

FINAL REPORT NUMBER: SPNCAP-TRC-23-004

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**BAYERISCHE MOTOREN WERKE AG
2023 MINI Countryman 5HB
NHTSA NUMBER: M20234104**

**PREPARED BY:
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Report Date: January 22, 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: January 22, 2024

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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Technical Report Documentation Page

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16. Abstract A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject vehicle, a 2023 MINI Countryman 5HB, in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on June 14, 2023. The impact velocity was 32.29 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.8° C. The test vehicle's post-test maximum crush was 311 mm at Level 3. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th><th>Unit</th><th>Threshold</th><th>Front SID-IIs</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆):</td><td>NA</td><td>1000</td><td>306.670</td></tr> <tr> <td>Resultant Lower Spine Acceleration:</td><td>g's</td><td>82</td><td>31.430</td></tr> <tr> <td>Total Pelvic Force: (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>2763.620</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>23.260</td></tr> <tr> <td>Maximum Abdomen Rib Deflection</td><td>mm</td><td>45*</td><td>24.380</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					Unit	Threshold	Front SID-IIs	Head Injury Criteria (HIC ₃₆):	NA	1000	306.670	Resultant Lower Spine Acceleration:	g's	82	31.430	Total Pelvic Force: (sum of acetabular and iliac forces)	N	5525	2763.620	Maximum Thoracic Rib Deflection	mm	38*	23.260	Maximum Abdomen Rib Deflection	mm	45*	24.380
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave Washington, DC 20590																									
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SECTION 1

TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY23 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 2023 MINI Countryman 5HB manufactured by BAYERISCHE MOTOREN WERKE AG. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a model year 2023 MINI Countryman 5HB. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.29 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on June 14, 2023. Pre-test and post-test photographs of the test vehicle and the side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated March 2020. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Primary and Redundant Head CG Triaxial Accelerometers
- Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
- Abdomen Upper and Lower Rib Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Iliac Load Cell
- Acetabulum Load Cell

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 contains the test equipment and instrumentation calibration data.

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	NA	1000	306.670
Lower Spine Acceleration Resultant	G	82	31.430
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2763.620
Maximum Thoracic Rib Deflection	mm	38*	23.260
Maximum Abdominal Rib Deflection	mm	45*	24.380

* 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		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Torso 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

GENERAL COMMENTS

Engine Top Acceleration (Y) QD after 39.0 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20234104
Model Year	2023
Make	Mini
Model	Countryman
Body Style	MPV
VIN	WMZ253BR02P3P94035
Body Color	Rooftop Grey Metallic
Odometer Reading (km/mi)	80 mi
Engine Displacement (L)	2.0
Type/No. Cylinders	Straight/4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	FWD
Roof Rack	Yes
Sunroof/T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	BAYERISCHE MOTOREN WERKE AG
Date of Manufacturer	11/22
Vehicle Type	MPV

GVWR (kg)	2060
GAWR Front (kg)	1090
GAWR Rear (kg)	1025

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Vehicle Capacity Weight (VCW) (kg)				430.0
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				89.8

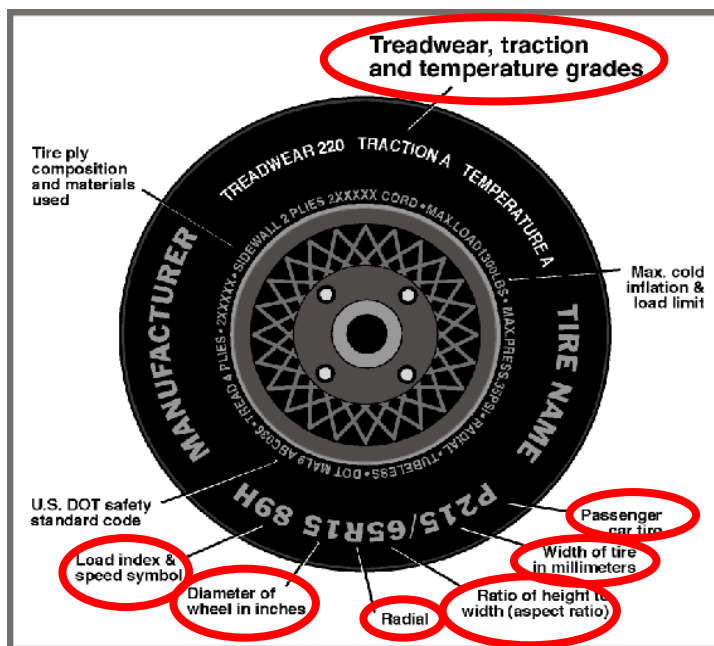
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	225/50R18 95	225/50R18 95
Tire Size on Vehicle	225/50R18	225/50R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Turanza	Turanza
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	95V	95V
Tire Material	Rayon, Polyester, Steel	Rayon, Polyester, Steel
DOT Safety Code Left	7G1N U3K 4022	7G1N U3K 4022
DOT Safety Code Right	7G1N U3K 4022	7G1N U3K 4022

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

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	248	248	248	248
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

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	462.4	331.6		477.8	405.0		483.8	400	
Right	kg	464.2	322.6		453.4	376.2		472.6	363.2	
Ratio	%	58.6	41.4		54.4	45.6		55.6	44.4	
Totals	kg	926.6	654.2	1580.8	931.2	781.2	1712.4	956.4	763.2	1719.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total As Delivered Weight (UVW)	kg	1580.8
Actual Weight of 1 P572V ATD (SID-ILs) Dummy Used	kg	49.0
Rated Cargo/Luggage Weight (RCLW)	kg	89.8
Calculated Vehicle Target Weight (TVTW)	kg	1719.6

(A)
 (B)
 (C)
 (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

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	0.0	0.0	0.2	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	0.0	0.0	0.1	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	0.0	-0.1	-0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	-0.3	-0.3	-0.3	Yes
Vehicle CG (Aft of Front Axle)	mm	1107	1220	1188	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+4	24	+22	

*ND=Nose Down (-), NU=Nose Up (+) **LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for "Meets Requirements".

DATA SHEET NO. 1 (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2023 MINI Countryman 5HBNHTSA No.: M20234104Test Program: SPNCAP Side ImpactTest Date: 6/14/2023**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

Component Description	Weight (kg)
Ballast: Steel plates in cargo area	38.4
Components Removed: None	0.0

Test height adjustable suspension setting, if applicable:

N/A

TEST SURFACE MARKINGS

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	1571
Aft 25 mm target	1677

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2023 MINI Countryman 5HB

NHTSA No.: M20234104

Test Program: SPNCAP Side Impact

Test Date: 6/14/2023

SEAT POSITIONING

The driver seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, 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	22.7	13.5	18.1
Front Passenger Seat	23.4	14.3	18.8
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	18.1	252	Max	265	273	280
			Mid	234	244	252
			Min	203	215	223
Front Passenger Seat	18.8	241	Max	245	254	258
			Mid	225	233	241
			Min	205	211	223
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	Fixed	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	Fixed	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	Fixed	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2023 MINI Countryman 5HB

NHTSA No.: M20234104

Test Program: SPNCAP Side Impact

Test Date: 6/14/2023

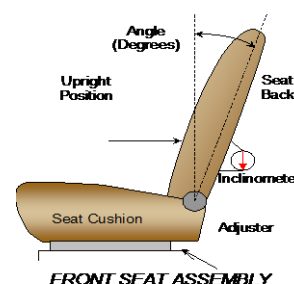
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detent*
Driver Seat	249	N/A	0	N/A
Front Passenger Seat	220	N/A	0	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A	N/A

* If applicable.

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. 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 passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1. For the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat w/ Seated Dummy	60.5	N/A	12.1	N/A
Front Passenger Seat	60.5	N/A	12.1	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	0	Fixed	0
Non-Struck Side Rear Seat	Fixed	0	Fixed	0
Rear Center Seat*	Fixed	0	Fixed	0

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted with the information provided by the manufacturer on Form No. 1

	Total # of Positions	Placed in Position #
Driver Seat	1	1

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	5	0, Full Down

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2023 MINI Countryman 5HB

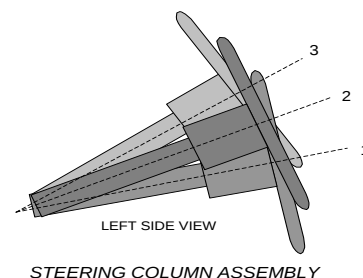
NHTSA No.: M20234104

Test Program: SPNCAP Side Impact

Test Date: 6/14/2023

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

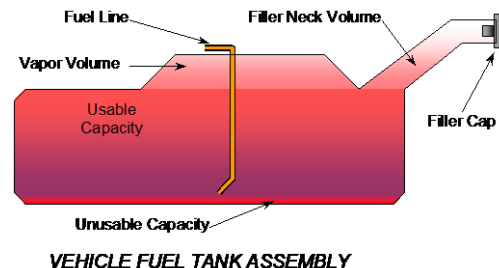


	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	39.3	
Geometric Center, Position No. 2	26.2	
Uppermost, Position No. 3	13.1	
Telescoping Steering Wheel Travel		60
Test Position	26.2	30

FUEL PUMP

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

Fuel pump starts when ignition is on. The fuel pump will operate for 5 seconds. After pressure has been built up the fuel pump switches to sleep mode until the engine will be started or the pressure decreases



FUEL TANK CAPACITY

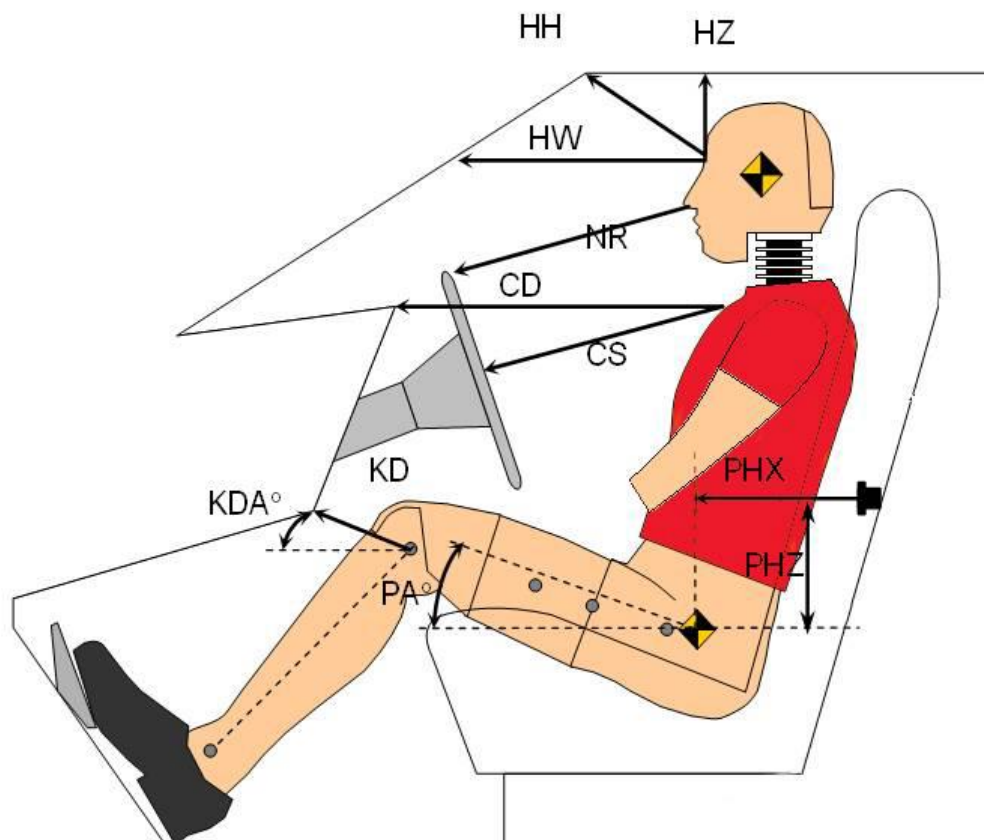
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	60.9
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	60.9
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	56.7
Actual Amount of Solvent Used in Test	56.7
1/3 of Usable Capacity	20.3

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: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023

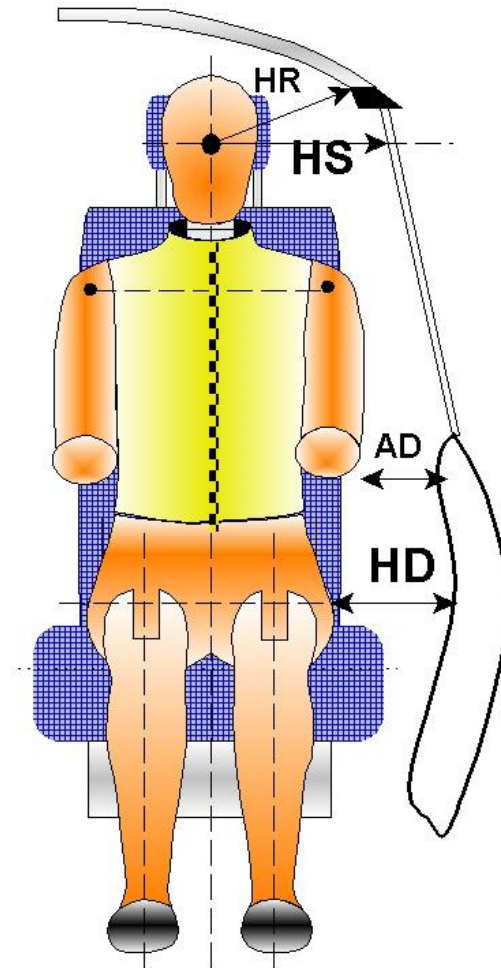


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	353	
HW	Head to Windshield	634	
HZ	Head to Visor	260	
NR	Nose to Rim	275	
CD	Chest to Dashboard	444	
CS	Chest to Steering Wheel	190	
KDL/KDLA°	Left Knee to Dash	125	9.0
KDR/KDRA°	Right Knee to Dash	98	9.0
PAX°	Pelvic Tilt Angle (X-axis)		19.2
PAY°	Pelvic Tilt Angle (Y-axis)		0.5
PHX	Hip Point to Striker (X-Axis)	305	
PHZ	Hip Point to Striker (Z-Axis)	165	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
Test Date: 6/14/2023

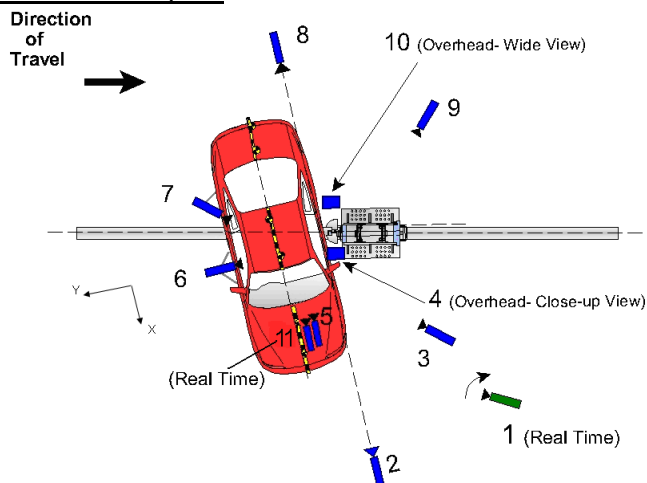


Code	Measurement Description	Length (mm)
HR	Head to Side Header	259
HS	Head to Side Window	370
AD	Arm to Door	120
HD	Hip Point to Door	160

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
Test Date: 6/14/2023



REFERENCE: (from point of impact for X and Y; from ground for Z)
+ X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real time (24-30 fps) pan view of impact				Zoom	30
2	Front ground level – impact view	5435	-12	-1522	20	1000
3	Impact side 45° – forward pole view	6024	-20	-1764	20	1000
4	Overhead Close-up view of impact	-70	-142	-1234	50	1000
5	Onboard – dummy front view				8.5	1000
6	Onboard – dummy side view				8.5	1000
7	Onboard – dummy rear oblique view				8.5	1000
8	Rear ground level – impact view	-3135	-1753	-1534	20	1000
9	Impact side 45° – rearward pole view	-3456	-2653	-1342	20	1000
10	Overhead wide view of impact	0	0	-4653	12.5	1000
11	Real time dummy front view				Zoom	30

All measurements accurate to +/- 6 mm.

NOTE: Vehicle was at a 75° angle to the rigid pole.

If applicable, explain why camera(s) did not run: N/A

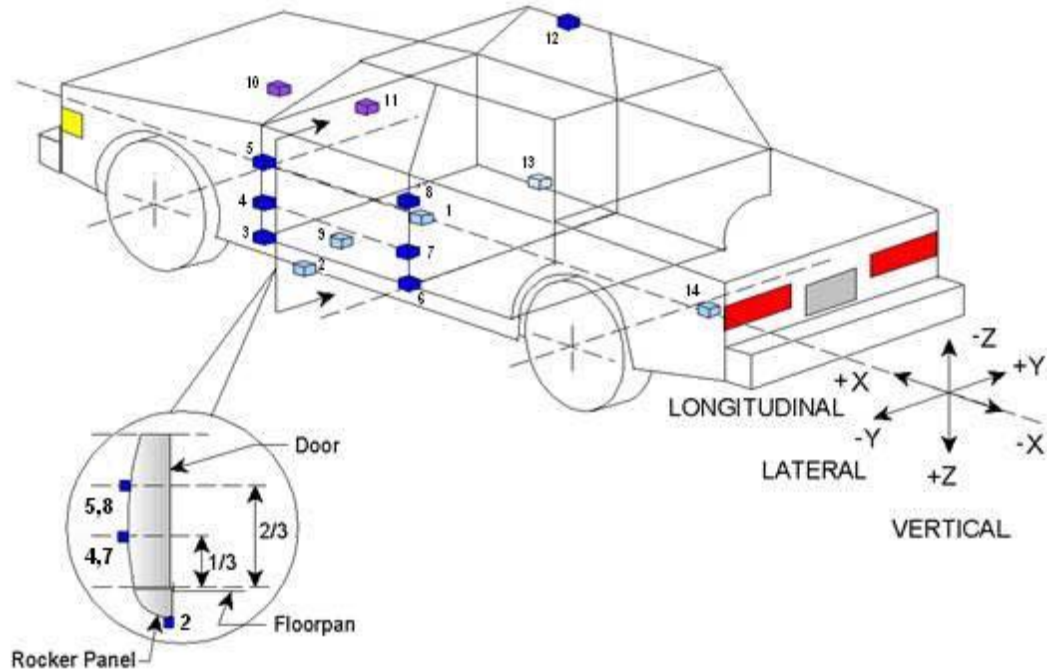
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
TOTAL	42

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
Test Date: 6/14/2023



Accelerometer/Sensor Location				
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2653	137	-364
2	Left Floor Sill	2580	-708	-175
3	A-Pillar Sill	2917	-667	-565
4	A-Pillar Low	2924	-795	-515
5	A-Pillar Mid	2915	-780	-876
6	B-Pillar Sill	1870	-675	-304
7	B-Pillar Low	1813	-800	-588
8	B-Pillar Mid	1883	-799	-942
9	Driver Seat Track	2152	-543	-428
10	Engine Top	3622	93	-883
11	Firewall	3335	-8	-906
12	Right Roof	2100	553	-1561
13	Right Floor Sill	2587	705	-191
14	Rear Floorpan	685	50	-468

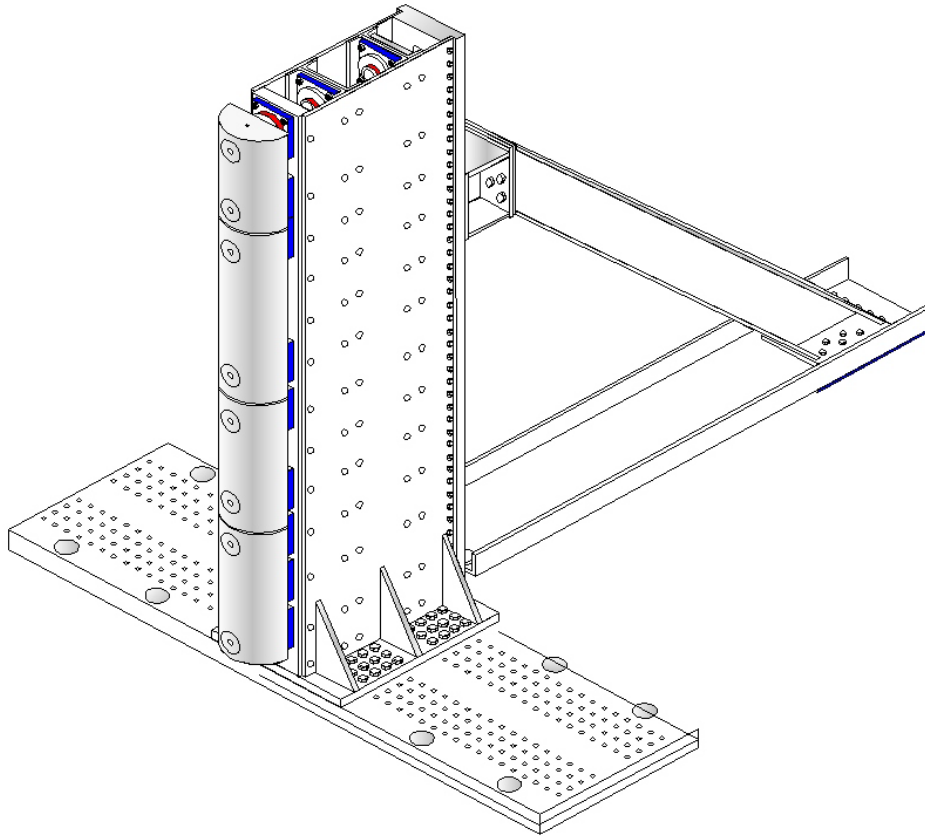
Reference: X - Test Vehicle Rear Bumper (+ forward)
Y - Test Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
Test Date: 6/14/2023

