

FINAL REPORT NUMBER: SINCAP-TRC-21-002

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

**FORD MOTOR CO.
2021 Ford Bronco Sport
NHTSA NUMBER: M20210203**

**PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
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Report Date: September 14, 2021

FINAL REPORT

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

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Report Prepared By: ILO Project Operations Group

Report Approved By: 

John Shultz

Approval Date: September 14, 2021

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 2021 Ford Bronco Sport, 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 February 19, 2021. The impact velocity of the Moving Deformable Barrier (MDB) was 61.37 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.2° C. The target vehicle post-test maximum crush was 198 mm at Level 3. The test vehicle's performance was as follows:																											
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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 1200 New Jersey Ave, SE Washington, DC 20590																									
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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2021 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 2021 Ford Bronco Sport. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A 2021 Ford Bronco Sport 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 61.37 km/h (38.13 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 February 19, 2021. 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 March 2020. The side impact event was documented by 11 cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

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

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

Lower spine (T12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG triaxial accelerometers

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

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	80
Maximum Thoracic Rib Deflection	mm	44	21.6
Combined Abdominal Force	N	2500	882.5
Pubic Symphysis Force	N	6000	-912.5
Lower Spine (T12) Resultant Acceleration	G	82*	25.0

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	144
Lower Spine (T12) Resultant Acceleration	G	82	32.6
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3063.3
Maximum Thoracic Rib Deflection	mm	38*	17.9
Maximum Abdominal Rib Deflection	mm	45*	15.2

* Proposed IARV

Supplemental Restraint Information is given below:

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

LEFT LOWER A-POST AY – Channel failed after 4.0 ms

LEFT MID A-POST AY – Channel failed after 32.0 ms

LEFT LOWER B-POST AY – Channel failed after 10.0 ms

RIGHT MDB CONTACT – Channel failed

The photo placards should say Bronco Sport

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20210203
Model Year	2021
Make	Ford
Model	Bronco Sport
Body Style	MPV
VIN	3FMCR9A69MRA16290
Body Color	Carbonized Gray Metallic
Odometer Reading (km/mi)	57.8 mi.
Engine Displacement (L)	1.5
Type/No. Cylinders	Straight/3
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	4WD
Roof Rack	Yes
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	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	Yes
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	12/20
Vehicle Type	MPV

GVWR (kg)	2100
GAWR Front (kg)	1089
GAWR Rear (kg)	1066

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)				530.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				189.8

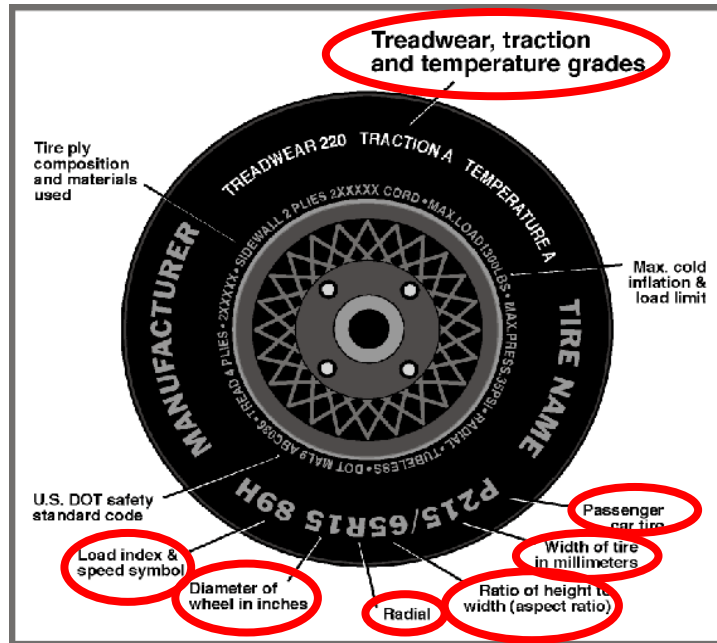
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	225/65R17 102H	225/65R17 102H
Tire Size on Vehicle	225/65R17	225/65R17
Tire Manufacturer	Continental	Continental
Tire Model	ProContact	ProContact
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	102H	102H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	1P50FBC3K 4720	1P50FBC3K 4720
DOT Safety Code Right	1P50FBC3K 4720	1P50FBC3K 4720

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

Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	317	317	296	296
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

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	455.0	344.2		493.8	472.0		492.8	471.2	
Right	kg	444.4	321.8		441.4	413.4		450.2	412.2	
Ratio	%	57.5	42.5		51.4	48.6		51.6	48.4	
Totals	kg	899.4	666.0	1565.4	935.2	885.4	1820.6	943.0	883.4	1826.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1565.4	(A)
Actual Weight of 1 P572V ATD (SID-ILs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW) ¹	kg	136.0	(C)
Calculated Vehicle Target Weight (TVT _W)	kg	1826.4	(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	905	908	Yes
RF	mm	912	920	Yes
RR	mm	912	915	Yes
LR	mm	900	907	Yes
Vehicle CG (Aft of Front Axle)	mm	1291	1298	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+45	+49	

***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

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

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

Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in cargo area	88.4
Removed: None	0.0

TEST SURFACE MARKINGS

	Distance from 63° Impact Angle Line (mm)
Fore 25 mm target	1048
Aft 25 mm target	1052
Pre-Impact Angle Line	440

Parallel Track Target	X Location (mm)	Y Location (mm)
A	0	0
B	1390	2650
C	4010	2650
D	4010	0

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

Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021

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	21.6	16.2	18.9
Front Passenger Seat	15.9	15.7	15.8
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	16.2
Non-Struck Side Rear Seat	N/A	N/A	14.5
Rear Center Seat*	N/A	N/A	15.5

* 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	18.9	163	Max	191	196	201
			Mid	158	163	168
			Min	145	150	155
Front Passenger Seat	15.8	171	Max	N/A	N/A	N/A
			Mid	166	171	175
			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	16.2	219	Max	N/A	N/A	N/A
			Mid	N/A	219	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	14.5	220	Max	N/A	N/A	N/A
			Mid	N/A	220	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	15.5	208	Max	N/A	N/A	N/A
			Mid	N/A	208	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: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021

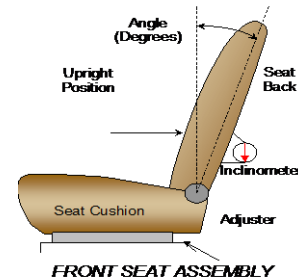
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	242	36	125	18
Front Passenger Seat	253	38	130	19
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	0	Fixed	0	Fixed
Non-Struck Side Rear Seat	0	Fixed	0	Fixed
Rear Center Seat*	0	Fixed	0	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	51.1	26	3.7	8
Front Passenger Seat	50.1	26	4.0	4
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	0.0	Fixed	23.1	Fixed
Non-Struck Side Rear Seat	0.0	Fixed	20.1	Fixed
Rear Center Seat*	0.0	Fixed	27.4	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	0, Uppermost
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	3	0, Uppermost
Rear Seat	Fixed	Fixed

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

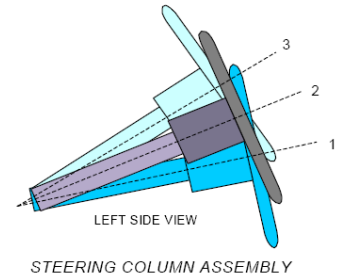
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STEERING COLUMN ADJUSTMENT

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

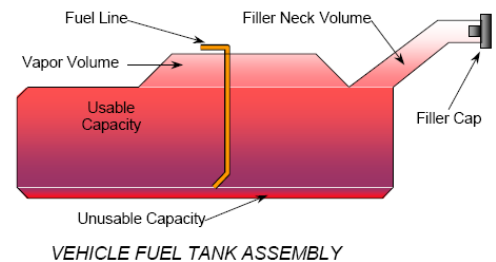
	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	22.6	0
Geometric Center, Position No. 2	25.3	27.5
Uppermost, Position No. 3	28.0	55
Telescoping Steering Wheel Travel		55
Test Position	25.3	27.5



FUEL PUMP

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

Fuel pump cycles for a brief period when key is moved to on position, but does not pump fuel unless engine is running



FUEL TANK CAPACITY

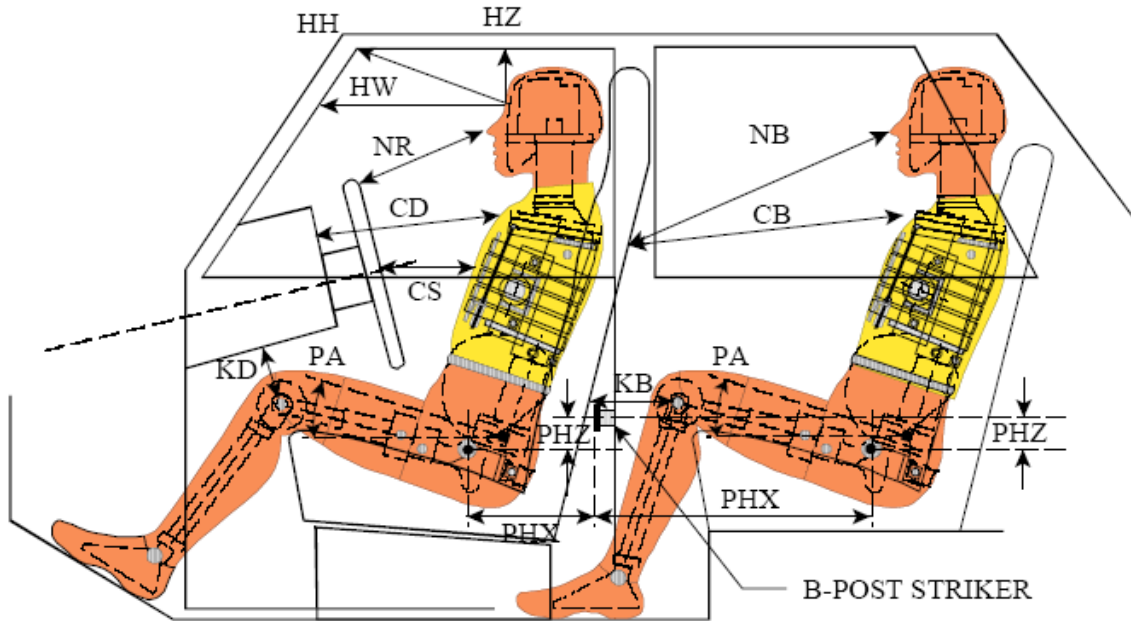
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	63.2
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	63.2
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	58.8
Actual Amount of Solvent Used in Test	58.8
1/3 of Usable Capacity	21.1

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: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021



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

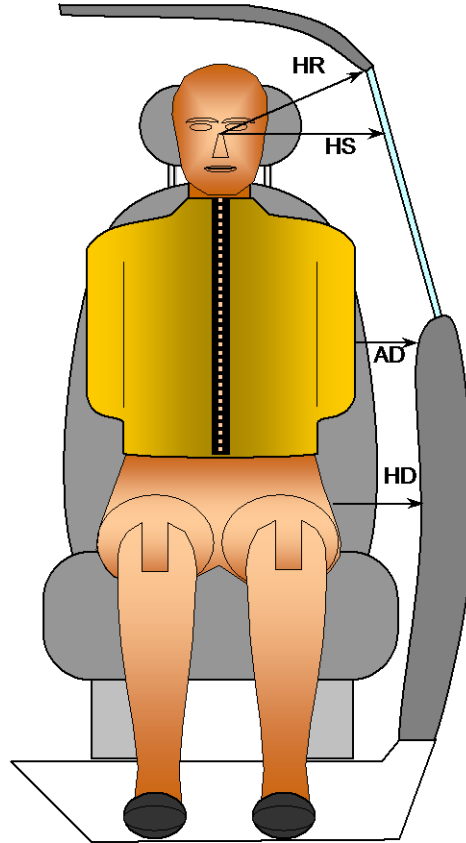
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	459			
HW		Header to Windshield	674			
HZ	HZ	Head to Roof Liner	243		343	
NR	NB	Nose to Rim/Seat Back	450		529	
CD	CB	Chest to Dash/Seat Back	586		521	
CS		Chest to Steering Wheel	366			
KD(L)/KDA(L) [°]	KB(L)/KBA(L) [°]	Left Knee to Dash/Seat Back	181	8.3	252	0.3
KD(R)/KDA(R) [°]	KB(R)/KBA(R) [°]	Right Knee to Dash/Seat Back	179	8.6	245	0.5
PAX [°]	PAX [°]	Pelvic Tilt Angle X		1.7		0.8
	PAY [°]	Pelvic Tilt Angle Y				21.8
PHX	PHX	Hip Point to Striker (X-Axis)	190		265	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	110		212	

**DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021



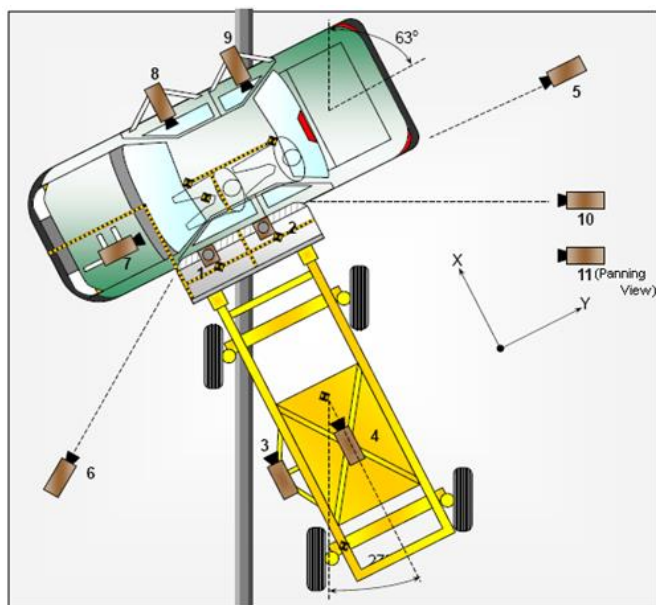
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	208	288
HS	Head to Side Window	mm	323	366
AD	Arm to Door	mm	81	132
HD	H-Point to Door	mm	210	162

**DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-1578	0	-5692	8.5	1000
2	Overhead Close-up	-1387	0	-5692	28	1000
3	Left Impact Point (MDB)	-1522	-907	-861	25	1000
4	Side Overall (MDB)	-2250	0	-1429	12.5	1000
5	Rear	0	8958	-1457	20	1000
6	Left Front	-1952	-3126	-1425	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

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

*All measurements accurate to ± 6 mm.

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

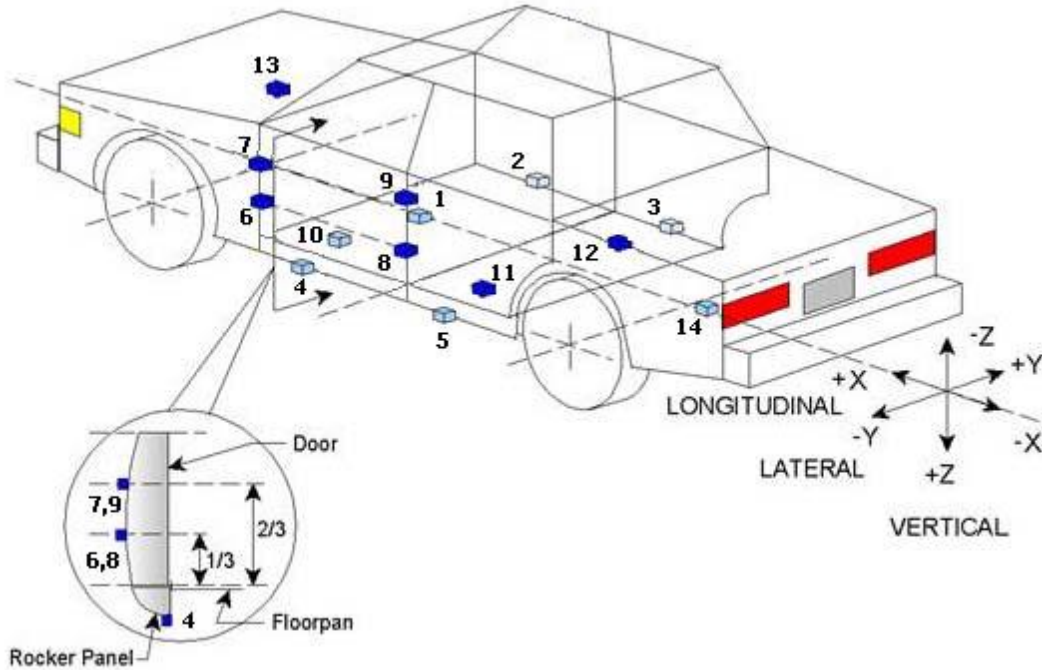
INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021



TEST VEHICLE ACCELEROMETER LOCATIONS

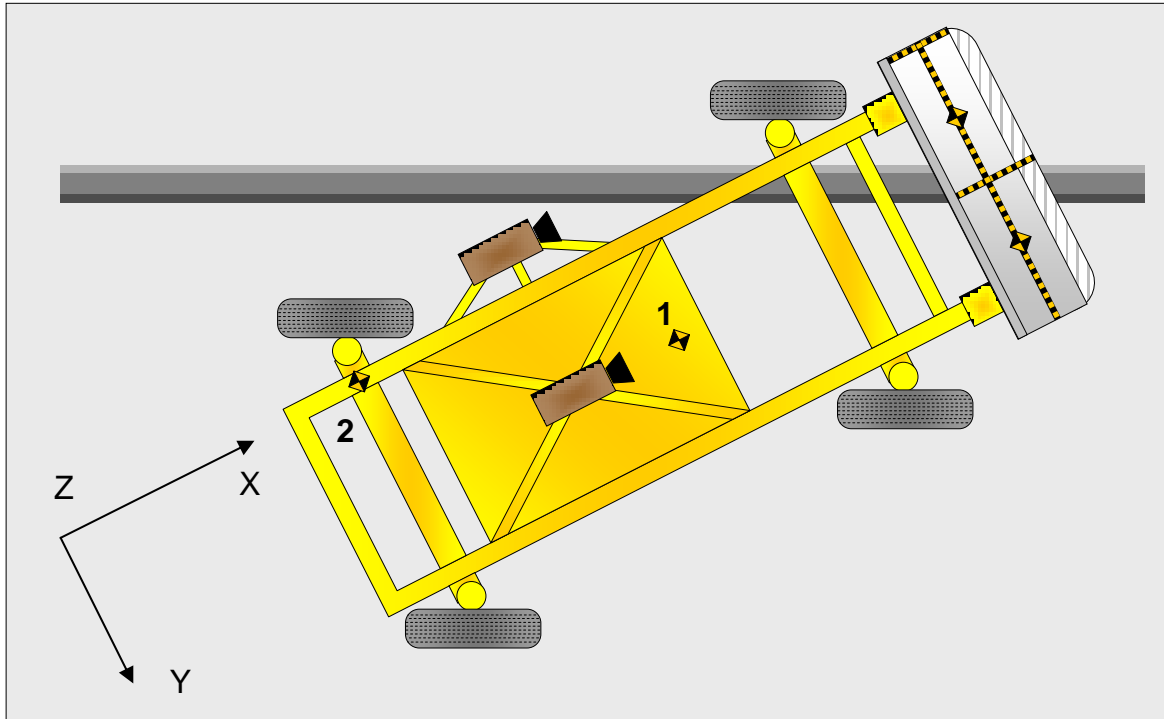
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2612	105	-435
2	Right Sill at Front Seat	2665	679	-387
3	Right Sill at Rear Seat	1805	-638	-397
4	Left Sill at Front Door	2697	-679	-379
5	Left Sill at Rear Door	1815	-638	-370
6	A-Post Lower	2695	-838	-559
7	A-Post Middle	2990	-820	-963
8	B-Post Lower	1950	-830	-613
9	B-Post Middle	1905	-795	-1060
10	Front Seat Track	2240	-550	-420
11	Rear Seat Structure	1705	-500	-391
12	Right Rear Occ. Compartment	1620	-660	-413
13	Engine Block	3560	80	-867
14	Rear Above Axle	1000	0	-494

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: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021



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: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

**DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS**

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2669
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		394
Actual Impact Point (Aft of Front Axle)	mm		383
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+11
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-3

**DATA SHEET NO. 9
MDB SUMMARY OF RESULTS**

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021

MDB SPECIFICATIONS

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

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	431.0	253.6	684.6
Right	kg	350.8	331.6	682.4
Ratio	%	57.2	42.8	100.0
Totals	kg	781.8	585.2	1367.0

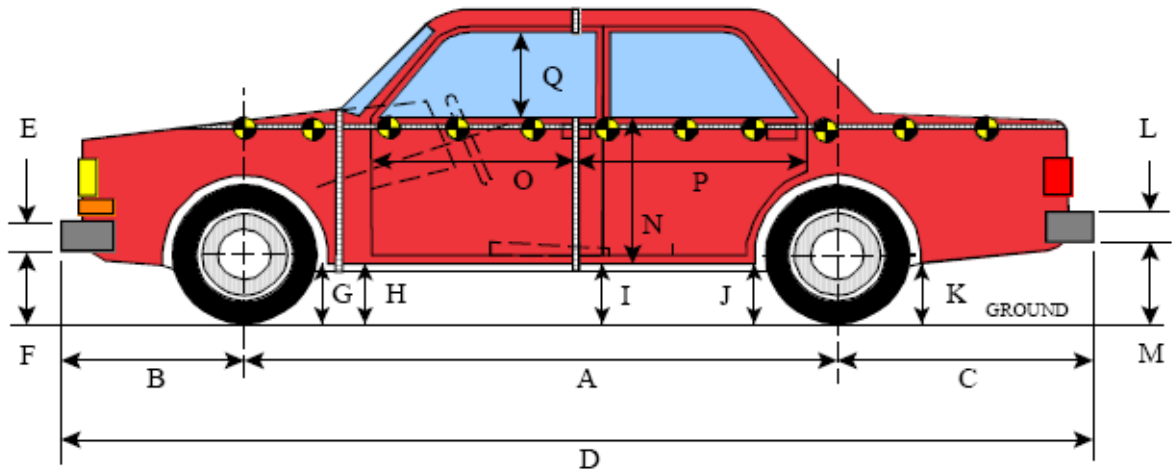
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.37
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.41
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: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021



LEFT SIDE VIEW

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

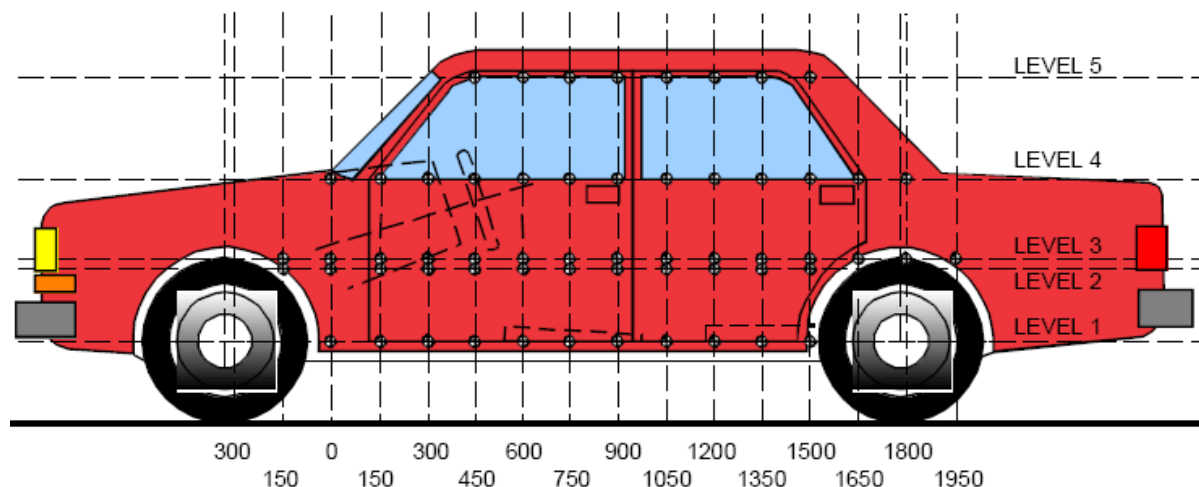
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2669	2665	4
B	Front Axle to Front Surface of Vehicle	850	850	0
C	Rear Axle to Rear Surface of Vehicle	860	860	0
D	Total Length at Centerline	4380	4420	-40
E	Front Bumper Thickness	160	160	0
F	Front Bumper Bottom to Ground	465	445	20
G	Sill Height at Front Wheel Well	435	450	-15
H	Sill Height at Front Door Leading Edge	438	460	-22
I	Sill Height at B-Pillar	445	510	-65
J1	Sill Height at Rear Wheel Well	450	565	-115
J2	Pinch Weld Height at Rear Wheel Well	240	297	-57
K	Sill Height Aft of Rear Wheel Well	428	510	-82
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	510	590	-80
N	Sill Height to Window Bottom Sill	800	830	-30
O	Front Door Leading Edge to Impact CL	735	725	10
P	Rear Door Trailing Edge to Impact CL	1292	1263	29
Q	Front Window Opening	430	430	0
R	Right Side Length	4300	4330	-30
S	Left Side Length	4300	4290	10
T	Vehicle Width	1830	1830	0
U	Front Wheel Track Width	1615	1615	0
V	Rear Wheel Track Width	1605	1605	0

**DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	417	60	750
2	Driver Hip Point	716	193	1650
3	Mid-Door	742	198	1650
4	Window Sill	1107	78	1650
5	Window Top	1626	6	1350

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: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021

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
-150	0	0	0	835	0	0	0	0	846	0	0	0	0	-11	0
0	0	936	932	848	0	0	931	927	857	0	0	5	5	-9	0
150	896	923	922	854	0	882	839	838	876	0	14	84	84	-22	0
300	899	921	922	861	0	856	822	823	888	0	43	99	99	-27	0
450	902	924	925	869	0	848	809	798	891	0	54	115	127	-22	0
600	904	926	927	876	0	846	781	773	890	0	58	145	154	-14	0
750	906	927	928	880	643	846	772	767	891	646	60	155	161	-11	-3
900	906	925	928	885	662	848	768	765	892	663	58	157	163	-7	-1
1050	904	921	926	887	668	846	777	786	890	668	58	144	140	-3	0
1200	903	917	925	886	670	854	781	780	852	667	49	136	145	34	3
1350	901	914	922	887	670	849	750	744	847	664	52	164	178	40	6
1500	898	910	919	886	669	848	730	730	834	664	50	180	189	52	5
1650	894	915	915	883	667	850	722	717	805	662	44	193	198	78	5
1800	889	921	921	878	662	857	758	752	823	657	32	163	169	55	5
1950	0	917	921	873	657	0	---1	---1	867	653	0	---1	---1	6	4
2100	0	0	0	867	652	0	0	0	885	647	0	0	0	-18	5
2250	0	0	0	860	645	0	0	0	851	643	0	0	0	9	2

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.

¹Missing points post-test

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

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

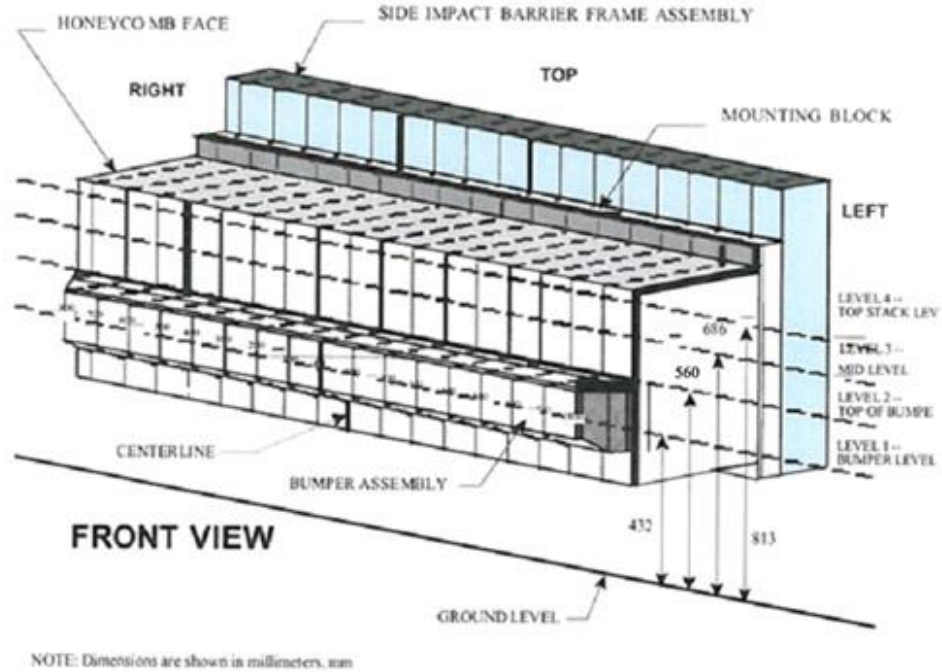
NHTSA No.: M20210203
Test Date: 2/19/2021



**DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS**

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	243
B	Top of Bumper	560	800	Left	152
C	Mid-Level	686	800	Left	136
D	Top of Stack	813	800	Left	155

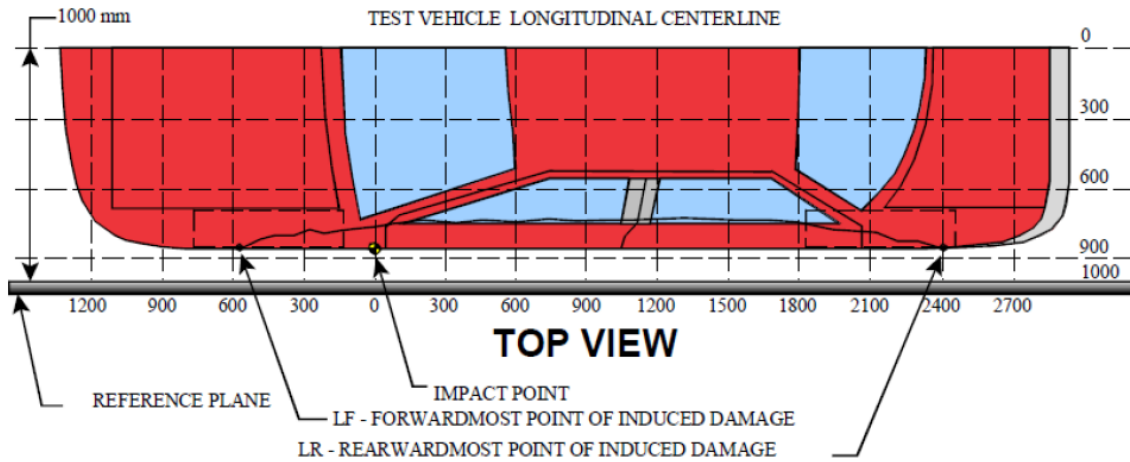
DEFORMABLE BARRIER STATIC CRUSH

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
1	243	241	232	225	221	218	215	213	209	204	200	198	195	192	193	201	210
2	146	147	143	137	137	132	127	123	120	114	111	106	104	101	102	116	152
3	62	48	46	47	54	79	67	55	40	39	37	37	42	57	82	106	136
4	55	35	34	42	61	93	97	101	71	66	69	69	79	89	98	125	155

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021



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	2250	4	851	860	9
2	1800	3	752	921	169
3	1350	3	744	922	178
4	900	3	765	928	163
5	450	3	798	925	127
6 ¹	0	2	931	936	0
		3	927	932	

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm Left of Center	1	261	471	210
2	500 mm Left of Center	1	294	486	192
3	200 mm Left of Center	1	286	486	200
4	200 mm Right of Center	1	271	486	215
5	500 mm Right of Center	1	262	487	225
6	800 mm Right of Center	1	230	473	243

¹ DPD 6 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

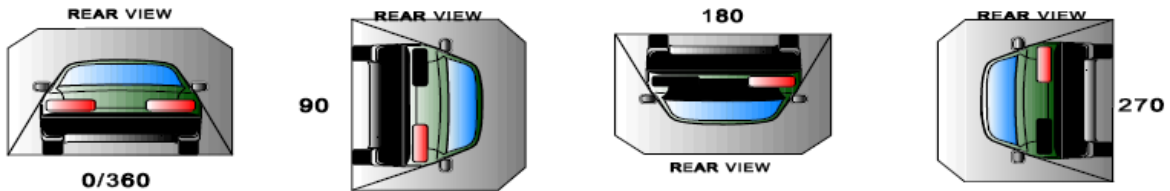
Test Vehicle: 2021 Ford Bronco Sport
 Test Program: SINCAP Side Impact

NHTSA No.: M20210203
 Test Date: 2/19/2021

Test Time: 17:17 **Temperature:** 21.2°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

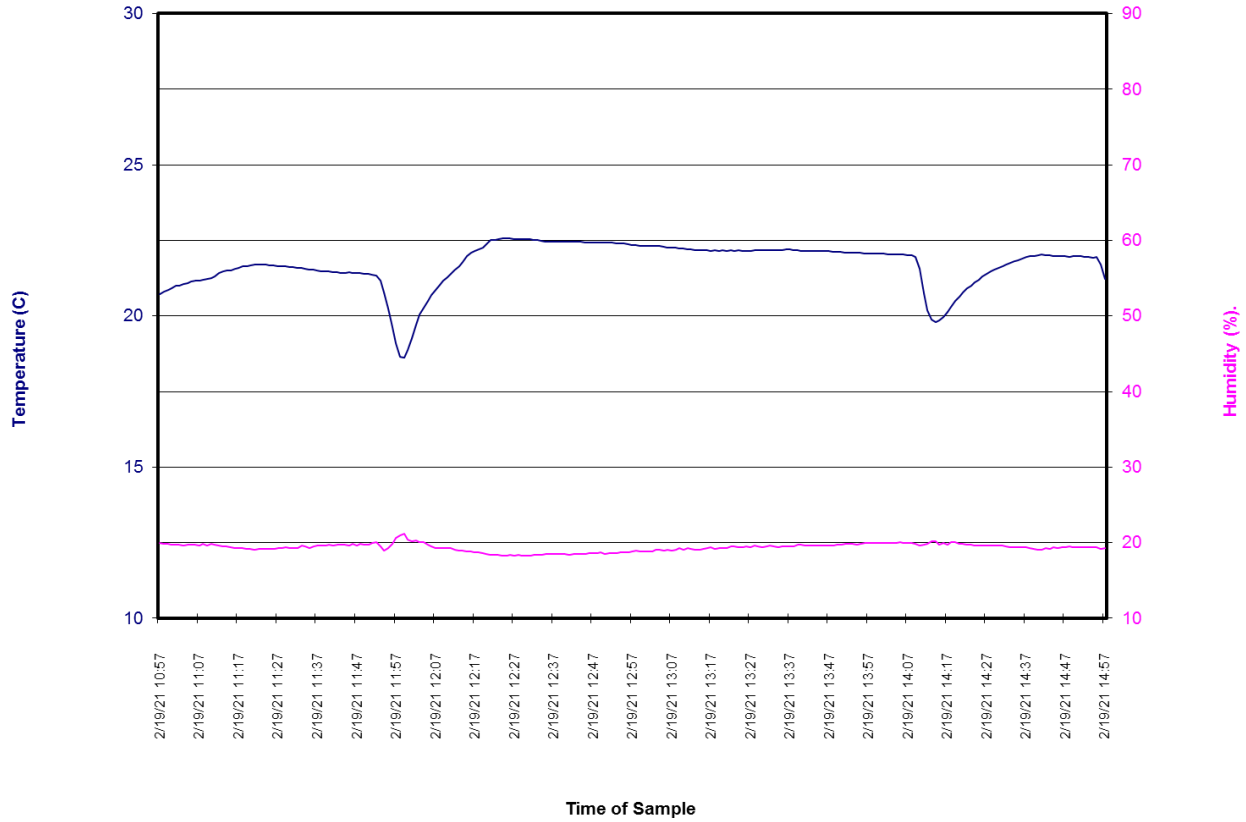
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

