

**RESEARCH FMVSS 214
MOVING DEFORMABLE BARRIER SIDE IMPACT**

**BAYERISCHE MOTOREN WERKE AG
2020 Mini Cooper S Convertible**

**PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319**



Report Date: October 28, 2021

FINAL REPORT

**PREPARED FOR:
Vehicle Research and Test Center
P. O. Box 37
East Liberty, OH 43319**

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Project Manager, John Shultz

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16. Abstract A 48/24 km/h 90° Moving Deformable Barrier Research Side Impact Test was conducted on the subject 2020 Mini Cooper S Convertible in accordance with the specifications of the Laboratory Test Procedure for the Moving Deformable Barrier test. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on April 29, 2021. The impact velocity of the Moving Deformable Barrier (MDB) was 53.11 km/h, and the ambient temperature at the struck (passenger's) side of the target vehicle at the time of impact was 21.0°C. The target vehicle post test maximum crush was 115 mm at level 2 and 3. The test vehicle's performance was as follows: <table border="1" data-bbox="371 1052 1294 1362"> <thead> <tr> <th colspan="3">Passenger ATD (WorldSID-50M)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criterion (HIC15)</td><td>N/A</td><td>49</td></tr> <tr> <td>Brain Injury Criterion (BrIC)</td><td>N/A</td><td>0.54</td></tr> <tr> <td>Peak Shoulder Force</td><td>N</td><td>-2024.8</td></tr> <tr> <td>Peak Thoracic Rib Deflection</td><td>mm</td><td>17.20</td></tr> <tr> <td>Peak Abdominal Rib Deflection</td><td>mm</td><td>14.20</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>-700.49</td></tr> <tr> <td>Peak Resultant Sacro-Iliac Force</td><td>N</td><td>1776.94</td></tr> </tbody> </table> <table border="1" data-bbox="371 1379 1294 1690"> <thead> <tr> <th colspan="3">Rear Passenger ATD (WorldSID-05F)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criterion (HIC15)</td><td>N/A</td><td>658</td></tr> <tr> <td>Brain Injury Criterion (BrIC)</td><td>N/A</td><td>1.47</td></tr> <tr> <td>Peak Shoulder Force</td><td>N</td><td>-1625.25</td></tr> <tr> <td>Peak Thoracic Rib Deflection</td><td>mm</td><td>32.37</td></tr> <tr> <td>Peak Abdominal Rib Deflection</td><td>mm</td><td>497</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>-720.10</td></tr> <tr> <td>Peak Resultant Sacro-Iliac Force</td><td>N</td><td>2047.42</td></tr> </tbody> </table>				Passenger ATD (WorldSID-50M)			Measurement Description	Units	Result	Head Injury Criterion (HIC15)	N/A	49	Brain Injury Criterion (BrIC)	N/A	0.54	Peak Shoulder Force	N	-2024.8	Peak Thoracic Rib Deflection	mm	17.20	Peak Abdominal Rib Deflection	mm	14.20	Pubic Symphysis Force	N	-700.49	Peak Resultant Sacro-Iliac Force	N	1776.94	Rear Passenger ATD (WorldSID-05F)			Measurement Description	Units	Result	Head Injury Criterion (HIC15)	N/A	658	Brain Injury Criterion (BrIC)	N/A	1.47	Peak Shoulder Force	N	-1625.25	Peak Thoracic Rib Deflection	mm	32.37	Peak Abdominal Rib Deflection	mm	497	Pubic Symphysis Force	N	-720.10	Peak Resultant Sacro-Iliac Force	N	2047.42
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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE AND TEST PROCEDURE

This moving deformable barrier 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 moving deformable barrier crash tests conducted by NHTSA. The test was conducted using NHTSA's 'LABORATORY TEST PROCEDURE FOR FMVSS No. 214, DYNAMIC SIDE IMPACT PROTECTION – Moving Deformable Barrier Test' dated September 2012 as a guideline. WorldSID-50M dummy was used instead of the ES-2re listed in the test procedure."

SECTION 2

SUMMARY OF TEST RESULTS

A 2020 Mini Cooper S Convertible was impacted on the right (passenger's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 53.11 km/h (33.00 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on April 29, 2021. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (WorldSID-50M and WorldSID-05F with RibEye) are included in Appendix A.

Dummies were placed in the passenger and right rear designated seating positions according to instructions specified in the Research Side Impact Moving Barrier Test Procedure, dated July 2017. The WorldSID-50M was seated per NHTSA report <https://rosap.nhtl.bts.gov/view/dot/41900>. The side impact event was documented by 11 cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

PASSENGER ATD (WorldSID-50M)

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

REAR PASSENGER ATD (WorldSID-05F)

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:

Passenger ATD (WorldSID-50M)		
Measurement Description	Units	Result
Head Injury Criterion (HIC15)	N/A	49
Brain Injury Criterion (BrIC)	N/A	0.54
Peak Shoulder Force	N	-2024.8
Peak Thoracic Rib Deflection	mm	17.20
Peak Abdominal Rib Deflection	mm	14.20
Pubic Symphysis Force	N	-700.49
Peak Resultant Sacro-Iliac Force	N	1776.94

Rear Passenger ATD (WorldSID-05F)		
Measurement Description	Units	Result
Head Injury Criterion (HIC15)	N/A	658
Brain Injury Criterion (BrIC)	N/A	1.47
Peak Shoulder Force	N	-1625.25
Peak Thoracic Rib Deflection	mm	32.37
Peak Abdominal Rib Deflection	mm	497
Pubic Symphysis Force	N	-720.10
Peak Resultant Sacro-Iliac Force	N	2047.42

Supplemental restraint information is given below:

Restraint Type	Right Front (Passenger) Occupant Location 3		Right Rear (Passenger) Occupant Location 6	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	No	N/A	No	N/A
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Pelvis Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	No	No	N/A
Other Safety Restraint	No	N/A	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

RIGHT LOWER B-PILLAR AY; QD after 13.0 ms

RIGHT MIDDLE B-PILLAR AY; CF at 95.0 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 Shoulder Front Led Position; Error Code 9 at 35.4-56.7 ms

Rear Passenger Shoulder Rear Led Position; Error Code 9 at 38.1-64.6 ms

Rear Passenger Shoulder Middle Led Position; Error Code 2 at 37.2-64.2 ms

Rear Passenger Shoulder Front Led Position; Error Code 2 at 36.2-63.0 ms

Rear Passenger Thorax Rib 2 Middle Led Position; Error Code 1 at 38.3-65.3 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

TEST VEHICLE INFORMATION AND OPTIONS

Model Year	2020	Traction Control System (TCS)	Yes
Make	Mini	Auto-Leveling System	No
Model	Cooper S	Automatic Door Locks (ADL)	Yes
Body Style	Passenger Car	Power Window Auto-Reverse	Yes
VIN	WMWWJ5C02L3L34787	Other Optional Feature	No
Body Color	Caribbean Aqua Metallic	Driver Front Airbag	Yes
Odometer Reading (km/mi)	9000 mi.	Driver Curtain Airbag	No
Engine Displacement (L)	2.0	Driver Head/Torso Airbag	Yes
Type/No. Cylinders	Straight/4	Driver Torso Airbag	No
Engine Placement	Transverse	Driver Torso/Pelvis Airbag	No
Transmission Type	Automatic	Driver Pelvis Airbag	No
Transmission Speeds	7	Driver Knee Airbag	Yes
Overdrive	Yes	Rear Pass. Curtain Airbag	No
Final Drive	FWD	Rear Pass. Head/Torso Airbag	No
Roof Rack	No	Rear Pass. Torso Airbag	No
Sunroof/T-Top	Yes/Convertible	Rear Pass. Torso/Pelvis Airbag	No
Running Boards	No	Rear Pass. Pelvis Airbag	No
Tilt Steering Wheel	Yes	Driver Seat Belt Pretensioner	Yes
Power Seats	No	Rear Pass. Seat Belt Pretensioner	No
Anti-Lock Brakes (ABS)	Yes	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	BAYERISCHE MOTOREN WERKE AG	GVWR (lbs)	1765
Date of Manufacturer	09/19	GAWR Front (lbs)	975
Vehicle Type	Passenger Car	GAWR Rear (lbs)	830

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	2	N/A	4
Vehicle Capacity Weight (VCW) (kg)				360.0
DSC X 68.04 kg				272.2
Rated Cargo and Luggage Weight (RCLW) (kg)				87.8

VEHICLE SEAT TYPE

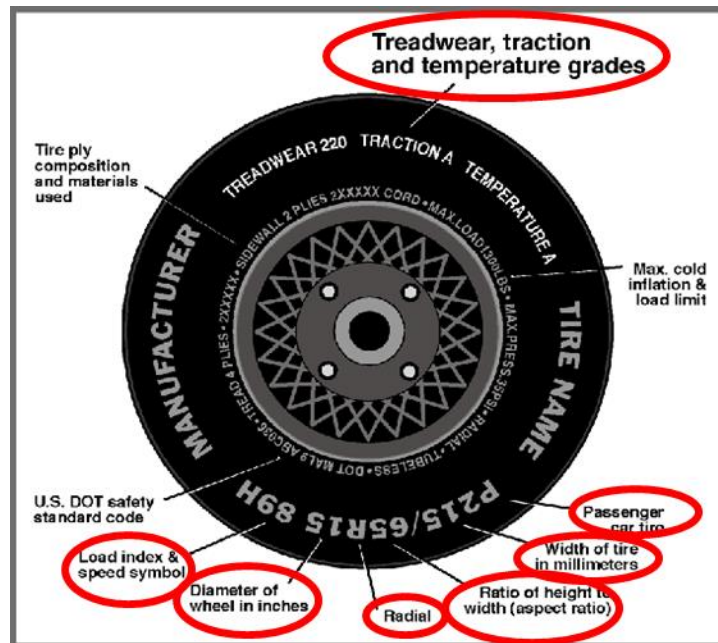
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	Yes	N/A	N/A	N/A	N/A	Yes	N/A
Rear or Second Row Seat	Yes	N/A	N/A	Yes	Yes	N/A	N/A
Third row seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	260	240
Recommended Tire Size	205/45R17 XL	205/45R17 XL
Tire Size on Vehicle	205/45R17	205/45R17
Tire Manufacturer	Hankook	Hankook
Tire Model	Optimo	Optimo
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	5	5
Tire Plies Body	4	4
Load Index/Speed Symbol	88V	88V
Tire Material	Steel, Rayon, Nylon	Steel, Rayon, Nylon
DOT Safety Code Left	2XAA DL H 2219	2XAA DL H 2219
DOT Safety Code Right	2XAA DL H 2219	2XAA DL H 3819

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

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	221	221	221	221
Tire Placard	kPa	260	260	240	240
Owner's Manual	kPa	260	260	240	240
As Tested	kPa	260	260	240	240

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21 kPa	207	207	207	207

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	426.0	265.4		445.0	321.4		426.2	326.6	
Right	kg	425.0	259.4		468.6	344.8		477.8	357.0	
Ratio	%	61.9	38.1		57.8	42.2		56.9	43.1	
Totals	kg	851.0	524.8	1375.8	913.6	666.2	1579.8	904.0	683.6	1587.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1375.8	(A)
Weight of 1 WorldSID (75kg) & 1 SID-IIs (49kg) ATD	kg	124.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	87.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1587.6	(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	Fully Loaded	As Tested	Meets Requirement***
LF	mm	755	755	Yes
RF	mm	745	747	Yes
RR	mm	745	745	Yes
LR	mm	740	740	Yes
Vehicle CG (Aft of Front Axle)	mm	+1076	+1054	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	-38	-22	

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

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

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

Test height adjustable suspension setting, if applicable:

N/A

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: 1x plate	2.2
Components removed: None	0.0

DATA SHEET NO. 2

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

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	26.9	21.6	24.2
Front Passenger Seat	25.8	20.8	23.3
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	16.8
Non-Struck Side Rear Seat	N/A	N/A	16.8
Rear Center Seat*	N/A	N/A	N/A

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR P Height (mm)	SCR P Height Position	SCR P Height (mm)		
				Rearmost	Mid Fore/Aft	Forward- Most
Driver Seat	24.2	112	Max	130	136	149
			Mid	104	112	123
			Min	95	101	110
Front Passenger Seat	23.3	116	Max	134	144	153
			Mid	109	116	126
			Min	93	99	108
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	16.8	341	Max	N/A	N/A	N/A
			Mid	N/A	341	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	16.8	354	Max	N/A	N/A	N/A
			Mid	N/A	354	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	244	26	128	13
Front Passenger Seat	245	26	130	13
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*	N/A	N/A	N/A	N/A

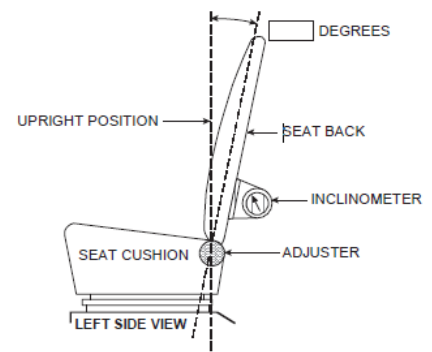
* If applicable.

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.

Driver seat: The driver's seat back was positioned according to the manufacturer's information as provided on Form 1; resulting in a head rest post angle of 2.9° rearward measured at the head rest post. The seat was positioned at mid-track fore and aft travel. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back.

Rear Passenger Seat: The left rear passenger seat back is positioned fixed. The seat track travel was fixed.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat	52.5	29	23.9	8
Front Passenger Seat w/ Seated Dummy	52.5	29	23.9	8
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	6.8	Fixed	8.0	Fixed
Non-Struck Side Rear Seat	6.7	Fixed	8.0	Fixed
Rear Center Seat*	N/A	N/A	N/A	N/A

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Passenger Seat	1; Fixed	Fixed
Rear Seat	1; Fixed	Fixed

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	5	5, Full Up
Rear Seat	2	2, Full Down

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2020 Mini Cooper S Convertible

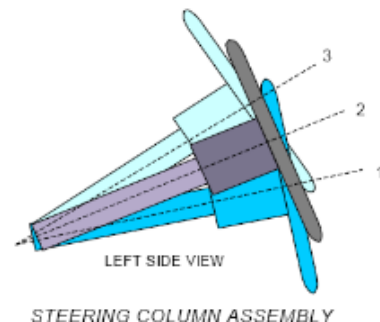
Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

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.

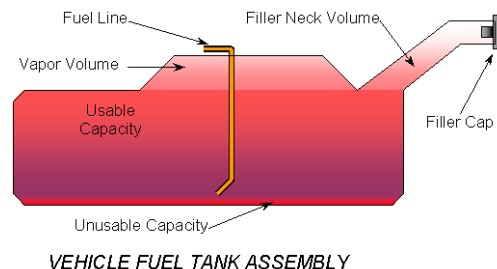
	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	17.7	0
Geometric Center, Position No. 2	19.7	29.5
Uppermost, Position No. 3	21.6	59
Telescoping Steering Wheel Travel		59
Test Position	19.7	29.5



FUEL PUMP

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

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



FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	43.9
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	43.9
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	40.8
Actual Amount of Solvent Used in Test	40.8
1/3 of Usable Capacity	13.6

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 AND WORLDSID-05F INSTRUMENTATION DATATest Vehicle: 2020 Mini Cooper S ConvertibleTest Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	5.34	192.75	-6.45	66.85
	Y	8.05	207.00	-26.06	58.05
	Z	16.12	42.40	-1.19	-27.15
	R	27.90	58.00		
Head Angular Rate (deg/sec)	X	1737.28	39.55	-914.54	187.60
	Y	560.72	150.45	-413.53	69.00
	Z	554.61	256.70	-558.42	213.35
Upper Neck Force (N)	X	101.97	185.55	-180.05	100.90
	Y	280.20	239.45	-400.52	63.05
	Z	703.06	41.85	-21.24	79.70
Upper Neck Moment (Nm)	X	30.09	30.40	-16.72	82.10
	Y	11.05	80.35	-14.50	209.75
	Z	16.75	231.65	-7.41	82.80
Lower Neck Force (N)	X	225.35	225.80	-213.30	18.70
	Y	296.21	219.70	-624.18	31.20
	Z	615.16	41.70	-226.62	68.45
Lower Neck Moment (Nm)	X	58.35	245.20	-91.24	62.35
	Y	34.70	105.10	-33.93	207.50
	Z	20.51	229.60	-7.23	54.50
Shoulder Force (N)	X	1550.44	16.30	-97.41	110.70
	Y	172.82	87.10	-2024.78	24.40
	Z	62.65	33.25	-616.75	15.30
Shoulder Rear Ribeye Position (mm)	X	-5.89	43.70	-59.25	121.50
	Y	84.34	14.85	57.78	44.00
	Z	-45.65	124.10	-62.96	65.60
Length of Change (mm)		29.16	43.90	-2.74	155.30
Shoulder Middle Ribeye Position (mm)	X	34.07	43.70	-25.91	122.70
	Y	96.20	14.10	55.59	44.25
	Z	-46.03	126.10	-65.87	65.45
Length of Change (mm)		26.30	26.95	-1.61	14.35
Shoulder Front Ribeye Position (mm) ¹	X	66.59	56.85	3.74	56.65
	Y	85.40	262.30	5.44	56.65
	Z	16.70	56.65	-75.38	56.85
Length of Change (mm) ¹		12.93	26.75	-4.34	82.85

¹ See Data Acquisition Explanations

TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-13.31	33.70	-35.94	177.95
	Y	104.60	137.20	91.45	42.80
	Z	2.87	186.10	-15.49	56.90
Length of Change (mm)		15.66	42.85	-1.29	91.00
Thorax Rib 1 Middle Ribeye Position (mm)	X	25.38	33.75	-0.92	200.95
	Y	111.45	94.05	95.53	25.00
	Z	2.16	185.40	-18.26	55.60
Length of Change (mm)		11.89	24.95	-1.85	94.95
Thorax Rib 1 Front Ribeye Position (mm)	X	60.47	33.65	33.57	237.20
	Y	106.36	85.15	90.52	25.70
	Z	3.39	186.10	-16.15	56.65
Length of Change (mm)		3.88	24.85	-3.57	33.60
Thorax Rib 2 Rear Ribeye Position (mm)	X	-12.08	22.30	-29.44	243.70
	Y	102.05	157.10	85.91	49.05
	Z	42.85	28.15	25.65	57.90
Length of Change (mm)		17.20	39.10	-0.89	157.05
Thorax Rib 2 Middle Ribeye Position (mm)	X	28.28	38.40	5.37	299.75
	Y	111.58	166.60	92.79	17.70
	Z	45.29	28.70	26.38	57.10
Length of Change (mm)		15.23	17.60	-1.71	166.60
Thorax Rib 2 Front Ribeye Position (mm)	X	65.40	36.35	39.69	203.05
	Y	104.48	156.40	87.60	18.05
	Z	49.33	29.00	31.39	57.10
Length of Change (mm)		6.22	17.90	-1.96	133.45
Thorax Rib 3 Rear Ribeye Position (mm)	X	-41.63	22.05	-52.53	286.10
	Y	94.01	286.10	78.20	18.20
	Z	-32.31	30.00	-49.03	57.45
Length of Change (mm)		14.78	18.35	-1.74	286.20
Thorax Rib 3 Middle Ribeye Position (mm)	X	-4.59	20.90	-21.50	238.80
	Y	102.75	101.00	85.24	18.15
	Z	-30.94	29.00	-49.03	57.50
Length of Change (mm)		14.90	17.85	-1.17	100.50

TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 Front Ribeye Position (mm)	X	29.87	20.30	10.76	236.00
	Y	94.10	226.15	77.92	18.20
	Z	-32.04	30.25	-48.41	57.45
Length of Change (mm)		6.65	17.60	-1.29	91.70
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-26.63	22.10	-35.42	242.20
	Y	98.78	164.65	83.01	18.15
	Z	3.05	28.30	-16.65	57.50
Length of Change (mm)		12.74	18.50	-2.79	164.70
Abdomen Rib 1 Middle Ribeye Position (mm)	X	10.81	20.30	-2.44	108.70
	Y	105.53	163.15	88.80	18.15
	Z	3.19	29.50	-18.69	57.45
Length of Change (mm)		14.20	18.15	-1.62	163.05
Abdomen Rib 1 Front Ribeye Position (mm)	X	45.06	21.15	29.46	103.75
	Y	99.88	227.15	82.93	18.15
	Z	3.37	30.60	-16.86	56.40
Length of Change (mm)		7.21	18.05	-3.64	226.95
Abdomen Rib 2 Rear Ribeye Position (mm)	X	-12.44	15.70	-21.64	95.70
	Y	95.01	174.10	81.36	49.40
	Z	36.90	27.95	14.99	59.60
Length of Change (mm)		7.24	53.35	-3.79	174.15
Abdomen Rib 2 Middle Ribeye Position (mm)	X	23.23	16.60	9.66	98.20
	Y	105.34	163.40	90.71	51.00
	Z	36.17	27.95	10.98	61.80
Length of Change (mm)		11.00	51.65	-3.01	163.40
Abdomen Rib 2 Front Ribeye Position (mm)	X	56.15	17.00	42.06	107.80
	Y	96.45	170.10	82.74	51.80
	Z	37.91	27.90	14.80	58.30
Length of Change (mm)		10.46	54.80	-1.32	170.00
T1 Acceleration (g)	X	4.98	31.80	-9.32	18.15
	Y	2.67	225.05	-29.58	20.25
	Z	4.91	18.45	-6.40	52.30
	R	29.69	20.25		

TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021
 Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	3.01	32.10	-8.33	17.75
	Y	3.24	173.70	-25.23	27.55
	Z	6.23	18.50	-6.20	52.65
	R	25.57	15.40		
T12 Acceleration (g)	X	8.42	17.15	-2.08	173.15
	Y	6.25	21.45	-36.65	15.25
	Z	4.55	17.80	-8.53	52.40
	R	36.94	15.25		
Pubic Symphysis (N)	Y	31.11	199.45	-700.49	41.70
Left Sacro-Iliac Force (N)	X	200.47	16.00	-193.87	56.25
	Y	85.00	57.80	-933.60	38.25
	Z	121.66	60.65	-195.88	42.20
Left Sacro-Iliac Moment (Nm)	X	22.85	217.70	-26.45	38.70
	Y	2.83	92.85	-24.24	44.45
	Z	31.32	34.65	-7.63	80.05
Right Sacro-Iliac Force (N)	X	119.88	96.95	-105.33	15.55
	Y	36.66	73.25	-1774.00	38.35
	Z	226.21	27.05	-743.34	53.40
Right Sacro-Iliac Moment (Nm)	X	23.05	198.45	-66.67	53.40
	Y	4.25	15.75	-30.08	41.10
	Z	34.53	34.55	-7.19	80.05
Lumbar Force (N)	X	197.60	57.80	-230.04	16.05
	Y	208.59	111.10	-498.21	47.90
	Z	598.90	197.70	-724.15	54.80
Lumbar Moment (Nm)	X	14.13	26.15	-53.66	52.70
	Y	10.17	16.05	-3.60	123.60
	Z	5.40	49.45	-5.56	17.00
Pelvis Acceleration (g)	X	4.07	51.70	-11.02	15.80
	Y	5.54	63.95	-39.56	36.00
	Z	11.93	19.05	-14.72	41.00
	R	41.04	36.00		

TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021
 Passenger Dummy Serial Number: EA7820

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Femur Force (N)	X	34.88	163.65	-126.40	58.80
	Y	264.16	58.20	-61.87	46.75
	Z	249.39	98.85	-749.61	50.20
Femur Moment (Nm)	X	35.63	64.30	-137.36	50.20
	Y	13.08	39.45	-27.20	55.00
	Z	22.96	60.00	-33.71	42.45
Femoral Neck Force (N)	X	367.14	60.60	-275.96	42.30
	Y	82.82	94.55	-1059.97	39.85
	Z	793.24	36.20	-169.26	298.05
Outer Knee Force (N)	Y	152.79	17.10	-1341.65	37.75
Inner Knee Force (N)	Y	5038.80	50.10	-121.61	16.35

TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021
 Rear Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	31.15	192.10	-45.20	59.30
	Y	9.03	208.20	-102.91	60.40
	Z	67.83	59.25	-2.55	87.60
	R	122.58	59.40		
Head Angular Rate (deg/sec)	X	3139.43	56.20	-848.26	183.30
	Y	1591.81	177.40	-722.52	233.90
	Z	1281.62	56.40	-2711.16	198.95
Upper Neck Force (N)	X	99.04	173.10	-307.51	56.05
	Y	188.39	206.65	-405.16	54.95
	Z	1493.58	55.70	-395.30	70.30
Upper Neck Moment (Nm)	X	18.66	42.65	-37.87	67.55
	Y	8.57	98.90	-24.51	199.95
	Z	19.03	224.95	-6.91	181.20
Lower Neck Force (N)	X	321.05	189.05	-363.86	57.15
	Y	368.22	69.35	-1139.30	57.00
	Z	1157.22	54.35	-490.02	63.15
Lower Neck Moment (Nm)	X	29.85	207.80	-93.96	58.20
	Y	43.40	58.20	-39.46	189.40
	Z	18.88	223.50	-10.62	180.15
Shoulder Force (N)	X	345.37	60.00	-248.30	30.05
	Y	1625.25	35.65	-49.13	172.50
	Z	384.91	39.75	-30.59	213.55
Shoulder Rear Ribeye Position (mm) ¹	X	16.70	64.55	-75.19	64.75
	Y	62.03	-32.00	5.71	64.55
	Z	13.30	64.55	-40.94	87.20
Length of Change (mm) ¹		10.38	64.55	-6.03	64.75
Shoulder Middle Ribeye Position (mm) ₁	X	11.21	175.50	-36.81	64.35
	Y	75.31	-26.60	-2.26	64.15
	Z	5.57	64.15	-41.50	87.40
Length of Change (mm) ¹		35.12	37.05	-1.03	37.25
Shoulder Front Ribeye Position (mm) ¹	X	42.06	175.30	-0.34	36.25
	Y	62.50	-49.80	-1.94	36.25
	Z	6.52	62.95	-49.34	88.20
Length of Change (mm) ¹		33.18	63.15	-3.23	174.30

¹ See Data Acquisition Explanations

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA**(CONTINUED)**Test Vehicle: 2020 Mini Cooper S ConvertibleTest Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

Rear Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-21.98	175.70	-46.57	52.50
	Y	73.86	289.00	55.84	50.40
	Z	8.06	41.20	-1.20	79.50
Length of Change (mm)		6.28	47.60	-0.91	288.90
Thorax Rib 1 Middle Ribeye Position (mm)	X	12.62	175.50	-12.01	52.50
	Y	96.94	39.05	62.38	51.30
	Z	1.73	37.20	-12.45	39.05
Length of Change (mm)		26.38	50.85	-6.46	39.05
Thorax Rib 1 Front Ribeye Position (mm)	X	43.84	176.00	29.75	53.70
	Y	72.77	-12.20	38.56	51.50
	Z	9.16	40.90	-0.14	77.40
Length of Change (mm)		32.37	52.20	-1.63	175.90
Thorax Rib 2 Rear Ribeye Position (mm)	X	-11.19	174.85	-23.32	49.50
	Y	76.09	279.70	64.71	50.50
	Z	38.62	41.00	30.85	62.90
Length of Change (mm)		5.17	50.25	-1.26	279.70
Thorax Rib 2 Middle Ribeye Position (mm) ¹	X	26.11	64.75	-1.40	64.95
	Y	100.84	64.75	-8.52	64.95
	Z	44.43	38.15	-2.97	38.35
Length of Change (mm)		15.11	38.15	-0.30	38.35
Thorax Rib 2 Front Ribeye Position (mm) ¹	X	56.30	60.90	50.30	83.85
	Y	74.81	20.60	48.24	50.80
	Z	45.63	40.20	37.74	104.40
Length of Change (mm)		22.36	50.95	-1.25	172.80
Thorax Rib 3 Rear Ribeye Position (mm)	X	-44.61	61.45	-51.54	167.40
	Y	74.71	268.05	68.55	50.10
	Z	-29.55	38.40	-36.03	56.00
Length of Change (mm)		4.69	50.20	-0.77	268.15
Thorax Rib 3 Middle Ribeye Position (mm)	X	-12.23	60.60	-20.95	166.40
	Y	89.44	225.90	79.45	49.00
	Z	-25.04	38.40	-32.79	55.90
Length of Change (mm)		8.84	49.00	-0.55	235.85

¹ See Data Acquisition Explanations

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021
 Rear Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 Front Ribeye Position (mm)	X	19.63	53.00	12.06	226.35
	Y	71.73	223.20	61.55	50.10
	Z	-27.88	38.45	-33.85	55.30
Length of Change (mm)		5.53	48.95	-1.07	62.95
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-23.15	56.25	-34.33	168.70
	Y	73.04	245.80	70.43	50.10
	Z	3.67	167.75	-4.49	54.55
Length of Change (mm)		3.66	53.25	-1.01	214.35
Abdomen Rib 1 Middle Ribeye Position (mm)	X	12.00	55.50	-1.80	167.70
	Y	89.93	232.10	83.18	52.25
	Z	-3.04	167.80	-13.82	54.50
Length of Change (mm)		4.61	50.00	-1.27	231.95
Abdomen Rib 1 Front Ribeye Position (mm)	X	42.25	53.95	30.13	169.15
	Y	72.41	232.10	65.63	52.70
	Z	2.22	168.10	-6.00	54.50
Length of Change (mm)		1.08	167.45	-1.40	60.85
Abdomen Rib 2 Rear Ribeye Position (mm)	X	-7.44	56.70	-18.74	233.35
	Y	75.02	229.90	71.74	51.95
	Z	34.17	229.65	24.98	56.00
Length of Change (mm)		4.05	54.35	-2.75	231.85
Abdomen Rib 2 Middle Ribeye Position (mm)	X	26.09	55.25	11.69	235.50
	Y	93.82	236.85	85.99	52.70
	Z	33.08	210.80	20.50	55.10
Length of Change (mm)		4.97	52.00	-2.89	236.80
Abdomen Rib 2 Front Ribeye Position (mm)	X	56.17	54.90	43.64	235.45
	Y	78.51	234.35	70.37	53.20
	Z	37.69	231.70	26.73	56.30
Length of Change (mm)		1.99	53.05	-1.27	147.05
T1 Acceleration (g)	X	14.86	197.35	-28.83	62.85
	Y	7.17	165.40	-40.58	50.15
	Z	12.51	62.15	-7.62	53.35
	R	42.43	50.20		

TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021
 Rear Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	11.66	199.70	-11.29	51.20
	Y	7.16	81.70	-41.29	47.70
	Z	9.08	62.45	-9.86	52.95
	R	42.63	47.80		
T12 Acceleration (g)	X	10.51	53.65	-6.54	62.65
	Y	10.82	137.40	-57.88	39.85
	Z	19.64	49.45	-8.82	139.15
	R	59.71	39.90		
Pubic Symphysis (N)	Y	23.55	74.60	-720.10	49.00
Left Sacro-Iliac Force (N)	X	259.28	48.35	-140.80	60.45
	Y	88.99	61.50	-682.05	47.00
	Z	41.44	87.00	-262.81	42.65
Left Sacro-Iliac Moment (Nm)	X	15.42	66.20	-10.60	151.10
	Y	6.17	63.80	-11.08	206.65
	Z	28.28	46.75	-7.60	60.70
Right Sacro-Iliac Force (N)	X	337.07	53.50	-163.93	196.00
	Y	131.41	89.55	-1952.47	47.55
	Z	347.25	132.45	-741.03	52.40
Right Sacro-Iliac Moment (Nm)	X	27.03	132.40	-75.83	50.20
	Y	12.51	35.50	-14.34	57.90
	Z	27.18	46.40	-22.80	61.00
Lumbar Force (N)	X	326.41	57.30	-155.92	191.40
	Y	376.24	132.40	-1045.93	48.15
	Z	516.67	223.90	-770.35	51.95
Lumbar Moment (Nm)	X	32.40	134.45	-84.91	50.65
	Y	10.31	36.75	-14.05	139.25
	Z	17.40	240.45	-22.95	51.75
Pelvis Acceleration (g)	X	13.60	40.85	-9.36	51.45
	Y	11.74	122.15	-60.47	46.80
	Z	14.04	46.00	-8.10	139.25
	R	62.10	46.80		

**TABLE 1 WORLD SID-50M AND WORLD SID-05F INSTRUMENTATION DATA
(CONTINUED)**

Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021
 Rear Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Femur Force (N)	X	14.55	204.50	-133.75	47.45
	Y	395.59	44.85	-17.87	14.90
	Z	468.16	79.45	-175.72	55.55
Femur Moment (Nm)	X	7.95	33.30	-74.17	61.25
	Y	12.76	138.50	-44.75	52.80
	Z	8.19	41.60	-4.92	135.50
Femoral Neck Force (N)	X	167.19	41.85	-70.19	135.00
	Y	421.51	49.10	-259.53	79.75
	Z	950.62	48.85	-42.79	23.15
Outer Knee Force (N)	Y	833.39	61.55	-72.09	38.80
Inner Knee Force (N)	Y	3369.29	61.20	-22.36	297.75

Positive Direction

Longitudinal Forward
 Lateral Rightward
 Vertical Downward

Negative Direction

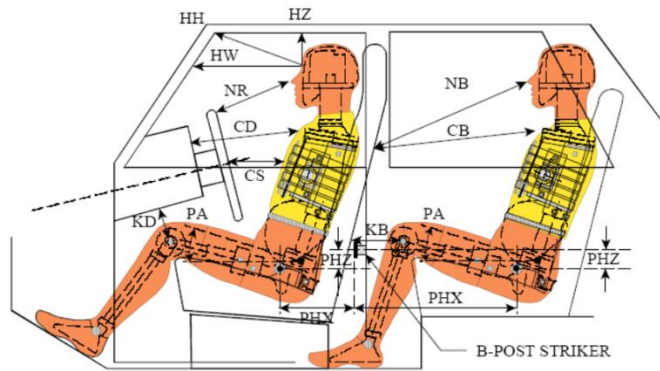
Longitudinal Rearward
 Lateral Leftward
 Vertical Upward

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



LEFT SIDE VIEW

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

Code	Measurement Description	Passenger WorldSID-50M SN # EA7820		Rear Passenger WorldSID-05F SN # DK1774	
		Length (mm)	Angle	Length (mm)	Angle
HH	Header to Header	671			
HW	Header to Windshield	824			
HZ	Head to Roof Liner	224		289	
NR	Nose to Rim/Seat Back			336	
CD	Chest to Dash/Seat Back	---		391	
CS	Chest to Steering Wheel				
KD(L)/KDA(L)°	Left Knee to Dash/Seat Back	178	25.9	308	82.4
KD(R)/KDA(R)°	Right Knee to Dash/Seat Back	196	26.0	307	84.4
PAX°	Pelvic Tilt Angle X		-0.1		0.7
PAY°	Pelvic Tilt Angle Y		-0.2		20.1
PHX	Hip Point to Striker (X-Axis)	334		-398	
PHZ	Hip Point to Striker (Z-Axis)	197		-149	
HAX°	Head Tilt Angle X		-1.0		0.3
HAY ¹ °	Head Tilt Angle Y		0.6		-1.6
TAX°	Thorax Tilt Angle X		-0.7		0.8
TAY°	Thorax Tilt Angle Y		1.7		14.5
	Head Rest Angle		8.1		8.0
	H-Point Tool Angle		43.3		49.8
	Torso Angle		13.9		69.4
	Windshield Angle		50.4		17.7

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

WorldSID-5F neck was adjusted 2 notches up

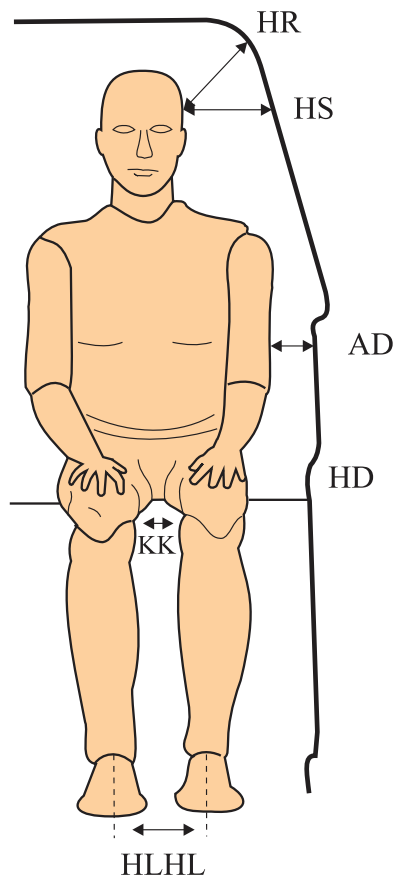
¹ Missing point D1

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



Code	Measurement Description	Passenger WorldSID- 50M SN # EA7820	Rear Passenger WorldSID- 05F SN # DK1774
HR	Head to Side Header	258	307
HS	Head to Side Window	309	270
AD	Arm to Door	119	18
HD	Hip Point to Door	77	25
KK	Knee to Knee	349	311
HLHL	Heel to Heel	193	174

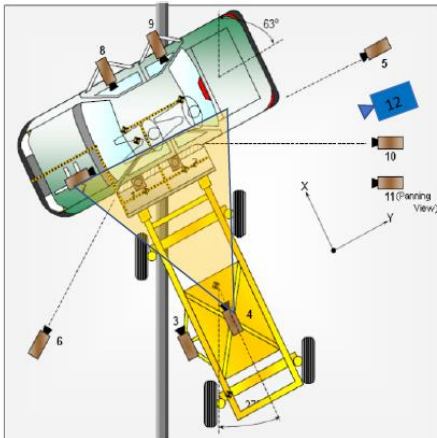
Note: All measurements are in millimeters.

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



CAMERA LOCATIONS AND DATA

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Wide View	-1578	0	-5692	8.5	1000
2	Overhead Close-Up View	-1387	0	-5962	28	1000
3	Impact Point	-1522	-907	-861	25	1000
4	Struck-Side View at Impact	-2250	0	-1429	8.5	1000
5	Rear Impact View of Struck Side	0	9358	-1482	20	1000
6	Front Oblique Impact View of Struck Side	-2352	-4126	-1456	20	1000
7	Driver Dummy Front View (Onboard)				25	1000
8	Driver Dummy Side View (Onboard)				8.5	1000
9	Rear Passenger Dummy Side View (Onboard)				8.5	1000
10	Real-Time Rear View of Impact				Zoom	1000
11	Real-Time Pan View of Impact				Zoom	30
12	Real-Time Left Rear View of Impact				Zoom	30

Reference: Impact Point projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down *All measurements accurate to ± 6 mm.

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: N/A

DATA SHEET NO. 5 (CONTINUED)
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

INSTRUMENTATION

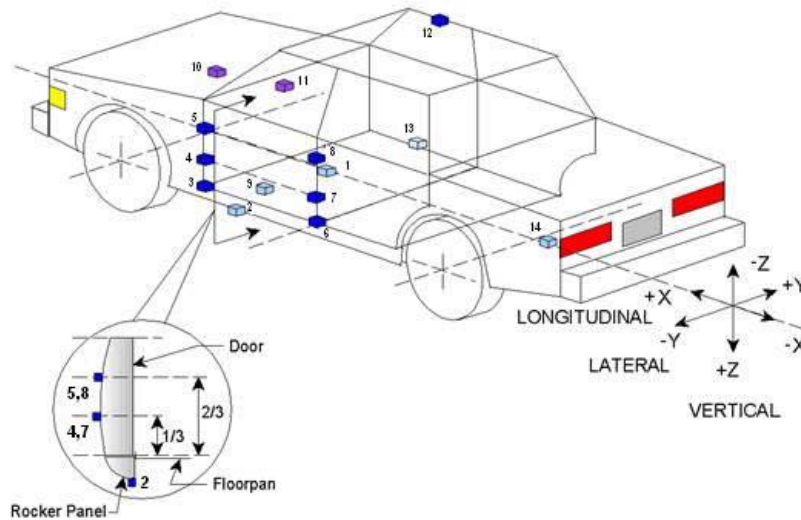
Driver Dummy Channels	135
Passenger Dummy Channels	135
Vehicle Structure Accelerometers	35
MDB Accelerometers	5
Contact Channels	10
TOTAL	320

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	1932	-30	-10				
	Longitudinal (g)				2.80	45.90	-10.15	9.35
	Lateral (g)				3.97	56.35	-26.75	7.65
	Vertical (g)				6.27	11.40	-6.51	29.05
	Resultant (g)				27.12	7.90		
2	Vehicle CG ARS	1902	-61	-14				
	Longitudinal (g)				78.63	48.30	-135.91	7.80
	Lateral (g)				46.36	8.25	-48.37	15.30
	Vertical (g)				3.92	5.00	-107.26	58.35
3	Left Sill at Front Seat	2219	-651	-125				
	Longitudinal (g)				3.36	28.35	-5.01	9.75
	Lateral (g)				3.49	74.30	-28.15	7.25
	Vertical (g)				5.29	36.95	-4.94	9.00
	Resultant (g)				28.42	7.30		
4	Left Side Sill At Rear Seat	1957	-630	-140				
	Longitudinal (g)				3.05	28.40	-5.04	9.80
	Lateral (g)				3.38	73.95	-28.42	7.05
	Vertical (g)				5.21	21.95	-4.42	12.60
	Resultant (g)				28.50	7.05		
5	Right Side Sill At Front Seat	2217	648	-122				
	Lateral (g)				13.22	9.50	-48.76	3.90
6	Right Side Sill At Rear Seat	1555	649	-103				
	Lateral (g)				13.03	8.20	-47.92	4.45

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
7	Lower A-Post	2463	675	-71				
	Lateral (g)				43.61	9.60	-179.12	4.35
8	Middle A-Post	2457	711	-490				
	Lateral (g)				46.06	18.00	-29.64	3.80
9	Lower B-Post	1302	670	-147				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
10	Middle B-Post	1390	671	-484				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
11	Front Seat Track	1687	538	-136				
	Lateral (g)				2.81	74.55	-28.02	5.60
12	Rear Seat Structure	1374	582	-4				
	Lateral (g)				3.28	73.25	-24.61	6.00
13	Right Rear Occupant Compartment	1538	-305	-232				
	Lateral (g)				3.17	73.75	-25.47	6.75
14	Engine Block	3262	19	-369				
	Longitudinal (g)				3.11	40.30	-13.09	32.00
	Lateral (g)				6.87	103.80	-22.61	28.40
15	Rear Floorpan Above Axle	711	24	-101				
	Longitudinal (g)				2.69	47.35	-4.65	17.05
	Lateral (g)				3.86	72.40	-27.51	7.00
	Vertical (g)				7.01	7.45	-3.47	46.60
	Resultant (g)				28.39	7.00		
16	Rear Deck	153	39	-195				
	Longitudinal (g)				9.78	16.60	-18.85	11.50
	Lateral (g)				6.43	65.60	-36.05	34.50
	Vertical (g)				14.24	9.90	-9.12	32.70
	Resultant (g)				36.59	34.10		
17	Rear Deck ARS	155	-59	-195				
	Longitudinal (g)				111.15	54.85	-82.15	12.70
	Lateral (g)				66.25	36.60	-131.67	13.75
	Vertical (g)				25.92	8.00	-129.46	75.40
18	Right Front Door Mid Centerline	1916	725	-270				
	Lateral (g)				141.01	12.15	-143.26	17.55
19	Right Front Door Mid Rear	1467	698	-263				
	Lateral (g)				24.60	26.95	-102.02	8.00
20	Right Front Door Upper Centerline	1891	682	-477				
	Lateral (g)				67.60	27.95	-139.98	13.50

*0,0,0 located at rear bumper

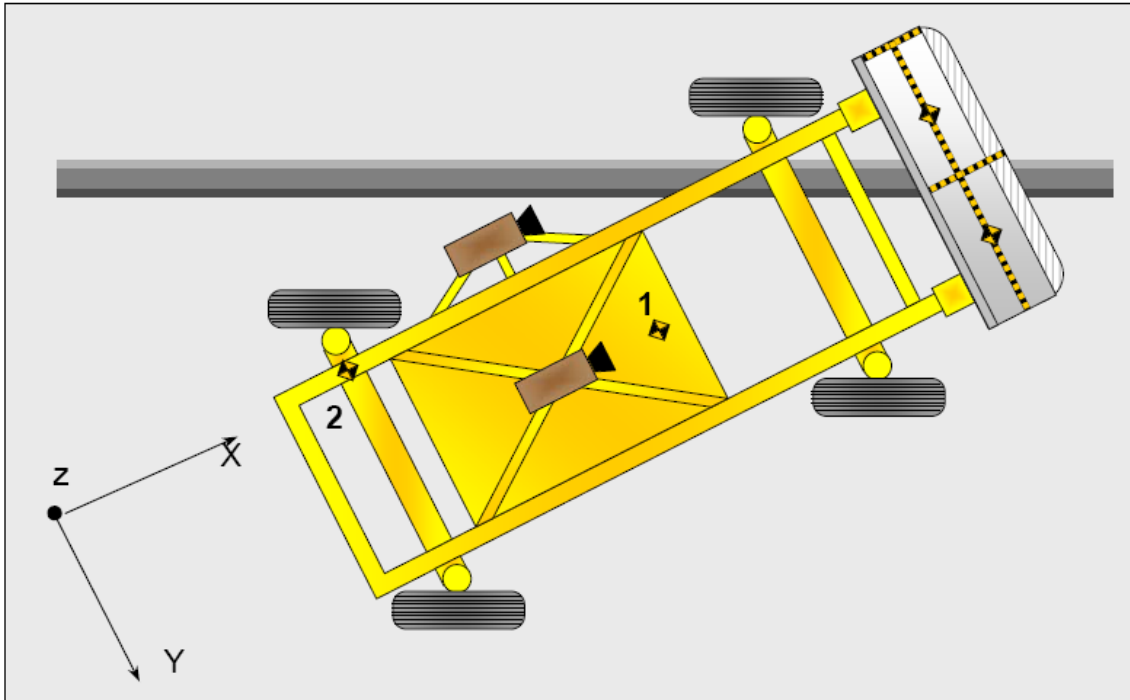
¹ See Data Acquisition Explanations

DATA SHEET NO. 7
MDB ACCELEROMETER DATA

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



MDB ACCELEROMETER LOCATIONS

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	MDB CG	-2179	0	-505				
	Longitudinal (g)				2.02	75.05	-21.94	21.40
	Lateral (g)				5.64	34.70	-2.69	54.00
	Vertical (g)				5.35	57.45	-4.87	51.10
	Resultant (g)				22.56	34.50		
2	MDB Rear	-3648	-650	-618				
	Longitudinal (g)				1.58	124.95	-17.73	19.55
	Lateral (g)				2.37	122.40	-3.56	22.50

Reference: X – Face of MDB (+ forward)
Y – MDB centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 8
POST TEST OBSERVATIONS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (WorldSID-50M)	Rear Seat Dummy (WorldSID-05F)
Face	None	Side wall of the soft top
Top of Head	None	Side wall of the soft top
Left Side of Head	SAB	Side wall of the soft top
Back of head	Head Rest	None
Left Shoulder	SAB	Car Panel
Upper Torso	SAB	Car Panel
Lower Torso	Side Seat Bolster SAB	Car Panel
Left Hip	Door Panel	Car Panel
Left Knee	Door Panel	Car Panel

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	N/A	Yes
Total Separation from Vehicle at Hinges or Latches	No	N/A	No	N/A	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	N/A	No	N/A	No
Disengaged from Latched Position	No	N/A	No	N/A	No
Latch Separated from Striker	No	N/A	No	N/A	No
Jammed Shut	Yes	N/A	No	N/A	No
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	None
Side Window Damage	None
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2500
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		308
Actual Impact Point (Aft of Front Axle)	mm		605
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-2
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	6

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Frame	4115
Wheel Base of Framework Carriage	2591
CG Location of Front Axle	1114

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	415.8	278.0	693.8
Right	kg	363.6	310.2	673.8
Ratio	%	57.0	43.0	100.0
Totals	kg	780.4	585.6	1367.6

SPEED AND ANGLE AT IMPACT DATA

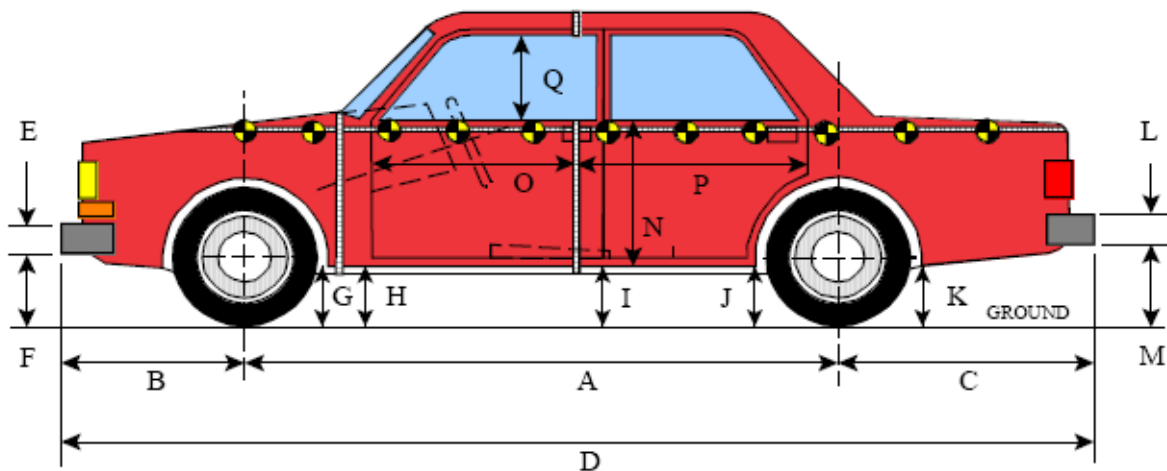
Measured Parameter	Units	Tolerance	Value
Trap No. 1 Velocity (Primary)	km/h	52.1 to 53.7	53.11
Trap No. 2 Velocity (Redundant)	km/h	52.1 to 53.7	53.14
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

DATA SHEET NO. 10
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



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	2500	2505	-5
B	Front Axle to FSOV	768	768	0
C	Rear Axle to RSOV	600	600	0
D	Total Length at Centerline	3825	3842	-17
E	Front Bumper Thickness	100	100	0
F	Front Bumper Bottom to Ground	437	448	-11
G	Sill Height at Front Wheel Well	260	290	-30
H	Sill Height at Front Door Leading Edge	264	312	-48
I	Sill Height at B Pillar	272	338	-66
J1	Sill Height at Rear Wheel Well	281	330	-49
J2	Pinch Weld Height at Rear Wheel Well	161	200	-39
K	Sill Height Aft of Rear Wheel Well	396	329	67
L	Rear Bumper Thickness	100	100	0
M	Rear Bumper Bottom to Ground	428	466	-38
N	Sill Height to Bottom of Front Window Sill	711	666	45
O	Front Door Leading Edge to Impact CL	630	620	10
P	Rear Door Trailing Edge to Impact CL	640	620	20
Q	Front Window Opening	380	368	12
R	Right Side Length	3620	3631	-11
S	Left Side Length	3630	3660	-30
T	Maximum Vehicle Width at B-Pillars	1690	1660	30
U	Maximum Vehicle Width	1700	1717	-17

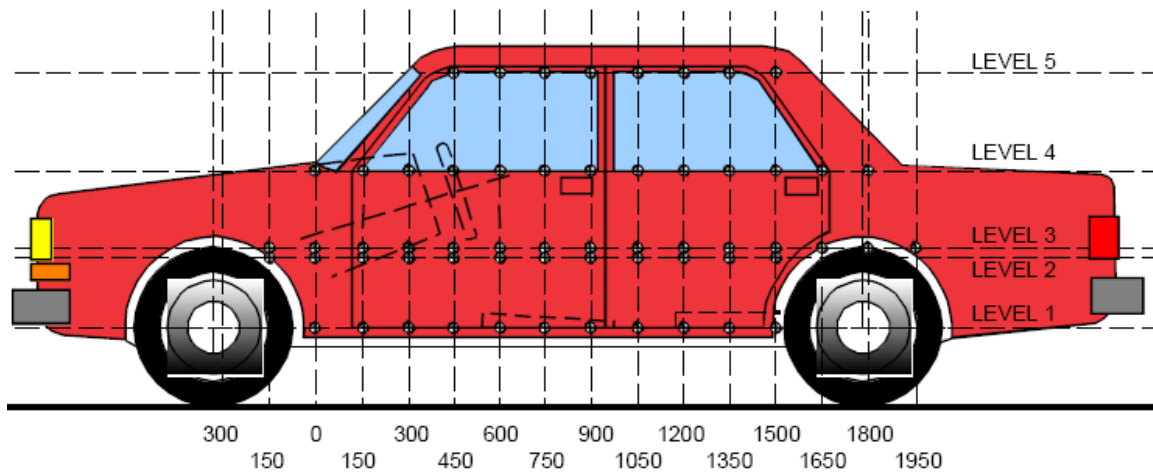
**All Dimensions in mm

DATA SHEET NO. 11
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	191	-1	300
				600
2	Occupant H-Point	511	115	1050
3	Mid-Door	687	115	900
4	Window Sill	934	40	1500
5	Window Top	1321	7	750
				1050

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. 11 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-150			854					877					-23		
0		845	845				866	806				-21	39		
150	804	837	840	698		806	750	791	690		-2	87	49	8	
300	804	833	840	719		805	760	787	716		-1	73	53	3	
450	806	833	841	730		806	734	763	732		0	99	78	-2	
600	808	835	843	735		809	728	741	735		-1	107	102	0	
750	809	837	845	743	576	811	735	735	738	569	-2	102	110	5	7
900	811	837	846	754	586	813	724	731	744	580	-2	113	115	10	6
1050	811	837	846	762	591	814	722	743	745	584	-3	115	103	17	7
1200	811	836	847	768	589	814	725	746	742	583	-3	111	101	26	6
1350	809	836	846	773	590	812	742	747	736	586	-3	94	99	37	4
1500	806	835	845	775	590	810	764	757	735	589	-4	71	88	40	1
1650	804	838	846	777	570	808	755	753	748	569	-4	83	93	29	1
1800	802	845	848	778	531	806	814	769	769	526	-4	31	79	9	5
1950			853	780				842	772				11	8	

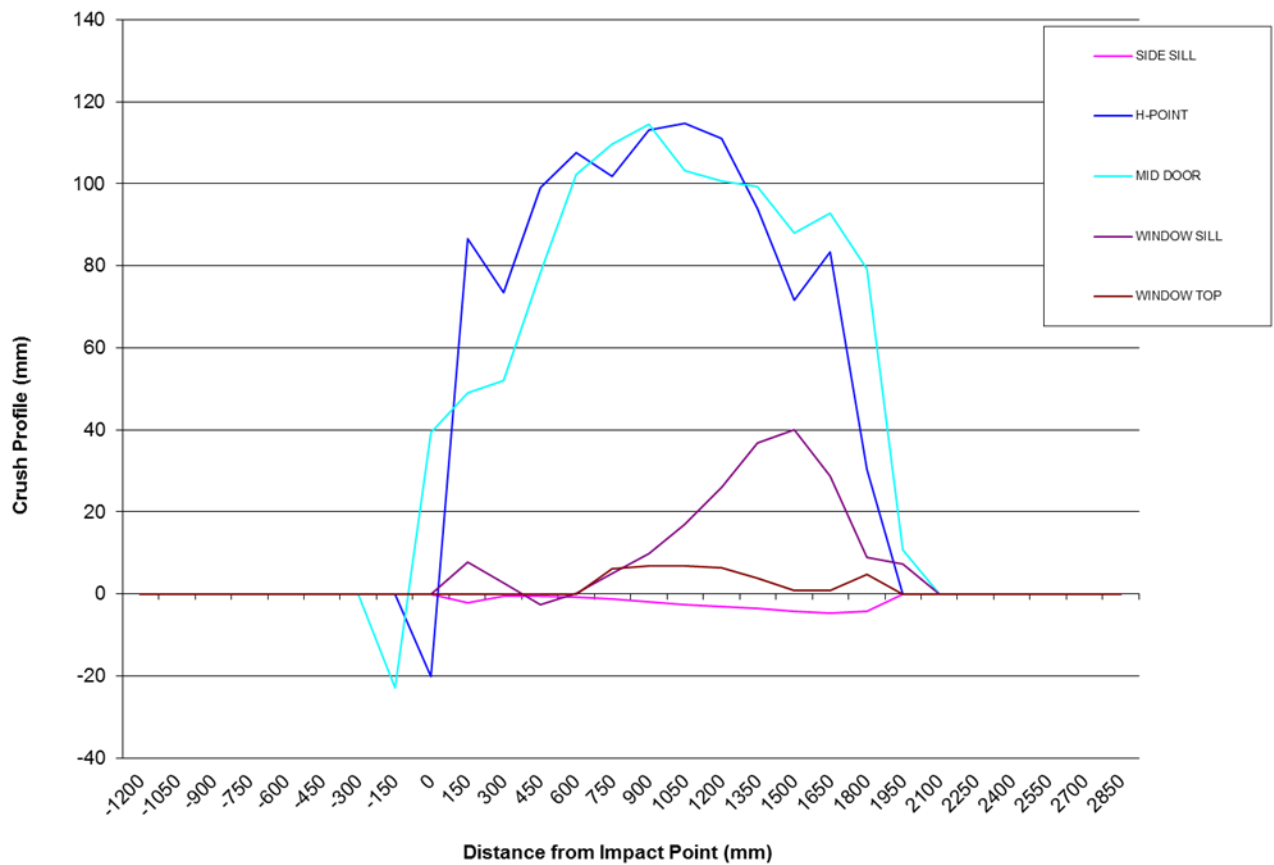
NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The vertical impact reference line was set at (0, 0, 0).

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

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021

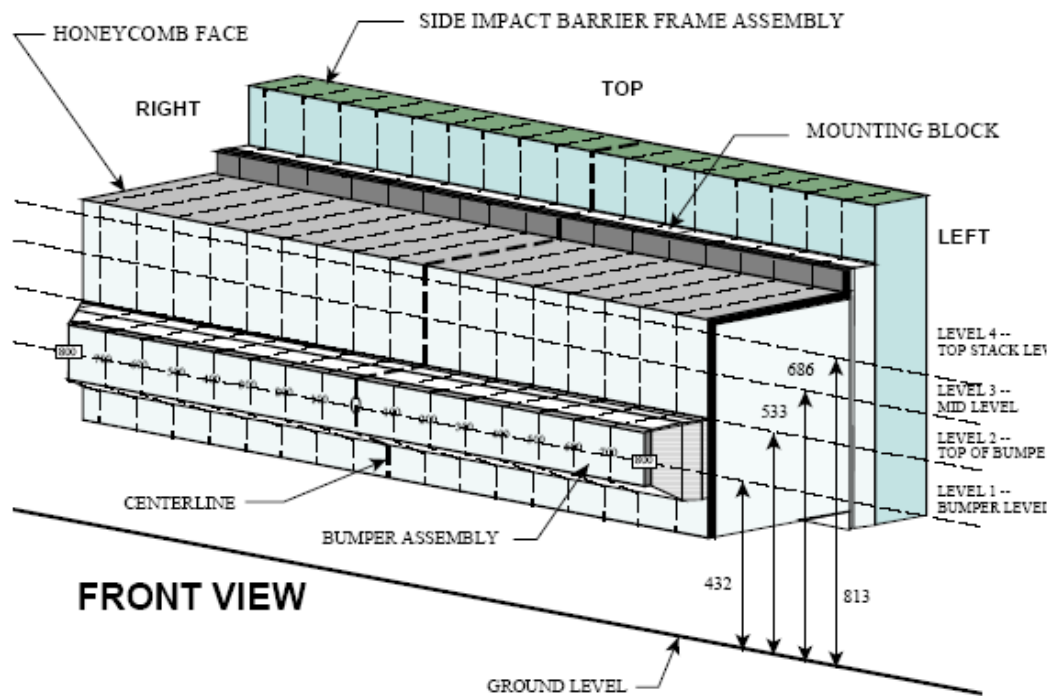


DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



NOTE: Dimensions are shown in millimeters, mm

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	600	Left	202
B	Top of Bumper	533	800	Left	141
C	Mid-Level	686	700	Right	102
D	Top of Stack	813	700	Right	93

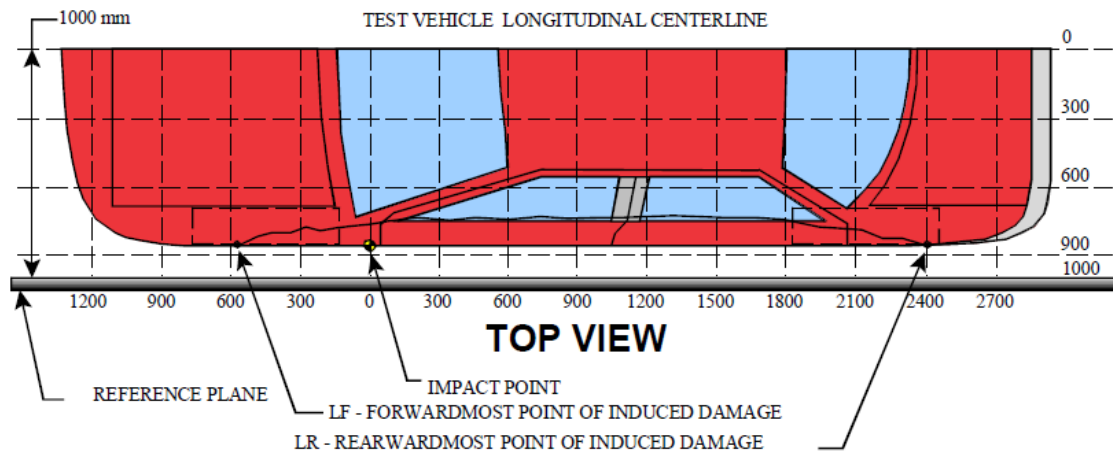
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	159	174	176	145	137	133	132	133	134	135	141	154	173	195	202	201	200
2	105	104	94	83	77	76	78	77	76	76	78	85	98	122	135	138	141
3	93	102	80	55	37	25	17	15	16	18	25	37	54	68	55	56	62
4	86	93	85	73	55	39	32	25	21	18	15	31	50	63	48	51	70

DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021



MEASUREMENT CONVENTIONS:

Forward of the impact point (towards front of vehicle) is considered negative (—).
Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

VEHICLE DAMAGE PROFILE DISTANCES

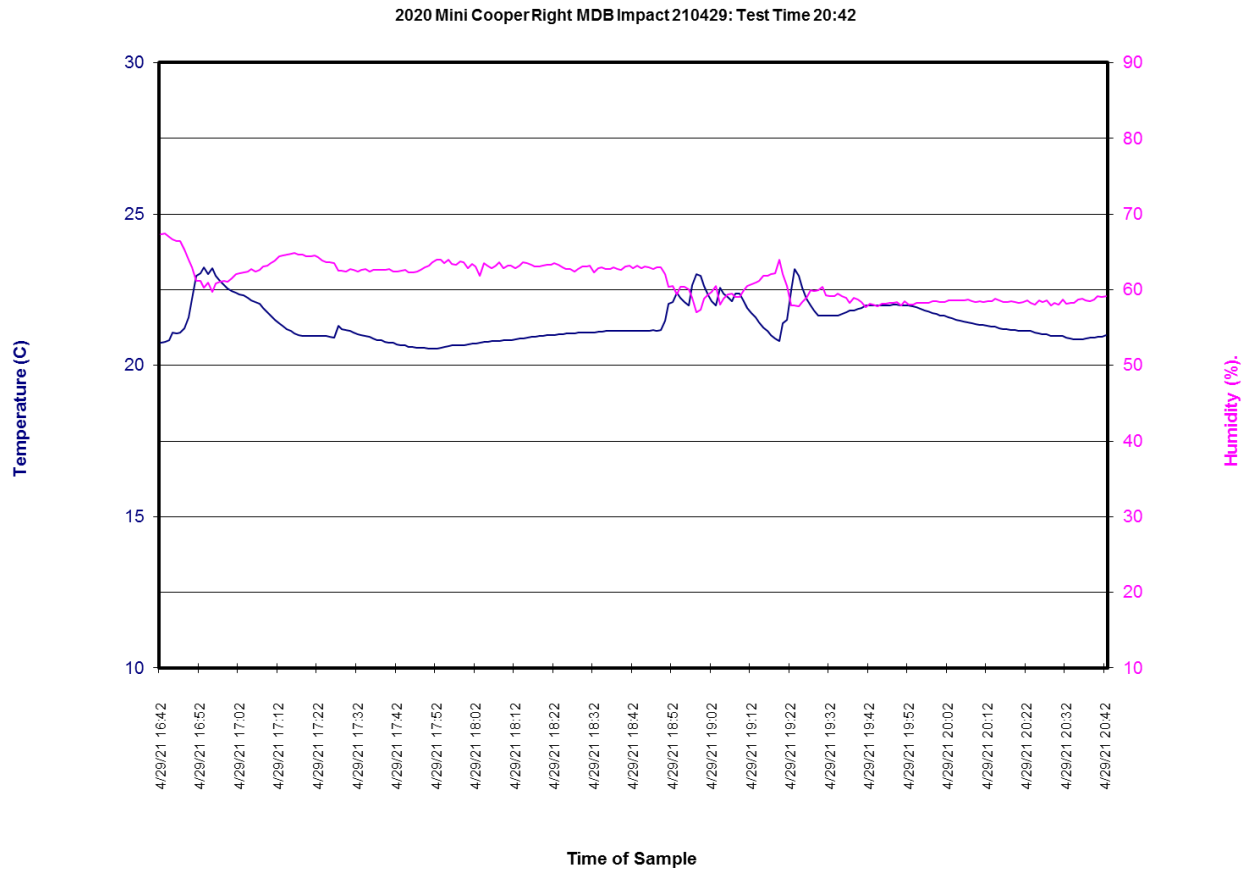
DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1 ¹	1950	3	842	853	11
2	1500	3	757	845	88
3	1200	2	725	836	111
4	750	3	735	845	110
5	450	2	734	833	99
6 ¹	0	3	806	845	0

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	200
2	500 mm left of center	1	195
3	200 mm left of center	1	141
4	200 mm right of center	1	132
5	500 mm right of center	1	145
6	800 mm right of center	1	159

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

DATA SHEET NO. 14
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA
 Test Vehicle: 2020 Mini Cooper S Convertible
 Test Program: Moving Deformable Barrier Side Impact Test Date: 4/29/2021



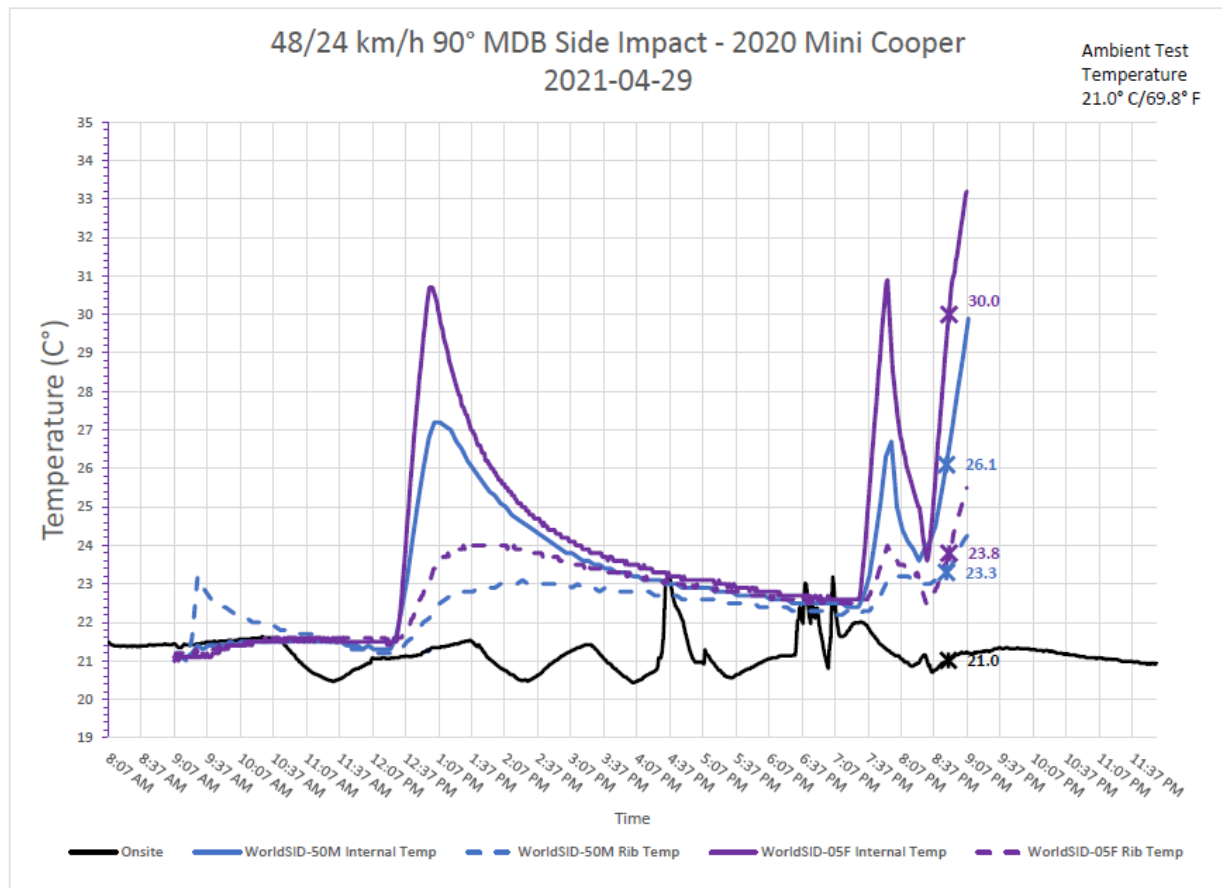
DATA SHEET NO. 14 (CONTINUED)

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2020 Mini Cooper S Convertible

Test Program: Moving Deformable Barrier Side Impact

Test Date: 4/29/2021



APPENDIX A
PHOTOGRAPHS

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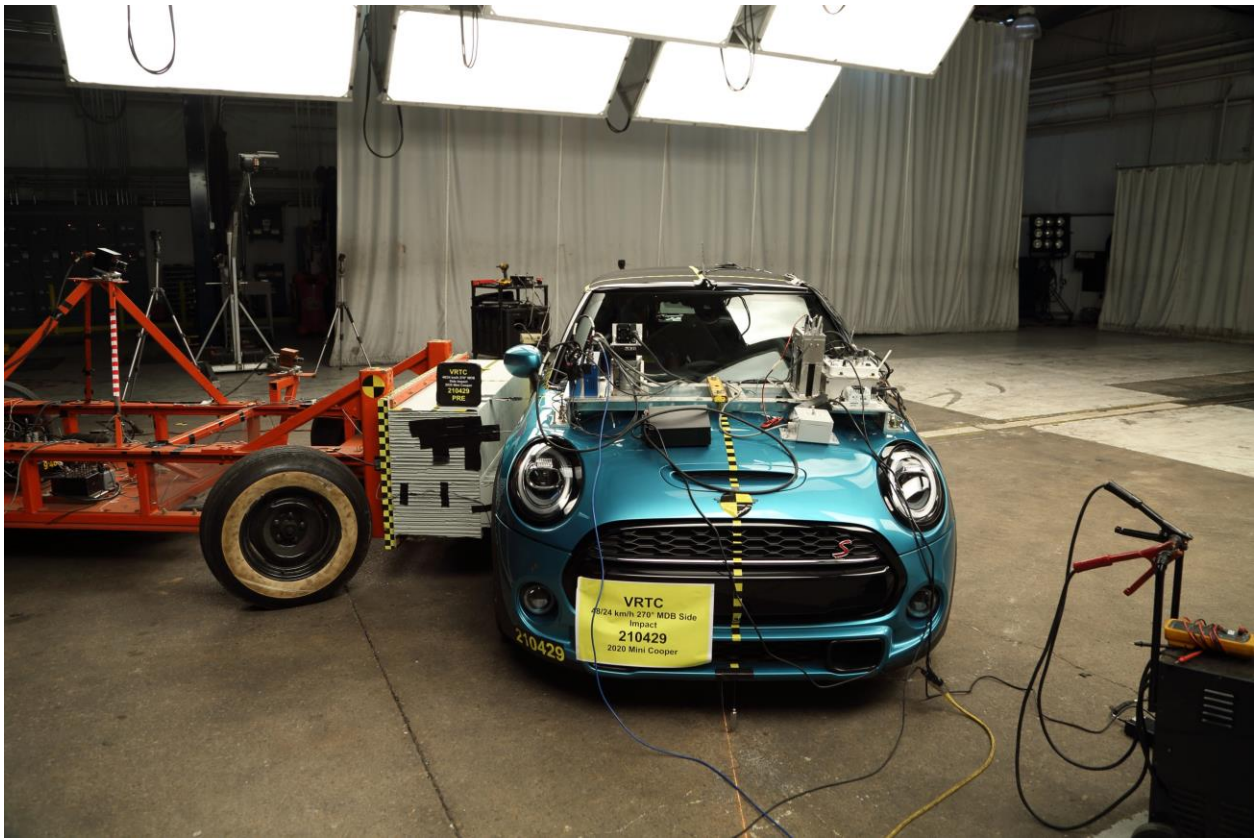
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01 As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



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



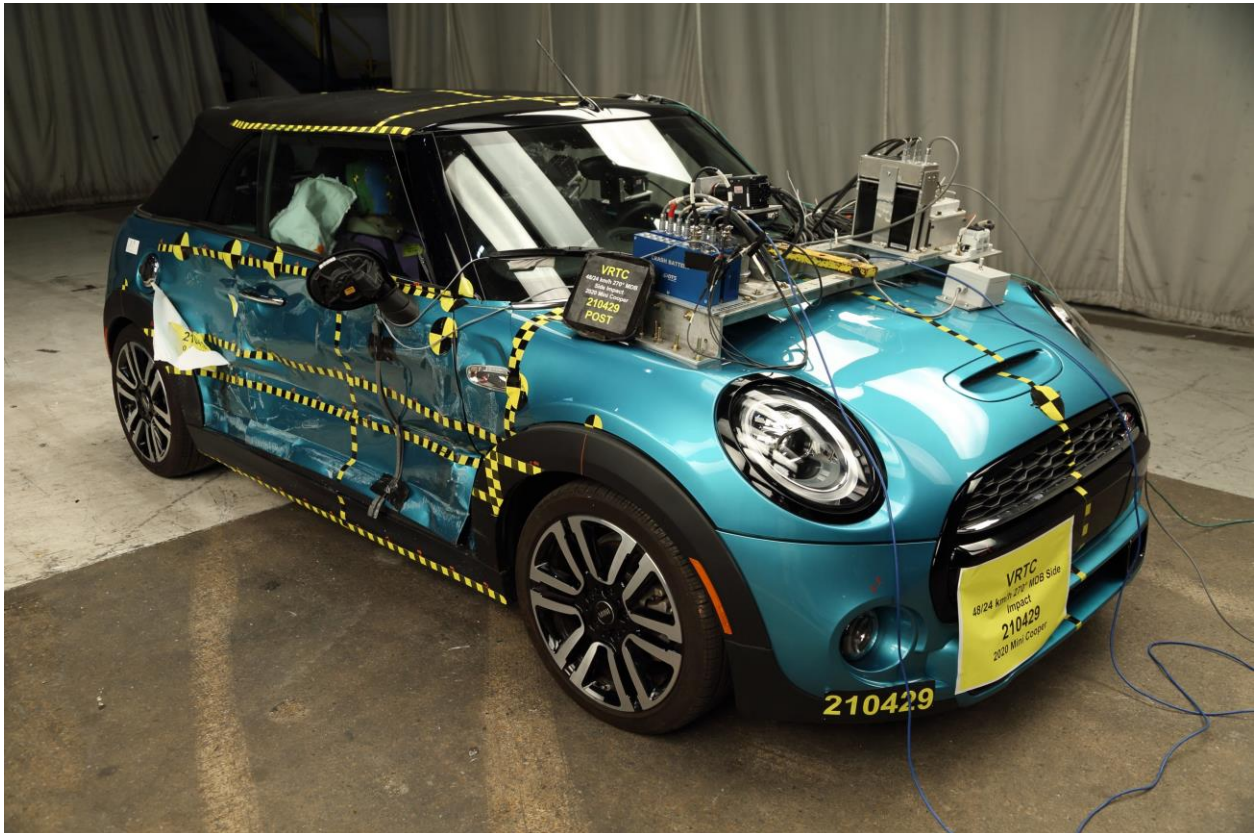
03 Pre-Test Frontal View of Test Vehicle



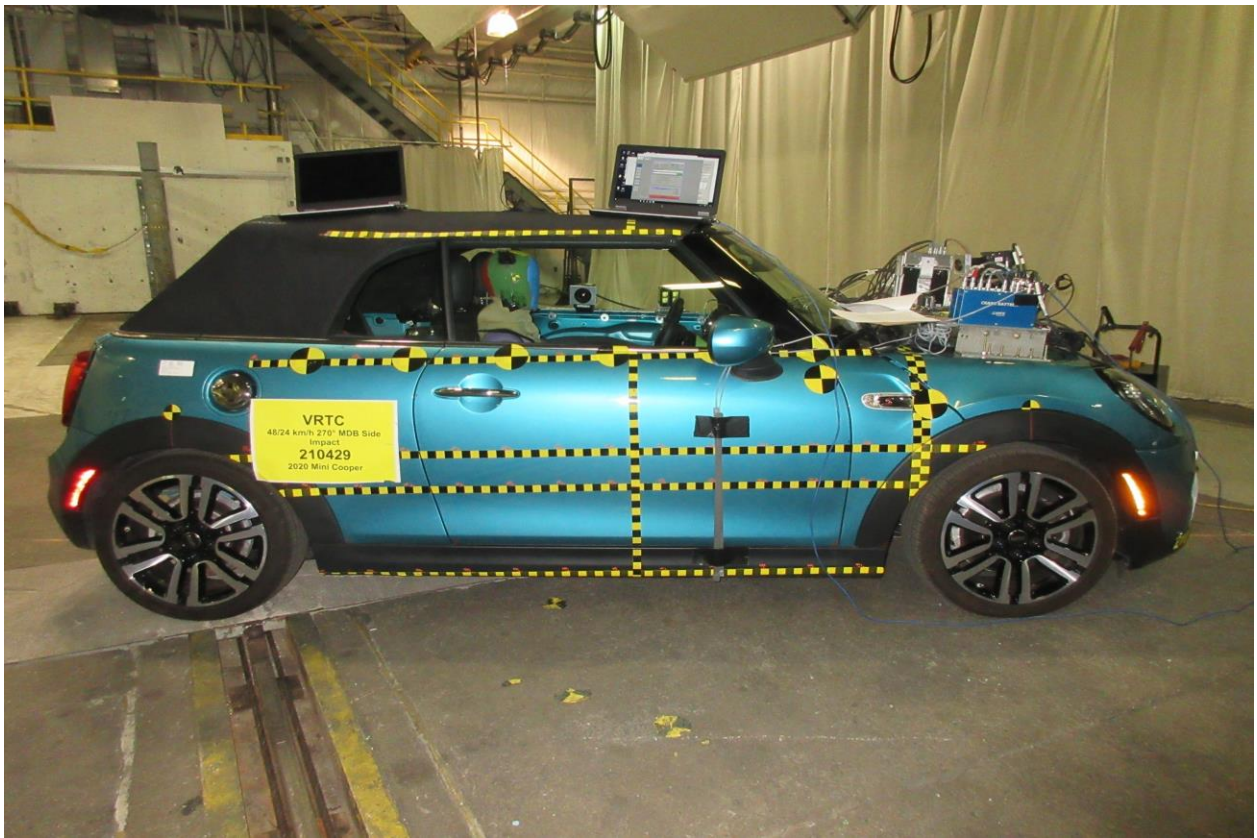
04 Post-Test Frontal View of Test Vehicle



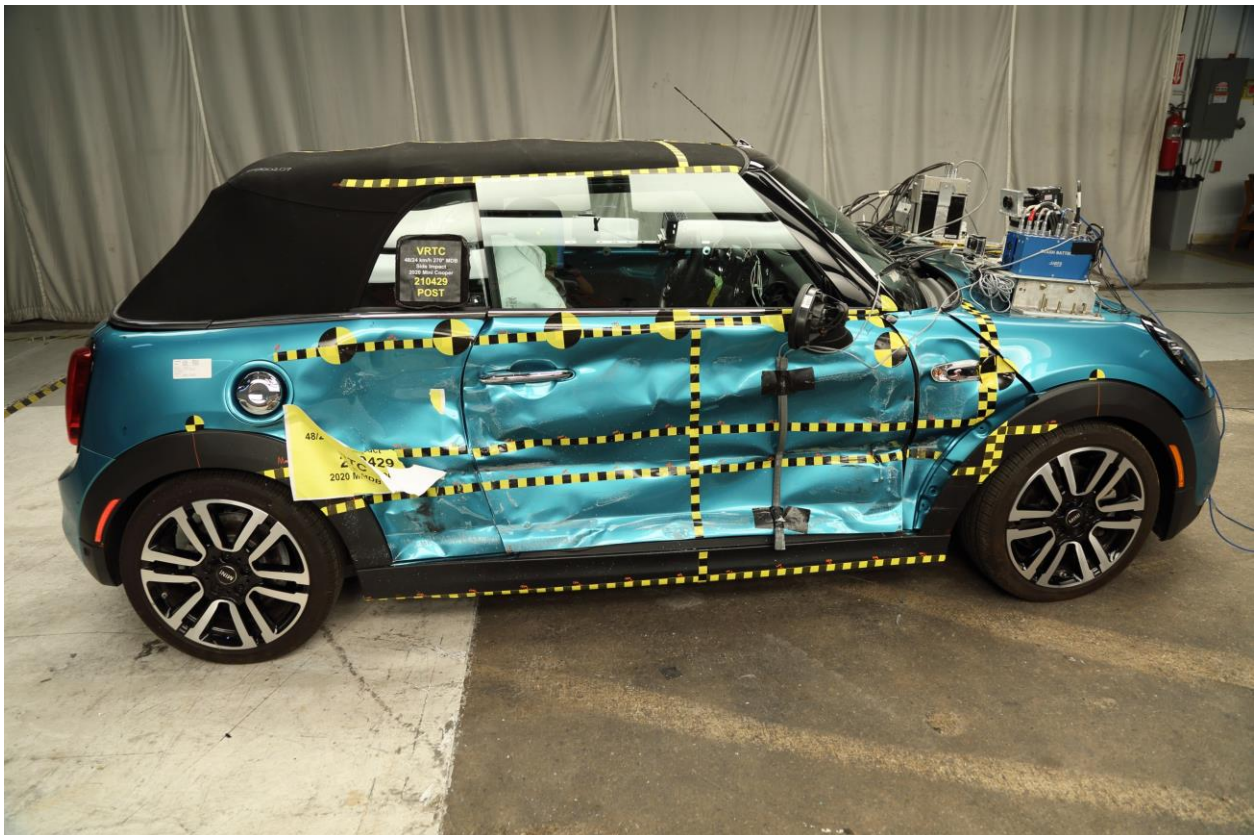
05 Pre-Test Right Front $\frac{3}{4}$ View of Test Vehicle



06 Post-Test Right Front $\frac{3}{4}$ View of Test Vehicle



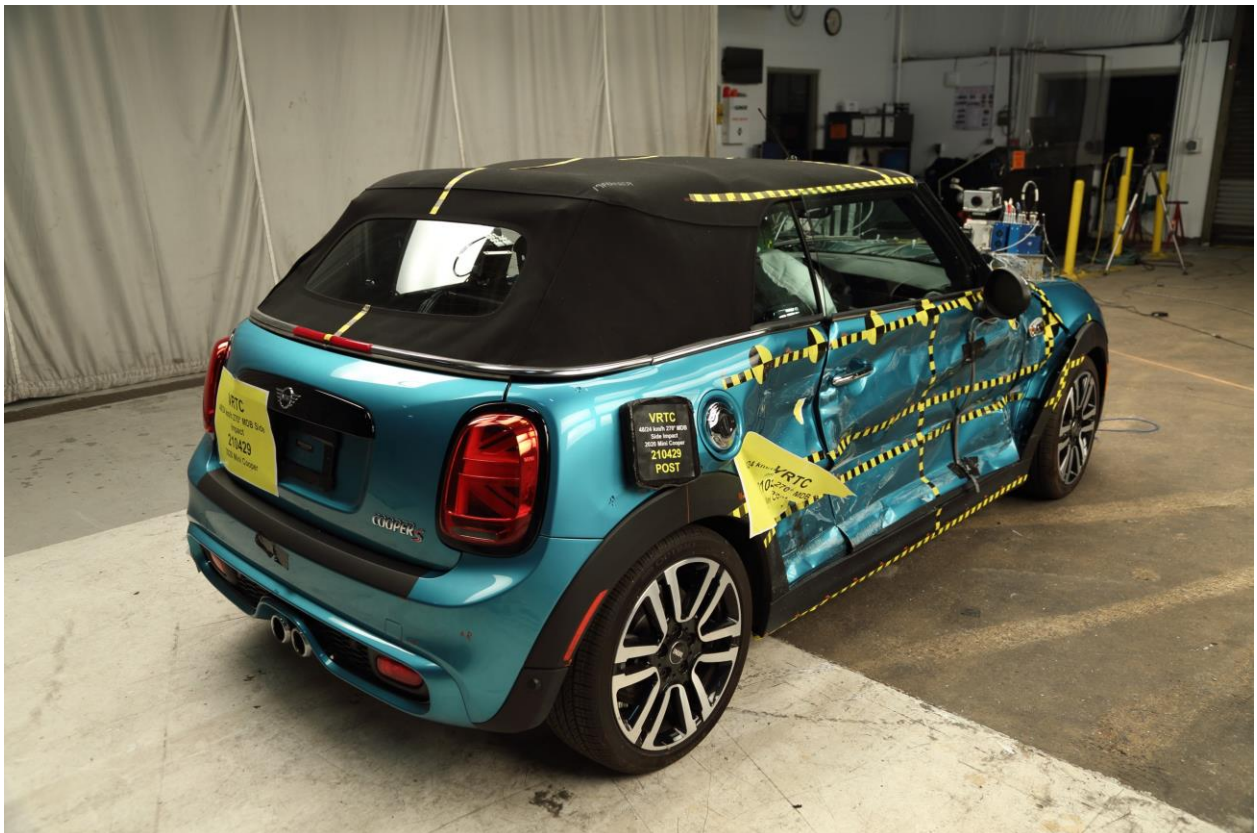
07 Pre-Test Right Side View of Test Vehicle



08 Post-Test Right Side View of Test Vehicle



09 Pre-Test Right Rear $\frac{3}{4}$ View of Test Vehicle



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



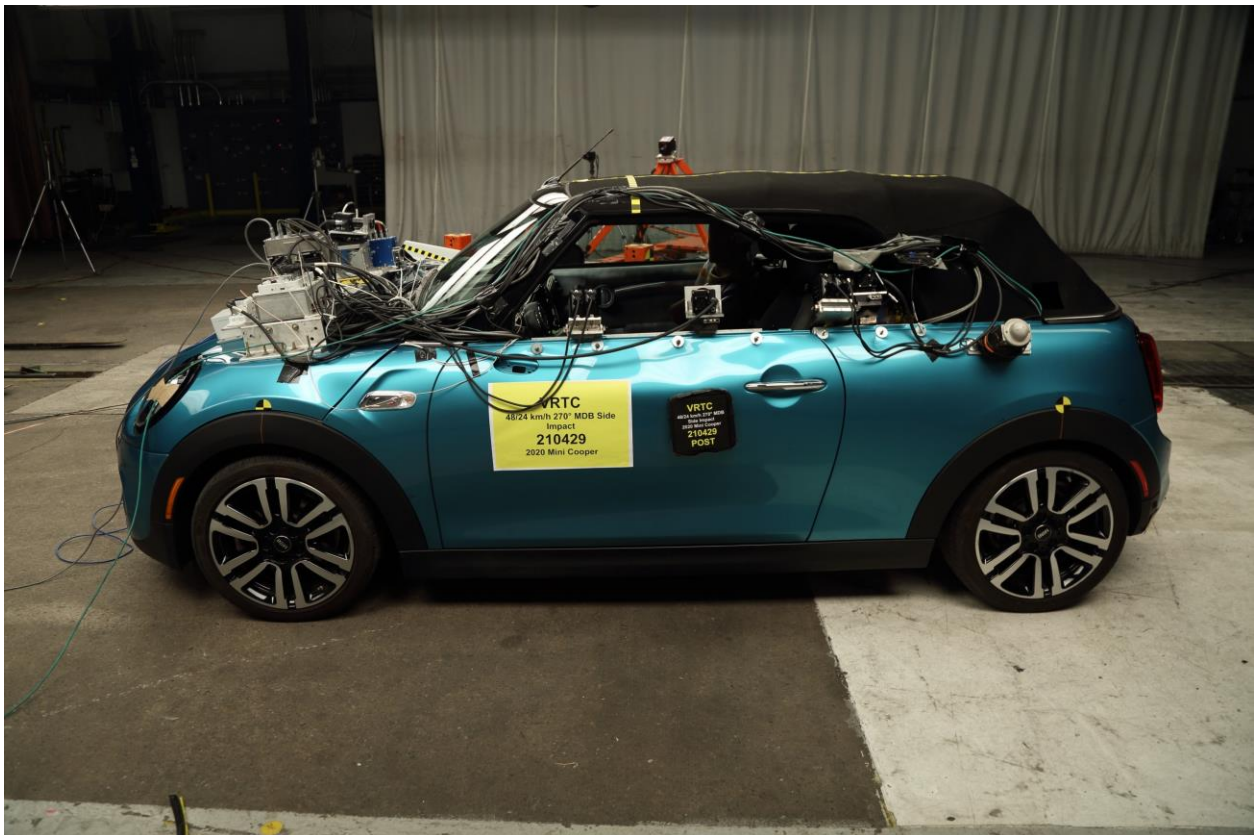
011 Pre-Test Rear View of Test Vehicle



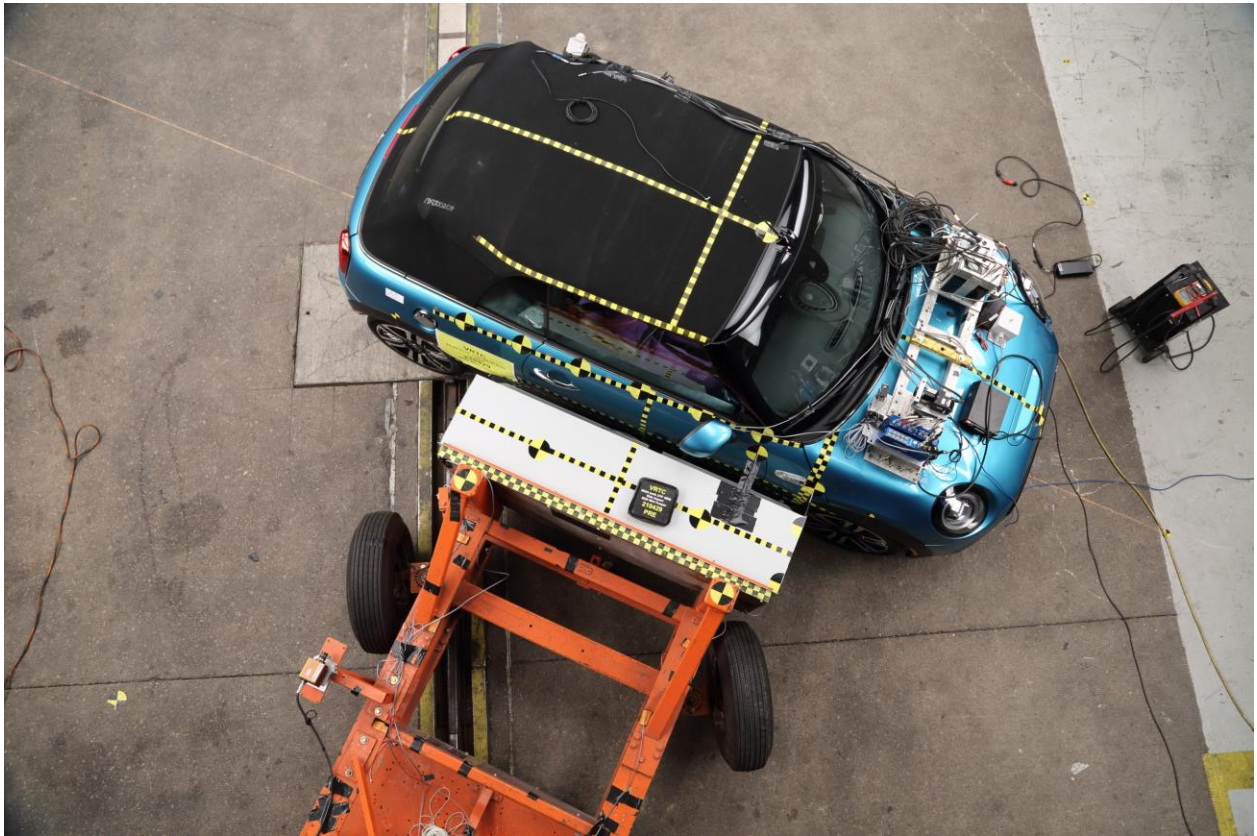
012 Post-Test Rear View of Test Vehicle



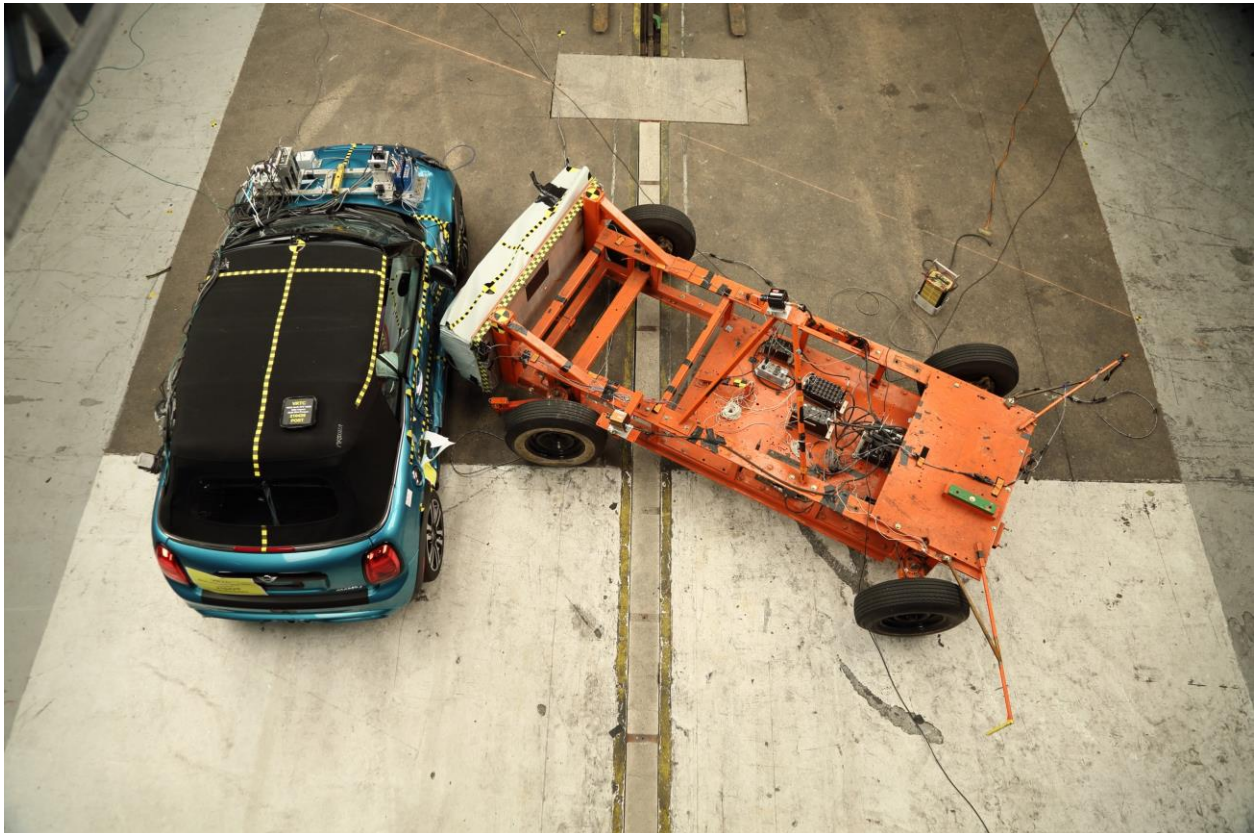
013 Pre-Test Left Side View of Test Vehicle



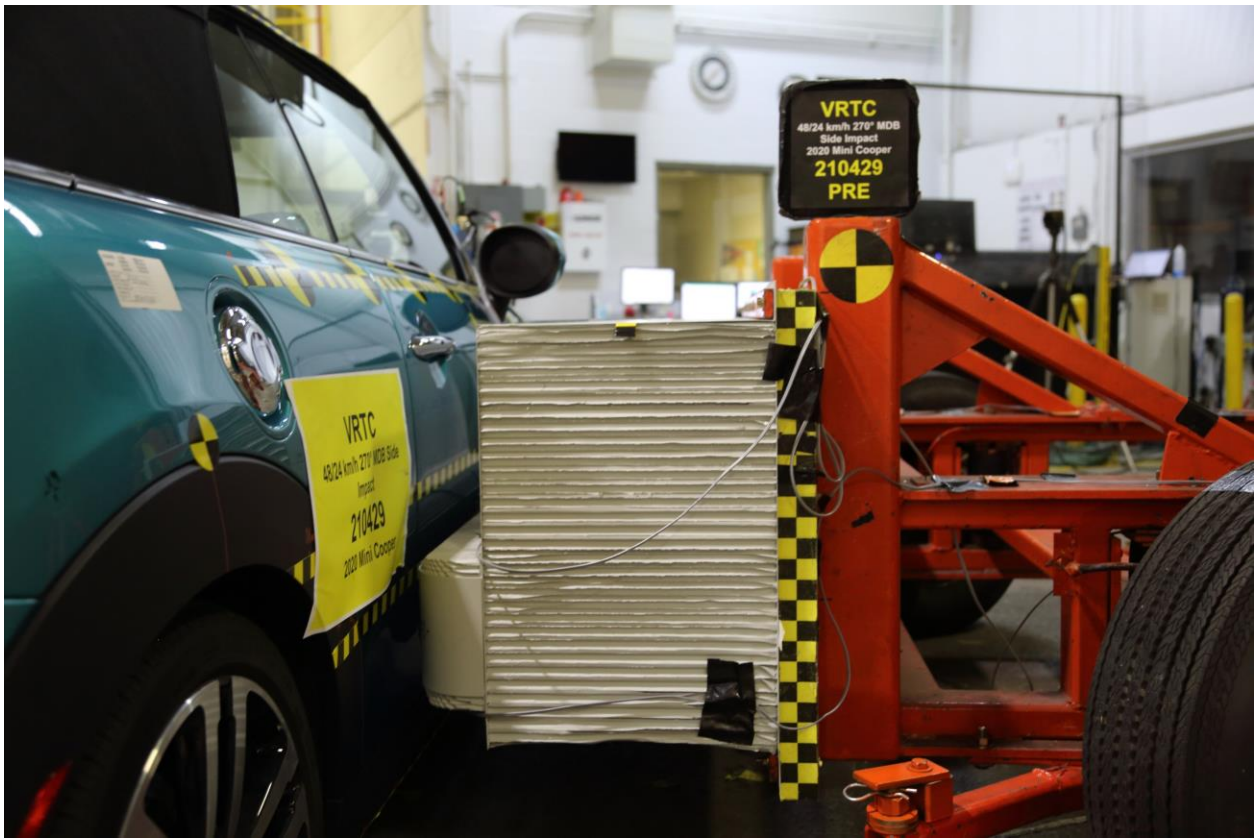
014 Post-Test Left Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



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



021 Pre-Test Right Front Door Latch Close-Up



022 Post-Test Right Front Door Latch Close-Up

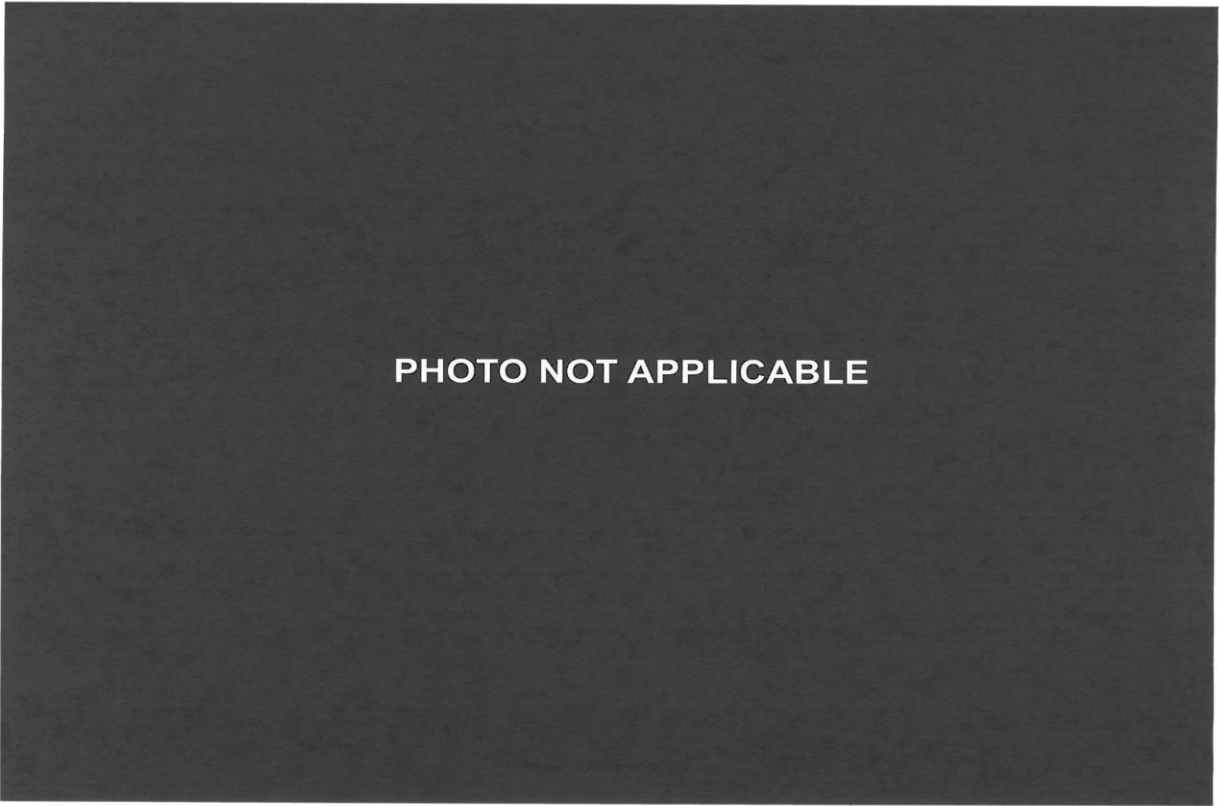


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023 Pre-Test Right Rear Door Latch Close-Up

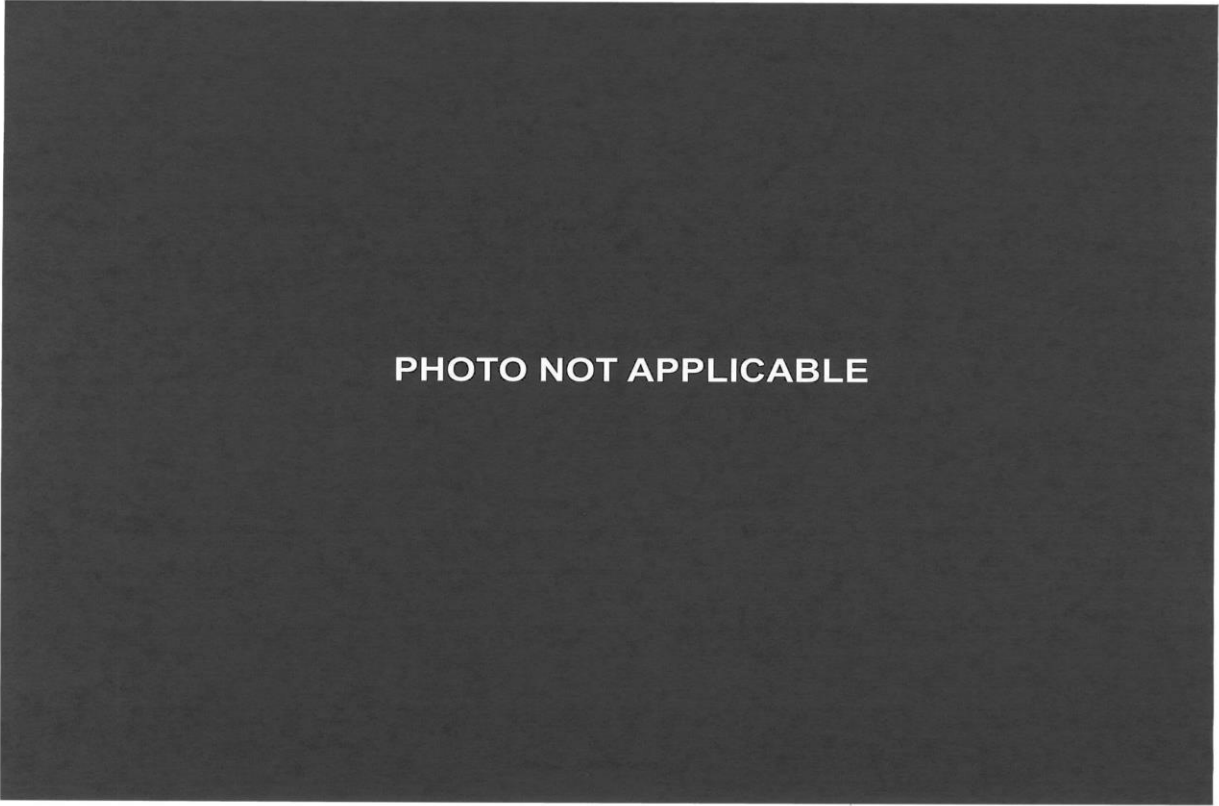


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024 Post-Test Right Rear Door Latch Close-Up



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



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



027 Pre-Test Right Side View of Passenger Dummy Showing Belt and Chalking

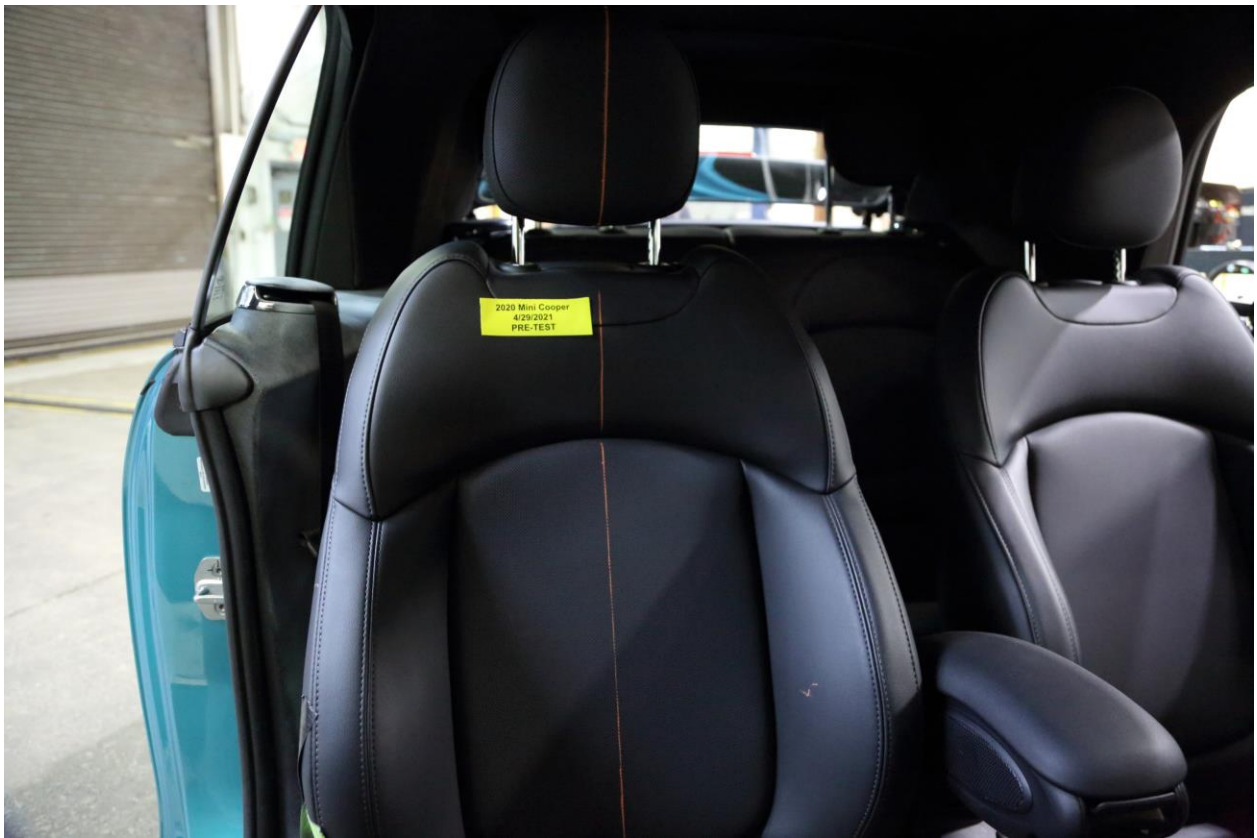
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028 Pre-Test Right Side View of Passenger Dummy Shoulder and Door Top View



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



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



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



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



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



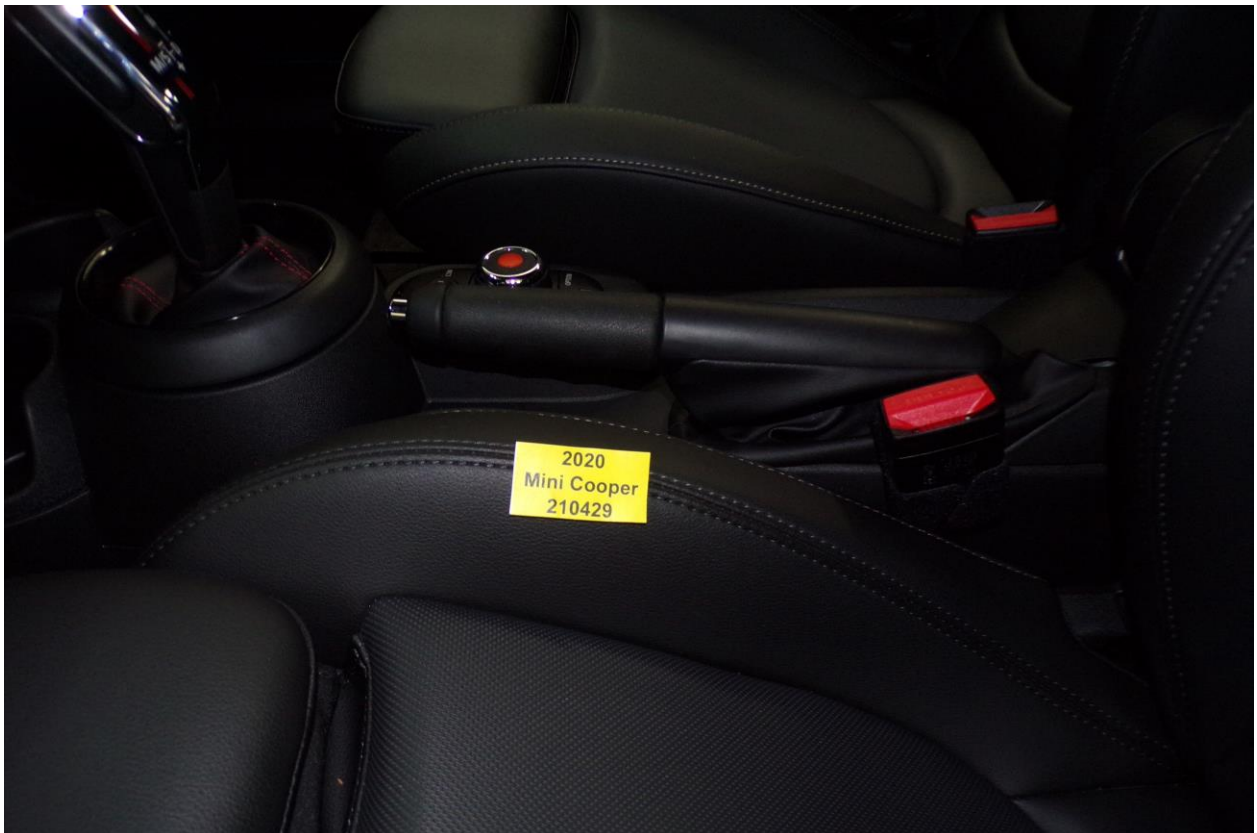
034 Pre-Test Placement of Passenger Dummy's Feet



035 Pre-Test View of Belt Anchorage for Passenger Dummy



036 Pre-Test Left Side View of Steering Wheel



037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake

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039 Pre-Test Close-Up Right Side View of Passenger Seat Track



040 Pre-Test Close-Up Right Side View of Passenger Seat Back



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

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042 Pre-Test Passenger Dummy and Door Clearance View



043 Post-Test Passenger Dummy and Door Clearance View



044 Pre-Test Left Side View of Passenger Dummy and Front Seat of Occupant Compartment



045 Post-Test Left Side View of Passenger Dummy and Front Seat of Occupant Compartment



046 Pre-Test Passenger Inner Door Panel View



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

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



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



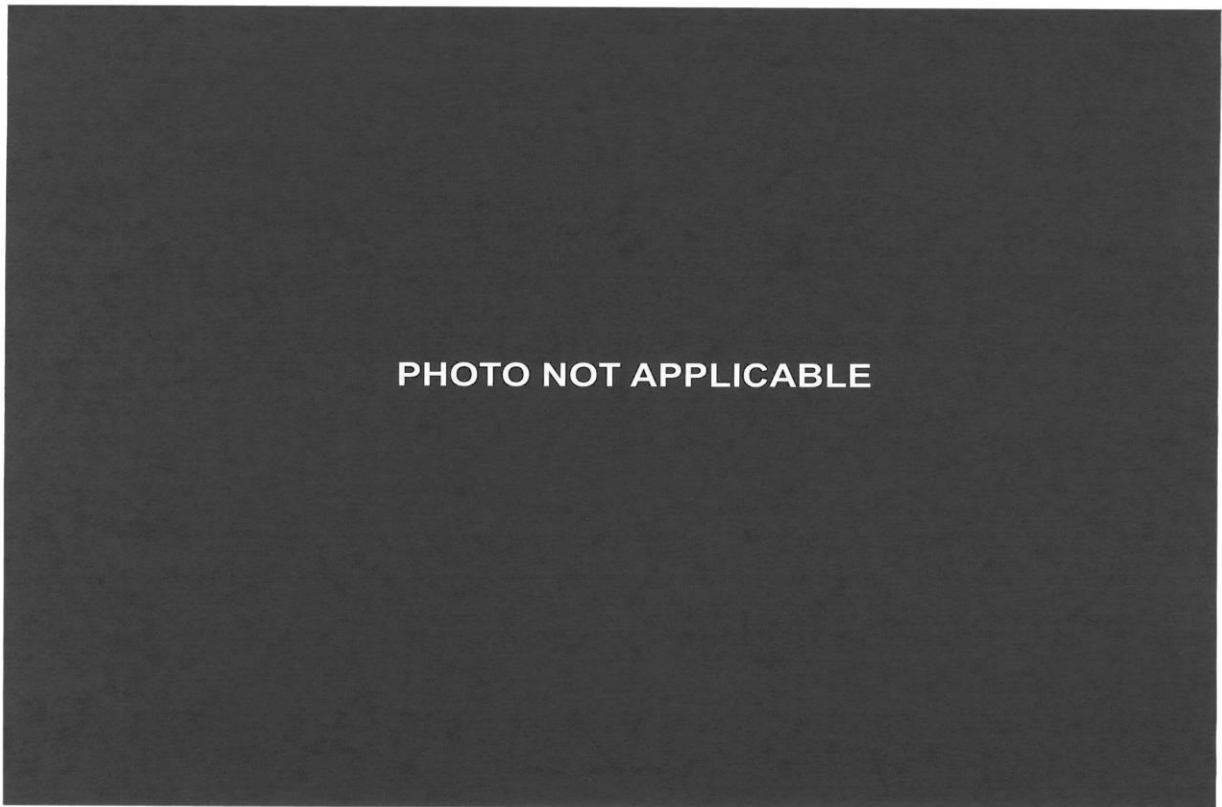
050 Post-Test Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



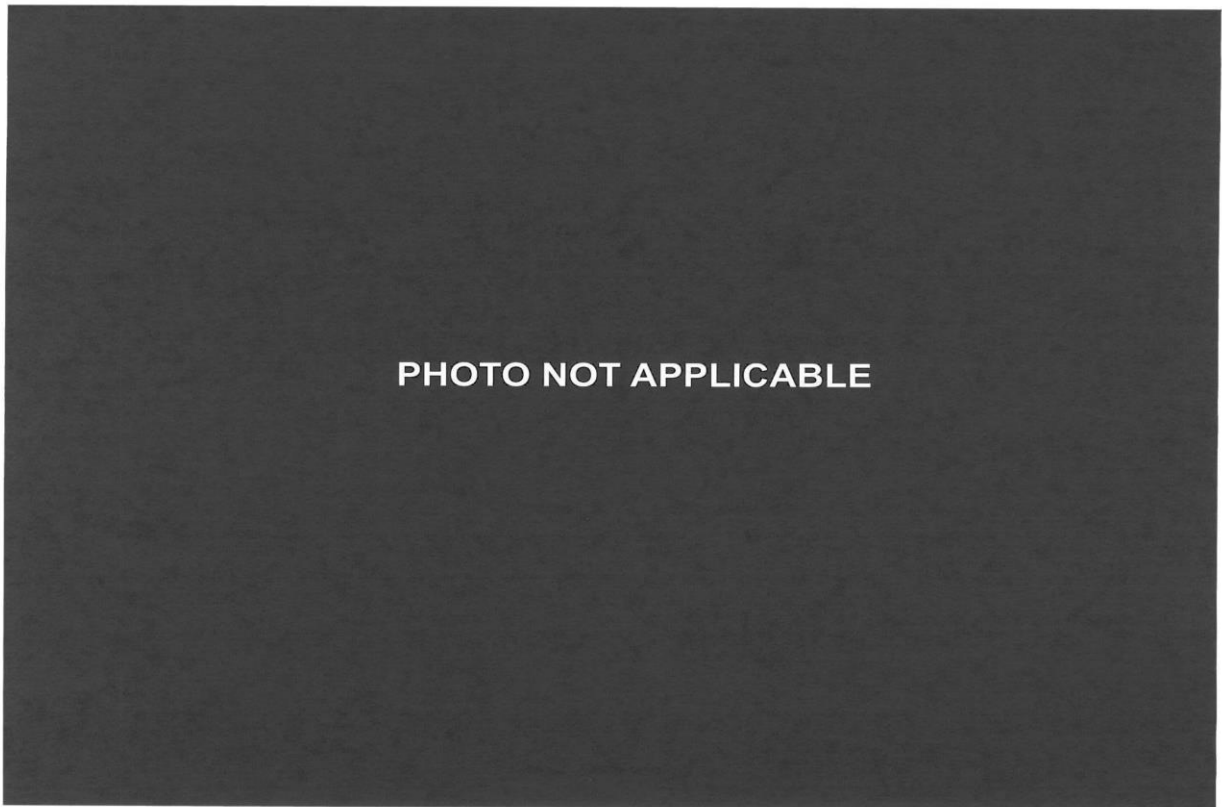
052 Post-Test Passenger Dummy Close-Up Pelvis Contact View



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



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



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

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



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



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



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



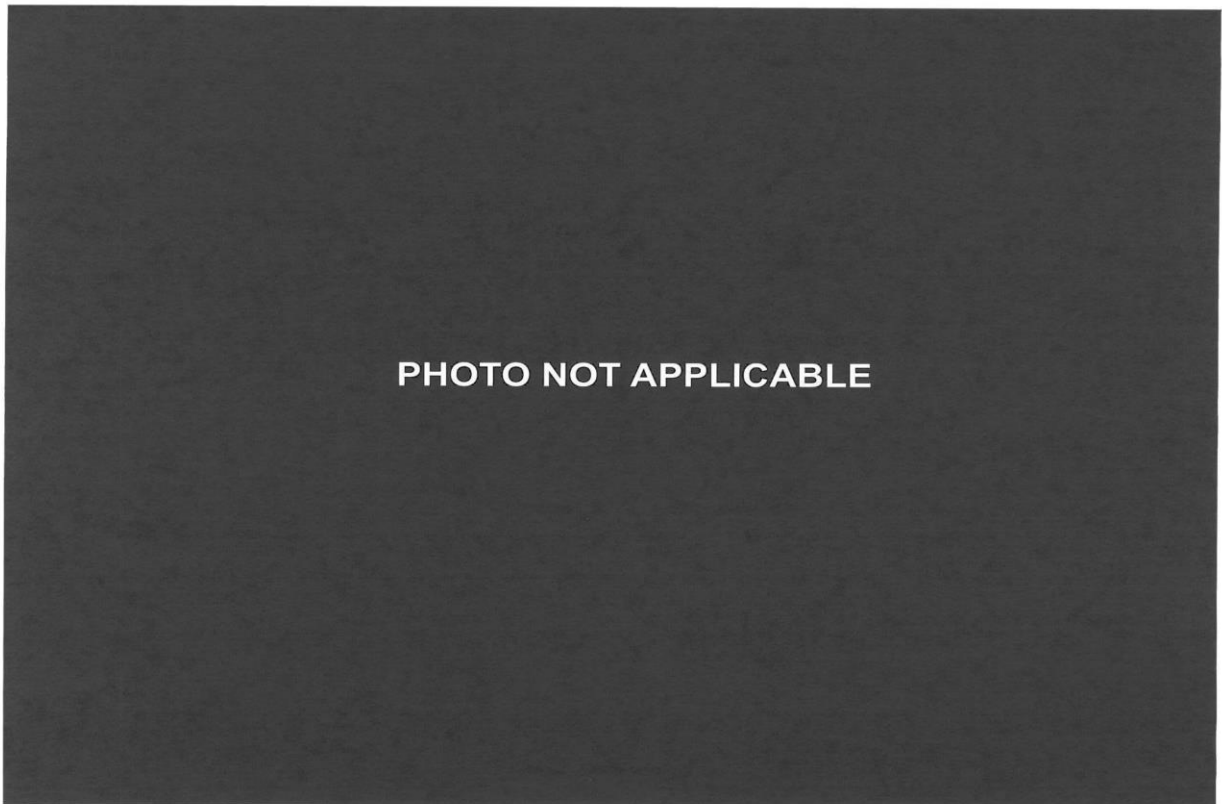
060 Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