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Top of Carrier (mm)
1	87
2	468
3	648
4	978
5	1168
6	1651
7	1816
8	2057

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
Test Date: 6/14/2023

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	SCAB
Top of Head	SCAB
Left Side of Head	SCAB
Back of Head	Head Restraint
Left Shoulder	Side Seat Bolster, SAB
Upper Torso	Side Seat Bolster
Lower Torso	Side Seat Bolster
Left Hip	Side Airbag
Left Knee	Door Panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	Cracked throughout
Side Window Damage	Blown out
Other Notable Effects	Rear sunroof shattered

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

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side (Driver)		Struck Side (Rear Passenger)	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Torso 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: Front Center Airbag	No	N/A	No	N/A

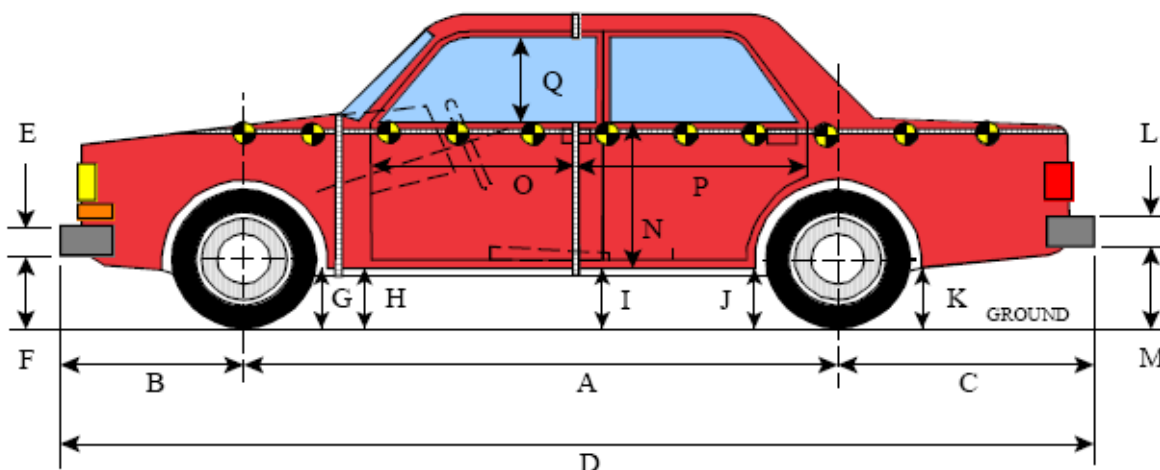
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1137
Actual Impact Point (Aft of Front Axle)	mm		1125
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	-13
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.29
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.31

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
Test Date: 6/14/2023



LEFT SIDE VIEW

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

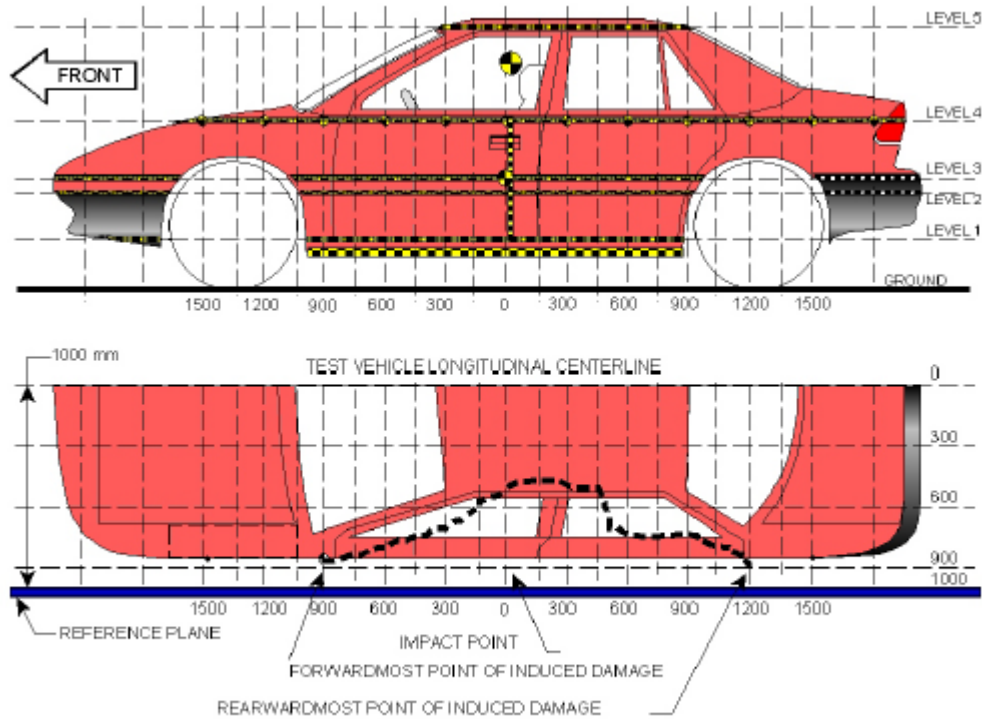
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	2675	2587	-88
B	Front Axle to Front Surface of Vehicle	832	832	0
C	Rear Axle to Rear Surface of Vehicle	795	795	0
D	Total Length at Centerline	4302	4298	-4
E	Front Bumper Thickness	70	70	0
F	Front Bumper Bottom to Ground	495	498	3
G	Sill Height at Front Wheel Well	295	293	-2
H	Sill Height at Front Door Leading Edge	299	296	-3
I	Sill Height at B-Pillar	312	317	5
J1	Sill Height at Rear Wheel Well	320	381	61
J2	Pinch Weld Height at Rear Wheel Well	206	248	42
K	Sill Height Aft of Rear Wheel Well	431	479	48
L	Rear Bumper Thickness	315	115	-200
M	Rear Bumper Bottom to Ground	480	510	30
N	Sill Height to Bottom of Front Window Sill	798	797	-1
O	Front Door Leading Edge to Impact CL	595	473	-122
P	Rear Door Trailing Edge to Impact CL	1422	1350	-72
Q	Front Window Opening	400	361	-39
R	Right Side Length	4140	4138	-2
S	Left Side Length	4145	4127	-18
T	Vehicle Width at B-Pillars	1782	1701	-81
U	Front Wheel Track Width	1566	1566	0
V	Rear Wheel Track Width	1565	1565	0

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023



NOTE: All measurements are in millimeters (mm)

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	394	265	-150
2	Occupant H-Point	648	304	0
3	Mid-Door	712	311	0
4	Window Sill	1040	251	-150
5	Window Top	1481	145	-150

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

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023

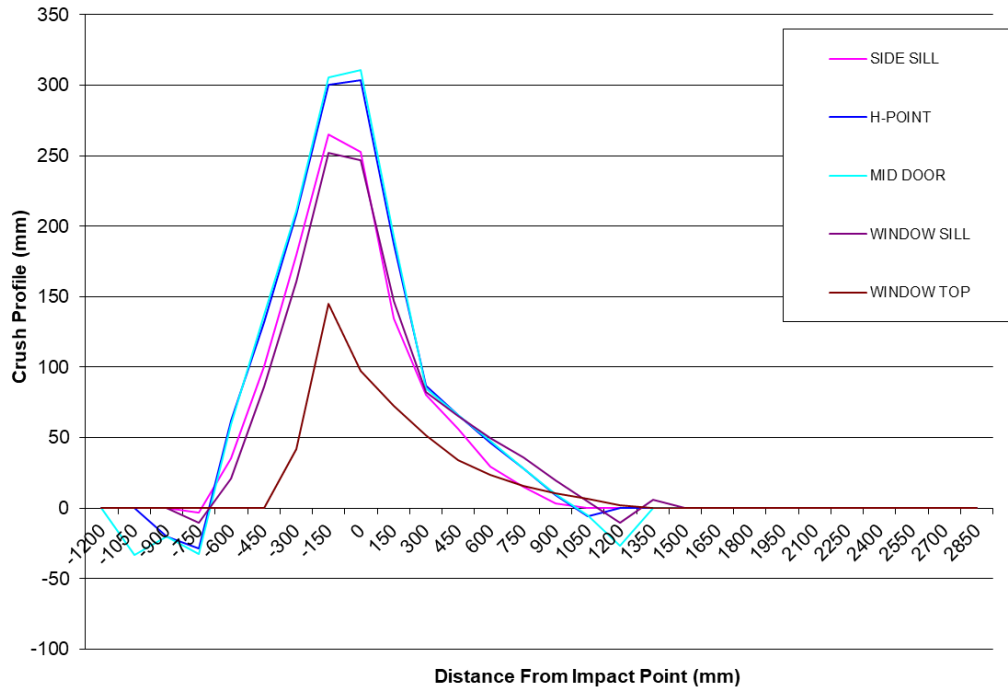
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050	0	0	895	0	0	0	0	929	0	0	0	0	-34	0	0
-900	0	884	879	0	0	0	904	900	0	0	0	-20	-21	0	0
-750	858	867	865	747	0	861	895	897	758	0	-3	-28	-32	-11	0
-600	852	868	867	765	0	817	806	808	744	0	35	62	59	21	0
-450	853	873	873	777	0	753	741	736	691	0	100	132	137	86	0
-300	858	878	878	787	573	678	670	667	627	531	180	208	211	160	42
-150	862	883	883	797	601	597	582	578	546	456	265	301	305	251	145
0	865	886	886	804	609	613	582	575	557	512	252	304	311	247	97
150	866	887	888	810	616	732	700	695	664	543	134	187	193	146	73
300	865	886	887	815	620	784	800	802	733	568	81	86	85	82	52
450	862	884	884	816	621	806	818	818	751	587	56	66	66	65	34
600	857	879	880	815	620	828	833	832	765	597	29	46	48	50	23
750	856	875	875	814	616	841	847	847	779	600	15	28	28	35	16
900	874	878	877	819	609	870	869	867	799	599	4	9	10	20	10
1050	0	896	886	831	598	0	901	891	826	591	0	-5	-5	5	7
1200	0	0	901	825	580	0	0	928	835	577	0	0	-27	-10	3
1350	0	0	0	818	553	0	0	0	812	552	0	0	0	6	1

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. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 MINI Countryman 5HB
Test Program: SPNCAP Side Impact

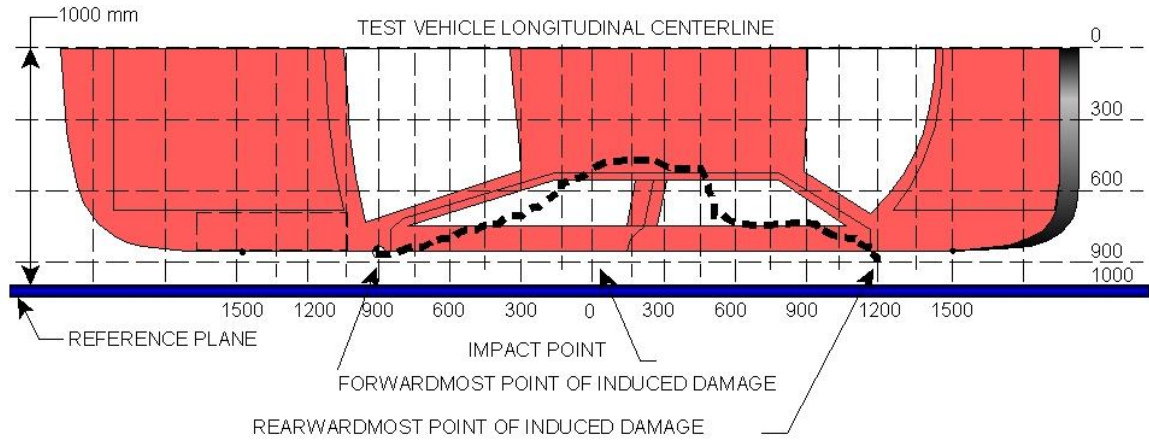
NHTSA No.: M20234104
Test Date: 6/14/2023



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2023 MINI Countryman 5HB
 Test Program: SPNCAP Side Impact

NHTSA No.: M20234104
 Test Date: 6/14/2023



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	1350	4	812	818	6
2	900	4	799	819	20
3	600	4	765	815	50
4	150	3	695	888	193
5	-150	3	578	883	305
6 ¹	-600	2	806	868	0

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

DATA SHEET NO. 12

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2023 MINI Countryman 5HB

NHTSA No.: M20234104

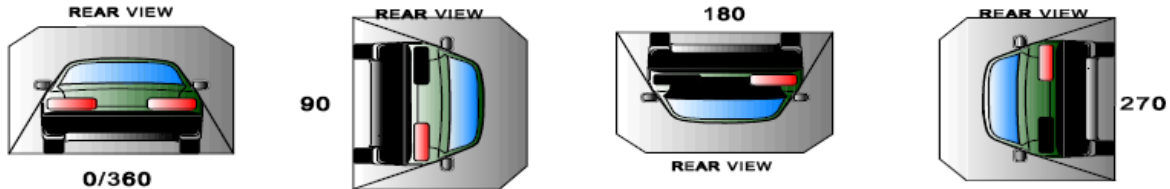
Test Program: SPNCAP Side Impact

Test Date: 6/14/2023

Test Time: 13:40 Temperature: 21.8°C

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable is 1 ounce/minute)
- D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

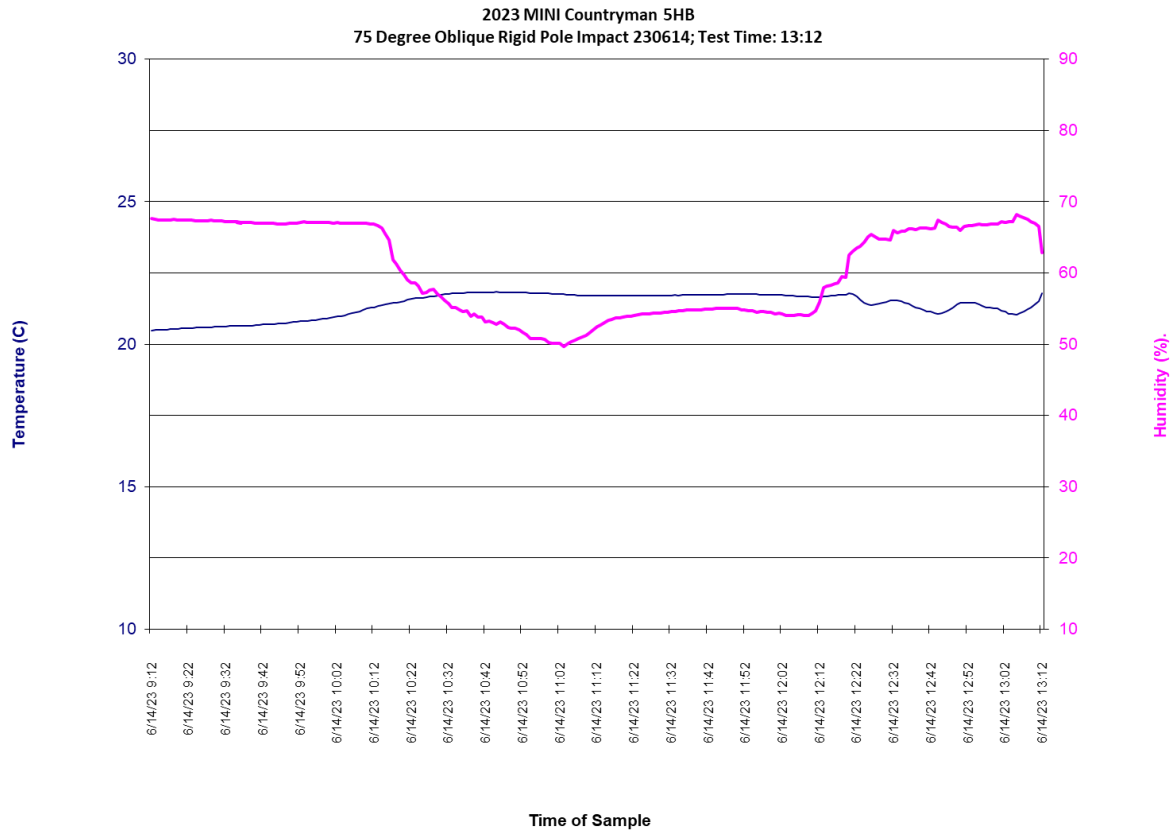
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	0
90 to 180	0	0	0	0
180 to 270	0	0	0	0
270 to 360	0	0	0	0

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. 13
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2023 MINI Countryman 5HB NHTSA No.: M20234104
Test Program: SPNCAP Side Impact Test Date: 6/14/2023



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

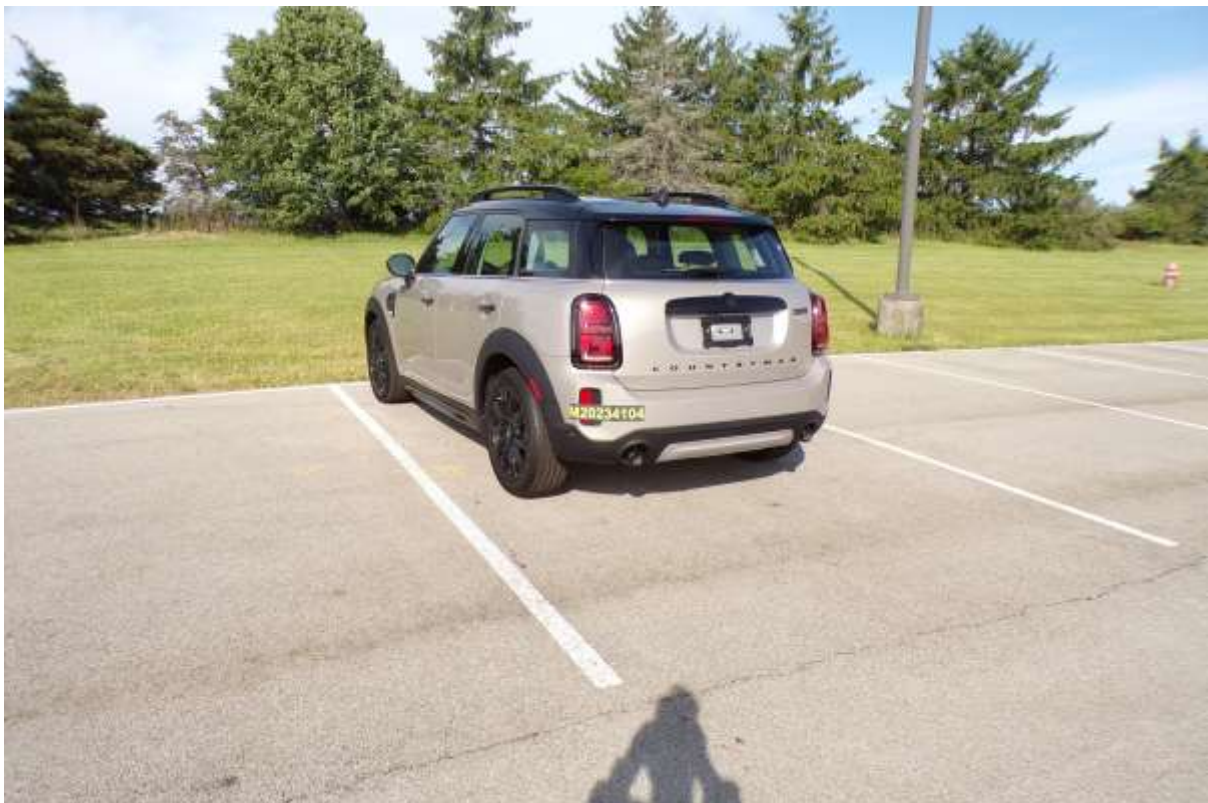
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2	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-6
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7	Pre-Test Left Side View of Test Vehicle	A-7
8	Post-Test Left Side View of Test Vehicle	A-7
9	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-8
10	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-8
11	Pre-Test Rear View of Test Vehicle	A-9
12	Post-Test Rear View of Test Vehicle	A-9
13	Pre-Test Right Side View of Test Vehicle	A-10
14	Post-Test Right Side View of Test Vehicle	A-10
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22	Post-Test Front Close-Up View of Dummy	A-14
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39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
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41	Post-Test Dummy and Door Clearance View	A-24
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50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-29
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73	Post-Test View of Shattered Vehicle Inner Door Panel	A-41



No. 001 As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



No. 002 As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 003 Pre-Test Frontal View of Test Vehicle



No. 004 Post-Test Frontal View of Test Vehicle



No. 005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



No. 006 Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



No. 007 Pre-Test Left Side View of Test Vehicle



No. 008 Post-Test Left Side View of Test Vehicle



No. 009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 010 Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 011 Pre-Test Rear View of Test Vehicle