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

Test Vehicle: 2021 Ford Bronco Sport
Test Program: SINCAP Side Impact

NHTSA No.: M20210203
Test Date: 2/19/2021

M20210203 2021 Ford Bronco Left MDB Impact 210219: Test Time 14:57



**APPENDIX A
PHOTOGRAPHS**

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



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



003 Pre-Test Frontal View of Test Vehicle



004 Post-Test Frontal View of Test Vehicle



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



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



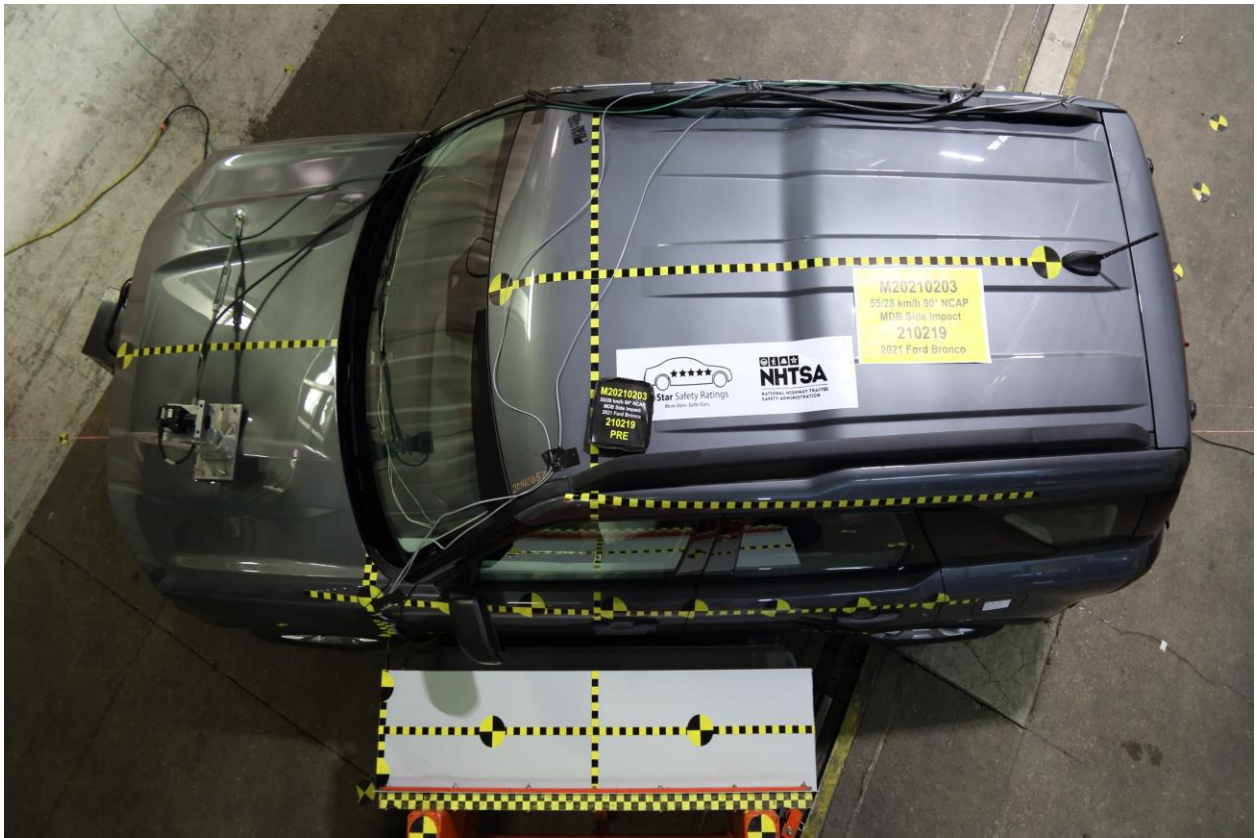
012 Post-Test Rear View of Test Vehicle



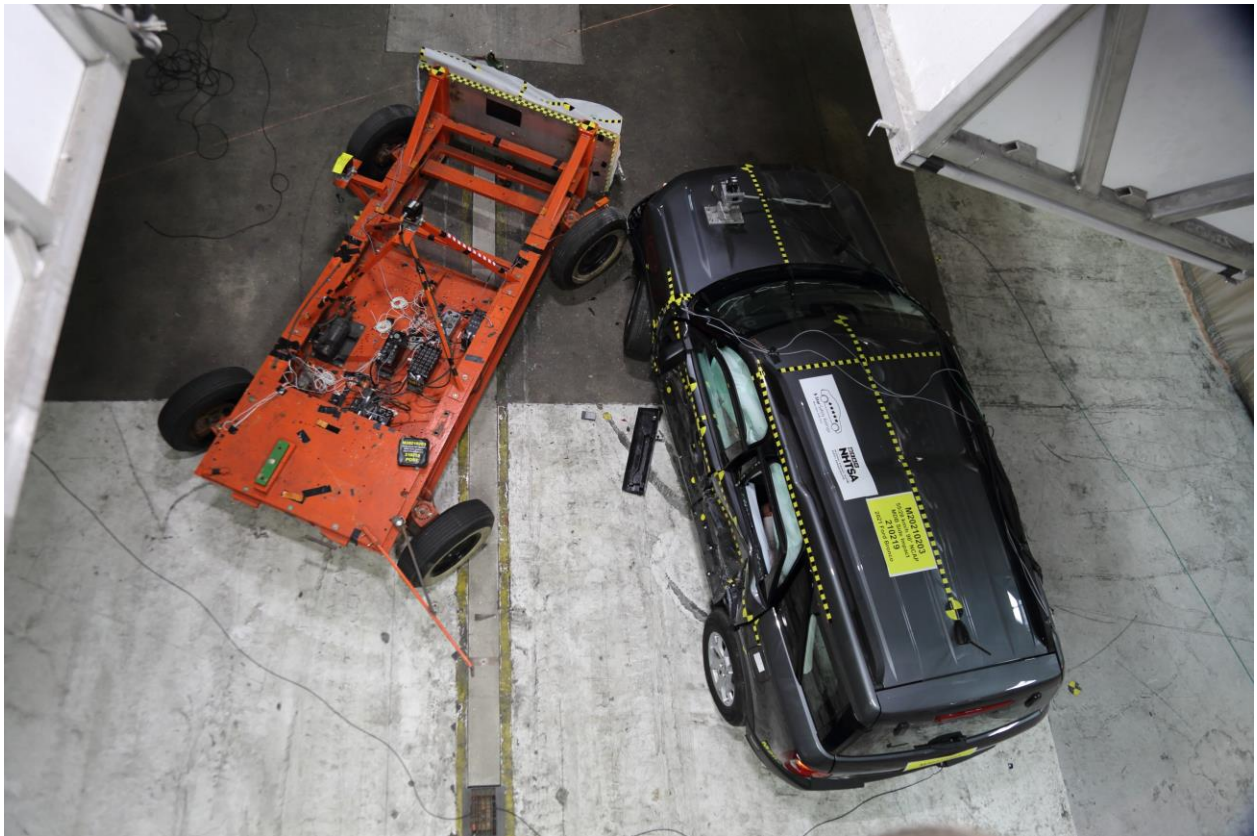
013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



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



021 Pre-Test Left Front Door Latch Close-Up



022 Post-Test Left Front Door Latch Close-Up



023 Pre-Test Left Rear Door Latch Close-Up



024 Post-Test Left Rear Door Latch Close-Up



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



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



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

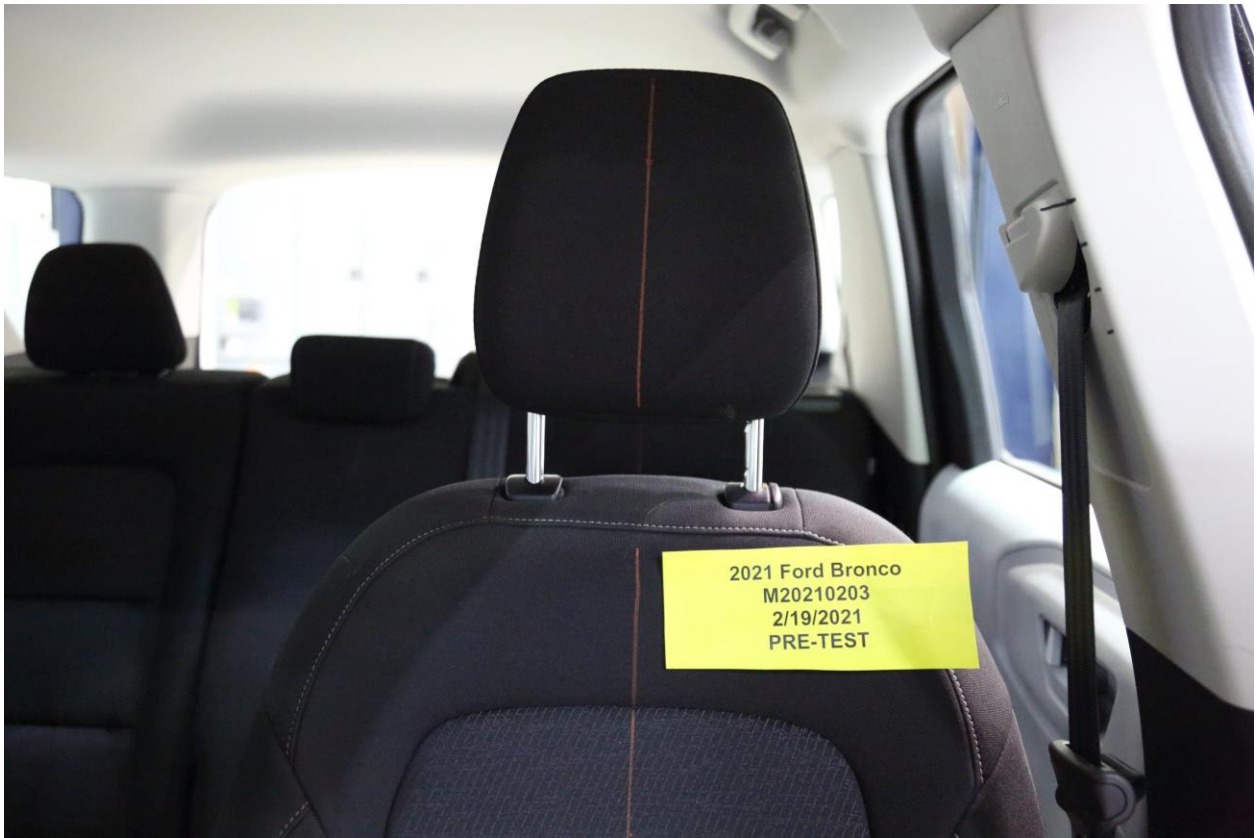
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028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



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



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



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



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



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



034 Pre-Test Placement of Driver's Dummy Feet



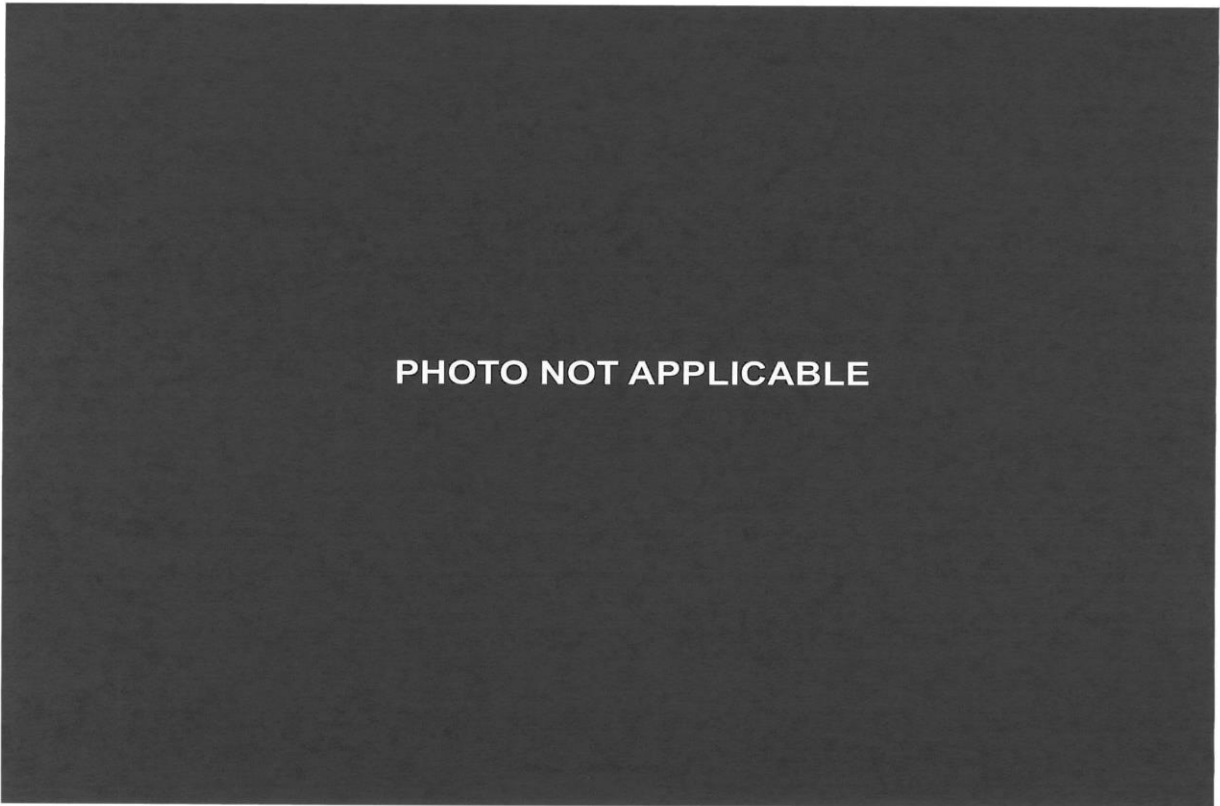
035 Pre-Test View of Belt Anchorage for Driver Dummy



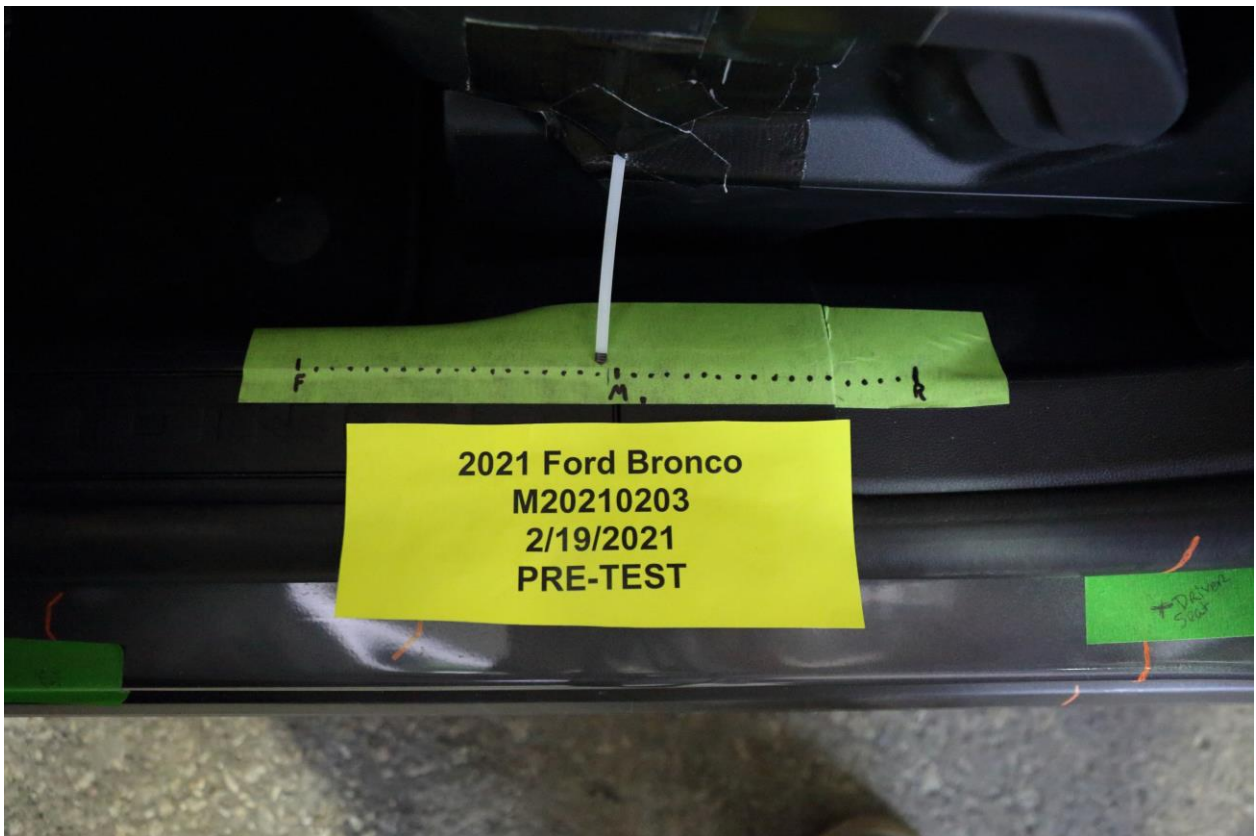
036 Pre-Test Left Side View of Steering Wheel



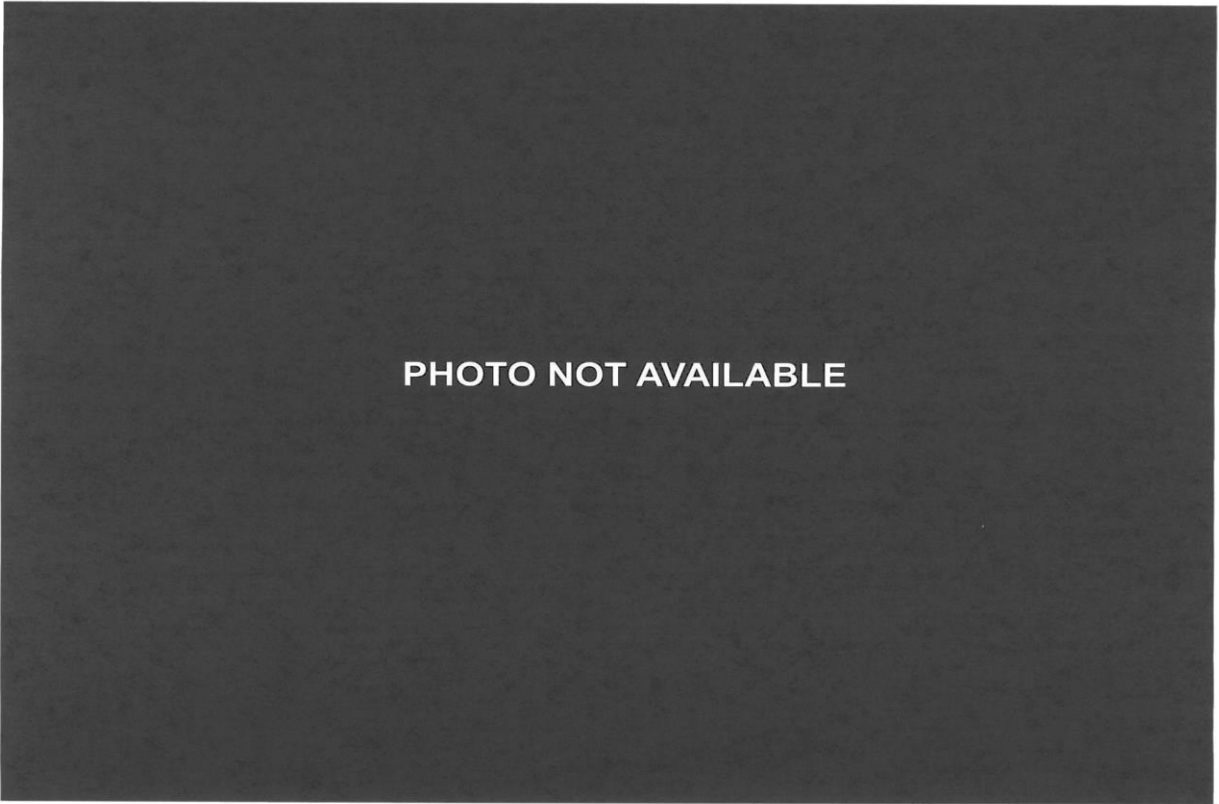
037 View of Disengaged Parking Brake



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



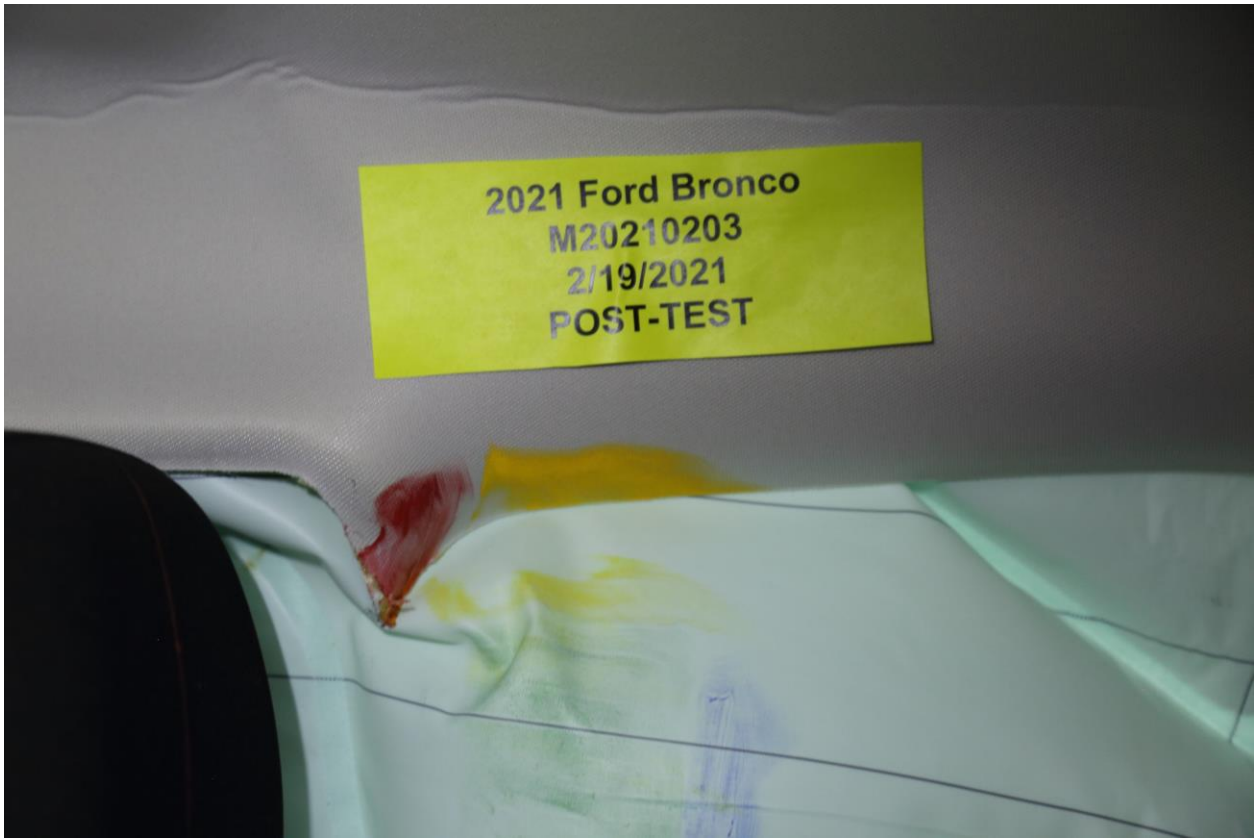
045 Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



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



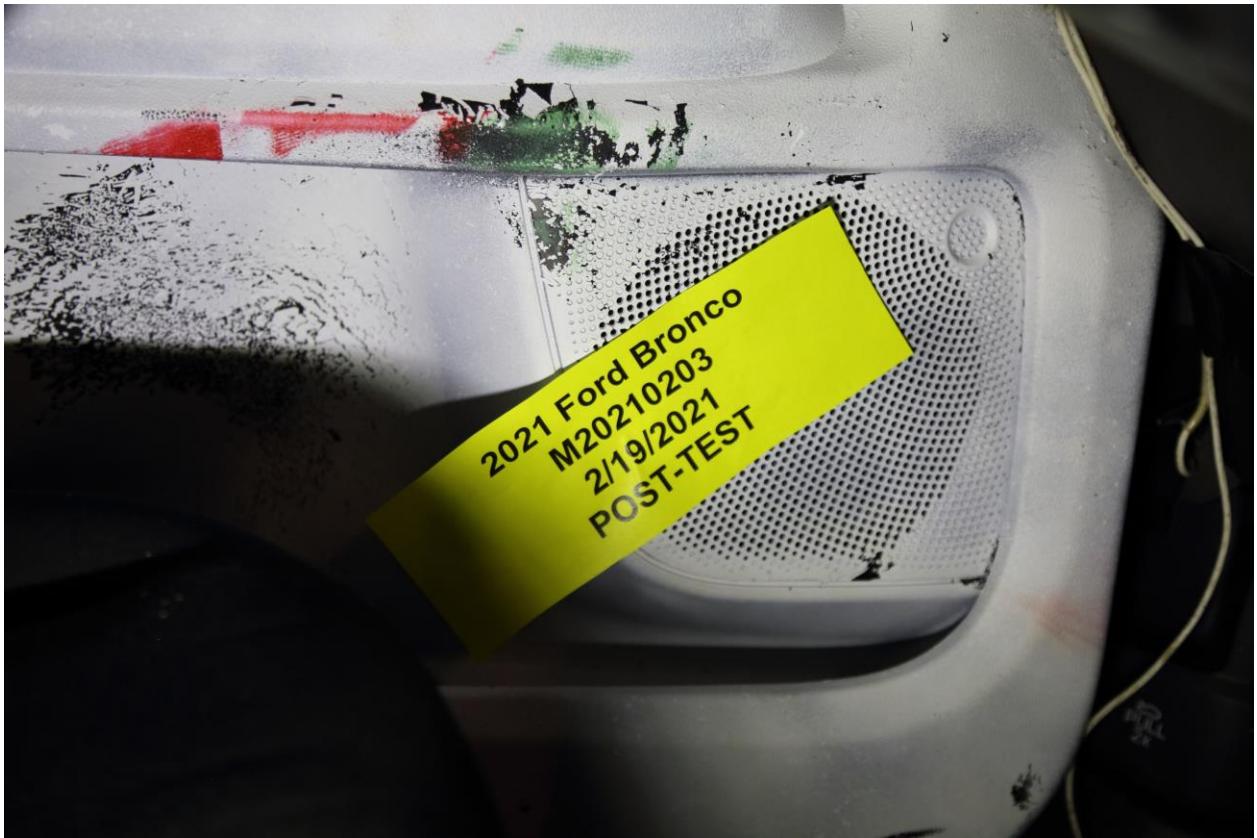
051 Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



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



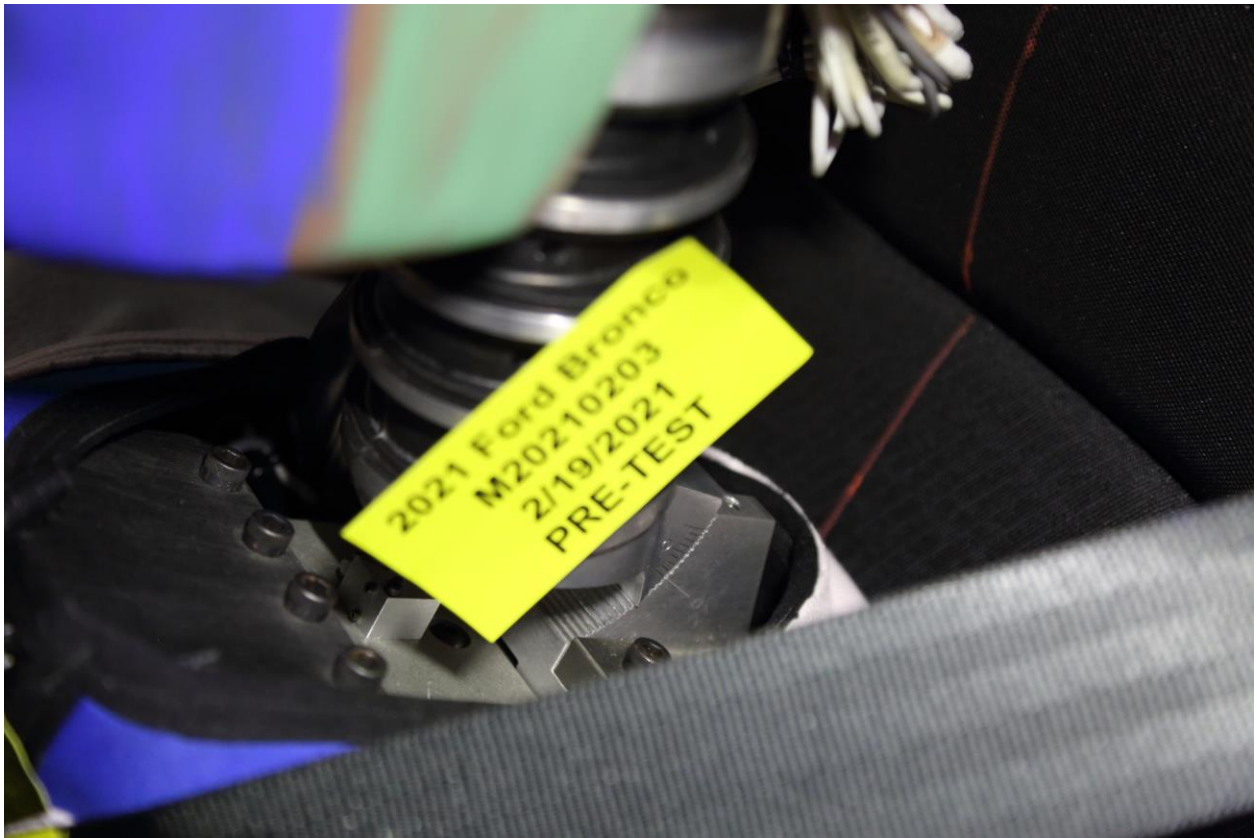
059 Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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



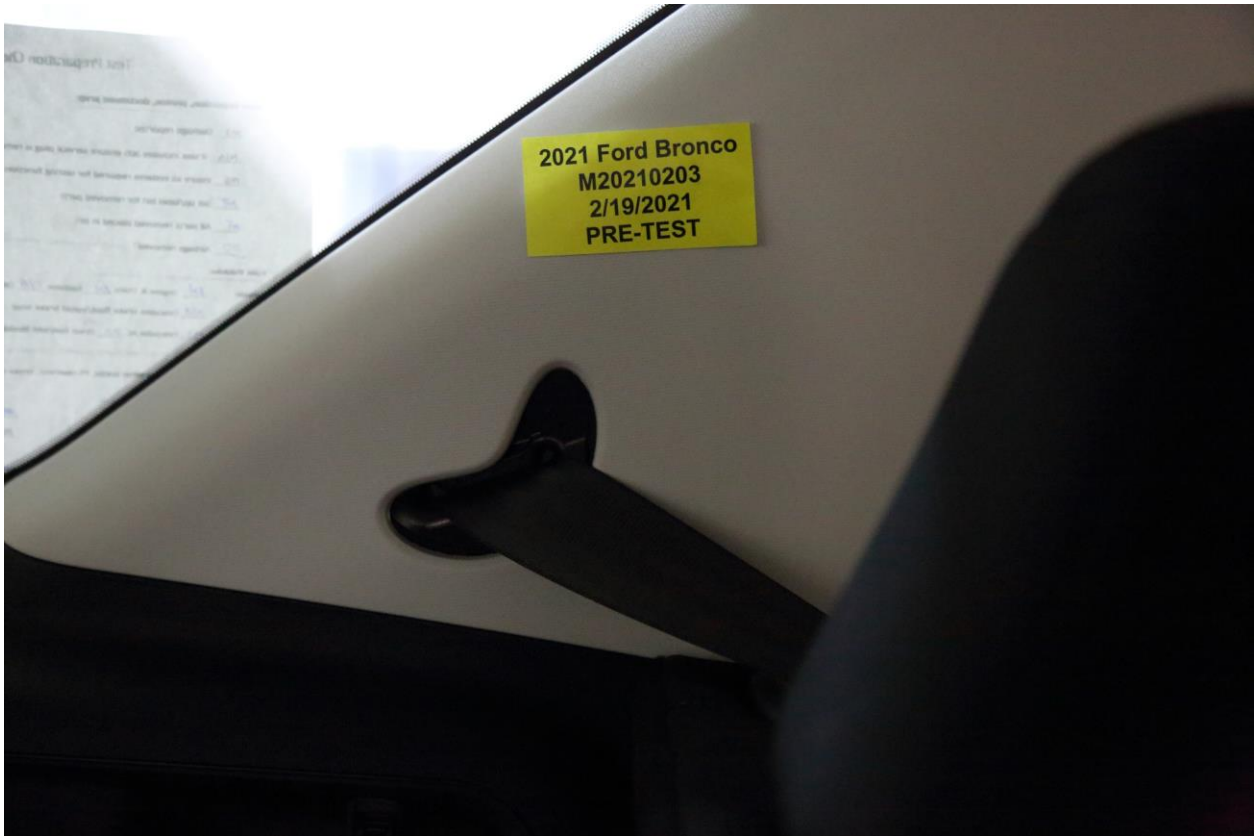
062 Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



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



PHOTO NOT APPLICABLE

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



PHOTO NOT APPLICABLE

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

PHOTO NOT APPLICABLE

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

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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



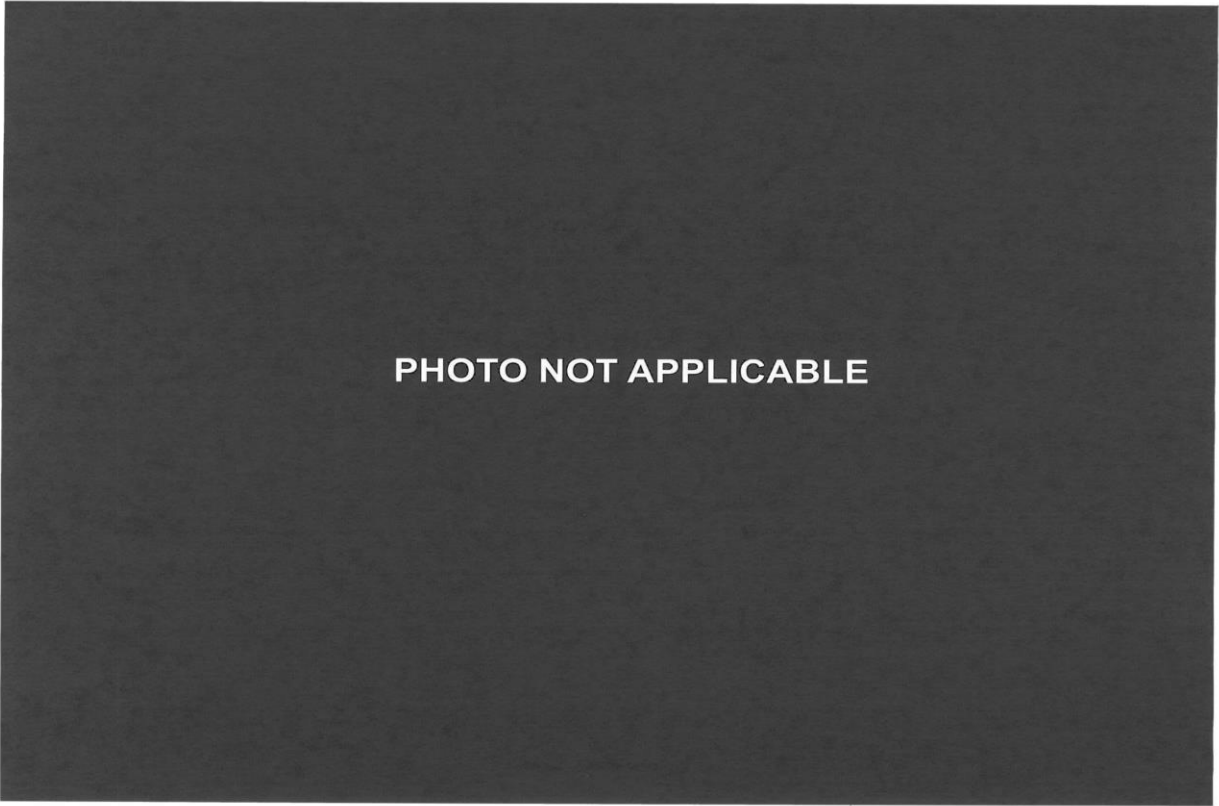
072 Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



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

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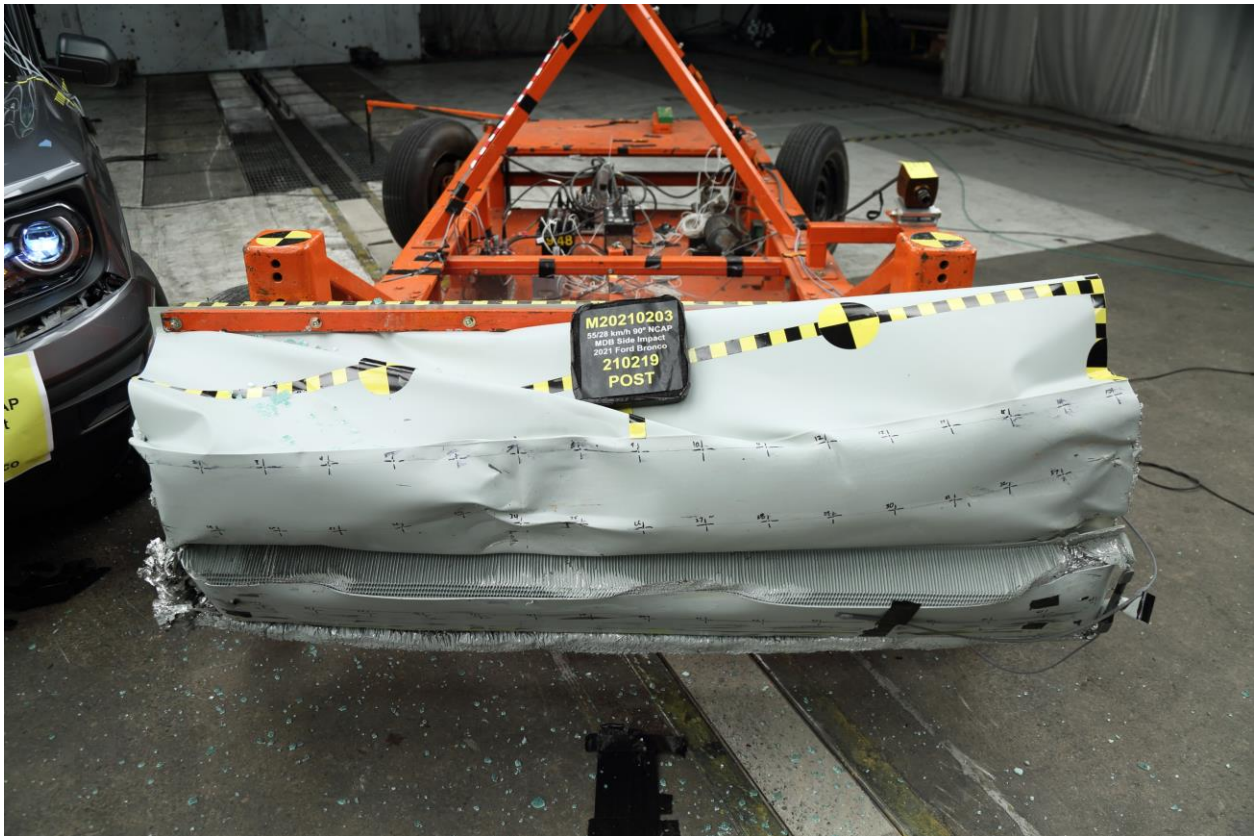
082 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



