FINAL REPORT NUMBER: SINCAP-TRC-20-004

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

HYUNDAI MOTOR COMPANY
2020 Hyundai Venue 5-Door Hatchback
NHTSA NUMBER: M20204211

PREPARED BY:
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Report Date: April 2, 2020

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: April 2, 2020

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 2020 Hyundai Venue 5-Door Hatchback, 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 January 23, 2020.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.25 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 22.3° C. The target vehicle post-test maximum crush was 219 mm at Level 3. The test vehicle's performance was as follows:

Driver ATD (ES-2re)

Measurement Description	**Units**	**IARV**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	154
Maximum Thoracic Rib Deflection	mm	44	28.9
Total Abdominal Force	N	2500	957.4
Pubic Symphysis Force	N	6000	-1223.7
Lower Spine Acceleration	G	82*	41.7

Passenger ATD (SID-IIs)

Measurement Description	**Units**	**IARV**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	223
Lower Spine Resultant Acceleration	g's	82	81.5
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3751.8
Maximum Thoracic Rib Deflection	mm	38*	31.6
Maximum Abdominal Rib Deflection	mm	45*	39.9

* Proposed IARV

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590

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TABLE OF CONTENTS

SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2020 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 2020 Hyundai Venue 5-Door Hatchback. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2020 Hyundai Venue 5-Door Hatchback was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.25 km/h (38.68 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 January 23, 2020. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

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

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (T12) tri-axial accelerometers
Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)
Primary and redundant head CG triaxial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen upper rib and lower rib y-axis displacement potentiometers
Lower spine (T12) tri-axial accelerometers
Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	154
Maximum Thoracic Rib Deflection	mm	44	28.9
Combined Abdominal Force	N	2500	957.4
Pubic Symphysis Force	N	6000	-1223.7
Lower Spine (T12) Resultant Acceleration	G	82*	41.7

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	223
Lower Spine (T12) Resultant Acceleration	G	82	81.5
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3751.8
Maximum Thoracic Rib Deflection	mm	38*	31.6
Maximum Abdominal Rib Deflection	mm	45*	39.9

* Proposed IARV

Supplemental Restraint Information is given below:

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

GENERAL COMMENTS

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

Left Lower A-Post Acceleration (Y); Failed after 16.0 ms

Left and right MDB Contact Channels failed

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20204211
Model Year	2020
Make	Hyundai
Model	Venue
Body Style	5HB
VIN	KMHRB8A32LU014323
Body Color	Galactic Grey
Odometer Reading (km/mi)	94 mi
Engine Displacement (L)	1.6
Type/No. Cylinders	Straight/4
Engine Placement	Front Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

Does owner's manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured By	HYUNDAI MOTOR COMPANY
Date of Manufacture	SEP/24/19
Vehicle Type	PASSENGER CAR

GVWR (lbs)	3770
GAWR Front (lbs)	2101
GAWR Rear (lbs)	1889

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

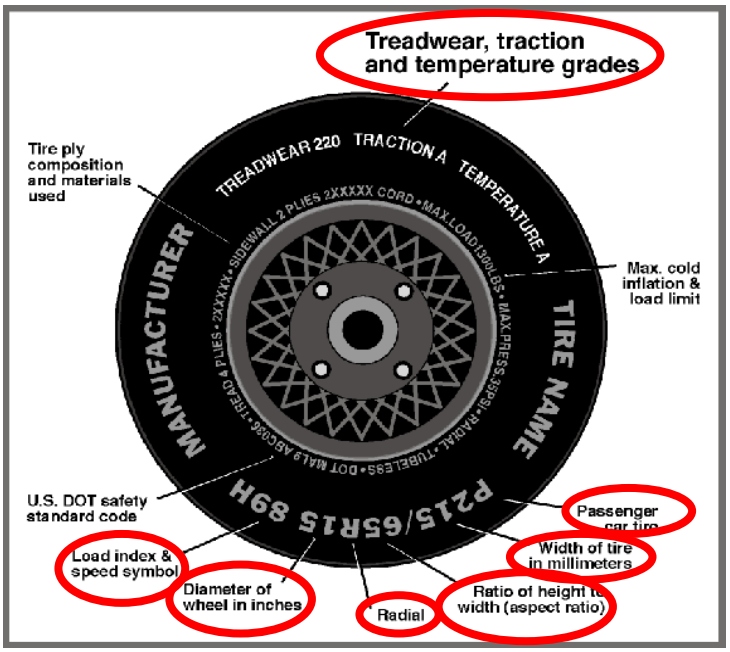
Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				380.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				39.8

VEHICLE SEAT TYPE

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

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

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	250	250
Recommended Tire Size	185/65R15	185/65R15
Tire Size on Vehicle	185/65R15	185/65R15
Tire Manufacturer	Hankook	Hankook
Tire Model	Kinergy GT	Kinergy GT
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	88H	88H
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	1T7DF IB HO 3219	1T7DF IB HO 3219
DOT Safety Code Right	1T7DF IB HO 3119	1T7DF IB HO 3219

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

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	250	250	250
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

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	362.2	241.8		409.2	295.6		410.6	315.0	
Right	kg	357.2	227.4		370.2	269.6		358.6	269.2	
Ratio	%	60.5	39.5		58.0	42.0		56.8	43.2	
Totals	kg	719.4	469.2	1188.6	779.4	565.2	1344.6	769.2	584.2	1353.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1188.6	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)[1]	kg	39.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1353.4	(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	674	675	Yes
RF	mm	689	682	Yes
RR	mm	672	675	Yes
LR	mm	655	658	Yes
Vehicle CG (Aft of Front Axle)	mm	1088	1060	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+56	+38	

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

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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: None	0.0
Removed: Rear bumper beam & fascia, and right rear door speaker	14.4

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

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

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	18.0	14.9	16.5
Front Passenger Seat	N/A	N/A	15.1
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	16.4
Non-Struck Side Rear Seat	N/A	N/A	16.9
Rear Center Seat*	N/A	N/A	12.9

* 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	16.5	177	Max	N/A	N/A	N/A
			Mid	166	177	186
			Min	N/A	N/A	N/A
Front Passenger Seat	15.1	178	Max	N/A	N/A	N/A
			Mid	172	178	184
			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	16.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	161	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	16.9	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	151	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	12.9	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	258	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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

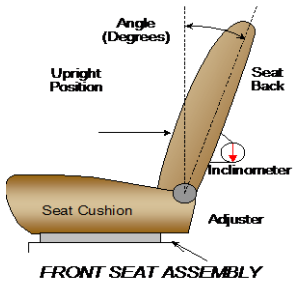
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	226	35	113	18
Front Passenger Seat	220	34	120	17
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	60.1	31	1.0	8
Front Passenger Seat	60.4	32	0.8	8
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	0	Fixed	23.8	Fixed
Non-Struck Side Rear Seat	0	Fixed	23.7	Fixed
Rear Center Seat*	0	Fixed	25.7	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	1	1, Fixed
Rear Seat	1	1, Fixed

HEAD RESTRAINT ADJUSTMENT

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

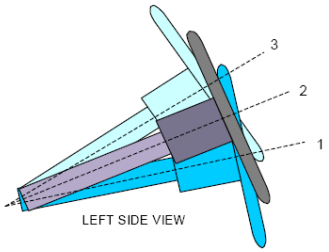
	Total # of Positions	Placed in Position #
Driver Seat	6	1 (Uppermost)
Rear Seat	2	2 (Lowermost)

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

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

STEERING COLUMN ADJUSTMENT

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



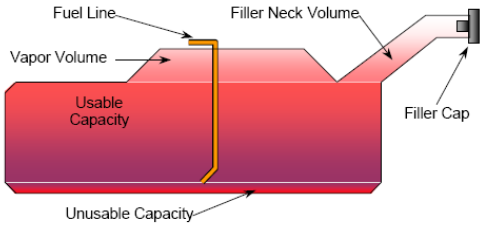
STEERING COLUMN ASSEMBLY

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	23.4	0
Geometric Center, Position No. 2	26.1	24
Uppermost, Position No. 3	28.8	48
Telescoping Steering Wheel Travel		48
Test Position	26.1	24

FUEL PUMP

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

Key is in the "ON" position.



VEHICLE FUEL TANK ASSEMBLY

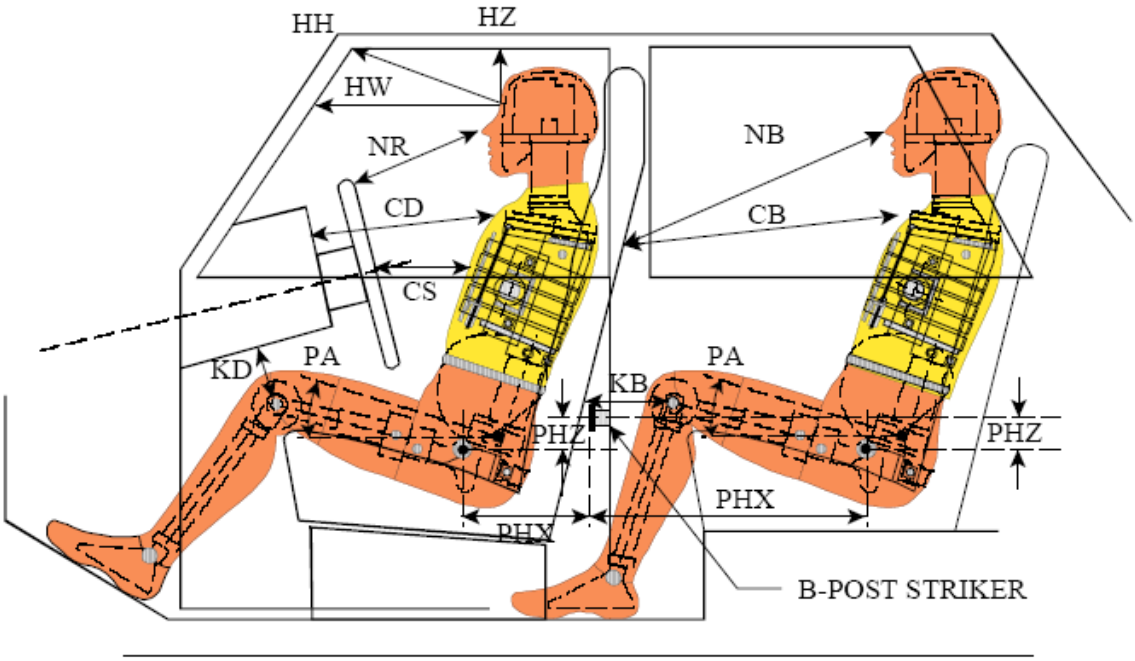
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	45.0
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	45.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	41.9
Actual Amount of Solvent Used in Test	42.0
1/3 of Usable Capacity	15.0

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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



LEFT SIDE VIEW

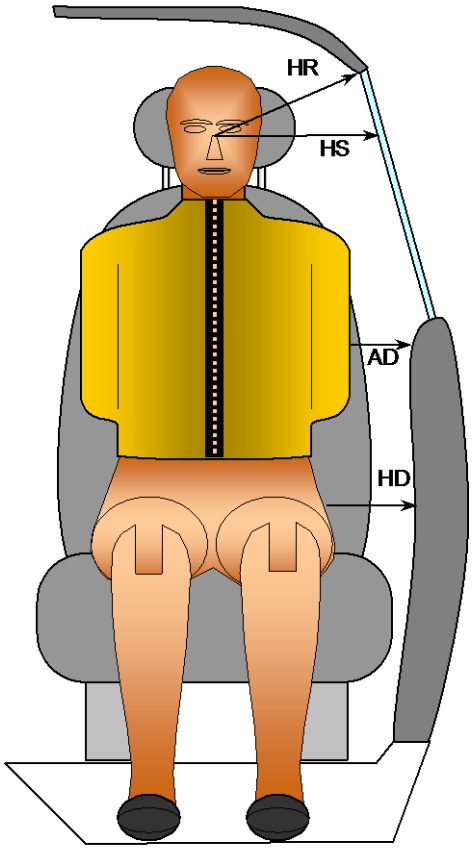
NOTE: 2-DOOR VEHICLE SHOWN. REAR DUMMY PHX & PHZ MEASUREMENTS FOR A 4-DOOR VEHICLE WOULD USE THE C-POST STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	430			
HW		Header to Windshield	645			
HZ	HZ	Head to Roof Liner	180		272	
NR	NB	Nose to Rim/Seat Back	430		561	
CD	CB	Chest to Dash/Seat Back	546		512	
CS		Chest to Steering Wheel	336			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	168	19.7	226	13.6
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	160	19.4	219	13.8
PAX°	PAX°	Pelvic Tilt Angle X		0.4		0.3
	PAY°	Pelvic Tilt Angle Y				21.7
PHX	PHX	Hip Point to Striker (X-Axis)	126		227	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	184		224	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

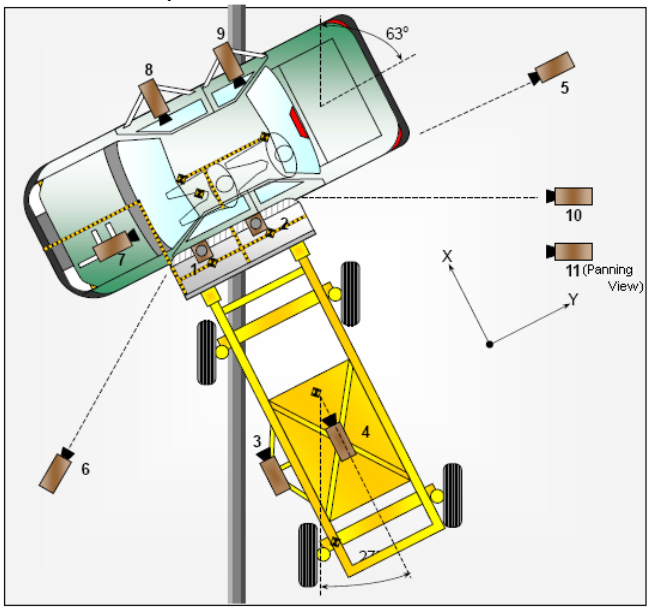


FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	201	237
HS	Head to Side Window	mm	321	339
AD	Arm to Door	mm	71	128
HD	H-Point to Door	mm	154	161

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-160	1150	-5692	12.5	1000
2	Overhead Close-up	0	770	-5692	28	1000
3	Left Impact Point (MDB)	-1811	890	-860	25	1000
4	Side Overall (MDB)	-2420	0	-1471	12.5	1000
5	Rear	0	6248	-1514	20	1000
6	Left Front	-2090	-5270	-1730	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

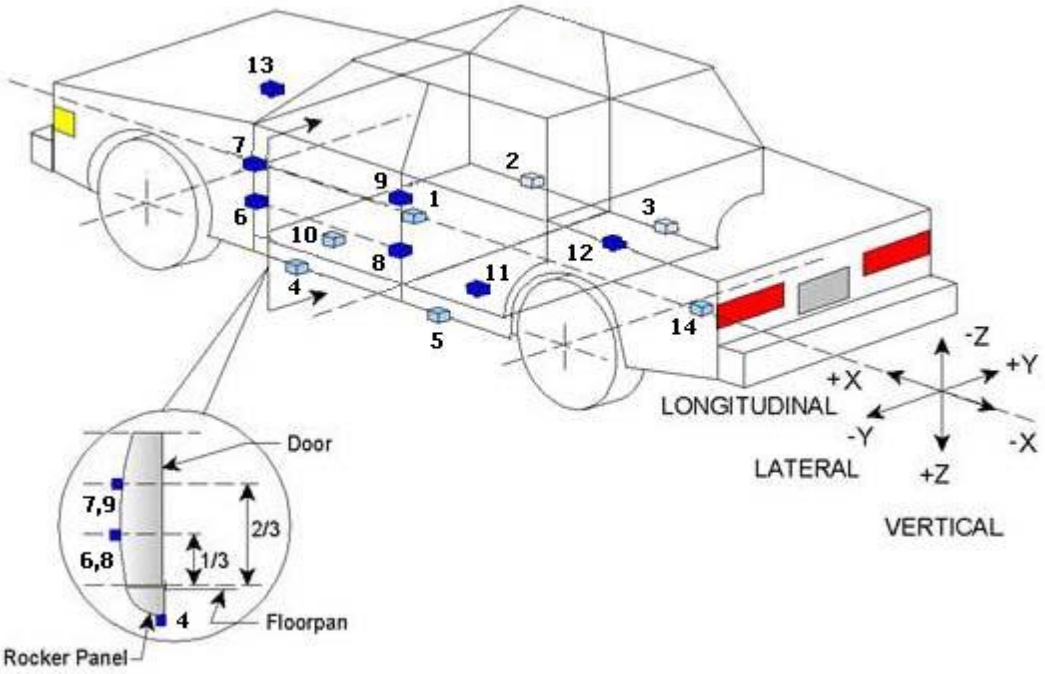
Reference: Impact Point projected to Ground; +X = To Front of MDB +Y = To Right of MDB; +Z = Down
*All measurements accurate to ± 6 mm.
If applicable, explain why camera(s) did not operate as intended: N/A

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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



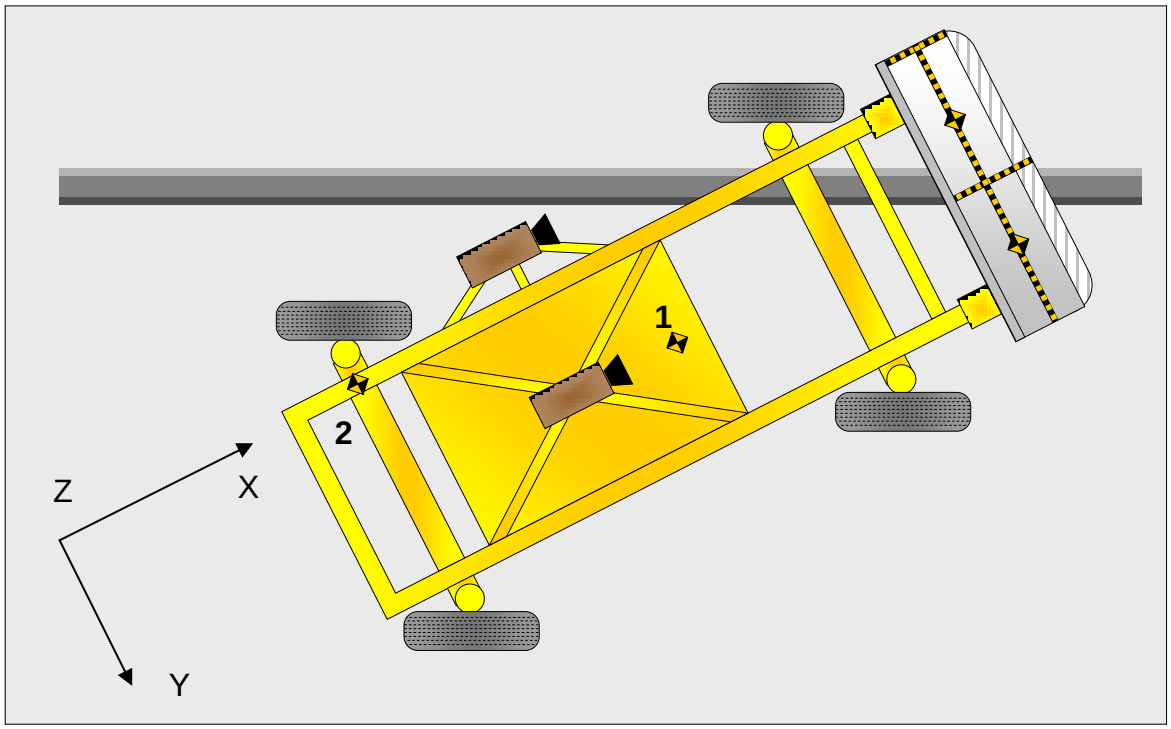
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2760	100	-326
2	Right Sill at Front Seat	2370	685	-346
3	Right Sill at Rear Seat	1475	685	-340
4	Left Sill at Front Door	2365	-690	-352
5	Left Sill at Rear Door	1140	-685	-330
6	A-Post Lower	2770	-770	-541
7	A-Post Middle	2770	-785	-886
8	B-Post Lower	1775	-760	-577
9	B-Post Middle	1735	-745	-1009
10	Front Seat Track	2060	-550	-335
11	Rear Seat Structure	1090	-438	-230
12	Right Rear Occ. Compartment	1075	435	-240
13	Engine Block	3380	25	-854
14	Rear Above Axle	730	-35	-340

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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

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	Head liner, SCAB	SCAB
Left Side of Head	Head liner, SCAB	SCAB
Back of Head	SCAB	SCAB
Left Shoulder	SAB	Door panel
Upper Torso	Seat back bolster, SAB	Door panel
Lower Torso	Seat back bolster, SAB	Door panel
Left Hip	SAB, Door panel	Door panel
Left Knee	Door panel	Door panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	N/A	No	N/A
Seat Disengagement from Floor pan	No	No	No	No
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	None
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2521
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		320
Actual Impact Point (Aft of Front Axle)	mm		310
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+10
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-6

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

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	1099

MDB WEIGHTS

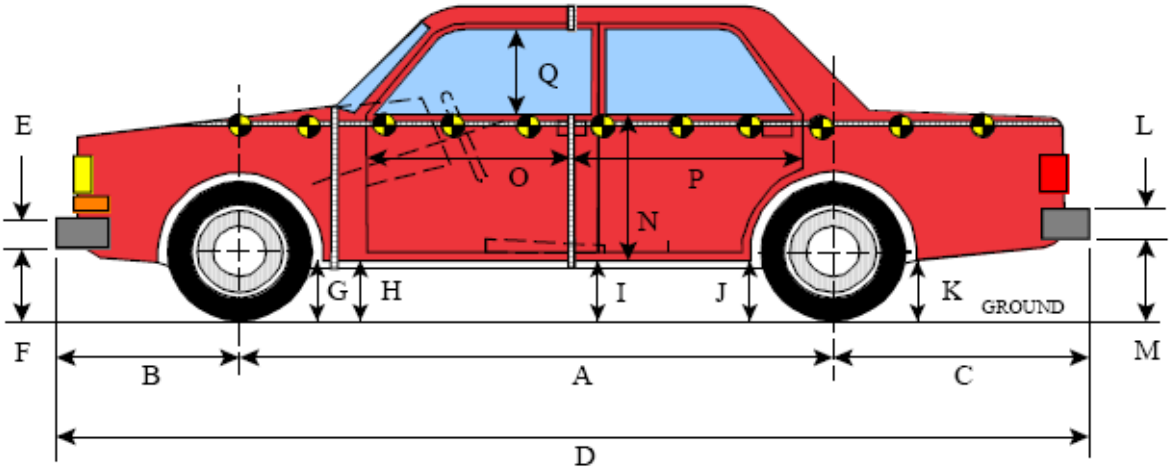
	Units	Front Axle	Rear Axle	Total
Left	kg	388.8	291.6	680.4
Right	kg	395.2	286.0	681.2
Ratio	%	57.6	42.4	100.0
Totals	kg	784.0	577.6	1361.6

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.25
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.25
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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



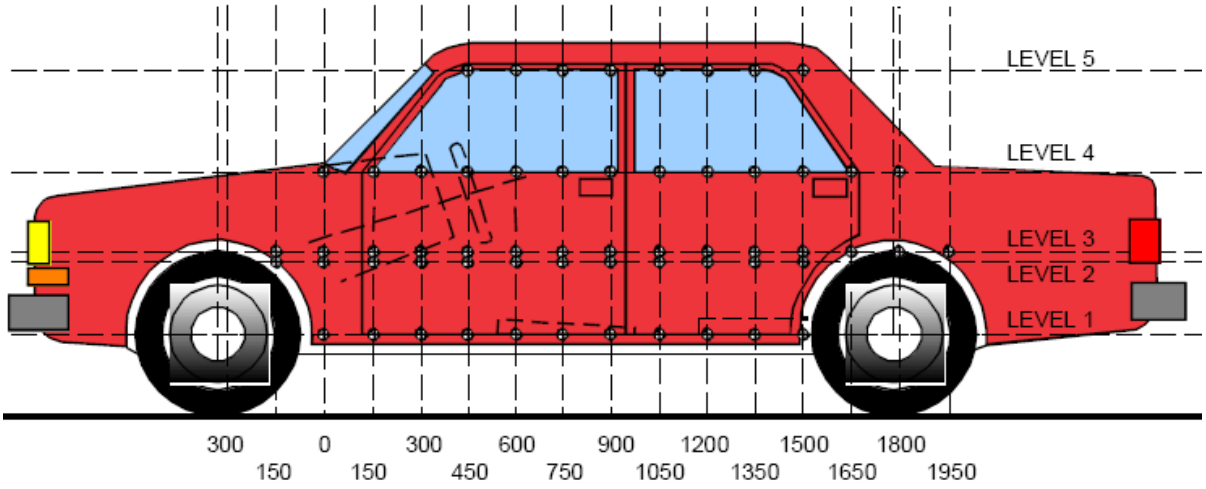
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2521	2510	11
B	Front Axle to Front Surface of Vehicle	600	600	0
C	Rear Axle to Rear Surface of Vehicle	900	900	0
D	Total Length at Centerline	4020	4030	-10
E	Front Bumper Thickness	70	70	0
F	Front Bumper Bottom to Ground	445	448	-3
G	Sill Height at Front Wheel Well	320	380	-60
H	Sill Height at Front Door Leading Edge	323	370	-47
I	Sill Height at B-Pillar	428	470	-42
J1	Sill Height at Rear Wheel Well	350	440	-90
J2	Pinch Weld Height at Rear Wheel Well	175	215	-40
K	Sill Height Aft of Rear Wheel Well	525	565	-40
L	Rear Bumper Thickness	50	50	0
M	Rear Bumper Bottom to Ground	550	605	-55
N	Sill Height to Window Bottom Sill	800	695	105
O	Front Door Leading Edge to Impact CL	702	700	2
P	Rear Door Trailing Edge to Impact CL	1371	1345	26
Q	Front Window Opening	380	380	0
R	Right Side Length	3815	3810	5
S	Left Side Length	3815	3790	25
T	Vehicle Width	1775	1765	10

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	338	114	1500
2	Driver Hip Point	537	202	1650
3	Mid-Door	702	219	1650
4	Window Sill	1012	60	1200
5	Window Top	1464	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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

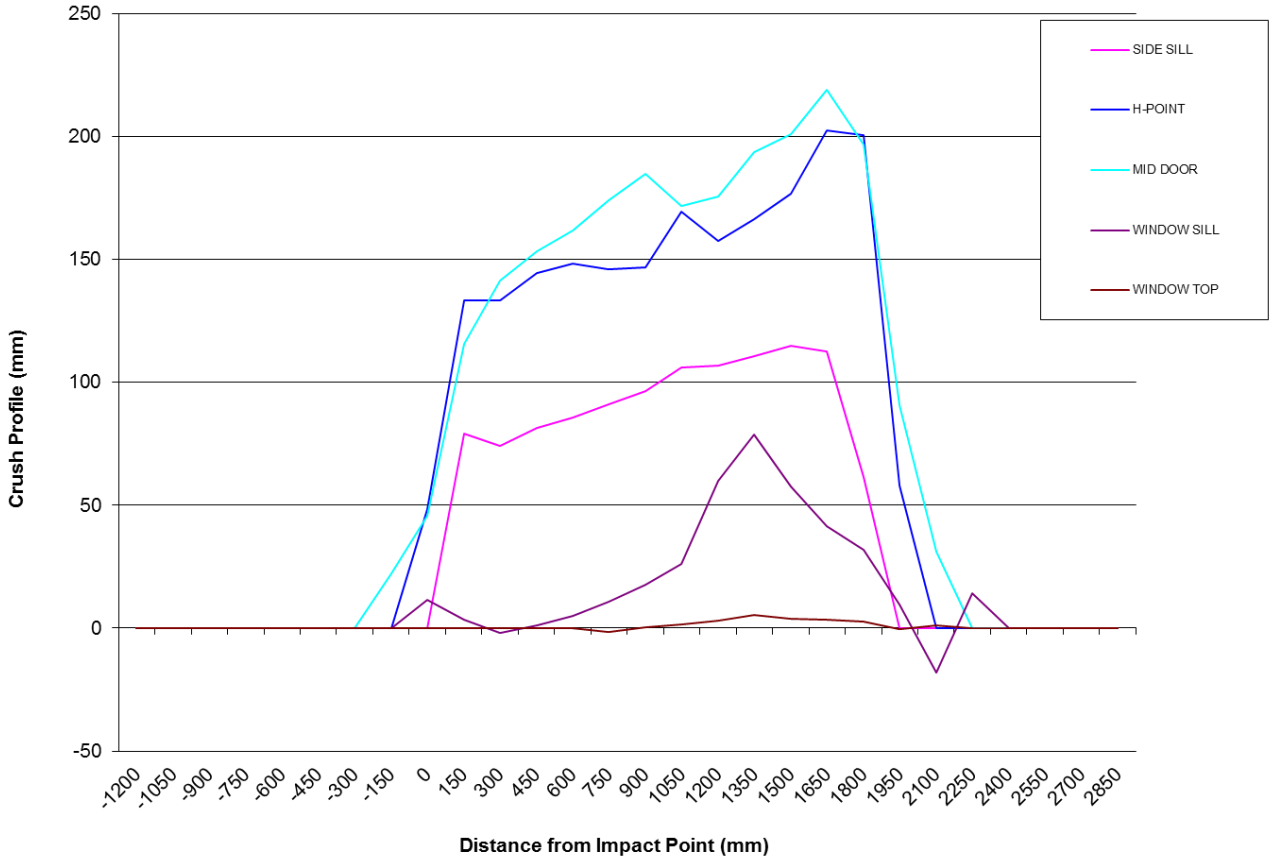
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-150	0	0	890	0	0	0	0	867	0	0	0	0	23	0	0
0	0	883	886	727	0	0	834	840	716	0	0	49	46	11	0
150	846	869	866	757	0	767	736	751	754	0	79	133	115	3	0
300	838	856	861	770	0	763	723	719	772	0	75	133	142	-2	0
450	839	856	862	781	0	758	712	709	780	0	81	144	153	1	0
600	841	858	863	791	0	755	709	702	786	0	86	149	161	5	0
750	844	859	865	798	586	753	714	691	787	588	91	145	174	11	-2
900	846	861	866	804	591	749	714	681	786	591	97	147	185	18	0
1050	848	862	867	809	593	742	692	696	783	591	106	170	171	26	2
1200	848	861	867	811	593	742	704	691	751	590	106	157	176	60	3
1350	850	860	866	814	593	740	694	672	735	587	110	166	194	79	6
1500	854	859	865	815	590	740	682	664	757	587	114	177	201	58	3
1650	858	864	868	815	587	745	662	649	774	584	113	202	219	41	3
1800	859	883	878	814	582	797	682	681	782	580	62	201	197	32	2
1950	0	885	887	812	575	0	827	796	802	575	0	58	91	10	0
2100	0	0	890	808	563	0	0	859	826	561	0	0	31	-18	2
2250	0	0	0	802	0	0	0	0	788	0	0	0	0	14	0

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

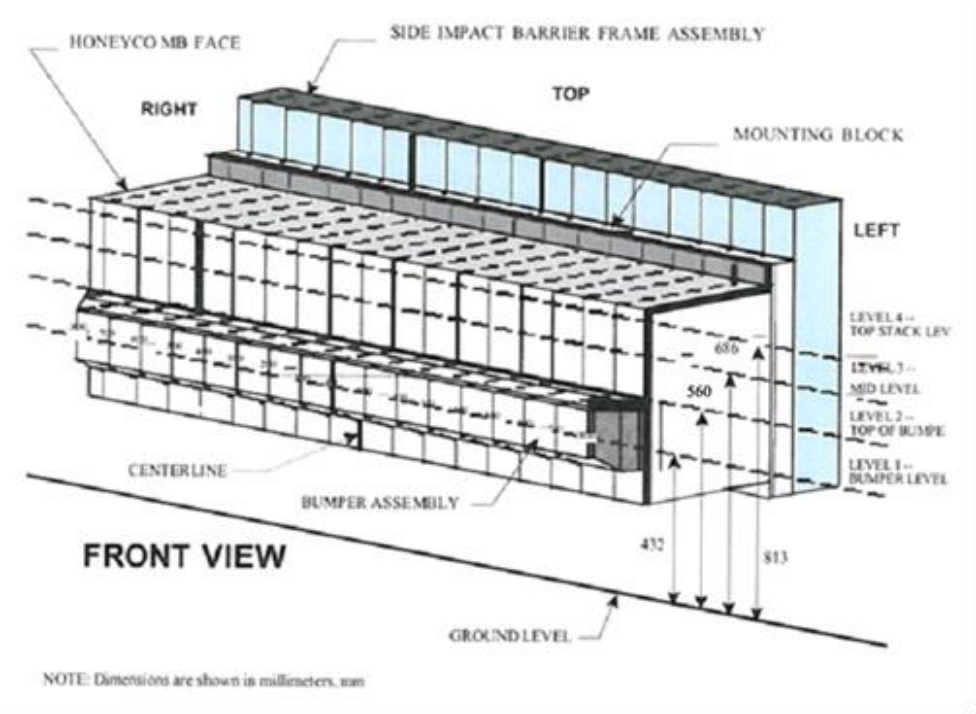
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

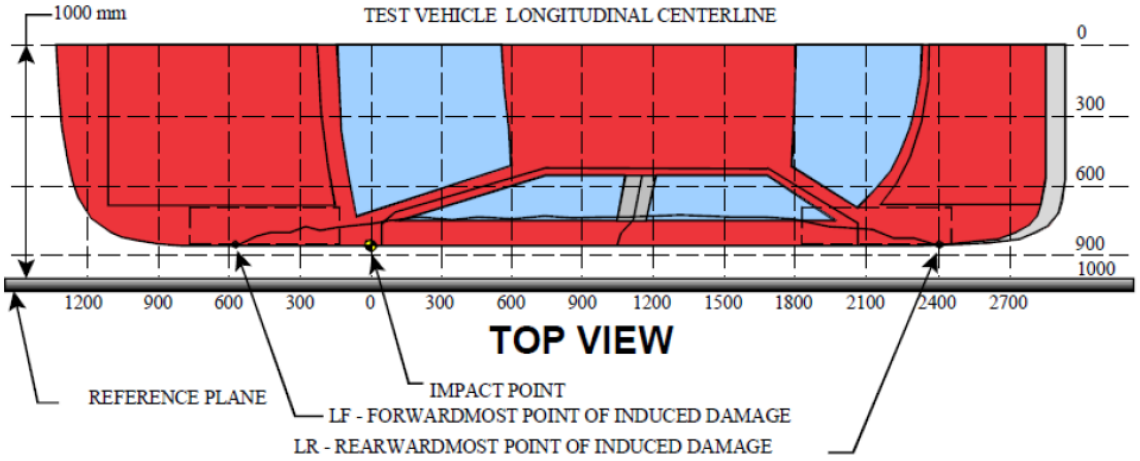
Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	170
B	Top of Bumper	560	800	Left	103
C	Mid-Level	686	800	Left	113
D	Top of Stack	813	800	Left	173

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	134	132	129	128	128	128	128	128	128	127	127	127	128	130	143	169	170
2	70	70	69	70	70	70	71	74	71	70	70	71	72	73	78	92	103
3	9	6	7	11	16	27	37	35	22	17	18	20	25	32	47	70	113
4	37	10	2	10	21	32	47	51	38	40	44	50	57	60	68	108	173

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



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	788	802	14
2	1800	2	682	883	201
3	1350	3	672	866	194
4	750	3	691	865	174
5	300	3	719	861	142
6	-150	3	867	890	23

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm Left of Center	4	210	383	173
2	500 mm Left of Center	1	355	485	130
3	200 mm Left of Center	1	359	486	127
4	200 mm Right of Center	1	358	486	128
5	500 mm Right of Center	1	359	487	128
6	800 mm Right of Center	1	342	476	134

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

Test Vehicle: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020

Test Time: 17:10 **Temperature:** 21.8°C

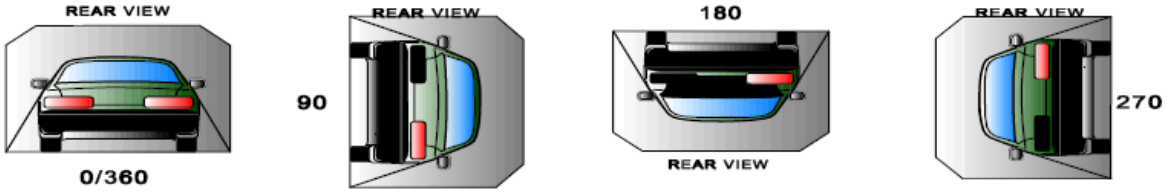
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

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

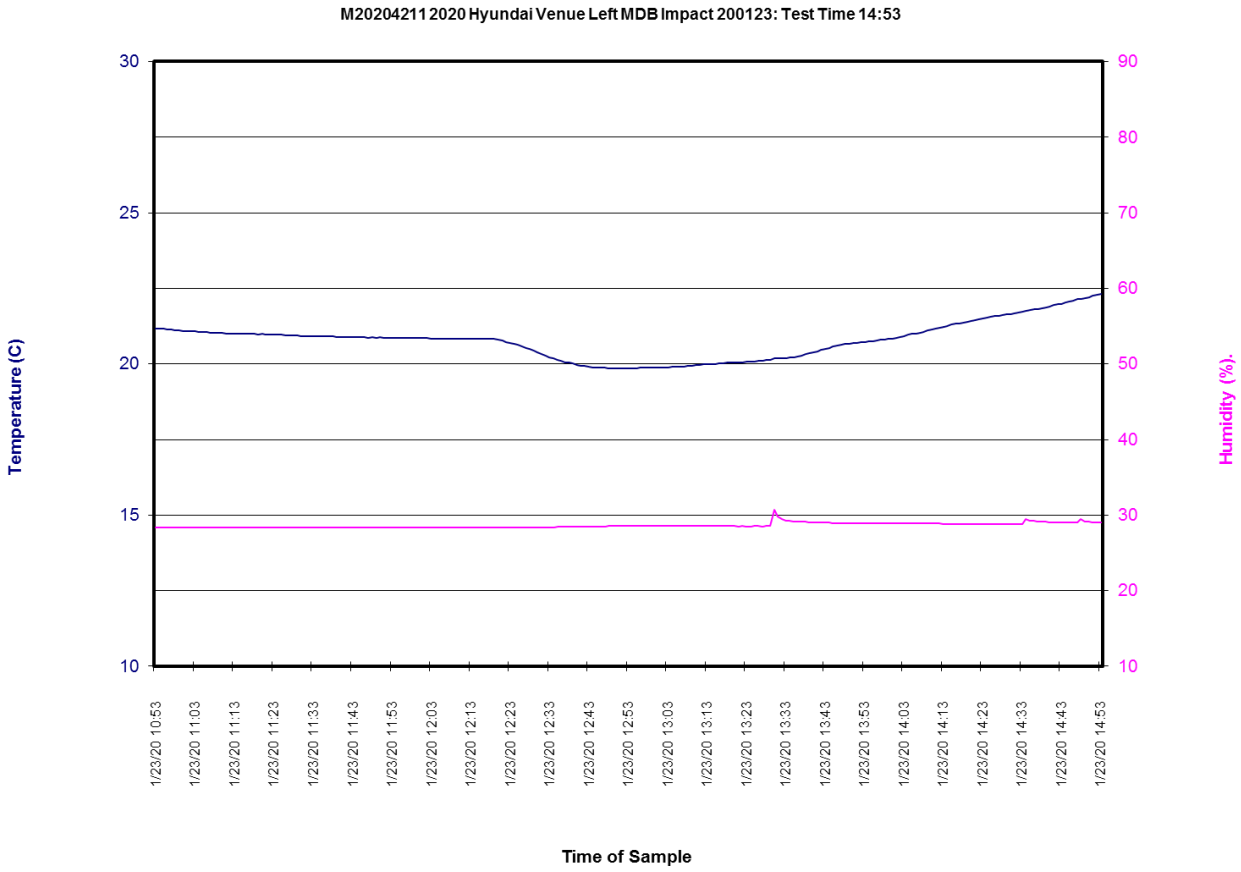
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

