FINAL REPORT NUMBER: SINCAP-TRC-19-007

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

FORD MOTOR CO.
2019 Ford Ranger Supercrew
NHTSA NUMBER: M20190213

PREPARED BY:
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Report Date: October 25, 2019

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 Prepared By: ILO Project Operations Group

Report Approved By: 

John Shultz

Approval Date: October 25, 2019

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 2019 Ford Ranger Supercrew, 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 September 6, 2019.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.95 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 239 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	12
Maximum Thoracic Rib Deflection	mm	44	27.6
Total Abdominal Force	N	2500	670.9
Pubic Symphysis Force	N	6000	-786.5
Lower Spine Acceleration	G	82*	31.2

Passenger ATD (SID-IIs)

Measurement Description	**Units**	**IARV**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	43
Lower Spine Resultant Acceleration	g's	82	25.3
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1461.6
Maximum Thoracic Rib Deflection	mm	38*	9.1
Maximum Abdominal Rib Deflection	mm	45*	4.4

* 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

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TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2019 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 2019 Ford Ranger Supercrew. 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 2019 Ford Ranger Supercrew was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.95 km/h (38.49 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 September 6, 2019. 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	12
Maximum Thoracic Rib Deflection	mm	44	27.6
Combined Abdominal Force	N	2500	670.9
Pubic Symphysis Force	N	6000	-786.5
Lower Spine (T12) Resultant Acceleration	G	82*	31.2

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	43
Lower Spine (T12) Resultant Acceleration	G	82	25.3
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1461.6
Maximum Thoracic Rib Deflection	mm	38*	9.1
Maximum Abdominal Rib Deflection	mm	45*	4.4

* Proposed IARV

Supplemental Restraint Information is given below:

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

The pre-test placard is missing a “0” in the NHTSA number. Should be “M20190213”. This affects all pre-test photos with this placard in view.

Left Front Sill AY; Questionable data

Left Lower B-Post AY; No valid data

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20190213
Model Year	2019
Make	Ford
Model	Ranger
Body Style	Truck
VIN	1FTER4EH6KLA70198
Body Color	Magnetic
Odometer Reading (km/mi)	5 mi
Engine Displacement (L)	2.3
Type/No. Cylinders	Gas/4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	10
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)	Yes
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	Yes
Driver Load Limiter	Yes
Rear Passenger Load Limiter	Yes
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	07/19
Vehicle Type	Truck

GVWR (kg)	2744
GAWR Front (kg)	1329
GAWR Rear (kg)	1588

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

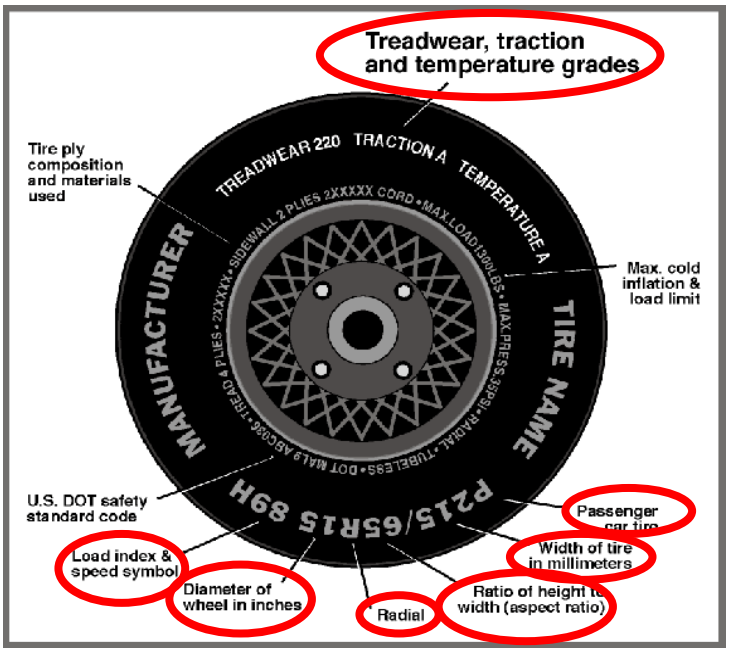
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				801.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				460.8

VEHICLE SEAT TYPE

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

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

Test Vehicle: 2019 Ford Ranger Supercrew
Test Program: SINCAP Side Impact
NHTSA No.: M20190213
Test Date: 9/6/2019



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	255/70R16 111T	255/70R16 111T
Tire Size on Vehicle	255/70R16 111T	255/70R16 111T
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler	Dueler
Treadwear	520	520
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	5	5
Tire Plies Body	2	2
Load Index/Speed Symbol	111T	111T
Tire Material	Polyester/Steel/Nylon	Polyester/Steel/Nylon
DOT Safety Code Left	9B0K DHT 2219	9B0K DHT 2219
DOT Safety Code Right	9B0K DHT 2219	9B0K DHT 2219

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

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	221	276	221	241
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

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	544.2	440.6		597.8	539.6		588.6	561.2	
Right	kg	517.8	403.4		525.2	495.8		511.0	506.2	
Ratio	%	55.7	44.3		52.0	48.0		50.7	49.3	
Totals	kg	1062.0	844.0	1906.0	1123.0	1035.4	2158.4	1099.6	1067.4	2167.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1906.0	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)[1]	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2167.0	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	879	879	Yes
RF	mm	897	890	Yes
RR	mm	960	957	Yes
LR	mm	938	940	Yes
Vehicle CG (Aft of Front Axle)	mm	1586	1545	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+48	+42	

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

Test height adjustable suspension setting, if applicable: N/A

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in cargo bed	82.6
Removed: None	0.0

[1] Rated cargo and luggage weight limited to 136.0 kg or 300.0 lbs.

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle:	2019 Ford Ranger Supercrew	NHTSA No.:	M20190213
Test Program:	SINCAP Side Impact	Test Date:	9/6/2019

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	14.2	9.0	11.6
Front Passenger Seat	13.0	7.8	10.4
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	14.8
Non-Struck Side Rear Seat	N/A	N/A	15.3
Rear Center Seat*	N/A	N/A	14.6

* 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	11.6	288	Max	312	319	327
			Mid	282	288	312
			Min	268	278	288
Front Passenger Seat	10.4	298	Max	N/A	N/A	N/A
			Mid	300	298	295
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	14.8	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	Fixed	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	15.3	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	Fixed	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	14.6	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	Fixed	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: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

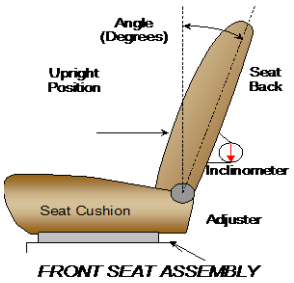
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	256	38	128	19
Front Passenger Seat	256	38	128	19
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	N/A	Fixed
Non-Struck Side Rear Seat	Fixed	N/A	N/A	Fixed
Rear Center Seat*	Fixed	N/A	N/A	Fixed

* 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	49.7	24	2.9	7
Front Passenger Seat	50.2	26	3.0	7
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	N/A	Fixed
Non-Struck Side Rear Seat	Fixed	N/A	N/A	Fixed
Rear Center Seat*	Fixed	N/A	N/A	Fixed

* 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	1, Uppermost
Rear Seat	1; Fixed	1

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.

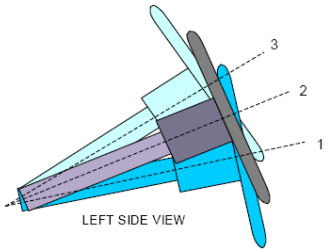
	Total # of Positions	Placed in Position #
Driver Seat	3 Up, 6 Forward	Full Up, Full Forward
Rear Seat	1/1	Fixed

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

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

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.



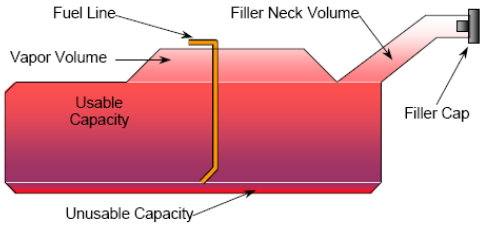
STEERING COLUMN ASSEMBLY

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	21.1	0
Geometric Center, Position No. 2	23.7	22
Uppermost, Position No. 3	25.7	43
Telescoping Steering Wheel Travel		43
Test Position	23.7	22

FUEL PUMP

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

The electronic fuel pump operates for a prescribed amount of time to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within two seconds following ignition operation 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. A fuel system shut-off system is also equipped which is designed to stop the fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.



VEHICLE FUEL TANK ASSEMBLY

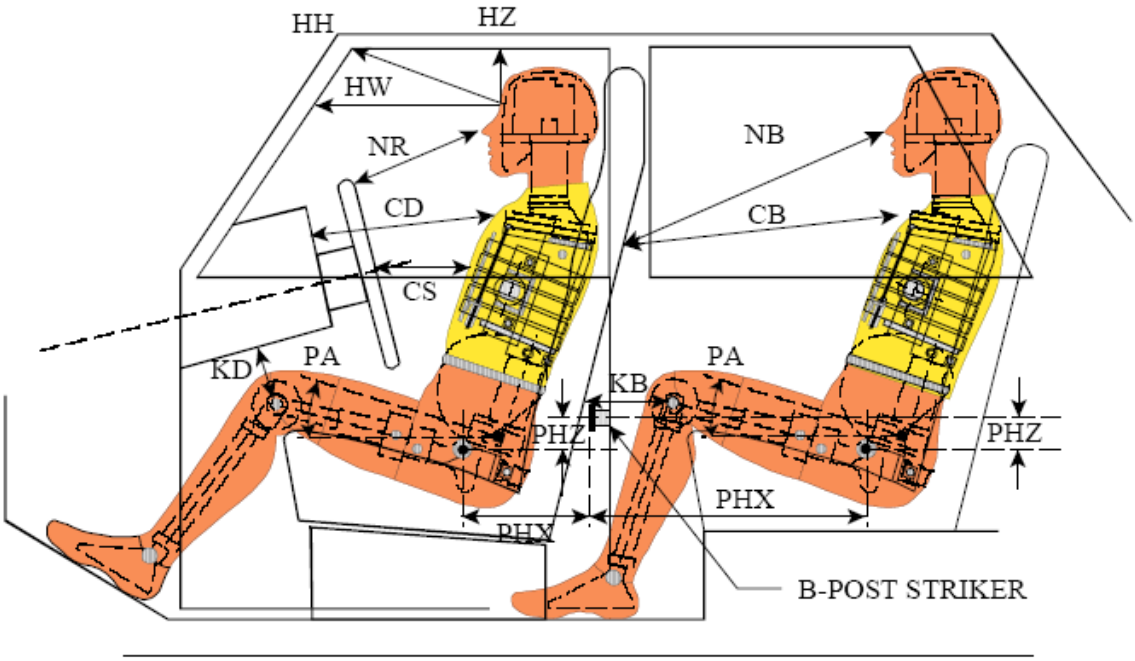
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	71.2
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	71.2
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	66.2
Actual Amount of Solvent Used in Test	66.2
1/3 of Usable Capacity	23.7

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: 2019 Ford Ranger Supercrew
Test Program: SINCAP Side Impact
NHTSA No.: M20190213
Test Date: 9/6/2019



LEFT SIDE VIEW

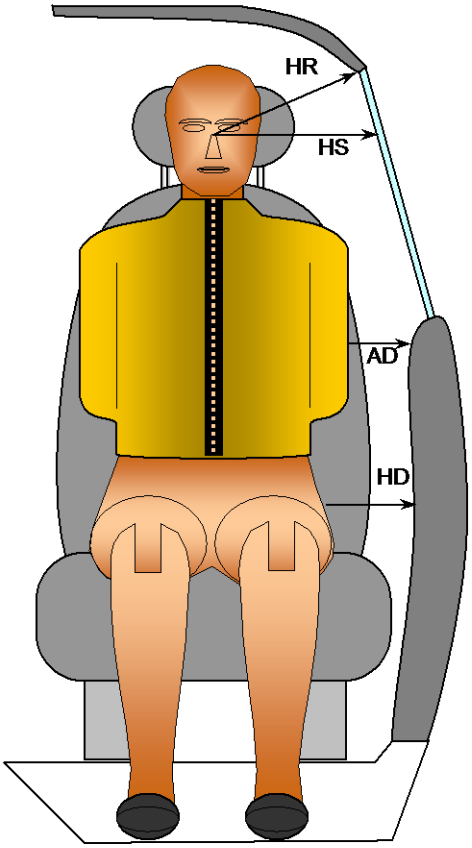
NOTE: 2-DOOR VEHICLE SHOWN. REAR DUMMY PHX & PHZ MEASUREMENTS FOR A 4-DOOR VEHICLE WOULD USE THE C-POST STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	379			
HW		Header to Windshield	622			
HZ	HZ	Head to Roof Liner	216		282	
NR	NB	Nose to Rim/Seat Back	427		597	
CD	CB	Chest to Dash/Seat Back	579		554	
CS		Chest to Steering Wheel	362			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	151	33.1	290	0.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	120	32.8	297	0.0
PAX°	PAX°	Pelvic Tilt Angle X		0.7		0.8
	PAY°	Pelvic Tilt Angle Y				20.9
PHX	PHX	Hip Point to Striker (X-Axis)	235		190	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	157		146	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Ford Ranger Supercrew
Test Program: SINCAP Side Impact
NHTSA No.: M20190213
Test Date: 9/6/2019

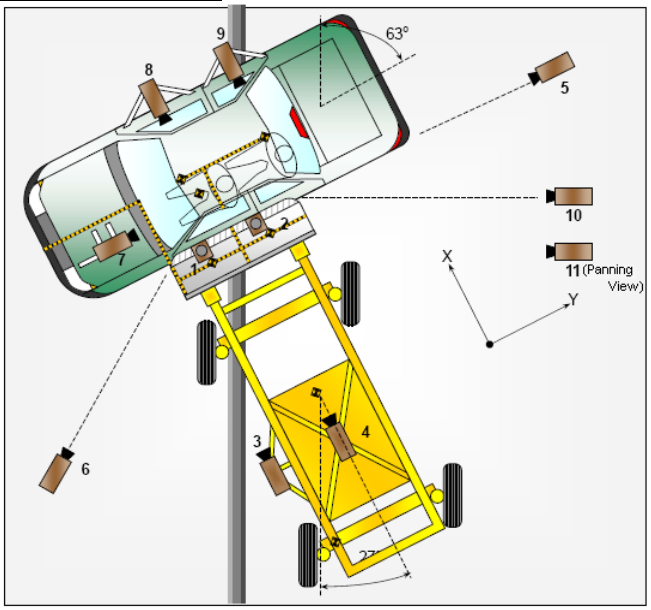


FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	231	302
HS	Head to Side Window	mm	323	362
AD	Arm to Door	mm	78	153
HD	H-Point to Door	mm	152	151

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



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	28	1000
3	Left Impact Point (MDB)	1811	890	-860	25	1000
4	Side Overall (MDB)	2420	0	-1471	12.5	1000
5	Rear	0	-6519	-1456	20	1000
6	Left Front	2415	4325	-1385	20	1000
7	Driver Front (OB)				18	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

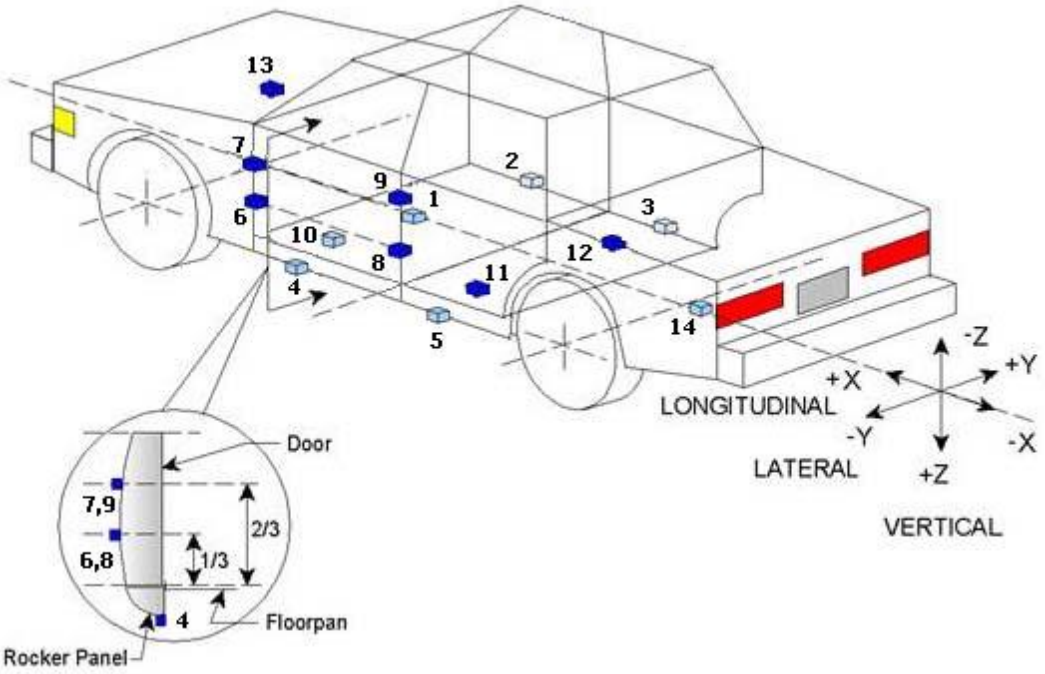
Reference: Impact Point projected to Ground; +X = To Front of MDB +Y = To Right of MDB; +Z = Down
*All measurements accurate to ± 6 mm.
If applicable, explain why camera(s) did not operate as intended: N/A

INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



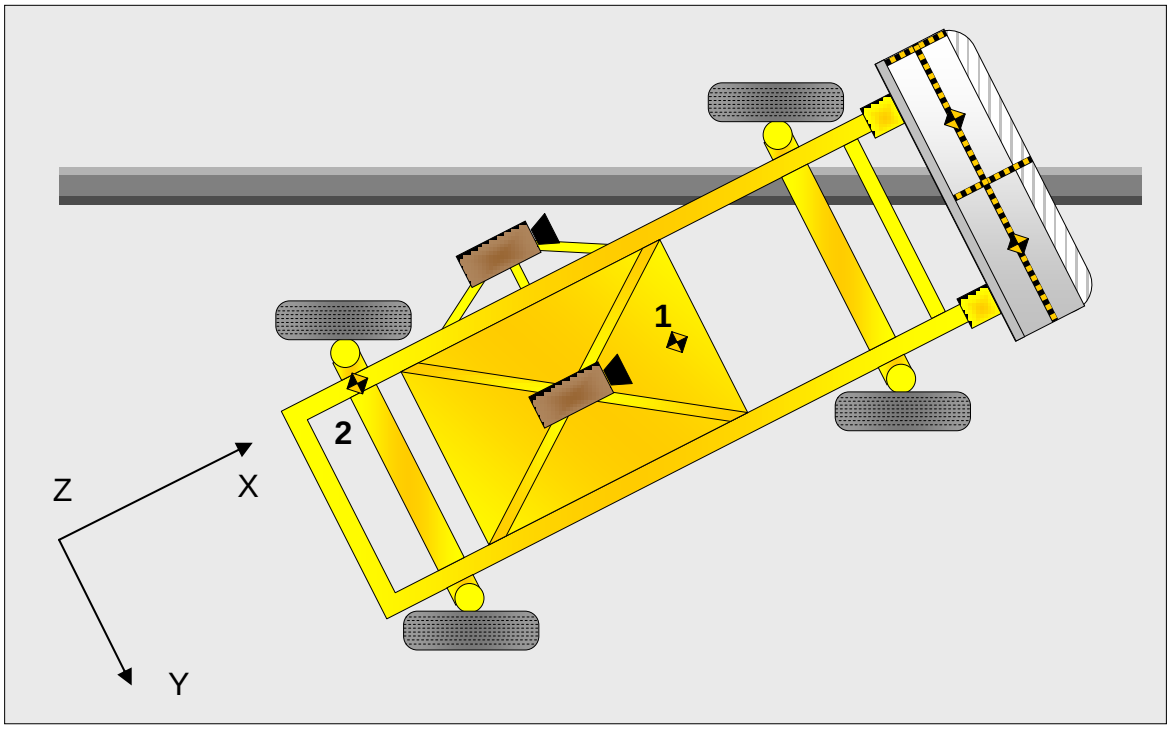
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3550	135	-640
2	Right Sill at Front Seat	3360	677	-493
3	Right Sill at Rear Seat	2445	635	-515
4	Left Sill at Front Door	3368	-677	-490
5	Left Sill at Rear Door	2435	-630	-519
6	A-Post Lower	3790	-821	-589
7	A-Post Middle	3840	-826	-995
8	B-Post Lower	2770	-822	-645
9	B-Post Middle	2765	-820	-1175
10	Front Seat Track	2980	-576	-554
11	Rear Seat Structure	2375	-497	-660
12	Right Rear Occ. Compartment	2365	495	-519
13	Engine Block	4620	5	-1032
14	Rear Above Axle	1310	0	-803

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: 2019 Ford Ranger Supercrew
Test Program: SINCAP Side Impact
NHTSA No.: M20190213
Test Date: 9/6/2019



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: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

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	SCAB
Left Side of Head	Head liner, SCAB	SCAB, Head rest
Back of Head	None	None
Left Shoulder	SAB	Door panel
Upper Torso	Seatback bolster, SAB	None
Lower Torso	Seatback bolster, SAB	None
Left Hip	SAB	Seat cushion bolster, 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	No	No	No
Seat Back Movement from Initial Position	No	N/A	No	N/A
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

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

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3220
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		509
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-1
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

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	1102

MDB WEIGHTS

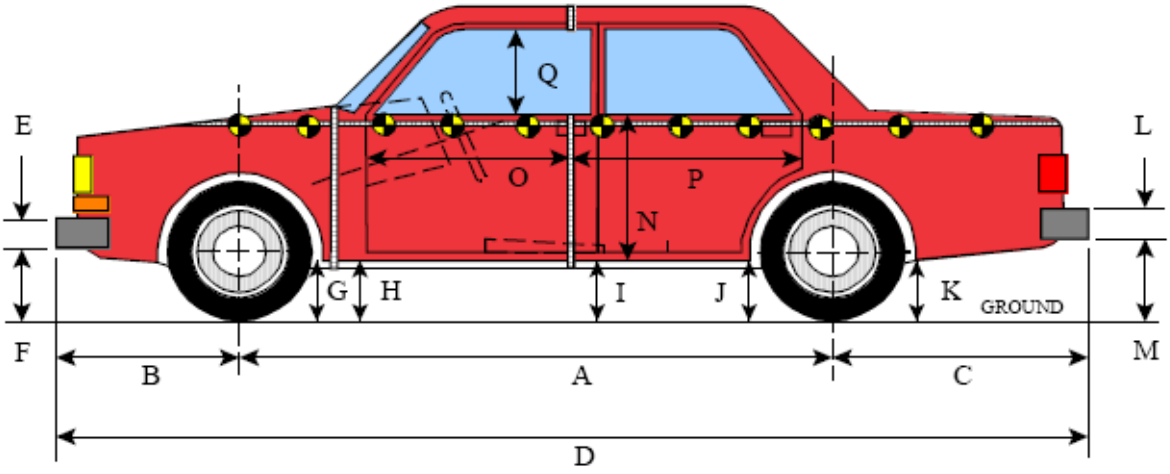
	Units	Front Axle	Rear Axle	Total
Left	kg	386.0	292.8	678.8
Right	kg	397.4	287.2	684.6
Ratio	%	57.5	42.5	100.0
Totals	kg	783.4	580.0	1363.4

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.95
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.95
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: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



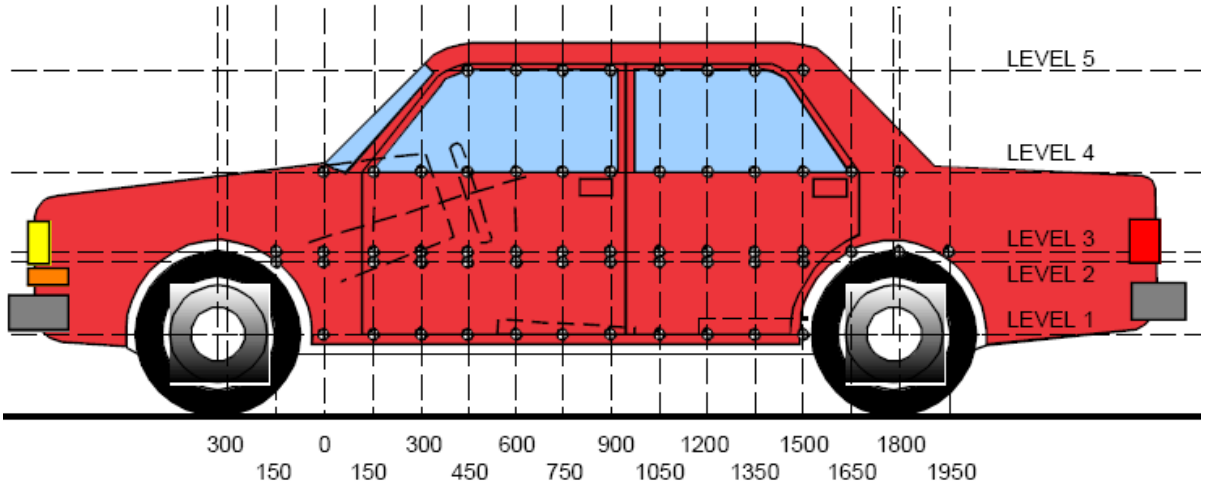
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3220	3200	20
B	Front Axle to Front Surface of Vehicle	900	900	0
C	Rear Axle to Rear Surface of Vehicle	1230	1230	0
D	Total Length at Centerline	5350	5356	-6
E	Front Bumper Thickness	70	70	0
F	Front Bumper Bottom to Ground	611	605	6
G	Sill Height at Front Wheel Well	430	443	-13
H	Sill Height at Front Door Leading Edge	457	470	-13
I	Sill Height at B-Pillar	456	470	-14
J1	Sill Height at Rear Wheel Well	492	523	-31
J2	Pinch Weld Height at Rear Wheel Well	396	425	-29
K	Sill Height Aft of Rear Wheel Well	528	575	-47
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	569	610	-41
N	Sill Height to Window Bottom Sill	829	825	4
O	Front Door Leading Edge to Impact CL	747	725	22
P	Rear Door Trailing Edge to Impact CL	1213	1178	35
Q	Front Window Opening	428	423	5
R	Right Side Length	5080	5075	5
S	Left Side Length	5080	5050	30
T	Vehicle Width	1865	1865	0

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 Ford Ranger Supercrew
Test Program: SINCAP Side Impact
NHTSA No.: M20190213
Test Date: 9/6/2019



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	506	239	1650
2	Driver Hip Point	829	173	1350
3	Mid-Door	856	172	1350
4	Window Sill	1194	75	1200
5	Window Top	1735	17	2100

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

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

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

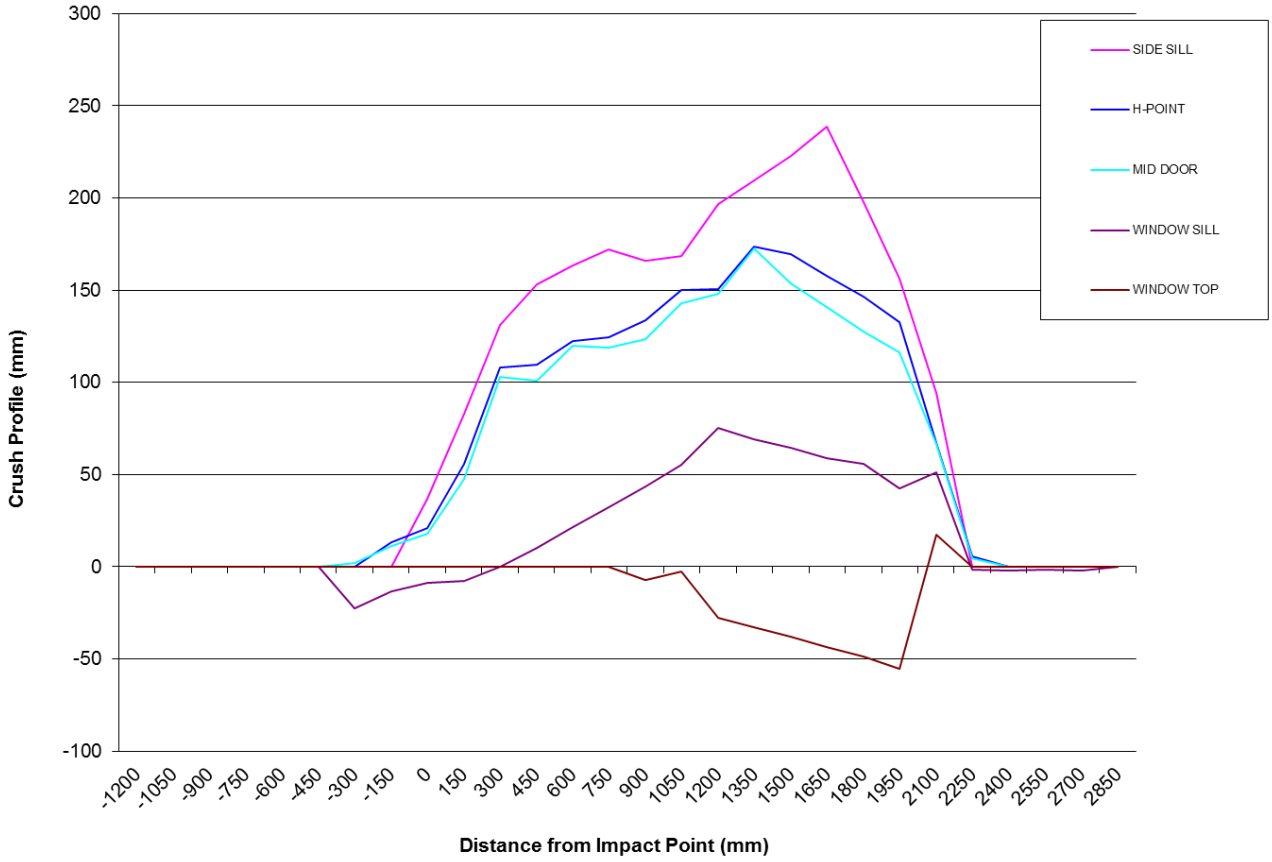
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
-300	0	0	932	809	0	0	0	930	831	0	0	0	2	-22	0
-150	0	926	926	822	0	0	913	915	836	0	0	13	11	-14	0
0	891	912	909	833	0	854	891	892	842	0	37	21	17	-9	0
150	877	901	902	838	0	795	845	855	846	0	82	56	47	-8	0
300	873	901	902	848	0	741	793	798	848	0	132	108	104	0	0
450	871	901	902	857	0	718	792	802	847	0	153	109	100	10	0
600	870	901	903	864	0	706	778	783	843	0	164	123	120	21	0
750	869	899	903	869	0	697	774	784	837	0	172	125	119	32	0
900	864	897	902	873	628	698	764	779	829	635	166	133	123	44	-7
1050	863	896	901	877	637	695	746	759	821	639	168	150	142	56	-2
1200	860	894	899	879	644	663	744	751	804	671	197	150	148	75	-27
1350	855	894	897	882	648	645	721	725	813	681	210	173	172	69	-33
1500	851	894	897	884	651	628	725	743	820	689	223	169	154	64	-38
1650	848	895	897	886	653	609	737	756	827	697	239	158	141	59	-44
1800	846	896	897	879	656	648	749	770	823	705	198	147	127	56	-49
1950	851	897	898	902	657	695	765	782	859	713	156	132	116	43	-56
2100	841	902	902	888	651	746	835	836	837	634	95	67	66	51	17
2250	0	924	922	880	0	0	919	917	882	0	0	5	5	-2	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.

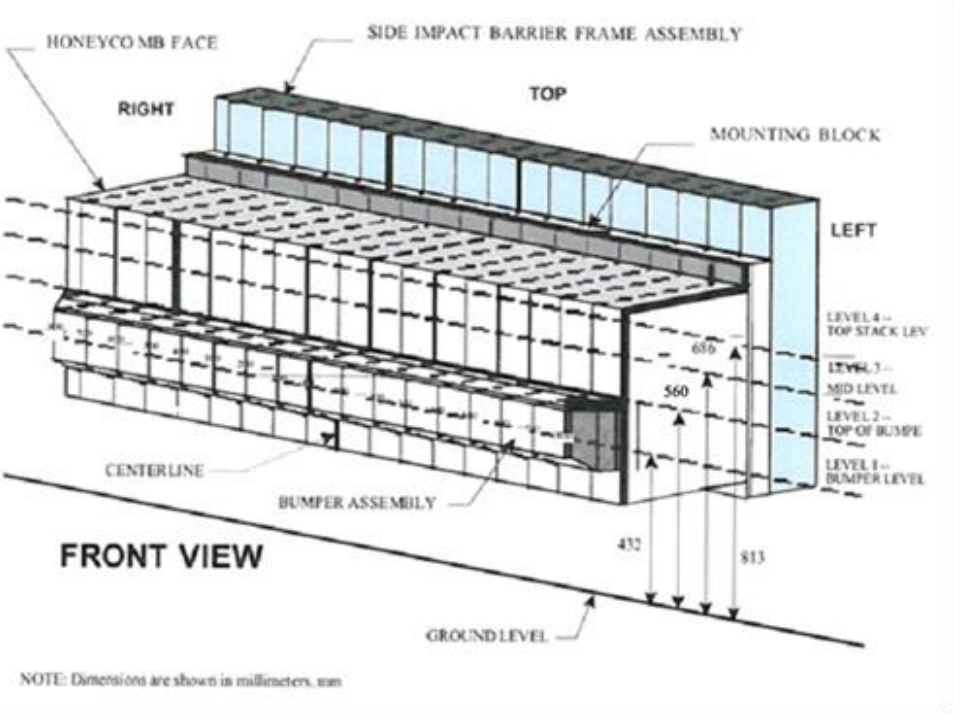
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	163
B	Top of Bumper	560	800	Right	176
C	Mid-Level	686	800	Right	168
D	Top of Stack	813	800	Right	186

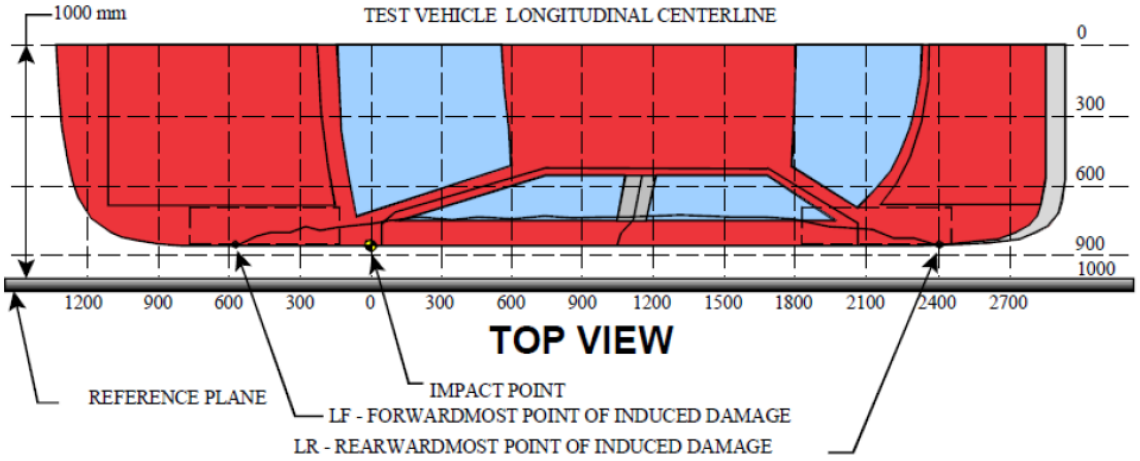
DEFORMABLE BARRIER STATIC CRUSH

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	92	91	88	93	98	104	109	114	119	124	129	134	139	144	151	160	163
2	176	137	108	113	---[1]	---[1]	---[1]	---[1]	---[1]	---[1]	---[1]	---[1]	---[1]	---[1]	169	172	167
3	168	136	72	61	61	61	77	79	81	87	85	80	87	88	86	97	126
4	186	140	107	93	86	90	130	147	126	96	81	79	80	82	92	104	144

[1] Post-Test missing points 39-48

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



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

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1[1]	2250	2	919	924	0
		3	917	922	0
2	1800	1	648	846	198
3	1200	1	663	860	197
4	750	1	697	869	172
5	150	1	795	877	82
6	-300	3	930	932	2

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	2	215	382	167
2	500 mm Left of Center	1	341	485	144
3	200 mm Left of Center	1	356	485	129
4	200 mm Right of Center	4	254	384	130
5	500 mm Right of Center	2	270	383	113
6	800 mm Right of Center	4	198	384	186

[1] DPD 1 is 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: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019

Test Time: 15:15 **Temperature:** 21.4°C

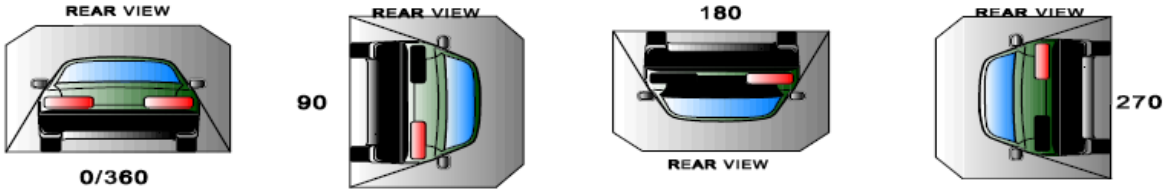
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

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

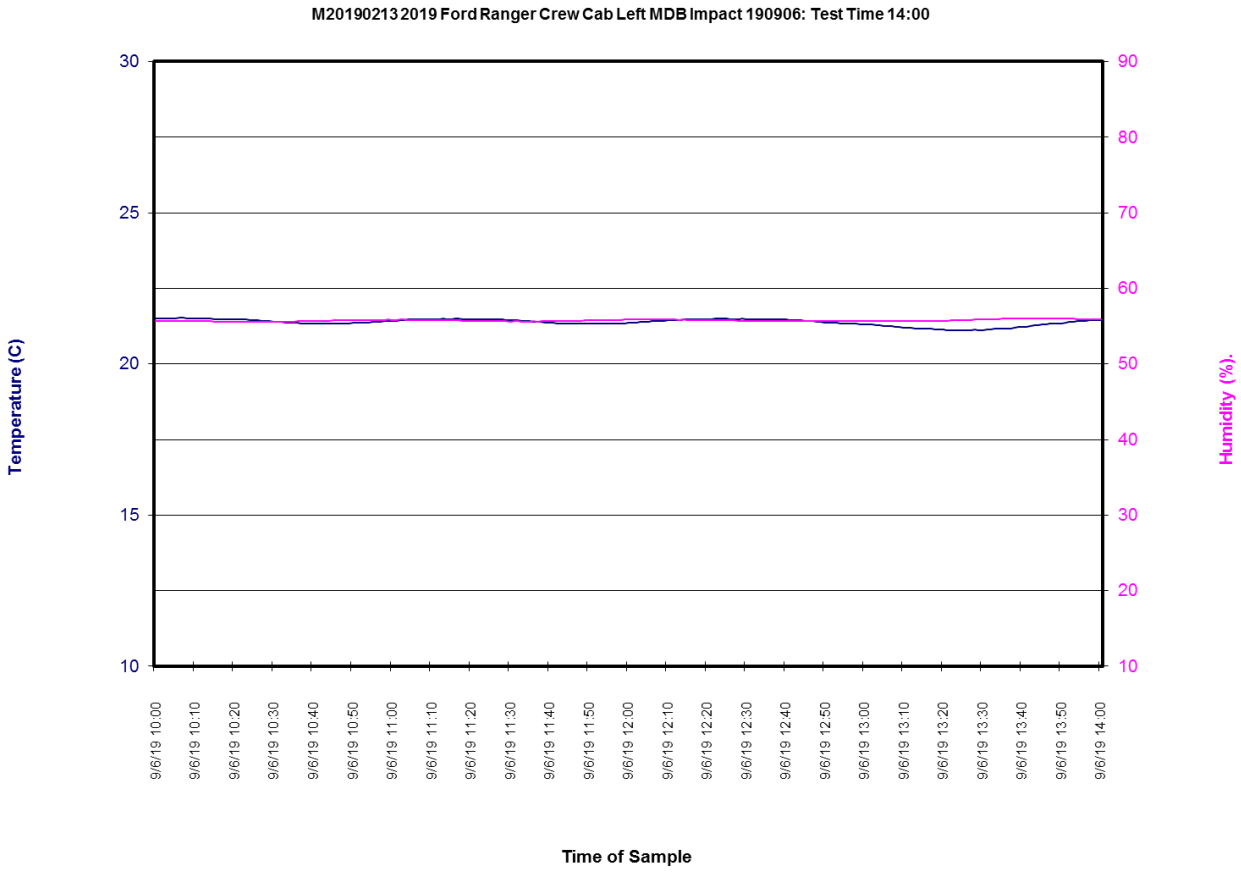
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

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: 2019 Ford Ranger Supercrew NHTSA No.: M20190213
Test Program: SINCAP Side Impact Test Date: 9/6/2019



