RESEARCH FMVSS 214
MOVING DEFORMABLE BARRIER SIDE IMPACT

HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC
2020 Hyundai Santa Fe

PREPARED BY:
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Report Date: October 27, 2021

FINAL REPORT

PREPARED FOR:
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TRC TEST NUMBER: 210128

Project Manager, John Shultz

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Project Engineer
Vehicle Research & Test Center

Technical Report Documentation Page

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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 Hyundai Santa Fe 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 January 28, 2021.

The impact velocity of the Moving Deformable Barrier (MDB) was 52.96 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.3°C. The target vehicle post test maximum crush was 193 mm at level 3. The test vehicle's performance was as follows:

	Driver ATD (WorldSID-50M)	
Measurement Description	**Units**	**Result**
Head Injury Criterion (HIC15)	N/A	27.79
Brain Injury Criterion (BrIC)	N/A	0.38
Peak Shoulder Force	N	-903.22
Peak Thoracic Rib Deflection	mm	14.76
Peak Abdominal Rib Deflection	mm	14.66
Pubic Symphysis Force	N	-786.60
Peak Resultant Sacro-Iliac Force	N	1720.19

	Passenger ATD (WorldSID-5F)	
Measurement Description	**Units**	**Result**
Head Injury Criterion (HIC15)	N/A	106.39
Brain Injury Criterion (BrIC)	N/A	0.63
Peak Shoulder Force	N	1567.46
Peak Thoracic Rib Deflection	mm	7.10
Peak Abdominal Rib Deflection	mm	24.07
Pubic Symphysis Force	N	-1102.18
Peak Resultant Sacro-Iliac Force	N	1749.21

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Side Impact MDB WorldSID-50M WorldSID-05F	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590

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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE AND TEST PROCEDURE

This 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."

SECTION 2

SUMMARY OF TEST RESULTS

A 2020 Hyundai Santa Fe was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 52.96 km/h (32.91 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on January 28, 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 driver and left 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.ntl.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:

DRIVER 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

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:

	Driver ATD (WorldSID-50M)	
Measurement Description	**Units**	**Result**
Head Injury Criterion (HIC15)	N/A	27.79
Brain Injury Criterion (BrIC)	N/A	0.38
Peak Shoulder Force	N	-903.22
Peak Thoracic Rib Deflection	mm	14.76
Peak Abdominal Rib Deflection	mm	14.66
Pubic Symphysis Force	N	-786.60
Peak Resultant Sacro-Iliac Force	N	1720.19

	Passenger ATD (WorldSID-05F)	
Measurement Description	**Units**	**Result**
Head Injury Criterion (HIC15)	N/A	106.39
Brain Injury Criterion (BrIC)	N/A	0.63
Peak Shoulder Force	N	1567.46
Peak Thoracic Rib Deflection	mm	7.10
Peak Abdominal Rib Deflection	mm	24.07
Pubic Symphysis Force	N	-1102.18
Peak Resultant Sacro-Iliac Force	N	1749.21

Supplemental restraint information is given below:

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

LEFT REAR SEAT STRUCTURE AY; CF after 7.0 MS

Left Front Door Mid Centerline (Y); CF after 31.0 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*

Driver Thorax Rib 1 Mid Led Position; Error Code 7 at 37.9-42.3 ms, Error Code 7 at 52.6-60 ms, Error Code 7 60.2-65.0 ms and Error Code 7 87.9-89.4 ms

Passenger Thorax Rib 3 Rear Led Position; Error Code 2 at 58.1-81.1 ms

Passenger Thorax Rib 3 Mid Led Position; Error Code 2 at 53.3-82.5 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

TEST VEHICLE INFORMATION AND OPTIONS

Model Year	2020
Make	Hyundai
Model	Santa Fe
Body Style	MPV
VIN	5NMS23AD5LH261120
Body Color	Rainforest
Odometer Reading (km/mi)	53 mi
Engine Displacement (L)	2.4
Type/No. Cylinders	Straight/4
Engine Placement	Front/Transverse
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC
Date of Manufacturer	Aug/04/20
Vehicle Type	MPV

GVWR (lbs)	4872
GAWR Front (lbs)	2866
GAWR Rear (lbs)	3075

VEHICLE SEATING AND WEIGHT CAPACITY DATA

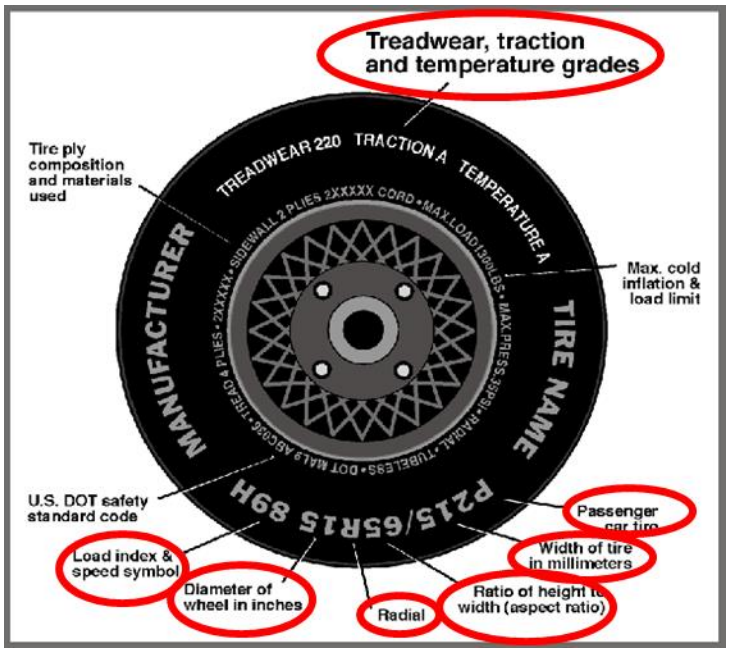
	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Vehicle Capacity Weight (VCW) (kg)				480.0
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				139.8

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	N/A	N/A	Yes	Yes	N/A	Yes	N/A
Third row seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	235/65R17	235/65R17
Tire Size on Vehicle	235/65R17	235/65R17
Tire Manufacturer	Hankook	Hankook
Tire Model	DynaPro HP2	DynaPro HP2
Treadwear	540	540
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	104H	104H
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	15M8R RT H0 0220	15M8R RT H0 0220
DOT Safety Code Right	15M8R RT H0 0220	15M8R RT H0 0220

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

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	221	221	221	228
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	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	478.4	354.4		515.2	478.8		525.8	477.8	
Right	kg	467.6	331.4		453.2	438.4		468.0	420.4	
Ratio	%	58.0	42.0		51.4	48.6		52.5	47.5	
Totals	kg	946.0	685.8	1631.8	968.4	917.2	1885.6	993.8	898.2	1892.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1631.8	(A)
Weight of 1 WorldSID (75kg) & 1 SID-IIs (49kg) ATD	kg	124.2	(B)
Rated Cargo/Luggage Weight (RCLW) [1]	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1892.0	(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)? X YES □ NO

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	858	862	Yes
RF	mm	873	879	Yes
RR	mm	890	884	Yes
LR	mm	884	880	Yes
Vehicle CG (Aft of Front Axle)	mm	1315	1347	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+50	+45	

***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".

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

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

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in the cargo area	54.6
Components removed: None	0.0

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

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	14.4	11.7	13.0
Front Passenger Seat	N/A	N/A	15.5
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	16.1	15.5	15.0
Non-Struck Side Rear Seat	15.2	14.6	14.1
Rear Center Seat*	15.4	15.0	14.6

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forward-Most
Driver Seat	13.0	205	Max	234	239	245
			Mid	200	205	210
			Min	189	194	200
Front Passenger Seat	15.5	289	Max	N/A	N/A	N/A
			Mid	285	289	294
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	16.1	275	Max	N/A	N/A	N/A
			Mid	280	277	275
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	15.2	280	Max	N/A	N/A	N/A
			Mid	285	283	280
			Min	N/A	N/A	N/A
Rear Center Seat*	15.4	312	Max	N/A	N/A	N/A
			Mid	318	315	312
			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 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	38	122	19
Front Passenger Seat	240	38	122	19
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

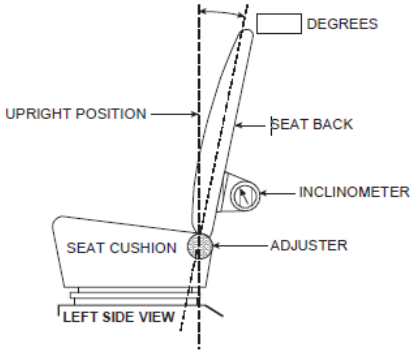
* If applicable.

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 is positioned according to the manufacturer's information as provided on Form 1; resulting in a head rest post angle of 2.6° 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 was adjusted to most upright position. 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 w/ Seated Dummy	65.1	33	2.6	10
Front Passenger Seat	65.7	33	2.4	10
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	22.0	12	5.2	0
Non-Struck Side Rear Seat	21.7	12	5.1	0
Rear Center Seat*	22.0	12	5.1	0

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4	4
Rear Seat	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 #
Driver Seat	7	7; Uppermost
Rear Seat	4	1; Lowermost

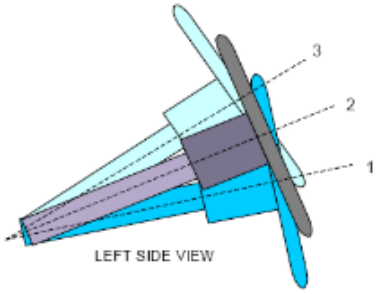
DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

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	23.6	0
Geometric Center, Position No. 2	26.6	22
Uppermost, Position No. 3	29.5	44
Telescoping Steering Wheel Travel		44
Test Position	26.6	22

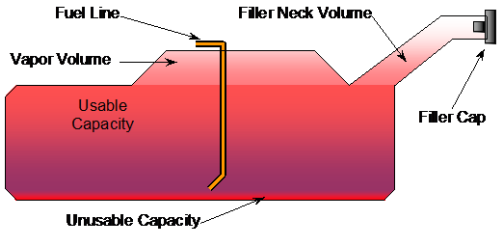


STEERING COLUMN ASSEMBLY

FUEL PUMP

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

Key is "ON" position



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	71.0
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	71.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	66.0
Actual Amount of Solvent Used in Test	66.0
1/3 of Usable Capacity	23.7

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 DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	5.21	201.05	-8.10	43.10
	Y	21.10	51.30	-4.08	100.85
	Z	8.45	67.95	-9.17	37.00
	R	22.22	47.10		
Head Angular Rate (deg/sec)	X	884.74	65.10	-508.83	140.20
	Y	292.85	169.00	-159.37	235.95
	Z	299.11	219.55	-686.97	56.40
Upper Neck Force (N)	X	135.89	84.15	-122.12	36.55
	Y	61.85	204.10	-477.99	75.40
	Z	413.25	36.35	-364.80	67.70
Upper Neck Moment (Nm)	X	6.49	181.35	-16.20	90.75
	Y	8.40	87.25	-11.51	36.75
	Z	7.37	65.15	-6.28	236.20
Lower Neck Force (N)	X	133.62	89.35	-116.78	38.70
	Y	173.65	26.40	-189.06	79.30
	Z	511.70	36.20	-520.42	67.60
Lower Neck Moment (Nm)	X	11.86	195.35	-64.81	79.30
	Y	8.00	37.90	-13.69	200.60
	Z	8.10	66.60	-6.49	236.20
Driver Shoulder Force (N)	X	56.64	21.95	-300.85	57.25
	Y	173.83	113.10	-903.22	23.45
	Z	166.39	67.75	-139.92	112.55
Shoulder Rear Ribeye Position (mm)	X	-44.50	66.75	-63.23	29.10
	Y	-76.77	24.90	-86.21	84.80
	Z	-42.79	111.00	-60.96	70.20
Length of Change (mm)		4.37	64.90	-2.18	189.15
Shoulder Middle Ribeye Position (mm)	X	-9.87	66.80	-30.22	29.20
	Y	-83.54	31.40	-97.75	210.15
	Z	-42.96	116.00	-64.49	69.10
Length of Change (mm)		10.51	32.15	-3.06	210.05
Shoulder Front Ribeye Position (mm)	X	23.64	65.70	10.00	28.95
	Y	-68.73	32.10	-84.16	115.65
	Z	-48.20	113.00	-68.05	68.80
Length of Change (mm)		14.01	31.20	-3.15	67.65

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-32.55	94.85	-42.24	30.40
	Y	-89.74	29.80	-99.79	199.90
	Z	1.16	115.60	-7.09	51.10
Length of Change (mm)		6.30	29.20	-0.64	195.25
Thorax Rib 1 Middle Ribeye Position (mm)[1]	X	7.70	37.95	-3.11	28.95
	Y	21.56	60.25	-119.48	89.55
	Z	8.25	60.25	-7.90	52.45
Length of Change (mm)[1]		14.40	29.50	-0.87	100.30
Thorax Rib 1 Front Ribeye Position (mm)	X	42.29	95.25	36.39	281.50
	Y	-82.16	31.15	-100.70	54.10
	Z	0.37	115.65	-7.85	49.90
Length of Change (mm)		14.76	30.65	-1.60	95.10
Thorax Rib 2 Rear Ribeye Position (mm)	X	-22.70	96.35	-30.82	26.25
	Y	-93.74	62.80	-99.95	17.30
	Z	44.98	34.80	32.83	59.55
Length of Change (mm)		5.78	63.65	-0.22	249.70
Thorax Rib 2 Middle Ribeye Position (mm)	X	14.08	95.20	6.11	25.65
	Y	-102.14	27.60	-111.90	150.85
	Z	46.72	35.30	32.81	60.70
Length of Change (mm)		7.26	27.55	-2.14	150.85
Thorax Rib 2 Front Ribeye Position (mm)	X	50.94	38.70	41.24	289.90
	Y	-92.57	28.95	-103.64	17.30
	Z	51.10	34.10	37.86	61.50
Length of Change (mm)		7.25	26.85	-2.80	135.60
Thorax Rib 3 Rear Ribeye Position (mm)	X	-40.64	37.45	-48.74	-24.75
	Y	-85.30	31.40	-94.11	84.25
	Z	-30.59	31.80	-46.77	59.90
Length of Change (mm)		9.07	31.40	-0.49	286.20
Thorax Rib 3 Middle Ribeye Position (mm)	X	-5.51	38.55	-17.85	-20.50
	Y	-90.91	31.35	-101.84	75.10
	Z	-28.77	34.35	-45.95	60.40
Length of Change (mm)		8.85	31.25	-0.92	83.55

[1]See data acquisition explanation

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 Front Ribeye Position (mm)	X	27.59	36.50	13.44	-10.55
	Y	-82.25	32.70	-92.84	291.30
	Z	-30.62	34.35	-45.32	61.15
Length of Change (mm)		3.18	30.65	-1.91	86.05
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-25.47	43.45	-35.64	79.90
	Y	-86.19	52.10	-96.68	235.10
	Z	2.99	33.40	-15.25	60.40
Length of Change (mm)		10.15	52.40	-1.30	234.85
Abdomen Rib 1 Middle Ribeye Position (mm)	X	12.39	46.90	-1.39	79.80
	Y	-92.06	52.80	-105.76	191.75
	Z	3.89	33.85	-16.43	58.95
Length of Change (mm)		11.21	52.75	-1.38	191.80
Abdomen Rib 1 Front Ribeye Position (mm)	X	47.13	49.60	31.81	81.30
	Y	-84.02	52.00	-98.77	235.30
	Z	1.94	33.40	-17.30	59.95
Length of Change (mm)		6.14	56.25	-2.61	235.35
Abdomen Rib 2 Rear Ribeye Position (mm)	X	-9.50	46.90	-24.94	82.90
	Y	-80.89	51.30	-94.16	193.80
	Z	38.00	33.00	18.74	65.70
Length of Change (mm)		12.13	50.35	-2.69	194.00
Abdomen Rib 2 Middle Ribeye Position (mm)	X	28.35	48.50	6.30	84.40
	Y	-88.36	52.80	-106.37	204.10
	Z	37.03	33.50	14.60	65.70
Length of Change (mm)		14.66	52.25	-2.73	204.05
Abdomen Rib 2 Front Ribeye Position (mm)	X	62.66	48.80	39.16	85.60
	Y	-80.94	51.10	-98.80	264.15
	Z	38.70	33.05	17.37	65.10
Length of Change (mm)		9.85	60.65	-1.47	264.15
T1 Acceleration (g)	X	6.52	43.90	-4.06	89.70
	Y	23.83	61.85	-3.57	14.45
	Z	6.61	12.45	-5.46	20.00
	R	24.12	61.55		

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021
Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	3.74	89.80	-6.14	44.10
	Y	14.62	15.15	-19.41	28.60
	Z	5.86	25.60	-1.96	228.30
	R	20.10	28.55		
T12 Acceleration (g)	X	4.24	32.90	-4.66	90.20
	Y	24.99	33.35	-8.59	14.05
	Z	7.95	18.35	-3.49	59.50
	R	25.45	33.35		
Pubic Symphysis (N)	Y	17.26	246.25	-786.60	42.55
Left Sacro-Iliac Force (N)	X	62.30	17.40	-205.92	46.00
	Y	5.79	1.65	-1694.35	43.15
	Z	257.62	94.45	-343.63	32.15
Left Sacro-Iliac Moment (Nm)	X	9.95	175.60	-31.74	44.15
	Y	17.86	54.20	-6.31	90.10
	Z	25.83	36.70	-13.91	57.75
Right Sacro-Iliac Force (N)	X	157.14	62.70	-184.98	37.35
	Y	36.03	63.90	-932.05	43.05
	Z	228.16	57.25	-134.49	95.65
Right Sacro-Iliac Moment (Nm)	X	26.96	64.90	-13.56	44.05
	Y	6.32	14.95	-8.73	69.05
	Z	19.31	36.90	-10.53	57.80
Lumbar Force (N)	X	214.33	58.25	-153.35	14.65
	Y	390.34	44.40	-18.83	15.45
	Z	603.72	46.75	-461.62	95.70
Lumbar Moment (Nm)	X	26.92	85.50	-4.47	18.95
	Y	11.98	90.65	-12.70	58.50
	Z	5.89	45.40	-6.61	224.90
Pelvis Acceleration (g)	X	10.79	14.40	-13.30	46.20
	Y	33.90	41.60	-10.28	67.10
	Z	8.45	14.10	-3.92	46.20
	R	34.19	41.60		

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Left Femur Force (N)	X	114.17	63.90	-151.06	42.90
	Y	94.67	38.80	-93.87	110.10
	Z	583.64	42.70	-205.77	73.00
Left Femur Moment (Nm)	X	127.27	41.35	-22.69	70.40
	Y	35.73	29.50	-22.49	110.00
	Z	51.38	45.55	-17.31	110.10
Left Femoral Neck Force (N)	X	649.31	43.05	-350.35	109.10
	Y	32.51	69.80	-1214.87	41.65
	Z	234.40	73.10	-928.70	41.60
Left Outer Knee Force (N)	Y	632.22	34.55	-88.69	42.00
Left Inner Knee Force (N)	Y	2578.03	65.30	-65.32	60.80

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021
Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	13.39	74.55	-8.69	51.70
	Y	28.97	70.30	-3.99	178.35
	Z	5.94	88.70	-32.13	74.90
	R	41.36	72.15		
Head Angular Rate (deg/sec)	X	1792.25	66.10	-748.42	109.35
	Y	419.58	59.60	-310.03	193.30
	Z	976.62	61.15	-888.31	231.20
Upper Neck Force (N)	X	303.11	73.35	-133.03	88.50
	Y	28.66	161.05	-638.23	77.95
	Z	104.25	124.25	-1054.79	75.85
Upper Neck Moment (Nm)	X	4.51	91.05	-41.75	72.25
	Y	16.80	74.00	-10.18	88.35
	Z	4.42	272.00	-13.16	199.65
Lower Neck Force (N)	X	126.90	70.55	-52.95	98.45
	Y	713.14	74.40	-256.14	89.05
	Z	115.86	123.50	-1108.77	76.55
Lower Neck Moment (Nm)	X	4.08	161.05	-54.93	89.20
	Y	4.34	99.20	-21.25	73.75
	Z	4.37	269.70	-13.78	201.05
Driver Shoulder Force (N)	X	250.92	59.20	-112.15	70.25
	Y	1567.46	68.55	-51.60	131.85
	Z	89.38	119.60	-467.29	62.85
Shoulder Rear Ribeye Position (mm)	X	-32.88	158.70	-64.73	69.85
	Y	-49.35	71.20	-67.16	175.60
	Z	-36.76	120.65	-50.32	60.15
Length of Change (mm)		0.71	118.30	-5.45	62.05
Shoulder Middle Ribeye Position (mm)	X	-1.99	158.80	-34.90	68.50
	Y	-57.12	71.00	-77.05	53.55
	Z	-37.39	120.70	-53.19	60.10
Length of Change (mm)		12.99	72.60	-1.27	53.60
Shoulder Front Ribeye Position (mm)	X	26.95	160.70	2.13	67.60
	Y	-50.71	72.55	-67.23	53.90
	Z	-43.20	121.90	-58.15	60.60
Length of Change (mm)		21.04	71.10	-0.34	172.55

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-23.34	112.75	-36.57	67.65
	Y	-72.08	72.30	-81.43	191.10
	Z	-6.79	191.60	-16.39	72.55
Length of Change (mm)		3.19	72.20	-1.49	191.00
Thorax Rib 1 Middle Ribeye Position (mm)	X	3.87	112.80	-9.97	67.05
	Y	-85.26	68.00	-93.05	152.75
	Z	-7.34	88.95	-14.00	72.95
Length of Change (mm)		5.99	68.15	-1.12	152.75
Thorax Rib 1 Front Ribeye Position (mm)	X	34.42	113.00	23.99	66.80
	Y	-71.94	66.80	-78.12	296.20
	Z	-5.95	88.00	-11.73	66.95
Length of Change (mm)		7.10	66.70	-0.51	119.10
Thorax Rib 2 Rear Ribeye Position (mm)	X	-8.97	89.10	-16.52	65.50
	Y	-74.54	63.55	-77.83	127.85
	Z	33.17	87.10	25.71	71.90
Length of Change (mm)		2.10	89.15	-0.34	231.80
Thorax Rib 2 Middle Ribeye Position (mm)	X	21.89	112.15	13.28	65.55
	Y	-87.59	66.90	-93.10	208.10
	Z	32.18	86.90	23.03	74.00
Length of Change (mm)		4.28	66.95	-0.83	208.05
Thorax Rib 2 Front Ribeye Position (mm)	X	50.97	112.10	43.66	64.90
	Y	-73.80	64.20	-77.75	-31.10
	Z	37.70	86.60	29.78	74.50
Length of Change (mm)		5.06	65.25	-0.83	126.60
Thorax Rib 3 Rear Ribeye Position (mm)[1]	X	6.56	80.45	-47.35	57.05
	Y	10.76	80.45	-88.94	80.25
	Z	6.47	79.65	-46.81	79.85
Length of Change (mm)[1]		2.38	58.00	-8.45	57.00
Thorax Rib 3 Middle Ribeye Position (mm)[1]	X	3.57	54.05	-17.91	53.15
	Y	11.21	82.45	-107.96	53.15
	Z	6.34	81.35	-43.18	81.55
Length of Change (mm)[1]		4.10	81.50	-7.21	53.15

[1]See data acquisition explanation

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 Front Ribeye Position (mm)	X	11.85	113.40	8.46	67.10
	Y	-75.22	179.50	-79.79	178.70
	Z	-30.77	88.35	-48.14	73.50
Length of Change (mm)		1.66	179.60	-2.52	178.70
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-20.83	88.95	-33.70	64.60
	Y	-66.31	63.90	-78.29	-33.80
	Z	-6.23	90.60	-25.59	74.40
Length of Change (mm)		7.10	63.25	-0.20	5.40
Abdomen Rib 1 Middle Ribeye Position (mm)	X	7.54	89.10	-3.71	66.50
	Y	-74.56	63.90	-89.43	21.30
	Z	-7.35	90.40	-29.99	73.60
Length of Change (mm)		13.90	65.05	-0.25	47.70
Abdomen Rib 1 Front Ribeye Position (mm)	X	34.69	88.40	27.97	67.05
	Y	-64.14	63.90	-79.50	172.10
	Z	-6.34	90.10	-26.24	73.25
Length of Change (mm)		13.02	64.25	-2.26	171.95
Abdomen Rib 2 Rear Ribeye Position (mm)	X	-2.04	88.30	-17.87	62.90
	Y	-61.56	61.95	-80.84	292.80
	Z	32.30	86.30	17.05	67.60
Length of Change (mm)		11.40	63.25	-0.57	137.65
Abdomen Rib 2 Middle Ribeye Position (mm)	X	24.70	87.10	12.43	64.20
	Y	-67.30	62.25	-92.34	-33.80
	Z	29.31	86.30	11.80	67.30
Length of Change (mm)		24.07	62.20	-0.26	24.50
Abdomen Rib 2 Front Ribeye Position (mm)	X	52.80	86.60	46.99	66.90
	Y	-56.98	61.20	-81.03	216.20
	Z	32.02	86.35	16.73	67.40
Length of Change (mm)		22.30	62.15	-0.73	216.25
T1 Acceleration (g)	X	8.62	88.30	-17.21	66.05
	Y	58.45	68.40	-17.12	50.90
	Z	11.40	76.85	-3.11	51.80
	R	60.17	68.40		

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021
Passenger Dummy Serial Number: DK1774

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	5.46	108.85	-14.25	61.85
	Y	55.65	67.75	-7.35	50.20
	Z	10.00	77.30	-5.00	55.40
	R	56.96	67.75		
T12 Acceleration (g)	X	7.61	60.30	-9.11	77.50
	Y	45.23	56.50	-10.97	89.85
	Z	13.28	55.15	-3.89	94.25
	R	47.06	56.20		
Pubic Symphysis (N)	Y	6.45	17.35	-1102.18	53.35
Left Sacro-Iliac Force (N)	X	259.22	62.70	-52.94	92.60
	Y	116.18	153.45	-1628.19	53.85
	Z	571.20	53.90	-203.49	87.20
Left Sacro-Iliac Moment (Nm)	X	7.97	156.25	-66.45	60.25
	Y	6.97	139.70	-41.84	53.65
	Z	17.95	52.55	-14.00	54.25
Right Sacro-Iliac Force (N)	X	499.46	53.85	-97.44	83.25
	Y	222.30	61.05	-165.10	46.25
	Z	356.93	64.95	-37.49	185.00
Right Sacro-Iliac Moment (Nm)	X	32.77	64.75	-5.79	182.45
	Y	5.75	40.45	-9.06	64.45
	Z	7.96	46.80	-17.21	54.75
Lumbar Force (N)	X	44.22	143.15	-578.92	53.40
	Y	1012.21	59.95	-139.36	185.00
	Z	126.11	57.55	-468.70	78.70
Lumbar Moment (Nm)	X	87.98	59.00	-9.35	187.35
	Y	32.12	53.90	-4.17	143.75
	Z	7.62	87.80	-14.56	154.95
Pelvis Acceleration (g)	X	10.65	54.15	-6.16	108.85
	Y	67.82	53.40	-6.87	72.35
	Z	42.18	53.50	-22.47	55.65
	R	80.10	53.40		

TABLE 1 WORLDSID-50M AND WORLDSID-05F INSTRUMENTATION DATA

(CONTINUED)

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Passenger Dummy Serial Number: DK1774

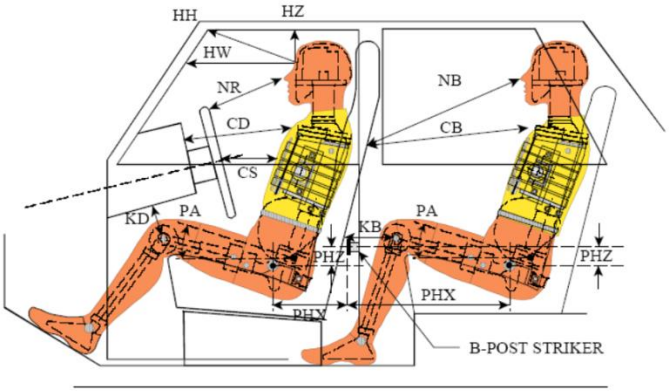
Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Left Femur Force (N)	X	9.39	-18.15	-453.58	47.90
	Y	116.52	42.35	-247.12	55.10
	Z	297.05	48.35	-814.19	52.10
Left Femur Moment (Nm)	X	12.17	38.70	-59.82	53.60
	Y	255.32	53.35	-1.09	123.85
	Z	35.44	47.65	-14.38	59.40
Left Femoral Neck Force (N)	X	461.42	48.10	-85.02	61.45
	Y	2501.81	53.60	-103.80	91.15
	Z	820.46	52.95	-89.55	121.20
Left Outer Knee Force (N)	Y	8174.85	52.35	-24.22	0.45
Left Inner Knee Force (N)	Y	1803.30	52.35	-140.89	47.85

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 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



LEFT SIDE VIEW

Code	Measurement Description	Driver WorldSID-50M SN # EB8888		Passenger WorldSID-05F SN # DK1774	
		Length (mm)	Angle	Length (mm)	Angle
HH	Header to Header	395			
HW	Header to Windshield	661			
HZ	Head to Roof Liner	204		300	
NR	Nose to Rim/Seat Back	460		636	
CD	Chest to Dash/Seat Back	615		623	
CS	Chest to Steering Wheel	368			
KD(L)/KDA(L)°	Left Knee to Dash/Seat Back	120	37.3	286	62.0
KD(R)/KDA(R)°	Right Knee to Dash/Seat Back	110	12.7	278	61.6
PAX°	Pelvic Tilt Angle X		1.1		-0.9
PAY°	Pelvic Tilt Angle Y		1.7		21.8
PHX	Hip Point to Striker (X-Axis)	215		267	
PHZ	Hip Point to Striker (Z-Axis)	238		203	
HAX°	Head Tilt Angle X		0.6		0.7
HAY[1]°	Head Tilt Angle Y		-1.9		-0.2
TAX°	Thorax Tilt Angle X		1.7		0.4
TAY°	Thorax Tilt Angle Y		-0.5		24.3
	Head Rest Angle		2.6		5.2
	H-Point Tool Angle		40.5		50.0
	Torso Angle		16.7		81.4
	Windshield Angle		58.4		

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.

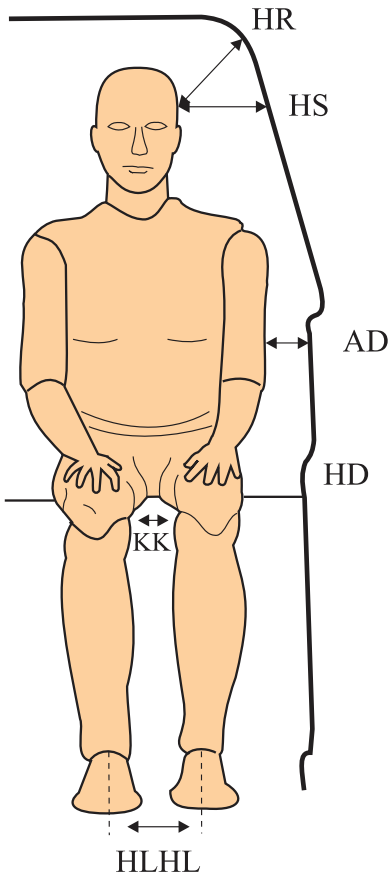
All tilt sensor angles are recorded digitally

WorldSID-50M neck was adjusted 0 notches

WorldSID-5F neck was adjusted -2 notches down

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

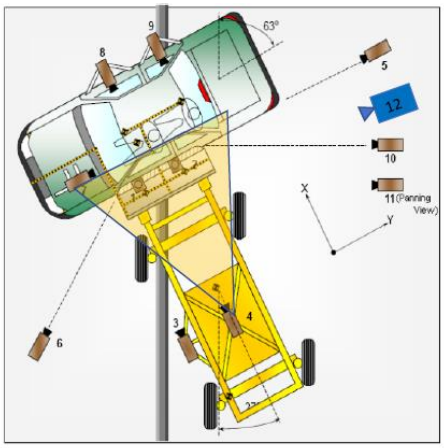


Code	Measurement Description	Driver WorldSID-50M SN # EB8888	Passenger WorldSID-05F SN # DK1774
HR	Head to Side Header	229	274
HS	Head to Side Window	358	379
AD	Arm to Door	156	195
HD	Hip Point to Door	127	138
KK	Knee to Knee	472	310
HLHL	Heel to Heel	349	228

Note: All measurements are in millimeters.

