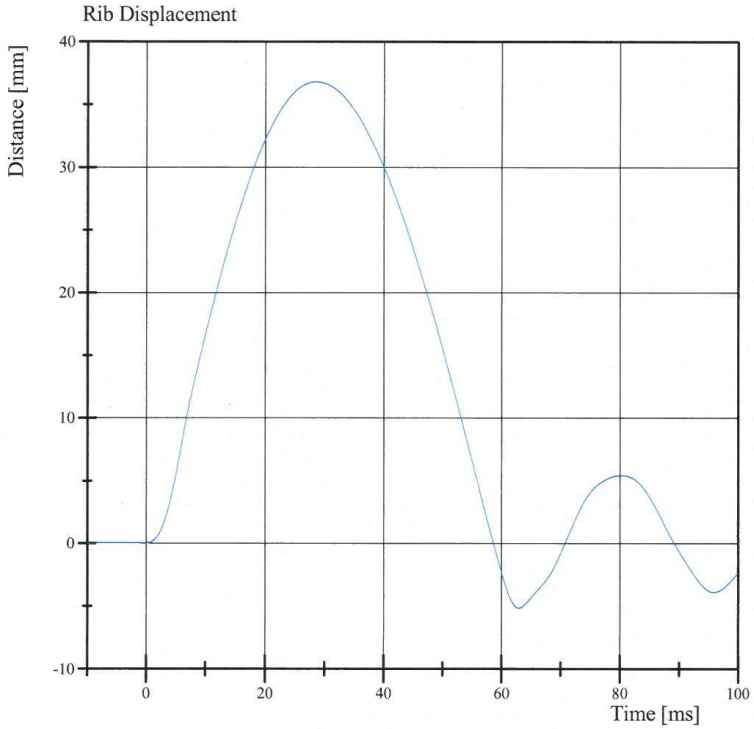
Test meets specifications.

Comments:

Drop Height: 462

Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 36.8 mm at 28.6 ms
Min: -5.2 mm at 63.0 ms

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

12.13.2016 08:26:52 890

Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.6 mm	Yes

Test meets specifications.

Comments:

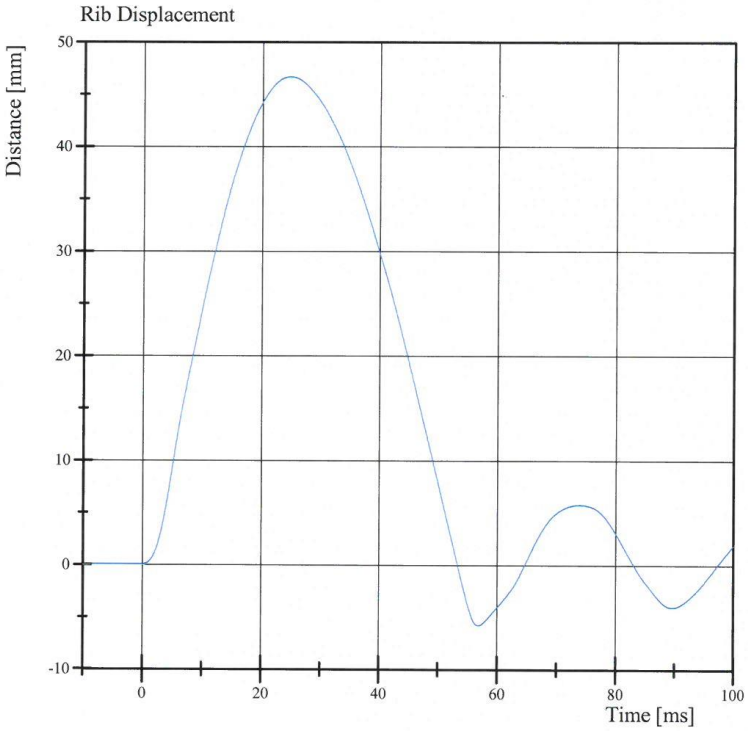
Drop Height: 816

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

12.13.2016 08:20:09 697

Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 46.6 mm at 24.7 ms
Min: -5.8 mm at 56.8 ms

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

12.13.2016 08:20:29 697

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.5 mm	Yes

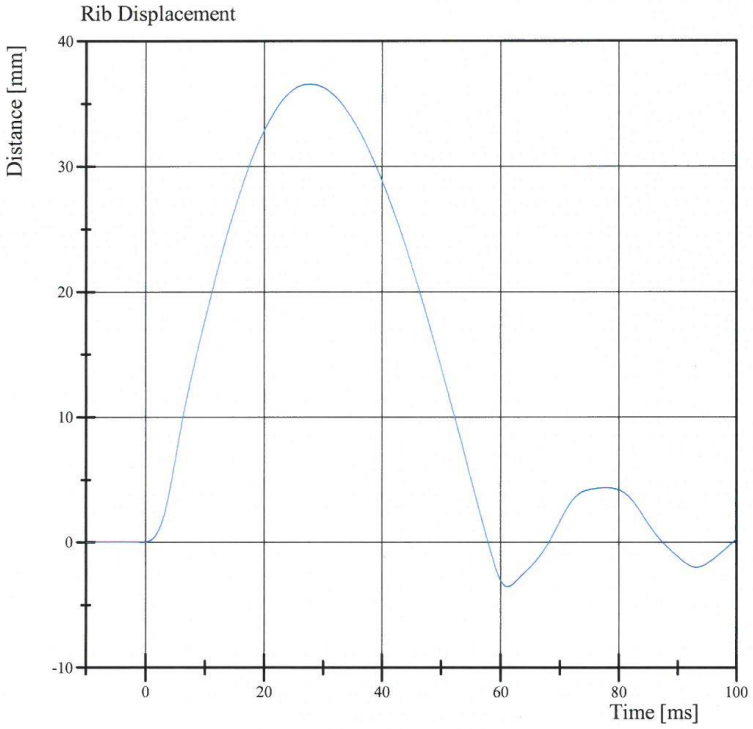
Test meets specifications.

Comments:

Drop Height: 462

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 36.5 mm at 27.7 ms
Min: -3.5 mm at 61.1 ms

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

12.13.2016 08:39:50 886

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.1 mm	Yes

Test meets specifications.

Comments:

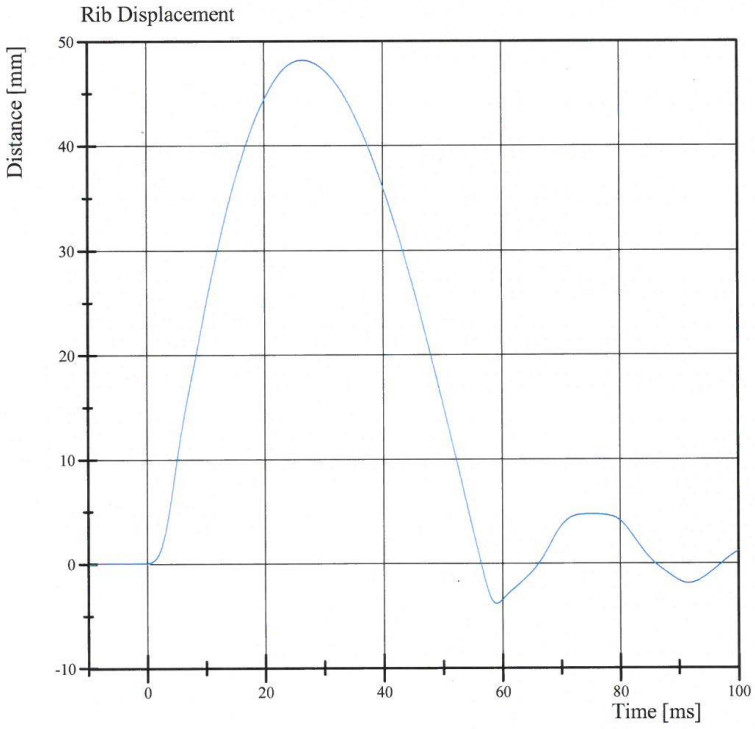
Drop Height: 816

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

12.13.2016 08:32:20 714

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 48.1 mm at 26.6 ms
Min: -3.9 mm at 59.0 ms

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

12.13.2016 08:32:33 714

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

Test meets specifications.

Comments:

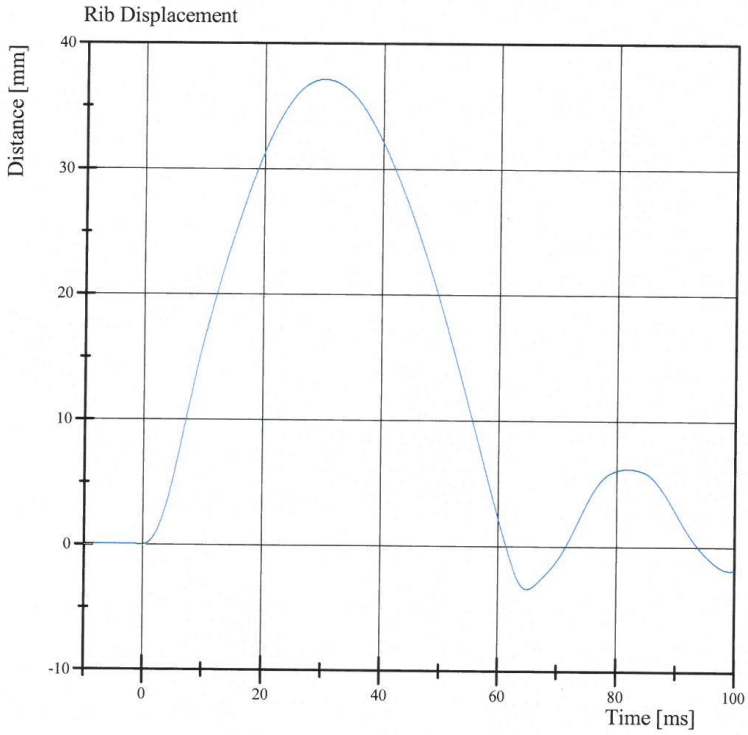
Drop Height: 462

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

12.13.2016 08:51:24 850

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 37.1 mm at 30.1 ms
Min: -3.4 mm at 65.0 ms

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

12.13.2016 08:51:34 850

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.2 mm	Yes

Test meets specifications.

Comments:

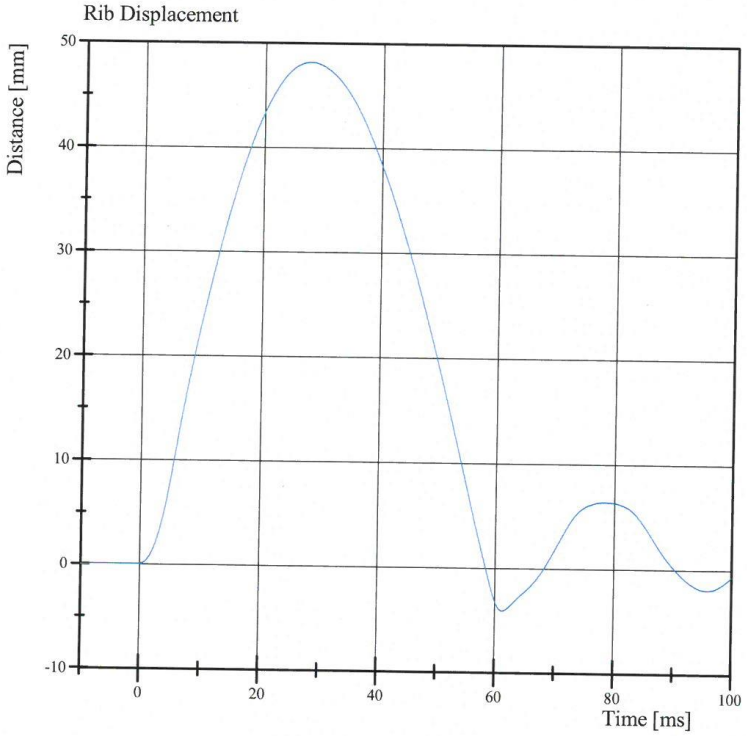
Drop Height: 816

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

12.13.2016 08:43:57 697

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 48.2 mm at 27.7 ms
Min: -4.1 mm at 61.3 ms

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

12.13.2016 08:44:08 697

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.549 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,372.3 N	Yes
Upper Rib Displacement	34 - 41 mm	36.4 mm	Yes
Center Rib Displacement	37 - 45 mm	41.0 mm	Yes
Lower Rib Displacement	37 - 44 mm	39.9 mm	Yes

Test meets specifications.

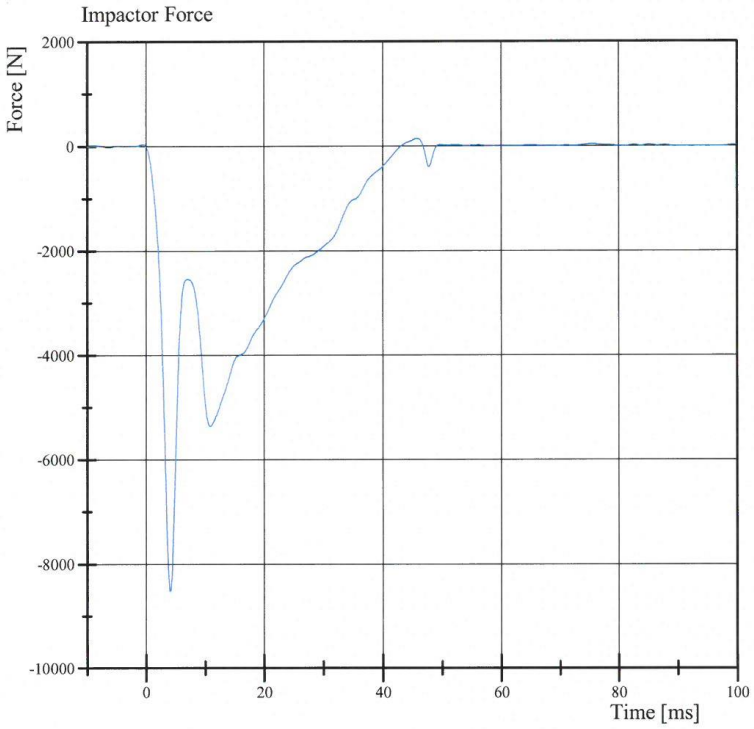
Comments:

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

12.13.2016 11:24:09 448

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016



Filter Class: CFC_180
Max: 139.0 N at 45.8 ms
Min: -8,538.9 N at 4.1 ms

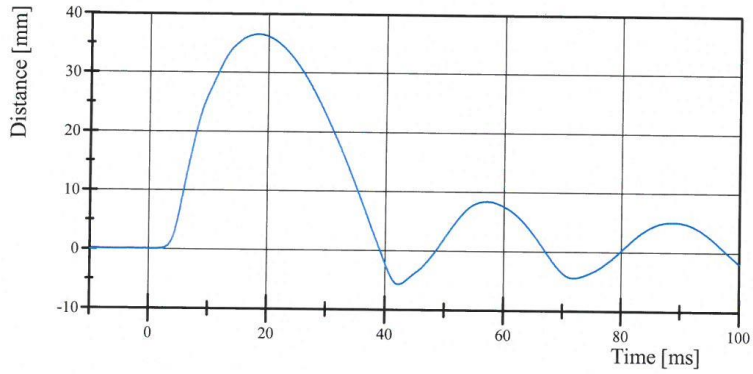
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.13.2016 11:24:21 448

Transportation Research Center Inc.