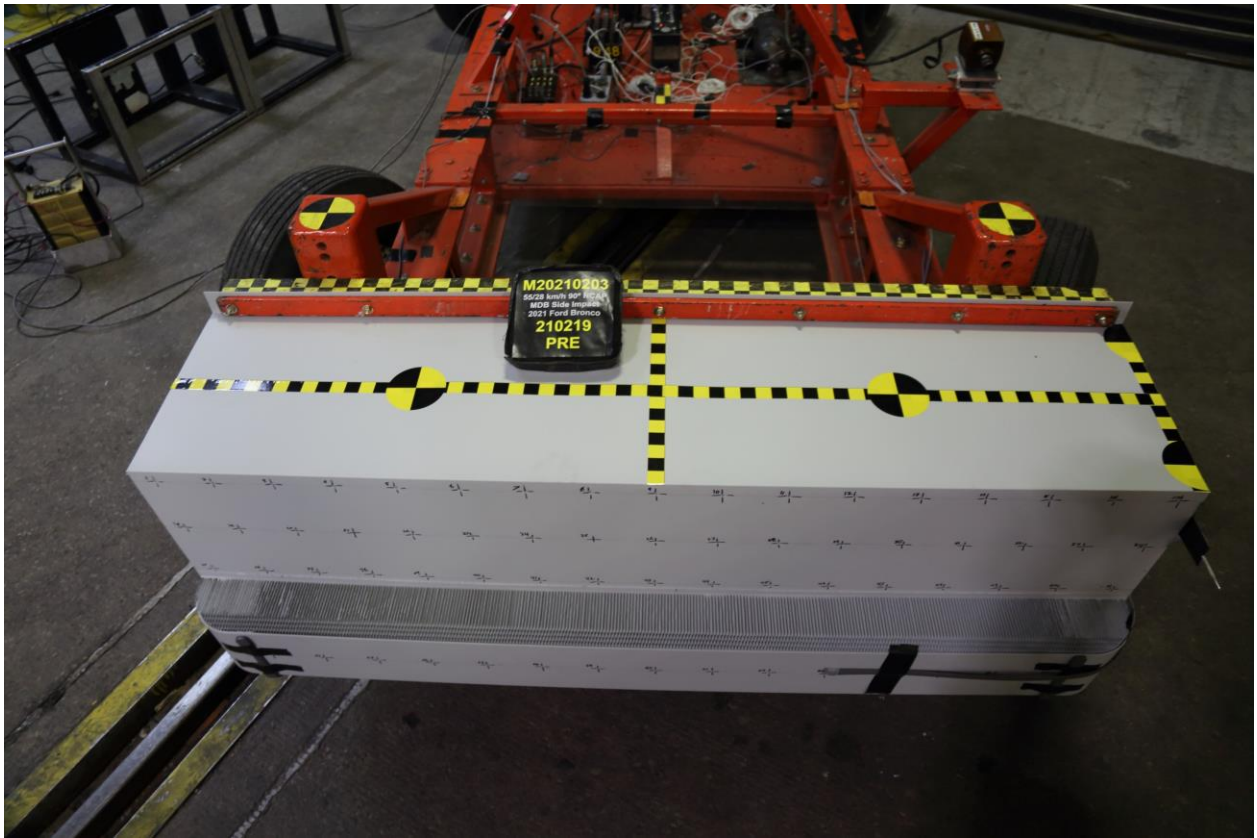
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



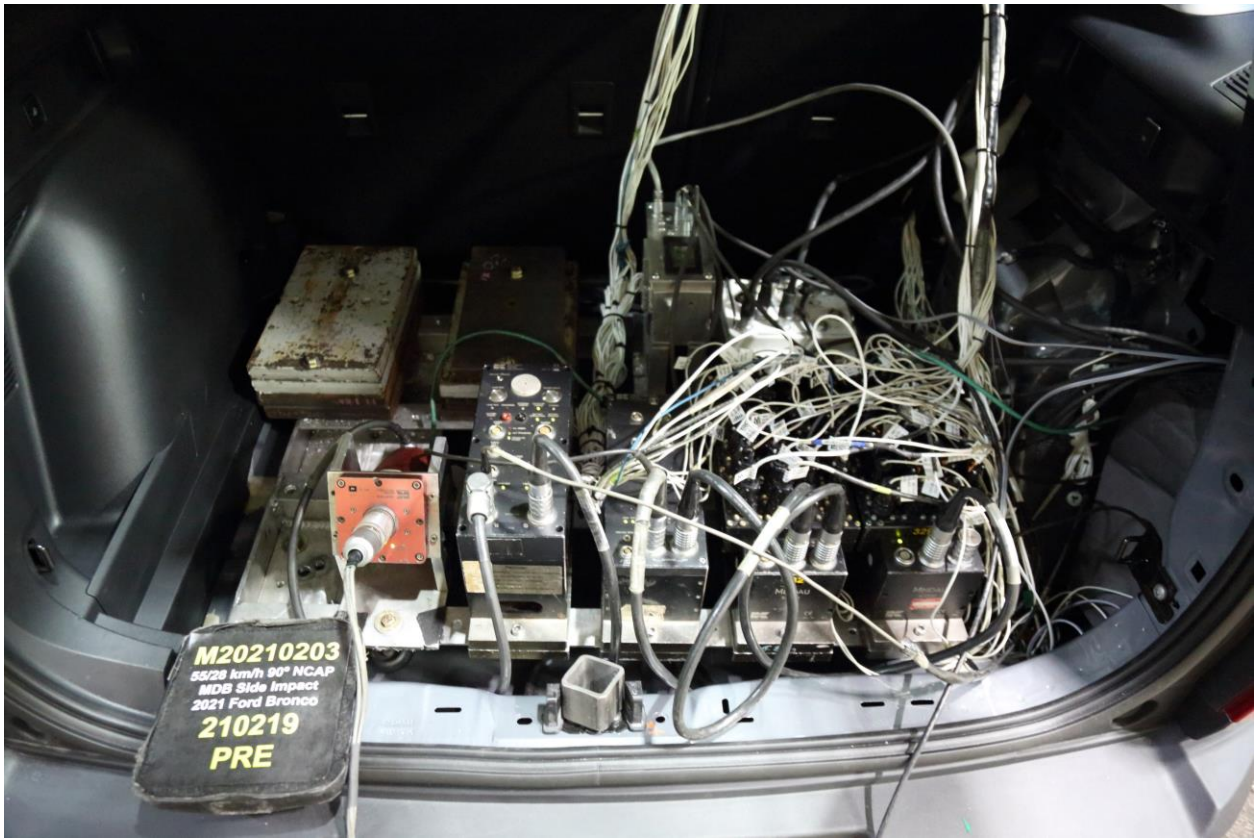
091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle's Certification Label



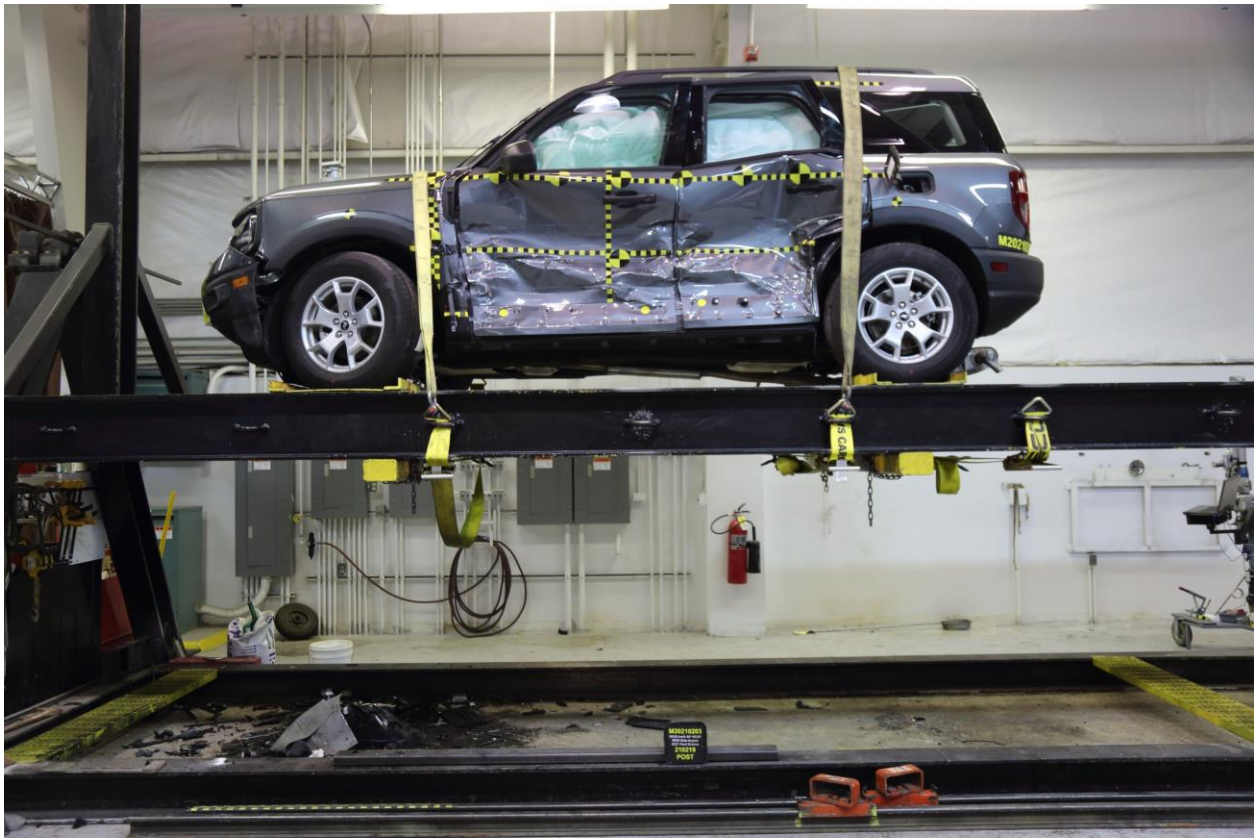
093 Close-Up View of Vehicle's Tire Information Placard or Label



094 Pre-Test Ballast View



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



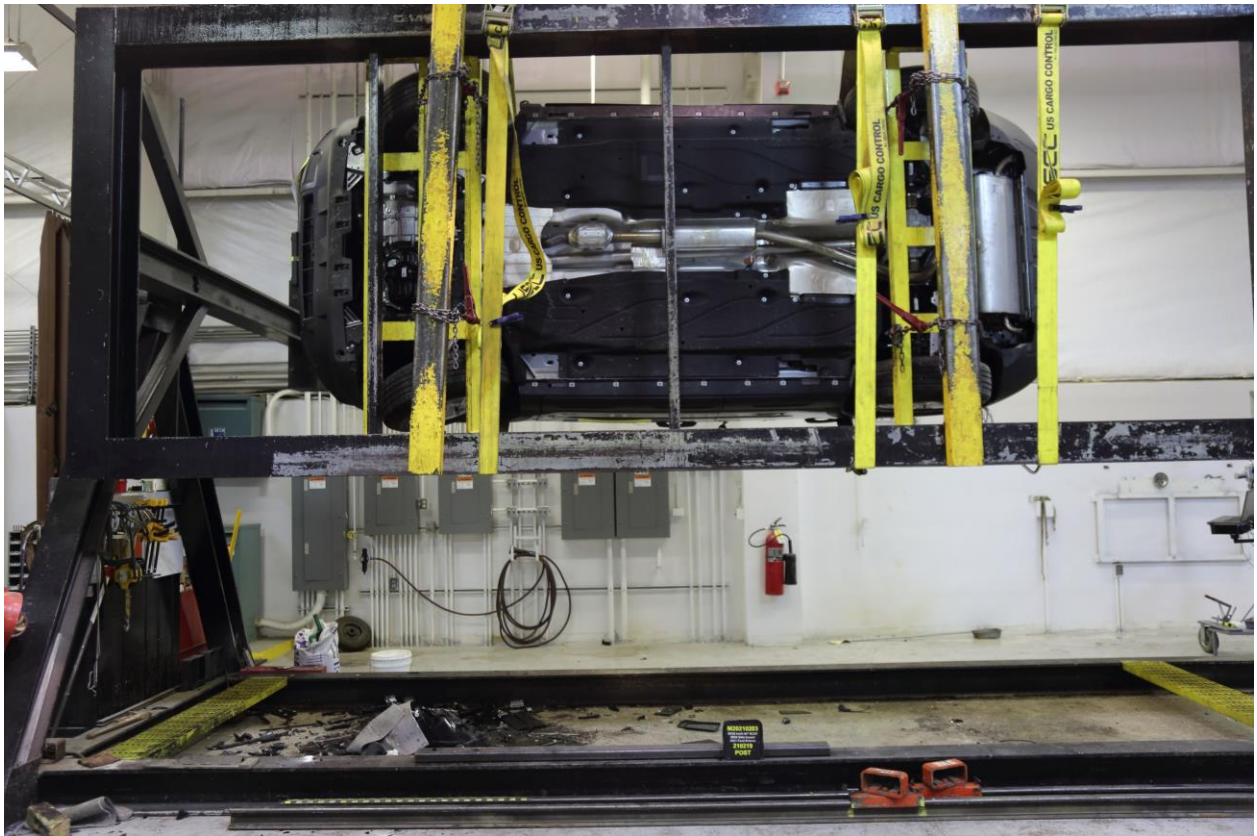
096 FMVSS No. 301 Static Rollover 0 Degrees



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 ford.com		VEHICLE DESCRIPTION BRONCO SPORT 2021 BASE 3X4 5-PASSENGER 1.5L ECOBOOST ENGINE 8-SPD AUTO TRANSMISSION		MR A16290 EXTERIOR CARBONIZED GRAY METALLIC INTERIOR EBONY BLACK CLOTH		EPA DOT Fuel Economy and Environment Gasoline Vehicle	
STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE						Fuel Economy 26 MPG combined city/hwy 25 city 28 highway 3.8 gallons per 100 miles Small SUVs range from 16 to 120 MPG. The best vehicle rates 141 MPG.	
EXTERIOR • ACTIVE GRILLE SHUTTERS • DOOR HANDLES - BLACK • EASY FUEL CAPLESS FILLER • GRILL-CAMB BLK - "BRONCO" BLK • HEADLAMPS - AUTO HIGH BEAM • HEADLAMPS-LED • LIFTGATE W/ LIFTGLASS • MIRRORS - POWER GLASS/ MANUAL FOLD • REAR W/ WIPER/WASH/OFFSET • ROOF-RACK SIDE RAILS-BLACK • TAILLAMPS-LED		INTERIOR • 1 TOUCH DOWN DRIVER WINDOW • 60/40 SPLIT FOLD REAR SEAT • CARGO CARABINER HOOKS • CLOTH BUCKET FRONT SEATS • DUAL VISION VANITY MIRRORS • FLOOD LIGHT ADJ LIFTGATE • ILLUMINATED ENTRY SYSTEM • MANUAL A/C, SINGLE ZONE • MANUAL DRY SEAT - 6-WAY • MANUAL PASS SEAT - 4-WAY • POWERPOINTS - 12V • SMART CHARGING USB PORTS • STEERING-TILT/TELESCOPE, CRUISE & AUDIO CONTROLS		FUNCTIONAL • AM/FM STEREO W/6 SPEAKERS • AUTO START STOP TECH • BRAKES, 4-WHEEL DISC/CABS • FORD CO-PILOT360™ • FORDPASS™ CONNECT 4G-WI-FI HOTSPOT TELEMATICS MODEM • HILL START ASSIST • MYKEY • POWER STEERING W/EPAS • REAR VIEW CAMERA • REMOTE KEYLESS ENTRY • SYNC®3 8" SCRIN W/APP/LINKS • TERRAIN MANAGEMENT SYS-5 • WIRING PRE-PACK		SAFETY/SECURITY • ADVANCEDTRAC® WITH RSC® • AIRBAG - DRIVER/PASS KNEE • AIRBAGS - DUAL STAGE FRONT • AIRBAGS - SAFETY CANOPY® • FET PASS SENSING SYSTEM • INDY TIRE PRESS MONIT SYS • LATCH CHILD SAFETY SYSTEM • PERIMETER ALARM • SECURLOCK® ANTI-THEFT SYS • SIDE AIRBAGS • SOS POST-CRASH ALERT SYS™ WARRANTY • 3YR/36,000 BUMPER / BUMPER • 5YR/60,000 POWERTRAIN • 5YR/60,000 ROADSIDE ASSIST	
INCLUDED ON THIS VEHICLE (MSRP) OPTIONAL EQUIPMENT/OTHER EQUIPMENT GROUP 100A 50 STATE EMISSIONS SUPPLEMENTAL PTC HEATER FRONT LICENSE PLATE BRACKET		NO CHARGE NO CHARGE NO CHARGE		PRICE INFORMATION BASE PRICE \$26,660.00 TOTAL OPTIONS/OTHER \$1,496.00 TOTAL VEHICLE & OPTIONS/OTHER DESTINATION & DELIVERY \$28,156.00		Annual fuel Cost \$1,550 Fuel Economy & Greenhouse Gas Rating (passenger only) Smog Rating (passenger only) 1 5 10 1 7 10 Best	
SOLD TO Dovi Motors, Inc. P.O. BOX 9395 Cortland NY 13045		RAMP ONE 13V 487 RA43		FINAL ASSEMBLY PLANT HERMOSILLO		TOTAL MSRP \$28,155.00	
SHP 101 OF OTHER PAGES SOLD TO Dovi Motors, Inc. 13 487 Cortland NY 13045		RAMP TWO		RAIL ITEM #: 13-1003 OIT 2		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 .	
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.		LM021 N RB 2X 120 007511 12 02 20		3FMC9B86MRA16290 		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.P3GWarnings.ca.gov/passenger-vehicle .	

102 Monroney Label

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.

WARNING: adjust the head restraints for all passengers before you drive your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraints when your vehicle is moving.

The head restraints consists of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and unlock button.

Rear Seat Center Head Restraint

The head restraint consists of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and unlock button.

Front Seat Head Restraints

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.

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 Restraints

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold button C.
3. Pull the head restraint up.

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.

WARNING: Adjust the head restraints for all passengers before you drive your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraints when your vehicle is moving.

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.

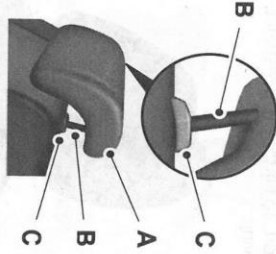
Front Seat Head Restraints



The head restraints consists of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and unlock button.

Rear Seat Center Head Restraint



E:187325

The head restraint consists of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and unlock button.

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 Restraints

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold button C.
3. Pull the head restraint up.

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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

The following additional data can be obtained from the Research and Development section of the NHTSA website (www.nhtsa.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

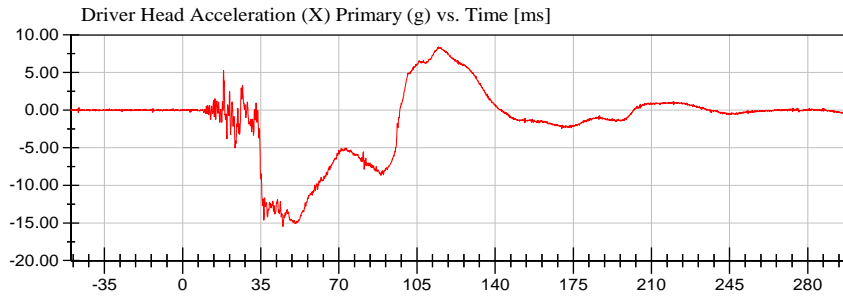
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

NHTSA

Test Lab: CTF
Test Number: 210219 (M20210203)

Test Date: 02/19/2021

Position #1 ES-2 Dummy with Rib Extension (F030)
Position #4 SID IIs Dummy (DQ0570)



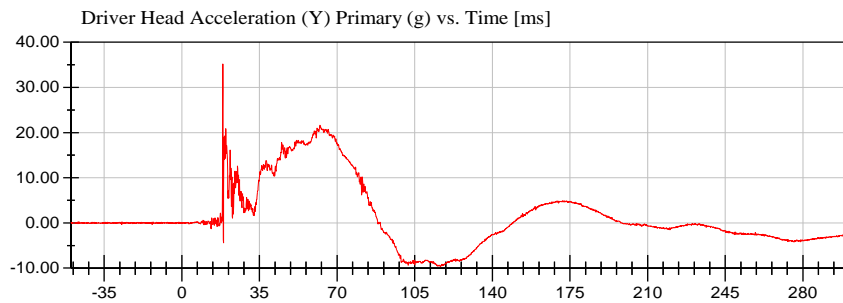
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CFC_1000



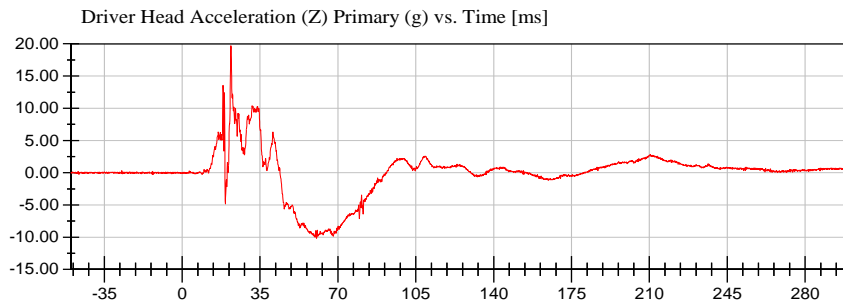
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35.18 g at 18.48 ms

<Min>

-9.66 g at 116.56 ms

CFC_1000



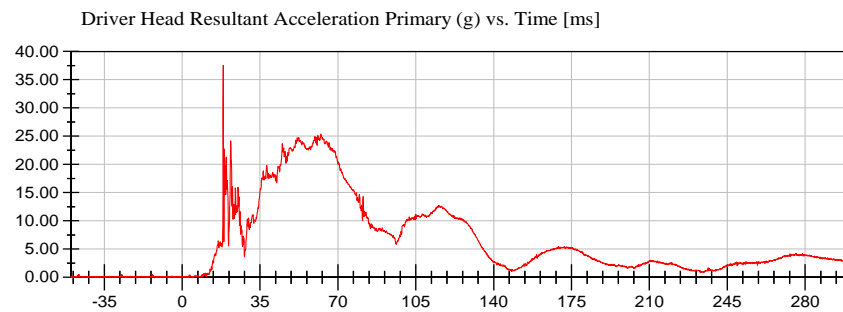
<Max>

19.71 g at 21.92 ms

<Min>

-10.17 g at 60.40 ms

CFC_1000



<Max>

37.53 g at 18.48 ms

<Min>

0.03 g at -49.76 ms

CFC_1000

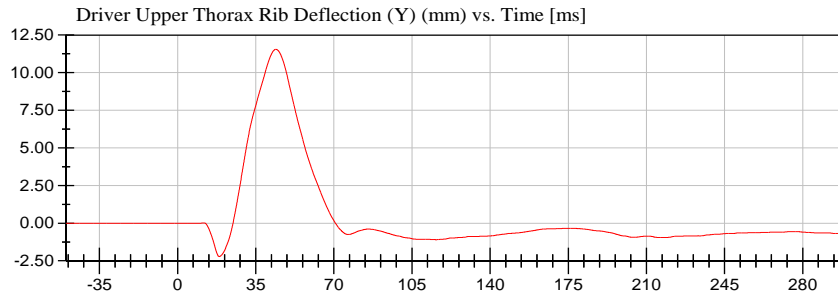


NHTSA

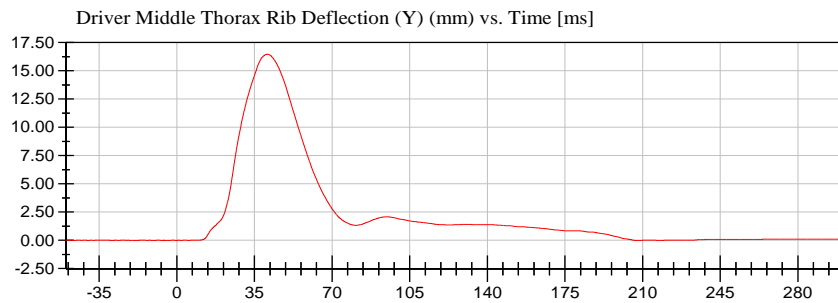
Test Lab: CTF
Test Number: 210219 (M20210203)

Position #1 ES-2 Dummy with Rib Extension (F030)
Position #4 SID IIs Dummy (DQ0570)

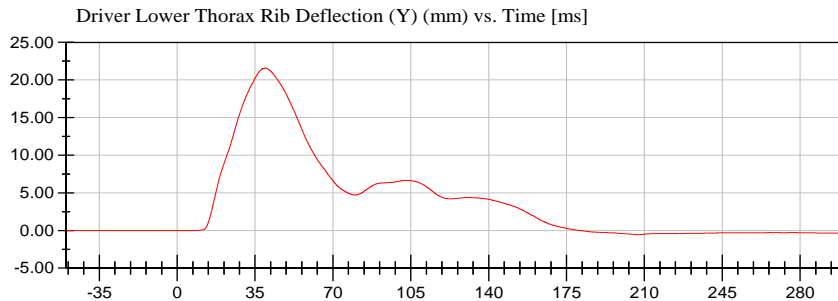
Test Date: 02/19/2021



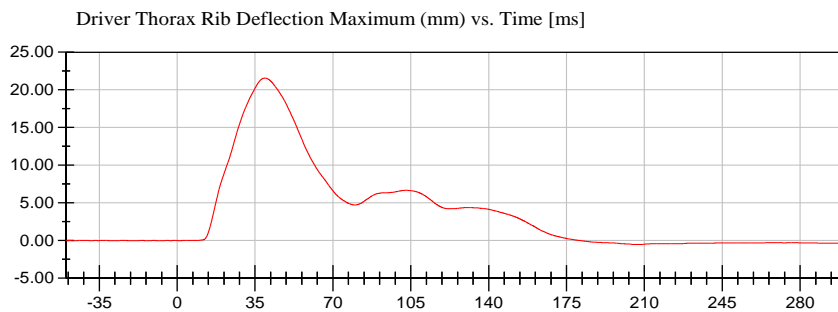
<Max>
11.55 mm at 44.08 ms
<Min>
-2.22 mm at 18.72 ms
CFC_180



<Max>
16.47 mm at 40.80 ms
<Min>
-0.01 mm at 208.24 ms
CFC_180



<Max>
21.56 mm at 39.44 ms
<Min>
-0.54 mm at 207.36 ms
CFC_180



<Max>
21.56 mm at 39.44 ms
<Min>
-0.54 mm at 207.36 ms
CFC_180

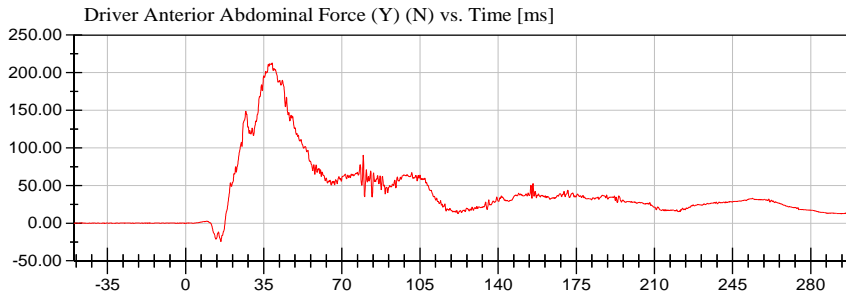


NHTSA

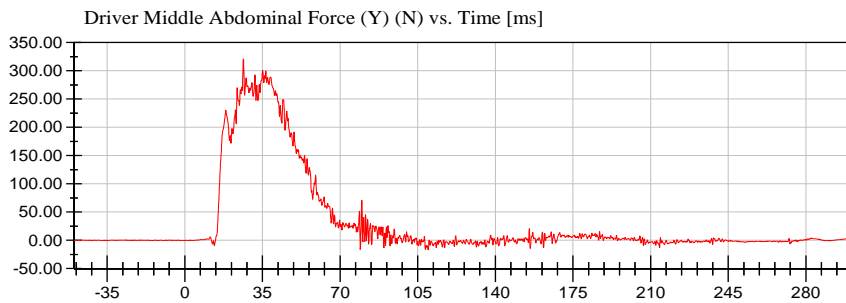
Test Lab: CTF
Test Number: 210219 (M20210203)

Test Date: 02/19/2021

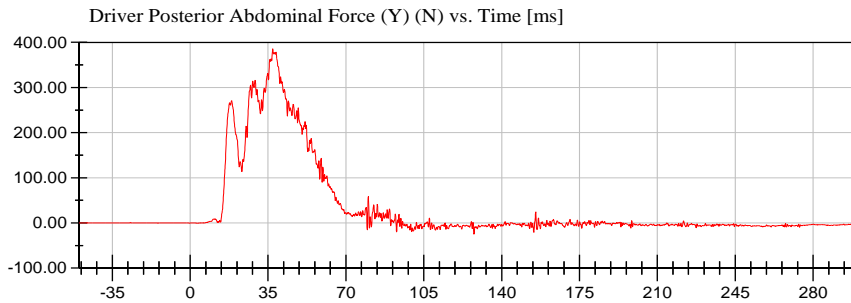
Position #1 ES-2 Dummy with Rib Extension (F030)
Position #4 SID IIs Dummy (DQ0570)



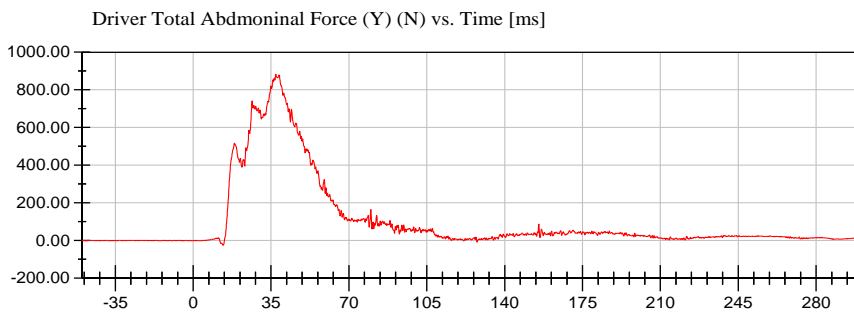
<Max>
212.97 N at 38.72 ms
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-24.50 N at 15.84 ms
CFC_600



<Max>
320.96 N at 26.40 ms
<Min>
-16.94 N at 109.68 ms
CFC_600



<Max>
385.48 N at 37.12 ms
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-24.55 N at 127.52 ms
CFC_600



<Max>
882.45 N at 37.12 ms
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-24.33 N at 13.44 ms
CFC_600



NHTSA

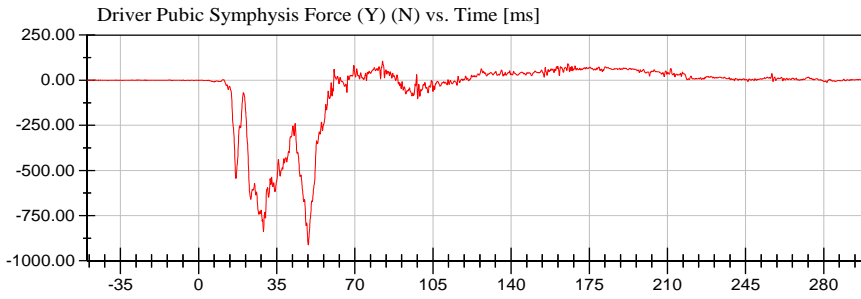
Test Lab: CTF

Test Number: 210219 (M20210203)

Test Date: 02/19/2021

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

Position #4 SID IIs Dummy (DQ0570)



<Max>

104.99 N at 82.40 ms

<Min>

-912.49 N at 49.12 ms

CFC_600

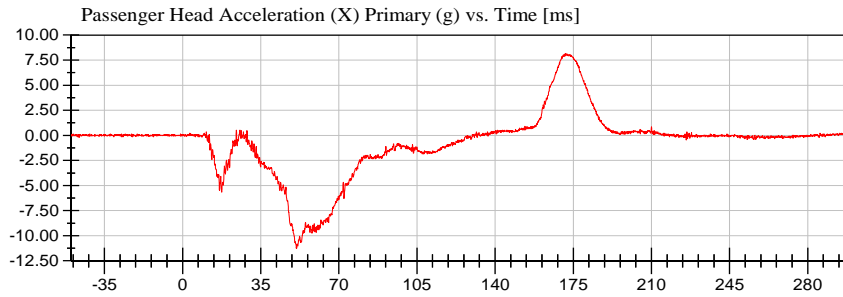


NHTSA

Test Lab: CTF
Test Number: 210219 (M20210203)

Position #1 ES-2 Dummy with Rib Extension (F030)
Position #4 SID IIs Dummy (DQ0570)

Test Date: 02/19/2021



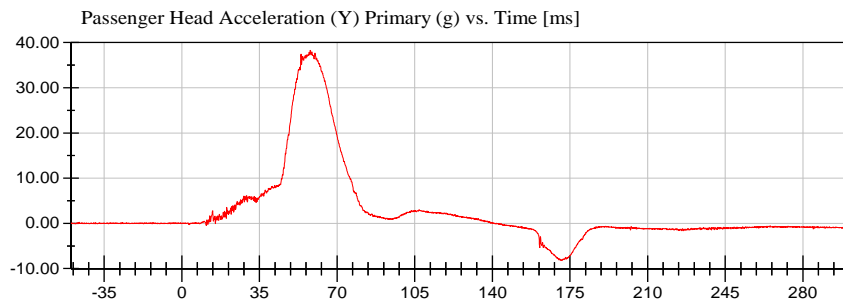
<Max>

8.17 g at 171.60 ms

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-11.24 g at 50.96 ms

CFC_1000



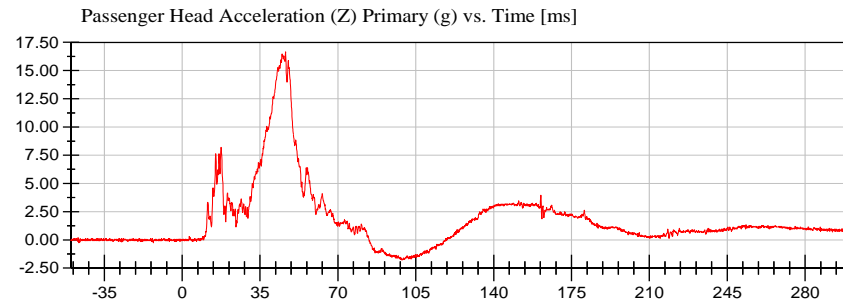
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38.27 g at 57.92 ms

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-8.17 g at 170.72 ms

CFC_1000



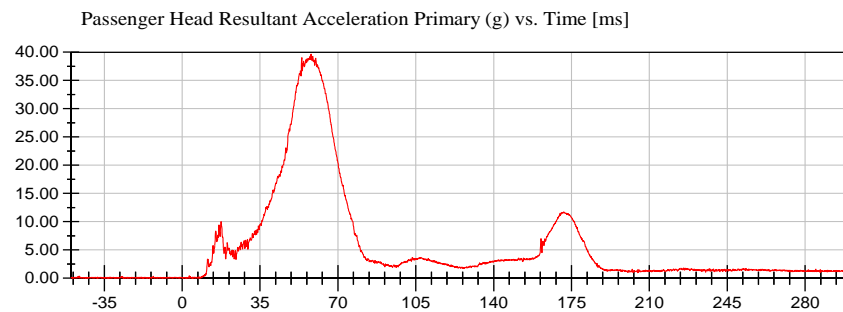
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16.66 g at 46.48 ms

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-1.80 g at 98.72 ms

CFC_1000



<Max>

39.67 g at 57.92 ms

<Min>

0.03 g at -49.44 ms

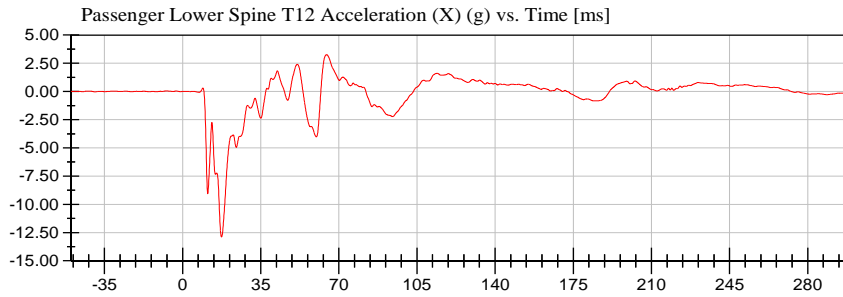
CFC_1000



NHTSA

Test Lab: CTF
Test Number: 210219 (M20210203)

Test Date: 02/19/2021
Position #1 ES-2 Dummy with Rib Extension (F030)
Position #4 SID IIs Dummy (DQ0570)



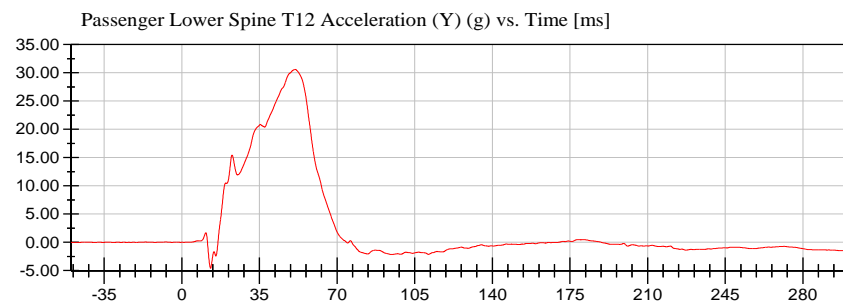
<Max>

3.25 g at 64.56 ms

<Min>

-12.89 g at 17.44 ms

CFC_180



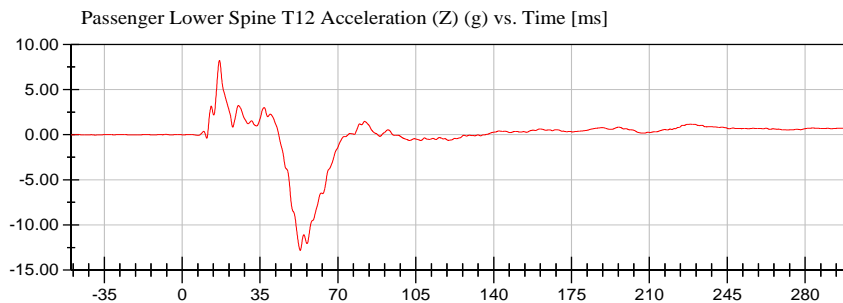
<Max>

30.59 g at 51.04 ms

<Min>

-4.58 g at 12.96 ms

CFC_180



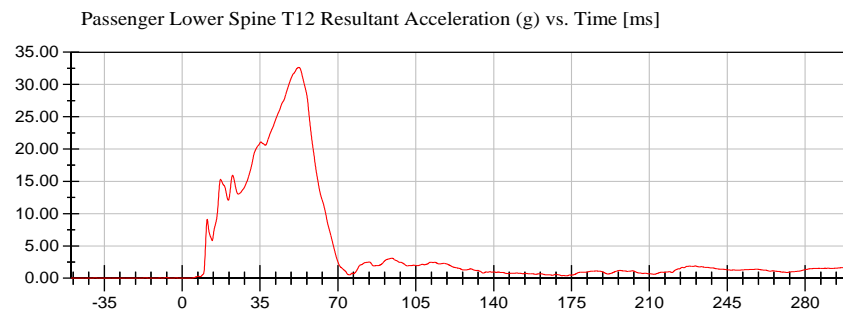
<Max>

8.22 g at 16.80 ms

<Min>

-12.81 g at 53.04 ms

CFC_180



<Max>

32.64 g at 52.40 ms

<Min>

0.00 g at -0.32 ms

CFC_180

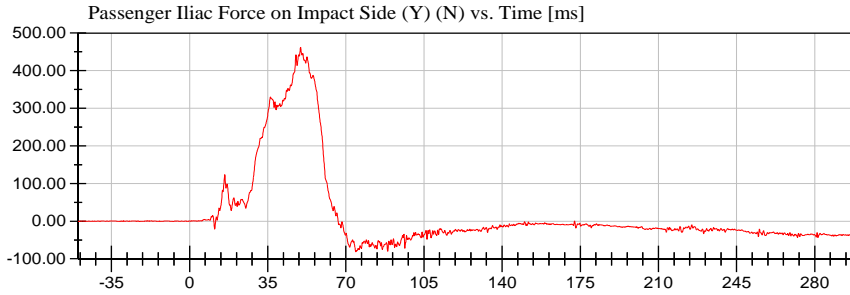


NHTSA

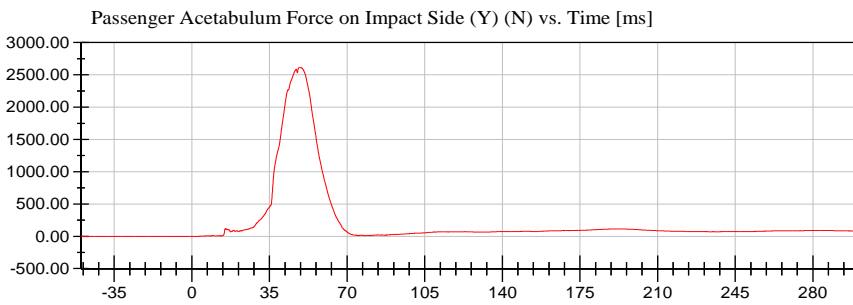
Test Lab: CTF
Test Number: 210219 (M20210203)

Position #1 ES-2 Dummy with Rib Extension (F030)
Position #4 SID IIs Dummy (DQ0570)

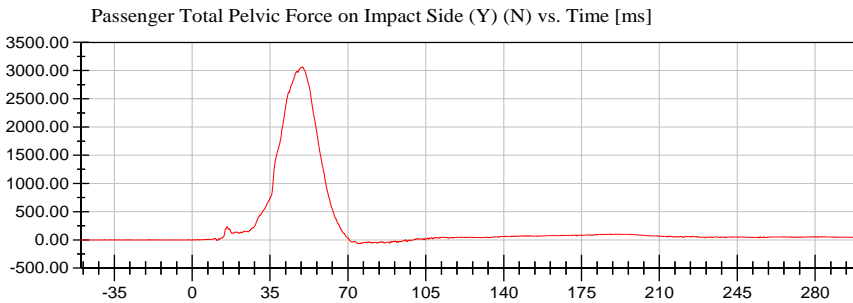
Test Date: 02/19/2021



<Max>
461.52 N at 49.76 ms
<Min>
-81.28 N at 74.48 ms
CFC_600



<Max>
2,613.15 N at 48.80 ms
<Min>
-0.73 N at -24.96 ms
CFC_600



<Max>
3,063.34 N at 49.60 ms
<Min>
-66.23 N at 75.04 ms
CFC_600



APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3 Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax – Upper Rib Drop Test

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

Table 6. Thorax – Middle Rib Drop Test

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

Table 7. Thorax – Lower Rib Drop Test

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

Table 8. Thorax – Full Body Impact Test

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

Table 9. Abdomen Impact Test

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

Table 10. Lumbar Spine Flexion Test

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

Table 11. Pelvis Impact Test

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

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3. Lateral Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax (With Arm) Impact Test

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

Table 6. Thorax (Without Arm) Impact Test

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

Table 7. Abdomen Impact Test

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

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

Table 9. Pelvis Acetabulum Impact Test

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

Table 10. Pelvis Iliac Impact Test

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

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 75

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	443	Yes
6	Head Width	152.0 - 158.0	154	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	279	Yes
10	Pelvis Lap Width	359.0 - 373.0	366	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



Report Number: F030_ERF75

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Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Resultant Acceleration	125 - 155 g	132.2 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.1 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	4.43 %	Yes

Test meets specifications.

