

**RESEARCH FMVSS 214
RIGID POLE SIDE IMPACT TEST**

**FCA US LLC
2019 Ram 1500**

**PREPARED BY:
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Report Date: October 20, 2021

FINAL REPORT

**PREPARED FOR:
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Project Manager, John Shultz

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16. Abstract A 31.00 km/h, 285° Oblique Rigid Pole Research Side Impact Test was conducted on the subject 2019 Ram 1500 in accordance with the specifications of the Laboratory Test Procedure for the Research Side Impact Rigid Pole Test 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 April 15, 2021. The impact velocity was 31.11 km/h, and the ambient temperature at the struck (passenger's) side of the target vehicle at the time of impact was 21.2°C. The test vehicle post-test maximum crush was 403 mm at level 3. The test vehicle's performance was as follows:																													
<table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="2">Passenger ATD (WorldSID-50M)</th> </tr> <tr> <th>Units</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criterion (HIC15)</td> <td>N/A</td> <td>144</td> </tr> <tr> <td>Brain Injury Criterion (BrIC)</td> <td>N/A</td> <td>0.62</td> </tr> <tr> <td>Peak Shoulder Force</td> <td>N</td> <td>-1624.97</td> </tr> <tr> <td>Peak Thoracic Rib Deflection</td> <td>mm</td> <td>21.99</td> </tr> <tr> <td>Peak Abdominal Rib Deflection</td> <td>mm</td> <td>28.79</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>-903.62</td> </tr> <tr> <td>Peak Resultant Sacro-Iliac Force</td> <td>N</td> <td>2163.45</td> </tr> </tbody> </table>				Measurement Description	Passenger ATD (WorldSID-50M)		Units	Result	Head Injury Criterion (HIC15)	N/A	144	Brain Injury Criterion (BrIC)	N/A	0.62	Peak Shoulder Force	N	-1624.97	Peak Thoracic Rib Deflection	mm	21.99	Peak Abdominal Rib Deflection	mm	28.79	Pubic Symphysis Force	N	-903.62	Peak Resultant Sacro-Iliac Force	N	2163.45
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The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.																													
17. Key Words Side Impact Pole WorldSID-50M		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590																											
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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE AND TEST PROCEDURE

This rigid pole side impact test is a part of the Federal Motor Vehicle Safety Standard 214 Side Impact Protection program. It was conducted for the National Highway Traffic Safety Administration's (NHTSA) under 693JJ918D000019 by Transportation Research Center Inc.. The purpose of this test was to evaluate the repeatability, reproducibility, and durability of the WorldSID 50th percentile male ATD (WorldSID-50M) equipped with RibEye™, to determine whether the dummy is a viable option to replace the EuroSID-2 dummy with rib extension modifiers (ES-2re) in future side impact rigid pole tests conducted by NHTSA. The test was conducted using NHTSA's 'LABORATORY TEST PROCEDURE FOR FMVSS No. 214, DYNAMIC SIDE IMPACT PROTECTION – Rigid Pole Side Impact Test' dated September 2012 as a guideline.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2019 Ram 1500. The subject vehicle was towed into the rigid pole at an angle of 285° and a velocity of 31.11 km/h. The test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on April 15, 2021. Pre-test and post test photographs of the test vehicle and side impact dummy (WorldSID-50M with RibEye) are included in APPENDIX A of this report.

The test setup was conducted following the FMVSS 214 test procedure dated September 2012, including instrumentation and camera placement. One WorldSID-50M with RibEye dummy was placed in the passenger designated seating position per NHTSA's "WorldSID 50th Male Dummy Seating Procedure, April 2019 (<https://rosap.nhtl.bts.gov/view/dot/41900>).

The dummy was instrumented in the following manner:

- Head CG tri-axial accelerometer
- Head angular rate sensor
- Upper and lower neck load cells
- Shoulder load cell
- RibEye measurement system in thorax ribs 1-3 and abdominal ribs 1 and 2, with three LEDs per rib
- Upper (T1), middle (T4), and lower spine (T12) tri-axial accelerometers
- Lumbar load cell
- Pelvic tri-axial accelerometers
- Pubic load cell
- Left and right sacroiliac load cells
- Left femur 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 of this report contains the test equipment and instrumentation calibration data. Worksheets and plots found in Appendix E describe dummy positions in detail.

Dummy injury readings were recorded as follows:

Measurement Description	Passenger ATD (WorldSID-50M)	
	Units	Result
Head Injury Criterion (HIC15)	N/A	144
Brain Injury Criterion (BrIC)	N/A	0.62
Peak Shoulder Force	N	-1624.97
Peak Thoracic Rib Deflection	mm	21.99
Peak Abdominal Rib Deflection	mm	28.79
Pubic Symphysis Force	N	-903.62
Peak Resultant Sacro-Iliac Force	N	2163.45

Supplemental restraint information is given below:

Restraint Type	Right Front (Passenger) Occupant Location 3	
	Mounted	Deployed
Frontal Airbag	Yes	No
Side Curtain Airbag	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes
Side Pelvis Airbag	No	N/A
Knee Airbag	No	N/A
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	Yes	No
Other Safety Restraint	No	N/A

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact and the static rollover test was not performed.

Data Acquisition Explanations

VEHICLE CG ARS Z; QD after 360.0 ms

Engine Top Acceleration (Y); CF at 64.0 ms

Right Front Door Mid Rear Acceleration (Y); CF after 20.0 ms

Ribeye Error Codes:

- 1 if the top sensor is blocked or sees too much ambient light
- 2 if the bottom sensor is blocked or sees too much ambient light
- 3 if both top and bottom sensors are blocked or see too much ambient light
- 4 if the middle sensor is blocked or sees too much ambient light
- 5 if the middle and top sensors are blocked or see too much ambient light
- 6 if the middle and bottom sensors are blocked or see too much ambient light
- 7 if all three sensors are blocked or see too much ambient light
- 8 if a divide-by-zero condition occurred in the data processing
- 9 if data goes past the end of the calibration curves

**error codes may be positive or negative in data and will occur to all x, y, and z channels*

Passenger Thorax Rib 3 Middle Displacement: Error code 2 at 57.4-66.0 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

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

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

TEST VEHICLE INFORMATION AND OPTIONS

Model Year	2019
Make	Ram
Model	1500
Body Style	Truck
VIN	1C6RRECT3KN884657
Body Color	Bright White
Odometer Reading (km/mi)	114 mi.
Engine Displacement (L)	5.7
Type/No. Cylinders	V/8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	No

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	No
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 Safety Restraint	No

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	FCA US LLC
Date of Manufacturer	7-19
Vehicle Type	Truck

GVWR (kg)	3130
GAWR Front (kg)	1679
GAWR Rear (kg)	1860

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	3	3	N/A	6
Vehicle Capacity Weight (VCW) (kg)				847.0
DSC X 68.04 kg				408.2
Rated Cargo and Luggage Weight (RCLW) (kg)				438.8

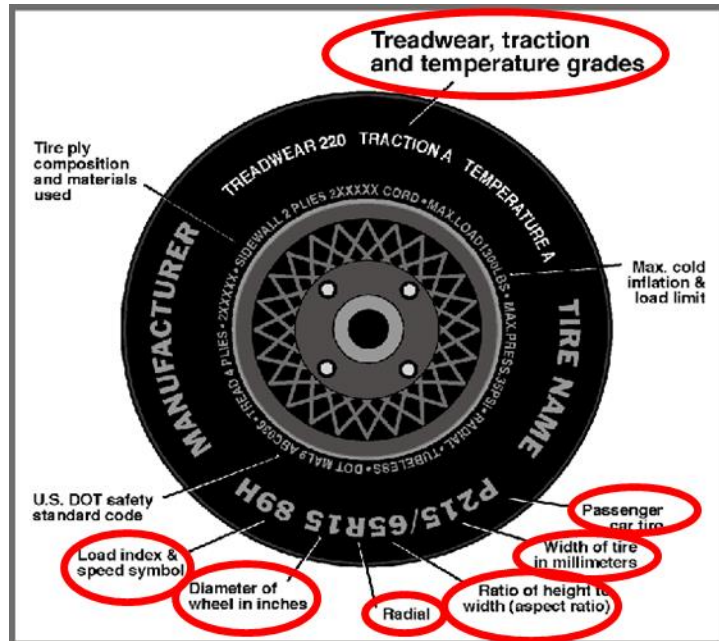
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	275/65R18 116T	275/65R18 116T
Tire Size on Vehicle	275/65R18	275/65R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler H/T	Dueler H/T
Treadwear	520	520
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	116T	116T
Tire Material	Polyester/Steel/Nylon	Polyester/Steel/Nylon
DOT Safety Code Left	9BYJ DHT 1719	9BYJ DHT 1719
DOT Safety Code Right	9BYJ DHT 1719	9BYJ DHT 1719

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

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	241	241	234	234
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

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	677.2	495.4		675.8	541.0		679.0	560.2	
Right	kg	646.2	469.6		710.0	565.4		703.0	557.2	
Ratio	%	57.8	42.2		55.6	44.4		55.3	44.7	
Totals	kg	1323.4	965.0	2288.4	1385.8	1106.4	2492.2	1382.0	1117.4	2499.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2288.4	(A)
Actual Weight of 1 WorldSID-50M with RibEye Dummy Used	kg	75.0	(B)
Rated Cargo/Luggage Weight (RCLW) ¹	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2499.4	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-1.2	-1.0	-1.0	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	-1.0	-1.0	-0.8	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	-0.3	-0.1	-0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	-0.4	-0.2	-0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	1510	1589	1601	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+22	-20	-7	

*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".

Test height adjustable suspension setting, if applicable:

N/A

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

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

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: 6x 25 lb plates	66.4
Components removed: None	0.0

DATA SHEET NO. 2

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

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

SEAT POSITIONING

The driver's 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 nonstruck 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	N/A	N/A	13.9
Front Passenger Seat	N/A	N/A	14.5
Front Center Seat*	N/A	N/A	6.4
Struck Side Rear Seat	N/A	N/A	13.8
Non-Struck Side Rear Seat	N/A	N/A	12.8
Rear Center Seat*	N/A	N/A	11.8

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rearmost	Mid Fore/Aft	Forward-Most
Driver Seat	13.9	366	Max	N/A	N/A	N/A
			Mid	372	366	360
			Min	N/A	N/A	N/A
Front Passenger Seat	14.5	362	Max	N/A	N/A	N/A
			Mid	366	362	357
			Min	N/A	N/A	N/A
Front Center Seat*	6.4	145	Max	N/A	N/A	N/A
			Mid	145	145	145
			Min	N/A	N/A	N/A
Struck Side Rear Seat	13.8	382	Max	N/A	N/A	N/A
			Mid	N/A	382	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	12.8	391	Max	N/A	N/A	N/A
			Mid	N/A	391	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	11.8	300	Max	N/A	N/A	N/A
			Mid	N/A	300	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: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

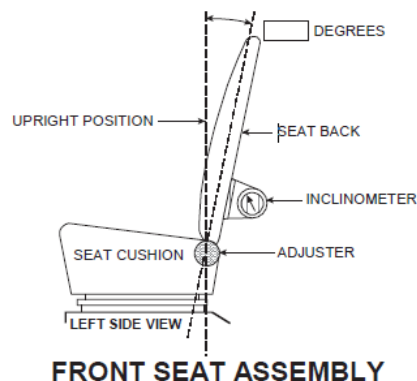
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	223	32	110	16
Front Passenger Seat	220	32	108	16
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	0	Fixed	0	Fixed
Non-Struck Side Rear Seat	0	Fixed	0	Fixed
Rear Center Seat*	0	Fixed	0	Fixed

* If applicable.

SEAT BACK ANGLE ADJUSTMENT

The passenger's seat back was positioned according to the manufacturer's information as provided on Form 1; resulting in a head rest post angle of 7.3° at the head rest post. The driver seat was set to match the front passenger seat.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat	55.8	32	7.8	9
Front Passenger Seat w/ Seated Dummy	62.1	35	7.3	8
Front Center Seat*	21.1	1	22.0	1
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.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

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 #
Passenger Seat	5	5, Full up

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Passenger Seat	4 up, 11 fwd	4 full up, 11 full fwd

DATA SHEET NO. 2 (CONTINUED)

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

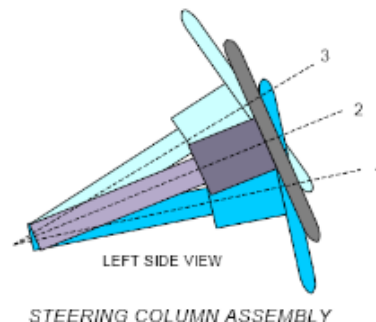
Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

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.

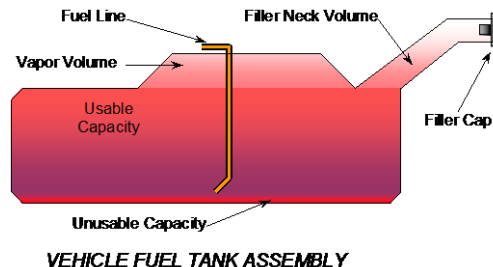
	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	22.6	0
Geometric Center, Position No. 2	24.1	30
Uppermost, Position No. 3	26.8	60
Telescoping Steering Wheel Travel		60
Test Position	24.1	30



FUEL PUMP

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

Ignition key in and turned to the run position. For keyless system use start/stop button to set it run position.



FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	98.4
Usable Capacity of "Optional" Tank (see Form No. 1)	121.1
Usable Capacity of Standard Tank (see Owner's Manual)	98.4
Usable Capacity of Optional Tank (see Owner's Manual)	121.1
93% of Usable Capacity	91.5
Actual Amount of Solvent Used in Test	91.5
1/3 of Usable Capacity	32.8

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated on Form No. 1? YES NO

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	4.26	126.65	-17.22	56.60
	Y	12.23	110.95	-37.90	50.95
	Z	14.75	108.95	-6.85	54.40
	R	41.22	53.75		
Head Angular Rate (deg/sec)	X	1188.06	146.60	-1246.87	115.20
	Y	844.15	109.40	-1120.77	150.80
	Z	974.73	55.20	-553.25	100.75
Upper Neck Force (N)	X	185.37	126.70	-240.15	179.30
	Y	420.06	110.95	-208.94	40.05
	Z	544.63	109.40	-276.20	75.80
Upper Neck Moment (Nm)	X	45.93	122.45	-5.45	106.40
	Y	21.70	166.85	-24.54	120.50
	Z	14.71	117.30	-12.63	63.80
Lower Neck Force (N)	X	228.76	104.05	-301.55	44.60
	Y	753.96	108.40	-552.56	43.20
	Z	514.24	40.35	-361.79	74.70
Lower Neck Moment (Nm)	X	89.70	111.25	-28.67	43.30
	Y	51.32	180.05	-43.27	127.20
	Z	27.16	122.20	-13.19	175.80
Shoulder Force (N)	X	393.34	61.80	-142.13	242.20
	Y	4.36	-12.90	-1624.97	51.65
	Z	106.44	16.25	-559.81	62.60
Shoulder Rear Ribeye Position (mm)	X	-48.04	47.50	-82.10	125.30
	Y	83.74	18.00	68.33	55.30
	Z	-51.72	-44.00	-73.35	71.25
Length of Change (mm)		13.96	45.75	-6.93	131.45
Shoulder Middle Ribeye Position (mm)	X	-11.03	46.60	-54.52	129.10
	Y	96.62	17.80	68.53	60.10
	Z	-52.67	-44.00	-75.81	52.70
Length of Change (mm)		26.42	58.35	-1.18	17.60
Shoulder Front Ribeye Position (mm)	X	31.58	46.95	-11.51	128.50
	Y	85.88	17.40	47.64	62.80
	Z	-57.64	17.50	-80.67	52.70
Length of Change (mm)		33.01	126.85	-0.97	17.80

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-23.13	43.85	-53.12	123.30
	Y	104.19	224.75	88.46	34.65
	Z	12.85	108.10	-9.87	51.35
Length of Change (mm)		16.18	43.35	-5.40	128.20
Thorax Rib 1 Middle Ribeye Position (mm)	X	14.83	44.20	-20.82	124.20
	Y	111.36	232.75	87.56	35.25
	Z	13.79	110.15	-12.24	51.60
Length of Change (mm)		21.80	34.95	-1.52	232.85
Thorax Rib 1 Front Ribeye Position (mm) ¹	X	54.10	43.80	15.66	124.35
	Y	105.90	240.20	79.02	37.30
	Z	15.73	107.75	-11.29	51.10
Length of Change (mm)		19.09	33.35	-0.97	20.40
Thorax Rib 2 Rear Ribeye Position (mm)	X	-25.29	58.50	-44.29	121.10
	Y	101.58	15.80	84.19	43.70
	Z	42.28	108.15	27.83	68.65
Length of Change (mm)		15.03	44.40	-2.25	120.95
Thorax Rib 2 Middle Ribeye Position (mm) ¹	X	11.90	57.90	-12.25	123.10
	Y	114.39	250.75	88.04	43.80
	Z	44.85	108.15	29.31	68.70
Length of Change (mm)		21.99	43.85	-2.89	250.80
Thorax Rib 2 Front Ribeye Position (mm)	X	50.26	57.60	24.32	121.35
	Y	107.23	204.75	80.69	43.80
	Z	49.04	108.05	34.34	69.75
Length of Change (mm)		18.37	43.70	-3.11	204.75
Thorax Rib 3 Rear Ribeye Position (mm)	X	-49.30	22.80	-67.93	119.20
	Y	94.86	168.35	80.28	42.70
	Z	-31.62	110.75	-49.10	67.90
Length of Change (mm)		10.28	49.10	-2.43	168.35
Thorax Rib 3 Middle Ribeye Position (mm) ¹	X	4.27	65.95	-39.11	119.85
	Y	121.30	68.05	-7.48	65.95
	Z	7.21	65.95	-54.88	66.15
Length of Change (mm) ¹		15.44	48.20	-16.77	68.10

¹See data acquisition explanation

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction		
		Max.	Time (ms)	Max.	Time (ms)	
Thorax Rib 3 Front Ribeye Position (mm)	X	19.26	47.40	-3.59	120.20	
	Y	95.31	199.00	76.78	45.85	
	Z	-31.41	110.40	-49.81	66.00	
Length of Change (mm)			12.21	44.10	-1.35	198.95
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-33.66	15.60	-63.51	121.30	
	Y	96.23	-40.20	74.00	54.00	
	Z	2.51	110.40	-14.86	67.30	
Length of Change (mm)			15.71	53.05	-0.66	121.85
Abdomen Rib 1 Middle Ribeye Position (mm)	X	2.14	22.50	-32.52	118.70	
	Y	105.04	-44.70	75.27	57.05	
	Z	2.80	113.80	-16.61	66.95	
Length of Change (mm)			28.79	55.65	-0.17	-41.65
Abdomen Rib 1 Front Ribeye Position (mm)	X	36.67	46.60	7.85	119.25	
	Y	97.09	-47.80	66.78	56.45	
	Z	2.98	111.40	-15.63	66.40	
Length of Change (mm)			26.56	57.55	-0.25	-41.60
Abdomen Rib 2 Rear Ribeye Position (mm)	X	-13.76	-8.40	-40.06	117.40	
	Y	93.30	-2.30	71.66	55.30	
	Z	44.98	113.80	21.55	63.85	
Length of Change (mm)			14.08	54.45	-3.24	124.15
Abdomen Rib 2 Middle Ribeye Position (mm)	X	18.54	16.90	-9.43	116.40	
	Y	103.50	-11.30	76.98	55.10	
	Z	46.29	112.80	19.21	65.10	
Length of Change (mm)			25.50	54.50	-0.20	-11.15
Abdomen Rib 2 Front Ribeye Position (mm)	X	53.37	49.55	28.91	114.80	
	Y	94.47	-46.10	68.16	53.45	
	Z	48.14	111.40	22.18	64.60	
Length of Change (mm)			22.85	53.50	-0.22	5.35
T1 Acceleration (g)	X	11.74	93.40	-18.50	128.10	
	Y	19.77	99.05	-24.66	63.60	
	Z	9.83	125.20	-7.62	81.15	
	R	26.87	63.45			

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	9.32	93.15	-14.48	127.45
	Y	23.11	96.45	-27.29	35.40
	Z	10.53	126.35	-9.09	81.15
	R	27.97	35.75		
T12 Acceleration (g)	X	16.11	21.15	-5.85	61.15
	Y	19.25	95.25	-35.85	36.65
	Z	8.50	125.45	-6.22	89.95
	R	36.66	36.60		
Pubic Symphysis (N)	Y	7.90	-45.90	-903.62	50.45
Left Sacro-Iliac Force (N)	X	417.55	18.05	-359.65	63.50
	Y	8.87	-18.40	-1302.15	89.30
	Z	2.55	16.10	-555.04	65.30
Left Sacro-Iliac Moment (Nm)	X	30.29	64.65	-22.29	89.25
	Y	26.65	90.75	-17.27	18.05
	Z	46.55	17.90	-15.52	59.55
Right Sacro-Iliac Force (N)	X	239.98	53.55	-382.60	110.25
	Y	4.74	-47.35	-2143.92	47.75
	Z	317.36	36.60	-68.13	110.80
Right Sacro-Iliac Moment (Nm)	X	12.96	258.50	-25.68	85.25
	Y	23.12	102.80	-13.80	56.50
	Z	44.53	111.40	-20.87	60.15
Lumbar Force (N)	X	468.58	60.35	-495.17	18.00
	Y	96.34	21.70	-483.11	49.60
	Z	802.89	64.85	-7.98	12.35
Lumbar Moment (Nm)	X	10.13	23.20	-37.79	64.15
	Y	17.42	18.10	-23.49	61.25
	Z	7.97	102.20	-9.26	178.65
Pelvis Acceleration (g)	X	7.50	59.50	-29.40	17.85
	Y	19.19	85.00	-47.47	47.15
	Z	32.67	17.85	-9.71	45.35
	R	48.44	46.50		

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Femur Force (N)	X	49.59	99.65	-177.82	76.40
	Y	623.94	48.65	-10.08	-42.55
	Z	1061.53	51.60	-222.29	95.60
Femur Moment (Nm)	X	1.55	18.30	-161.50	55.85
	Y	30.86	126.85	-13.50	20.00
	Z	4.19	40.80	-39.52	98.80
Femoral Neck Force (N)	X	69.84	19.45	-454.85	98.50
	Y	96.35	18.30	-1234.82	113.45
	Z	2165.48	50.70	-3.36	-38.90
Outer Knee Force (N)	Y	194.80	21.55	-570.93	65.30
Inner Knee Force (N)	Y	3118.00	65.40	-189.15	18.20

Positive Direction

Longitudinal Forward
 Lateral Rightward
 Vertical Downward

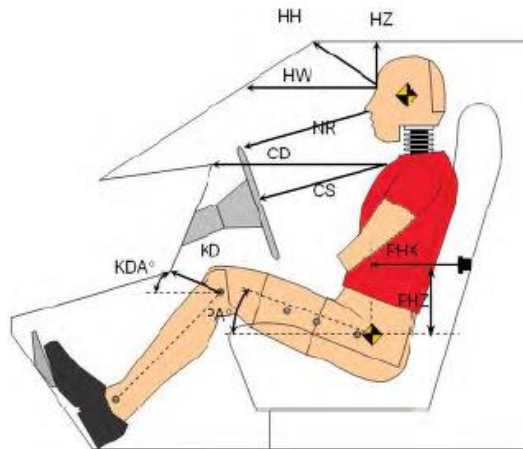
Negative Direction

Longitudinal Rearward
 Lateral Leftward
 Vertical Upward

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



Code	Measurement Description	Passenger WorldSID-50M SN # EA7820	
		Length (mm)	Angle
HH	Header to Header	493	
HW	Header to Windshield	750	
HZ	Head to Roof Liner	225	
NR	Nose to Rim/Seat Back		
CD	Chest to Dash/Seat Back	668	
CS	Chest to Steering Wheel		
KD(L)/KDA(L)°	Left Knee to Dash/Seat Back	88	50.6
KD(R)/KDA(R)°	Right Knee to Dash/Seat Back	116	39.8
PAX°	Pelvic Tilt Angle X		1.3
PAY°	Pelvic Tilt Angle Y		1.3
PHX	Hip Point to Striker (X-Axis)	213	
PHZ	Hip Point to Striker (Z-Axis)	5	
HAX°	Head Tilt Angle X		0.0
HAY ¹ °	Head Tilt Angle Y		-2.1
TAX°	Thorax Tilt Angle X		0.1
TAY°	Thorax Tilt Angle Y		-1.0
	Head Rest Angle		6.7
	H-Point Tool Angle		38.5
	Torso Angle		13.7
	Windshield Angle		56.1

Note: All measurements are in millimeters. 2-door vehicle shown. Rear dummy HX, HZ, PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

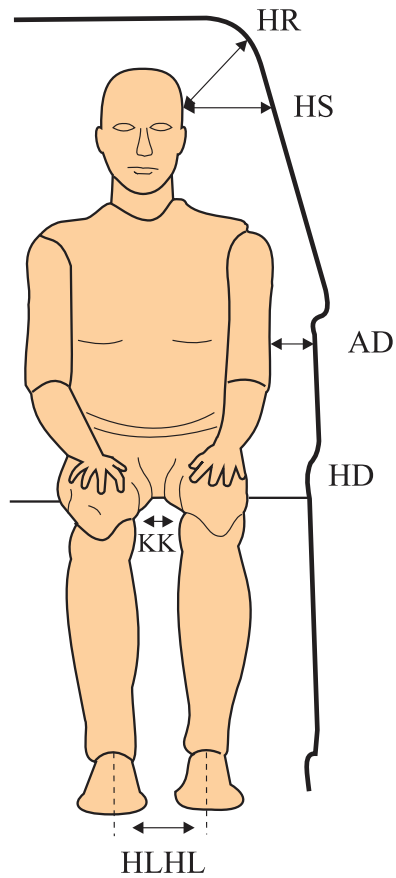
All tilt sensor angles are recorded digitally

WorldSID-50M neck was adjusted 0 notches

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

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



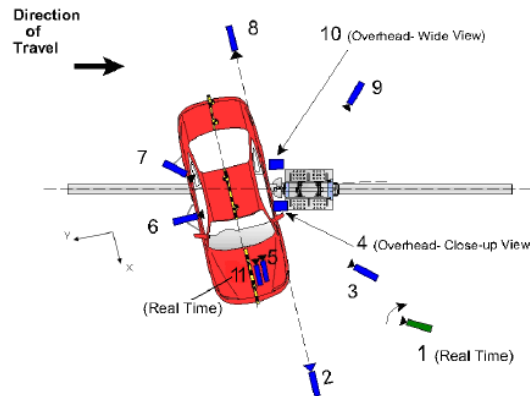
Code	Measurement Description	Passenger WorldSID-50M SN # EA7820
HR	Head to Side Header	213
HS	Head to Side Window	328
AD	Arm to Door	118
HD	Hip Point to Door	91
KK	Knee to Knee	339
HLHL	Heel to Heel	142

Note: All measurements are in millimeters.

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

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



REFERENCE (from Point of Impact for X and Y; from Ground for Z):
 + X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

CAMERA LOCATIONS AND DATA

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	6947	-4264	-1633	20	1000
3	Impact side 45° – forward pole view	4123	-2246	-1651	20	1000
4	Overhead Close-up view of impact	0	0	-5252	28	1000
5	Onboard – dummy front view				25	1000
6	Onboard – dummy side view				8.5	1000
7	Onboard – dummy rear oblique view				8.5	1000
8	Rear ground level – impact view	5149	1853	-1868	20	1000
9	Impact side 45° – rearward pole view	-3267	1494	-1656	20	1000
10	Overhead wide – view of impact	-301	280	-5261	18.5	1000
11	Real time (24-30 fps) – dummy front view				Zoom	30

* All measurements accurate to ± 6 mm.

NOTE: Vehicle is at a 285° angle to the rigid pole.

The Diagram depicts a left side impact; however the setup for this test was mirrored to impact the right side of the vehicle

If applicable, explain why camera(s) did not operate as intended: Camera 11 failed to record

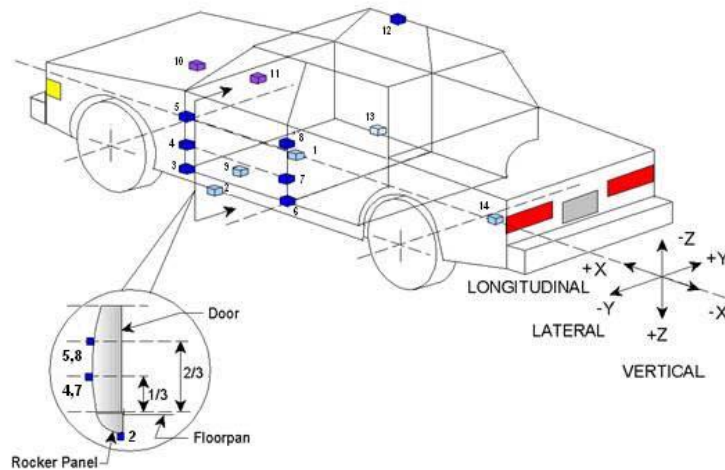
INSTRUMENTATION

Driver Dummy	135
Vehicle Structure	37
Pole Load Cells	8
Contact Channels	4
TOTAL	184

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	3660	-24	-170				
	Longitudinal (g)				9.83	74.70	-9.32	35.80
	Lateral (g)				1.41	84.00	-18.61	40.80
	Vertical (g)				18.98	91.20	-11.46	24.60
	Resultant (g)				23.13	36.15		
2	Vehicle CG ARS	3659	13	-170				
	Longitudinal (deg/s)				126.82	168.50	-450.23	74.55
	Lateral (deg/s)				520.65	74.95	-69.19	126.50
	Vertical (deg/s)				--- ¹	--- ¹	--- ¹	--- ¹
3	Right Floor Sill Acceleration	3873	753	1				
	Lateral (g)				1.81	282.50	-20.33	56.00
4	Right A-Pillar Sill Acceleration	4171	825	-52				
	Lateral (g)				2.90	50.50	-67.46	25.70
5	Right Lower A-Pillar Acceleration	4193	918	-115				
	Lateral (g)				6.81	13.50	-19.75	32.50
6	Right Mid A-Pillar Acceleration	4220	900	-647				
	Lateral (g)				3.62	5.20	-20.33	52.35
7	Right B-Pillar Sill Acceleration	3038	825	-37				
	Lateral (g)				13.21	50.05	-40.55	19.85
8	Right Lower B-Pillar Acceleration	3077	927	-164				
	Lateral (g)				16.71	79.85	-57.06	20.90
9	Right Mid B-Pillar Acceleration	3064	908	-665				
	Lateral (g)				28.95	14.70	-65.87	22.25

¹See data acquisition explanation

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
10	Passenger Seat Track at Dummy H-Point Acceleration	3418	673	-129				
	Lateral (g)				7.33	87.25	-39.31	64.60
11	Engine Top Acceleration	4698	55	-516				
	Longitudinal (g)				4.33	101.50	-13.68	67.30
	Lateral (g)				---	---	---	---
12	Firewall Center Acceleration	4619	-2	-630				
	Lateral (g)				1.18	6.90	-16.08	47.45
13	Left Roof at Vertical Impact Reference Line Acceleration	3189	-717	-1301				
	Lateral (g)				1.77	57.85	-23.40	41.00
14	Left Sill at Vertical Impact Reference Line Acceleration	3823	-741	4				
	Longitudinal (g)				1.17	36.45	-8.04	58.75
	Lateral (g)				4.46	52.00	-18.84	36.05
	Vertical (g)				11.36	50.90	-6.22	85.25
	Resultant (g)				18.90	36.05		
15	Right Sill at Rear Seat Acceleration	2770	762	-37				
	Longitudinal (g)				2.76	49.10	-9.66	41.85
	Lateral (g)				6.61	95.00	-29.11	41.20
	Vertical (g)				13.28	78.40	-10.02	20.70
	Resultant (g)				30.51	41.35		
16	Rear Floorpan Behind Rear Axle at Centerline Acceleration	1140	2	-282				
	Longitudinal (g)				7.11	59.70	-13.38	54.75
	Lateral (g)				1.70	252.65	-20.05	67.40
17	Right Front Door Mid Centerline Acceleration	3677	889	-412				
	Lateral (g)				122.32	19.20	-116.97	12.50
18	Right Front Door Mid Rear Acceleration	3346	860	-362				
	Lateral (g)				---	---	---	---
19	Right Front Door Upper Centerline Acceleration	3676	901	-638				
	Lateral (g)				46.80	26.70	-77.82	9.65

¹See data acquisition explanation

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
20	Right Rear Door Mid Rear Acceleration	2504	859	-380				
	Lateral (g)				23.64	28.10	-59.71	36.35
21	Right Rear Door Upper Centerline Acceleration	2702	886	-675				
	Lateral (g)				35.58	62.05	-61.60	30.70
22	Rear Deck Acceleration	362	2	-296				
	Longitudinal (g)				1.56	215.70	-8.73	52.95
	Lateral (g)				1.80	253.50	-21.87	68.10
	Vertical (g)				11.65	55.60	-17.12	53.05
	Resultant (g)				23.17	68.75		
23	Rear Deck ARS	338	2	-296				
	Longitudinal (deg/s)				84.77	95.90	-103.47	157.90
	Lateral (deg/s)				89.05	110.00	-64.91	187.75
	Vertical (deg/s)				40.39	60.70	-30.66	111.20

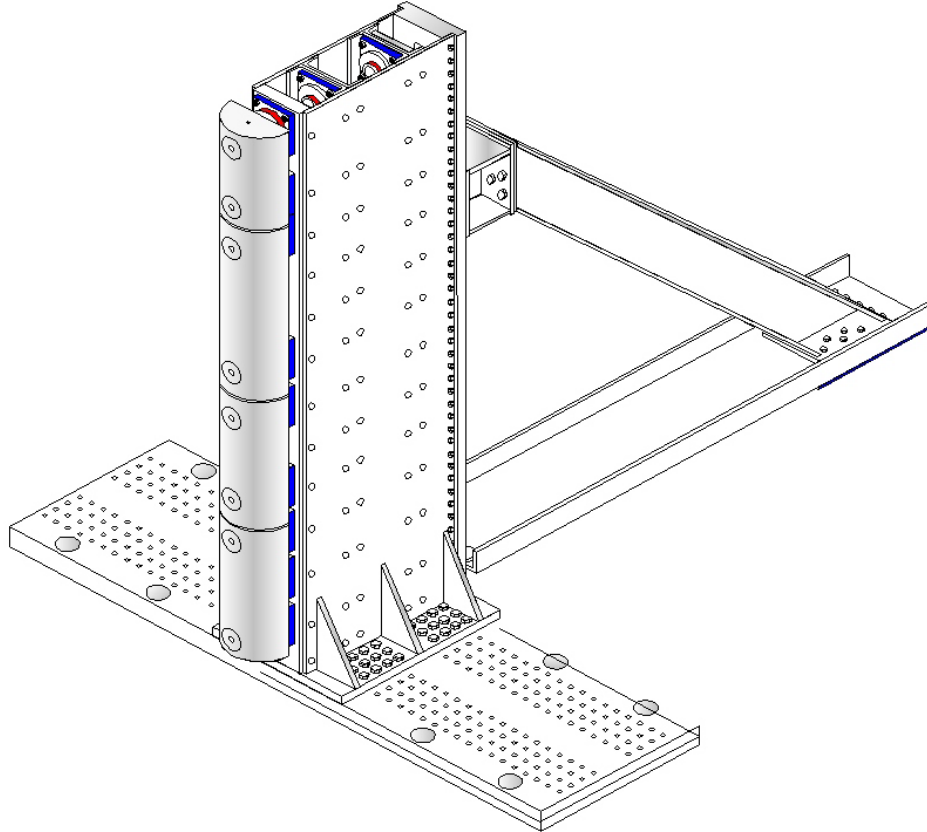
*0,0,0 located at rear bumper

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

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: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Passenger WorldSID-50M Dummy
Face	SCAB
Top of Head	SCAB; Side header
Left Side of Head	SCAB
Back of head	None
Left Shoulder	SAB
Upper Torso	Seat side bolster
Lower Torso	Seat side bolster
Left Hip	SAB
Left Knee	Door trim

POST-TEST DOOR PERFORMANCE

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

* Indicate "Yes", "No", or "NA".

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle: 2019 Ram 1500

Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

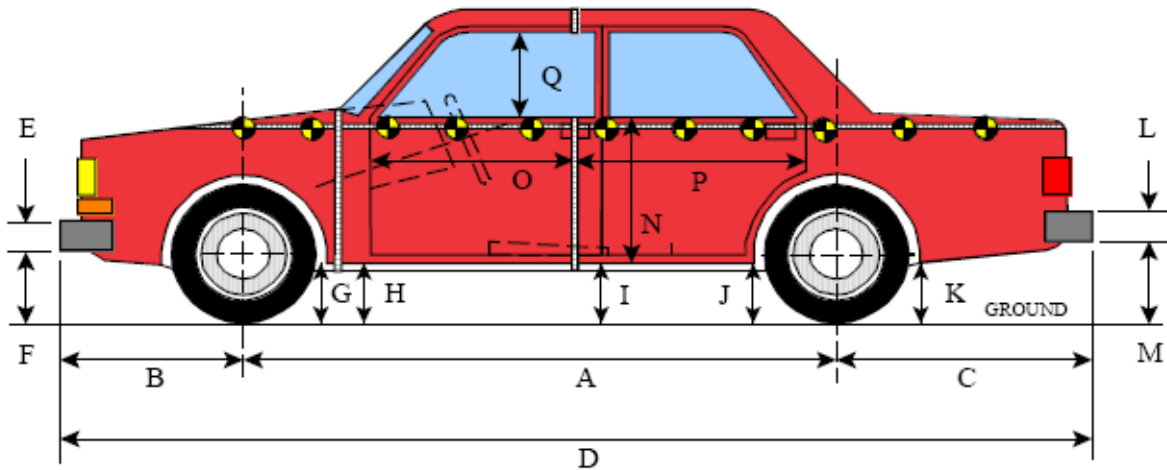
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1490
Actual Impact Point (Aft of Front Axle)	mm		1492
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact Point	-2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	Degrees	285 +/- 3	285
Trap No. 1 Velocity (Primary)	km/h	30.1 to 31.9	31.11
Trap No. 2 Velocity (Redundant)	km/h	30.1 to 31.9	31.10

**DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



LEFT SIDE VIEW

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

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

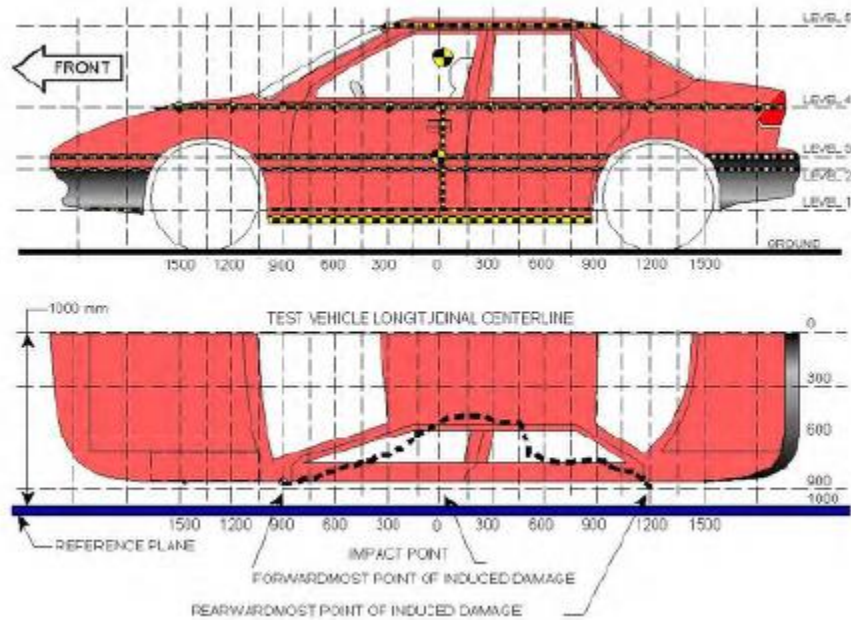
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3580	3570	10
B	Front Axle to FSOV	1005	1005	0
C	Rear Axle to RSOV	1225	1225	0
D	Total Length at Centerline	5800	5798	2
E	Front Bumper Thickness	270	270	0
F	Front Bumper Bottom to Ground	390	420	-30
G	Sill Height at Front Wheel Well	420	453	-33
H	Sill Height at Front Door Leading Edge	430	462	-32
I	Sill Height at B Pillar	440	447	-7
J1	Sill Height at Rear Wheel Well	475	508	-33
J2	Pinch Weld Height at Rear Wheel Well	350	372	-22
K	Sill Height Aft of Rear Wheel Well	548	780	-232
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	545	583	-38
N	Sill Height to Bottom of Front Window Sill	890	888	2
O	Front Door Leading Edge to Impact CL	856	776	80
P	Rear Door Trailing Edge to Impact CL	1090	996	94
Q	Front Window Opening	520	515	5
R	Right Side Length	5620	5585	35
S	Left Side Length	5620	5627	-7
T	Maximum Vehicle Width at B-Pillars	2030	1909	121
U	Maximum Vehicle Width	2030	2050	-20

**All Dimensions in mm

**DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	573	393	0
2	Occupant H-Point	915	402	0
3	Mid-Door	895	403	0
4	Window Sill	1266	375	0
5	Window Top	1834	179	0

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: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021

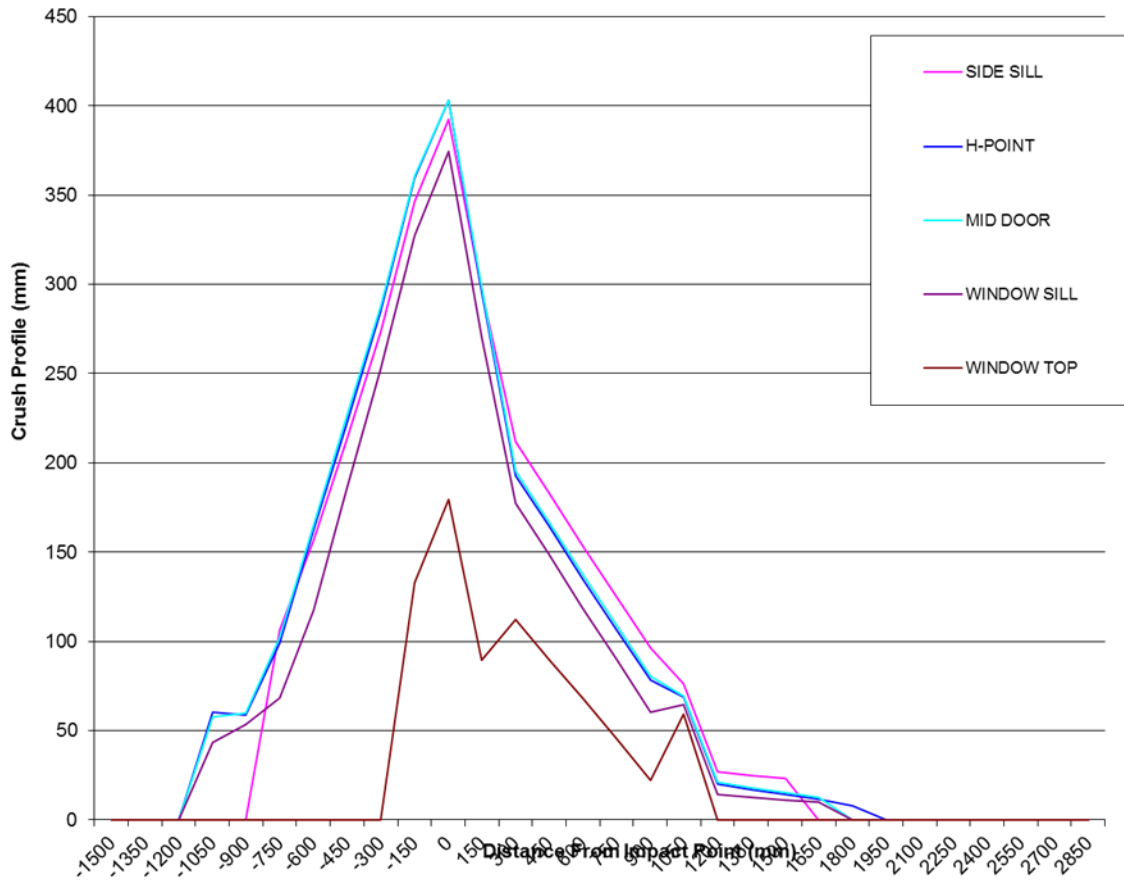
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1200		1015	1016				957	962				58	54		
-1050		1013	1016	904			952	958	861			61	58	43	
-900	1002	1008	1010	922		935	949	951	868		67	59	59	54	
-750	991	1002	1003	928		885	903	901	859		106	99	102	69	
-600	988	998	999	937		831	836	834	820		157	162	165	117	
-450	989	995	996	945		776	773	769	760		213	222	227	185	
-300	990	993	994	951		717	709	706	698		273	284	288	253	
-150	991	994	995	958	710	644	634	634	631	577	347	360	361	327	133
0	991	995	997	964	722	598	593	594	589	543	393	402	403	375	179
150	991	997	999	968	728	694	701	700	698	639	297	296	299	270	89
300	990	997	999	972	731	778	804	804	794	619	212	193	195	178	112
450	989	998	1001	976	736	806	834	835	828	646	183	164	166	148	90
600	988	999	1003	979	740	834	864	865	860	672	154	135	138	119	68
750	986	1000	1004	981	743	861	893	894	891	697	125	107	110	90	46
900	982	998	1002	980	742	886	920	922	919	720	96	78	80	61	22
1050	971	992	995	976	705	895	923	926	911	646	76	69	69	65	59
1200	958	976	979	957		931	956	958	942		27	20	21	15	
1350	964	986	989	959		939	969	971	946		25	17	18	13	
1500	976	997	999	961		953	983	984	950		23	14	15	11	
1650		1008	1010	964			996	997	954			12	13	10	
1800		1012					1004					8			

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 vertical impact reference line was set at (0, 0, 0).

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

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

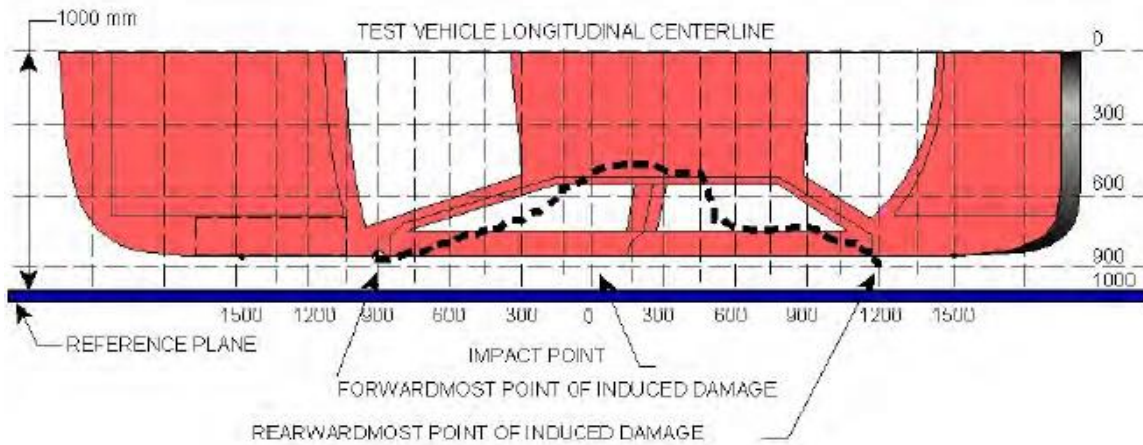
Test Date: 4/15/2021



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2019 Ram 1500
 Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



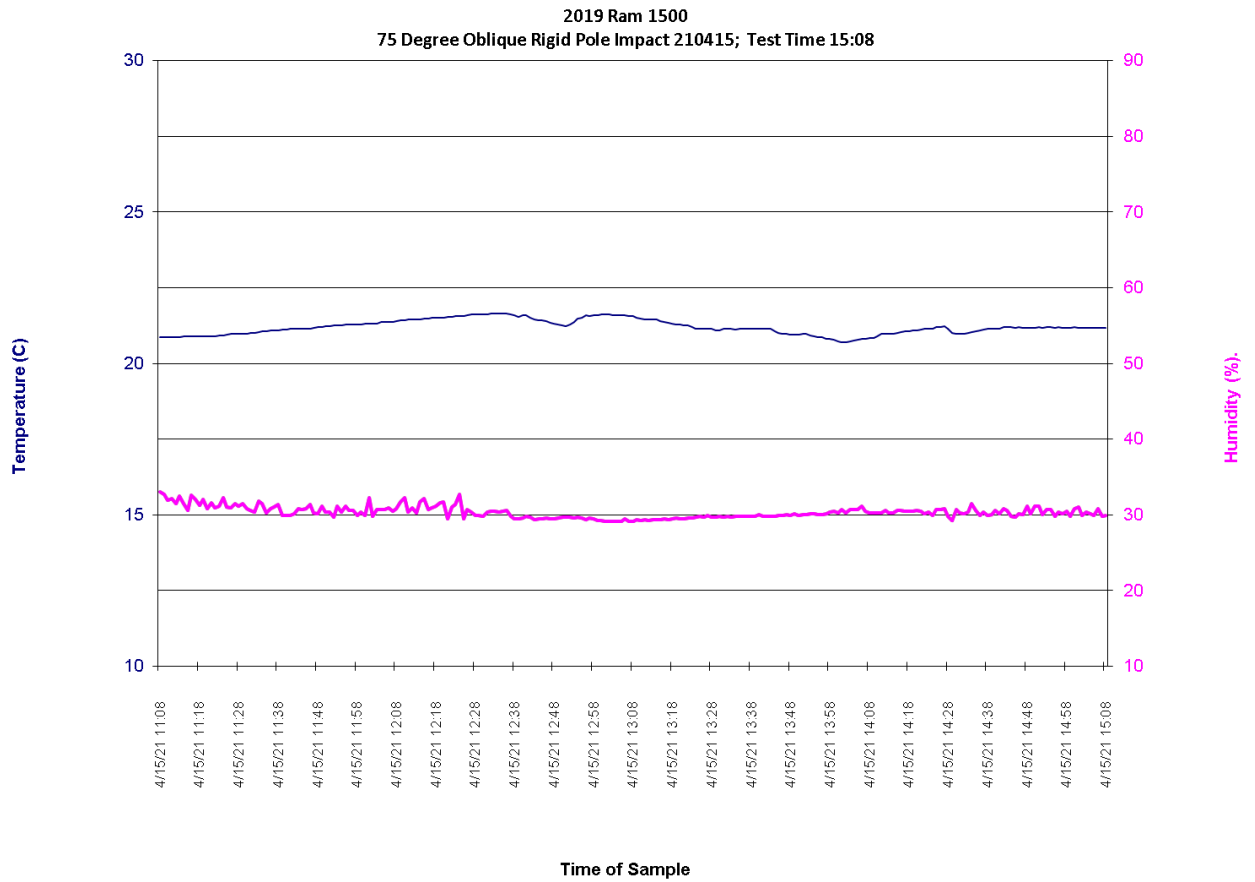
VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	1800	2	1004	1012	8
2	1200	1	931	958	27
3	600	1	834	988	154
4	0	3	594	997	403
5	-600	3	834	999	165
6	-1200	2	957	1015	58

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

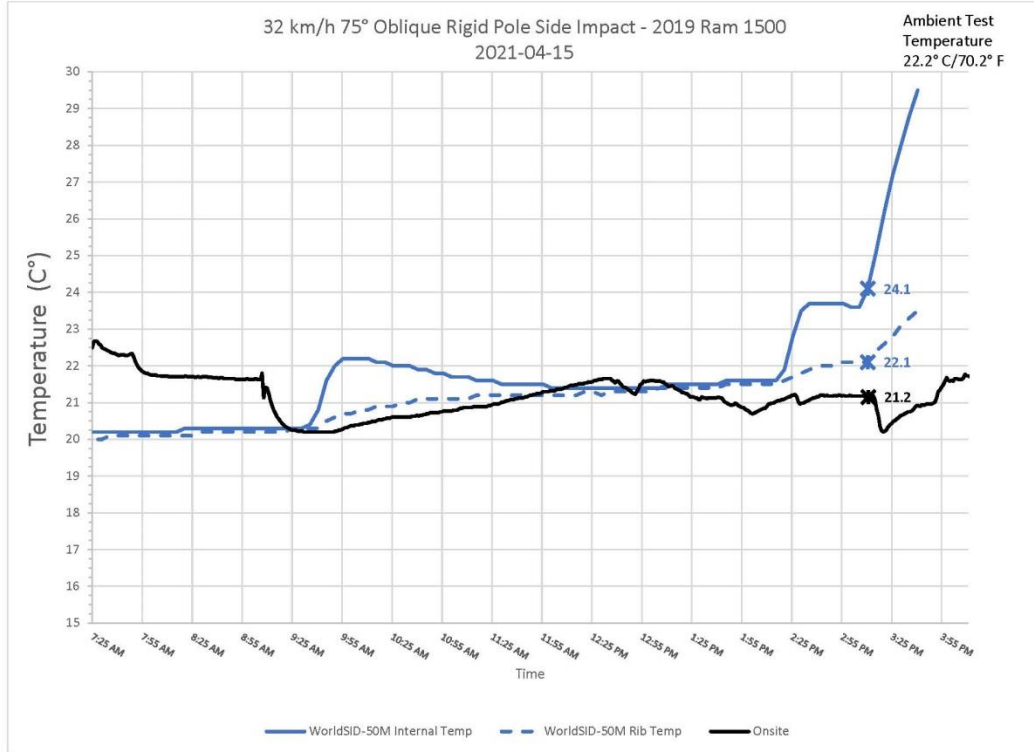
Test Date: 4/15/2021



DATA SHEET NO. 12, CONTINUED
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2019 Ram 1500
Test Program: Rigid Pole Side Impact

Test Date: 4/15/2021



**APPENDIX A
PHOTOGRAPHS**

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27	Pre-Test Front View of Dummy Head and Shoulders in Relation to Head Restraint	A-17
28	Pre-Test Front View of Seat Pan Prior to Dummy Positioning	A-18
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-18
30	Pre-Test Right Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-19
31	Pre-Test Right Side View of Dummy's Head Showing Dummy's Head is Level	A-19
32	Pre-Test Placement of Dummy's Feet	A-20
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41	Post-Test Dummy and Door Clearance View	A-24
42	Pre-Test Left Side View of Dummy and Front Seat of Occupant Compartment	A-25
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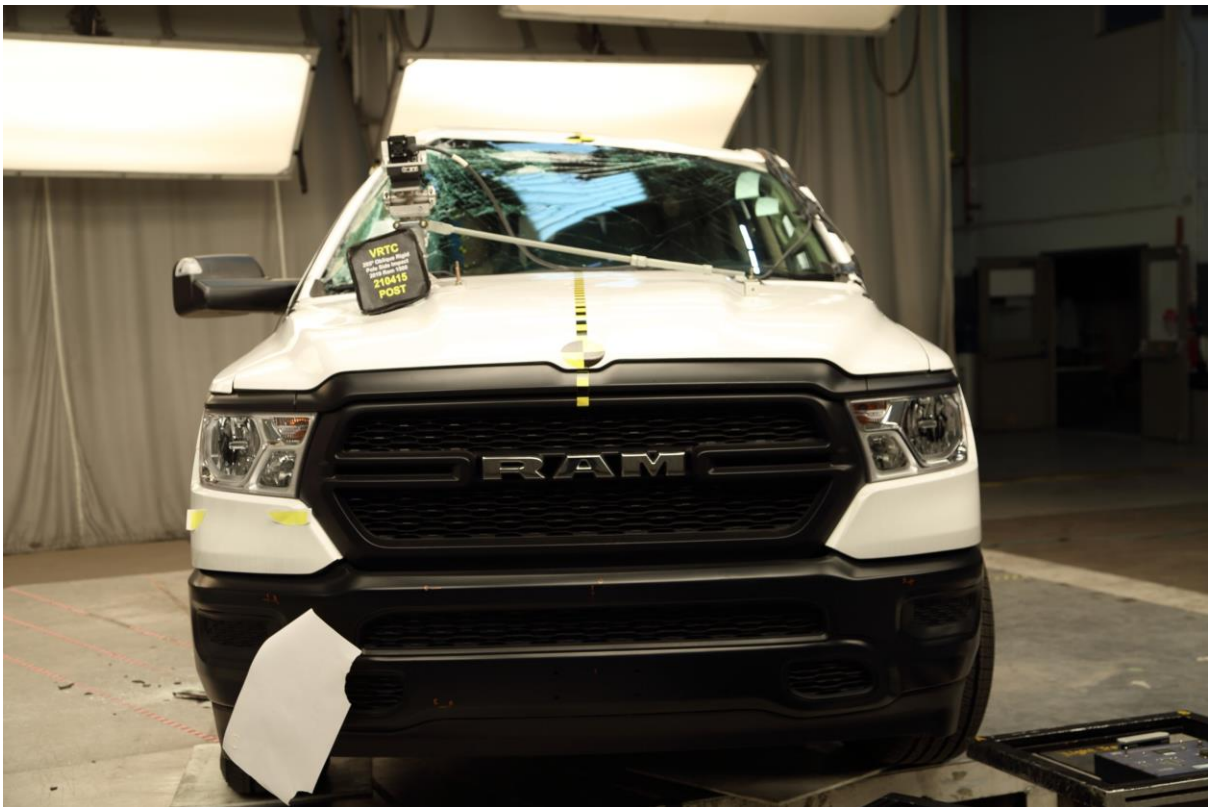
No. 001 As Delivered Right Front ¾ View of Test Vehicle



No. 002 As Delivered Left Rear ¾ View of Test Vehicle



No. 003 Pre-Test Frontal View of Test Vehicle



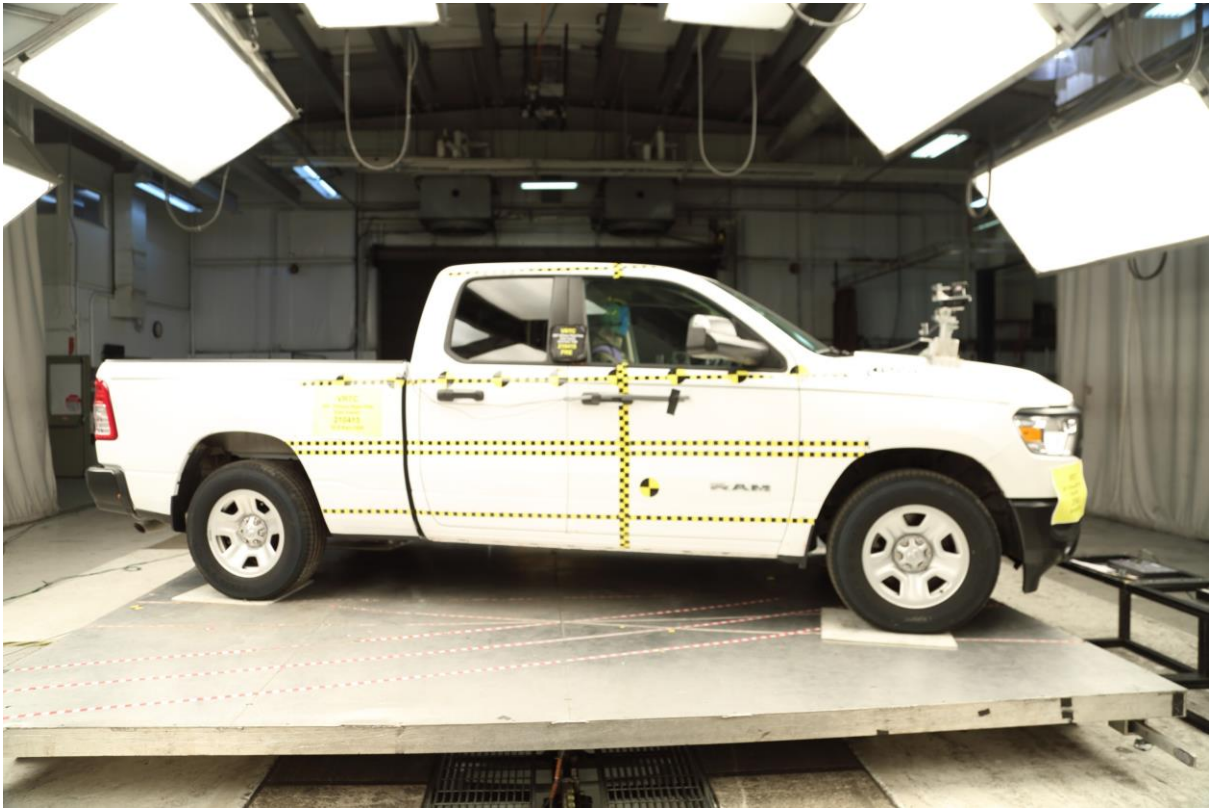
No. 004 Post-Test Frontal View of Test Vehicle



No. 005 Pre-Test Right Front ¾ View of Test Vehicle



No. 006 Post-Test Right Front ¾ View of Test Vehicle



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



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



No. 009 Pre-Test Right Rear ¾ View of Test Vehicle



No. 010 Post-Test Right Rear ¾ View of Test Vehicle



No. 011 Pre-Test Rear View of Test Vehicle



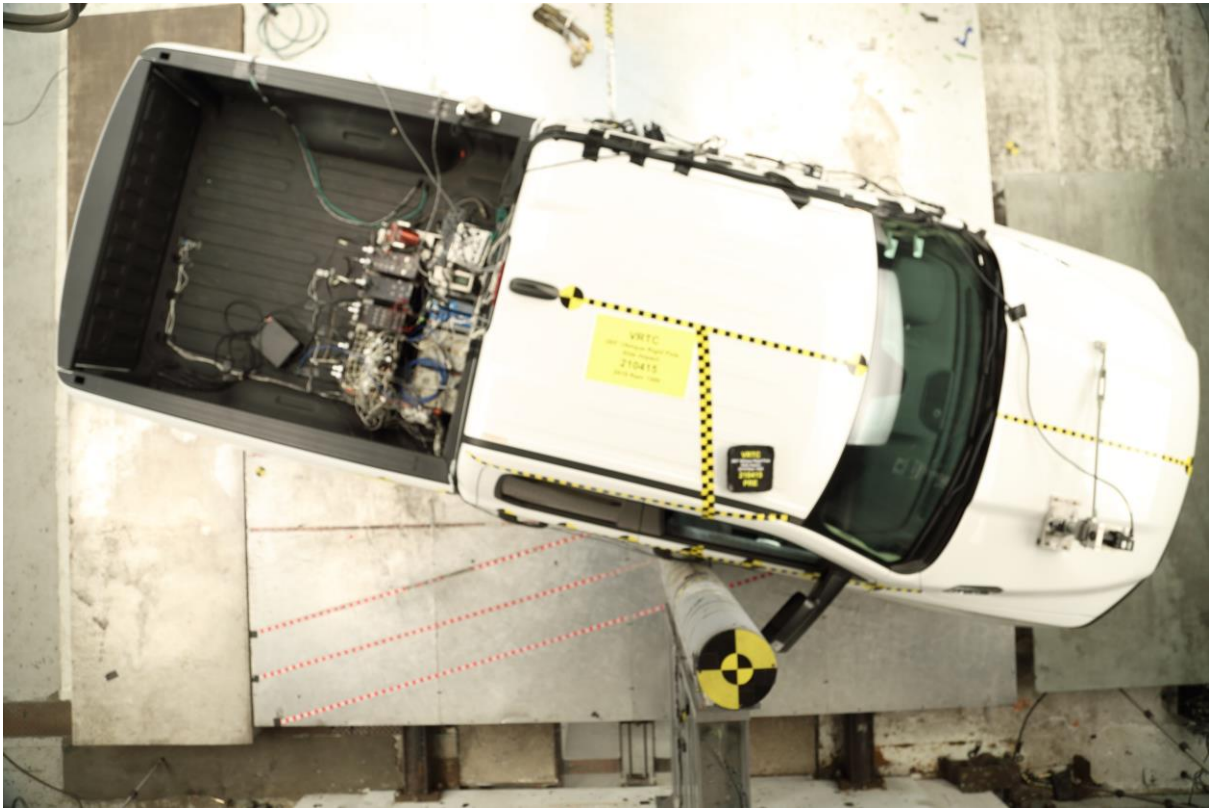
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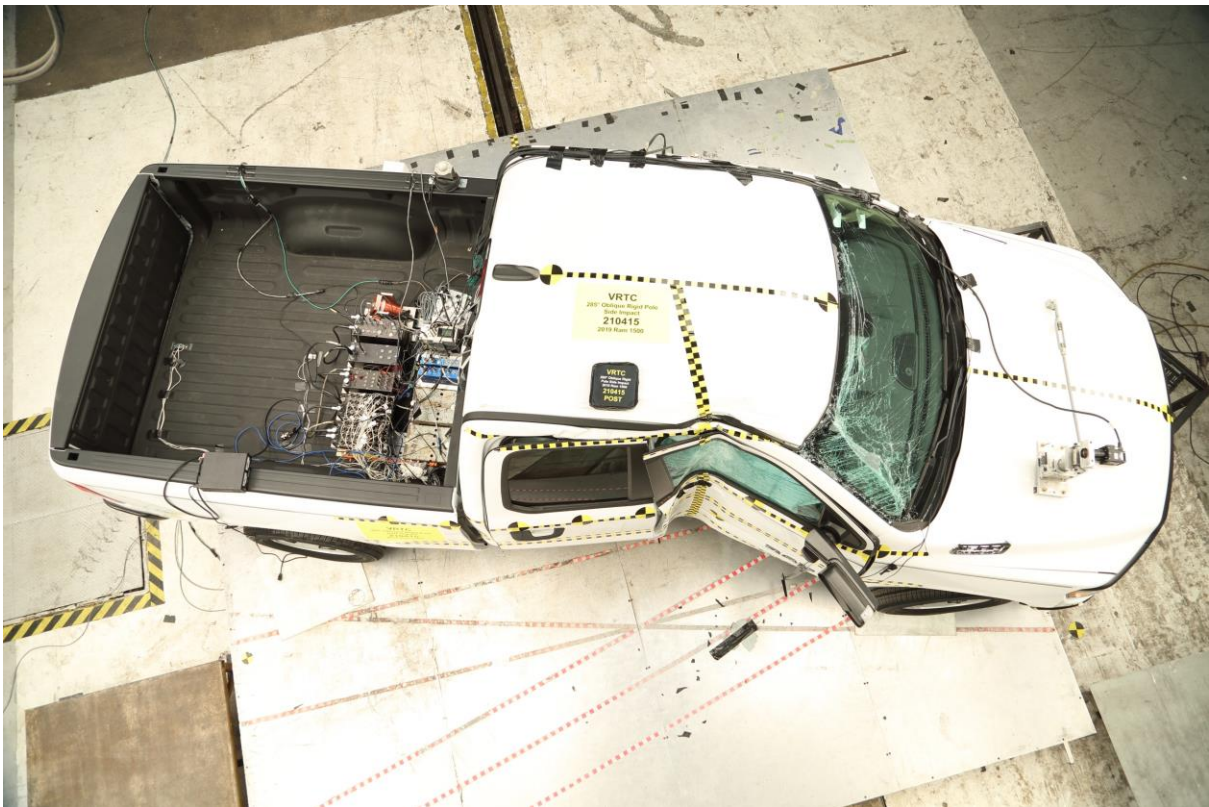
No. 013 Pre-Test Left Side View of Test Vehicle



No. 014 Post-Test Left 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



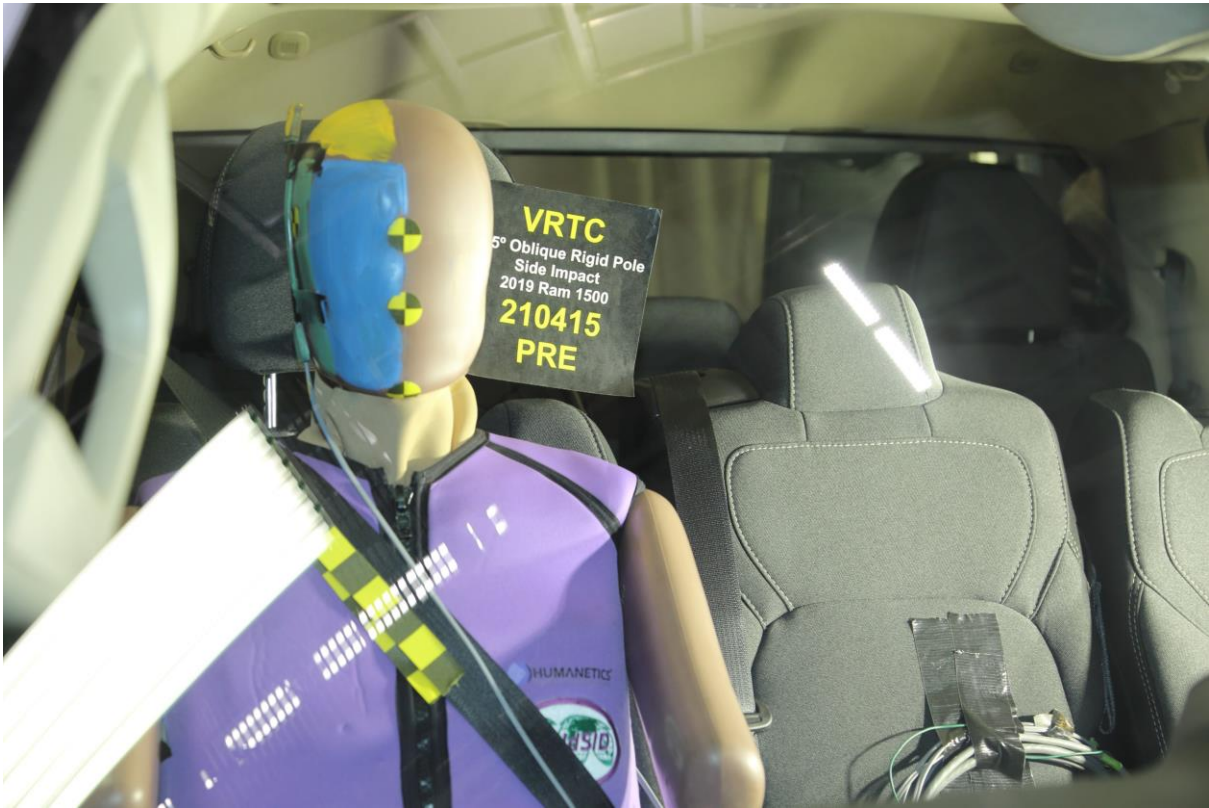
No. 018 Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



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 Right Side View of Dummy Showing Belt and Chalking

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



No. 025 Post-Test Right 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



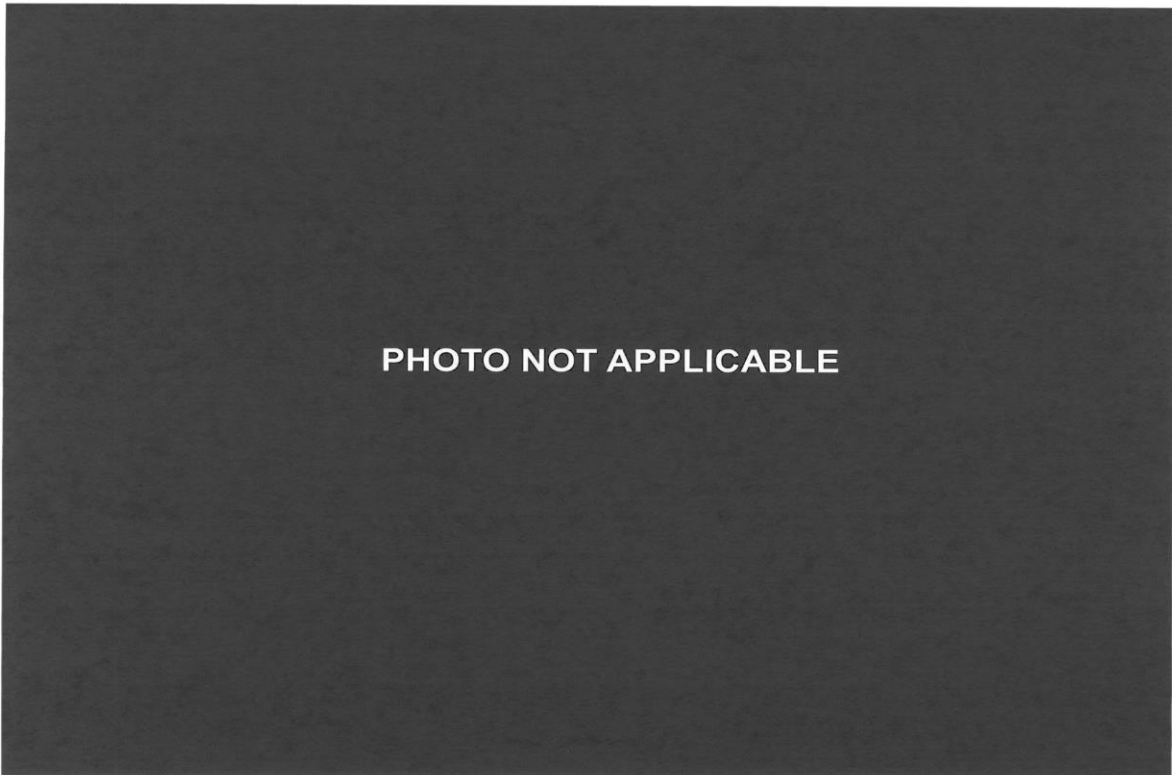
No. 028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning



