

FINAL REPORT NUMBER: SINCAP-TRC-24-004

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

**KIA CORPORATION
2024 Kia Carnival
NHTSA NUMBER: M20244215**

**PREPARED BY:
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Report Date: December 26, 2024

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
Washington, D.C. 20590**

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Report Prepared By: ILO Project Operations Group

Report Approved By: 

John Shultz

Approval Date: December 26, 2024

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 2024 Kia Carnival, 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 July 25, 2024. The impact velocity of the Moving Deformable Barrier (MDB) was 61.81 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.5° C. The target vehicle post-test maximum crush was 245 mm at Level 3. The test vehicle's performance was as follows: Driver ATD (ES-2re) <table border="1"> <thead> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>112.150</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>22.190</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>692.720</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-1259.840</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>22.320</td></tr> </tbody> </table> Passenger ATD (SID-IIs) <table border="1"> <thead> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>71.060</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>43.370</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>2295.080</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>20.070</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>4.230</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.			Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	112.150	Maximum Thoracic Rib Deflection	mm	44	22.190	Total Abdominal Force	N	2500	692.720	Pubic Symphysis Force	N	6000	-1259.840	Lower Spine Acceleration	G	82*	22.320	Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	71.060	Lower Spine Resultant Acceleration	g's	82	43.370	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2295.080	Maximum Thoracic Rib Deflection	mm	38*	20.070	Maximum Abdominal Rib Deflection	mm	45*	4.230
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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data	9
3	Dummy Longitudinal Clearance Dimensions	12
4	Dummy Lateral Clearance Dimensions	13
5	Camera and Instrumentation Data	14
6	Test Vehicle Accelerometer Locations	15
7	MDB Accelerometer Locations	16
8	Post-Test Observations	17
9	MDB Summary of Results	19
10	Test Vehicle Profile Measurements	20
11	Test Vehicle Exterior Crush Measurements	21
12	MDB Exterior Static Crush Measurements	24
13	Vehicle and MDB Damage Distances	25
14	FMVSS No. 301 Static Rollover Results	26
15	Dummy/Vehicle Temperature and Humidity Stabilization	27
Appendix		
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Performance Calibration Test Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1

SECTION 1

TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2024 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000018. The purpose of this test is to generate comparative side impact performance in a 2024 Kia Carnival. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A 2024 Kia Carnival was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.81 km/h (38.41 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 July 25, 2024. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated March 2020. The side impact event was documented by 11 cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

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

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

Lower spine (T12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG triaxial accelerometers

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

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	112.150
Maximum Thoracic Rib Deflection	mm	44	22.190
Combined Abdominal Force	N	2500	692.720
Pubic Symphysis Force	N	6000	-1259.840
Lower Spine (T12) Resultant Acceleration ¹	G	82*	22.320

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	71.060
Lower Spine (T12) Resultant Acceleration	G	82	43.370
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2295.080
Maximum Thoracic Rib Deflection	mm	38*	20.070
Maximum Abdominal Rib Deflection	mm	45*	4.230

* 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	Yes	No	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	No	No	N/A
Other	No	N/A	No	N/A

GENERAL COMMENTS

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

Left Side Sill at Rear Seat Acceleration (Y): QD throughout

Left Middle A-Post Acceleration (Y): CF at 25

Left Middle B-Post Acceleration (Y): CF at 25

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20244215
Model Year	2024
Make	Kia
Model	Carnival
Body Style	MPV
VIN	KNDNB4H32R6441533
Body Color	Flare Red
Odometer Reading (km/mi)	13 mi
Engine Displacement (L)	3.5
Type/No. Cylinders	V/6
Engine Placement	Front
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes, Driver
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	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	N/A

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	KIA CORPORATION
Date of Manufacture	03/24
Vehicle Type	MPV

GVWR (LB)	5952
GAWR Front (LB)	3064
GAWR Rear (LB)	3263

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	3	8
Capacity Weight (VCW) (kg)				600.0
DSC x 68 (kg)				544.0
Cargo Weight (RCLW) (kg)				56.0

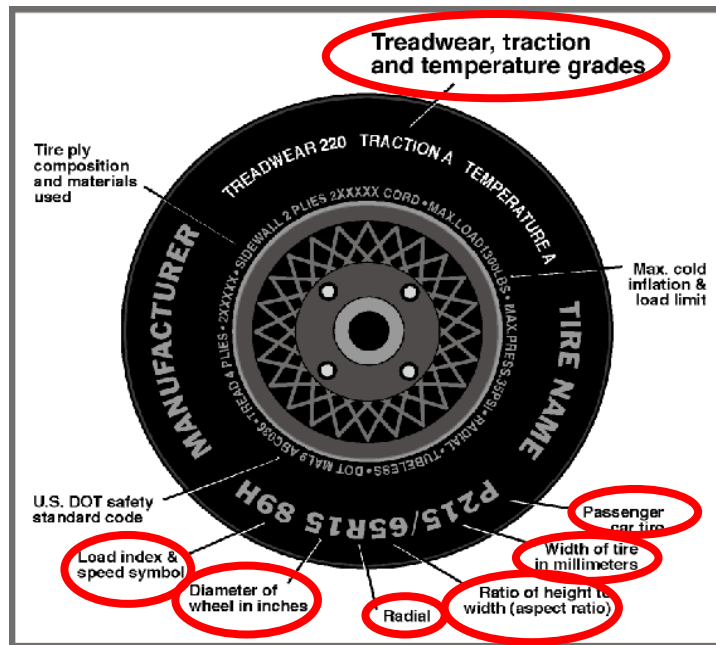
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	255	255
Recommended Tire Size	235/65R17	235/65R17
Tire Size on Vehicle	235/65R17	235/65R17
Tire Manufacturer	Hankook	Hankook
Tire Model	Dynapro	Dynapro
Treadwear	540	540
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	6	6
Load Index/Speed Symbol	104H	104H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	15M8R RT H0 0724	15M8R RT H0 0724
DOT Safety Code Right	15M8R RT H0	15M8R RT H0

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

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	241	241	241	241
Tire Placard	kPa	255	255	255	255
Owner's Manual	kPa	255	255	255	255
As Tested	kPa	255	255	255	255

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	579.4	461.8		629.6	536.8		614.2	561.2	
Right	kg	576.8	441.8		568.8	498.4		563.0	502.4	
Ratio	%	56.1	43.9		53.7	46.3		52.5	47.5	
Totals	kg	1156.2	903.6	2059.8	1198.4	1035.2	2233.6	1177.2	1063.6	2240.8

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2059.8	(A)
Actual Weight of 1 P572V ATD (SID-ILs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	56.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2240.8	(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	770	768	Yes
RF	mm	778	772	Yes
RR	mm	780	780	Yes
LR	mm	769	765	Yes
Vehicle CG (Aft of Front Axle)	mm	1467	1432	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	43	39	

***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

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

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate	39.6
Removed: None	0.0

TEST SURFACE MARKINGS

	Distance from 63° Impact Angle Line (mm)
Fore 25 mm target	1000
Aft 25 mm target	990
Pre-Impact Angle Line	260

Parallel Track Target	X Location (mm)	Y Location (mm)
A	0	0
B	1620	3420
C	3985	3420
D	3985	0

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

Test Vehicle: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024

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	20.3	11.1	15.7
Front Passenger Seat	13.0	13.0	13.0
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	15.5	15.5	15.5
Non-Struck Side Rear Seat	16.7	16.7	16.7
Rear Center Seat*	9.9	9.9	9.9

* 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	15.7	293	Max	N/A	N/A	N/A
			Mid	282	293	301
			Min	N/A	N/A	N/A
Front Passenger Seat	13.0	299	Max	N/A	N/A	N/A
			Mid	294	299	305
			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	15.5	234	Max	N/A	N/A	N/A
			Mid	234	228	218
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	16.7	230	Max	N/A	N/A	N/A
			Mid	230	224	215
			Min	N/A	N/A	N/A
Rear Center Seat*	9.9	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

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

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024

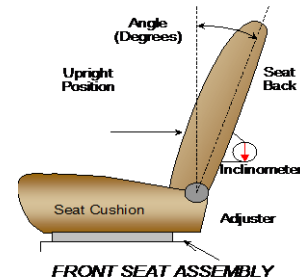
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	220	Power	110	MID
Front Passenger Seat	240	56	120	28
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	300	16	300	16
Non-Struck Side Rear Seat	300	16	300	16
Rear Center Seat*	300	16	300	16

* 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	65.7	Power	4.0	Power
Front Passenger Seat	61.7	30	4.5	
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	20.2	7	10.9	1
Non-Struck Side Rear Seat	20.4	7	10.9	1
Rear Center Seat*	20.4	7	10.9	1

* 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	3	0
Rear Seat	0	0

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	5	5
Rear Seat	5	0

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

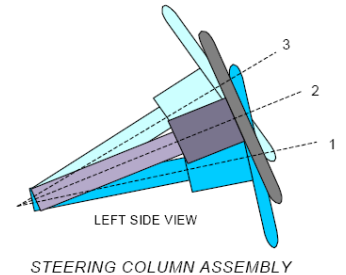
Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024

STEERING COLUMN ADJUSTMENT

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

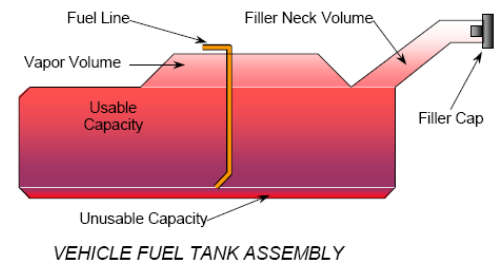
	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	24.8	
Geometric Center, Position No. 2	27.2	
Uppermost, Position No. 3	29.6	
Telescoping Steering Wheel Travel		48
Test Position	27.2	24



FUEL PUMP

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

Fuel pump will run for approximately 3 seconds when the key or push start button is switched to "On" position, then, it will stop and will not resume operation unless the engine is cranking or running



FUEL TANK CAPACITY

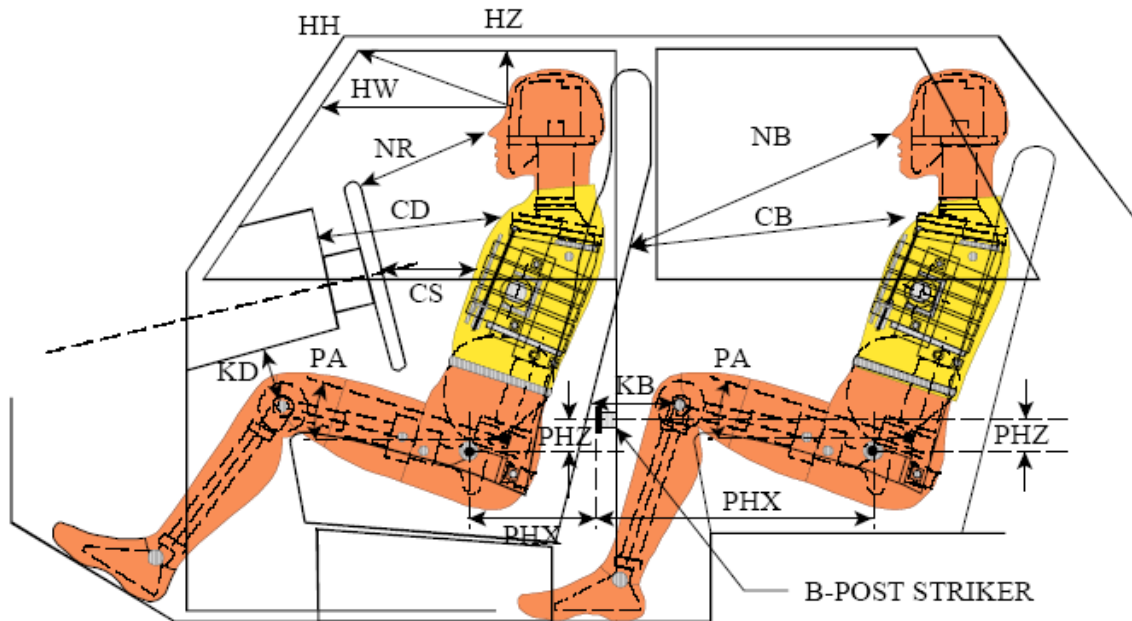
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	72.0
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	72.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	67.0
Actual Amount of Solvent Used in Test	67.0
1/3 of Usable Capacity	24.0

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



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

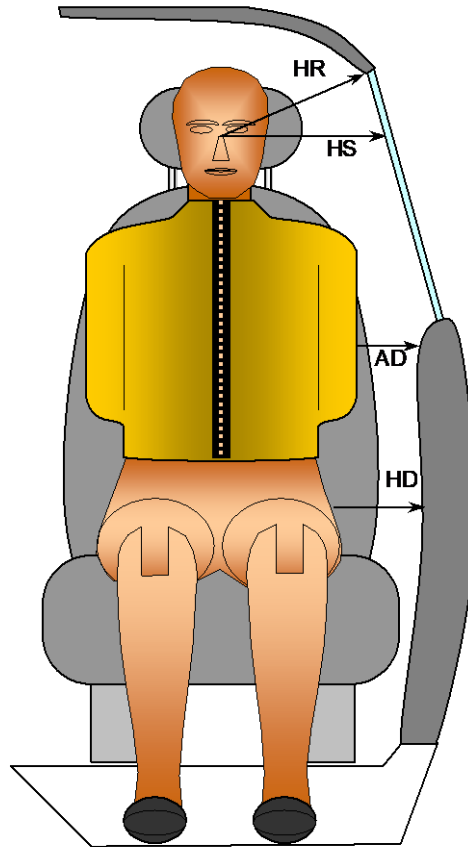
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	520			
HW		Header to Windshield	780			
HZ	HZ	Head to Roof Liner	230		302	
NR	NB	Nose to Rim/Seat Back	481		615	
CD	CB	Chest to Dash/Seat Back	595		589	
CS		Chest to Steering Wheel	383			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	213	0.0	359	0.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	208	0.0	355	0.0
PAX°	PAX°	Pelvic Tilt Angle X		0.21		0.42
	PAY°	Pelvic Tilt Angle Y				20.5
PHX	PHX	Hip Point to Striker (X-Axis)	193		360	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	243		145	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



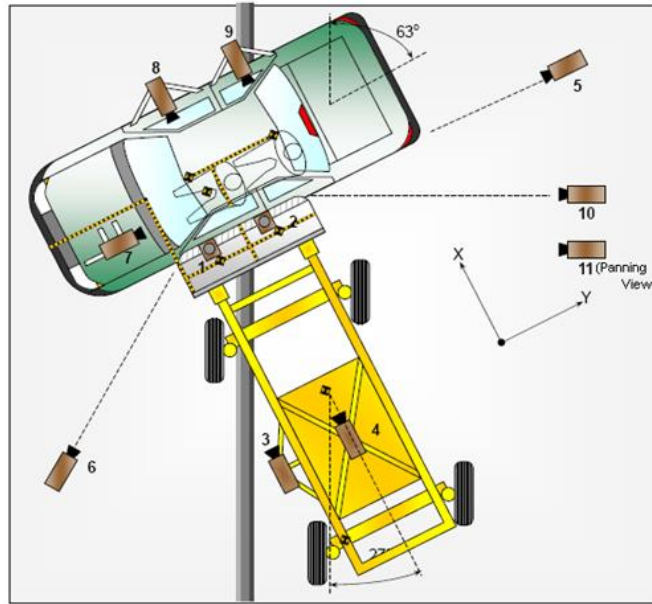
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	223	243
HS	Head to Side Window	mm	364	358
AD	Arm to Door	mm	132	141
HD	H-Point to Door	mm	198	223

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	1581	0	-5550	18	1000
2	Overhead Close-up	1501	0	-5906	28	1000
3	Left Impact Point (MDB)	-1612	-920	-911	25	1000
4	Side Overall (MDB)	-2322	0	-1401	8.5	1000
5	Rear	3605	5744	-1299	20	1000
6	Left Front	-4342	-3846	-1505	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				8.5	1000
9	Passenger Side (OB)				8.5	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

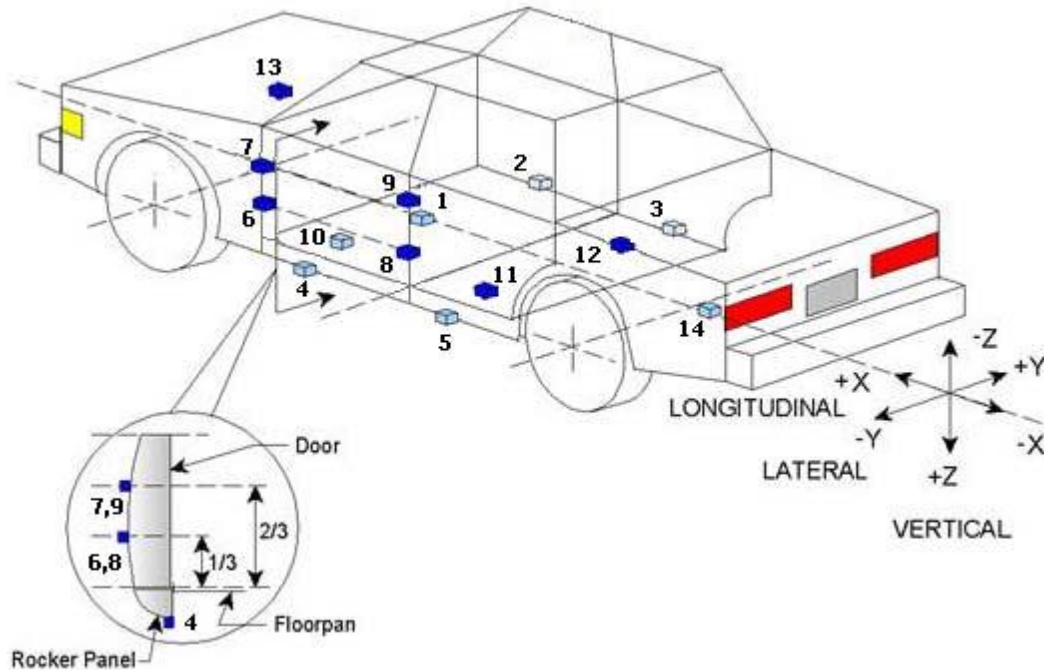
INSTRUMENTATION

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: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024



TEST VEHICLE ACCELEROMETER LOCATIONS

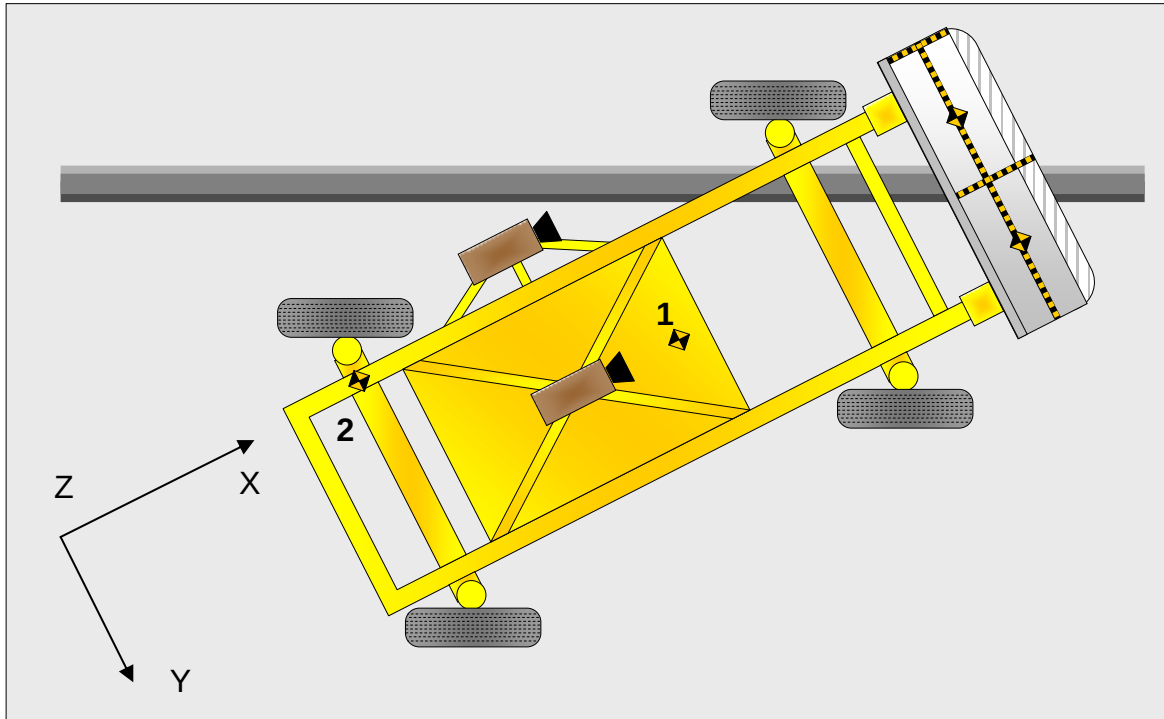
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3231	119	-434
2	Right Sill at Front Seat	3358	741	-375
3	Right Sill at Rear Seat	2006	763	-428
4	Left Sill at Front Door	3274	-744	-367
5	Left Sill at Rear Door	2097	-830	-417
6	A-Post Lower	3690	-910	-593
7	A-Post Middle	3698	-891	-912
8	B-Post Lower	2634	-954	-732
9	B-Post Middle	2631	-935	-909
10	Front Seat Track	2968	-644	478
11	Rear Seat Structure	2170	-452	-453
12	Right Rear Occ. Compartment	2130	390	-462
13	Engine Block	4262	160	-929
14	Rear Above Axle	928	49	-519

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: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	-2196	0	-500
2	MDB Rear	-3585	-645	-620

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

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

Test Vehicle: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	None	None
Top of Head	SCAB; Side Header	SCAB
Left Side of Head	SCAB; Side Header	SCAB
Back of Head	SCAB; Head Rest	Head Rest
Left Shoulder	SAB	Door Panel
Upper Torso	SAB; Seat Bolster	Door Panel
Lower Torso	SAB; Seat Bolster	Door Panel
Left Hip	SAB	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)	No	No	No	No	No

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	None	None	None	None
Seat Disengagement from Floor pan	None	None	None	None
Seat Back Movement from Initial Position	None	None	None	None
Seat Back Collapse	None	None	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	Good
Windshield Damage	None
Side Window Damage	Passenger struck side blown out
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	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	No	No	N/A
Other:	No	N/A	No	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3090
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		510
Actual Impact Point (Aft of Front Axle)	mm		497
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+13
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-1

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024

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	1125

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	403.2	283.2	686.4
Right	kg	370.4	310.4	680.8
Ratio	%	56.6	43.4	100.0
Totals	kg	773.6	593.6	1367.2

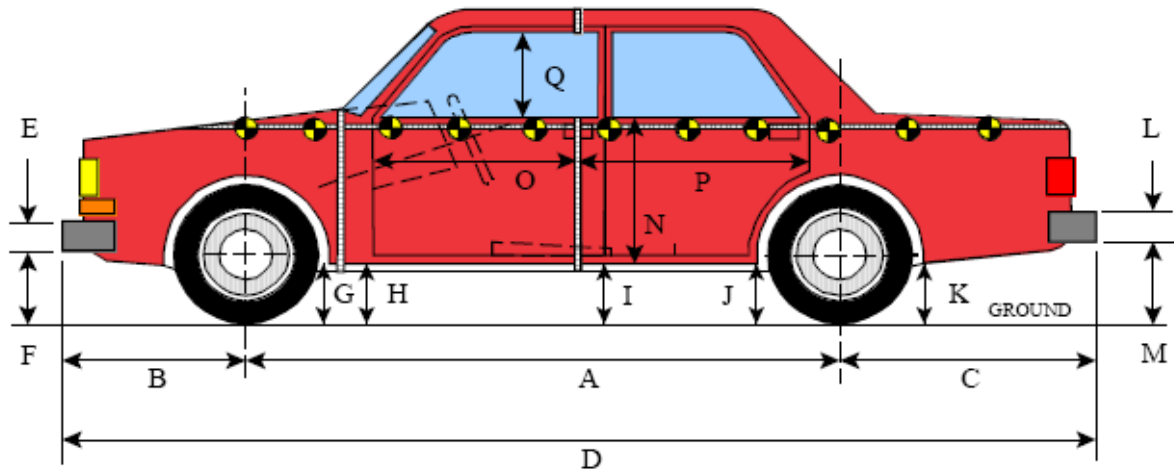
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.81
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.83
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.0

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



LEFT SIDE VIEW

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

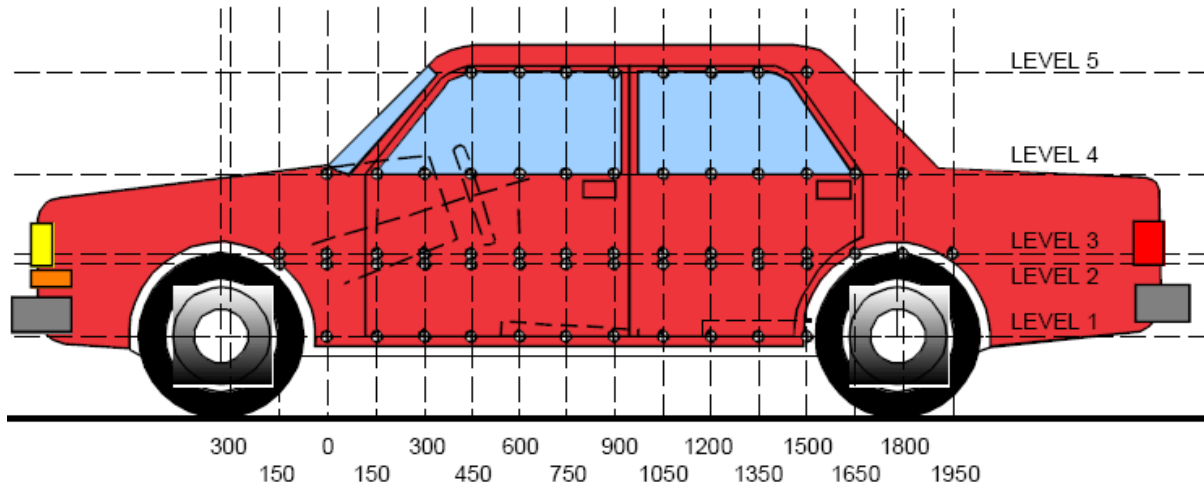
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	3090	3068	-22
B	Front Axle to Front Surface of Vehicle	954	957	3
C	Rear Axle to Rear Surface of Vehicle	1124	1133	9
D	Total Length at Centerline	5168	5158	-10
E	Front Bumper Thickness	155	155	0
F	Front Bumper Bottom to Ground	485	492	7
G	Sill Height at Front Wheel Well	276	294	18
H	Sill Height at Front Door Leading Edge	270	289	19
I	Sill Height at B-Pillar	249	280	31
J1	Sill Height at Rear Wheel Well	265	288	23
J2	Pinch Weld Height at Rear Wheel Well	200	231	31
K	Sill Height Aft of Rear Wheel Well	225	348	123
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	455	475	20
N	Sill Height to Window Bottom Sill	920	760	-160
O	Front Door Leading Edge to Impact CL	851	839	-12
P	Rear Door Trailing Edge to Impact CL	1448	1425	-23
Q	Front Window Opening	465	466	1
R	Right Side Length	5008	5005	-3
S	Left Side Length	5010	4985	-25
T	Vehicle Width	2004	2000	-4
U	Front Wheel Track Width	1752	1725	-27
V	Rear Wheel Track Width	1750	1750	0

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	364	105	1650
2	Driver Hip Point	686	250	1350
3	Mid Door	715	254	1500
4	Window Sill	1108	133	1350
5	Window Top	1625	9	1050

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: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

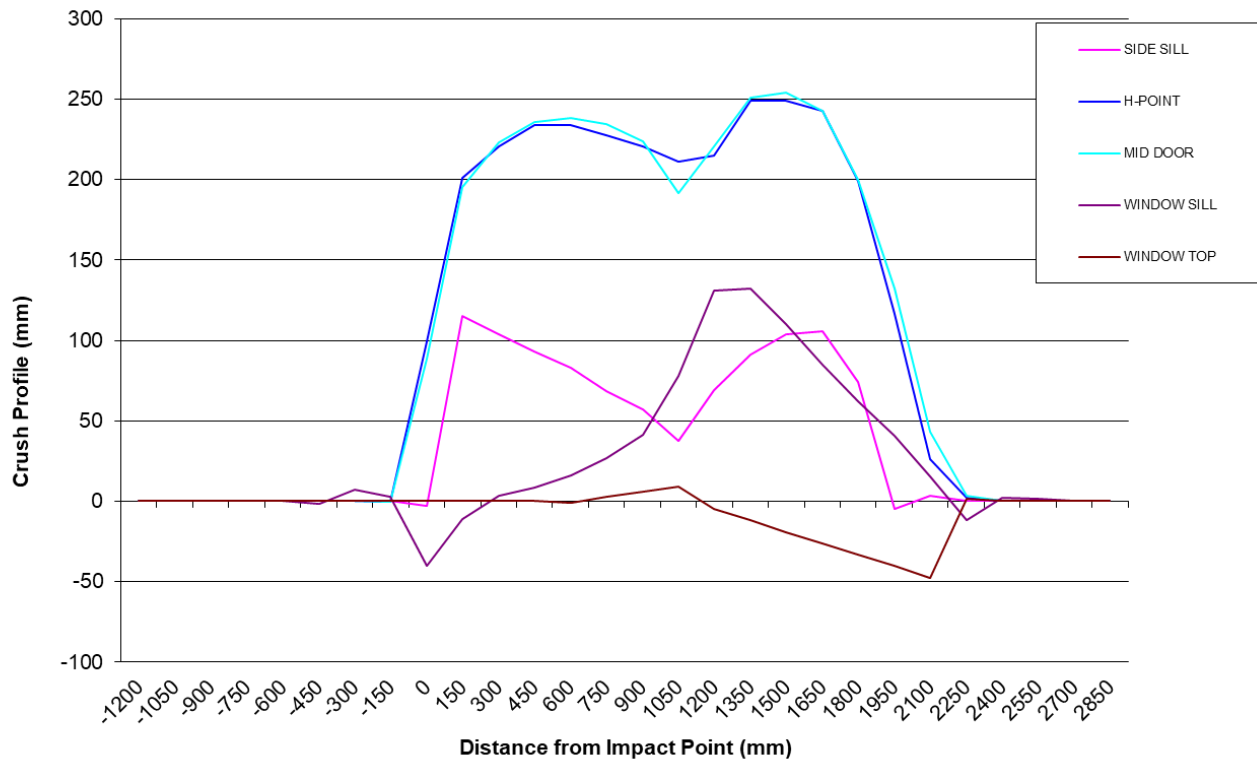
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-450	0	0	0	851	0	0	0	0	852	0	0	0	0	-1	0
-300	0	0	0	869	0	0	0	0	862	0	0	0	0	7	0
-150	0	993	995	881	0	0	993	995	878	0	0	0	0	3	0
0	966	989	989	888	0	969	890	900	928	0	-3	99	89	-40	0
150	945	979	980	891	0	830	778	785	902	0	115	201	195	-11	0
300	944	974	977	901	0	840	753	753	897	0	104	221	224	4	0
450	947	974	976	905	0	854	741	740	897	0	93	233	236	8	0
600	951	975	976	910	692	868	741	738	894	693	83	234	238	16	-1
750	952	976	976	915	709	884	748	742	888	706	68	228	234	27	3
900	955	977	976	920	712	897	757	752	878	706	58	220	224	42	6
1050	955	977	976	924	712	918	766	785	847	703	37	211	191	77	9
1200	955	977	975	928	713	885	762	755	796	718	70	215	220	132	-5
1350	954	976	974	931	714	862	726	723	798	726	92	250	251	133	-12
1500	953	974	973	933	714	849	725	719	823	733	104	249	254	110	-19
1650	951	973	972	934	714	846	730	729	849	740	105	243	243	85	-26
1800	950	973	974	936	714	876	774	774	874	747	74	199	200	62	-33
1950	950	980	981	936	714	954	864	849	896	755	-4	116	132	40	-41
2100	965	992	991	934	713	962	965	948	919	761	3	27	43	15	-48
2250	0	992	993	932	710	0	990	990	944	709	0	2	3	-12	1
2400	0	0	0	929	707	0	0	0	927	706	0	0	0	2	1
2550	0	0	0	927	701	0	0	0	925	701	0	0	0	2	0

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

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

Test Vehicle: 2024 Kia Carnival
Test Program: SINCAP Side Impact

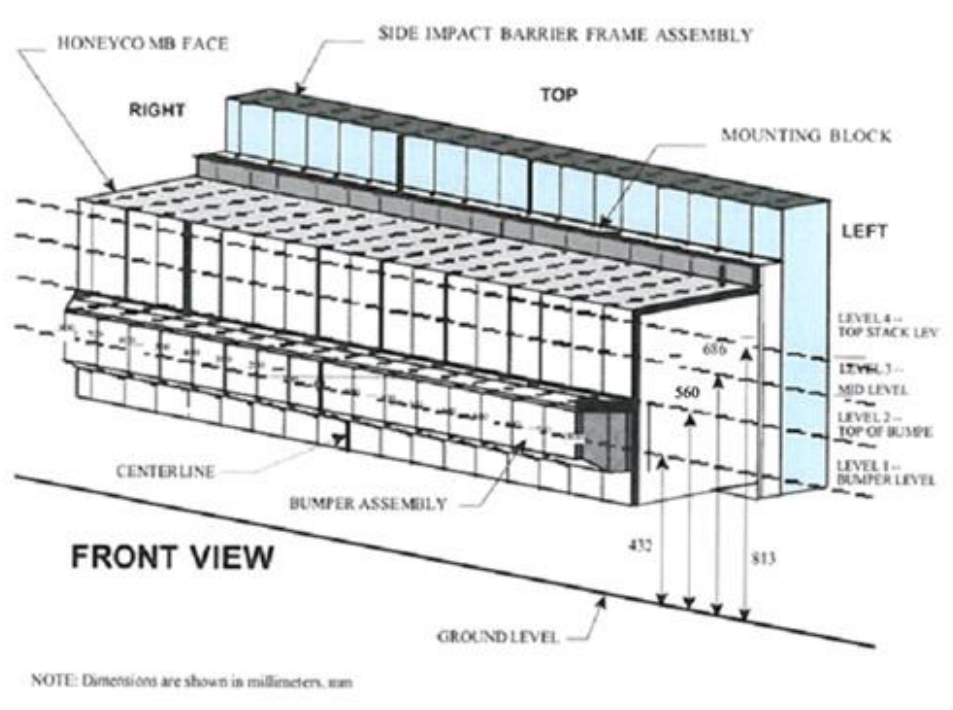
NHTSA No.: M20244215
Test Date: 7/25/2024



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	200	Right	281
B	Top of Bumper	560	800	Right	153
C	Mid-Level	686	800	Right	116
D	Top of Stack	813	800	Right	133

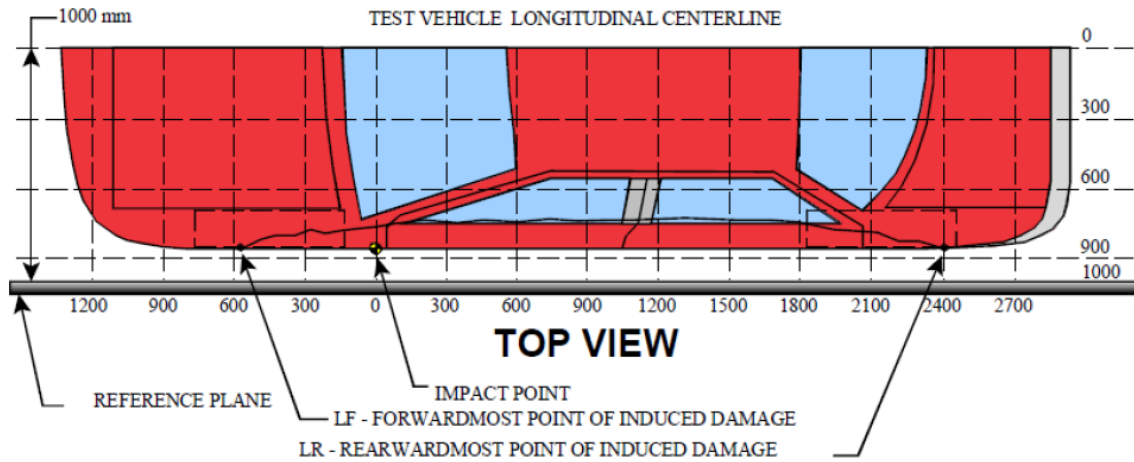
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	272	273	271	268	266	266	281	251	236	227	212	201	191	180	169	159	146
2	153	152	152	146	142	140	134	130	116	103	90	77	65	55	45	47	69
3	116	84	69	58	50	52	81	62	40	32	28	24	23	27	35	47	68
4	133	86	55	38	36	41	65	101	76	55	55	56	57	57	64	71	102

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024



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	925	927	2
2	1950	3	849	981	132
3	1350	3	723	974	251
4	900	3	752	967	224
5	300	3	753	977	224
6 ¹	-300	4	862	869	0

1
MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800	1	320	466	146
2	500	1	303	483	180
3	200	1	271	483	212
4	200	1	203	484	281
5	500	1	216	484	268
6 ¹	800	1	199	471	272

¹ DPD 6 is defined as zero crush since the crush does not extend to the end of the vehicle.