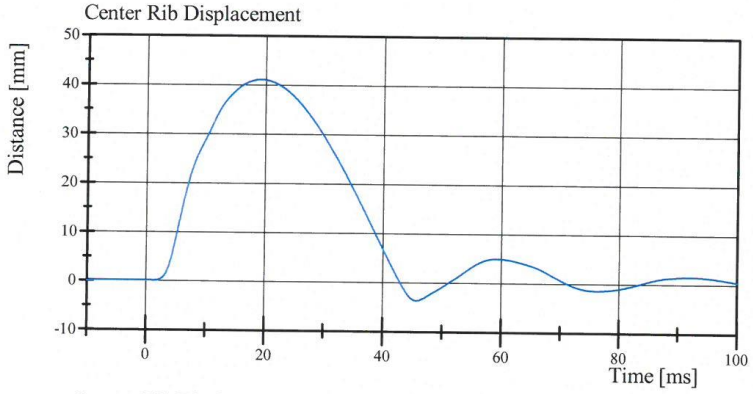
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Upper Rib Displacement



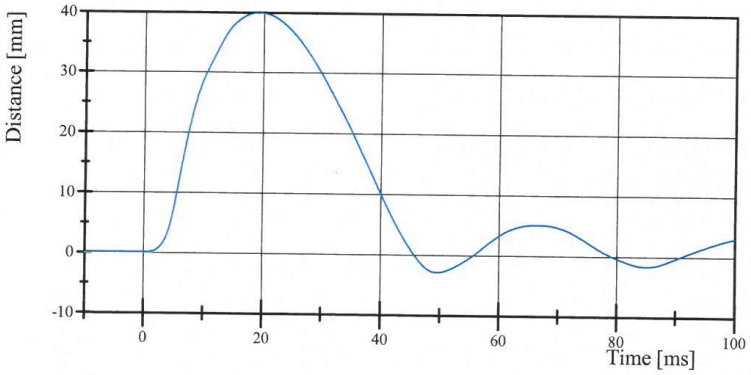
Filter Class: CFC_180
Max: 36.4 mm at 18.2 ms
Min: -5.8 mm at 42.2 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 41.0 mm at 19.2 ms
Min: -3.7 mm at 45.7 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 39.9 mm at 19.0 ms
Min: -3.0 mm at 49.5 ms

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

12.13.2016 11:24:22 448

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,084.1 N	Yes
Time of Peak	10.6 - 13.0 ms	10.72 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,433.5 N	Yes
Time of Peak	10.0 - 12.3 ms	10.72 ms	Yes

Test meets specifications.

Comments:

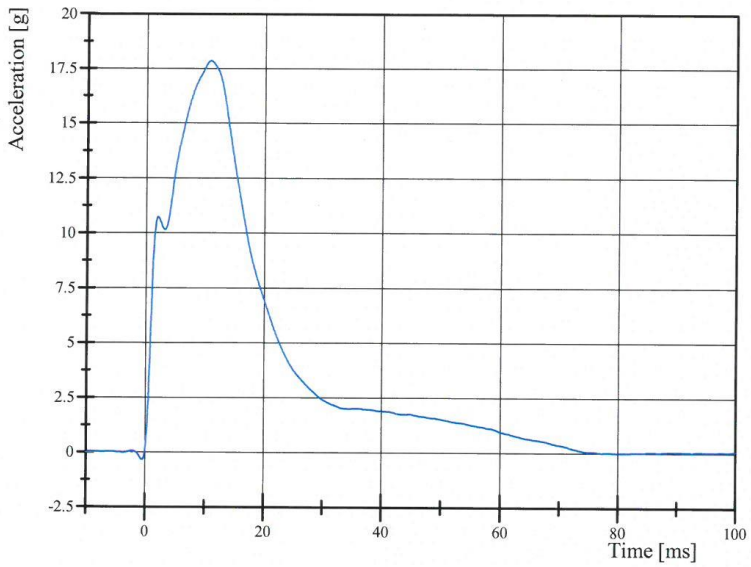
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.13.2016 11:31:06 585

Transportation Research Center Inc.

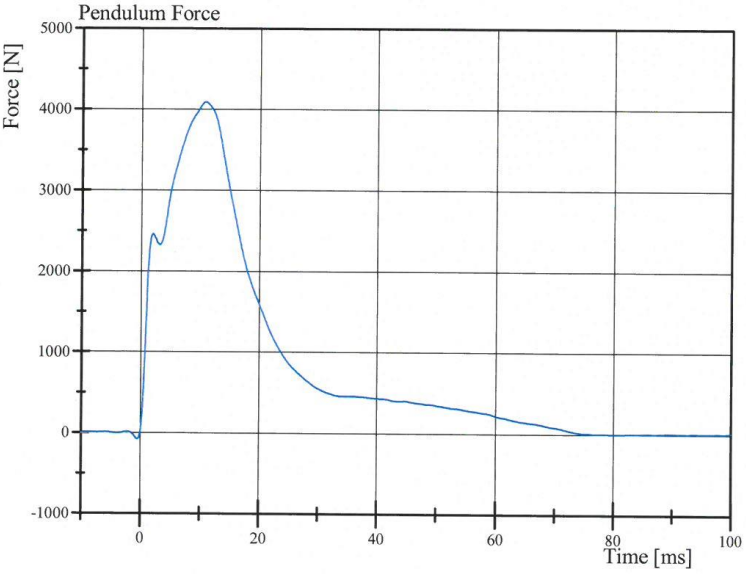
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Pendulum Acceleration



Filter Class: CFC_180
Max: 17.8 g at 10.7 ms
Min: -0.4 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,084.1 N at 10.7 ms
Min: -83.5 N at -0.6 ms

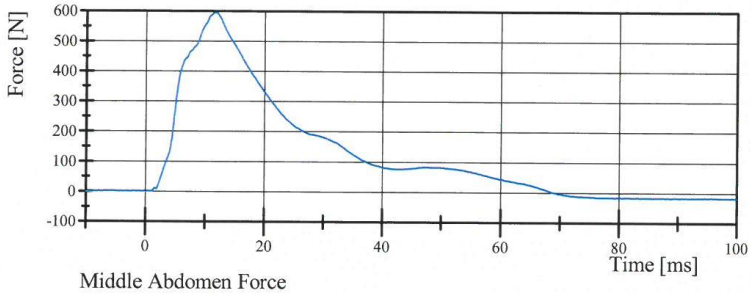
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.13.2016 11:31:18 585

Transportation Research Center Inc.

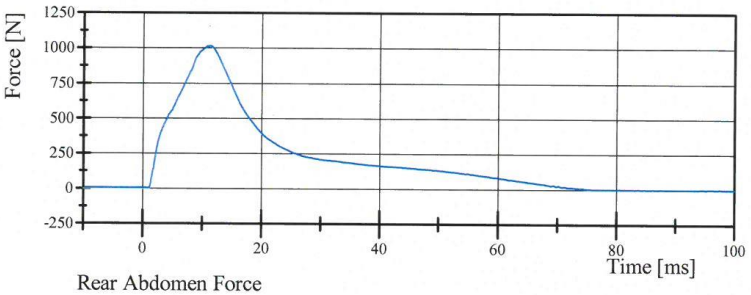
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Front Abdomen Force



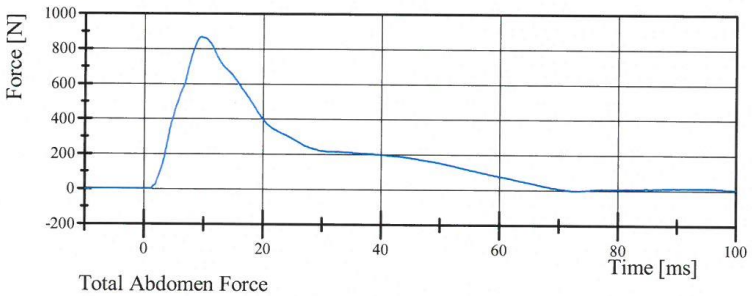
Filter Class: CFC_600
Max: 592.9 N at 11.6 ms
Min: -17.9 N at 98.3 ms

Middle Abdomen Force



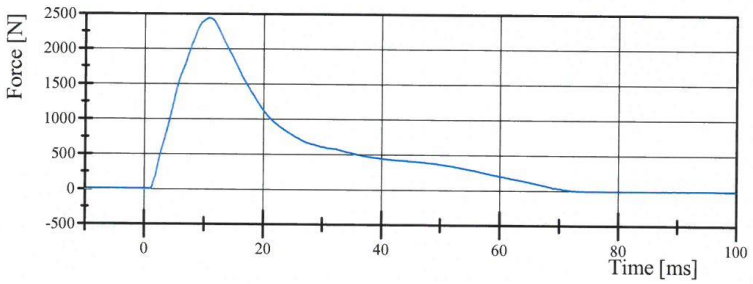
Filter Class: CFC_600
Max: 1,010.5 N at 11.3 ms
Min: -3.3 N at 90.2 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 863.5 N at 9.4 ms
Min: -2.6 N at 72.8 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,433.5 N at 10.7 ms
Min: -15.5 N at 99.8 ms

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

12.13.2016 11:31:19 585

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.105 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-48.7 deg	Yes
Time of Peak	39 - 53 ms	44.2 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	38.6 ms	Yes

Test meets specifications.

Comments:

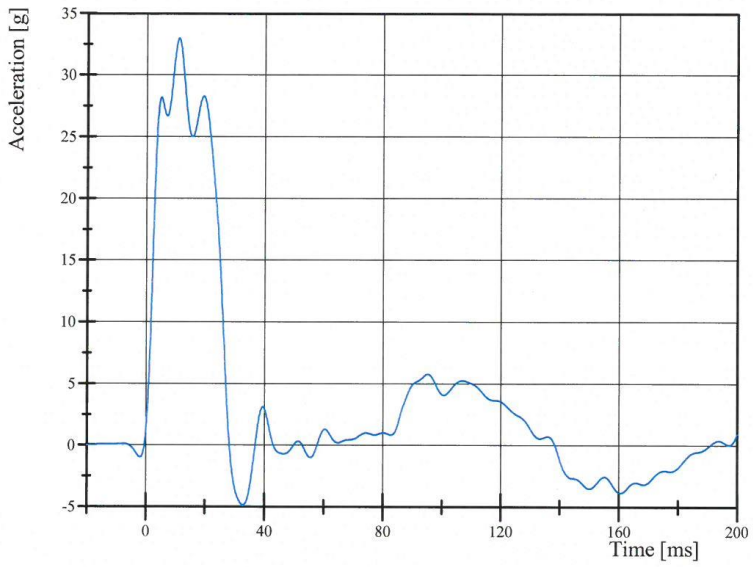
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.13.2016 09:16:58 669

Transportation Research Center Inc.

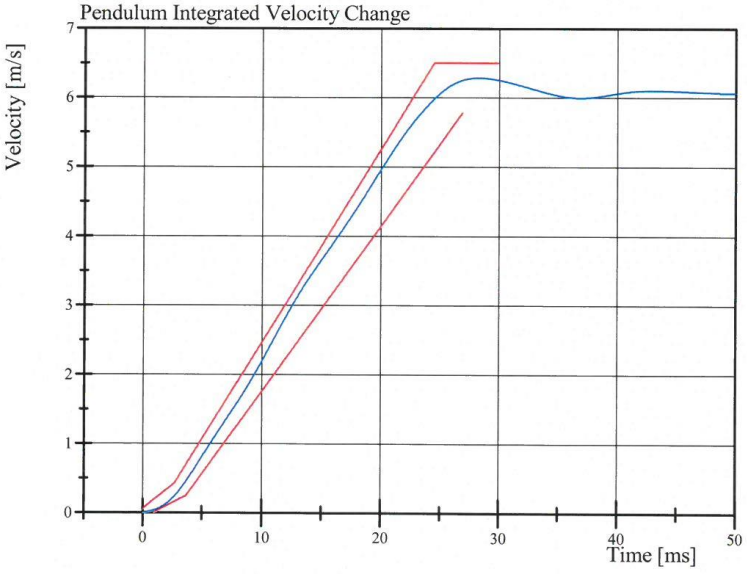
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Pendulum Acceleration



Filter Class: CFC_60
Max: 32.9 g at 11.0 ms
Min: -4.9 g at 32.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.3 m/s at 28.2 ms
Min: 0.0 m/s at 0.0 ms

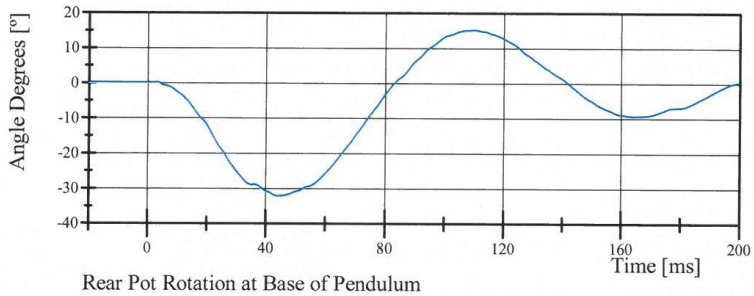
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.13.2016 09:18:40 669

Transportation Research Center Inc.