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



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



No. 031 Pre-Test Right 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

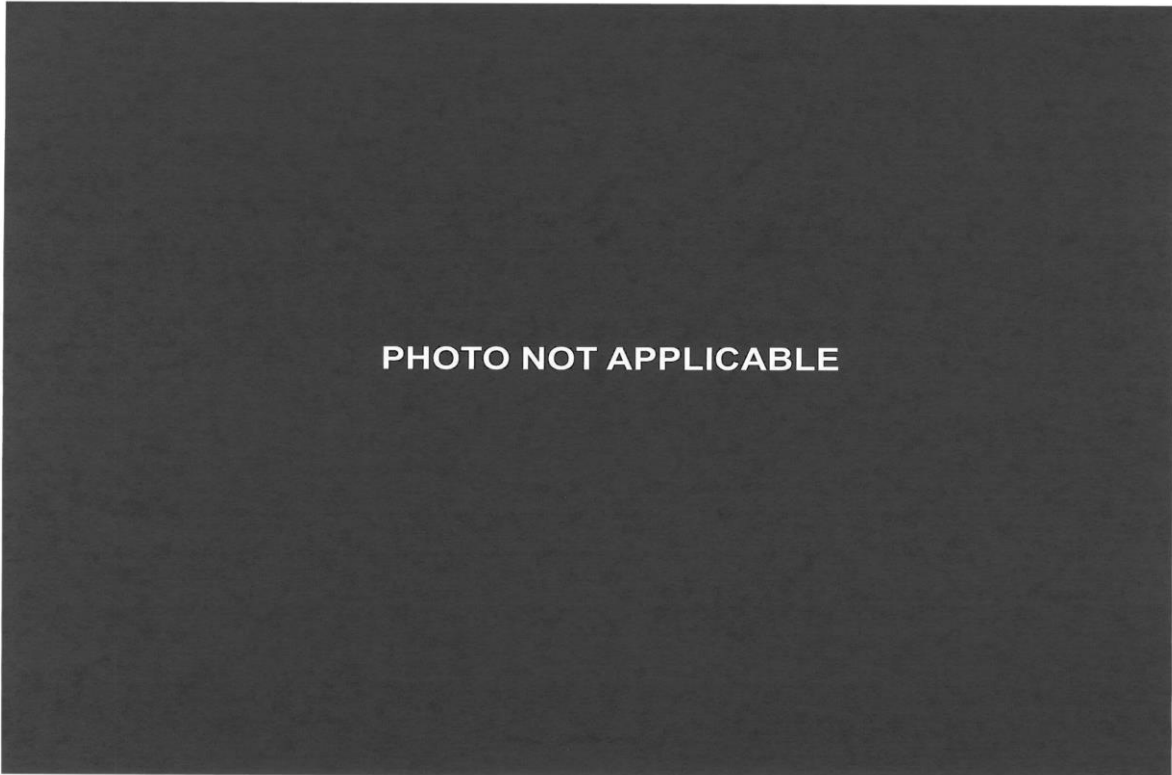


PHOTO NOT APPLICABLE

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



No. 035 Pre-Test View of Disengaged Parking Brake

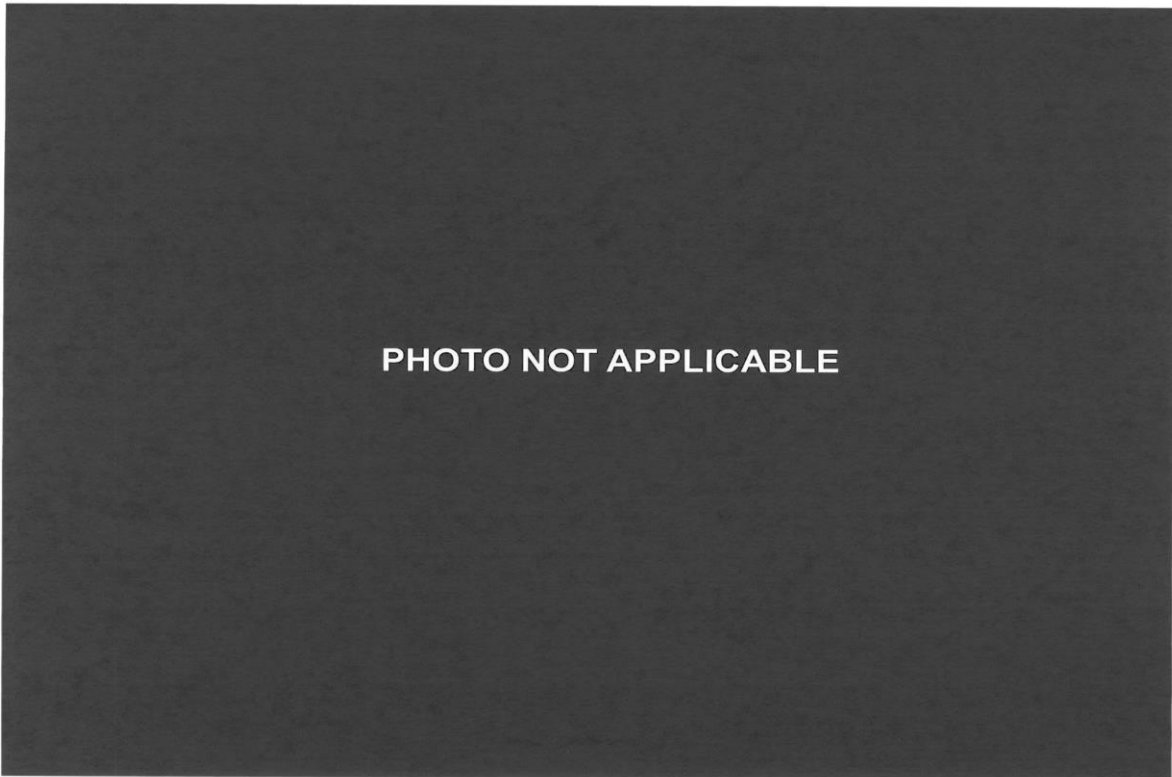


PHOTO NOT APPLICABLE

No. 036 Pre-Test View of Parking Brake



No. 037 Pre-Test Close-Up Right Side View of Passenger Seat Track



No. 038 Pre-Test Close-Up Right Side View of Passenger Seat Back



No. 039 Pre-Test Close-Up View of Passenger 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 Left Side View of Dummy and Front Seat of Occupant Compartment



No. 043 Post-Test Left 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

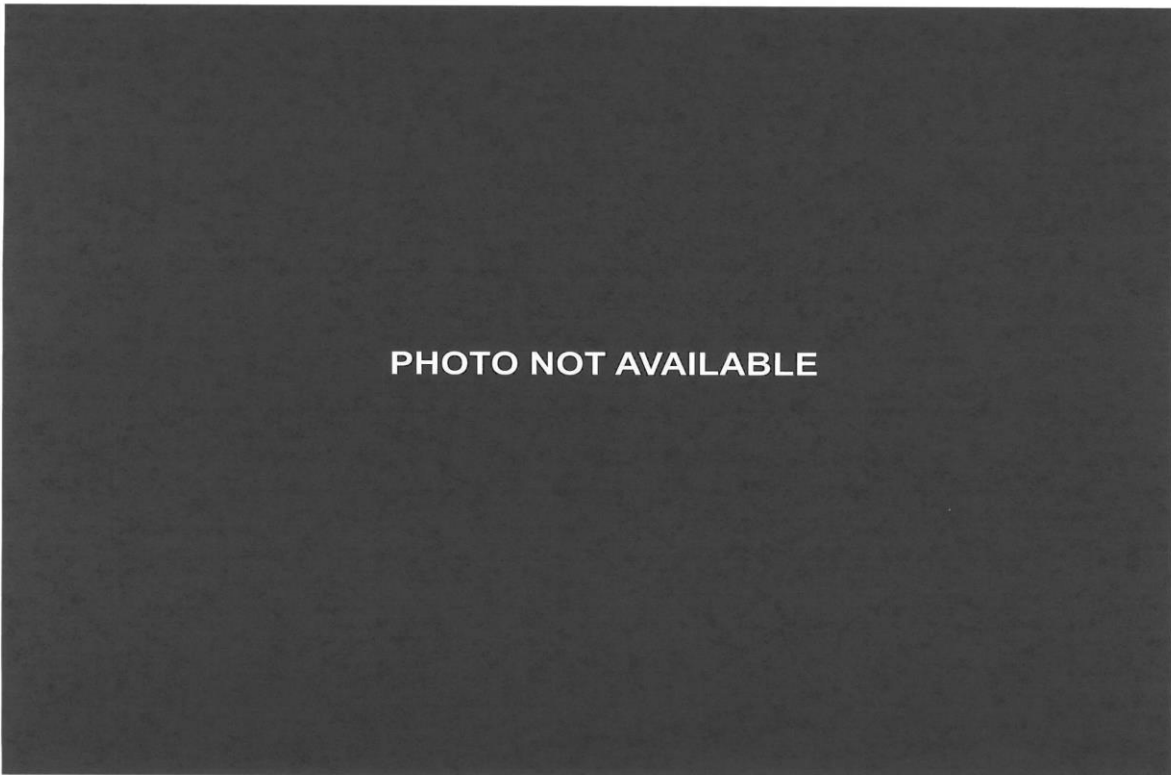


No. 053 Post-Test Left Side View of Dummy and Rear Seat of Occupant Compartment

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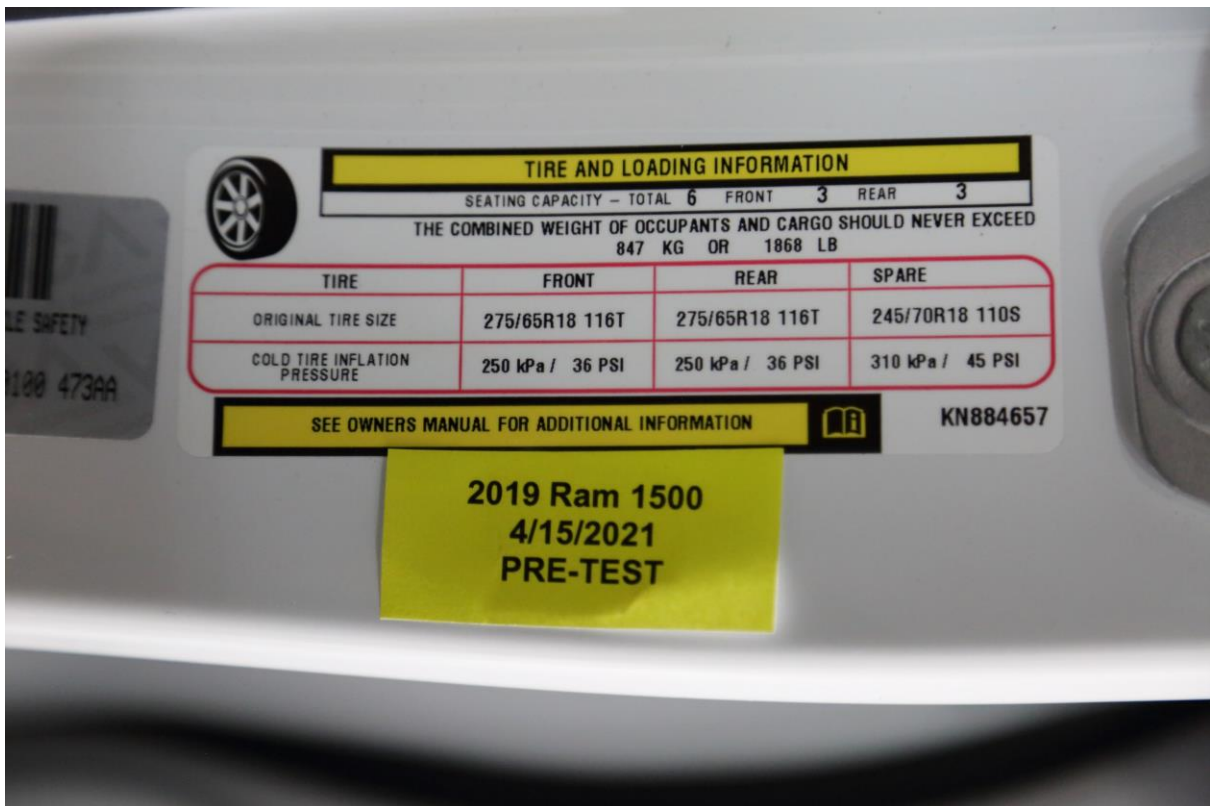
No. 054 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



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



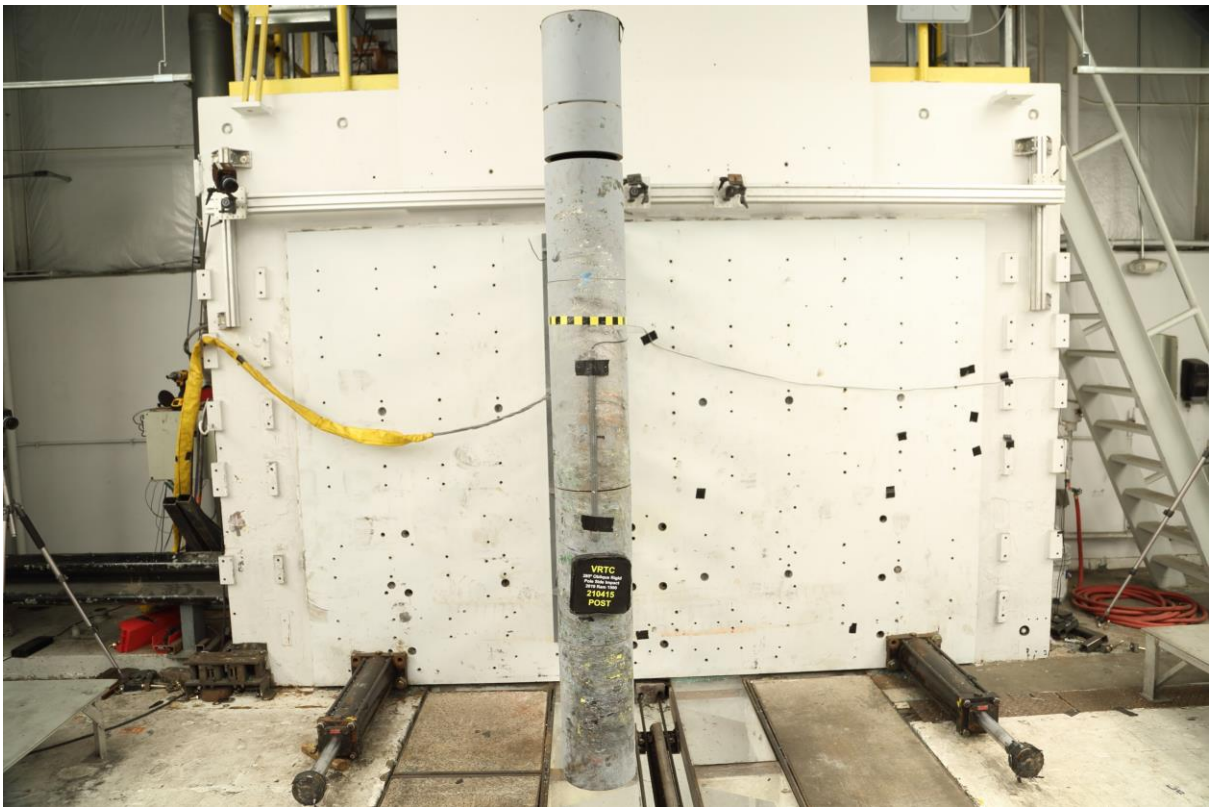
No. 056 Close-Up View of Vehicle Certification Label



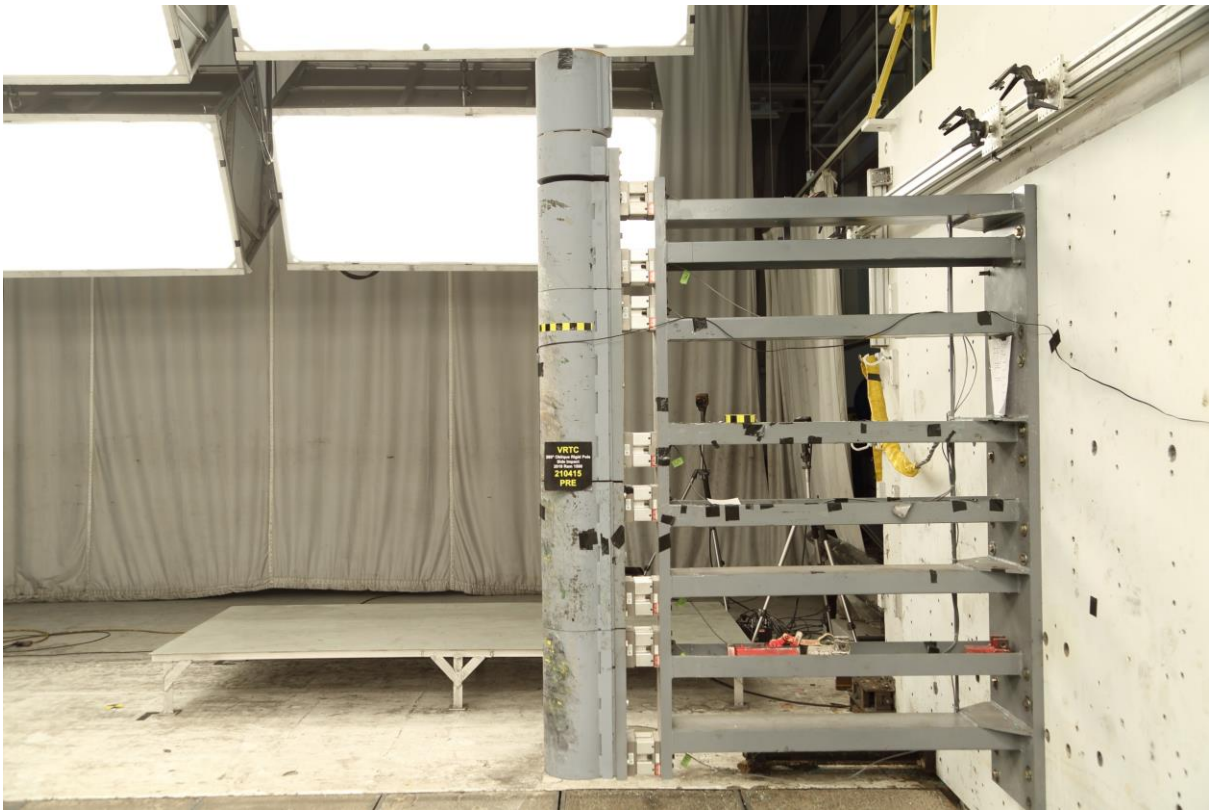
No. 057 Close-Up View of Vehicle Tire Information Placard or Label



No. 058 Pre-Test Pole Barrier Front View



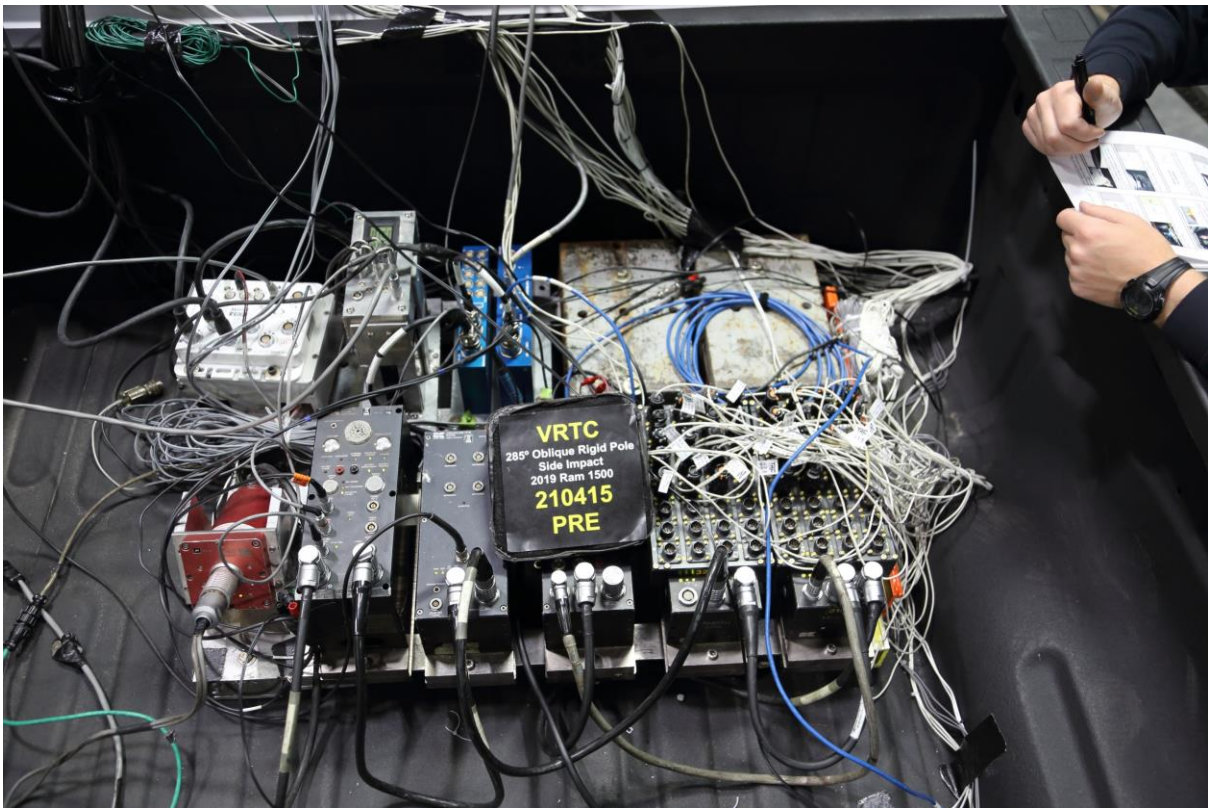
No. 059 Post-Test Pole Barrier Front View



No. 060 Pre-Test Pole Barrier Side View



No. 061 Post-Test Pole Barrier Side View



No. 062 Pre-Test Ballast View



No. 063 Post-Test Primary and Redundant Speed Trap Read Out



PHOTO NOT APPLICABLE

No. 064 FMVSS No. 301 Static Rollover 0 Degrees



PHOTO NOT APPLICABLE

No. 065 FMVSS No. 301 Static Rollover 90 Degrees



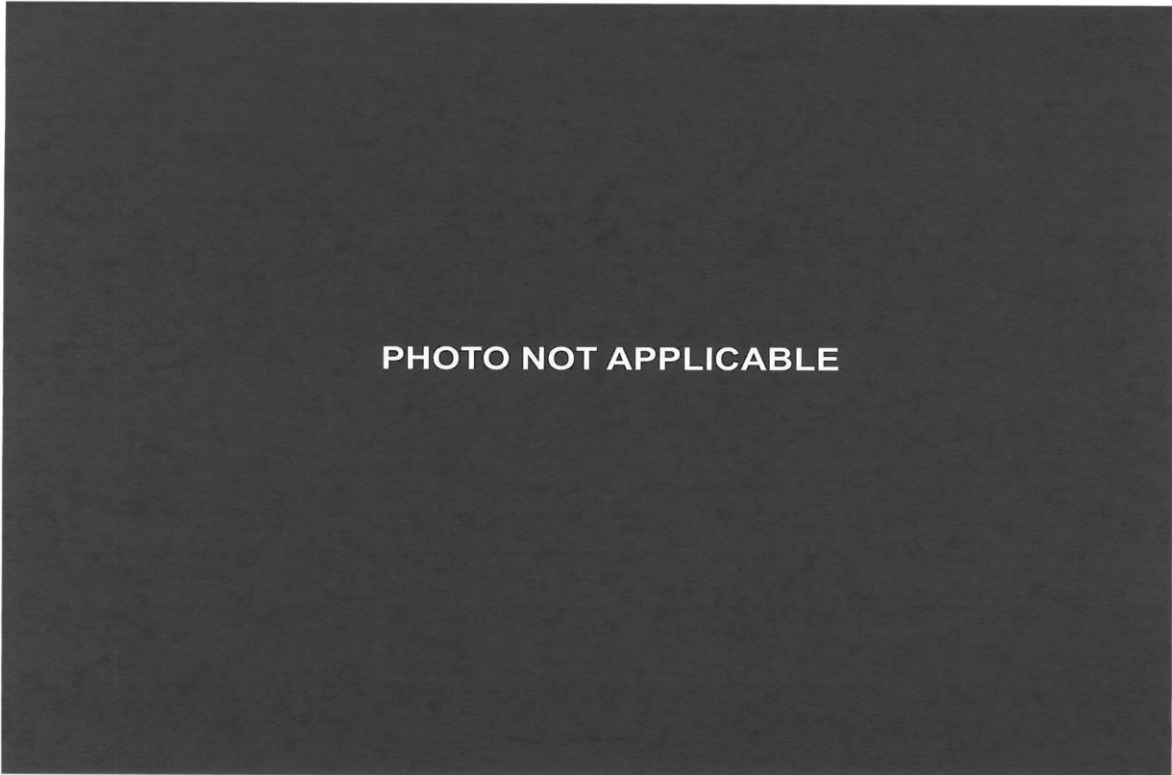
PHOTO NOT APPLICABLE

No. 066 FMVSS No. 301 Static Rollover 180 Degrees



PHOTO NOT APPLICABLE

No. 067 FMVSS No. 301 Static Rollover 270 Degrees



No. 068 FMVSS No. 301 Static Rollover 360 Degrees



No. 069 Impact Event

2019 MODEL YEAR
RAM 1500 TRADESMAN QUAD CAB 4X2

For more information visit: www.ramtrucks.com
or call 1-866-RAMINFO

FCA US LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: \$32,045

EXTERIOR FEATURES
18.0-Inch x 7.5-Inch Steel Painted Wheels
275/65R18 BSW All-Season Tires
18-Inch Full Size Spare Wheel
Power-Heated Mirrors with Manual Fold-Away
Automatic Headlamps
Halogen Quad Headlamps
Cargo Tie-Down Loops

OPTIONAL EQUIPMENT (May Replace Standard Equipment)

Customer Preferred Package 25A \$645
Trailer-Tow Group
Class IV Receiver-Hitch
Exterior Mirrors with Supplemental Signals
Power Trailer-Tow Mirrors w/Manual Fold-Away
Trailer Brake Control

Tradesman Group \$500
Spray-in Bedliner
Level 1 Equipment Group
Cloth 40 / 20 / 40 Bench Seat
Front and Rear Floor Mats
Carpet Floor Covering
Rear Power Sliding Window
SiriusXM® with 1-Year Radio Sub Call 800-643-2112

Three Rear Seat Head Restraints \$1,395
5.7-Liter V8 HEMI® MDS VVT Engine
600W Engine Cooling Fan
26-Gallon Fuel Tank

DESTINATION CHARGE \$1,695

TOTAL PRICE: * \$37,835

WARRANTY COVERAGE
5-year or 60,000-mile Powertrain Limited Warranty.
3-year or 50,000-mile Basic Limited Warranty.
Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

5 YEAR / 60,000 MILE POWERTRAIN WARRANTY

INTERIOR FEATURES
Uconnect® 3 with 5-inch Display
3.5-Inch Cluster TFT Black and White Display
Integrated Voice Command with Bluetooth®
Media Hub-2 USB. Full Function. Aux.
12-Volt Auxiliary Power Outlet
6-Speakers
4-Way Manual Adjustable Driver Seat
4-Way Manual Adjustable Front Passenger Seat
Power Windows w/ Front 1-Touch Up and Down Feature
Front / Rear Climate-Control Outlets
Steering Wheel Mounted Shift Control
Tilt / Telescope Steering Column

STANDARD EQUIPMENT (unless replaced by optional equipment)

FUNCTIONAL/SAFETY FEATURES
Advanced Multistage Front Air Bags
Supplemental Front Seat Side Air Bags
Supplemental Side-Curtain Front / Rear Air Bags
3.21 Rear Axle Ratio
Push-Button Start
Remote Keyless Entry with All-Secure
ParkView® Rear Back-Up Camera
Sentry Key® Theft Deterrent System
4-Wheel Disc Anti-Lock Brakes
Electric Park Brake
Ready-Alert Braking
Rain Brake Support
Tire-Fill Alert
Electronic Roll Mitigation
Electronic Stability Control
Trailer Sway Damping
Hill Start Assist
Speed Control
Black Rotary Shifter
Class III Hitch
7-Pin Wiring Harness
Cables Fuel-Fill

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score ★★★★★
Based on the combined ratings of frontal, side, and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash ★★★★★
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash ★★★★★
Based on the risk of injury in a side impact.

Rollover ★★★★★
Based on the risk of rollover in a single-vehicle crash.

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

PARTS CONTENT INFORMATION
FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 57%
MAJOR SOURCES OF FOREIGN PARTS CONTENT:
MEXICO: 28%
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
STERLING HTS, MICH., U.S.A.
COUNTRY OF ORIGIN:
ENGINE: MEXICO
TRANSMISSION: UNITED STATES

VEHICLE PROTECTION
A PRODUCT OF FCA US LLC
Ask for Major Vehicle Protection for your vehicle. We Built It. We Back It.

Assembly Plant/Port of Entry: STERLING HTS, MICH., U.S.A.
VIN: 1C6RRECT3KH-884657 1410N 6035 8713

SHIP TO: 8888 25
CHRYSLER DRIVE DOODGE
001 17860 10 401 3801 3037
001 17860 10 401 3801 3037
001 17860 10 401 3801 3037

THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THIS LABEL CANNOT BE REMOVED OR ALTERED FROM THE VEHICLE WITHOUT PERMISSION.
* STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES IF PURCHASED SEPARATELY.
** IS BASED ON PRICE OF OPTIONS IF PURCHASED SEPARATELY.

No. 70 Monroney Label

40 GETTING TO KNOW YOUR VEHICLE

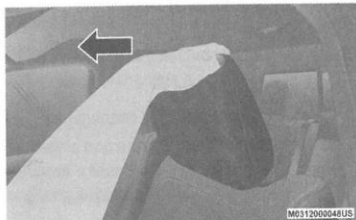
Front Head Restraints

Four-Way Head Restraints — If Equipped

Your vehicle may be equipped with front four-way driver and passenger head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward on the head restraint.

To adjust the head restraint forward, pull the top of the head restraint toward the front of the vehicle as desired and release. To adjust the head restraint rearward, pull the top of the head restraint to the forward most position and release. The head restraint will return to the rear most position.



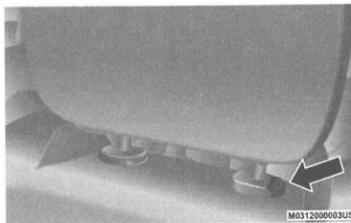
NOTE:

If your vehicle is equipped with a front bench seat, the center head restraint is not adjustable or removable.

Two-Way Head Restraints — If Equipped

Your vehicle may be equipped with front two-way driver and passenger head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of head restraint, and push downward on the head restraint.



NOTE:

The head restraints should only be removed by qualified technicians, for service purposes only. If either of the head restraints require removal, see an authorized dealer.

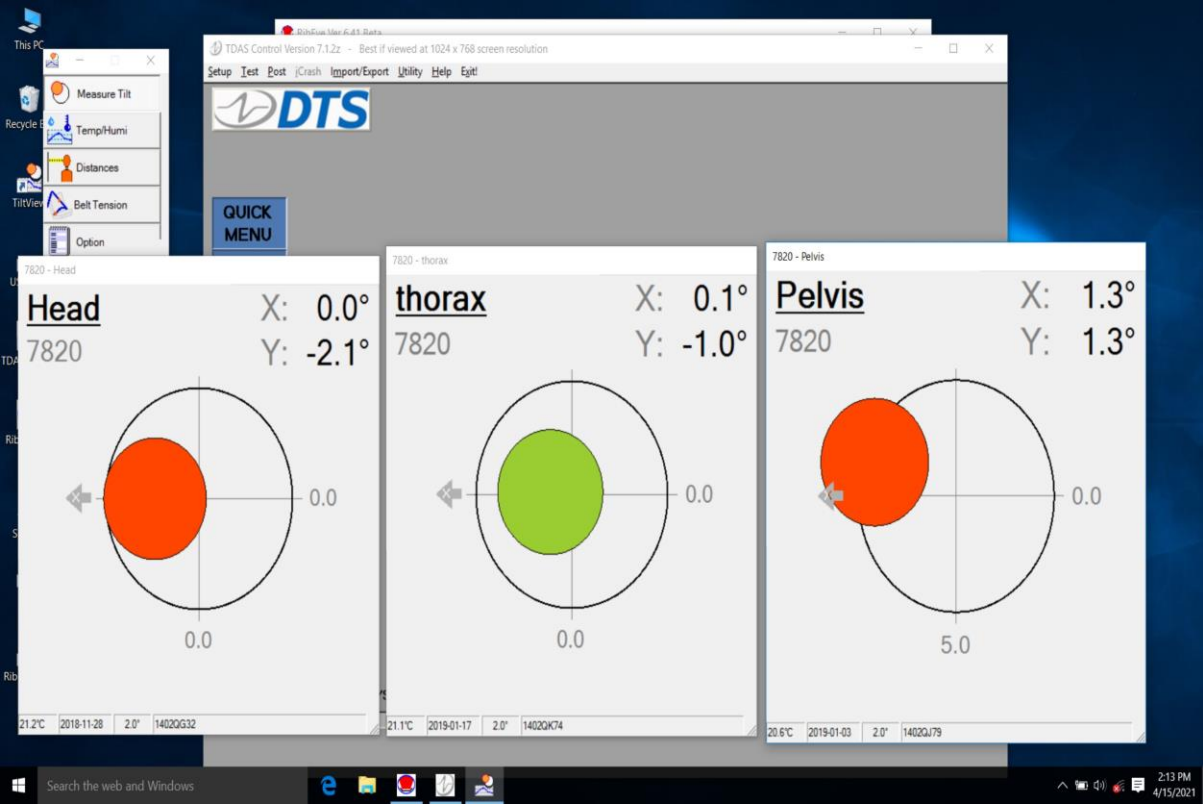
WARNING!

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.
- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

No. 071 Head Restraint Use and Adjustment Information from Vehicle Owner Manual

PHOTO NOT APPLICABLE

No. 072 Post-Test View of Shattered Vehicle Inner Door Panel



No. 073 WorldSID-50M Pre-Test Tilt Sensor View

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

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Passenger Dummy & Vehicle Instrumentation Plots

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4	Passenger Head Resultant Acceleration	B-8
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7	Passenger Head Angular Rate (Z)	B-9
8	Passenger Upper Neck Force (X)	B-10
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10	Passenger Upper Neck Force (Z)	B-10
11	Passenger Upper Neck Moment (X)	B-11
12	Passenger Upper Neck Moment (Y)	B-11
13	Passenger Upper Neck Moment (Z)	B-11
14	Passenger Lower Neck Force (X)	B-12
15	Passenger Lower Neck Force (Y)	B-12
16	Passenger Lower Neck Force (Z)	B-12
17	Passenger Lower Neck Moment (X)	B-13
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20	Passenger Shoulder Force (X)	B-14
21	Passenger Shoulder Force (Y)	B-14
22	Passenger Shoulder Force (Z)	B-14
23	Passenger Shoulder Rear Displacement (X)	B-15
24	Passenger Shoulder Rear Displacement (Y)	B-15
25	Passenger Shoulder Rear Displacement (Z)	B-15
26	Passenger Shoulder Rear Length Change	B-15
27	Passenger Shoulder Middle Displacement (X)	B-16
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29	Passenger Shoulder Middle Displacement (Z)	B-16
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31	Passenger Shoulder Front Displacement (X)	B-17
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37	Passenger Thorax Rib 1 Rear Displacement (Z)	B-18
38	Passenger Thorax Rib 1 Rear Length Change	B-18
39	Passenger Thorax Rib 1 Middle Displacement (X)	B-19
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41	Passenger Thorax Rib 1 Middle Displacement (Z)	B-19
42	Passenger Thorax Rib 1 Middle Length Change	B-19
43	Passenger Thorax Rib 1 Front Displacement (X)	B-20
44	Passenger Thorax Rib 1 Front Displacement (Y)	B-20
45	Passenger Thorax Rib 1 Front Displacement (Z)	B-20
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47	Passenger Thorax Rib 2 Rear Displacement (X)	B-21
48	Passenger Thorax Rib 2 Rear Displacement (Y)	B-21
49	Passenger Thorax Rib 2 Rear Displacement (Z)	B-21
50	Passenger Thorax Rib 2 Rear Length Change	B-21
51	Passenger Thorax Rib 2 Middle Displacement (X)	B-22
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54	Passenger Thorax Rib 2 Middle Length Change	B-22
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63	Passenger Thorax Rib 3 Middle Displacement (X)	B-25
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69	Passenger Thorax Rib 3 Front Displacement (Z)	B-26
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71	Passenger Abdomen Rib 1 Rear Displacement (X)	B-27
72	Passenger Abdomen Rib 1 Rear Displacement (Y)	B-27
73	Passenger Abdomen Rib 1 Rear Displacement (Z)	B-27
74	Passenger Abdomen Rib 1 Rear Length Change	B-27
75	Passenger Abdomen Rib 1 Middle Displacement (X)	B-28
76	Passenger Abdomen Rib 1 Middle Displacement (Y)	B-28
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78	Passenger Abdomen Rib 1 Middle Length Change	B-28
79	Passenger Abdomen Rib 1 Front Displacement (X)	B-29
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85	Passenger Abdomen Rib 2 Rear Displacement (Z)	B-30
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87	Passenger Abdomen Rib 2 Middle Displacement (X)	B-31
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101	Passenger Spine T4 Acceleration (Z)	B-34
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103	Passenger Spine T12 Acceleration (X)	B-35
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108	Passenger Sacro-iliac Left Force (X)	B-37
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114	Passenger Sacro-iliac Right Force (X)	B-39
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128	Passenger Pelvic Acceleration (Z)	B-43
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Passenger Dummy & Vehicle Instrumentation Plots

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135	Passenger Right Femur Moment (Z)	B-45
136	Passenger Femoral Neck Force (X)	B-46
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140	Passenger Right Outer Knee Force (Y)	B-47
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144	Vehicle Center of Gravity Acceleration Resultant	B-48
145	Vehicle Center of Gravity Angular Rate (X)	B-49
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147	Vehicle Center of Gravity Angular Rate (Z)	B-49
148	Right Floor Sill Acceleration (Y)	B-50
149	Right A-Pillar Sill Acceleration (Y)	B-50
150	Right Lower A-Pillar Acceleration (Y)	B-50
151	Right Mid A-Pillar Acceleration (Y)	B-50
152	Right B-Pillar Sill Acceleration (Y)	B-51
153	Right Lower B-Pillar Acceleration (Y)	B-51
154	Right Mid B-Pillar Acceleration (Y)	B-51
155	Passenger Seat Track at Dummy H-Point Acceleration (Y)	B-51
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158	Firewall Center Acceleration (Y)	B-52
159	Left Roof at Vertical Impact Reference Line Acceleration (Y)	B-52
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166	Right Sill at Rear Seat Acceleration (Z)	B-54
167	Right Sill at Rear Seat Acceleration Resultant	B-54

TABLE OF DATA PLOTS, CONTINUED

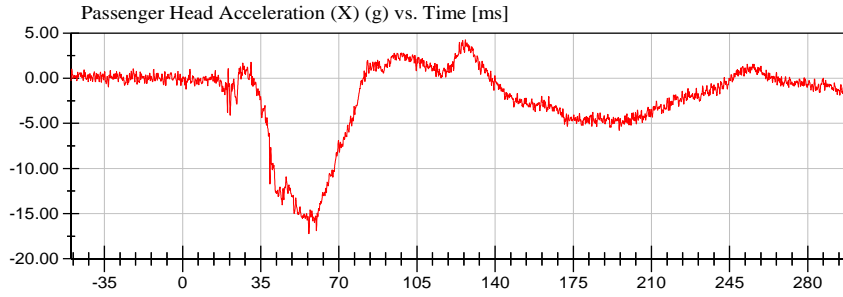
Passenger Dummy & Vehicle Instrumentation Plots

No.	Description	Page
168	Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)	B-55
169	Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)	B-55
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171	Right Front Door Mid Rear Acceleration (Y)	B-56
172	Right Front Door Upper Centerline Acceleration (Y)	B-56
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186	Load Cell Pole Barrier #1 Force (Y)	B-60
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190	Load Cell Pole Barrier #5 Force (Y)	B-61
191	Load Cell Pole Barrier #6 Force (Y)	B-61
192	Load Cell Pole Barrier #7 Force (Y)	B-61
193	Load Cell Pole Barrier #8 Force (Y)	B-61

VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



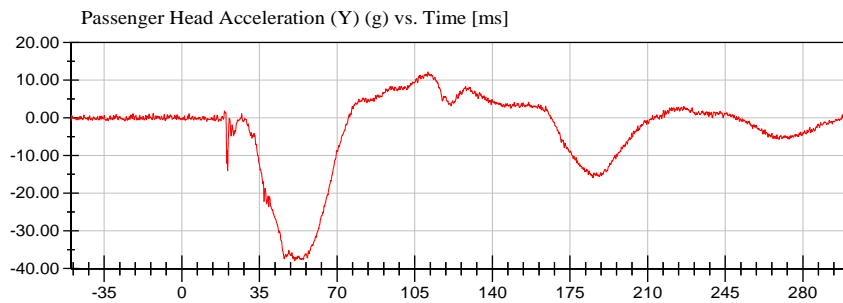
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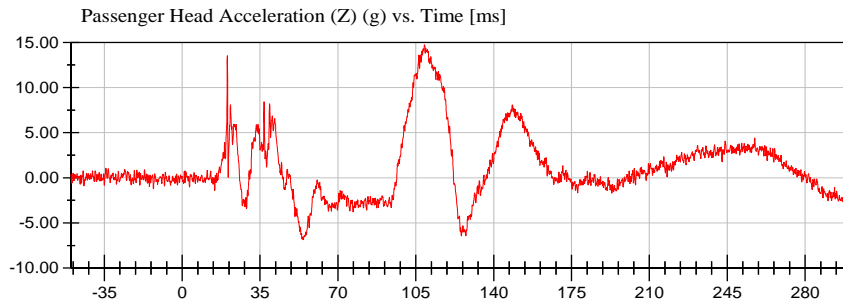
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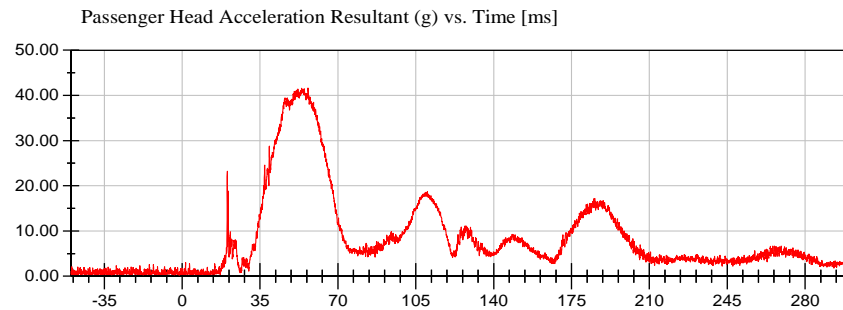
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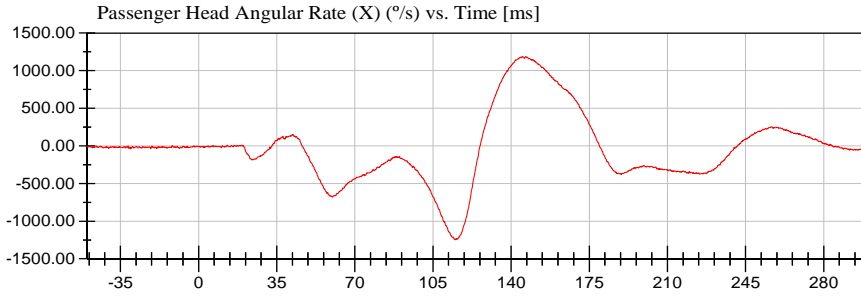
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VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



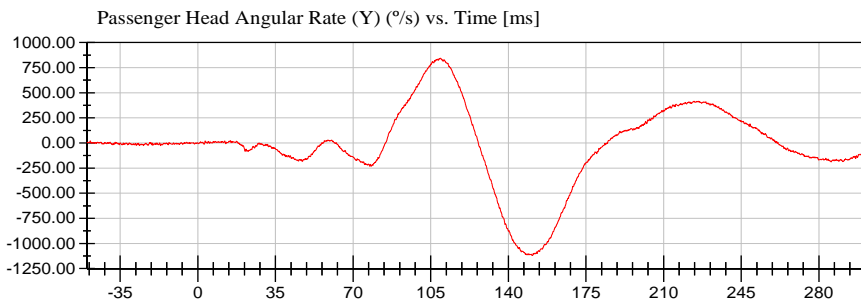
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-1,246.87 °/s at 115.20 ms

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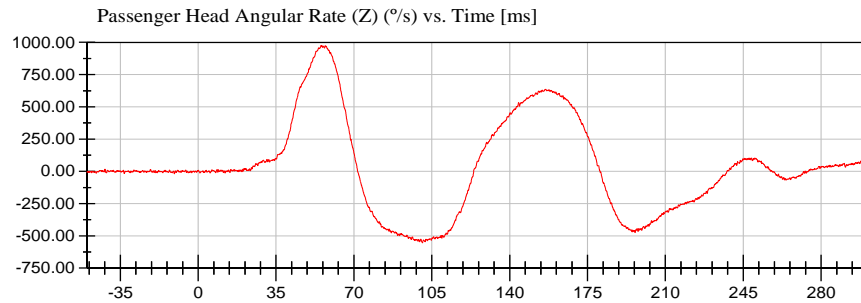
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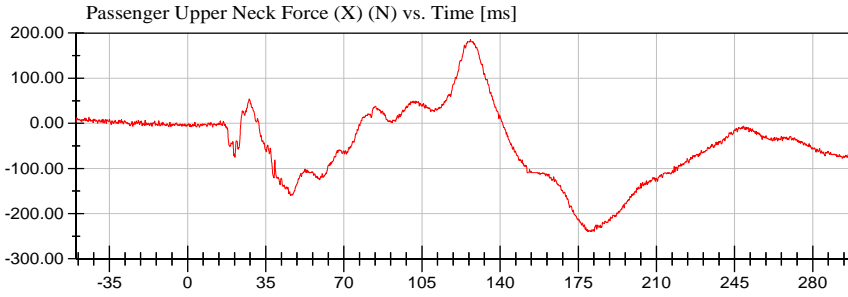
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VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



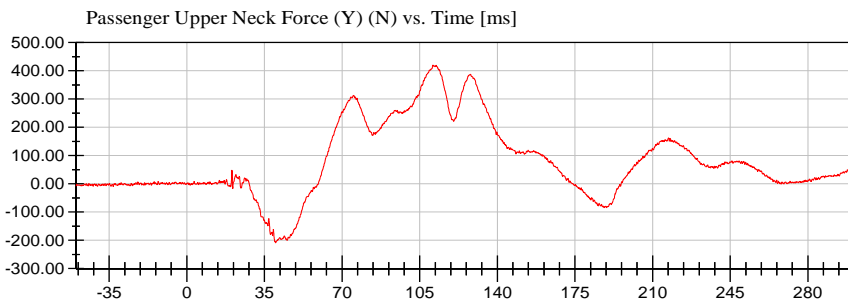
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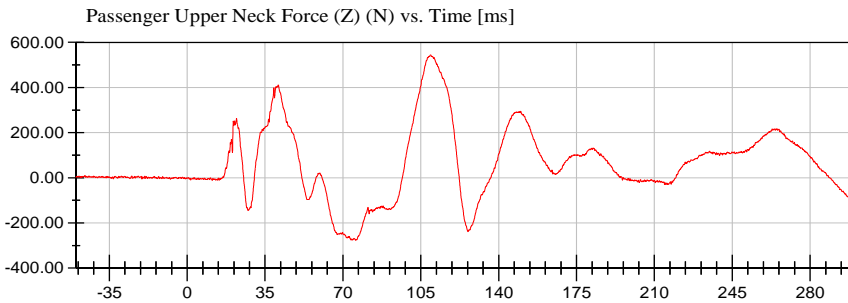
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420.05 N at 110.95 ms

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-208.94 N at 40.05 ms

CFC_1000



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544.63 N at 109.40 ms

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-276.20 N at 75.80 ms

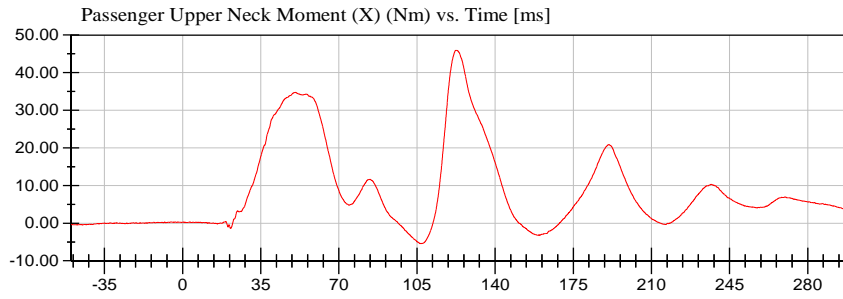
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VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



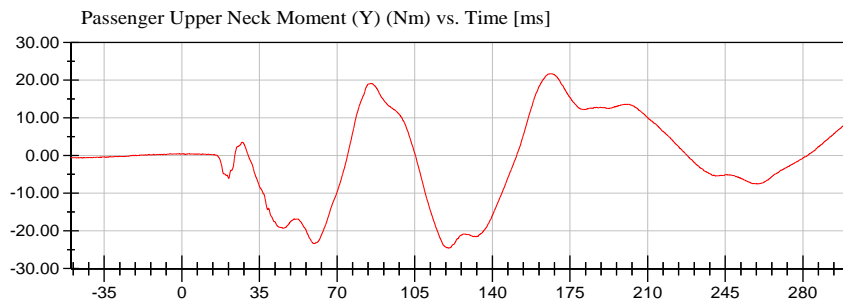
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-5.45 Nm at 106.40 ms

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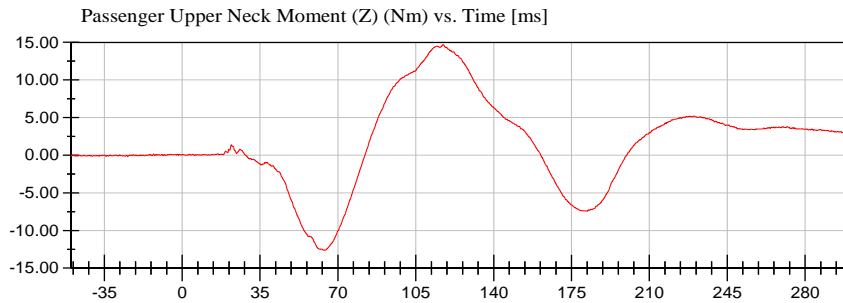
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21.70 Nm at 166.85 ms

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-24.54 Nm at 120.50 ms

CFC_600



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-12.63 Nm at 63.80 ms

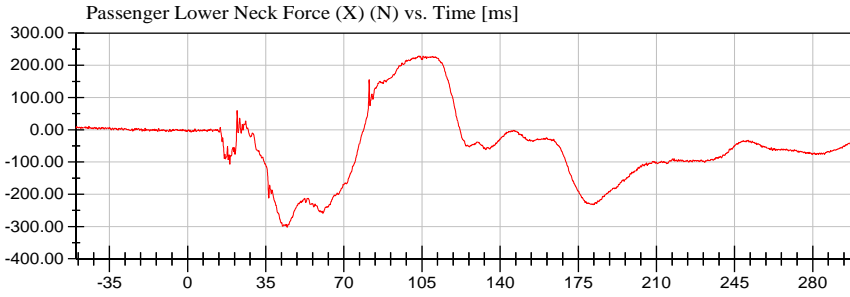
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VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



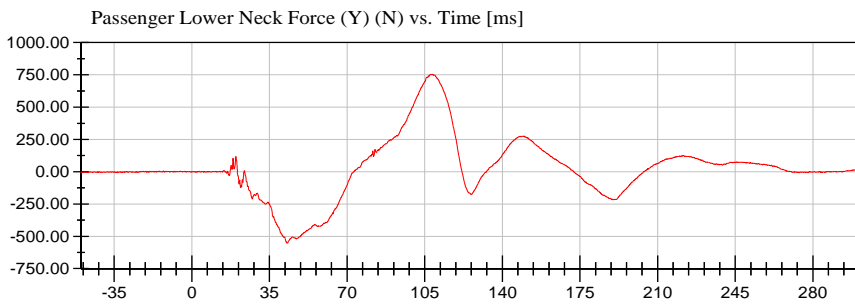
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228.75 N at 104.05 ms

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-301.55 N at 44.60 ms

CFC_1000



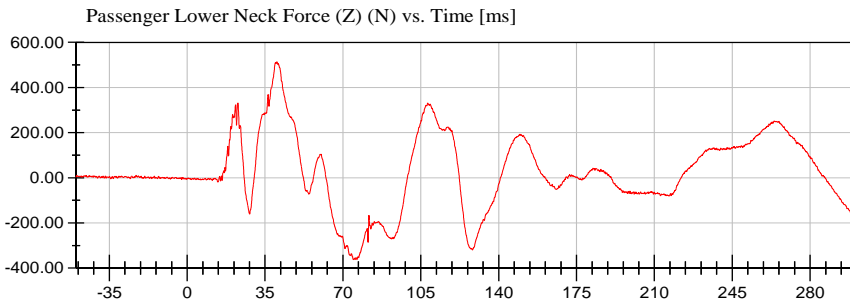
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753.96 N at 108.40 ms

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CFC_1000



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514.24 N at 40.35 ms

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-361.79 N at 74.70 ms

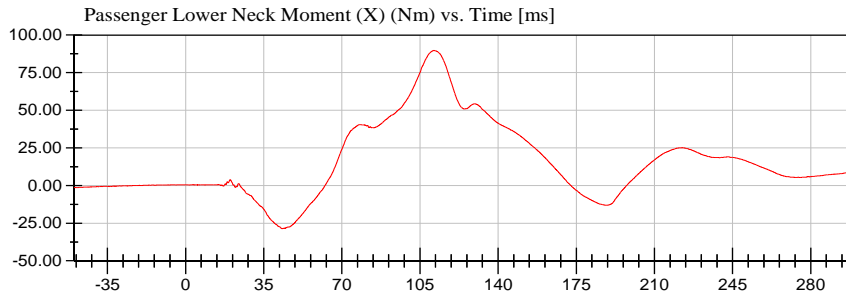
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VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



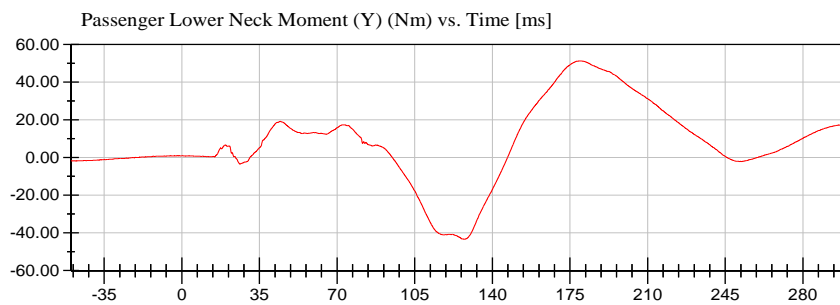
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-28.66 Nm at 43.30 ms

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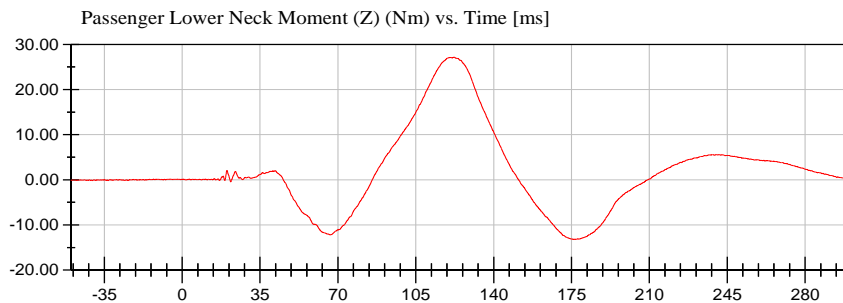
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CFC_600



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-13.19 Nm at 175.80 ms

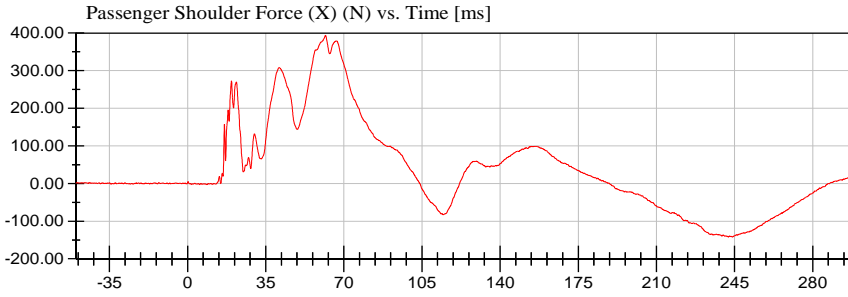
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VRTC

Test Lab: CTF
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Test Date: 04/15/2021



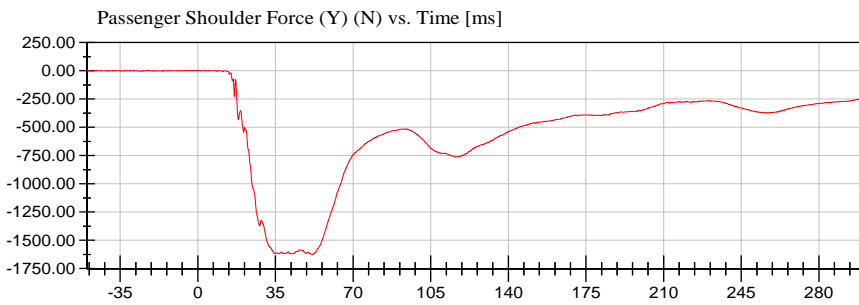
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-142.13 N at 242.20 ms

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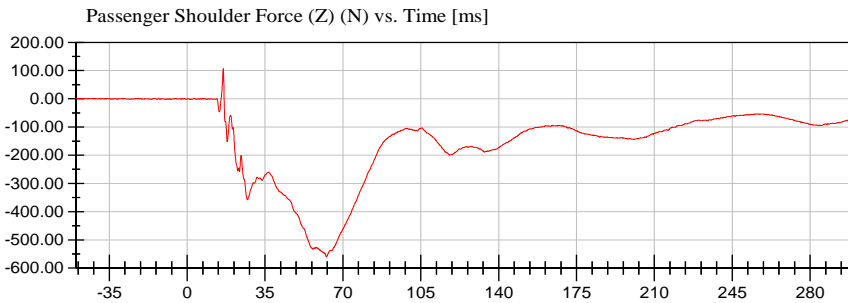
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CFC_600



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-559.80 N at 62.60 ms

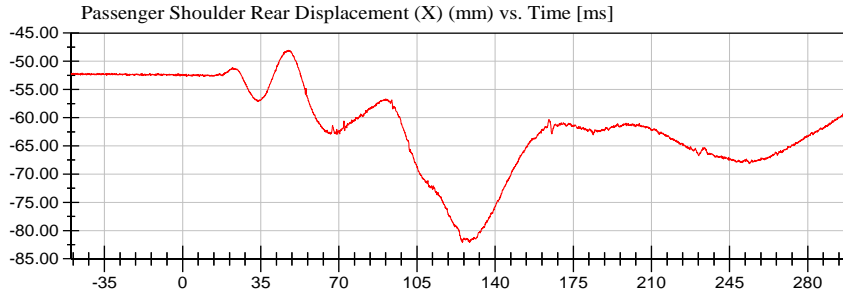
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VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



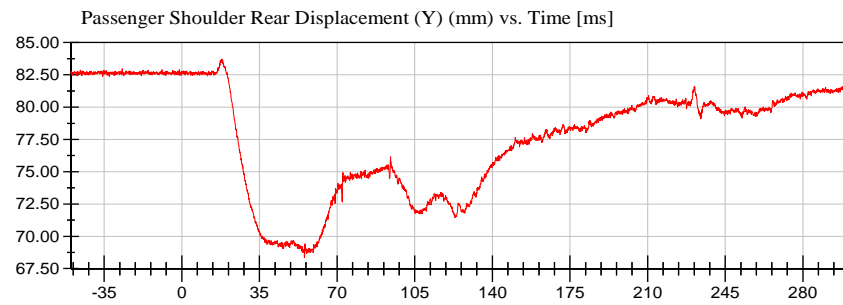
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-82.10 mm at 125.30 ms

Unfiltered



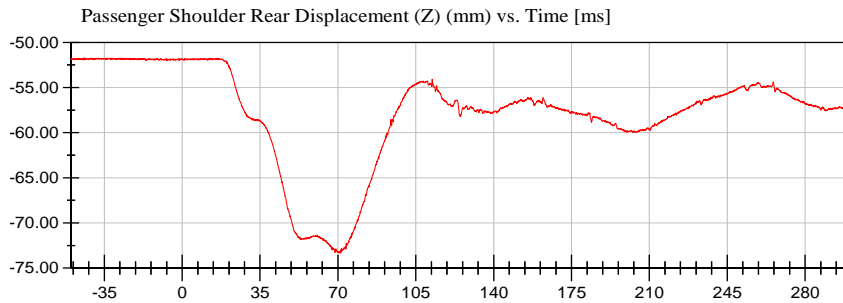
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83.74 mm at 18.00 ms

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68.33 mm at 55.30 ms

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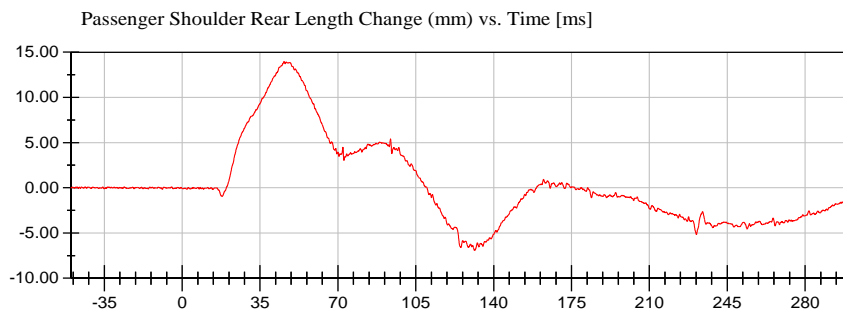
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-51.72 mm at -44.00 ms

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-73.35 mm at 71.25 ms

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13.96 mm at 45.75 ms

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-6.93 mm at 131.45 ms

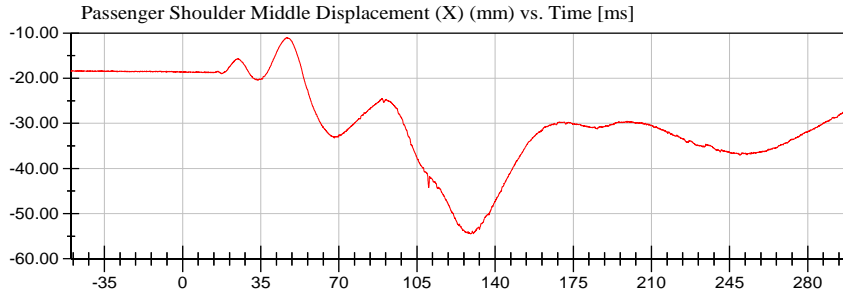
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VRTC

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Test Number: 210415 ()

Test Date: 04/15/2021



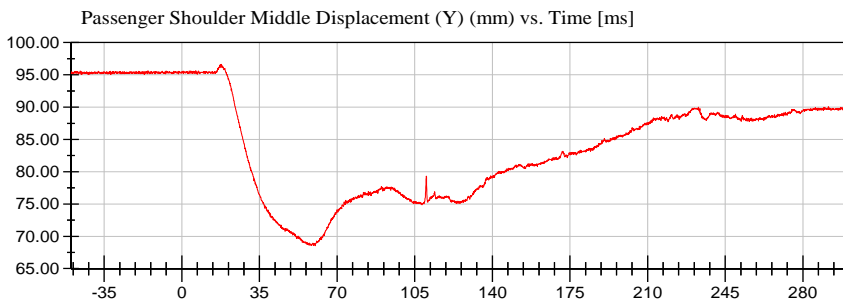
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-54.52 mm at 129.10 ms

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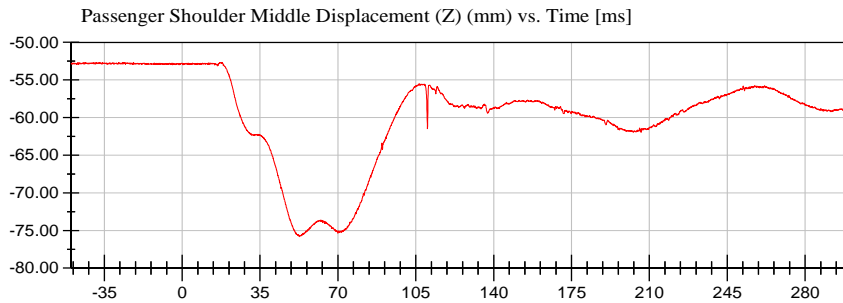
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96.62 mm at 17.80 ms

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68.53 mm at 60.10 ms

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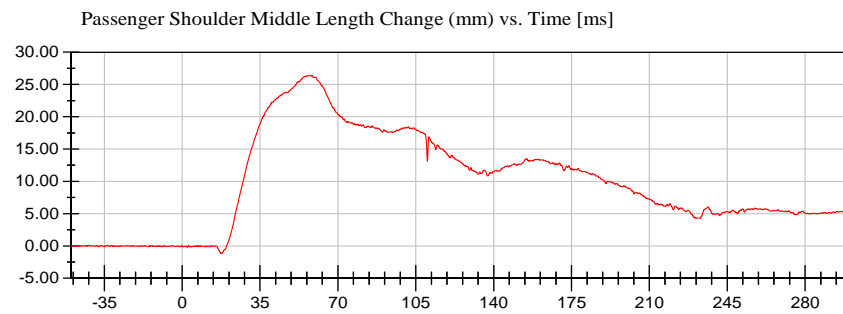
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-75.81 mm at 52.70 ms

Unfiltered



<Max>

26.42 mm at 58.35 ms

<Min>

-1.18 mm at 17.60 ms

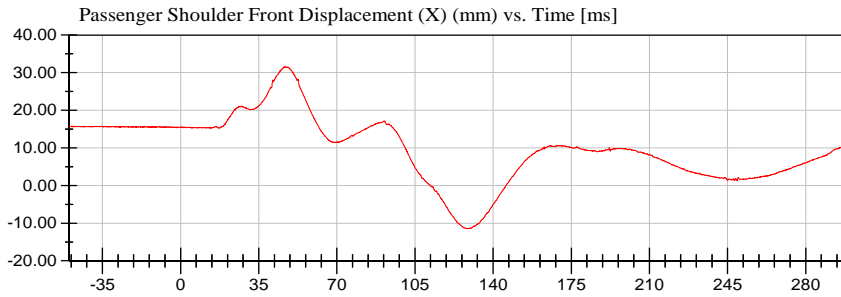
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



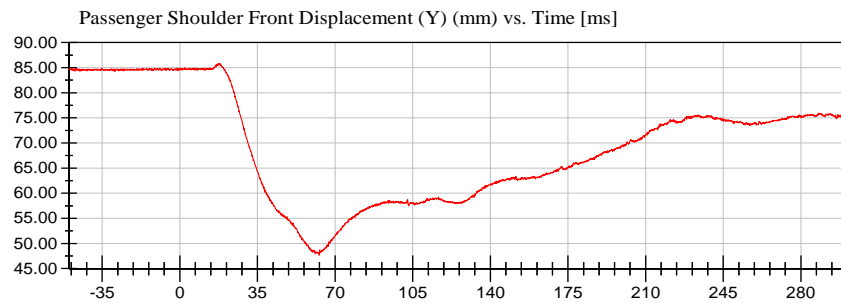
<Max>

31.58 mm at 46.95 ms

<Min>

-11.50 mm at 128.50 ms

Unfiltered



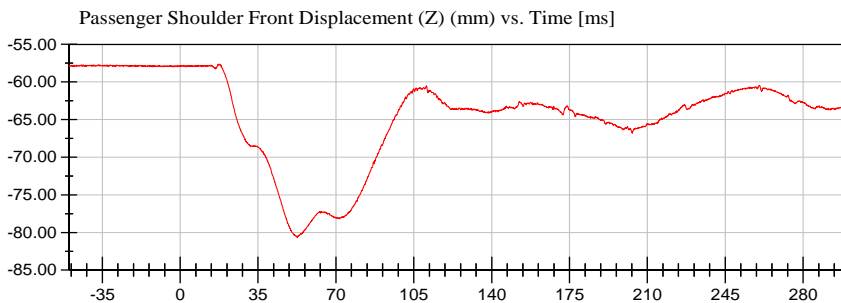
<Max>

85.88 mm at 17.40 ms

<Min>

47.64 mm at 62.80 ms

Unfiltered



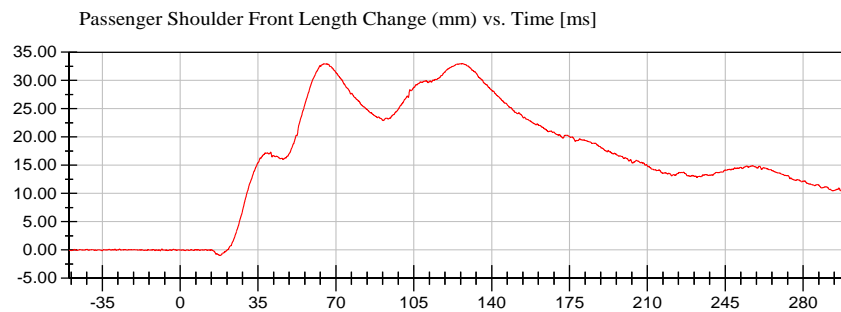
<Max>

-57.64 mm at 17.50 ms

<Min>

-80.67 mm at 52.70 ms

Unfiltered



<Max>

33.01 mm at 126.85 ms

<Min>

-0.97 mm at 17.80 ms

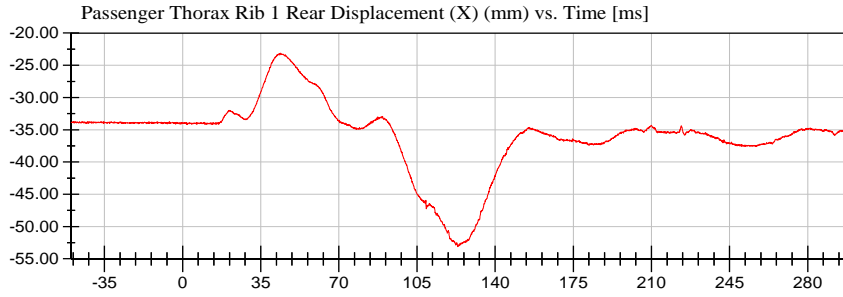
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



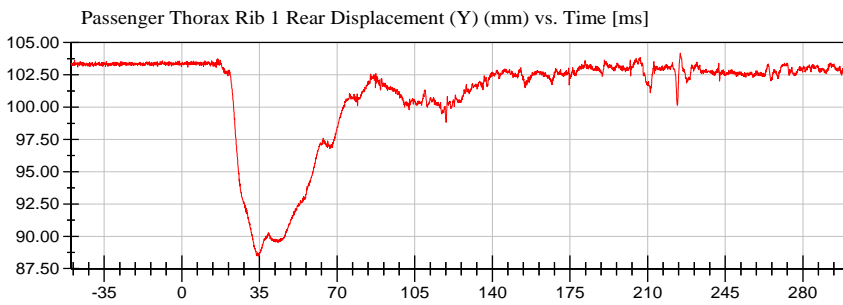
<Max>

-23.13 mm at 43.85 ms

<Min>

-53.12 mm at 123.30 ms

Unfiltered



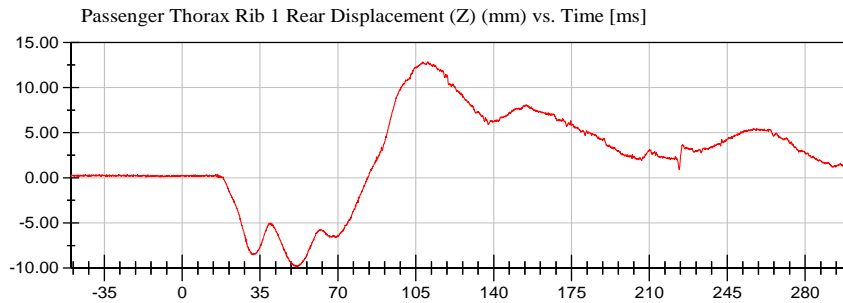
<Max>

104.19 mm at 224.75 ms

<Min>

88.46 mm at 34.65 ms

Unfiltered



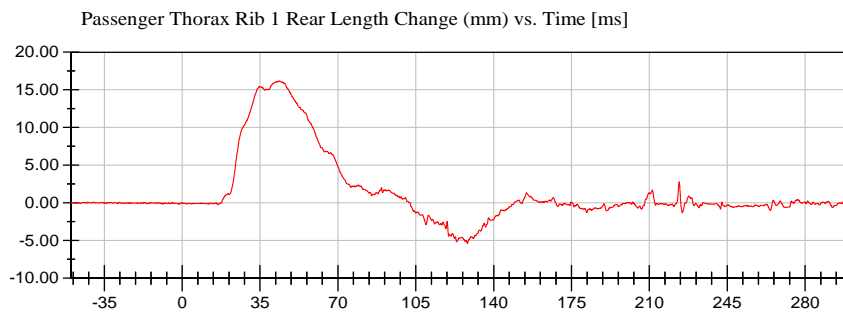
<Max>

12.85 mm at 108.10 ms

<Min>

-9.87 mm at 51.35 ms

Unfiltered



<Max>

16.18 mm at 43.35 ms

<Min>

-5.40 mm at 128.20 ms

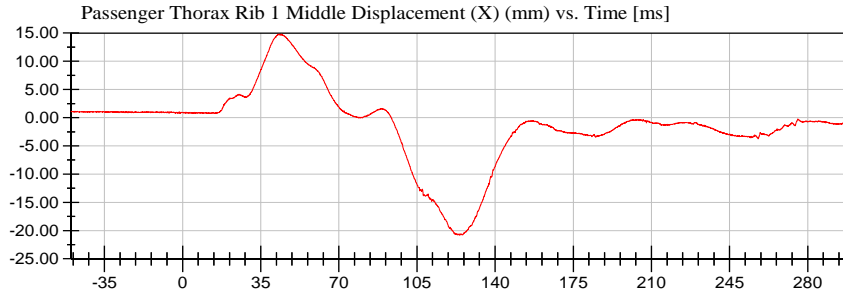
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



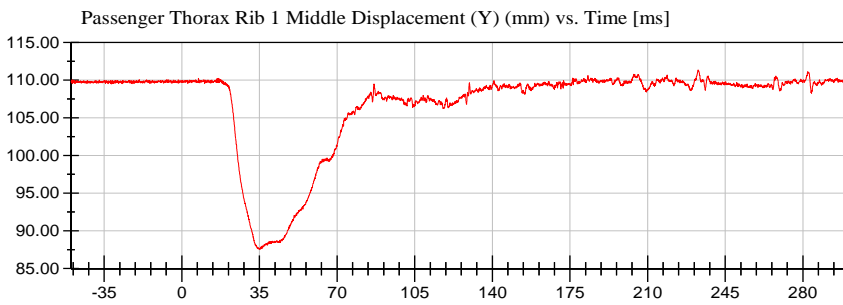
<Max>

14.83 mm at 44.20 ms

<Min>

-20.82 mm at 124.20 ms

Unfiltered



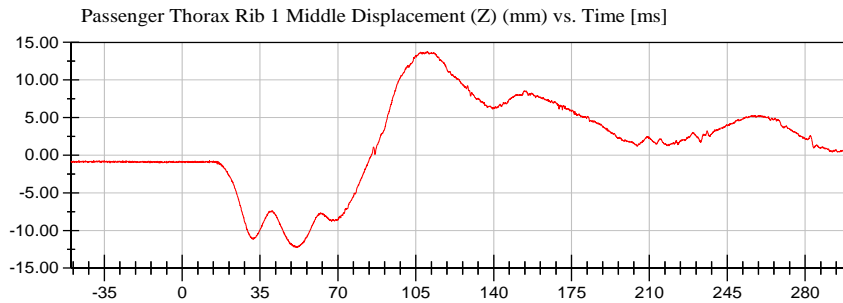
<Max>

111.36 mm at 232.75 ms

<Min>

87.56 mm at 35.25 ms

Unfiltered



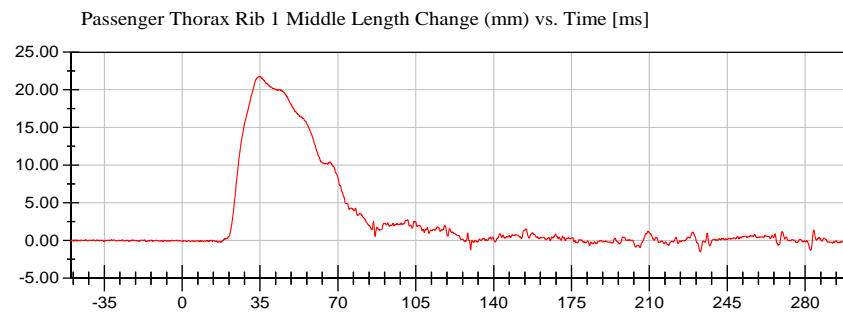
<Max>

13.79 mm at 110.15 ms

<Min>

-12.24 mm at 51.60 ms

Unfiltered



<Max>

21.80 mm at 34.95 ms

<Min>

-1.52 mm at 232.85 ms

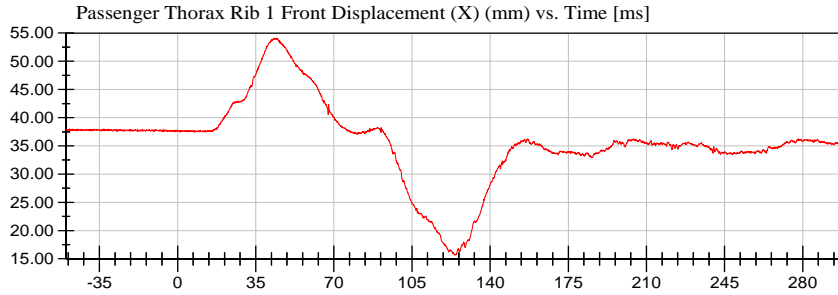
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