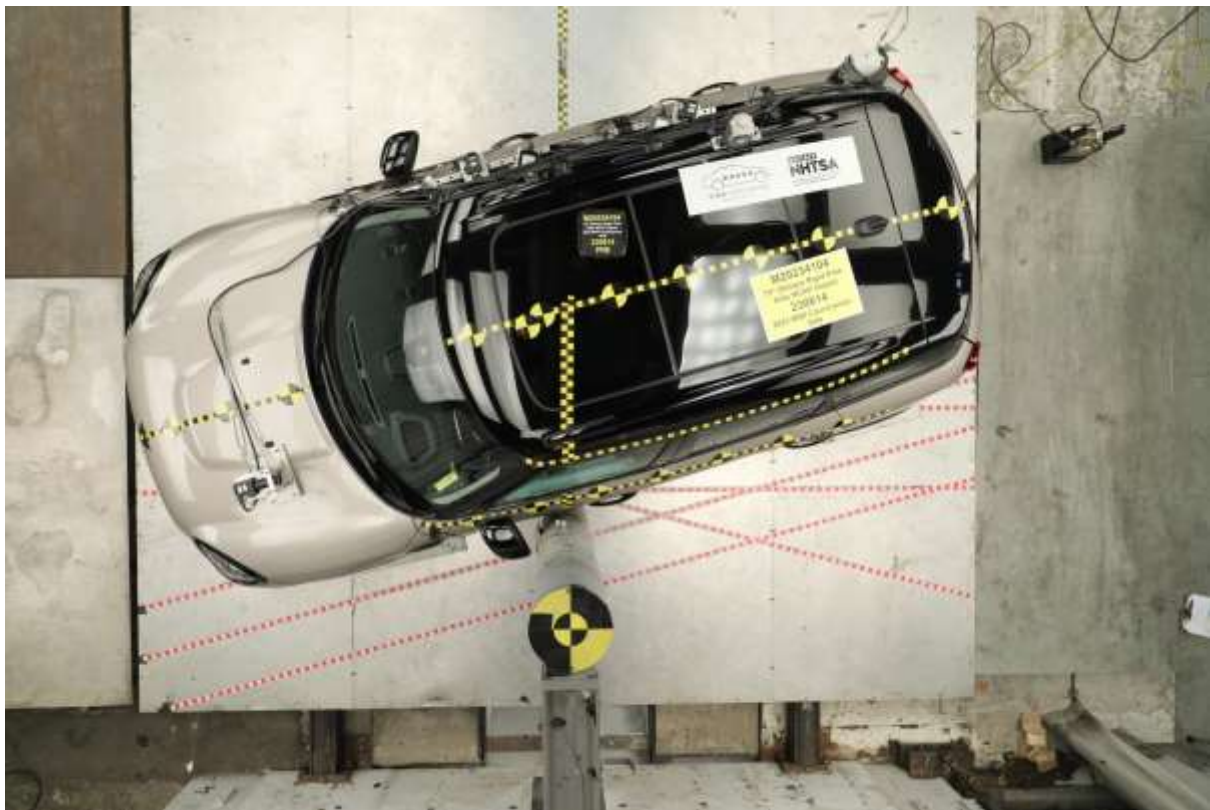
No. 012 Post-Test Rear View of Test Vehicle



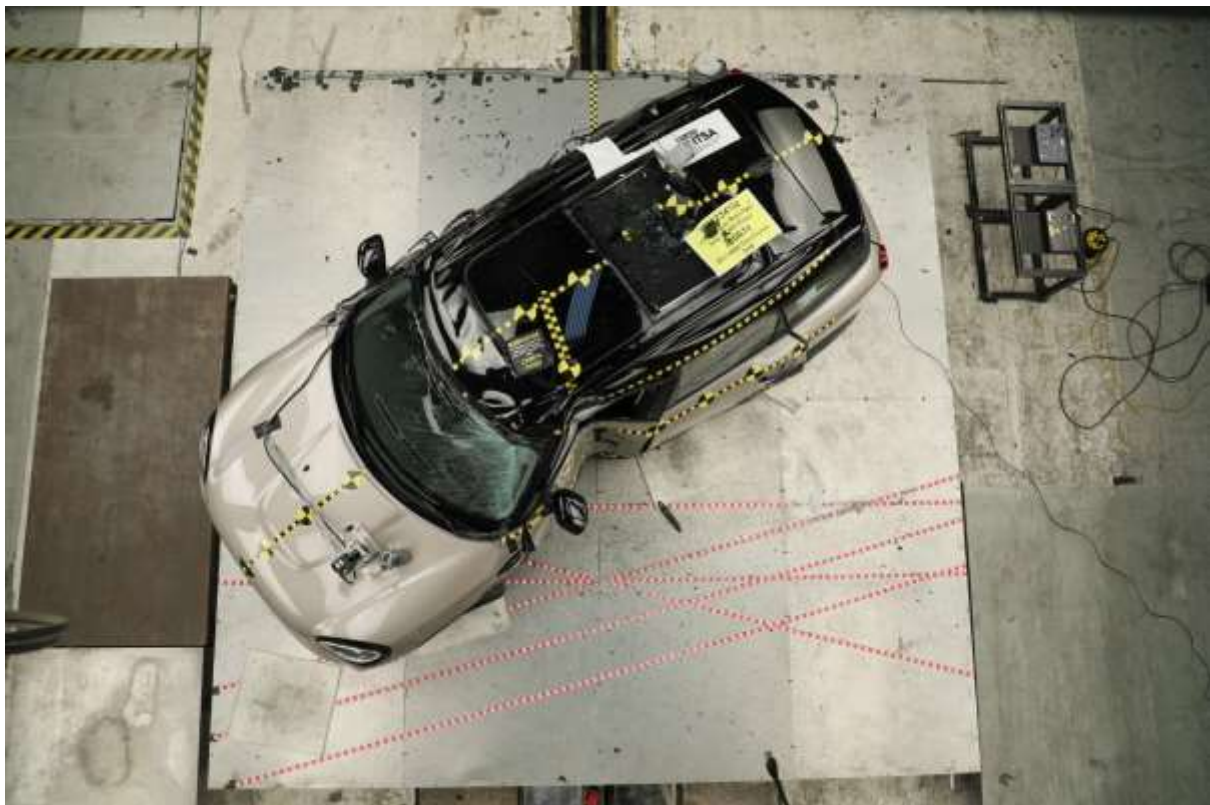
No. 013 Pre-Test Right Side View of Test Vehicle



No. 014 Post-Test Right Side View of Test Vehicle



No. 015 Pre-Test Overhead View of Test Area



No. 016 Post-Test Overhead View of Test Area



No. 017 Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



No. 018 Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



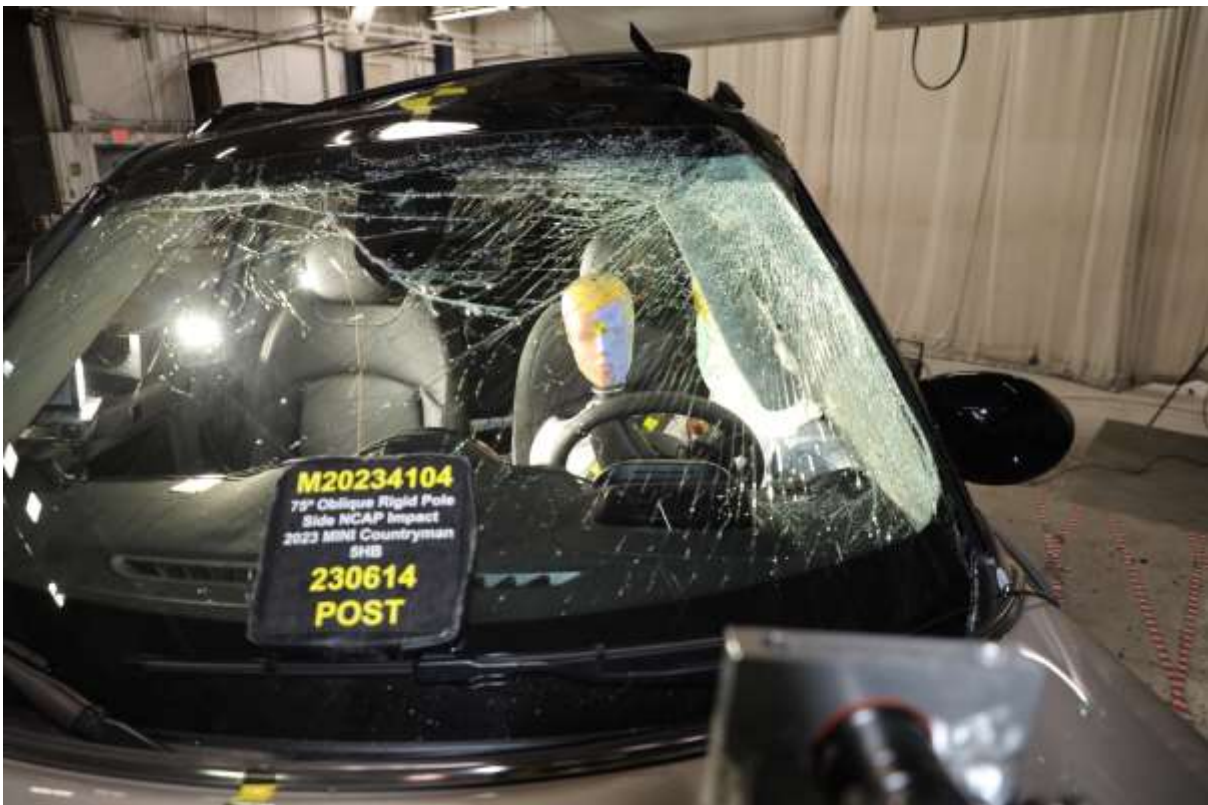
No. 019 Pre-Test Close-Up View of Impact Point Target



No. 020 Post-Test Close-Up View of Impact Point Target Showing Impact Location



No. 021 Pre-Test Front Close-Up View of Dummy Head and Chest



No. 022 Post-Test Front Close-Up View of Dummy



No. 023 Pre-Test Left Side View of Dummy Showing Belt and Chalking

Intentionally Left Blank



No. 024 Pre-Test Left Side View of Dummy Shoulder and Door Top View



No. 025 Post-Test Left Side View of Dummy Shoulder and Door Top View



No. 026 Pre-Test Front View of Seat Back Prior to Dummy Positioning



No. 027 Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



No. 028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning



No. 029 Pre-Test Overhead View of Dummy Thighs on Seat Pan



No. 030 Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket



No. 031 Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level



No. 032 Pre-Test Placement of Dummy Feet



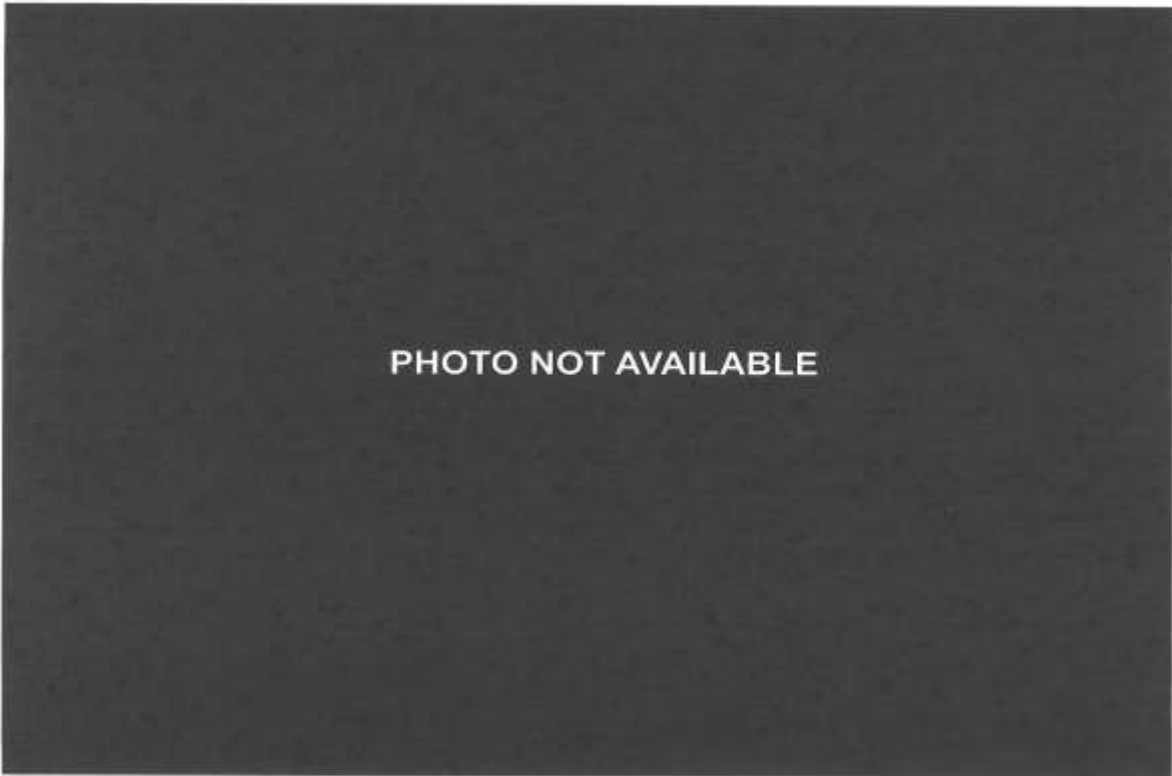
No. 033 Pre-Test View of Belt Anchorage for Dummy



No. 034 Pre-Test Left Side View of Steering Wheel



No. 035 Pre-Test View of Disengaged Parking Brake



No. 036 Pre-Test View of Parking Brake



No. 037 Pre-Test Close-Up Left Side View of Driver Seat Track



No. 038 Pre-Test Close-Up Left Side View of Driver Seat Back



No. 039 Pre-Test Close-Up View of Driver Seat Back or Head Restraint



No. 040 Pre-Test Dummy and Door Clearance View



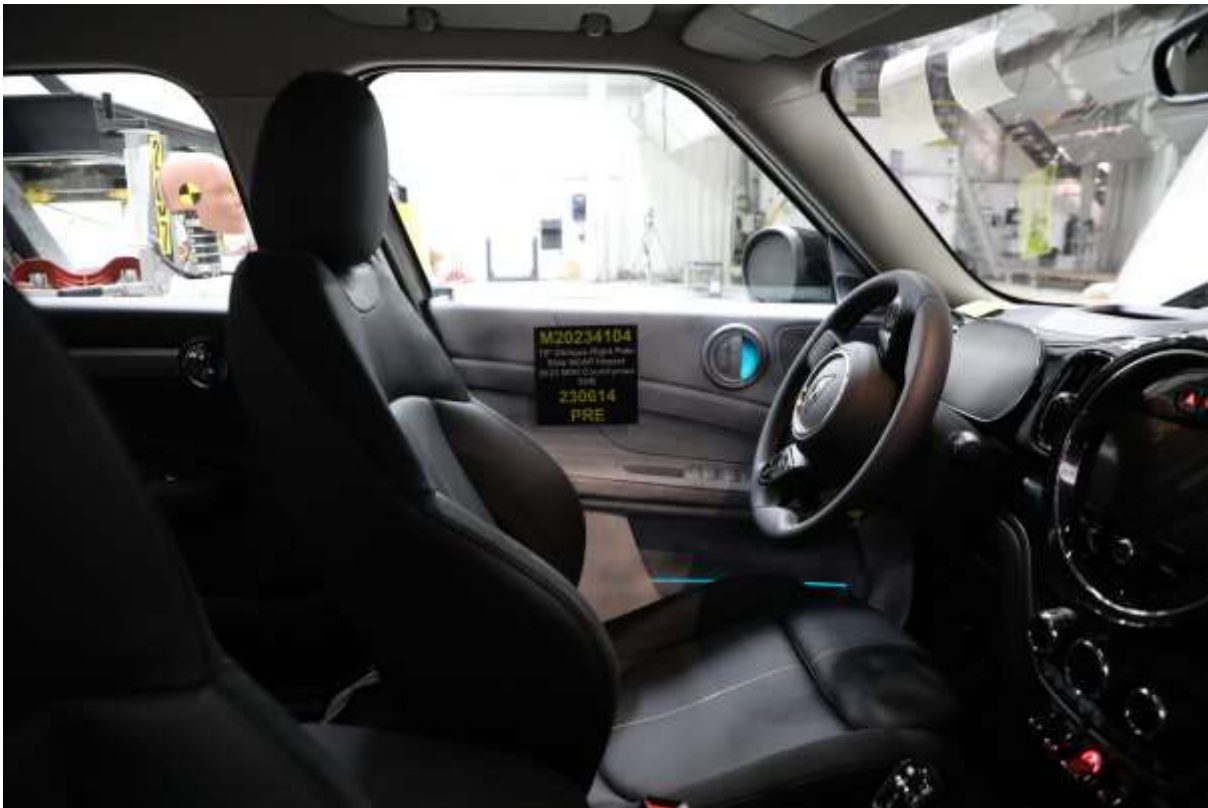
No. 041 Post-Test Dummy and Door Clearance View



No. 042 Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



No. 043 Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



No. 044 Pre-Test Inner Door Panel View



No. 045 Post-Test Inner Door Panel View Showing Dummy Contact Location



No. 046 Post-Test Dummy Close-Up Head Contact with Vehicle Interior View

Intentionally Left Blank



No. 047 Post-Test Dummy Close-Up Head Contact with Side Airbag View



No. 048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



No. 049 Post-Test Dummy Close-Up Torso Contact with Side Airbag View



No. 050 Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



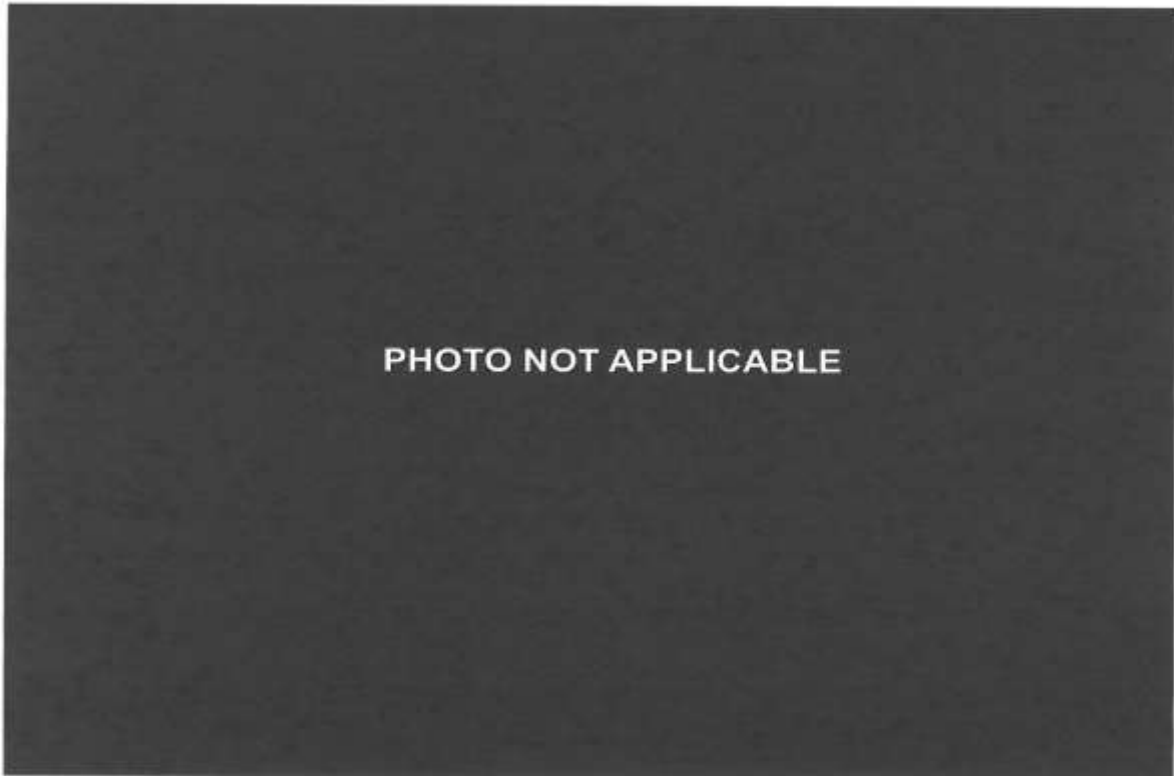
No. 051 Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



No. 052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



No. 053 Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment



No. 054 Post-Test Inner Rear Passenger Torso Air Bag Deployment View



No. 055 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



No. 056 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



No. 057 Close-Up View of Vehicle Certification Label



No. 058 Close-Up View of Vehicle Tire Information Placard or Label



No. 059 Pre-Test Pole Barrier Front View



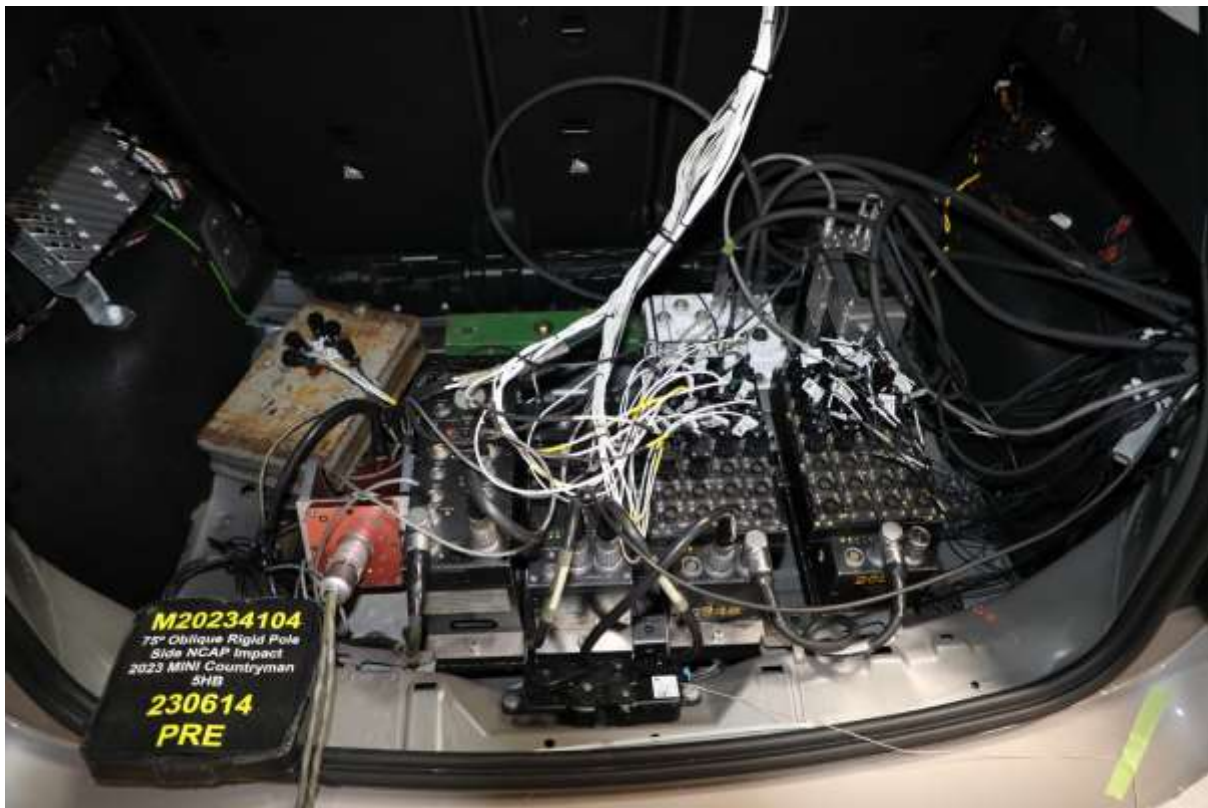
No. 060 Post-Test Pole Barrier Front View