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



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



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

PHOTO NOT AVAILABLE

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



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

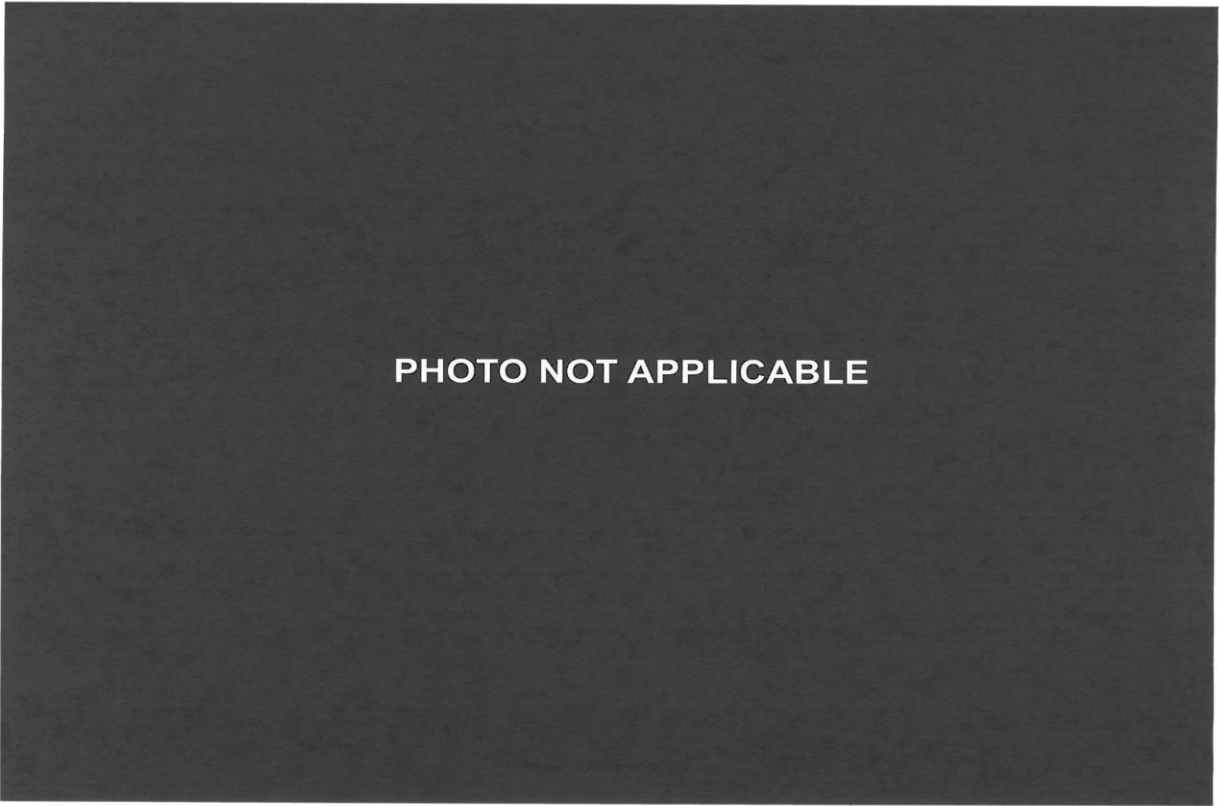


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066 Pre-Test Close-Up Right Side View of Rear Passenger Seat Track

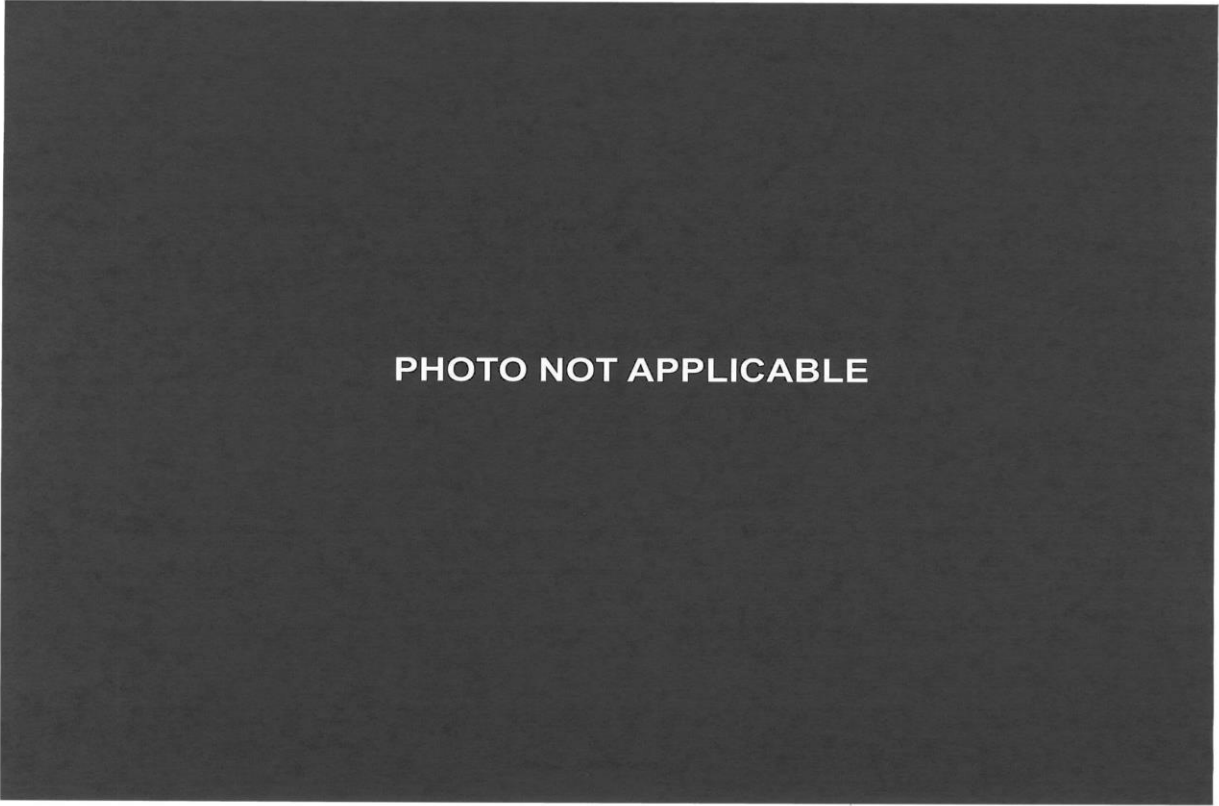


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067 Pre-Test Close-Up Right Side View of Rear Passenger Seat Back

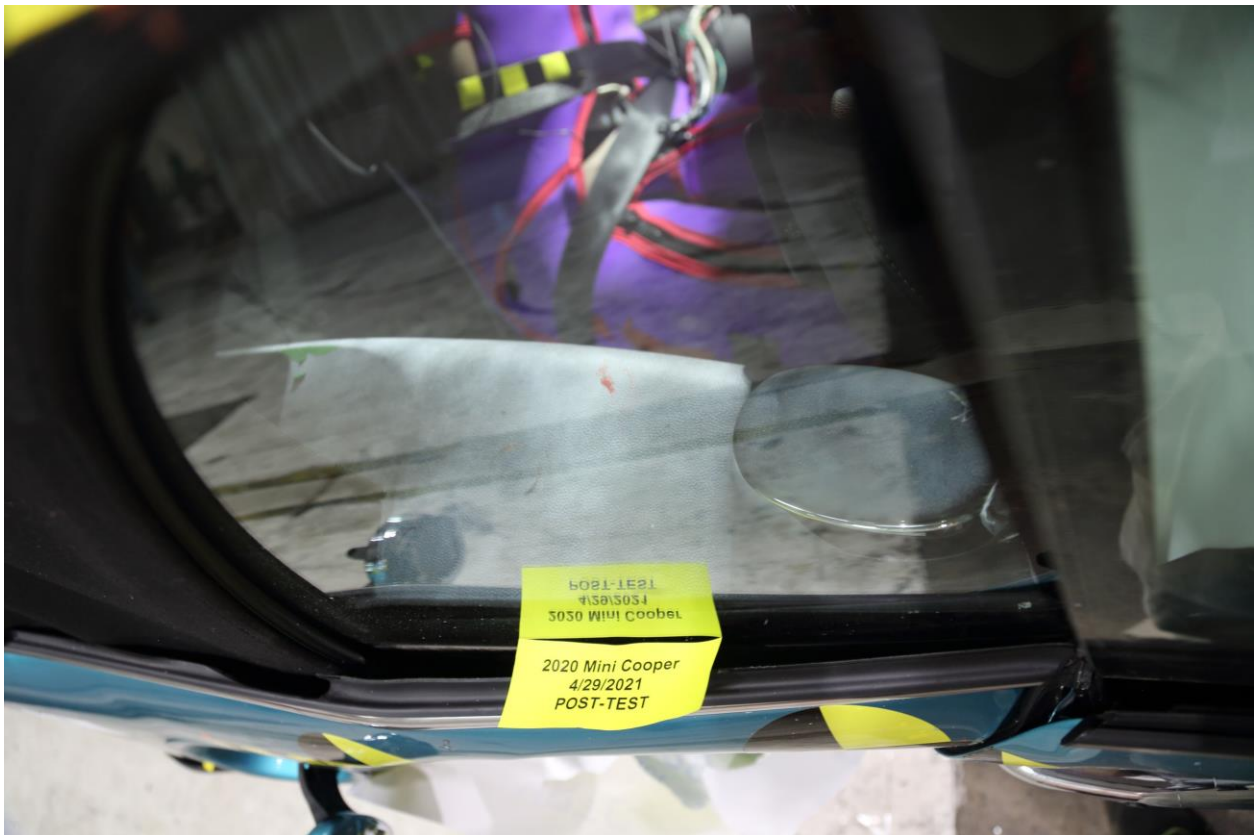


068 Pre-Test Close-Up Right Side View of Rear Passenger Seat Back or Head Restraint

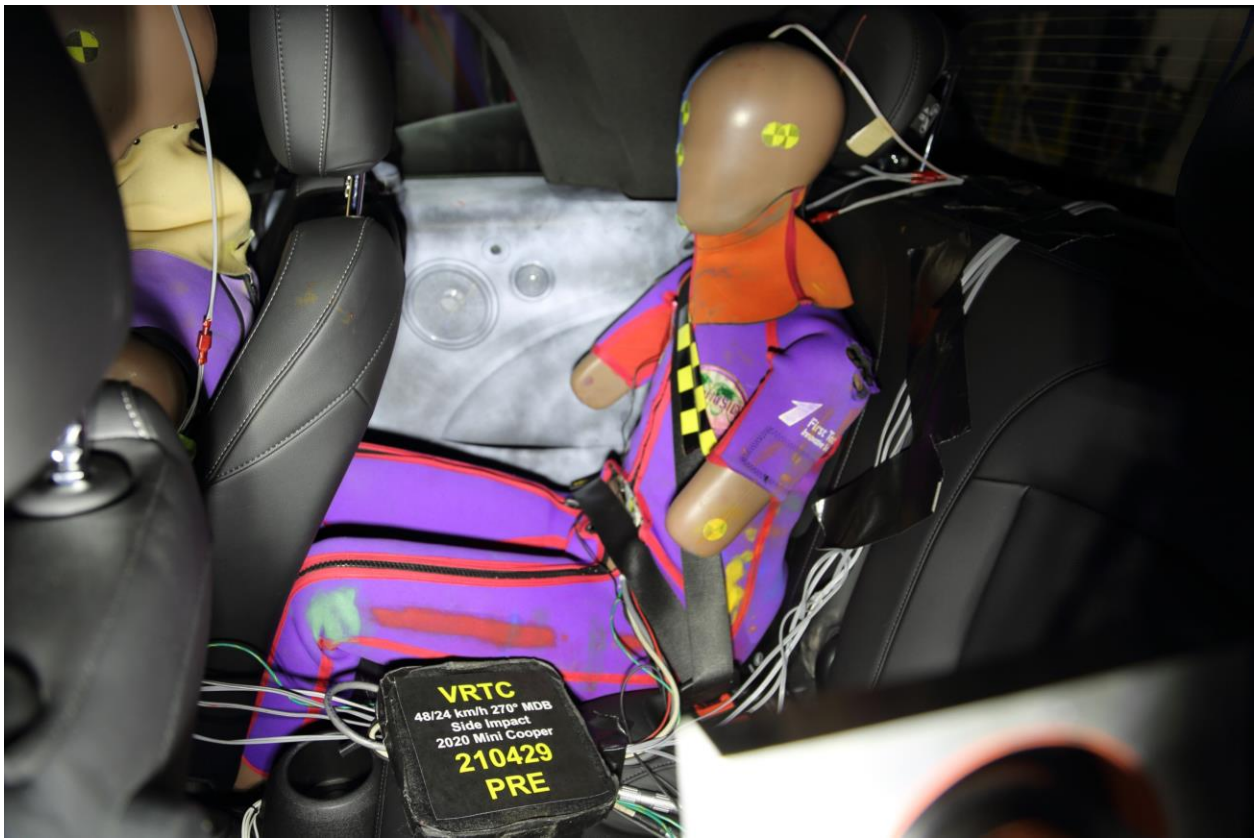
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069 Pre-Test Rear Passenger Dummy and Door Clearance View



070 Post-Test Rear Passenger Dummy and Door Clearance View



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



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



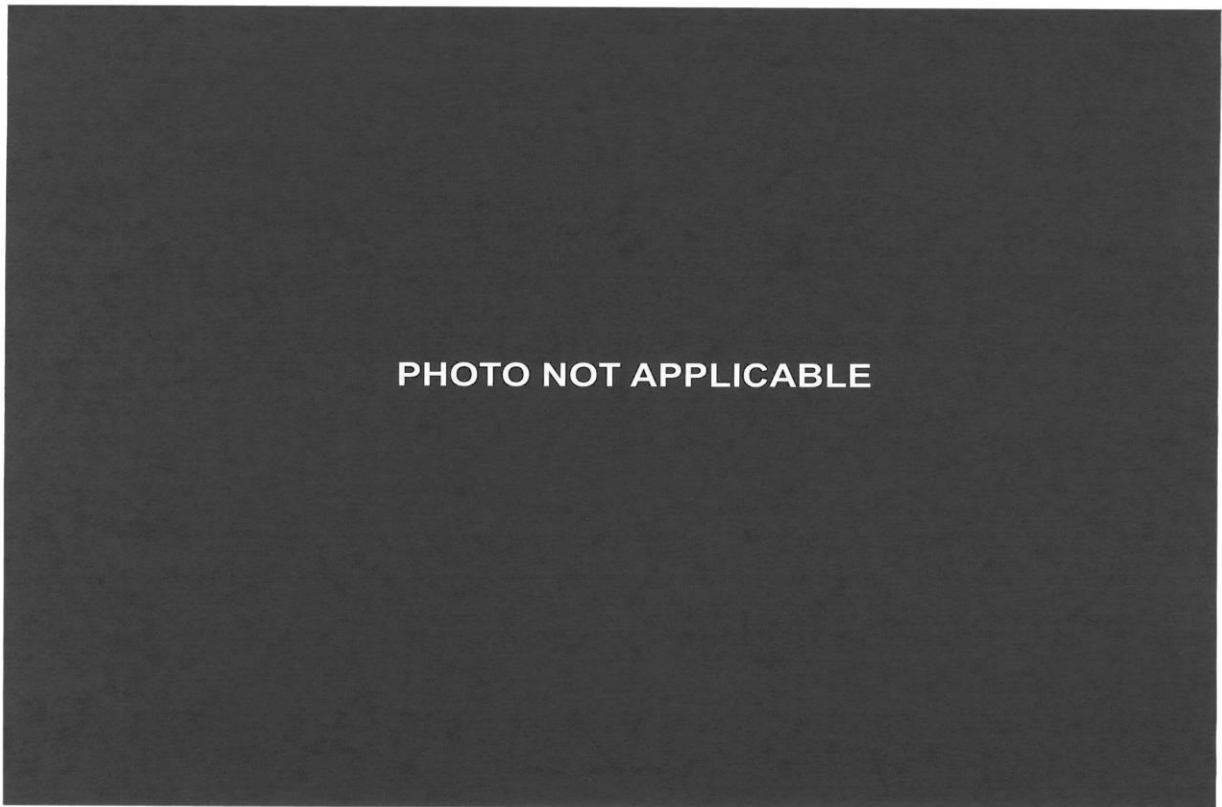
073 Pre-Test Rear Passenger Inner Door Panel View



074 Post-Test Rear Passenger Inner Door Panel View



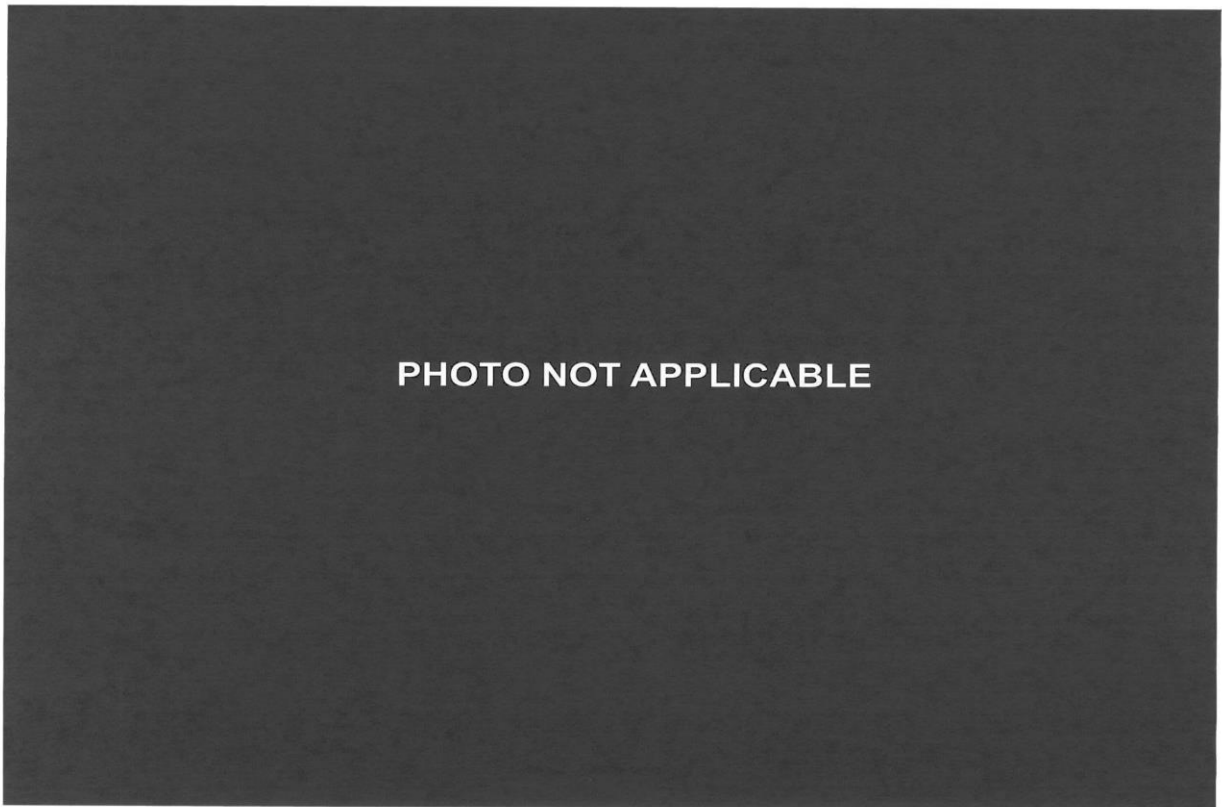
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



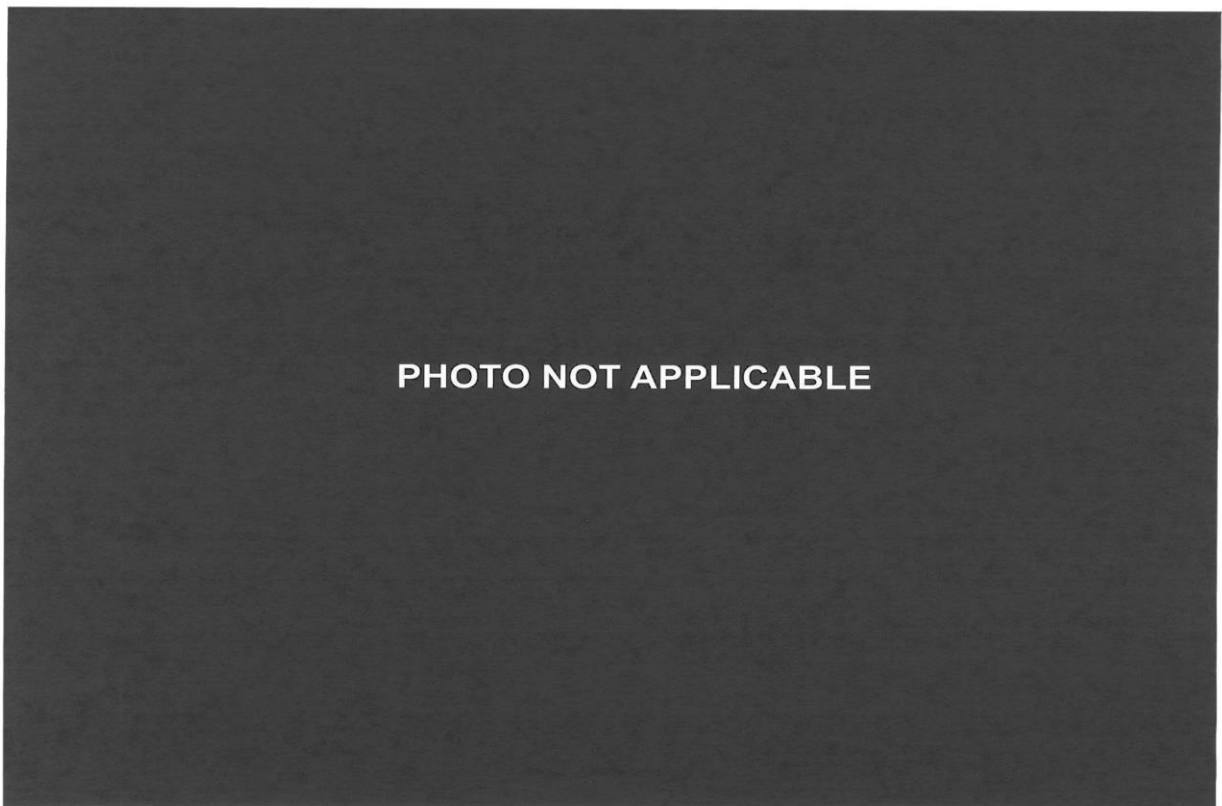
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



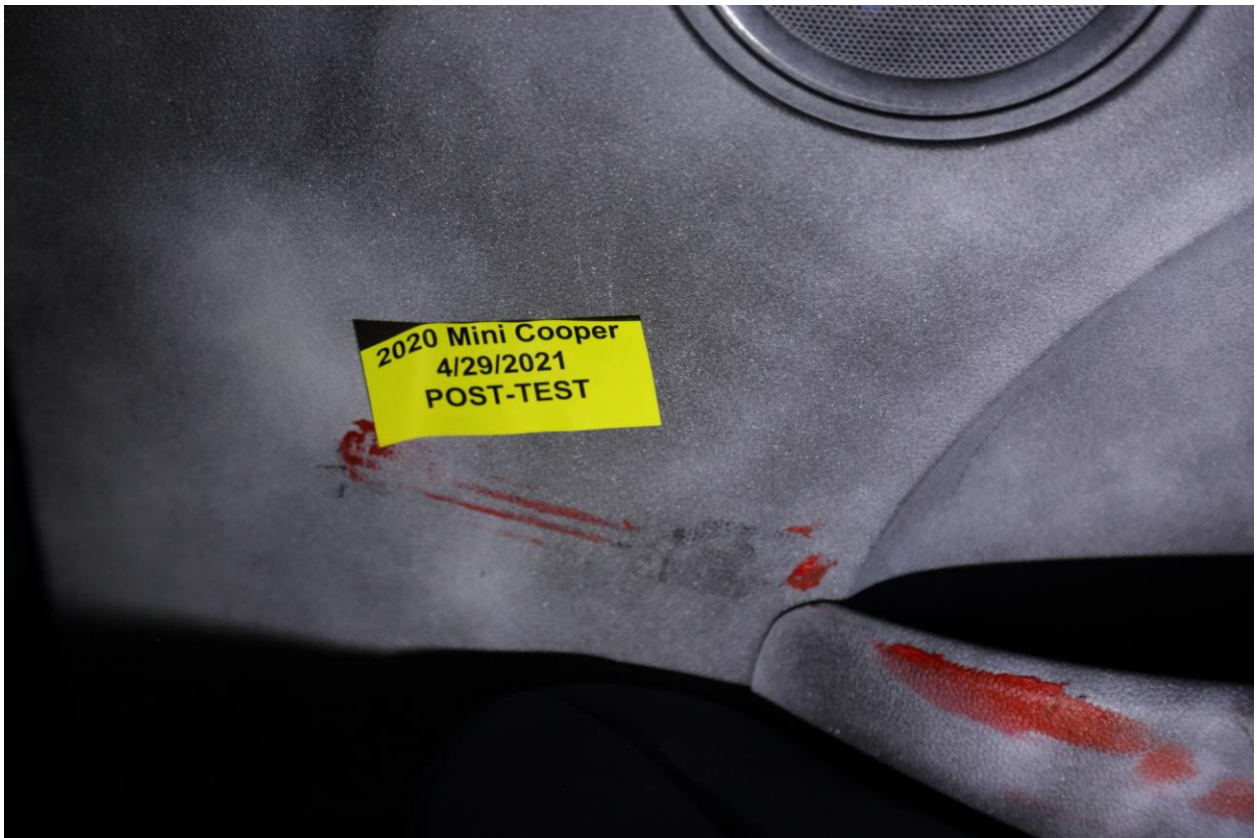
078 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View



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



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



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

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



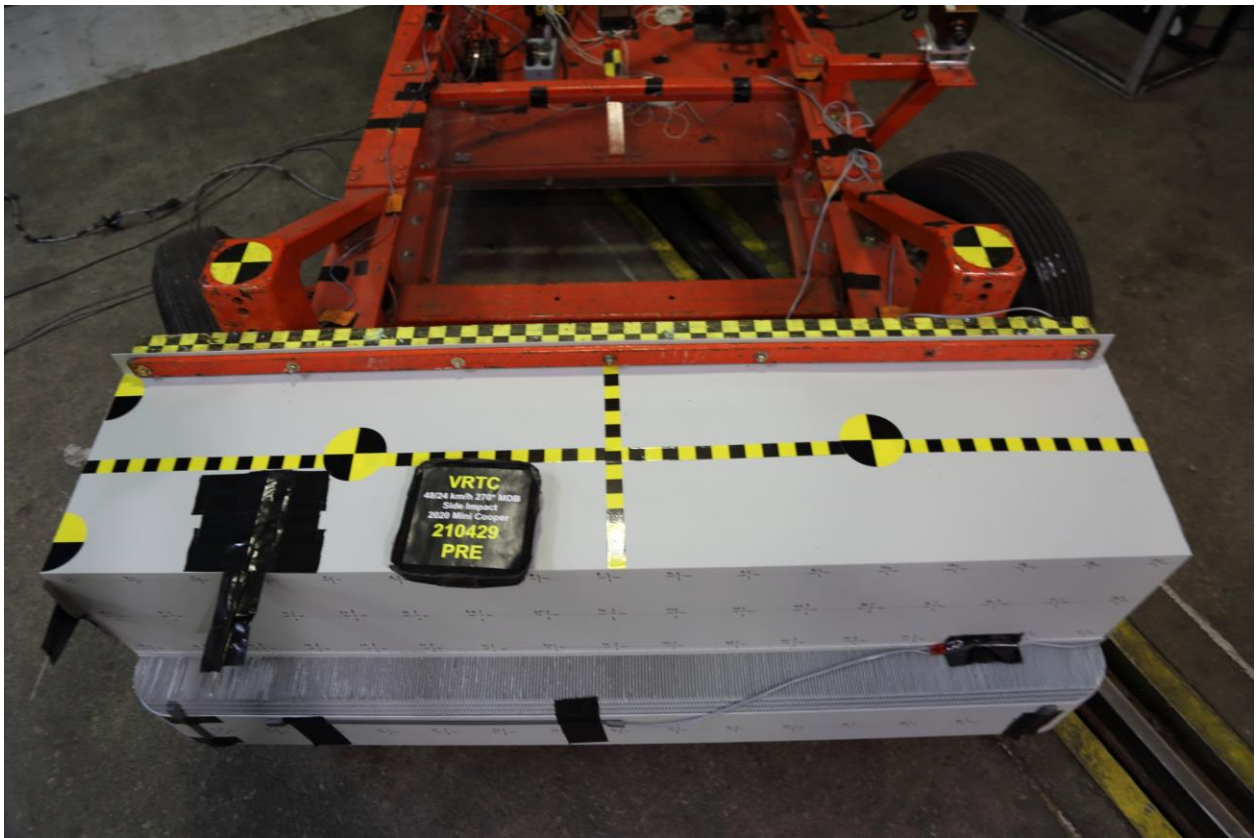
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



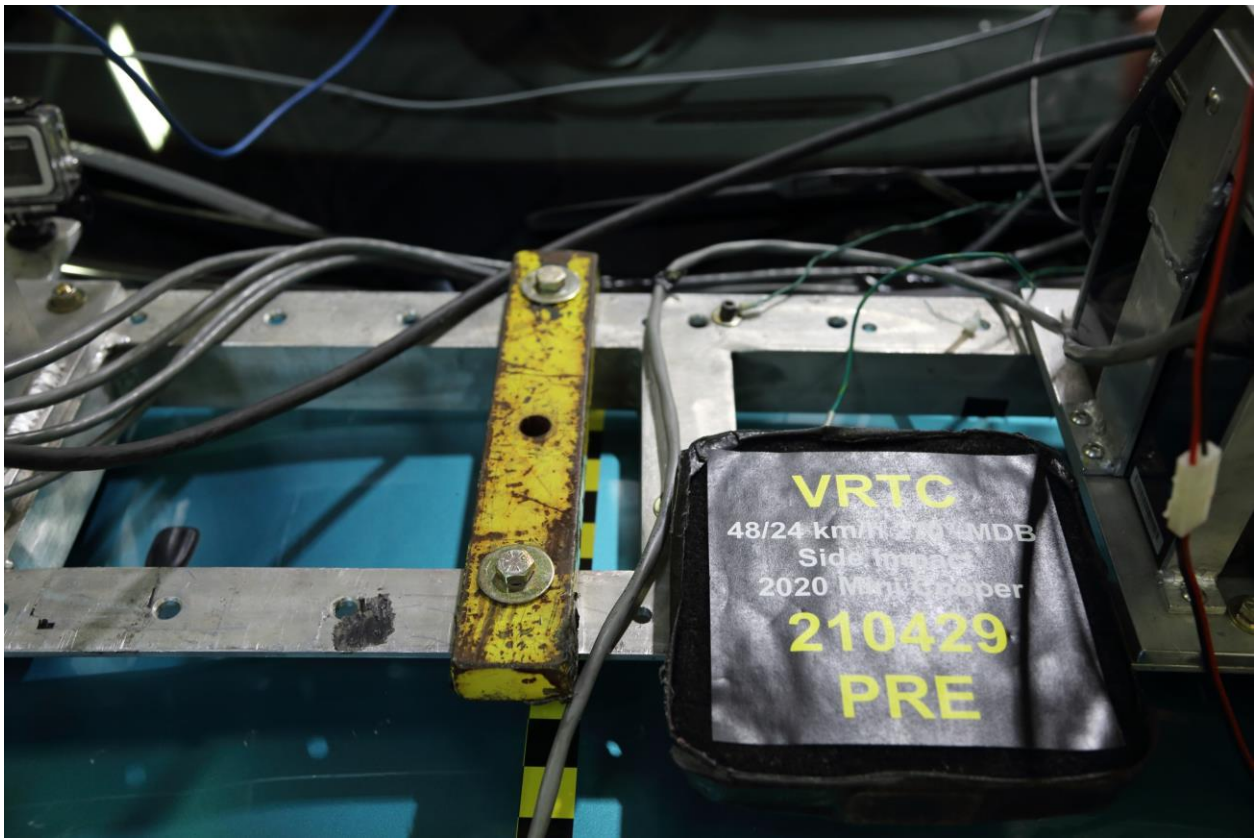
091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle's Certification Label



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



094 Pre-Test Ballast View



095 Post-Test Primary and Redundant Speed Trap Read-Out

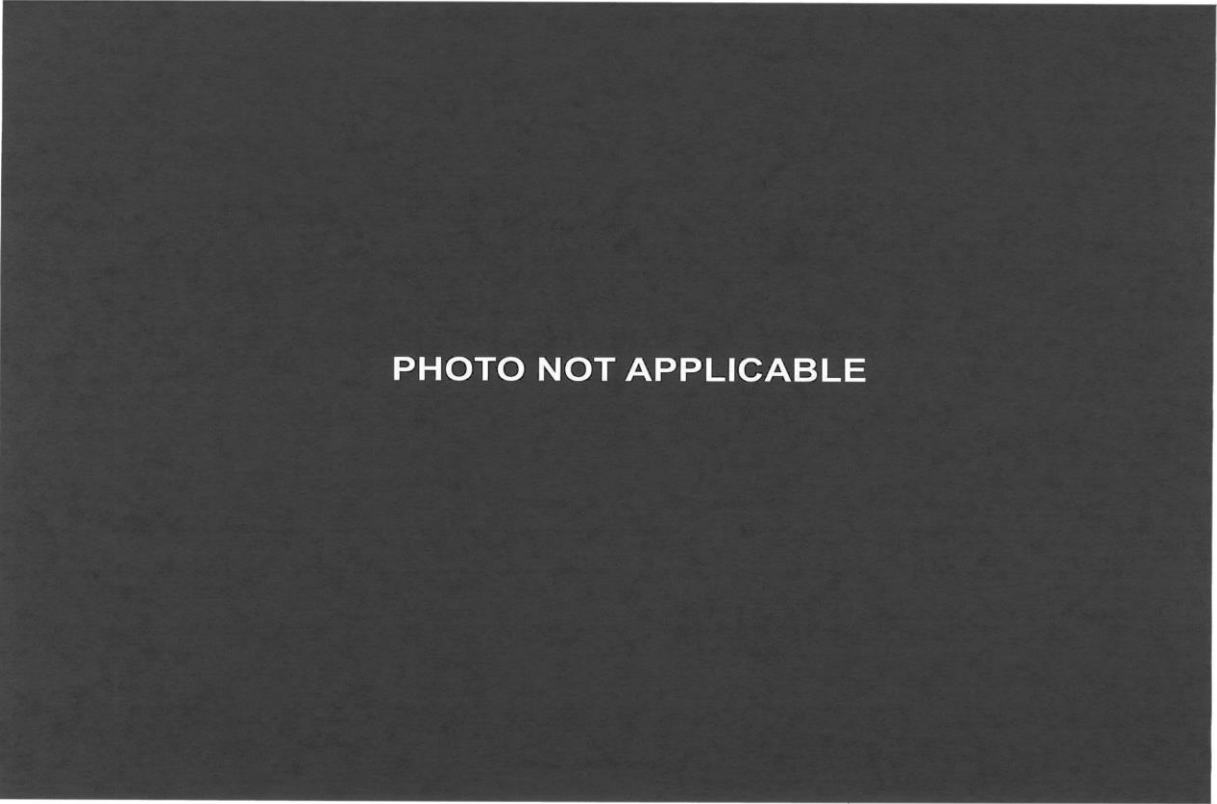


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096 FMVSS 301 Static Rollover 0 Degrees

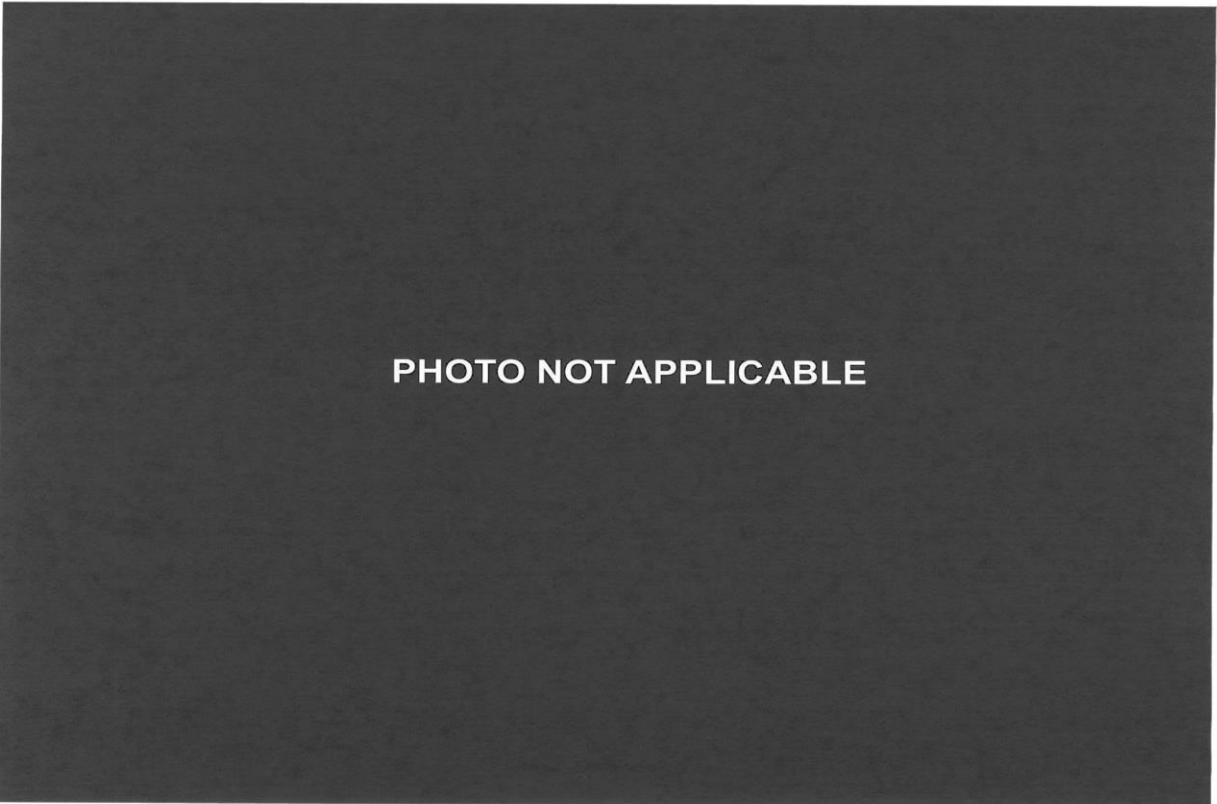


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097 FMVSS 301 Static Rollover 90 Degrees

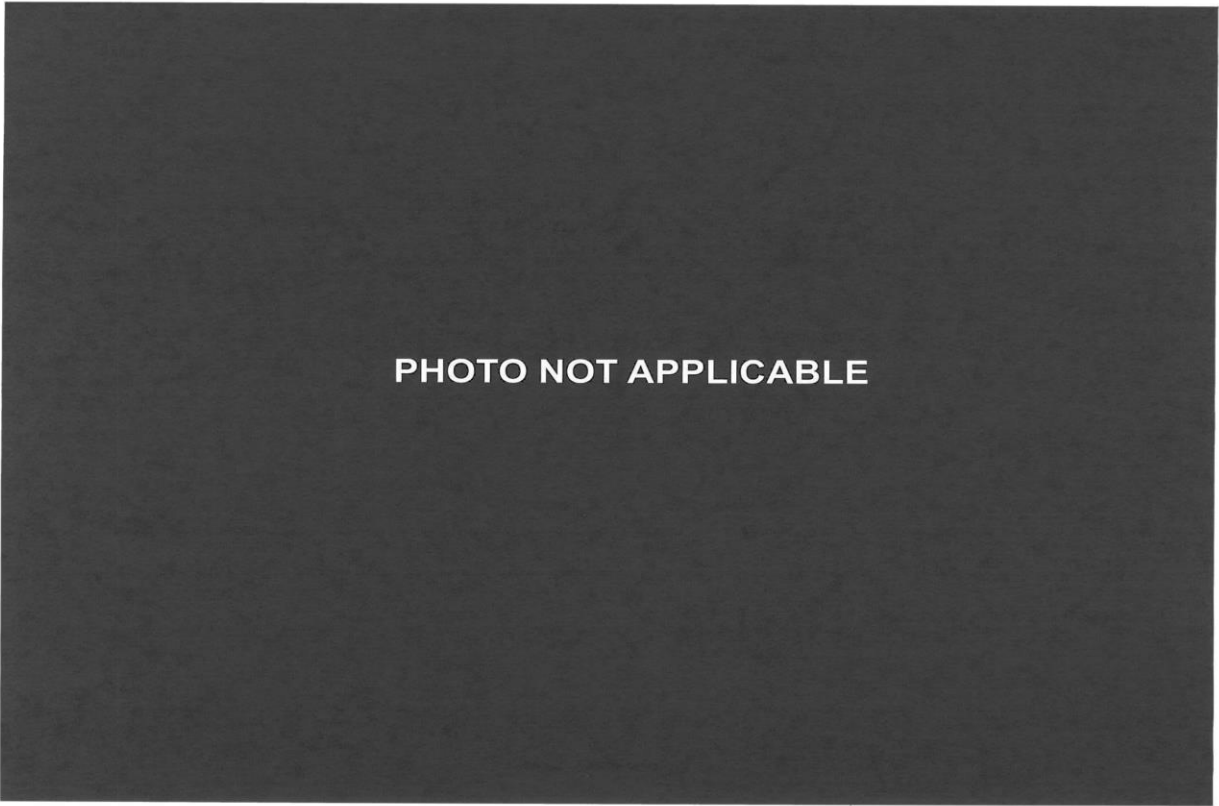


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098 FMVSS 301 Static Rollover 180 Degrees

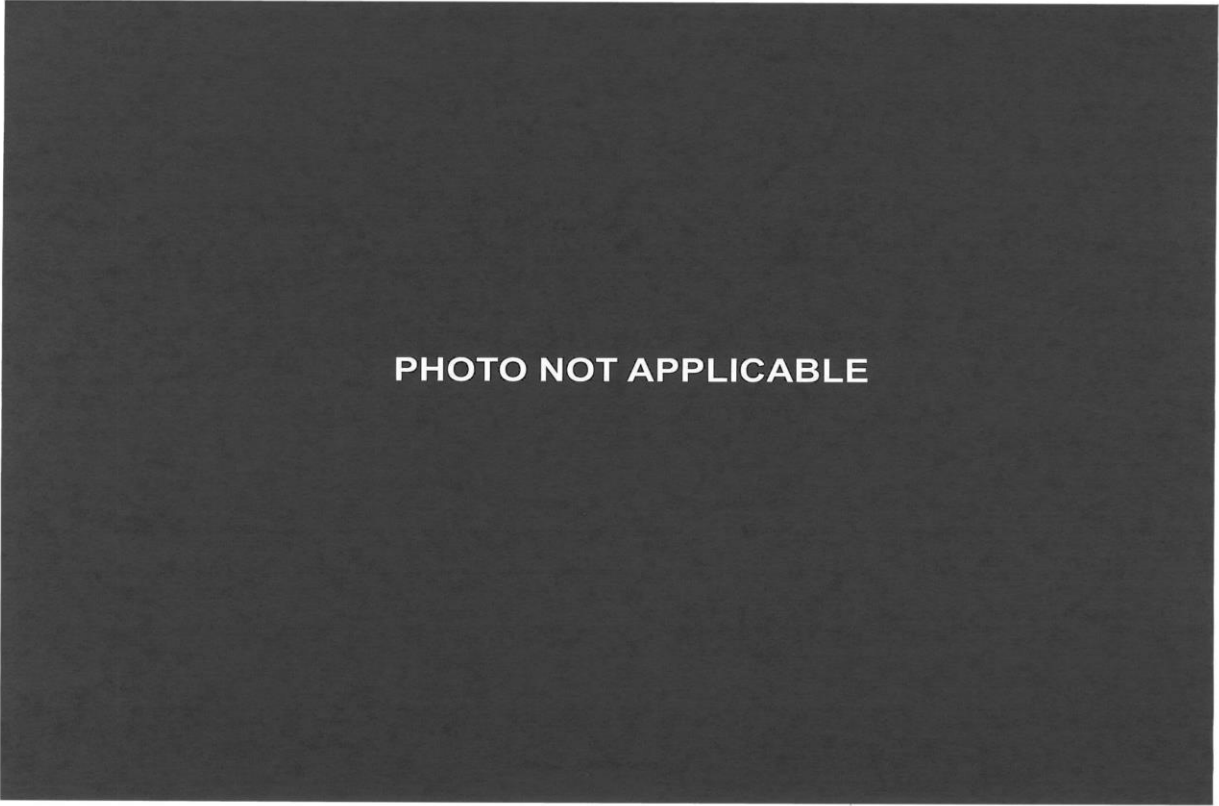


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099 FMVSS 301 Static Rollover 270 Degrees

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100 FMVSS 301 Static Rollover 360 Degrees

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101 Impact Event

LET'S MOTOR.®

2020 MINI Cooper S Convertible

Manufacturer's Suggested Retail Price	\$ 32,400.00
Options and Additional Charges: (Optional equipment may supersede standard equipment; check with your authorized MINI dealer).	
Caribbean Aqua metallic	Included
Carbon Black Leatherette	Included
Premium Package	\$ 1,750.00
- Power-folding Mirrors	
- Piano Black exterior	
- Auto-dimming mirrors	
- Auto-dimming rearview mirror	
- SiriusXM Radio w/ 1 year sub.	
- Harman/ardon Premium System	
Signature Trim	\$ 3,500.00
- Confirmed Access keyless entry	
- Convertible Wind Deflector	
- Heated front seats	
- Automatic climate control	
- LED Fog Lights	
- LED Headlights w/ Cornering	
- All-season tires	
Without addl. interior chrome	Included
17" Rail Spoke 2-tone wheels	Included
7-Speed Steptronic Sport DCT	Included
Performance Control	Included
JCW Leather Steering Wheel	Included
Multifunction steering wheel	Included
Rear view camera	Included
MINI Driving Modes	Included
MINI Excitement Package	Included
Center armrest	Included
Sport seats	Included
Active Driving Assistant	Included
Park Distance Control (rear)	Included
Ambient Lighting	Included
White Turn-Signal Lights	Included
Refrigerant	Included
Black All Weather Floor Mats	\$ 135.00
Destination Charge	\$ 850.00
Total Suggested Retail Price	\$ 36,635.00

VIN: WWWWJ5C02L3L34787

STANDARD FEATURES

Convenience and Safety

- 6 airbags including front occupant knee airbags
- Active Driving Assistant with Forward Collision Warning
- Rear View camera
- Telematics and Emergency Call
- Fully recessed active roll-over protection system
- ISOFIX (LATCH) Child Seat Restraint System
- Tire Pressure Monitoring System
- Heated exterior mirrors and washer jets
- Automatic modes for headlights and rain-sensing windshield wipers

Warranty

- 12 Year/Unlimited Mileage Rust Perforation Limited Warranty
- 4 Year/50,000 mile Limited Warranty
- 4 Year/Unlimited Mileage Roadside Assistance Program

Performance and Minimalism

- 2.0-liter MINI TwinPower Turbo 4-cylinder engine with 189 hp and 207 lb-ft torque
- 7-Speed Steptronic Sport Dual Clutch Automatic Transmission
- Dynamic Cruise Control
- MINI Driving Modes: Sport, Mild, Green

Handling and Braking

- Dynamic Stability Control (DSC) incl. DTC + EDC
- Four-wheel disc brakes with Anti-lock Braking System (ABS) and Electronic Brakeforce Distribution (EBD)

Comfort and Versatility

- MacPherson strut front/multi-link rear suspension
- Multifunction leather-wrapped sport steering wheel
- Rear Park Distance Control
- Power-folding convertible soft top with sliding feature
- Front center armrest
- Seventy manually adjustable driver and front passenger sport seats with additional bolsters
- 50/50 split-folding rear seatback
- Floor mats

Audio and Technology

- Center Media Display
- Bluetooth® connecting for telephone and audio streaming
- LED center instrument ring
- Six-speaker audio system with AM/FM and HD radio
- Ambient lighting with adjustable colors

MINI Maintenance

\$0 Complimentary Program
For the first 3 years or
36,000 miles, whichever
comes first, on scheduled
maintenance.*

Your Costs:

Engine Oil Services: \$0 Air Filter: \$0
Vehicle Checks: \$0 Brake Fluid: \$0
Spark Plugs: \$0

*Coverage is not transferable to subsequent purchasers, owners, or lessees. Please see MINUSA.com or ask your authorized MINI dealer for details.

EPA DOT Fuel Economy and Environment

Fuel Economy

29 MPG
combined city/hwy
26 city
34 highway
3.4 gallons per 100 miles

Minicompact cars range from 13 to 31 MPG. The best vehicle rates 136 MPG.

You spend

\$1,000
more in fuel costs
over 5 years
compared to the
average new vehicle.

Annual fuel cost

\$1,700

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

1 2 3 4 5 6 7 8 9 10 Best
This vehicle emits 304 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Smog Rating (tailpipe only)

1 2 3 4 5 6 7 8 9 10 Best

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and cost \$7,650 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.25 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov

Calculate personalized estimates and compare vehicles



PARTS CONTENT INFORMATION

For Vehicles in this Car Line:
US/Canadian Parts Content: 5%
Major Source of Foreign Parts Content:
GERMANY: 35%
UNITED KINGDOM: 35%
Note: Parts content does not include final assembly, distribution, or other non-parts costs.

For this Vehicle:
Final Assembly Point: BORN, NETHERLANDS
Country of Origin: GERMANY
Engine: JAPAN
Transmission: JAPAN

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Crash	Driver Passenger	Not Rated
Frontal	Not Rated	Not Rated

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

Crash	Front seat Rear seat	Not Rated
Side	Not Rated	Not Rated

Based on the risk of injury in a side impact.

Rollover Not Rated
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

This vehicle is equipped with a front bumper that has been tested at an impact speed of 2.5 miles per hour and a rear bumper that has been tested at an impact speed of 2.5 miles per hour, and has sustained no damage to the vehicle's body and minimal damage to the bumper and attachment hardware. Minimal damage to the bumper means damage that can be repaired with the use of common repair materials and without replacing any parts. The stronger the bumper, the less likely the car will require repair after a low-speed collision.

MINI Division of BMW of North America, LLC

Woodcliff Lake, NJ 07677

VPC Location: BALTIMORE VDC

Port of Entry: BALTIMORE, MARYLAND

Carrier: MOORE TRANSPORT

Sold To: Motor City MINI

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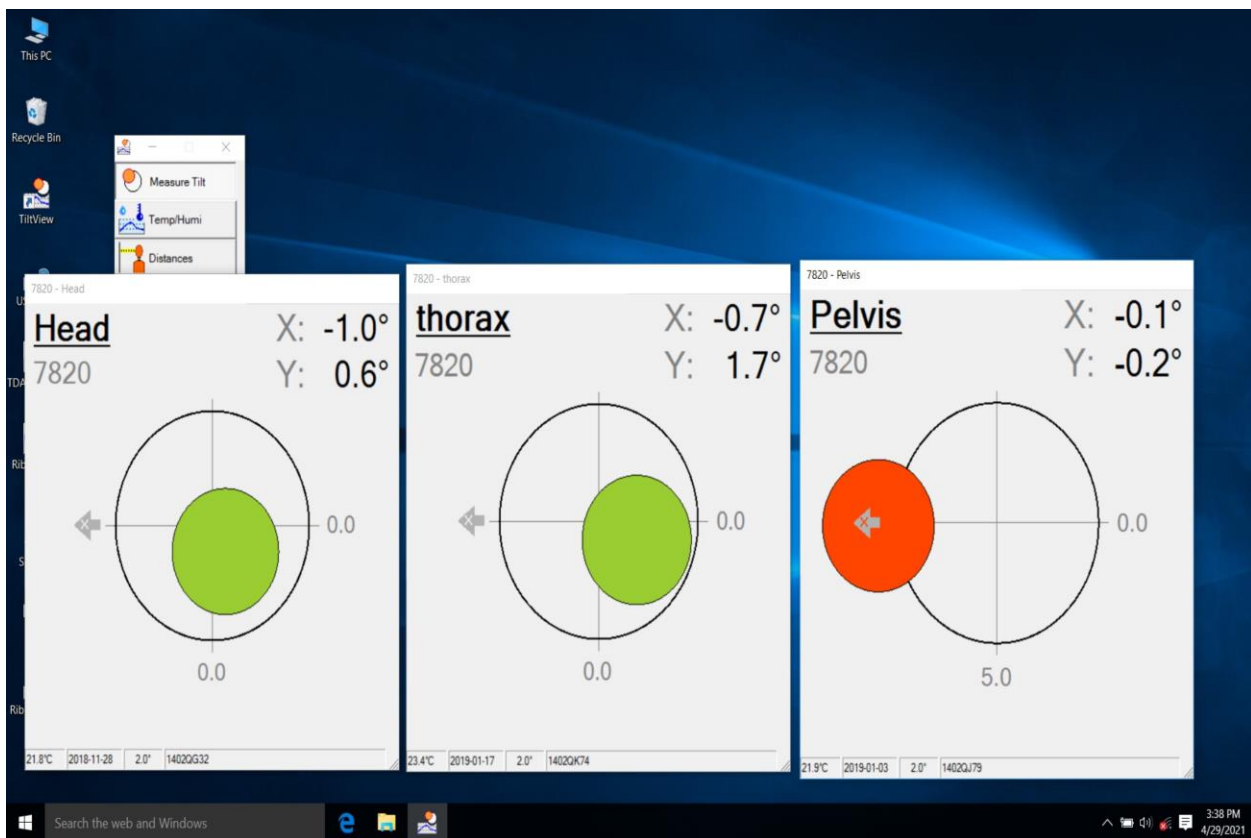
Ship To: Motor City MINI

29929 Telegraph Rd

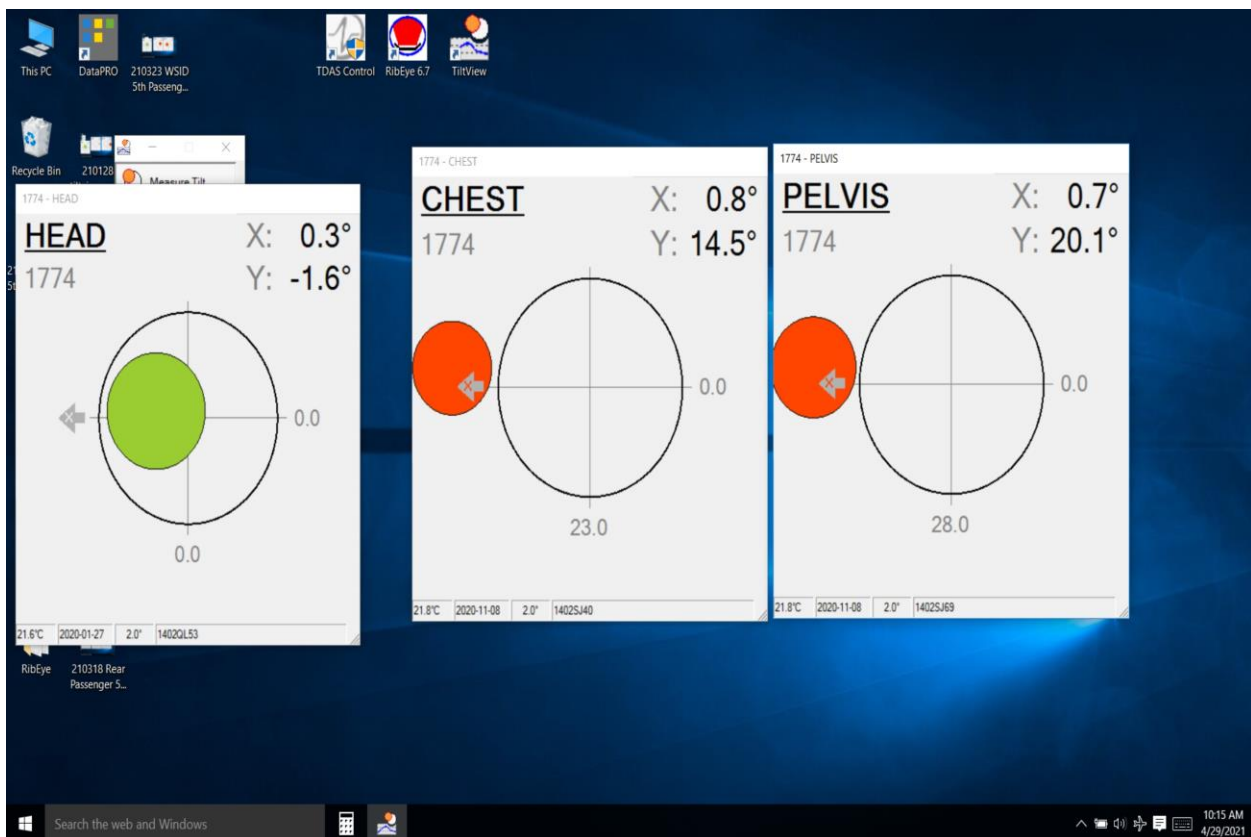
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102 Monroney Label



105 WorldSID-50M Pre-Test Tilt Sensor View



106 WorldSID-05F Pre-Test Tilt Sensor View



107 WorldSID-05F Thorax Rib 2 Inclinometer



108 WorldSID-05F H-Point Inclinometer

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

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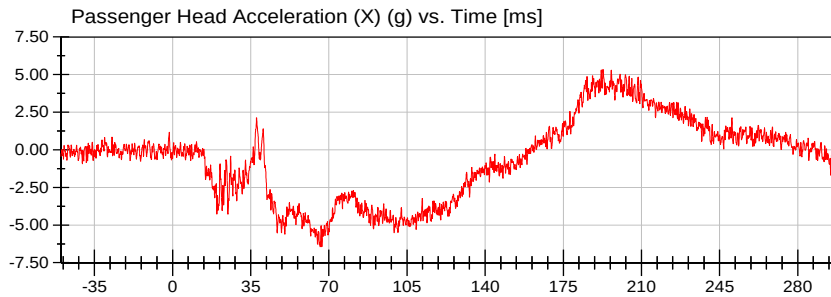
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VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



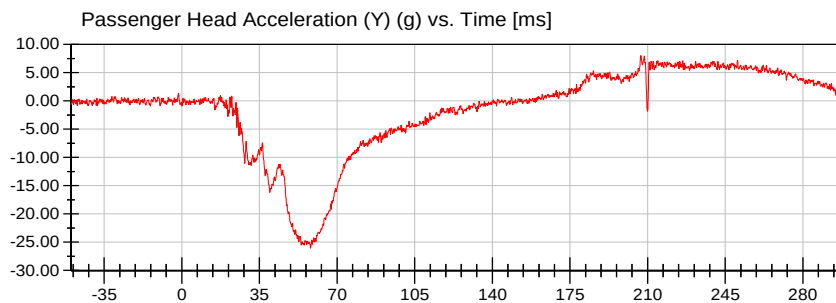
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CFC_1000



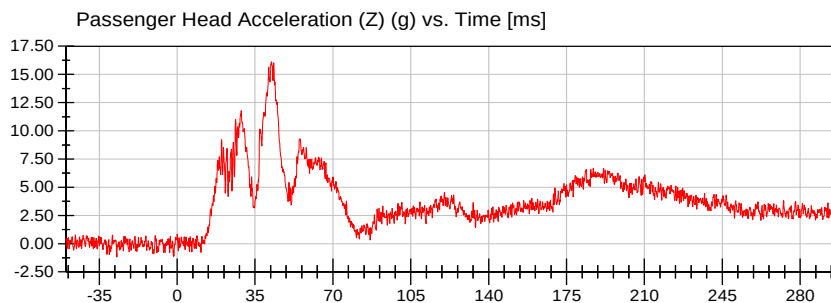
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<Min>

-26.06 g at 58.05 ms

CFC_1000



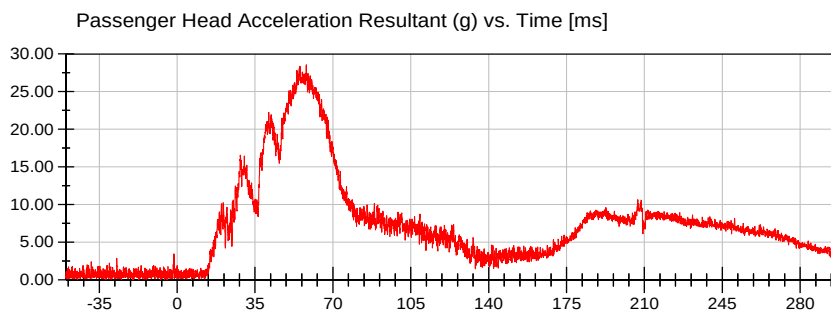
<Max>

16.12 g at 42.40 ms

<Min>

-1.19 g at -27.15 ms

CFC_1000



<Max>

28.57 g at 58.05 ms

<Min>

0.04 g at -44.80 ms

Prefiltered_> CFC 1000

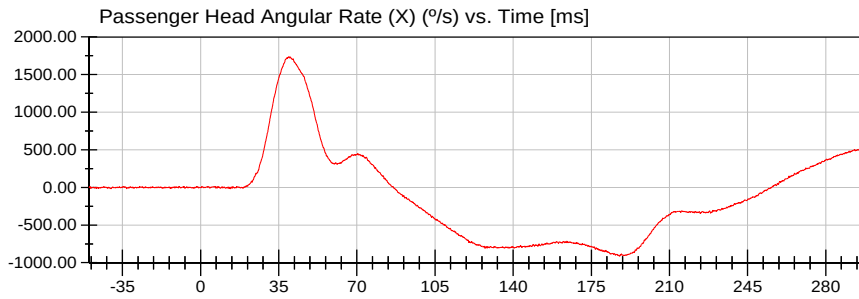


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



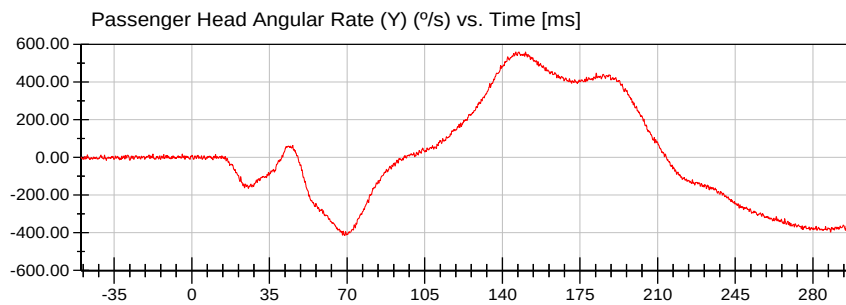
<Max>

1,737.28 °/s at 39.55 ms

<Min>

-914.54 °/s at 187.60 ms

CFC_1000



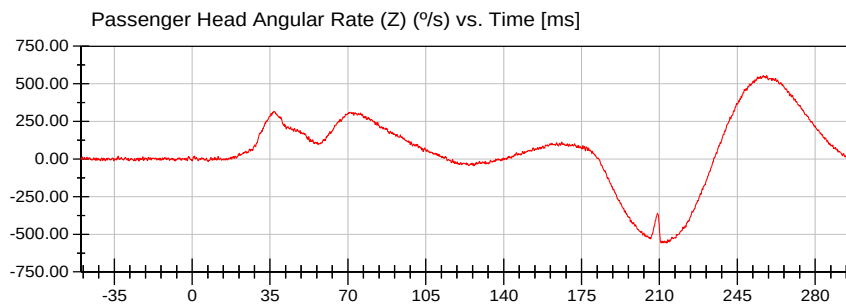
<Max>

560.72 °/s at 150.45 ms

<Min>

-413.53 °/s at 69.00 ms

CFC_1000



<Max>

554.61 °/s at 256.70 ms

<Min>

-558.42 °/s at 213.35 ms

CFC_1000

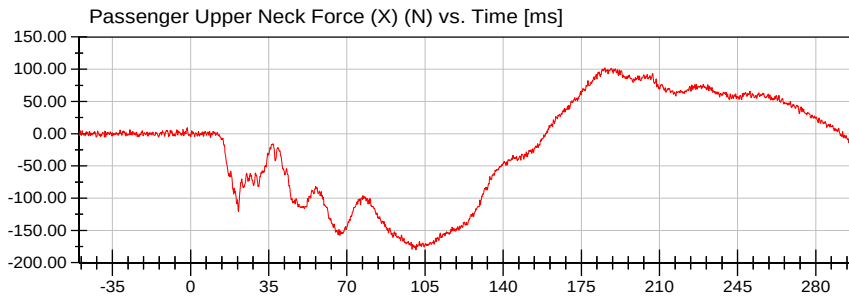


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



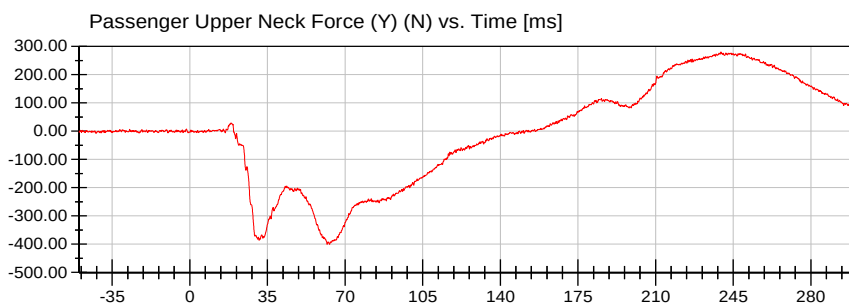
<Max>

101.97 N at 185.55 ms

<Min>

-180.05 N at 100.90 ms

CFC_1000



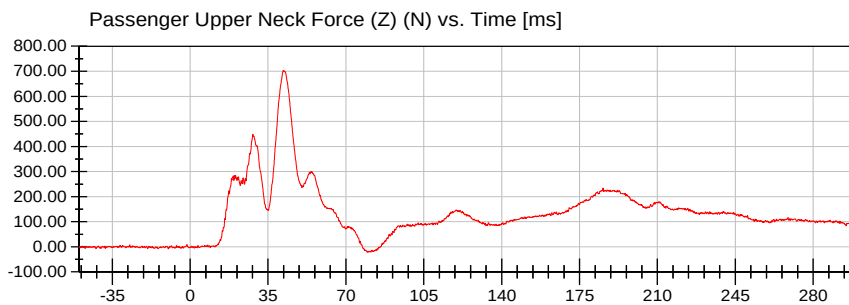
<Max>

280.20 N at 239.45 ms

<Min>

-400.52 N at 63.05 ms

CFC_1000



<Max>

703.06 N at 41.85 ms

<Min>

-21.24 N at 79.70 ms

CFC_1000

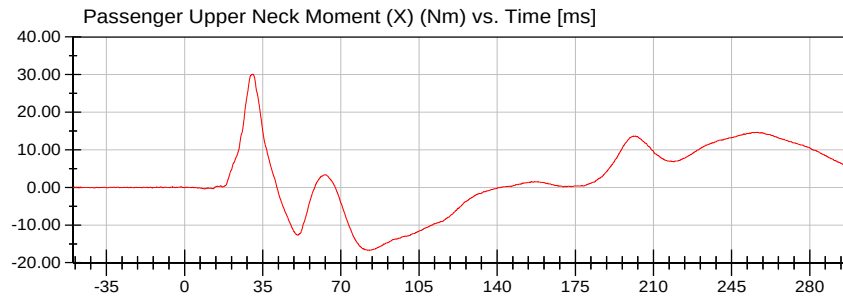


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



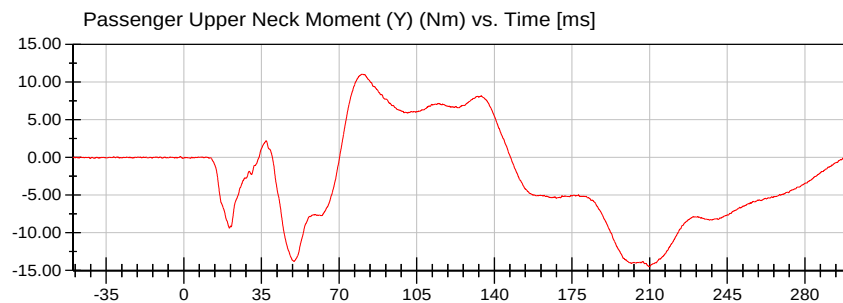
<Max>

30.09 Nm at 30.40 ms

<Min>

-16.72 Nm at 82.10 ms

CFC_600



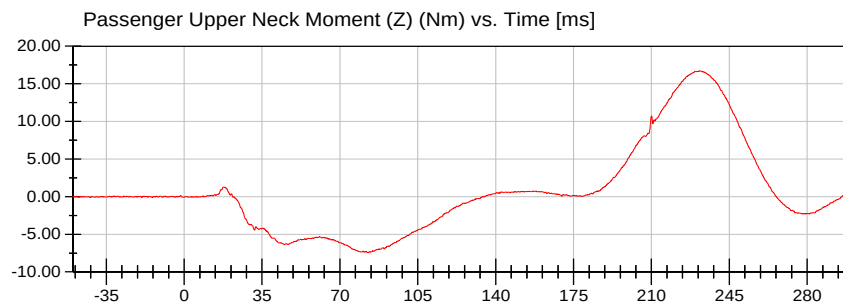
<Max>

11.05 Nm at 80.35 ms

<Min>

-14.50 Nm at 209.75 ms

CFC_600



<Max>

16.75 Nm at 231.65 ms

<Min>

-7.41 Nm at 82.80 ms

CFC_600

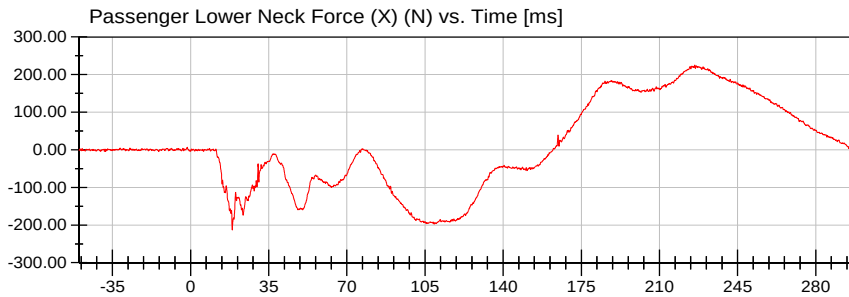


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



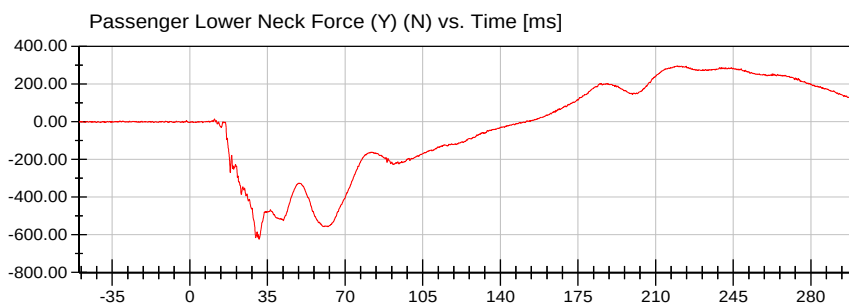
<Max>

225.35 N at 225.80 ms

<Min>

-213.30 N at 18.70 ms

CFC_1000



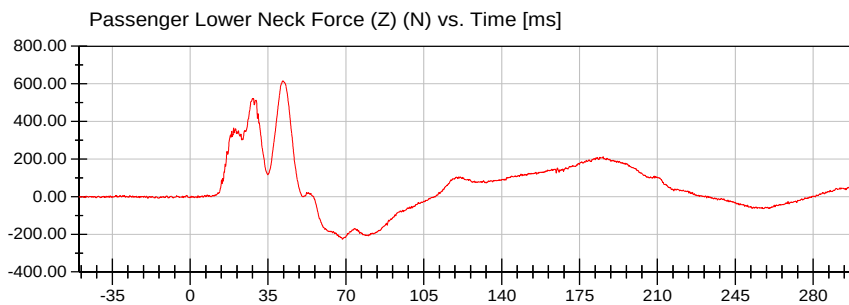
<Max>

296.21 N at 219.70 ms

<Min>

-624.18 N at 31.20 ms

CFC_1000



<Max>

615.16 N at 41.70 ms

<Min>

-226.62 N at 68.45 ms

CFC_1000

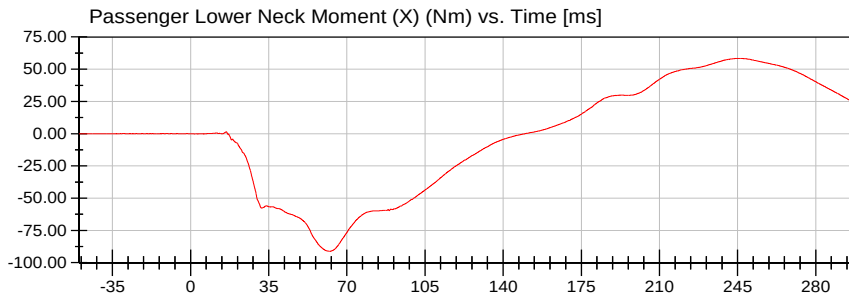


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



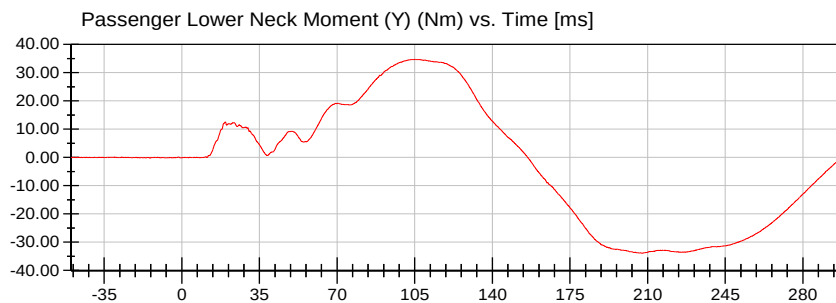
<Max>

58.35 Nm at 245.20 ms

<Min>

-91.24 Nm at 62.35 ms

CFC_600



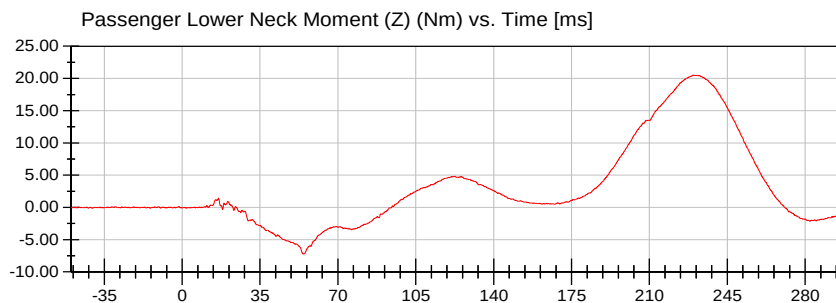
<Max>

34.70 Nm at 105.10 ms

<Min>

-33.93 Nm at 207.50 ms

CFC_600



<Max>

20.51 Nm at 229.60 ms

<Min>

-7.23 Nm at 54.50 ms

CFC_600

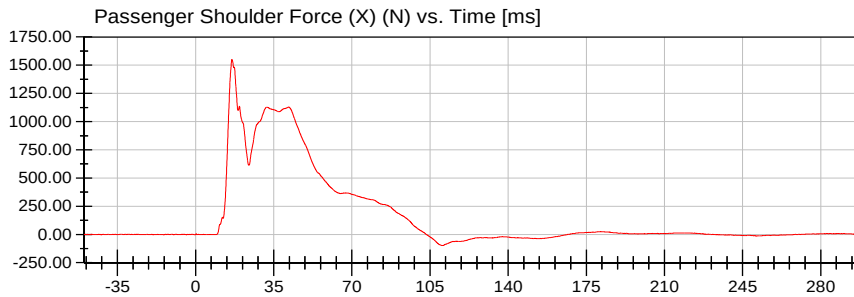


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



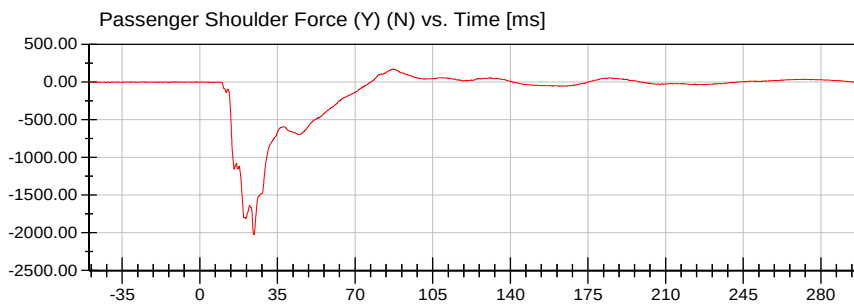
<Max>

1,550.44 N at 16.30 ms

<Min>

-97.41 N at 110.70 ms

CFC_600



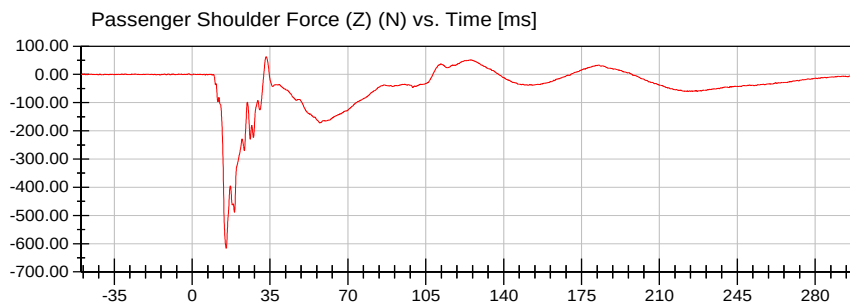
<Max>

172.82 N at 87.10 ms

<Min>

-2,024.78 N at 24.40 ms

CFC_600



<Max>

62.65 N at 33.25 ms

<Min>

-616.75 N at 15.30 ms

CFC_600

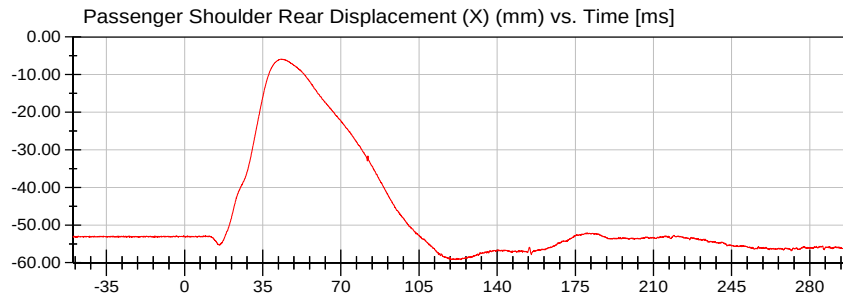


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



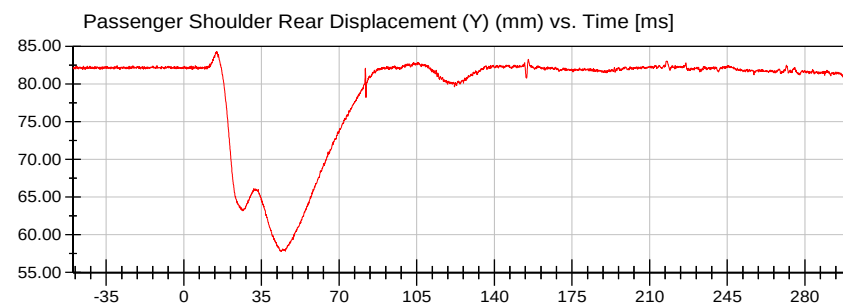
<Max>

-5.89 mm at 43.70 ms

<Min>

-59.25 mm at 121.50 ms

Unfiltered



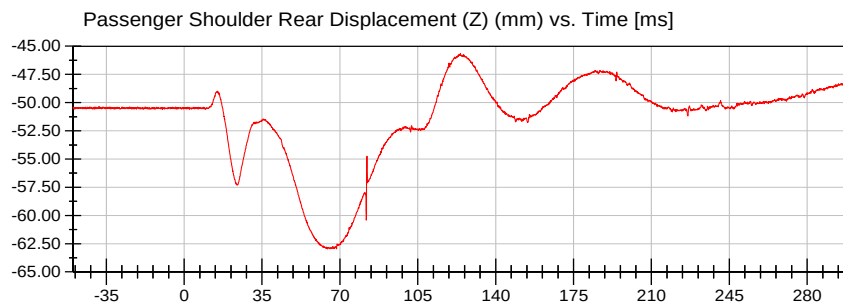
<Max>

84.34 mm at 14.85 ms

<Min>

57.78 mm at 44.00 ms

Unfiltered



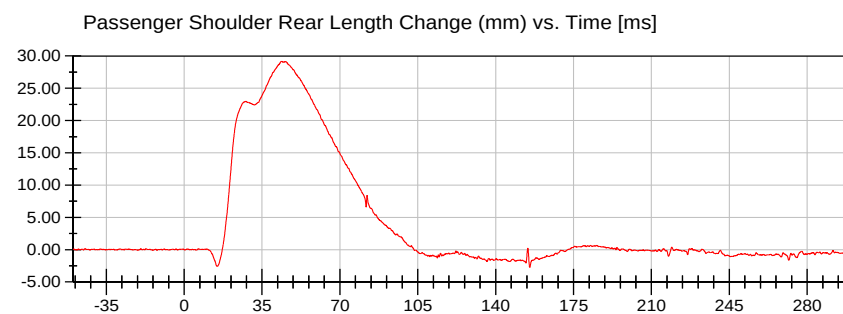
<Max>

-45.65 mm at 124.10 ms

<Min>

-62.96 mm at 65.60 ms

Unfiltered



<Max>

29.16 mm at 43.90 ms

<Min>

-2.74 mm at 155.30 ms

CFC_600

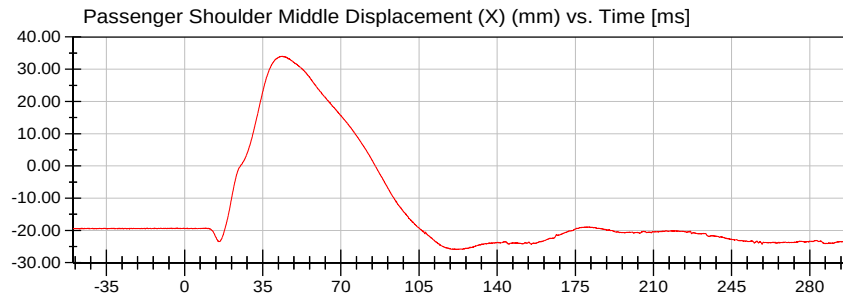


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



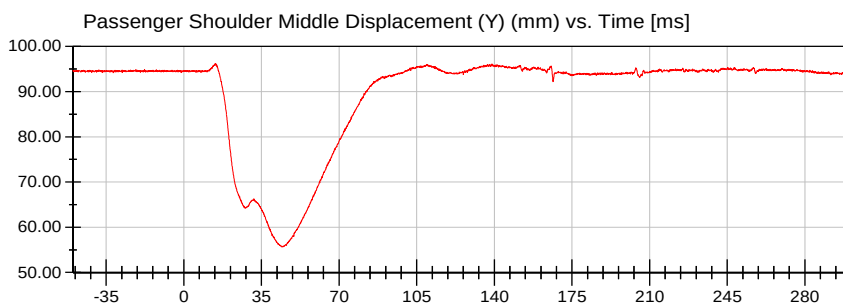
<Max>

34.07 mm at 43.70 ms

<Min>

-25.91 mm at 122.70 ms

Unfiltered



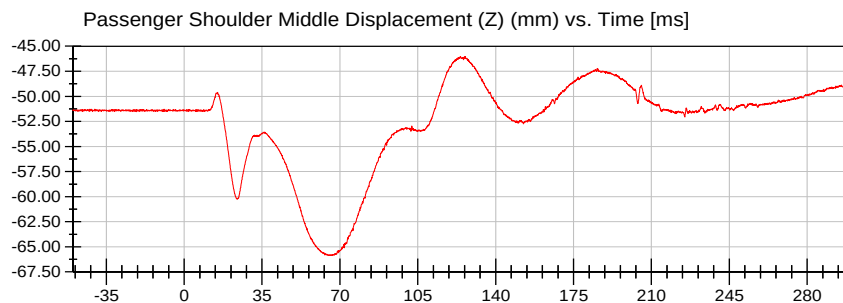
<Max>

96.20 mm at 14.10 ms

<Min>

55.59 mm at 44.25 ms

Unfiltered



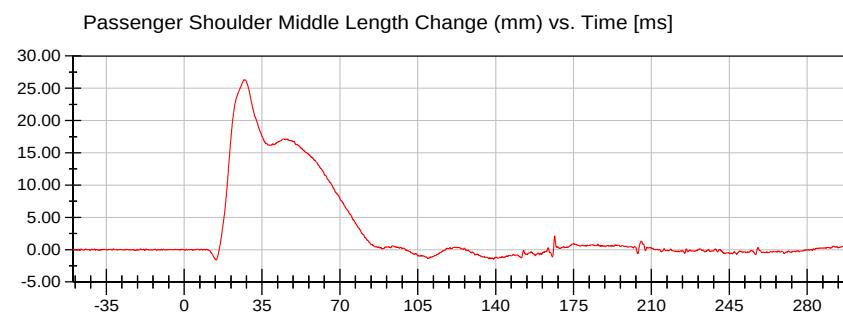
<Max>

-46.03 mm at 126.10 ms

<Min>

-65.87 mm at 65.45 ms

Unfiltered



<Max>

26.30 mm at 26.95 ms

<Min>

-1.61 mm at 14.35 ms

CFC_600

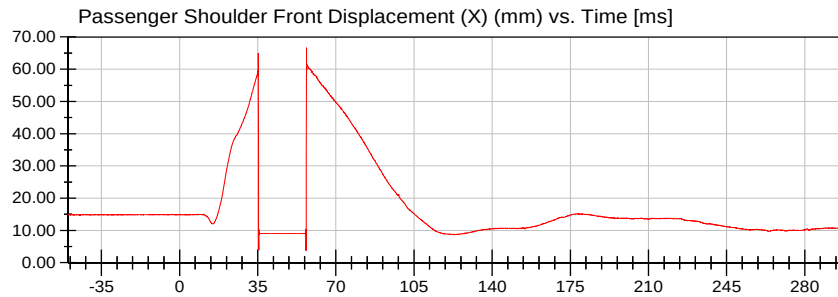


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



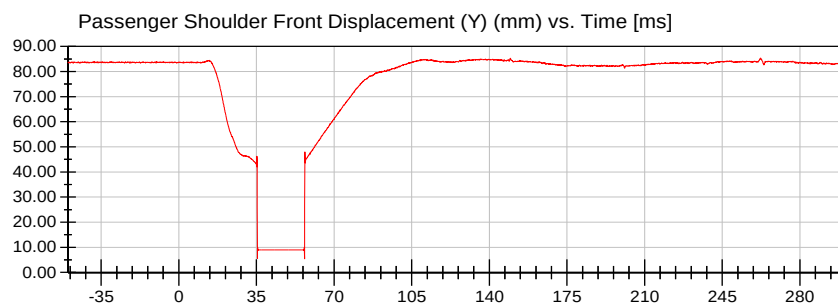
<Max>

66.59 mm at 56.85 ms

<Min>

3.74 mm at 56.65 ms

Unfiltered



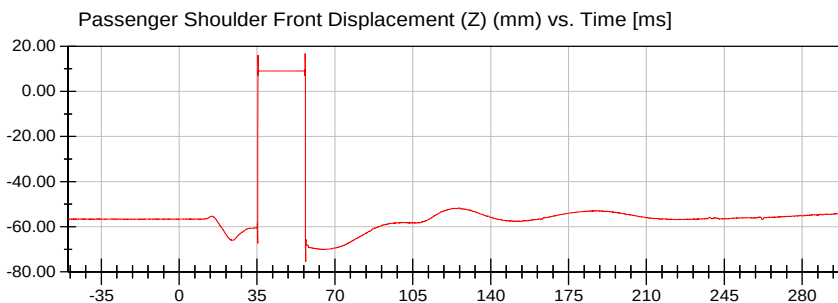
<Max>

85.40 mm at 262.30 ms

<Min>

5.44 mm at 56.65 ms

Unfiltered



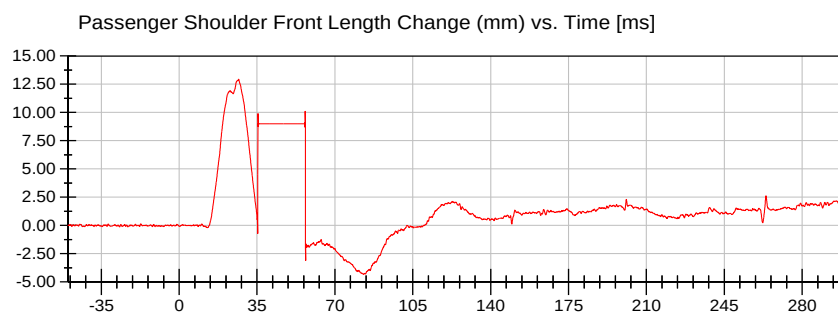
<Max>

16.70 mm at 56.65 ms

<Min>

-75.38 mm at 56.85 ms

Unfiltered



<Max>

12.93 mm at 26.75 ms

<Min>

-4.34 mm at 82.85 ms

CFC_600

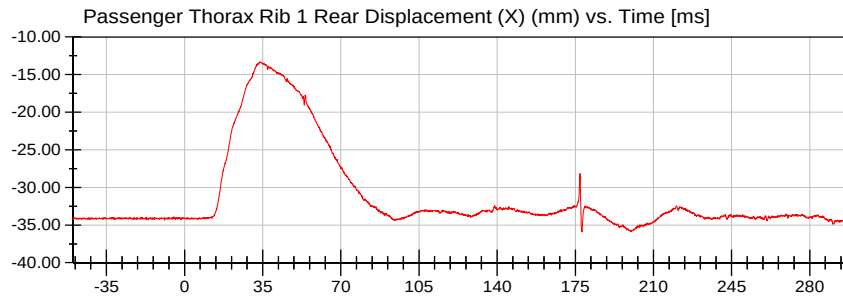


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



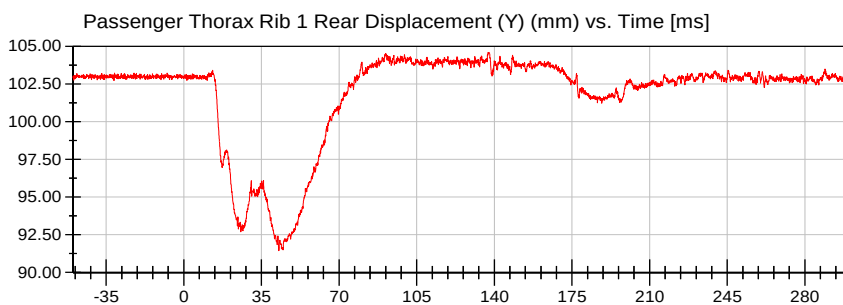
<Max>

-13.31 mm at 33.70 ms

<Min>

-35.94 mm at 177.95 ms

Unfiltered



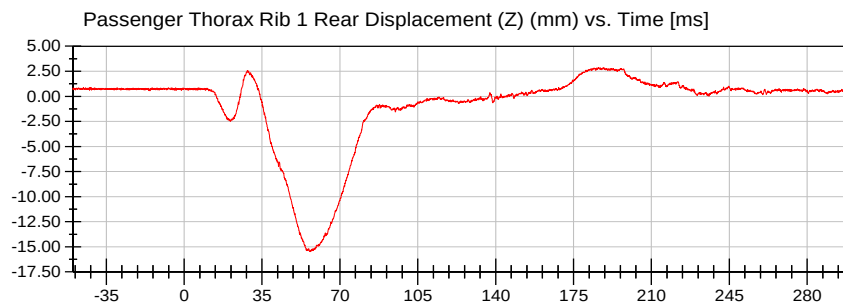
<Max>

104.60 mm at 137.20 ms

<Min>

91.45 mm at 42.80 ms

Unfiltered



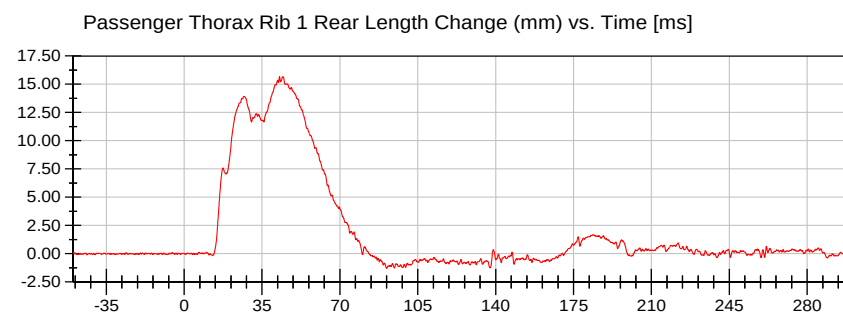
<Max>

2.87 mm at 186.10 ms

<Min>

-15.49 mm at 56.90 ms

Unfiltered



<Max>

15.66 mm at 42.85 ms

<Min>

-1.29 mm at 91.00 ms

CFC_600

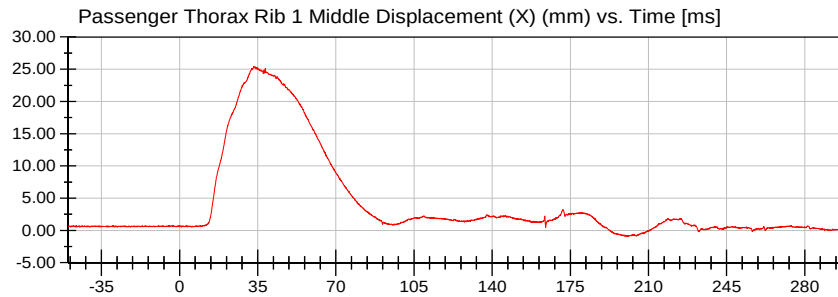


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



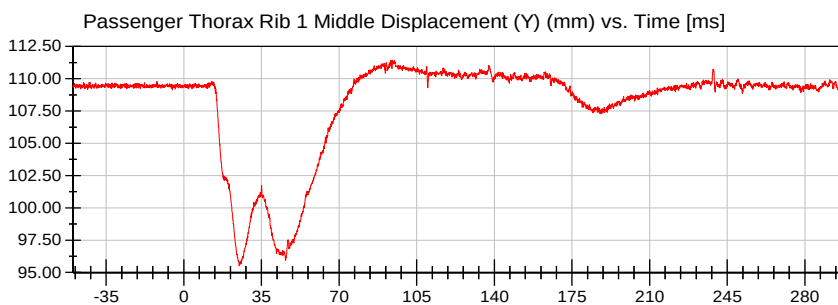
<Max>

25.38 mm at 33.75 ms

<Min>

-0.92 mm at 200.95 ms

Unfiltered



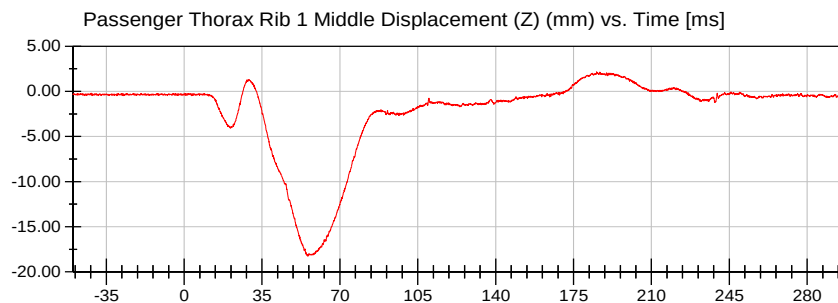
<Max>

111.45 mm at 94.05 ms

<Min>

95.53 mm at 25.00 ms

Unfiltered



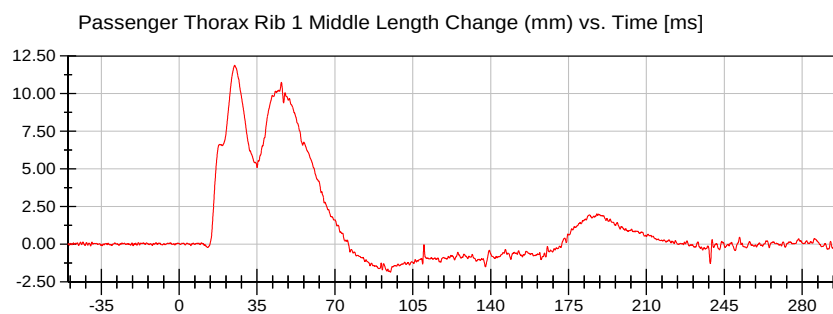
<Max>

2.16 mm at 185.40 ms

<Min>

-18.26 mm at 55.60 ms

Unfiltered



<Max>

11.89 mm at 24.95 ms

<Min>

-1.85 mm at 94.95 ms

CFC_600

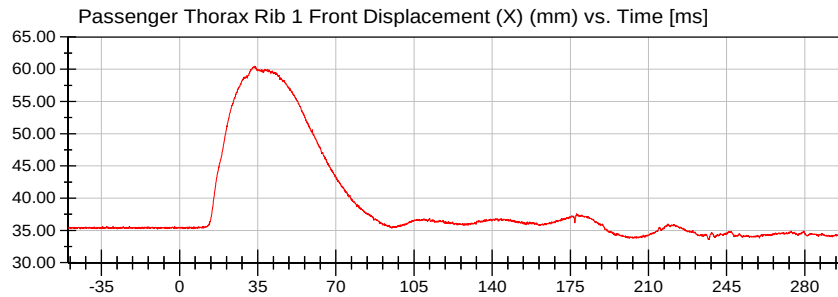


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



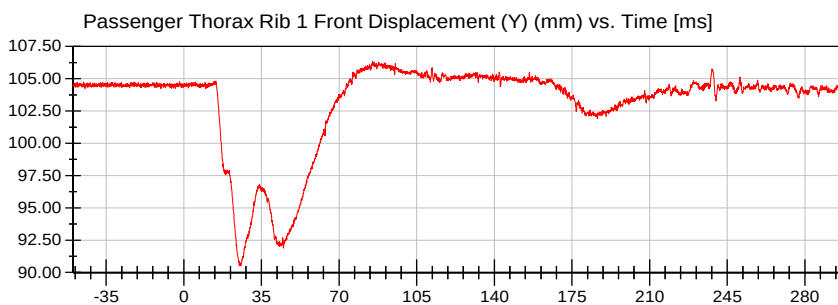
<Max>

60.47 mm at 33.65 ms

<Min>

33.57 mm at 237.20 ms

Unfiltered



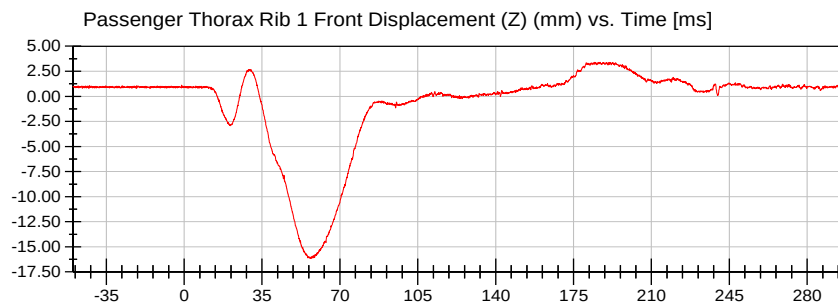
<Max>

106.36 mm at 85.15 ms

<Min>

90.52 mm at 25.70 ms

Unfiltered



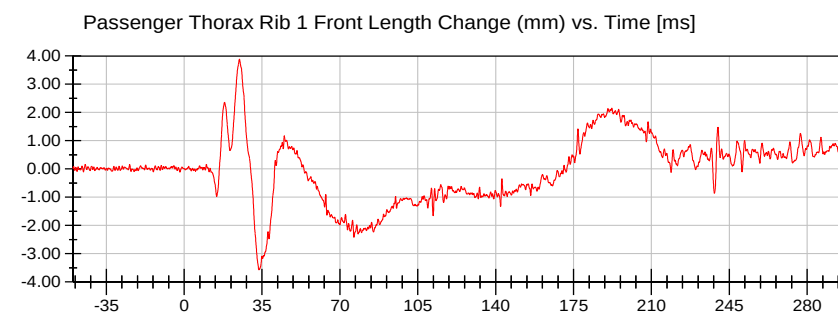
<Max>

3.39 mm at 186.10 ms

<Min>

-16.15 mm at 56.65 ms

Unfiltered



<Max>

3.88 mm at 24.85 ms

<Min>

-3.57 mm at 33.60 ms

CFC_600



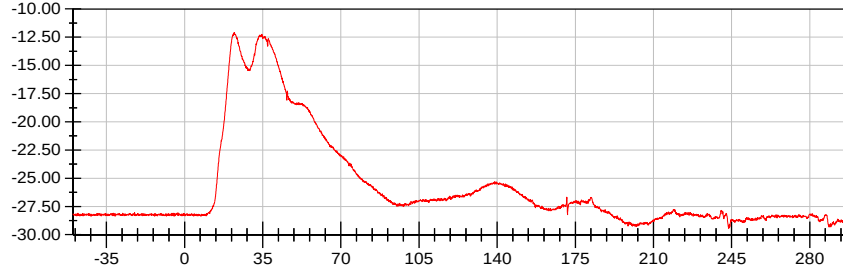
VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021

Passenger Thorax Rib 2 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

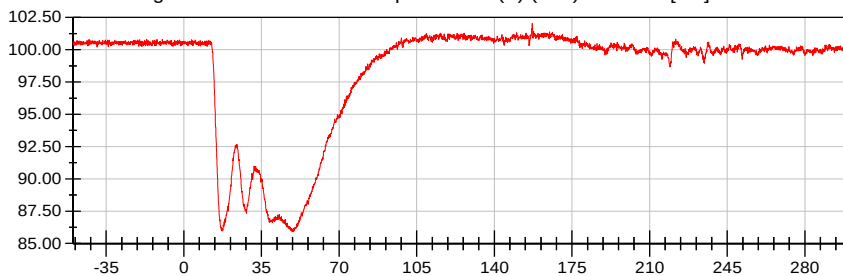
-12.08 mm at 22.30 ms

<Min>

-29.44 mm at 243.70 ms

Unfiltered

Passenger Thorax Rib 2 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

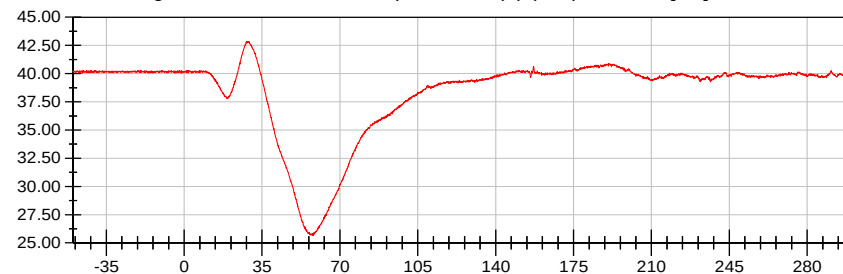
102.05 mm at 157.10 ms

<Min>

85.91 mm at 49.05 ms

Unfiltered

Passenger Thorax Rib 2 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

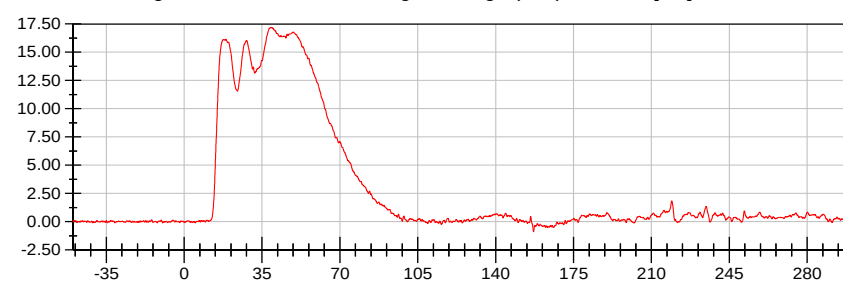
42.85 mm at 28.15 ms

<Min>

25.65 mm at 57.90 ms

Unfiltered

Passenger Thorax Rib 2 Rear Length Change (mm) vs. Time [ms]



<Max>

17.20 mm at 39.10 ms

<Min>

-0.89 mm at 157.05 ms

CFC_600

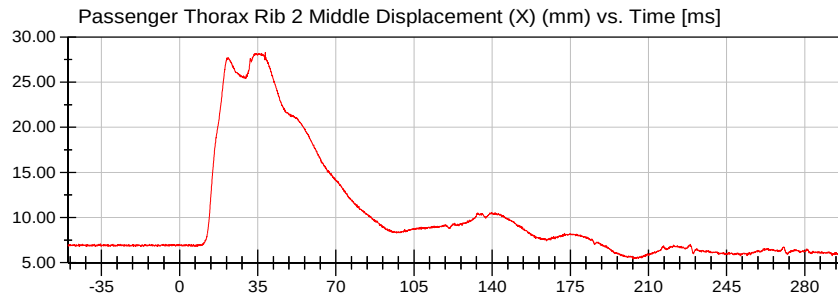


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



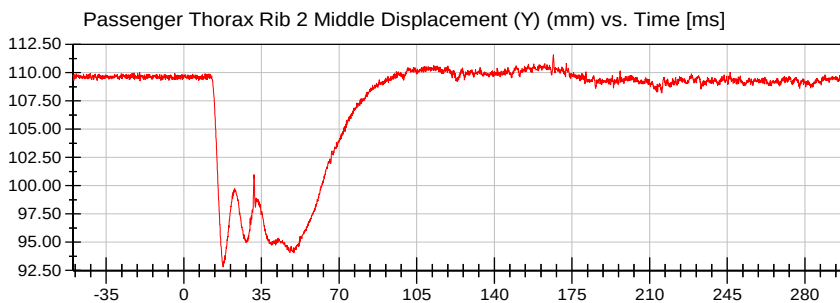
<Max>

28.28 mm at 38.40 ms

<Min>

5.37 mm at 299.75 ms

Unfiltered



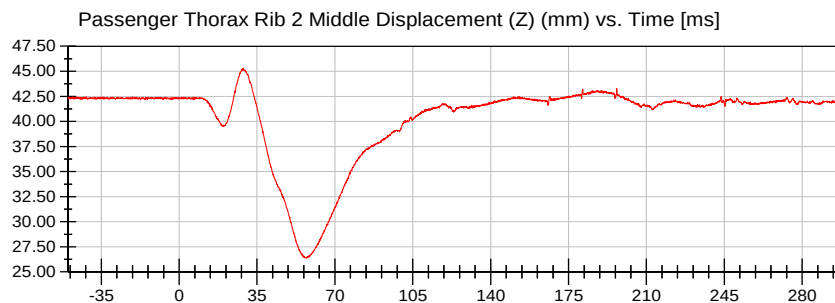
<Max>

111.58 mm at 166.60 ms

<Min>

92.79 mm at 17.70 ms

Unfiltered



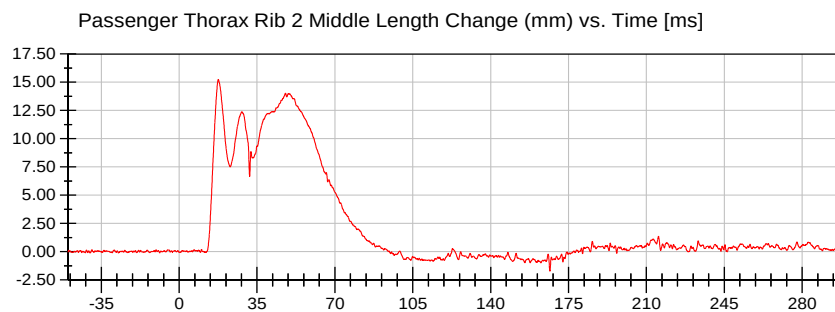
<Max>

45.29 mm at 28.70 ms

<Min>

26.38 mm at 57.10 ms

Unfiltered



<Max>

15.23 mm at 17.60 ms

<Min>

-1.71 mm at 166.60 ms

CFC_600

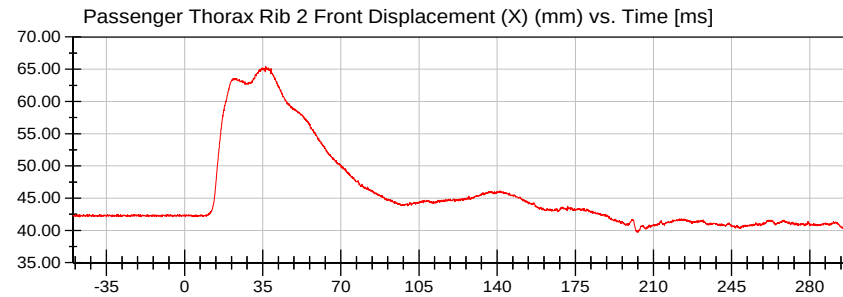


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



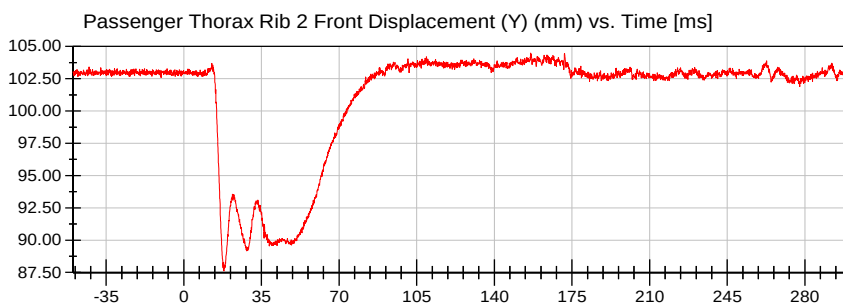
<Max>

65.40 mm at 36.35 ms

<Min>

39.69 mm at 203.05 ms

Unfiltered



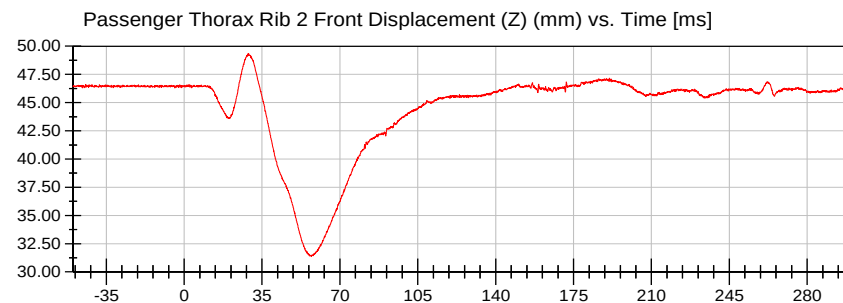
<Max>

104.47 mm at 156.40 ms

<Min>

87.60 mm at 18.05 ms

Unfiltered



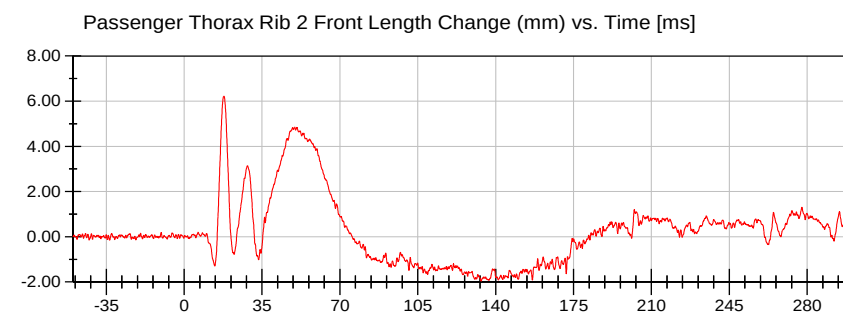
<Max>

49.33 mm at 29.00 ms

<Min>

31.39 mm at 57.10 ms

Unfiltered



<Max>

6.22 mm at 17.90 ms

<Min>

-1.96 mm at 133.45 ms

CFC_600



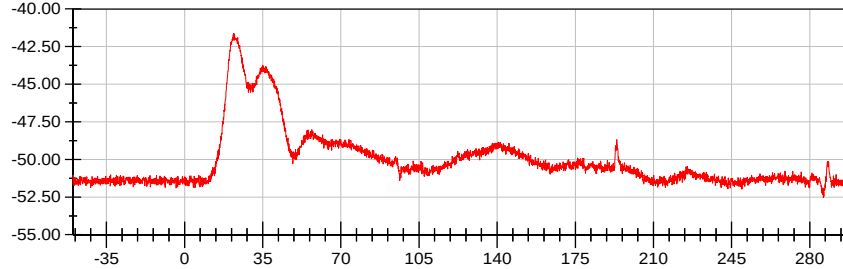
VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021

Passenger Thorax Rib 3 Rear Displacement (X) (mm) vs. Time [ms]



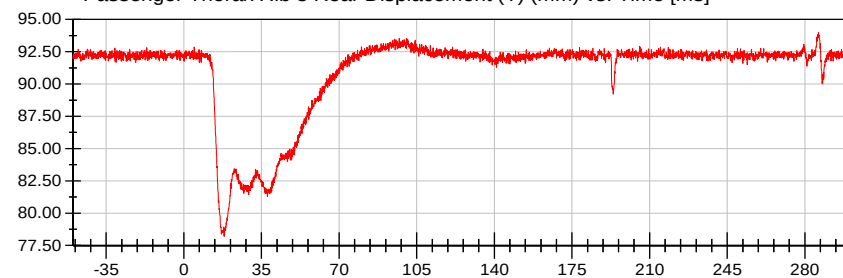
<Max>

-41.63 mm at 22.05 ms

<Min>

-52.53 mm at 286.10 ms

Passenger Thorax Rib 3 Rear Displacement (Y) (mm) vs. Time [ms]



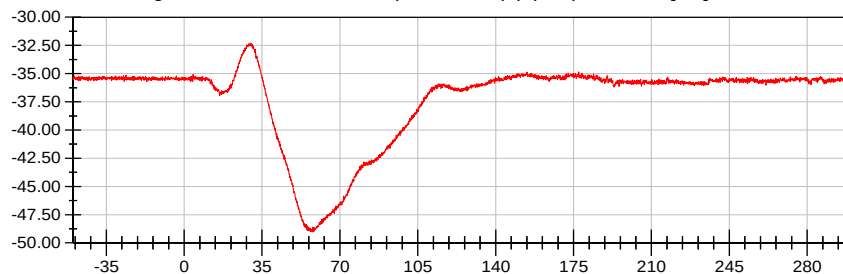
<Max>

94.01 mm at 286.10 ms

<Min>

78.20 mm at 18.20 ms

Passenger Thorax Rib 3 Rear Displacement (Z) (mm) vs. Time [ms]



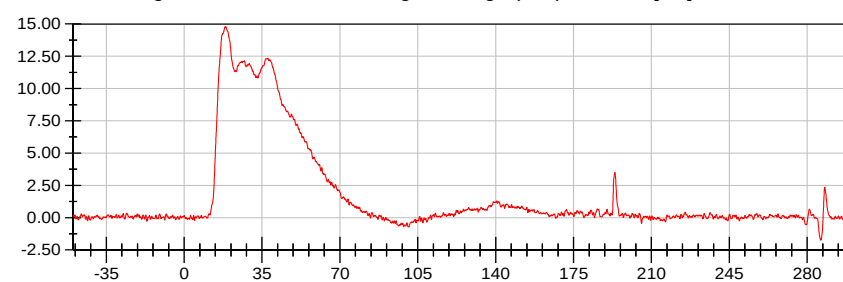
<Max>

-32.31 mm at 30.00 ms

<Min>

-49.02 mm at 57.45 ms

Passenger Thorax Rib 3 Rear Length Change (mm) vs. Time [ms]