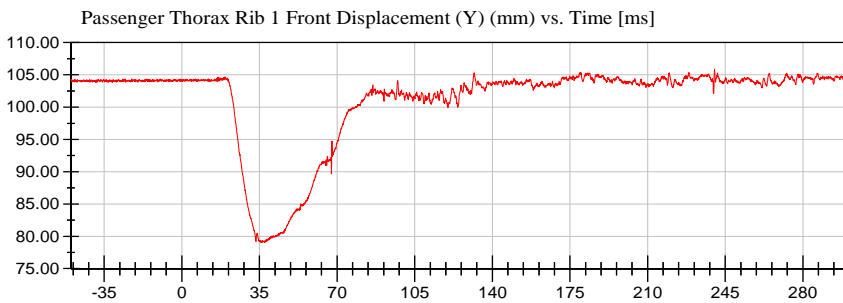
<Max>

54.10 mm at 43.80 ms

<Min>

15.66 mm at 124.35 ms

Unfiltered



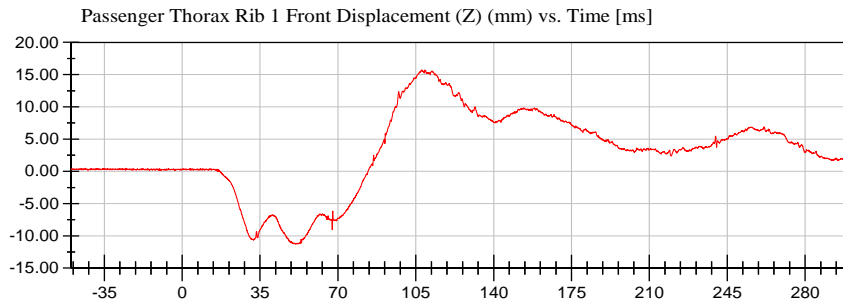
<Max>

105.90 mm at 240.20 ms

<Min>

79.02 mm at 37.30 ms

Unfiltered



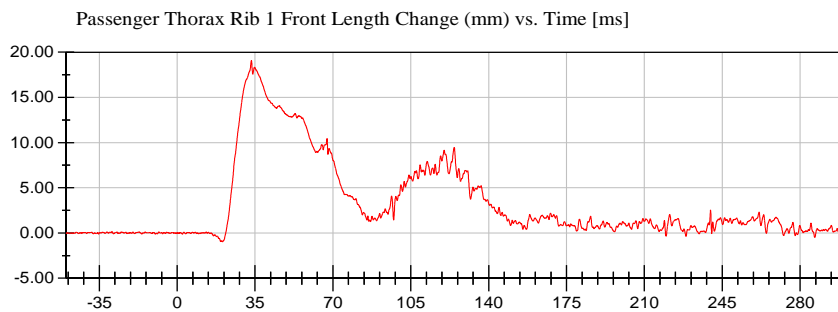
<Max>

15.73 mm at 107.75 ms

<Min>

-11.29 mm at 51.10 ms

Unfiltered



<Max>

19.09 mm at 33.35 ms

<Min>

-0.97 mm at 20.40 ms

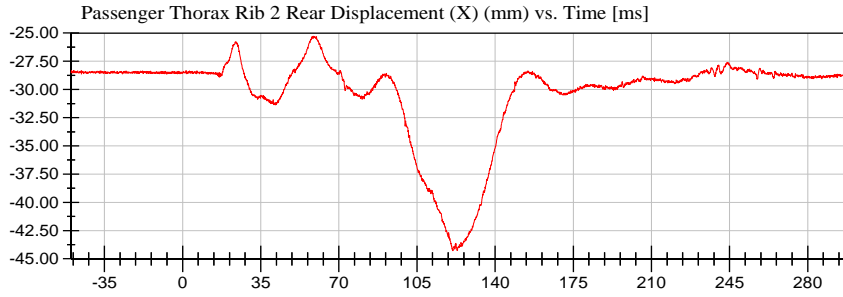
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



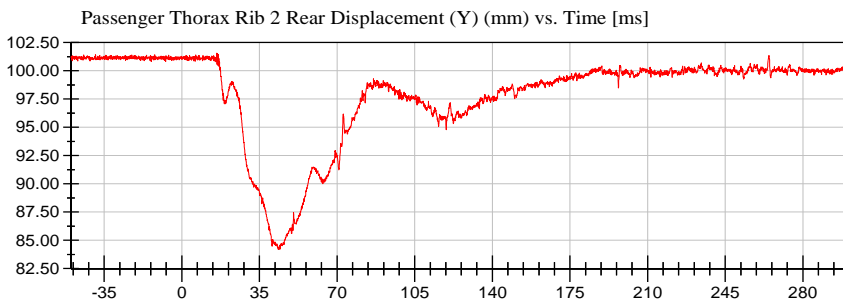
<Max>

-25.29 mm at 58.50 ms

<Min>

-44.29 mm at 121.10 ms

Unfiltered



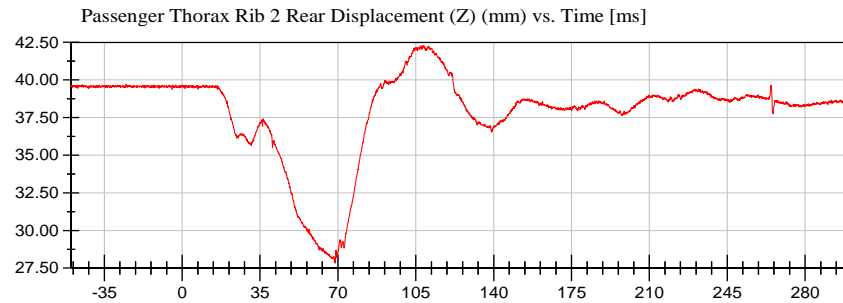
<Max>

101.58 mm at 15.80 ms

<Min>

84.19 mm at 43.70 ms

Unfiltered



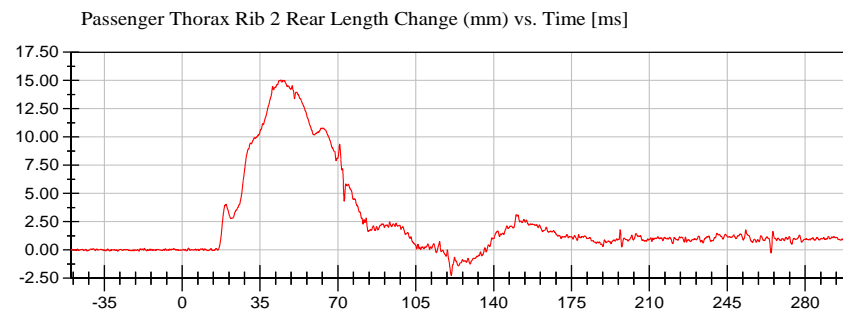
<Max>

42.28 mm at 108.15 ms

<Min>

27.83 mm at 68.65 ms

Unfiltered



<Max>

15.03 mm at 44.40 ms

<Min>

-2.25 mm at 120.95 ms

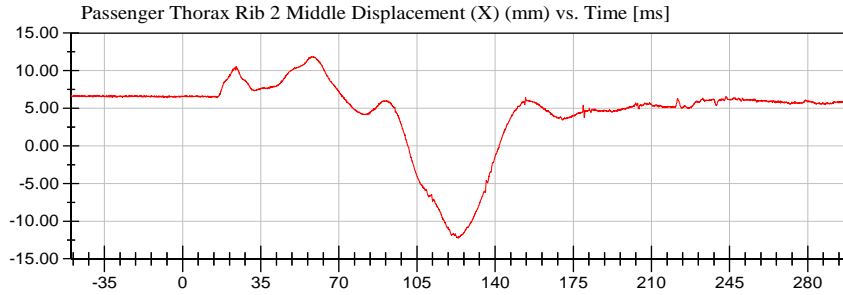
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



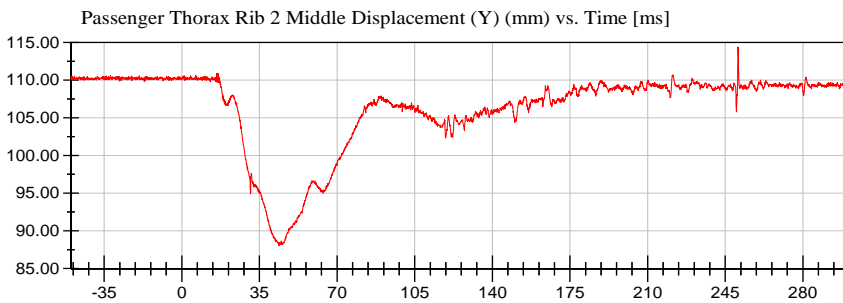
<Max>

11.90 mm at 57.90 ms

<Min>

-12.25 mm at 123.10 ms

Unfiltered



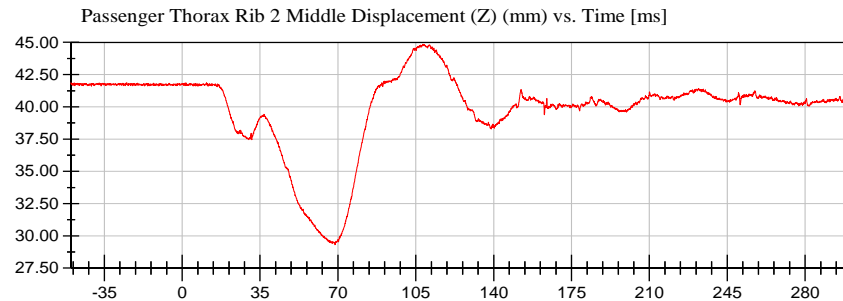
<Max>

114.39 mm at 250.75 ms

<Min>

88.03 mm at 43.80 ms

Unfiltered



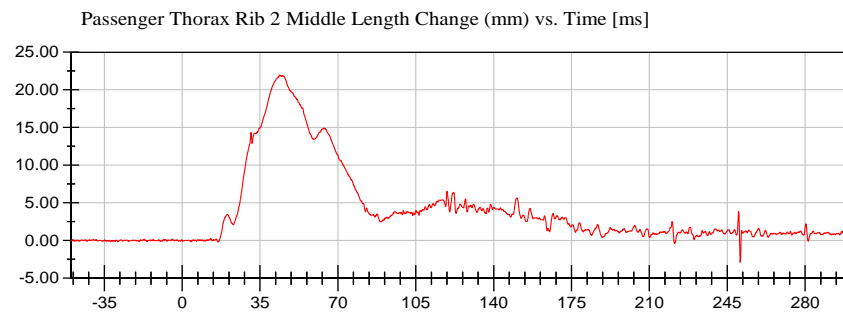
<Max>

44.85 mm at 108.15 ms

<Min>

29.31 mm at 68.70 ms

Unfiltered



<Max>

21.99 mm at 43.85 ms

<Min>

-2.89 mm at 250.80 ms

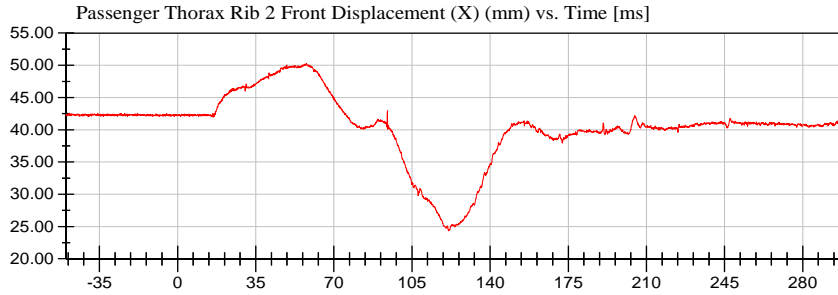
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



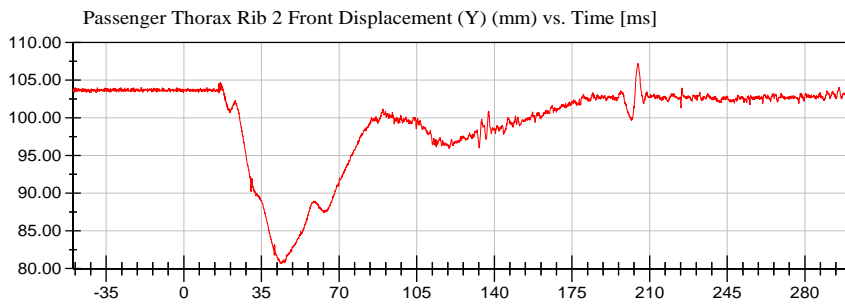
<Max>

50.26 mm at 57.60 ms

<Min>

24.32 mm at 121.35 ms

Unfiltered



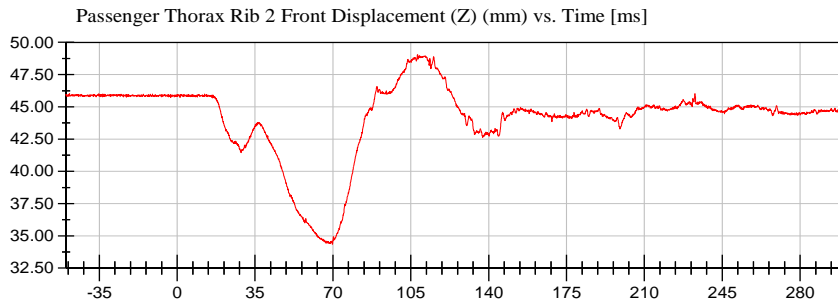
<Max>

107.23 mm at 204.75 ms

<Min>

80.69 mm at 43.80 ms

Unfiltered



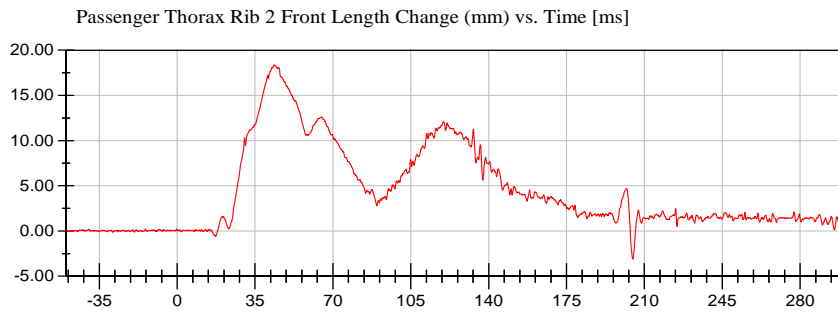
<Max>

49.04 mm at 108.05 ms

<Min>

34.34 mm at 69.75 ms

Unfiltered



<Max>

18.37 mm at 43.70 ms

<Min>

-3.11 mm at 204.75 ms

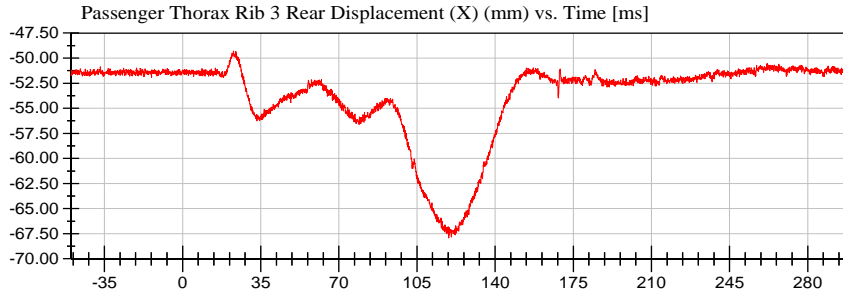
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



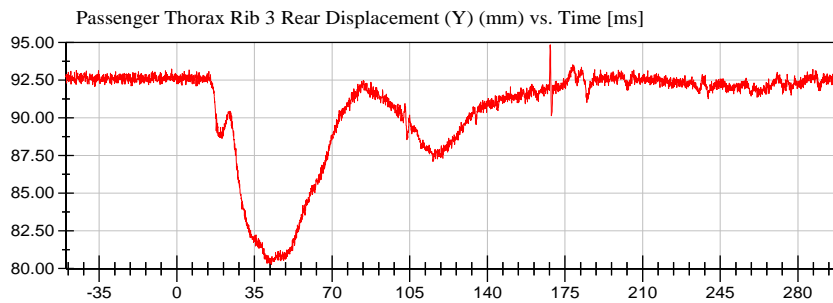
<Max>

-49.30 mm at 22.80 ms

<Min>

-67.93 mm at 119.20 ms

Unfiltered



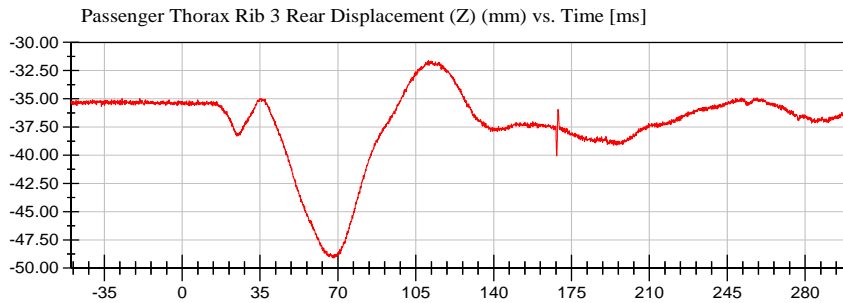
<Max>

94.86 mm at 168.35 ms

<Min>

80.28 mm at 42.70 ms

Unfiltered



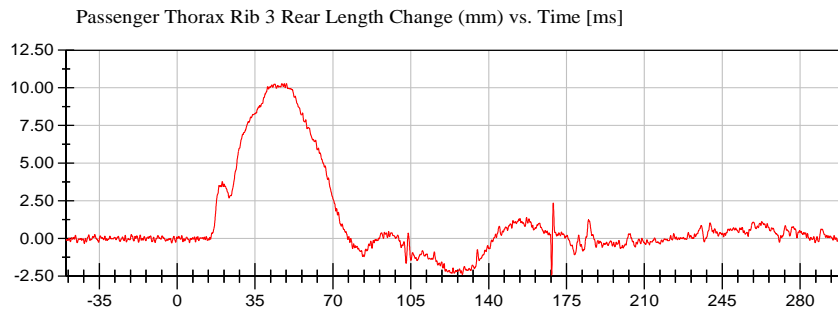
<Max>

-31.62 mm at 110.75 ms

<Min>

-49.10 mm at 67.90 ms

Unfiltered



<Max>

10.28 mm at 49.10 ms

<Min>

-2.42 mm at 168.35 ms

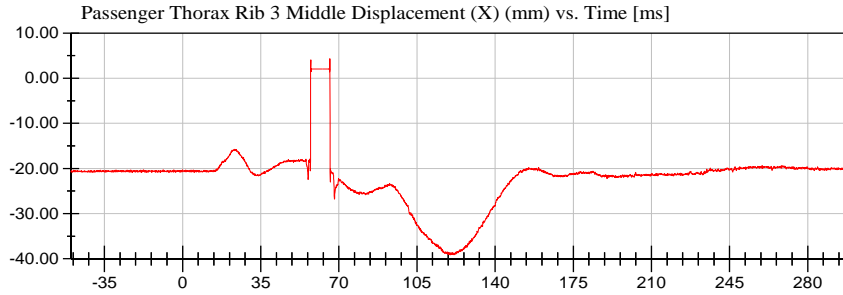
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



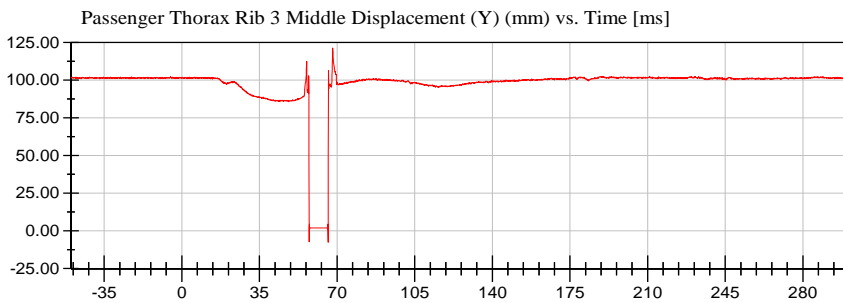
<Max>

4.27 mm at 65.95 ms

<Min>

-39.11 mm at 119.85 ms

Unfiltered



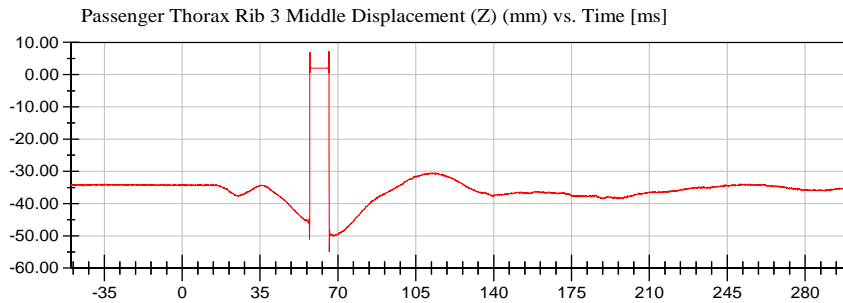
<Max>

121.30 mm at 68.05 ms

<Min>

-7.48 mm at 65.95 ms

Unfiltered



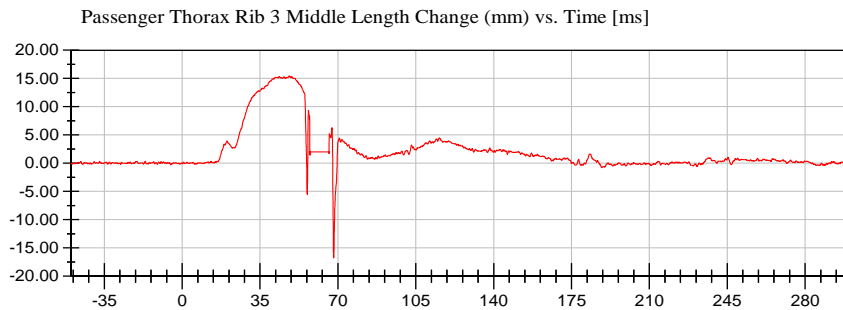
<Max>

7.21 mm at 65.95 ms

<Min>

-54.88 mm at 66.15 ms

Unfiltered



<Max>

15.44 mm at 48.20 ms

<Min>

-16.77 mm at 68.10 ms

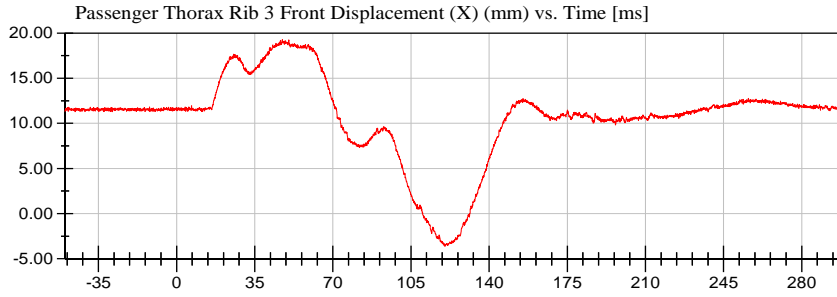
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



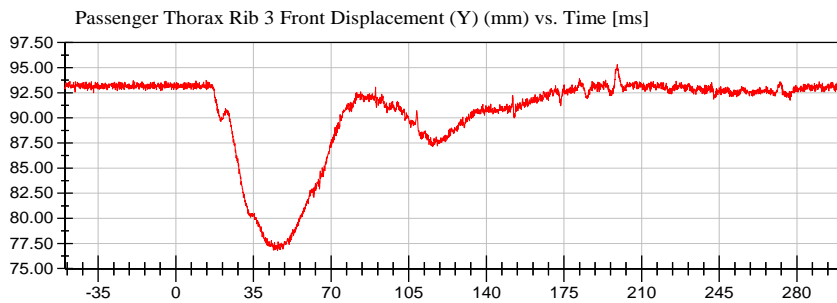
<Max>

19.26 mm at 47.40 ms

<Min>

-3.59 mm at 120.20 ms

Unfiltered



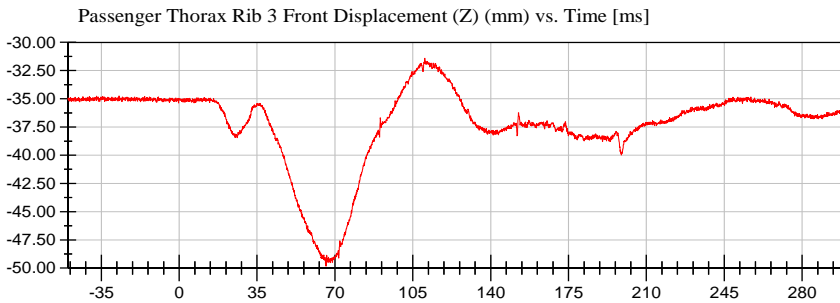
<Max>

95.31 mm at 199.00 ms

<Min>

76.78 mm at 45.85 ms

Unfiltered



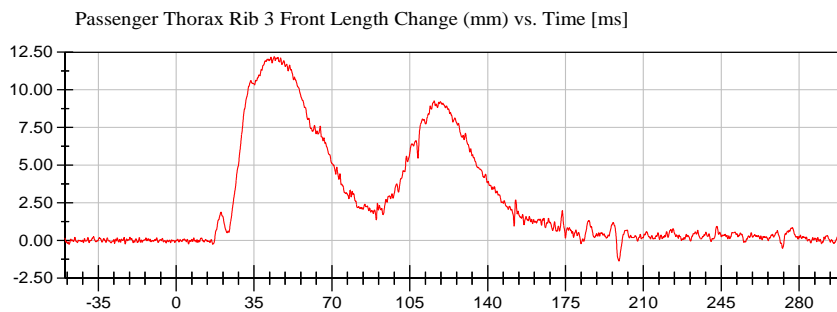
<Max>

-31.41 mm at 110.40 ms

<Min>

-49.81 mm at 66.00 ms

Unfiltered



<Max>

12.21 mm at 44.10 ms

<Min>

-1.35 mm at 198.95 ms

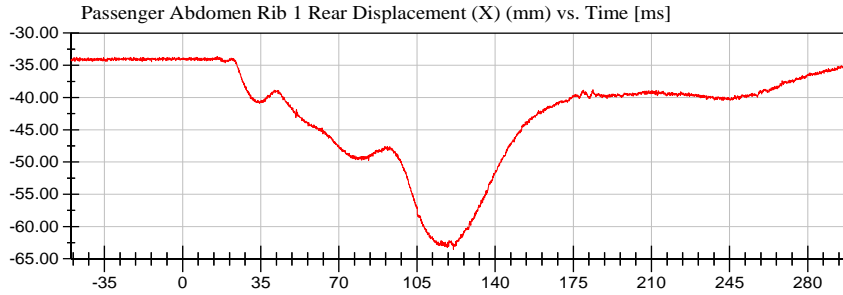
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



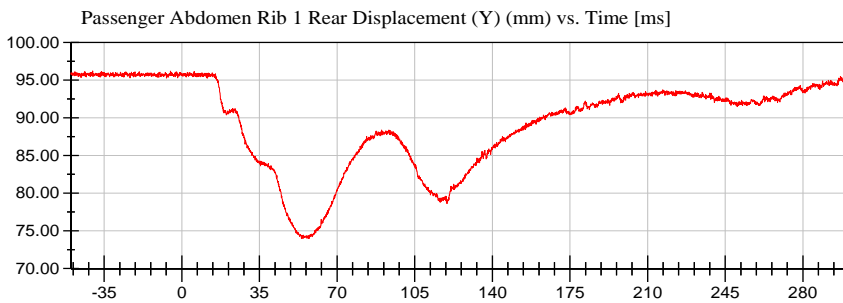
<Max>

-33.66 mm at 15.60 ms

<Min>

-63.51 mm at 121.30 ms

Unfiltered



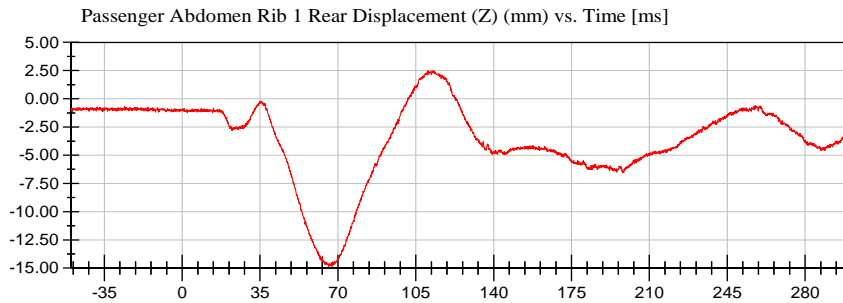
<Max>

96.23 mm at -40.20 ms

<Min>

74.00 mm at 54.00 ms

Unfiltered



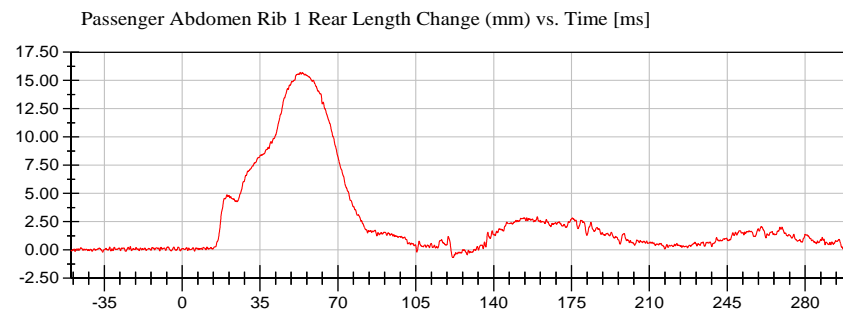
<Max>

2.51 mm at 110.40 ms

<Min>

-14.86 mm at 67.30 ms

Unfiltered



<Max>

15.71 mm at 53.05 ms

<Min>

-0.66 mm at 121.85 ms

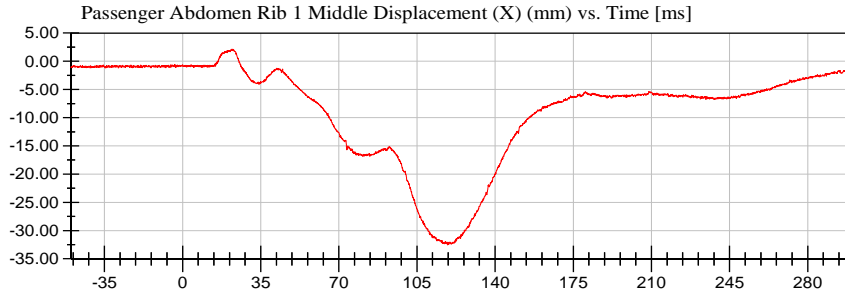
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



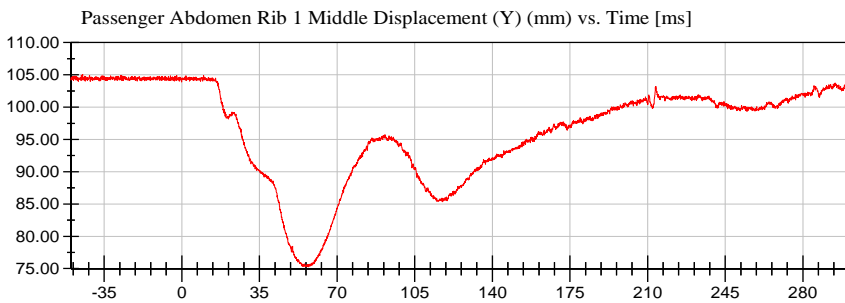
<Max>

2.14 mm at 22.50 ms

<Min>

-32.52 mm at 118.70 ms

Unfiltered



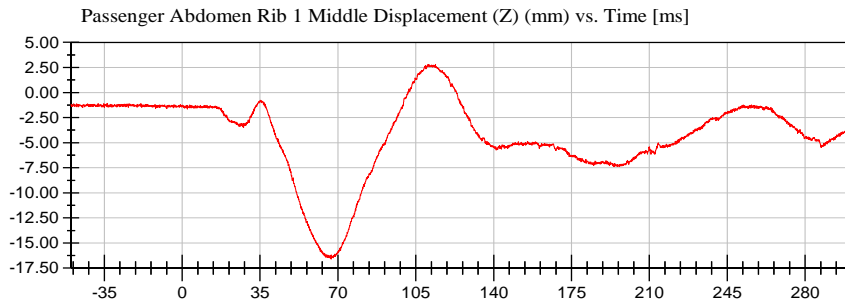
<Max>

105.04 mm at -44.70 ms

<Min>

75.27 mm at 57.05 ms

Unfiltered



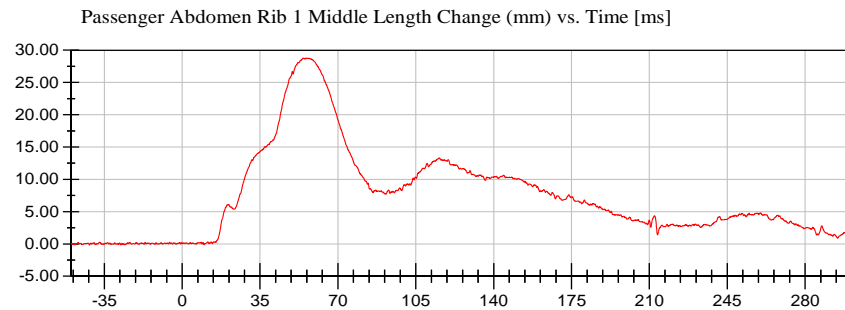
<Max>

2.80 mm at 113.80 ms

<Min>

-16.61 mm at 66.95 ms

Unfiltered



<Max>

28.79 mm at 55.65 ms

<Min>

-0.17 mm at -41.65 ms

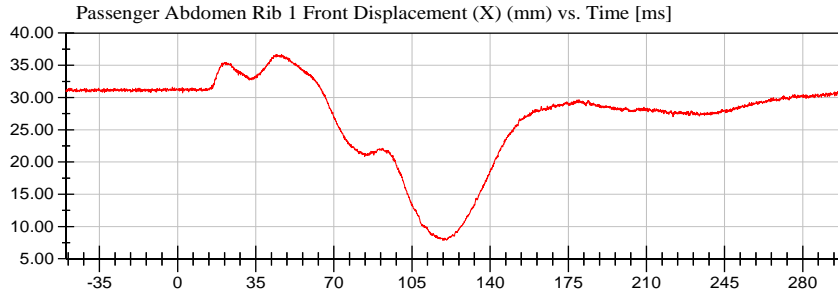
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



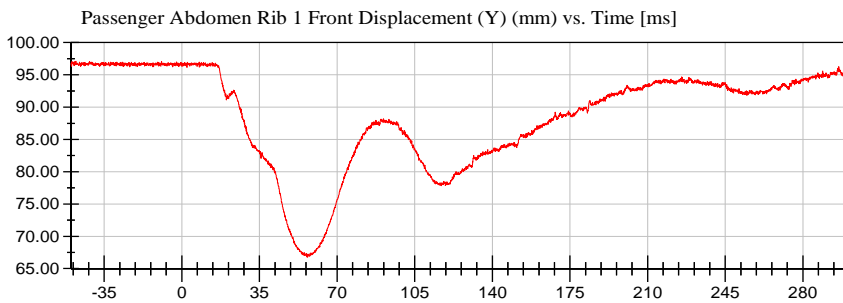
<Max>

36.67 mm at 46.60 ms

<Min>

7.85 mm at 119.25 ms

Unfiltered



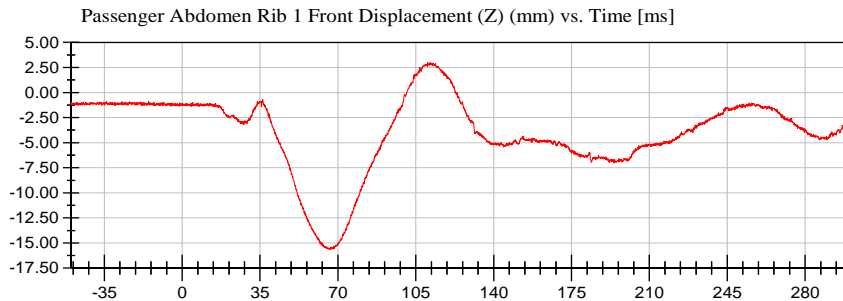
<Max>

97.09 mm at -47.80 ms

<Min>

66.78 mm at 56.45 ms

Unfiltered



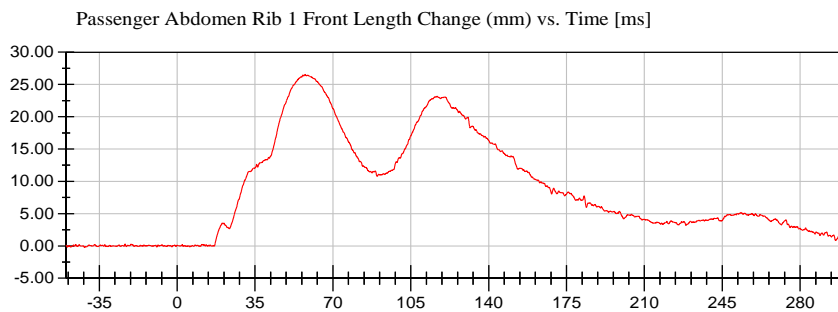
<Max>

2.98 mm at 111.40 ms

<Min>

-15.63 mm at 66.40 ms

Unfiltered



<Max>

26.55 mm at 57.55 ms

<Min>

-0.25 mm at -41.60 ms

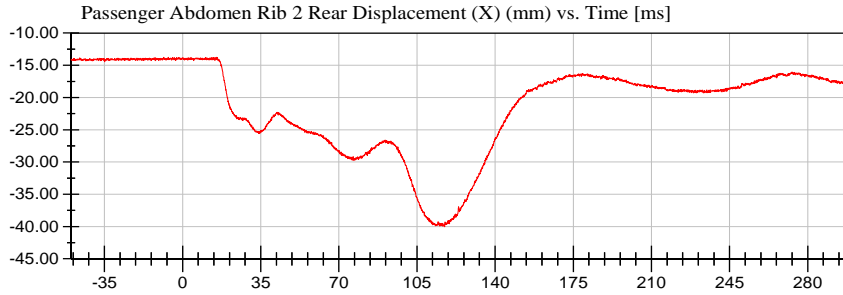
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



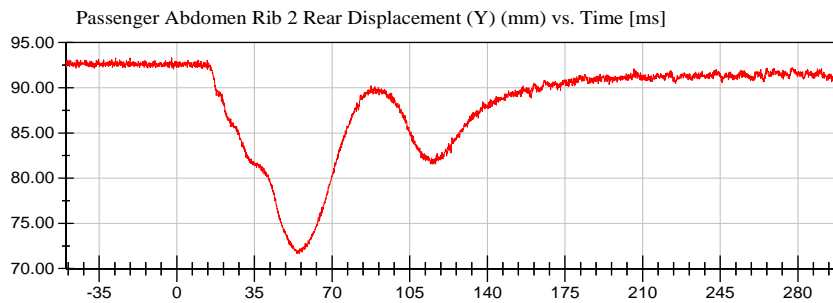
<Max>

-13.76 mm at -8.40 ms

<Min>

-40.06 mm at 117.40 ms

Unfiltered



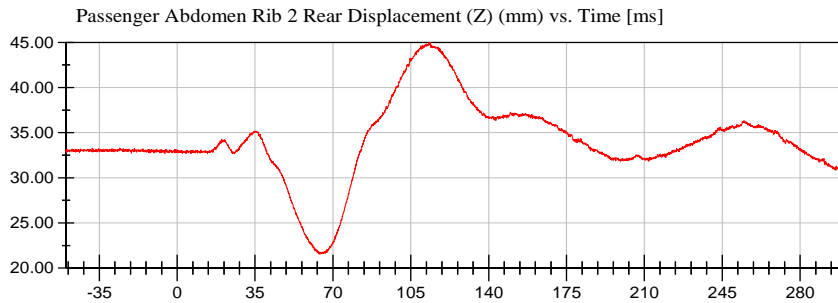
<Max>

93.30 mm at -2.30 ms

<Min>

71.66 mm at 55.30 ms

Unfiltered



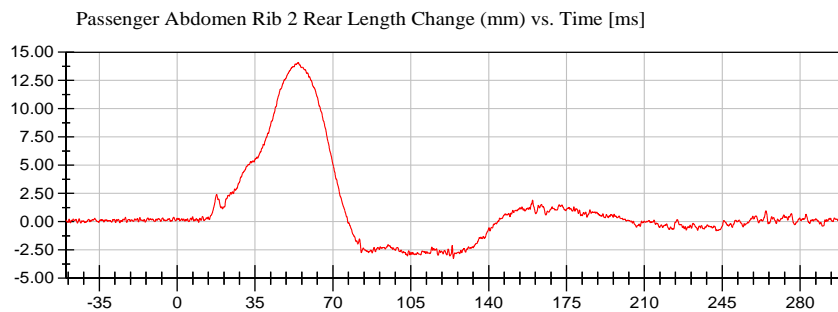
<Max>

44.98 mm at 113.80 ms

<Min>

21.55 mm at 63.85 ms

Unfiltered



<Max>

14.08 mm at 54.45 ms

<Min>

-3.24 mm at 124.15 ms

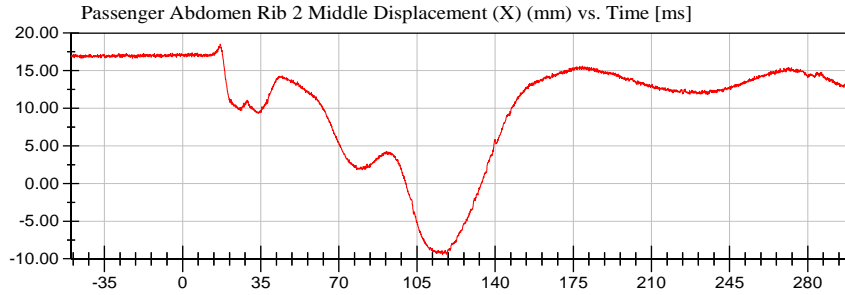
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



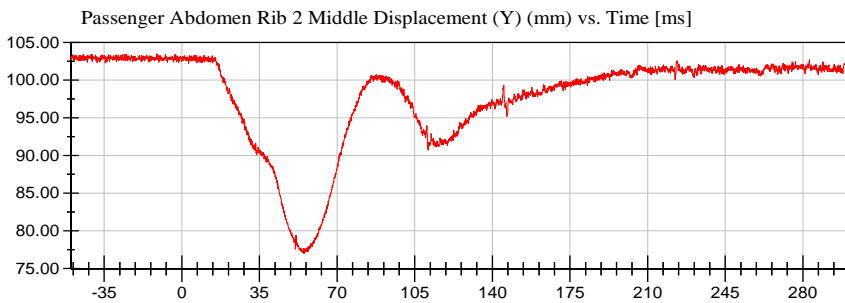
<Max>

18.54 mm at 16.90 ms

<Min>

-9.43 mm at 116.40 ms

Unfiltered



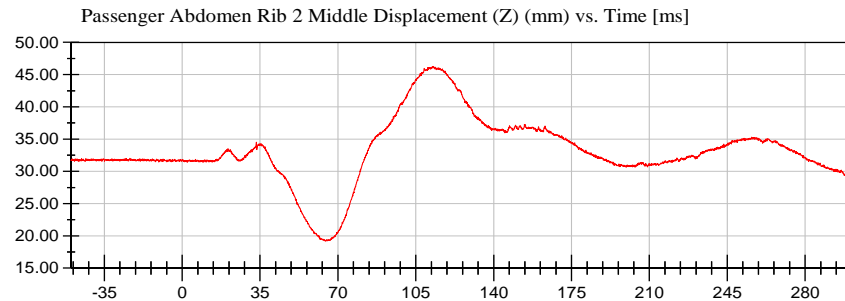
<Max>

103.50 mm at -11.30 ms

<Min>

76.98 mm at 55.10 ms

Unfiltered



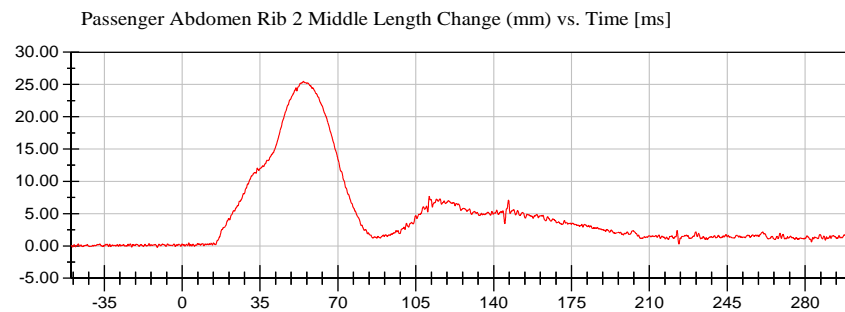
<Max>

46.29 mm at 112.80 ms

<Min>

19.21 mm at 65.10 ms

Unfiltered



<Max>

25.50 mm at 54.50 ms

<Min>

-0.20 mm at -11.15 ms

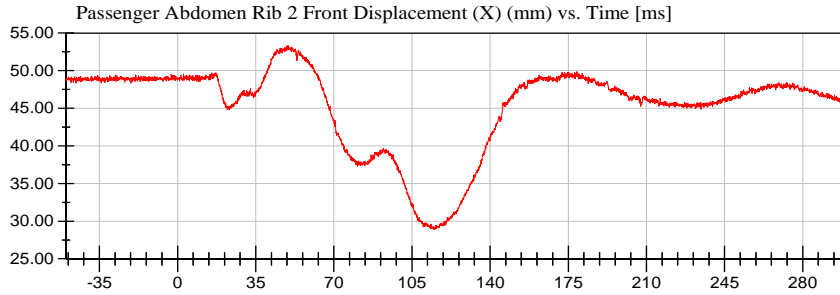
CFC_600



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



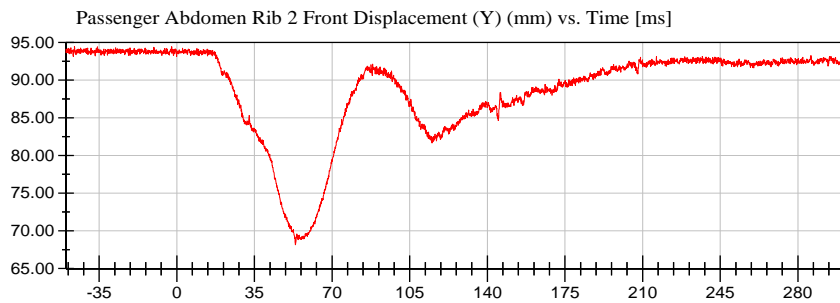
<Max>

53.37 mm at 49.55 ms

<Min>

28.91 mm at 114.80 ms

Unfiltered



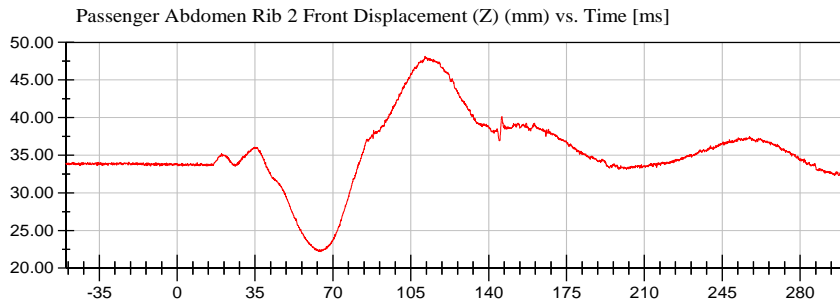
<Max>

94.47 mm at -46.10 ms

<Min>

68.16 mm at 53.45 ms

Unfiltered



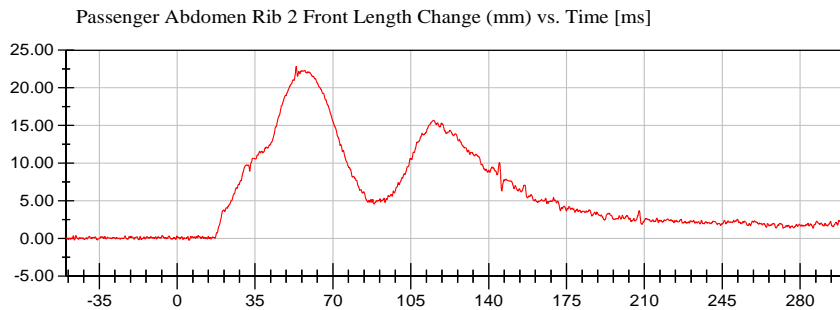
<Max>

48.14 mm at 111.40 ms

<Min>

22.18 mm at 64.60 ms

Unfiltered



<Max>

22.85 mm at 53.50 ms

<Min>

-0.22 mm at 5.35 ms

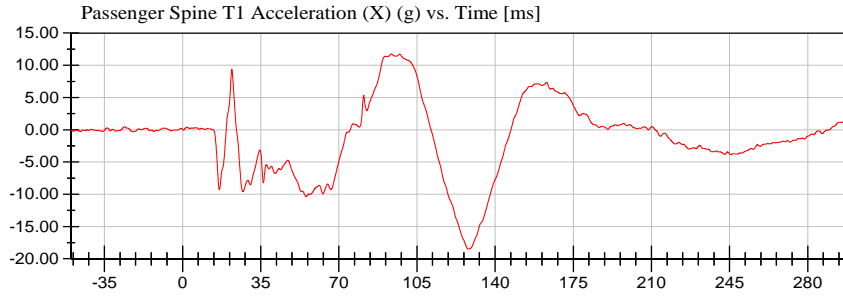
CFC_600



VRTC

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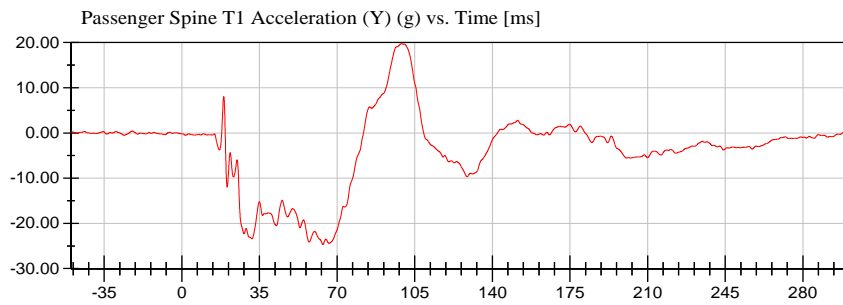
<Max>

11.74 g at 93.40 ms

<Min>

-18.50 g at 128.10 ms

CFC_180



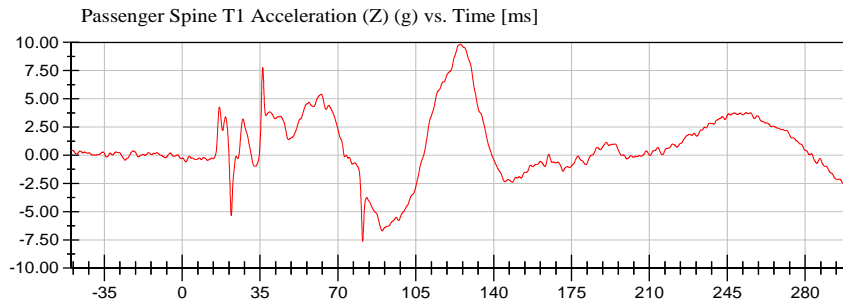
<Max>

19.77 g at 99.05 ms

<Min>

-24.66 g at 63.60 ms

CFC_180



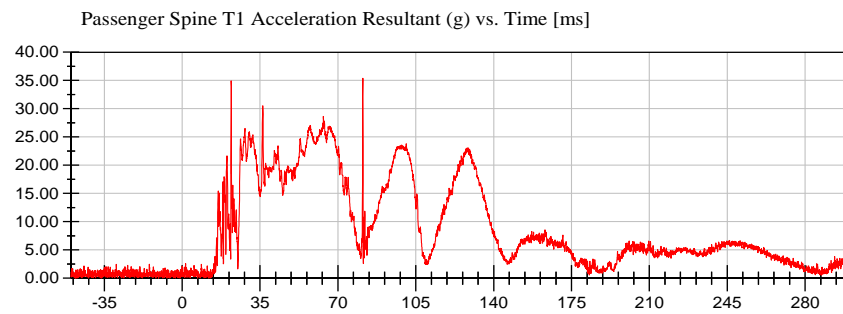
<Max>

9.83 g at 125.20 ms

<Min>

-7.62 g at 81.15 ms

CFC_180



<Max>

35.38 g at 81.20 ms

<Min>

0.03 g at -47.95 ms

Prefiltered_> CFC 1000

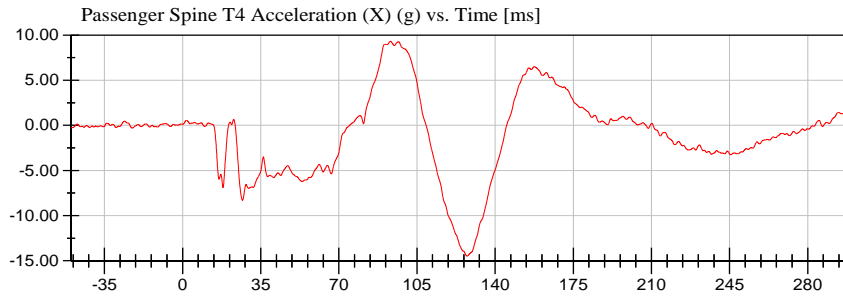


VRTC

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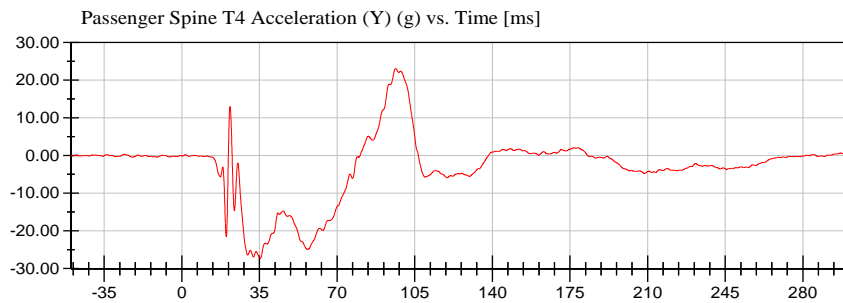
<Max>

9.32 g at 93.15 ms

<Min>

-14.48 g at 127.45 ms

CFC_180



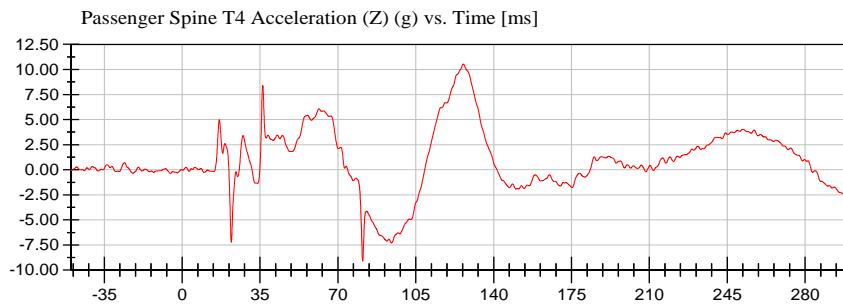
<Max>

23.11 g at 96.45 ms

<Min>

-27.28 g at 35.40 ms

CFC_180



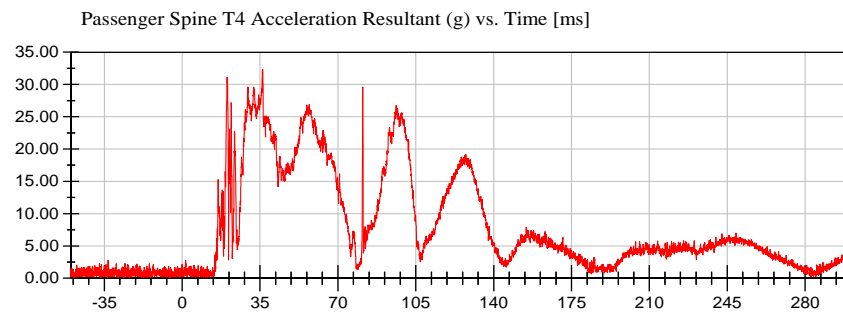
<Max>

10.53 g at 126.35 ms

<Min>

-9.09 g at 81.15 ms

CFC_180



<Max>

32.36 g at 36.10 ms

<Min>

0.09 g at -36.25 ms

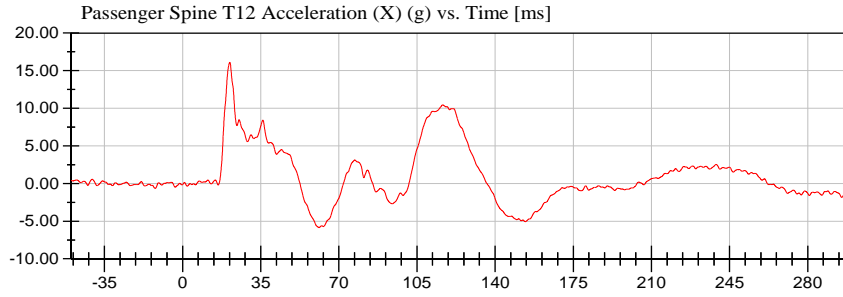
Prefiltered_> CFC 1000



VRTC

Test Lab: CTF
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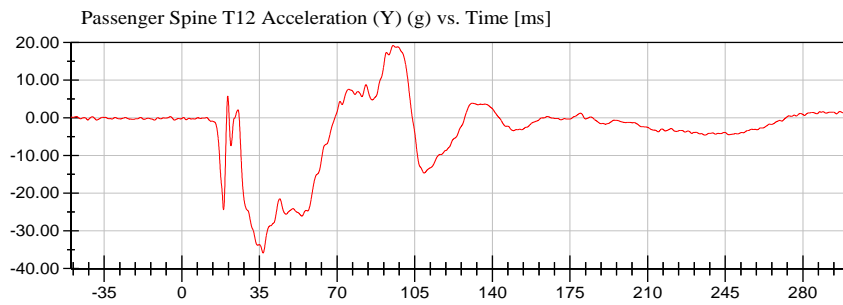
<Max>

16.11 g at 21.15 ms

<Min>

-5.85 g at 61.15 ms

CFC_180



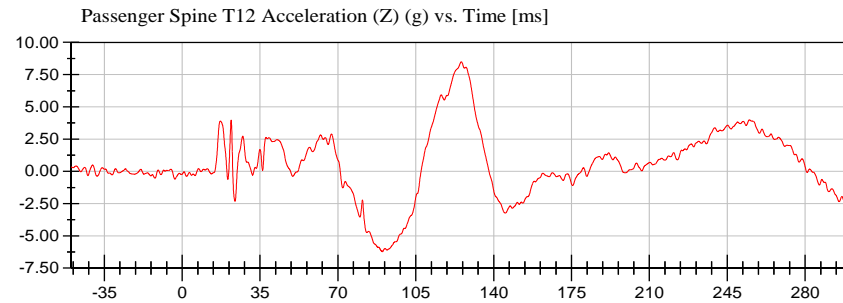
<Max>

19.25 g at 95.25 ms

<Min>

-35.85 g at 36.65 ms

CFC_180



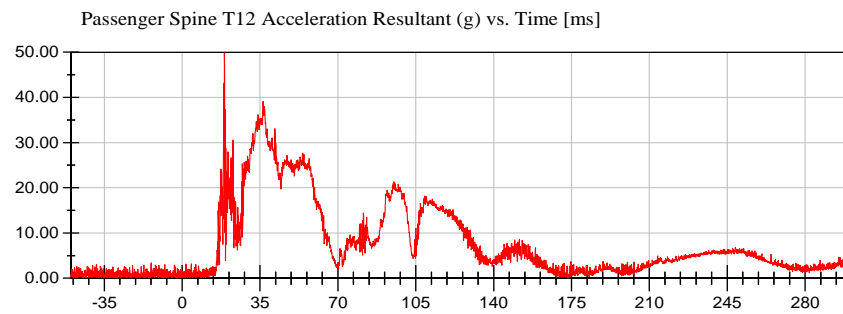
<Max>

8.50 g at 125.45 ms

<Min>

-6.22 g at 89.95 ms

CFC_180



<Max>

49.81 g at 19.05 ms

<Min>

0.07 g at -47.70 ms

Prefiltered_> CFC 1000

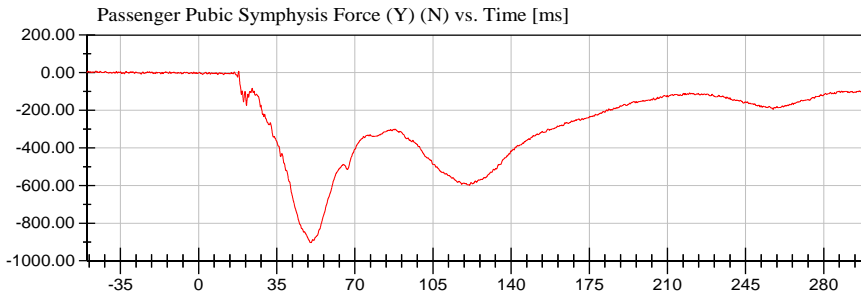


VRTC

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<Max>

7.89 N at -45.90 ms

<Min>

-903.62 N at 50.45 ms

CFC_600

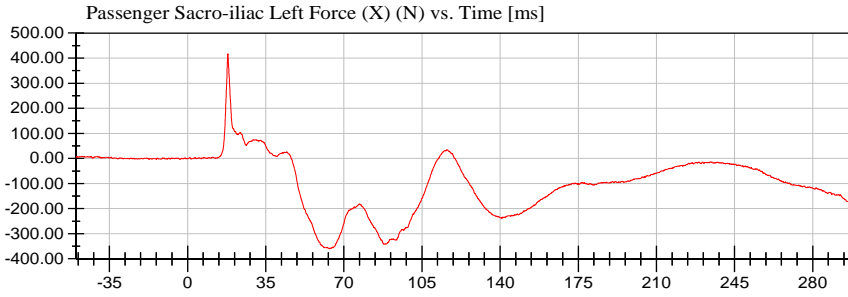


VRTC

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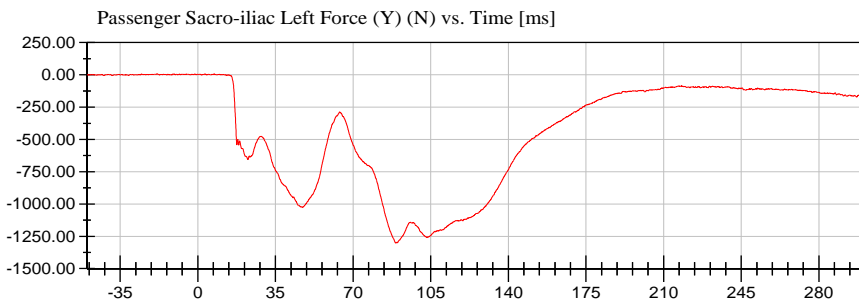
<Max>

417.55 N at 18.05 ms

<Min>

-359.65 N at 63.50 ms

CFC_600



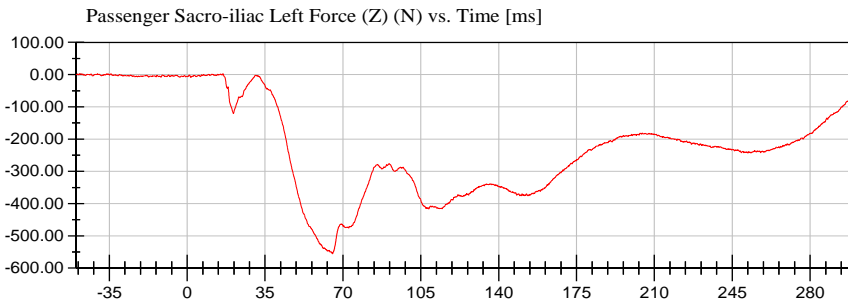
<Max>

8.87 N at -18.40 ms

<Min>

-1,302.15 N at 89.30 ms

CFC_600



<Max>

2.55 N at 16.10 ms

<Min>

-555.04 N at 65.30 ms

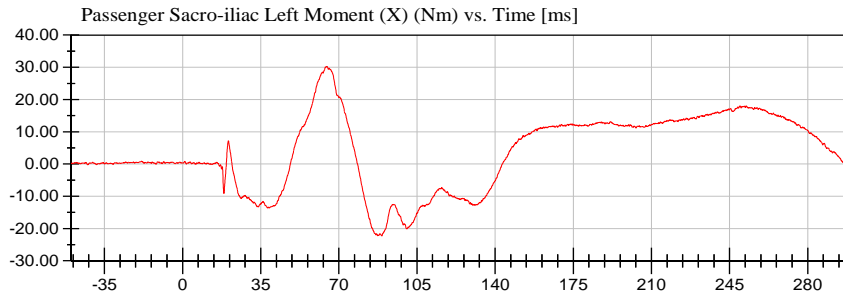
CFC_600



VRTC

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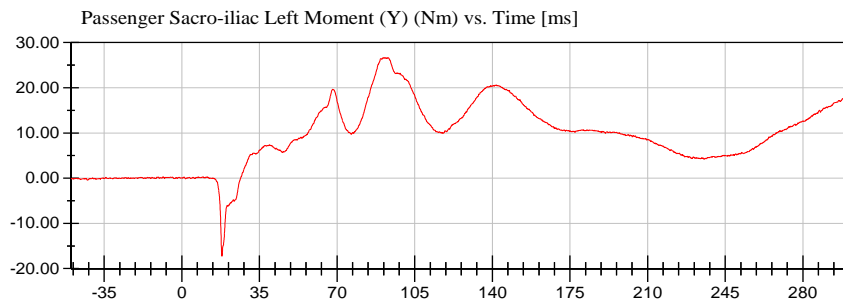
<Max>

30.29 Nm at 64.65 ms

<Min>

-22.29 Nm at 89.25 ms

CFC_600



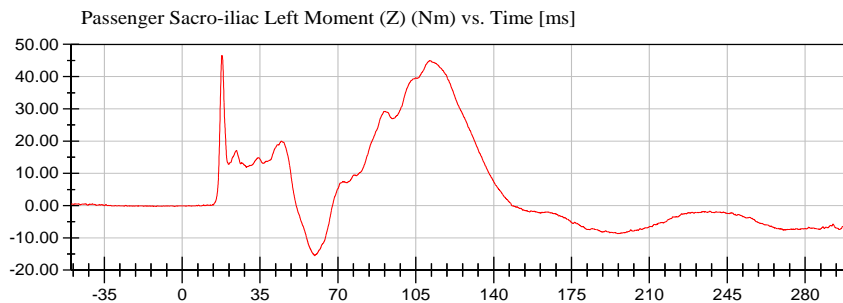
<Max>

26.65 Nm at 90.75 ms

<Min>

-17.27 Nm at 18.05 ms

CFC_600



<Max>

46.55 Nm at 17.90 ms

<Min>

-15.52 Nm at 59.55 ms

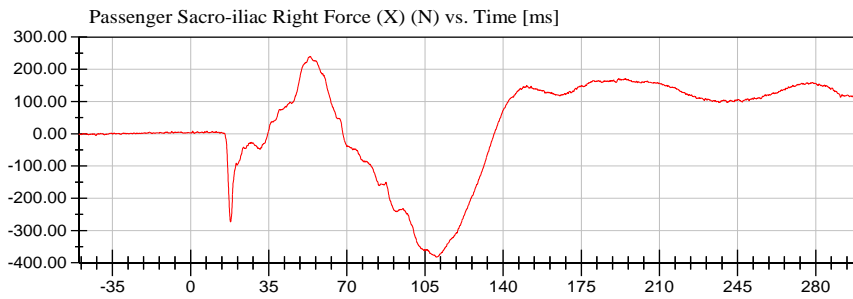
CFC_600



VRTC

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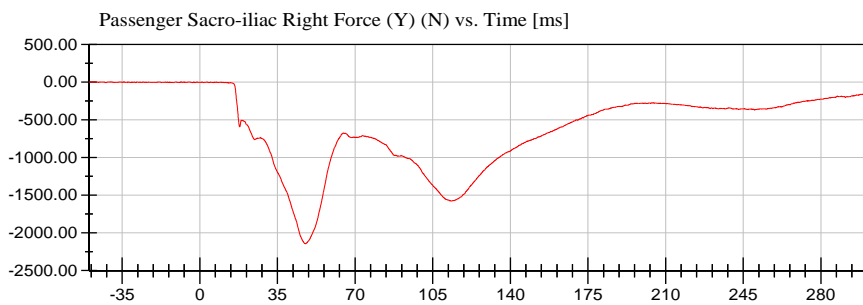
<Max>

239.98 N at 53.55 ms

<Min>

-382.60 N at 110.25 ms

CFC_600



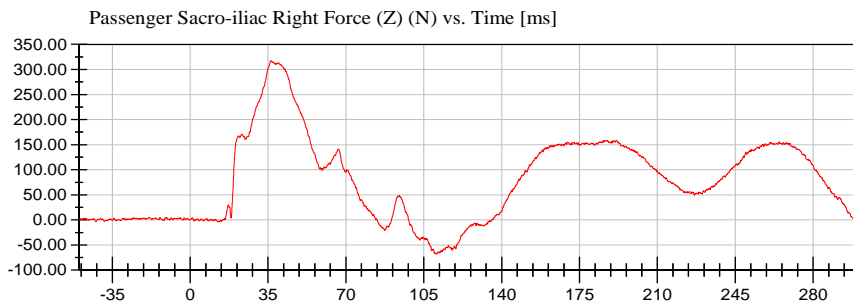
<Max>

4.74 N at -47.35 ms

<Min>

-2,143.91 N at 47.75 ms

CFC_600



<Max>

317.36 N at 36.60 ms

<Min>

-68.13 N at 110.80 ms

CFC_600

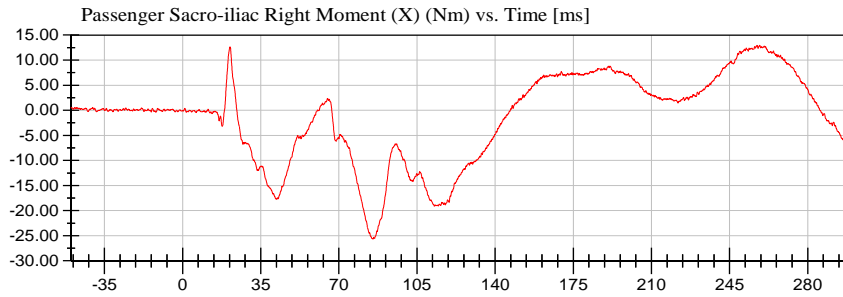


VRTC

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Test Lab: CTF

Test Number: 210415 ()



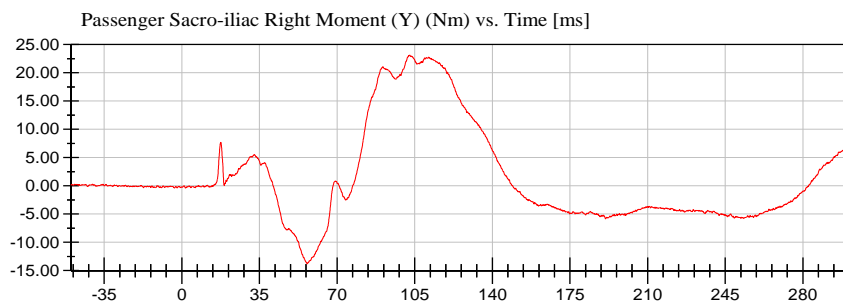
<Max>

12.96 Nm at 258.50 ms

<Min>

-25.68 Nm at 85.25 ms

CFC_600



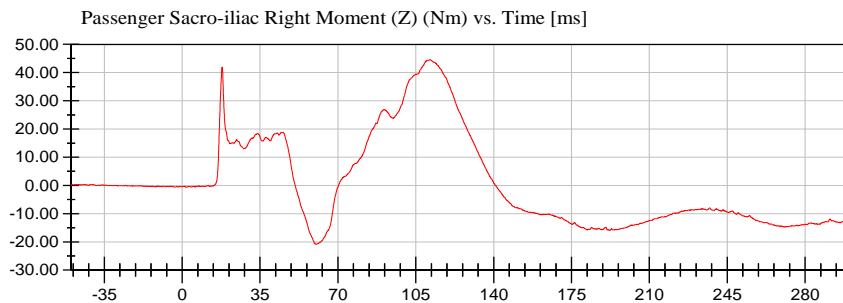
<Max>

23.12 Nm at 102.80 ms

<Min>

-13.80 Nm at 56.50 ms

CFC_600



<Max>

44.53 Nm at 111.40 ms

<Min>

-20.87 Nm at 60.15 ms

CFC_600

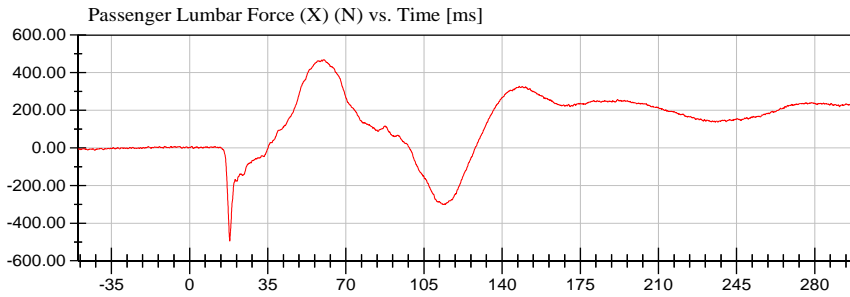


VRTC

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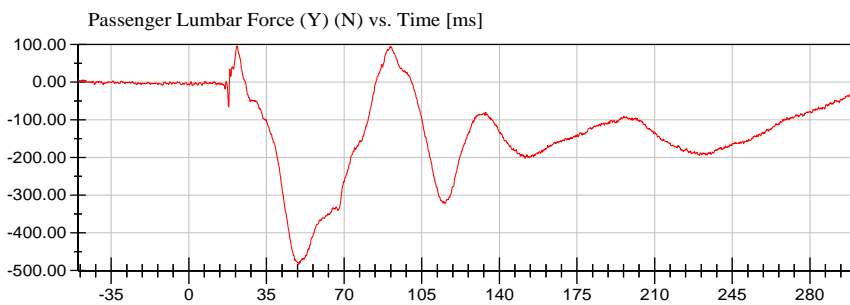
<Max>