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

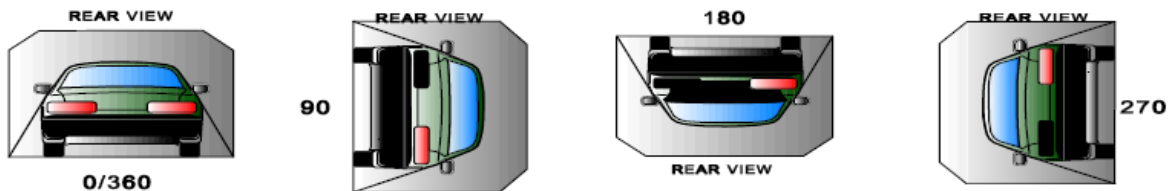
Test Vehicle: 2024 Kia Carnival
 Test Program: SINCAP Side Impact

NHTSA No.: M20244215
 Test Date: 7/25/2024

Test Time: 16:58 **Temperature:** 21.5C

- 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

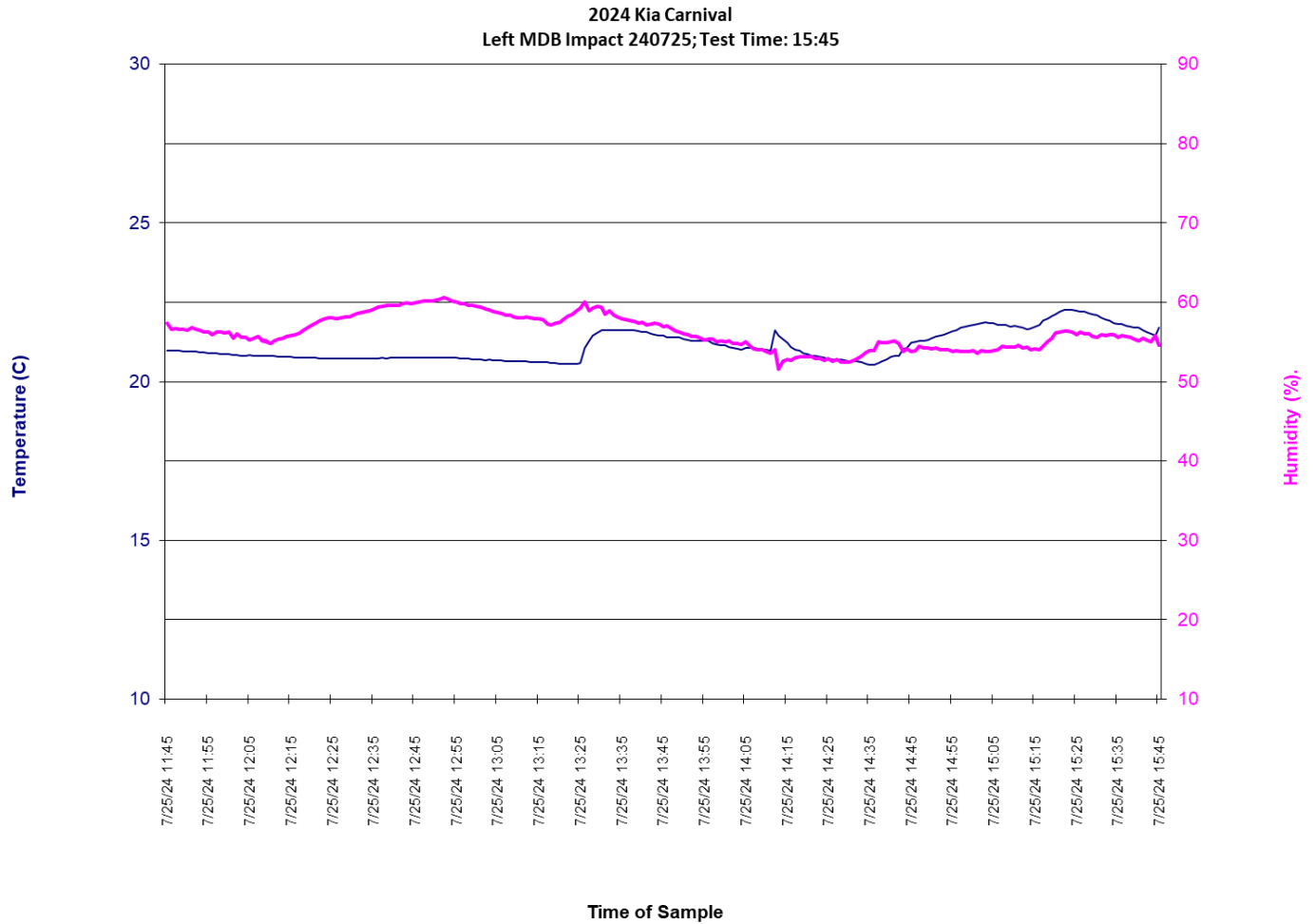
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2024 Kia Carnival
Test Program: SINCAP Side Impact

NHTSA No.: M20244215
Test Date: 7/25/2024



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

No.	Description	Page
001	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-6
002	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-6
003	Pre-Test Frontal View of Test Vehicle	A-7
004	Post-Test Frontal View of Test Vehicle	A-7
005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
006	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
007	Pre-Test Left Side View of Test Vehicle	A-9
008	Post-Test Left Side View of Test Vehicle	A-9
009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
010	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
011	Pre-Test Rear View of Test Vehicle	A-11
012	Post-Test Rear View of Test Vehicle	A-11
013	Pre-Test Right Side View of Test Vehicle	A-12
014	Post-Test Right Side View of Test Vehicle	A-12
015	Pre-Test Overhead View of Test Area	A-13
016	Post-Test Overhead View of Test Area	A-13
017	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-14
018	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-14
019	Pre-Test Close-Up View of Impact Point Target	A-15
020	Post-Test Close-Up View of Impact Point Target	A-15
021	Pre-Test Left Front Door Latch Close-Up	A-16
022	Post-Test Left Front Door Latch Close-Up	A-16
023	Pre-Test Left Rear Door Latch Close-Up	A-17
024	Post-Test Left Rear Door Latch Close-Up	A-17
025	Pre-Test Front Close-Up View of Driver Dummy	A-18
026	Post-Test Front Close-Up View of Driver Dummy	A-18
027	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-19
028	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
029	Post-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
030	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-21
031	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-21
032	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-22
033	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-22
034	Pre-Test Placement of Driver Dummy's Feet	A-23
035	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
036	Pre-Test Left Side View of Steering Wheel	A-24

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
037	View of Disengaged Parking Brake	A-24
038	Pre-Test View of Parking Brake	A-25
039	Pre-Test Close-Up Left Side View of Driver Seat Track	A-25
040	Pre-Test Close-Up Left Side View of Driver Seat Back	A-26
041	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-26
042	Pre-Test Driver Dummy and Door Clearance View	A-27
043	Post-Test Driver Dummy and Door Clearance View	A-27
044	Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-28
045	Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-28
046	Pre-Test Driver Inner Door Panel View	A-29
047	Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations	A-29
048	Post-Test Driver Dummy Close-Up Head Contact with Vehicle View	A-30
049	Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View	A-30
050	Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View	A-31
051	Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View	A-31
052	Post-Test Driver Dummy Close-Up Pelvis Contact View	A-32
053	Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View	A-32
054	Post-Test Driver Dummy Close-Up Knee Contact View	A-33
055	Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking	A-33
056	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-34
057	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-34
058	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-35
059	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-35
060	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-36
061	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-36
062	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-37
063	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-37

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
064	Pre-Test Placement of Rear Passenger Dummy's Feet	A-38
065	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-38
066	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-39
067	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-39
068	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-40
069	Pre-Test Rear Passenger Dummy and Door Clearance View	A-41
070	Post-Test Rear Passenger Dummy and Door Clearance View	A-41
071	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-42
072	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-42
073	Pre-Test Rear Passenger Inner Door Panel View	A-43
074	Post-Test Rear Passenger Inner Door Panel View	A-43
075	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	A-44
076	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View	A-44
077	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-45
078	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	A-45
079	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	A-46
080	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	A-46
081	Post-Test Rear Passenger Dummy Close-Up Knee Contact View	A-47
082	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-48
083	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-48
084	Pre-Test Front View of MDB Impactor Face	A-49
085	Post-Test Front View of MDB Impactor Face	A-49
086	Pre-Test Top View of MDB Impactor Face	A-50
087	Post-Test Top View of MDB Impactor Face	A-50
088	Pre-Test Left Side View of MDB Impactor Face	A-51
089	Post-Test Left Side View of MDB Impactor Face	A-51
090	Pre-Test Right Side View of MDB Impactor Face	A-52
091	Post-Test Right Side View of MDB Impactor Face	A-52

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
092	Close-Up View of Vehicle's Certification Label	A-53
093	Close-Up View of Vehicle's Tire Information Placard or Label	A-53
094	Pre-Test Ballast View	A-54
095	Post-Test Primary and Redundant Speed Trap Read-Out	A-54
096	FMVSS No. 301 Static Rollover 0 Degrees	A-55
097	FMVSS No. 301 Static Rollover 90 Degrees	A-55
098	FMVSS No. 301 Static Rollover 180 Degrees	A-56
099	FMVSS No. 301 Static Rollover 270 Degrees	A-56
100	FMVSS No. 301 Static Rollover 360 Degrees	A-57
101	Impact Event	A-57
102	Monroney Label	A-58
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-58
104	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-59



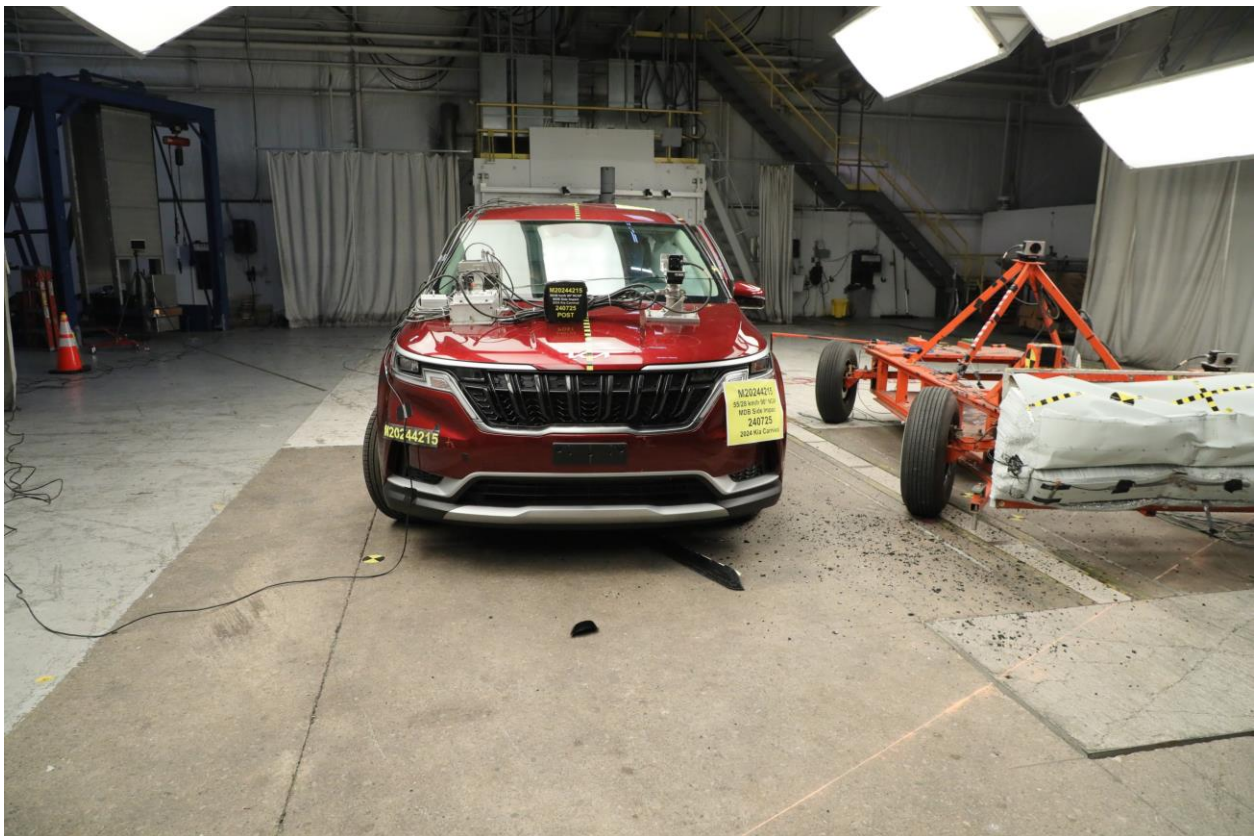
001 As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



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



003 Pre-Test Frontal View of Test Vehicle



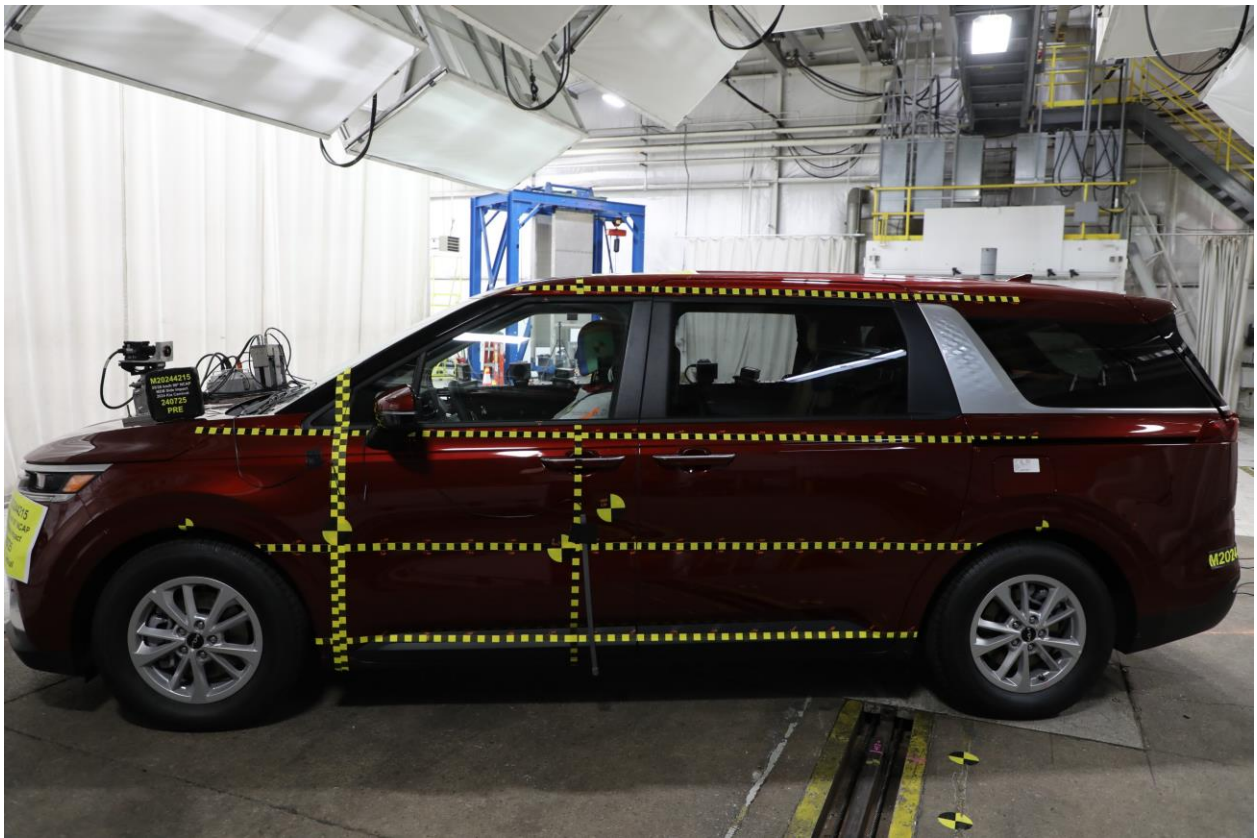
004 Post-Test Frontal View of Test Vehicle



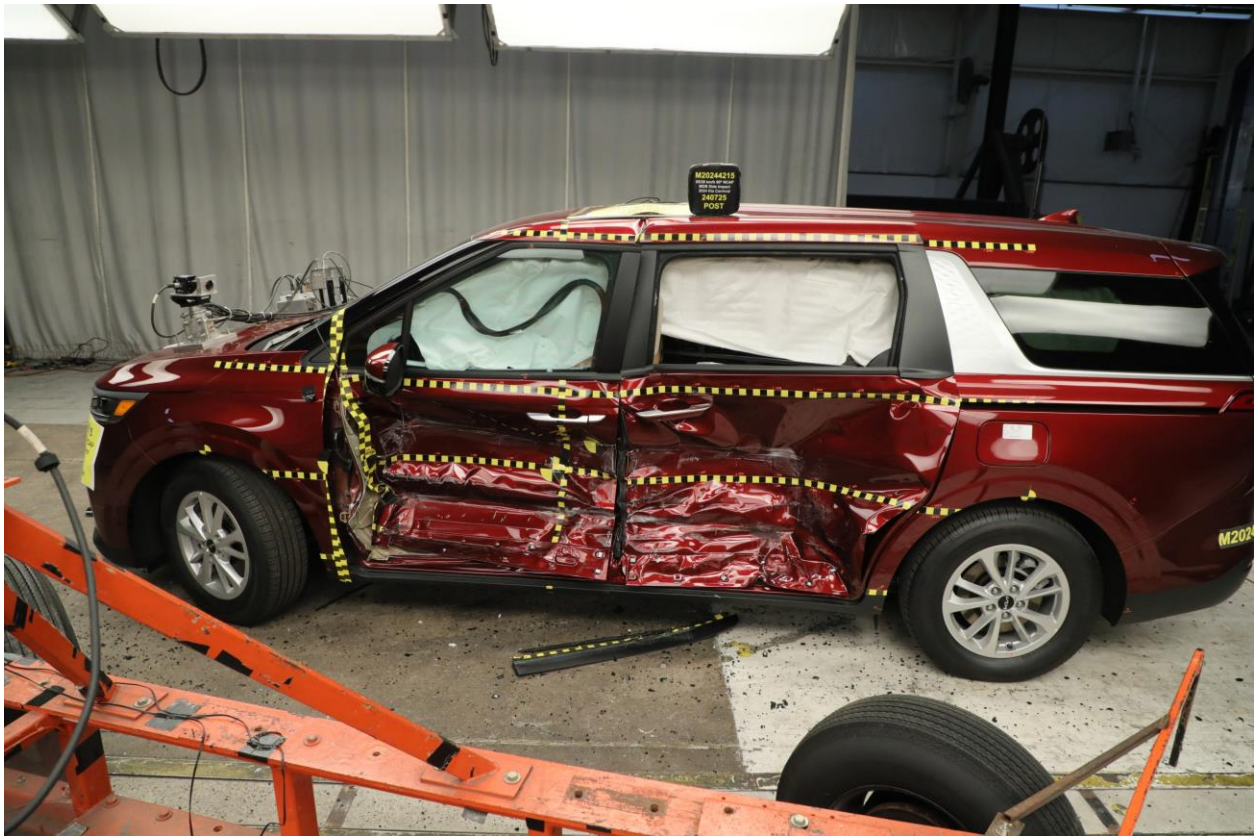
005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



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



021 Pre-Test Left Front Door Latch Close-Up



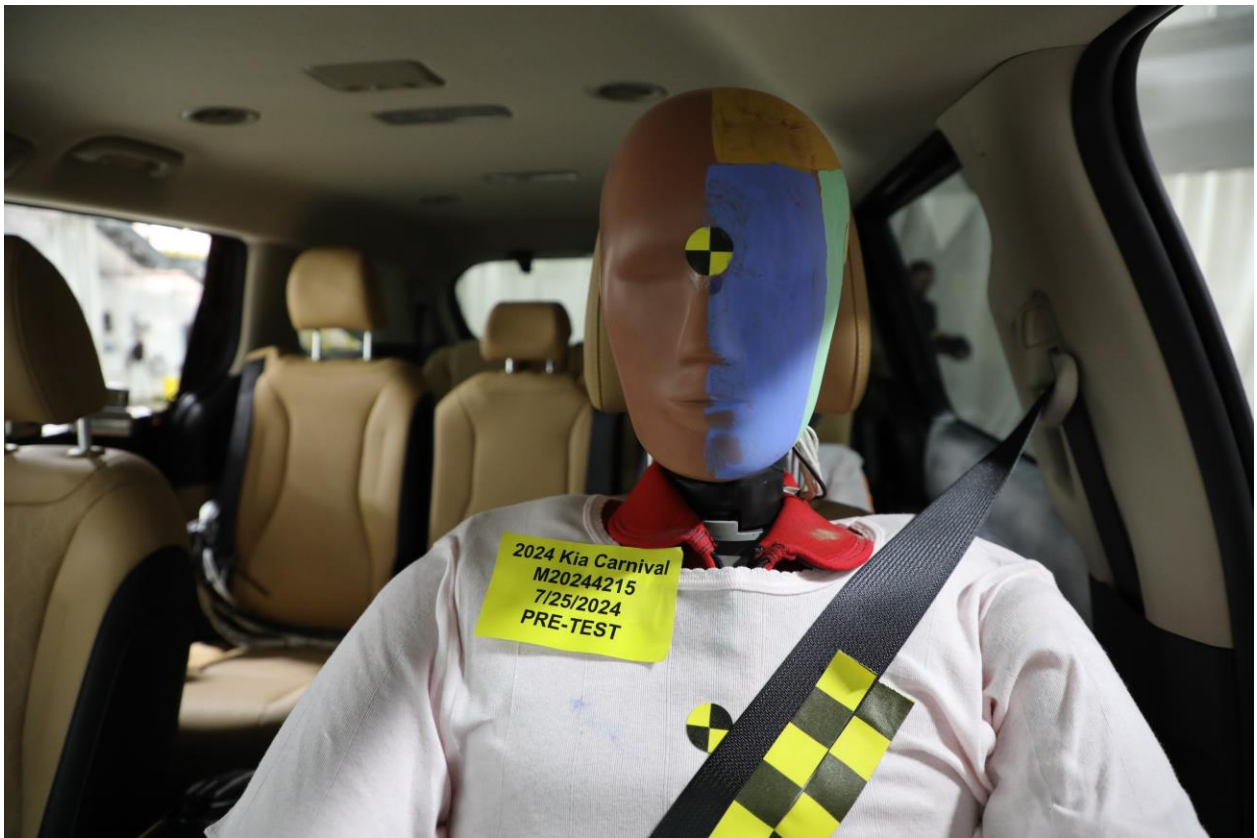
022 Post-Test Left Front Door Latch Close-Up



023 Pre-Test Left Rear Door Latch Close-Up



024 Post-Test Left Rear Door Latch Close-Up



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



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



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

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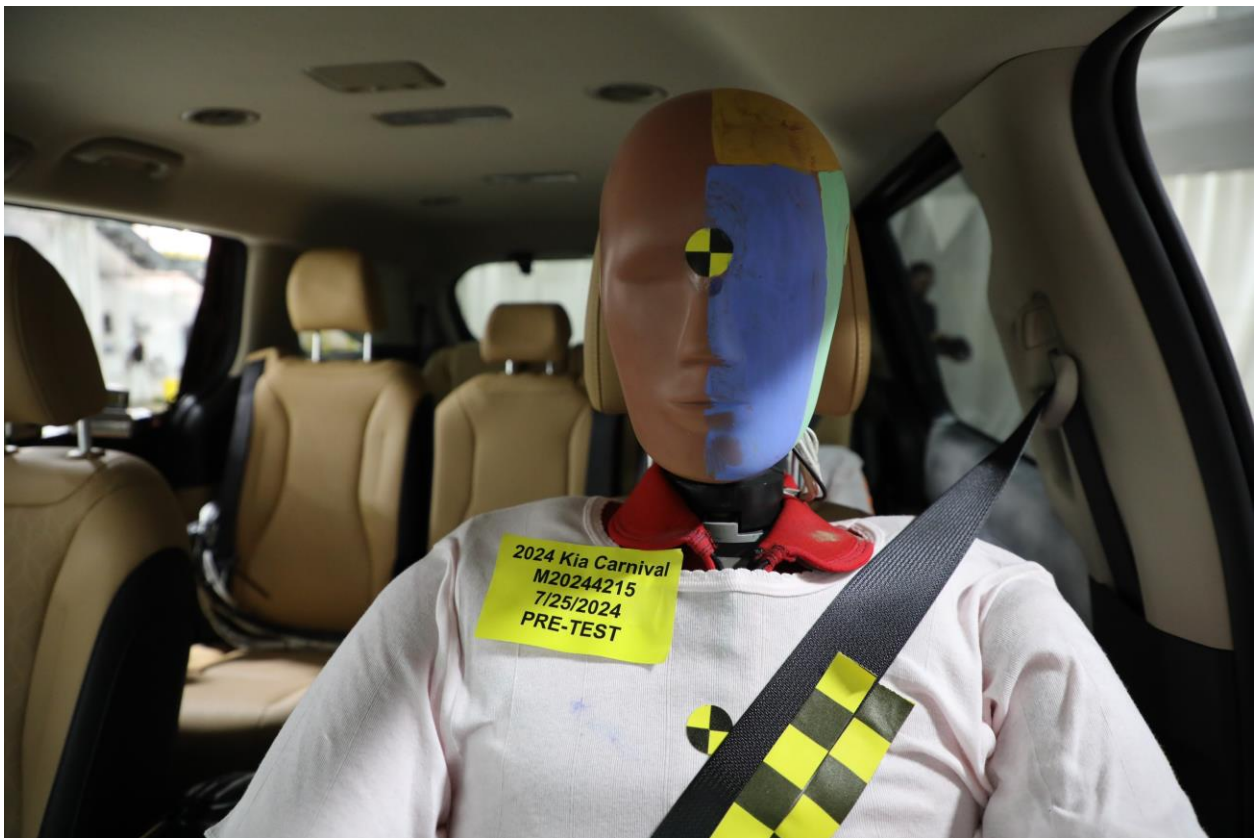
028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



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



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



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



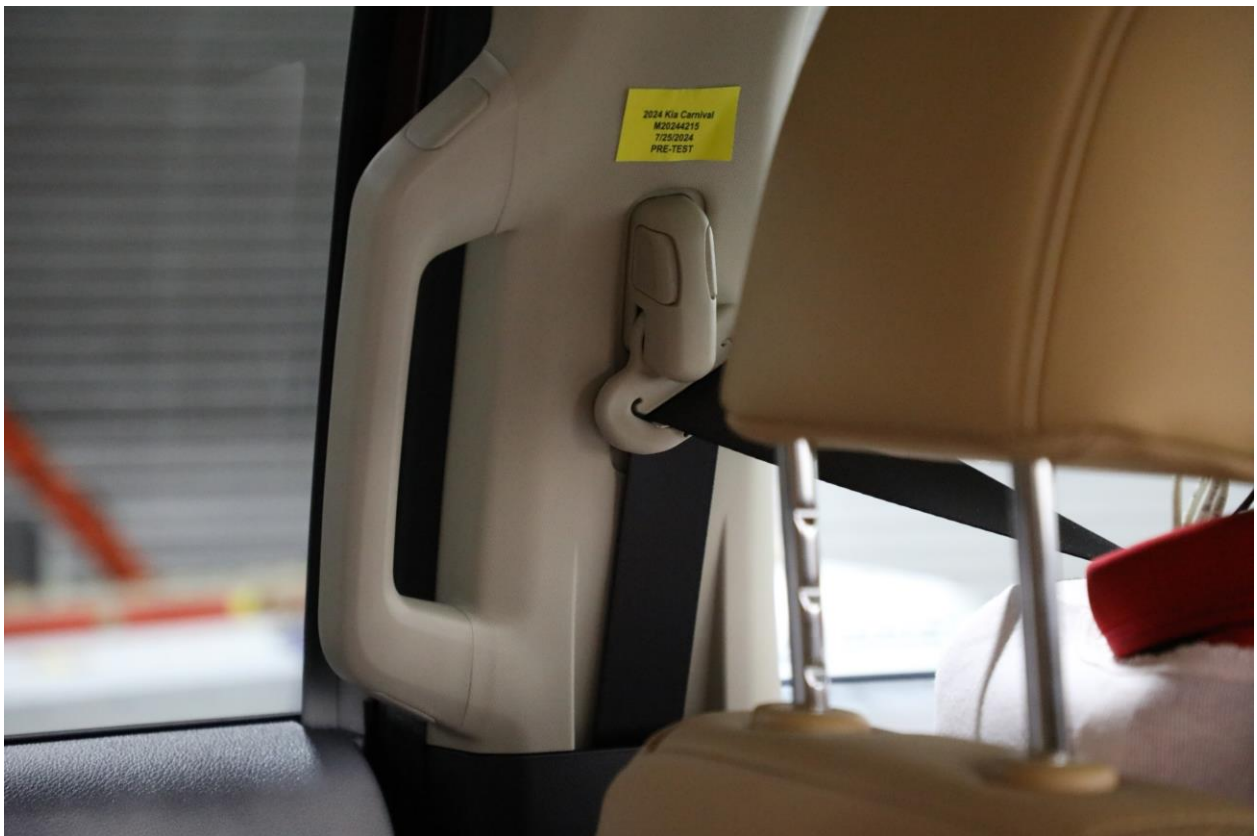
032 Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



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



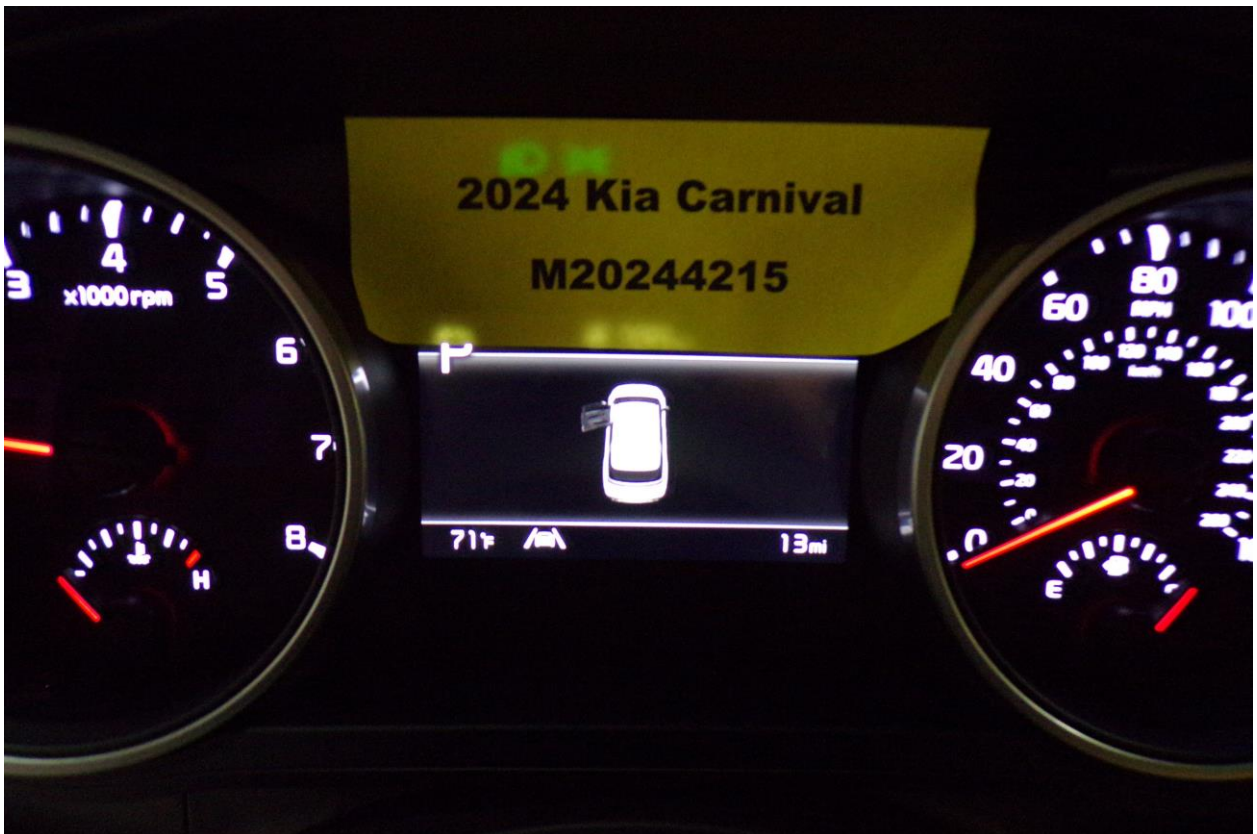
034 Pre-Test Placement of Driver's Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



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



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



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



042 Pre-Test Driver Dummy and Door Clearance View



043 Post-Test Driver Dummy and Door Clearance View



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



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



046 Pre-Test Driver Inner Door Panel View



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



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



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



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



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



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



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



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



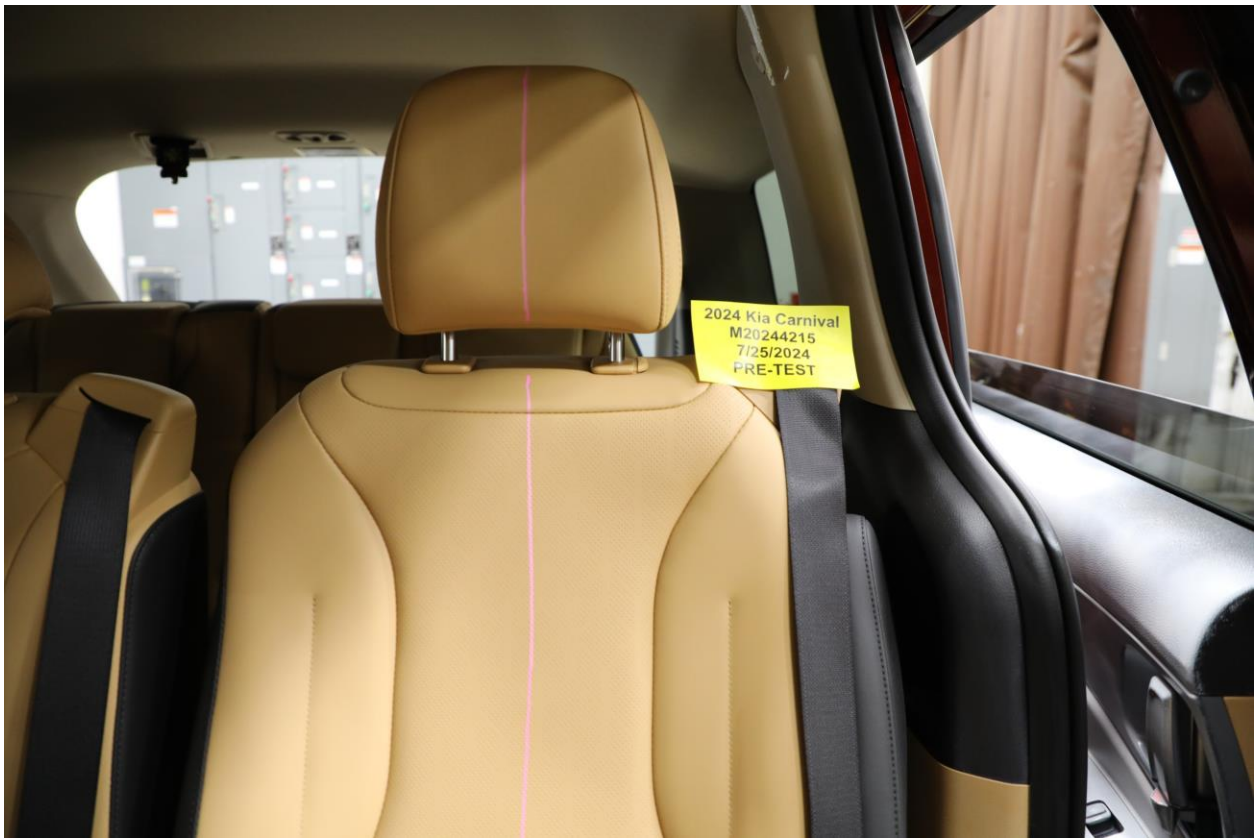
055 Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking



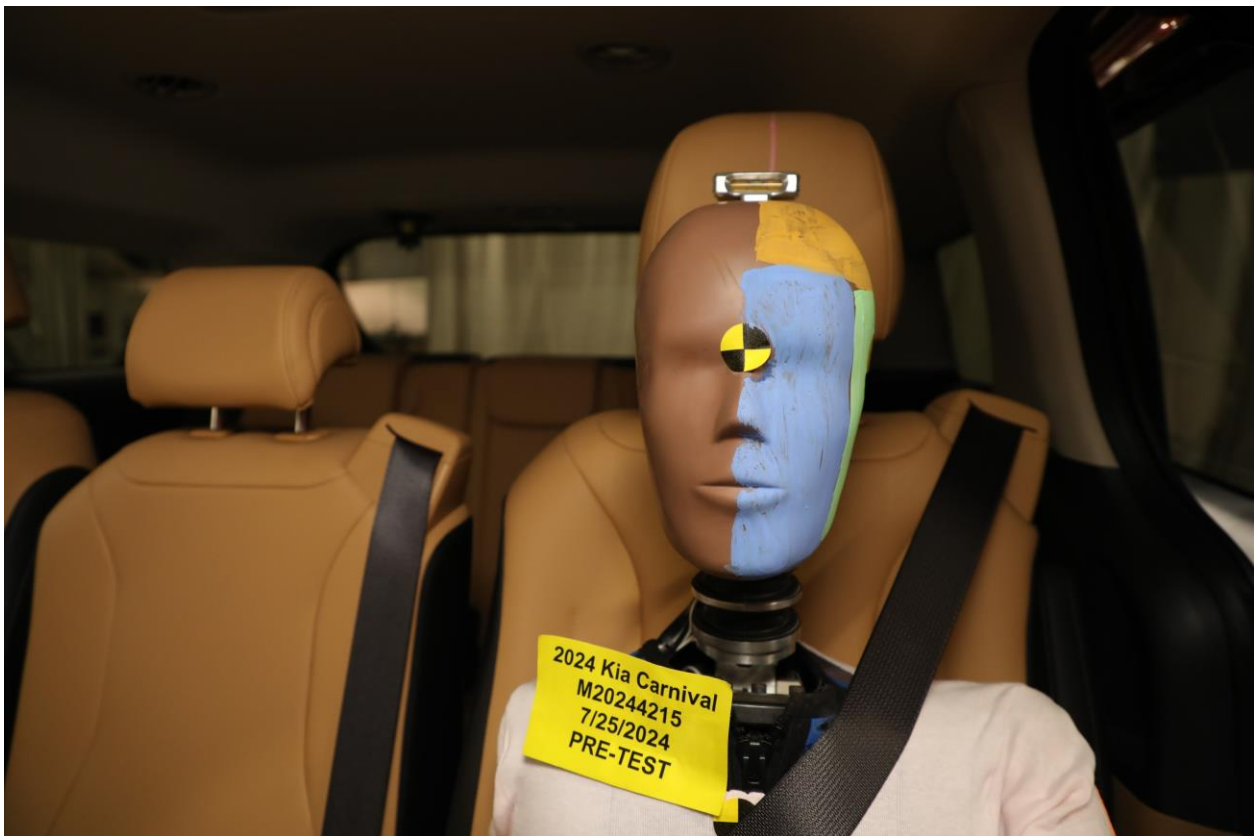
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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



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



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



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



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



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



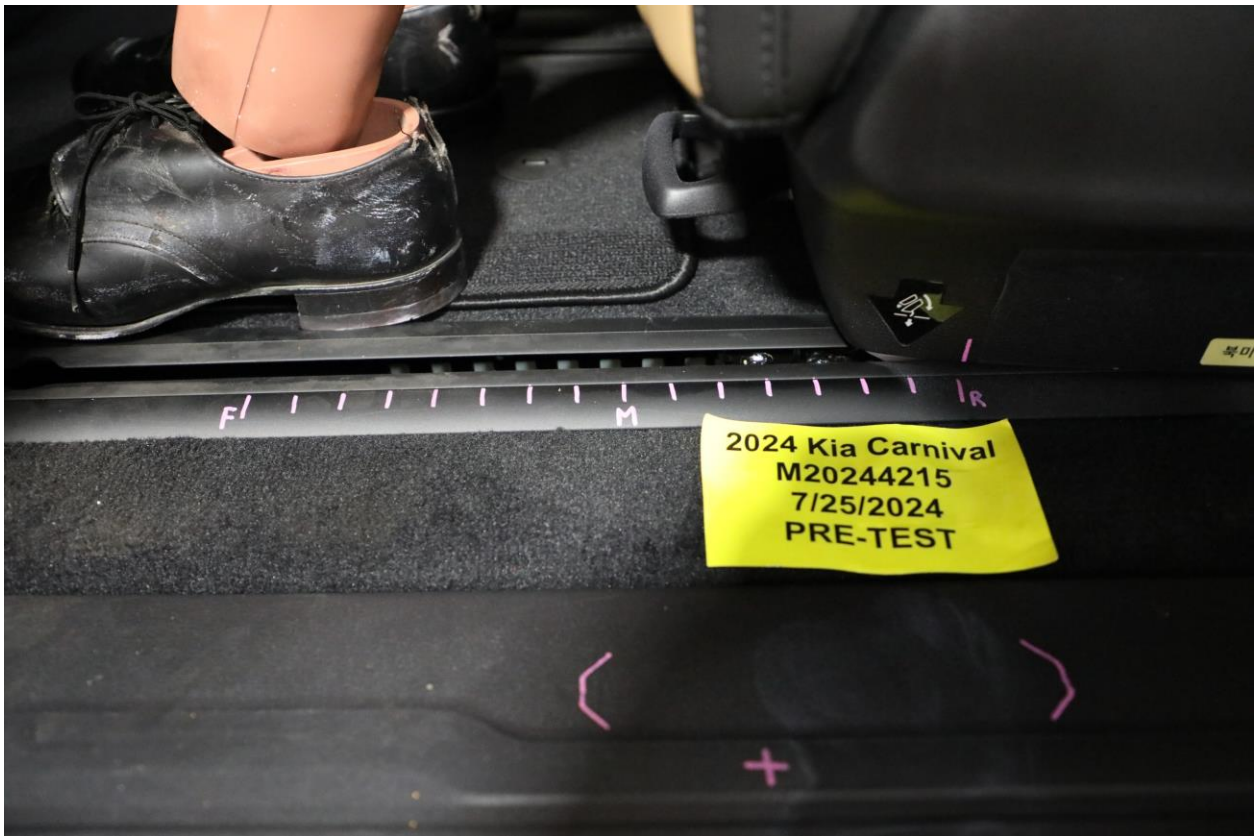
063 Pre-Test View of Rear Passenger Dummy's Head Showing Dummy Head is Level