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



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	-5692	28	1000
3	Impact Point	-1522	-907	-861	25	1000
4	Struck-Side View at Impact	-2250	0	-1429	12.5	1000
5	Rear Impact View of Struck Side	0	8762	-1474	20	1000
6	Front Oblique Impact View of Struck Side	-1852	-2924	-1422	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.*

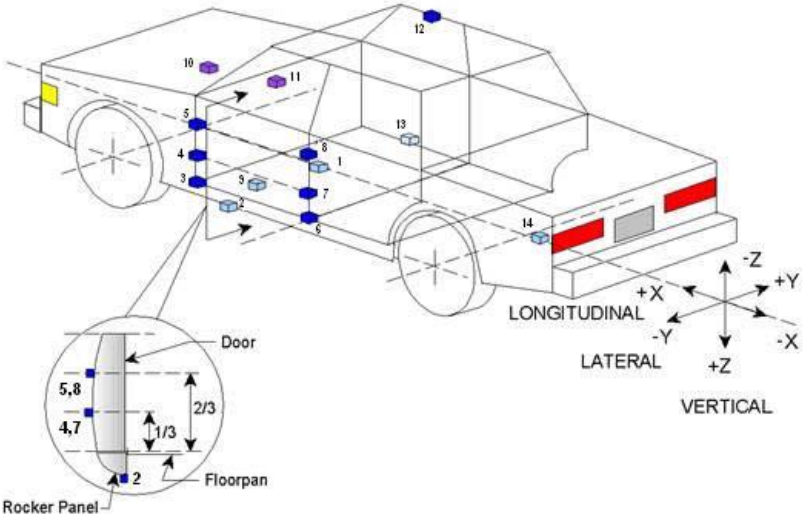
If applicable, explain why camera(s) did not operate as intended: N/A

INSTRUMENTATION

Driver Dummy Channels	135
Passenger Dummy Channels	135
Vehicle Structure Accelerometers	37
MDB Accelerometers	5
Contact Channels	10
TOTAL	322

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	2504	-65	-78				
	Longitudinal (g)				2.04	56.05	-9.30	10.80
	Lateral (g)				21.23	8.40	-1.73	76.25
	Vertical (g)				5.72	16.50	-7.29	51.70
	Resultant (g)				22.16	9.10		
2	Vehicle CG ARS	2527	-62	-79				
	Longitudinal (g)				164.19	10.40	-89.61	182.05
	Lateral (g)				22.29	8.60	-16.48	14.90
	Vertical (g)				55.94	83.00	-74.27	11.50
3	Right Sill at Front Seat	2887	725	-144				
	Longitudinal (g)				2.62	56.30	-5.81	11.60
	Lateral (g)				23.93	8.95	-2.36	75.25
	Vertical (g)				5.69	63.25	-8.34	11.10
	Resultant (g)				24.56	9.20		
4	Right Side Sill At Rear Seat	1818	717	-126				
	Longitudinal (g)				2.32	56.35	-5.11	11.10
	Lateral (g)				24.05	8.60	-1.87	83.75
	Vertical (g)				4.62	86.10	-8.53	20.40
	Resultant (g)				24.45	8.65		
5	Left Side Sill At Front Seat	2870	-722	-148				
	Lateral (g)				27.18	6.90	-4.99	12.75
6	Left Side Sill At Rear Seat	1824	-715	-131				
	Lateral (g)				19.87	9.65	-1.51	104.60

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
7	Lower A-Post	3301	-735	-105				
	Lateral (g)				24.18	3.55	-1.61	77.80
8	Middle A-Post	3208	-757	-597				
	Lateral (g)				40.57	11.15	-1.70	272.85
9	Lower B-Post	2275	-765	-248				
	Lateral (g)				49.66	3.90	-16.46	28.95
10	Middle B-Post	2245	-753	-541				
	Lateral (g)				48.51	9.25	-14.09	28.50
11	Front Seat Track	2372	-607	-82				
	Lateral (g)				29.50	21.40	-5.02	34.30
12	Rear Seat Structure	1894	-566	-41				
	Lateral (g)				---[1]	---[1]	---[1]	---[1]
13	Right Rear Occupant Compartment	2117	407	-171				
	Lateral (g)				23.67	8.20	-1.78	144.95
14	Engine Block	4040	162	-301				
	Longitudinal (g)				7.69	42.25	-9.10	25.55
	Lateral (g)				27.66	20.45	-6.19	108.10
15	Rear Floorpan Above Axle	1120	0	-55				
	Longitudinal (g)				2.08	56.55	-4.62	20.95
	Lateral (g)				22.58	9.65	-1.58	105.70
	Vertical (g)				13.10	18.15	-13.50	22.55
	Resultant (g)				23.01	10.25		
16	Rear Deck	160	9	-96				
	Longitudinal (g)				2.49	57.05	-5.96	13.55
	Lateral (g)				22.90	31.90	-2.00	106.85
	Vertical (g)				4.47	50.65	-4.06	21.45
	Resultant (g)				23.15	31.90		
17	Rear Deck ARS	160	-36	-96				
	Longitudinal (g)				105.35	25.20	-88.12	184.25
	Lateral (g)				44.67	81.55	-53.97	59.80
	Vertical (g)				57.26	286.00	-31.65	11.40
18	Left Front Door Mid Centerline	2730	-810	-239				
	Lateral (g)				---[1]	---[1]	---[1]	---[1]
19	Left Front Door Mid Rear	2423	-781	-248				
	Lateral (g)				112.82	23.10	-28.21	39.60
20	Left Front Door Upper Centerline	2694	-795	-541				
	Lateral (g)				74.15	13.35	-43.15	42.05

[1]See data acquisition explanation

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

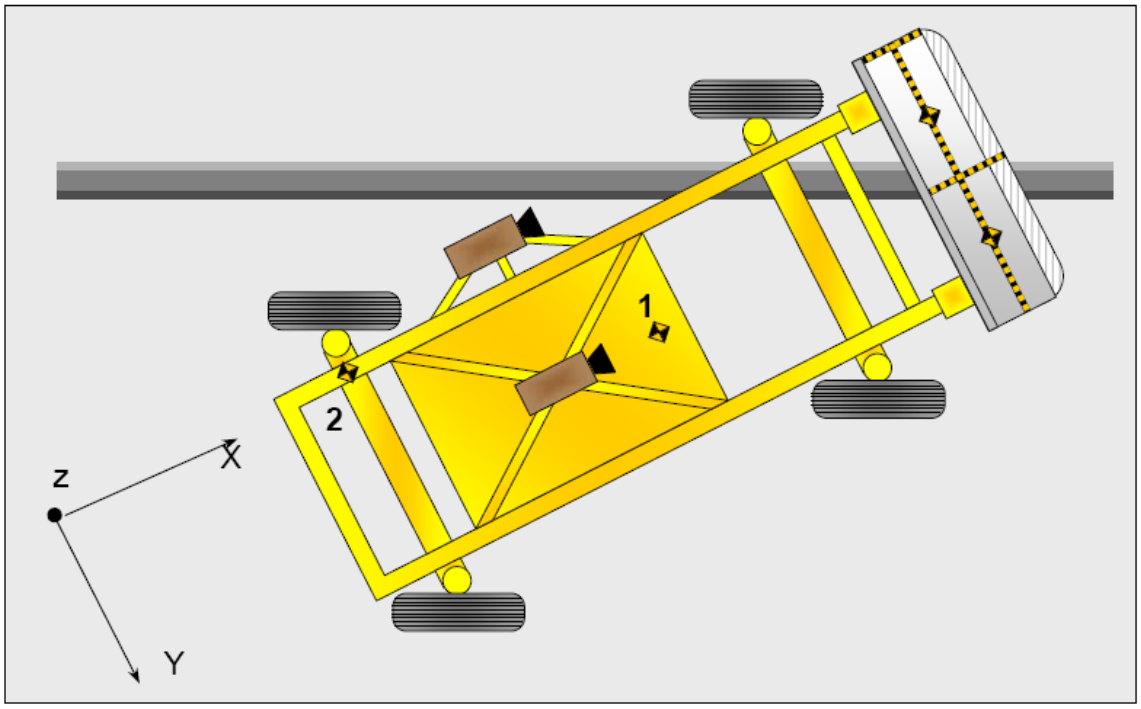
Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
21	Left Rear Door Mid Rear	1510	-796	-275				
	Lateral (g)				128.37	20.65	-86.15	27.30
22	Left Rear Door Upper Centerline	1726	-771	-575				
	Lateral (g)				92.36	14.15	-36.43	20.25

*0,0,0 located at rear bumper

DATA SHEET NO. 7
MDB ACCELEROMETER DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



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)				2.16	128.70	-22.92	15.60
	Lateral (g)				2.47	65.85	-10.35	35.15
	Vertical (g)				10.75	22.25	-9.78	37.55
	Resultant (g)				25.36	37.05		
2	MDB Rear	-3648	-650	-618				
	Longitudinal (g)				1.72	125.25	-23.30	34.50
	Lateral (g)				3.58	59.75	-2.88	37.80

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

DATA SHEET NO. 8
POST TEST OBSERVATIONS

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (WorldSID-50M)	Rear Seat Dummy (WorldSID-05F)
Face	None	SCAB
Top of Head	SCAB, Headrest	SCAB
Left Side of Head	SCAB	SCAB
Back of head	None	SCAB
Left Shoulder	SAB, Door panel	Door panel
Upper Torso	Seat back bolster	Door panel
Lower Torso	Seat back bolster	Door panel
Left Hip	Door panel	Door panel
Left Knee	Door panel	Door panel

POST-TEST DOOR PERFORMANCE

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

* 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 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2770
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		443
Actual Impact Point (Aft of Front Axle)	mm		434
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	+9
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

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	1110

MDB WEIGHTS

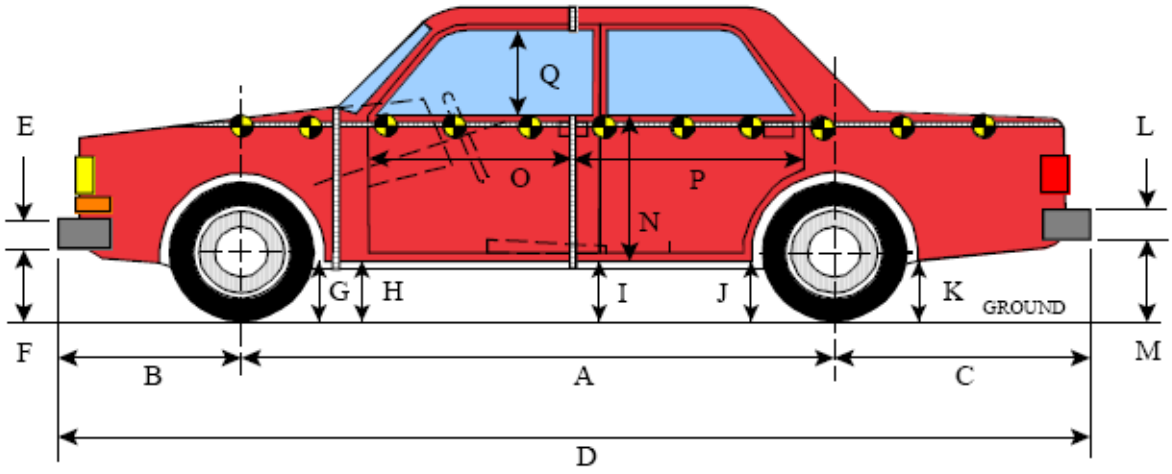
	Units	Front Axle	Rear Axle	Total
Left	kg	451.2	231.2	682.4
Right	kg	328.4	353.4	681.8
Ratio	%	57.1	42.9	100.0
Totals	kg	779.6	584.6	1364.2

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Tolerance	Value
Trap No. 1 Velocity (Primary)	km/h	52.1 to 53.7	52.96
Trap No. 2 Velocity (Redundant)	km/h	52.1 to 53.7	53.00
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 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



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

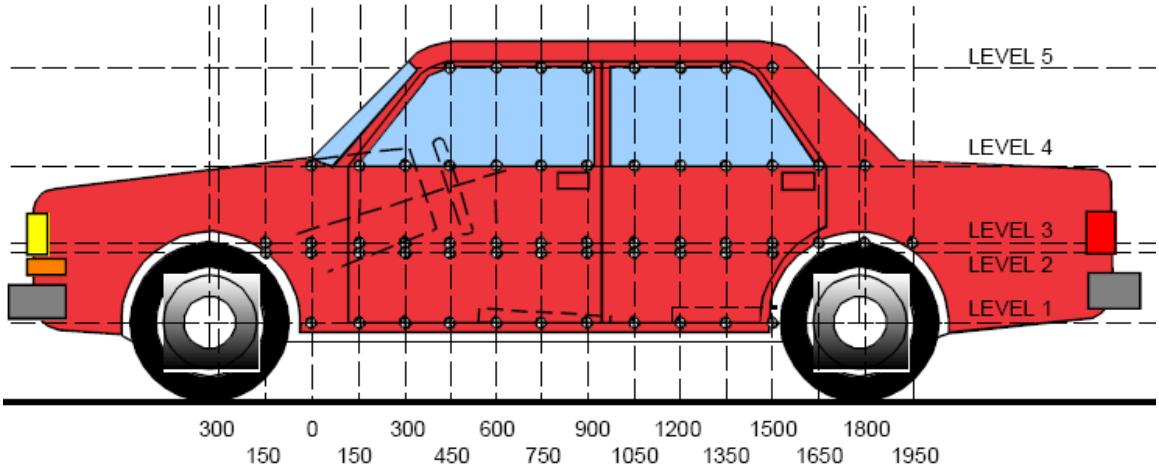
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2770	2760	10
B	Front Axle to FSOV	930	930	0
C	Rear Axle to RSOV	1040	1040	0
D	Total Length at Centerline	4740	4740	0
E	Front Bumper Thickness	125	125	0
F	Front Bumper Bottom to Ground	444	465	-21
G	Sill Height at Front Wheel Well	405	432	-27
H	Sill Height at Front Door Leading Edge	405	434	-29
I	Sill Height at B Pillar	411	440	-29
J1	Sill Height at Rear Wheel Well	416	460	-44
J2	Pinch Weld Height at Rear Wheel Well	227	267	-40
K	Sill Height Aft of Rear Wheel Well	435	465	-30
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	540	570	-30
N	Sill Height to Bottom of Front Window Sill	945	805	140
O	Front Door Leading Edge to Impact CL	793	750	43
P	Rear Door Trailing Edge to Impact CL	1380	1365	15
Q	Front Window Opening	388	394	-6
R	Right Side Length	4670	4670	0
S	Left Side Length	4670	4640	30
T	Maximum Vehicle Width at B-Pillars	1870	1790	80
U	Maximum Vehicle Width	1890	1890	0

**All Dimensions in mm

DATA SHEET NO. 11
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	412	134	1200
			134	1350
2	Occupant H-Point	715	177	1650
3	Mid-Door	789	193	1350
4	Window Sill	1127	55	1200
5	Window Top	1631	12	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

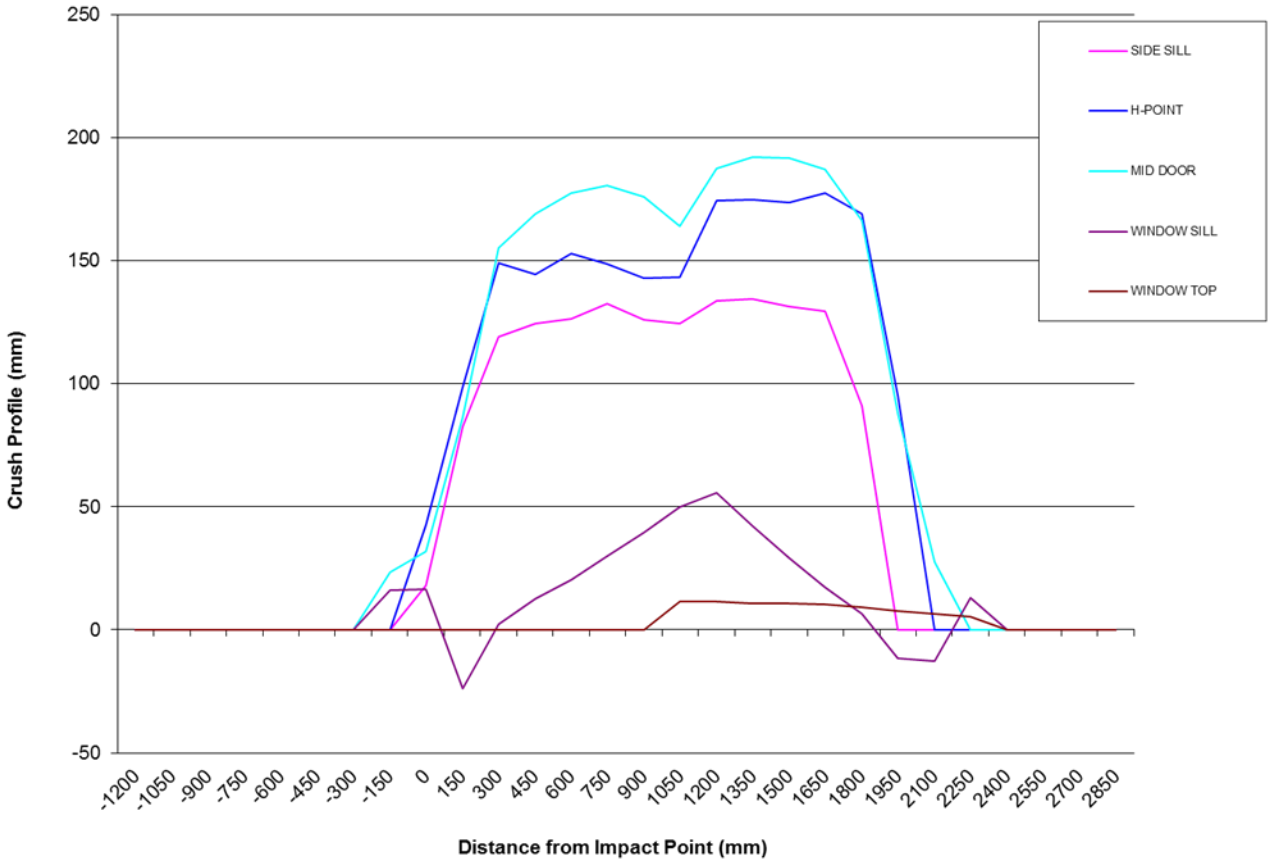
Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-150			955	817				931	801				24	16	
0	929	951	951	828		911	909	919	812		18	42	32	16	
150	933	945	946	831		850	846	859	855		83	99	87	-24	
300	939	940	945	838		820	790	790	836		119	150	155	2	
450	943	939	946	844		818	794	776	831		125	145	170	13	
600	945	938	946	855		819	785	768	834		126	153	178	21	
750	947	937	945	870		814	788	765	840		133	149	180	30	
900	946	935	944	884		820	792	769	844		126	143	175	40	
1050	943	932	943	893	615	819	789	778	843	603	124	143	165	50	12
1200	940	928	939	894	625	806	754	752	839	614	134	174	187	55	11
1350	937	926	936	893	626	803	751	743	851	615	134	175	193	42	11
1500	933	926	934	890	625	802	752	742	861	615	131	174	192	29	10
1650	928	933	937	887	623	799	756	750	870	613	129	177	187	17	10
1800	923	944	944	884	621	832	775	777	877	612	91	169	167	7	9
1950		947	949	879	617		851	860	891	609		96	89	-12	8
2100			951	875	608			923	888	602			28	-13	6
2250				873	597				860	592				13	5

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).

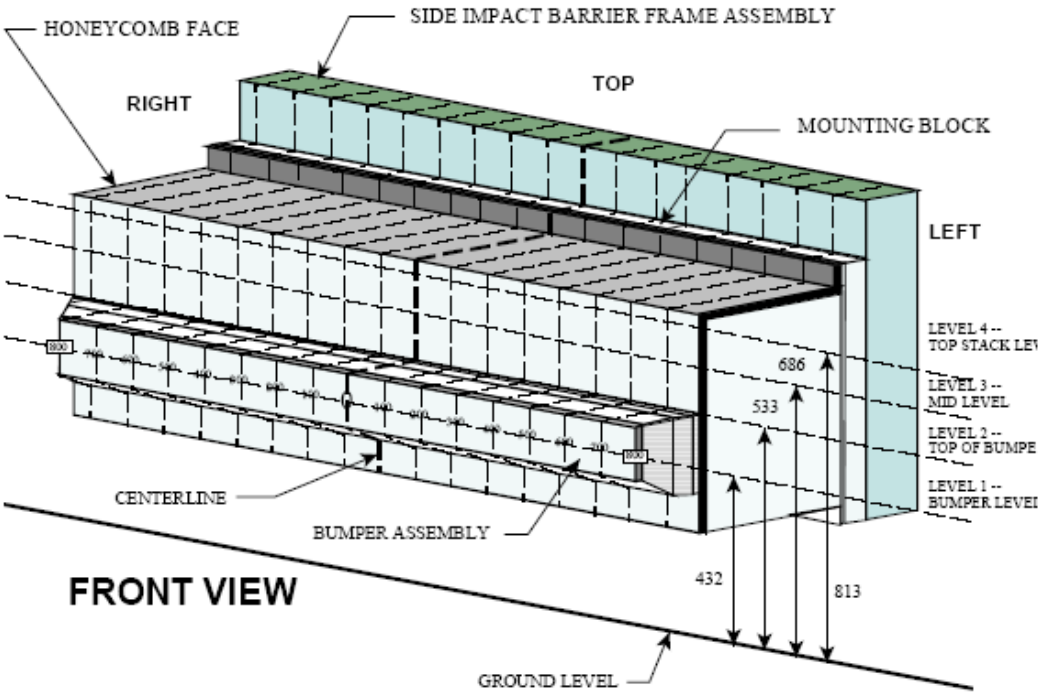
DATA SHEET NO. 11 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



NOTE: Dimensions are shown in millimeters, mm

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

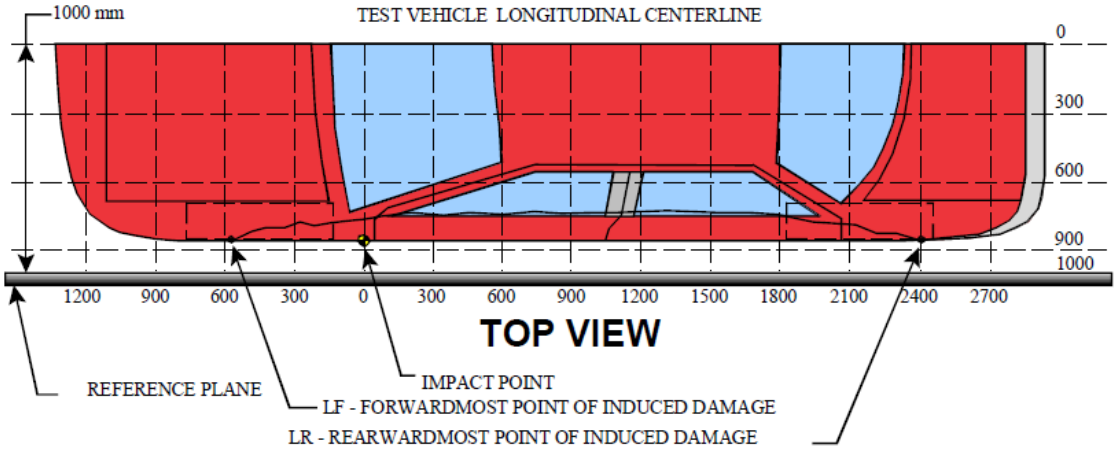
Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	178
B	Top of Bumper	533	800	Left	84
C	Mid-Level	686	800	Left	81
D	Top of Stack	813	800	Left	98

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	178	176	174	173	173	173	172	169	165	160	159	159	158	157	157	157	159
2	60	64	65	62	60	57	60	51	47	45	45	45	46	45	48	54	84
3	60	30	41	16	11	12	19	31	31	23	14	10	10	11	17	30	81
4	48	36	44	18	6	8	19	22	10	11	13	15	17	21	23	44	98

DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



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	2250	4	860	873	13
2	1800	2	775	944	169
3	1350	3	743	936	193
4	750	3	765	945	180
5	300	3	790	945	155
6	-150	3	931	955	24

MDB DAMAGE PROFILE DISTANCES

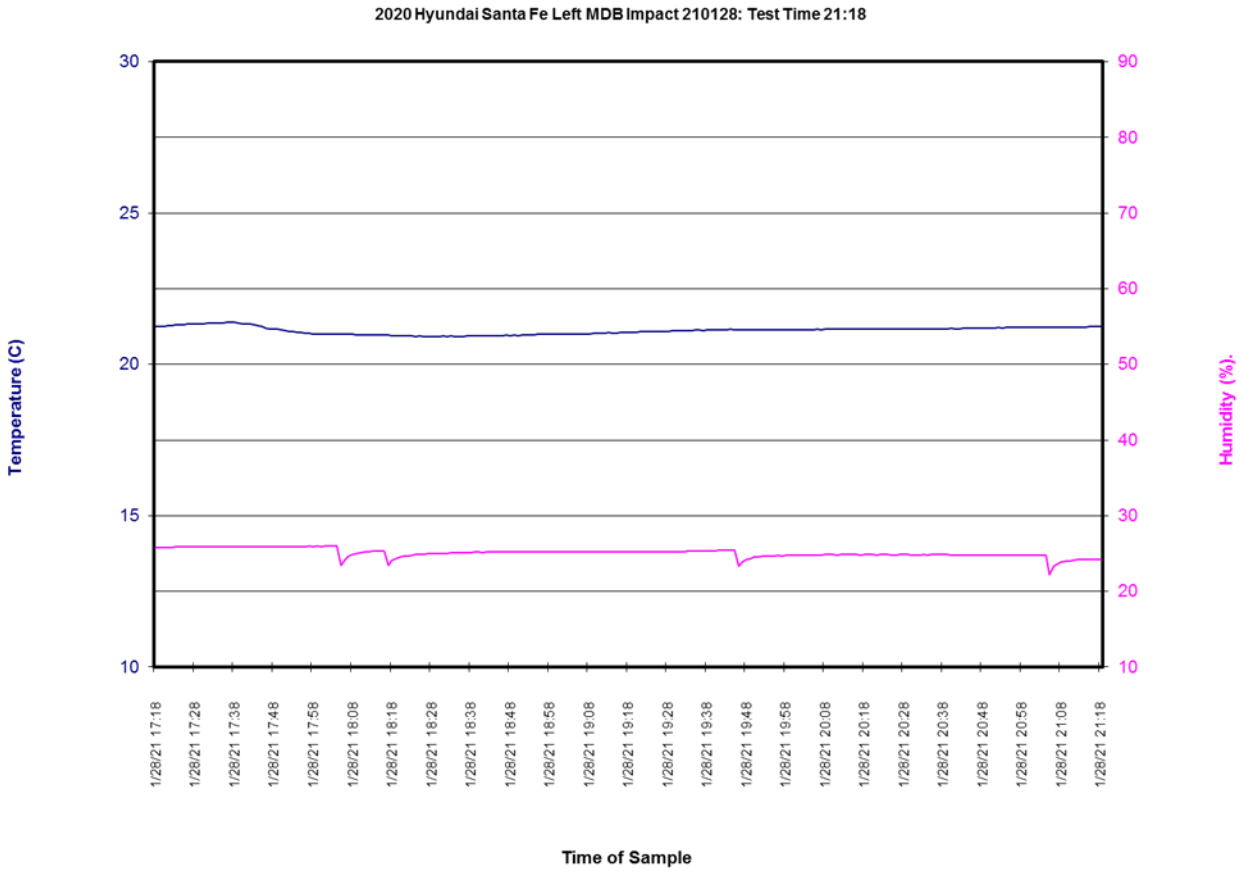
DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	159
2	500 mm left of center	1	157
3	200 mm left of center	1	159
4	200 mm right of center	1	172
5	500 mm right of center	1	173
6	800 mm right of center	1	178

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

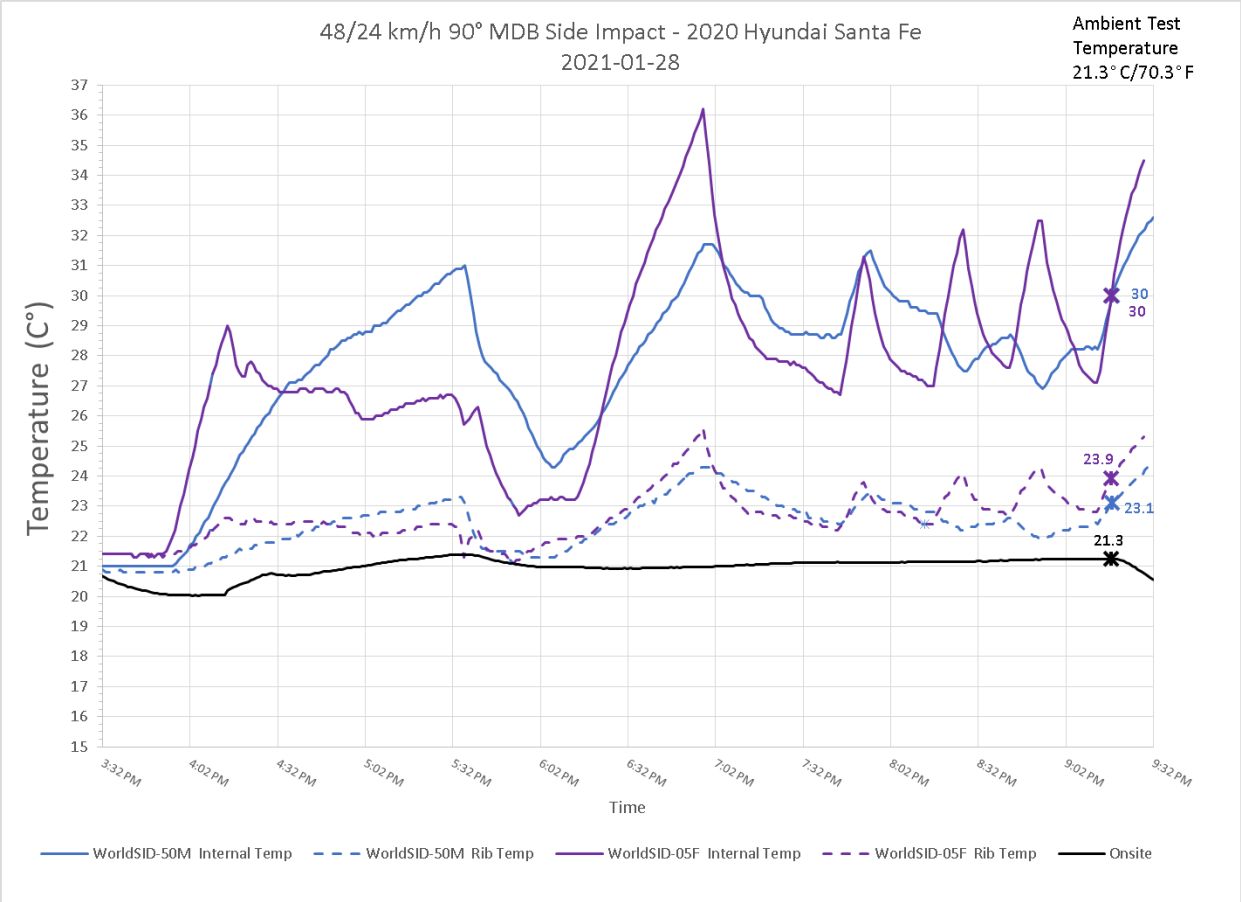
Test Vehicle: 2020 Hyundai Santa Fe

Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



DATA SHEET NO. 14 (CONTINUED)
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2020 Hyundai Santa Fe
Test Program: Moving Deformable Barrier Side Impact Test Date: 1/28/2021