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: 2020 Hyundai Venue 5-Door Hatchback NHTSA No.: M20204211
Test Program: SINCAP Side Impact Test Date: 1/23/2020



APPENDIX A

PHOTOGRAPHS

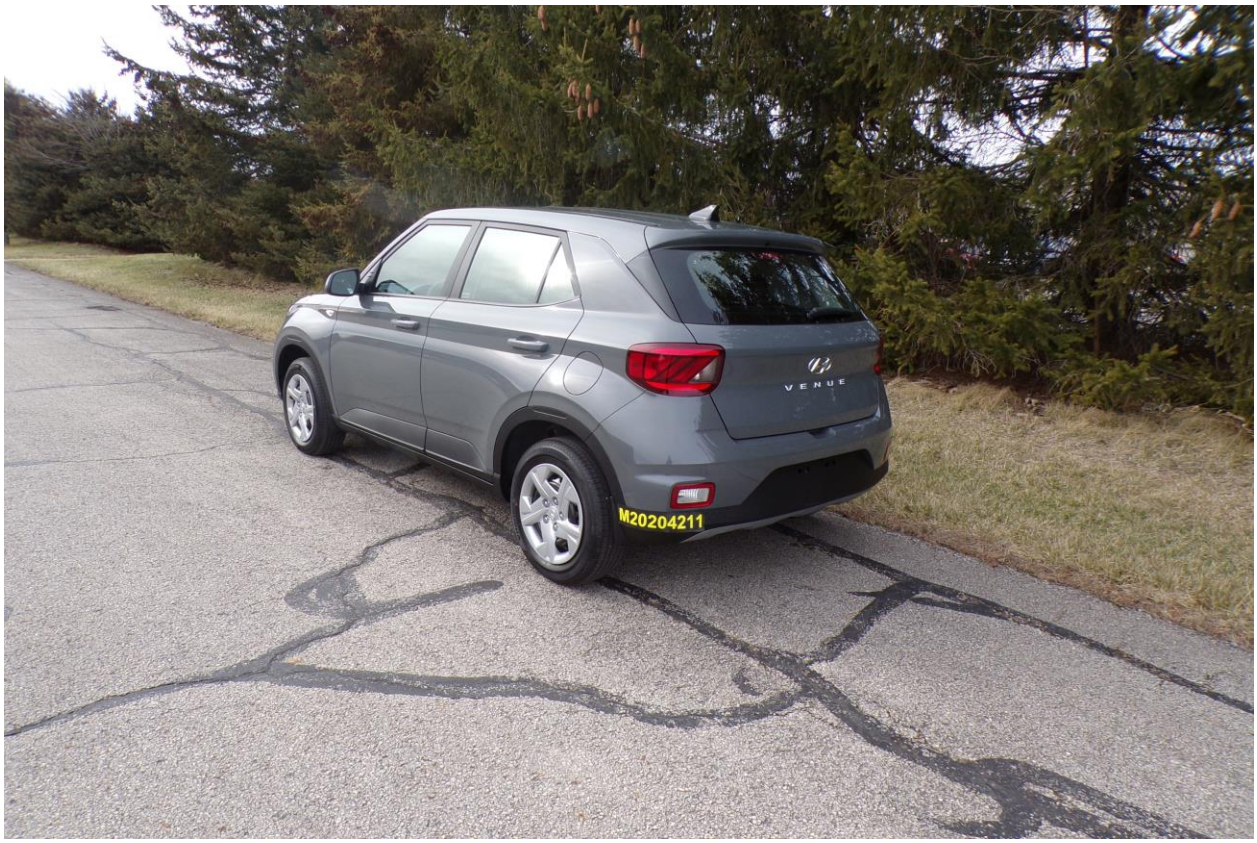
TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

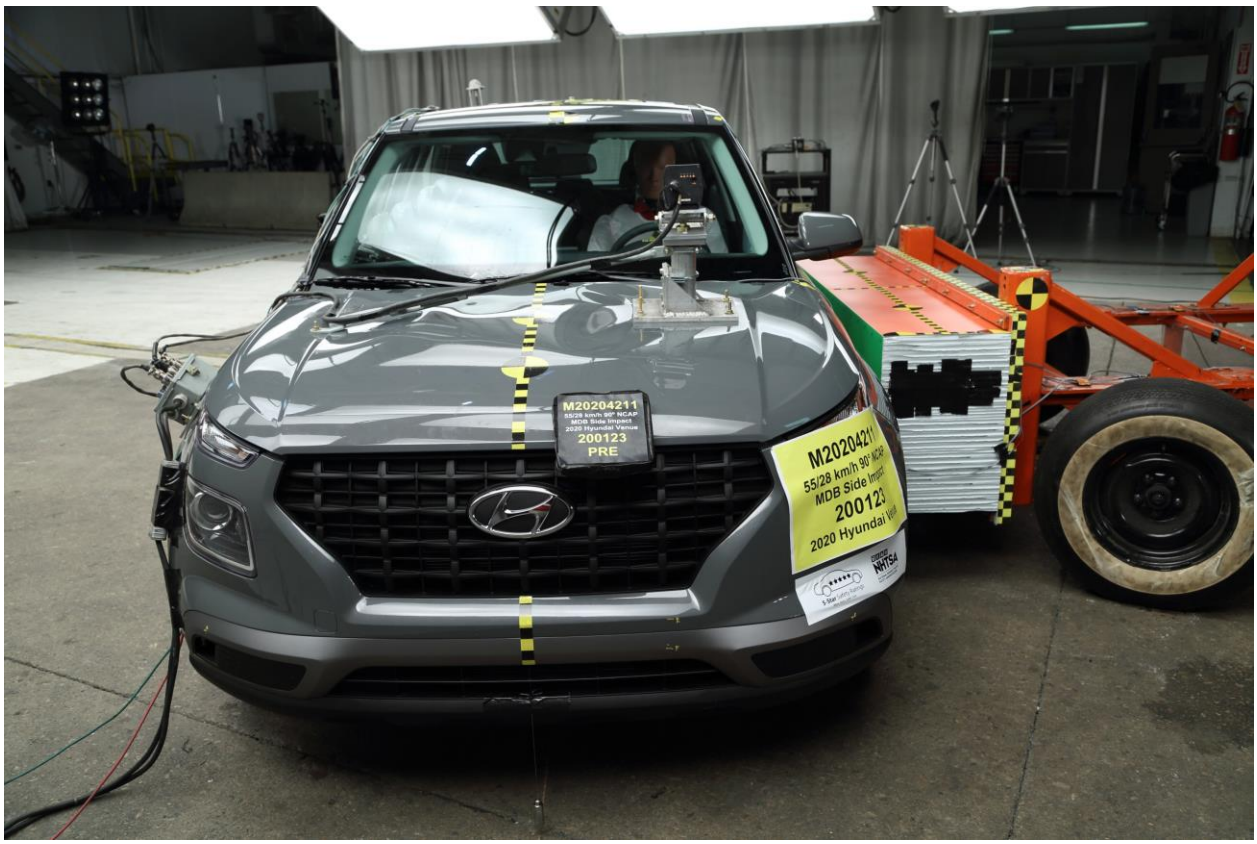
TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

001 As-Delivered Right Front ¾ View of Test Vehicle



002 As-Delivered Left Rear ¾ View of Test Vehicle

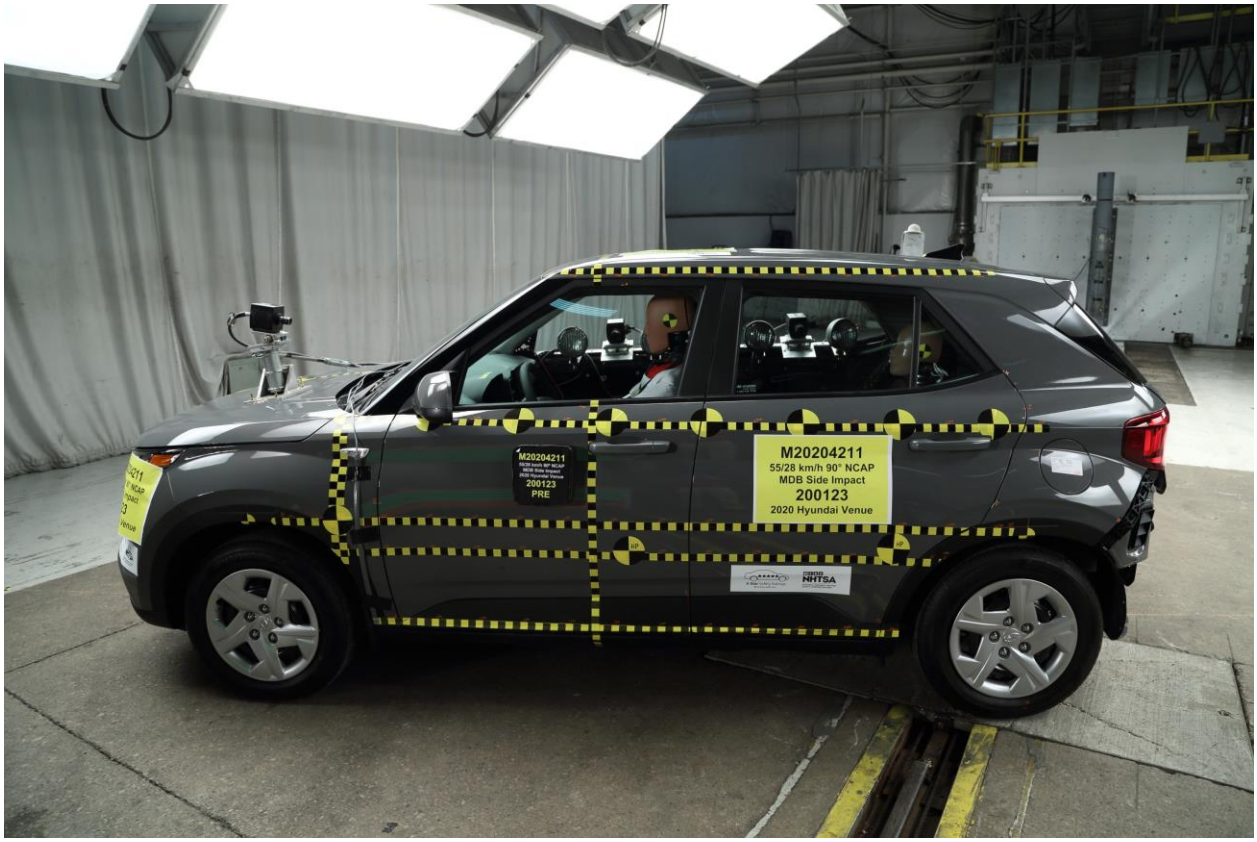


003 Pre-Test Frontal View of Test Vehicle

004 Post-Test Frontal View of Test Vehicle

005 Pre-Test Left Front ¾ View of Test Vehicle

006 Post-Test Left Front ¾ View of Test Vehicle



007 Pre-Test Left Side View of Test Vehicle

008 Post-Test Left Side View of Test Vehicle

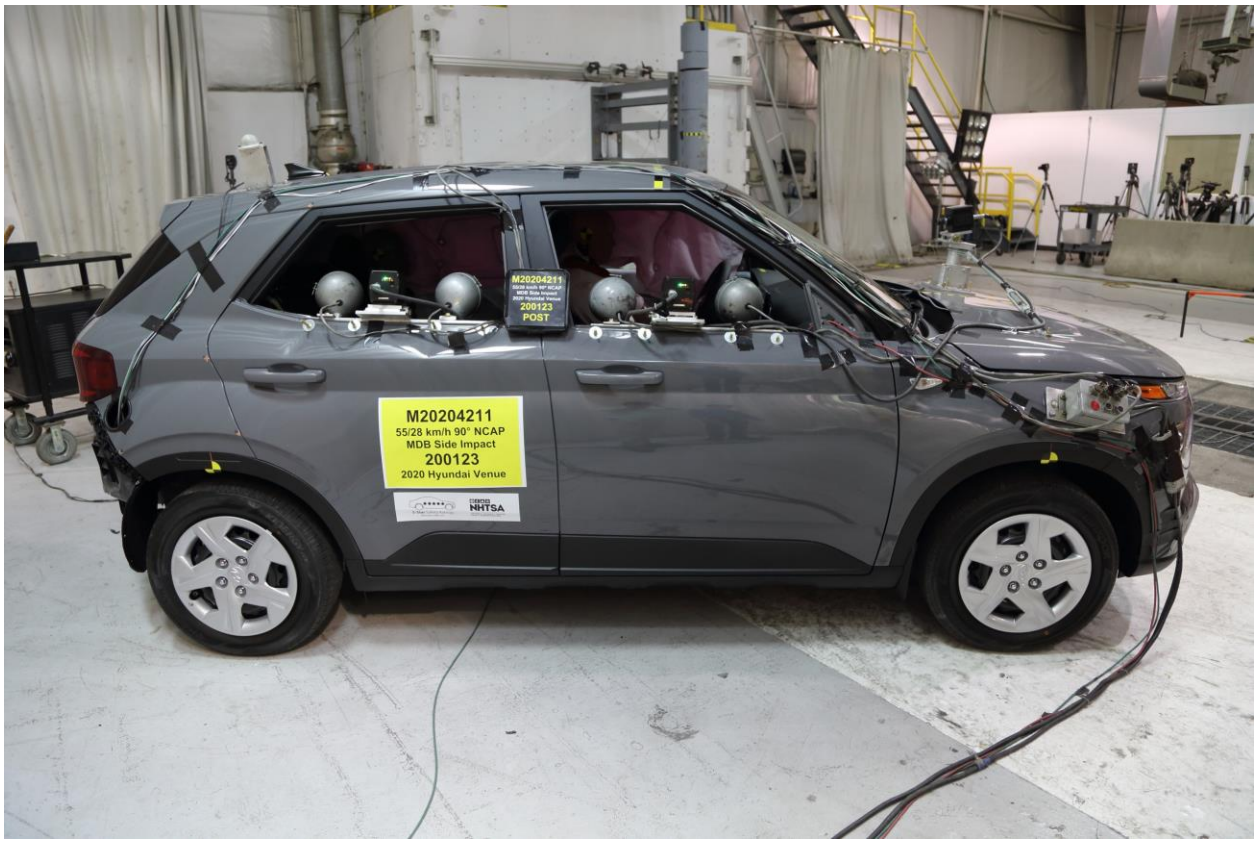
009 Pre-Test Left Rear ¾ View of Test Vehicle

010 Post-Test Left Rear ¾ View of Test Vehicle

011 Pre-Test Rear View of Test Vehicle

012 Post-Test Rear View of Test Vehicle

013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle

015 Pre-Test Overhead View of Test Area

016 Post-Test Overhead View of Test Area

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

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

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

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

021 Pre-Test Left Front Door Latch Close-Up

022 Post-Test Left Front Door Latch Close-Up

023 Pre-Test Left Rear Door Latch Close-Up

024 Post-Test Left Rear Door Latch Close-Up

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

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

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

Intentionally Left Blank

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

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

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

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

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

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

034 Pre-Test Placement of Driver's Dummy Feet

035 Pre-Test View of Belt Anchorage for Driver Dummy

036 Pre-Test Left Side View of Steering Wheel

037 View of Disengaged Parking Brake

038 Pre-Test View of Parking Brake

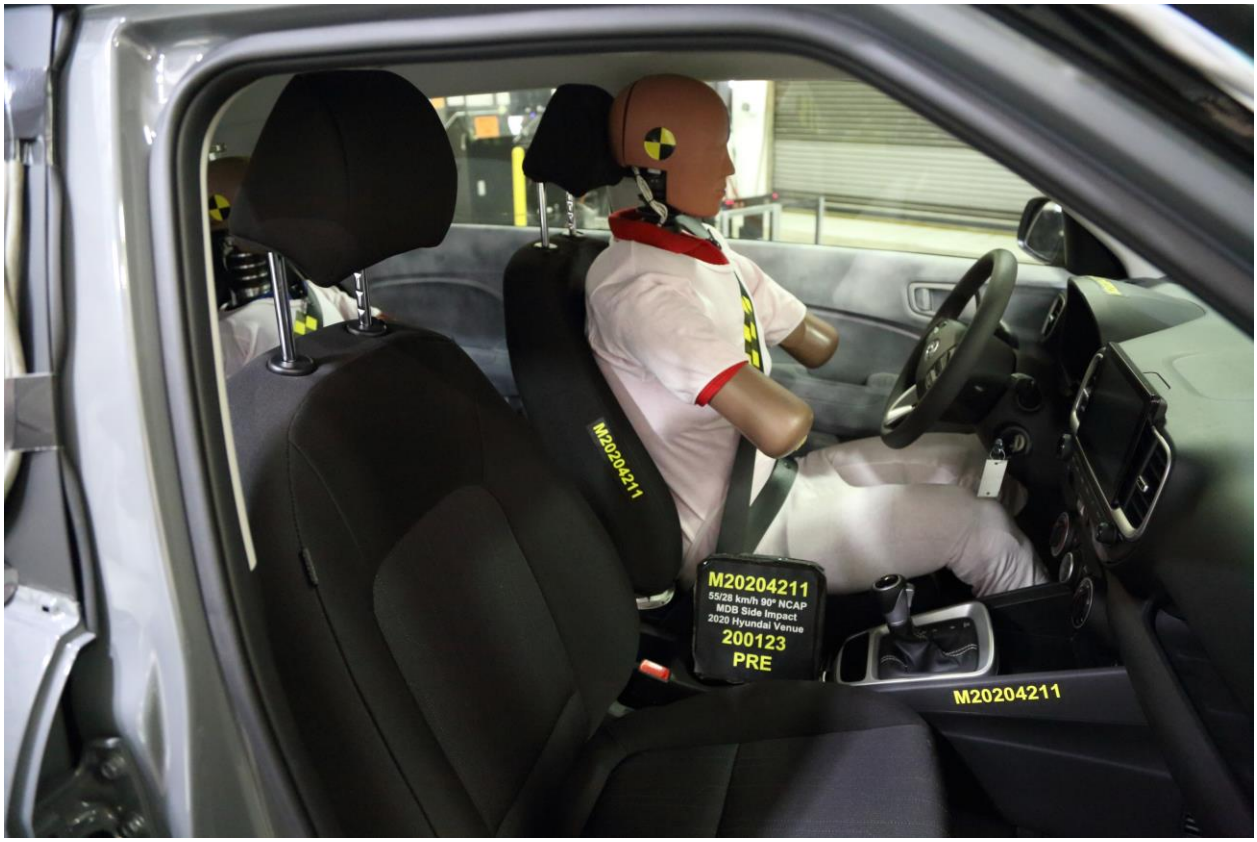
039 Pre-Test Close-Up Left Side View of Driver Seat Track

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

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

042 Pre-Test Driver Dummy and Door Clearance View

043 Post-Test Driver Dummy and Door Clearance View



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

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

046 Pre-Test Driver Inner Door Panel View

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

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

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

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

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

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

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

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

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

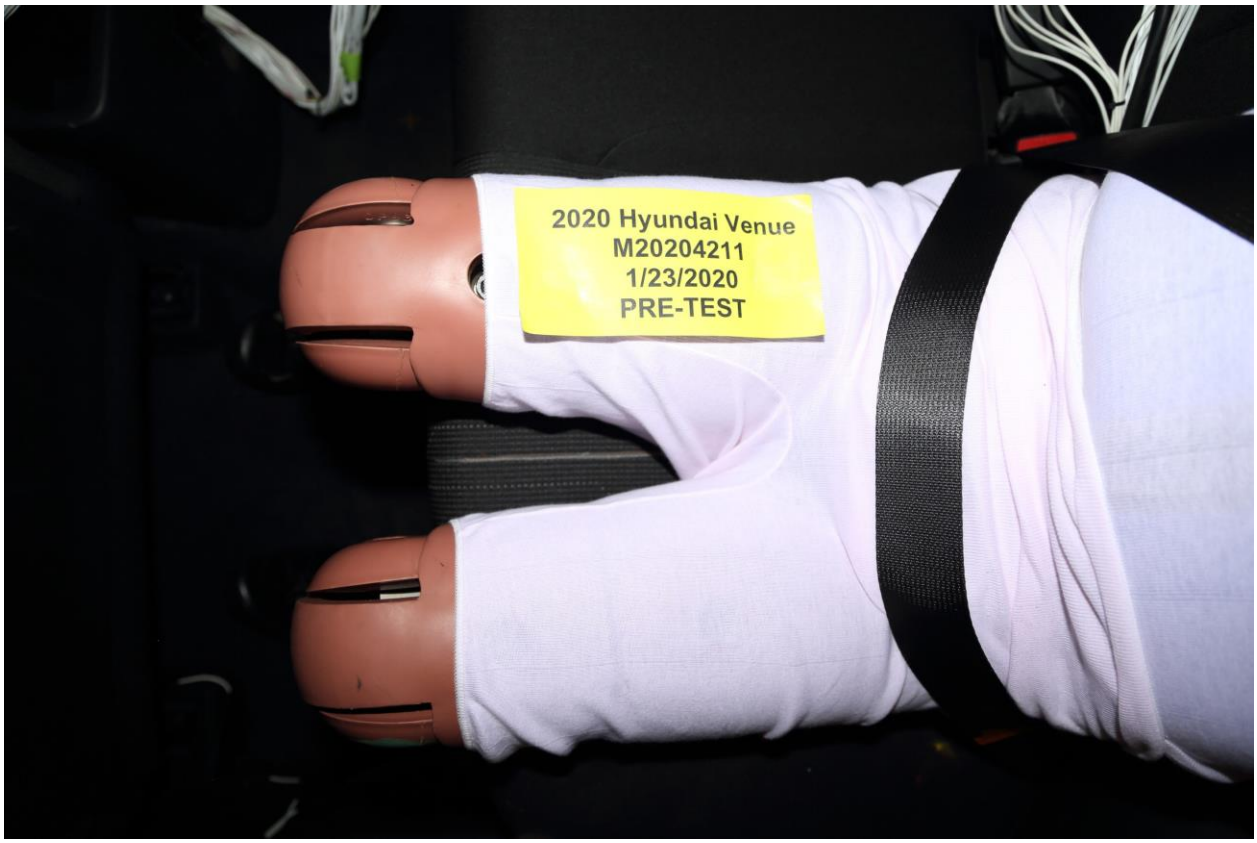
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View

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

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

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

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



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

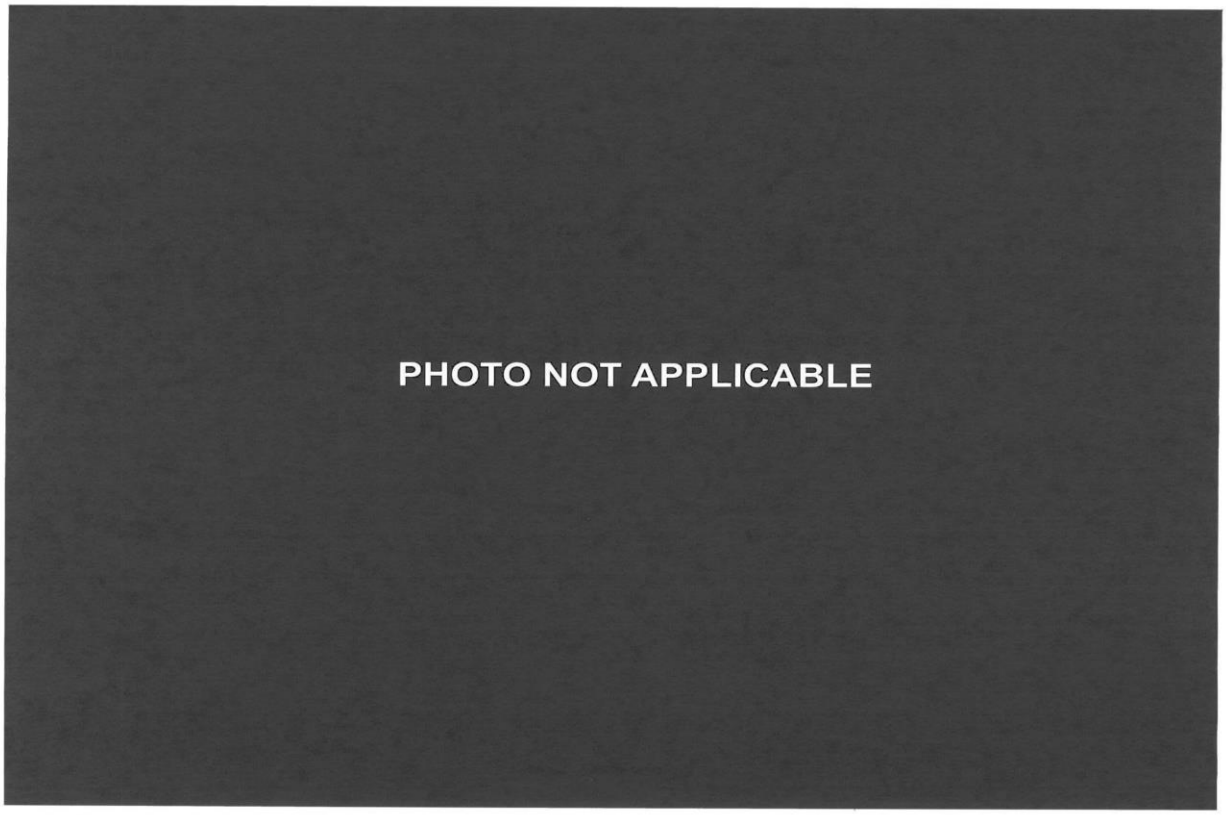
062 Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

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

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

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

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



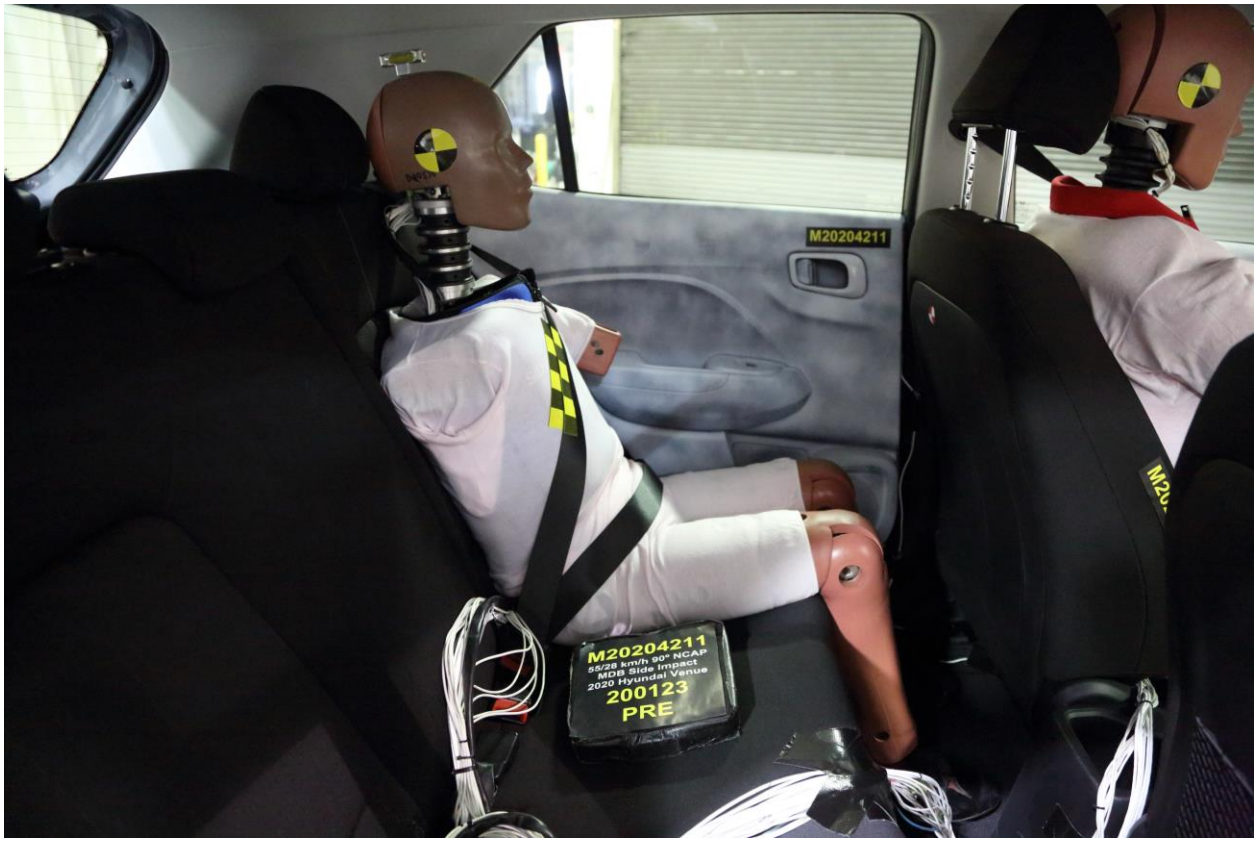
067 Pre-test Close-Up Left Side View of Rear Passenger Seat Back

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

Intentionally Left Blank

069 Pre-Test Rear Passenger Dummy and Door Clearance View

070 Post-Test Rear Passenger Dummy and Door Clearance View

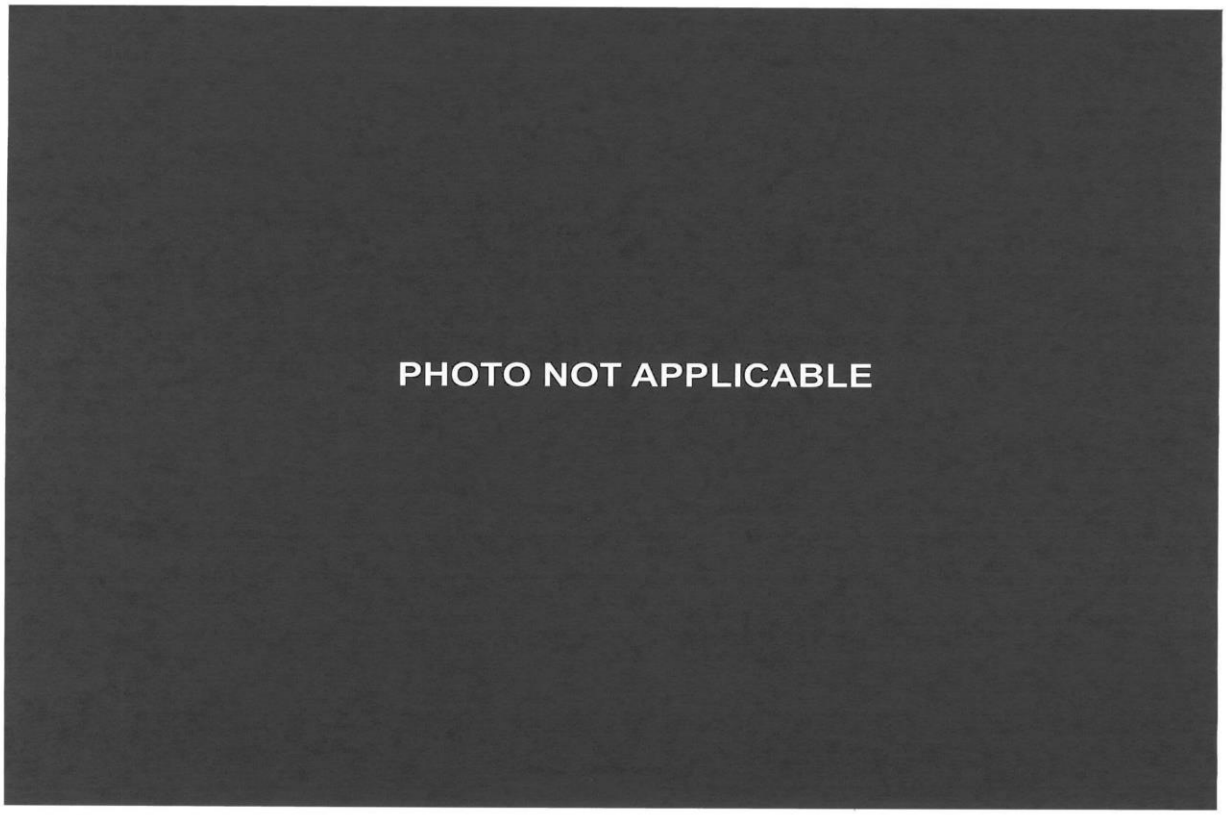


071 Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

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

073 Pre-Test Rear Passenger Inner Door Panel View

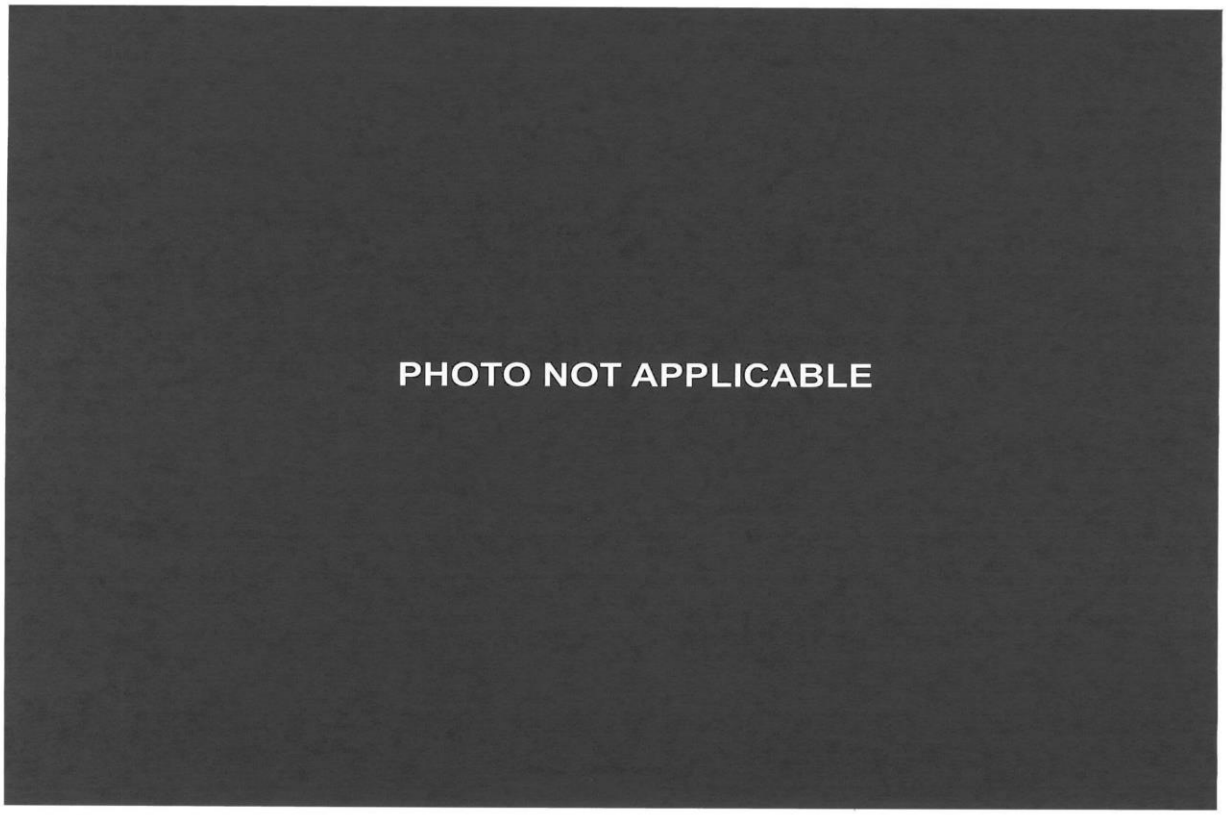
074 Post-Test Rear Passenger Inner Door Panel View



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

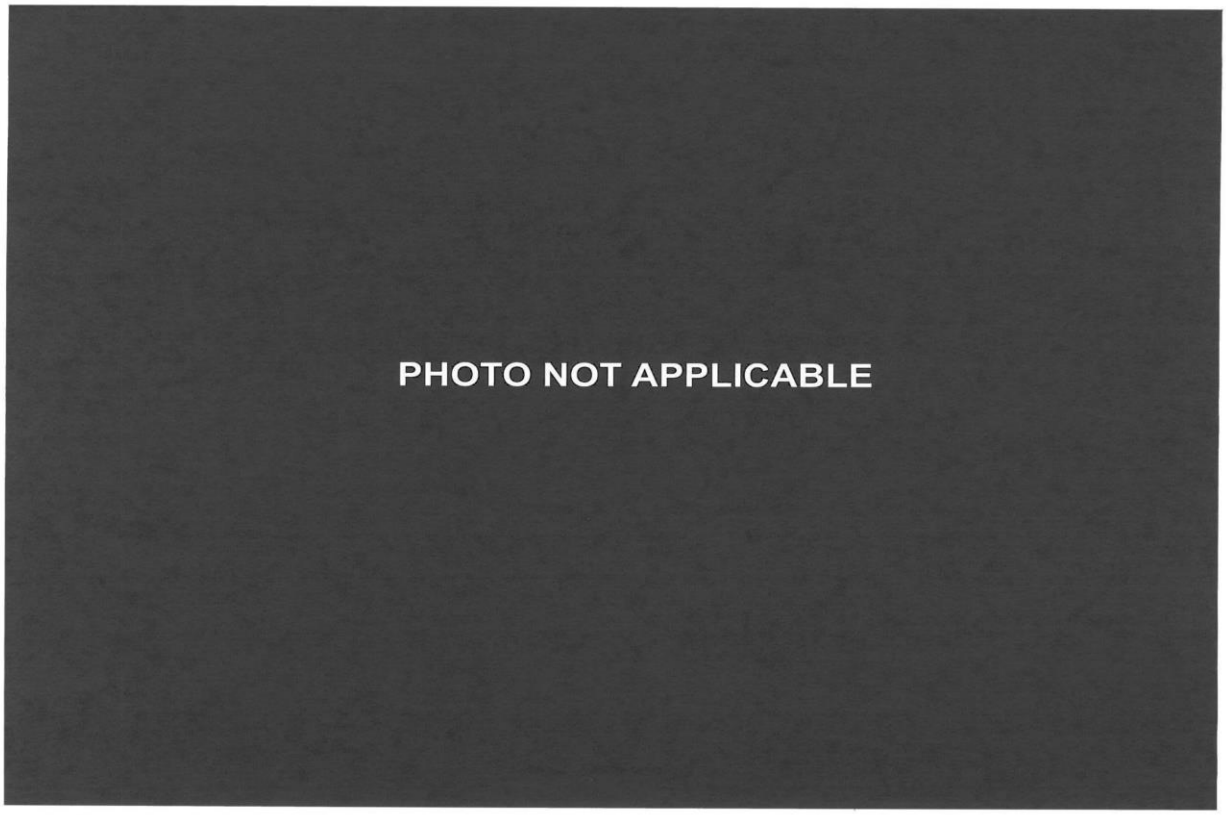
076 Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