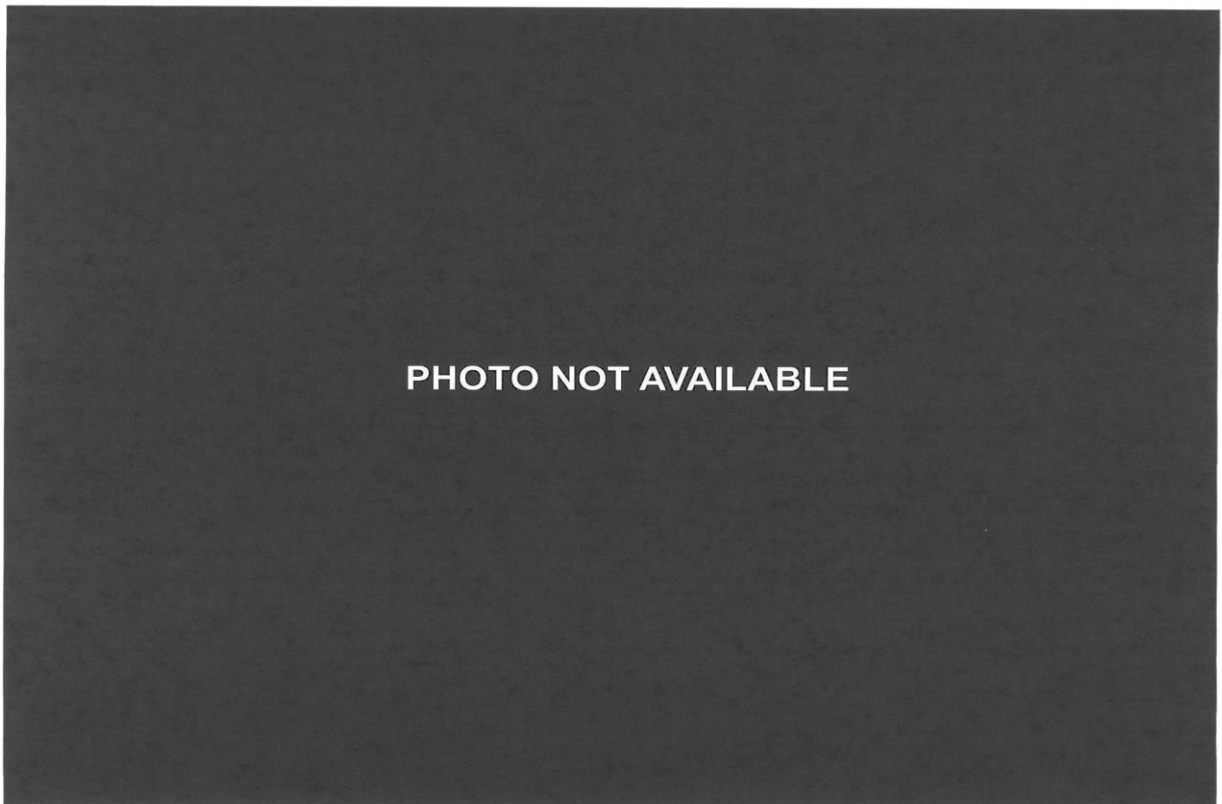
064 Pre-Test Placement of Rear Passenger Dummy's Feet



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



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

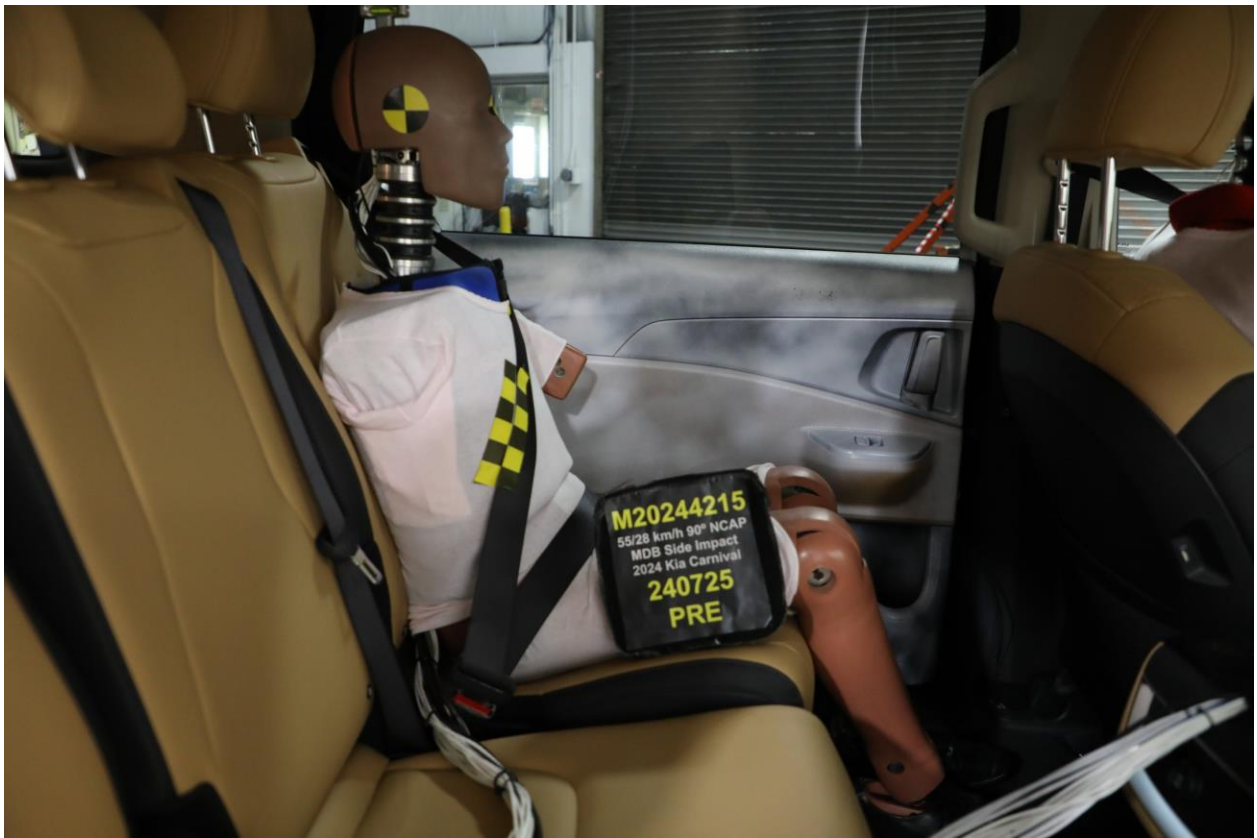
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069 Pre-Test Rear Passenger Dummy and Door Clearance View



070 Post-Test Rear Passenger Dummy and Door Clearance View



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



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



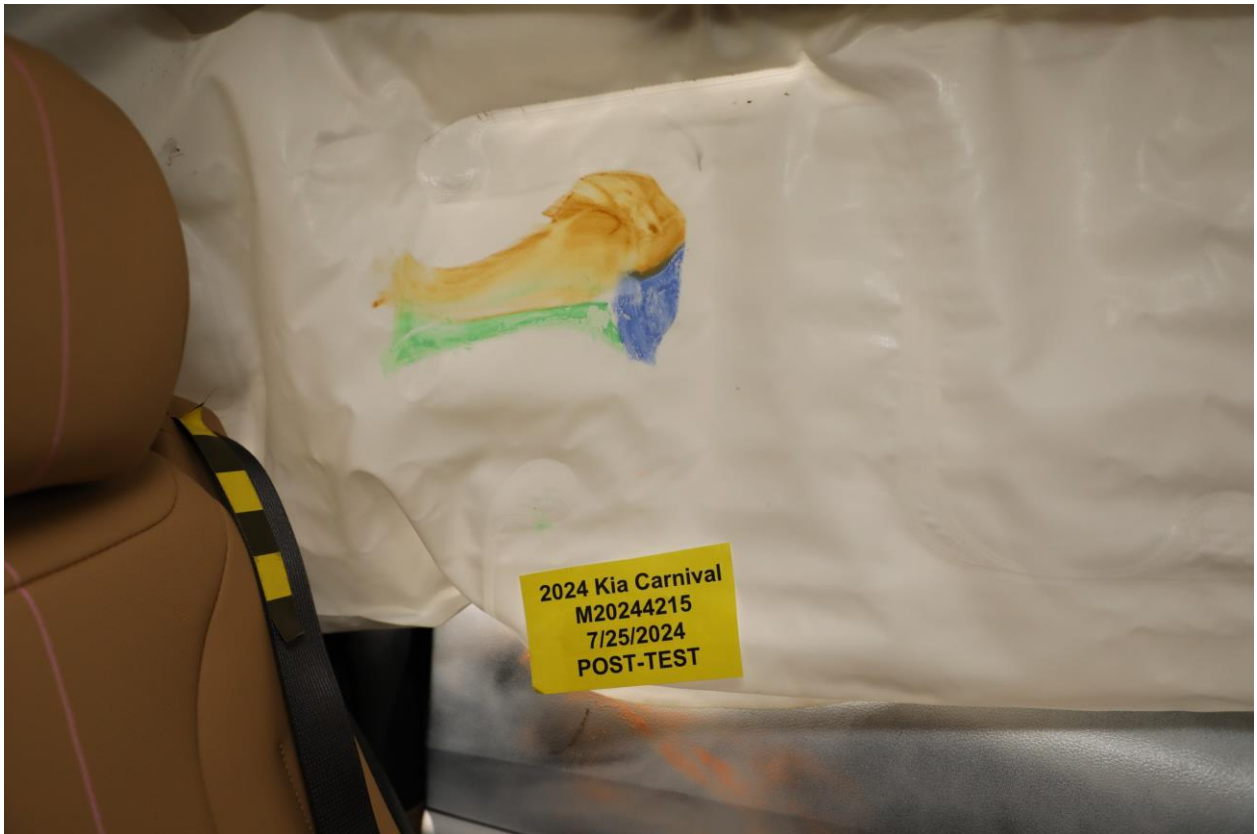
073 Pre-Test Rear Passenger Inner Door Panel View



074 Post-Test Rear Passenger Inner Door Panel View

PHOTO NOT APPLICABLE

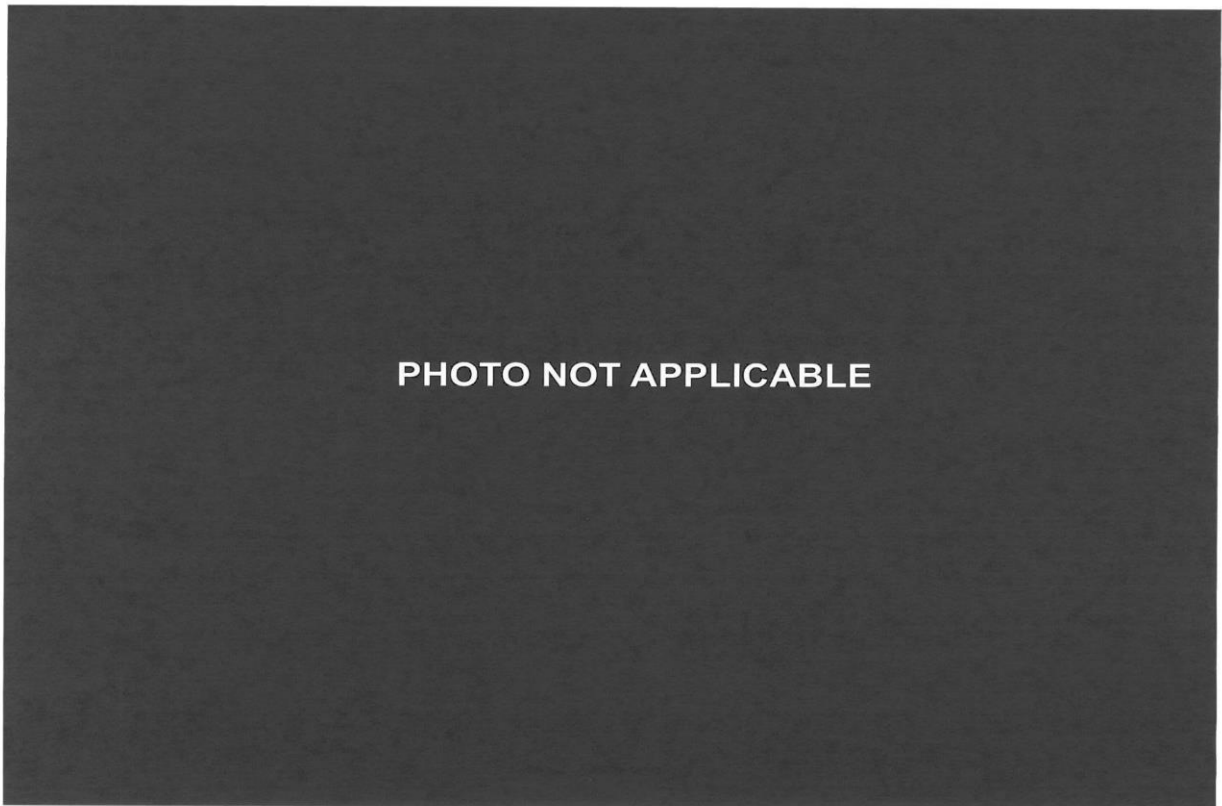
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



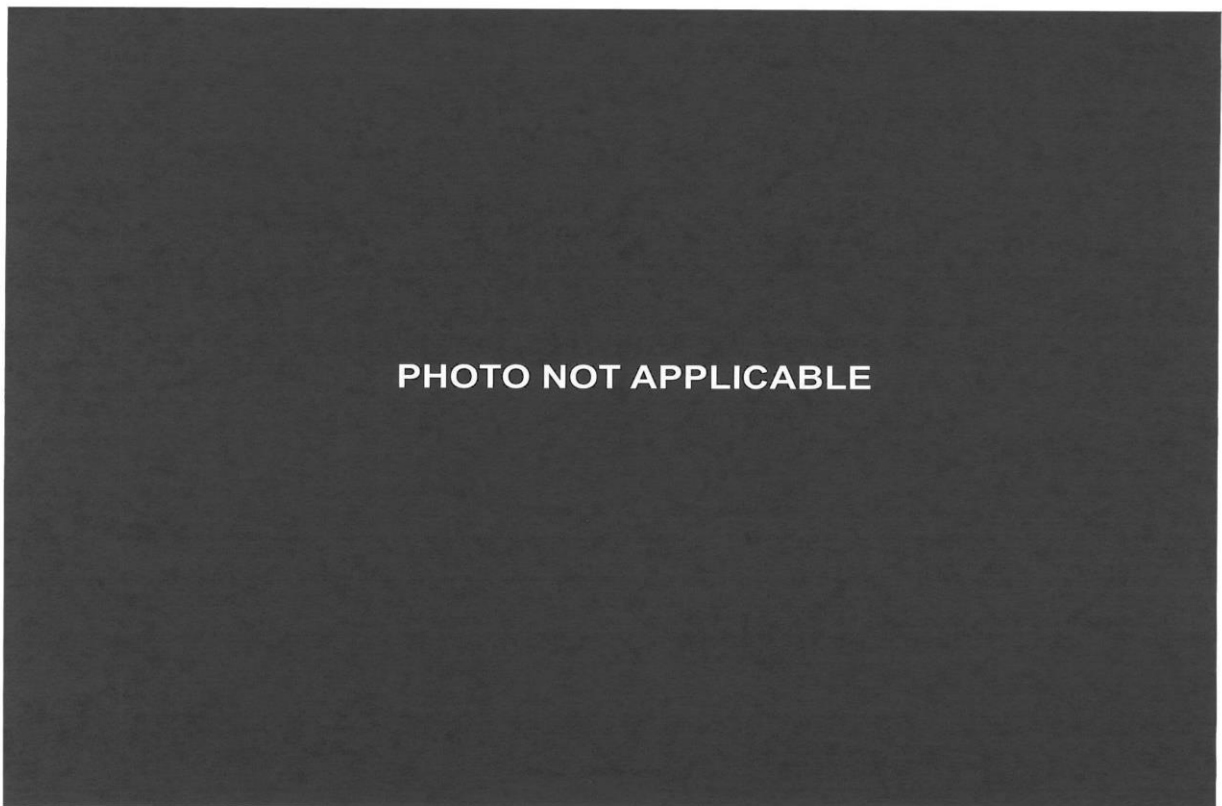
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



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



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



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

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



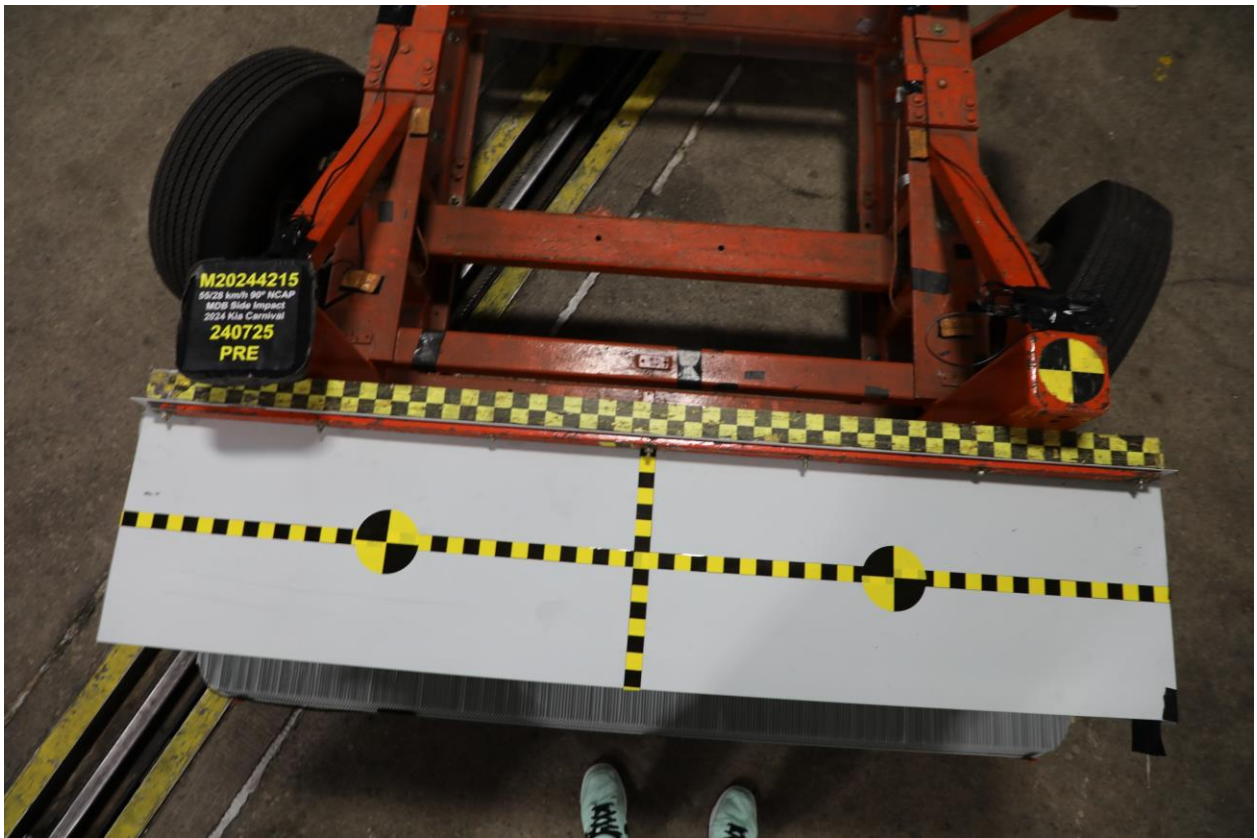
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



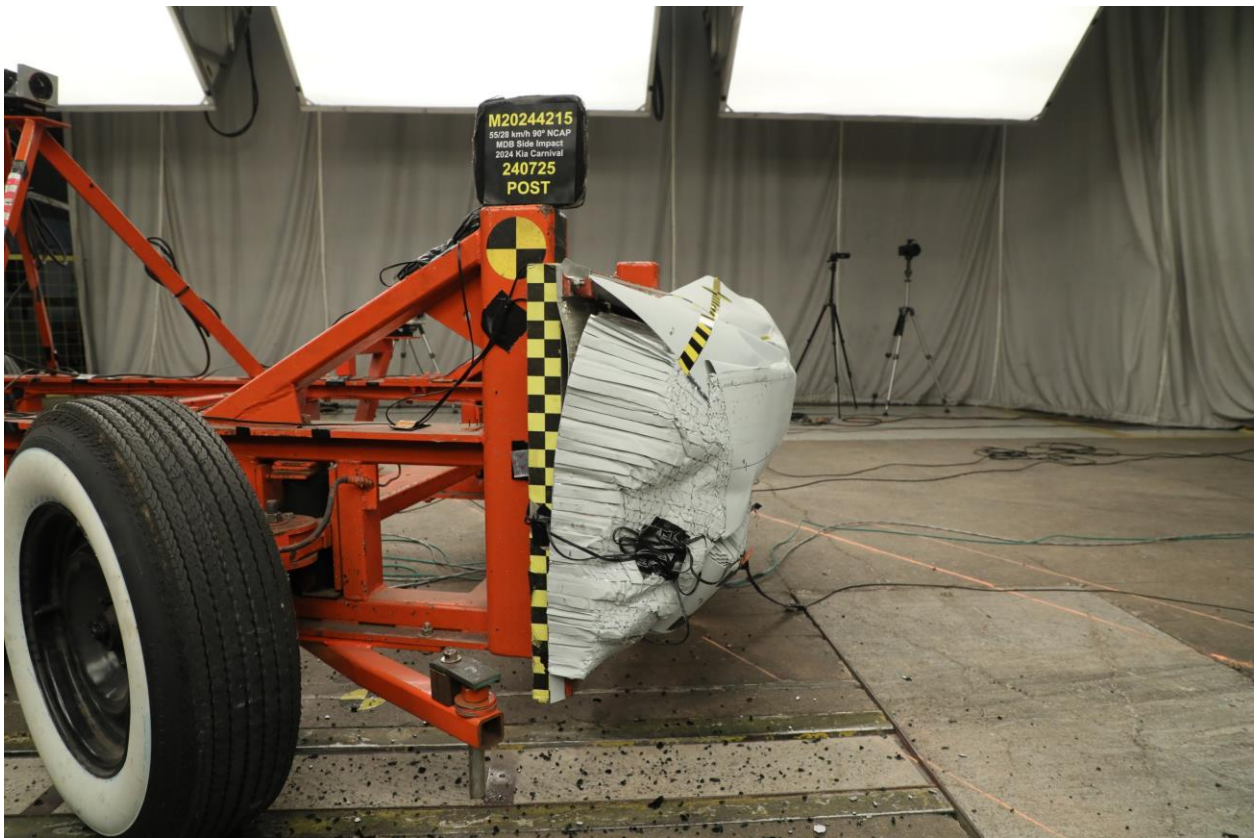
088 Pre-Test Left Side View of MDB Impactor Face



089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle's Certification Label



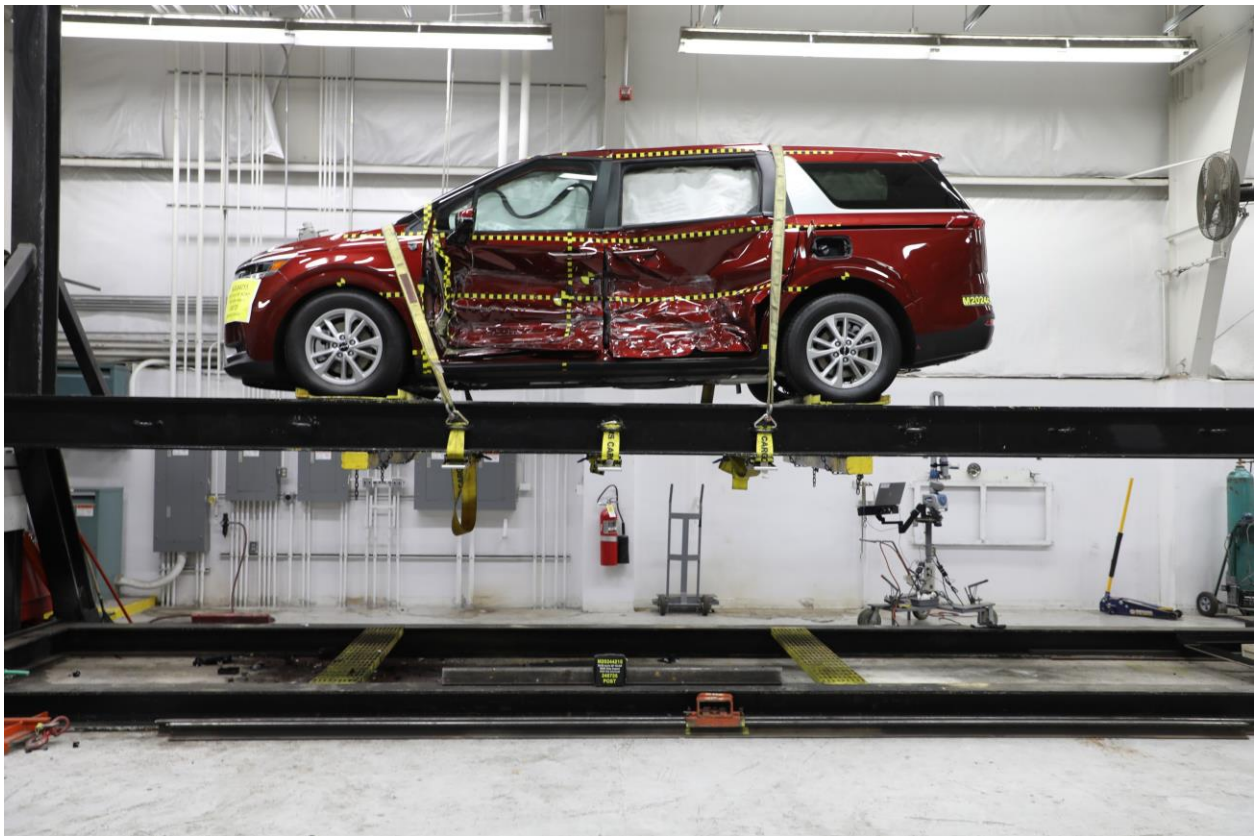
093 Close-Up View of Vehicle's Tire Information Placard or Label



094 Pre-Test Ballast View



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



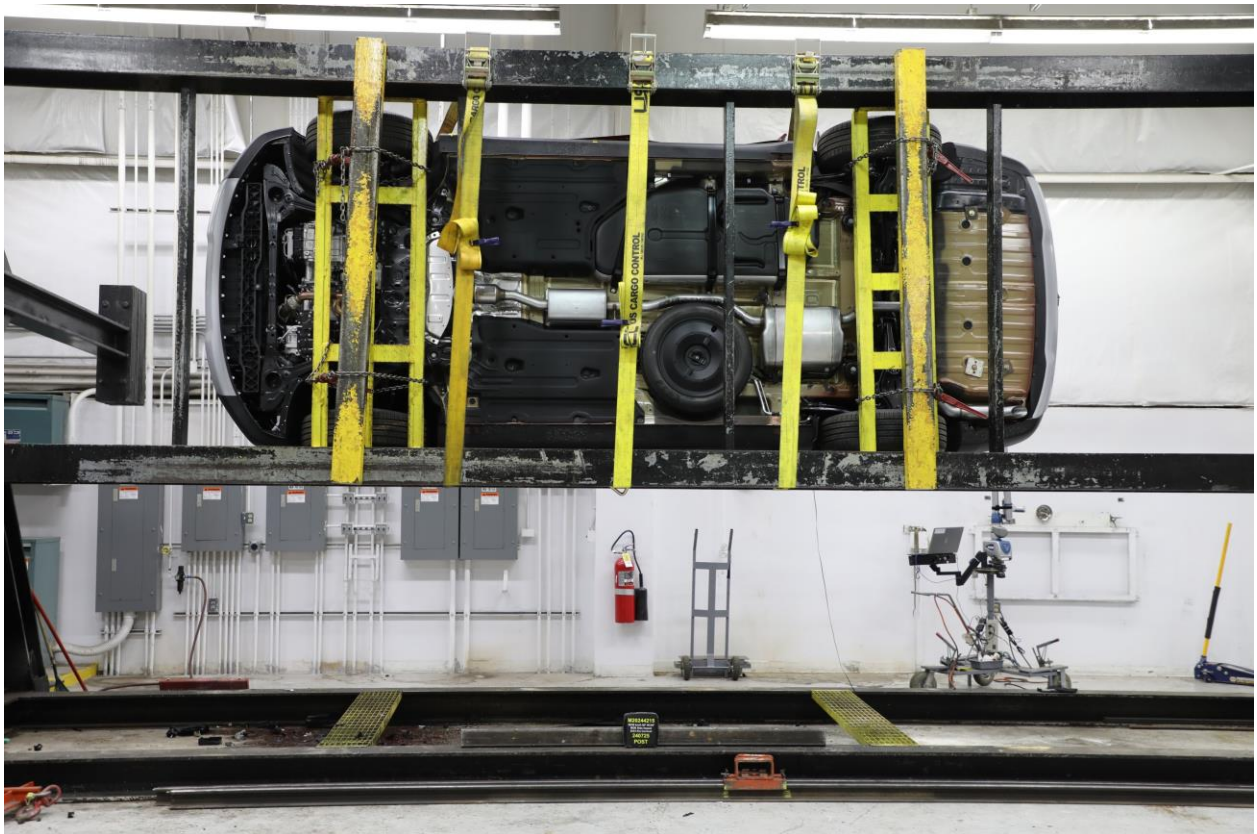
096 FMVSS No. 301 Static Rollover 0 Degrees



097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees



099 FMVSS No. 301 Static Rollover 270 Degrees

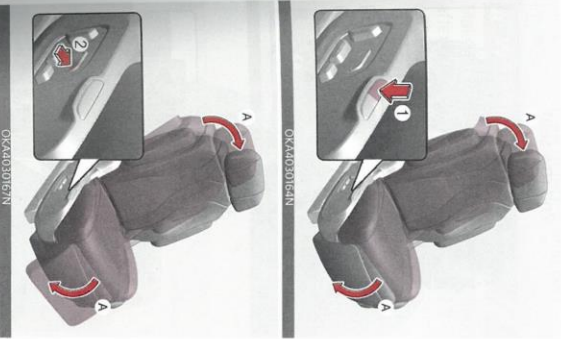


100 FMVSS No. 301 Static Rollover 360 Degrees



101 Impact Event

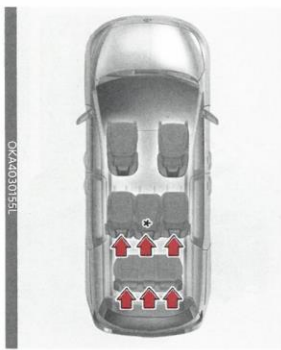
Return function



[A]: Moves simultaneously
If you push down the one touch switch (1), the seat will return to the previous position. If you push the switch (2), the seat will be slightly adjusted to the previous position.

Headrest (for rear seat)

The rear seats are equipped with headrests in all the seating positions for the occupant's safety and comfort.



* : 2nd-row center headrest for 8 seats

The headrest not only provides comfort for passengers, but also helps protect the head and neck in the event of a collision.

To maximize the effectiveness in case of accidents, the headrest should be adjusted so the middle of the headrest is as high as the center of gravity of an occupant's head. Generally, the center of gravity of most people's heads is similar with the height as the top of their eyes. Also, adjust the headrest as close to your head as possible. For this reason, the use of a cushion that holds the body away from the seatback is not recommended.

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

Test Lab: CTF

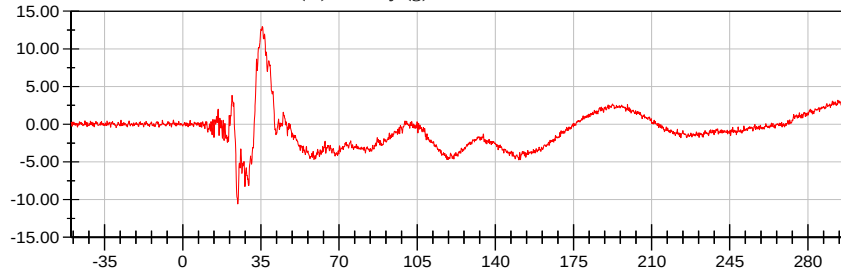
Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)

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



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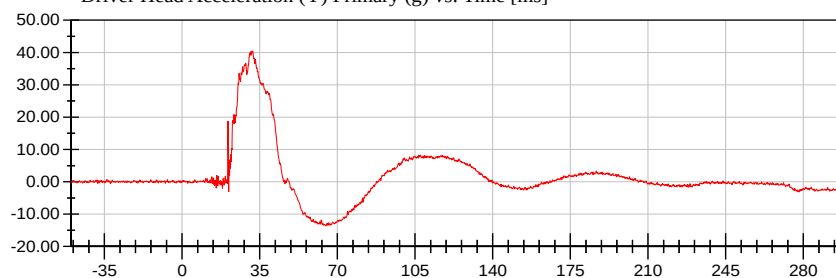
12.96 g at 35.60 ms

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-10.58 g at 24.64 ms

CFC_1000

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



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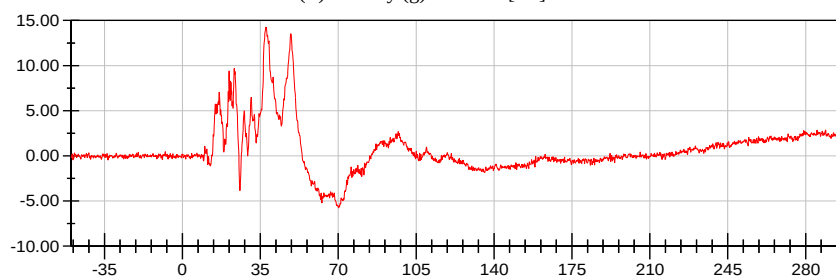
40.38 g at 31.60 ms

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-13.67 g at 64.80 ms

CFC_1000

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



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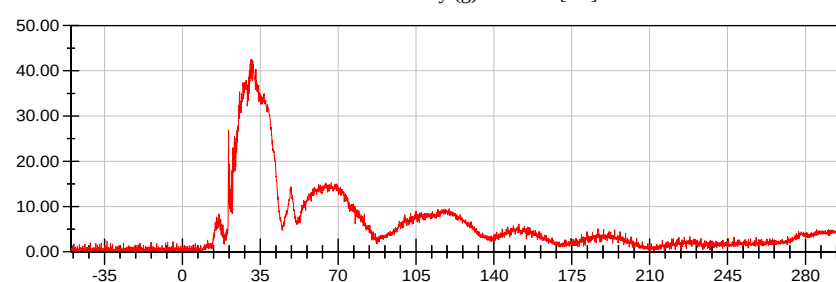
14.26 g at 37.52 ms

<Min>

-5.76 g at 70.24 ms

CFC_1000

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



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42.53 g at 30.88 ms

<Min>

0.09 g at -43.28 ms

Prefiltered_> CFC 1000



NHTSA

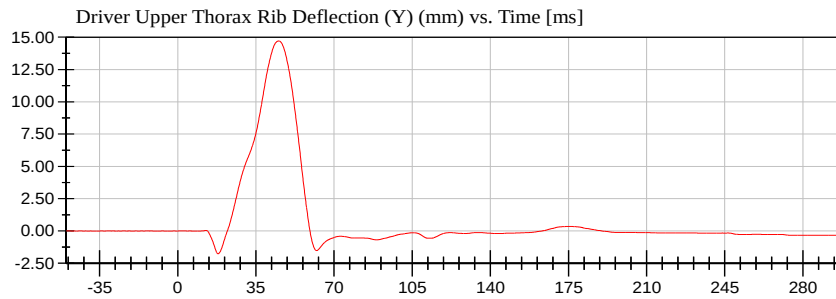
Test Lab: CTF

Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)



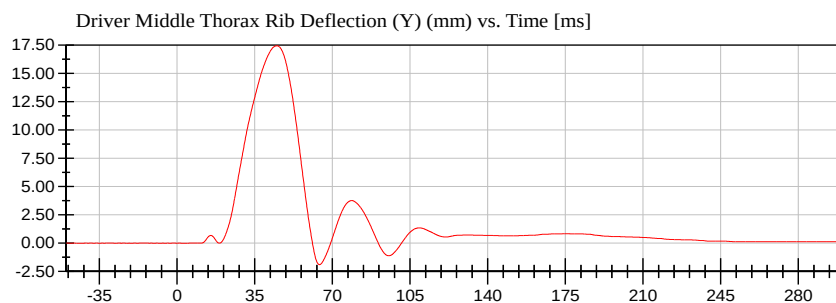
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14.71 mm at 45.20 ms

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-1.76 mm at 18.08 ms

CFC_180



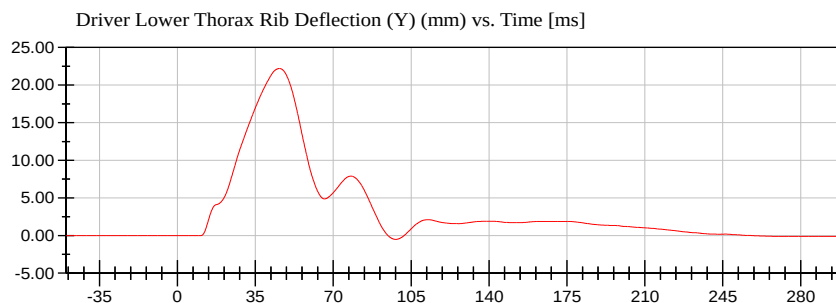
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17.45 mm at 45.04 ms

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-1.90 mm at 64.16 ms

CFC_180



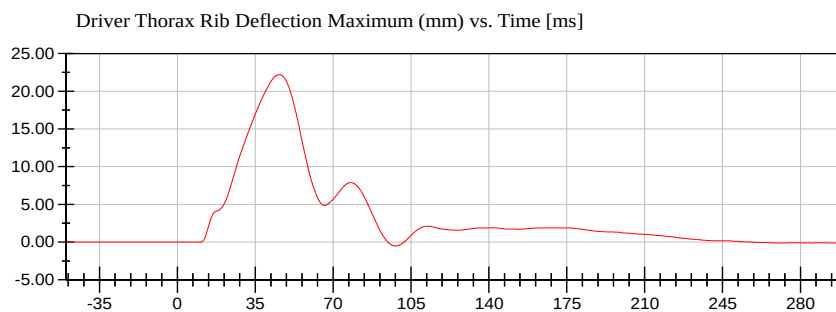
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22.19 mm at 45.84 ms

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-0.51 mm at 98.08 ms

CFC_180



<Max>

22.19 mm at 45.84 ms

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-0.51 mm at 98.08 ms

CFC_180



NHTSA

Test Lab: CTF

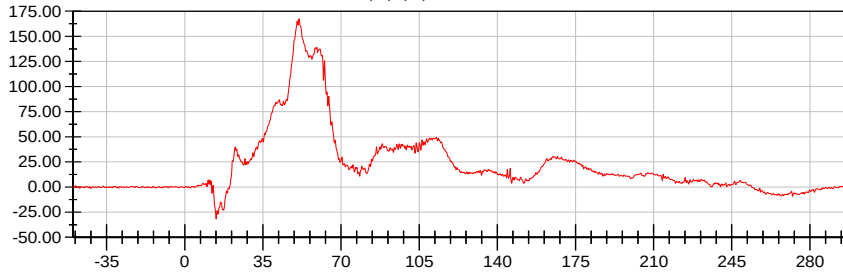
Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)

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



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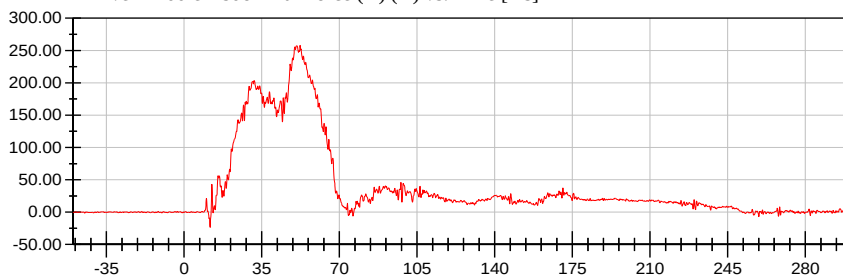
167.56 N at 51.20 ms

<Min>

-31.60 N at 14.08 ms

CFC_600

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



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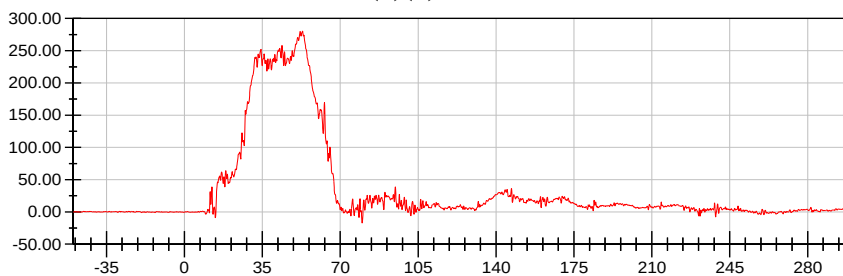
257.80 N at 52.32 ms