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

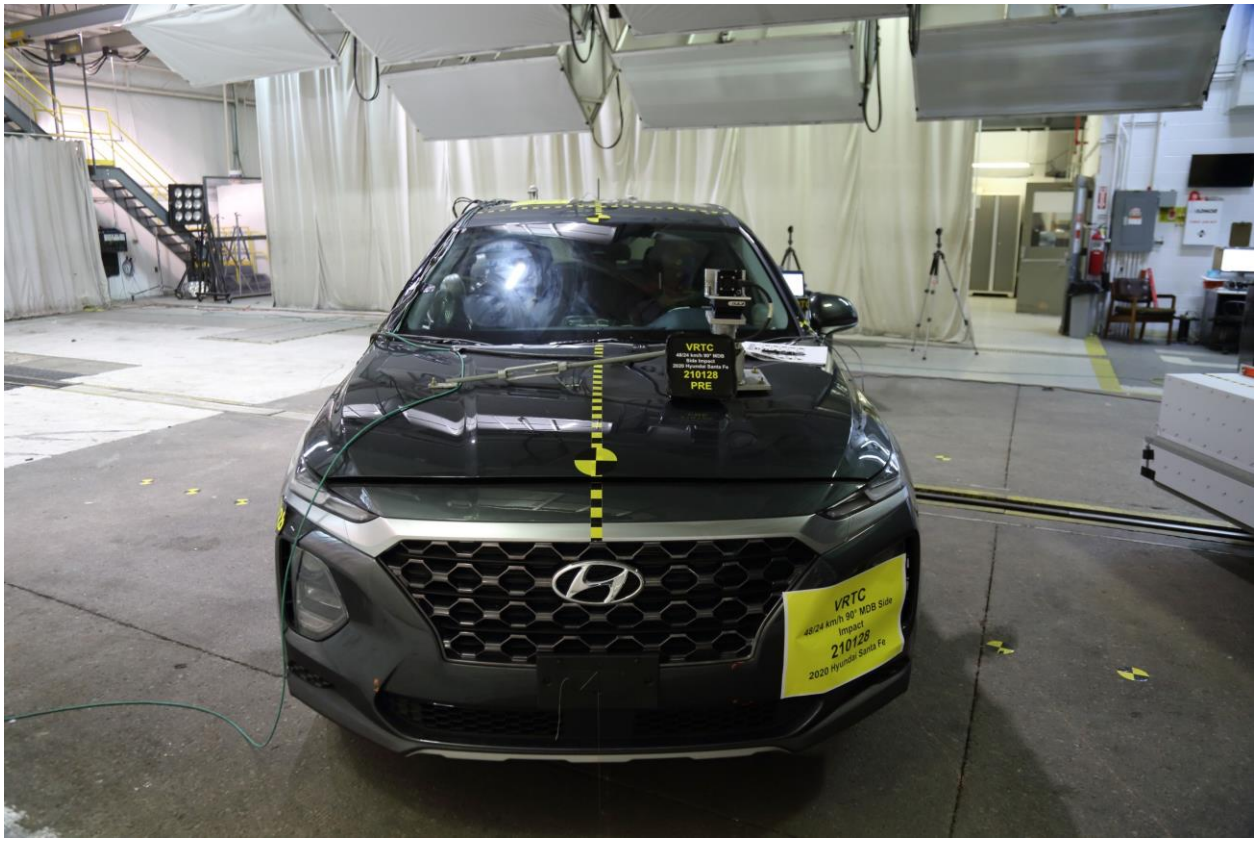
TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

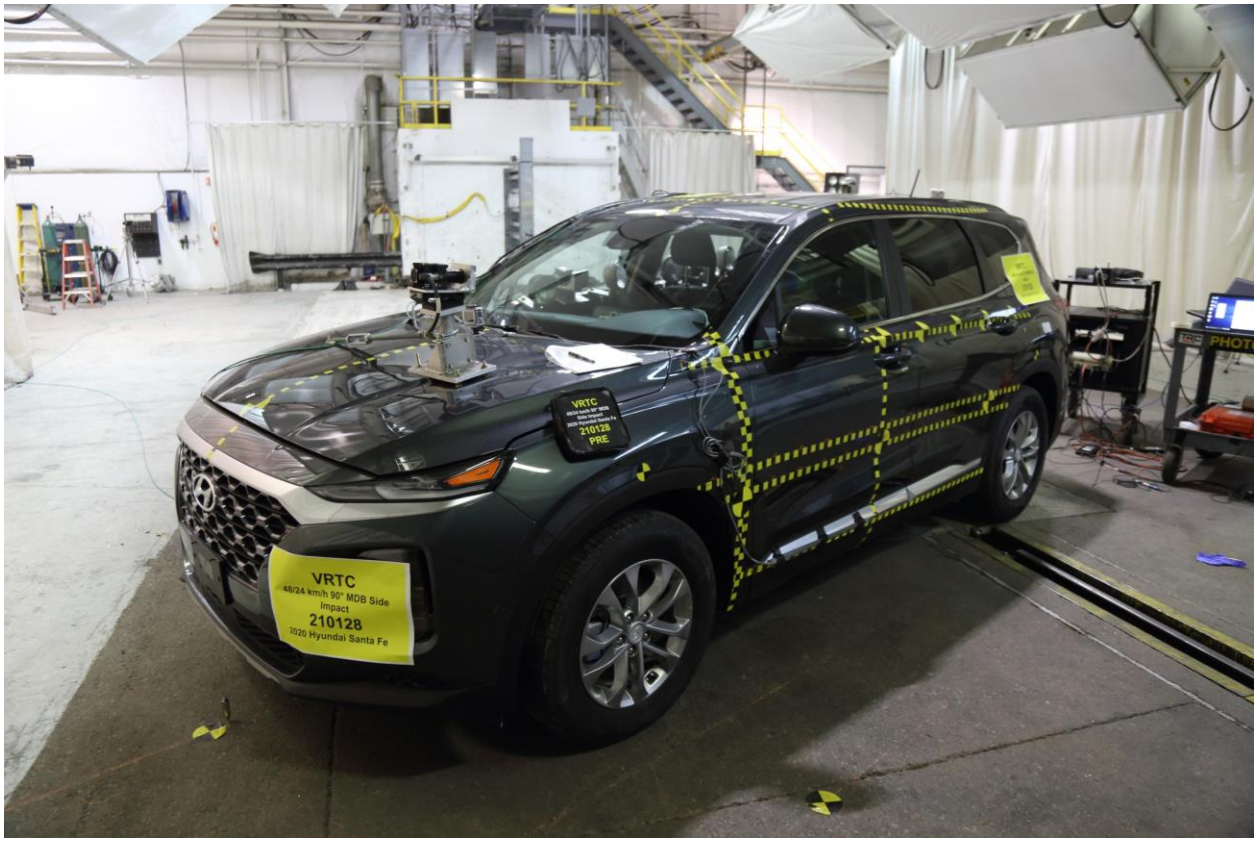
001 As-Delivered Right Front ¾ View of Test Vehicle

002 As-Delivered Left Rear ¾ View of Test Vehicle



003 Pre-Test Frontal View of Test Vehicle

004 Post-Test Frontal View of Test Vehicle



005 Pre-Test Left Front ¾ View of Test Vehicle

006 Post-Test Left Front ¾ View of Test Vehicle

007 Pre-Test Left Side View of Test Vehicle

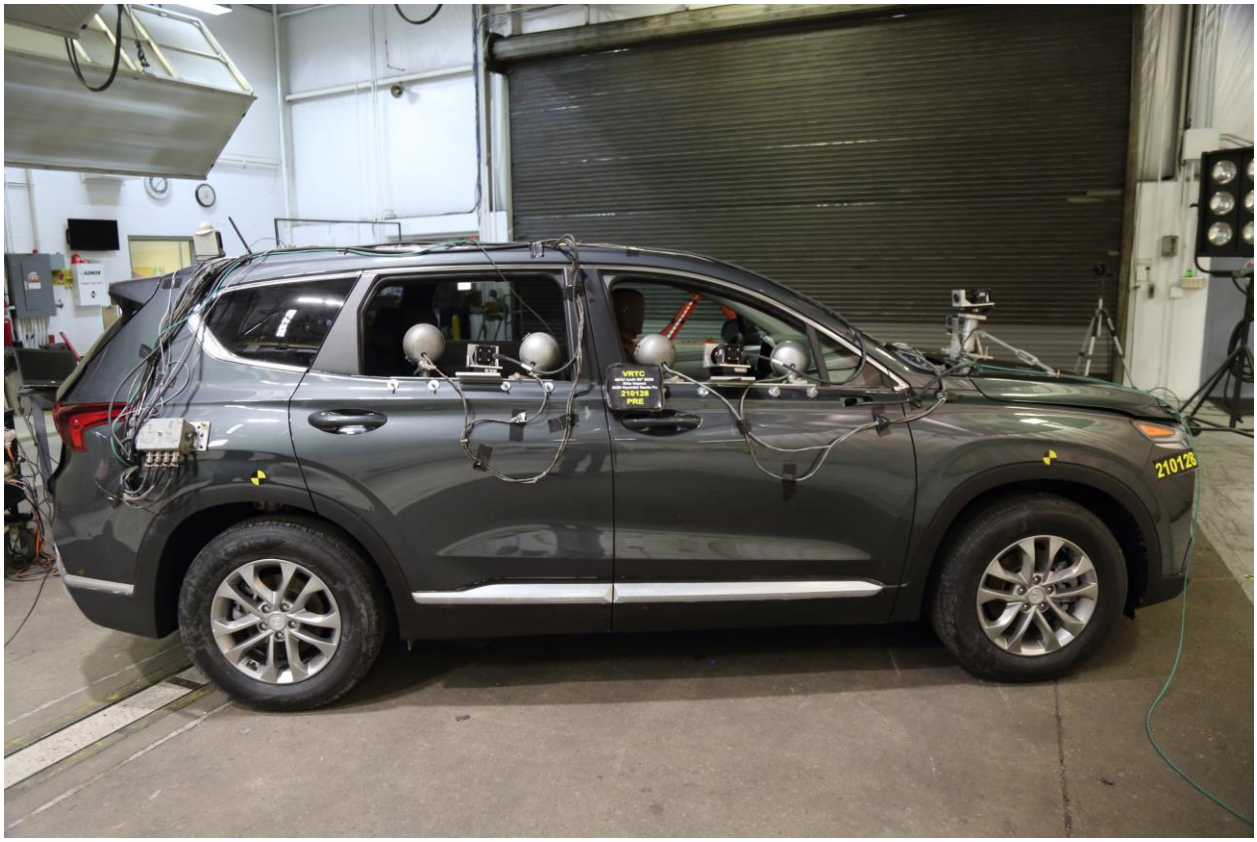
008 Post-Test Left Side View of Test Vehicle

009 Pre-Test Left Rear ¾ View of Test Vehicle

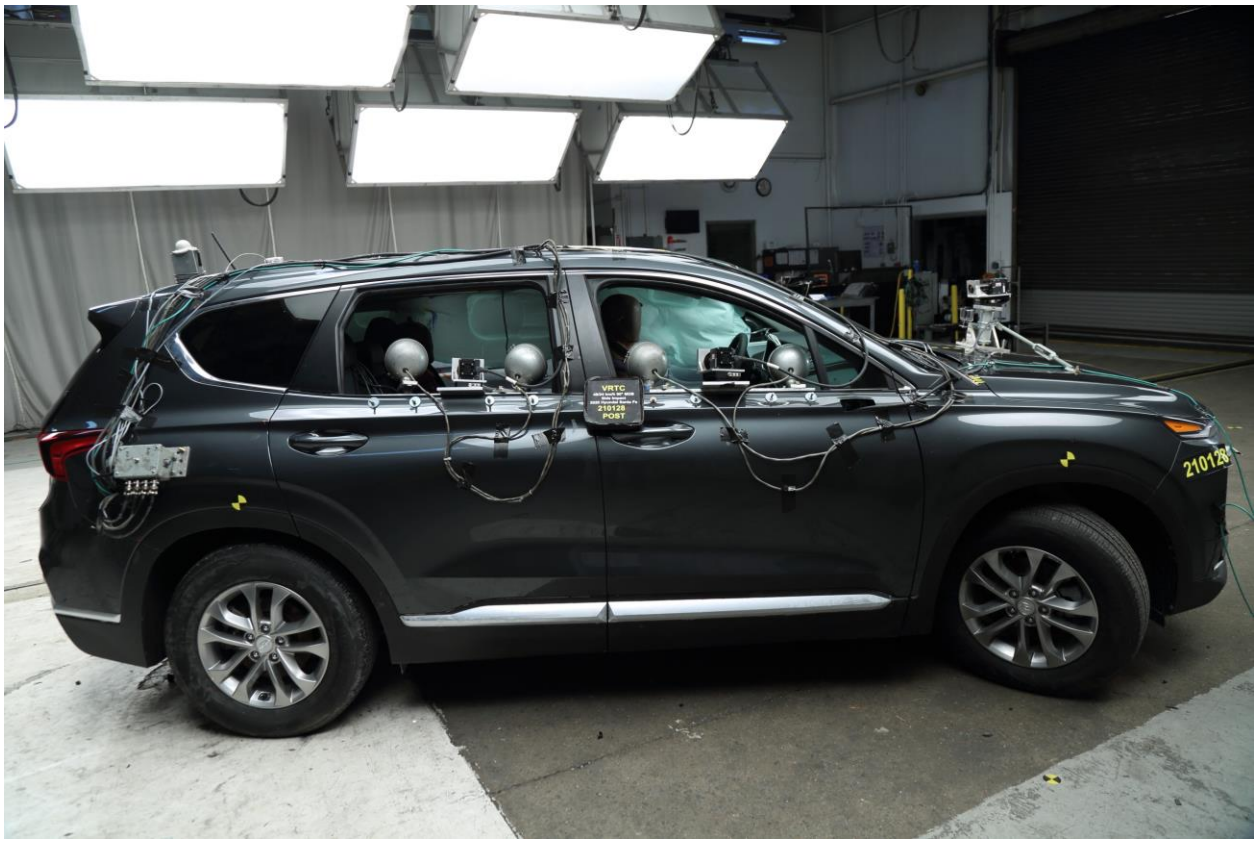
010 Post-Test Left Rear ¾ View of Test Vehicle

011 Pre-Test Rear View of Test Vehicle

012 Post-Test Rear View of Test Vehicle

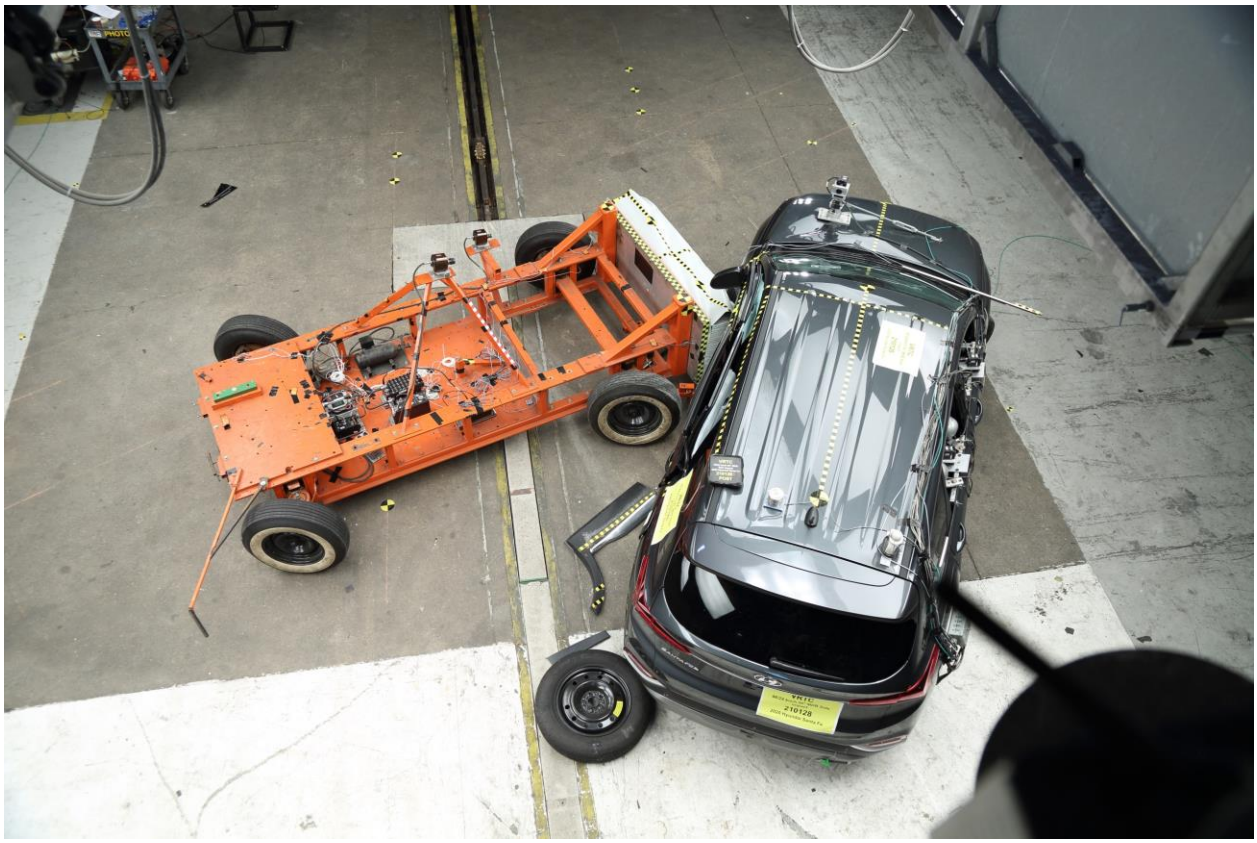


013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle

015 Pre-Test Overhead View of Test Area

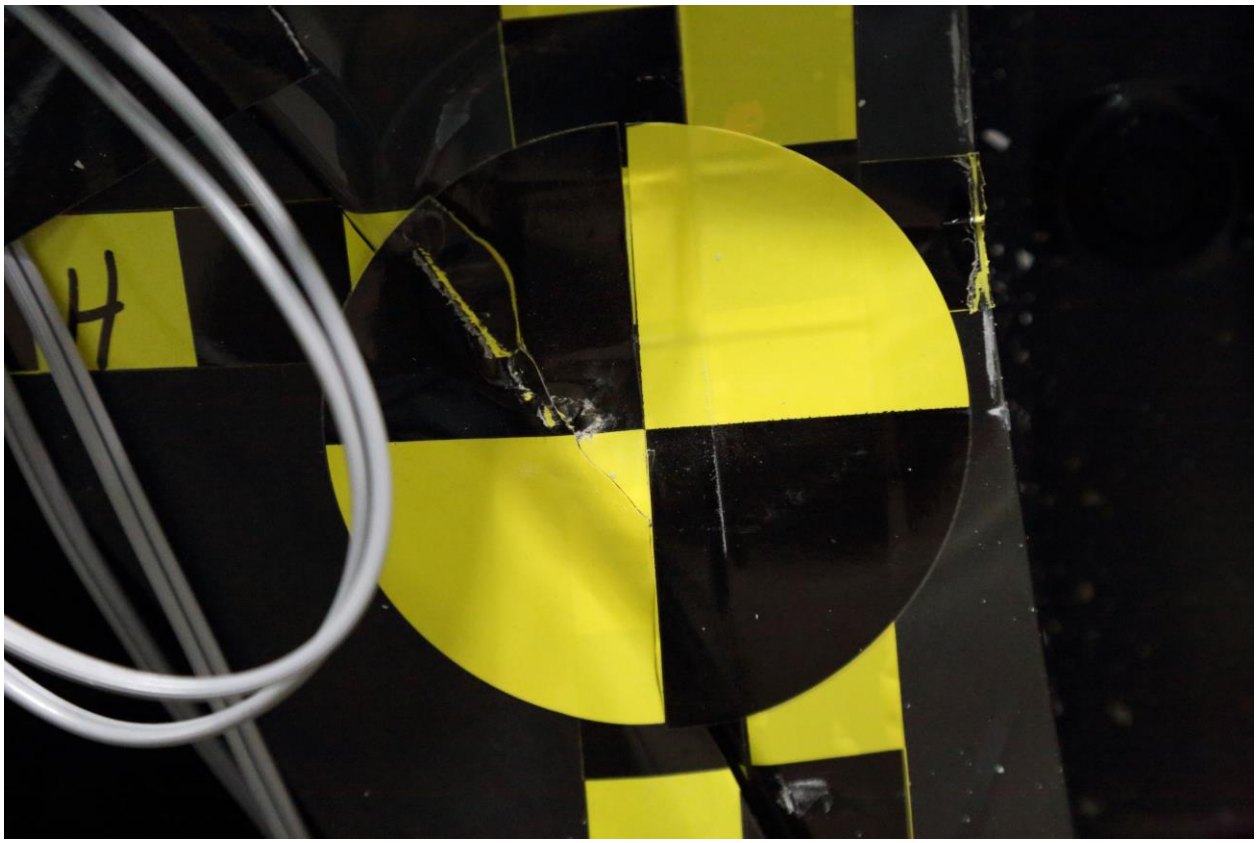


016 Post-Test Overhead View of Test Area

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

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

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



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

021 Pre-Test Left Front Door Latch Close-Up

022 Post-Test Left Front Door Latch Close-Up

023 Pre-Test Left Rear Door Latch Close-Up

024 Post-Test Left Rear Door Latch Close-Up

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

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

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

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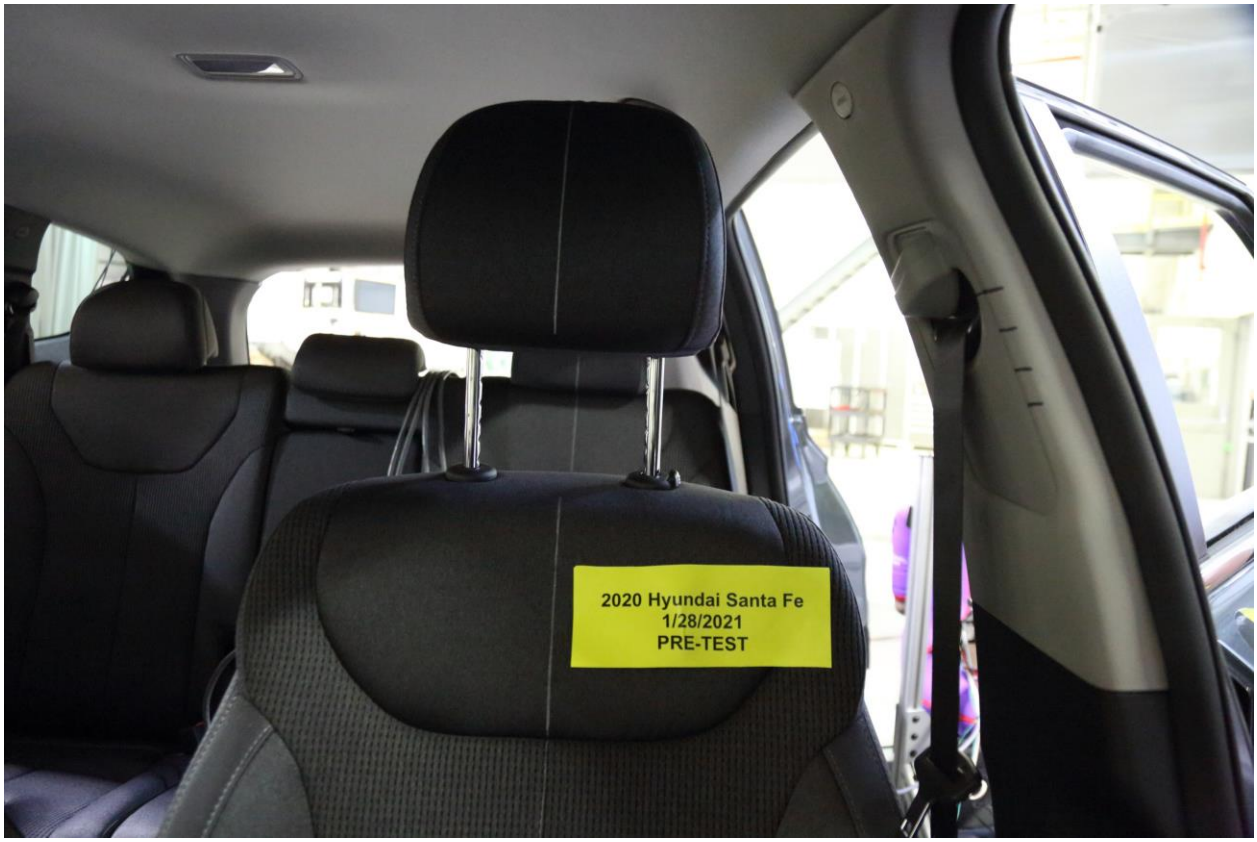
028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top

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



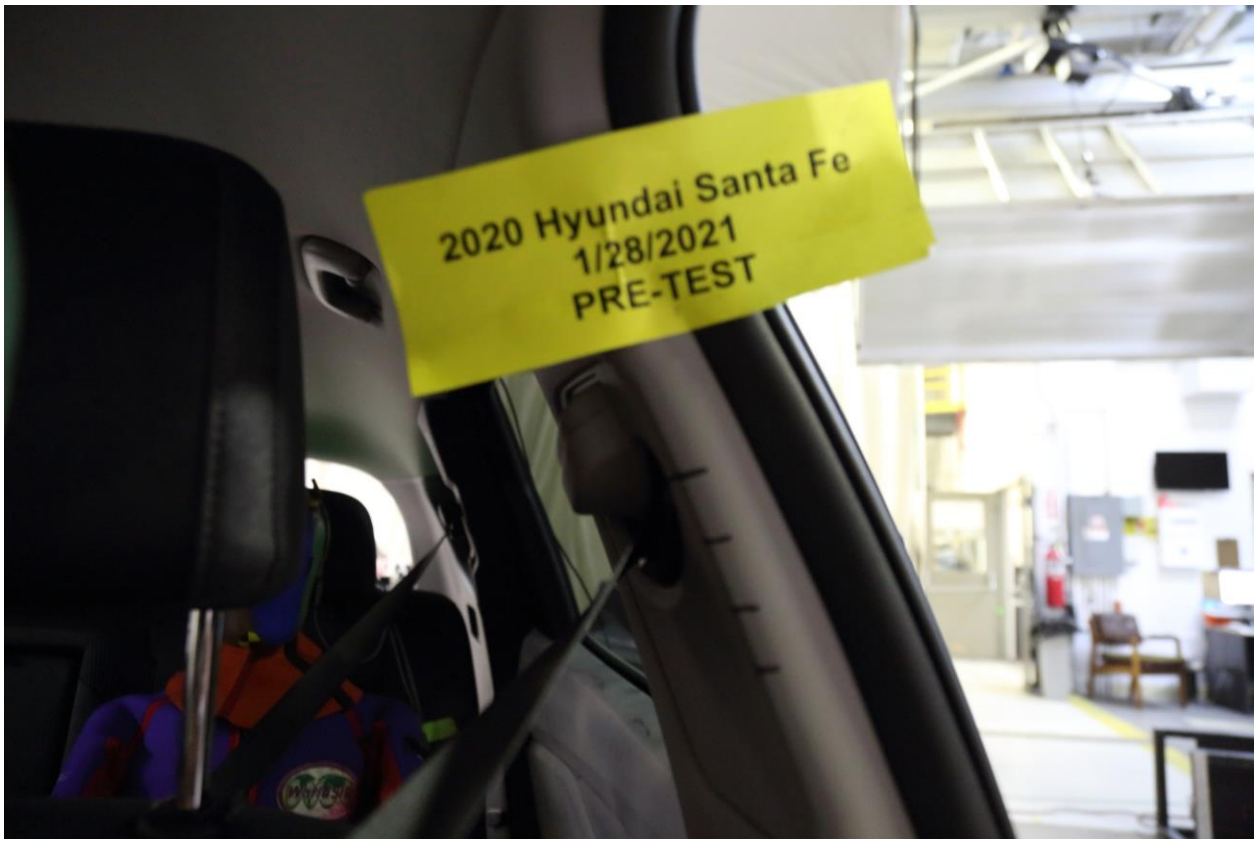
030 Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning

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

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

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

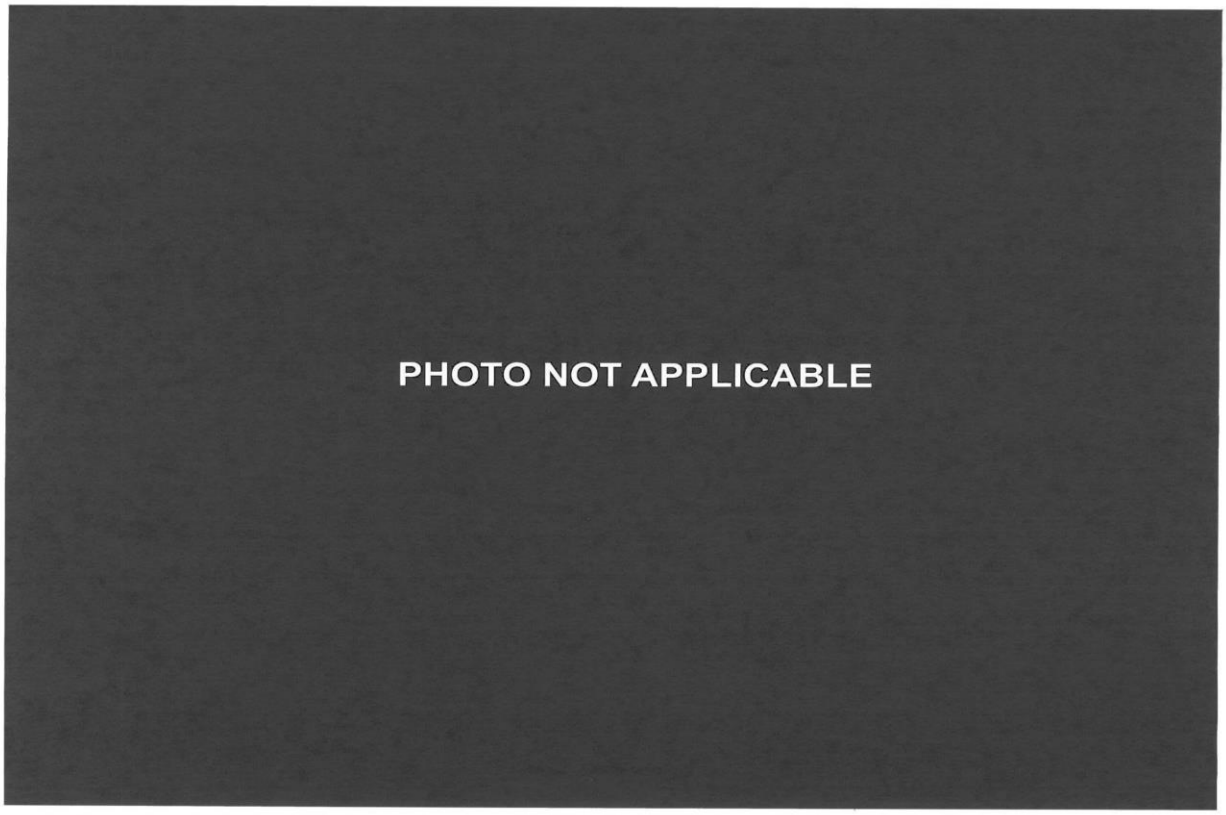
034 Pre-Test Placement of Driver's Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy