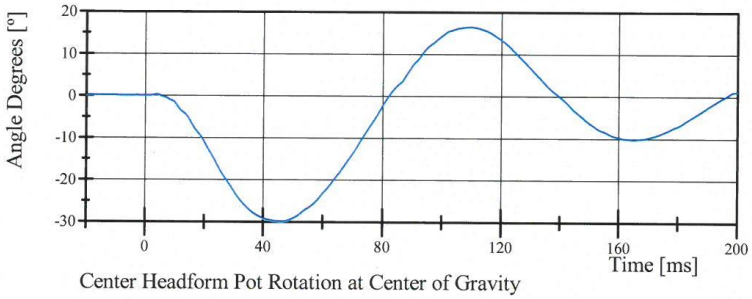
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Forward Pot Rotation at Base of Pendulum



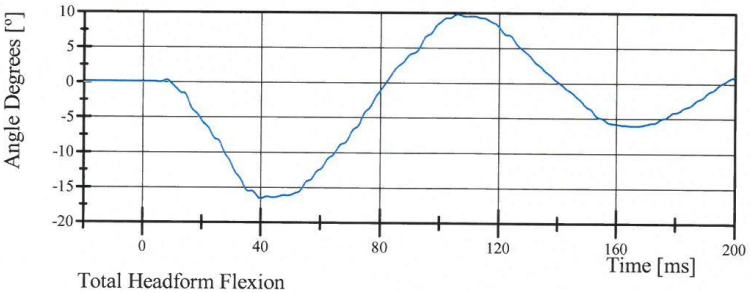
Filter Class: CFC_180
Max: 15.1 ° at 109.9 ms
Min: -32.3 ° at 44.2 ms

Rear Pot Rotation at Base of Pendulum



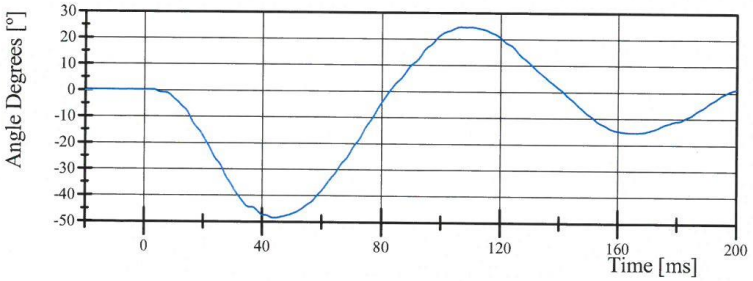
Filter Class: CFC_180
Max: 16.4 ° at 109.3 ms
Min: -30.0 ° at 46.1 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.8 ° at 105.8 ms
Min: -16.6 ° at 39.9 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 24.6 ° at 106.6 ms
Min: -48.7 ° at 44.2 ms

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

12.13.2016 09:18:42 669

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,120.1 N	Yes
Time of Peak	11.8 - 16.1 ms	13.12 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,302.1 N	Yes
Time of Peak	12.2 - 17.0 ms	12.72 ms	Yes

Test meets specifications.

Comments:

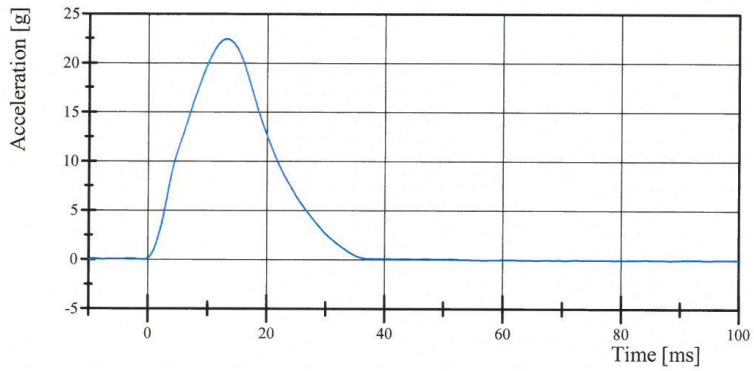
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.13.2016 11:36:51 536

Transportation Research Center Inc.

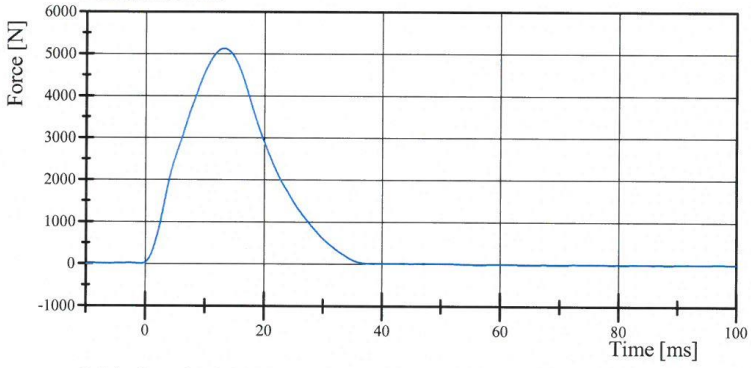
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 45-1
Test Date: 12/13/2016

Pendulum Acceleration



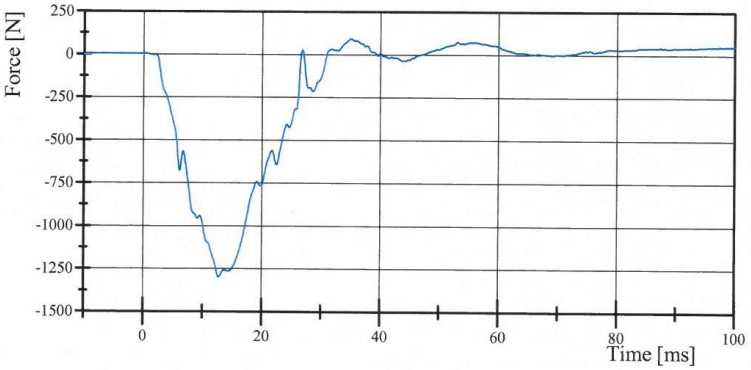
Filter Class: CFC_180
Max: 22.3 g at 13.1 ms
Min: -0.1 g at 57.0 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,120.1 N at 13.1 ms
Min: -14.4 N at 57.0 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 88.9 N at 35.0 ms
Min: -1,302.1 N at 12.7 ms

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

12.13.2016 11:37:03 536

Pre-Test Calibration Sheets
Passenger S/N 305

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

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

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

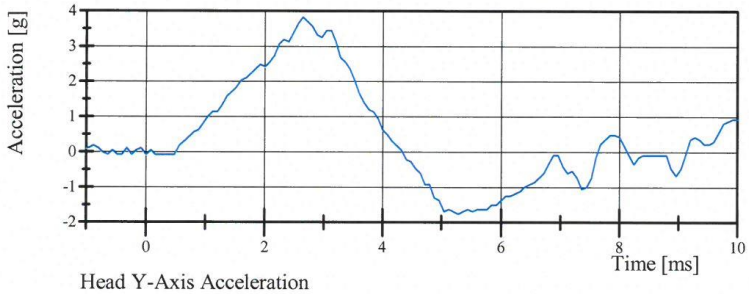
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

12.08.2016 14:38:11 233

Transportation Research Center Inc.

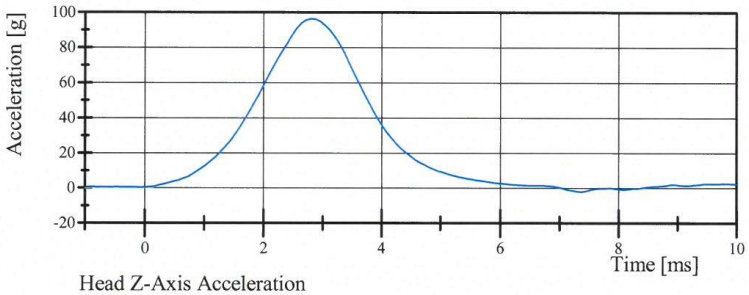
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Head X-Axis Acceleration



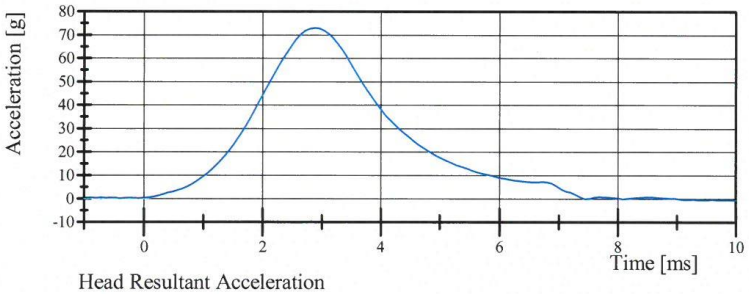
Filter Class: CFC_1000
Max: 3.8 g at 2.6 ms
Min: -1.8 g at 5.3 ms

Head Y-Axis Acceleration



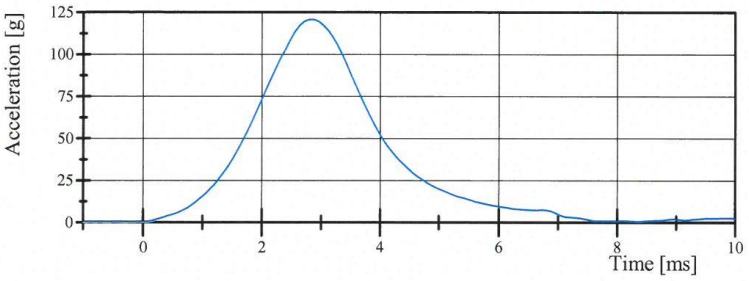
Filter Class: CFC_1000
Max: 96.1 g at 2.8 ms
Min: -2.3 g at 7.4 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 72.7 g at 2.9 ms
Min: -0.7 g at 10.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 120.4 g at 2.8 ms
Min: 0.0 g at -0.2 ms

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

12.08.2016 14:38:21 233

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

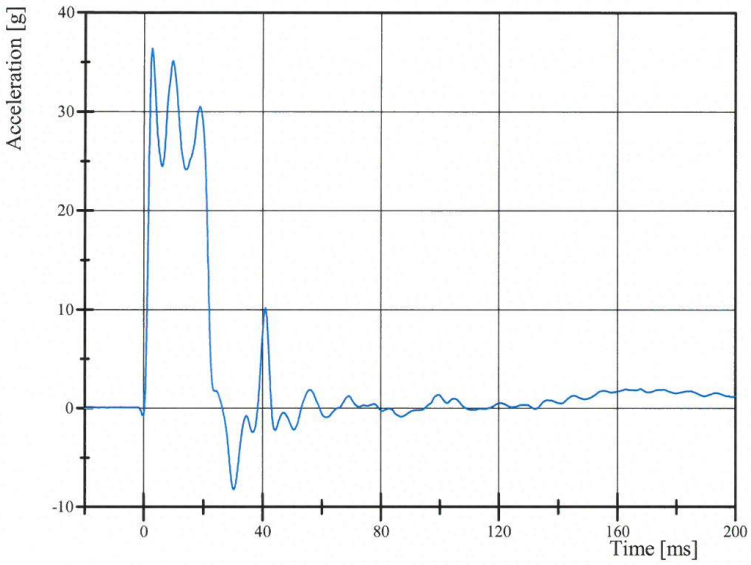
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

12.08.2016 16:36:42 739

Transportation Research Center Inc.

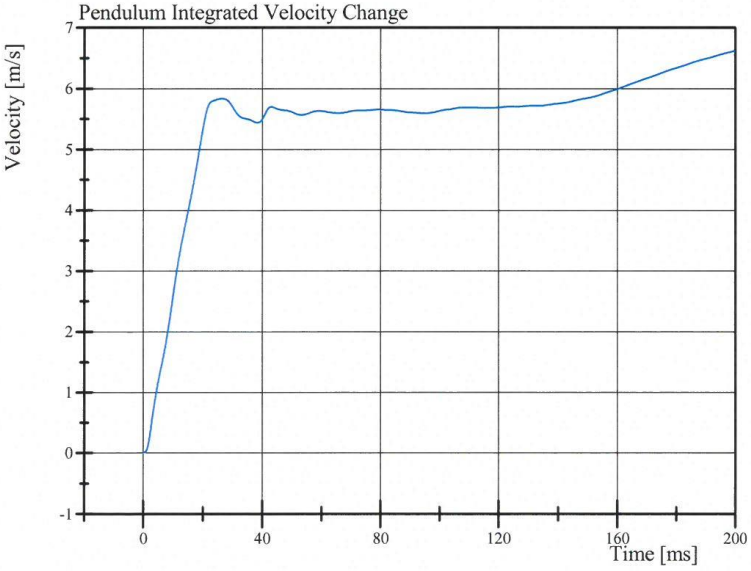
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Pendulum Acceleration



Filter Class: CFC_180
Max: 36.3 g at 2.6 ms
Min: -8.3 g at 30.2 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.6 m/s at 200.0 ms
Min: -0.0 m/s at 0.2 ms

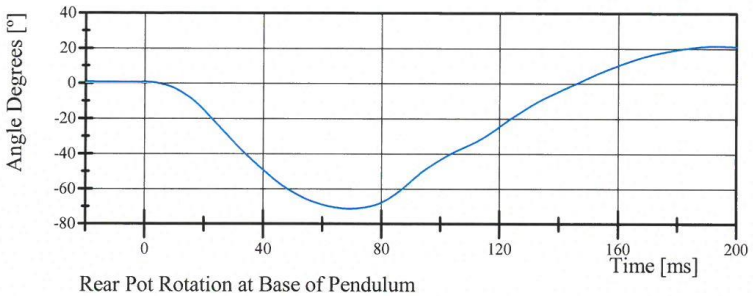
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:36:52 739

Transportation Research Center Inc.

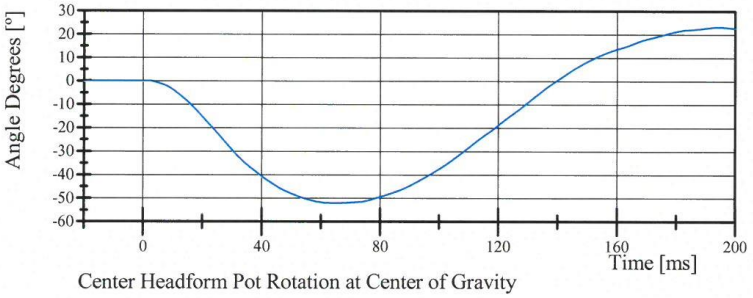
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Forward Pot Rotation at Base of Pendulum



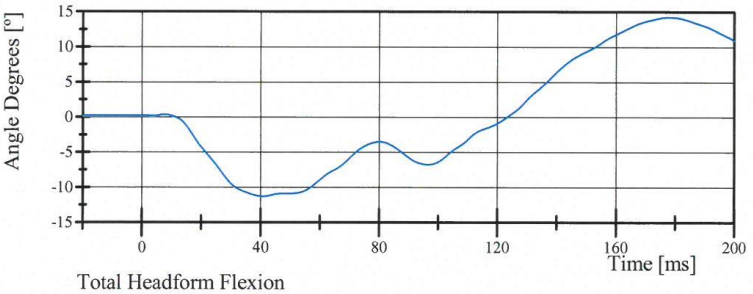
Filter Class: CFC_60
Max: 21.3 ° at 192.6 ms
Min: -71.6 ° at 69.0 ms

Rear Pot Rotation at Base of Pendulum



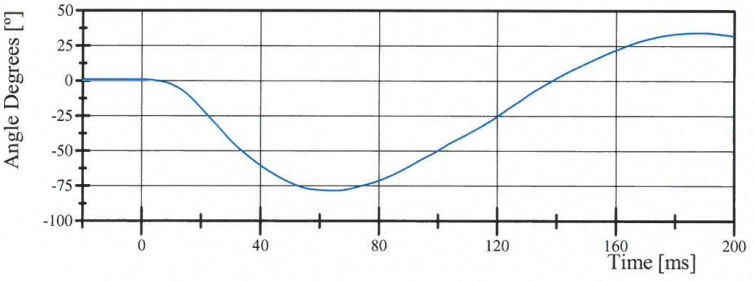
Filter Class: CFC_60
Max: 23.1 ° at 194.3 ms
Min: -52.3 ° at 65.0 ms

Center Headform Pot Rotation at Center of Gravity



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

Total Headform Flexion



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

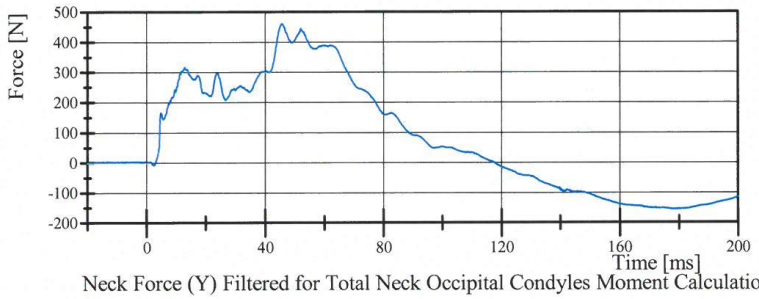
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:36:53 739

Transportation Research Center Inc.