No. 061 Pre-Test Pole Barrier Side View



No. 062 Post-Test Pole Barrier Side View



No. 063 Pre-Test Ballast View



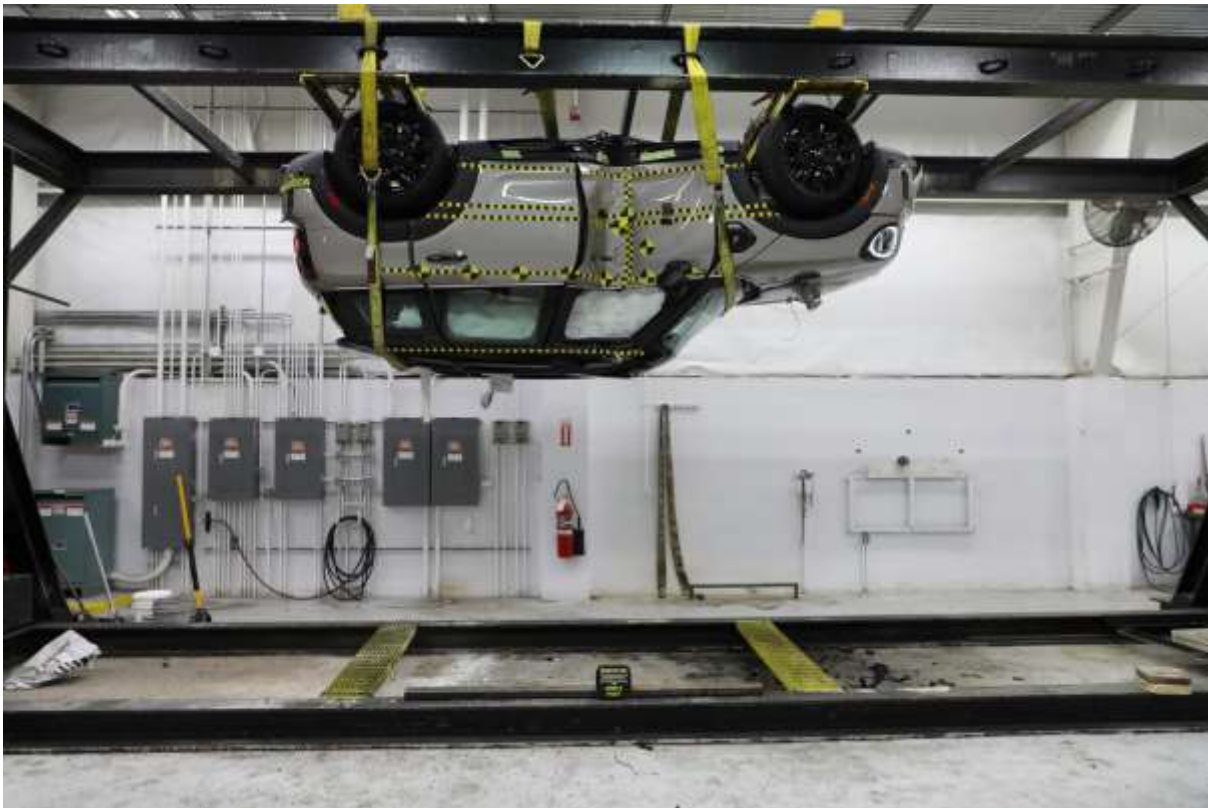
No. 064 Post-Test Primary and Redundant Speed Trap Read Out



No. 065 FMVSS No. 301 Static Rollover 0 Degrees



No. 066 FMVSS No. 301 Static Rollover 90 Degrees



No. 067 FMVSS No. 301 Static Rollover 180 Degrees



No. 068 FMVSS No. 301 Static Rollover 270 Degrees



No. 069 FMVSS No. 301 Static Rollover 360 Degrees



No. 070 Impact Event

No. 071 Monroney Label



PHOTO NOT APPLICABLE

No. 073 Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

No.	Description	Page
1	Driver Head Acceleration (X) vs. Time	B-4
2	Driver Head Acceleration (Y) vs. Time	B-4
3	Driver Head Acceleration (Z) vs. Time	B-4
4	Driver Head Acceleration Resultant vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Acceleration Resultant vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at: www.nhtsa.gov.

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Redundant
Driver Head Acceleration (Y) Redundant
Driver Head Acceleration (Z) Redundant
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)
Driver Head Angular Velocity (X)
Driver Head Angular Velocity (Y)
Driver 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)
 Left Floor Sill Acceleration (Y)
 Left A-Pillar Sill Acceleration (Y)
 Left Lower A-Pillar Acceleration (Y)
 Left Mid A-Pillar Acceleration (Y)
 Left B-Pillar Sill Acceleration (Y)
 Left Lower B-Pillar Acceleration (Y)
 Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
 Engine Top Acceleration (X)
 Engine Top Acceleration (Y)
 Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (X)
Load Cell Pole Barrier #2 Force (X)
Load Cell Pole Barrier #3 Force (X)
Load Cell Pole Barrier #4 Force (X)
Load Cell Pole Barrier #5 Force (X)
Load Cell Pole Barrier #6 Force (X)
Load Cell Pole Barrier #7 Force (X)
Load Cell Pole Barrier #8 Force (X)

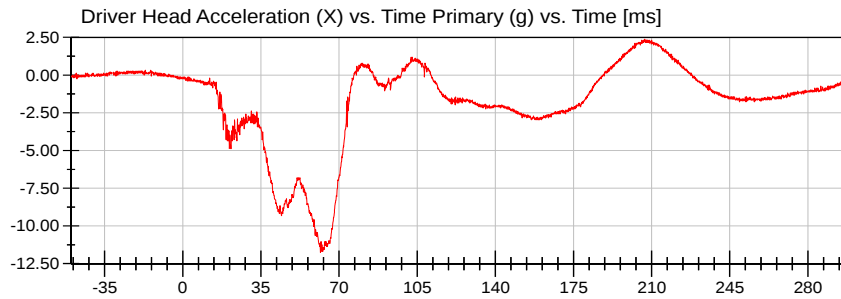
NHTSA

Test Lab: CTF

Test Number: 230614 (M20234104)

Position #1 SID IIs Dummy (297)

Test Date: 06/14/2023

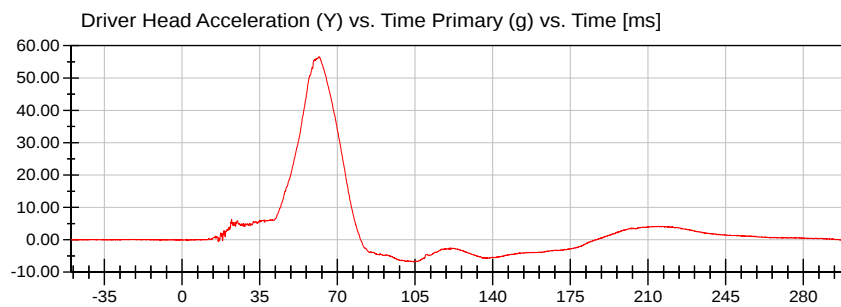


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2.38 g at 206.88 ms

<Min>

-11.76 g at 61.68 ms

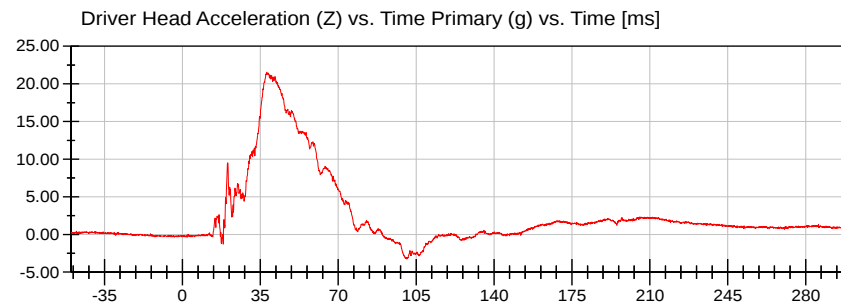


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56.65 g at 61.76 ms

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-6.92 g at 104.24 ms

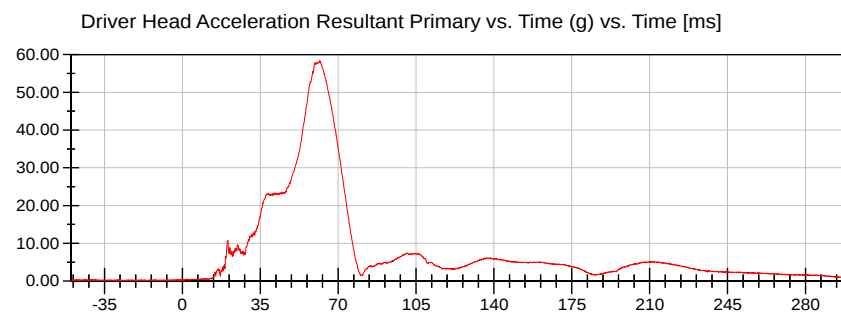


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21.55 g at 37.92 ms

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-3.25 g at 100.88 ms



<Max>

58.41 g at 61.76 ms

<Min>

0.03 g at -30.40 ms



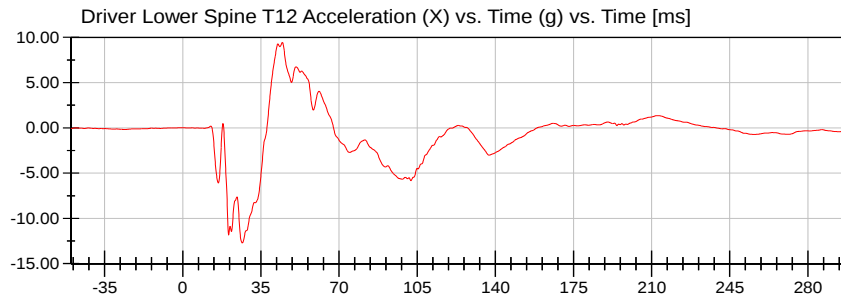
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Test Lab: CTF

Test Number: 230614 (M20234104)

Position #1 SID IIs Dummy (297)

Test Date: 06/14/2023



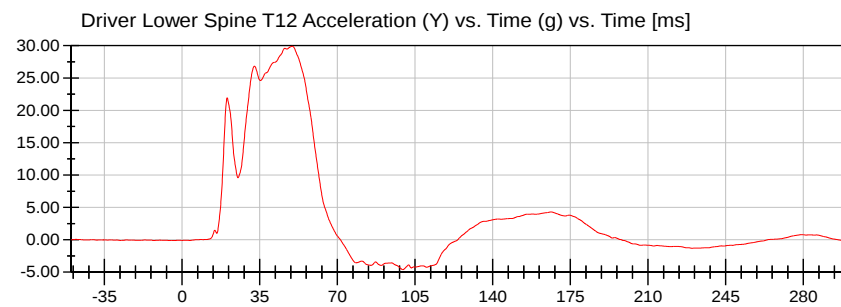
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9.43 g at 44.64 ms

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-12.71 g at 26.64 ms

CFC_180



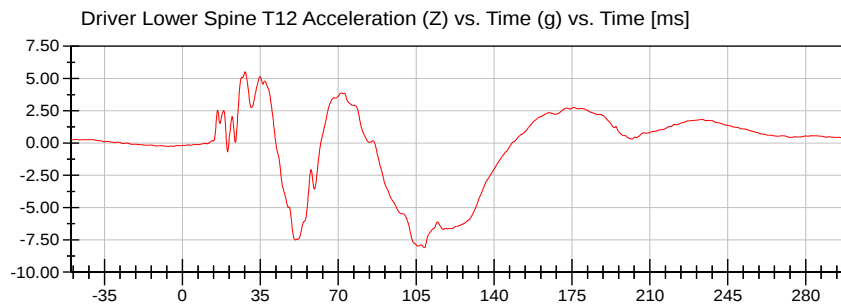
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29.90 g at 49.68 ms

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-4.62 g at 99.52 ms

CFC_180



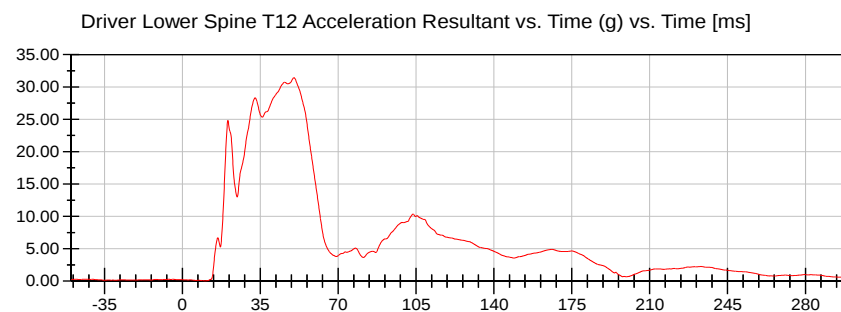
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5.52 g at 28.16 ms

<Min>

-8.10 g at 108.72 ms

CFC_180



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31.43 g at 50.16 ms

<Min>

0.05 g at 10.32 ms

CFC_180



NHTSA

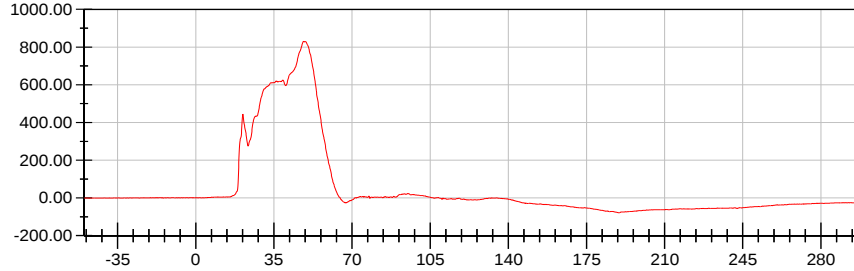
Test Lab: CTF

Test Number: 230614 (M20234104)

Position #1 SID IIs Dummy (297)

Test Date: 06/14/2023

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



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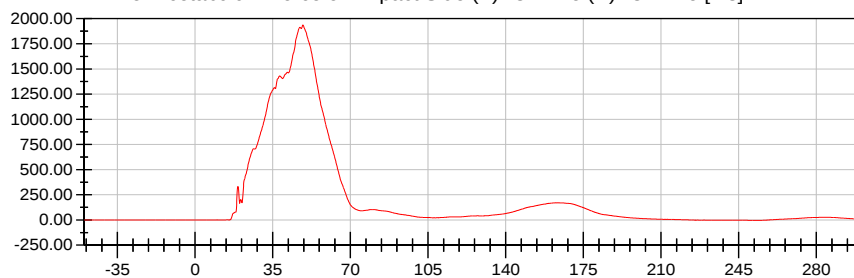
830.37 N at 48.24 ms

<Min>

-79.05 N at 189.60 ms

CFC_600

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



<Max>

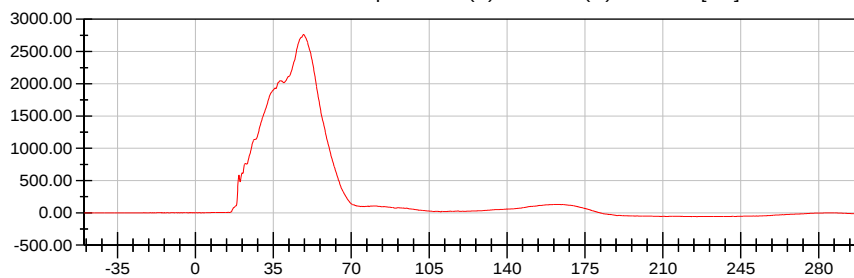
1,936.06 N at 48.64 ms

<Min>

-4.00 N at 251.76 ms

CFC_600

Driver Total Pelvis Force on Impact Side (Y) vs. Time (N) vs. Time [ms]



<Max>

2,763.62 N at 48.64 ms

<Min>

-59.02 N at 225.36 ms

CFC_600



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS
SID-IIs (Driver) Dummy
Description

Table 1. External Measurements

Table 2. Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)
Head (X) Acceleration (G's) vs. Time (ms)
Head (Y) Acceleration (G's) vs. Time (ms)
Head (Z) 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 297

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 297 Calibration No. 64

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	450	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	147	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	147	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	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	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	200	Yes
P	Foot Length (right)	216.0 - 232.0	223	Yes
P	Foot Length (left)	216.0 - 232.0	223	Yes
Q	Hip Breadth	313.0 - 323.0	319	Yes
R	Arm Length	249.0 - 259.0	254	Yes
S	Knee Joint to seat Back	478.0 - 493.0	485	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	877	Yes
Z	Waist Circumference	761.0 - 791.0	781	Yes

Revised 9/29/2005

Report Number: 297_S2F64

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Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. 297 Certification No. 64-1

Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-1.6 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	0.76 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: 1330

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

05.22.2023 12:48:28 234

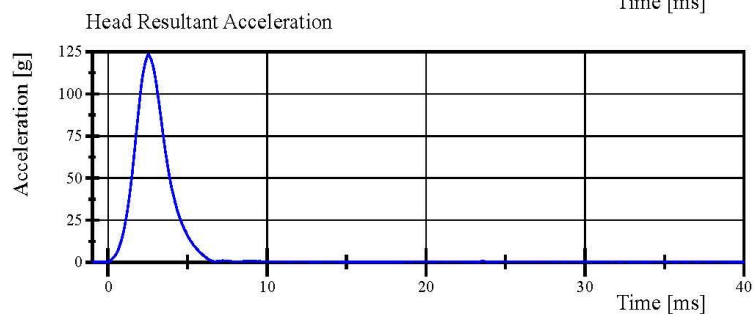
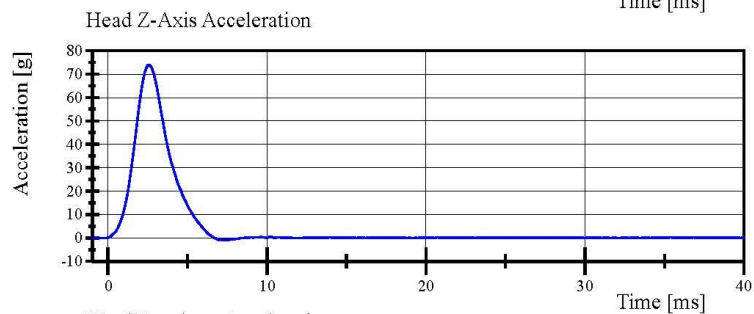
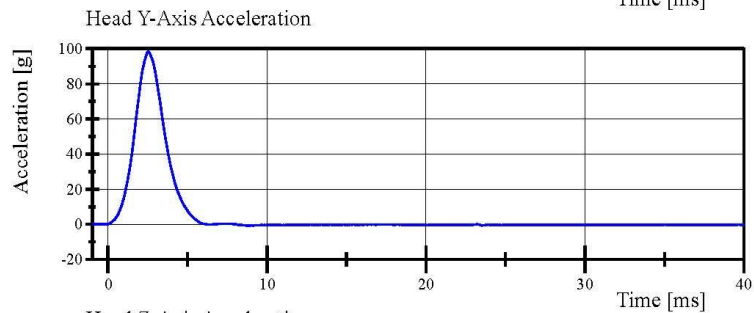
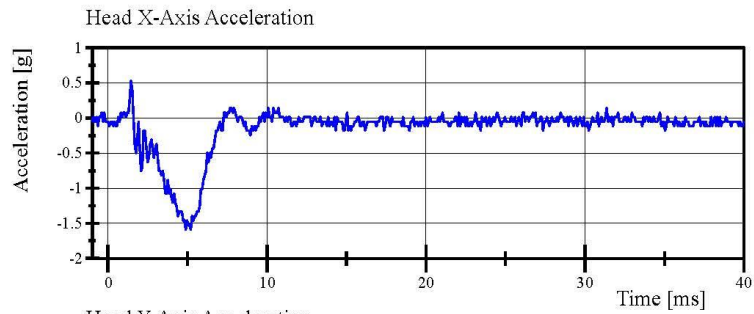


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. 297 Certification No. 64-1

Test Date: 5/22/2023



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

05.22.2023 12:48:56 234



Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 297 Certification No. 64-3

Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.590 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.708 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.943 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.191 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.802 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.809 m/s	Yes
Maximum Headform Flexion			
Peak	(-71) - (-81) deg	-79.3 deg	Yes
Time of Peak	50 - 70 ms	63.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.8 N·m	Yes
Decay to 0 N·m	102 - 126 ms	118.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 779