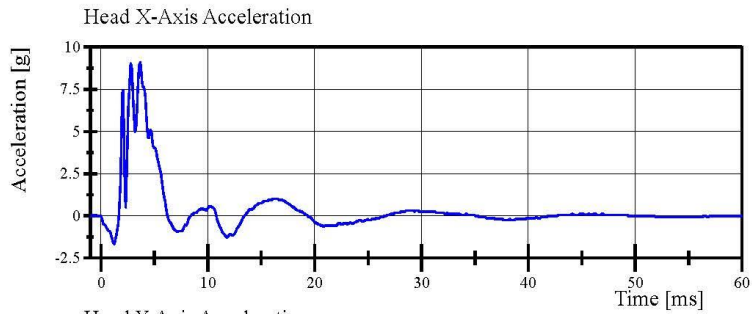
Condition: Used

Comments:

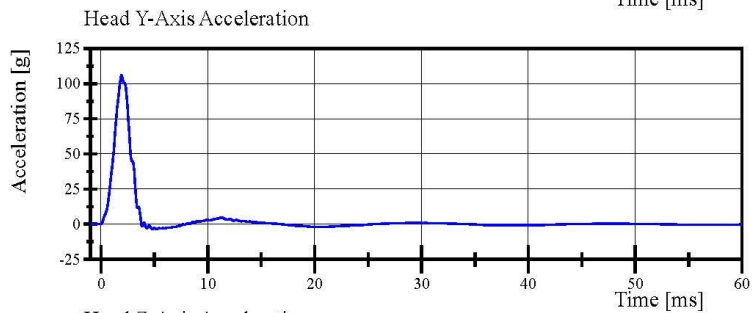
Head Skin S/N: DP6812

Transportation Research Center Inc.

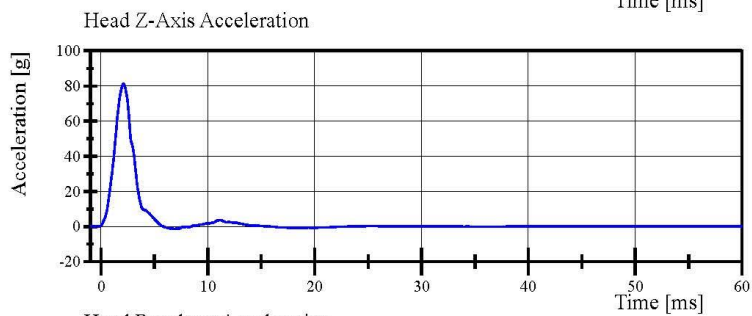
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



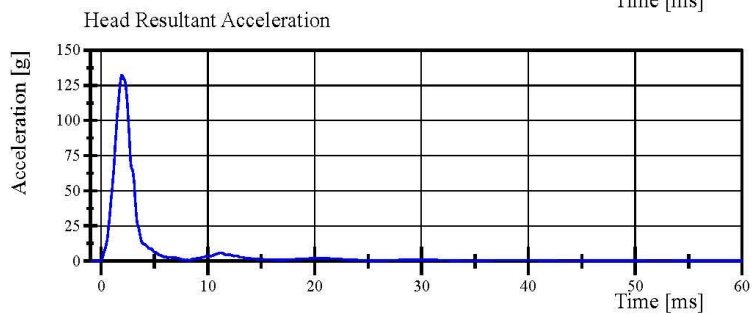
Filter Class: CFC_1000
Max: 9.1 g at 3.7 ms
Min: -1.7 g at 1.2 ms



Filter Class: CFC_1000
Max: 106.2 g at 1.9 ms
Min: -3.6 g at 4.8 ms



Filter Class: CFC_1000
Max: 81.4 g at 2.1 ms
Min: -1.3 g at 6.8 ms



Filter Class: CFC_1000
Max: 132.2 g at 1.9 ms
Min: 0.0 g at -1.0 ms

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 75-2
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-49.8 deg	Yes
Time of Peak	54 - 66 ms	58.6 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	58.1 ms	Yes

Test meets specifications.

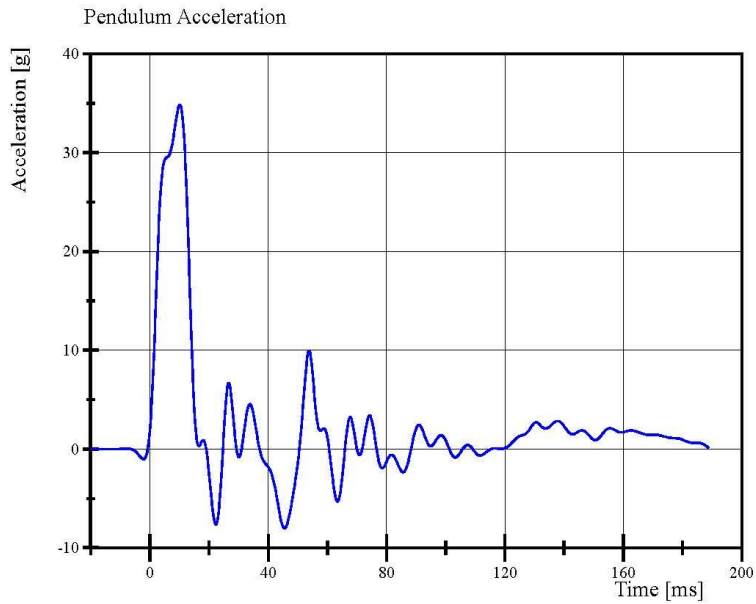
Condition: Used

Comments:

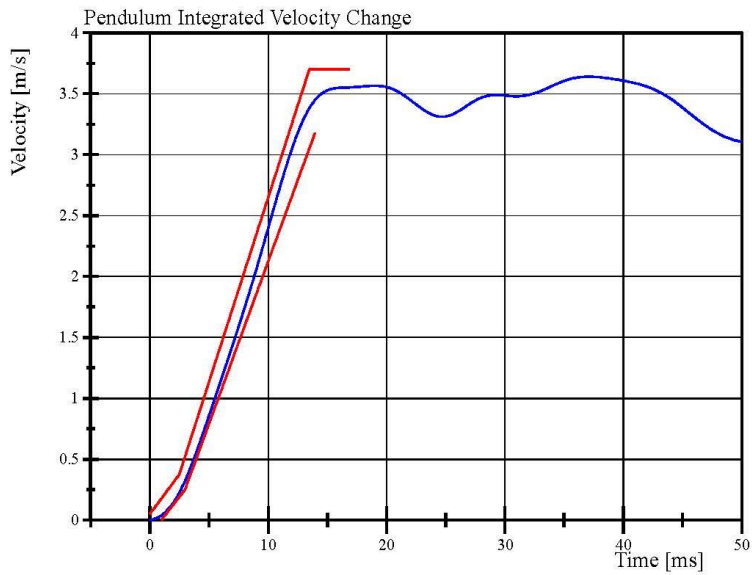
Neck S/N: 05053

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 75-2
Test Date: 1/11/2021



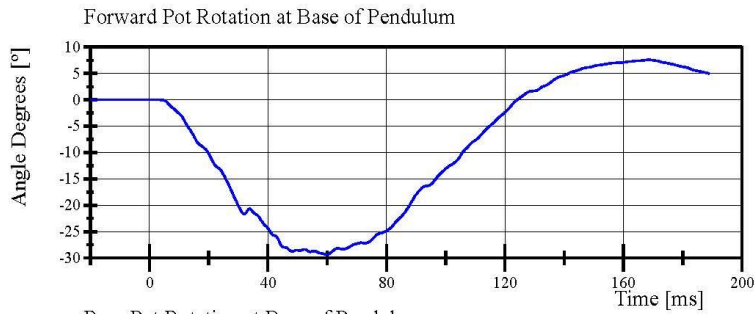
Filter Class: CFC_60
Max: 34.9 g at 10.2 ms
Min: -8.0 g at 45.5 ms



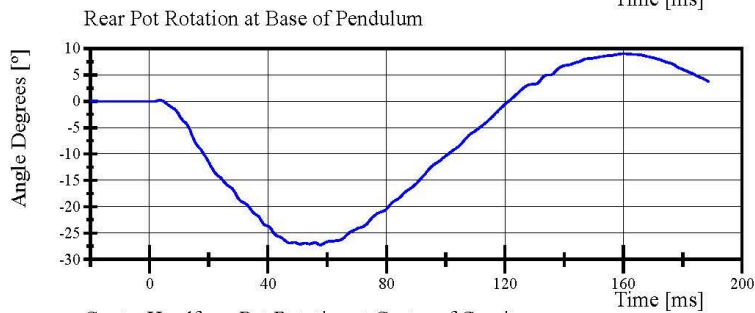
Filter Class: CFC_60
Max: 3.6 m/s at 37.0 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

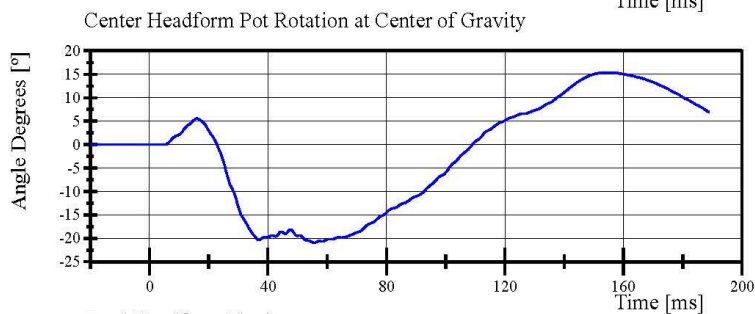
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 75-2
Test Date: 1/11/2021



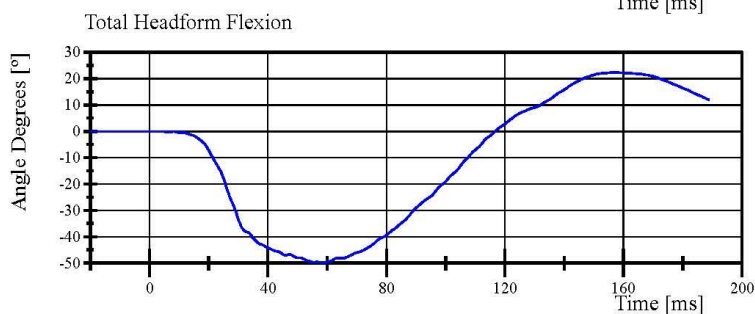
Filter Class: CFC_180
Max: 7.6 ° at 168.6 ms
Min: -29.4 ° at 59.8 ms



Filter Class: CFC_180
Max: 9.0 ° at 160.1 ms
Min: -27.3 ° at 57.7 ms



Filter Class: CFC_180
Max: 15.3 ° at 153.4 ms
Min: -21.0 ° at 55.5 ms



Filter Class: CFC_180
Max: 22.3 ° at 156.9 ms
Min: -49.8 ° at 58.6 ms



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.87 g	Yes

Test meets specifications.

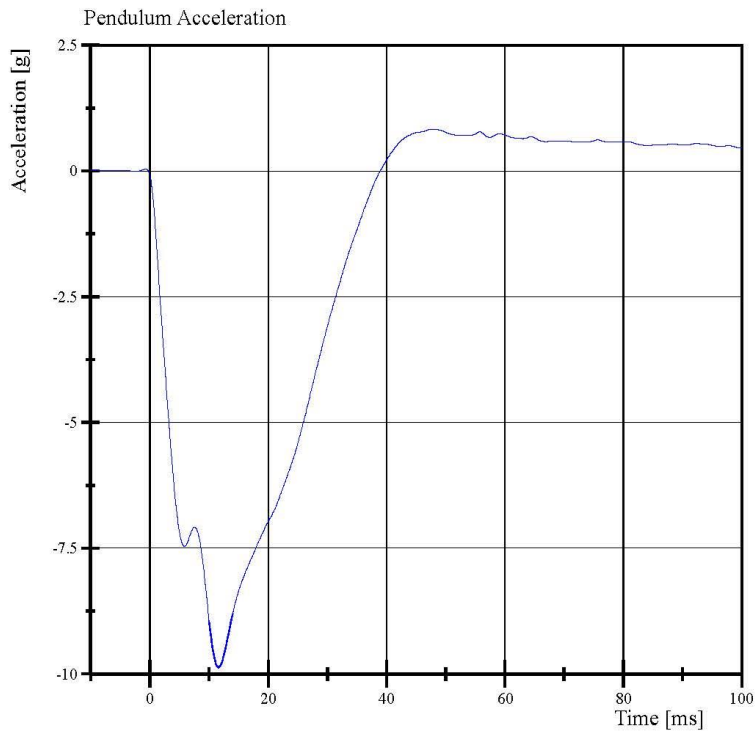
Condition: Used

Comments:

Arm S/N: 175-3501-07014

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



Filter Class: CFC_180
Max: 0.8 g at 47.5 ms
Min: -9.9 g at 11.6 ms

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	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

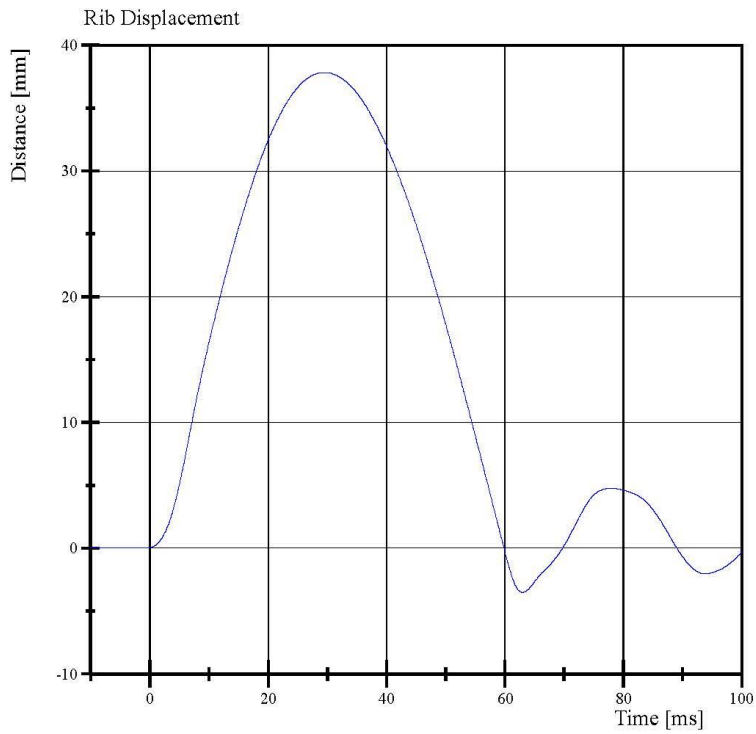
Comments:

Drop Height: 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. 75-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 37.8 mm at 29.6 ms
Min: -3.5 mm at 63.0 ms

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.5 mm	Yes

Test meets specifications.

Condition: Used

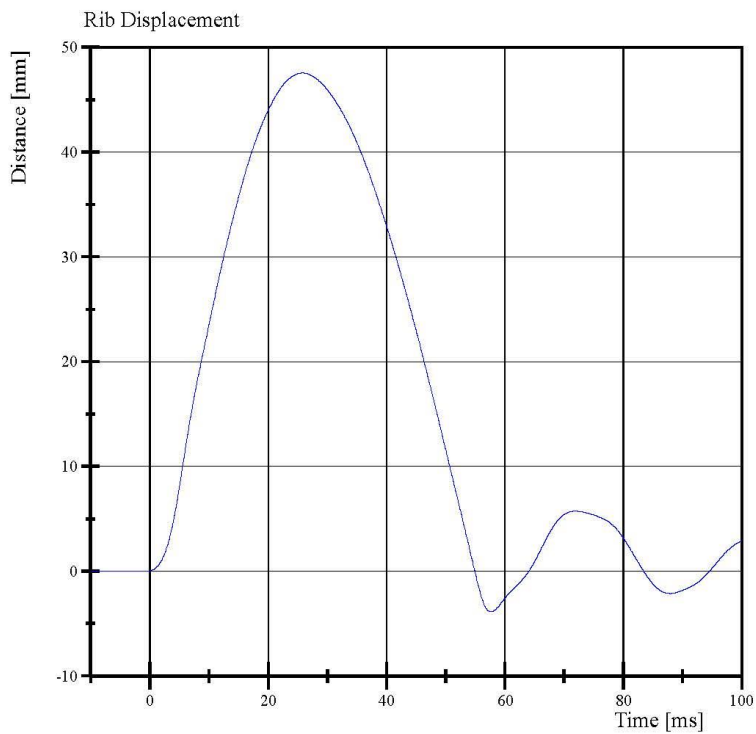
Comments:

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. 75-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 47.5 mm at 25.8 ms
Min: -3.9 mm at 57.6 ms

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.4 mm	Yes

Test meets specifications.

Condition: Used

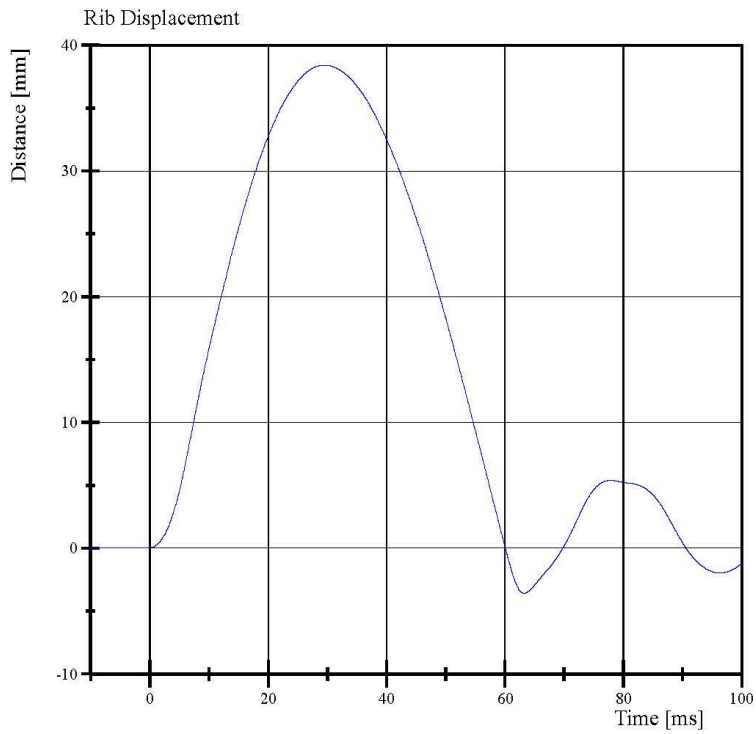
Comments:

Drop Height: 462mm

Rib Module: 175-4008-A

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 38.4 mm at 29.5 ms
Min: -3.6 mm at 63.3 ms

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	50.0 mm	Yes

Test meets specifications.

Condition: Used

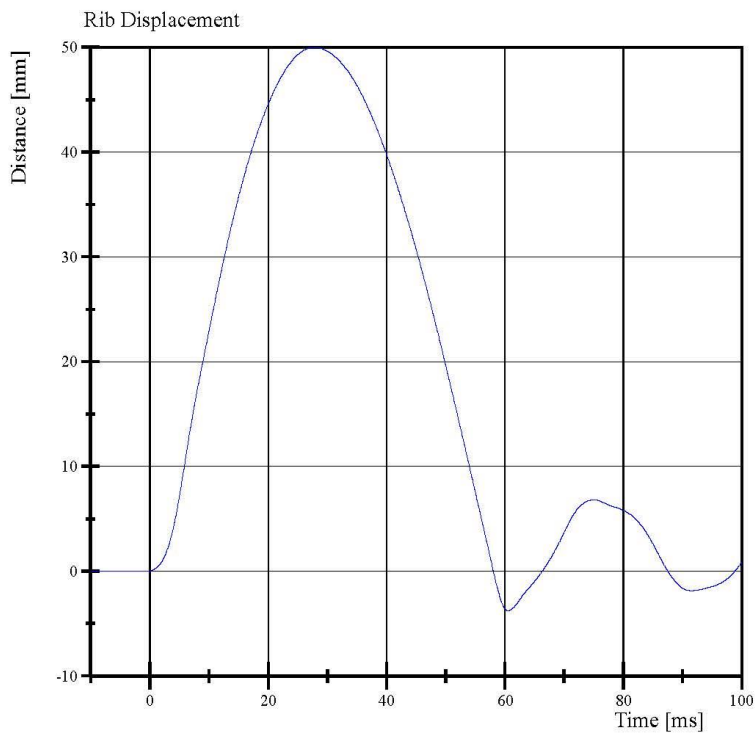
Comments:

Drop Height: 816mm

Rib Module: 175-4008-A

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 50.0 mm at 27.8 ms
Min: -3.8 mm at 60.6 ms



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	37 %	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

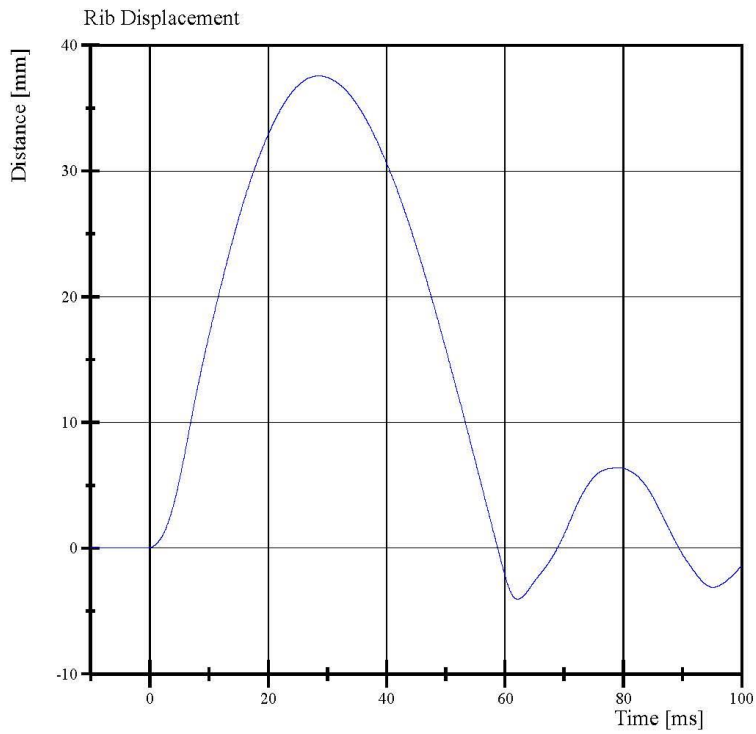
Comments:

Drop Height: 462mm

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. 75-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 37.6 mm at 28.6 ms
Min: -4.1 mm at 62.2 ms

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.1 mm	Yes

Test meets specifications.

Condition: Used

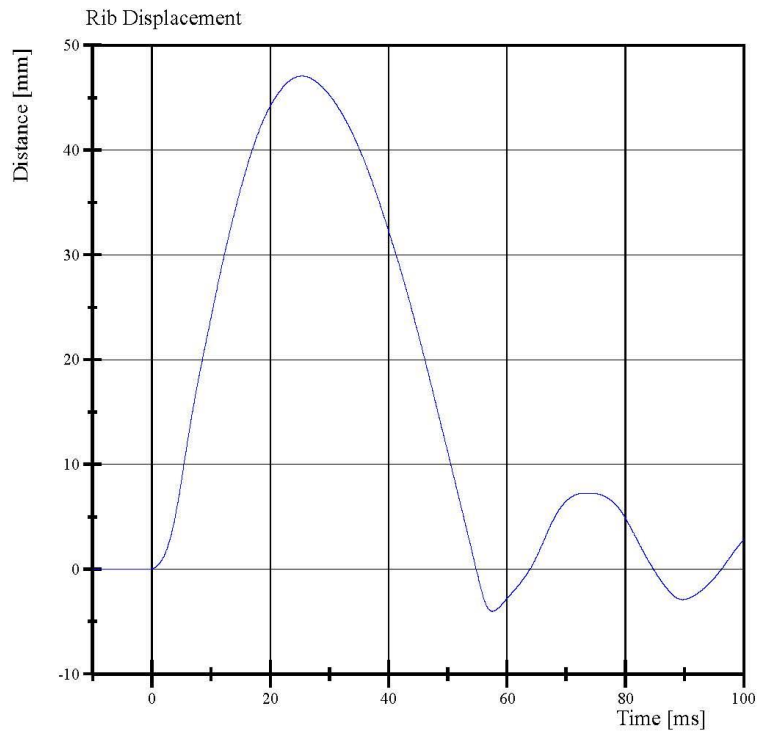
Comments:

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. 75-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 47.1 mm at 25.4 ms
Min: -4.0 mm at 57.5 ms

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.467 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,903.9 N	Yes
Upper Rib Displacement	34 - 41 mm	36.3 mm	Yes
Center Rib Displacement	37 - 45 mm	39.7 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.0 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib Module S/N: 175-4008-A

Upper Rib Foam S/N: 175-4003-EK6973

Middle Rib Module S/N: 175-4008-A

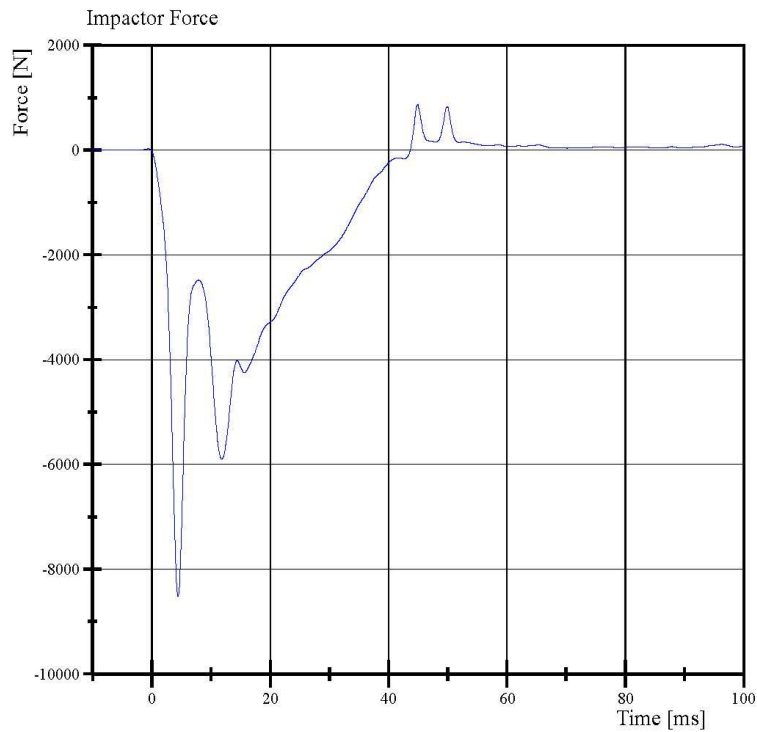
Middle Rib Foam S/N: 175-4003-EK6970

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

Lower Rib Foam S/N: 175-4008-EK6971

Transportation Research Center Inc.

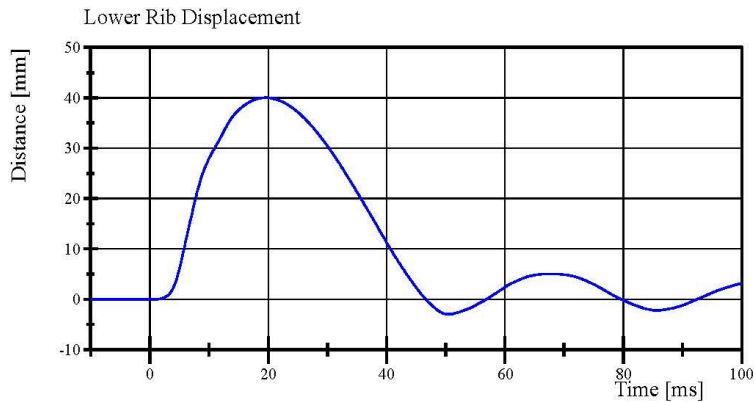
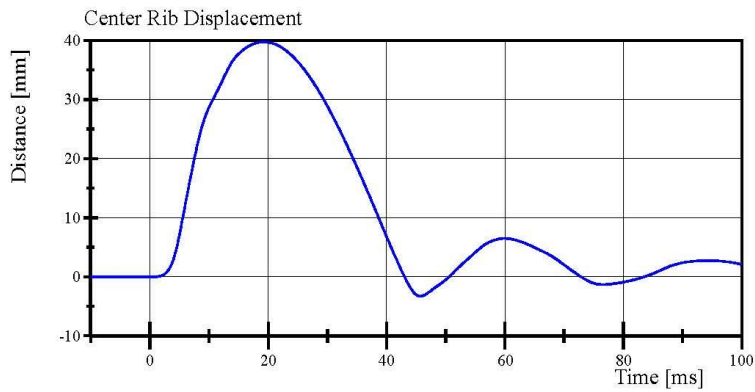
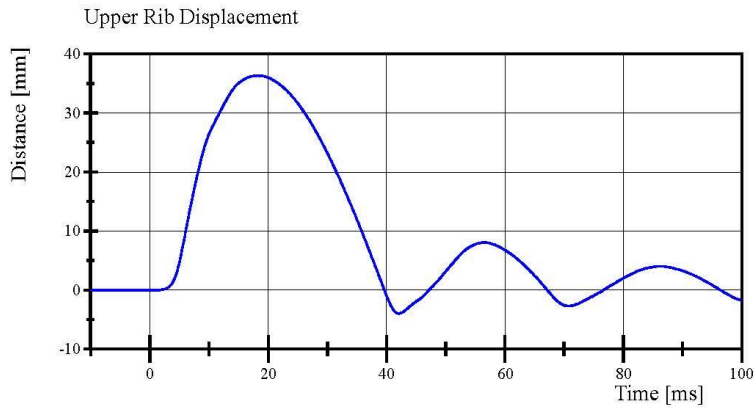
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



Filter Class: CFC_180
Max: 870.1 N at 44.9 ms
Min: -8,517.1 N at 4.4 ms

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 75-2
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.112 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-46.5 deg	Yes
Time of Peak	39 - 53 ms	44.7 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.8 ms	Yes

Test meets specifications.