<Max>

14.78 mm at 18.35 ms

<Min>

-1.74 mm at 286.20 ms

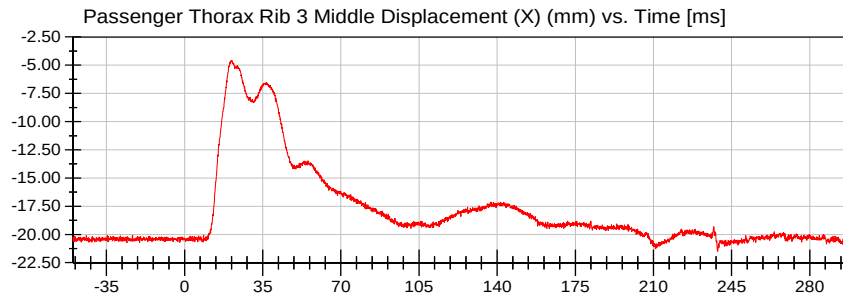


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



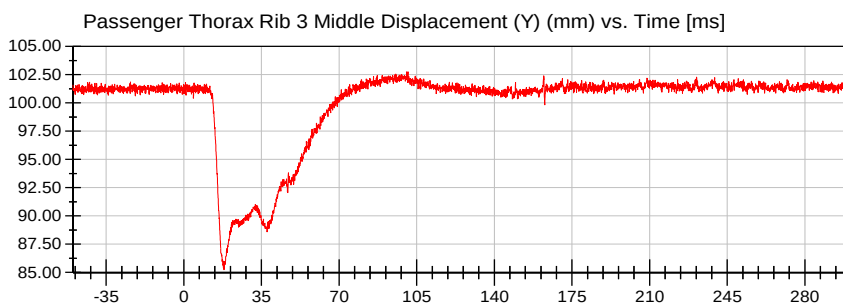
<Max>

-4.59 mm at 20.90 ms

<Min>

-21.50 mm at 238.80 ms

Unfiltered



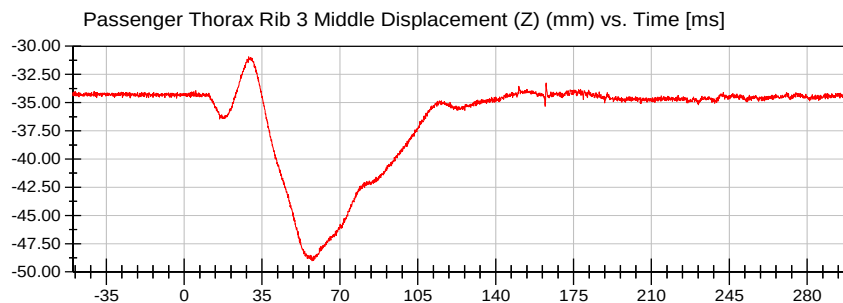
<Max>

102.75 mm at 101.00 ms

<Min>

85.24 mm at 18.15 ms

Unfiltered



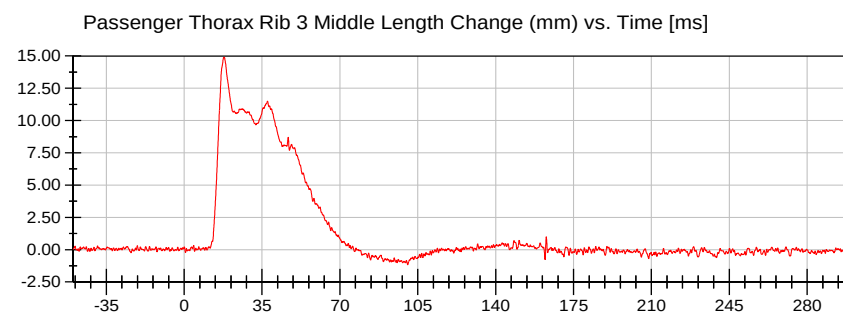
<Max>

-30.94 mm at 29.00 ms

<Min>

-49.03 mm at 57.50 ms

Unfiltered



<Max>

14.90 mm at 17.85 ms

<Min>

-1.17 mm at 100.50 ms

CFC_600

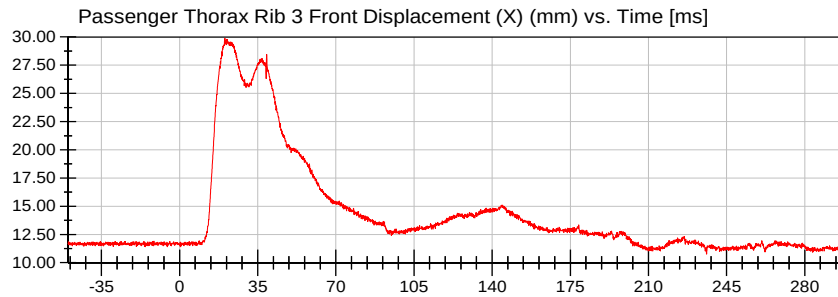


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



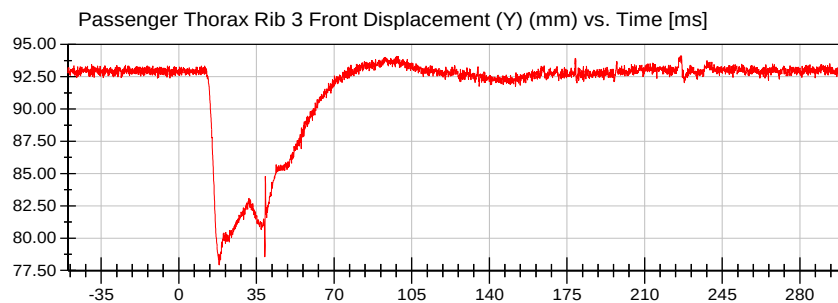
<Max>

29.86 mm at 20.30 ms

<Min>

10.76 mm at 236.00 ms

Unfiltered



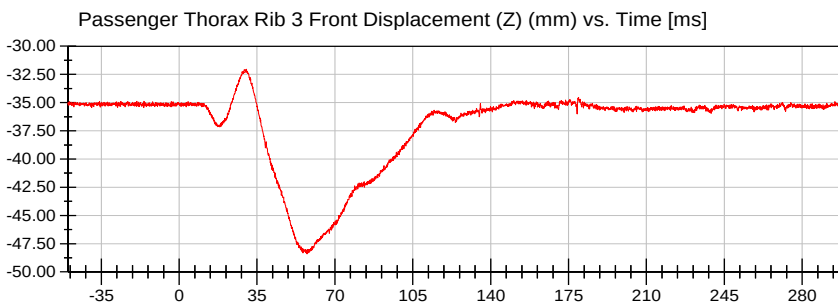
<Max>

94.10 mm at 226.15 ms

<Min>

77.92 mm at 18.20 ms

Unfiltered



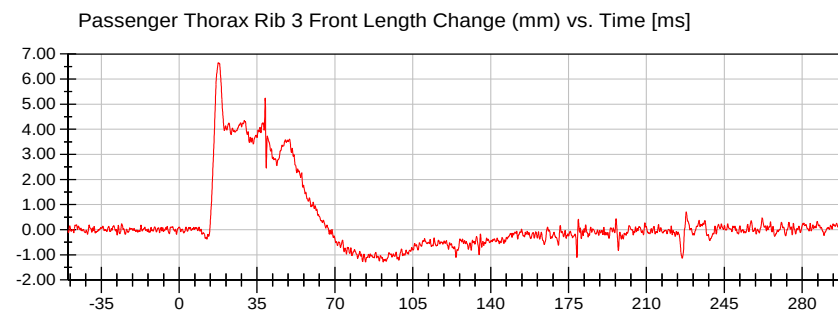
<Max>

-32.04 mm at 30.25 ms

<Min>

-48.41 mm at 57.45 ms

Unfiltered



<Max>

6.65 mm at 17.60 ms

<Min>

-1.29 mm at 91.70 ms

CFC_600

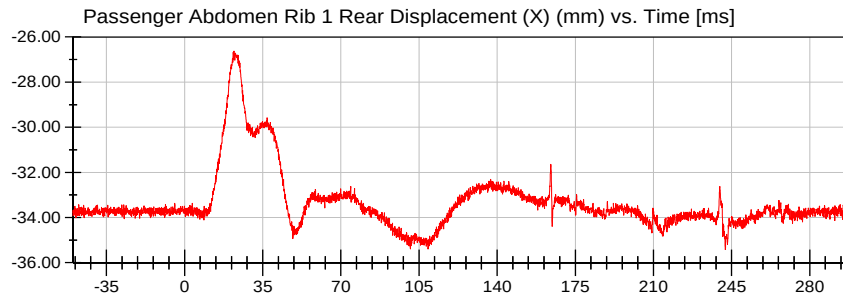


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



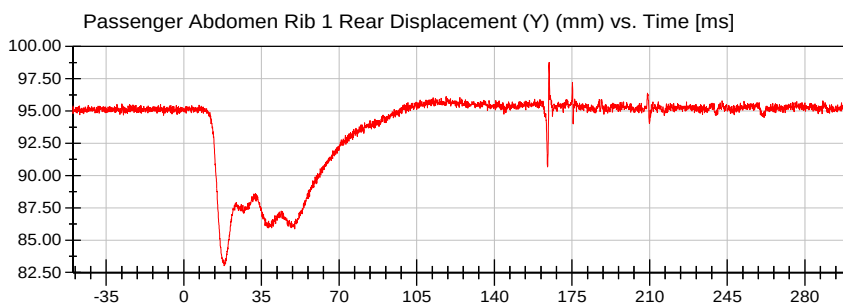
<Max>

-26.62 mm at 22.10 ms

<Min>

-35.42 mm at 242.20 ms

Unfiltered



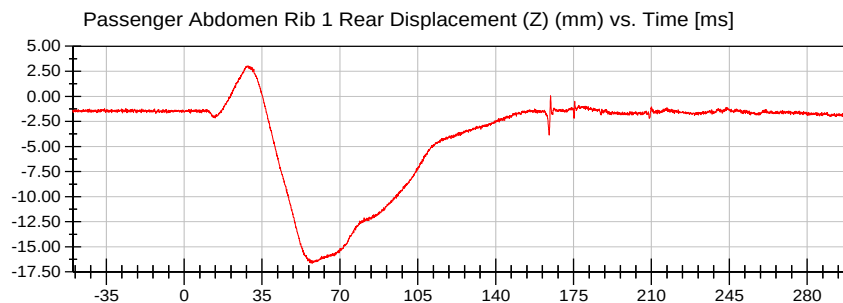
<Max>

98.78 mm at 164.65 ms

<Min>

83.01 mm at 18.15 ms

Unfiltered



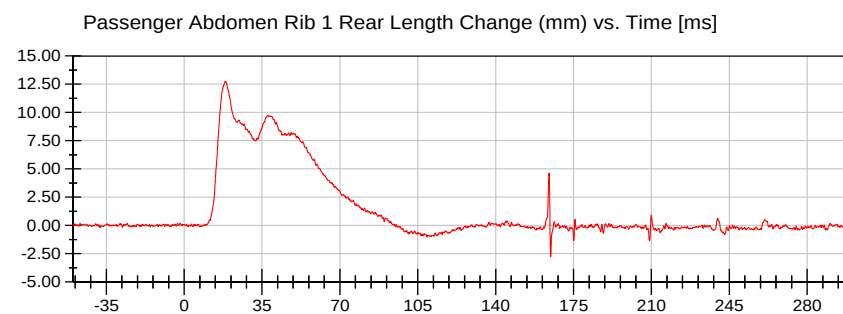
<Max>

3.04 mm at 28.30 ms

<Min>

-16.65 mm at 57.50 ms

Unfiltered



<Max>

12.74 mm at 18.50 ms

<Min>

-2.79 mm at 164.70 ms

CFC_600

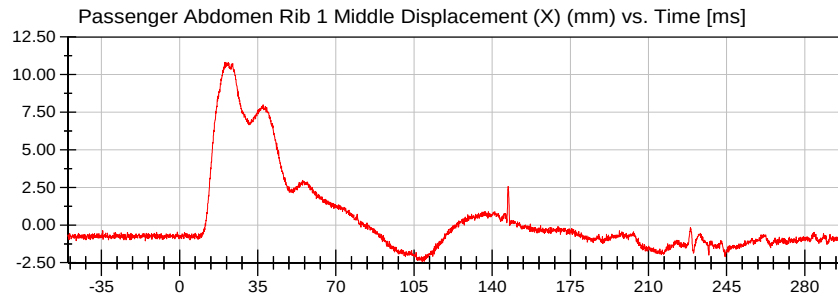


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



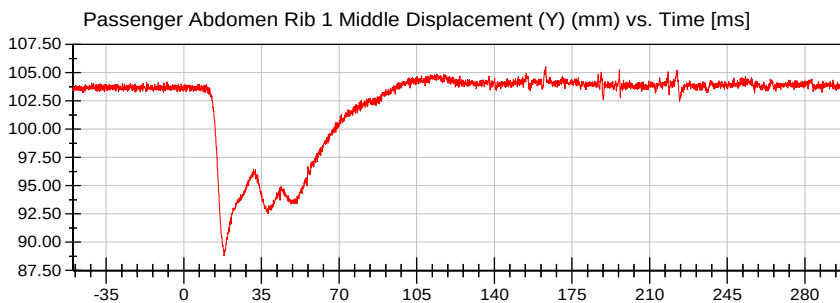
<Max>

10.81 mm at 20.30 ms

<Min>

-2.44 mm at 108.70 ms

Unfiltered



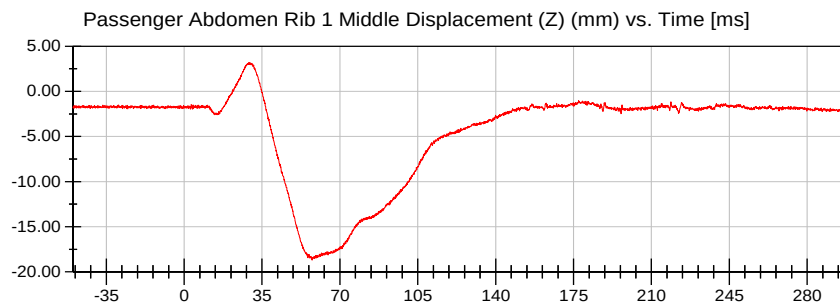
<Max>

105.53 mm at 163.15 ms

<Min>

88.80 mm at 18.15 ms

Unfiltered



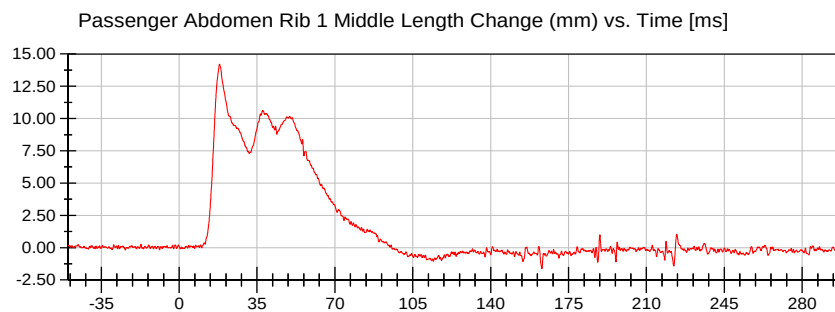
<Max>

3.19 mm at 29.50 ms

<Min>

-18.69 mm at 57.45 ms

Unfiltered



<Max>

14.20 mm at 18.15 ms

<Min>

-1.62 mm at 163.05 ms

CFC_600

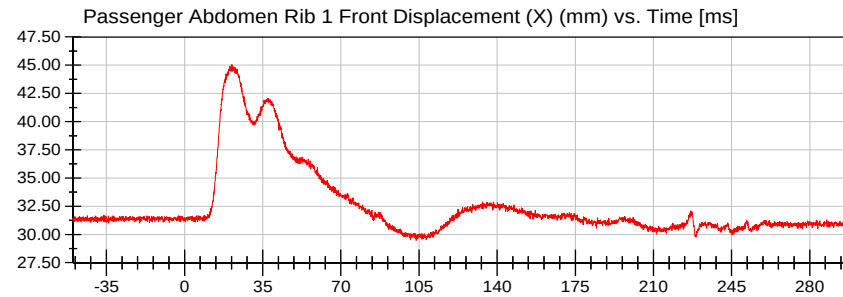


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



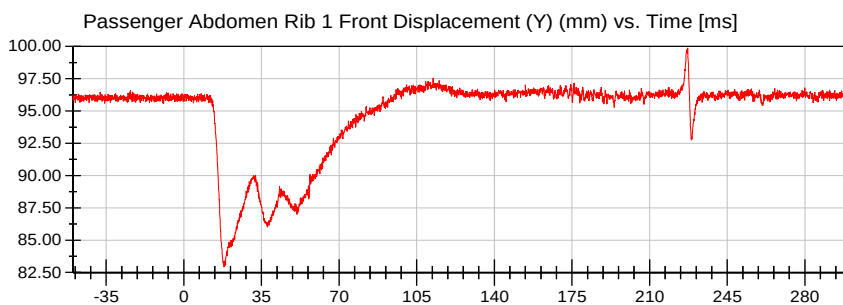
<Max>

45.06 mm at 21.15 ms

<Min>

29.46 mm at 103.75 ms

Unfiltered



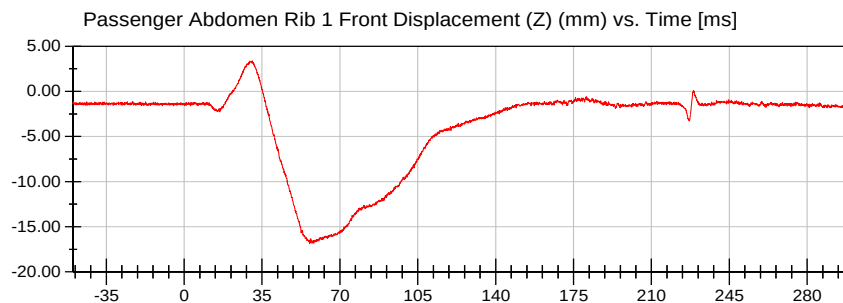
<Max>

99.88 mm at 227.15 ms

<Min>

82.93 mm at 18.15 ms

Unfiltered



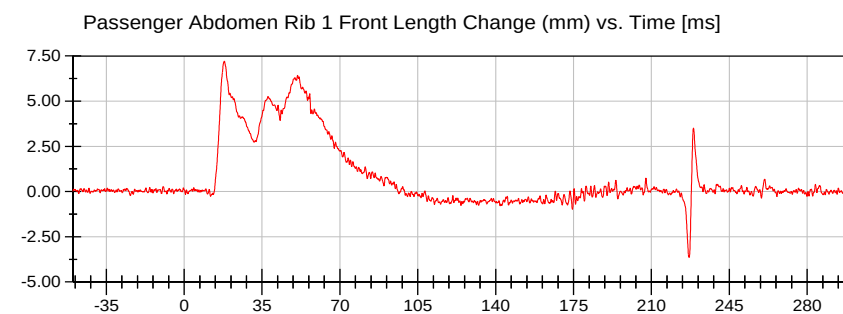
<Max>

3.37 mm at 30.60 ms

<Min>

-16.86 mm at 56.40 ms

Unfiltered



<Max>

7.20 mm at 18.05 ms

<Min>

-3.64 mm at 226.95 ms

CFC_600

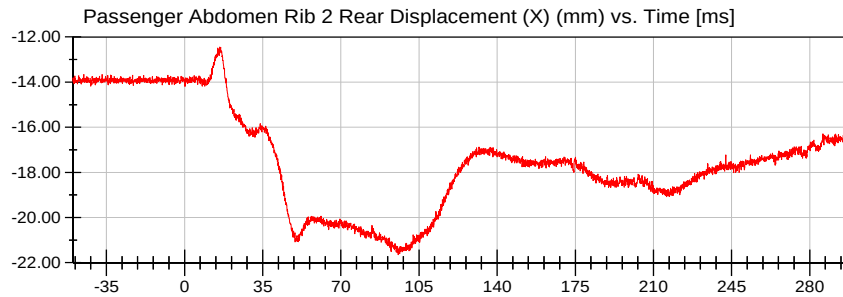


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



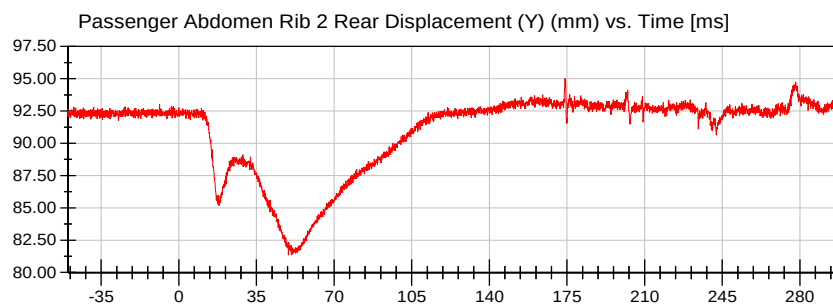
<Max>

-12.44 mm at 15.70 ms

<Min>

-21.64 mm at 95.70 ms

Unfiltered



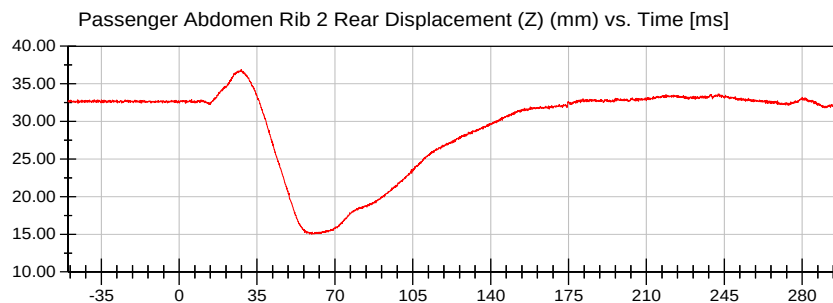
<Max>

95.01 mm at 174.10 ms

<Min>

81.36 mm at 49.40 ms

Unfiltered



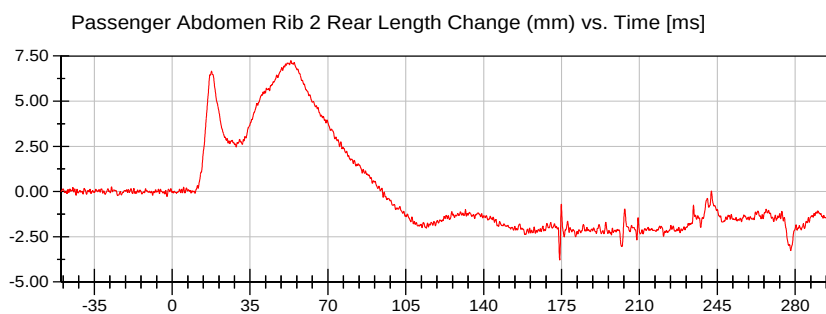
<Max>

36.90 mm at 27.95 ms

<Min>

14.99 mm at 59.60 ms

Unfiltered



<Max>

7.24 mm at 53.35 ms

<Min>

-3.79 mm at 174.15 ms

CFC_600

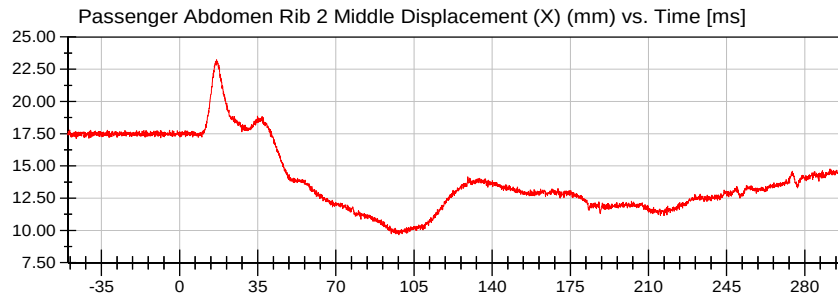


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



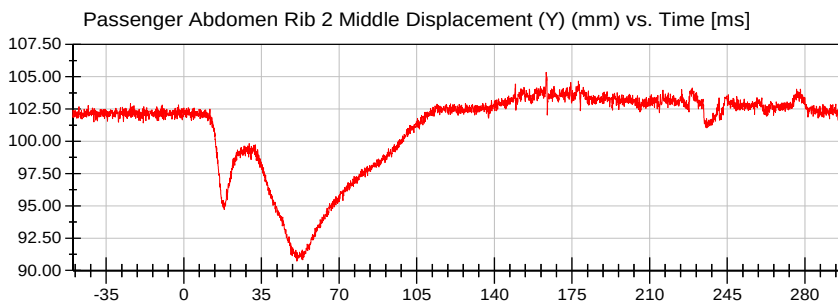
<Max>

23.23 mm at 16.60 ms

<Min>

9.66 mm at 98.20 ms

Unfiltered



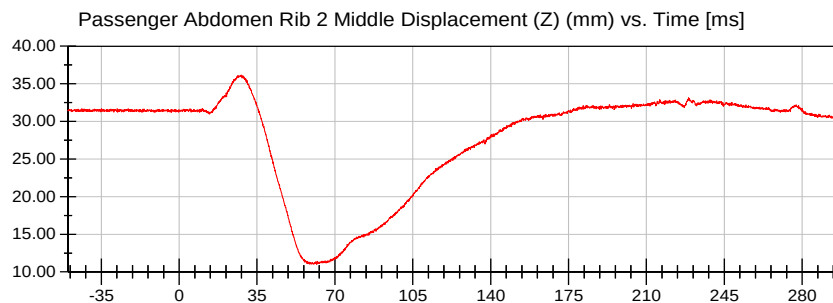
<Max>

105.34 mm at 163.40 ms

<Min>

90.71 mm at 51.00 ms

Unfiltered



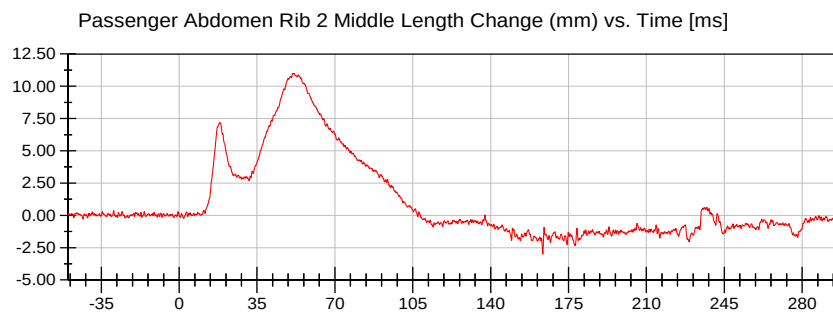
<Max>

36.17 mm at 27.95 ms

<Min>

10.98 mm at 61.80 ms

Unfiltered



<Max>

11.00 mm at 51.65 ms

<Min>

-3.01 mm at 163.40 ms

CFC_600

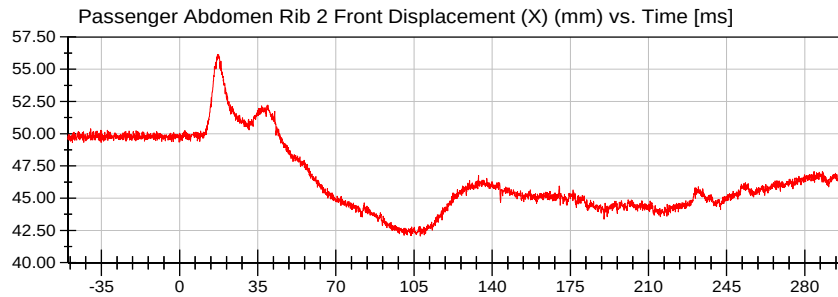


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



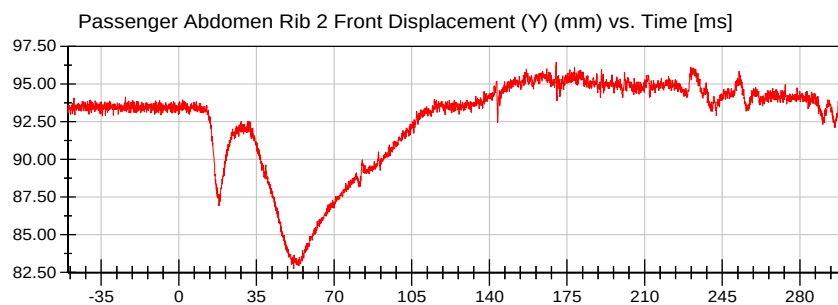
<Max>

56.15 mm at 17.00 ms

<Min>

42.06 mm at 107.80 ms

Unfiltered



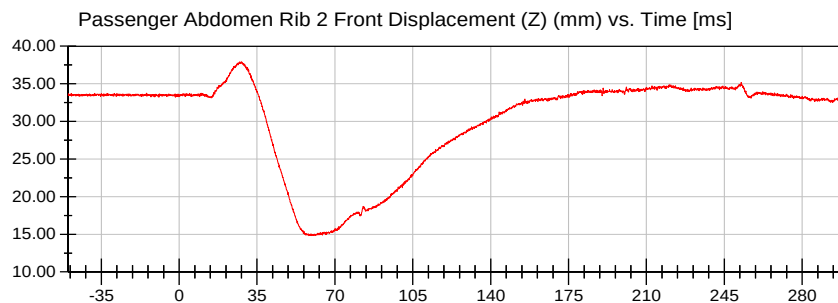
<Max>

96.45 mm at 170.10 ms

<Min>

82.74 mm at 51.80 ms

Unfiltered



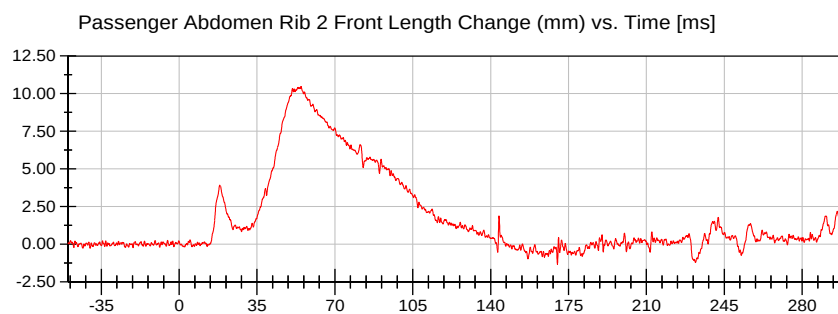
<Max>

37.91 mm at 27.90 ms

<Min>

14.80 mm at 58.30 ms

Unfiltered



<Max>

10.46 mm at 54.80 ms

<Min>

-1.32 mm at 170.00 ms

CFC_600

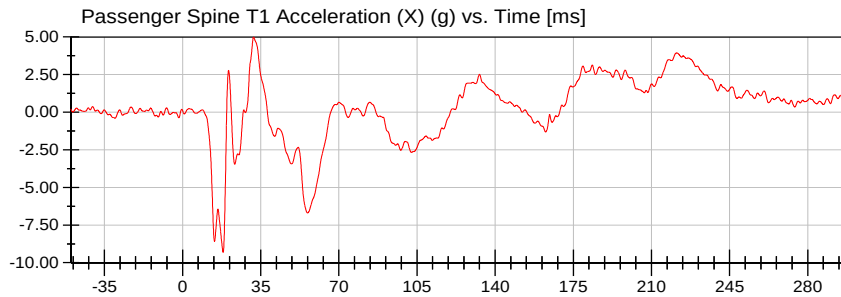


VRTC

Test Date: 04/29/2021

Test Lab: CTF

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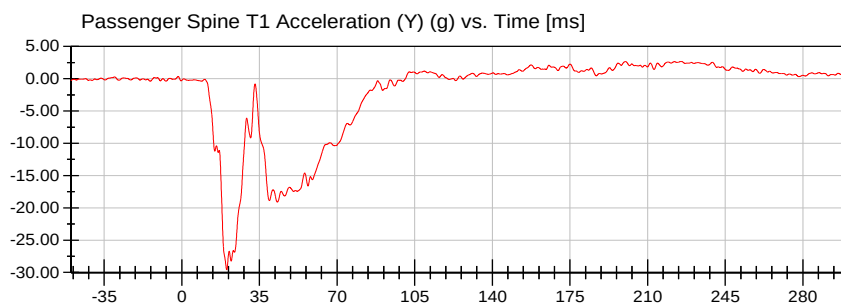
<Max>

4.98 g at 31.80 ms

<Min>

-9.32 g at 18.15 ms

CFC_180



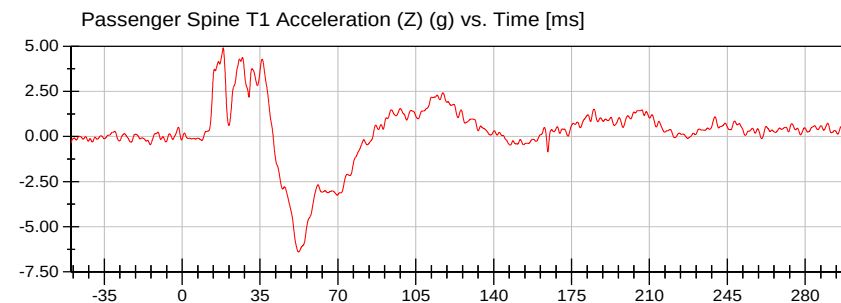
<Max>

2.67 g at 225.05 ms

<Min>

-29.58 g at 20.25 ms

CFC_180



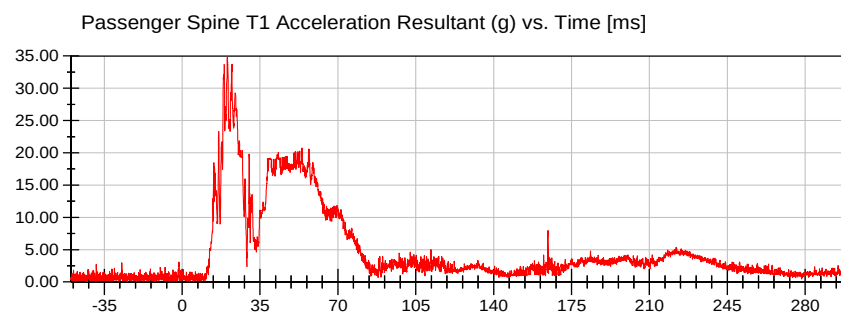
<Max>

4.91 g at 18.45 ms

<Min>

-6.40 g at 52.30 ms

CFC_180



<Max>

34.86 g at 20.30 ms

<Min>

0.08 g at -43.10 ms

Prefiltered_> CFC 1000

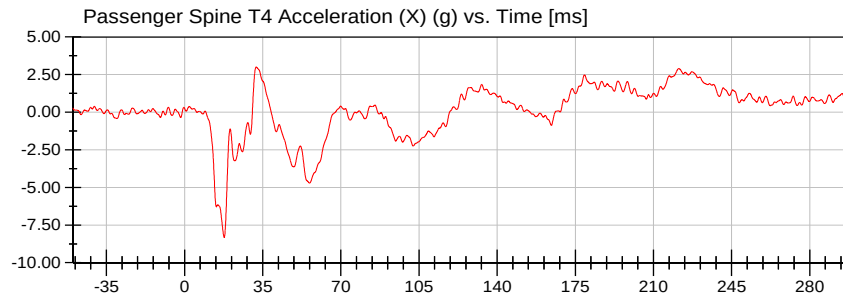


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



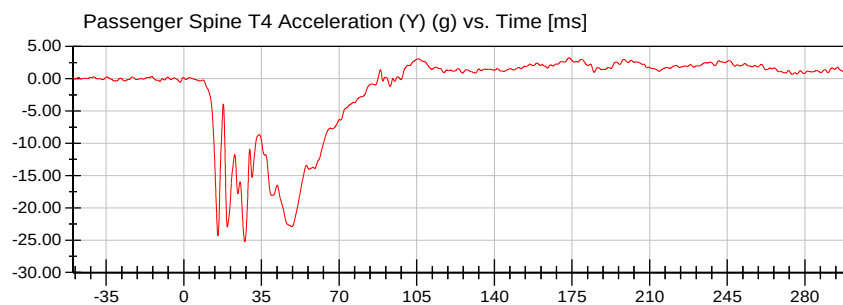
<Max>

3.01 g at 32.10 ms

<Min>

-8.33 g at 17.75 ms

CFC_180



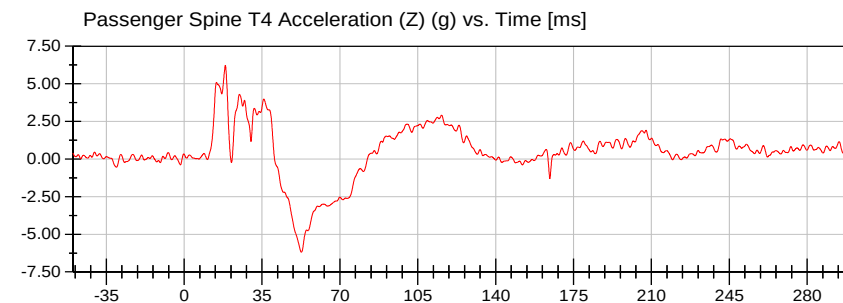
<Max>

3.24 g at 173.70 ms

<Min>

-25.23 g at 27.55 ms

CFC_180



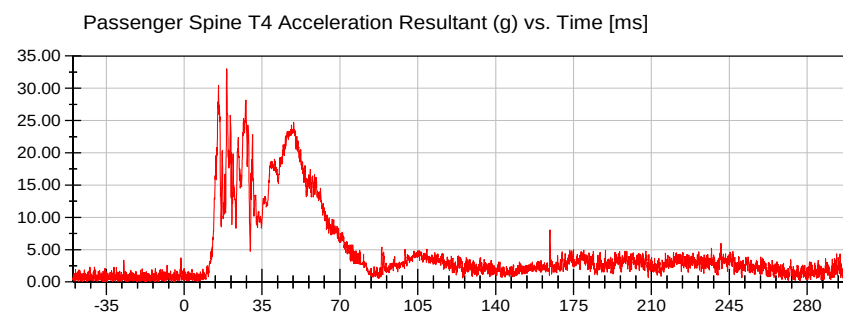
<Max>

6.23 g at 18.50 ms

<Min>

-6.19 g at 52.65 ms

CFC_180



<Max>

33.00 g at 19.15 ms

<Min>

0.05 g at -25.25 ms

Prefiltered_> CFC 1000



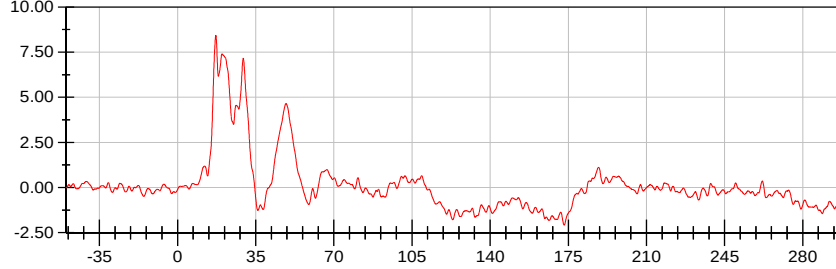
VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021

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



<Max>

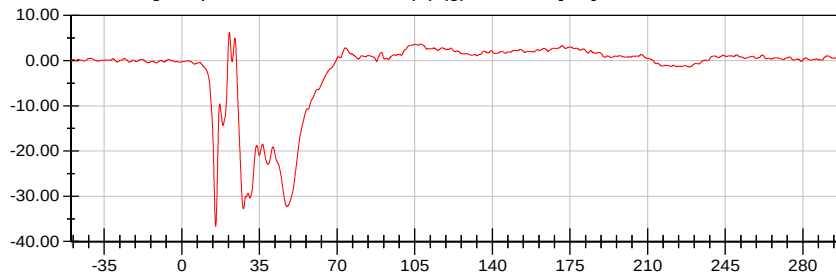
8.42 g at 17.15 ms

<Min>

-2.08 g at 173.15 ms

CFC_180

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



<Max>

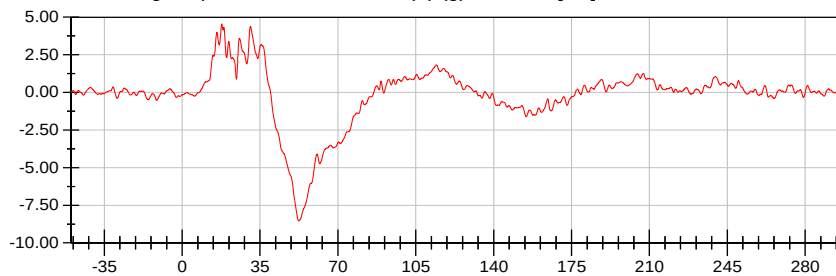
6.25 g at 21.45 ms

<Min>

-36.65 g at 15.25 ms

CFC_180

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



<Max>

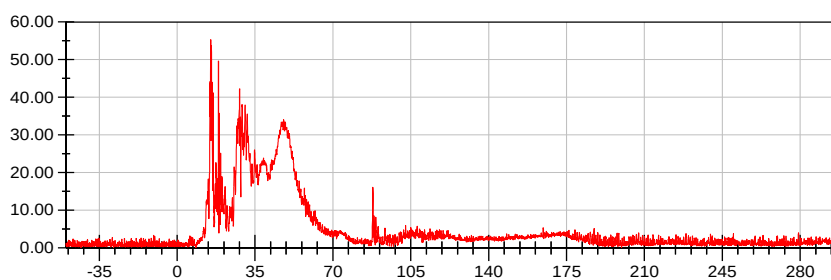
4.55 g at 17.80 ms

<Min>

-8.53 g at 52.40 ms

CFC_180

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



<Max>

55.29 g at 15.05 ms

<Min>

0.08 g at 8.40 ms

Prefiltered_> CFC 1000

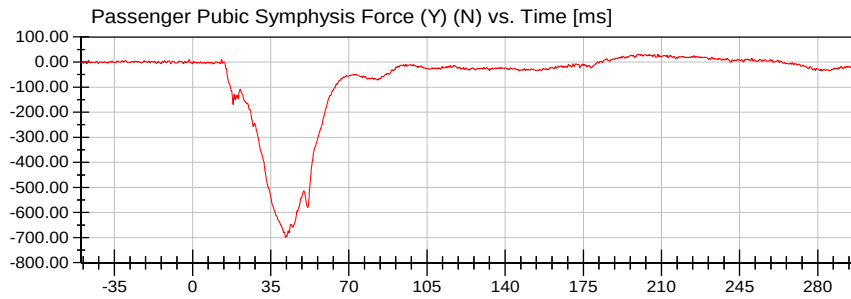


VRTC

Test Lab: CTF

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<Max>

31.10 N at 199.45 ms

<Min>

-700.49 N at 41.70 ms

CFC_600

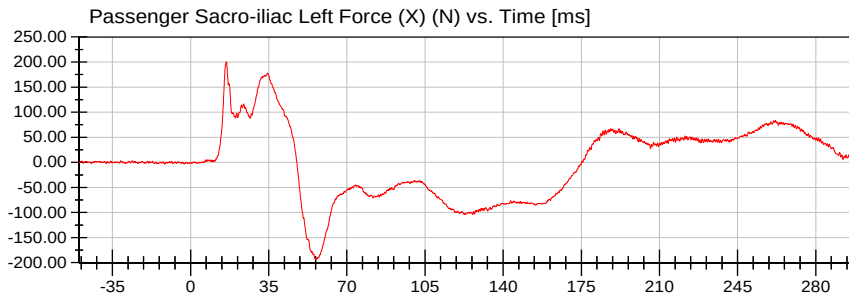


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



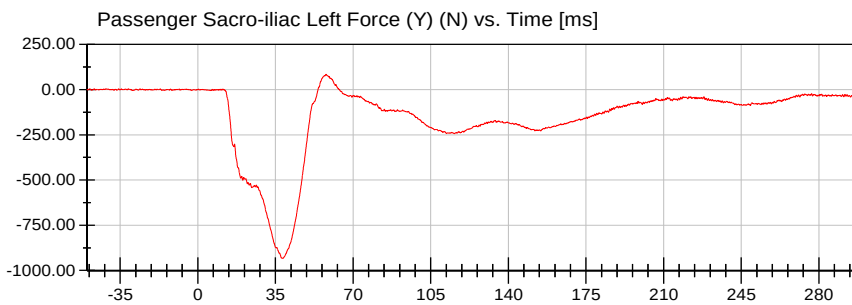
<Max>

200.47 N at 16.00 ms

<Min>

-193.87 N at 56.25 ms

CFC_600



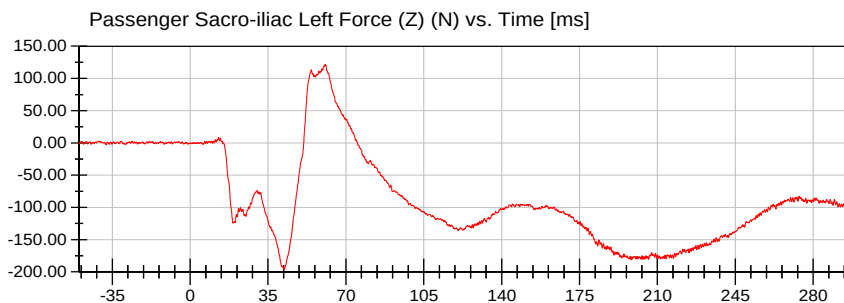
<Max>

85.00 N at 57.80 ms

<Min>

-933.60 N at 38.25 ms

CFC_600



<Max>

121.66 N at 60.65 ms

<Min>

-195.88 N at 42.20 ms

CFC_600

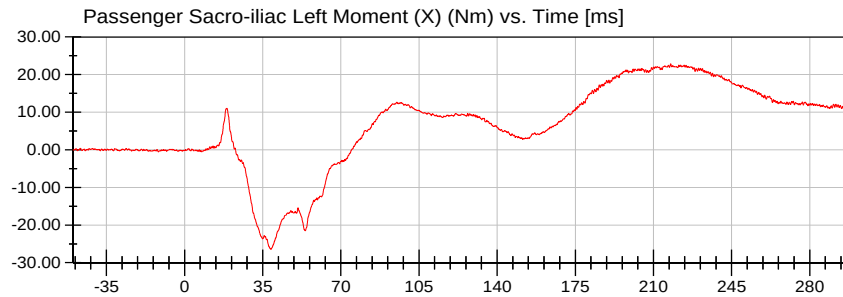


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



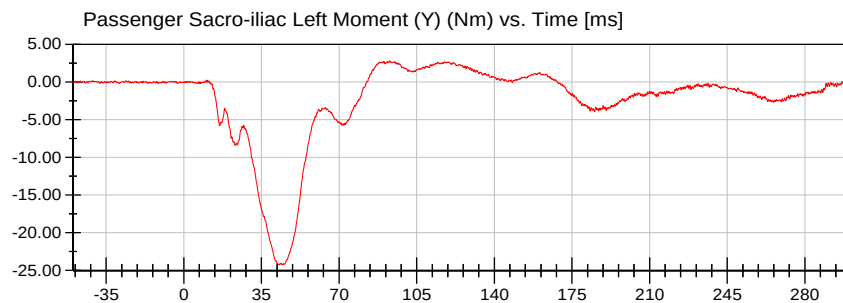
<Max>

22.85 Nm at 217.70 ms

<Min>

-26.45 Nm at 38.70 ms

CFC_600



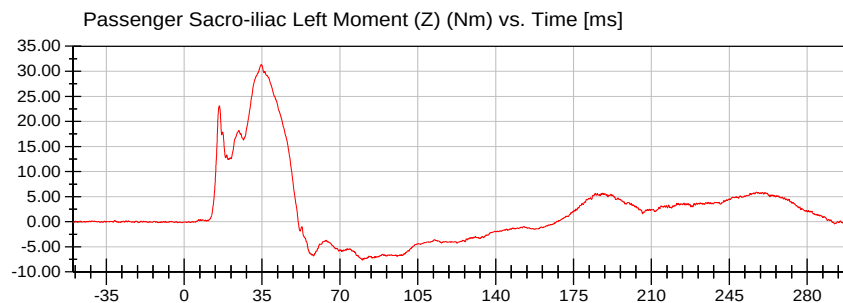
<Max>

2.83 Nm at 92.85 ms

<Min>

-24.24 Nm at 44.45 ms

CFC_600



<Max>

31.32 Nm at 34.65 ms

<Min>

-7.63 Nm at 80.05 ms

CFC_600

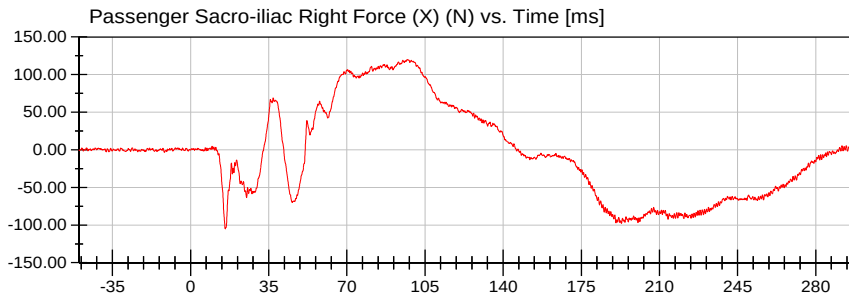


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



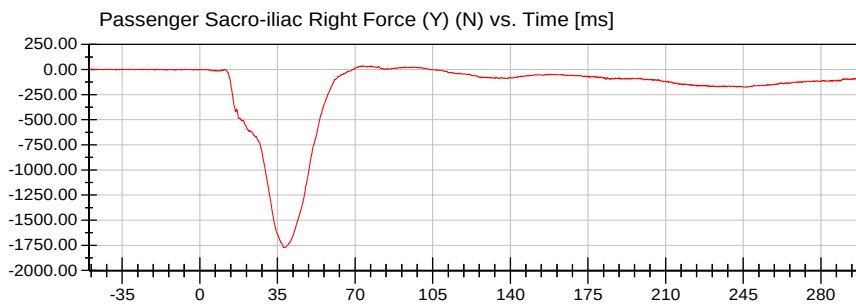
<Max>

119.88 N at 96.95 ms

<Min>

-105.33 N at 15.55 ms

CFC_600



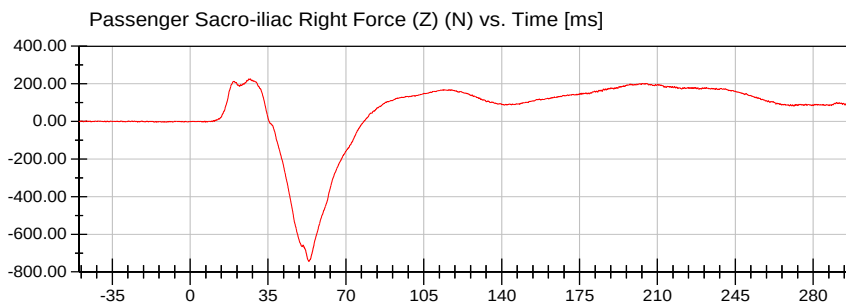
<Max>

36.66 N at 73.25 ms

<Min>

-1,774.00 N at 38.35 ms

CFC_600



<Max>

226.21 N at 27.05 ms

<Min>

-743.34 N at 53.40 ms

CFC_600

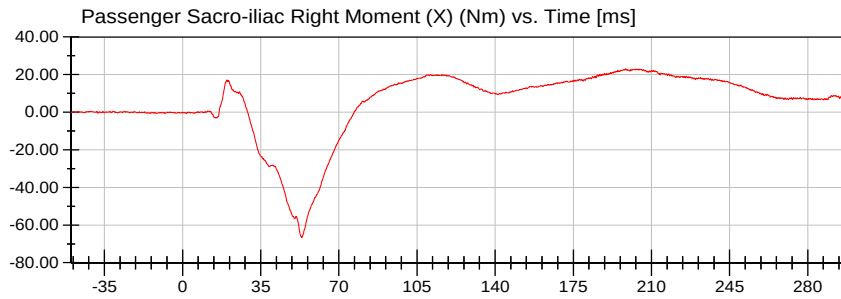


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



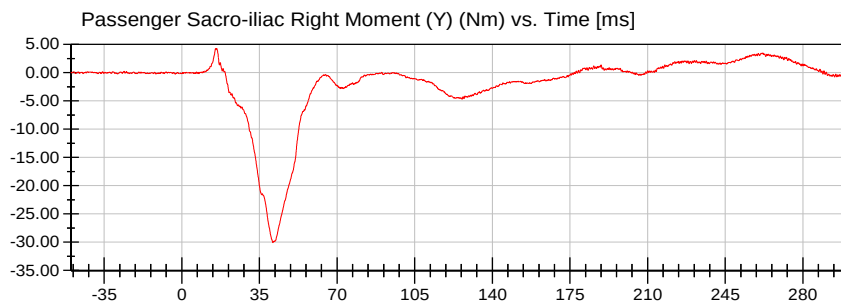
<Max>

23.05 Nm at 198.45 ms

<Min>

-66.67 Nm at 53.40 ms

CFC_600



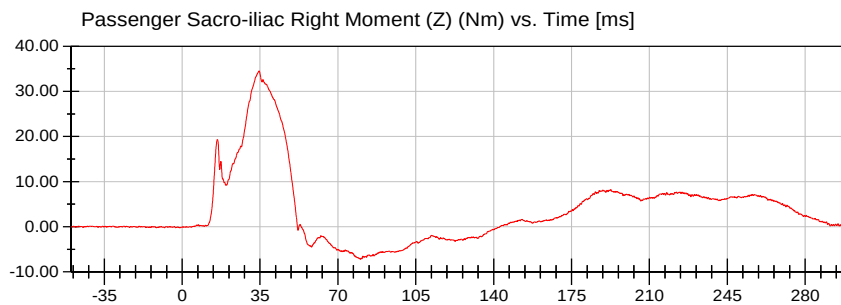
<Max>

4.25 Nm at 15.75 ms

<Min>

-30.08 Nm at 41.10 ms

CFC_600



<Max>

34.52 Nm at 34.55 ms

<Min>

-7.18 Nm at 80.05 ms

CFC_600

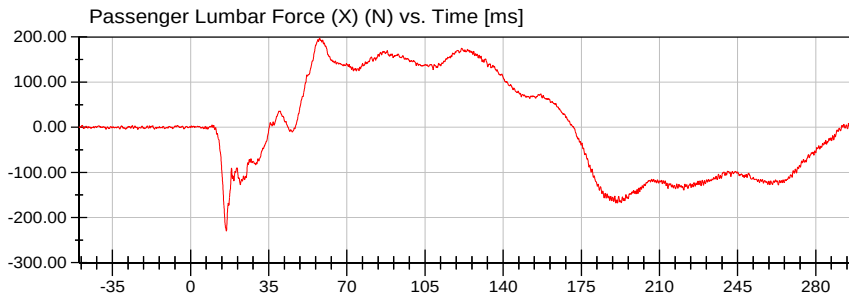


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



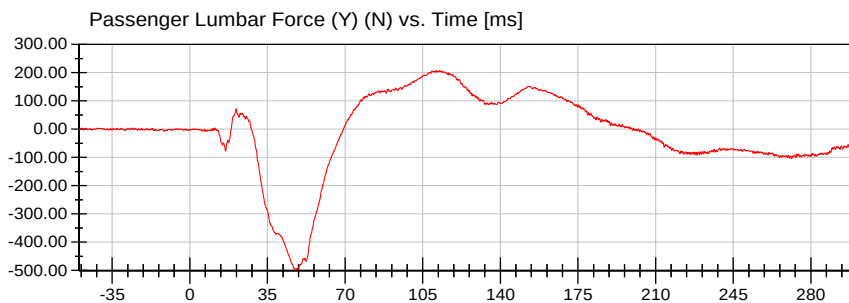
<Max>

197.60 N at 57.80 ms

<Min>

-230.04 N at 16.05 ms

CFC_600



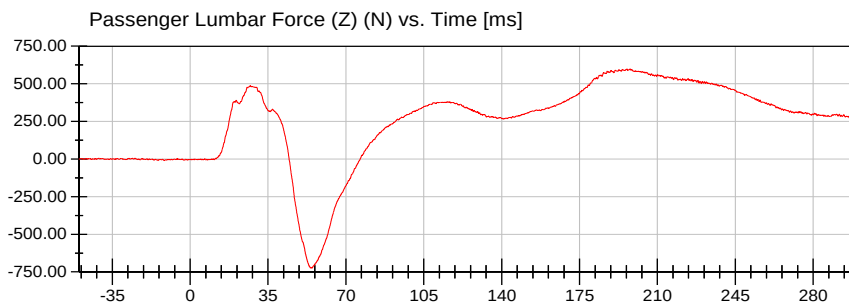
<Max>

208.59 N at 111.10 ms

<Min>

-498.21 N at 47.90 ms

CFC_600



<Max>

598.90 N at 197.70 ms

<Min>

-724.15 N at 54.80 ms

CFC_600

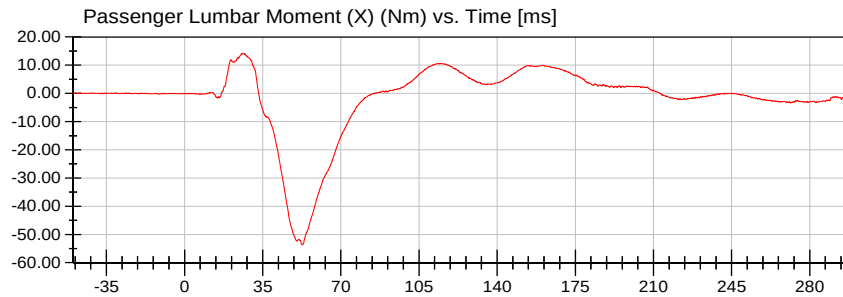


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



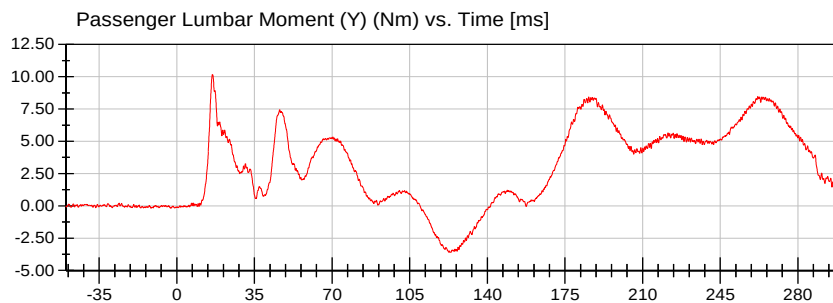
<Max>

14.13 Nm at 26.15 ms

<Min>

-53.66 Nm at 52.70 ms

CFC_600



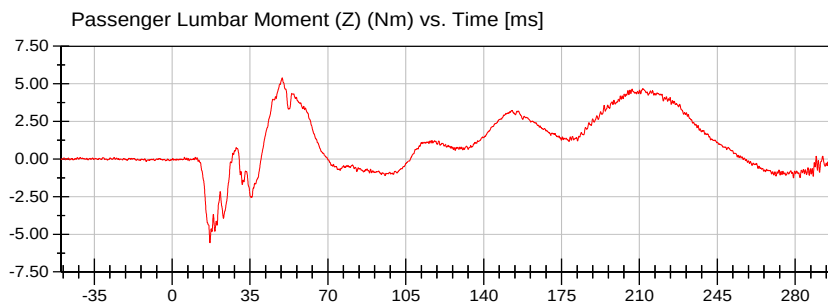
<Max>

10.17 Nm at 16.05 ms

<Min>

-3.60 Nm at 123.60 ms

CFC_600



<Max>

5.40 Nm at 49.45 ms

<Min>

-5.56 Nm at 17.00 ms

CFC_600

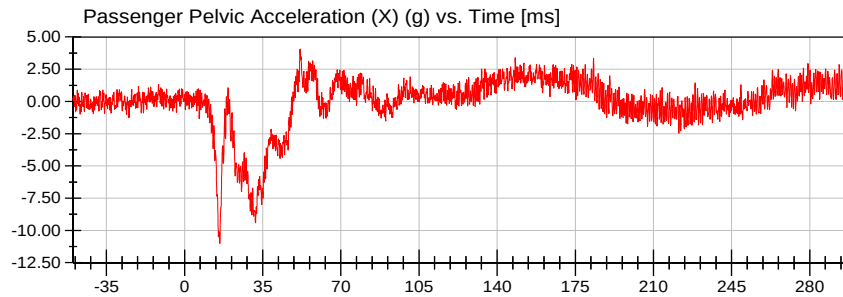


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



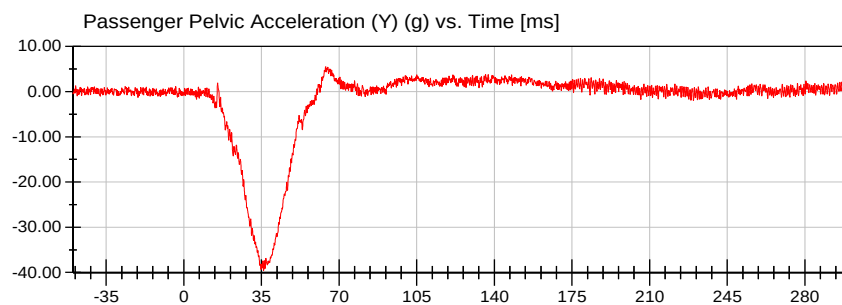
<Max>

4.07 g at 51.70 ms

<Min>

-11.01 g at 15.80 ms

CFC_1000



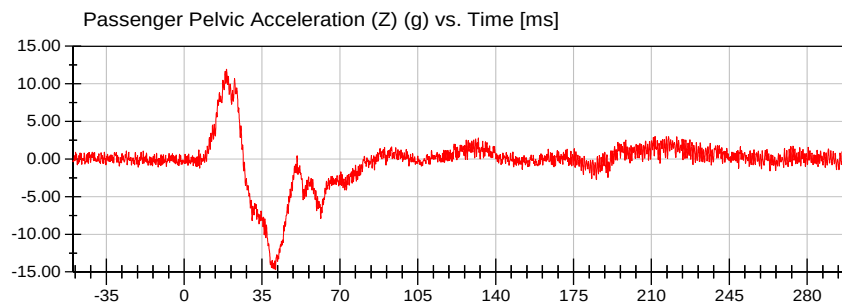
<Max>

5.54 g at 63.95 ms

<Min>

-39.56 g at 36.00 ms

CFC_1000



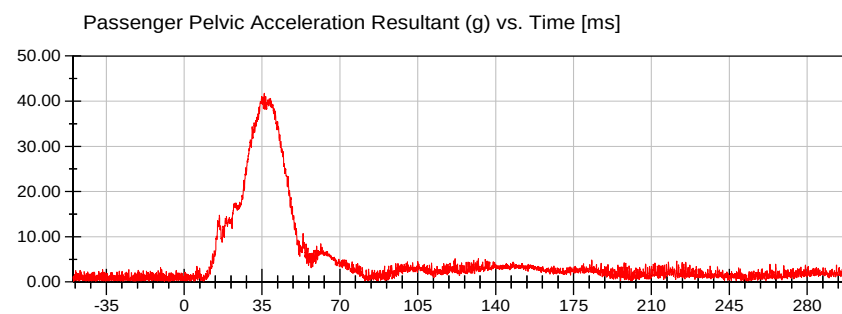
<Max>

11.93 g at 19.05 ms

<Min>

-14.72 g at 41.00 ms

CFC_1000



<Max>

41.73 g at 36.00 ms

<Min>

0.20 g at -28.60 ms

Prefiltered_> CFC 1000

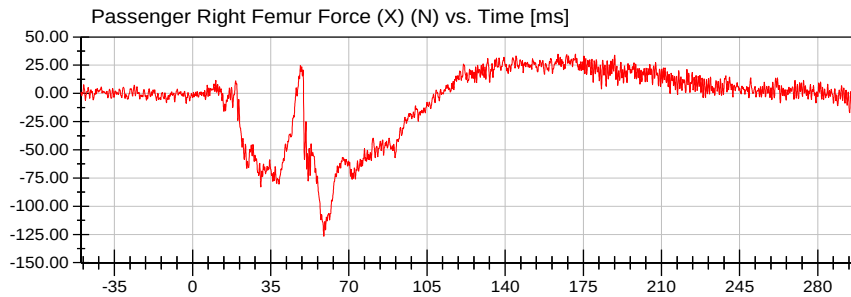


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



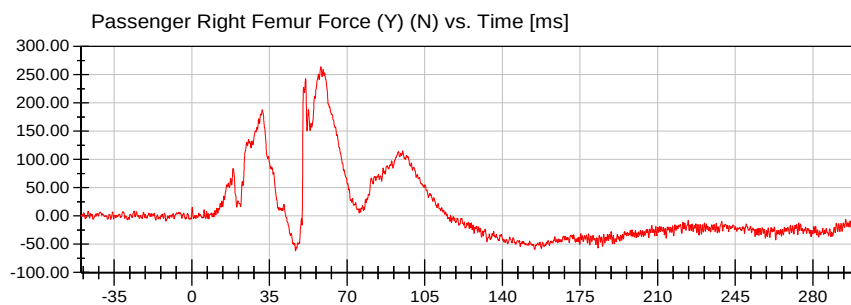
<Max>

34.88 N at 163.65 ms

<Min>

-126.40 N at 58.80 ms

CFC_600



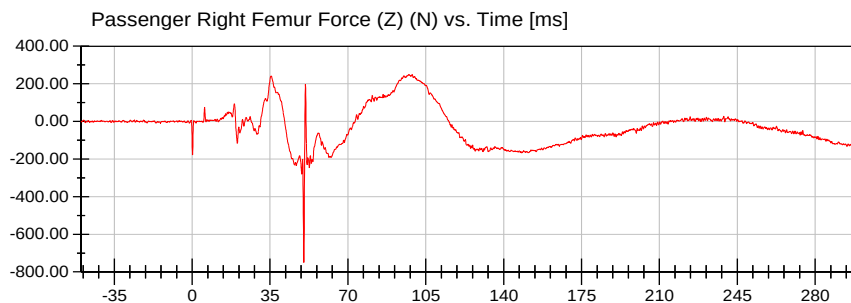
<Max>

264.16 N at 58.20 ms

<Min>

-61.87 N at 46.75 ms

CFC_600



<Max>

249.39 N at 98.85 ms

<Min>

-749.61 N at 50.20 ms

CFC_600

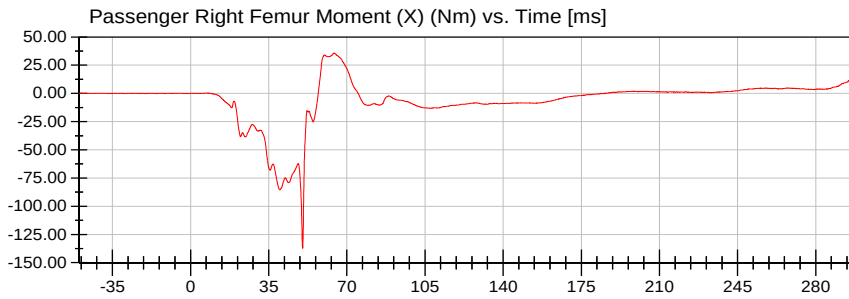


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



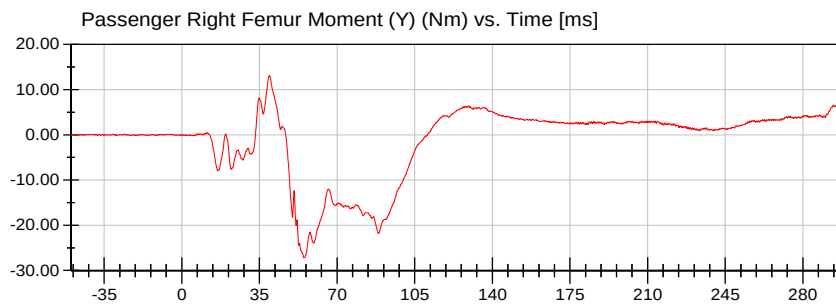
<Max>

35.63 Nm at 64.30 ms

<Min>

-137.35 Nm at 50.20 ms

CFC_600



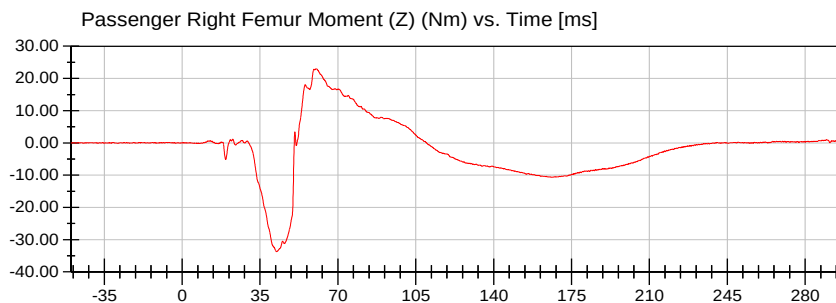
<Max>

13.08 Nm at 39.45 ms

<Min>

-27.20 Nm at 55.00 ms

CFC_600



<Max>

22.96 Nm at 60.00 ms

<Min>

-33.71 Nm at 42.45 ms

CFC_600

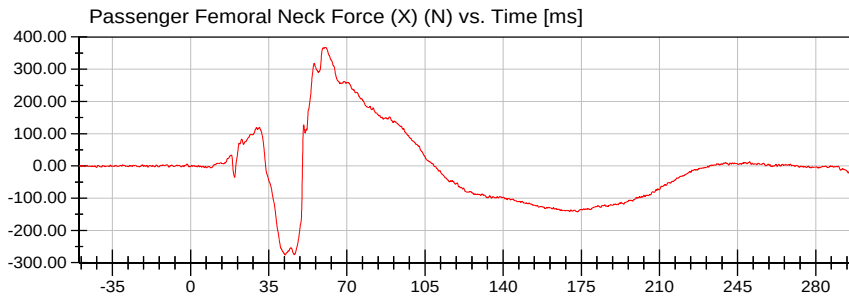


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



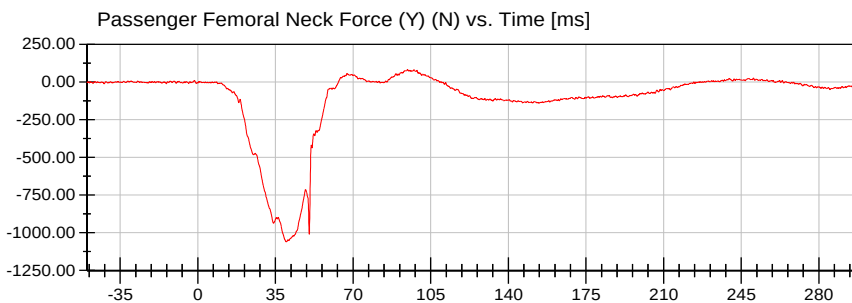
<Max>

367.14 N at 60.60 ms

<Min>

-275.96 N at 42.30 ms

CFC_600



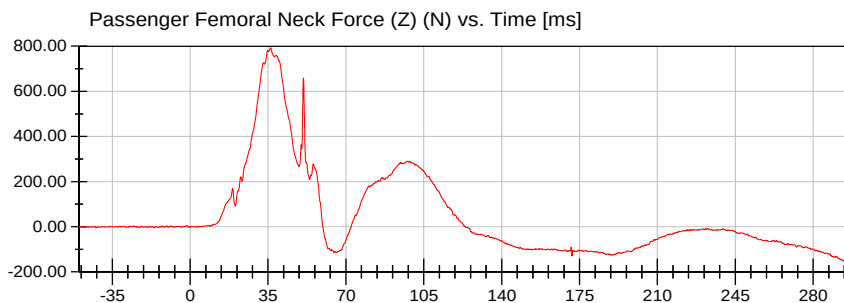
<Max>

82.82 N at 94.55 ms

<Min>

-1,059.97 N at 39.85 ms

CFC_600



<Max>

793.24 N at 36.20 ms

<Min>

-169.26 N at 298.05 ms

CFC_600

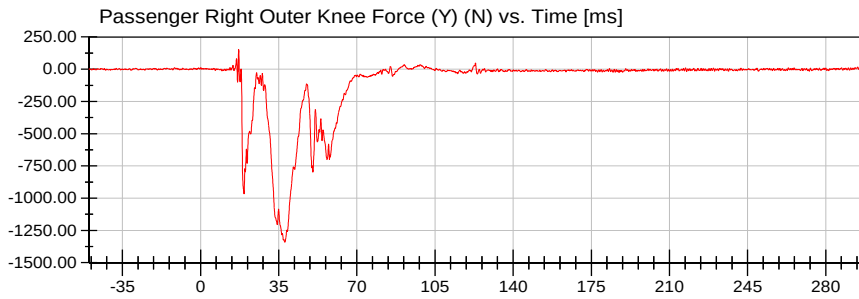


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



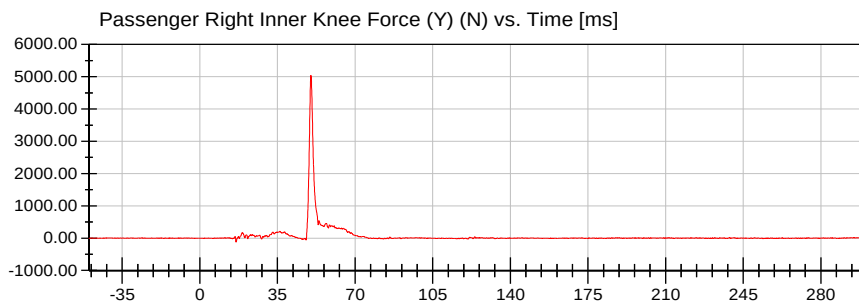
<Max>

152.79 N at 17.10 ms

<Min>

-1,341.65 N at 37.75 ms

CFC_600



<Max>

5,038.80 N at 50.10 ms

<Min>

-121.61 N at 16.35 ms

CFC_600

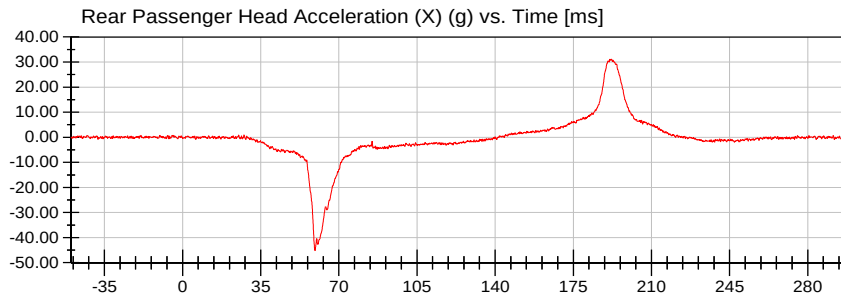


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



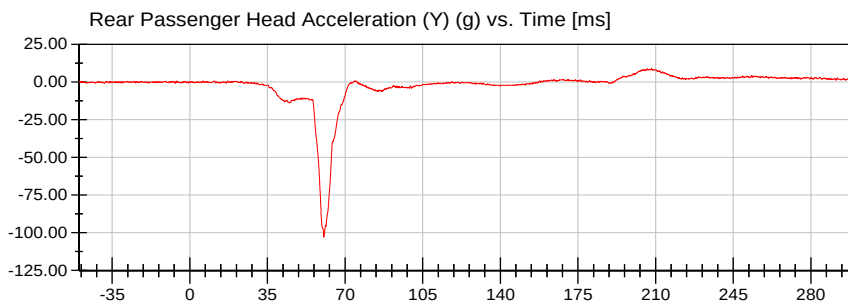
<Max>

31.15 g at 192.10 ms

<Min>

-45.20 g at 59.30 ms

CFC_1000



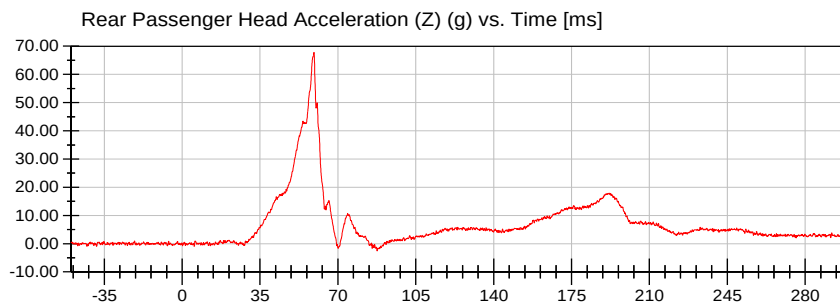
<Max>

9.03 g at 208.20 ms

<Min>

-102.91 g at 60.40 ms

CFC_1000



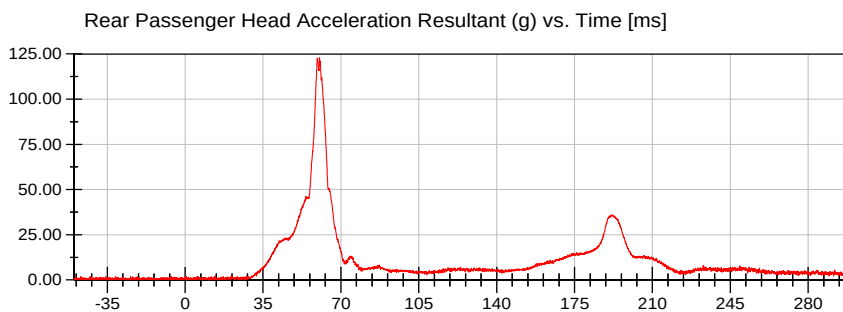
<Max>

67.83 g at 59.25 ms

<Min>

-2.55 g at 87.60 ms

CFC_1000



<Max>

122.91 g at 60.35 ms

<Min>

0.06 g at -28.20 ms

Prefiltered_> CFC 1000

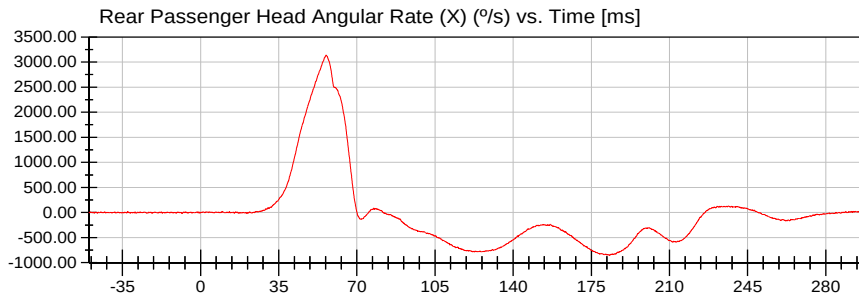


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



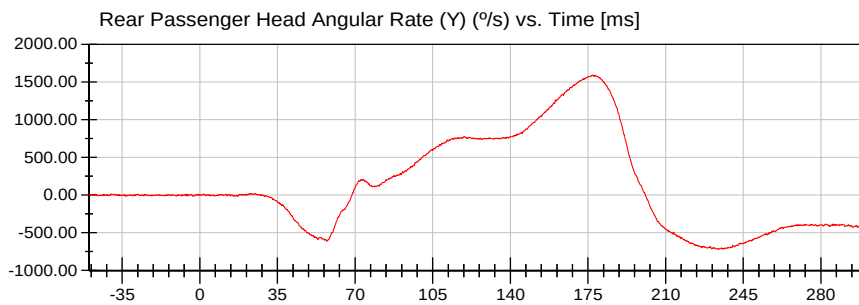
<Max>

3,139.43 °/s at 56.20 ms

<Min>

-848.26 °/s at 183.30 ms

CFC_1000



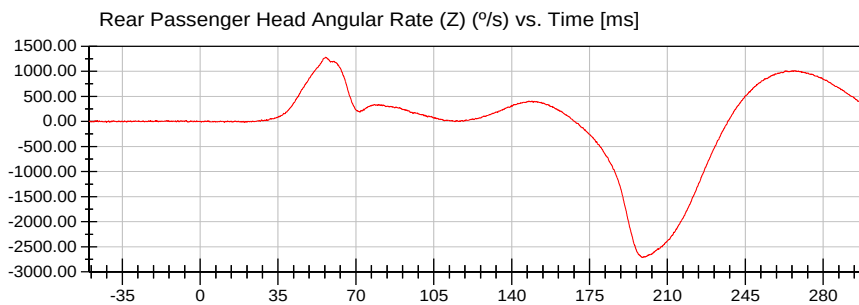
<Max>

1,591.81 °/s at 177.40 ms

<Min>

-722.52 °/s at 233.90 ms

CFC_1000



<Max>

1,281.62 °/s at 56.40 ms

<Min>

-2,711.16 °/s at 198.95 ms

CFC_1000

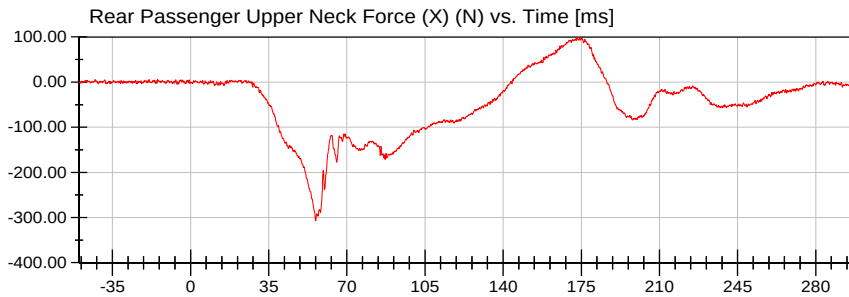


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



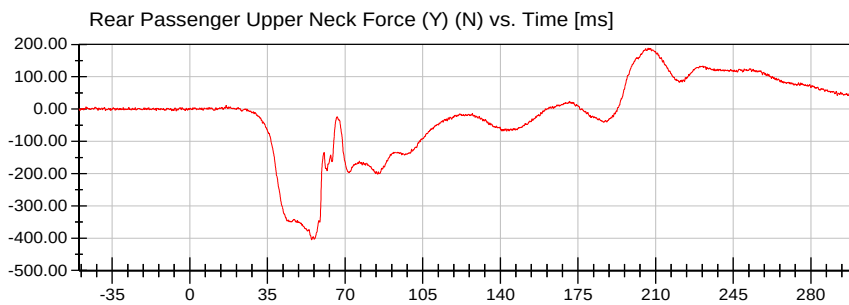
<Max>

99.04 N at 173.10 ms

<Min>

-307.51 N at 56.05 ms

CFC_1000



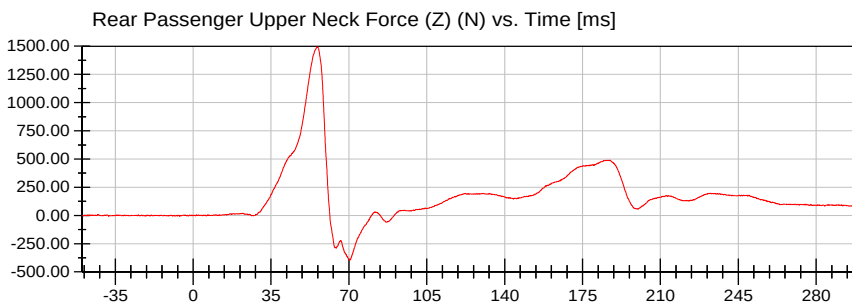
<Max>

188.39 N at 206.65 ms

<Min>

-405.16 N at 54.95 ms

CFC_1000



<Max>

1,493.58 N at 55.70 ms

<Min>

-395.30 N at 70.30 ms

CFC_1000

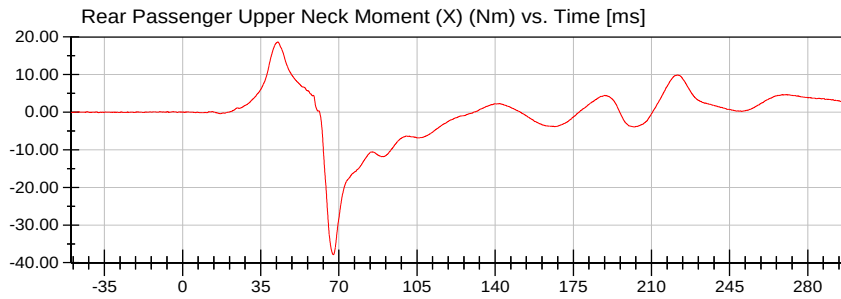


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



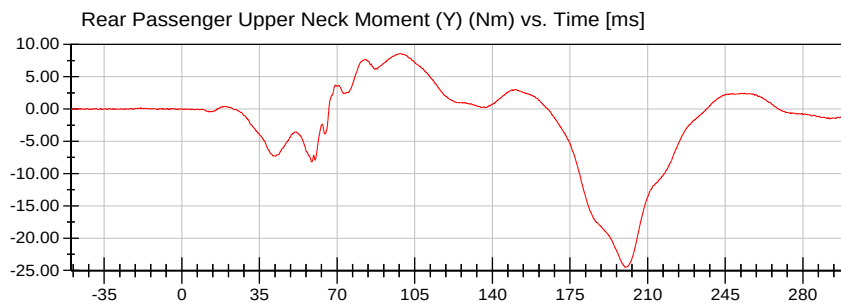
<Max>

18.66 Nm at 42.65 ms

<Min>

-37.86 Nm at 67.55 ms

CFC_600



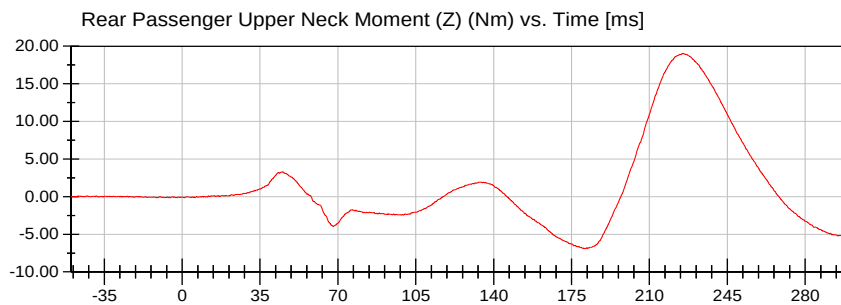
<Max>

8.57 Nm at 98.90 ms

<Min>

-24.51 Nm at 199.95 ms

CFC_600



<Max>

19.03 Nm at 224.95 ms

<Min>

-6.91 Nm at 181.20 ms

CFC_600

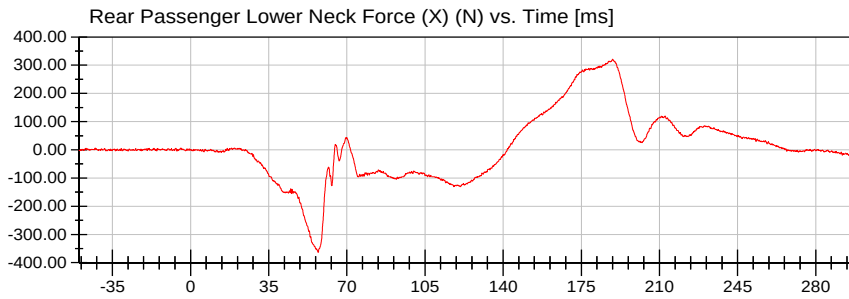


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



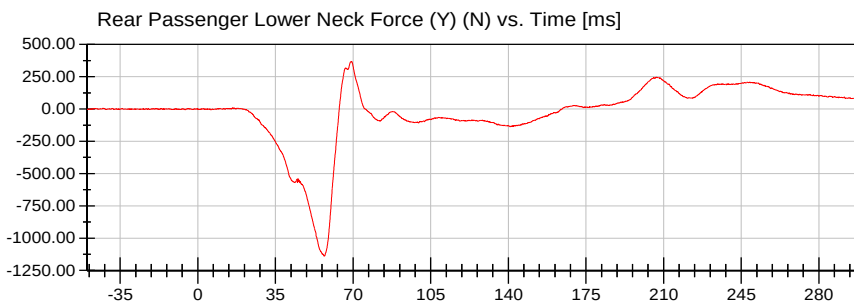
<Max>

321.05 N at 189.05 ms

<Min>

-363.86 N at 57.15 ms

CFC_1000



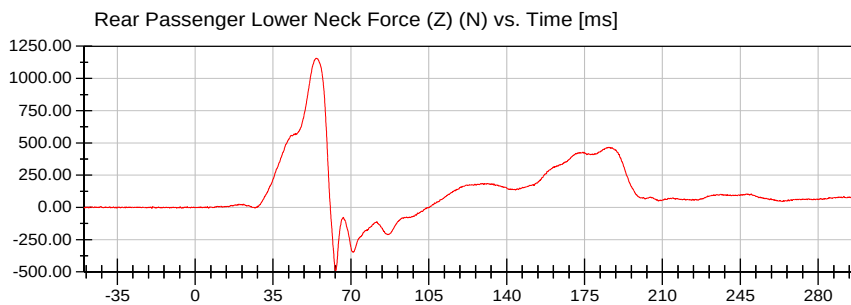
<Max>

368.22 N at 69.35 ms

<Min>

-1,139.30 N at 57.00 ms

CFC_1000



<Max>

1,157.22 N at 54.35 ms

<Min>

-490.02 N at 63.15 ms

CFC_1000

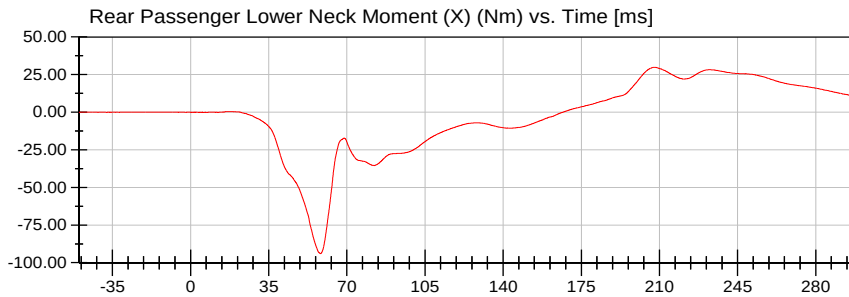


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



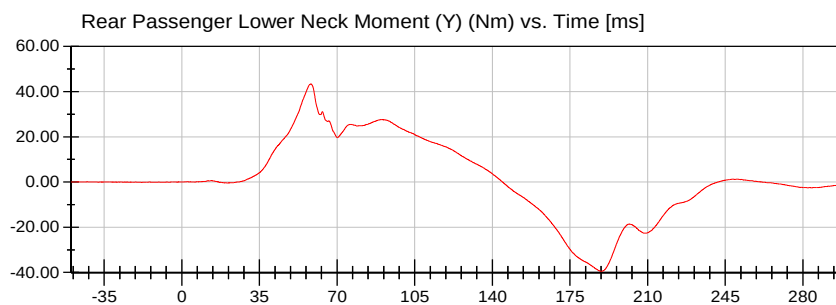
<Max>

29.85 Nm at 207.80 ms

<Min>

-93.95 Nm at 58.20 ms

CFC_600



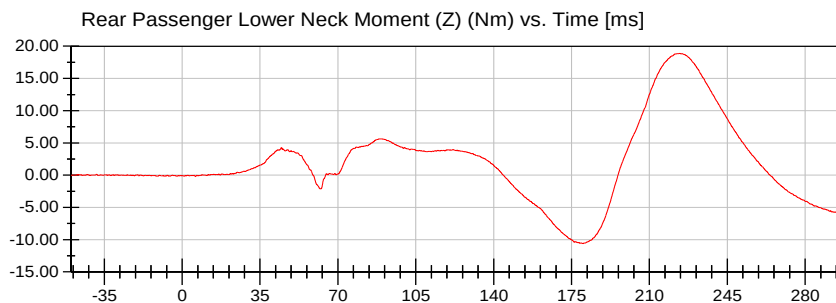
<Max>

43.40 Nm at 58.20 ms

<Min>

-39.46 Nm at 189.40 ms

CFC_600



<Max>

18.88 Nm at 223.50 ms

<Min>

-10.62 Nm at 180.15 ms

CFC_600

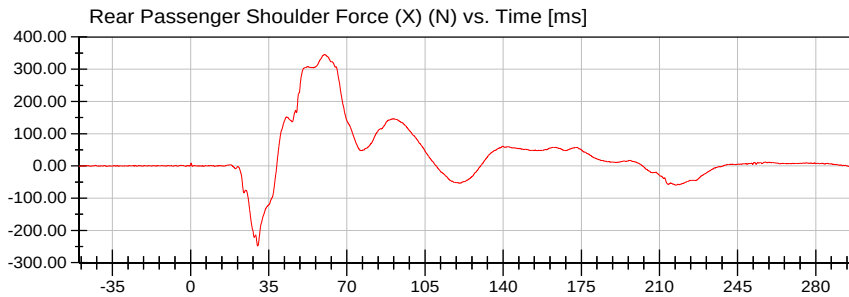


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



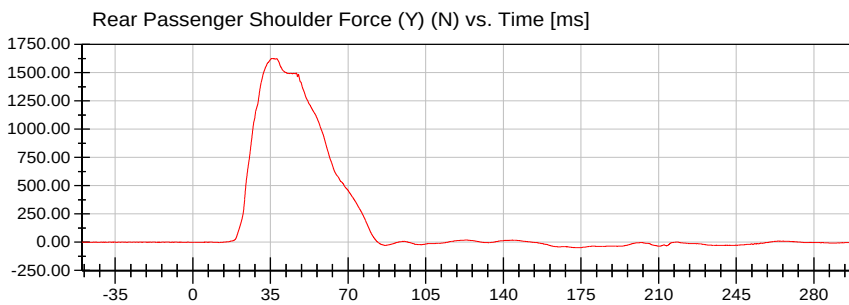
<Max>

345.37 N at 60.00 ms

<Min>

-248.30 N at 30.05 ms

CFC_600



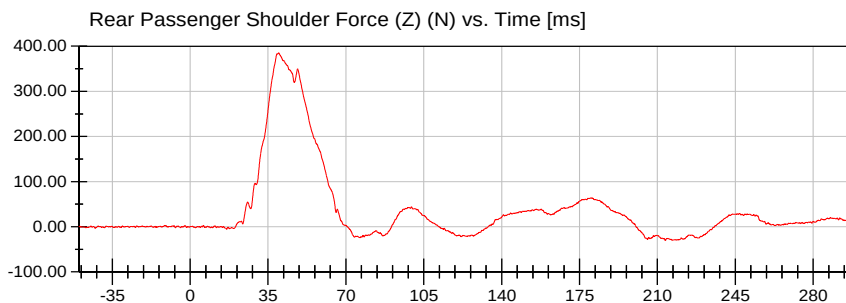
<Max>

1,625.25 N at 35.65 ms

<Min>

-49.13 N at 172.50 ms

CFC_600



<Max>

384.91 N at 39.75 ms

<Min>

-30.59 N at 213.55 ms

CFC_600

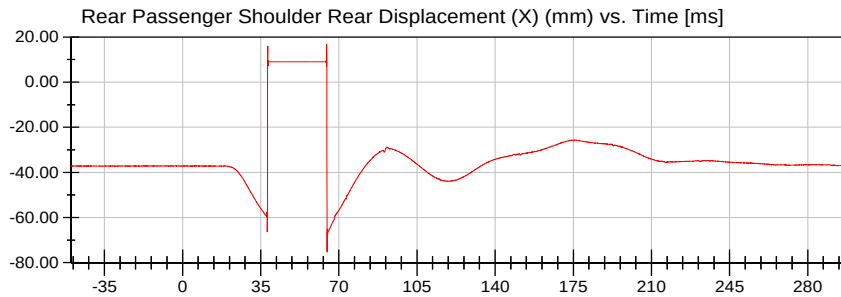


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



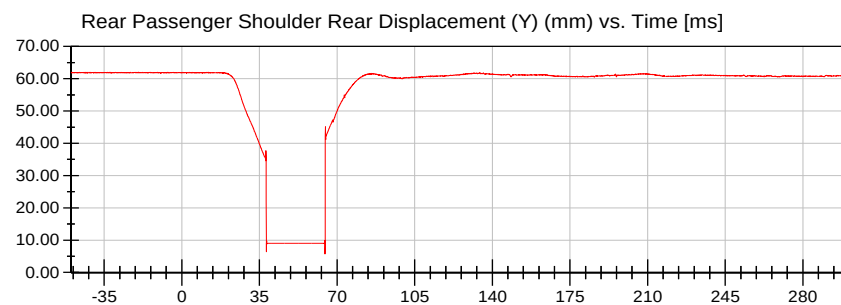
<Max>

16.70 mm at 64.55 ms

<Min>

-75.19 mm at 64.75 ms

Unfiltered



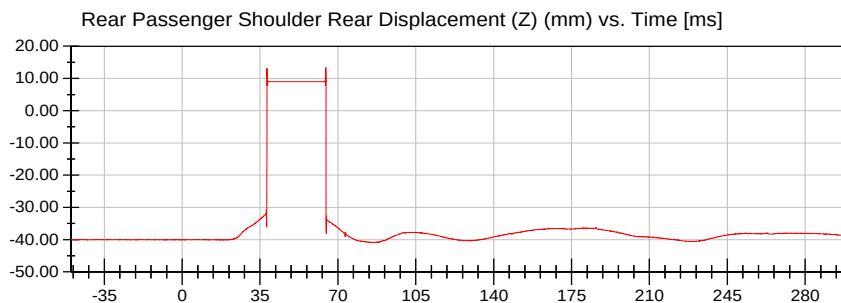
<Max>

62.03 mm at -32.00 ms

<Min>

5.71 mm at 64.55 ms

Unfiltered



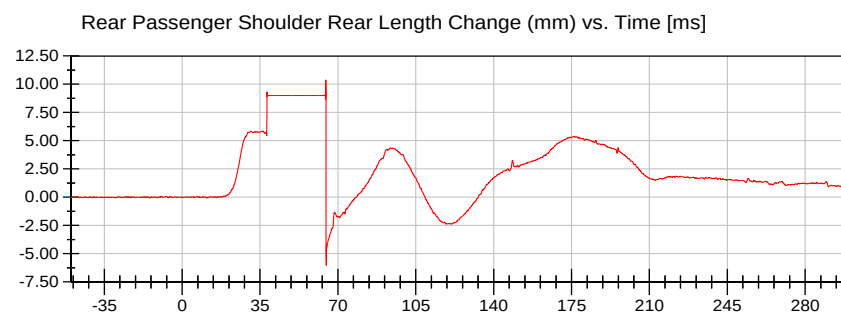
<Max>

13.30 mm at 64.55 ms

<Min>

-40.94 mm at 87.20 ms

Unfiltered



<Max>

10.38 mm at 64.55 ms

<Min>

-6.02 mm at 64.75 ms

CFC_600

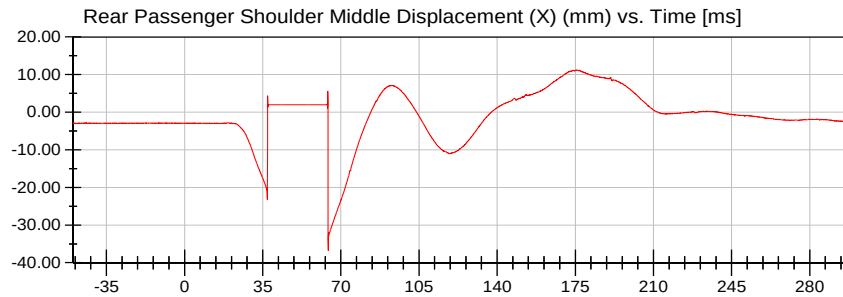


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



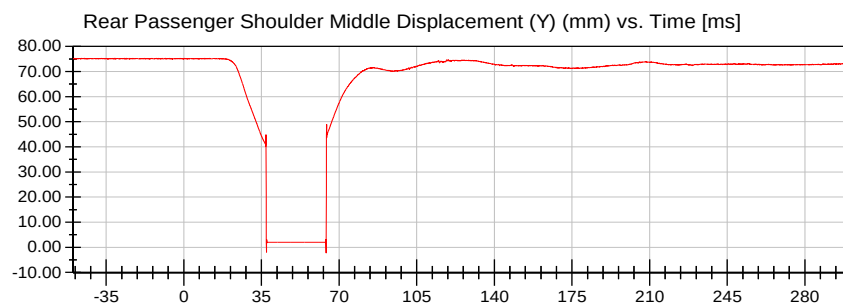
<Max>

11.21 mm at 175.50 ms

<Min>

-36.81 mm at 64.35 ms

Unfiltered



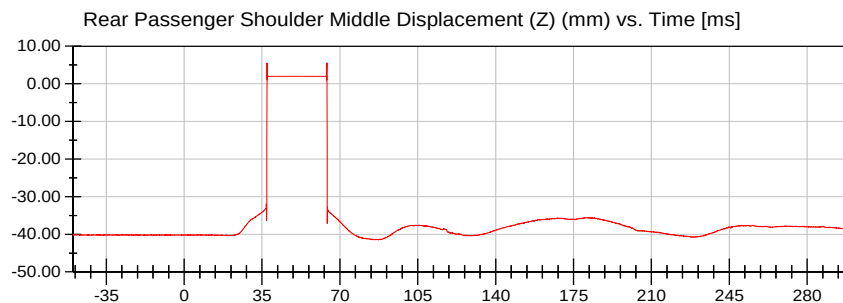
<Max>

75.31 mm at -26.60 ms

<Min>

-2.26 mm at 64.15 ms

Unfiltered



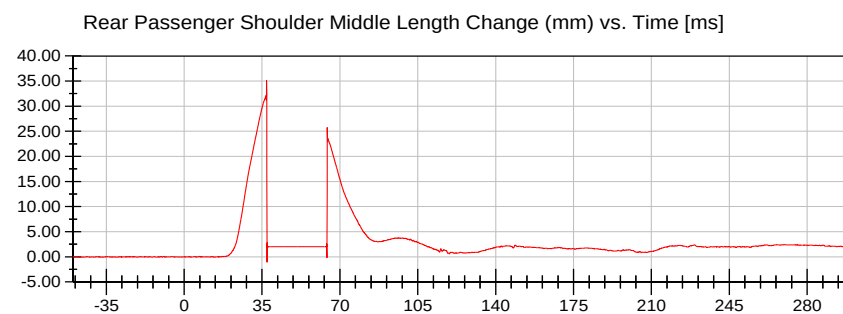
<Max>

5.57 mm at 64.15 ms

<Min>

-41.50 mm at 87.40 ms

Unfiltered



<Max>

35.12 mm at 37.05 ms

<Min>

-1.03 mm at 37.25 ms

CFC_600

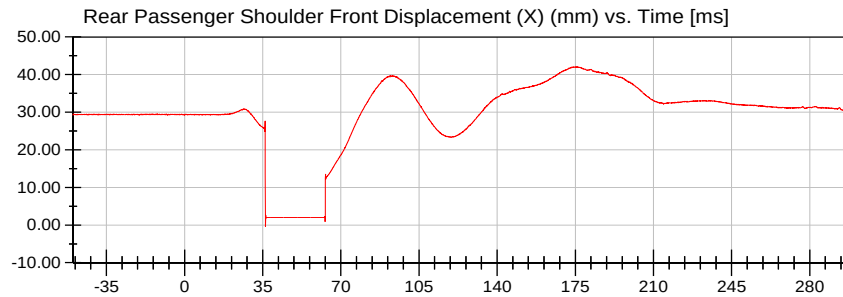


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



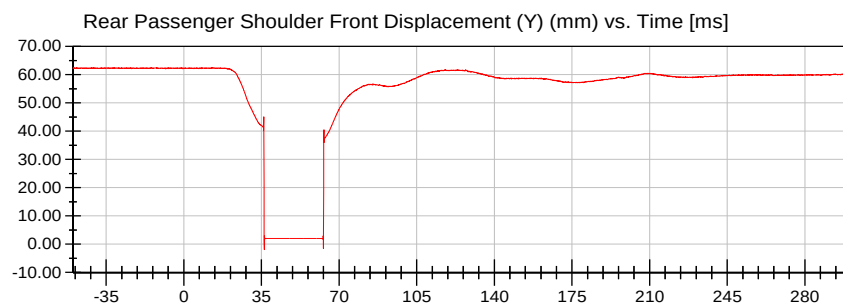
<Max>

42.06 mm at 175.30 ms

<Min>

-0.34 mm at 36.25 ms

Unfiltered



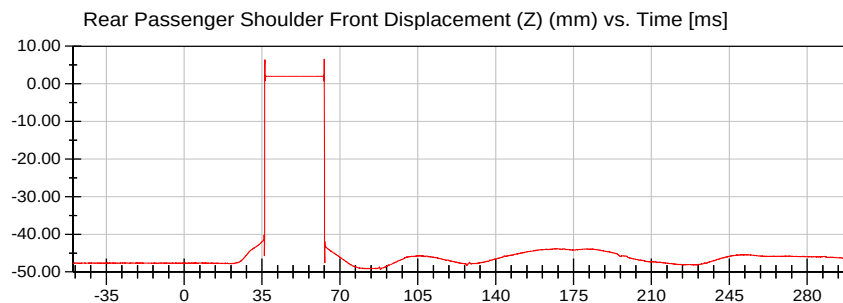
<Max>

62.49 mm at -49.80 ms

<Min>

-1.94 mm at 36.25 ms

Unfiltered



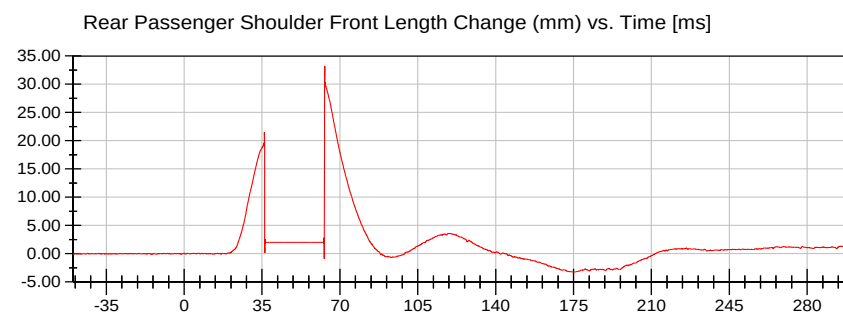
<Max>

6.52 mm at 62.95 ms

<Min>

-49.33 mm at 88.20 ms

Unfiltered



<Max>

33.18 mm at 63.15 ms

<Min>

-3.23 mm at 174.30 ms

CFC_600

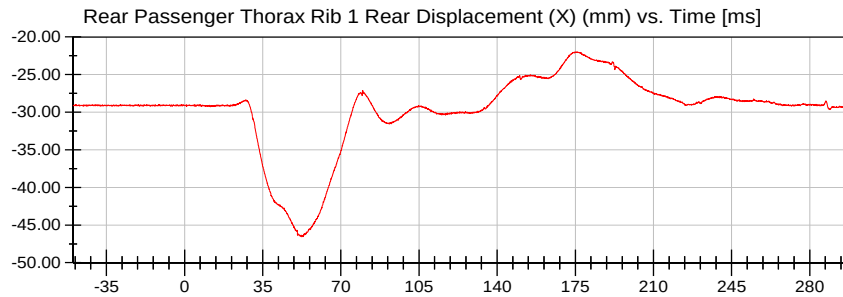


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



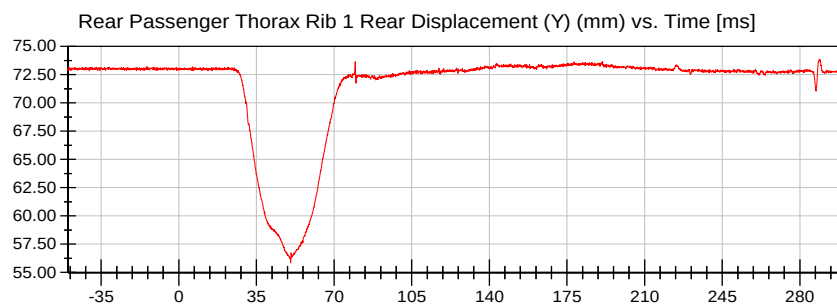
<Max>

-21.98 mm at 175.70 ms

<Min>

-46.57 mm at 52.50 ms

Unfiltered



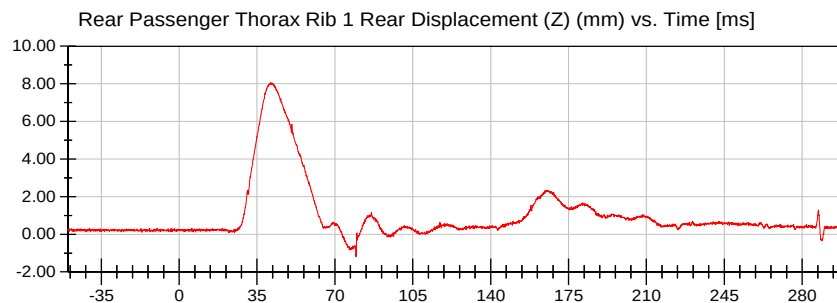
<Max>

73.85 mm at 289.00 ms

<Min>

55.84 mm at 50.40 ms

Unfiltered



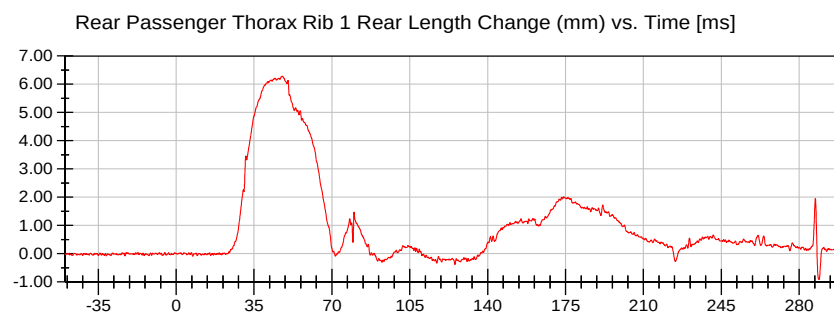
<Max>

8.06 mm at 41.20 ms

<Min>

-1.20 mm at 79.50 ms

Unfiltered



<Max>

6.28 mm at 47.60 ms

<Min>

-0.91 mm at 288.90 ms

CFC_600

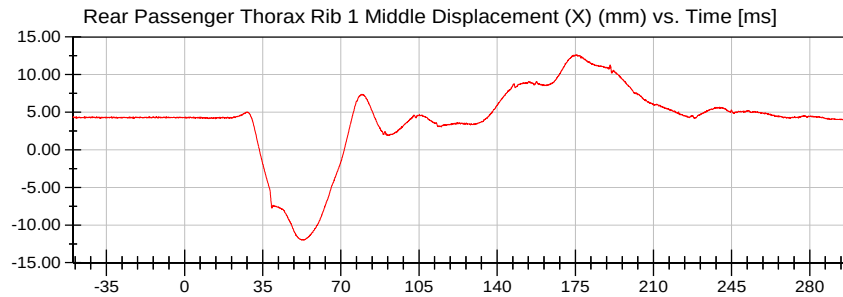


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



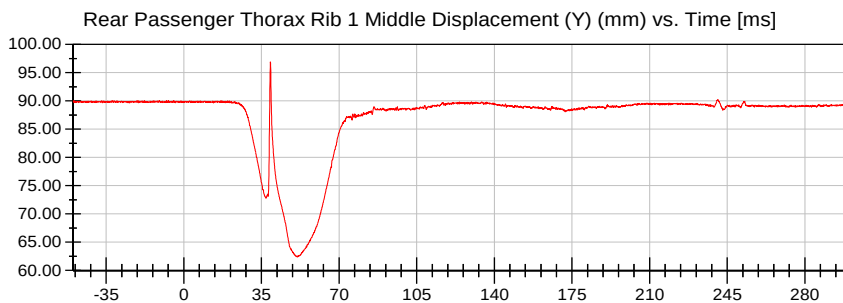
<Max>

12.62 mm at 175.50 ms

<Min>

-12.01 mm at 52.50 ms

Unfiltered



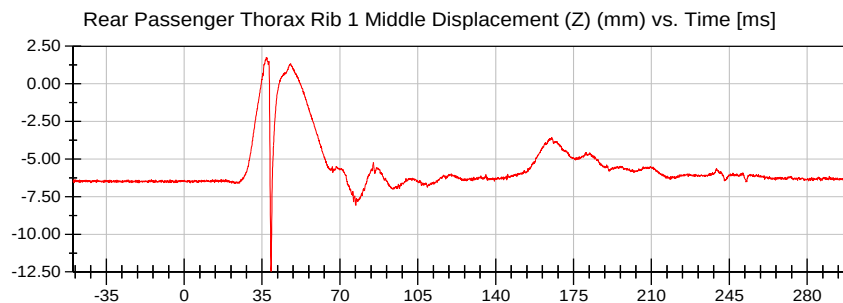
<Max>

96.94 mm at 39.05 ms

<Min>

62.38 mm at 51.30 ms

Unfiltered



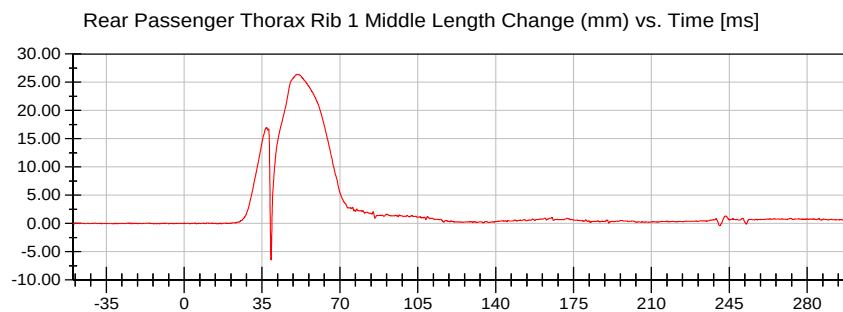
<Max>

1.73 mm at 37.20 ms

<Min>

-12.45 mm at 39.05 ms

Unfiltered



<Max>

26.38 mm at 50.85 ms

<Min>

-6.45 mm at 39.05 ms

CFC_600

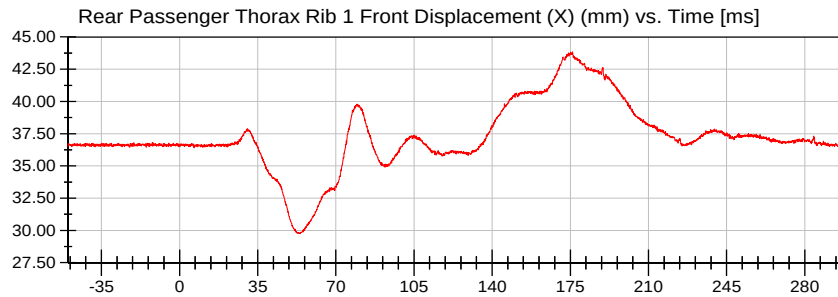


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



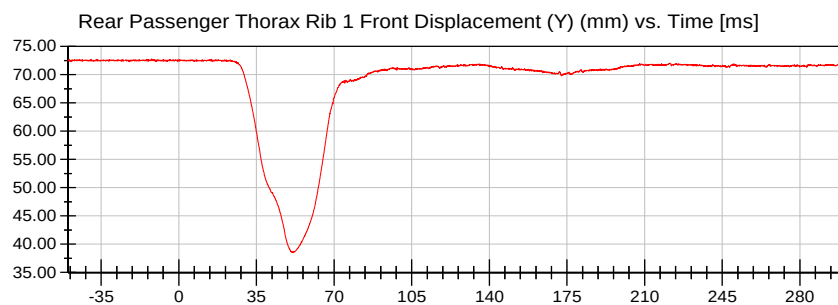
<Max>

43.84 mm at 176.00 ms

<Min>

29.75 mm at 53.70 ms

Unfiltered



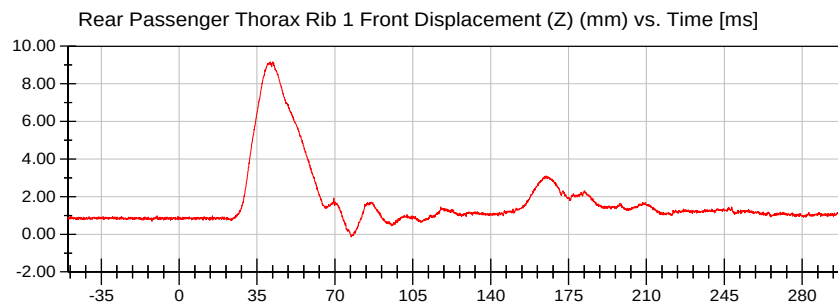
<Max>

72.77 mm at -12.20 ms

<Min>

38.56 mm at 51.50 ms

Unfiltered



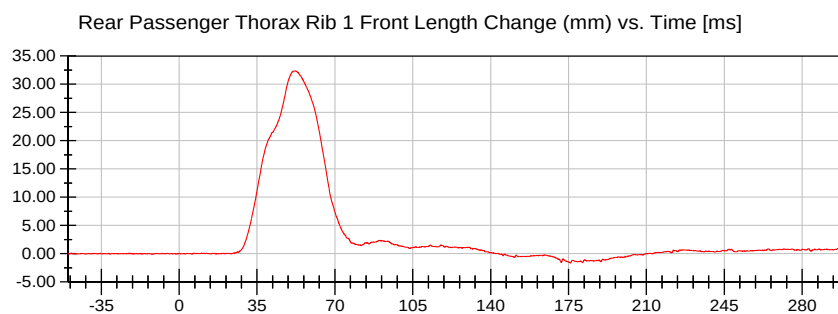
<Max>

9.16 mm at 40.90 ms

<Min>

-0.14 mm at 77.40 ms

Unfiltered



<Max>

32.37 mm at 52.20 ms

<Min>

-1.63 mm at 175.90 ms

CFC_600

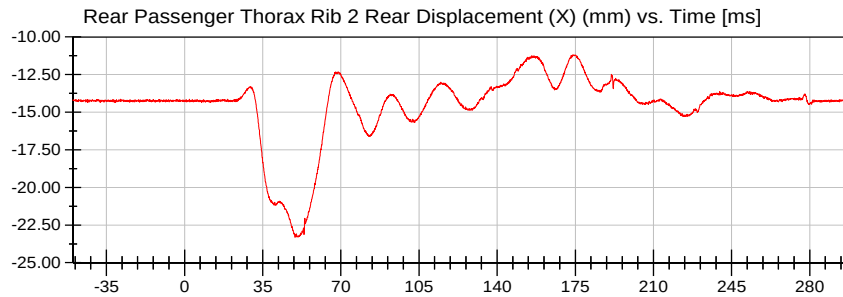


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



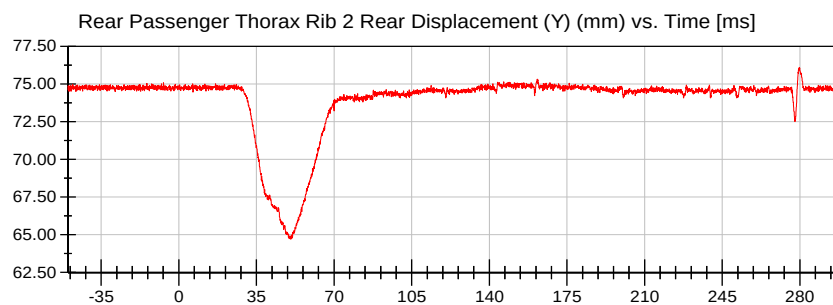
<Max>

-11.19 mm at 174.85 ms

<Min>

-23.32 mm at 49.50 ms

Unfiltered



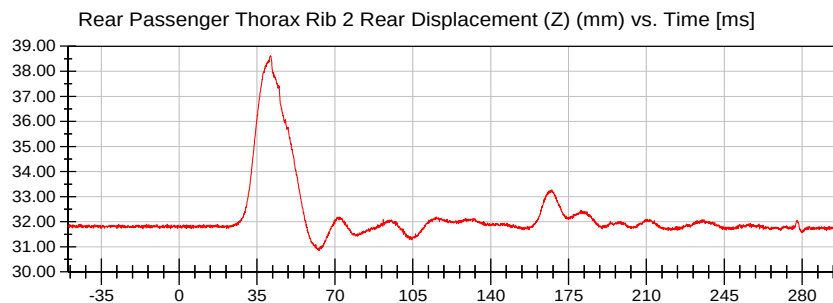
<Max>

76.08 mm at 279.70 ms

<Min>

64.71 mm at 50.50 ms

Unfiltered



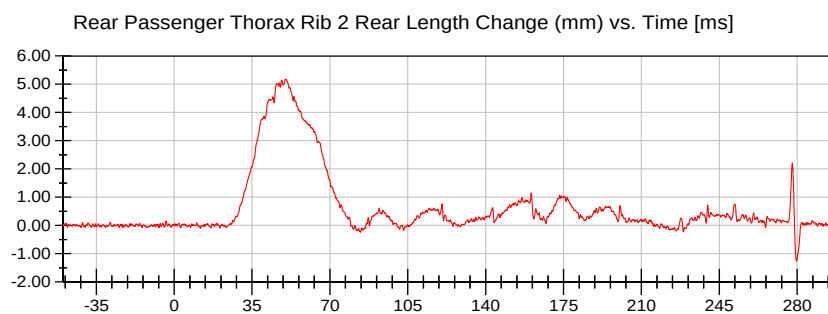
<Max>

38.62 mm at 41.00 ms

<Min>

30.85 mm at 62.90 ms

Unfiltered



<Max>

5.17 mm at 50.25 ms

<Min>

-1.26 mm at 279.70 ms

CFC_600

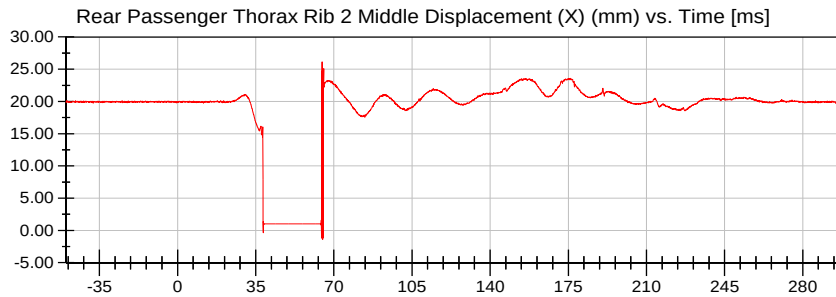


VRTC

Test Date: 04/29/2021

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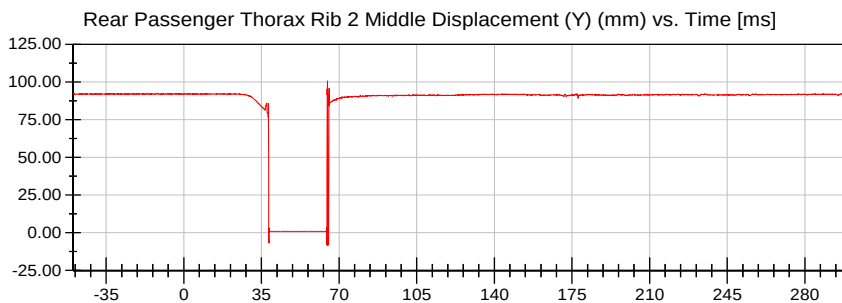
<Max>

26.11 mm at 64.75 ms

<Min>

-1.40 mm at 64.95 ms

Unfiltered



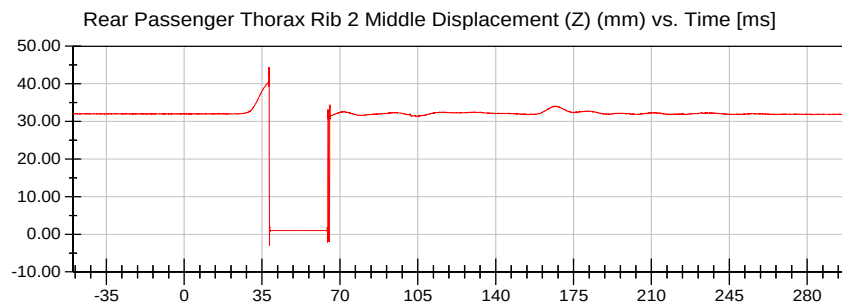
<Max>

100.84 mm at 64.75 ms

<Min>

-8.52 mm at 64.95 ms

Unfiltered



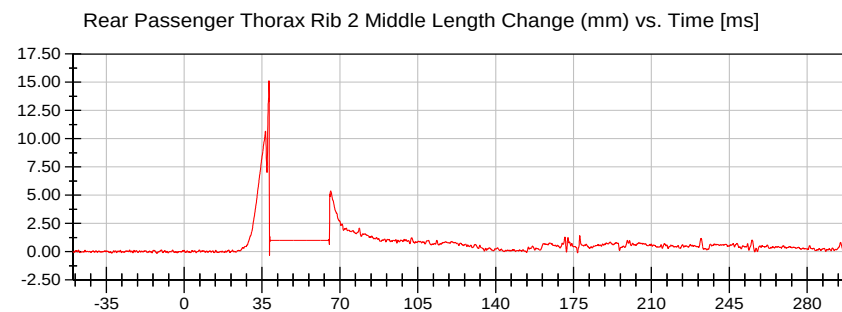
<Max>

44.43 mm at 38.15 ms

<Min>

-2.97 mm at 38.35 ms

Unfiltered



<Max>

15.11 mm at 38.15 ms

<Min>

-0.30 mm at 38.35 ms

CFC_600

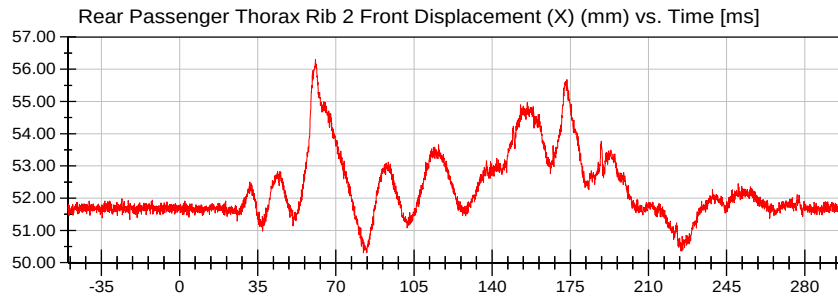


VRTC

Test Lab: CTF

Test Number: 210429 ()

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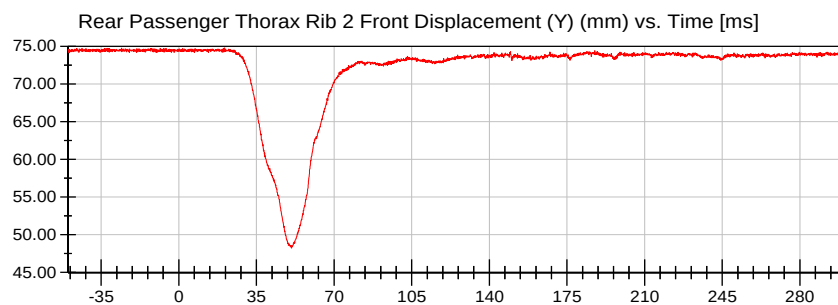
<Max>

56.30 mm at 60.90 ms

<Min>

50.30 mm at 83.85 ms

Unfiltered



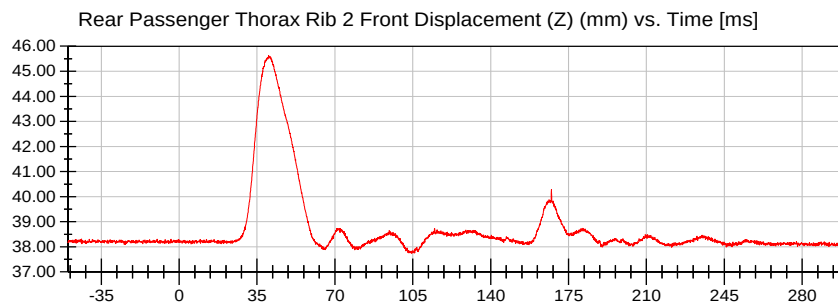
<Max>

74.81 mm at 20.60 ms

<Min>

48.24 mm at 50.80 ms

Unfiltered



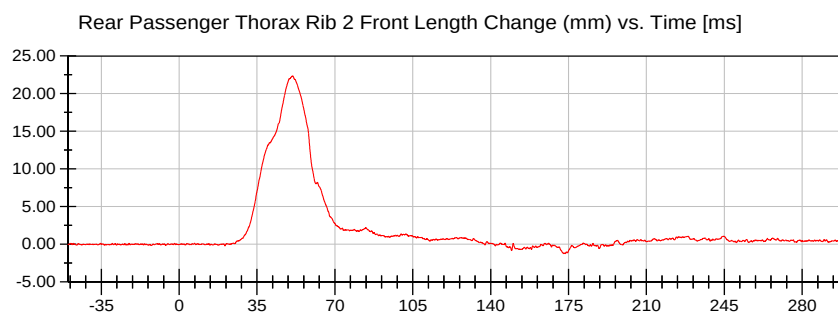
<Max>

45.63 mm at 40.20 ms

<Min>

37.74 mm at 104.40 ms

Unfiltered



<Max>

22.36 mm at 50.95 ms

<Min>

-1.25 mm at 172.80 ms

CFC_600

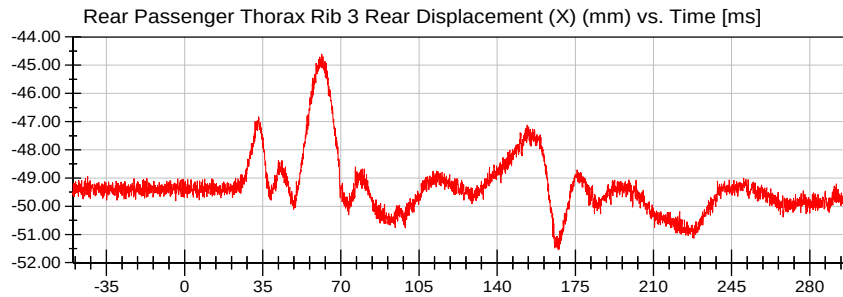


VRTC

Test Lab: CTF

Test Number: 210429 ()

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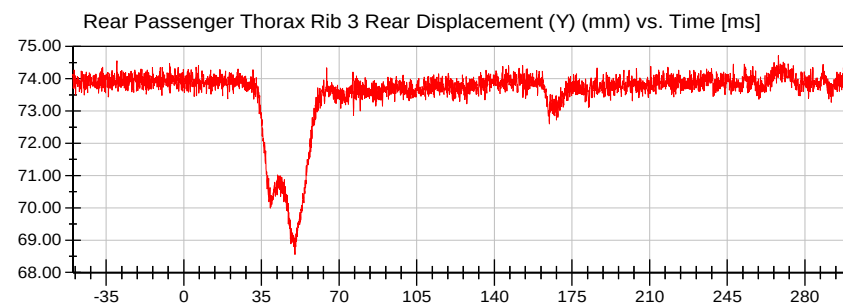
<Max>

-44.61 mm at 61.45 ms

<Min>

-51.54 mm at 167.40 ms

Unfiltered



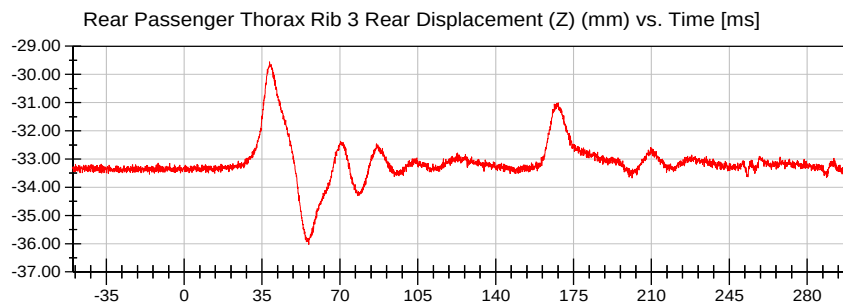
<Max>

74.71 mm at 268.05 ms

<Min>

68.55 mm at 50.10 ms

Unfiltered



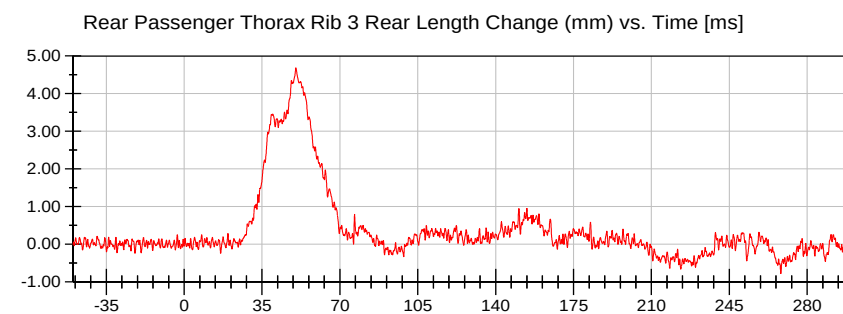
<Max>

-29.55 mm at 38.40 ms

<Min>

-36.03 mm at 56.00 ms

Unfiltered



<Max>

4.69 mm at 50.20 ms

<Min>

-0.77 mm at 268.15 ms

CFC_600

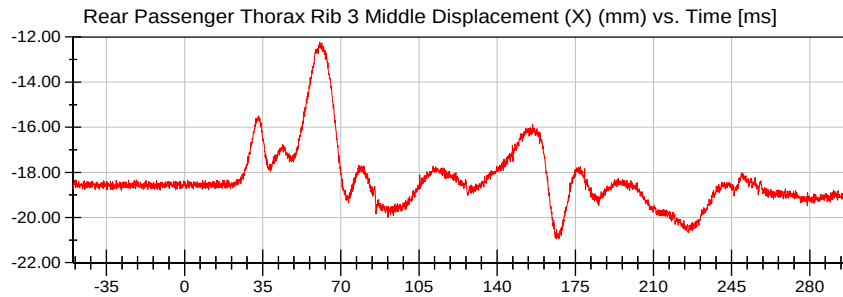


VRTC

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Test Number: 210429 ()