468.58 N at 60.35 ms

<Min>

-495.17 N at 18.00 ms

CFC_600



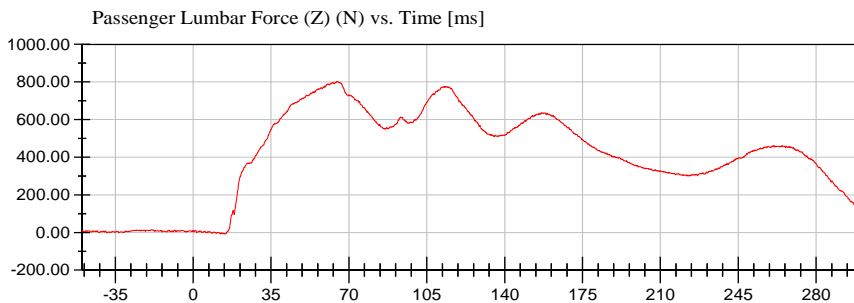
<Max>

96.34 N at 21.70 ms

<Min>

-483.11 N at 49.60 ms

CFC_600



<Max>

802.89 N at 64.85 ms

<Min>

-7.98 N at 12.35 ms

CFC_600

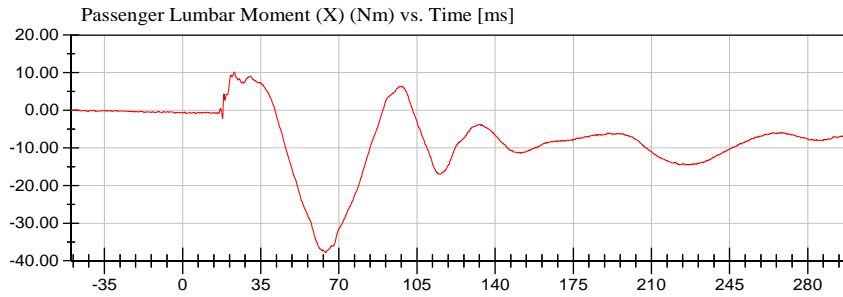


VRTC

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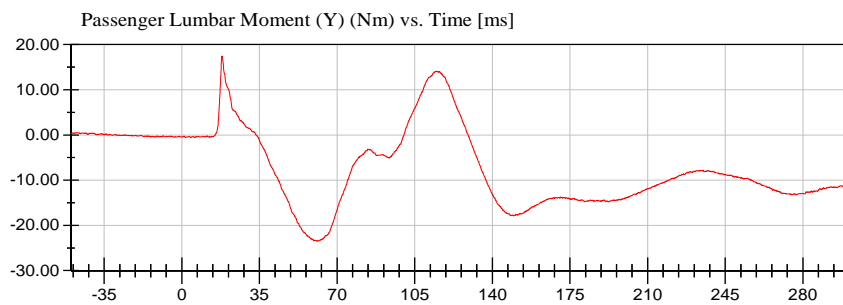
<Max>

10.13 Nm at 23.20 ms

<Min>

-37.79 Nm at 64.15 ms

CFC_600



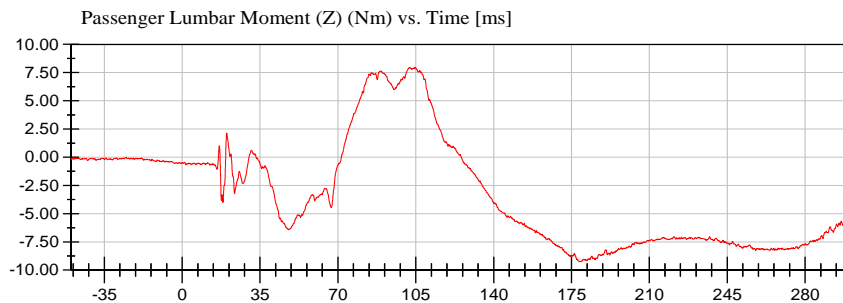
<Max>

17.42 Nm at 18.10 ms

<Min>

-23.49 Nm at 61.25 ms

CFC_600



<Max>

7.96 Nm at 102.20 ms

<Min>

-9.26 Nm at 178.65 ms

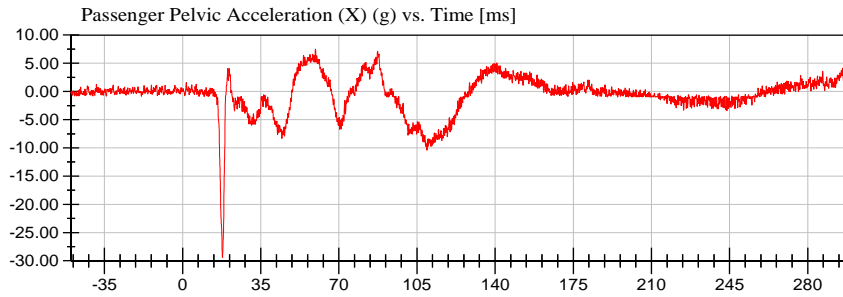
CFC_600



VRTC

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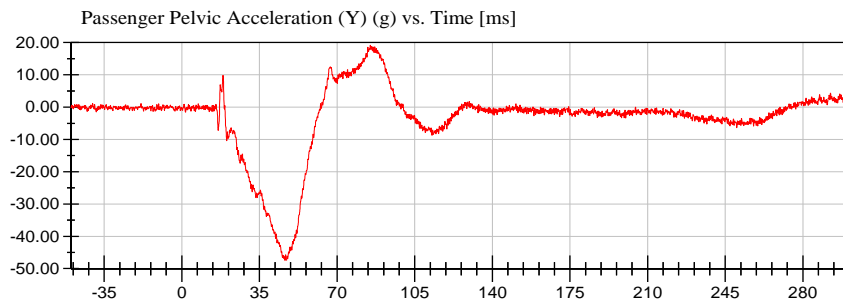
<Max>

7.50 g at 59.50 ms

<Min>

-29.40 g at 17.85 ms

CFC_1000



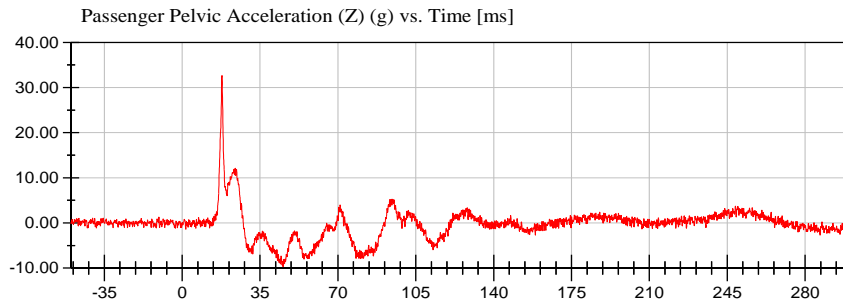
<Max>

19.19 g at 85.00 ms

<Min>

-47.47 g at 47.15 ms

CFC_1000



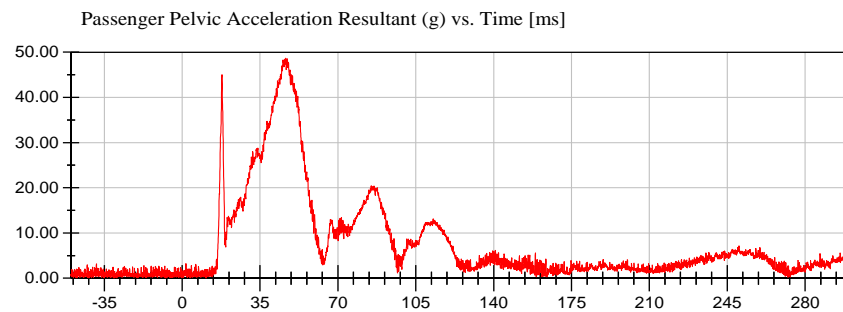
<Max>

32.67 g at 17.85 ms

<Min>

-9.71 g at 45.35 ms

CFC_1000



<Max>

48.69 g at 46.50 ms

<Min>

0.07 g at -48.80 ms

Prefiltered_> CFC 1000

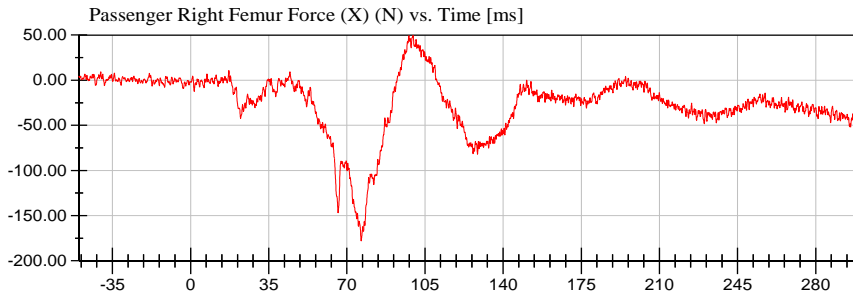


VRTC

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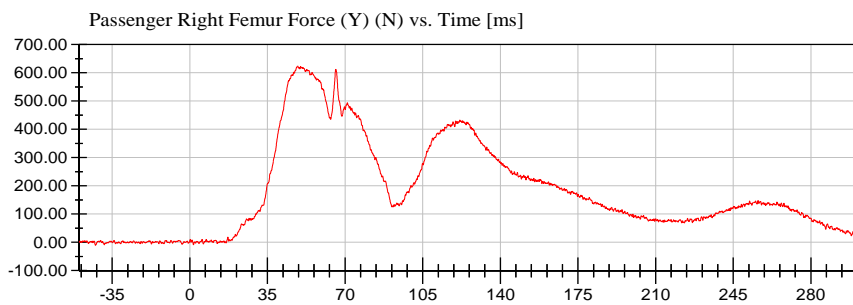
<Max>

49.59 N at 99.65 ms

<Min>

-177.82 N at 76.40 ms

CFC_600



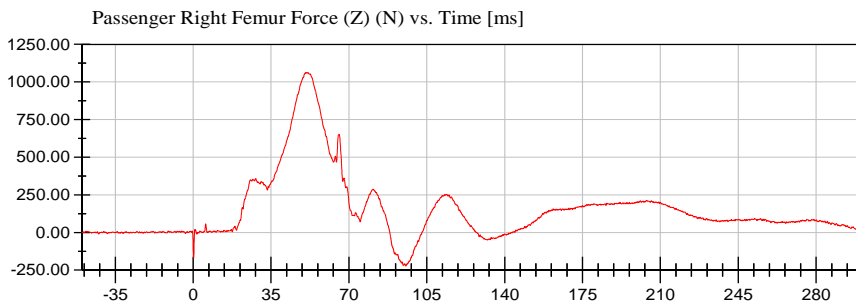
<Max>

623.94 N at 48.65 ms

<Min>

-10.08 N at -42.55 ms

CFC_600



<Max>

1,061.53 N at 51.60 ms

<Min>

-222.29 N at 95.60 ms

CFC_600

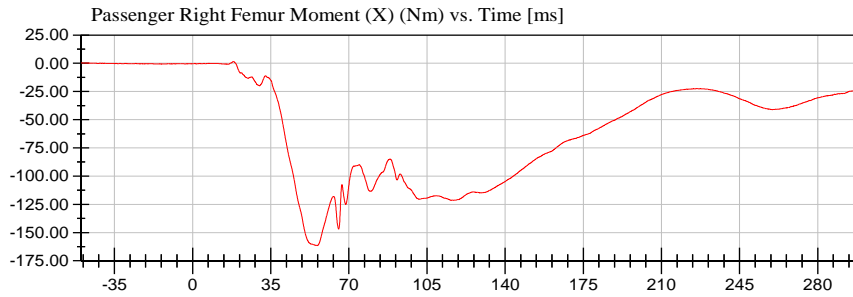


VRTC

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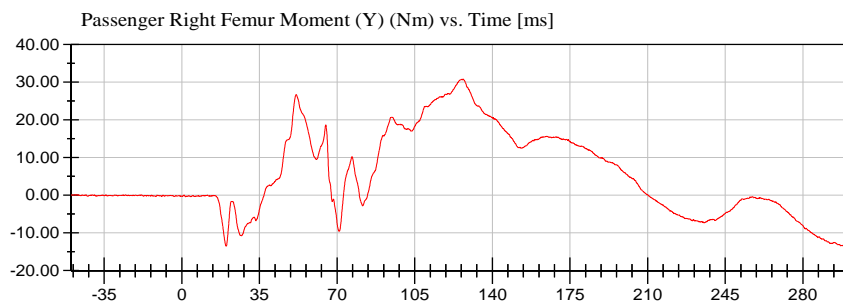
<Max>

1.55 Nm at 18.30 ms

<Min>

-161.50 Nm at 55.85 ms

CFC_600



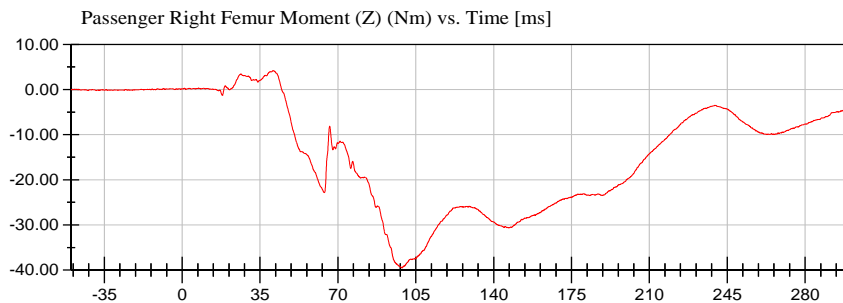
<Max>

30.86 Nm at 126.85 ms

<Min>

-13.50 Nm at 20.00 ms

CFC_600



<Max>

4.19 Nm at 40.80 ms

<Min>

-39.52 Nm at 98.80 ms

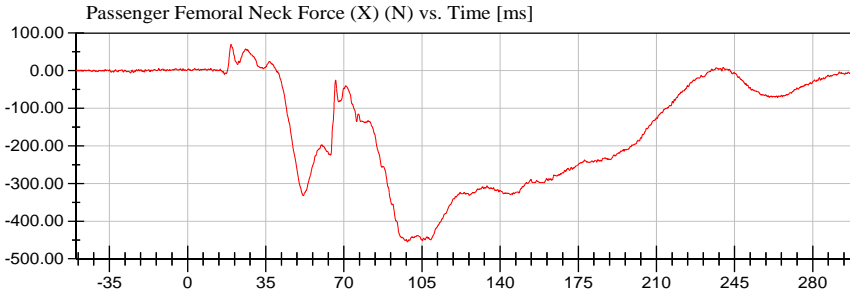
CFC_600



VRTC

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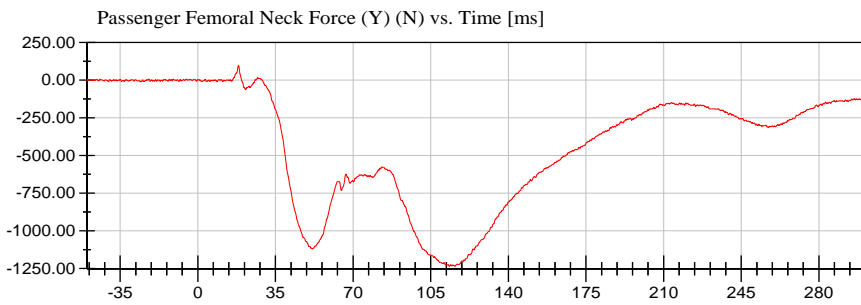
<Max>

69.84 N at 19.45 ms

<Min>

-454.85 N at 98.50 ms

CFC_600



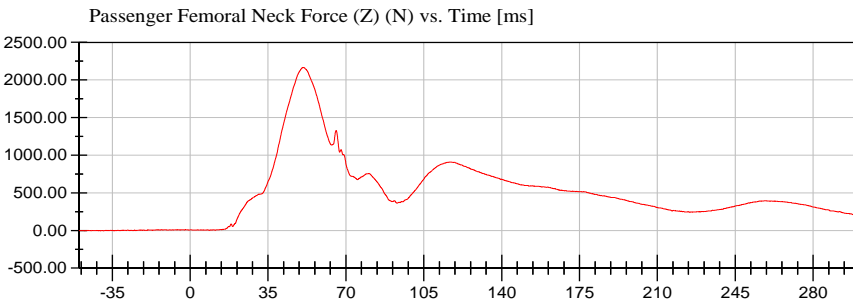
<Max>

96.35 N at 18.30 ms

<Min>

-1,234.82 N at 113.45 ms

CFC_600



<Max>

2,165.48 N at 50.70 ms

<Min>

-3.36 N at -38.90 ms

CFC_600

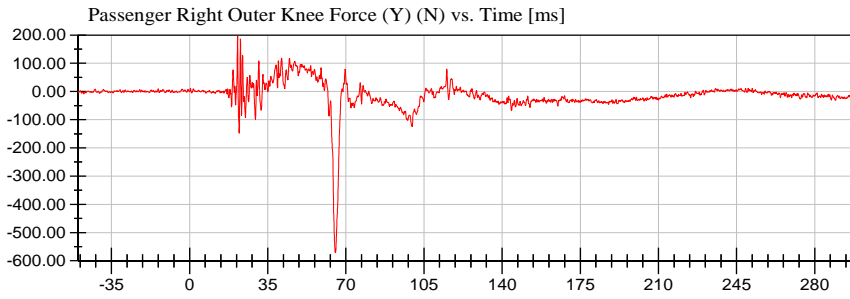


VRTC

Test Date: 04/15/2021

Test Lab: CTF

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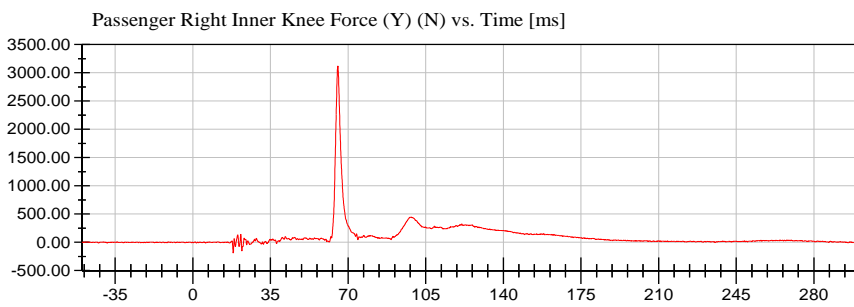
<Max>

194.80 N at 21.55 ms

<Min>

-570.93 N at 65.30 ms

CFC_600



<Max>

3,118.00 N at 65.40 ms

<Min>

-189.15 N at 18.20 ms

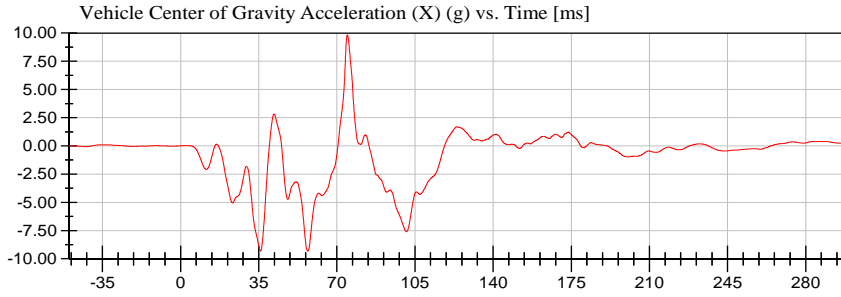
CFC_600



VRTC

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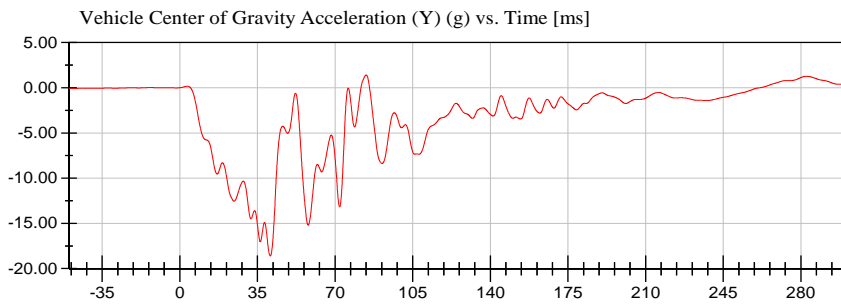
<Max>

9.83 g at 74.70 ms

<Min>

-9.32 g at 35.80 ms

CFC_60



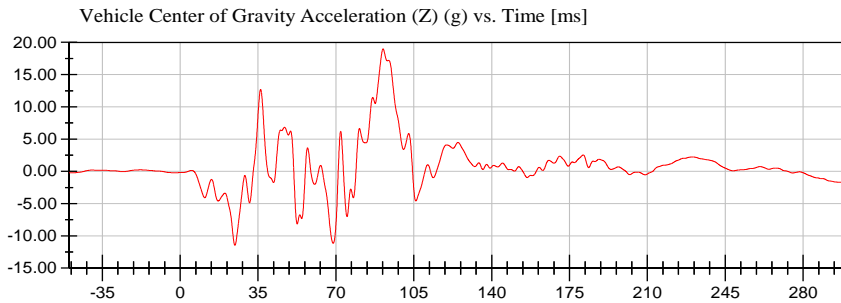
<Max>

1.41 g at 84.00 ms

<Min>

-18.61 g at 40.80 ms

CFC_60



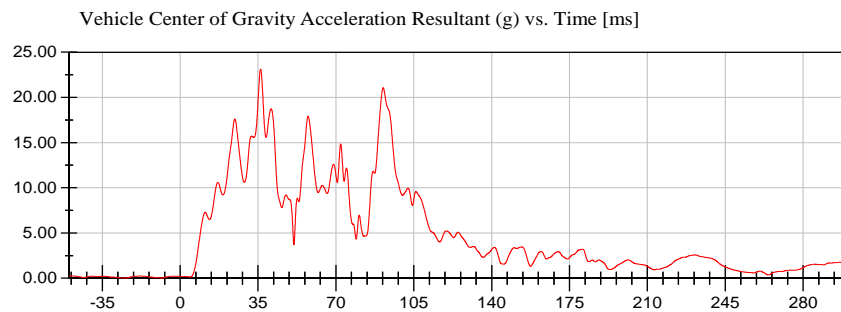
<Max>

18.98 g at 91.20 ms

<Min>

-11.46 g at 24.60 ms

CFC_60



<Max>

23.13 g at 36.15 ms

<Min>

0.01 g at -8.05 ms

CFC_60

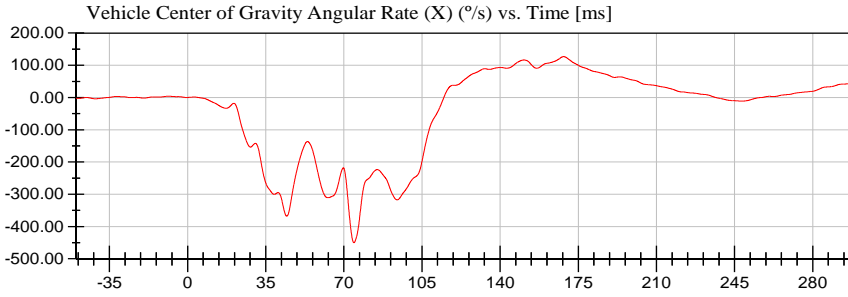


VRTC

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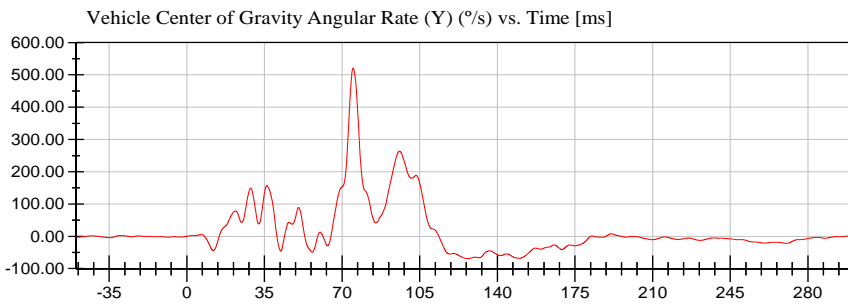
<Max>

126.82 °/s at 168.50 ms

<Min>

-450.23 °/s at 74.55 ms

CFC_60



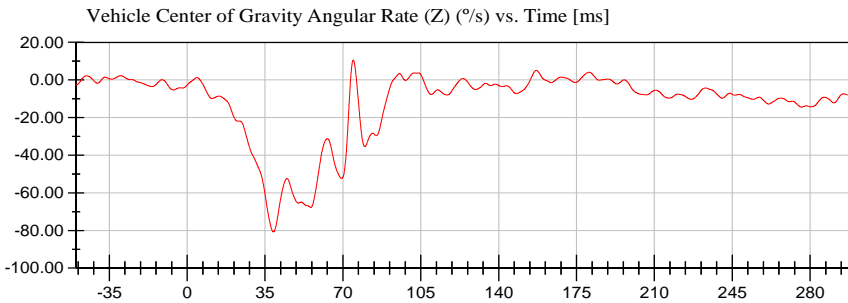
<Max>

520.64 °/s at 74.95 ms

<Min>

-69.19 °/s at 126.50 ms

CFC_60



<Max>

10.56 °/s at 74.65 ms

<Min>

-80.73 °/s at 38.75 ms

CFC_60

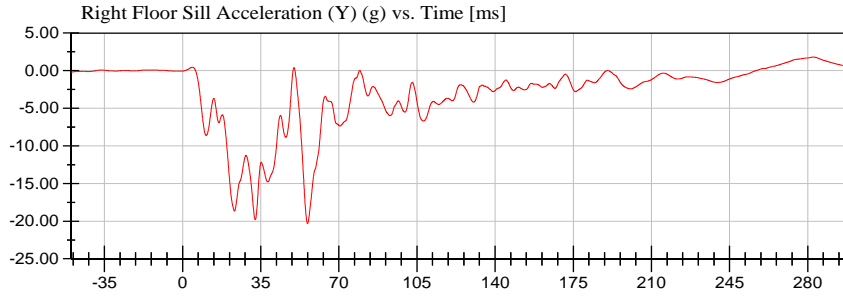


VRTC

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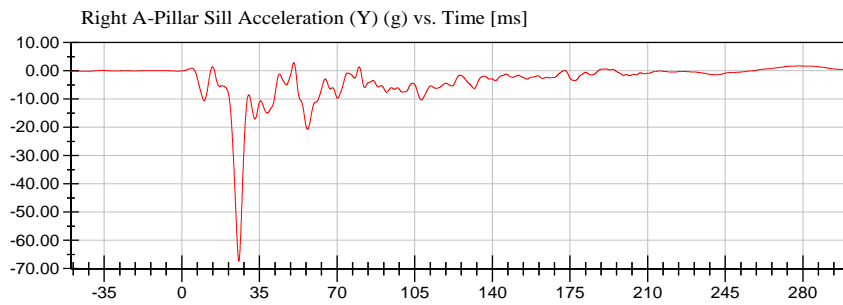
<Max>

1.81 g at 282.50 ms

<Min>

-20.33 g at 56.00 ms

CFC_60



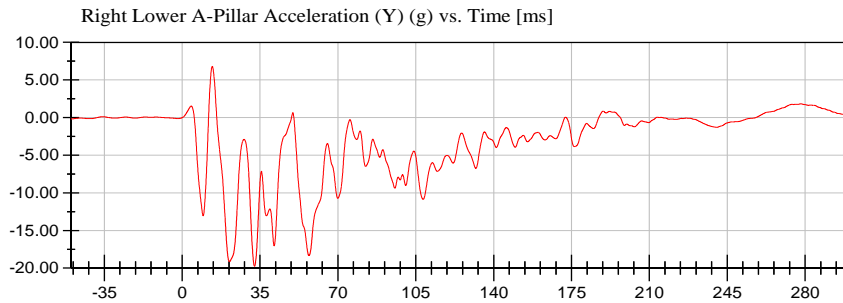
<Max>

2.90 g at 50.50 ms

<Min>

-67.46 g at 25.70 ms

CFC_60



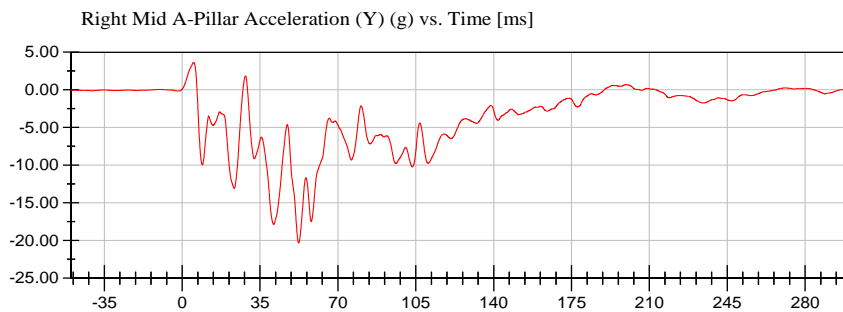
<Max>

6.81 g at 13.50 ms

<Min>

-19.75 g at 32.50 ms

CFC_60



<Max>

3.62 g at 5.20 ms

<Min>

-20.33 g at 52.35 ms

CFC_60

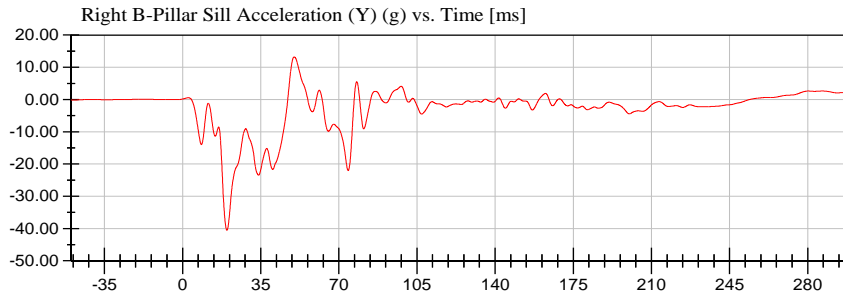


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



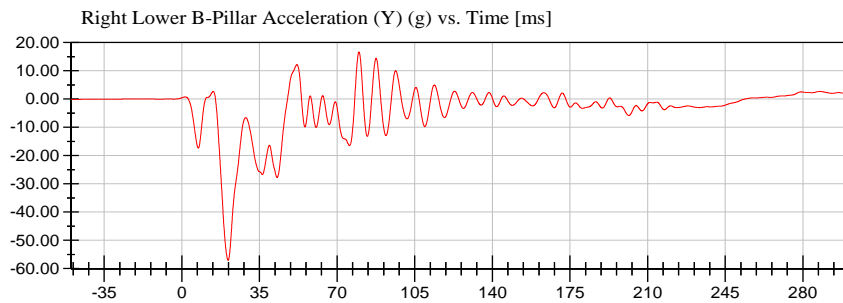
<Max>

13.21 g at 50.05 ms

<Min>

-40.55 g at 19.85 ms

CFC_60



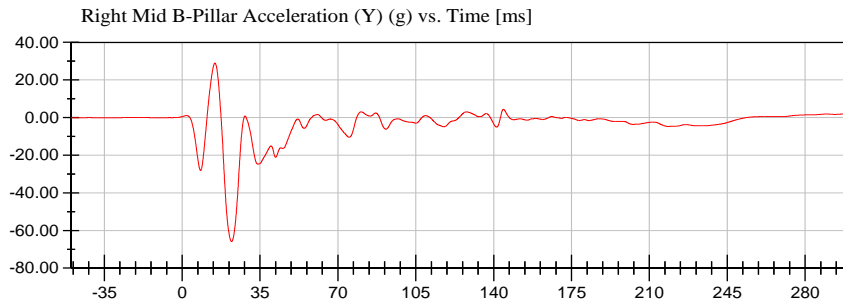
<Max>

16.71 g at 79.85 ms

<Min>

-57.06 g at 20.90 ms

CFC_60



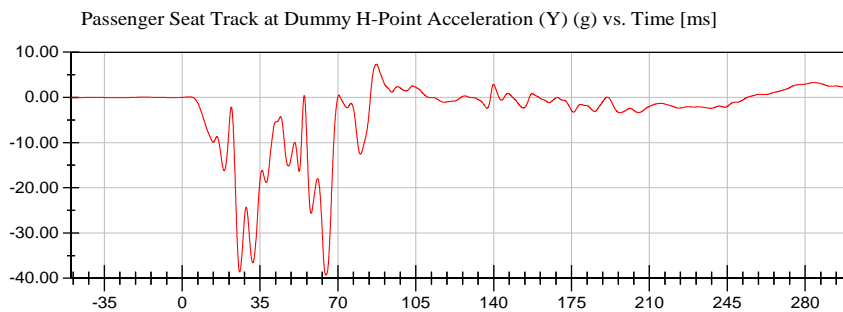
<Max>

28.95 g at 14.70 ms

<Min>

-65.87 g at 22.25 ms

CFC_60



<Max>

7.33 g at 87.25 ms

<Min>

-39.31 g at 64.60 ms

CFC_60

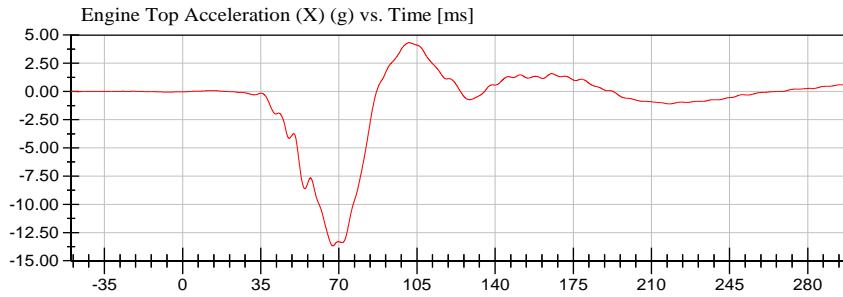


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



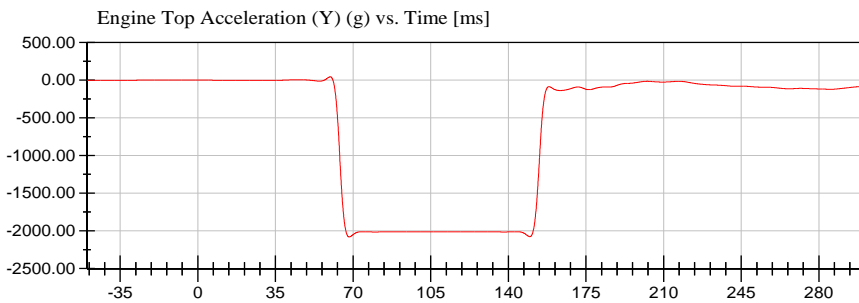
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4.32 g at 101.50 ms

<Min>

-13.68 g at 67.30 ms

CFC_60



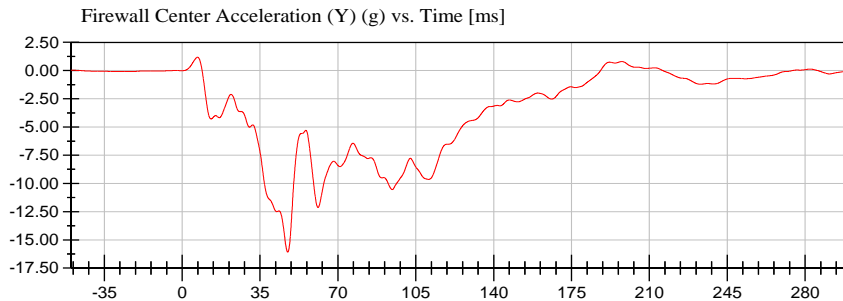
<Max>

45.43 g at 59.70 ms

<Min>

-2,079.99 g at 68.25 ms

CFC_60



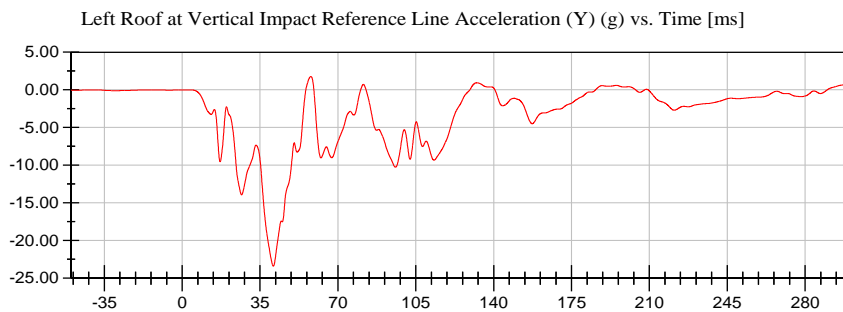
<Max>

1.18 g at 6.90 ms

<Min>

-16.08 g at 47.45 ms

CFC_60



<Max>

1.77 g at 57.85 ms

<Min>

-23.40 g at 41.00 ms

CFC_60

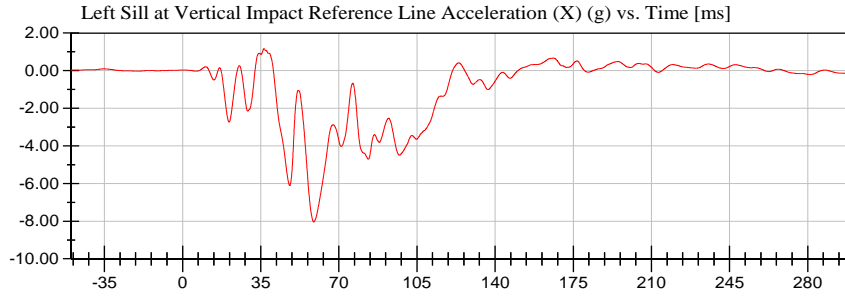


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



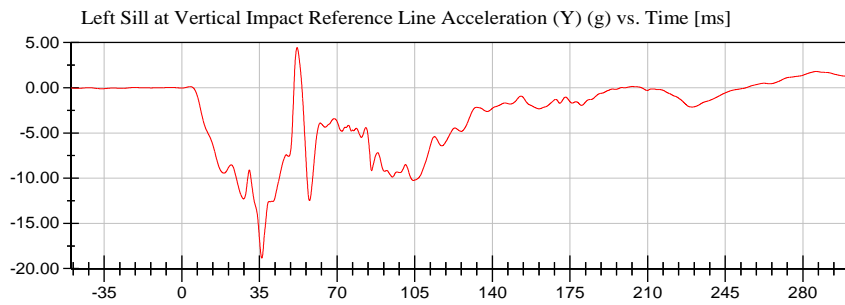
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1.17 g at 36.45 ms

<Min>

-8.04 g at 58.75 ms

CFC_60



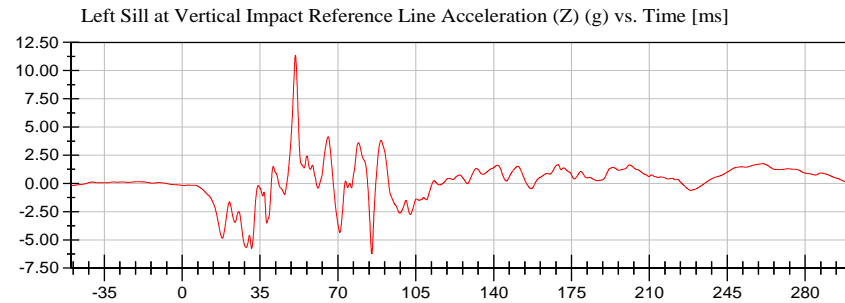
<Max>

4.46 g at 52.00 ms

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-18.84 g at 36.05 ms

CFC_60



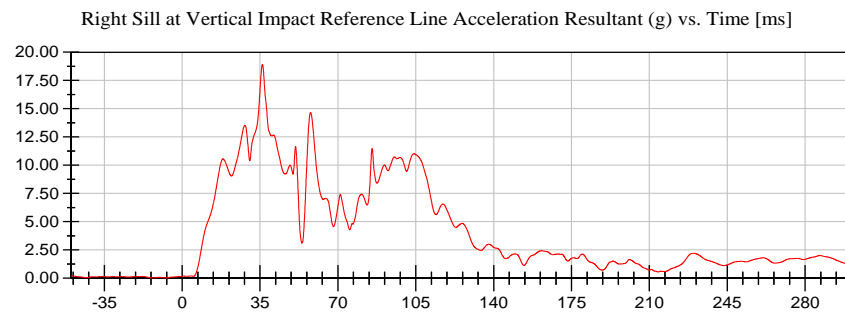
<Max>

11.36 g at 50.90 ms

<Min>

-6.22 g at 85.25 ms

CFC_60



<Max>

18.90 g at 36.05 ms

<Min>

0.02 g at -7.15 ms

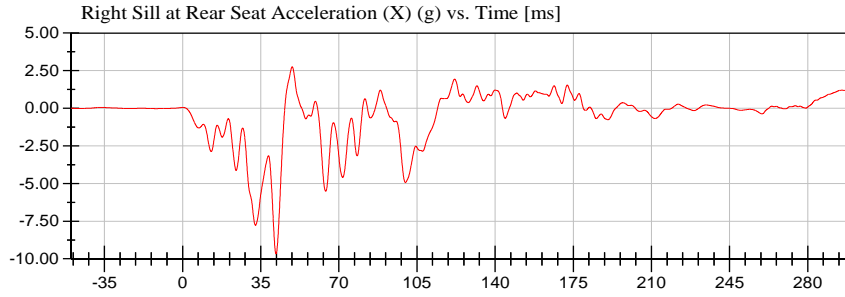
CFC_60



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



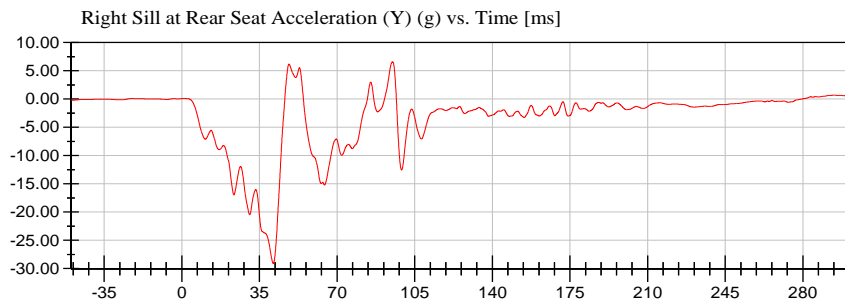
<Max>

2.76 g at 49.10 ms

<Min>

-9.66 g at 41.85 ms

CFC_60



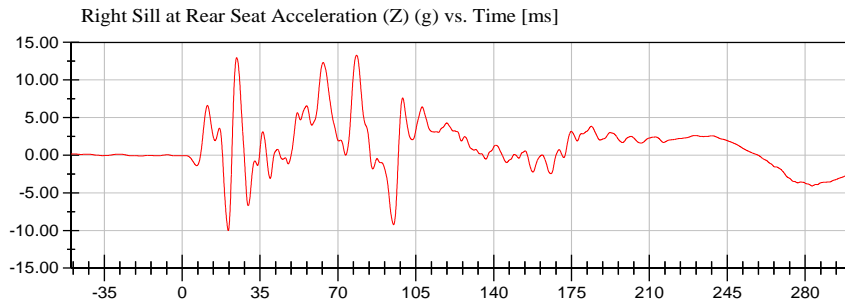
<Max>

6.61 g at 95.00 ms

<Min>

-29.11 g at 41.20 ms

CFC_60



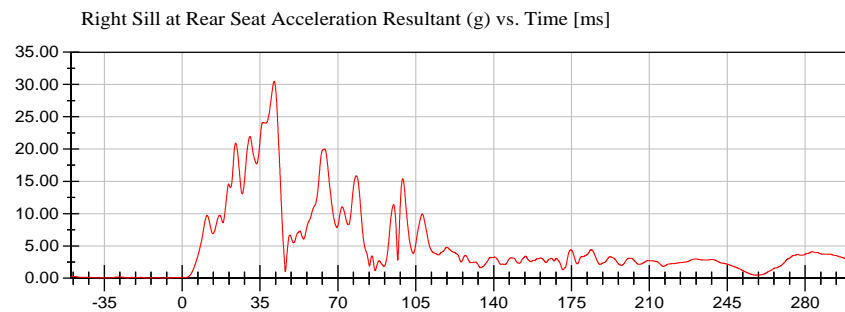
<Max>

13.28 g at 78.40 ms

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-10.02 g at 20.70 ms

CFC_60



<Max>

30.51 g at 41.35 ms

<Min>

0.00 g at -5.25 ms

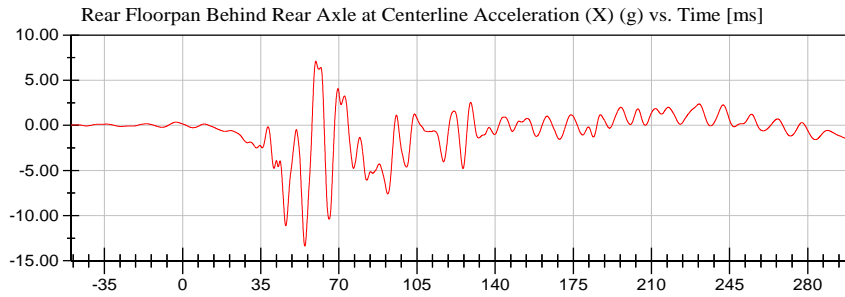
CFC_60



VRTC

Test Lab: CTF
Test Number: 210415 ()

Test Date: 04/15/2021



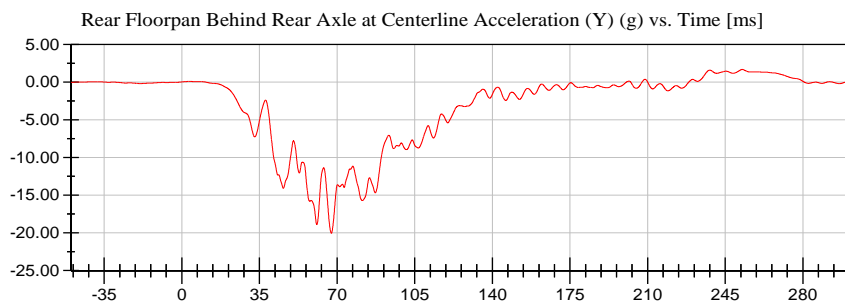
<Max>

7.11 g at 59.70 ms

<Min>

-13.38 g at 54.75 ms

CFC_60



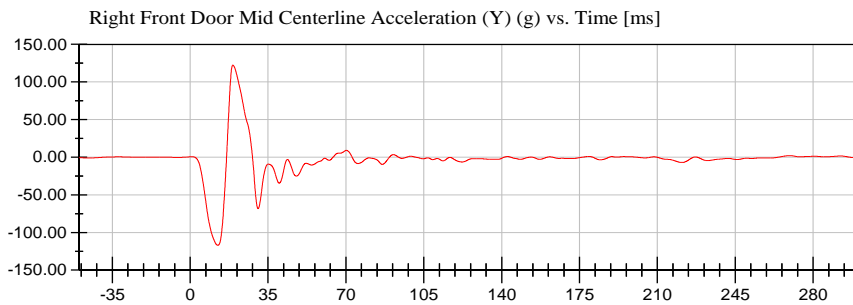
<Max>

1.70 g at 252.65 ms

<Min>

-20.05 g at 67.40 ms

CFC_60



<Max>

122.32 g at 19.20 ms

<Min>

-116.97 g at 12.50 ms

CFC_60



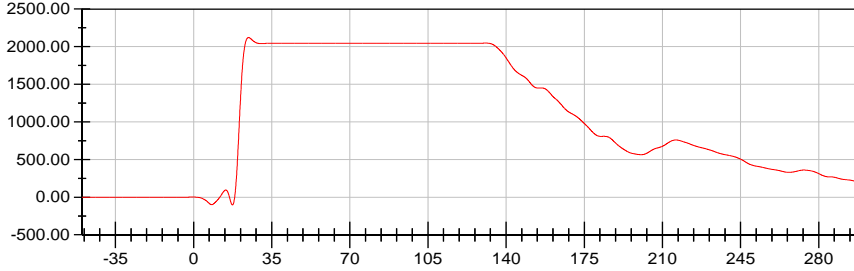
VRTC

Test Lab: CTF

Test Number: 210415 ()

Test Date: 04/15/2021

Right Front Door Mid Rear Acceleration (Y) (g) vs. Time [ms]



<Max>

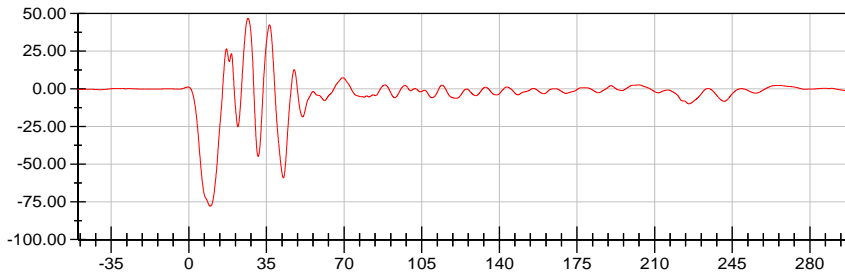
2,121.30 g at 24.60 ms

<Min>

-103.74 g at 17.40 ms

CFC_60

Right Front Door Upper Centerline Acceleration (Y) (g) vs. Time [ms]



<Max>

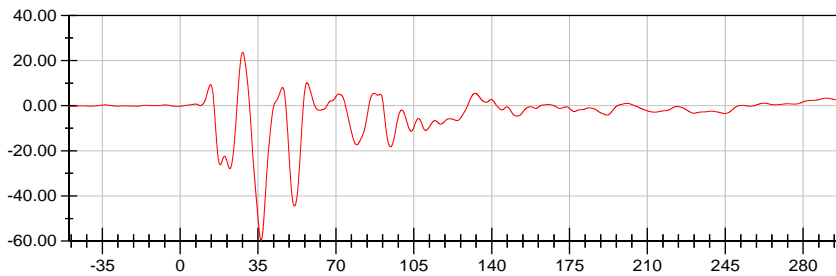
46.80 g at 26.70 ms

<Min>

-77.82 g at 9.65 ms

CFC_60

Right Rear Door Mid Rear Acceleration (Y) (g) vs. Time [ms]



<Max>

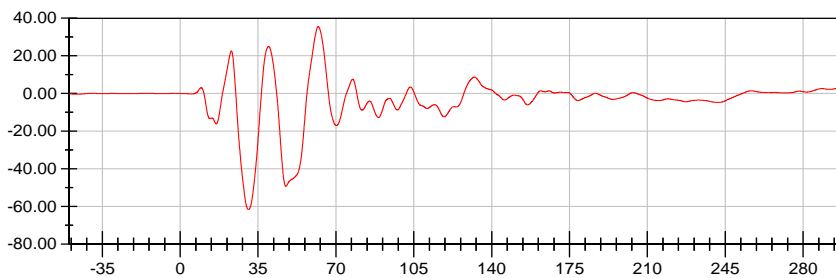
23.64 g at 28.10 ms

<Min>

-59.71 g at 36.35 ms

CFC_60

Right Rear Door Upper Centerline Acceleration (Y) (g) vs. Time [ms]



<Max>

35.58 g at 62.05 ms

<Min>

-61.60 g at 30.70 ms

CFC_60

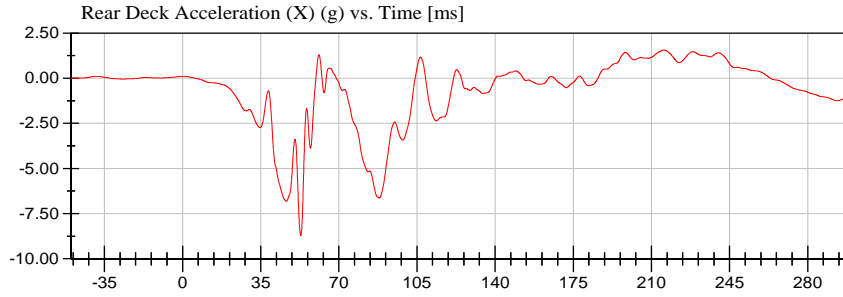


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



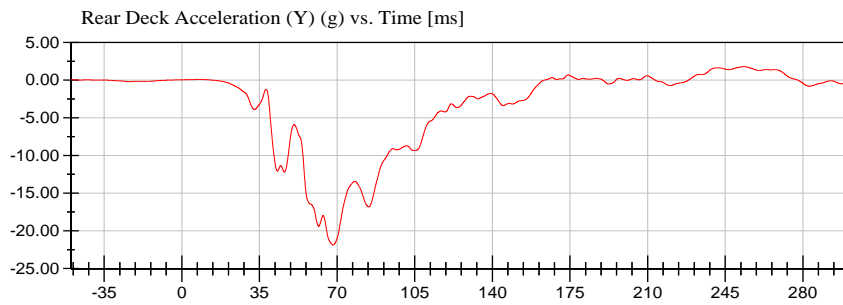
<Max>

1.56 g at 215.70 ms

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-8.73 g at 52.95 ms

CFC_60



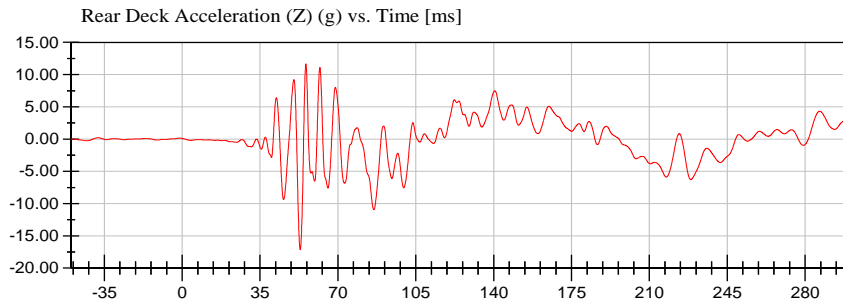
<Max>

1.80 g at 253.50 ms

<Min>

-21.87 g at 68.10 ms

CFC_60



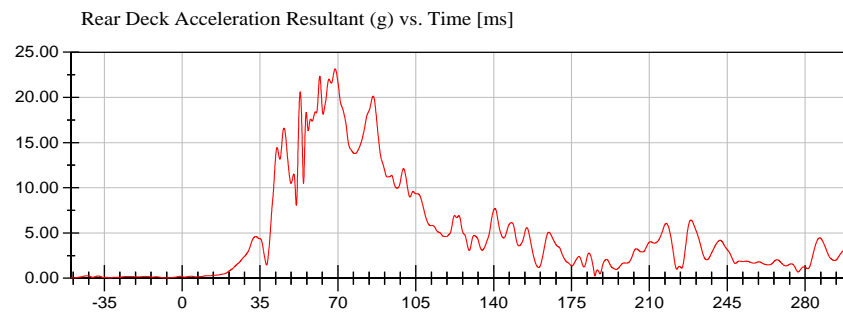
<Max>

11.65 g at 55.60 ms

<Min>

-17.12 g at 53.05 ms

CFC_60



<Max>

23.17 g at 68.75 ms

<Min>

0.01 g at -32.45 ms

CFC_60

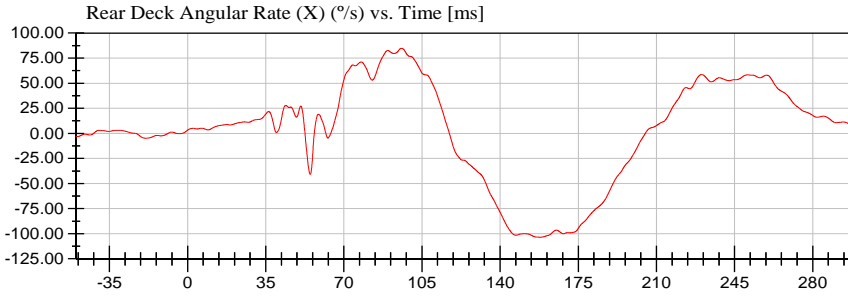


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



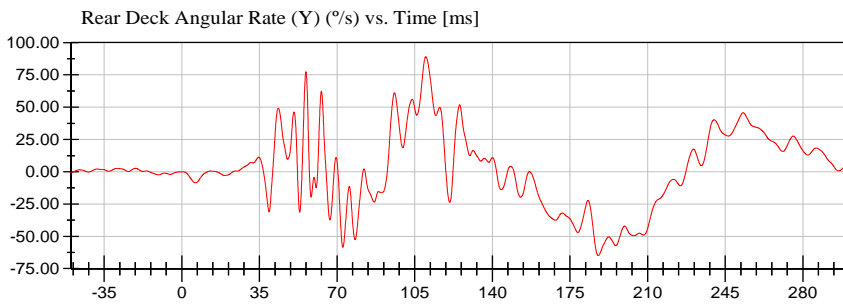
<Max>

84.77 °/s at 95.90 ms

<Min>

-103.47 °/s at 157.90 ms

CFC_60



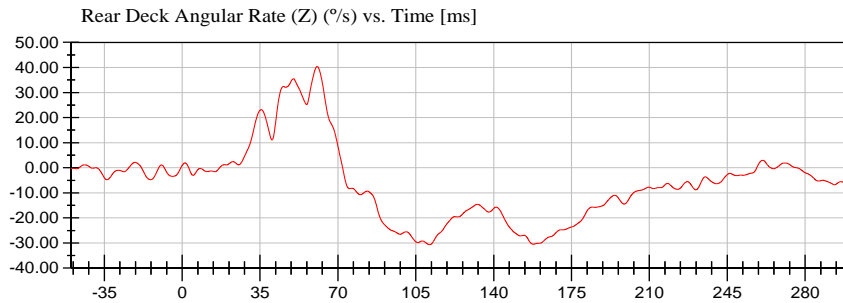
<Max>

89.05 °/s at 110.00 ms

<Min>

-64.91 °/s at 187.75 ms

CFC_60



<Max>

40.39 °/s at 60.70 ms

<Min>

-30.66 °/s at 111.20 ms

CFC_60



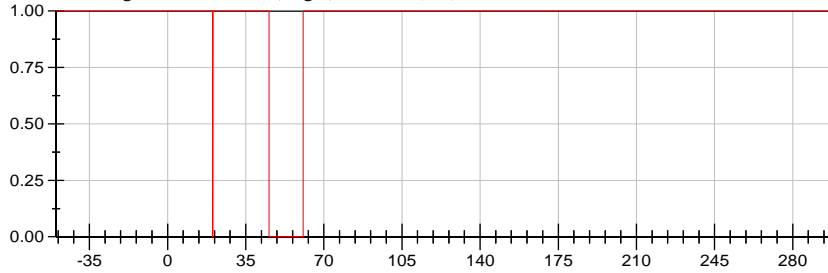
VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()

Passenger Head Contact (Logic) vs. Time [ms]



<Max>

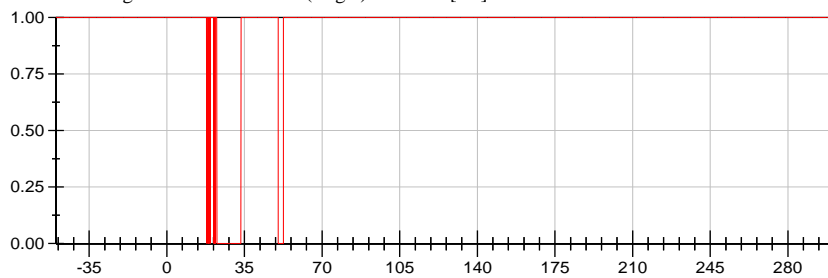
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 20.20 ms

Unfiltered

Passenger Shoulder Contact (Logic) vs. Time [ms]



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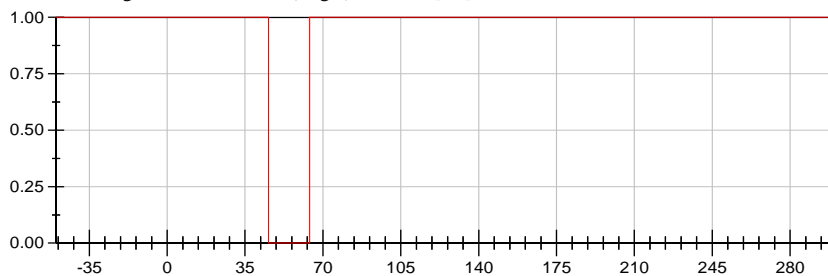
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 17.95 ms

Unfiltered

Passenger Thorax Contact (Logic) vs. Time [ms]



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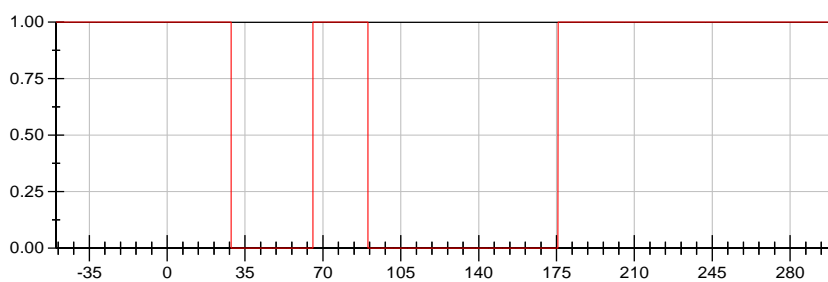
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 45.55 ms

Unfiltered

Passenger Pelvis Contact (Logic) vs. Time [ms]



<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 28.75 ms

Unfiltered

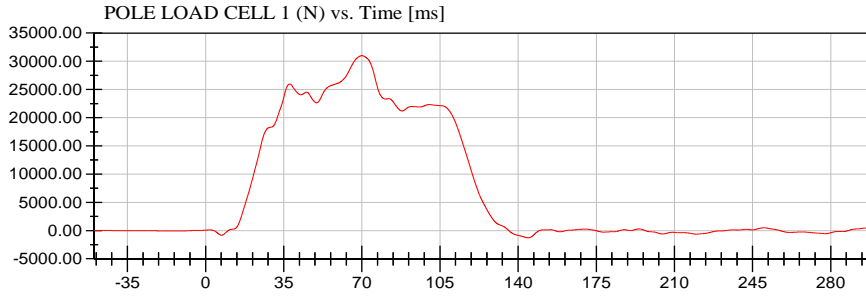


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



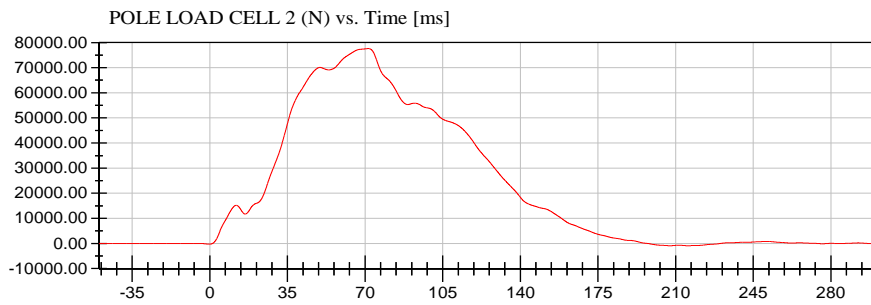
<Max>

30,990.41 N at 70.00 ms

<Min>

-1,279.38 N at 144.45 ms

CFC_60



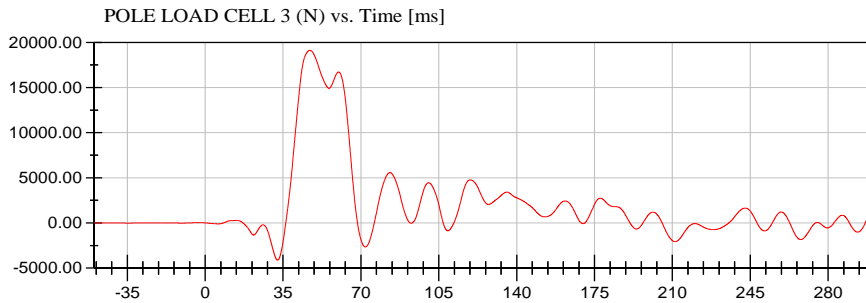
<Max>

77,591.80 N at 71.45 ms

<Min>

-910.37 N at 207.50 ms

CFC_60



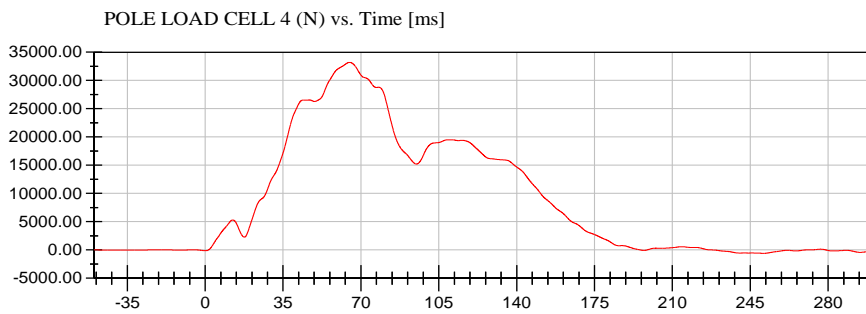
<Max>

19,111.92 N at 47.05 ms

<Min>

-4,122.48 N at 32.55 ms

CFC_60



<Max>

33,193.00 N at 64.90 ms

<Min>

-603.55 N at 251.00 ms

CFC_60

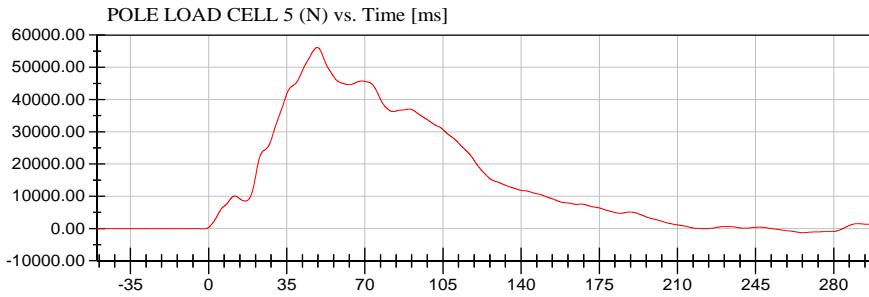


VRTC

Test Date: 04/15/2021

Test Lab: CTF

Test Number: 210415 ()