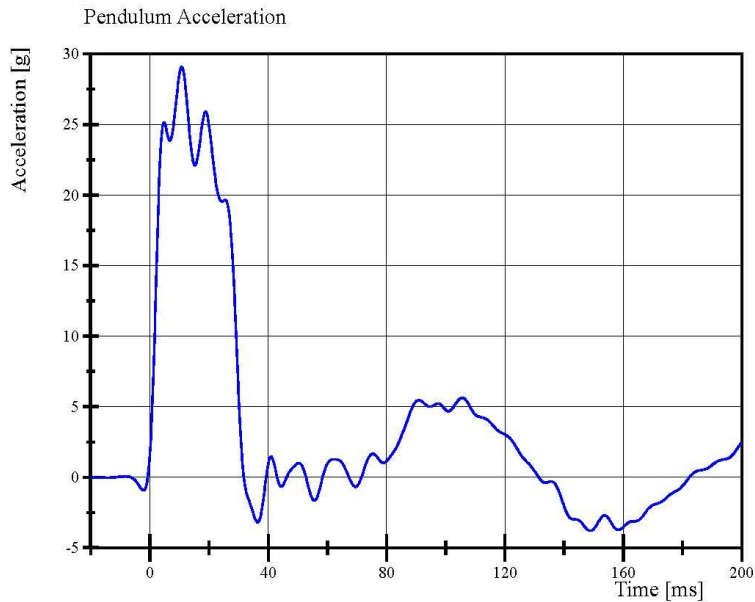
Condition: Used

Comments:

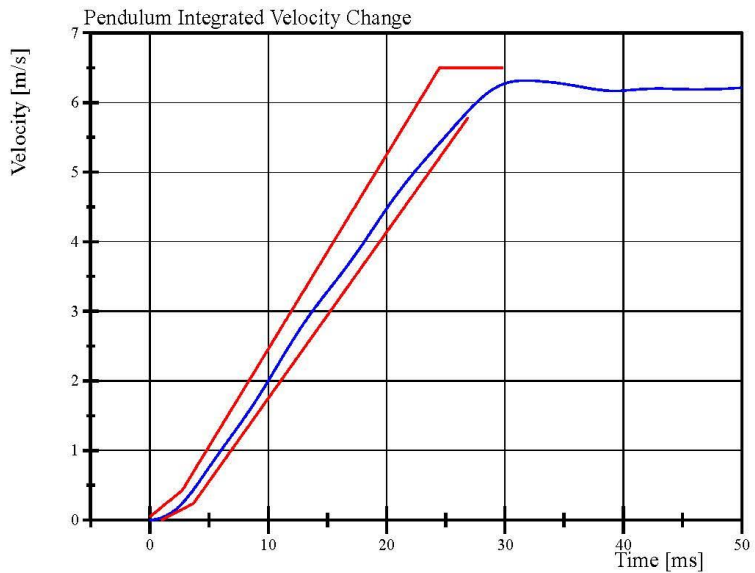
Lumbar S/N: 150365

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 75-2
Test Date: 1/11/2021



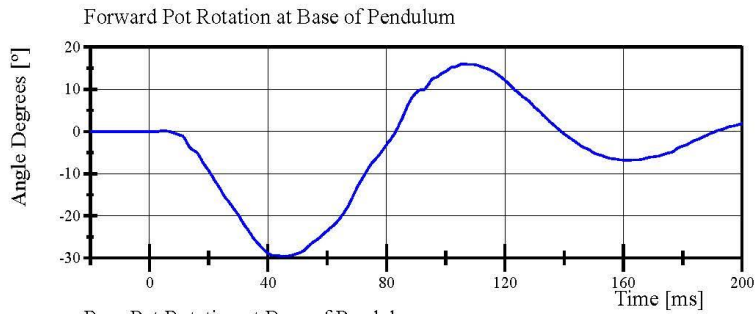
Filter Class: CFC_60
Max: 29.1 g at 10.7 ms
Min: -3.8 g at 148.9 ms



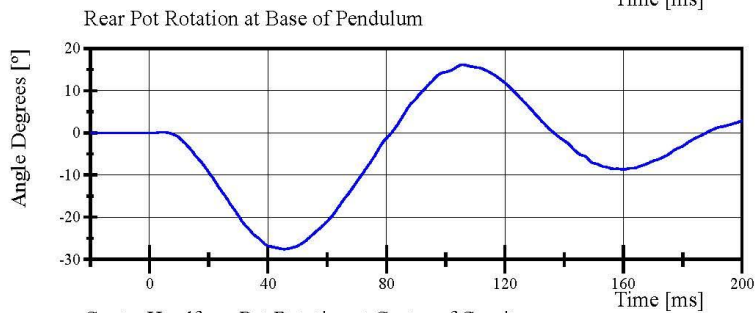
Filter Class: CFC_60
Max: 6.3 m/s at 31.8 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

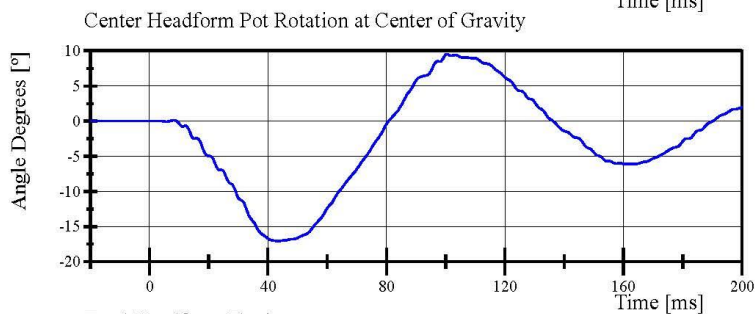
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 75-2
Test Date: 1/11/2021



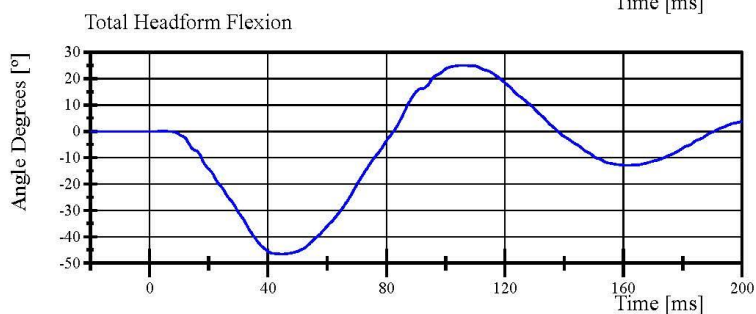
Filter Class: CFC_180
Max: 16.0 ° at 105.8 ms
Min: -29.6 ° at 45.4 ms



Filter Class: CFC_180
Max: 16.1 ° at 105.7 ms
Min: -27.6 ° at 45.6 ms



Filter Class: CFC_180
Max: 9.5 ° at 100.5 ms
Min: -17.0 ° at 43.4 ms



Filter Class: CFC_180
Max: 25.0 ° at 105.6 ms
Min: -46.5 ° at 44.7 ms



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.07 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,111.3 N	Yes
Time of Peak	10.6 - 13.0 ms	11.76 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,420.7 N	Yes
Time of Peak	10.0 - 12.3 ms	10.88 ms	Yes

Test meets specifications.

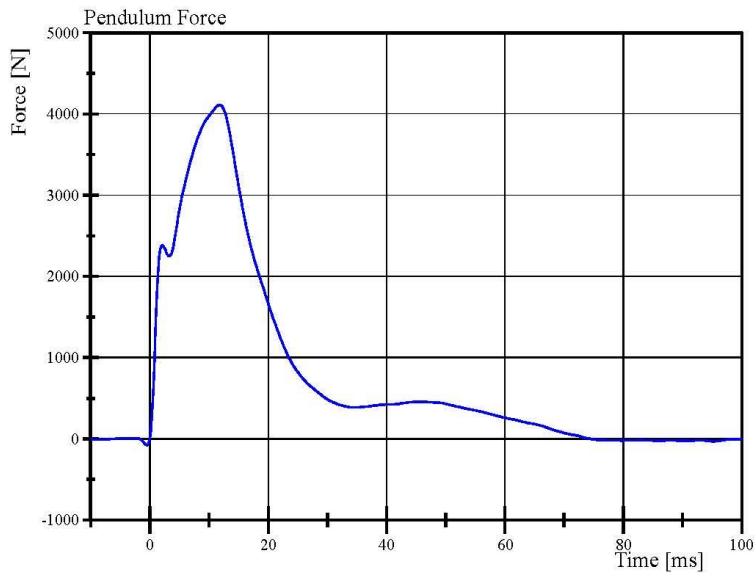
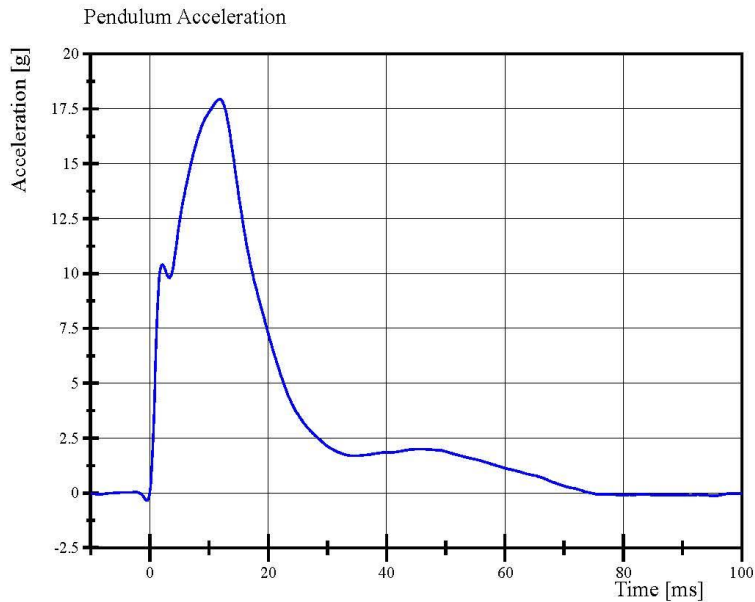
Condition: Used

Comments:

Abdomen S/N: 1066

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



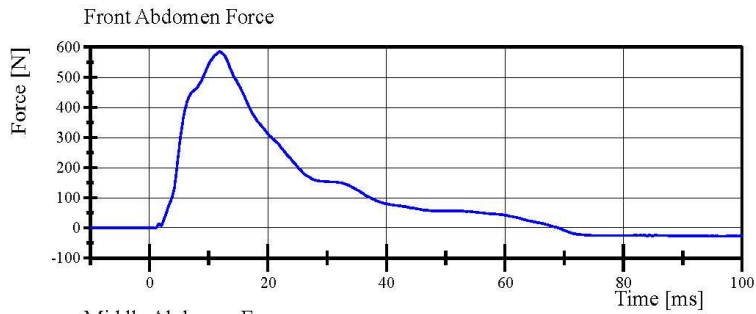
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211
Report Number: F030_ERF75

01.11.2021 11:22:25 606

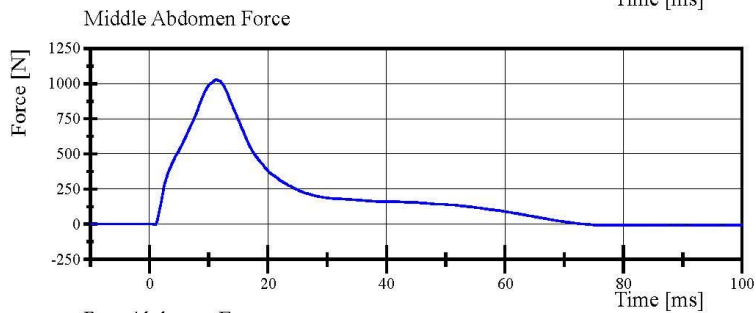


Transportation Research Center Inc.

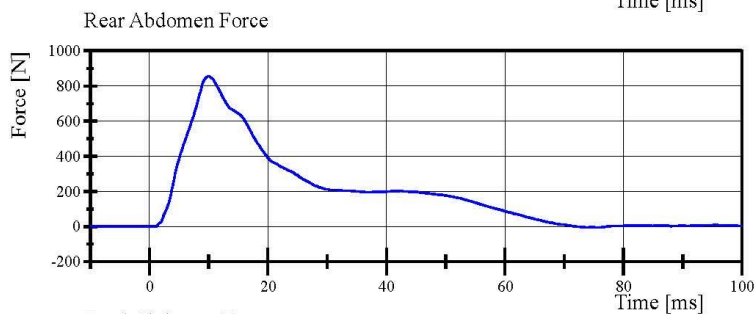
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



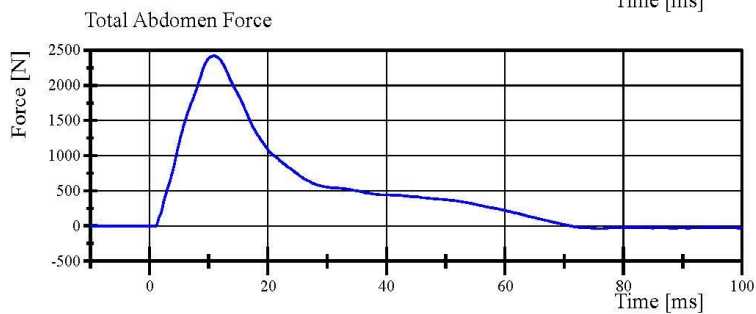
Filter Class: CFC_600
Max: 584.7 N at 11.8 ms
Min: -27.7 N at 97.2 ms



Filter Class: CFC_600
Max: 1,027.8 N at 11.3 ms
Min: -9.0 N at 90.9 ms



Filter Class: CFC_600
Max: 855.5 N at 10.0 ms
Min: -4.1 N at 75.7 ms



Filter Class: CFC_600
Max: 2,420.7 N at 10.9 ms
Min: -36.1 N at 76.0 ms

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,243.4 N	Yes
Time of Peak	11.8 - 16.1 ms	12.88 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,241.4 N	Yes
Time of Peak	12.2 - 17.0 ms	12.48 ms	Yes

Test meets specifications.

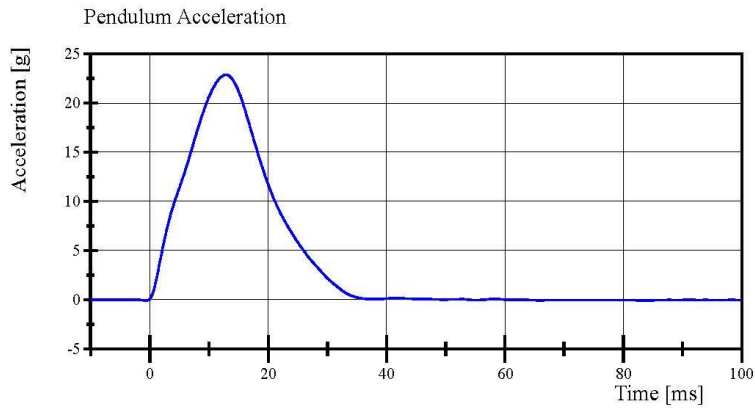
Condition: Used

Comments:

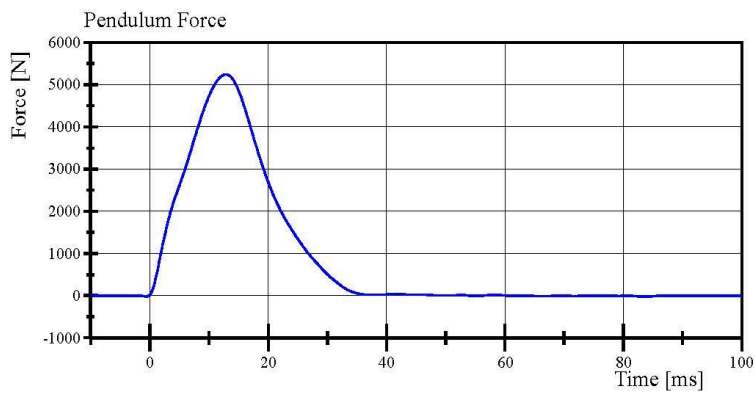
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

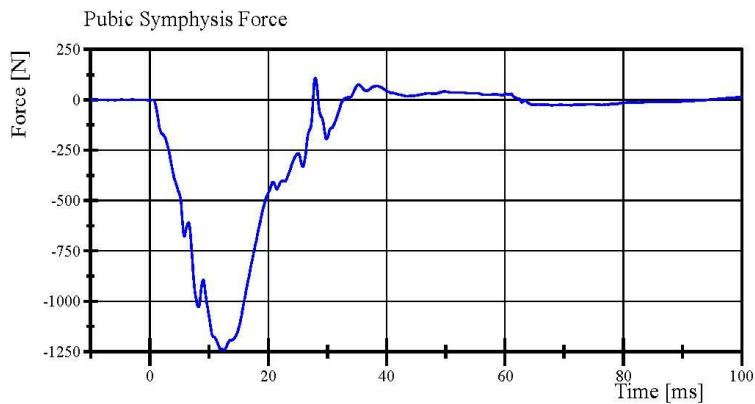
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 75-1
Test Date: 1/11/2021



Filter Class: CFC_180
Max: 22.9 g at 12.9 ms
Min: -0.1 g at 83.6 ms



Filter Class: CFC_180
Max: 5,243.4 N at 12.9 ms
Min: -17.8 N at 83.6 ms



Filter Class: CFC_600
Max: 106.0 N at 27.9 ms
Min: -1,241.4 N at 12.5 ms

**Post-Test Calibration Sheets
Driver S/N F030**

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 76

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	443	Yes
6	Head Width	152.0 - 158.0	154	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	279	Yes
10	Pelvis Lap Width	359.0 - 373.0	366	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



Report Number: F030_ERF76

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Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Resultant Acceleration	125 - 155 g	139.2 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	8.3 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	3.81 %	Yes

Test meets specifications.

Condition: Used

Comments:

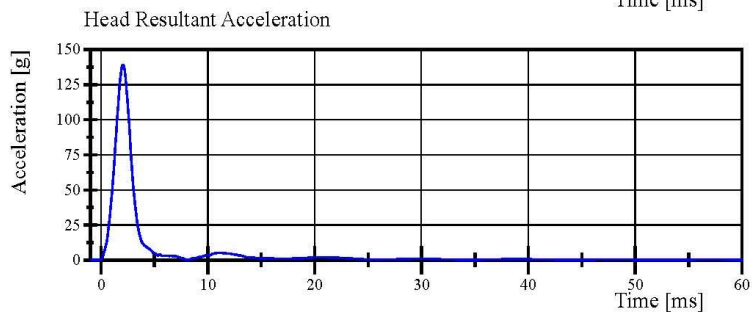
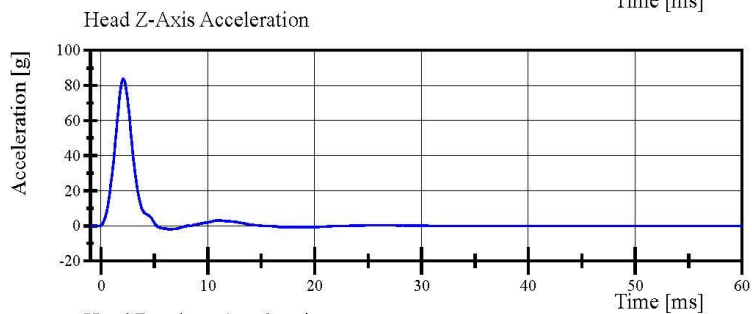
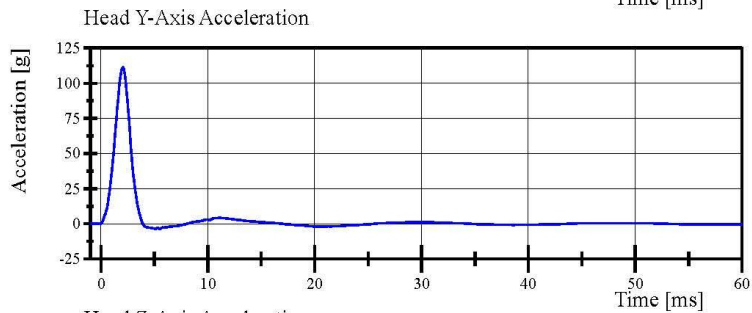
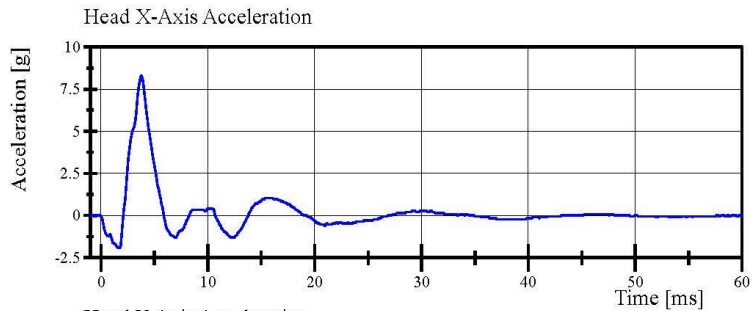
Head Skin S/N: DP6812

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 76-1

Test Date: 2/22/2021



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

02.22.2021 10:01:55 328



Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.38 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-49.3 deg	Yes
Time of Peak	54 - 66 ms	55.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	59.9 ms	Yes

Test meets specifications.

Condition: Used

Comments:

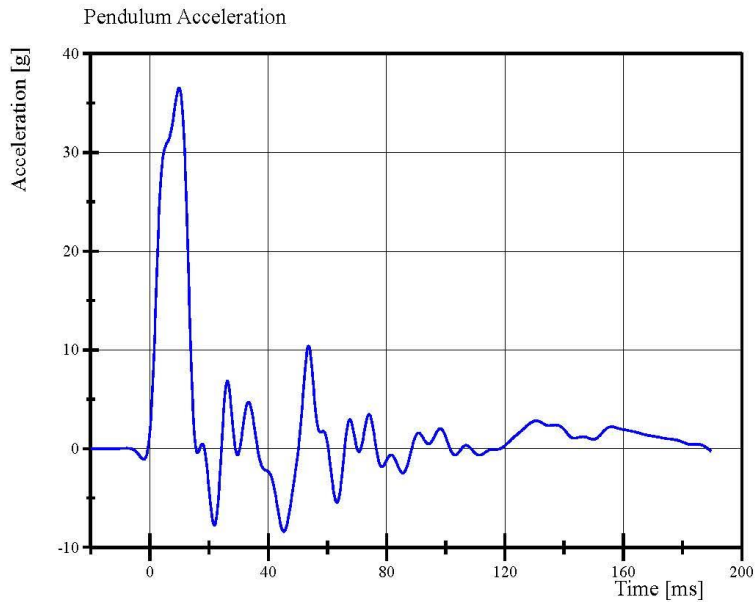
Neck S/N: 05053

Transportation Research Center Inc.

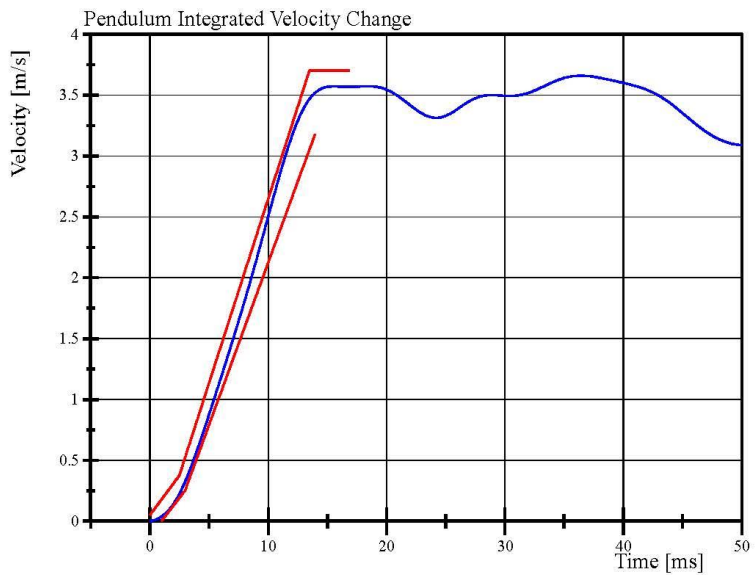
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 76-1

Test Date: 2/22/2021



Filter Class: CFC_60
Max: 36.5 g at 9.8 ms
Min: -8.4 g at 45.3 ms



Filter Class: CFC_60
Max: 3.7 m/s at 36.4 ms
Min: 0.0 m/s at 0.0 ms

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

02.22.2021 13:24:27 1455

Report Number: F030_ERF76

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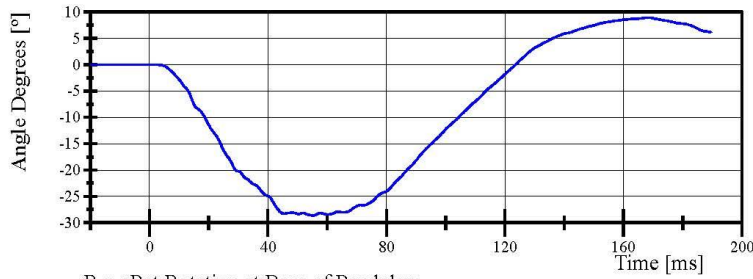
Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 76-1

Test Date: 2/22/2021

Forward Pot Rotation at Base of Pendulum

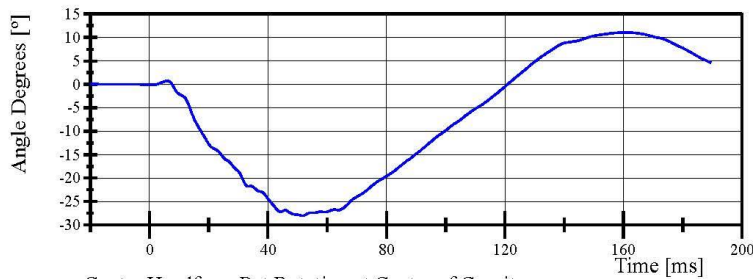


Filter Class: CFC_180

Max: 8.9 ° at 168.4 ms

Min: -28.6 ° at 55.2 ms

Rear Pot Rotation at Base of Pendulum

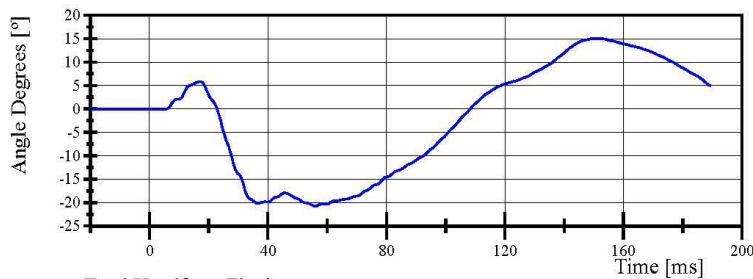


Filter Class: CFC_180

Max: 11.1 ° at 160.2 ms

Min: -28.0 ° at 51.6 ms

Center Headform Pot Rotation at Center of Gravity

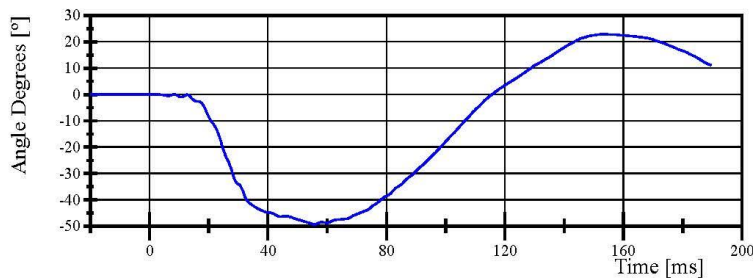


Filter Class: CFC_180

Max: 15.0 ° at 151.8 ms

Min: -20.8 ° at 56.0 ms

Total Headform Flexion



Filter Class: CFC_180

Max: 22.9 ° at 153.4 ms

Min: -49.3 ° at 55.8 ms

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

02.22.2021 13:24:27 1455



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.09 g	Yes

Test meets specifications.

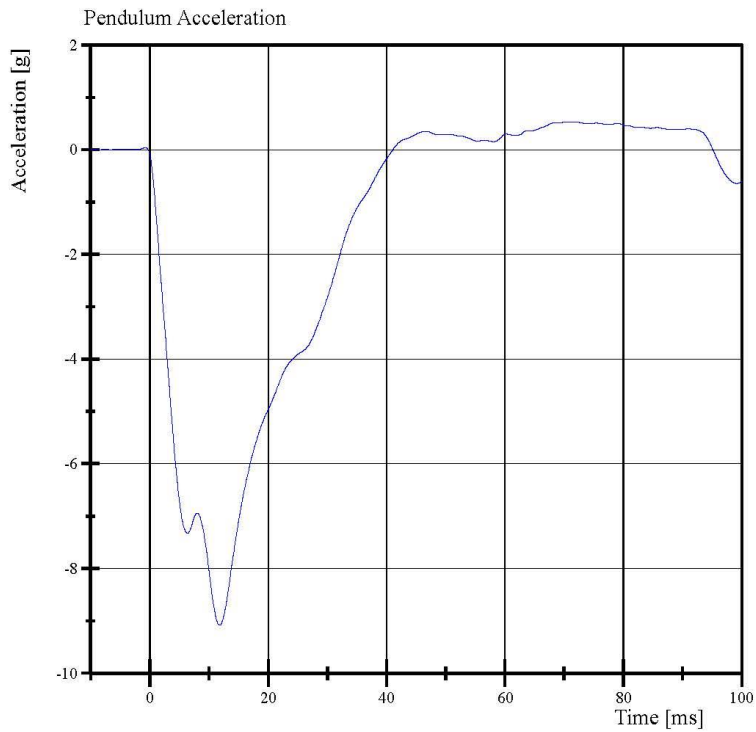
Condition: Used

Comments:

Arm S/N: 175-3501-07014

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 0.5 g at 70.8 ms
Min: -9.1 g at 11.8 ms

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.9 mm	Yes

Test meets specifications.

Condition: Used

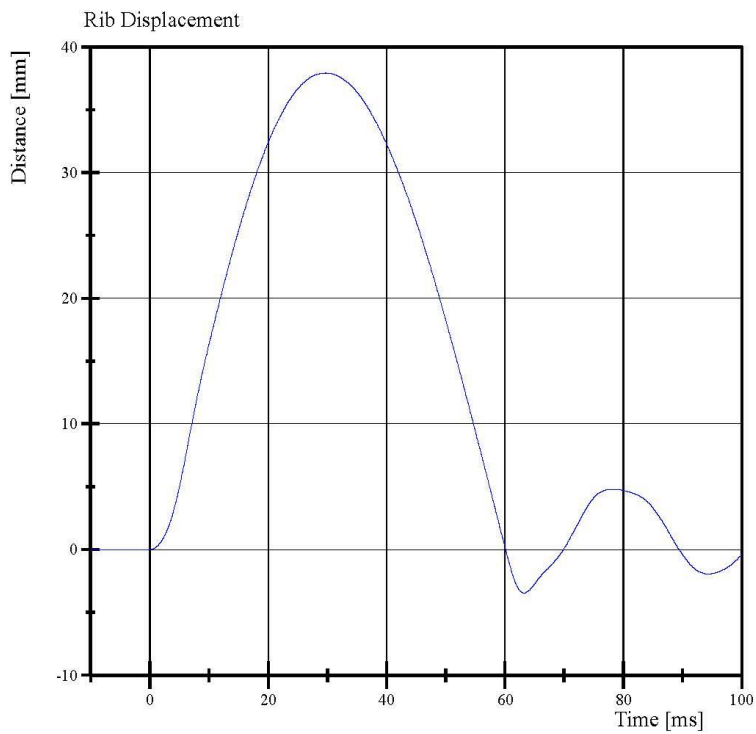
Comments:

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. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 37.9 mm at 29.7 ms
Min: -3.5 mm at 63.2 ms

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.7 mm	Yes

Test meets specifications.

Condition: Used

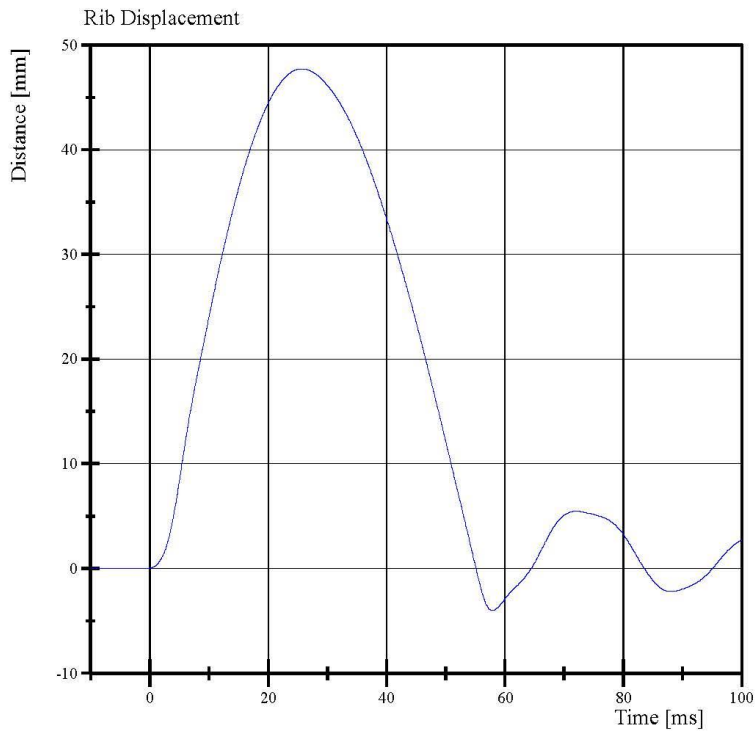
Comments:

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. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 47.7 mm at 25.7 ms
Min: -4.0 mm at 57.8 ms

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.4 mm	Yes

Test meets specifications.

Condition: Used

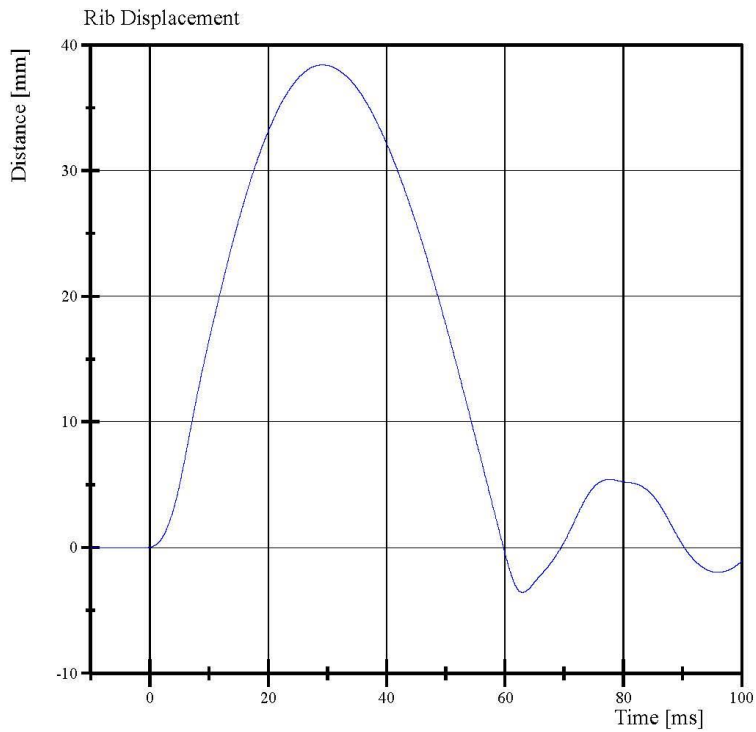
Comments:

Drop Height: 462mm

Rib Module: 175-4008-A

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 38.4 mm at 29.2 ms
Min: -3.6 mm at 63.0 ms



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.9 mm	Yes

Test meets specifications.

Condition: Used

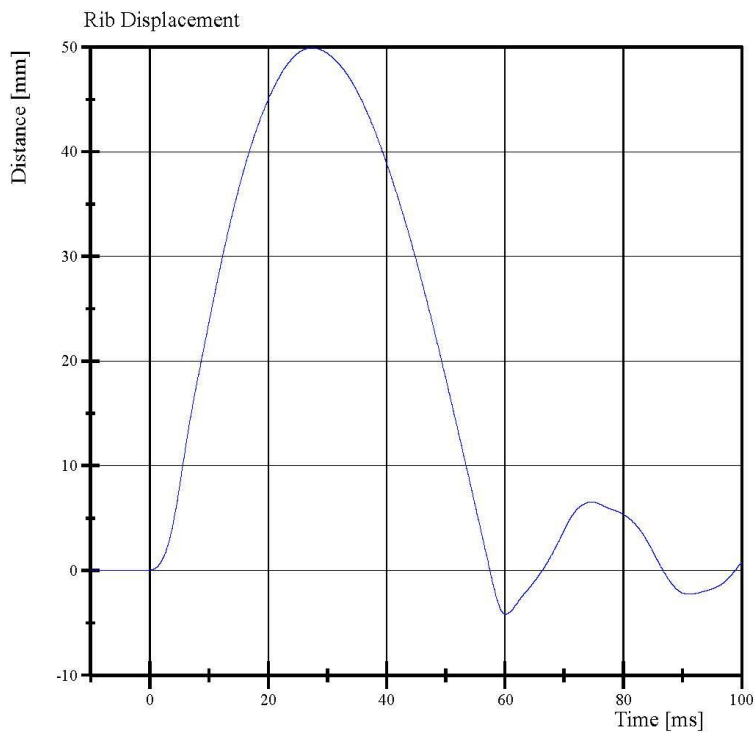
Comments:

Drop Height: 816mm

Rib Module: 175-4008-A

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 49.9 mm at 27.4 ms
Min: -4.2 mm at 60.1 ms



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	37 %	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

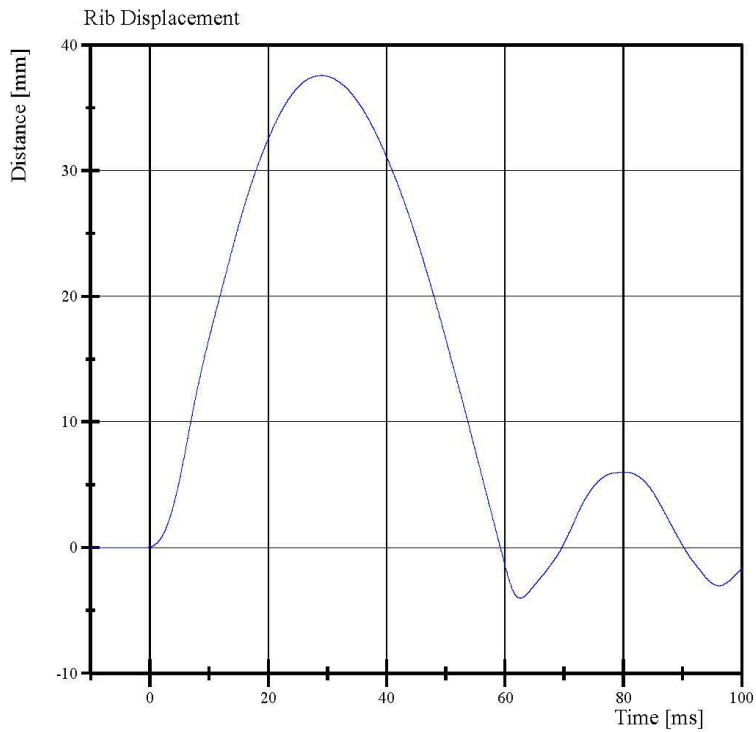
Comments:

Drop Height: 462mm

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. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 37.6 mm at 29.0 ms
Min: -4.0 mm at 62.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211
Report Number: F030_ERF76

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Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.7 mm	Yes

Test meets specifications.