<Min>

-23.68 N at 11.76 ms

CFC_600

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



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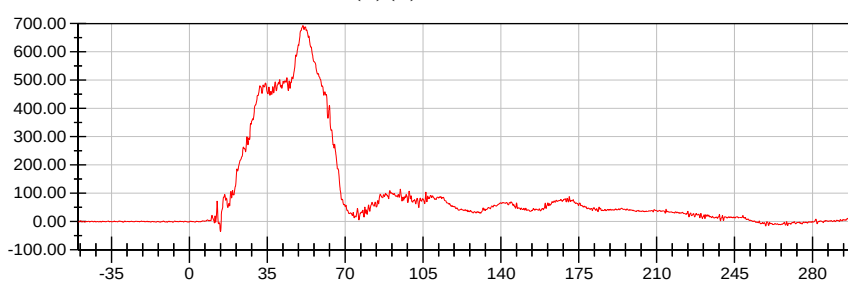
280.34 N at 53.04 ms

<Min>

-17.15 N at 79.84 ms

CFC_600

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



<Max>

692.72 N at 51.04 ms

<Min>

-35.25 N at 14.00 ms

CFC_600



NHTSA

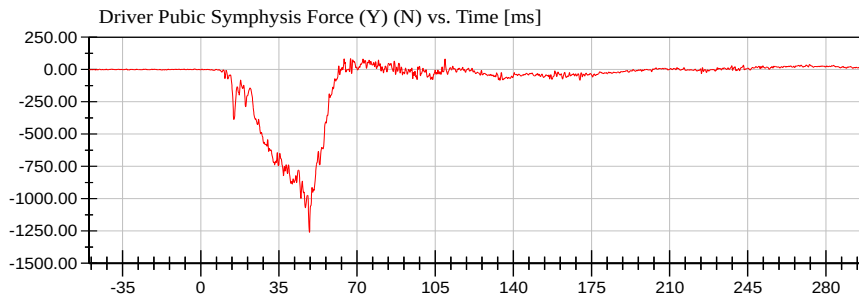
Test Lab: CTF

Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)



<Max>

83.88 N at 67.12 ms

<Min>

-1,259.84 N at 48.64 ms

CFC_600



NHTSA

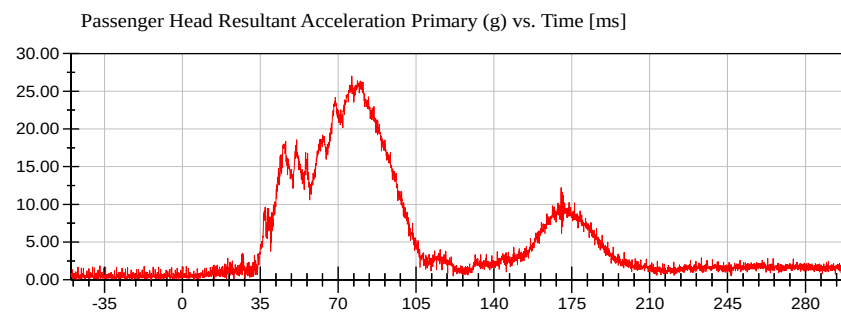
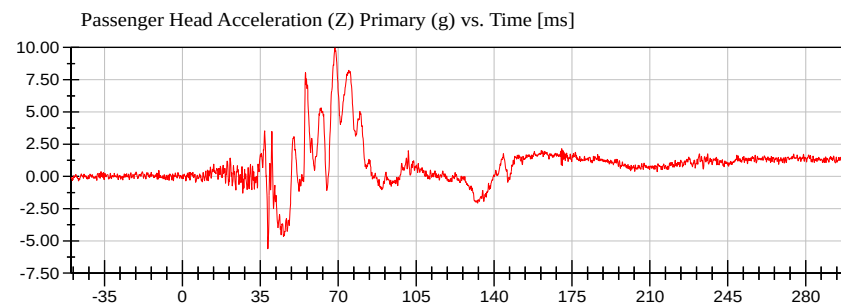
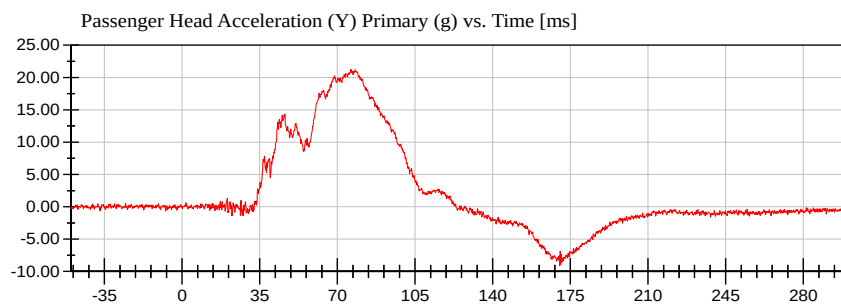
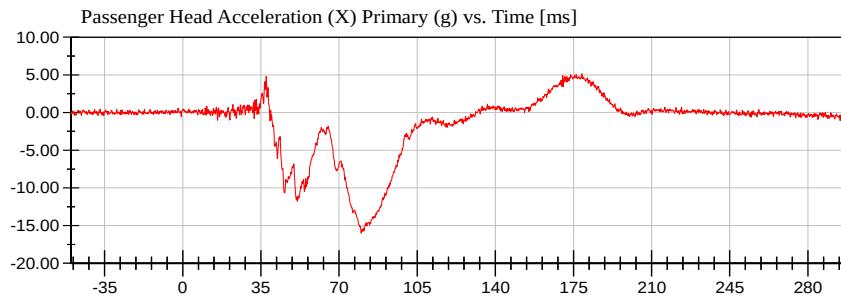
Test Lab: CTF

Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)



NHTSA

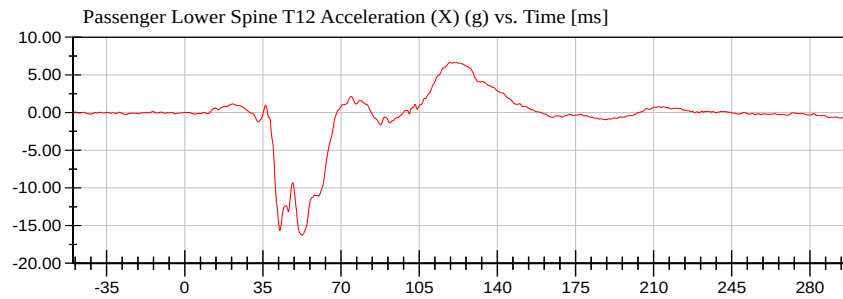
Test Lab: CTF

Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)

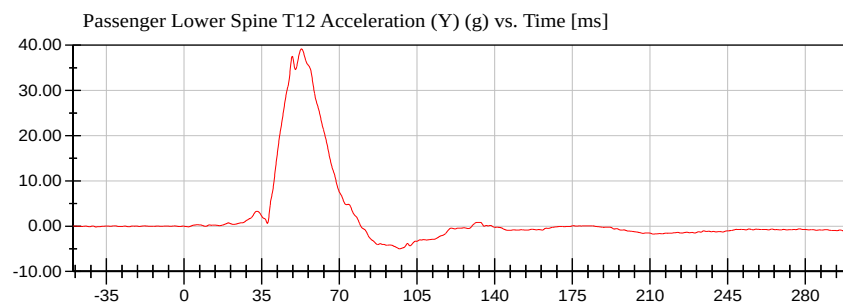


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6.65 g at 121.28 ms

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-16.25 g at 52.64 ms

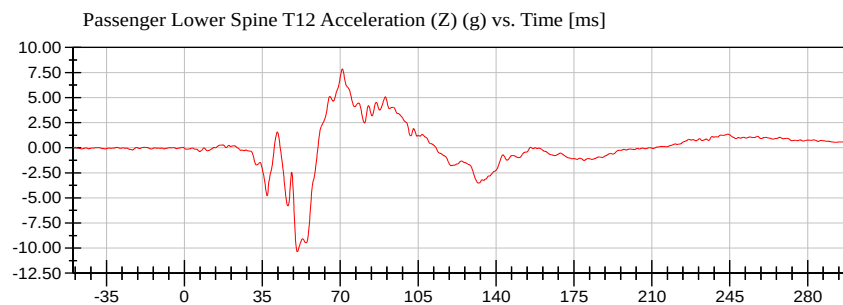


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39.18 g at 52.96 ms

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-5.00 g at 97.12 ms

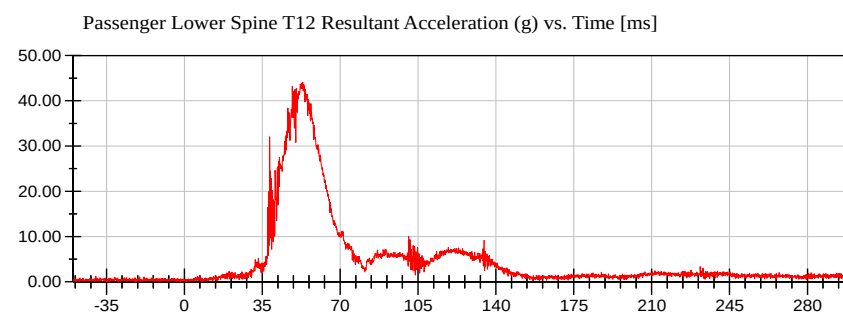


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7.85 g at 70.96 ms

<Min>

-10.36 g at 50.72 ms



<Max>

44.11 g at 53.20 ms

<Min>

0.04 g at -47.44 ms



NHTSA

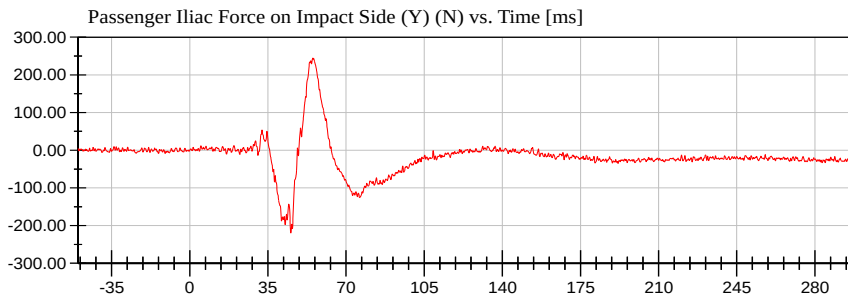
Test Lab: CTF

Test Number: 240725 (M20244215)

Test Date: 07/25/2024

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

Position #4 SID IIs Dummy (DQ0570)



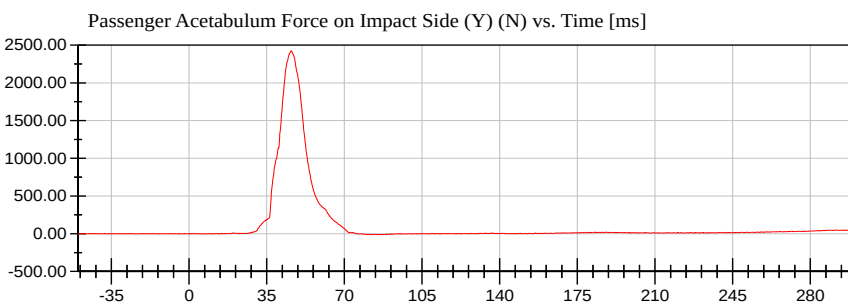
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244.43 N at 55.12 ms

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-219.65 N at 45.28 ms

CFC_600



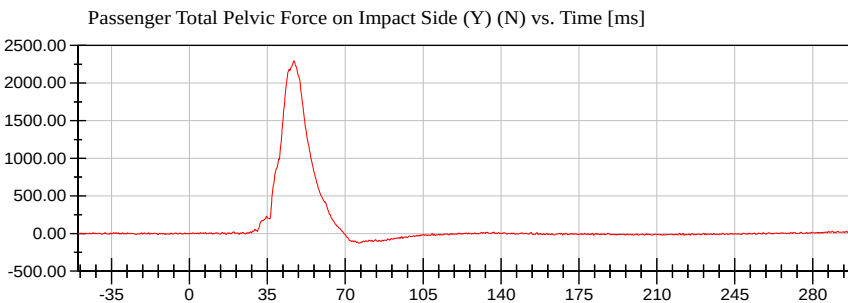
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2,427.22 N at 46.00 ms

<Min>

-13.02 N at 82.72 ms

CFC_600



<Max>

2,295.08 N at 46.96 ms

<Min>

-129.11 N at 76.08 ms

CFC_600

TRC

APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3 Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax – Upper Rib Drop Test

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

Table 6. Thorax – Middle Rib Drop Test

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

Table 7. Thorax – Lower Rib Drop Test

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

Table 8. Thorax – Full Body Impact Test

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

Table 9. Abdomen Impact Test

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

Table 10. Lumbar Spine Flexion Test

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

Table 11. Pelvis Impact Test

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

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

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

Table 3. Lateral Neck Pendulum Test

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

Table 4. Shoulder Impact Test

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

Table 5. Thorax (With Arm) Impact Test

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

Table 6. Thorax (Without Arm) Impact Test

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

Table 7. Abdomen Impact Test

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

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

Table 9. Pelvis Acetabulum Impact Test

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

Table 10. Pelvis Iliac Impact Test

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

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 94-1

Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	68 %	Yes
Peak Resultant Acceleration	125 - 155 g	141.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.7 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	4.08 %	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

07.01.2024 11:37:31 361

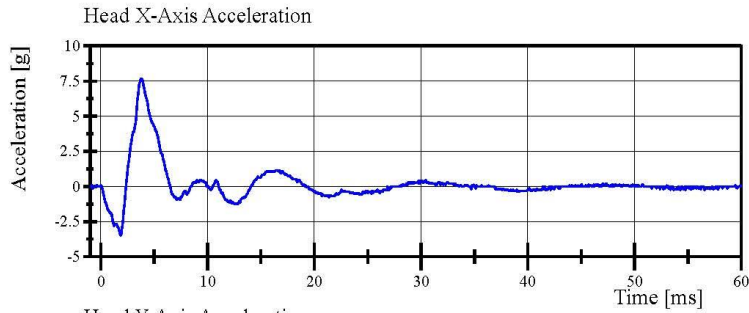


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 94-1

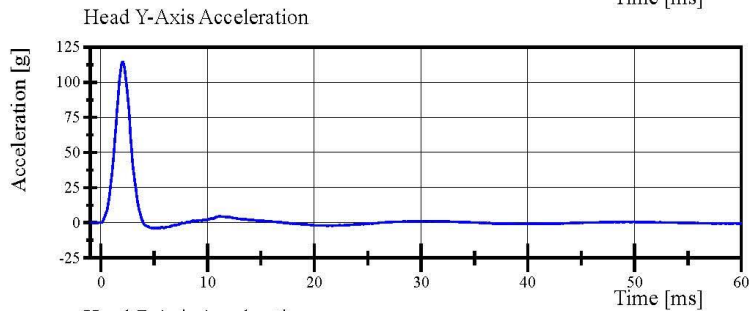
Test Date: 7/1/2024



Filter Class: CFC_1000

Max: 7.7 g at 3.8 ms

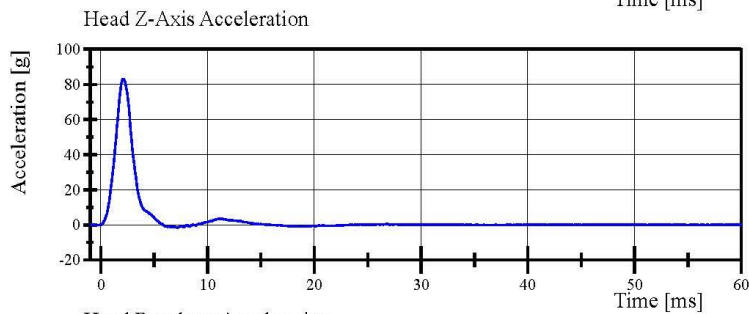
Min: -3.5 g at 1.8 ms



Filter Class: CFC_1000

Max: 114.7 g at 2.1 ms

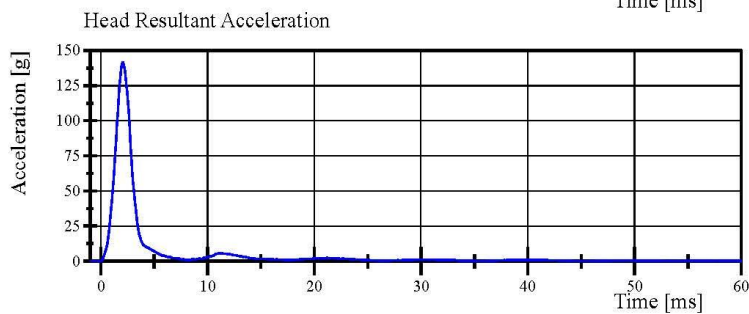
Min: -3.9 g at 5.1 ms



Filter Class: CFC_1000

Max: 83.1 g at 2.1 ms

Min: -1.4 g at 7.2 ms



Filter Class: CFC_1000

Max: 141.7 g at 2.1 ms

Min: 0.0 g at -0.6 ms

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

07.01.2024 11:38:04 361



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 94-2

Test Date: 7/2/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.38 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-53.6 deg	Yes
Time of Peak	54 - 66 ms	56.7 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	55.5 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 05053

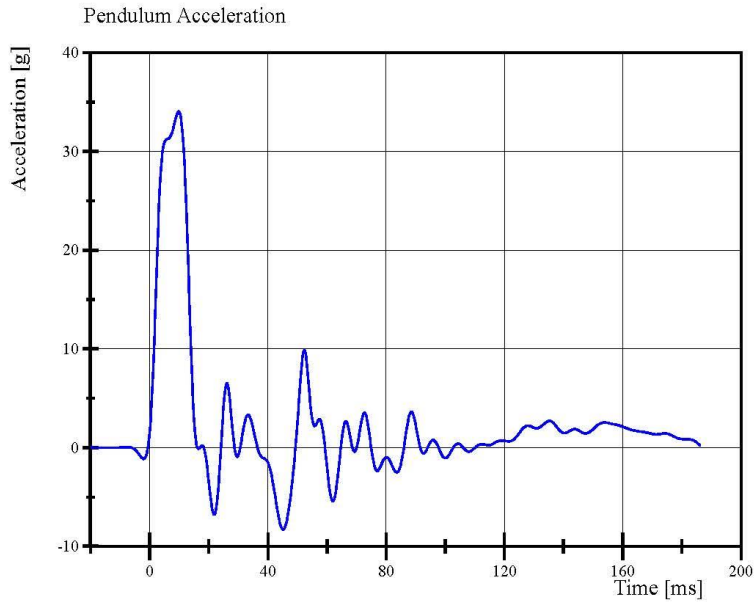
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.02.2024 10:50:29 1497

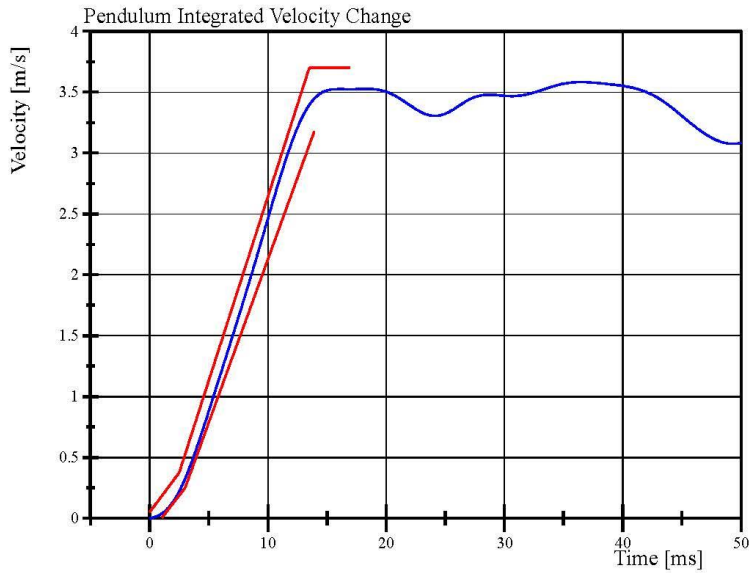


Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 94-2
Test Date: 7/2/2024



Filter Class: CFC_60
Max: 34.0 g at 9.8 ms
Min: -8.3 g at 45.1 ms



Filter Class: CFC_60
Max: 3.6 m/s at 36.5 ms
Min: 0.0 m/s at 0.0 ms

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

07.02.2024 10:51:32 1497

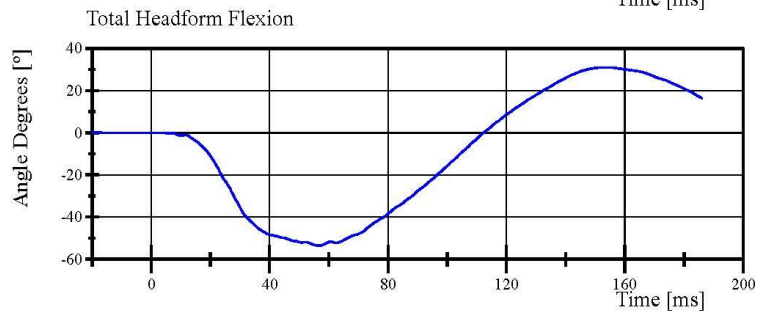
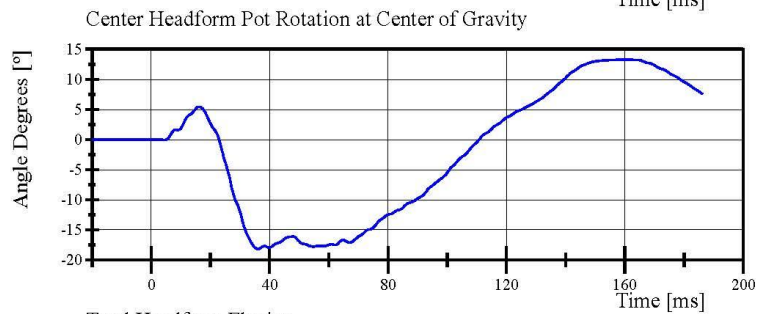
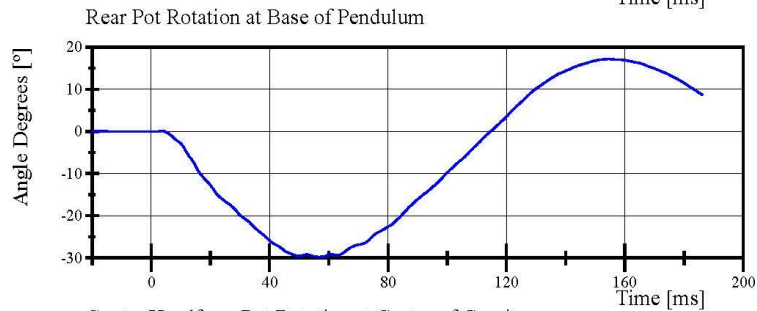
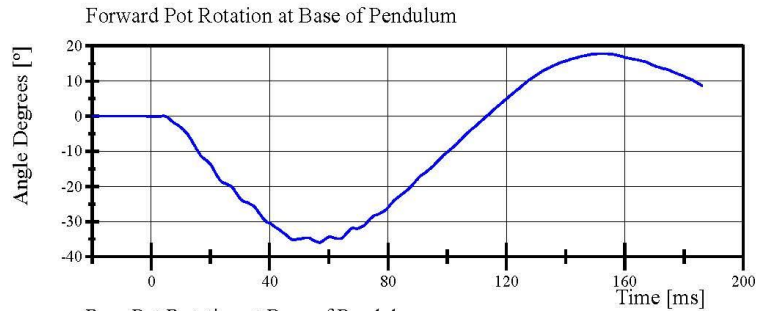


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 94-2

Test Date: 7/2/2024



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

07.02.2024 10:51:33 1497



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 95-6

Test Date: 7/3/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	68 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.10 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: 175-3501-07014

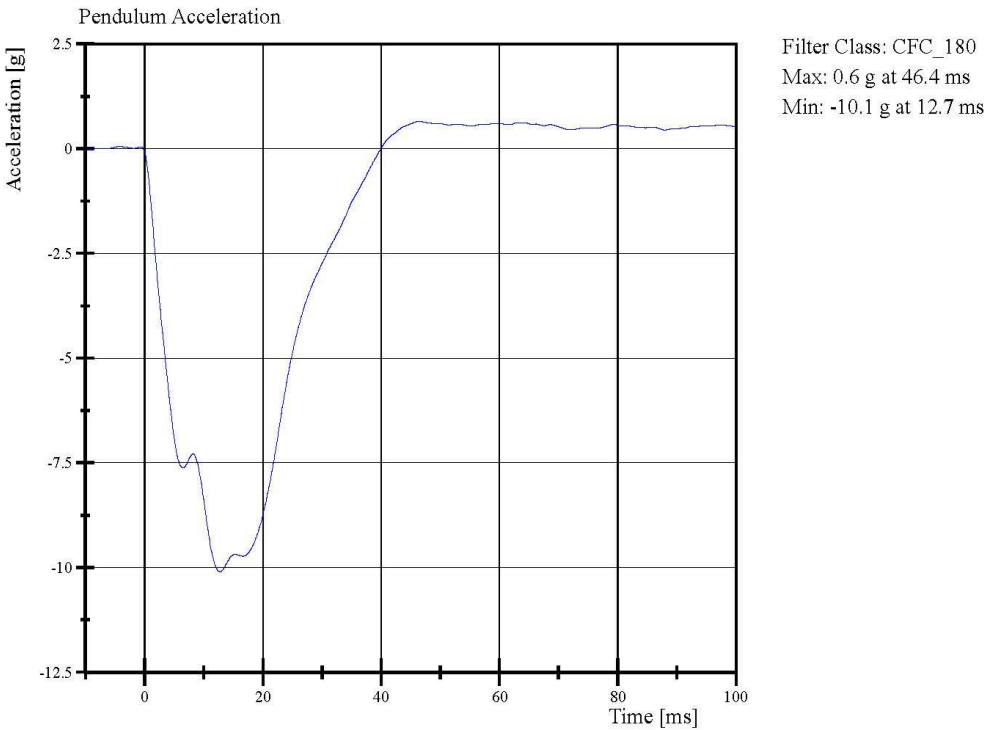
Specification Source: CFR49 Part 572 Sub part U
with Polarity in accordance with J211

07.03.2024 12:56:00 572



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 95-6
Test Date: 7/3/2024



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

07.03.2024 12:56:48 572



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	39.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Foam S/N: EK6973

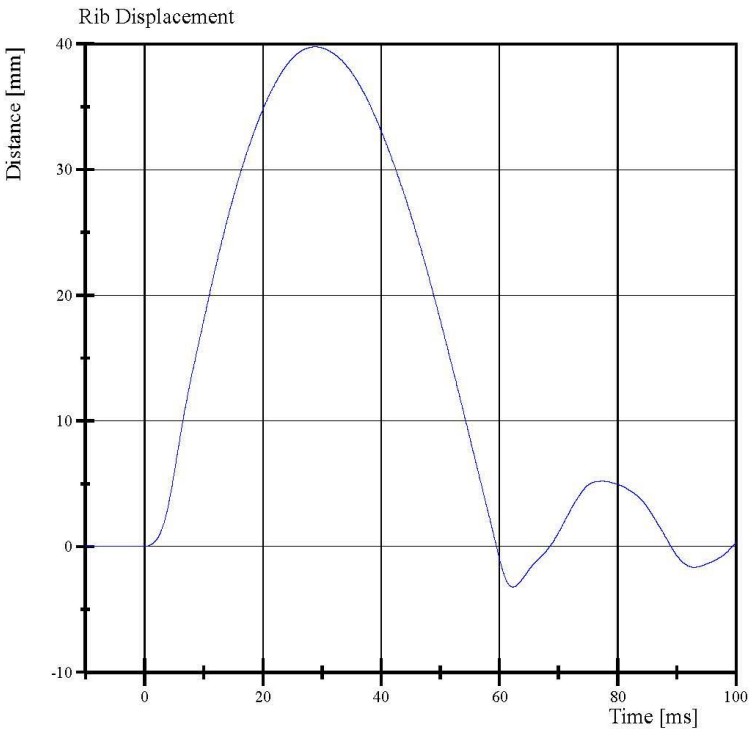
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.01.2024 13:05:32 604



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024



Filter Class: CFC_180
Max: 39.8 mm at 28.9 ms
Min: -3.2 mm at 62.3 ms

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

07.01.2024 13:05:52 604



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Foam S/N: EK6973

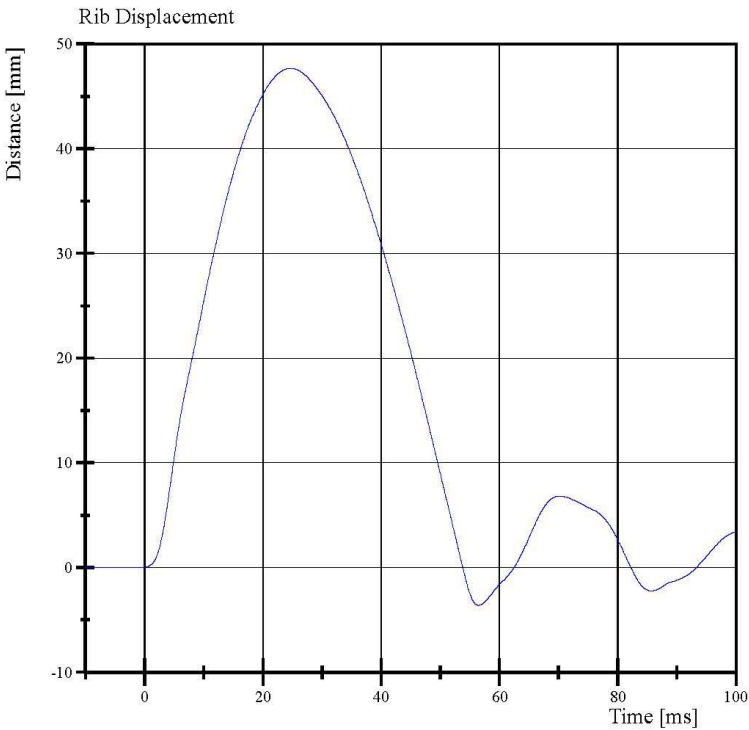
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.01.2024 12:53:13 524



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024



Filter Class: CFC_180
Max: 47.7 mm at 24.7 ms
Min: -3.6 mm at 56.4 ms

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

07.01.2024 12:53:47 524



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Foam S/N: EK6970

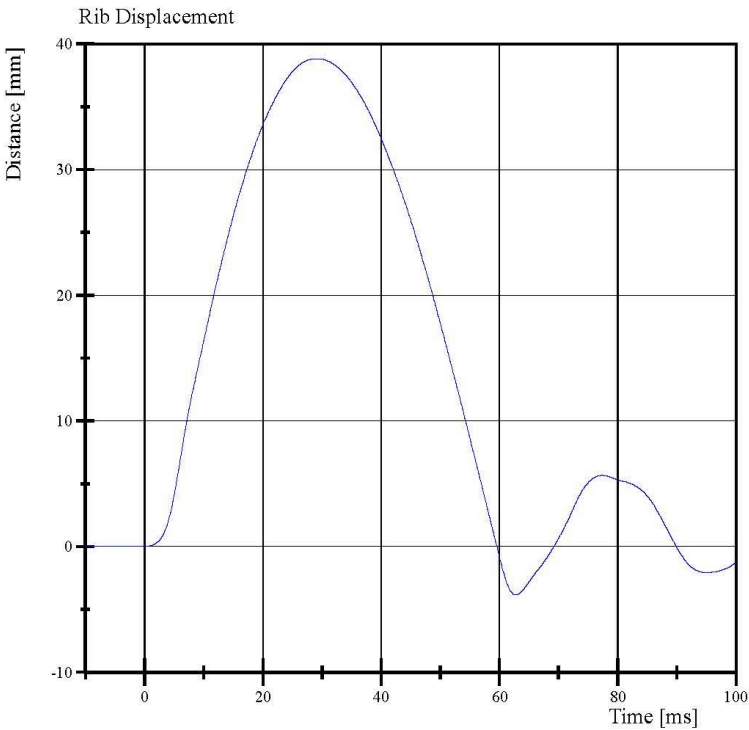
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.01.2024 13:13:37 629



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024



Filter Class: CFC_180
Max: 38.8 mm at 29.1 ms
Min: -3.9 mm at 62.7 ms

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

07.01.2024 13:14:01 629



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.9 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Foam S/N: EK6970

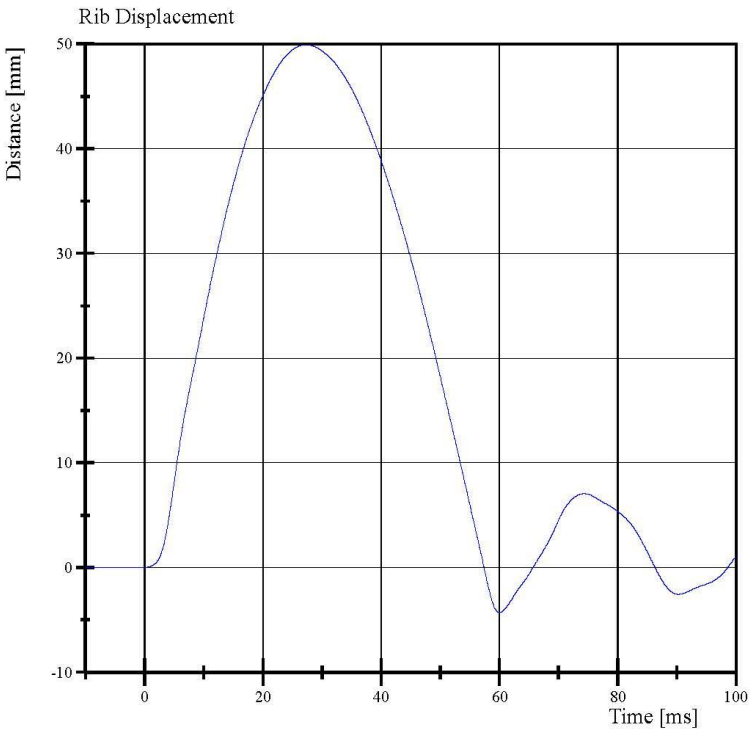
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.01.2024 13:10:09 518



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024



Filter Class: CFC_180
Max: 49.9 mm at 27.3 ms
Min: -4.3 mm at 60.0 ms

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

07.01.2024 13:10:35 518



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.0 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Foam S/N: EK6971

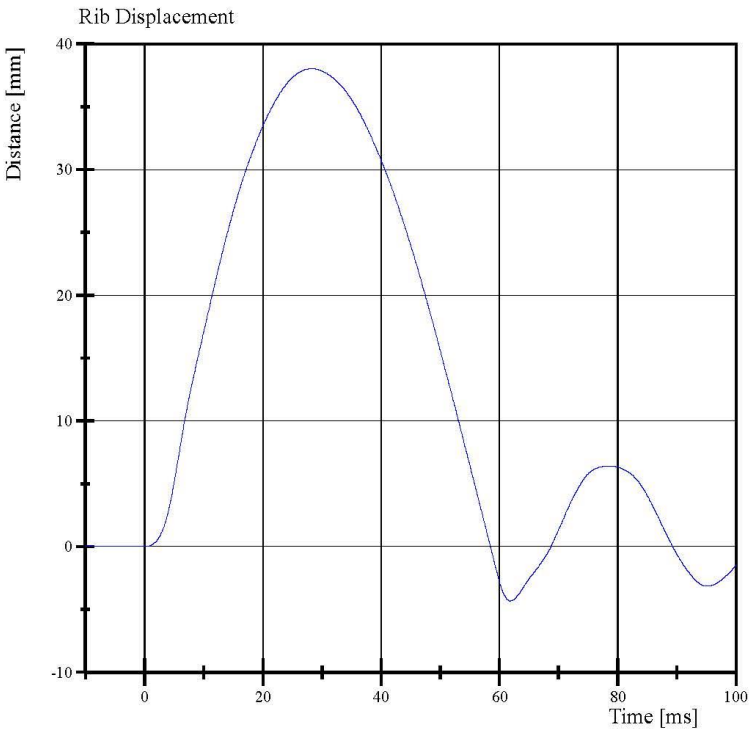
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with Polarity in accordance with J211

07.01.2024 13:23:18 608



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024



Filter Class: CFC_180
Max: 38.0 mm at 28.3 ms
Min: -4.3 mm at 61.8 ms

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

07.01.2024 13:23:47 608



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Foam S/N: EK6971

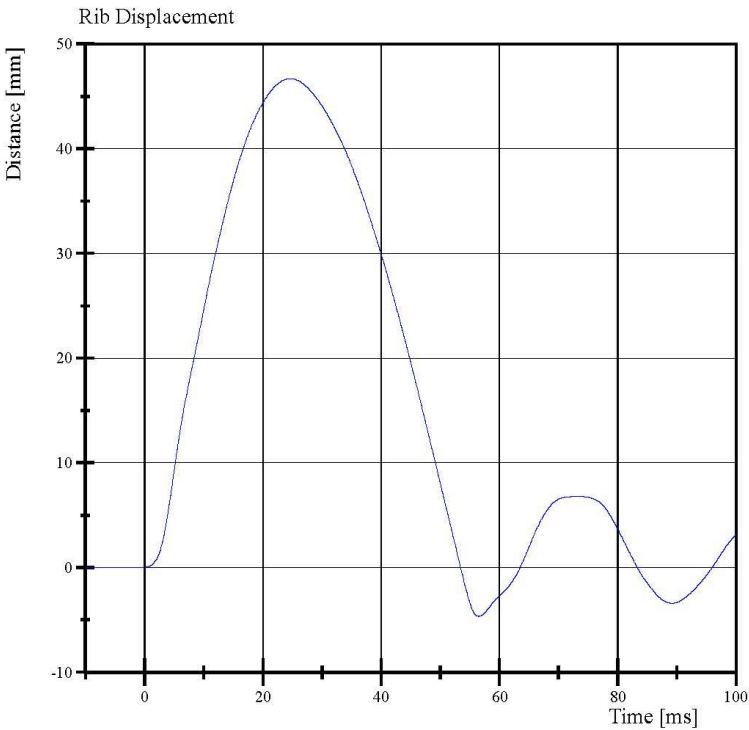
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.01.2024 13:17:28 500



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/1/2024



Filter Class: CFC_180
Max: 46.7 mm at 24.6 ms
Min: -4.7 mm at 56.5 ms

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

07.01.2024 13:17:56 500



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/2/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.420 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,968.0 N	Yes
Upper Rib Displacement	34 - 41 mm	38.2 mm	Yes
Center Rib Displacement	37 - 45 mm	40.4 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

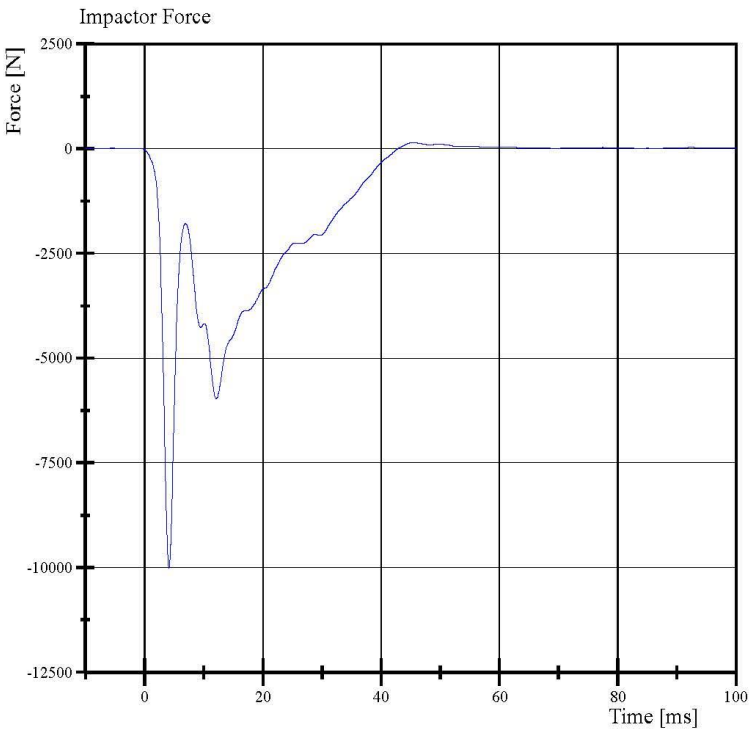
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.02.2024 12:57:11 538