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

05.22.2023 14:53:50 748

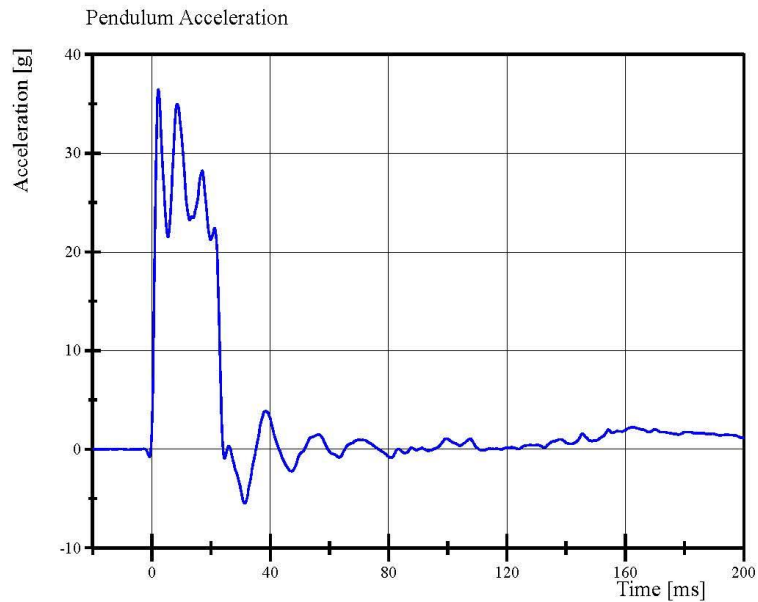


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 297 Certification No. 64-3

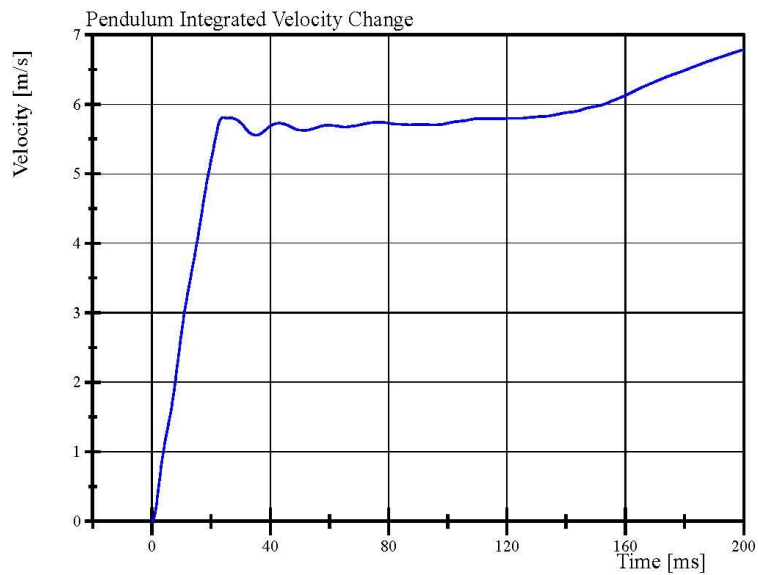
Test Date: 5/22/2023



Filter Class: CFC_180

Max: 36.4 g at 2.2 ms

Min: -5.5 g at 31.3 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

05.22.2023 14:54:25 748

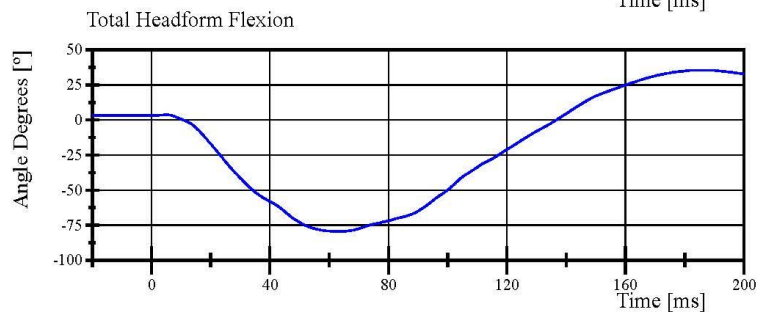
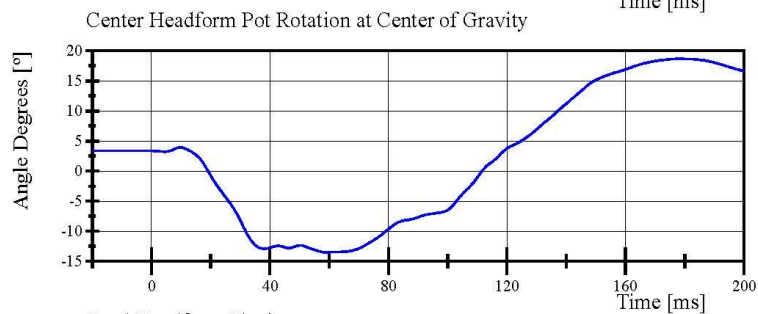
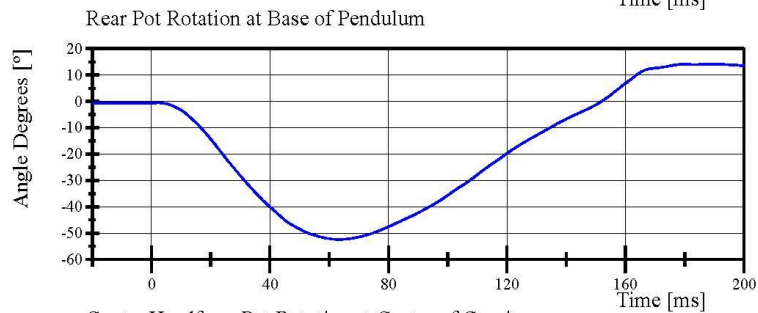
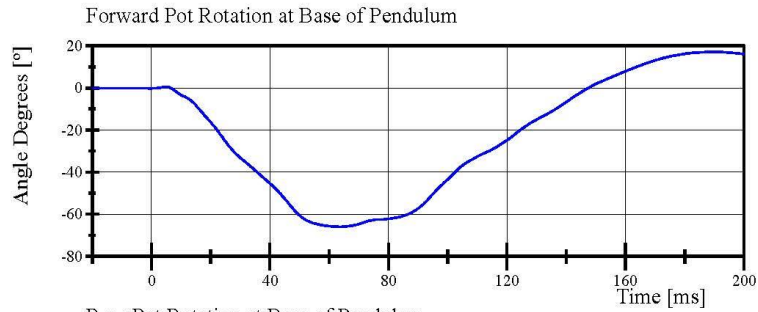


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 297 Certification No. 64-3

Test Date: 5/22/2023



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

05.22.2023 14:54:25 748

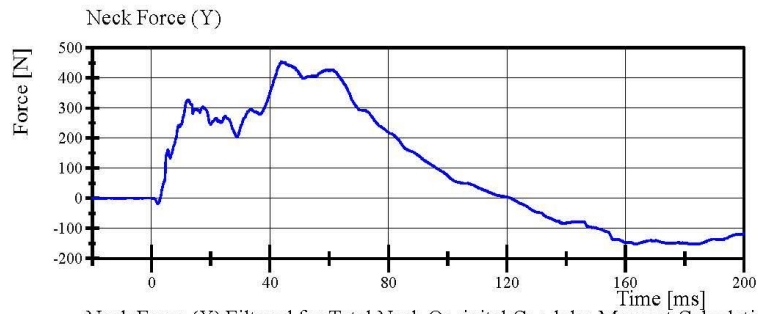


Transportation Research Center Inc.

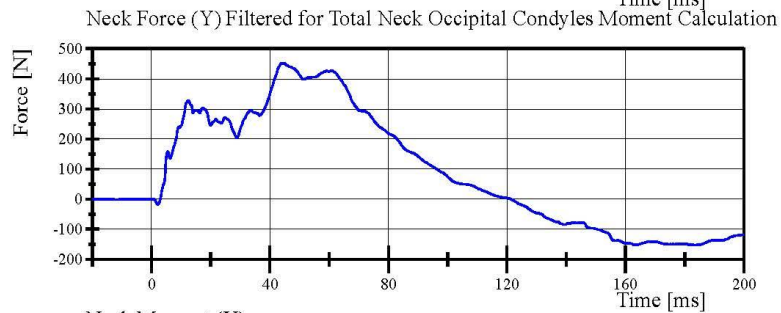
Left Lateral Neck

SID IIS Serial No. 297 Certification No. 64-3

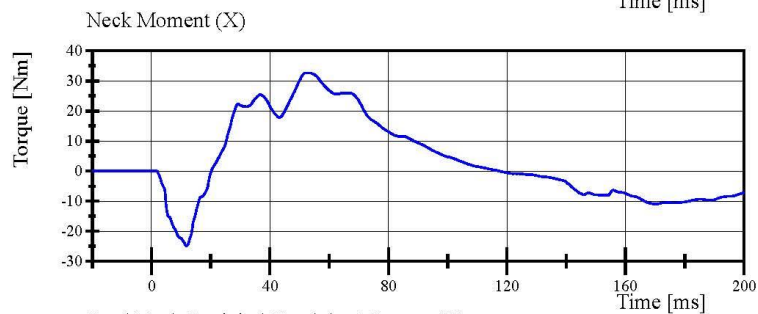
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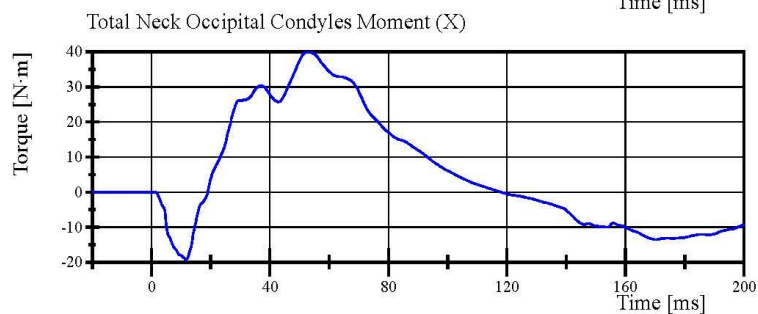
Filter Class: CFC_1000
Max: 453.1 N at 43.9 ms
Min: -153.8 N at 183.6 ms



Filter Class: CFC_600
Max: 452.7 N at 44.0 ms
Min: -153.0 N at 183.6 ms



Filter Class: CFC_600
Max: 32.6 Nm at 52.4 ms
Min: -24.9 Nm at 11.8 ms



Filter Class: Without_(Constar
Max: 39.8 N·m at 53.0 ms
Min: -19.2 N·m at 11.7 ms

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

05.22.2023 14:54:25 748



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIS Serial No. 297 Certification No. 64-1

Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.0 g	Yes
Shoulder Displacement	28 - 37 mm	31.0 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.7 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 940L

Shoulder Rib S/N: 180-3355 259

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

05.22.2023 15:52:46 907

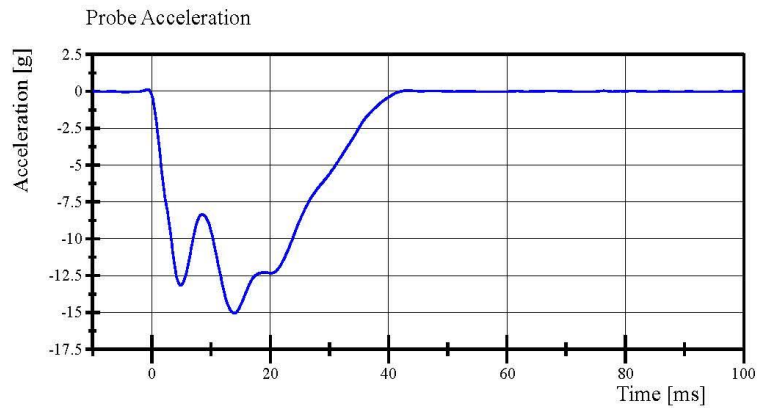


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 297 Certification No. 64-1

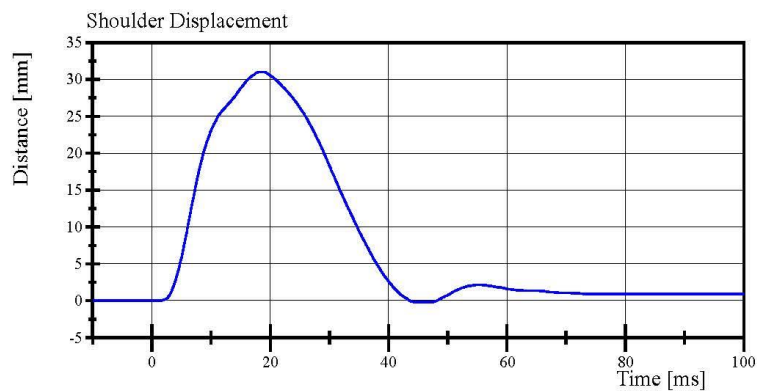
Test Date: 5/22/2023



Filter Class: CFC_180

Max: 0.1 g at -0.7 ms

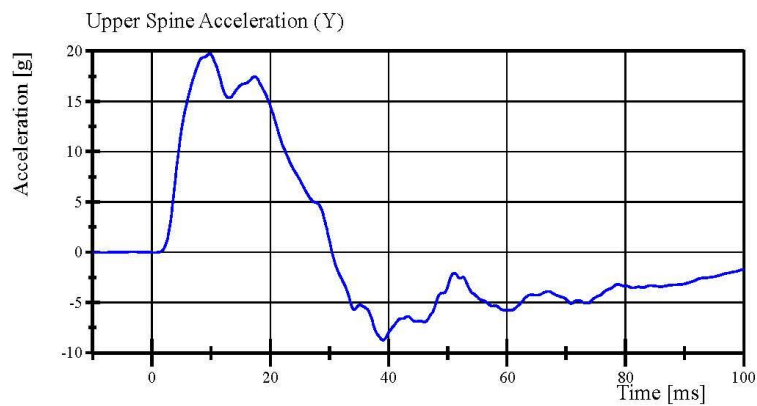
Min: -15.0 g at 13.9 ms



Filter Class: CFC_600

Max: 31.0 mm at 18.3 ms

Min: -0.2 mm at 46.2 ms



Filter Class: CFC_180

Max: 19.7 g at 9.8 ms

Min: -8.7 g at 39.1 ms

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

05.22.2023 15:53:28 907



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIS Serial No. 297 Certification No. 64-1
Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.733 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.4 g	Yes
Shoulder Displacement	31 - 40 mm	35.0 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.4 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.3 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.8 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 940L

Shoulder Rib S/N: 180-3355 259

Upper Thorax Rib S/N: DM5020

Middle Thorax Rib S/N: DM5021

Lower Thorax Rib S/N: DM5022

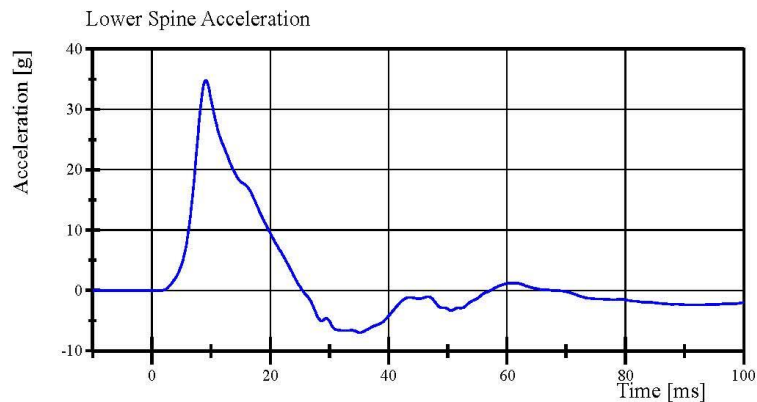
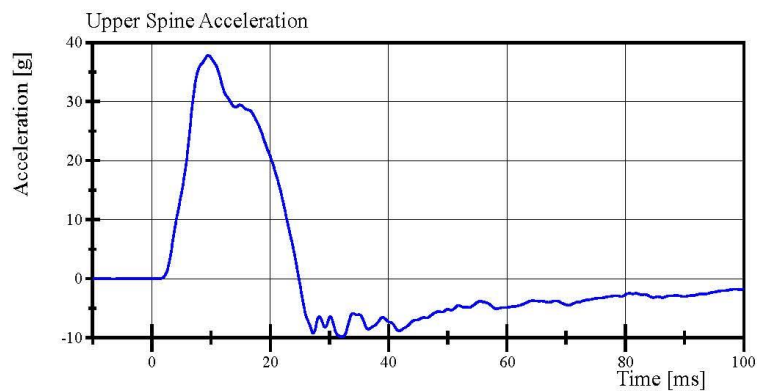
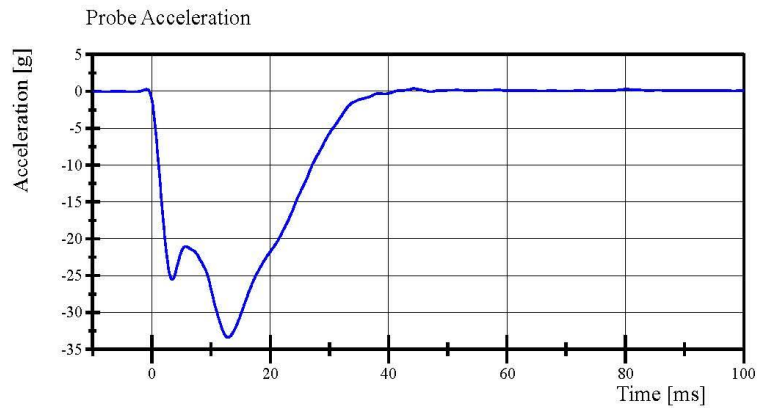
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with Polarity in accordance with J211

05.22.2023 16:43:52 647



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 64-1
Test Date: 5/22/2023



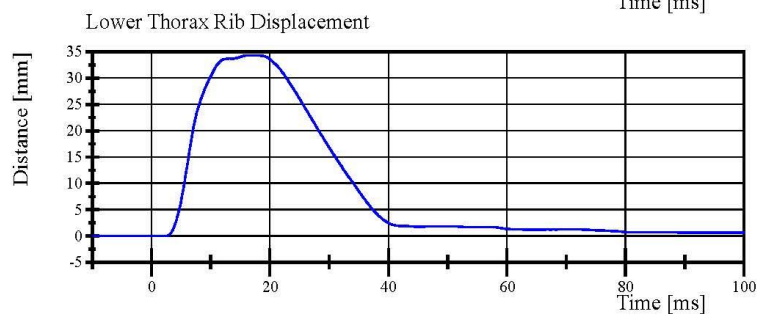
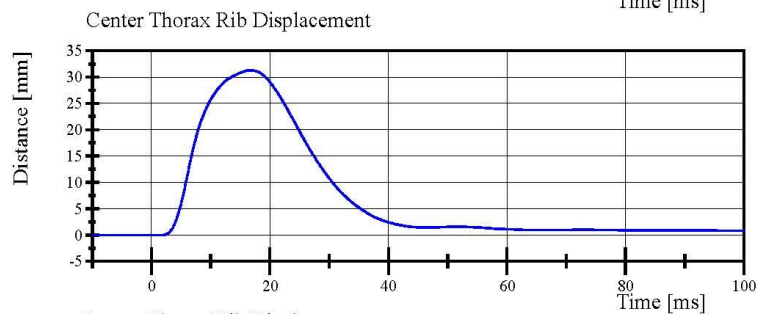
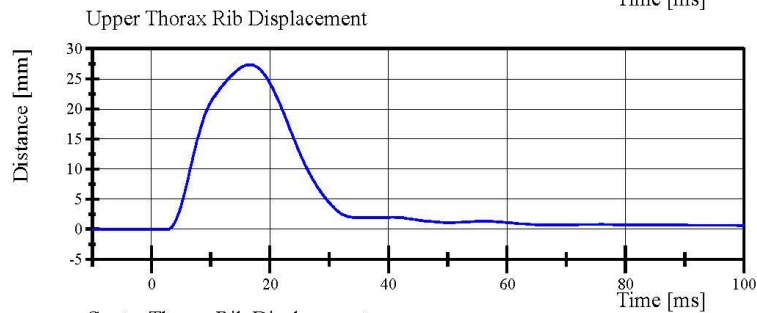
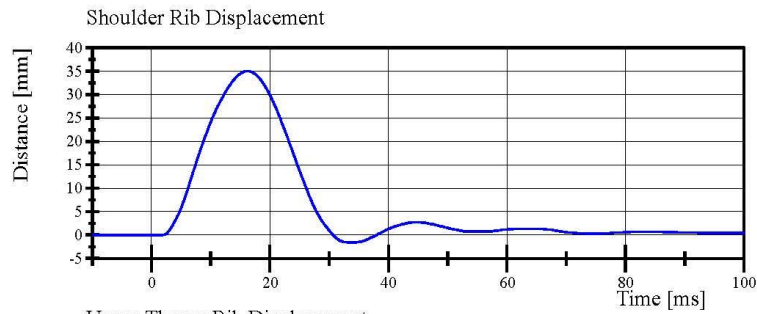
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with Polarity in accordance with J211

05.22.2023 16:44:37 647



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 64-1
Test Date: 5/22/2023



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

05.22.2023 16:44:37 647



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIS Serial No. 297 Certification No. 64-1
Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.353 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.3 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.7 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	41.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	13.4 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.0 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Thorax Rib S/N: DM5020

Middle Thorax Rib S/N: DM5021

Lower Thorax Rib S/N: DM5022

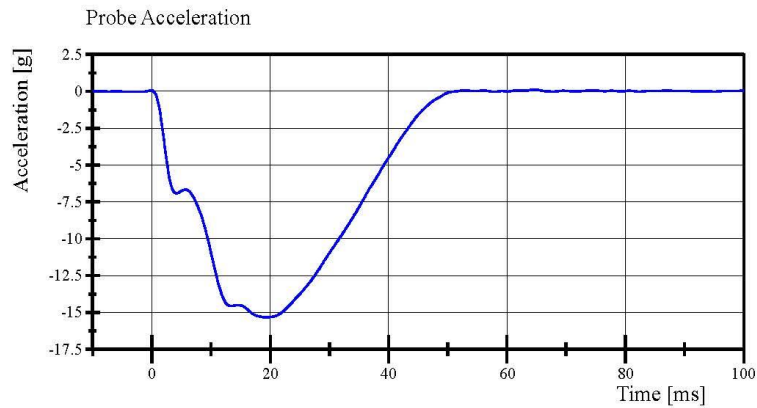
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

05.22.2023 16:12:55 892

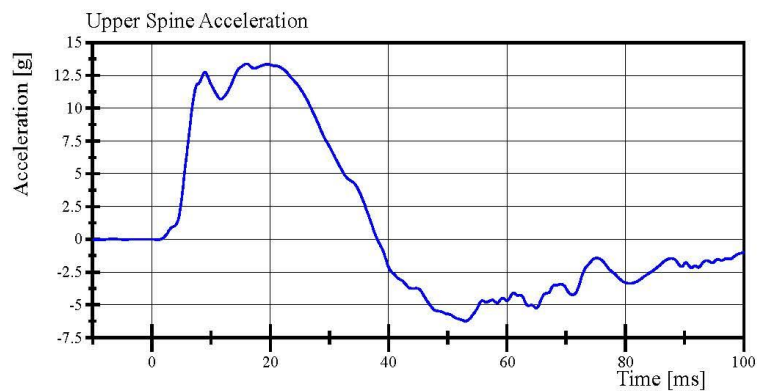


Transportation Research Center Inc.