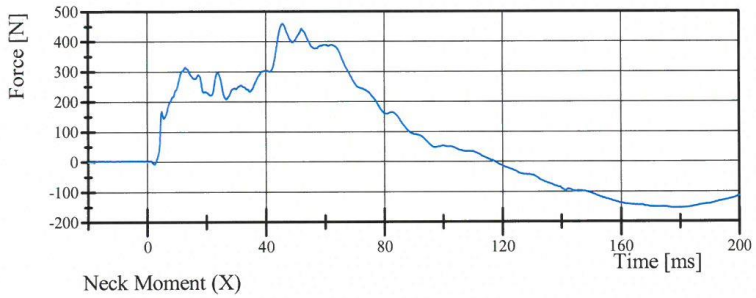
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Neck Force (Y)



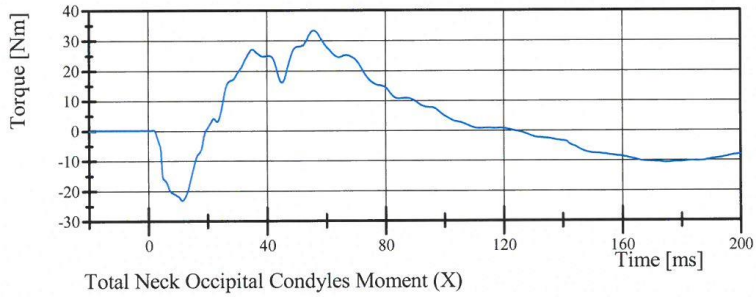
Filter Class: CFC_1000
Max: 458.5 N at 45.6 ms
Min: -156.0 N at 177.8 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



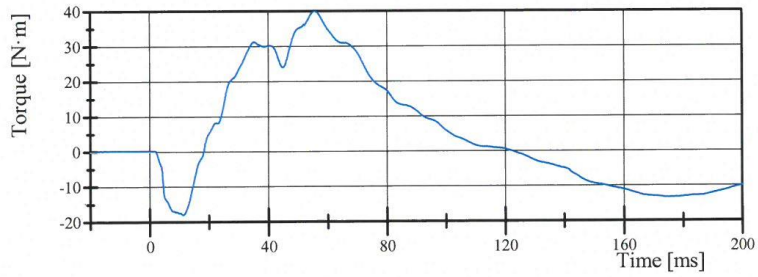
Filter Class: CFC_600
Max: 458.2 N at 45.6 ms
Min: -155.5 N at 177.8 ms

Neck Moment (X)



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

Total Neck Occipital Condyles Moment (X)



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

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

12.08.2016 16:36:54 739

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

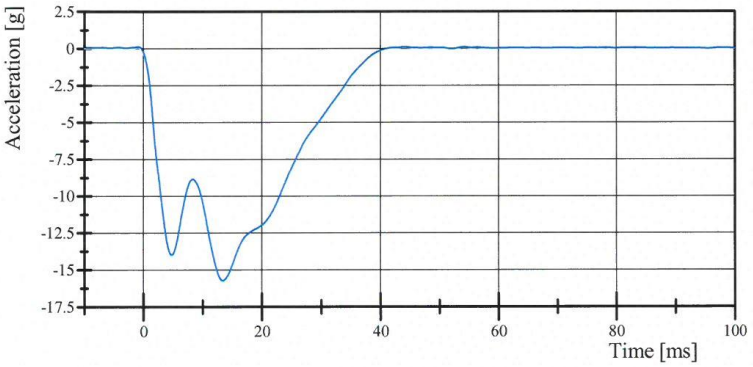
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:43:41 856

Transportation Research Center Inc.

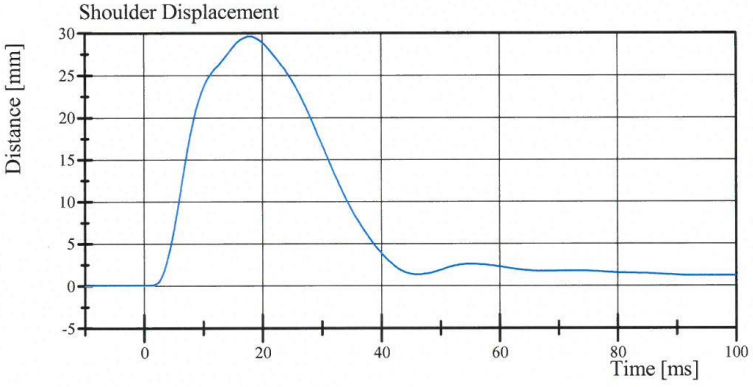
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Probe Acceleration



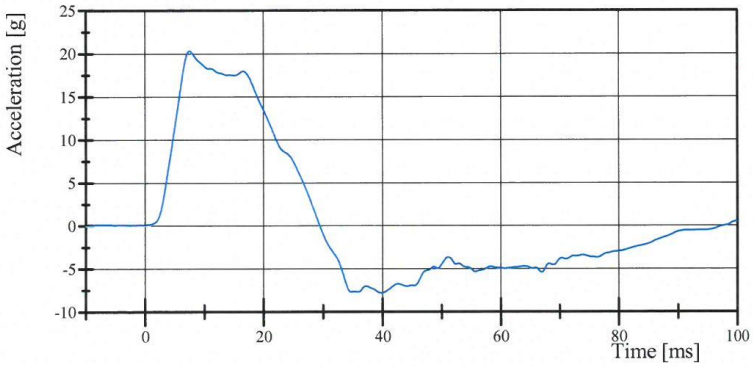
Filter Class: CFC_180
Max: 0.1 g at 44.0 ms
Min: -15.8 g at 13.4 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 29.6 mm at 17.9 ms
Min: -0.0 mm at -9.0 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 20.2 g at 7.5 ms
Min: -7.9 g at 39.8 ms

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

12.08.2016 15:43:57 856

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

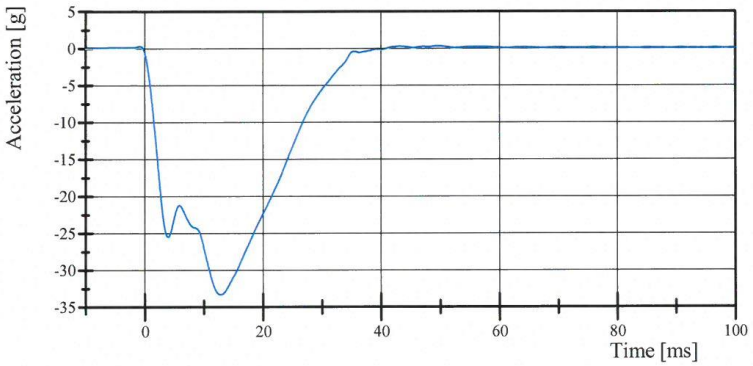
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:48:03 632

Transportation Research Center Inc.

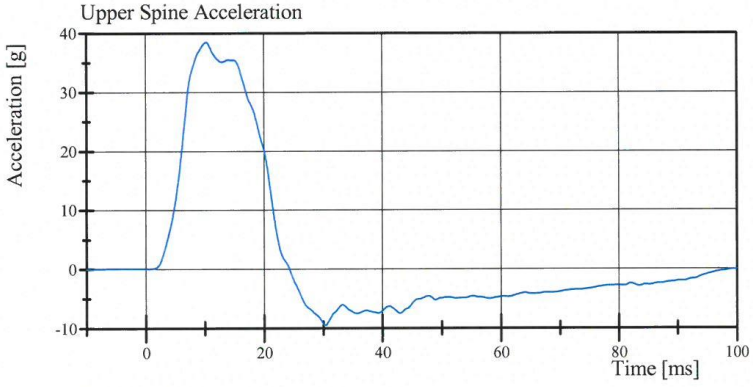
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Probe Acceleration



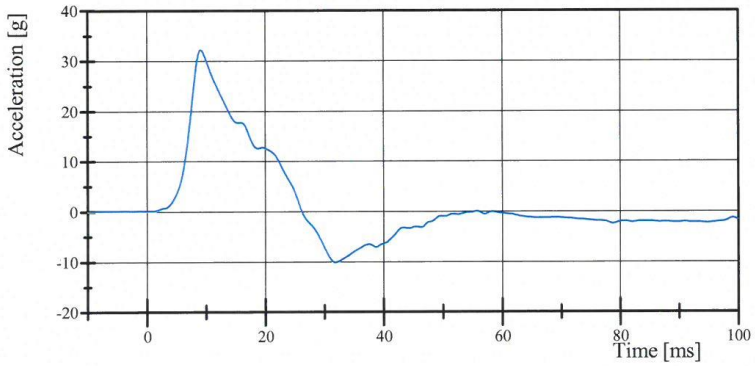
Filter Class: CFC_180
Max: 0.3 g at 49.7 ms
Min: -33.4 g at 12.8 ms

Upper Spine Acceleration



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

Lower Spine Acceleration



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

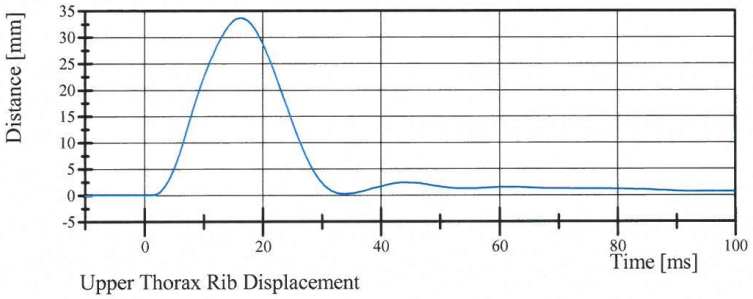
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:48:15 632

Transportation Research Center Inc.

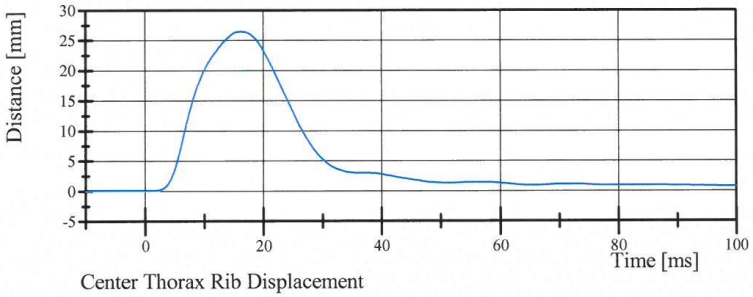
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Shoulder Rib Displacement



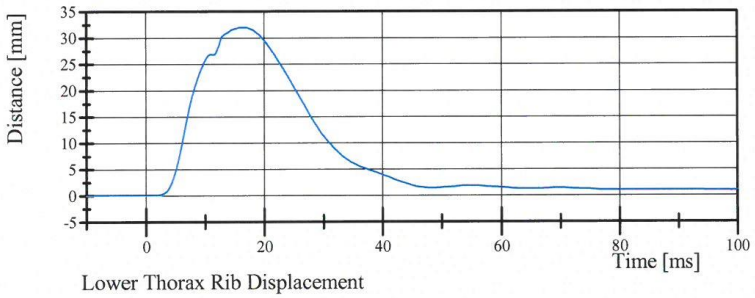
Filter Class: CFC_600
Max: 33.5 mm at 16.2 ms
Min: -0.0 mm at -9.0 ms

Upper Thorax Rib Displacement



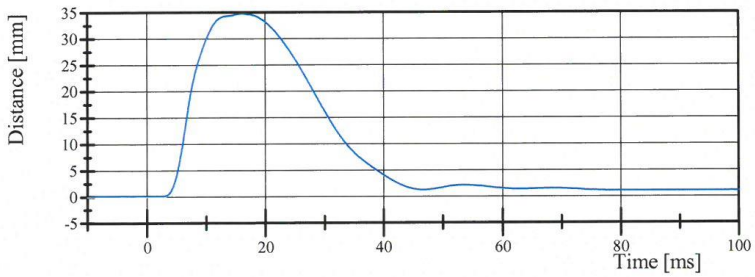
Filter Class: CFC_600
Max: 26.4 mm at 16.1 ms
Min: -0.0 mm at -0.6 ms

Center Thorax Rib Displacement



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

Lower Thorax Rib Displacement



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

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

12.08.2016 16:48:16 632

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

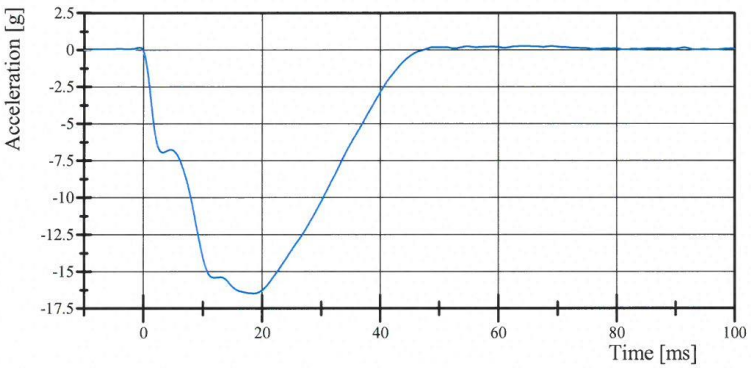
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:01:24 875

Transportation Research Center Inc.