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/2/2024



Filter Class: CFC_180
Max: 151.9 N at 45.4 ms
Min: -10,020.5 N at 4.1 ms

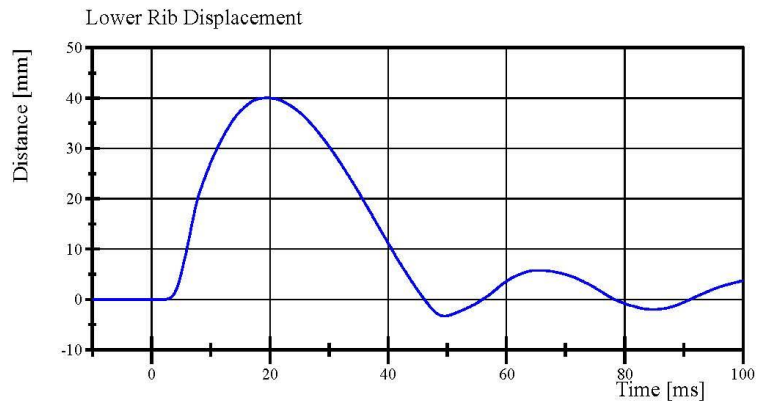
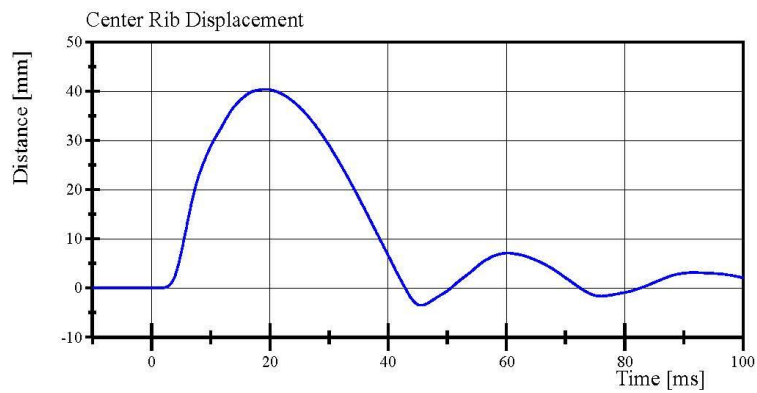
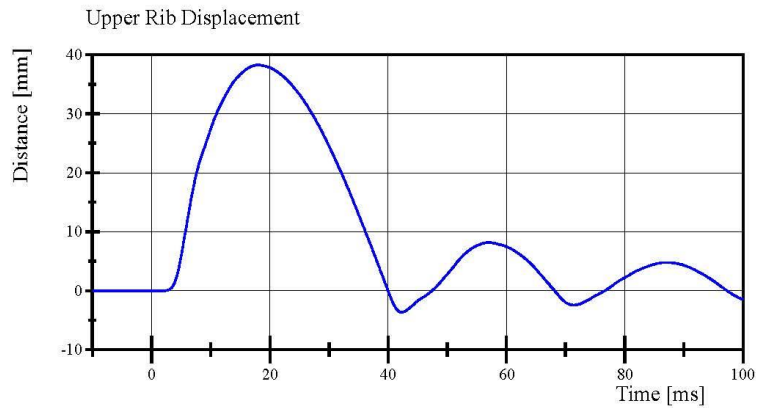
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.02.2024 12:58:09 538



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 94-1
Test Date: 7/2/2024



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

07.02.2024 12:58:09 538



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 95-4
Test Date: 7/3/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	68 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.129 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-45.8 deg	Yes
Time of Peak	39 - 53 ms	40.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.4 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Lumbar S/N: DJ7964

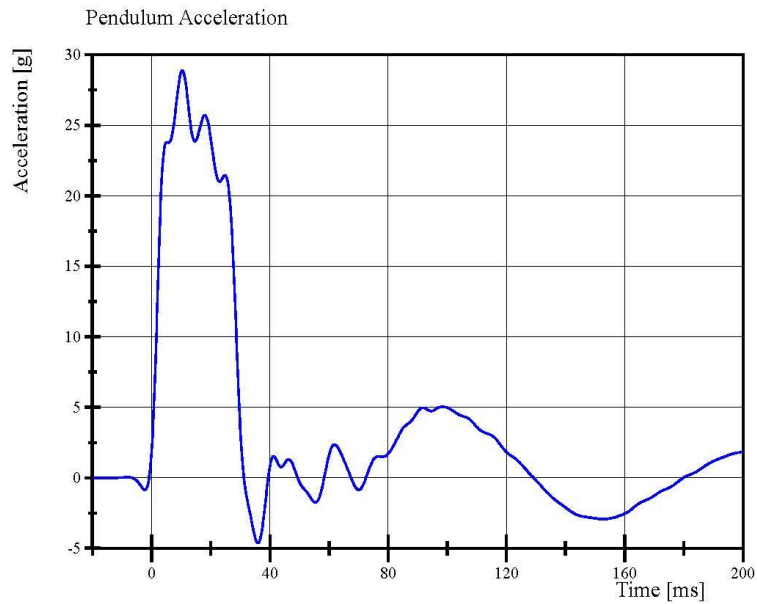
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.03.2024 15:09:43 672

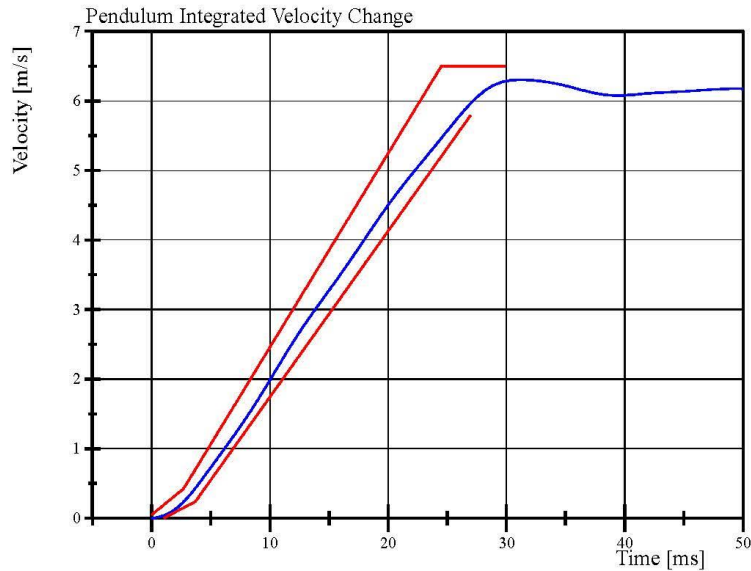


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 95-4
Test Date: 7/3/2024



Filter Class: CFC_60
Max: 28.9 g at 10.4 ms
Min: -4.6 g at 35.9 ms



Filter Class: CFC_60
Max: 6.3 m/s at 31.2 ms
Min: 0.0 m/s at 0.0 ms

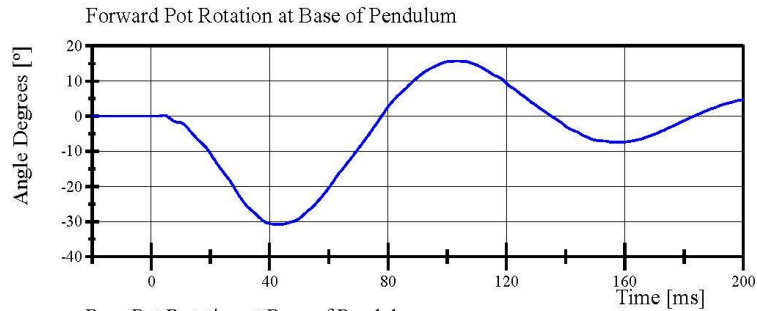
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.03.2024 15:10:27 672

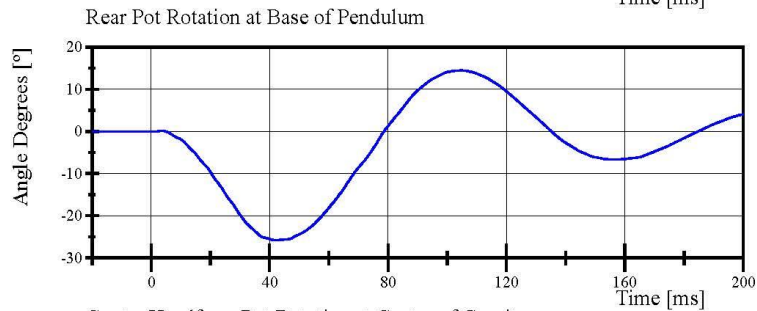


Transportation Research Center Inc.

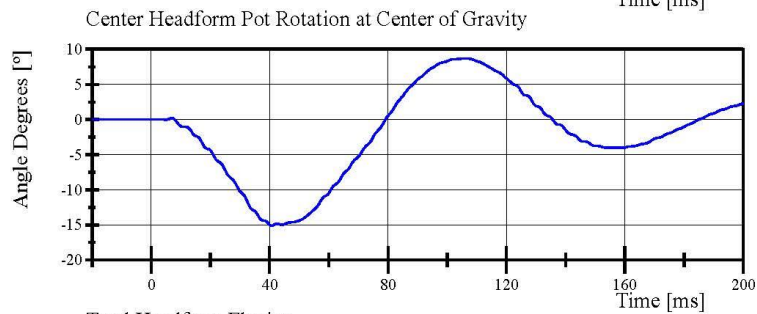
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 95-4
Test Date: 7/3/2024



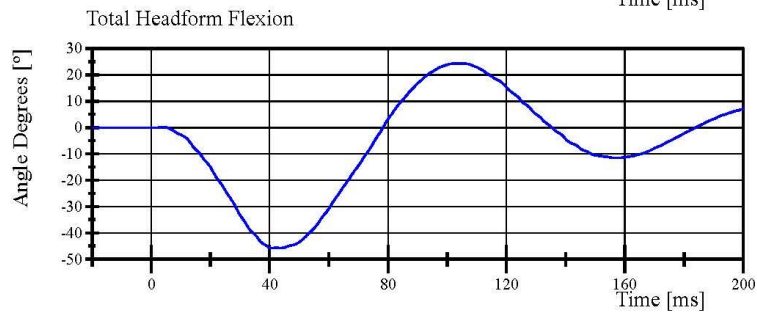
Filter Class: CFC_180
Max: 15.7 ° at 103.2 ms
Min: -30.8 ° at 43.2 ms



Filter Class: CFC_180
Max: 14.5 ° at 104.7 ms
Min: -25.8 ° at 42.2 ms



Filter Class: CFC_180
Max: 8.7 ° at 106.6 ms
Min: -15.1 ° at 40.6 ms



Filter Class: CFC_180
Max: 24.3 ° at 104.4 ms
Min: -45.8 ° at 40.9 ms

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

07.03.2024 15:10:28 672



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 94-1

Test Date: 7/2/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.09 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,406.9 N	Yes
Time of Peak	10.6 - 13.0 ms	12.08 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,610.2 N	Yes
Time of Peak	10.0 - 12.3 ms	11.92 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

07.02.2024 13:12:51 688

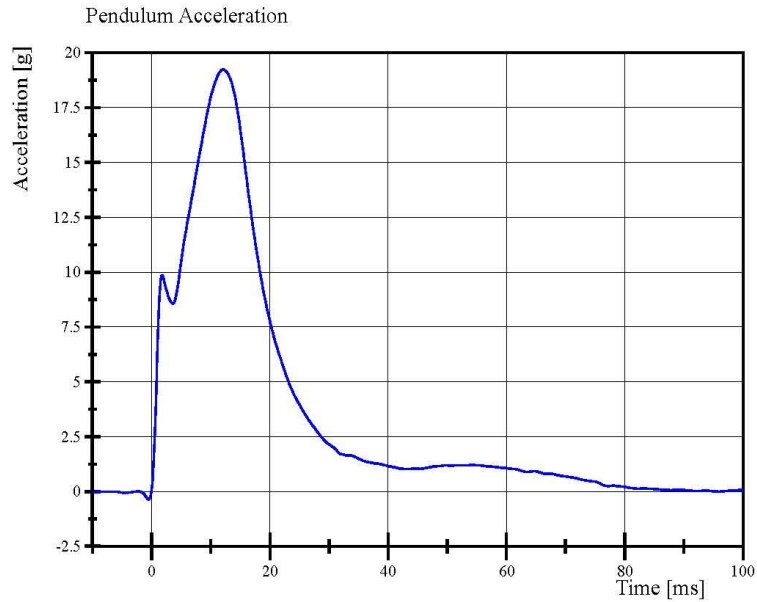


Transportation Research Center Inc.

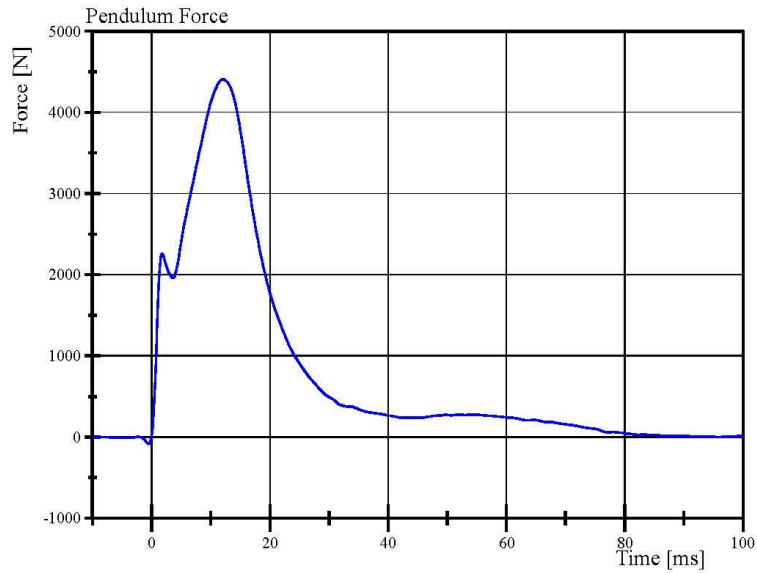
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 94-1

Test Date: 7/2/2024



Filter Class: CFC_180
Max: 19.2 g at 12.1 ms
Min: -0.4 g at -0.5 ms



Filter Class: CFC_180
Max: 4,406.9 N at 12.1 ms
Min: -82.8 N at -0.5 ms

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

07.02.2024 13:13:31 688

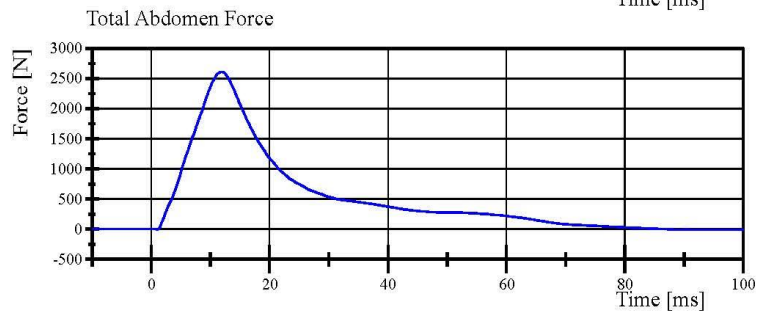
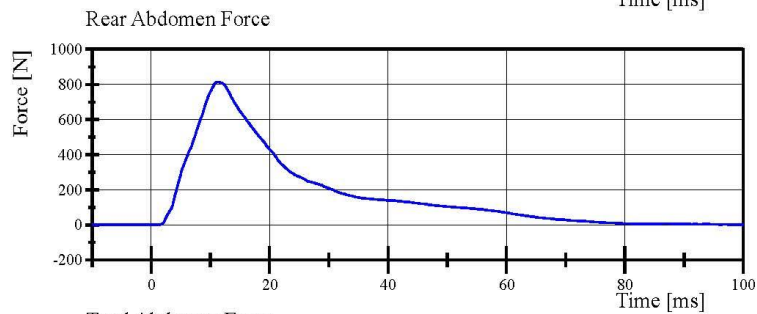
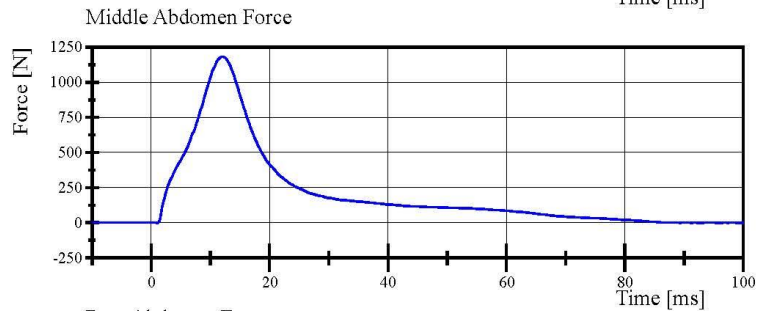
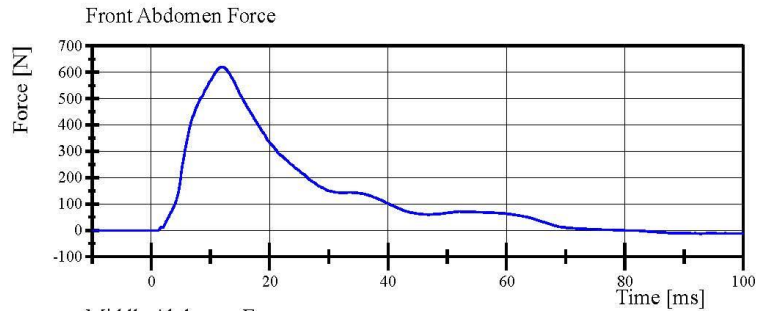


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 94-1

Test Date: 7/2/2024



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

07.02.2024 13:13:31 688



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 95-2

Test Date: 7/3/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	67 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,290.7 N	Yes
Time of Peak	11.8 - 16.1 ms	13.68 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,356.1 N	Yes
Time of Peak	12.2 - 17.0 ms	13.60 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis S/N: NA

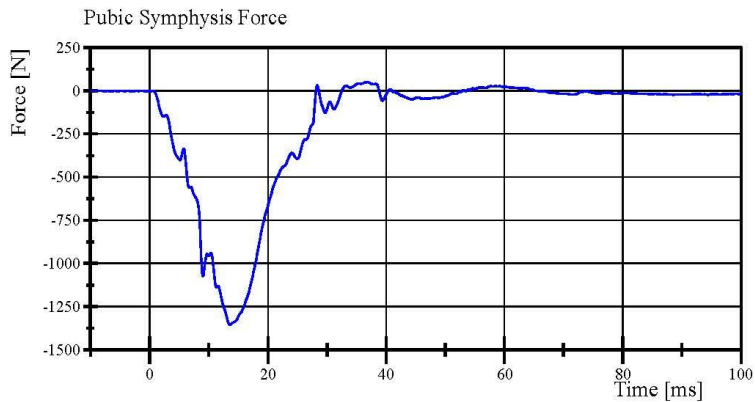
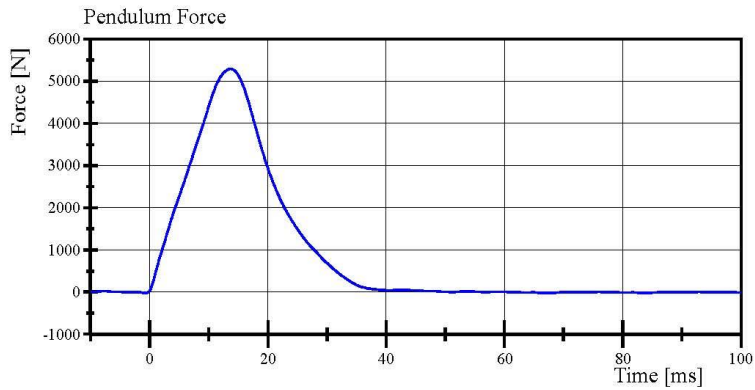
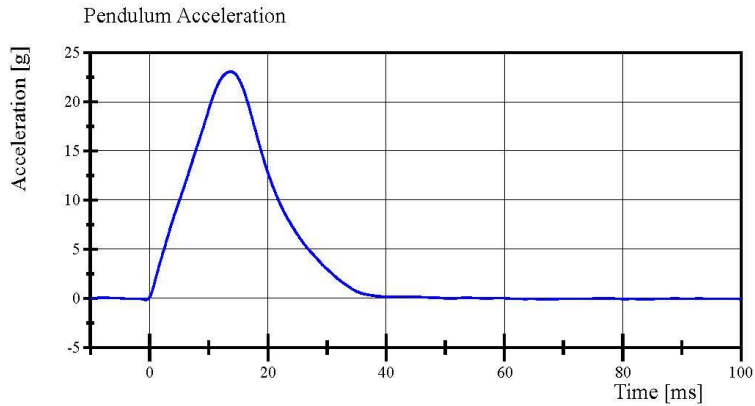
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.03.2024 09:34:16 579



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 95-2
Test Date: 7/3/2024



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

07.03.2024 09:35:16 579



Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 95

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	443	Yes
6	Head Width	152.0 - 158.0	154	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	328	Yes
9	Abdomen Width	273.0 - 287.0	279	Yes
10	Pelvis Lap Width	359.0 - 373.0	366	Yes
11	Head Depth	196.0 - 206.0	201	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 96

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	443	Yes
6	Head Width	152.0 - 158.0	154	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	328	Yes
9	Abdomen Width	273.0 - 287.0	279	Yes
10	Pelvis Lap Width	359.0 - 373.0	366	Yes
11	Head Depth	196.0 - 206.0	201	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Report Number: F030_ERF96

Page 9 of 41

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
Peak Resultant Acceleration	125 - 155 g	144.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	8.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	3.79 %	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

07.26.2024 09:23:23 361

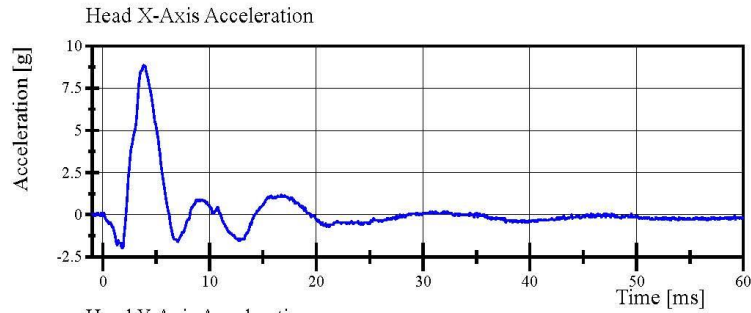


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 96-1

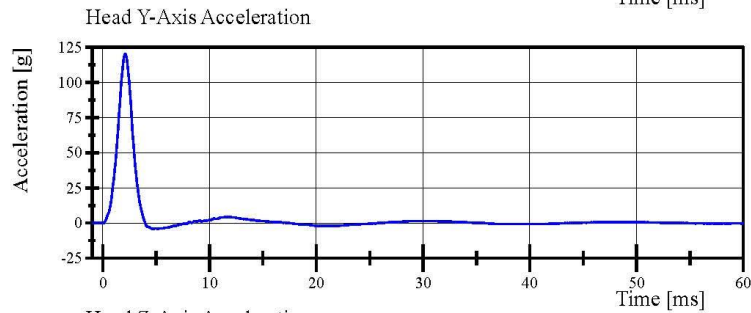
Test Date: 7/26/2024



Filter Class: CFC_1000

Max: 8.9 g at 3.8 ms

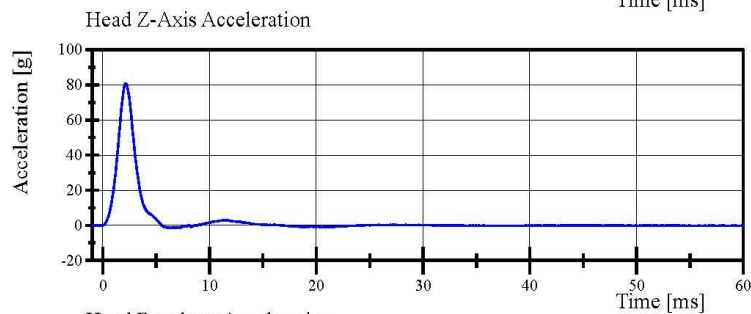
Min: -2.0 g at 1.8 ms



Filter Class: CFC_1000

Max: 120.3 g at 2.1 ms

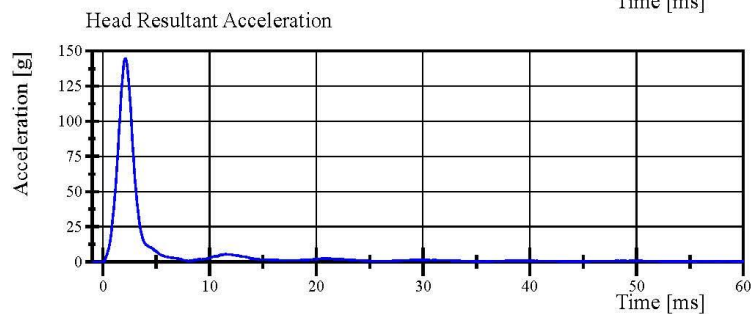
Min: -4.1 g at 4.7 ms



Filter Class: CFC_1000

Max: 80.9 g at 2.2 ms

Min: -1.4 g at 6.3 ms



Filter Class: CFC_1000

Max: 144.7 g at 2.2 ms

Min: 0.0 g at -0.9 ms

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

07.26.2024 09:23:59 361



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	64 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.38 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-53.4 deg	Yes
Time of Peak	54 - 66 ms	57.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	54.9 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 05053

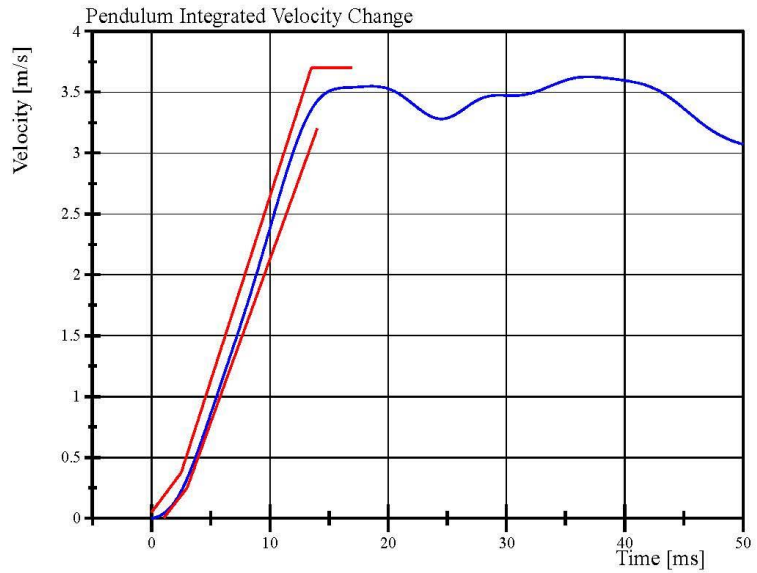
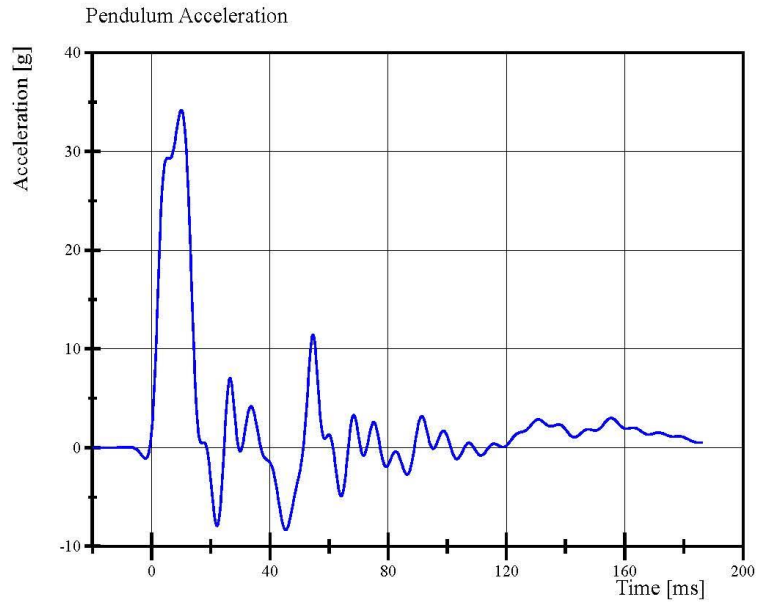
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 10:01:22 1495



Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



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

07.26.2024 10:01:49 1495

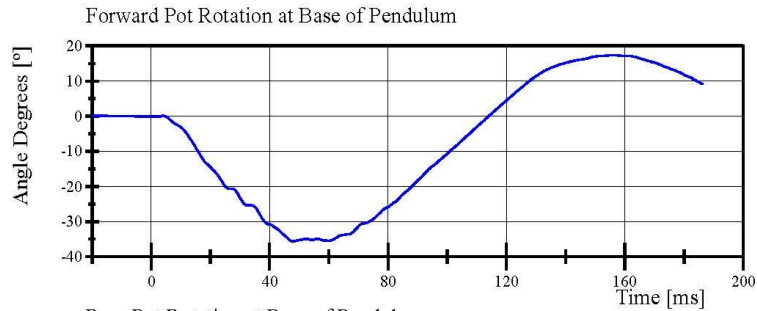


Transportation Research Center Inc.

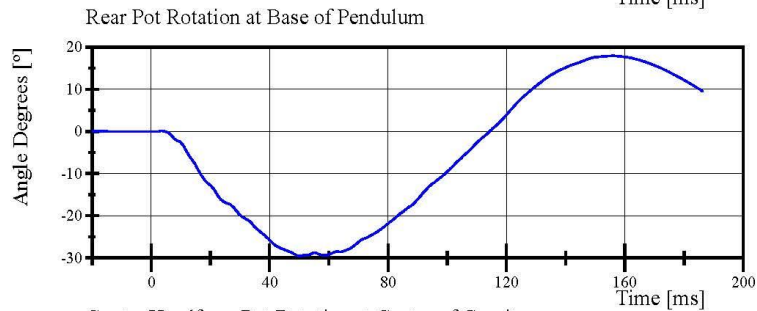
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 96-1

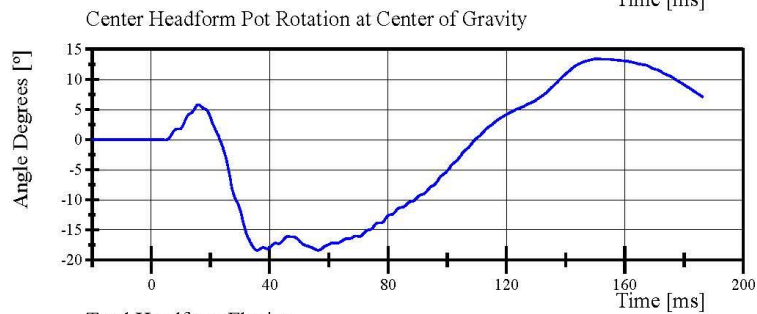
Test Date: 7/26/2024



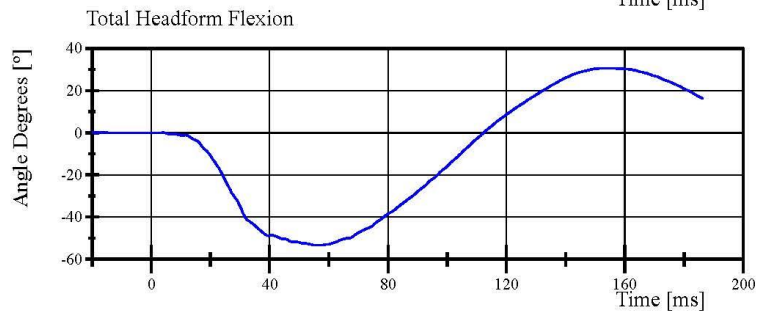
Filter Class: CFC_180
Max: 17.4 ° at 155.8 ms
Min: -35.7 ° at 47.9 ms



Filter Class: CFC_180
Max: 18.0 ° at 155.9 ms
Min: -29.5 ° at 50.1 ms



Filter Class: CFC_180
Max: 13.4 ° at 150.4 ms
Min: -18.4 ° at 35.8 ms



Filter Class: CFC_180
Max: 30.7 ° at 155.1 ms
Min: -53.4 ° at 57.4 ms

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

07.26.2024 10:01:49 1495



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	69 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.49 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

07.29.2024 08:40:48 546

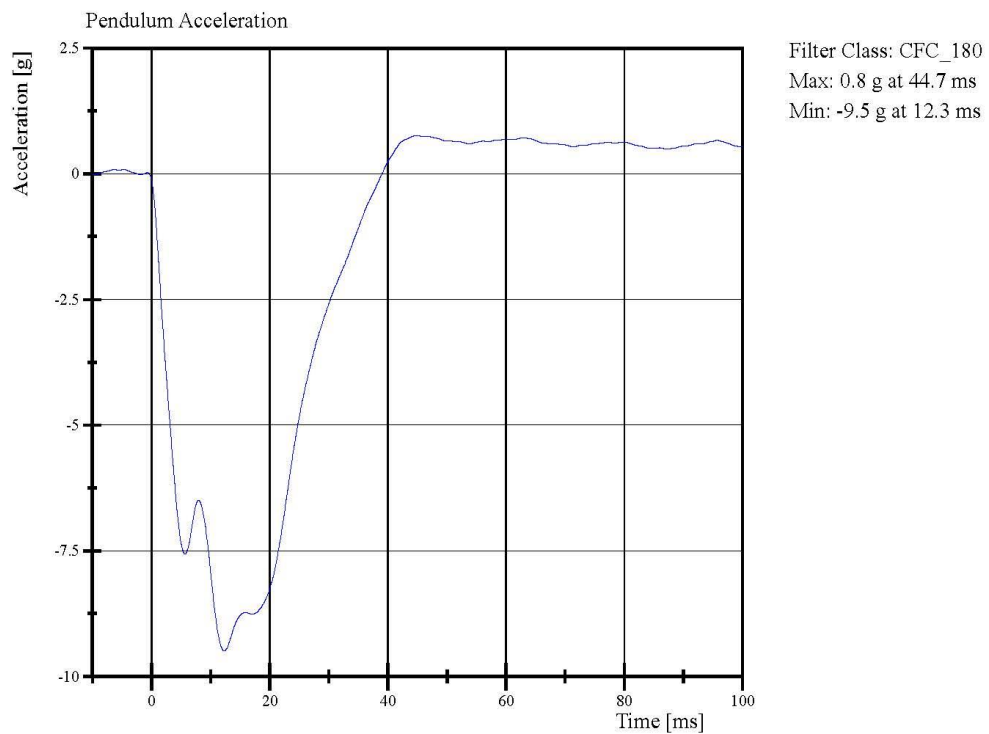


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024



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

07.29.2024 08:42:40 546



Report Number: F030_ERF96

Page 16 of 41

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	39.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Foam S/N: EK6973

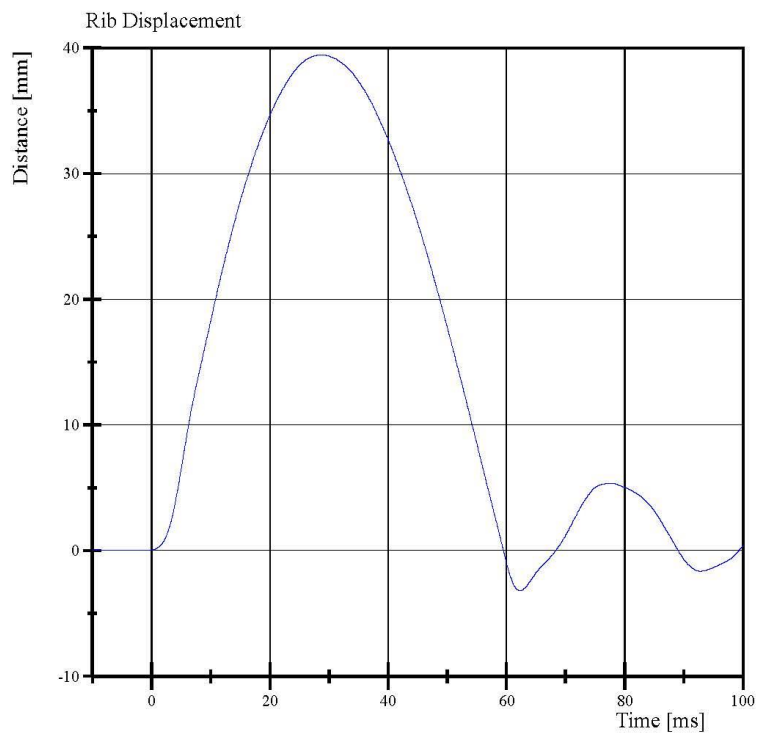
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 13:17:58 603



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 39.4 mm at 28.7 ms
Min: -3.2 mm at 62.3 ms

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

07.26.2024 13:18:33 603



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	64 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Foam S/N: EK6973

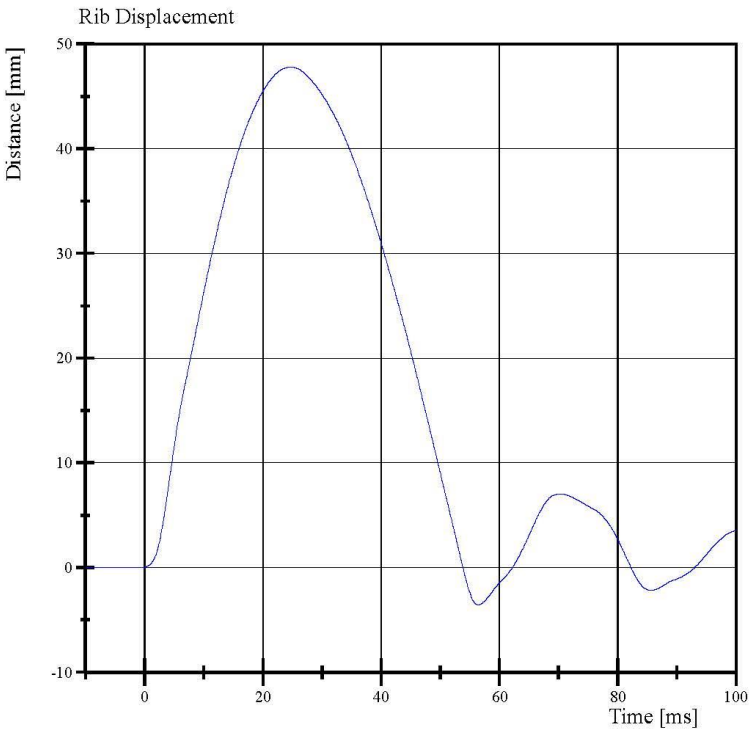
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 13:11:16 509



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 47.8 mm at 24.7 ms
Min: -3.6 mm at 56.4 ms

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

07.26.2024 13:14:19 509



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Foam S/N: EK6970

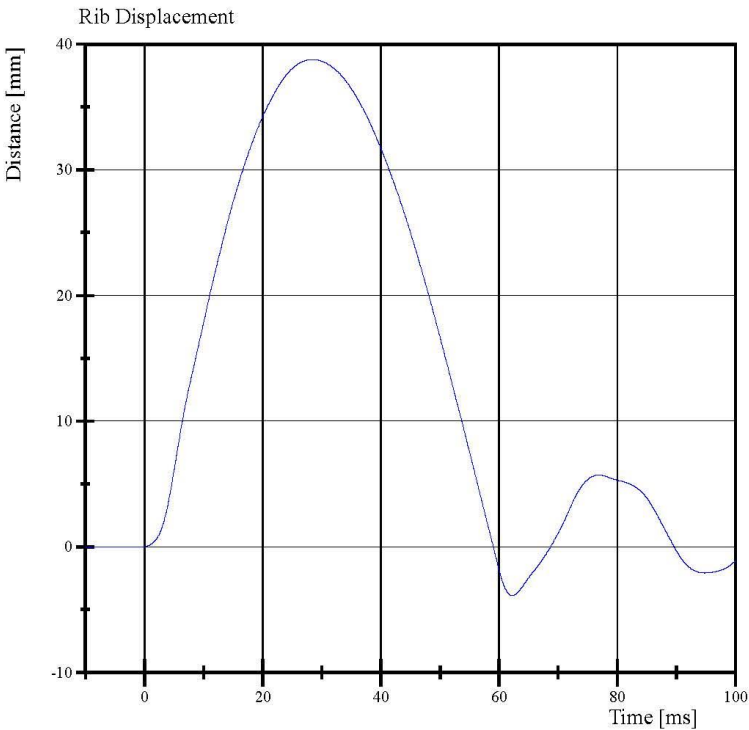
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 13:30:18 619