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

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

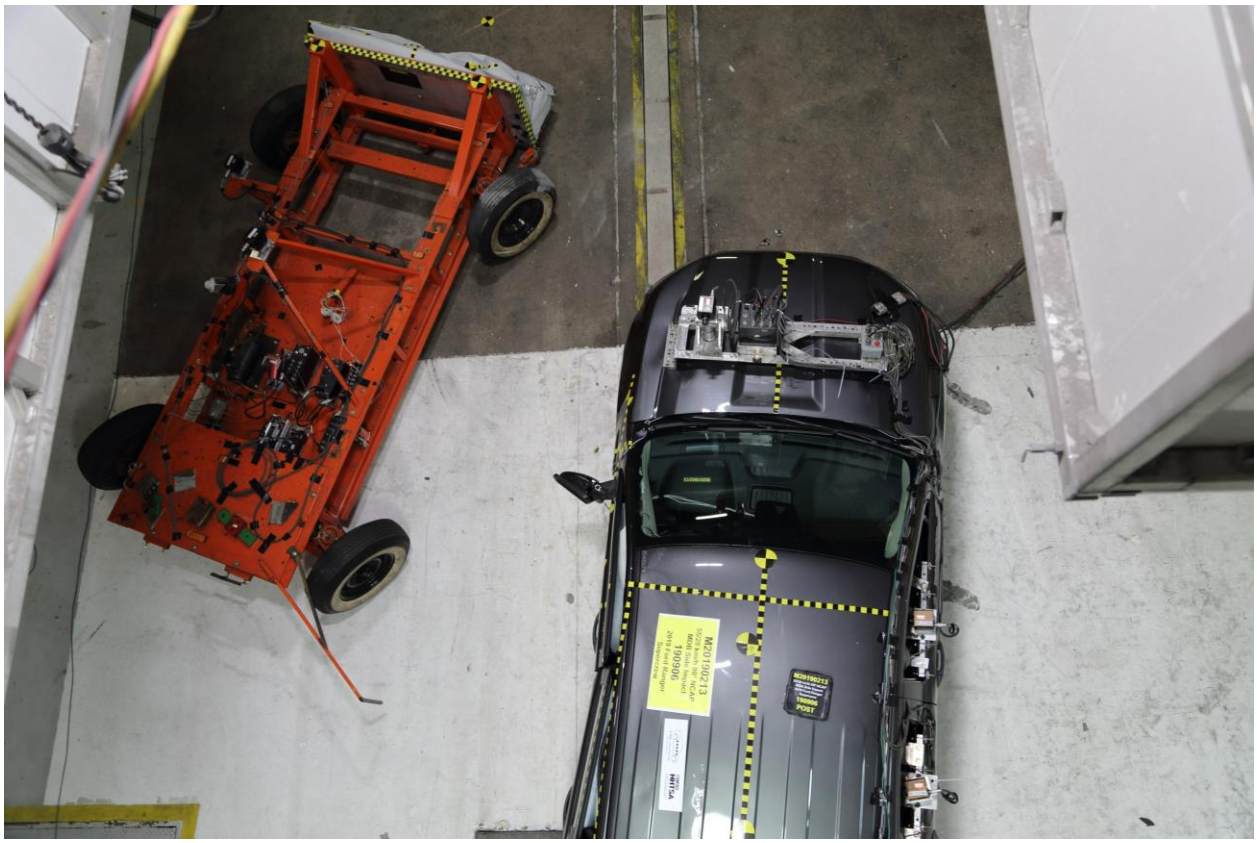
011 Pre-Test Rear View of Test Vehicle

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

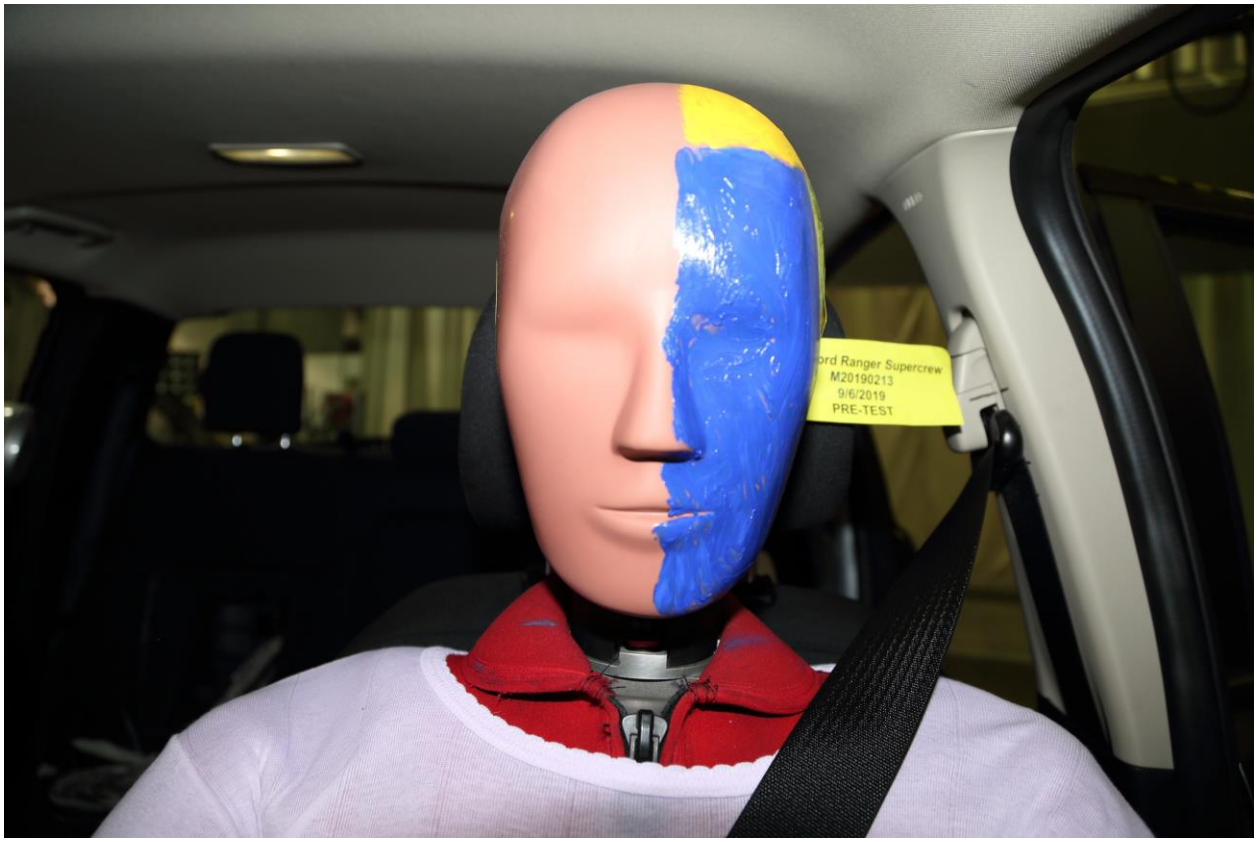
020 Post-Test Close-Up View of Impact Point Target

021 Pre-Test Left Front Door Latch Close-Up

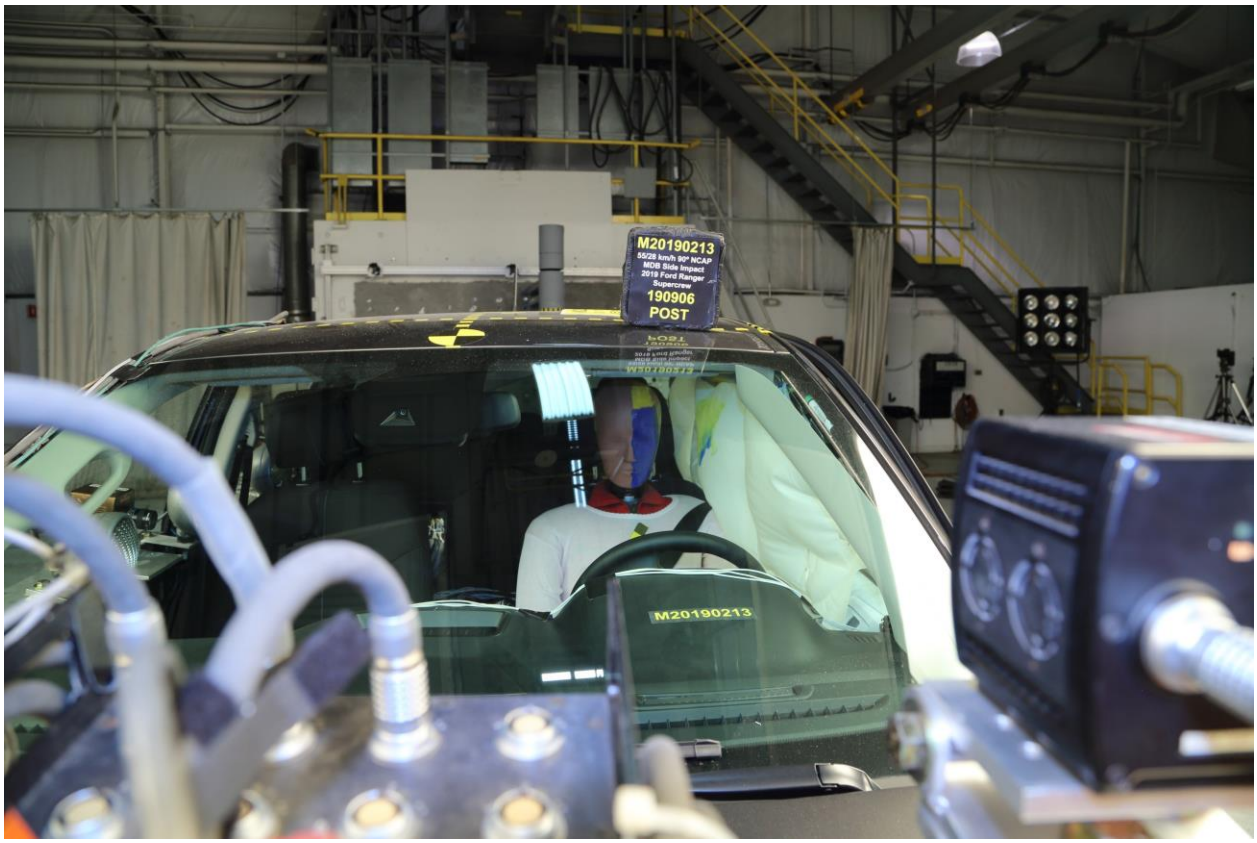
022 Post-Test Left Front Door Latch Close-Up

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

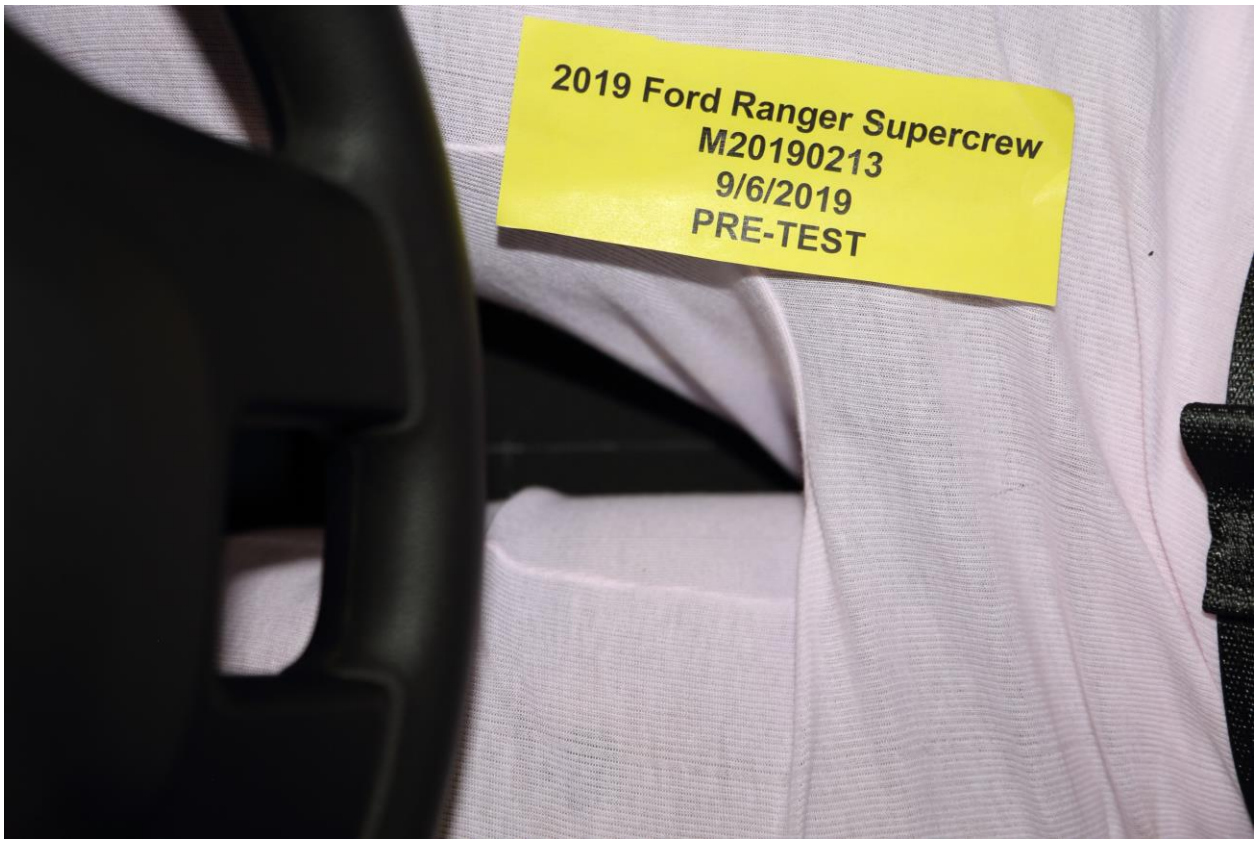
028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top

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

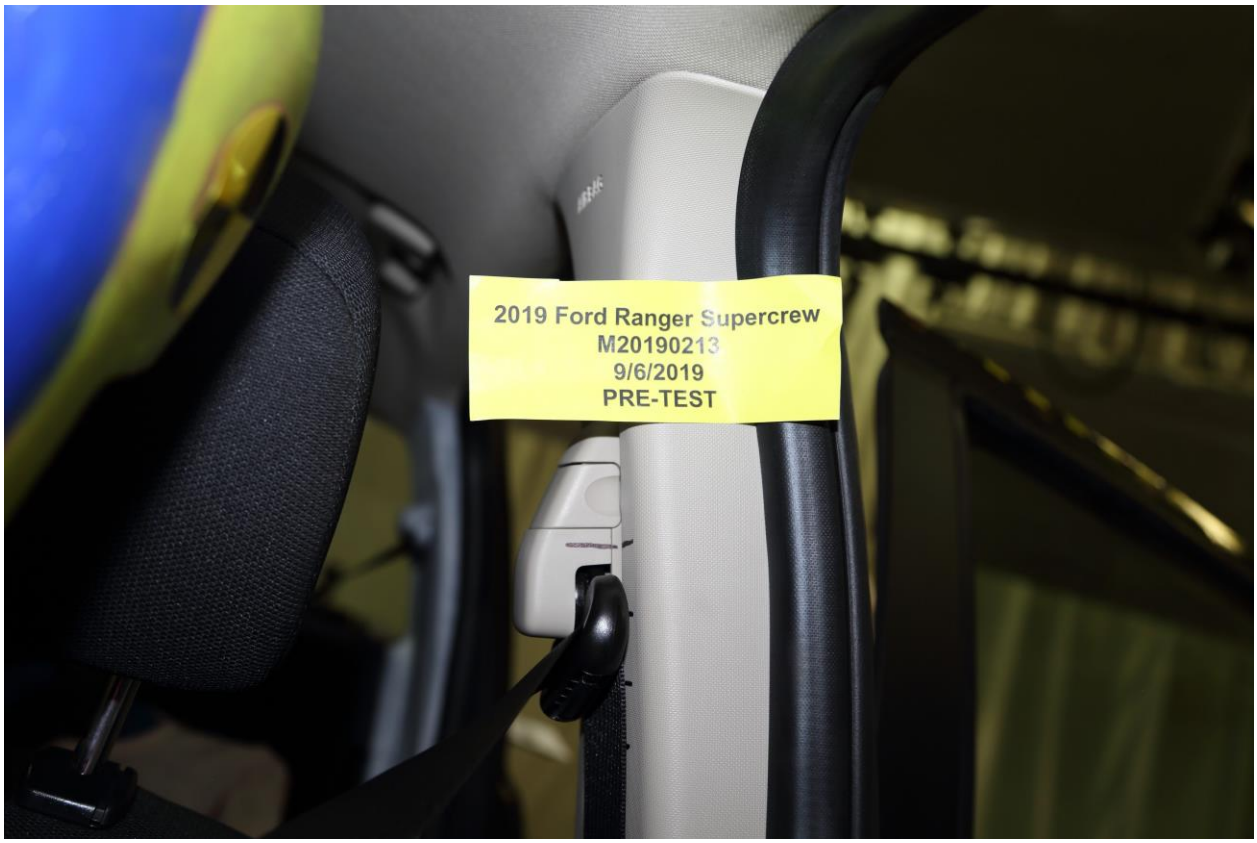
031 Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint

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's Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy

036 Pre-Test Left Side View of Steering Wheel

037 View of Disengaged Parking Brake

038 Pre-Test View of Parking Brake

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

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

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

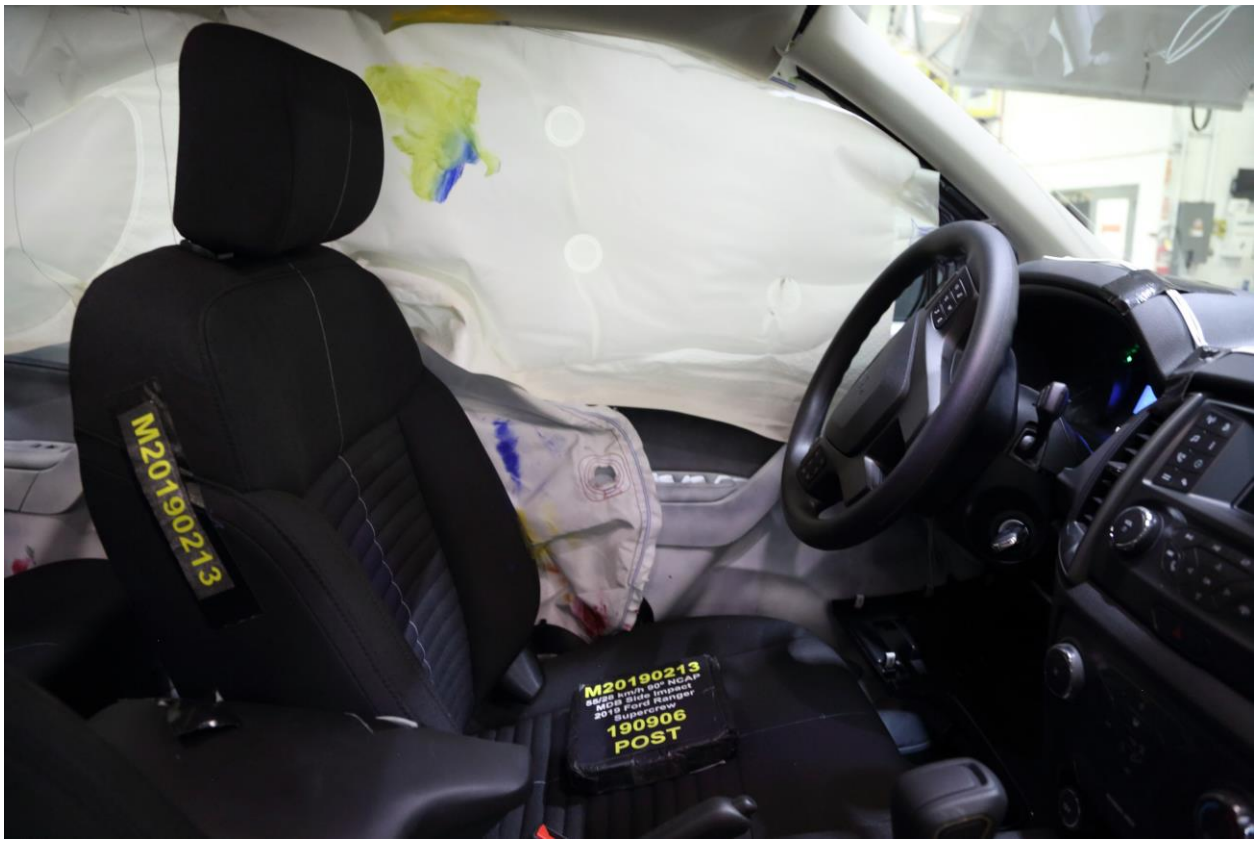
042 Pre-Test Driver Dummy and Door Clearance View

043 Post-Test Driver Dummy and Door Clearance View

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

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

046 Pre-Test Driver Inner Door Panel View



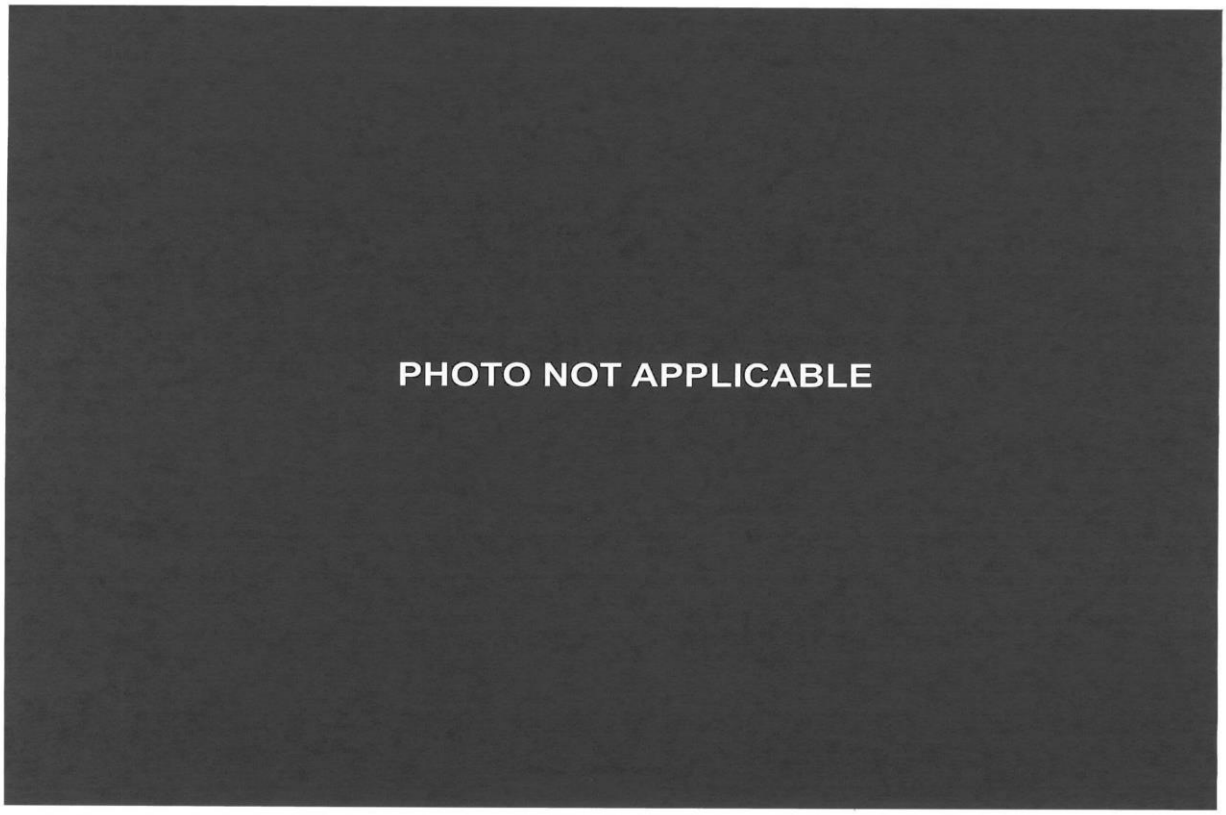
047 Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations

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

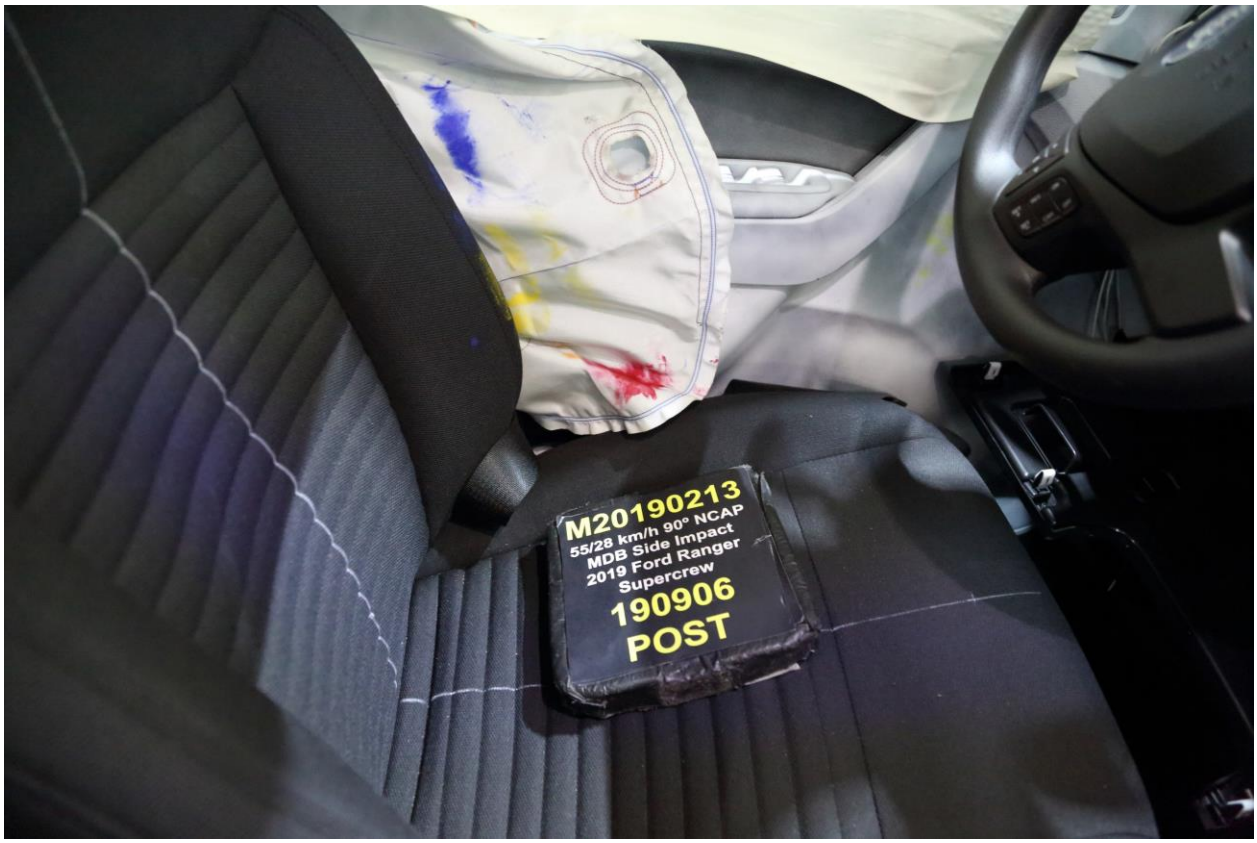
049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

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

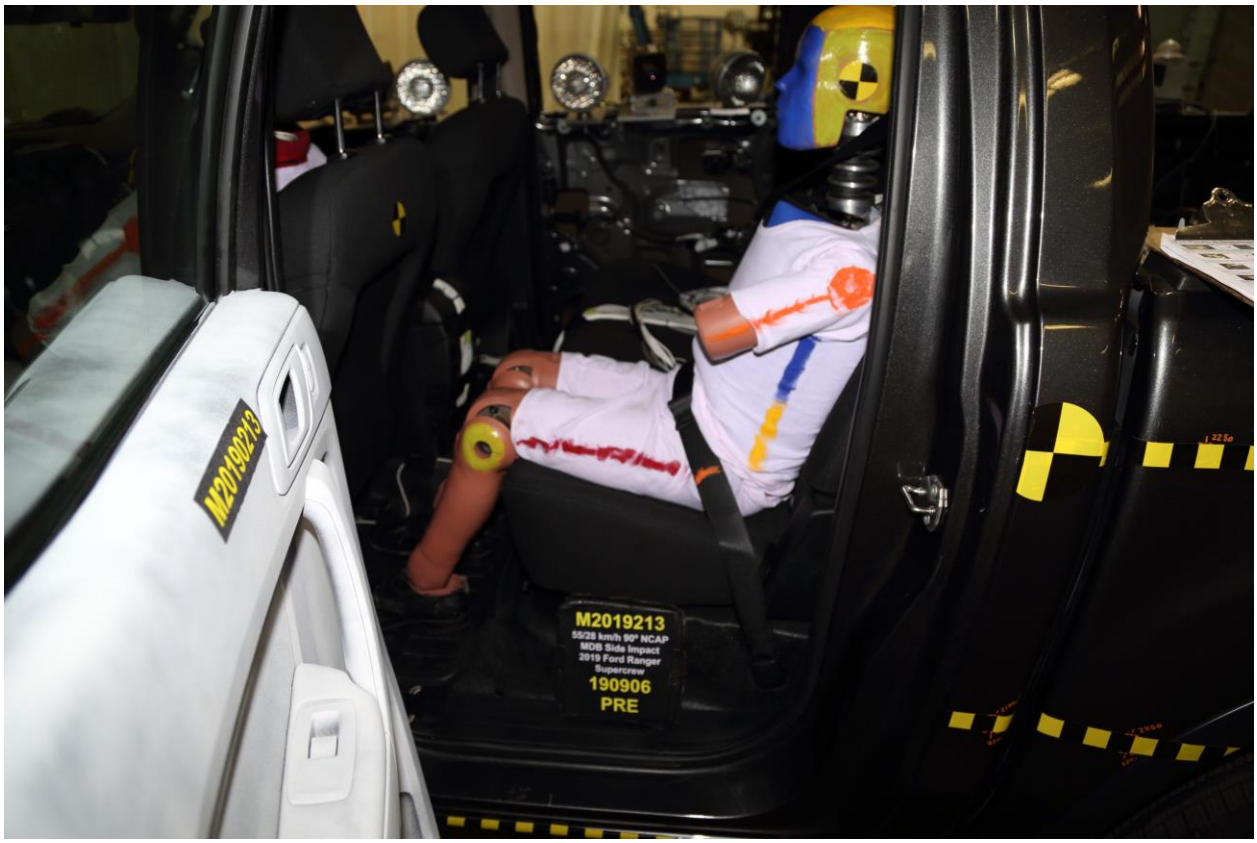


052 Post-Test Driver Dummy Close-Up Pelvis Contact View



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

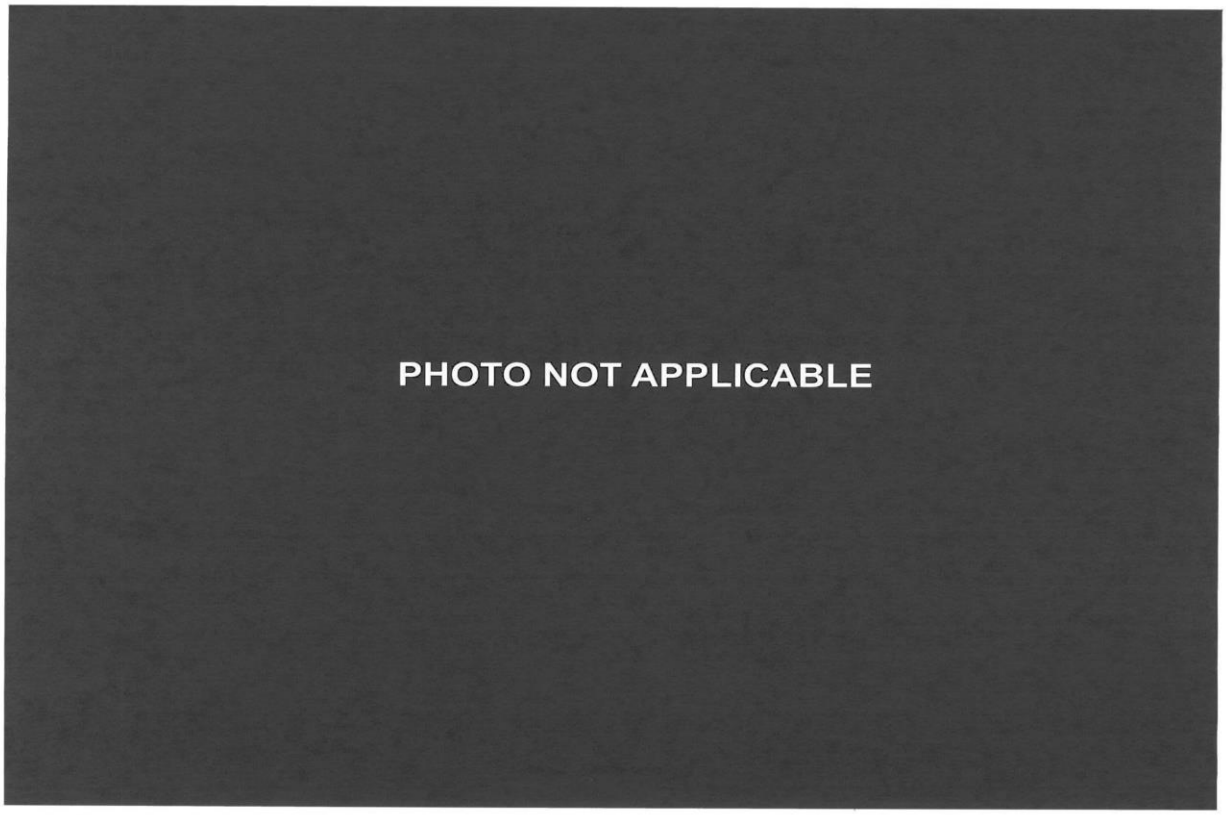
062 Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

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

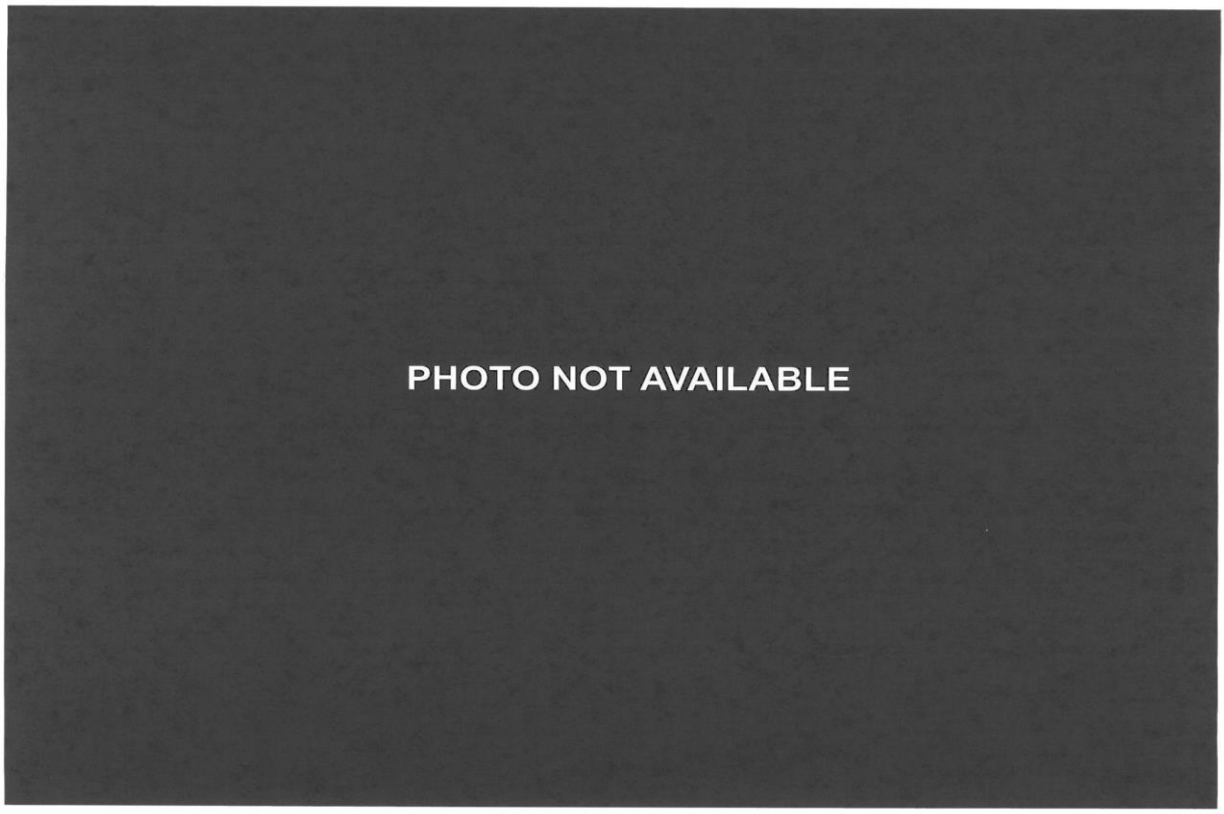
064 Pre-Test Placement of Rear Passenger Dummy's Feet

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 Rear Passenger Dummy and Door Clearance View

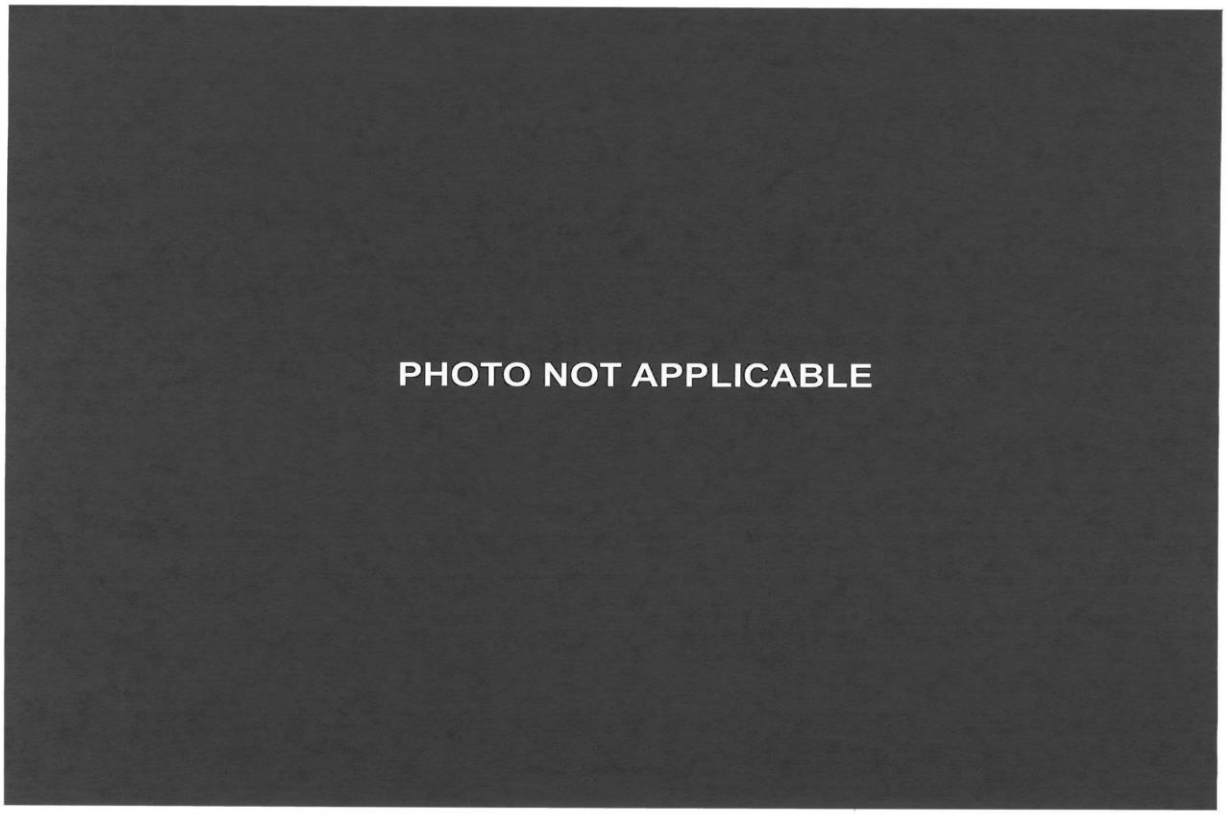
070 Post-Test Rear Passenger Dummy and Door Clearance View

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 Rear Passenger Inner Door Panel View

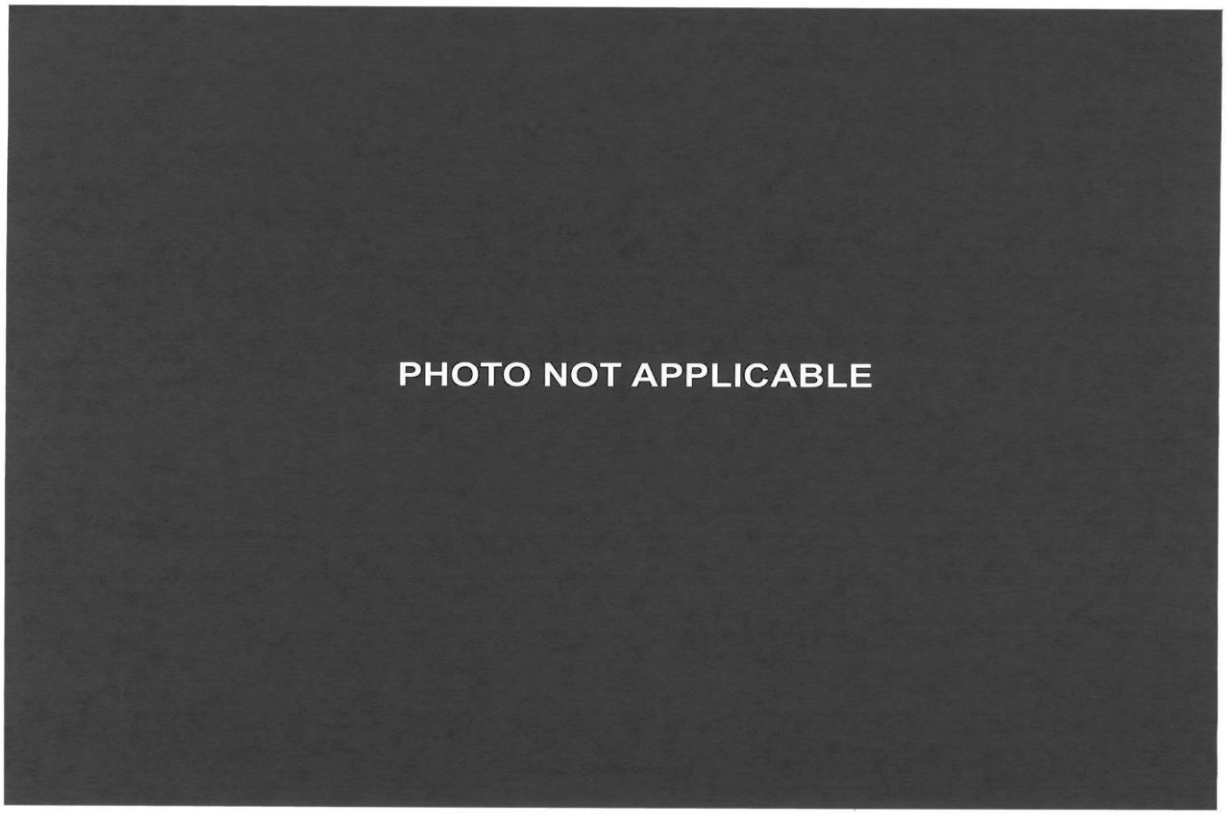
074 Post-Test Rear Passenger Inner Door Panel View