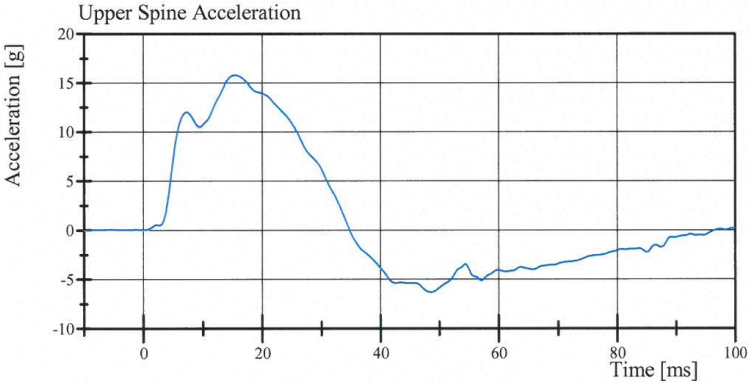
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Probe Acceleration



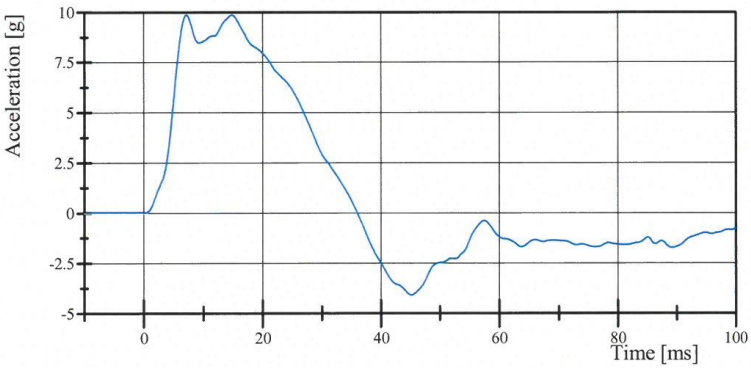
Filter Class: CFC_180
Max: 0.2 g at 64.7 ms
Min: -16.5 g at 18.5 ms

Upper Spine Acceleration



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

Lower Spine Acceleration



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

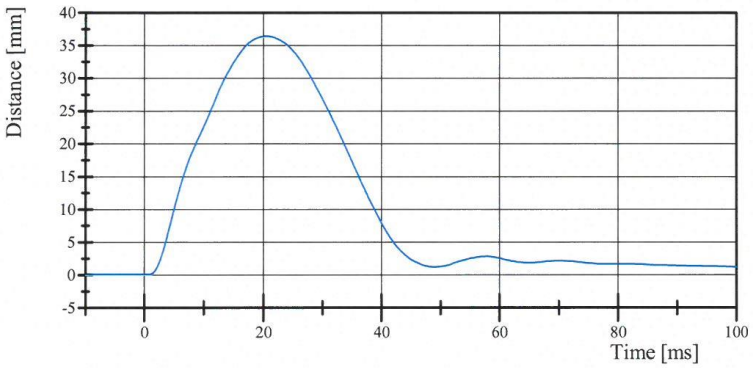
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 16:01:35 875

Transportation Research Center Inc.

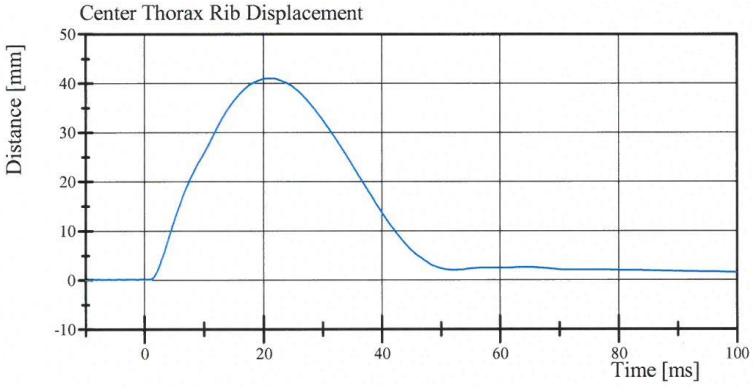
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Upper Thorax Rib Displacement



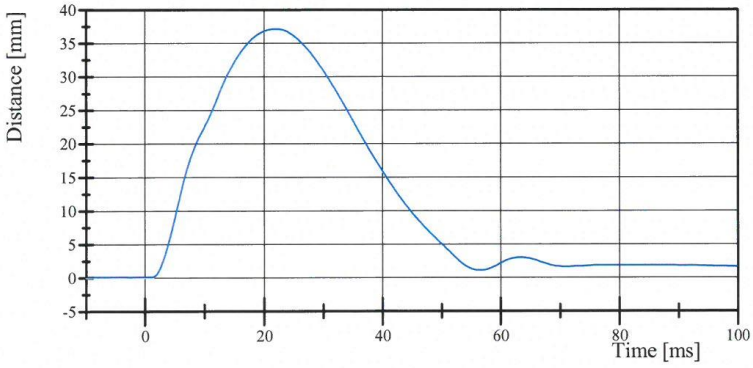
Filter Class: CFC_600
Max: 36.3 mm at 20.4 ms
Min: -0.0 mm at 0.7 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.9 mm at 21.1 ms
Min: -0.0 mm at -6.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.0 mm at 21.9 ms
Min: -0.0 mm at -3.8 ms

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

12.08.2016 16:01:35 875

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments:

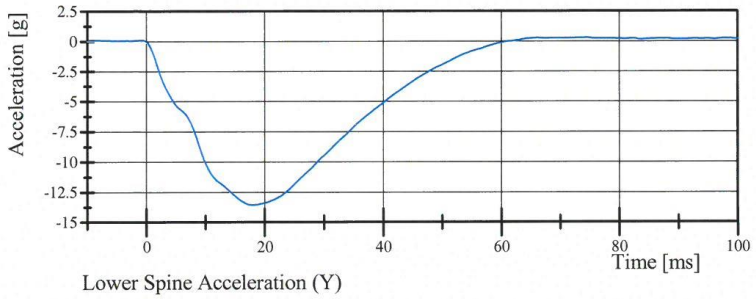
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.08.2016 15:53:05 701

Transportation Research Center Inc.

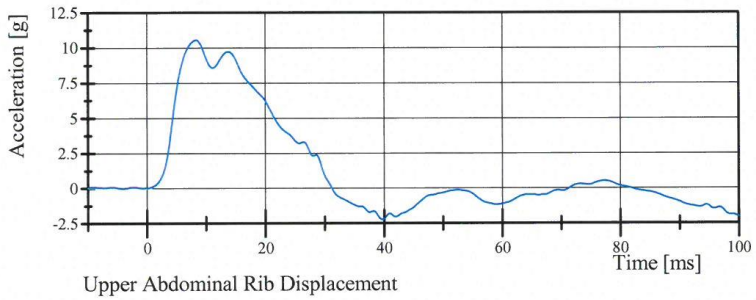
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Probe Acceleration



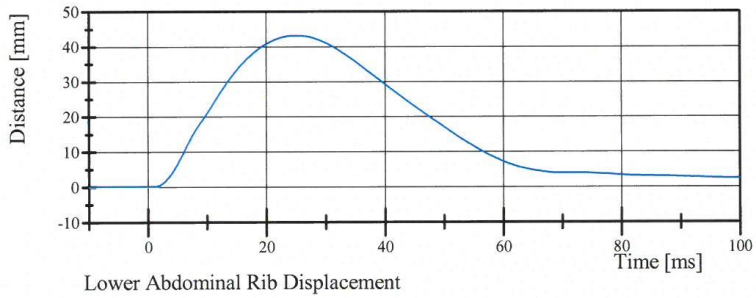
Filter Class: CFC_180
Max: 0.3 g at 74.5 ms
Min: -13.6 g at 17.9 ms

Lower Spine Acceleration (Y)



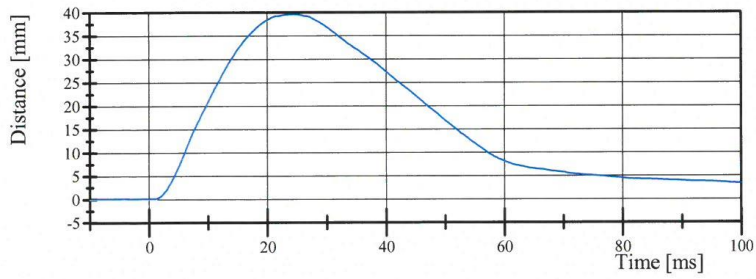
Filter Class: CFC_180
Max: 10.5 g at 8.3 ms
Min: -2.3 g at 39.6 ms

Upper Abdominal Rib Displacement



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

Lower Abdominal Rib Displacement



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

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

12.08.2016 15:53:22 701

Transportation Research Center Inc.

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

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

Test meets specifications.

Comments: Pelvis Plug #11045

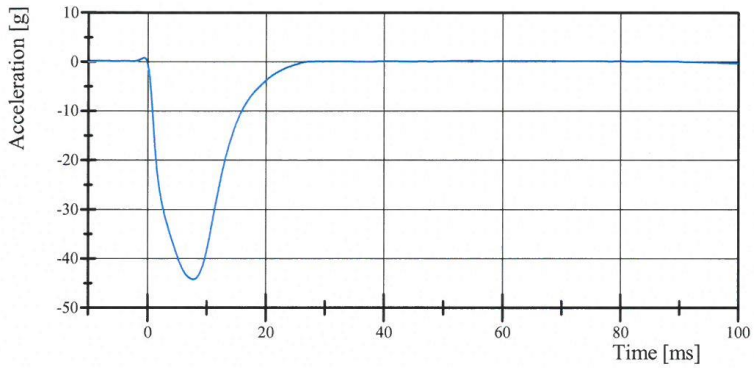
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

12.08.2016 15:22:41 464

Transportation Research Center Inc.

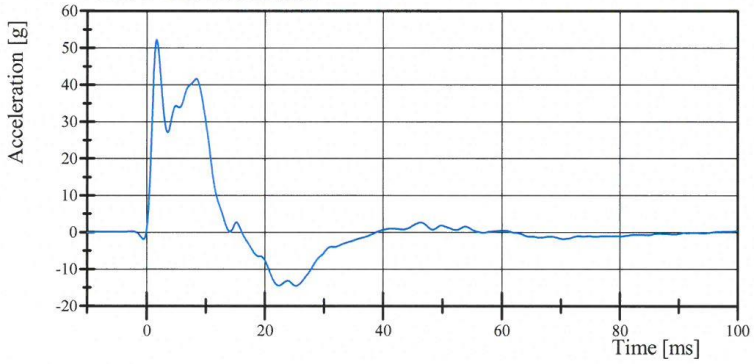
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/8/2016

Probe Acceleration



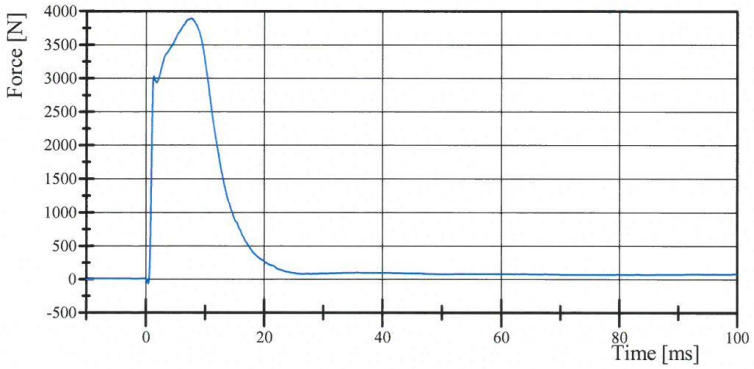
Filter Class: CFC_180
Max: 0.7 g at -0.7 ms
Min: -44.3 g at 7.7 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 52.1 g at 1.6 ms
Min: -14.6 g at 25.2 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 3,887.2 N at 7.6 ms
Min: -69.2 N at 0.4 ms

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

12.08.2016 15:23:06 464

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/9/2016

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

Test meets specifications.

Comments:

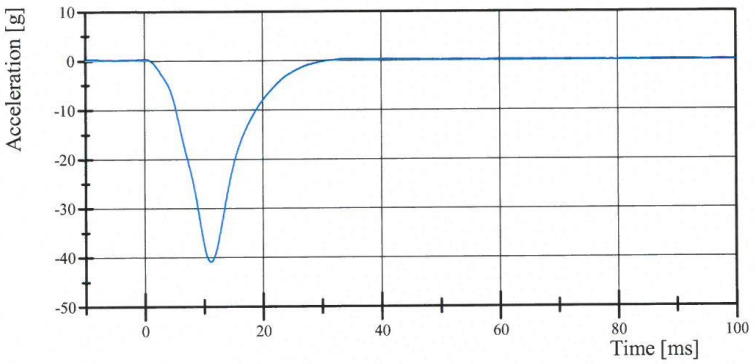
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.09.2016 09:41:42 651

Transportation Research Center Inc.

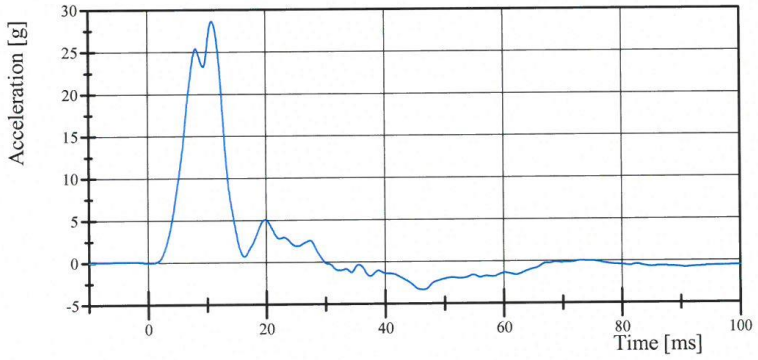
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 51-1
Test Date: 12/9/2016

Probe Acceleration



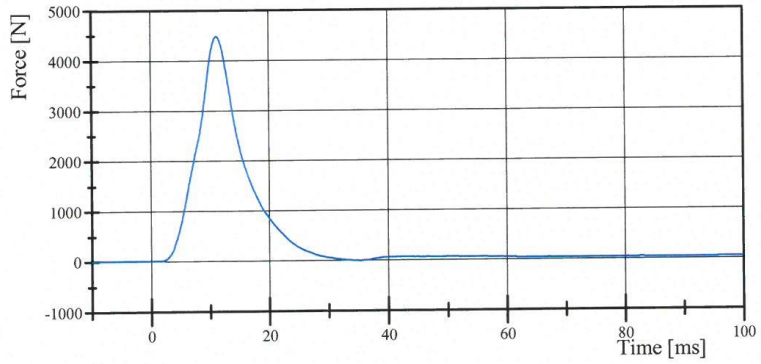
Filter Class: CFC_180
Max: 0.2 g at 34.0 ms
Min: -41.0 g at 11.1 ms

Pelvis Y-Axis Acceleration



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

Iliac Y-Axis Force



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

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

12.09.2016 09:41:53 651

Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.52

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	779	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	88	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	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	200	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. 52-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.9 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

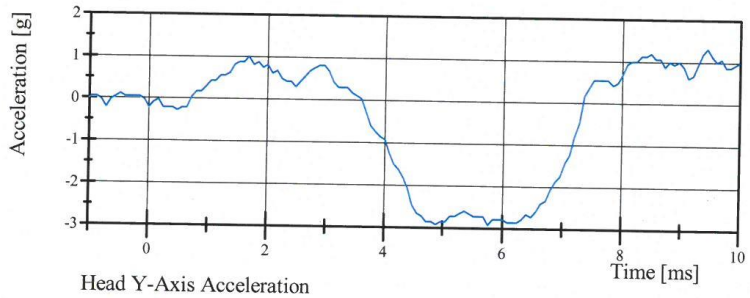
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 14:40:45 232

Transportation Research Center Inc.