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



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

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



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

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

Intentionally Left Blank

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

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

084 Pre-Test Front View of MDB Impactor Face

085 Post-Test Front View of MDB Impactor Face

086 Pre-Test Top View of MDB Impactor Face

087 Post-Test Top View of MDB Impactor Face

088 Pre-Test Left Side View of MDB Impactor Face

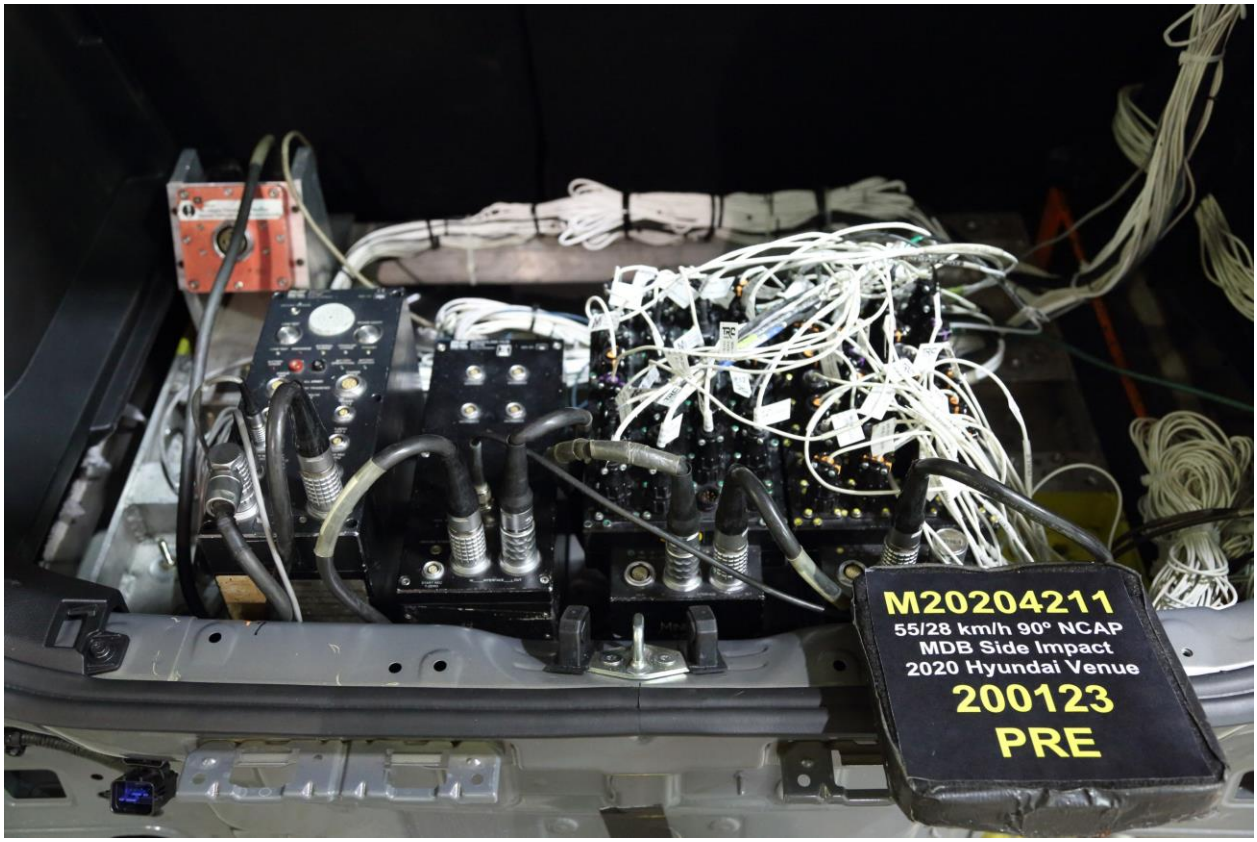
089 Post-Test Left Side View of MDB Impactor Face

090 Pre-Test Right Side View of MDB Impactor Face

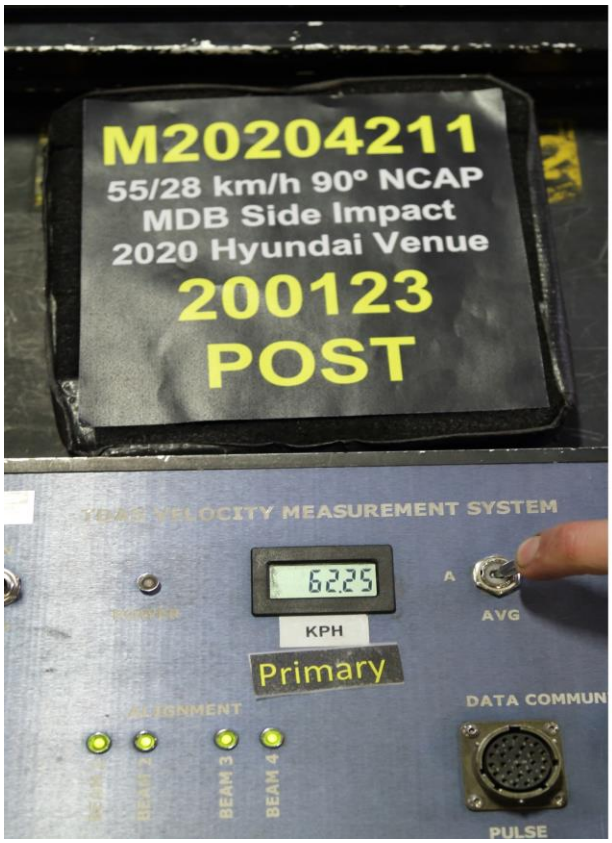
091 Post-Test Right Side View of MDB Impactor Face

092 Close-Up View of Vehicle's Certification Label

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

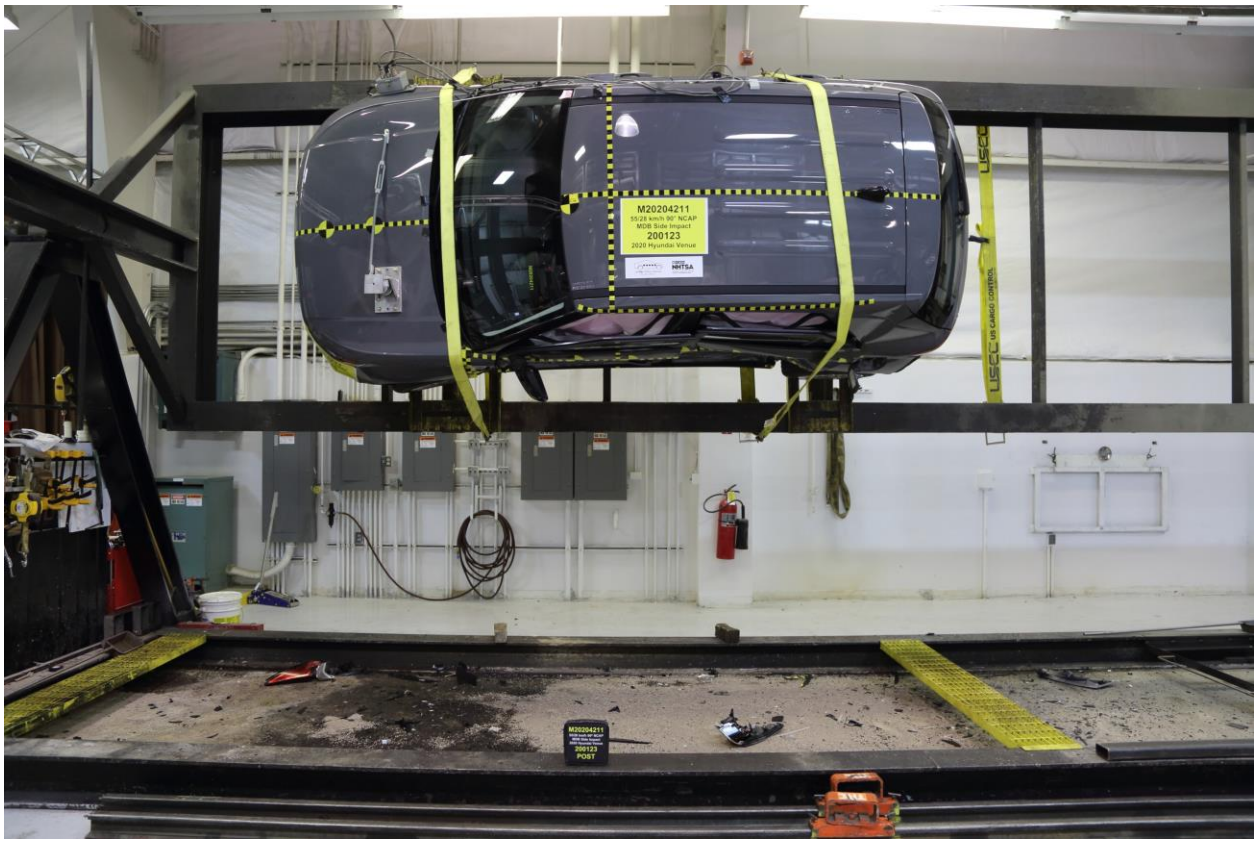


094 Pre-Test Ballast View



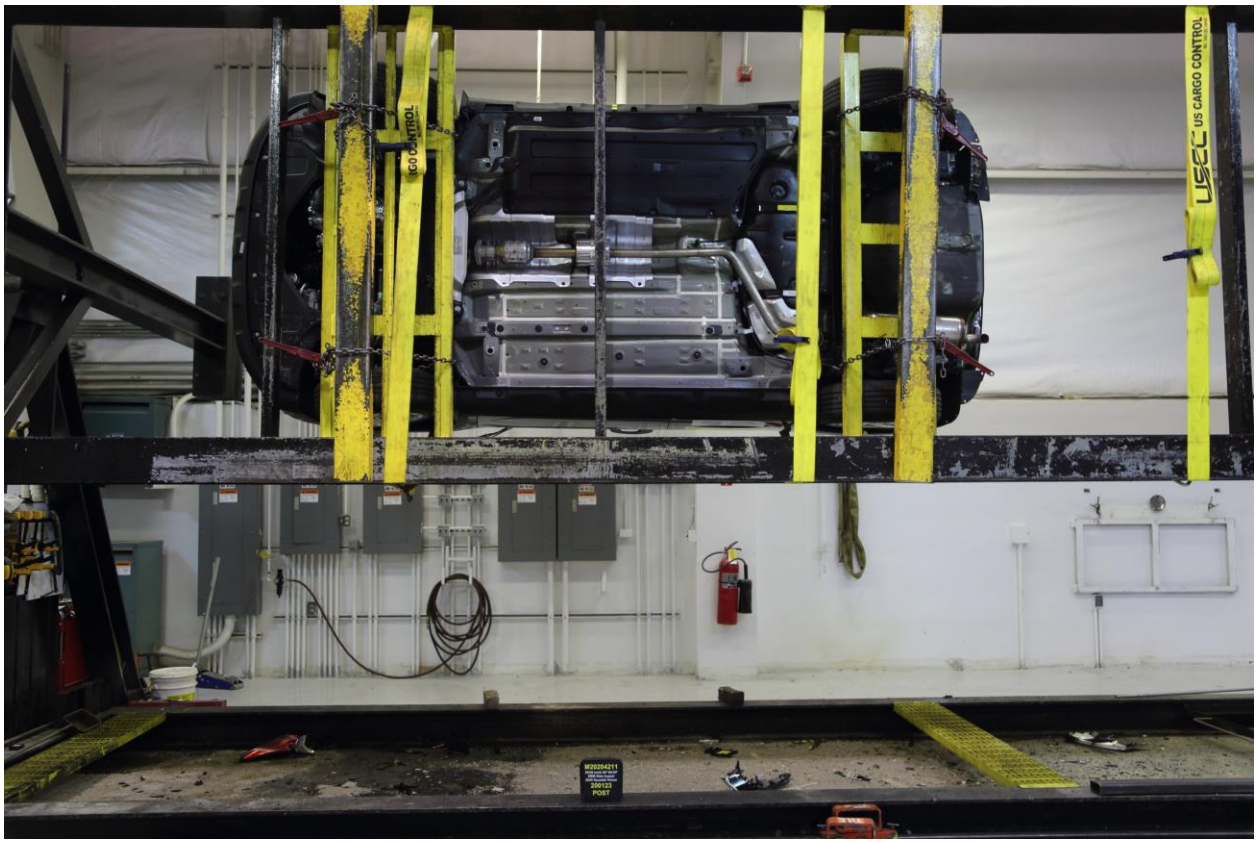
095 No. Post-Test Primary and Redundant Speed Trap Read-Out

096 FMVSS No. 301 Static Rollover 0 Degrees

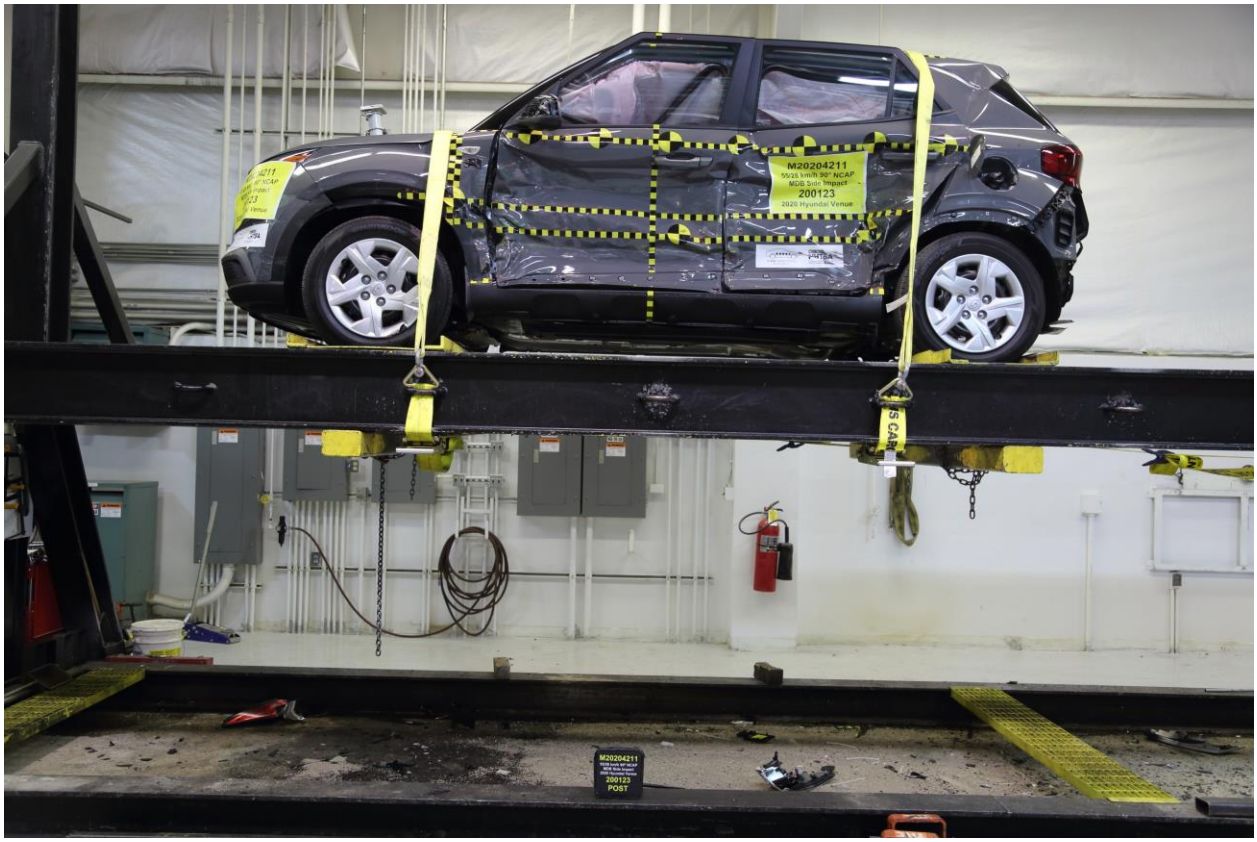


097 FMVSS No. 301 Static Rollover 90 Degrees

098 FMVSS No. 301 Static Rollover 180 Degrees

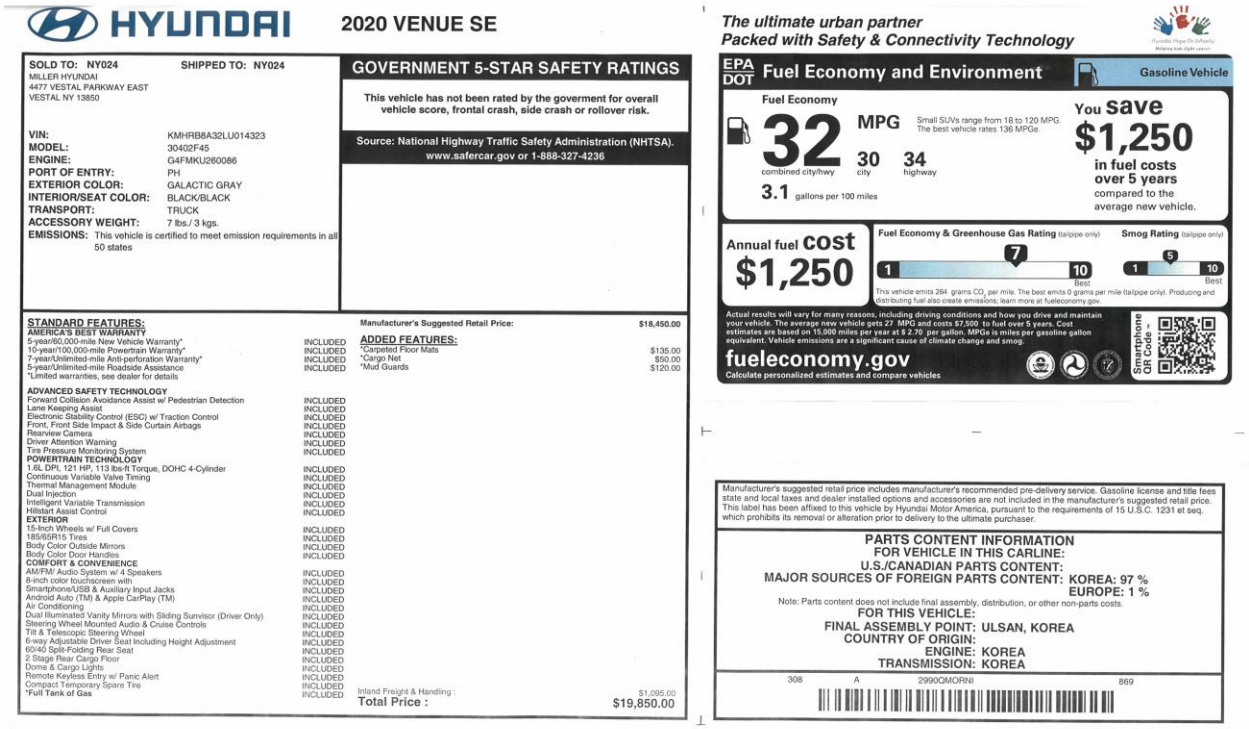


099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees

101 Impact Event



HYUNDAI 2020 VENUE SE

SOLD TO: NY024 SHIPPED TO: NY024
MILLER HYUNDAI
4477 VESTAL PARKWAY EAST
VESTAL NY 13850

VIN: KMHRB8A32LU014323
MODEL: 30402F45
ENGINE: G4FMKU260086
PORT OF ENTRY: PH
EXTERIOR COLOR: GALACTIC GRAY
INTERIOR/SEAT COLOR: BLACK/BLACK
TRANSPORT: TRUCK
ACCESSORY WEIGHT: 7 lbs./ 3 kgs.
EMISSIONS: This vehicle is certified to meet emission requirements in all 50 states

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the goverment for overall vehicle score, frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA).
www.safercar.gov or 1-888-327-4236

STANDARD FEATURES:
AMERICA'S BEST WARRANTY
5-year/60,000-mile New Vehicle Warranty* INCLUDED
10-year/100,000-mile Powertrain Warranty* INCLUDED
7-year/Unlimited-mile Anti-perforation Warranty* INCLUDED
5-year/Unlimited-mile Roadside Assistance INCLUDED
*Limited warranties, see dealer for details

ADVANCED SAFETY TECHNOLOGY
Forward Collision Avoidance Assist w/ Pedestrian Detection INCLUDED
Lane Keeping Assist INCLUDED
Electronic Stability Control (ESC) w/ Traction Control INCLUDED
Front, Front Side Impact & Side Curtain Airbags INCLUDED
Rearview Camera INCLUDED
Driver Attention Warning INCLUDED
Tire Pressure Monitoring System INCLUDED
POWERTRAIN TECHNOLOGY
1.6L DPI, 121 HP, 113 lbs-ft Torque, DOHC 4-Cylinder INCLUDED
Continuous Variable Valve Timing INCLUDED
Thermal Management Module INCLUDED
Dual Injection INCLUDED
Intelligent Variable Transmission INCLUDED
Hillstart Assist Control INCLUDED
EXTERIOR
15-Inch Wheels w/ Full Covers INCLUDED
185/65R15 Tires INCLUDED
Body Color Outside Mirrors INCLUDED
Body Color Door Handles INCLUDED
COMFORT & CONVENIENCE
AM/FM/ Audio System w/ 4 Speakers INCLUDED
8-inch color touchscreen with INCLUDED
Smartphone/USB & Auxiliary Input Jacks INCLUDED
Android Auto (TM) & Apple CarPlay (TM) INCLUDED
Air Conditioning INCLUDED
Dual Illuminated Vanity Mirrors with Sliding Sunvisor (Driver Only) INCLUDED
Steering Wheel Mounted Audio & Cruise Controls INCLUDED
Tilt & Telescopic Steering Wheel INCLUDED
6-way Adjustable Driver Seat Including Height Adjustment INCLUDED
60/40 Split-Folding Rear Seat INCLUDED
2 Stage Rear Cargo Floor INCLUDED
Dome & Cargo Lights INCLUDED
Remote Keyless Entry w/ Panic Alert INCLUDED
Compact Temporary Spare Tire INCLUDED
*Full Tank of Gas INCLUDED

Manufacturer's Suggested Retail Price: $18,450.00

ADDED FEATURES:
*Carpeted Floor Mats $135.00
*Cargo Net $50.00
*Mud Guards $120.00

Inland Freight & Handling: $1,095.00
Total Price: $19,850.00

The ultimate urban partner
Packed with Safety & Connectivity Technology

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
32 MPG combined city/hwy
30 city 34 highway
3.1 gallons per 100 miles
Small SUVs range from 18 to 120 MPG. The best vehicle rates 136 MPGe.

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

Annual fuel cost $1,250

Fuel Economy & Greenhouse Gas Rating (tailpipe only) 7 (1 Worst, 10 Best)
Smog Rating (tailpipe only) 5 (1 Worst, 10 Best)
This vehicle emits 284 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs $7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $ 2.76 per gallon. MPGe is miles per gallon gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

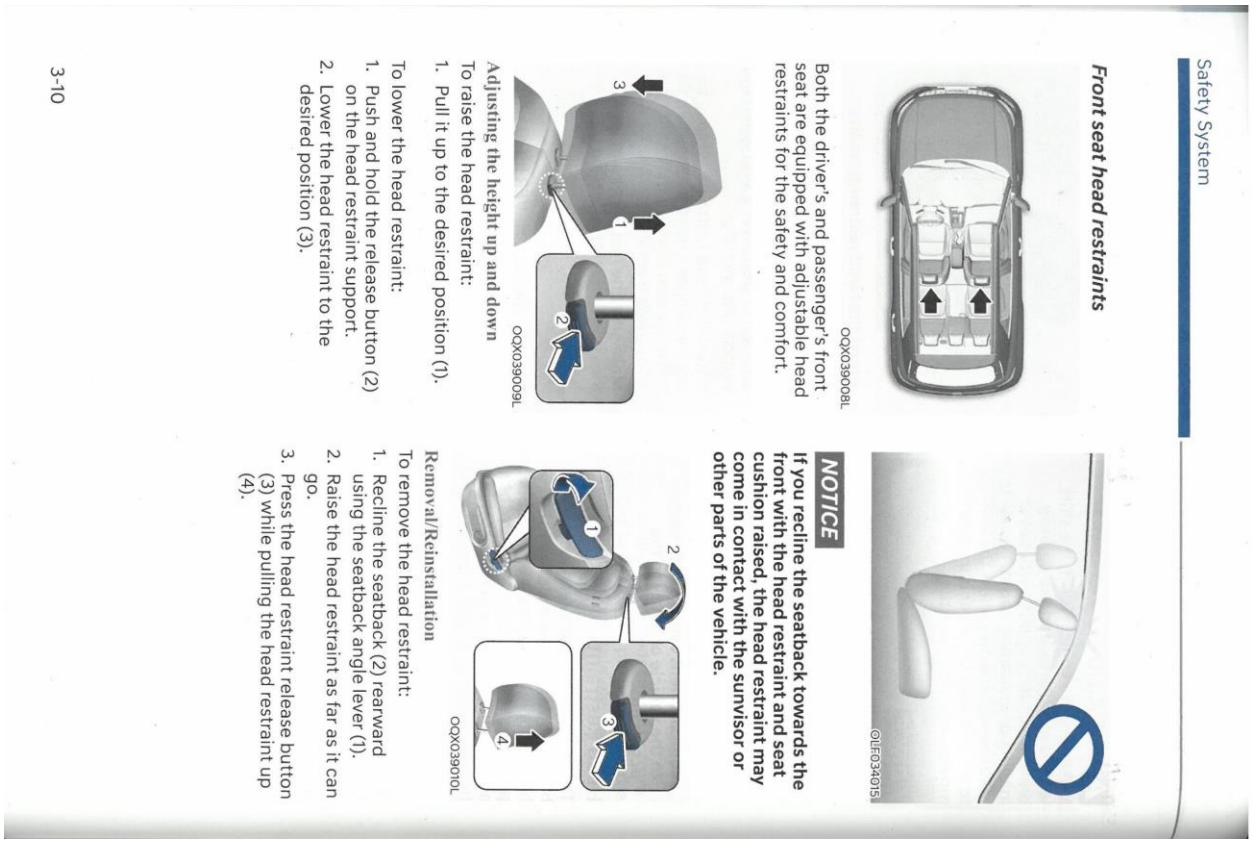
Smartphone QR Code

Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline license and title fees state and local taxes and dealer installed options and accessories are not included in the manufacturer's suggested retail price. This label has been affixed to this vehicle by Hyundai Motor America, pursuant to the requirements of 15 U.S.C. 1231 et seq. which prohibits its removal or alteration prior to delivery to the ultimate purchaser.

PARTS CONTENT INFORMATION
FOR VEHICLE IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT:
MAJOR SOURCES OF FOREIGN PARTS CONTENT: KOREA: 97 %
EUROPE: 1 %
Note: Parts content does not include final assembly, distribution, or other non-parts costs.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: ULSAN, KOREA
COUNTRY OF ORIGIN:
ENGINE: KOREA
TRANSMISSION: KOREA

308 A 2990OMORNI 869

102 Monroney Label



Safety System

Front seat head restraints

Both the driver's and passenger's front seat are equipped with adjustable head restraints for the safety and comfort.

OQX039008L

Adjusting the height up and down

To raise the head restraint:
1. Pull it up to the desired position (1).

To lower the head restraint:
1. Push and hold the release button (2) on the head restraint support.
2. Lower the head restraint to the desired position (3).

OQX039009L

NOTICE

If you recline the seatback towards the front with the head restraint and seat cushion raised, the head restraint may come in contact with the sunvisor or other parts of the vehicle.

OLF034015L

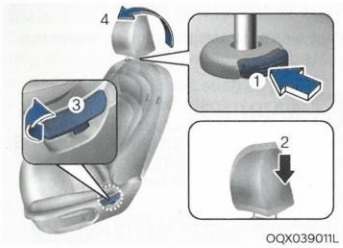
Removal/Reinstallation

To remove the head restraint:
1. Recline the seatback (2) rearward using the seatback angle lever (1).
2. Raise the head restraint as far as it can go.
3. Press the head restraint release button (3) while pulling the head restraint up (4).

OQX039010L

3-10

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

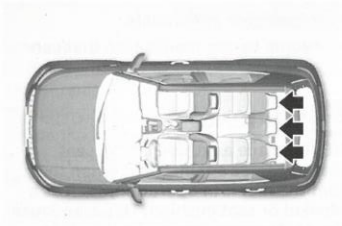


OQX039011L

To reinstall the head restraint:

1. Put the head restraint poles (2) into the holes while pressing the release button (1).
2. Adjust the head restraint to the appropriate height.
3. Adjust the seatback (4) forward using the seatback angle lever (3).

Rear seat head restraints

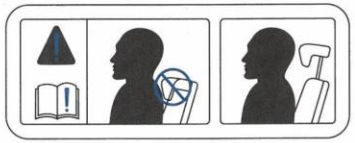


OQX039032L

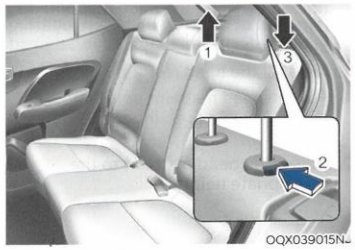
The rear seats are equipped with head restraints in all the seating positions for the passenger's safety and comfort.

CAUTION

- **For each rear passenger, adjust the head restraint so that the middle of the head restraint is at the same height as the height of the top of the eyes.**



- **When seating on the rear seat, do not adjust the height of the head restraints to the lowest position.**



OQX039015N

Adjusting the height up and down

To raise the head restraint:

1. Pull it up to the desired position (1).

To lower the head restraint:

1. Push and hold the release button (2) on the head restraint support.
2. Lower the head restraint to the desired position (3).

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

The following additional data can be obtained from the Research and Development section of the NHTSA website (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 Date: 01/23/2020

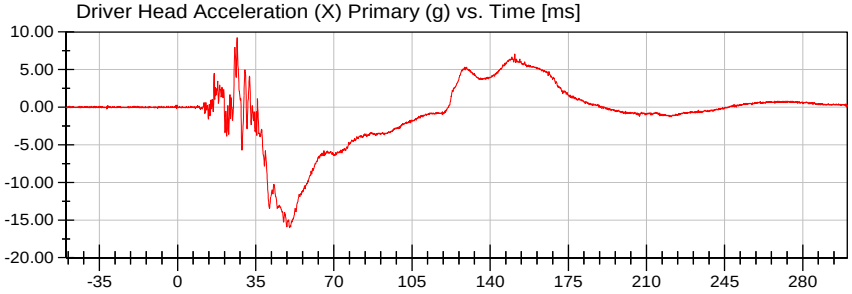
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

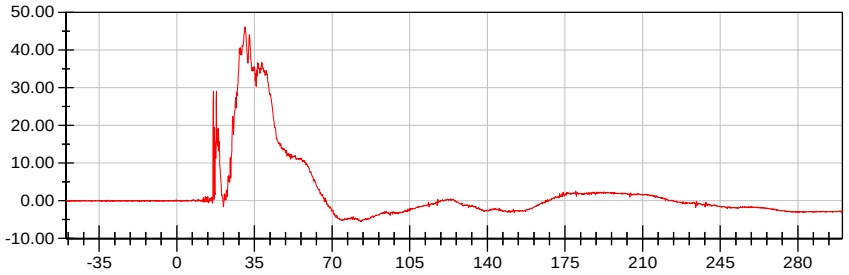
9.24 g at 26.64 ms

<Min>

-16.03 g at 50.16 ms

CFC_1000

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



<Max>

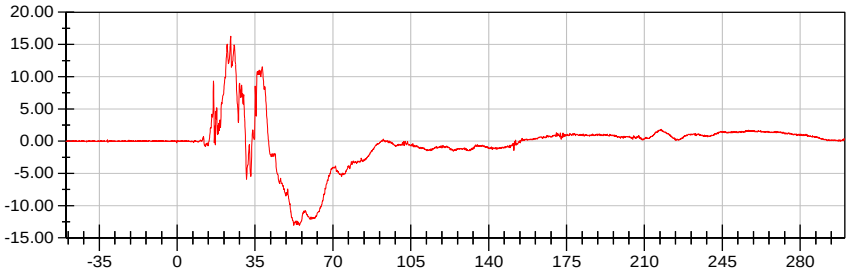
46.16 g at 30.72 ms

<Min>

-5.51 g at 82.72 ms

CFC_1000

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



<Max>

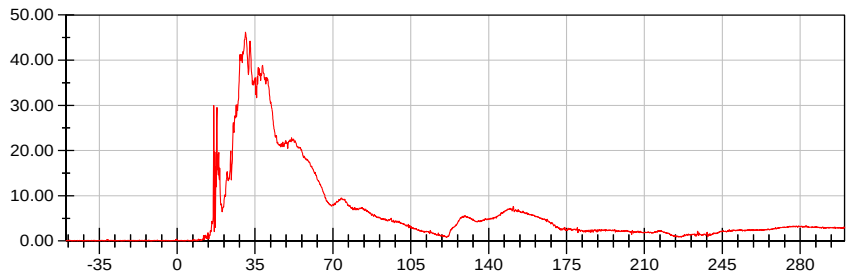
16.29 g at 24.08 ms

<Min>

-13.03 g at 52.40 ms

CFC_1000

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



<Max>

46.18 g at 30.72 ms

<Min>

0.03 g at -49.68 ms

CFC_1000

NHTSA

Test Date: 01/23/2020

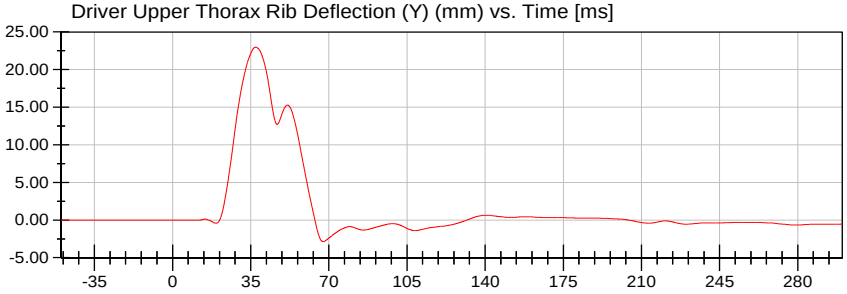
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

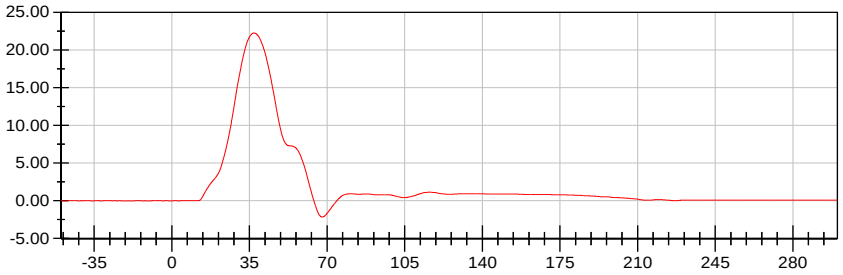
22.98 mm at 37.28 ms

<Min>

-2.86 mm at 67.52 ms

CFC_180

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



<Max>

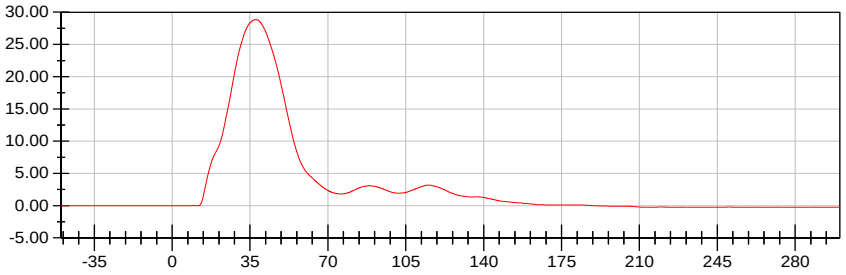
22.27 mm at 37.04 ms

<Min>

-2.16 mm at 67.76 ms

CFC_180

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



<Max>

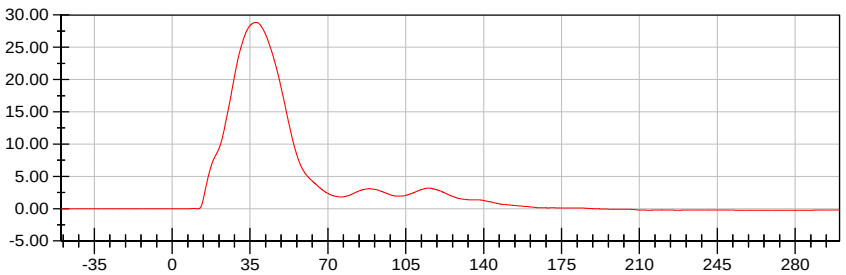
28.85 mm at 37.68 ms

<Min>

-0.24 mm at 214.32 ms

CFC_180

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



<Max>

28.85 mm at 37.68 ms

<Min>

-0.24 mm at 214.32 ms

CFC_180

NHTSA

Test Date: 01/23/2020

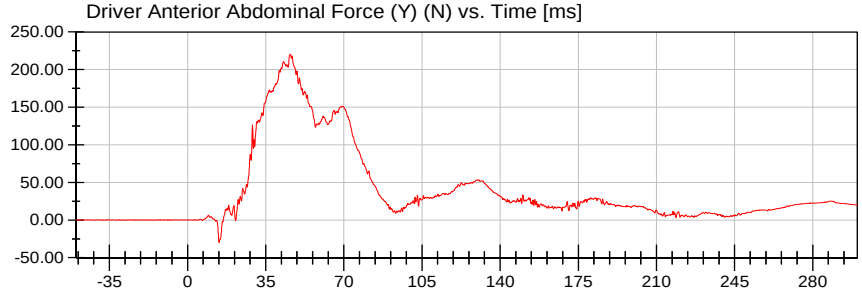
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