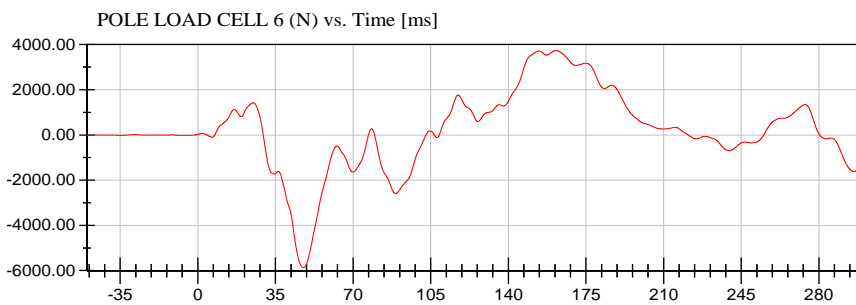
<Max>

56,148.12 N at 48.70 ms

<Min>

-1,268.06 N at 266.25 ms

CFC_60



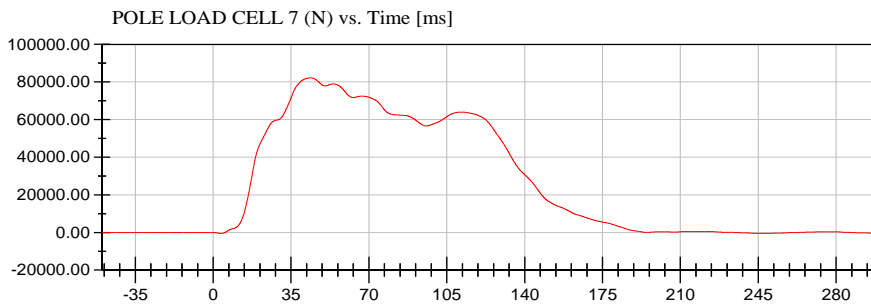
<Max>

3,739.18 N at 161.40 ms

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-5,874.63 N at 47.65 ms

CFC_60



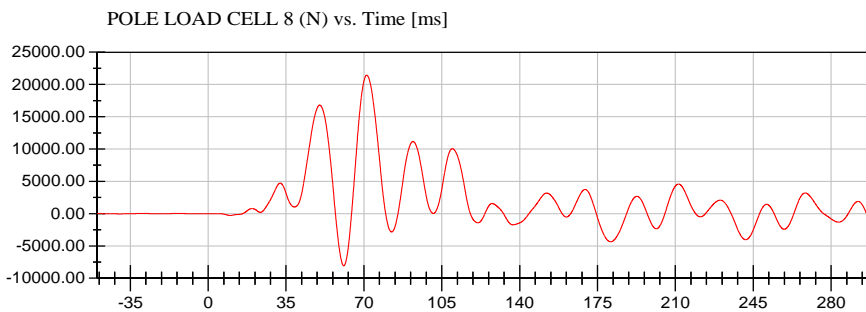
<Max>

82,170.90 N at 43.70 ms

<Min>

-496.81 N at 248.50 ms

CFC_60



<Max>

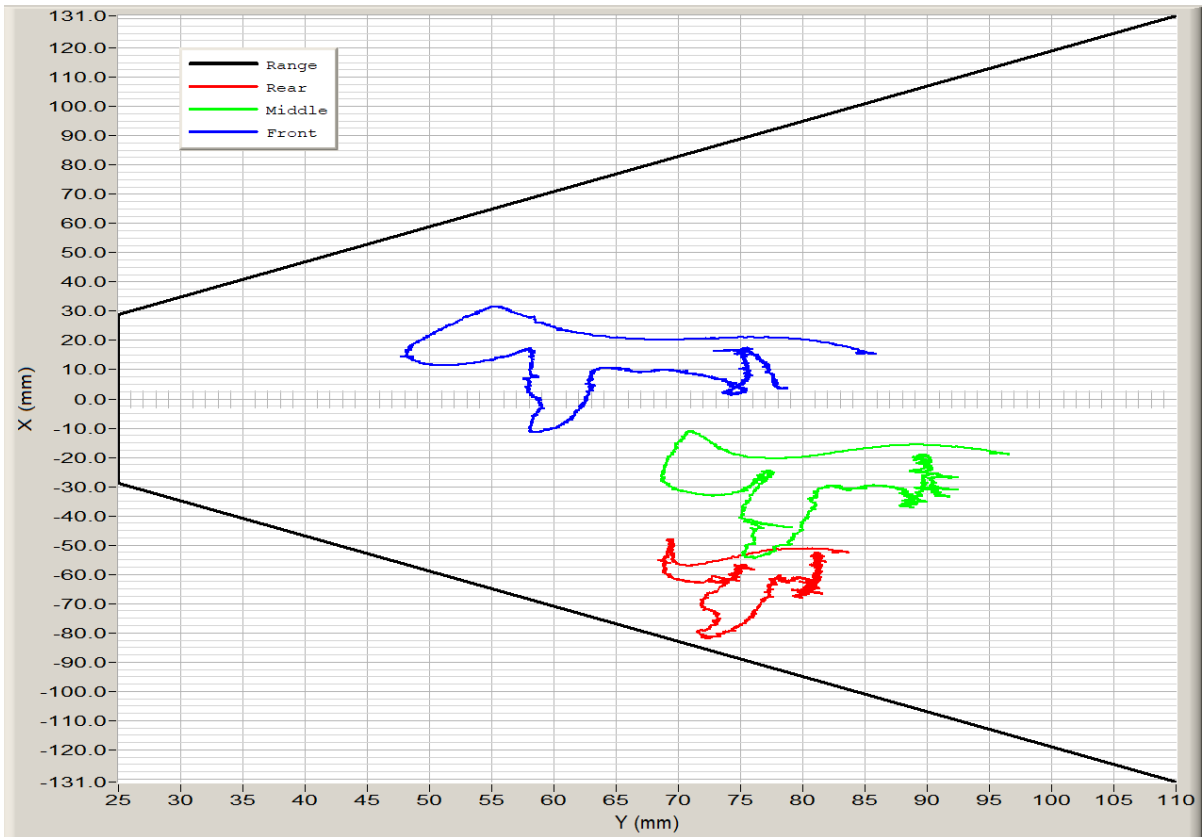
21,443.97 N at 71.25 ms

<Min>

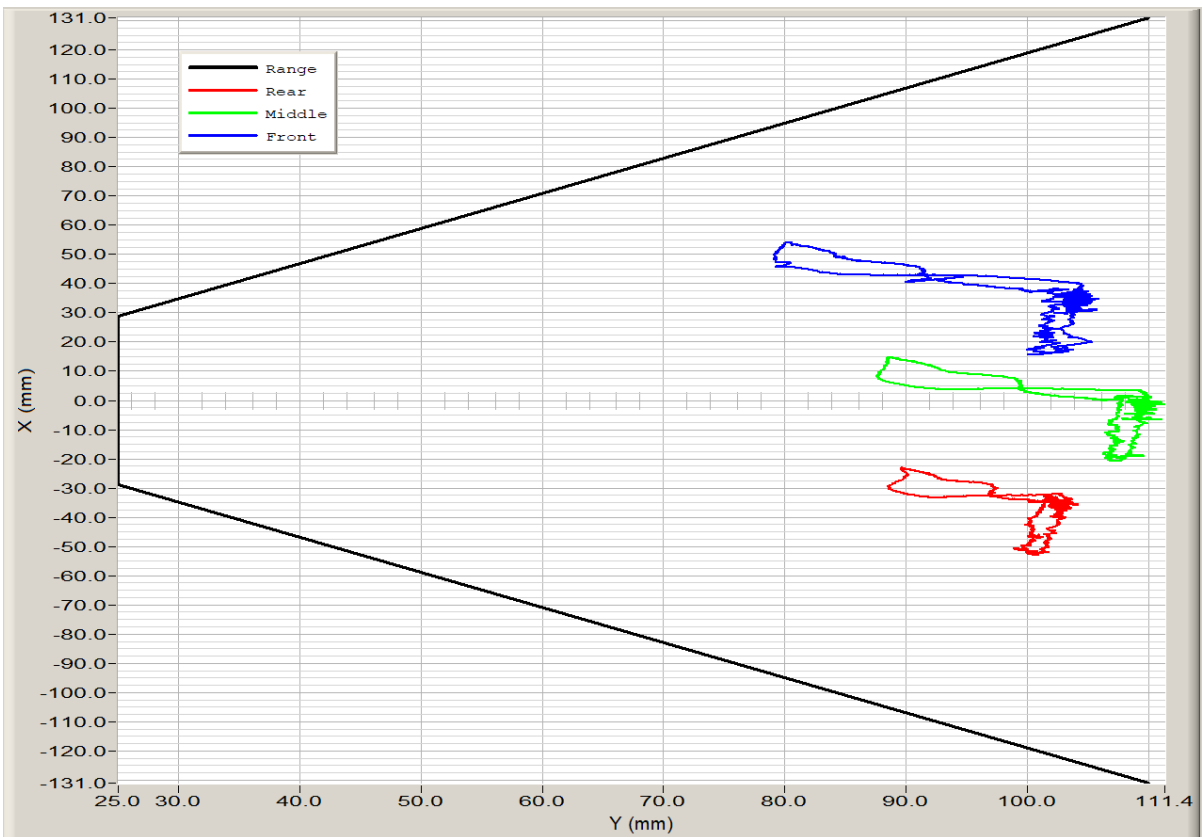
-8,076.49 N at 60.95 ms

CFC_60

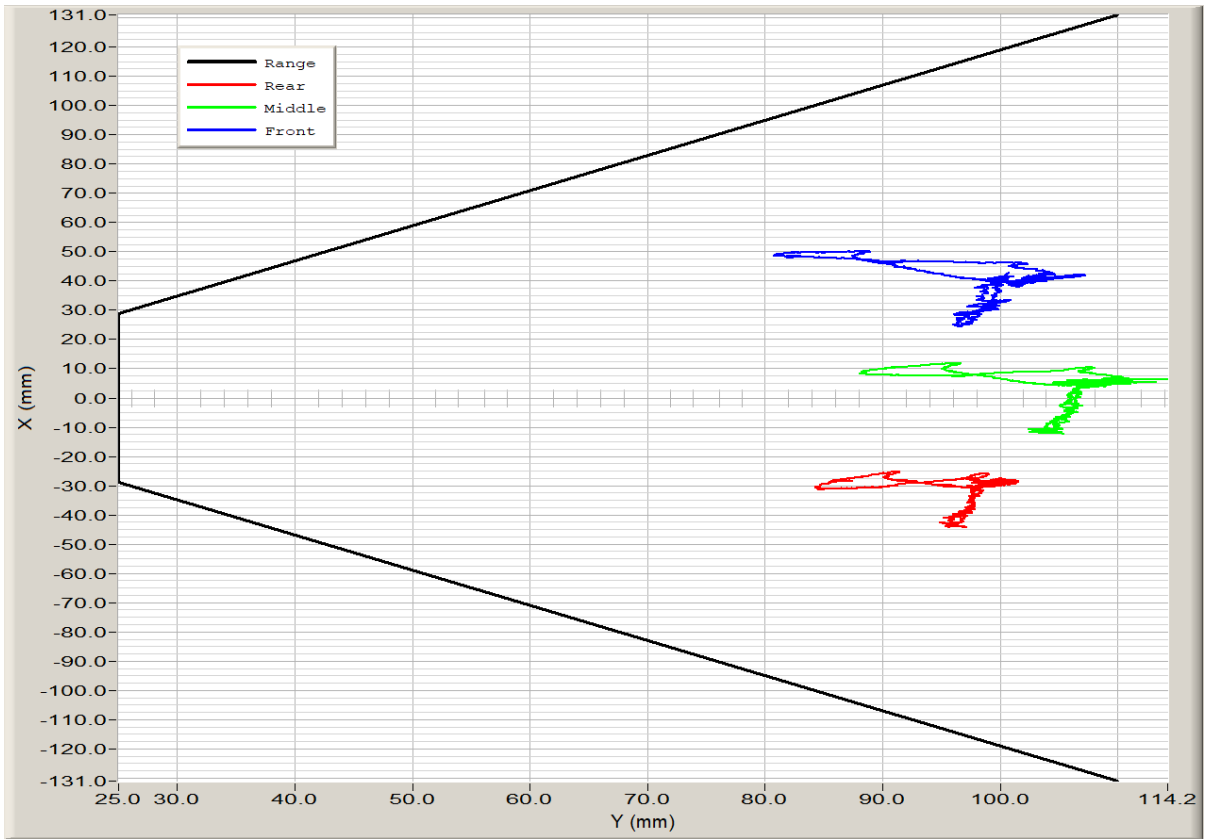




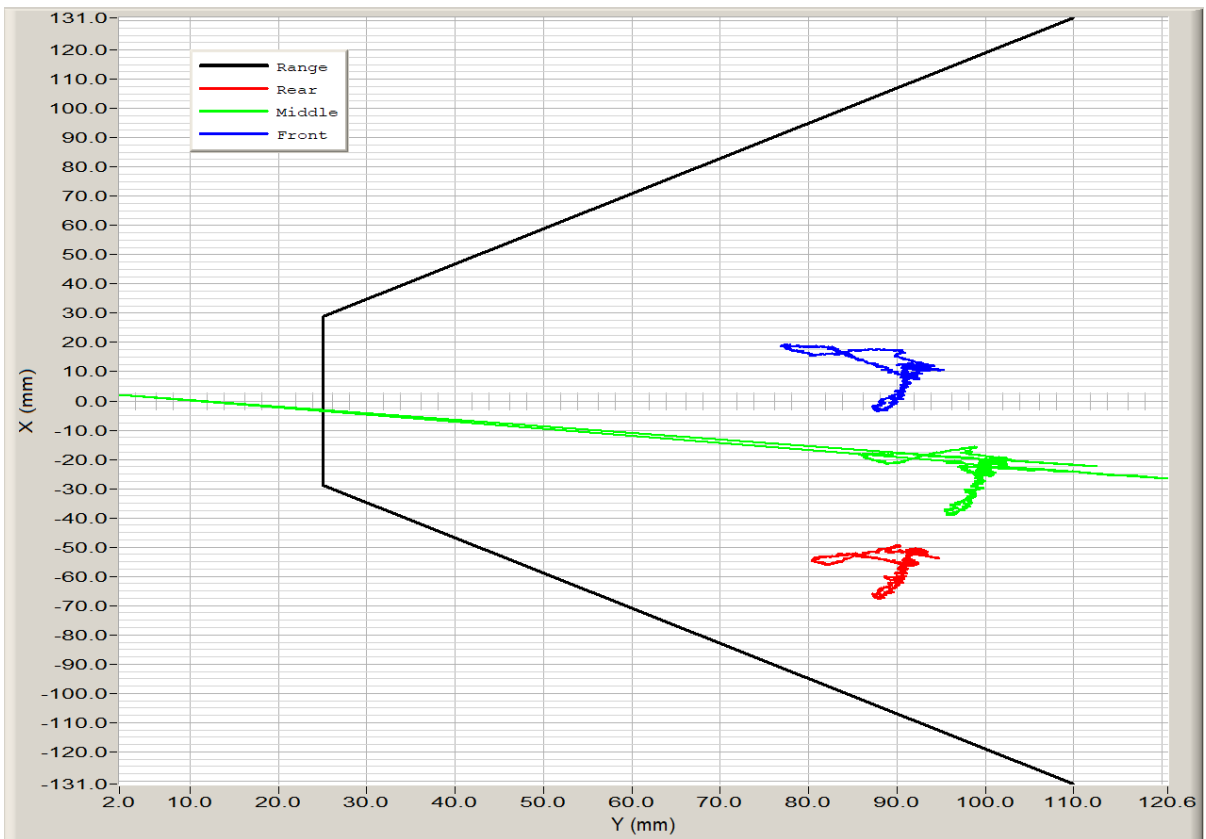
Shoulder_XY



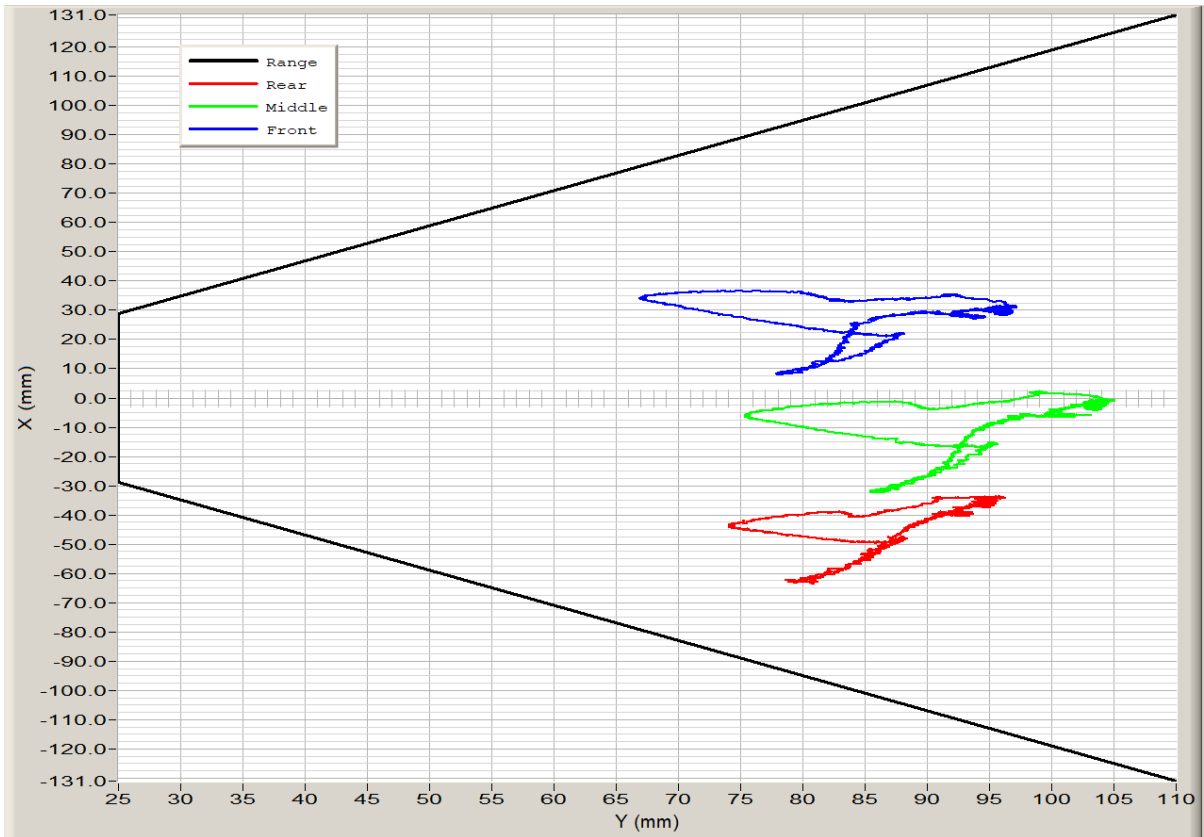
Thorax_1_XY



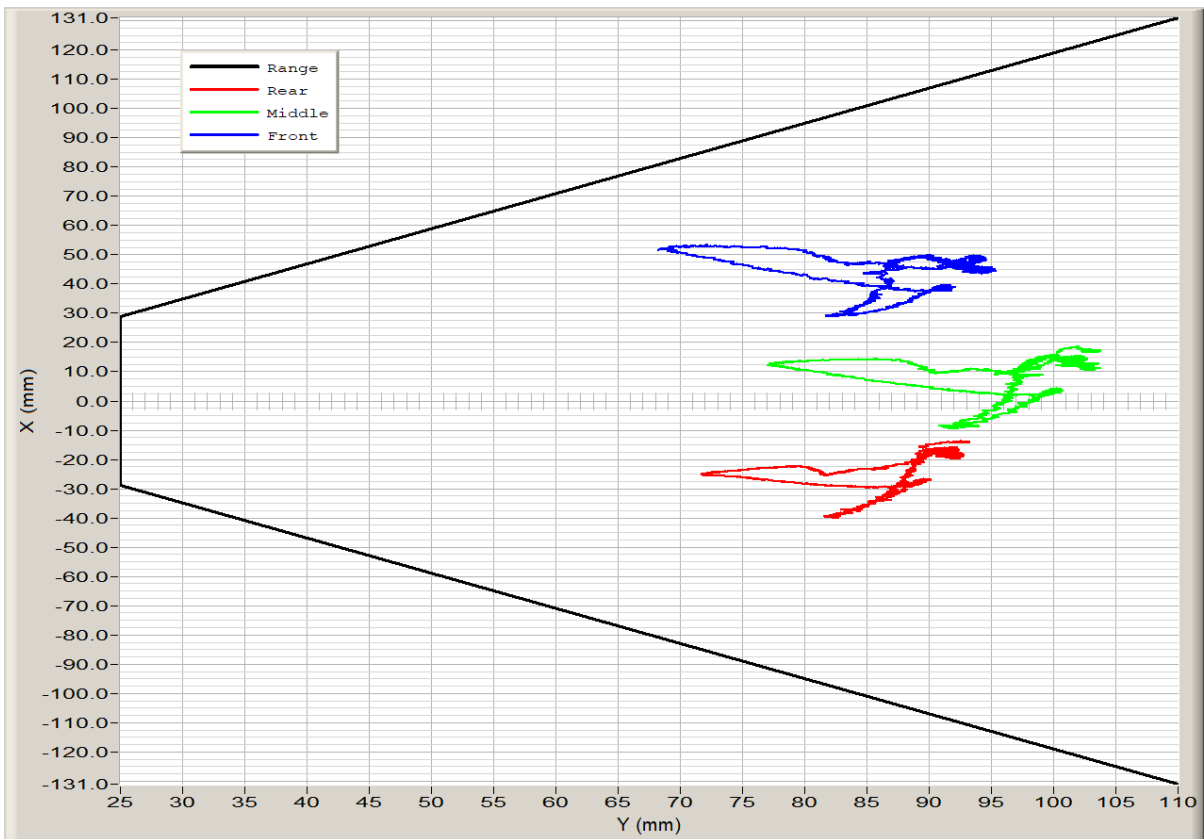
Thorax_2_XY



Thorax_3_XY



Abdomen_1_XY



Abdomen_2_XY

APPENDIX C
DUMMY PERFORMANCE QUALIFICATION TEST DATA

TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS

WorldSID-50M (Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Front 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. Left Lateral 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 4. Right Lateral 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 5. Left Lateral Neck Pendulum Test

Pendulum Acceleration (G's) vs. Time (ms)

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Forward Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Rear Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Center Headform Potentiometer Rotation at CG (°) vs. Time (ms)

Neck Force Y (N) vs. Time (ms)

Neck Force Y (N) Filtered for Total Neck Occipital Condyle Moment Calculation vs. Time (ms)

Neck Moment X (Nm) vs. Time (ms)

Total Neck Occipital Condyle Moment X (Nm) vs. Time (ms)

Table 6. Right Lateral Neck Pendulum Test

Pendulum Acceleration (G's) vs. Time (ms)

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Forward Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Rear Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Center Headform Potentiometer Rotation at CG (°) vs. Time (ms)

Neck Force Y (N) vs. Time (ms)

Neck Force Y (N) Filtered for Total Neck Occipital Condyle Moment Calculation vs. Time (ms)

Neck Moment X (Nm) vs. Time (ms)

Total Neck Occipital Condyle Moment X (Nm) vs. Time (ms)

Table 7. Left Lateral Shoulder Impact Test

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

Impactor Force (N) vs. Time (ms)

Shoulder Displacement (mm) vs. Time (ms)

Table 8. Left Lateral Thorax with Arm Impact Test

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

Impactor Force (N) vs. Time (ms)

TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS (CONTUNUED)

WorldSID-50M (Passenger) Dummy

Description

Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)
Upper Thorax Rib Displacement (mm) vs. Time (ms)
Center Thorax Rib Displacement (mm) vs. Time (ms)
Lower Thorax Rib Displacement (mm) vs. Time (ms)

Table 9. Left Lateral Thorax without Arm Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Impactor Force (N) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)
Upper Thorax Rib Displacement (mm) vs. Time (ms)
Center Thorax Rib Displacement (mm) vs. Time (ms)
Lower Thorax Rib Displacement (mm) vs. Time (ms)

Table 10. Left Lateral Abdomen Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Impactor Force (N) 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 11. Left Lateral Pelvis Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Impactor Force (N) vs. Time (ms)
Pelvis Acceleration Y (G's) vs. Time (ms)
Lower Spine Acceleration Y (G's) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N EA7820

Transportation Research Center Inc.
WorldSID-50M
External Measurements
Serial No. EA7820 Qualification No. 01

WorldSID-50M Angular Reference Measurements					
Parameter	Symbol	Tilt Sensor (°)	Inclinometer (°)		
			Center	Left	Right
Head X-Axis	A1	0	n/a	n/a	n/a
Head Y-Axis	A2	2.2	n/a	2	Note 1
Neck Bracket X-Axis	A3	n/a	-0.5	n/a	n/a
Neck Bracket Y-Axis	A4	n/a	-3.1	n/a	n/a
Thorax X-Axis	A5	1.3	n/a	n/a	n/a
Thorax Y-Axis	A6	3.9	n/a	n/a	n/a
Pelvis X-Axis	A7	0.7	n/a	n/a	n/a
Pelvis Y-Axis	A8	10.2	n/a	n/a	n/a
H-point Tool	A9	n/a	n/a	32.8	33.7

WorldSID-50M External Linear Dimensions				
Parameter	Symbol	Specification (mm)		
		Center	Left	Right
Seated Height	L1	870	n/a	n/a
Hip Pivot Height	L2	n/a	89	89
Hip Pivot to Back Line	L3	n/a	187	176
Thigh Clearance	L4	n/a	181	180
Knee Height	L5	n/a	580	583
Knee to Backline	L6	n/a	667	670
Head Back to Seat Back	L7	156	n/a	n/a
Thorax Rib 1 Front to Back	L8	n/a	209	209
Abdomen Rib 2 Front to Back	L9	n/a	223	226
Arm Length	L10	n/a	330	330
Width Across Arms	L11	482	n/a	n/a
Waist Width	L12	341	n/a	n/a

Note 1: No land marks on the right side of head. Unable to align level.

Transportation Research Center Inc.

Front Head Drop
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 1/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Peak Head Resultant Acceleration	211 - 261 g	224.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	4.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.85 %	Yes

Test meets specifications.

Condition: Used

Comments:

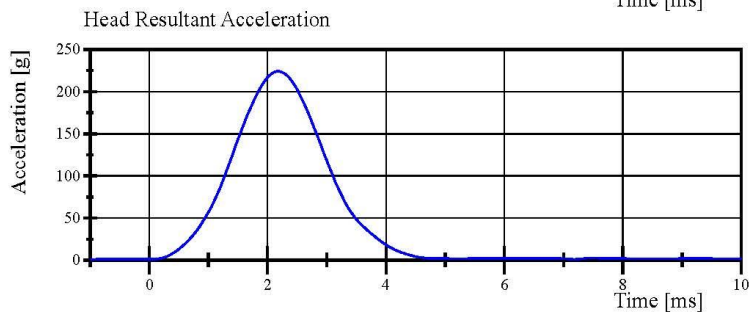
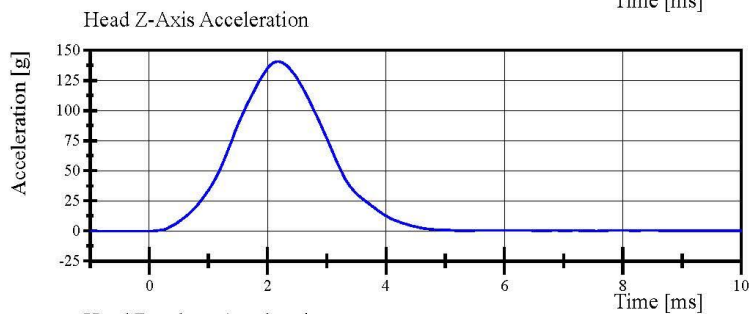
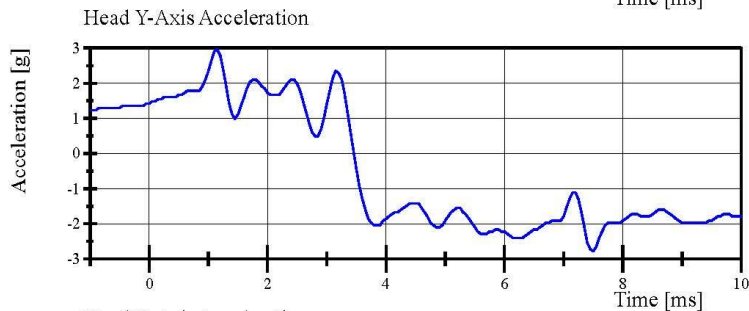
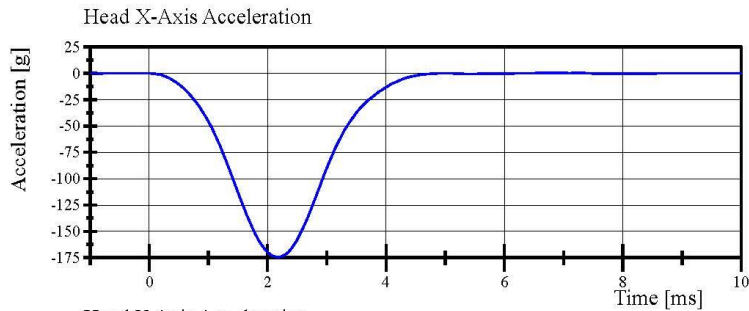
Head Skin S/N: EE8693

Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 1/26/2021



Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
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Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 1/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	124.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	1.6 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	9.85 %	Yes

Test meets specifications.

Condition: Used

Comments:

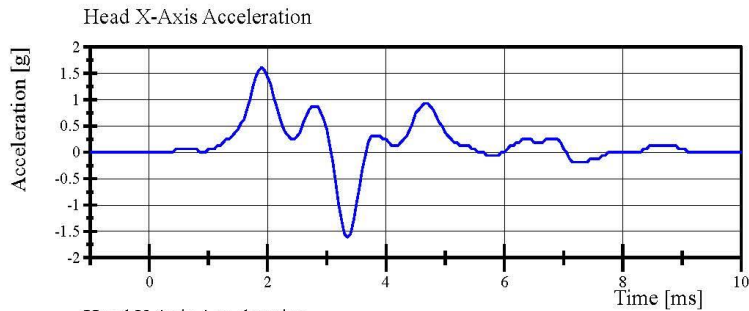
Head Skin S/N: EE8693

Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EA7820 Certification No. 1-1

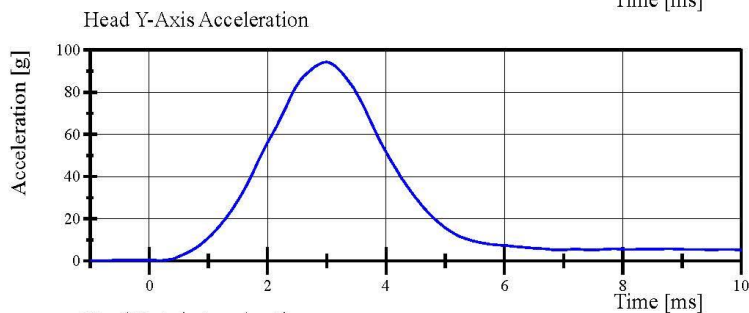
Test Date: 1/26/2021



Filter Class: CFC_1000

Max: 1.6 g at 1.9 ms

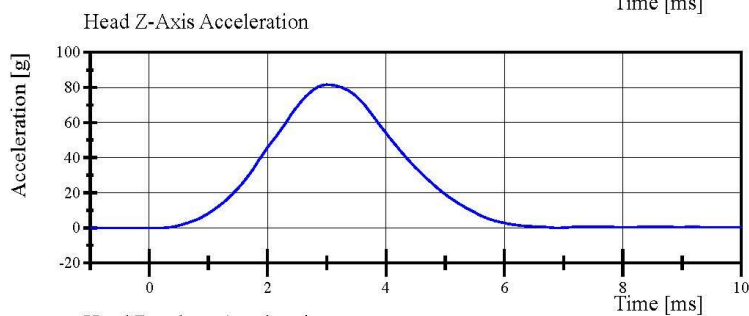
Min: -1.6 g at 3.4 ms



Filter Class: CFC_1000

Max: 94.3 g at 3.0 ms

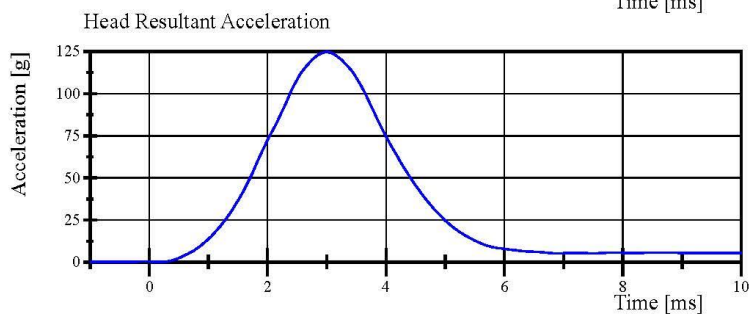
Min: 0.1 g at -1.0 ms



Filter Class: CFC_1000

Max: 81.6 g at 3.0 ms

Min: -0.0 g at -1.0 ms



Filter Class: CFC_1000

Max: 124.7 g at 3.0 ms

Min: 0.1 g at -1.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
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Transportation Research Center Inc.

Right Lateral Head Drop
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 1/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	116.4 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.02 %	Yes

Test meets specifications.

Condition: Used

Comments:

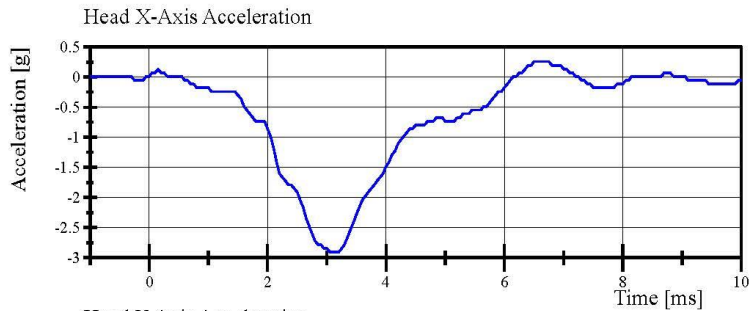
Head Skin S/N: EE8693

Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EA7820 Certification No. 1-1

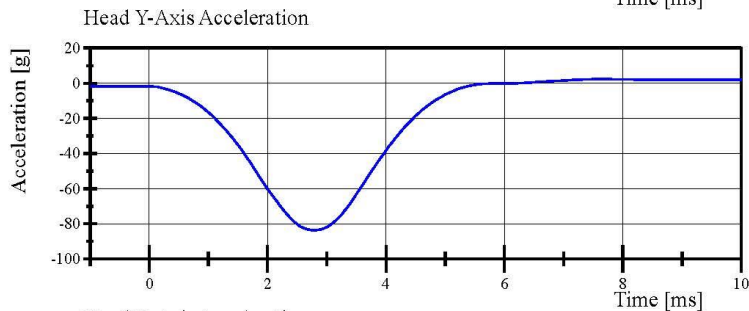
Test Date: 1/26/2021



Filter Class: CFC_1000

Max: 0.3 g at 6.5 ms

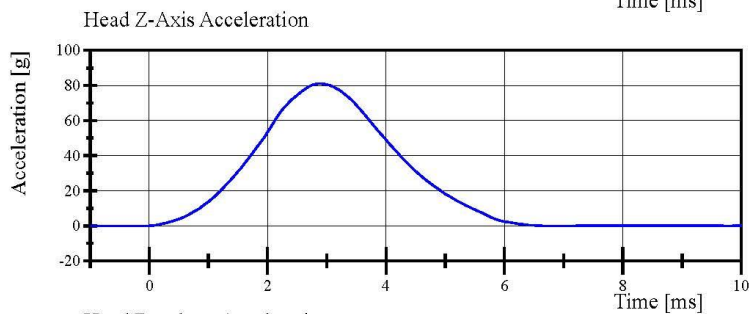
Min: -2.9 g at 3.1 ms



Filter Class: CFC_1000

Max: 2.3 g at 7.5 ms

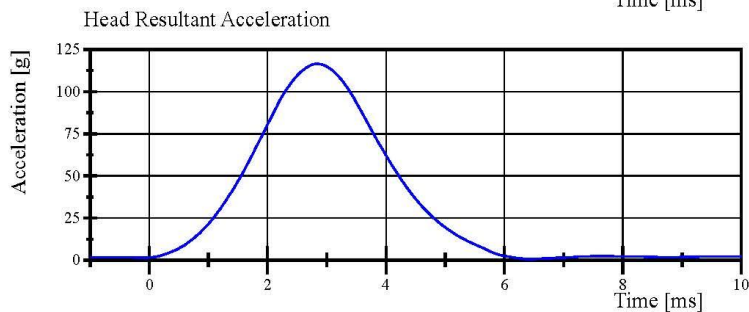
Min: -83.7 g at 2.8 ms



Filter Class: CFC_1000

Max: 81.0 g at 2.9 ms

Min: -0.1 g at -1.0 ms



Filter Class: CFC_1000

Max: 116.4 g at 2.9 ms

Min: 0.6 g at 6.5 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx
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Transportation Research Center Inc.

Left Lateral Neck
WorldSID 50th Serial No. EA7820 Certification No. 1-2
Test Date: 1/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	(-3.30) - (-3.50) m/s	-3.334 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	0.87 - 1.09 m/s	0.975 m/s	Yes
Change at 8 ms	1.72 - 2.1 m/s	1.874 m/s	Yes
Change at 12 ms	2.63 - 3.17 m/s	2.864 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-53.4 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	62.2 ms	Yes
Total Neck Occipital Condyles Moment	54 - 67 N·m	62.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	76.5 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-34.4 °	Yes
Time of Peak	56 - 68 ms	58.3 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-29) - (-36) °	-30.8 °	Yes
Time of Peak	56 - 68 ms	60.8 ms	Yes
Maximum Headform Angular Rate	(-2,047) - (-2,503) %/s	-2,255.2 %/s	Yes

Test meets specifications.

Condition: Used

Comments:

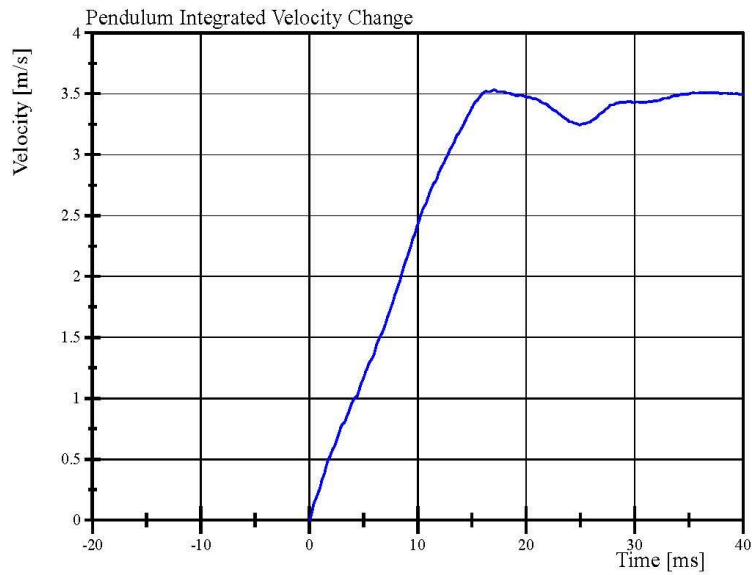
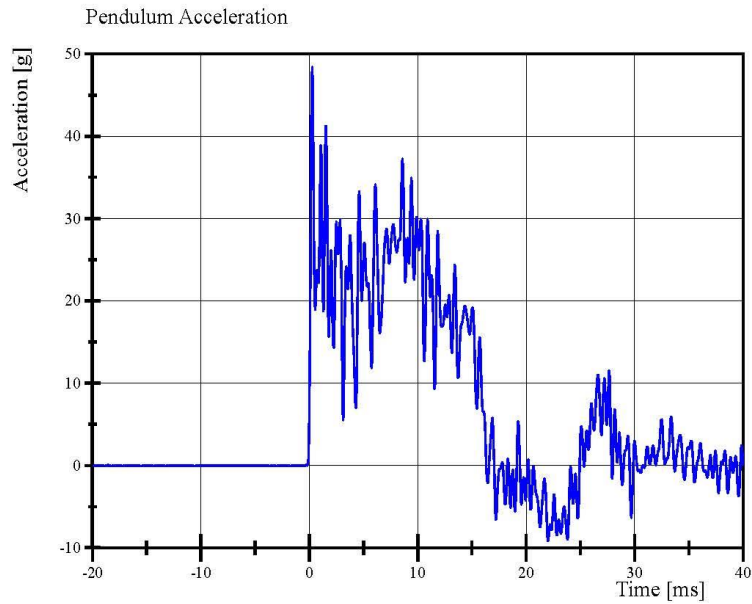
Neck S/N: DW6607

Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-2

Test Date: 1/26/2021

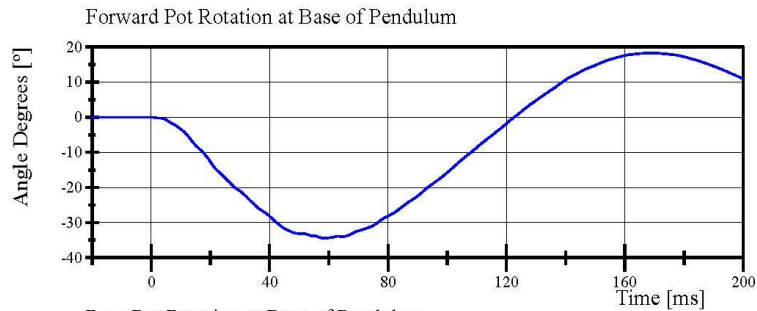


Transportation Research Center Inc.

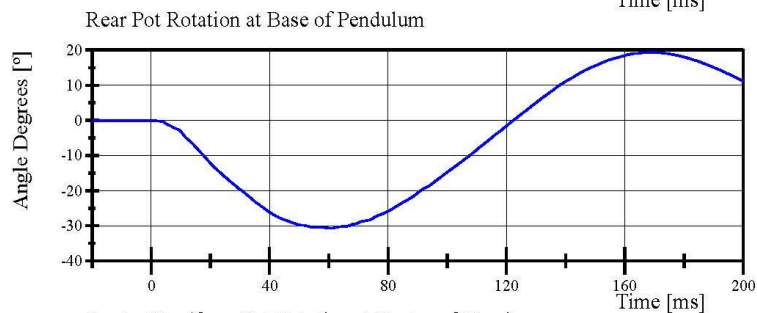
Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-2

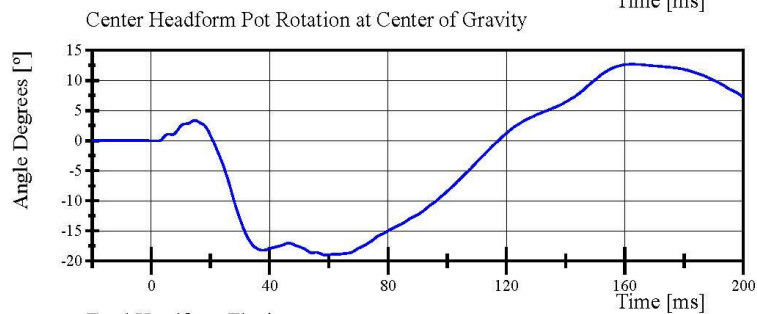
Test Date: 1/26/2021



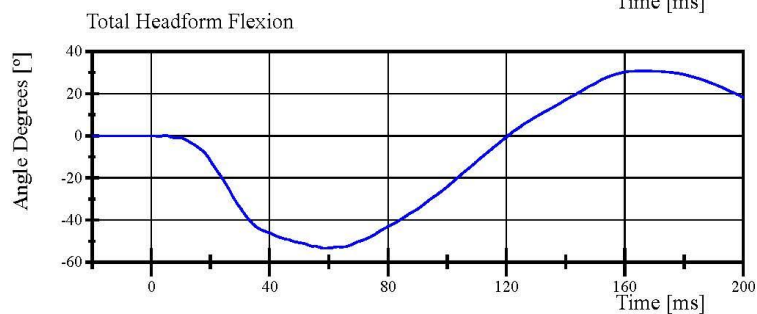
Filter Class: CFC_180
Max: 18.3 ° at 169.4 ms
Min: -34.4 ° at 58.3 ms



Filter Class: CFC_180
Max: 19.3 ° at 169.2 ms
Min: -30.8 ° at 60.8 ms



Filter Class: CFC_180
Max: 12.7 ° at 162.7 ms
Min: -19.0 ° at 58.5 ms



Filter Class: CFC_180
Max: 30.8 ° at 166.1 ms
Min: -53.4 ° at 58.4 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

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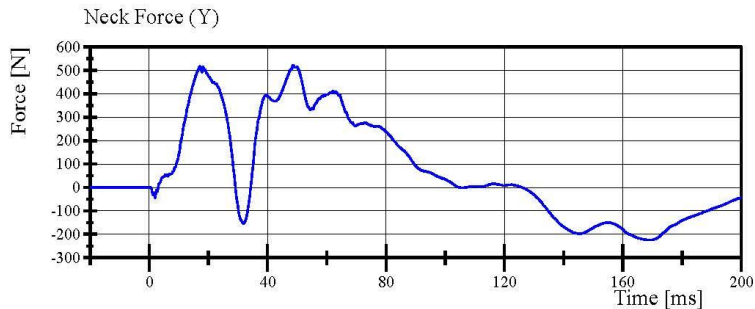
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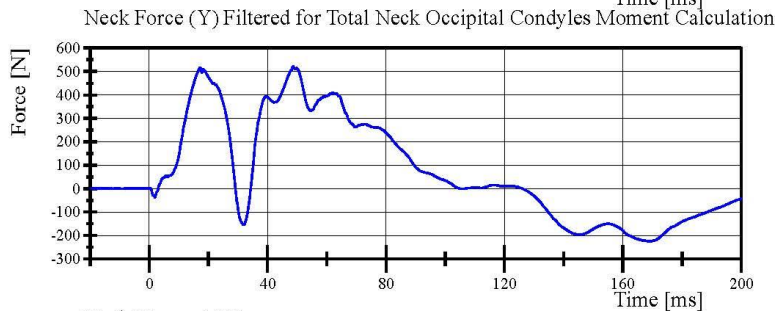
Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-2

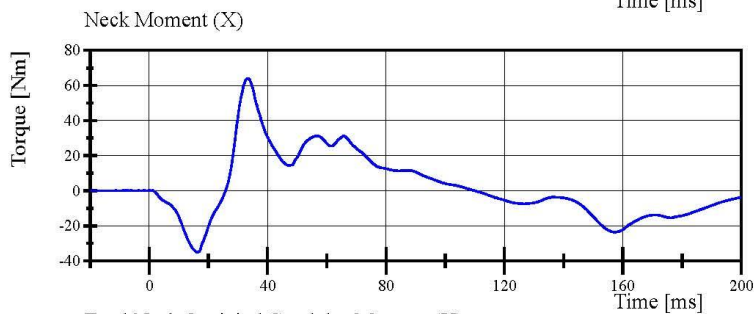
Test Date: 1/26/2021



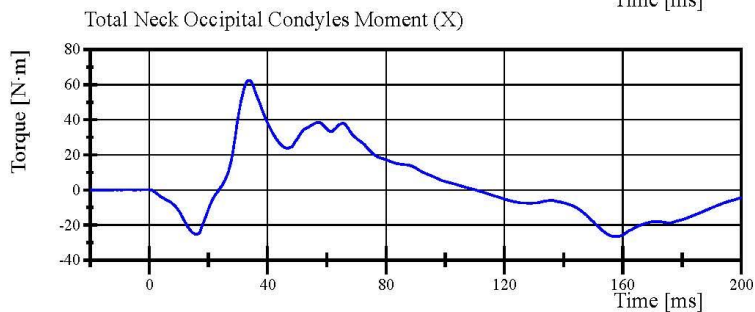
Filter Class: CFC_1000
Max: 522.6 N at 48.6 ms
Min: -224.8 N at 168.8 ms



Filter Class: CFC_600
Max: 521.5 N at 48.7 ms
Min: -224.5 N at 169.5 ms



Filter Class: CFC_600
Max: 64.0 Nm at 33.3 ms
Min: -34.9 Nm at 16.2 ms



Filter Class: Without_(Constar
Max: 62.4 N·m at 33.7 ms
Min: -26.6 N·m at 157.6 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH01

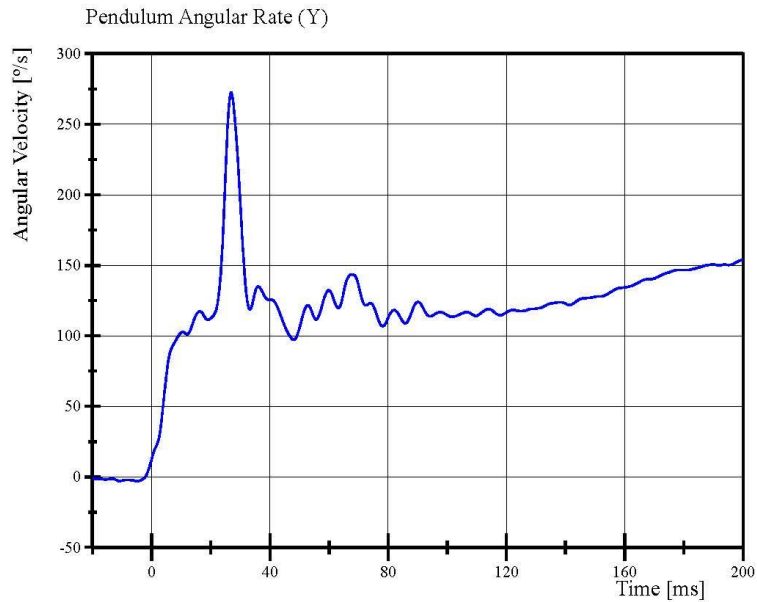
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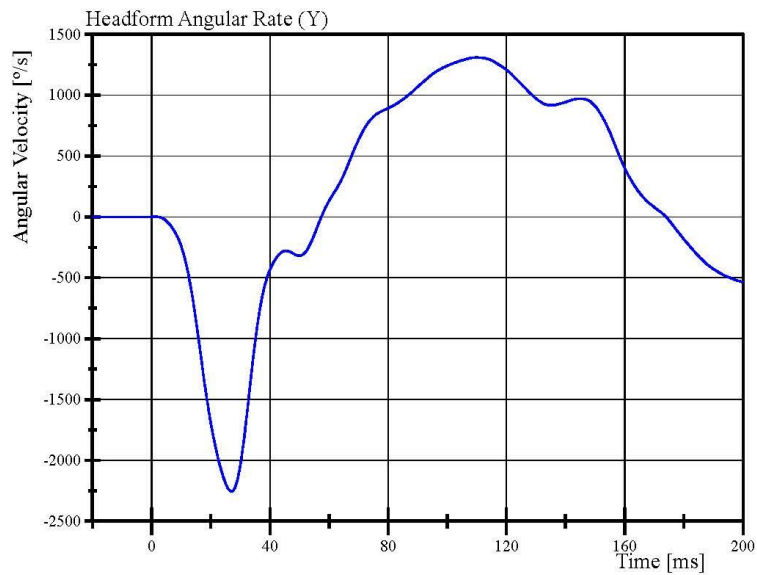
Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-2

Test Date: 1/26/2021



Filter Class: CFC_60
Max: 272.6 °/s at 26.9 ms
Min: -2.9 °/s at -4.9 ms



Filter Class: CFC_60
Max: 1,309.1 °/s at 110.0 ms
Min: -2,255.2 °/s at 27.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

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Transportation Research Center Inc.

Right Lateral Neck
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 1/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	3.30 - 3.50 m/s	3.335 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	(-0.87) - (-1.09) m/s	-0.974 m/s	Yes
Change at 8 ms	(-1.72) - (-2.1) m/s	-1.904 m/s	Yes
Change at 12 ms	(-2.63) - (-3.17) m/s	-2.907 m/s	Yes
Maximum Headform Flexion	50 - 61 deg	53.3 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	61.6 ms	Yes
Total Neck Occipital Condyles Moment	(-54) - (-67) N·m	-63.9 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	75.7 ms	Yes
Maximum Forward Pot Rotation			
Peak	32 - 39 °	34.3 °	Yes
Time of Peak	56 - 68 ms	60.3 ms	Yes
Maximum Rear Pot Rotation			
Peak	29 - 36 °	30.5 °	Yes
Time of Peak	56 - 68 ms	61.8 ms	Yes
Maximum Headform Angular Rate	2,047 - 2,503 %/s	2,292.0 %/s	Yes

Test meets specifications.

Condition: Used

Comments:

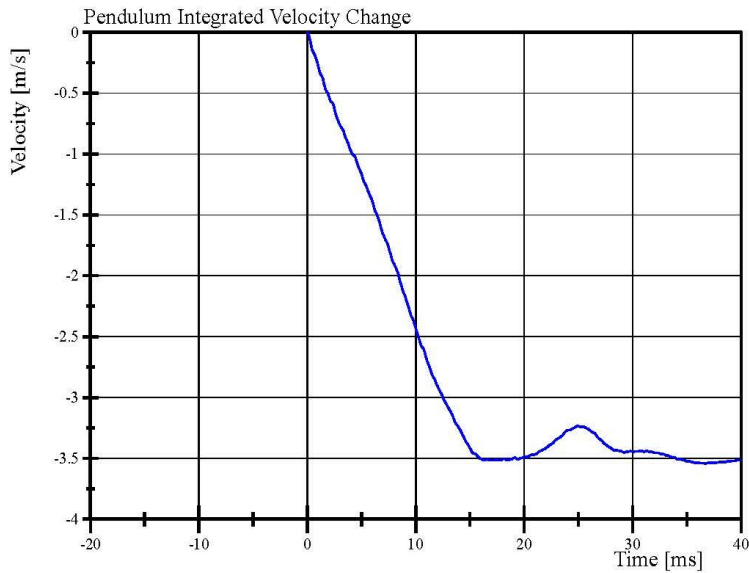
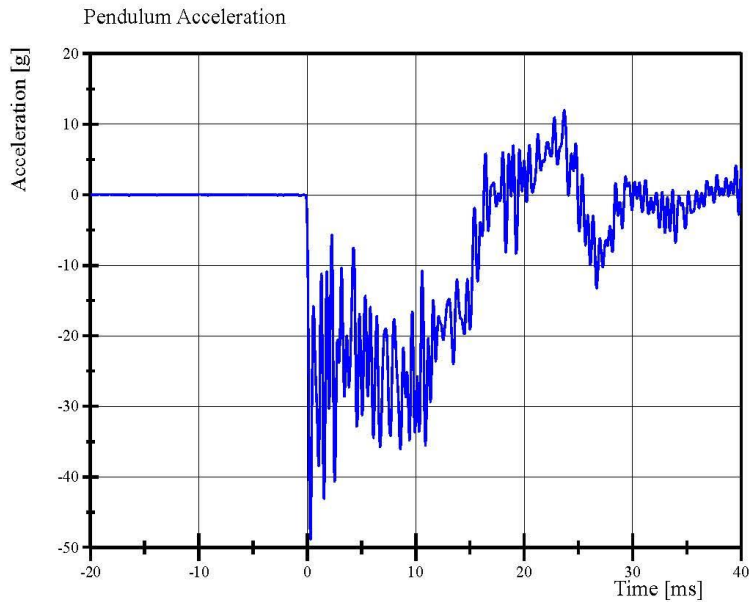
Neck S/N: DW6607

Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 1/26/2021



Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH01

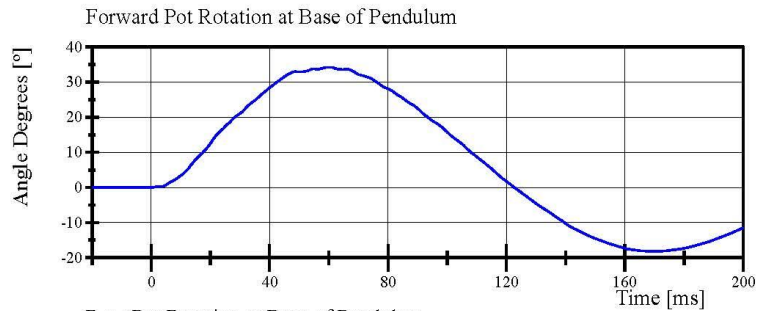
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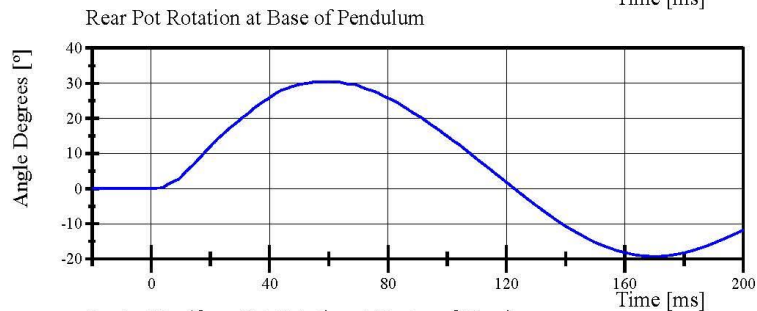
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-1

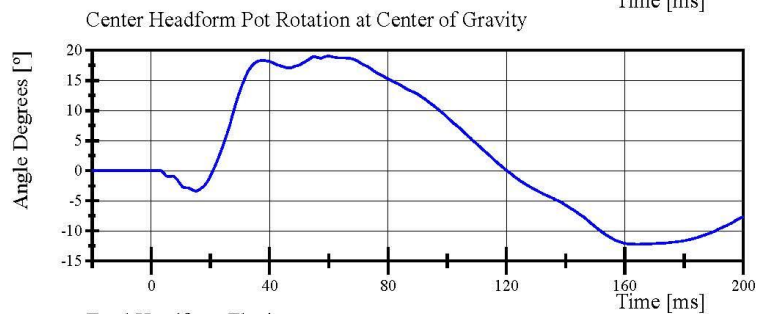
Test Date: 1/26/2021



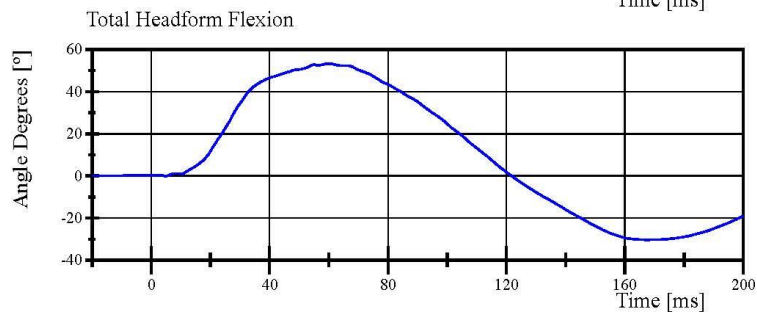
Filter Class: CFC_180
Max: 34.3 ° at 60.3 ms
Min: -18.2 ° at 171.0 ms



Filter Class: CFC_180
Max: 30.5 ° at 61.8 ms
Min: -19.3 ° at 170.7 ms



Filter Class: CFC_180
Max: 19.0 ° at 59.8 ms
Min: -12.2 ° at 164.4 ms



Filter Class: CFC_180
Max: 53.3 ° at 60.2 ms
Min: -30.3 ° at 167.5 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

01.26.2021 15:13:55 4011



Report Number: EA7820_WSH01

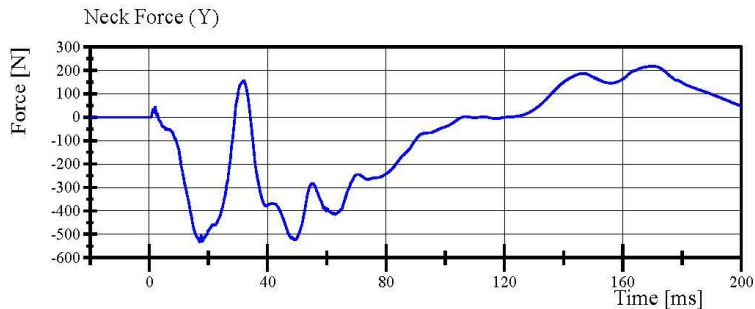
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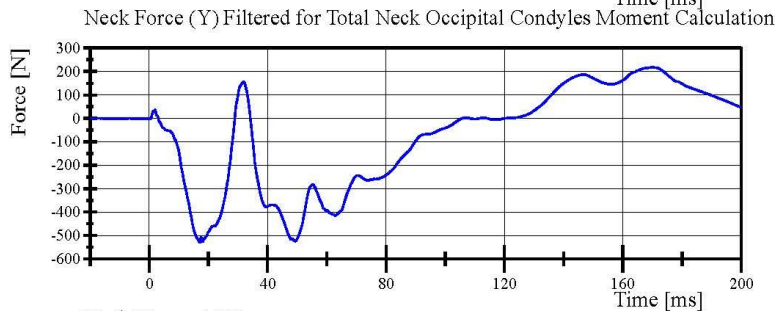
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-1

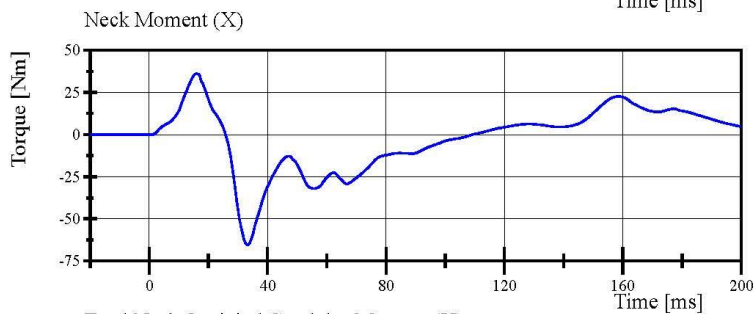
Test Date: 1/26/2021



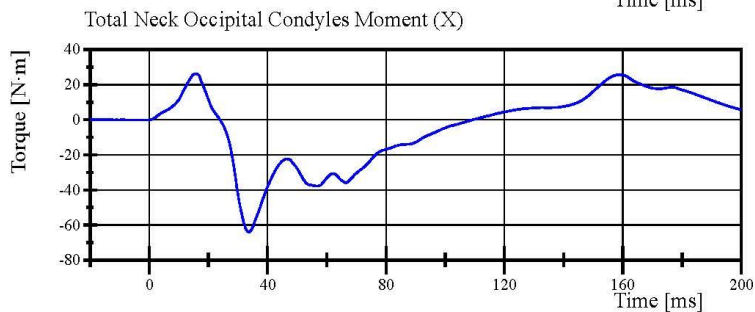
Filter Class: CFC_1000
Max: 218.1 N at 169.9 ms
Min: -532.4 N at 17.0 ms



Filter Class: CFC_600
Max: 217.9 N at 170.0 ms
Min: -530.4 N at 17.0 ms



Filter Class: CFC_600
Max: 36.1 Nm at 16.0 ms
Min: -65.5 Nm at 33.2 ms



Filter Class: Without_(Constar
Max: 26.2 N·m at 15.8 ms
Min: -63.9 N·m at 33.7 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
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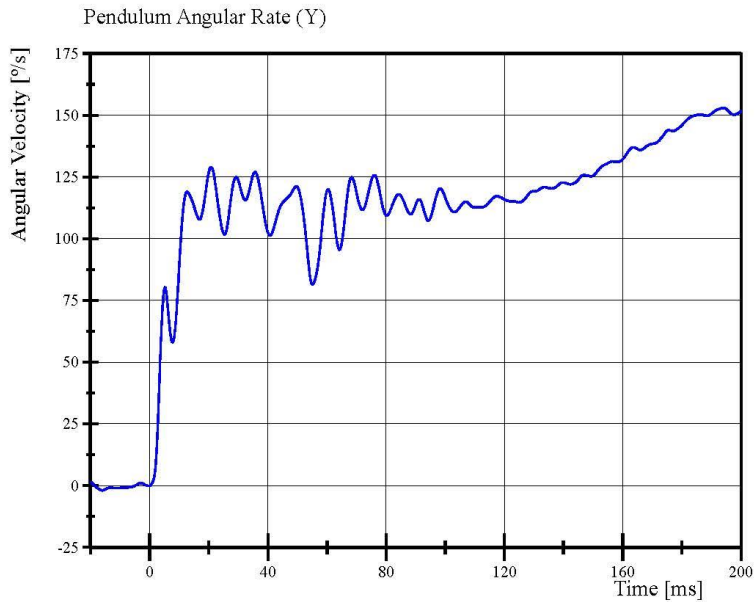
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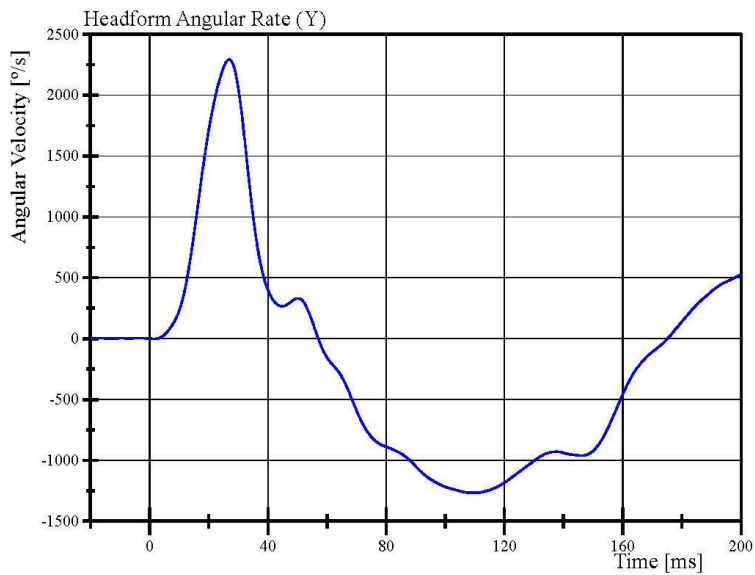
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 1/26/2021



Filter Class: CFC_60
Max: 153.0 %/s at 194.0 ms
Min: -1.9 %/s at -16.0 ms



Filter Class: CFC_60
Max: 2,292.0 %/s at 26.9 ms
Min: -1,267.1 %/s at 109.8 ms

Transportation Research Center Inc.

Left Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 1/27/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.124 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.233 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.320 m/s	Yes
Peak Fixture Rotation	(-41.5) - (-51) °	-45.49 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.9 ms	Yes
Peak Head Angular Velocity Z-axis	(-1,345) - (-1,655) %/s	-1,492.0 %/s	Yes
Peak Lower Neck Moment Z-axis	34 - 42 N·m	38.1 N·m	Yes

Test meets specifications.

Condition: Used

Comments:

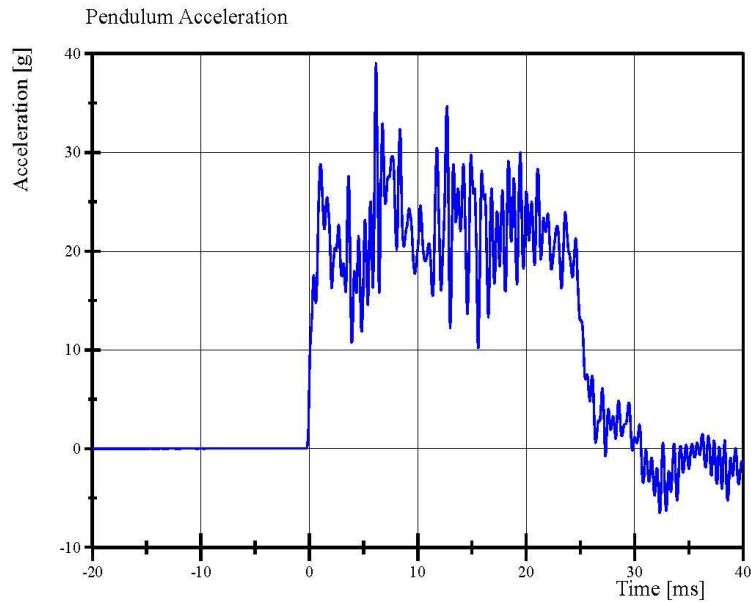
Neck S/N: DW6607

Transportation Research Center Inc.

Left Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 1-1

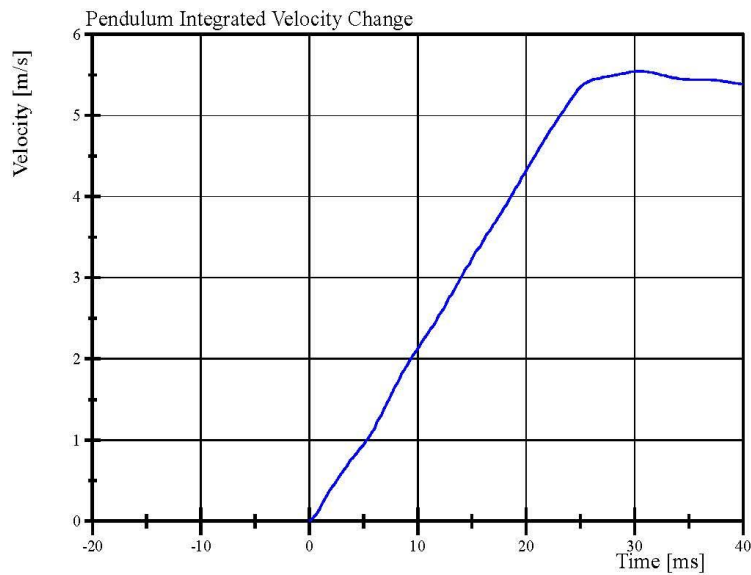
Test Date: 1/27/2021



Filter Class: CFC_1000

Max: 39.1 g at 6.2 ms

Min: -6.5 g at 32.3 ms



Filter Class: CFC_1000

Max: 5.5 m/s at 30.6 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH01

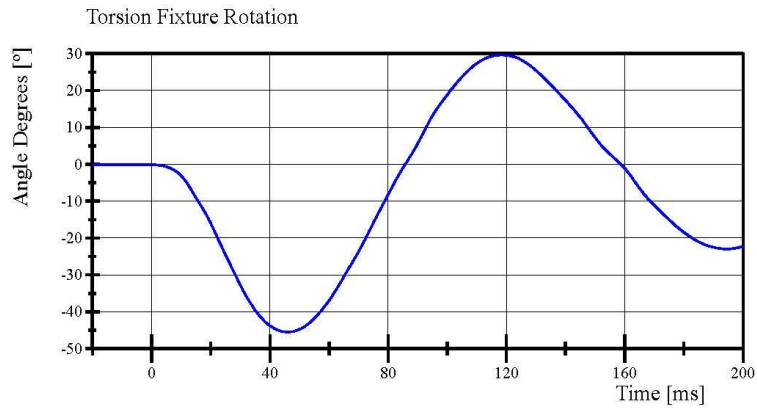
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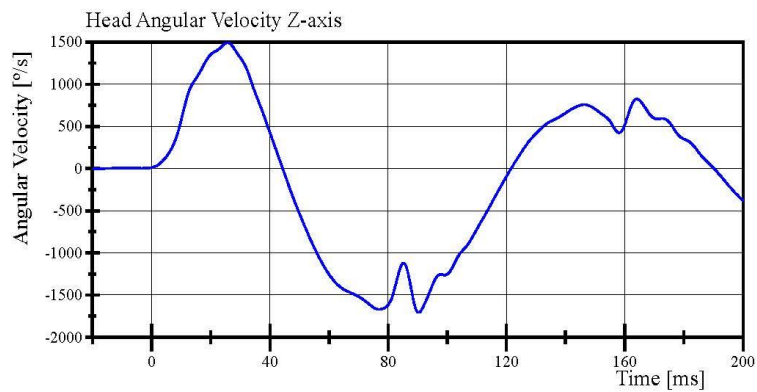
Left Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 1-1

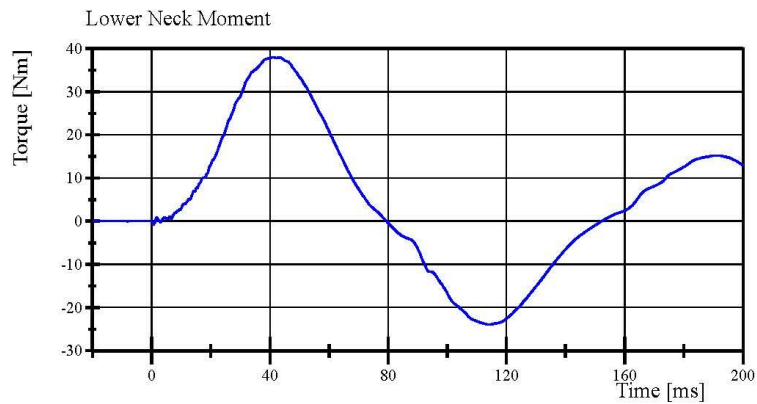
Test Date: 1/27/2021



Filter Class: CFC_60
Max: 29.7 ° at 118.4 ms
Min: -45.5 ° at 45.9 ms



Filter Class: CFC_60
Max: 1,492.0 °/s at 25.7 ms
Min: -1,707.8 °/s at 90.3 ms



Filter Class: CFC_600
Max: 38.1 Nm at 41.0 ms
Min: -23.9 Nm at 114.2 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH01

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Transportation Research Center Inc.

Right Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 1/27/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.142 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.278 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.388 m/s	Yes
Peak Fixture Rotation	41.5 - 51 °	45.06 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.4 ms	Yes
Peak Head Angular Velocity Z-axis	1,345 - 1,655 %/s	1,537.4 %/s	Yes
Peak Lower Neck Moment Z-axis	(-34) - (-42) N·m	-38.6 N·m	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DW6607

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

Report Number: EA7820_WSH01

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01.27.2021 10:16:01 4007

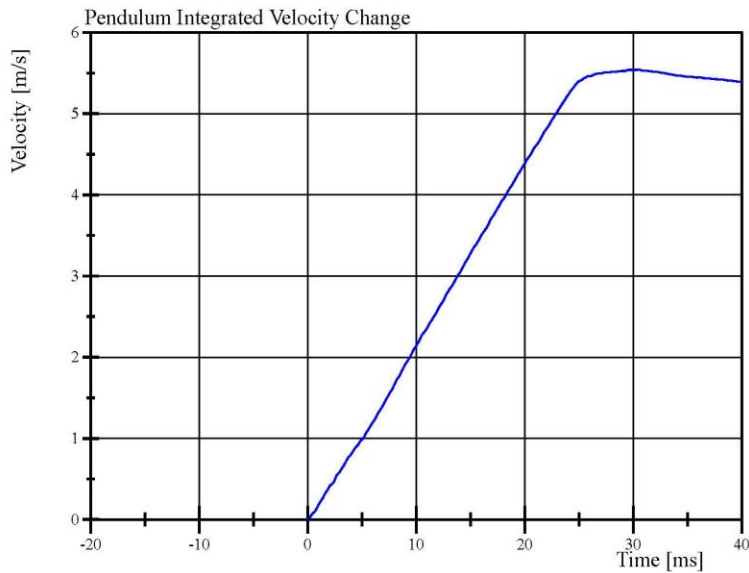
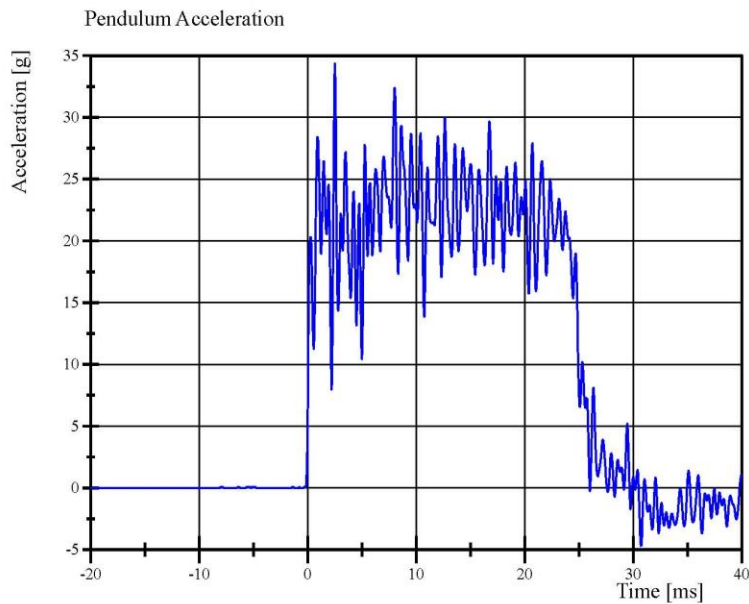


Transportation Research Center Inc.

Right Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 1/27/2021



Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

01.27.2021 10:16:55 4007



Report Number: EA7820_WSH01

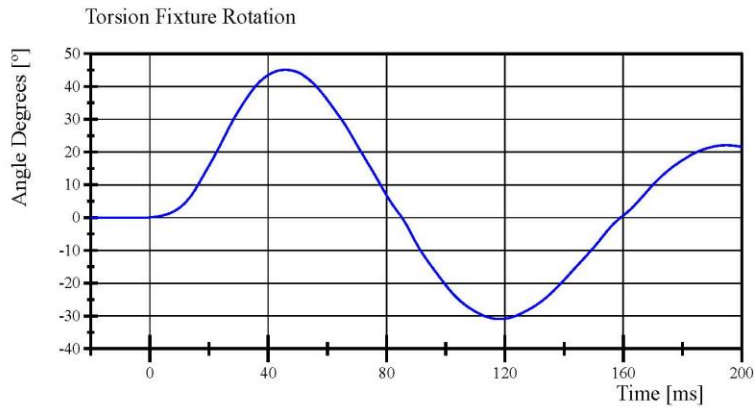
Page 30 of 47

Transportation Research Center Inc.

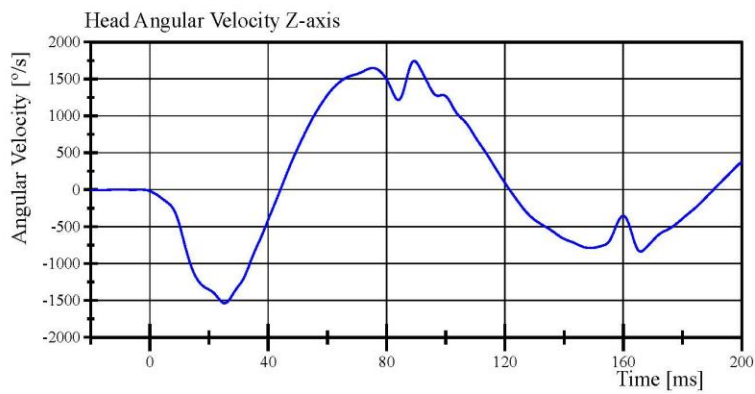
Right Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 1-1

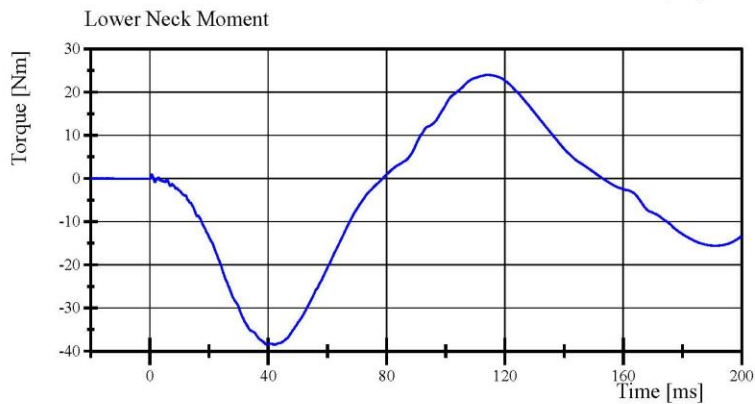
Test Date: 1/27/2021



Filter Class: CFC_60
Max: 45.1 ° at 45.8 ms
Min: -30.9 ° at 118.3 ms



Filter Class: CFC_60
Max: 1,742.1 °/s at 89.3 ms
Min: -1,537.4 °/s at 25.3 ms



Filter Class: CFC_600
Max: 24.0 Nm at 114.4 ms
Min: -38.6 Nm at 39.8 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

01.27.2021 10:16:55 4007



Report Number: EA7820_WSH01

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Transportation Research Center Inc.

Right Lateral Shoulder

WorldSID 50th Serial No. EA7820 Certification No. 1-4

Test Date: 2/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.37 m/s	Yes
Impactor Force	2,600 - 3,300 N	2,978.1 N	Yes
Shoulder Force	(-1,470) - (-1,800) N	-1,649.3 N	Yes
Shoulder Rib Length Change	37 - 46 mm	38.9 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EE7908

Shoulder Rib S/N: ED9644

Ribeye S/N: 160

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

Report Number: EA7820_WSH01

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03.24.2021 09:54:37 993

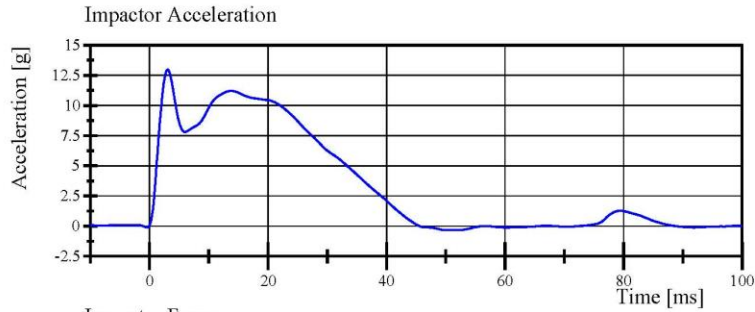


Transportation Research Center Inc.

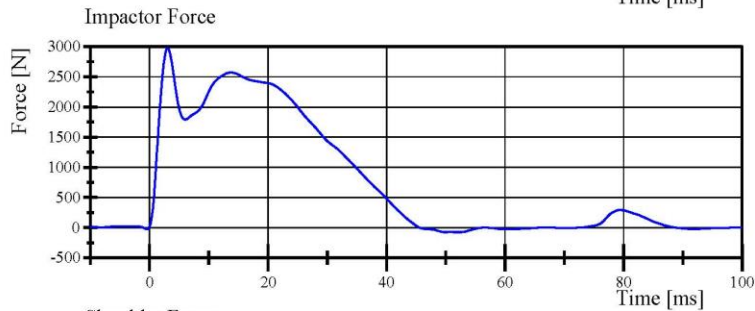
Right Lateral Shoulder

WorldSID 50th Serial No. EA7820 Certification No. 1-4

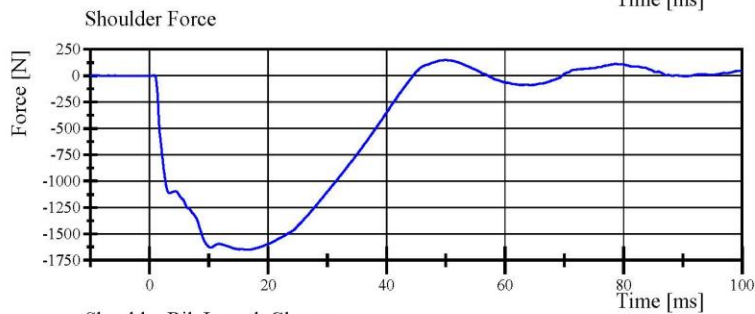
Test Date: 2/10/2021



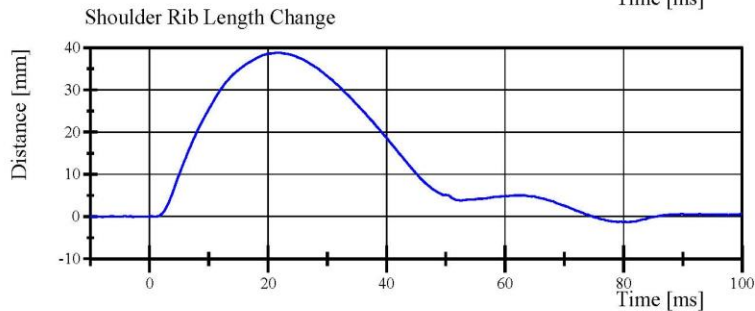
Filter Class: CFC_180
Max: 13.0 g at 3.1 ms
Min: -0.3 g at 52.1 ms



Filter Class: CFC_180
Max: 2,978.1 N at 3.1 ms
Min: -75.1 N at 52.1 ms



Filter Class: CFC_600
Max: 149.1 N at 49.9 ms
Min: -1,649.3 N at 16.4 ms



Filter Class: CFC_600
Max: 38.9 mm at 21.6 ms
Min: -1.3 mm at 80.7 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

03.24.2021 09:55:02 993



Report Number: EA7820_WSH01

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Transportation Research Center Inc.

Right Lateral Thorax with Arm

WorldSID 50th Serial No. EA7820 Certification No. 1-1

Test Date: 2/12/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.68 m/s	Yes
Impactor Force	5,300 - 6,200 N	6,400.0 N	No
Peak Thorax Rib 1 Length Change	35 - 47 mm	37.0 mm	Yes
Peak Thorax Rib 2 Length Change	46 - 56 mm	39.5 mm	No
Peak Thorax Rib 3 Length Change	33.5 - 40.5 mm	32.55 mm	No
Peak T4 Acceleration, y-axis	(-28) - (-37) g	-37.8 g	No
Peak T12 Acceleration, y-axis	(-22) - (-28) g	-32.7 g	No

Test does not meet specifications.