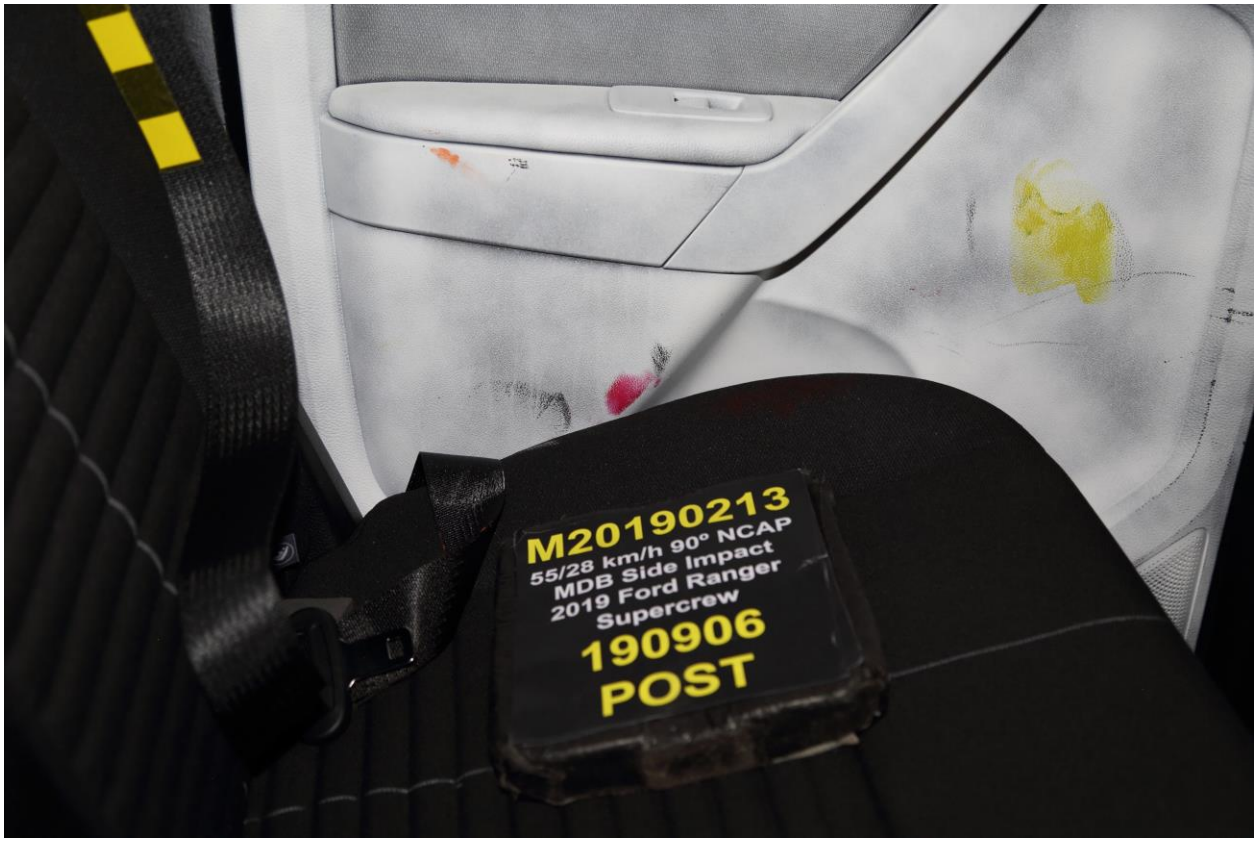
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

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

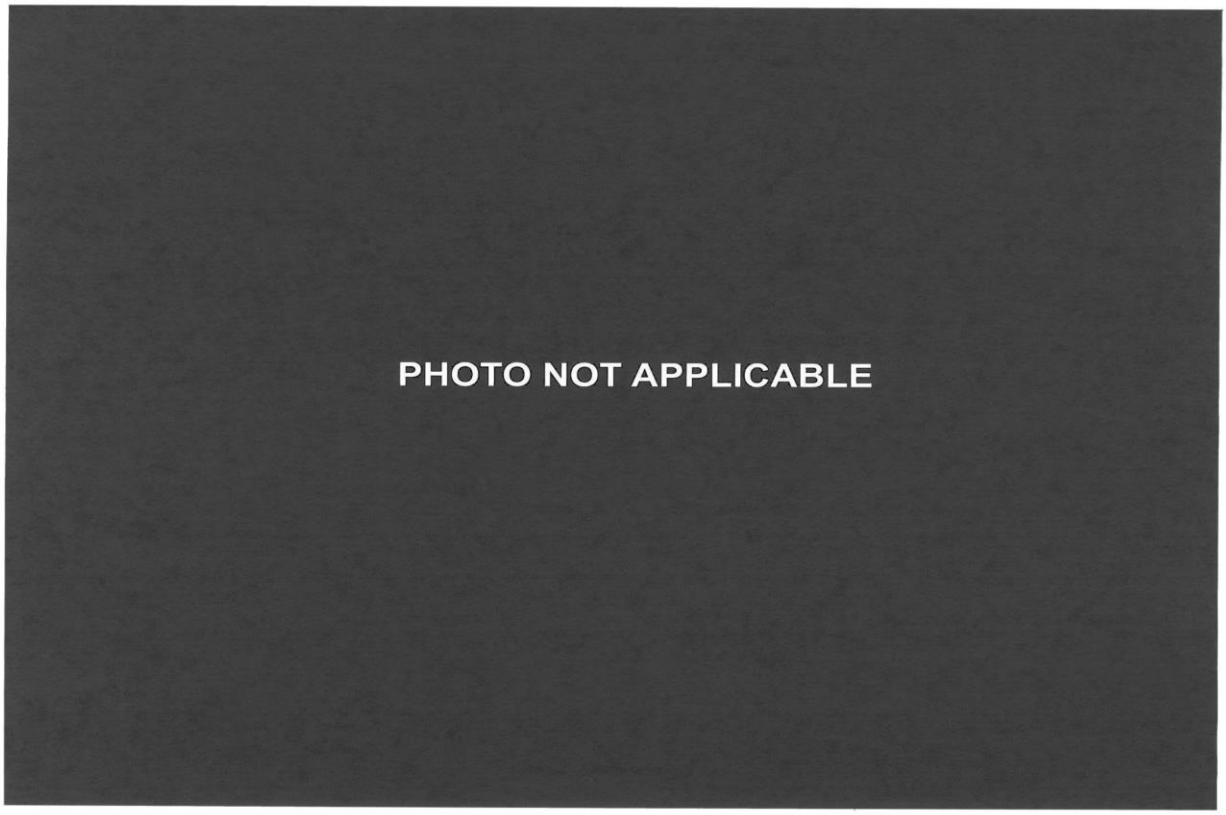
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



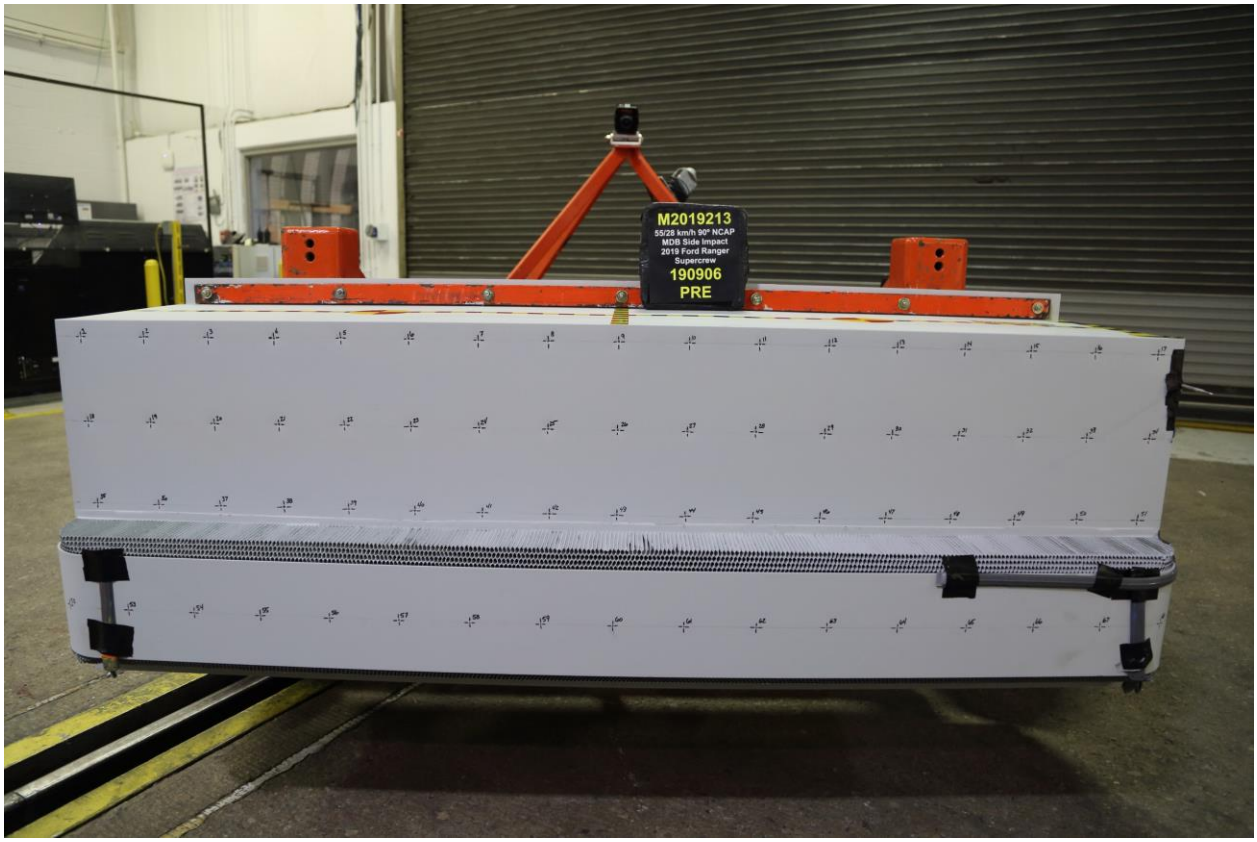
080 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

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

Intentionally Left Blank

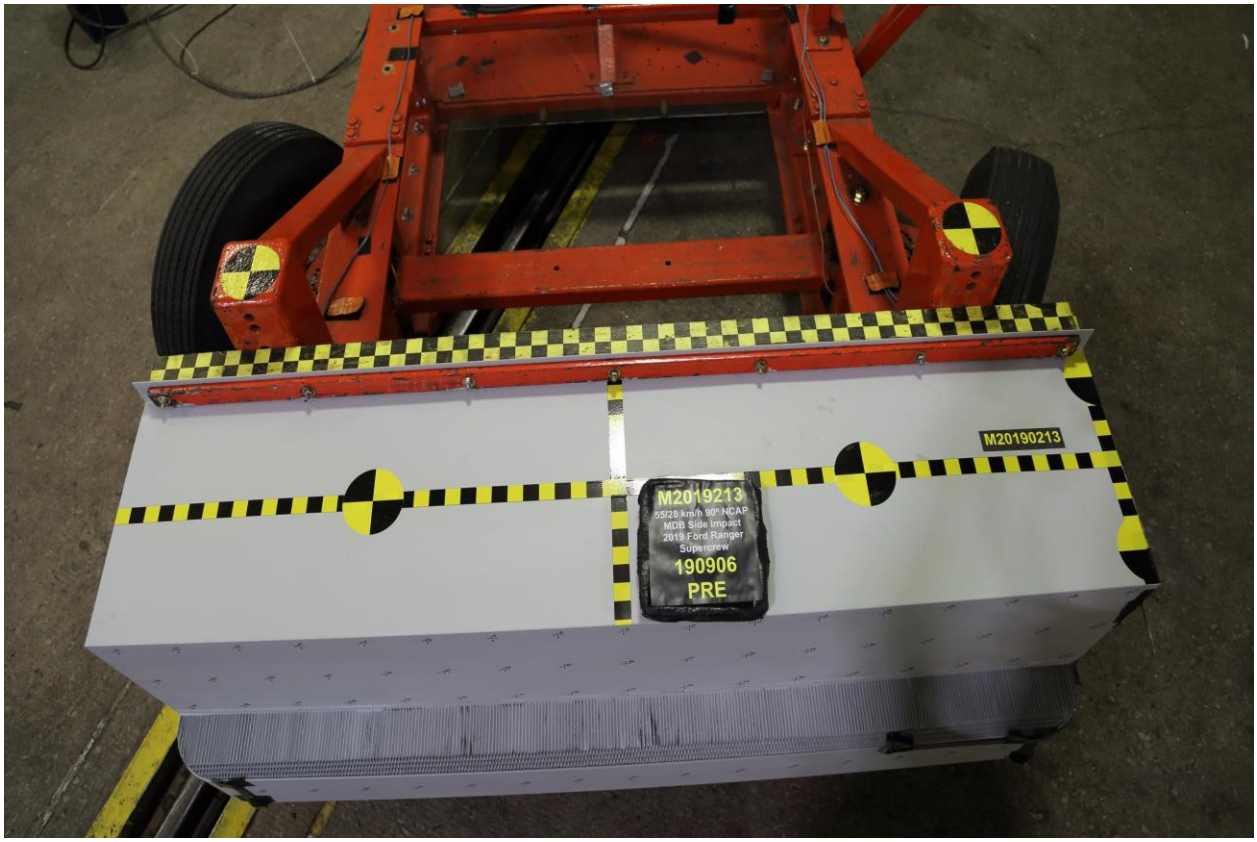
082 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

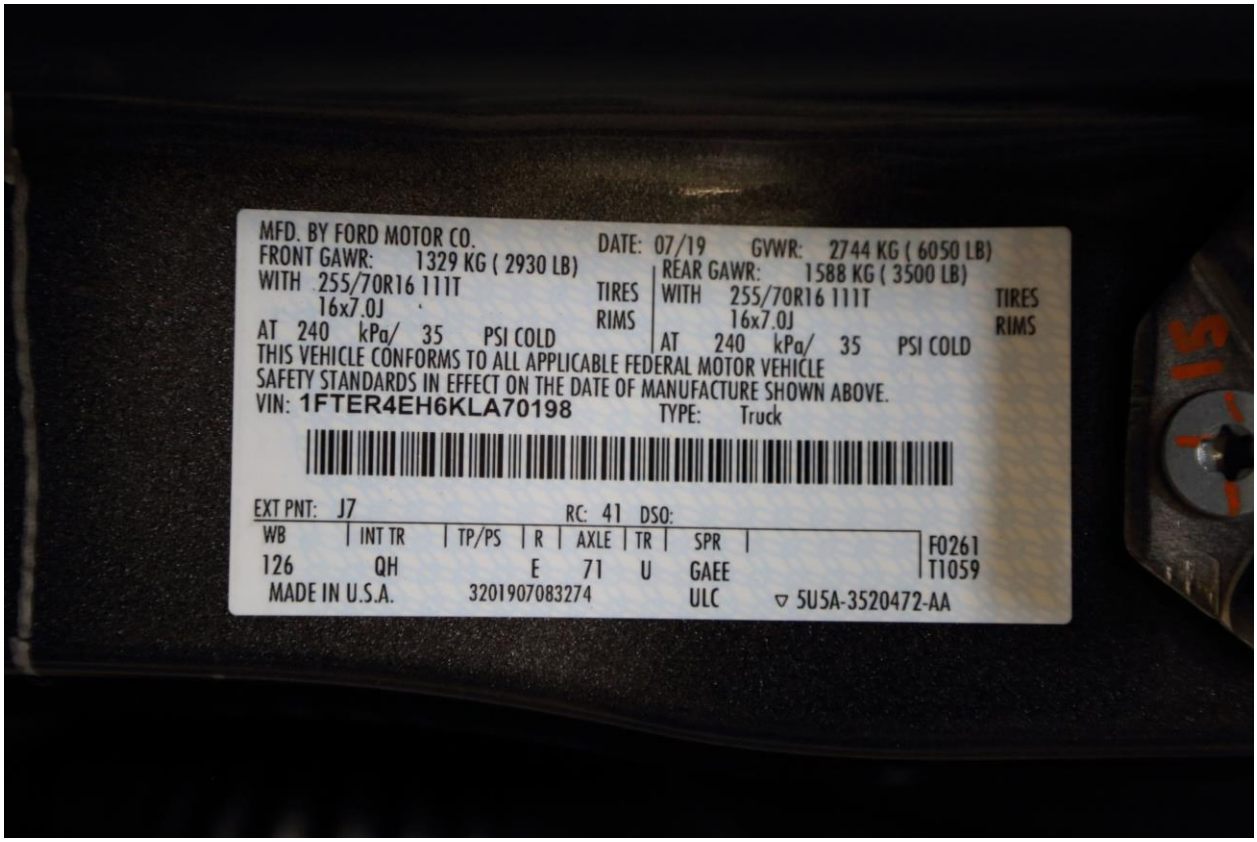
087 Post-Test Top View of MDB Impactor Face

088 Pre-Test Left Side View of MDB Impactor Face

089 Post-Test Left Side View of MDB Impactor Face

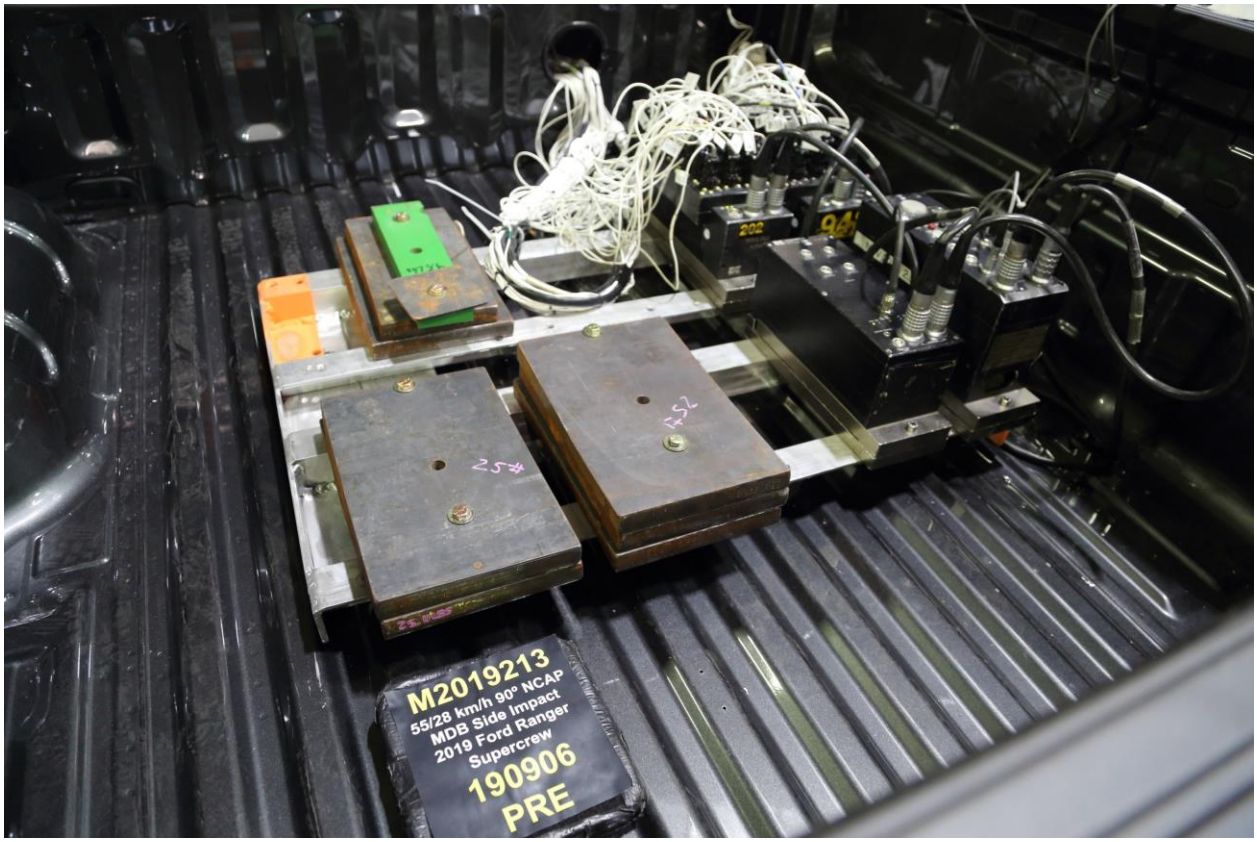
090 Pre-Test Right Side View of MDB Impactor Face

091 Post-Test Right Side View of MDB Impactor Face

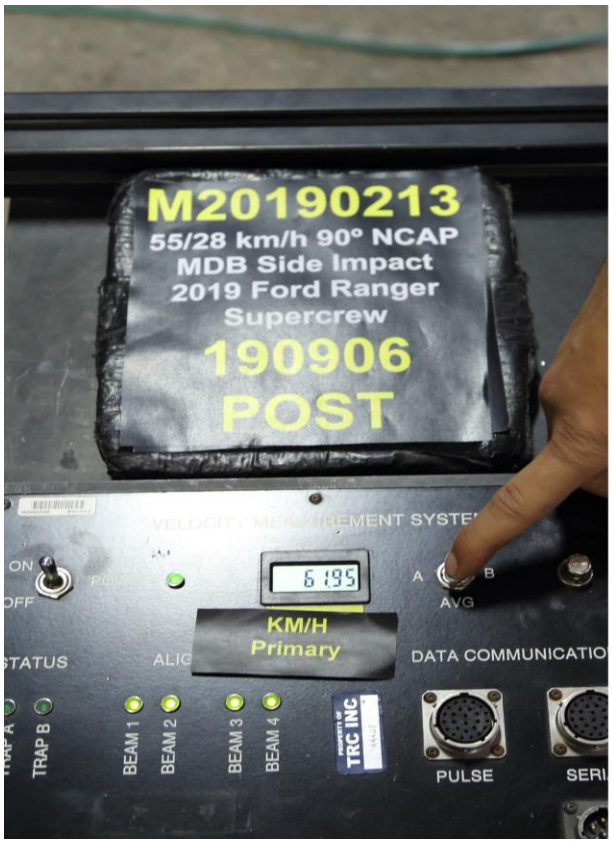


092 Close-Up View of Vehicle's Certification Label

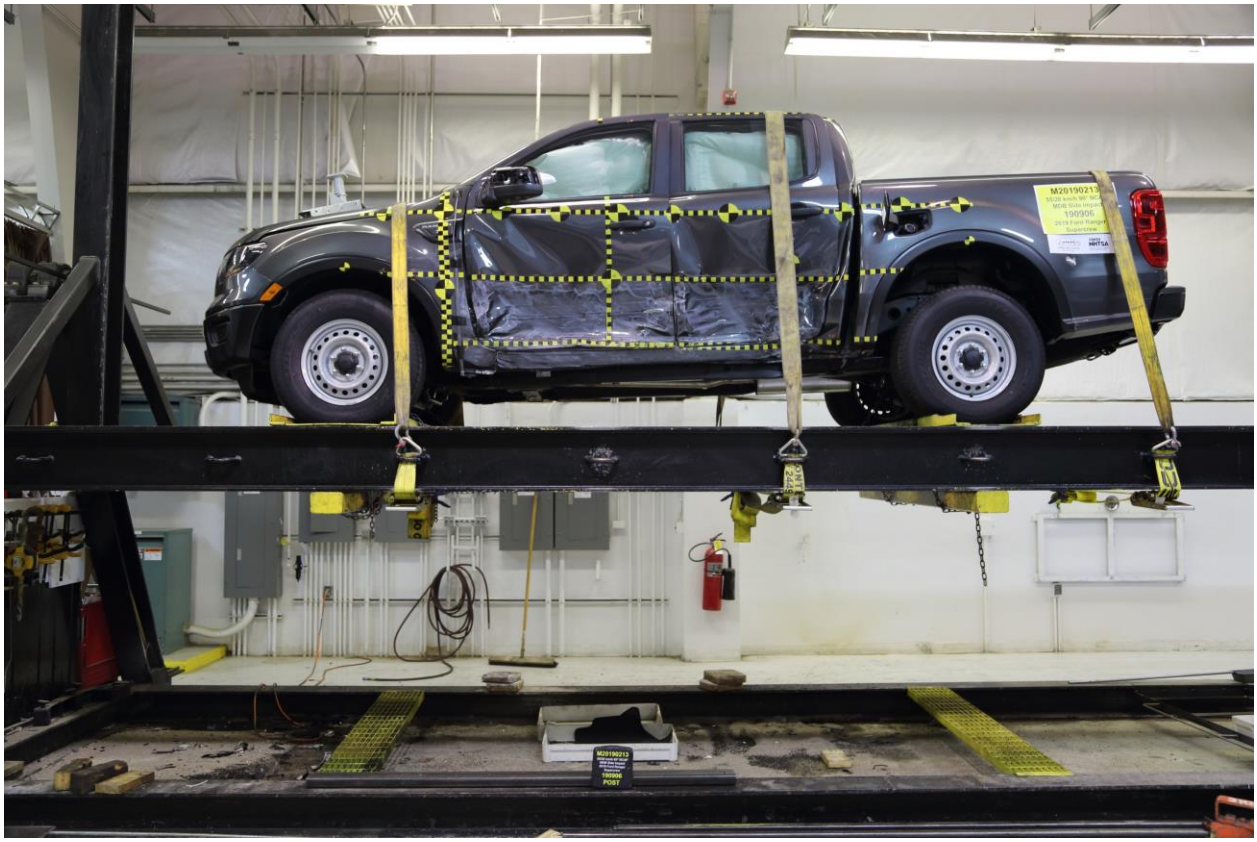
093 Close-Up View of Vehicle's Tire Information Placard or Label



094 Pre-Test Ballast View

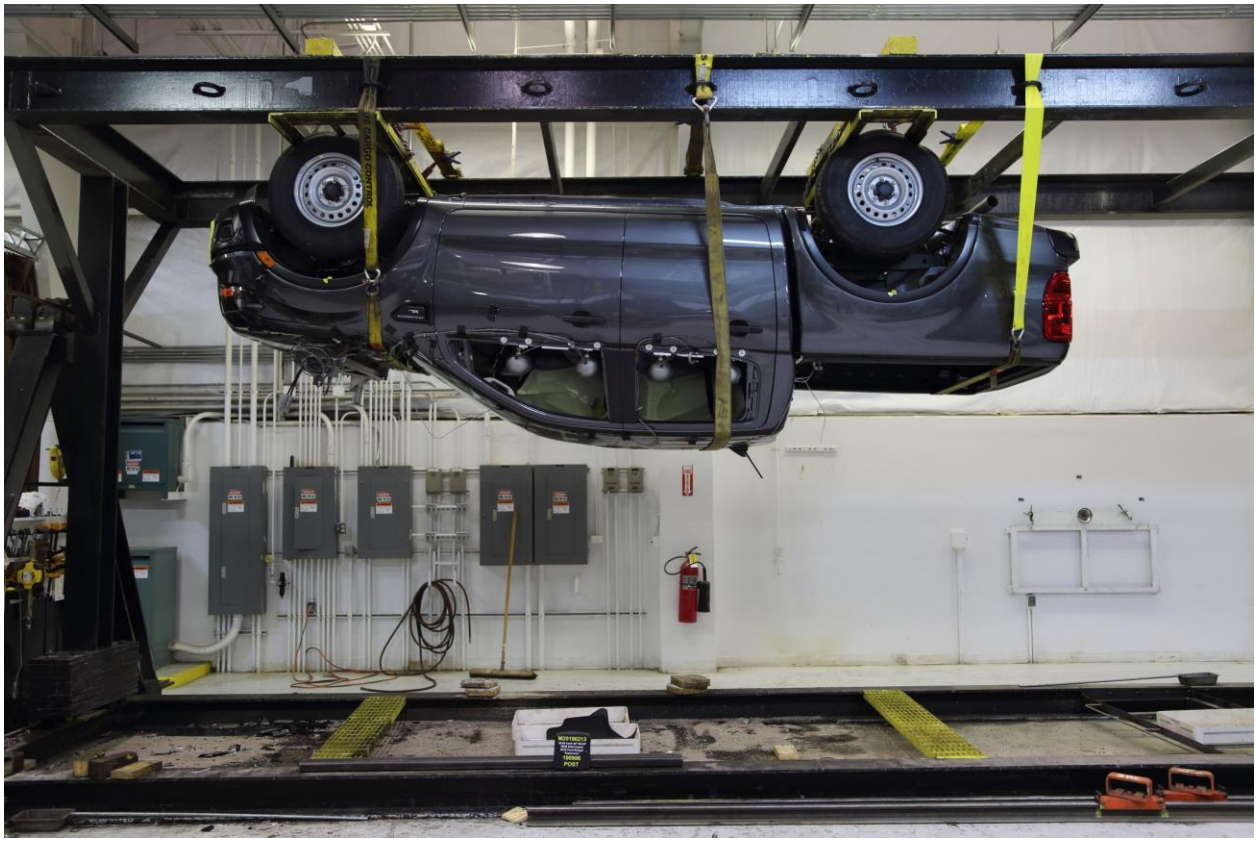


095 No. Post-Test Primary and Redundant Speed Trap Read-Out

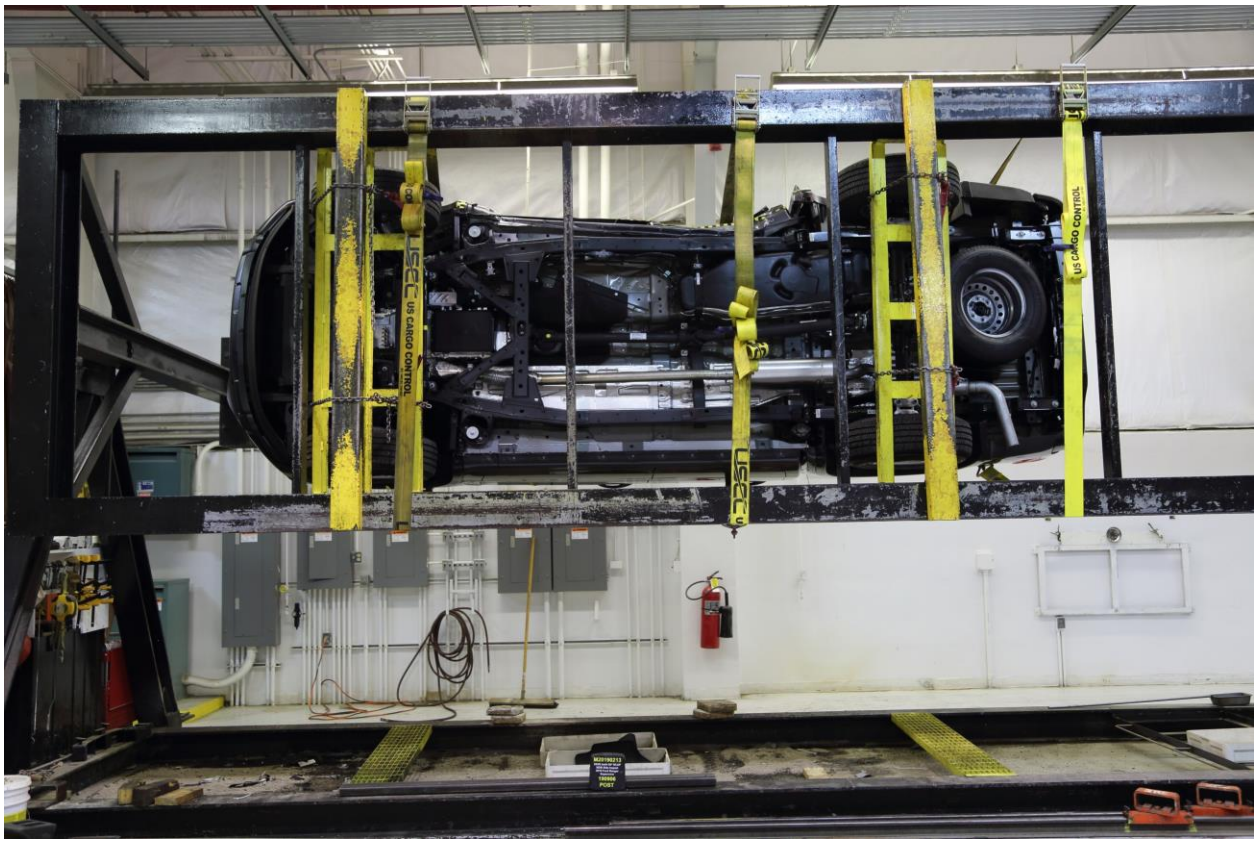


096 FMVSS No. 301 Static Rollover 0 Degrees

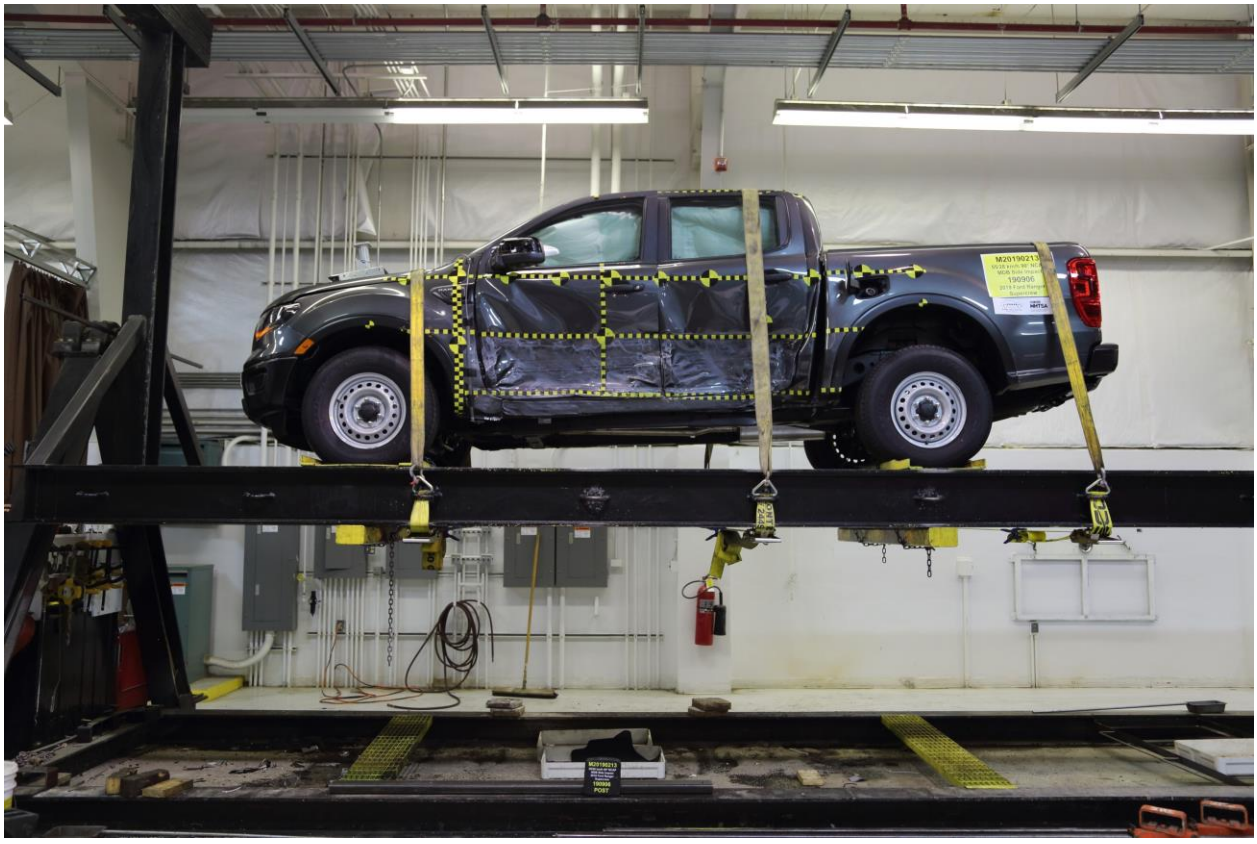
097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees

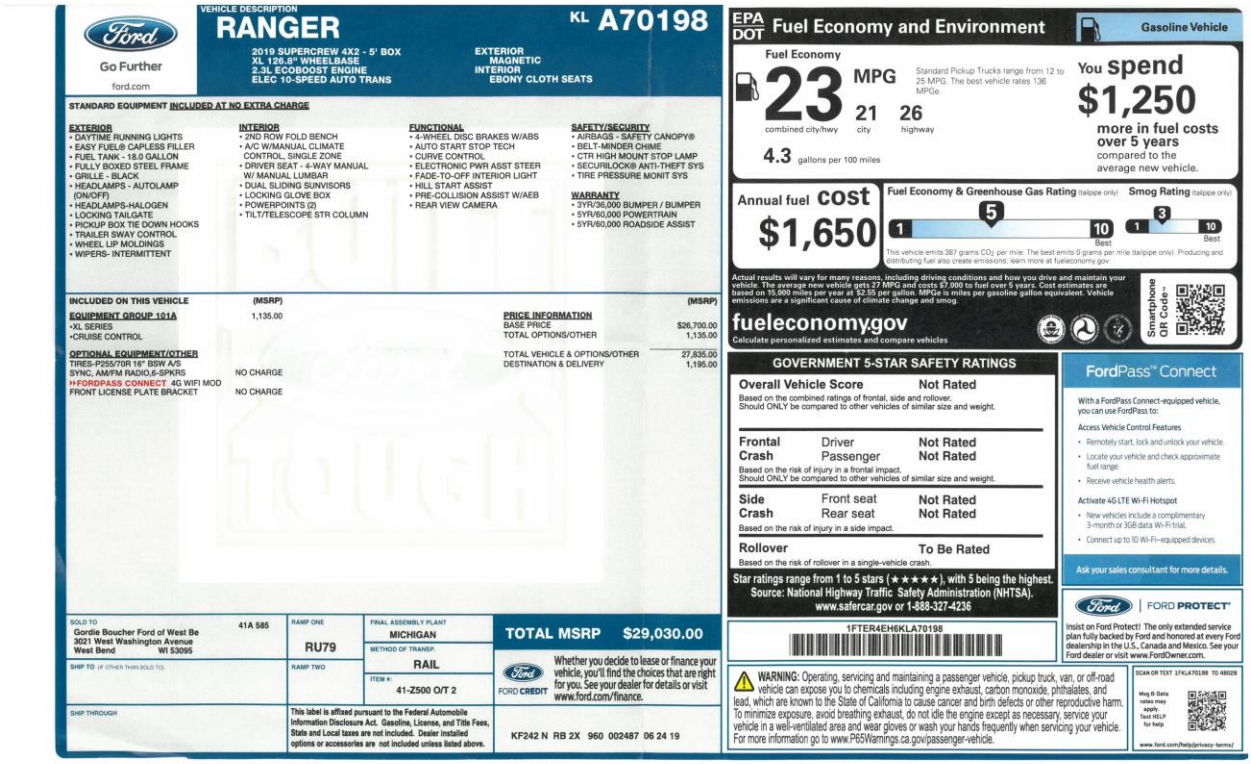


099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees

101 Impact Event



Go Further
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VEHICLE DESCRIPTION
RANGER KL **A70198**
2019 SUPERCREW 4X2 - 5' BOX
XL 126.8" WHEELBASE
2.3L ECOBOOST ENGINE
ELEC 10-SPEED AUTO TRANS
EXTERIOR MAGNETIC
INTERIOR EBONY CLOTH SEATS

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR
- DAYTIME RUNNING LIGHTS
- EASY FUEL® CAPLESS FILLER
- FUEL TANK - 18.0 GALLON
- FULLY BOXED STEEL FRAME
- GRILLE - BLACK
- HEADLAMPS - AUTOLAMP (ON/OFF)
- HEADLAMPS-HALOGEN
- LOCKING TAILGATE
- PICKUP BOX TIE DOWN HOOKS
- TRAILER SWAY CONTROL
- WHEEL LIP MOLDINGS
- WIPERS- INTERMITTENT

INTERIOR
- 2ND ROW FOLD BENCH
- A/C W/MANUAL CLIMATE CONTROL, SINGLE ZONE
- DRIVER SEAT - 4-WAY MANUAL W/ MANUAL LUMBAR
- DUAL SLIDING SUNVISORS
- LOCKING GLOVE BOX
- POWERPOINTS (2)
- TILT/TELESCOPE STR COLUMN

FUNCTIONAL
- 4-WHEEL DISC BRAKES W/ABS
- AUTO START STOP TECH
- CURVE CONTROL
- ELECTRONIC PWR ASST STEER
- FADE-TO-OFF INTERIOR LIGHT
- HILL START ASSIST
- PRE-COLLISION ASSIST W/AEB
- REAR VIEW CAMERA

SAFETY/SECURITY
- AIRBAGS - SAFETY CANOPY®
- BELT-MINDER CHIME
- CTR HIGH MOUNT STOP LAMP
- SECURILOCK® ANTI-THEFT SYS
- TIRE PRESSURE MONIT SYS

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

INCLUDED ON THIS VEHICLE	(MSRP)
EQUIPMENT GROUP 101A	1,135.00
•XL SERIES	
•CRUISE CONTROL	
OPTIONAL EQUIPMENT/OTHER	
TIRES-P255/70R 16" BSW A/S	
SYNC, AM/FM RADIO,6-SPKRS	NO CHARGE
++FORDPASS CONNECT 4G WIFI MOD	
FRONT LICENSE PLATE BRACKET	NO CHARGE

PRICE INFORMATION

	(MSRP)
BASE PRICE	$26,700.00
TOTAL OPTIONS/OTHER	1,135.00
TOTAL VEHICLE & OPTIONS/OTHER	27,835.00
DESTINATION & DELIVERY	1,195.00

SOLD TO: Gordie Boucher Ford of West Be, 3021 West Washington Avenue, West Bend WI 53095 — 41A 585
SHIP TO (IF OTHER THAN SOLD TO)
SHIP THROUGH
RAMP ONE: RU79
RAMP TWO
FINAL ASSEMBLY PLANT: MICHIGAN
METHOD OF TRANSP.: RAIL
ITEM #: 41-Z500 O/T 2

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

TOTAL MSRP $29,030.00

FORD CREDIT Whether you decide to lease or finance your vehicle, you'll find the choices that are right for you. See your dealer for details or visit www.ford.com/finance.