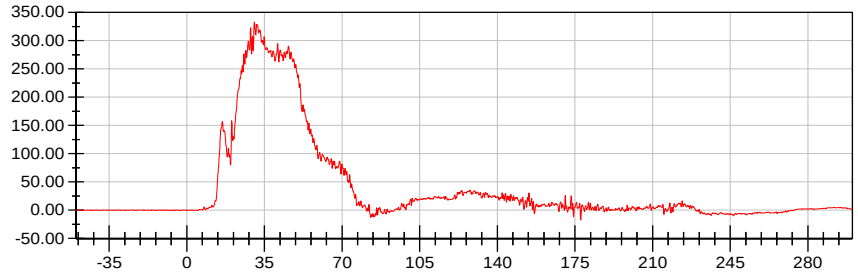
220.34 N at 46.00 ms

<Min>

-29.96 N at 14.16 ms

CFC_600

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



<Max>

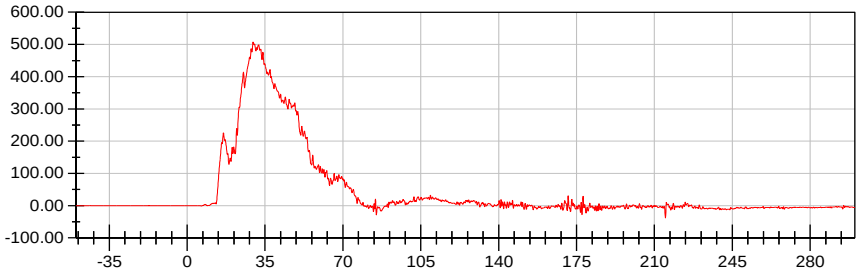
333.09 N at 30.48 ms

<Min>

-17.53 N at 177.60 ms

CFC_600

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



<Max>

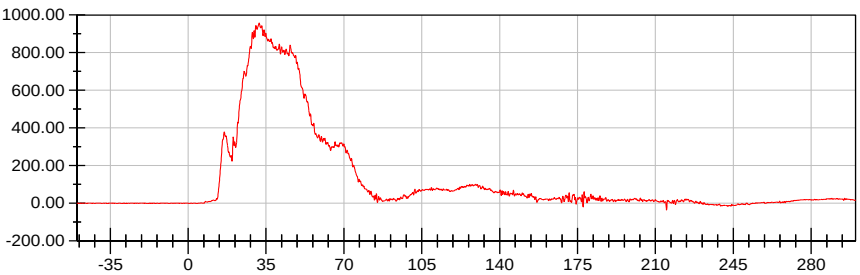
507.07 N at 29.60 ms

<Min>

-38.30 N at 214.96 ms

CFC_600

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



<Max>

957.41 N at 31.92 ms

<Min>

-35.74 N at 214.96 ms

CFC_600

NHTSA

Test Date: 01/23/2020

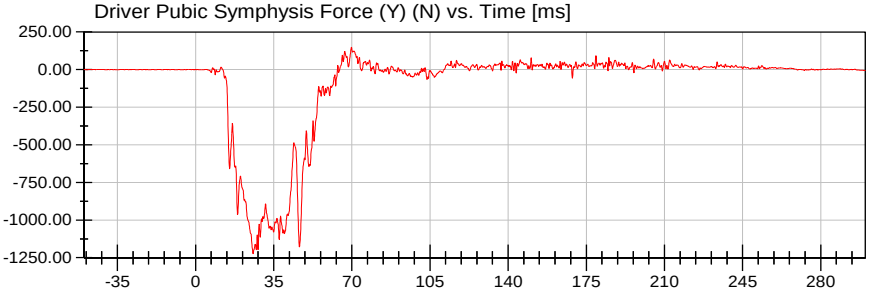
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

147.25 N at 69.76 ms

<Min>

-1,223.70 N at 25.76 ms

CFC_600

NHTSA

Test Date: 01/23/2020

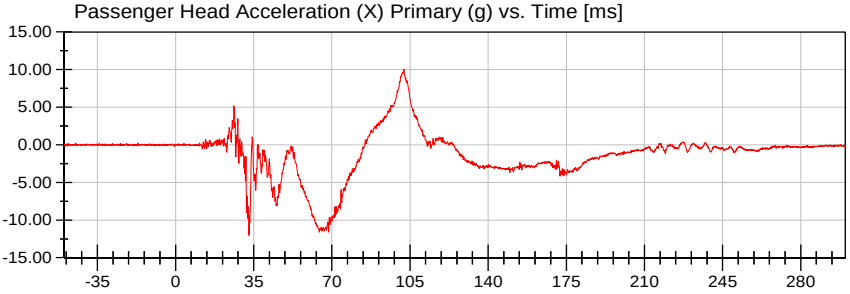
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

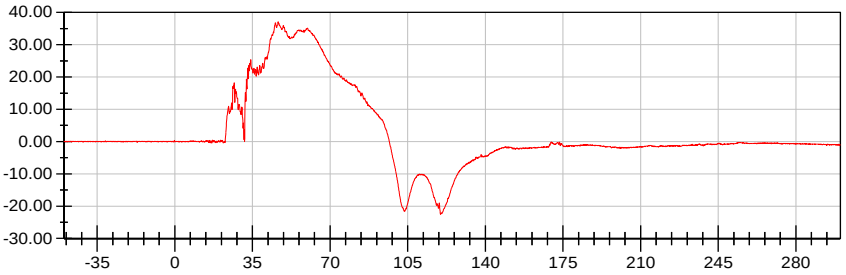
10.08 g at 102.24 ms

<Min>

-12.02 g at 32.88 ms

CFC_1000

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



<Max>

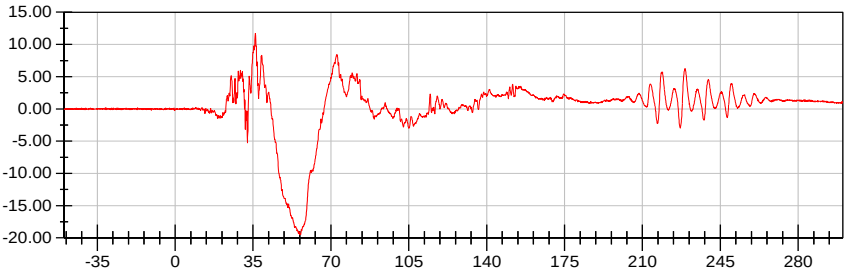
37.12 g at 46.56 ms

<Min>

-22.53 g at 119.84 ms

CFC_1000

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



<Max>

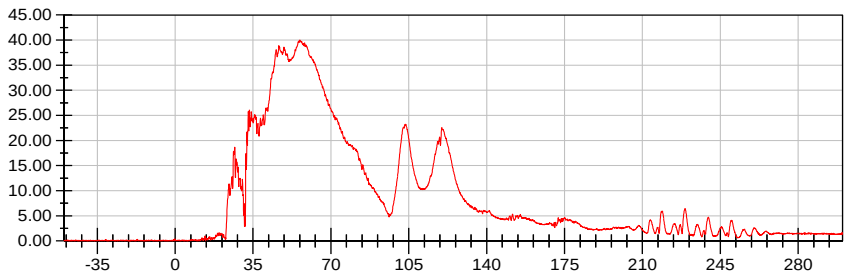
11.72 g at 36.08 ms

<Min>

-19.52 g at 56.24 ms

CFC_1000

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



<Max>

40.01 g at 56.00 ms

<Min>

0.04 g at -49.60 ms

CFC_1000

NHTSA

Test Date: 01/23/2020

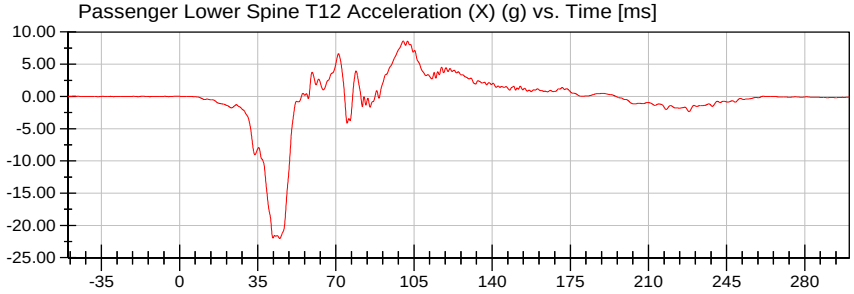
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

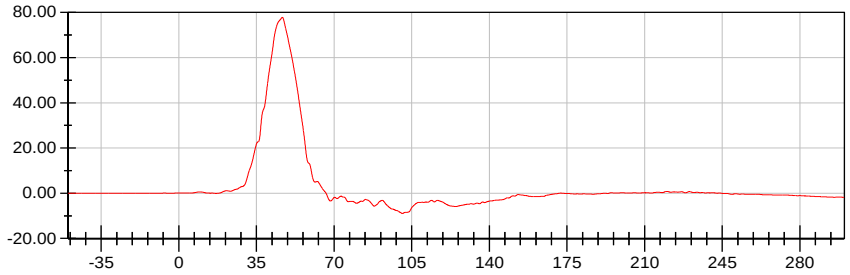
8.60 g at 100.16 ms

<Min>

-22.03 g at 44.88 ms

CFC_180

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



<Max>

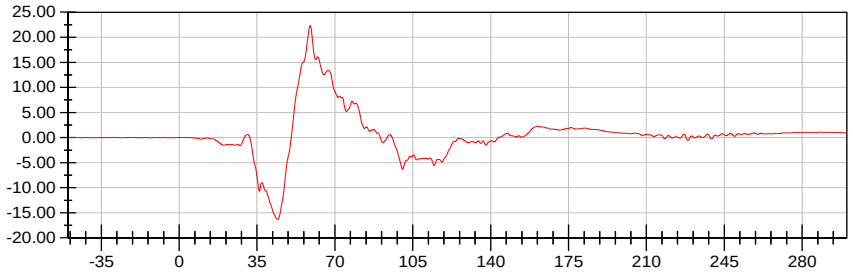
77.85 g at 46.64 ms

<Min>

-8.96 g at 100.80 ms

CFC_180

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



<Max>

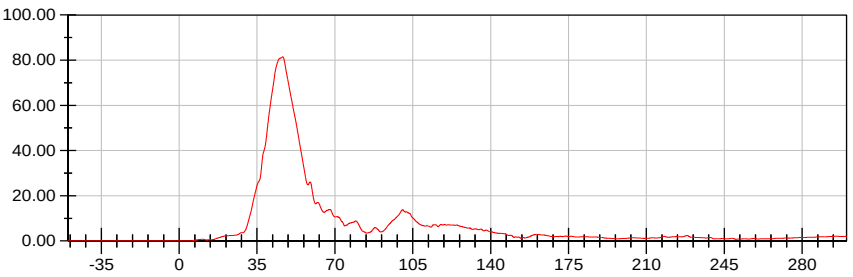
22.35 g at 58.88 ms

<Min>

-16.31 g at 44.24 ms

CFC_180

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



<Max>

81.47 g at 46.56 ms

<Min>

0.01 g at -32.32 ms

CFC_180

NHTSA

Test Date: 01/23/2020

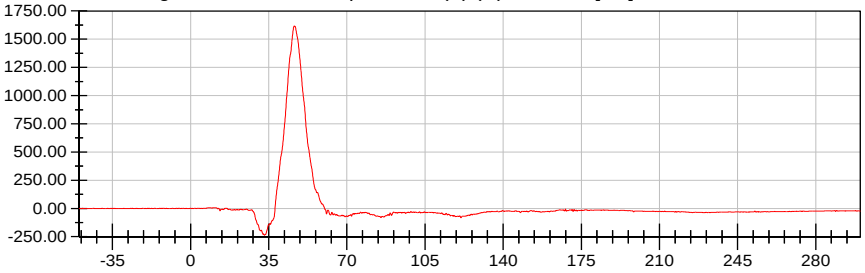
Test Lab: CTF

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

Test Number: 200123 (M20204211)

Position #4 SID IIs Dummy (DQ0570)

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



<Max>

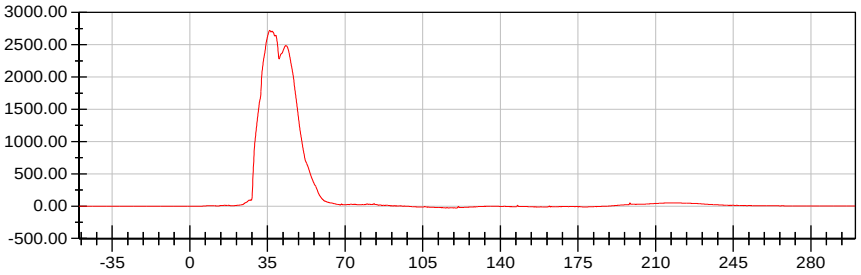
1,616.32 N at 46.48 ms

<Min>

-236.52 N at 33.12 ms

CFC_600

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



<Max>

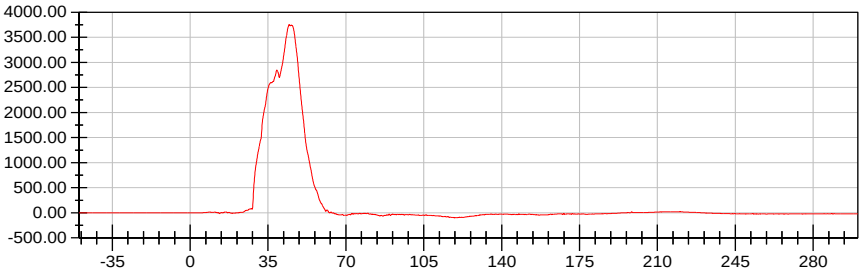
2,721.88 N at 36.00 ms

<Min>

-28.96 N at 120.32 ms

CFC_600

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



<Max>

3,751.76 N at 44.48 ms

<Min>

-99.28 N at 118.80 ms

CFC_600

APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 70

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	328	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	201	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Resultant Acceleration	125 - 155 g	142.8 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	8.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	3.51 %	Yes

Test meets specifications.

Condition: Used

Comments:
Head Skin S/N: DP6812

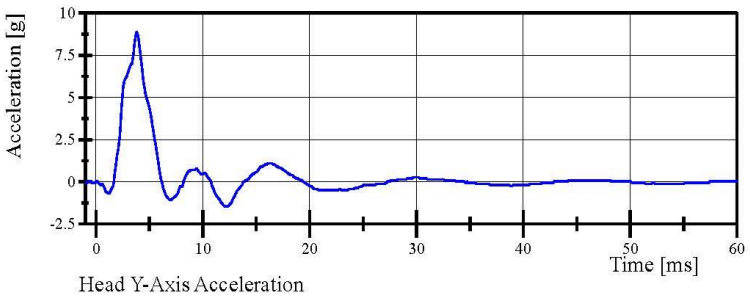
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.11.2019 11:13:41 326

Transportation Research Center Inc.

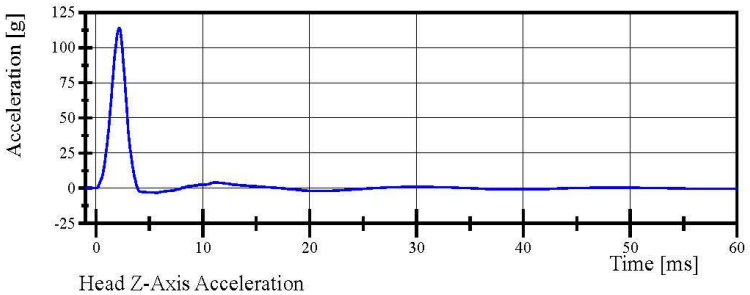
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Head X-Axis Acceleration



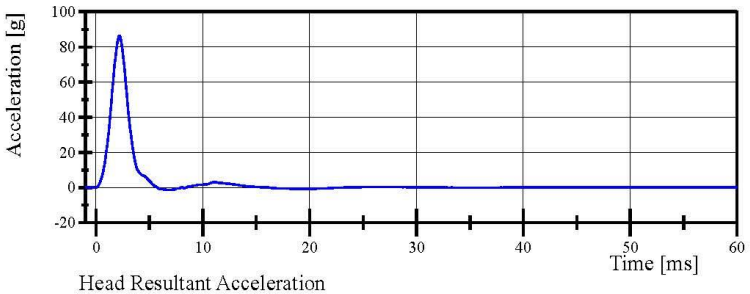
Filter Class: CFC_1000
Max: 8.9 g at 3.8 ms
Min: -1.4 g at 12.0 ms

Head Y-Axis Acceleration



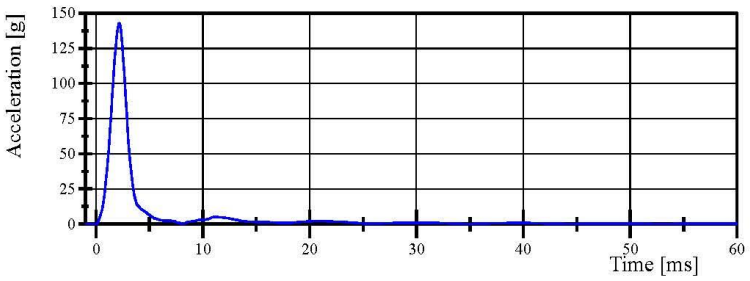
Filter Class: CFC_1000
Max: 113.9 g at 2.2 ms
Min: -3.1 g at 5.7 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 86.4 g at 2.2 ms
Min: -1.4 g at 6.7 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 142.8 g at 2.2 ms
Min: 0.0 g at -0.7 ms

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

12.11.2019 11:14:07 326

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 70-2
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	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	-51.6 deg	Yes
Time of Peak	54 - 66 ms	55.9 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	57.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: 05053

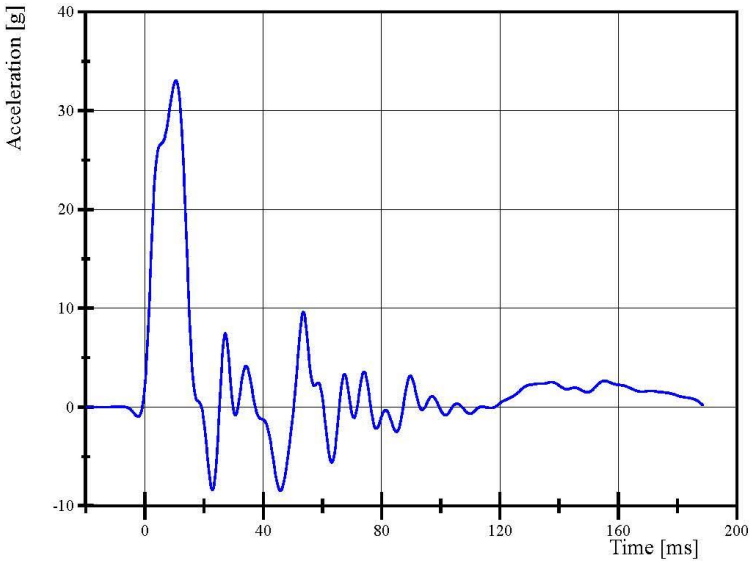
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.11.2019 12:36:36 1468

Transportation Research Center Inc.

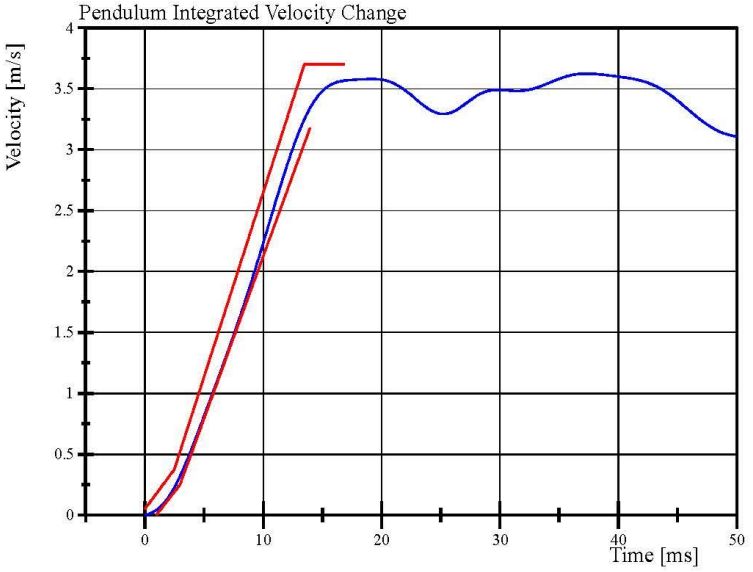
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 70-2
Test Date: 12/11/2019

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.1 g at 10.5 ms
Min: -8.5 g at 45.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 37.3 ms
Min: 0.0 m/s at 0.0 ms

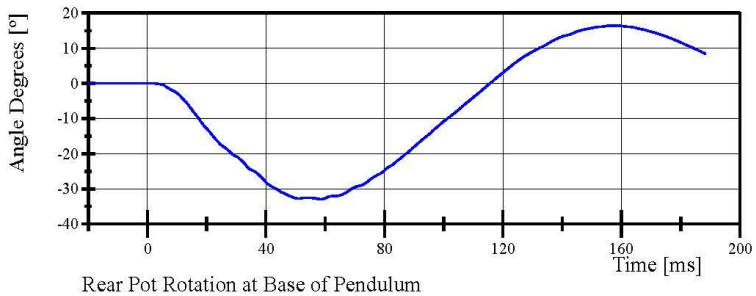
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 12:37:17 1468

Transportation Research Center Inc.

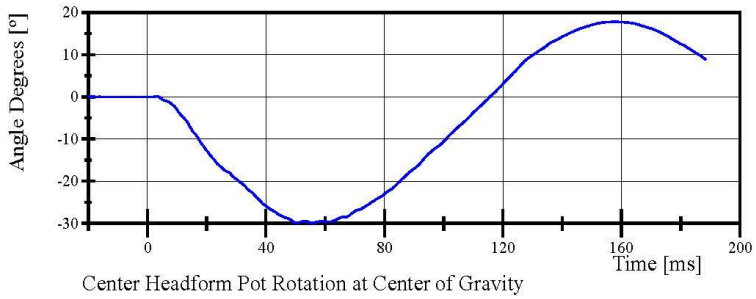
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 70-2
Test Date: 12/11/2019

Forward Pot Rotation at Base of Pendulum



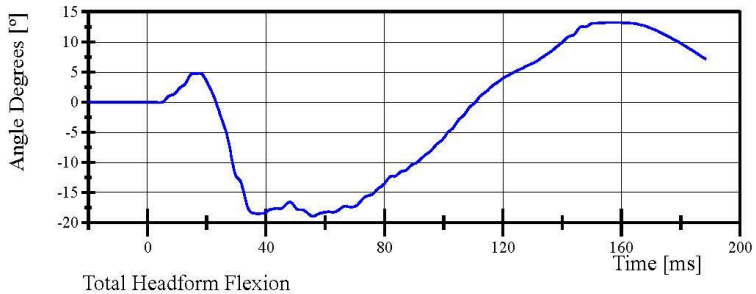
Filter Class: CFC_180
Max: 16.4 ° at 156.6 ms
Min: -32.9 ° at 58.4 ms

Rear Pot Rotation at Base of Pendulum



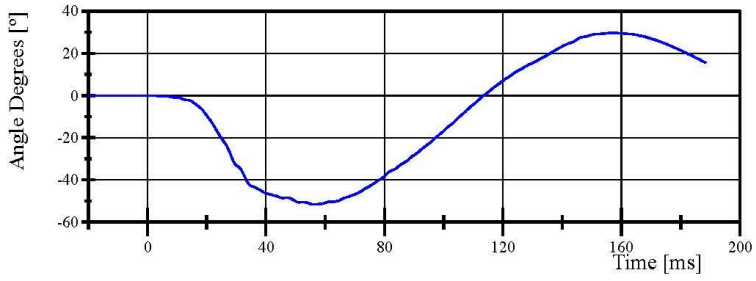
Filter Class: CFC_180
Max: 17.8 ° at 157.5 ms
Min: -29.9 ° at 50.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 13.2 ° at 159.4 ms
Min: -19.0 ° at 55.8 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 29.6 ° at 156.6 ms
Min: -51.6 ° at 55.9 ms

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

12.11.2019 12:37:17 1468

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-8.79 g	Yes

Test meets specifications.

Condition: Used

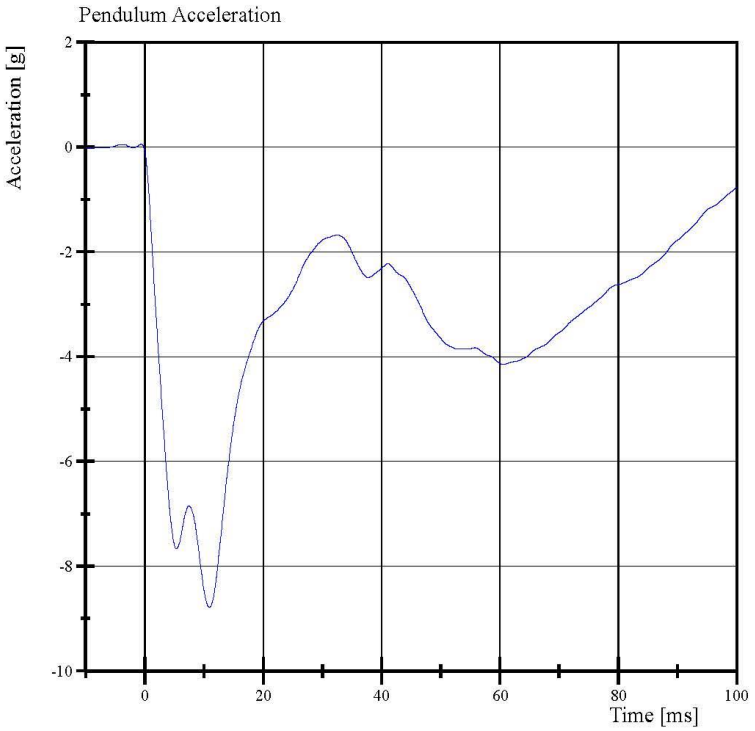
Comments:
Arm S/N: 175-3501-07014

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

12.11.2019 13:37:21 537

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 0.1 g at -0.6 ms
Min: -8.8 g at 10.9 ms

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

12.11.2019 13:37:50 537

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.4 mm	Yes

Test meets specifications.

Condition: Used

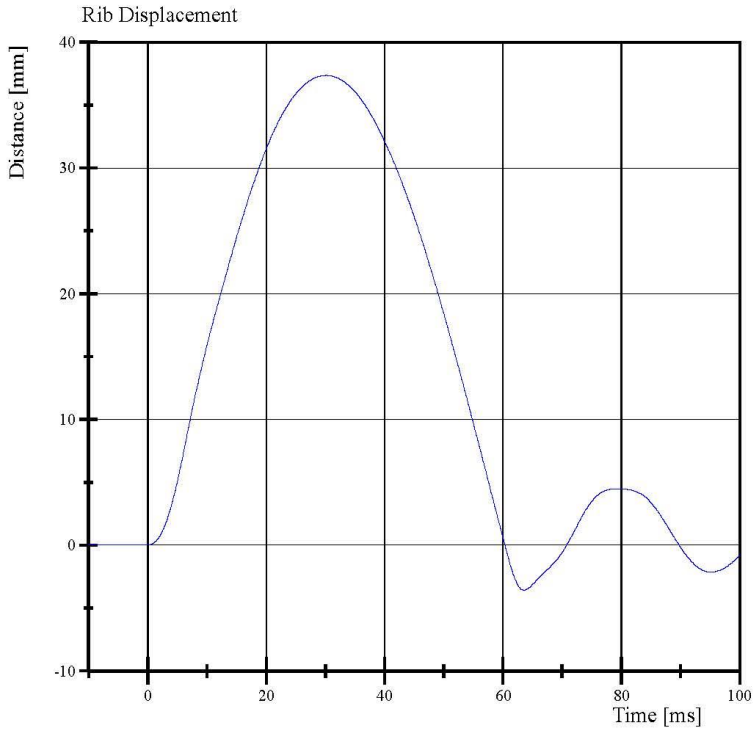
Comments:
Drop Height: 462mm
Rib Module: 175-4008-A

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

12.11.2019 09:44:17 474

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 37.4 mm at 30.2 ms
Min: -3.6 mm at 63.5 ms

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

12.11.2019 09:44:51 474

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.5 mm	Yes

Test meets specifications.

Condition: Used

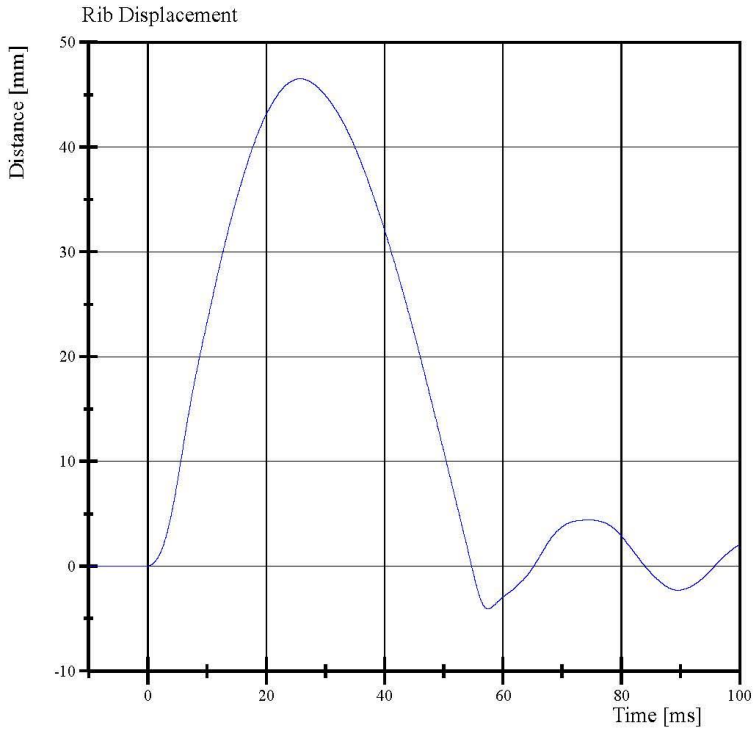
Comments:
Drop Height: 816mm
Rib Module: 175-4008-A

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

12.11.2019 09:34:06 426

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 46.5 mm at 25.8 ms
Min: -4.1 mm at 57.4 ms

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

12.11.2019 09:34:43 426

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.7 mm	Yes

Test meets specifications.

Condition: Used

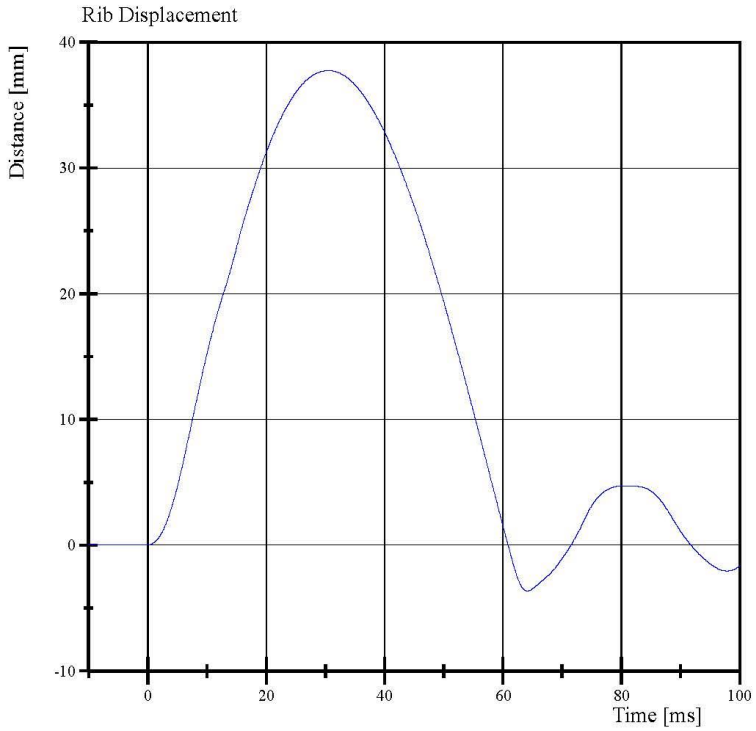
Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A

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

12.11.2019 09:56:08 475

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 37.7 mm at 30.5 ms
Min: -3.6 mm at 64.2 ms

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

12.11.2019 09:56:53 475

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.3 mm	Yes

Test meets specifications.

Condition: Used

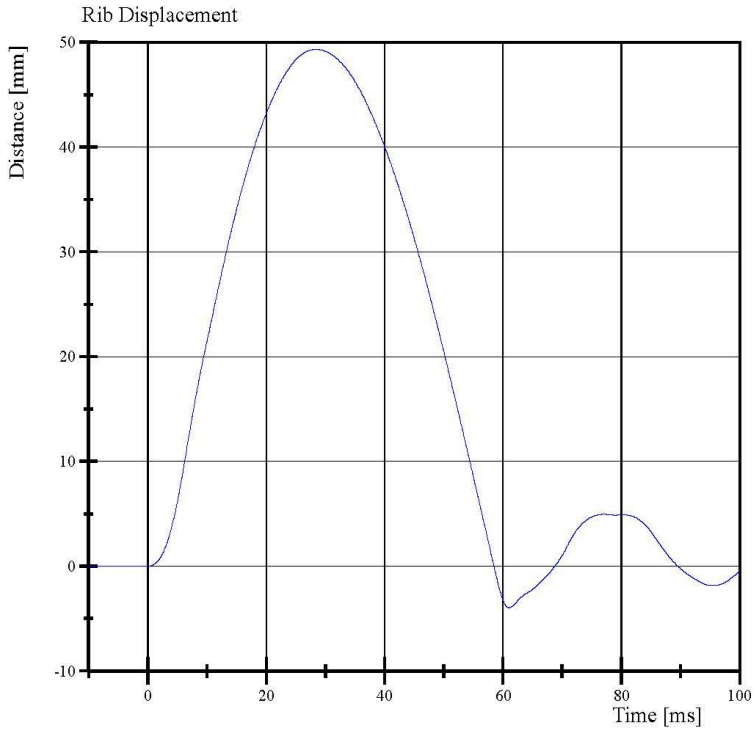
Comments:
Drop Height: 816 mm
Rib Module: 175-4008-A

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

12.11.2019 09:50:22 418

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 49.3 mm at 28.5 ms
Min: -4.0 mm at 61.0 ms

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

12.11.2019 09:50:55 418

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.4 mm	Yes

Test meets specifications.

Condition: Used

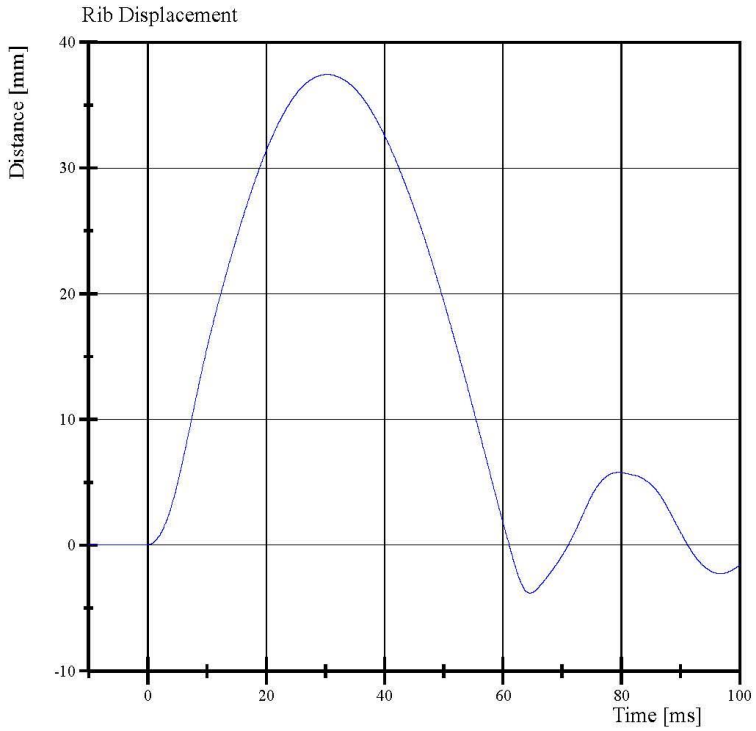
Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A-06-017

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

12.11.2019 10:10:43 499

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 37.4 mm at 30.3 ms
Min: -3.8 mm at 64.6 ms

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

12.11.2019 10:11:29 499

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.4 mm	Yes

Test meets specifications.

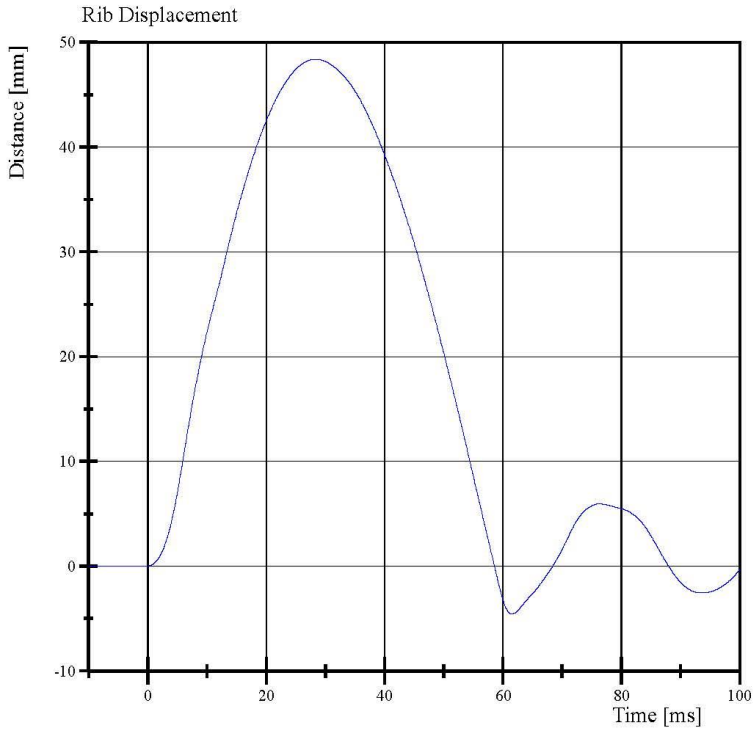
Condition: Used
Comments:
Drop Height: 816 mm
Rib Module: 175-4008-A-06-017

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

12.11.2019 10:02:42 409

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 48.4 mm at 28.4 ms
Min: -4.6 mm at 61.5 ms

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

12.11.2019 10:03:20 409

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.472 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,597.3 N	Yes
Upper Rib Displacement	34 - 41 mm	38.4 mm	Yes
Center Rib Displacement	37 - 45 mm	40.9 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.6 mm	Yes

Test meets specifications.