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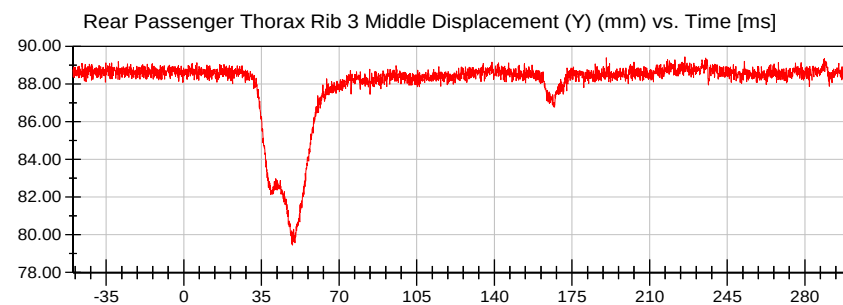
<Max>

-12.23 mm at 60.60 ms

<Min>

-20.95 mm at 166.40 ms

Unfiltered



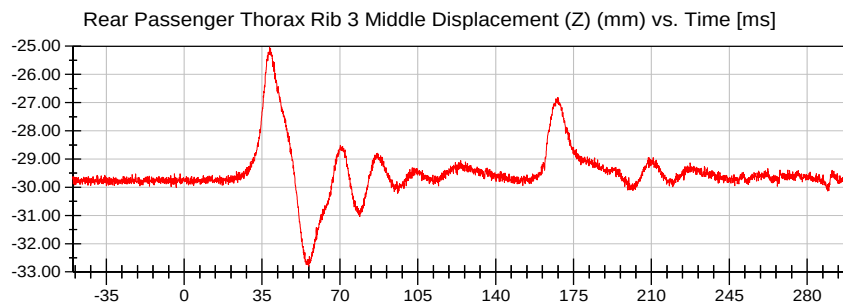
<Max>

89.44 mm at 225.90 ms

<Min>

79.45 mm at 49.00 ms

Unfiltered



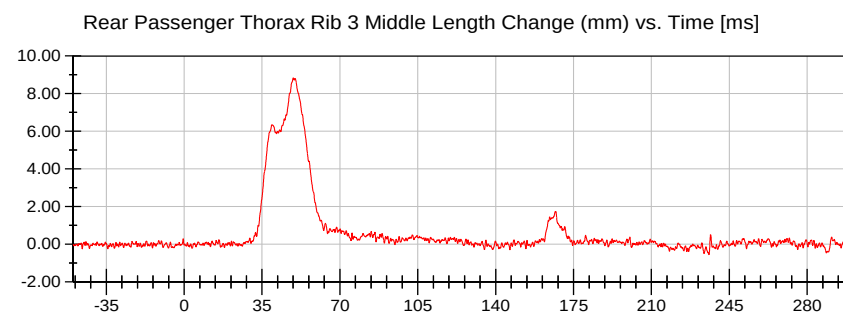
<Max>

-25.04 mm at 38.40 ms

<Min>

-32.79 mm at 55.90 ms

Unfiltered



<Max>

8.84 mm at 49.00 ms

<Min>

-0.55 mm at 235.85 ms

CFC_600

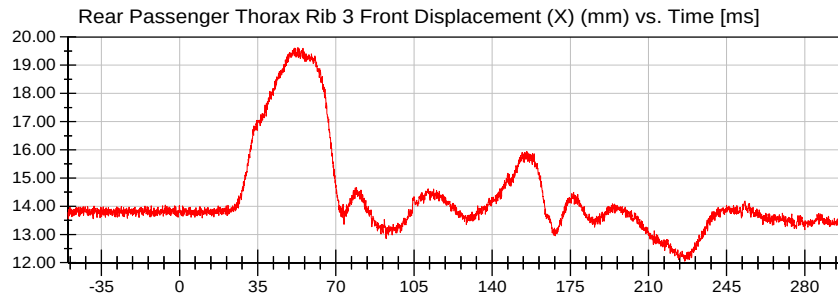


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



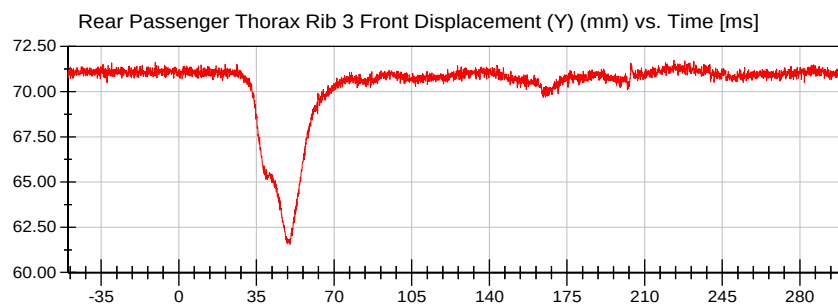
<Max>

19.63 mm at 53.00 ms

<Min>

12.06 mm at 226.35 ms

Unfiltered



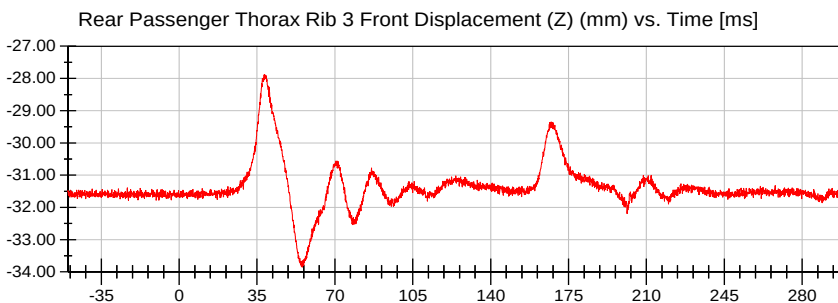
<Max>

71.73 mm at 223.20 ms

<Min>

61.55 mm at 50.10 ms

Unfiltered



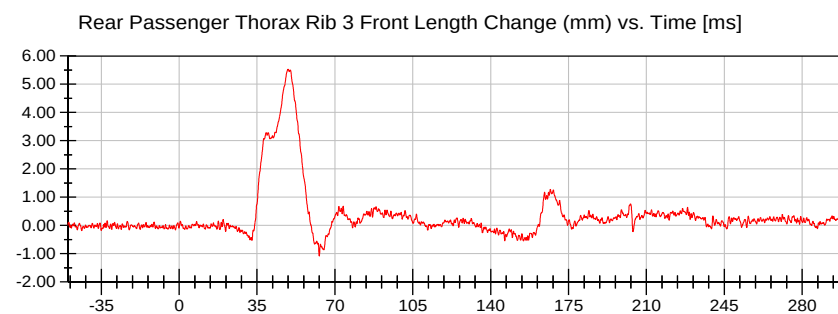
<Max>

-27.88 mm at 38.45 ms

<Min>

-33.85 mm at 55.30 ms

Unfiltered



<Max>

5.53 mm at 48.95 ms

<Min>

-1.07 mm at 62.95 ms

CFC_600

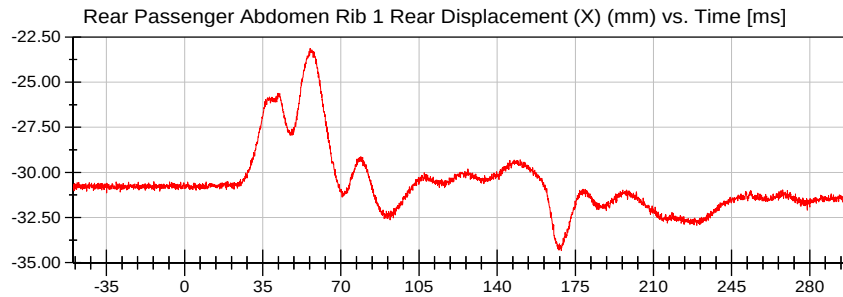


VRTC

Test Lab: CTF

Test Number: 210429 ()

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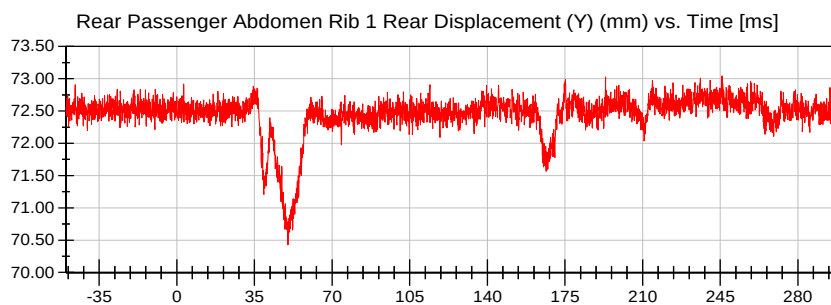
<Max>

-23.15 mm at 56.25 ms

<Min>

-34.33 mm at 168.70 ms

Unfiltered



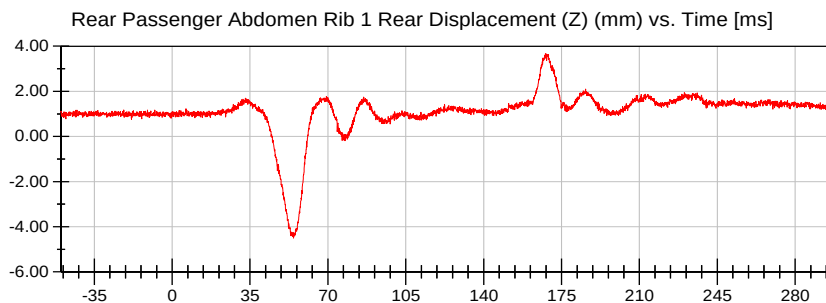
<Max>

73.04 mm at 245.80 ms

<Min>

70.43 mm at 50.10 ms

Unfiltered



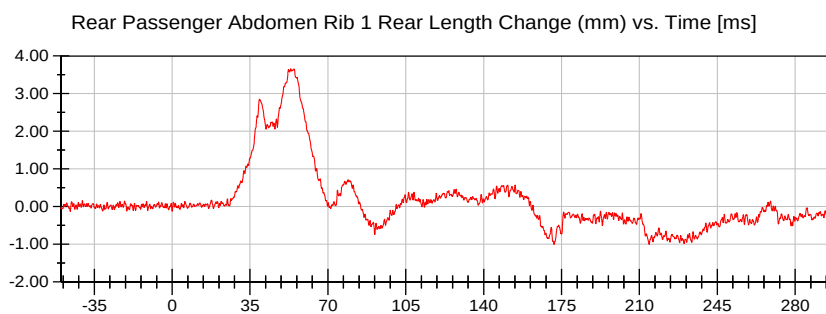
<Max>

3.67 mm at 167.75 ms

<Min>

-4.49 mm at 54.55 ms

Unfiltered



<Max>

3.66 mm at 53.25 ms

<Min>

-1.01 mm at 214.35 ms

CFC_600

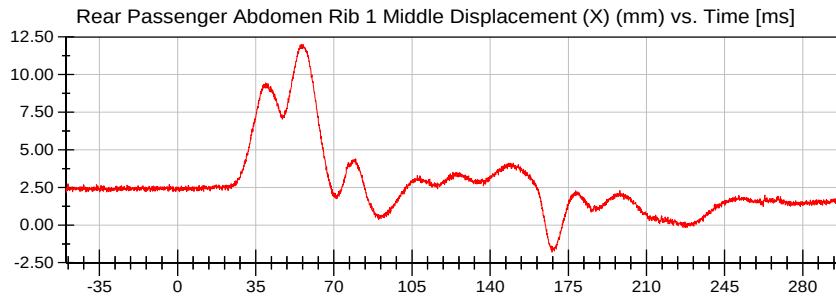


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



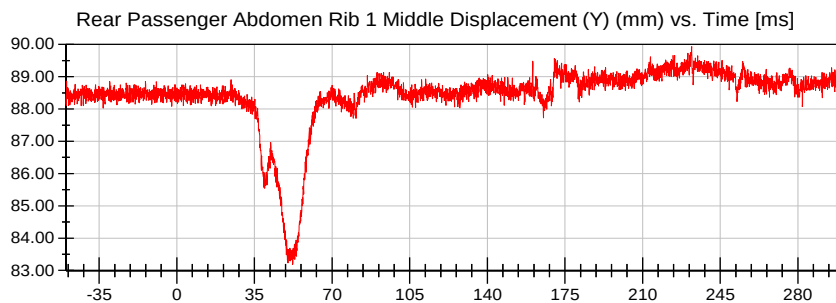
<Max>

12.00 mm at 55.50 ms

<Min>

-1.80 mm at 167.70 ms

Unfiltered



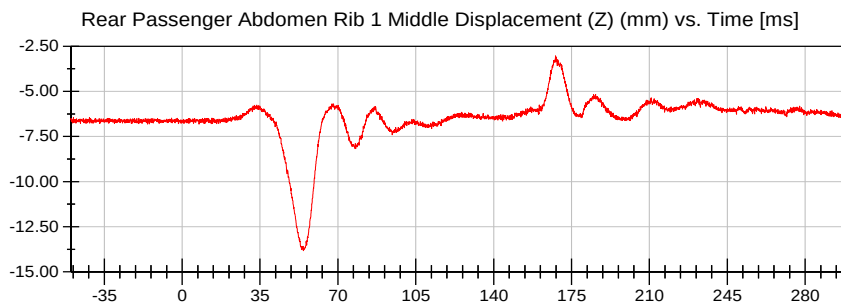
<Max>

89.93 mm at 232.10 ms

<Min>

83.18 mm at 52.25 ms

Unfiltered



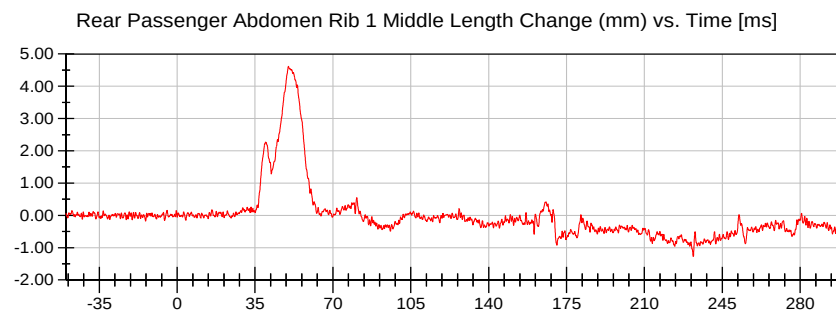
<Max>

-3.04 mm at 167.80 ms

<Min>

-13.82 mm at 54.50 ms

Unfiltered



<Max>

4.61 mm at 50.00 ms

<Min>

-1.27 mm at 231.95 ms

CFC_600

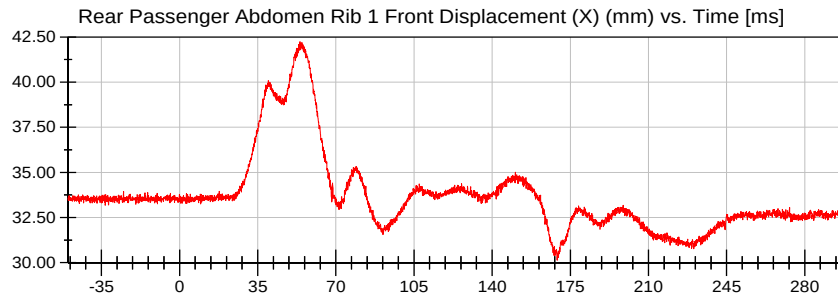


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



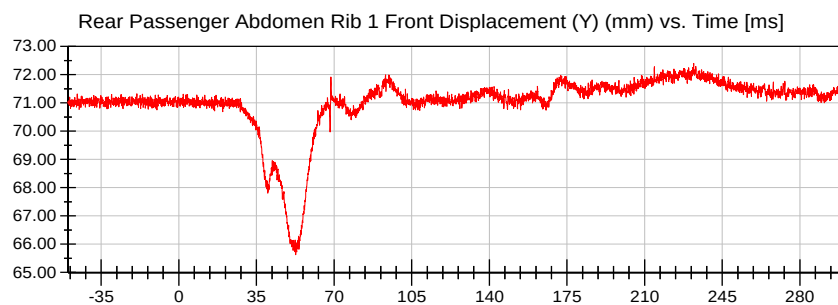
<Max>

42.25 mm at 53.95 ms

<Min>

30.13 mm at 169.15 ms

Unfiltered



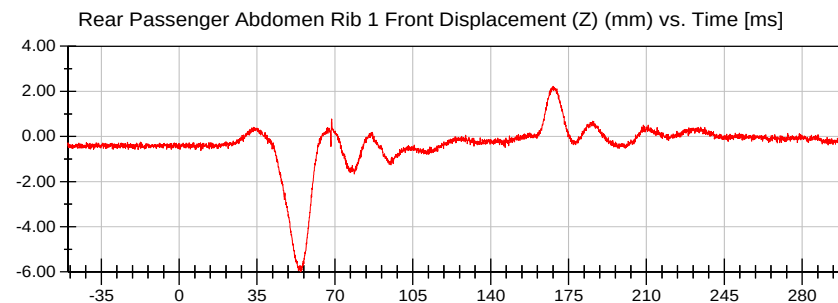
<Max>

72.40 mm at 232.10 ms

<Min>

65.63 mm at 52.70 ms

Unfiltered



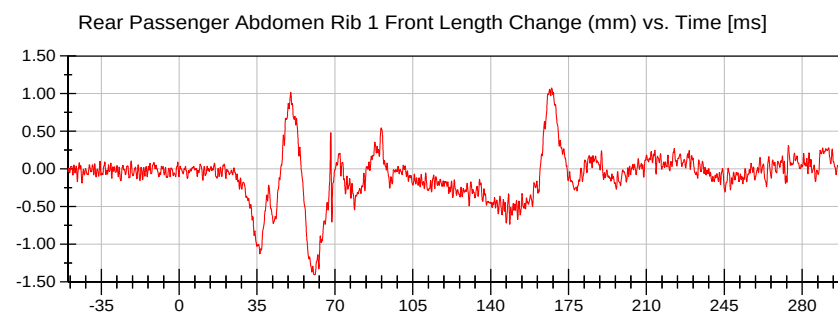
<Max>

2.22 mm at 168.10 ms

<Min>

-6.00 mm at 54.50 ms

Unfiltered



<Max>

1.08 mm at 167.45 ms

<Min>

-1.40 mm at 60.85 ms

CFC_600

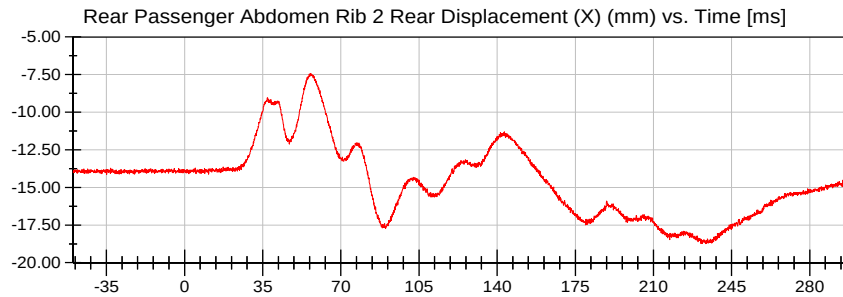


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



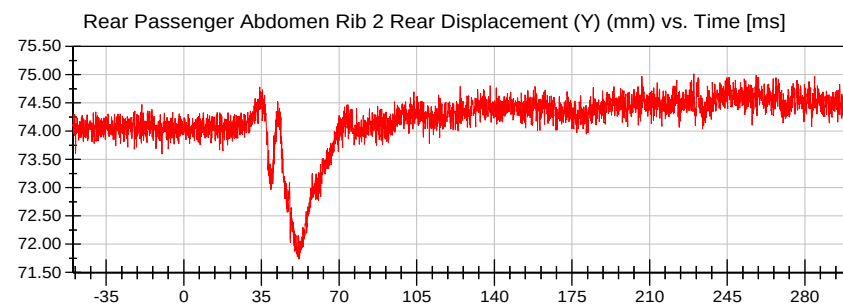
<Max>

-7.44 mm at 56.70 ms

<Min>

-18.74 mm at 233.35 ms

Unfiltered



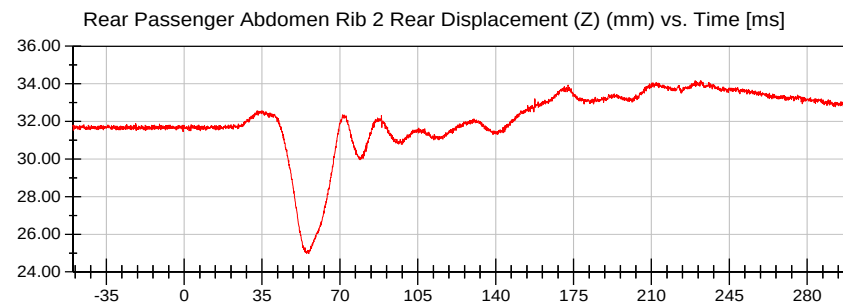
<Max>

75.02 mm at 229.90 ms

<Min>

71.74 mm at 51.95 ms

Unfiltered



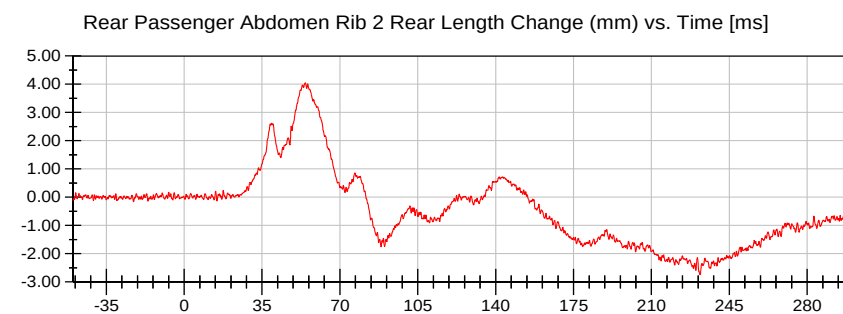
<Max>

34.17 mm at 229.65 ms

<Min>

24.98 mm at 56.00 ms

Unfiltered



<Max>

4.05 mm at 54.35 ms

<Min>

-2.75 mm at 231.85 ms

CFC_600

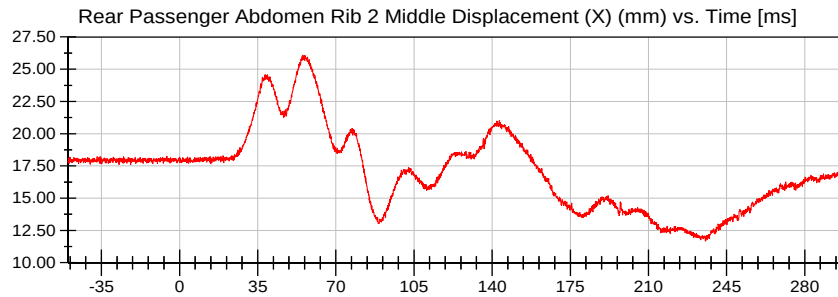


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



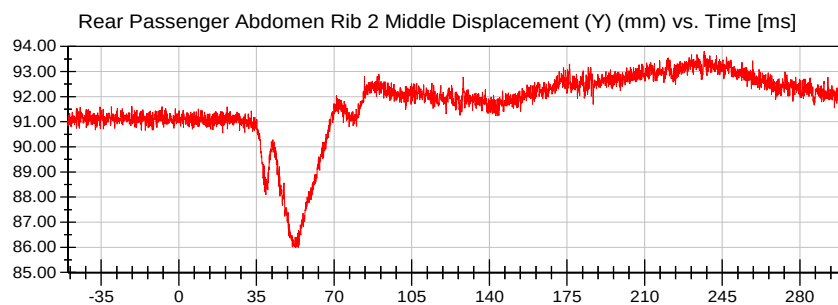
<Max>

26.09 mm at 55.25 ms

<Min>

11.69 mm at 235.50 ms

Unfiltered



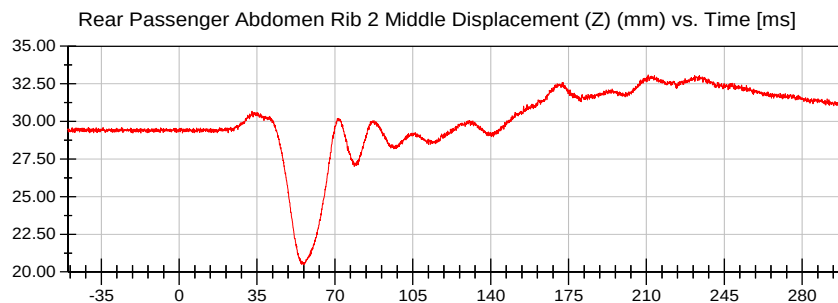
<Max>

93.82 mm at 236.85 ms

<Min>

85.99 mm at 52.70 ms

Unfiltered



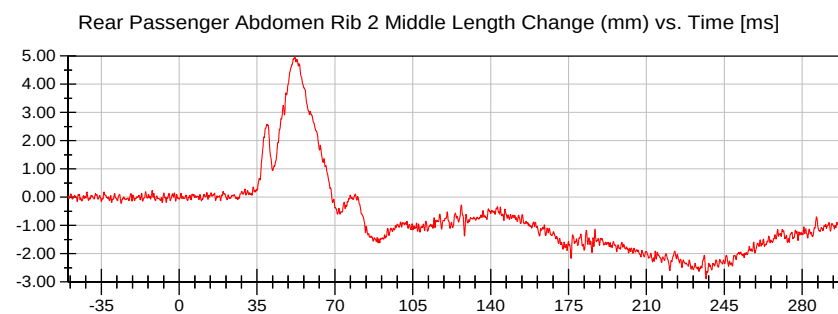
<Max>

33.08 mm at 210.80 ms

<Min>

20.50 mm at 55.10 ms

Unfiltered



<Max>

4.97 mm at 52.00 ms

<Min>

-2.89 mm at 236.80 ms

CFC_600

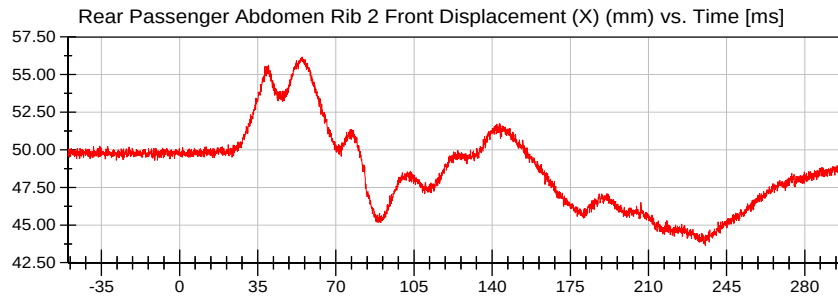


VRTC

Test Lab: CTF

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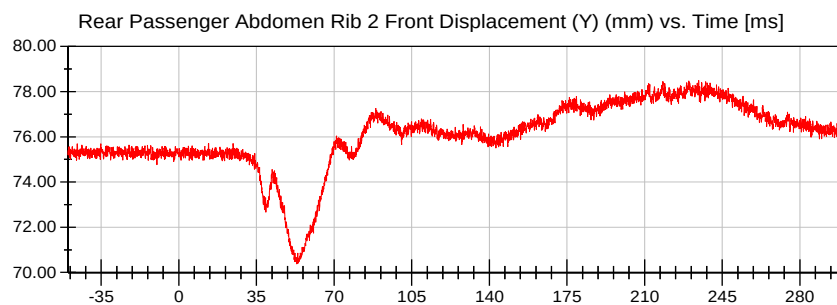
<Max>

56.16 mm at 54.90 ms

<Min>

43.64 mm at 235.45 ms

Unfiltered



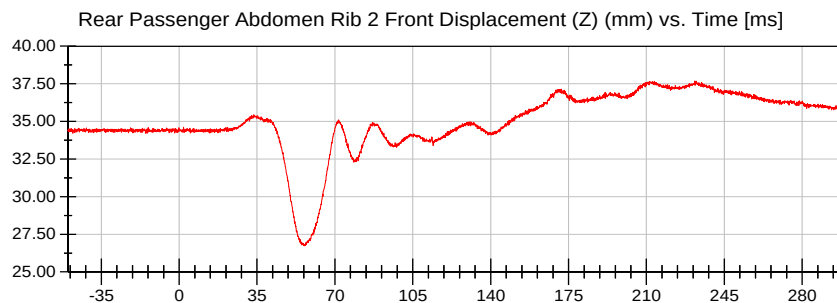
<Max>

78.51 mm at 234.35 ms

<Min>

70.37 mm at 53.20 ms

Unfiltered



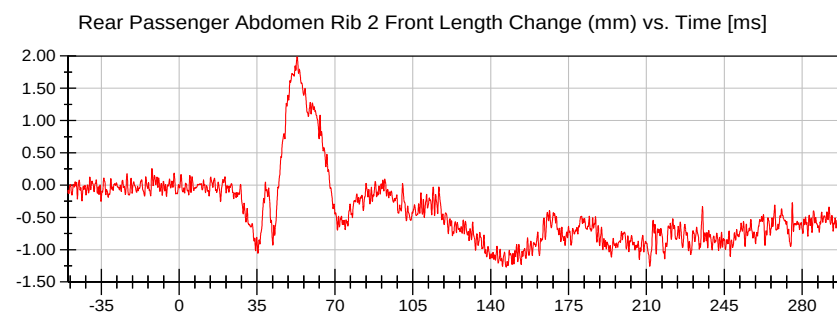
<Max>

37.69 mm at 231.70 ms

<Min>

26.73 mm at 56.30 ms

Unfiltered



<Max>

1.99 mm at 53.05 ms

<Min>

-1.27 mm at 147.05 ms

CFC_600

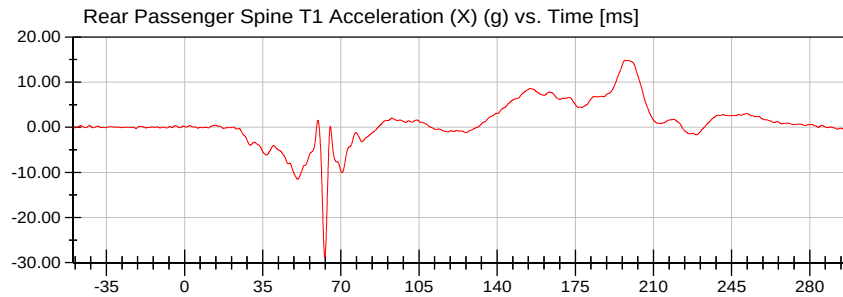


VRTC

Test Date: 04/29/2021

Test Lab: CTF

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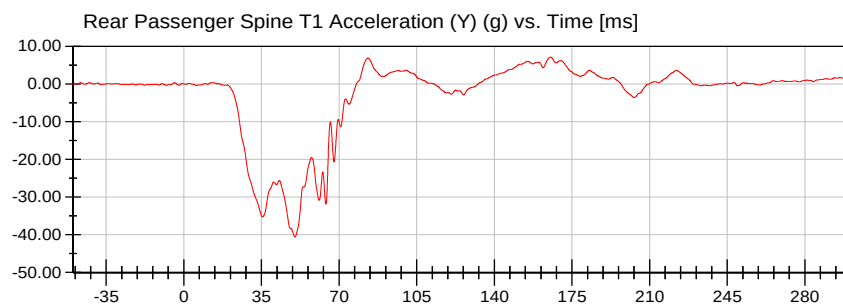
<Max>

14.86 g at 197.35 ms

<Min>

-28.83 g at 62.85 ms

CFC_180



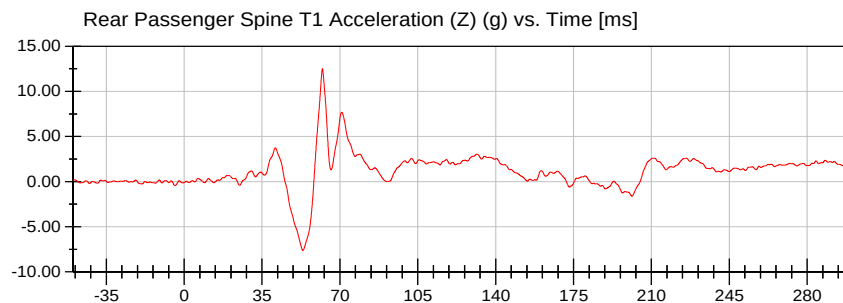
<Max>

7.17 g at 165.40 ms

<Min>

-40.58 g at 50.15 ms

CFC_180



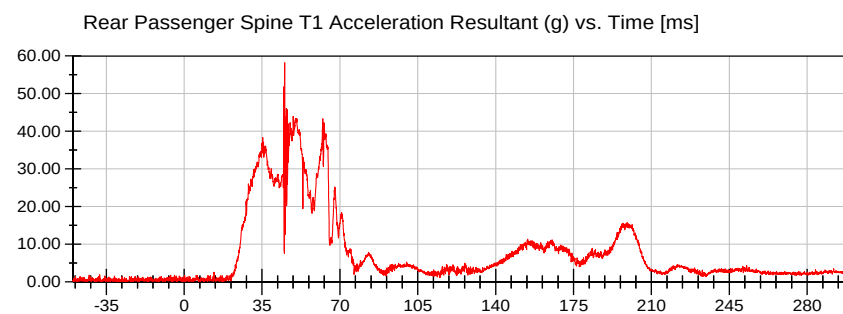
<Max>

12.51 g at 62.15 ms

<Min>

-7.62 g at 53.35 ms

CFC_180



<Max>

58.20 g at 45.15 ms

<Min>

0.05 g at -33.10 ms

Prefiltered_> CFC 1000

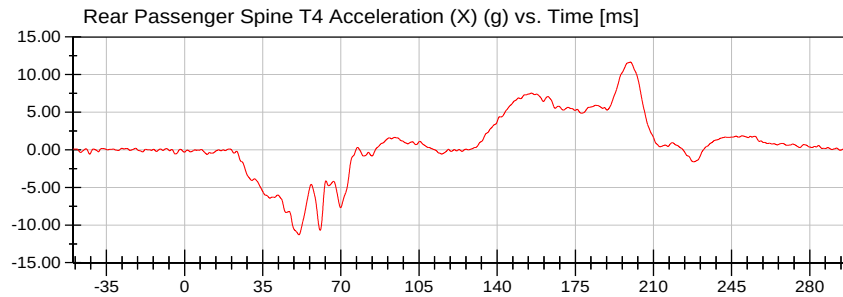


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



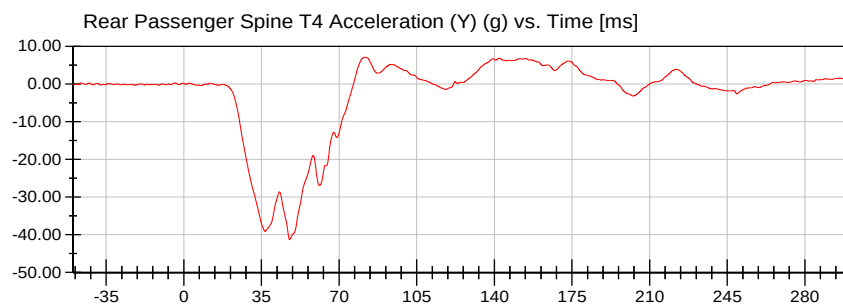
<Max>

11.66 g at 199.70 ms

<Min>

-11.29 g at 51.20 ms

CFC_180



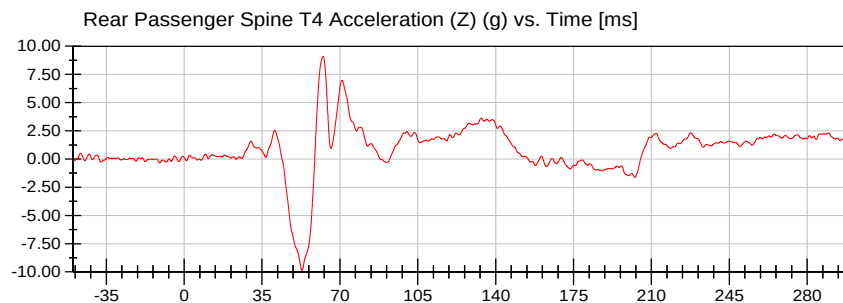
<Max>

7.16 g at 81.70 ms

<Min>

-41.29 g at 47.70 ms

CFC_180



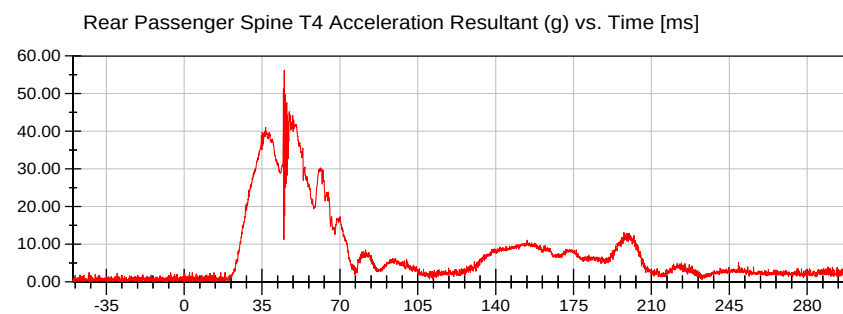
<Max>

9.08 g at 62.45 ms

<Min>

-9.86 g at 52.95 ms

CFC_180



<Max>

56.17 g at 44.95 ms

<Min>

0.17 g at -8.35 ms

Prefiltered_> CFC 1000



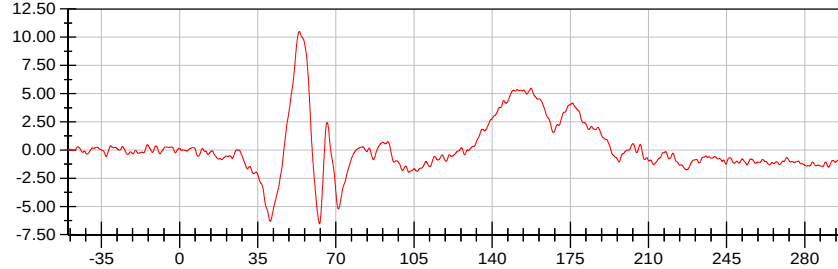
VRTC

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Test Date: 04/29/2021

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



<Max>

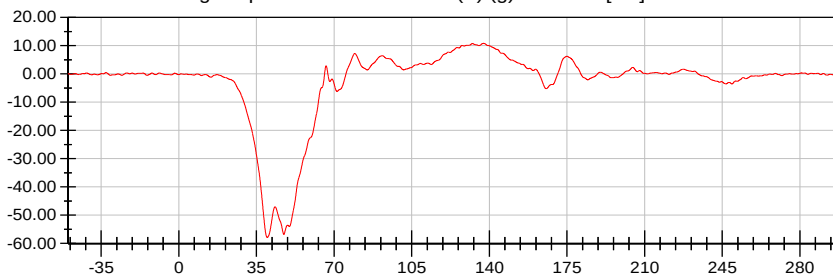
10.51 g at 53.65 ms

<Min>

-6.54 g at 62.65 ms

CFC_180

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



<Max>

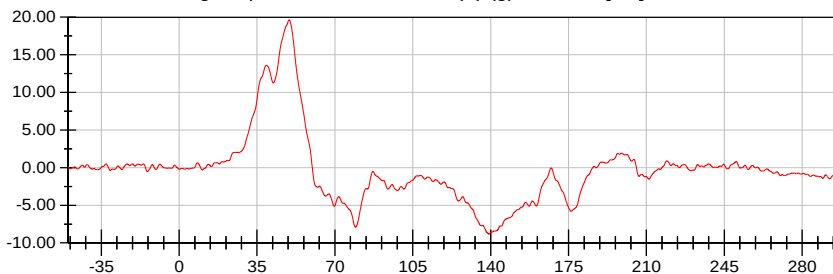
10.82 g at 137.40 ms

<Min>

-57.88 g at 39.85 ms

CFC_180

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



<Max>

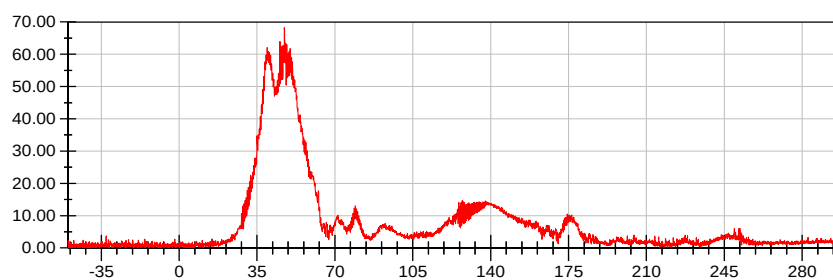
19.64 g at 49.45 ms

<Min>

-8.82 g at 139.15 ms

CFC_180

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



<Max>

68.23 g at 47.30 ms

<Min>

0.04 g at -39.90 ms

Prefiltered_> CFC 1000

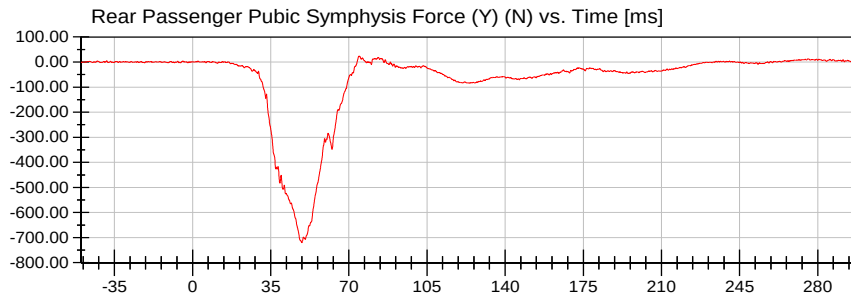


VRTC

Test Lab: CTF

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<Max>

23.55 N at 74.60 ms

<Min>

-720.10 N at 49.00 ms

CFC_600

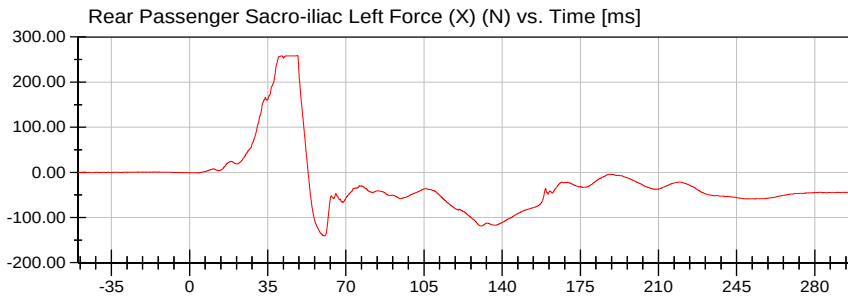


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



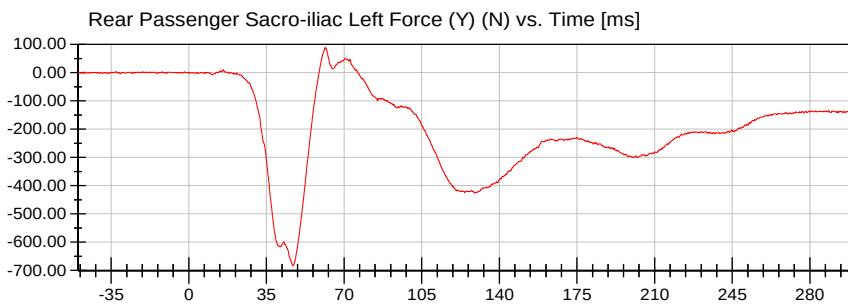
<Max>

259.28 N at 48.35 ms

<Min>

-140.80 N at 60.45 ms

CFC_600



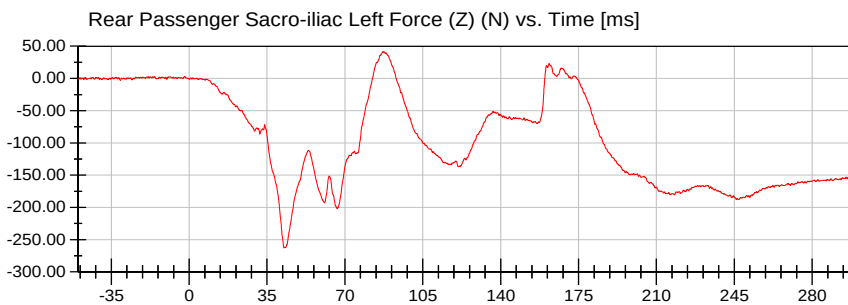
<Max>

88.99 N at 61.50 ms

<Min>

-682.05 N at 47.00 ms

CFC_600



<Max>

41.44 N at 87.00 ms

<Min>

-262.81 N at 42.65 ms

CFC_600

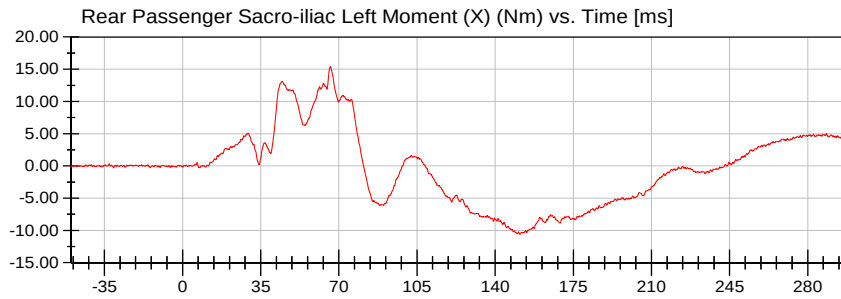


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



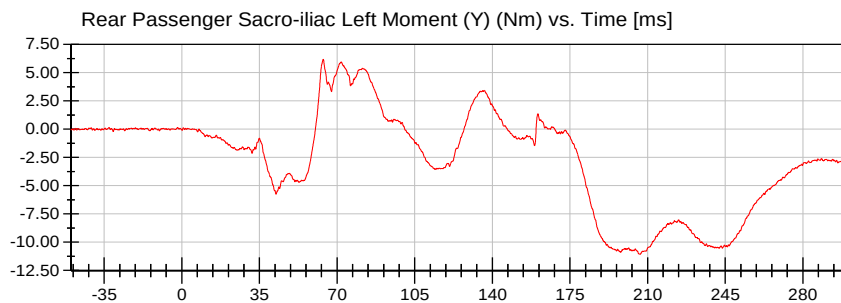
<Max>

15.42 Nm at 66.20 ms

<Min>

-10.60 Nm at 151.10 ms

CFC_600



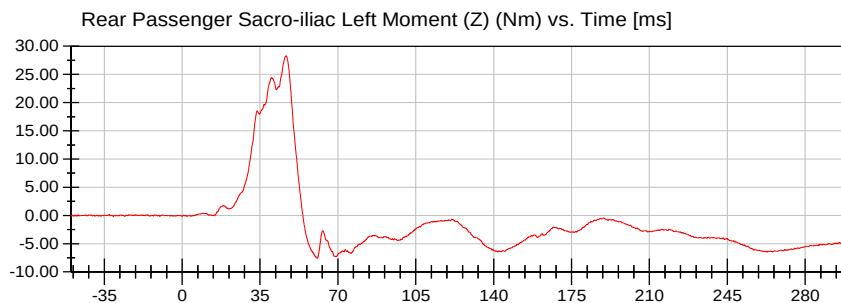
<Max>

6.17 Nm at 63.80 ms

<Min>

-11.08 Nm at 206.65 ms

CFC_600



<Max>

28.28 Nm at 46.75 ms

<Min>

-7.60 Nm at 60.70 ms

CFC_600

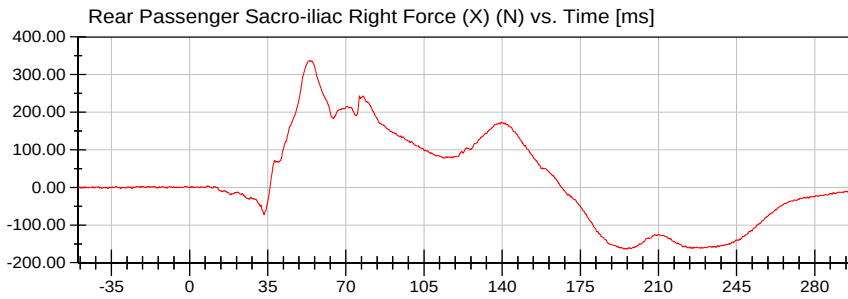


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



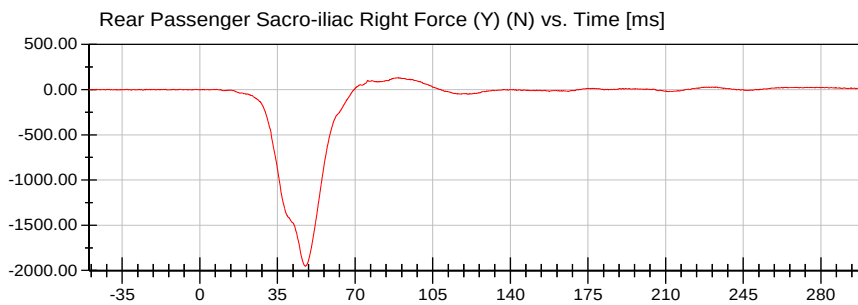
<Max>

337.07 N at 53.50 ms

<Min>

-163.93 N at 196.00 ms

CFC_600



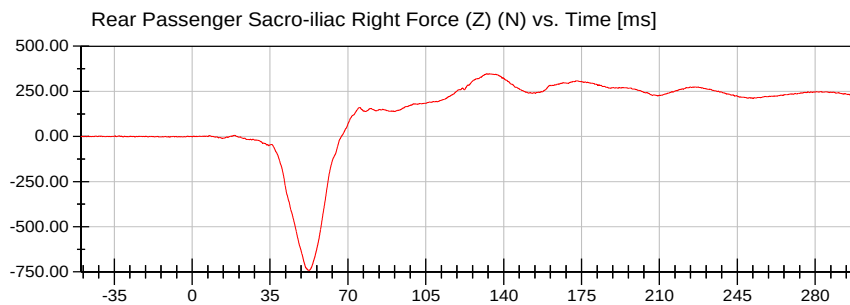
<Max>

131.41 N at 89.55 ms

<Min>

-1,952.47 N at 47.55 ms

CFC_600



<Max>

347.25 N at 132.45 ms

<Min>

-741.03 N at 52.40 ms

CFC_600

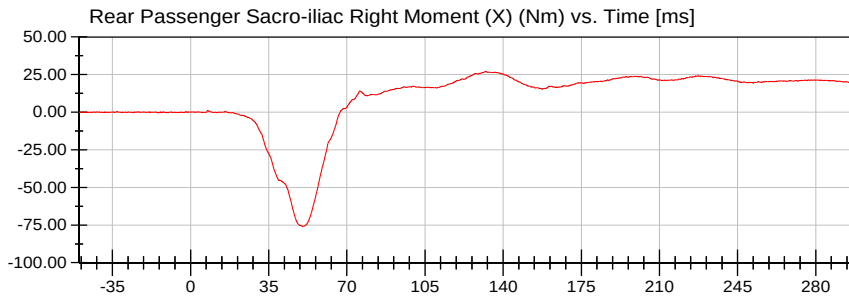


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



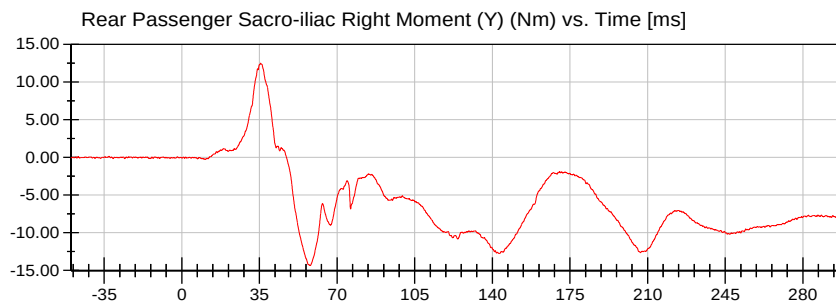
<Max>

27.03 Nm at 132.40 ms

<Min>

-75.83 Nm at 50.20 ms

CFC_600



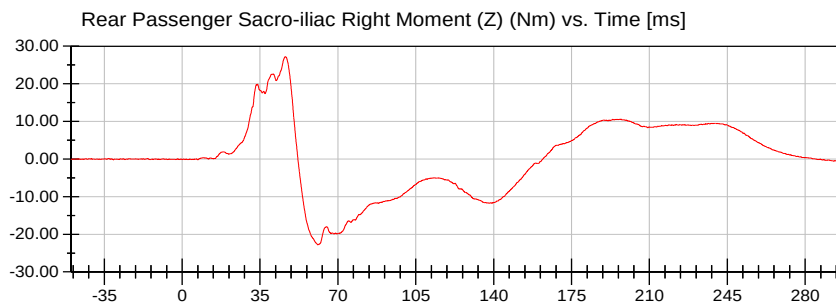
<Max>

12.51 Nm at 35.50 ms

<Min>

-14.34 Nm at 57.90 ms

CFC_600



<Max>

27.18 Nm at 46.40 ms

<Min>

-22.80 Nm at 61.00 ms

CFC_600

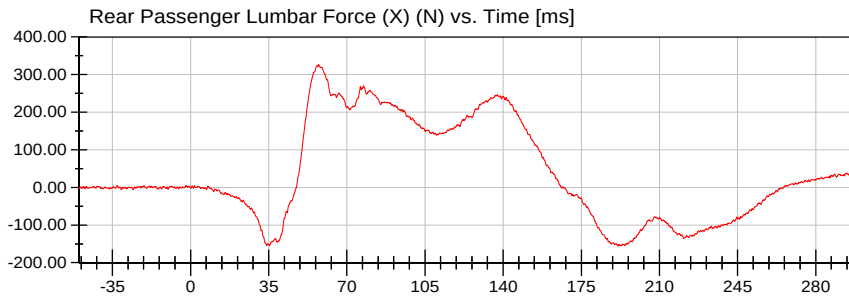


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



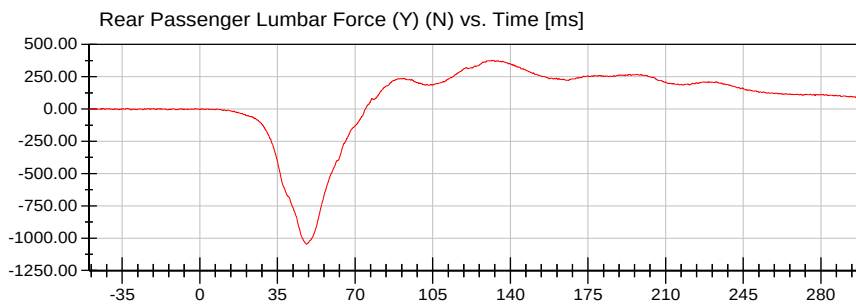
<Max>

326.41 N at 57.30 ms

<Min>

-155.92 N at 191.40 ms

CFC_600



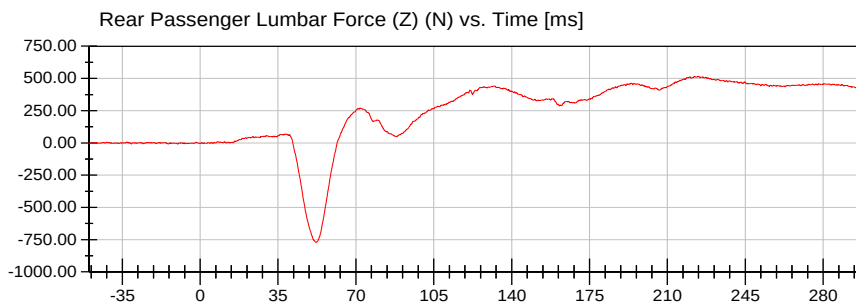
<Max>

376.24 N at 132.40 ms

<Min>

-1,045.93 N at 48.15 ms

CFC_600



<Max>

516.67 N at 223.90 ms

<Min>

-770.35 N at 51.95 ms

CFC_600

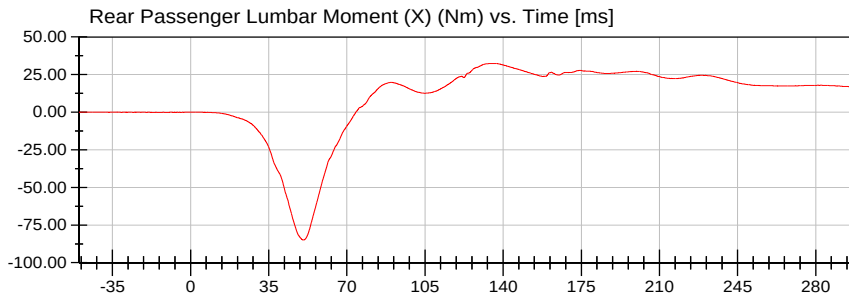


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



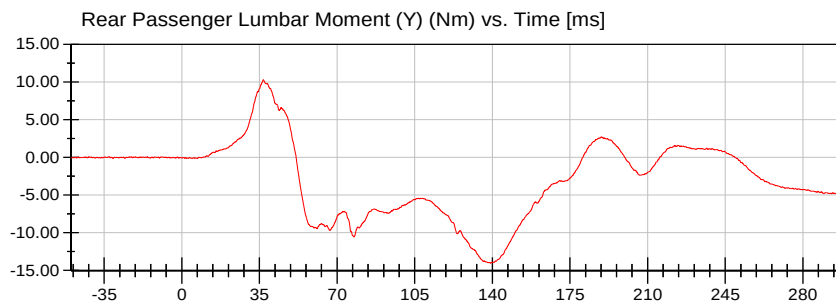
<Max>

32.40 Nm at 134.45 ms

<Min>

-84.91 Nm at 50.65 ms

CFC_600



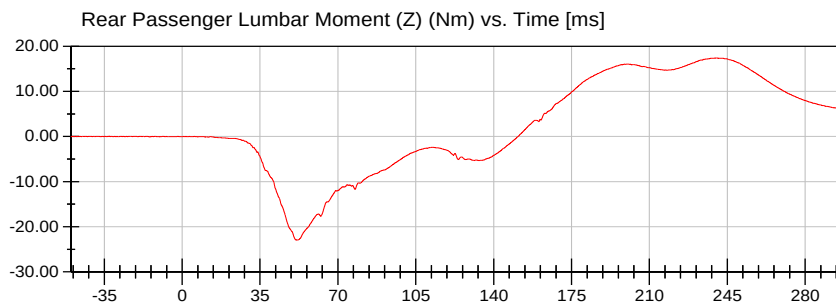
<Max>

10.31 Nm at 36.75 ms

<Min>

-14.05 Nm at 139.25 ms

CFC_600



<Max>

17.40 Nm at 240.45 ms

<Min>

-22.95 Nm at 51.75 ms

CFC_600

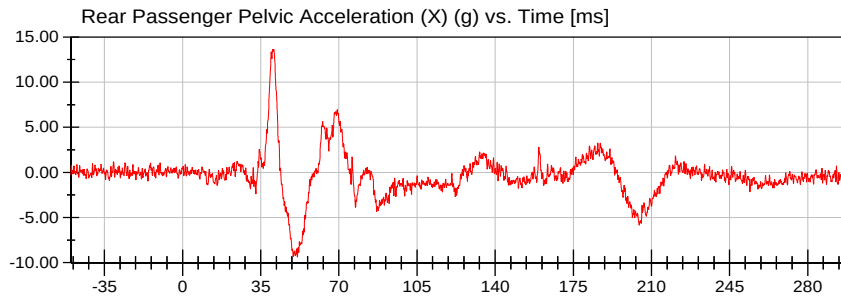


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



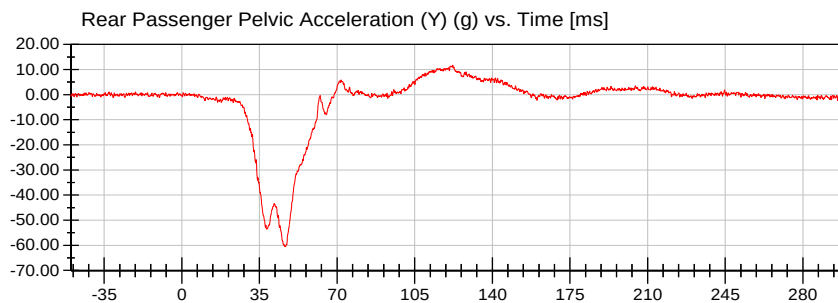
<Max>

13.60 g at 40.85 ms

<Min>

-9.36 g at 51.45 ms

CFC_1000



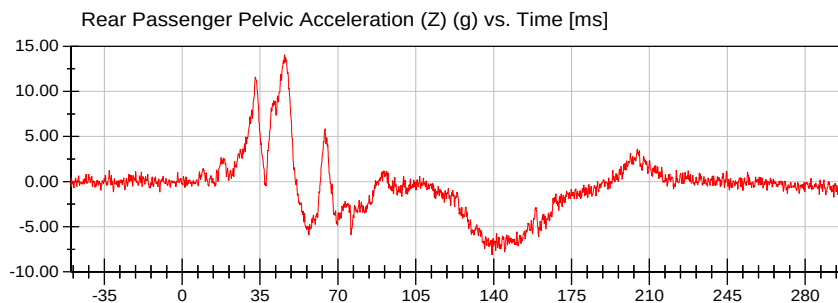
<Max>

11.73 g at 122.15 ms

<Min>

-60.47 g at 46.80 ms

CFC_1000



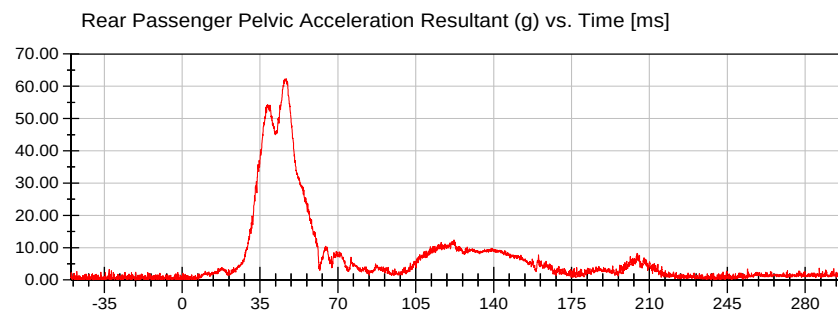
<Max>

14.04 g at 46.00 ms

<Min>

-8.10 g at 139.25 ms

CFC_1000



<Max>

62.31 g at 46.85 ms

<Min>

0.07 g at -46.95 ms

Prefiltered_> CFC 1000

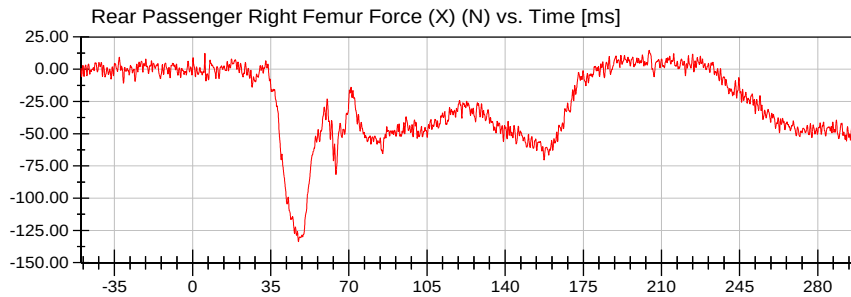


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



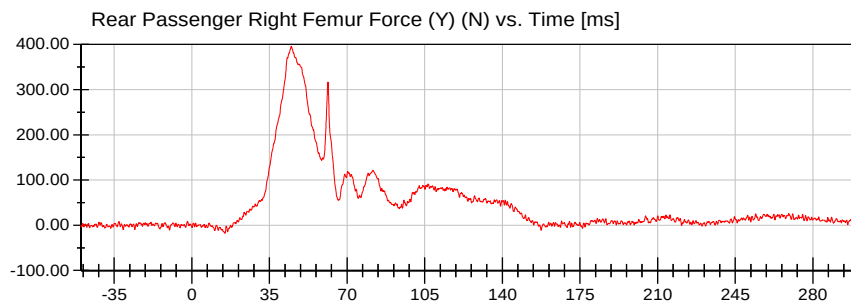
<Max>

14.55 N at 204.50 ms

<Min>

-133.75 N at 47.45 ms

CFC_600



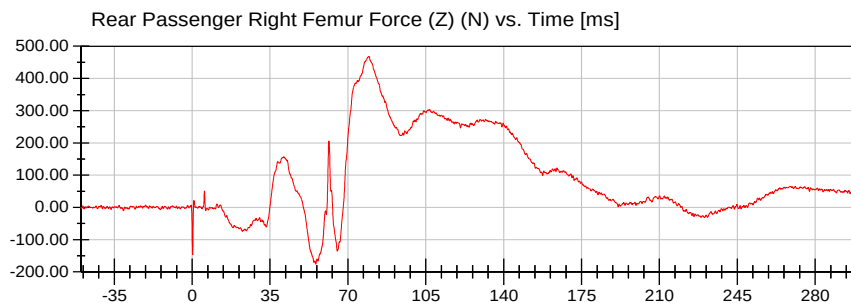
<Max>

395.59 N at 44.85 ms

<Min>

-17.87 N at 14.90 ms

CFC_600



<Max>

468.16 N at 79.45 ms

<Min>

-175.72 N at 55.55 ms

CFC_600

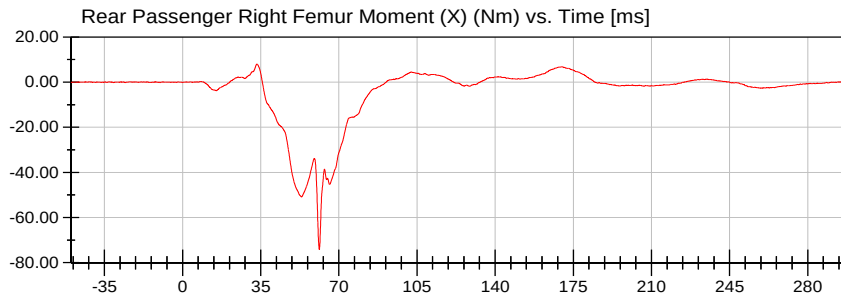


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



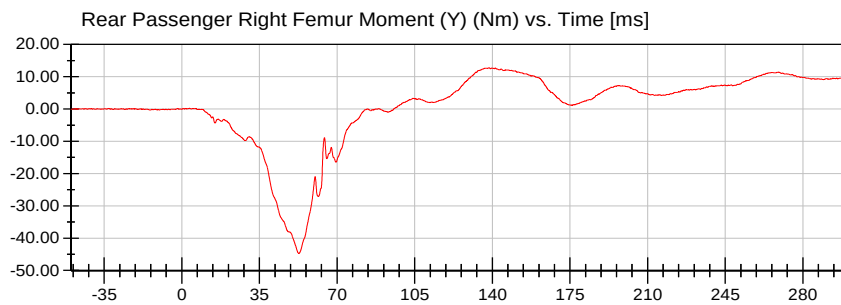
<Max>

7.95 Nm at 33.30 ms

<Min>

-74.17 Nm at 61.25 ms

CFC_600



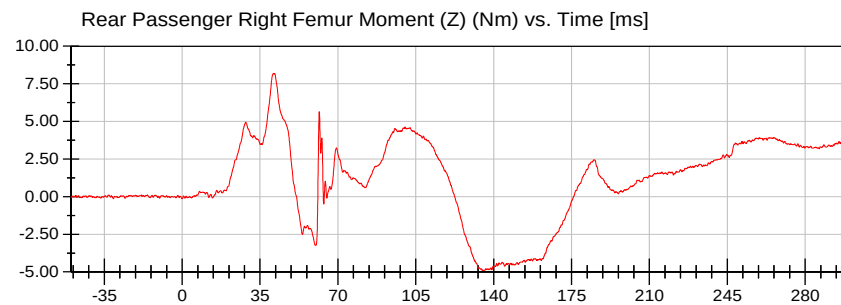
<Max>

12.76 Nm at 138.50 ms

<Min>

-44.74 Nm at 52.80 ms

CFC_600



<Max>

8.19 Nm at 41.60 ms

<Min>

-4.92 Nm at 135.50 ms

CFC_600

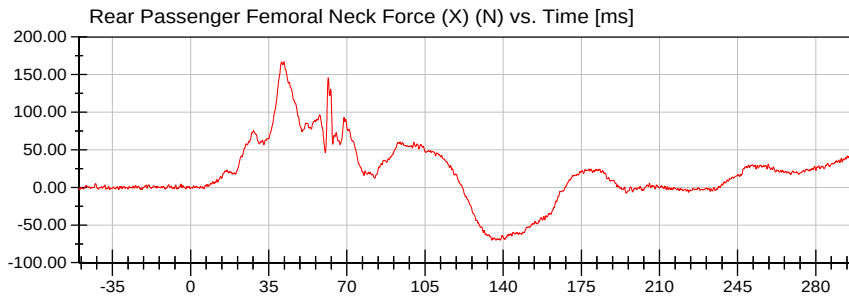


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



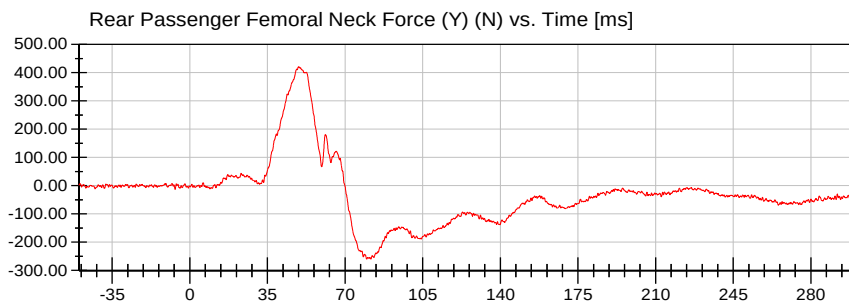
<Max>

167.18 N at 41.85 ms

<Min>

-70.19 N at 135.00 ms

CFC_600



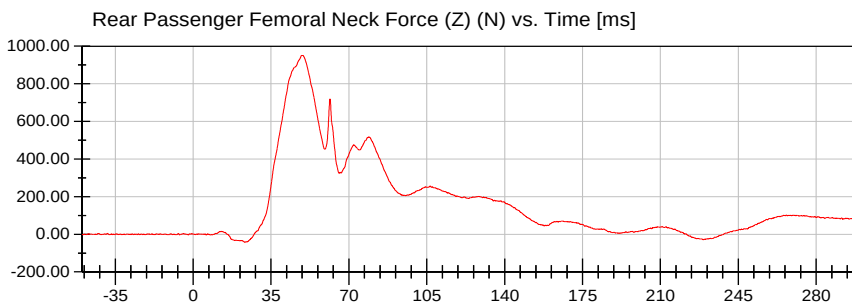
<Max>

421.51 N at 49.10 ms

<Min>

-259.53 N at 79.75 ms

CFC_600



<Max>

950.62 N at 48.85 ms

<Min>

-42.79 N at 23.15 ms

CFC_600



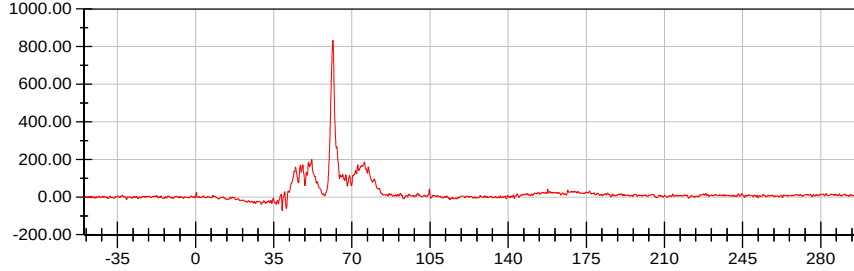
VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021

Rear Passenger Right Outer Knee Force (Y) (N) vs. Time [ms]



<Max>

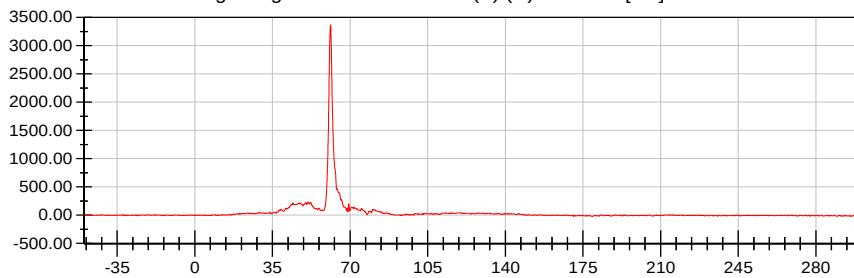
833.39 N at 61.55 ms

<Min>

-72.09 N at 38.80 ms

CFC_600

Rear Passenger Right Inner Knee Force (Y) (N) vs. Time [ms]



<Max>

3,369.29 N at 61.20 ms

<Min>

-22.36 N at 297.75 ms

CFC_600

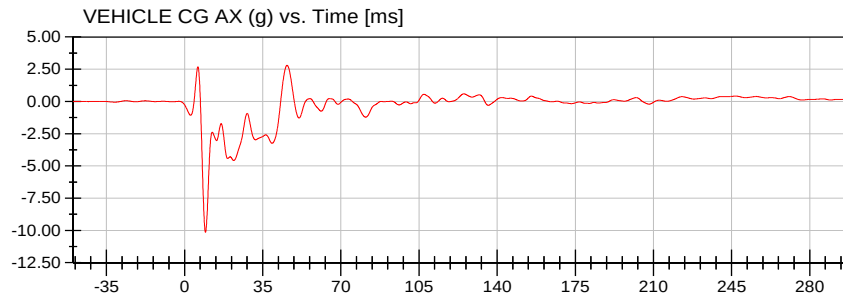


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



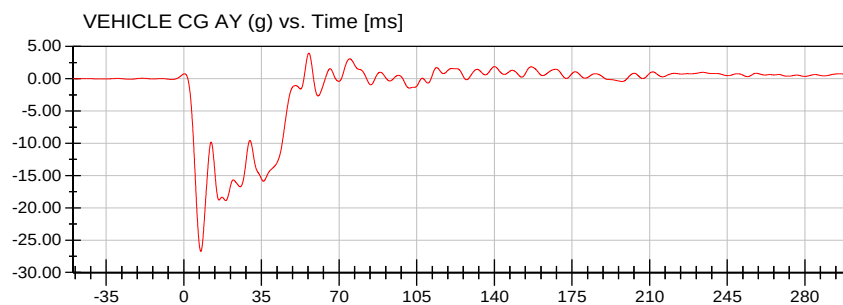
<Max>

2.80 g at 45.90 ms

<Min>

-10.15 g at 9.35 ms

CFC_60



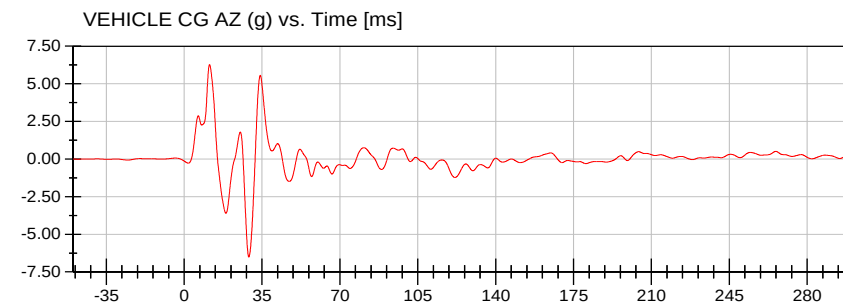
<Max>

3.97 g at 56.35 ms

<Min>

-26.75 g at 7.65 ms

CFC_60



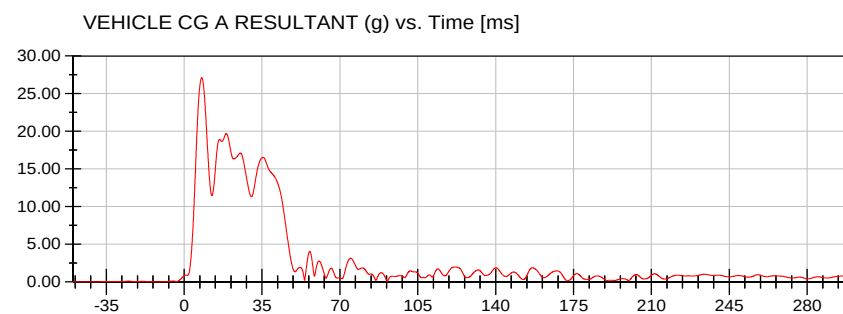
<Max>

6.27 g at 11.40 ms

<Min>

-6.51 g at 29.05 ms

CFC_60



<Max>

27.12 g at 7.90 ms

<Min>

0.00 g at -50.00 ms

CFC_60

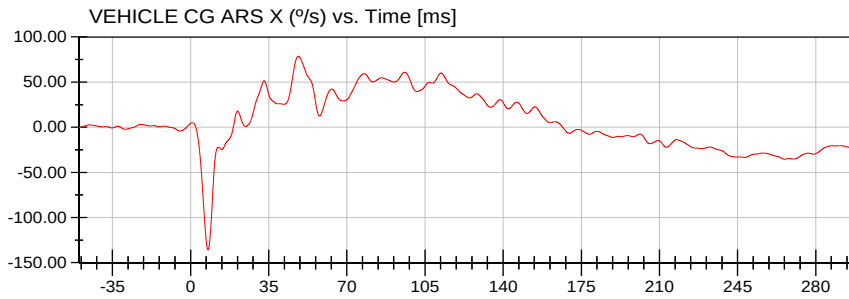


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



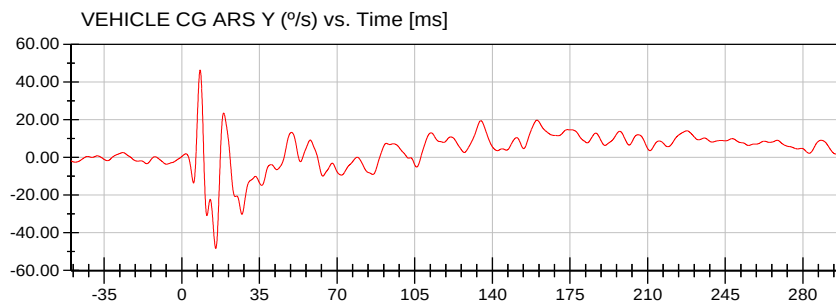
<Max>

78.63 °/s at 48.30 ms

<Min>

-135.91 °/s at 7.80 ms

CFC_60



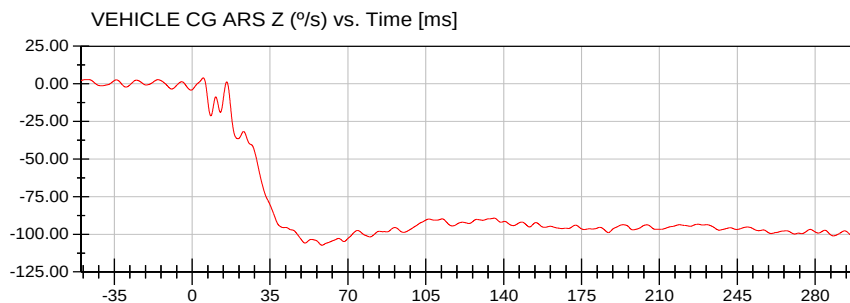
<Max>

46.35 °/s at 8.25 ms

<Min>

-48.37 °/s at 15.30 ms

CFC_60



<Max>

3.92 °/s at 5.00 ms

<Min>

-107.26 °/s at 58.35 ms

CFC_60

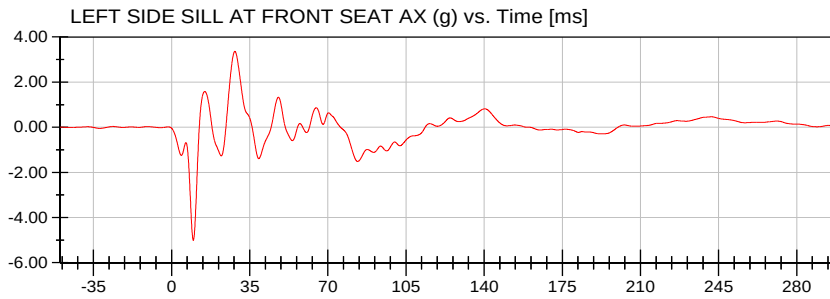


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



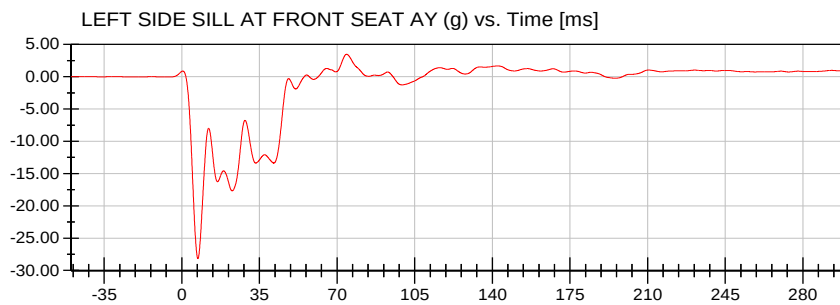
<Max>

3.36 g at 28.35 ms

<Min>

-5.01 g at 9.75 ms

CFC_60



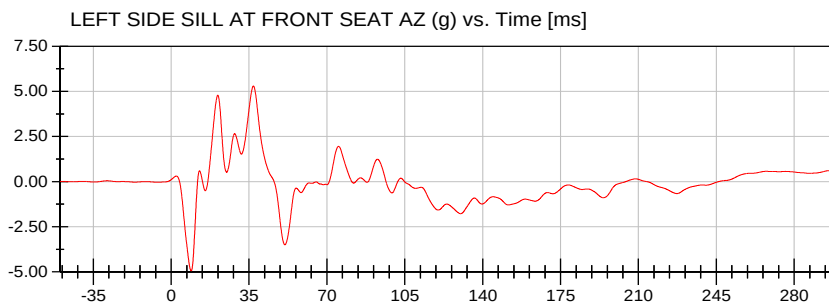
<Max>

3.49 g at 74.30 ms

<Min>

-28.15 g at 7.25 ms

CFC_60



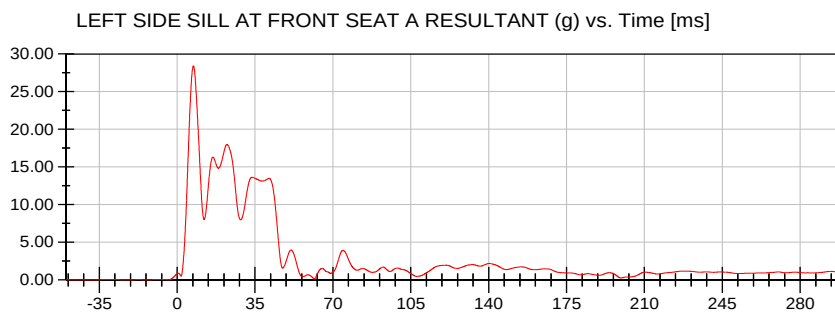
<Max>

5.29 g at 36.95 ms

<Min>

-4.94 g at 9.00 ms

CFC_60



<Max>

28.42 g at 7.30 ms

<Min>

0.00 g at -42.65 ms

CFC_60

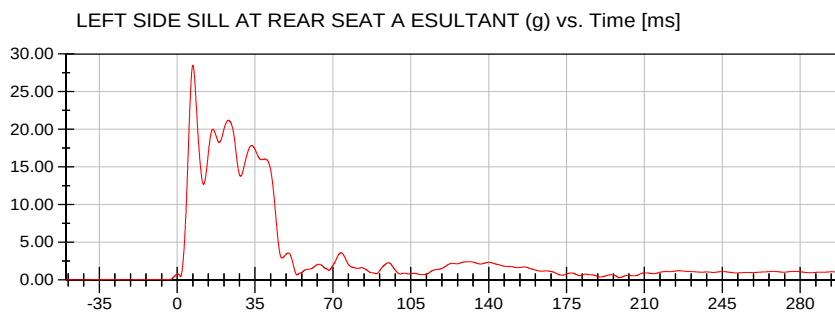
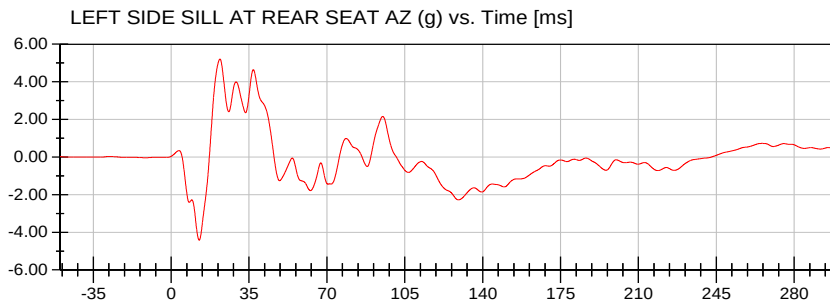
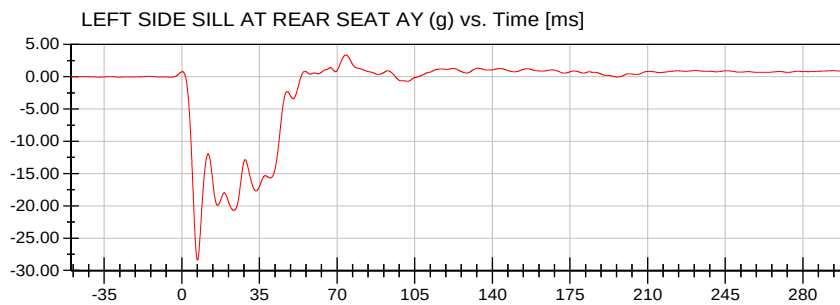
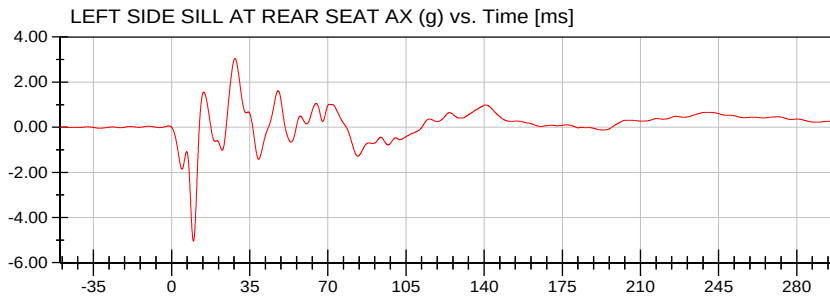


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()

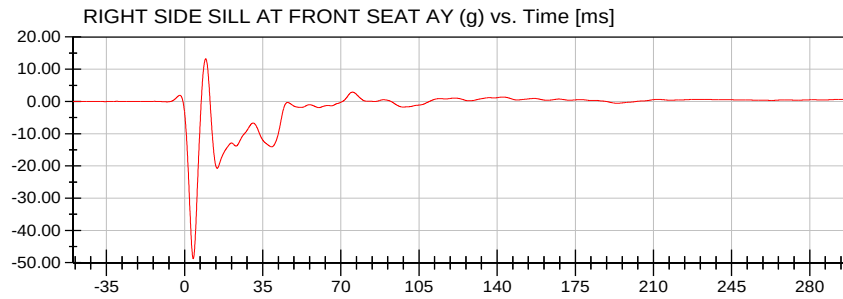


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021

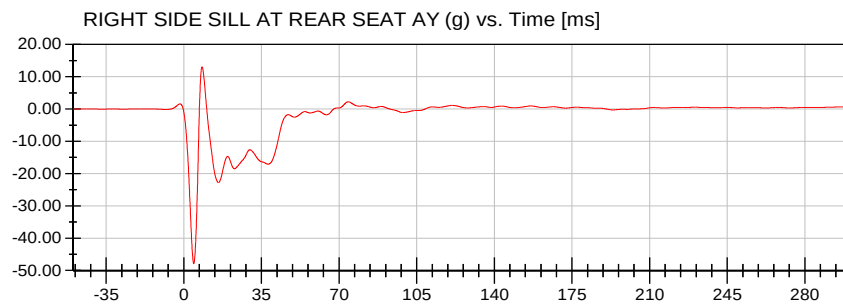


<Max>

13.22 g at 9.50 ms

<Min>

-48.76 g at 3.90 ms

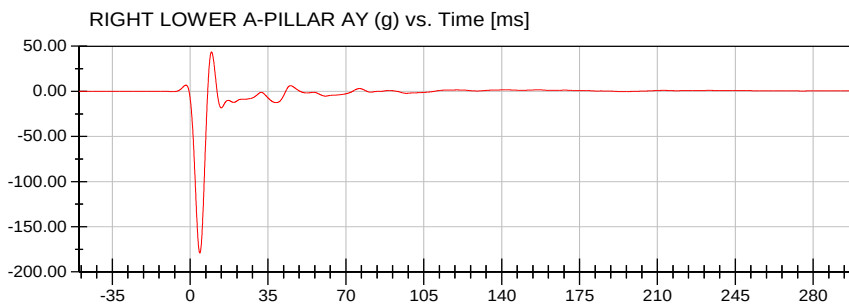


<Max>

13.03 g at 8.20 ms

<Min>

-47.92 g at 4.45 ms

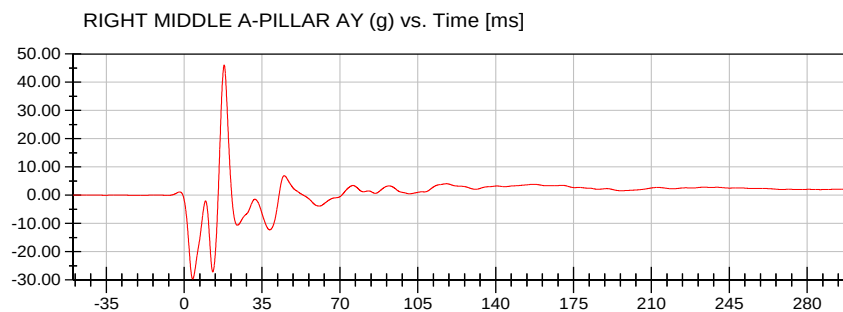


<Max>

43.61 g at 9.60 ms

<Min>

-179.12 g at 4.35 ms



<Max>

46.06 g at 18.00 ms

<Min>

-29.64 g at 3.80 ms

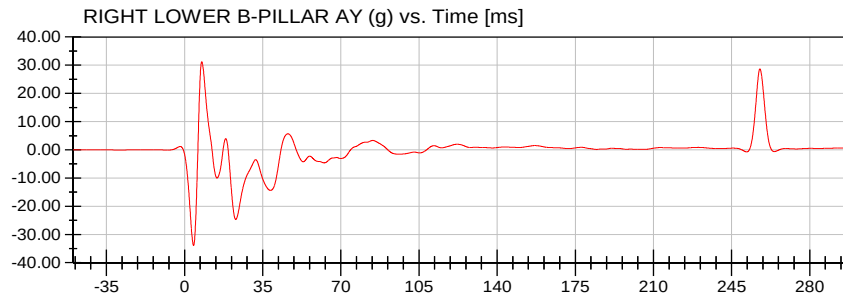


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



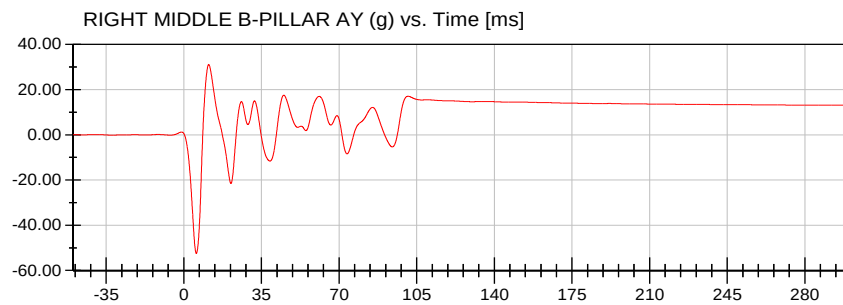
<Max>

31.18 g at 7.70 ms

<Min>

-33.90 g at 4.05 ms

CFC_60



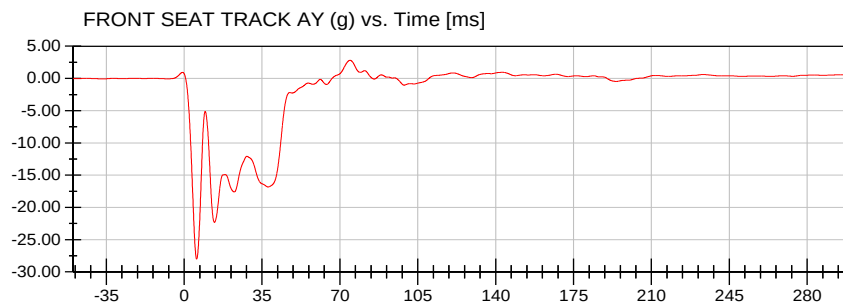
<Max>

31.13 g at 11.20 ms

<Min>

-52.51 g at 5.65 ms

CFC_60



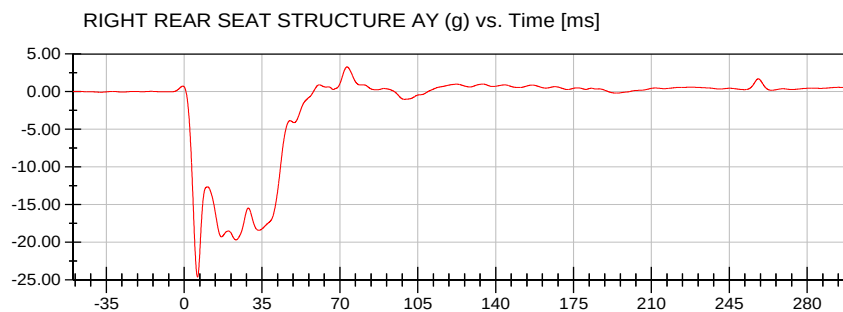
<Max>

2.81 g at 74.55 ms

<Min>

-28.02 g at 5.60 ms

CFC_60



<Max>

3.28 g at 73.25 ms

<Min>

-24.61 g at 6.00 ms

CFC_60

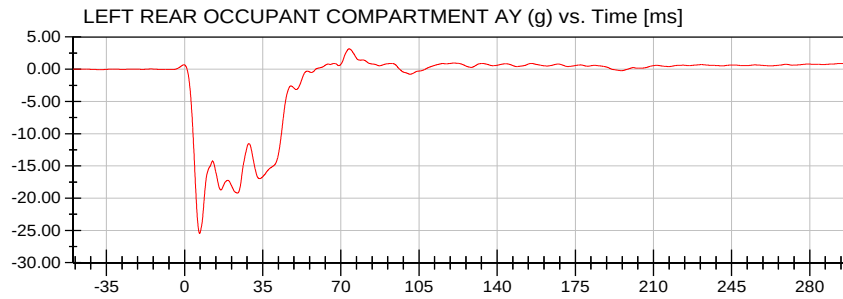


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



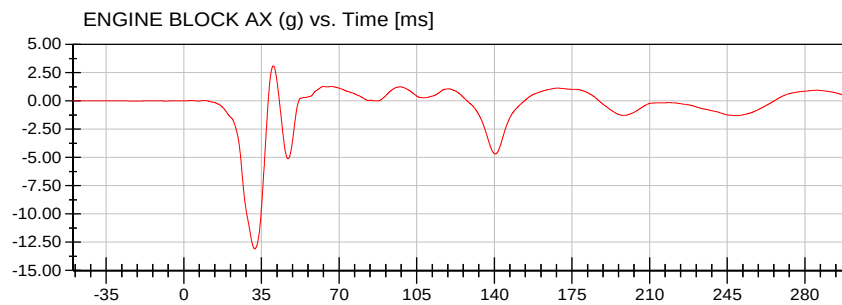
<Max>

3.17 g at 73.75 ms

<Min>

-25.47 g at 6.75 ms

CFC_60



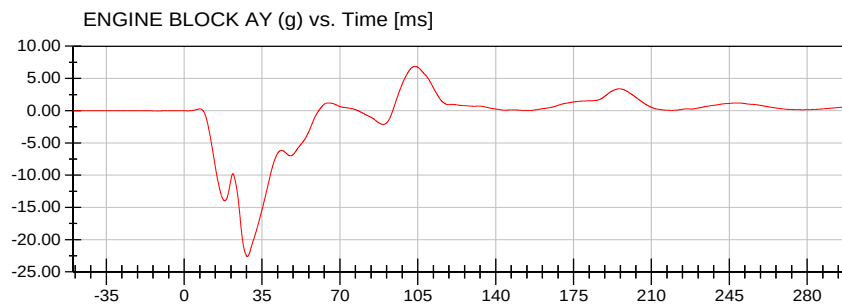
<Max>

3.11 g at 40.30 ms

<Min>

-13.09 g at 32.00 ms

CFC_60



<Max>

6.87 g at 103.80 ms

<Min>

-22.61 g at 28.40 ms

CFC_60

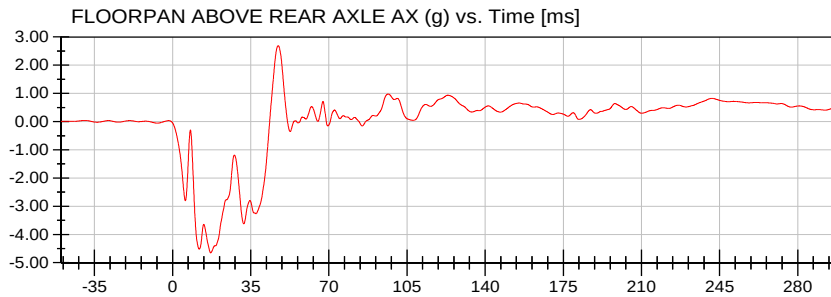


VRTC

Test Lab: CTF

Test Number: 210429 ()

Test Date: 04/29/2021



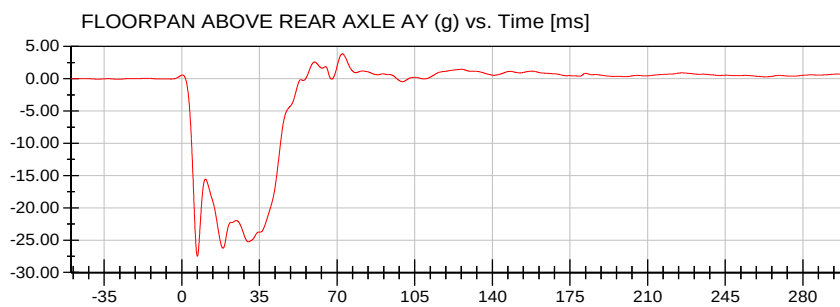
<Max>

2.69 g at 47.35 ms

<Min>

-4.65 g at 17.05 ms

CFC_60



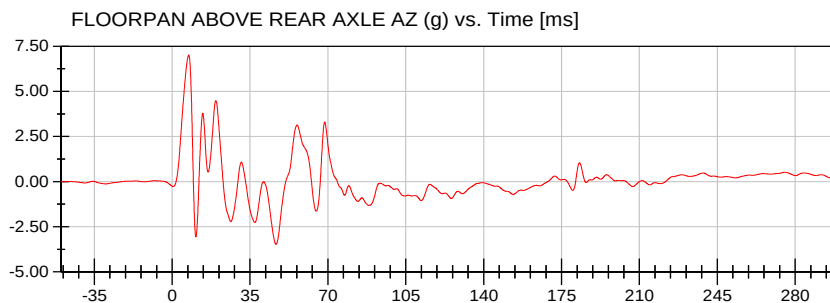
<Max>

3.86 g at 72.40 ms

<Min>

-27.51 g at 7.00 ms

CFC_60



<Max>

7.01 g at 7.45 ms

<Min>

-3.47 g at 46.60 ms

CFC_60



<Max>

28.39 g at 7.00 ms

<Min>

0.01 g at -50.00 ms

CFC_60

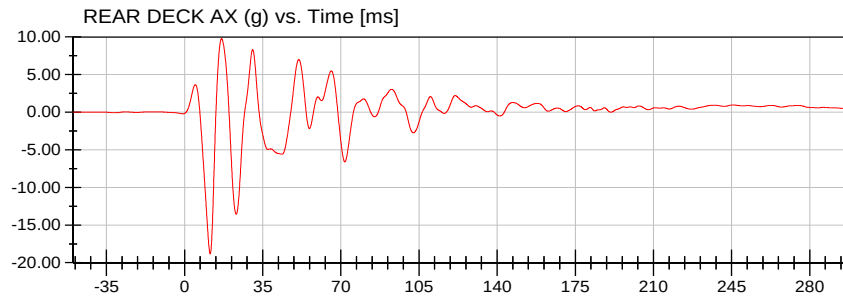


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



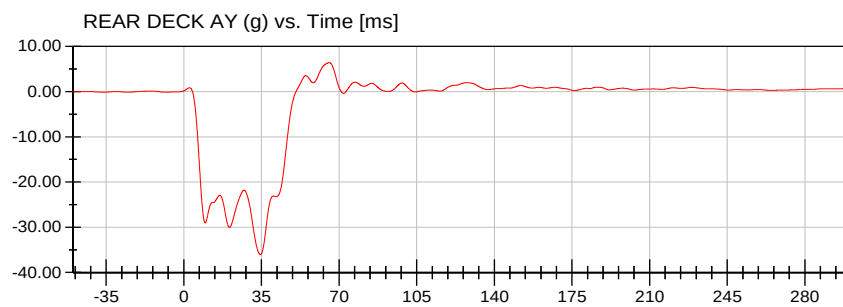
<Max>

9.78 g at 16.60 ms

<Min>

-18.85 g at 11.50 ms

CFC_60



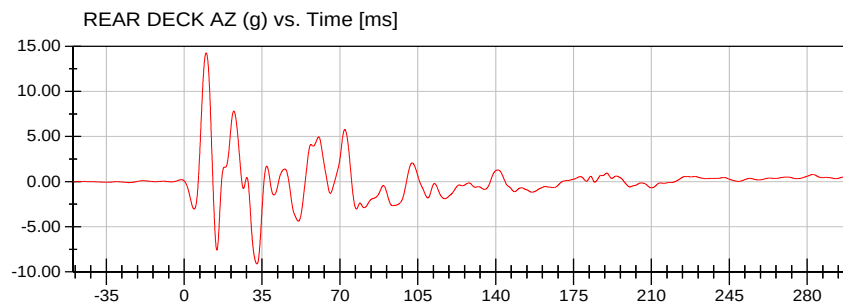
<Max>

6.42 g at 65.60 ms

<Min>

-36.05 g at 34.50 ms

CFC_60



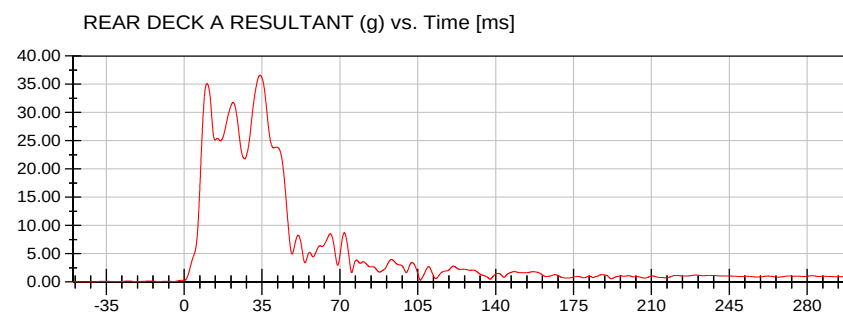
<Max>

14.24 g at 9.90 ms

<Min>

-9.12 g at 32.70 ms

CFC_60



<Max>

36.59 g at 34.10 ms

<Min>

0.00 g at -50.00 ms

CFC_60

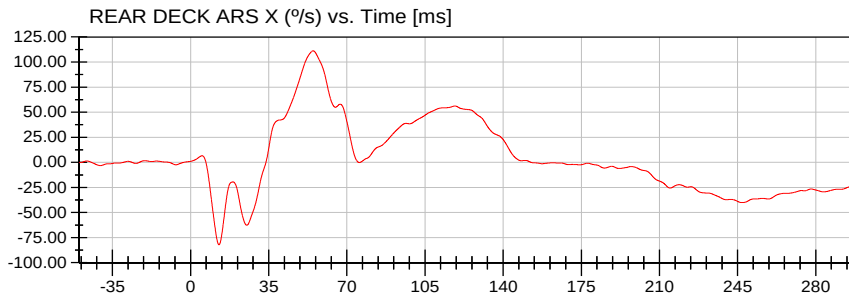


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



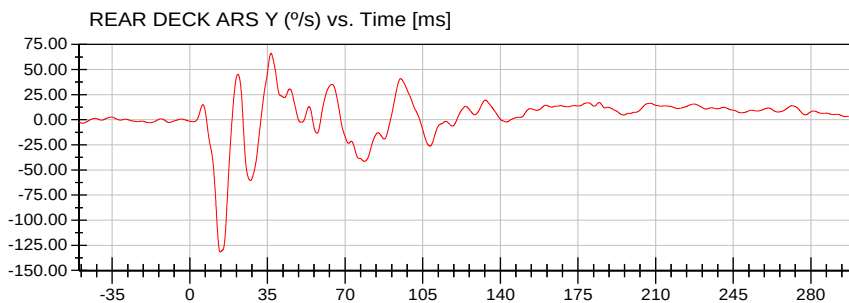
<Max>

111.15 °/s at 54.85 ms

<Min>

-82.15 °/s at 12.70 ms

CFC_60



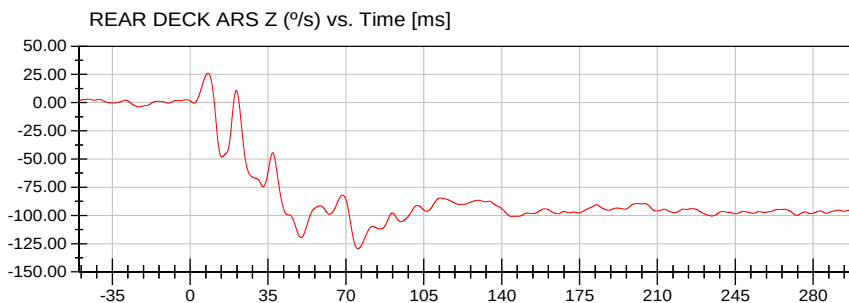
<Max>

66.25 °/s at 36.60 ms

<Min>

-131.67 °/s at 13.75 ms

CFC_60



<Max>

25.92 °/s at 8.00 ms

<Min>

-129.46 °/s at 75.40 ms

CFC_60

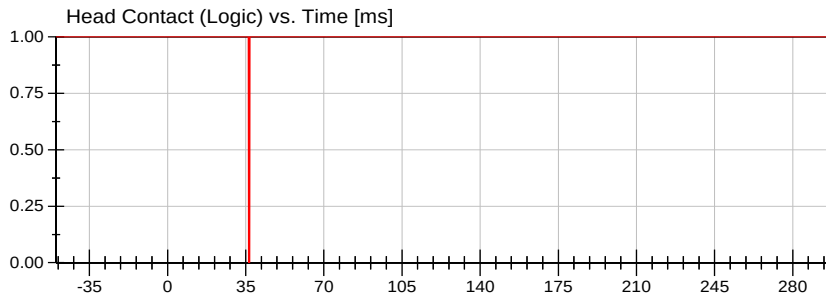


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



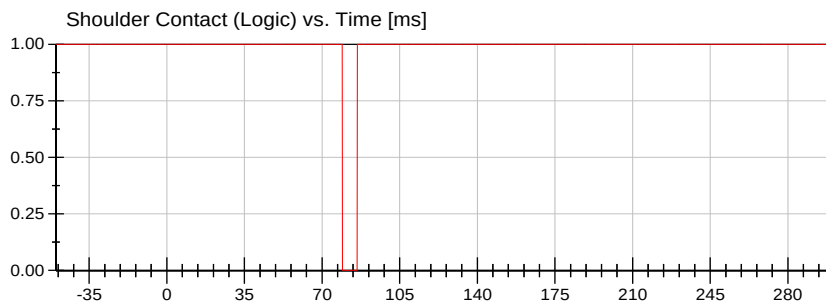
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1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 36.20 ms

Unfiltered



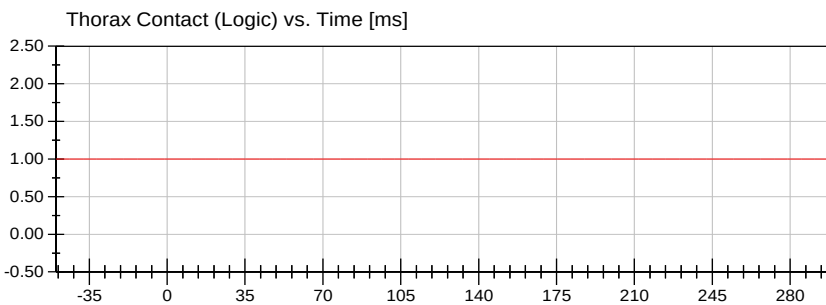
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1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 79.15 ms

Unfiltered



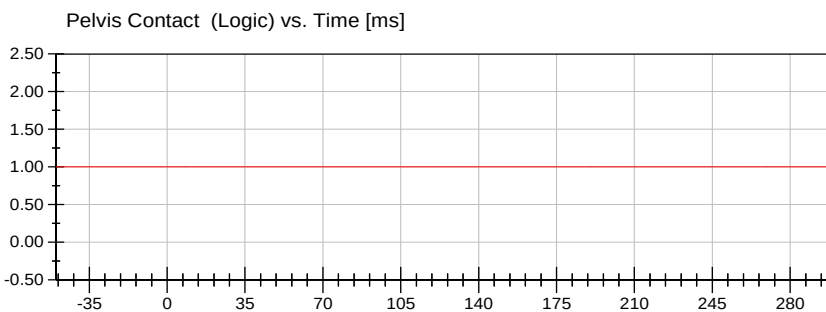
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1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered



<Max>

1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered

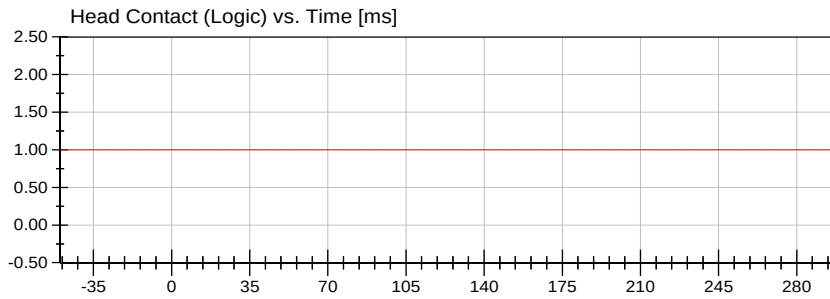


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



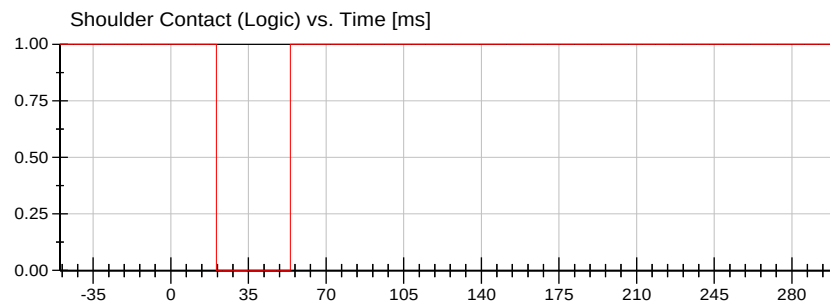
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1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered



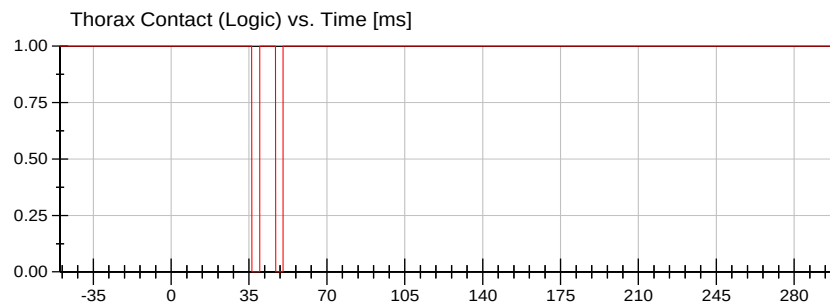
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1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 20.55 ms

Unfiltered



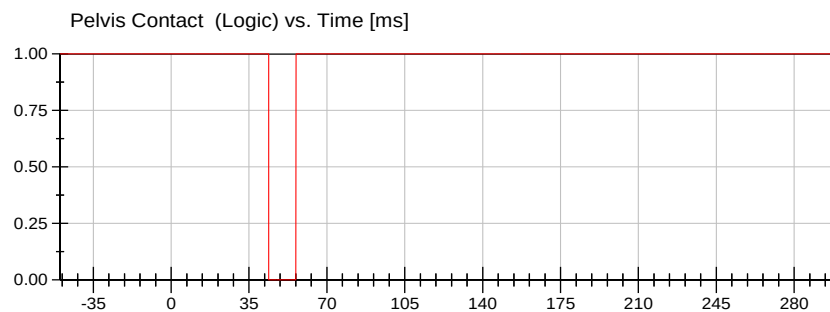
<Max>

1.00 Logic at -50.00 ms

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0.00 Logic at 36.25 ms

Unfiltered



<Max>

1.00 Logic at -50.00 ms

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0.00 Logic at 43.85 ms

Unfiltered

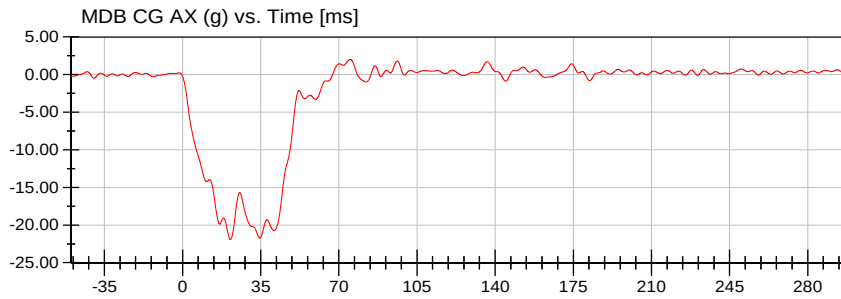


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



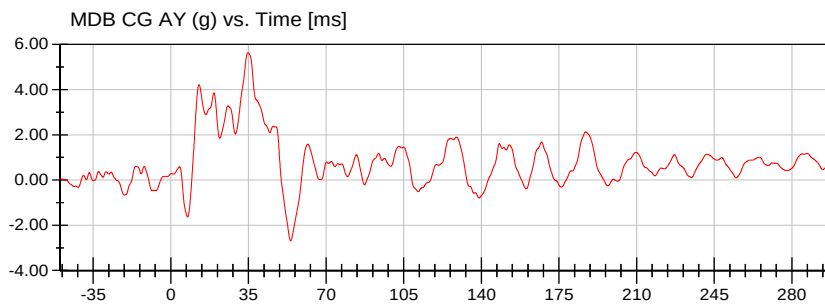
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2.02 g at 75.05 ms

<Min>

-21.94 g at 21.40 ms

CFC_60



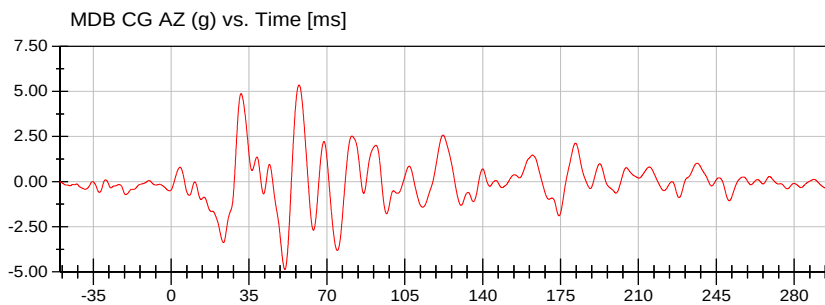
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5.64 g at 34.70 ms

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-2.69 g at 54.00 ms

CFC_60



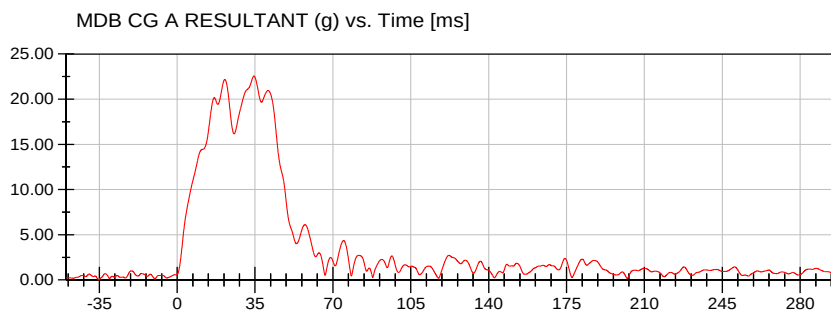
<Max>

5.35 g at 57.45 ms

<Min>

-4.87 g at 51.10 ms

CFC_60



<Max>

22.56 g at 34.50 ms

<Min>

0.02 g at -35.35 ms

CFC_60

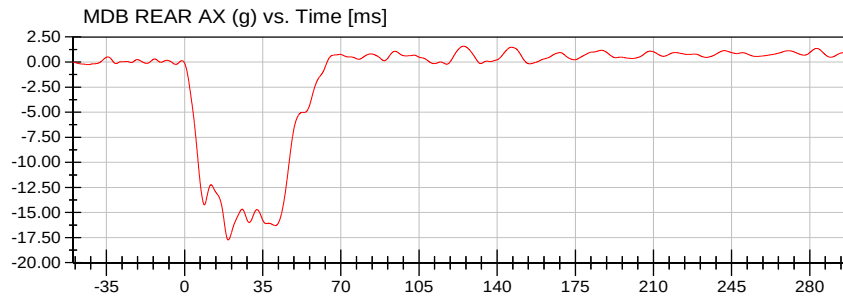


VRTC

Test Date: 04/29/2021

Test Lab: CTF

Test Number: 210429 ()



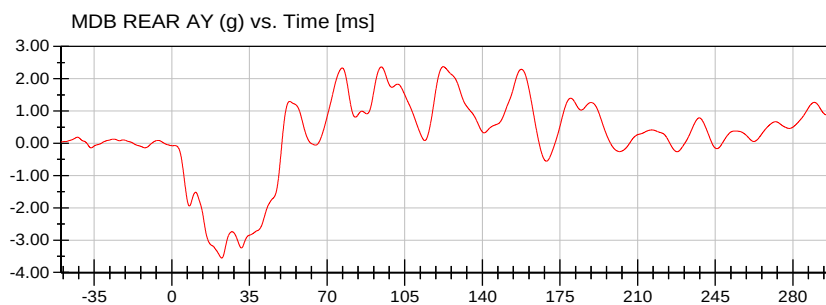
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1.58 g at 124.95 ms

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-17.73 g at 19.55 ms

CFC_60



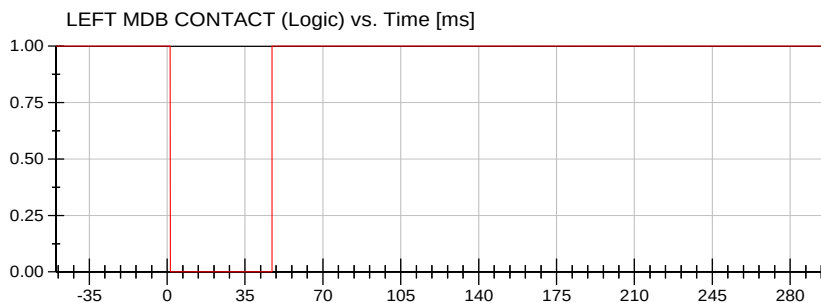
<Max>

2.37 g at 122.40 ms

<Min>

-3.56 g at 22.50 ms

CFC_60



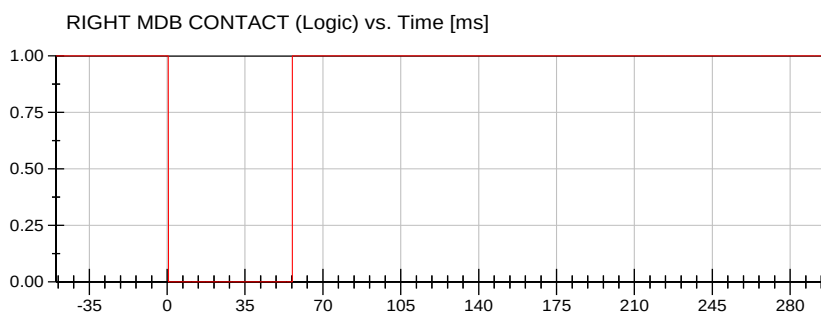
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1.00 Logic at -50.00 ms