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 38.8 mm at 28.5 ms
Min: -3.9 mm at 62.2 ms

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

07.26.2024 13:30:46 619



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	66 %	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 Foam S/N: EK6970

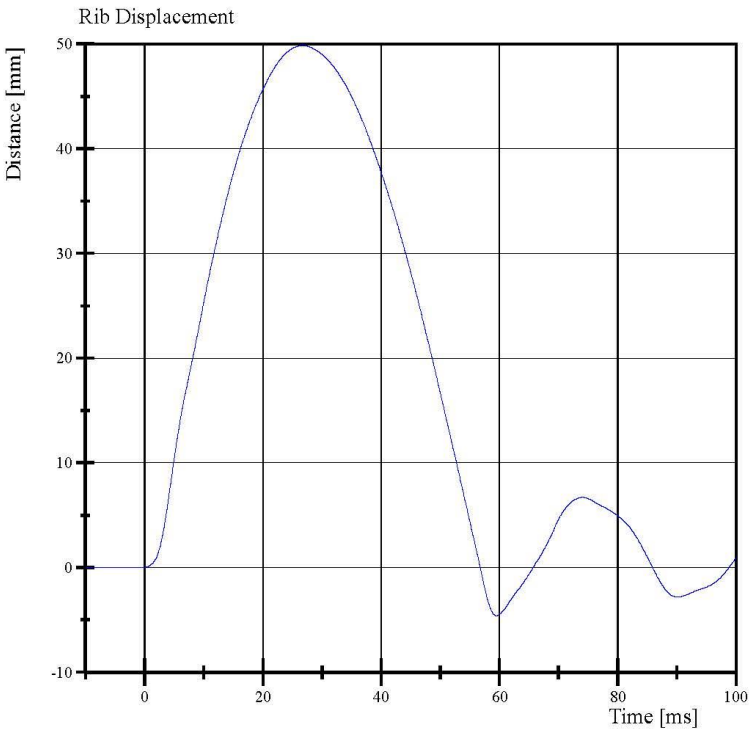
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 13:25:14 509



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 49.8 mm at 26.7 ms
Min: -4.6 mm at 59.4 ms

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

07.26.2024 13:25:58 509



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	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 Foam S/N: EK6971

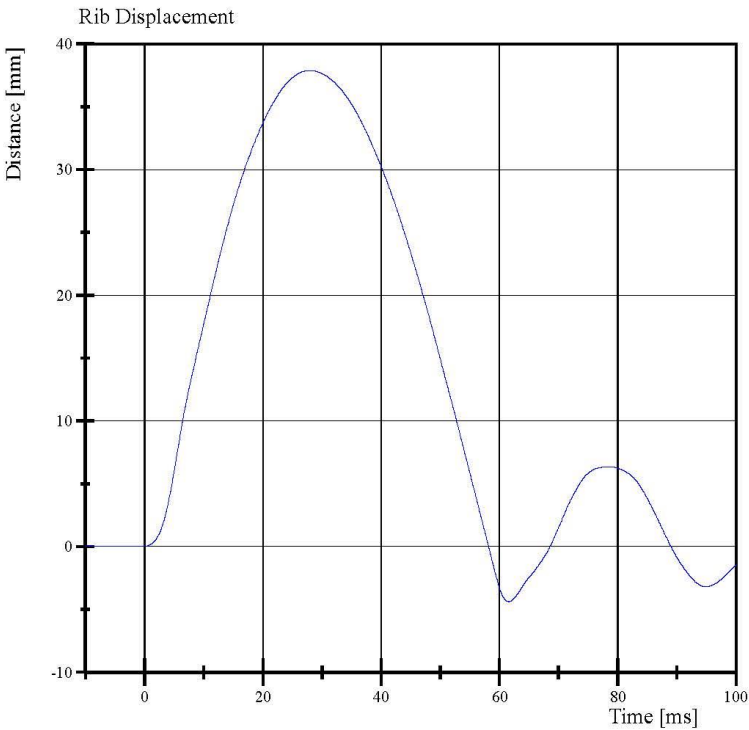
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 13:45:54 613



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 37.9 mm at 27.9 ms
Min: -4.4 mm at 61.5 ms

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

07.26.2024 13:46:25 613



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	63 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Foam S/N: EK6971

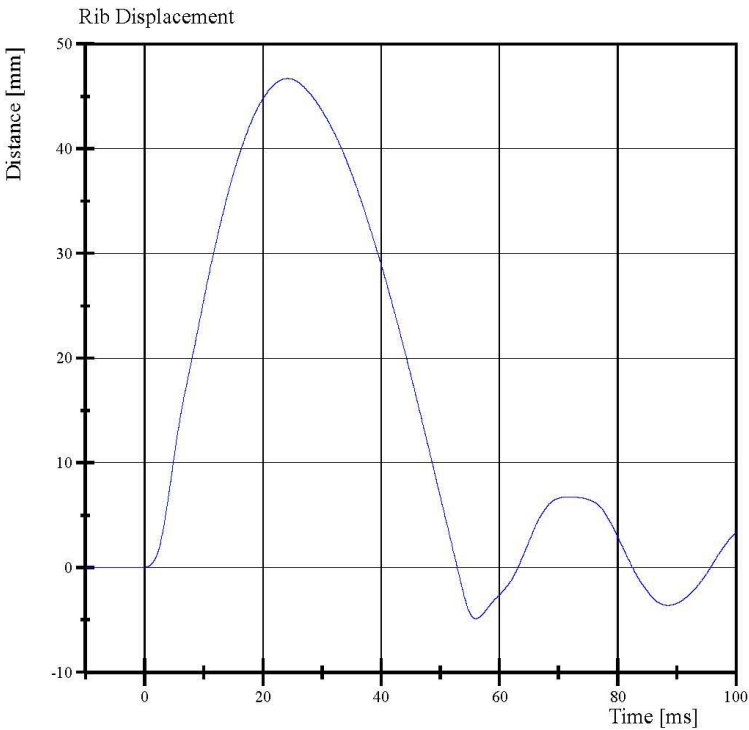
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.26.2024 13:40:52 510



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 46.7 mm at 24.2 ms
Min: -4.9 mm at 56.0 ms

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

07.26.2024 13:42:04 510



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	69 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.440 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,145.9 N	Yes
Upper Rib Displacement	34 - 41 mm	39.1 mm	Yes
Center Rib Displacement	37 - 45 mm	41.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.4 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

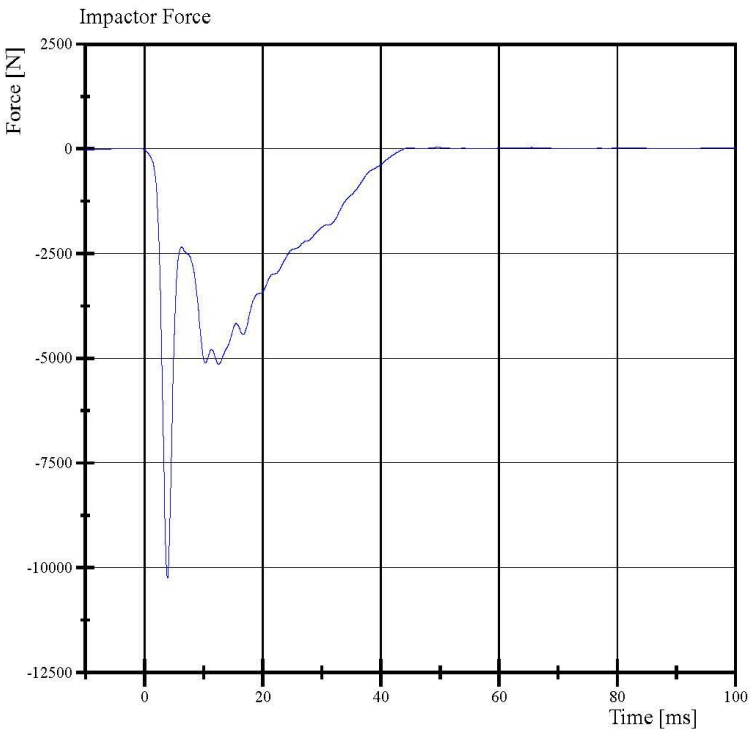
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.29.2024 09:04:43 475



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 96-1
Test Date: 7/29/2024



Filter Class: CFC_180
Max: 30.1 N at 49.5 ms
Min: -10,242.1 N at 3.8 ms

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

07.29.2024 09:05:14 475

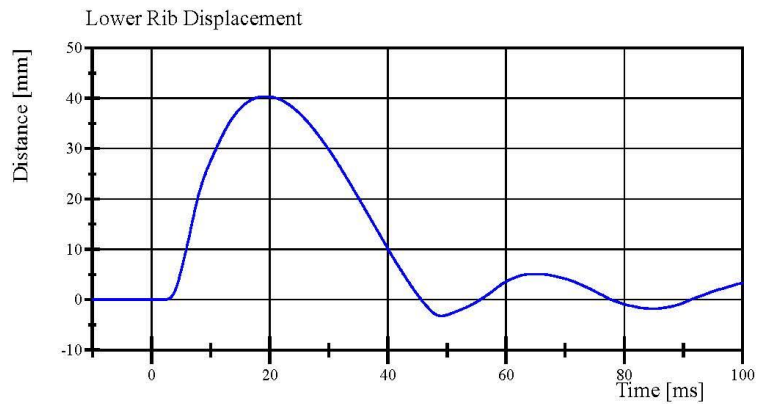
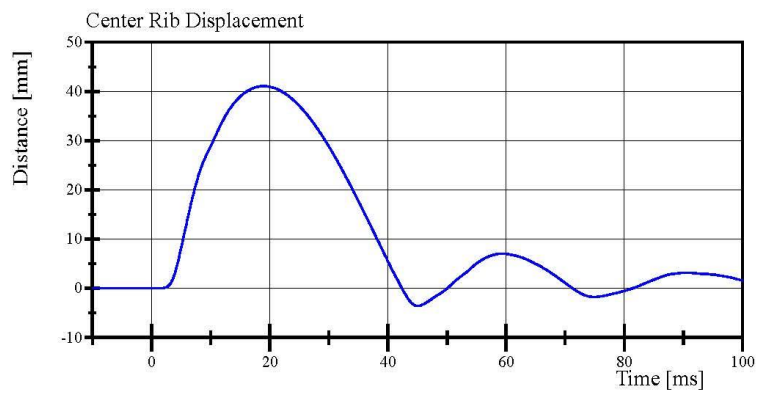
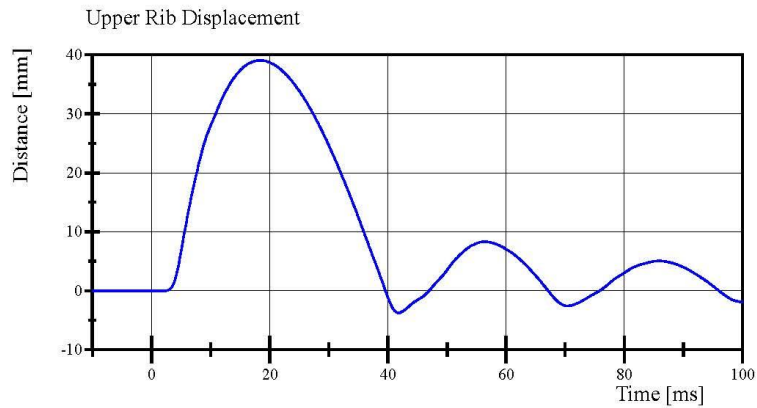


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024



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

07.29.2024 09:05:14 475



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 96-8
Test Date: 7/30/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	69 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.140 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.9 deg	Yes
Time of Peak	39 - 53 ms	42.0 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	38.2 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Lumbar S/N: DJ7964

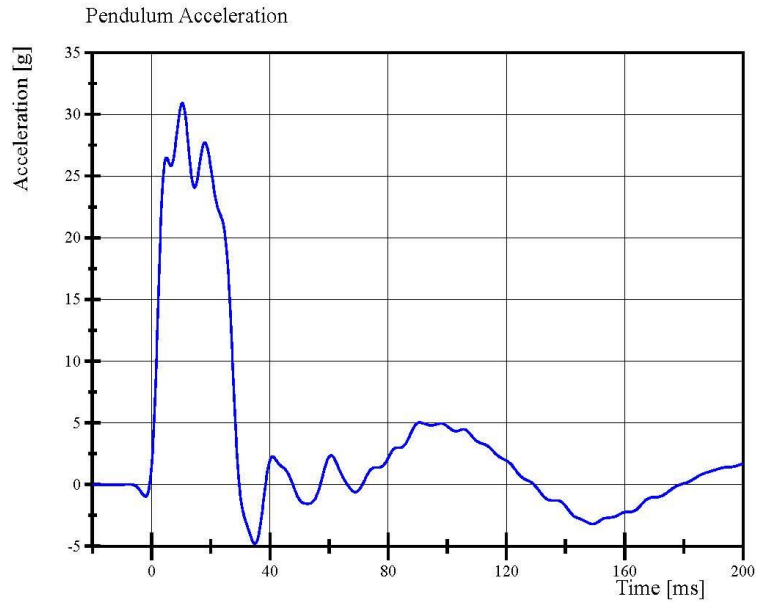
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.30.2024 08:48:37 669

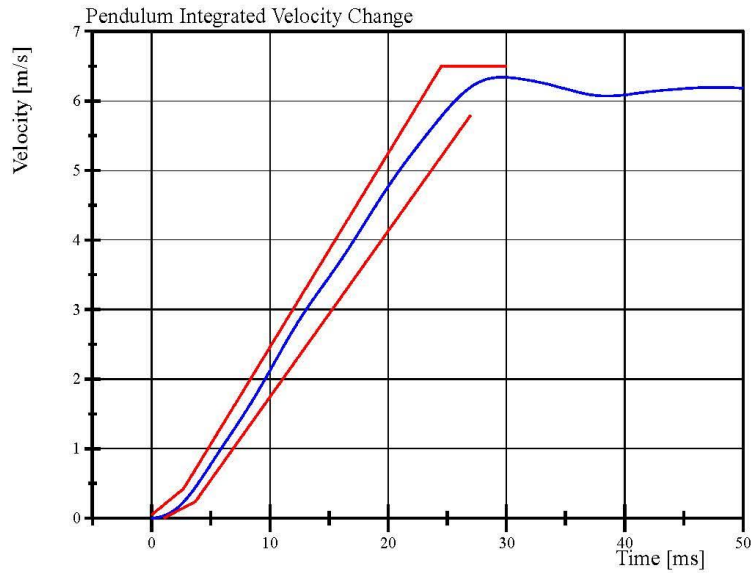


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 96-8
Test Date: 7/30/2024



Filter Class: CFC_60
Max: 30.9 g at 10.4 ms
Min: -4.8 g at 34.9 ms



Filter Class: CFC_60
Max: 6.3 m/s at 29.6 ms
Min: 0.0 m/s at 0.0 ms

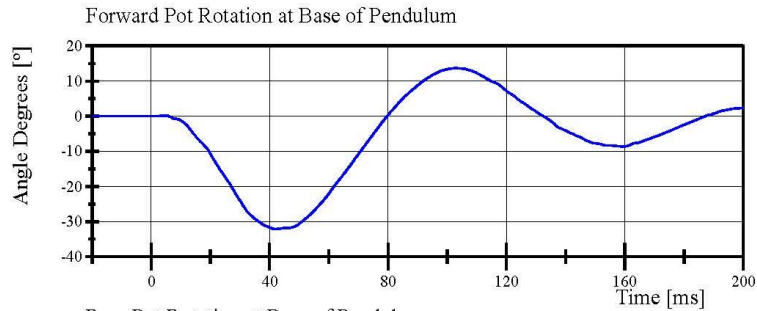
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

07.30.2024 08:49:50 669

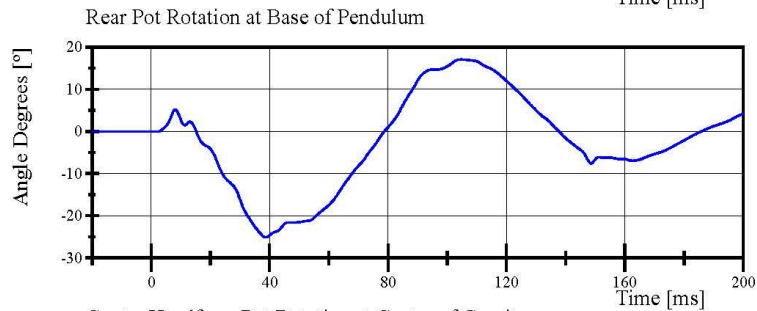


Transportation Research Center Inc.

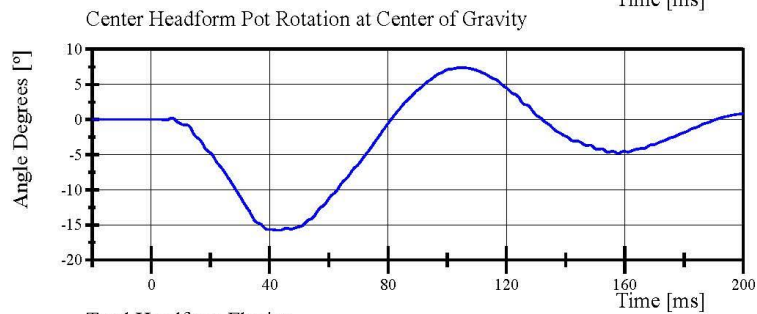
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 96-8
Test Date: 7/30/2024



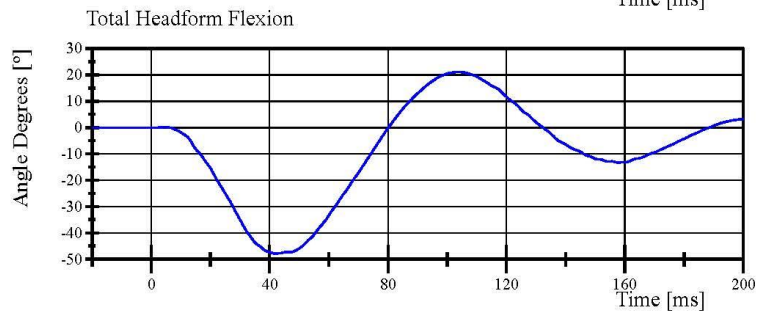
Filter Class: CFC_180
Max: 13.7 ° at 102.8 ms
Min: -32.1 ° at 41.9 ms



Filter Class: CFC_180
Max: 17.1 ° at 104.8 ms
Min: -25.2 ° at 38.6 ms



Filter Class: CFC_180
Max: 7.4 ° at 104.2 ms
Min: -15.7 ° at 43.4 ms



Filter Class: CFC_180
Max: 21.0 ° at 103.5 ms
Min: -47.9 ° at 42.0 ms

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

07.30.2024 08:49:50 669



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	69 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.10 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,362.4 N	Yes
Time of Peak	10.6 - 13.0 ms	12.16 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,556.3 N	Yes
Time of Peak	10.0 - 12.3 ms	12.08 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

07.29.2024 09:32:04 619

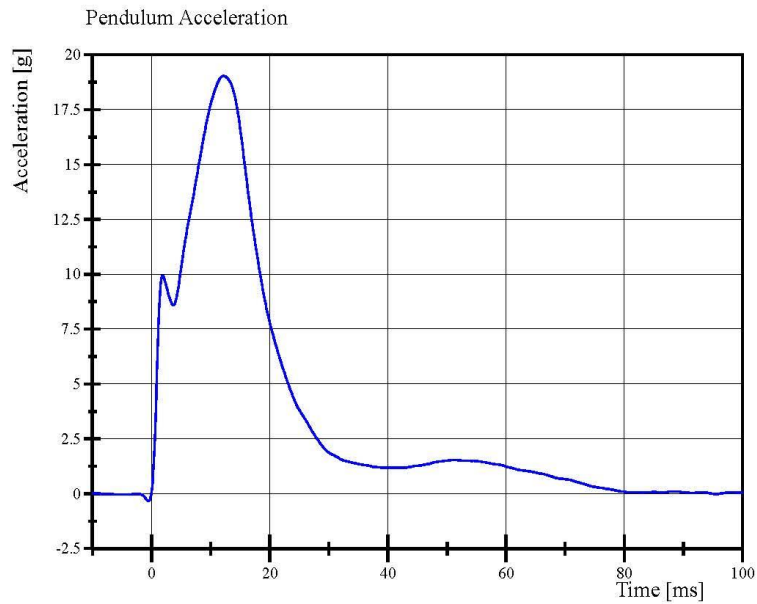


Transportation Research Center Inc.

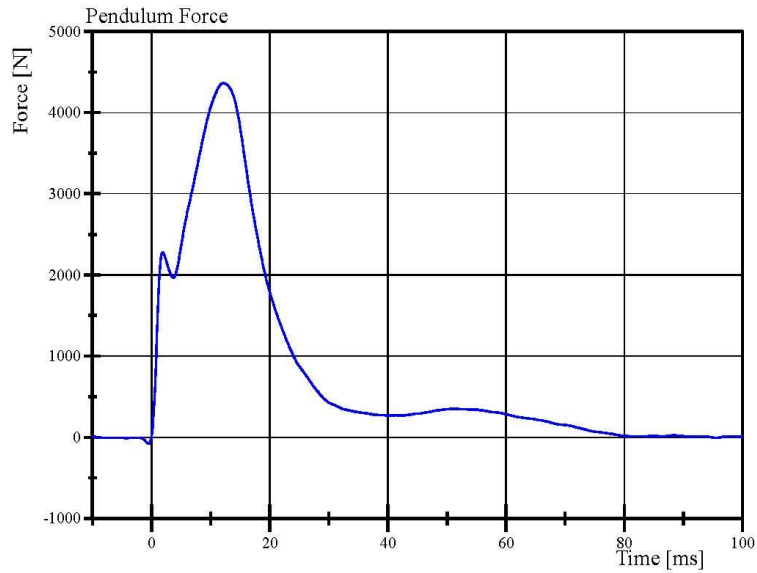
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024



Filter Class: CFC_180
Max: 19.0 g at 12.2 ms
Min: -0.3 g at -0.5 ms



Filter Class: CFC_180
Max: 4,362.4 N at 12.2 ms
Min: -77.9 N at -0.5 ms

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

07.29.2024 09:32:49 619

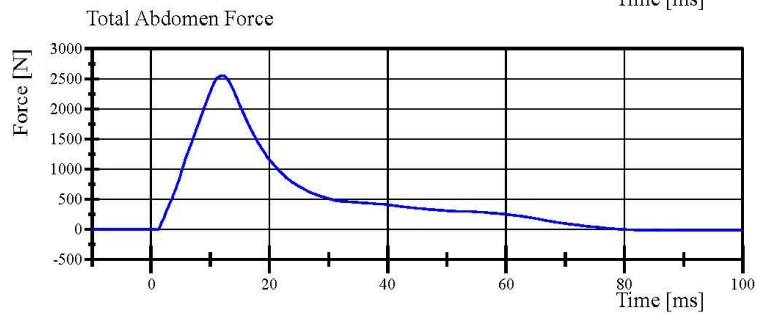
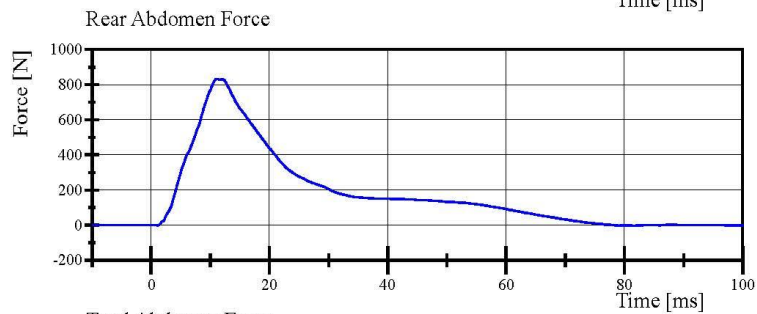
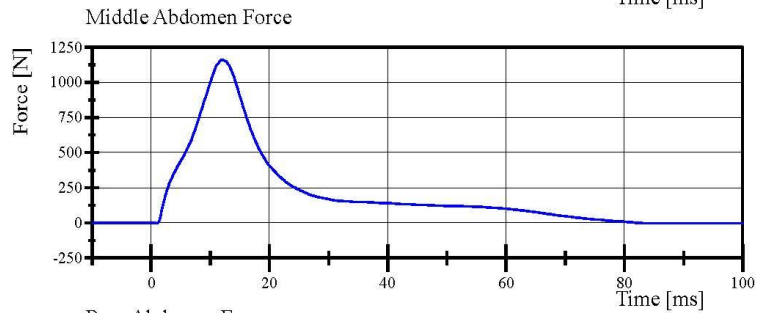
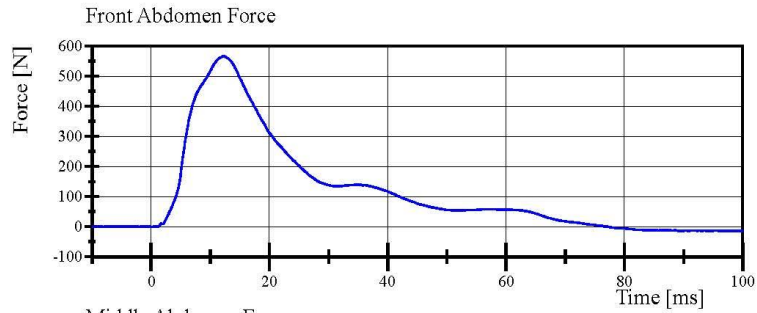


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 96-1

Test Date: 7/29/2024



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

07.29.2024 09:32:49 619



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 96-2

Test Date: 7/29/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	68 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,252.3 N	Yes
Time of Peak	11.8 - 16.1 ms	13.84 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,309.9 N	Yes
Time of Peak	12.2 - 17.0 ms	14.24 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis S/N: NA

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

07.29.2024 10:33:46 575

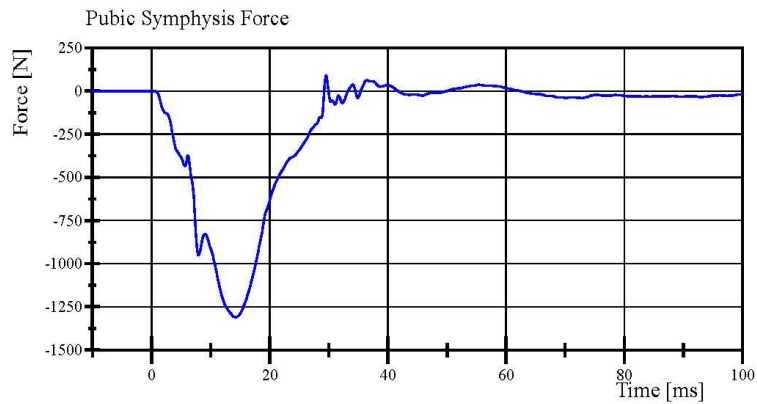
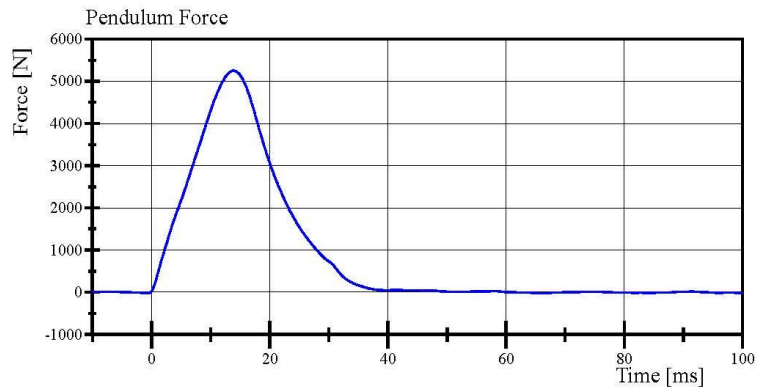
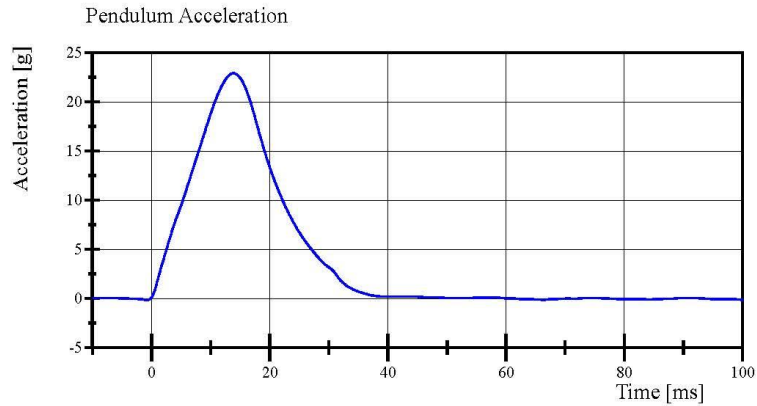


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 96-2

Test Date: 7/29/2024



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

07.29.2024 10:34:47 575



Pre-Test Calibration Sheets
Passenger S/N DQ0570

Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. DQ0570 Calibration No. 27

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

Revised 9/29/2005



Report Number: DQ0570_S2H27

Page 29 of 31

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DQ0570 Certification No. 27-2

Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	62 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	136.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.3 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.25 %	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

06.28.2024 11:54:02 229

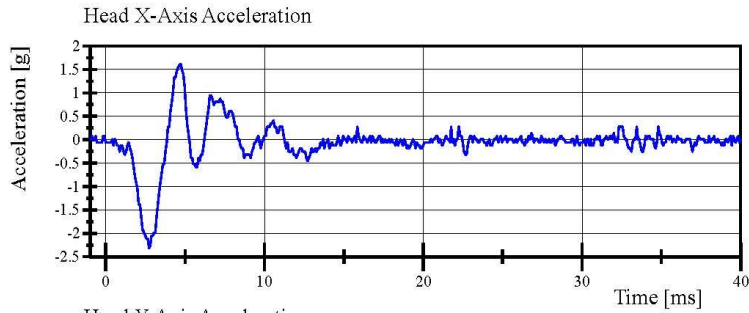


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DQ0570 Certification No. 27-2

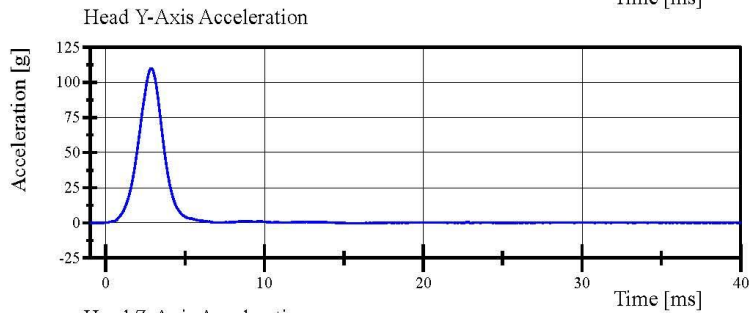
Test Date: 6/28/2024



Filter Class: CFC_1000

Max: 1.6 g at 4.6 ms

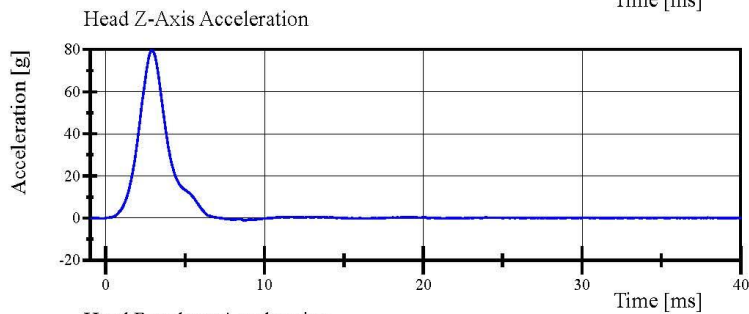
Min: -2.3 g at 2.7 ms



Filter Class: CFC_1000

Max: 110.1 g at 2.9 ms

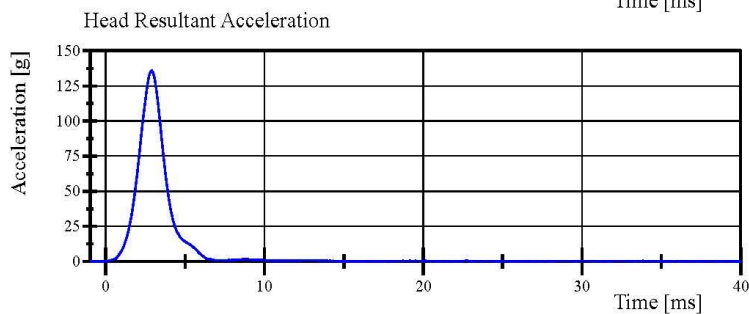
Min: -0.1 g at 15.2 ms



Filter Class: CFC_1000

Max: 79.7 g at 2.9 ms

Min: -1.1 g at 8.7 ms



Filter Class: CFC_1000

Max: 136.0 g at 2.9 ms

Min: 0.0 g at -1.0 ms

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

06.28.2024 11:56:35 229



Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 27-1

Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	62 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.619 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.457 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.603 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.934 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.812 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.826 m/s	Yes
Maximum Headform Flexion			
Peak	(-71) - (-81) deg	-73.5 deg	Yes
Time of Peak	50 - 70 ms	57.7 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.8 N·m	Yes
Decay to 0 N·m	102 - 126 ms	108.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 717

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

06.28.2024 09:47:16 752

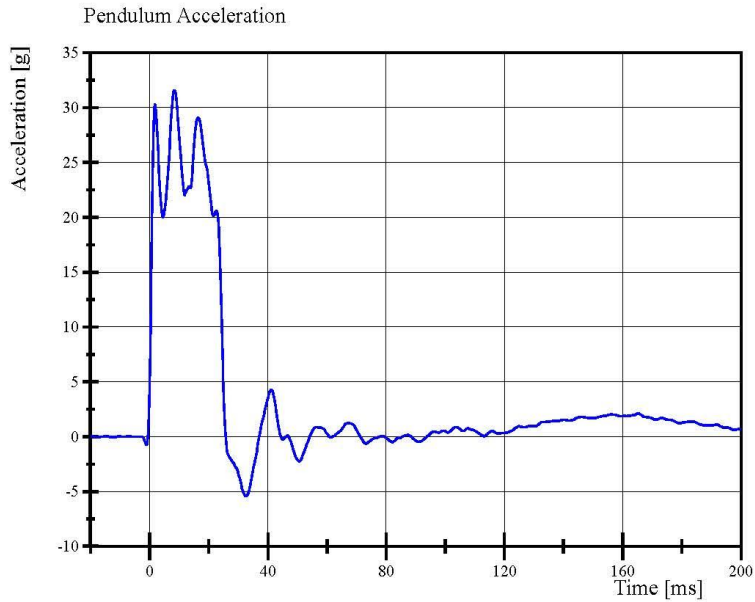


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. DQ0570 Certification No. 27-1

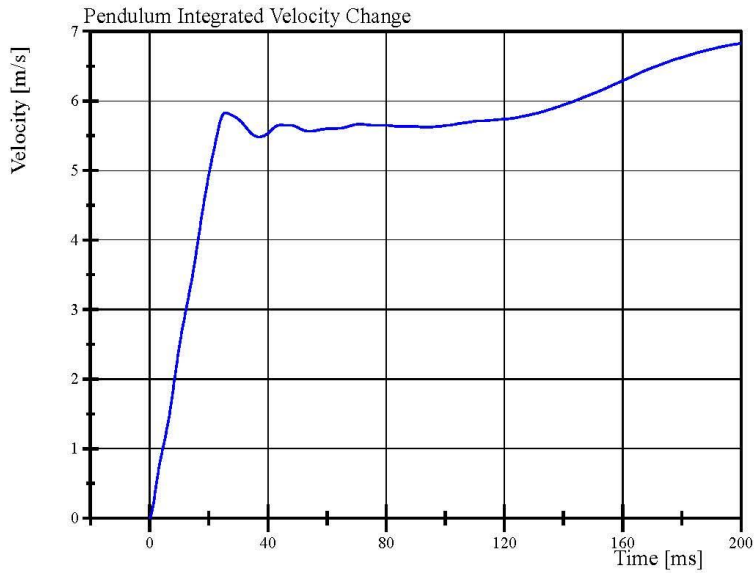
Test Date: 6/28/2024



Filter Class: CFC_180

Max: 31.6 g at 8.4 ms

Min: -5.4 g at 32.4 ms



Filter Class: CFC_180

Max: 6.8 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

06.28.2024 09:48:00 752

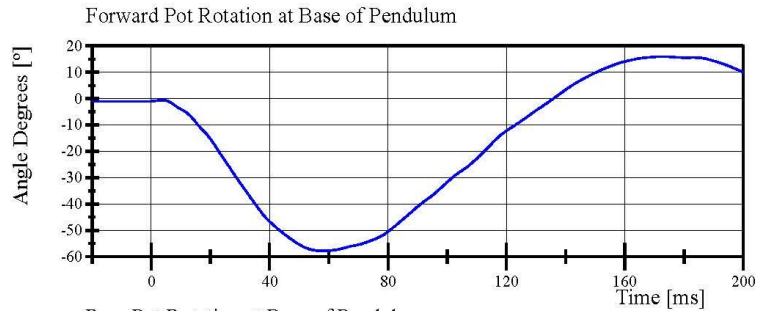


Transportation Research Center Inc.

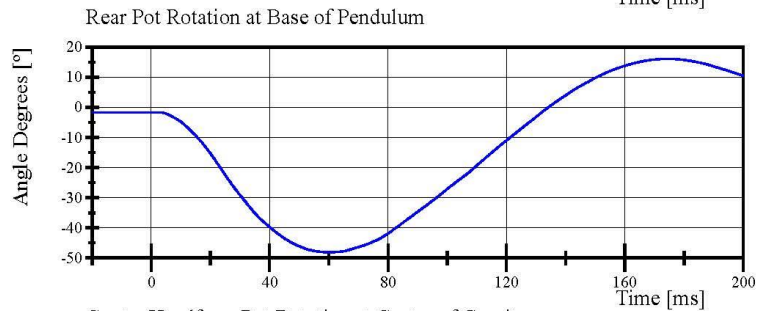
Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 27-1

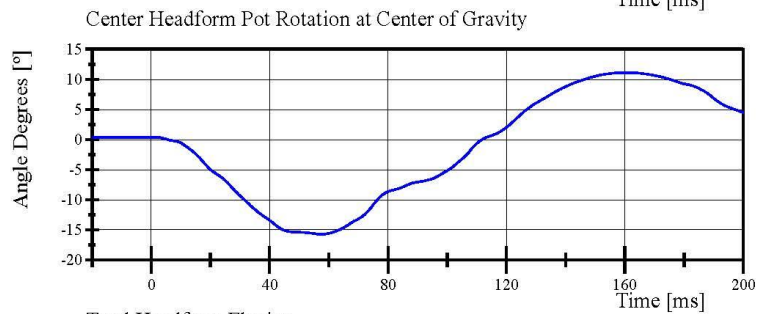
Test Date: 6/28/2024



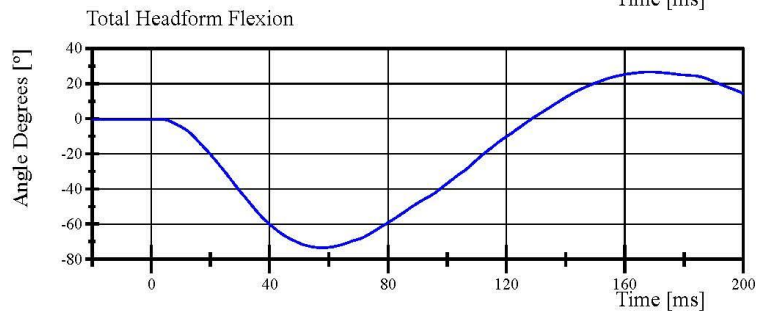
Filter Class: CFC_60
Max: 15.9 ° at 172.7 ms
Min: -57.8 ° at 57.9 ms



Filter Class: CFC_60
Max: 16.1 ° at 174.6 ms
Min: -48.1 ° at 60.0 ms



Filter Class: CFC_60
Max: 11.1 ° at 160.4 ms
Min: -15.7 ° at 57.4 ms



Filter Class: CFC_60
Max: 26.5 ° at 168.2 ms
Min: -73.5 ° at 57.7 ms

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

06.28.2024 09:48:00 752



Transportation Research Center Inc.