Condition: Used

Comments:

Right Arm S/N: EE7908

Thorax Rib 1 S/N: DW6882

Thorax Rib 2 S/N: DW8864

Thorax Rib 3 S/N: ED4871

Ribeye S/N: 160

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

Report Number: EA7820_WSH01

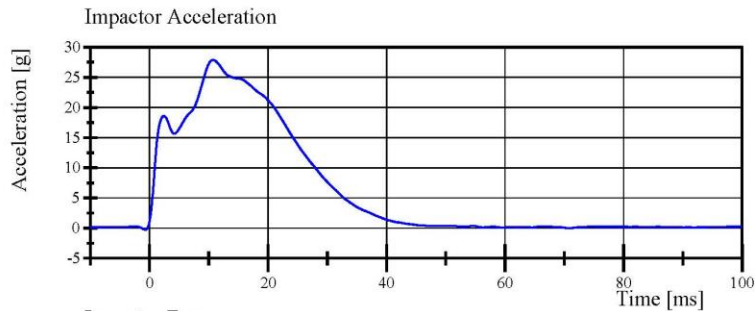
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03.24.2021 09:57:22 1001

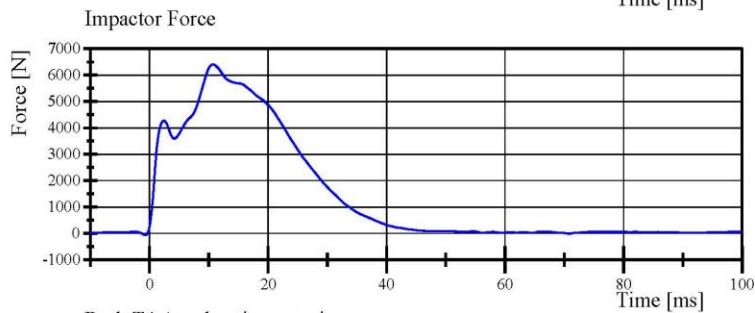


Transportation Research Center Inc.

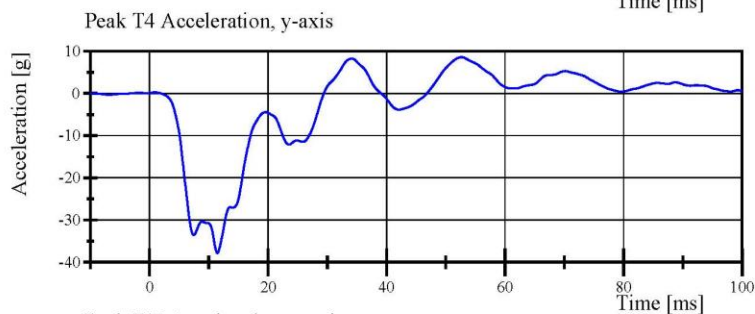
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 2/12/2021



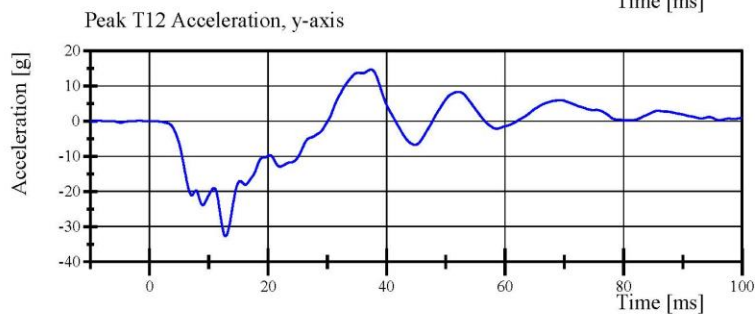
Filter Class: CFC_180
Max: 27.9 g at 10.7 ms
Min: -0.3 g at -0.7 ms



Filter Class: CFC_180
Max: 6,400.0 N at 10.7 ms
Min: -60.9 N at -0.7 ms



Filter Class: CFC_180
Max: 8.6 g at 52.7 ms
Min: -37.8 g at 11.5 ms



Filter Class: CFC_180
Max: 14.7 g at 37.4 ms
Min: -32.7 g at 12.8 ms

Specification Source: WorldSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

03.24.2021 09:59:50 1001

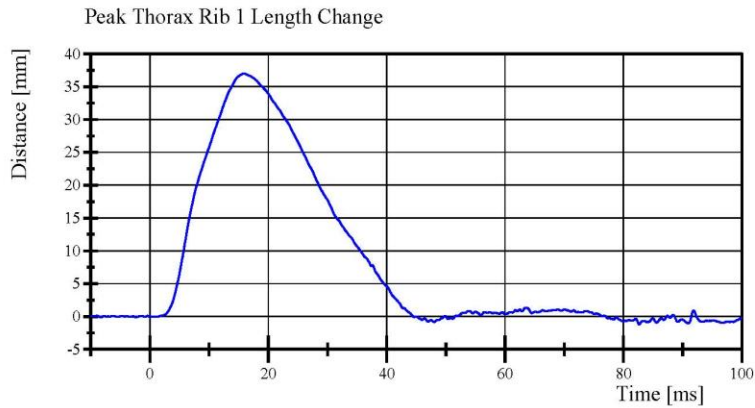


Report Number: EA7820_WSH01

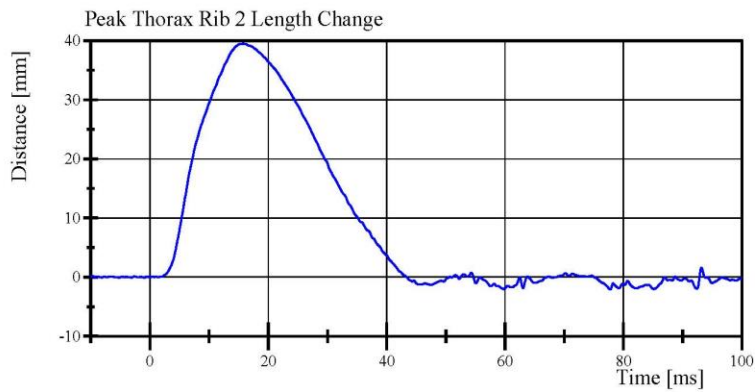
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Transportation Research Center Inc.

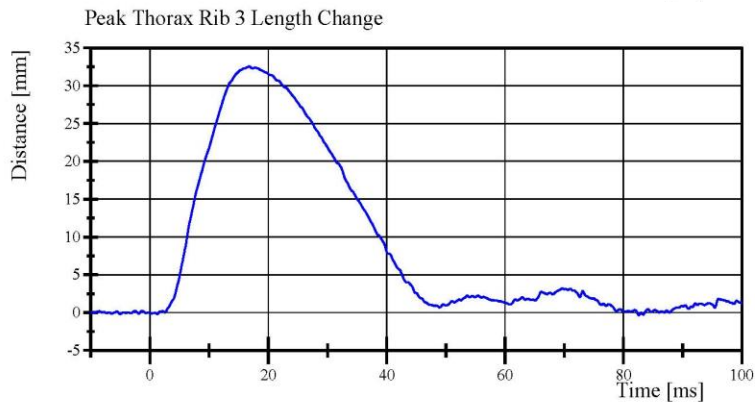
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 2/12/2021



Filter Class: CFC_600
Max: 37.0 mm at 16.0 ms
Min: -1.2 mm at 82.7 ms



Filter Class: CFC_600
Max: 39.5 mm at 15.8 ms
Min: -2.1 mm at 77.8 ms



Filter Class: CFC_600
Max: 32.6 mm at 16.8 ms
Min: -0.3 mm at 82.6 ms

Transportation Research Center Inc.

Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-2
Test Date: 2/12/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Force	3,200 - 3,800 N	3,840.7 N	No
Peak Thorax Rib 1 Length Change	33 - 43 mm	32.8 mm	No
Peak Thorax Rib 2 Length Change	35 - 43 mm	33.0 mm	No
Peak Thorax Rib 3 Length Change	32 - 40 mm	32.7 mm	Yes
Peak T4 Acceleration, y-axis	(-14) - (-20) g	-19.2 g	Yes
Peak T12 Acceleration, y-axis	(-14) - (-22) g	-21.3 g	Yes

Test does not meet specifications.

Condition: Used

Comments:

Thorax Rib 1 S/N: DW6882

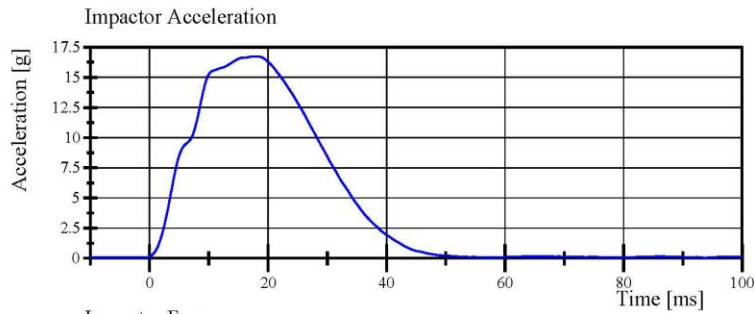
Thorax Rib 2 S/N: DW8864

Thorax Rib 3 S/N: ED4871

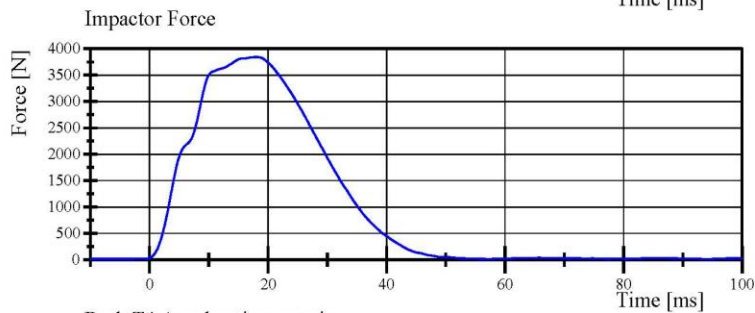
Ribeye S/N: 160

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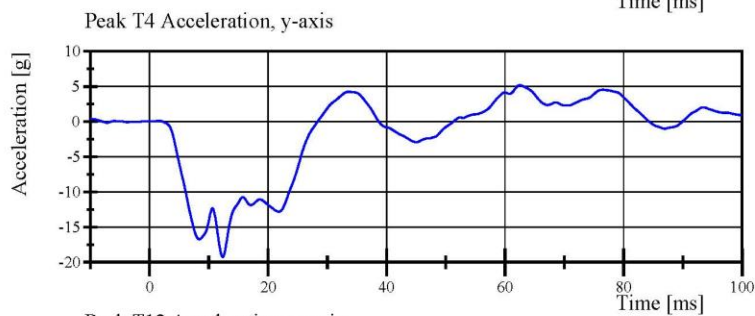
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-2
Test Date: 2/12/2021



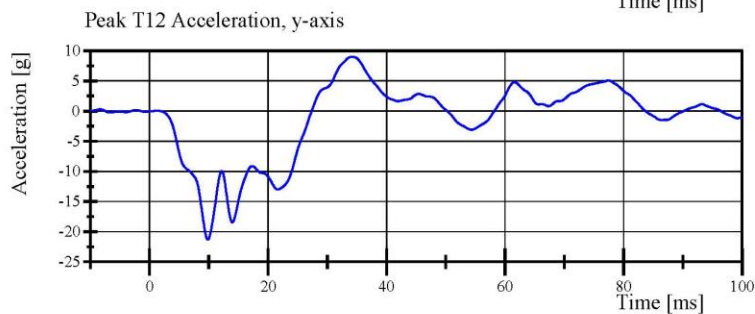
Filter Class: CFC_180
Max: 16.7 g at 18.2 ms
Min: 0.0 g at 93.7 ms



Filter Class: CFC_180
Max: 3,840.7 N at 18.2 ms
Min: 9.7 N at 93.7 ms



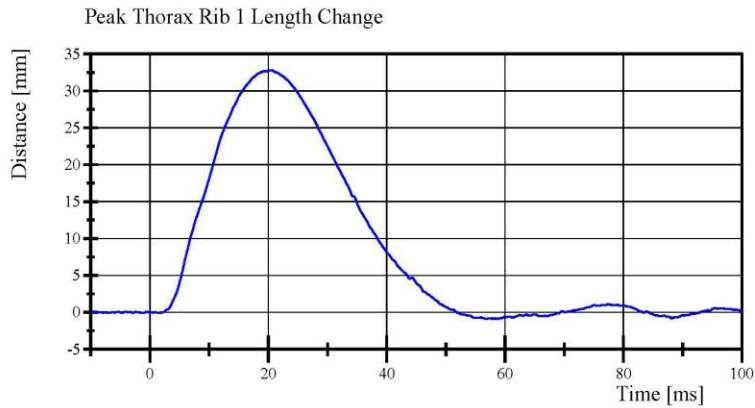
Filter Class: CFC_180
Max: 5.2 g at 62.5 ms
Min: -19.2 g at 12.4 ms



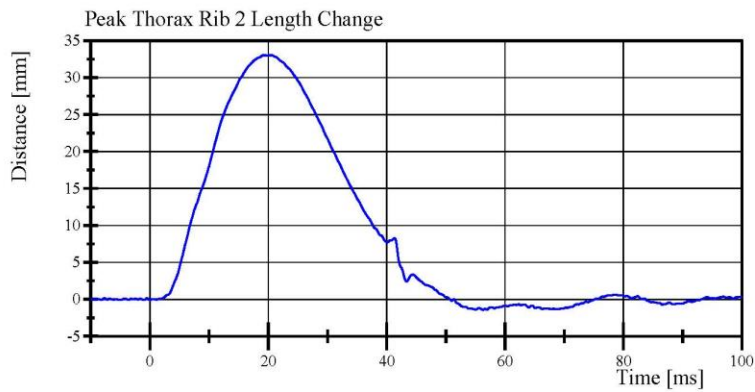
Filter Class: CFC_180
Max: 9.0 g at 34.2 ms
Min: -21.3 g at 9.9 ms

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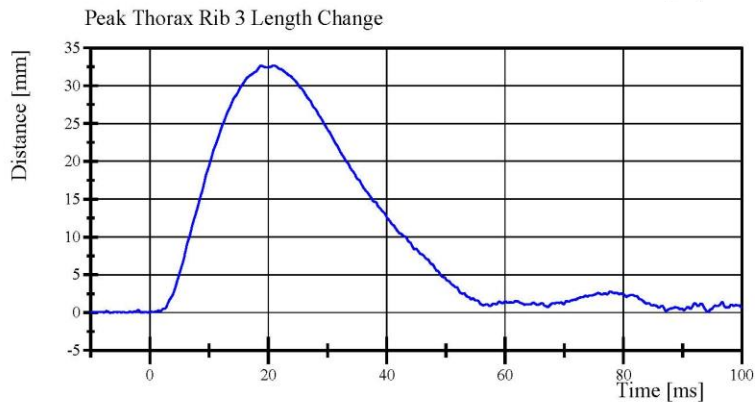
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-2
Test Date: 2/12/2021



Filter Class: CFC_600
Max: 32.8 mm at 20.6 ms
Min: -0.9 mm at 56.9 ms



Filter Class: CFC_600
Max: 33.0 mm at 19.5 ms
Min: -1.4 mm at 56.3 ms



Filter Class: CFC_600
Max: 32.7 mm at 20.9 ms
Min: -0.0 mm at -6.7 ms



Transportation Research Center Inc.

Right Lateral Abdomen
WorldSID 50th Serial No. EA7820 Certification No. 1-3
Test Date: 2/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.38 m/s	Yes
Impactor Force	2,700 - 3,100 N	2,966.8 N	Yes
Peak Abdomen Rib 1 Length Change	32.5 - 39.5 mm	36.28 mm	Yes
Peak Abdomen Rib 2 Length Change	32 - 38 mm	34.9 mm	Yes
Peak T12 Acceleration, y-axis	(-14.5) - (-19.5) g	-16.51 g	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen Rib S/N #1: DW8877

Abdomen Rib S/N #2: DW8878

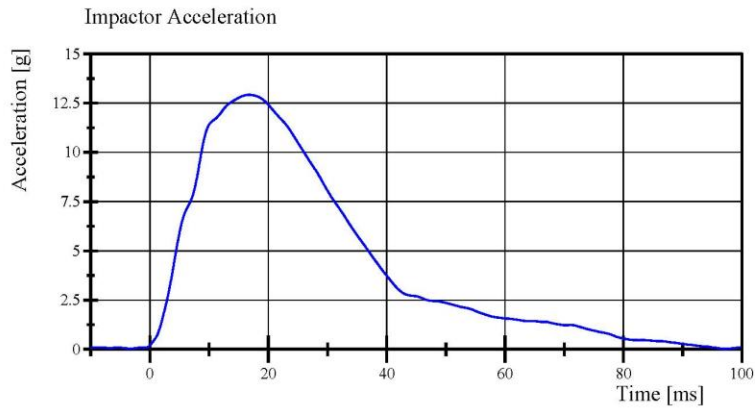
Ribeye S/N: 160

Transportation Research Center Inc.

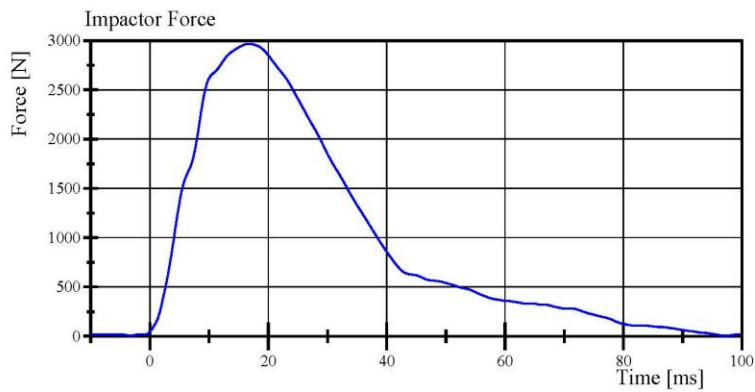
Right Lateral Abdomen

WorldSID 50th Serial No. EA7820 Certification No. 1-3

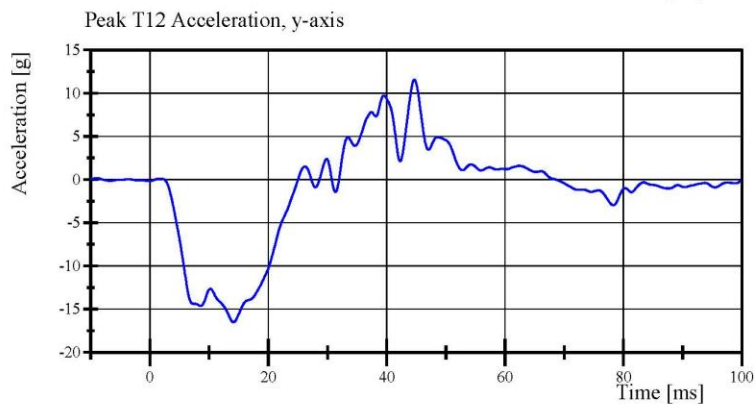
Test Date: 2/11/2021



Filter Class: CFC_180
Max: 12.9 g at 16.8 ms
Min: 0.0 g at 97.2 ms



Filter Class: CFC_180
Max: 2,966.8 N at 16.8 ms
Min: 6.2 N at 97.2 ms



Filter Class: CFC_180
Max: 11.5 g at 44.7 ms
Min: -16.5 g at 14.1 ms

Specification Source: WorldSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

03.23.2021 15:45:25 1006



Report Number: EA7820_WSH01

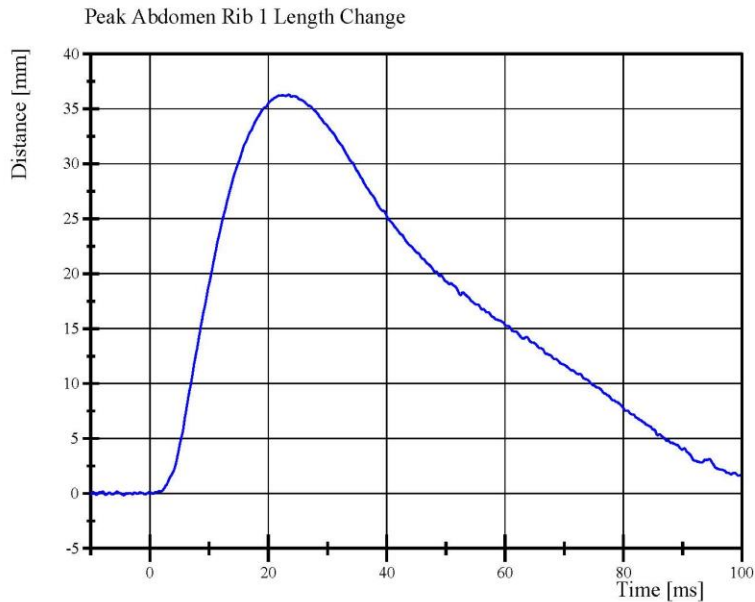
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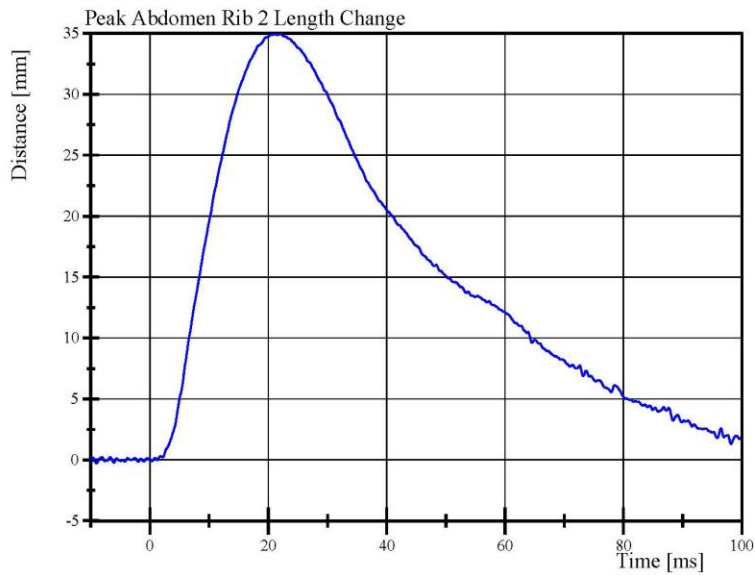
Right Lateral Abdomen

WorldSID 50th Serial No. EA7820 Certification No. 1-3

Test Date: 2/11/2021



Filter Class: CFC_600
Max: 36.3 mm at 23.5 ms
Min: -0.2 mm at -4.4 ms



Filter Class: CFC_600
Max: 34.9 mm at 22.1 ms
Min: -0.3 mm at -9.1 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

03.23.2021 15:45:25 1006



Report Number: EA7820_WSH01

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Transportation Research Center Inc.

Right Lateral Pelvis
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 2/12/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.70 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,997.9 N	Yes
Pelvis Lateral Acceleration	(-38.5) - (-48.5) g	-42.14 g	Yes
Lower Spine Lateral Acceleration	(-10) - (-14) g	-13.2 g	Yes
Pubic Lateral Force	(-1,300) - (-1,590) N	-1,393.2 N	Yes
Sacroiliac Lateral Force	(-1,860) - (-2,280) N	-2,135.9 N	Yes

Test meets specifications.

Condition: Used

Comments:

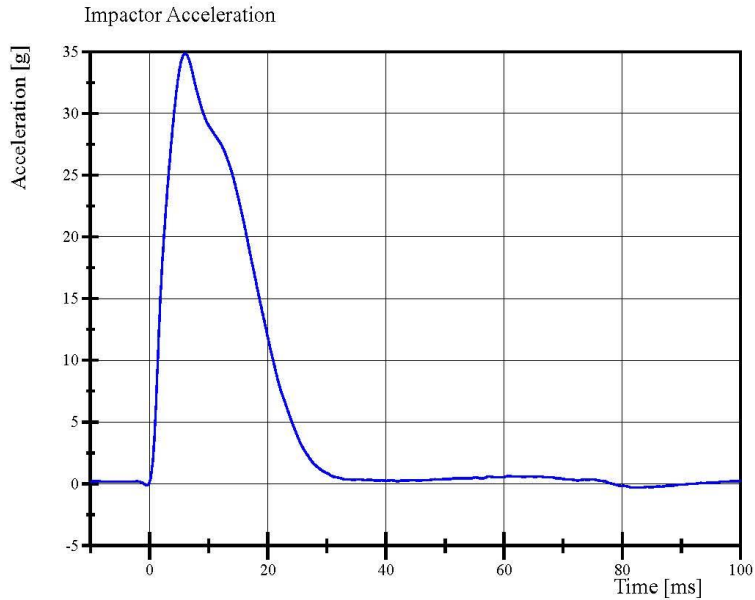
Pelvis Skin S/N: EA7060

Transportation Research Center Inc.

Right Lateral Pelvis

WorldSID 50th Serial No. EA7820 Certification No. 1-1

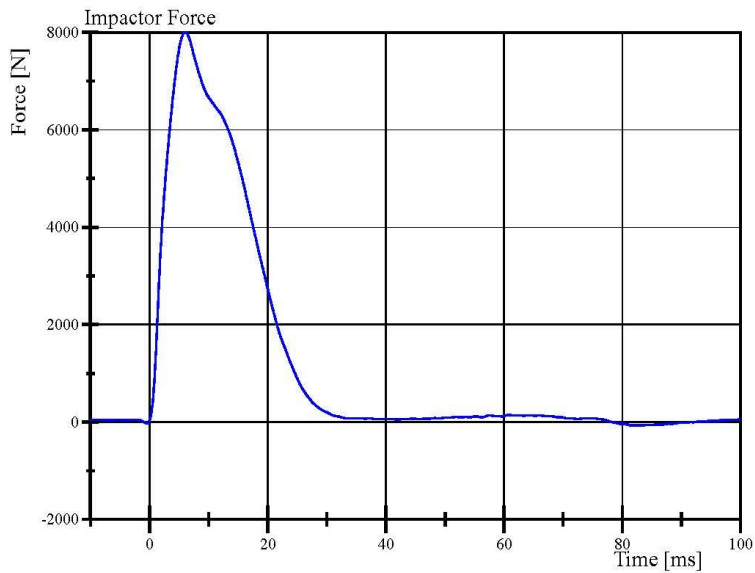
Test Date: 2/12/2021



Filter Class: CFC_180

Max: 34.8 g at 6.1 ms

Min: -0.3 g at 83.1 ms



Filter Class: CFC_180

Max: 7,997.9 N at 6.1 ms

Min: -72.8 N at 83.1 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

02.12.2021 14:20:50 998

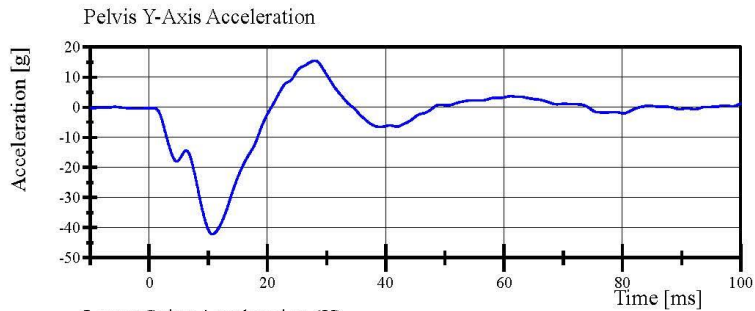
Report Number: EA7820_WSH01

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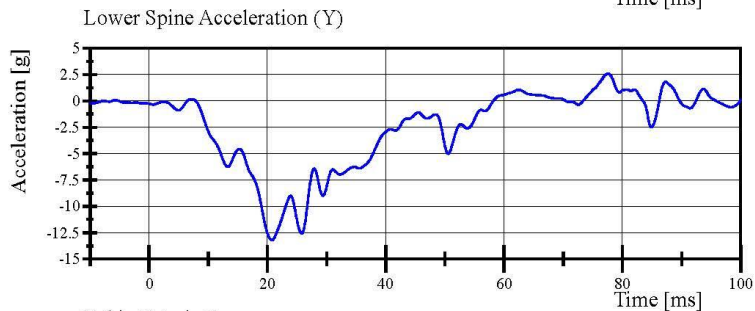


Transportation Research Center Inc.

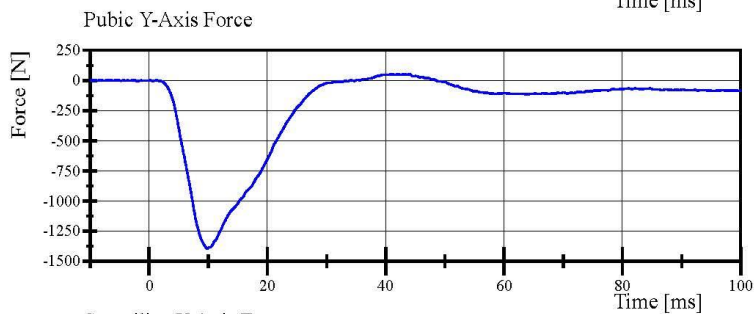
Right Lateral Pelvis
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 2/12/2021



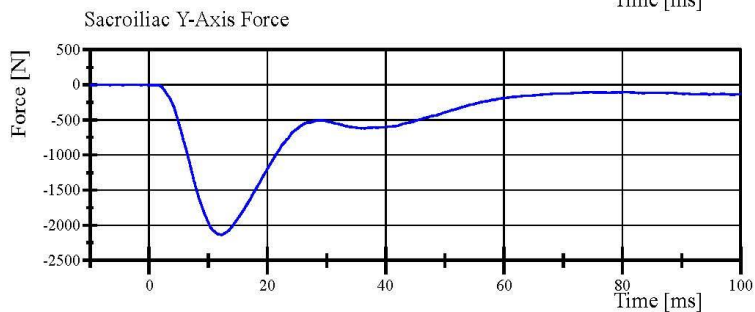
Filter Class: CFC_180
Max: 15.5 g at 28.0 ms
Min: -42.1 g at 10.7 ms



Filter Class: CFC_180
Max: 2.6 g at 77.6 ms
Min: -13.2 g at 20.8 ms



Filter Class: CFC_600
Max: 54.4 N at 44.1 ms
Min: -1,393.2 N at 9.8 ms



Filter Class: CFC_600
Max: 2.6 N at -5.9 ms
Min: -2,135.9 N at 12.3 ms

**WorldSID-50M Right Shoulder Qualification
Test Results Summary**

Dummy Serial Number: EA7820

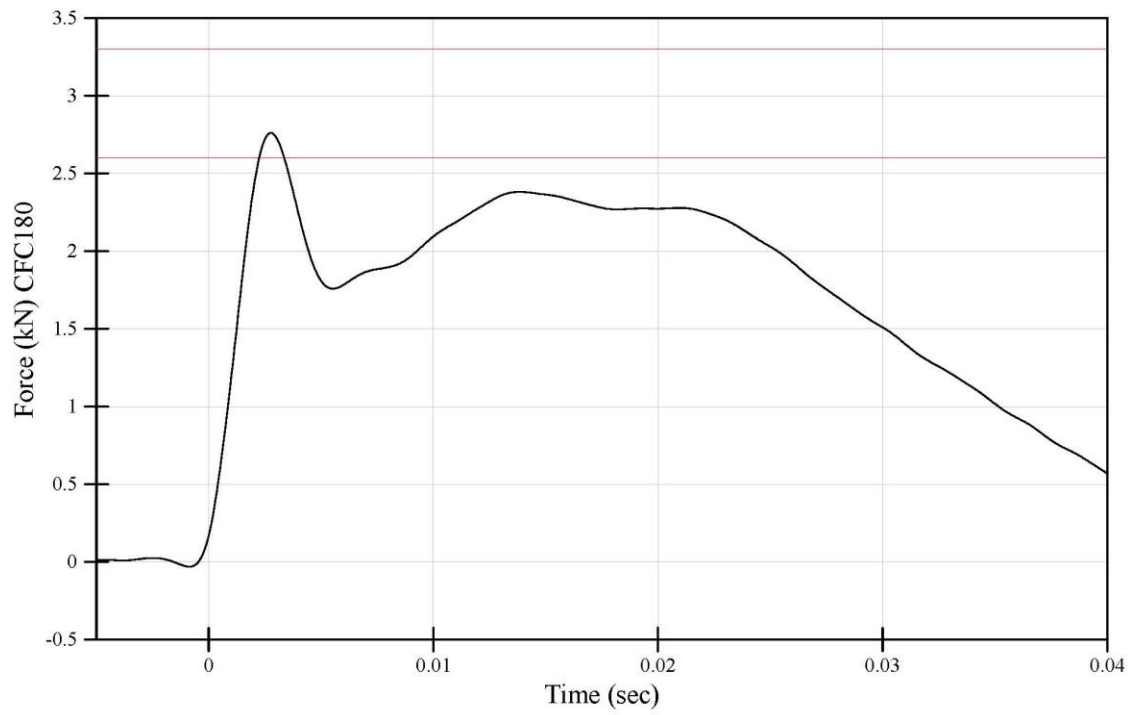
<u>Tested Components</u>		Test ID: 210330-1
Shoulder Pad: MC-R-3	Thorax Rib 3: EI8148	Test Date: 3/30/2021
Shoulder Rib: ED9644	RibEye: 160	Test Time: 7:36 AM
Thorax Rib 1: EI6666	Impacted Arm: EE7908	
Thorax Rib 2: EI8150		

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	22.0	Pass
Test Humidity (%)	10 - 70	51	Pass
Test Velocity (m/s)	4.20 - 4.40	4.29	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	21.8	Pass
Peak Probe Force (kN)	2.60 - 3.30	2.76	Pass
Peak Shoulder Fy (kN)	-1.80 - (-1.47)	-1.65	Pass
Peak Shoulder Rib Length Change (mm)	37.0 - 46.0	40.8	Pass

* WorldSID-50M Qualification Manual - November 2020

File Name: 210330-1 processed

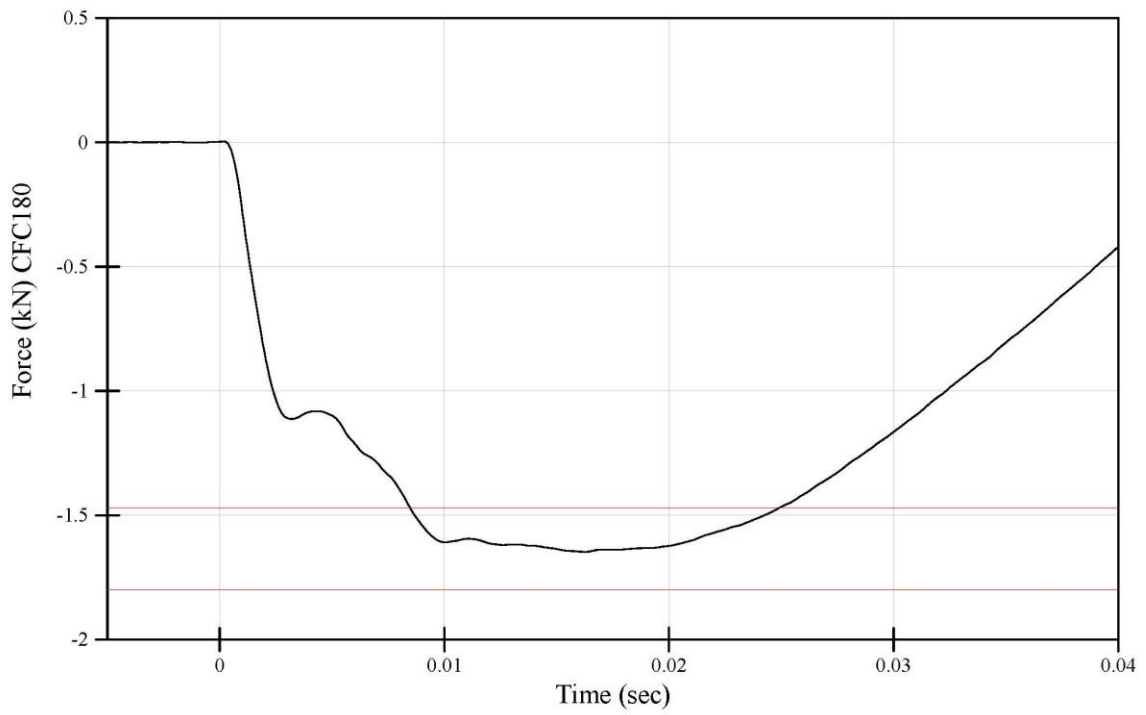
WorldSID-50M Right Shoulder Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210330-1 processed

3/30/2021 7:36 AM

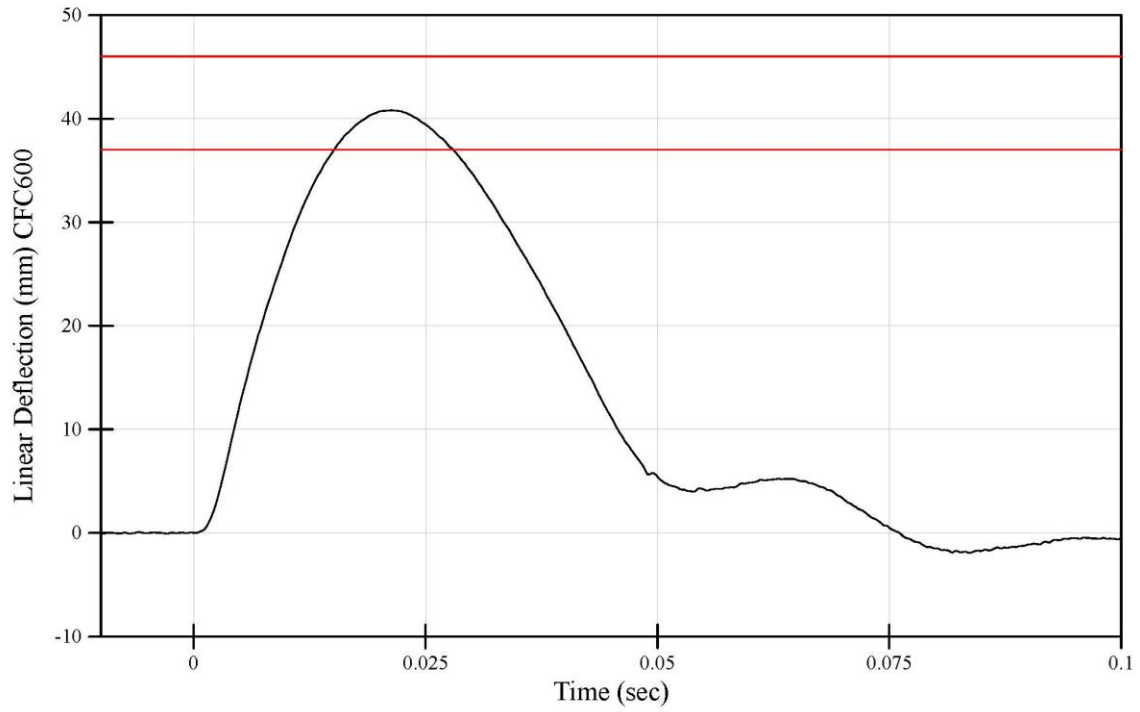
WorldSID-50M Right Shoulder Qualification
Peak Shoulder Y Force
Dummy Serial Number: EA7820



File Name: 210330-1 processed

3/30/2021 7:36 AM

WorldSID-50M Right Shoulder Qualification
Maximum Shoulder Y Deflection
Dummy Serial Number: EA7820



File Name: 210330-1 processed

3/30/2021 7:36 AM

**WorldSID-50M Right Thorax with Arm Qualification
Test Results Summary**

Dummy Serial Number: EA7820

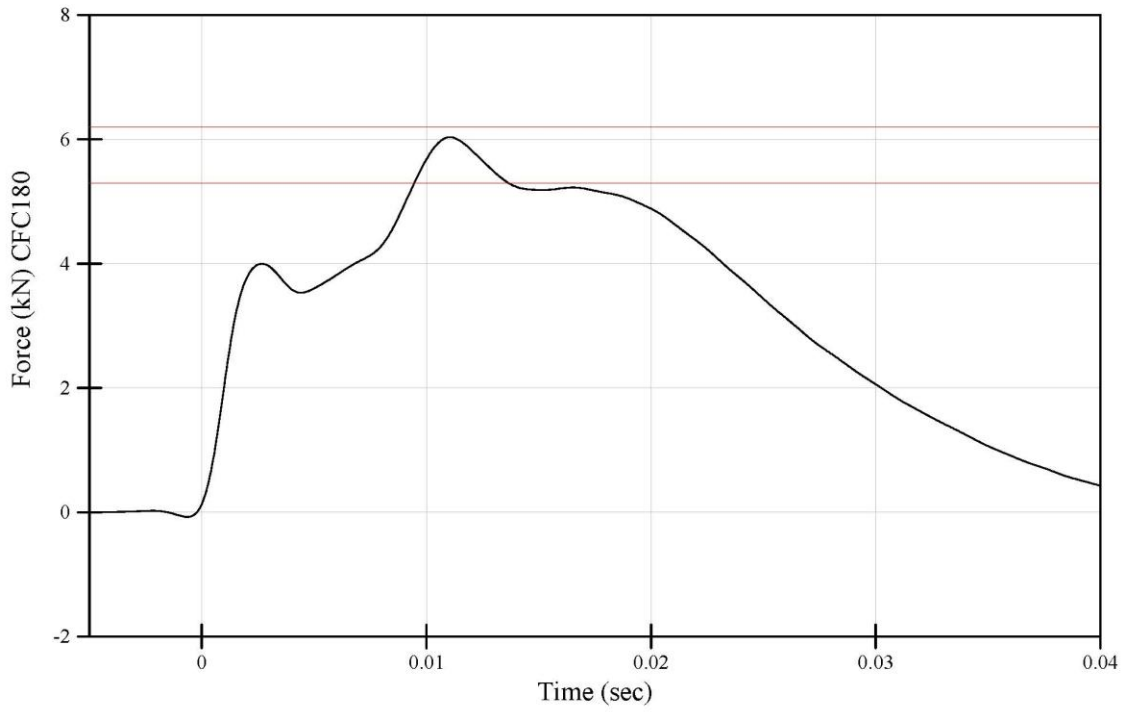
<u>Tested Components</u>		Test ID: 210325-9
Shoulder Rib: ED9644	RibEye: 160	Test Date: 3/25/2021
Thorax Rib 1: EI6666	Impacted Arm: EE7908	Test Time: 2:58 PM
Thorax Rib 2: EI8150		
Thorax Rib 3: EI8148		

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.0	Pass
Test Humidity (%)	10 - 70	49	Pass
Test Velocity (m/s)	6.60 - 6.80	6.68	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.3	Pass
Peak Probe Force (kN)	5.30 - 6.20	6.03	Pass
Peak Thorax Rib 1 Length Change (mm)	35.0 - 47.0	39.5	Pass
Peak Thorax Rib 2 Length Change (mm)	46.0 - 56.0	46.4	Pass
Peak Thorax Rib 3 Length Change (mm)	33.5 - 40.5	34.9	Pass
Peak T4 Acceleration (g)	-37.0 - (-28.0)	-33.0	Pass
Peak T12 Acceleration (g)	-28.0 - (-22.0)	-24.4	Pass

* WorldSID-50M Qualification Manual - November 2020

File Name: 210325-9 processed

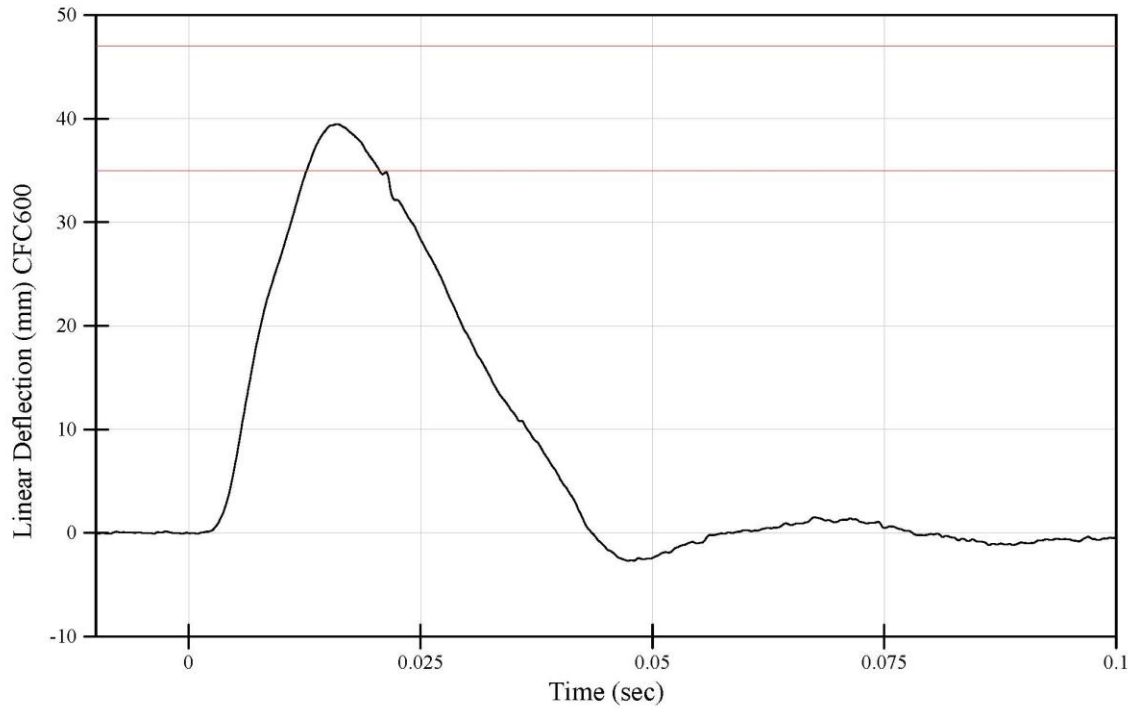
WorldSID-50M Left Thorax with Arm Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

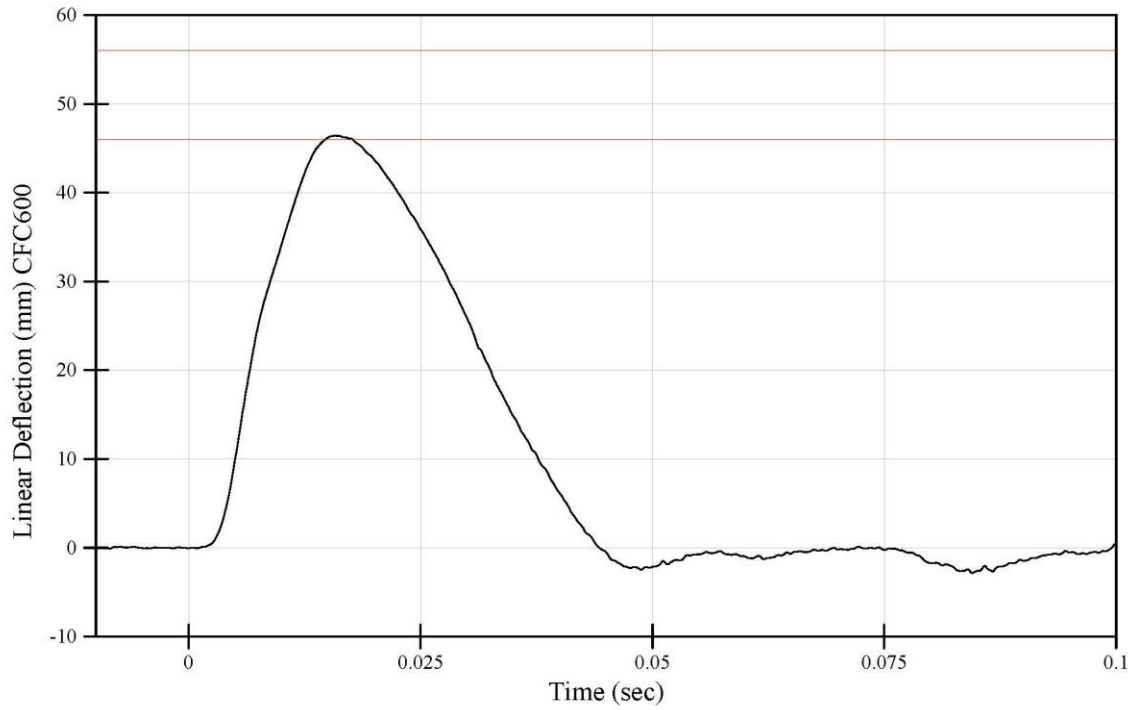
WorldSID-50M Left Thorax with Arm Qualification
Max Thorax Rib 1 Y Deflection
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

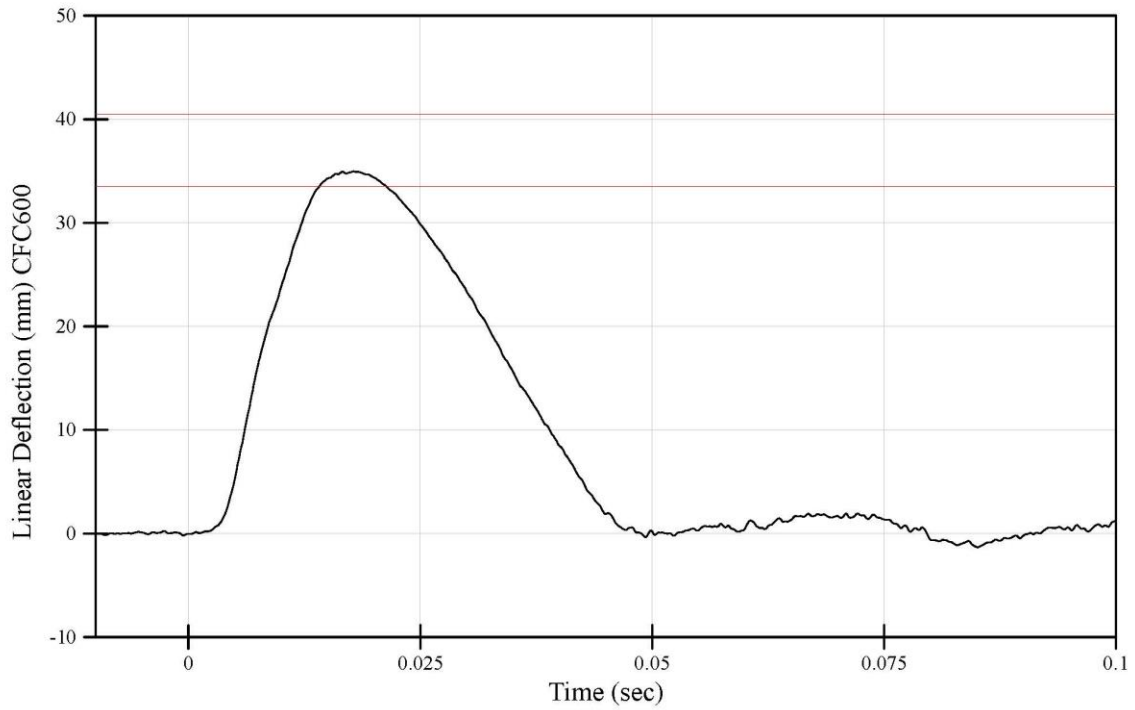
WorldSID-50M Left Thorax with Arm Qualification
Max Thorax Rib 2 Y Deflection
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

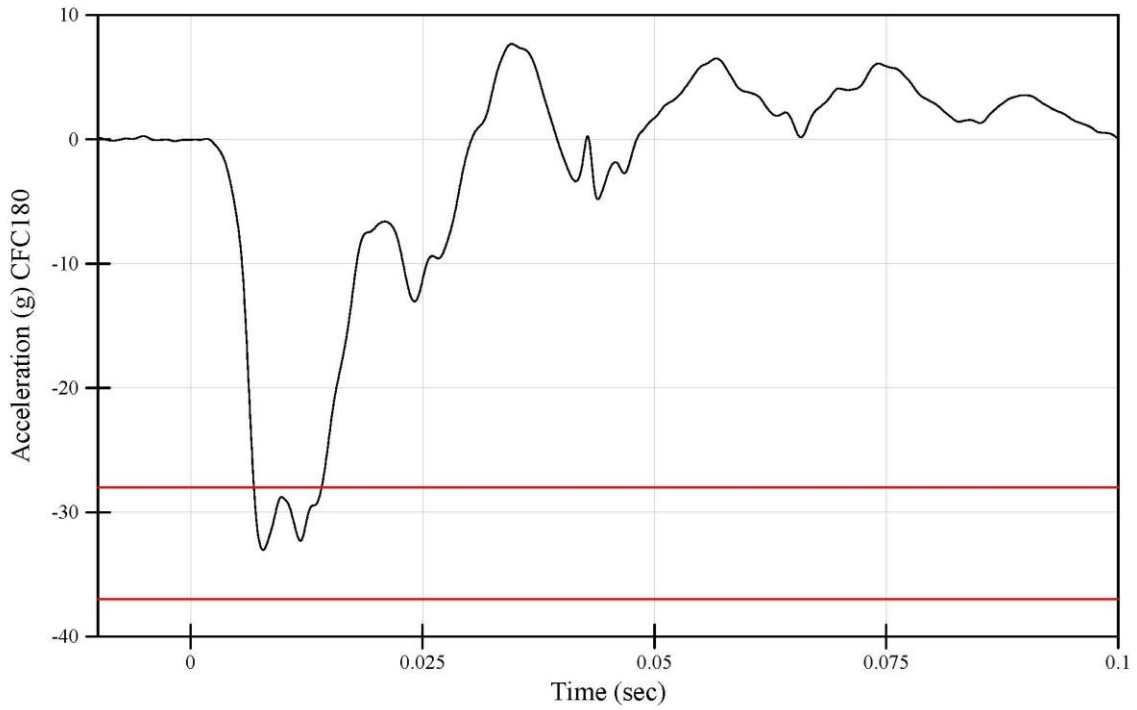
WorldSID-50M Left Thorax with Arm Qualification
Max Thorax Rib 3 Y Deflection
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

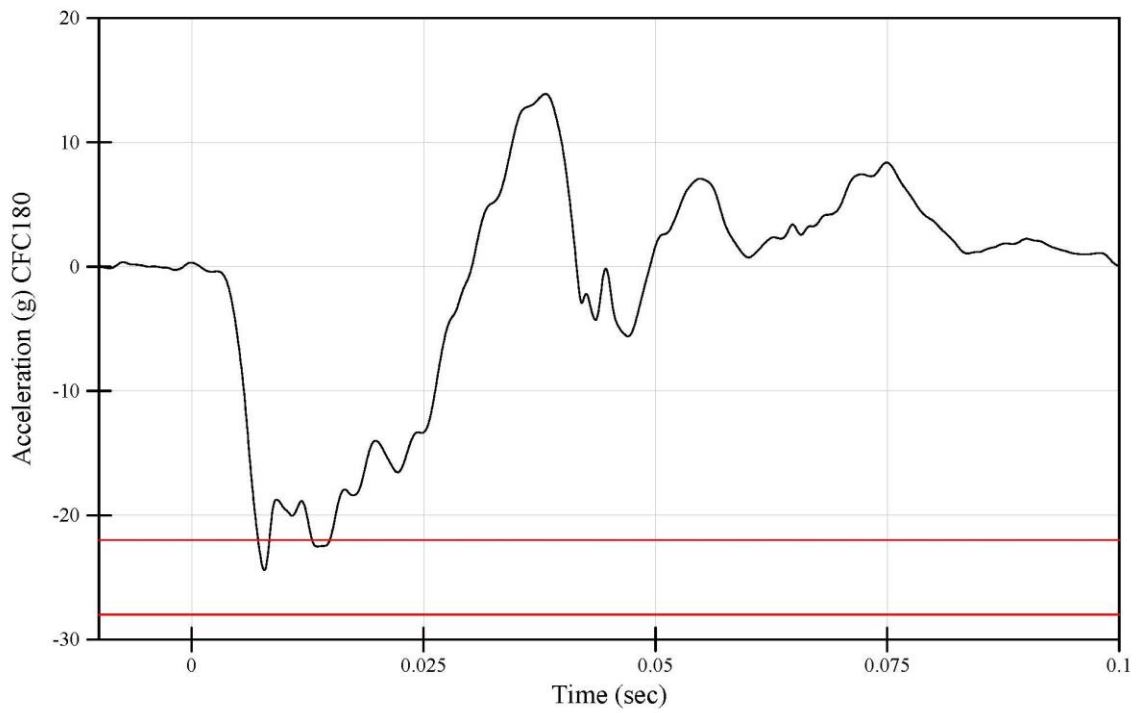
WorldSID-50M Left Thorax with Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

WorldSID-50M Left Thorax with Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

**WorldSID-50M Right Thorax without Arm Qualification
Test Results Summary**

Dummy Serial Number: EA7820

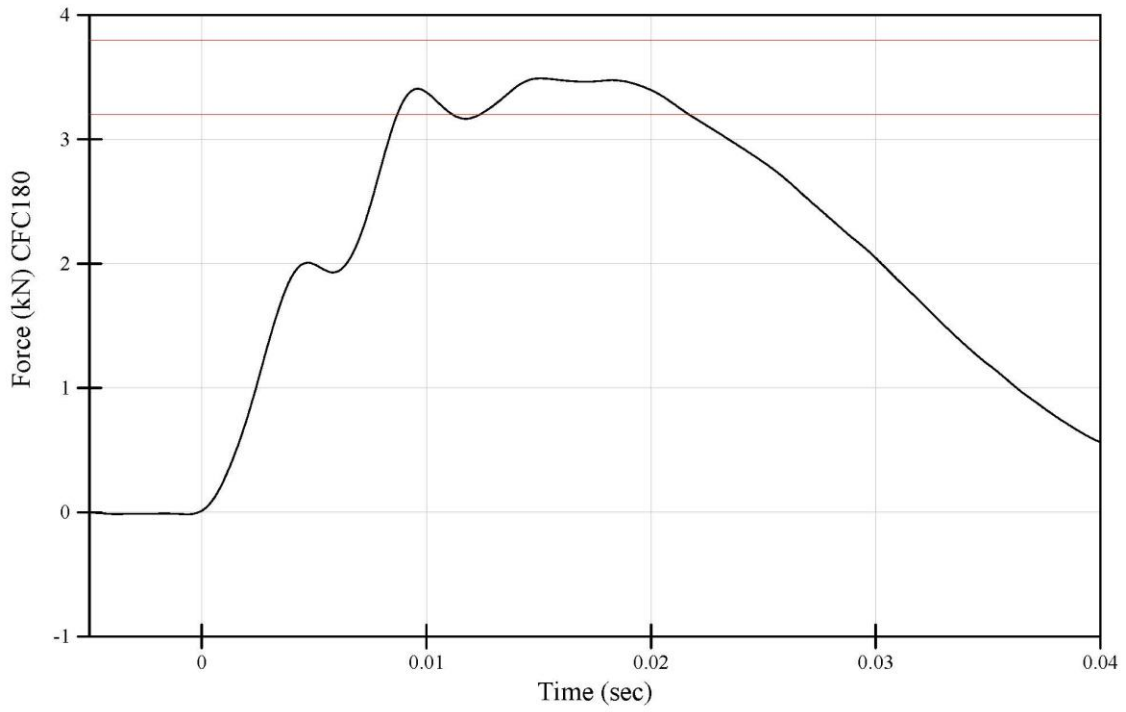
<u>Tested Components</u>		Test ID: 210329-2
Shoulder Rib: ED9644	Thorax Rib 3: EI8148	Test Date: 3/29/2021
Thorax Rib 1: EI6666	RibEye: 160	Test Time: 2:25 PM
Thorax Rib 2: EI8150		

<u>Test Results</u>			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.7	Pass
Test Humidity (%)	10 - 70	55	Pass
Test Velocity (m/s)	4.20 - 4.40	4.28	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	21.7	Pass
Peak Probe Force (kN)	3.20 - 3.80	3.49	Pass
Peak Thorax Rib 1 Length Change (mm)	33.0 - 43.0	36.3	Pass
Peak Thorax Rib 2 Length Change (mm)	35.0 - 43.0	38.1	Pass
Peak Thorax Rib 3 Length Change (mm)	32.0 - 40.0	33.6	Pass
Peak T4 Acceleration (g)	-20.0 - (-14.0)	-16.2	Pass
Peak T12 Acceleration (g)	-22.0 - (-14.0)	-14.6	Pass

* WorldSID-50M Qualification Manual - November 2020

File Name: 210329-2 processed

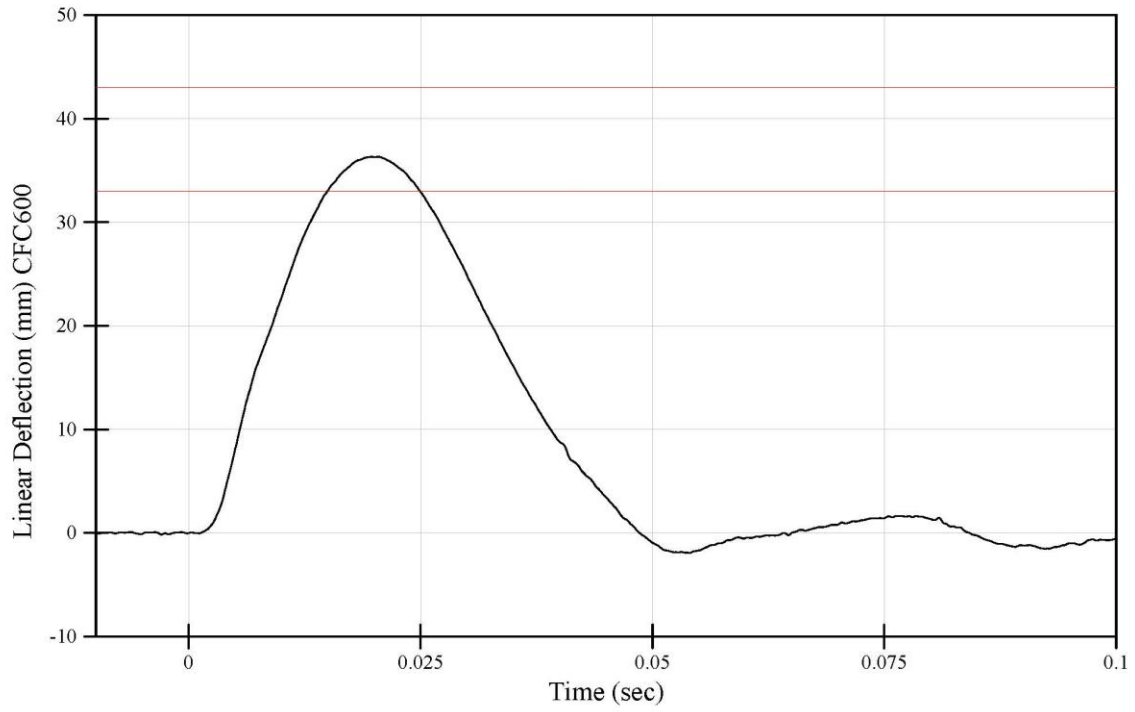
WorldSID-50M Right Thorax without Arm Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

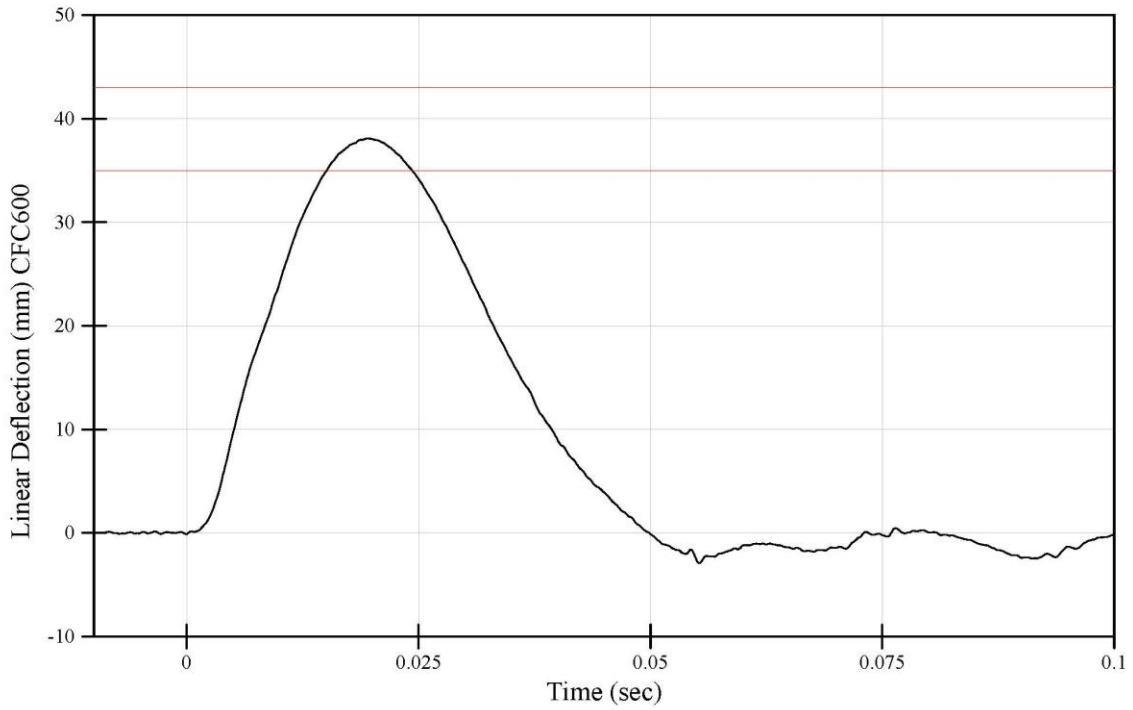
WorldSID-50M Right Thorax without Arm Qualification
Max Thorax Rib 1 Y Deflection
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

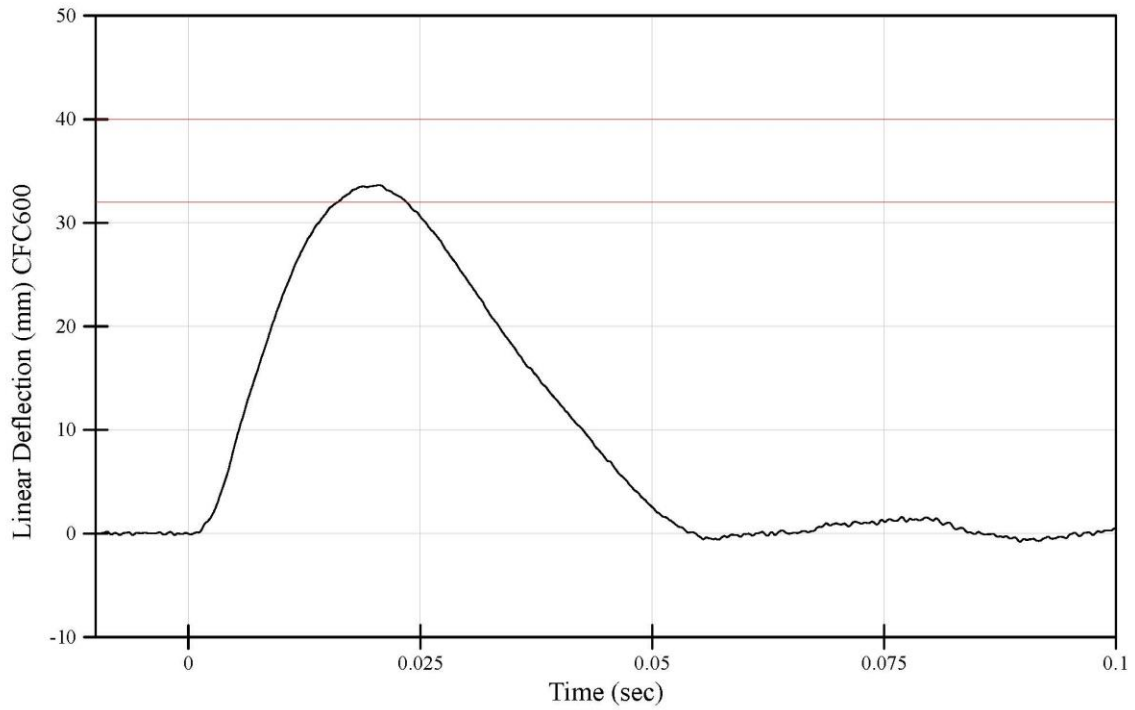
WorldSID-50M Right Thorax without Arm Qualification
Max Thorax Rib 2 Y Deflection
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

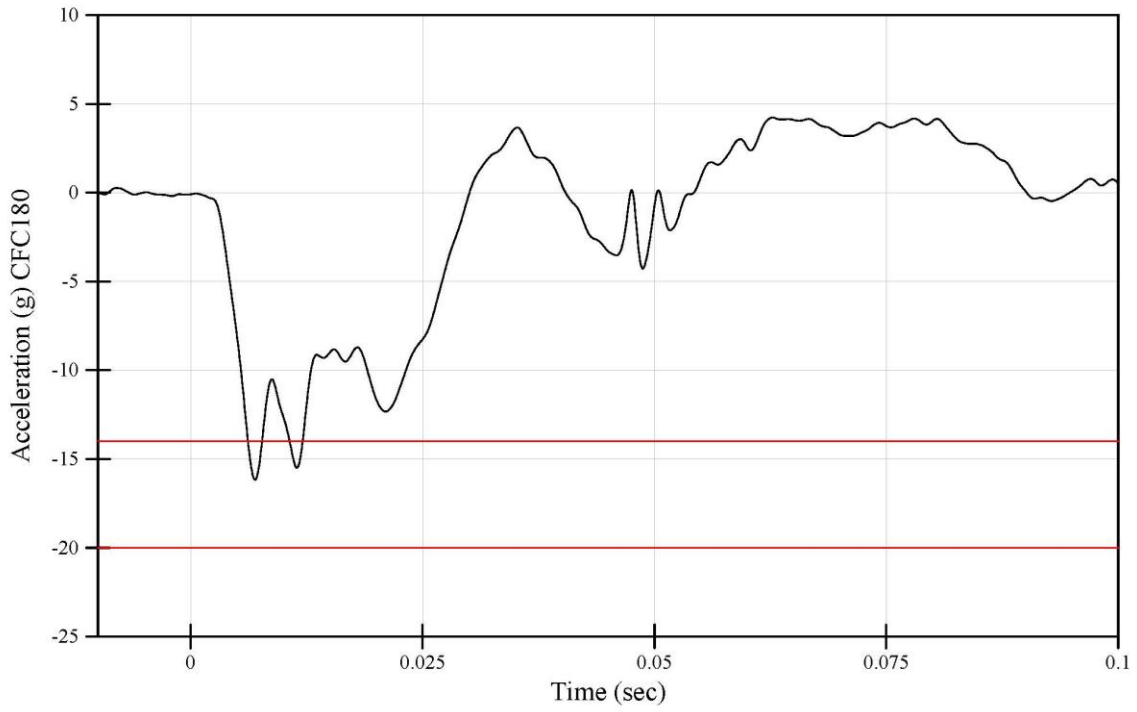
WorldSID-50M Right Thorax without Arm Qualification
Max Thorax Rib 3 Y Deflection
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

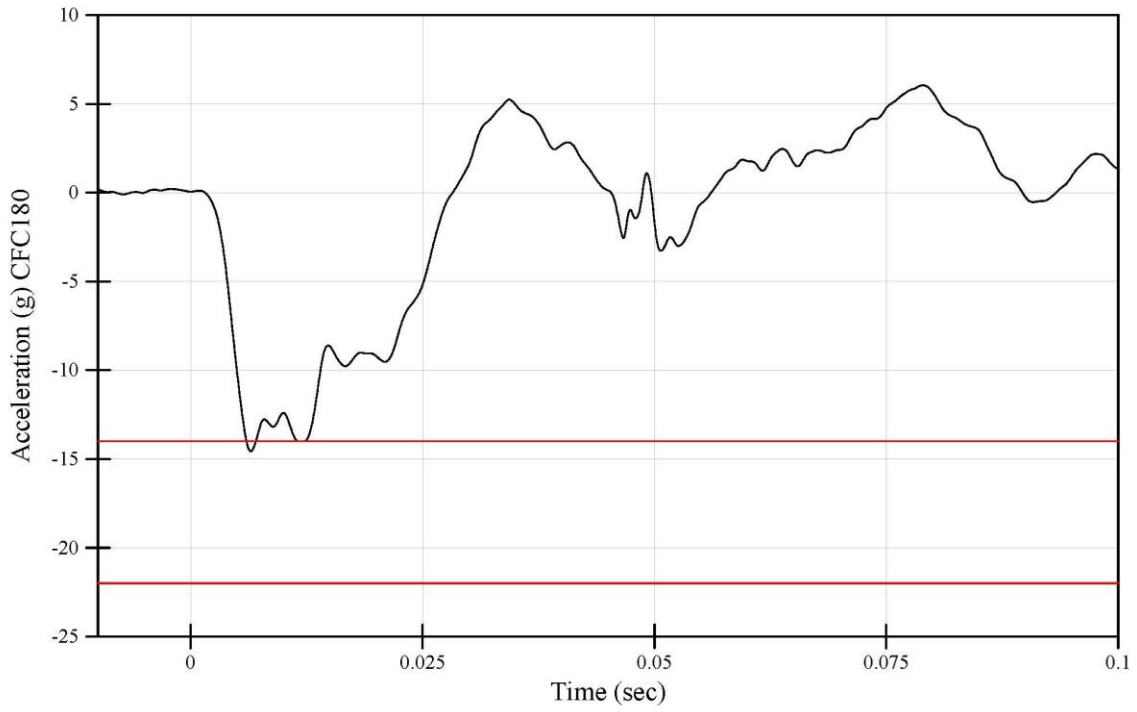
WorldSID-50M Right Thorax without Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

WorldSID-50M Right Thorax without Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

**WorldSID-50M Right Abdomen Qualification
Test Results Summary**

Dummy Serial Number: EA7820

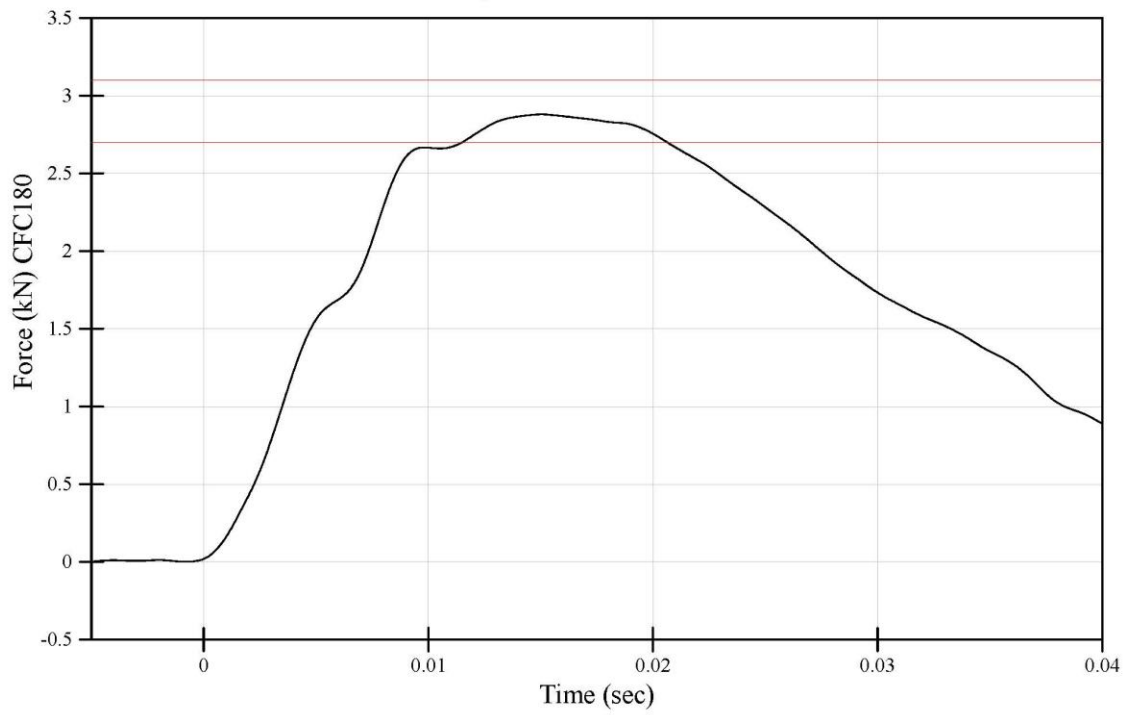
<u>Tested Components</u> Abdomen Rib 1: DW8877 Abdomen Rib 2: DW8878 RibEye: 160	Test ID: 210330-2 Test Date: 3/30/2021 Test Time: 10:36 AM
---	--