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0.00 Logic at 1.40 ms

Unfiltered



<Max>

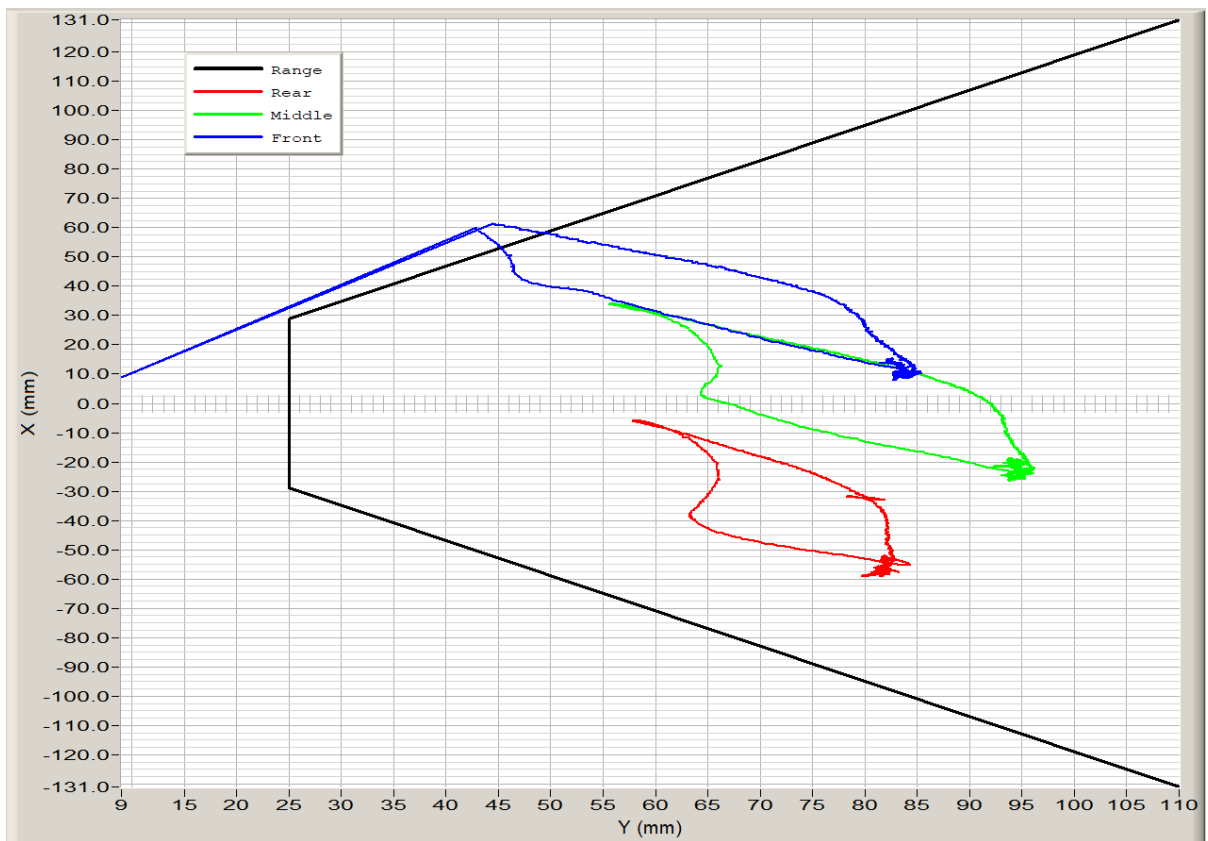
1.00 Logic at -50.00 ms

<Min>

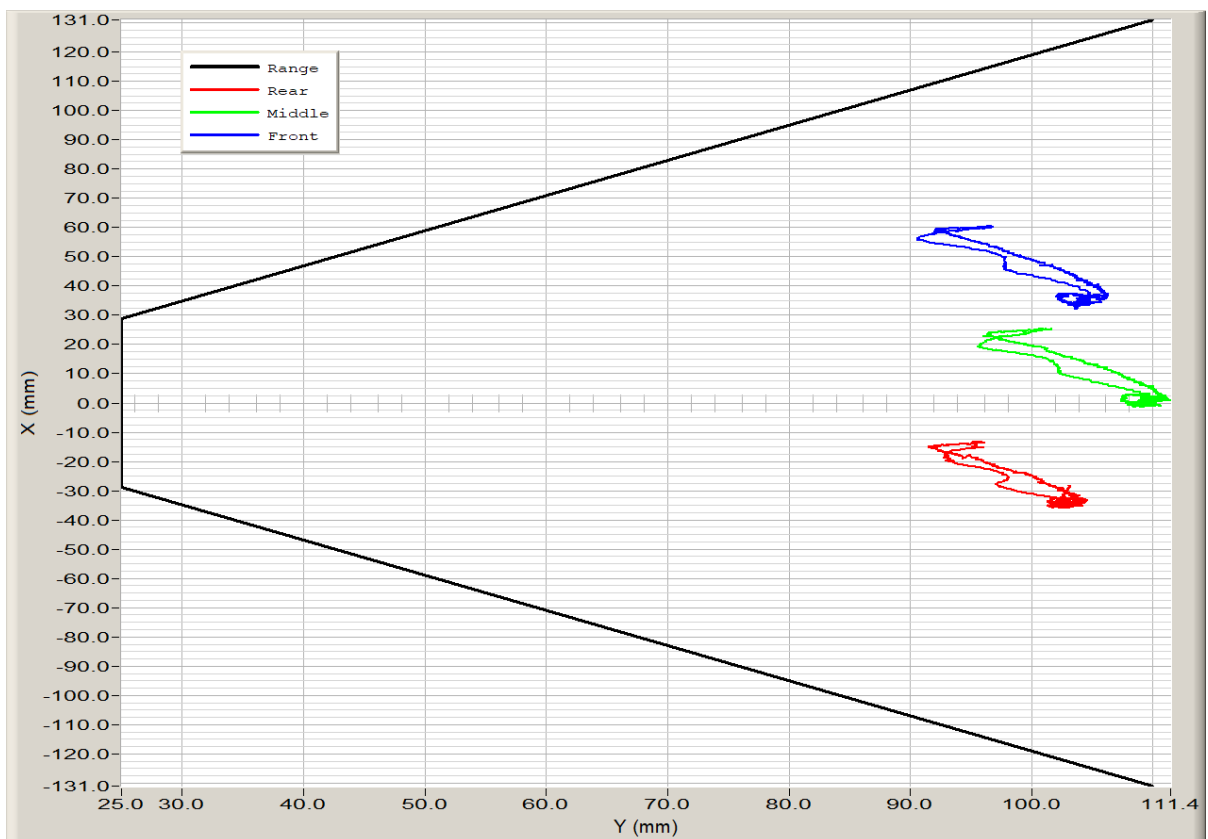
0.00 Logic at 0.55 ms

Unfiltered

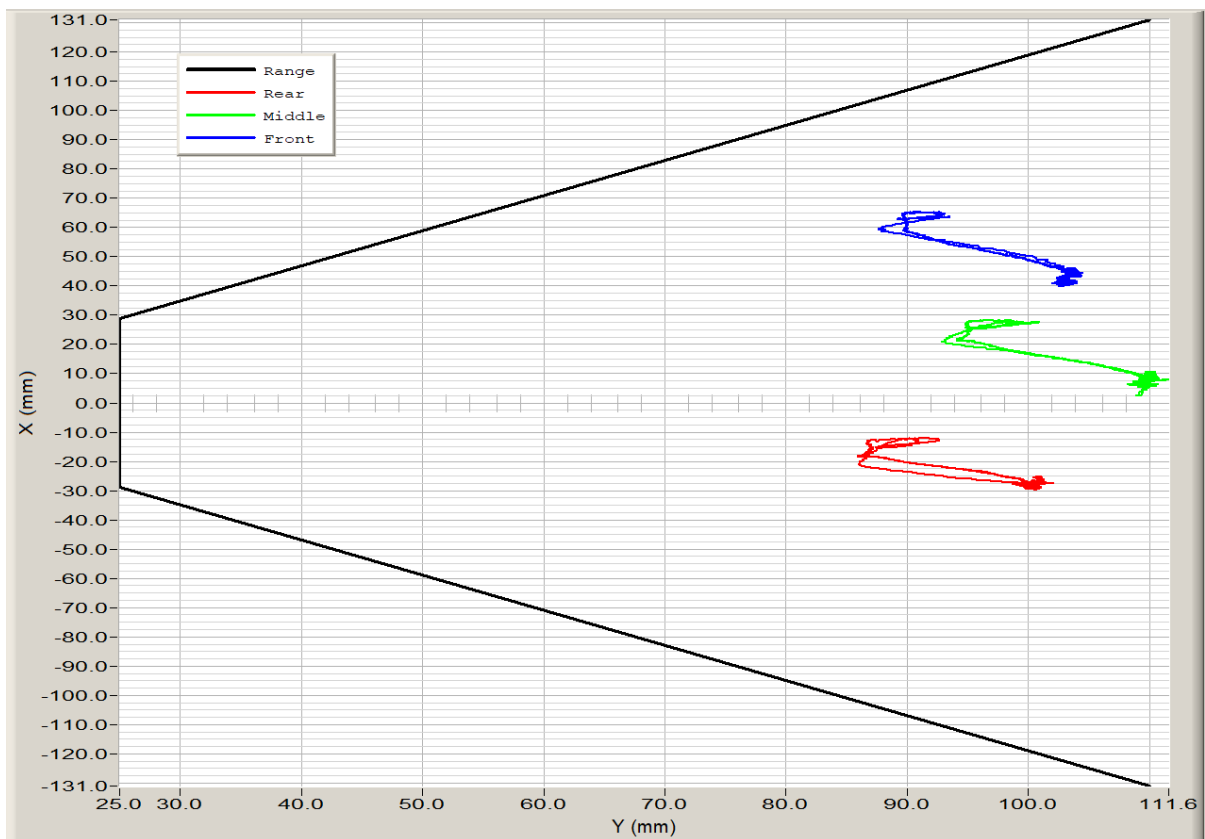




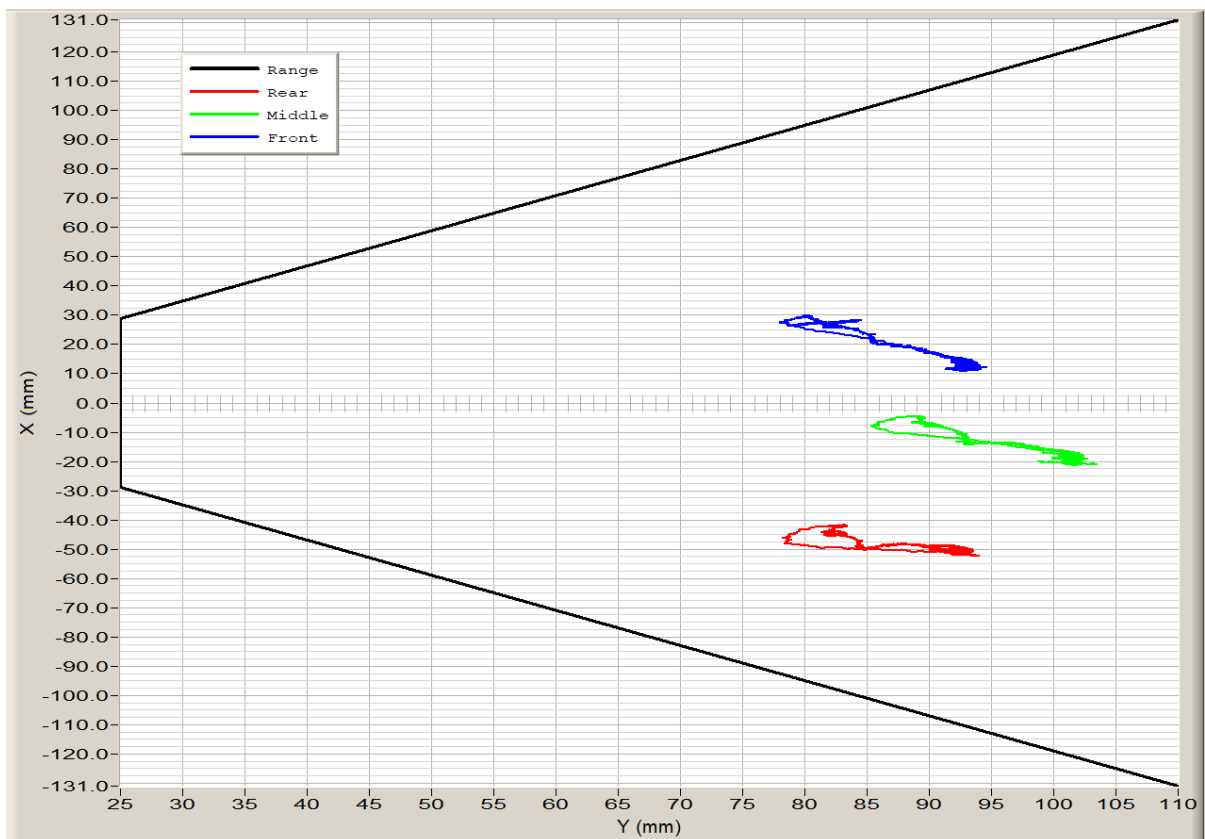
50th_Shoulder_XY



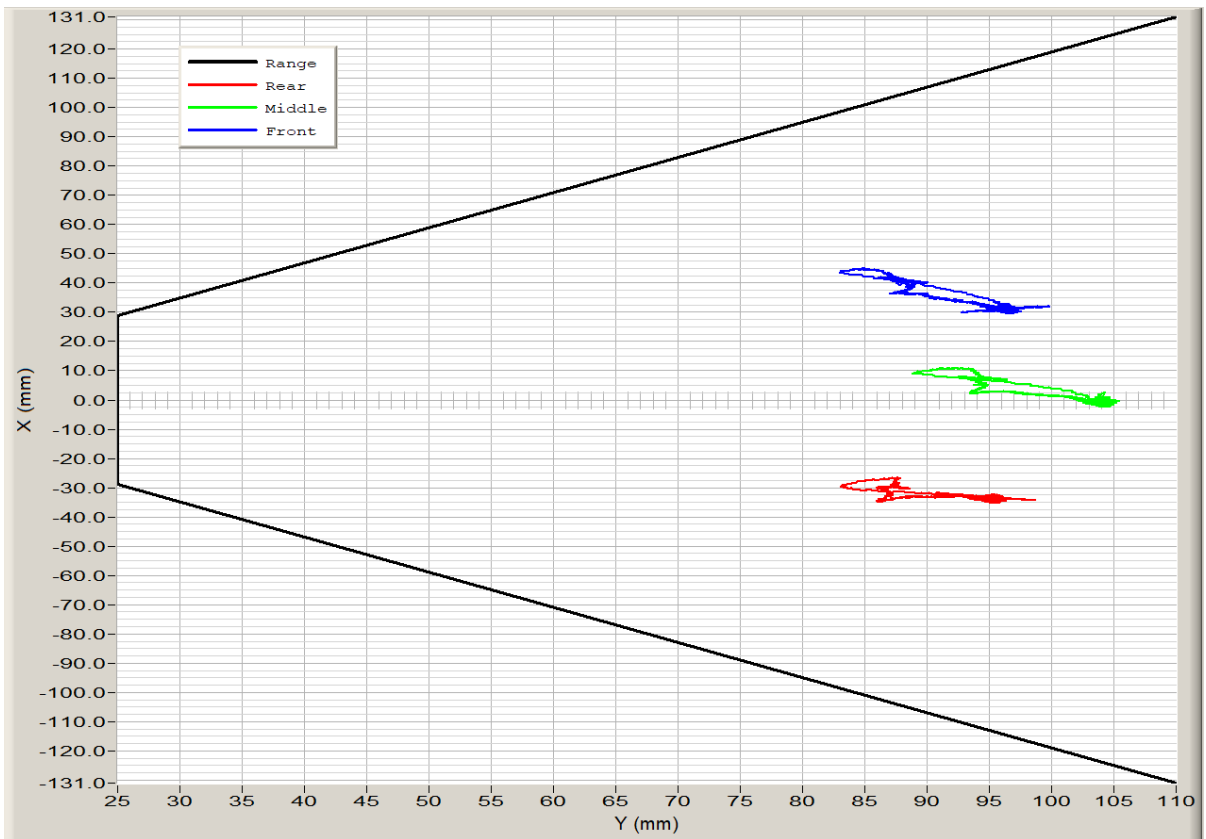
50th_Thorax_1_XY



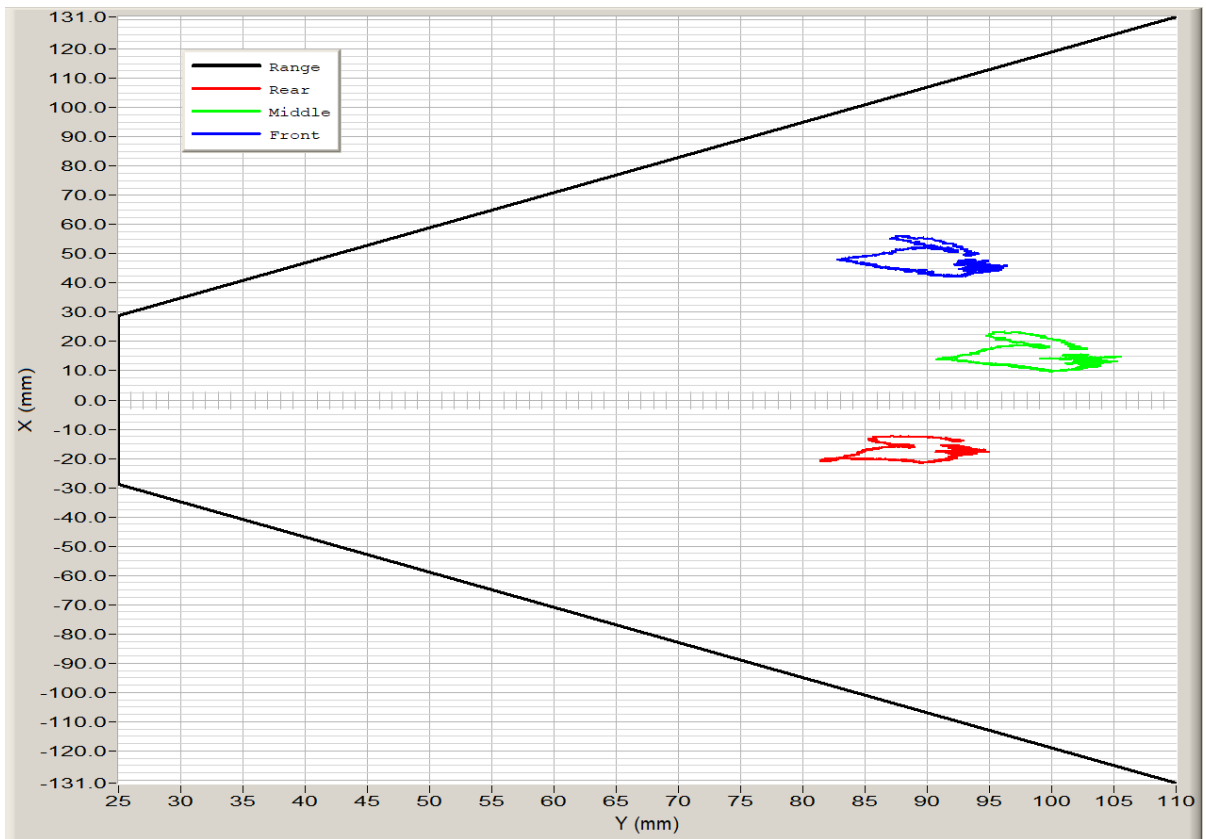
50th_Thorax_2_XY



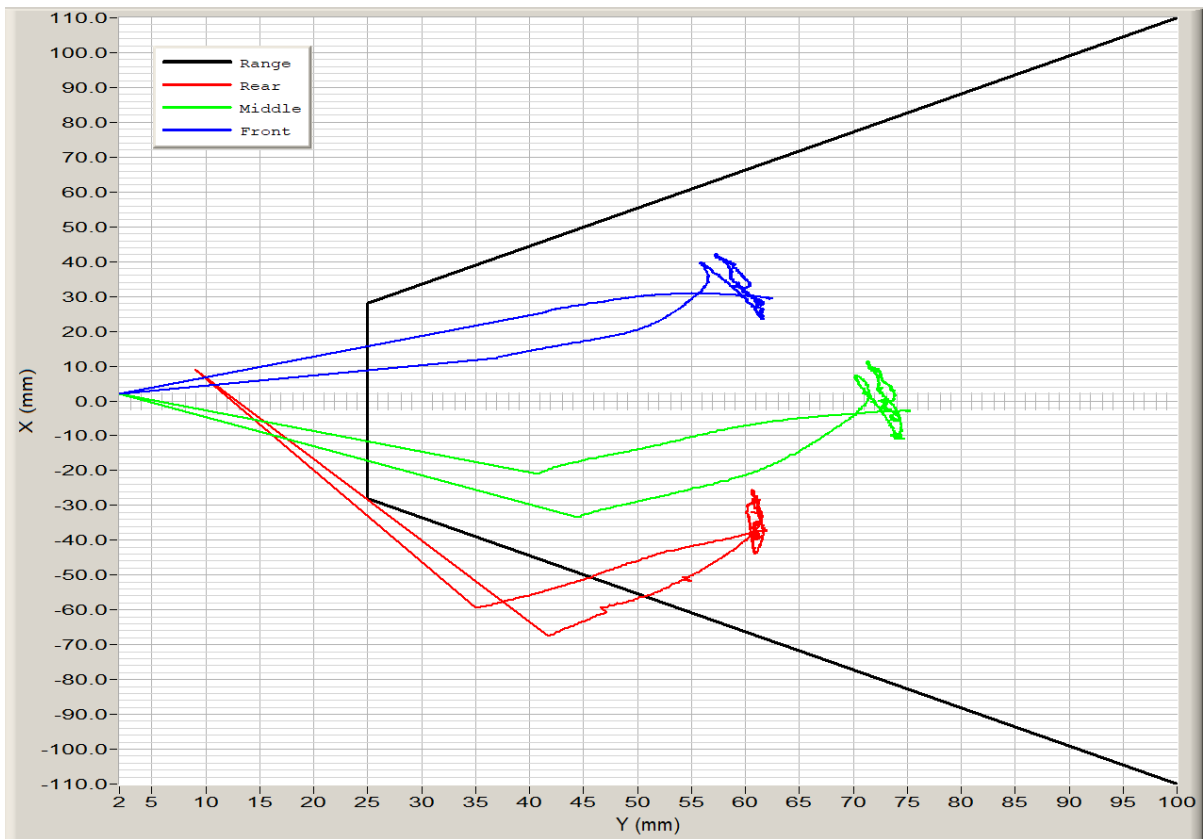
50th_Thorax_3_XY



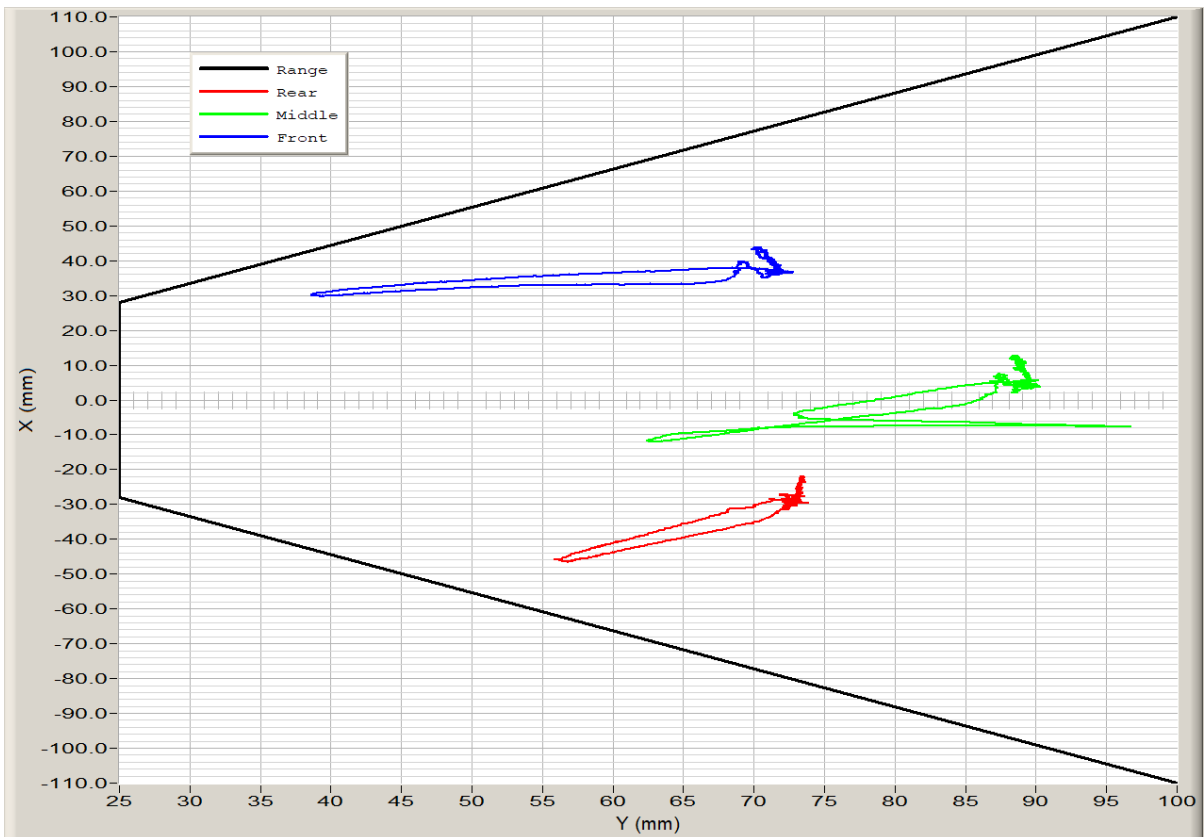
50th_Abdomen_1_XY



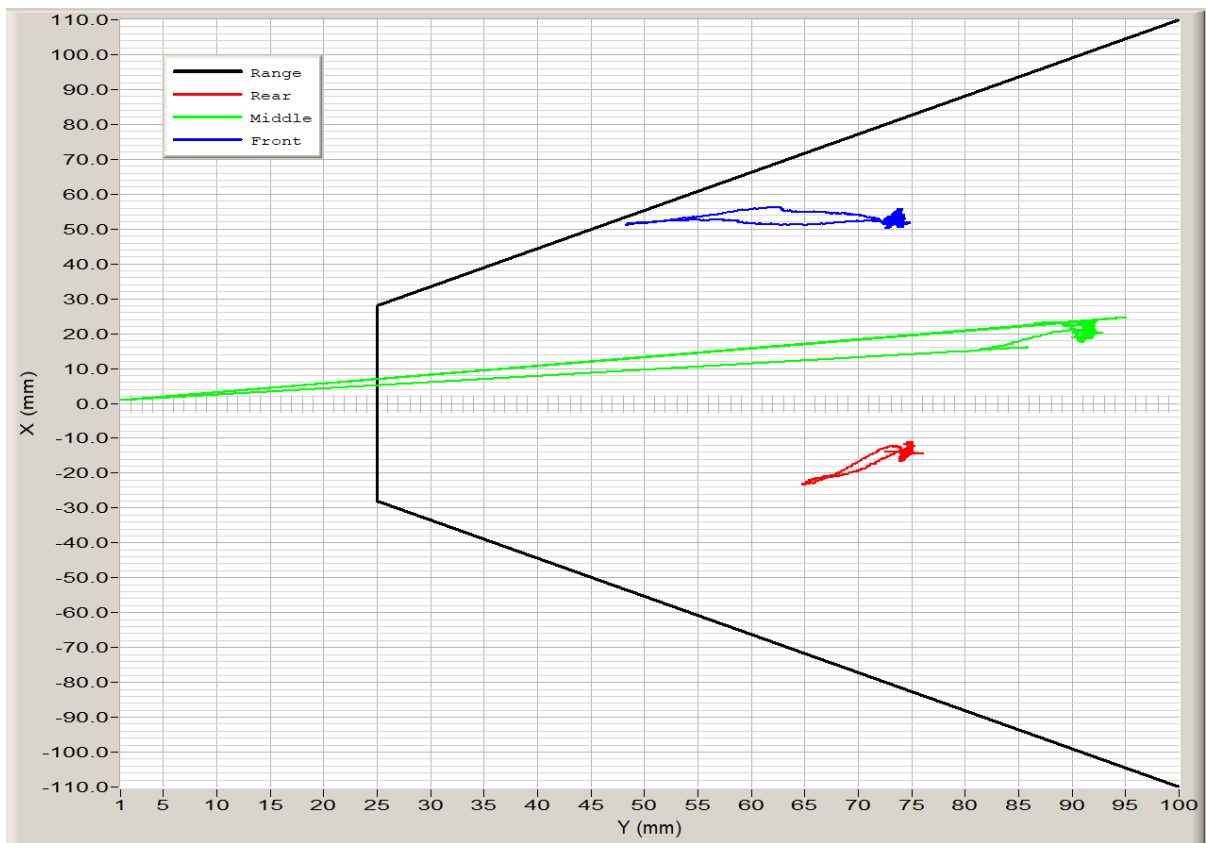
50th_Abdomen_2_XY



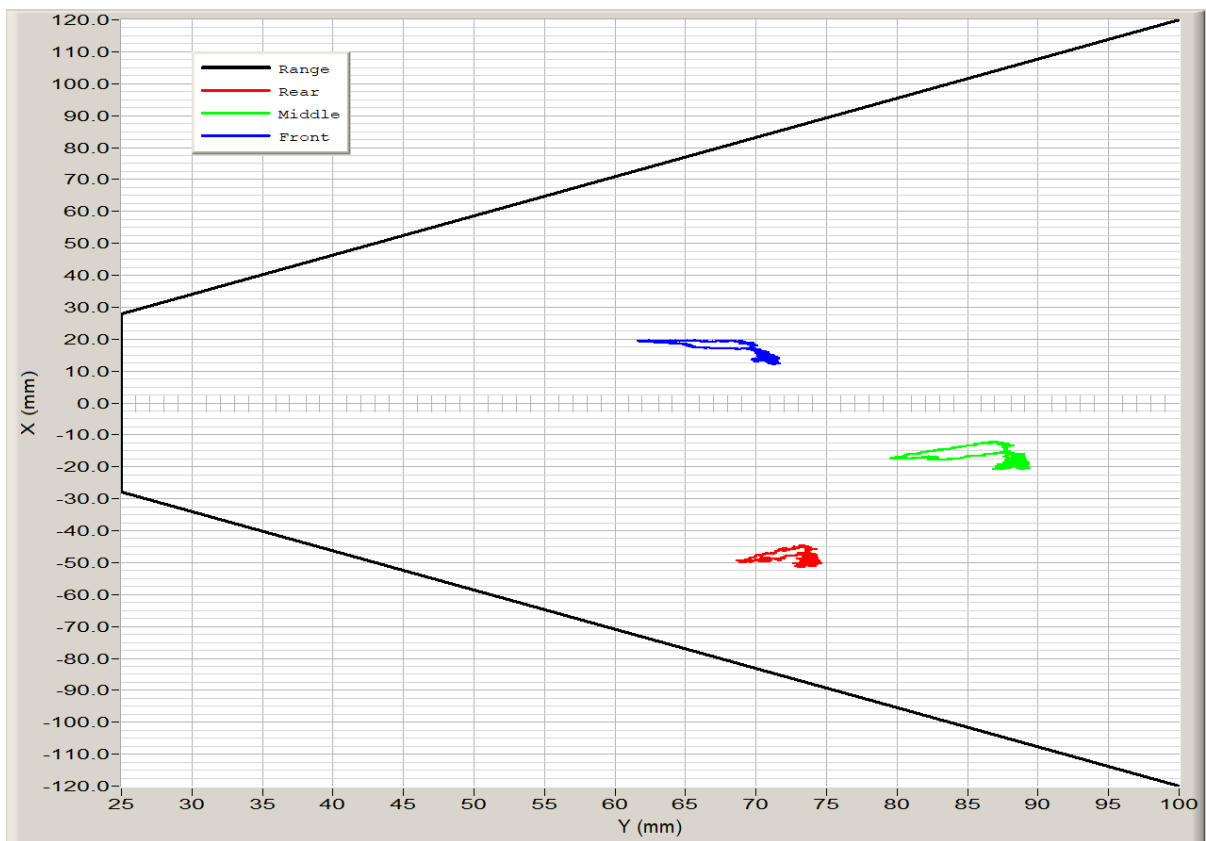
5th_Shoulder_XY



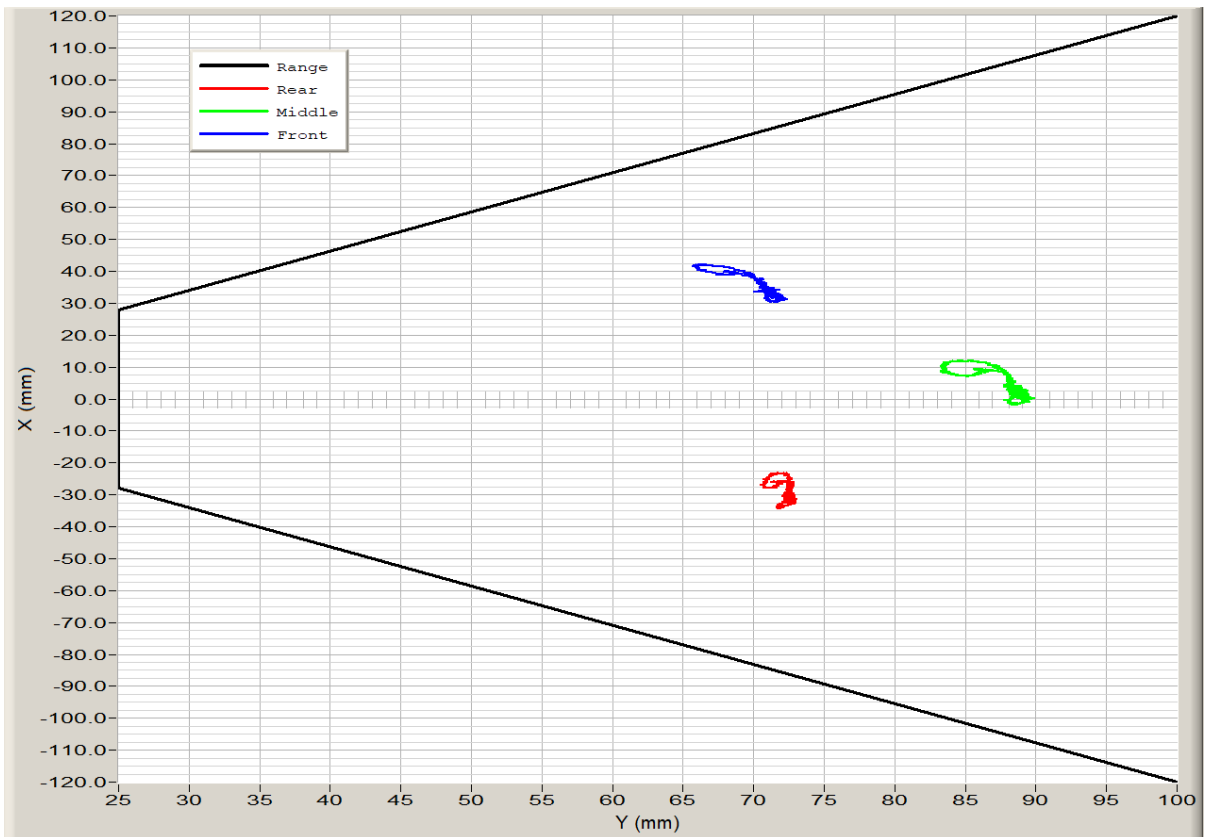
5th_Thorax_1_XY



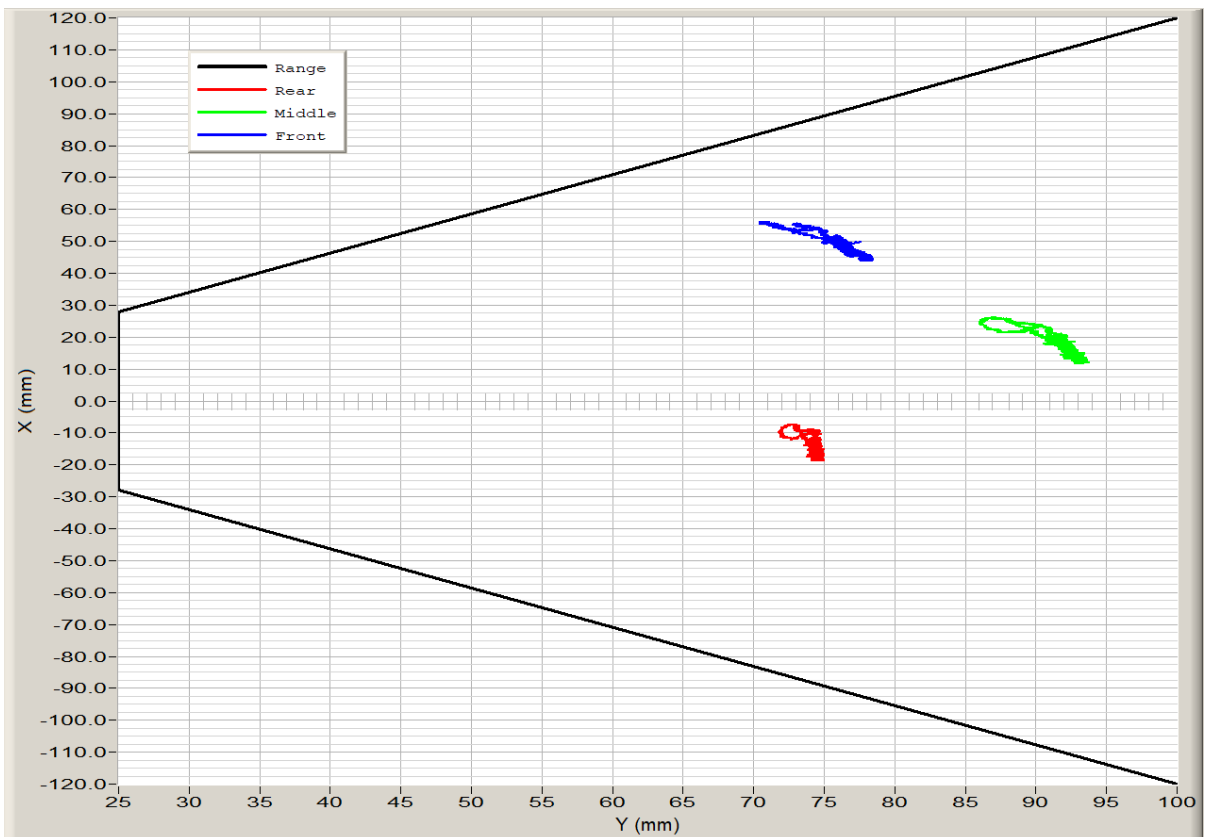
5th_Thorax_2_XY



5th_Thorax_3_XY



5th_Abdomen_1_XY



5th_Abdomen_2_XY

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION 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)

TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS

WorldSID-5F (Rear 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-5F (Rear 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
Passenger 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:

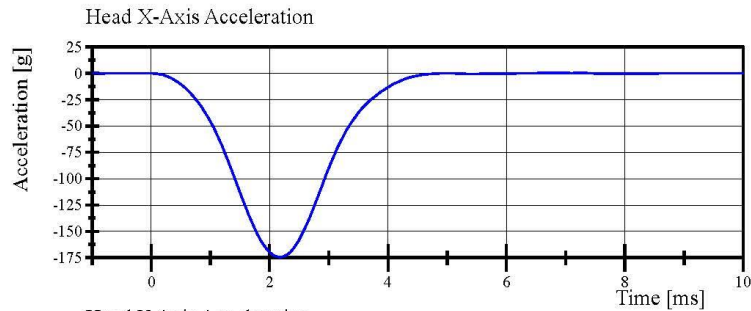
Head Skin S/N: EE8693

Transportation Research Center Inc.

Front Head Drop

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

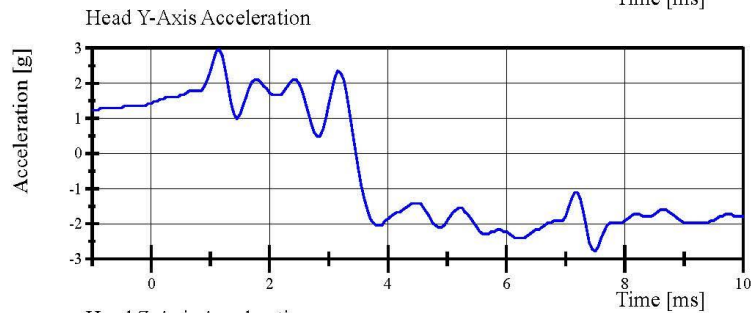
Test Date: 1/26/2021



Filter Class: CFC_1000

Max: 0.3 g at 6.7 ms

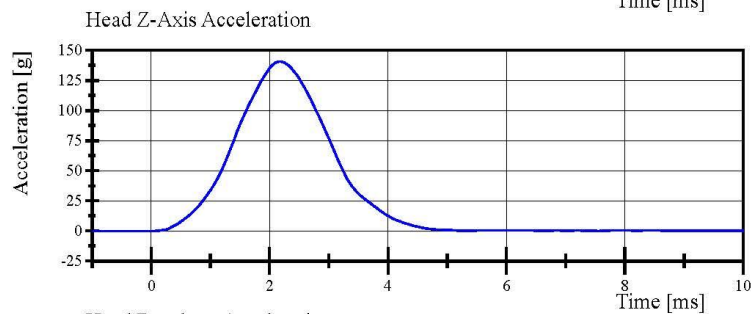
Min: -174.4 g at 2.2 ms



Filter Class: CFC_1000

Max: 3.0 g at 1.2 ms

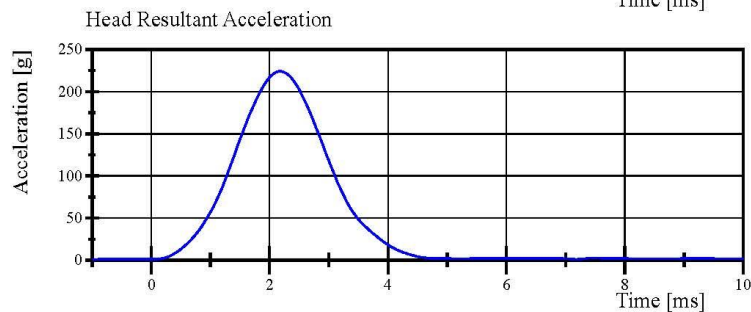
Min: -2.8 g at 7.5 ms



Filter Class: CFC_1000

Max: 140.6 g at 2.2 ms

Min: -0.1 g at -1.0 ms



Filter Class: CFC_1000

Max: 224.0 g at 2.2 ms

Min: 1.2 g at 7.2 ms

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

Report Number: EA7820_WSH01

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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:

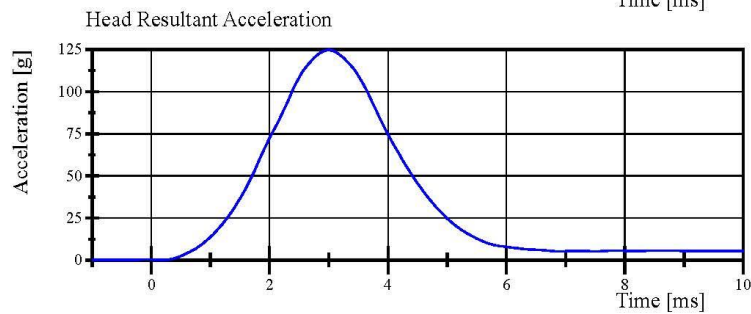
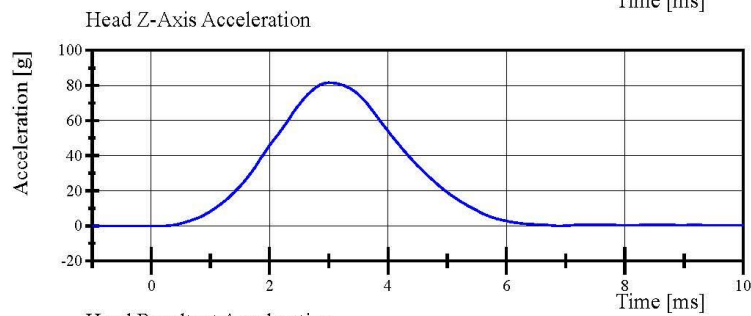
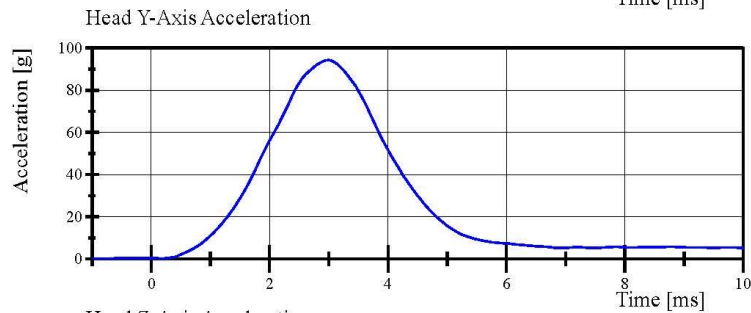
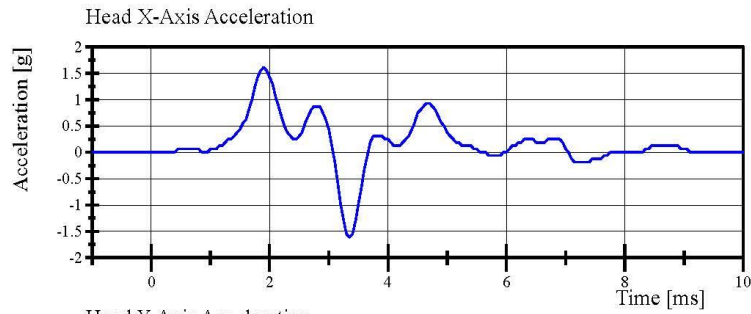
Head Skin S/N: EE8693

Transportation Research Center Inc.

Left Lateral Head Drop

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

Test Date: 1/26/2021



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:

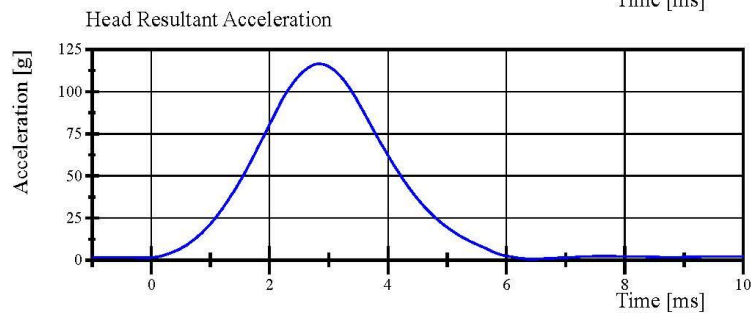
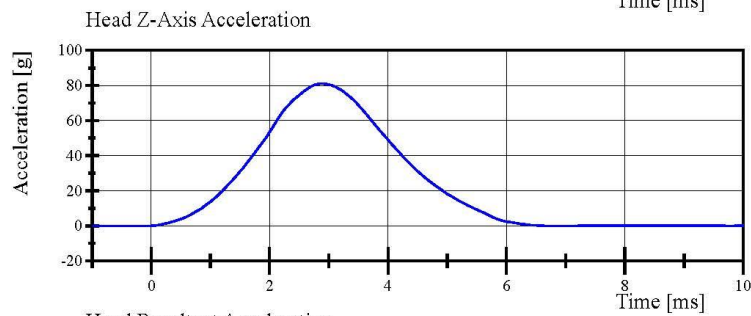
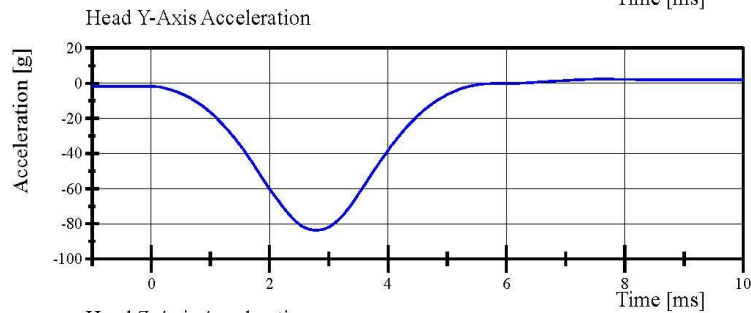
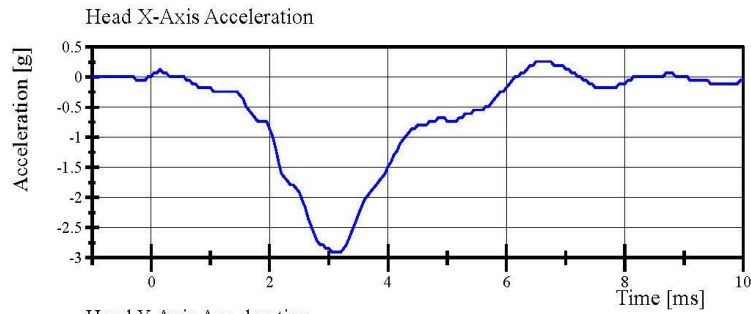
Head Skin S/N: EE8693

Transportation Research Center Inc.

Right Lateral Head Drop

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

Test Date: 1/26/2021



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:

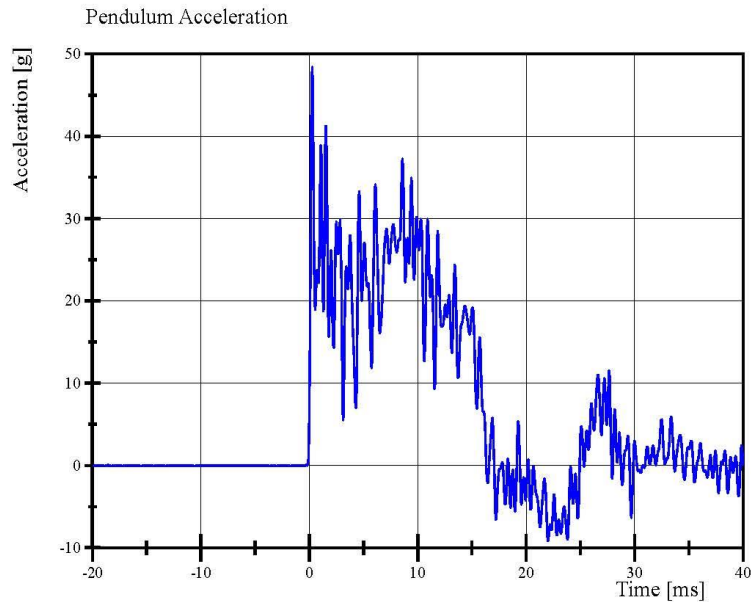
Neck S/N: DW6607

Transportation Research Center Inc.

Left Lateral Neck

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

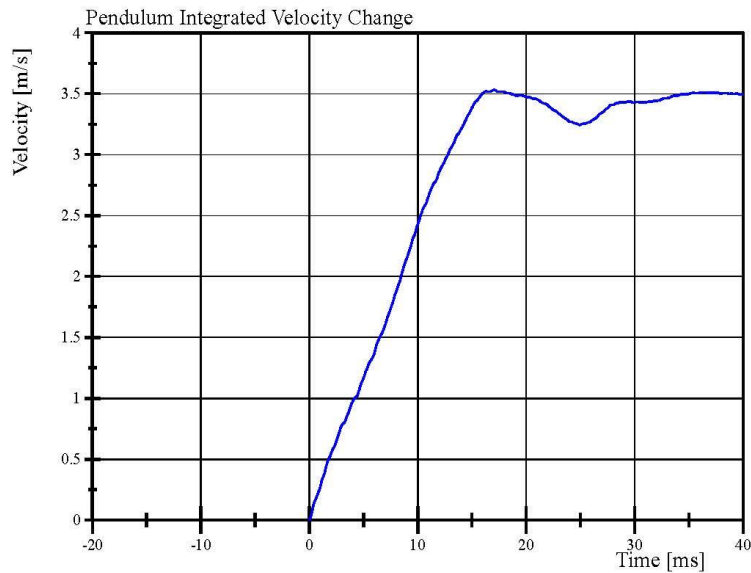
Test Date: 1/26/2021



Filter Class: CFC_1000

Max: 48.4 g at 0.3 ms

Min: -9.2 g at 22.0 ms



Filter Class: CFC_1000

Max: 3.5 m/s at 17.1 ms

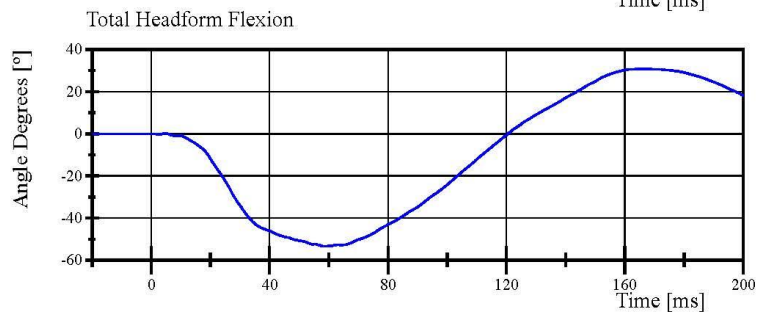
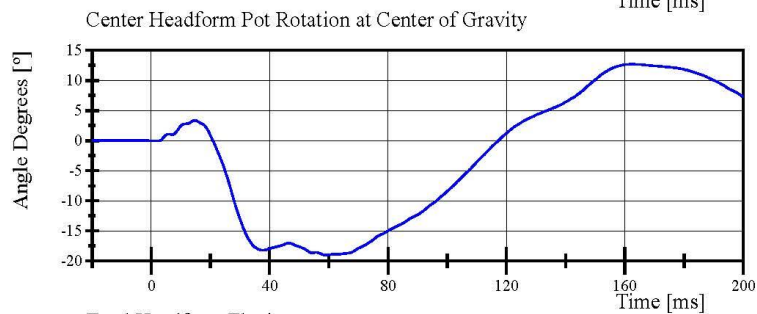
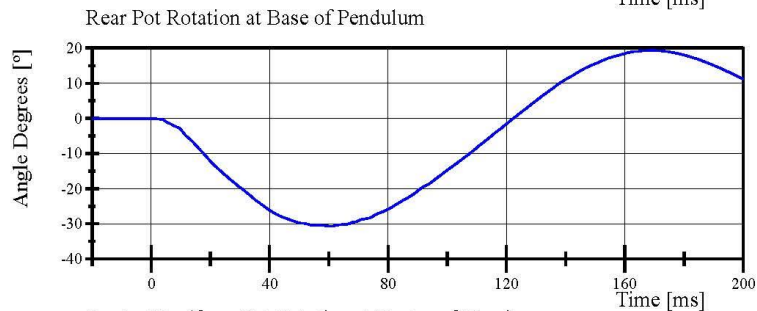
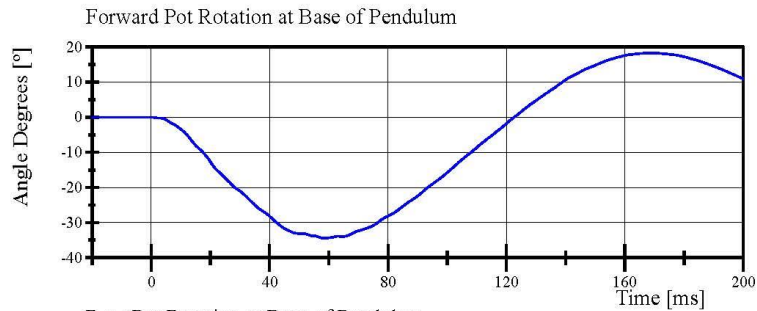
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

Left Lateral Neck

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

Test Date: 1/26/2021



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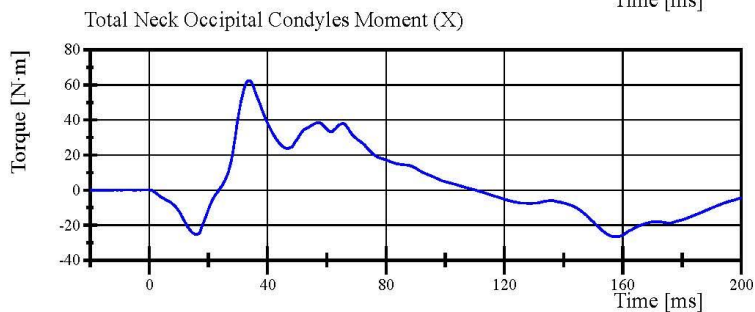
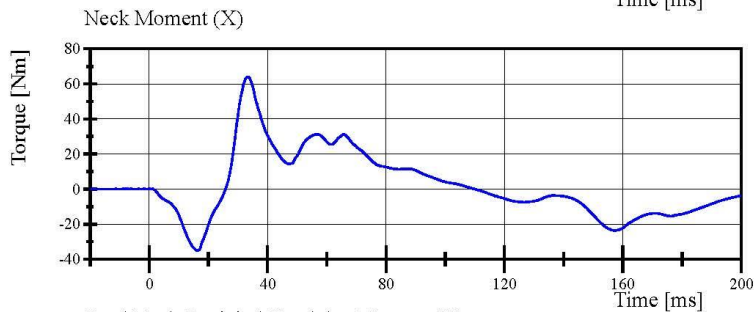
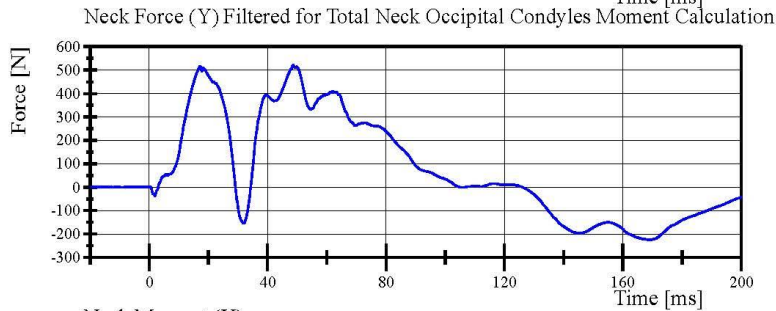
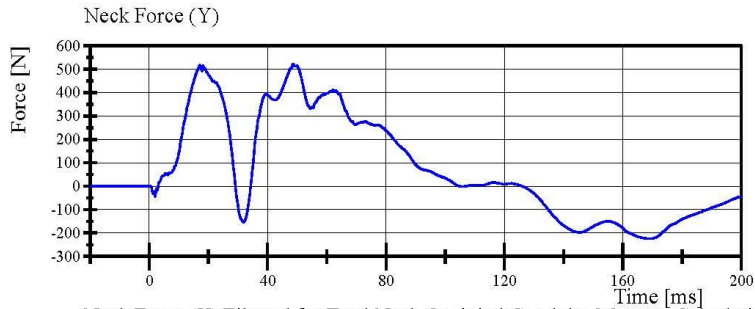


Transportation Research Center Inc.

Left Lateral Neck

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

Test Date: 1/26/2021



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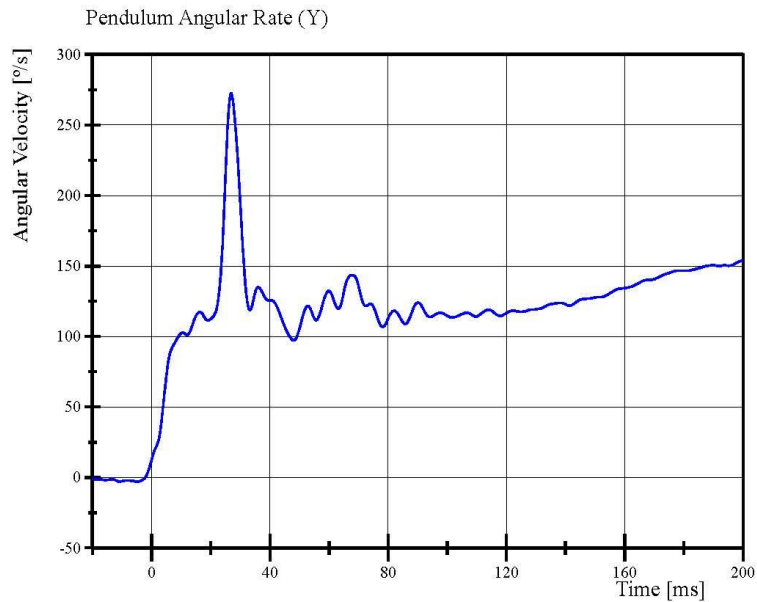


Transportation Research Center Inc.

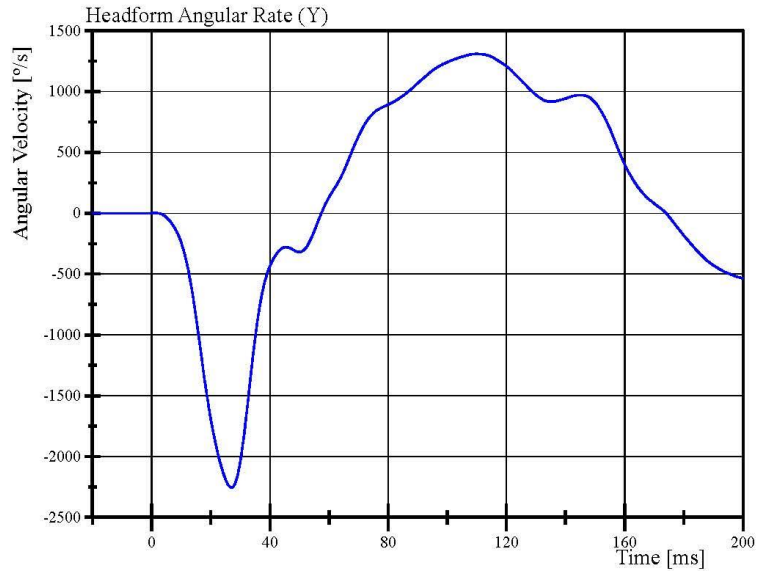
Left Lateral Neck

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

Test Date: 1/26/2021



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
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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:

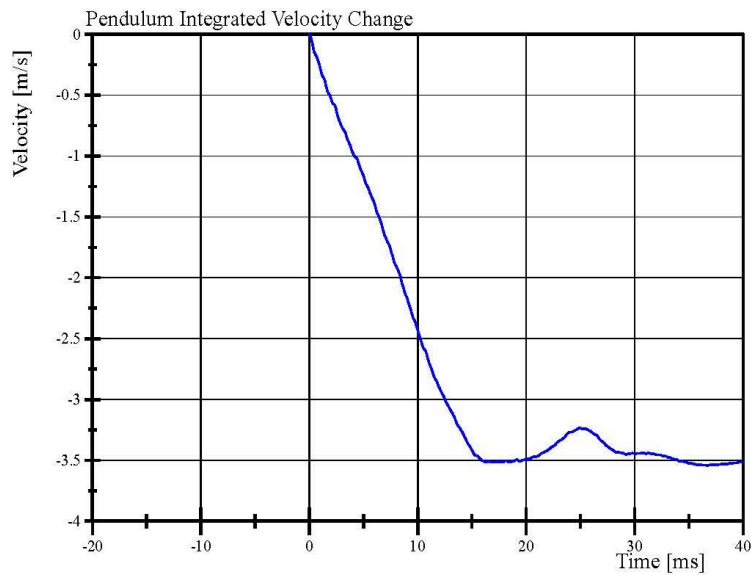
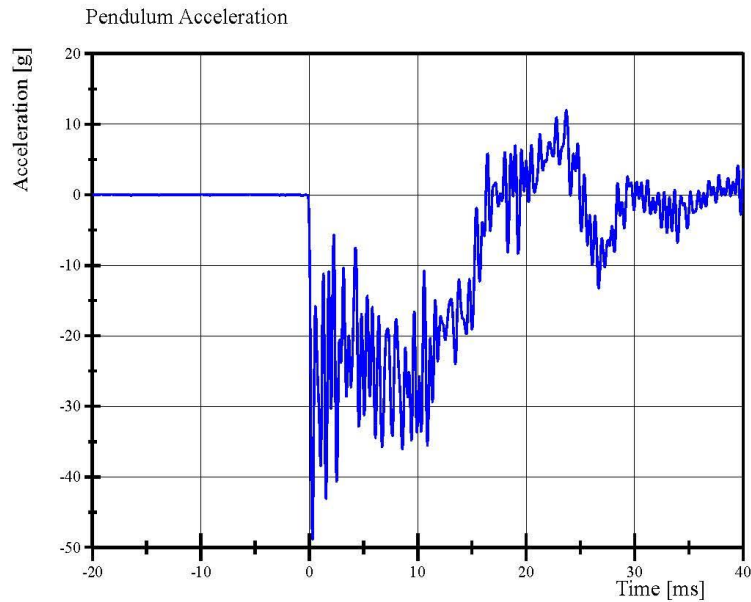
Neck S/N: DW6607

Transportation Research Center Inc.

Right Lateral Neck

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

Test Date: 1/26/2021

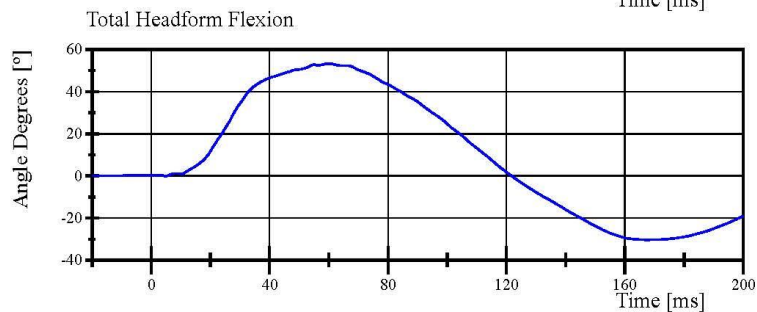
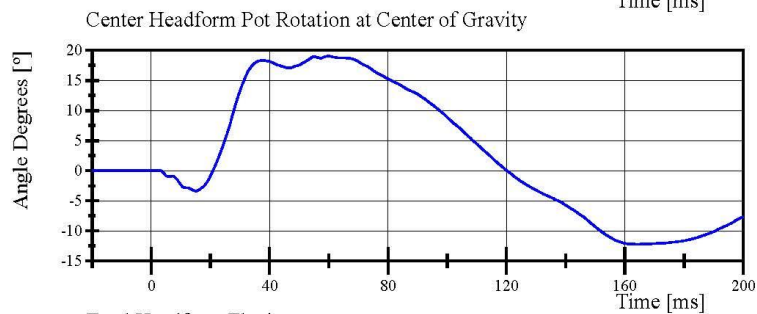
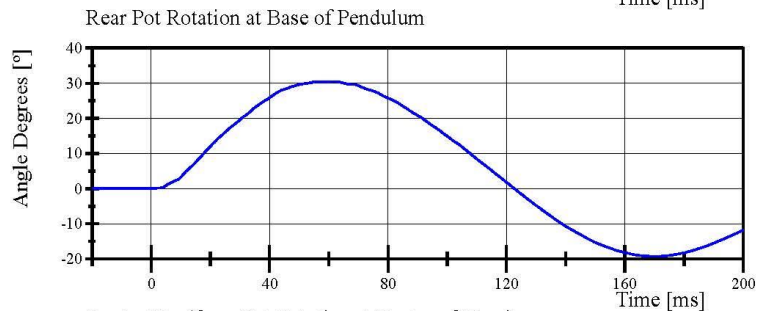
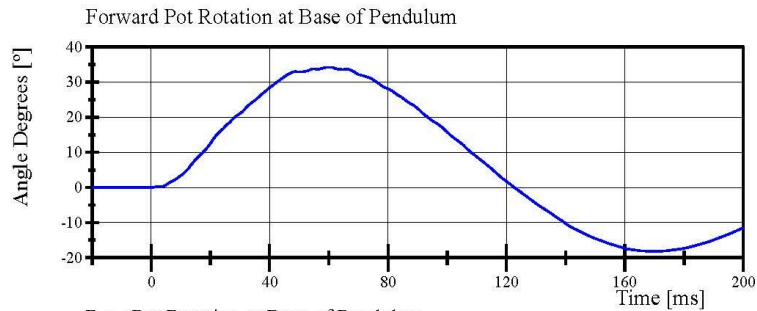


Transportation Research Center Inc.

Right Lateral Neck

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

Test Date: 1/26/2021



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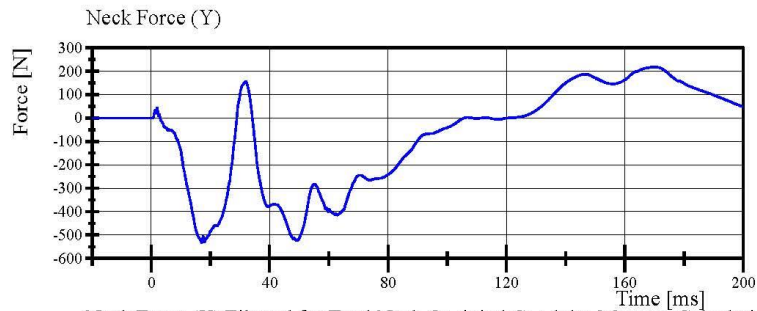


Transportation Research Center Inc.

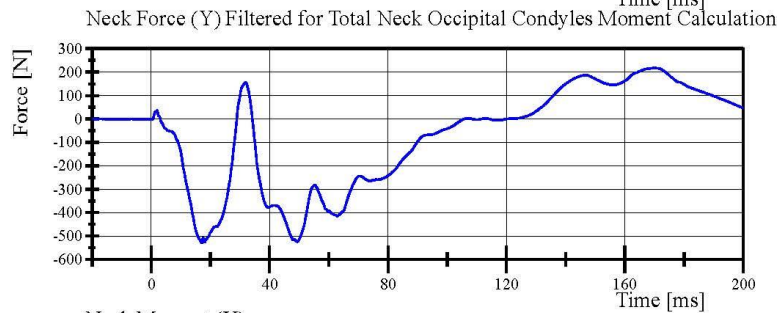
Right Lateral Neck

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

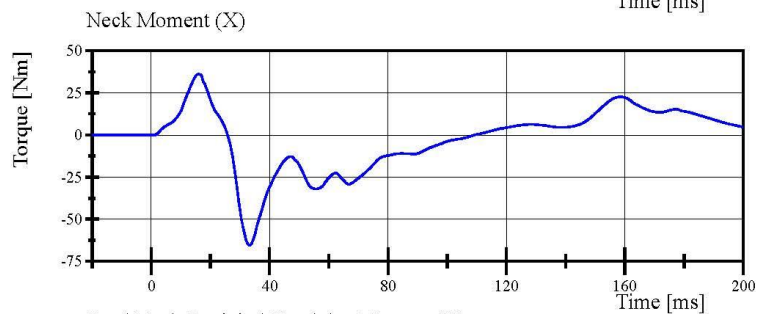
Test Date: 1/26/2021



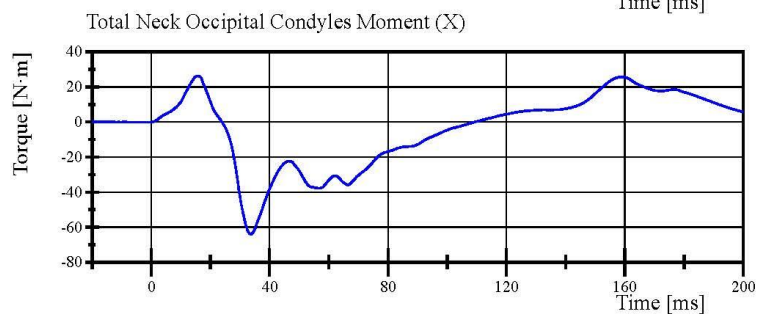
Filter Class: CFC_1000
Max: 218.1 N at 169.9 ms
Min: -532.4 N at 17.0 ms



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: WorldSID 50th(WS) VRTC Nov 2020.xlsx
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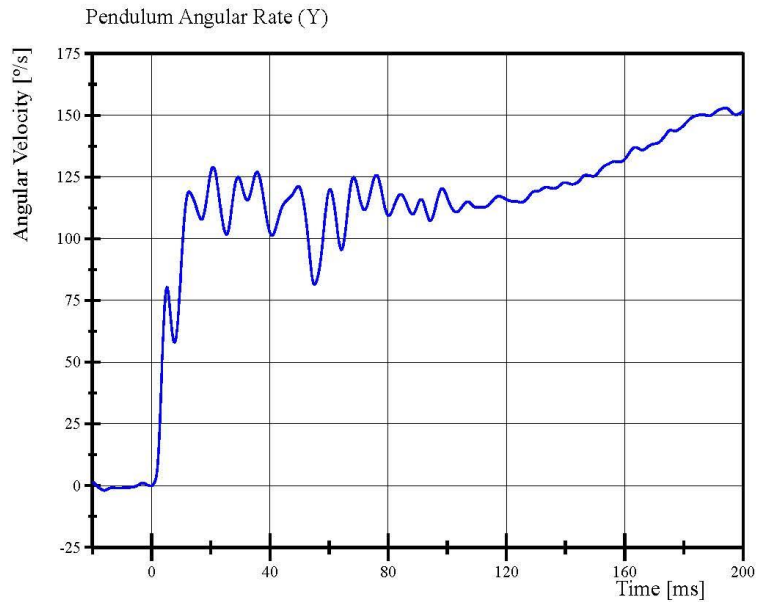
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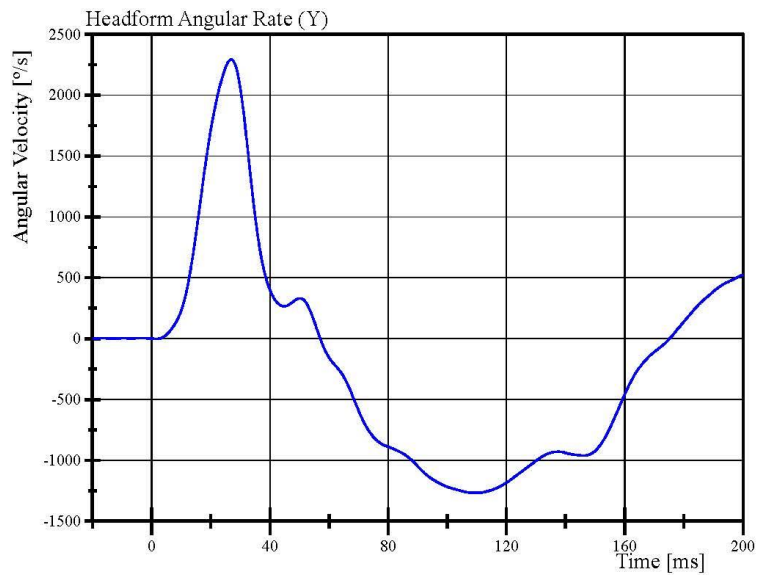


Transportation Research Center Inc.

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



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:

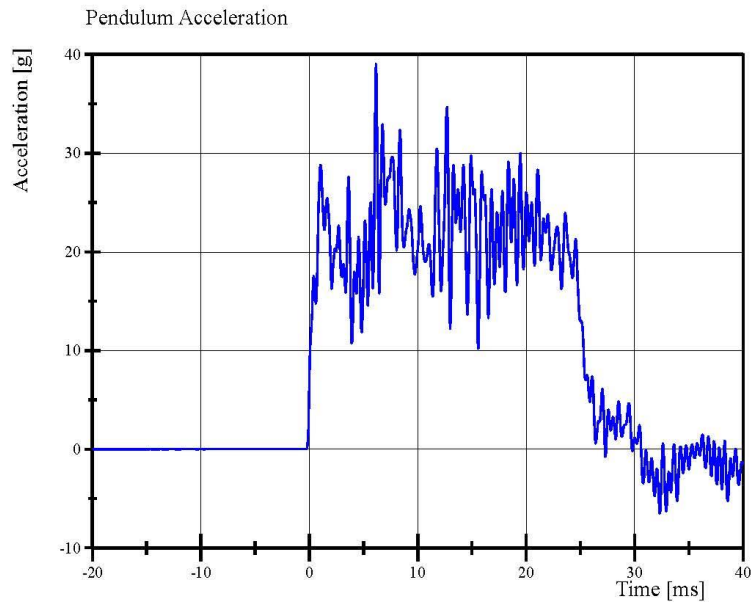
Neck S/N: DW6607

Transportation Research Center Inc.

Left Lateral Torsion

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

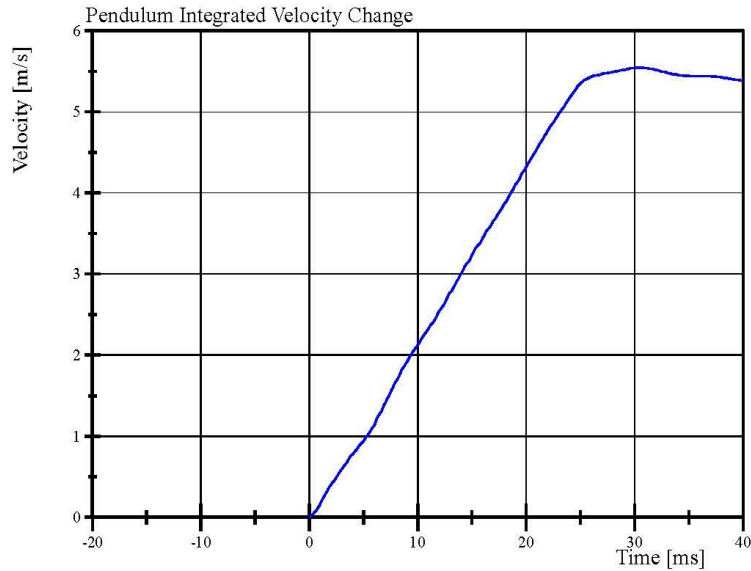
Test Date: 1/27/2021



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(WS) VRTC Nov 2020.xlsx
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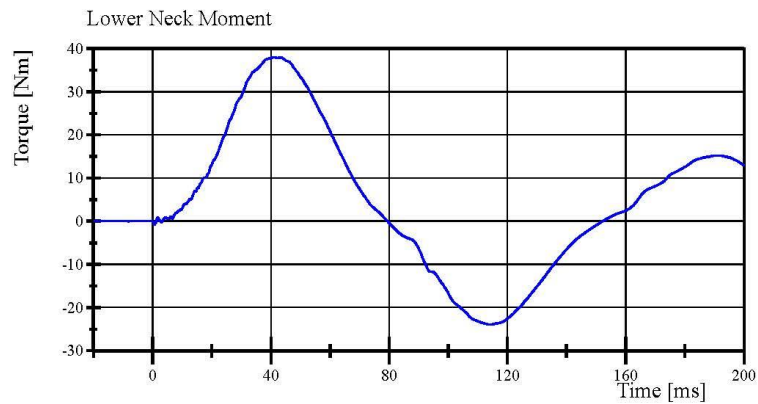
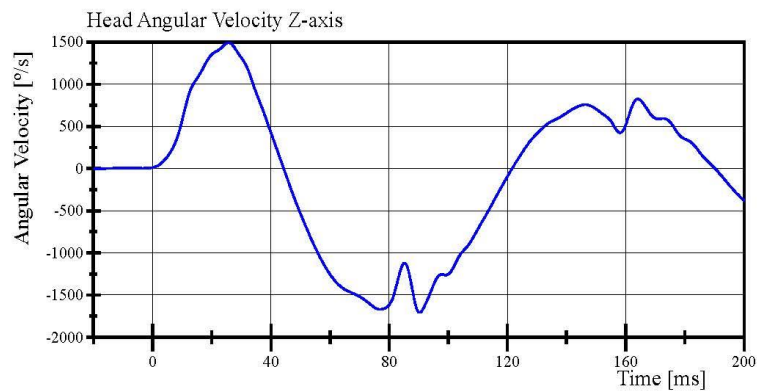
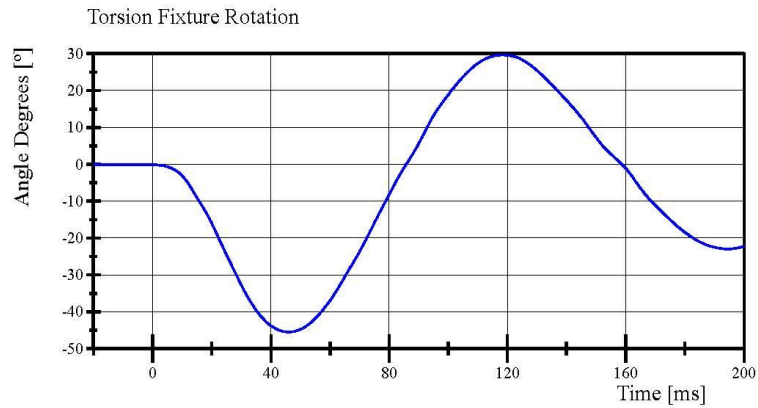


Transportation Research Center Inc.

Left 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
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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
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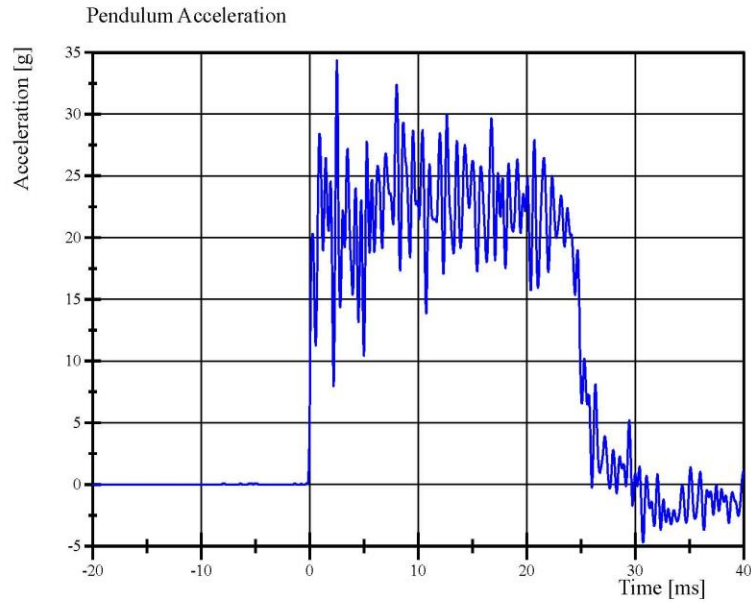


Transportation Research Center Inc.

Right Lateral Torsion

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

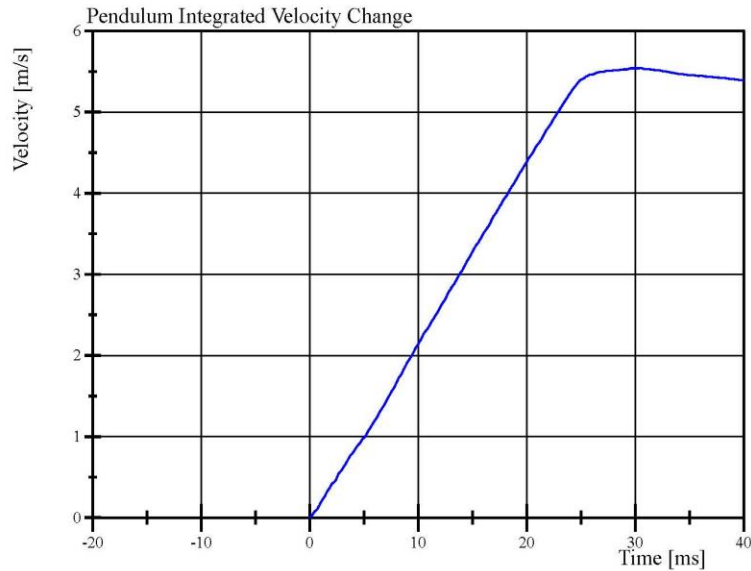
Test Date: 1/27/2021



Filter Class: CFC_1000

Max: 34.4 g at 2.5 ms

Min: -4.7 g at 30.7 ms



Filter Class: CFC_1000

Max: 5.5 m/s at 30.5 ms

Min: 0.0 m/s at 0.0 ms

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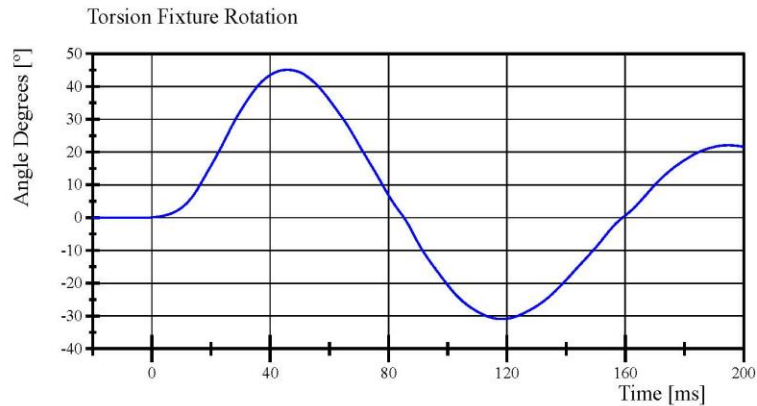


Transportation Research Center Inc.

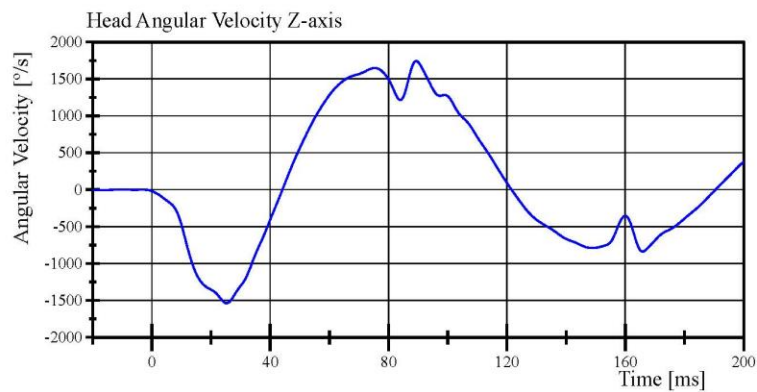
Right Lateral Torsion

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

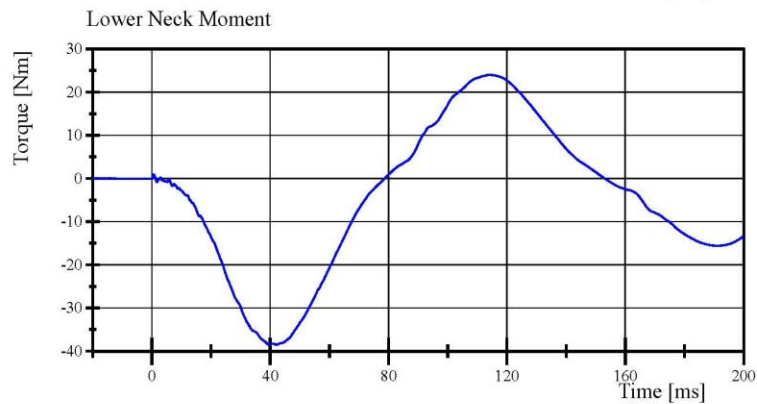
Test Date: 1/27/2021



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
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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
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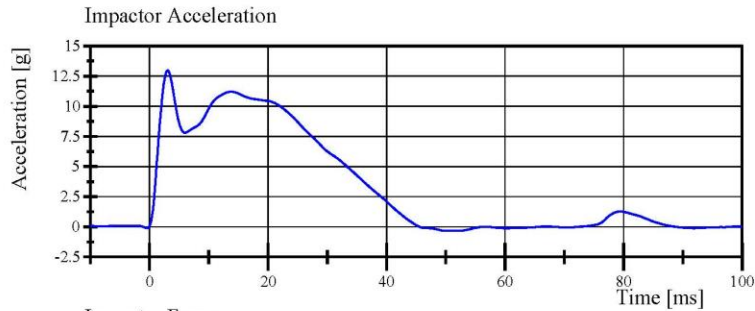


Transportation Research Center Inc.

Right Lateral Shoulder

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

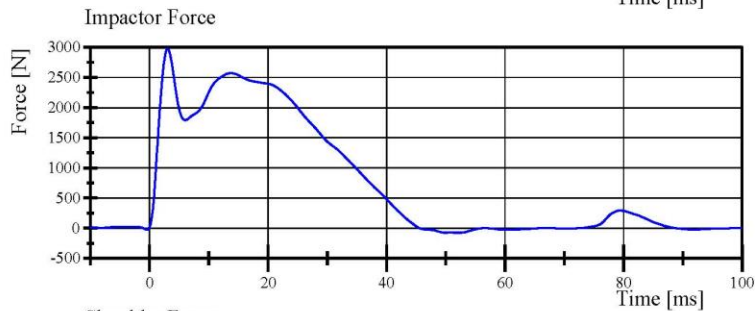
Test Date: 2/10/2021



Filter Class: CFC_180

Max: 13.0 g at 3.1 ms

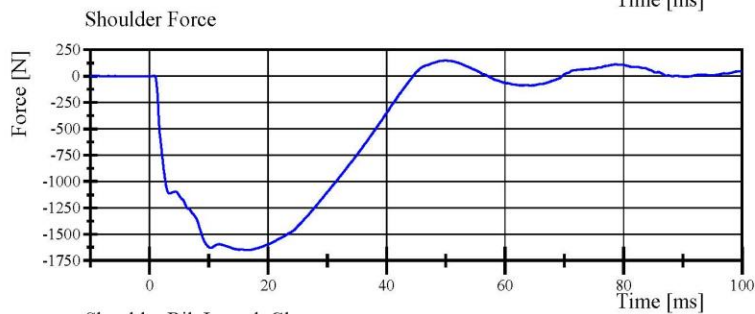
Min: -0.3 g at 52.1 ms



Filter Class: CFC_180

Max: 2,978.1 N at 3.1 ms

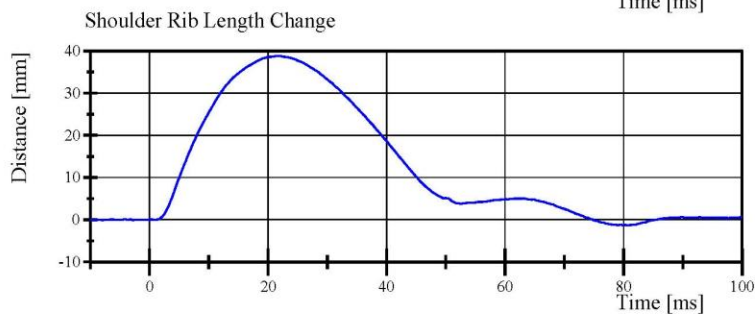
Min: -75.1 N at 52.1 ms



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
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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

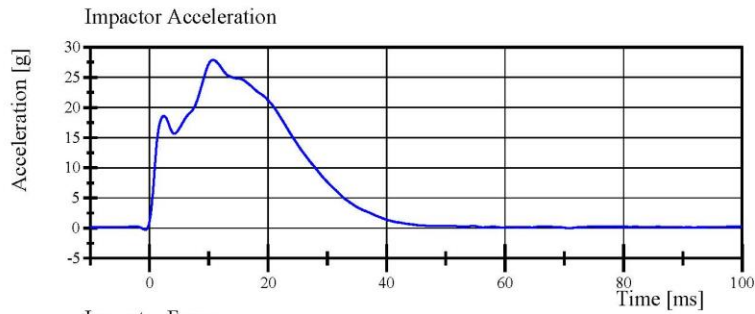
Thorax Rib 2 S/N: DW8864

Thorax Rib 3 S/N: ED4871

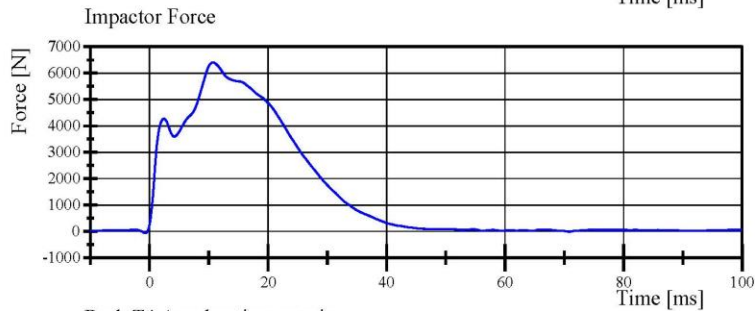
Ribeye S/N: 160

Transportation Research Center Inc.

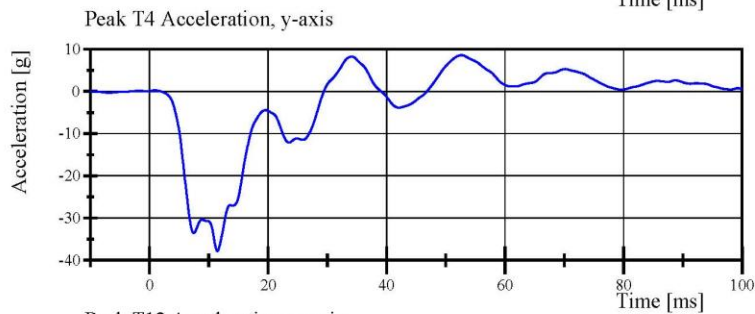
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-1
Test Date: 2/12/2021



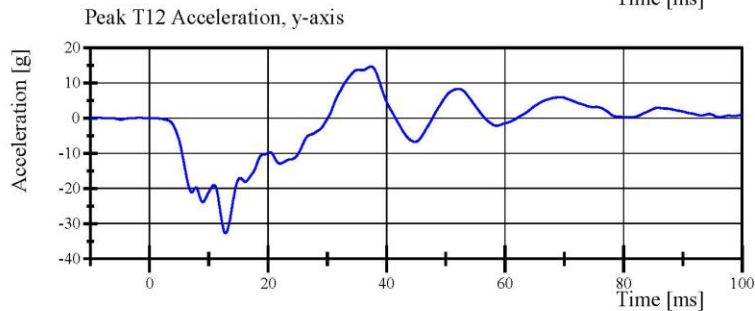
Filter Class: CFC_180
Max: 27.9 g at 10.7 ms
Min: -0.3 g at -0.7 ms



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

Report Number: EA7820_WSH01

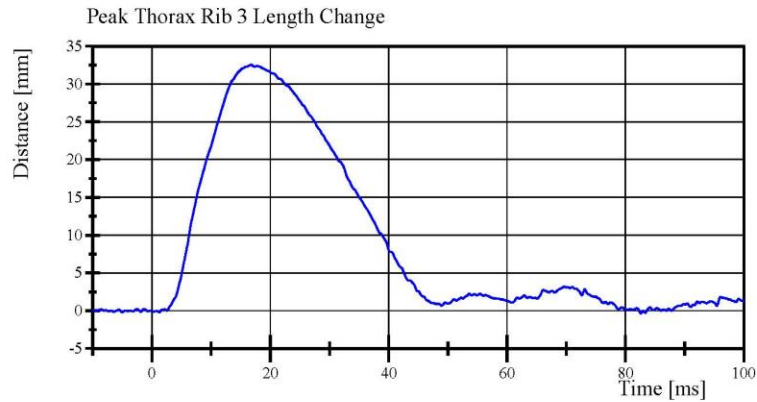
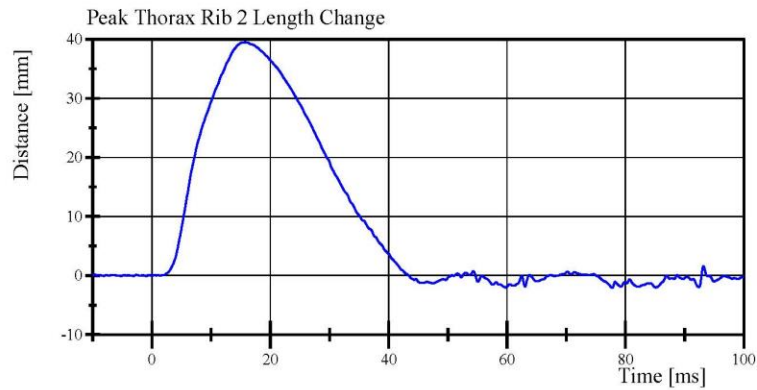
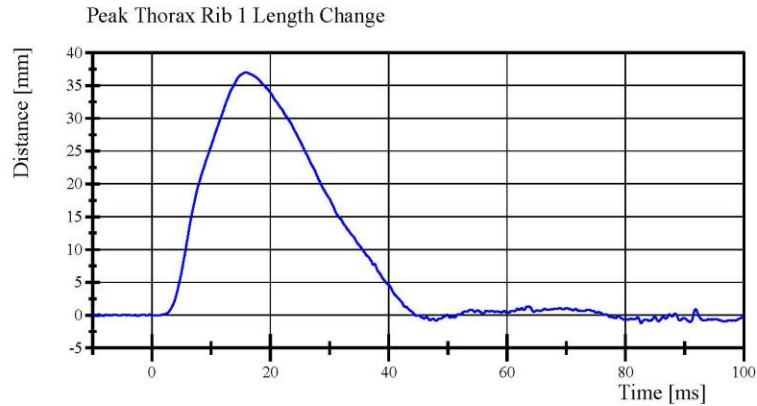
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Transportation Research Center Inc.

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



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

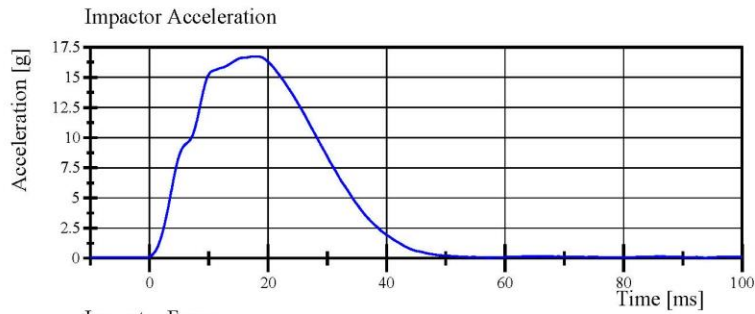
Thorax Rib 2 S/N: DW8864

Thorax Rib 3 S/N: ED4871

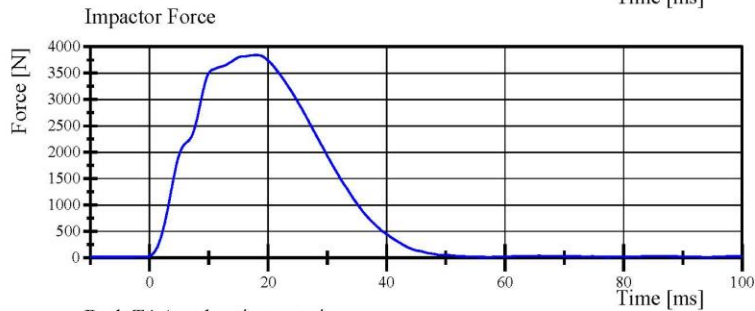
Ribeye S/N: 160

Transportation Research Center Inc.

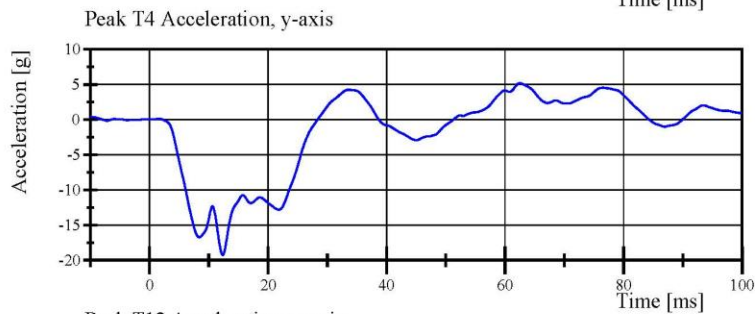
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-2
Test Date: 2/12/2021



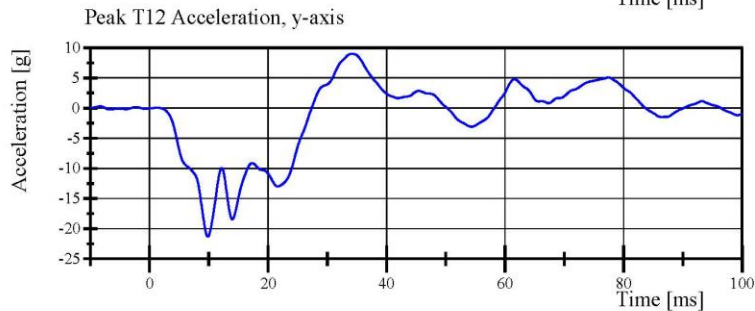
Filter Class: CFC_180
Max: 16.7 g at 18.2 ms
Min: 0.0 g at 93.7 ms



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



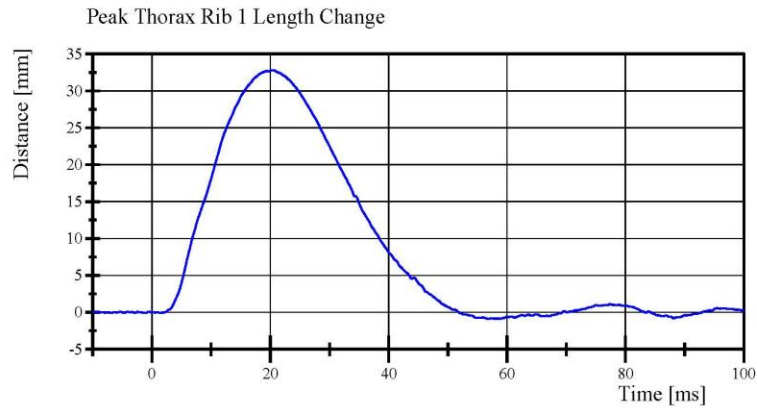
Filter Class: CFC_180
Max: 5.2 g at 62.5 ms
Min: -19.2 g at 12.4 ms



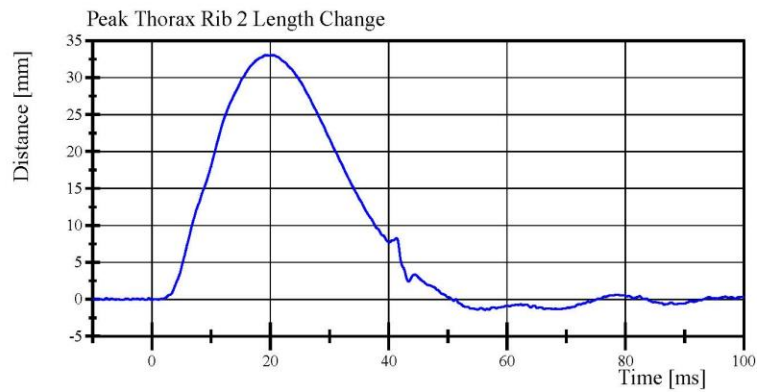
Filter Class: CFC_180
Max: 9.0 g at 34.2 ms
Min: -21.3 g at 9.9 ms

Transportation Research Center Inc.

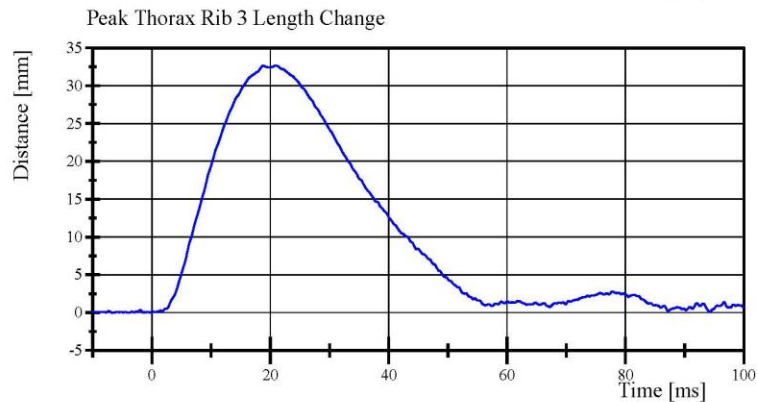
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 1-2
Test Date: 2/12/2021



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

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

Report Number: EA7820_WSH01

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03.23.2021 15:44:56 1006

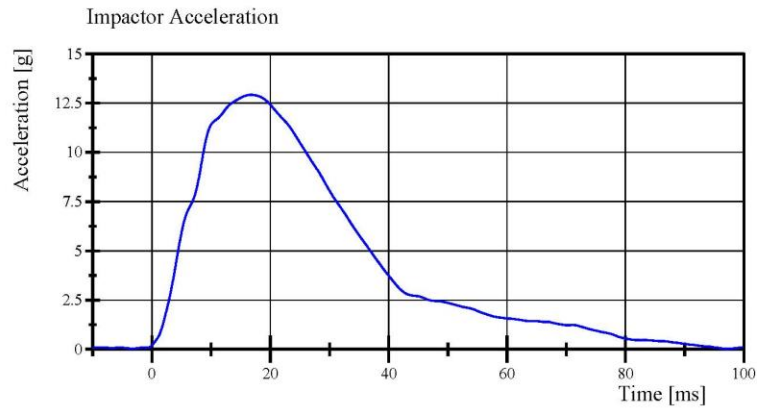


Transportation Research Center Inc.

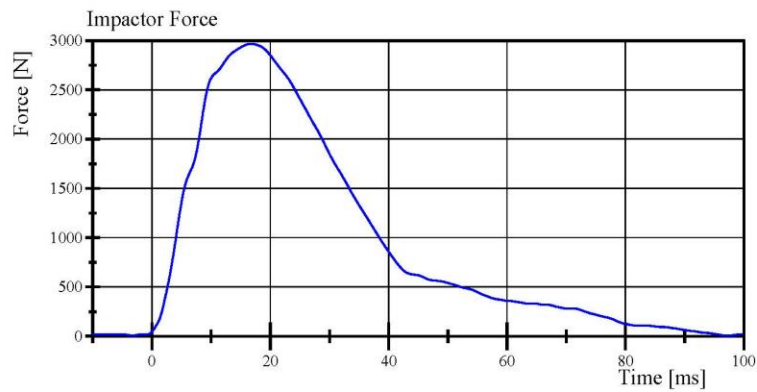
Right Lateral Abdomen

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

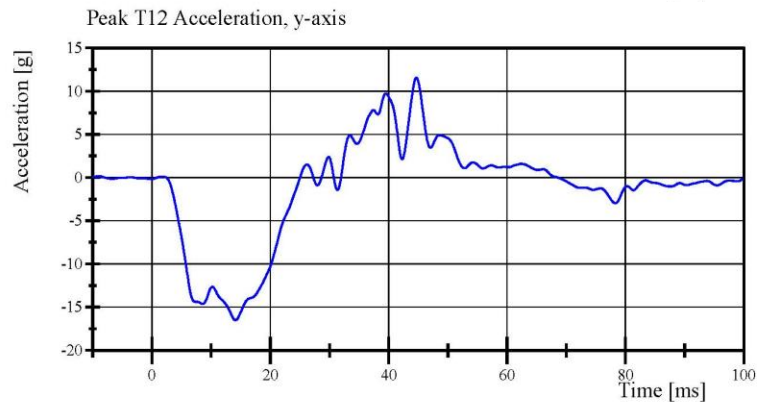
Test Date: 2/11/2021



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

Report Number: EA7820_WSH01

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03.23.2021 15:45:25 1006

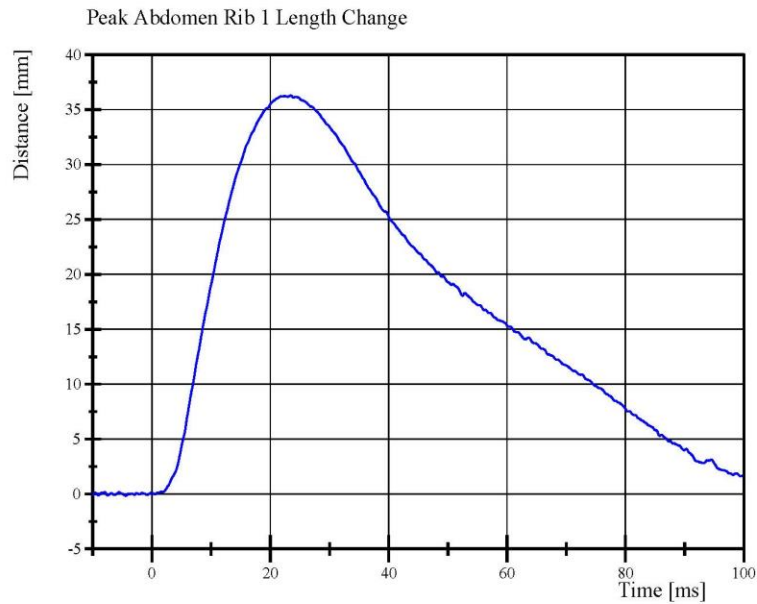


Transportation Research Center Inc.

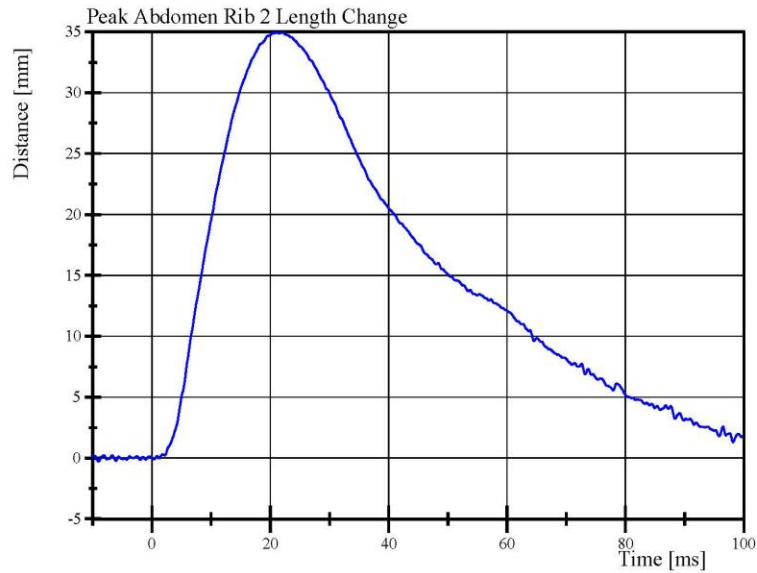
Right Lateral Abdomen

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

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.

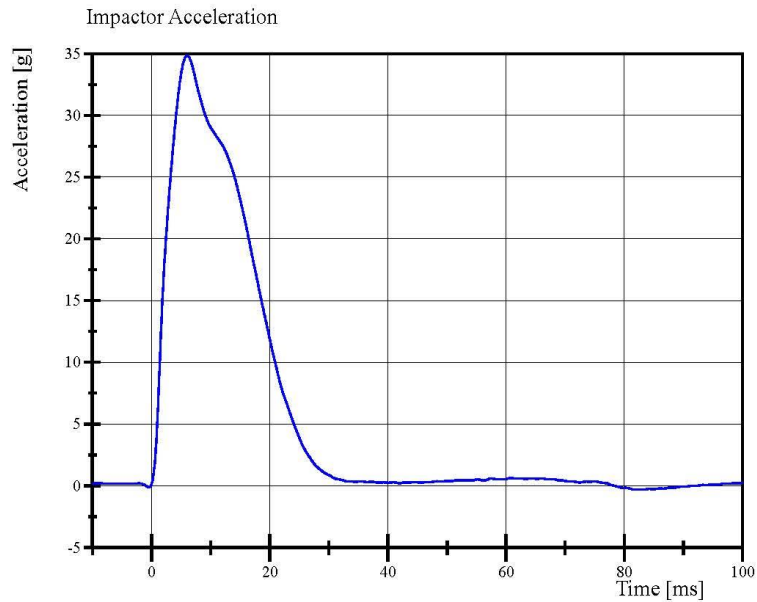
Condition: Used

Comments:

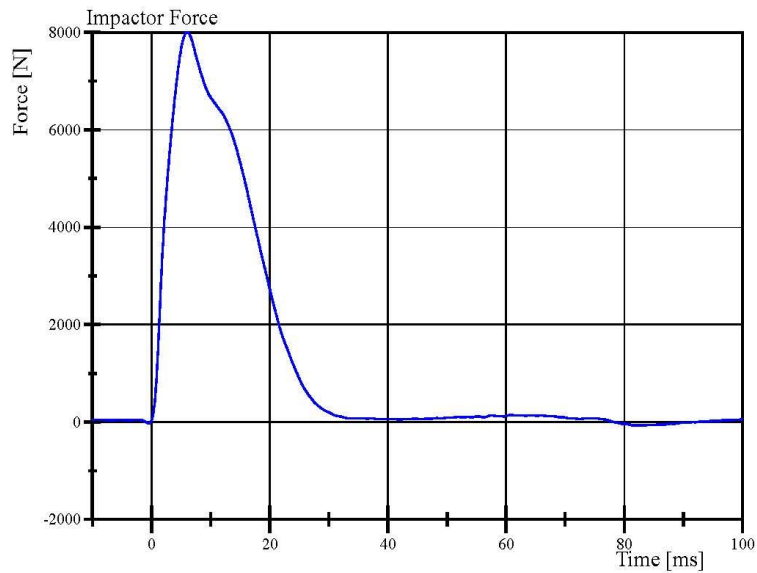
Pelvis Skin S/N: EA7060

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



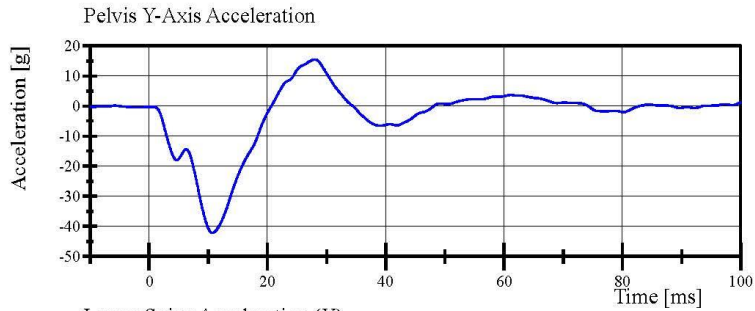
Filter Class: CFC_180
Max: 7,997.9 N at 6.1 ms
Min: -72.8 N at 83.1 ms

Transportation Research Center Inc.