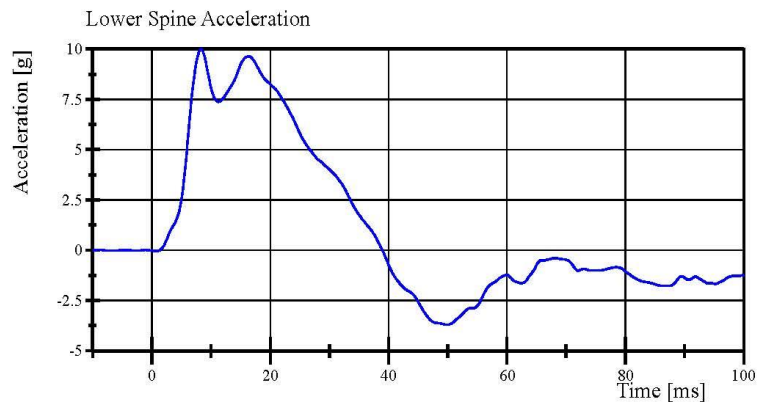
Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 64-1
Test Date: 5/22/2023



Filter Class: CFC_180
Max: 0.1 g at 64.6 ms
Min: -15.3 g at 19.4 ms



Filter Class: CFC_180
Max: 13.4 g at 16.0 ms
Min: -6.2 g at 53.0 ms



Filter Class: CFC_180
Max: 10.0 g at 8.3 ms
Min: -3.7 g at 49.8 ms

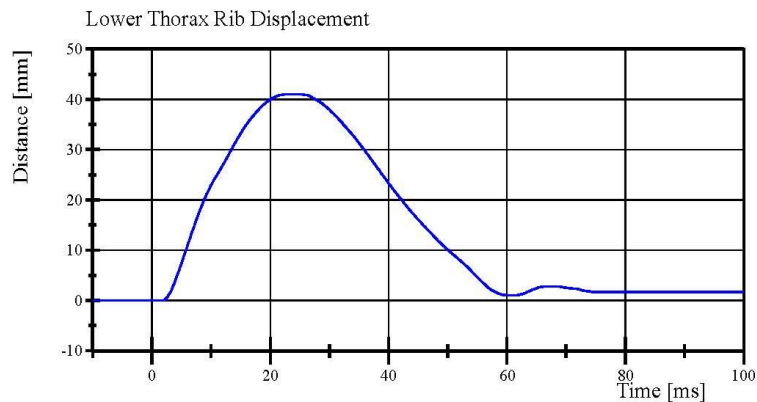
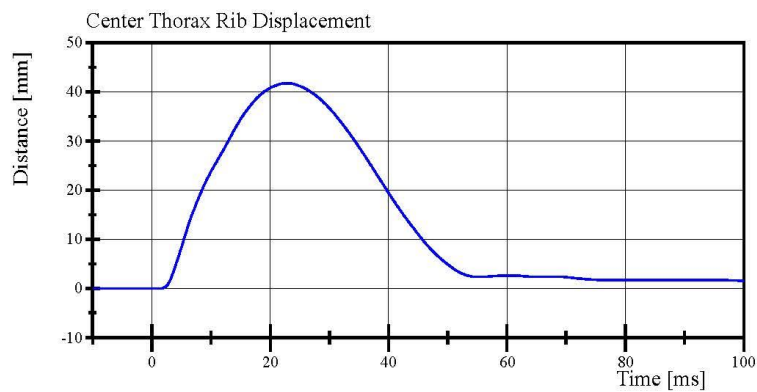
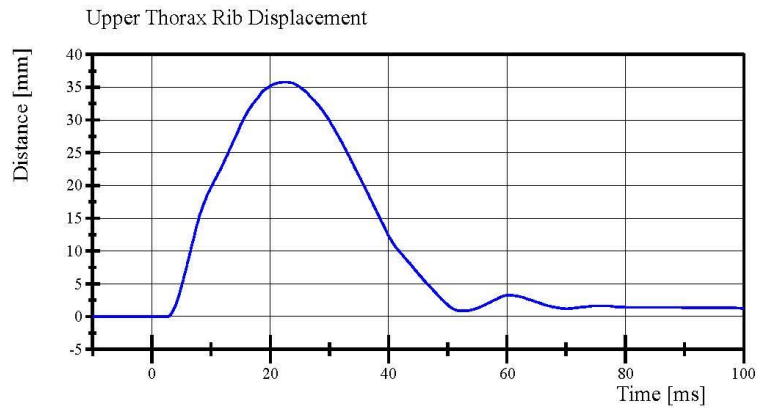
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

05.22.2023 16:13:33 892



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 64-1
Test Date: 5/22/2023



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

05.22.2023 16:13:33 892



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 297 Certification No. 64-1

Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.9 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	37.6 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.1 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.30 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: DM7281

Lower Abdominal Rib S/N: DM7275

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

05.22.2023 16:05:10 731

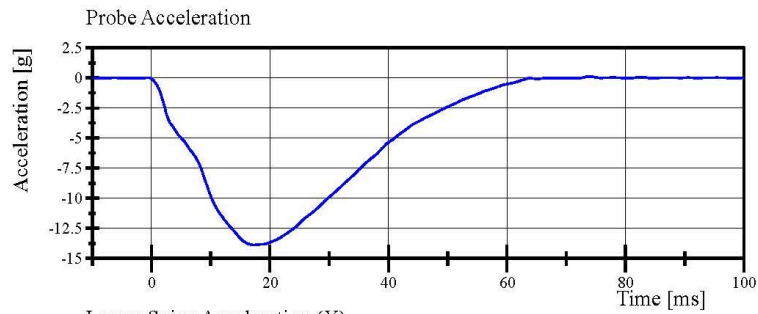


Transportation Research Center Inc.

Left Lateral Abdomen

SID IIS Serial No. 297 Certification No. 64-1

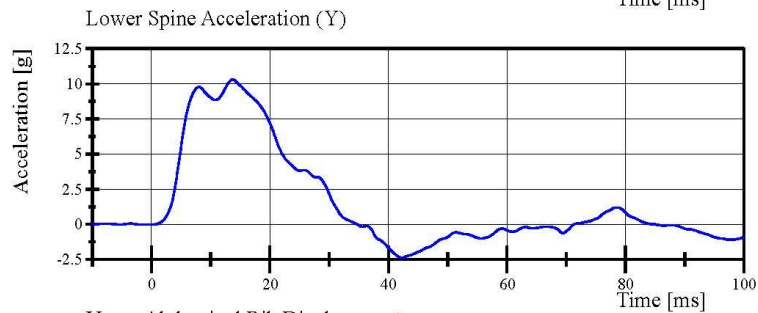
Test Date: 5/22/2023



Filter Class: CFC_180

Max: 0.1 g at 73.9 ms

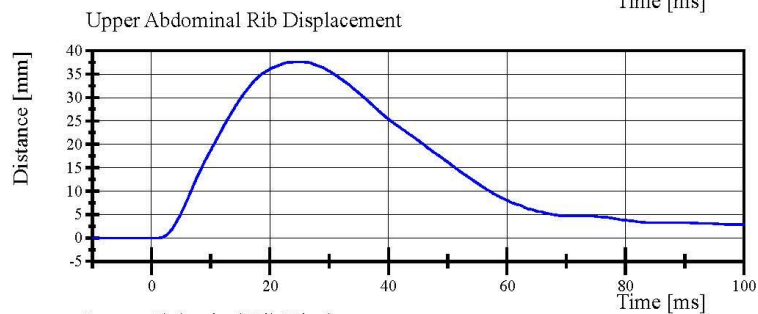
Min: -13.9 g at 17.3 ms



Filter Class: CFC_180

Max: 10.3 g at 13.7 ms

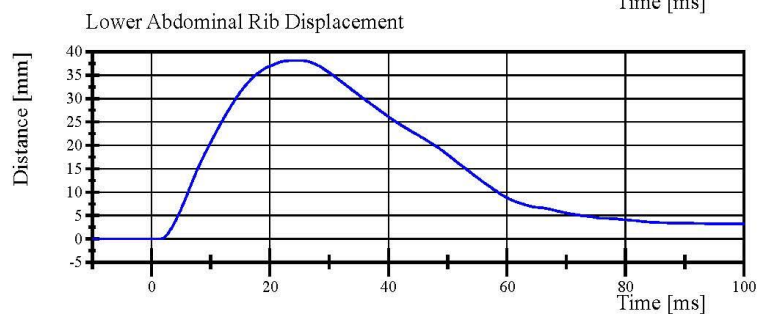
Min: -2.4 g at 42.2 ms



Filter Class: CFC_600

Max: 37.6 mm at 25.2 ms

Min: -0.0 mm at -9.8 ms



Filter Class: CFC_600

Max: 38.1 mm at 24.6 ms

Min: -0.0 mm at 1.5 ms

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

05.22.2023 16:05:39 731



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 297 Certification No. 64-1

Test Date: 5/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-41.75 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.6 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,614.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1171

Pelvis Plug Info: Manufacturer: Saco

S/N: 14568

Cal Date: 20201221

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

05.22.2023 15:39:06 493

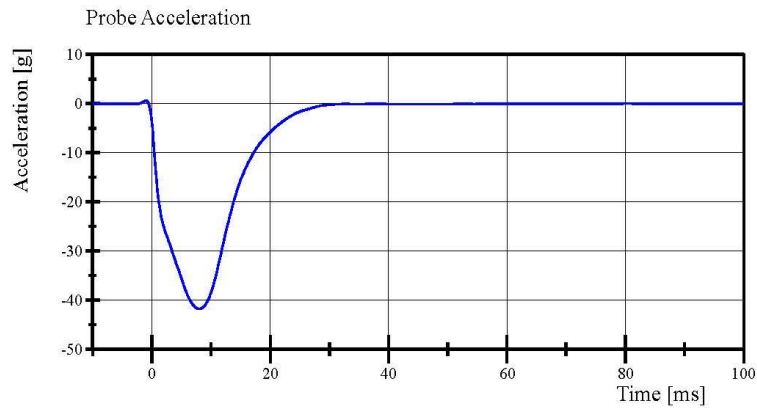


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIS Serial No. 297 Certification No. 64-1

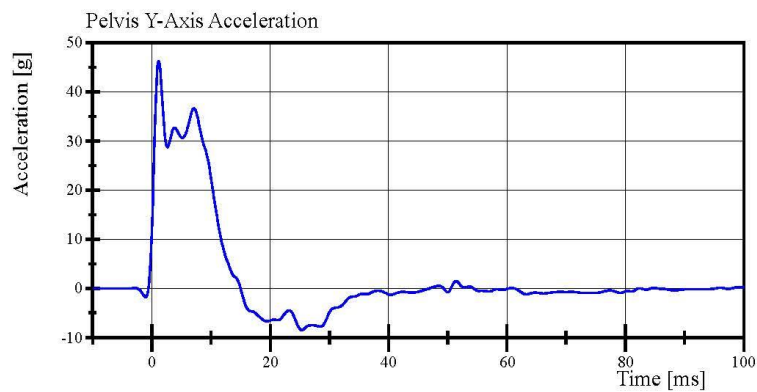
Test Date: 5/22/2023



Filter Class: CFC_180

Max: 0.6 g at -1.0 ms

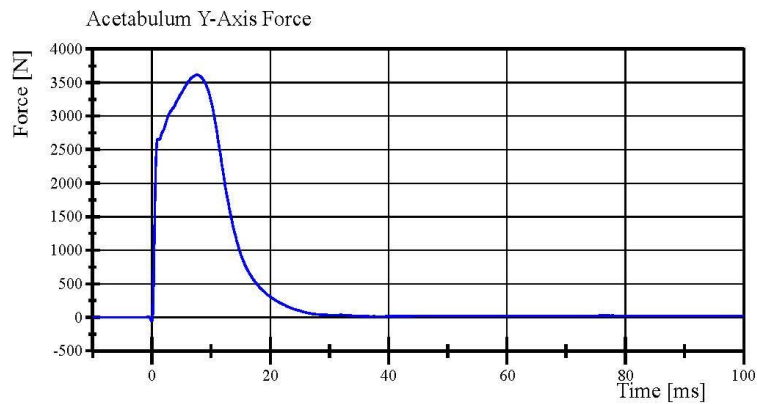
Min: -41.8 g at 8.0 ms



Filter Class: CFC_180

Max: 46.2 g at 1.1 ms

Min: -8.5 g at 25.4 ms



Filter Class: CFC_600

Max: 3,614.8 N at 7.6 ms

Min: -56.4 N at 0.0 ms

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

05.22.2023 15:41:52.493



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 64-1

Test Date: 5/23/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.24 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.2 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	32.6 g	Yes
Iliac Force	4,100 - 5,100 N	4,621.7 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1171

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

05.23.2023 09:04:48 724

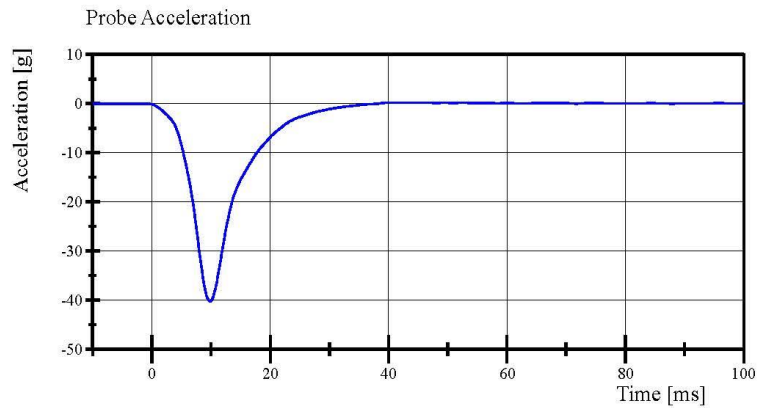


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 64-1

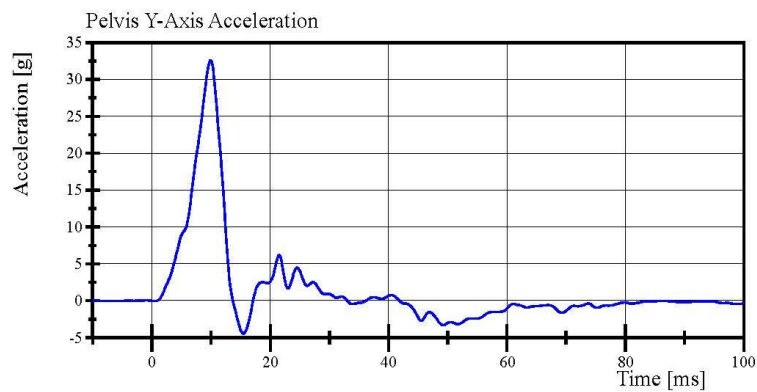
Test Date: 5/23/2023



Filter Class: CFC_180

Max: 0.3 g at 41.7 ms

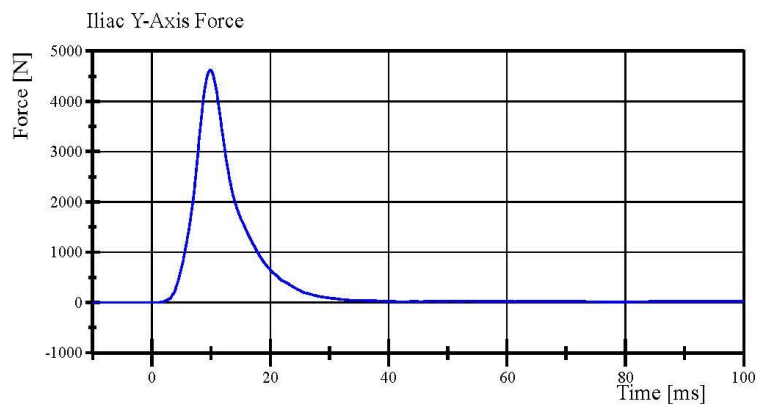
Min: -40.2 g at 9.8 ms



Filter Class: CFC_180

Max: 32.6 g at 9.9 ms

Min: -4.4 g at 15.4 ms



Filter Class: CFC_600

Max: 4,621.7 N at 9.9 ms

Min: -0.8 N at -5.5 ms

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

05.23.2023 09:05:52 724



Post-Test Calibration Sheets
Driver S/N 297

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 297 Calibration No. 65

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	450	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	147	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	147	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	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	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	200	Yes
P	Foot Length (right)	216.0 - 232.0	223	Yes
P	Foot Length (left)	216.0 - 232.0	223	Yes
Q	Hip Breadth	313.0 - 323.0	319	Yes
R	Arm Length	249.0 - 259.0	254	Yes
S	Knee Joint to seat Back	478.0 - 493.0	485	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	877	Yes
Z	Waist Circumference	761.0 - 791.0	781	Yes

Revised 9/29/2005

Report Number: 297_S2F65

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Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 297 Certification No. 65-1

Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.7 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.17 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: 1330

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

06.15.2023 13:29:59 234

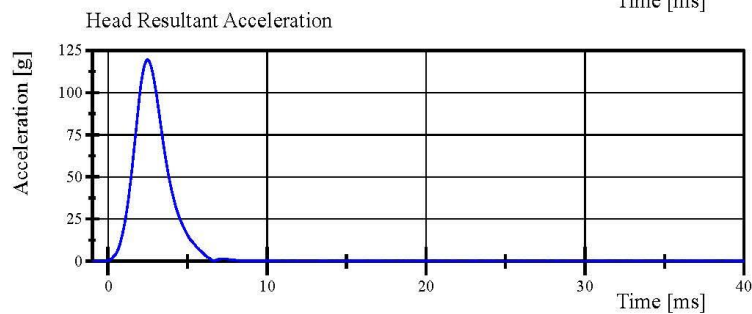
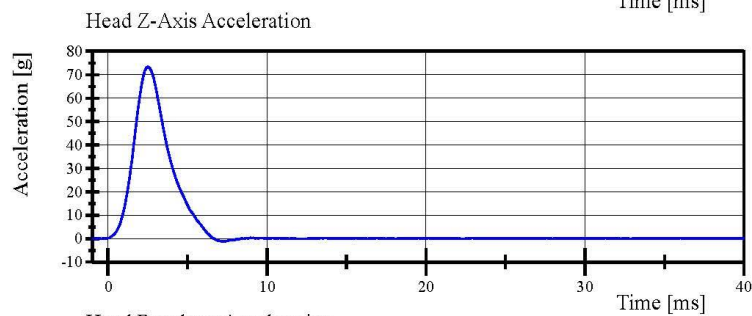
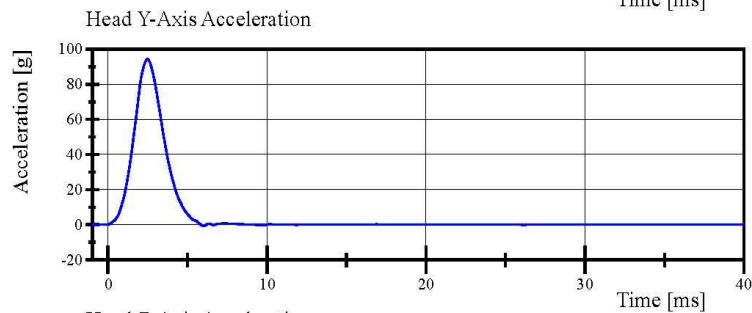
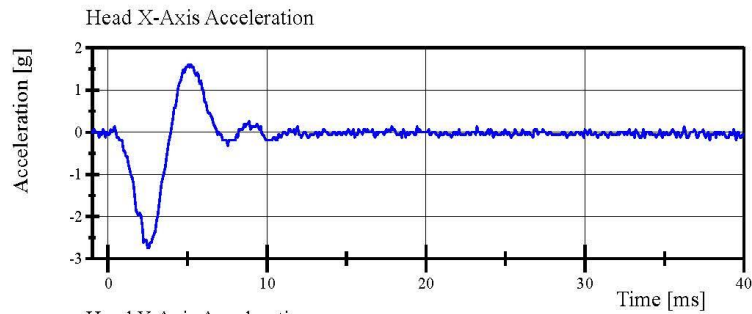


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 297 Certification No. 65-1

Test Date: 6/15/2023



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

06.15.2023 13:30:24 234



Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 297 Certification No. 65-1

Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.591 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.433 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.623 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.891 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.828 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.845 m/s	Yes
Maximum Headform Flexion			
Peak	(-71) - (-81) deg	-78.2 deg	Yes
Time of Peak	50 - 70 ms	63.2 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.2 N·m	Yes
Decay to 0 N·m	102 - 126 ms	119.1 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 779