036 Pre-Test Left Side View of Steering Wheel

037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake

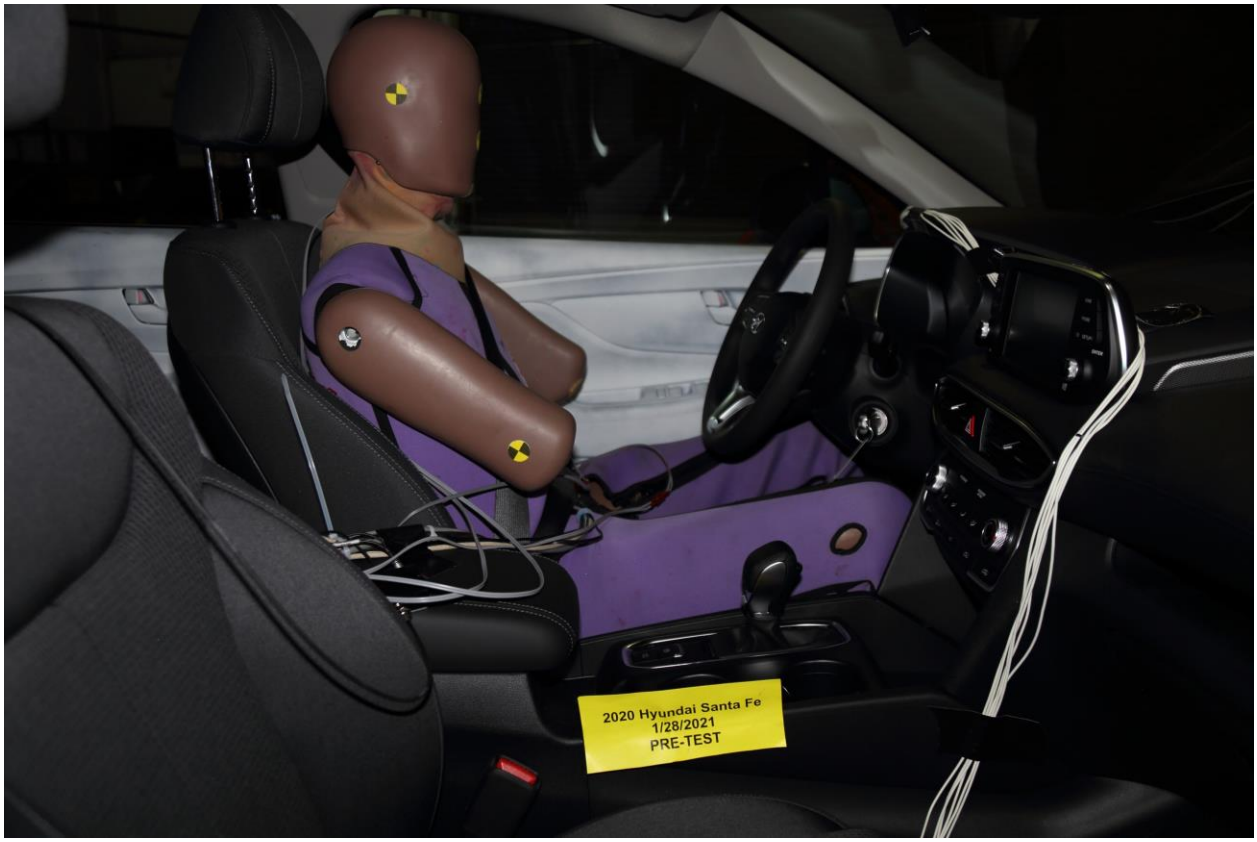
039 Pre-Test Close-Up Left Side View of Driver Seat Track

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

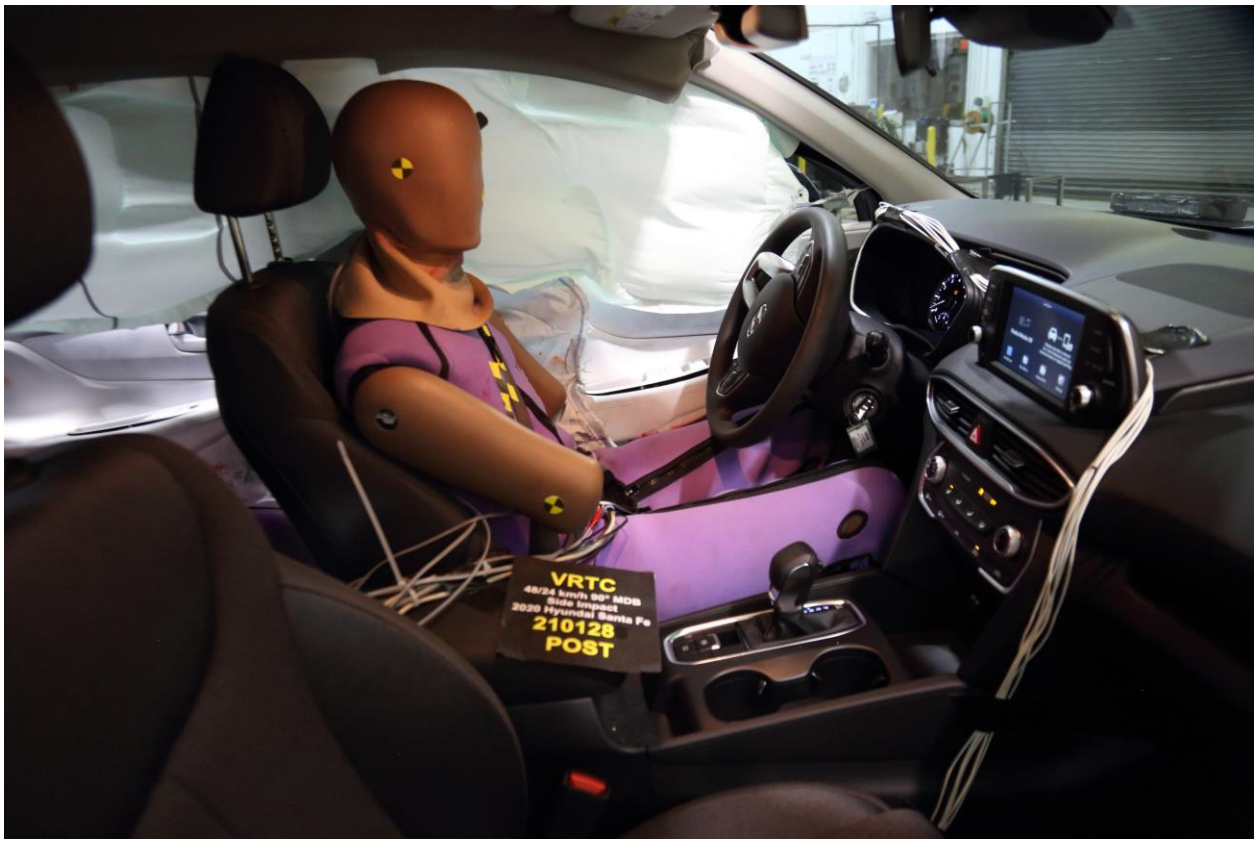
041 Pre-Test Close-Up View of Driver Seat Back or Head Restraint

042 Pre-Test Driver Dummy and Door Clearance View

043 Post-Test Driver Dummy and Door Clearance View



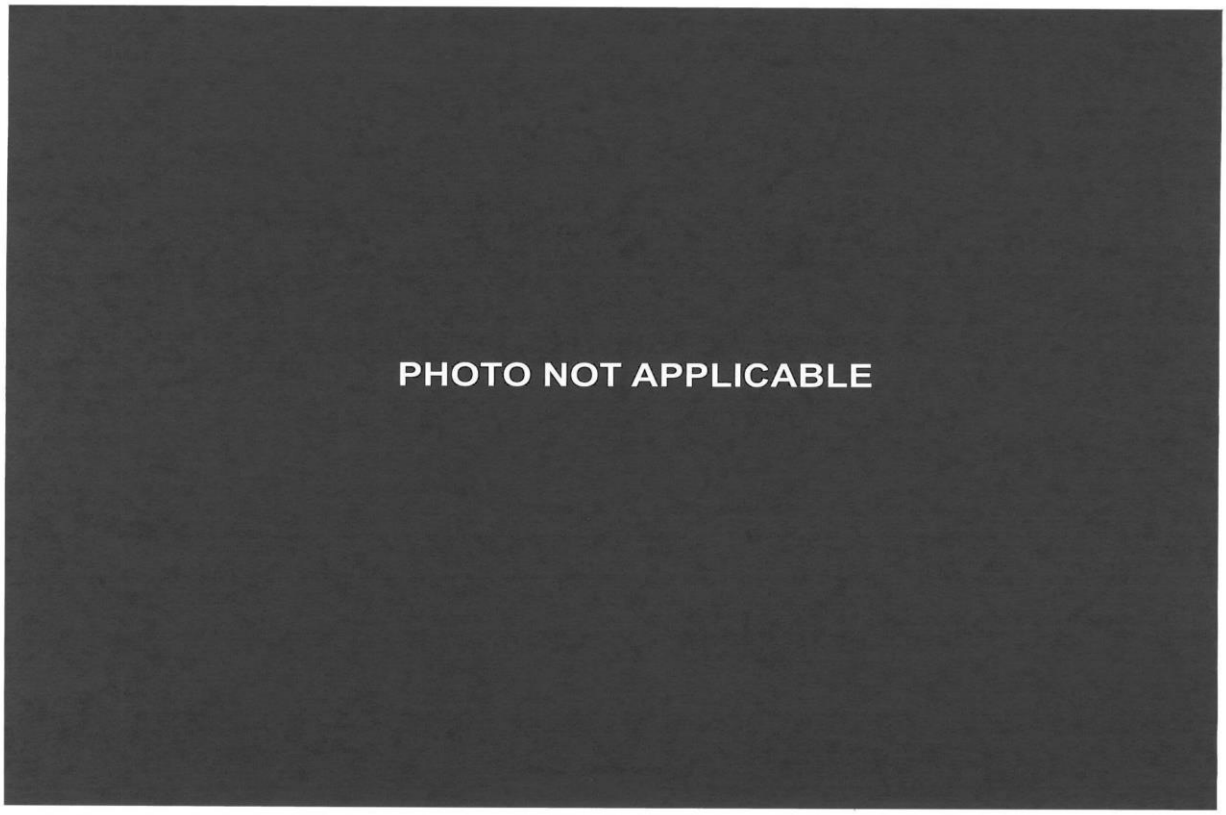
044 Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



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

046 Pre-Test Driver Inner Door Panel View

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



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

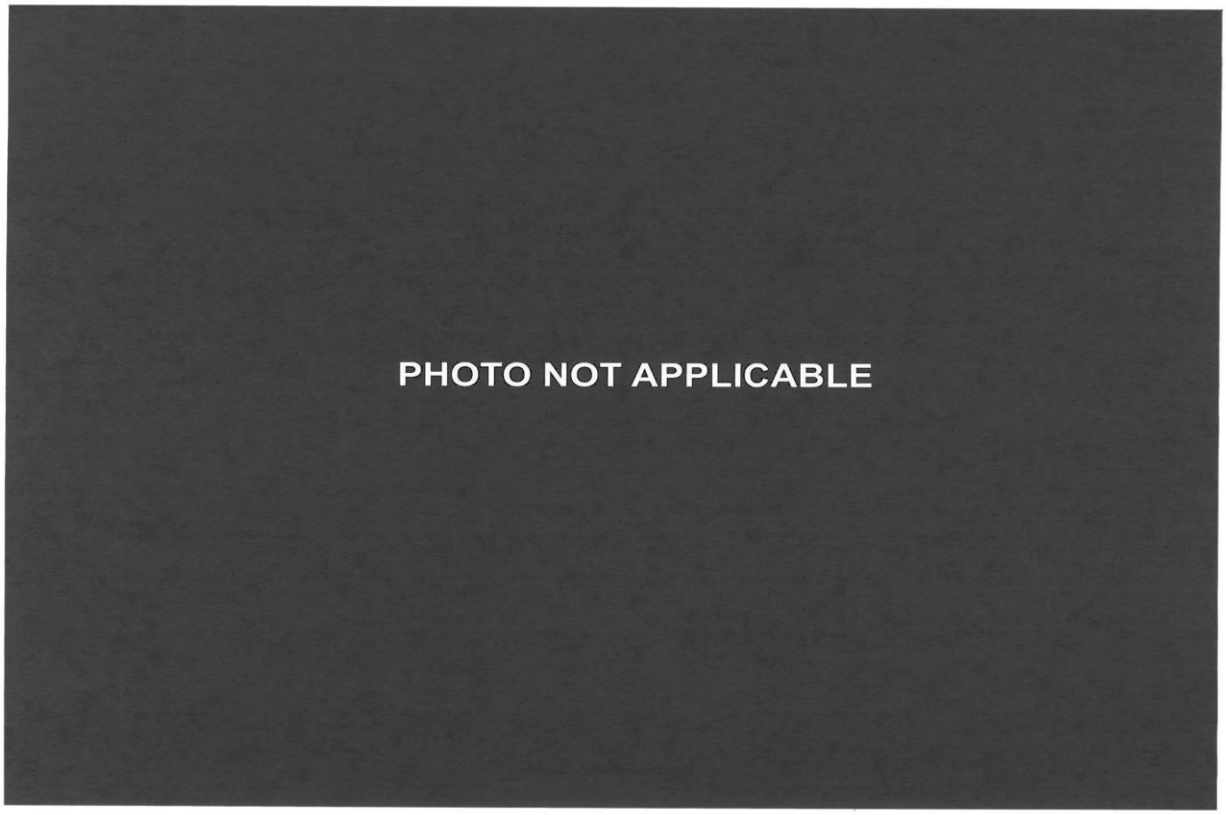
049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

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

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

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

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



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

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

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

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

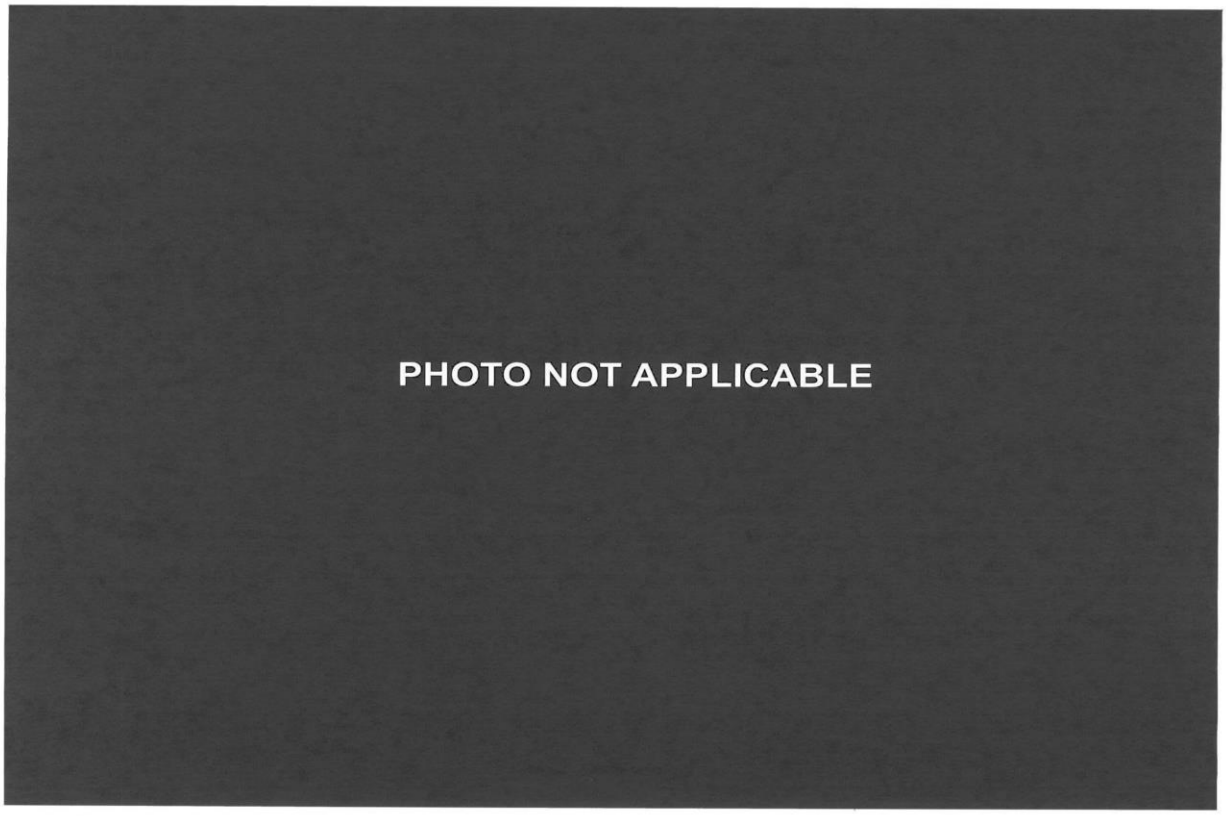
058 Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

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

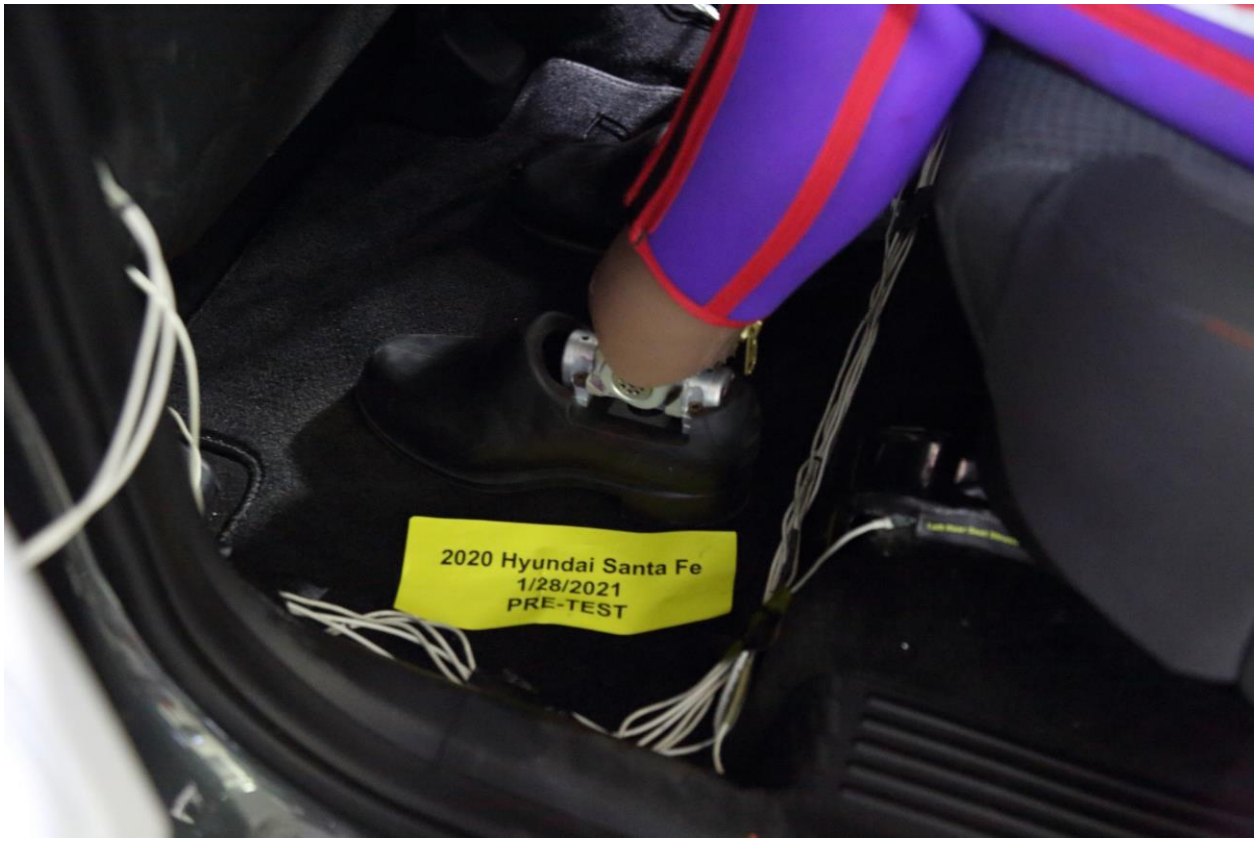
060 Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

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

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



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

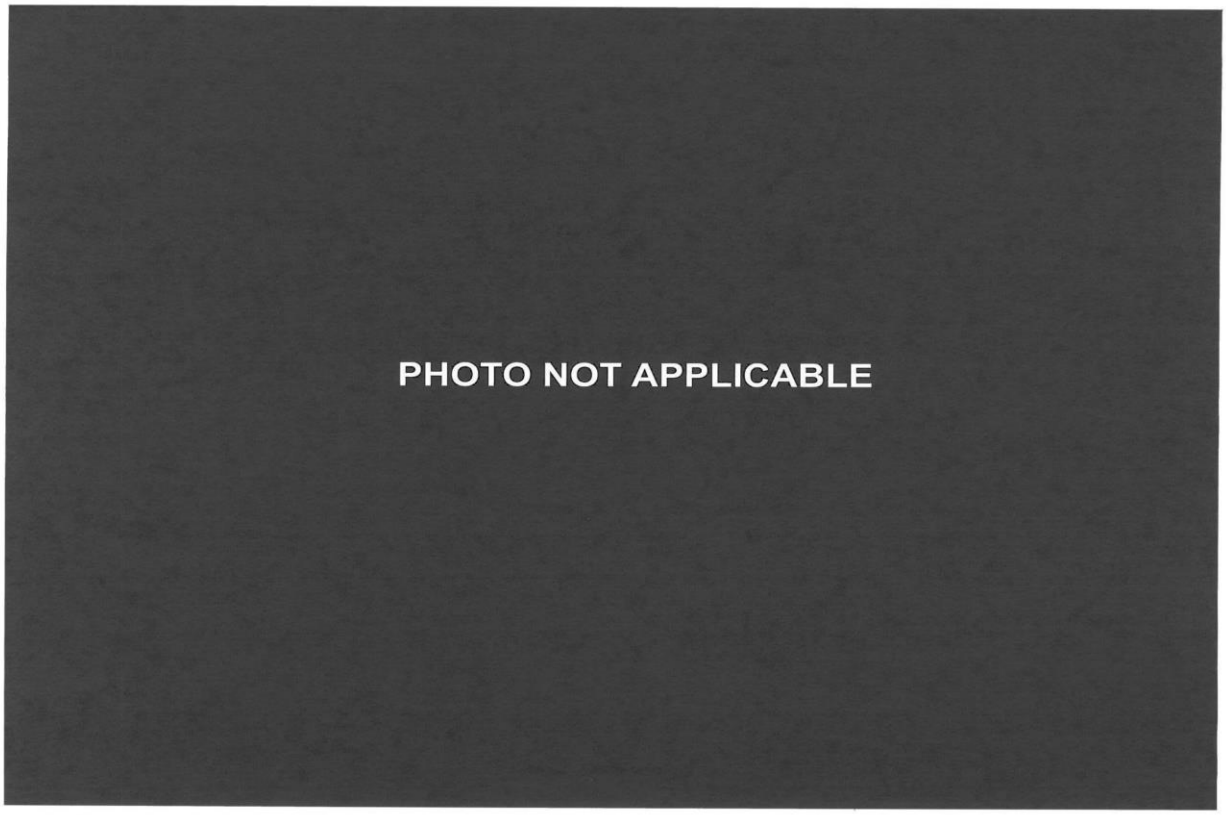


064 Pre-Test Placement of Rear Passenger Dummy's Feet

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

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

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



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

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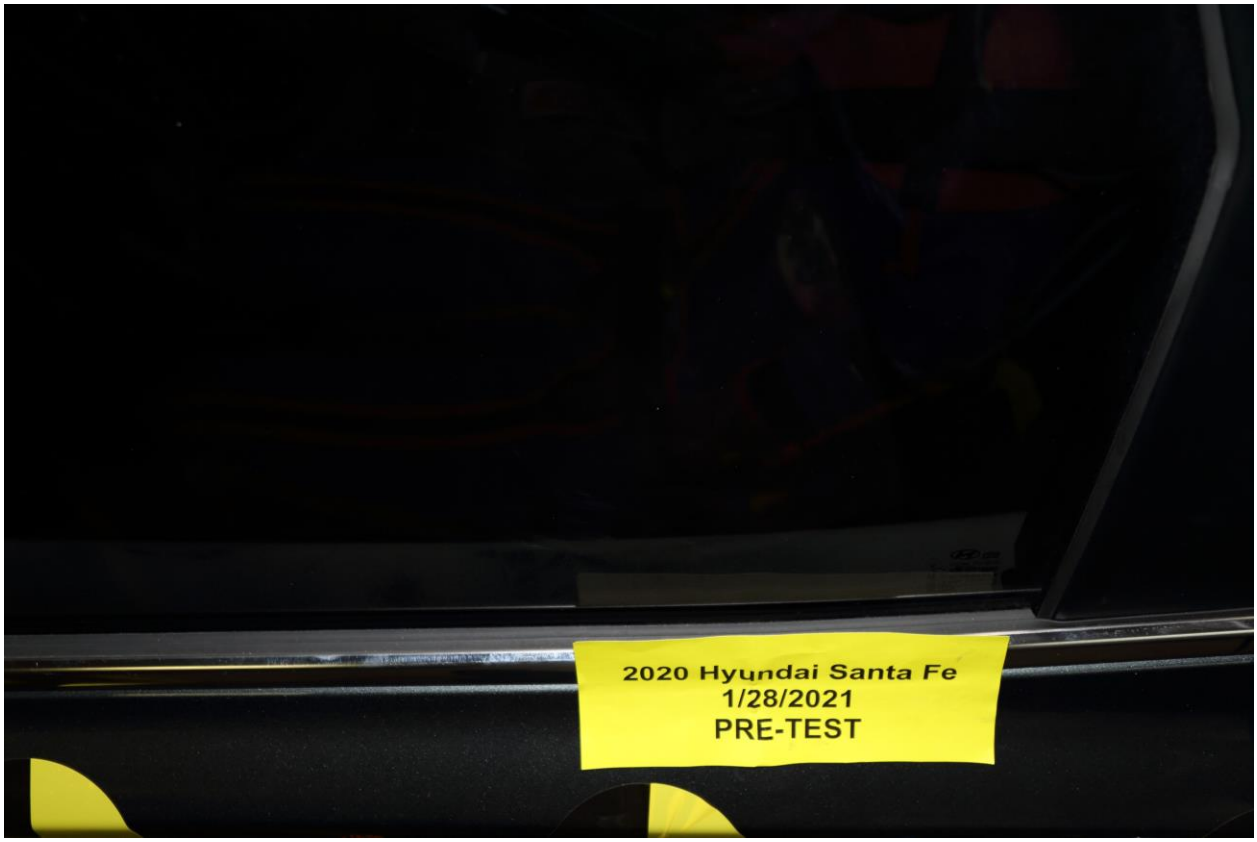


069 Pre-Test Rear Passenger Dummy and Door Clearance View

070 Post-Test Rear Passenger Dummy and Door Clearance View

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

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

073 Pre-Test Rear Passenger Inner Door Panel View

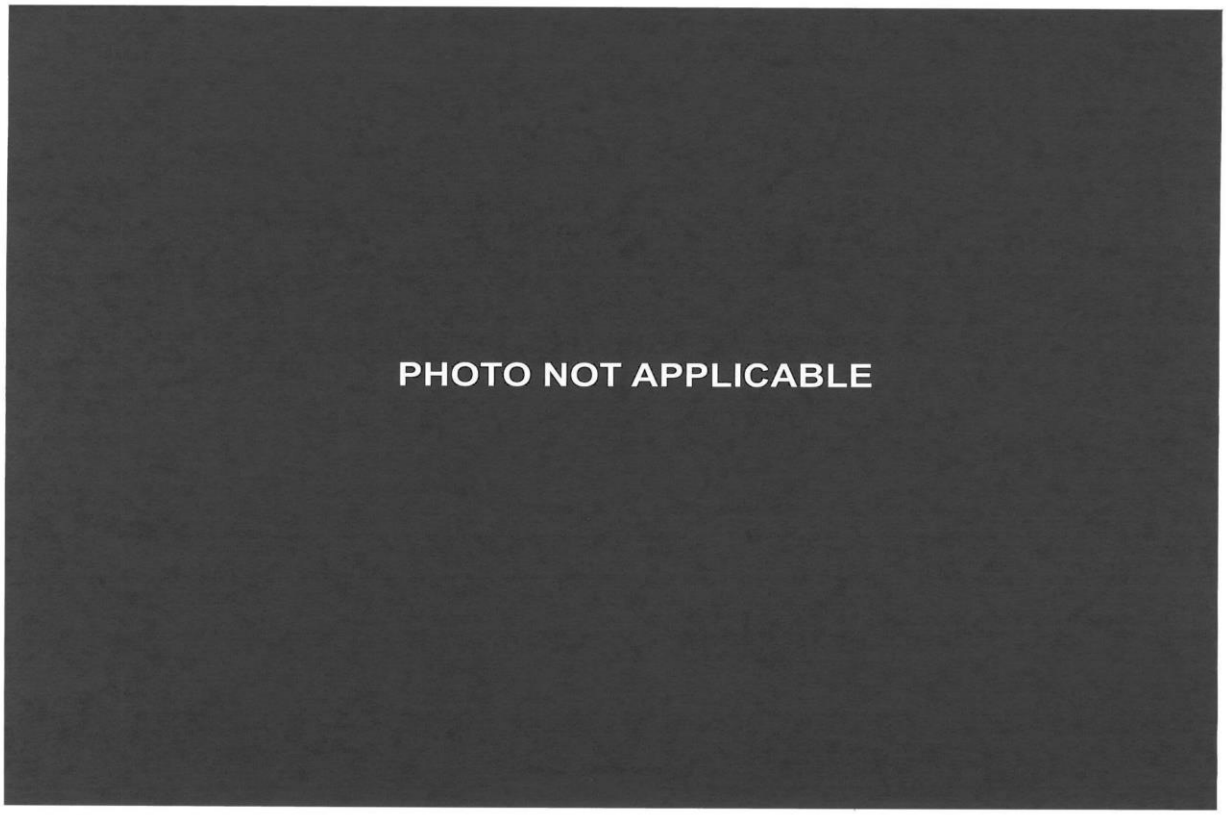
074 Post-Test Rear Passenger Inner Door Panel View

PHOTO NOT APPLICABLE

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

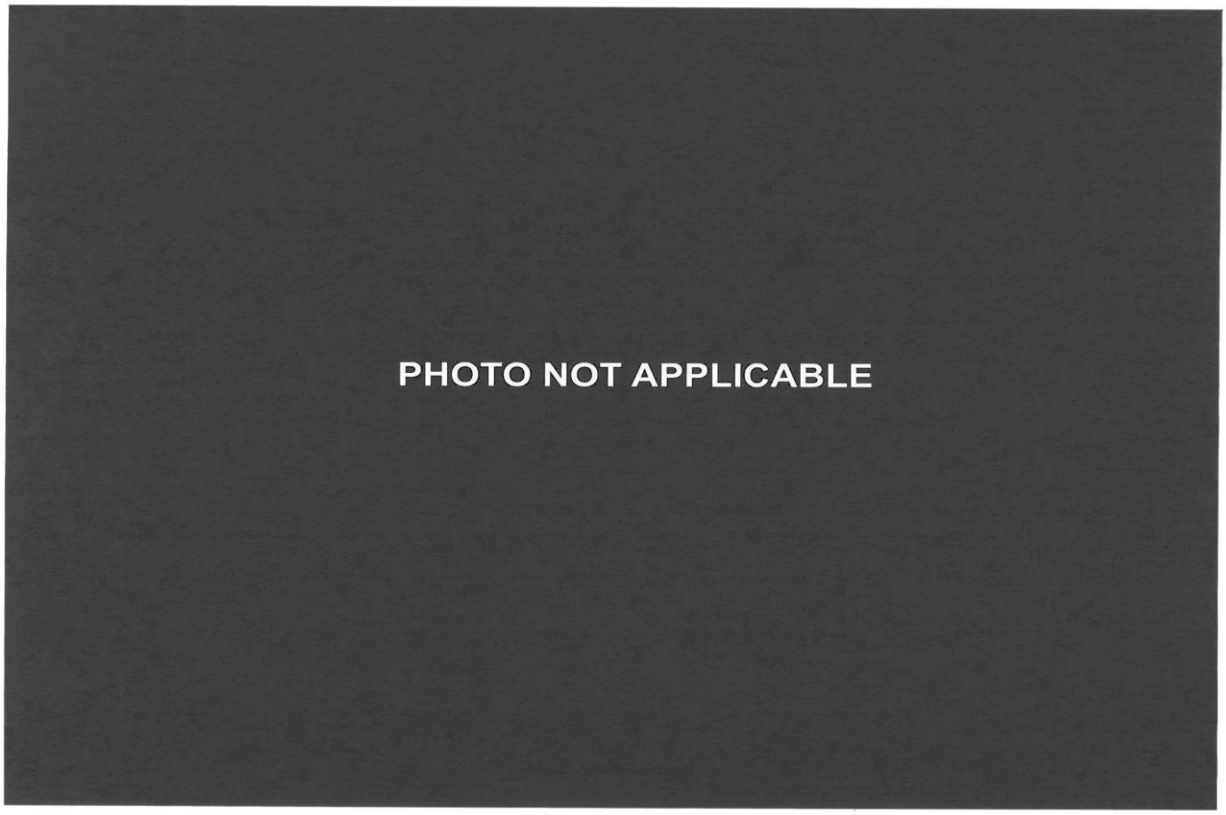
076 Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