Condition: Used

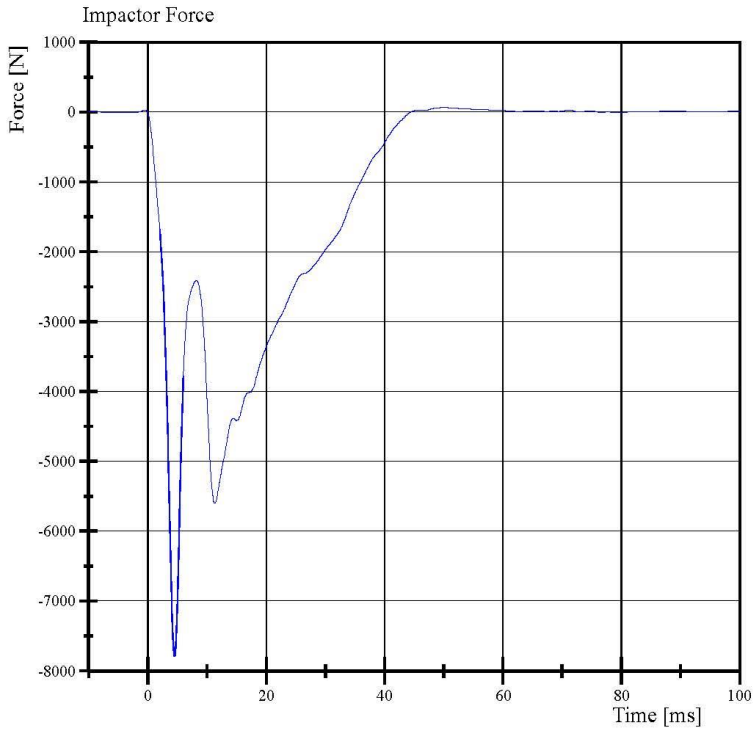
Comments:
Upper Rib Module S/N: 175-4008-A
Upper Rib Foam S/N: 175-4003-EK6973
Middle Rib Module S/N: 175-4008-A
Middle Rib Foam S/N: 175-4003-EK6970
Lower Rib Module S/N: 175-4008-A-06-017
Lower Rib Foam S/N: 175-4008-EK6971

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

12.11.2019 13:46:52 400

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 66.9 N at 50.1 ms
Min: -7,788.1 N at 4.5 ms

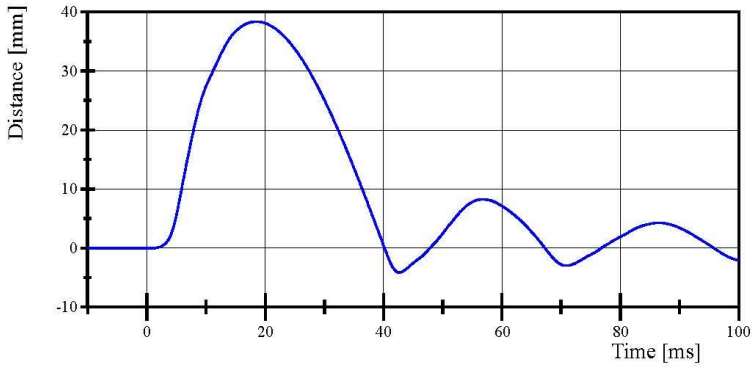
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 13:47:55 400

Transportation Research Center Inc.

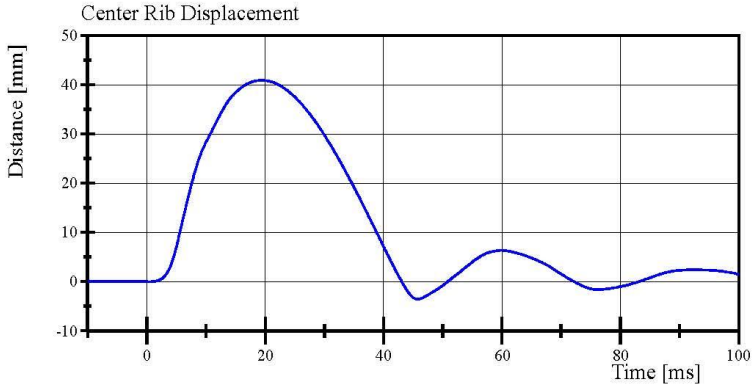
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Upper Rib Displacement



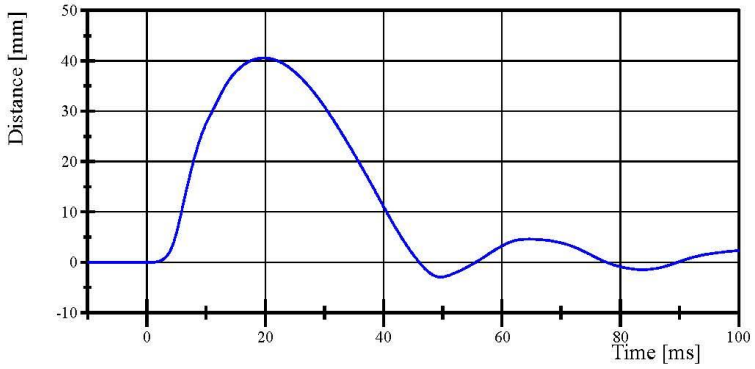
Filter Class: CFC_180
Max: 38.4 mm at 18.6 ms
Min: -4.2 mm at 42.6 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 40.9 mm at 19.4 ms
Min: -3.6 mm at 45.8 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 40.6 mm at 19.8 ms
Min: -2.9 mm at 49.6 ms

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

12.11.2019 13:47:55 400

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 70-3
Test Date: 12/11/2019

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	-6.117 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-50.4 deg	Yes
Time of Peak	39 - 53 ms	45.9 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	37.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Lumbar S/N: 150365

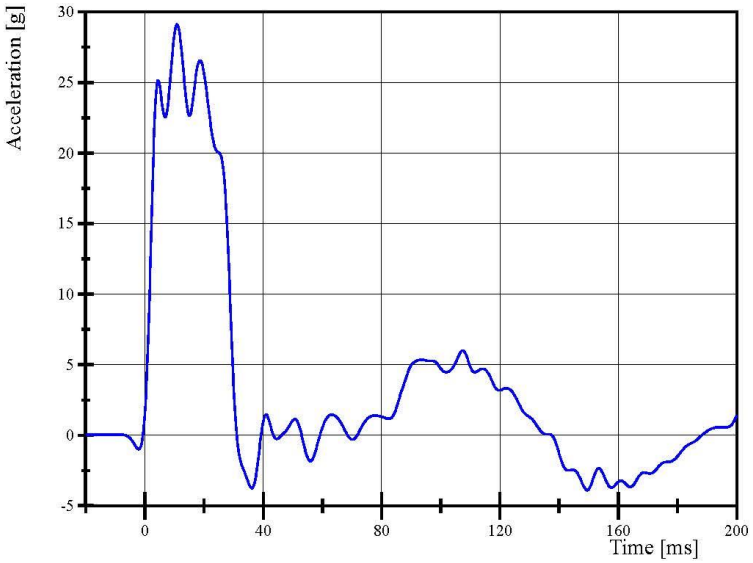
Specification Source: CFR49 Part 572 Subpart U with Polarity in accordance with J211

12.11.2019 12:56:06 638

Transportation Research Center Inc.

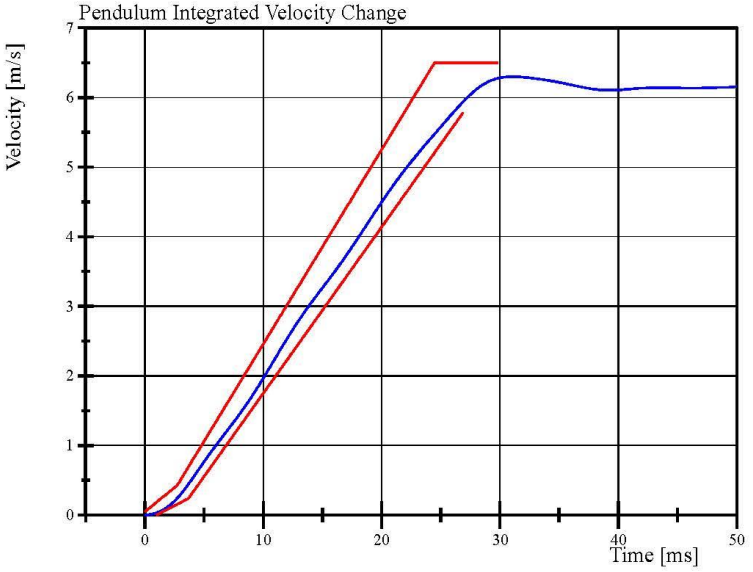
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 70-3
Test Date: 12/11/2019

Pendulum Acceleration



Filter Class: CFC_60
Max: 29.1 g at 10.9 ms
Min: -3.9 g at 149.5 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.3 m/s at 31.0 ms
Min: 0.0 m/s at 0.0 ms

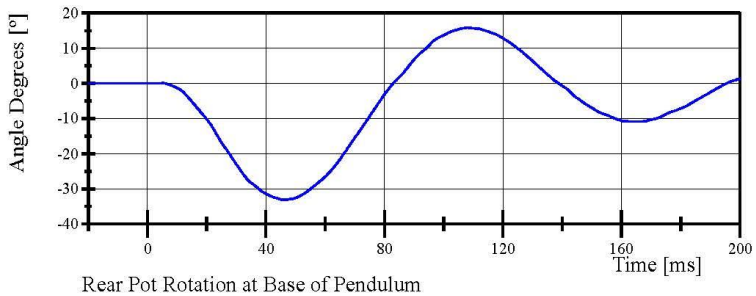
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 12:56:46 638

Transportation Research Center Inc.

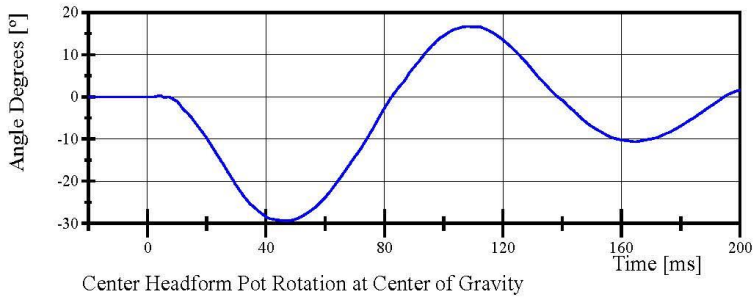
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 70-3
Test Date: 12/11/2019

Forward Pot Rotation at Base of Pendulum



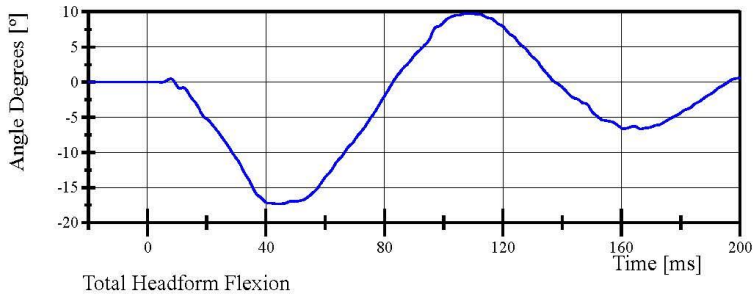
Filter Class: CFC_180
Max: 15.8 ° at 108.0 ms
Min: -33.1 ° at 46.1 ms

Rear Pot Rotation at Base of Pendulum



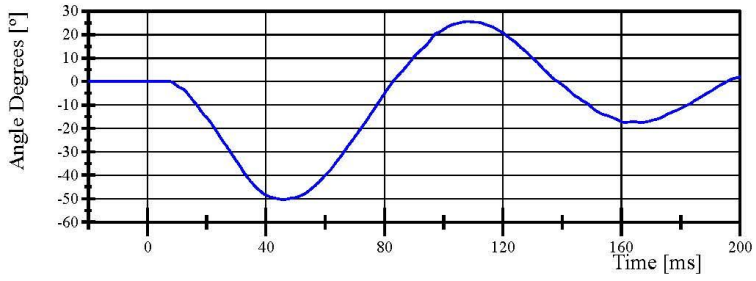
Filter Class: CFC_180
Max: 16.7 ° at 108.1 ms
Min: -29.4 ° at 46.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.8 ° at 108.2 ms
Min: -17.3 ° at 43.8 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.6 ° at 108.1 ms
Min: -50.4 ° at 45.9 ms

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

12.11.2019 12:56:47 638

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.05 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,283.1 N	Yes
Time of Peak	10.6 - 13.0 ms	11.28 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,353.0 N	Yes
Time of Peak	10.0 - 12.3 ms	10.64 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Abdomen S/N: 1066

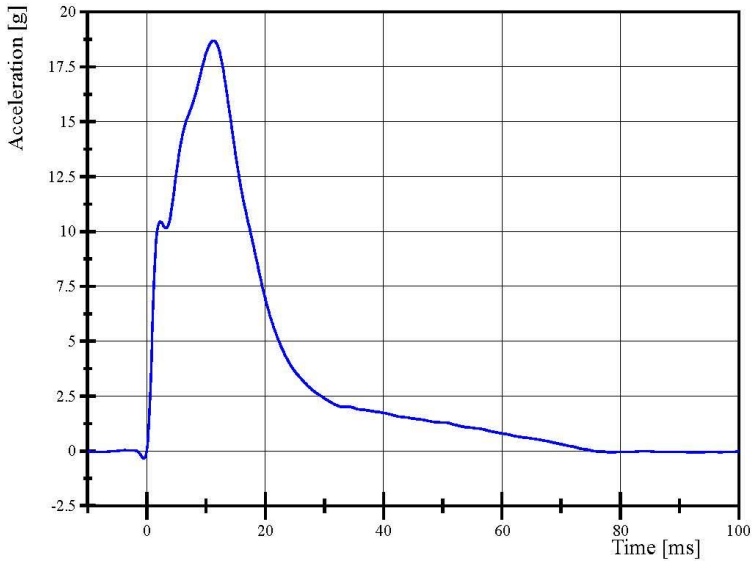
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 14:12:57 525

Transportation Research Center Inc.

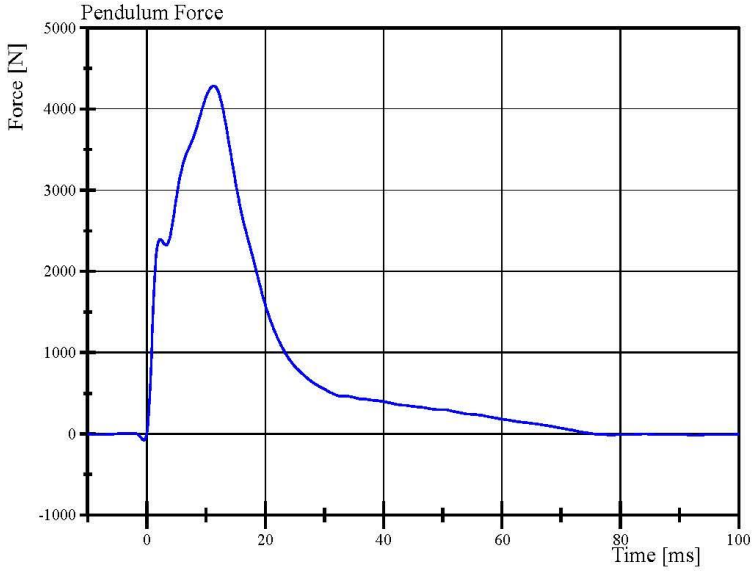
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.7 g at 11.3 ms
Min: -0.3 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,283.1 N at 11.3 ms
Min: -77.3 N at -0.5 ms

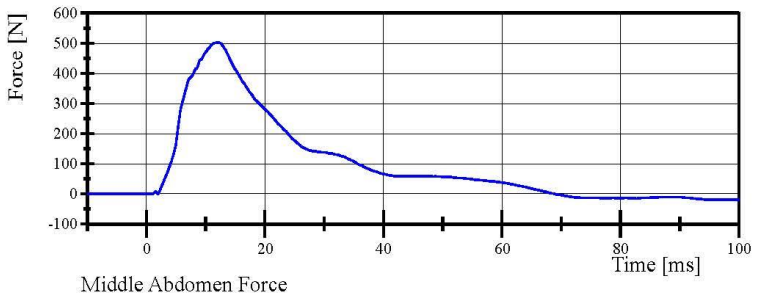
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 14:13:23 525

Transportation Research Center Inc.

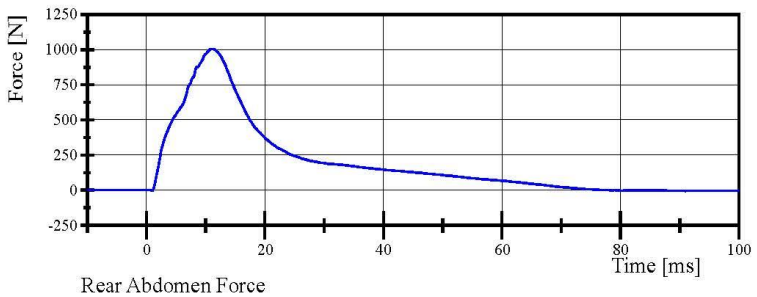
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Front Abdomen Force



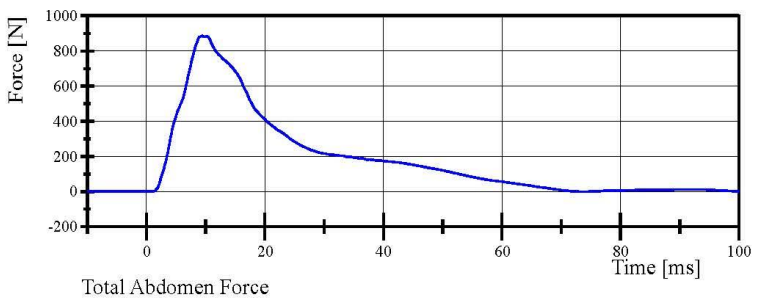
Filter Class: CFC_600
Max: 503.5 N at 12.2 ms
Min: -20.1 N at 96.9 ms

Middle Abdomen Force



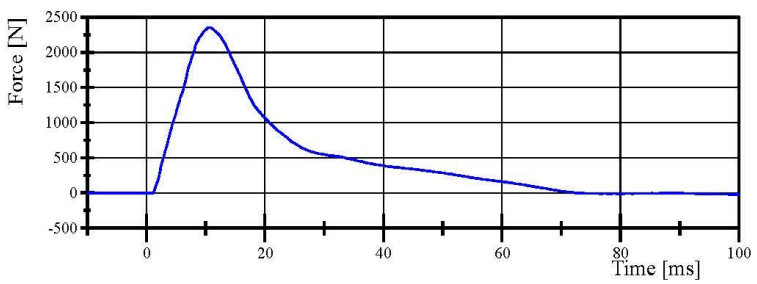
Filter Class: CFC_600
Max: 1,006.0 N at 11.0 ms
Min: -4.4 N at 91.0 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 885.7 N at 9.4 ms
Min: -1.4 N at 73.8 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,353.0 N at 10.6 ms
Min: -22.4 N at 100.0 ms

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

12.11.2019 14:13:24 525

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,189.7 N	Yes
Time of Peak	11.8 - 16.1 ms	12.64 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,318.2 N	Yes
Time of Peak	12.2 - 17.0 ms	12.72 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Pelvis Skin S/N: N/A

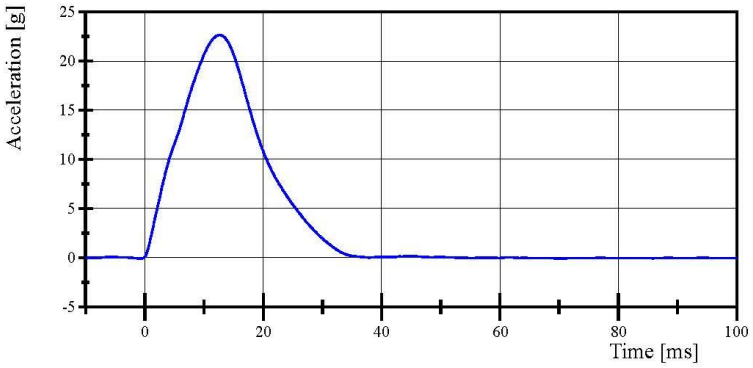
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 14:22:28 509

Transportation Research Center Inc.

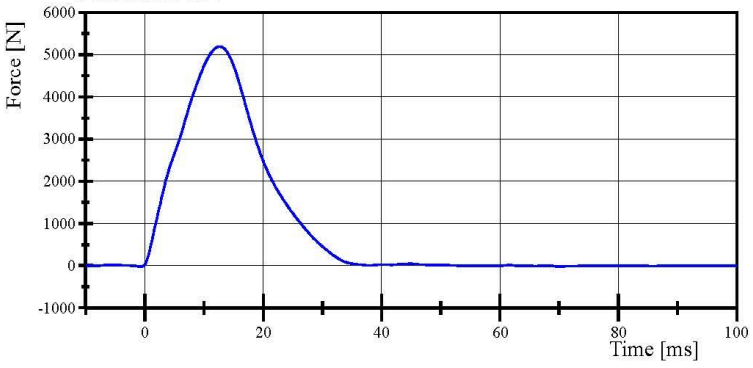
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Pendulum Acceleration



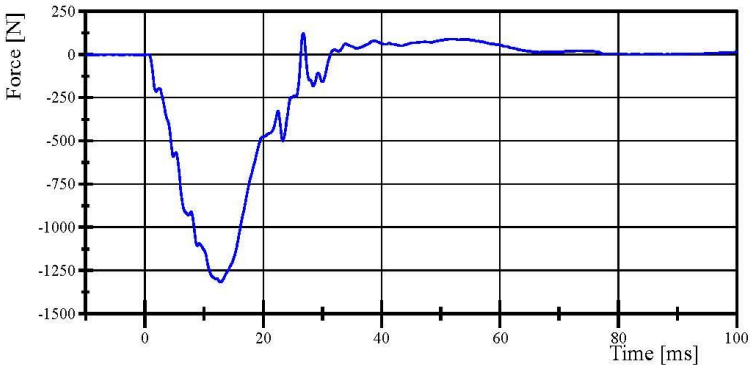
Filter Class: CFC_180
Max: 22.6 g at 12.6 ms
Min: -0.1 g at -0.7 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,189.7 N at 12.6 ms
Min: -22.6 N at -0.7 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 122.9 N at 26.8 ms
Min: -1,318.2 N at 12.7 ms

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

12.11.2019 14:22:52 509

Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 71

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	328	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	201	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Resultant Acceleration	125 - 155 g	144.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	10.7 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	8.58 %	Yes

Test meets specifications.

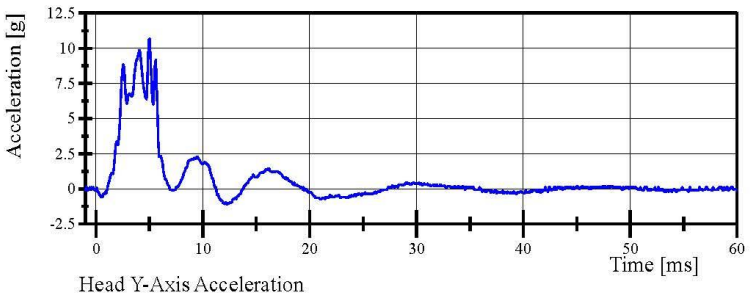
Condition: Used

Comments:
Head Skin S/N: DP6812

Transportation Research Center Inc.

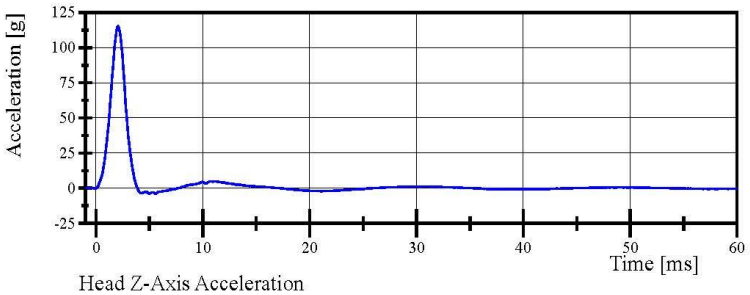
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Head X-Axis Acceleration



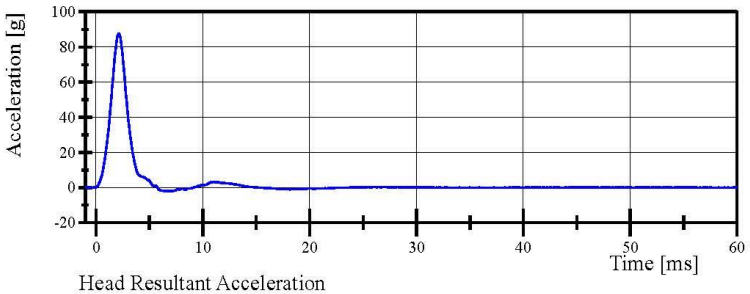
Filter Class: CFC_1000
Max: 10.7 g at 5.0 ms
Min: -1.1 g at 12.1 ms

Head Y-Axis Acceleration



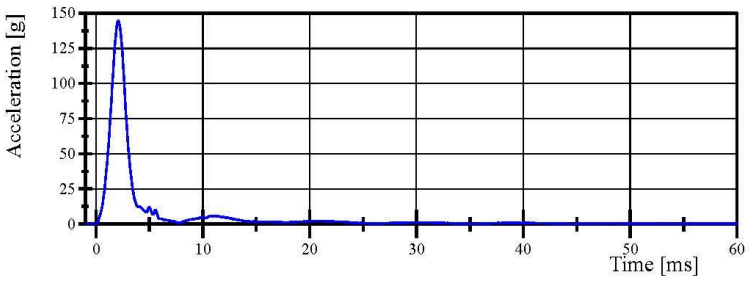
Filter Class: CFC_1000
Max: 115.4 g at 2.1 ms
Min: -3.9 g at 5.6 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 87.5 g at 2.2 ms
Min: -2.1 g at 6.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 144.7 g at 2.1 ms
Min: 0.1 g at -0.3 ms

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

01.24.2020 07:46:50 362

Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °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	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-51.1 deg	Yes
Time of Peak	54 - 66 ms	57.3 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	57.5 ms	Yes

Test meets specifications.

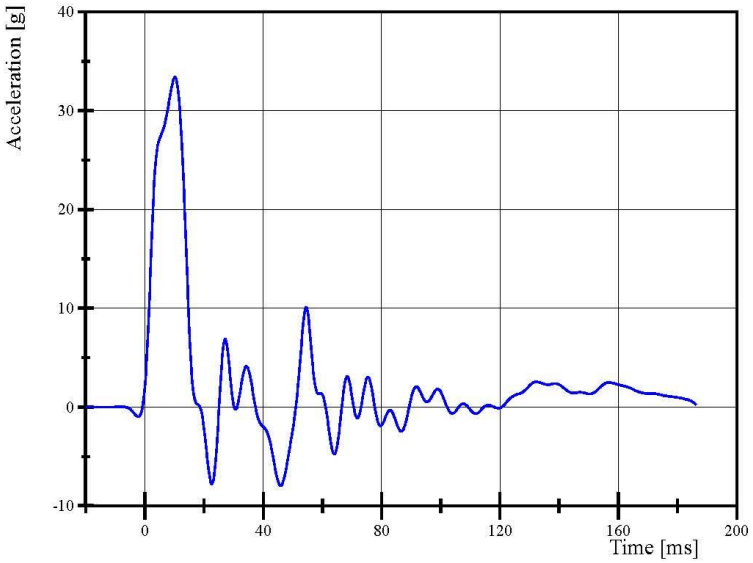
Condition: Used

Comments:
Neck S/N: 05053

Transportation Research Center Inc.

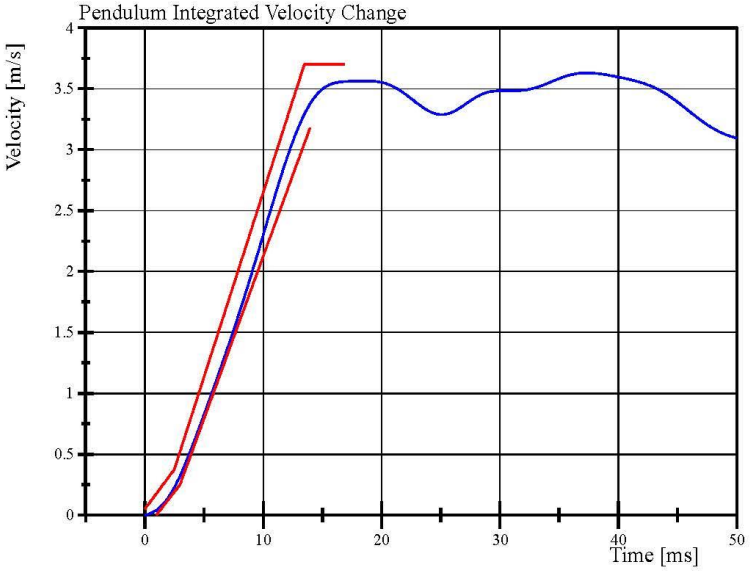
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.4 g at 10.2 ms
Min: -8.0 g at 45.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 37.4 ms
Min: 0.0 m/s at 0.0 ms

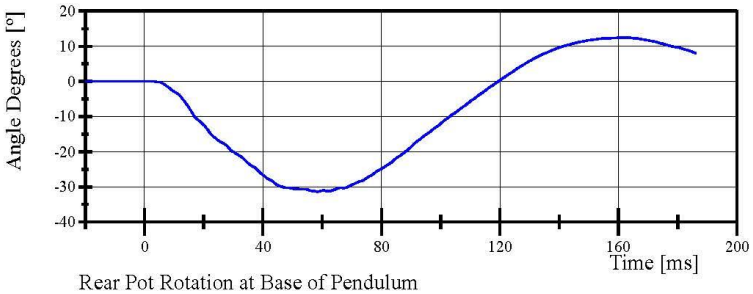
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

01.24.2020 09:11:03 1496

Transportation Research Center Inc.

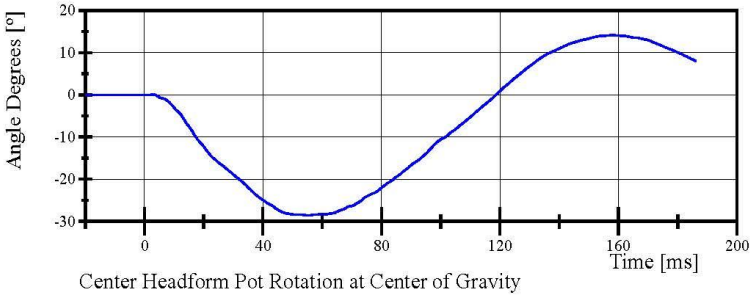
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Forward Pot Rotation at Base of Pendulum



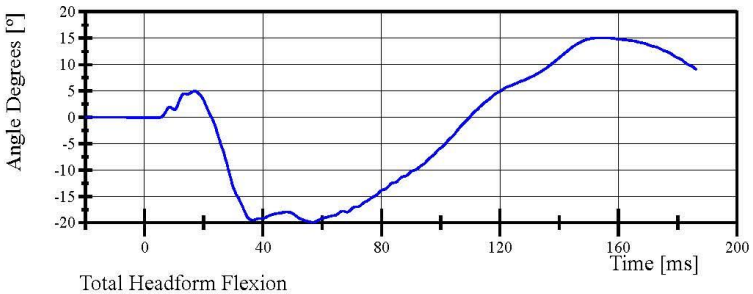
Filter Class: CFC_180
Max: 12.4 ° at 162.2 ms
Min: -31.4 ° at 58.5 ms

Rear Pot Rotation at Base of Pendulum



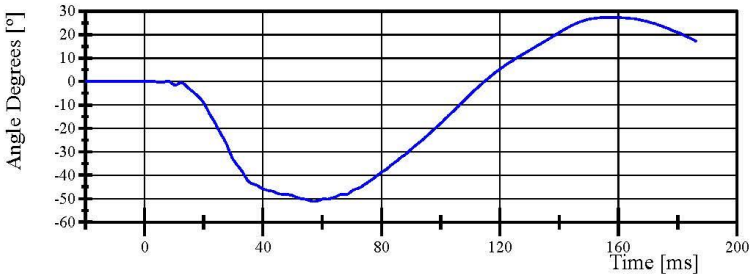
Filter Class: CFC_180
Max: 14.1 ° at 157.8 ms
Min: -28.6 ° at 55.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 15.1 ° at 155.7 ms
Min: -19.9 ° at 56.8 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 27.4 ° at 157.0 ms
Min: -51.1 ° at 57.3 ms

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

01.24.2020 09:11:03 1496

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-8.26 g	Yes

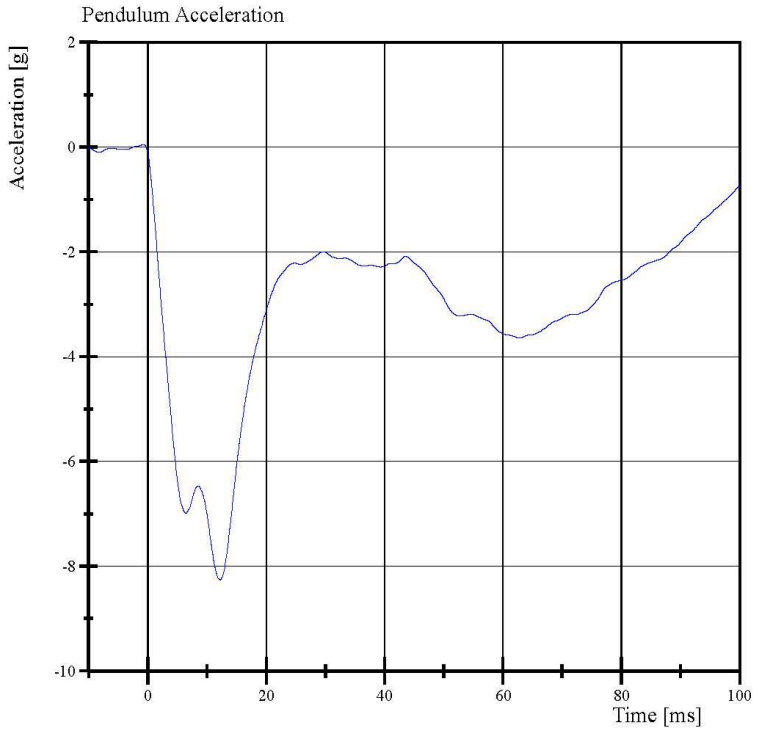
Test meets specifications.

Condition: Used

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

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 0.1 g at -0.7 ms
Min: -8.3 g at 12.2 ms

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

01.24.2020 11:49:43 600

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

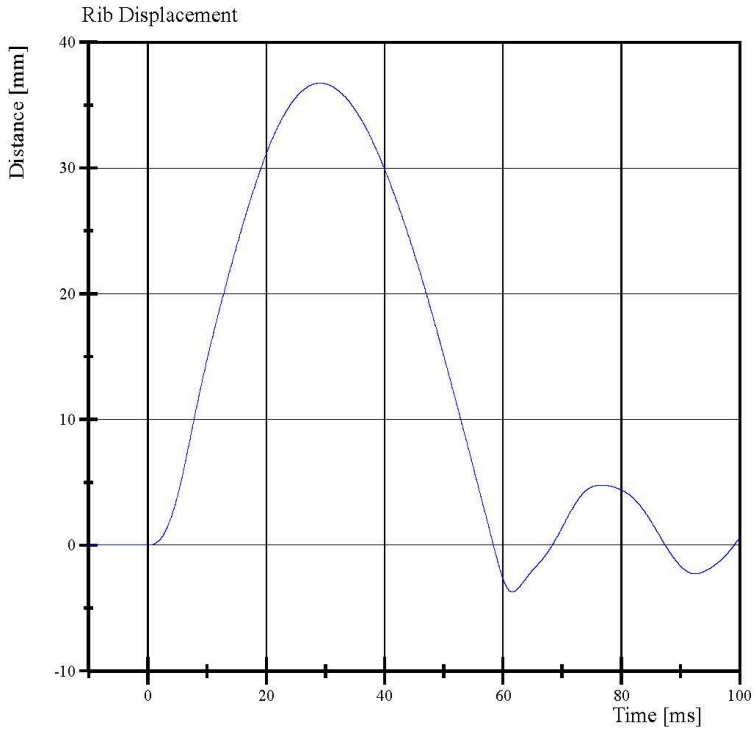
Condition: Used
Comments:
Drop Height: 462mm
Rib Module: 175-4008-A

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

01.24.2020 09:34:02 534

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 36.8 mm at 29.1 ms
Min: -3.7 mm at 61.6 ms

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

01.24.2020 09:34:32 534

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.5 mm	Yes

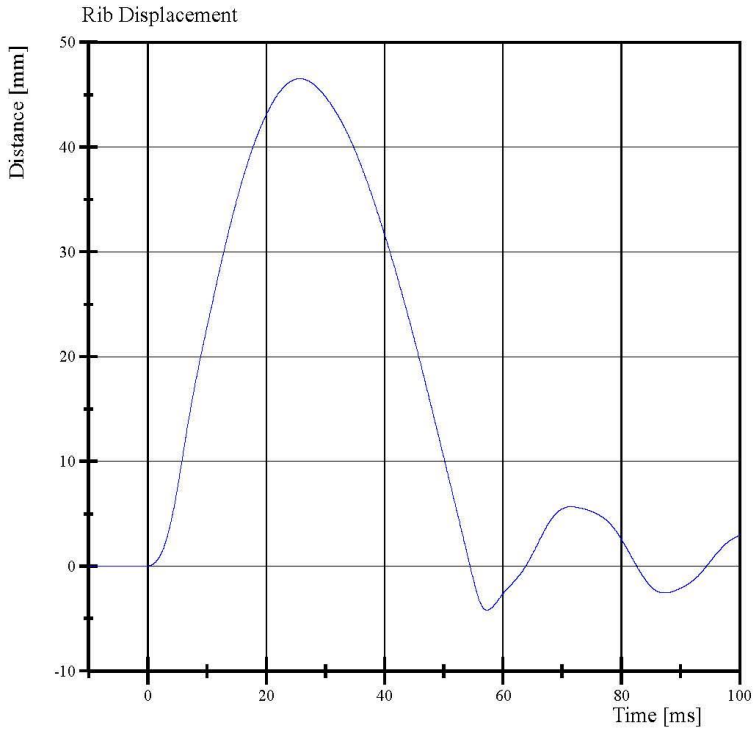
Test meets specifications.