KF242 N RB 2X 960 002487 06 24 19

EPA DOT **Fuel Economy and Environment** — Gasoline Vehicle

Fuel Economy: **23** MPG (combined city/hwy) — 21 city — 26 highway — 4.3 gallons per 100 miles
Standard Pickup Trucks range from 12 to 25 MPG. The best vehicle rates 136 MPGe.

You spend **$1,250** more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$1,650**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 5 (1 — 10 Best)
Smog Rating (tailpipe only): 3 (1 — 10 Best)
This vehicle emits 387 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions, learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs $7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $2.55 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles
Smartphone QR Code™

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.		
Frontal Crash	Driver	Not Rated
	Passenger	Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
Side Crash	Front seat	Not Rated
	Rear seat	Not Rated
Based on the risk of injury in a side impact.		
Rollover		To Be Rated
Based on the risk of rollover in a single-vehicle crash.		

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

1FTER4EH6KLA70198

FordPass™ Connect
With a FordPass Connect-equipped vehicle, you can use FordPass to:
Access Vehicle Control Features
- Remotely start, lock and unlock your vehicle.
- Locate your vehicle and check approximate fuel range.
- Receive vehicle health alerts.

Activate 4G LTE Wi-Fi Hotspot
- New vehicles include a complimentary 3-month or 3GB data Wi-Fi trial.
- Connect up to 10 Wi-Fi–equipped devices.

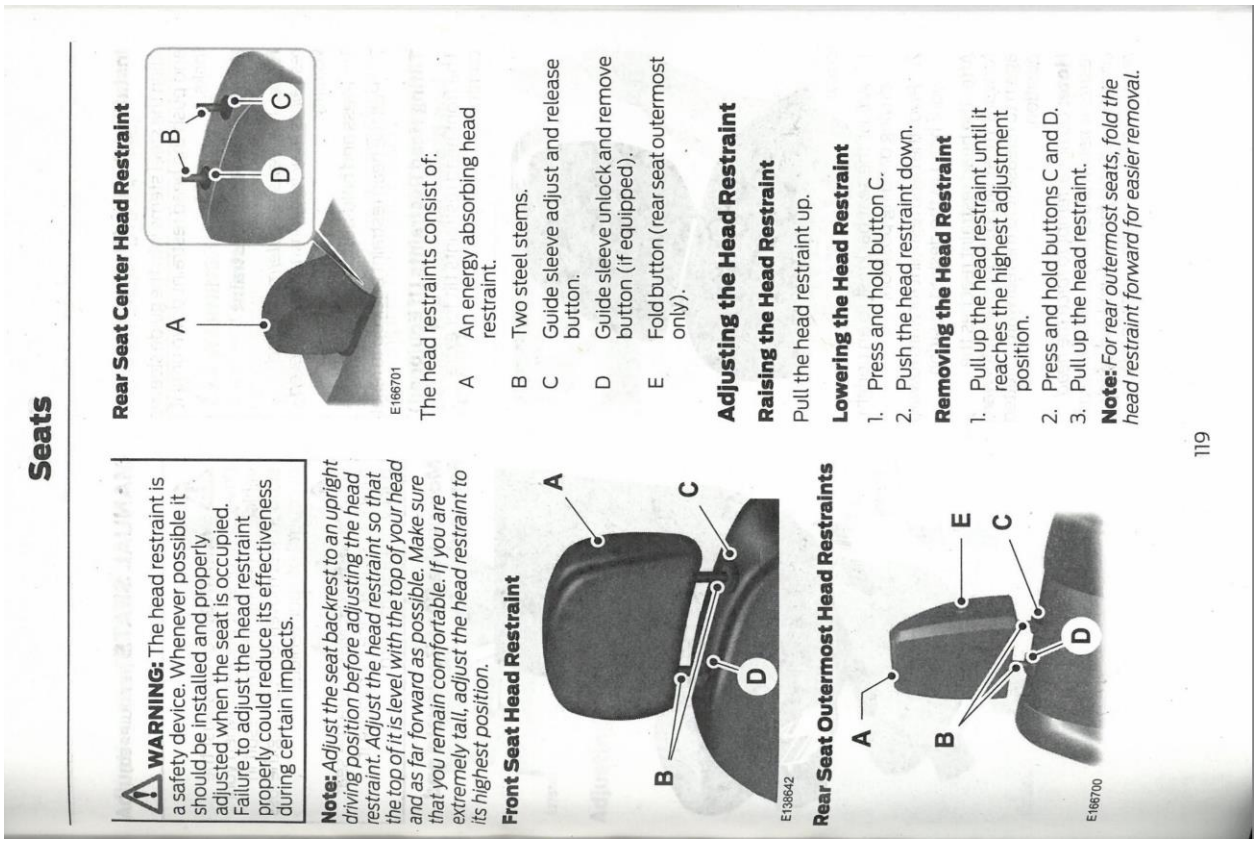
Ask your sales consultant for more details.

FORD PROTECT™
Insist on Ford Protect! The only extended service plan fully backed by Ford and honored at every Ford dealership in the U.S., Canada and Mexico. See your Ford dealer or visit www.FordOwner.com.

WARNING: Operating, servicing and maintaining a passenger vehicle, pickup truck, van, or off-road vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

SCAN OR TEXT 1FTER4EH6KLA70198 TO 48028
Msg & Data rates may apply. Text HELP for help
www.ford.com/help/privacy-terms/

102 Monroney Label



Seats

Rear Seat Center Head Restraint

E166701

The head restraints 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 (if equipped).
- E Fold button (rear seat outermost only).

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. Pull up the head restraint until it reaches the highest adjustment position.
2. Press and hold buttons C and D.
3. Pull up the head restraint.

Note: *For rear outermost seats, fold the head restraint forward for easier removal.*

WARNING: The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. Failure to adjust the head restraint properly could reduce its effectiveness during certain impacts.

Note: *Adjust the seat backrest 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

E138842

Rear Seat Outermost Head Restraints

E166700

119

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

Seats

WARNING: The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. Failure to adjust the head restraint properly could reduce its effectiveness during certain impacts.

***Note:** Adjust the seat backrest 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 Outermost Head Restraints

E168700

Rear Seat Center Head Restraint

E166701

The head restraints 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 (if equipped).
- E Fold button (rear seat outermost only).

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. Pull up the head restraint until it reaches the highest adjustment position.
2. Press and hold buttons C and D.
3. Pull up the head restraint.

***Note:** For rear outermost seats, fold the head restraint forward for easier removal.*

119

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

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)
Passenger Head Angular Velocity (X)
Passenger Head Angular Velocity (Y)
Passenger Head Angular Velocity (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: 09/06/2019

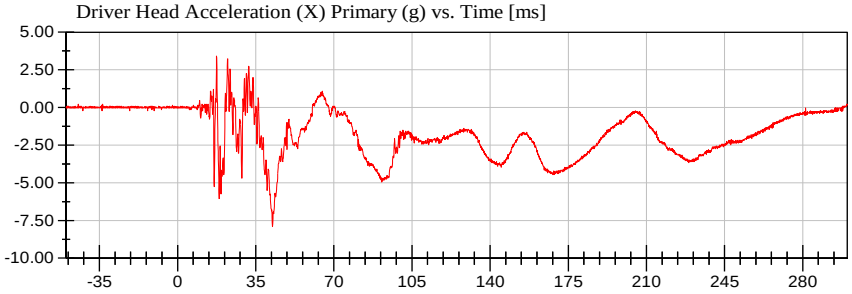
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

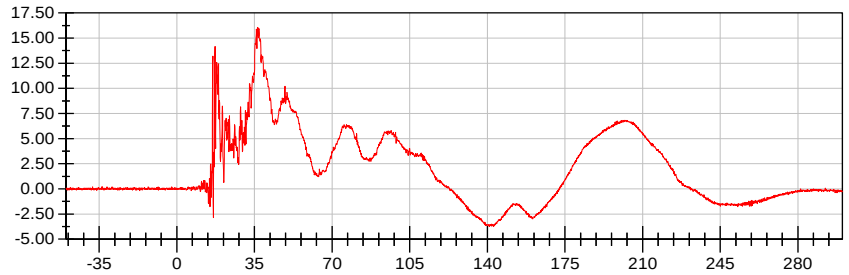
3.42 g at 17.44 ms

<Min>

-7.91 g at 42.48 ms

CFC_1000

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



<Max>

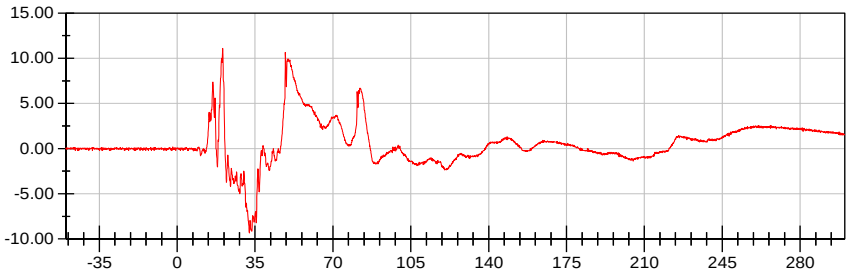
16.08 g at 36.48 ms

<Min>

-3.76 g at 141.04 ms

CFC_1000

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



<Max>

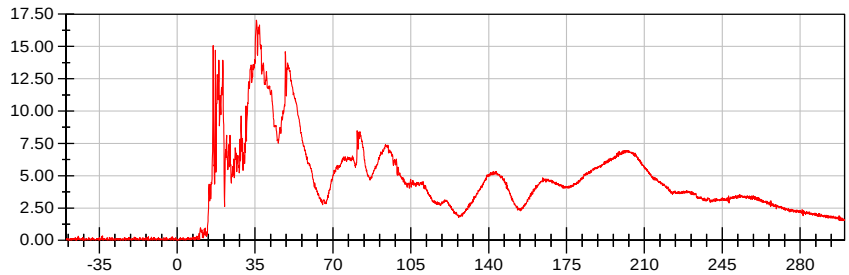
11.11 g at 20.48 ms

<Min>

-9.33 g at 32.48 ms

CFC_1000

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



<Max>

17.04 g at 35.60 ms

<Min>

0.03 g at -49.44 ms

CFC_1000

NHTSA

Test Date: 09/06/2019

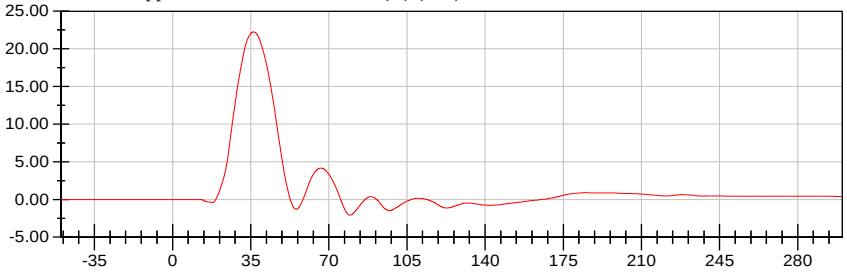
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

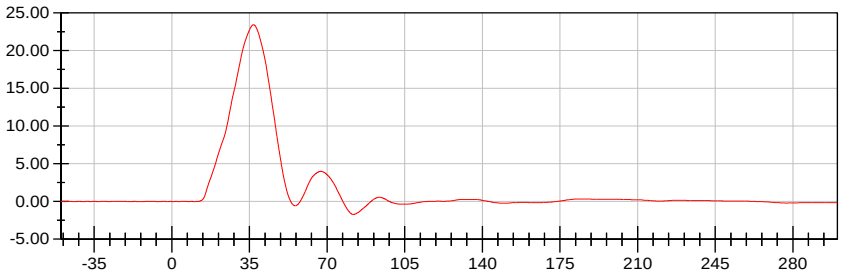
22.25 mm at 36.32 ms

<Min>

-2.08 mm at 79.44 ms

CFC_180

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



<Max>

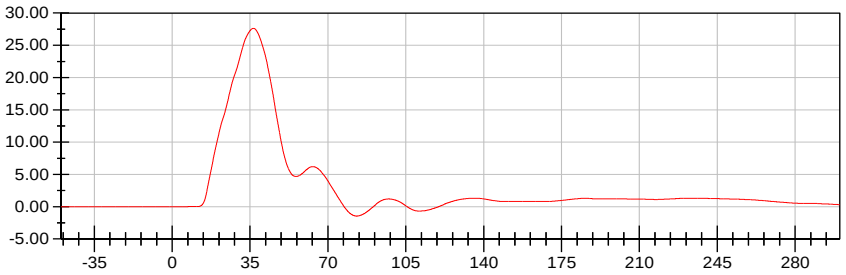
23.43 mm at 36.80 ms

<Min>

-1.71 mm at 81.92 ms

CFC_180

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



<Max>

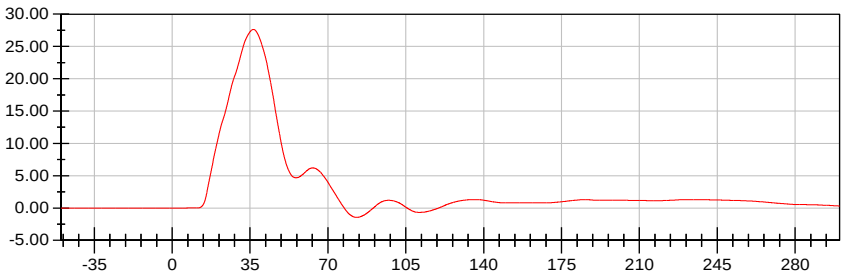
27.62 mm at 36.56 ms

<Min>

-1.45 mm at 82.96 ms

CFC_180

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



<Max>

27.62 mm at 36.56 ms

<Min>

-1.45 mm at 82.96 ms

CFC_180

NHTSA

Test Date: 09/06/2019

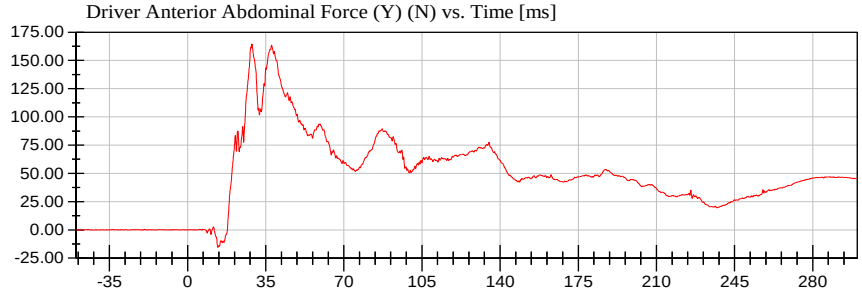
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

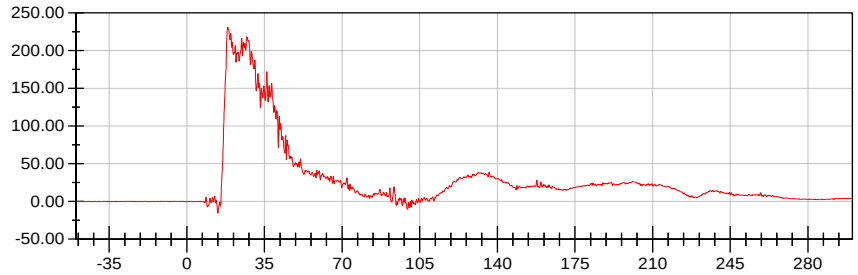
164.51 N at 28.88 ms

<Min>

-15.49 N at 13.60 ms

CFC_600

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



<Max>

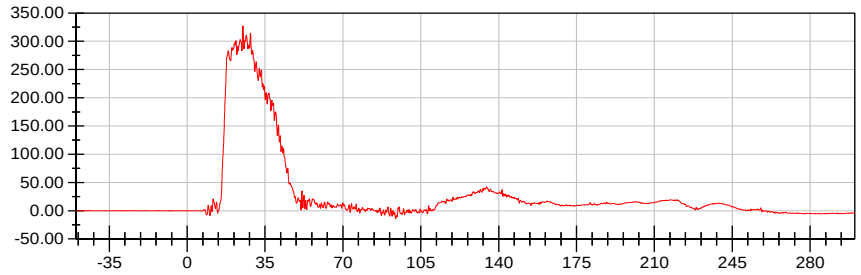
231.28 N at 18.48 ms

<Min>

-15.50 N at 14.00 ms

CFC_600

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



<Max>

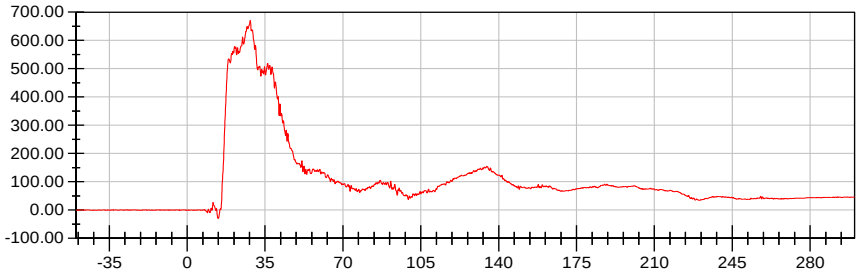
327.39 N at 25.04 ms

<Min>

-14.35 N at 93.68 ms

CFC_600

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



<Max>

670.88 N at 28.32 ms

<Min>

-29.19 N at 14.00 ms

CFC_600

NHTSA

Test Date: 09/06/2019

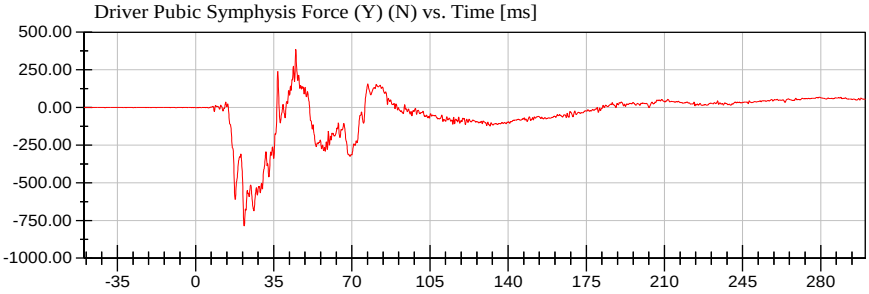
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

386.64 N at 44.88 ms

<Min>

-786.52 N at 21.84 ms

CFC_600

NHTSA

Test Date: 09/06/2019

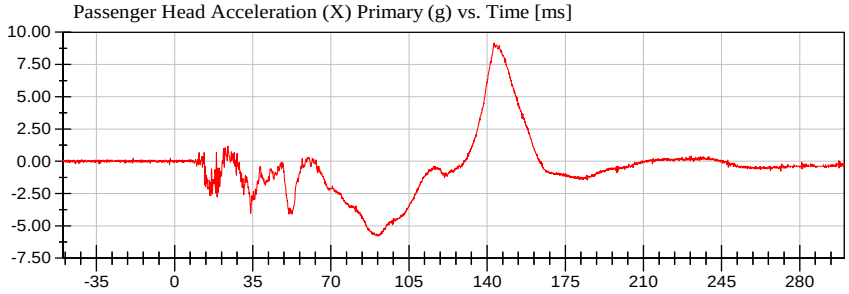
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

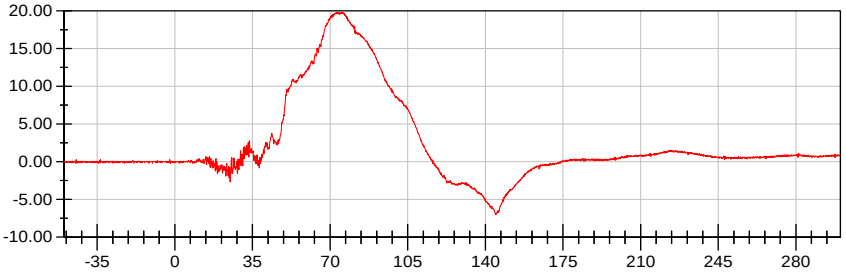
9.15 g at 143.12 ms

<Min>

-5.80 g at 90.72 ms

CFC_1000

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



<Max>

19.82 g at 73.12 ms

<Min>

-7.04 g at 144.72 ms

CFC_1000

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

<Max>

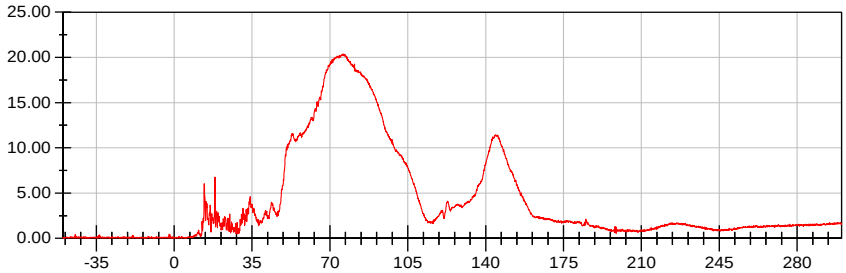
6.27 g at 81.36 ms

<Min>

-6.44 g at 18.32 ms

CFC_1000

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



<Max>

20.37 g at 76.16 ms

<Min>

0.03 g at -49.84 ms

CFC_1000

NHTSA

Test Date: 09/06/2019

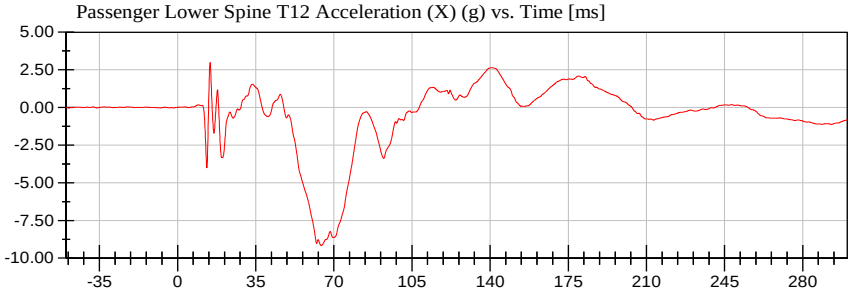
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

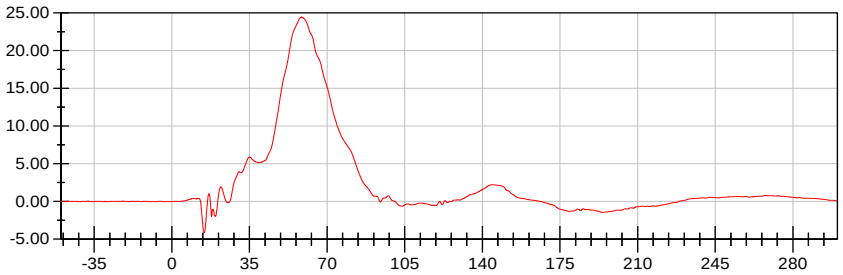
2.98 g at 14.56 ms

<Min>

-9.16 g at 64.40 ms

CFC_180

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



<Max>

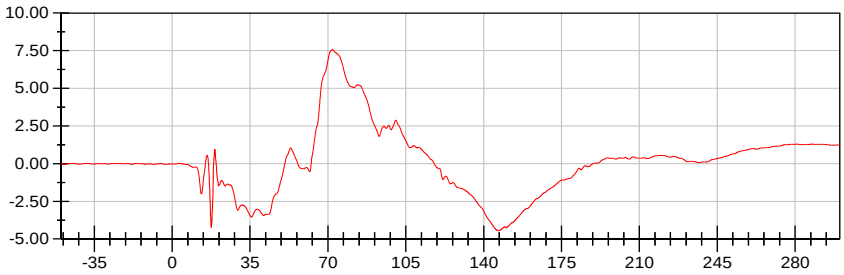
24.47 g at 58.48 ms

<Min>

-4.18 g at 14.56 ms

CFC_180

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



<Max>

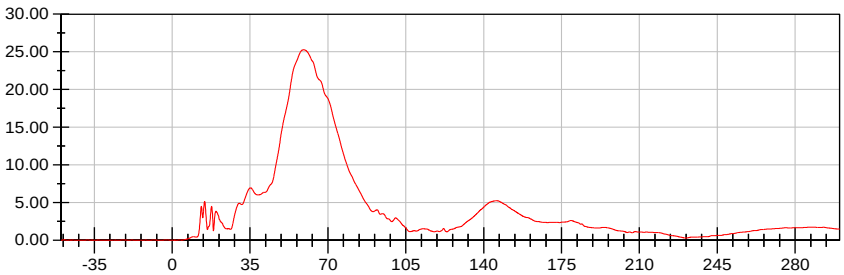
7.57 g at 72.00 ms

<Min>

-4.46 g at 146.72 ms

CFC_180

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



<Max>

25.28 g at 59.04 ms

<Min>

0.01 g at -27.60 ms

CFC_180

NHTSA

Test Date: 09/06/2019

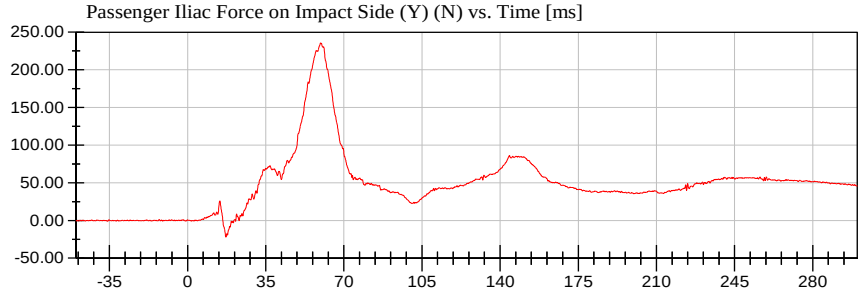
Test Lab: CTF

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

Test Number: 190906 (M20190213)

Position #4 SID IIs Dummy (305)

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



<Max>

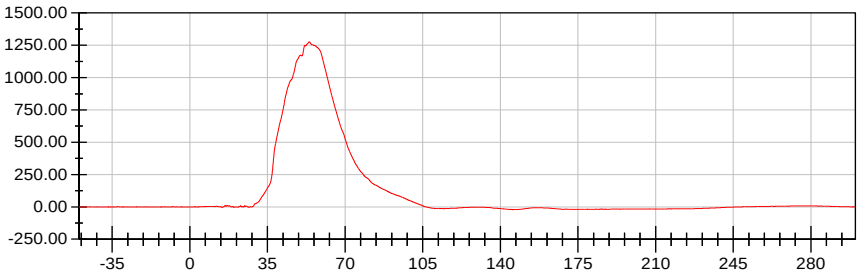
235.75 N at 59.52 ms

<Min>

-22.01 N at 17.12 ms

CFC_600

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



<Max>

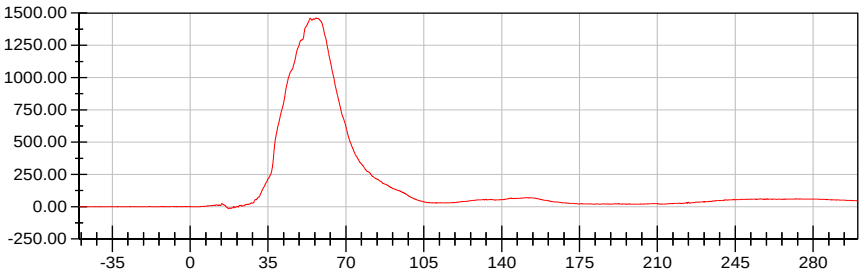
1,277.18 N at 53.84 ms

<Min>

-22.60 N at 145.60 ms

CFC_600

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



<Max>

1,461.59 N at 56.64 ms

<Min>

-15.89 N at 17.20 ms

CFC_600

APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

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. 66

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	561	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	97	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	328	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	201	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	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. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Peak Resultant Acceleration	125 - 155 g	132.5 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.1 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	3.81 %	Yes

Test meets specifications.

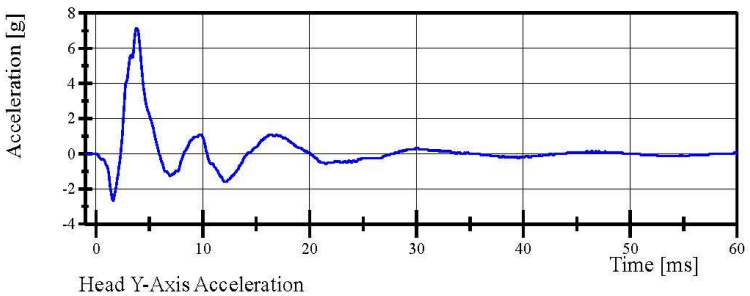
Condition: Used

Comments:
Head Skin S/N: DP6812

Transportation Research Center Inc.

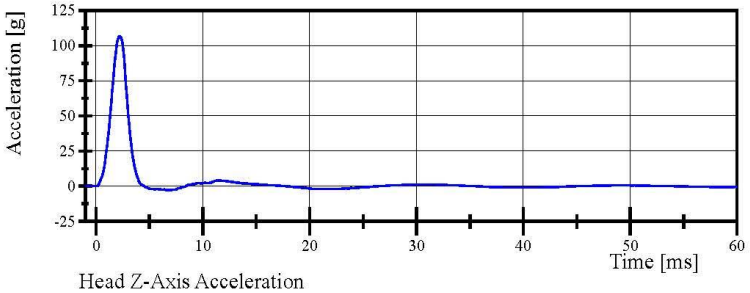
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Head X-Axis Acceleration



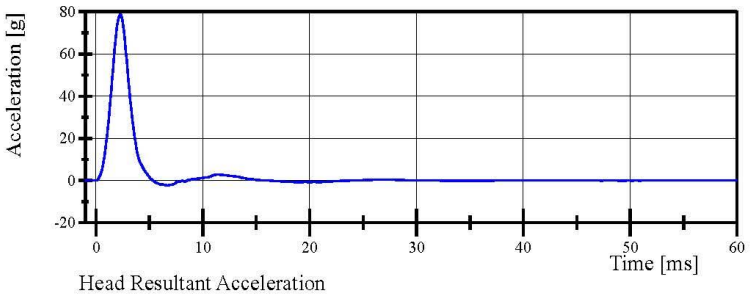
Filter Class: CFC_1000
Max: 7.1 g at 3.8 ms
Min: -2.7 g at 1.6 ms

Head Y-Axis Acceleration



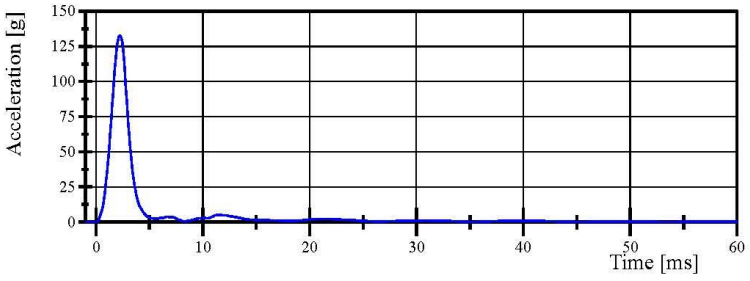
Filter Class: CFC_1000
Max: 106.7 g at 2.2 ms
Min: -2.8 g at 6.6 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 78.7 g at 2.3 ms
Min: -2.3 g at 6.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 132.5 g at 2.2 ms
Min: 0.0 g at -0.6 ms

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

08.27.2019 15:51:11 326

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 66-11
Test Date: 8/30/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	54 %	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	-50.3 deg	Yes
Time of Peak	54 - 66 ms	55.4 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	61.5 ms	Yes

Test meets specifications.

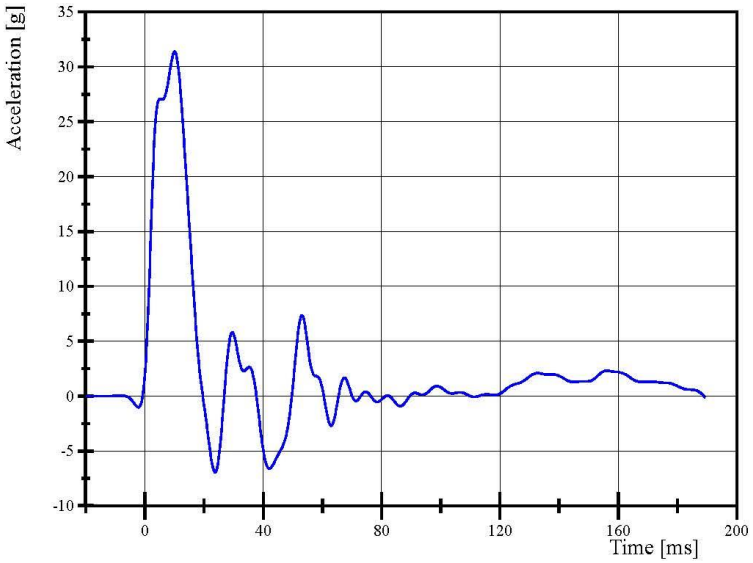
Condition: Used

Comments:
Neck S/N: DS5463

Transportation Research Center Inc.

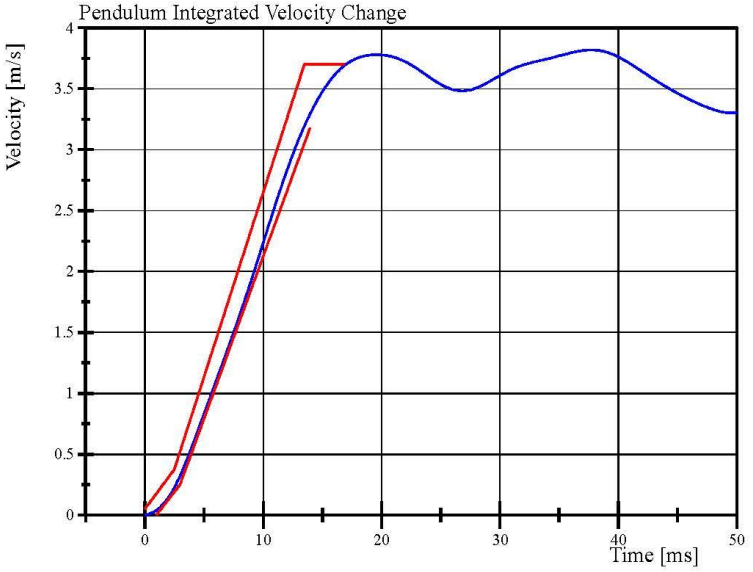
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 66-11
Test Date: 8/30/2019

Pendulum Acceleration



Filter Class: CFC_60
Max: 31.4 g at 10.0 ms
Min: -6.9 g at 23.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.8 m/s at 37.7 ms
Min: 0.0 m/s at 0.0 ms

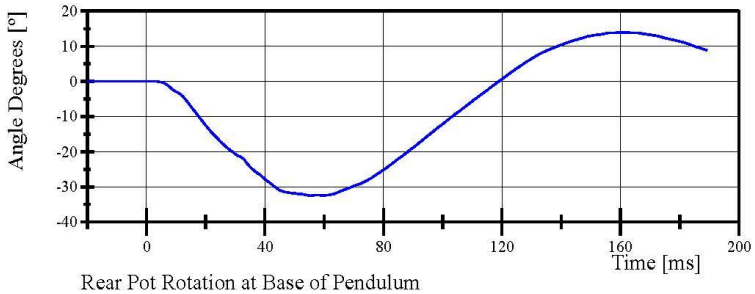
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.30.2019 08:48:32 1459

Transportation Research Center Inc.

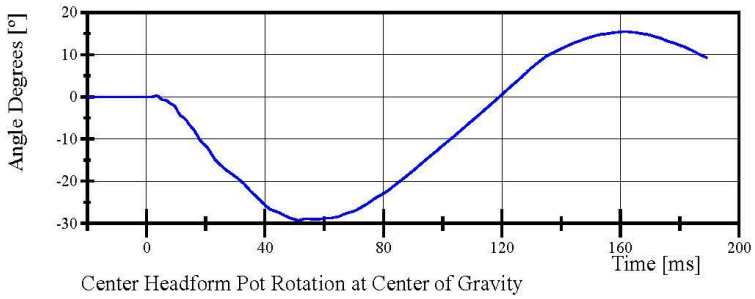
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 66-11
Test Date: 8/30/2019

Forward Pot Rotation at Base of Pendulum



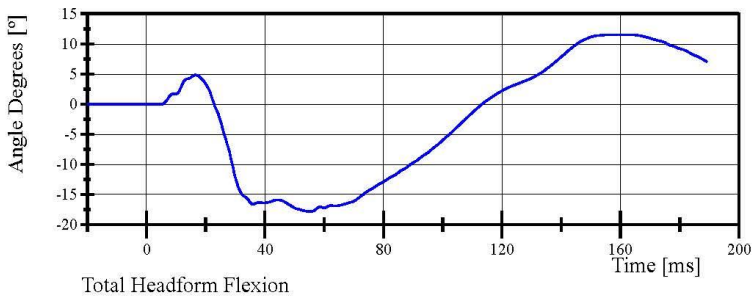
Filter Class: CFC_180
Max: 13.9 ° at 160.1 ms
Min: -32.5 ° at 55.4 ms

Rear Pot Rotation at Base of Pendulum



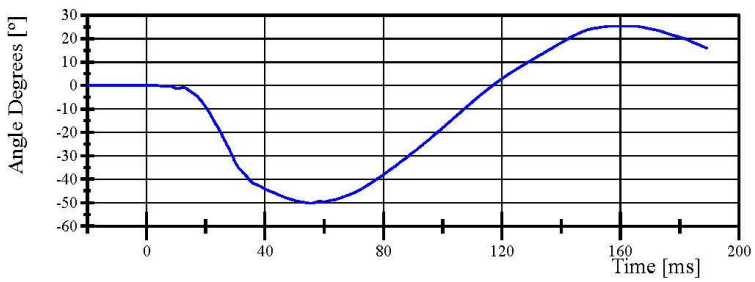
Filter Class: CFC_180
Max: 15.4 ° at 161.5 ms
Min: -29.3 ° at 51.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.5 ° at 162.0 ms
Min: -17.8 ° at 55.6 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.4 ° at 160.1 ms
Min: -50.3 ° at 55.4 ms

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

08.30.2019 08:48:32 1459

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.94 g	Yes

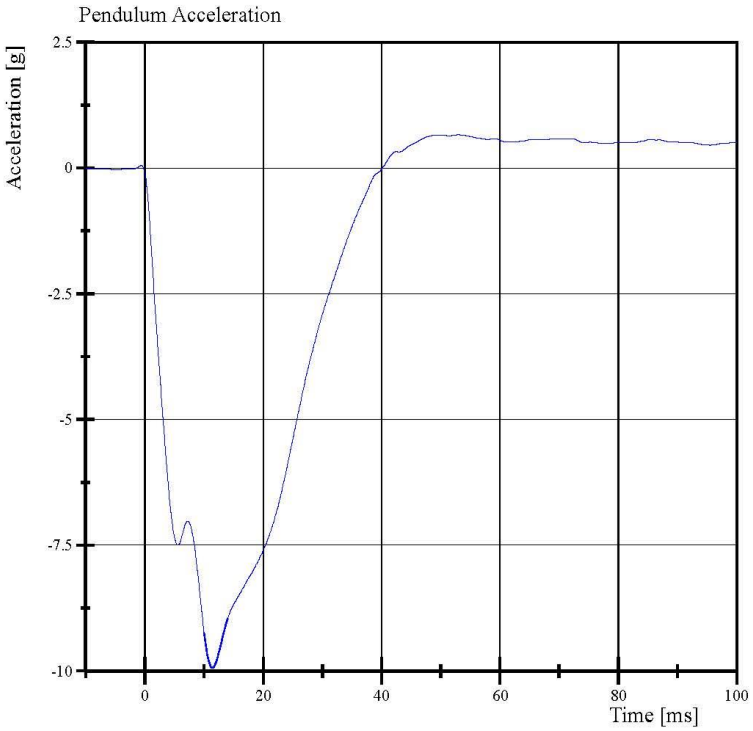
Test meets specifications.