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.6	Pass
Test Humidity (%)	10 - 70	53	Pass
Test Velocity (m/s)	4.20 - 4.40	4.29	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.2	Pass
Peak Probe Force (kN)	2.70 - 3.10	2.88	Pass
Peak Abdomen Rib 1 Length Change (mm)	32.5 - 39.5	36.0	Pass
Peak Abdomen Rib 2 Length Change (mm)	32.0 - 38.0	33.4	Pass
Peak T12 Acceleration (g)	-19.5 - (-14.5)	-16.4	Pass

* WorldSID-50M Qualification Manual - November 2020

File Name: 210330-2 processed

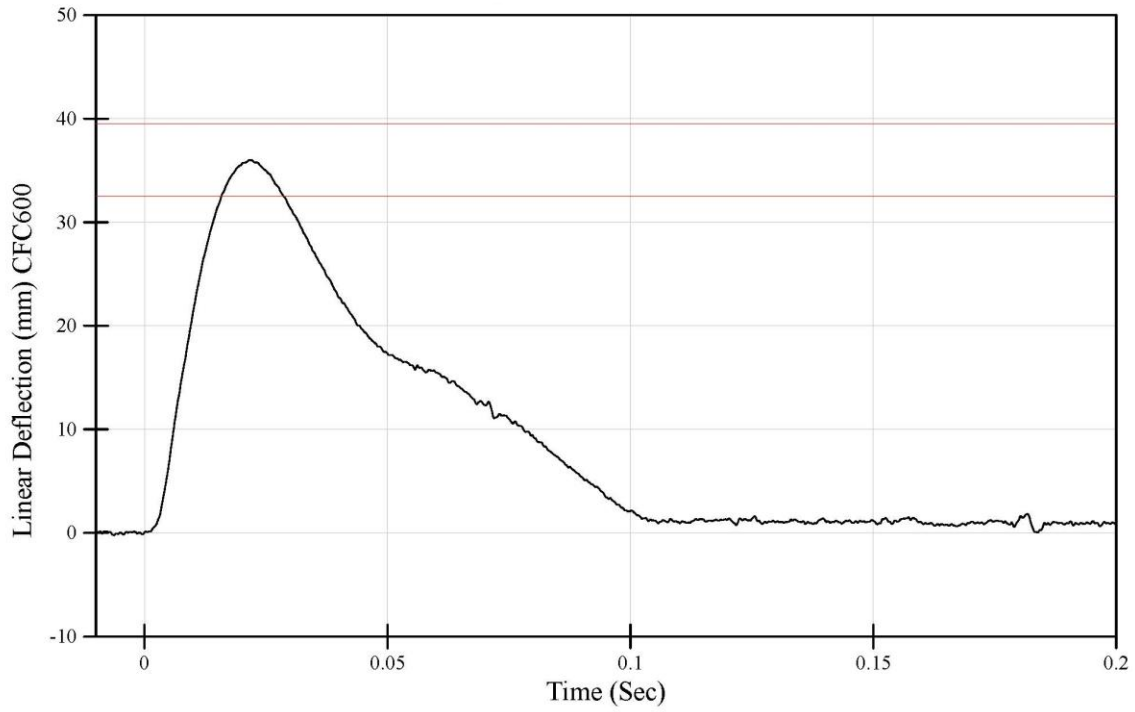
WorldSID-50M Right Abdomen Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210330-2.processed

3/30/2021 10:36 AM

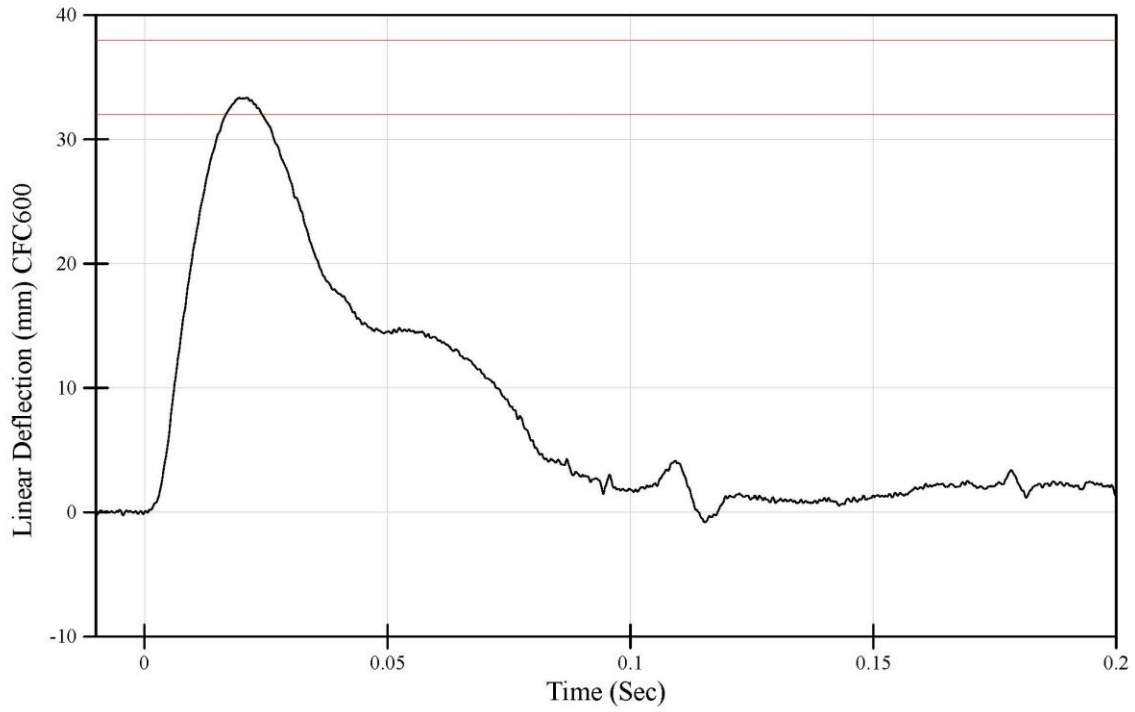
WorldSID-50M Right Abdomen Qualification
Max Abdomen Rib 1 Y Deflection
Dummy Serial Number: EA7820



File Name: 210330-2.processed

3/30/2021 10:36 AM

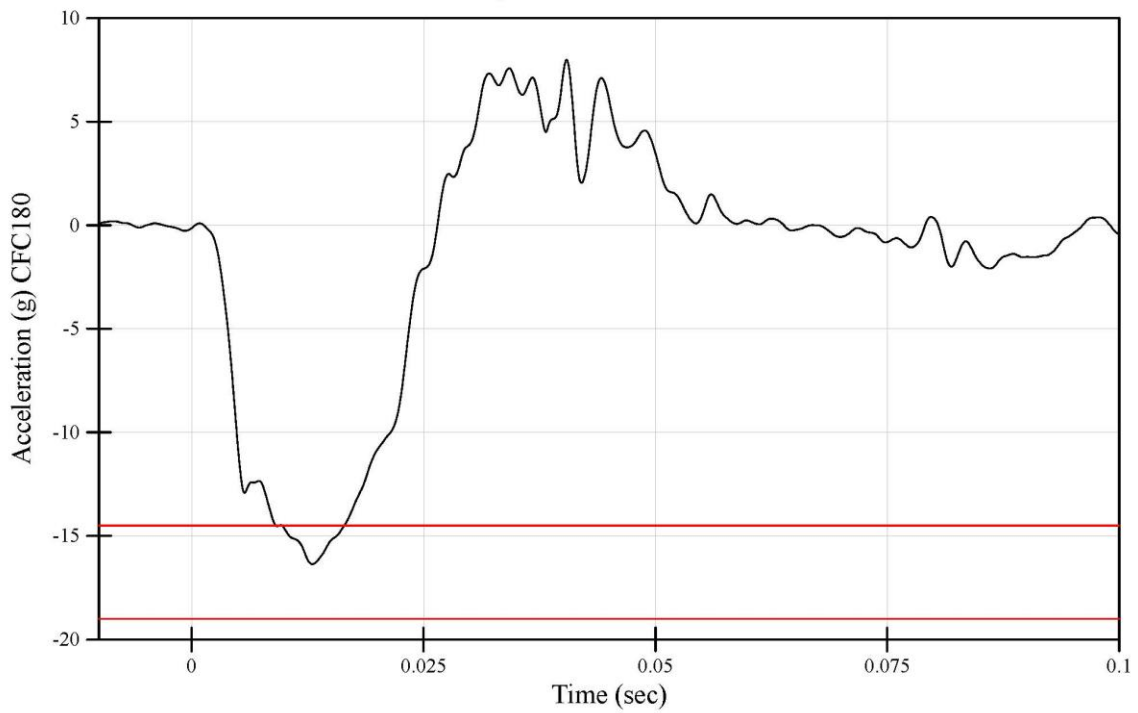
WorldSID-50M Right Abdomen Qualification
Max Abdomen Rib 2 Y Deflection
Dummy Serial Number: EA7820



File Name: 210330-2.processed

3/30/2021 10:36 AM

WorldSID-50M Right Abdomen Qualification
T12 Acceleration along Y axis
Dummy Serial Number: EA7820



File Name: 210330-2.processed

3/30/2021 10:36 AM

**WorldSID-50M Right Pelvis Qualification
Test Results Summary**

Dummy Serial Number: EA7820

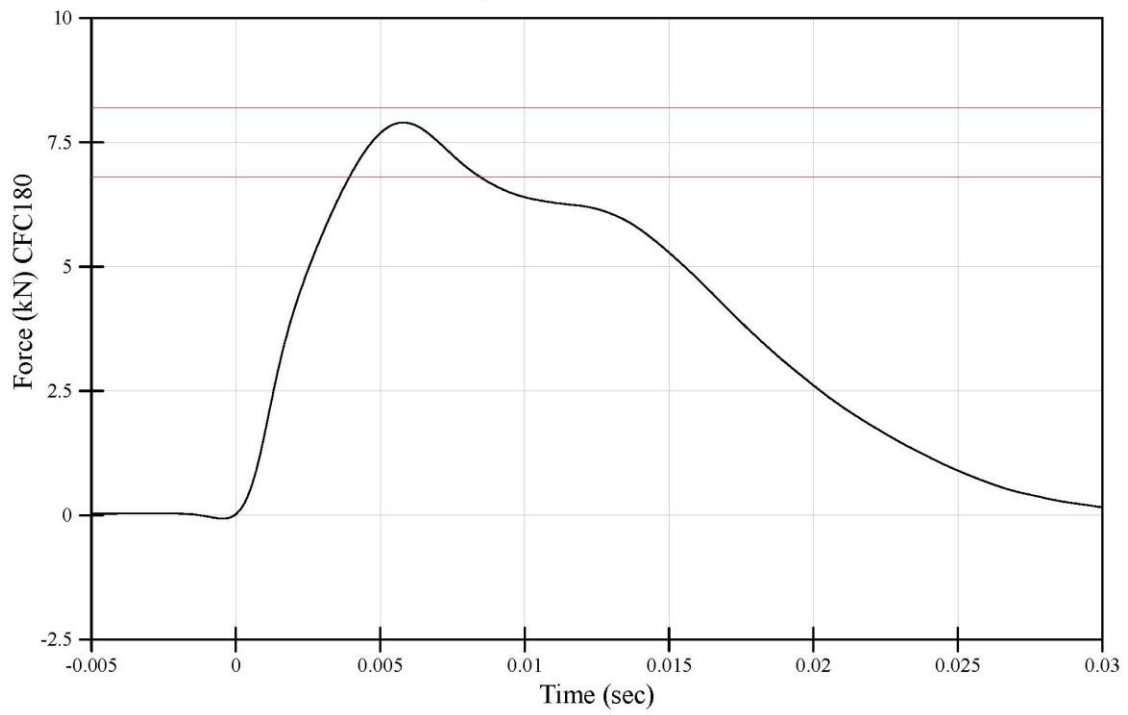
<u>Tested Components</u> Pelvis Flesh: EA7060 Pelvic Bone: EA5031	Test ID: 210331-3 Test Date: 3/31/2021 Test Time: 8:00 AM
---	---

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	20.9	Pass
Test Humidity (%)	10 - 70	51	Pass
Test Velocity (m/s)	6.60 - 6.80	6.68	Pass
Peak Probe Force (kN)	6.80 - 8.20	7.90	Pass
Peak Pubic Force FY (kN)	-1.6 - (-1.3)	-1.39	Pass
Peak Sacroiliac Force FY (kN)	-2.3 - (-1.9)	-1.90	Pass
Peak T12 Acceleration (g)	-14.0 - (-10.0)	-13.0	Pass
Peak Pelvis Acceleration (g)	-48.5 - (-38.5)	-41.3	Pass

* WorldSID-50M Qualification Manual - November 2020

File Name: 210331-3 processed

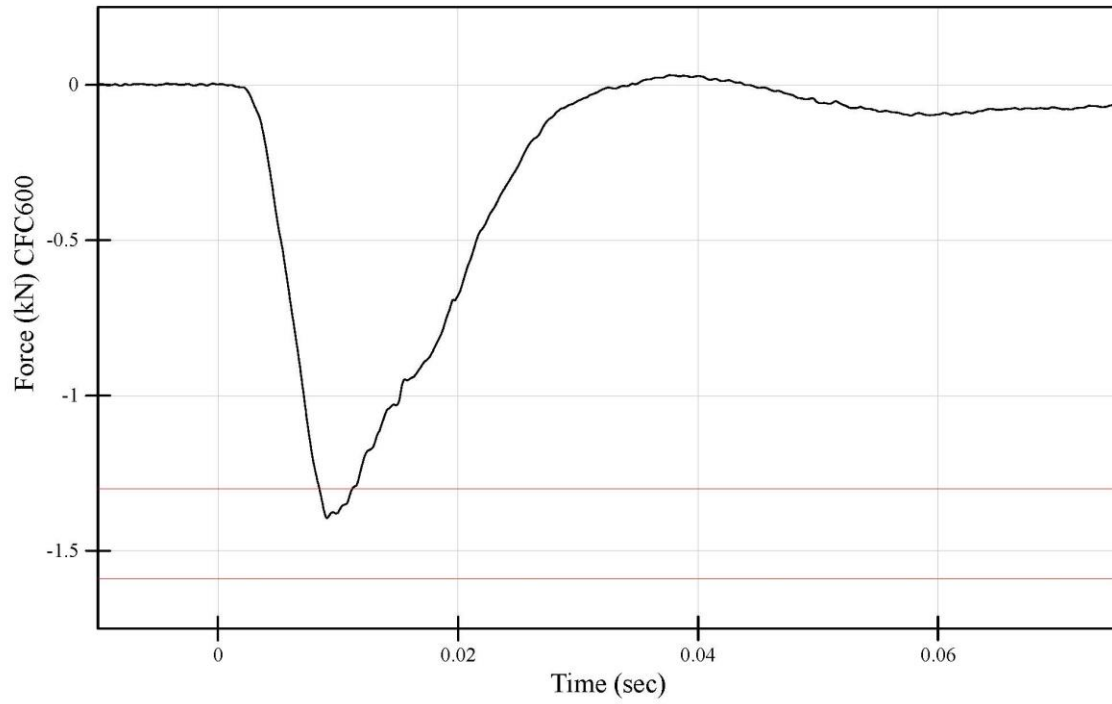
WorldSID-50M Right Pelvis Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

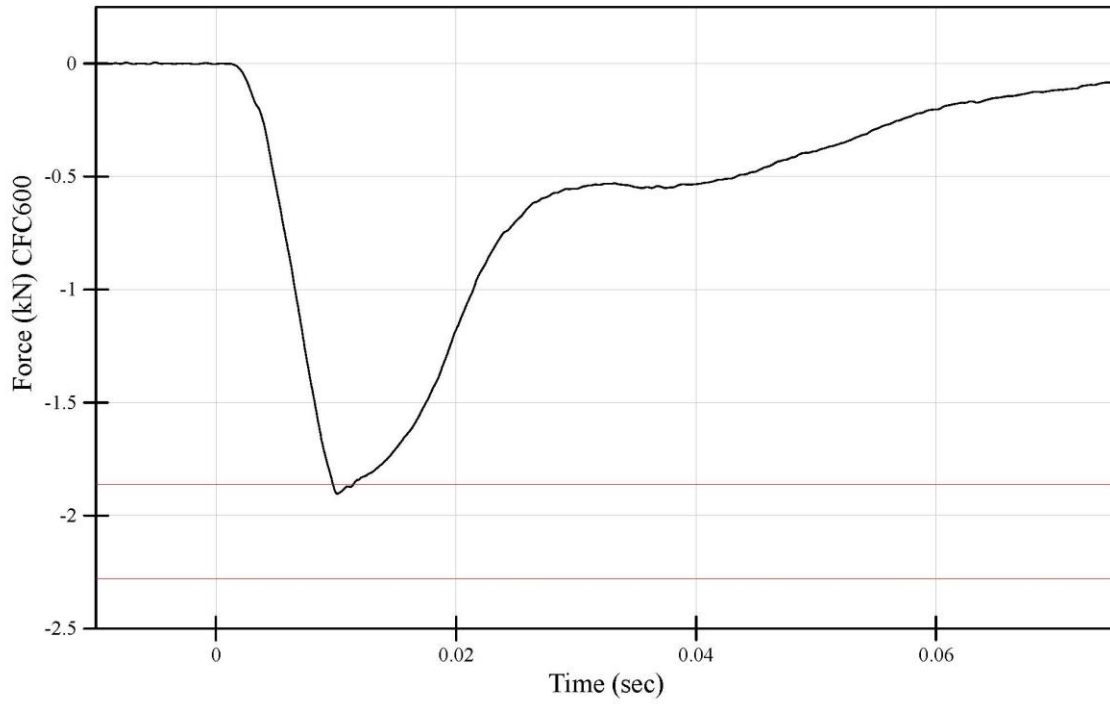
WorldSID-50M Right Pelvis Qualification
Peak Pubic Y axis Force
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

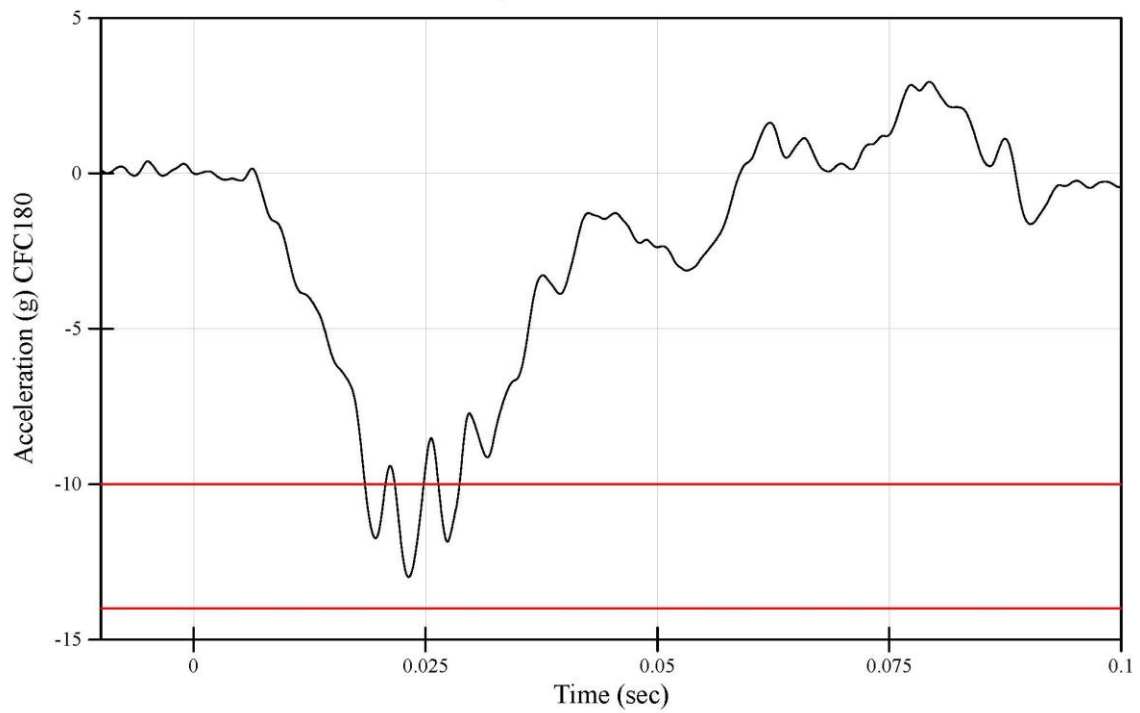
WorldSID-50M Right Pelvis Qualification
Peak Sacro-Iliac Y axis Force
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

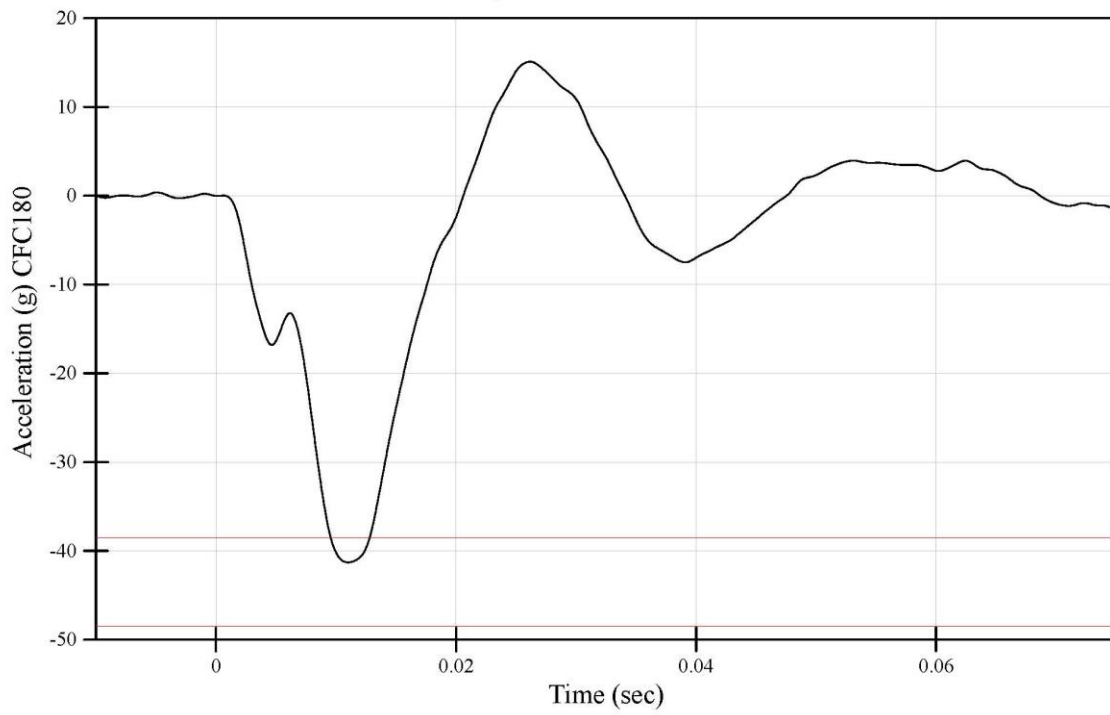
WorldSID-50M Right Pelvis Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

WorldSID-50M Right Pelvis Qualification
Peak Pelvis Y Axis Acceleration
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

Post-Test Calibration Sheets
Driver S/N EA7820

Transportation Research Center Inc.
WorldSID-50M
External Measurements
Serial No. EA7820 Qualification No. 03

WorldSID-50M Angular Reference Measurements					
Parameter	Symbol	Tilt Sensor (°)	Inclinometer (°)		
			Center	Left	Right
Head X-Axis	A1	0	n/a	n/a	n/a
Head Y-Axis	A2	2.2	n/a	2	Note 1
Neck Bracket X-Axis	A3	n/a	-0.5	n/a	n/a
Neck Bracket Y-Axis	A4	n/a	-3.1	n/a	n/a
Thorax X-Axis	A5	1.3	n/a	n/a	n/a
Thorax Y-Axis	A6	3.9	n/a	n/a	n/a
Pelvis X-Axis	A7	0.7	n/a	n/a	n/a
Pelvis Y-Axis	A8	10.2	n/a	n/a	n/a
H-point Tool	A9	n/a	n/a	32.8	33.7

WorldSID-50M External Linear Dimensions				
Parameter	Symbol	Specification (mm)		
		Center	Left	Right
Seated Height	L1	870	n/a	n/a
Hip Pivot Height	L2	n/a	89	89
Hip Pivot to Back Line	L3	n/a	187	176
Thigh Clearance	L4	n/a	181	180
Knee Height	L5	n/a	580	583
Knee to Backline	L6	n/a	667	670
Head Back to Seat Back	L7	156	n/a	n/a
Thorax Rib 1 Front to Back	L8	n/a	209	209
Abdomen Rib 2 Front to Back	L9	n/a	223	226
Arm Length	L10	n/a	330	330
Width Across Arms	L11	482	n/a	n/a
Waist Width	L12	341	n/a	n/a

Note 1: No land marks on the right side of head. Unable to align level.

Transportation Research Center Inc.

Front Head Drop
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	211 - 261 g	229.7 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-12.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.67 %	Yes

Test meets specifications.

Condition: Used

Comments:

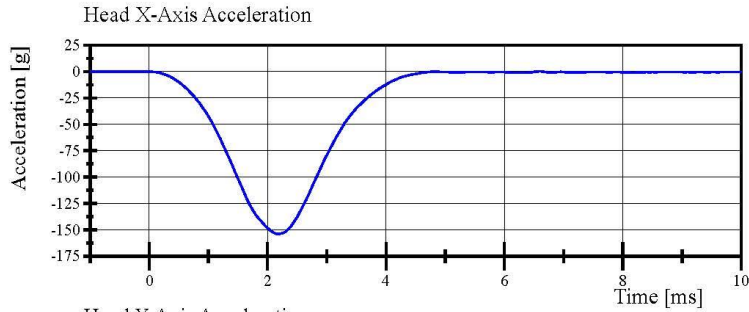
Head Skin S/N: EE8693

Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EA7820 Certification No. 3-1

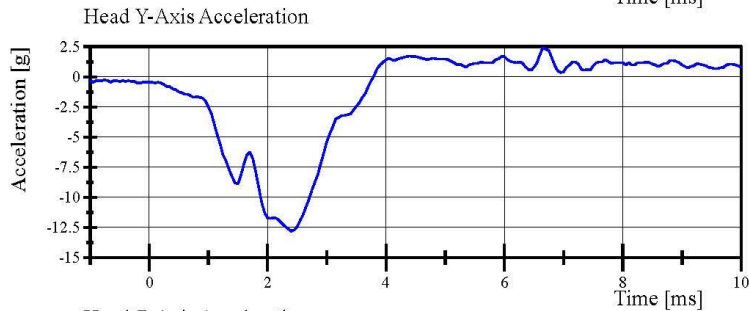
Test Date: 5/5/2021



Filter Class: CFC_1000

Max: 0.3 g at 6.6 ms

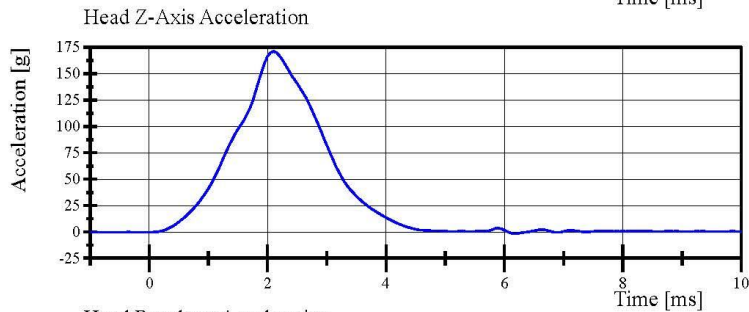
Min: -153.9 g at 2.2 ms



Filter Class: CFC_1000

Max: 2.4 g at 6.7 ms

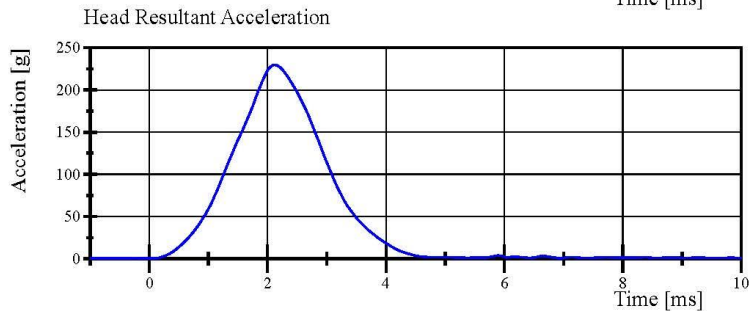
Min: -12.8 g at 2.4 ms



Filter Class: CFC_1000

Max: 171.1 g at 2.1 ms

Min: -1.7 g at 6.2 ms



Filter Class: CFC_1000

Max: 229.7 g at 2.1 ms

Min: 0.4 g at -0.5 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.05.2021 13:34:44 984



Report Number: EA7820_WSH03

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Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	121.9 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.42 %	Yes

Test meets specifications.

Condition: Used

Comments:

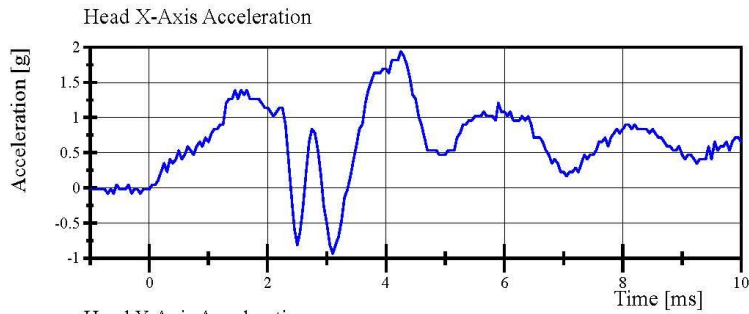
Head Skin S/N: EE8693

Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EA7820 Certification No. 3-1

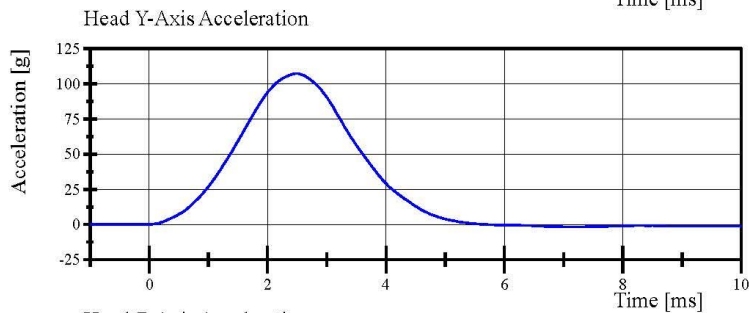
Test Date: 5/5/2021



Filter Class: CFC_1000

Max: 1.9 g at 4.3 ms

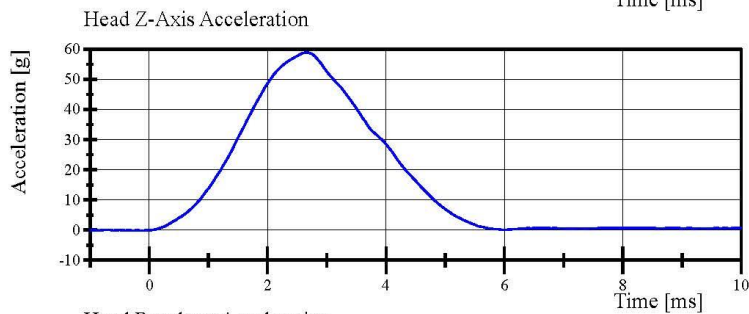
Min: -0.9 g at 3.1 ms



Filter Class: CFC_1000

Max: 107.3 g at 2.5 ms

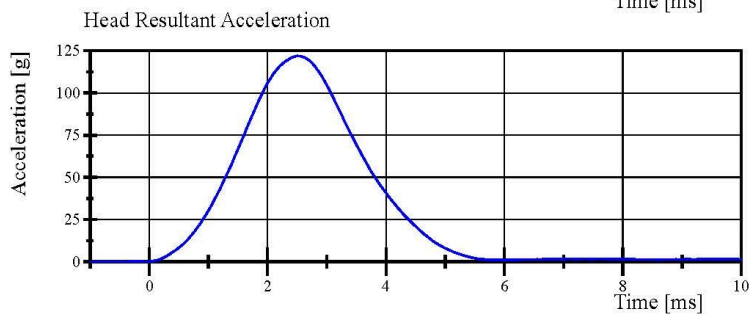
Min: -1.6 g at 7.1 ms



Filter Class: CFC_1000

Max: 58.9 g at 2.7 ms

Min: -0.2 g at -0.3 ms



Filter Class: CFC_1000

Max: 121.9 g at 2.5 ms

Min: 0.0 g at -0.5 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.05.2021 14:45:32 982



Report Number: EA7820_WSH03

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Transportation Research Center Inc.

Right Lateral Head Drop
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	121.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-5.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.86 %	Yes

Test meets specifications.

Condition: Used

Comments:

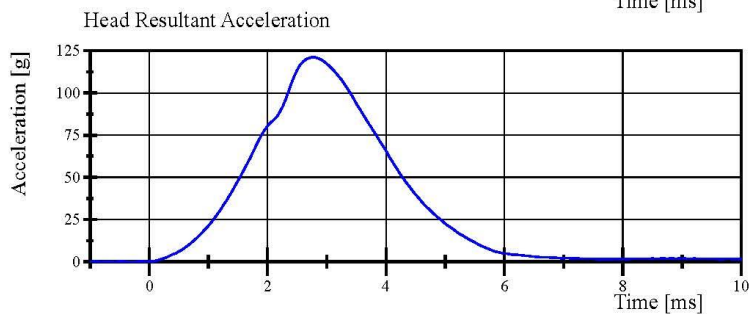
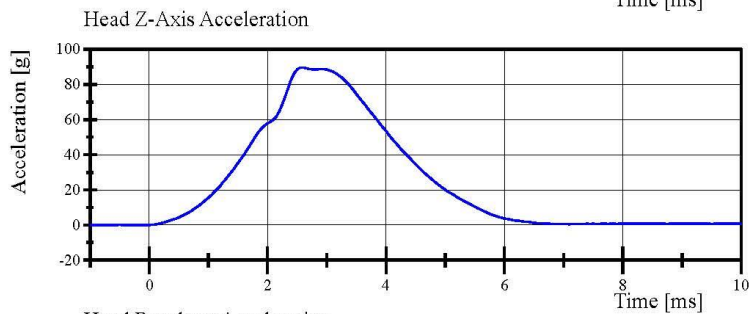
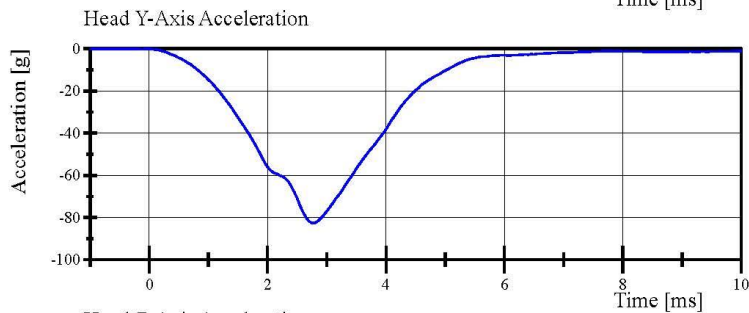
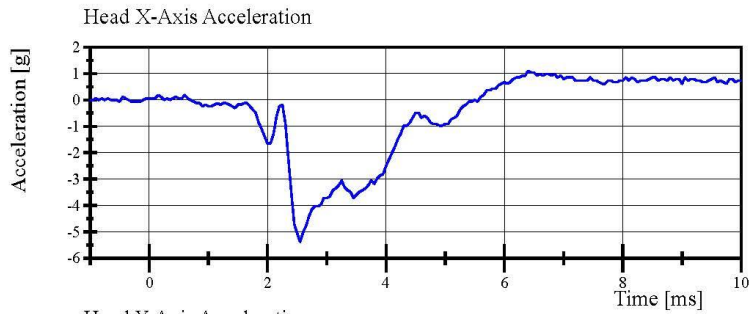
Head Skin S/N: EE8693

Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EA7820 Certification No. 3-1

Test Date: 5/5/2021



Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

Test Date: 5/7/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	(-3.30) - (-3.50) m/s	-3.324 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	0.87 - 1.09 m/s	0.952 m/s	Yes
Change at 8 ms	1.72 - 2.1 m/s	1.853 m/s	Yes
Change at 12 ms	2.63 - 3.17 m/s	2.796 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-52.9 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	60.7 ms	Yes
Total Neck Occipital Condyles Moment	54 - 67 N·m	61.1 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	77.0 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-34.3 °	Yes
Time of Peak	56 - 68 ms	60.4 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-29) - (-36) °	-30.8 °	Yes
Time of Peak	56 - 68 ms	61.4 ms	Yes
Maximum Headform Angular Rate	(-2,047) - (-2,503) %/s	-2,235.4 %/s	Yes

Test meets specifications.

Condition: Used

Comments:

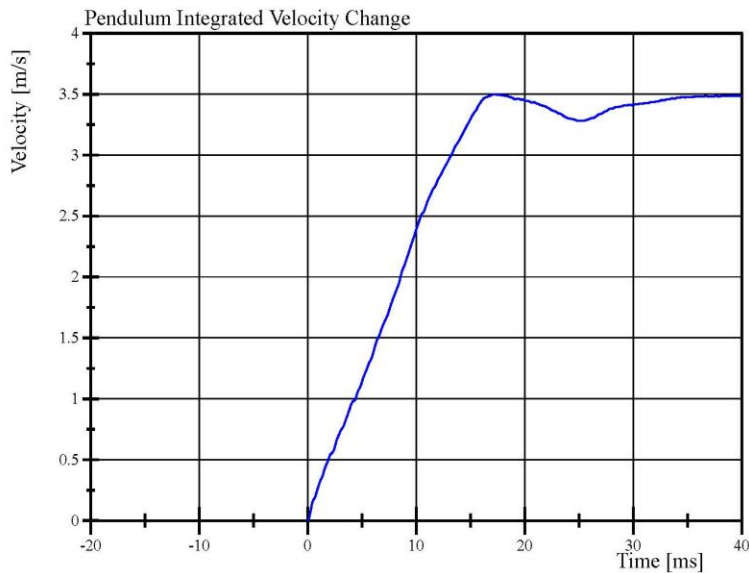
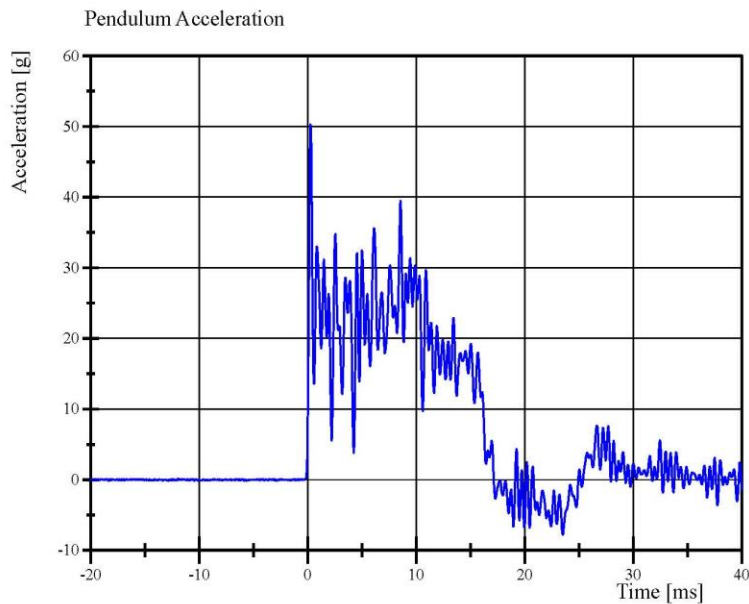
Neck S/N: DW6607

Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

Test Date: 5/7/2021



Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.07.2021 09:58:58 4010



Report Number: EA7820_WSH03

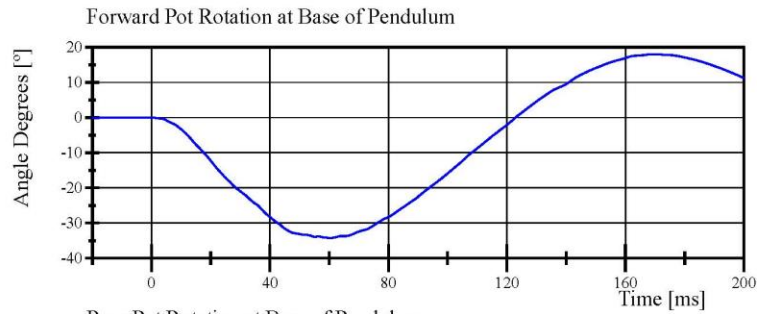
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Transportation Research Center Inc.

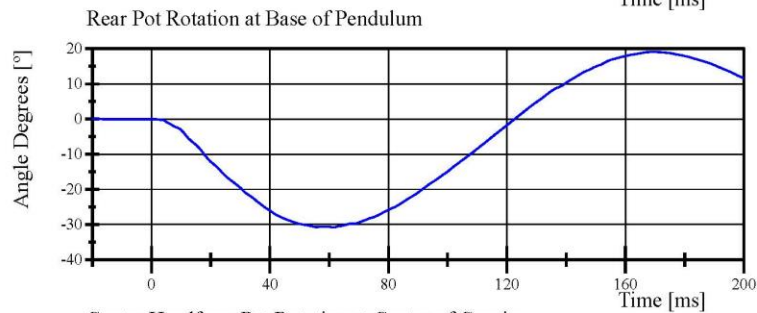
Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

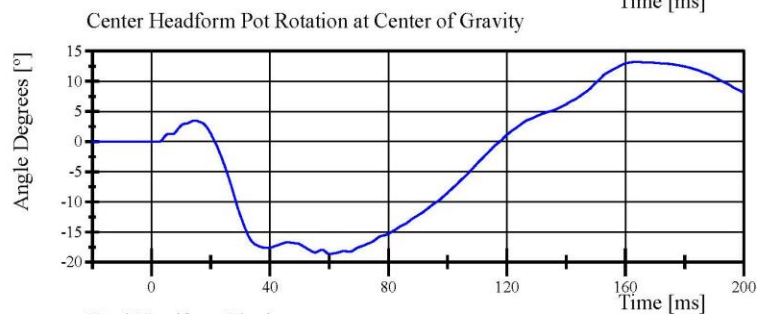
Test Date: 5/7/2021



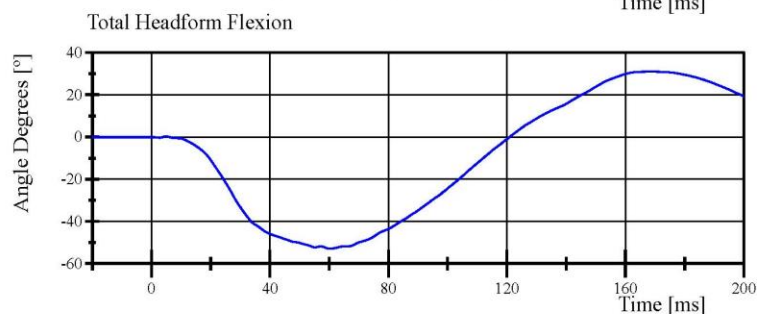
Filter Class: CFC_180
Max: 18.0 ° at 169.2 ms
Min: -34.3 ° at 60.4 ms



Filter Class: CFC_180
Max: 19.1 ° at 169.9 ms
Min: -30.8 ° at 61.4 ms



Filter Class: CFC_180
Max: 13.2 ° at 163.3 ms
Min: -18.7 ° at 60.1 ms



Filter Class: CFC_180
Max: 31.1 ° at 168.4 ms
Min: -52.9 ° at 60.2 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.07.2021 09:58:58 4010

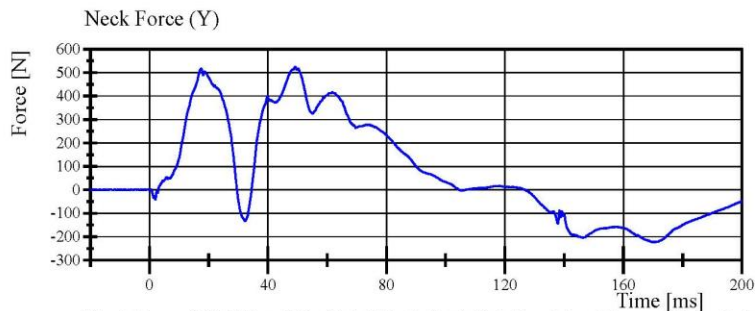


Transportation Research Center Inc.

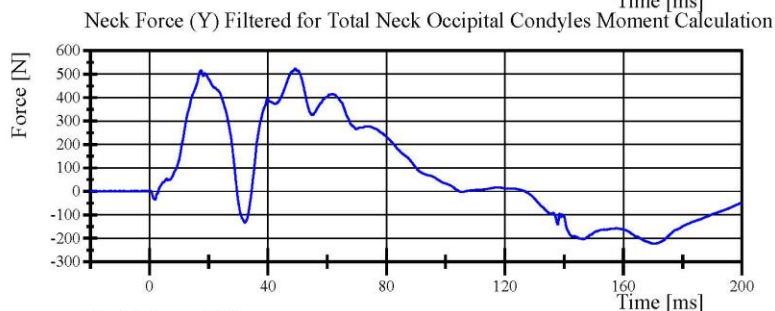
Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

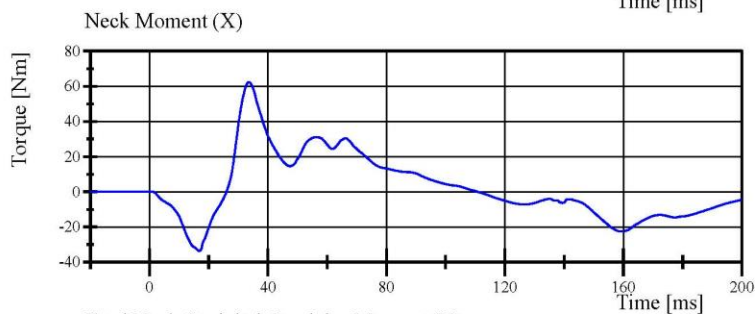
Test Date: 5/7/2021



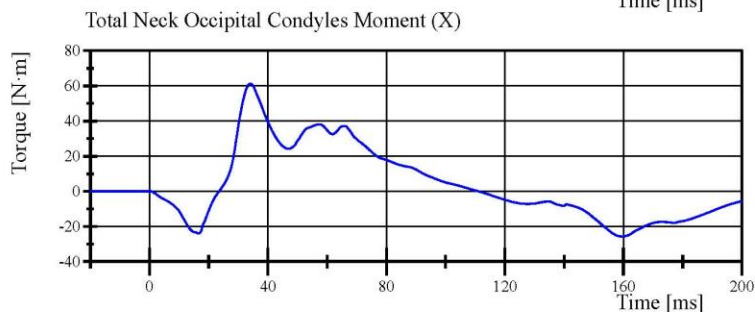
Filter Class: CFC_1000
Max: 524.0 N at 49.2 ms
Min: -223.1 N at 170.5 ms



Filter Class: CFC_600
Max: 523.2 N at 49.2 ms
Min: -222.6 N at 170.5 ms



Filter Class: CFC_600
Max: 62.4 Nm at 33.6 ms
Min: -33.6 Nm at 16.8 ms



Filter Class: Without_(Constar
Max: 61.1 N·m at 34.1 ms
Min: -25.7 N·m at 159.5 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH03

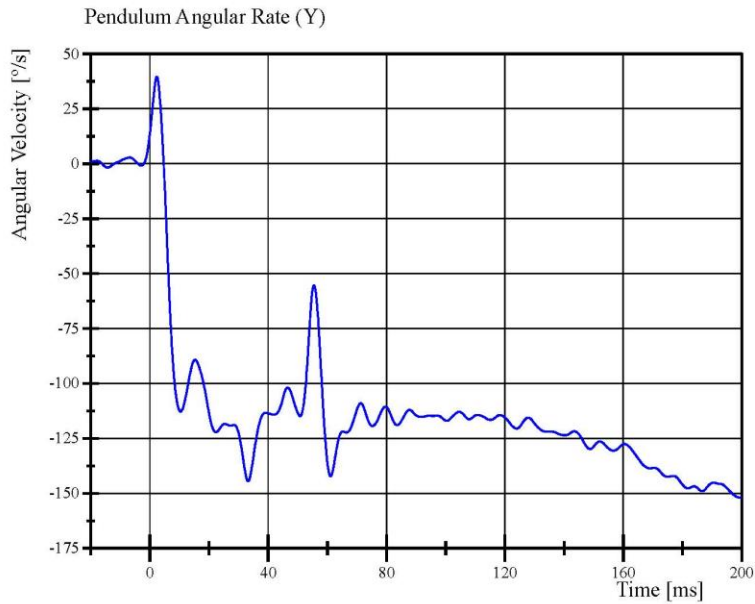
Page 19 of 47

Transportation Research Center Inc.

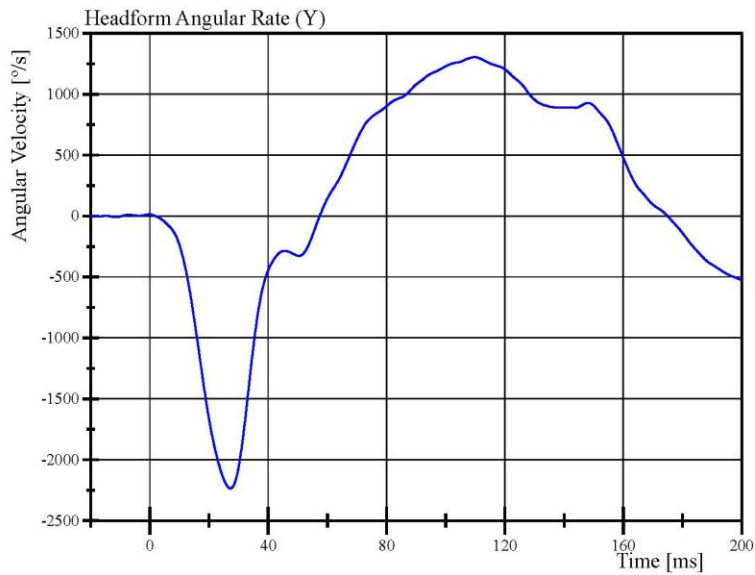
Left Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

Test Date: 5/7/2021



Filter Class: CFC_60
Max: 39.7 °/s at 2.4 ms
Min: -151.9 °/s at 199.5 ms



Filter Class: CFC_60
Max: 1,304.5 °/s at 109.8 ms
Min: -2,235.4 °/s at 27.2 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH03

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Transportation Research Center Inc.

Right Lateral Neck
 WorldSID 50th Serial No. EA7820 Certification No. 3-1
 Test Date: 5/7/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	3.30 - 3.50 m/s	3.320 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	(-0.87) - (-1.09) m/s	-1.001 m/s	Yes
Change at 8 ms	(-1.72) - (-2.1) m/s	-2.000 m/s	Yes
Change at 12 ms	(-2.63) - (-3.17) m/s	-3.026 m/s	Yes
Maximum Headform Flexion	50 - 61 deg	52.7 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	61.7 ms	Yes
Total Neck Occipital Condyles Moment	(-54) - (-67) N·m	-63.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	76.2 ms	Yes
Maximum Forward Pot Rotation			
Peak	32 - 39 °	34.1 °	Yes
Time of Peak	56 - 68 ms	59.7 ms	Yes
Maximum Rear Pot Rotation			
Peak	29 - 36 °	30.5 °	Yes
Time of Peak	56 - 68 ms	62.4 ms	Yes
Maximum Headform Angular Rate	2,047 - 2,503 %/s	2,314.7 %/s	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DW6607

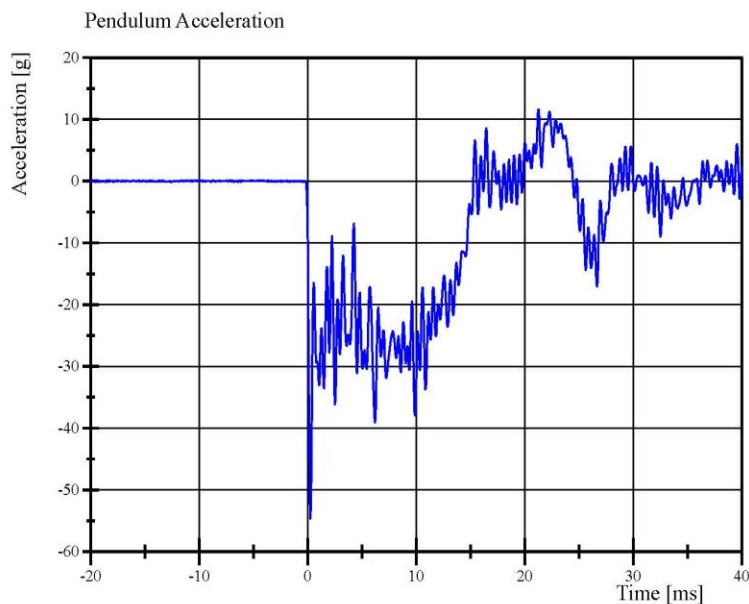


Transportation Research Center Inc.

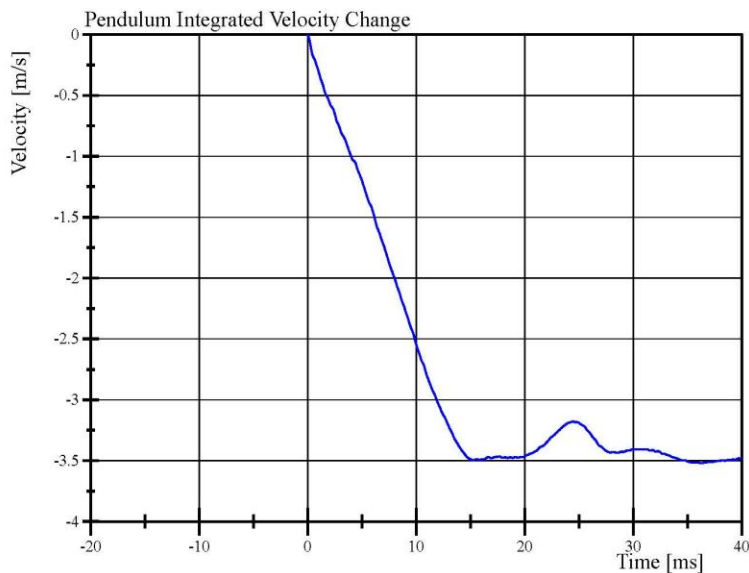
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

Test Date: 5/7/2021



Filter Class: CFC_1000
Max: 11.6 g at 21.3 ms
Min: -54.6 g at 0.3 ms



Filter Class: CFC_1000
Max: 0.0 m/s at 0.0 ms
Min: -3.5 m/s at 36.3 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.07.2021 10:43:02 4009



Report Number: EA7820_WSH03

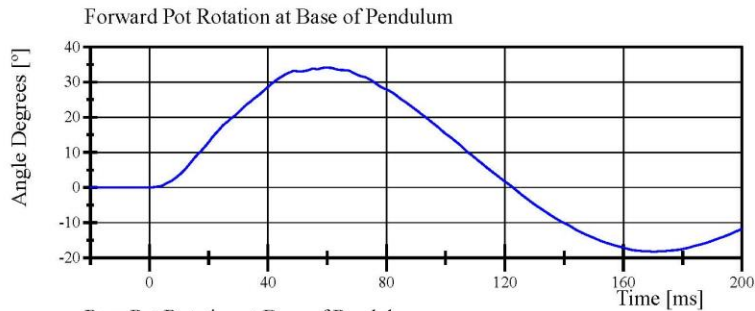
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Transportation Research Center Inc.

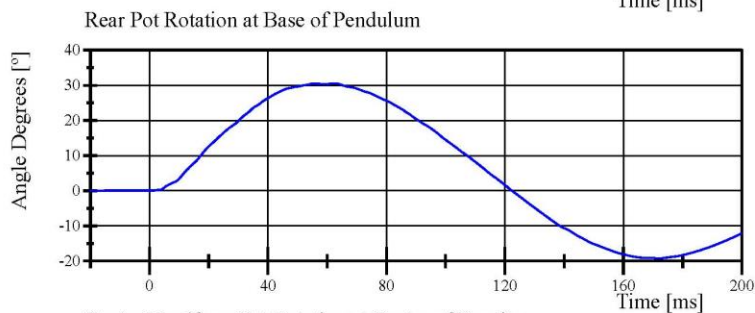
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

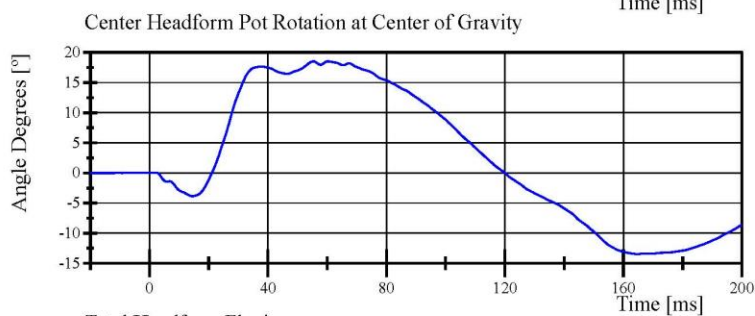
Test Date: 5/7/2021



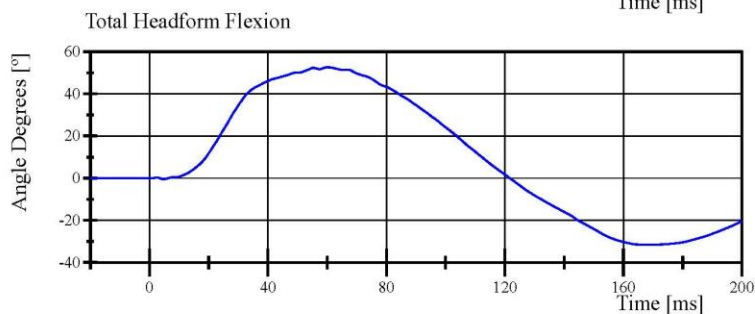
Filter Class: CFC_180
Max: 34.1 ° at 59.7 ms
Min: -18.2 ° at 170.4 ms



Filter Class: CFC_180
Max: 30.5 ° at 62.4 ms
Min: -19.2 ° at 172.2 ms



Filter Class: CFC_180
Max: 18.5 ° at 55.4 ms
Min: -13.5 ° at 164.7 ms



Filter Class: CFC_180
Max: 52.7 ° at 60.0 ms
Min: -31.6 ° at 170.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

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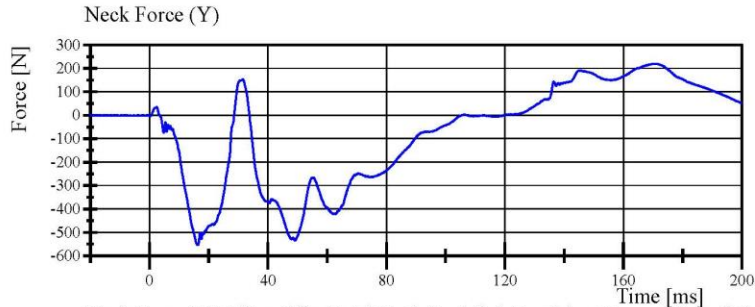


Transportation Research Center Inc.

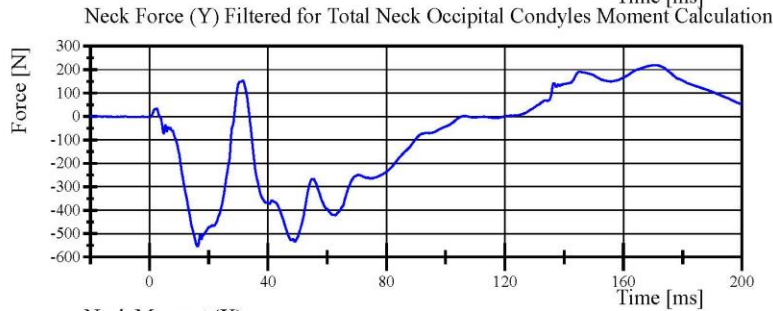
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

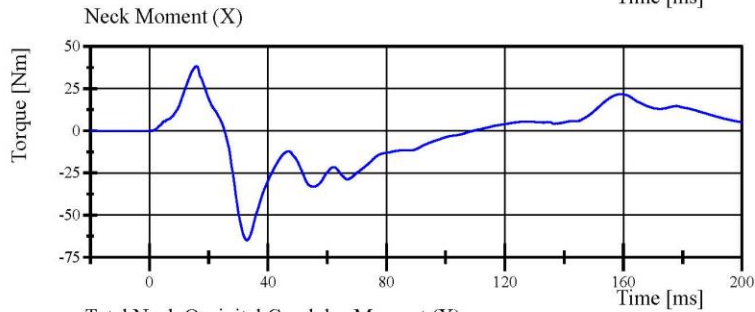
Test Date: 5/7/2021



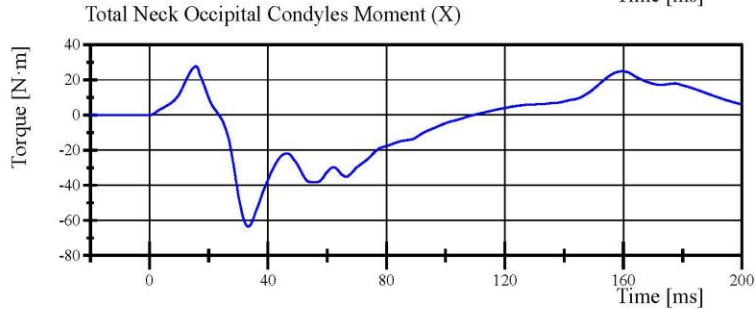
Filter Class: CFC_1000
Max: 220.1 N at 170.5 ms
Min: -553.9 N at 16.3 ms



Filter Class: CFC_600
Max: 219.4 N at 170.5 ms
Min: -554.1 N at 16.3 ms



Filter Class: CFC_600
Max: 38.2 Nm at 15.8 ms
Min: -64.9 Nm at 32.9 ms



Filter Class: Without_(Constar)
Max: 27.6 N·m at 15.6 ms
Min: -63.5 N·m at 33.3 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH03

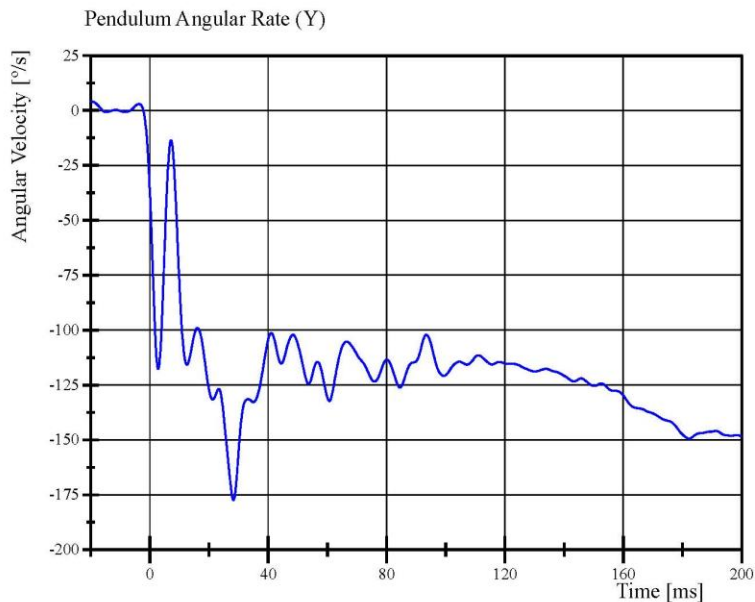
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Transportation Research Center Inc.

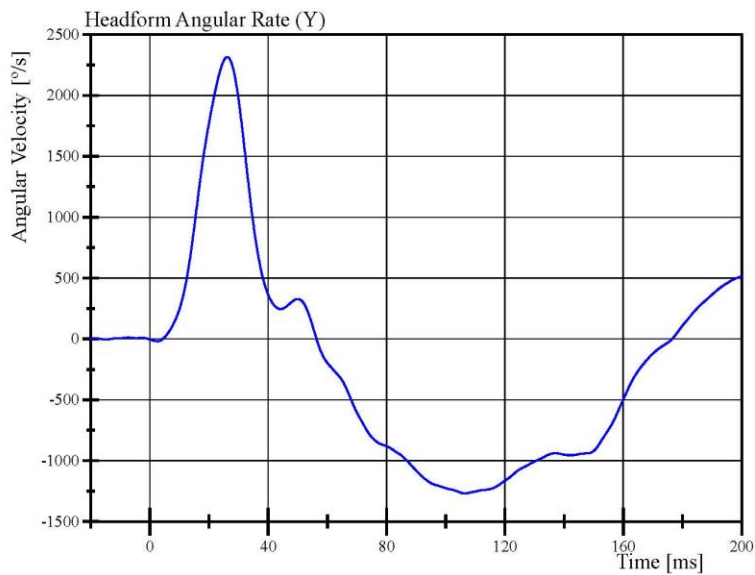
Right Lateral Neck

WorldSID 50th Serial No. EA7820 Certification No. 3-1

Test Date: 5/7/2021



Filter Class: CFC_60
Max: 4.1 °/s at -19.6 ms
Min: -177.4 °/s at 28.3 ms



Filter Class: CFC_60
Max: 2,314.7 °/s at 26.2 ms
Min: -1,268.3 °/s at 106.4 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

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Report Number: EA7820_WSH03

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Transportation Research Center Inc.

Left Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 3-2

Test Date: 5/7/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.251 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.376 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.549 m/s	Yes
Peak Fixture Rotation	(-41.5) - (-51) °	-46.41 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	40.1 ms	Yes
Peak Head Angular Velocity Z-axis	(-1,345) - (-1,655) %/s	-1,574.8 %/s	Yes
Peak Lower Neck Moment Z-axis	34 - 42 N·m	38.5 N·m	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DW6607

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

Report Number: EA7820_WSH03

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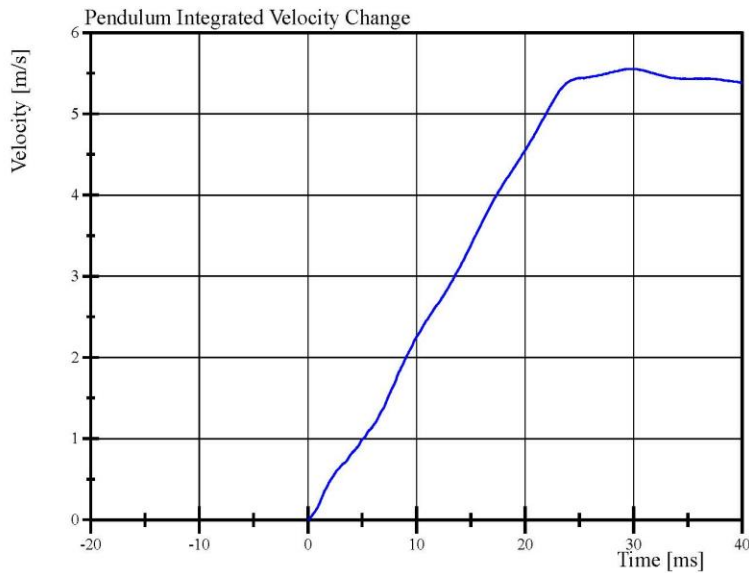
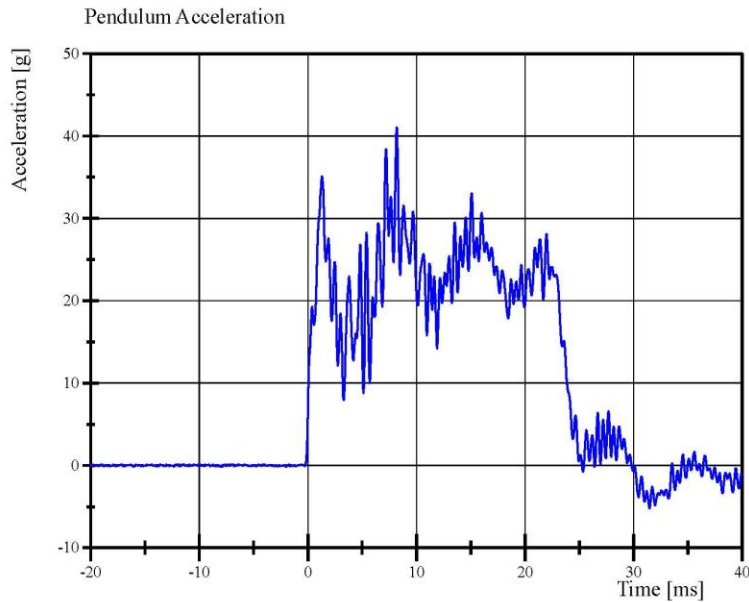


Transportation Research Center Inc.

Left Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 3-2

Test Date: 5/7/2021



Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

05.07.2021 14:53:09 4008



Report Number: EA7820_WSH03

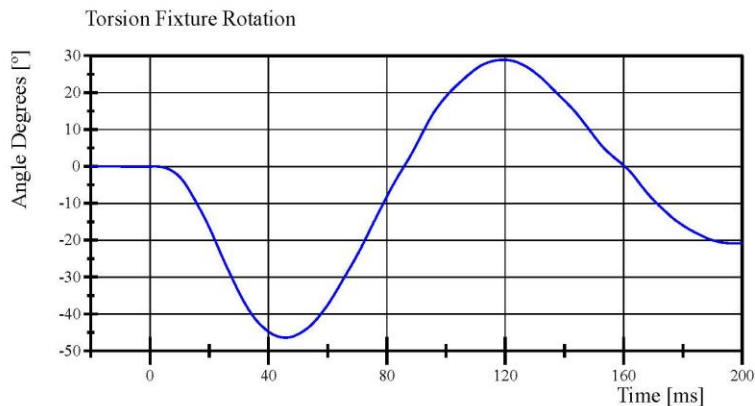
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Transportation Research Center Inc.

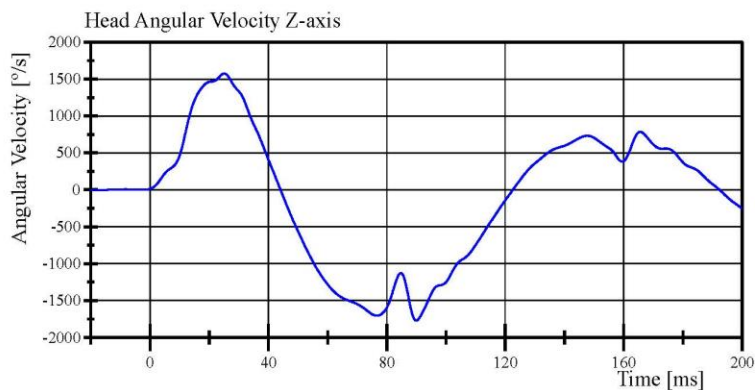
Left Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 3-2

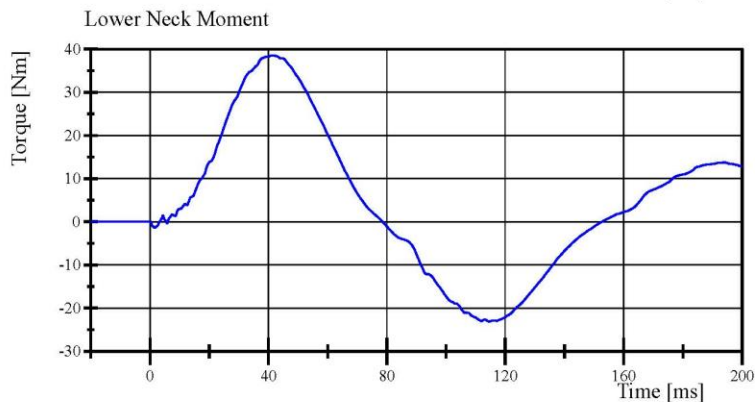
Test Date: 5/7/2021



Filter Class: CFC_60
Max: 28.9 ° at 119.3 ms
Min: -46.4 ° at 45.8 ms



Filter Class: CFC_60
Max: 1,574.8 °/s at 25.1 ms
Min: -1,771.5 °/s at 89.9 ms



Filter Class: CFC_600
Max: 38.5 Nm at 41.2 ms
Min: -23.1 Nm at 114.6 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Transportation Research Center Inc.

Right Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 3-3

Test Date: 5/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.175 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.302 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.431 m/s	Yes
Peak Fixture Rotation	41.5 - 51 °	45.37 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.8 ms	Yes
Peak Head Angular Velocity Z-axis	1,345 - 1,655 %/s	1,554.1 %/s	Yes
Peak Lower Neck Moment Z-axis	(-34) - (-42) N·m	-37.8 N·m	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DW6607

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

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05.13.2021 08:34:11 4009

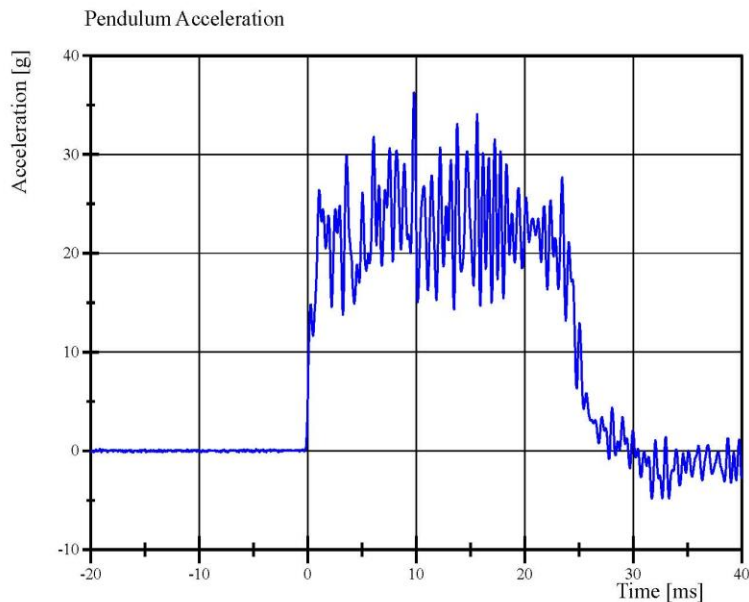


Transportation Research Center Inc.