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



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

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



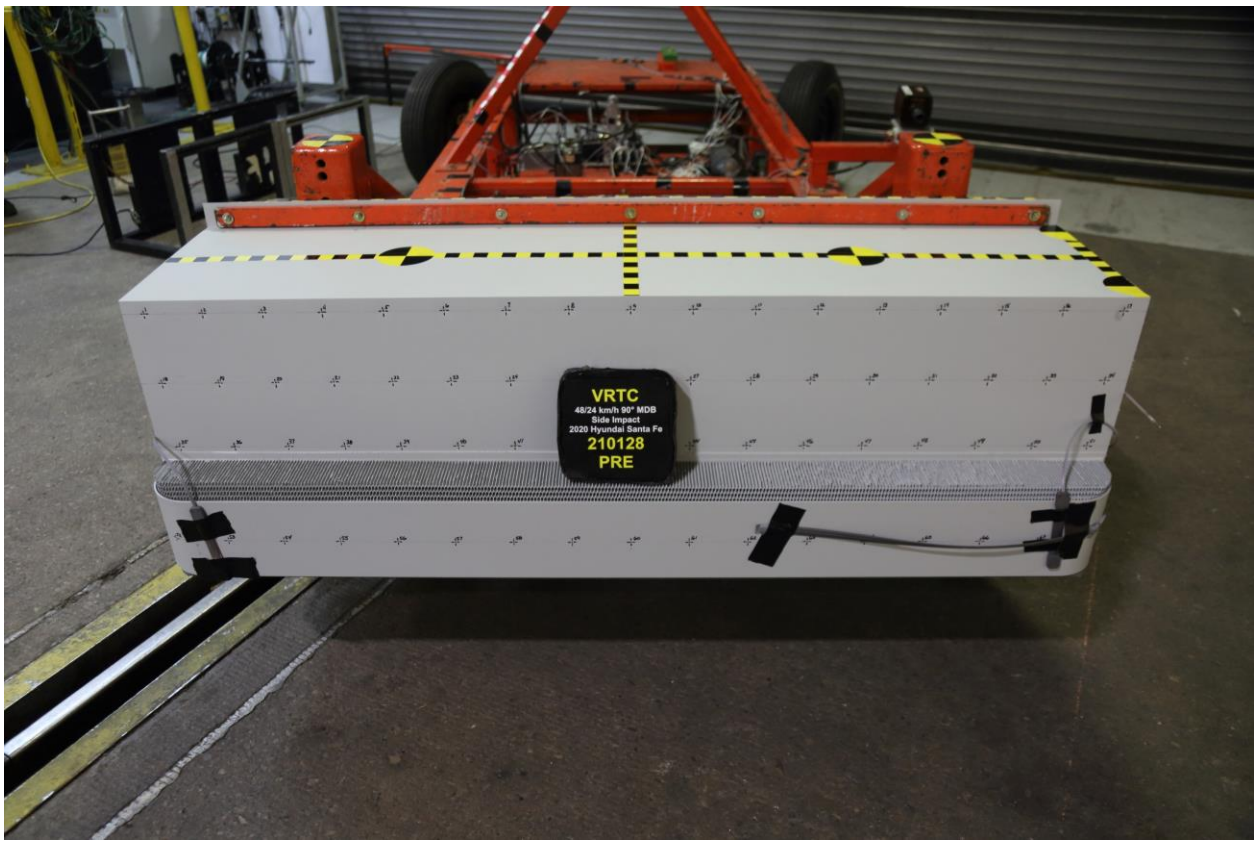
080 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

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

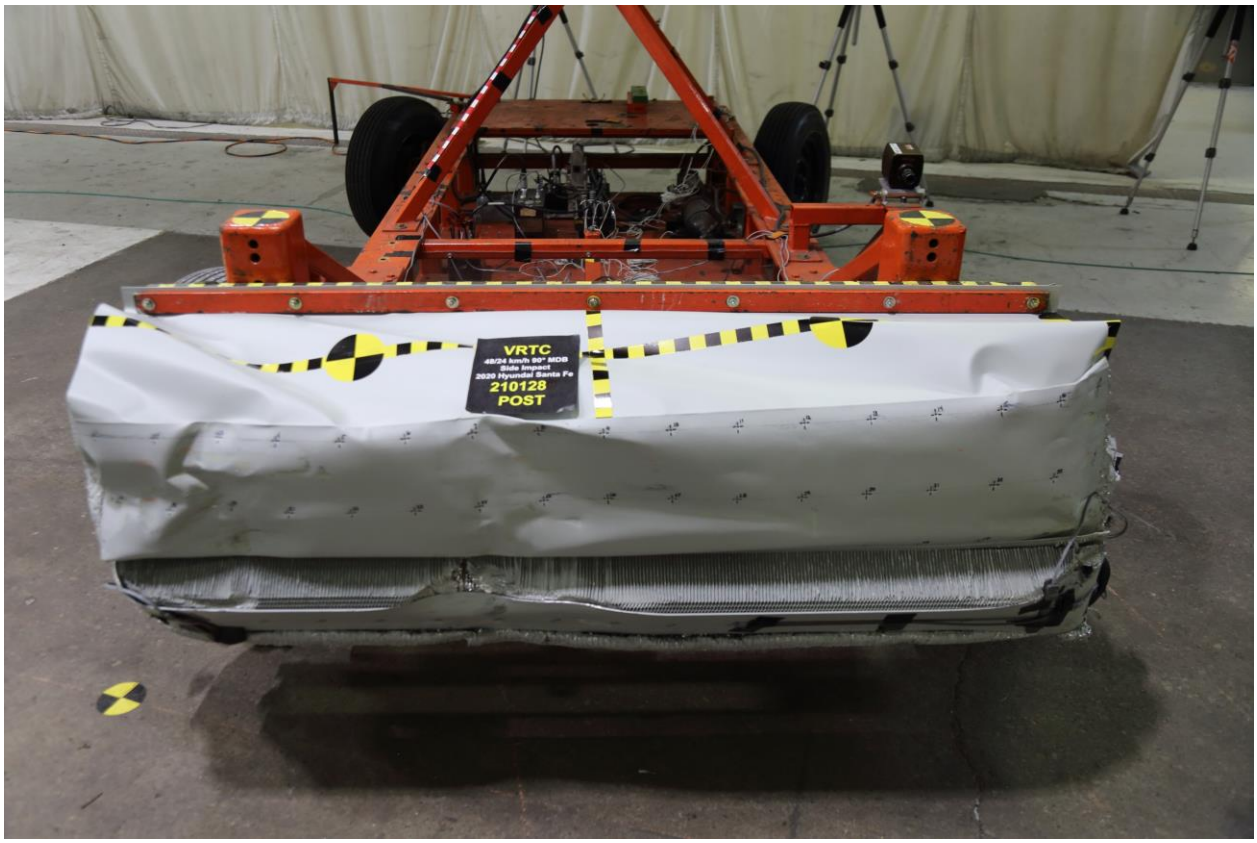
Intentionally Left Blank

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

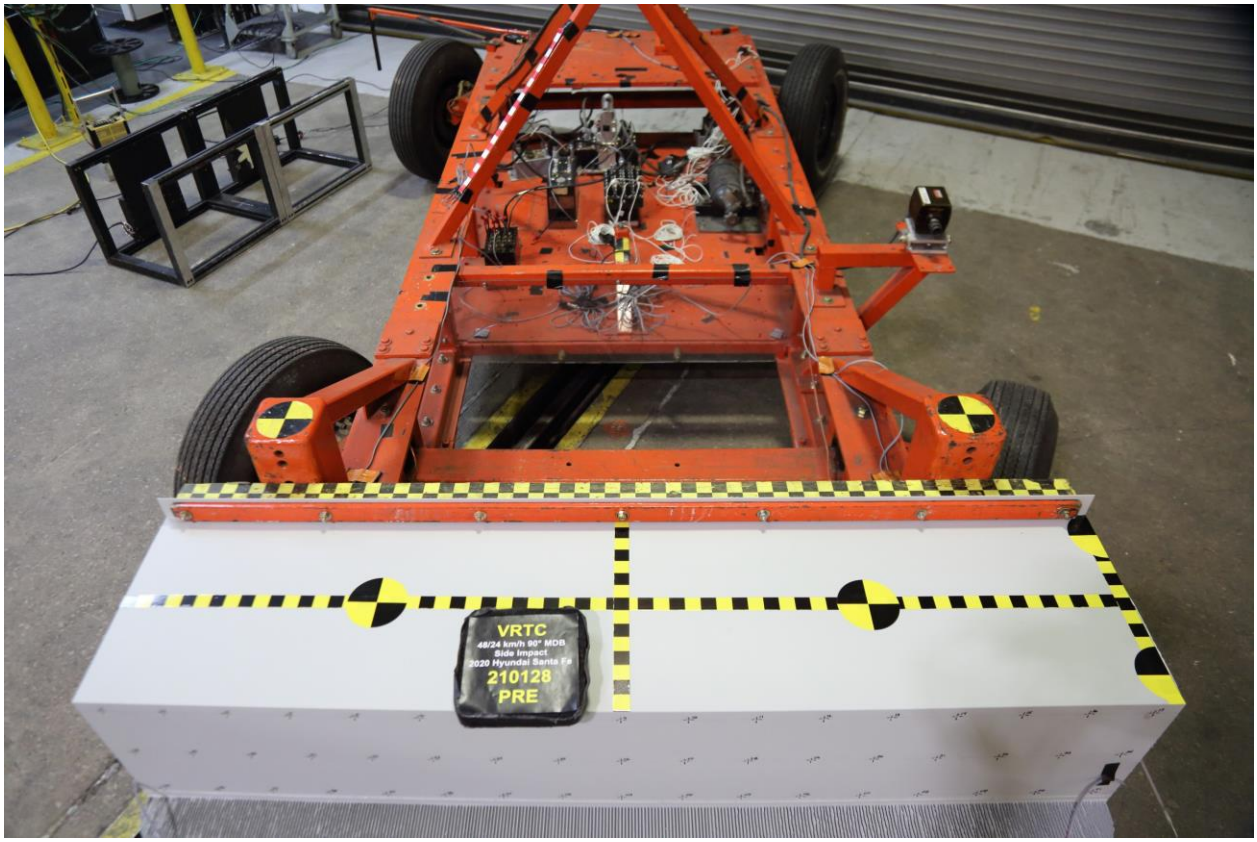
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



084 Pre-Test Front View of MDB Impactor Face

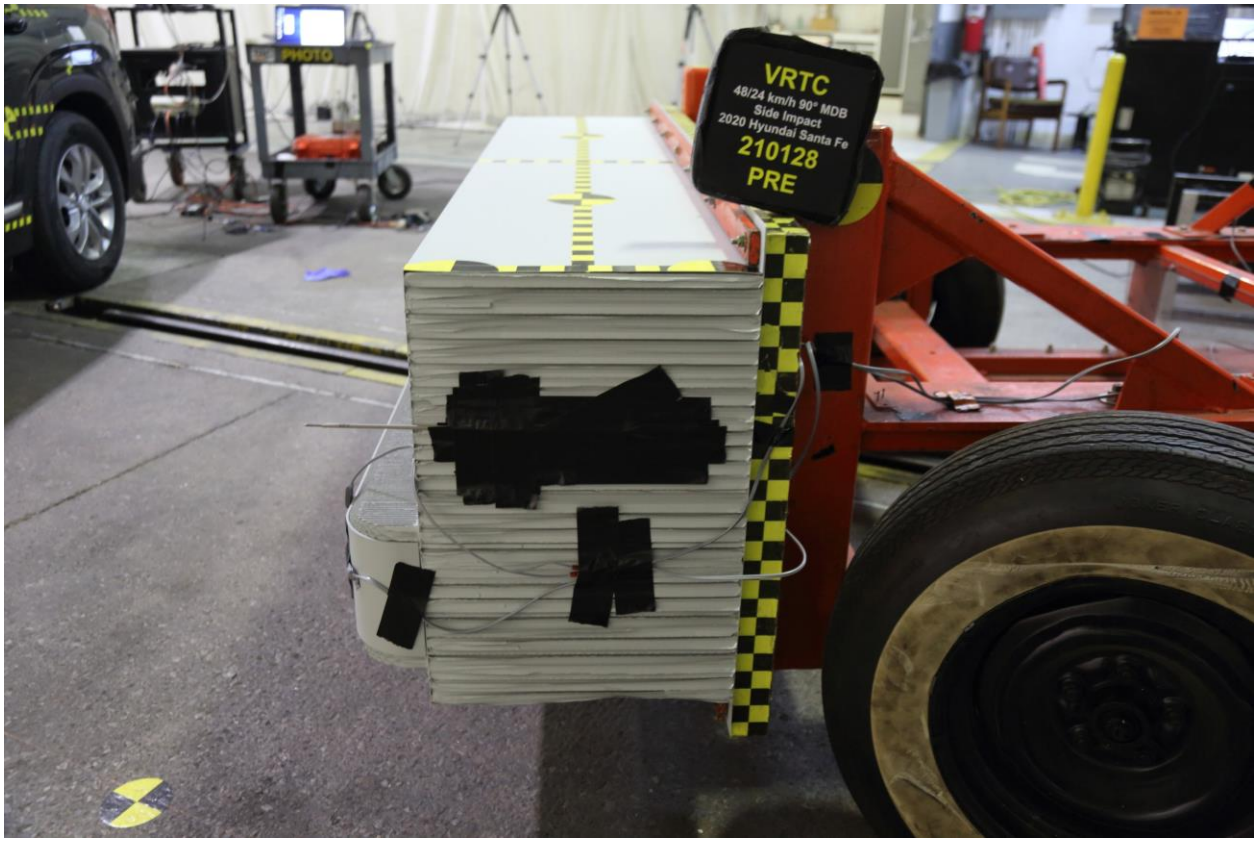


085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face

087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face

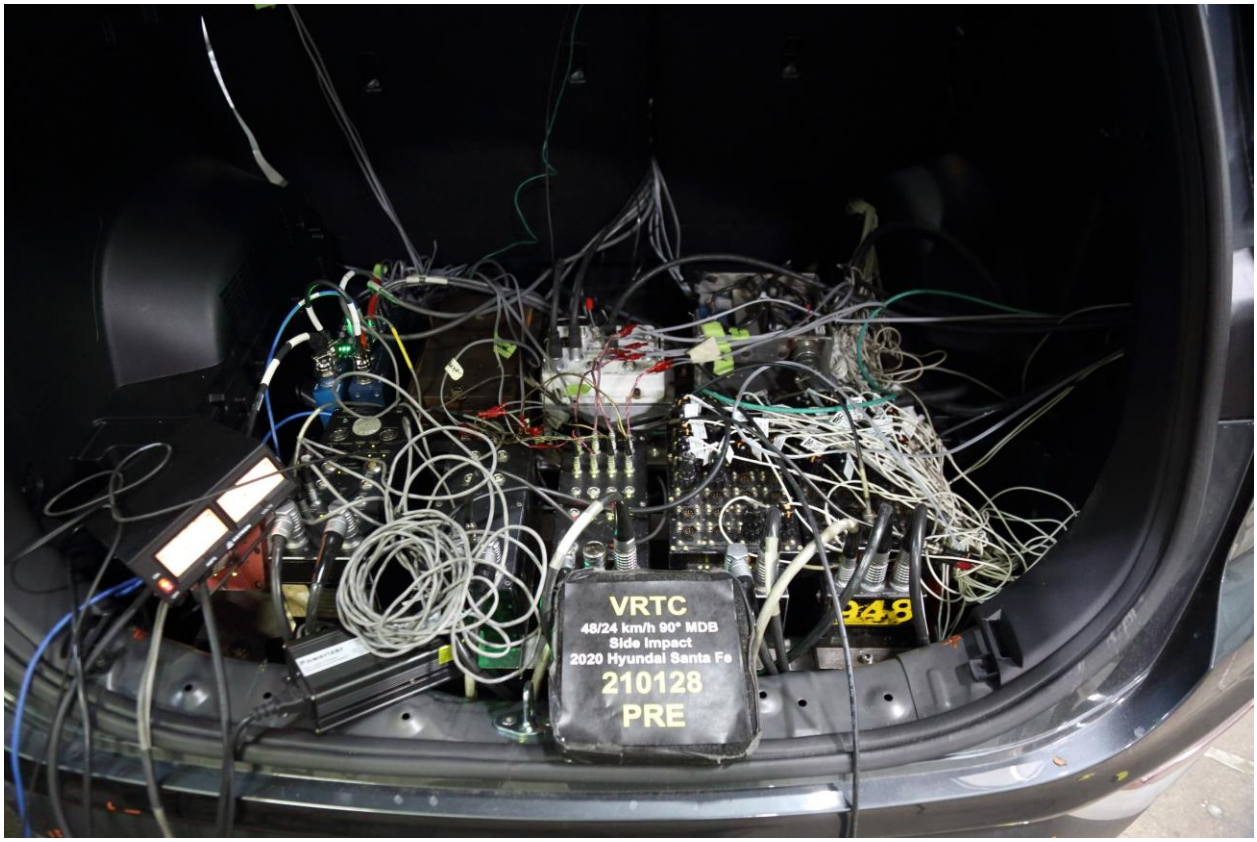
089 Post-Test Left Side View of MDB Impactor Face

090 Pre-Test Right Side View of MDB Impactor Face

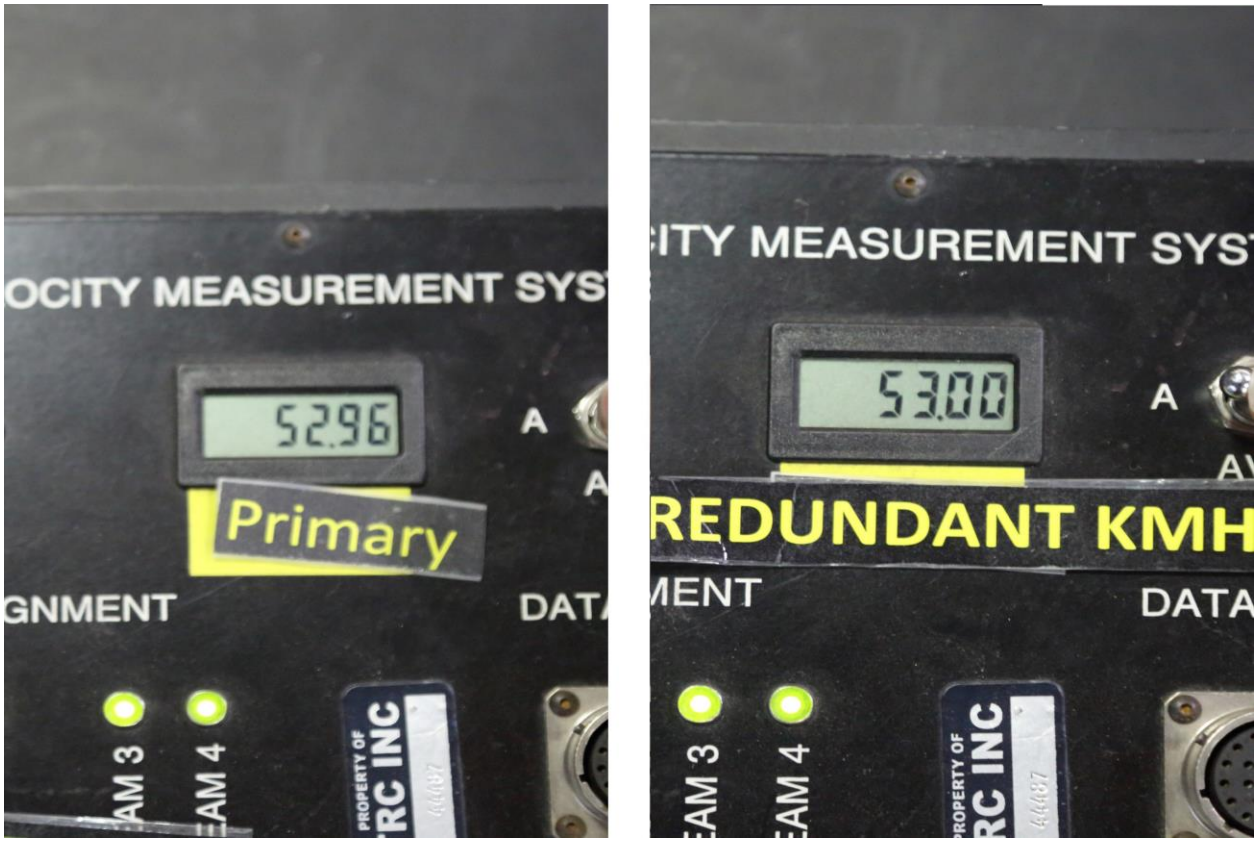
091 Post-Test Right Side View of MDB Impactor Face

092 Close-Up View of Vehicle's Certification Label

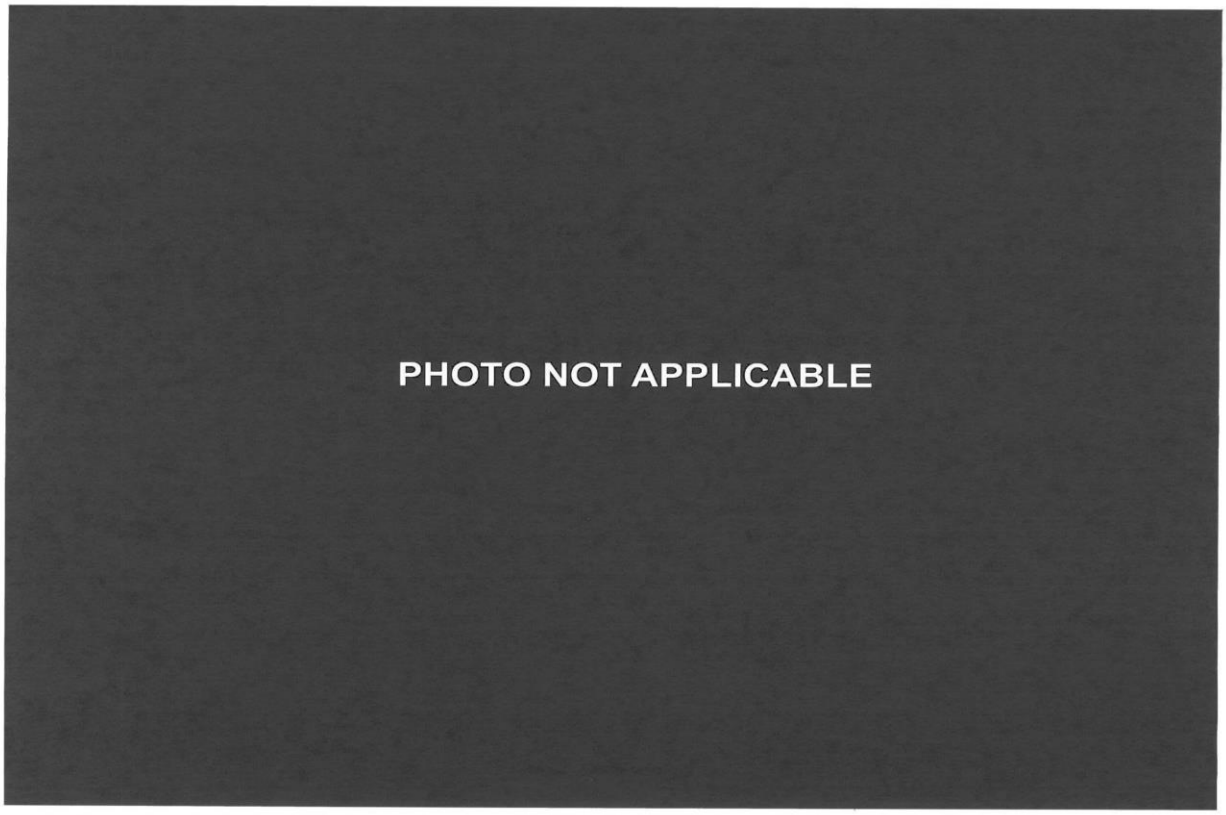
093 Close-Up View of Vehicle's Tire Information Placard or Label



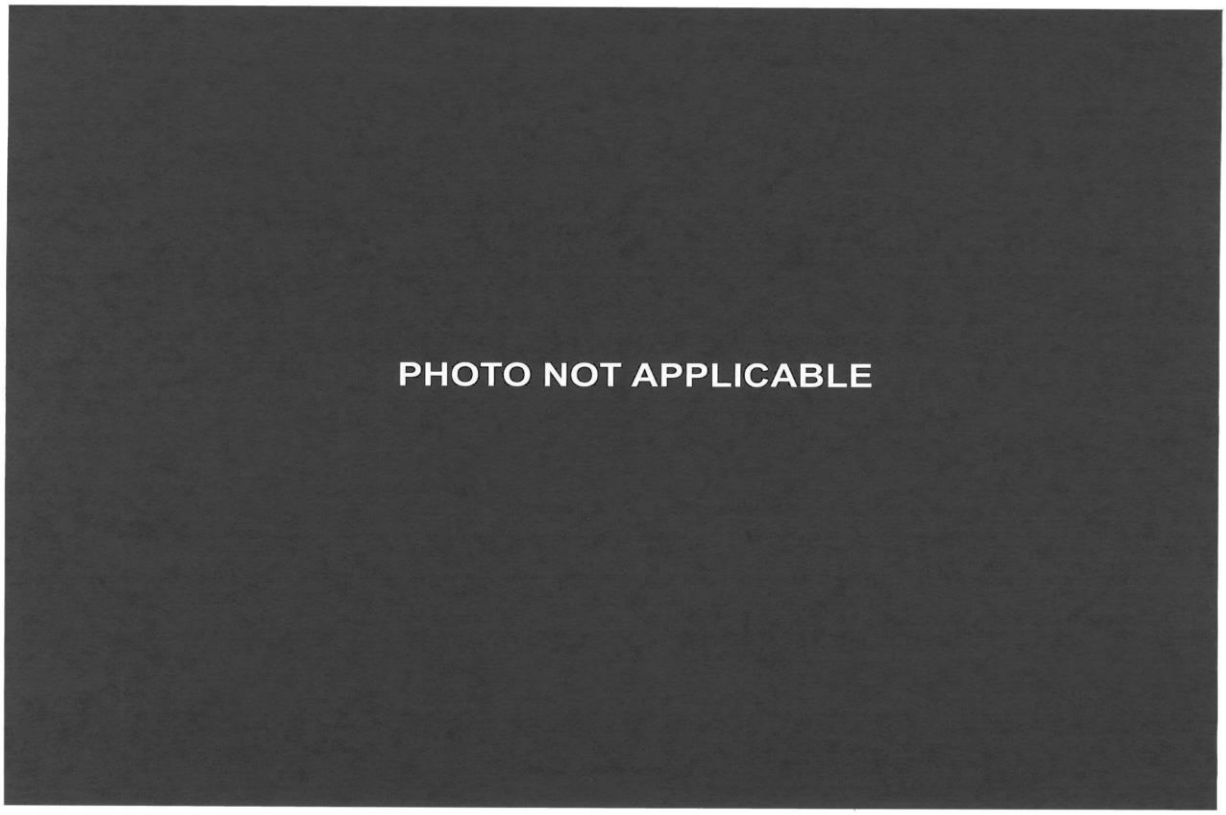
094 Pre-Test Ballast View



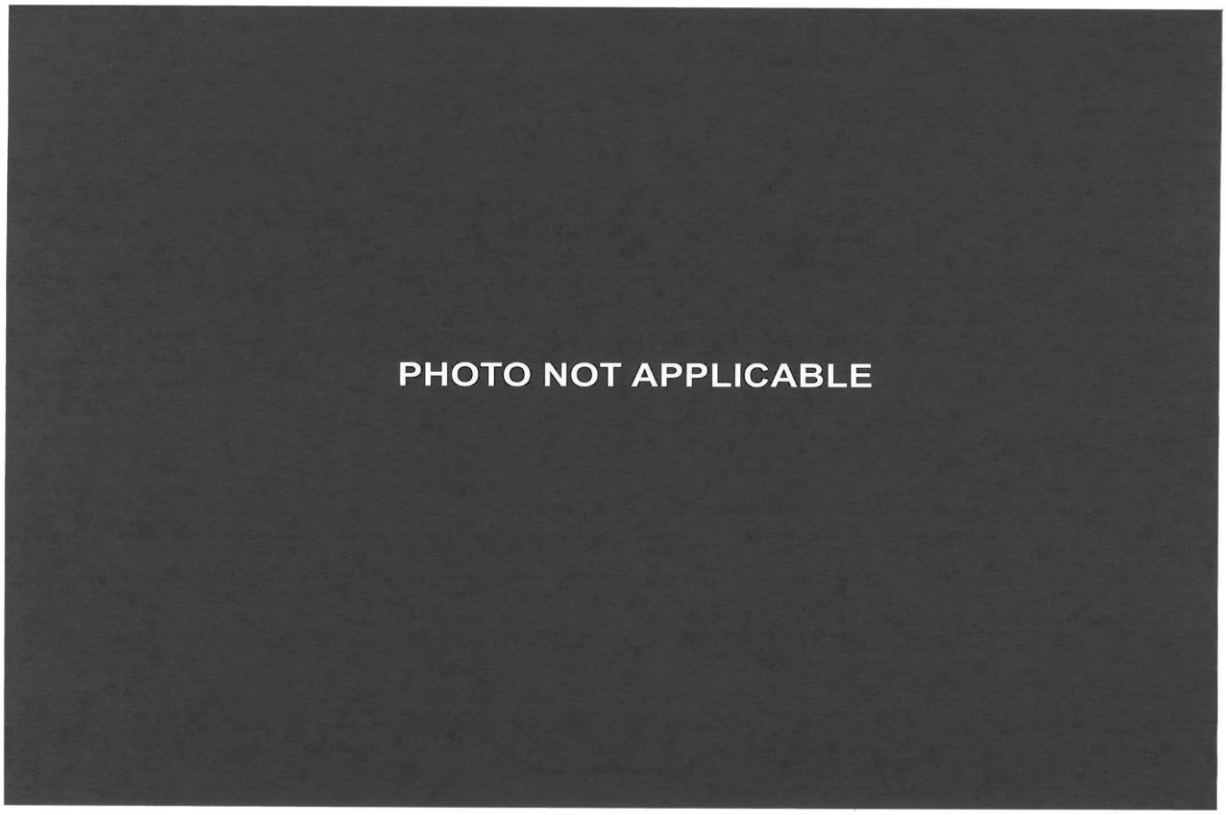
095 No. Post-Test Primary and Redundant Speed Trap Read-Out