Condition: Used

Comments:
Arm S/N: 175-3501-07014

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019



Filter Class: CFC_180
Max: 0.7 g at 53.0 ms
Min: -9.9 g at 11.4 ms

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

08.29.2019 07:45:33 521

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.7 mm	Yes

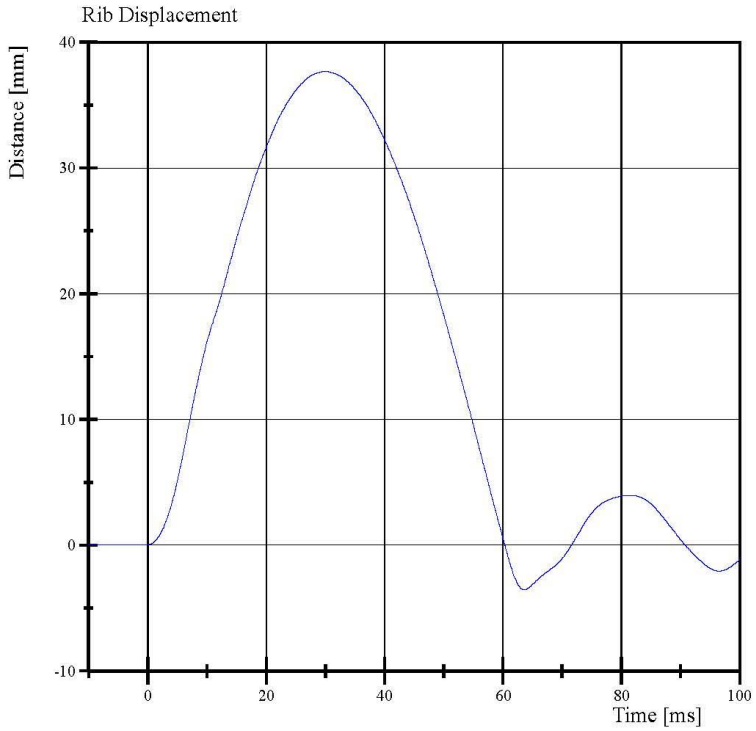
Test meets specifications.

Condition: Used

Comments:
Drop Height: 462mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019



Filter Class: CFC_180
Max: 37.7 mm at 30.0 ms
Min: -3.6 mm at 63.6 ms

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

08.27.2019 13:58:13 452

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.2 mm	Yes

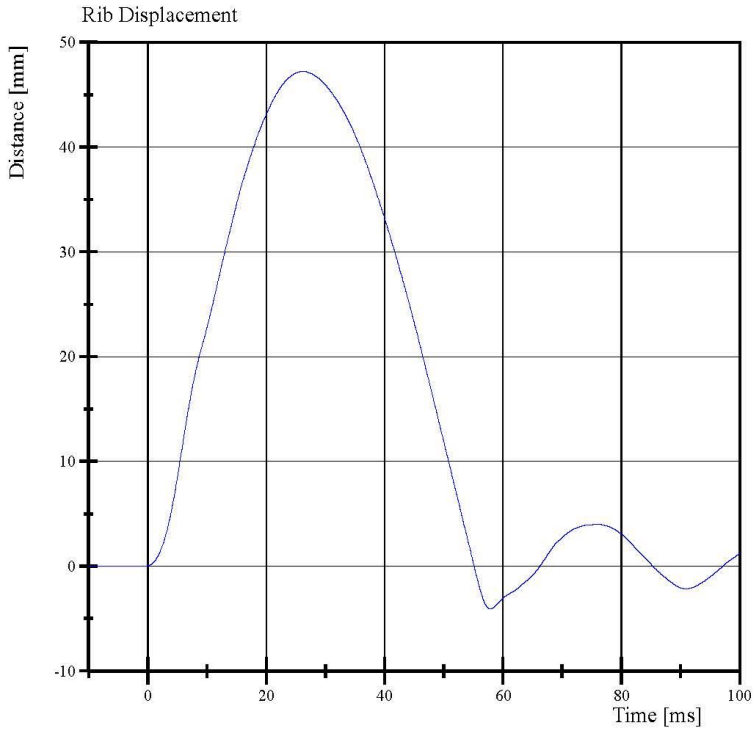
Test meets specifications.

Condition: Used

Comments:
Drop Height: 816mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019



Filter Class: CFC_180
Max: 47.2 mm at 26.2 ms
Min: -4.1 mm at 57.8 ms

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

08.27.2019 13:51:34 384

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.8 mm	Yes

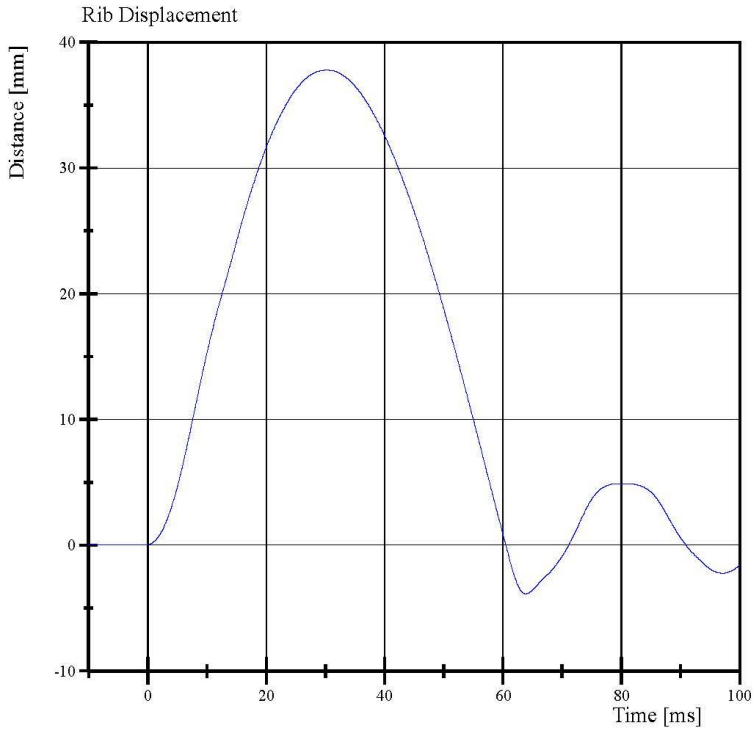
Test meets specifications.

Condition: Used

Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019



Filter Class: CFC_180
Max: 37.8 mm at 30.2 ms
Min: -3.9 mm at 63.8 ms

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

08.27.2019 14:23:27 462

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.4 mm	Yes

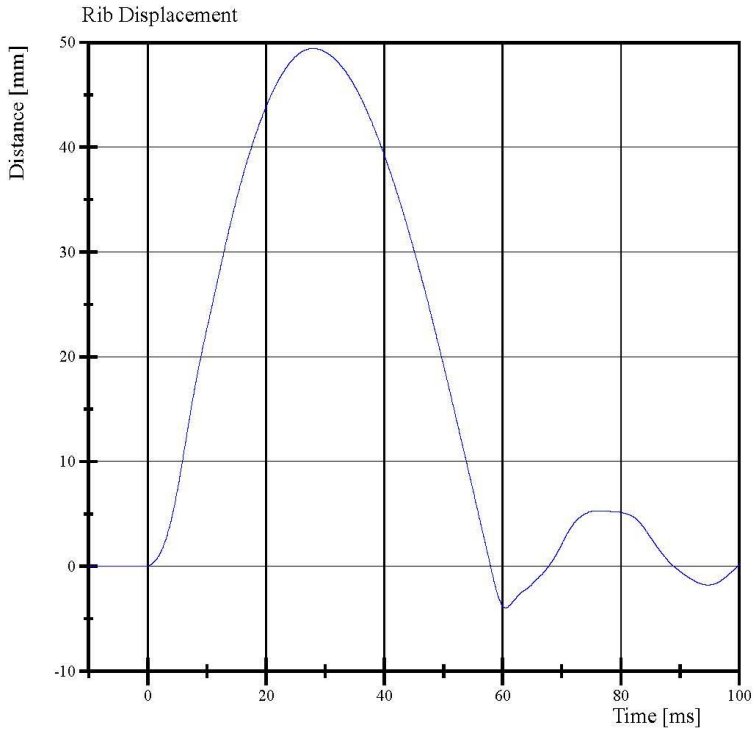
Test meets specifications.

Condition: Used

Comments:
Drop Height: 816 mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019



Filter Class: CFC_180
Max: 49.4 mm at 28.0 ms
Min: -3.9 mm at 60.5 ms

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

08.27.2019 14:04:23 396

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.6 mm	Yes

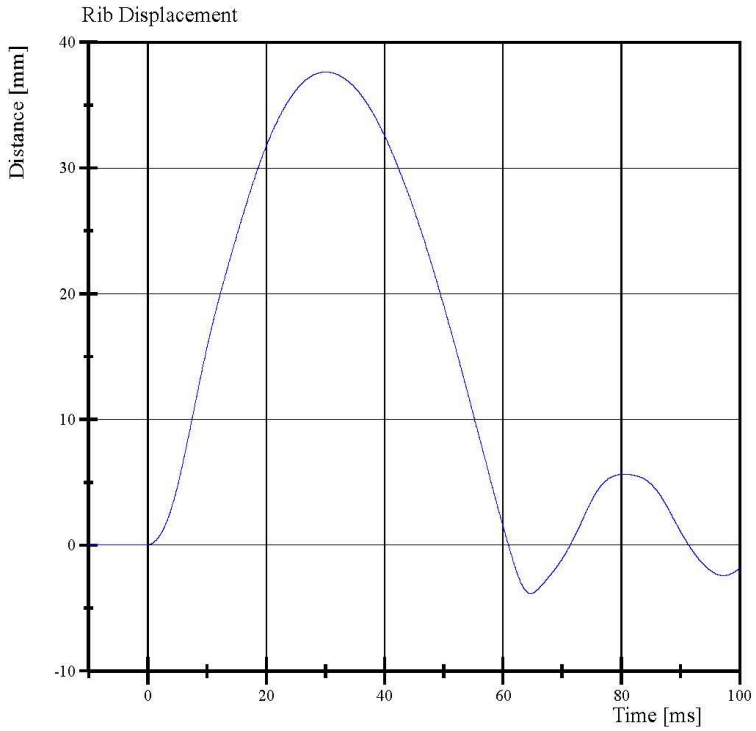
Test meets specifications.

Condition: Used

Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A-06-017

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019



Filter Class: CFC_180
Max: 37.6 mm at 30.1 ms
Min: -3.8 mm at 64.6 ms

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

08.27.2019 14:37:58 456

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.0 mm	Yes

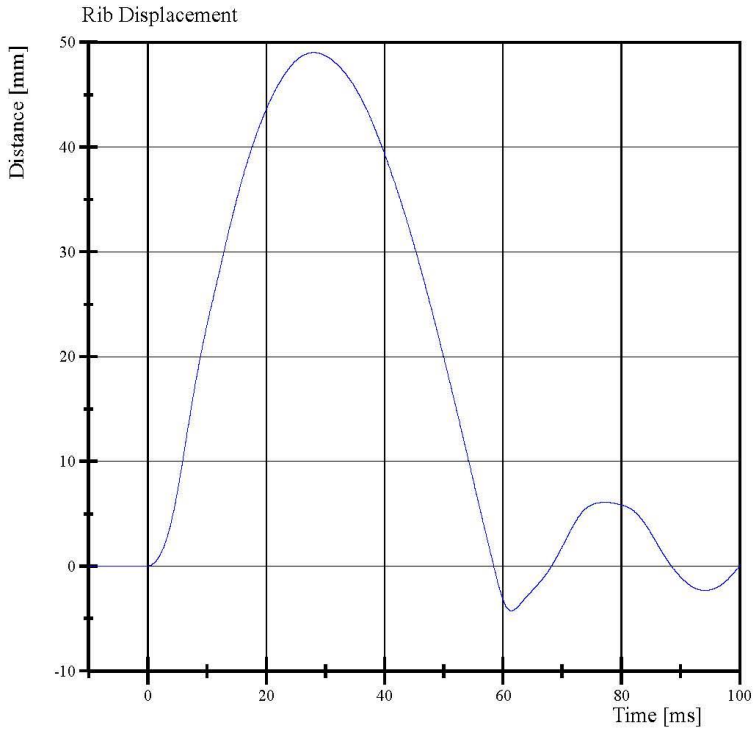
Test meets specifications.

Condition: Used

Comments:
Drop Height: 816 mm
Rib Module: 175-4008-A-06-017

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/27/2019



Filter Class: CFC_180
Max: 49.0 mm at 28.0 ms
Min: -4.3 mm at 61.4 ms

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

08.27.2019 14:34:09 384

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.488 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-6,124.9 N	Yes
Upper Rib Displacement	34 - 41 mm	38.4 mm	Yes
Center Rib Displacement	37 - 45 mm	41.0 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.6 mm	Yes

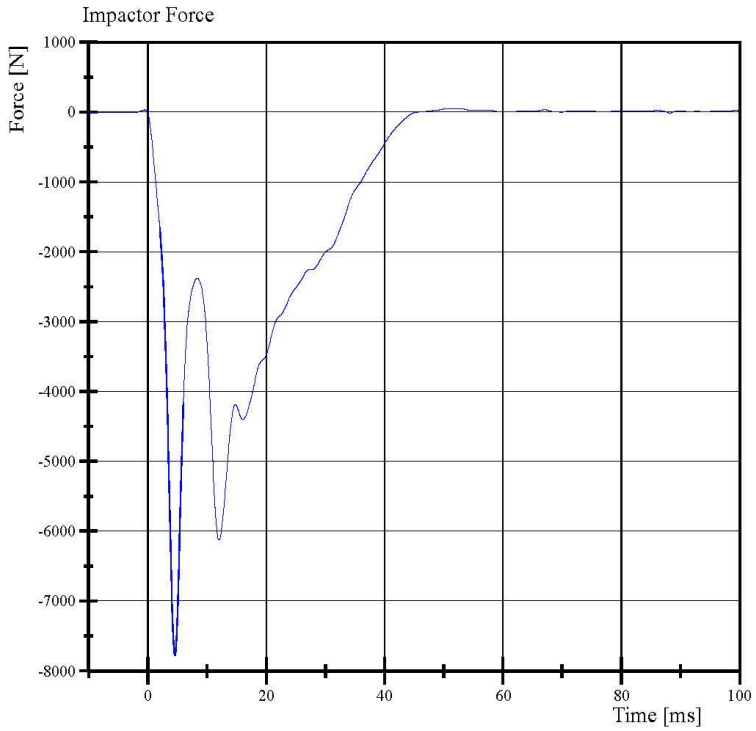
Test meets specifications.

Condition: Used

Comments:
Upper Rib Module S/N: 175-4008-A
Middle Rib Module S/N: 175-4008-A
Lower Rib Module S/N: 175-4008-A-06-017

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019



Filter Class: CFC_180
Max: 50.3 N at 52.7 ms
Min: -7,777.6 N at 4.6 ms

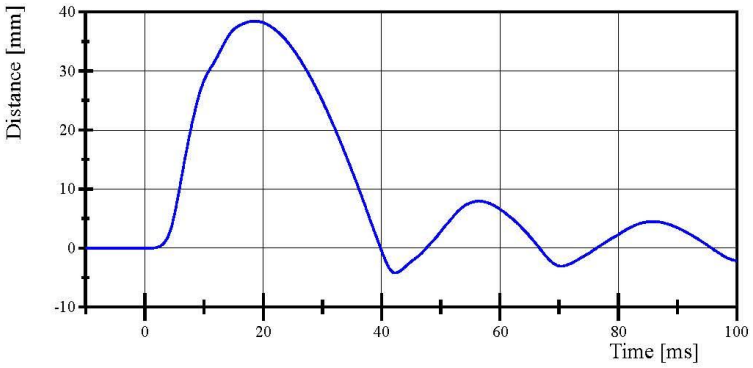
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2019 08:28:36 447

Transportation Research Center Inc.

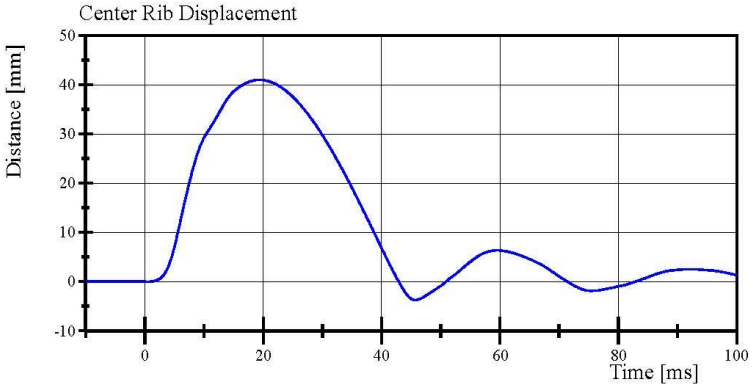
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Upper Rib Displacement



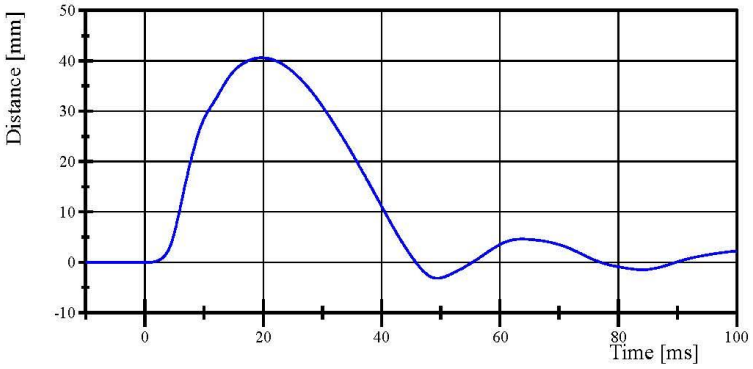
Filter Class: CFC_180
Max: 38.4 mm at 18.6 ms
Min: -4.2 mm at 42.3 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 41.0 mm at 19.4 ms
Min: -3.7 mm at 45.7 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 40.6 mm at 19.5 ms
Min: -3.2 mm at 49.4 ms

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

08.29.2019 08:28:36 447

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 66-4
Test Date: 8/27/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.095 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-45.7 deg	Yes
Time of Peak	39 - 53 ms	45.4 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	37.0 ms	Yes

Test meets specifications.

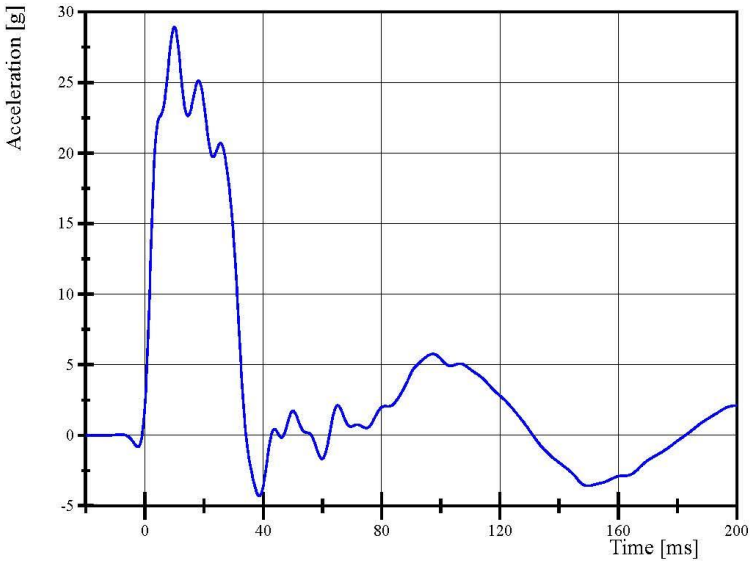
Condition: Used

Comments:
Lumbar S/N: DM3011

Transportation Research Center Inc.

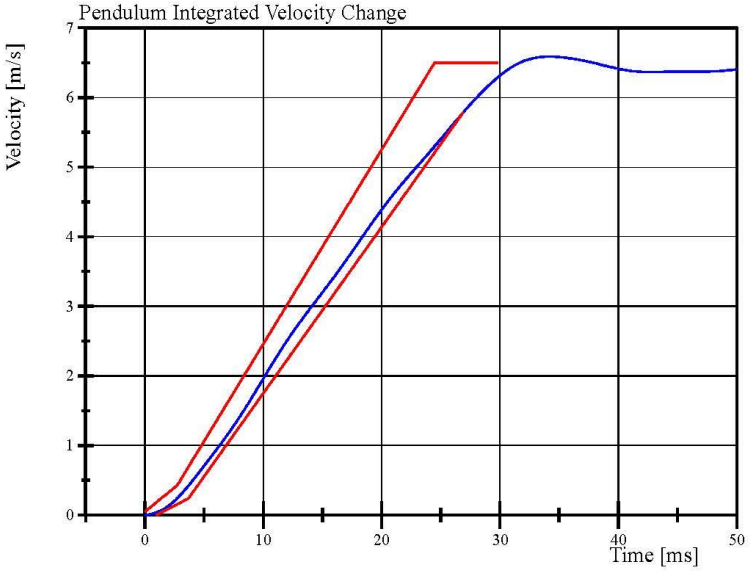
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 66-4
Test Date: 8/27/2019

Pendulum Acceleration



Filter Class: CFC_60
Max: 28.9 g at 9.9 ms
Min: -4.3 g at 38.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.6 m/s at 34.2 ms
Min: 0.0 m/s at 0.0 ms

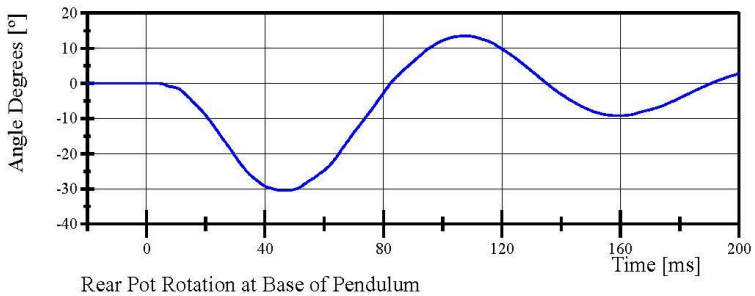
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.27.2019 13:07:52 642

Transportation Research Center Inc.

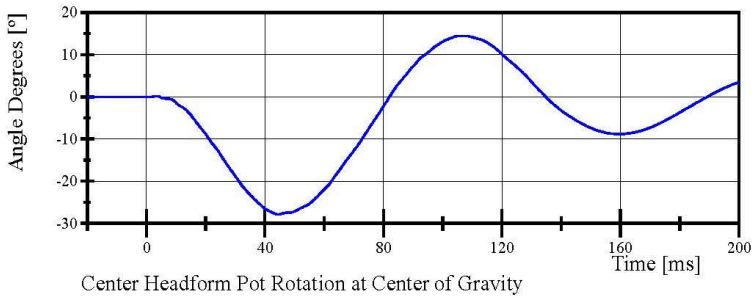
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 66-4
Test Date: 8/27/2019

Forward Pot Rotation at Base of Pendulum



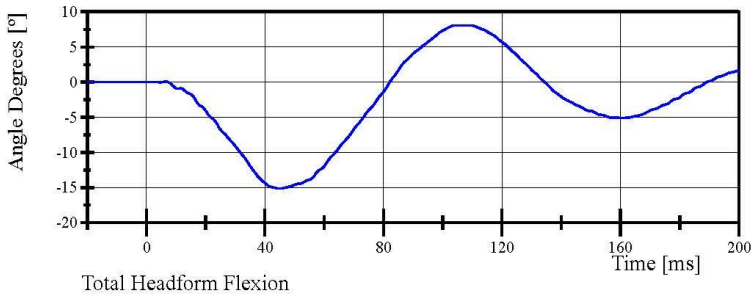
Filter Class: CFC_180
Max: 13.6 ° at 107.3 ms
Min: -30.5 ° at 46.4 ms

Rear Pot Rotation at Base of Pendulum



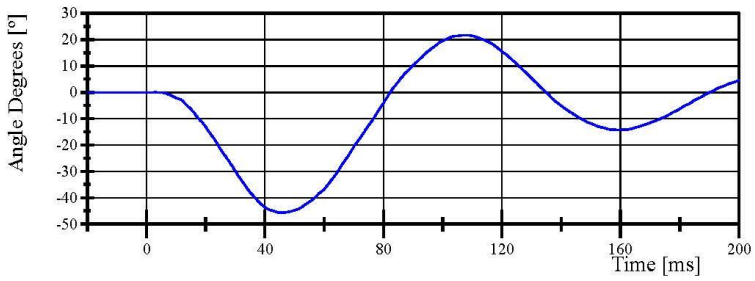
Filter Class: CFC_180
Max: 14.4 ° at 106.5 ms
Min: -27.9 ° at 44.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 8.1 ° at 107.9 ms
Min: -15.2 ° at 45.0 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 21.7 ° at 107.5 ms
Min: -45.7 ° at 45.4 ms

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

08.27.2019 13:07:55 642

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,168.9 N	Yes
Time of Peak	10.6 - 13.0 ms	12.32 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,541.0 N	Yes
Time of Peak	10.0 - 12.3 ms	11.68 ms	Yes

Test meets specifications.

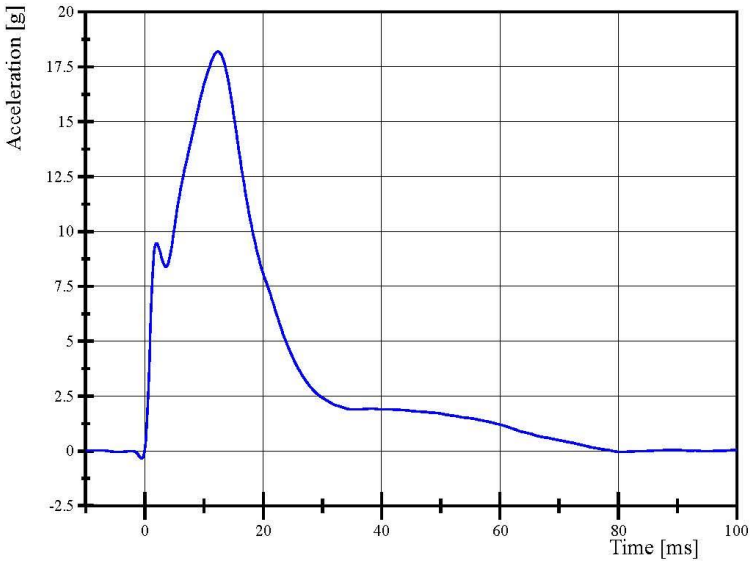
Condition: Used

Comments:
Abdomen S/N: 1066

Transportation Research Center Inc.

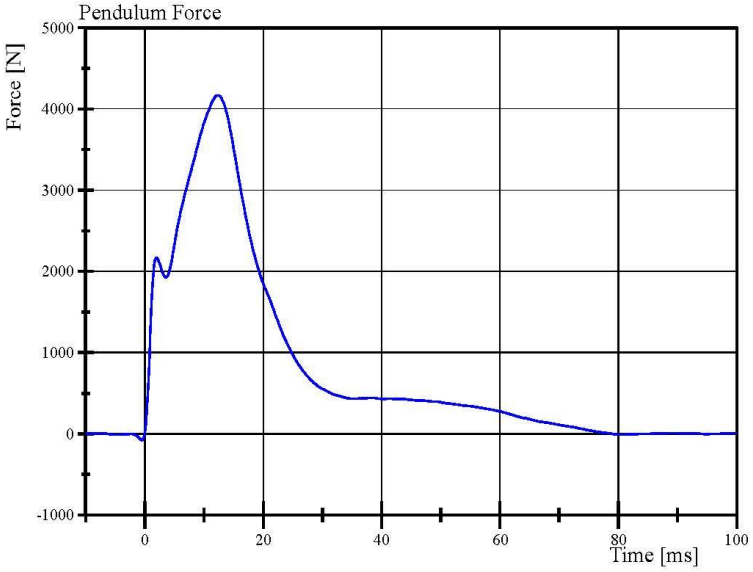
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.2 g at 12.3 ms
Min: -0.3 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,168.9 N at 12.3 ms
Min: -76.9 N at -0.6 ms

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

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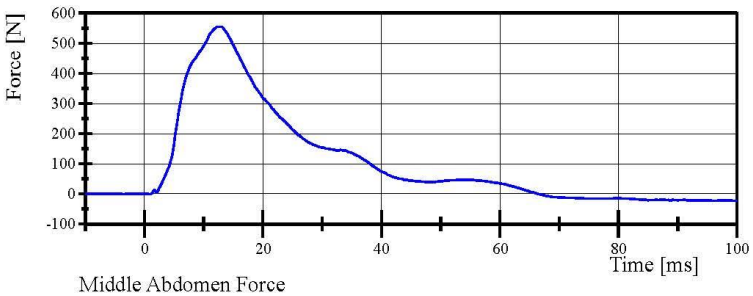
Transportation Research Center Inc.

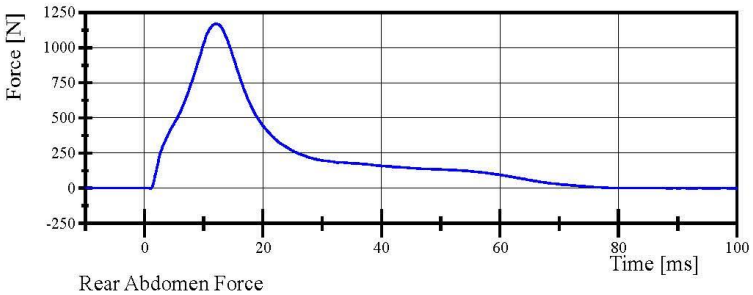
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Front Abdomen Force



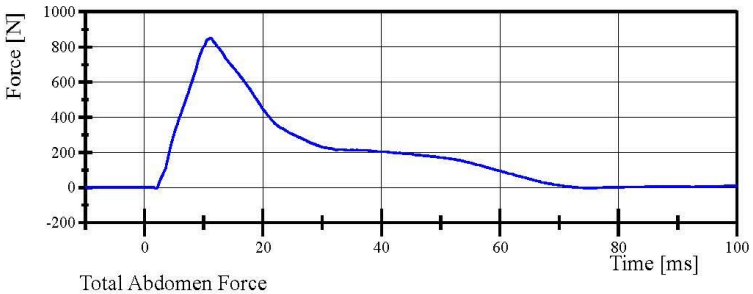
Filter Class: CFC_600
Max: 555.5 N at 12.9 ms
Min: -23.3 N at 100.0 ms

Middle Abdomen Force



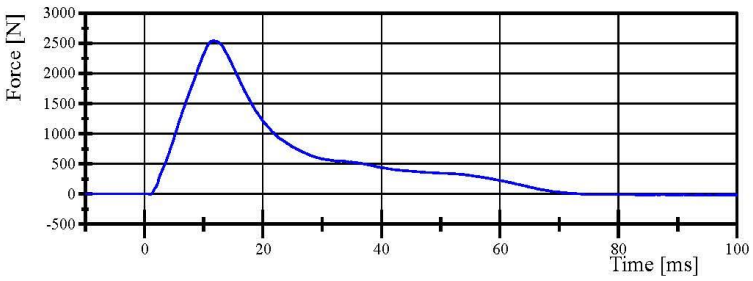
Filter Class: CFC_600
Max: 1,169.4 N at 12.1 ms
Min: -2.4 N at 92.5 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 849.4 N at 11.2 ms
Min: -6.4 N at 1.9 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,541.0 N at 11.7 ms
Min: -21.2 N at 92.6 ms

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

08.29.2019 08:42:58 574

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,276.0 N	Yes
Time of Peak	11.8 - 16.1 ms	13.76 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,330.7 N	Yes
Time of Peak	12.2 - 17.0 ms	14.00 ms	Yes

Test meets specifications.

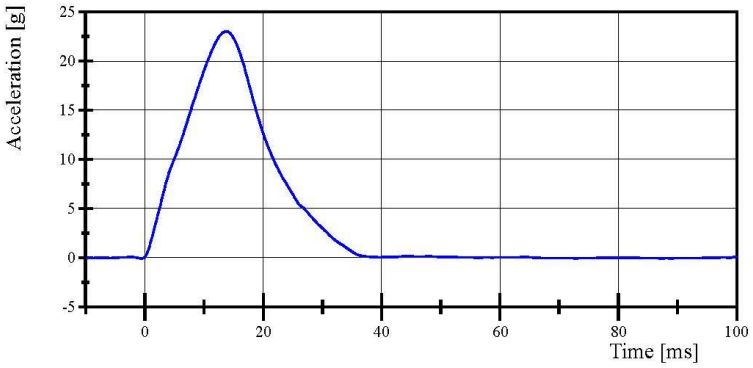
Condition: Used

Comments:
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

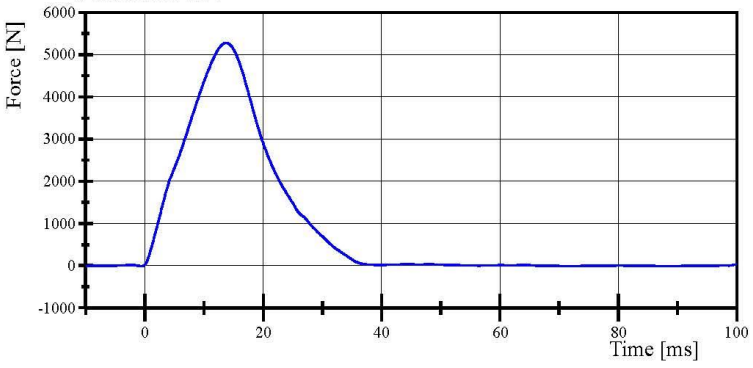
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 66-1
Test Date: 8/29/2019

Pendulum Acceleration



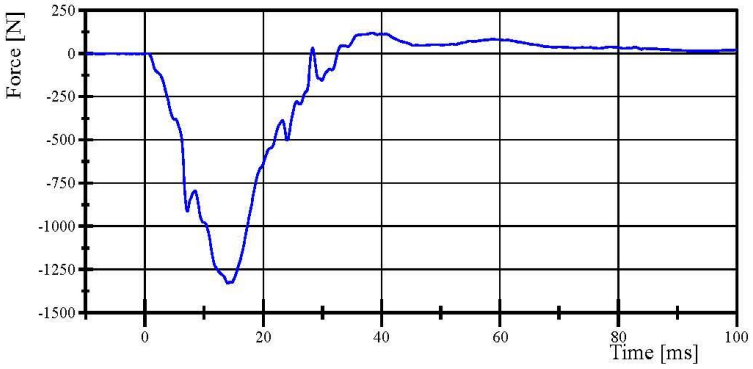
Filter Class: CFC_180
Max: 23.0 g at 13.8 ms
Min: -0.1 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,276.0 N at 13.8 ms
Min: -13.7 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 120.0 N at 38.5 ms
Min: -1,330.7 N at 14.0 ms

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

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Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 67

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	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	328	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	201	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	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. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Resultant Acceleration	125 - 155 g	146.5 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.8 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	3.67 %	Yes

Test meets specifications.

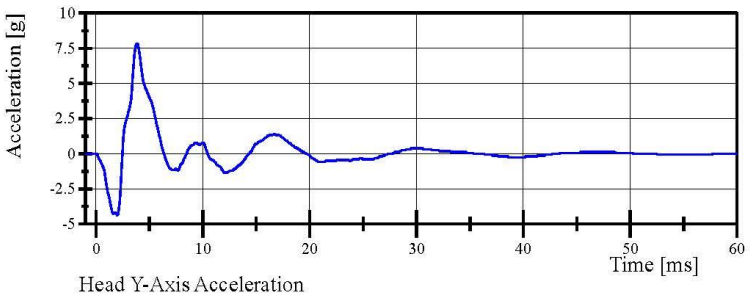
Condition: Used

Comments:
Head Skin S/N: DP6812

Transportation Research Center Inc.

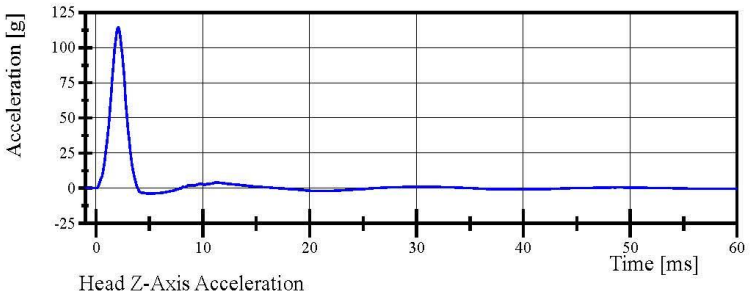
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Head X-Axis Acceleration



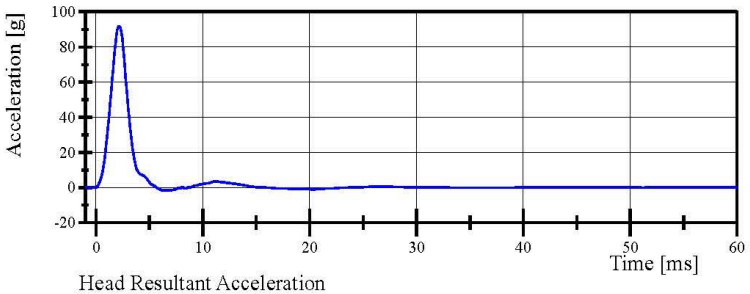
Filter Class: CFC_1000
Max: 7.8 g at 3.8 ms
Min: -4.4 g at 2.0 ms

Head Y-Axis Acceleration



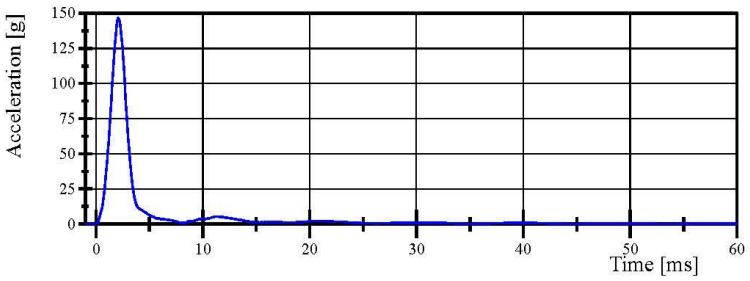
Filter Class: CFC_1000
Max: 114.5 g at 2.1 ms
Min: -3.9 g at 5.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 91.9 g at 2.2 ms
Min: -1.6 g at 6.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 146.5 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

09.10.2019 08:14:20 326

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 67-13
Test Date: 9/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.30 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-49.7 deg	Yes
Time of Peak	54 - 66 ms	53.5 ms	No
Headform Flexion Decay - Peak to Zero	53 - 88 ms	63.8 ms	Yes

Test does not meet specifications.

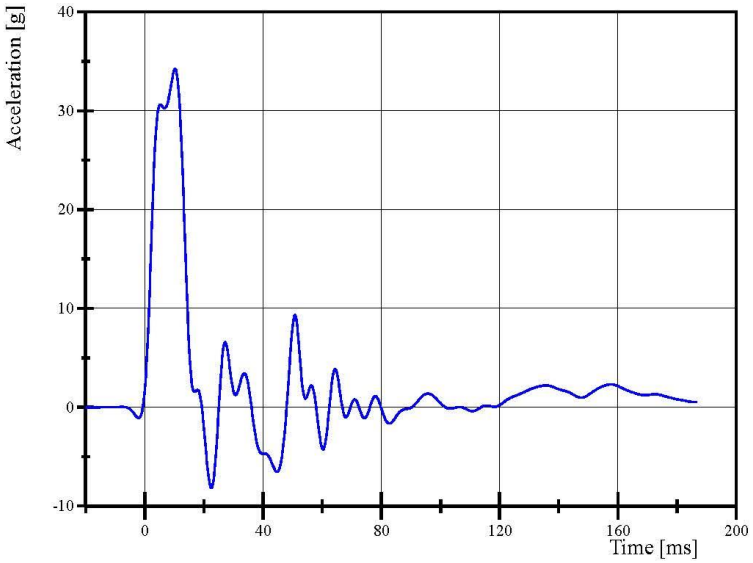
Condition: Used

Comments:
Neck S/N: DS5463

Transportation Research Center Inc.

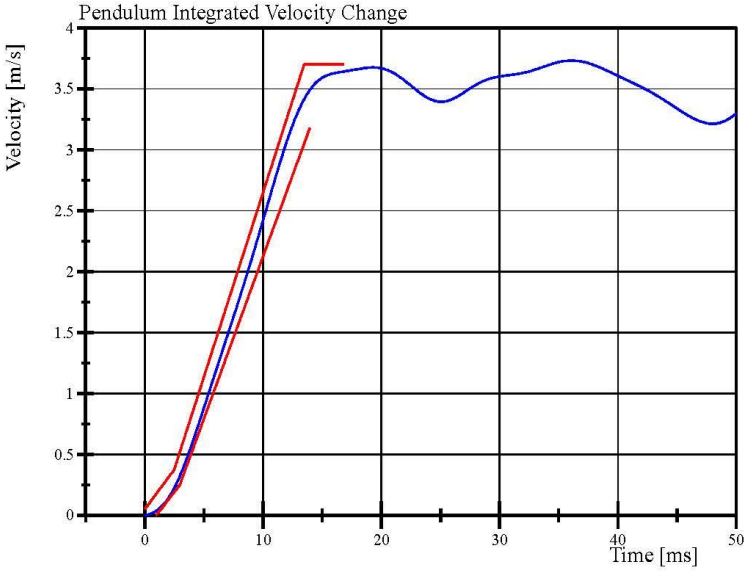
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 67-13
Test Date: 9/12/2019

Pendulum Acceleration



Filter Class: CFC_60
Max: 34.2 g at 10.2 ms
Min: -8.2 g at 22.5 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.7 m/s at 36.1 ms
Min: 0.0 m/s at 0.0 ms

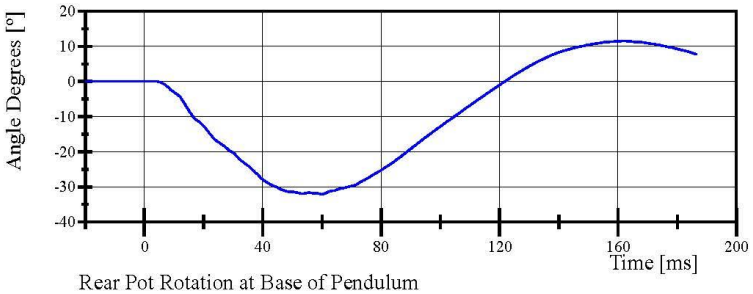
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

09.12.2019 13:21:09 1492

Transportation Research Center Inc.