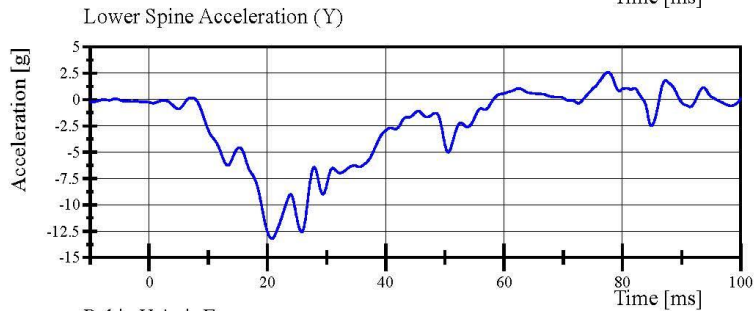
Right Lateral Pelvis

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

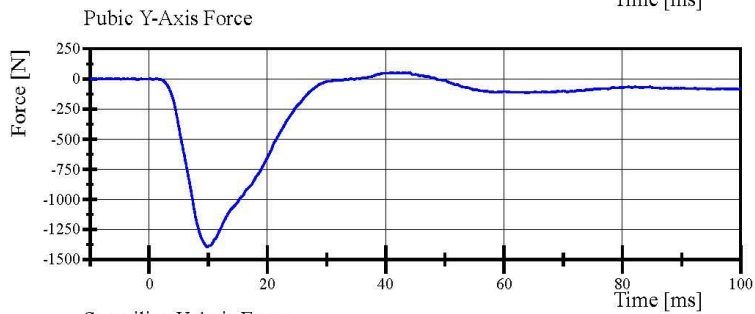
Test Date: 2/12/2021



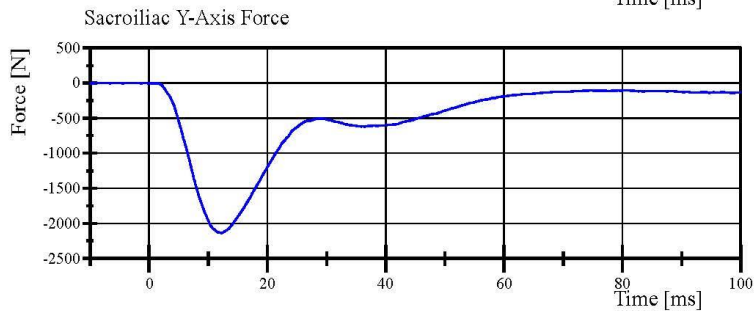
Filter Class: CFC_180
Max: 15.5 g at 28.0 ms
Min: -42.1 g at 10.7 ms



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

Tested Components

Shoulder Pad: MC-R-3 Thorax Rib 3: EI8148
Shoulder Rib: ED9644 RibEye: 160
Thorax Rib 1: EI6666 Impacted Arm: EE7908
Thorax Rib 2: EI8150

Test ID: 210330-1
Test Date: 3/30/2021
Test Time: 7:36 AM

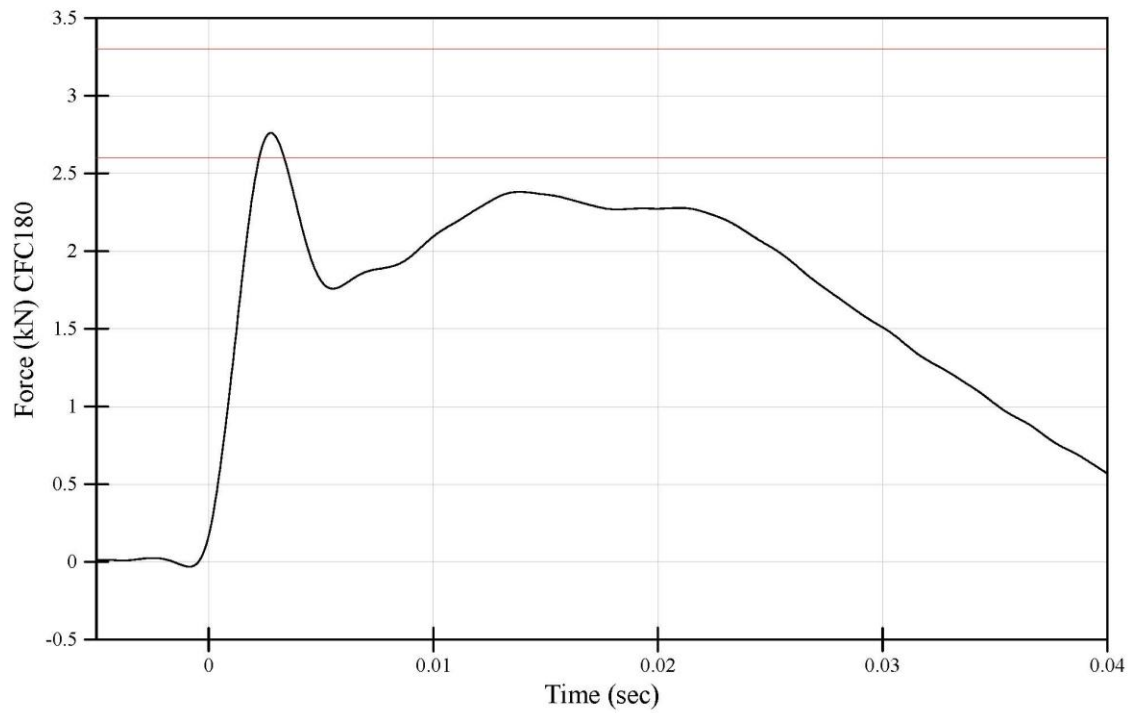
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	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

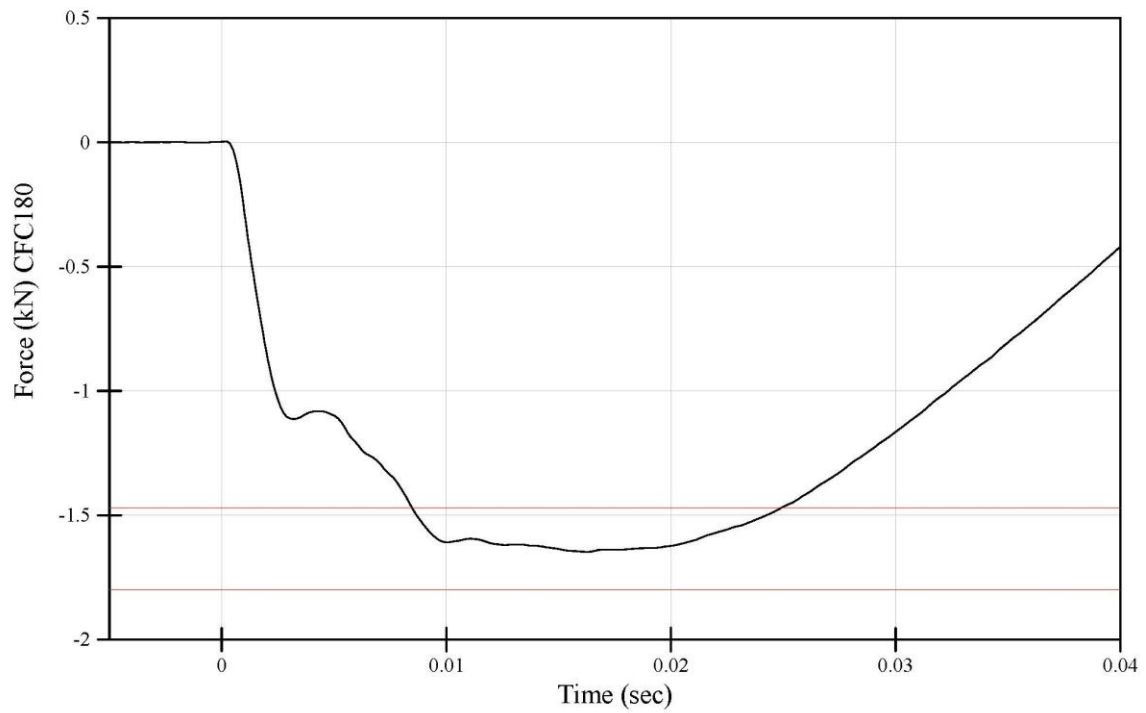
WorldSID-50M Right Shoulder Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210330-1 processed

3/30/2021 7:36 AM

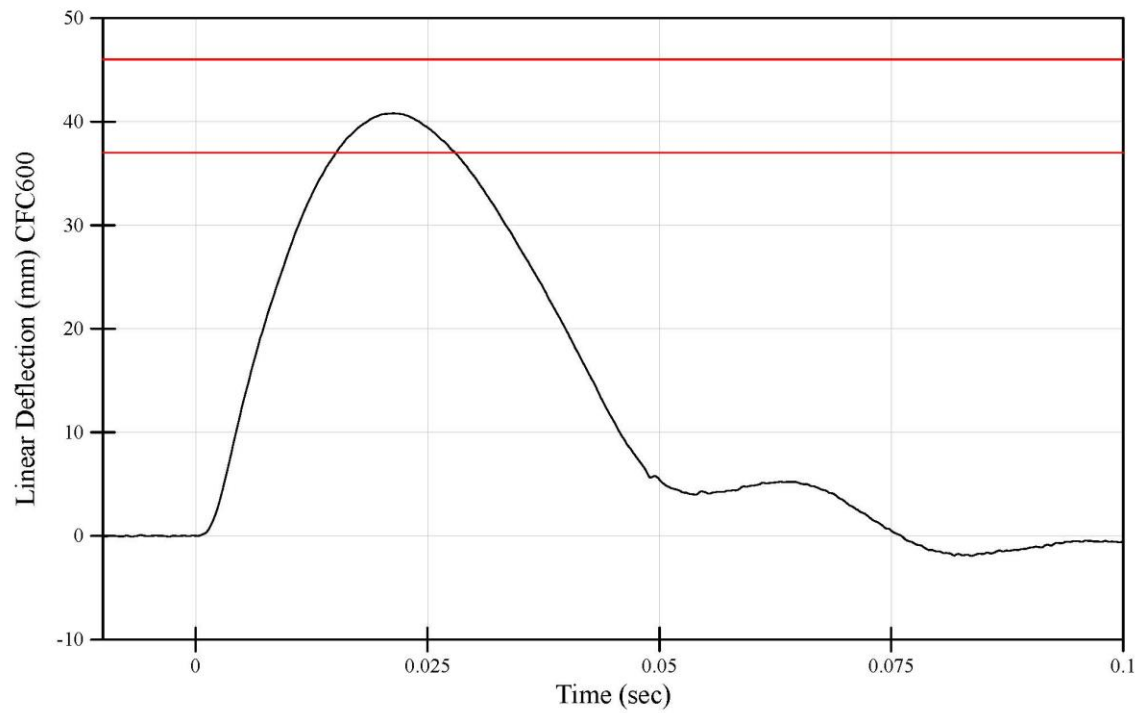
WorldSID-50M Right Shoulder Qualification
Peak Shoulder Y Force
Dummy Serial Number: EA7820



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

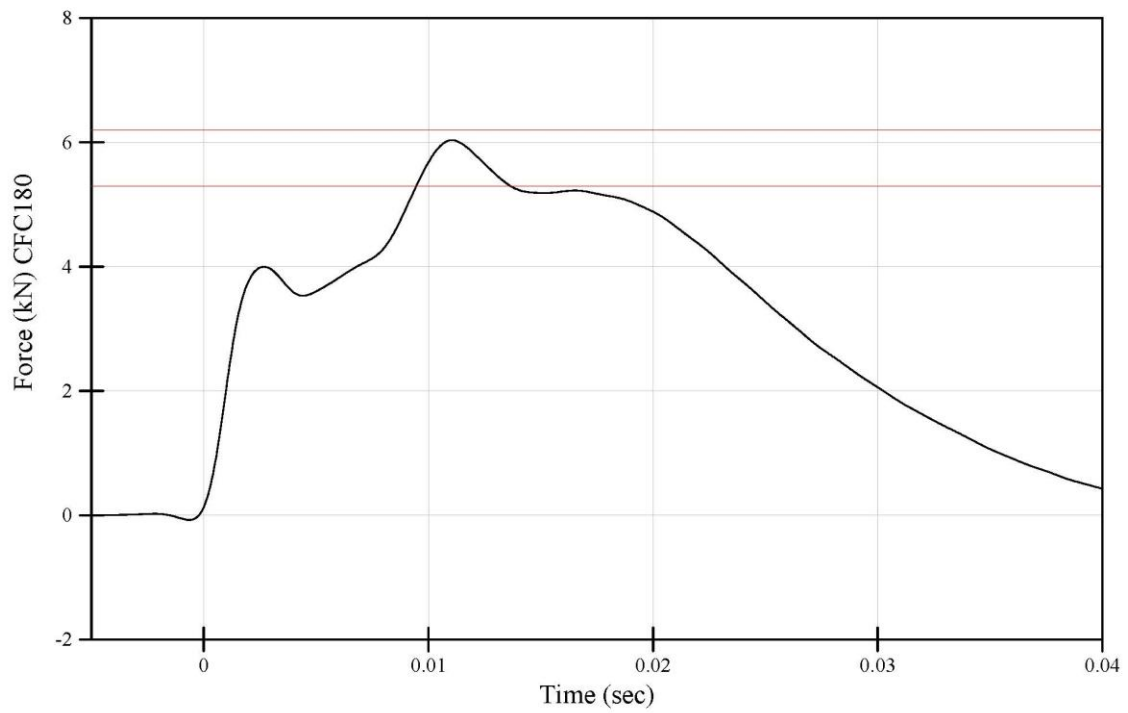
<u>Tested Components</u>		Test ID: 210325-9
Shoulder Rib: ED9644	RibEye: 160	Test Date: 3/25/2021
Thorax Rib 1: EI6666	Impacted Arm: EE7908	Test Time: 2:58 PM
Thorax Rib 2: EI8150		
Thorax Rib 3: EI8148		

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

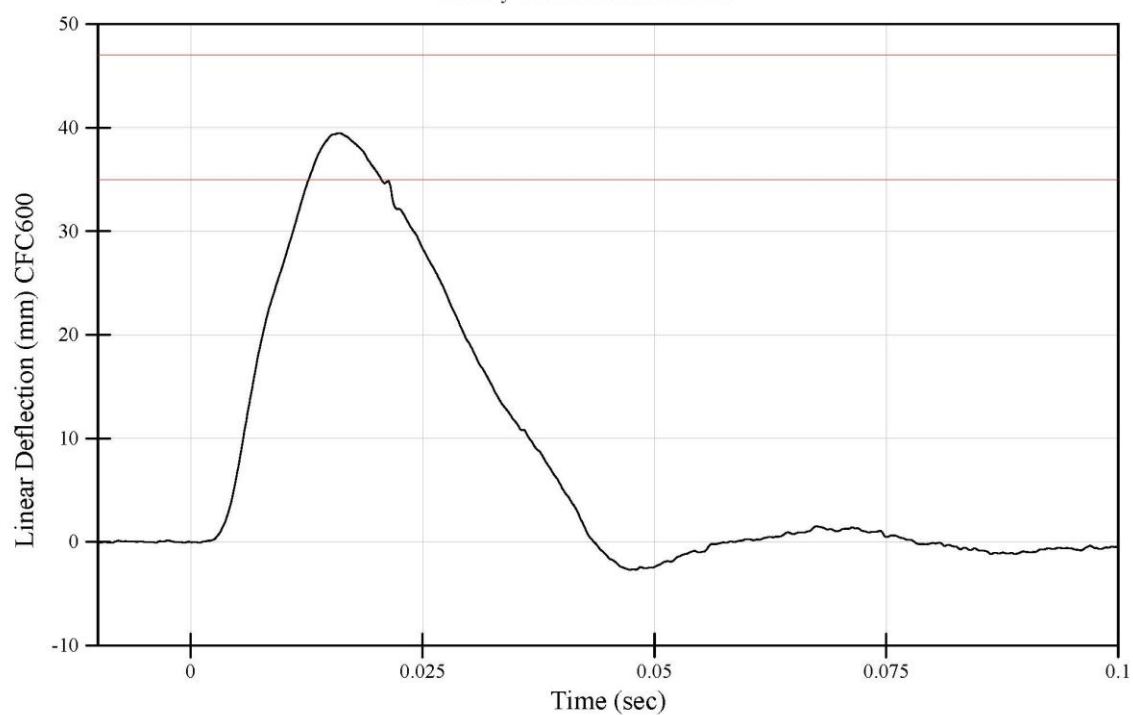
WorldSID-50M Left Thorax with Arm Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

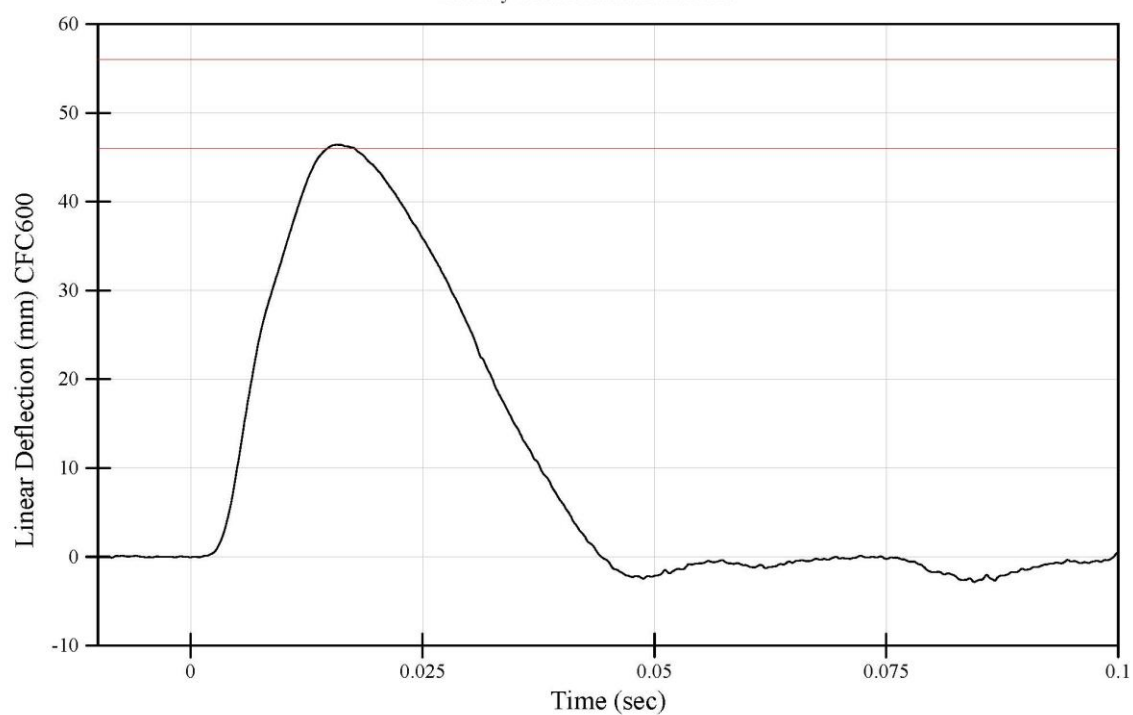
WorldSID-50M Left Thorax with Arm Qualification
Max Thorax Rib 1 Y Deflection
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

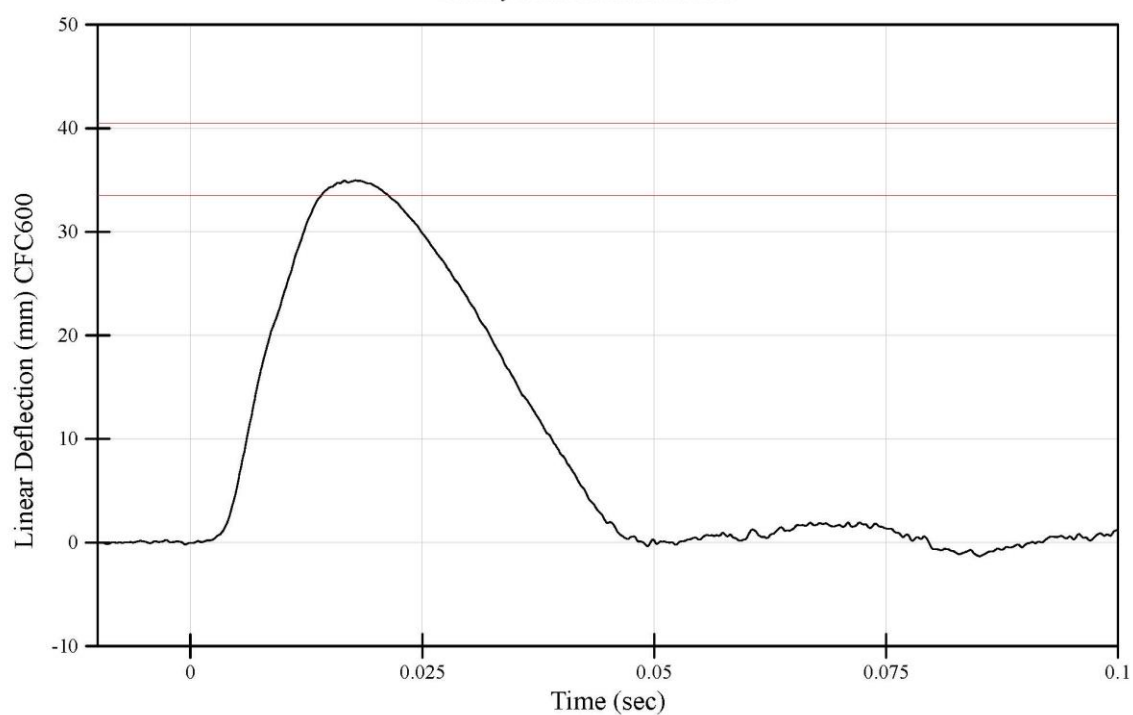
WorldSID-50M Left Thorax with Arm Qualification
Max Thorax Rib 2 Y Deflection
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

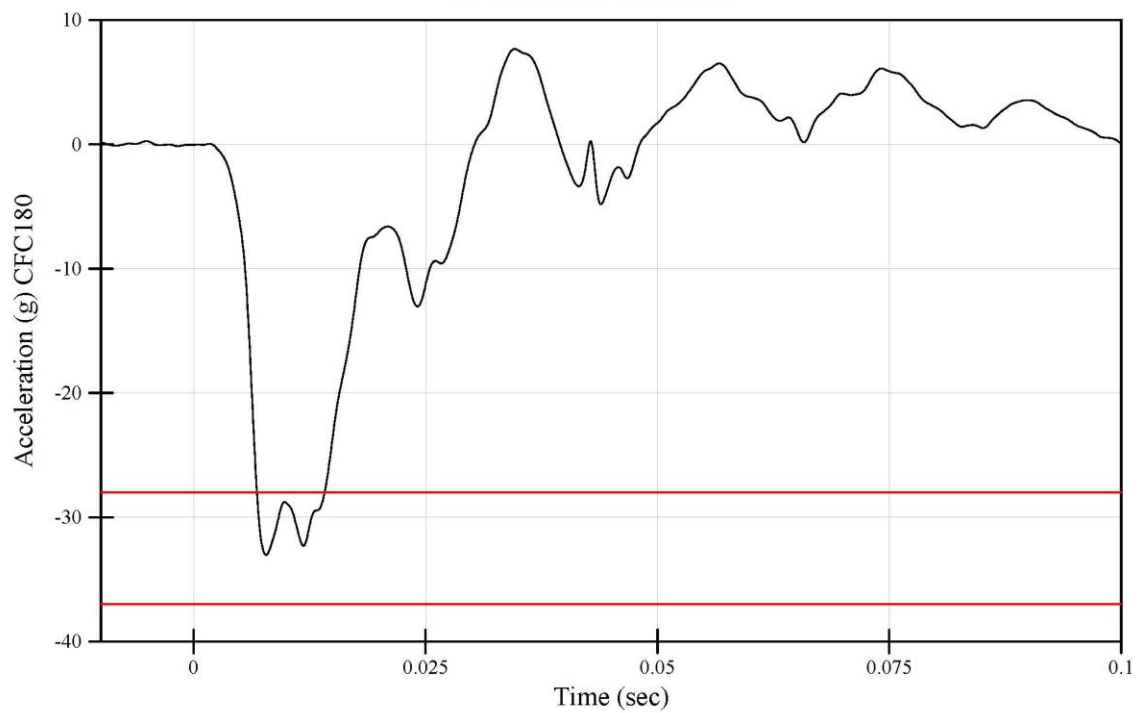
WorldSID-50M Left Thorax with Arm Qualification
Max Thorax Rib 3 Y Deflection
Dummy Serial Number: EA7820



File Name: 210325-9 processed

3/25/2021 2:58 PM

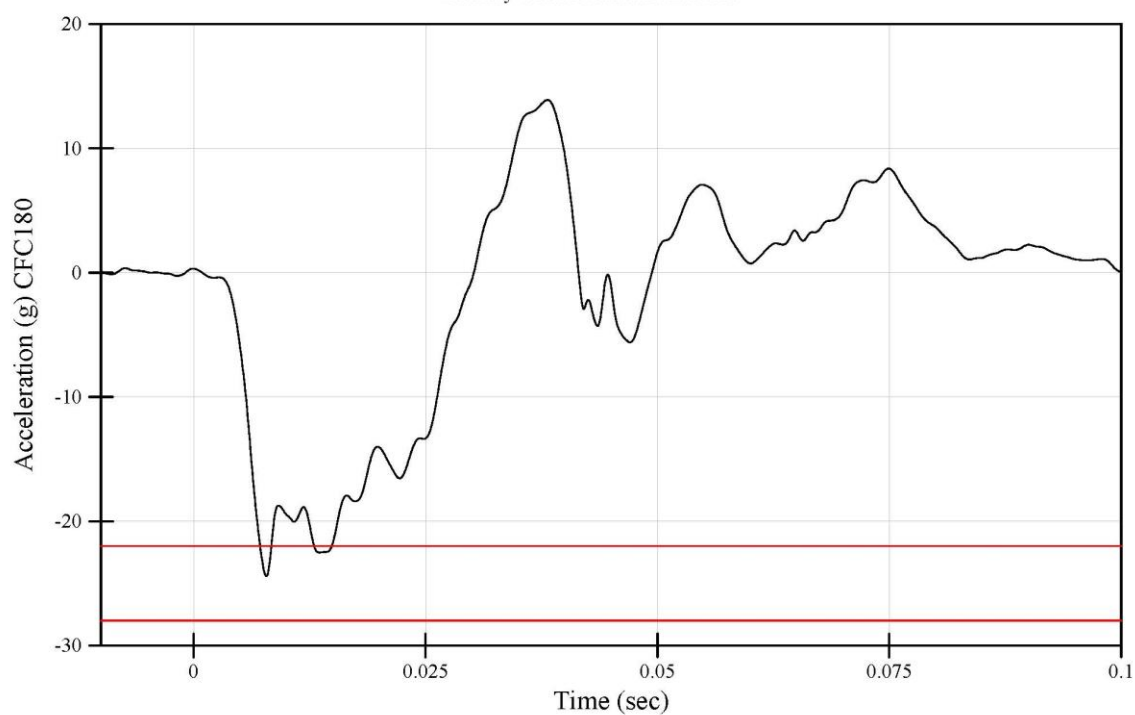
WorldSID-50M Left Thorax with Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: EA7820



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

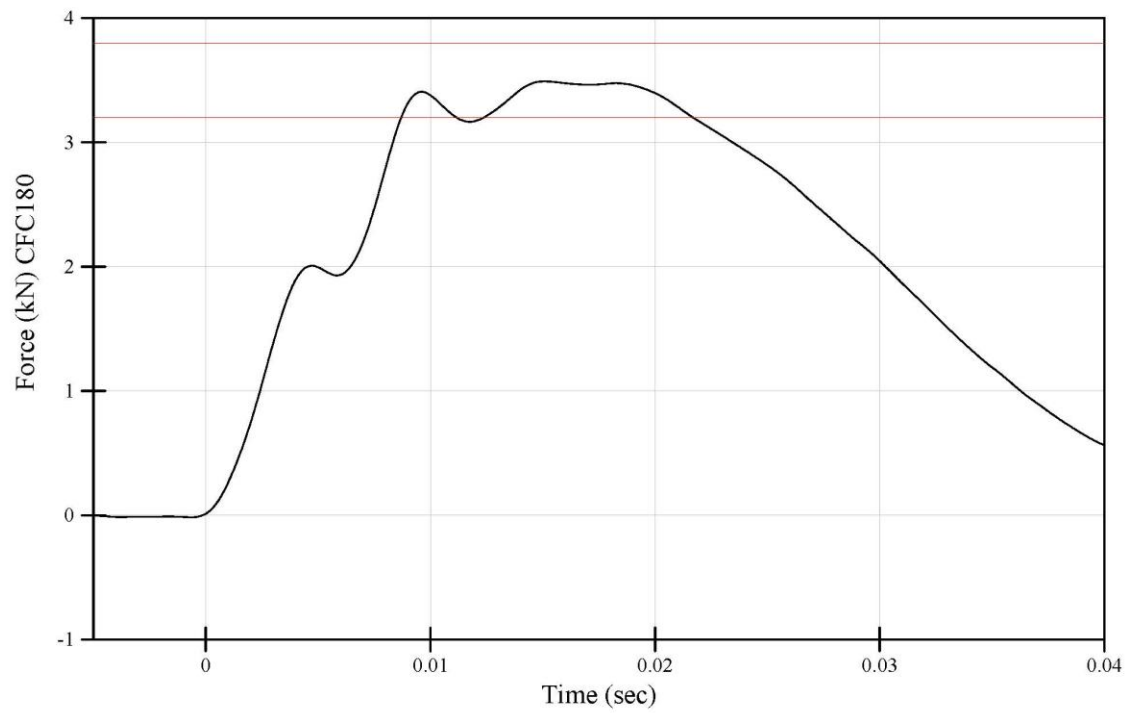
<u>Tested Components</u>		Test ID: 210329-2
Shoulder Rib: ED9644	Thorax Rib 3: EI8148	Test Date: 3/29/2021
Thorax Rib 1: EI6666	RibEye: 160	Test Time: 2:25 PM
Thorax Rib 2: EI8150		

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.7	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

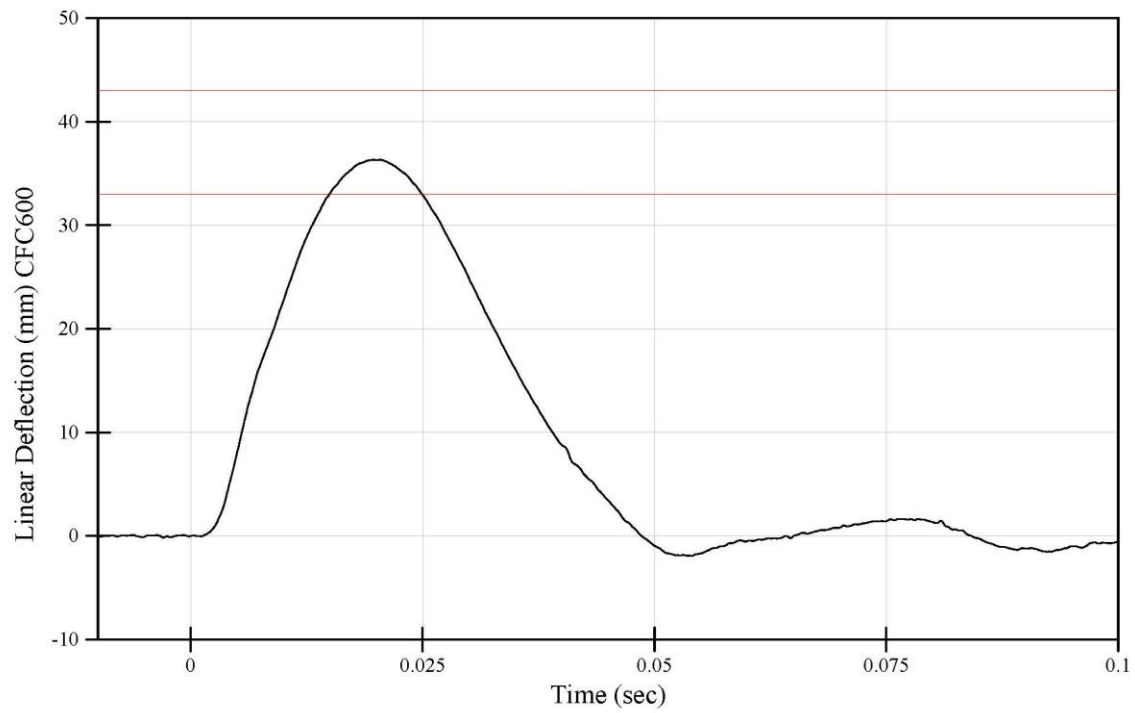
WorldSID-50M Right Thorax without Arm Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

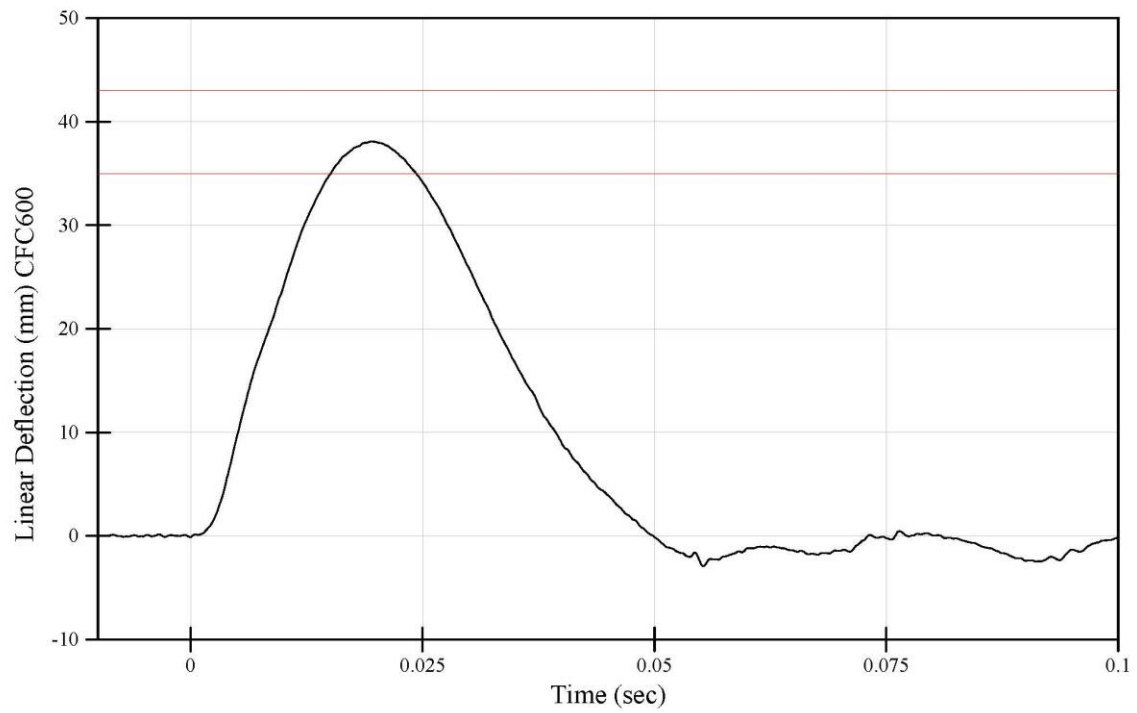
WorldSID-50M Right Thorax without Arm Qualification
Max Thorax Rib 1 Y Deflection
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

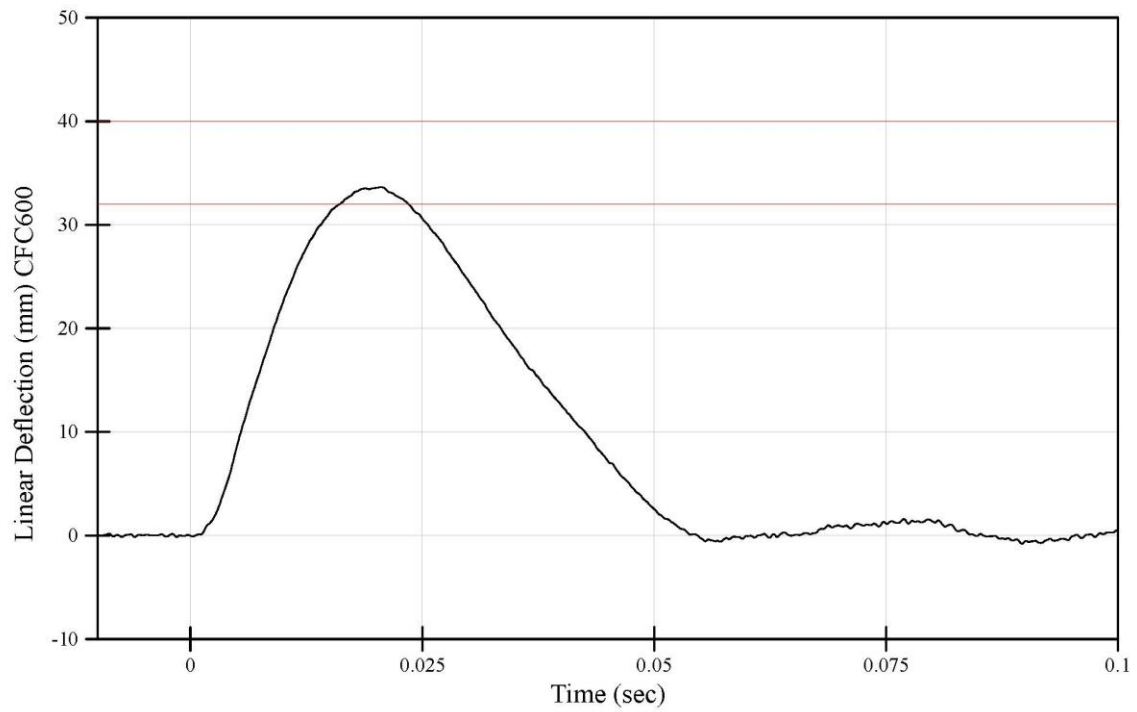
WorldSID-50M Right Thorax without Arm Qualification
Max Thorax Rib 2 Y Deflection
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

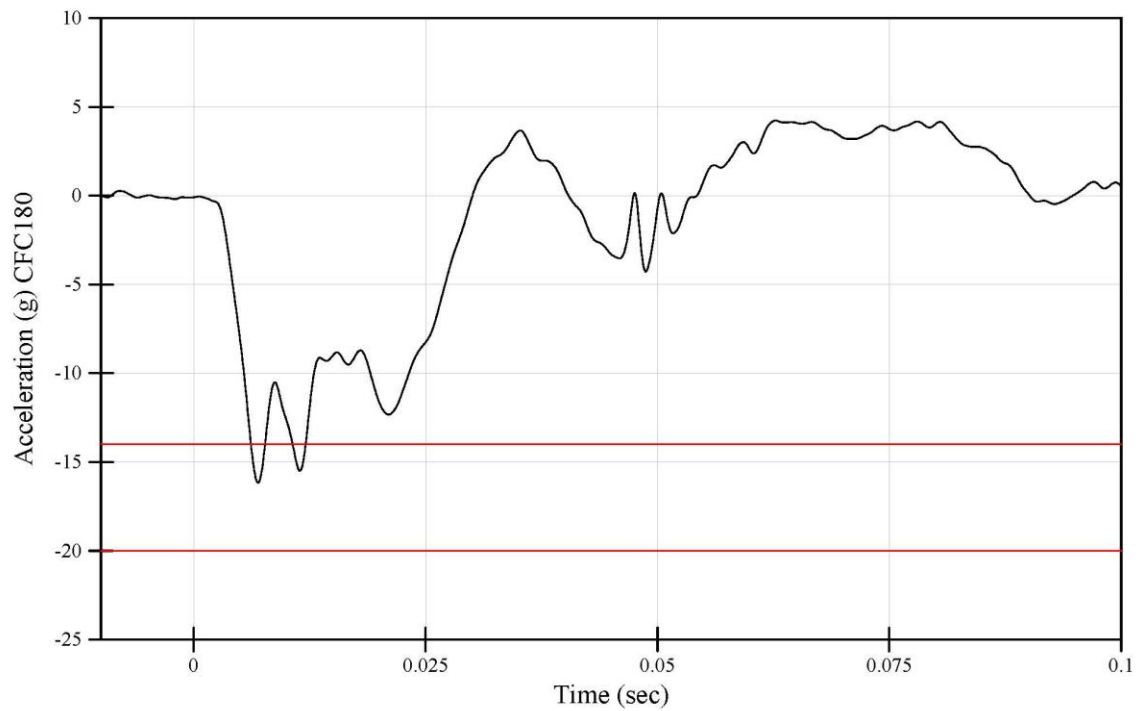
WorldSID-50M Right Thorax without Arm Qualification
Max Thorax Rib 3 Y Deflection
Dummy Serial Number: EA7820



File Name: 210329-2 processed

3/29/2021 2:25 PM

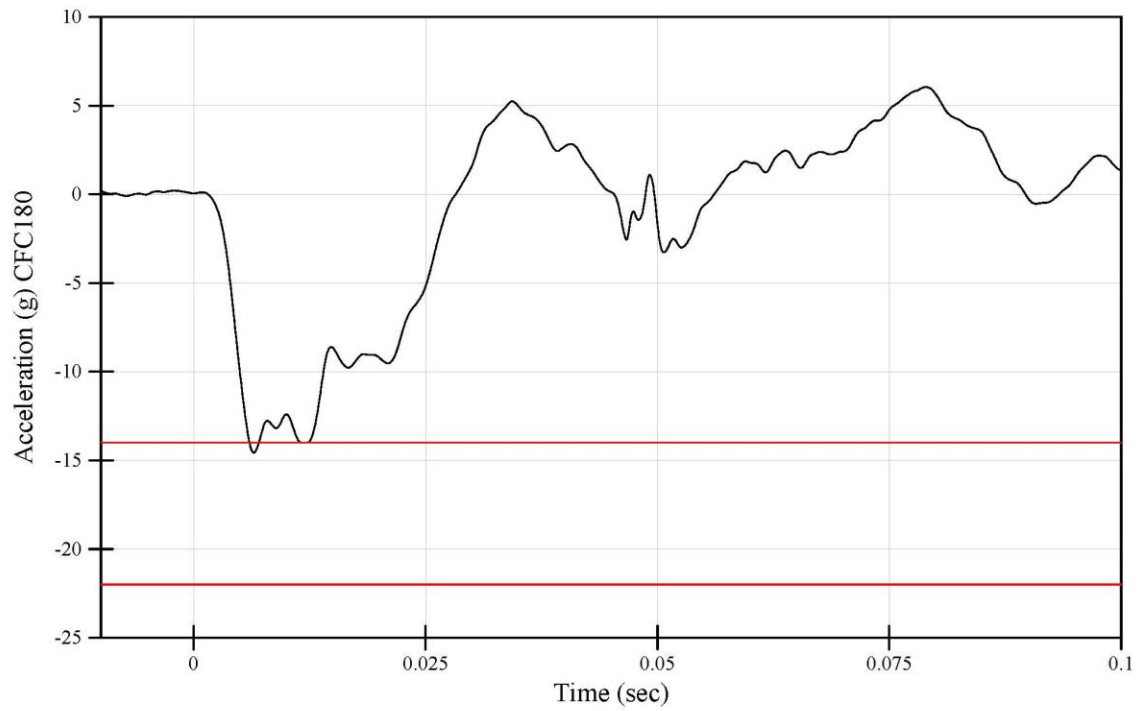
WorldSID-50M Right Thorax without Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: EA7820



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

Tested Components

Abdomen Rib 1: DW8877
Abdomen Rib 2: DW8878
RibEye: 160

Test ID: 210330-2
Test Date: 3/30/2021
Test Time: 10:36 AM

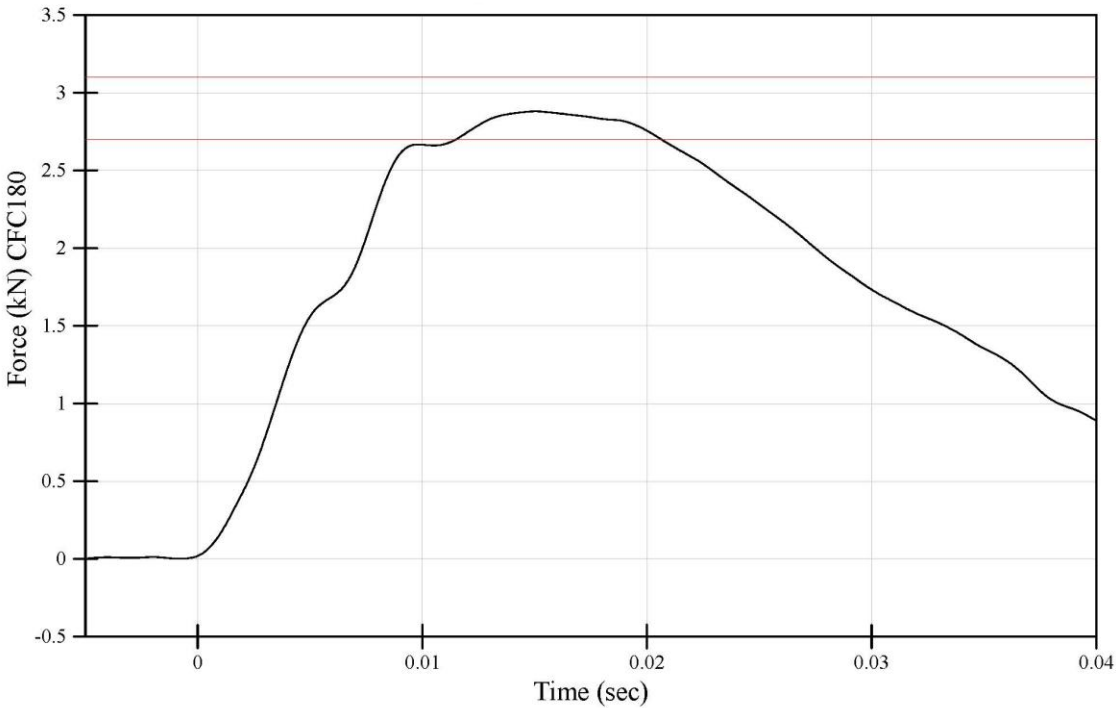
Test Results

<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

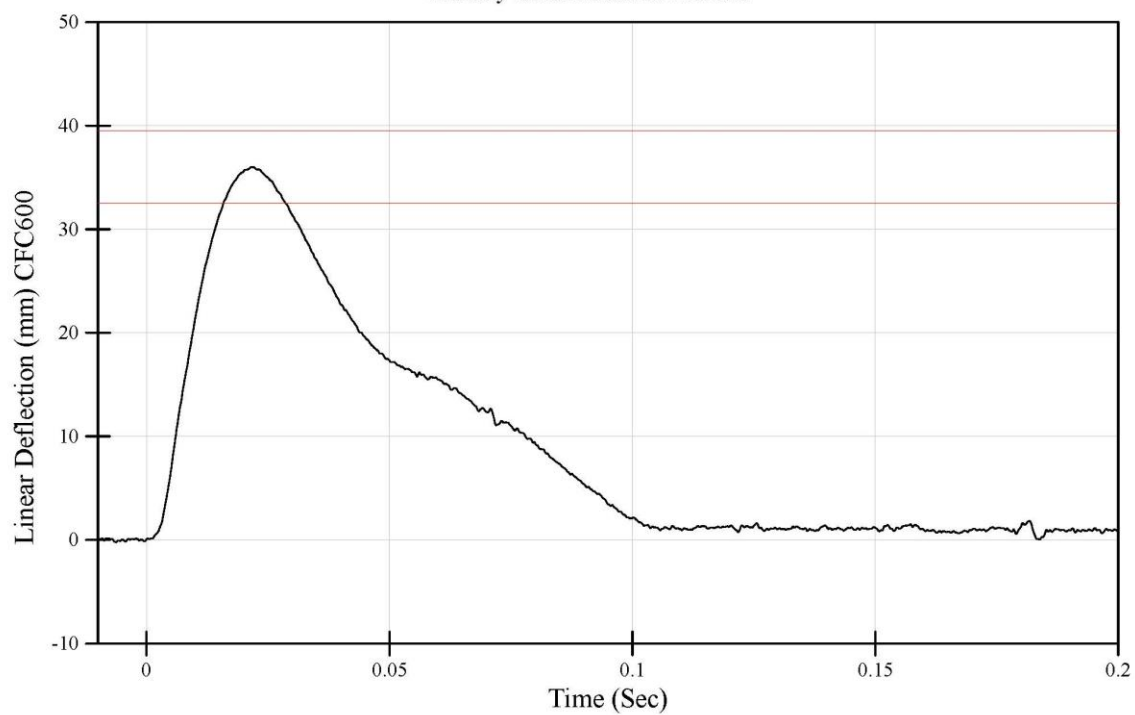
WorldSID-50M Right Abdomen Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210330-2 processed

3/30/2021 10:36 AM

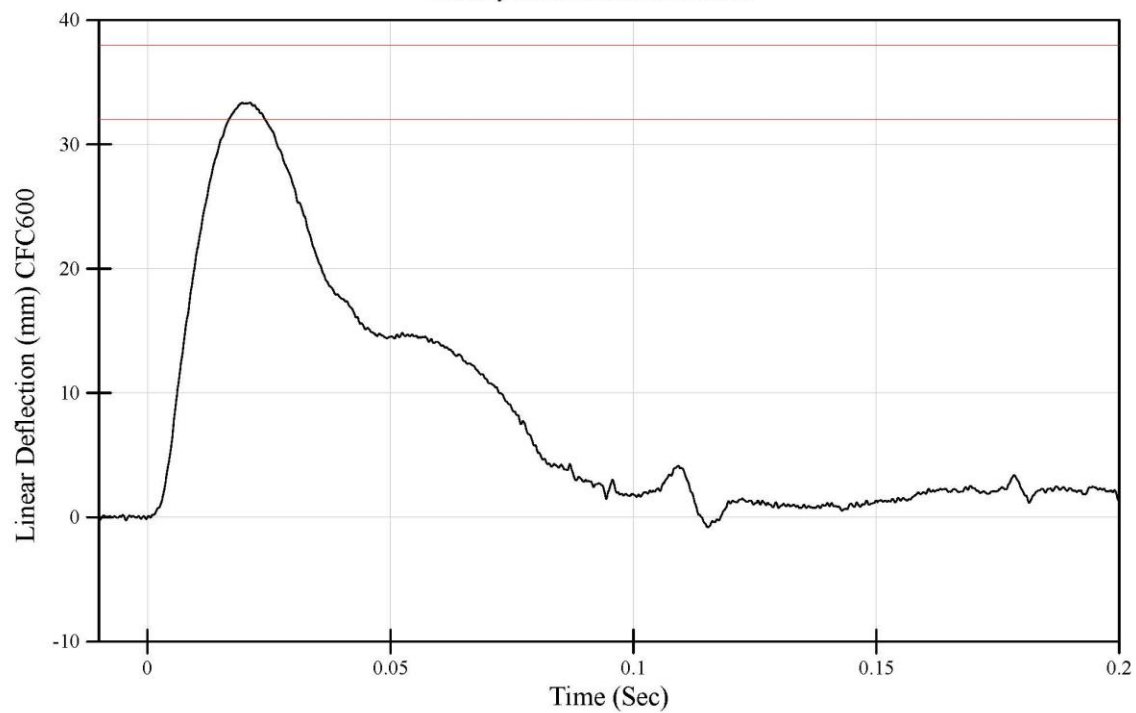
WorldSID-50M Right Abdomen Qualification
Max Abdomen Rib 1 Y Deflection
Dummy Serial Number: EA7820



File Name: 210330-2 processed

3/30/2021 10:36 AM

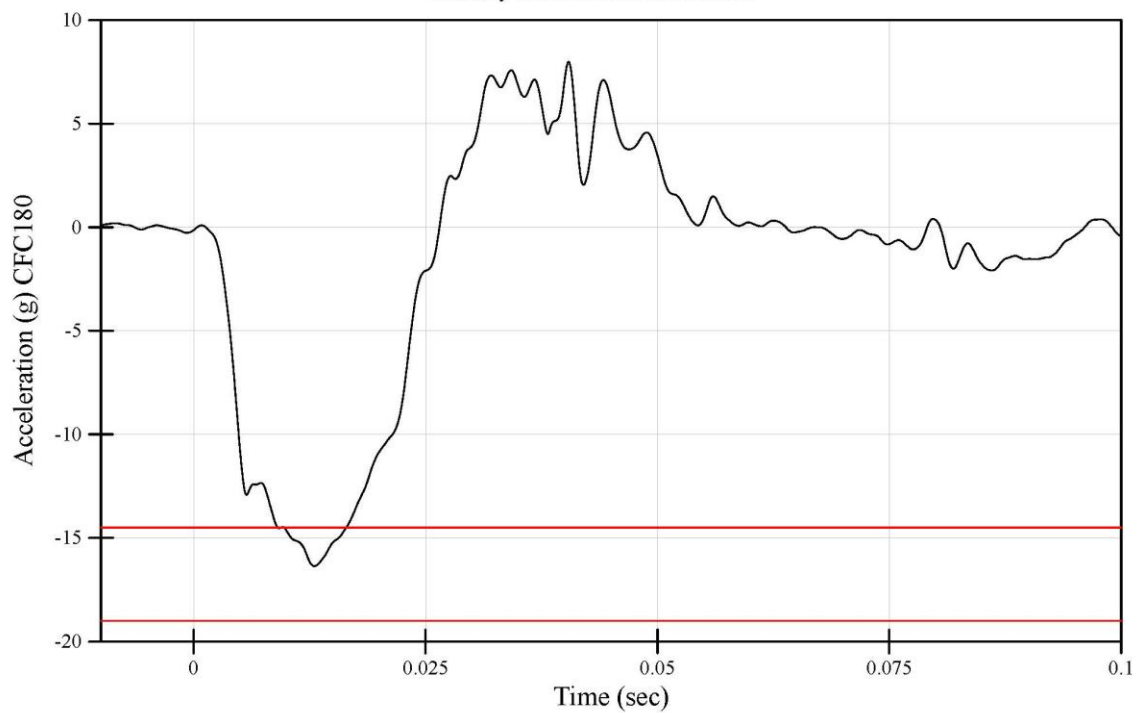
WorldSID-50M Right Abdomen Qualification
Max Abdomen Rib 2 Y Deflection
Dummy Serial Number: EA7820



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

Tested Components

Pelvis Flesh: EA7060
Pelvic Bone: EA5031

Test ID: 210331-3
Test Date: 3/31/2021
Test Time: 8:00 AM

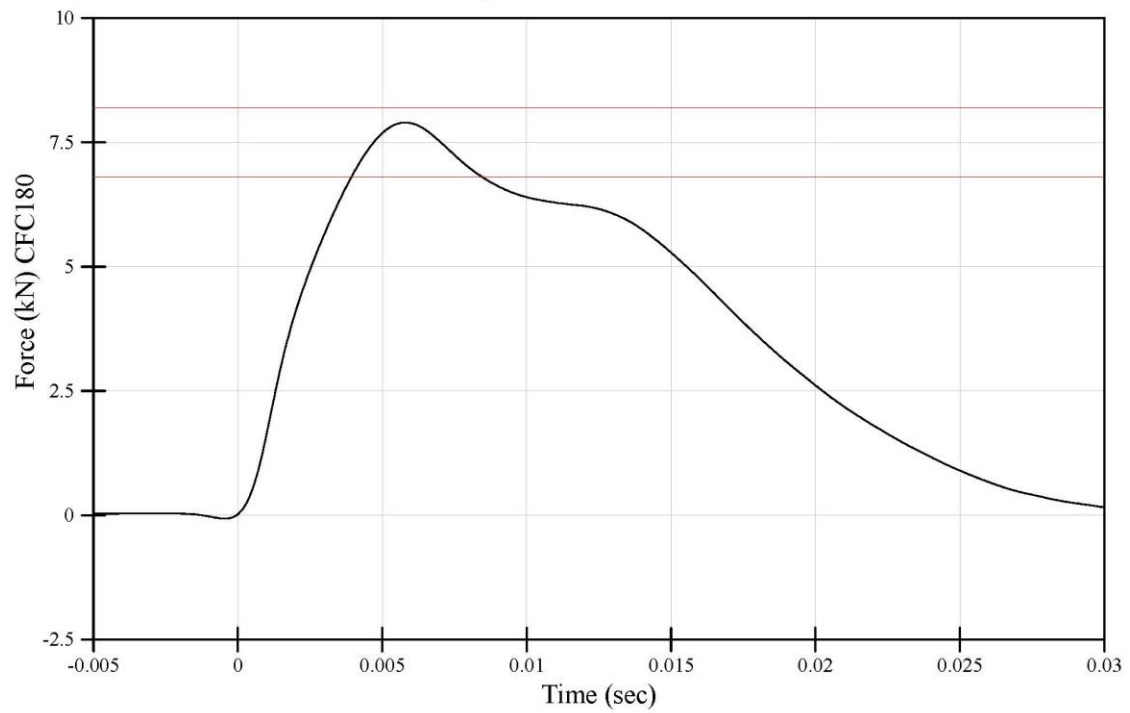
Test Results

<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

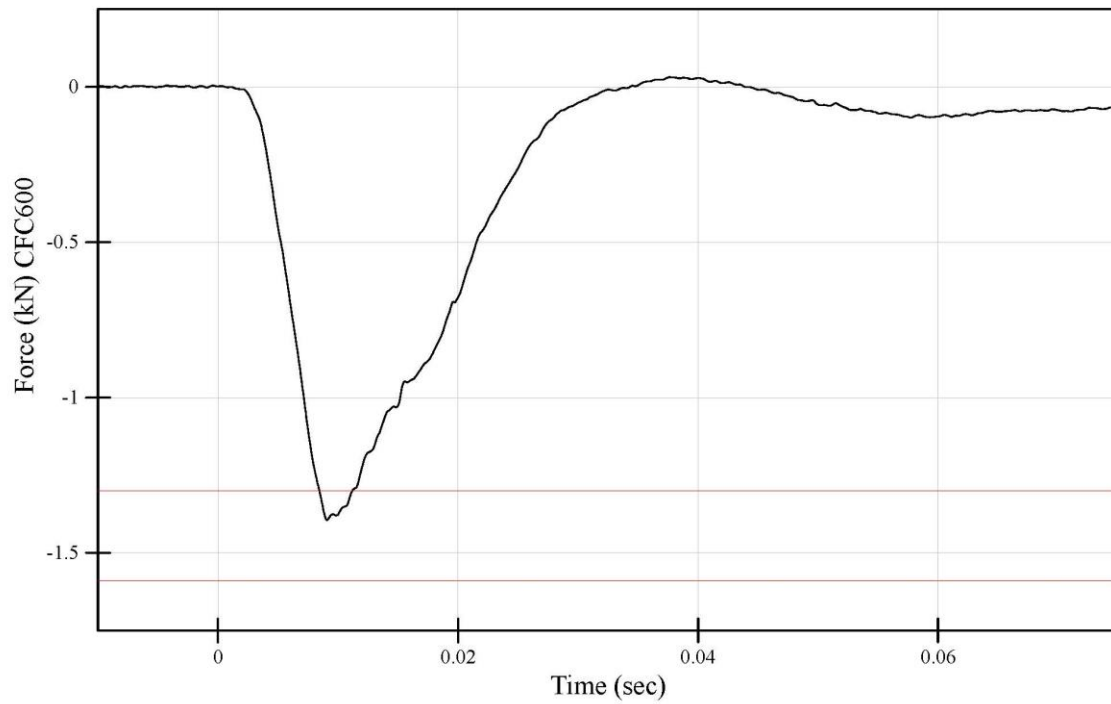
WorldSID-50M Right Pelvis Qualification
Peak Pendulum Force
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

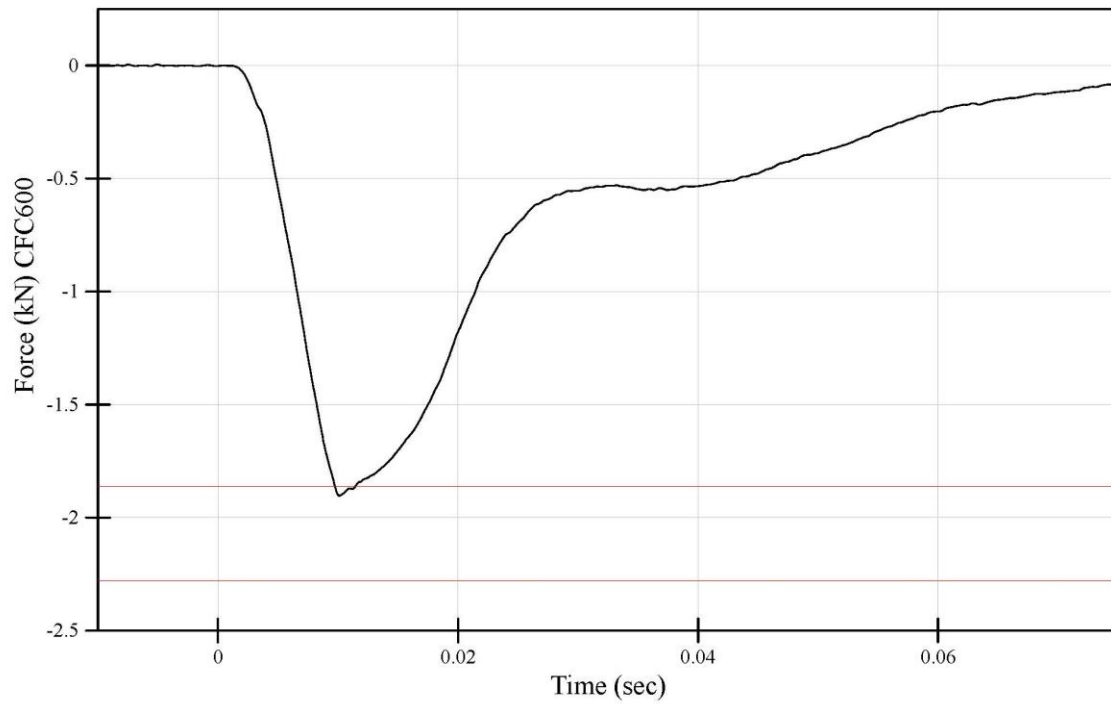
WorldSID-50M Right Pelvis Qualification
Peak Pubic Y axis Force
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

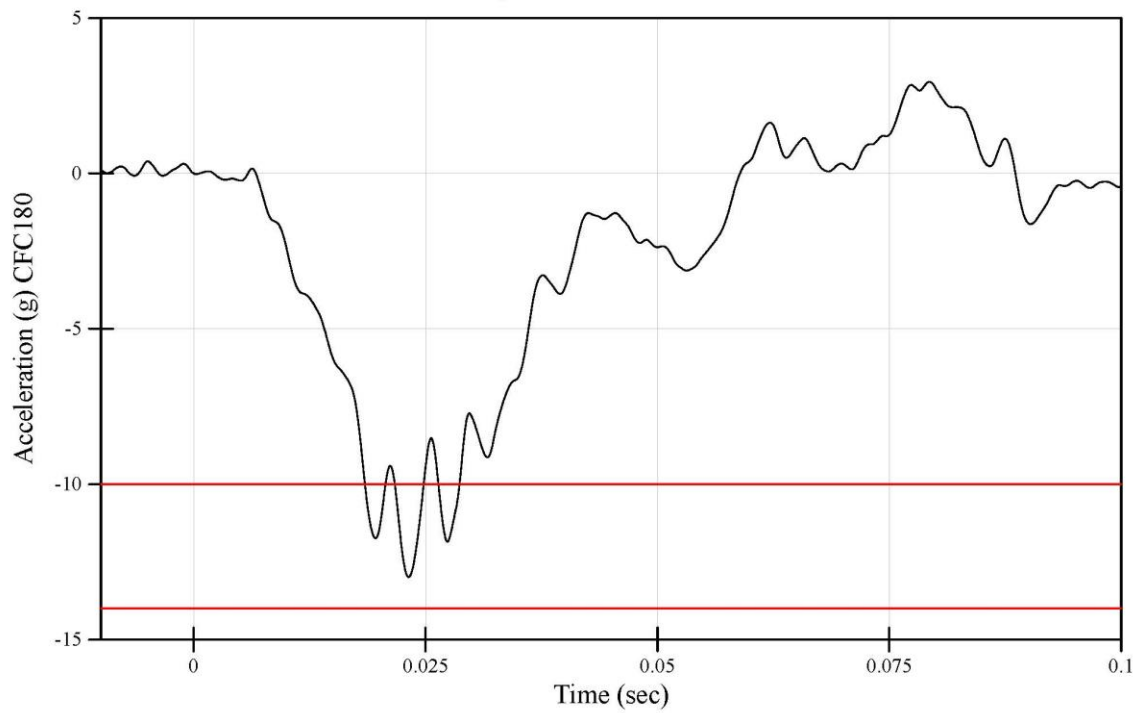
WorldSID-50M Right Pelvis Qualification
Peak Sacro-Iliac Y axis Force
Dummy Serial Number: EA7820



File Name: 210331-3 processed

3/31/2021 8:00 AM

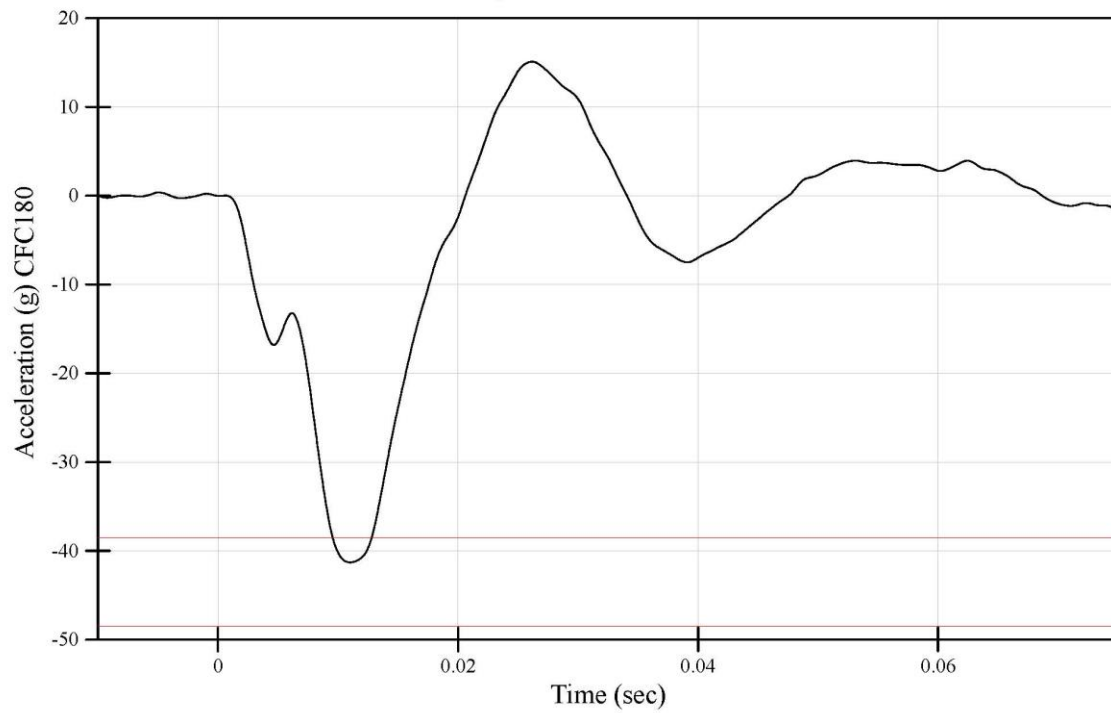
WorldSID-50M Right Pelvis Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: EA7820



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
Passenger 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:

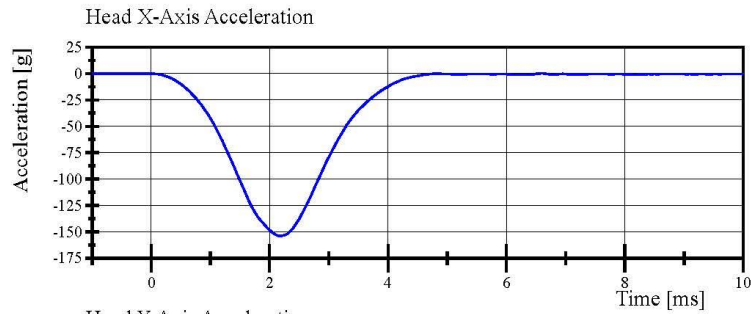
Head Skin S/N: EE8693

Transportation Research Center Inc.

Front Head Drop

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

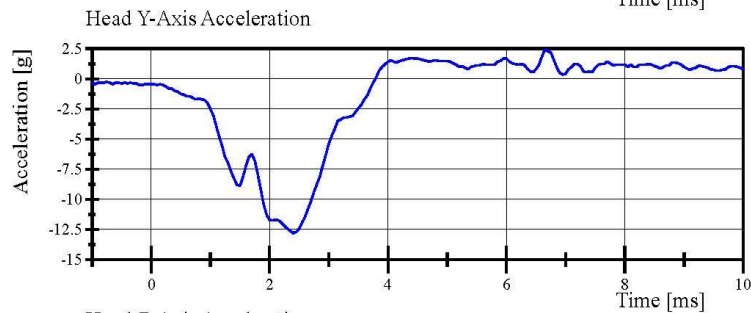
Test Date: 5/5/2021



Filter Class: CFC_1000

Max: 0.3 g at 6.6 ms

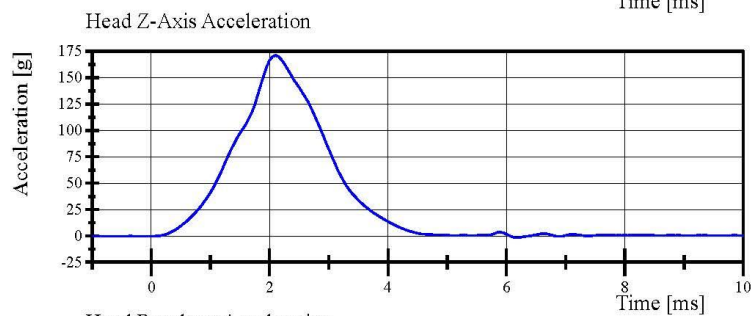
Min: -153.9 g at 2.2 ms



Filter Class: CFC_1000

Max: 2.4 g at 6.7 ms

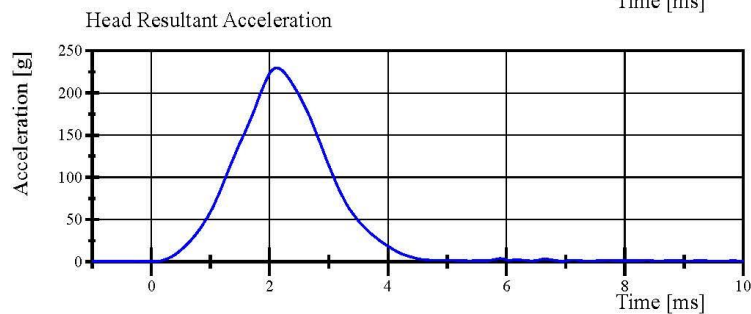
Min: -12.8 g at 2.4 ms



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

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:

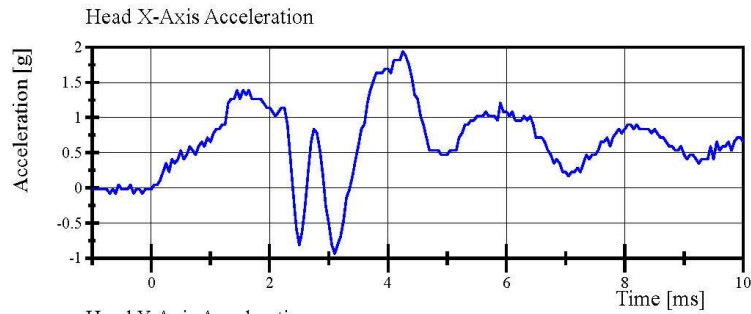
Head Skin S/N: EE8693

Transportation Research Center Inc.

Left Lateral Head Drop

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

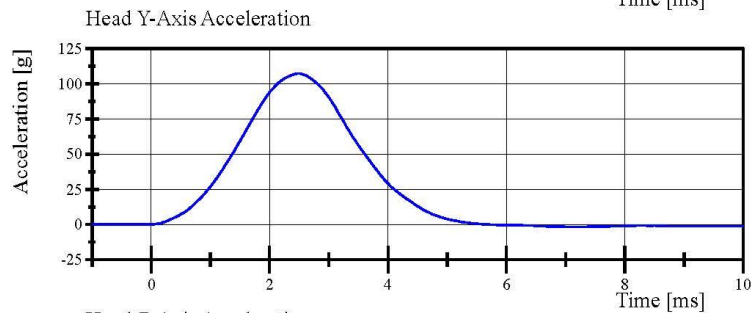
Test Date: 5/5/2021



Filter Class: CFC_1000

Max: 1.9 g at 4.3 ms

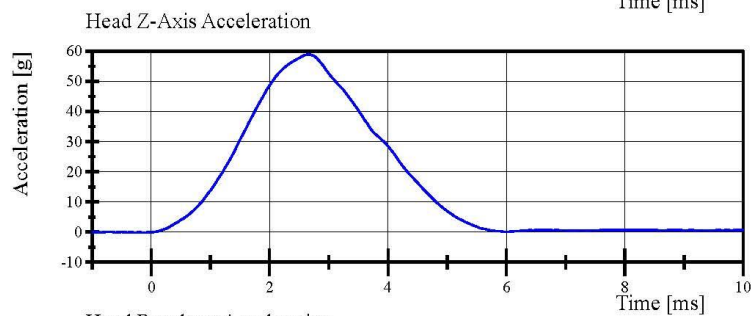
Min: -0.9 g at 3.1 ms



Filter Class: CFC_1000

Max: 107.3 g at 2.5 ms

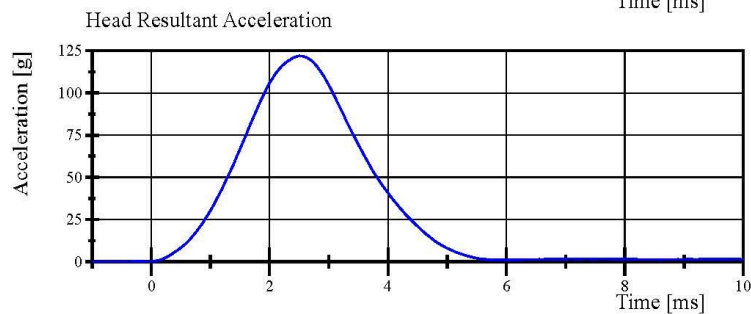
Min: -1.6 g at 7.1 ms



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
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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:

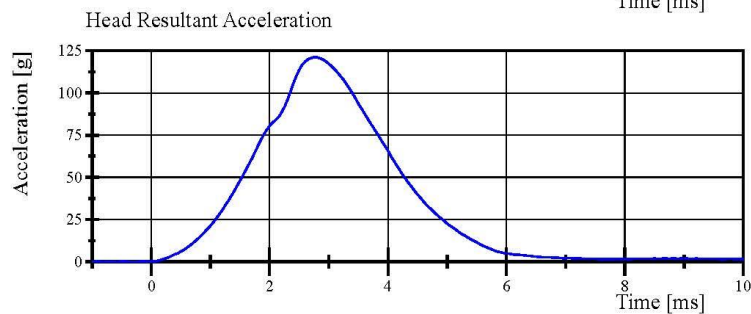
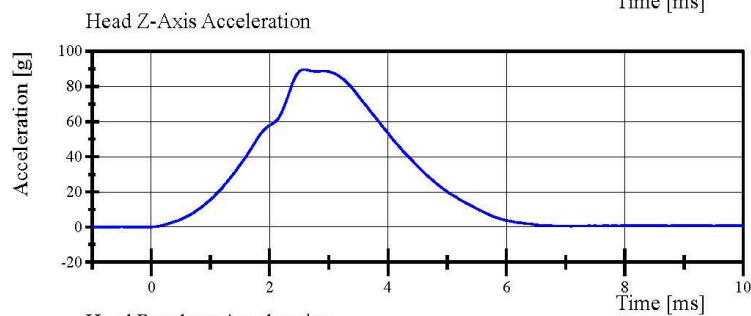
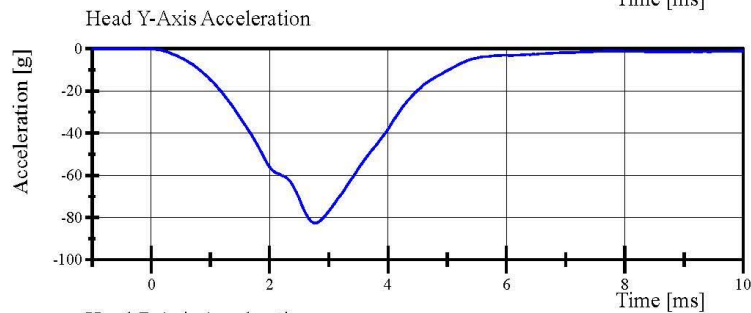
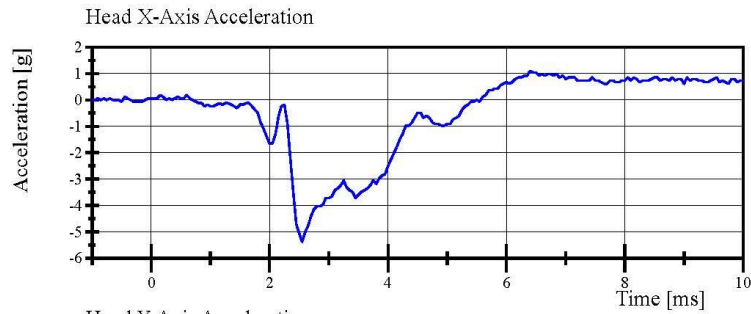
Head Skin S/N: EE8693

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:

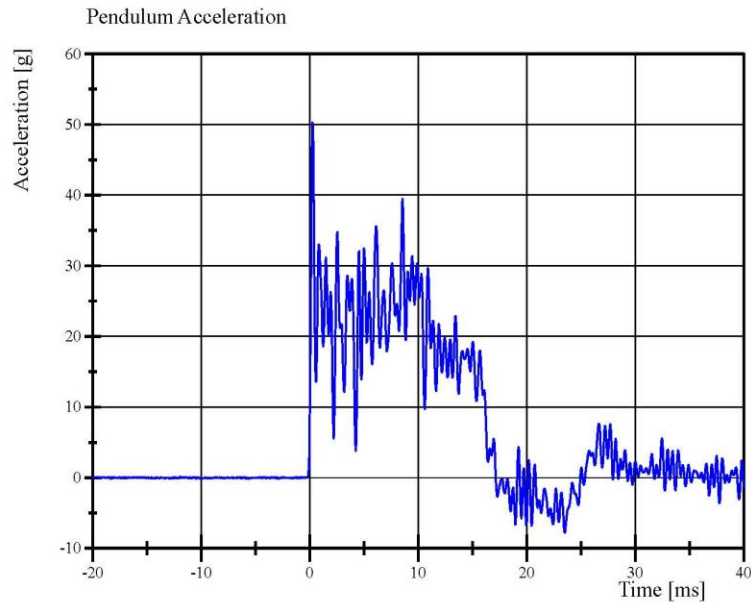
Neck S/N: DW6607

Transportation Research Center Inc.

Left Lateral Neck

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

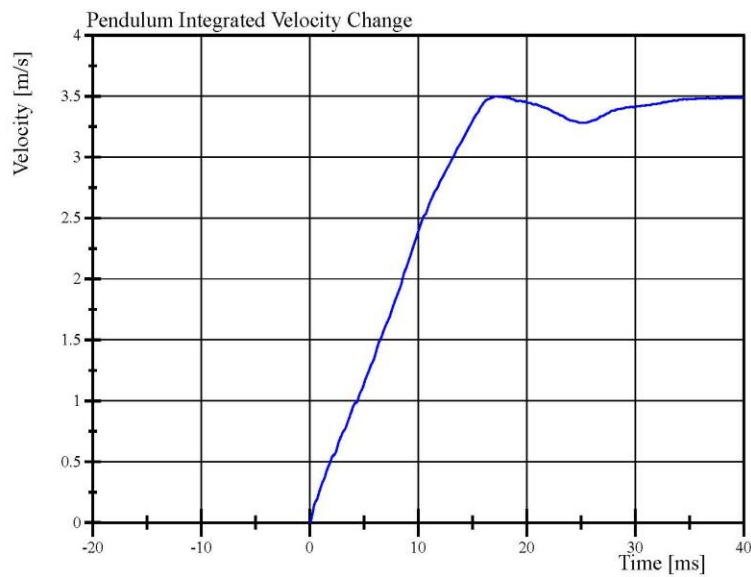
Test Date: 5/7/2021



Filter Class: CFC_1000

Max: 50.3 g at 0.3 ms

Min: -7.8 g at 23.5 ms



Filter Class: CFC_1000

Max: 3.5 m/s at 17.2 ms

Min: 0.0 m/s at -0.0 ms

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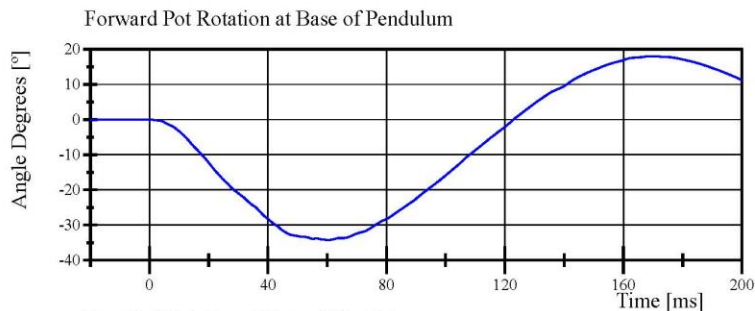


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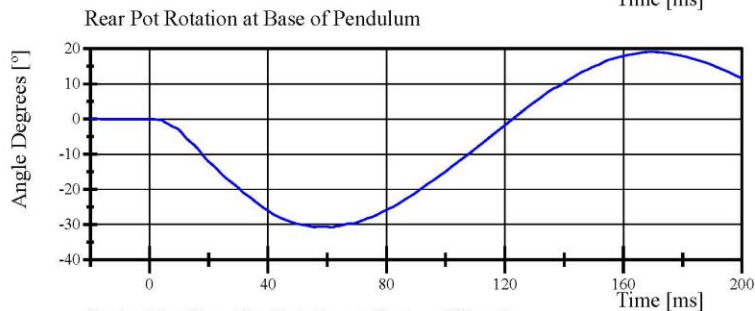
Left Lateral Neck

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

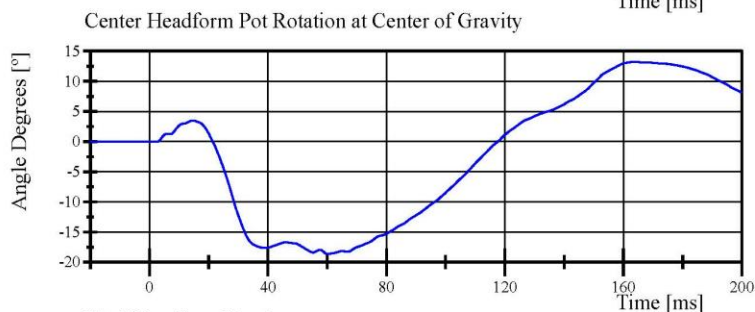
Test Date: 5/7/2021



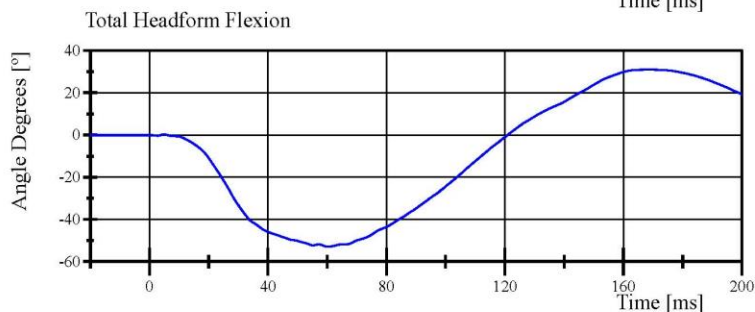
Filter Class: CFC_180
Max: 18.0 ° at 169.2 ms
Min: -34.3 ° at 60.4 ms



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_Qalification Manual 11_09_2020

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Report Number: EA7820_WSH03

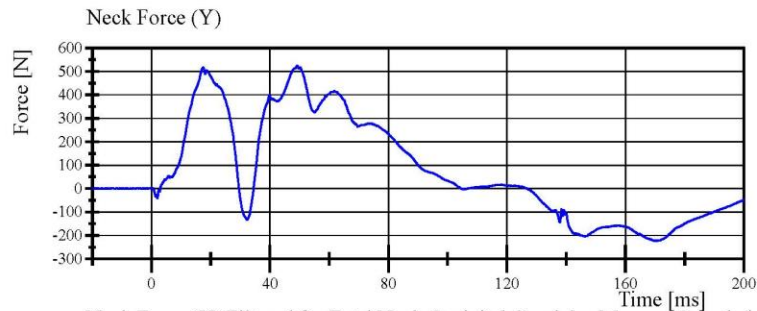
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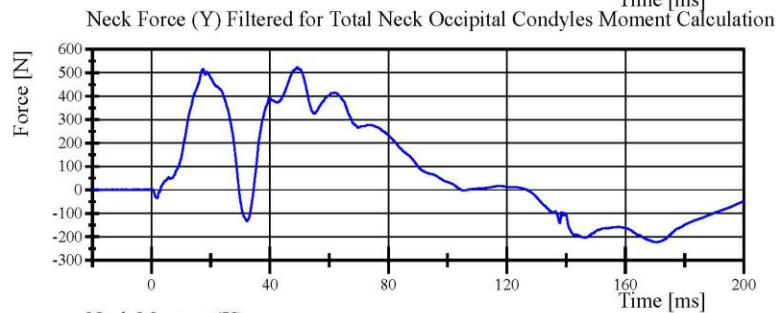
Left Lateral Neck

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

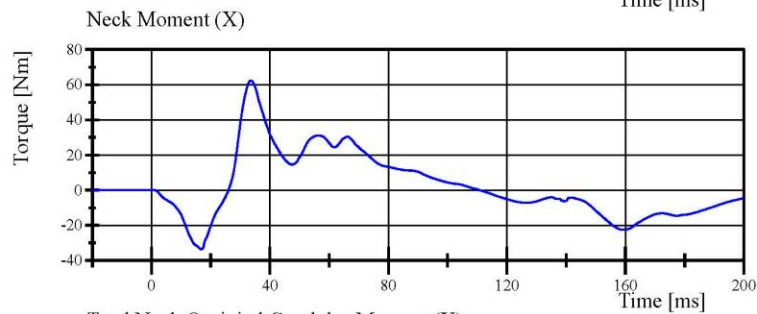
Test Date: 5/7/2021



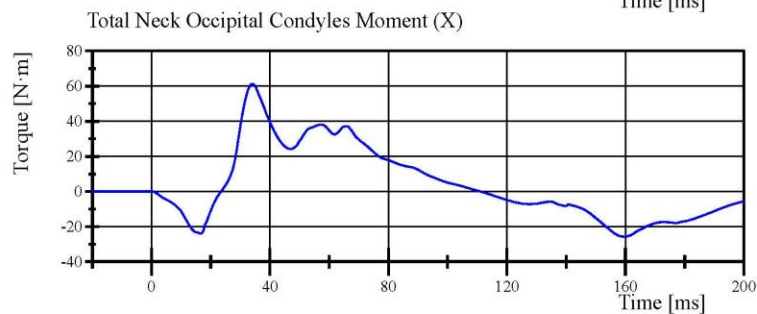
Filter Class: CFC_1000
Max: 524.0 N at 49.2 ms
Min: -223.1 N at 170.5 ms



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: WorldSID 50th(WS) VRTC Nov 2020.xlsx
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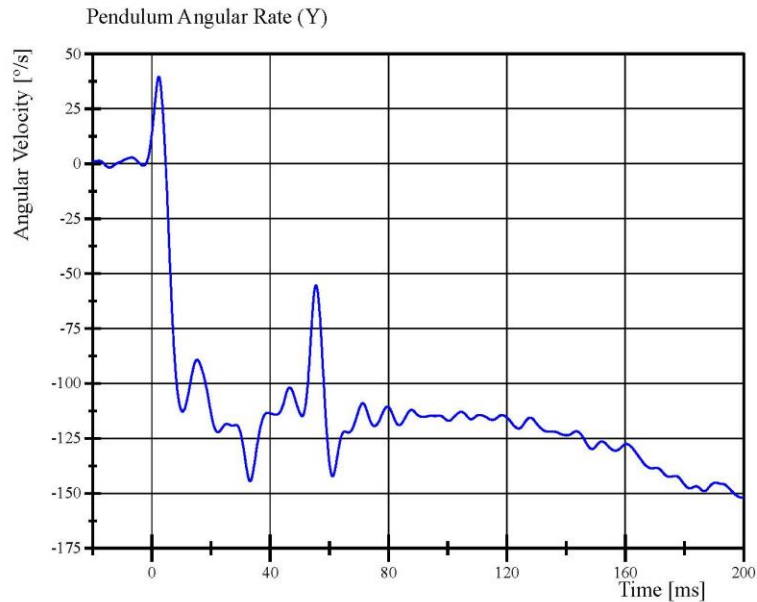


Transportation Research Center Inc.

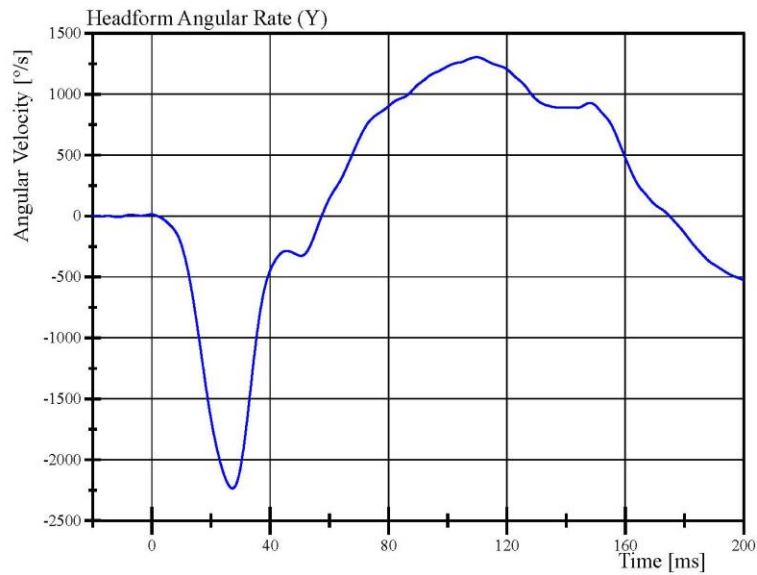
Left Lateral Neck

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

Test Date: 5/7/2021



Filter Class: CFC_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
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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:

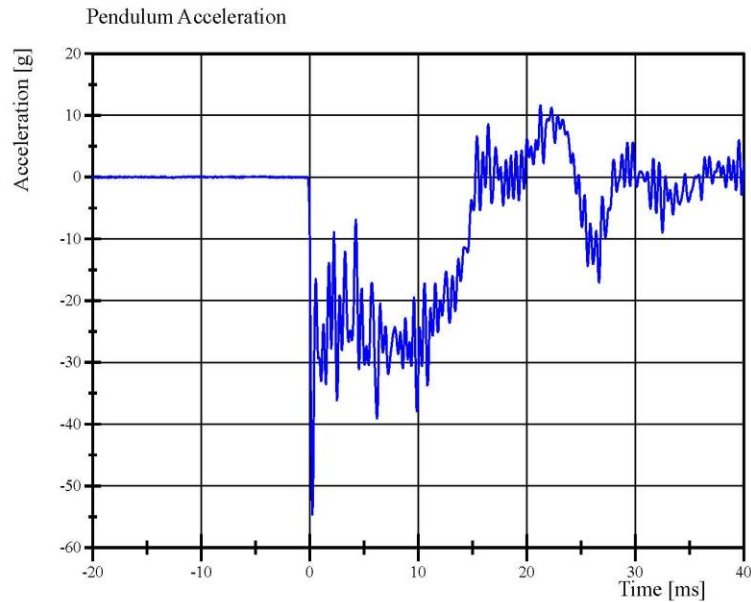
Neck S/N: DW6607

Transportation Research Center Inc.

Right Lateral Neck

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

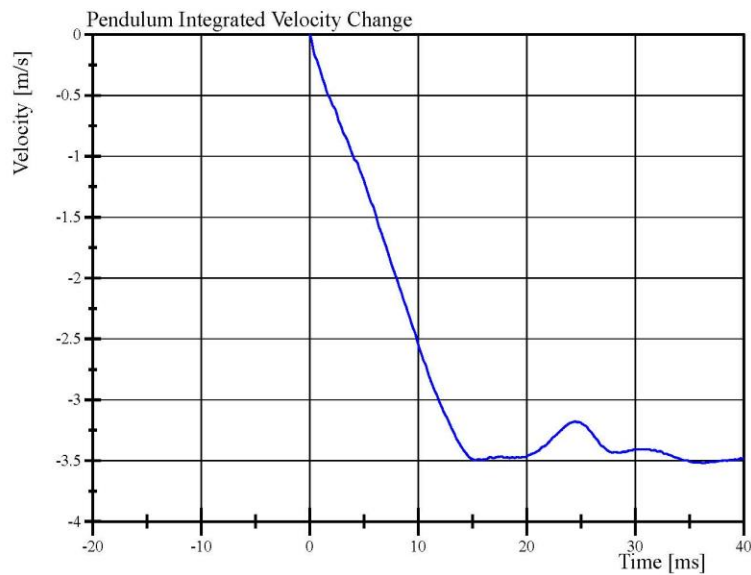
Test Date: 5/7/2021



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_Qalification Manual 11_09_2020

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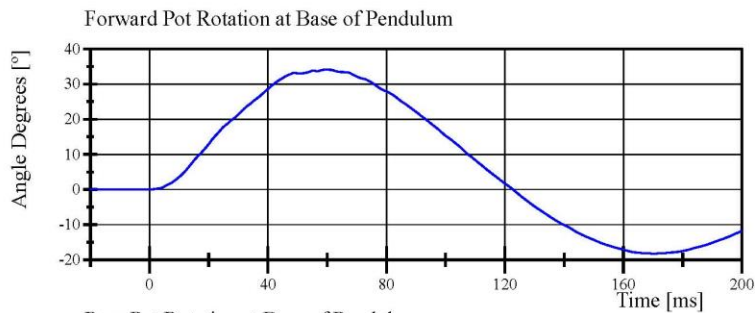


Transportation Research Center Inc.

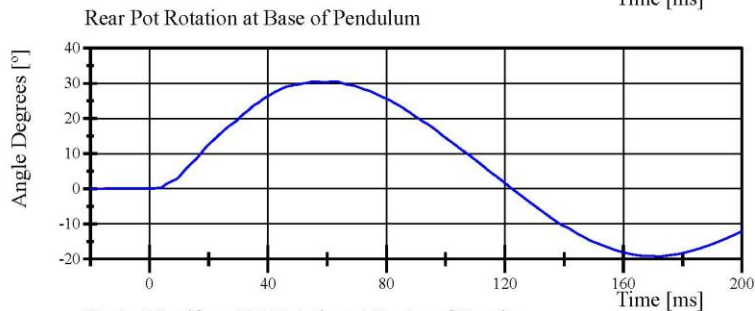
Right Lateral Neck

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

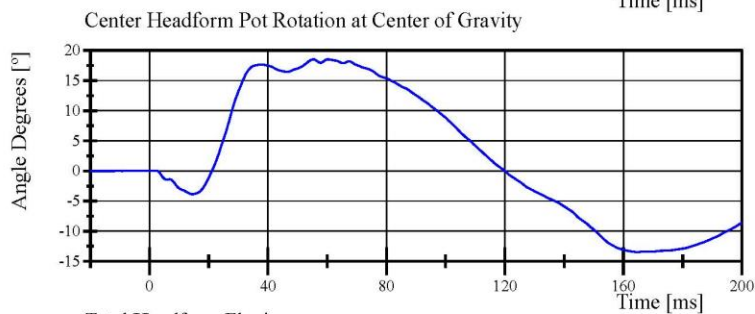
Test Date: 5/7/2021



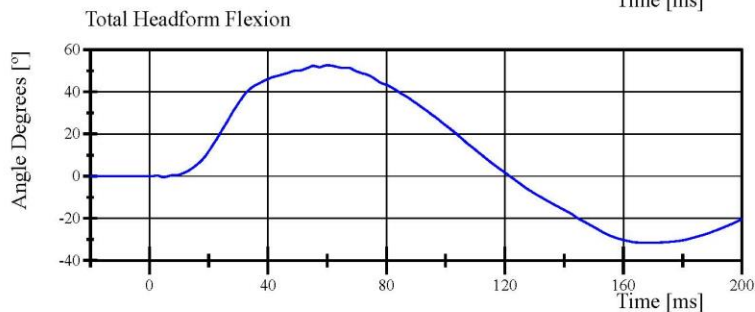
Filter Class: CFC_180
Max: 34.1 ° at 59.7 ms
Min: -18.2 ° at 170.4 ms



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(W5) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

05.07.2021 10:43:02 4009

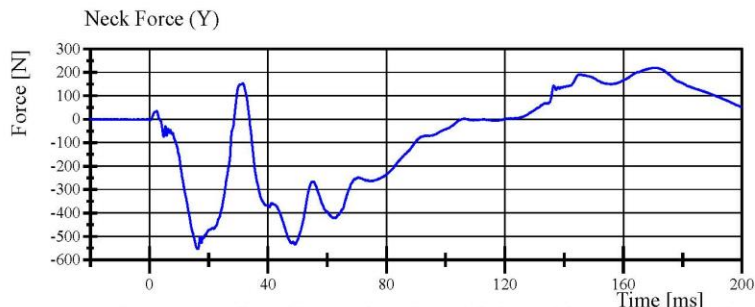


Report Number: EA7820_WSH03

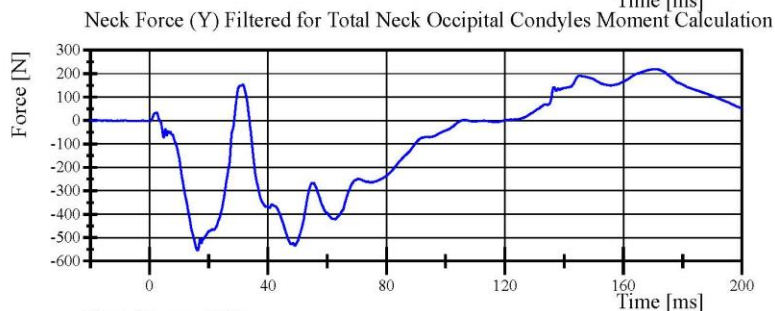
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Transportation Research Center Inc.

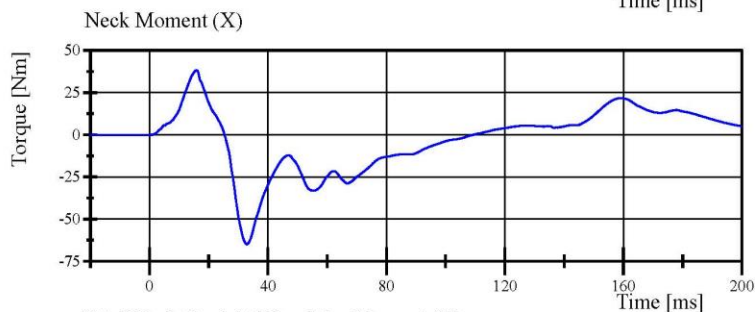
Right Lateral Neck
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/7/2021



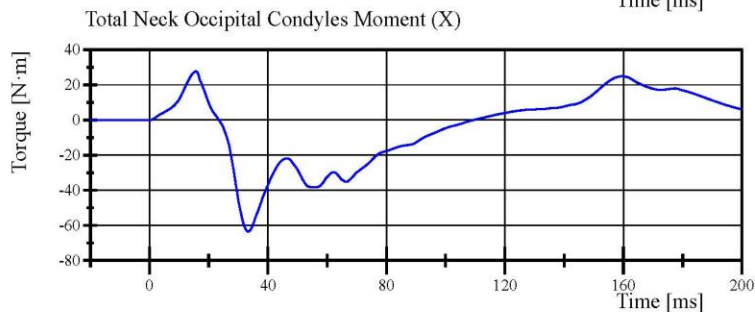
Filter Class: CFC_1000
Max: 220.1 N at 170.5 ms
Min: -553.9 N at 16.3 ms



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



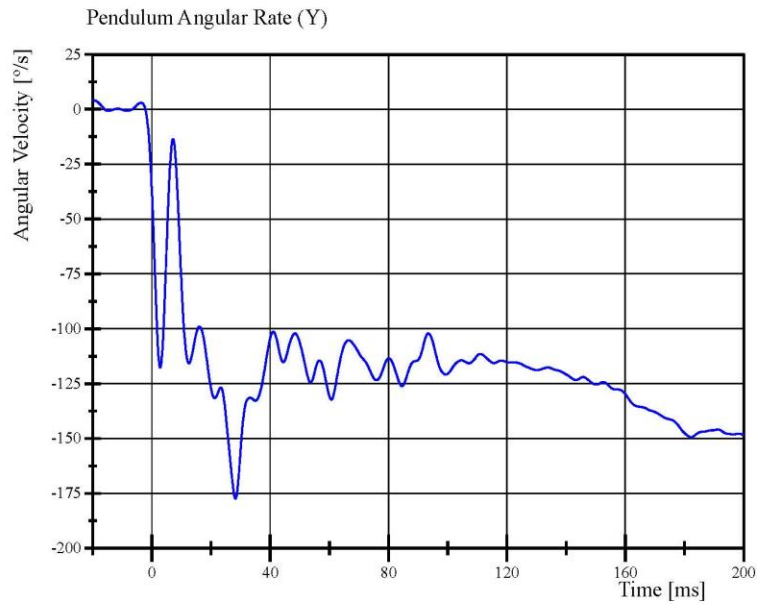
Filter Class: Without_(Constar
Max: 27.6 N·m at 15.6 ms
Min: -63.5 N·m at 33.3 ms

Transportation Research Center Inc.

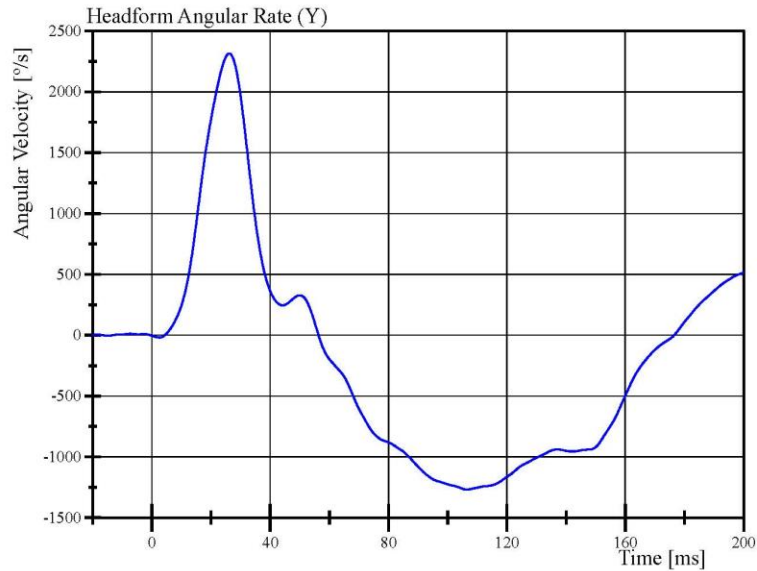
Right Lateral Neck

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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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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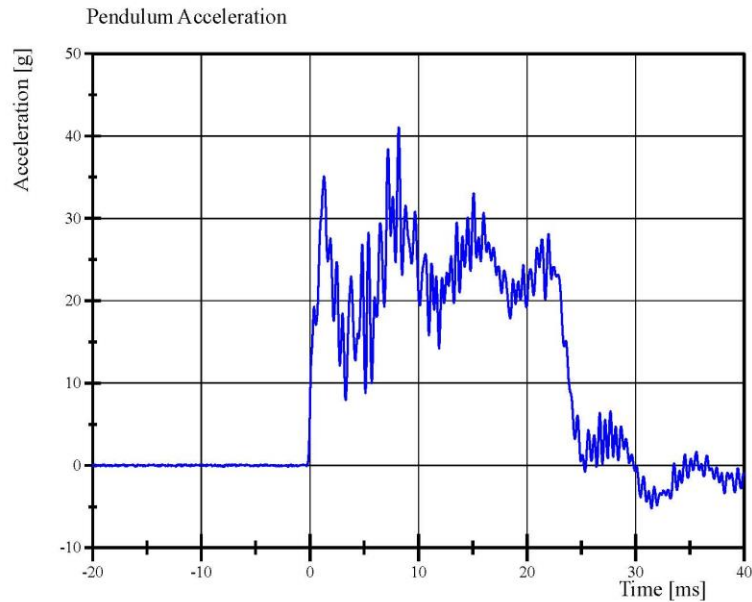


Transportation Research Center Inc.

Left Lateral Torsion

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

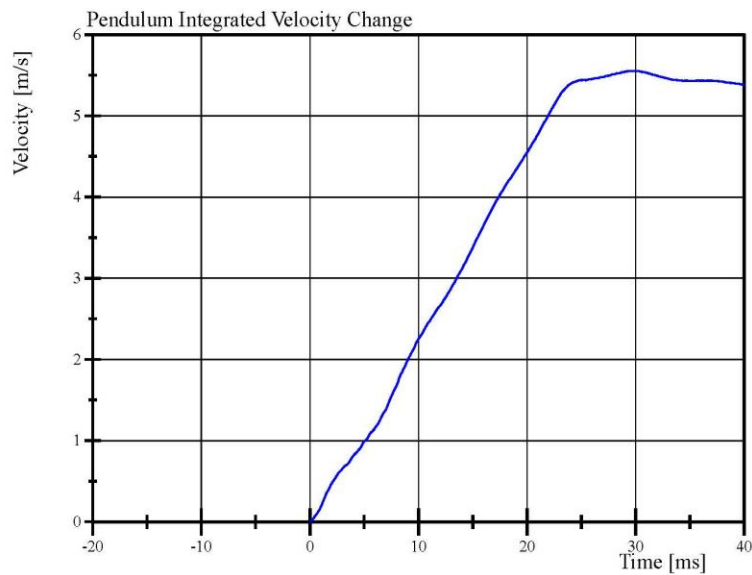
Test Date: 5/7/2021



Filter Class: CFC_1000

Max: 41.0 g at 8.2 ms

Min: -5.2 g at 31.5 ms



Filter Class: CFC_1000

Max: 5.6 m/s at 29.8 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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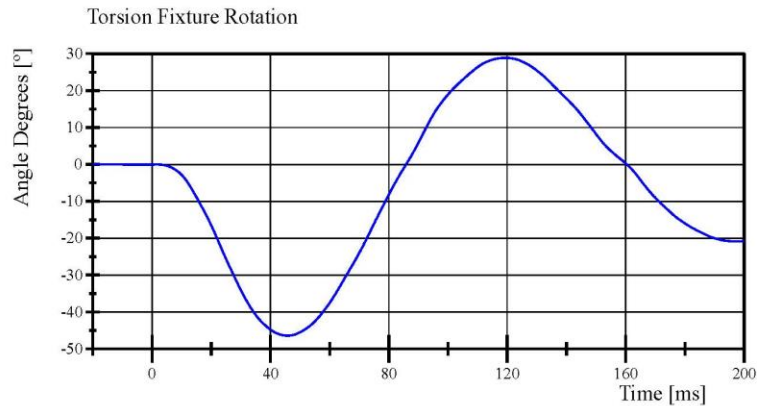


Transportation Research Center Inc.

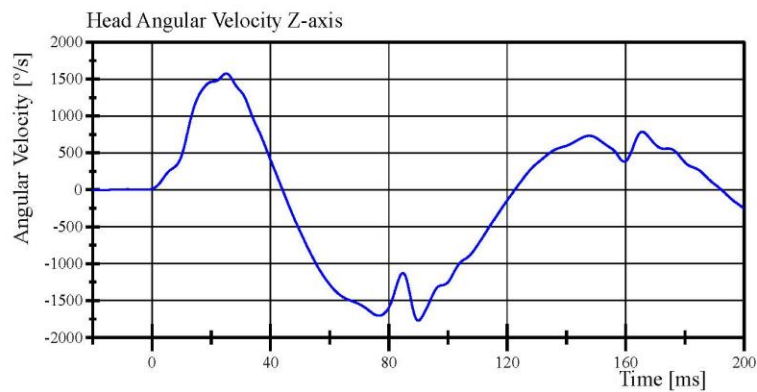
Left Lateral Torsion

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

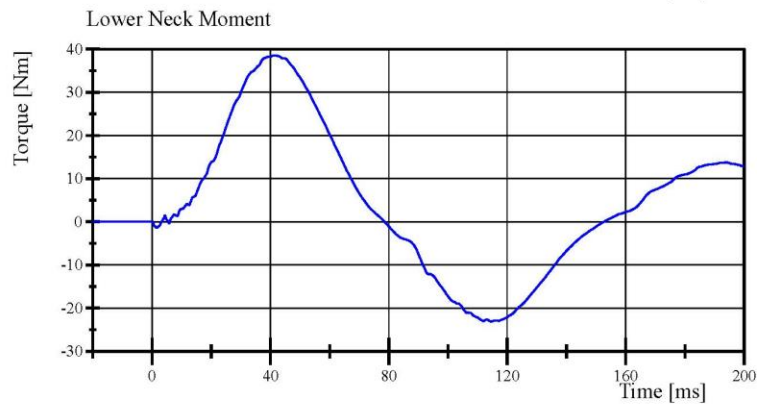
Test Date: 5/7/2021



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_Qalification 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:

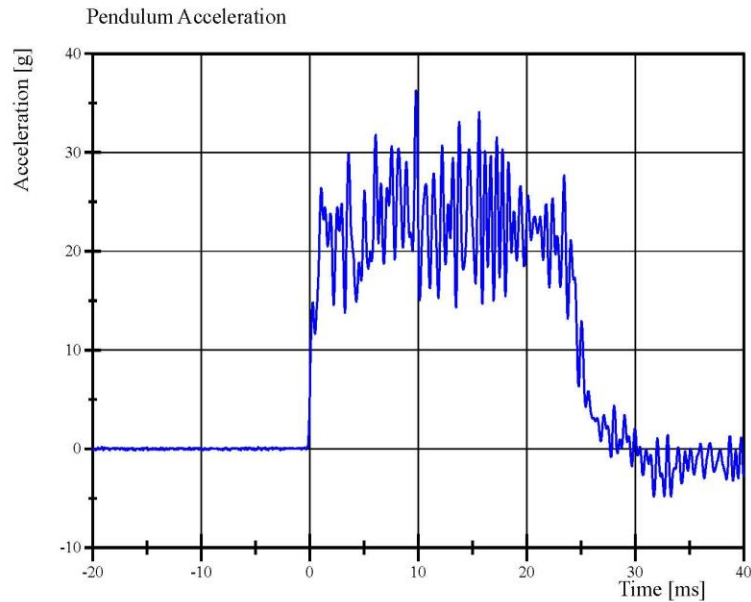
Neck S/N: DW6607

Transportation Research Center Inc.

Right Lateral Torsion

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

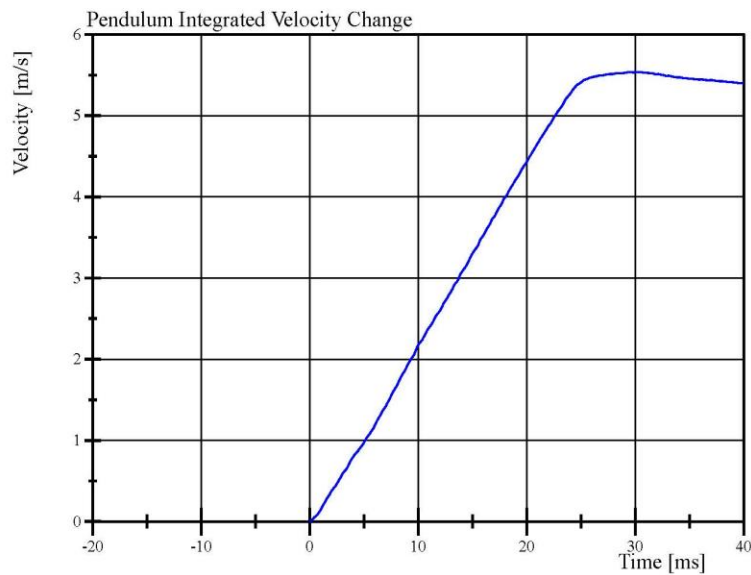
Test Date: 5/10/2021



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
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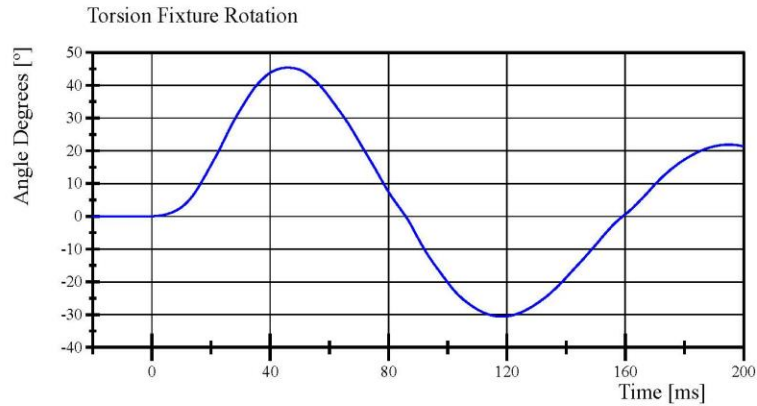


Transportation Research Center Inc.

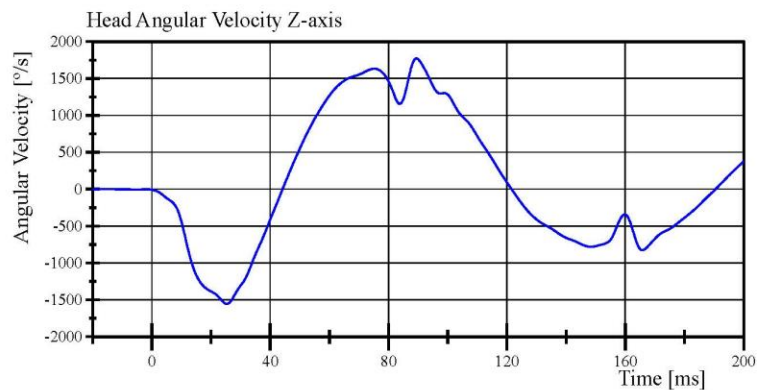
Right Lateral Torsion

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

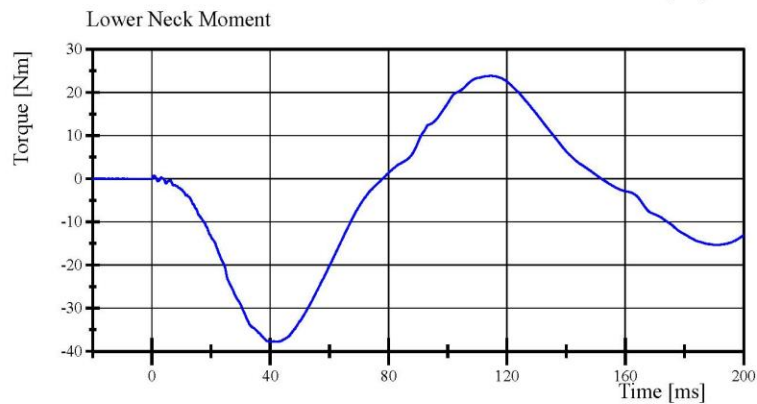
Test Date: 5/10/2021



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
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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

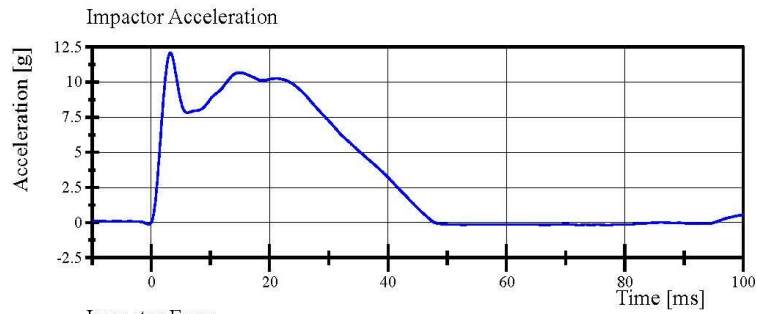
Ribeye S/N: 160

Transportation Research Center Inc.

Right Lateral Shoulder

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

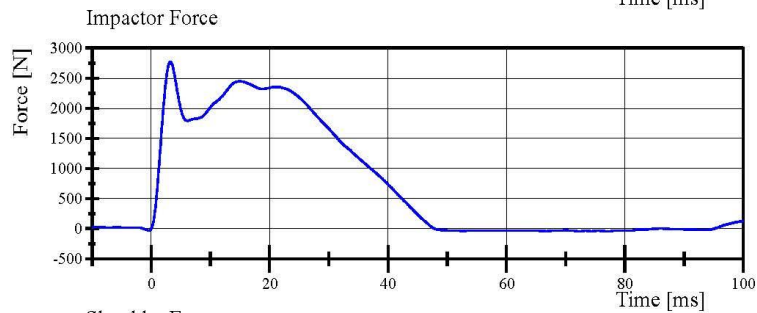
Test Date: 5/4/2021



Filter Class: CFC_180

Max: 12.1 g at 3.3 ms

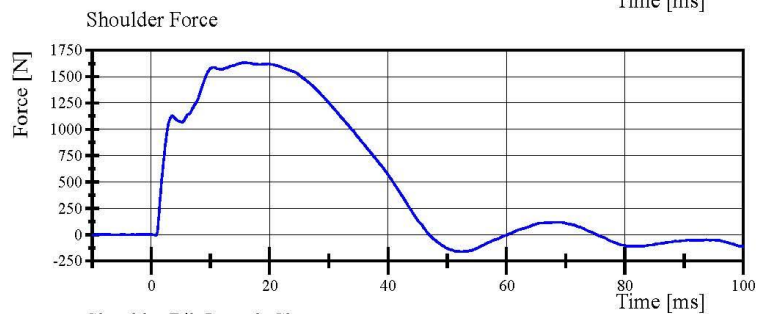
Min: -0.2 g at 77.2 ms



Filter Class: CFC_180

Max: 2,773.4 N at 3.3 ms

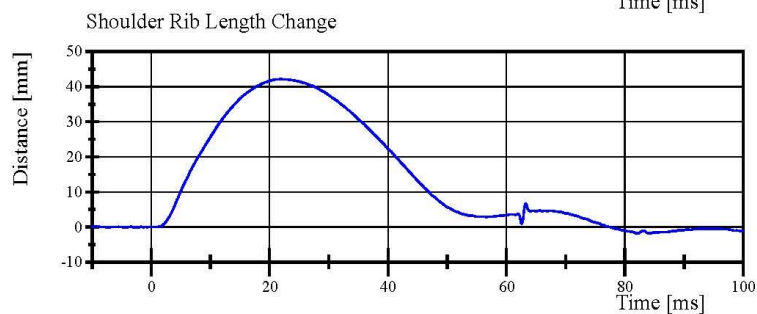
Min: -42.2 N at 77.2 ms



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

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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

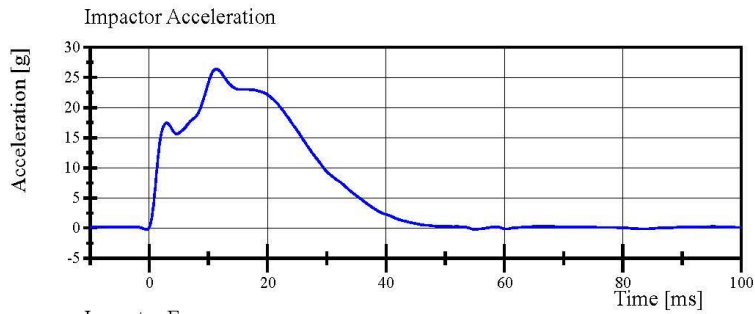
Thorax Rib #2 S/N: DW8864

Thorax Rib #3 S/N: ED4871

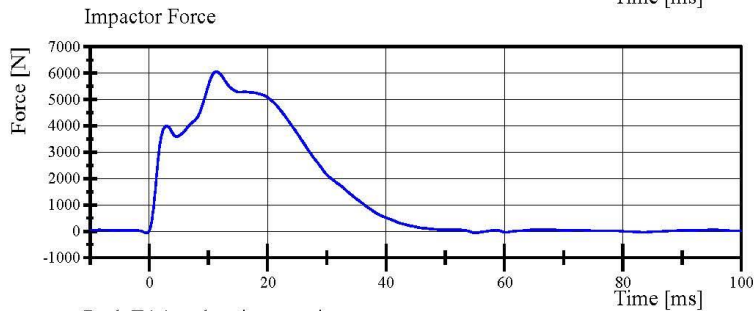
RibEye S/N: 160

Transportation Research Center Inc.

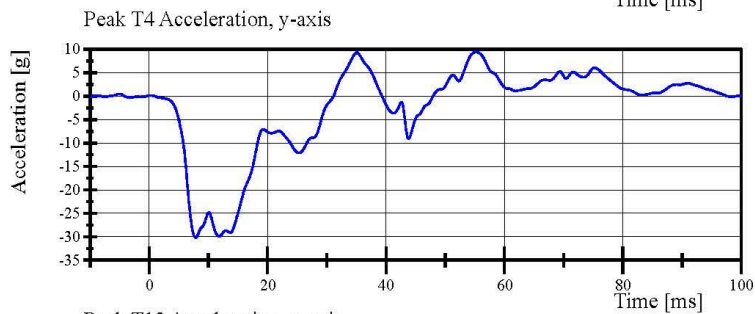
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



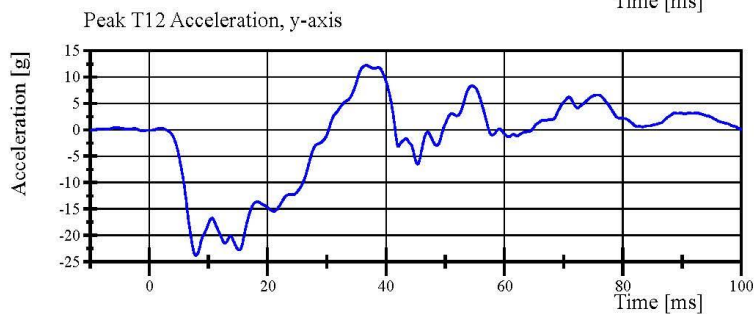
Filter Class: CFC_180
Max: 26.4 g at 11.3 ms
Min: -0.3 g at -0.4 ms



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



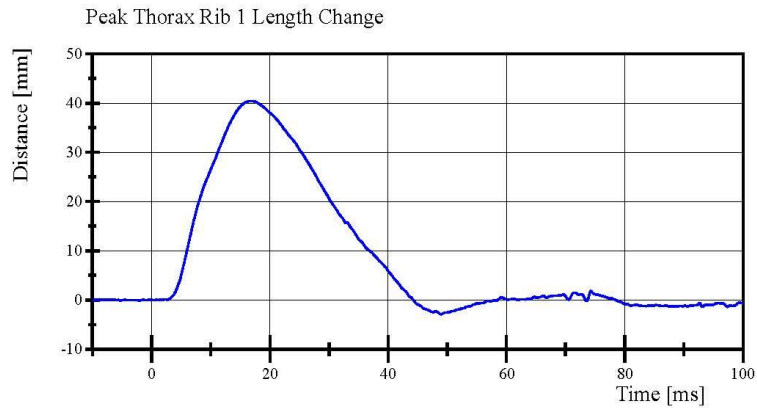
Filter Class: CFC_180
Max: 9.4 g at 55.2 ms
Min: -30.2 g at 7.9 ms



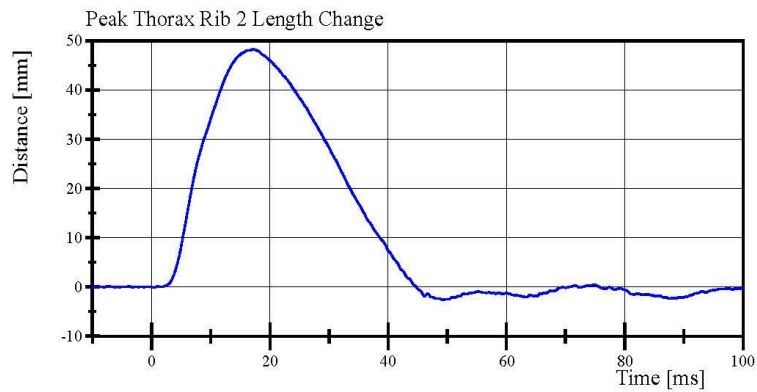
Filter Class: CFC_180
Max: 12.2 g at 36.7 ms
Min: -23.8 g at 7.9 ms

Transportation Research Center Inc.

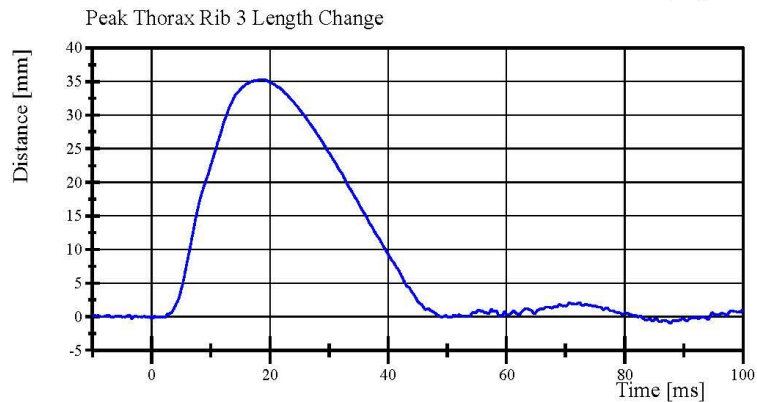
Right Lateral Thorax with Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



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

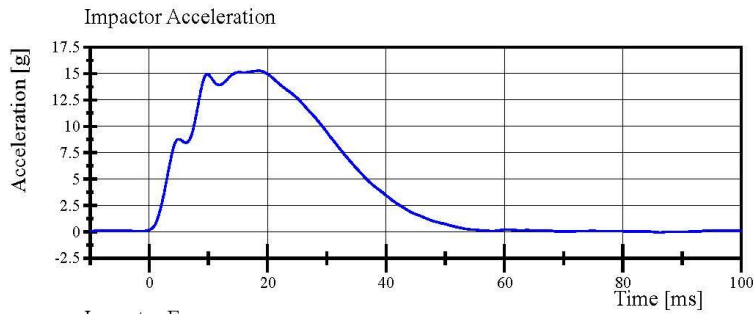
Thorax Rib #2 S/N: DW8864

Thorax Rib #3 S/N: ED4871

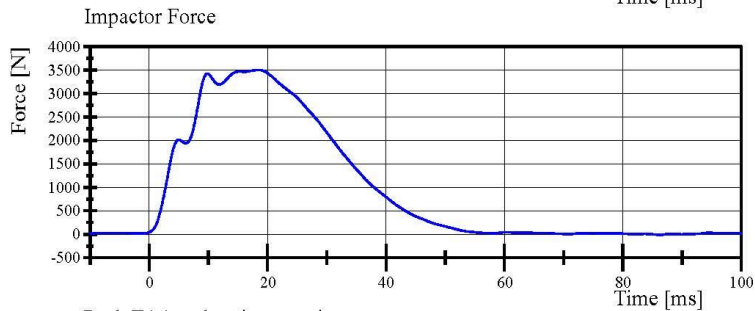
RibEye S/N: 160

Transportation Research Center Inc.

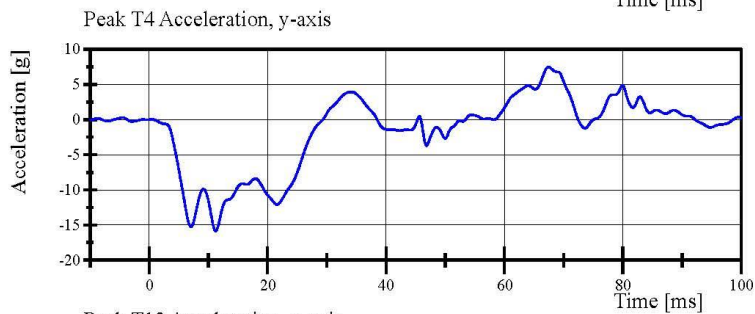
Right Lateral Thorax without Arm
WorldSID 50th Serial No. EA7820 Certification No. 3-1
Test Date: 5/5/2021



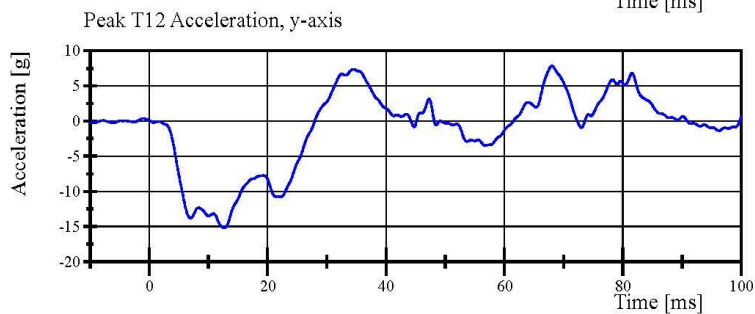
Filter Class: CFC_180
Max: 15.3 g at 18.5 ms
Min: -0.0 g at 86.4 ms



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



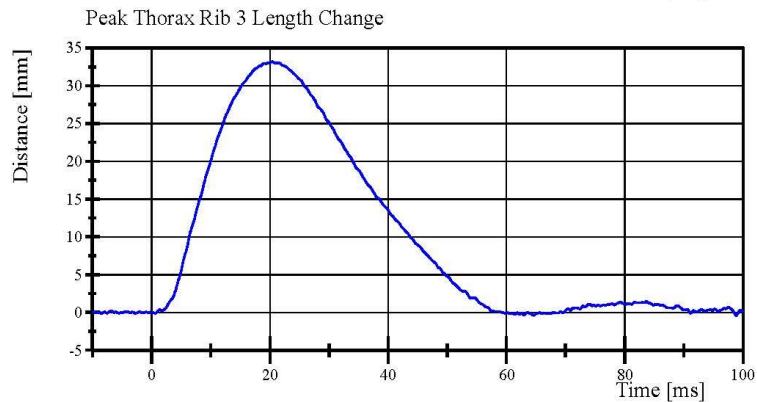
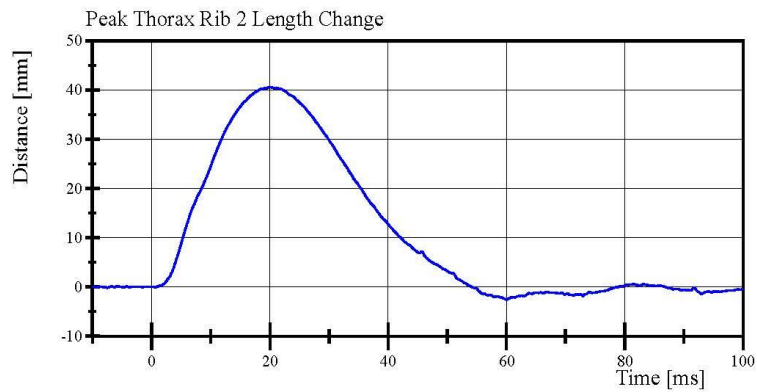
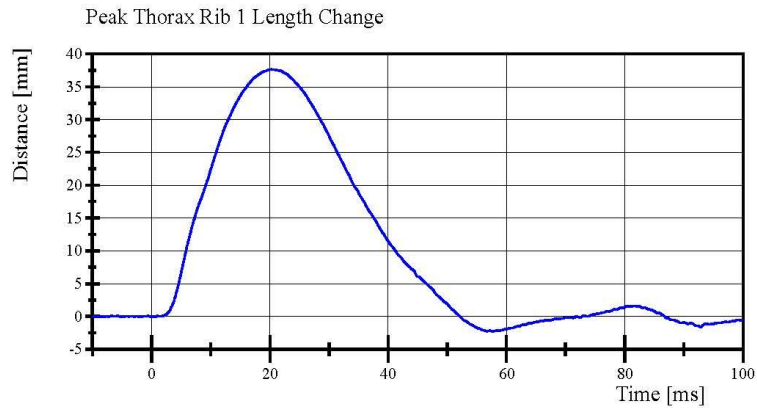
Filter Class: CFC_180
Max: 7.5 g at 67.5 ms
Min: -15.8 g at 11.2 ms



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



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.

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

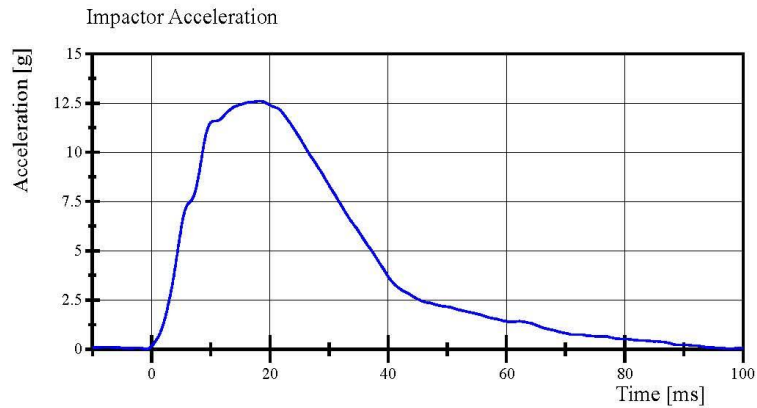
Ribeye S/N: 160

Transportation Research Center Inc.

Right Lateral Abdomen

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

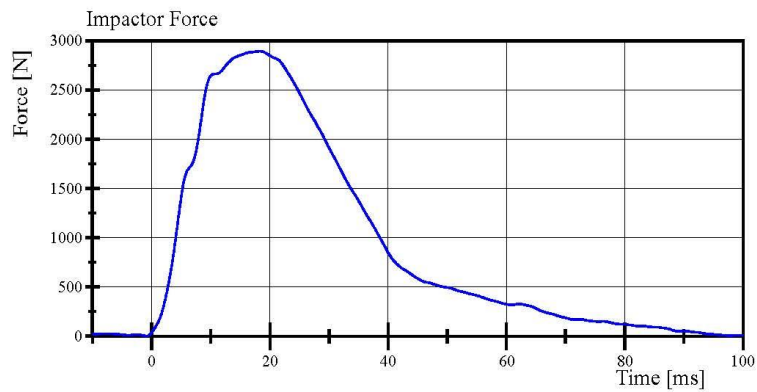
Test Date: 5/5/2021



Filter Class: CFC_180

Max: 12.6 g at 18.3 ms

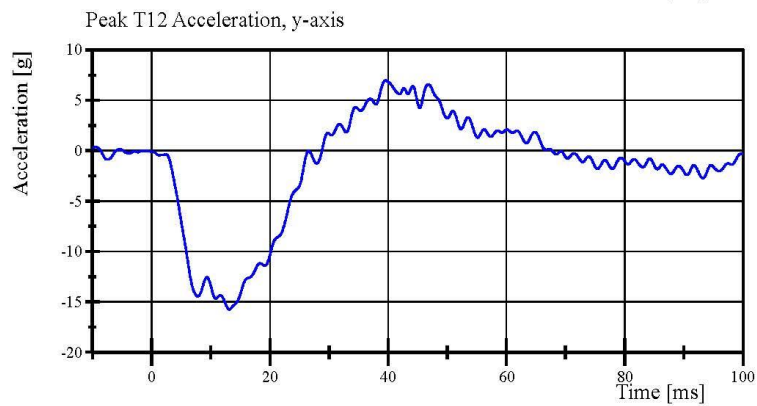
Min: 0.0 g at -0.9 ms



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

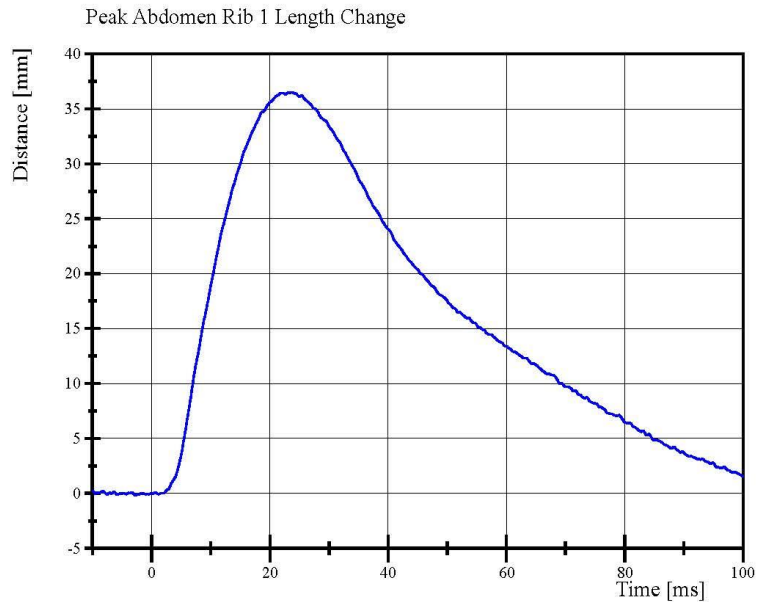
Min: -15.8 g at 13.2 ms

Transportation Research Center Inc.