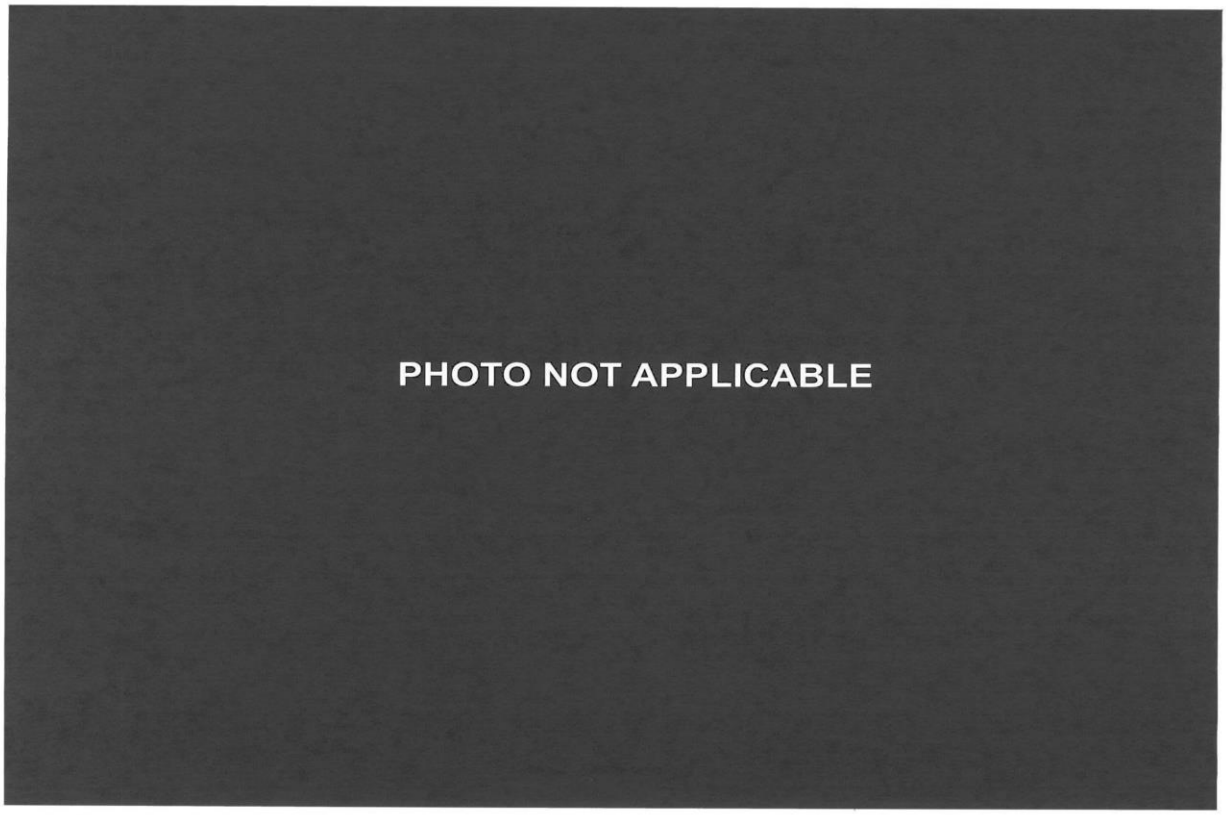
096 FMVSS No. 301 Static Rollover 0 Degrees



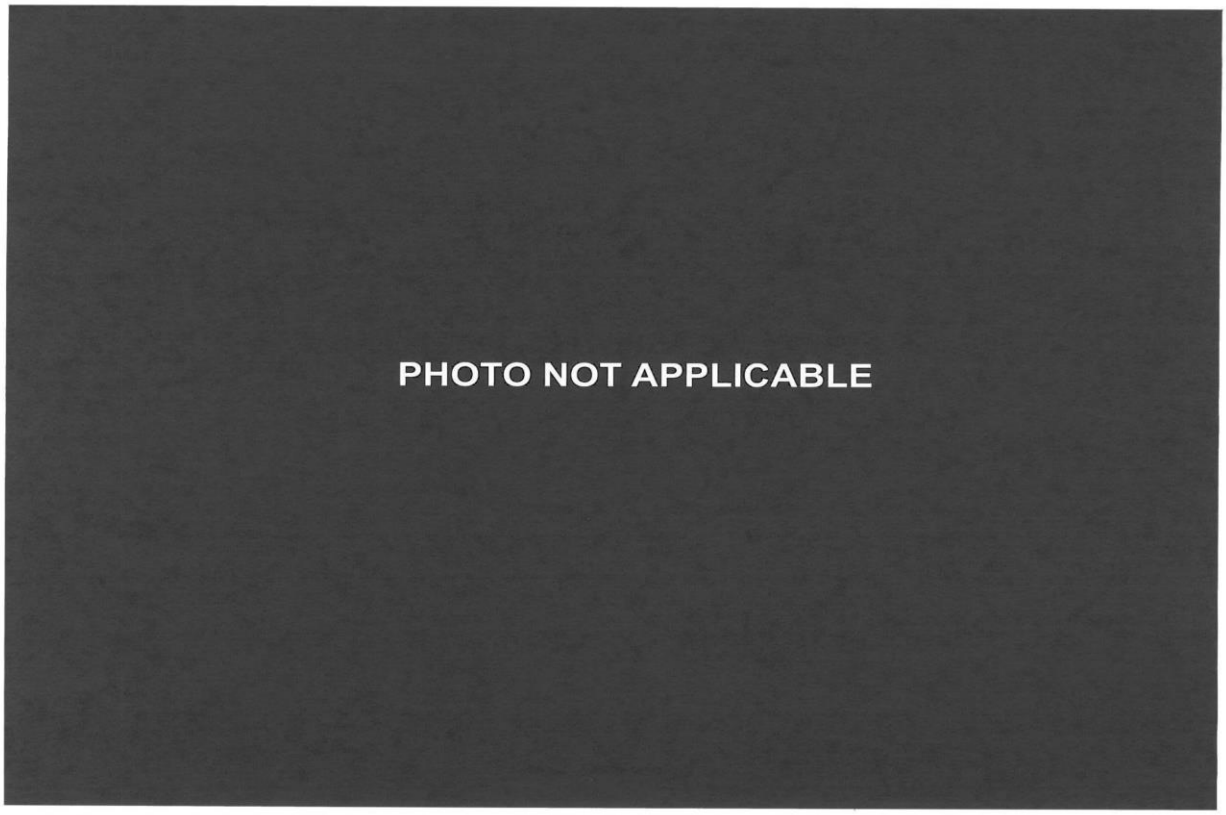
097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees

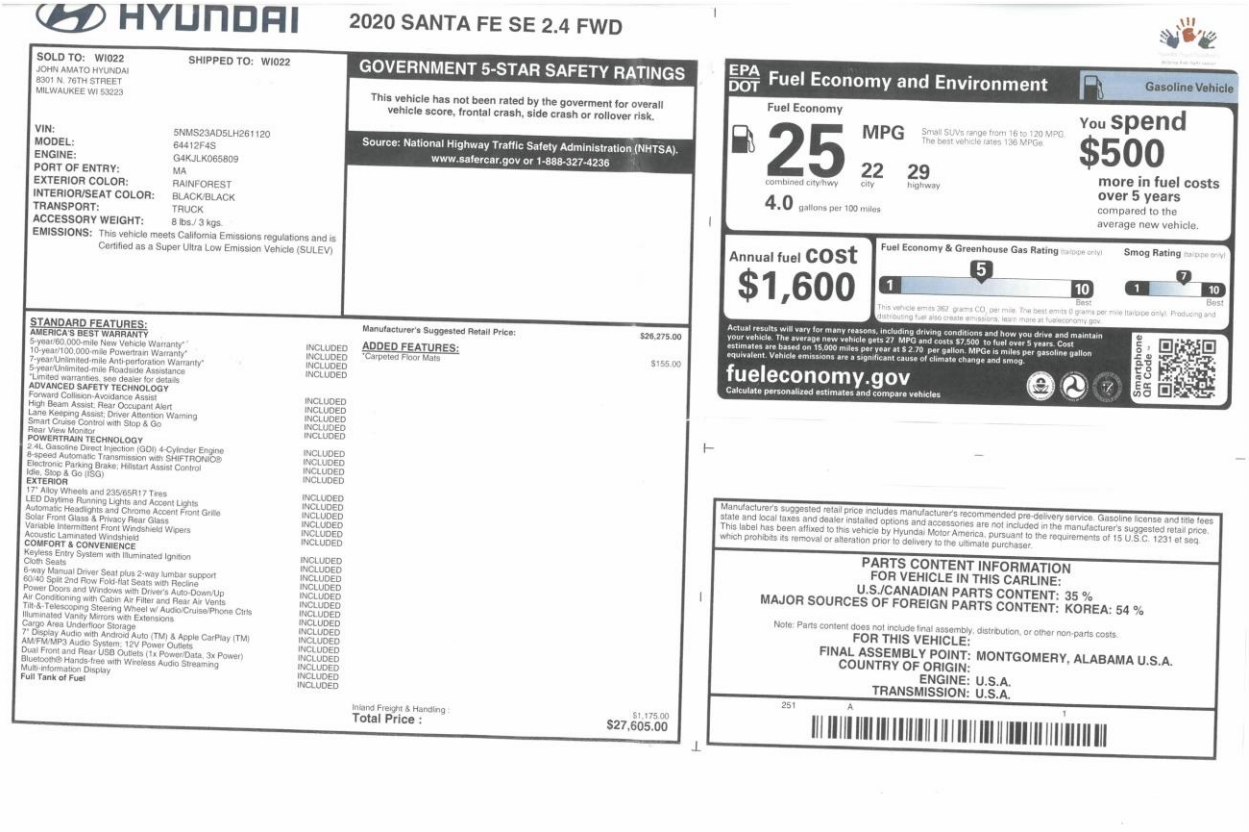


099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees

101 Impact Event



HYUNDAI 2020 SANTA FE SE 2.4 FWD

SOLD TO: WI022
JOHN AMATO HYUNDAI
8301 N. 76TH STREET
MILWAUKEE WI 53223

SHIPPED TO: WI022

VIN: 5NMS23AD5LH261120
MODEL: 64412F4S
ENGINE: G4KJLK065809
PORT OF ENTRY: MA
EXTERIOR COLOR: RAINFOREST
INTERIOR/SEAT COLOR: BLACK/BLACK
TRANSPORT: TRUCK
ACCESSORY WEIGHT: 8 lbs./ 3 kgs.
EMISSIONS: This vehicle meets California Emissions regulations and is Certified as a Super Ultra Low Emission Vehicle (SULEV)

GOVERNMENT 5-STAR SAFETY RATINGS

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

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

STANDARD FEATURES:
AMERICA'S BEST WARRANTY
5-year/60,000-mile New Vehicle Warranty* INCLUDED
10-year/100,000-mile Powertrain Warranty* INCLUDED
7-year/Unlimited-mile Anti-perforation Warranty* INCLUDED
5-year/Unlimited-mile Roadside Assistance INCLUDED
*Limited warrantees, see dealer for details
ADVANCED SAFETY TECHNOLOGY
Forward Collision-Avoidance Assist INCLUDED
High Beam Assist; Rear Occupant Alert INCLUDED
Lane Keeping Assist; Driver Attention Warning INCLUDED
Smart Cruise Control with Stop & Go INCLUDED
Rear View Monitor INCLUDED
POWERTRAIN TECHNOLOGY
2.4L Gasoline Direct Injection (GDI) 4-Cylinder Engine INCLUDED
8-speed Automatic Transmission with SHIFTRONIC® INCLUDED
Electronic Parking Brake; Hillstart Assist Control INCLUDED
Idle, Stop & Go (ISG) INCLUDED
EXTERIOR
17" Alloy Wheels and 235/65R17 Tires INCLUDED
LED Daytime Running Lights and Accent Lights INCLUDED
Automatic Headlights and Chrome Accent Front Grille INCLUDED
Solar Front Glass & Privacy Rear Glass INCLUDED
Variable Intermittent Front Windshield Wipers INCLUDED
Acoustic Laminated Windshield INCLUDED
COMFORT & CONVENIENCE
Keyless Entry System with Illuminated Ignition INCLUDED
Cloth Seats INCLUDED
6-way Manual Driver Seat plus 2-way lumbar support INCLUDED
60/40 Split 2nd Row Fold-flat Seats with Recline INCLUDED
Power Doors and Windows with Driver's Auto-Down/Up INCLUDED
Air Conditioning with Cabin Air Filter and Rear Air Vents INCLUDED
Tilt-&-Telescoping Steering Wheel w/ Audio/Cruise/Phone Ctrls INCLUDED
Illuminated Vanity Mirrors with Extensions INCLUDED
Cargo Area Underfloor Storage INCLUDED
7" Display Audio with Android Auto (TM) & Apple CarPlay (TM) INCLUDED
AM/FM/MP3 Audio System; 12V Power Outlets INCLUDED
Dual Front and Rear USB Outlets (1x Power/Data, 3x Power) INCLUDED
Bluetooth® Hands-free with Wireless Audio Streaming INCLUDED
Multi-information Display INCLUDED
Full Tank of Fuel INCLUDED

Manufacturer's Suggested Retail Price: $26,275.00

ADDED FEATURES:
*Carpeted Floor Mats $155.00

Inland Freight & Handling: $1,175.00
Total Price: $27,605.00

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
25 MPG (combined city/hwy) — 22 city — 29 highway
Small SUVs range from 16 to 120 MPG. The best vehicle rates 136 MPGe
4.0 gallons per 100 miles

You spend $500 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel COST $1,600

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 5 (1–10, Best)
Smog Rating (tailpipe only): 7 (1–10, Best)
This vehicle emits 362 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

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs $7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $ 2.70 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

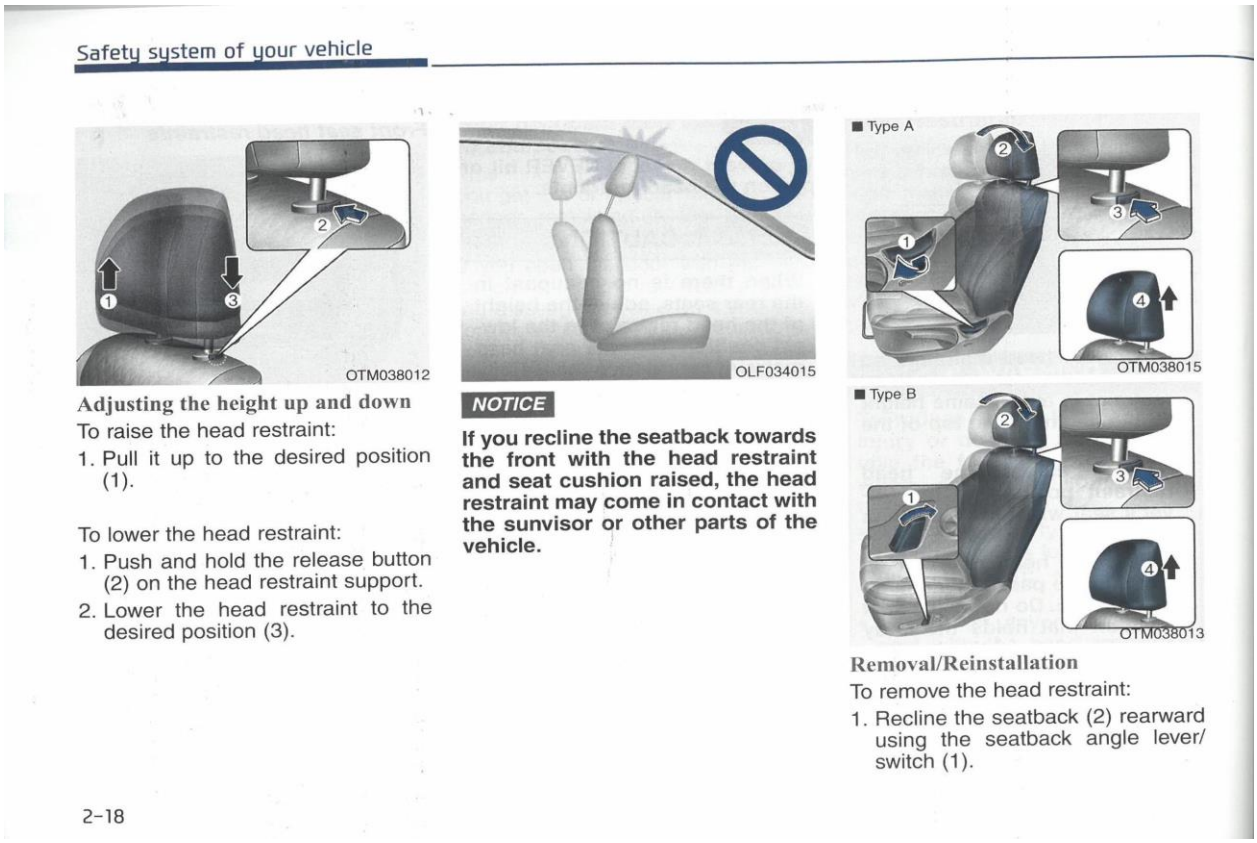
Smartphone QR Code

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

PARTS CONTENT INFORMATION
FOR VEHICLE IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 35 %
MAJOR SOURCES OF FOREIGN PARTS CONTENT: KOREA: 54 %
Note: Parts content does not include final assembly, distribution, or other non-parts costs.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: MONTGOMERY, ALABAMA U.S.A.
COUNTRY OF ORIGIN:
ENGINE: U.S.A.
TRANSMISSION: U.S.A.

251 A 1

102 Monroney Label



Safety system of your vehicle

OTM038012

Adjusting the height up and down

To raise the head restraint:

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

To lower the head restraint:

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

OLF034015

NOTICE

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

■ Type A

OTM038015

■ Type B

OTM038013

Removal/Reinstallation

To remove the head restraint:

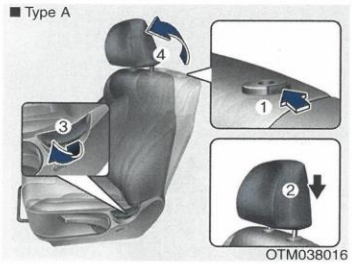
1. Recline the seatback (2) rearward using the seatback angle lever/ switch (1).

2-18

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

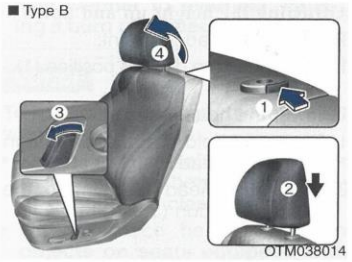
2. Raise the head restraint as far as it can go.
3. Press the head restraint release button (3) while pulling the head restraint up (4).

■ Type A



OTM038016

■ Type B



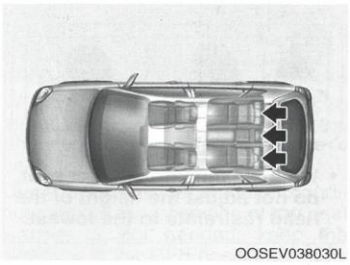
OTM038014

To reinstall the head restraint:

1. Put the head restraint poles (2) into the holes while pressing the release button (1).

2. Adjust the head restraint to the appropriate height.
3. Adjust the seatback (4) forward using the seatback angle lever/ switch (3).

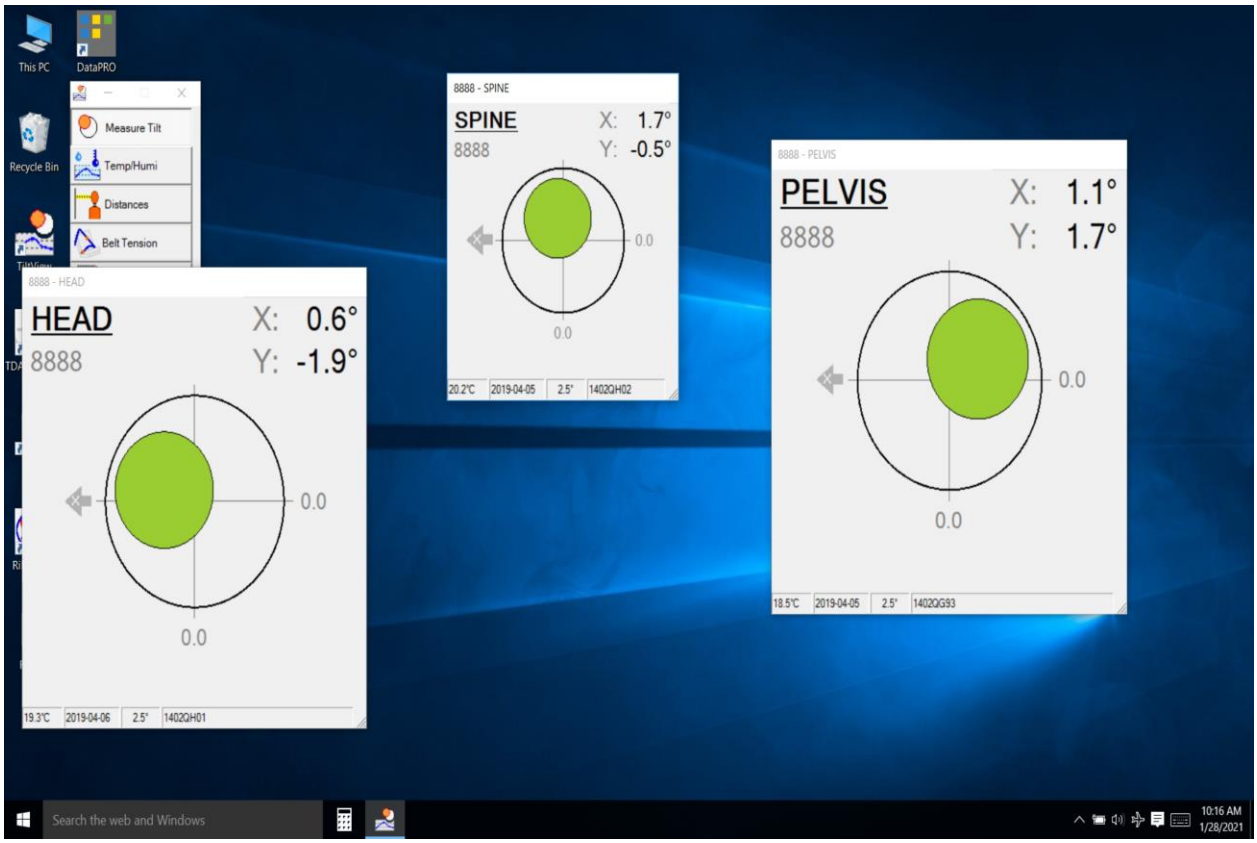
Rear seat head restraints



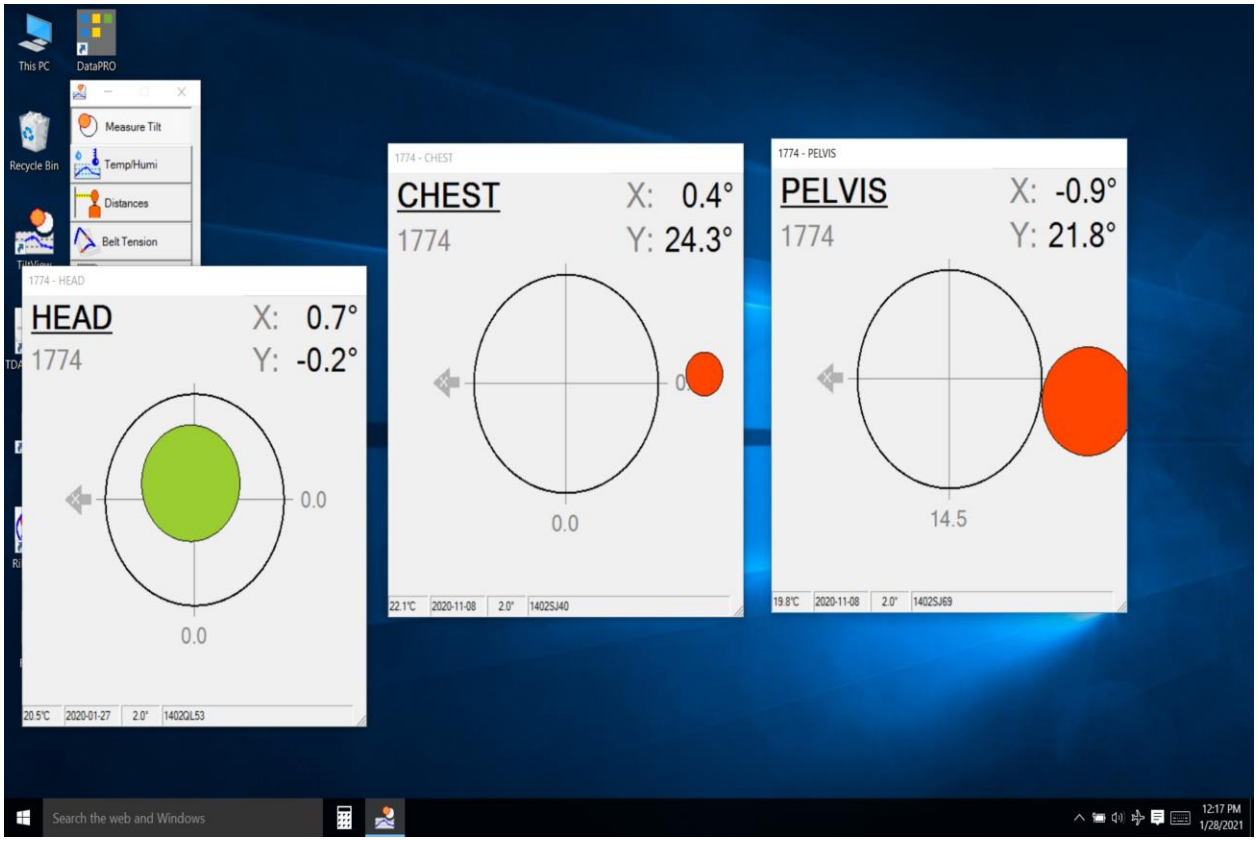
OOSEV038030L

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

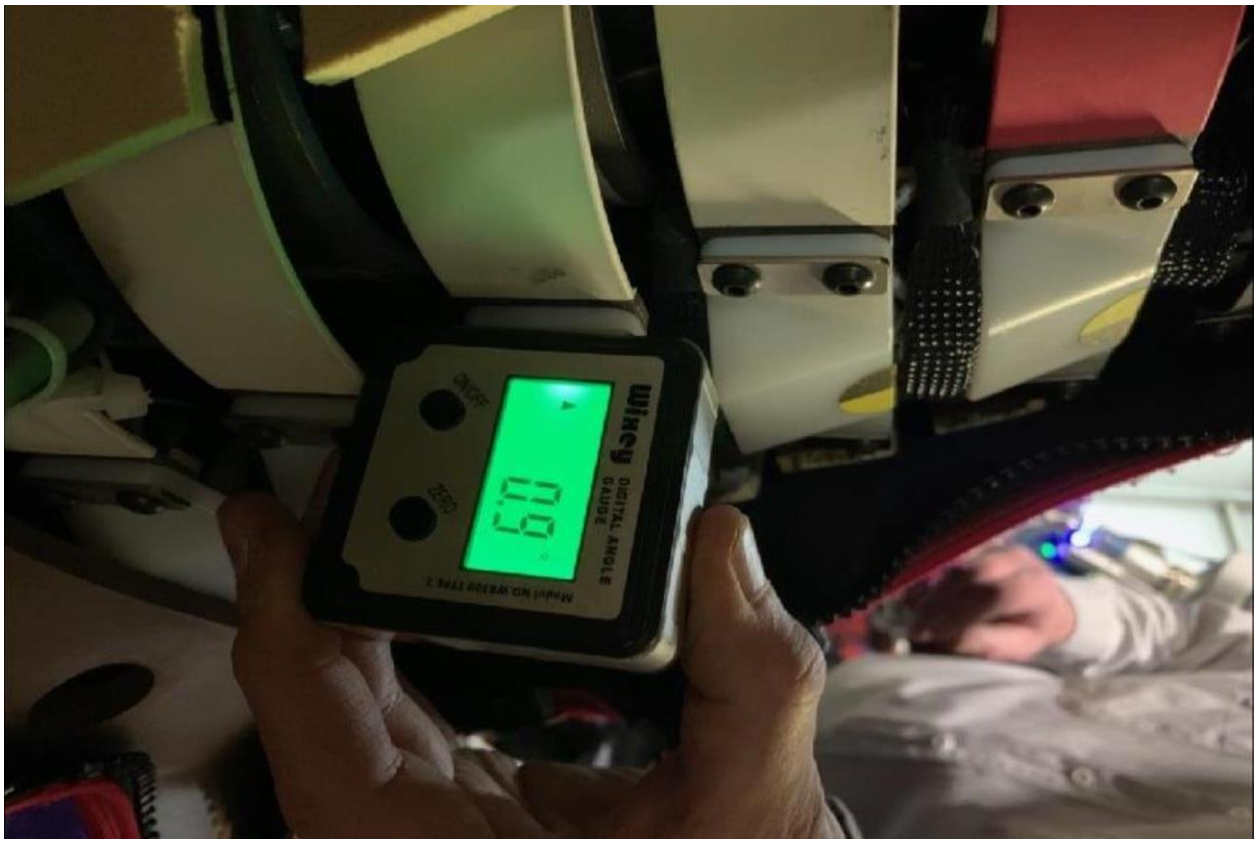
104 Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



105 WorldSID-50M Pre-Test Tilt Sensor View



No. 106 WorldSID-05F Pre-Test Tilt Sensor View



No. 107 WorldSID-05F Thorax Rib 2 Inclinometer

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

TABLE OF DATA PLOTS, CONTINUED

Driver & Passenger Dummy Instrumentation Plots

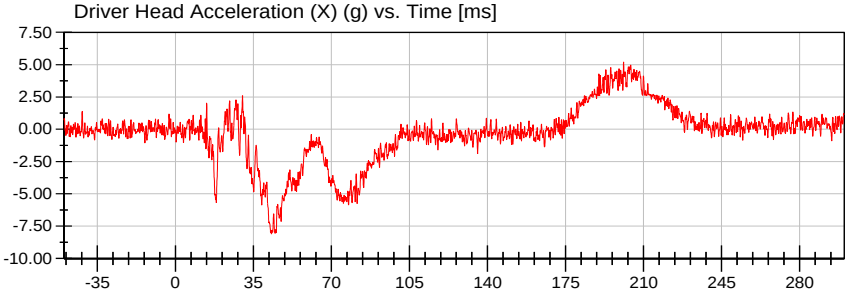
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