Condition: Used

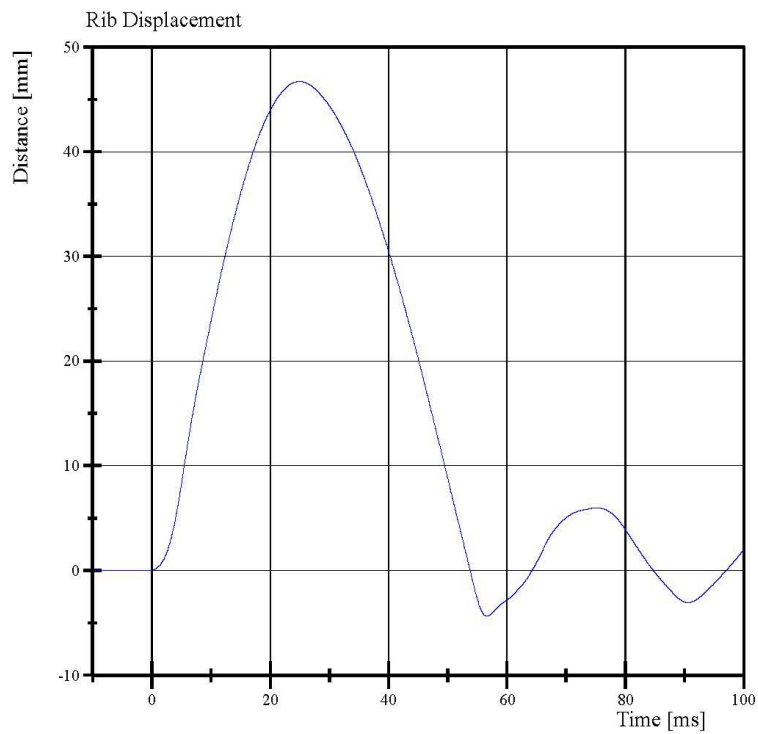
Comments:

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. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 46.7 mm at 25.0 ms
Min: -4.4 mm at 56.6 ms

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.505 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,488.8 N	Yes
Upper Rib Displacement	34 - 41 mm	38.6 mm	Yes
Center Rib Displacement	37 - 45 mm	40.9 mm	Yes
Lower Rib Displacement	37 - 44 mm	39.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib Module S/N: 175-4008-A

Upper Rib Foam S/N: 175-4003-EK6973

Middle Rib Module S/N: 175-4008-A

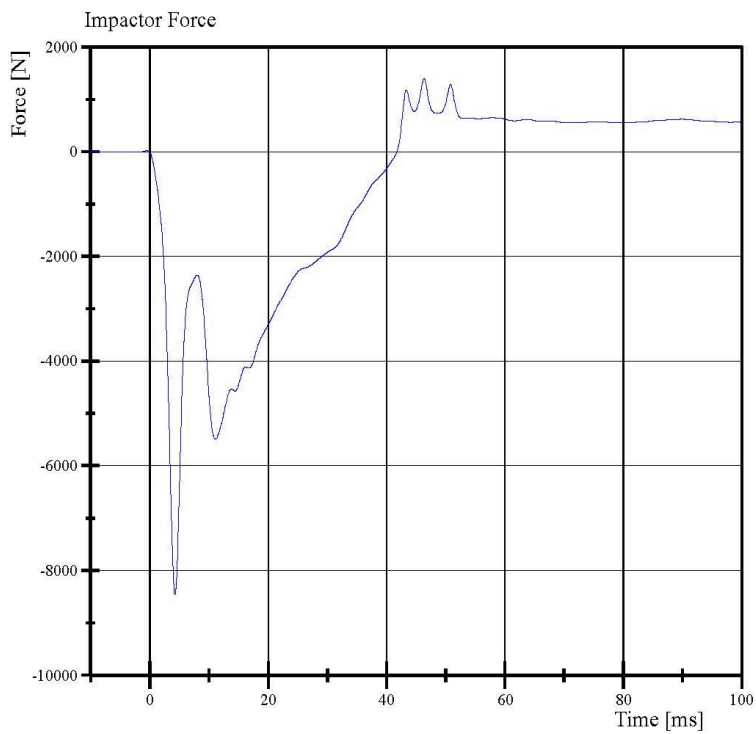
Middle Rib Foam S/N: 175-4003-EK6970

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

Lower Rib Foam S/N: 175-4008-EK6971

Transportation Research Center Inc.

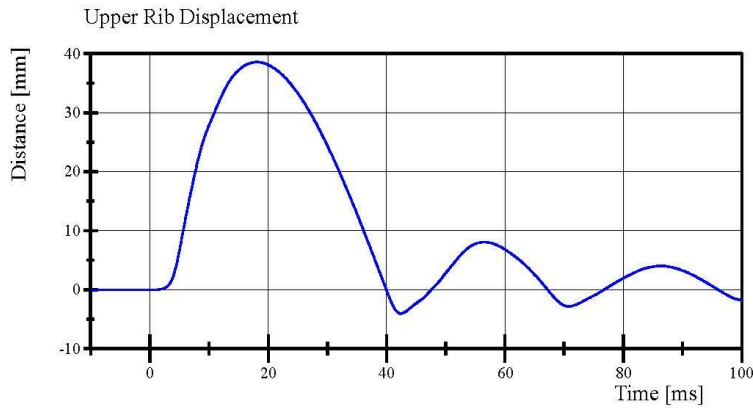
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



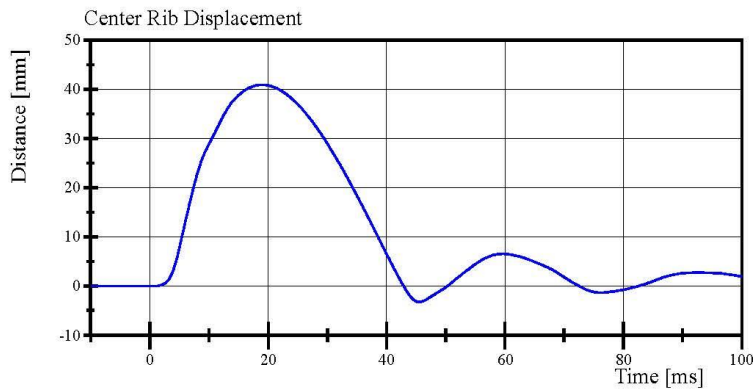
Filter Class: CFC_180
Max: 1,404.2 N at 46.3 ms
Min: -8,457.6 N at 4.2 ms

Transportation Research Center Inc.

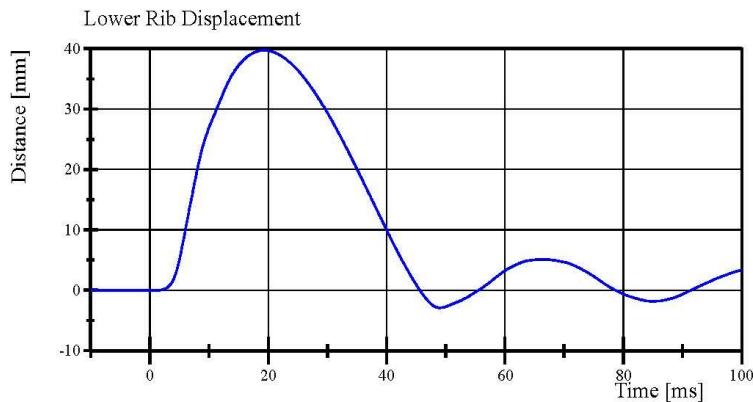
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 38.6 mm at 18.2 ms
Min: -4.0 mm at 42.4 ms



Filter Class: CFC_180
Max: 40.9 mm at 19.0 ms
Min: -3.2 mm at 45.5 ms



Filter Class: CFC_180
Max: 39.7 mm at 19.3 ms
Min: -2.9 mm at 49.0 ms

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 76-2
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.117 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.7 deg	Yes
Time of Peak	39 - 53 ms	43.3 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.5 ms	Yes

Test meets specifications.

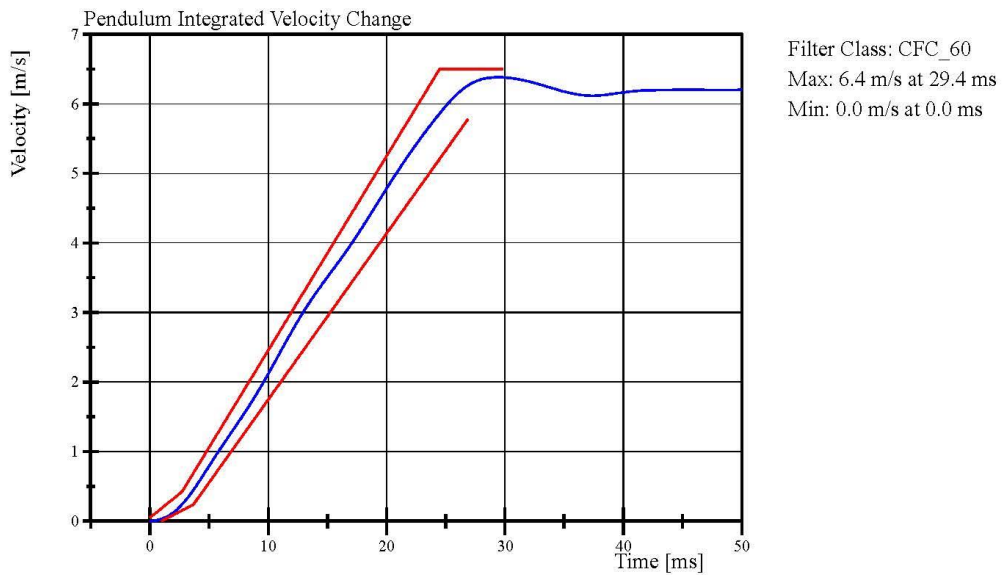
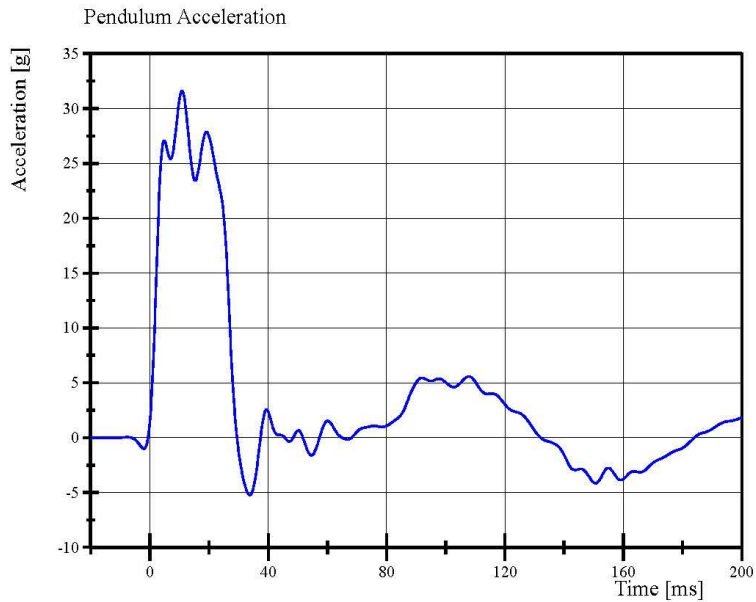
Condition: Used

Comments:

Lumbar S/N: 150365

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 76-2
Test Date: 2/22/2021



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211
Report Number: F030_ERF76

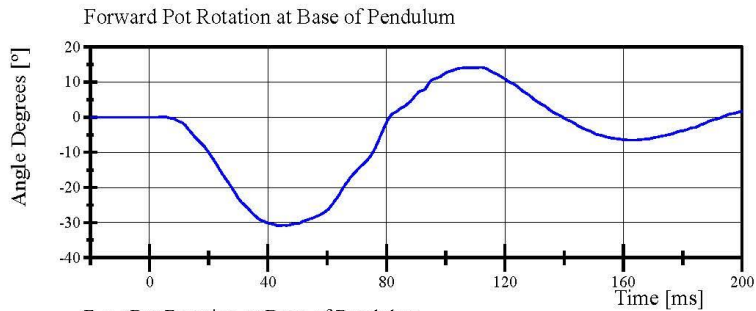
02.22.2021 11:52:25 638



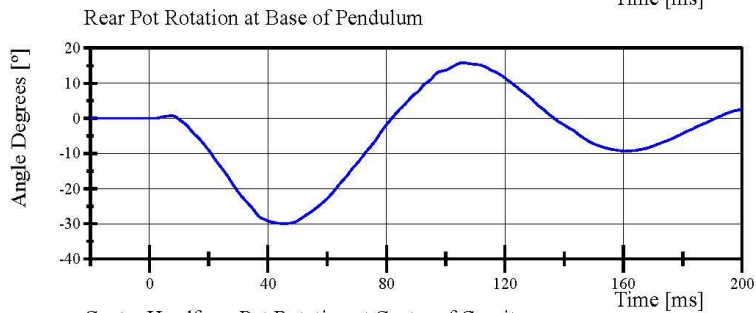
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Transportation Research Center Inc.

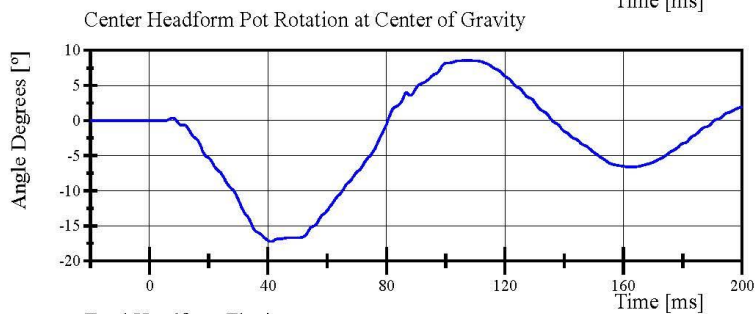
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 76-2
Test Date: 2/22/2021



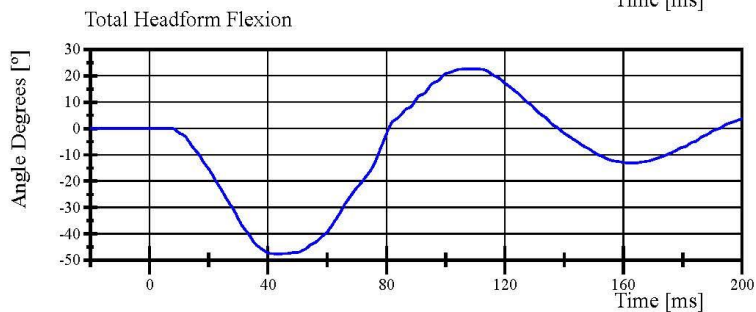
Filter Class: CFC_180
Max: 14.1 ° at 111.9 ms
Min: -30.8 ° at 43.5 ms



Filter Class: CFC_180
Max: 15.9 ° at 105.7 ms
Min: -30.0 ° at 45.2 ms



Filter Class: CFC_180
Max: 8.5 ° at 107.4 ms
Min: -17.2 ° at 41.0 ms



Filter Class: CFC_180
Max: 22.6 ° at 108.7 ms
Min: -47.7 ° at 43.3 ms

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.07 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,138.6 N	Yes
Time of Peak	10.6 - 13.0 ms	11.04 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,453.5 N	Yes
Time of Peak	10.0 - 12.3 ms	10.48 ms	Yes

Test meets specifications.

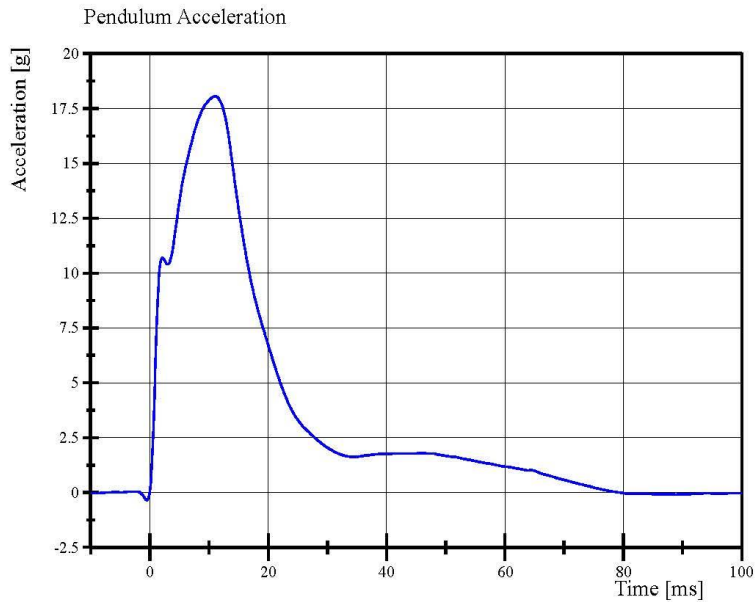
Condition: Used

Comments:

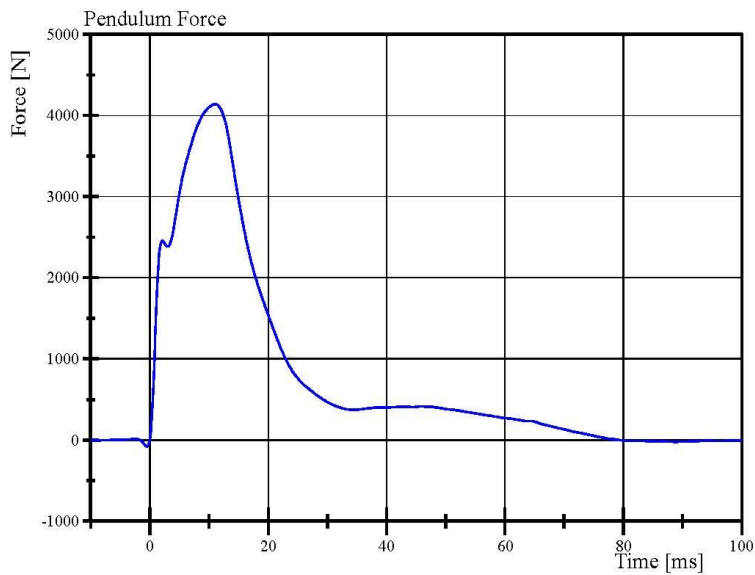
Abdomen S/N: 1066

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 18.1 g at 11.0 ms
Min: -0.3 g at -0.5 ms



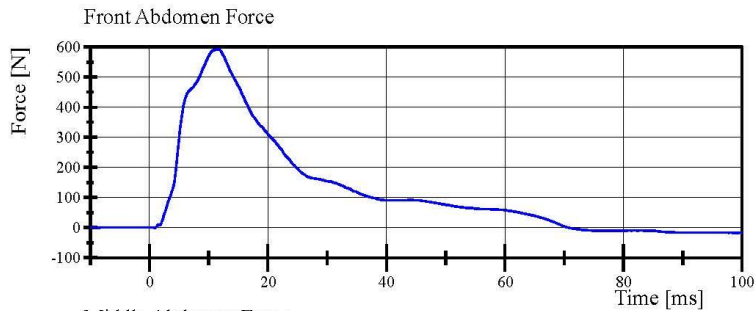
Filter Class: CFC_180
Max: 4,138.6 N at 11.0 ms
Min: -79.4 N at -0.5 ms

Transportation Research Center Inc.

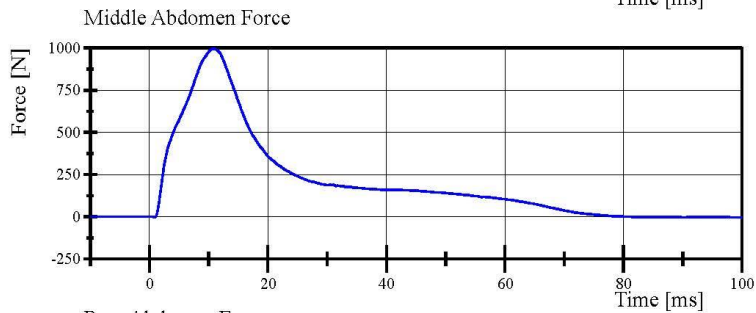
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 76-1

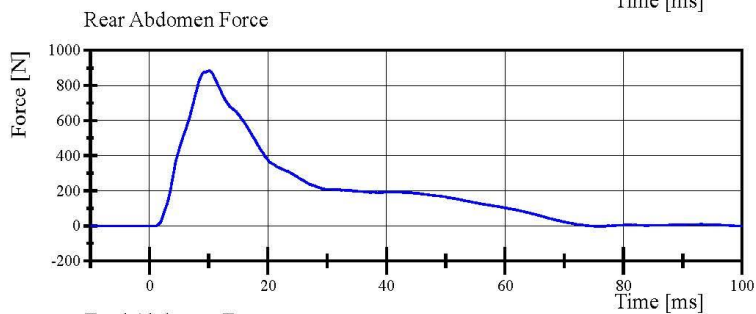
Test Date: 2/22/2021



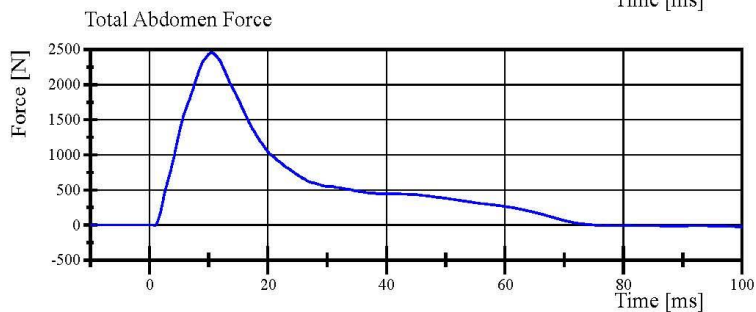
Filter Class: CFC_600
Max: 592.3 N at 11.5 ms
Min: -16.8 N at 99.2 ms



Filter Class: CFC_600
Max: 997.1 N at 10.7 ms
Min: -3.9 N at 99.1 ms



Filter Class: CFC_600
Max: 883.0 N at 10.1 ms
Min: -3.2 N at 76.0 ms



Filter Class: CFC_600
Max: 2,453.5 N at 10.5 ms
Min: -21.3 N at 99.8 ms

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

02.22.2021 14:39:14 566



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.36 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,234.0 N	Yes
Time of Peak	11.8 - 16.1 ms	12.64 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,313.9 N	Yes
Time of Peak	12.2 - 17.0 ms	13.52 ms	Yes

Test meets specifications.

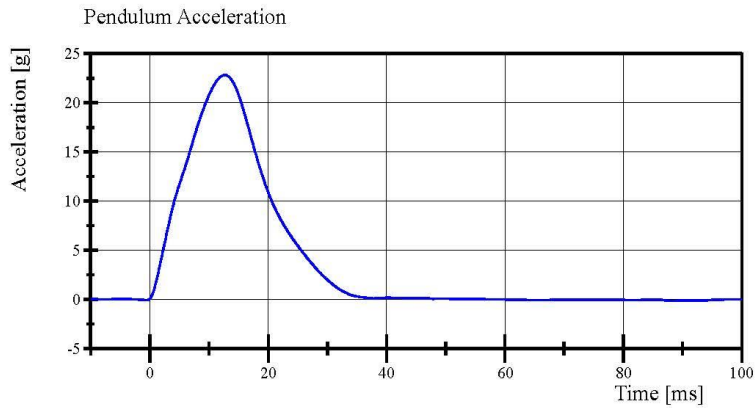
Condition: Used

Comments:

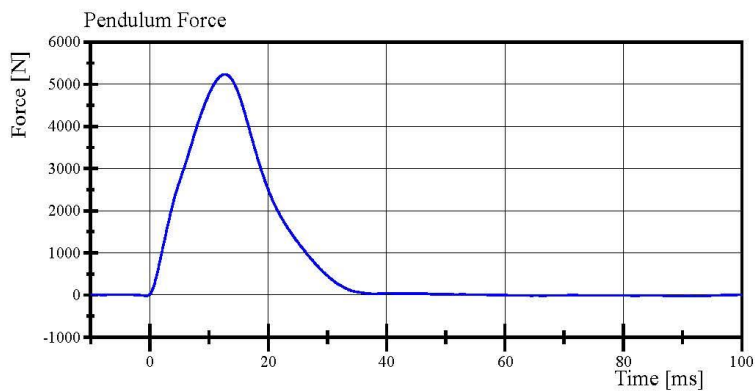
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

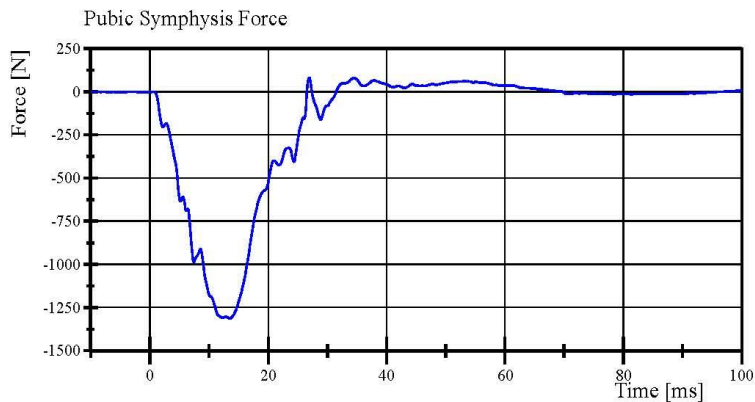
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 76-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 22.8 g at 12.6 ms
Min: -0.1 g at 88.2 ms



Filter Class: CFC_180
Max: 5,234.0 N at 12.6 ms
Min: -29.1 N at 88.2 ms



Filter Class: CFC_600
Max: 80.5 N at 27.0 ms
Min: -1,313.9 N at 13.5 ms

Pre-Test Calibration Sheets
Passenger S/N DQ0570

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DQ0570 Calibration No. 08

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	786	Yes
B	Shoulder Pivot Height	437.0 - 453.0	445	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	147	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	129	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	184	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	533	Yes
L	Popliteal Height	343.0 - 369.0	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	427	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	316	Yes
R	Arm Length	249.0 - 259.0	254	Yes
S	Knee Joint to seat Back	478.0 - 493.0	486	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	781	Yes

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	133.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-5.7 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.44 %	Yes

Test meets specifications.

Condition: Used

Comments:

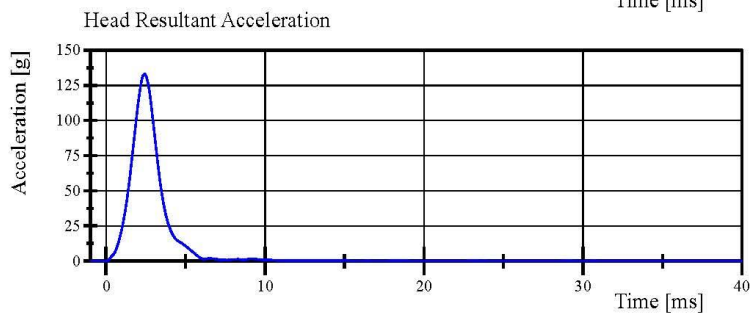
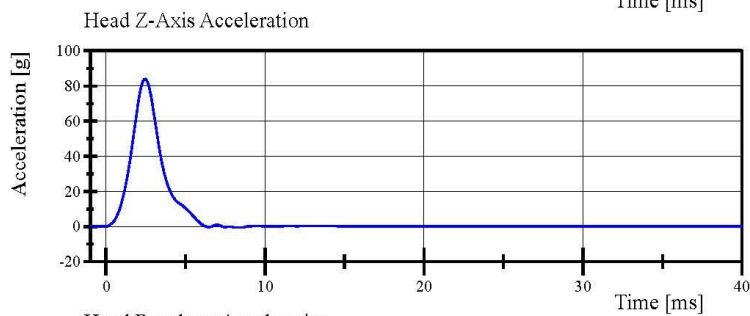
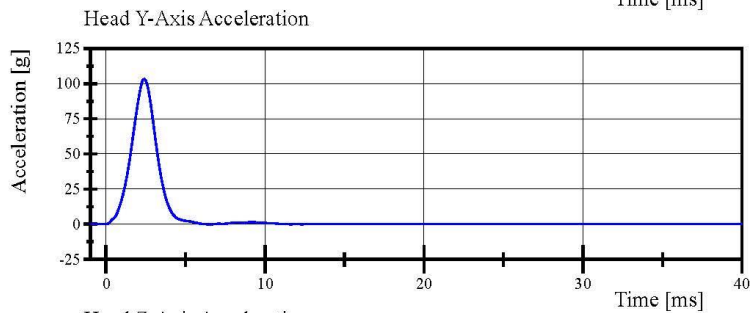
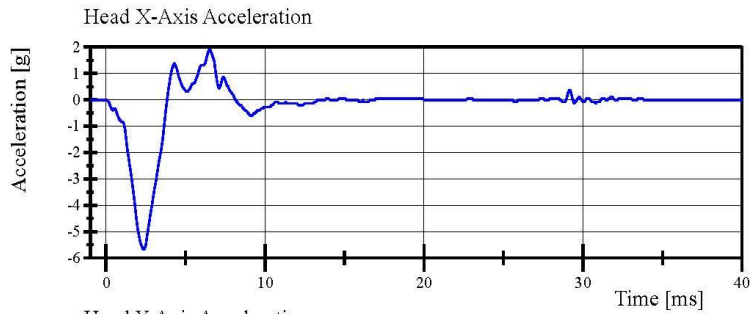
Head Skin S/N: DP6812

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. DQ0570 Certification No. 8-1

Test Date: 1/8/2021



Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 8-13
Test Date: 2/2/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.620 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.640 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.893 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.269 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.855 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.874 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-72.1 deg	Yes
Time of Peak	50 - 70 ms	63.0 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	36.2 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	115.9 ms	Yes

Test meets specifications.

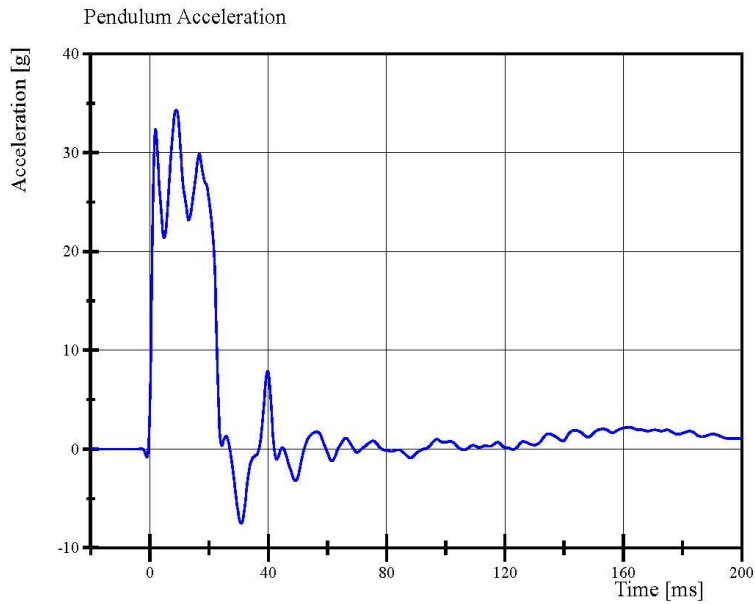
Condition: Used

Comments:

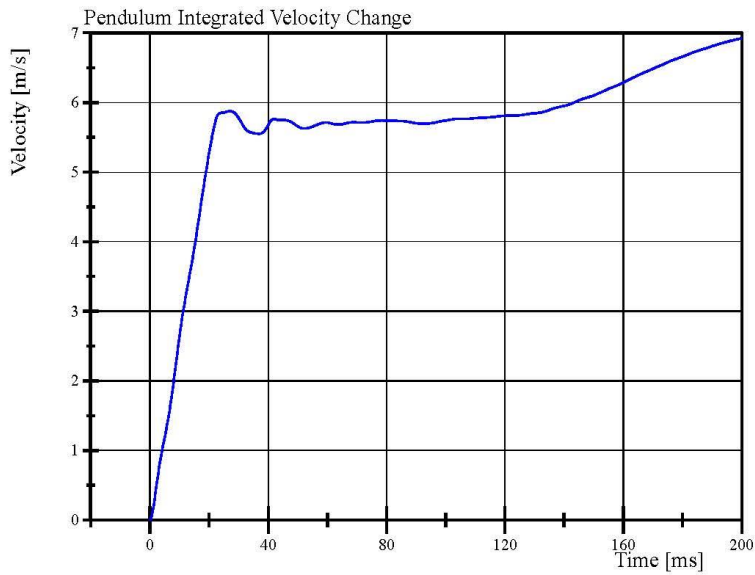
Neck S/N: 717

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 8-13
Test Date: 2/2/2021



Filter Class: CFC_180
Max: 34,3 g at 8.8 ms
Min: -7.5 g at 30.8 ms

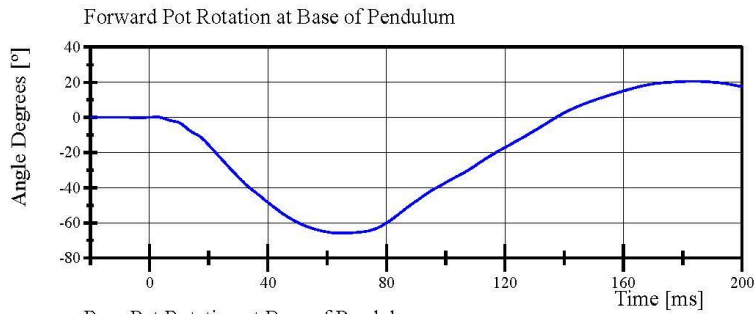


Filter Class: CFC_180
Max: 6.9 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

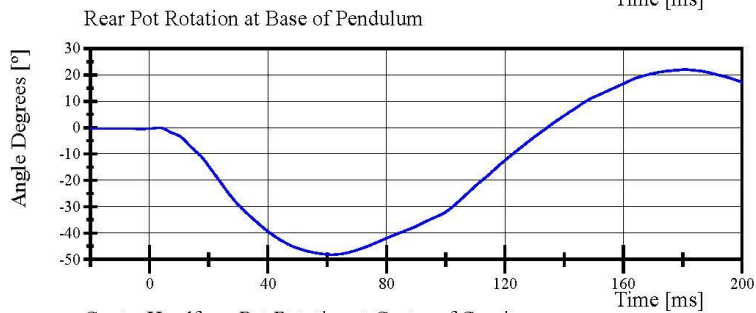


Transportation Research Center Inc.

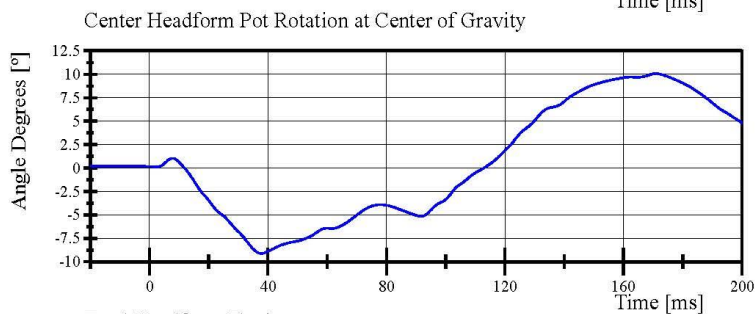
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 8-13
Test Date: 2/2/2021



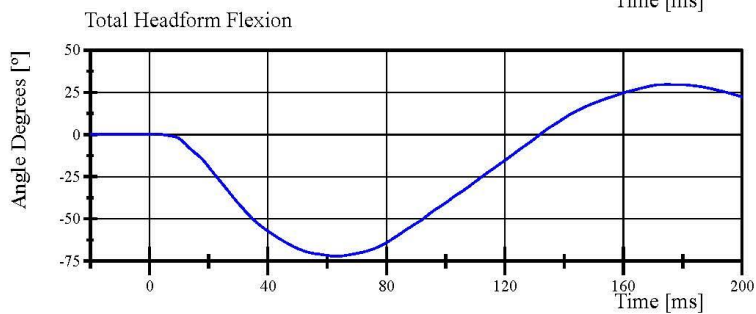
Filter Class: CFC_60
Max: 20.6 ° at 183.6 ms
Min: -65.8 ° at 64.7 ms



Filter Class: CFC_60
Max: 22.0 ° at 180.9 ms
Min: -48.2 ° at 61.5 ms



Filter Class: CFC_60
Max: 10.1 ° at 171.0 ms
Min: -9.1 ° at 37.8 ms

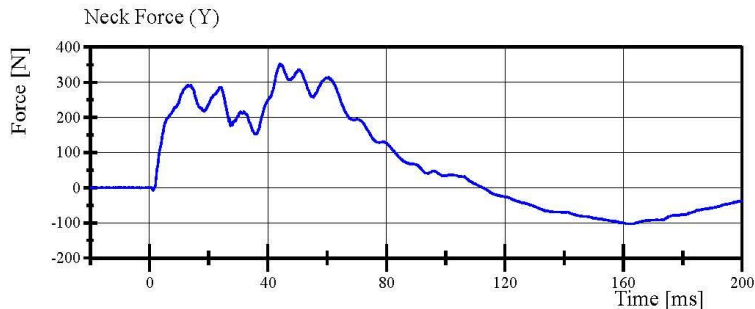


Filter Class: CFC_60
Max: 29.7 ° at 174.9 ms
Min: -72.1 ° at 63.0 ms

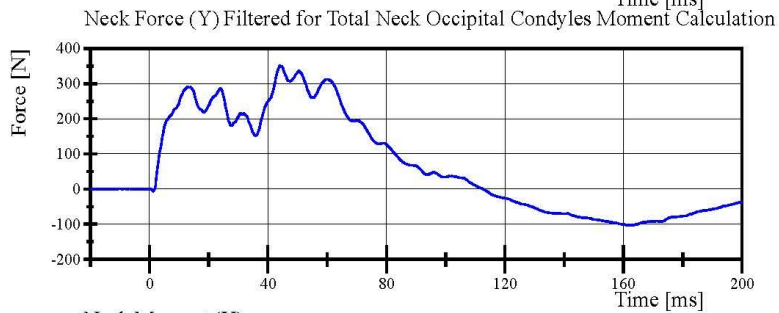


Transportation Research Center Inc.

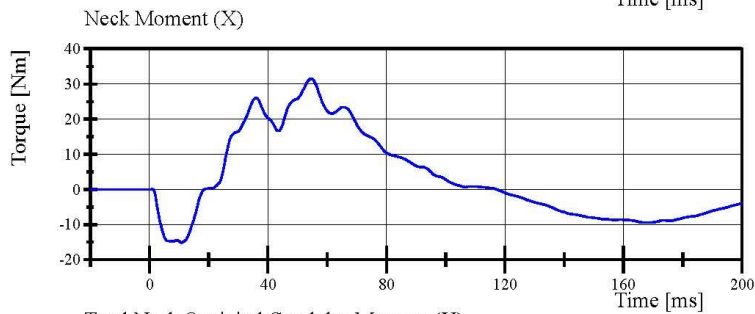
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 8-13
Test Date: 2/2/2021



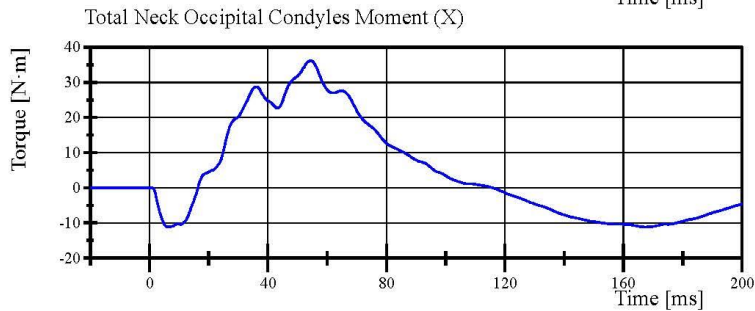
Filter Class: CFC_1000
Max: 352.0 N at 44.1 ms
Min: -103.4 N at 162.2 ms



Filter Class: CFC_600
Max: 350.9 N at 44.1 ms
Min: -103.3 N at 162.2 ms



Filter Class: CFC_600
Max: 31.5 Nm at 54.6 ms
Min: -15.1 Nm at 10.8 ms



Filter Class: Without_(Constar
Max: 36.2 N·m at 54.5 ms
Min: -11.2 N·m at 167.2 ms

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.0 g	Yes
Shoulder Displacement	28 - 37 mm	31.1 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.5 g	Yes

Test meets specifications.