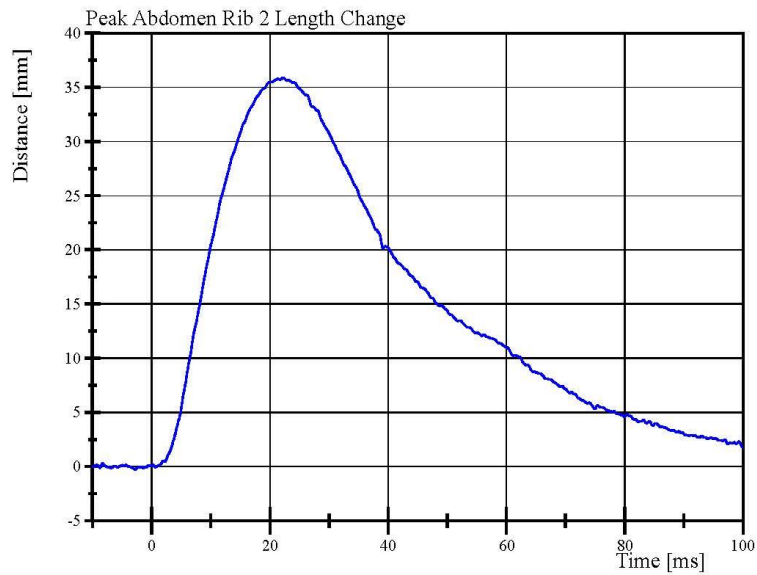
Right Lateral Abdomen

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

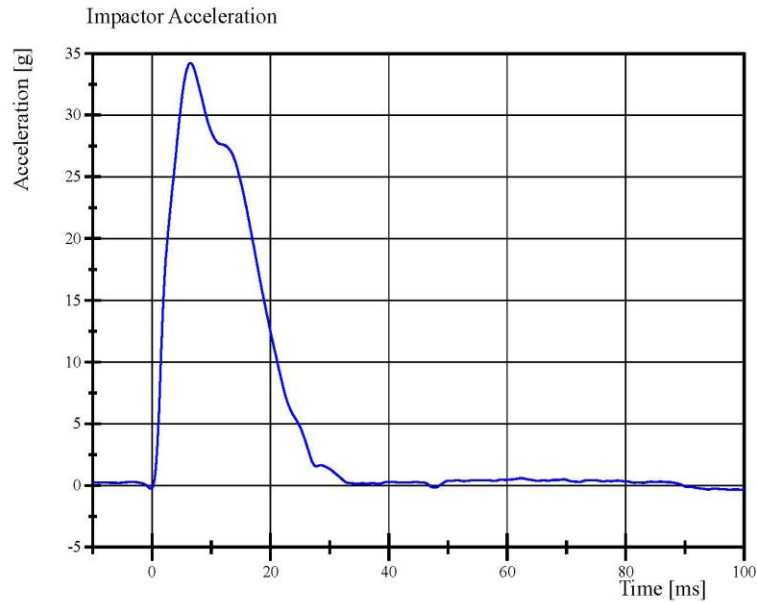
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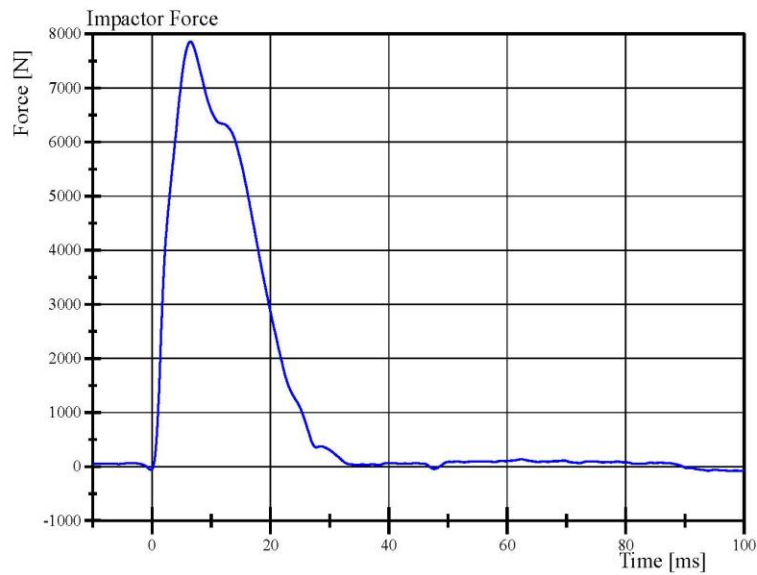


Transportation Research Center Inc.

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



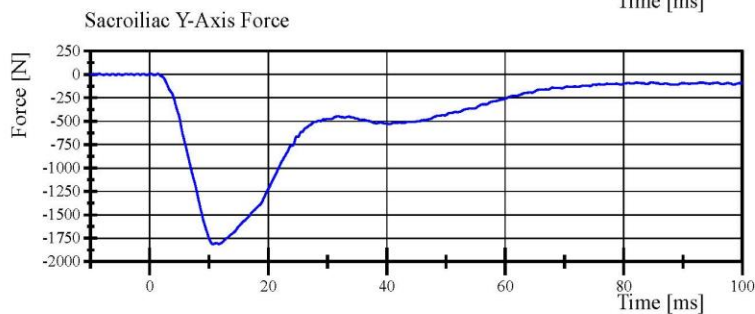
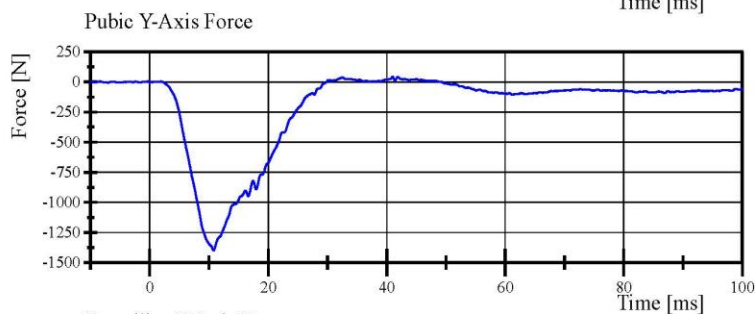
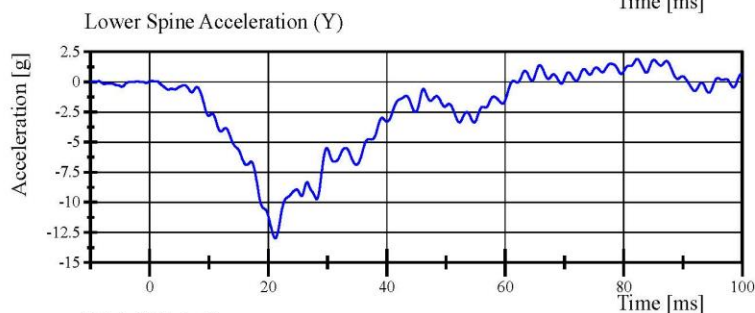
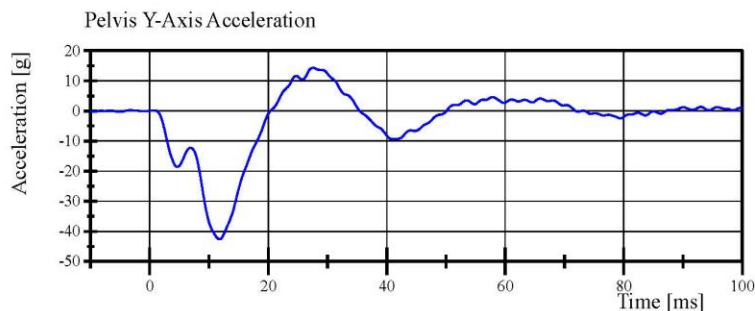
Filter Class: CFC_180
Max: 34.2 g at 6.5 ms
Min: -0.4 g at 97.6 ms



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

Transportation Research Center Inc.

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



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 11:15:19 1001



Pre-Test Calibration Sheets
Rear Passenger S/N DK1774

WorldSID-05F Head Front Qualification Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Head: DM1000

Test ID: 210412-5

Test Date: 4/12/2021

Test Time: 9:35 AM

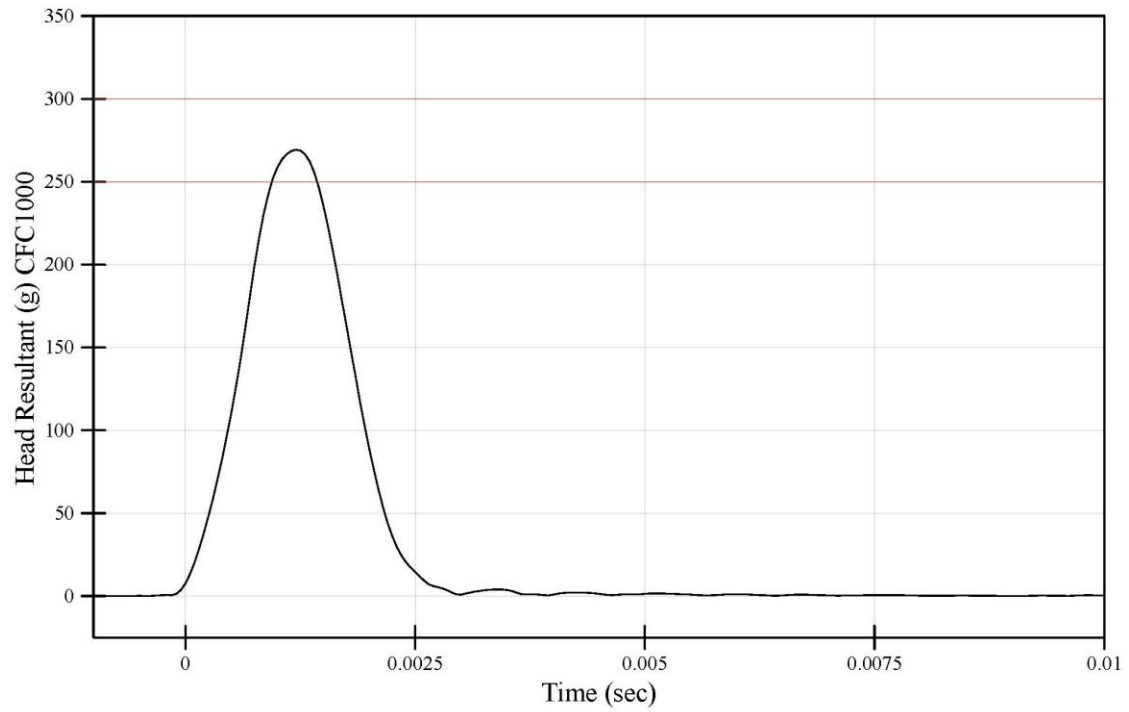
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.7	Pass
Test Humidity (%)	10 - 70	57	Pass
Peak Resultant Acceleration (g)	250.0 - 300.0	269.3	Pass
Peak Acceleration, y-axis (g)	-15.00 - 15.00	-3.09	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	1.5	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210412-5 processed

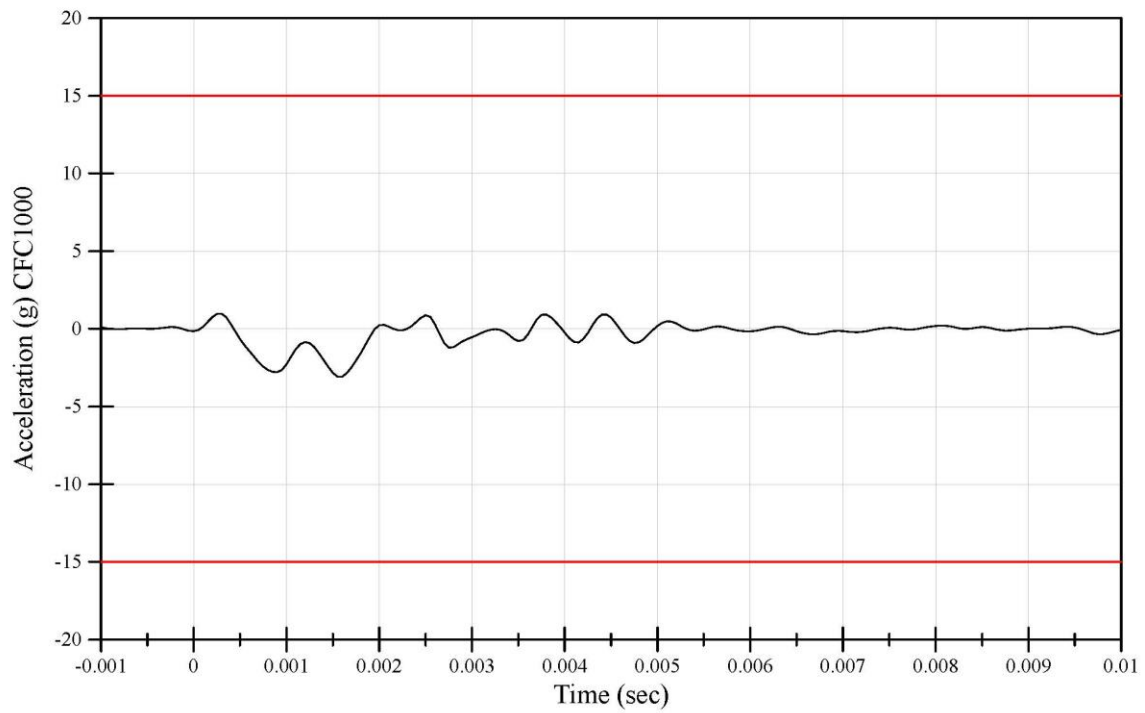
WorldSID-05F Head Front Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000



File Name: 210412-5 processed

4/12/2021 9:35 AM

WorldSID-05F Head Front Qualification
Peak Lateral Y Acceleration
Head Serial Number: DM1000



File Name: 210412-5 processed

4/12/2021 9:35 AM

**WorldSID-05F Head Left Lateral Qualification
Test Results Summary**

Dummy Serial Number: DK1774

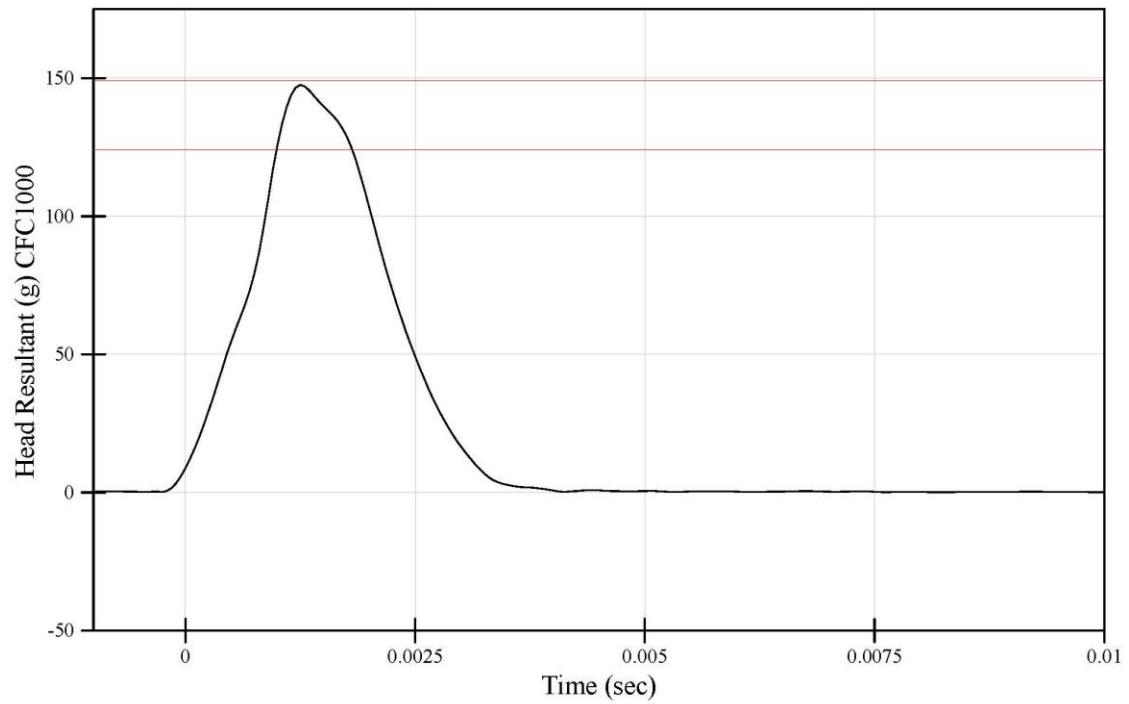
<u>Tested Components</u> Head: DM1000	Test ID: 210412-3 Test Date: 4/12/2021 Test Time: 8:20 AM
--	---

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	59	Pass
Peak Resultant Acceleration (g)	124.0 - 149.0	147.5	Pass
Peak Acceleration, x-axis (g)	-15.00 - 15.00	-9.79	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	0.5	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210412-3 processed

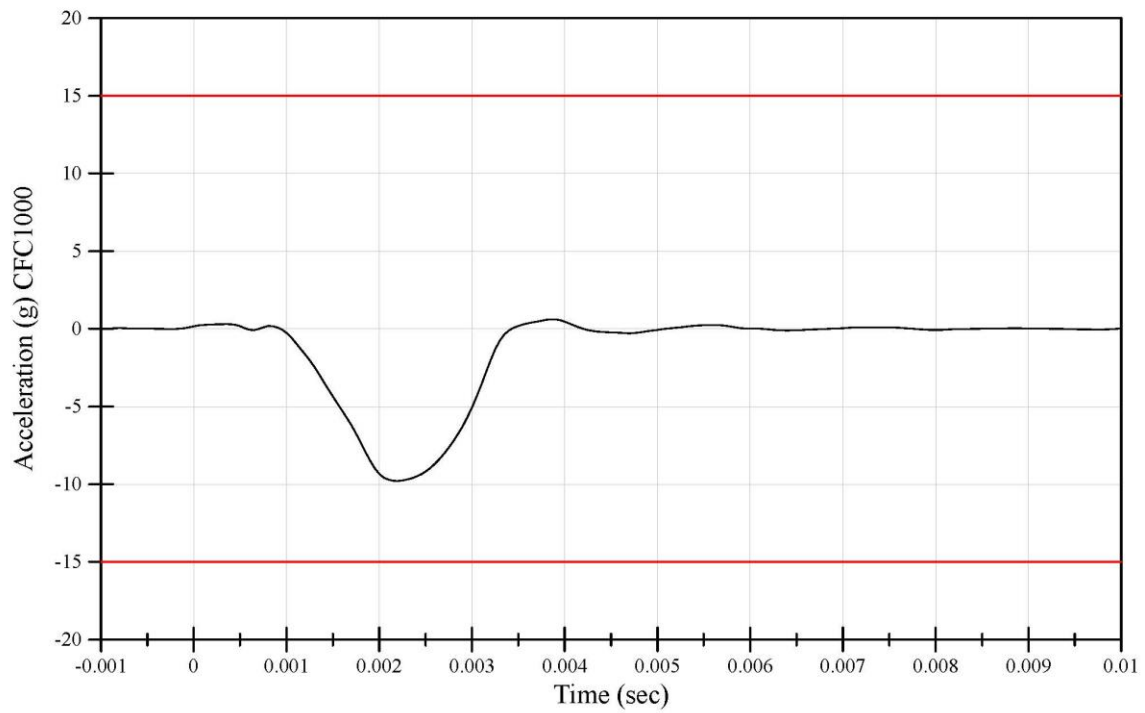
WorldSID-05F Head Left Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000



File Name: 210412-3 processed

4/12/2021 8:20 AM

WorldSID-05F Head Left Lateral Qualification
Peak Lateral X Acceleration
Head Serial Number: DM1000



File Name: 210412-3 processed

4/12/2021 8:20 AM

**WorldSID-05F Head Right Lateral Qualification
Test Results Summary**

Dummy Serial Number: DK1774

Tested Components
Head: DM1000

Test ID: 210412-4
Test Date: 4/12/2021
Test Time: 9:05 AM

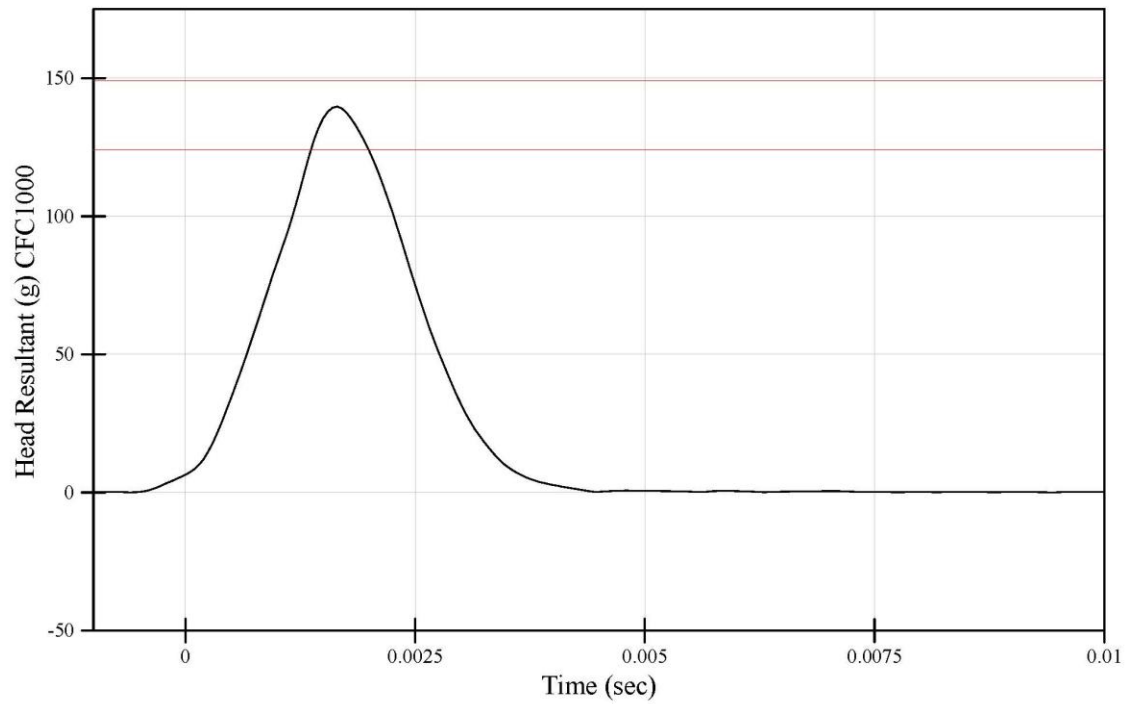
Test Results

<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	58	Pass
Peak Resultant Acceleration (g)	124.0 - 149.0	139.7	Pass
Peak Acceleration, x-axis (g)	-15.00 - 15.00	-4.97	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	0.5	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210412-4 processed

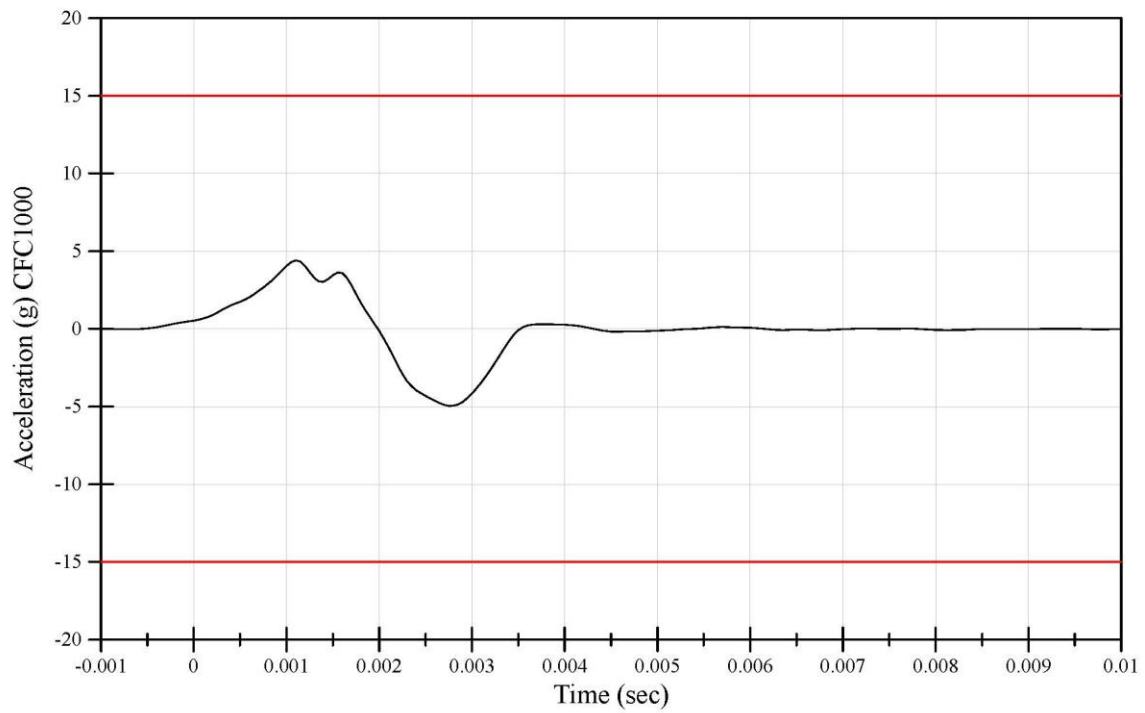
WorldSID-05F Head Right Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000



File Name: 210412-4 processed

4/12/2021 9:05 AM

WorldSID-05F Head Right Lateral Qualification
Peak Lateral Y Acceleration
Head Serial Number: DM1000



File Name: 210412-4 processed

4/12/2021 9:05 AM

WorldSID-05F Neck Left Lateral Qualification Test Results Summary

Dummy Serial Number: DK1774

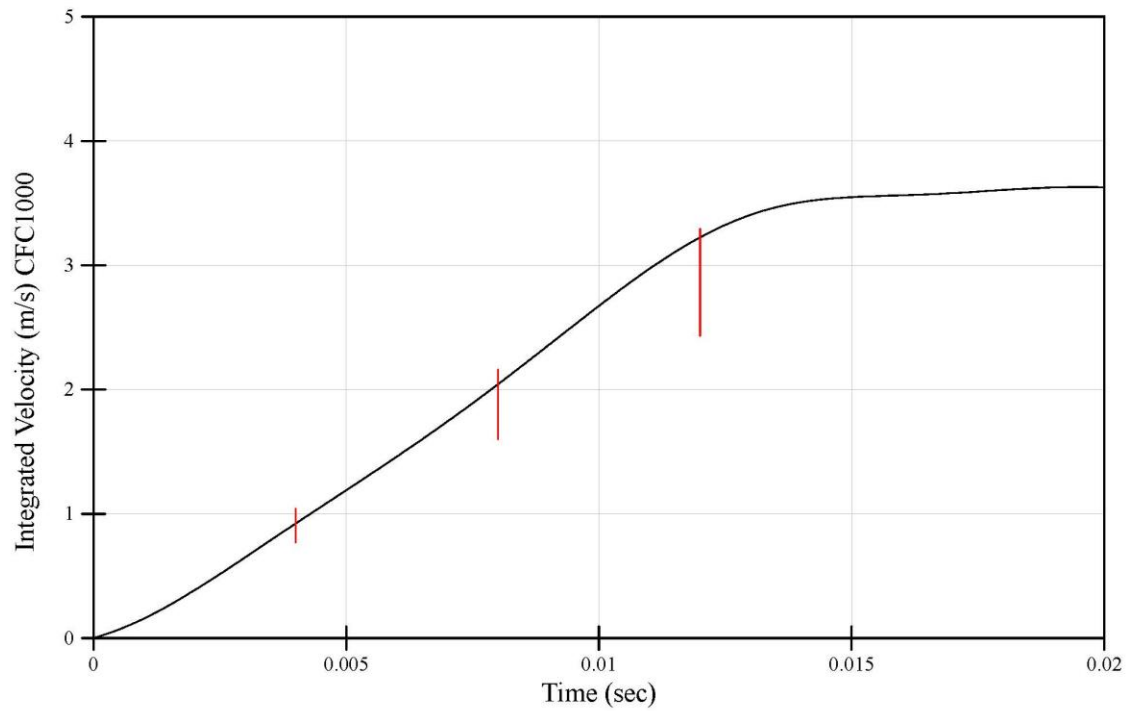
<u>Tested Components</u>	Test ID: 210407-10
Neck: DX6209	Test Date: 4/7/2021
	Test Time: 3:14 PM

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	20.6	Pass
Test Humidity (%)	10 - 70	54	Pass
Test Velocity (m/s)	3.30 - 3.50	3.50	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.92	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.04	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.22	Pass
Peak Headform Flexion Angle (deg)	-71.4 - (-58.5)	-67.3	Pass
Peak Headform Flexion Angle Decay			
Time to 0 degrees (ms)	57.3 - 76.5	65.4	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	34.2 - 51.0	38.3	Pass
Peak X-Axis Moment at Occipital Condyle			
Decay Time to 0 Nm (ms)	69.4 - 93.3	80.2	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210407-10 processed

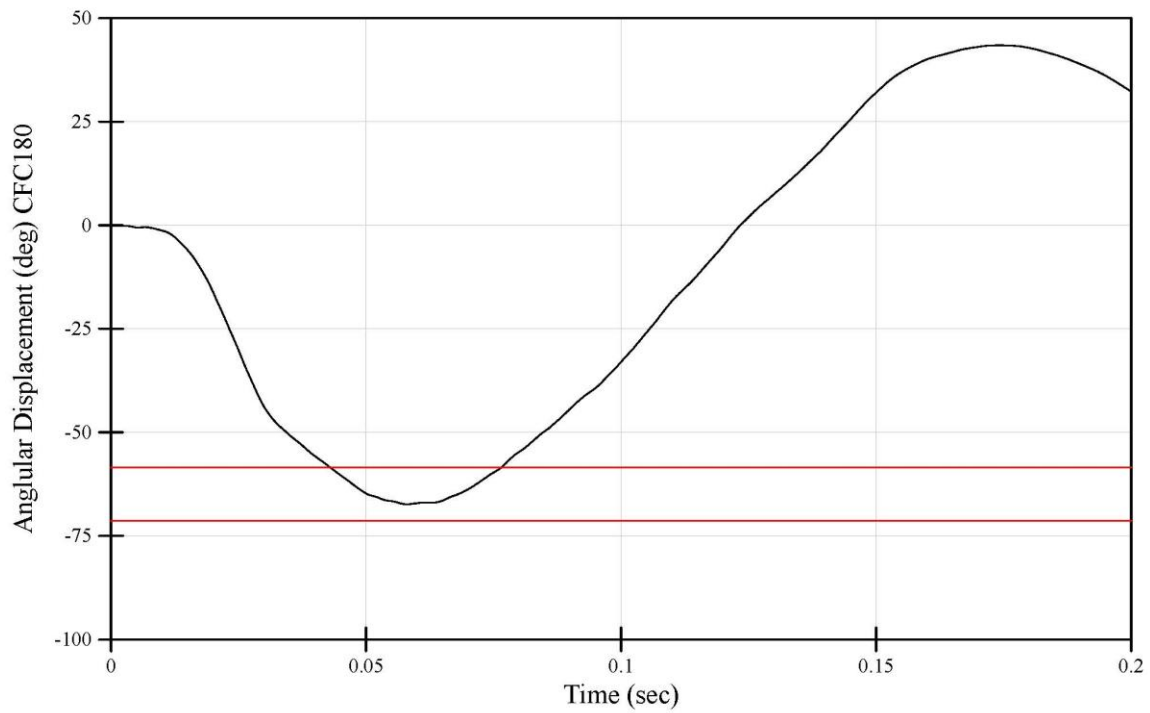
WorldSID-05F Neck Left Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774



File Name: 210407-10 processed

4/7/2021 3:14 PM

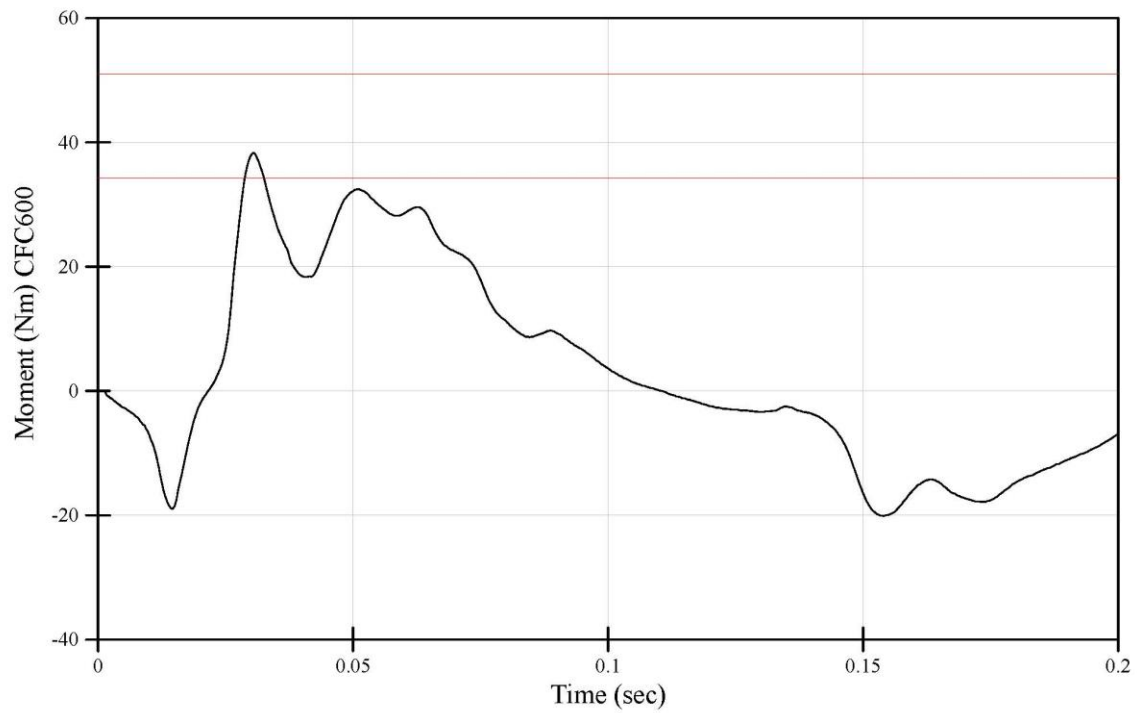
WorldSID-05F Neck Left Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774



File Name: 210407-10 processed

4/7/2021 3:14 PM

WorldSID-05F Neck Left Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774



File Name: 210407-10 processed

4/7/2021 3:14 PM

WorldSID-05F Neck Right Lateral Qualification **Test Results Summary**

Dummy Serial Number: DK1774

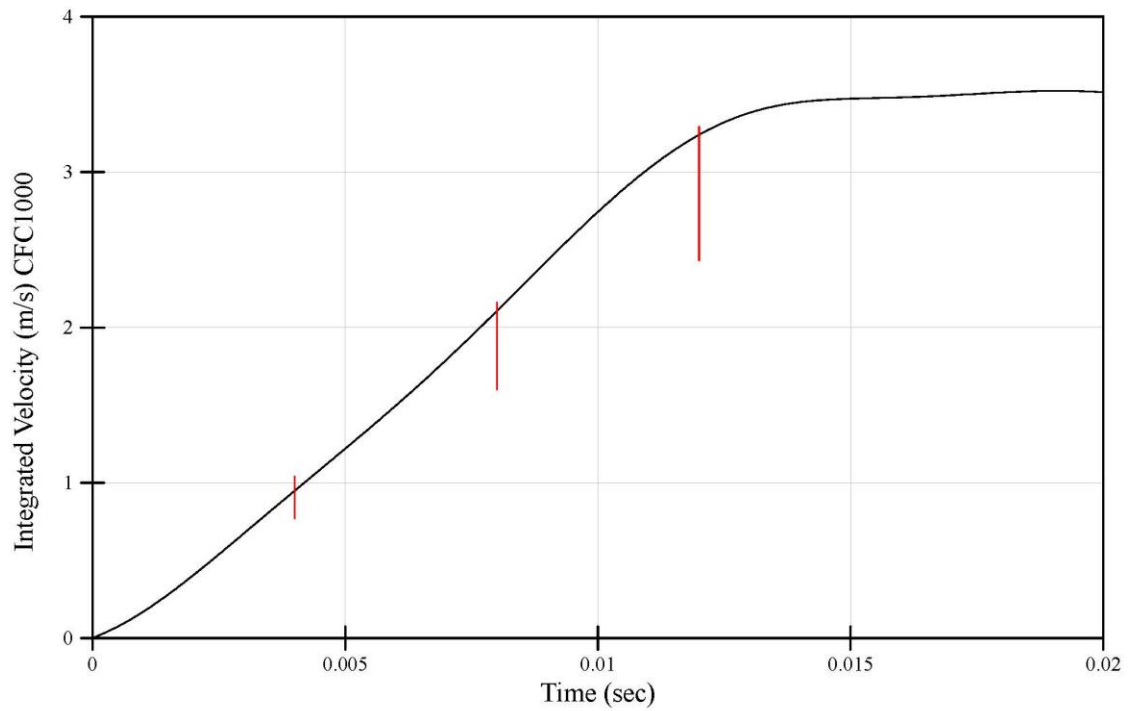
<u>Tested Components</u>	Test ID: 210407-12
Neck: DX6209	Test Date: 4/7/2021
	Test Time: 4:32 PM

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	20.8	Pass
Test Humidity (%)	10 - 70	56	Pass
Test Velocity (m/s)	3.30 - 3.50	3.43	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.95	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.11	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.24	Pass
Peak Headform Flexion Angle (deg)	58.5 - 71.4	65.8	Pass
Peak Headform Flexion Angle Decay			
Time to 0 degrees (ms)	57.3 - 76.5	60.1	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	-51.0 - (-34.2)	-37.4	Pass
Peak X-Axis Moment at Occipital Condyle			
Decay Time to 0 Nm (ms)	69.4 - 93.3	81.8	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210407-12 processed

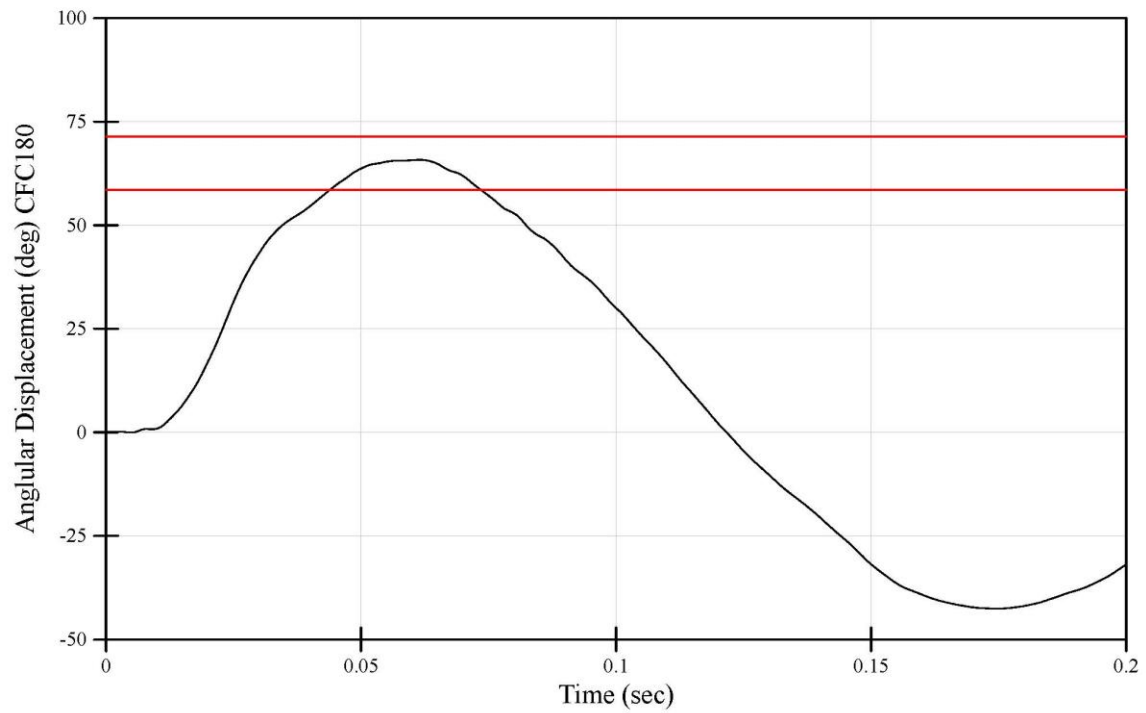
WorldSID-05F Neck Right Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774



File Name: 210407-12 processed

4/7/2021 4:32 PM

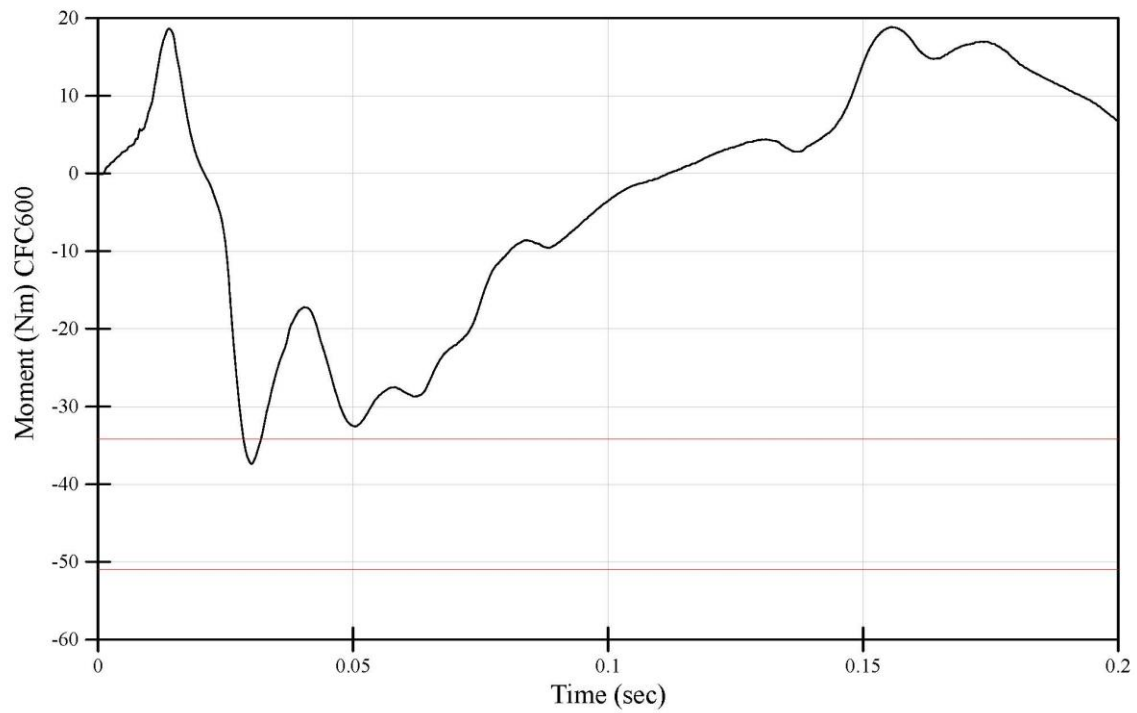
WorldSID-05F Neck Right Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774



File Name: 210407-12 processed

4/7/2021 4:32 PM

WorldSID-05F Neck Right Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774



File Name: 210407-12 processed

4/7/2021 4:32 PM

WorldSID-05F Right Shoulder Qualification Test Results Summary

Dummy Serial Number: DK1774

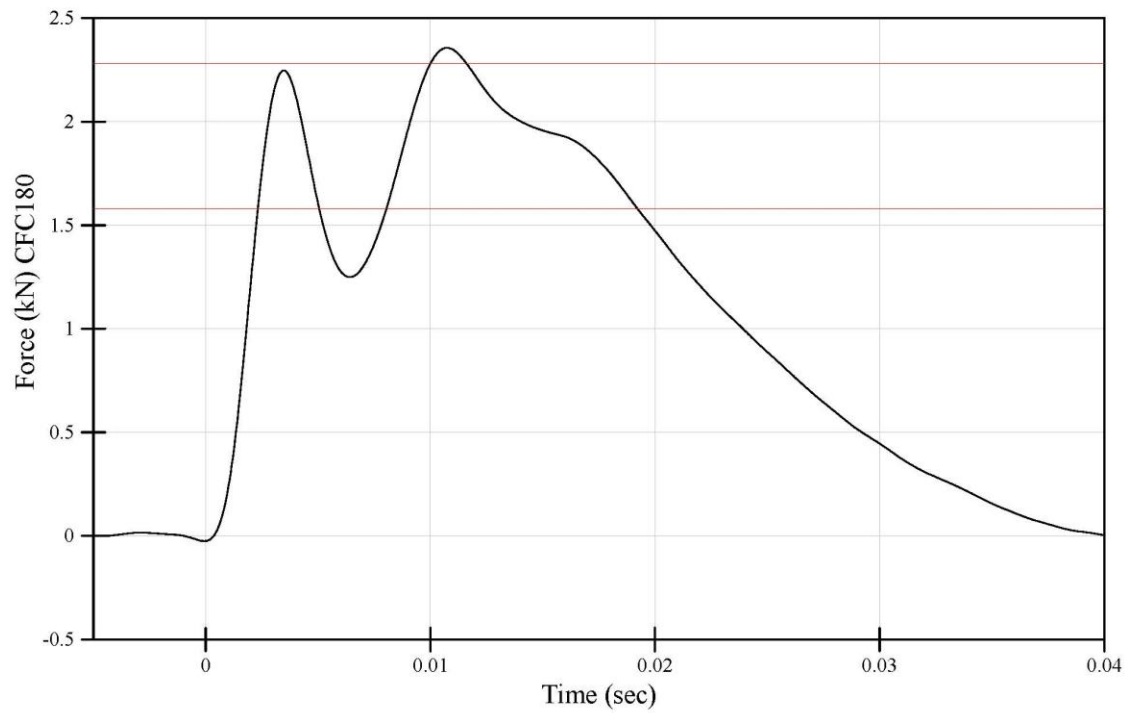
Tested Components		Test ID: 210421-1
Shoulder Pad: W5-P02	Thorax Rib 3: EA2794	Test Date: 4/21/2021
Shoulder Rib: EA1182	RibEye: 161	Test Time: 8:13 AM
Thorax Rib 1: EA3021	Impacted Arm: DI9019	
Thorax Rib 2: EA2790		

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	47	Pass
Test Velocity (m/s)	4.20 - 4.40	4.30	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	21.9	Pass
Peak Probe Force (kN)	1.58 - 2.28	2.36	Fail
Peak Shoulder Rib Length Change (mm)	23.4 - 36.6	27.6	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210421-1 processed

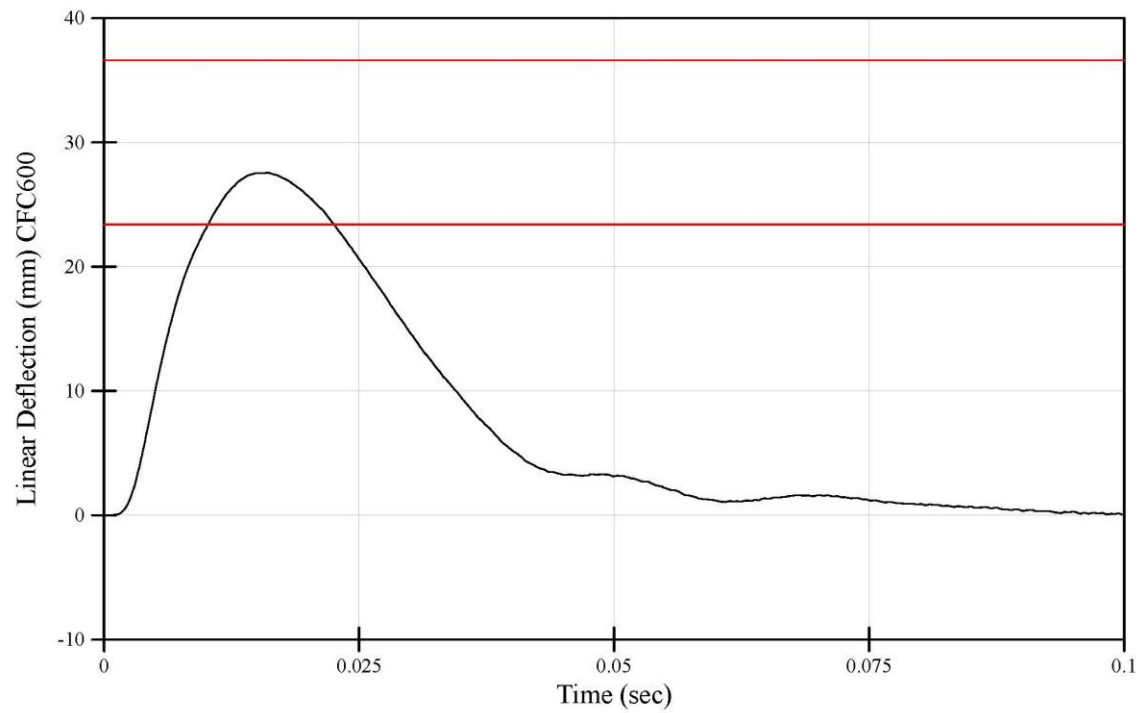
WorldSID-05F Right Shoulder Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210421-1 processed

4/21/2021 8:13 AM

WorldSID-05F Right Shoulder Qualification
Peak Shoulder Rib Deflection
Dummy Serial Number: DK1774



File Name: 210421-1 processed

4/21/2021 8:13 AM

WorldSID-05F Right Thorax with Arm Qualification Test Results Summary

Dummy Serial Number: DK1774

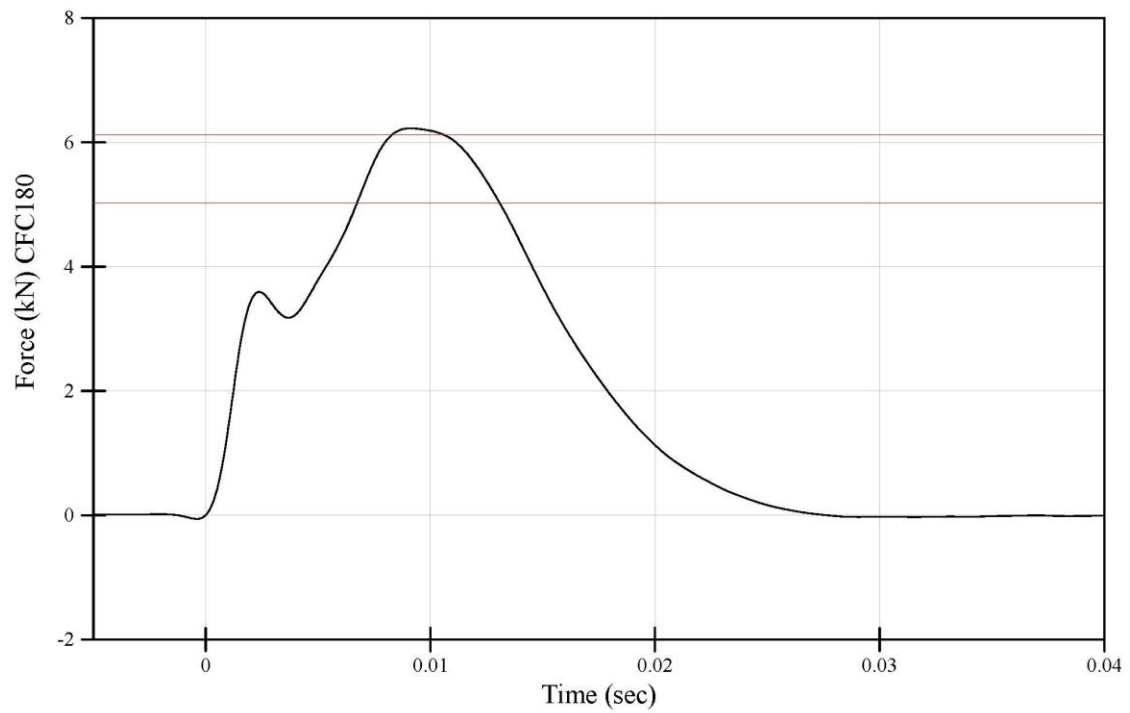
<u>Tested Components</u>		Test ID: 210421-7
Thorax Rib 1: EA3021	RibEye: 161	Test Date: 4/21/2021
Thorax Rib 2: EA2790	Impacted Arm: DI9019	Test Time: 12:53 PM
Thorax Rib 3: EA2794		

Test Results			
<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.9	Pass
Test Humidity (%)	10 - 70	40	Pass
Test Velocity (m/s)	6.60 - 6.80	6.70	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.1	Pass
Peak Probe Force (kN)	5.02 - 6.13	6.22	Fail
Peak T4 Y Acceleration (g)	-52.0 - (-34.7)	-51.1	Pass
Peak T12 Y Acceleration (g)	-54.9 - (-44.5)	-60.7	Fail
Peak Thorax Rib 1 Y Length Change (mm)	18.3 - 26.4	18.4	Pass
Peak Thorax Rib 2 Y Length Change (mm)	21.6 - 26.4	21.7	Pass
Peak Thorax Rib 3 Y Length Change (mm)	19.7 - 26.6	18.8	Fail

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210421-7 processed

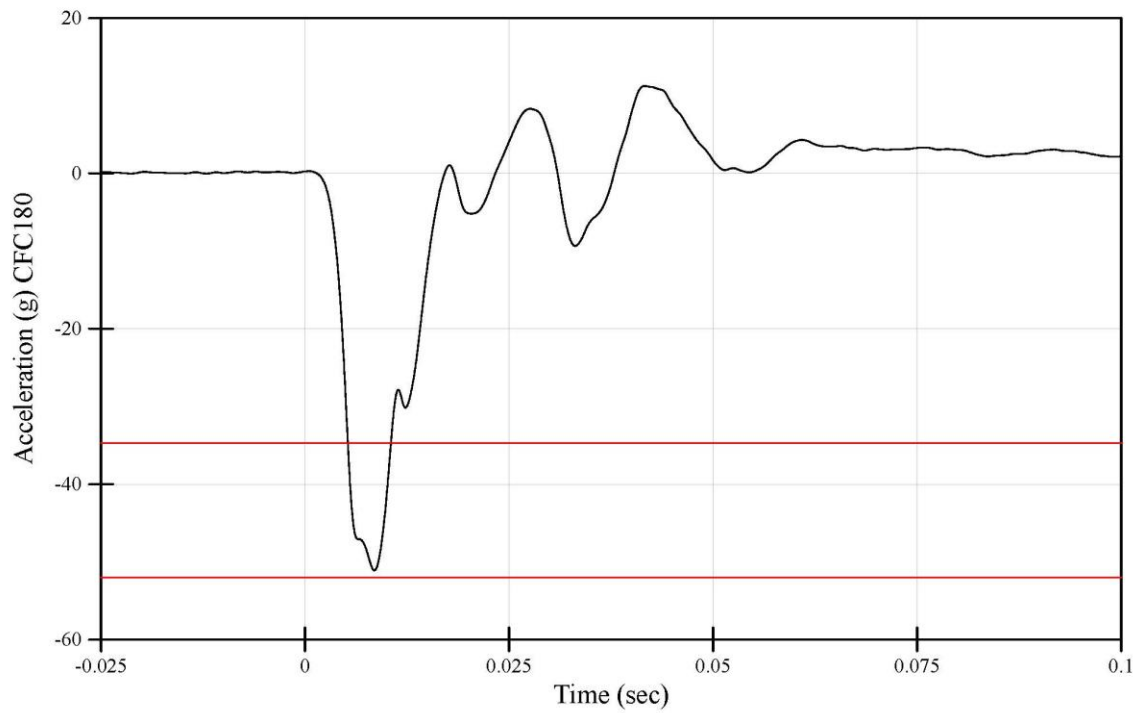
WorldSID-05F Right Thorax with Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210421-7 processed

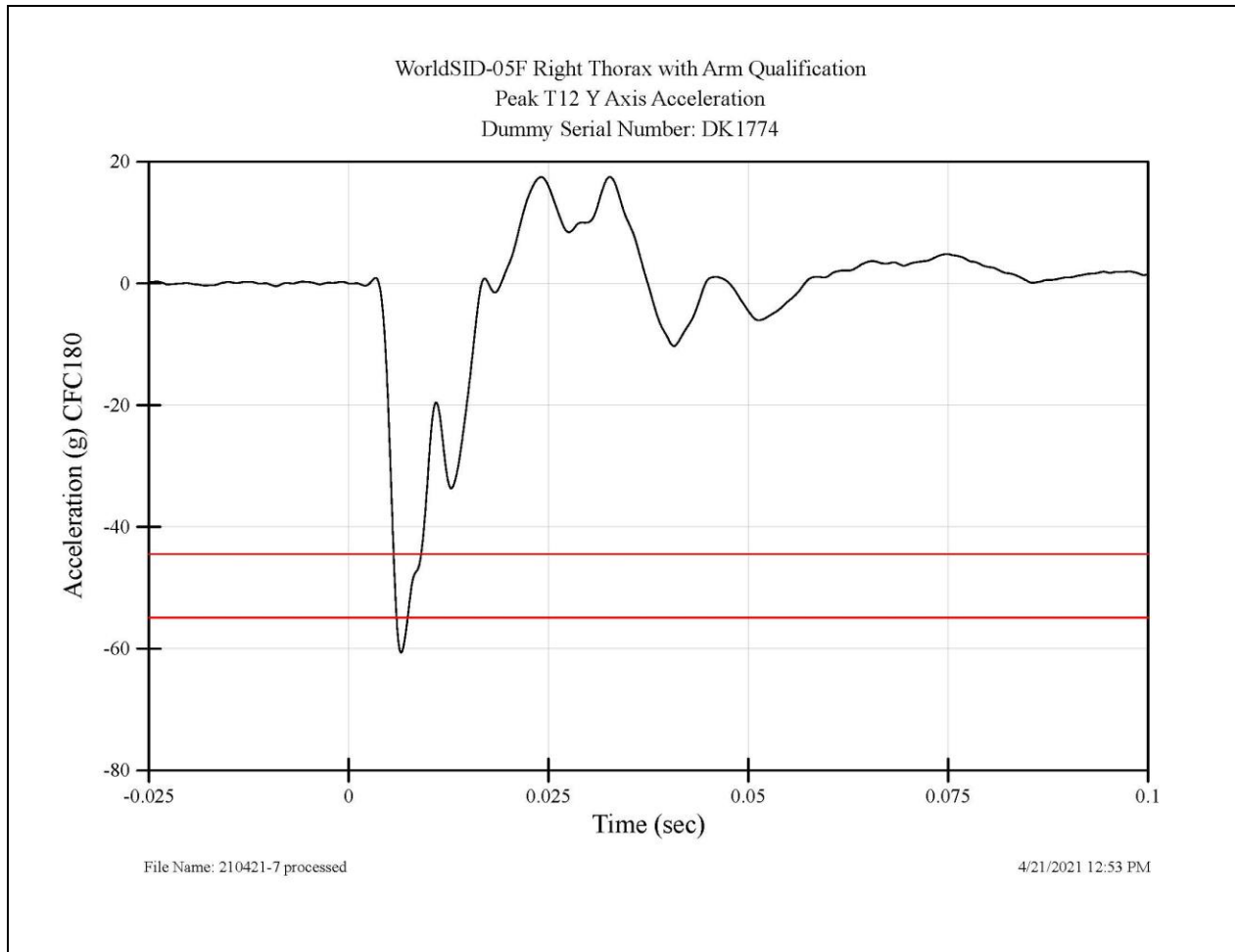
4/21/2021 12:53 PM

WorldSID-05F Right Thorax with Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774

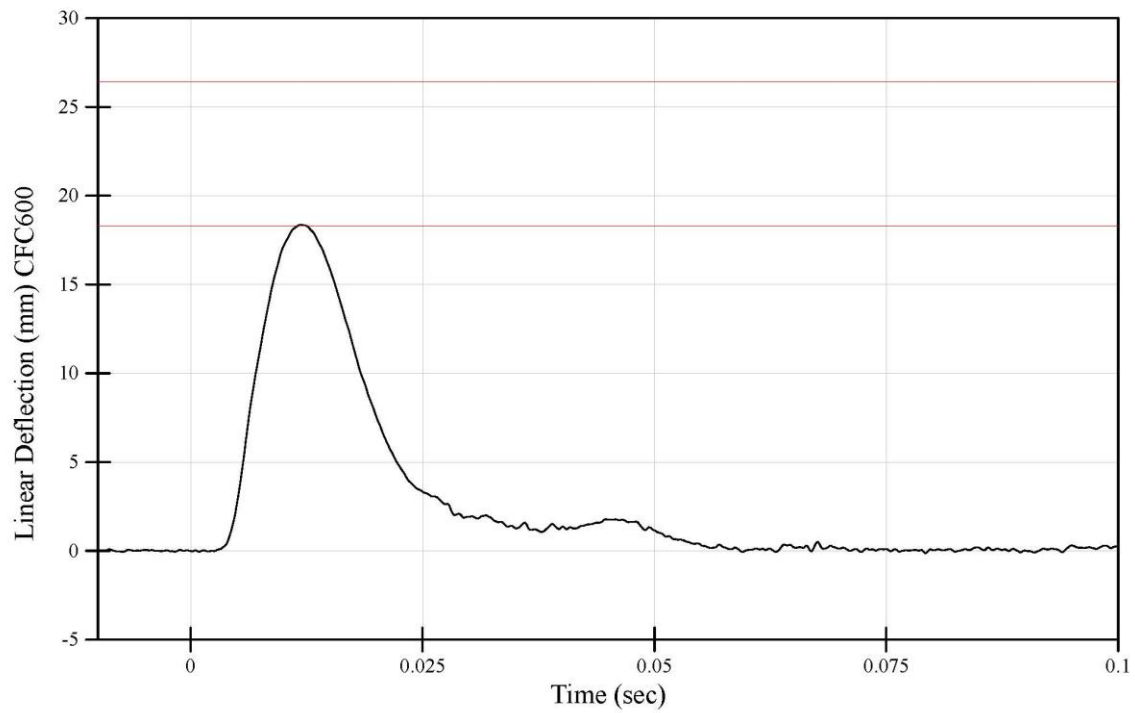


File Name: 210421-7 processed

4/21/2021 12:53 PM



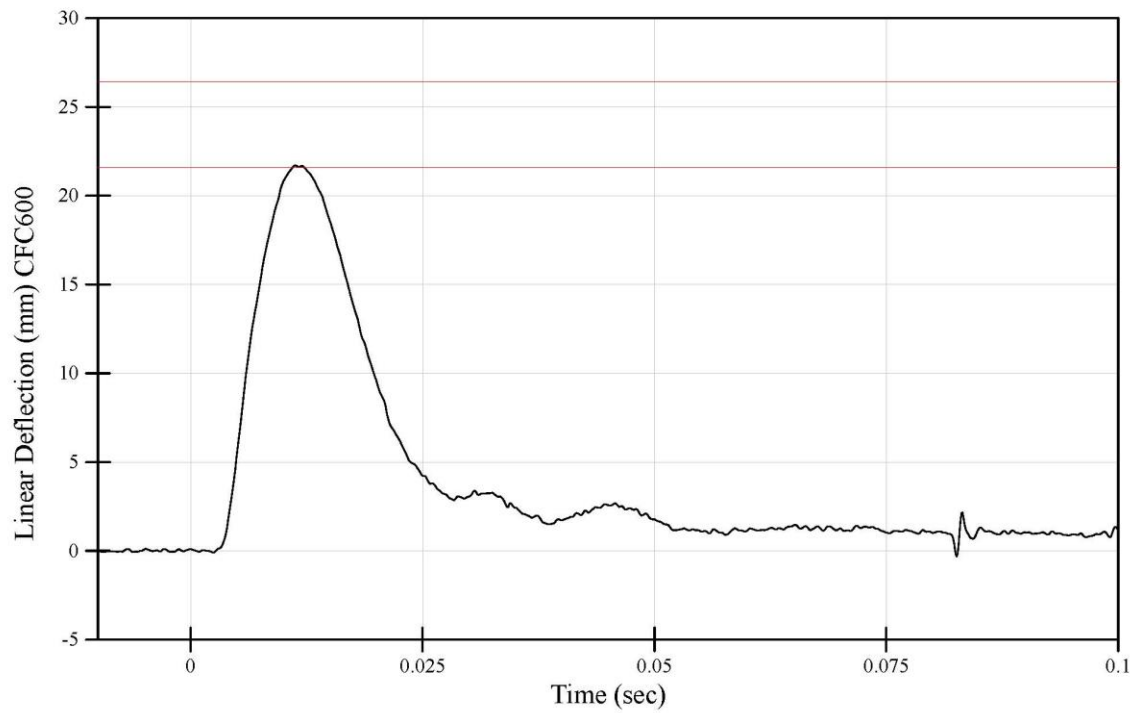
WorldSID-05F Right Thorax with Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774



File Name: 210421-7 processed

4/21/2021 12:53 PM

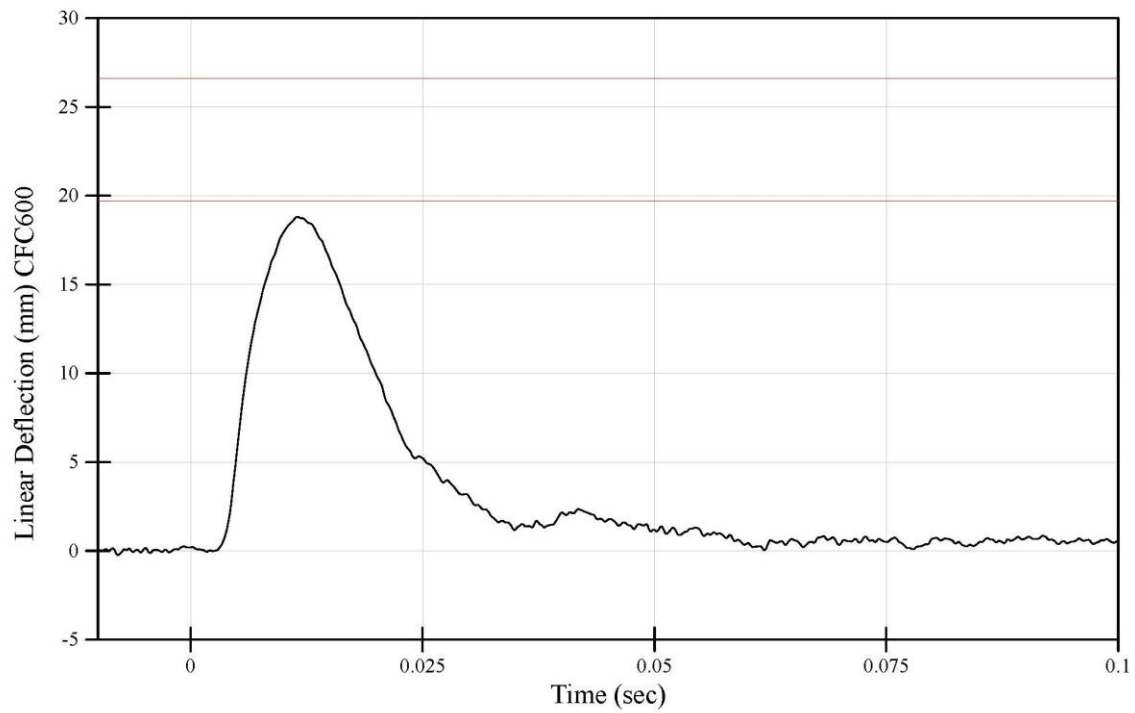
WorldSID-05F Right Thorax with Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774



File Name: 210421-7 processed

4/21/2021 12:53 PM

WorldSID-05F Right Thorax with Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774



File Name: 210421-7 processed

4/21/2021 12:53 PM

WorldSID-05F Right Thorax without Arm Qualification **Test Results Summary**

Dummy Serial Number: DK1774

Tested Components

Thorax Rib 1: EA3021
 Thorax Rib 2: EA2790
 Thorax Rib 3: EA2794
 RibEye: 161

Test ID: 210421-11

Test Date: 4/21/2021

Test Time: 3:11 PM

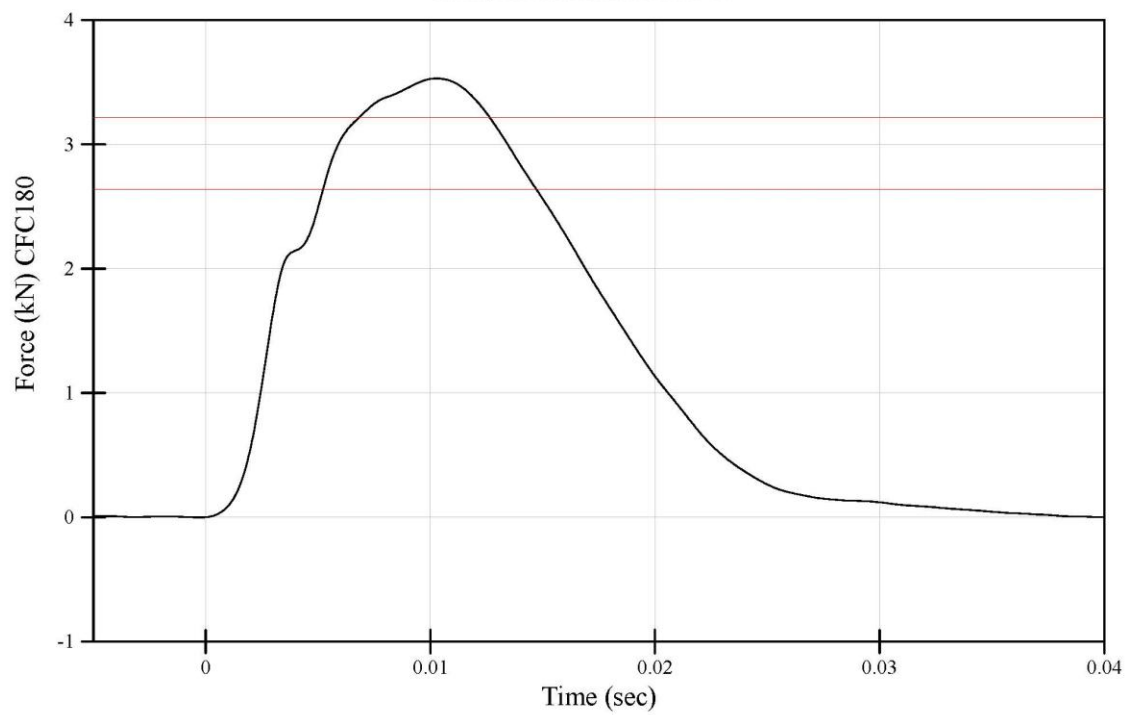
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.8	Pass
Test Humidity (%)	10 - 70	38	Pass
Test Velocity (m/s)	4.20 - 4.40	4.30	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.1	Pass
Peak Probe Force (kN)	2.64 - 3.22	3.53	Fail
Peak T4 Y Acceleration (g)	-27.5 - (-21.2)	-29.6	Fail
Peak T12 Y Acceleration (g)	-28.9 - (-20.6)	-26.6	Pass
Peak Thorax Rib 1 Y Length Change (mm)	20.5 - 27.7	20.8	Pass
Peak Thorax Rib 2 Y Length Change (mm)	21.7 - 26.7	22.3	Pass
Peak Thorax Rib 3 Y Length Change (mm)	20.9 - 27.3	20.7	Fail

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210421-11 processed

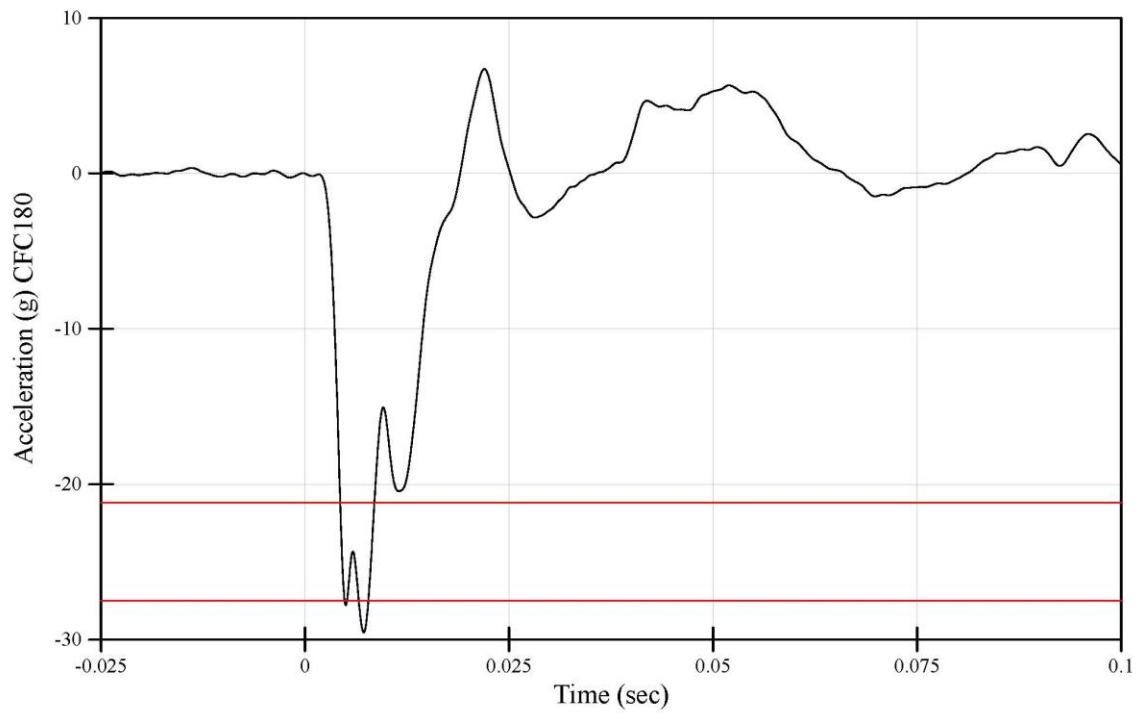
WorldSID-05F Right Thorax without Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210421-11 processed

4/21/2021 3:11 PM

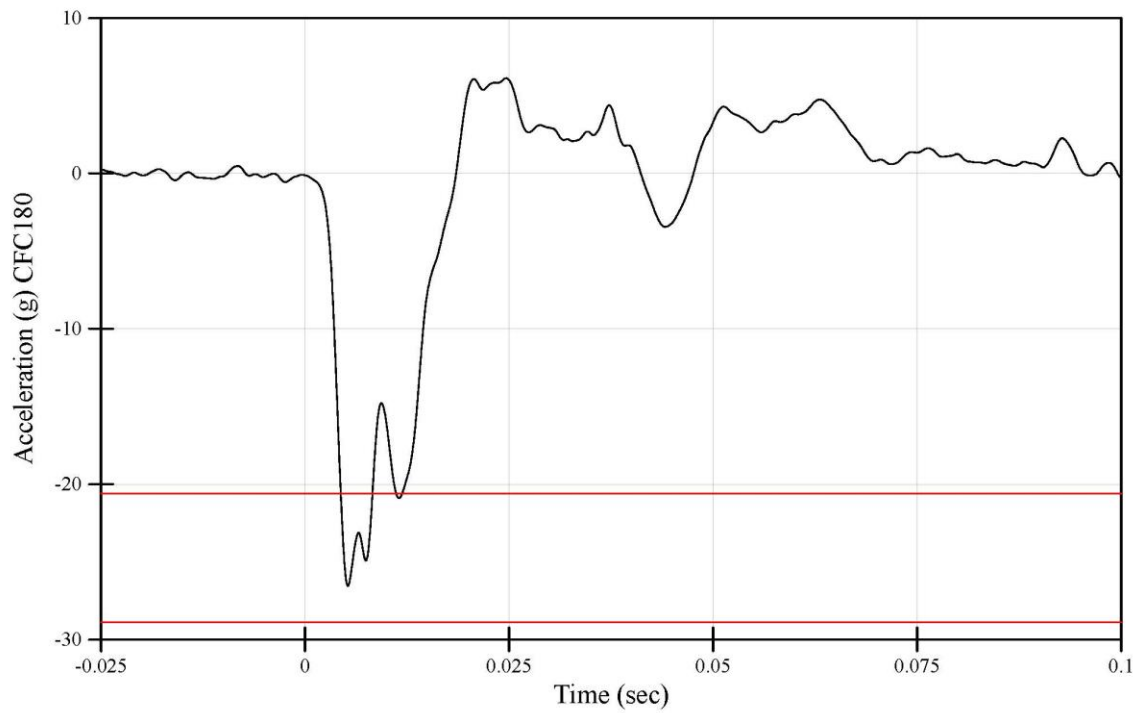
WorldSID-05F Right Thorax without Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210421-11 processed

4/21/2021 3:11 PM

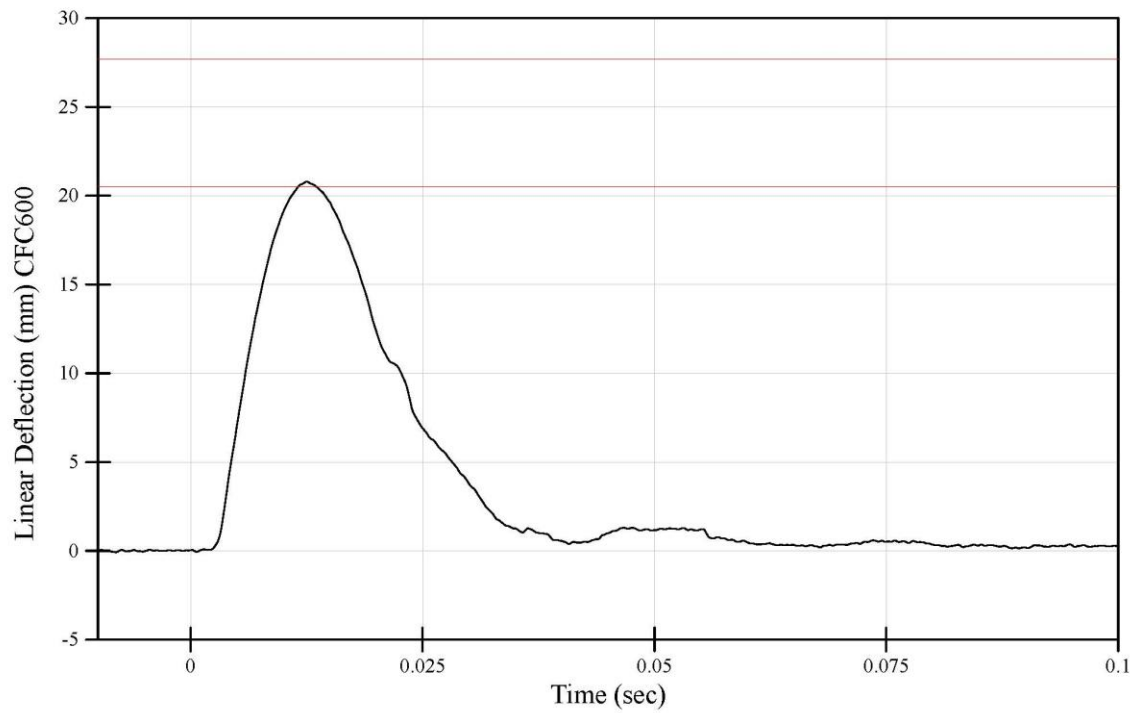
WorldSID-05F Right Thorax without Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210421-11 processed

4/21/2021 3:11 PM

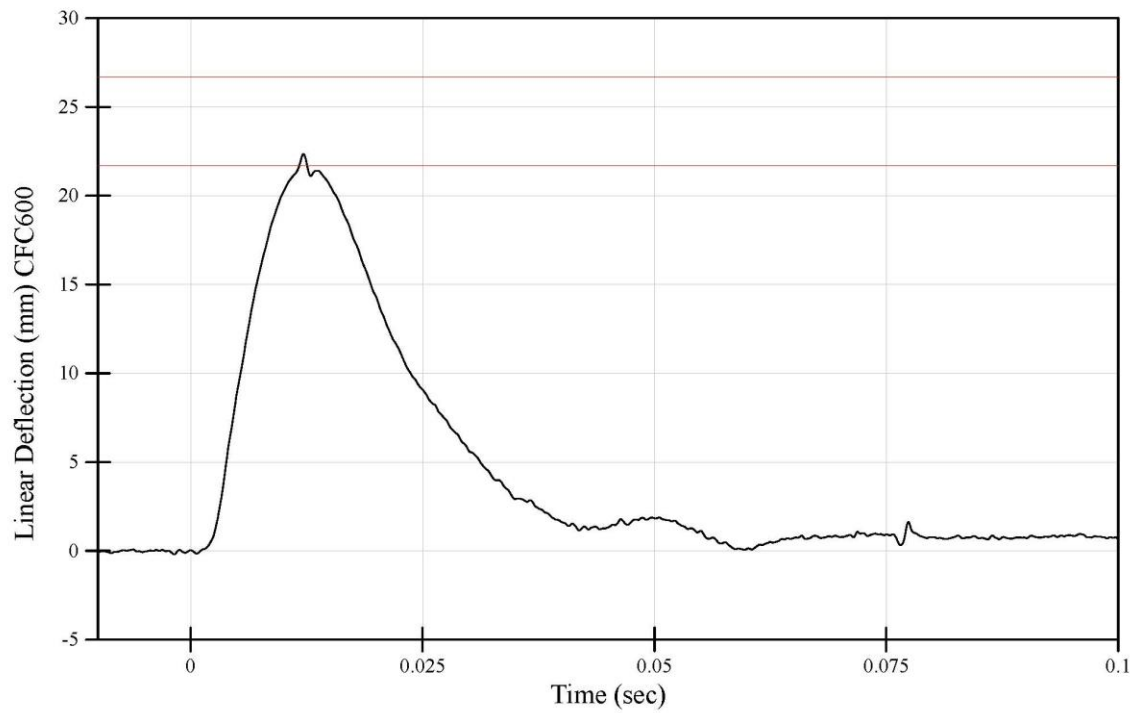
WorldSID-05F Right Thorax without Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774



File Name: 210421-11 processed

4/21/2021 3:11 PM

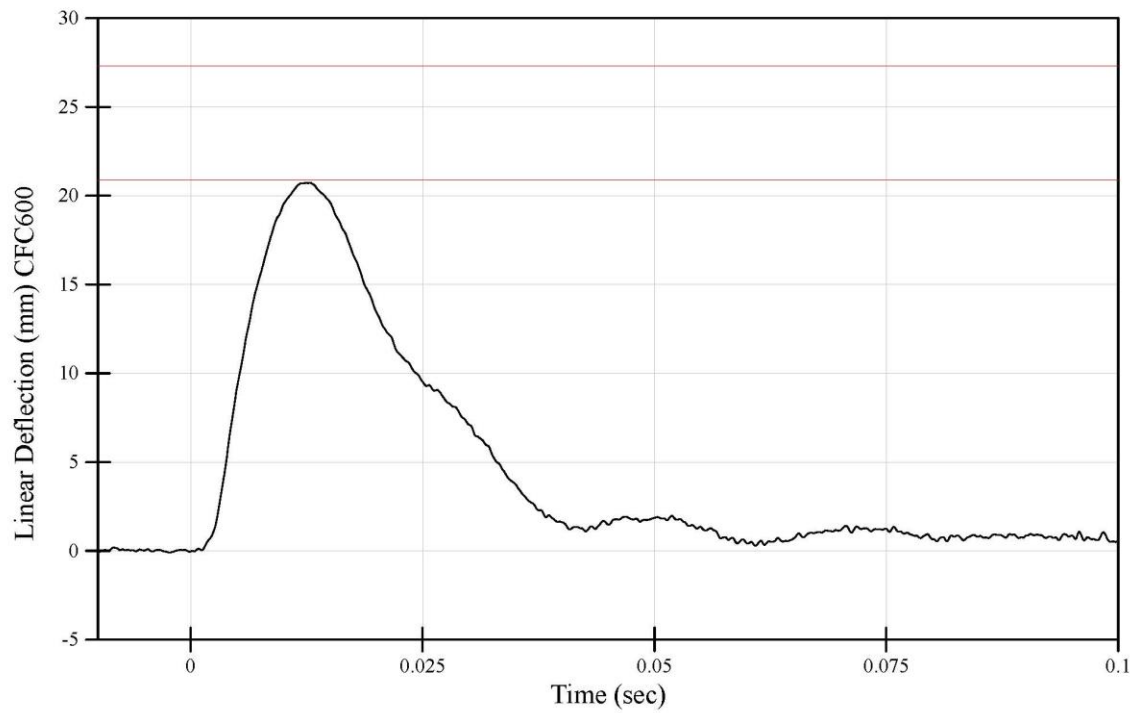
WorldSID-05F Right Thorax without Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774



File Name: 210421-11 processed

4/21/2021 3:11 PM

WorldSID-05F Right Thorax without Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774



File Name: 210421-11 processed

4/21/2021 3:11 PM

WorldSID-05F Right Abdomen Qualification Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Abdomen Rib 1: EA3008
Abdomen Rib 2: EA3009
RibEye: 161

Test ID: 210420-6
Test Date: 4/20/2021
Test Time: 2:34 PM

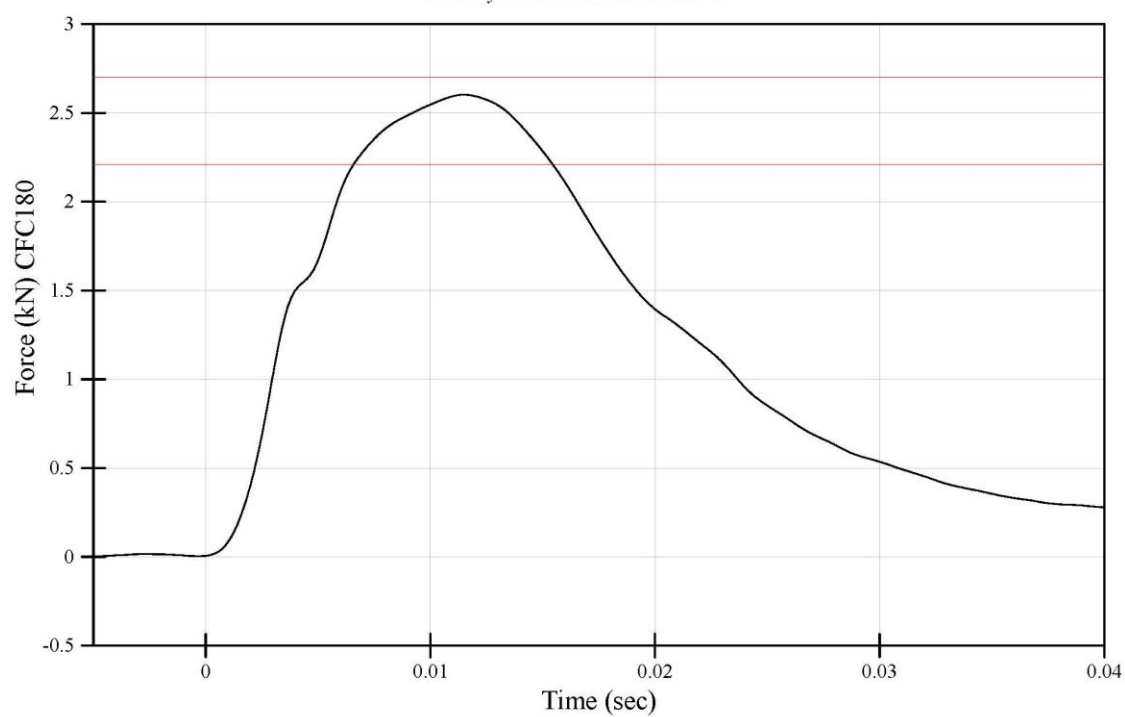
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.7	Pass
Test Humidity (%)	10 - 70	56	Pass
Test Velocity (m/s)	4.20 - 4.40	4.34	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.1	Pass
Peak Probe Force (kN)	2.21 - 2.70	2.60	Pass
Peak T12 Acceleration (g)	-30.6 - (-24.4)	-29.3	Pass
Peak Abdomen Rib 1 Length Change (mm)	23.1 - 31.2	23.4	Pass
Peak Abdomen Rib 2 Length Change (mm)	22.7 - 27.8	23.7	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210420-6 processed

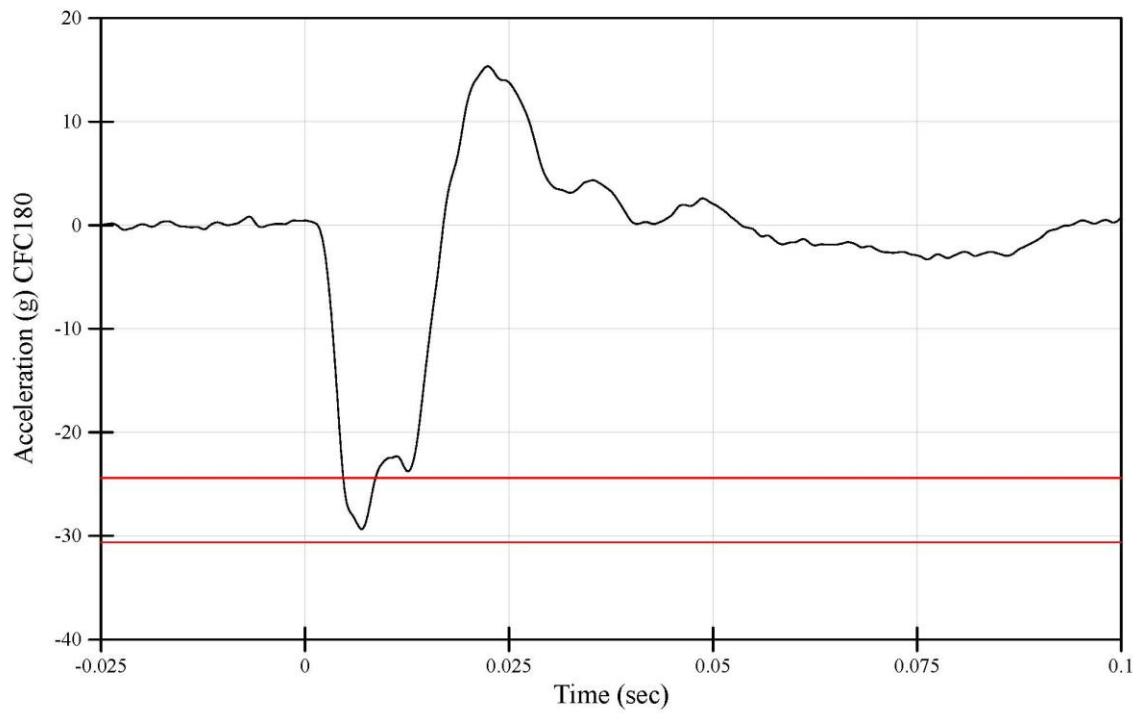
WorldSID-05F Right Abdomen Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210420-6 processed

4/20/2021 2:34 PM

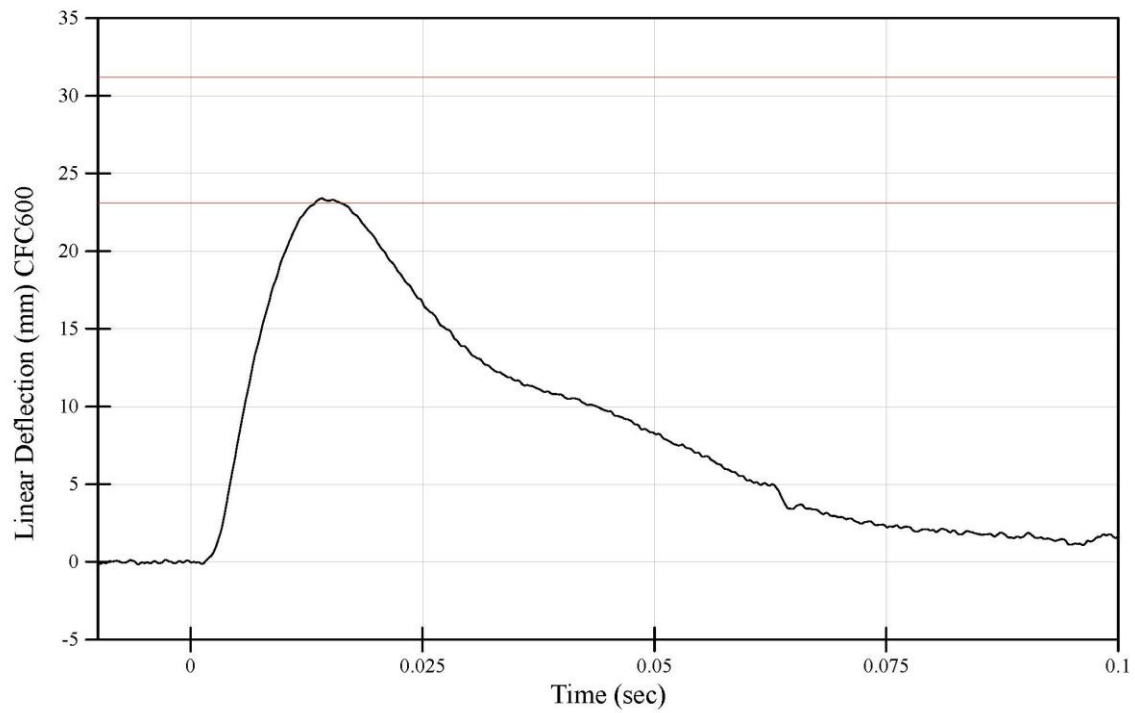
WorldSID-05F Right Abdomen Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210420-6 processed

4/20/2021 2:34 PM

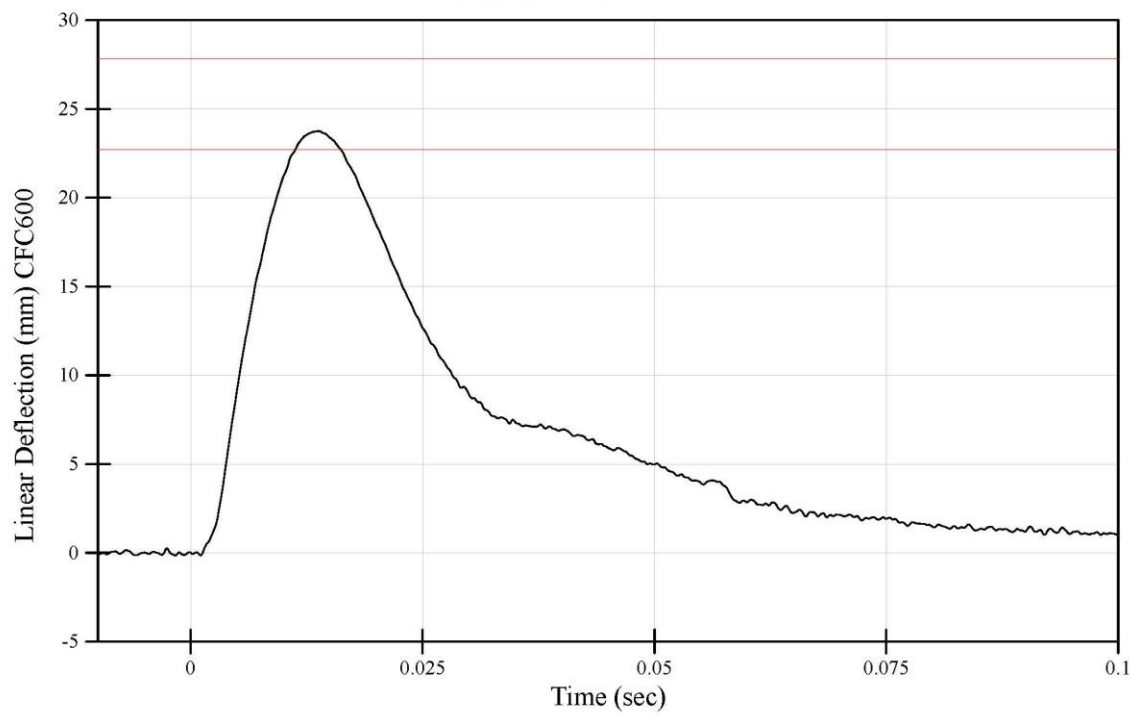
WorldSID-05F Right Abdomen Qualification
Peak Abdomen Rib 1 Compression
Dummy Serial Number: DK1774



File Name: 210420-6 processed

4/20/2021 2:34 PM

WorldSID-05F Right Abdomen Qualification
Peak Abdomen Rib 2 Compression
Dummy Serial Number: DK1774



File Name: 210420-6 processed

4/20/2021 2:34 PM

WorldSID-05F Right Pelvis Qualification Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Pelvis Flesh:
Pelvic Bone: DW2458

Test ID: 210421-14
Test Date: 4/21/2021
Test Time: 5:31 PM

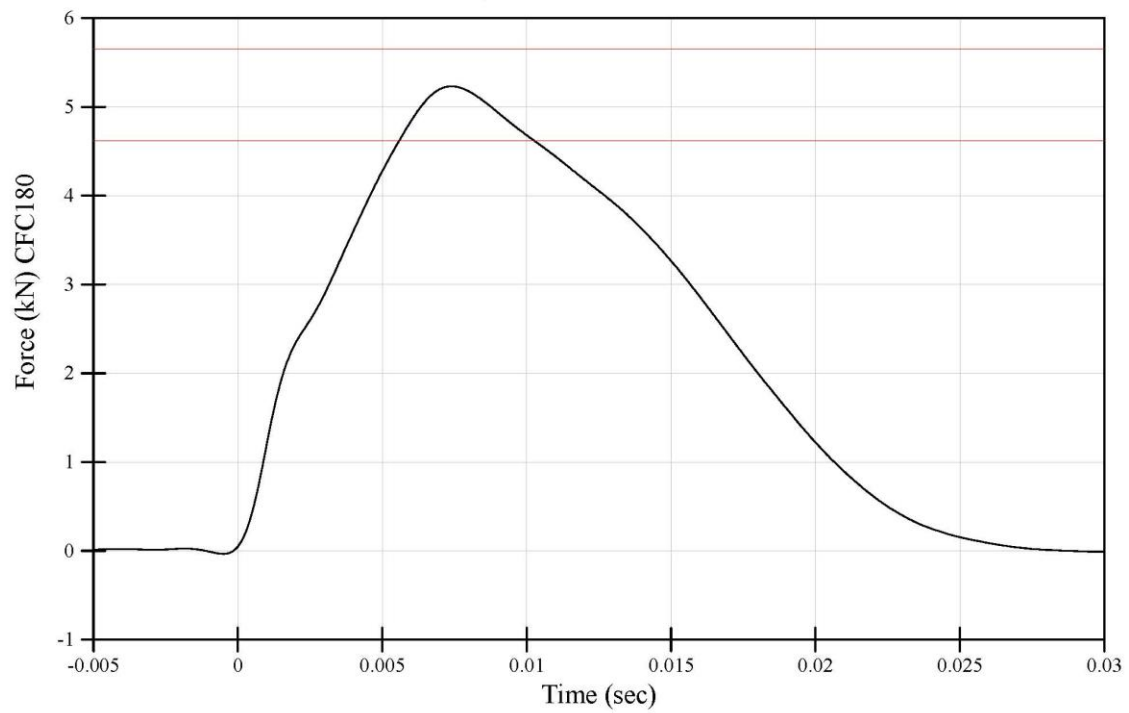
Test Results

<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	36	Pass
Test Velocity (m/s)	6.60 - 6.80	6.69	Pass
Peak Probe Force (kN)	4.62 - 5.65	5.23	Pass
Peak Pubic Force FY (N)	-1200.0 - (-770.0)	-1065.3	Pass
Peak T12 Acceleration (g)	-15.8 - (-11.8)	-19.1	Fail
Peak Pelvis Acceleration (g)	-74.4 - (-48.6)	-46.7	Fail

* WorldSID-50M Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210421-14 processed

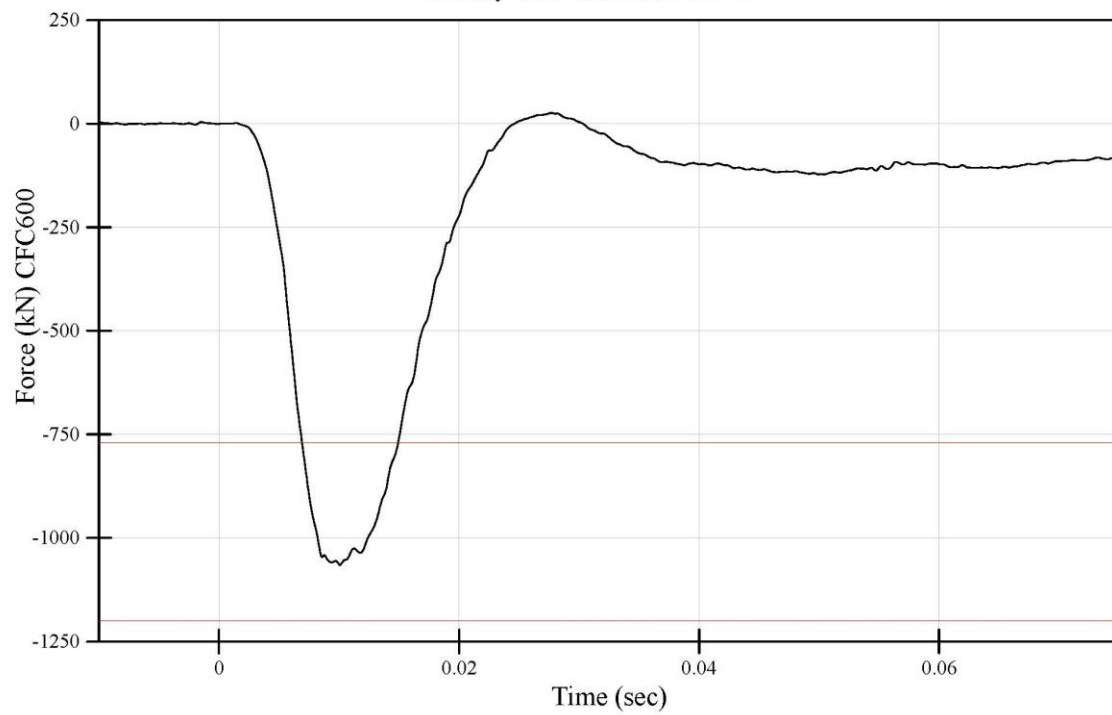
WorldSID-05F Right Pelvis Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210421-14 processed

4/21/2021 5:31 PM

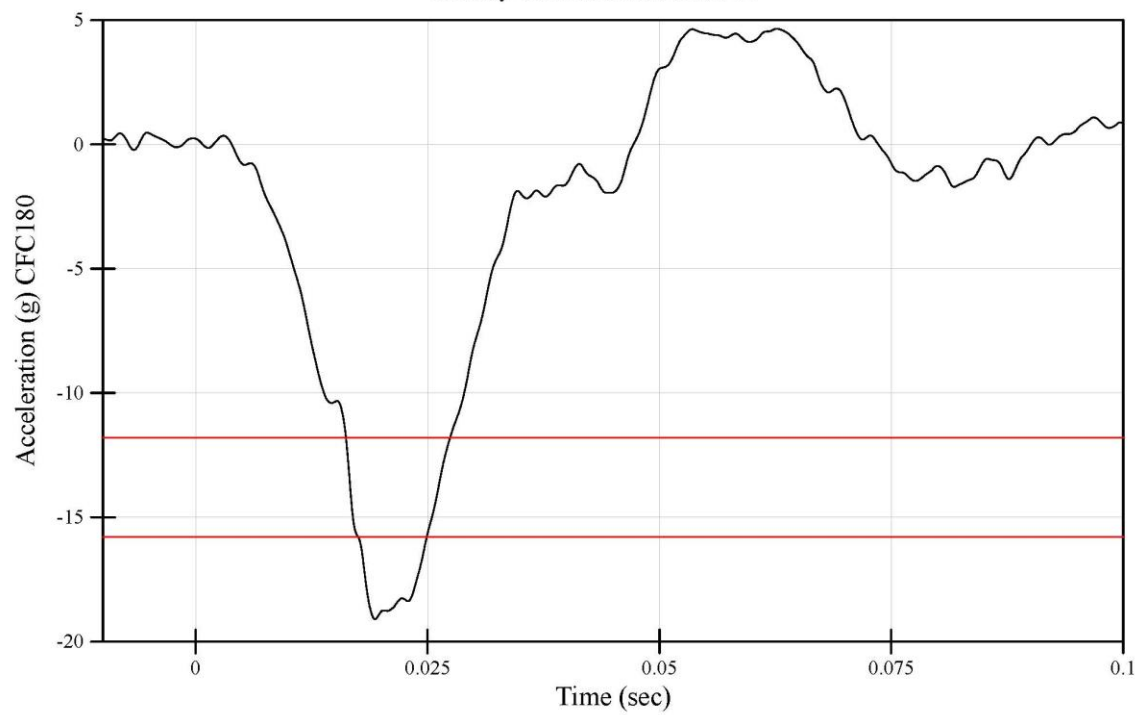
WorldSID-05F Right Pelvis Qualification
Peak Pubic Y axis Force
Dummy Serial Number: DK1774



File Name: 210421-14 processed

4/21/2021 5:31 PM

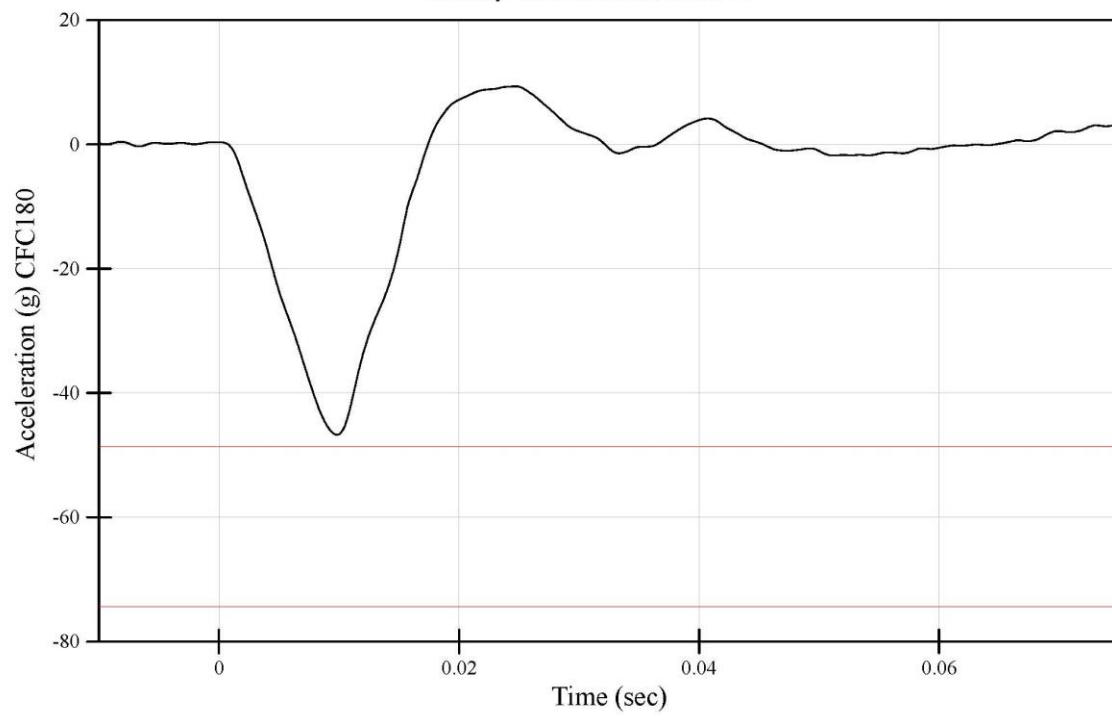
WorldSID-05F Right Pelvis Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210421-14 processed

4/21/2021 5:31 PM

WorldSID-05F Right Pelvis Qualification
Peak Pelvis Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210421-14 processed

4/21/2021 5:31 PM

Post-Test Calibration Sheets
Rear Passenger S/N DK1774

**WorldSID-05F Head Front Qualification
Test Results Summary**

Dummy Serial Number: DK1774

Tested Components

Head: DM1000

Test ID: 210609-9

Test Date: 6/9/2021

Test Time: 3:24 PM

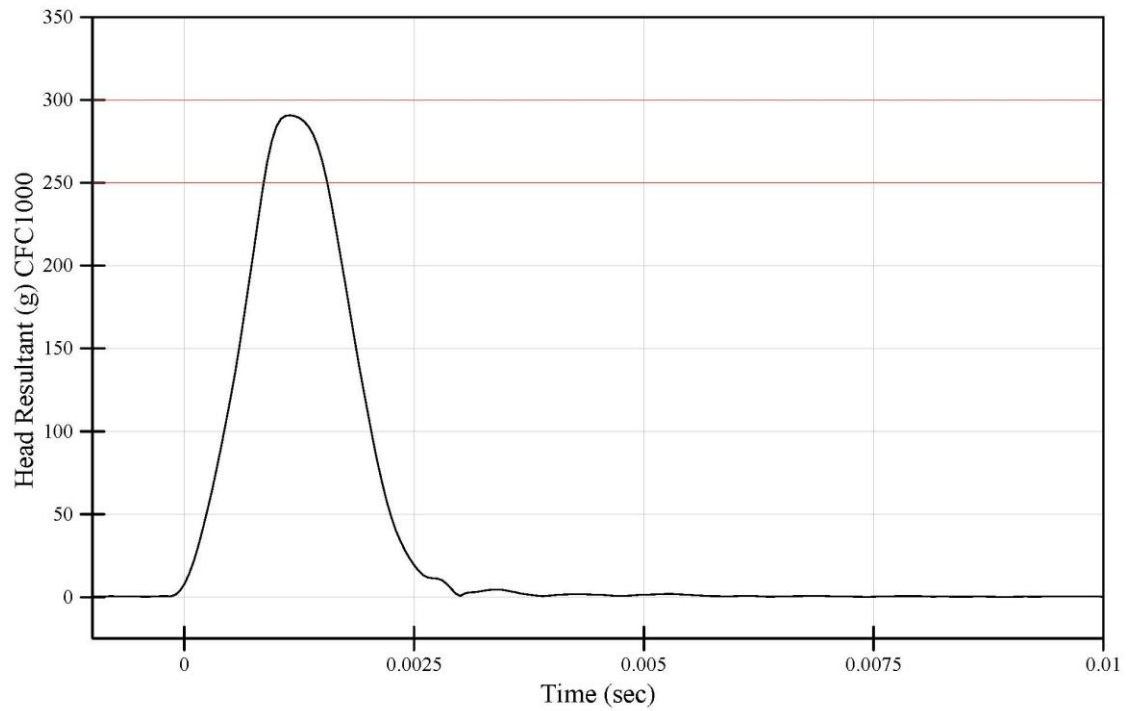
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.1	Pass
Test Humidity (%)	10 - 70	66	Pass
Peak Resultant Acceleration (g)	250 - 300	291	Pass
Peak Acceleration, y-axis (g)	-15 - 15	10	Pass
Oscillations occurring after the main acceleration pulse (%)	-10 - 10	2	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210609-9 processed

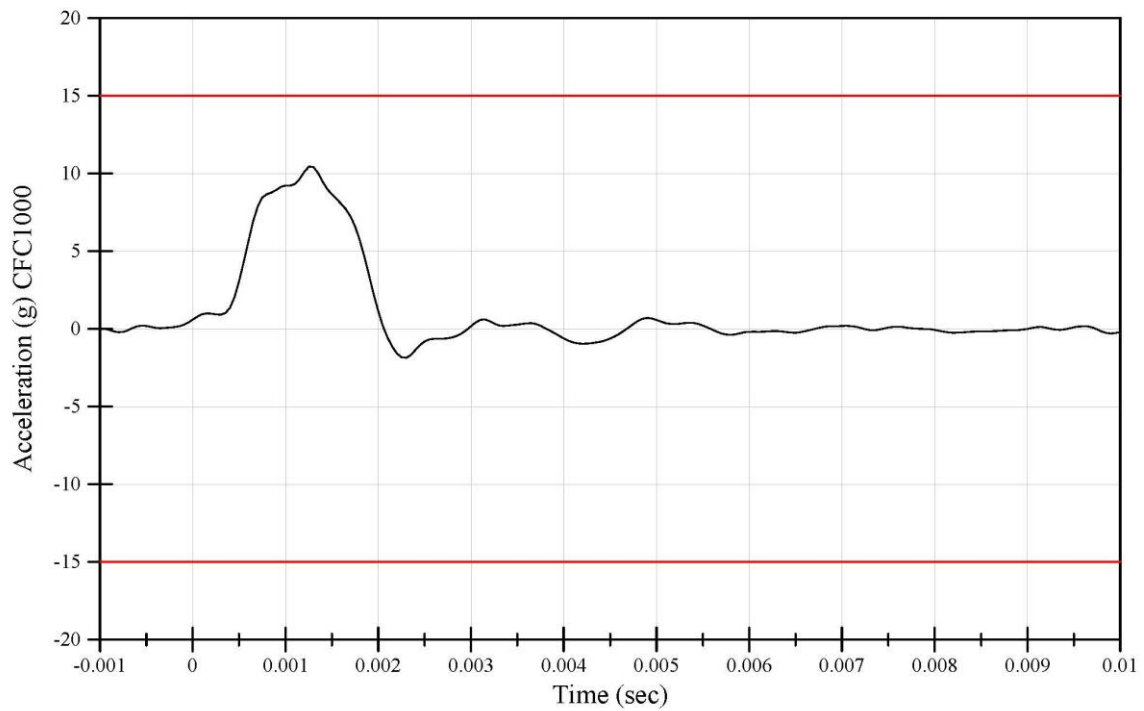
WorldSID-05F Head Front Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000



File Name: 210609-9 processed

6/9/2021 3:24 PM

WorldSID-05F Head Front Qualification
Peak Lateral Y Acceleration
Head Serial Number: DM1000



File Name: 210609-9 processed

6/9/2021 3:24 PM

**WorldSID-05F Head Left Lateral Qualification
Test Results Summary**

Dummy Serial Number: DK1774

Tested Components

Head: DM1000

Test ID: 210609-2

Test Date: 6/9/2021

Test Time: 11:07 AM

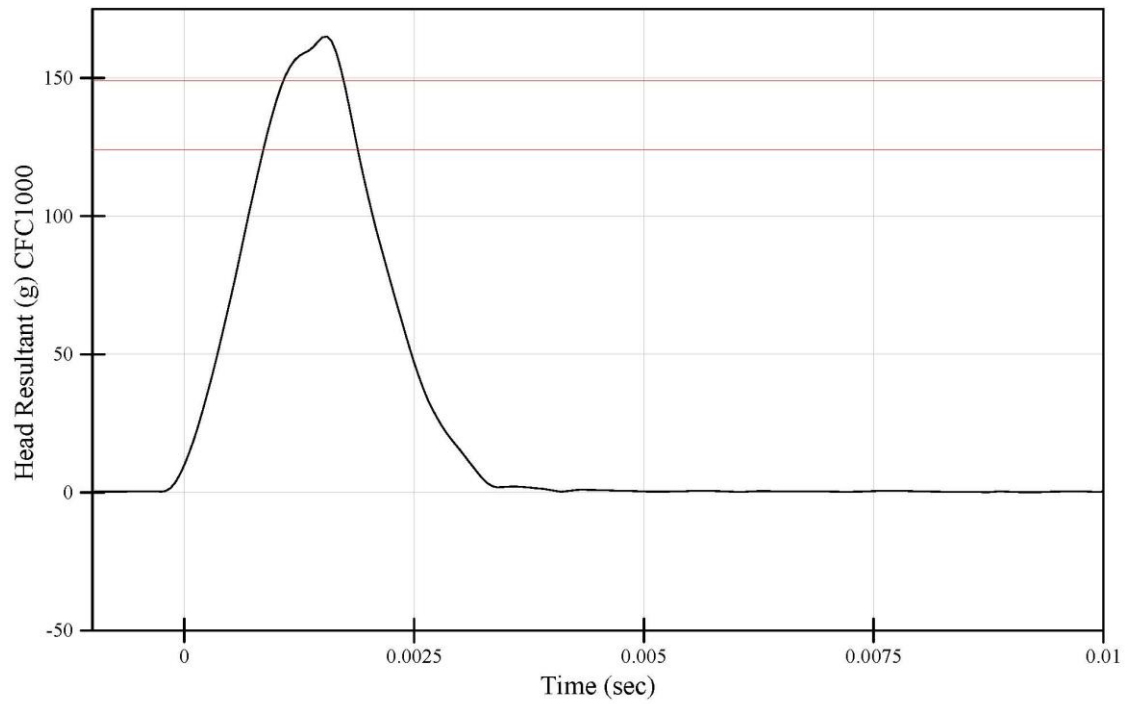
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.0	Pass
Test Humidity (%)	10 - 70	68	Pass
Peak Resultant Acceleration (g)	124 - 149	165	Fail
Peak Acceleration, x-axis (g)	-15 - 15	8	Pass
Oscillations occurring after the main acceleration pulse (%)	-10 - 10	1	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210609-2 processed

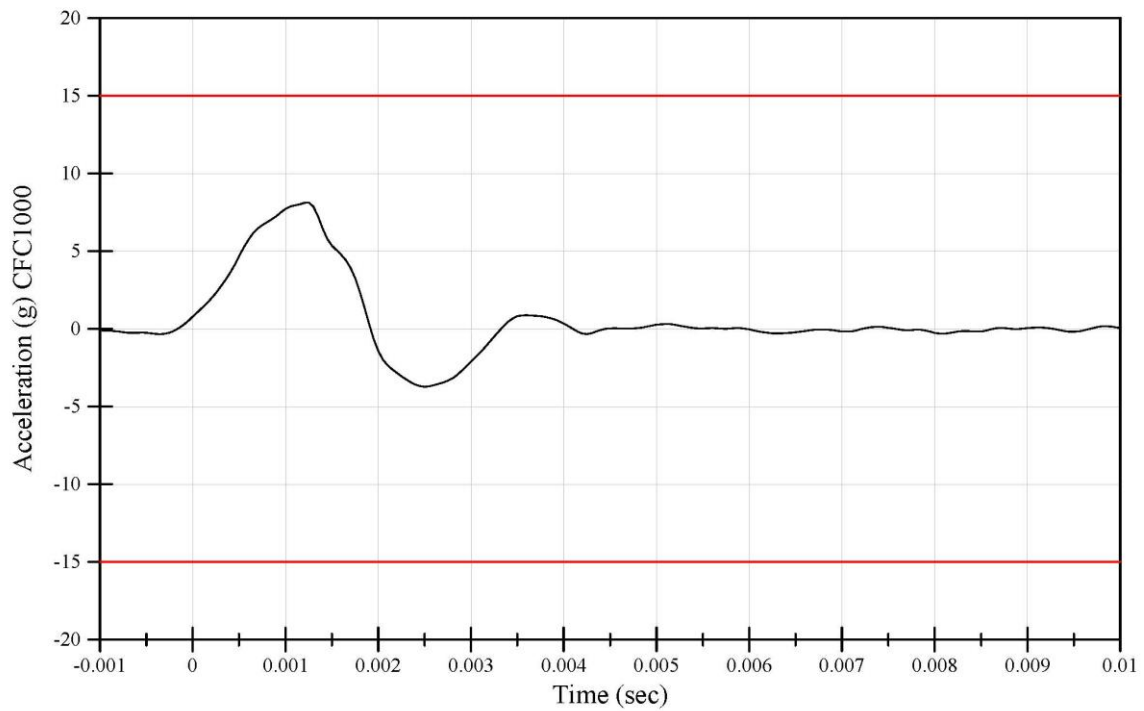
WorldSID-05F Head Left Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000



File Name: 210609-2 processed

6/9/2021 11:07 AM

WorldSID-05F Head Left Lateral Qualification
Peak Lateral X Acceleration
Head Serial Number: DM1000



File Name: 210609-2 processed

6/9/2021 11:07 AM

**WorldSID-05F Head Right Lateral Qualification
Test Results Summary**

Dummy Serial Number: DK1774

Tested Components
Head: DM1000

Test ID: 210608-8
Test Date: 6/8/2021
Test Time: 10:43 AM

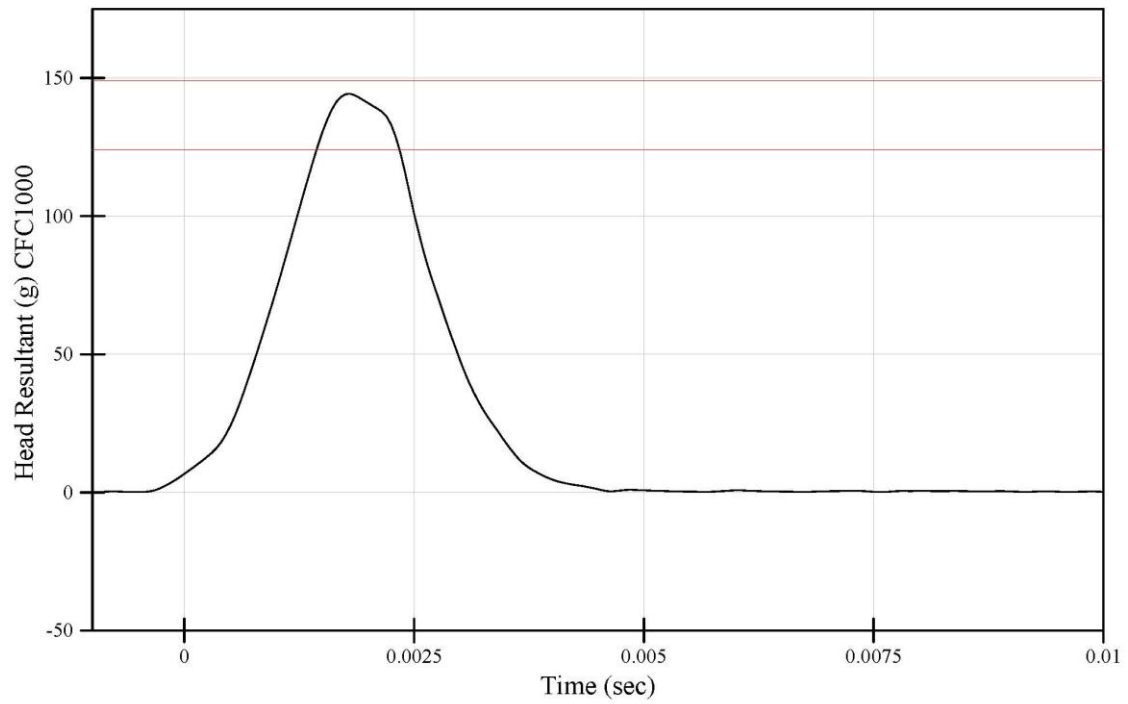
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.1	Pass
Test Humidity (%)	10 - 70	65	Pass
Peak Resultant Acceleration (g)	124 - 149	144	Pass
Peak Acceleration, x-axis (g)	-15 - 15	-7	Pass
Oscillations occurring after the main acceleration pulse (%)	-10 - 10	1	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210608-8 processed