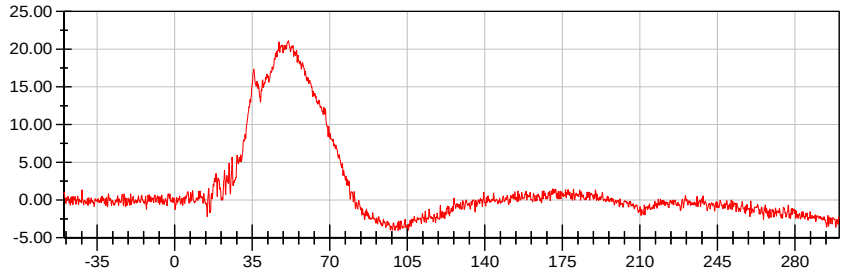
5.21 g at 201.05 ms

<Min>

-8.10 g at 43.10 ms

CFC_1000

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



<Max>

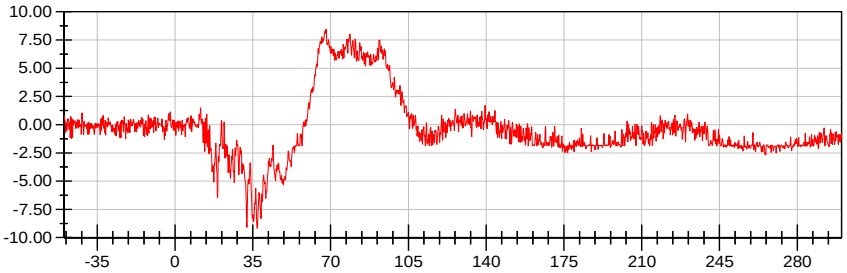
21.10 g at 51.30 ms

<Min>

-4.08 g at 100.85 ms

CFC_1000

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



<Max>

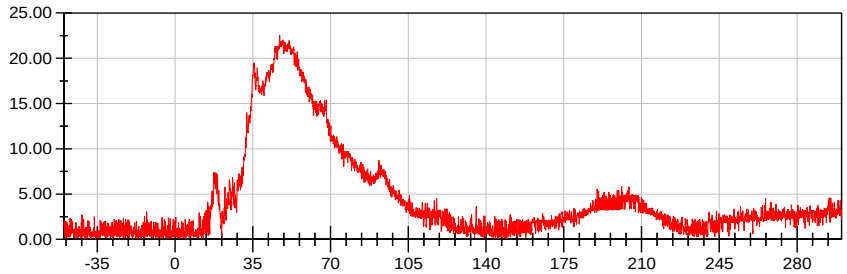
8.45 g at 67.95 ms

<Min>

-9.17 g at 37.00 ms

CFC_1000

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



<Max>

22.55 g at 47.15 ms

<Min>

0.06 g at -35.75 ms

Prefiltered_> CFC 1000

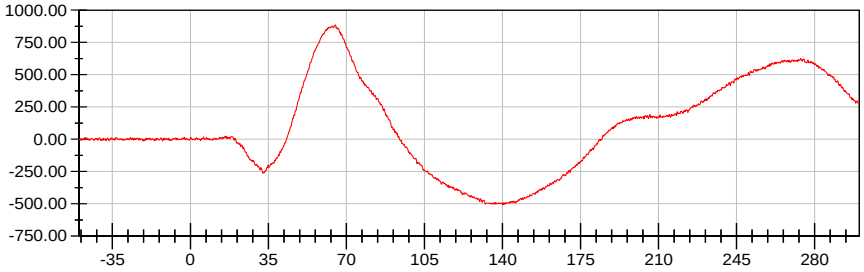
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Head Angular Rate (X) (º/s) vs. Time [ms]



<Max>

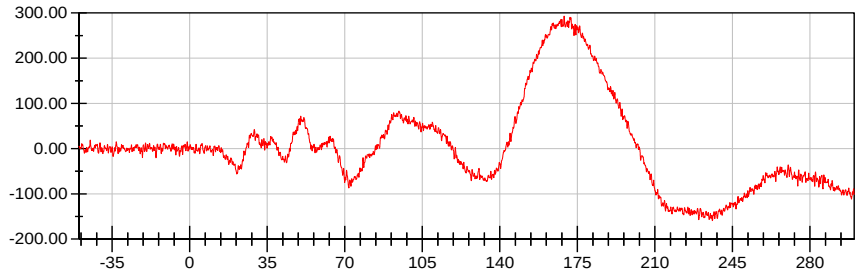
884.74 º/s at 65.10 ms

<Min>

-508.83 º/s at 140.20 ms

CFC_1000

Driver Head Angular Rate (Y) (º/s) vs. Time [ms]



<Max>

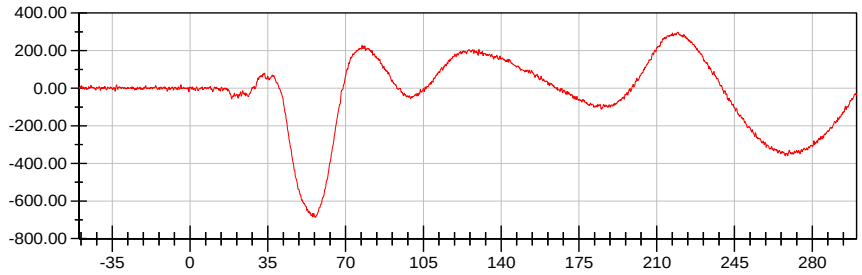
292.85 º/s at 169.00 ms

<Min>

-159.37 º/s at 235.95 ms

CFC_1000

Driver Head Angular Rate (Z) (º/s) vs. Time [ms]



<Max>

299.11 º/s at 219.55 ms

<Min>

-686.97 º/s at 56.40 ms

CFC_1000

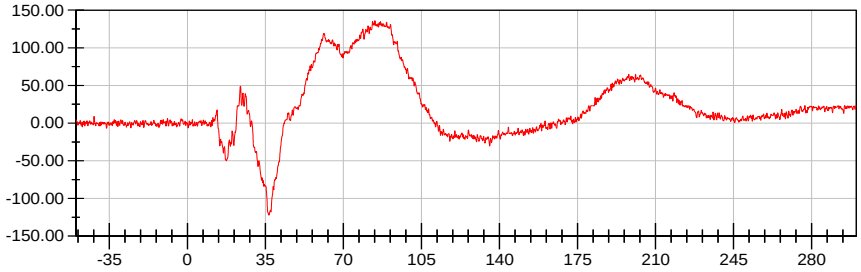
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Upper Neck Force (X) (N) vs. Time [ms]



<Max>

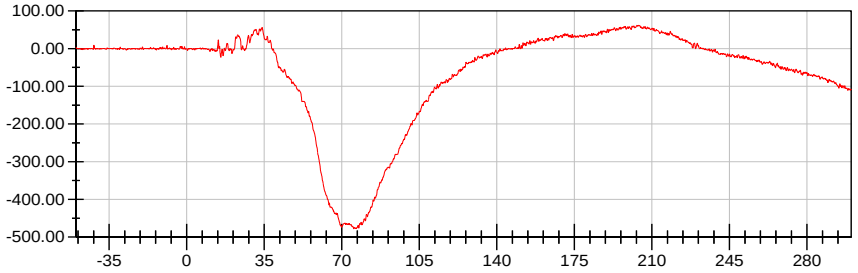
135.89 N at 84.15 ms

<Min>

-122.12 N at 36.55 ms

CFC_1000

Driver Upper Neck Force (Y) (N) vs. Time [ms]



<Max>

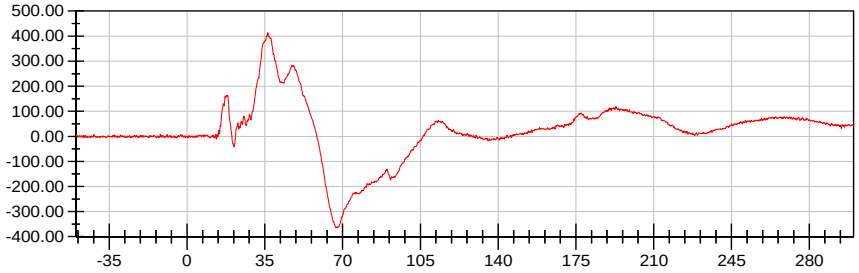
61.85 N at 204.10 ms

<Min>

-477.99 N at 75.40 ms

CFC_1000

Driver Upper Neck Force (Z) (N) vs. Time [ms]



<Max>

413.25 N at 36.35 ms

<Min>

-364.80 N at 67.70 ms

CFC_1000

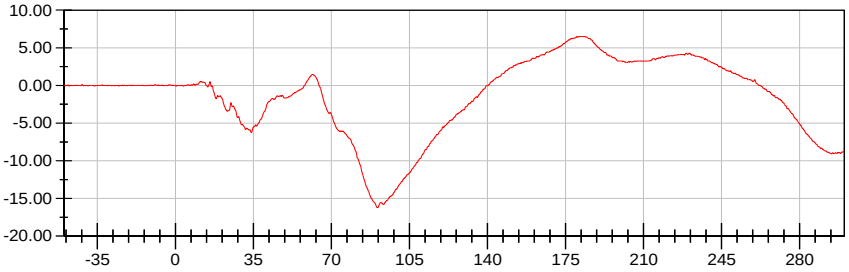
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Upper Neck Moment (X) (Nm) vs. Time [ms]



<Max>

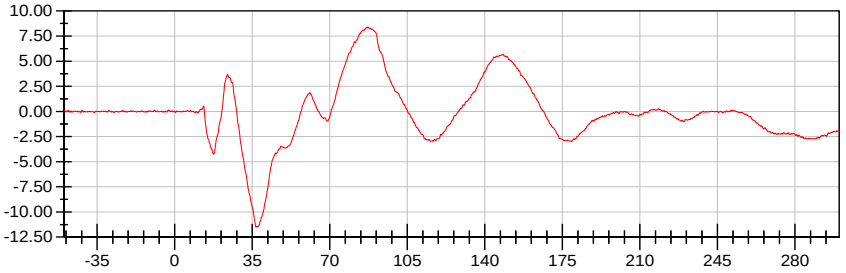
6.49 Nm at 181.35 ms

<Min>

-16.20 Nm at 90.75 ms

CFC_600

Driver Upper Neck Moment (Y) (Nm) vs. Time [ms]



<Max>

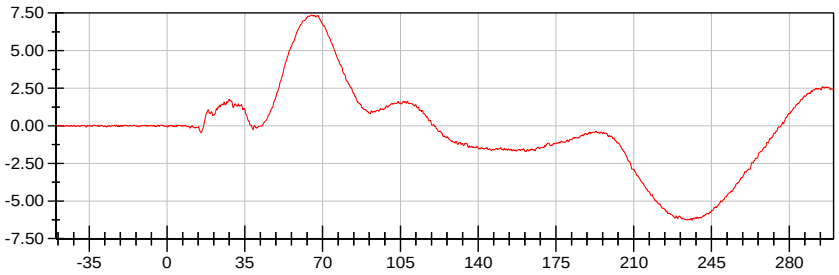
8.39 Nm at 87.25 ms

<Min>

-11.51 Nm at 36.75 ms

CFC_600

Driver Upper Neck Moment (Z) (Nm) vs. Time [ms]



<Max>

7.37 Nm at 65.15 ms

<Min>

-6.27 Nm at 236.20 ms

CFC_600

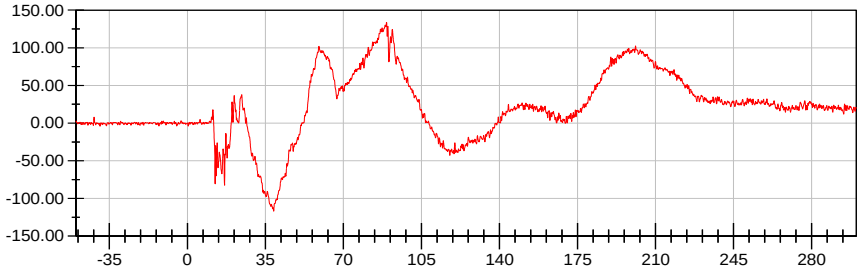
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Lower Neck Force (X) (N) vs. Time [ms]



<Max>

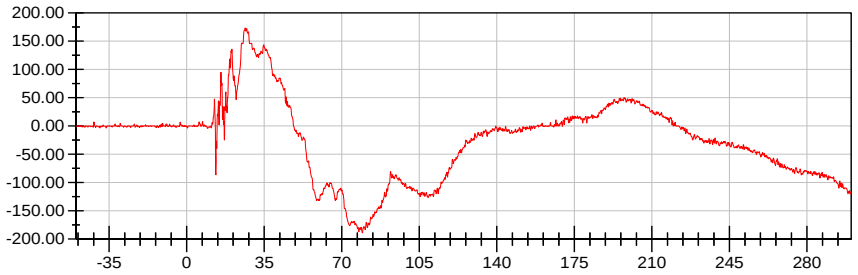
133.62 N at 89.35 ms

<Min>

-116.78 N at 38.70 ms

CFC_1000

Driver Lower Neck Force (Y) (N) vs. Time [ms]



<Max>

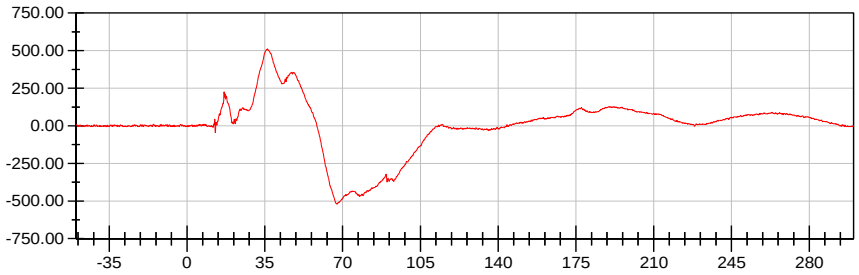
173.65 N at 26.40 ms

<Min>

-189.06 N at 79.30 ms

CFC_1000

Driver Lower Neck Force (Z) (N) vs. Time [ms]



<Max>

511.70 N at 36.20 ms

<Min>

-520.42 N at 67.60 ms

CFC_1000

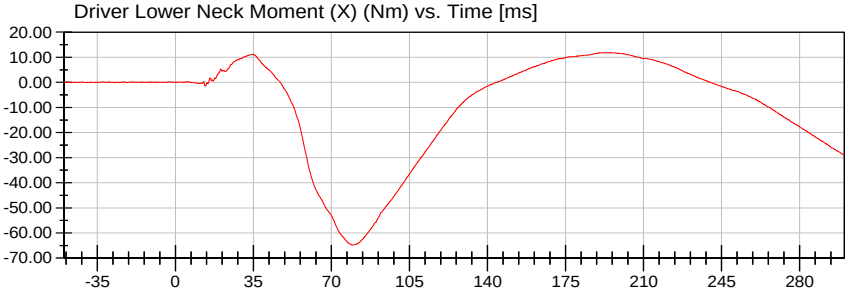
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Lower Neck Moment (X) (Nm) vs. Time [ms]



<Max>

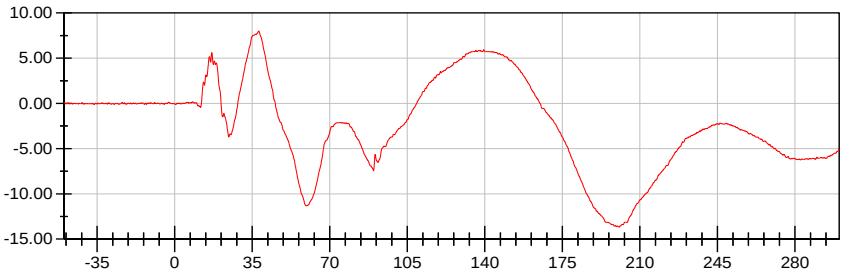
11.86 Nm at 195.35 ms

<Min>

-64.81 Nm at 79.30 ms

CFC_600

Driver Lower Neck Moment (Y) (Nm) vs. Time [ms]



<Max>

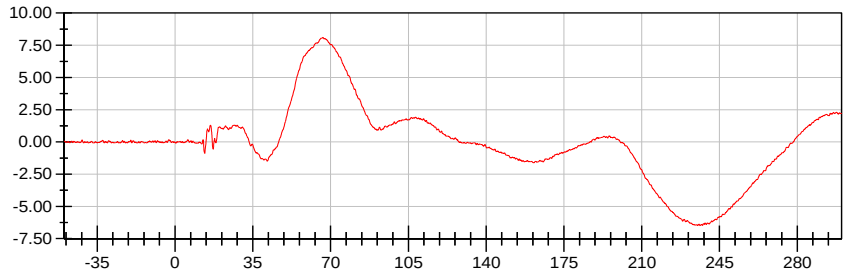
8.00 Nm at 37.90 ms

<Min>

-13.69 Nm at 200.60 ms

CFC_600

Driver Lower Neck Moment (Z) (Nm) vs. Time [ms]



<Max>

8.10 Nm at 66.60 ms

<Min>

-6.49 Nm at 236.20 ms

CFC_600

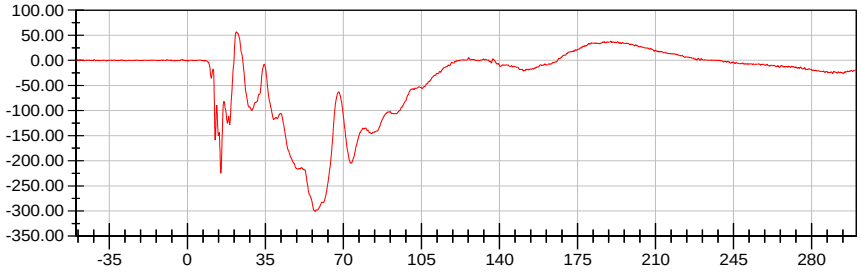
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Shoulder Force (X) (N) vs. Time [ms]



<Max>

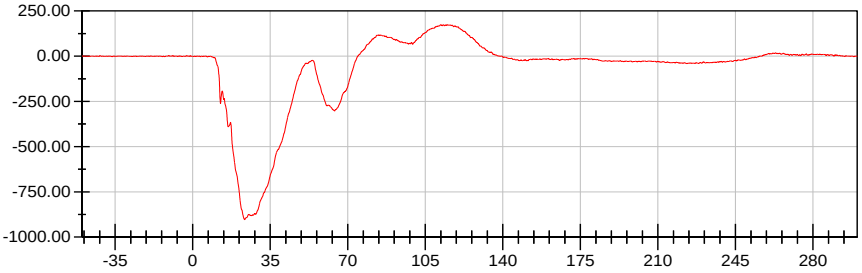
56.64 N at 21.95 ms

<Min>

-300.85 N at 57.25 ms

CFC_600

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



<Max>

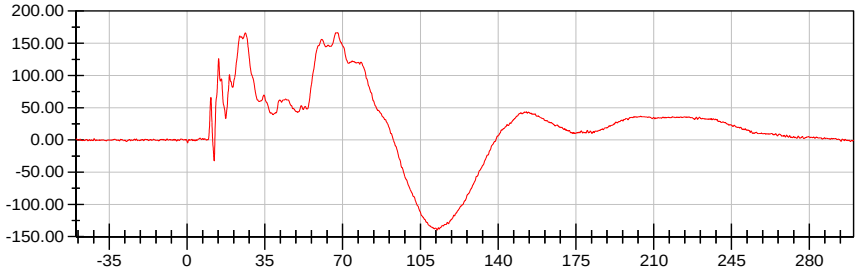
173.83 N at 113.10 ms

<Min>

-903.22 N at 23.45 ms

CFC_600

Driver Shoulder Force (Z) (N) vs. Time [ms]



<Max>

166.39 N at 67.75 ms

<Min>

-139.92 N at 112.55 ms

CFC_600

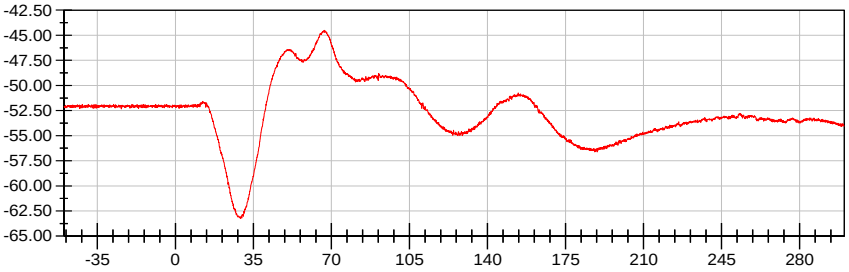
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Shoulder Rear Displacement (X) (mm) vs. Time [ms]



<Max>

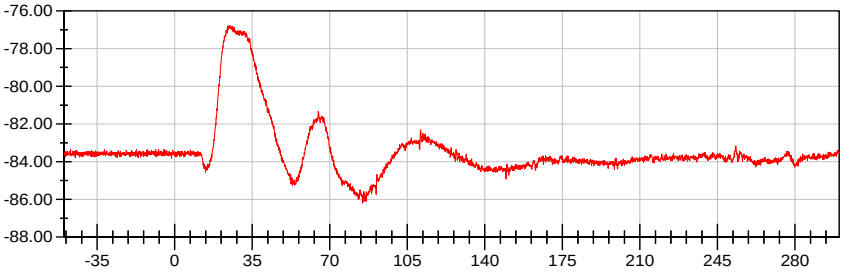
-44.50 mm at 66.75 ms

<Min>

-63.23 mm at 29.10 ms

Unfiltered

Driver Shoulder Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

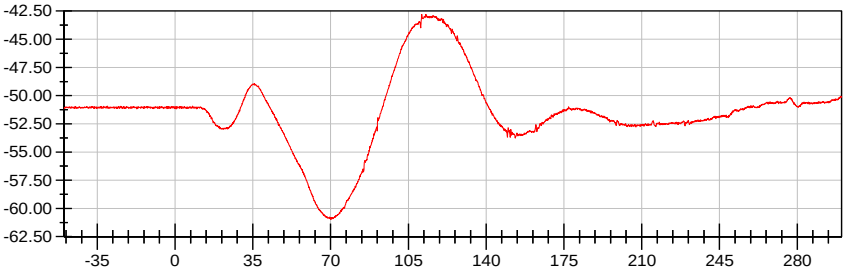
-76.77 mm at 24.90 ms

<Min>

-86.21 mm at 84.80 ms

Unfiltered

Driver Shoulder Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

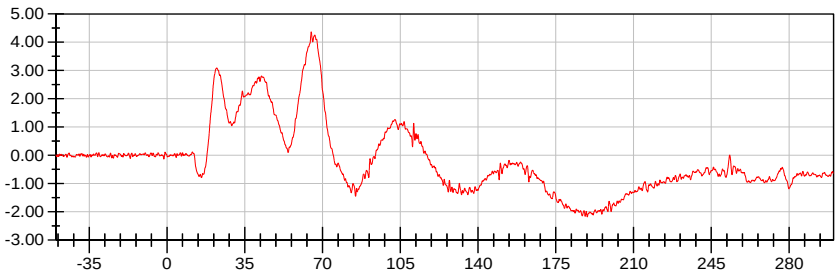
-42.79 mm at 111.00 ms

<Min>

-60.96 mm at 70.20 ms

Unfiltered

Driver Shoulder Rear Length Change (mm) vs. Time [ms]



<Max>

4.37 mm at 64.90 ms

<Min>

-2.18 mm at 189.15 ms

CFC_600

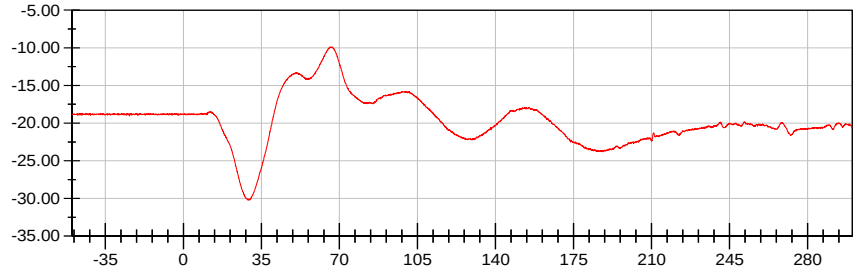
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Shoulder Middle Displacement (X) (mm) vs. Time [ms]



<Max>

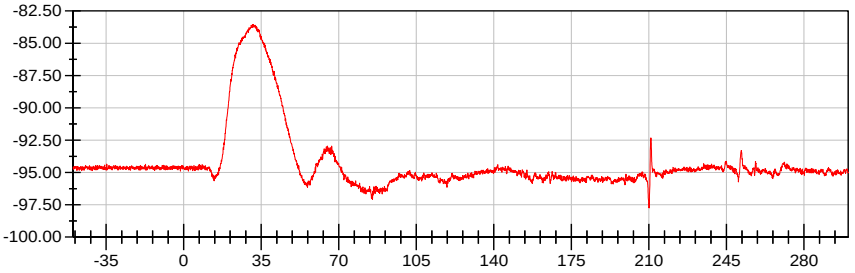
-9.87 mm at 66.80 ms

<Min>

-30.22 mm at 29.20 ms

Unfiltered

Driver Shoulder Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

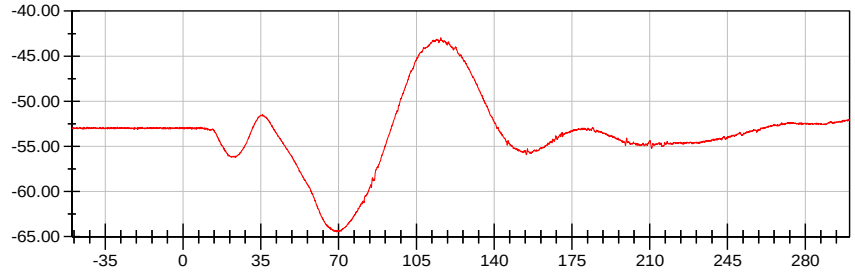
-83.54 mm at 31.40 ms

<Min>

-97.75 mm at 210.15 ms

Unfiltered

Driver Shoulder Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

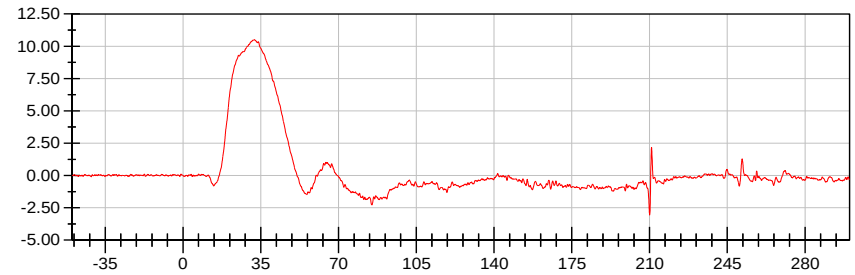
-42.96 mm at 116.00 ms

<Min>

-64.49 mm at 69.10 ms

Unfiltered

Driver Shoulder Middle Length Change (mm) vs. Time [ms]



<Max>

10.51 mm at 32.15 ms

<Min>

-3.06 mm at 210.05 ms

CFC_600

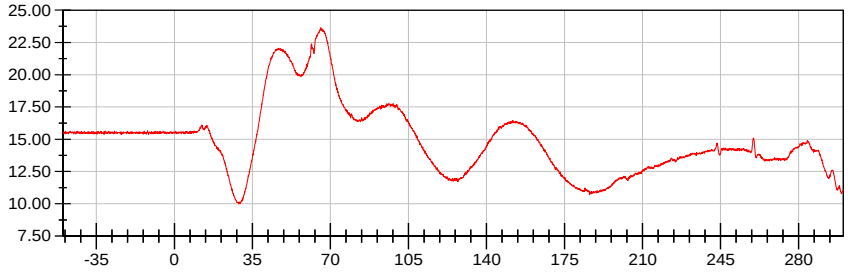
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Shoulder Front Displacement (X) (mm) vs. Time [ms]



<Max>

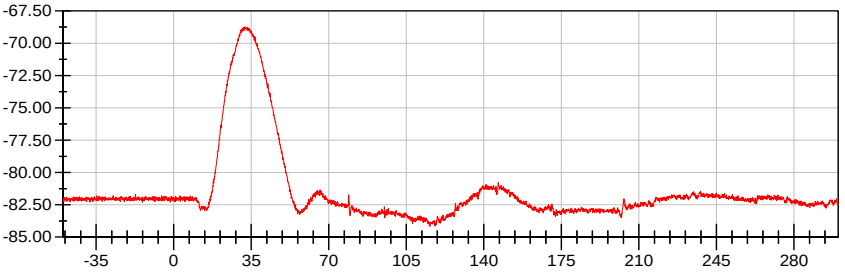
23.64 mm at 65.70 ms

<Min>

10.00 mm at 28.95 ms

Unfiltered

Driver Shoulder Front Displacement (Y) (mm) vs. Time [ms]



<Max>

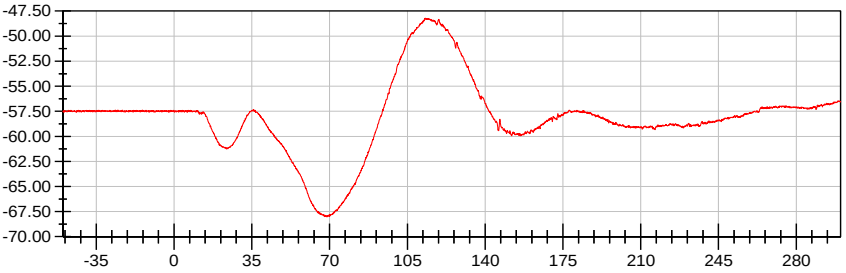
-68.73 mm at 32.10 ms

<Min>

-84.16 mm at 115.65 ms

Unfiltered

Driver Shoulder Front Displacement (Z) (mm) vs. Time [ms]



<Max>

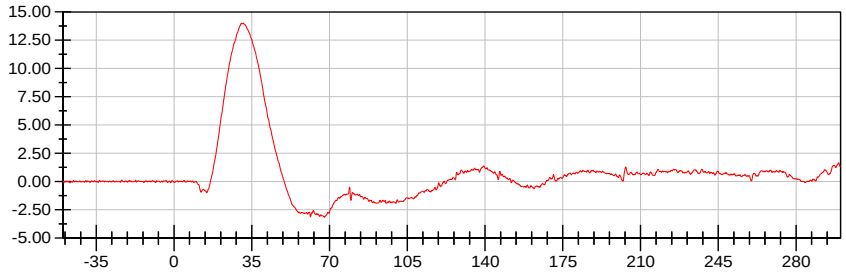
-48.20 mm at 113.00 ms

<Min>

-68.05 mm at 68.80 ms

Unfiltered

Driver Shoulder Front Length Change (mm) vs. Time [ms]



<Max>

14.01 mm at 31.20 ms

<Min>

-3.15 mm at 67.65 ms

CFC_600

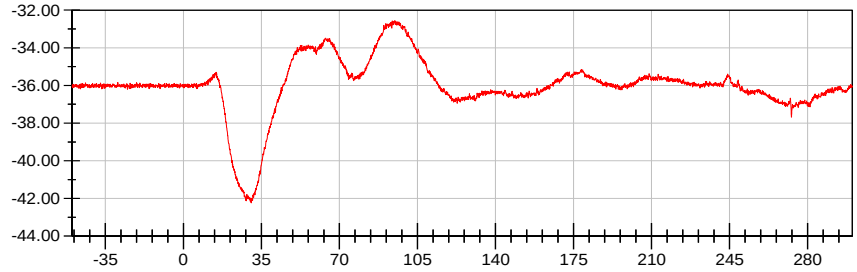
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 1 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

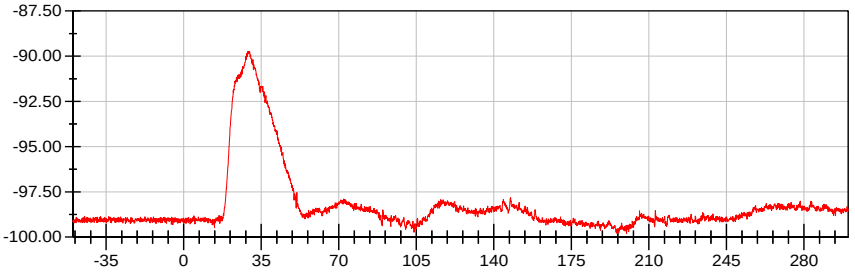
-32.55 mm at 94.85 ms

<Min>

-42.24 mm at 30.40 ms

Unfiltered

Driver Thorax Rib 1 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

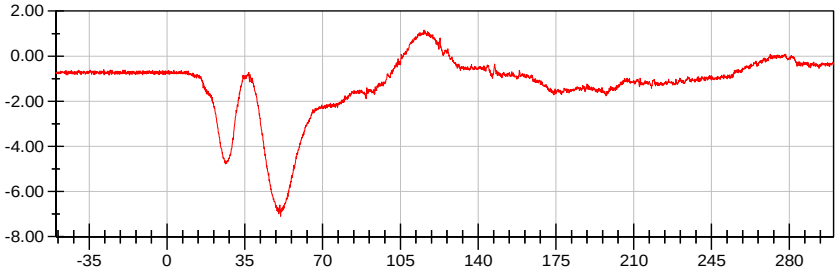
-89.74 mm at 29.80 ms

<Min>

-99.79 mm at 199.90 ms

Unfiltered

Driver Thorax Rib 1 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

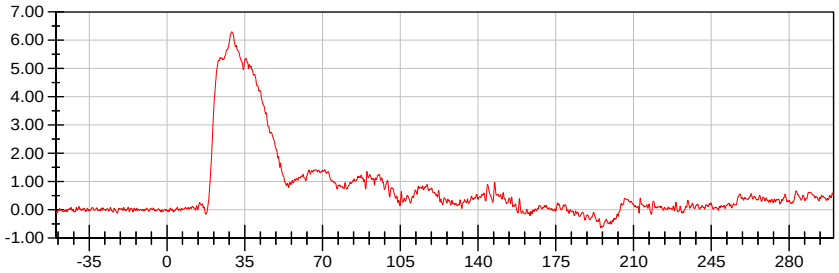
1.16 mm at 115.60 ms

<Min>

-7.09 mm at 51.10 ms

Unfiltered

Driver Thorax Rib 1 Rear Length Change (mm) vs. Time [ms]