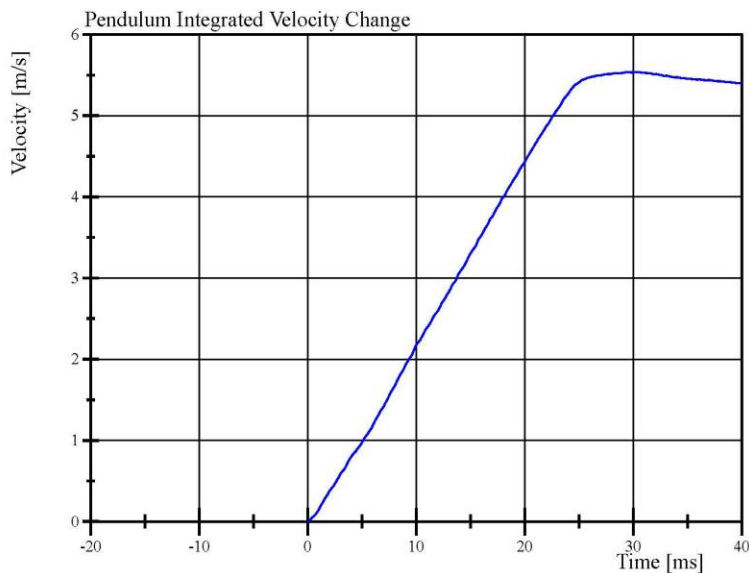
Right Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 3-3

Test Date: 5/10/2021



Filter Class: CFC_1000
Max: 36.3 g at 9.8 ms
Min: -4.8 g at 31.7 ms



Filter Class: CFC_1000
Max: 5.5 m/s at 30.2 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

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Report Number: EA7820_WSH03

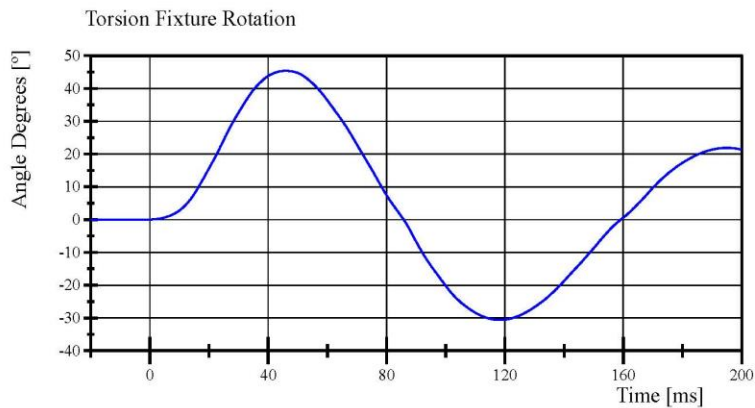
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Transportation Research Center Inc.

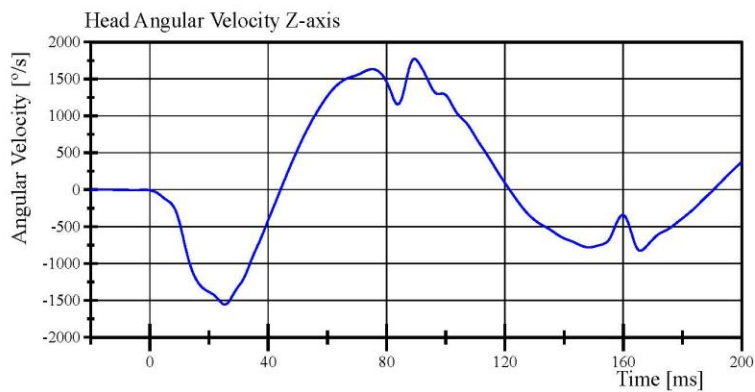
Right Lateral Torsion

WorldSID 50th Serial No. EA7820 Certification No. 3-3

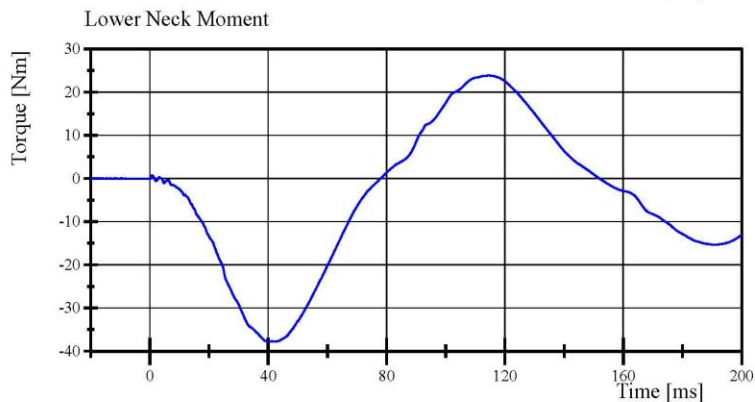
Test Date: 5/10/2021



Filter Class: CFC_60
Max: 45.4 ° at 46.0 ms
Min: -30.6 ° at 118.3 ms



Filter Class: CFC_60
Max: 1,771.4 °/s at 89.4 ms
Min: -1,554.1 °/s at 25.4 ms



Filter Class: CFC_600
Max: 23.8 Nm at 114.7 ms
Min: -37.8 Nm at 42.6 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.13.2021 08:35:08 4009



Transportation Research Center Inc.

Right Lateral Shoulder
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/4/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	67 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.36 m/s	Yes
Impactor Force	2,600 - 3,300 N	2,773.4 N	Yes
Shoulder Force	(-1,470) - (-1,800) N	-1,633.9 N	Yes
Shoulder Rib Length Change	37 - 46 mm	42.1 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EE7908

Shoulder Rib S/N: ED9644

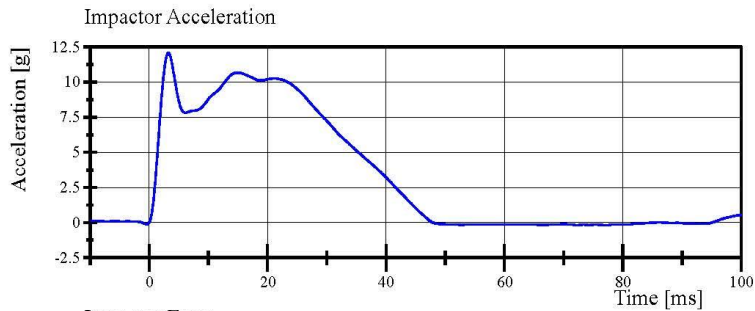
Ribeye S/N: 160

Transportation Research Center Inc.

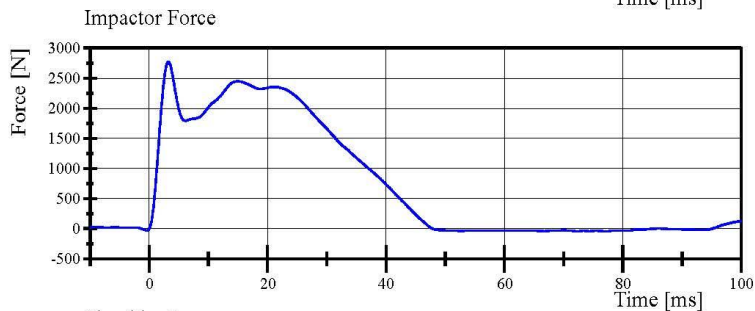
Right Lateral Shoulder

WorldSID 50th Serial No. EA7820 Certification No. 3-1

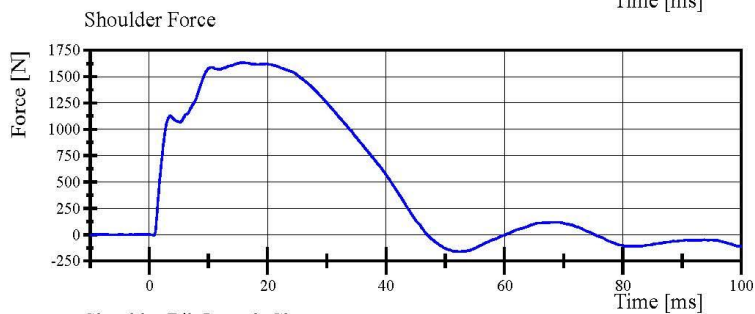
Test Date: 5/4/2021



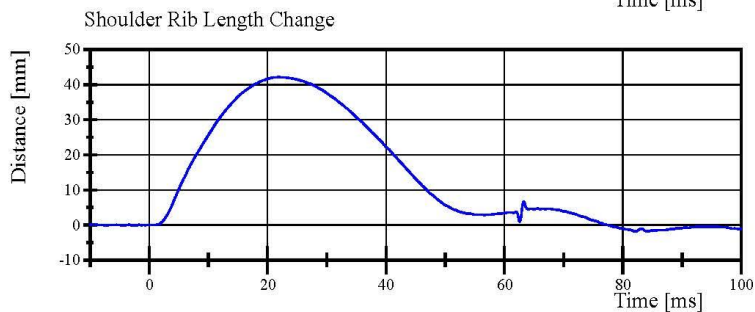
Filter Class: CFC_180
Max: 12.1 g at 3.3 ms
Min: -0.2 g at 77.2 ms



Filter Class: CFC_180
Max: 2,773.4 N at 3.3 ms
Min: -42.2 N at 77.2 ms



Filter Class: CFC_600
Max: 1,633.9 N at 15.6 ms
Min: -162.4 N at 52.5 ms



Filter Class: CFC_600
Max: 42.1 mm at 21.9 ms
Min: -1.8 mm at 82.1 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.05.2021 08:07:29 999



Report Number: EA7820_WSH03

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Transportation Research Center Inc.

Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.66 m/s	Yes
Impactor Force	5,300 - 6,200 N	6,053.1 N	Yes
Peak Thorax Rib 1 Length Change	35 - 47 mm	40.5 mm	Yes
Peak Thorax Rib 2 Length Change	46 - 56 mm	48.2 mm	Yes
Peak Thorax Rib 3 Length Change	33.5 - 40.5 mm	35.32 mm	Yes
Peak T4 Acceleration, y-axis	(-28) - (-37) g	-30.2 g	Yes
Peak T12 Acceleration, y-axis	(-22) - (-28) g	-23.8 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EE7908

Thorax Rib #1 S/N: DW6882

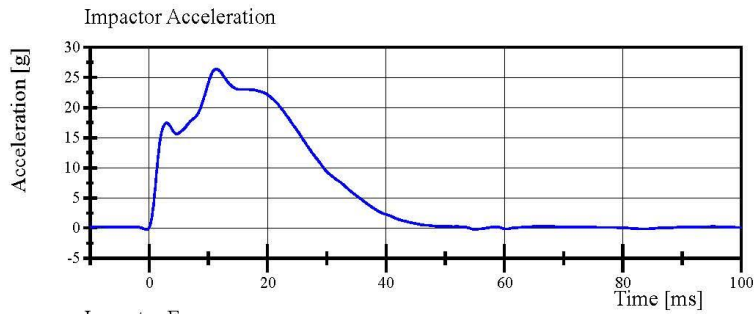
Thorax Rib #2 S/N: DW8864

Thorax Rib #3 S/N: ED4871

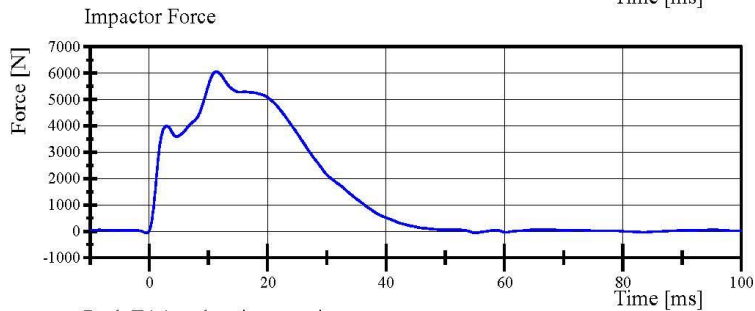
RibEye S/N: 160

Transportation Research Center Inc.

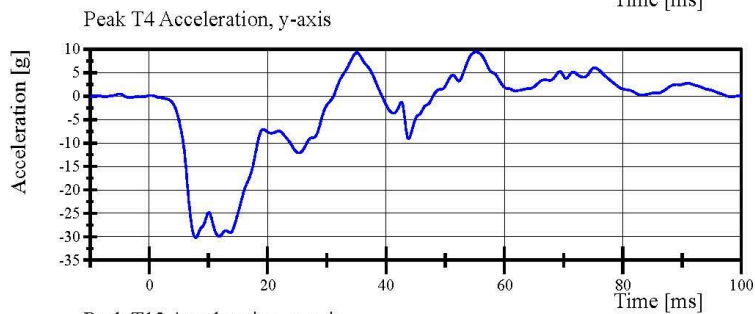
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



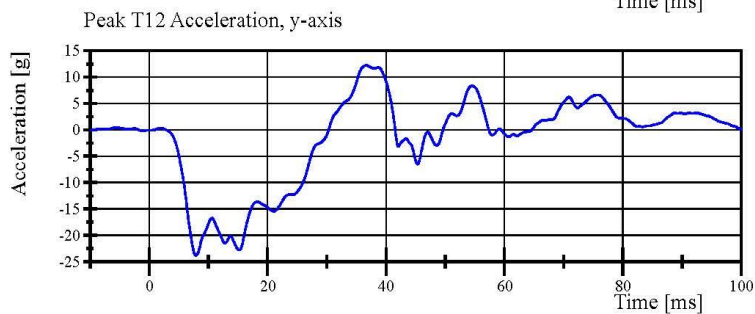
Filter Class: CFC_180
Max: 26.4 g at 11.3 ms
Min: -0.3 g at -0.4 ms



Filter Class: CFC_180
Max: 6,053.1 N at 11.3 ms
Min: -59.4 N at -0.4 ms



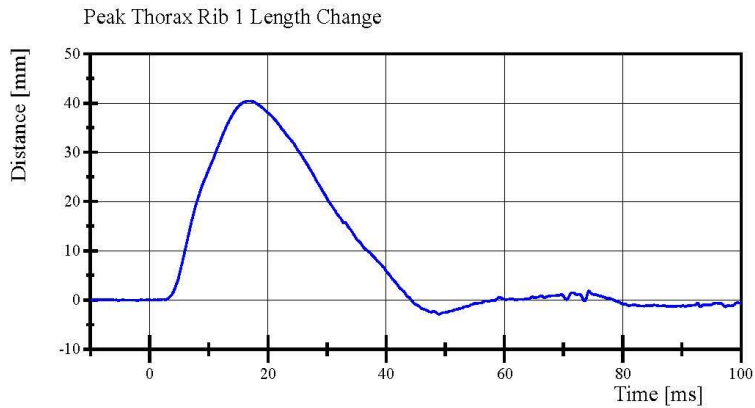
Filter Class: CFC_180
Max: 9.4 g at 55.2 ms
Min: -30.2 g at 7.9 ms



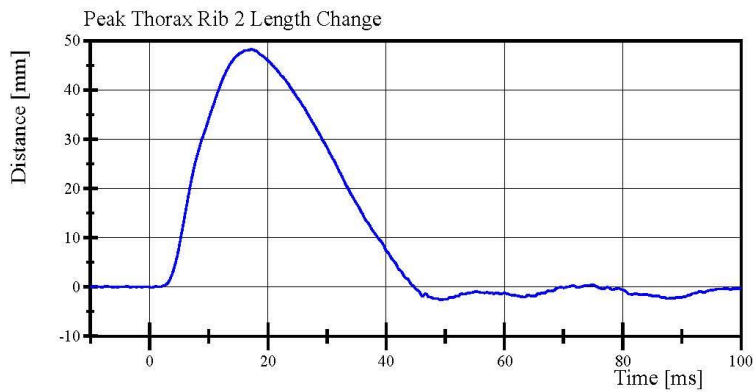
Filter Class: CFC_180
Max: 12.2 g at 36.7 ms
Min: -23.8 g at 7.9 ms

Transportation Research Center Inc.

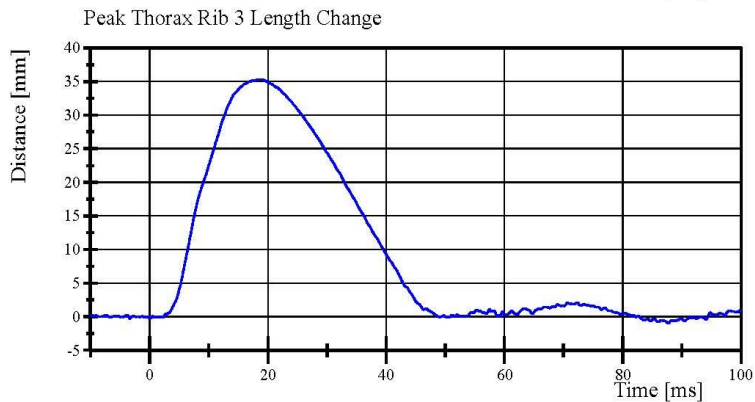
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



Filter Class: CFC_600
Max: 40.5 mm at 17.0 ms
Min: -2.9 mm at 48.9 ms



Filter Class: CFC_600
Max: 48.2 mm at 17.2 ms
Min: -2.6 mm at 49.3 ms



Filter Class: CFC_600
Max: 35.3 mm at 18.3 ms
Min: -1.0 mm at 87.8 ms

Transportation Research Center Inc.

Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Force	3,200 - 3,800 N	3,505.8 N	Yes
Peak Thorax Rib 1 Length Change	33 - 43 mm	37.6 mm	Yes
Peak Thorax Rib 2 Length Change	35 - 43 mm	40.6 mm	Yes
Peak Thorax Rib 3 Length Change	32 - 40 mm	33.2 mm	Yes
Peak T4 Acceleration, y-axis	(-14) - (-20) g	-15.8 g	Yes
Peak T12 Acceleration, y-axis	(-14) - (-22) g	-15.2 g	Yes

Test meets specifications.

Condition: Used

Comments:

Thorax Rib #1 S/N: DW6882

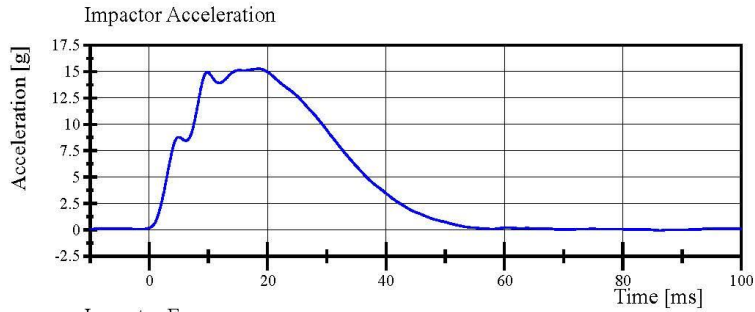
Thorax Rib #2 S/N: DW8864

Thorax Rib #3 S/N: ED4871

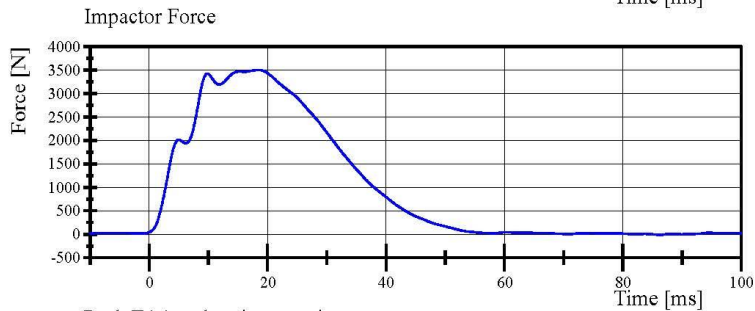
RibEye S/N: 160

Transportation Research Center Inc.

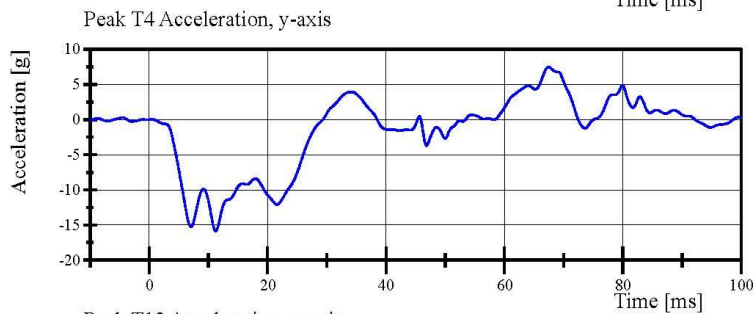
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



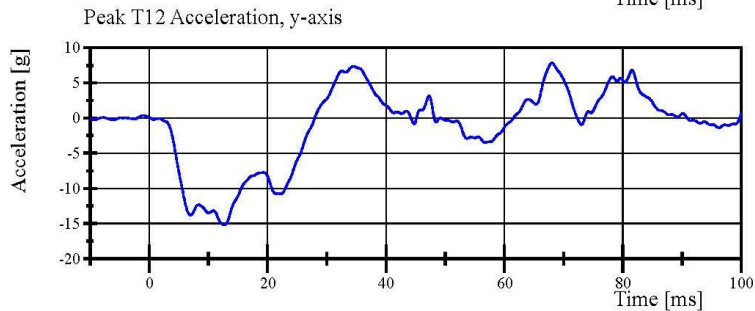
Filter Class: CFC_180
Max: 15.3 g at 18.5 ms
Min: -0.0 g at 86.4 ms



Filter Class: CFC_180
Max: 3,505.8 N at 18.5 ms
Min: -10.9 N at 86.4 ms



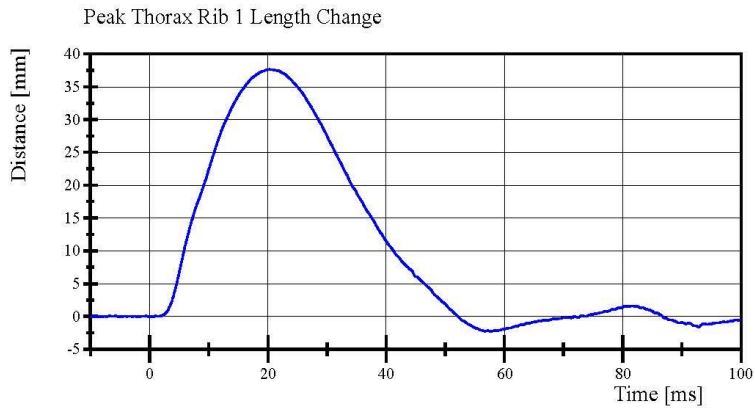
Filter Class: CFC_180
Max: 7.5 g at 67.5 ms
Min: -15.8 g at 11.2 ms



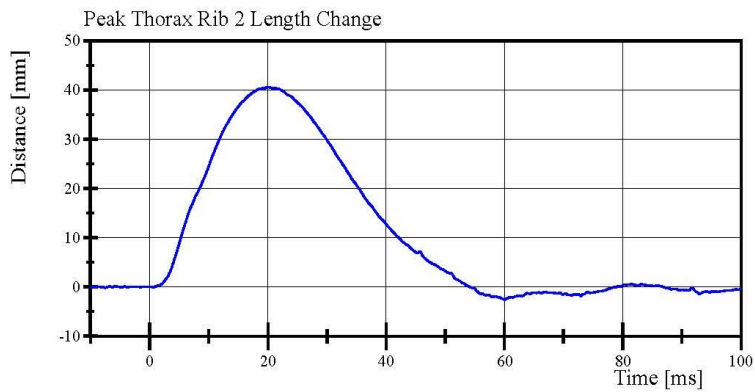
Filter Class: CFC_180
Max: 7.8 g at 68.0 ms
Min: -15.2 g at 12.7 ms

Transportation Research Center Inc.

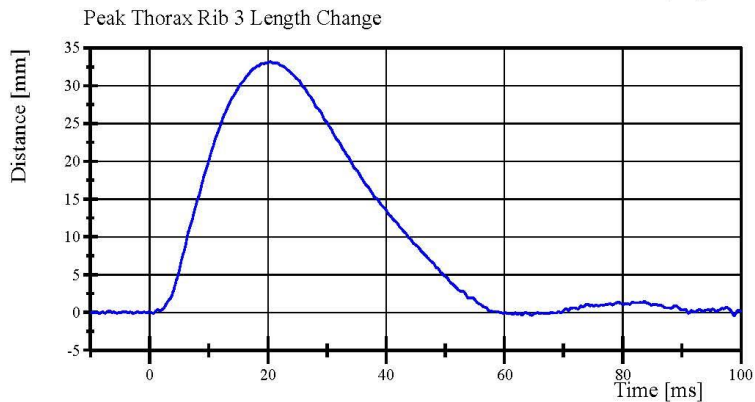
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



Filter Class: CFC_600
Max: 37.6 mm at 20.3 ms
Min: -2.2 mm at 57.7 ms



Filter Class: CFC_600
Max: 40.6 mm at 20.0 ms
Min: -2.6 mm at 60.0 ms



Filter Class: CFC_600
Max: 33.2 mm at 20.4 ms
Min: -0.4 mm at 98.9 ms

Transportation Research Center Inc.

Right Lateral Abdomen
WorldSID 50th Serial No. EA7820 Certification No. 3-2
Test Date: 5/5/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Force	2,700 - 3,100 N	2,894.2 N	Yes
Peak Abdomen Rib 1 Length Change	32.5 - 39.5 mm	36.51 mm	Yes
Peak Abdomen Rib 2 Length Change	32 - 38 mm	35.9 mm	Yes
Peak T12 Acceleration, y-axis	(-14.5) - (-19.5) g	-15.76 g	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen Rib 1 S/N: DW8877

Abdomen Rib 2 S/N: DW8878

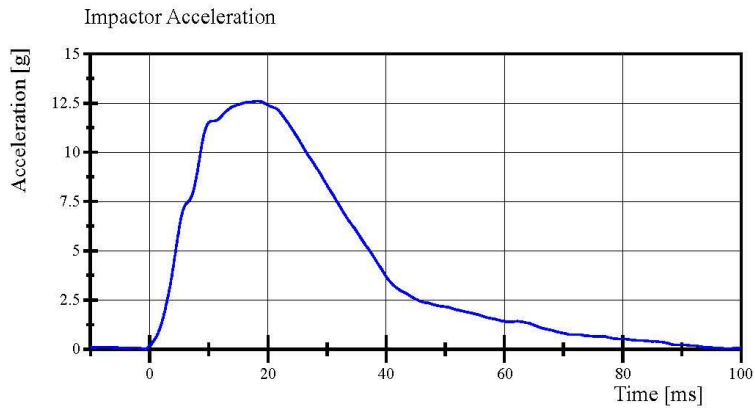
Ribeye S/N: 160

Transportation Research Center Inc.

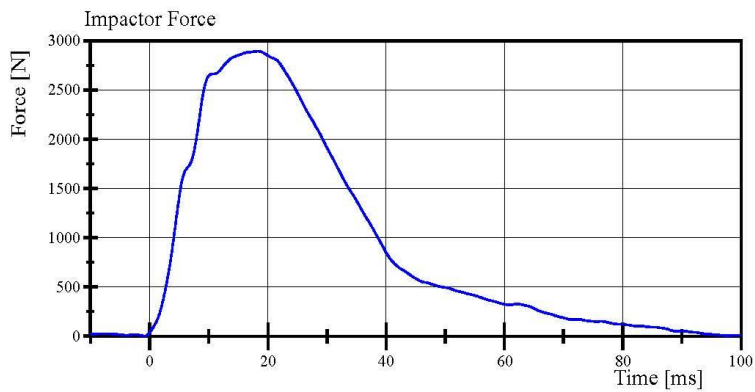
Right Lateral Abdomen

WorldSID 50th Serial No. EA7820 Certification No. 3-2

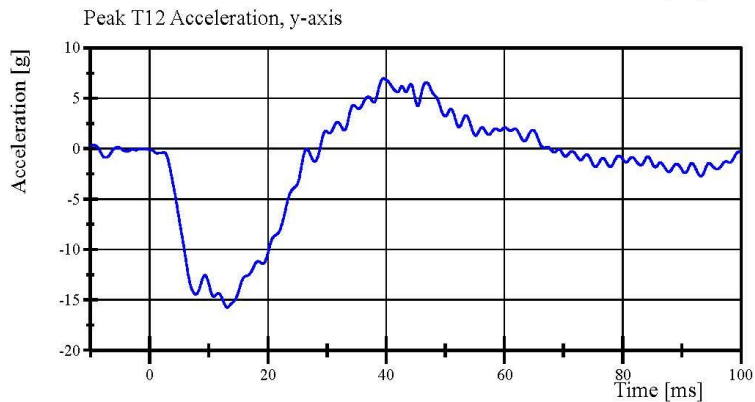
Test Date: 5/5/2021



Filter Class: CFC_180
Max: 12.6 g at 18.3 ms
Min: 0.0 g at -0.9 ms



Filter Class: CFC_180
Max: 2,894.2 N at 18.3 ms
Min: 2.7 N at -0.9 ms



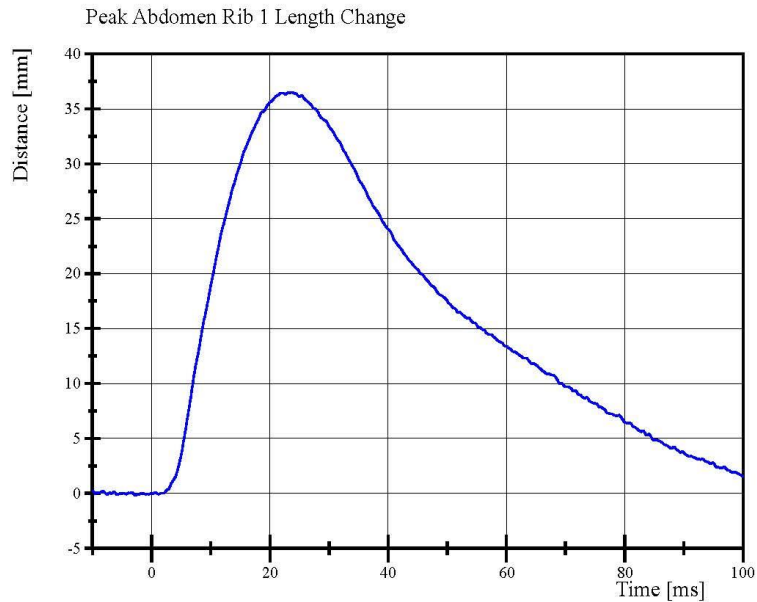
Filter Class: CFC_180
Max: 7.0 g at 39.6 ms
Min: -15.8 g at 13.2 ms

Transportation Research Center Inc.

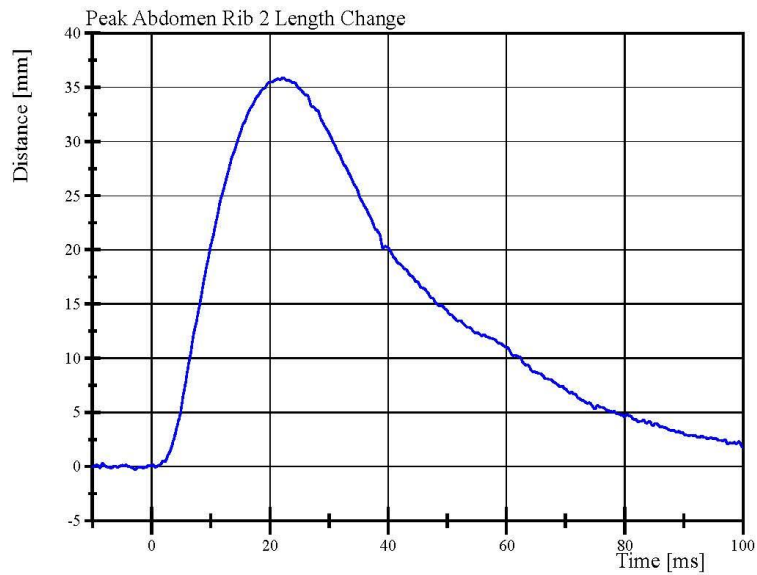
Right Lateral Abdomen

WorldSID 50th Serial No. EA7820 Certification No. 3-2

Test Date: 5/5/2021



Filter Class: CFC_600
Max: 36.5 mm at 23.7 ms
Min: -0.2 mm at -2.8 ms



Filter Class: CFC_600
Max: 35.9 mm at 22.3 ms
Min: -0.3 mm at -2.9 ms

Transportation Research Center Inc.

Right Lateral Pelvis
WorldSID 50th Serial No. EA7820 Certification No. 3-4
Test Date: 5/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.69 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,856.4 N	Yes
Pelvis Lateral Acceleration	(-38.5) - (-48.5) g	-42.63 g	Yes
Peak T12 Acceleration, y-axis	(-10) - (-14) g	-13.0 g	Yes
Pubic Lateral Force	(-1,300) - (-1,590) N	-1,398.3 N	Yes
Sacroiliac Lateral Force	(-1,860) - (-2,280) N	-1,811.9 N	No

Test does not meet specifications.

Condition: Used

Comments:

Pelvis Skin S/N: EA7060

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

Report Number: EA7820_WSH03

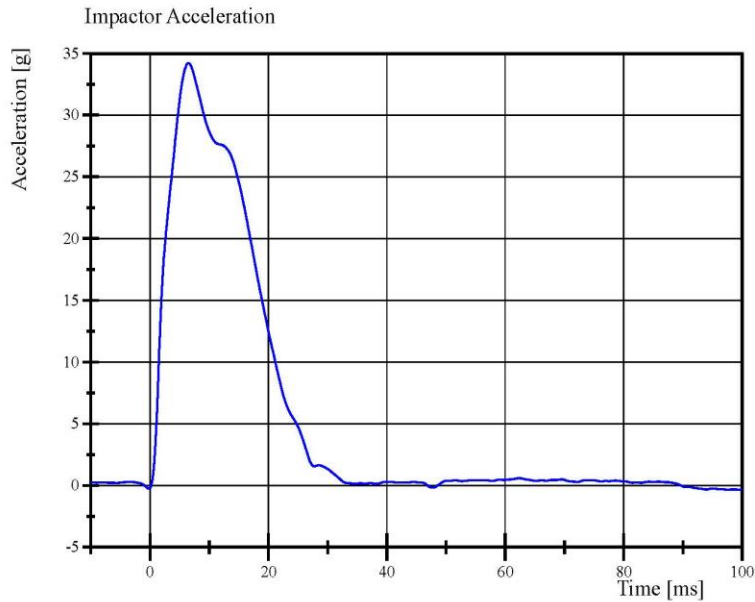
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05.10.2021 11:13:49 1001

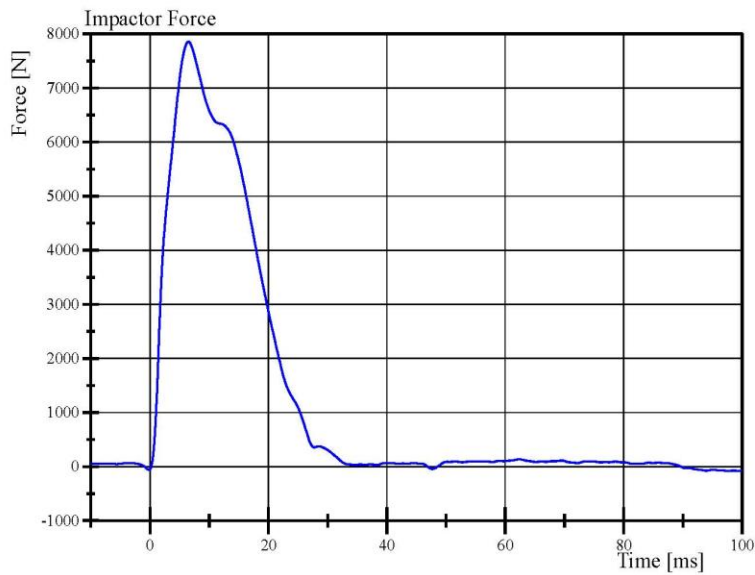


Transportation Research Center Inc.

Right Lateral Pelvis
WorldSID 50th Serial No. EA7820 Certification No. 3-4
Test Date: 5/10/2021



Filter Class: CFC_180
Max: 34.2 g at 6.5 ms
Min: -0.4 g at 97.6 ms



Filter Class: CFC_180
Max: 7,856.4 N at 6.5 ms
Min: -80.4 N at 97.6 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.10.2021 11:15:19 1001

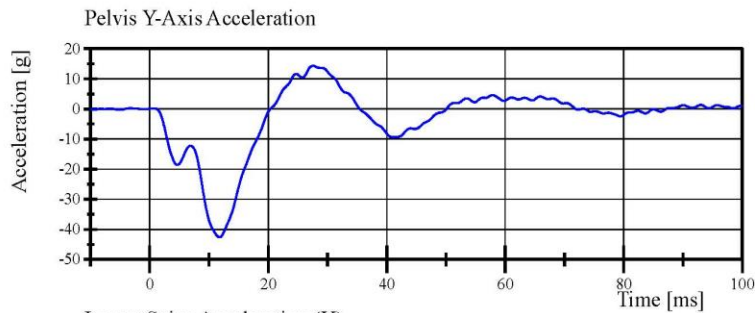


Report Number: EA7820_WSH03

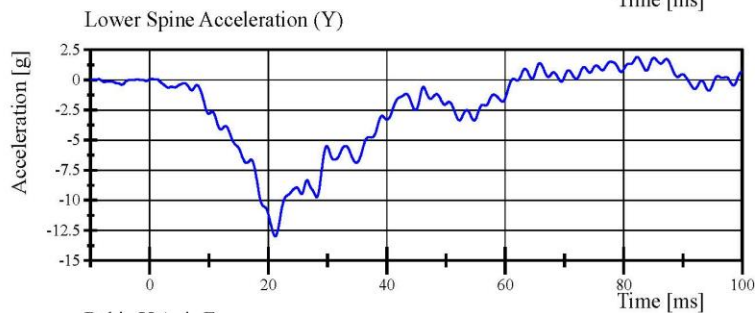
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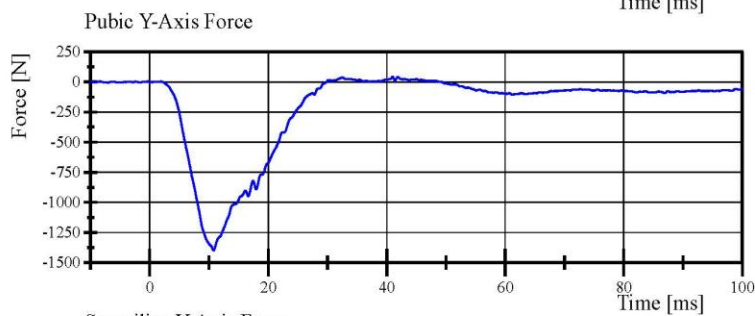
Right Lateral Pelvis
WorldSID 50th Serial No. EA7820 Certification No. 3-4
Test Date: 5/10/2021



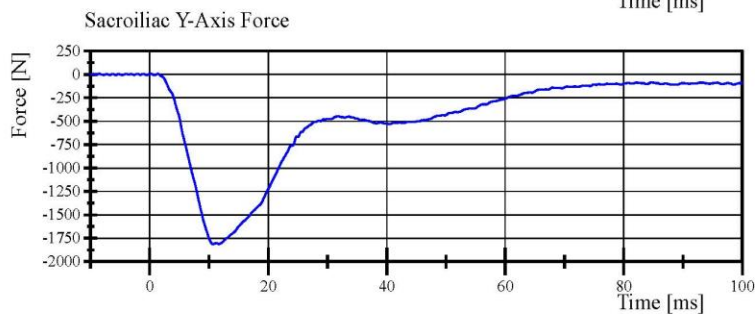
Filter Class: CFC_180
Max: 14.3 g at 27.6 ms
Min: -42.6 g at 11.8 ms



Filter Class: CFC_180
Max: 1.9 g at 82.3 ms
Min: -13.0 g at 21.2 ms



Filter Class: CFC_600
Max: 43.1 N at 41.0 ms
Min: -1,398.3 N at 10.8 ms



Filter Class: CFC_600
Max: 5.7 N at 0.2 ms
Min: -1,811.9 N at 10.7 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qualification Manual 11_09_2020

05.10.2021 11:15:19 1001



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™)

		WorldSID-50M S/N EA7820		
		Serial Number	Manufacturer	Calibration Date
Head Accelerometers (g)	X	10820-1	Endevco	29-Oct-2020
	Y	10820-3	Endevco	29-Oct-2020
	Z	10820-2	Endevco	29-Oct-2020
Head Angular Rates Sensors (deg/sec)	X	ARS11763	DTS	4-Aug-2020
	Y	ARS11755	DTS	4-Aug-2020
	Z	ARS11079	DTS	4-Aug-2020
Upper Neck Force (N)	X	EC2343	Humanetics	17-Jun-2020
	Y	EC2343	Humanetics	17-Jun-2020
	Z	EC2343	Humanetics	17-Jun-2020
Upper Neck Moment (Nm)	X	EC2343	Humanetics	17-Jun-2020
	Y	EC2343	Humanetics	17-Jun-2020
	Z	EC2343	Humanetics	17-Jun-2020
Lower Neck Force (N)	X	DN9609	Humanetics	15-Jun-2020
	Y	DN9609	Humanetics	15-Jun-2020
	Z	DN9609	Humanetics	15-Jun-2020
Lower Neck Moment (Nm)	X	DN9609	Humanetics	15-Jun-2020
	Y	DN9609	Humanetics	15-Jun-2020
	Z	DN9609	Humanetics	15-Jun-2020
Shoulder Force (N)	X	EC4095	Humanetics	27-Oct-2020
	Y	EC4095	Humanetics	27-Oct-2020
	Z	EC4095	Humanetics	27-Oct-2020
Upper Spine Accelerometers (T1) (g)	X	12376-3	Endevco	28-Oct-2020
	Y	12376-2	Endevco	28-Oct-2020
	Z	12376-1	Endevco	28-Oct-2020
Middle Spine Accelerometers (T4) (g)	X	12300-3	Endevco	29-Oct-2020
	Y	12300-2	Endevco	29-Oct-2020
	Z	12300-1	Endevco	29-Oct-2020
Lower Spine Accelerometers (T12) (g)	X	12172-3	Endevco	28-Oct-2020
	Y	12172-2	Endevco	28-Oct-2020
	Z	12172-1	Endevco	28-Oct-2020
Pubic Symphysis Force (N)	Y	EA8949	Humanetics	17-Jun-2020
Sacro-Iliac Left Force (N)	X	EA8971	Humanetics	17-Jun-2020
	Y	EA8971	Humanetics	17-Jun-2020
	Z	EA8971	Humanetics	17-Jun-2020
Sacro-Iliac Left Moment (Nm)	X	EA8971	Humanetics	17-Jun-2020
	Y	EA8971	Humanetics	17-Jun-2020
	Z	EA8971	Humanetics	17-Jun-2020

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)

		WorldSID-50M S/N EA7820		
		Serial Number	Manufacturer	Calibration Date
Sacro-Iliac Right Force (N)	X	EA8971	Humanetics	17-Jun-2020
	Y	EA8971	Humanetics	17-Jun-2020
	Z	EA8971	Humanetics	17-Jun-2020
Sacro-Iliac Right Moment (Nm)	X	EA8971	Humanetics	17-Jun-2020
	Y	EA8971	Humanetics	17-Jun-2020
	Z	EA8971	Humanetics	17-Jun-2020
Lumbar Force (N)	X	EG4790	Humanetics	16-Jun-2020
	Y	EG4790	Humanetics	16-Jun-2020
	Z	EG4790	Humanetics	16-Jun-2020
Lumbar Moment (Nm)	X	EG4790	Humanetics	16-Jun-2020
	Y	EG4790	Humanetics	16-Jun-2020
	Z	EG4790	Humanetics	16-Jun-2020
Pelvis Accelerometers (g)	X	10563-3	Endevco	28-Oct-2020
	Y	10563-2	Endevco	28-Oct-2020
	Z	10563-1	Endevco	28-Oct-2020
Femur Force (N)	X	EG2791	Humanetics	16-Jun-2020
	Y	EG2791	Humanetics	16-Jun-2020
	Z	EG2791	Humanetics	16-Jun-2020
Femur Moment (Nm)	X	EG2791	Humanetics	16-Jun-2020
	Y	EG2791	Humanetics	16-Jun-2020
	Z	EG2791	Humanetics	16-Jun-2020
Femoral Neck Force (N)	X	EB8706	Humanetics	27-Oct-2020
	Y	EB8706	Humanetics	27-Oct-2020
	Z	EB8706	Humanetics	27-Oct-2020
Outer Knee Force (N)	Y	EC0323	Humanetics	16-Jun-2021
Inner Knee Force (N)	Y	EC0325	Humanetics	16-Jun-2021

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)

			WorldSID-50M S/N EA7820		
			Serial Number	Manufacturer	Calibration Date
Shoulder RibEye (mm)	Front	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Middle	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Rear	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
Thorax Rib 1 RibEye (mm)	Front	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Middle	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Rear	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
Thorax Rib 2 RibEye (mm)	Front	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Middle	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Rear	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
Thorax Rib 3 RibEye (mm)	Front	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Middle	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Rear	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)

			WorldSID-50M S/N EA7820		
			Serial Number	Manufacturer	Calibration Date
Abdomen Rib 1 RibEye (mm)	Front	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Middle	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Rear	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
Abdomen Rib 2 RibEye (mm)	Front	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Middle	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020
	Rear	X	160	Boxboro Systems	26-Oct-2020
		Y	160	Boxboro Systems	26-Oct-2020
		Z	160	Boxboro Systems	26-Oct-2020

TABLE 2 – VEHICLE INSTRUMENTATION

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity (g)	X	P94498	ENDEVCO	11-Feb-2021
	Y	T23815	ENDEVCO	11-Mar-2021
	Z	T23777	ENDEVCO	11-Mar-2021
Vehicle Center of Gravity Angular Rate (deg/sec)	X	ARS6461	DTS	6-Jul-2020
	Y	ARS6383	DTS	6-Jul-2020
	Z	ARS6463	DTS	6-Jul-2020
Right Floor Sill (g)	Y	P94560	ENDEVCO	1-Mar-2021
Right A-Pillar Sill (g)	Y	P97717	ENDEVCO	1-Mar-2021
Right Lower A-Pillar (g)	Y	T25572	ENDEVCO	11-Feb-2021
Right Mid A-Pillar (g)	Y	T18569	ENDEVCO	11-Mar-2021
Right B-Pillar Sill (g)	Y	P81622	ENDEVCO	1-Mar-2021
Right Lower B-Pillar (g)	Y	T11434	ENDEVCO	1-Mar-2021
Right Mid B-Pillar (g)	Y	T10644	ENDEVCO	1-Mar-2021
Passenger Seat Track at Dummy H-Point (g)	Y	P81630	ENDEVCO	1-Mar-2021
Engine Top (g)	X	P85291	ENDEVCO	1-Mar-2021
	Y	P87018	ENDEVCO	1-Mar-2021
Firewall Center (g)	Y	P88461	ENDEVCO	11-Feb-2021
Left Roof at Vertical Impact Reference Line (g)	Y	P73587	ENDEVCO	1-Feb-2021
Left Sill at Vertical Impact Reference Line (g)	X	T23837	ENDEVCO	11-Mar-2021
	Y	T23797	ENDEVCO	11-Mar-2021
	Z	T11802	ENDEVCO	11-Mar-2021
Right Sill at Rear Seat Acceleration (g)	X	T11867	ENDEVCO	11-Mar-2021
	Y	T11804	ENDEVCO	11-Mar-2021
	Z	T11875	ENDEVCO	11-Mar-2021
Rear Floorpan Behind Rear Axle at Centerline (g)	X	P83026	ENDEVCO	1-Mar-2021
Rear Floorpan Behind Rear Axle at Centerline (g)	Y	P83257	ENDEVCO	1-Mar-2021
Right Front Door Mid Centerline (g)	Y	P57192	ENDEVCO	11-Mar-2021
Right Front Door Mid Rear (g)	Y	T11815	ENDEVCO	11-Mar-2021
Right Front Door Upper Centerline (g)	Y	T16779	ENDEVCO	11-Mar-2021
Right Rear Door Mid Rear (g)	Y	T23813	ENDEVCO	11-Mar-2021
Right Rear Door Upper Centerline (g)	Y	T23832	ENDEVCO	11-Mar-2021
Rear Deck (g)	X	T23885	ENDEVCO	11-Mar-2021
	Y	T11805	ENDEVCO	11-Mar-2021
	Z	T16772	ENDEVCO	11-Mar-2021
Rear Deck Angular Rate (deg/sec)	X	ARS9194	DTS	11-Sep-2020
	Y	ARS7974	DTS	6-Jul-2020
	Z	ARS8743	DTS	11-Sep-2020

TABLE 3 – POLE INSTRUMENTATION

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Pole Load Cell 1	DK7091S	Humanetics	12-Nov-2020
Pole Load Cell 2	DK7120S	Humanetics	12-Nov-2020
Pole Load Cell 3	DK7118S	Humanetics	12-Nov-2020
Pole Load Cell 4	DK7124S	Humanetics	12-Nov-2020
Pole Load Cell 5	DK7111S	Humanetics	12-Nov-2020
Pole Load Cell 6	DK7126S	Humanetics	12-Nov-2020
Pole Load Cell 7	DK7112S	Humanetics	12-Nov-2020
Pole Load Cell 8	DK7074S	Humanetics	12-Nov-2020

Sign Convention
SAE J211 MAR95

Accelerometers:
+X: Forward
+Y: Rightward
+Z: Downward

Potentiometers:
+Chest longitudinal deflection: Outward
+Chest lateral deflection: Rightward
+Seat belt displacement: Outward
+Seat belt extension: Elongation
+Knee slider displacement: Distance between femur and tibia increased (in relation to a seated dummy)

Rotation potentiometers:
+About the X-axis: Left foot-eversion
Right foot-inversion
+About the Y-axis: Left/right foot-dorsiflexion
+About the Z-axis: Left foot-internal
Right foot-external

Load cells:
+Femur force: Tension
+Seat belt force: Tension
+Barrier force: Tension

Neck load cells:
+X force: Head pushed rearward
+Y force: Head pushed leftward
+Z force: Head pulled upward (tension on neck)
+X moment: Left ear rotating toward left shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

Tibia load cells:
+X force: Ankle forward, knee rearward
+Y force: Ankle rightward, knee leftward
+Z force: Tension
+X moment: Bottom of tibia moving leftward
+Y moment: Bottom of tibia moving rearward

Sign Convention (Continued)
SAE J211 MAR95

<u>Lumbar load cells:</u>	+X force:	Chest rearward, pelvis forward
	+Y force:	Chest leftward, pelvis rightward
	+Z force:	Chest upward, pelvis downward
	+X moment:	Left shoulder toward left hip
	+Y moment:	Sternum toward front of legs
	+Z moment:	Right shoulder forward, left shoulder rearward

Frequency Response Classes
SAE J211 MAR95

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	600
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Head Form Accelerations	1000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
1	13HEAD0000WSACXP	Passenger Head Acceleration (X)	1000	+	yes	2000
2	13HEAD0000WSACYP	Passenger Head Acceleration (Y)	1000	+	yes	2000
3	13HEAD0000WSACZP	Passenger Head Acceleration (Z)	1000	+	yes	2000
3A	13HEAD0000WSACRP	Passenger Head Acceleration Resultant	1000			
4	13HEAD0000WSAVXP	Passenger Head Angular Rate (X)	1000	+	yes	8000
5	13HEAD0000WSAVYP	Passenger Head Angular Rate (Y)	1000	+	yes	8000
6	13HEAD0000WSAVZP	Passenger Head Angular Rate (Z)	1000	+	yes	8000
7	13NECKUP00WSFOXP	Passenger Upper Neck Force (X)	1000	+	yes	10000
8	13NECKUP00WSFOYP	Passenger Upper Neck Force (Y)	1000	+	yes	10000
9	13NECKUP00WSFOZP	Passenger Upper Neck Force (Z)	1000	+	yes	12000
10	13NECKUP00WSMOXP	Passenger Upper Neck Moment (X)	600	+	yes	300
11	13NECKUP00WSMOYP	Passenger Upper Neck Moment (Y)	600	+	yes	300
12	13NECKUP00WSMOZP	Passenger Upper Neck Moment (Z)	600	+	yes	200
13	13NECKLO00WSFOXP	Passenger Lower Neck Force (X)	1000	+	yes	10000
14	13NECKLO00WSFOYP	Passenger Lower Neck Force (Y)	1000	+	yes	10000
15	13NECKLO00WSFOZP	Passenger Lower Neck Force (Z)	1000	+	yes	12000
16	13NECKLO00WSMOXP	Passenger Lower Neck Moment (X)	600	+	yes	300
17	13NECKLO00WSMOYP	Passenger Lower Neck Moment (Y)	600	+	yes	300
18	13NECKLO00WSMOZP	Passenger Lower Neck Moment (Z)	600	+	yes	200
19	13SHLDRI00WSFOXP	Passenger Shoulder Force (X)	600	+	yes	5000
20	13SHLDRI00WSFOYP	Passenger Shoulder Force (Y)	600	+	yes	10000
21	13SHLDRI00WSFOZP	Passenger Shoulder Force (Z)	600	+	yes	5000
22	13SHRIRIREWSDSX0	Passenger Shoulder Rear Displacement (X)	0	+	no	60
23	13SHRIRIREWSDSY0	Passenger Shoulder Rear Displacement (Y)	0	+	no	60
24	13SHRIRIREWSDSZ0	Passenger Shoulder Rear Displacement (Z)	0	+	no	60
25	13SHRIRIREWSDSLB	Passenger Shoulder Rear Length Change	600	+	no	60
26	13SHRIRIMIWSDSX0	Passenger Shoulder Middle Displacement (X)	0	+	no	60
27	13SHRIRIMIWSDSY0	Passenger Shoulder Middle Displacement (Y)	0	+	no	60
28	13SHRIRIMIWSDSZ0	Passenger Shoulder Middle Displacement (Z)	0	+	no	60
29	13SHRIRIMIWSDSLB	Passenger Shoulder Middle Length Change	600	+	no	60
30	13SHRIRIFRWSDSX0	Passenger Shoulder Front Displacement (X)	0	+	no	60
31	13SHRIRIFRWSDSY0	Passenger Shoulder Front Displacement (Y)	0	+	no	60
32	13SHRIRIFRWSDSZ0	Passenger Shoulder Front Displacement (Z)	0	+	no	60
33	13SHRIRIFRWSDSLB	Passenger Shoulder Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
34	13TRRIRUREWSDSX0	Passenger Thorax Rib 1 Rear Displacement (X)	0	+	no	60
35	13TRRIRUREWSDSY0	Passenger Thorax Rib 1 Rear Displacement (Y)	0	+	no	60
36	13TRRIRUREWSDSZ0	Passenger Thorax Rib 1 Rear Displacement (Z)	0	+	no	60
37	13TRRIRUREWSDSLB	Passenger Thorax Rib 1 Rear Length Change	600	+	no	60
38	13TRRIRUMIWSDSX0	Passenger Thorax Rib 1 Middle Displacement (X)	0	+	no	60
39	13TRRIRUMIWSDSY0	Passenger Thorax Rib 1 Middle Displacement (Y)	0	+	no	60
40	13TRRIRUMIWSDSZ0	Passenger Thorax Rib 1 Middle Displacement (Z)	0	+	no	60
41	13TRRIRUMIWSDSLB	Passenger Thorax Rib 1 Middle Length Change	600	+	no	60
42	13TRRIRUFRWSDSX0	Passenger Thorax Rib 1 Front Displacement (X)	0	+	no	60
43	13TRRIRUFRWSDSY0	Passenger Thorax Rib 1 Front Displacement (Y)	0	+	no	60
44	13TRRIRUFRWSDSZ0	Passenger Thorax Rib 1 Front Displacement (Z)	0	+	no	60
45	13TRRIRUFRWSDSLB	Passenger Thorax Rib 1 Front Length Change	600	+	no	60
46	13TRRIRMREWSDSX0	Passenger Thorax Rib 2 Rear Displacement (X)	0	+	no	60
47	13TRRIRMREWSDSY0	Passenger Thorax Rib 2 Rear Displacement (Y)	0	+	no	60
48	13TRRIRMREWSDSZ0	Passenger Thorax Rib 2 Rear Displacement (Z)	0	+	no	60
49	13TRRIRMREWSDSLB	Passenger Thorax Rib 2 Rear Length Change	600	+	no	60
50	13TRRIRMMIWSDSX0	Passenger Thorax Rib 2 Middle Displacement (X)	0	+	no	60
51	13TRRIRMMIWSDSY0	Passenger Thorax Rib 2 Middle Displacement (Y)	0	+	no	60
52	13TRRIRMMIWSDSZ0	Passenger Thorax Rib 2 Middle Displacement (Z)	0	+	no	60
53	13TRRIRMMIWSDSLB	Passenger Thorax Rib 2 Middle Length Change	600	+	no	60
54	13TRRIRMFRWSDSX0	Passenger Thorax Rib 2 Front Displacement (X)	0	+	no	60
55	13TRRIRMFRWSDSY0	Passenger Thorax Rib 2 Front Displacement (Y)	0	+	no	60
56	13TRRIRMFRWSDSZ0	Passenger Thorax Rib 2 Front Displacement (Z)	0	+	no	60
57	13TRRIRMFRWSDSLB	Passenger Thorax Rib 2 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
58	13TRRIRLREWSDSX0	Passenger Thorax Rib 3 Rear Displacement (X)	0	+	no	60
59	13TRRIRLREWSDSY0	Passenger Thorax Rib 3 Rear Displacement (Y)	0	+	no	60
60	13TRRIRLREWSDSZ0	Passenger Thorax Rib 3 Rear Displacement (Z)	0	+	no	60
61	13TRRIRLREWSDSLB	Passenger Thorax Rib 3 Rear Length Change	600	+	no	60
62	13TRRIRLMIWSDSX0	Passenger Thorax Rib 3 Middle Displacement (X)	0	+	no	60
63	13TRRIRLMIWSDSY0	Passenger Thorax Rib 3 Middle Displacement (Y)	0	+	no	60
64	13TRRIRLMIWSDSZ0	Passenger Thorax Rib 3 Middle Displacement (Z)	0	+	no	60
65	13TRRIRLMIWSDSLB	Passenger Thorax Rib 3 Middle Length Change	600	+	no	60
66	13TRRIRLFRWSDSX0	Passenger Thorax Rib 3 Front Displacement (X)	0	+	no	60
67	13TRRIRLFRWSDSY0	Passenger Thorax Rib 3 Front Displacement (Y)	0	+	no	60
68	13TRRIRLFRWSDSZ0	Passenger Thorax Rib 3 Front Displacement (Z)	0	+	no	60
69	13TRRIRLFRWSDSLB	Passenger Thorax Rib 3 Front Length Change	600	+	no	60
70	13ABRIRUREWSDSX0	Passenger Abdomen Rib 1 Rear Displacement (X)	0	+	no	60
71	13ABRIRUREWSDSY0	Passenger Abdomen Rib 1 Rear Displacement (Y)	0	+	no	60
72	13ABRIRUREWSDSZ0	Passenger Abdomen Rib 1 Rear Displacement (Z)	0	+	no	60
73	13ABRIRUREWSDSLB	Passenger Abdomen Rib 1 Rear Length Change	600	+	no	60
74	13ABRIRUMIWSDSX0	Passenger Abdomen Rib 1 Middle Displacement (X)	0	+	no	60
75	13ABRIRUMIWSDSY0	Passenger Abdomen Rib 1 Middle Displacement (Y)	0	+	no	60
76	13ABRIRUMIWSDSZ0	Passenger Abdomen Rib 1 Middle Displacement (Z)	0	+	no	60
77	13ABRIRUMIWSDSLB	Passenger Abdomen Rib 1 Middle Length Change	600	+	no	60
78	13ABRIRUFRWSDSX0	Passenger Abdomen Rib 1 Front Displacement (X)	0	+	no	60
79	13ABRIRUFRWSDSY0	Passenger Abdomen Rib 1 Front Displacement (Y)	0	+	no	60
80	13ABRIRUFRWSDSZ0	Passenger Abdomen Rib 1 Front Displacement (Z)	0	+	no	60
81	13ABRIRUFRWSDSLB	Passenger Abdomen Rib 1 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
82	13ABRIRLREWSDSX0	Passenger Abdomen Rib 2 Rear Displacement (X)	0	+	no	60
83	13ABRIRLREWSDSY0	Passenger Abdomen Rib 2 Rear Displacement (Y)	0	+	no	60
84	13ABRIRLREWSDSZ0	Passenger Abdomen Rib 2 Rear Displacement (Z)	0	+	no	60
85	13ABRIRLREWSDSLB	Passenger Abdomen Rib 2 Rear Length Change	600	+	no	60
86	13ABRIRLMIWSDSX0	Passenger Abdomen Rib 2 Middle Displacement (X)	0	+	no	60
87	13ABRIRLMIWSDSY0	Passenger Abdomen Rib 2 Middle Displacement (Y)	0	+	no	60
88	13ABRIRLMIWSDSZ0	Passenger Abdomen Rib 2 Middle Displacement (Z)	0	+	no	60
89	13ABRIRLMIWSDSLB	Passenger Abdomen Rib 2 Middle Length Change	600	+	no	60
90	13ABRIRLFRWSDSX0	Passenger Abdomen Rib 2 Front Displacement (X)	0	+	no	60
91	13ABRIRLFRWSDSY0	Passenger Abdomen Rib 2 Front Displacement (Y)	0	+	no	60
92	13ABRIRLFRWSDSZ0	Passenger Abdomen Rib 2 Front Displacement (Z)	0	+	no	60
93	13ABRIRLFRWSDSLB	Passenger Abdomen Rib 2 Front Length Change	600	+	no	60
94	13THSP0100WSACXP	Passenger Spine T1 Acceleration (X)	180	+	yes	2000
95	13THSP0100WSACYP	Passenger Spine T1 Acceleration (Y)	180	+	yes	2000
96	13THSP0100WSACZP	Passenger Spine T1 Acceleration (Z)	180	+	yes	2000
96A	13THSP0100WSACRP	Passenger Spine T1 Acceleration Resultant	180			
97	13THSP0400WSACXP	Passenger Spine T4 Acceleration (X)	180	+	yes	2000
98	13THSP0400WSACYP	Passenger Spine T4 Acceleration (Y)	180	+	yes	2000
99	13THSP0400WSACZP	Passenger Spine T4 Acceleration (Z)	180	+	yes	2000
99A	13THSP0400WSACRP	Passenger Spine T4 Acceleration Resultant	180			
100	13THSP1200WSACXP	Passenger Spine T12 Acceleration (X)	180	+	yes	2000
101	13THSP1200WSACYP	Passenger Spine T12 Acceleration (Y)	180	+	yes	2000
102	13THSP1200WSACZP	Passenger Spine T12 Acceleration (Z)	180	+	yes	2000
102A	13THSP1200WSACRP	Passenger Spine T12 Acceleration Resultant	180			
103	13PUBC0000WSFOYP	Passenger Pubic Symphysis Force (Y)	600	+	yes	12000
104	13SACRLE00WSFOXP	Passenger Sacro-iliac Left Force (X)	600	+	yes	6000
105	13SACRLE00WSFOYP	Passenger Sacro-iliac Left Force (Y)	600	+	yes	12000
106	13SACRLE00WSFOZP	Passenger Sacro-iliac Left Force (Z)	600	+	yes	6000
107	13SACRLE00WSMOXP	Passenger Sacro-iliac Left Moment (X)	600	+	yes	800
108	13SACRLE00WSMOYP	Passenger Sacro-iliac Left Moment (Y)	600	+	yes	400
109	13SACRLE00WSMOZP	Passenger Sacro-iliac Left Moment (Z)	600	+	yes	400

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
110	13SACRRI00WSFOXP	Passenger Sacro-iliac Right Force (X)	600	+	yes	6000
111	13SACRRI00WSFOYP	Passenger Sacro-iliac Right Force (Y)	600	+	yes	12000
112	13SACRRI00WSFOZP	Passenger Sacro-iliac Right Force (Z)	600	+	yes	6000
113	13SACRRI00WSMOXP	Passenger Sacro-iliac Right Moment (X)	600	+	yes	800
114	13SACRRI00WSMOYP	Passenger Sacro-iliac Right Moment (Y)	600	+	yes	400
115	13SACRRI00WSMOZP	Passenger Sacro-iliac Right Moment (Z)	600	+	yes	400
116	13LUSP0000WSFOXP	Passenger Lumbar Force (X)	600	+	yes	10000
117	13LUSP0000WSFOYP	Passenger Lumbar Force (Y)	600	+	yes	10000
118	13LUSP0000WSFOZP	Passenger Lumbar Force (Z)	600	+	yes	12000
119	13LUSP0000WSMOXP	Passenger Lumbar Moment (X)	600	+	yes	300
120	13LUSP0000WSMOYP	Passenger Lumbar Moment (Y)	600	+	yes	300
121	13LUSP0000WSMOZP	Passenger Lumbar Moment (Z)	600	+	yes	200
122	13PELV0000WSACXP	Passenger Pelvic Acceleration (X)	1000	+	yes	2000
123	13PELV0000WSACYP	Passenger Pelvic Acceleration (Y)	1000	+	yes	2000
124	13PELV0000WSACZP	Passenger Pelvic Acceleration (Z)	1000	+	yes	2000
124A	13PELV0000WSACRP	Passenger Pelvic Acceleration Resultant	1000			
125	13FEMRRI00WSFOXP	Passenger Right Femur Force (X)	600	+	yes	15000
126	13FEMRRI00WSFOYP	Passenger Right Femur Force (Y)	600	+	yes	15000
127	13FEMRRI00WSFOZP	Passenger Right Femur Force (Z)	600	+	yes	15000
128	13FEMRRI00WSMOXP	Passenger Right Femur Moment (X)	600	+	yes	350
129	13FEMRRI00WSMOYP	Passenger Right Femur Moment (Y)	600	+	yes	200
130	13FEMRRI00WSMOZP	Passenger Right Femur Moment (Z)	600	+	yes	350
131	13FEACRI00WSFOXP	Passenger Femoral Neck Force (X)	600	+	yes	10000
132	13FEACRI00WSFOYP	Passenger Femoral Neck Force (Y)	600	+	yes	25000
133	13FEACRI00WSFOZP	Passenger Femoral Neck Force (Z)	600	+	yes	10000
134	13KNEERIOUWSFOYP	Passenger Right Outer Knee Force (Y)	600	+	yes	20000
135	13KNEERIINWSFOYP	Passenger Right Inner Knee Force (Y)	600	+	yes	20000
136	11VEHCCG0000ACXA	Vehicle Center of Gravity Acceleration (X)	60	+	yes	2000
137	11VEHCCG0000ACYA	Vehicle Center of Gravity Acceleration (Y)	60	+	yes	2000
138	11VEHCCG0000ACZA	Vehicle Center of Gravity Acceleration (Z)	60	+	yes	2000
138A	11VEHCCG0000ACRA	Vehicle Center of Gravity Acceleration Resultant	60			
139	11VEHCCG0000AVXA	Vehicle Center of Gravity Angular Rate (X)	60	+	yes	8000
140	11VEHCCG0000AVYA	Vehicle Center of Gravity Angular Rate (Y)	60	+	yes	1500
141	11VEHCCG0000AVZA	Vehicle Center of Gravity Angular Rate (Z)	60	+	yes	8000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
142	13VEHC00LO00ACYA	Right Floor Sill Acceleration (Y)	60	+	yes	2000
143	13APIL000000ACYA	Right A-Pillar Sill Acceleration (Y)	60	+	yes	2000
144	13APILLO0000ACYA	Right Lower A-Pillar Acceleration (Y)	60	+	yes	2000
145	13APILMI0000ACYA	Right Mid A-Pillar Acceleration (Y)	60	+	yes	2000
146	11BPILMI0000ACYA	Right B-Pillar Sill Acceleration (Y)	60	+	yes	2000
147	13BPILLO0000ACYA	Right Lower B-Pillar Acceleration (Y)	60	+	yes	2000
148	13BPILMI0000ACYA	Right Mid B-Pillar Acceleration (Y)	60	+	yes	2000
149	13SETR000000ACYA	Passenger Seat Track at Dummy H-Point Acceleration (Y)	60	+	yes	2000
150	11ENGNTPO000ACXA	Engine Top Acceleration (X)	60	+	yes	2000
151	11ENGNTPO000ACYA	Engine Top Acceleration (Y)	60	+	yes	2000
152	12FIRCX00000ACYA	Firewall Center Acceleration (Y)	60	+	yes	2000
153	11ROFR000000ACYA	Left Roof at Vertical Impact Reference Line Acceleration (Y)	60	+	yes	2000
154	11SILB000000ACXA	Left Sill at Vertical Impact Reference Line Acceleration (X)	60	+	yes	2000
155	11SILB000000ACYA	Left Sill at Vertical Impact Reference Line Acceleration (Y)	60	+	yes	2000
156	11SILB000000ACZA	Left Sill at Vertical Impact Reference Line Acceleration (Z)	60	+	yes	2000
156A	11SILB000000ACRA	Right Sill at Vertical Impact Reference Line Acceleration Resultant	60			
157	16SILB000000ACXA	Right Sill at Rear Seat Acceleration (X)	60	+	yes	2000
158	16SILB000000ACYA	Right Sill at Rear Seat Acceleration (Y)	60	+	yes	2000
159	16SILB000000ACZA	Right Sill at Rear Seat Acceleration (Z)	60	+	yes	2000
159A	16SILB000000ACRA	Right Sill at Rear Seat Acceleration Resultant	60			
160	11FORA000000ACXA	Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)	60	+	yes	2000
161	11FORA000000ACYA	Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)	60	+	yes	2000
162	13DOORMIMI71ACYA	Right Front Door Mid Centerline Acceleration (Y)	60	+	yes	2000
163	13DOORMIRE71ACYA	Right Front Door Mid Rear Acceleration (Y)	60	+	yes	2000
164	13DOORMIUP71ACYA	Right Front Door Upper Centerline Acceleration (Y)	60	+	yes	2000
165	16DOORMIRE71ACYA	Right Rear Door Mid Rear Acceleration (Y)	60	+	yes	2000
166	16DOORMIUP71ACYA	Right Rear Door Upper Centerline Acceleration (Y)	60	+	yes	2000
167	10FORARD0000ACXA	Rear Deck Acceleration (X)	60	+	yes	2000
168	10FORARD0000ACYA	Rear Deck Acceleration (Y)	60	+	yes	2000
169	10FORARD0000ACZA	Rear Deck Acceleration (Z)	60	+	yes	2000
169A	10FORARD0000ACRA	Rear Deck Acceleration Resultant	60			

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
170	10FORARD0000AVXA	Rear Deck Angular Rate (X)	60	+	yes	8000
171	10FORARD0000AVYA	Rear Deck Angular Rate (Y)	60	+	yes	8000
172	10FORARD0000AVZA	Rear Deck Angular Rate (Z)	60	+	yes	8000
173	13HEADCONT00VO00	Passenger Head Contact	0	+	no	1
174	13SHOUCONT00VO00	Passenger Shoulder Contact	0	+	no	1
175	13THORCONT00VO00	Passenger Thorax Contact	0	+	no	1
176	13PELVCONT00VO00	Passenger Pelvis Contact	0	+	no	1
177	K0FBAR010000FOXA	POLE LOAD CELL 1	60	+	yes	400000
178	K0FBAR020000FOXA	POLE LOAD CELL 2	60	+	yes	400000
179	K0FBAR030000FOXA	POLE LOAD CELL 3	60	+	yes	400000
180	K0FBAR040000FOXA	POLE LOAD CELL 4	60	+	yes	400000
181	K0FBAR050000FOXA	POLE LOAD CELL 5	60	+	yes	400000
182	K0FBAR060000FOXA	POLE LOAD CELL 6	60	+	yes	400000
183	K0FBAR070000FOXA	POLE LOAD CELL 7	60	+	yes	400000
184	K0FBAR080000FOXA	POLE LOAD CELL 8	60	+	yes	400000

APPENDIX E
SEATING PROCEDURE WORKSHEETS AND PLOTS

Passenger WSID 50th Seating Worksheet

Vehicle	2019 Ram 1500	Technician	K. Brown
VIN #	1C6RRECT3KN884657	Position	Right Front Passenger
ATD	WSID 50th EA7820	Date	4/15/2021
SEATING #			

SCRL Angle	Max	N/A	WSID 50th Tilt Sensors	X	Y	
	Min -	N/A		Head 0°±2	0.0	-2.1
	Difference	N/A				
	/2	N/A		T6 0°±2	0.1	-1.0
	Min +	N/A				
	Mid Angle	14.5		Pelvis 0°±2	1.3	1.3

Seat Back Angle	W/Level °	7.3	HEAD REST POST ANGLE	7.3	FINAL HEAD REST POST ANGLE	6.7
Seat Pan Angle	W/Level °	4.9				

Pelvis Angle	WSID 50th 0° +/-2.5°	Manual Inclinometer	39.8
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Collected Points			
Name	Meas X	Meas Y	Meas Z
SBU -	-31.502	0.274	-16.274
SBL -	-27.311	2.682	23.637
STRIKER -	0.000	0.000	0.000
FOSB -	457.016	-205.802	313.033
FISB -	456.470	-205.794	312.660
ROSB -	-14.682	-203.541	374.118
RISB -	0.767	-628.468	277.594
OSCAR H-POINT -	192.427	-225.888	13.552
PASS PROJECTED WSID H-POINT AT MID-POSITION -	212.000		206.000
PASS STP 11.27 MID-POSITION -	212.533	-147.137	97.274
PASS STP STEP 14.6 TRIAL 1 -	213.119	-146.831	98.076
PASS PROJECTED WSID H-POINT STEP 14.6.2 TRIAL 1 -	213.000		-5.500
PASS STP STEP 14.6 TRIAL 2 -			
PASS PROJECTED WSID H-POINT STEP 14.6.2 TRIAL 2 -			
PASS STP STEP 14.6 TRIAL 3 -			
PASS PROJECTED WSID H-POINT STEP 14.6.2 TRIAL 3 -			
3DRHCG-	69.848	-344.236	-657.639
3DLHCG-	52.063	-501.915	-655.655
LHD CG -	52.063	-501.915	-655.655
BON -	143.024	-418.261	-648.020
TN -	139.298	-418.482	-593.060
TC -	121.812	-419.263	-527.420
SHLD R1 -	98.211	-418.065	-430.003
THX R1 -	132.724	-419.279	-354.005
THX R2 -	167.696	-418.492	-289.094
THX R3 -	186.568	-418.532	-237.780
ABD R1 -	205.567	-420.036	-185.397
ABD R2 -	222.733	-420.347	-139.973
TPS -	256.697	-419.200	-121.922
C1 -	108.775	-419.133	-402.205
SHT -	7.259	-205.412	-388.149
E1 -	196.811	-170.566	-260.829
P1 -	156.291	-183.705	-40.484
H-POINT -	213.215	-182.656	4.854
H-POINT 2 -	209.631	-205.617	7.209

OK -	633.157	-246.839	-65.958
IK -	638.223	-585.863	-70.057
OA -	890.544	-318.299	256.571
IA -	873.196	-450.377	252.726
OH -	864.246	-339.023	384.218
IH -	868.204	-480.770	379.808
OP -	-211.860	-335.089	-475.543
R -	143.625	-418.516	-872.998
H -	605.733	-417.868	-817.635
W1 -	892.641	-417.562	-648.503
W1 Outside -	907.297	-418.258	-648.171
W2 Outside -	1132.496	-416.930	-496.749
D1 -	773.396	-419.851	-331.033
D2 -	722.151	-253.607	-140.114
D3 -	694.087	-583.524	-138.173
HRP -	141.997	-277.980	-807.981
HSP -	142.978	-90.479	-647.320
ADP -	196.454	-52.460	-260.107
HDP -	212.655	-92.113	5.018

Calculated Measurements

Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			225		
HH -				493	
HW -	750				
CD -				668	
IKD -				88	
OKD -				116	
HR -				213	
HS -		328			
AD -		118			
HD -		91			
HLHL -				142	
KK -				339	
SH -				281	
HRA -					6.7
H-POINT TOOL ANGLE -					38.5
TORSO ANGLE -					13.7
WINDSHIELD ANGLE -					56.1