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

06.15.2023 13:49:39 750

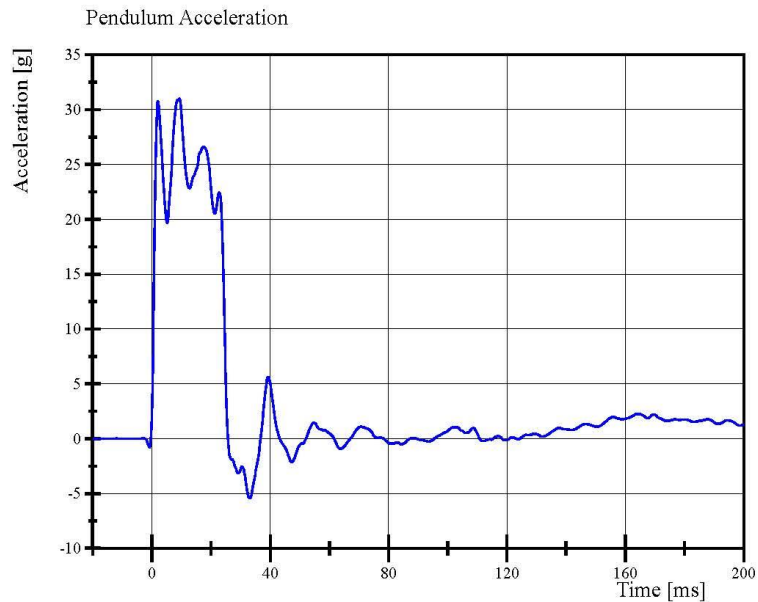


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 297 Certification No. 65-1

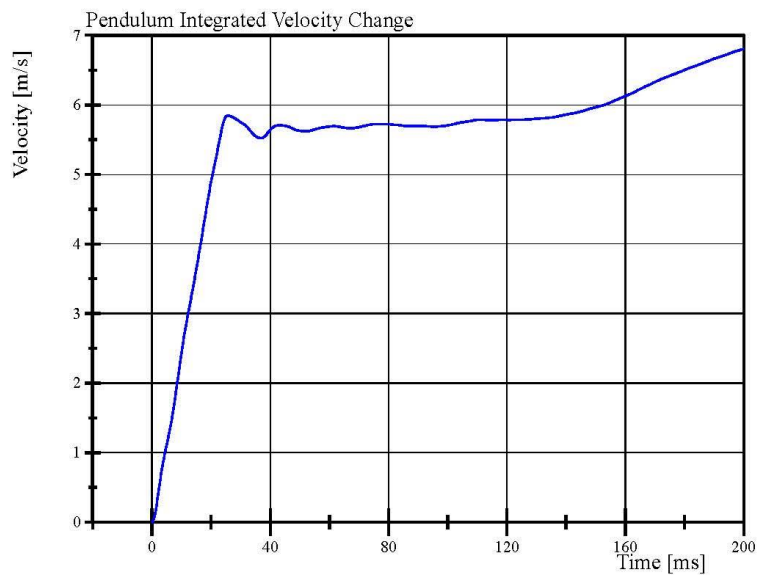
Test Date: 6/15/2023



Filter Class: CFC_180

Max: 31.0 g at 9.3 ms

Min: -5.4 g at 33.1 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

06.15.2023 13:50:07 750

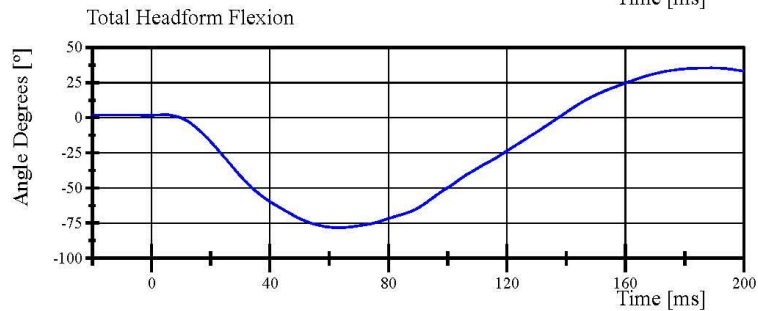
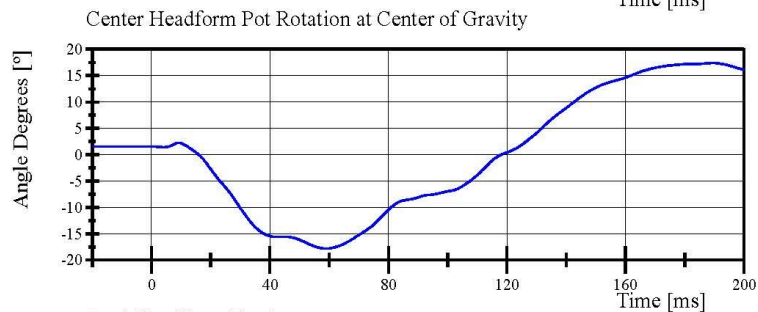
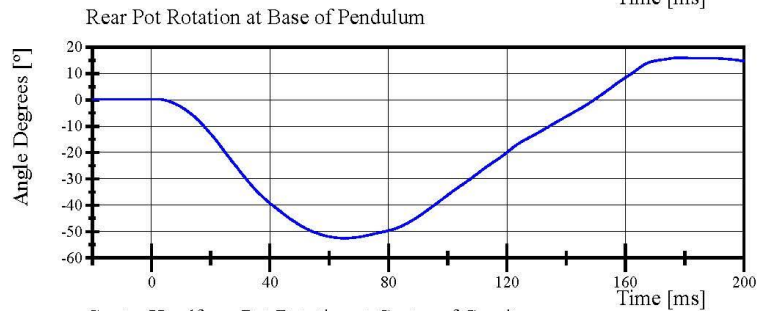
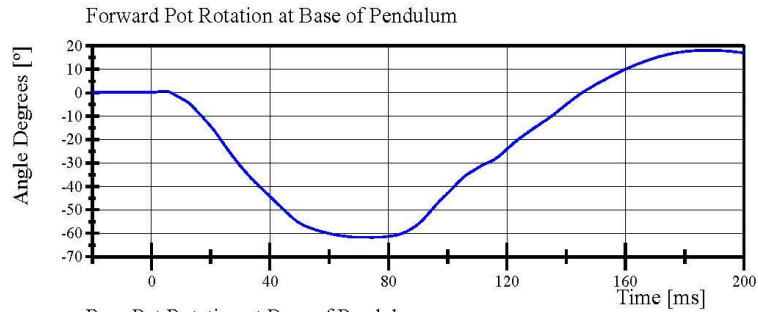


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 297 Certification No. 65-1

Test Date: 6/15/2023



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

06.15.2023 13:50:07 750

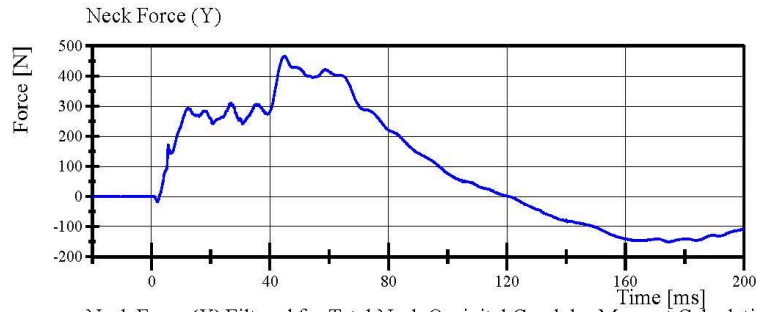


Transportation Research Center Inc.

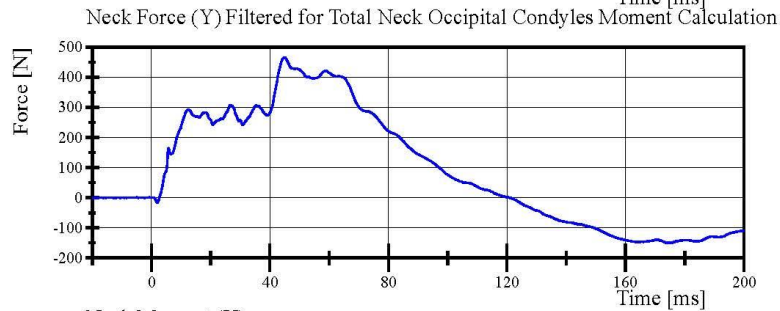
Left Lateral Neck

SID IIS Serial No. 297 Certification No. 65-1

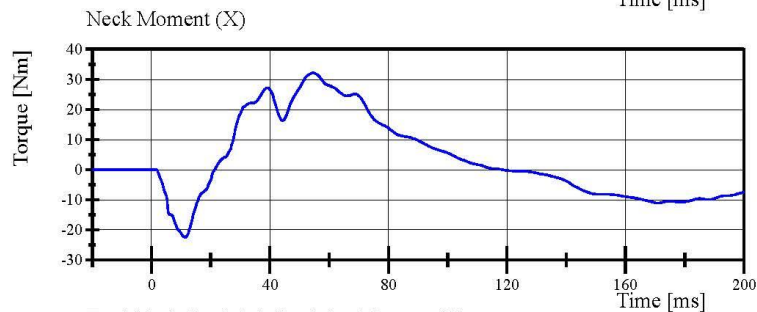
Test Date: 6/15/2023



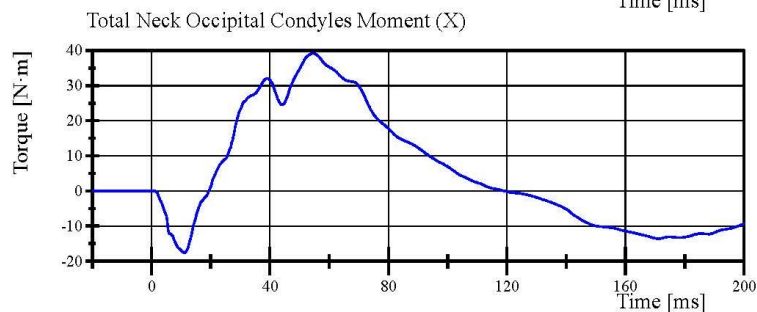
Filter Class: CFC_1000
Max: 465.8 N at 45.0 ms
Min: -150.9 N at 174.4 ms



Filter Class: CFC_600
Max: 465.6 N at 45.0 ms
Min: -150.5 N at 174.4 ms



Filter Class: CFC_600
Max: 32.1 Nm at 54.6 ms
Min: -22.4 Nm at 11.4 ms



Filter Class: Without_(Constar
Max: 39.2 N·m at 54.6 ms
Min: -17.6 N·m at 11.1 ms

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

06.15.2023 13:50:08 750



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIS Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.2 g	Yes
Shoulder Displacement	28 - 37 mm	31.5 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.2 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 940L

Shoulder Rib S/N: 180-3355 259

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

06.15.2023 10:51:37 885

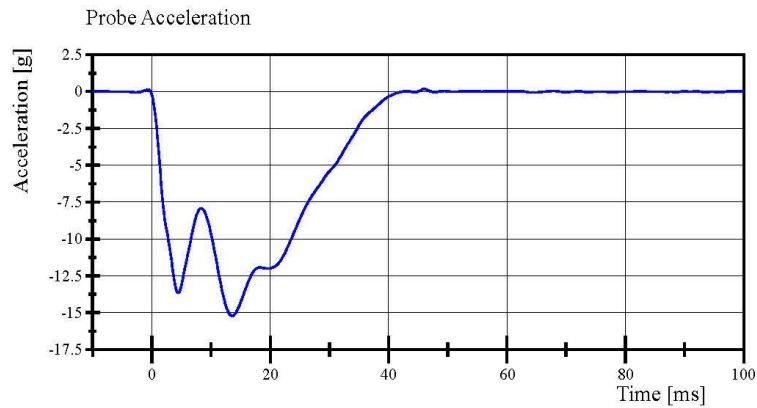


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 297 Certification No. 65-1

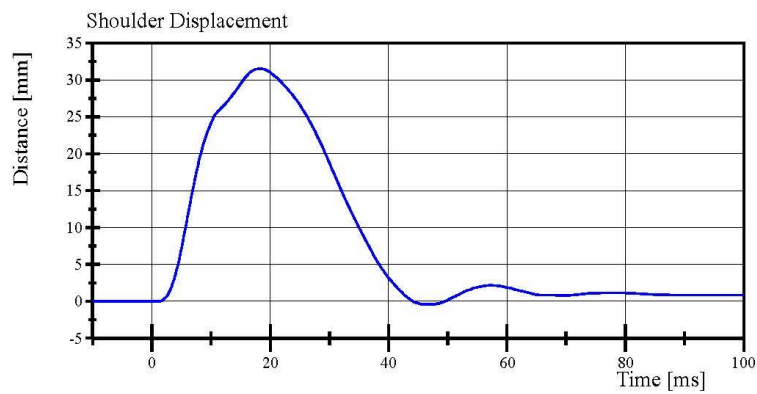
Test Date: 6/15/2023



Filter Class: CFC_180

Max: 0.2 g at 46.0 ms

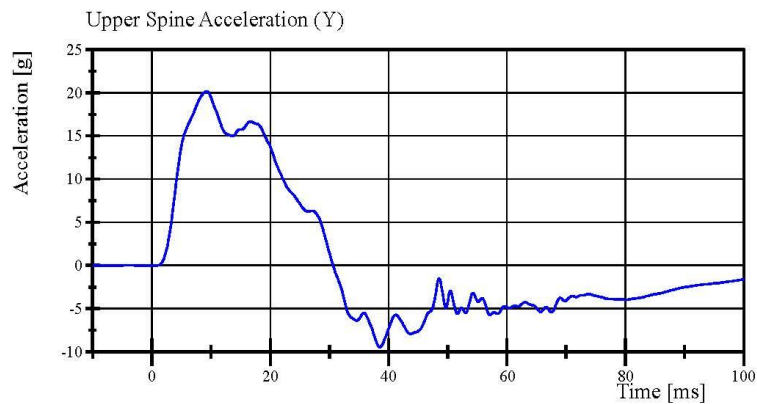
Min: -15.2 g at 13.5 ms



Filter Class: CFC_600

Max: 31.5 mm at 18.6 ms

Min: -0.4 mm at 47.1 ms



Filter Class: CFC_180

Max: 20.2 g at 9.3 ms

Min: -9.5 g at 38.5 ms

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

06.15.2023 10:52:04 885



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIS Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.730 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.4 g	Yes
Shoulder Displacement	31 - 40 mm	35.1 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.5 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.9 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.4 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.6 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 940L

Shoulder Rib S/N: 180-3355 259

Upper Thorax Rib S/N: DM5020

Middle Thorax Rib S/N: DM5021

Lower Thorax Rib S/N: DM5022

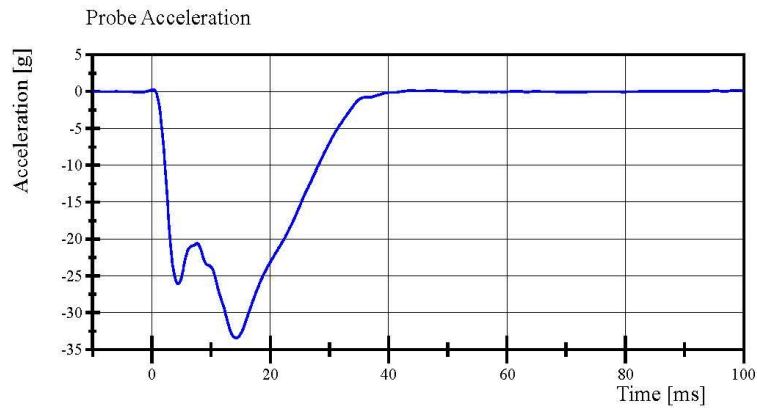
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.15.2023 11:39:43 641

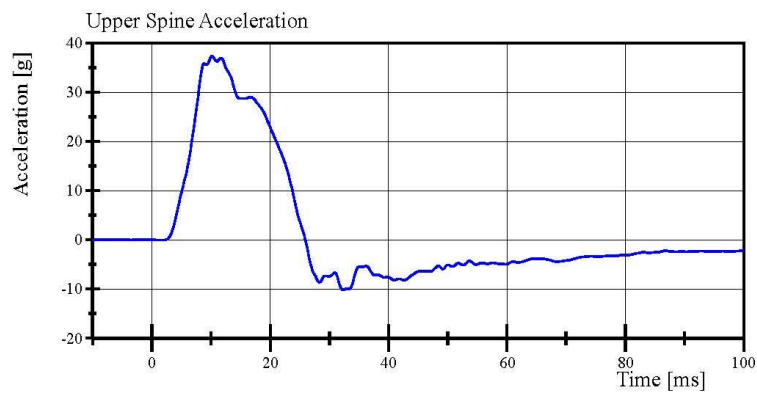


Transportation Research Center Inc.

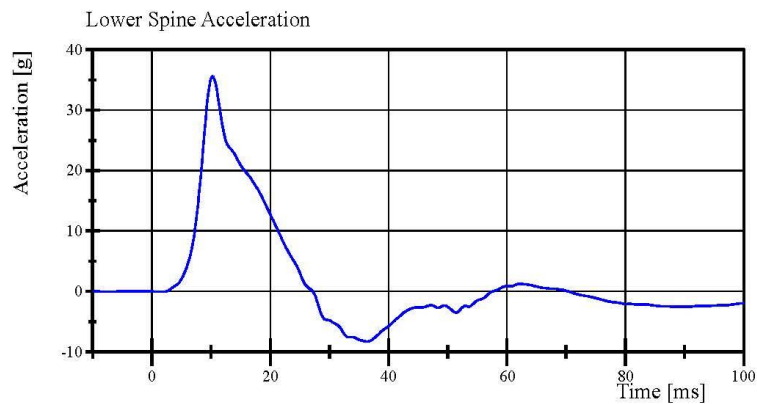
Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023



Filter Class: CFC_180
Max: 0.3 g at 0.2 ms
Min: -33.4 g at 14.2 ms



Filter Class: CFC_180
Max: 37.3 g at 10.2 ms
Min: -10.2 g at 32.3 ms



Filter Class: CFC_180
Max: 35.6 g at 10.2 ms
Min: -8.3 g at 36.4 ms

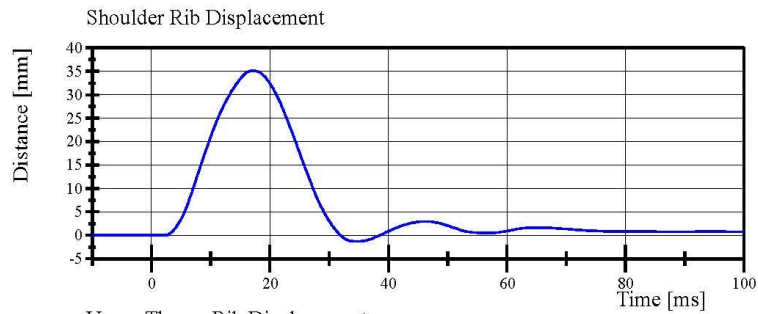
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.15.2023 11:40:30 641

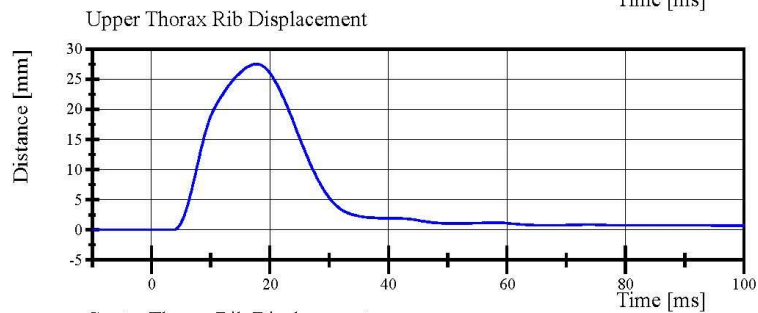


Transportation Research Center Inc.