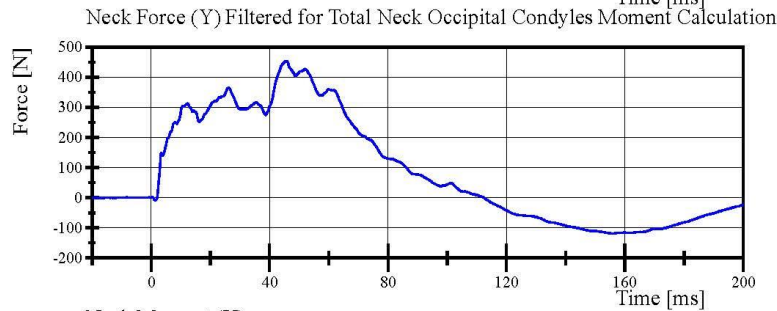
Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 27-1

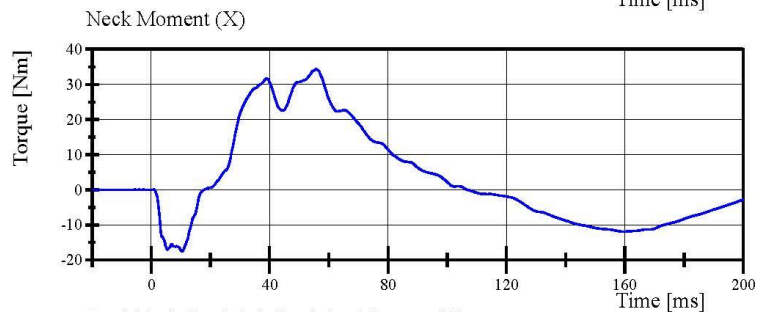
Test Date: 6/28/2024



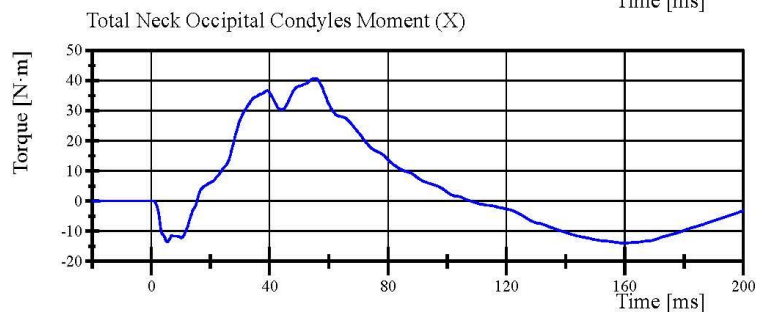
Filter Class: CFC_1000
Max: 454.9 N at 45.1 ms
Min: -119.5 N at 155.6 ms



Filter Class: CFC_600
Max: 453.5 N at 45.8 ms
Min: -119.1 N at 155.7 ms



Filter Class: CFC_600
Max: 34.4 Nm at 55.7 ms
Min: -17.5 Nm at 10.4 ms



Filter Class: Without_(Constar
Max: 40.8 N·m at 55.4 ms
Min: -14.0 N·m at 159.6 ms

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

06.28.2024 09:48:00 752



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DQ0570 Certification No. 27-1

Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.2 g	Yes
Shoulder Displacement	28 - 37 mm	32.6 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	17.9 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

Shoulder Rib S/N: DO9814

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

06.28.2024 10:57:50 872

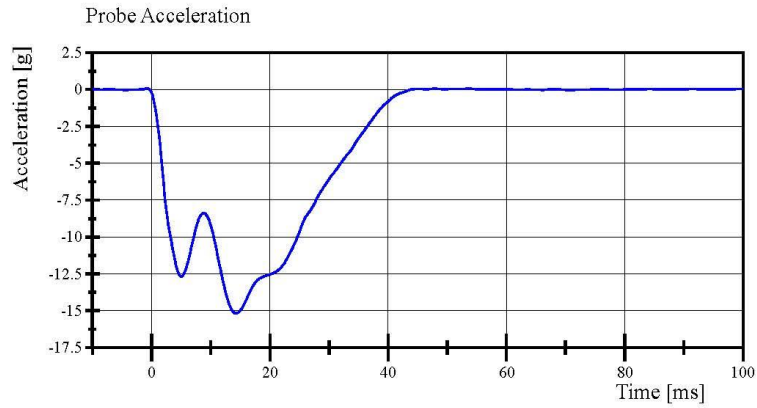


Transportation Research Center Inc.

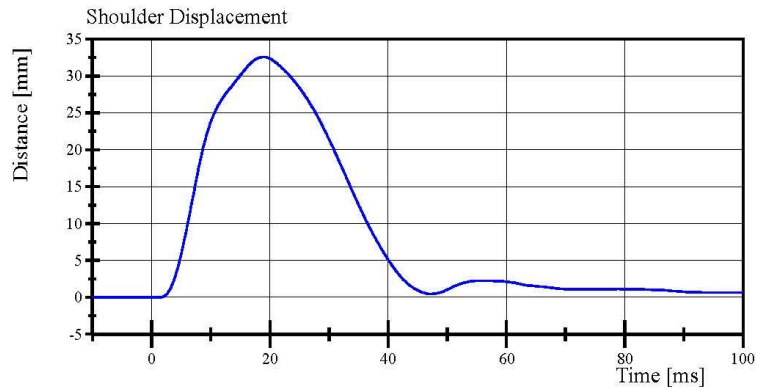
Left Lateral Shoulder

SID IIs Serial No. DQ0570 Certification No. 27-1

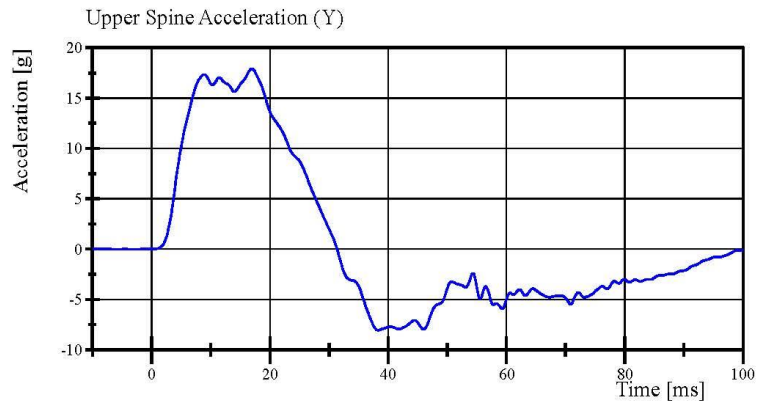
Test Date: 6/28/2024



Filter Class: CFC_180
Max: 0.1 g at -0.8 ms
Min: -15.2 g at 14.2 ms



Filter Class: CFC_600
Max: 32.6 mm at 19.0 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_180
Max: 17.9 g at 17.0 ms
Min: -8.1 g at 38.3 ms

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

06.28.2024 10:58:38 872



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 27-2
Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	66 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.725 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.4 g	Yes
Shoulder Displacement	31 - 40 mm	34.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	33.4 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	36.7 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.0 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

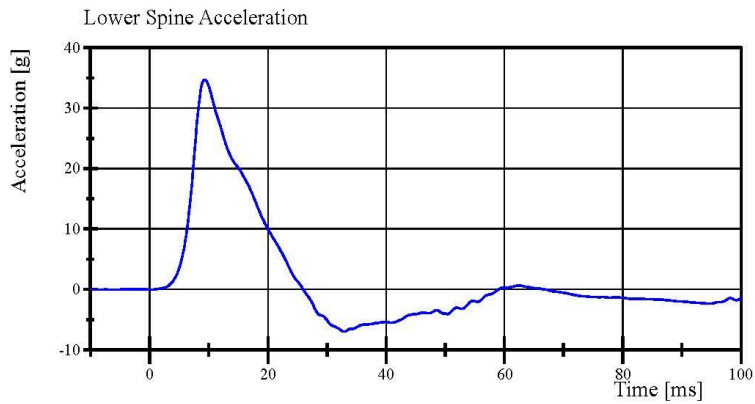
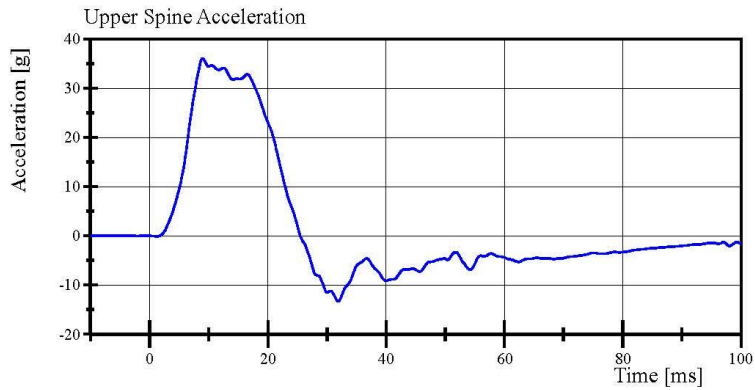
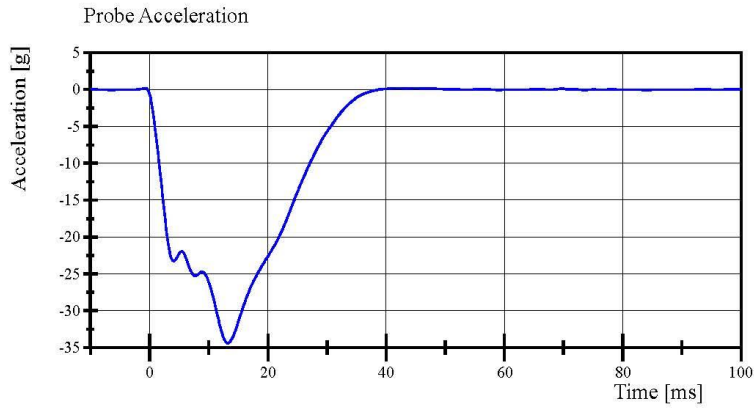
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.28.2024 12:48:56 631



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 27-2
Test Date: 6/28/2024



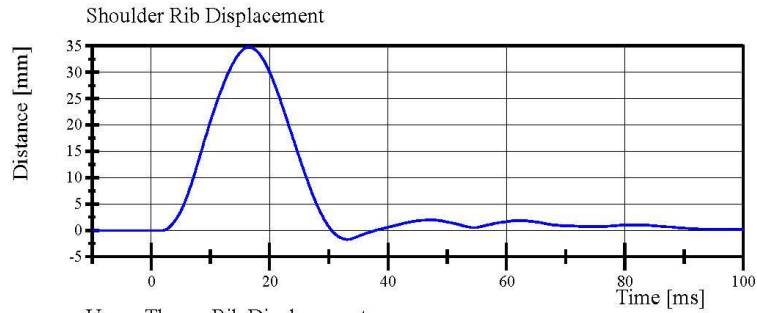
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.28.2024 12:49:43 631

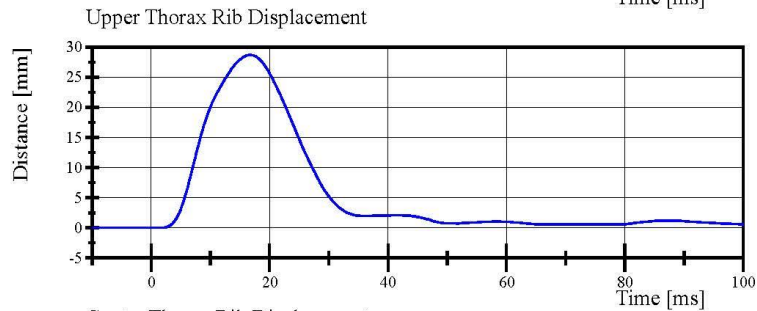


Transportation Research Center Inc.

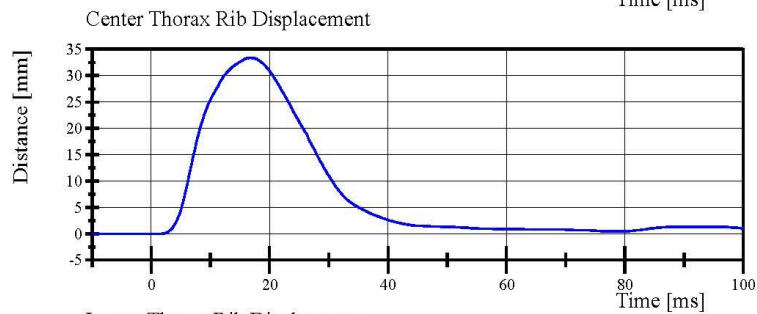
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 27-2
Test Date: 6/28/2024



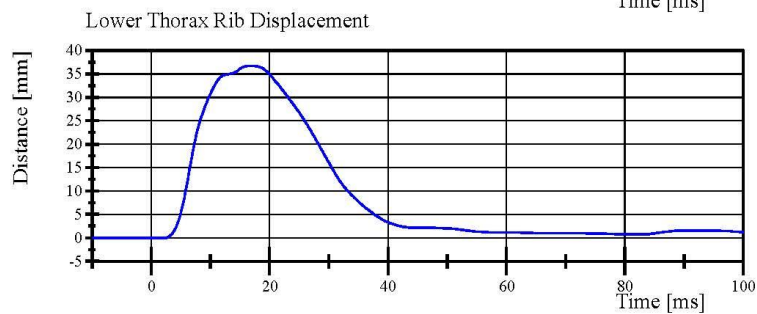
Filter Class: CFC_600
Max: 34.7 mm at 16.5 ms
Min: -1.7 mm at 33.1 ms



Filter Class: CFC_600
Max: 28.7 mm at 16.7 ms
Min: -0.0 mm at 2.0 ms



Filter Class: CFC_600
Max: 33.4 mm at 16.7 ms
Min: -0.0 mm at -9.8 ms



Filter Class: CFC_600
Max: 36.7 mm at 16.4 ms
Min: -0.0 mm at 2.4 ms

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

06.28.2024 12:49:44 631



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 27-1
Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	67 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.335 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.0 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.6 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.6 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	39.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.2 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

06.28.2024 11:29:02 869

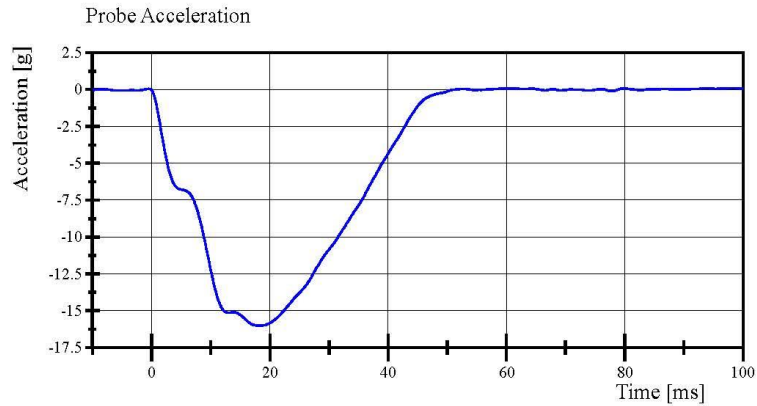


Transportation Research Center Inc.

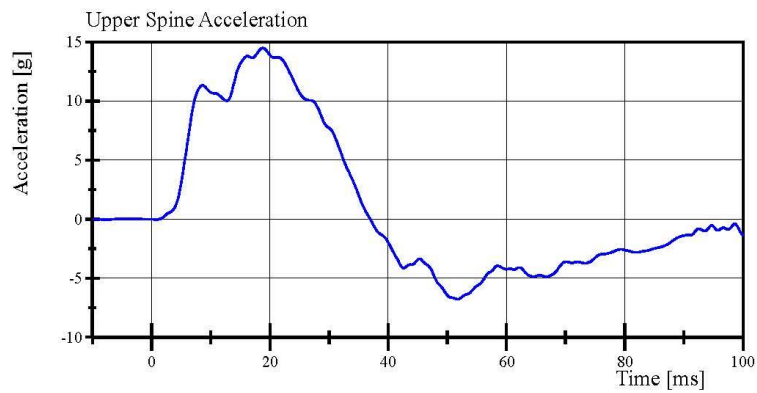
Left Lateral Thorax without Arm

SID IIs Serial No. DQ0570 Certification No. 27-1

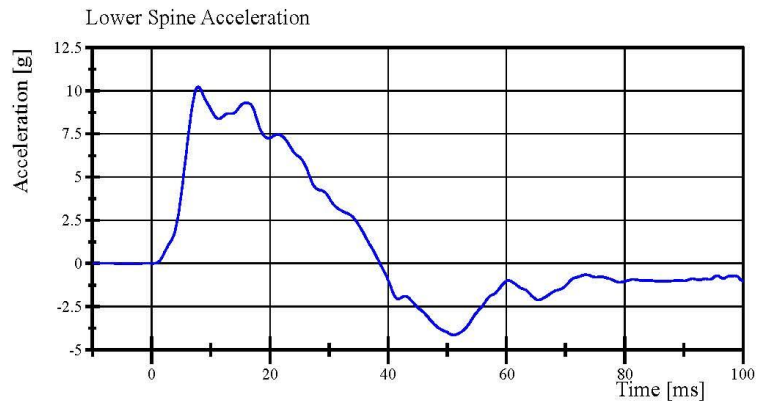
Test Date: 6/28/2024



Filter Class: CFC_180
Max: 0.1 g at 98.4 ms
Min: -16.0 g at 18.2 ms



Filter Class: CFC_180
Max: 14.5 g at 18.8 ms
Min: -6.8 g at 51.8 ms



Filter Class: CFC_180
Max: 10.2 g at 7.8 ms
Min: -4.1 g at 51.0 ms

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

06.28.2024 11:30:01 869

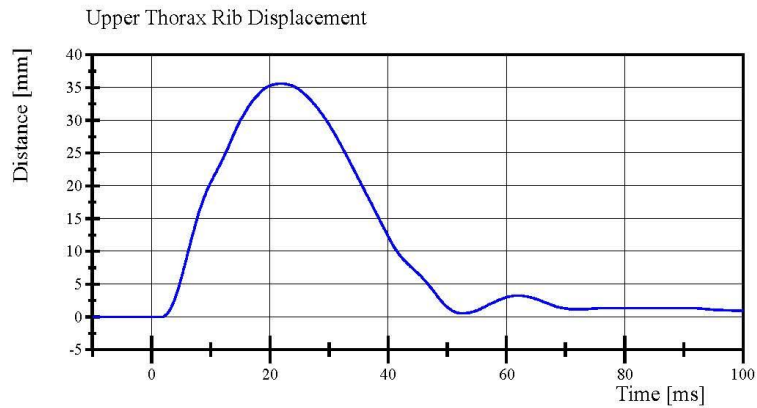


Transportation Research Center Inc.

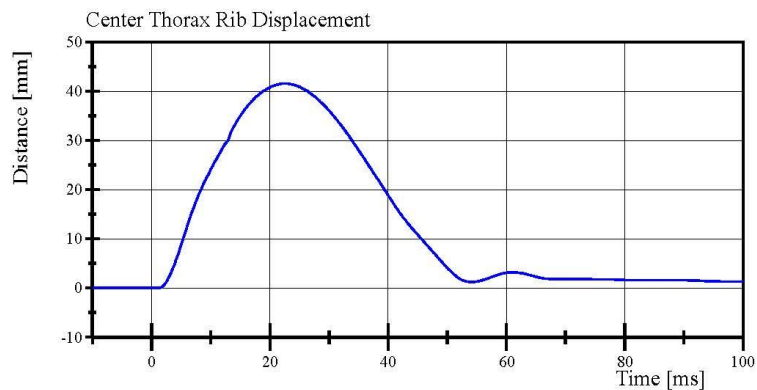
Left Lateral Thorax without Arm

SID IIs Serial No. DQ0570 Certification No. 27-1

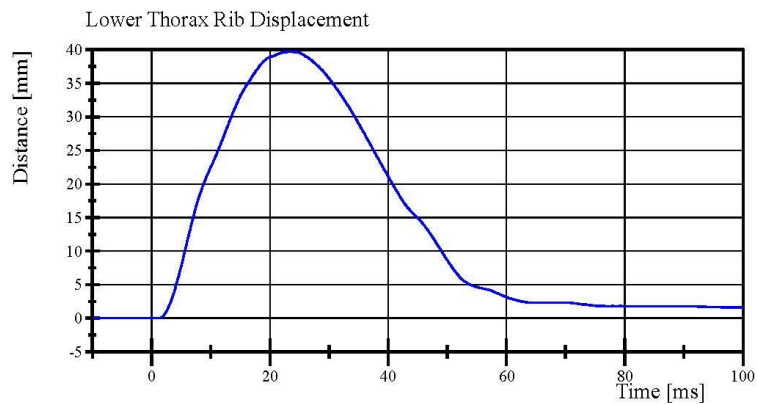
Test Date: 6/28/2024



Filter Class: CFC_600
Max: 35.6 mm at 22.0 ms
Min: -0.0 mm at 1.7 ms



Filter Class: CFC_600
Max: 41.6 mm at 22.4 ms
Min: -0.0 mm at 0.1 ms



Filter Class: CFC_600
Max: 39.7 mm at 23.4 ms
Min: -0.0 mm at 1.3 ms

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

06.28.2024 11:30:01 869



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. DQ0570 Certification No. 27-1

Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	62 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	38.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	12.12 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

Shoulder Rib S/N: DO9814

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

06.28.2024 11:12:56 700

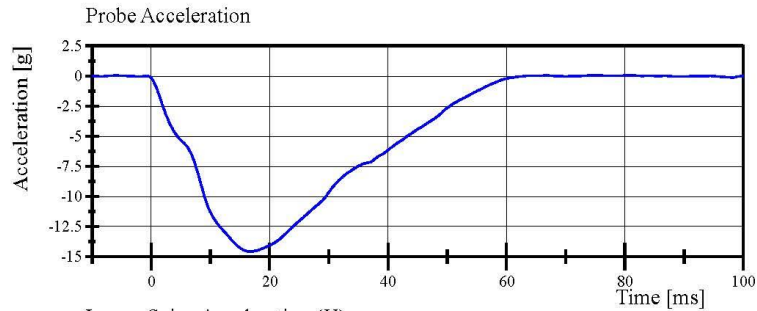


Transportation Research Center Inc.

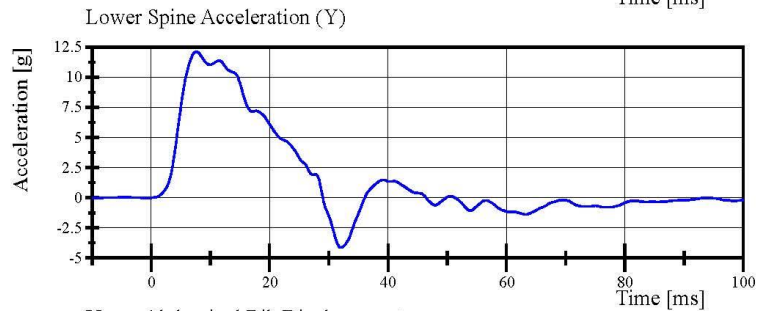
Left Lateral Abdomen

SID IIs Serial No. DQ0570 Certification No. 27-1

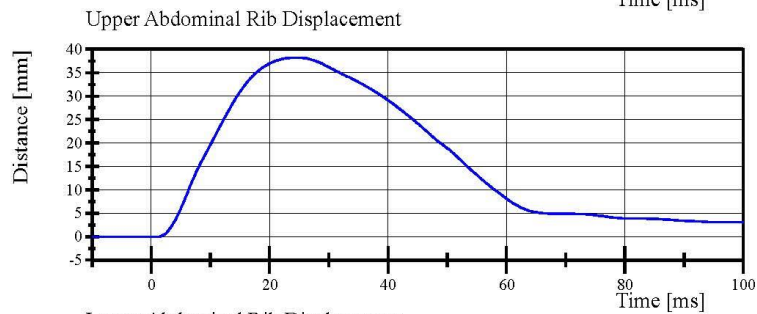
Test Date: 6/28/2024



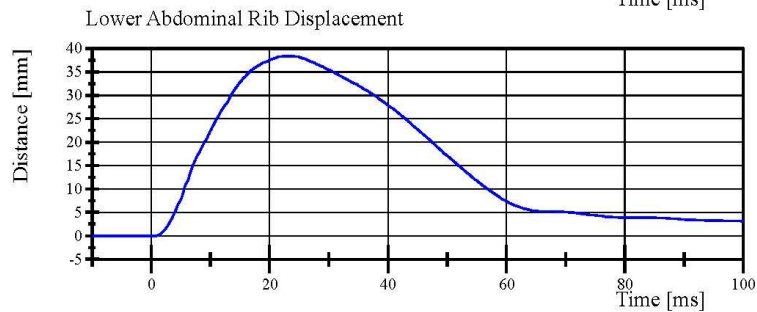
Filter Class: CFC_180
Max: 0.1 g at 74.4 ms
Min: -14.6 g at 16.7 ms



Filter Class: CFC_180
Max: 12.1 g at 7.6 ms
Min: -4.1 g at 32.1 ms



Filter Class: CFC_600
Max: 38.2 mm at 24.7 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 38.4 mm at 23.0 ms
Min: -0.0 mm at 0.6 ms

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

06.28.2024 11:13:25 700



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIS Serial No. DQ0570 Certification No. 27-2

Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	62 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.47 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	34.7 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,737.6 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1173

Pelvis Plug Info:

Manufacturer: SACO

S/N: 14634

Cal Date: 20201221

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

06.28.2024 15:16:30 467

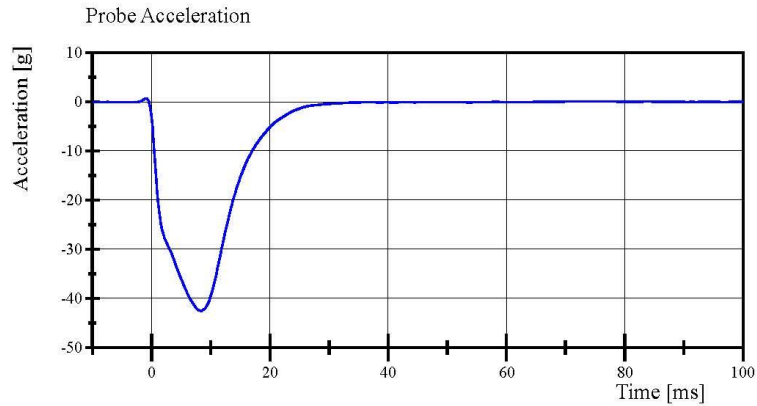


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DQ0570 Certification No. 27-2

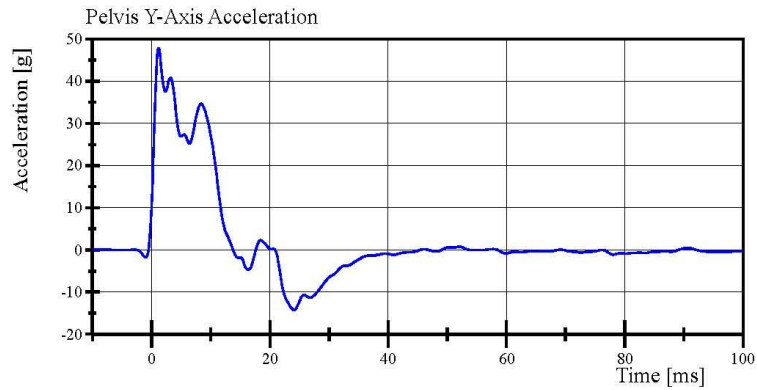
Test Date: 6/28/2024



Filter Class: CFC_180

Max: 0.7 g at -1.0 ms

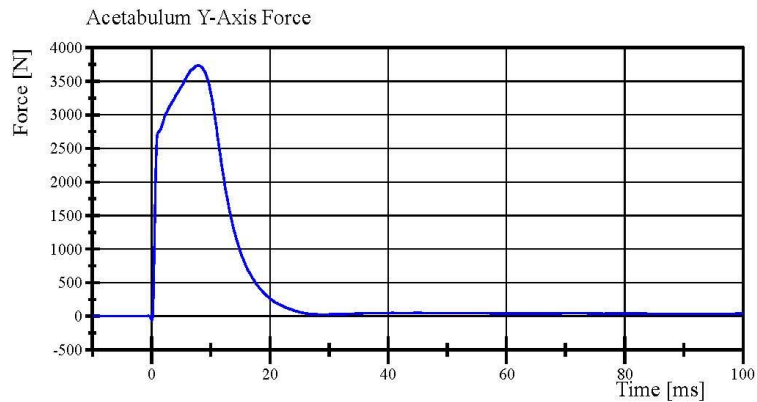
Min: -42.5 g at 8.3 ms



Filter Class: CFC_180

Max: 47.8 g at 1.2 ms

Min: -14.3 g at 24.1 ms



Filter Class: CFC_600

Max: 3,737.6 N at 7.9 ms

Min: -58.6 N at 0.0 ms

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

06.28.2024 15:17:37 467



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DQ0570 Certification No. 27-1

Test Date: 6/28/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	67 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	35.7 g	Yes
Iliac Force	4,100 - 5,100 N	4,748.7 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1173

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

06.28.2024 10:34:52 701

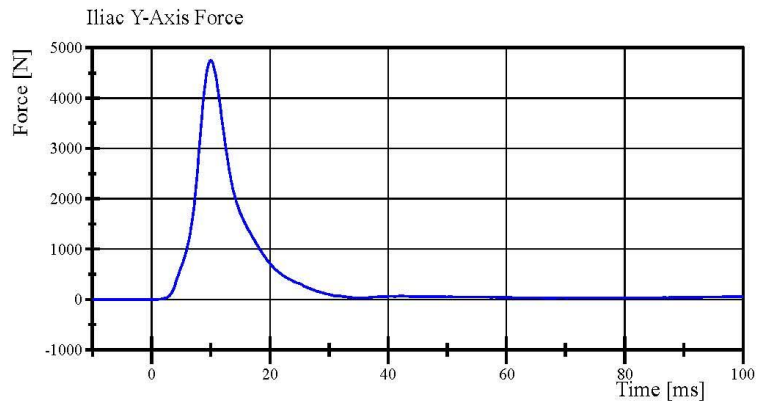
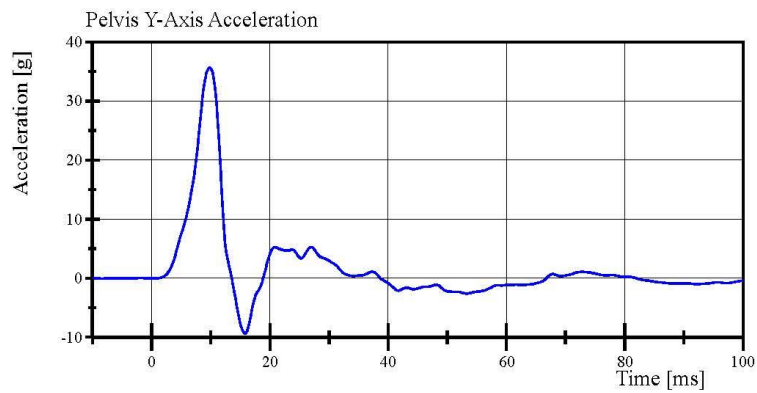
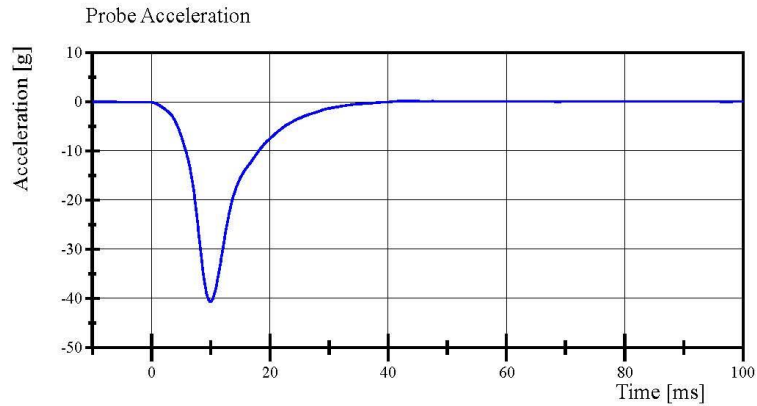


Transportation Research Center Inc.

Left Lateral Iliac

SID IIS Serial No. DQ0570 Certification No. 27-1

Test Date: 6/28/2024



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

06.28.2024 10:35:22 701



Post-Test Calibration Sheets
Passenger S/N DQ0570

Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. DQ0570 Calibration No. 28

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

Revised 9/29/2005



Report Number: DQ0570_S2H28

Page 29 of 31

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	66 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	129.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.03 %	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

07.26.2024 11:17:43 233

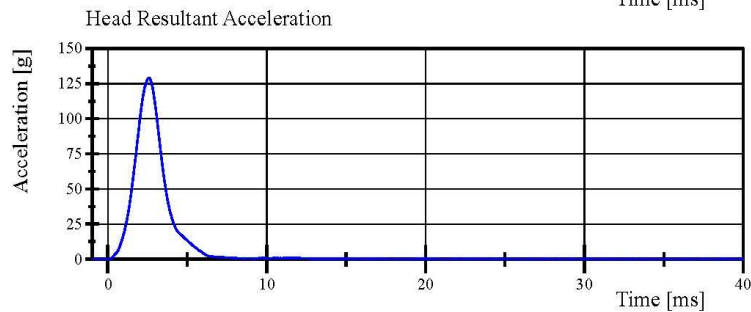
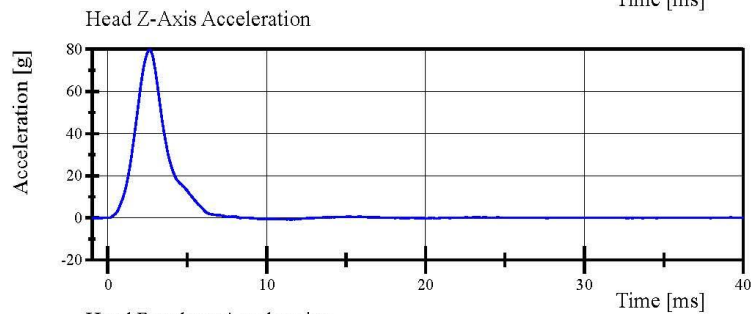
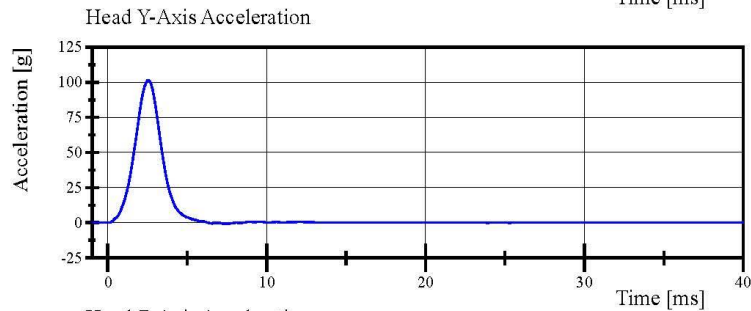
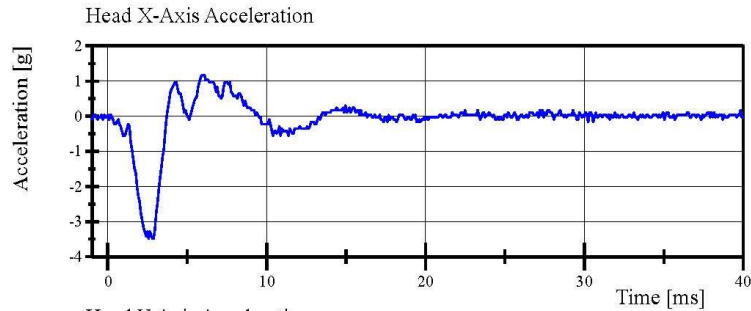


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024



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

07.26.2024 11:18:32 233



Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	61 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.629 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.584 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.729 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.053 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.888 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.892 m/s	Yes
Maximum Headform Flexion			
Peak	(-71) - (-81) deg	-73.4 deg	Yes
Time of Peak	50 - 70 ms	58.0 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.5 N·m	Yes
Decay to 0 N·m	102 - 126 ms	107.8 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 717

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

07.26.2024 12:49:48 750

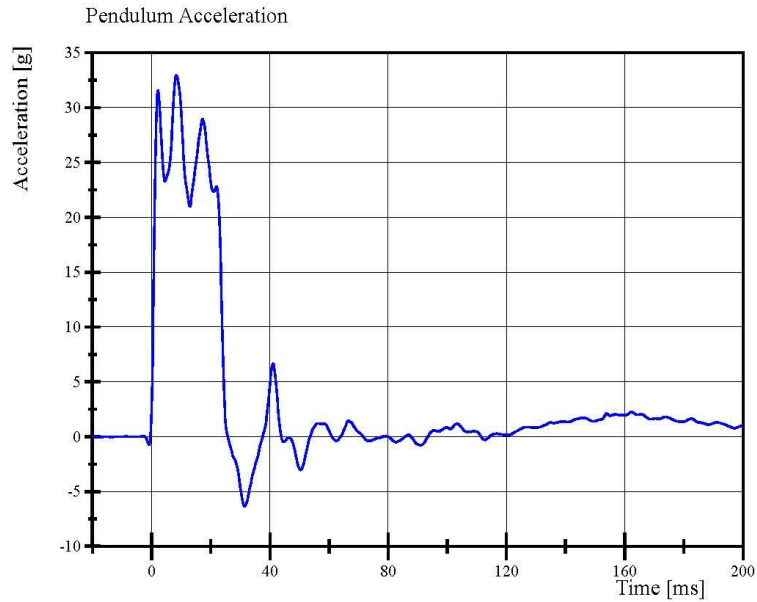


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. DQ0570 Certification No. 28-1

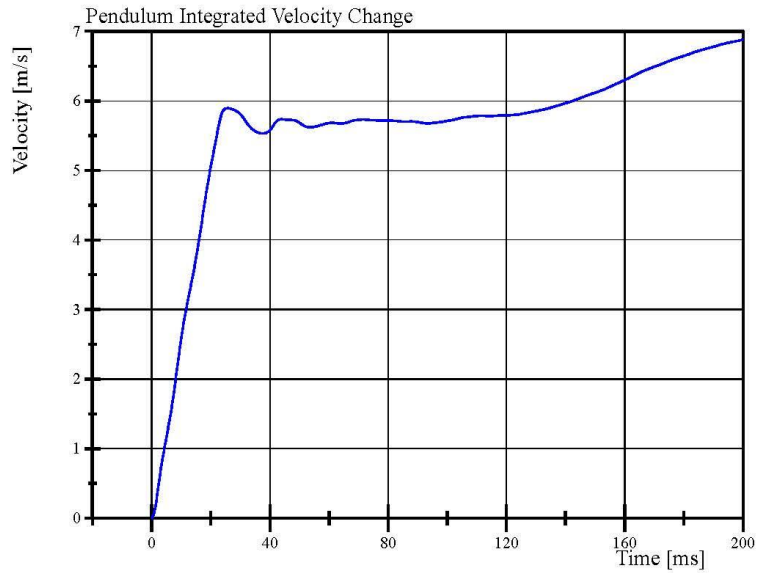
Test Date: 7/26/2024



Filter Class: CFC_180

Max: 32.9 g at 8.4 ms

Min: -6.3 g at 31.4 ms



Filter Class: CFC_180

Max: 6.9 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

07.26.2024 12:50:12 750



Report Number: DQ0570_S2H28

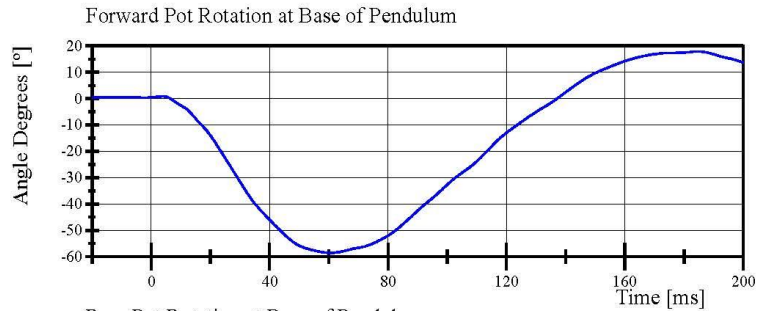
Page 12 of 31

Transportation Research Center Inc.