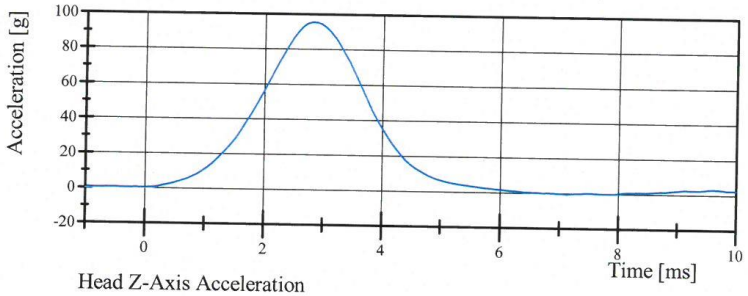
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Head X-Axis Acceleration



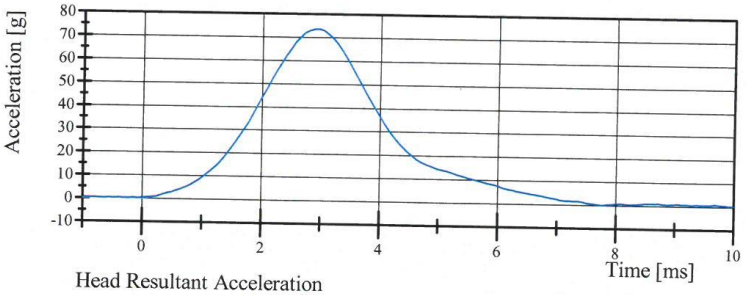
Filter Class: CFC_1000
Max: 1.3 g at 9.4 ms
Min: -2.9 g at 4.9 ms

Head Y-Axis Acceleration



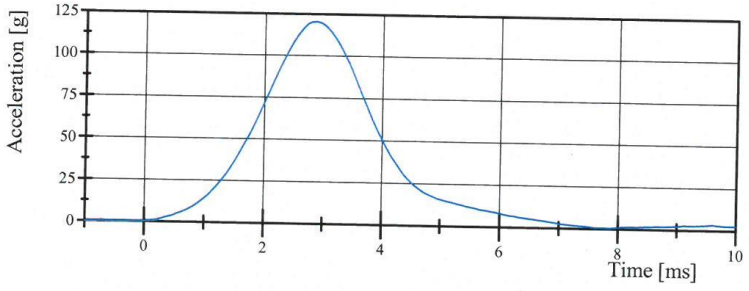
Filter Class: CFC_1000
Max: 95.4 g at 2.8 ms
Min: -0.5 g at 7.1 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 73.4 g at 2.9 ms
Min: -0.1 g at -0.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 120.1 g at 2.9 ms
Min: 0.0 g at -1.0 ms

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

12.13.2016 14:40:59 232

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.611 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.672 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.933 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.251 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.810 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.810 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-77.2 deg	Yes
Time of Peak	50 - 70 ms	63.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	121.8 ms	Yes

Test meets specifications.

Comments:

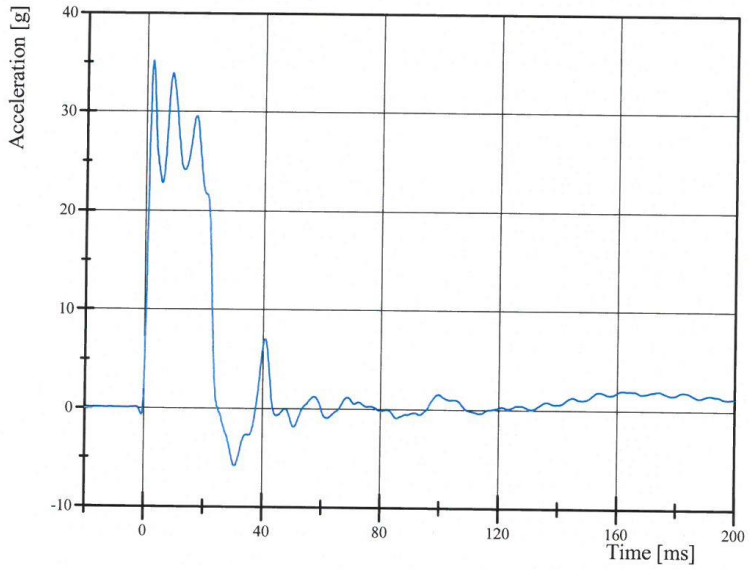
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

12.14.2016 07:57:21 748

Transportation Research Center Inc.

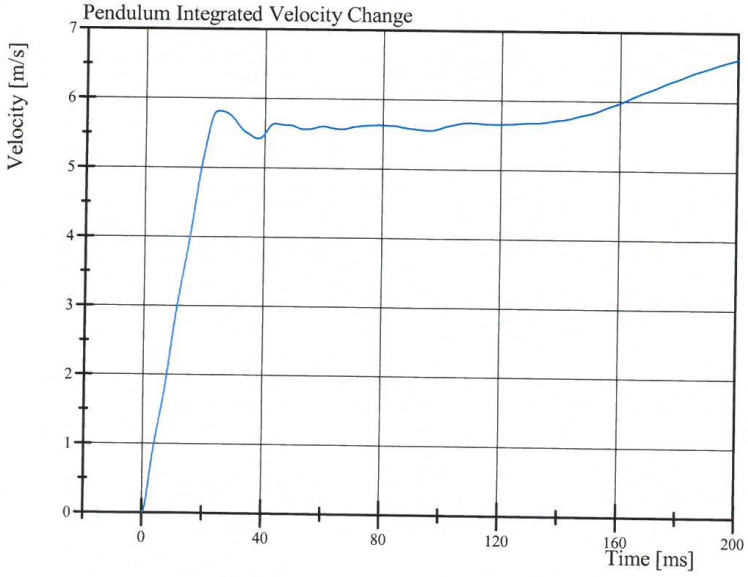
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/14/2016

Pendulum Acceleration



Filter Class: CFC_180
Max: 35.1 g at 2.1 ms
Min: -5.9 g at 30.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.6 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

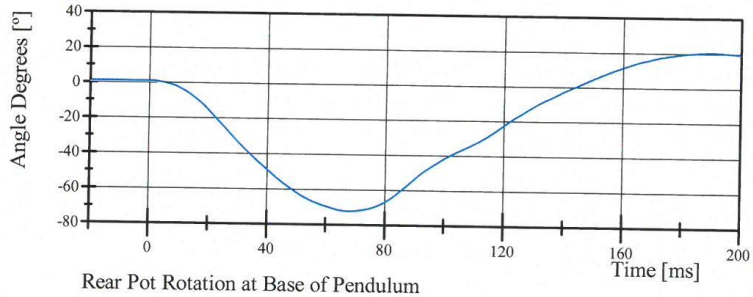
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.14.2016 07:57:39 748

Transportation Research Center Inc.

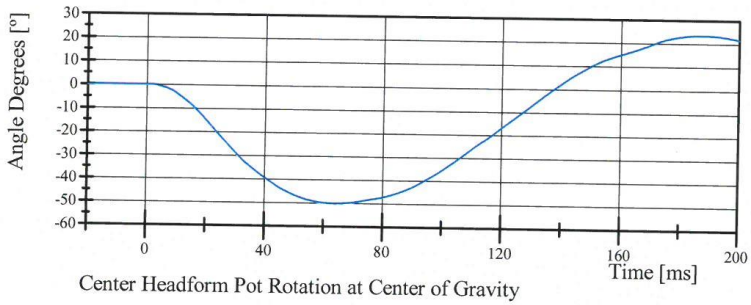
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/14/2016

Forward Pot Rotation at Base of Pendulum



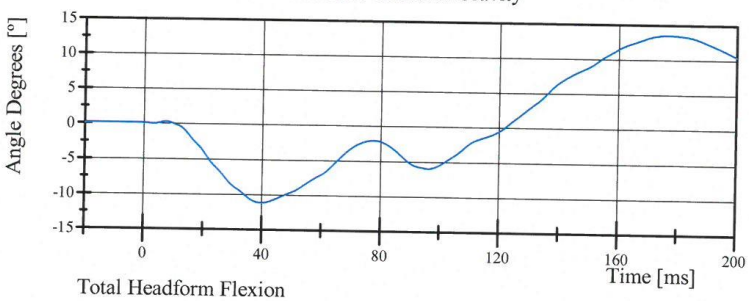
Filter Class: CFC_60
Max: 20.3 ° at 189.6 ms
Min: -72.2 ° at 68.1 ms

Rear Pot Rotation at Base of Pendulum



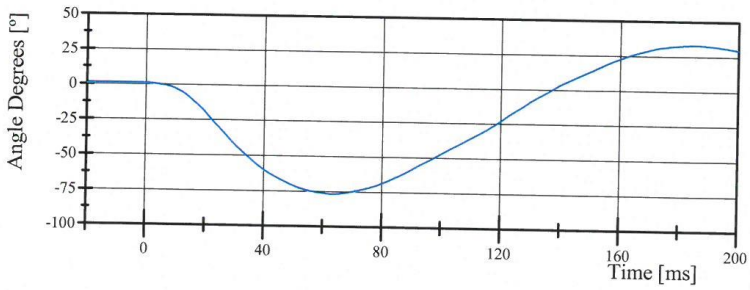
Filter Class: CFC_60
Max: 23.6 ° at 186.9 ms
Min: -50.4 ° at 63.9 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 13.5 ° at 176.6 ms
Min: -11.2 ° at 39.8 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 33.2 ° at 185.2 ms
Min: -77.2 ° at 63.4 ms

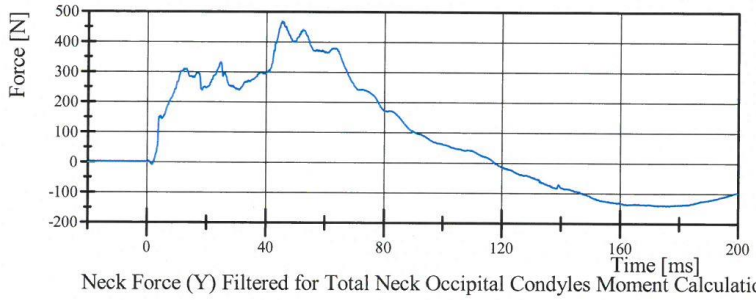
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.14.2016 07:57:40 748

Transportation Research Center Inc.

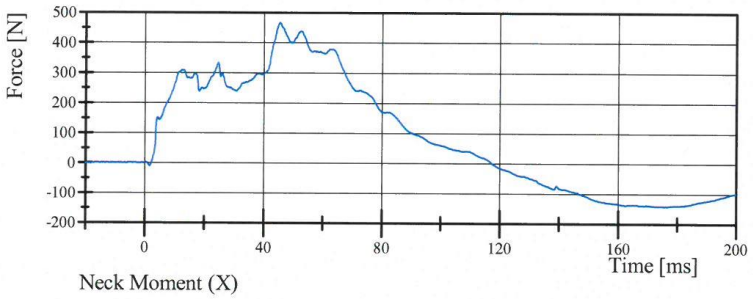
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/14/2016

Neck Force (Y)



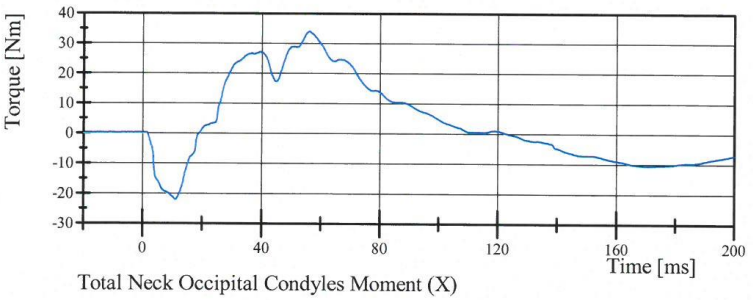
Filter Class: CFC_1000
Max: 467.8 N at 45.4 ms
Min: -141.7 N at 175.5 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



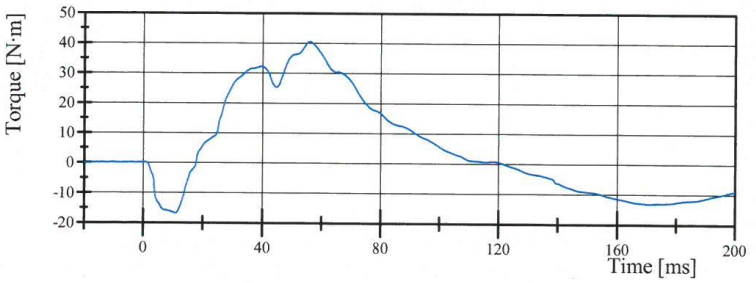
Filter Class: CFC_600
Max: 465.4 N at 45.4 ms
Min: -141.2 N at 176.6 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 33.9 Nm at 56.0 ms
Min: -22.2 Nm at 11.0 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Consta
Max: 40.4 N·m at 55.9 ms
Min: -17.0 N·m at 10.7 ms

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

12.14.2016 07:57:41 748

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.0 g	Yes
Shoulder Displacement	28 - 37 mm	30.4 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.6 g	Yes

Test meets specifications.

Comments:

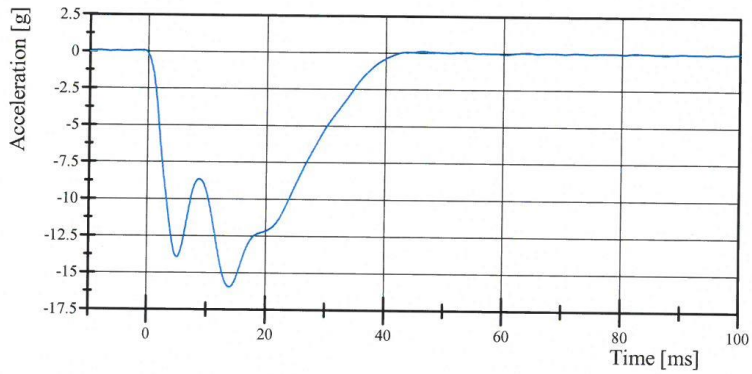
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 13:47:44 857

Transportation Research Center Inc.