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. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 46.5 mm at 25.7 ms
Min: -4.2 mm at 57.3 ms

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

01.24.2020 09:28:16 463

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.2 mm	Yes

Test meets specifications.

Condition: Used

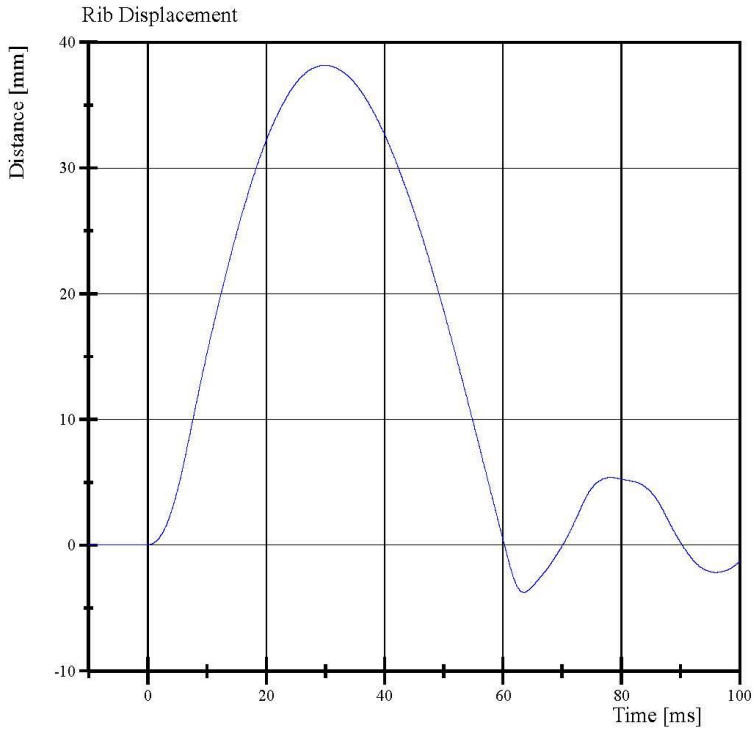
Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A

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

01.24.2020 09:45:17 532

Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 38.2 mm at 29.9 ms
Min: -3.8 mm at 63.5 ms

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

01.24.2020 09:45:50 532

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.8 mm	Yes

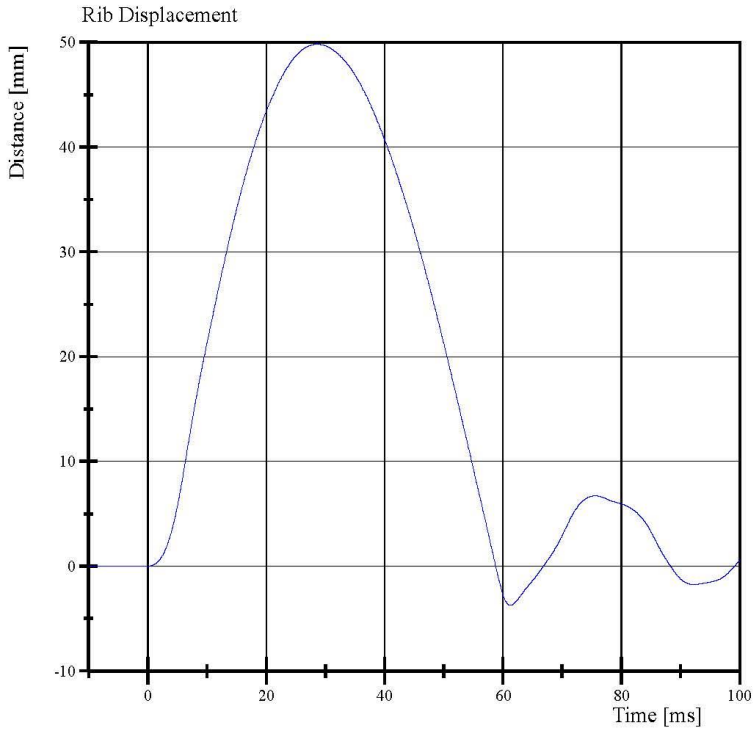
Test meets specifications.

Condition: Used

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

Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 49.8 mm at 28.6 ms
Min: -3.7 mm at 61.3 ms

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

01.24.2020 09:38:39 447

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.9 mm	Yes

Test meets specifications.

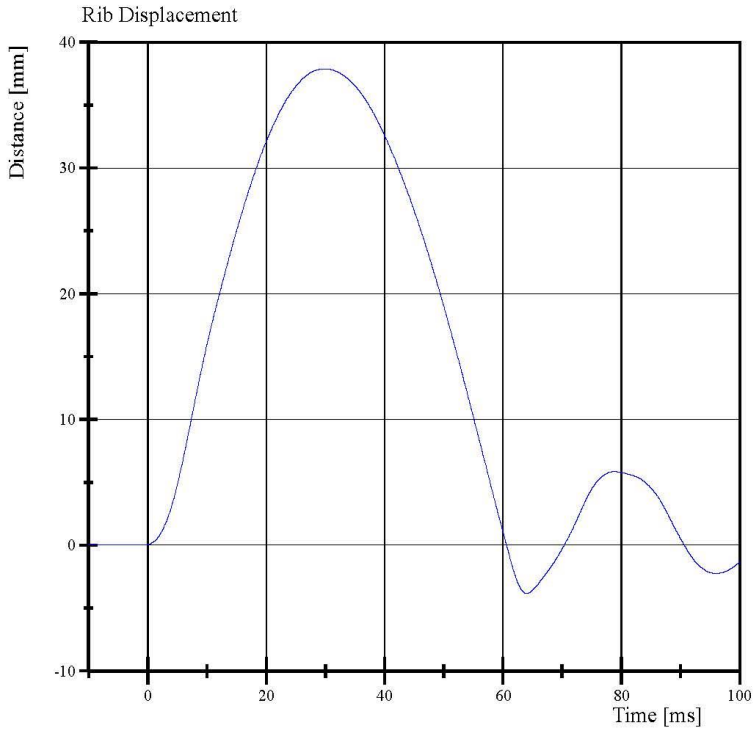
Condition: Used
Comments:
Drop Height: 462 mm
Rib Module: 175-4008-A-06-017

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

01.24.2020 09:55:02 542

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 37.9 mm at 29.8 ms
Min: -3.8 mm at 64.0 ms

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

01.24.2020 09:55:32 542

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

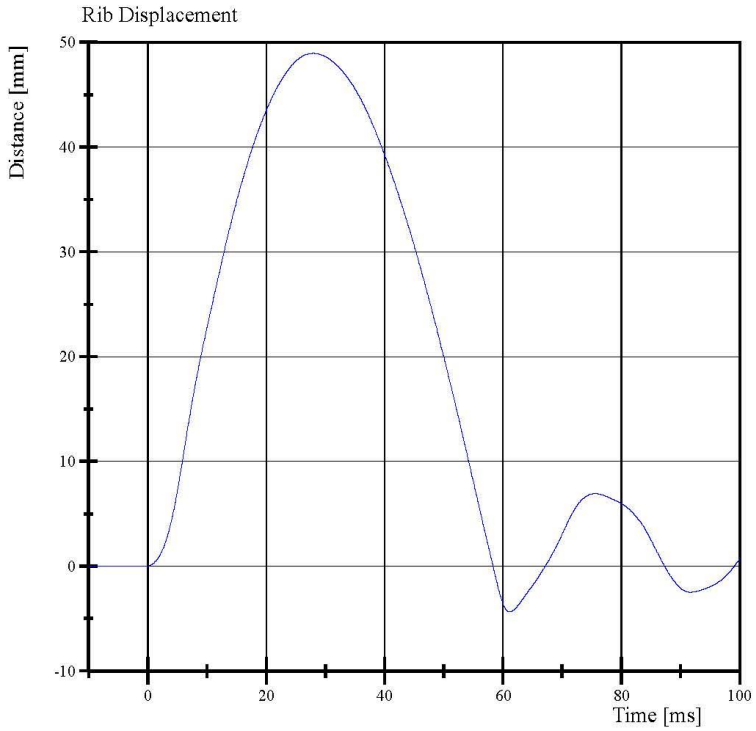
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.9 mm	Yes

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. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 48.9 mm at 28.0 ms
Min: -4.4 mm at 61.1 ms

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

01.24.2020 09:49:26 446

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.471 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,610.8 N	Yes
Upper Rib Displacement	34 - 41 mm	37.3 mm	Yes
Center Rib Displacement	37 - 45 mm	40.2 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.0 mm	Yes

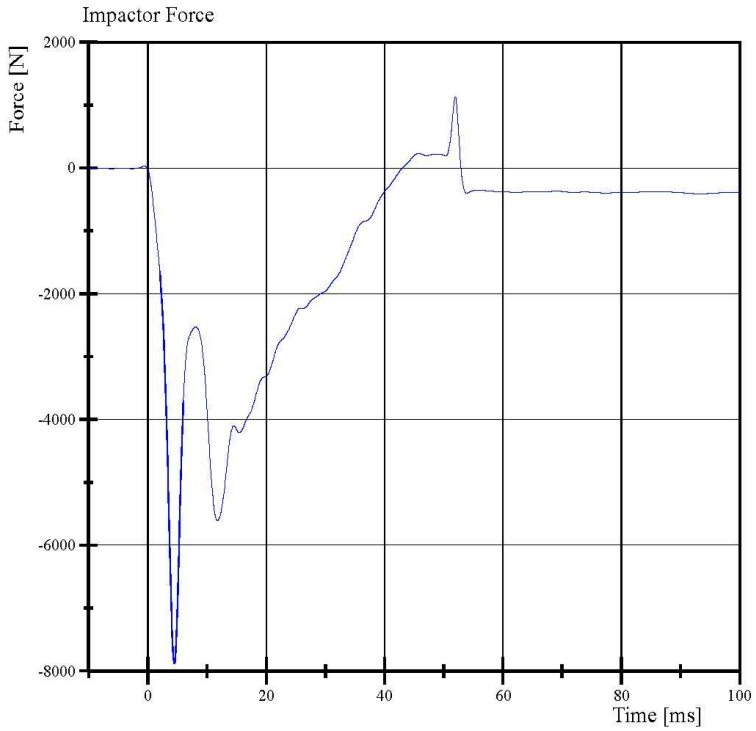
Test meets specifications.

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. 71-1
Test Date: 1/24/2020



Filter Class: CFC_180
Max: 1,131.1 N at 51.9 ms
Min: -7,881.0 N at 4.5 ms

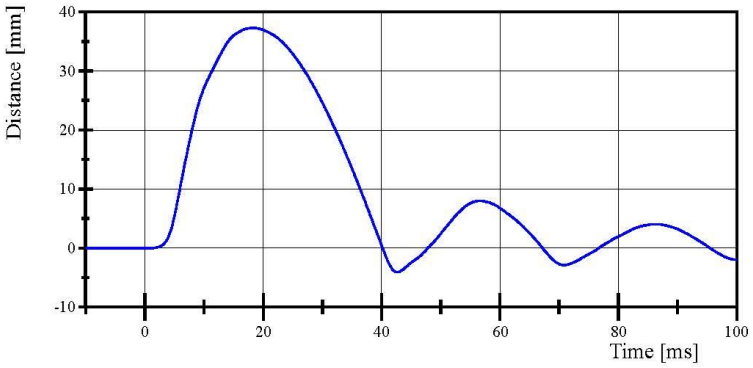
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

01.24.2020 12:48:28 470

Transportation Research Center Inc.

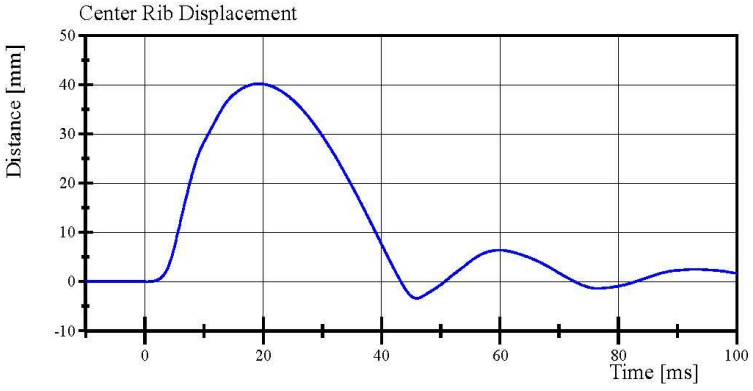
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Upper Rib Displacement



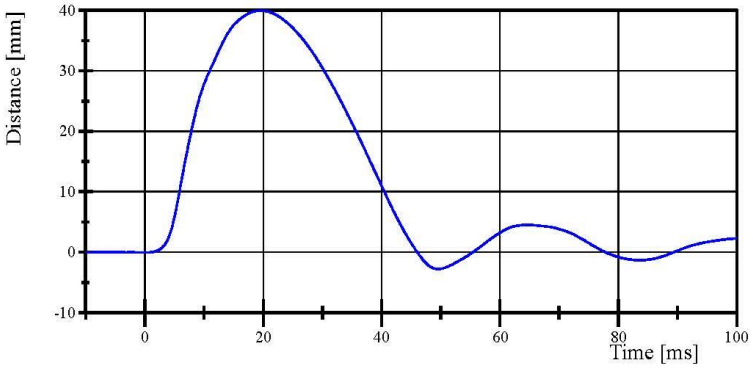
Filter Class: CFC_180
Max: 37.3 mm at 18.3 ms
Min: -4.1 mm at 42.6 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 40.2 mm at 19.3 ms
Min: -3.4 mm at 45.9 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 40.0 mm at 19.5 ms
Min: -2.8 mm at 49.5 ms

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

01.24.2020 12:48:28 470

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.116 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-49.6 deg	Yes
Time of Peak	39 - 53 ms	44.5 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	37.4 ms	Yes

Test meets specifications.

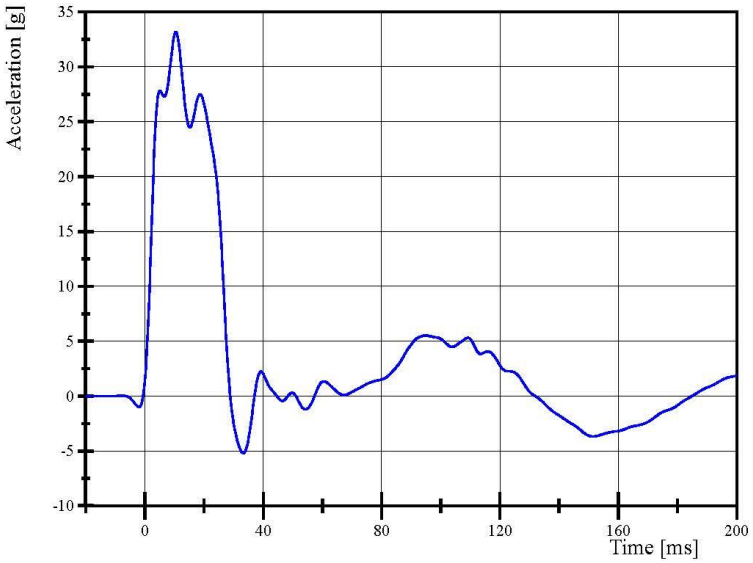
Condition: Used

Comments:
Lumbar S/N: 150365

Transportation Research Center Inc.

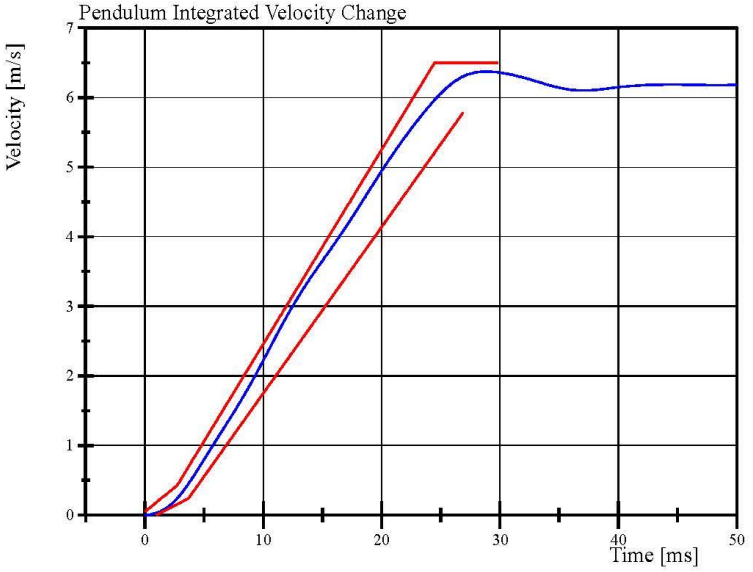
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.2 g at 10.5 ms
Min: -5.2 g at 33.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.4 m/s at 28.8 ms
Min: 0.0 m/s at 0.0 ms

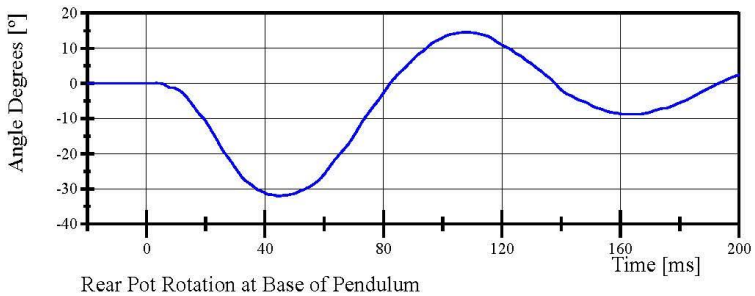
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

01.24.2020 08:40:52 671

Transportation Research Center Inc.

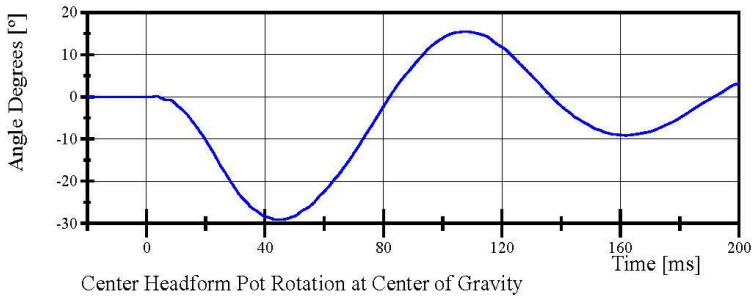
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Forward Pot Rotation at Base of Pendulum



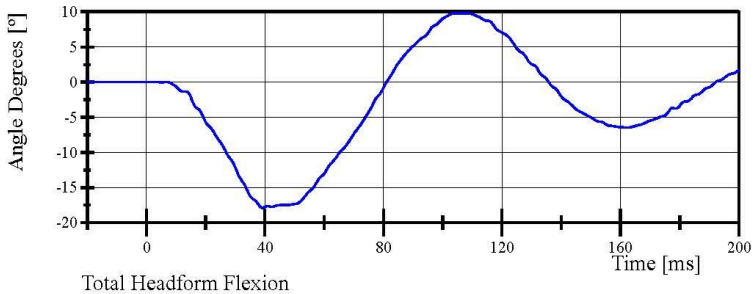
Filter Class: CFC_180
Max: 14.6 ° at 108.0 ms
Min: -32.0 ° at 44.6 ms

Rear Pot Rotation at Base of Pendulum



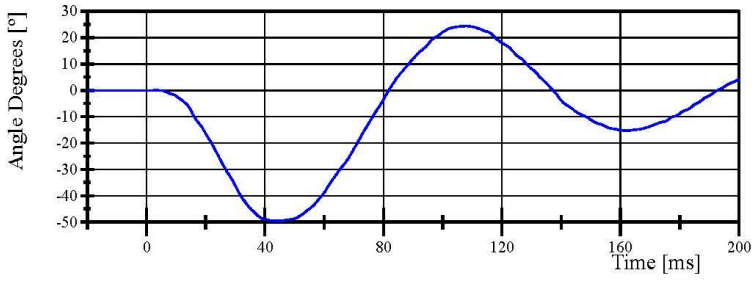
Filter Class: CFC_180
Max: 15.5 ° at 107.9 ms
Min: -29.1 ° at 44.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.8 ° at 108.0 ms
Min: -17.9 ° at 39.1 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 24.4 ° at 108.0 ms
Min: -49.6 ° at 44.5 ms

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

01.24.2020 08:40:53 671

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,094.9 N	Yes
Time of Peak	10.6 - 13.0 ms	10.72 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,408.7 N	Yes
Time of Peak	10.0 - 12.3 ms	10.72 ms	Yes

Test meets specifications.

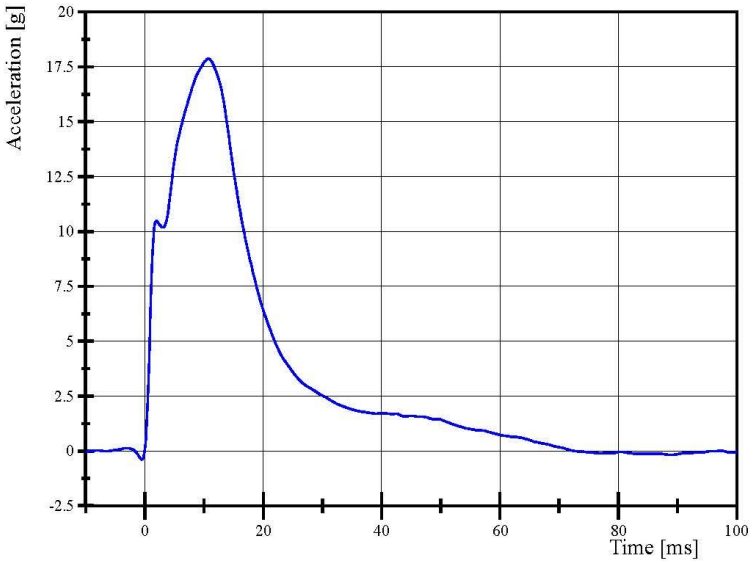
Condition: Used

Comments:
Abdomen S/N: 1066

Transportation Research Center Inc.

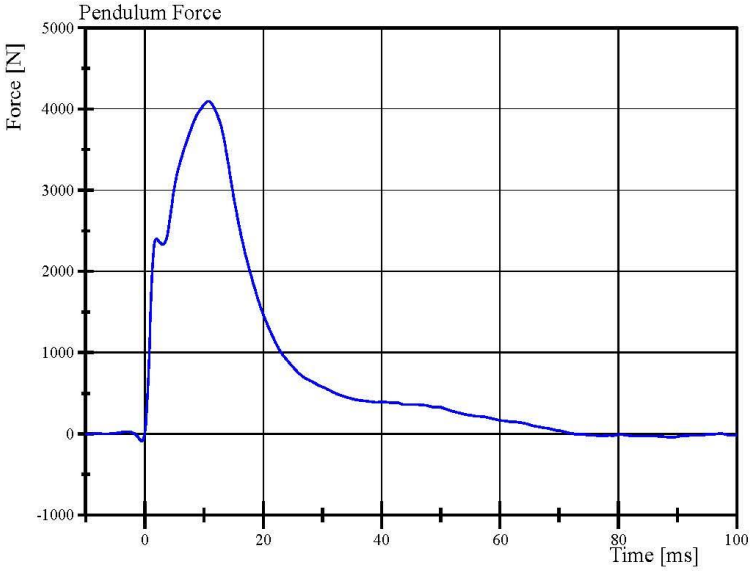
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 17.9 g at 10.7 ms
Min: -0.4 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,094.9 N at 10.7 ms
Min: -88.3 N at -0.6 ms

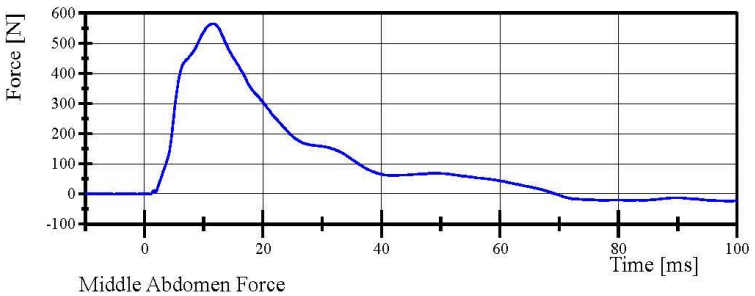
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

01.24.2020 13:07:54 623

Transportation Research Center Inc.

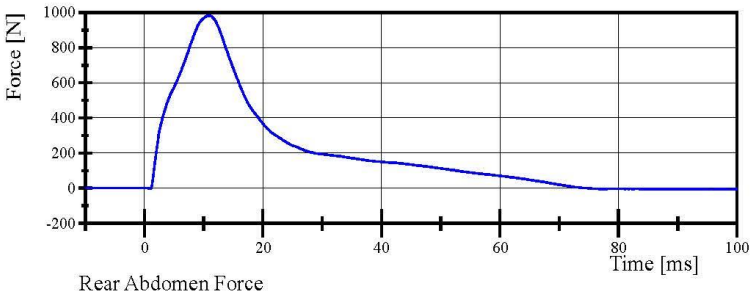
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Front Abdomen Force



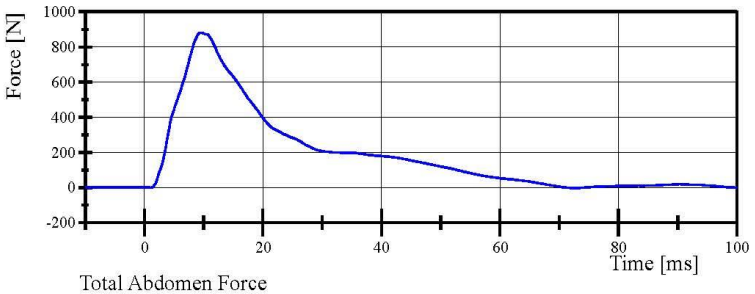
Filter Class: CFC_600
Max: 565.2 N at 11.6 ms
Min: -24.4 N at 98.8 ms

Middle Abdomen Force



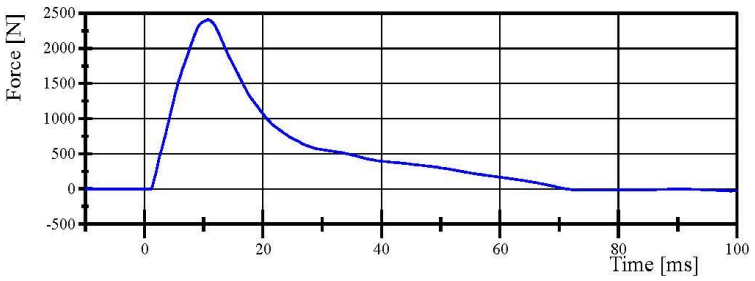
Filter Class: CFC_600
Max: 982.3 N at 10.9 ms
Min: -6.9 N at 95.6 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 882.1 N at 9.5 ms
Min: -3.3 N at 72.4 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,408.7 N at 10.7 ms
Min: -31.1 N at 99.0 ms

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

01.24.2020 13:07:54 623

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,227.1 N	Yes
Time of Peak	11.8 - 16.1 ms	12.80 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,347.7 N	Yes
Time of Peak	12.2 - 17.0 ms	12.64 ms	Yes

Test meets specifications.

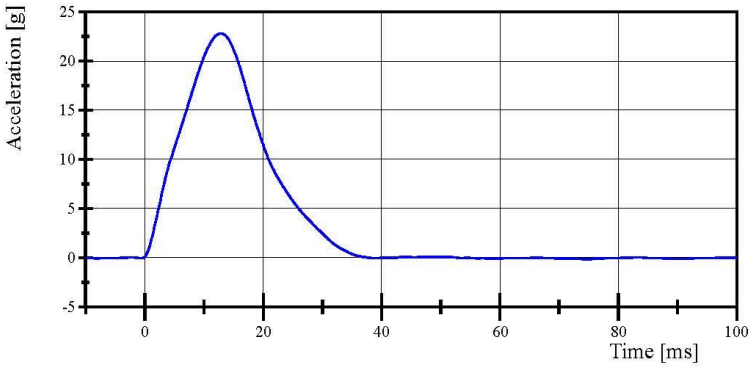
Condition: Used

Comments:
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

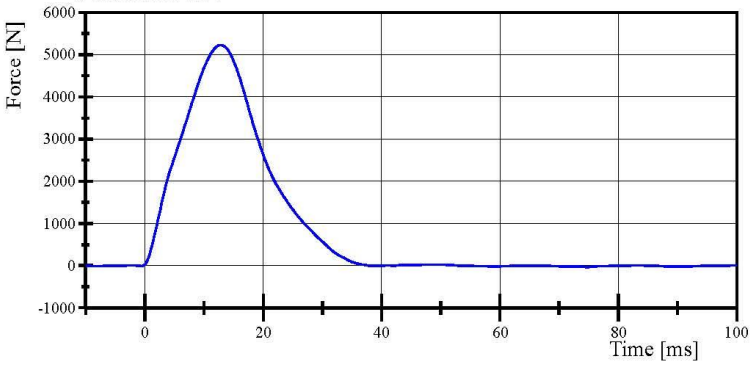
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 71-1
Test Date: 1/24/2020

Pendulum Acceleration



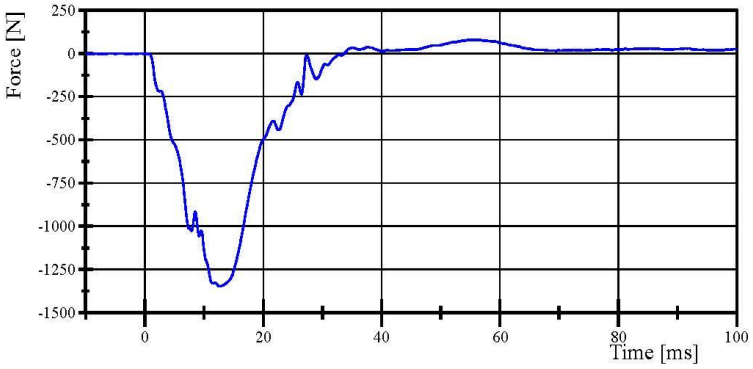
Filter Class: CFC_180
Max: 22.8 g at 12.8 ms
Min: -0.1 g at 74.8 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,227.1 N at 12.8 ms
Min: -33.7 N at 74.8 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 80.2 N at 56.2 ms
Min: -1,347.7 N at 12.6 ms

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

01.24.2020 13:31:03 588

Pre-Test Calibration Sheets
Passenger S/N DQ0570

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DQ0570 Calibration No. 03

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	784	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	428	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	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/9/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.5 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.9 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.22 %	Yes

Test meets specifications.

Condition: Used

Comments:
Head Skin S/N: DP8345

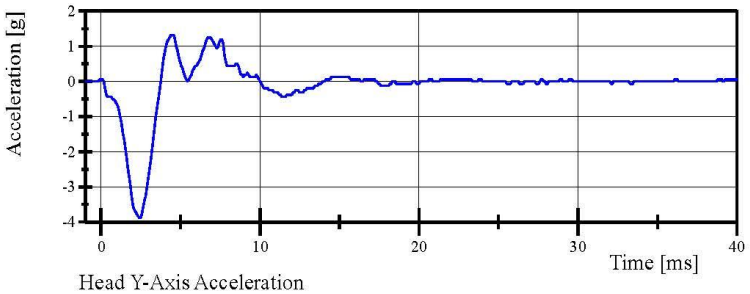
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.09.2020 16:00:38 199

Transportation Research Center Inc.

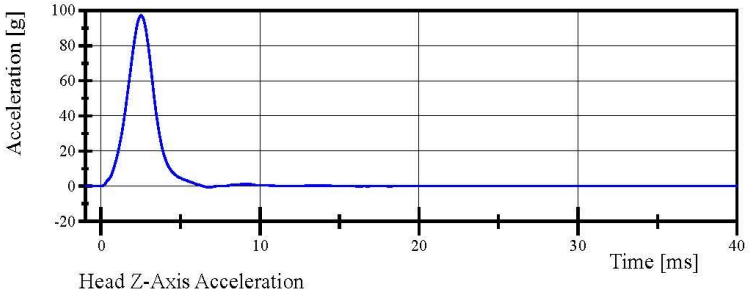
Left Lateral Head Drop
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/9/2020

Head X-Axis Acceleration



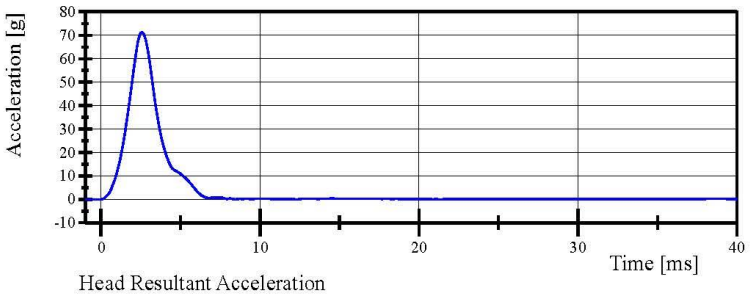
Filter Class: CFC_1000
Max: 1.3 g at 4.4 ms
Min: -3.9 g at 2.4 ms

Head Y-Axis Acceleration



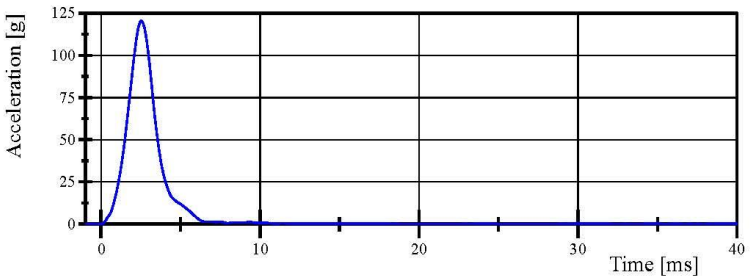
Filter Class: CFC_1000
Max: 97.2 g at 2.5 ms
Min: -0.5 g at 6.7 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 71.4 g at 2.6 ms
Min: -0.0 g at -1.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 120.5 g at 2.6 ms
Min: 0.0 g at -1.0 ms

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

01.09.2020 16:03:12 199

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 3-2
Test Date: 1/10/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.623 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.440 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.642 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.909 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.852 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.912 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-71.0 deg	Yes
Time of Peak	50 - 70 ms	57.5 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	110.5 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: DP3365

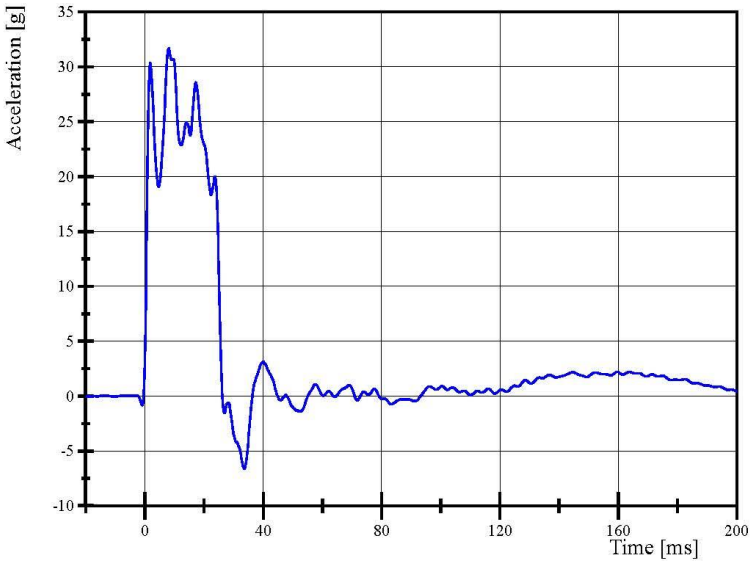
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

01.10.2020 09:04:00 717

Transportation Research Center Inc.

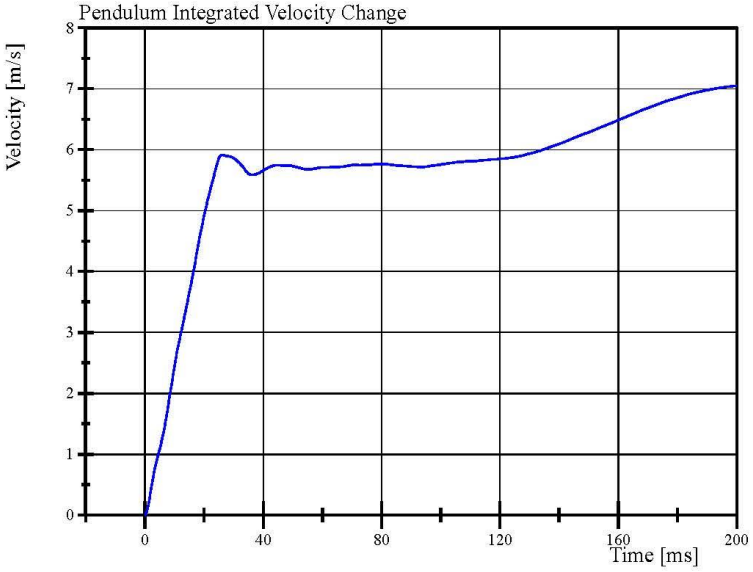
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 3-2
Test Date: 1/10/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 31.7 g at 8.1 ms
Min: -6.6 g at 33.7 ms

Pendulum Integrated Velocity Change



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

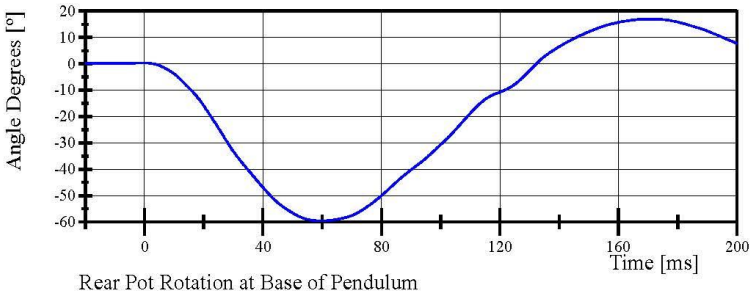
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.10.2020 09:04:31 717

Transportation Research Center Inc.