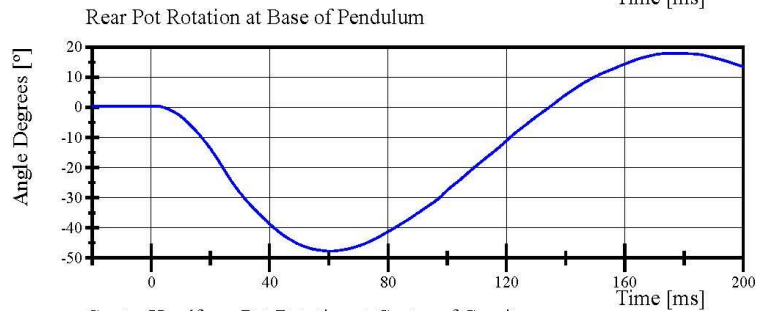
Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 28-1

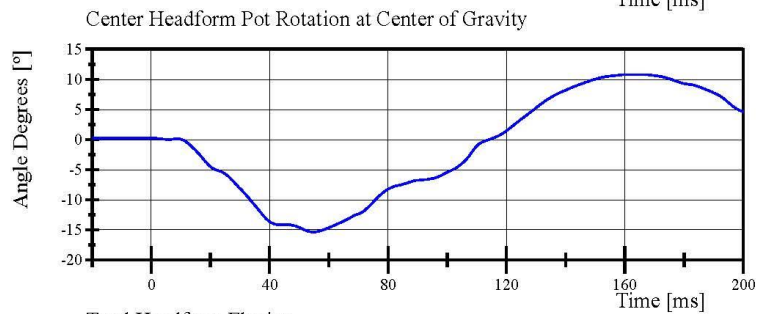
Test Date: 7/26/2024



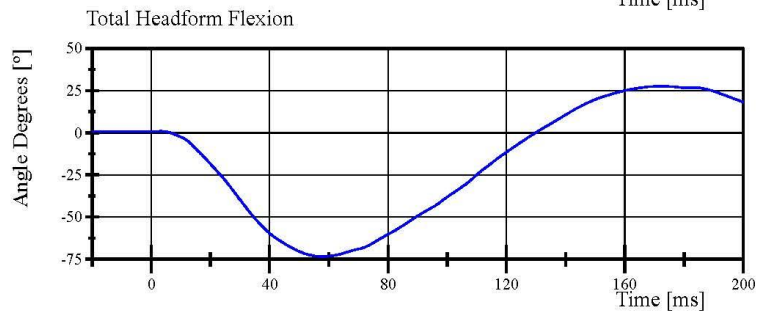
Filter Class: CFC_60
Max: 17.9 ° at 184.6 ms
Min: -58.6 ° at 60.6 ms



Filter Class: CFC_60
Max: 18.0 ° at 176.8 ms
Min: -47.7 ° at 60.5 ms



Filter Class: CFC_60
Max: 10.8 ° at 163.8 ms
Min: -15.3 ° at 54.8 ms



Filter Class: CFC_60
Max: 27.6 ° at 172.2 ms
Min: -73.4 ° at 58.0 ms

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

07.26.2024 12:50:12 750



Transportation Research Center Inc.

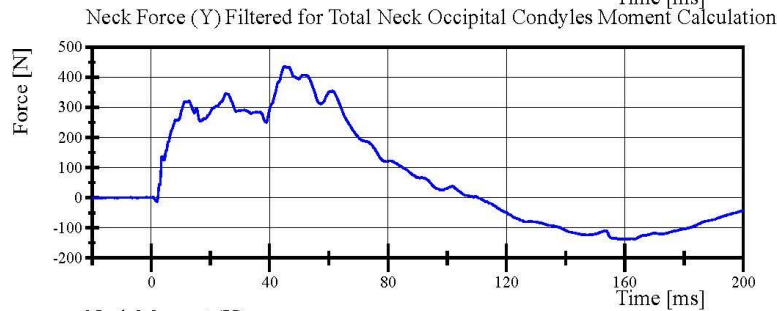
Left Lateral Neck

SID IIS Serial No. DQ0570 Certification No. 28-1

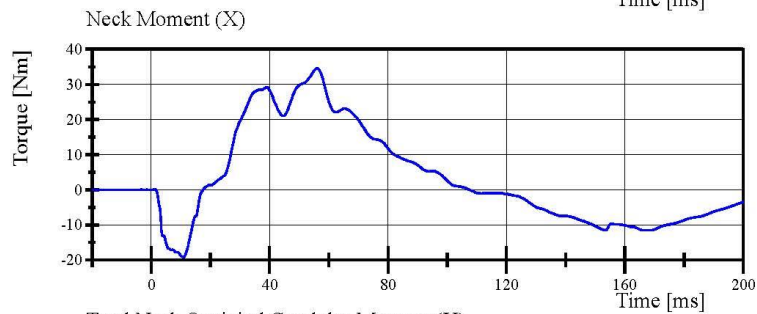
Test Date: 7/26/2024



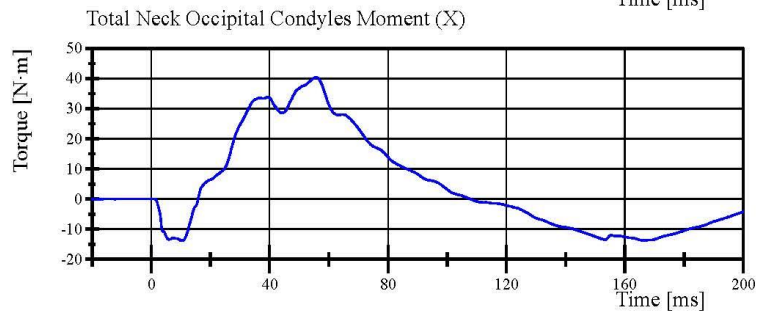
Filter Class: CFC_1000
Max: 438.2 N at 45.2 ms
Min: -138.9 N at 161.0 ms



Filter Class: CFC_600
Max: 436.2 N at 45.2 ms
Min: -138.5 N at 161.1 ms



Filter Class: CFC_600
Max: 34.6 Nm at 56.0 ms
Min: -19.2 Nm at 11.0 ms



Filter Class: Without_(Constar
Max: 40.5 N·m at 55.7 ms
Min: -13.8 N·m at 10.2 ms

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

07.26.2024 12:50:13 750



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-14.9 g	Yes
Shoulder Displacement	28 - 37 mm	32.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.2 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

Shoulder Rib S/N: DO9814

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

07.26.2024 09:04:06 823

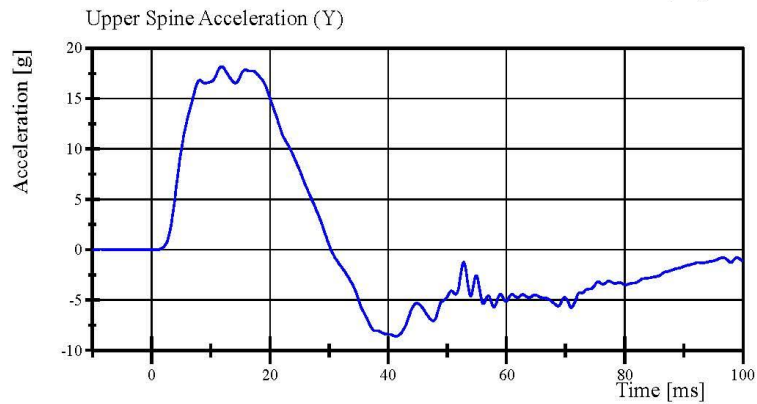
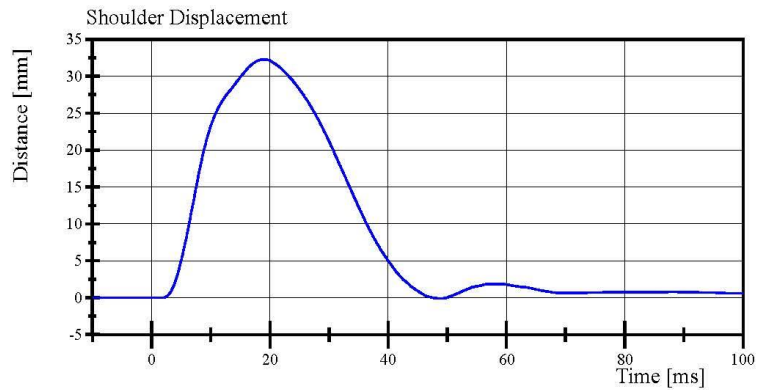
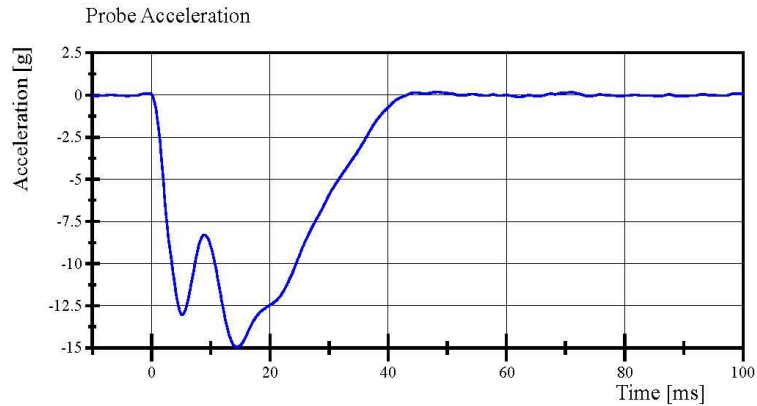


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024



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

07.26.2024 09:04:30 823



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 28-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	66 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.716 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.3 g	Yes
Shoulder Displacement	31 - 40 mm	36.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	29.5 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	33.0 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	35.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.4 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: DP8451

Shoulder Rib S/N: 180-3355 DO9814

Upper Thorax Rib S/N: 180-3362 DP6492

Middle Thorax Rib S/N: 180-3362 DP6493

Lower Thorax Rib S/N: 180-3362 DP7664

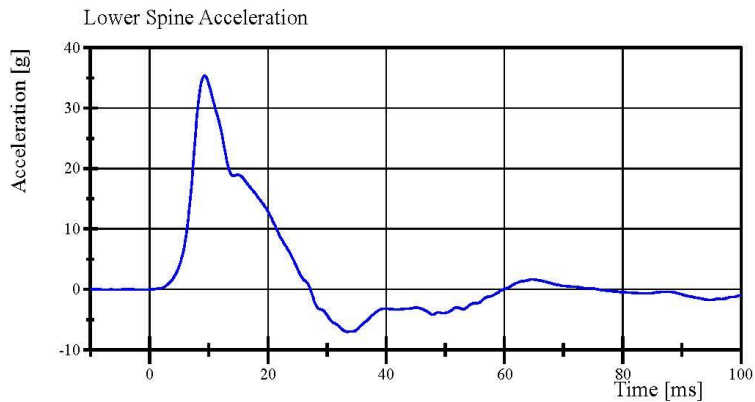
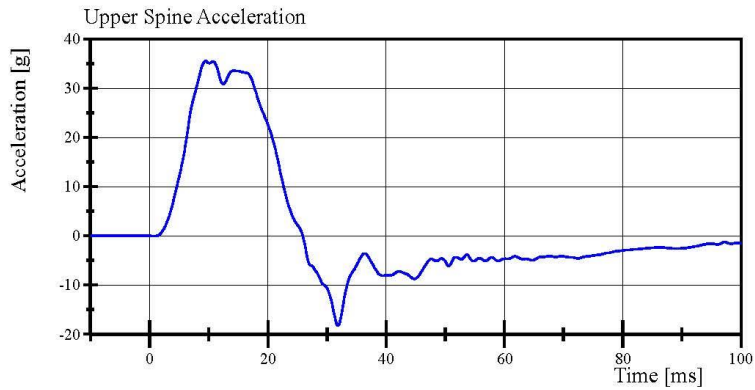
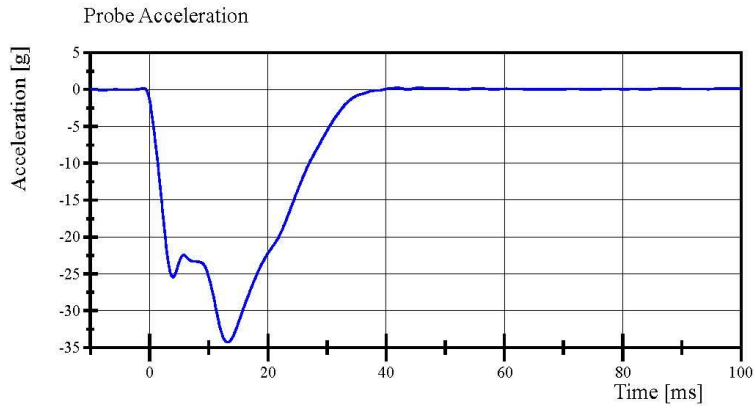
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

07.26.2024 10:06:56 623



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 28-1
Test Date: 7/26/2024



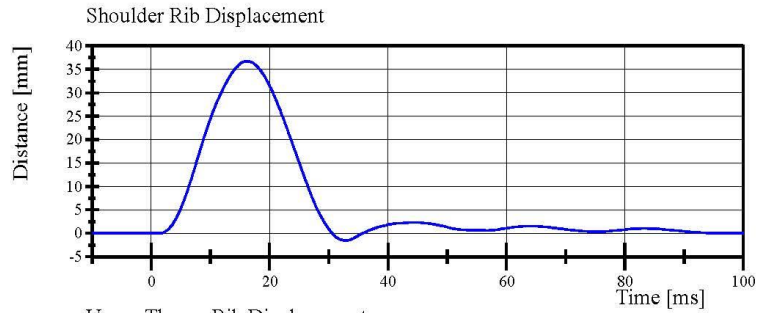
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

07.26.2024 10:07:31 623

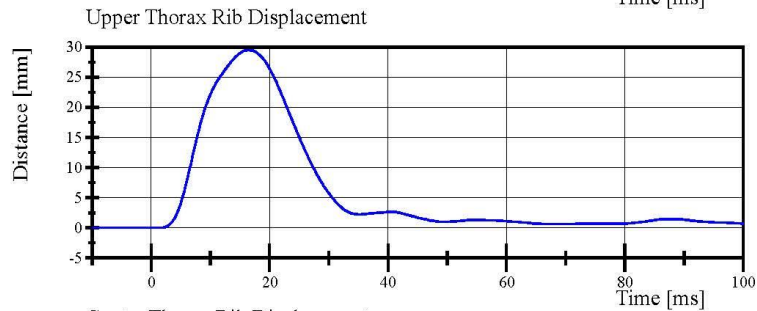


Transportation Research Center Inc.

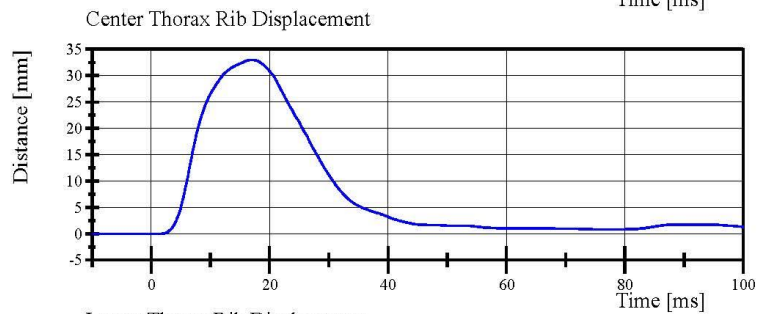
Left Lateral Thorax with Arm
SID IIs Serial No. DQ0570 Certification No. 28-1
Test Date: 7/26/2024



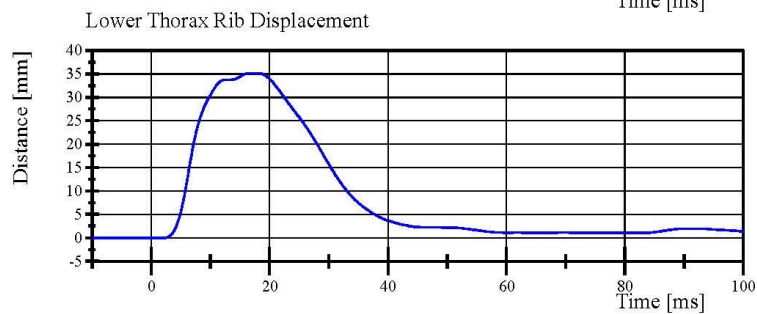
Filter Class: CFC_600
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Min: -1.5 mm at 33.0 ms



Filter Class: CFC_600
Max: 29.5 mm at 16.4 ms
Min: -0.0 mm at 0.2 ms



Filter Class: CFC_600
Max: 33.0 mm at 17.0 ms
Min: -0.0 mm at 0.3 ms



Filter Class: CFC_600
Max: 35.2 mm at 17.0 ms
Min: -0.0 mm at 2.2 ms

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

07.26.2024 10:07:31 623



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DQ0570 Certification No. 28-1
Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	64 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.332 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.8 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	38.4 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	42.4 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.8 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.2 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

07.26.2024 09:31:00 771

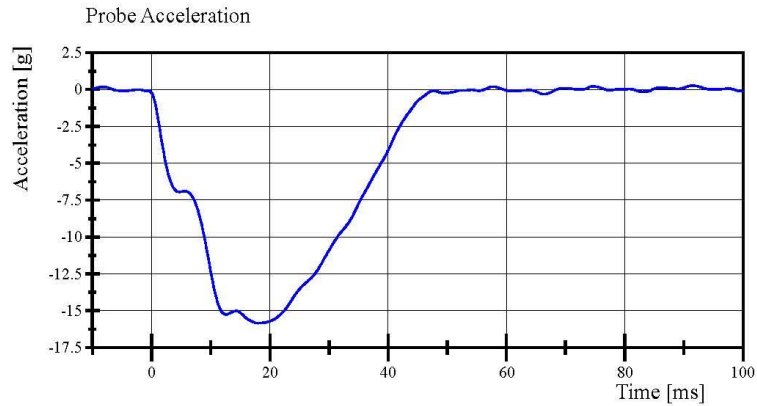


Transportation Research Center Inc.

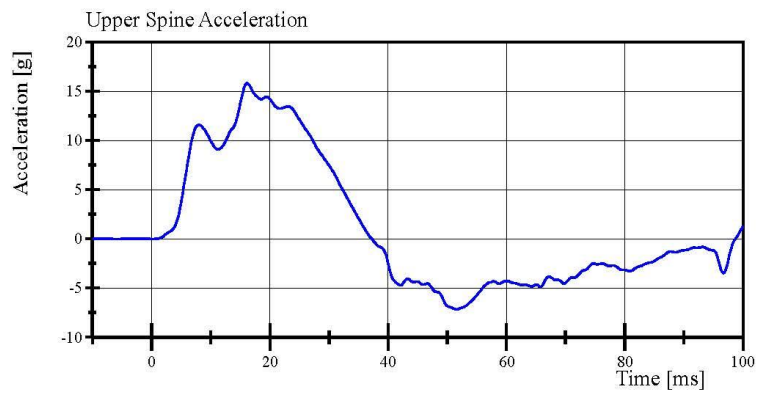
Left Lateral Thorax without Arm

SID IIs Serial No. DQ0570 Certification No. 28-1

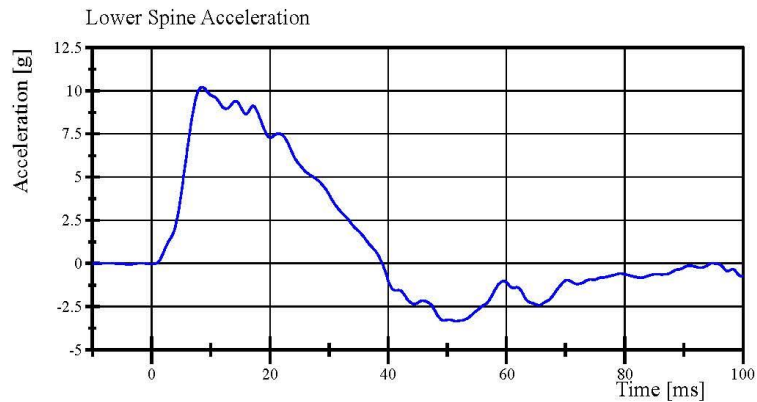
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 0.3 g at 91.4 ms
Min: -15.8 g at 18.0 ms



Filter Class: CFC_180
Max: 15.8 g at 16.2 ms
Min: -7.2 g at 51.6 ms



Filter Class: CFC_180
Max: 10.2 g at 8.5 ms
Min: -3.3 g at 51.4 ms

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

07.26.2024 09:31:28 771

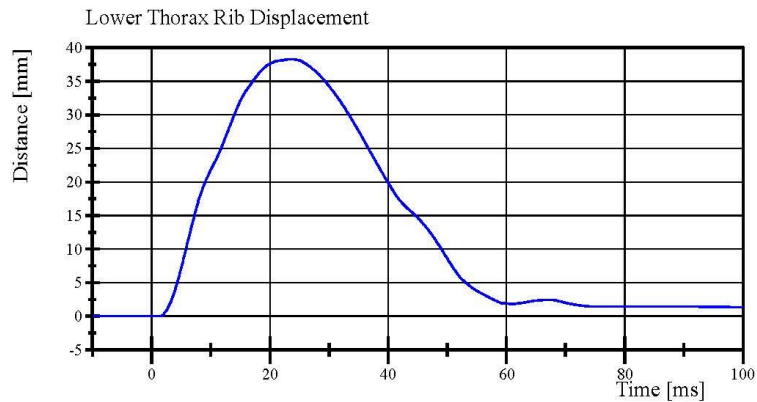
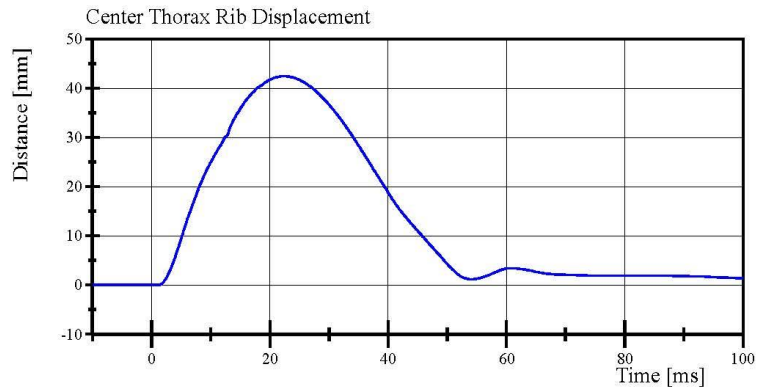
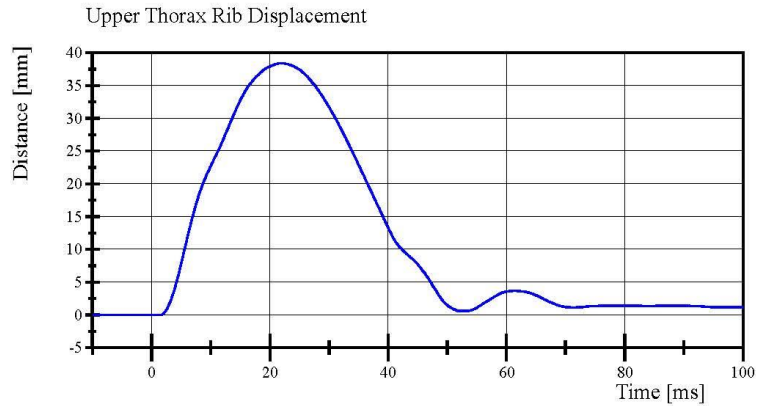


Transportation Research Center Inc.

Left Lateral Thorax without Arm

SID IIs Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024



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

07.26.2024 09:31:28 771



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.4 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	40.4 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	12.59 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

07.26.2024 09:15:22 645

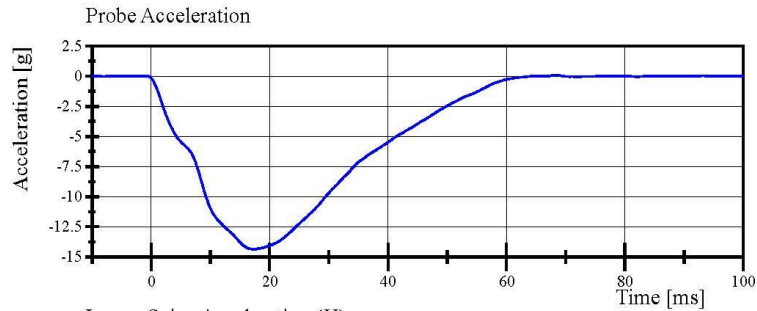


Transportation Research Center Inc.

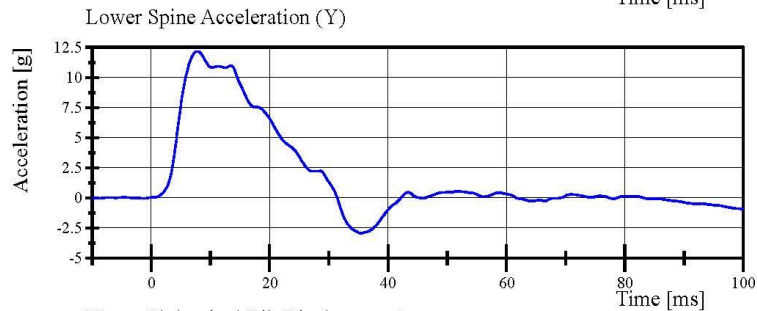
Left Lateral Abdomen

SID IIs Serial No. DQ0570 Certification No. 28-1

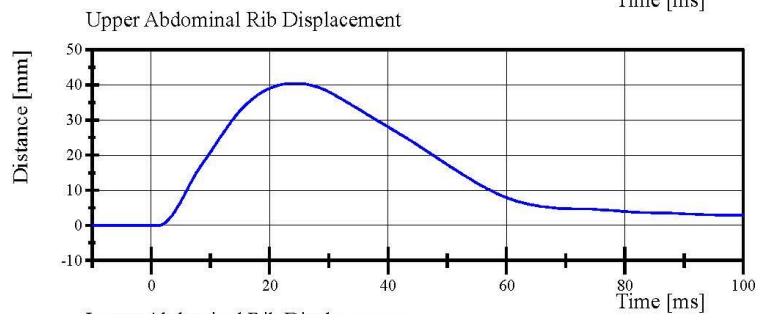
Test Date: 7/26/2024



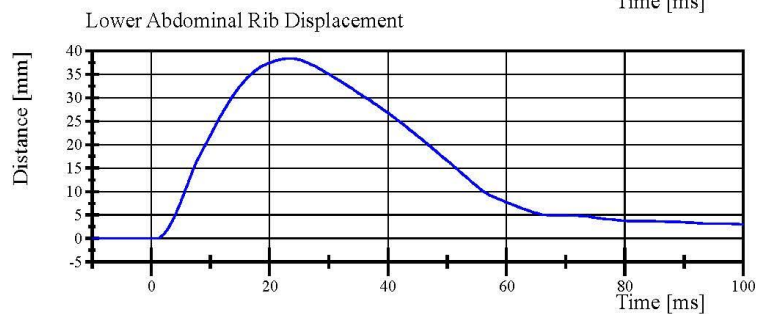
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Min: -14.4 g at 17.4 ms



Filter Class: CFC_180
Max: 12.2 g at 7.8 ms
Min: -2.9 g at 35.4 ms



Filter Class: CFC_600
Max: 40.4 mm at 24.2 ms
Min: -0.0 mm at -5.8 ms



Filter Class: CFC_600
Max: 38.4 mm at 23.4 ms
Min: -0.0 mm at 0.9 ms

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

07.26.2024 09:17:05 645



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DQ0570 Certification No. 28-2

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	65 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.49 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.5 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,659.9 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1173

Pelvis Plug Info:

Manufacturer: SACO

S/N: 14538

Cal Date: 20201218

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

07.26.2024 13:34:38.445

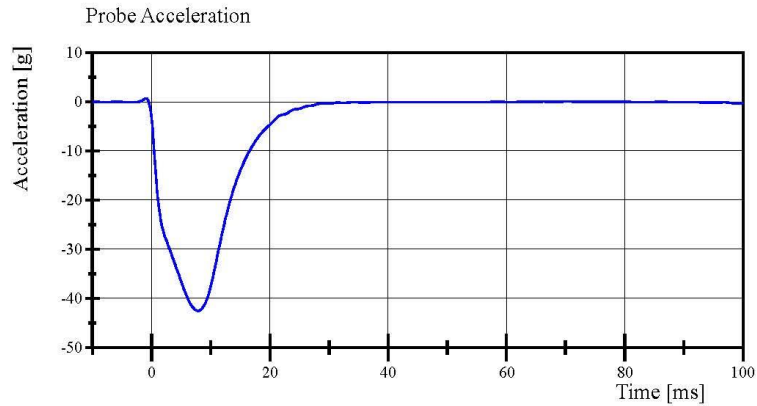


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DQ0570 Certification No. 28-2

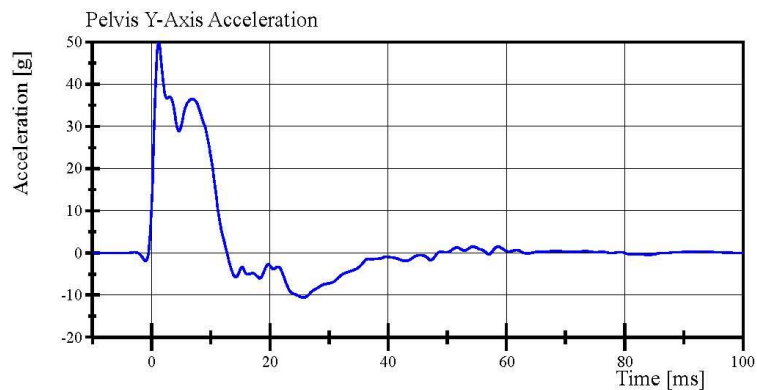
Test Date: 7/26/2024



Filter Class: CFC_180

Max: 0.7 g at -1.0 ms

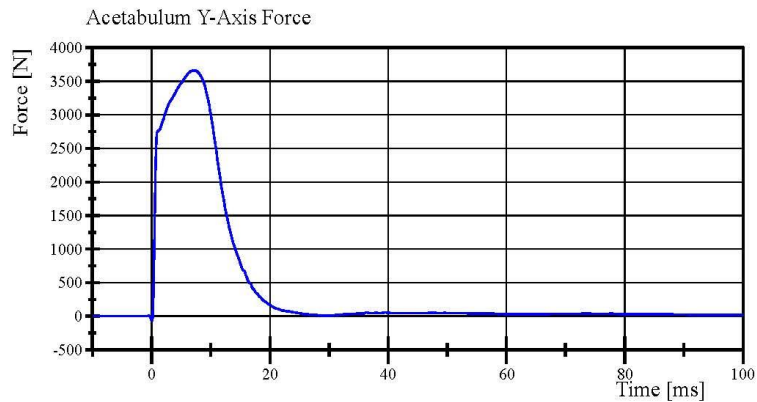
Min: -42.5 g at 7.8 ms



Filter Class: CFC_180

Max: 49.8 g at 1.2 ms

Min: -10.6 g at 25.7 ms



Filter Class: CFC_600

Max: 3,659.9 N at 7.3 ms

Min: -65.6 N at 0.0 ms

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

07.26.2024 13:35:31 445



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DQ0570 Certification No. 28-1

Test Date: 7/26/2024

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	66 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.0 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.7 g	Yes
Iliac Force	4,100 - 5,100 N	4,814.7 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1173

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

07.26.2024 10:54:11 648

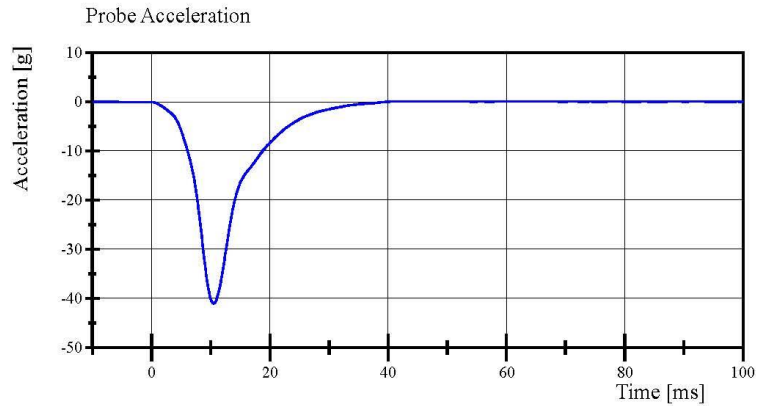


Transportation Research Center Inc.

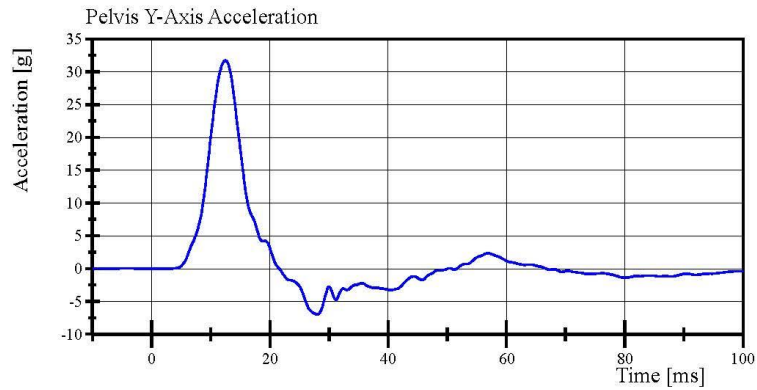
Left Lateral Iliac

SID IIs Serial No. DQ0570 Certification No. 28-1

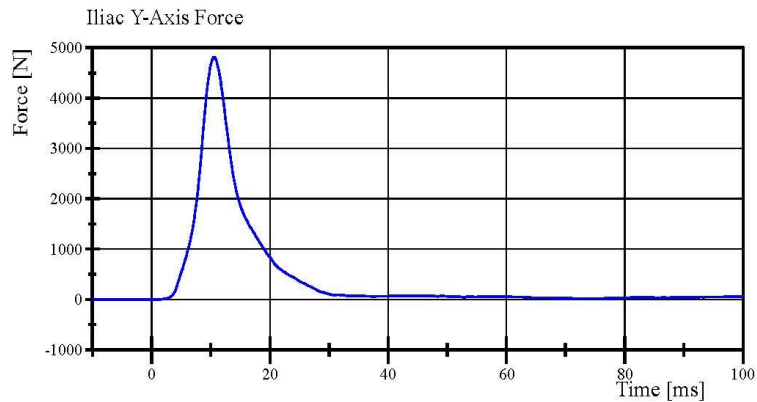
Test Date: 7/26/2024



Filter Class: CFC_180
Max: 0.2 g at 63.5 ms
Min: -41.0 g at 10.5 ms



Filter Class: CFC_180
Max: 31.7 g at 12.5 ms
Min: -7.0 g at 28.0 ms



Filter Class: CFC_600
Max: 4,814.7 N at 10.6 ms
Min: -0.3 N at -7.3 ms

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

07.26.2024 10:54:34 648



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		T14583	Endevco	01-May-2024
	Y		T13068	Endevco	01-May-2024
	Z		T14569	Endevco	01-May-2024
Redundant Head Accelerometers	X		T17635	Endevco	01-May-2024
	Y		T14567	Endevco	01-May-2024
	Z		T14586	Endevco	01-May-2024
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	01-May-2024
	Middle	Y	174	Honeywell	01-May-2024
	Lower	Y	0913	Honeywell	01-May-2024
Abdomen Load Cells	Front	Y	1441	Denton	01-May-2024
	Middle	Y	1436	Denton	01-May-2024
	Rear	Y	1437	Denton	01-May-2024
Lower Spine Accelerometers (T12)	X		T16354	Endevco	01-May-2024
	Y		T17602	Endevco	01-May-2024
	Z		T17625	Endevco	01-May-2024
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	465-FY	Denton	01-May-2024

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N DQ0570			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	T18335	Endevco	29-Apr-2024
				Y	T24497	Endevco	29-Apr-2024
				Z	T18333	Endevco	29-Apr-2024
Redundant Head Accelerometers				X	T25601	Endevco	29-Apr-2024
				Y	T25566	Endevco	29-Apr-2024
				Z	T20557	Endevco	29-Apr-2024
Displacement Potentiometers	Shoulder			N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	1-May-2024	
		Middle	Y	037	Servo	1-May-2024	
		Lower	Y	048	Servo	30-Apr-2024	
	Abdominal Rib	Upper	Y	1295	Servo	1-May-2024	
		Lower	Y	1136	Servo	1-May-2024	
Lower Spine Accelerometers (T12)				X	T14559	Endevco	29-Apr-2024
				Y	T13682	Endevco	29-Apr-2024
				Z	T18476	Endevco	29-Apr-2024
Acetabulum Load Cell				Y	DK7483S-FY	FTSS	29-Apr-2024
Iliac Wing Load Cell				Y	287-FY	Denton	30-Apr-2024
Pelvis Plug (struck side)					14628	SACO	21-Dec-2020
Pelvis Plug (non-struck side)					14631	SACO	21-Dec-2020

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A385698	Measurement Specialties	18-Jun-2024
	Vehicle Center of Gravity	Y	A386417	Measurement Specialties	23-May-2024
	Vehicle Center of Gravity	Z	A386362	Measurement Specialties	18-Jun-2024
2	Right Sill at Front Seat	X	A385699	Measurement Specialties	18-Jun-2024
	Right Sill at Front Seat	Y	A254929	Measurement Specialties	25-Mar-2024
	Right Sill at Front Seat	Z	A386297	Measurement Specialties	30-Apr-2024
3	Right Sill at Rear Seat	X	A386295	Measurement Specialties	30-Apr-2024
	Right Sill at Rear Seat	Y	A385709	Measurement Specialties	18-Jun-2024
	Right Sill at Rear Seat	Z	A385713	Measurement Specialties	18-Jun-2024
4	Left Sill at Front Door	Y	A385757	Measurement Specialties	23-May-2024
5	Left Sill at Rear Door	Y	A385739	Measurement Specialties	30-Apr-2024
6	Left A-Post Lower	Y	A385755	Measurement Specialties	23-May-2024
7	Left A-Post Middle	Y	A386305	Measurement Specialties	30-Apr-2024
8	Left B-Post Lower	Y	A349889	Measurement Specialties	6-Jun-2024
9	B-Post Middle	Y	A381839	Measurement Specialties	21-Mar-2024
10	Front Seat Track	Y	A378289	Measurement Specialties	23-May-2024
11	Rear Seat Track or Structure	Y	A400110	Measurement Specialties	6-Jun-2024
12	Right Rear Occupant Compartment	Y	A400091	Measurement Specialties	23-May-2024
13	Engine Block	X	A385705	Measurement Specialties	18-Jun-2024
	Engine Block	Y	A385711	Measurement Specialties	18-Jun-2024
14	Rear Floorpan Above Axle	X	A400084	Measurement Specialties	30-Apr-2024
	Rear Floorpan Above Axle	Y	A377501	Measurement Specialties	21-Mar-2024
	Rear Floorpan Above Axle	Z	A385704	Measurement Specialties	18-Jun-2024

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	A386333	Measurement Specialties	30-Apr-2024
MDB Center of Gravity	Y	A378288	Measurement Specialties	30-Apr-2024
MDB Center of Gravity	Z	A385748	Measurement Specialties	30-Apr-2024
Left Frame Rail at Rear Axle Centerline	X	A385742	Measurement Specialties	30-Apr-2024
Left Frame Rail at Rear Axle Centerline	Y	A386414	Measurement Specialties	30-Apr-2024