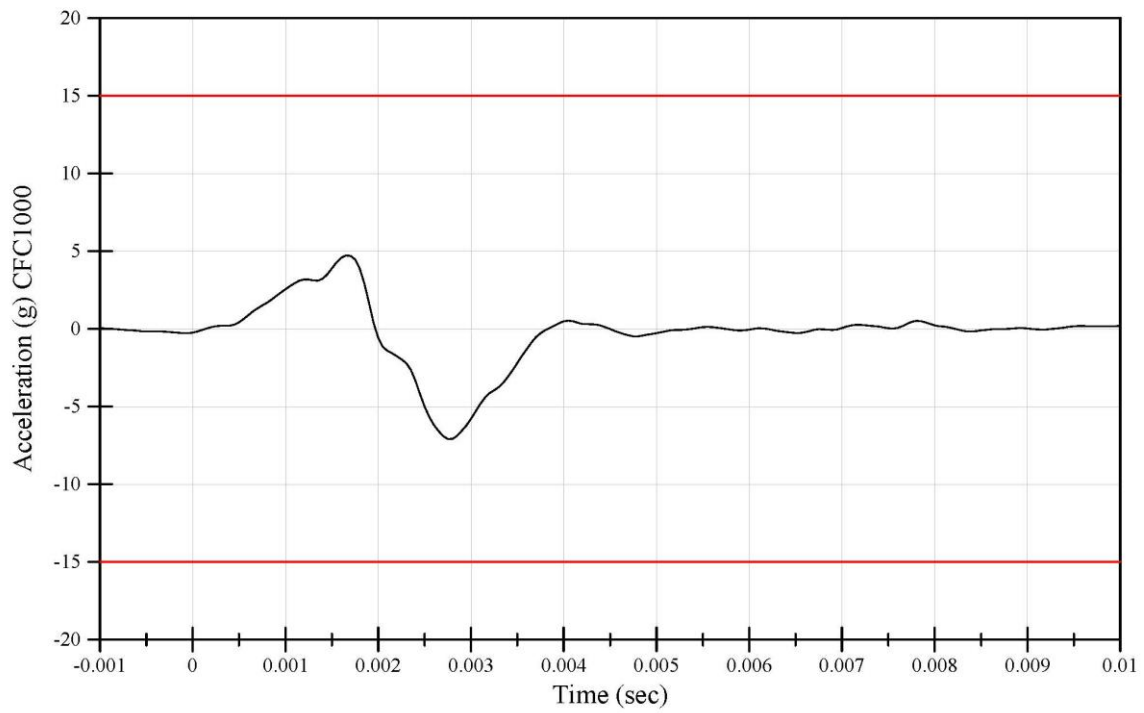
WorldSID-05F Head Right Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000



File Name: 210608-8 processed

6/8/2021 10:43 AM

WorldSID-05F Head Right Lateral Qualification
Peak Lateral Y Acceleration
Head Serial Number: DM1000



File Name: 210608-8 processed

6/8/2021 10:43 AM

WorldSID-05F Neck Left Lateral Qualification Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Neck: DX6209

Test ID: 210610-3

Test Date: 6/10/2021

Test Time: 1:03 PM

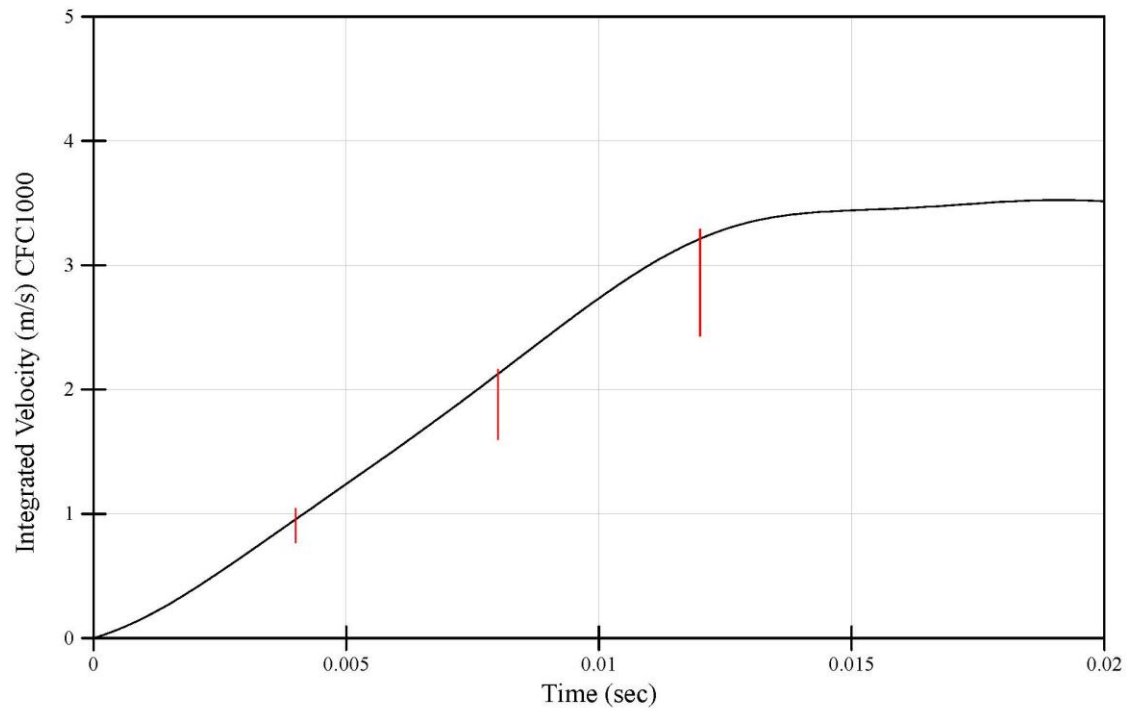
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	69	Pass
Test Velocity (m/s)	3.30 - 3.50	3.43	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.96	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.12	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.21	Pass
Peak Headform Flexion Angle (deg)	-71.4 - (-58.5)	-60.8	Pass
Peak Headform Flexion Angle Decay			
Time to 0 degrees (ms)	57.3 - 76.5	64.3	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	34.2 - 51.0	37.8	Pass
Peak X-Axis Moment at Occipital Condyle			
Decay Time to 0 Nm (ms)	69.4 - 93.3	83.2	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210610-3 processed

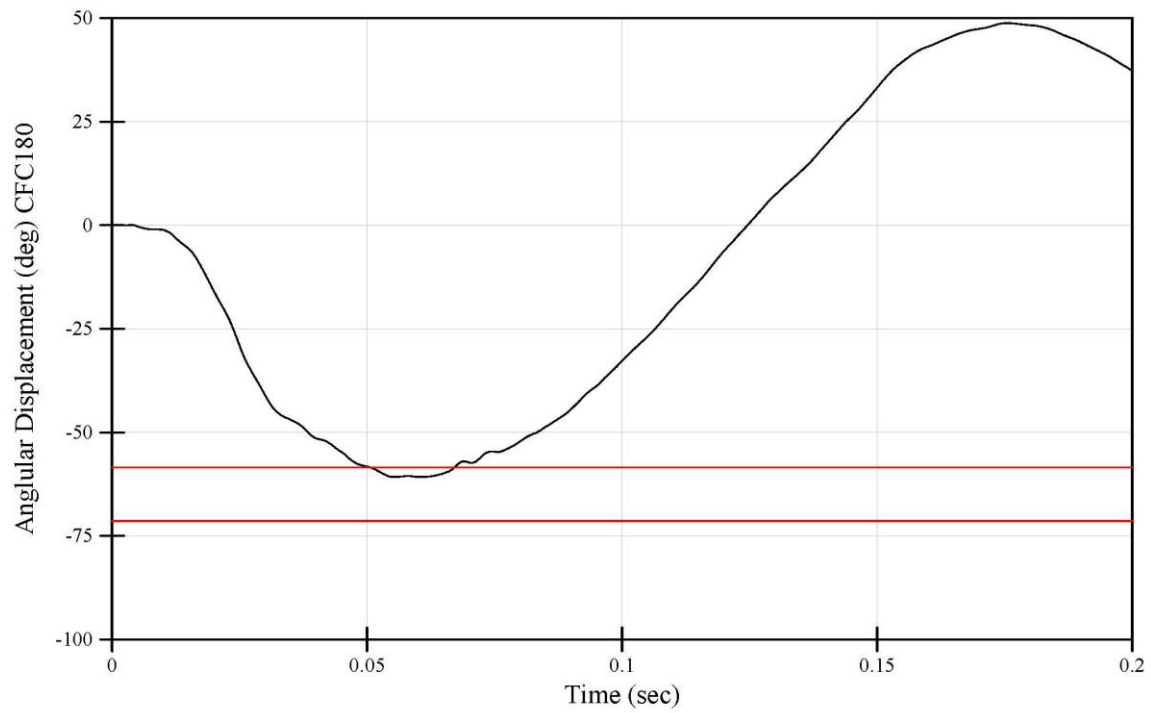
WorldSID-05F Neck Left Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774



File Name: 210610-3 processed

6/10/2021 1:03 PM

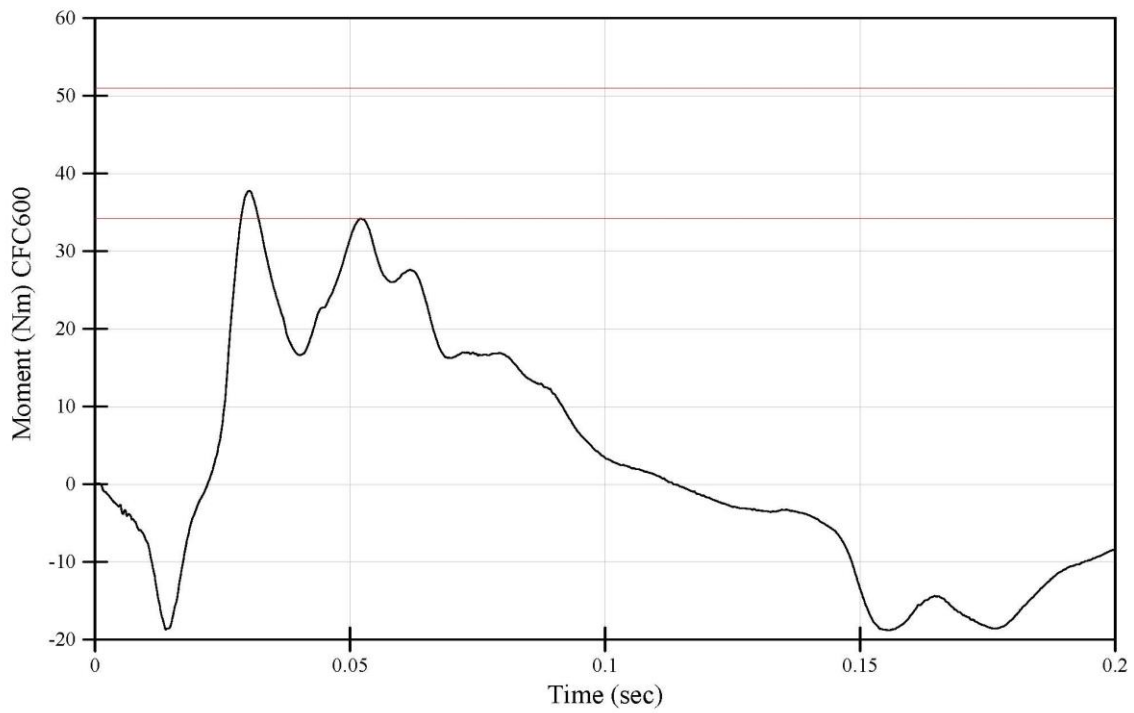
WorldSID-05F Neck Left Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774



File Name: 210610-3 processed

6/10/2021 1:03 PM

WorldSID-05F Neck Left Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774



File Name: 210610-3 processed

6/10/2021 1:03 PM

WorldSID-05F Neck Right Lateral Qualification **Test Results Summary**

Dummy Serial Number: DK1774

Tested Components

Neck: DX6209

Test ID: 210610-5

Test Date: 6/10/2021

Test Time: 2:05 PM

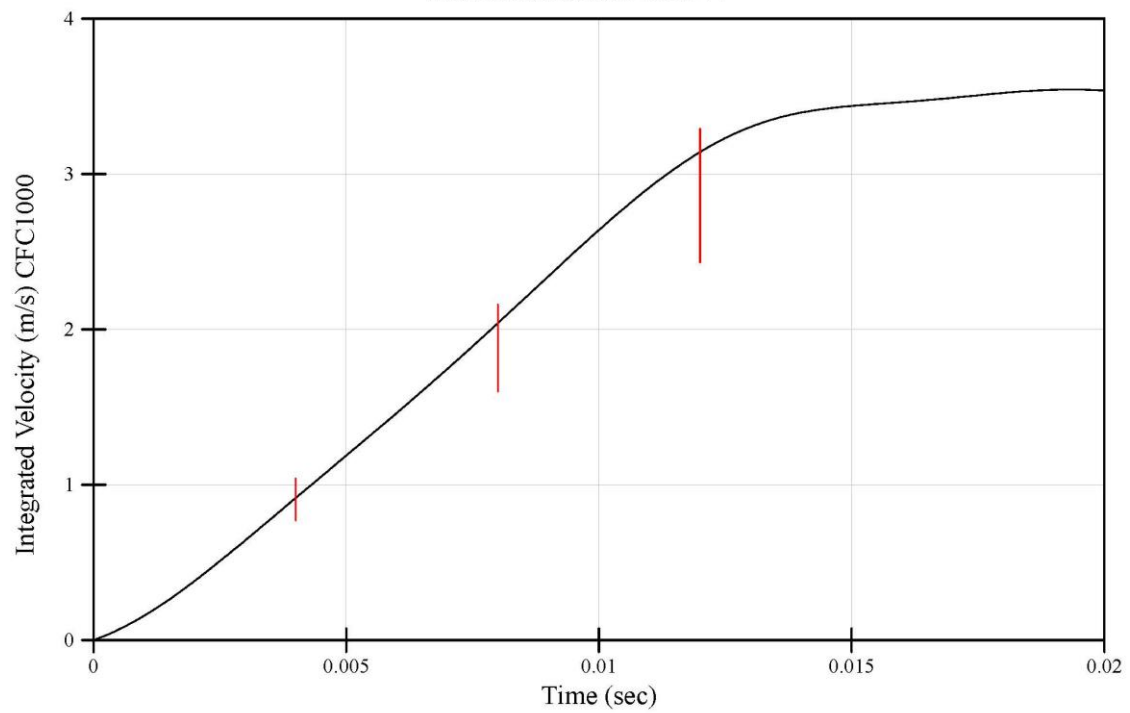
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	69	Pass
Test Velocity (m/s)	3.30 - 3.50	3.43	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.91	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.04	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.14	Pass
Peak Headform Flexion Angle (deg)	58.5 - 71.4	62.0	Pass
Peak Headform Flexion Angle Decay			
Time to 0 degrees (ms)	57.3 - 76.5	67.5	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	-51.0 - (-34.2)	-36.3	Pass
Peak X-Axis Moment at Occipital Condyle			
Decay Time to 0 Nm (ms)	69.4 - 93.3	86.2	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210610-5 processed

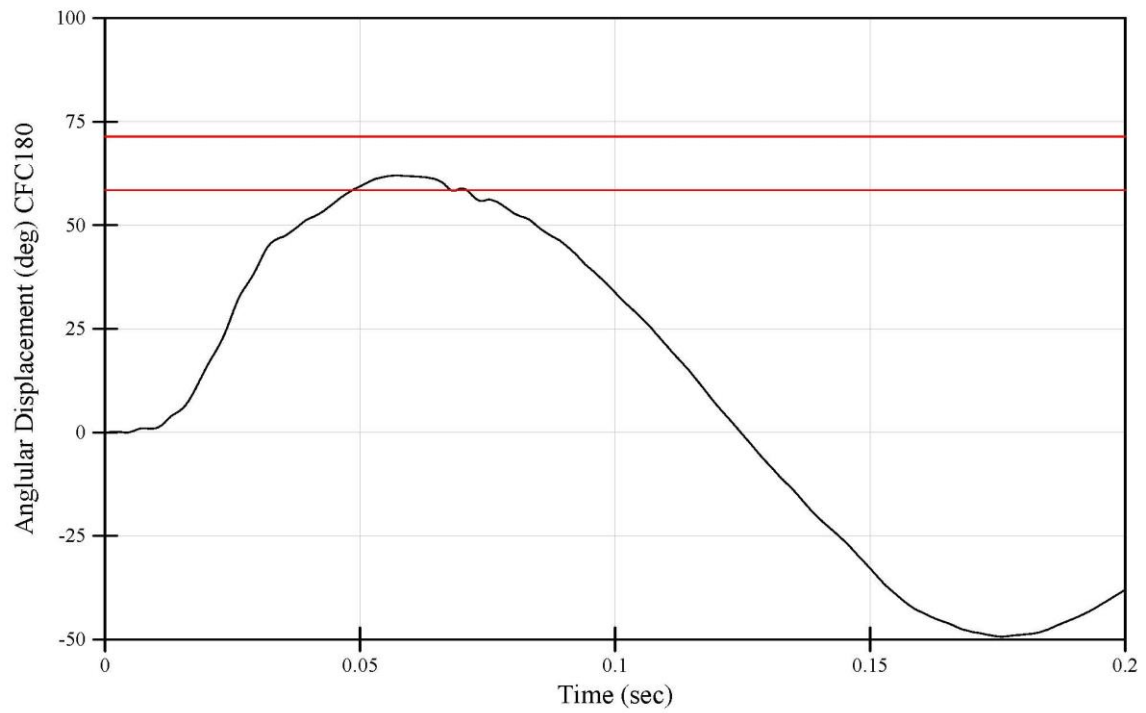
WorldSID-05F Neck Right Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774



File Name: 210610-5 processed

6/10/2021 2:05 PM

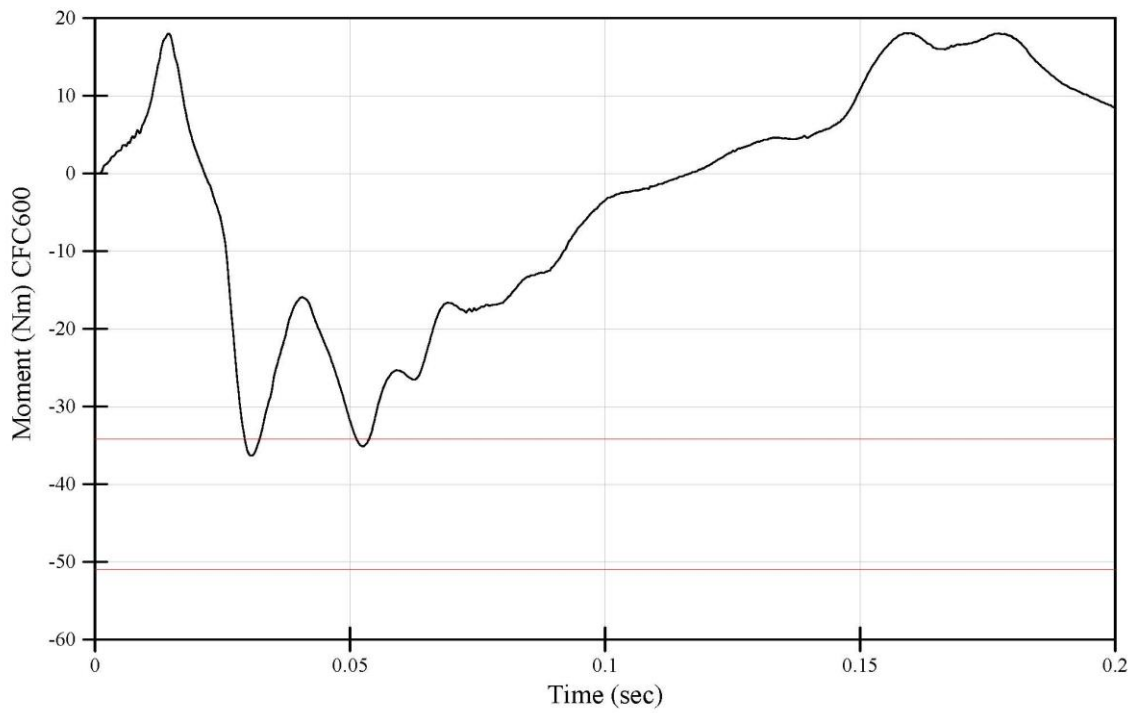
WorldSID-05F Neck Right Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774



File Name: 210610-5 processed

6/10/2021 2:05 PM

WorldSID-05F Neck Right Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774



File Name: 210610-5 processed

6/10/2021 2:05 PM

**WorldSID-05F Right Shoulder Qualification
Test Results Summary**

Dummy Serial Number: DK1774

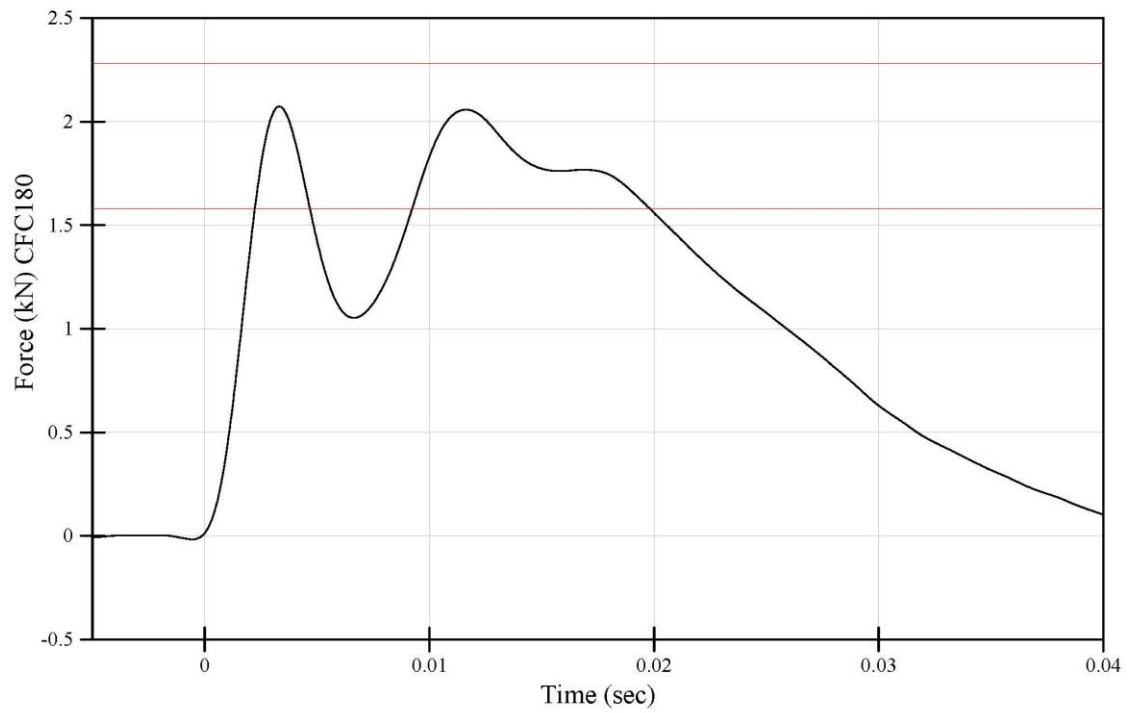
<u>Tested Components</u>		Test ID: 210621-9
Shoulder Pad: W5-P02	Thorax Rib 3: EA2794	Test Date: 6/21/2021
Shoulder Rib: EA1182	RibEye: 161	Test Time: 2:32 PM
Thorax Rib 1: EA3021	Impacted Arm: DI9019	
Thorax Rib 2: EA2790		

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	69	Pass
Test Velocity (m/s)	4.20 - 4.40	4.30	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.5	Pass
Peak Probe Force (kN)	1.58 - 2.28	2.07	Pass
Peak Shoulder Rib Length Change (mm)	23.4 - 36.6	28.9	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210621-9 processed

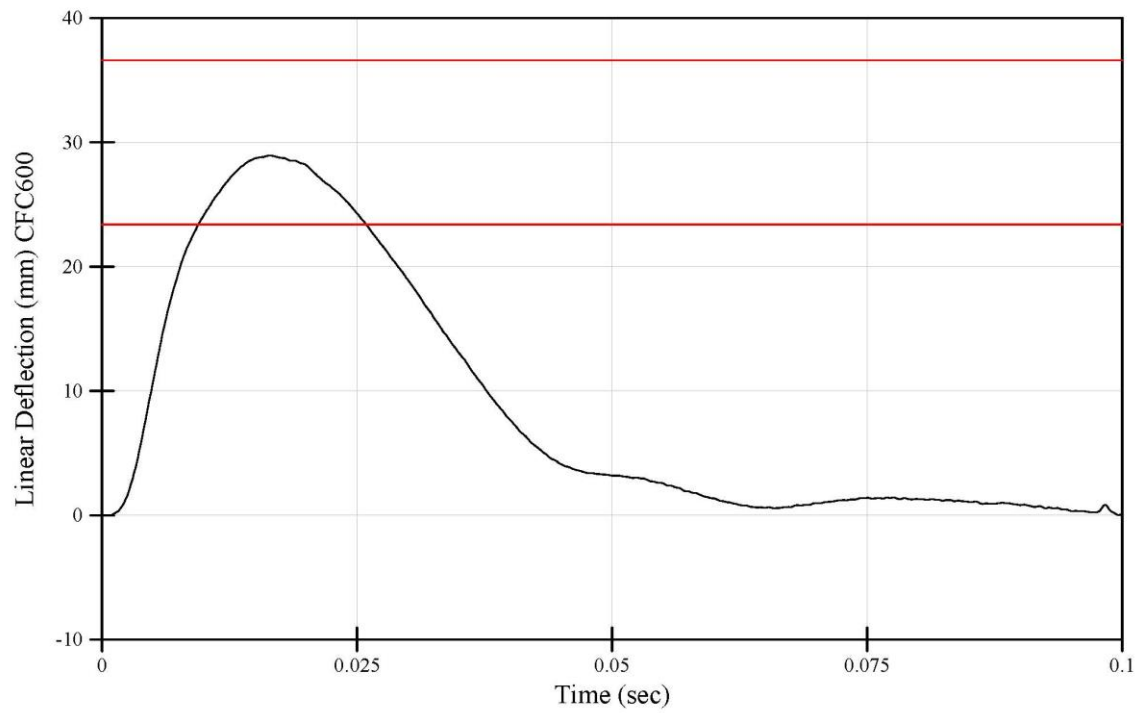
WorldSID-05F Right Shoulder Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210621-9 processed

6/21/2021 2:32 PM

WorldSID-05F Right Shoulder Qualification
Peak Shoulder Rib Deflection
Dummy Serial Number: DK1774



File Name: 210621-9 processed

6/21/2021 2:32 PM

WorldSID-05F Right Thorax with Arm Qualification Test Results Summary

Dummy Serial Number: DK1774

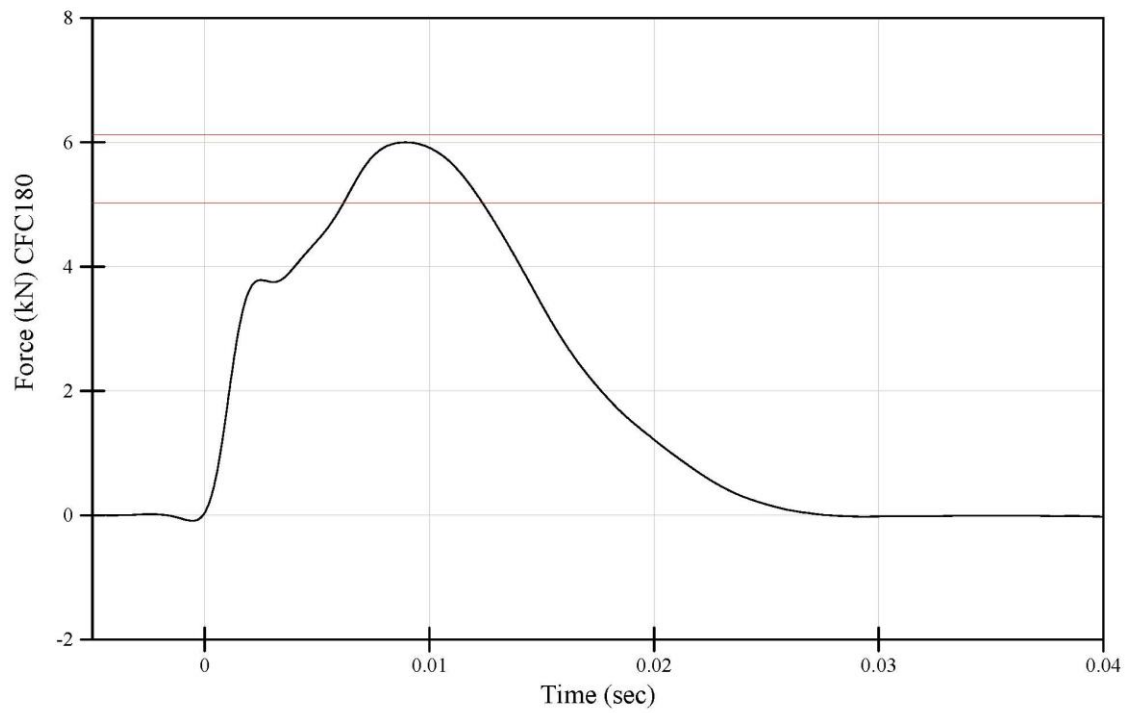
<u>Tested Components</u>		Test ID: 210622-2
Thorax Rib 1: EA3021	RibEye: 161	Test Date: 6/22/2021
Thorax Rib 2: EA2790	Impacted Arm: DI9019	Test Time: 8:48 AM
Thorax Rib 3: EA2794		

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	65	Pass
Test Velocity (m/s)	6.60 - 6.80	6.68	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.4	Pass
Peak Probe Force (kN)	5.02 - 6.13	6.00	Pass
Peak T4 Y Acceleration (g)	-52.0 - (-34.7)	-53.1	Fail
Peak T12 Y Acceleration (g)	-54.9 - (-44.5)	-59.9	Fail
Peak Thorax Rib 1 Y Length Change (mm)	18.3 - 26.4	18.1	Fail
Peak Thorax Rib 2 Y Length Change (mm)	21.6 - 26.4	21.3	Fail
Peak Thorax Rib 3 Y Length Change (mm)	19.7 - 26.6	18.5	Fail

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210622-2 processed

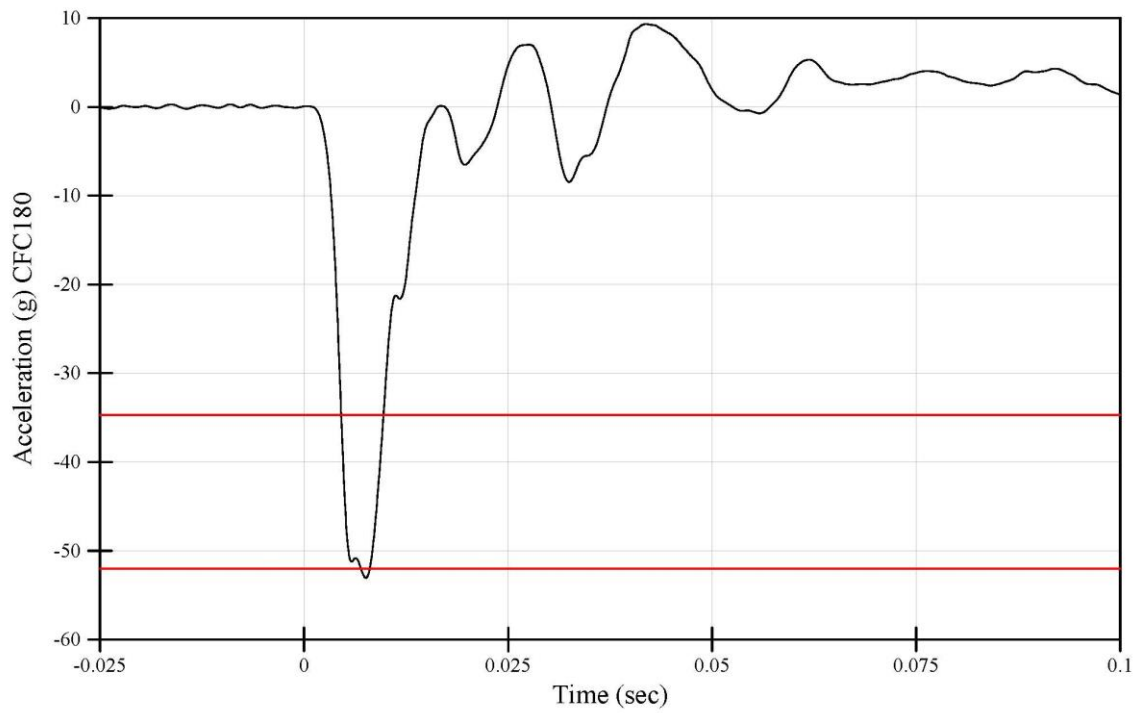
WorldSID-05F Right Thorax with Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210622-2 processed

6/22/2021 8:48 AM

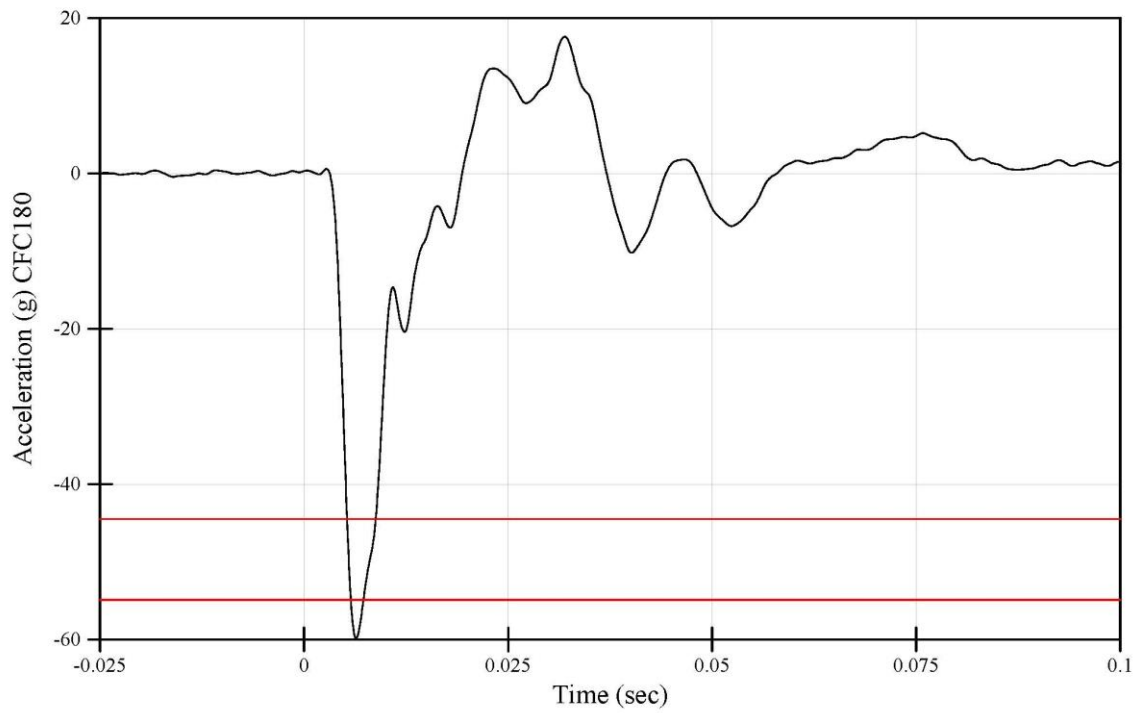
WorldSID-05F Right Thorax with Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210622-2 processed

6/22/2021 8:48 AM

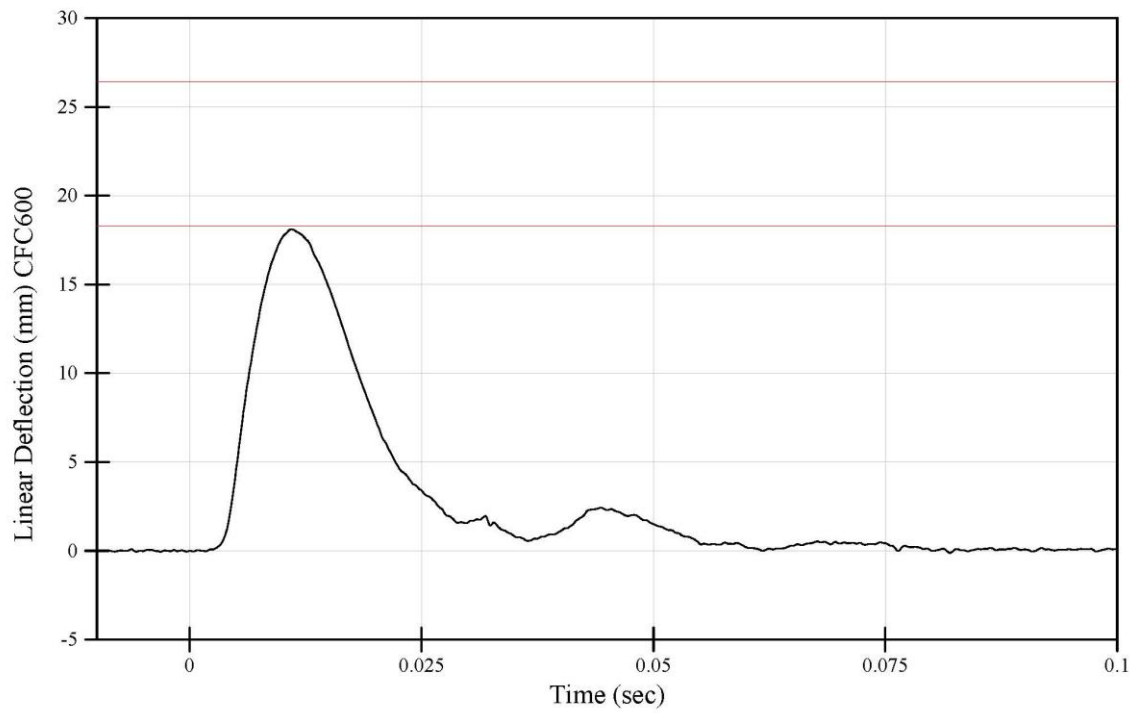
WorldSID-05F Right Thorax with Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210622-2 processed

6/22/2021 8:48 AM

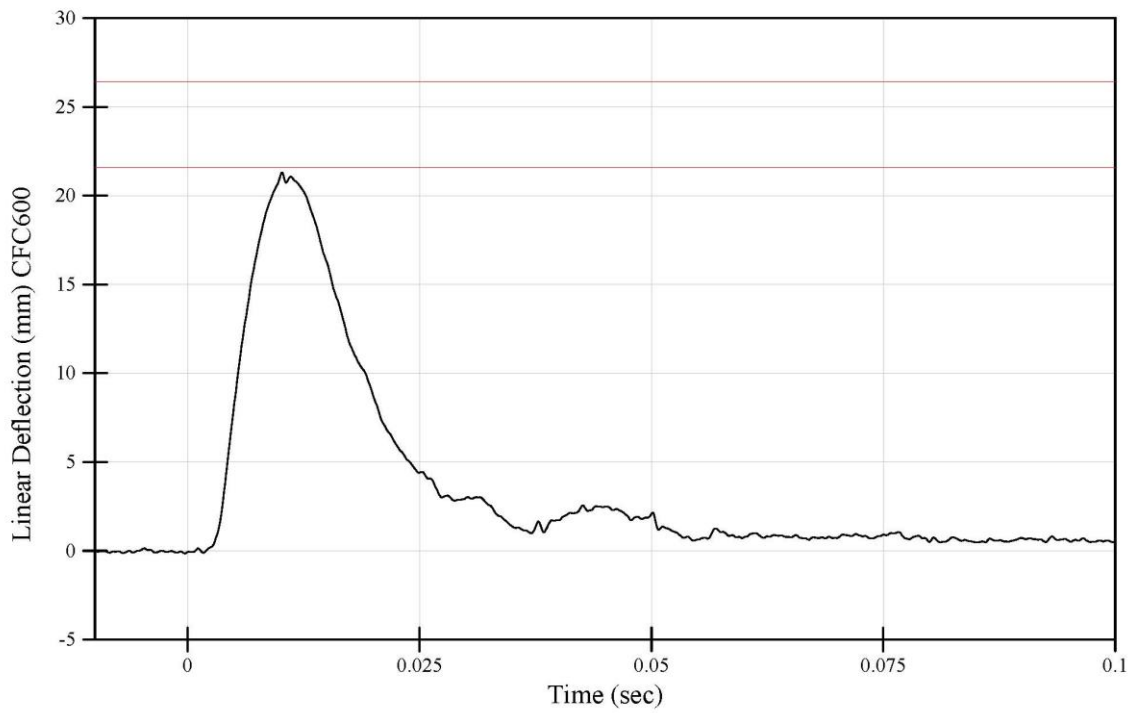
WorldSID-05F Right Thorax with Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774



File Name: 210622-2 processed

6/22/2021 8:48 AM

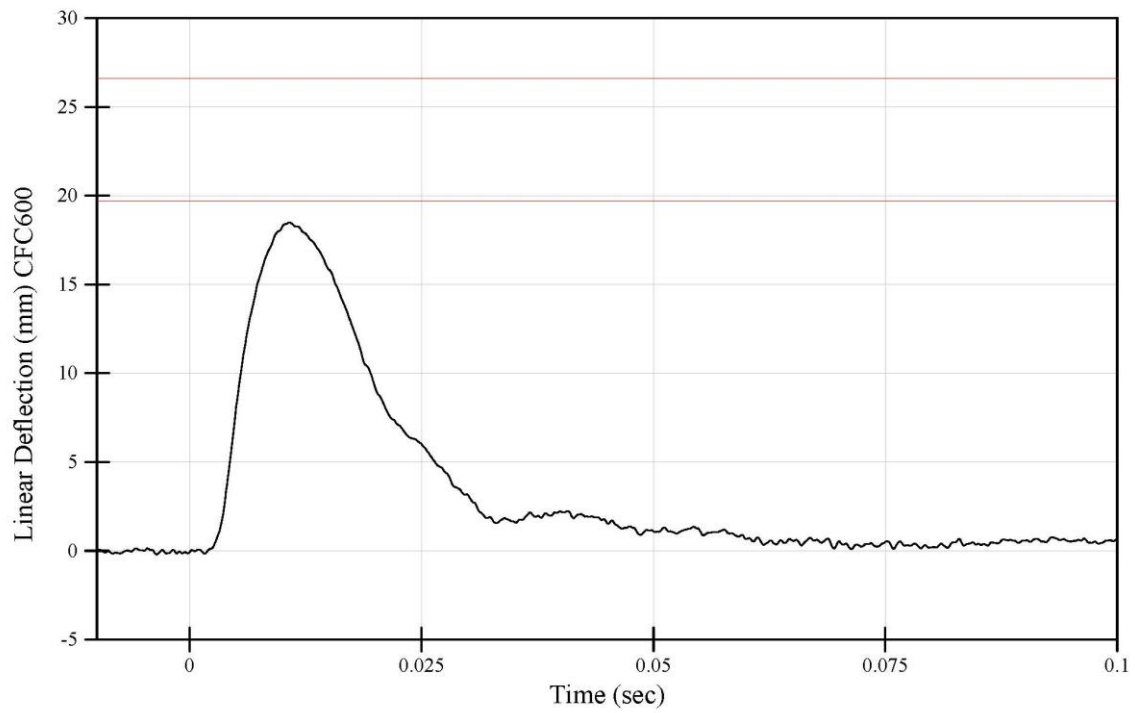
WorldSID-05F Right Thorax with Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774



File Name: 210622-2 processed

6/22/2021 8:48 AM

WorldSID-05F Right Thorax with Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774



File Name: 210622-2 processed

6/22/2021 8:48 AM

WorldSID-05F Right Thorax without Arm Qualification **Test Results Summary**

Dummy Serial Number: DK1774

Tested Components

Thorax Rib 1: EA3021
 Thorax Rib 2: EA2790
 Thorax Rib 3: EA2794
 RibEye: 161

Test ID: 210622-5
 Test Date: 6/22/2021
 Test Time: 1:01 PM

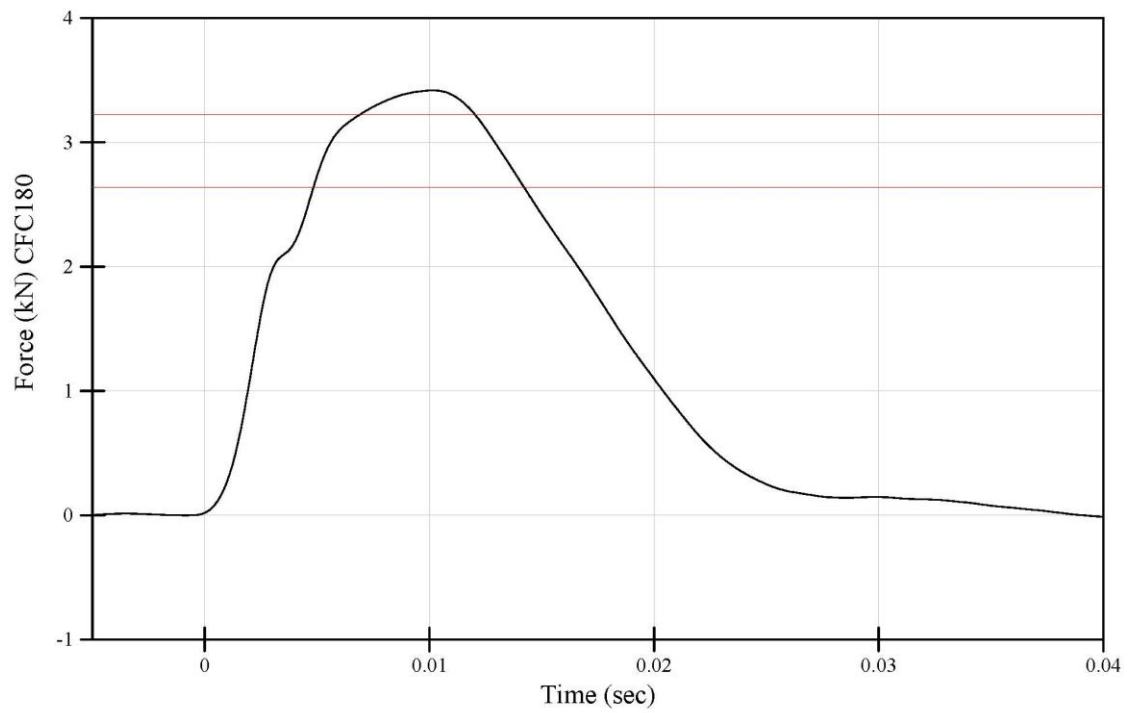
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	67	Pass
Test Velocity (m/s)	4.20 - 4.40	4.30	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	23.1	Pass
Peak Probe Force (kN)	2.64 - 3.22	3.42	Fail
Peak T4 Y Acceleration (g)	-27.5 - (-21.2)	-28.8	Fail
Peak T12 Y Acceleration (g)	-28.9 - (-20.6)	-25.7	Pass
Peak Thorax Rib 1 Y Length Change (mm)	20.5 - 27.7	19.6	Fail
Peak Thorax Rib 2 Y Length Change (mm)	21.7 - 26.7	21.5	Fail
Peak Thorax Rib 3 Y Length Change (mm)	20.9 - 27.3	21.1	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210622-5 processed

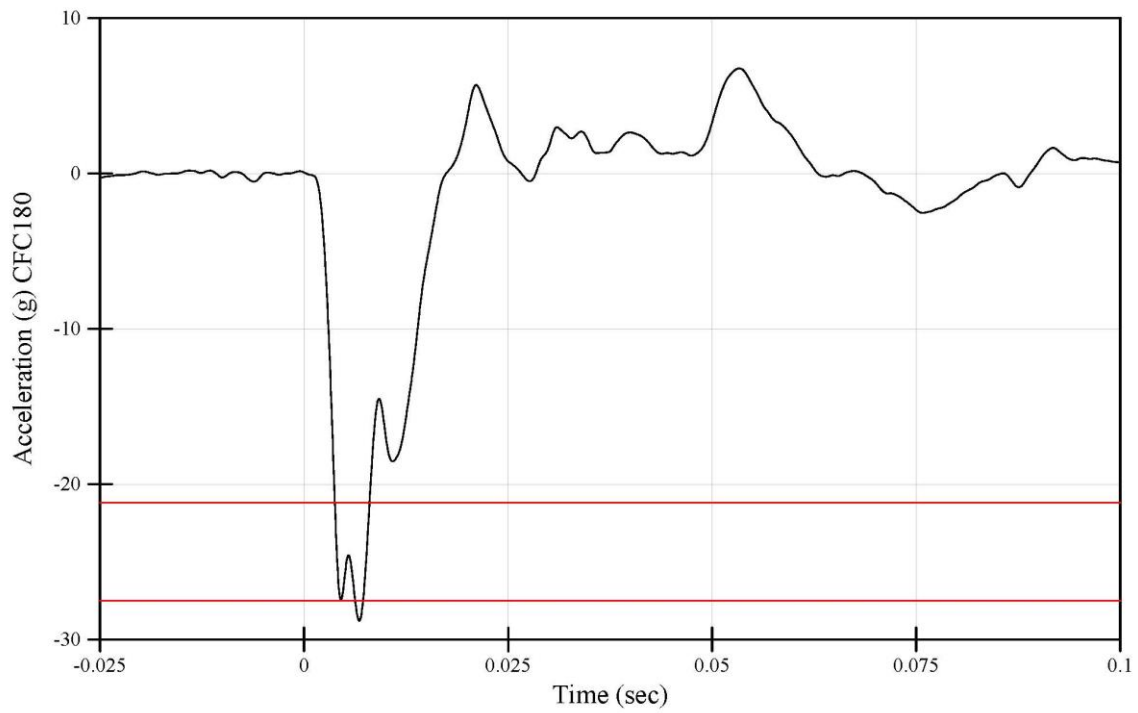
WorldSID-05F Right Thorax without Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210622-5 processed

6/22/2021 1:01 PM

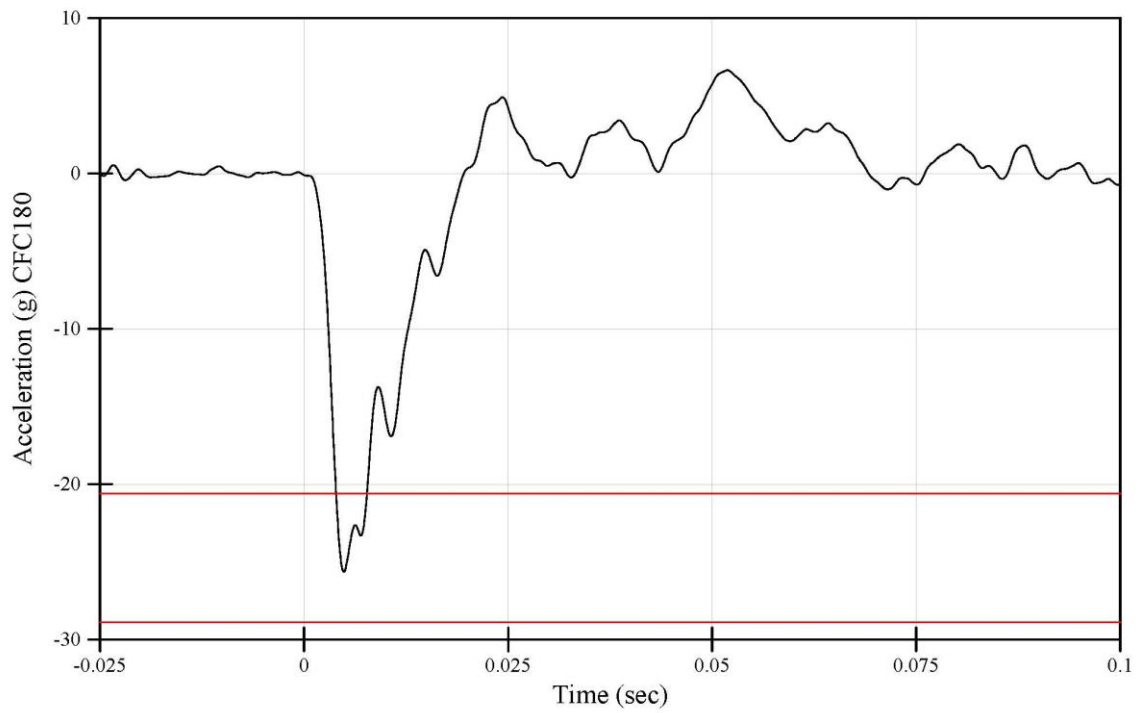
WorldSID-05F Right Thorax without Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210622-5 processed

6/22/2021 1:01 PM

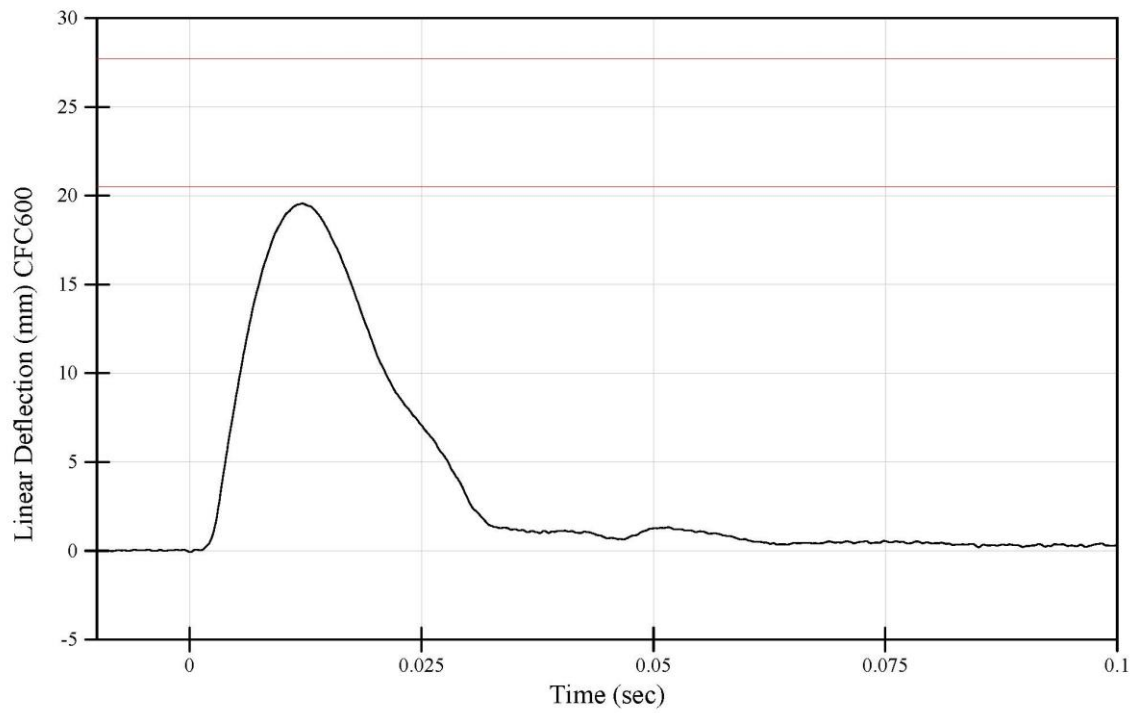
WorldSID-05F Right Thorax without Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210622-5 processed

6/22/2021 1:01 PM

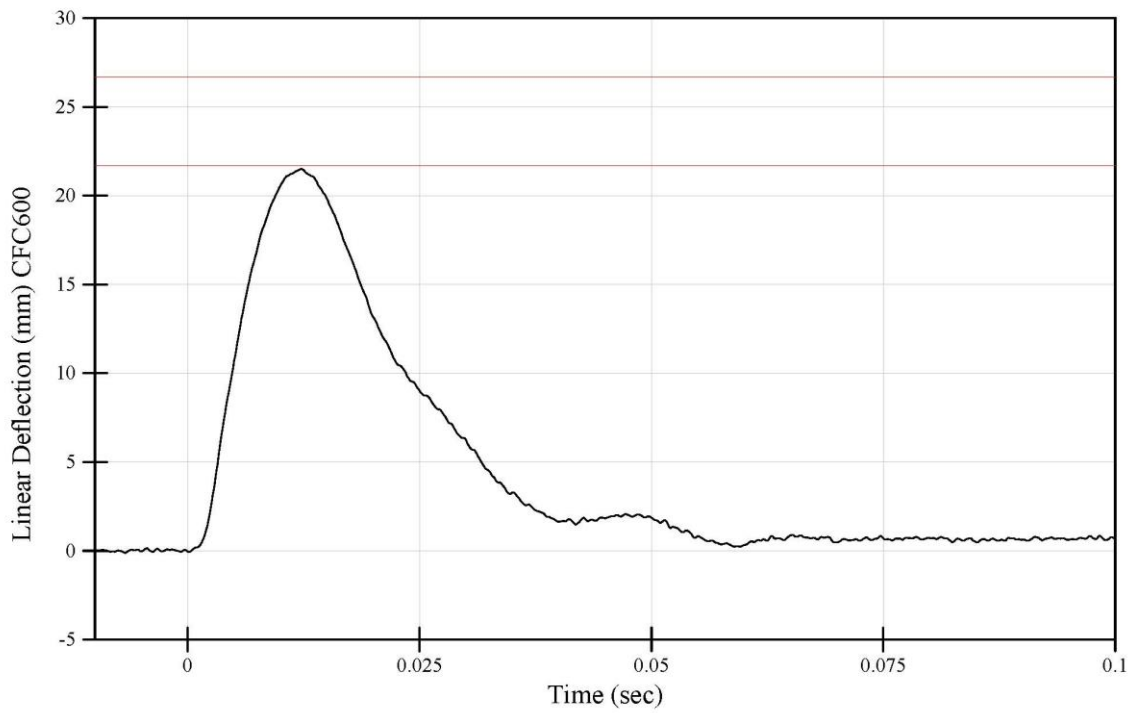
WorldSID-05F Right Thorax without Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774



File Name: 210622-5 processed

6/22/2021 1:01 PM

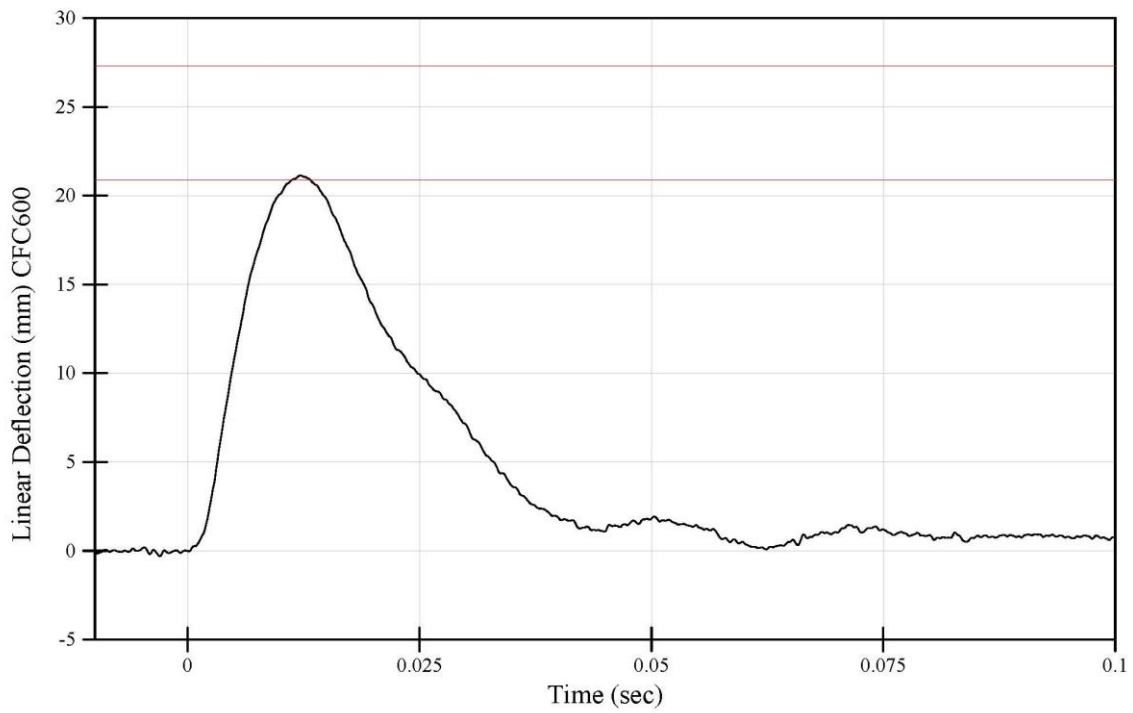
WorldSID-05F Right Thorax without Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774



File Name: 210622-5 processed

6/22/2021 1:01 PM

WorldSID-05F Right Thorax without Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774



File Name: 210622-5 processed

6/22/2021 1:01 PM

WorldSID-05F Right Abdomen Qualification Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Abdomen Rib 1: W5-P02
Abdomen Rib 2: EA1182
RibEye: EA3021

Test ID: 210622-7
Test Date: 6/22/2021
Test Time: 2:28 PM

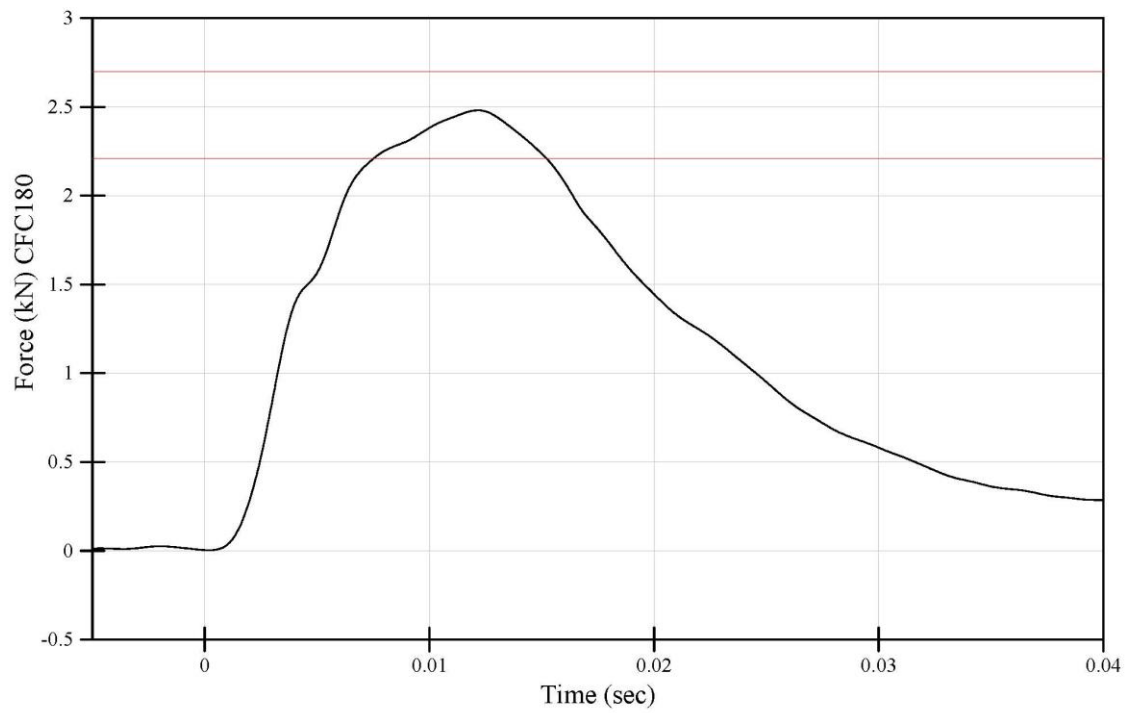
Test Results

<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	68	Pass
Test Velocity (m/s)	4.20 - 4.40	4.31	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	23.2	Pass
Peak Probe Force (kN)	2.21 - 2.70	2.48	Pass
Peak T12 Acceleration (g)	-30.6 - (-24.4)	-30.1	Pass
Peak Abdomen Rib 1 Length Change (mm)	23.1 - 31.2	23.1	Pass
Peak Abdomen Rib 2 Length Change (mm)	22.7 - 27.8	23.0	Pass

* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210622-7 processed

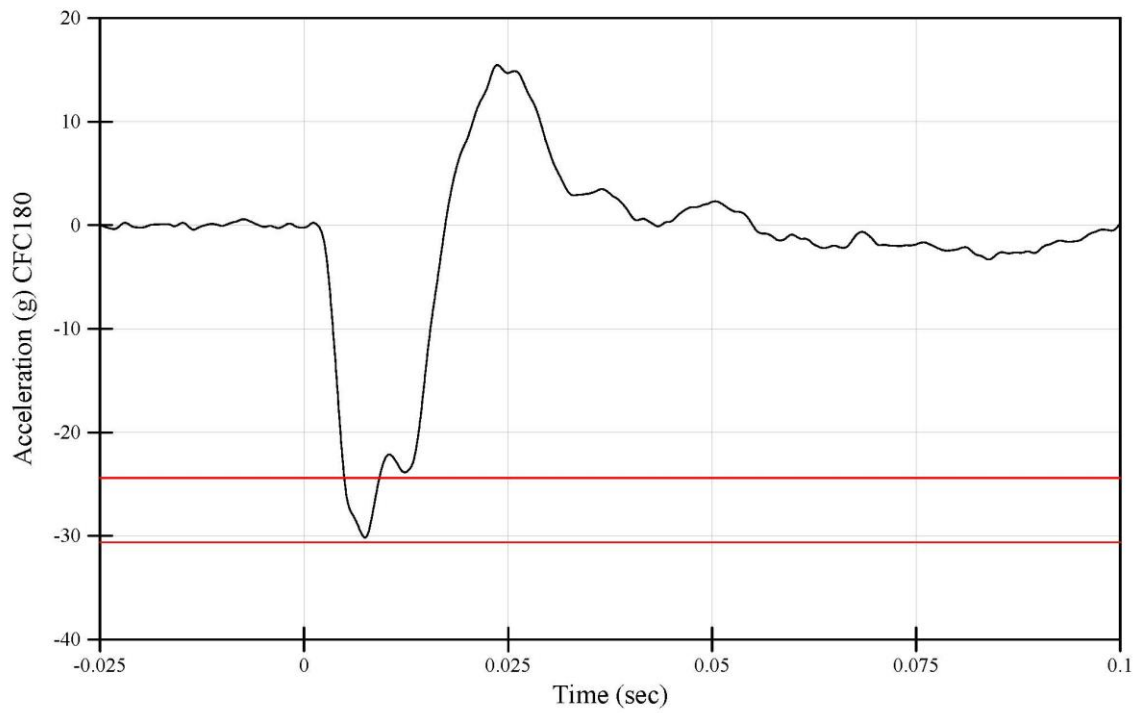
WorldSID-05F Right Abdomen Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210622-7 processed

6/22/2021 2:28 PM

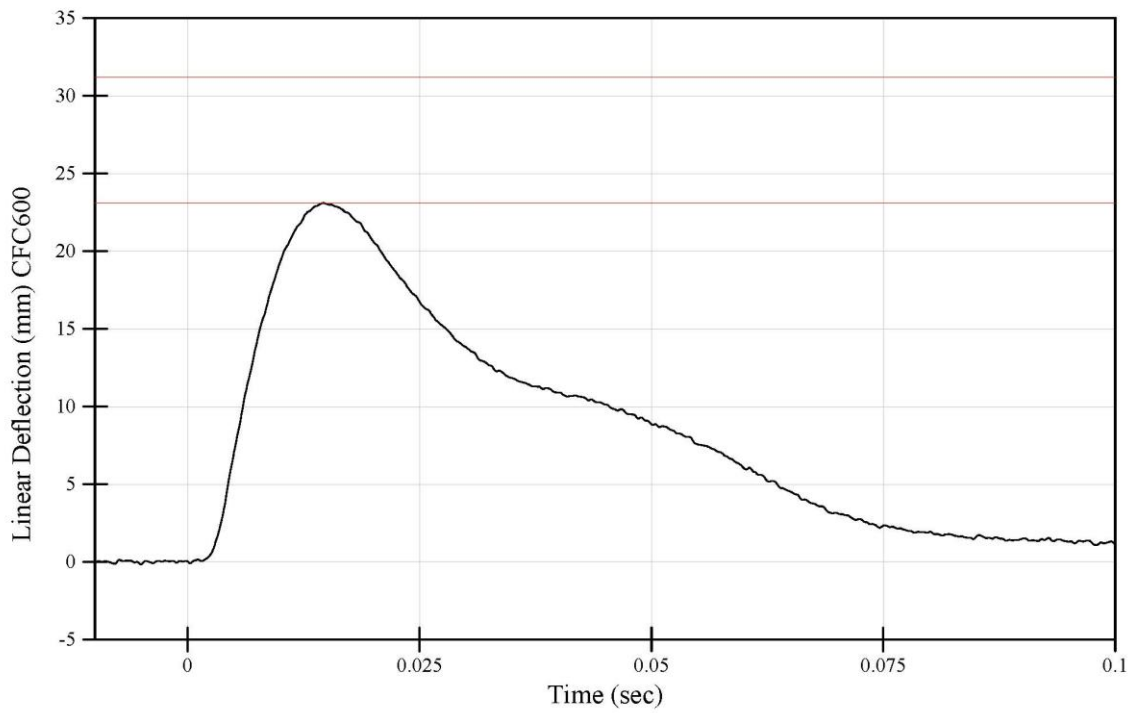
WorldSID-05F Right Abdomen Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



File Name: 210622-7 processed

6/22/2021 2:28 PM

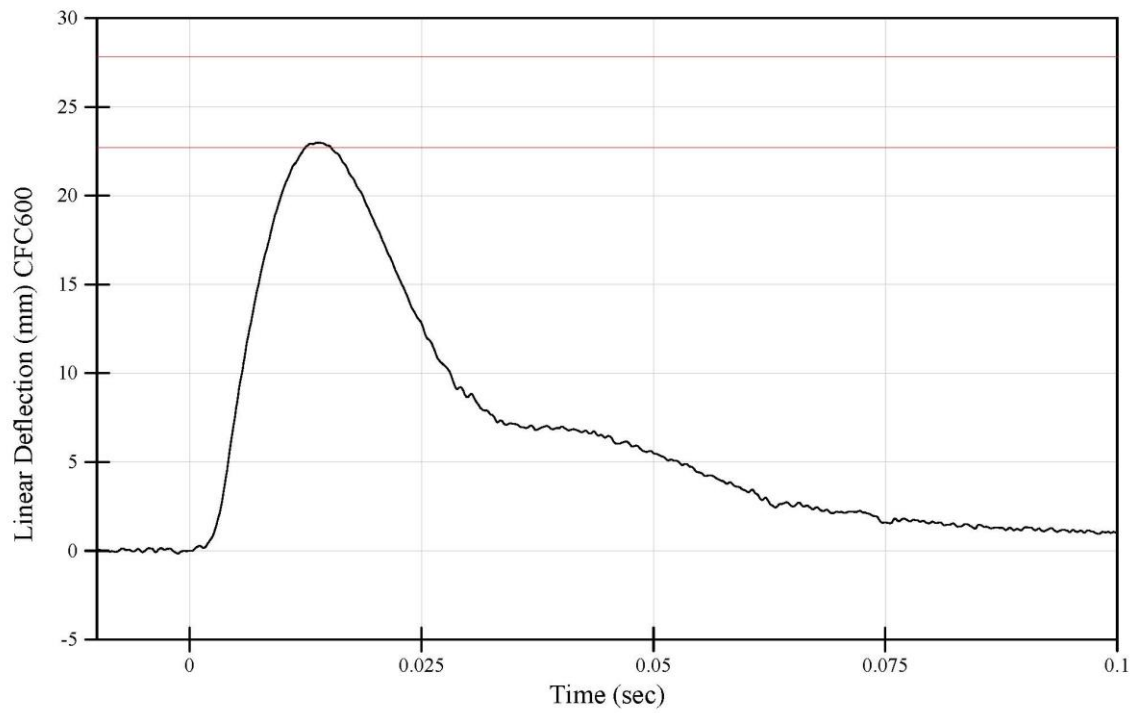
WorldSID-05F Right Abdomen Qualification
Peak Abdomen Rib 1 Compression
Dummy Serial Number: DK1774



File Name: 210622-7 processed

6/22/2021 2:28 PM

WorldSID-05F Right Abdomen Qualification
Peak Abdomen Rib 2 Compression
Dummy Serial Number: DK1774



File Name: 210622-7 processed

6/22/2021 2:28 PM

**WorldSID-05F Right Pelvis Qualification
Test Results Summary**

Dummy Serial Number: DK1774

Tested Components

Pelvis Flesh: W5-P02

Pelvic Bone: EA1182

Test ID: 210623-2

Test Date: 6/23/2021

Test Time: 9:34 AM

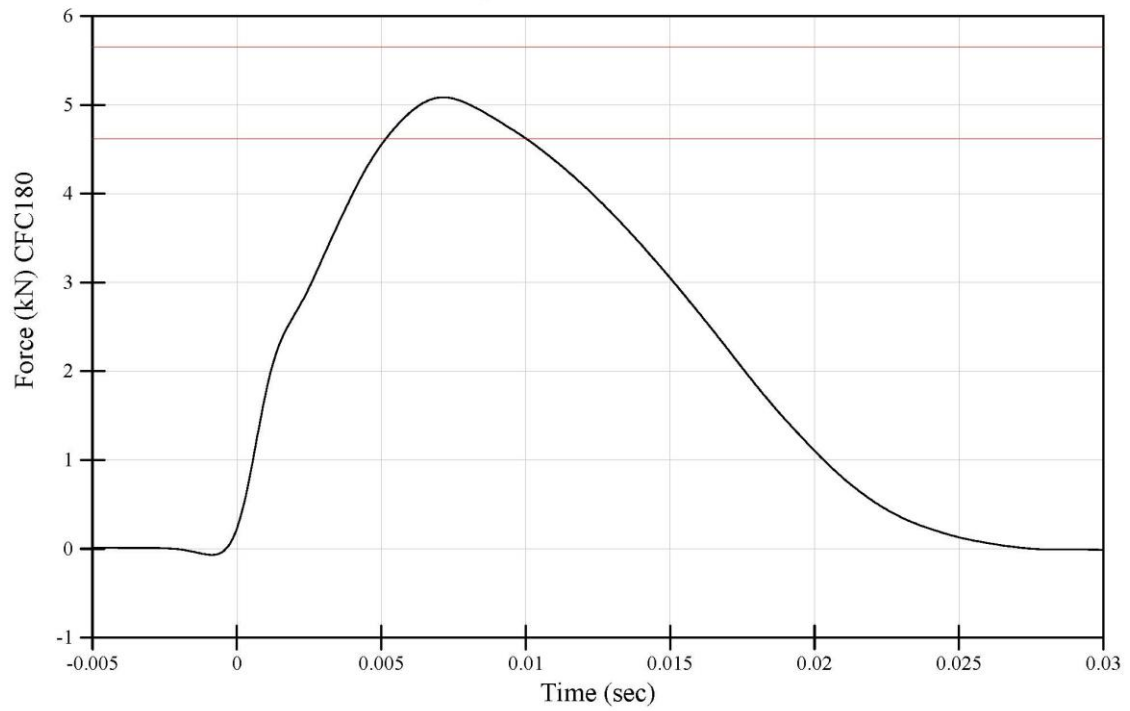
Test Results

<u>Test Parameter</u>	<u>Specification Range*</u>	<u>Result</u>	<u>Pass/Fail</u>
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	62	Pass
Test Velocity (m/s)	6.60 - 6.80	6.70	Pass
Peak Probe Force (kN)	4.62 - 5.65	5.08	Pass
Peak Pubic Force FY (N)	-1200 - (-770)	-1016	Pass
Peak T12 Acceleration (g)	-15.8 - (-11.8)	-18.5	Fail
Peak Pelvis Acceleration (g)	-74.4 - (-48.6)	-45.4	Fail

* WorldSID-50M Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 210623-2 processed

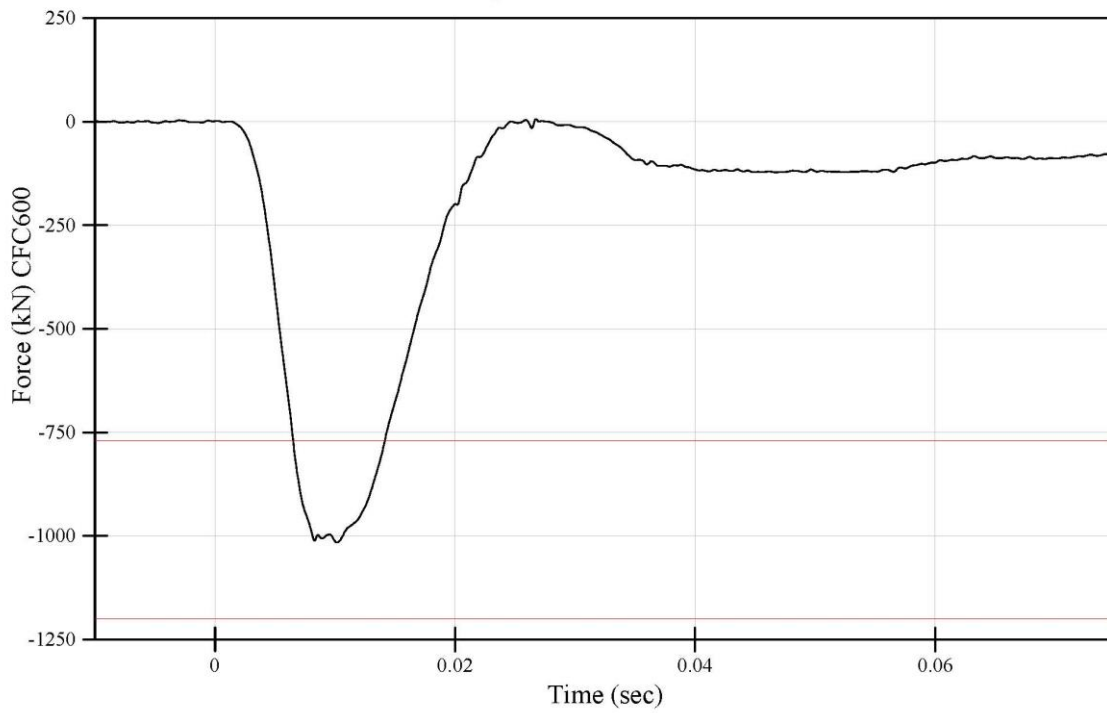
WorldSID-05F Right Pelvis Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774



File Name: 210623-2 processed

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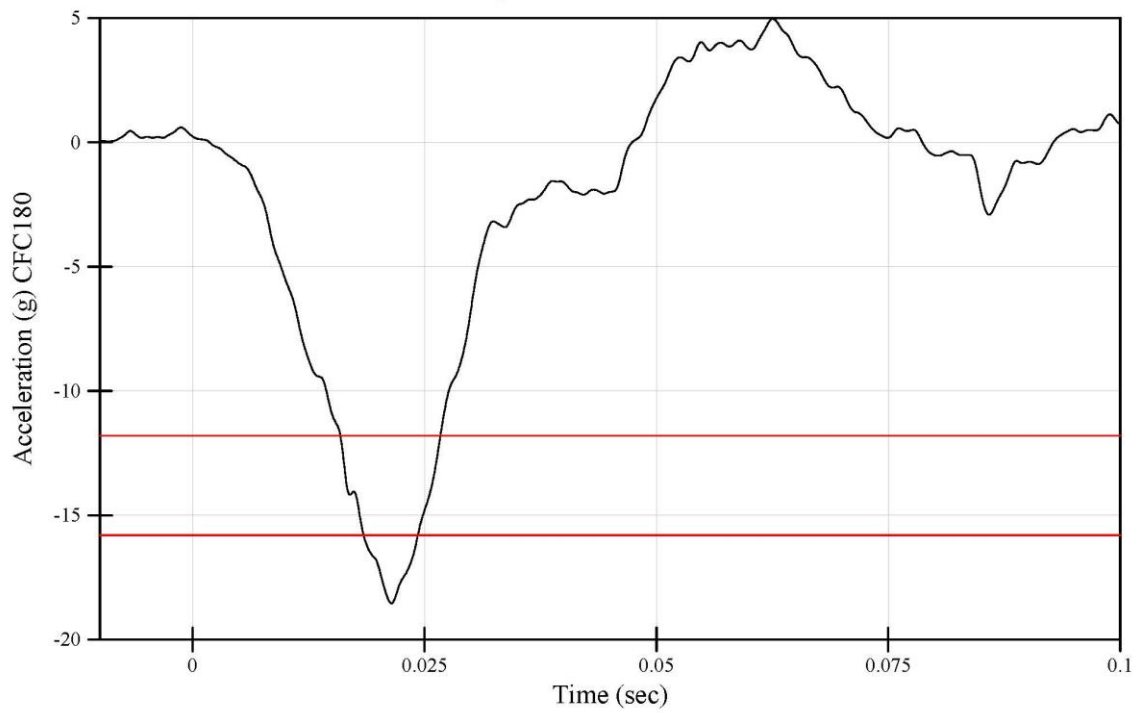
WorldSID-05F Right Pelvis Qualification
Peak Pubic Y axis Force
Dummy Serial Number: DK1774



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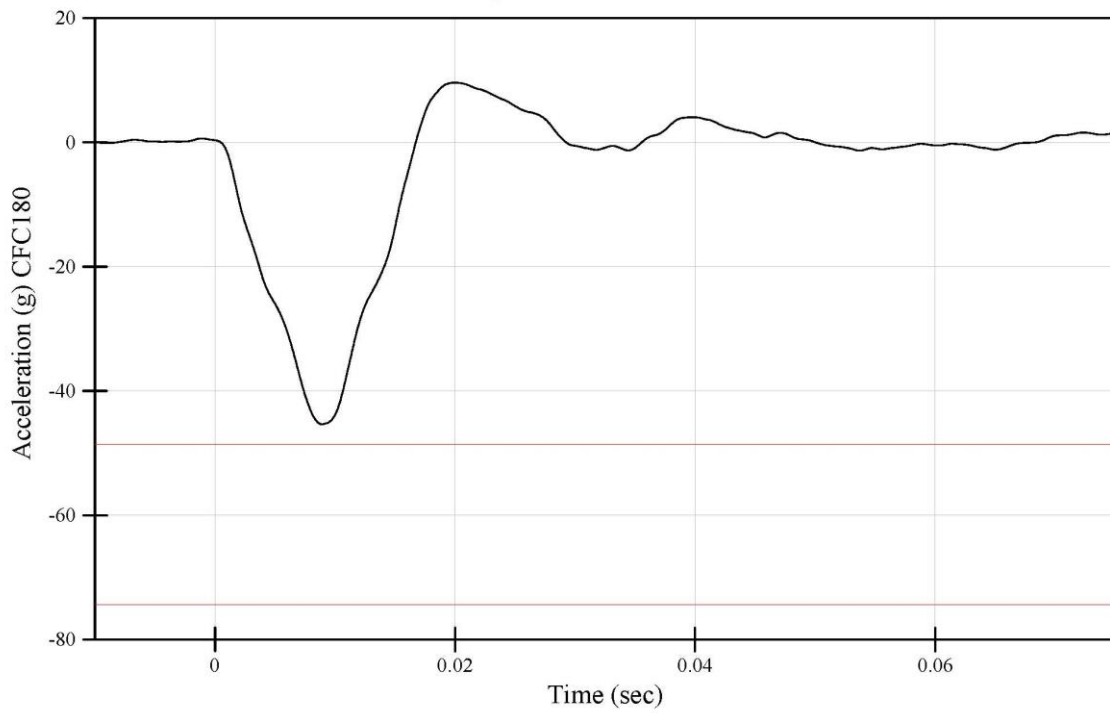
WorldSID-05F Right Pelvis Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774



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WorldSID-05F Right Pelvis Qualification
Peak Pelvis Y Axis Acceleration
Dummy Serial Number: DK1774



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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-Apr-2021
	Y	10820-3	Endevco	29-Apr-2021
	Z	10820-2	Endevco	29-Apr-2021
Head Angular Rates Sensors (deg/sec)	X	ARS11763	DTS	29-Apr-2021
	Y	ARS11755	DTS	29-Apr-2021
	Z	ARS11079	DTS	29-Apr-2021
Upper Neck Force (N)	X	EC2343	Humanetics	29-Apr-2021
	Y	EC2343	Humanetics	29-Apr-2021
	Z	EC2343	Humanetics	29-Apr-2021
Upper Neck Moment (Nm)	X	EC2343	Humanetics	29-Apr-2021
	Y	EC2343	Humanetics	29-Apr-2021
	Z	EC2343	Humanetics	29-Apr-2021
Lower Neck Force (N)	X	DN9609	Humanetics	29-Apr-2021
	Y	DN9609	Humanetics	29-Apr-2021
	Z	DN9609	Humanetics	29-Apr-2021
Lower Neck Moment (Nm)	X	DN9609	Humanetics	29-Apr-2021
	Y	DN9609	Humanetics	29-Apr-2021
	Z	DN9609	Humanetics	29-Apr-2021
Upper Spine Accelerometers (T1) (g)	X	EC4095	Humanetics	29-Apr-2021
	Y	EC4095	Humanetics	29-Apr-2021
	Z	EC4095	Humanetics	29-Apr-2021
Middle Spine Accelerometers (T4) (g)	X	10820-1	Endevco	29-Apr-2021
	Y	10820-3	Endevco	29-Apr-2021
	Z	10820-2	Endevco	29-Apr-2021
Lower Spine Accelerometers (T12) (g)	X	ARS11763	Endevco	29-Apr-2021
	Y	ARS11755	Endevco	29-Apr-2021
	Z	ARS11079	Endevco	29-Apr-2021
Shoulder Force (N)	X	EC2343	Endevco	29-Apr-2021
	Y	EC2343	Endevco	29-Apr-2021
	Z	EC2343	Endevco	29-Apr-2021
Pubic Symphysis Force (N)	Y	EA8949	Humanetics	29-Apr-2021
Sacro-Iliac Left Force (N)	X	EA8971	Humanetics	29-Apr-2021
	Y	EA8971	Humanetics	29-Apr-2021
	Z	EA8971	Humanetics	29-Apr-2021
Sacro-Iliac Left Moment (Nm)	X	EA8971	Humanetics	29-Apr-2021
	Y	EA8971	Humanetics	29-Apr-2021
	Z	EA8971	Humanetics	29-Apr-2021

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	29-Apr-2021
	Y	EA8971	Humanetics	29-Apr-2021
	Z	EA8971	Humanetics	29-Apr-2021
Sacro-Iliac Right Moment (Nm)	X	EA8971	Humanetics	29-Apr-2021
	Y	EA8971	Humanetics	29-Apr-2021
	Z	EA8971	Humanetics	29-Apr-2021
Lumbar Force (N)	X	EG4790	Humanetics	29-Apr-2021
	Y	EG4790	Humanetics	29-Apr-2021
	Z	EG4790	Humanetics	29-Apr-2021
Lumbar Moment (Nm)	X	EG4790	Humanetics	29-Apr-2021
	Y	EG4790	Humanetics	29-Apr-2021
	Z	EG4790	Humanetics	29-Apr-2021
Pelvis Accelerometers (g)	X	10563-3	Endevco	29-Apr-2021
	Y	10563-2	Endevco	29-Apr-2021
	Z	10563-1	Endevco	29-Apr-2021
Femur Force (N)	X	EG2791	Humanetics	29-Apr-2021
	Y	EG2791	Humanetics	29-Apr-2021
	Z	EG2791	Humanetics	29-Apr-2021
Femur Moment (Nm)	X	EG2791	Humanetics	29-Apr-2021
	Y	EG2791	Humanetics	29-Apr-2021
	Z	EG2791	Humanetics	29-Apr-2021
Femoral Neck Force (N)	X	EB8706	Humanetics	29-Apr-2021
	Y	EB8706	Humanetics	29-Apr-2021
	Z	EB8706	Humanetics	29-Apr-2021
Outer Knee Force (N)	Y	EC0323	Humanetics	29-Apr-2021
Inner Knee Force (N)	Y	EC0323	Humanetics	29-Apr-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	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Middle	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Rear	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
Thorax Rib 1 RibEye (mm)	Front	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Middle	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Rear	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
Thorax Rib 2 RibEye (mm)	Front	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Middle	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Rear	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
Thorax Rib 3 RibEye (mm)	Front	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Middle	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Rear	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-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	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Middle	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Rear	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
Abdomen Rib 2 RibEye (mm)	Front	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Middle	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020
	Rear	X	161	Boxboro Systems	2-Nov-2020
		Y	161	Boxboro Systems	2-Nov-2020
		Z	161	Boxboro Systems	2-Nov-2020

TABLE 2 – DUMMY INSTRUMENTATION (WorldSID-05F with RibEye™)

		WorldSID-05F S/N DK1774		
		Serial Number	Manufacturer	Calibration Date
Head Accelerometers (g)	X	12346-3	Endevco	29-Apr-2021
	Y	12346-1	Endevco	29-Apr-2021
	Z	12346-2	Endevco	29-Apr-2021
Head Angular Rates Sensors (deg/sec)	X	ARS11034	DTS	29-Apr-2021
	Y	ARS14271	DTS	29-Apr-2021
	Z	ARS14273	DTS	29-Apr-2021
Upper Neck Force (N)	X	EB8759	Humanetics	29-Apr-2021
	Y	EB8759	Humanetics	29-Apr-2021
	Z	EB8759	Humanetics	29-Apr-2021
Upper Neck Moment (Nm)	X	EB8759	Humanetics	29-Apr-2021
	Y	EB8759	Humanetics	29-Apr-2021
	Z	EB8759	Humanetics	29-Apr-2021
Lower Neck Force (N)	X	DW9074	Humanetics	29-Apr-2021
	Y	DW9074	Humanetics	29-Apr-2021
	Z	DW9074	Humanetics	29-Apr-2021
Lower Neck Moment (Nm)	X	DW9074	Humanetics	29-Apr-2021
	Y	DW9074	Humanetics	29-Apr-2021
	Z	DW9074	Humanetics	29-Apr-2021
Shoulder Force (N)	X	DW9661	Humanetics	29-Apr-2021
	Y	DW9661	Humanetics	29-Apr-2021
	Z	DW9661	Humanetics	29-Apr-2021
Upper Spine Accelerometers (T1) (g)	X	12116-2	Endevco	29-Apr-2021
	Y	12116-1	Endevco	29-Apr-2021
	Z	12116-3	Endevco	29-Apr-2021
Middle Spine Accelerometers (T4) (g)	X	12075-3	Endevco	29-Apr-2021
	Y	12075-2	Endevco	29-Apr-2021
	Z	12075-1	Endevco	29-Apr-2021
Lower Spine Accelerometers (T12) (g)	X	12363-3	Endevco	29-Apr-2021
	Y	12363-2	Endevco	29-Apr-2021
	Z	12363-1	Endevco	29-Apr-2021
Pubic Symphysis Force (N)	Y	EF8492	Humanetics	29-Apr-2021
Sacro-Iliac Left Force (N)	X	EG1102	Humanetics	29-Apr-2021
	Y	EG1102	Humanetics	29-Apr-2021
	Z	EG1102	Humanetics	29-Apr-2021
Sacro-Iliac Left Moment (Nm)	X	EG1102	Humanetics	29-Apr-2021
	Y	EG1102	Humanetics	29-Apr-2021
	Z	EG1102	Humanetics	29-Apr-2021

TABLE 2 – DUMMY INSTRUMENTATION (WorldSID-05F with RibEye™) (CONTINUED)

		WorldSID-05F S/N DK1774		
		Serial Number	Manufacturer	Calibration Date
Sacro-Iliac Right Force (N)	X	EG1102	Humanetics	11-Sep-2020
	Y	EG1102	Humanetics	11-Sep-2020
	Z	EG1102	Humanetics	11-Sep-2020
Sacro-Iliac Right Moment (Nm)	X	EG1102	Humanetics	11-Sep-2020
	Y	EG1102	Humanetics	11-Sep-2020
	Z	EG1102	Humanetics	11-Sep-2020
Lumbar Force (N)	X	DW9492	Humanetics	29-Jul-2020
	Y	DW9492	Humanetics	29-Jul-2020
	Z	DW9492	Humanetics	29-Jul-2020
Lumbar Moment (Nm)	X	DW9492	Humanetics	29-Jul-2020
	Y	DW9492	Humanetics	29-Jul-2020
	Z	DW9492	Humanetics	29-Jul-2020
Pelvis Accelerometers (g)	X	12398-3	Endevco	28-Oct-2020
	Y	12398-2	Endevco	28-Oct-2020
	Z	12398-1	Endevco	28-Oct-2020
Left Femur Force (N)	X	DZ5708T	Humanetics	27-Oct-2020
	Y	DZ5708T	Humanetics	27-Oct-2020
	Z	DZ5708T	Humanetics	27-Oct-2020
Left Femur Moment (Nm)	X	DZ5708T	Humanetics	27-Oct-2020
	Y	DZ5708T	Humanetics	27-Oct-2020
	Z	DZ5708T	Humanetics	27-Oct-2020
Left Femoral Neck Force (N)	X	DK5906	Humanetics	13-Jul-2020
	Y	DK5906	Humanetics	13-Jul-2020
	Z	DK5906	Humanetics	13-Jul-2020
Left Outer Knee Force (N)	Y	EC4098	Humanetics	27-Oct-2020
Left Inner Knee Force (N)	Y	EG2793	Humanetics	27-Oct-2020

TABLE 2 – DUMMY INSTRUMENTATION (WorldSID-05F with RibEye™) (CONTINUED)

			WorldSID-05F S/N DK1774		
			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 2 – DUMMY INSTRUMENTATION (WorldSID-05F with RibEye™) (CONTINUED)

			WorldSID-05F S/N DK1774		
			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 3 – VEHICLE INSTRUMENTATION

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity (g)	X	P87064	Endevco	18-Mar-2021
	Y	P94559	Endevco	8-Jun-2020
	Z	P81617	Endevco	9-Jun-2020
Vehicle Center of Gravity Angular Rate (deg/sec)	X	ARS12511	DTS	11-Sep-2020
	Y	ARS8813	DTS	11-Sep-2020
	Z	ARS12500	DTS	11-Sep-2020
Right Side Sill At Front Seat (g)	X	P87077	Endevco	8-Jun-2020
	Y	P69075	Endevco	8-Jun-2020
	Z	P88565	Endevco	9-Jun-2020
Right Side Sill At Rear Seat (g)	X	T23797	Endevco	11-Mar-2021
	Y	T11802	Endevco	11-Mar-2021
	Z	T23837	Endevco	11-Mar-2021
Left Side Sill At Front Seat (g)	Y	P87031	Endevco	8-Jun-2020
Left Side Sill At Rear Seat (g)	Y	P91570	Endevco	8-Jun-2020
Left Lower A-Pillar (g)	Y	P88554	Endevco	9-Jun-2020
Left Middle A-Pillar (g)	Y	P45669	Endevco	9-Jun-2020
Left Lower B-Pillar (g)	Y	P54147	Endevco	8-Jun-2020
Left Middle B-Pillar (g)	Y	P72547	Endevco	8-Jun-2020
Front Seat Track (g)	Y	P61532	Endevco	8-Jun-2020
Rear Seat Structure (g)	Y	P87069	Endevco	8-Jun-2020
Right Rear Occupant Compartment (g)	Y	P50467	Endevco	8-Jun-2020
Engine Block (g)	X	P45643	Endevco	9-Jun-2020
	Y	P50400	Endevco	9-Jun-2020
Floorpan Above Rear Axle (g)	X	T11805	Endevco	11-Mar-2021
	Y	T23885	Endevco	11-Mar-2021
	Z	T16772	Endevco	11-Mar-2021
Rear Deck (g)	X	T11867	Endevco	11-Mar-2021
	Y	T11804	Endevco	11-Mar-2021
	Z	T11875	Endevco	11-Mar-2021
Rear Deck Angular Rate (deg/sec)	X	ARS9185	DTS	6-Jul-2020
	Y	ARS8290	DTS	6-Jul-2020
	Z	ARS8001	DTS	6-Jul-2020
Left Front Door Mid Centerline Acceleration (g)	Y	P87824	Endevco	9-Jun-2020
Left Front Door Mid Rear Acceleration (g)	Y	P88005	Endevco	9-Jun-2020
Left Front Door Upper Centerline (g)	Y	P88011	Endevco	9-Jun-2020

TABLE 4 – MDB INSTRUMENTATION

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity (g)	X	P58472	Endevco	8-Feb-2021
	Y	T11389	Endevco	11-Feb-2021
	Z	P33965	Endevco	11-Feb-2021
MDB Rear (g)	X	T23866	Endevco	15-Sep-2020
	Y	P87139	Endevco	4-Feb-2021

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

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
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
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

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
136	16HEAD0000WFACXP	Rear Passenger Head Acceleration (X)	1000	+	yes	2000
137	16HEAD0000WFACYP	Rear Passenger Head Acceleration (Y)	1000	+	yes	2000
138	16HEAD0000WFACZP	Rear Passenger Head Acceleration (Z)	1000	+	yes	2000
138A	16HEAD0000WFACRP	Rear Passenger Head Acceleration Resultant	1000			
139	16HEAD0000WFAVXP	Rear Passenger Head Angular Rate (X)	1000	+	yes	8000
140	16HEAD0000WFAVYP	Rear Passenger Head Angular Rate (Y)	1000	+	yes	8000
141	16HEAD0000WFAVZP	Rear Passenger Head Angular Rate (Z)	1000	+	yes	8000
142	16NECKUP00WFFOXP	Rear Passenger Upper Neck Force (X)	1000	+	yes	10000
143	16NECKUP00WFFOYP	Rear Passenger Upper Neck Force (Y)	1000	+	yes	10000
144	16NECKUP00WFFOZP	Rear Passenger Upper Neck Force (Z)	1000	+	yes	12000
145	16NECKUP00WFMOPX	Rear Passenger Upper Neck Moment (X)	600	+	yes	300
146	16NECKUP00WFMOPY	Rear Passenger Upper Neck Moment (Y)	600	+	yes	300
147	16NECKUP00WFMOPZ	Rear Passenger Upper Neck Moment (Z)	600	+	yes	200
148	16NECKLO00WFFOXP	Rear Passenger Lower Neck Force (X)	1000	+	yes	10000
149	16NECKLO00WFFOYP	Rear Passenger Lower Neck Force (Y)	1000	+	yes	10000
150	16NECKLO00WFFOZP	Rear Passenger Lower Neck Force (Z)	1000	+	yes	12000
151	16NECKLO00WFMOPX	Rear Passenger Lower Neck Moment (X)	600	+	yes	300
152	16NECKLO00WFMOPY	Rear Passenger Lower Neck Moment (Y)	600	+	yes	300
153	16NECKLO00WFMOPZ	Rear Passenger Lower Neck Moment (Z)	600	+	yes	200
154	16SHLDRI00WFFOXP	Rear Passenger Shoulder Force (X)	600	+	yes	4500
155	16SHLDRI00WFFOYP	Rear Passenger Shoulder Force (Y)	600	+	yes	4500
156	16SHLDRI00WFFOZP	Rear Passenger Shoulder Force (Z)	600	+	yes	6000
157	16SHRIRIREWFDSX0	Rear Passenger Shoulder Rear Displacement (X)	0	+	no	60
158	16SHRIRIREWFDSY0	Rear Passenger Shoulder Rear Displacement (Y)	0	+	no	60
159	16SHRIRIREWFDSZ0	Rear Passenger Shoulder Rear Displacement (Z)	0	+	no	60
160	16SHRIRIREWFDSL0	Rear Passenger Shoulder Rear Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
161	16SHRIRIMIWFDSX0	Rear Passenger Shoulder Middle Displacement (X)	0	+	no	60
162	16SHRIRIMIWFDSY0	Rear Passenger Shoulder Middle Displacement (Y)	0	+	no	60
163	16SHRIRIMIWFDSZ0	Rear Passenger Shoulder Middle Displacement (Z)	0	+	no	60
164	16SHRIRIMIWFDSL B	Rear Passenger Shoulder Middle Length Change	600	+	no	60
165	16SHRIRIFRWFD SX0	Rear Passenger Shoulder Front Displacement (X)	0	+	no	60
166	16SHRIRIFRWFD SY0	Rear Passenger Shoulder Front Displacement (Y)	0	+	no	60
167	16SHRIRIFRWFD SZ0	Rear Passenger Shoulder Front Displacement (Z)	0	+	no	60
168	16SHRIRIFRWFD SLB	Rear Passenger Shoulder Front Length Change	600	+	no	60
169	16TRRIRUREWFD SX0	Rear Passenger Thorax Rib 1 Rear Displacement (X)	0	+	no	60
170	16TRRIRUREWFD SY0	Rear Passenger Thorax Rib 1 Rear Displacement (Y)	0	+	no	60
171	16TRRIRUREWFD SZ0	Rear Passenger Thorax Rib 1 Rear Displacement (Z)	0	+	no	60
172	16TRRIRUREWFD SLB	Rear Passenger Thorax Rib 1 Rear Length Change	600	+	no	60
173	16TRRIRUMIWFDS X0	Rear Passenger Thorax Rib 1 Middle Displacement (X)	0	+	no	60
174	16TRRIRUMIWFDS Y0	Rear Passenger Thorax Rib 1 Middle Displacement (Y)	0	+	no	60
175	16TRRIRUMIWFDS Z0	Rear Passenger Thorax Rib 1 Middle Displacement (Z)	0	+	no	60
176	16TRRIRUMIWFDSL B	Rear Passenger Thorax Rib 1 Middle Length Change	600	+	no	60
177	16TRRIRUFRWFD SX0	Rear Passenger Thorax Rib 1 Front Displacement (X)	0	+	no	60
178	16TRRIRUFRWFD SY0	Rear Passenger Thorax Rib 1 Front Displacement (Y)	0	+	no	60
179	16TRRIRUFRWFD SZ0	Rear Passenger Thorax Rib 1 Front Displacement (Z)	0	+	no	60
180	16TRRIRUFRWFD SLB	Rear Passenger Thorax Rib 1 Front Length Change	600	+	no	60
181	16TRRIRMREWFD SX0	Rear Passenger Thorax Rib 2 Rear Displacement (X)	0	+	no	60
182	16TRRIRMREWFD SY0	Rear Passenger Thorax Rib 2 Rear Displacement (Y)	0	+	no	60
183	16TRRIRMREWFD SZ0	Rear Passenger Thorax Rib 2 Rear Displacement (Z)	0	+	no	60
184	16TRRIRMREWFD SLB	Rear Passenger Thorax Rib 2 Rear Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
185	16TRRIRMMIWFD SX0	Rear Passenger Thorax Rib 2 Middle Displacement (X)	0	+	no	60
186	16TRRIRMMIWFD SY0	Rear Passenger Thorax Rib 2 Middle Displacement (Y)	0	+	no	60
187	16TRRIRMMIWFD SZ0	Rear Passenger Thorax Rib 2 Middle Displacement (Z)	0	+	no	60
188	16TRRIRMMIWFD SLB	Rear Passenger Thorax Rib 2 Middle Length Change	600	+	no	60
189	16TRRIRMFRWFD SX0	Rear Passenger Thorax Rib 2 Front Displacement (X)	0	+	no	60
190	16TRRIRMFRWFD SY0	Rear Passenger Thorax Rib 2 Front Displacement (Y)	0	+	no	60
191	16TRRIRMFRWFD SZ0	Rear Passenger Thorax Rib 2 Front Displacement (Z)	0	+	no	60
192	16TRRIRMFRWFD SLB	Rear Passenger Thorax Rib 2 Front Length Change	600	+	no	60
193	16TRRIRLREWFD SX0	Rear Passenger Thorax Rib 3 Rear Displacement (X)	0	+	no	60
194	16TRRIRLREWFD SY0	Rear Passenger Thorax Rib 3 Rear Displacement (Y)	0	+	no	60
195	16TRRIRLREWFD SZ0	Rear Passenger Thorax Rib 3 Rear Displacement (Z)	0	+	no	60
196	16TRRIRLREWFD SLB	Rear Passenger Thorax Rib 3 Rear Length Change	600	+	no	60
197	16TRRIRLMIWFD SX0	Rear Passenger Thorax Rib 3 Middle Displacement (X)	0	+	no	60
198	16TRRIRLMIWFD SY0	Rear Passenger Thorax Rib 3 Middle Displacement (Y)	0	+	no	60
199	16TRRIRLMIWFD SZ0	Rear Passenger Thorax Rib 3 Middle Displacement (Z)	0	+	no	60
200	16TRRIRLMIWFD SLB	Rear Passenger Thorax Rib 3 Middle Length Change	600	+	no	60
201	16TRRIRLFRWFD SX0	Rear Passenger Thorax Rib 3 Front Displacement (X)	0	+	no	60
202	16TRRIRLFRWFD SY0	Rear Passenger Thorax Rib 3 Front Displacement (Y)	0	+	no	60
203	16TRRIRLFRWFD SZ0	Rear Passenger Thorax Rib 3 Front Displacement (Z)	0	+	no	60
204	16TRRIRLFRWFD SLB	Rear Passenger Thorax Rib 3 Front Length Change	600	+	no	60
205	16ABRIRUREWFD SX0	Rear Passenger Abdomen Rib 1 Rear Displacement (X)	0	+	no	60
206	16ABRIRUREWFD SY0	Rear Passenger Abdomen Rib 1 Rear Displacement (Y)	0	+	no	60
207	16ABRIRUREWFD SZ0	Rear Passenger Abdomen Rib 1 Rear Displacement (Z)	0	+	no	60
208	16ABRIRUREWFD SLB	Rear Passenger Abdomen Rib 1 Rear Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
209	16ABRIRUMIWFDSX0	Rear Passenger Abdomen Rib 1 Middle Displacement (X)	0	+	no	60
210	16ABRIRUMIWFDSY0	Rear Passenger Abdomen Rib 1 Middle Displacement (Y)	0	+	no	60
211	16ABRIRUMIWFDSZ0	Rear Passenger Abdomen Rib 1 Middle Displacement (Z)	0	+	no	60
212	16ABRIRUMIWFDSL B	Rear Passenger Abdomen Rib 1 Middle Length Change	600	+	no	60
213	16ABRIRUFRWFDSX0	Rear Passenger Abdomen Rib 1 Front Displacement (X)	0	+	no	60
214	16ABRIRUFRWFDSY0	Rear Passenger Abdomen Rib 1 Front Displacement (Y)	0	+	no	60
215	16ABRIRUFRWFDSZ0	Rear Passenger Abdomen Rib 1 Front Displacement (Z)	0	+	no	60
216	16ABRIRUFRWFDSL B	Rear Passenger Abdomen Rib 1 Front Length Change	600	+	no	60
217	16ABRIRLREWFDSX0	Rear Passenger Abdomen Rib 2 Rear Displacement (X)	0	+	no	60
218	16ABRIRLREWFDSY0	Rear Passenger Abdomen Rib 2 Rear Displacement (Y)	0	+	no	60
219	16ABRIRLREWFDSZ0	Rear Passenger Abdomen Rib 2 Rear Displacement (Z)	0	+	no	60
220	16ABRIRLREWFDSL B	Rear Passenger Abdomen Rib 2 Rear Length Change	600	+	no	60
221	16ABRIRLMIWFDSX0	Rear Passenger Abdomen Rib 2 Middle Displacement (X)	0	+	no	60
222	16ABRIRLMIWFDSY0	Rear Passenger Abdomen Rib 2 Middle Displacement (Y)	0	+	no	60
223	16ABRIRLMIWFDSZ0	Rear Passenger Abdomen Rib 2 Middle Displacement (Z)	0	+	no	60
224	16ABRIRLMIWFDSL B	Rear Passenger Abdomen Rib 2 Middle Length Change	600	+	no	60
225	16ABRIRLFRWFDSX0	Rear Passenger Abdomen Rib 2 Front Displacement (X)	0	+	no	60
226	16ABRIRLFRWFDSY0	Rear Passenger Abdomen Rib 2 Front Displacement (Y)	0	+	no	60
227	16ABRIRLFRWFDSZ0	Rear Passenger Abdomen Rib 2 Front Displacement (Z)	0	+	no	60
228	16ABRIRLFRWFDSL B	Rear Passenger Abdomen Rib 2 Front Length Change	600	+	no	60
229	16THSP0100WFACXP	Rear Passenger Spine T1 Acceleration (X)	180	+	yes	2000
230	16THSP0100WFACYP	Rear Passenger Spine T1 Acceleration (Y)	180	+	yes	2000
231	16THSP0100WFACZP	Rear Passenger Spine T1 Acceleration (Z)	180	+	yes	2000
231A	16THSP0100WFACRP	Rear Passenger Spine T1 Acceleration Resultant	180			

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
232	16THSP0400WFACXP	Rear Passenger Spine T4 Acceleration (X)	180	+	yes	2000
233	16THSP0400WFACYP	Rear Passenger Spine T4 Acceleration (Y)	180	+	yes	2000
234	16THSP0400WFACZP	Rear Passenger Spine T4 Acceleration (Z)	180	+	yes	2000
234A	16THSP0400WFACRP	Rear Passenger Spine T4 Acceleration Resultant	180			
235	16THSP1200WFACXP	Rear Passenger Spine T12 Acceleration (X)	180	+	yes	2000
236	16THSP1200WFACYP	Rear Passenger Spine T12 Acceleration (Y)	180	+	yes	2000
237	16THSP1200WFACZP	Rear Passenger Spine T12 Acceleration (Z)	180	+	yes	2000
237A	16THSP1200WFACRP	Rear Passenger Spine T12 Acceleration Resultant	180			
238	16PUBC0000WFFOYP	Rear Passenger Pubic Symphysis Force (Y)	600	+	yes	12000
239	16SACRLE00WFFOXP	Rear Passenger Sacro-iliac Left Force (X)	600	+	yes	200
240	16SACRLE00WFFOYP	Rear Passenger Sacro-iliac Left Force (Y)	600	+	yes	10000
241	16SACRLE00WFFOZP	Rear Passenger Sacro-iliac Left Force (Z)	600	+	yes	5000
242	16SACRLE00WFMOXP	Rear Passenger Sacro-iliac Left Moment (X)	600	+	yes	600
243	16SACRLE00WFMOYP	Rear Passenger Sacro-iliac Left Moment (Y)	600	+	yes	275
244	16SACRLE00WFMOZP	Rear Passenger Sacro-iliac Left Moment (Z)	600	+	yes	300
245	16SACRRI00WFFOXP	Rear Passenger Sacro-iliac Right Force (X)	600	+	yes	5000
246	16SACRRI00WFFOYP	Rear Passenger Sacro-iliac Right Force (Y)	600	+	yes	10000
247	16SACRRI00WFFOZP	Rear Passenger Sacro-iliac Right Force (Z)	600	+	yes	5000
248	16SACRRI00WFMOXP	Rear Passenger Sacro-iliac Right Moment (X)	600	+	yes	600
249	16SACRRI00WFMOYP	Rear Passenger Sacro-iliac Right Moment (Y)	600	+	yes	275
250	16SACRRI00WFMOZP	Rear Passenger Sacro-iliac Right Moment (Z)	600	+	yes	300
251	16LUSP0000WFFOXP	Rear Passenger Lumbar Force (X)	600	+	yes	10000
252	16LUSP0000WFFOYP	Rear Passenger Lumbar Force (Y)	600	+	yes	10000
253	16LUSP0000WFFOZP	Rear Passenger Lumbar Force (Z)	600	+	yes	12000
254	16LUSP0000WFMOXP	Rear Passenger Lumbar Moment (X)	600	+	yes	220
255	16LUSP0000WFMOYP	Rear Passenger Lumbar Moment (Y)	600	+	yes	220
256	16LUSP0000WFMOZP	Rear Passenger Lumbar Moment (Z)	600	+	yes	125

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
257	16PELV0000WFACXP	Rear Passenger Pelvic Acceleration (X)	1000	+	yes	2000
258	16PELV0000WFACYP	Rear Passenger Pelvic Acceleration (Y)	1000	+	yes	2000
259	16PELV0000WFACZP	Rear Passenger Pelvic Acceleration (Z)	1000	+	yes	2000
259A	16PELV0000WFACRP	Rear Passenger Pelvic Acceleration Resultant	1000			
260	16FEMRRI00WFFOXP	Rear Passenger Right Femur Force (X)	600	+	yes	15000
261	16FEMRRI00WFFOYP	Rear Passenger Right Femur Force (Y)	600	+	yes	15000
262	16FEMRRI00WFFOZP	Rear Passenger Right Femur Force (Z)	600	+	yes	15000
263	16FEMRRI00WFMOXP	Rear Passenger Right Femur Moment (X)	600	+	yes	300
264	16FEMRRI00WFMOYP	Rear Passenger Right Femur Moment (Y)	600	+	yes	350
265	16FEMRRI00WFMOZP	Rear Passenger Right Femur Moment (Z)	600	+	yes	350
266	16FEACRI00WFFOXP	Rear Passenger Femoral Neck Force (X)	600	+	yes	10000
267	16FEACRI00WFFOYP	Rear Passenger Femoral Neck Force (Y)	600	+	yes	25000
268	16FEACRI00WFFOZP	Rear Passenger Femoral Neck Force (Z)	600	+	yes	10000
269	16KNEERIOUWFFOYP	Rear Passenger Right Outer Knee Force (Y)	600	+	yes	20000
270	16KNEERIINWFFOYP	Rear Passenger Right Inner Knee Force (Y)	600	+	yes	20000
271	12VEHCCG0000ACXA	VEHICLE CG AX	60	+	yes	2000
272	12VEHCCG0000ACYA	VEHICLE CG AY	60	+	yes	2000
273	12VEHCCG0000ACZA	VEHICLE CG AZ	60	+	yes	2000
273A	12VEHCCG0000ACRA	VEHICLE CG A RESULTANT	60			
274	12VEHCCG0000AVXA	VEHICLE CG ARS X	60	+	yes	8000
275	12VEHCCG0000AVYA	VEHICLE CG ARS Y	60	+	yes	8000
276	12VEHCCG0000AVZA	VEHICLE CG ARS Z	60	+	yes	8000
277	11SILBRIFR00ACXA	LEFT SIDE SILL AT FRONT SEAT AX	60	+	yes	2000
278	11SILBRIFR00ACYA	LEFT SIDE SILL AT FRONT SEAT AY	60	+	yes	2000
279	11SILBRIFR00ACZA	LEFT SIDE SILL AT FRONT SEAT AZ	60	+	yes	2000
279A	11SILBRIFR00ACRA	LEFT SIDE SILL AT FRONT SEAT A RESULTANT	60			

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
280	14SILBRIRE00ACXA	LEFT SIDE SILL AT REAR SEAT AX	60	+	yes	2000
281	14SILBRIRE00ACYA	LEFT SIDE SILL AT REAR SEAT AY	60	+	yes	2000
282	14SILBRIRE00ACZA	LEFT SIDE SILL AT REAR SEAT AZ	60	+	yes	2000
282A	14SILBRIRE00ACRA	LEFT SIDE SILL AT REAR SEAT A RESULTANT	60			
283	13SILBLEFR00ACYA	RIGHT SIDE SILL AT FRONT SEAT AY	60	+	yes	2000
284	16SILBLERE00ACYA	RIGHT SIDE SILL AT REAR SEAT AY	60	+	yes	2000
285	13APILLO0000ACYA	RIGHT LOWER A-PILLAR AY	60	+	yes	2000
286	13APILMI0000ACYA	RIGHT MIDDLE A-PILLAR AY	60	+	yes	2000
287	13BPILLO0000ACYA	RIGHT LOWER B-PILLAR AY	60	+	yes	2000
288	13BPILMI0000ACYA	RIGHT MIDDLE B-PILLAR AY	60	+	yes	2000
289	13SETR000000ACYA	FRONT SEAT TRACK AY	60	+	yes	2000
290	16SETRLERE00ACYA	RIGHT REAR SEAT STRUCTURE AY	60	+	yes	2000
291	14OCCRIRE000ACYA	LEFT REAR OCCUPANT COMPARTMENT AY	60	+	yes	2000
292	12ENGNT00000ACXA	ENGINE BLOCK AX	60	+	yes	2000
293	12ENGNT00000ACYA	ENGINE BLOCK AY	60	+	yes	2000
294	15FORA000000ACXA	FLOORPAN ABOVE REAR AXLE AX	60	+	yes	2000
295	15FORA000000ACYA	FLOORPAN ABOVE REAR AXLE AY	60	+	yes	2000
296	15FORA000000ACZA	FLOORPAN ABOVE REAR AXLE AZ	60	+	yes	2000
296A	15FORA000000ACRA	FLOORPAN ABOVE REAR AXLE A RESULTANT	60			
297	10FORARD0000ACXA	REAR DECK AX	60	+	yes	2000
298	10FORARD0000ACYA	REAR DECK AY	60	+	yes	2000
299	10FORARD0000ACZA	REAR DECK AZ	60	+	yes	2000
299A	10FORARD0000ACRA	REAR DECK A RESULTANT	60			
300	10FORARD0000AVXA	REAR DECK ARS X	60	+	yes	8000
301	10FORARD0000AVYA	REAR DECK ARS Y	60	+	yes	8000
302	10FORARD0000AVZA	REAR DECK ARS Z	60	+	yes	8000
303	13DOORMIMI71ACYA	Right Front Door Mid Centerline (Y)	60	+	yes	2000
304	13DOORMIRE71ACYA	Right Front Door Mid Rear (Y)	60	+	yes	2000
305	13DOORMIUP71ACYA	Right Front Door Upper Centerline (Y)	60	+	yes	2000
306	13HEADCONT00VO00	Head Contact	0	+	no	1
307	13SHOUCONT00VO00	Shoulder Contact	0	+	no	1
308	13THORCONT00VO00	Thorax Contact	0	+	no	1
309	13PELVCONT00VO00	Pelvis Contact	0	+	no	1
310	16HEADCONT00VO00	Head Contact	0	+	no	1
311	16SHOUCONT00VO00	Shoulder Contact	0	+	no	1
312	16THORCONT00VO00	Thorax Contact	0	+	no	1
313	16PELVCONT00VO00	Pelvis Contact	0	+	no	1

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
314	M0MBARCG0000ACXA	MDB CG AX	60	+	yes	2000
315	M0MBARCG0000ACYA	MDB CG AY	60	+	yes	2000
316	M0MBARCG0000ACZA	MDB CG AZ	60	+	yes	2000
316A	M0MBARCG0000ACRA	MDB CG A RESULTANT	60	+	yes	
317	M0FRAMRE0000ACXA	MDB REAR AX	60	+	yes	2000
318	M0FRAMRE0000ACYA	MDB REAR AY	60	+	yes	2000
319	M0MBARLE0000VO00	LEFT MDB CONTACT	0	+	no	1
320	M0MBARRI0000VO00	RIGHT MDB CONTACT	0	+	no	1

APPENDIX E
SEATING PROCEDURE WORKSHEETS AND PLOTS

Passenger WSID 50th Seating Worksheet

Vehicle	2020 Mini Cooper	Technician	K. Brown
VIN #	WMWWJ5C02L3L34787	Position	Right Front
ATD	WorldSID 50th EA7820	Date	4/29/2021
SEATING #			

SCRL Angle	Max	25.8	WSID 50th Tilt Sensors		X	Y
	Min -	20.8	Head	0°±2	-1.0	0.6
	Difference	5				
	/2	2.5	T6	0°±2	-0.7	1.7
	Min +	2.5				
	Mid Angle	23.3	Pelvis	0°±2	-0.1	-0.2

Seat Back Angle	W/Level °	23.9	HEAD REST		FINAL HEAD REST	
Seat Pan Angle	W/Level °	7.3	POST ANGLE	N/A	POST ANGLE	8.1

Pelvis Angle	WSID 50th 0° +/-2.5°	Manual Inclinometer	44
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Collected Points			
Name	Meas X	Meas Y	Meas Z
SBU -	-32.519	1.775	-19.781
SBL -	-32.252	3.047	20.245
STRIKER -	0.000	0.000	0.000
FOSB -	607.987	-156.238	408.627
FISB -	608.926	-571.395	411.248
ROSB -	242.919	-155.940	432.488
RISB -	243.266	-571.946	435.392
OSCAR H-POINT -	316.702	-195.191	212.854
PASS PROJECTED WSID H-POINT AT MID-POSITION -	337.000		193.000
PASS STP 11.27 MID-POSITION -	336.707	-141.788	260.789
PASS STP STEP 14.6 TRIAL 1 -	336.733	-140.837	260.583
PASS PROJECTED WSID H-POINT STEP 14.6.2 TRIAL 1 -	337.000		193.000
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-	148.761	-307.263	-468.822
3DLHCG-	168.814	-309.789	-468.490
LHDCG -	143.038	-466.778	-466.293
BON -	241.361	-391.024	-462.970
TN -	239.584	-388.667	-408.375
TC -	224.897	-387.014	-341.091
SHLD R1 -	203.731	-384.619	-242.024
THX R1 -	242.064	-387.841	-166.080
THX R2 -	279.290	-387.598	-104.928
THX R3 -	300.530	-388.678	-55.765
ABD R1 -	321.587	-389.409	-3.877
ABD R2 -	342.058	-392.693	44.451
TPS -	377.105	-388.450	70.907
C1 -	214.014	-386.612	-214.897
SHT -	131.991	-166.245	-194.311
E1 -	326.275	-147.188	-76.911
P1 -	281.034	-146.113	147.034
H-POINT -	333.616	-145.419	196.585
H-POINT 2 -	332.883	-173.046	206.337

OK -	750.963	-215.471	112.198
IK -	747.543	-564.727	112.457
OA -	1090.859	-283.919	341.949
IA -	1090.070	-458.907	344.144
OH -	1116.750	-307.170	465.771
IH -	1112.407	-500.441	468.556
OP -	-78.398	-311.247	-312.261
R -	242.134	-390.049	-687.453
H -	901.401	-390.871	-582.143
W1 -	1065.247	-392.117	-463.847
W1 Outside -	1077.371	-391.885	-464.016
W2 Outside -	1258.905	-392.516	-313.735
D1 -	N/A	N/A	N/A
D2 -	926.663	-224.534	26.507
D3 -	905.167	-533.013	35.913
HRP -	241.233	-211.002	-647.727
HSP -	240.627	-81.976	-463.144
ADP -	327.064	-28.683	-77.566
HDP -	332.920	-68.334	198.061

Calculated Measurements					
Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			224		
HH -				671	
HW -	824				
CD -				Missing D1	
IKD -				178	
OKD -				196	
HR -				258	
HS -		309			
AD -		119			
HD -		77			
HLHL -				193	
KK -				349	
SH -				414	
HRA -					8.1
H-POINT TOOL ANGLE -					43.3
TORSO ANGLE -					13.9
WINDSHIELD ANGLE -					50.4

Rear Passenger WSID 5th Seating Worksheet

Vehicle	2020 Mini Cooper	Technician	K. Brown
VIN #	WMWWJ5C02L3L34787	Position	Right Rear
ATD	WorldSID 5th DK1774	Date	
SEATING #			

Seat Back Angle	W/Level °	11.7	HEAD REST		FINAL HEAD REST	
Seat Pan Angle	W/Level °	21	POST ANGLE	N/A	POST ANGLE	8

Pelvis Angle	Manual Inclinometer	47.1
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Collected Points			
Name	Meas X	Meas Y	Meas Z
SBU -	N/A	N/A	N/A
SBL -	N/A	N/A	N/A
STRIKER -	-0.012	82.824	326.225
FOSB -			
FISB -			
ROSB -			
RISB -			
RHP -			
LHP -			
OSCAR H-POINT -			
LHDCG -	-510.918	-528.836	-422.113
BON -	-422.638	-455.496	-433.083
TN -	-421.182	-452.929	-387.950
TC -	-431.174	-453.607	-309.307
C1 -	-461.879	-454.561	-186.098
SHT -	-567.786	-255.141	-188.913
E1 -	-399.651	-209.894	-90.938
P1 -	-443.656	-229.818	122.822
H-POINT -	-398.066	-240.616	176.846
H-POINT 2 -	-396.778	-265.060	173.580
OK -	-56.800	-293.520	49.154
IK -	-42.224	-603.721	65.852
OA -	95.016	-306.737	366.464
IA -	84.986	-480.342	372.879
OH -	6.385	-326.316	458.200
IH -	7.476	-500.085	449.977
OP -	-692.320	-376.022	-377.892
R -	-423.898	-456.027	-722.407
SB -	-92.893	-455.412	-315.938
KBL -	23.112	-590.653	47.633
KBR -	33.864	-279.664	43.625
HRP -	-422.319	-272.637	-679.436
HSP -	-423.801	-185.926	-434.043
ADP -	-399.135	-191.639	-92.218
HDP -	-398.547	-215.592	177.524

WS05F Tilt Sensors	X	Y
Head	0.3	-1.6
T6	0.8	14.5
Pelvis	0.7	20.1

Calculated Measurements					
Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			289		
NB -				336	
CB -				391	
IKB -				334	
OKB -				308	
HR -				307	
HS -		270			
AD -		18			
HD -		25			
HLHL -				174	
KK -				311	
SH -				727	
HRA -					8.0
H-POINT TOOL ANGLE -					49.8
TORSO ANGLE -					69.4
SEATBACK ANGLE -					17.7