Condition: Used

Comments:

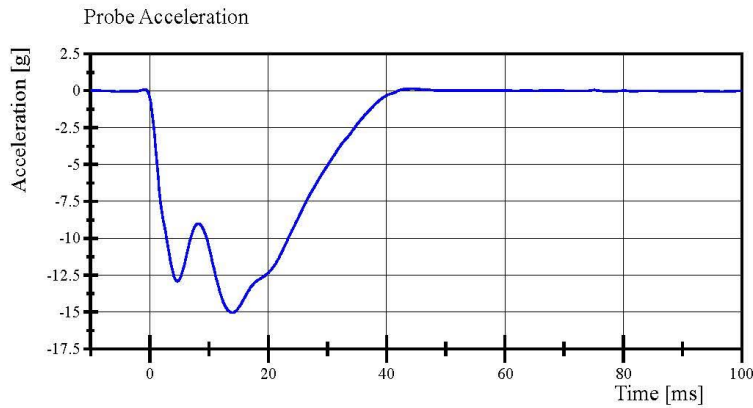
Left Arm S/N: DP8451

Transportation Research Center Inc.

Left Lateral Shoulder

SID IIS Serial No. DQ0570 Certification No. 8-1

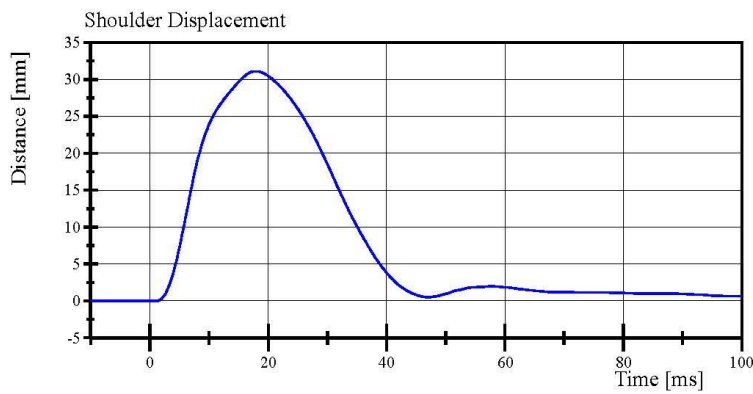
Test Date: 1/8/2021



Filter Class: CFC_180

Max: 0.2 g at 44.3 ms

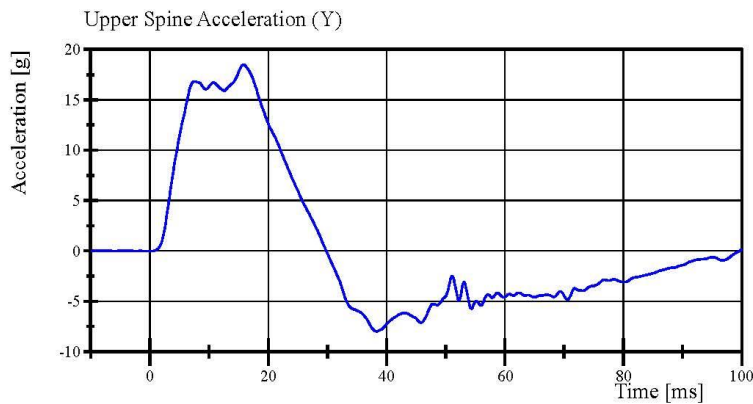
Min: -15.0 g at 13.9 ms



Filter Class: CFC_600

Max: 31.1 mm at 17.8 ms

Min: -0.0 mm at 1.2 ms



Filter Class: CFC_180

Max: 18.5 g at 15.8 ms

Min: -8.0 g at 38.3 ms

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

01.08.2021 08:27:23 882



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Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.660 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.5 g	Yes
Shoulder Displacement	31 - 40 mm	35.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.6 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.8 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	36.0 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

Shoulder Rib S/N: 180-3355 DO9814

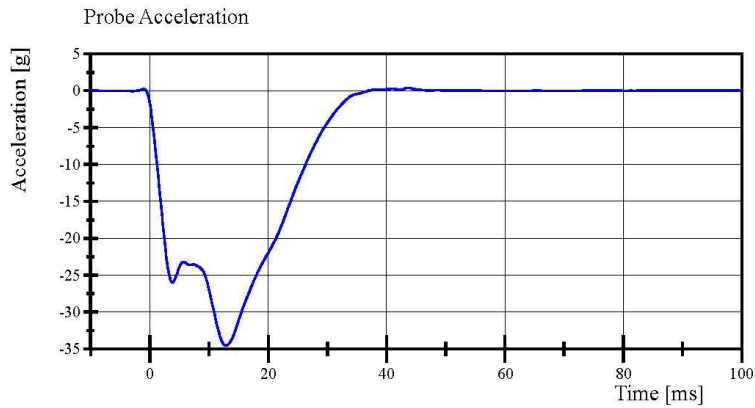
Upper Thorax Rib S/N: 180-3362 DP6492

Middle Thorax Rib S/N: 180-3362 DP6493

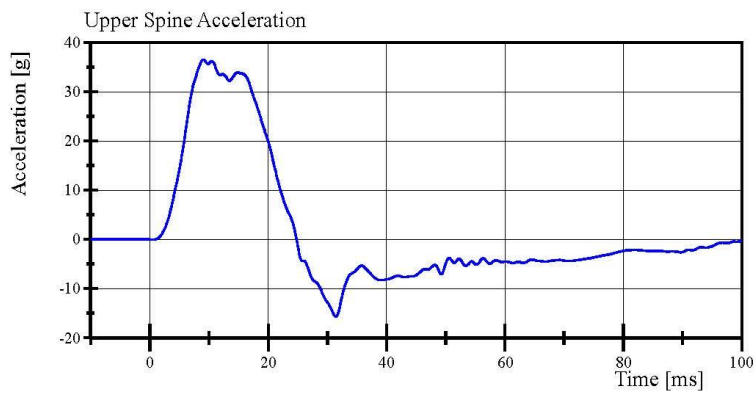
Lower Thorax Rib S/N: 180-3362 DP7664

Transportation Research Center Inc.

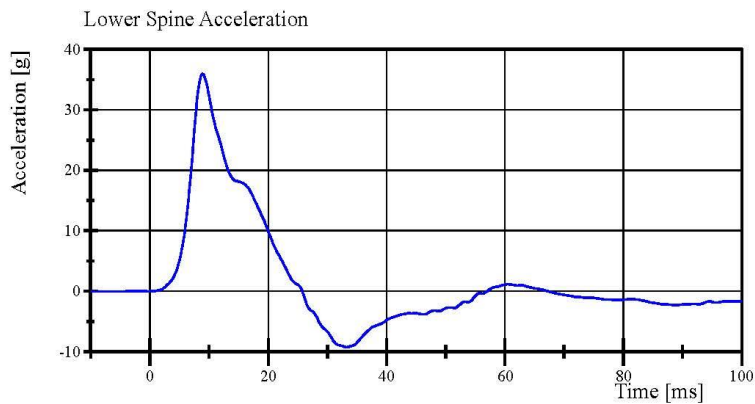
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 0.4 g at 43.7 ms
Min: -34.5 g at 12.8 ms



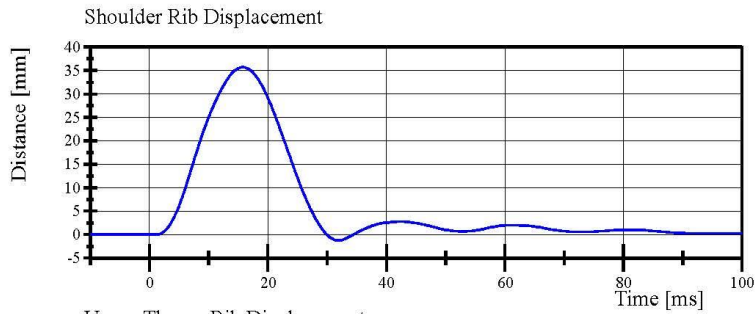
Filter Class: CFC_180
Max: 36.5 g at 9.0 ms
Min: -15.7 g at 31.4 ms



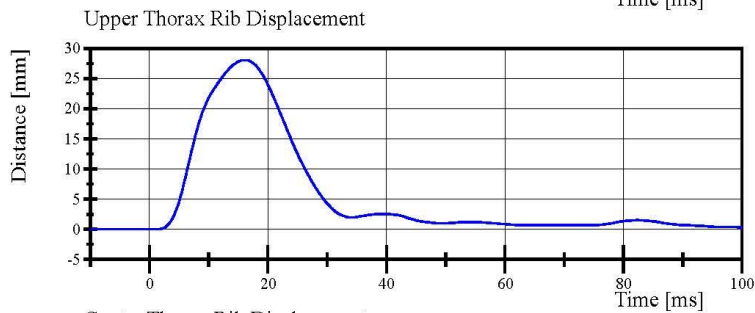
Filter Class: CFC_180
Max: 36.0 g at 8.9 ms
Min: -9.3 g at 33.3 ms

Transportation Research Center Inc.

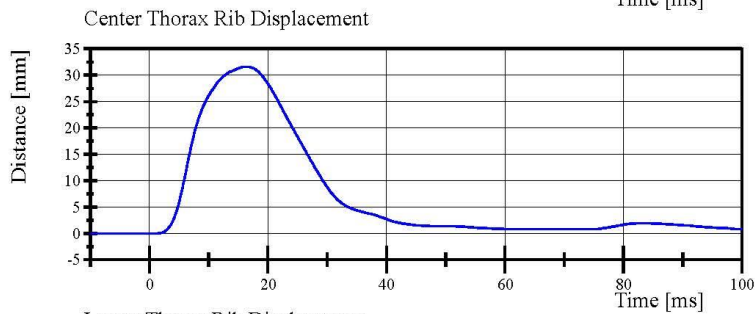
Left Lateral Thorax with Arm
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021



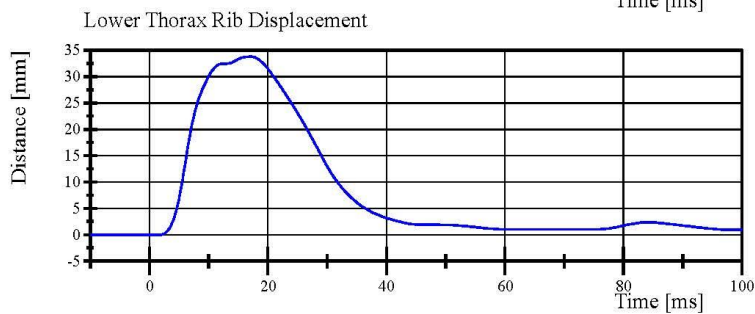
Filter Class: CFC_600
Max: 35.7 mm at 15.8 ms
Min: -1.2 mm at 31.9 ms



Filter Class: CFC_600
Max: 28.1 mm at 15.9 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 31.6 mm at 16.3 ms
Min: -0.0 mm at 0.9 ms



Filter Class: CFC_600
Max: 33.8 mm at 17.2 ms
Min: -0.0 mm at 1.7 ms

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.330 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.4 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.4 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.4 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	39.9 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.7 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.0 g	Yes

Test meets specifications.

Condition: Used

Comments:

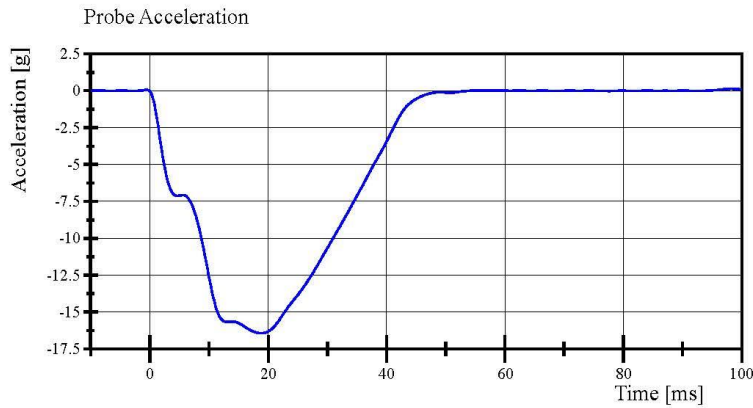
Upper Thorax Rib S/N: 180-3362 DP6492

Middle Thorax Rib S/N: 180-3362 DP6493

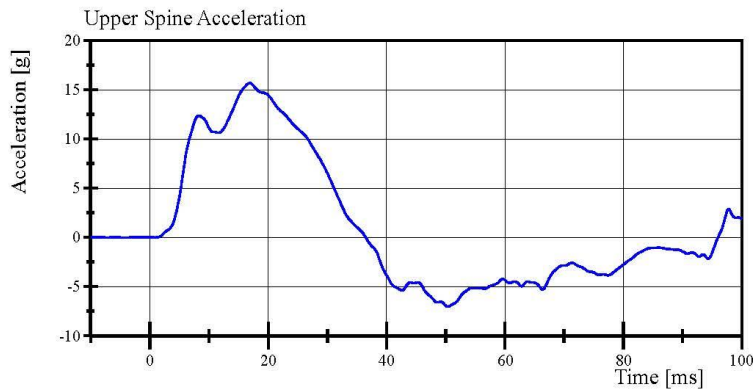
Lower Thorax Rib S/N: 180-3362 DP7664

Transportation Research Center Inc.

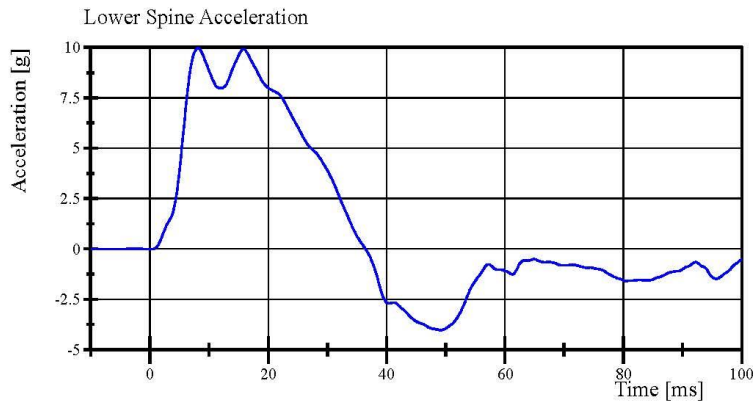
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 0.1 g at 98.2 ms
Min: -16.4 g at 18.8 ms



Filter Class: CFC_180
Max: 15.7 g at 16.9 ms
Min: -7.0 g at 50.3 ms

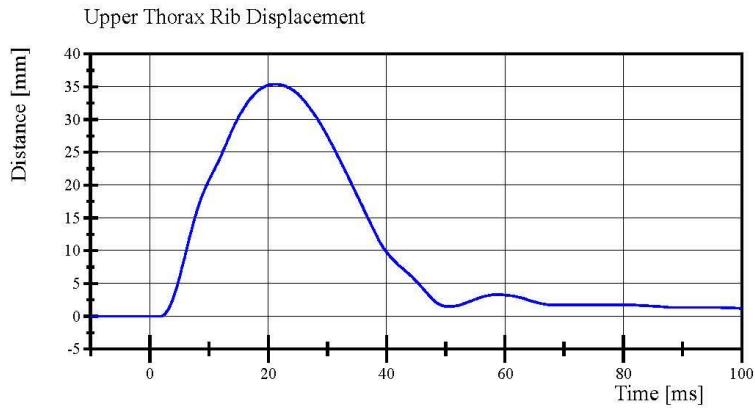


Filter Class: CFC_180
Max: 10.0 g at 8.2 ms
Min: -4.0 g at 49.1 ms

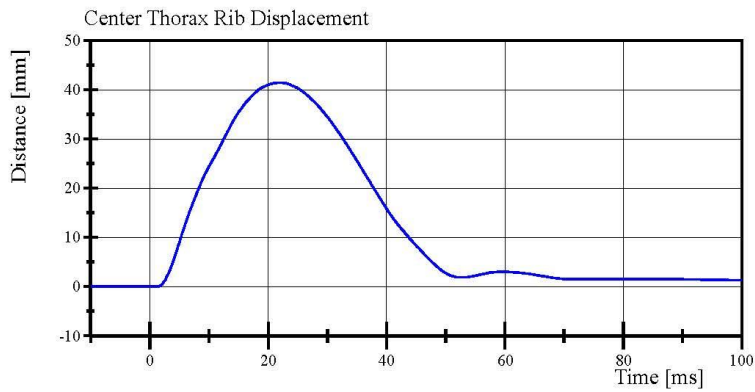


Transportation Research Center Inc.

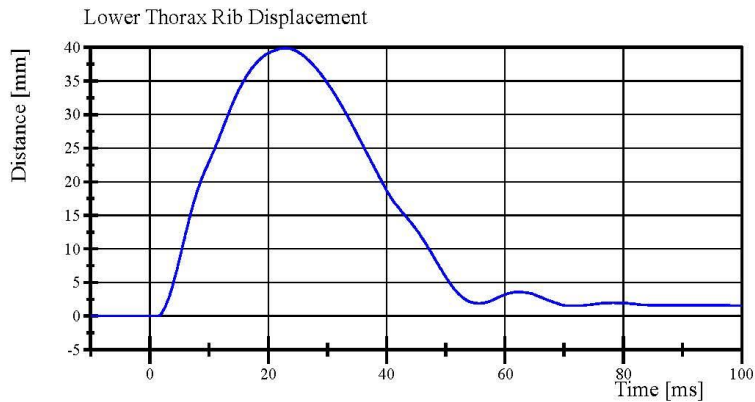
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021



Filter Class: CFC_600
Max: 35.4 mm at 21.3 ms
Min: -0.0 mm at 1.7 ms



Filter Class: CFC_600
Max: 41.4 mm at 21.9 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 39.9 mm at 23.0 ms
Min: -0.0 mm at 1.3 ms



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-15.4 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	40.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	37.7 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.38 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: 180-3368 DP5142

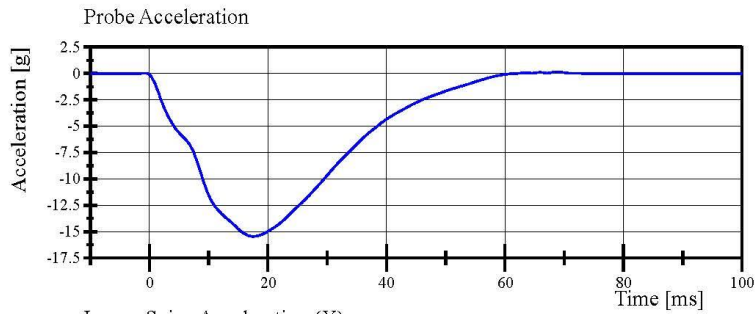
Lower Abdominal Rib S/N: 180-3368 DP5143

Transportation Research Center Inc.

Left Lateral Abdomen

SID IIS Serial No. DQ0570 Certification No. 8-1

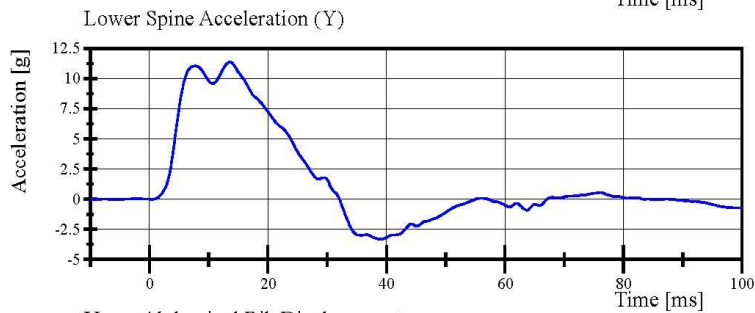
Test Date: 1/8/2021



Filter Class: CFC_180

Max: 0.1 g at 68.6 ms

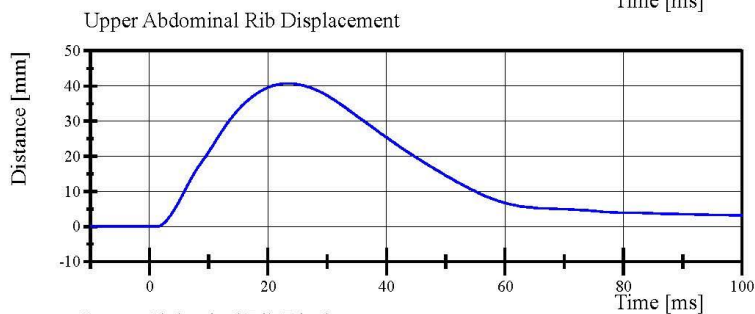
Min: -15.4 g at 17.5 ms



Filter Class: CFC_180

Max: 11.4 g at 13.6 ms

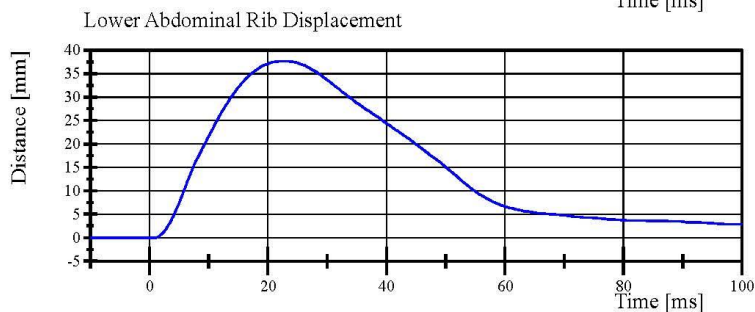
Min: -3.3 g at 39.0 ms



Filter Class: CFC_600

Max: 40.7 mm at 23.3 ms

Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600

Max: 37.7 mm at 22.6 ms

Min: -0.0 mm at 0.8 ms

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

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Transportation Research Center Inc.

Left Lateral Pelvis
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.75 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	37.7 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,002.1 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: EN1613

Pelvis Plug Info:

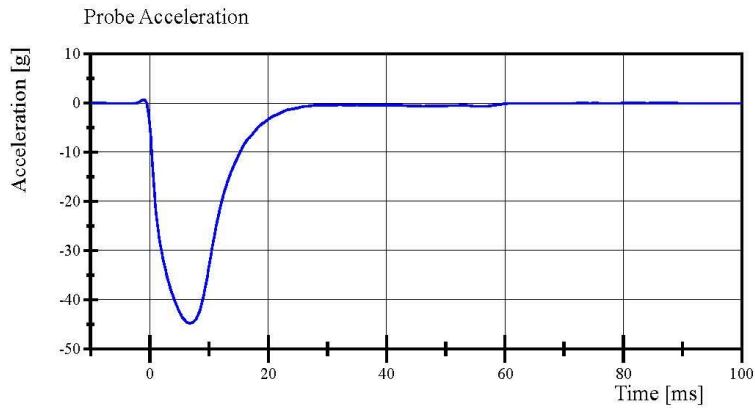
Manufacturer: SACO

S/N: 13209

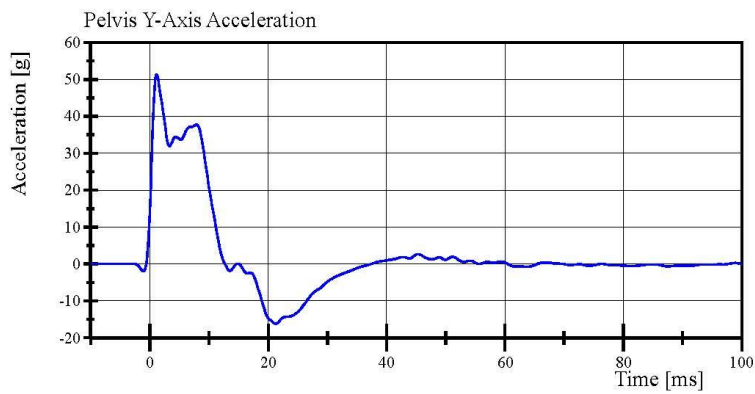
Cal Date: 20190808

Transportation Research Center Inc.

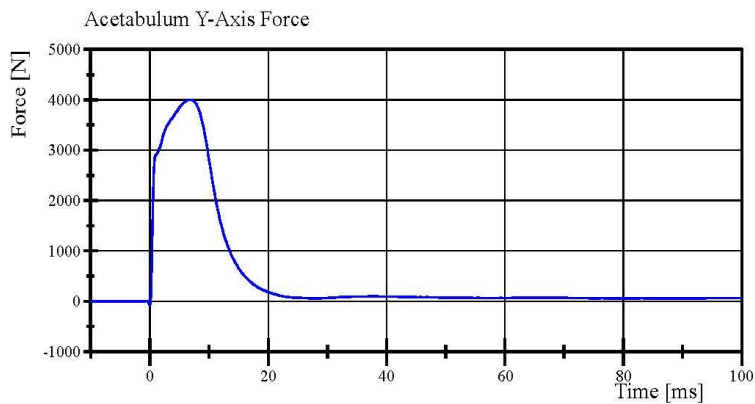
Left Lateral Pelvis
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 0.7 g at -1.0 ms
Min: -44.8 g at 6.8 ms



Filter Class: CFC_180
Max: 51.3 g at 1.1 ms
Min: -16.2 g at 21.3 ms



Filter Class: CFC_600
Max: 4,002.1 N at 6.7 ms
Min: -72.0 N at 0.0 ms



Transportation Research Center Inc.

Left Lateral Iliac
SID IIS Serial No. DQ0570 Certification No. 8-1
Test Date: 1/8/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-37.8 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,189.4 N	Yes

Test meets specifications.

Condition: Used

Comments:

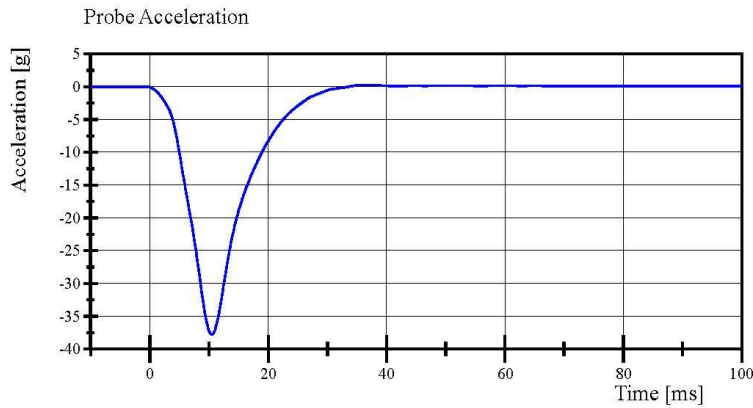
Pelvis Skin S/N: EN1613

Transportation Research Center Inc.

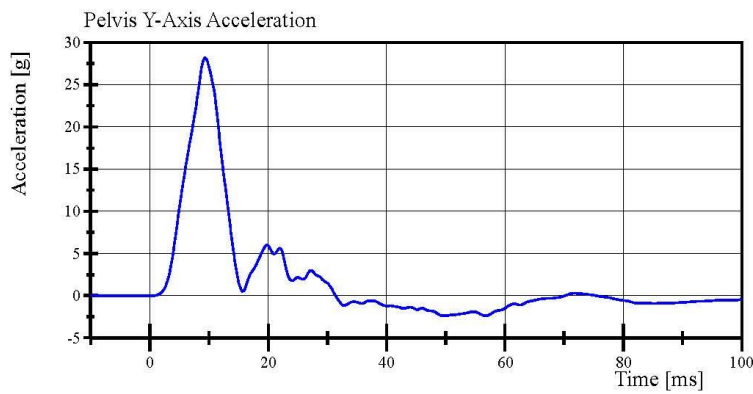
Left Lateral Iliac

SID IIs Serial No. DQ0570 Certification No. 8-1

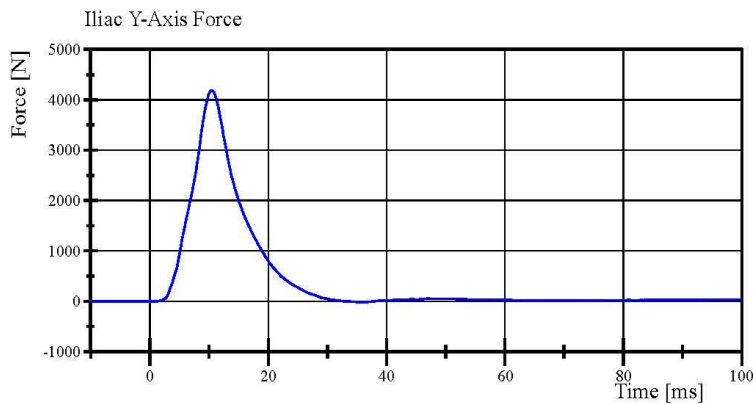
Test Date: 1/8/2021



Filter Class: CFC_180
Max: 0.2 g at 37.4 ms
Min: -37.8 g at 10.5 ms



Filter Class: CFC_180
Max: 28.2 g at 9.4 ms
Min: -2.4 g at 56.8 ms



Filter Class: CFC_600
Max: 4,189.4 N at 10.5 ms
Min: -17.1 N at 36.1 ms

Post-Test Calibration Sheets
Passenger S/N DQ0570

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DQ0570 Calibration No. 09

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	785	Yes
B	Shoulder Pivot Height	437.0 - 453.0	445	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	147	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	184	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	533	Yes
L	Popliteal Height	343.0 - 369.0	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	427	Yes
O	Chest Depth without Jacket	195.0 - 211.0	200	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	316	Yes
R	Arm Length	249.0 - 259.0	254	Yes
S	Knee Joint to seat Back	478.0 - 493.0	486	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIS Serial No. DQ0570 Certification No. 9-2
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	132.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.7 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.10 %	Yes

Test meets specifications.

Condition: Used

Comments:

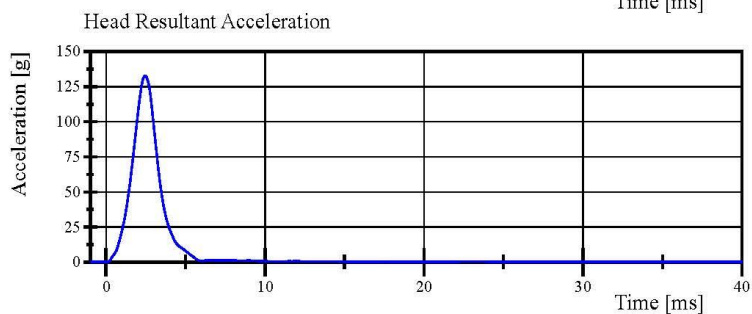
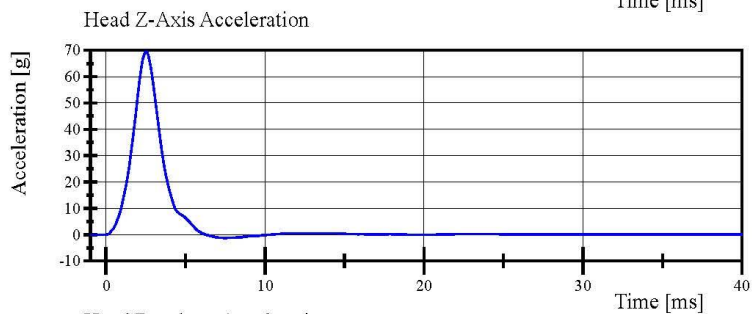
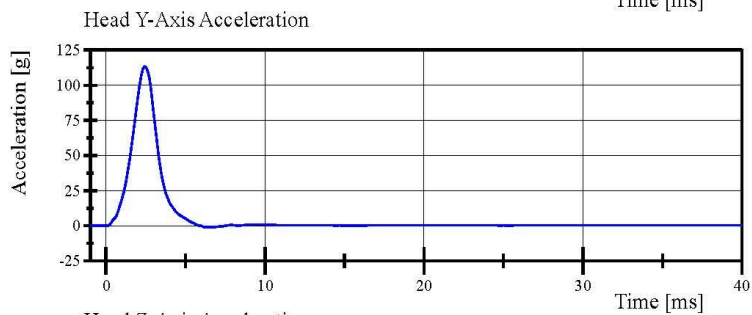
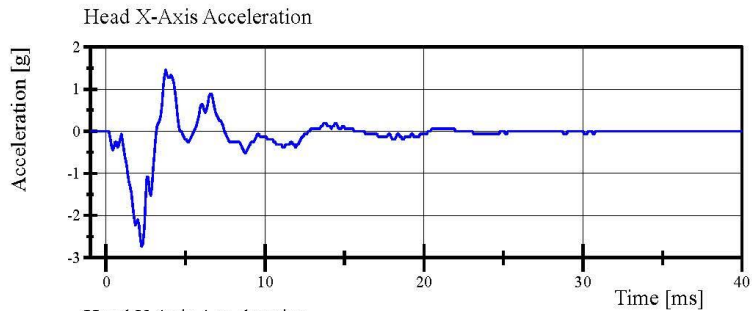
Head Skin S/N: DP6812

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. DQ0570 Certification No. 9-2

Test Date: 2/22/2021



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

02.22.2021 13:55:34 200



Transportation Research Center Inc.

Left Lateral Neck
SID IIS Serial No. DQ0570 Certification No. 9-2
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.620 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.732 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	4.000 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.355 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.878 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.896 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-71.1 deg	Yes
Time of Peak	50 - 70 ms	63.7 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	37.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	112.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

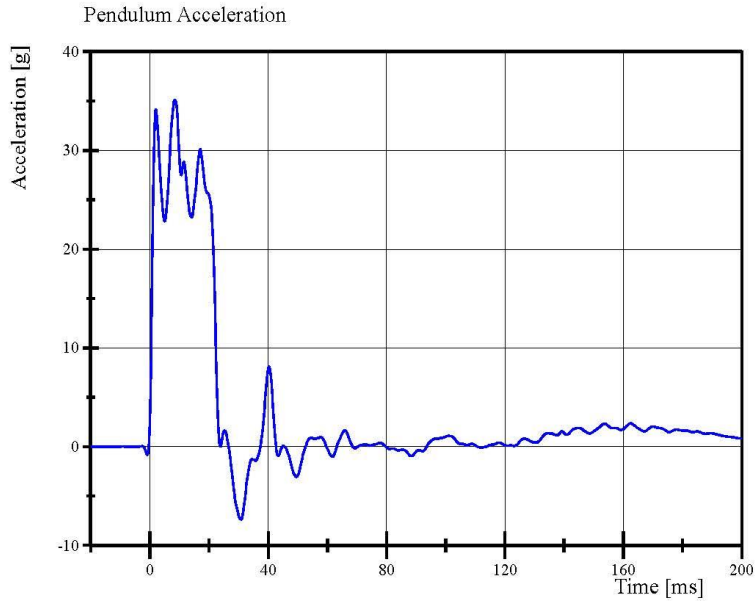
Neck S/N: 717

Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 9-2

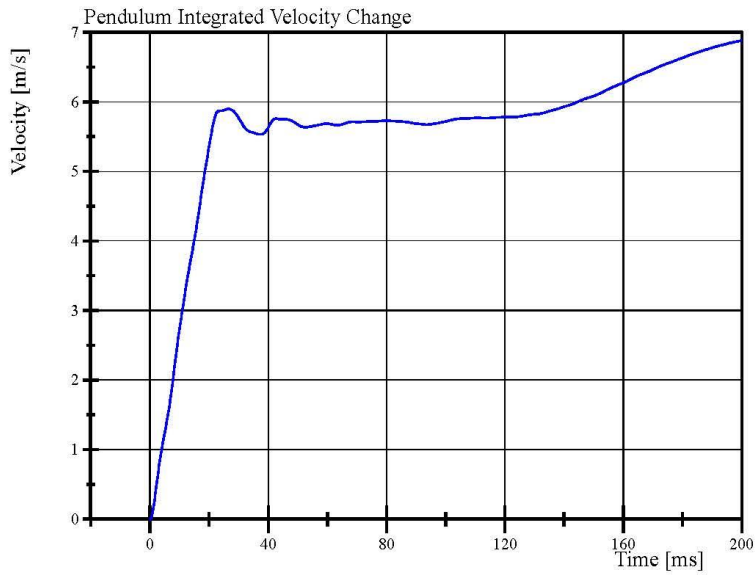
Test Date: 2/22/2021



Filter Class: CFC_180

Max: 35.1 g at 8.4 ms

Min: -7.4 g at 30.8 ms



Filter Class: CFC_180

Max: 6.9 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

02.22.2021 10:36:16 716



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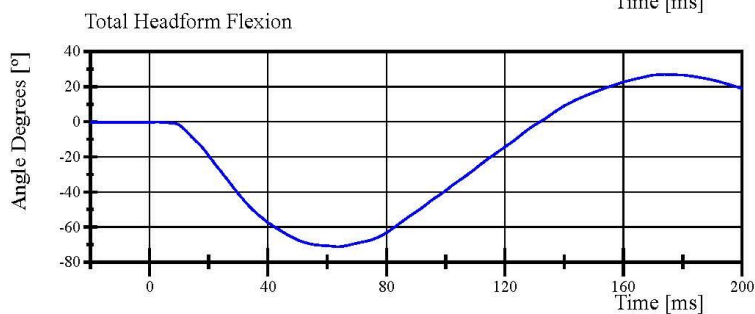
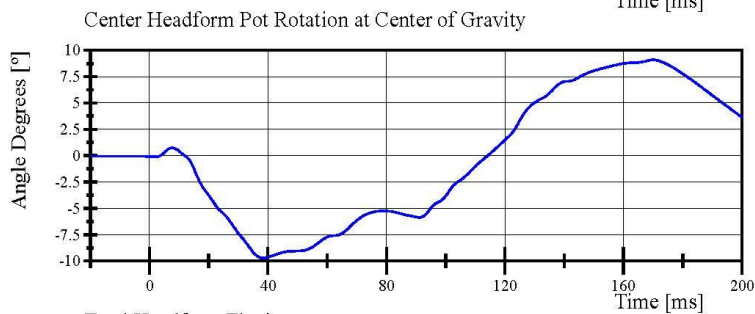
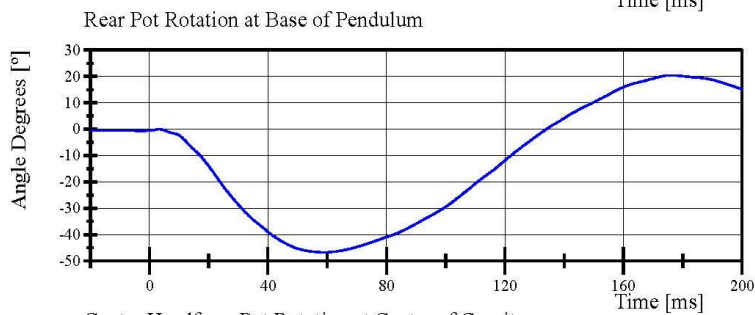
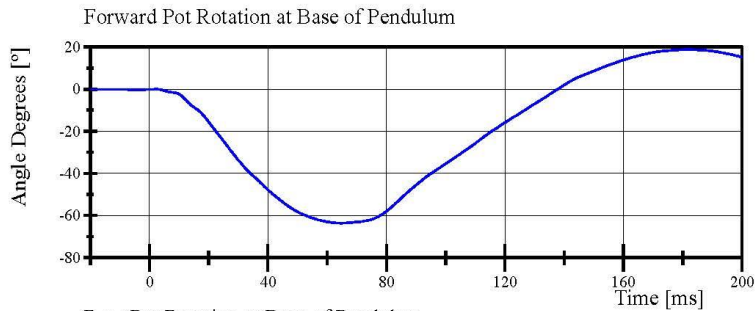
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Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 9-2

Test Date: 2/22/2021



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

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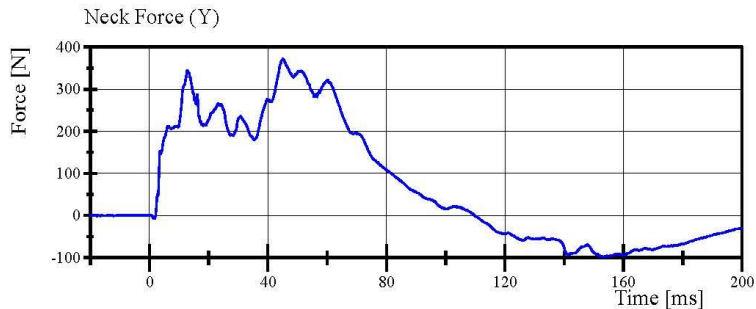


Transportation Research Center Inc.