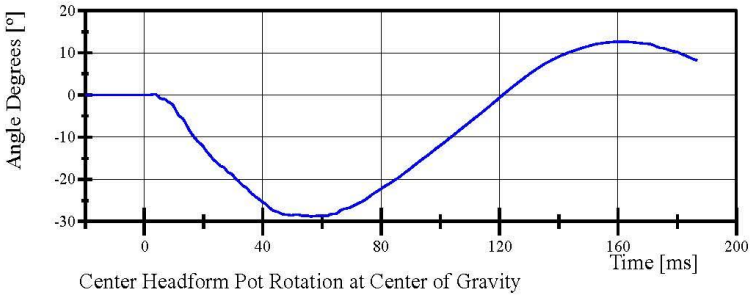
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 67-13
Test Date: 9/12/2019

Forward Pot Rotation at Base of Pendulum



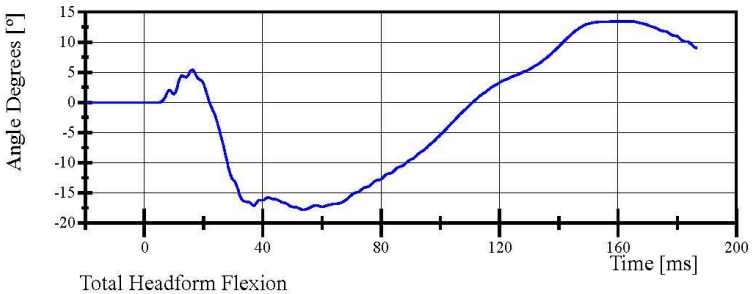
Filter Class: CFC_180
Max: 11.5 ° at 162.0 ms
Min: -32.1 ° at 60.1 ms

Rear Pot Rotation at Base of Pendulum



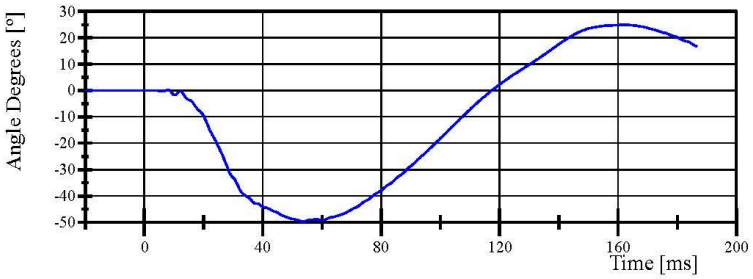
Filter Class: CFC_180
Max: 12.6 ° at 160.6 ms
Min: -28.8 ° at 56.2 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 13.4 ° at 164.1 ms
Min: -17.8 ° at 53.8 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 24.9 ° at 162.1 ms
Min: -49.7 ° at 53.5 ms

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

09.12.2019 13:21:09 1492

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.45 g	Yes

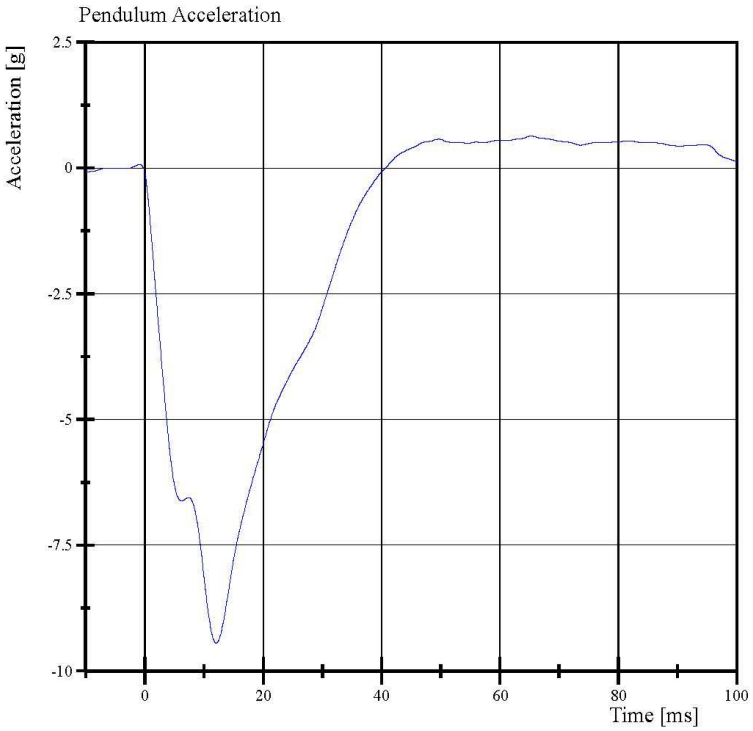
Test meets specifications.

Condition: Used

Comments:
Arm S/N: 175-3501-07014

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019



Filter Class: CFC_180
Max: 0.6 g at 65.2 ms
Min: -9.4 g at 12.1 ms

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

09.12.2019 10:35:32 565

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.1 mm	Yes

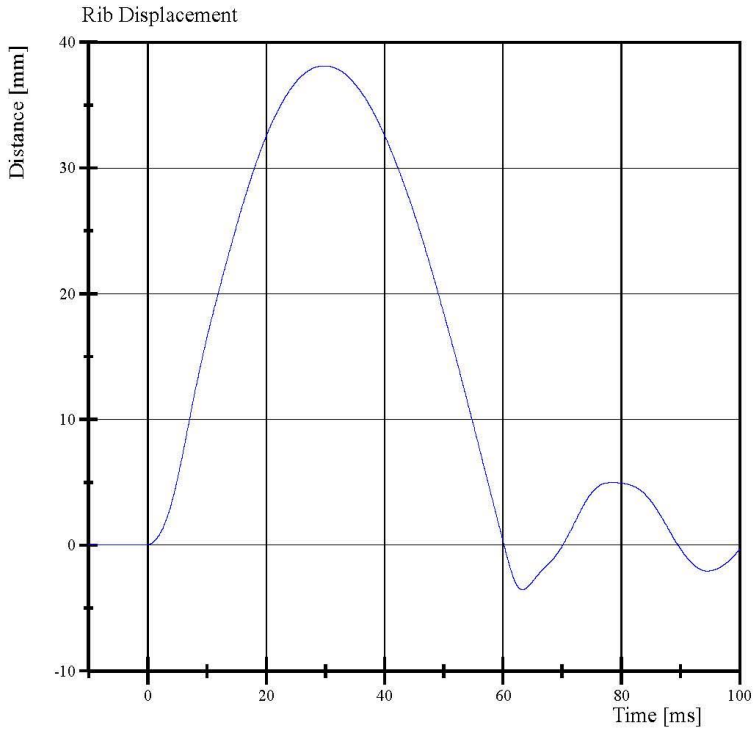
Test meets specifications.

Condition: Used

Comments:
Drop Height: 462mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019



Filter Class: CFC_180
Max: 38.1 mm at 29.8 ms
Min: -3.6 mm at 63.3 ms

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

09.10.2019 08:52:38 493

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.9 mm	Yes

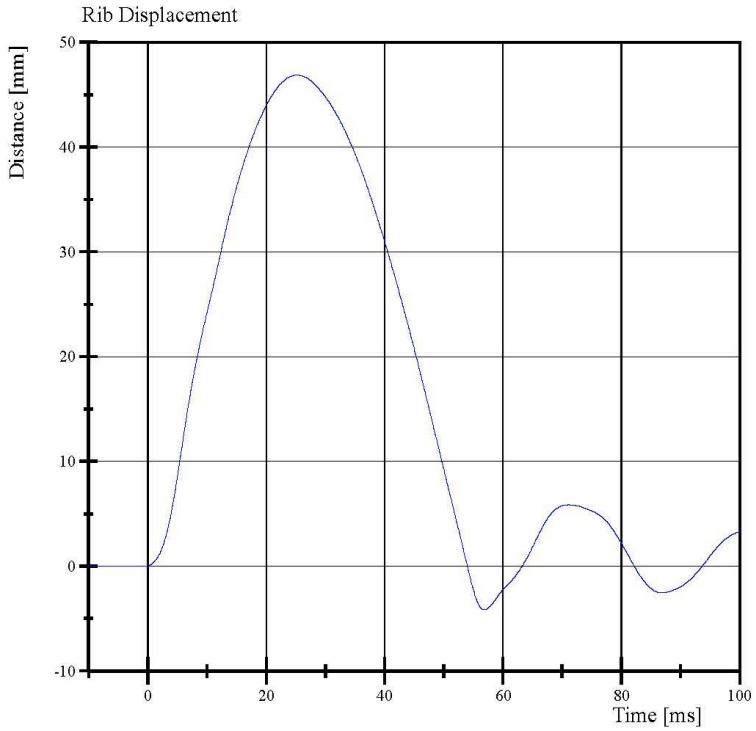
Test meets specifications.

Condition: Used

Comments:
Drop Height: 816mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019



Filter Class: CFC_180
Max: 46.9 mm at 25.2 ms
Min: -4.2 mm at 56.9 ms

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

09.10.2019 08:47:43 401

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.1 mm	Yes

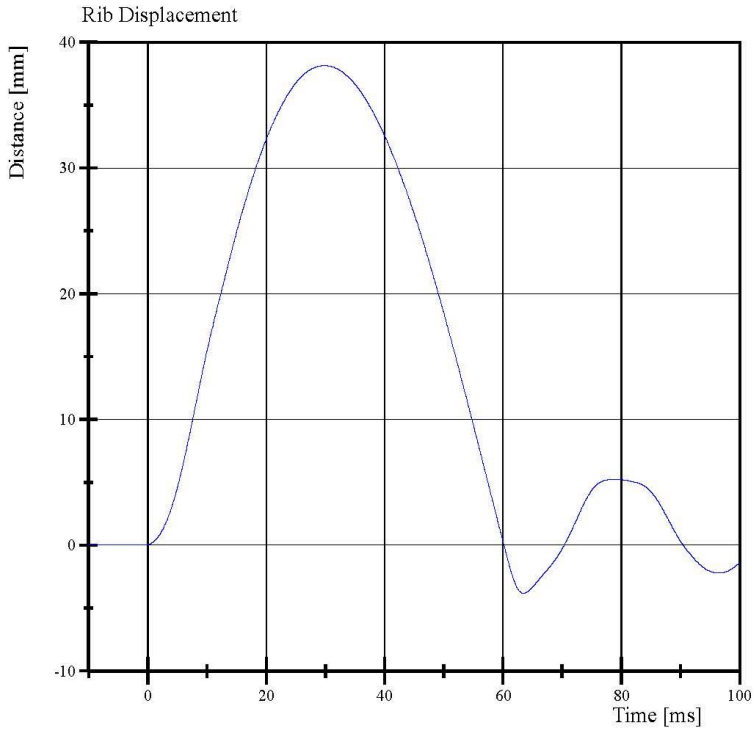
Test meets specifications.

Condition: Used

Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019



Filter Class: CFC_180
Max: 38.1 mm at 29.8 ms
Min: -3.8 mm at 63.5 ms

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

09.10.2019 09:20:56 501

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.6 mm	Yes

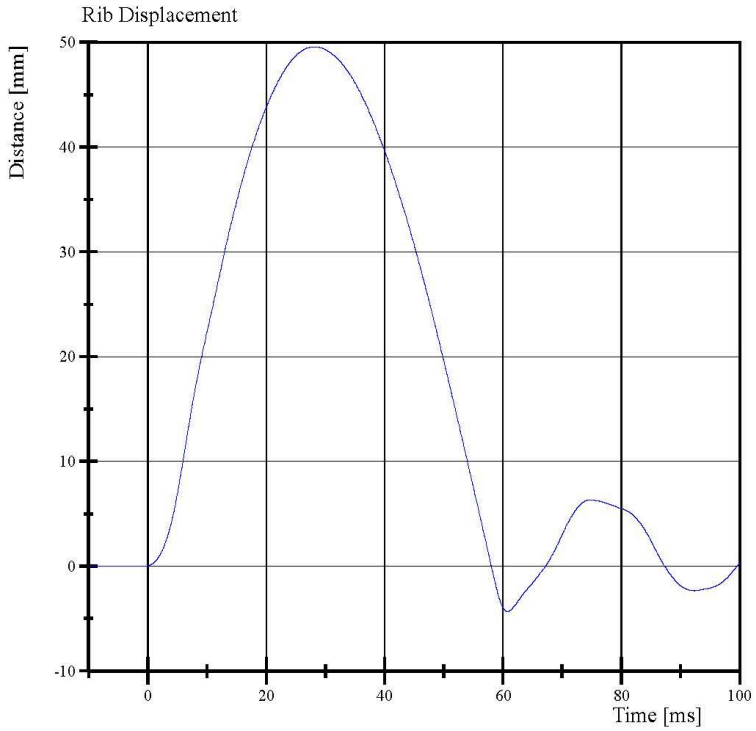
Test meets specifications.

Condition: Used

Comments:
Drop Height: 816 mm
Rib Module: 175-4008-A

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019



Filter Class: CFC_180
Max: 49.6 mm at 28.2 ms
Min: -4.3 mm at 60.7 ms

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

09.10.2019 09:15:33 413

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.1 mm	Yes

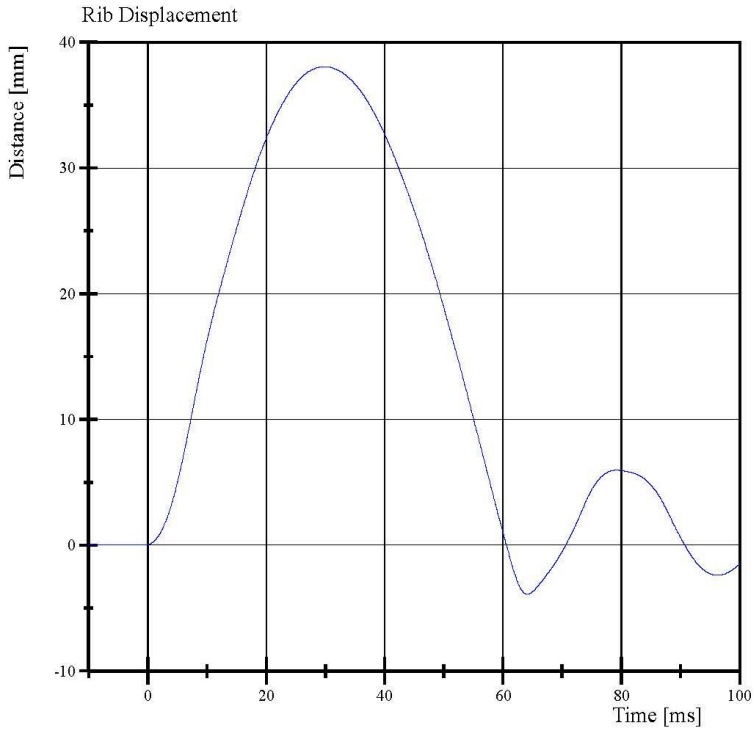
Test meets specifications.

Condition: Used

Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A-06-017

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019



Filter Class: CFC_180
Max: 38.1 mm at 29.8 ms
Min: -3.9 mm at 64.2 ms

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

09.10.2019 09:37:14 476

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.1 mm	Yes

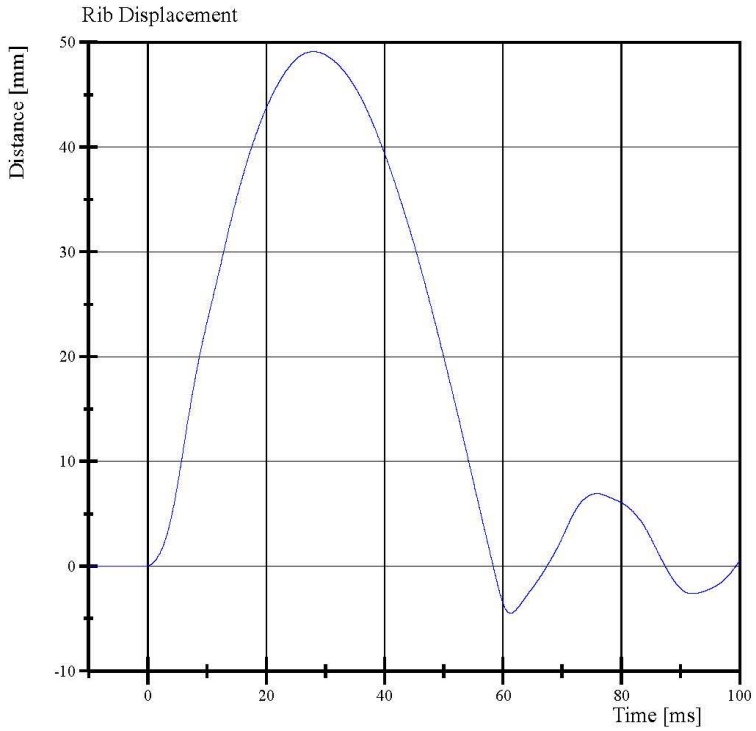
Test meets specifications.

Condition: Used

Comments:
Drop Height: 816 mm
Rib Module: 175-4008-A-06-017

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/10/2019



Filter Class: CFC_180
Max: 49.1 mm at 28.0 ms
Min: -4.5 mm at 61.3 ms

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

09.10.2019 09:32:01 406

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 67-2
Test Date: 9/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.507 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-6,739.3 N	No
Upper Rib Displacement	34 - 41 mm	37.7 mm	Yes
Center Rib Displacement	37 - 45 mm	39.8 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.2 mm	Yes

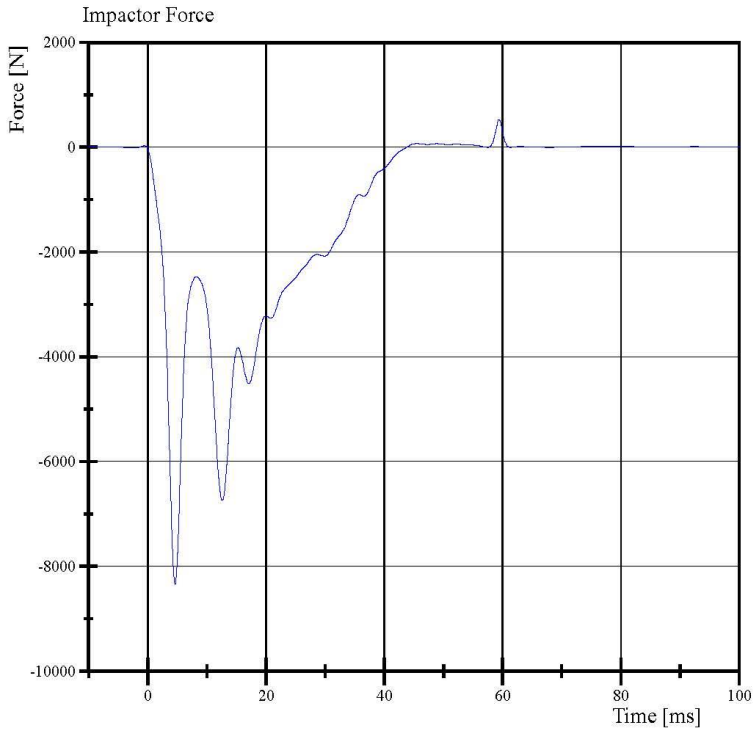
Test does not meet specifications.

Condition: Used

Comments:
Upper Rib Module S/N: 175-4008-A
Middle Rib Module S/N: 175-4008-A
Lower Rib Module S/N: 175-4008-A-06-017

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 67-2
Test Date: 9/12/2019



Filter Class: CFC_180
Max: 525.4 N at 59.4 ms
Min: -8,344.5 N at 4.6 ms

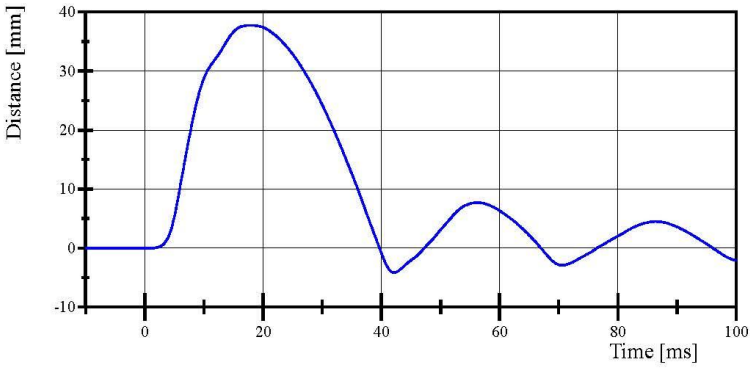
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

09.12.2019 11:22:24 476

Transportation Research Center Inc.

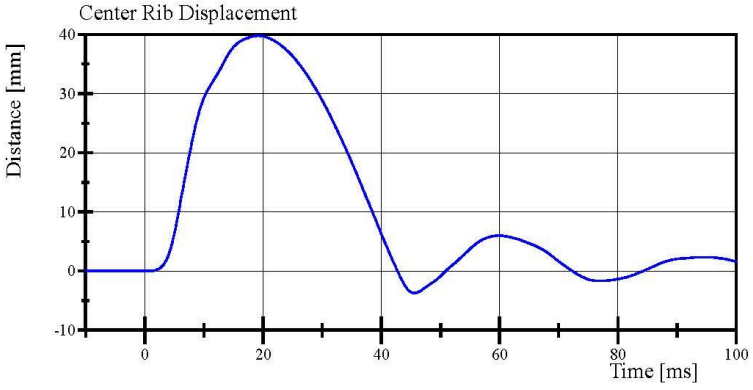
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 67-2
Test Date: 9/12/2019

Upper Rib Displacement



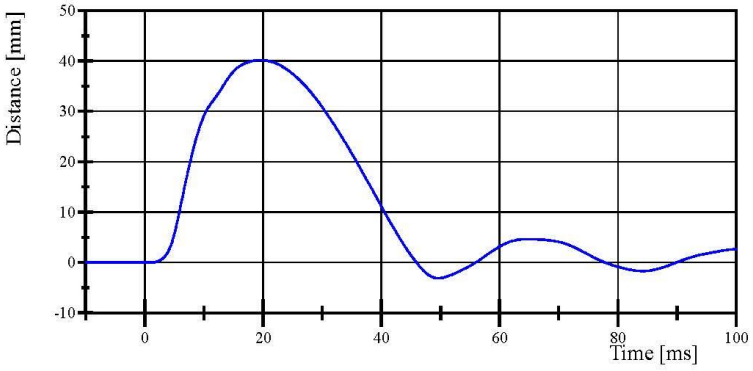
Filter Class: CFC_180
Max: 37.7 mm at 17.8 ms
Min: -4.1 mm at 42.2 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 39.8 mm at 19.2 ms
Min: -3.8 mm at 45.6 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 40.2 mm at 19.6 ms
Min: -3.1 mm at 49.6 ms

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

09.12.2019 11:22:24 476

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 67-2
Test Date: 9/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.086 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-44.4 deg	No
Time of Peak	39 - 53 ms	44.8 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	35.4 ms	No

Test does not meet specifications.

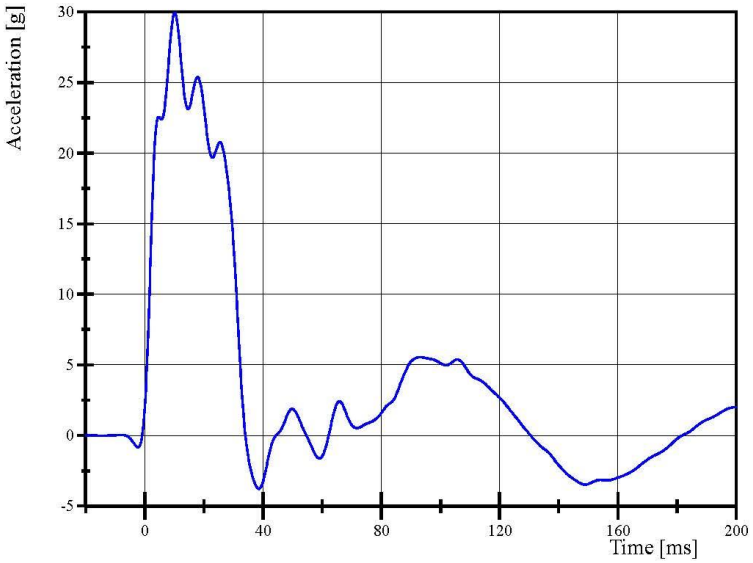
Condition: Used

Comments:
Lumbar S/N: DM3011

Transportation Research Center Inc.

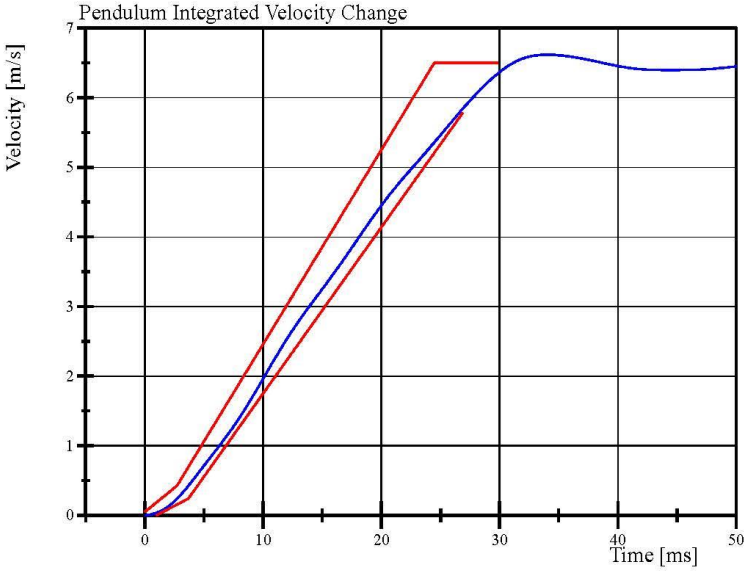
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 67-2
Test Date: 9/11/2019

Pendulum Acceleration



Filter Class: CFC_60
Max: 29.9 g at 10.2 ms
Min: -3.8 g at 38.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.6 m/s at 34.1 ms
Min: 0.0 m/s at 0.0 ms

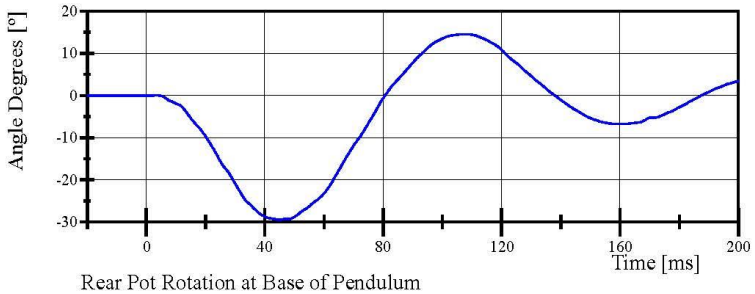
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

09.12.2019 13:16:53 643

Transportation Research Center Inc.

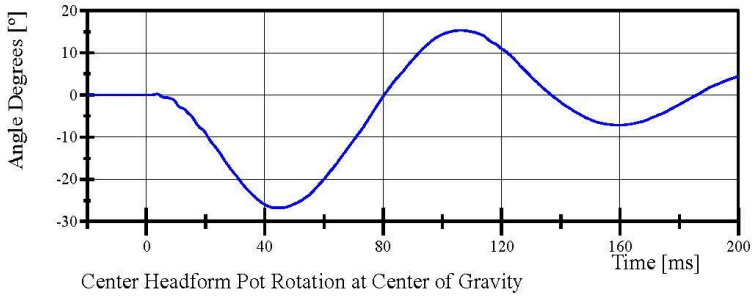
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 67-2
Test Date: 9/11/2019

Forward Pot Rotation at Base of Pendulum



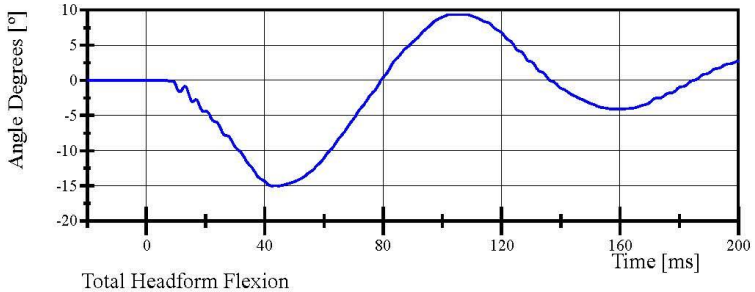
Filter Class: CFC_180
Max: 14.5 ° at 108.3 ms
Min: -29.4 ° at 44.8 ms

Rear Pot Rotation at Base of Pendulum



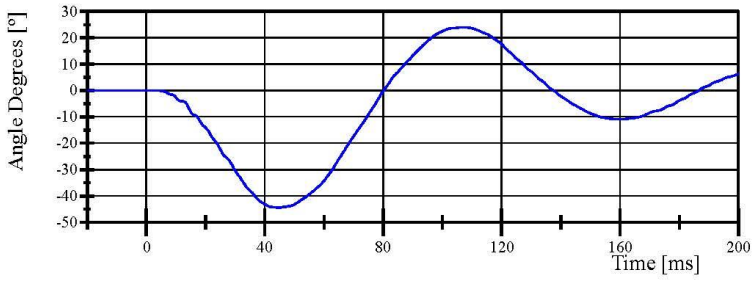
Filter Class: CFC_180
Max: 15.3 ° at 106.2 ms
Min: -26.8 ° at 43.5 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.4 ° at 105.9 ms
Min: -15.0 ° at 42.4 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 23.9 ° at 107.7 ms
Min: -44.4 ° at 44.8 ms

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

09.12.2019 13:16:53 643

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	3,835.6 °C	No
Relative Humidity	10 - 70 %	58 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.05 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,149.0 N	Yes
Time of Peak	10.6 - 13.0 ms	11.92 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,534.8 N	Yes
Time of Peak	10.0 - 12.3 ms	11.68 ms	Yes

Test does not meet specifications.

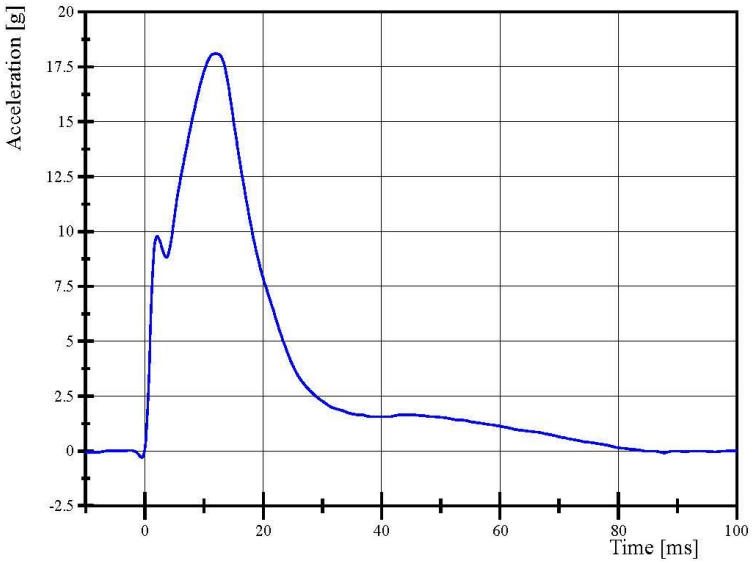
Condition: Used

Comments:
Abdomen S/N: 1066

Transportation Research Center Inc.

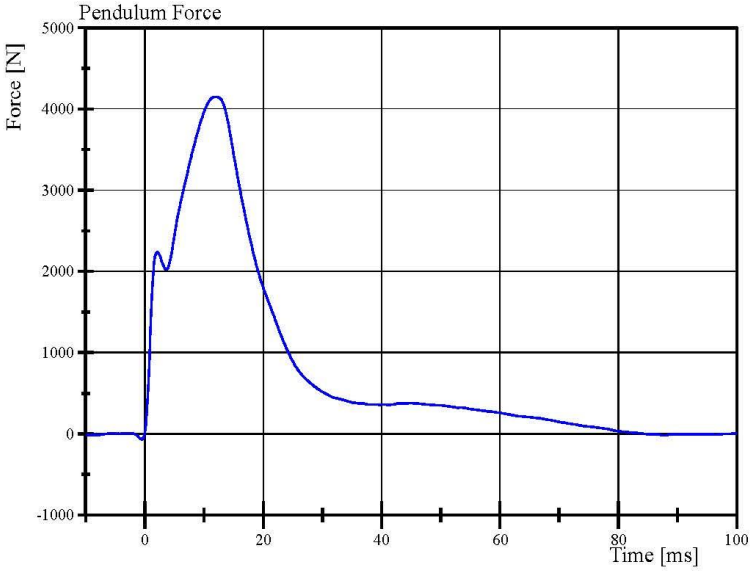
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.1 g at 11.9 ms
Min: -0.3 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,149.0 N at 11.9 ms
Min: -67.5 N at -0.5 ms

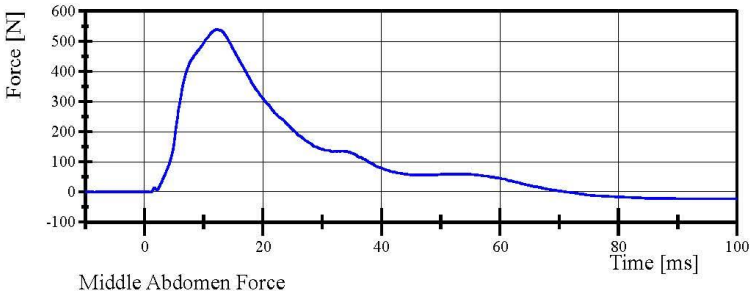
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

09.12.2019 11:40:02 628

Transportation Research Center Inc.

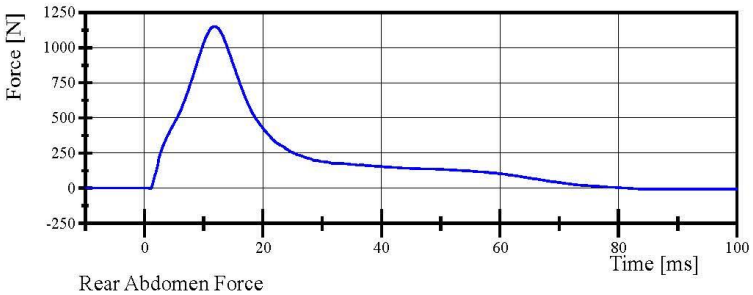
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019

Front Abdomen Force



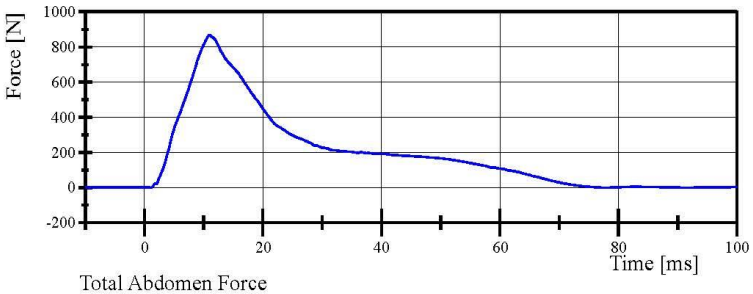
Filter Class: CFC_600
Max: 539.4 N at 12.2 ms
Min: -23.5 N at 91.7 ms

Middle Abdomen Force



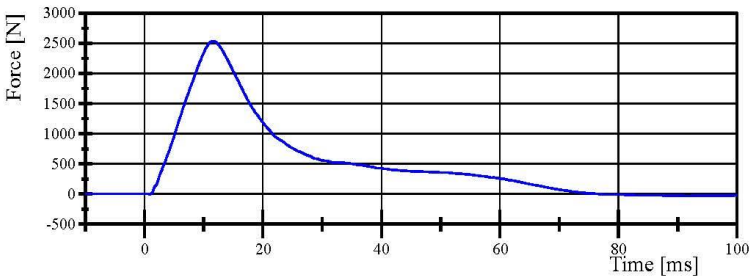
Filter Class: CFC_600
Max: 1,151.2 N at 11.8 ms
Min: -7.2 N at 91.4 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 867.0 N at 11.0 ms
Min: -1.6 N at 77.8 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,534.8 N at 11.7 ms
Min: -32.0 N at 91.6 ms

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

09.12.2019 11:40:02 628

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,219.4 N	Yes
Time of Peak	11.8 - 16.1 ms	13.84 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,304.5 N	Yes
Time of Peak	12.2 - 17.0 ms	13.60 ms	Yes

Test meets specifications.

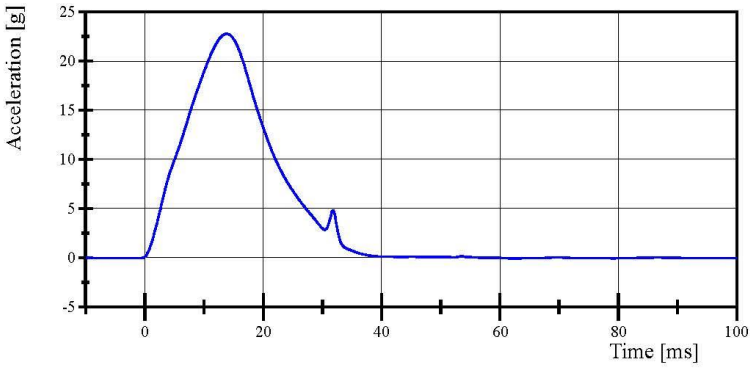
Condition: Used

Comments:
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

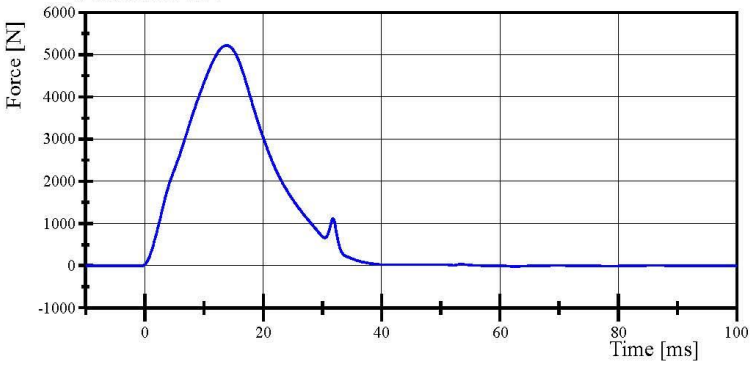
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 67-1
Test Date: 9/12/2019

Pendulum Acceleration



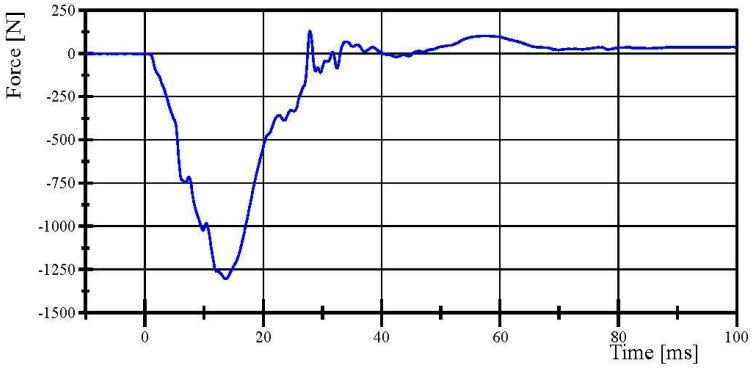
Filter Class: CFC_180
Max: 22.8 g at 13.8 ms
Min: -0.1 g at 62.7 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,219.4 N at 13.8 ms
Min: -16.6 N at 62.7 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 130.1 N at 27.9 ms
Min: -1,304.5 N at 13.6 ms

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

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Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No. 74

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	86	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	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	44	Yes
I	Head Depth	178.0 - 188.0	185	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	532	Yes
L	Popliteal Height	343.0 - 369.0	349	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	197	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	220	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	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	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	878	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. 74-1
Test Date: 8/23/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.9 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	1.7 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.76 %	Yes

Test meets specifications.

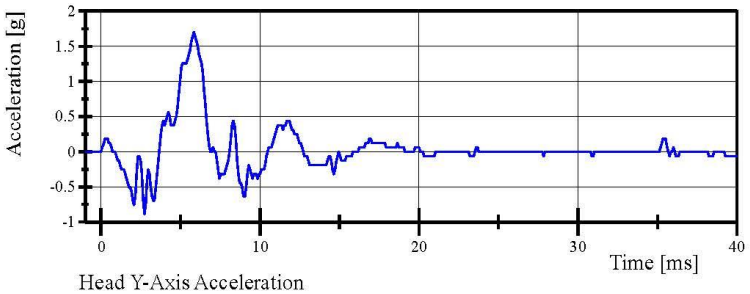
Condition: Used

Comments:
Head Skin S/N: 1253

Transportation Research Center Inc.