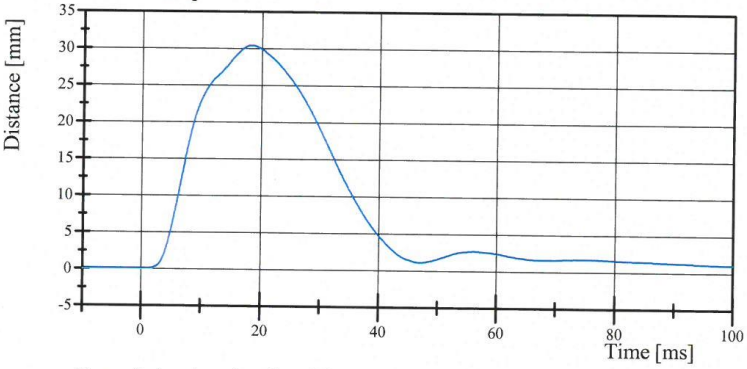
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Probe Acceleration



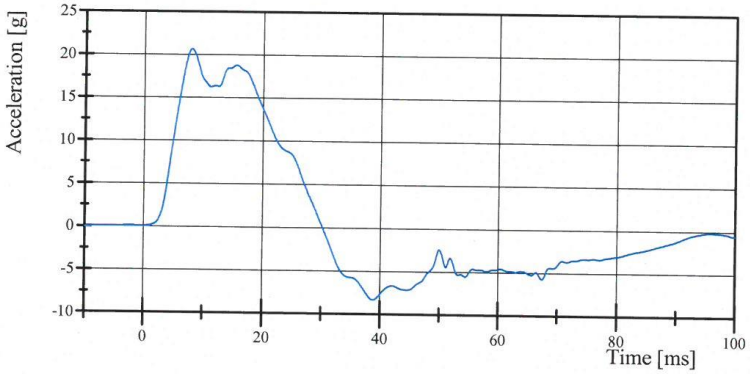
Filter Class: CFC_180
Max: 0.1 g at 46.2 ms
Min: -16.0 g at 13.9 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 30.4 mm at 18.2 ms
Min: -0.0 mm at 0.9 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 20.6 g at 8.0 ms
Min: -8.4 g at 38.8 ms

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

12.13.2016 13:47:56 857

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 52-2
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.780 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.9 g	Yes
Shoulder Displacement	31 - 40 mm	33.6 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.5 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.4 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.3 g	Yes

Test meets specifications.

Comments:

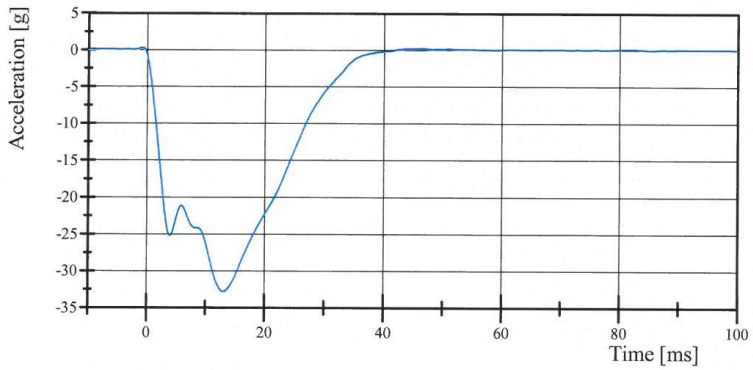
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 15:32:57 633

Transportation Research Center Inc.

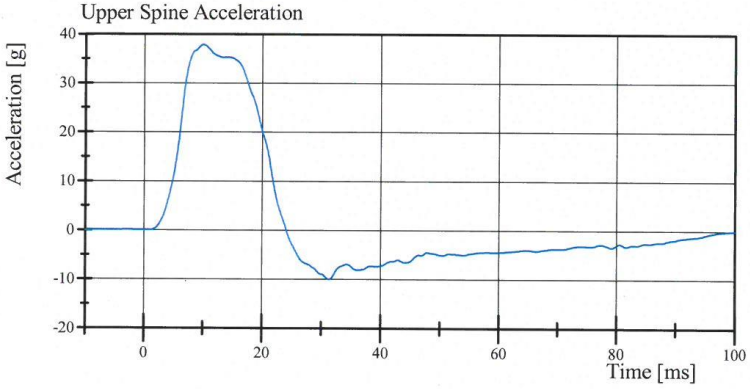
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 52-2
Test Date: 12/13/2016

Probe Acceleration



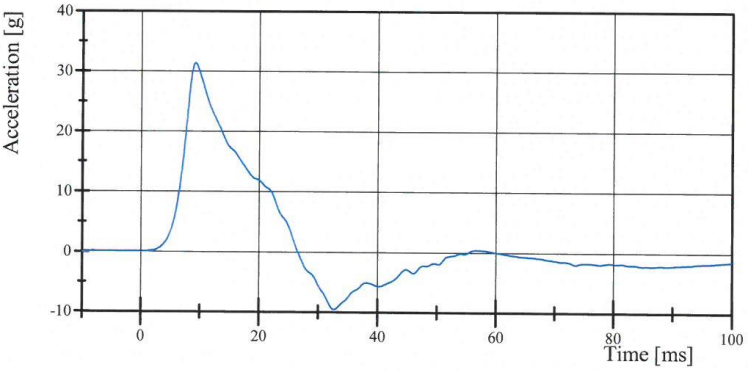
Filter Class: CFC_180
Max: 0.2 g at -0.8 ms
Min: -32.9 g at 13.0 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 37.8 g at 10.0 ms
Min: -10.1 g at 31.3 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 31.3 g at 9.2 ms
Min: -9.6 g at 32.6 ms

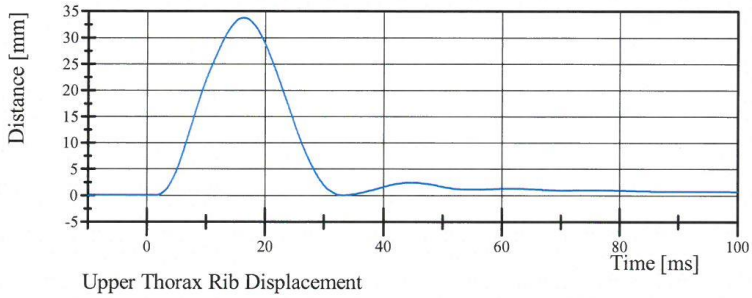
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 15:33:10 633

Transportation Research Center Inc.

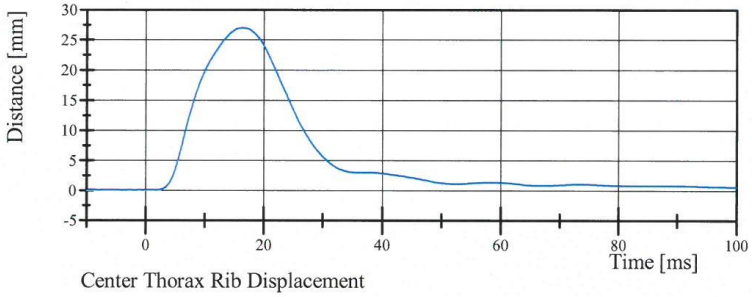
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 52-2
Test Date: 12/13/2016

Shoulder Rib Displacement



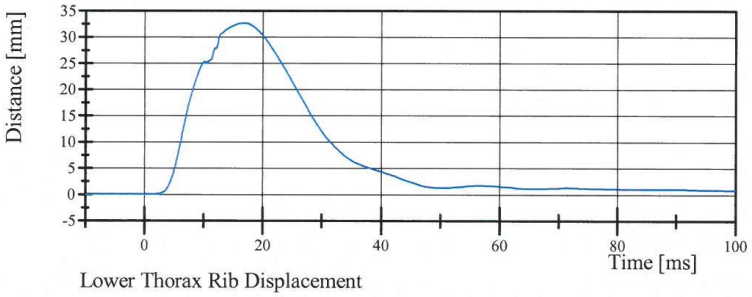
Filter Class: CFC_600
Max: 33.6 mm at 16.3 ms
Min: -0.0 mm at -0.9 ms

Upper Thorax Rib Displacement



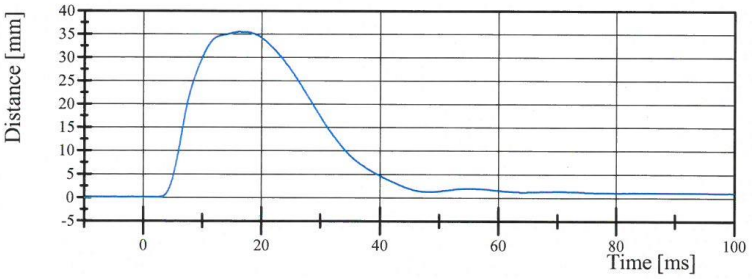
Filter Class: CFC_600
Max: 27.0 mm at 16.4 ms
Min: -0.0 mm at -4.2 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.5 mm at 17.0 ms
Min: -0.0 mm at -1.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 35.4 mm at 16.2 ms
Min: -0.0 mm at -4.2 ms

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

12.13.2016 15:33:12 633

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.383 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.3 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.9 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.6 g	Yes

Test meets specifications.

Comments:

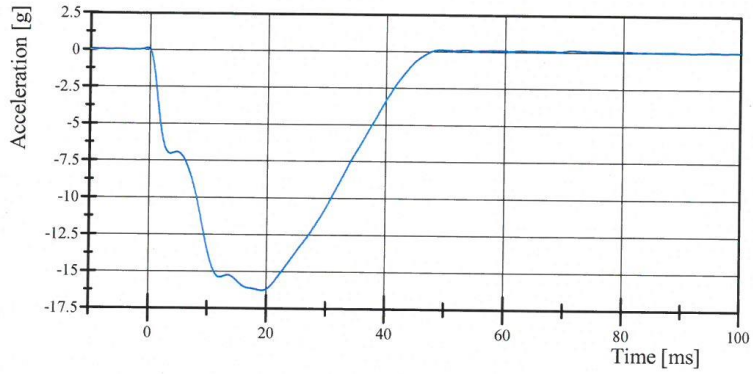
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 14:12:58 835

Transportation Research Center Inc.

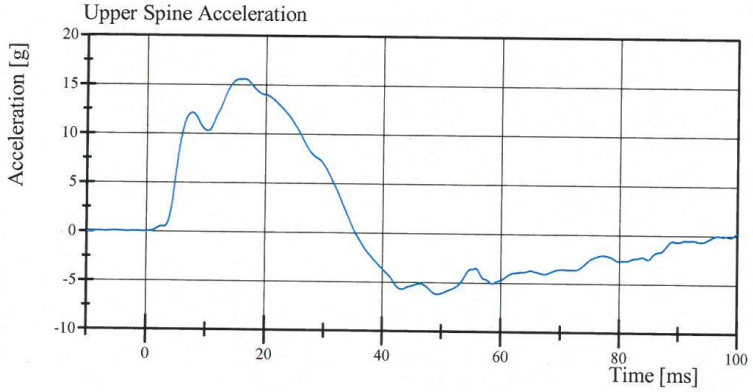
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Probe Acceleration



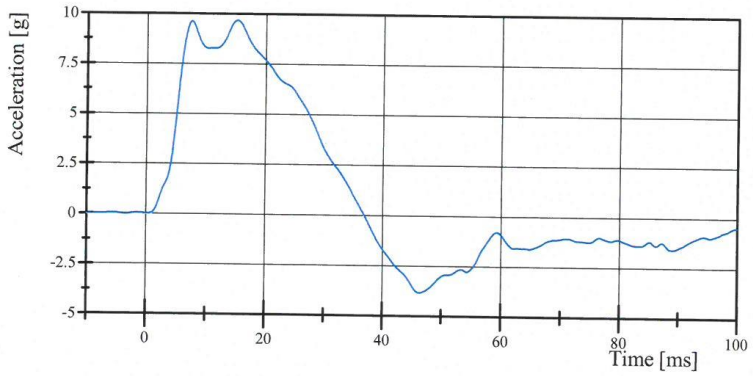
Filter Class: CFC_180
Max: 0.1 g at 71.2 ms
Min: -16.3 g at 19.2 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.5 g at 16.3 ms
Min: -6.2 g at 49.4 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.6 g at 15.1 ms
Min: -3.8 g at 46.2 ms

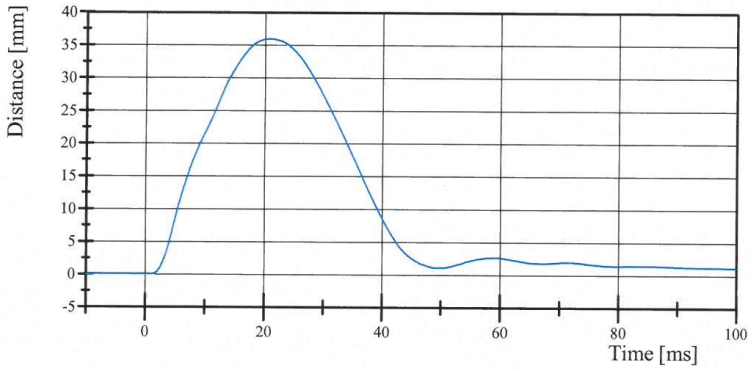
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 14:13:12 835

Transportation Research Center Inc.

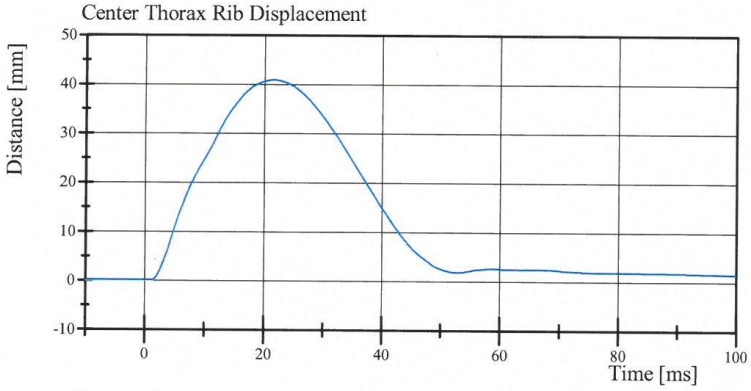
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Upper Thorax Rib Displacement



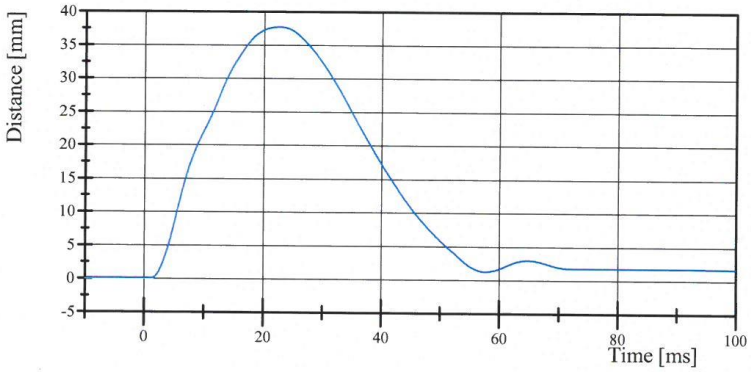
Filter Class: CFC_600
Max: 35.8 mm at 20.7 ms
Min: -0.0 mm at 1.1 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.9 mm at 21.6 ms
Min: -0.0 mm at -4.0 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.7 mm at 22.6 ms
Min: -0.0 mm at -3.8 ms

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

12.13.2016 14:13:13 835

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.4 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.9 g	Yes
Iliac Force	4,100 - 5,100 N	4,735.8 N	Yes

Test meets specifications.