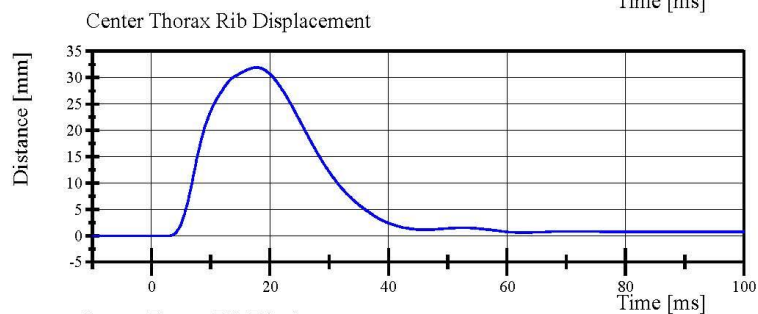
Left Lateral Thorax with Arm
SID IIs Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023



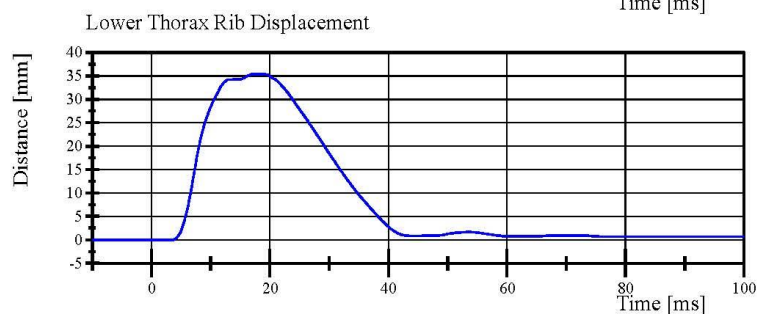
Filter Class: CFC_600
Max: 35.1 mm at 17.0 ms
Min: -1.3 mm at 35.0 ms



Filter Class: CFC_600
Max: 27.5 mm at 17.7 ms
Min: -0.0 mm at -6.2 ms



Filter Class: CFC_600
Max: 31.9 mm at 17.7 ms
Min: -0.0 mm at -2.5 ms



Filter Class: CFC_600
Max: 35.4 mm at 18.1 ms
Min: -0.0 mm at 3.5 ms

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

06.15.2023 11:40:30 641



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIS Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.352 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.4 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.7 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	40.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.7 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Thorax Rib S/N: DM5020

Middle Thorax Rib S/N: DM5021

Lower Thorax Rib S/N: DM5022

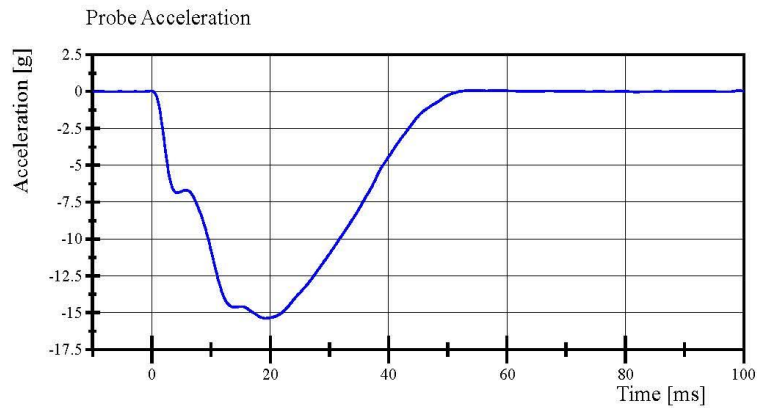
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.15.2023 11:06:59 881

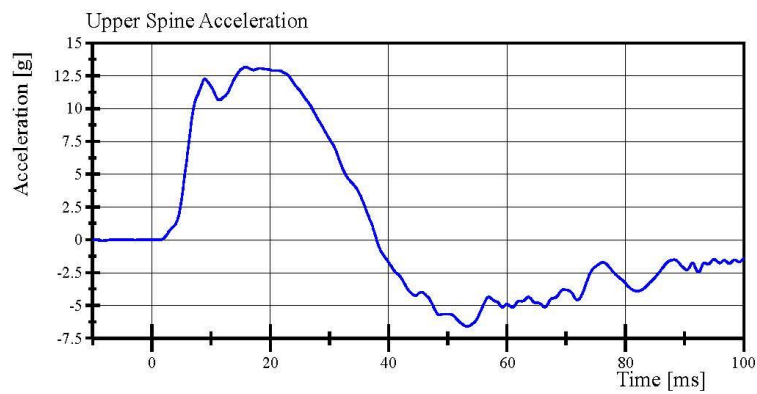


Transportation Research Center Inc.

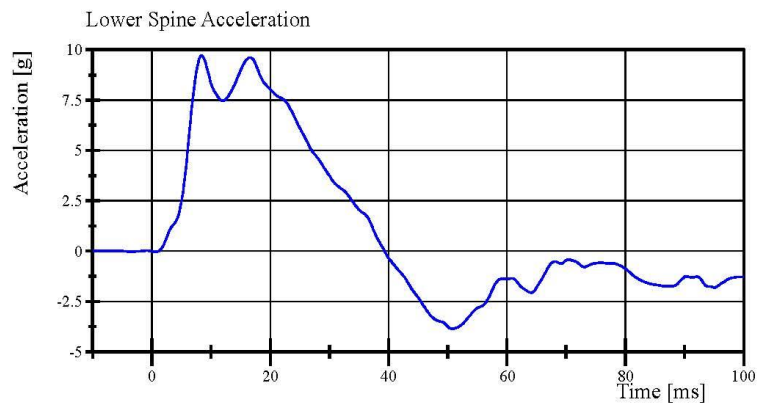
Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023



Filter Class: CFC_180
Max: 0.1 g at 58.4 ms
Min: -15.4 g at 19.2 ms



Filter Class: CFC_180
Max: 13.2 g at 15.8 ms
Min: -6.6 g at 53.4 ms



Filter Class: CFC_180
Max: 9.7 g at 8.4 ms
Min: -3.9 g at 50.8 ms

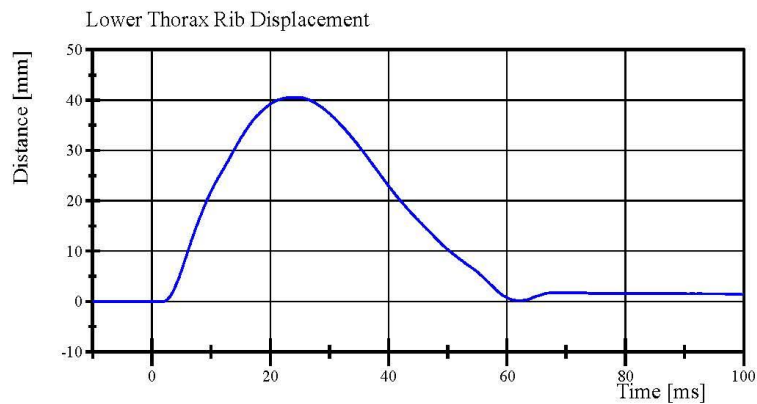
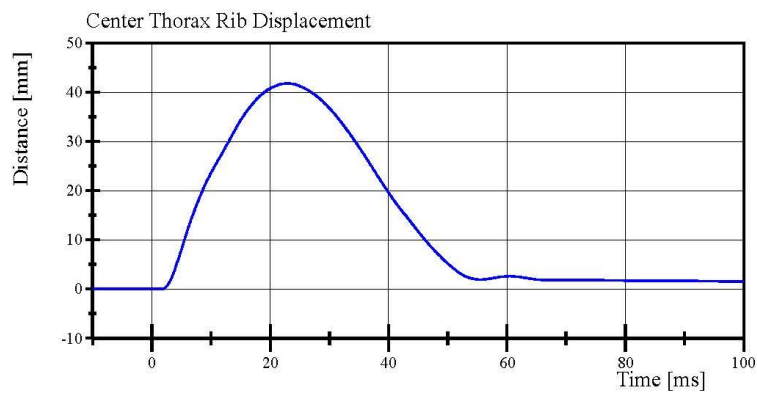
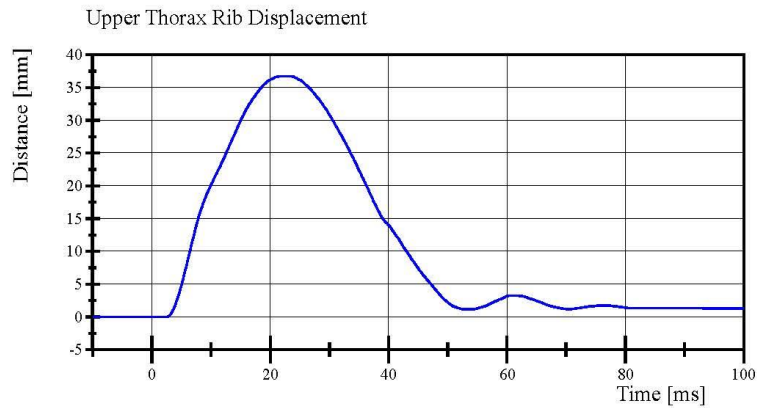
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.15.2023 11:07:33 881



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023



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

06.15.2023 11:07:33 881



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 297 Certification No. 65-2
Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.0 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	40.3 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.66 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: DM7281

Lower Abdominal Rib S/N: DM7275

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

06.15.2023 11:48:40 720

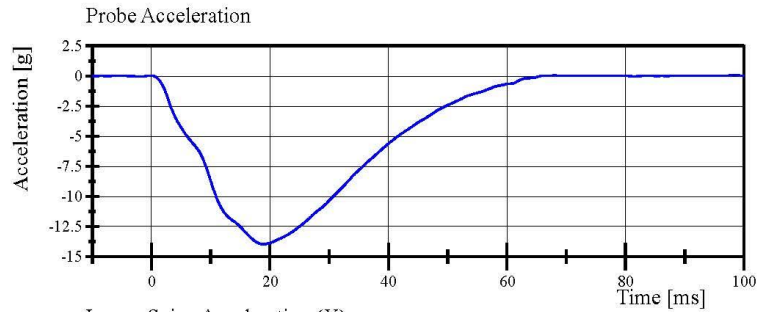


Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 297 Certification No. 65-2

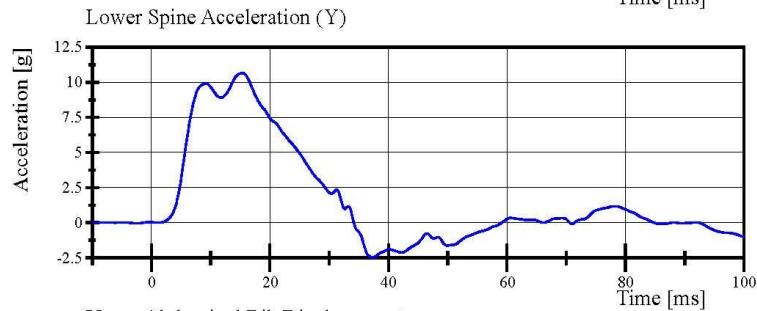
Test Date: 6/15/2023



Filter Class: CFC_180

Max: 0.1 g at 98.4 ms

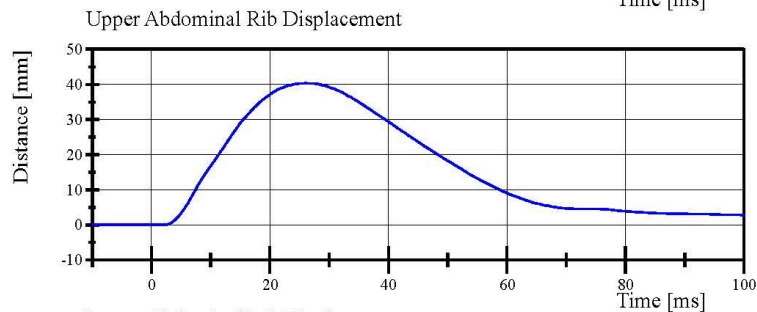
Min: -14.0 g at 18.9 ms



Filter Class: CFC_180

Max: 10.7 g at 15.4 ms

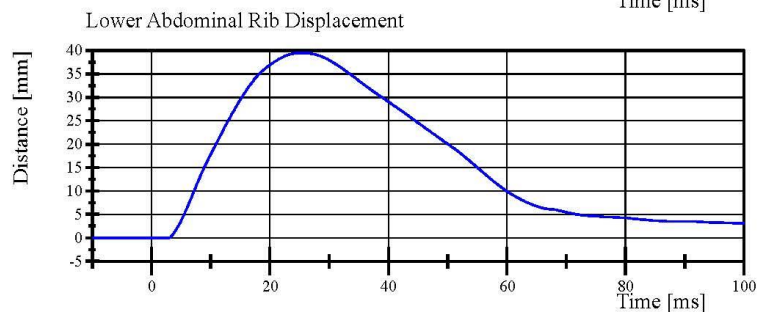
Min: -2.5 g at 37.3 ms



Filter Class: CFC_600

Max: 40.3 mm at 26.0 ms

Min: -0.0 mm at -2.2 ms



Filter Class: CFC_600

Max: 39.5 mm at 25.4 ms

Min: -0.0 mm at 2.8 ms

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

06.15.2023 11:49:08 720



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIS Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.86 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.7 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,731.7 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1171

Pelvis Plug Info:

Manufacturer: Saco

S/N: 14577

Cal Date: 20201218

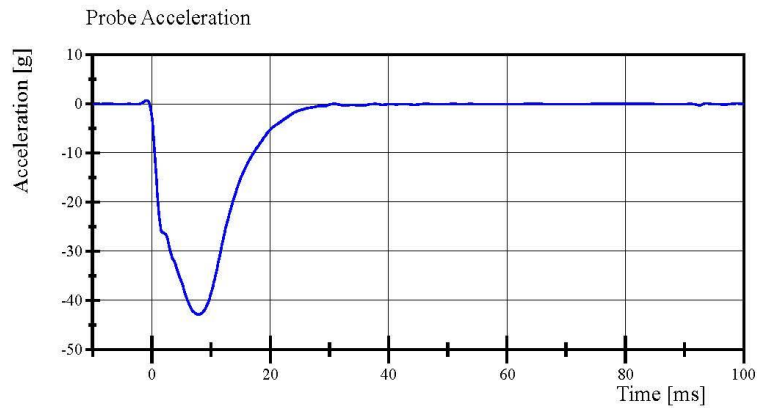
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

06.15.2023 10:32:50.468

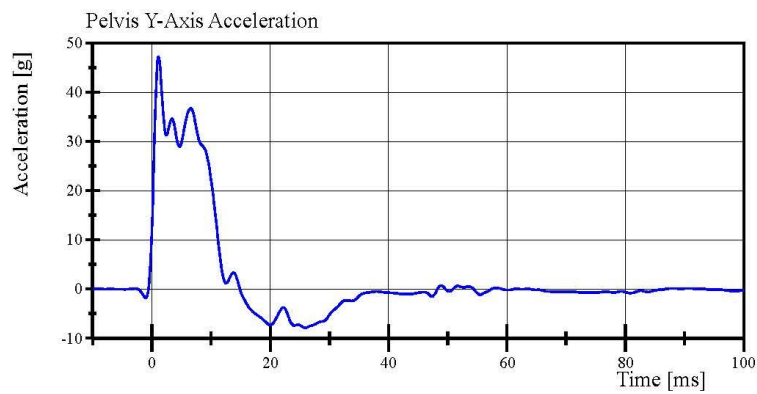


Transportation Research Center Inc.

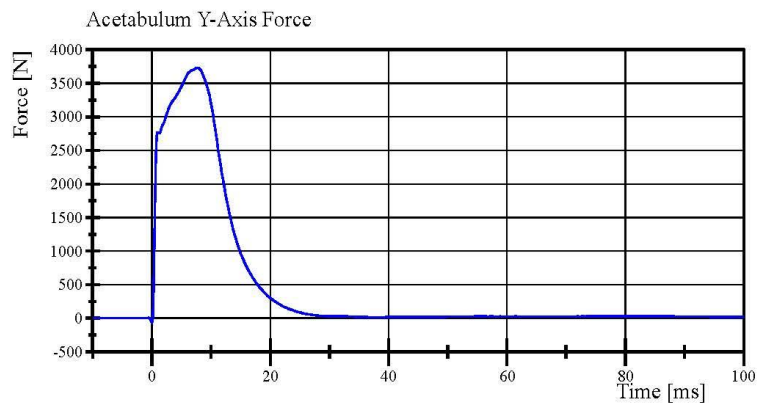
Left Lateral Pelvis
SID IIs Serial No. 297 Certification No. 65-1
Test Date: 6/15/2023



Filter Class: CFC_180
Max: 0.7 g at -0.9 ms
Min: -42.9 g at 7.8 ms



Filter Class: CFC_180
Max: 47.2 g at 1.1 ms
Min: -7.9 g at 25.9 ms



Filter Class: CFC_600
Max: 3,731.7 N at 7.7 ms
Min: -69.5 N at 0.0 ms

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

06.15.2023 10:37:39 468



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 65-1

Test Date: 6/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.23 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.2 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	35.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,978.3 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 1171

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

06.15.2023 13:14:50 744

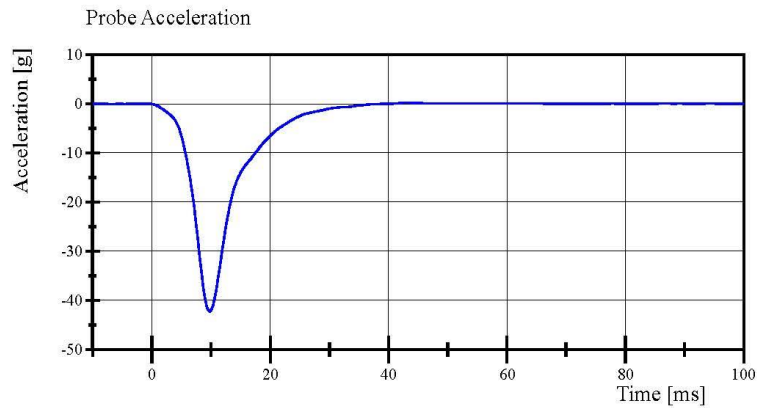


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 297 Certification No. 65-1

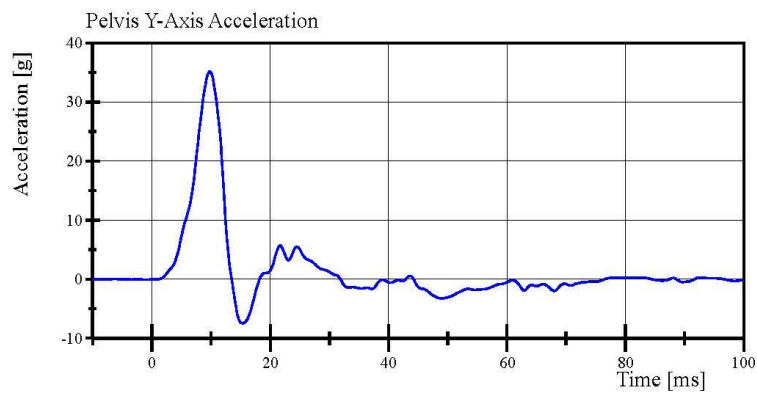
Test Date: 6/15/2023



Filter Class: CFC_180

Max: 0.2 g at 42.8 ms

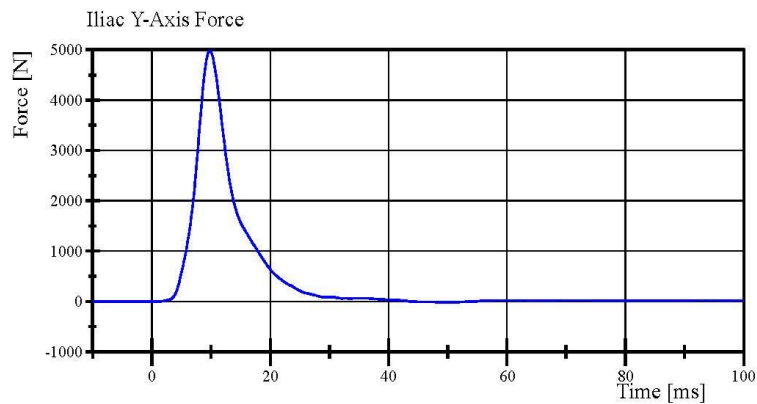
Min: -42.2 g at 9.8 ms



Filter Class: CFC_180

Max: 35.2 g at 9.8 ms

Min: -7.4 g at 15.4 ms



Filter Class: CFC_600

Max: 4,978.3 N at 9.8 ms

Min: -16.2 N at 50.7 ms

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

06.15.2023 13:15:41 744



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 297			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	P93539	Endevco	31-Jan-2023
				Y	P93549	Endevco	31-Jan-2023
				Z	P93776	Endevco	31-Jan-2023
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A	
	Thoracic Rib	Upper	Y	023	Servo	1-Feb-2023	
		Middle	Y	063	Servo	1-Feb-2023	
		Lower	Y	043	Servo	1-Feb-2023	
	Abdominal Rib	Upper	Y	1152	Servo	1-Feb-2023	
		Lower	Y	051	Servo	1-Feb-2023	
Lower Spine Accelerometers (T12)				X	P94425	Endevco	31-Jan-2023
				Y	P91522	Endevco	31-Jan-2023
				Z	P91511	Endevco	31-Jan-2023
Acetabulum Load Cell				Y	235-FY	FTSS	31-Jan-2023
Iliac Wing Load Cell				Y	320-FY	FTSS	31-Jan-2023
Pelvis Plug (struck side)					14564	SACO	2-Dec-2020
Pelvis Plug (non-struck side)					14577	SACO	2-Dec-2020

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A377510	Measurement Specialties	3-Apr-2023
Vehicle Center of Gravity	Y	A377512	Measurement Specialties	3-Apr-2023
Vehicle Center of Gravity	Z	A298534	Measurement Specialties	3-Apr-2023
Left Floor Sill	Y	A373384	Measurement Specialties	18-Apr-2023
A-Pillar Sill	Y	A377493	Measurement Specialties	18-Apr-2023
A-Pillar Low	Y	A298553	Measurement Specialties	3-Apr-2023
A-Pillar Mid	Y	A373376	Measurement Specialties	18-Apr-2023
B-Pillar Sill	Y	A378352	Measurement Specialties	18-Apr-2023
B-Pillar Low	Y	A349892	Measurement Specialties	18-Apr-2023
B-Pillar Mid	Y	A378310	Measurement Specialties	18-Apr-2023
Driver Seat	Y	A377508	Measurement Specialties	18-Apr-2023
Engine Top	X	A400123	Measurement Specialties	18-Apr-2023
Engine Top	Y	A227200	Measurement Specialties	3-Apr-2023
Firewall	Y	A349879	Measurement Specialties	18-Apr-2023
Right Roof	Y	A300428	Measurement Specialties	18-Apr-2023
Right Floor Sill	Y	A349889	Measurement Specialties	18-Apr-2023
Rear Floor Pan	X	A227171	Measurement Specialties	18-Apr-2023
Rear Floor Pan	Y	A298343	Measurement Specialties	3-Apr-2023

TABLE 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	DK7091S	Humanetics	2-Jan-2023
Load Cell 2	DK7120S	Humanetics	3-Jan-2023
Load Cell 3	DK7118S	Humanetics	3-Jan-2023
Load Cell 4	DK7124S	Humanetics	3-Jan-2023
Load Cell 5	DK7111S	Humanetics	3-Jan-2023
Load Cell 6	DK7126S	Humanetics	3-Jan-2023
Load Cell 7	DK7112S	Humanetics	3-Jan-2023
Load Cell 8	DK7074S	Humanetics	3-Jan-2023