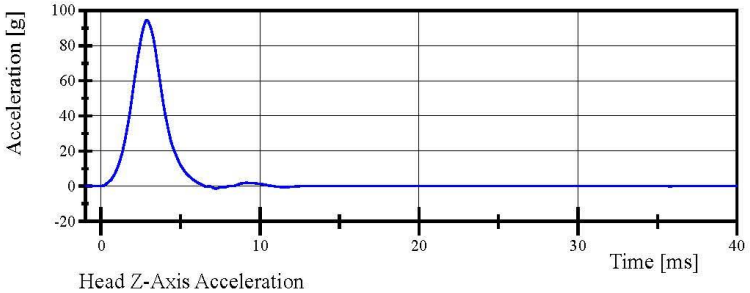
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/23/2019

Head X-Axis Acceleration



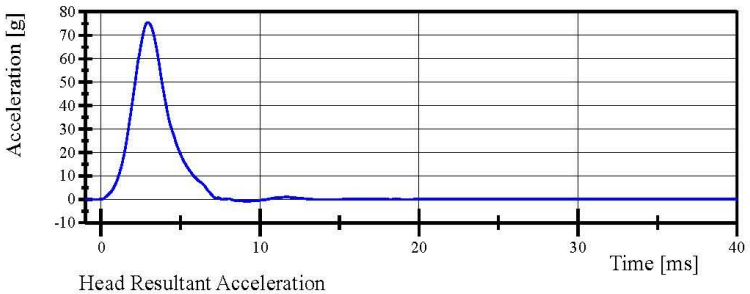
Filter Class: CFC_1000
Max: 1.7 g at 5.8 ms
Min: -0.9 g at 2.7 ms

Head Y-Axis Acceleration



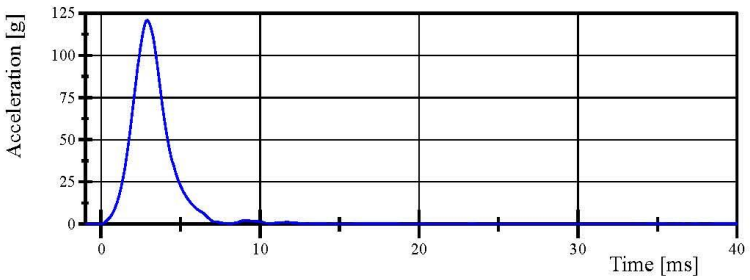
Filter Class: CFC_1000
Max: 94.6 g at 2.9 ms
Min: -1.3 g at 7.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 75.5 g at 3.0 ms
Min: -0.9 g at 9.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 120.9 g at 2.9 ms
Min: 0.0 g at 15.0 ms

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

08.23.2019 07:49:11 196

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 74-3
Test Date: 8/26/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.591 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.698 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.873 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.203 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	6.086 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	6.129 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.8 deg	Yes
Time of Peak	50 - 70 ms	65.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.2 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	121.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: 180-2001-606

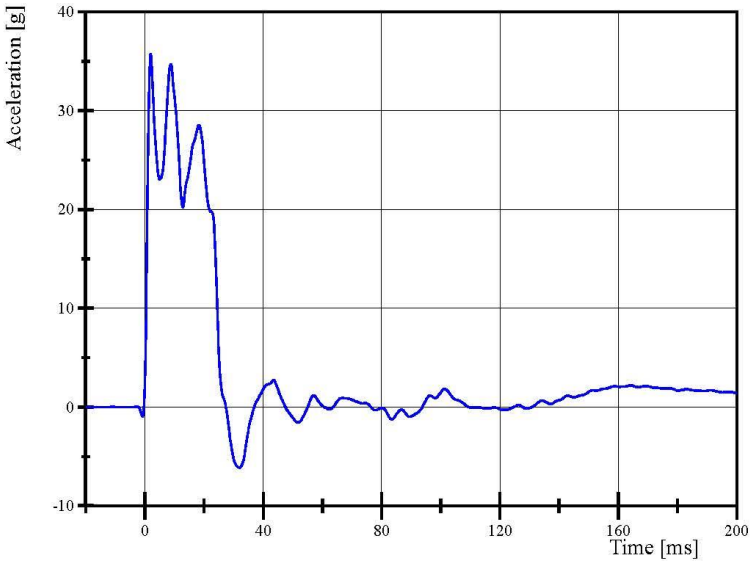
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

08.26.2019 07:41:36 719

Transportation Research Center Inc.

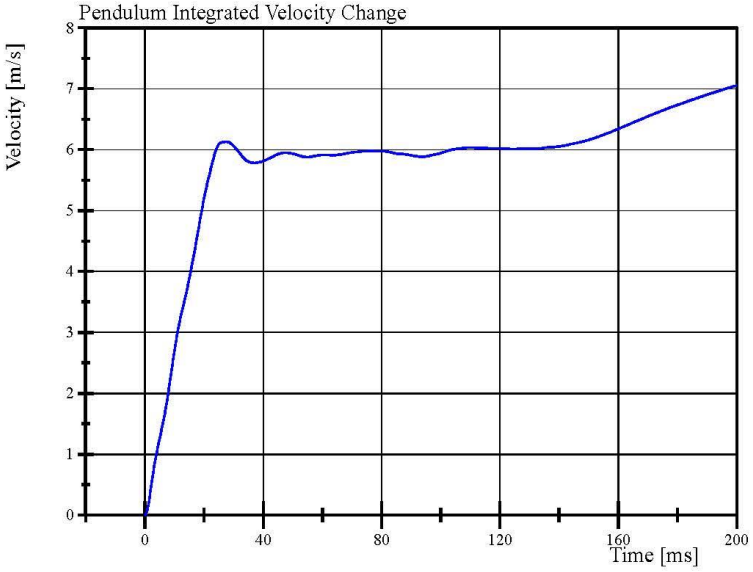
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 74-3
Test Date: 8/26/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 35.7 g at 1.9 ms
Min: -6.1 g at 32.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 7.1 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

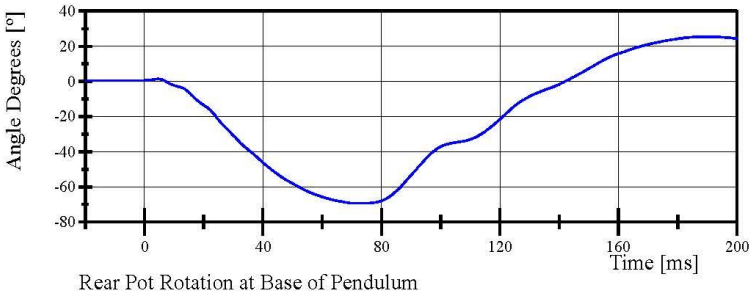
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.26.2019 07:42:51 719

Transportation Research Center Inc.

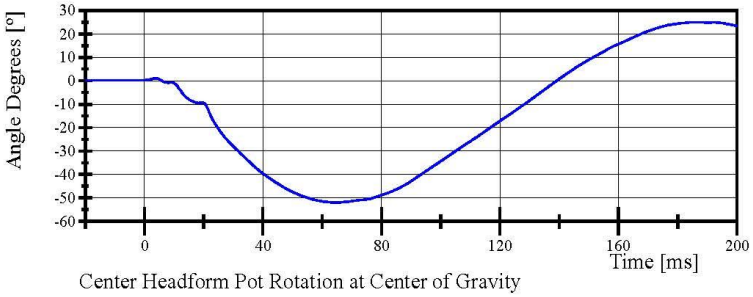
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 74-3
Test Date: 8/26/2019

Forward Pot Rotation at Base of Pendulum



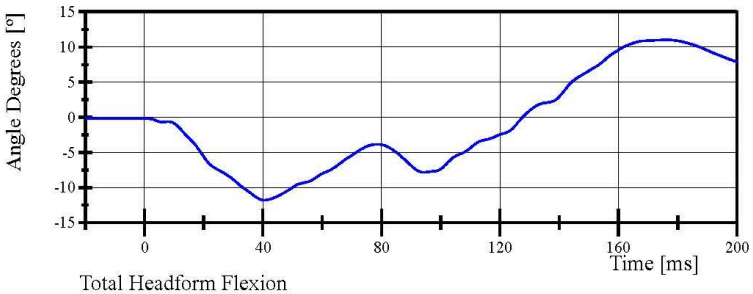
Filter Class: CFC_60
Max: 25.3 ° at 191.8 ms
Min: -69.3 ° at 71.4 ms

Rear Pot Rotation at Base of Pendulum



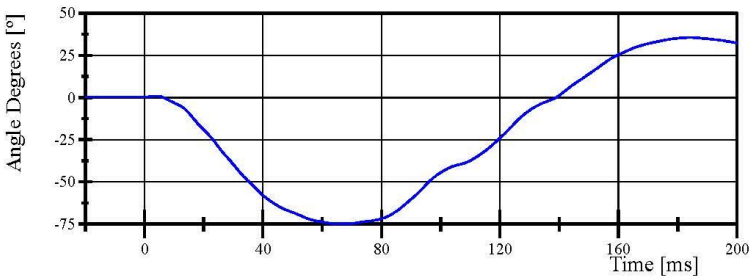
Filter Class: CFC_60
Max: 24.9 ° at 185.9 ms
Min: -51.9 ° at 64.6 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.0 ° at 176.2 ms
Min: -11.8 ° at 40.4 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 35.6 ° at 184.2 ms
Min: -74.8 ° at 65.4 ms

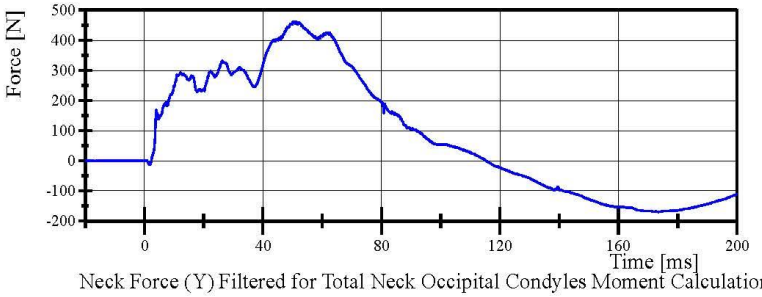
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.26.2019 07:42:52 719

Transportation Research Center Inc.

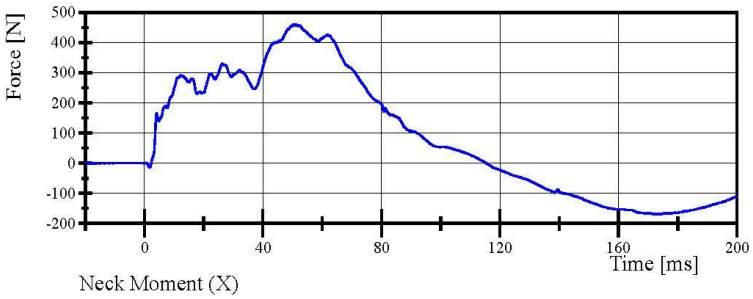
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 74-3
Test Date: 8/26/2019

Neck Force (Y)



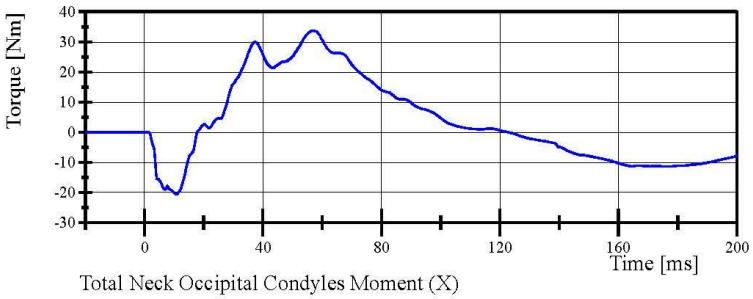
Filter Class: CFC_1000
Max: 461.8 N at 50.2 ms
Min: -170.0 N at 173.5 ms

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



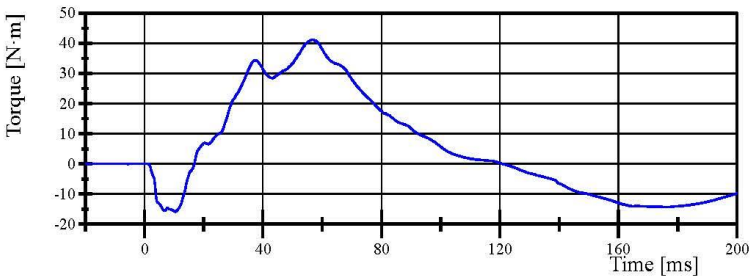
Filter Class: CFC_600
Max: 460.4 N at 50.3 ms
Min: -169.7 N at 173.5 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 33.8 Nm at 57.1 ms
Min: -20.6 Nm at 10.8 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constar
Max: 41.2 N·m at 57.0 ms
Min: -15.8 N·m at 10.4 ms

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

08.26.2019 07:42:52 719

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 74-2
Test Date: 8/22/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.6 g	Yes
Shoulder Displacement	28 - 37 mm	32.5 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	17.0 g	Yes

Test meets specifications.

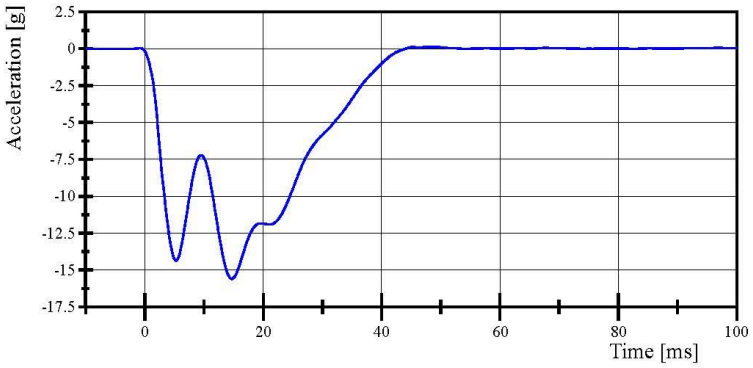
Condition: Used

Comments:
Left Arm S/N: 952

Transportation Research Center Inc.

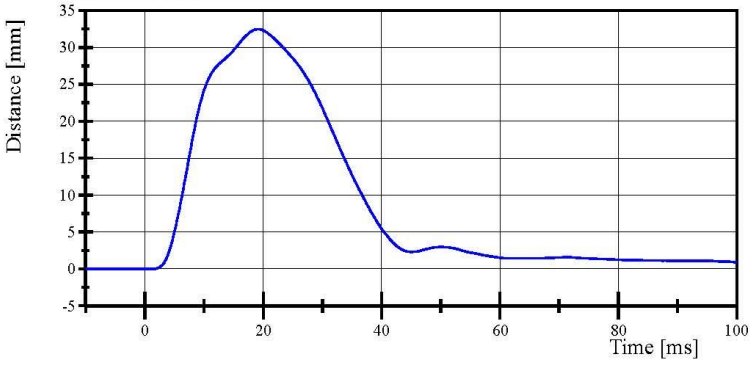
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 74-2
Test Date: 8/22/2019

Probe Acceleration



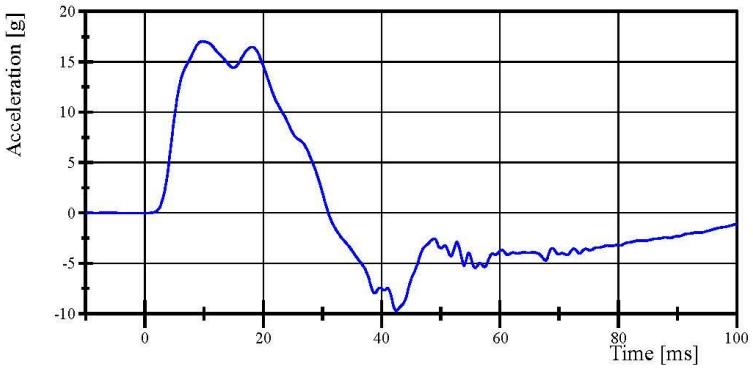
Filter Class: CFC_180
Max: 0.1 g at 47.8 ms
Min: -15.6 g at 14.6 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 32.5 mm at 19.1 ms
Min: -0.0 mm at 1.3 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 17.0 g at 9.8 ms
Min: -9.7 g at 42.5 ms

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

08.22.2019 15:43:57 835

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.724 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.2 g	Yes
Shoulder Displacement	31 - 40 mm	35.2 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	33.1 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	36.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.7 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	30.7 g	Yes

Test meets specifications.

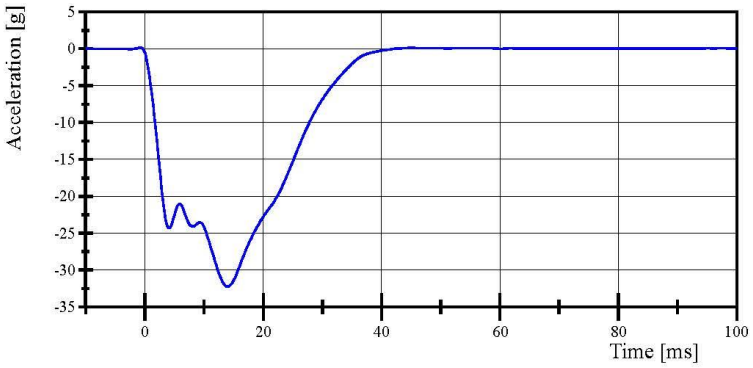
Condition: Used

Comments:
Left Arm S/N: 952
Shoulder Rib S/N: 180-3355 DM4450
Upper Thorax Rib S/N: 2135
Middle Thorax Rib S/N: 2136
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

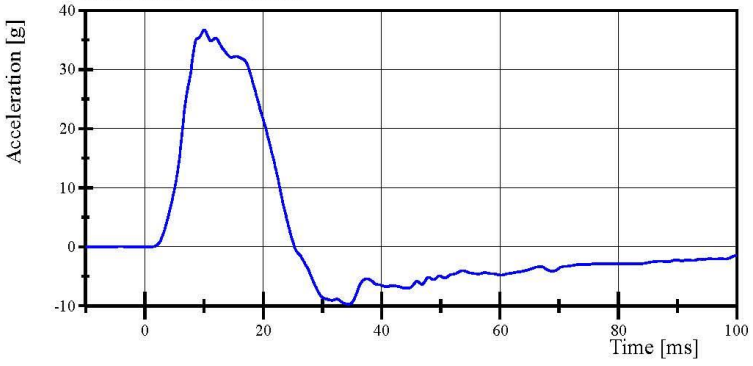
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Probe Acceleration



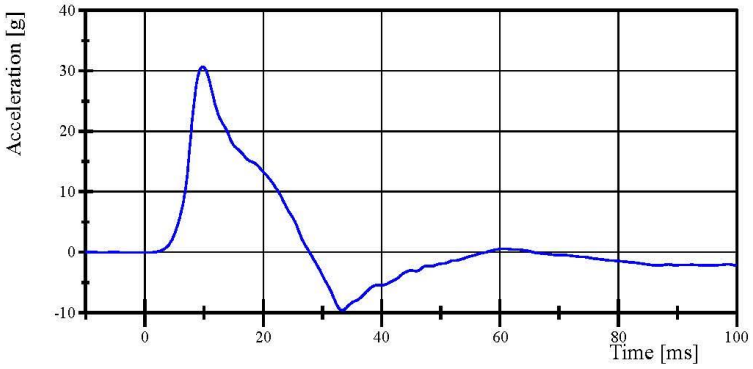
Filter Class: CFC_180
Max: 0.2 g at -0.8 ms
Min: -32.2 g at 14.0 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 36.7 g at 10.0 ms
Min: -9.7 g at 34.4 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 30.7 g at 9.8 ms
Min: -9.6 g at 33.4 ms

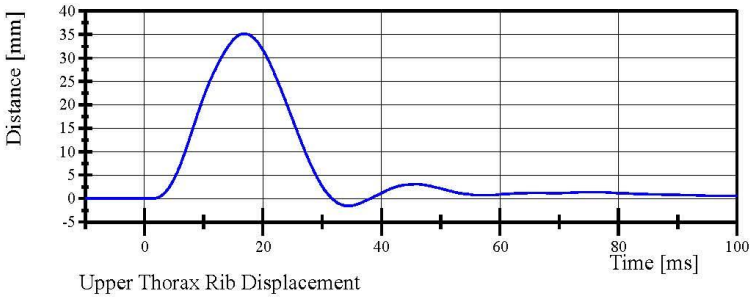
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.22.2019 16:34:37 642

Transportation Research Center Inc.

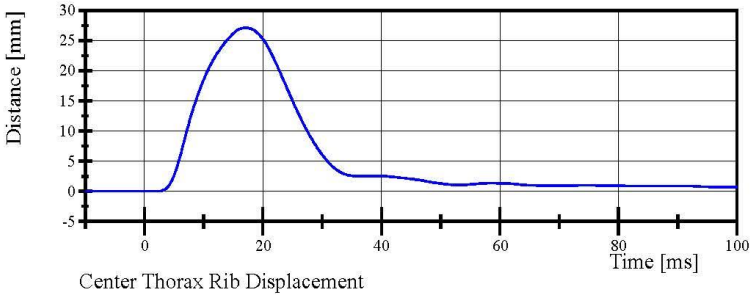
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Shoulder Rib Displacement



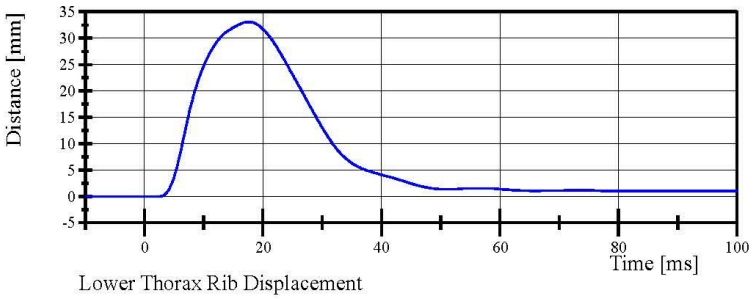
Filter Class: CFC_600
Max: 35.2 mm at 16.9 ms
Min: -1.6 mm at 34.4 ms

Upper Thorax Rib Displacement



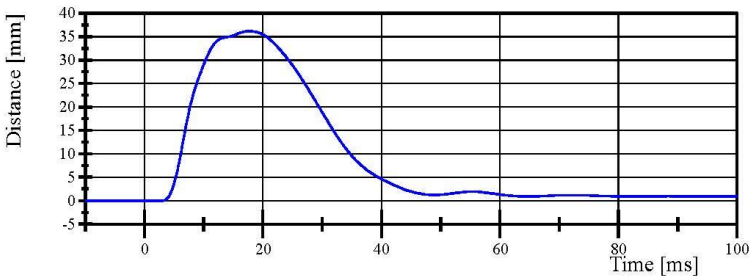
Filter Class: CFC_600
Max: 27.1 mm at 17.1 ms
Min: -0.0 mm at 2.3 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 33.1 mm at 17.5 ms
Min: -0.0 mm at 2.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.2 mm at 17.6 ms
Min: -0.0 mm at 2.9 ms

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

08.22.2019 16:34:37 642

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.274 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.7 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	34.0 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.6 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.4 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.3 g	Yes

Test meets specifications.

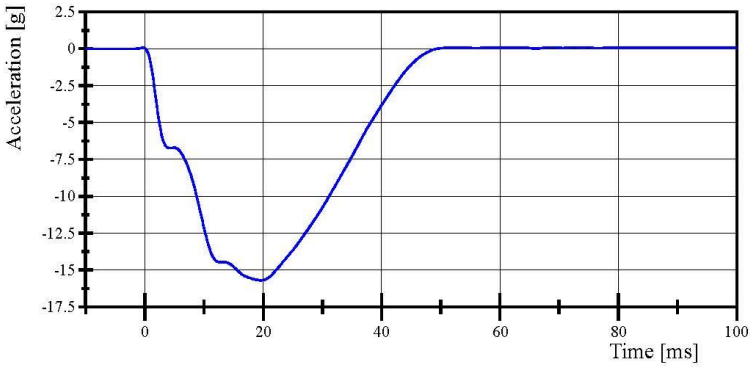
Condition: Used

Comments:
Upper Thorax Rib S/N: 2135
Middle Thorax Rib S/N: 2136
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

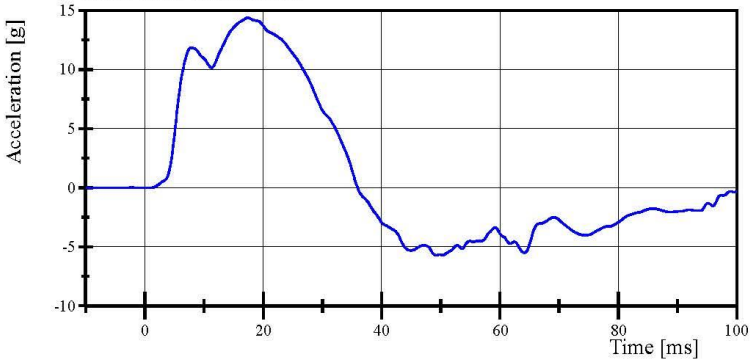
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Probe Acceleration



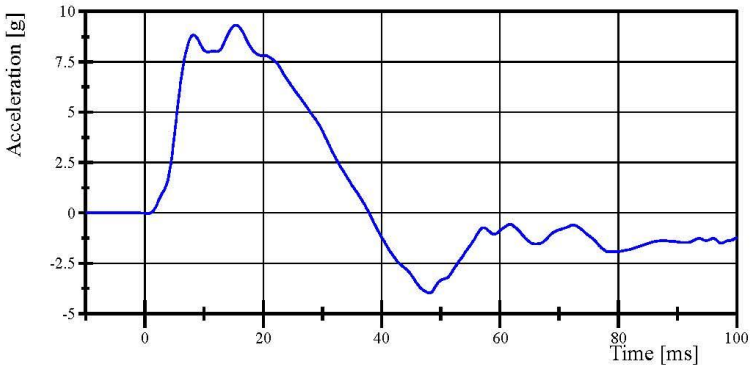
Filter Class: CFC_180
Max: 0.1 g at 68.8 ms
Min: -15.7 g at 19.6 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 14.4 g at 17.4 ms
Min: -5.7 g at 49.2 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.3 g at 15.4 ms
Min: -4.0 g at 48.2 ms

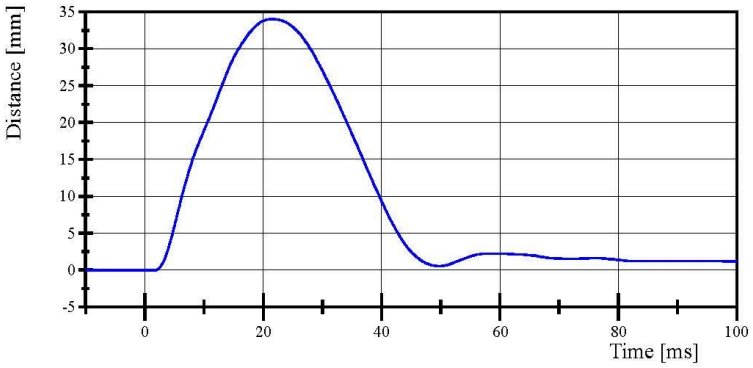
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.22.2019 16:03:32 878

Transportation Research Center Inc.

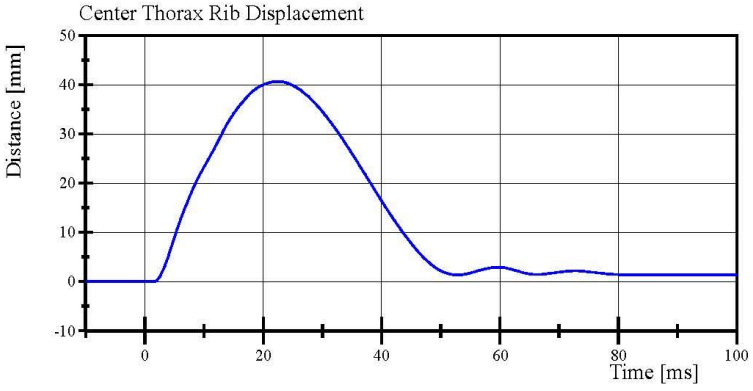
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Upper Thorax Rib Displacement



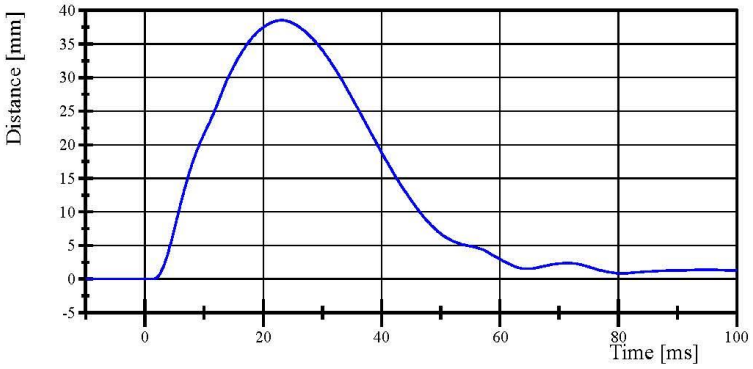
Filter Class: CFC_600
Max: 34.0 mm at 21.4 ms
Min: -0.0 mm at 1.5 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.6 mm at 22.6 ms
Min: -0.0 mm at 1.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.5 mm at 23.2 ms
Min: -0.0 mm at 1.2 ms

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

08.22.2019 16:03:32 878

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.1 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	43.1 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.59 g	Yes

Test meets specifications.

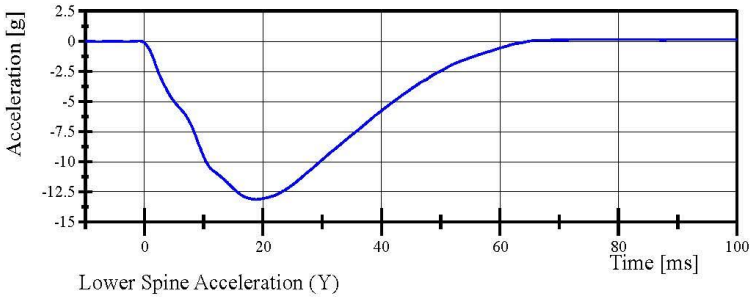
Condition: Used

Comments:
Upper Abdominal Rib S/N: 1997
Lower Abdominal Rib S/N: DS1234

Transportation Research Center Inc.

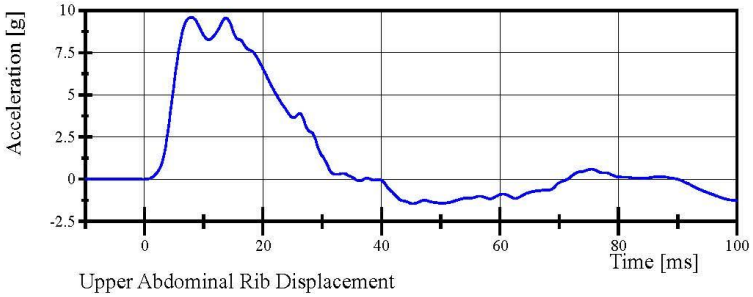
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/22/2019

Probe Acceleration



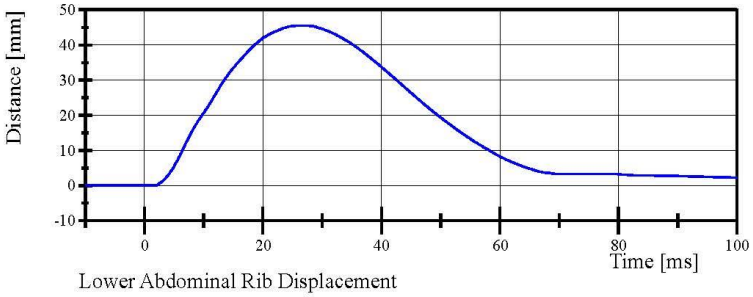
Filter Class: CFC_180
Max: 0.2 g at 80.6 ms
Min: -13.1 g at 18.8 ms

Lower Spine Acceleration (Y)



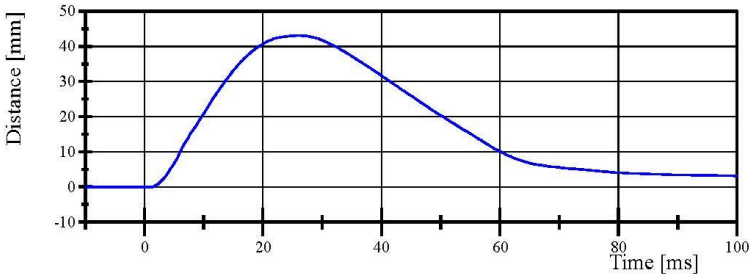
Filter Class: CFC_180
Max: 9.6 g at 7.9 ms
Min: -1.5 g at 45.3 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 45.5 mm at 26.3 ms
Min: -0.0 mm at 1.8 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 43.1 mm at 25.9 ms
Min: -0.0 mm at 1.0 ms

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

08.22.2019 15:53:55 685

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 74-2
Test Date: 8/23/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-41.71 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	35.8 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,221.4 N	Yes

Test meets specifications.

Condition: Used

Comments:
Pelvis Skin S/N: 884
Pelvis Plug Info:
Manufacturer: SACO
S/N: 12226
Cal Date: 20180314

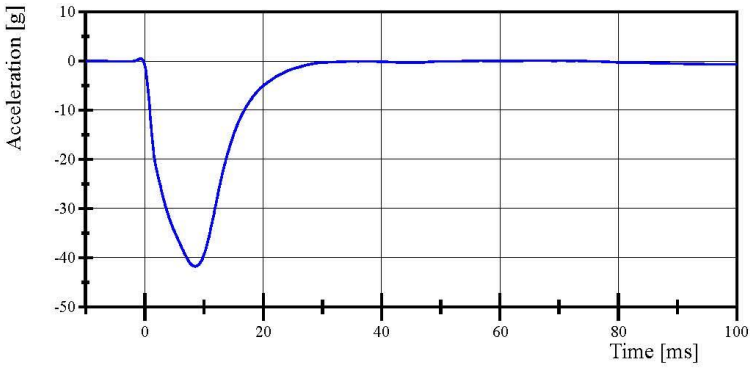
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

08.23.2019 06:53:04 460

Transportation Research Center Inc.

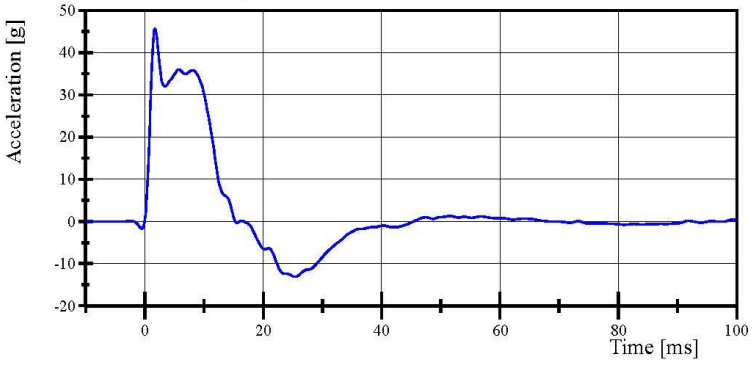
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 74-2
Test Date: 8/23/2019

Probe Acceleration



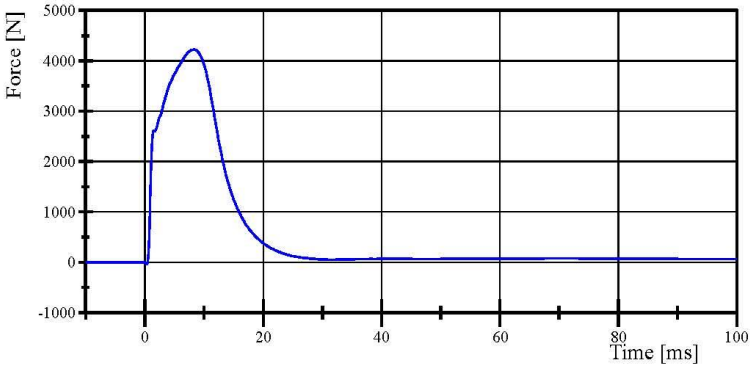
Filter Class: CFC_180
Max: 0.5 g at -0.7 ms
Min: -41.7 g at 8.5 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 45.7 g at 1.7 ms
Min: -13.1 g at 25.4 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,221.4 N at 8.3 ms
Min: -35.6 N at 0.3 ms

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

08.23.2019 06:54:45 460

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/23/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-36.8 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	30.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,302.9 N	Yes

Test meets specifications.

Condition: Used

Comments:
Pelvis Skin S/N: 884

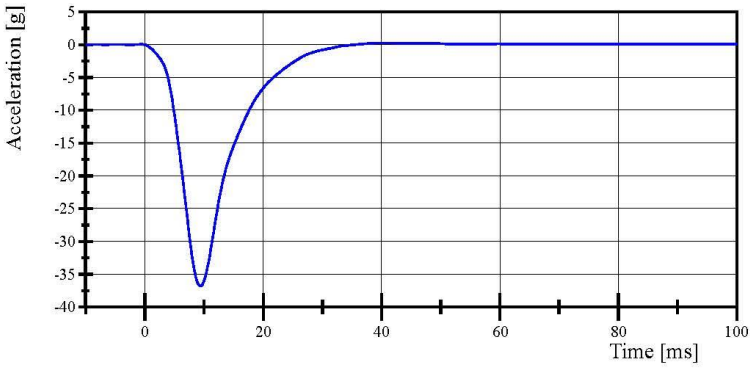
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.23.2019 09:09:12 657

Transportation Research Center Inc.

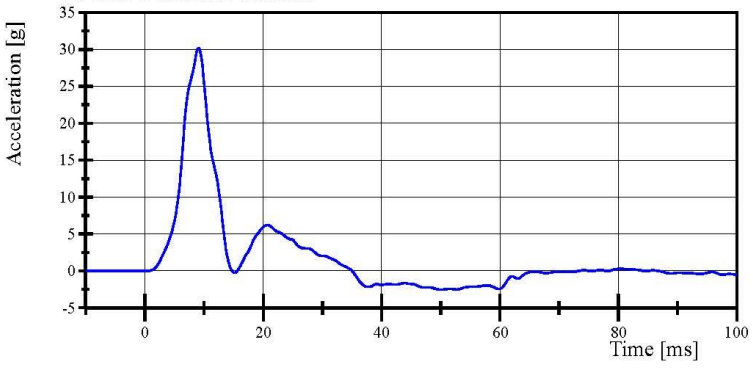
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 74-1
Test Date: 8/23/2019

Probe Acceleration



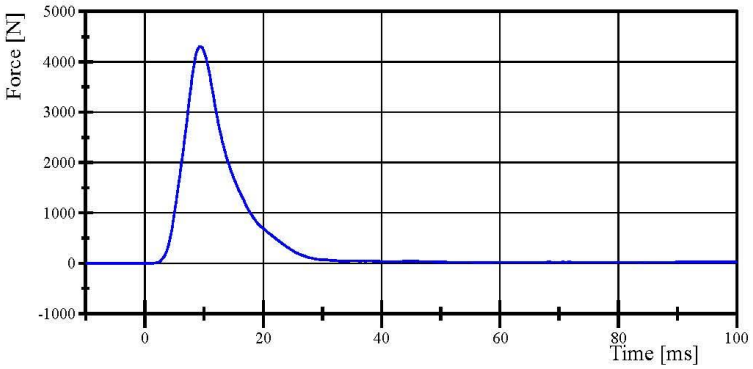
Filter Class: CFC_180
Max: 0.2 g at 40.5 ms
Min: -36.8 g at 9.4 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 30.2 g at 9.0 ms
Min: -2.6 g at 50.0 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,302.9 N at 9.4 ms
Min: -0.7 N at -5.2 ms

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

08.23.2019 09:09:52 657

Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No. 75

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	86	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	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	44	Yes
I	Head Depth	178.0 - 188.0	185	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	532	Yes
L	Popliteal Height	343.0 - 369.0	349	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	197	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	220	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	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	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	878	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. 75-2
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.3 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	2.53 %	Yes

Test meets specifications.

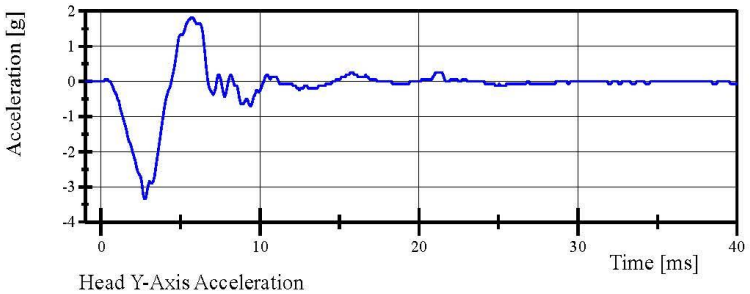
Condition: Used

Comments:
Head Skin S/N: 1253

Transportation Research Center Inc.