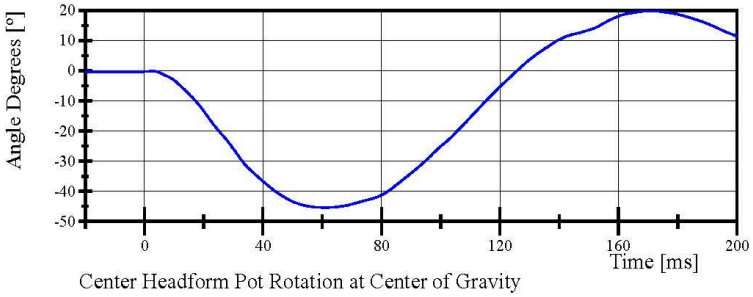
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 3-2
Test Date: 1/10/2020

Forward Pot Rotation at Base of Pendulum



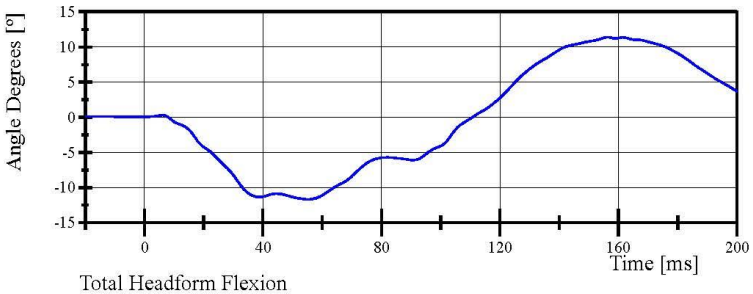
Filter Class: CFC_60
Max: 17.0 ° at 168.8 ms
Min: -59.6 ° at 59.8 ms

Rear Pot Rotation at Base of Pendulum



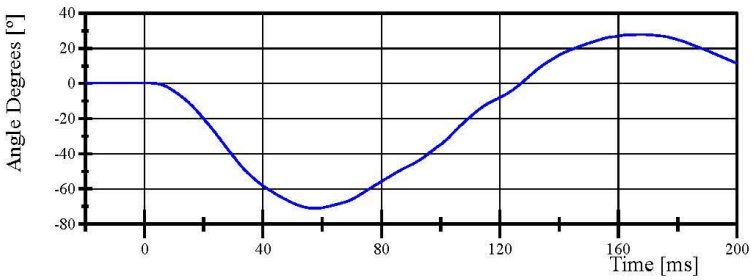
Filter Class: CFC_60
Max: 19.8 ° at 170.6 ms
Min: -45.4 ° at 61.1 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.4 ° at 156.3 ms
Min: -11.7 ° at 55.3 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 27.9 ° at 167.6 ms
Min: -71.0 ° at 57.5 ms

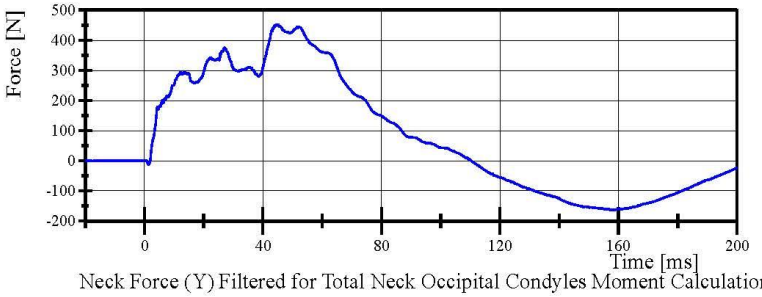
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.10.2020 09:04:31 717

Transportation Research Center Inc.

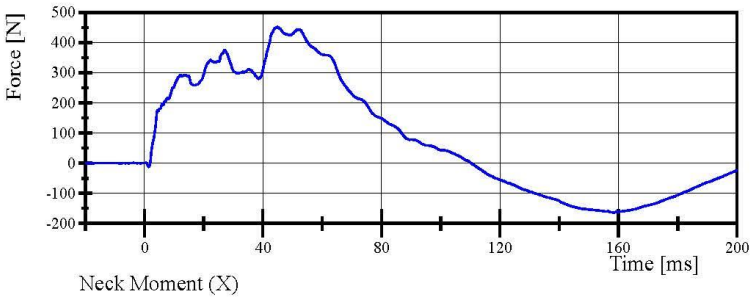
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 3-2
Test Date: 1/10/2020

Neck Force (Y)



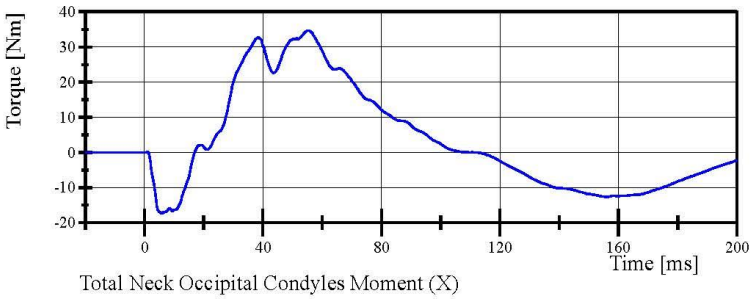
Filter Class: CFC_1000
Max: 453.0 N at 44.8 ms
Min: -165.0 N at 158.7 ms

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



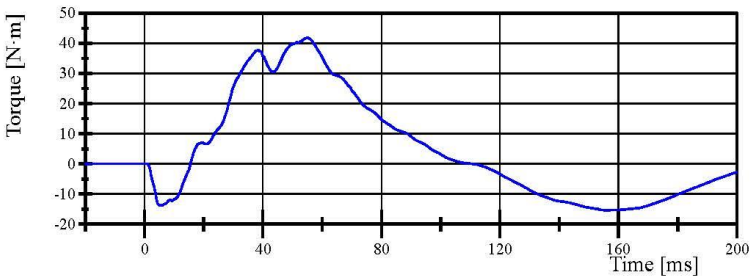
Filter Class: CFC_600
Max: 452.0 N at 44.9 ms
Min: -164.2 N at 158.6 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 34.7 Nm at 55.3 ms
Min: -17.3 Nm at 5.8 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constar
Max: 41.8 N·m at 55.0 ms
Min: -15.4 N·m at 156.4 ms

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

01.10.2020 09:04:31 717

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.37 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.2 g	Yes
Shoulder Displacement	28 - 37 mm	31.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.4 g	Yes

Test meets specifications.

Condition: Used

Comments:
Left Arm S/N: DP8451

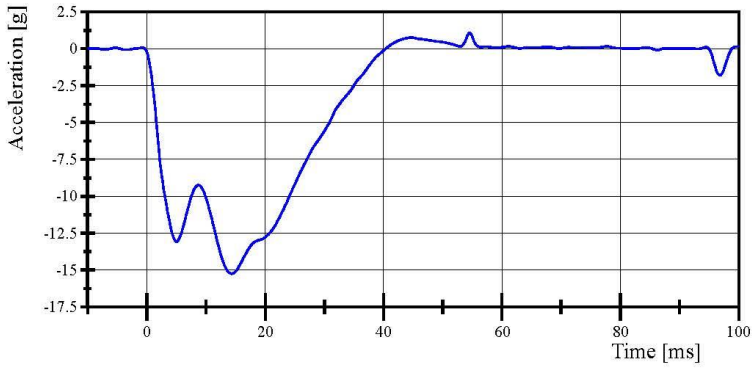
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.13.2020 16:02:03 912

Transportation Research Center Inc.

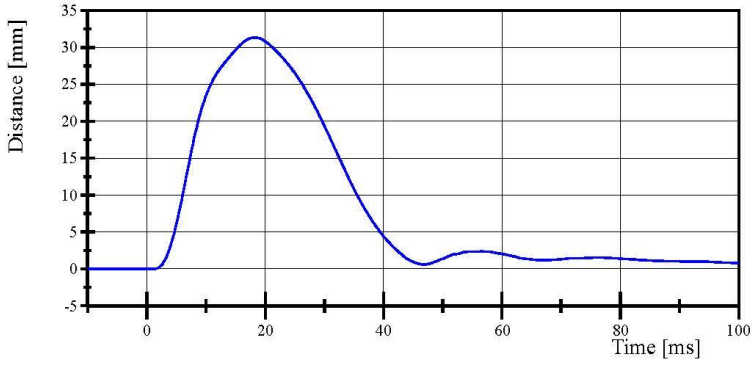
Left Lateral Shoulder
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Probe Acceleration



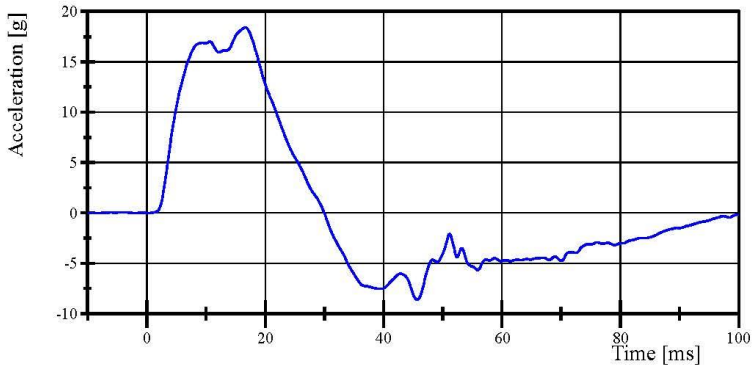
Filter Class: CFC_180
Max: 1.1 g at 54.6 ms
Min: -15.2 g at 14.3 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 31.3 mm at 18.2 ms
Min: -0.0 mm at -4.9 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 18.4 g at 16.6 ms
Min: -8.6 g at 45.7 ms

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

01.13.2020 16:03:03 912

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/14/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.673 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.7 g	Yes
Shoulder Displacement	31 - 40 mm	36.2 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.3 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.6 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

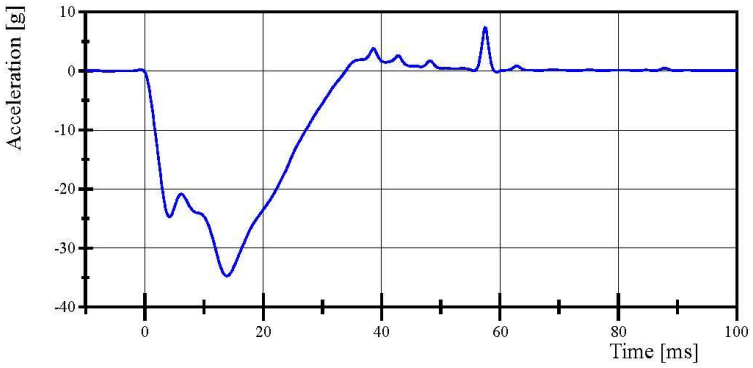
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.14.2020 08:57:21 646

Transportation Research Center Inc.

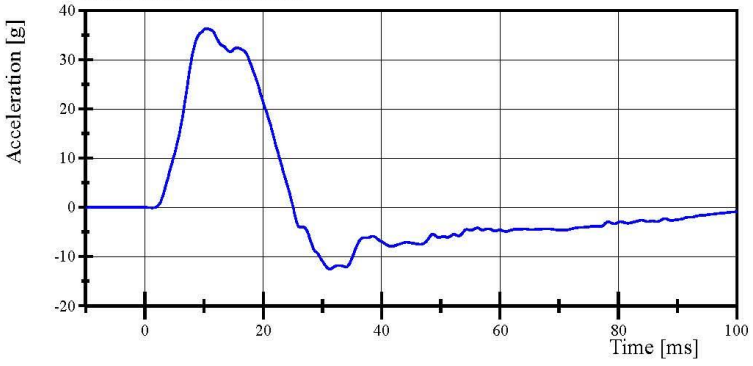
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/14/2020

Probe Acceleration



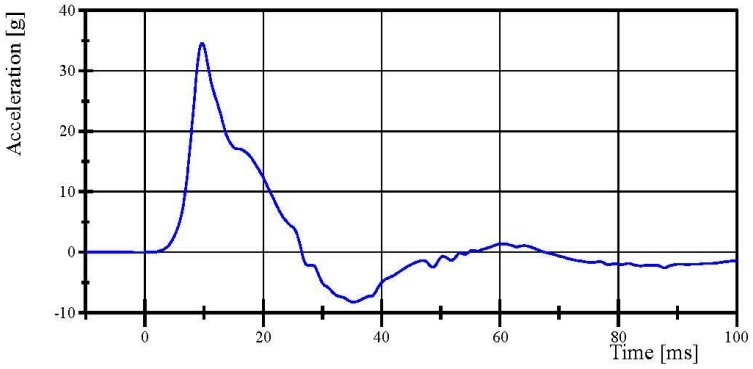
Filter Class: CFC_180
Max: 7.4 g at 57.5 ms
Min: -34.7 g at 13.8 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 36.3 g at 10.5 ms
Min: -12.5 g at 31.3 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 34.6 g at 9.7 ms
Min: -8.3 g at 35.2 ms

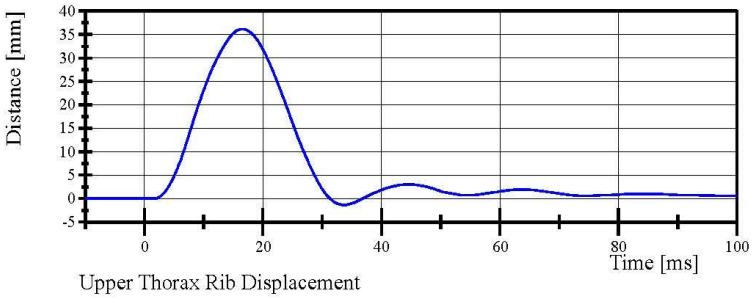
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.14.2020 09:00:55 646

Transportation Research Center Inc.

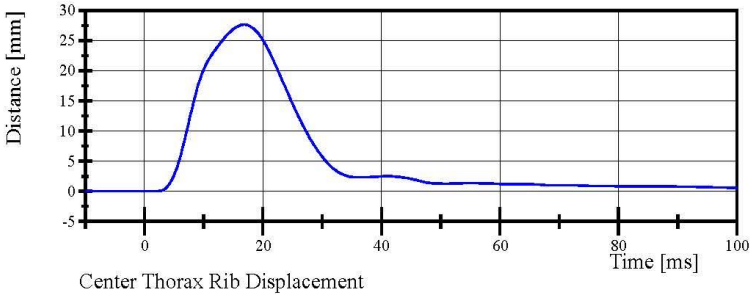
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/14/2020

Shoulder Rib Displacement



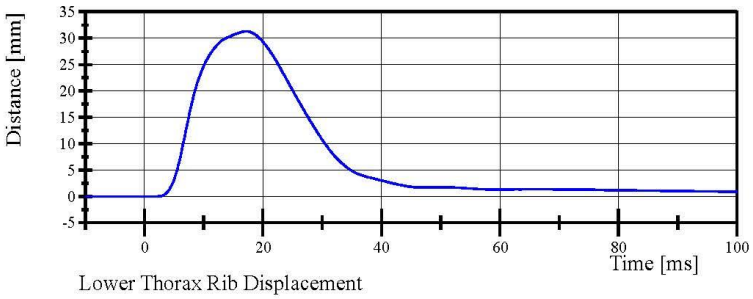
Filter Class: CFC_600
Max: 36.2 mm at 16.6 ms
Min: -1.4 mm at 33.7 ms

Upper Thorax Rib Displacement



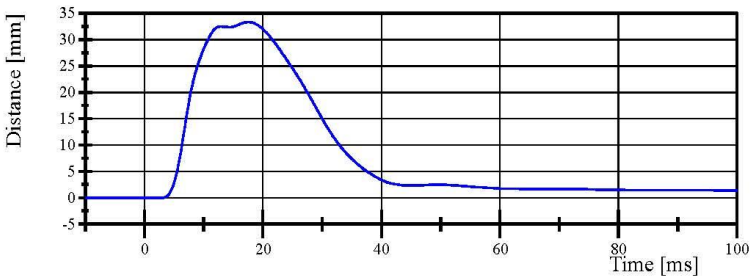
Filter Class: CFC_600
Max: 27.7 mm at 16.8 ms
Min: -0.0 mm at -9.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 31.3 mm at 17.2 ms
Min: -0.0 mm at -3.2 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 33.3 mm at 17.6 ms
Min: -0.0 mm at -9.8 ms

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

01.14.2020 09:00:55 646

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.332 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.5 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.9 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.0 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.3 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

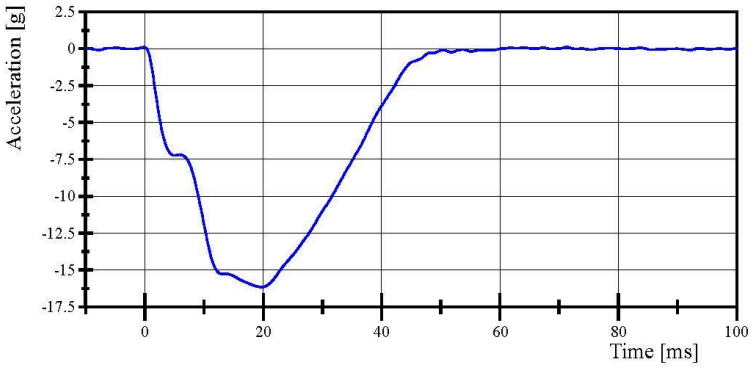
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.14.2020 08:53:45 907

Transportation Research Center Inc.

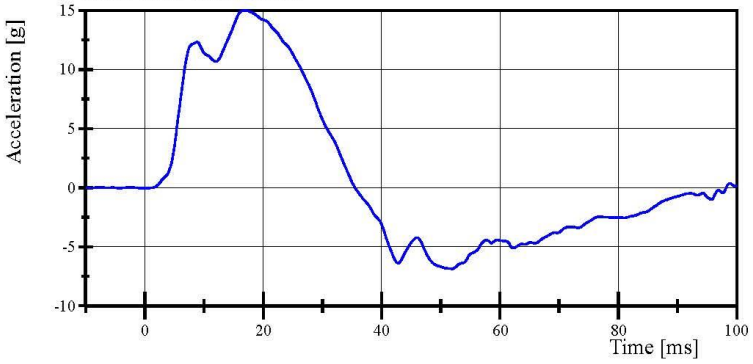
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Probe Acceleration



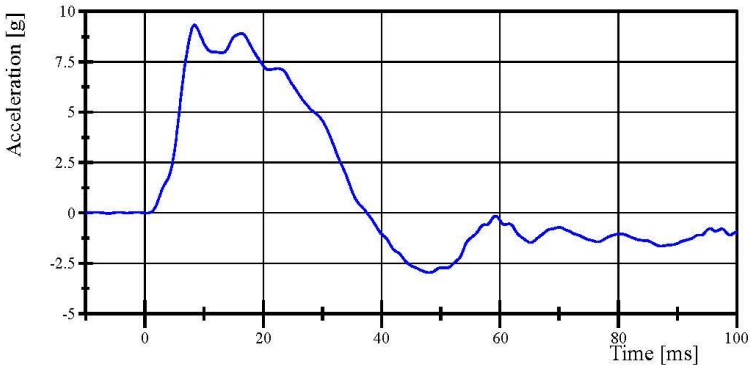
Filter Class: CFC_180
Max: 0.1 g at 71.3 ms
Min: -16.1 g at 19.7 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.0 g at 16.8 ms
Min: -6.9 g at 51.9 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.3 g at 8.4 ms
Min: -3.0 g at 48.1 ms

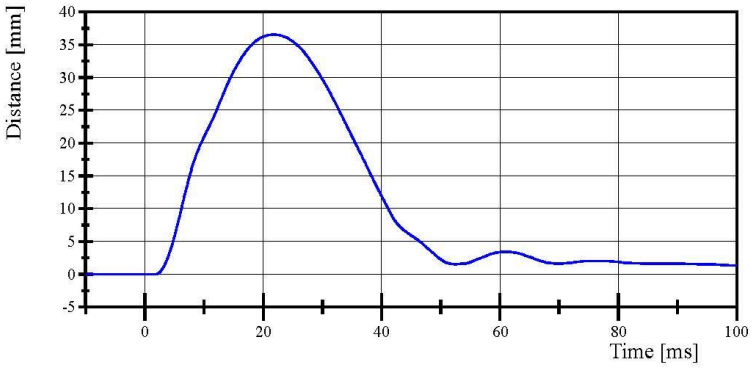
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.14.2020 08:55:44 907

Transportation Research Center Inc.

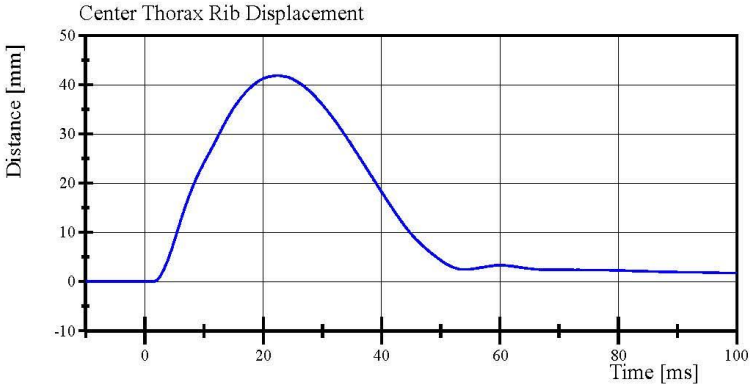
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Upper Thorax Rib Displacement



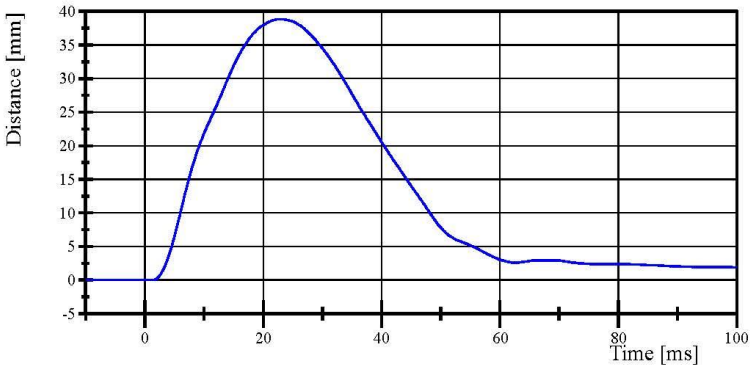
Filter Class: CFC_600
Max: 36.5 mm at 21.8 ms
Min: -0.0 mm at 1.8 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.8 mm at 22.4 ms
Min: -0.0 mm at 0.9 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.9 mm at 22.8 ms
Min: -0.0 mm at 0.7 ms

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

01.14.2020 08:55:44 907

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.7 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.3 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.0 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.63 g	Yes

Test meets specifications.

Condition: Used

Comments:
Upper Abdominal Rib S/N: 180-3368 DP5142
Lower Abdominal Rib S/N: 180-3368 DP5143

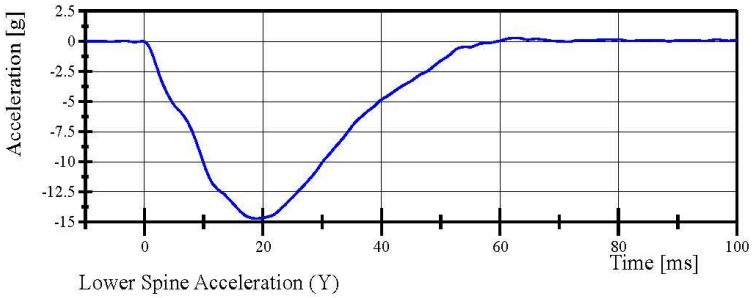
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.13.2020 16:12:04 722

Transportation Research Center Inc.

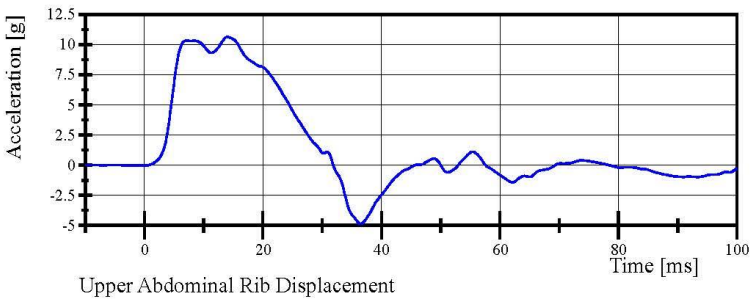
Left Lateral Abdomen
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/13/2020

Probe Acceleration



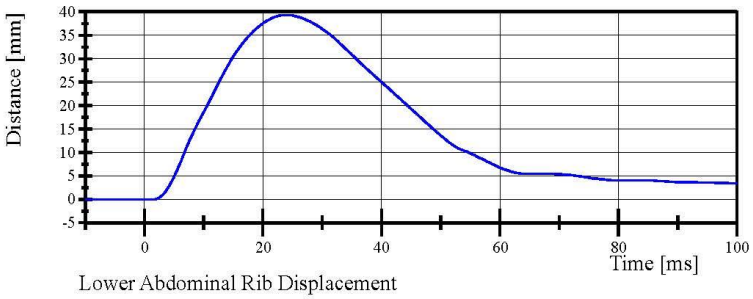
Filter Class: CFC_180
Max: 0.3 g at 62.5 ms
Min: -14.7 g at 18.9 ms

Lower Spine Acceleration (Y)



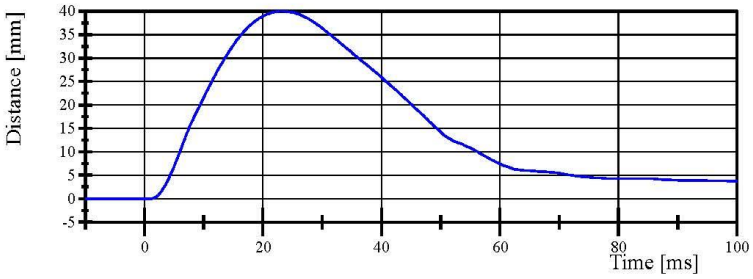
Filter Class: CFC_180
Max: 10.6 g at 14.0 ms
Min: -4.9 g at 36.5 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 39.3 mm at 23.9 ms
Min: -0.0 mm at -2.4 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 40.0 mm at 23.0 ms
Min: -0.0 mm at 1.0 ms

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

01.13.2020 16:14:48 722

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. DQ0570 Certification No. 3-3
Test Date: 1/15/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-45.78 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.4 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,951.9 N	Yes

Test meets specifications.

Condition: New

Comments:
Pelvis Skin S/N: 1159
Pelvis Plug Info:
Manufacturer: SACO
S/N: 12605
Cal Date: 20181003

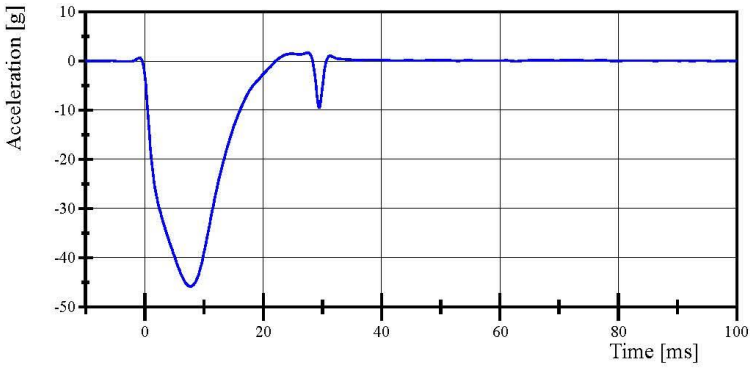
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.16.2020 06:42:45 478

Transportation Research Center Inc.

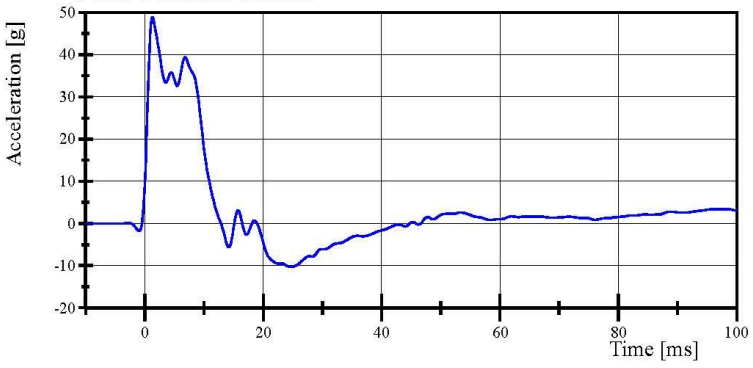
Left Lateral Pelvis
SID IIs Serial No. DQ0570 Certification No. 3-3
Test Date: 1/15/2020

Probe Acceleration



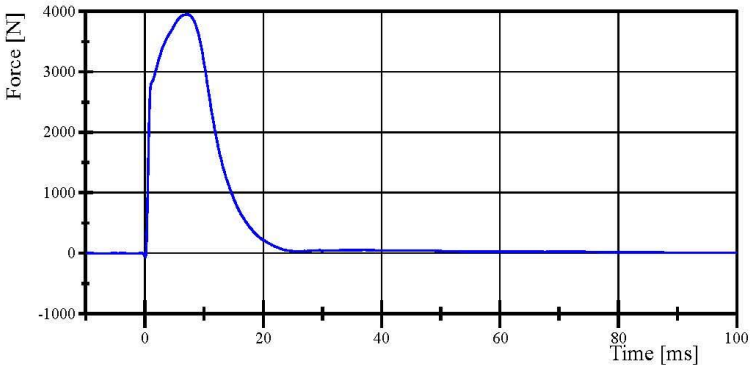
Filter Class: CFC_180
Max: 1.7 g at 27.5 ms
Min: -45.8 g at 7.7 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 48.9 g at 1.3 ms
Min: -10.3 g at 24.6 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 3,951.9 N at 7.2 ms
Min: -61.8 N at 0.1 ms

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

01.16.2020 06:43:50 478

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/15/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-39.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	32.8 g	Yes
Iliac Force	4,100 - 5,100 N	4,536.1 N	Yes

Test meets specifications.

Condition: New

Comments:
Pelvis Skin S/N: 1159

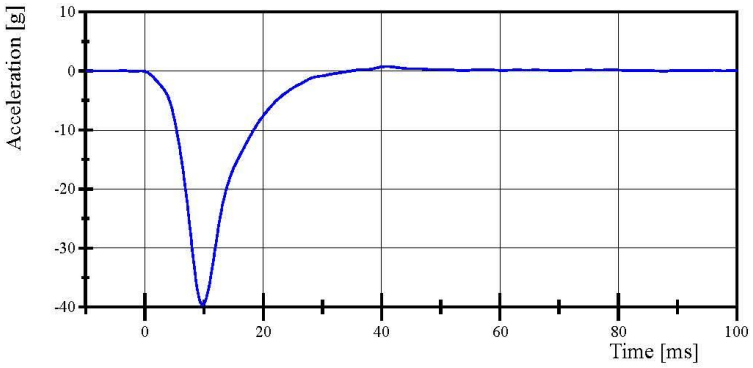
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.16.2020 06:52:37 689

Transportation Research Center Inc.

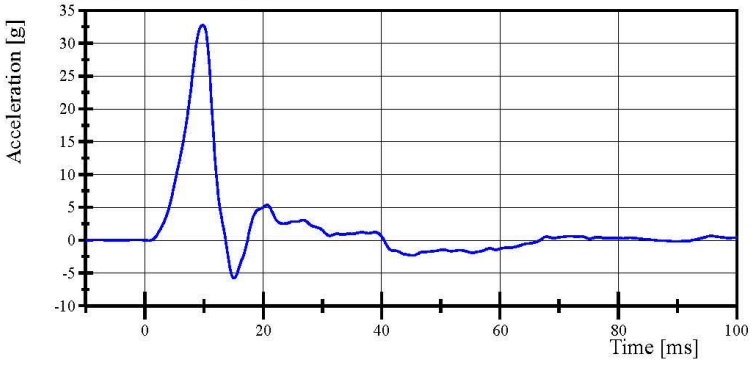
Left Lateral Iliac
SID IIs Serial No. DQ0570 Certification No. 3-1
Test Date: 1/15/2020

Probe Acceleration



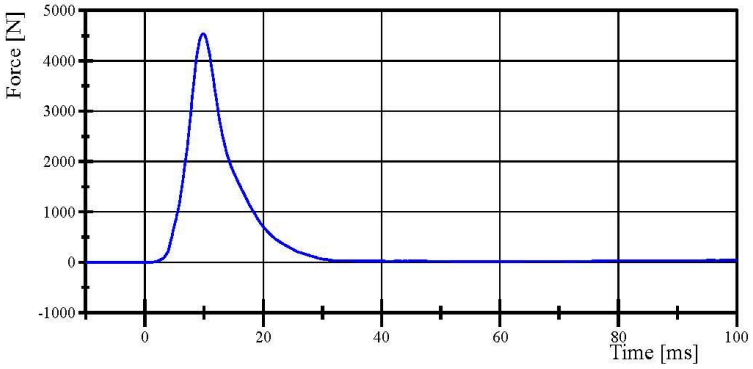
Filter Class: CFC_180
Max: 0.8 g at 41.0 ms
Min: -39.6 g at 9.8 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 32.8 g at 9.8 ms
Min: -5.8 g at 15.0 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,536.1 N at 9.8 ms
Min: -0.8 N at -8.7 ms

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

01.16.2020 06:52:57 689

Post-Test Calibration Sheets
Passenger S/N DQ0570

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DQ0570 Calibration No. 04

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	784	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	428	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	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	128.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-8.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.23 %	Yes

Test meets specifications.

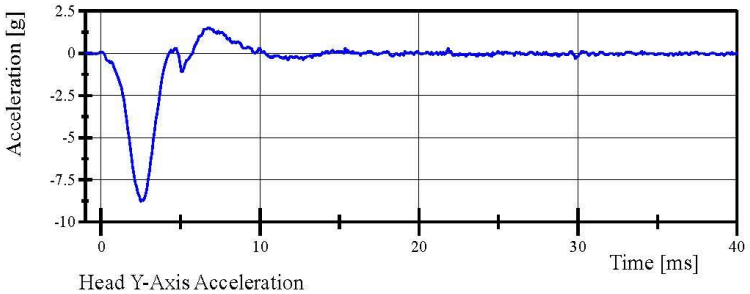
Condition: Used

Comments:
Head Skin S/N: DP8345

Transportation Research Center Inc.

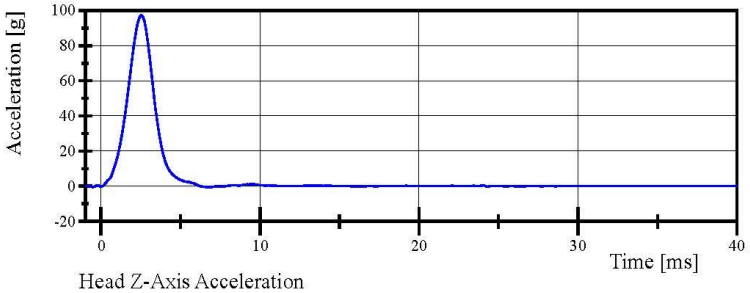
Left Lateral Head Drop
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Head X-Axis Acceleration



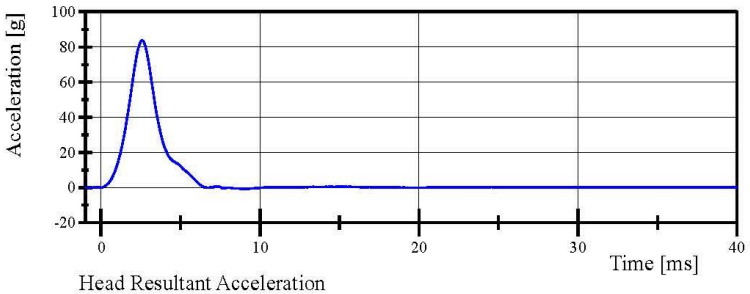
Filter Class: CFC_1000
Max: 1.5 g at 6.7 ms
Min: -8.8 g at 2.5 ms

Head Y-Axis Acceleration



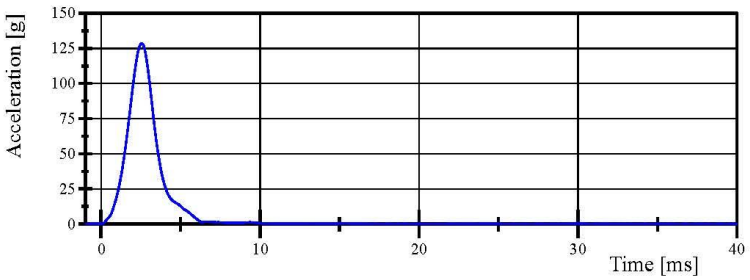
Filter Class: CFC_1000
Max: 97.3 g at 2.6 ms
Min: -0.5 g at 6.6 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 83.8 g at 2.6 ms
Min: -0.7 g at 9.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 128.7 g at 2.6 ms
Min: 0.0 g at -0.7 ms

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

01.24.2020 11:07:04 234

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 4-3
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.596 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.310 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.342 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.547 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.589 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.830 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-71.6 deg	Yes
Time of Peak	50 - 70 ms	63.1 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.6 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	113.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: DP3365

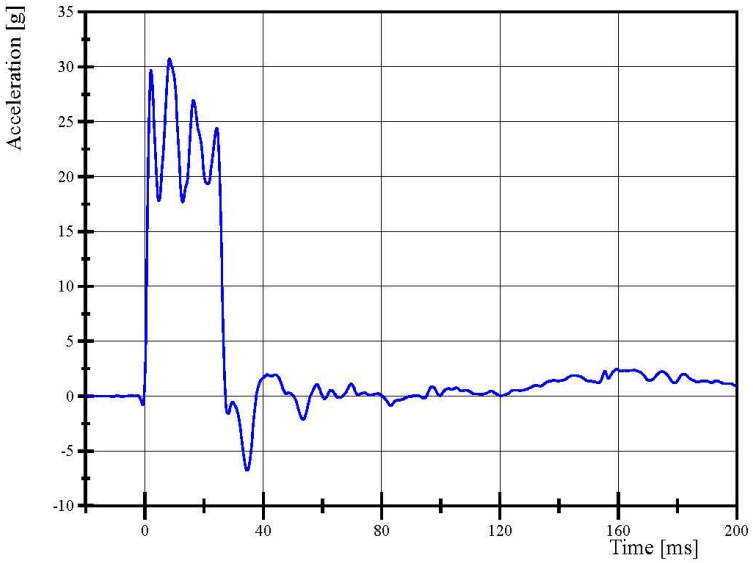
Specification Source: CFR49 Part 572 Subpart V with Polarity in accordance with J211

01.24.2020 14:06:04 753

Transportation Research Center Inc.