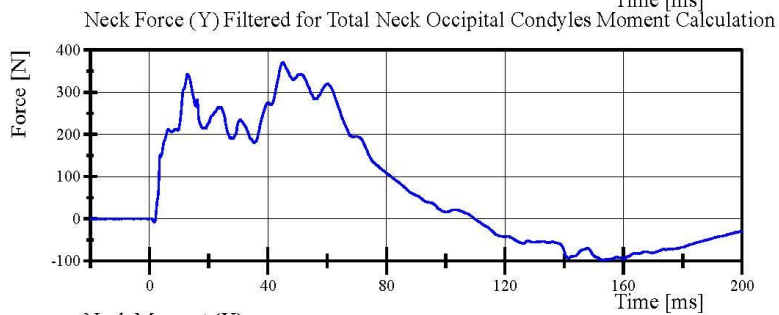
Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 9-2

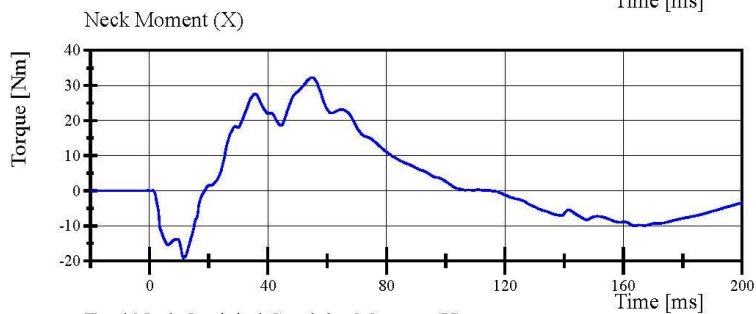
Test Date: 2/22/2021



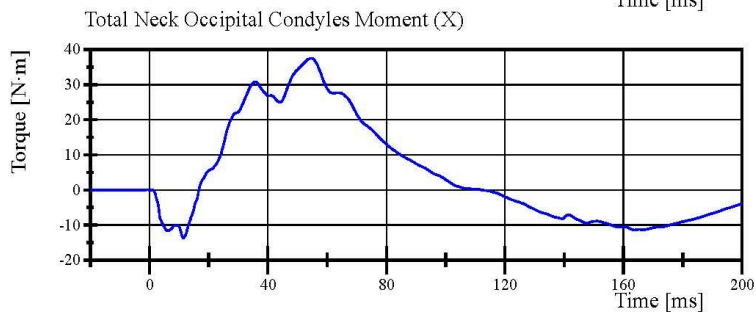
Filter Class: CFC_1000
Max: 371.9 N at 45.0 ms
Min: -98.2 N at 153.4 ms



Filter Class: CFC_600
Max: 371.1 N at 45.0 ms
Min: -98.0 N at 153.4 ms



Filter Class: CFC_600
Max: 32.2 Nm at 54.6 ms
Min: -19.1 Nm at 11.4 ms



Filter Class: Without_(Constar
Max: 37.5 N·m at 54.6 ms
Min: -13.7 N·m at 11.4 ms

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

02.22.2021 10:36:16 716



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIS Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.3 g	Yes
Shoulder Displacement	28 - 37 mm	31.2 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.2 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

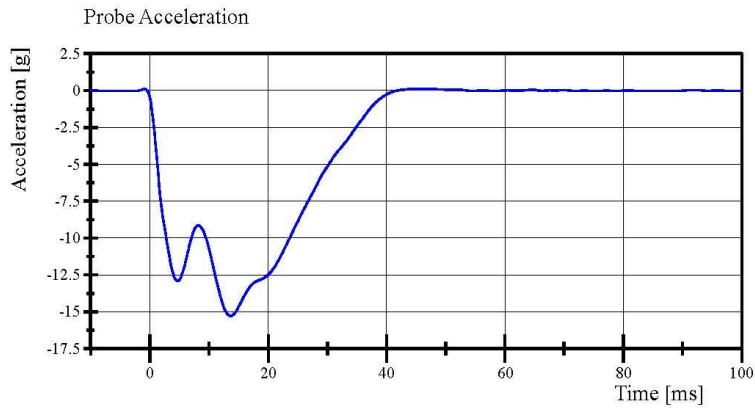
Shoulder Rib S/N: DO9814

Transportation Research Center Inc.

Left Lateral Shoulder

SID IIS Serial No. DQ0570 Certification No. 9-1

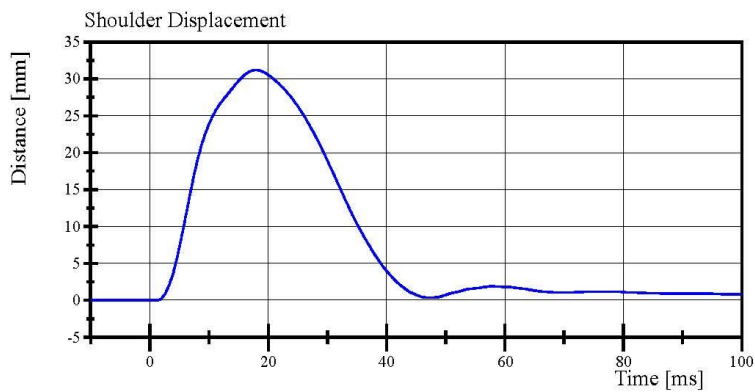
Test Date: 2/22/2021



Filter Class: CFC_180

Max: 0.1 g at -0.9 ms

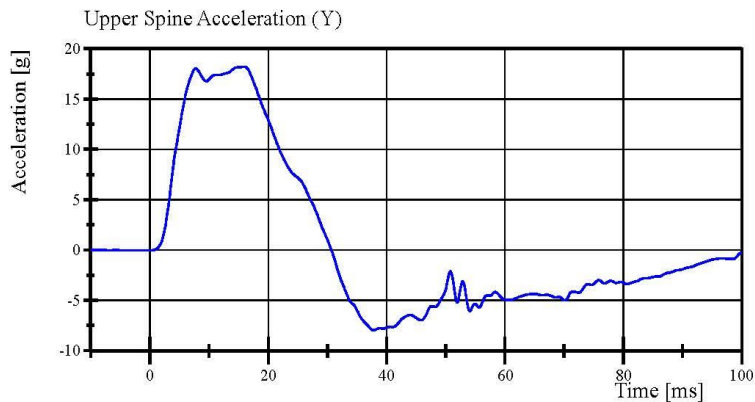
Min: -15.3 g at 13.7 ms



Filter Class: CFC_600

Max: 31.2 mm at 17.9 ms

Min: -0.0 mm at 1.0 ms



Filter Class: CFC_180

Max: 18.2 g at 15.8 ms

Min: -8.0 g at 37.8 ms

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

02.22.2021 10:48:07 861



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIS Serial No. DQ0570 Certification No. 9-2
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.682 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.1 g	Yes
Shoulder Displacement	31 - 40 mm	35.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.6 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.5 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.6 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.4 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

Shoulder Rib S/N: 180-3355 DO9814

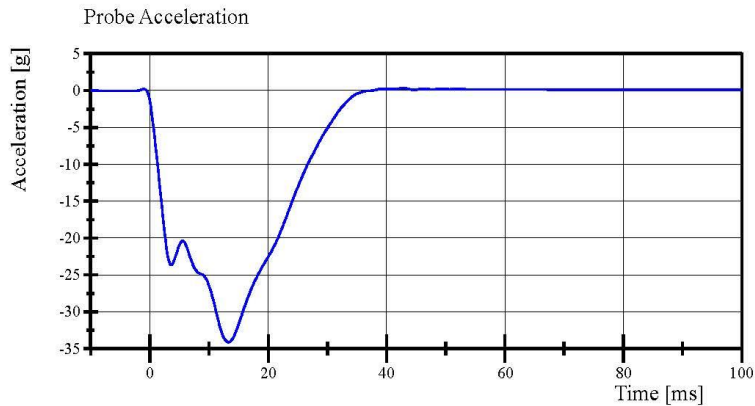
Upper Thorax Rib S/N: 180-3362 DP6492

Middle Thorax Rib S/N: 180-3362 DP6493

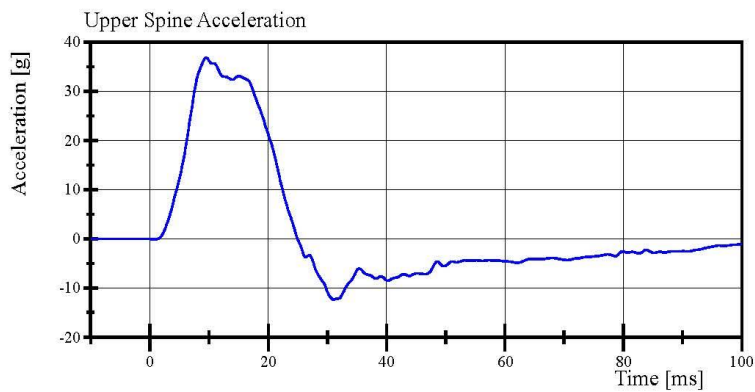
Lower Thorax Rib S/N: 180-3362 DP7664

Transportation Research Center Inc.

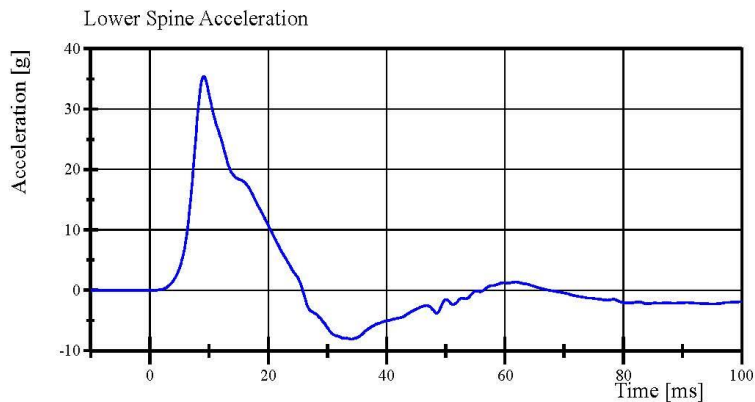
Left Lateral Thorax with Arm
SID IIS Serial No. DQ0570 Certification No. 9-2
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 0.3 g at 42.8 ms
Min: -34.1 g at 13.3 ms



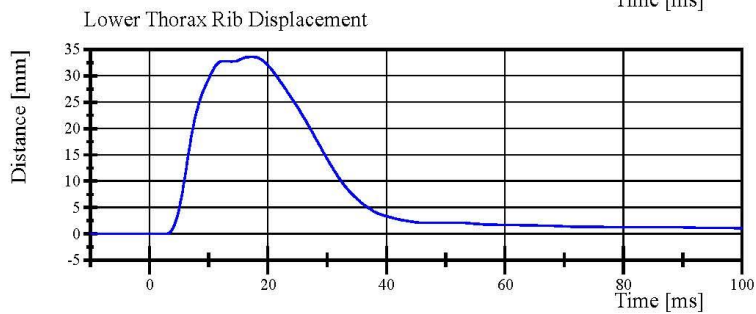
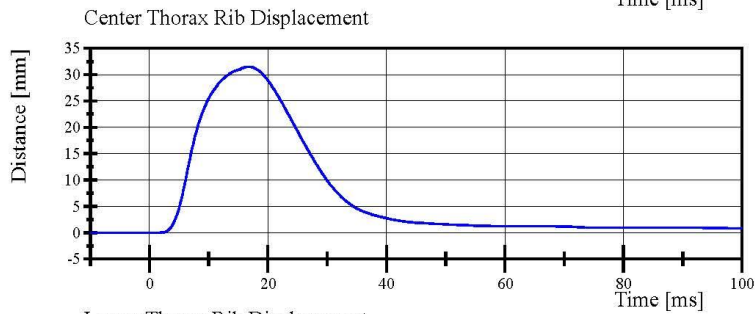
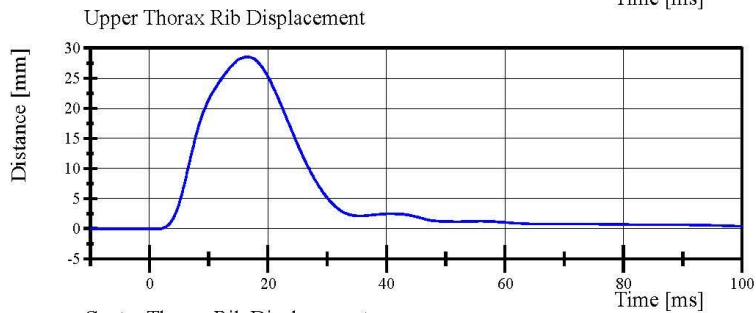
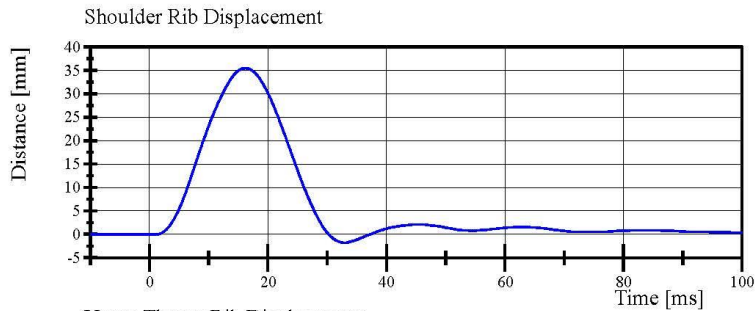
Filter Class: CFC_180
Max: 36.8 g at 9.4 ms
Min: -12.4 g at 31.0 ms



Filter Class: CFC_180
Max: 35.4 g at 9.1 ms
Min: -8.1 g at 34.1 ms

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIS Serial No. DQ0570 Certification No. 9-2
Test Date: 2/22/2021



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIS Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.329 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.3 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	39.2 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	42.5 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.6 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.4 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.9 g	Yes

Test meets specifications.

Condition: Used

Comments:

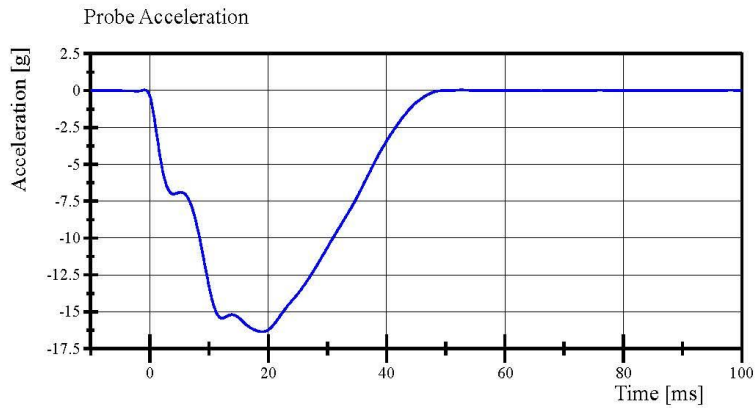
Upper Thorax Rib S/N: 180-3362 DP6492

Middle Thorax Rib S/N: 180-3362 DP6493

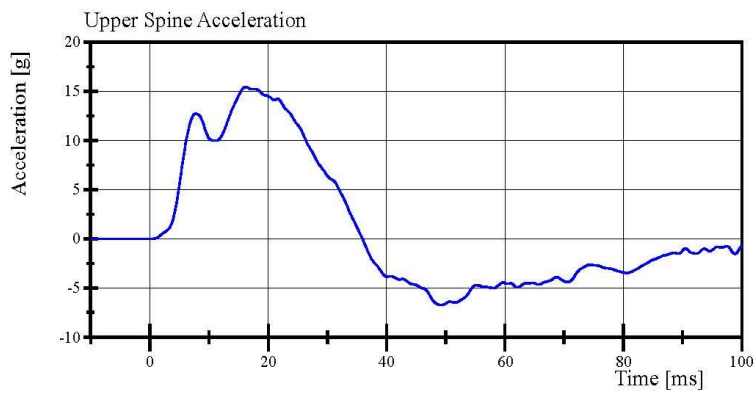
Lower Thorax Rib S/N: 180-3362 DP7664

Transportation Research Center Inc.

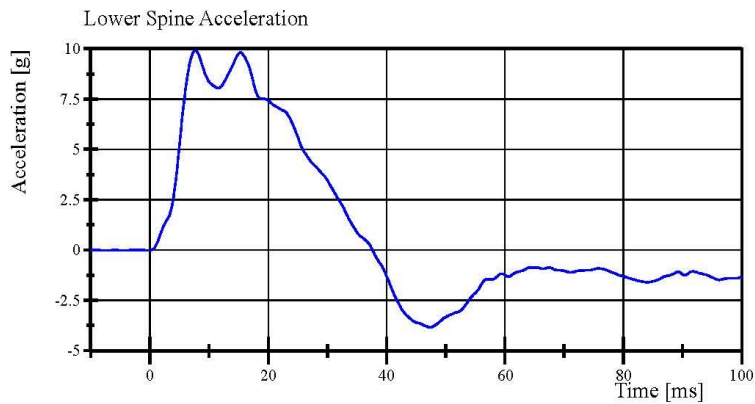
Left Lateral Thorax without Arm
SID IIS Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021



Filter Class: CFC_180
Max: 0.0 g at 52.6 ms
Min: -16.3 g at 19.0 ms



Filter Class: CFC_180
Max: 15.4 g at 16.2 ms
Min: -6.7 g at 49.3 ms

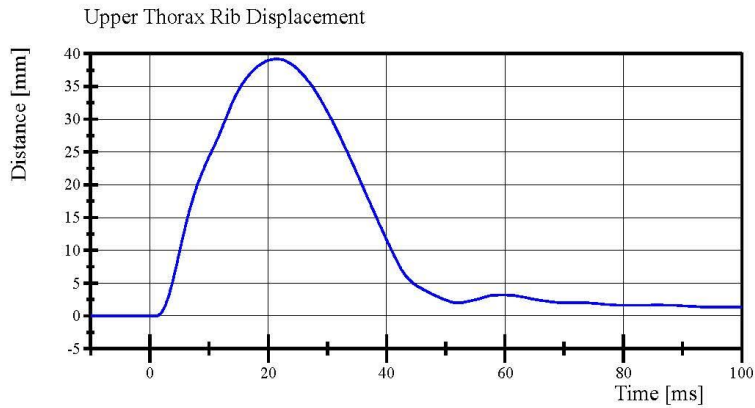


Filter Class: CFC_180
Max: 9.9 g at 7.7 ms
Min: -3.8 g at 47.4 ms

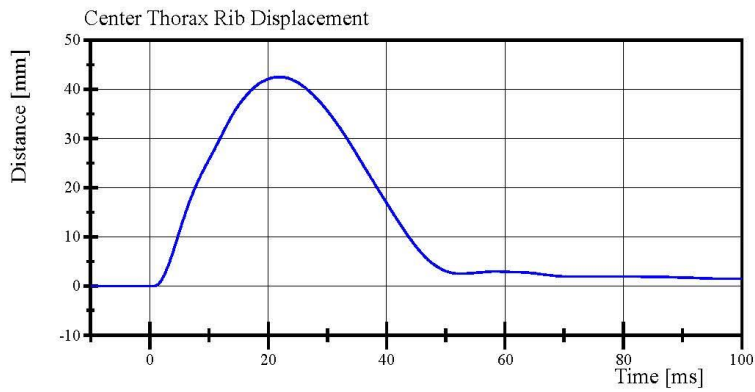


Transportation Research Center Inc.

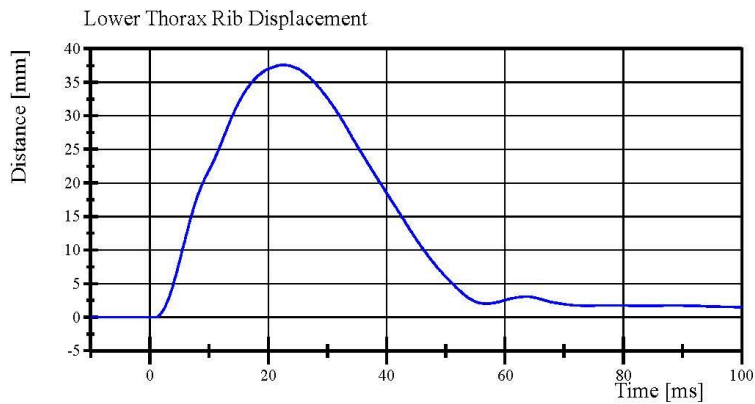
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021



Filter Class: CFC_600
Max: 39.2 mm at 21.4 ms
Min: -0.0 mm at 0.9 ms



Filter Class: CFC_600
Max: 42.5 mm at 21.9 ms
Min: -0.0 mm at -0.5 ms



Filter Class: CFC_600
Max: 37.6 mm at 22.6 ms
Min: -0.0 mm at 1.0 ms



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIS Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-15.0 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.6 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.91 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: 180-3368 DP5142

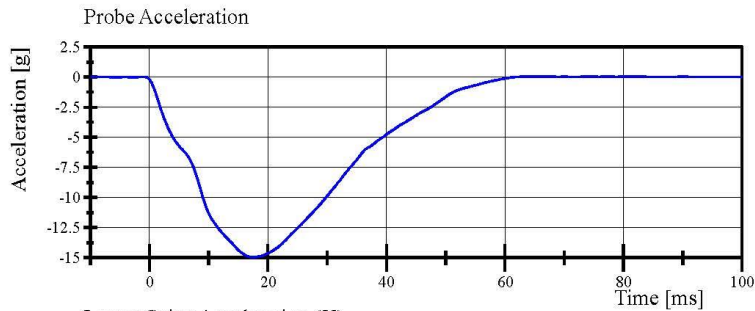
Lower Abdominal Rib S/N: 180-3368 DP5143

Transportation Research Center Inc.

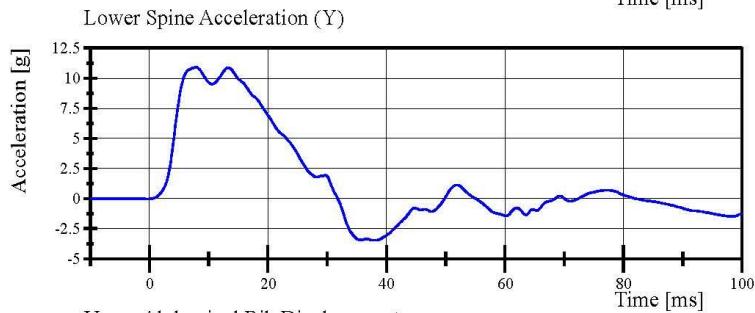
Left Lateral Abdomen

SID IIS Serial No. DQ0570 Certification No. 9-1

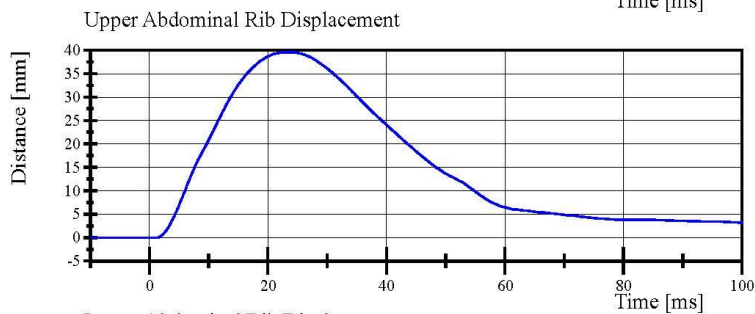
Test Date: 2/22/2021



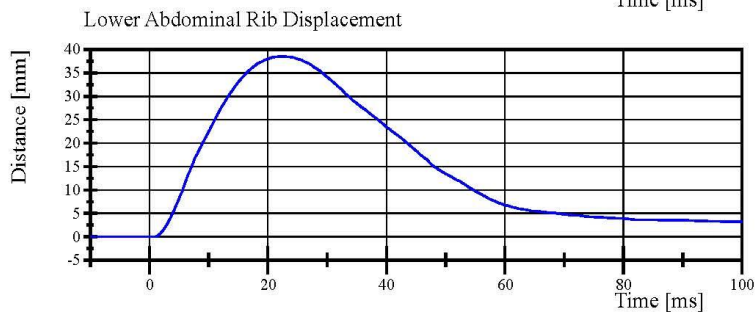
Filter Class: CFC_180
Max: 0.1 g at 64.9 ms
Min: -15.0 g at 17.4 ms



Filter Class: CFC_180
Max: 10.9 g at 7.8 ms
Min: -3.5 g at 37.8 ms



Filter Class: CFC_600
Max: 39.6 mm at 23.4 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 38.5 mm at 22.4 ms
Min: -0.0 mm at -3.7 ms

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

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Transportation Research Center Inc.

Left Lateral Pelvis
SID IIS Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-45.14 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.9 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,976.2 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: EN1613

Pelvis Plug Info:

Manufacturer: SACO

S/N: 13144

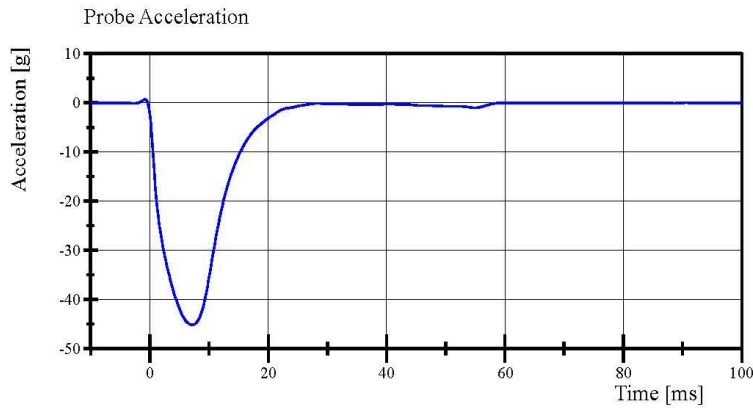
Cal Date: 20190808

Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DQ0570 Certification No. 9-1

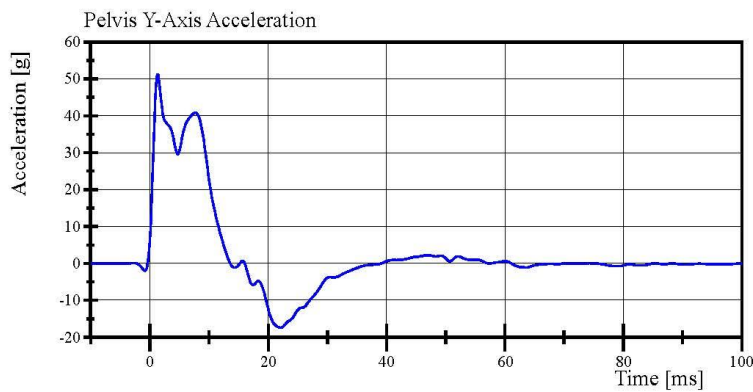
Test Date: 2/22/2021



Filter Class: CFC_180

Max: 0.7 g at -0.8 ms

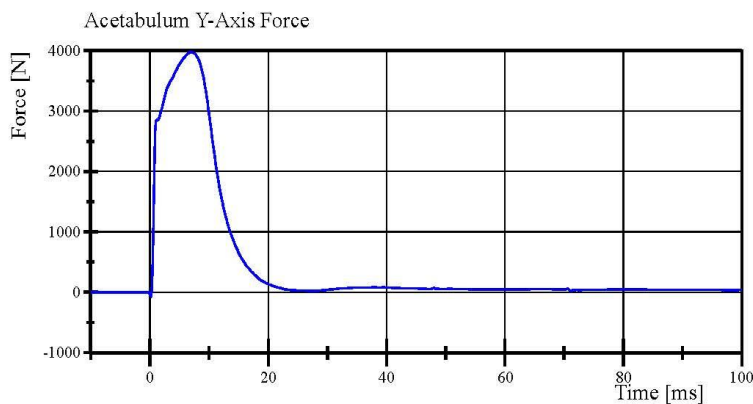
Min: -45.1 g at 7.1 ms



Filter Class: CFC_180

Max: 51.2 g at 1.3 ms

Min: -17.4 g at 22.1 ms



Filter Class: CFC_600

Max: 3,976.2 N at 7.0 ms

Min: -72.6 N at 0.2 ms

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

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Transportation Research Center Inc.

Left Lateral Iliac
SID IIS Serial No. DQ0570 Certification No. 9-1
Test Date: 2/22/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-38.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.9 g	Yes
Iliac Force	4,100 - 5,100 N	4,326.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

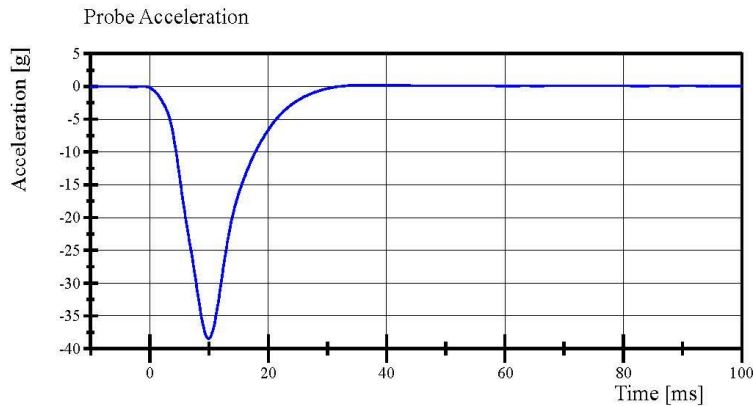
Pelvis Skin S/N: EN1613

Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DQ0570 Certification No. 9-1

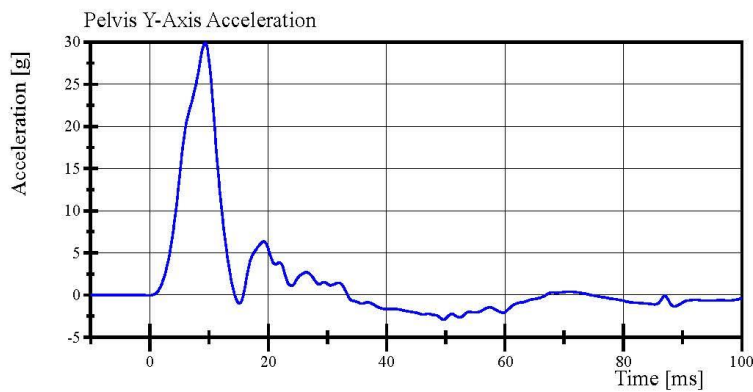
Test Date: 2/22/2021



Filter Class: CFC_180

Max: 0.2 g at 34.5 ms

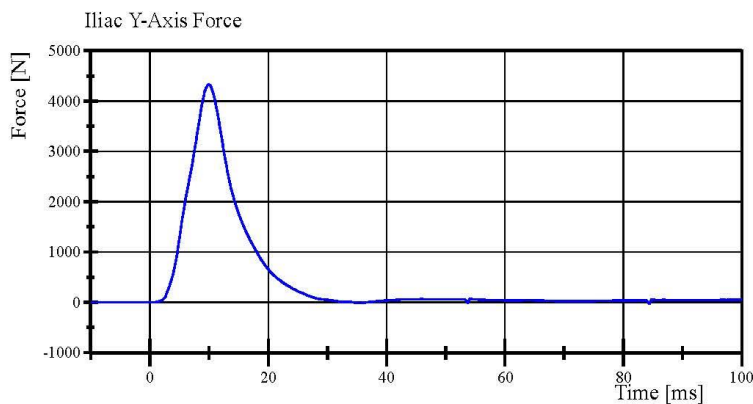
Min: -38.5 g at 9.9 ms



Filter Class: CFC_180

Max: 29.9 g at 9.4 ms

Min: -2.9 g at 49.6 ms



Filter Class: CFC_600

Max: 4,326.8 N at 9.9 ms

Min: -28.1 N at 84.4 ms

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

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Report Number: DQ0570_S2H09

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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	19-Aug-2020	
	Y	T10352	Endevco	19-Aug-2020	
	Z	P91950	Endevco	19-Aug-2020	
Redundant Head Accelerometers	X	T11817	Endevco	19-Aug-2020	
	Y	P83368	Endevco	19-Aug-2020	
	Z	P91904	Endevco	3-Feb-2021	
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	21-Aug-2020
	Middle	Y	174	FTSS	21-Aug-2020
	Lower	Y	0913	Honeywell	21-Aug-2020
Abdomen Load Cells	Front	Y	1441	Denton	20-Aug-2020
	Middle	Y	1436	Denton	20-Aug-2020
	Rear	Y	1437	Denton	20-Aug-2020
Lower Spine Accelerometers (T12)	X	T11866	Endevco	25-Jan-2021	
	Y	P91615	Endevco	3-Feb-2021	
	Z	P64884	Endevco	25-Jan-2021	
Acetabulum Load Cell	Y	N/A	N/A	N/A	
Pubic Symphysis Load Cell	Y	457-FY	Denton	8-May-2020	

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N DQ0570		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X		T11432	Endevco	25-Jan-2021
		Y		P93774	Endevco	25-Jan-2021
		Z		P91566	Endevco	25-Jan-2021
Redundant Head Accelerometers		X		T16785	Endevco	1-Feb-2021
		Y		P93762	Endevco	25-Jan-2021
		Z		P93761	Endevco	25-Jan-2021
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	24-Aug-2020
		Middle	Y	037	Servo	24-Aug-2020
		Lower	Y	048	Servo	24-Aug-2020
	Abdominal Rib	Upper	Y	1295	Servo	24-Aug-2020
		Lower	Y	1136	Servo	24-Aug-2020
Lower Spine Accelerometers (T12)		X		P94545	Endevco	25-Jan-2021
		Y		P94647	Endevco	25-Jan-2021
		Z		P94530	Endevco	25-Jan-2021
Acetabulum Load Cell		Y		DK7483S-FY	FTSS	20-Aug-2020
Iliac Wing Load Cell		Y		287-FY	Denton	20-Aug-2020
Pelvis Plug (struck side)				13164	SACO	08-Aug-2019
Pelvis Plug (non-struck side)				13275	SACO	08-Aug-2019

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T23837	Endevco	15-Sep-2020
	Vehicle Center of Gravity	Y	T23797	Endevco	11-Sep-2020
	Vehicle Center of Gravity	Z	T23807	Endevco	15-Sep-2020
2	Right Sill at Front Seat	X	T16770	Endevco	27-Aug-2020
	Right Sill at Front Seat	Y	T11835	Endevco	13-Jan-2021
	Right Sill at Front Seat	Z	P61501	Endevco	13-Jan-2021
3	Right Sill at Rear Seat	X	T23815	Endevco	11-Sep-2020
	Right Sill at Rear Seat	Y	T23777	Endevco	15-Sep-2020
	Right Sill at Rear Seat	Z	T23789	Endevco	15-Sep-2020
4	Left Sill at Front Door	Y	P73587	Endevco	1-Feb-2021
5	Left Sill at Rear Door	Y	P58472	Endevco	27-Aug-2020
6	Left A-Post Lower	Y	P44288	Endevco	12-Jan-2021
7	Left A-Post Middle	Y	T11449	Endevco	12-Jan-2021
8	Left B-Post Lower	Y	P76114	Endevco	20-Nov-2020
9	B-Post Middle	Y	P76171	Endevco	20-Nov-2020
10	Front Seat Track	Y	P88461	Endevco	11-Feb-2021
11	Rear Seat Track or Structure	Y	P87134	Endevco	11-Feb-2021
12	Right Rear Occupant Compartment	Y	T16771	Endevco	27-Aug-2020
13	Engine Block	X	T23832	Endevco	29-Sep-2020
	Engine Block	Y	T23813	Endevco	11-Sep-2020
14	Rear Floorpan Above Axle	X	P94567	Endevco	20-Nov-2020
	Rear Floorpan Above Axle	Y	P33547	Endevco	20-Nov-2020
	Rear Floorpan Above Axle	Z	P75115	Endevco	20-Nov-2020

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	T11875	Endevco	27-Aug-2020
MDB Center of Gravity	Y	T11867	Endevco	27-Aug-2020
MDB Center of Gravity	Z	T11804	Endevco	27-Aug-2020
Left Frame Rail at Rear Axle Centerline	X	T23821	Endevco	11-Sep-2020
Left Frame Rail at Rear Axle Centerline	Y	T23805	Endevco	11-Sep-2020