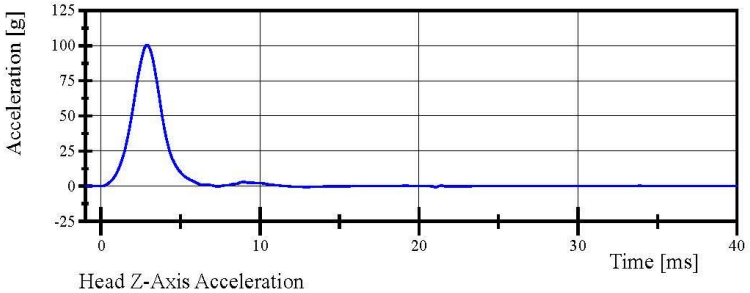
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 75-2
Test Date: 9/10/2019

Head X-Axis Acceleration



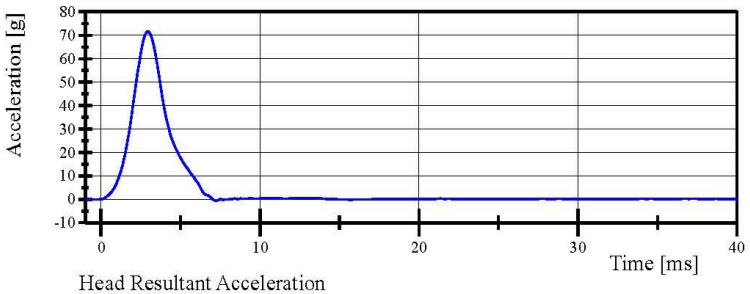
Filter Class: CFC_1000
Max: 1.8 g at 5.7 ms
Min: -3.3 g at 2.7 ms

Head Y-Axis Acceleration



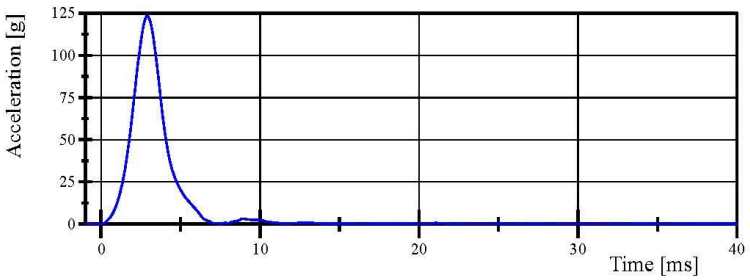
Filter Class: CFC_1000
Max: 100.4 g at 2.9 ms
Min: -0.7 g at 21.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 71.7 g at 3.0 ms
Min: -0.6 g at 7.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 123.3 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

09.10.2019 07:10:51 194

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.604 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.571 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.664 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.940 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.930 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	6.114 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.5 deg	Yes
Time of Peak	50 - 70 ms	69.6 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	38.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	122.7 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: 180-2001-606

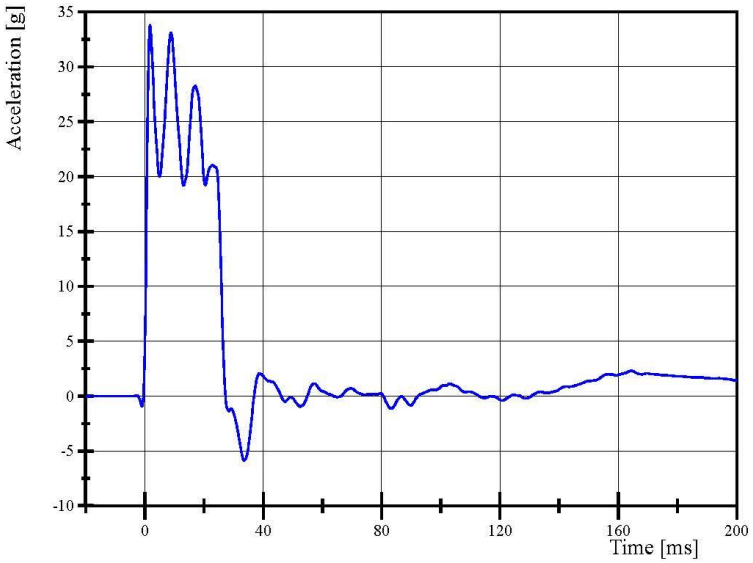
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

09.10.2019 09:02:41 720

Transportation Research Center Inc.

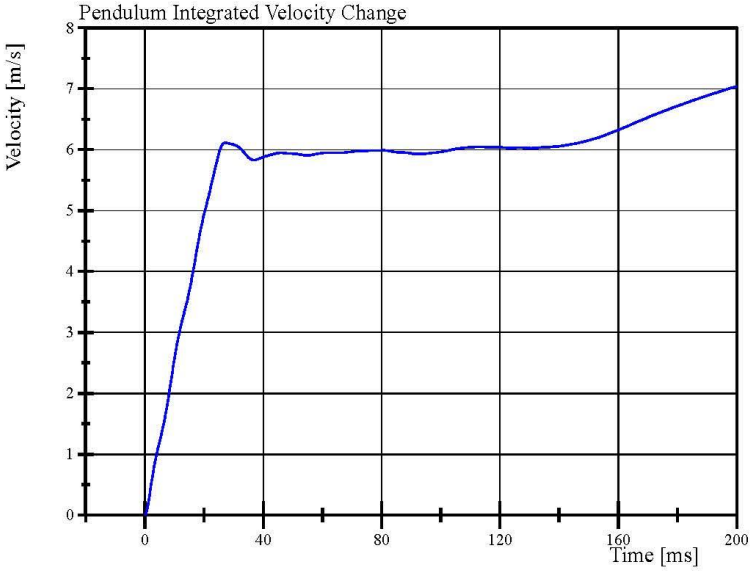
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/10/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 33.8 g at 1.8 ms
Min: -5.9 g at 33.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 7.0 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

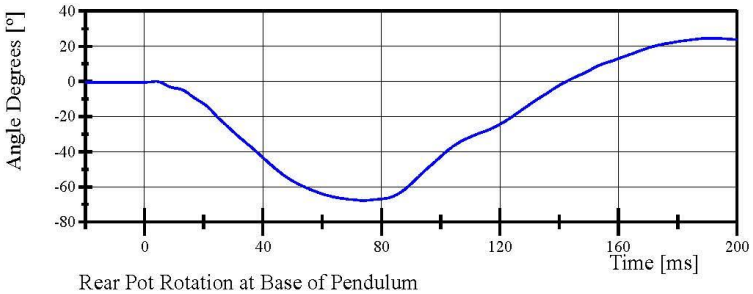
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

09.10.2019 09:03:26 720

Transportation Research Center Inc.

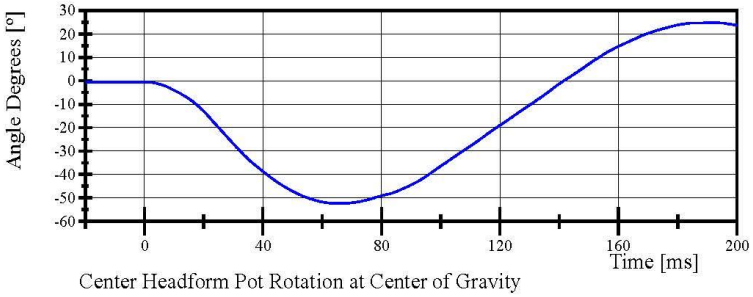
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/10/2019

Forward Pot Rotation at Base of Pendulum



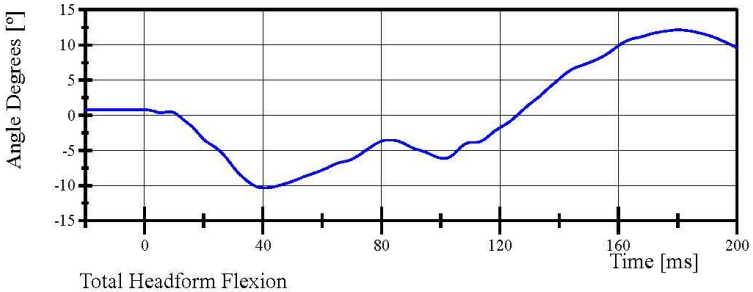
Filter Class: CFC_60
Max: 24.7 ° at 191.0 ms
Min: -67.7 ° at 73.9 ms

Rear Pot Rotation at Base of Pendulum



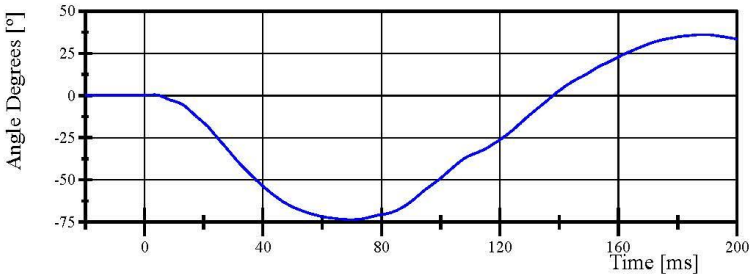
Filter Class: CFC_60
Max: 24.8 ° at 192.2 ms
Min: -52.4 ° at 65.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 12.1 ° at 180.2 ms
Min: -10.3 ° at 40.7 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 36.1 ° at 189.1 ms
Min: -73.5 ° at 69.6 ms

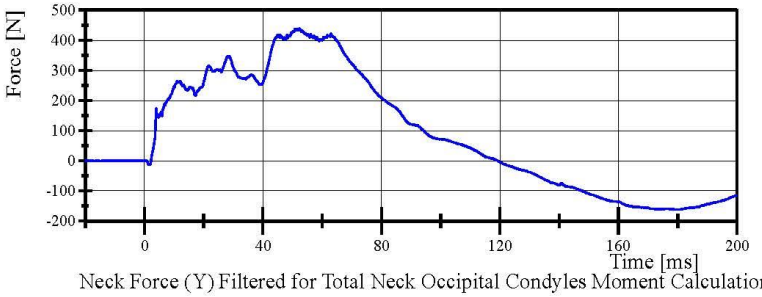
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

09.10.2019 09:03:26 720

Transportation Research Center Inc.

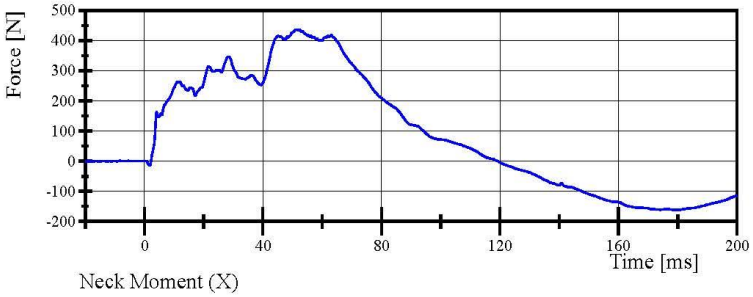
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/10/2019

Neck Force (Y)



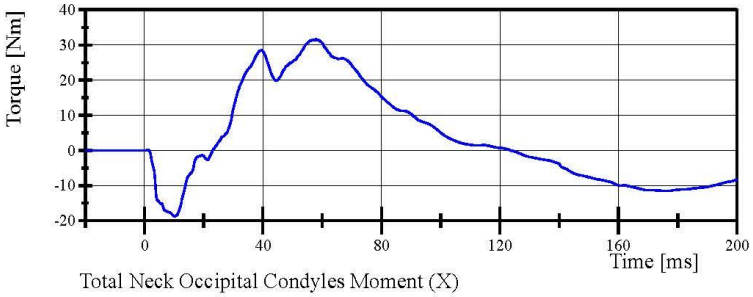
Filter Class: CFC_1000
Max: 439.0 N at 52.3 ms
Min: -162.6 N at 179.2 ms

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



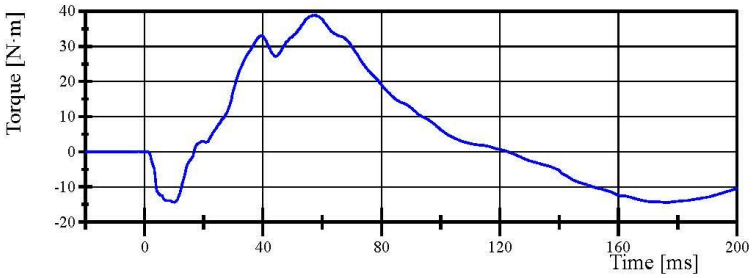
Filter Class: CFC_600
Max: 437.4 N at 52.3 ms
Min: -162.4 N at 179.3 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 31.6 Nm at 57.8 ms
Min: -18.7 Nm at 10.2 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constar
Max: 38.8 N·m at 57.8 ms
Min: -14.4 N·m at 176.2 ms

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

09.10.2019 09:03:27 720

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.8 g	Yes
Shoulder Displacement	28 - 37 mm	33.2 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	17.3 g	Yes

Test meets specifications.

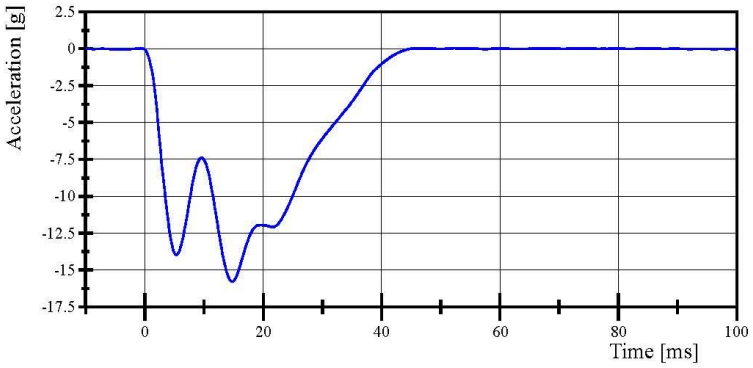
Condition: Used

Comments:
Left Arm S/N: 952

Transportation Research Center Inc.

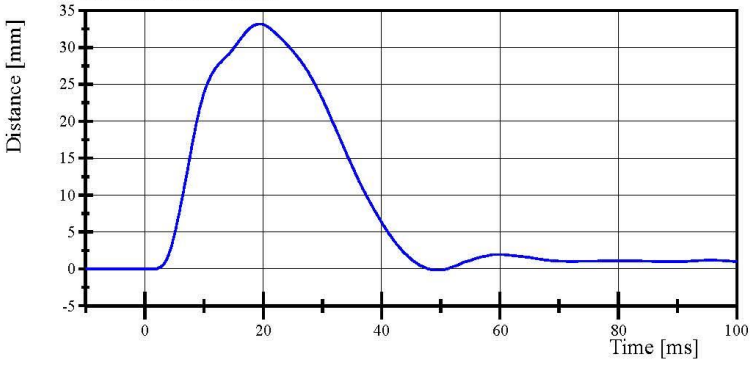
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Probe Acceleration



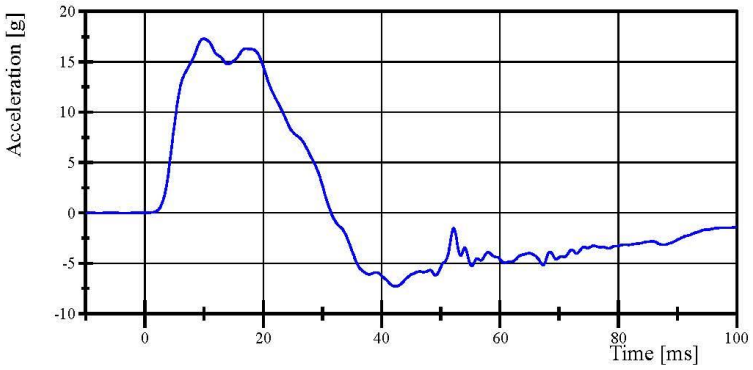
Filter Class: CFC_180
Max: 0.0 g at 52.2 ms
Min: -15.8 g at 14.8 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 33.2 mm at 19.5 ms
Min: -0.2 mm at 49.8 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 17.3 g at 9.9 ms
Min: -7.3 g at 42.4 ms

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

09.09.2019 13:10:42 838

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.750 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.1 g	Yes
Shoulder Displacement	31 - 40 mm	37.8 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.4 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.4 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.1 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	32.2 g	Yes

Test meets specifications.

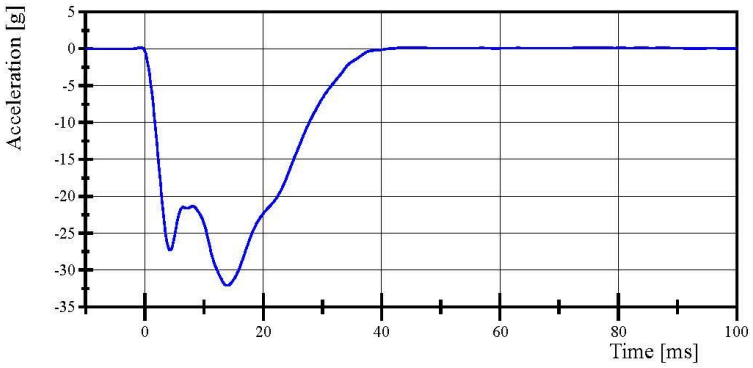
Condition: Used

Comments:
Left Arm S/N: 952
Shoulder Rib S/N: 180-3355 DM4450
Upper Thorax Rib S/N: 2135
Middle Thorax Rib S/N: 2136
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

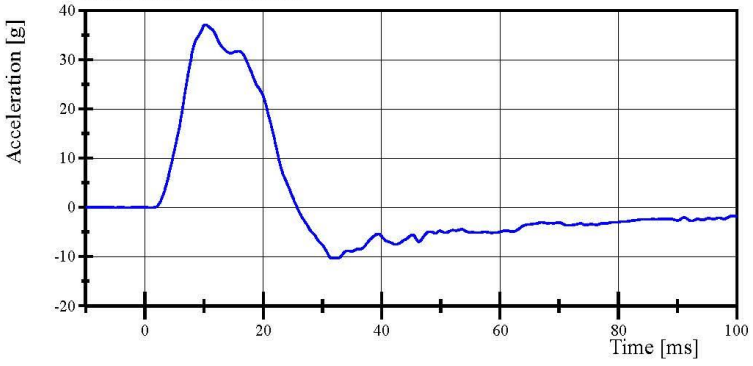
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Probe Acceleration



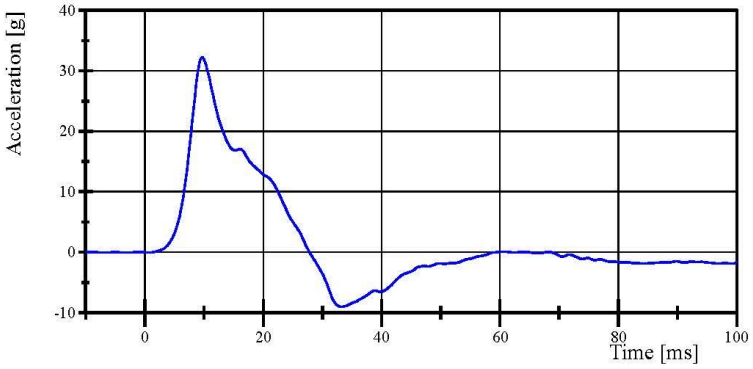
Filter Class: CFC_180
Max: 0.2 g at -0.7 ms
Min: -32.1 g at 13.8 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 37.1 g at 10.2 ms
Min: -10.3 g at 31.6 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 32.2 g at 9.7 ms
Min: -9.0 g at 33.1 ms

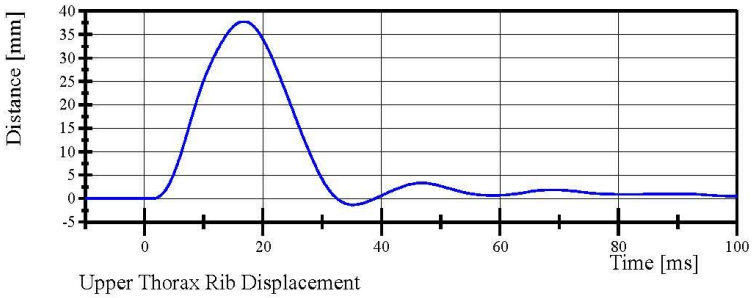
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

09.09.2019 14:14:48 613

Transportation Research Center Inc.

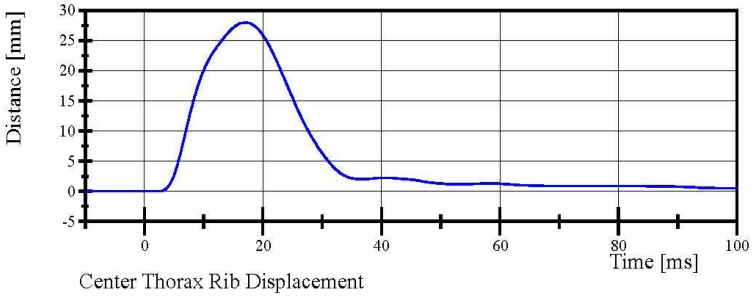
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Shoulder Rib Displacement



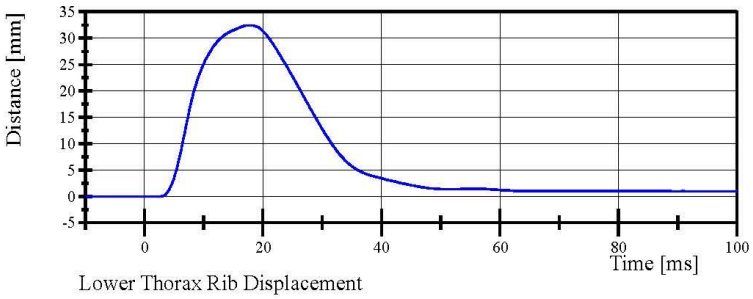
Filter Class: CFC_600
Max: 37.8 mm at 16.8 ms
Min: -1.3 mm at 35.1 ms

Upper Thorax Rib Displacement



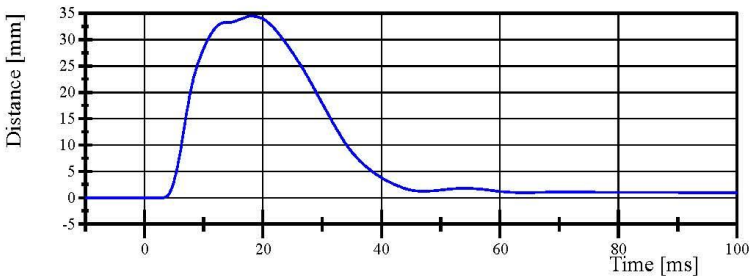
Filter Class: CFC_600
Max: 28.0 mm at 17.0 ms
Min: -0.0 mm at 2.5 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.4 mm at 17.9 ms
Min: -0.0 mm at 2.6 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 34.4 mm at 18.0 ms
Min: -0.0 mm at -4.1 ms

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

09.09.2019 14:14:48 613

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.273 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.6 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	34.1 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.3 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.1 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.3 g	Yes

Test meets specifications.

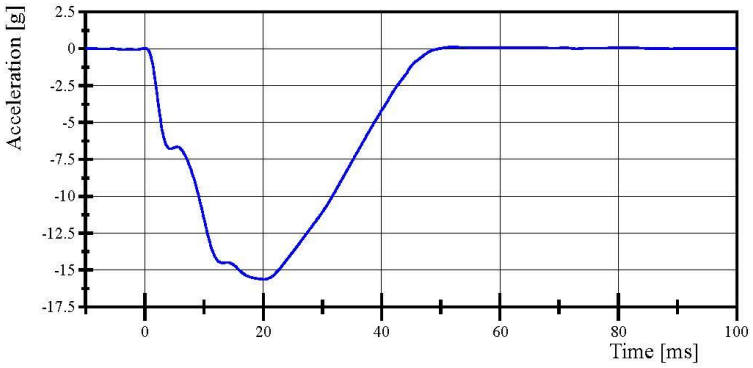
Condition: Used

Comments:
Upper Thorax Rib S/N: 2135
Middle Thorax Rib S/N: 2136
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

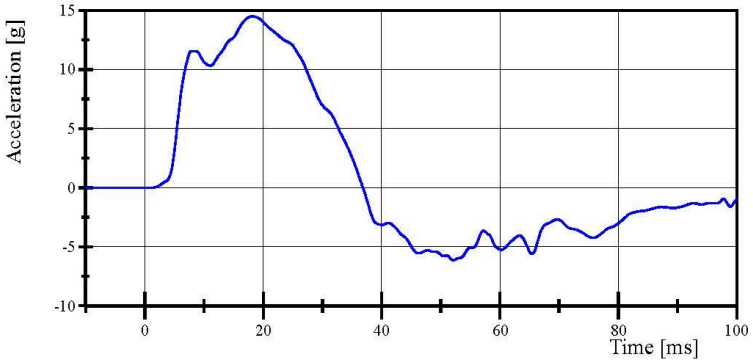
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Probe Acceleration



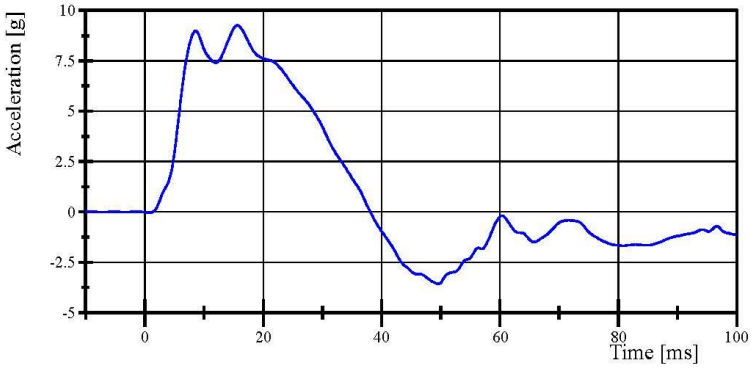
Filter Class: CFC_180
Max: 0.1 g at 52.1 ms
Min: -15.6 g at 20.1 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 14.5 g at 18.2 ms
Min: -6.1 g at 52.1 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.3 g at 15.6 ms
Min: -3.6 g at 49.6 ms

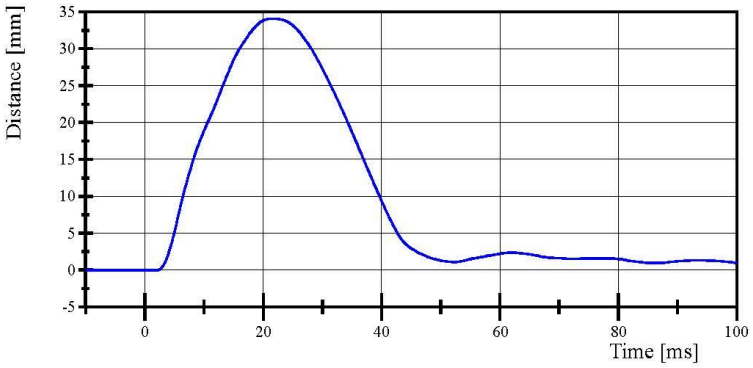
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

09.09.2019 13:44:51 840

Transportation Research Center Inc.

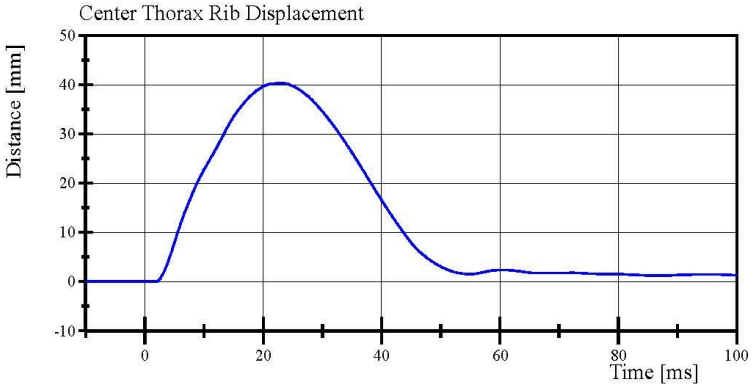
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Upper Thorax Rib Displacement



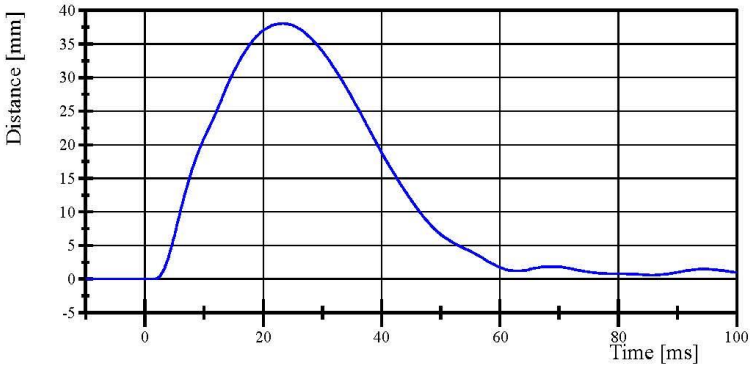
Filter Class: CFC_600
Max: 34.1 mm at 21.7 ms
Min: -0.0 mm at 2.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.3 mm at 22.7 ms
Min: -0.0 mm at 1.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.1 mm at 23.4 ms
Min: -0.0 mm at 1.5 ms

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

09.09.2019 13:44:52 840

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.1 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.4 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	42.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.59 g	Yes

Test meets specifications.

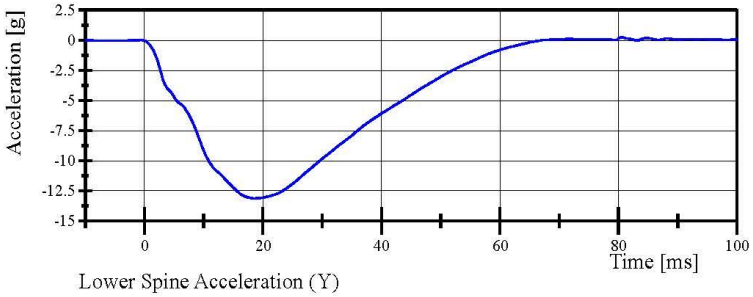
Condition: Used

Comments:
Upper Abdominal Rib S/N: 1997
Lower Abdominal Rib S/N: DS1234

Transportation Research Center Inc.

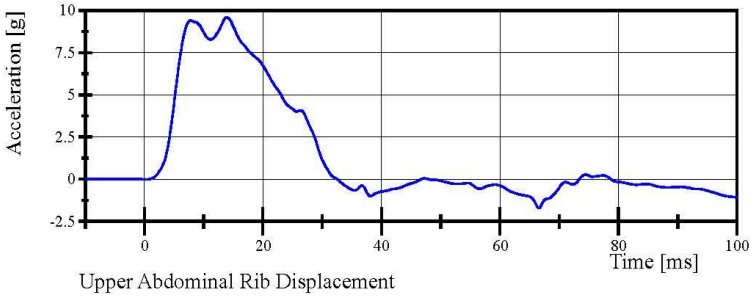
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Probe Acceleration



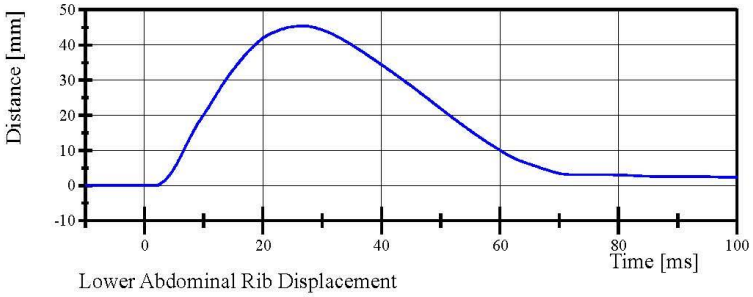
Filter Class: CFC_180
Max: 0.2 g at 80.6 ms
Min: -13.1 g at 18.5 ms

Lower Spine Acceleration (Y)



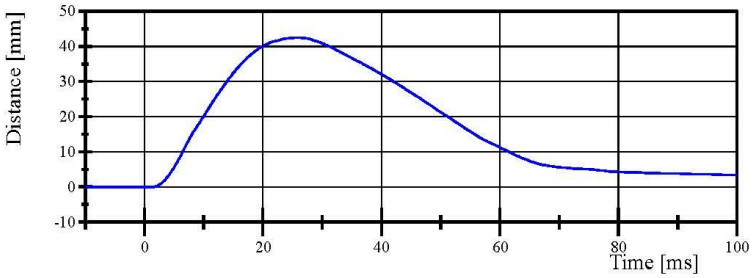
Filter Class: CFC_180
Max: 9.6 g at 13.9 ms
Min: -1.7 g at 66.6 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 45.4 mm at 26.8 ms
Min: -0.0 mm at 1.9 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 42.5 mm at 25.8 ms
Min: -0.0 mm at 1.2 ms

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

09.09.2019 13:34:36 673

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 75-3
Test Date: 9/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.57 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.5 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,797.0 N	Yes

Test meets specifications.

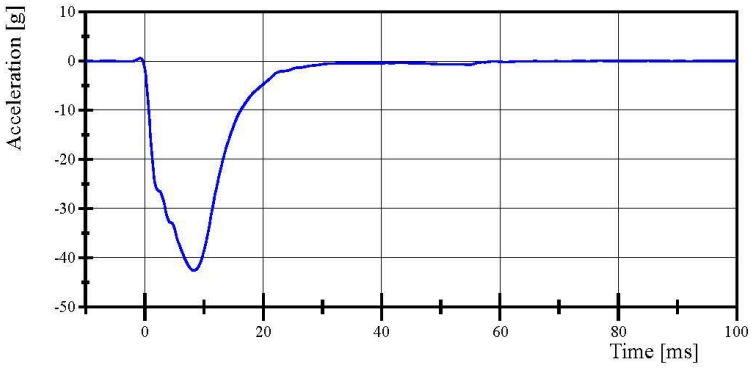
Condition: Used

Comments:
Pelvis Skin S/N: 884
Pelvis Plug Info:
Manufacturer: SACO
S/N: 11602
Cal Date: 20161004

Transportation Research Center Inc.

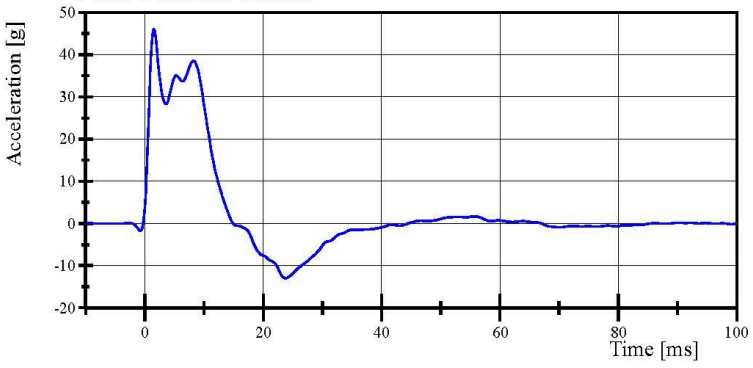
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 75-3
Test Date: 9/10/2019

Probe Acceleration



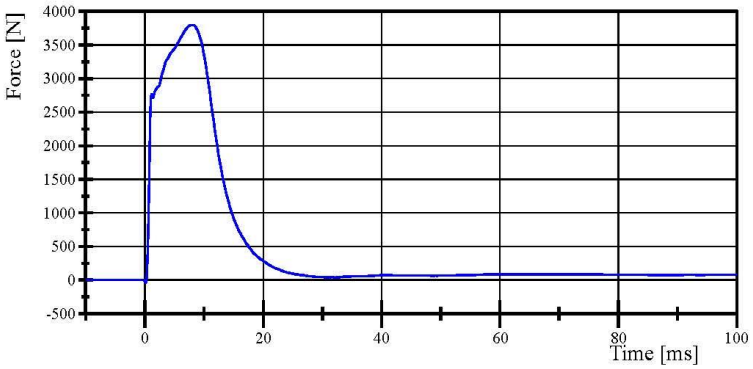
Filter Class: CFC_180
Max: 0.6 g at -0.8 ms
Min: -42.6 g at 8.2 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 46.1 g at 1.5 ms
Min: -13.0 g at 23.8 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 3,797.0 N at 8.1 ms
Min: -37.9 N at 0.2 ms

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

09.10.2019 11:59:57 441

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-38.2 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.4 g	Yes
Iliac Force	4,100 - 5,100 N	4,509.5 N	Yes

Test meets specifications.

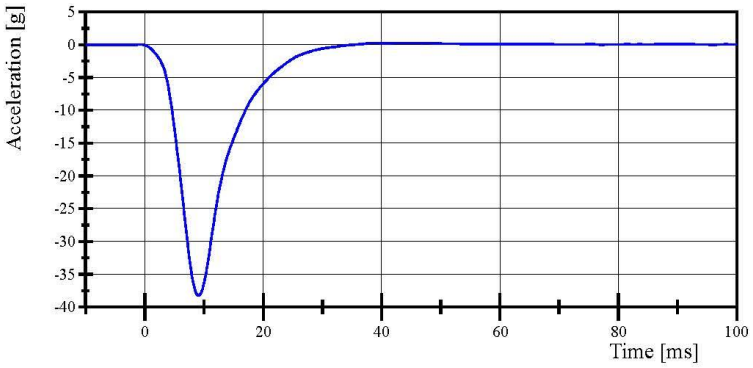
Condition: Used

Comments:
Pelvis Skin S/N: 884

Transportation Research Center Inc.

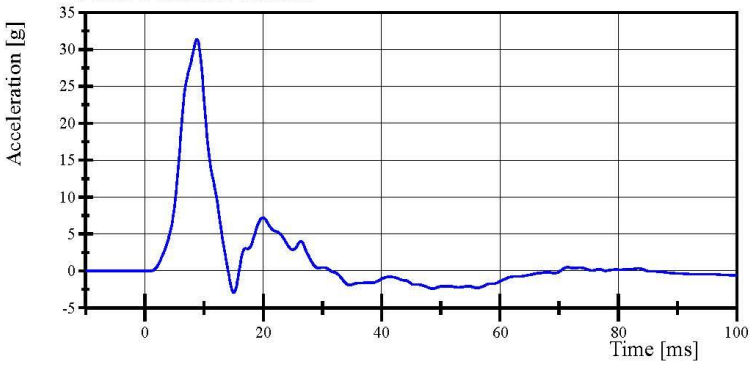
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 75-1
Test Date: 9/9/2019

Probe Acceleration



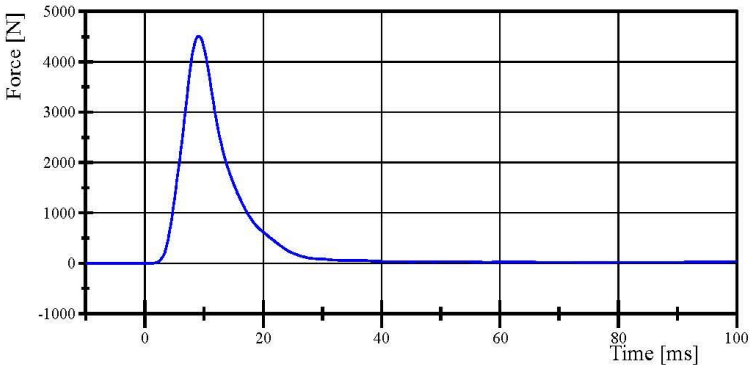
Filter Class: CFC_180
Max: 0.3 g at 44.6 ms
Min: -38.2 g at 9.0 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 31.4 g at 8.8 ms
Min: -2.9 g at 15.0 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,509.5 N at 9.1 ms
Min: -0.7 N at -5.1 ms

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

09.09.2019 12:58:52 679

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	16-Apr-2019
		Y	T10352	Endevco	16-Apr-2019
		Z	P91950	Endevco	16-Apr-2019
Redundant Head Accelerometers		X	P94566	Endevco	16-Apr-2019
		Y	P83368	Endevco	16-Apr-2019
		Z	P94483	Endevco	16-Apr-2019
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	16-Apr-2019
	Middle	Y	174	FTSS	16-Apr-2019
	Lower	Y	173	FTSS	16-Apr-2019
Abdomen Load Cells	Front	Y	1441	Denton	16-Apr-2019
	Middle	Y	1436	Denton	16-Apr-2019
	Rear	Y	1437	Denton	16-Apr-2019
Lower Spine Accelerometers (T12)		X	P89126	Endevco	16-Apr-2019
		Y	P87139	Endevco	16-Apr-2019
		Z	P64884	Endevco	16-Apr-2019
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	16-Apr-2019

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	T11432	Endevco	18-Apr-2019
			Y	P93774	Endevco	18-Apr-2019
			Z	P91566	Endevco	18-Apr-2019
Redundant Head Accelerometers			X	P91615	Endevco	18-Apr-2019
			Y	P93762	Endevco	18-Apr-2019
			Z	P93761	Endevco	18-Apr-2019
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	18-Apr-2019
		Middle	Y	037	Servo	18-Apr-2019
		Lower	Y	1161	Servo	18-Apr-2019
	Abdominal Rib	Upper	Y	1295	Servo	18-Apr-2019
		Lower	Y	1136	Servo	18-Apr-2019
Lower Spine Accelerometers (T12)			X	P94545	Endevco	18-Apr-2019
			Y	P94647	Endevco	18-Apr-2019
			Z	P94530	Endevco	18-Apr-2019
Acetabulum Load Cell			Y	DK7483S-FY	FTSS	18-Apr-2019
Iliac Wing Load Cell			Y	287-FY	Denton	18-Apr-2019
Pelvis Plug (struck side)				12327	SACO	21-Mar-2018
Pelvis Plug (non-struck side)				36473	FTSS	29-Sep-2010

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T11455	Endevco	5-Sep-2019
	Vehicle Center of Gravity	Y	T11827	Endevco	5-Sep-2019
	Vehicle Center of Gravity	Z	T11856	Endevco	5-Sep-2019
2	Right Sill at Front Seat	X	T11453	Endevco	4-Sep-2019
	Right Sill at Front Seat	Y	T11846	Endevco	4-Sep-2019
	Right Sill at Front Seat	Z	T11861	Endevco	4-Sep-2019
3	Right Sill at Rear Seat	X	T11813	Endevco	5-Sep-2019
	Right Sill at Rear Seat	Y	T11841	Endevco	5-Sep-2019
	Right Sill at Rear Seat	Z	T11815	Endevco	5-Sep-2019
4	Left Sill at Front Door	Y	T11829	Endevco	10-May-2019
5	Left Sill at Rear Door	Y	T11854	Endevco	10-May-2019
6	Left A-Post Lower	Y	T11449	Endevco	18-Jun-2019
7	Left A-Post Middle	Y	P44288	Endevco	8-May-2019
8	Left B-Post Lower	Y	P88453	Endevco	17-Jun-2019
9	B-Post Middle	Y	P94561	Endevco	15-Apr-2019
10	Front Seat Track	Y	T11450	Endevco	10-May-2019
11	Rear Seat Track or Structure	Y	T11850	Endevco	10-May-2019
12	Right Rear Occupant Compartment	Y	P81013	Endevco	10-May-2019
13	Engine Block	X	P57917	Endevco	8-May-2019
	Engine Block	Y	P57192	Endevco	16-Jul-2019
14	Rear Floorpan Above Axle	X	P94485	Endevco	17-Jun-2019
	Rear Floorpan Above Axle	Y	P61501	Endevco	8-May-2019
	Rear Floorpan Above Axle	Z	T11835	Endevco	18-Jun-2019

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P75713	Endevco	19-Mar-2019
MDB Center of Gravity	Y	P76171	Endevco	19-Mar-2019
MDB Center of Gravity	Z	P76114	Endevco	19-Mar-2019
Left Frame Rail at Rear Axle Centerline	X	P75115	Endevco	25-Mar-2019
Left Frame Rail at Rear Axle Centerline	Y	P94567	Endevco	25-Mar-2019