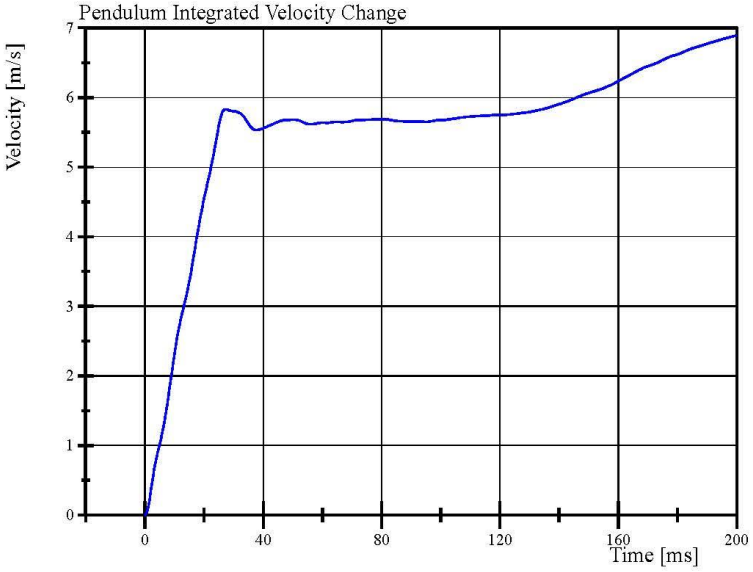
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 4-3
Test Date: 1/24/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 30.7 g at 8.3 ms
Min: -6.8 g at 34.5 ms

Pendulum Integrated Velocity Change



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

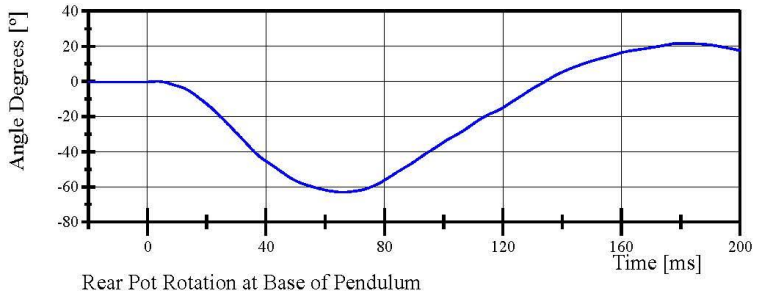
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.24.2020 14:06:43 753

Transportation Research Center Inc.

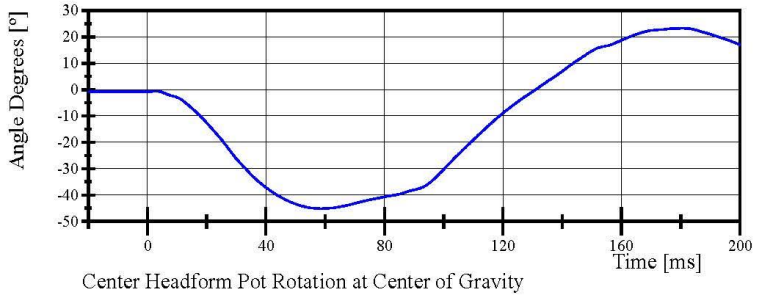
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 4-3
Test Date: 1/24/2020

Forward Pot Rotation at Base of Pendulum



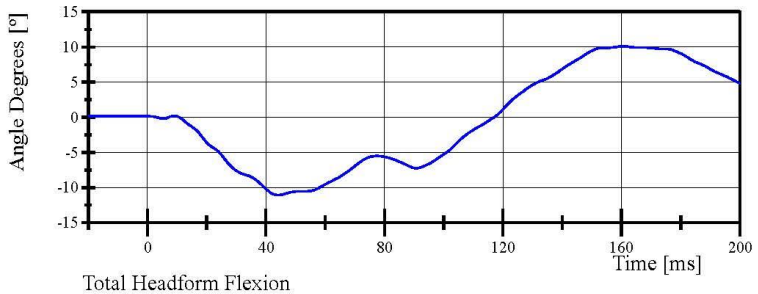
Filter Class: CFC_60
Max: 21.7 ° at 180.2 ms
Min: -63.0 ° at 66.0 ms

Rear Pot Rotation at Base of Pendulum



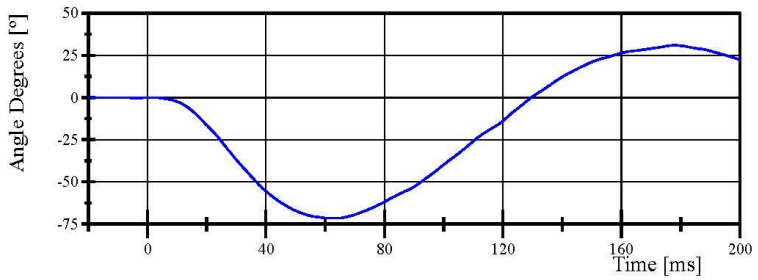
Filter Class: CFC_60
Max: 23.3 ° at 180.6 ms
Min: -45.1 ° at 58.6 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 10.1 ° at 160.6 ms
Min: -11.1 ° at 44.1 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 31.0 ° at 177.9 ms
Min: -71.6 ° at 63.1 ms

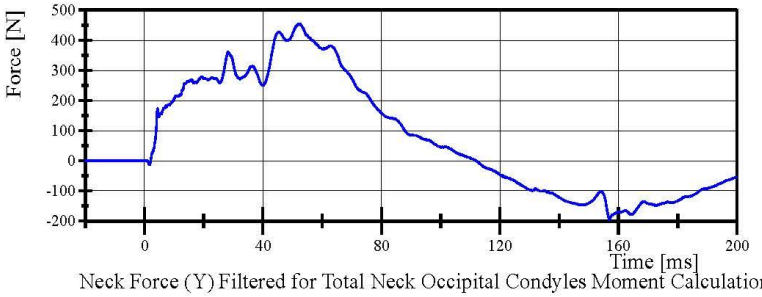
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.24.2020 14:06:43 753

Transportation Research Center Inc.

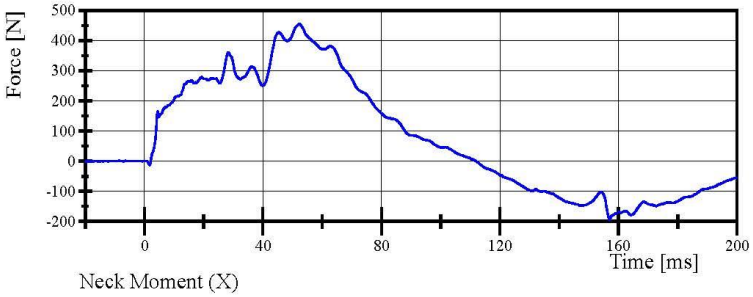
Left Lateral Neck
SID IIs Serial No. DQ0570 Certification No. 4-3
Test Date: 1/24/2020

Neck Force (Y)



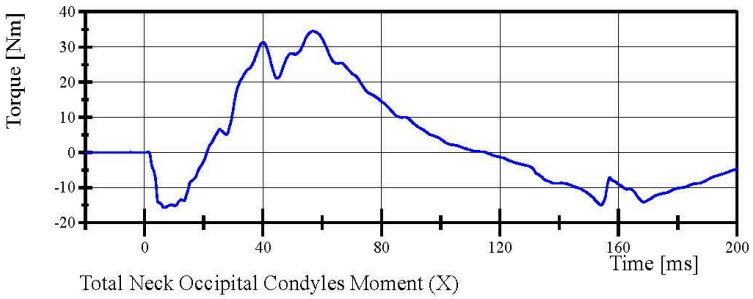
Filter Class: CFC_1000
Max: 455.0 N at 52.5 ms
Min: -195.3 N at 157.0 ms

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



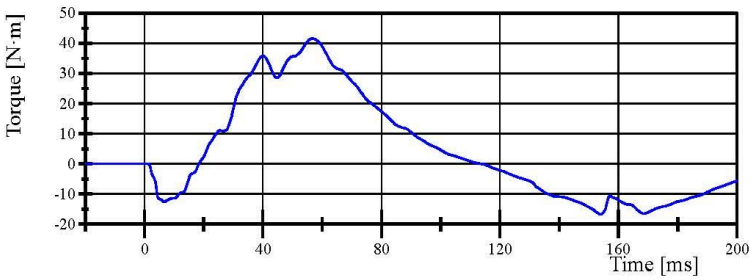
Filter Class: CFC_600
Max: 454.9 N at 52.3 ms
Min: -194.3 N at 157.0 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 34.5 Nm at 56.7 ms
Min: -15.7 Nm at 7.0 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constar
Max: 41.6 N·m at 56.7 ms
Min: -16.8 N·m at 154.0 ms

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

01.24.2020 14:06:44 753

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.5 g	Yes
Shoulder Displacement	28 - 37 mm	31.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.3 g	Yes

Test meets specifications.

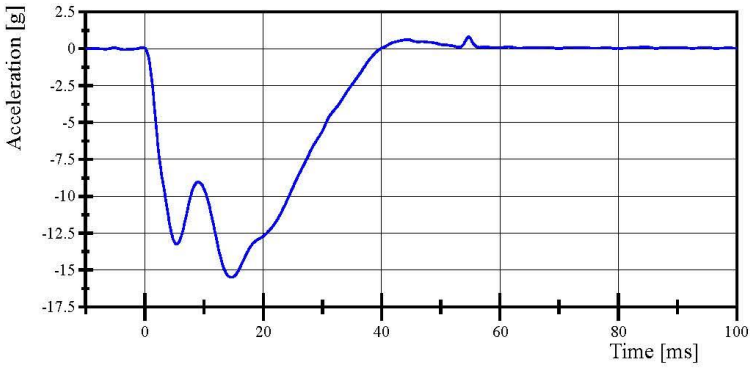
Condition: Used

Comments:
Left Arm S/N: DP8451

Transportation Research Center Inc.

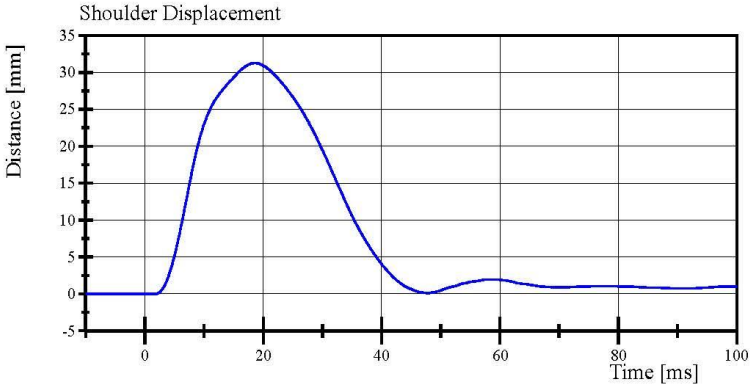
Left Lateral Shoulder
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Probe Acceleration



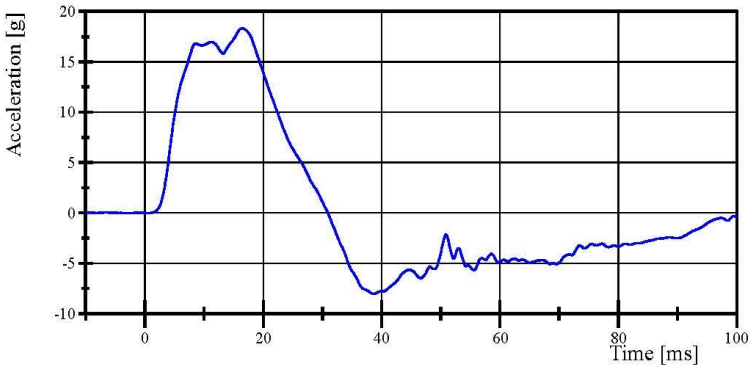
Filter Class: CFC_180
Max: 0.8 g at 54.7 ms
Min: -15.5 g at 14.6 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 31.3 mm at 18.6 ms
Min: -0.0 mm at 1.8 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 18.3 g at 16.4 ms
Min: -8.0 g at 38.6 ms

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

01.24.2020 07:58:41 870

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.669 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.1 g	Yes
Shoulder Displacement	31 - 40 mm	35.6 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.4 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.6 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.7 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.7 g	Yes

Test meets specifications.

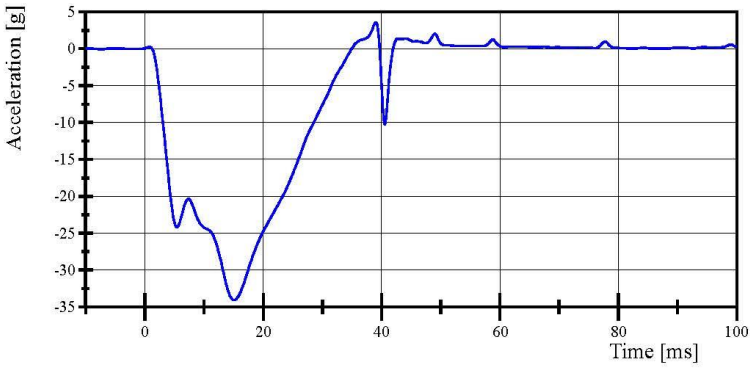
Condition: Used

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.

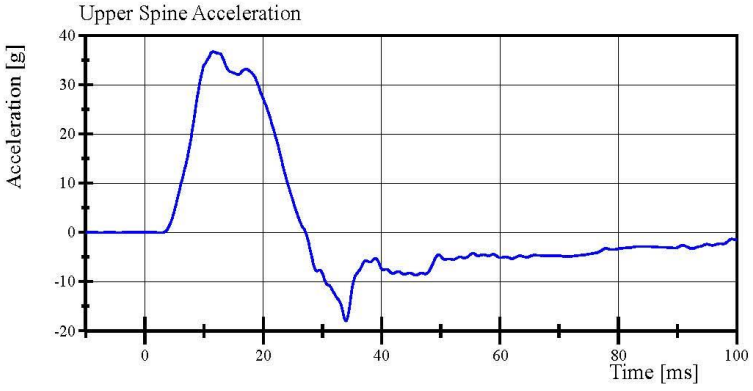
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Probe Acceleration



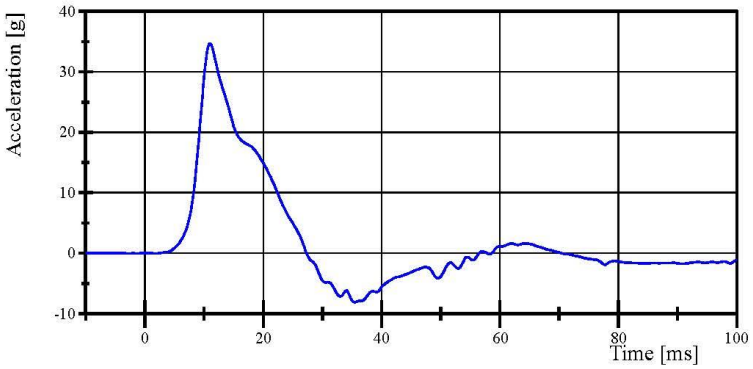
Filter Class: CFC_180
Max: 3.6 g at 39.0 ms
Min: -34.1 g at 15.0 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 36.7 g at 11.5 ms
Min: -18.0 g at 34.0 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 34.7 g at 11.0 ms
Min: -8.1 g at 35.4 ms

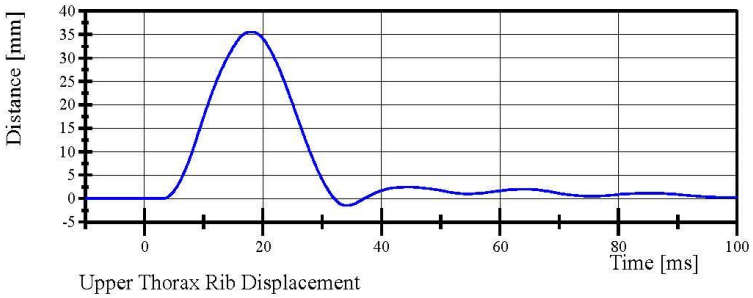
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.24.2020 09:02:05 617

Transportation Research Center Inc.

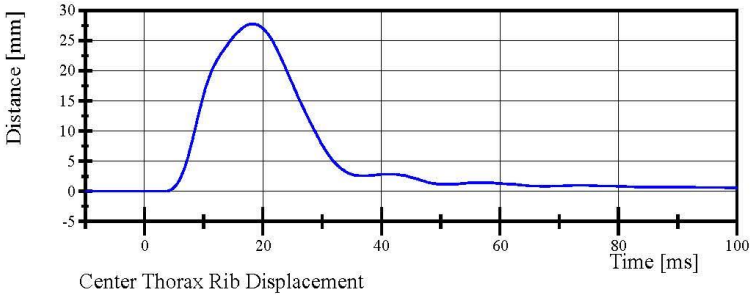
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Shoulder Rib Displacement



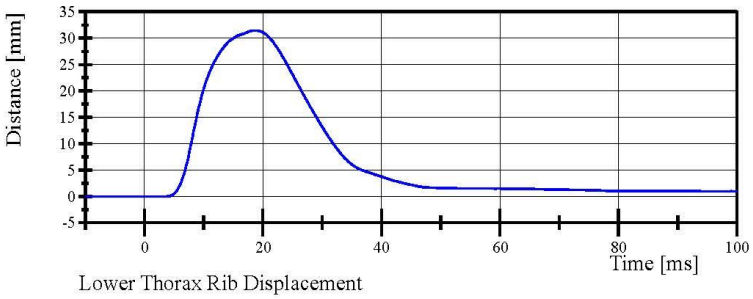
Filter Class: CFC_600
Max: 35.6 mm at 18.1 ms
Min: -1.5 mm at 34.3 ms

Upper Thorax Rib Displacement



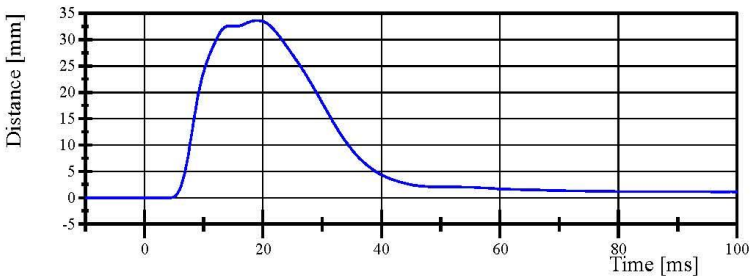
Filter Class: CFC_600
Max: 27.7 mm at 18.2 ms
Min: -0.0 mm at 1.7 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 31.4 mm at 18.6 ms
Min: -0.0 mm at 1.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 33.6 mm at 19.0 ms
Min: -0.0 mm at 1.5 ms

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

01.24.2020 09:02:05 617

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.338 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.9 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	39.4 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	42.5 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.4 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.9 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.6 g	Yes

Test meets specifications.

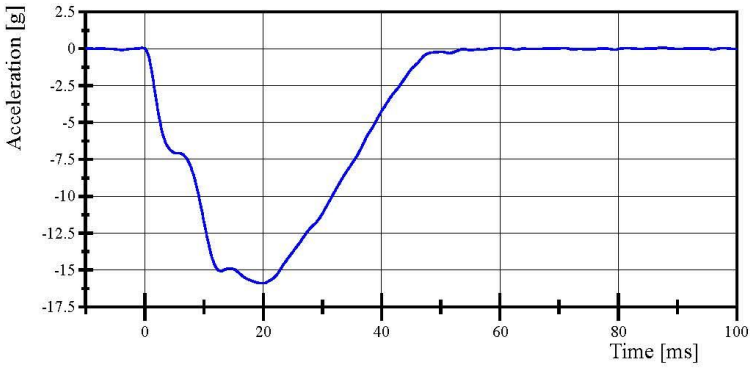
Condition: Used

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.

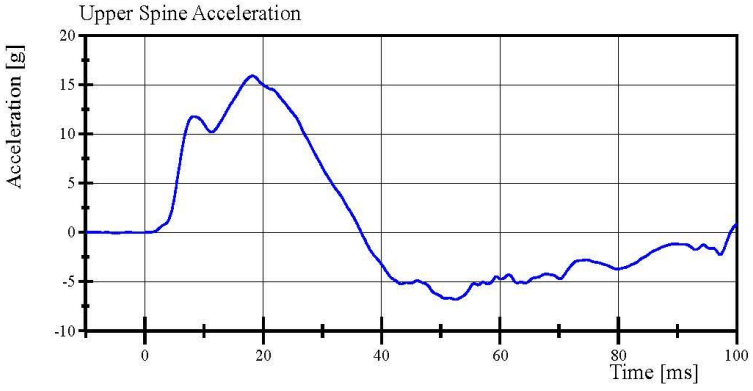
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Probe Acceleration



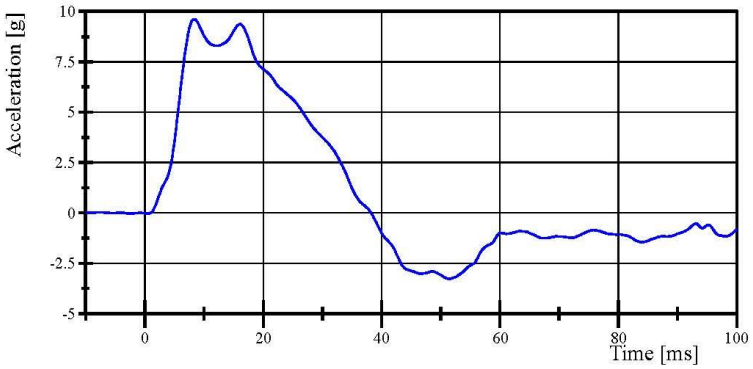
Filter Class: CFC_180
Max: 0.1 g at 87.5 ms
Min: -15.9 g at 19.8 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.9 g at 18.2 ms
Min: -6.8 g at 52.4 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.6 g at 8.3 ms
Min: -3.3 g at 51.4 ms

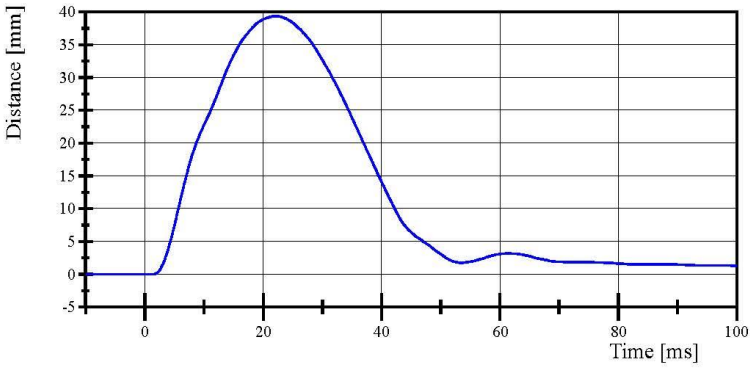
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

01.24.2020 08:27:17 834

Transportation Research Center Inc.

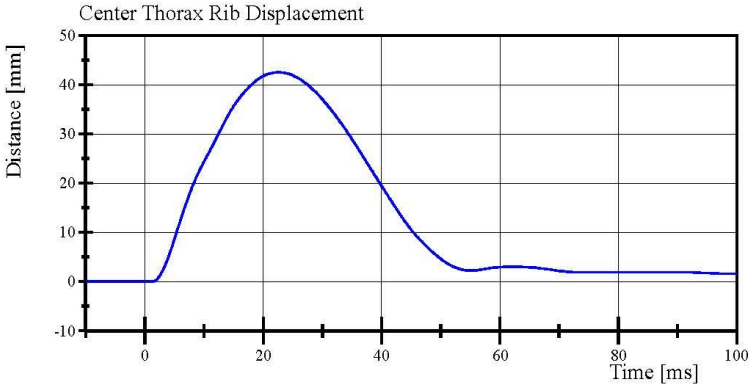
Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Upper Thorax Rib Displacement



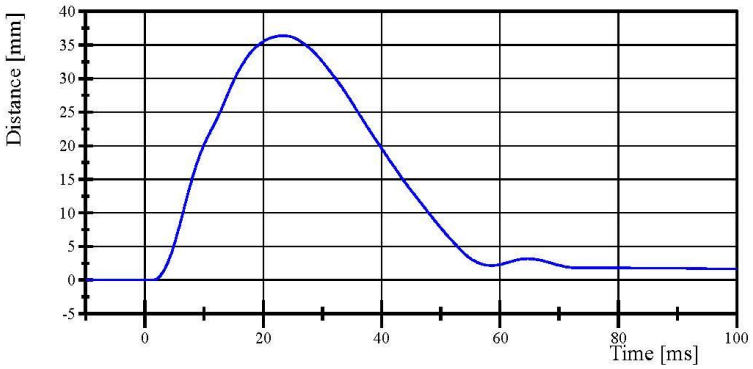
Filter Class: CFC_600
Max: 39.4 mm at 22.2 ms
Min: -0.0 mm at -6.4 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 42.5 mm at 22.6 ms
Min: -0.0 mm at -6.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.4 mm at 23.4 ms
Min: -0.0 mm at -6.5 ms

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

01.24.2020 08:27:17 834

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.8 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	41.9 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.84 g	Yes

Test meets specifications.

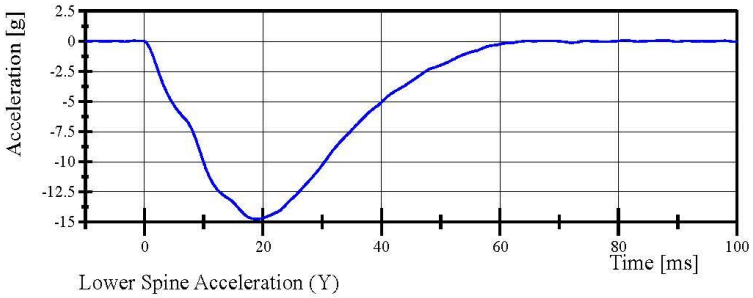
Condition: Used

Comments:
Upper Abdominal Rib S/N: 180-3368 DP5142
Lower Abdominal Rib S/N: 180-3368 DP5143

Transportation Research Center Inc.

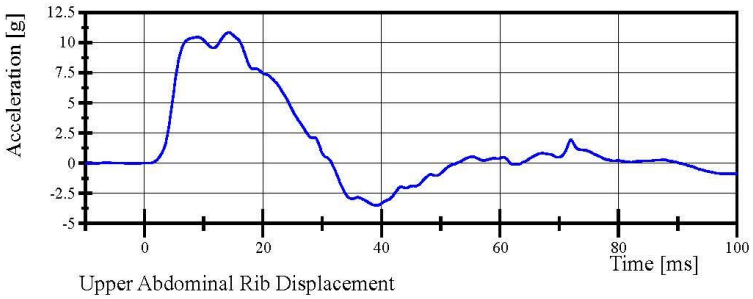
Left Lateral Abdomen
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Probe Acceleration



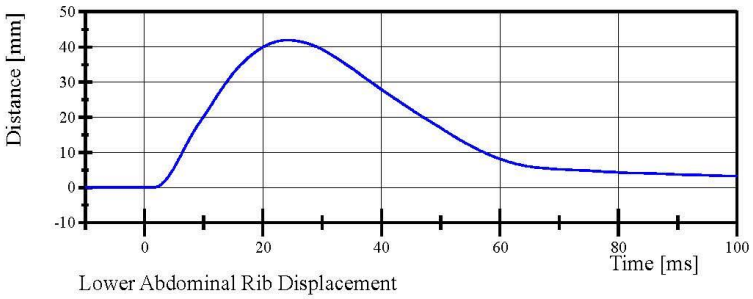
Filter Class: CFC_180
Max: 0.1 g at 81.2 ms
Min: -14.8 g at 19.0 ms

Lower Spine Acceleration (Y)



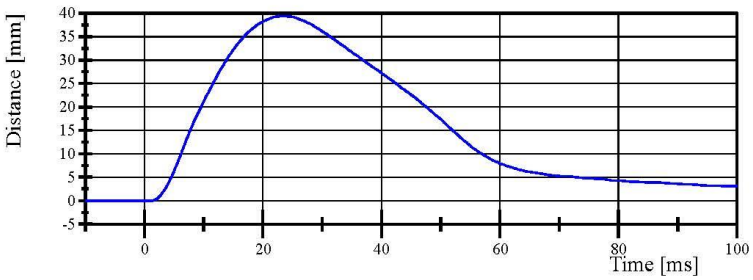
Filter Class: CFC_180
Max: 10.8 g at 14.2 ms
Min: -3.5 g at 39.1 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 41.9 mm at 24.2 ms
Min: -0.0 mm at -3.0 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 39.4 mm at 23.4 ms
Min: -0.0 mm at 1.2 ms

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

01.24.2020 08:15:17 686

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.65 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-45.01 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,182.8 N	Yes

Test meets specifications.

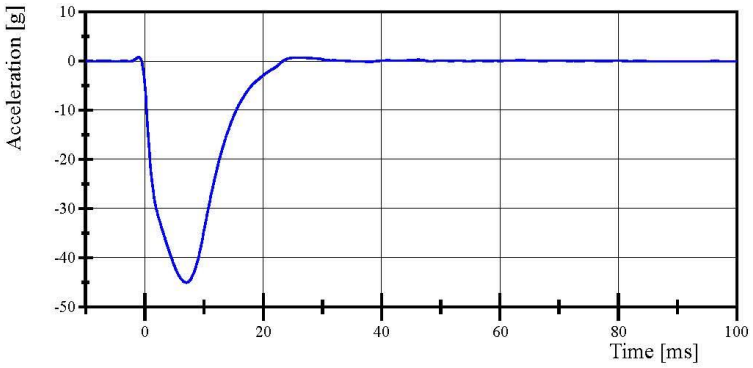
Condition: Used

Comments:
Pelvis Skin S/N: 1159
Pelvis Plug Info:
Manufacturer: SACO
S/N: 12683
Cal Date: 201811121

Transportation Research Center Inc.

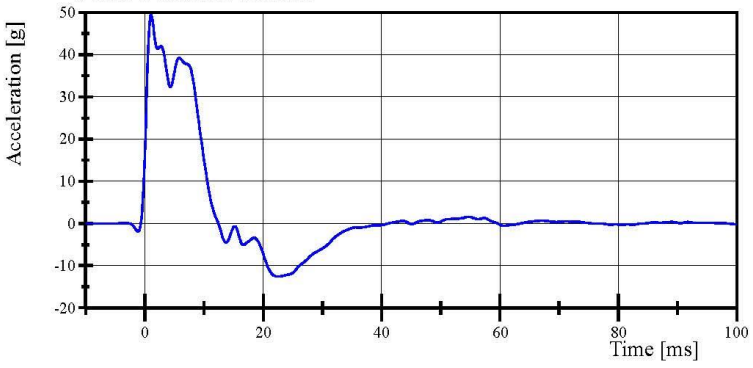
Left Lateral Pelvis
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Probe Acceleration



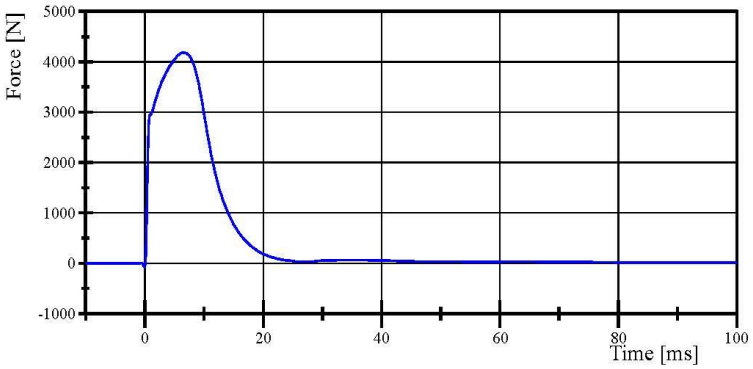
Filter Class: CFC_180
Max: 0.8 g at -1.0 ms
Min: -45.0 g at 7.0 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 49.4 g at 1.0 ms
Min: -12.6 g at 22.5 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,182.8 N at 6.5 ms
Min: -75.8 N at -0.1 ms

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

01.24.2020 10:01:51 448

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.25 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-45.2 g	No
Peak Pelvis Lateral Acceleration	28 - 39 g	38.6 g	Yes
Iliac Force	4,100 - 5,100 N	5,394.3 N	No

Test does not meet specifications.

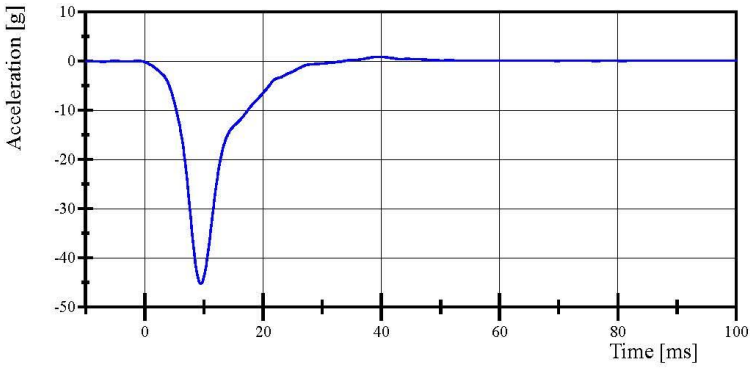
Condition: Used

Comments:
Pelvis Skin S/N: 1159

Transportation Research Center Inc.

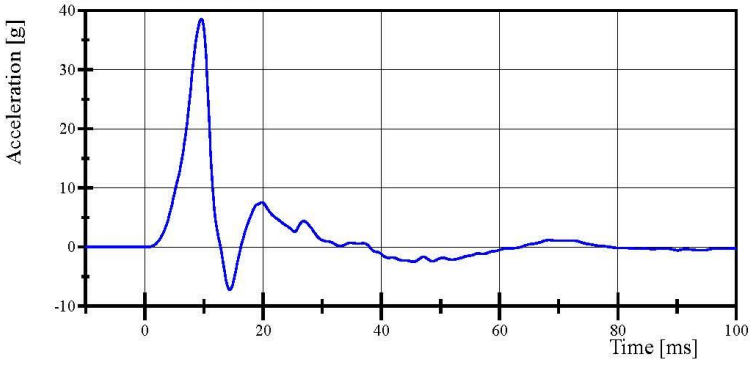
Left Lateral Iliac
SID IIs Serial No. DQ0570 Certification No. 4-1
Test Date: 1/24/2020

Probe Acceleration



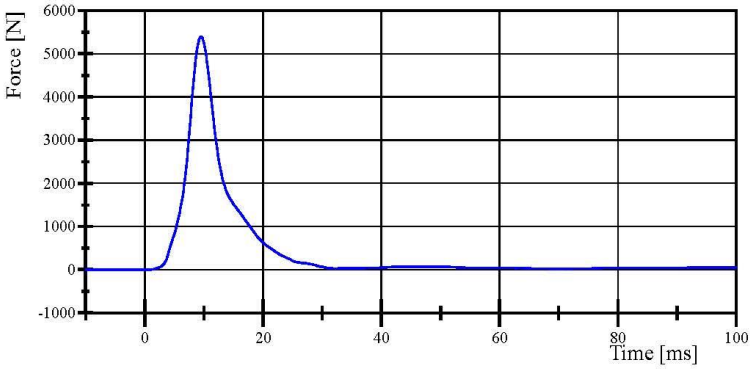
Filter Class: CFC_180
Max: 0.9 g at 39.6 ms
Min: -45.2 g at 9.4 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 38.6 g at 9.6 ms
Min: -7.3 g at 14.4 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 5,394.3 N at 9.5 ms
Min: -0.5 N at -3.0 ms

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

01.24.2020 07:49:10 673

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	9-Oct-2019
		Y	T10352	Endevco	9-Oct-2019
		Z	P91950	Endevco	9-Oct-2019
Redundant Head Accelerometers		X	T11817	Endevco	9-Oct-2019
		Y	P83368	Endevco	9-Oct-2019
		Z	P94483	Endevco	9-Oct-2019
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	16-Apr-2019
	Middle	Y	174	FTSS	16-Apr-2019
	Lower	Y	173	FTSS	16-Apr-2019
Abdomen Load Cells	Front	Y	1441	Denton	16-Apr-2019
	Middle	Y	1436	Denton	16-Apr-2019
	Rear	Y	1437	Denton	16-Apr-2019
Lower Spine Accelerometers (T12)		X	T11866	Endevco	9-Oct-2019
		Y	P87139	Endevco	9-Oct-2019
		Z	P64884	Endevco	9-Oct-2019
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	16-Apr-2019

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N DQ0570		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	T11432	Endevco	14-Oct-2019
			Y	P93774	Endevco	14-Oct-2019
			Z	P91566	Endevco	14-Oct-2019
Redundant Head Accelerometers			X	P91615	Endevco	14-Oct-2019
			Y	P93762	Endevco	14-Oct-2019
			Z	P93761	Endevco	14-Oct-2019
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	18-Apr-2019
		Middle	Y	037	Servo	18-Apr-2019
		Lower	Y	036	Servo	23-May-2019
	Abdominal Rib	Upper	Y	1295	Servo	18-Apr-2019
		Lower	Y	1136	Servo	18-Apr-2019
Lower Spine Accelerometers (T12)			X	P94545	Endevco	14-Oct-2019
			Y	P94647	Endevco	14-Oct-2019
			Z	P94530	Endevco	14-Oct-2019
Acetabulum Load Cell			Y	DK7483S-FY	FTSS	18-Apr-2019
Iliac Wing Load Cell			Y	287-FY	Denton	18-Apr-2019
Pelvis Plug (struck side)				12581	SACO	3-Oct-2018
Pelvis Plug (non-struck side)				12605	SACO	3-Oct-2018

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T11814	Endevco	21-Jan-2020
	Vehicle Center of Gravity	Y	T16725	Endevco	21-Jan-2020
	Vehicle Center of Gravity	Z	T11807	Endevco	21-Jan-2020
2	Right Sill at Front Seat	X	T11808	Endevco	21-Jan-2020
	Right Sill at Front Seat	Y	T11812	Endevco	21-Jan-2020
	Right Sill at Front Seat	Z	T16764	Endevco	21-Jan-2020
3	Right Sill at Rear Seat	X	P58494	Endevco	26-Nov-2019
	Right Sill at Rear Seat	Y	P74456	Endevco	26-Nov-2019
	Right Sill at Rear Seat	Z	P58537	Endevco	26-Nov-2019
4	Left Sill at Front Door	Y	T16786	Endevco	21-Jan-2020
5	Left Sill at Rear Door	Y	T16776	Endevco	21-Jan-2020
6	Left A-Post Lower	Y	T11868	Endevco	21-Jan-2020
7	Left A-Post Middle	Y	T16770	Endevco	21-Jan-2020
8	Left B-Post Lower	Y	T16772	Endevco	21-Jan-2020
9	B-Post Middle	Y	T16763	Endevco	21-Jan-2020
10	Front Seat Track	Y	T11875	Endevco	21-Jan-2020
11	Rear Seat Track or Structure	Y	P57192	Endevco	10-Jan-2020
12	Right Rear Occupant Compartment	Y	P33547	Endevco	28-Aug-2019
13	Engine Block	X	T16769	Endevco	21-Jan-2020
	Engine Block	Y	T16762	Endevco	21-Jan-2020
14	Rear Floorpan Above Axle	X	T16775	Endevco	21-Jan-2020
	Rear Floorpan Above Axle	Y	T11876	Endevco	21-Jan-2020
	Rear Floorpan Above Axle	Z	T11873	Endevco	21-Jan-2020

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P75713	Endevco	10-Sep-2019
MDB Center of Gravity	Y	P76171	Endevco	10-Sep-2019
MDB Center of Gravity	Z	P76114	Endevco	10-Sep-2019
Left Frame Rail at Rear Axle Centerline	X	P75115	Endevco	10-Sep-2019
Left Frame Rail at Rear Axle Centerline	Y	P94567	Endevco	10-Sep-2019