Comments:

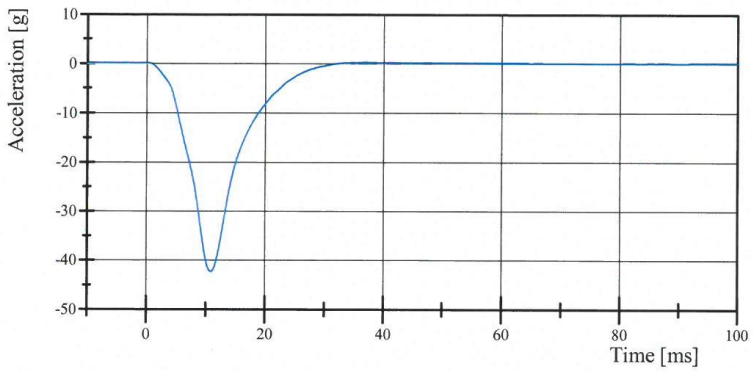
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 15:51:27 661

Transportation Research Center Inc.

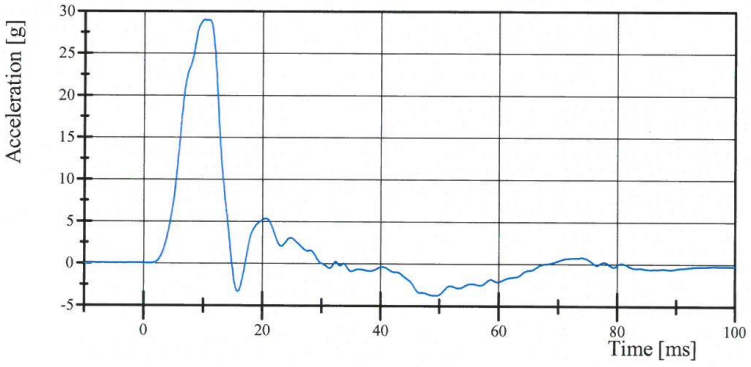
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Probe Acceleration



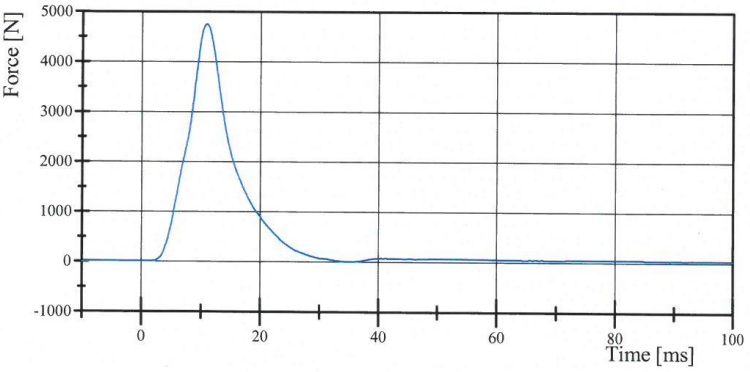
Filter Class: CFC_180
Max: 0.2 g at 36.6 ms
Min: -42.4 g at 10.8 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 28.9 g at 10.2 ms
Min: -3.7 g at 49.5 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,735.8 N at 10.9 ms
Min: -0.8 N at 35.0 ms

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

12.13.2016 15:51:40 661

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.64 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,713.7 N	Yes

Test meets specifications.

Comments: Pelvis Plug #11080

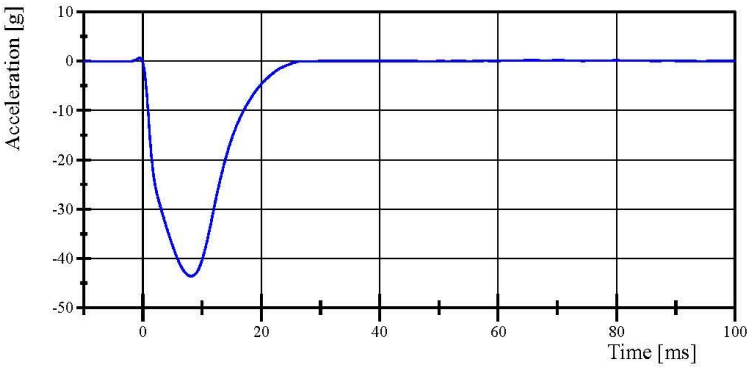
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

12.14.2016 11:05:04 449

Transportation Research Center Inc.

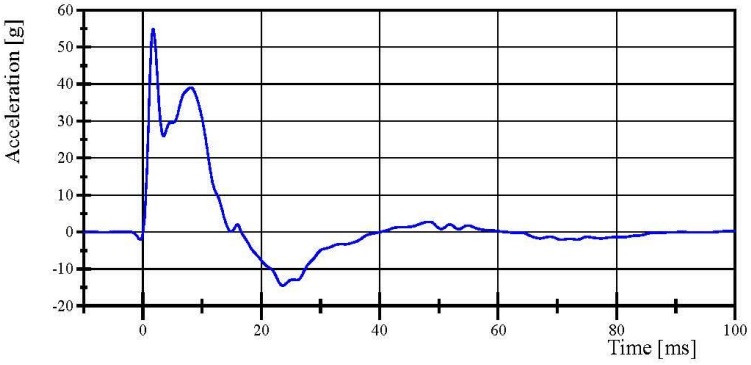
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Probe Acceleration



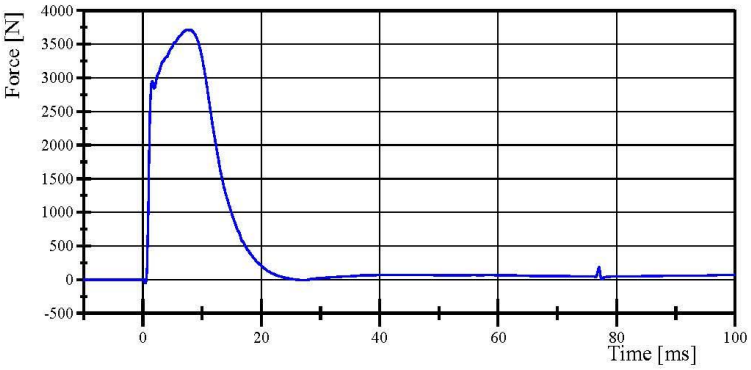
Filter Class: CFC_180
Max: 0.6 g at -0.6 ms
Min: -43.6 g at 8.2 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 55.0 g at 1.8 ms
Min: -14.5 g at 23.6 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 3,713.7 N at 7.5 ms
Min: -53.3 N at 0.5 ms

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

12.14.2016 11:05:34 449

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.4 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.9 g	Yes
Iliac Force	4,100 - 5,100 N	4,735.8 N	Yes

Test meets specifications.

Comments:

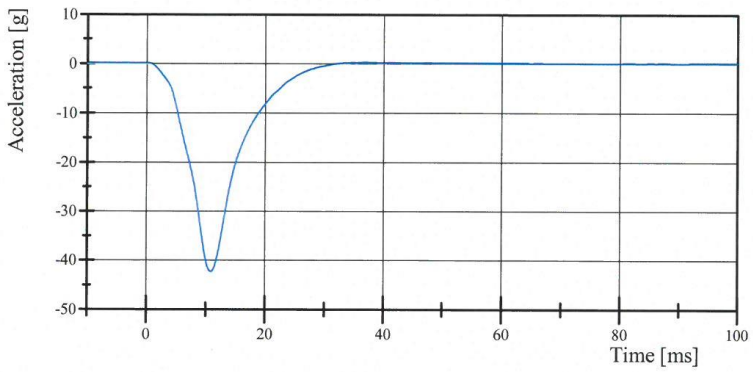
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.13.2016 15:51:27 661

Transportation Research Center Inc.

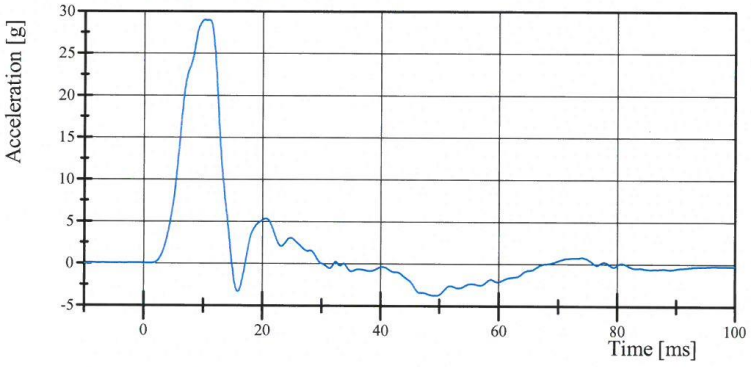
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 52-1
Test Date: 12/13/2016

Probe Acceleration



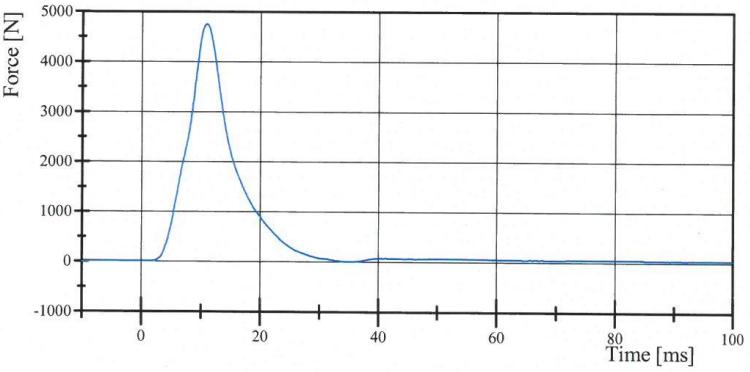
Filter Class: CFC_180
Max: 0.2 g at 36.6 ms
Min: -42.4 g at 10.8 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 28.9 g at 10.2 ms
Min: -3.7 g at 49.5 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,735.8 N at 10.9 ms
Min: -0.8 N at 35.0 ms

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

12.13.2016 15:51:40 661

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F030		
			Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers		X	P87680	Endevco	21-Sep-16
		Y	P66873	Endevco	10-Nov-16
		Z	P91950	Endevco	6-Oct-16
Redundant Head Accelerometers		X	P94566	Endevco	10-Nov-16
		Y	P94429	Endevco	1-Sep-16
		Z	P94483	Endevco	1-Sep-16
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	29-Sep-16
	Middle	Y	174	FTSS	29-Sep-16
	Lower	Y	173	FTSS	29-Sep-16
Abdomen Load Cells	Front	Y	1441	Denton	18-Mar-16
	Middle	Y	1436	Denton	18-Mar-16
	Rear	Y	1437	Denton	18-Mar-16
Lower Spine Accelerometers (T12)		X	P89126	Endevco	21-Sep-16
		Y	P87139	Endevco	21-Sep-16
		Z	P64884	Endevco	21-Sep-16
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	18-Mar-16

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers			X	P90267	Endevco	29-Sep-16
			Y	P93774	Endevco	01-Sep-16
			Z	P91566	Endevco	21-Sep-16
Redundant Head Accelerometers			X	P91615	Endevco	21-Sep-16
			Y	P93762	Endevco	01-Sep-16
			Z	P93761	Endevco	01-Sep-16
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	29-Sep-16
		Middle	Y	1161	Servo	29-Sep-16
		Lower	Y	037	Servo	29-Sep-16
	Abdominal Rib	Upper	Y	1295	Servo	29-Sep-16
		Lower	Y	1136	Servo	29-Sep-16
Lower Spine Accelerometers (T12)			X	P94545	Endevco	15-Sep-16
			Y	P94647	Endevco	21-Sep-16
			Z	P94530	Endevco	1-Sep-16
Acetabulum Load Cell			Y	103-FY	FTSS	13-Jun-16
Iliac Wing Load Cell			Y	287-FY	Denton	22-Mar-16
Pelvis Plug (struck side)				11076	SACO	08-Apr-16
Pelvis Plug (non-struck side)				36473	FTSS	23-Sep-10

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P91482	Endevco	28-Sep-16
	Vehicle Center of Gravity	Y	P88004	Endevco	15-Aug-16
	Vehicle Center of Gravity	Z	P93550	Endevco	25-Jul-16
2	Right Sill at Front Seat	X	P91903	Endevco	16-Nov-16
	Right Sill at Front Seat	Y	P91966	Endevco	29-Sep-16
	Right Sill at Front Seat	Z	P90856	Endevco	13-Oct-16
3	Right Sill at Rear Seat	X	P94567	Endevco	9-Nov-16
	Right Sill at Rear Seat	Y	P94544	Endevco	10-Nov-16
	Right Sill at Rear Seat	Z	P94516	Endevco	9-Nov-16
4	Left Sill at Front Door	Y	P89124	Endevco	14-Nov-16
5	Left Sill at Rear Door	Y	P87578	Endevco	18-Nov-16
6	Left A-Post Lower	Y	P91108	Endevco	18-Nov-16
7	Left A-Post Middle	Y	P91505	Endevco	14-Nov-16
8	Left B-Post Lower	Y	P34087	Endevco	12-Oct-16
9	B-Post Middle	Y	P41055	Endevco	12-Oct-16
10	Front Seat Track	Y	P61943	Endevco	16-Nov-16
11	Rear Seat Track or Structure	Y	P91181	Endevco	12-Oct-16
12	Right Rear Occupant Compartment	Y	P83385	Endevco	16-Nov-16
13	Engine Block	X	P94563	Endevco	3-Nov-16
	Engine Block	Y	P94485	Endevco	3-Nov-16
14	Rear Floorpan Above Axle	X	P94423	Endevco	9-Nov-16
	Rear Floorpan Above Axle	Y	P94529	Endevco	9-Nov-16
	Rear Floorpan Above Axle	Z	P94526	Endevco	9-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