<Max>

6.30 mm at 29.20 ms

<Min>

-0.64 mm at 195.25 ms

CFC_600

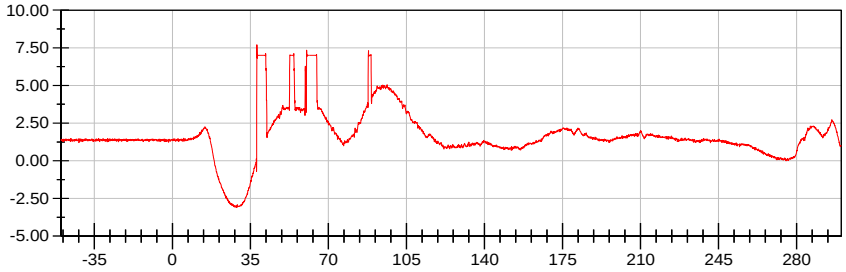
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 1 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

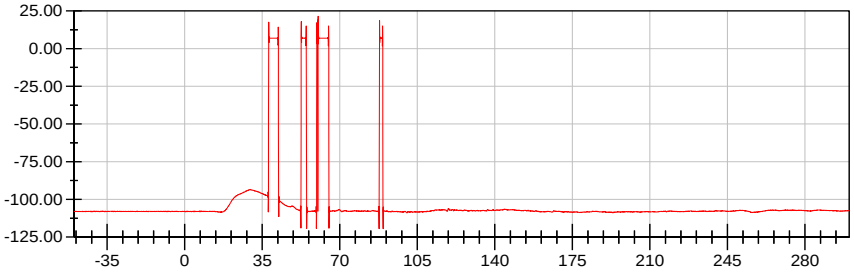
7.70 mm at 37.95 ms

<Min>

-3.11 mm at 28.95 ms

Unfiltered

Driver Thorax Rib 1 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

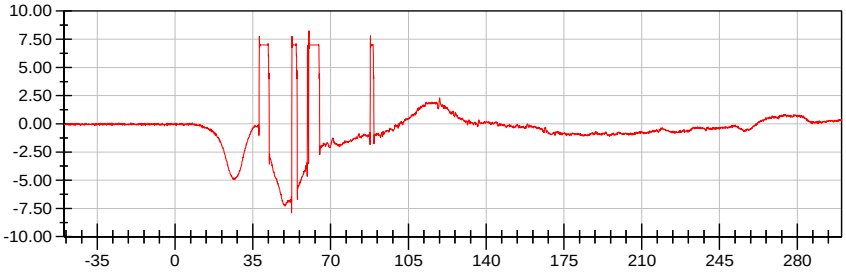
21.56 mm at 60.25 ms

<Min>

-119.48 mm at 89.55 ms

Unfiltered

Driver Thorax Rib 1 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

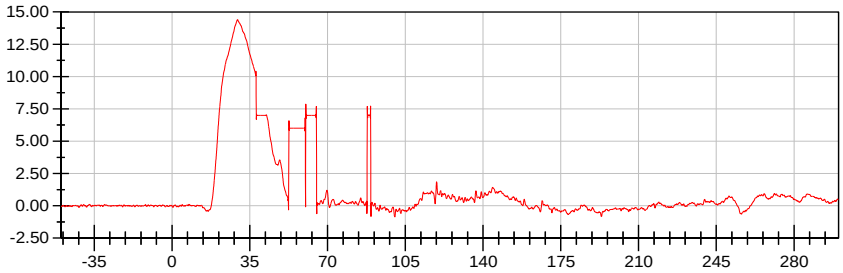
8.25 mm at 60.25 ms

<Min>

-7.90 mm at 52.45 ms

Unfiltered

Driver Thorax Rib 1 Middle Length Change (mm) vs. Time [ms]



<Max>

14.40 mm at 29.50 ms

<Min>

-0.87 mm at 100.30 ms

CFC_600

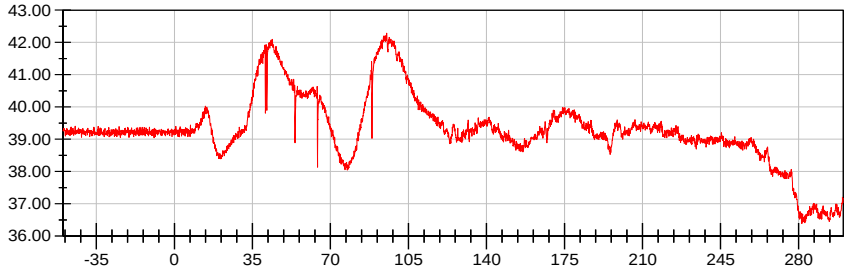
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 1 Front Displacement (X) (mm) vs. Time [ms]



<Max>

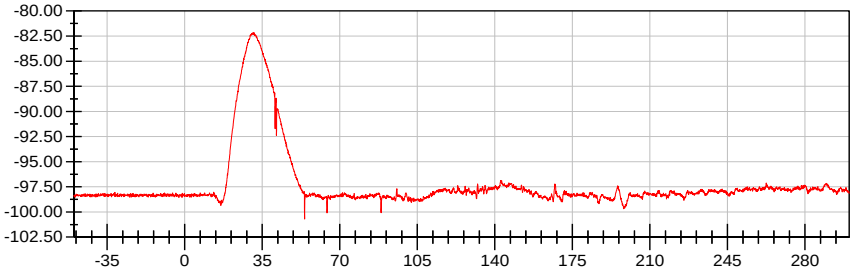
42.29 mm at 95.25 ms

<Min>

36.39 mm at 281.50 ms

Unfiltered

Driver Thorax Rib 1 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

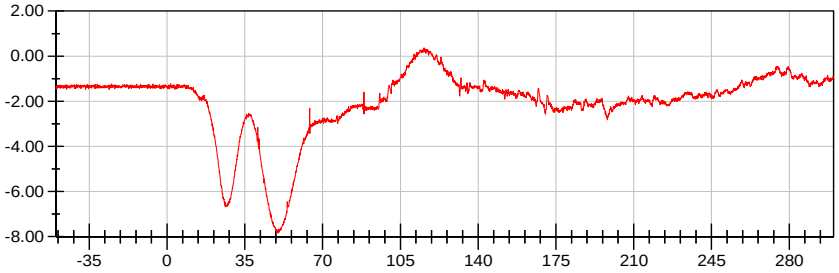
-82.16 mm at 31.15 ms

<Min>

-100.70 mm at 54.10 ms

Unfiltered

Driver Thorax Rib 1 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

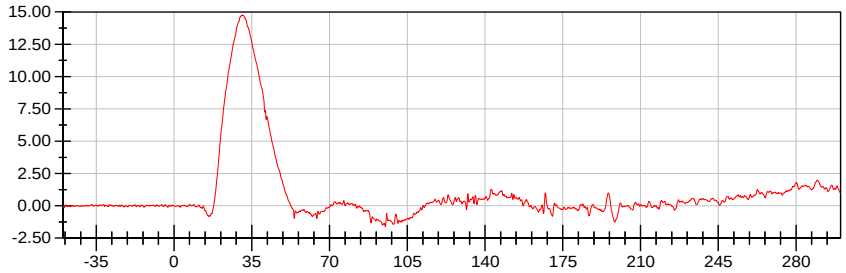
0.37 mm at 115.65 ms

<Min>

-7.85 mm at 49.90 ms

Unfiltered

Driver Thorax Rib 1 Front Length Change (mm) vs. Time [ms]



<Max>

14.76 mm at 30.65 ms

<Min>

-1.60 mm at 95.10 ms

CFC_600

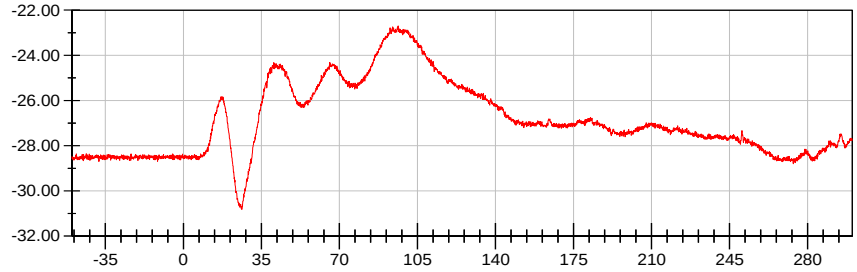
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

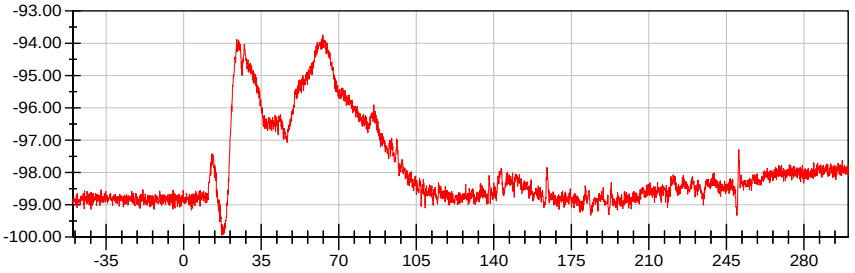
-22.69 mm at 96.35 ms

<Min>

-30.82 mm at 26.25 ms

Unfiltered

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



<Max>

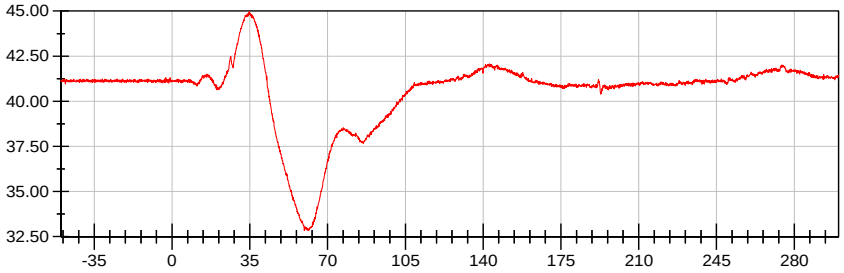
-93.74 mm at 62.80 ms

<Min>

-99.95 mm at 17.30 ms

Unfiltered

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



<Max>

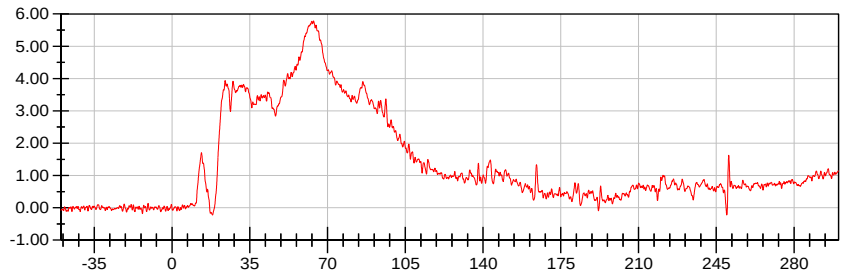
44.98 mm at 34.80 ms

<Min>

32.83 mm at 59.55 ms

Unfiltered

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



<Max>

5.78 mm at 63.65 ms

<Min>

-0.22 mm at 249.70 ms

CFC_600

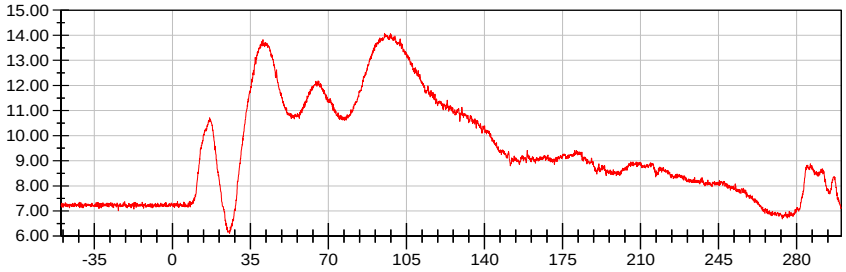
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 2 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

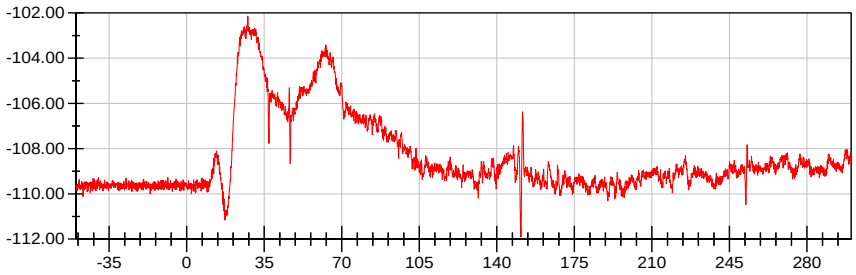
14.08 mm at 95.20 ms

<Min>

6.11 mm at 25.65 ms

Unfiltered

Driver Thorax Rib 2 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

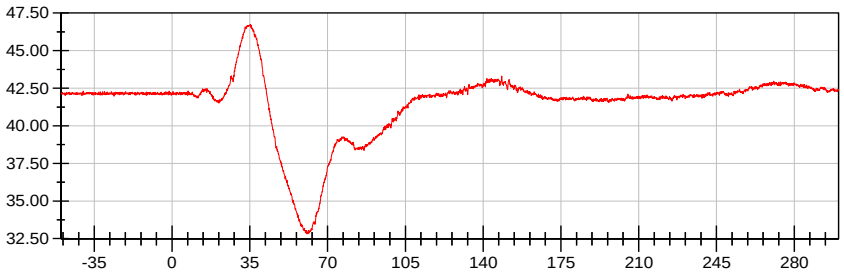
-102.14 mm at 27.60 ms

<Min>

-111.90 mm at 150.85 ms

Unfiltered

Driver Thorax Rib 2 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

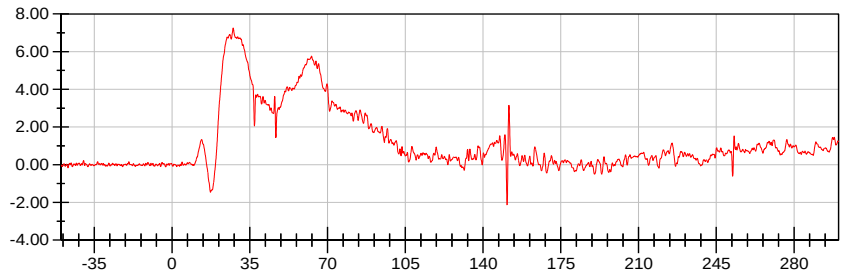
46.72 mm at 35.30 ms

<Min>

32.81 mm at 60.70 ms

Unfiltered

Driver Thorax Rib 2 Middle Length Change (mm) vs. Time [ms]



<Max>

7.26 mm at 27.55 ms

<Min>

-2.14 mm at 150.85 ms

CFC_600

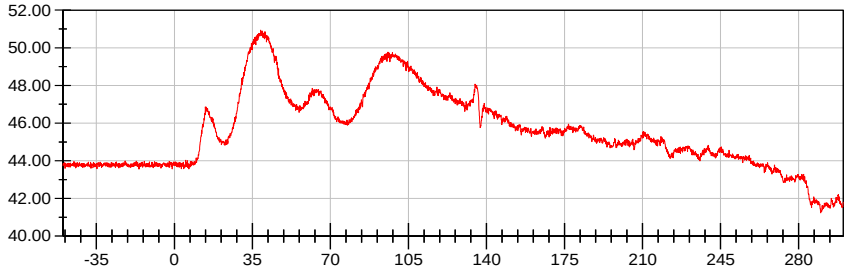
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 2 Front Displacement (X) (mm) vs. Time [ms]



<Max>

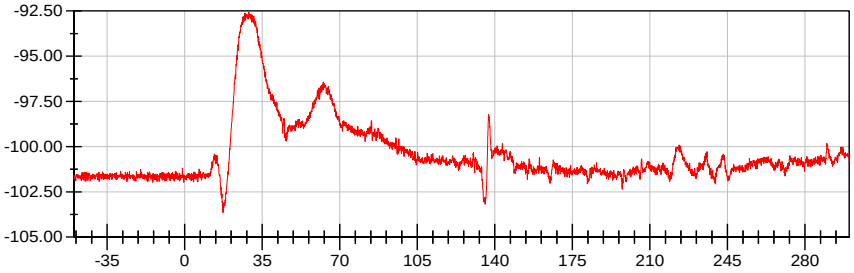
50.94 mm at 38.70 ms

<Min>

41.24 mm at 289.90 ms

Unfiltered

Driver Thorax Rib 2 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

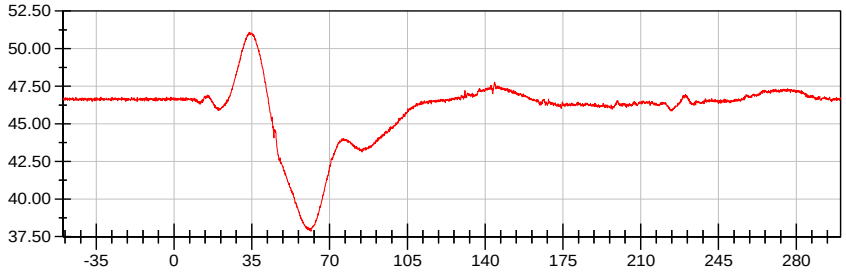
-92.57 mm at 28.95 ms

<Min>

-103.64 mm at 17.30 ms

Unfiltered

Driver Thorax Rib 2 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

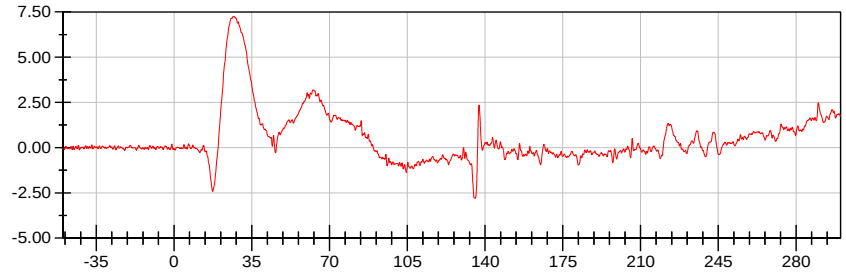
51.10 mm at 34.10 ms

<Min>

37.86 mm at 61.50 ms

Unfiltered

Driver Thorax Rib 2 Front Length Change (mm) vs. Time [ms]



<Max>

7.25 mm at 26.85 ms

<Min>

-2.80 mm at 135.60 ms

CFC_600

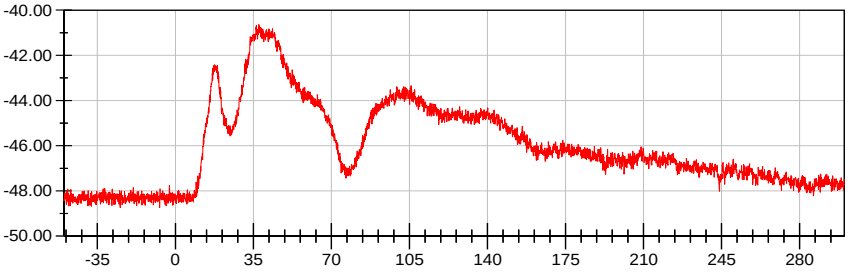
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

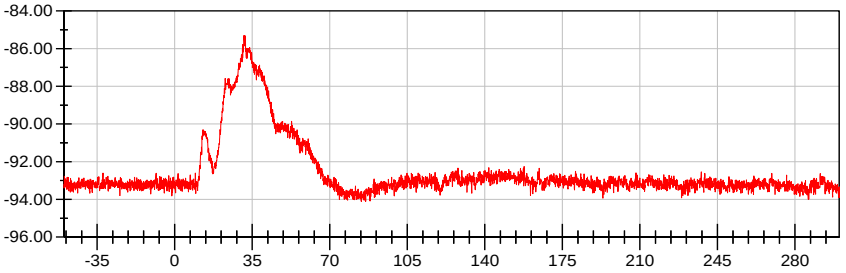
-40.64 mm at 37.45 ms

<Min>

-48.74 mm at -24.75 ms

Unfiltered

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



<Max>

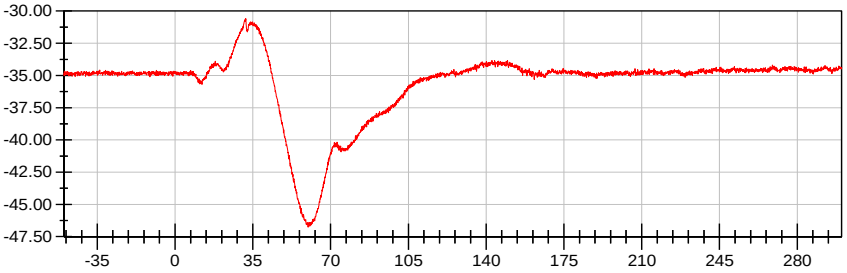
-85.30 mm at 31.40 ms

<Min>

-94.11 mm at 84.25 ms

Unfiltered

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



<Max>

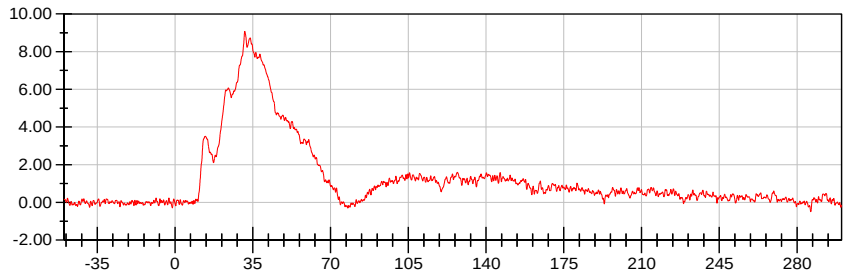
-30.59 mm at 31.80 ms

<Min>

-46.77 mm at 59.90 ms

Unfiltered

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



<Max>

9.07 mm at 31.40 ms

<Min>

-0.49 mm at 286.20 ms

CFC_600

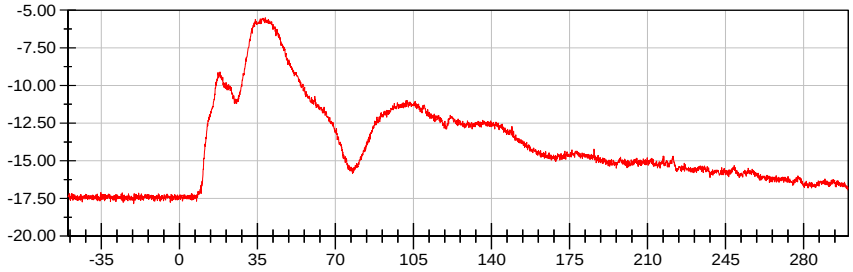
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 3 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

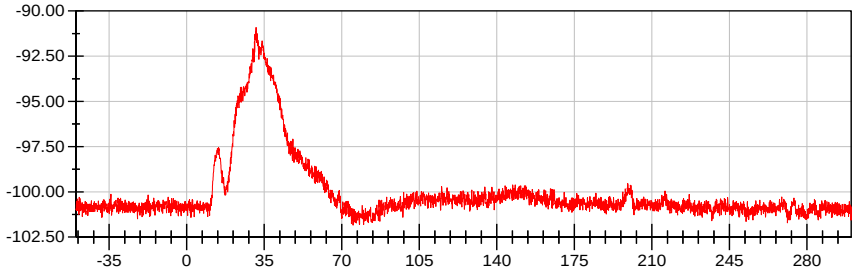
-5.51 mm at 38.55 ms

<Min>

-17.85 mm at -20.50 ms

Unfiltered

Driver Thorax Rib 3 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

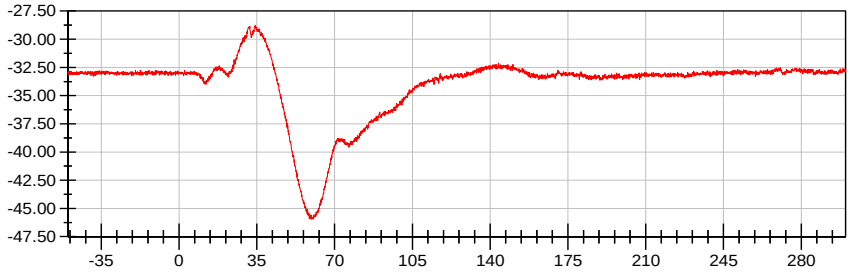
-90.91 mm at 31.35 ms

<Min>

-101.84 mm at 75.10 ms

Unfiltered

Driver Thorax Rib 3 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

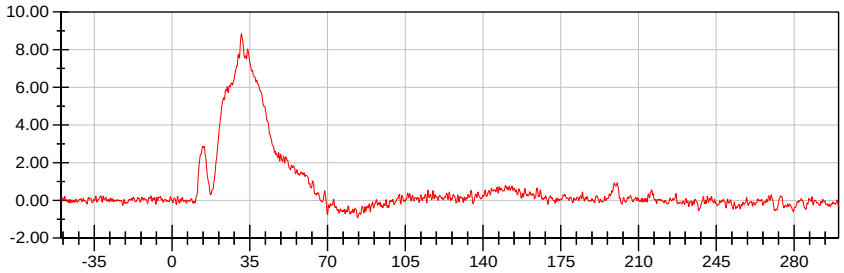
-28.77 mm at 34.35 ms

<Min>

-45.95 mm at 60.40 ms

Unfiltered

Driver Thorax Rib 3 Middle Length Change (mm) vs. Time [ms]



<Max>

8.85 mm at 31.25 ms

<Min>

-0.92 mm at 83.55 ms

CFC_600

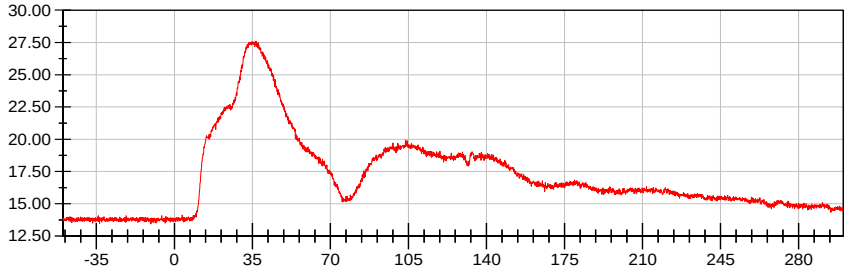
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Thorax Rib 3 Front Displacement (X) (mm) vs. Time [ms]



<Max>

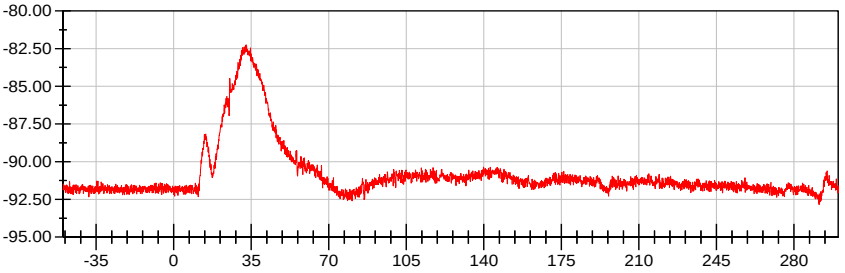
27.59 mm at 36.50 ms

<Min>

13.44 mm at -10.55 ms

Unfiltered

Driver Thorax Rib 3 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

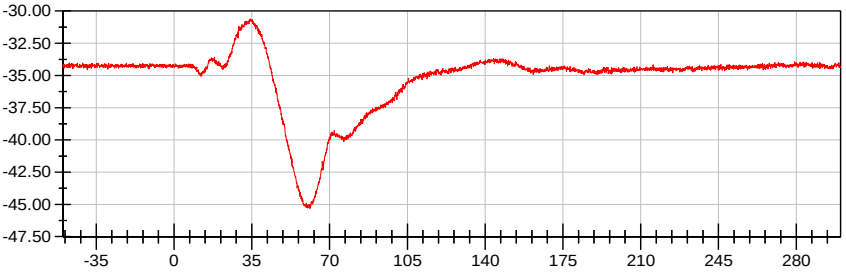
-82.25 mm at 32.70 ms

<Min>

-92.84 mm at 291.30 ms

Unfiltered

Driver Thorax Rib 3 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

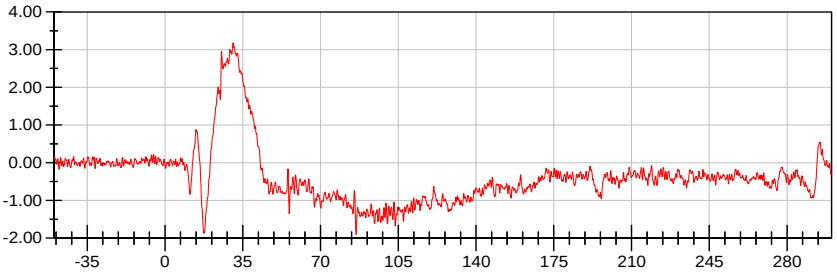
-30.62 mm at 34.35 ms

<Min>

-45.32 mm at 61.15 ms

Unfiltered

Driver Thorax Rib 3 Front Length Change (mm) vs. Time [ms]



<Max>

3.18 mm at 30.65 ms

<Min>

-1.91 mm at 86.05 ms

CFC_600

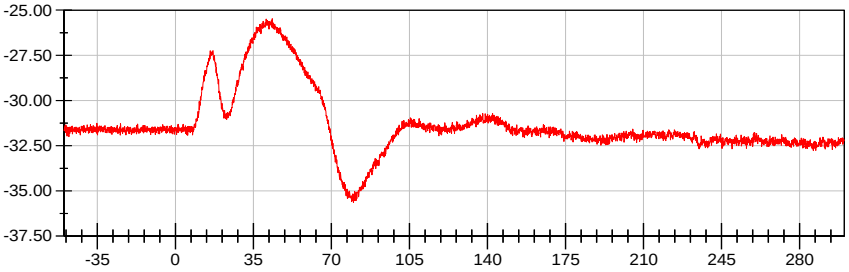
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Abdomen Rib 1 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

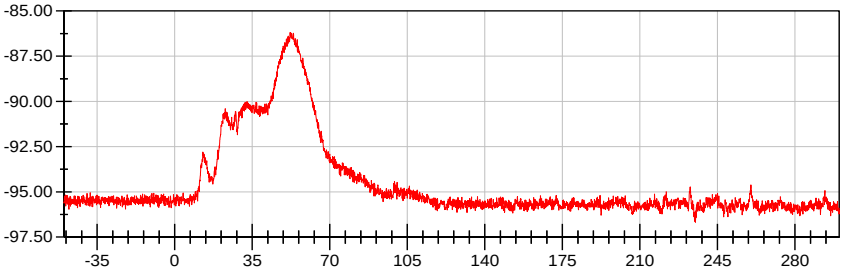
-25.47 mm at 43.45 ms

<Min>

-35.64 mm at 79.90 ms

Unfiltered

Driver Abdomen Rib 1 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

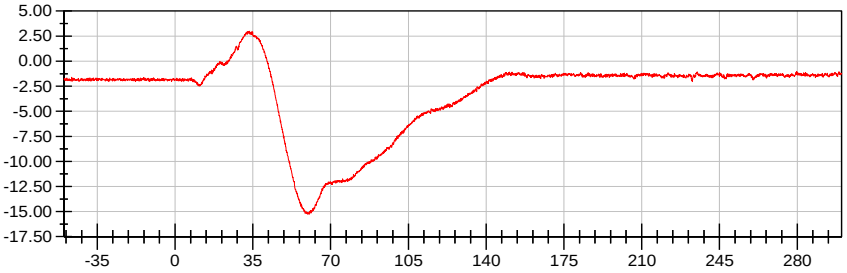
-86.19 mm at 52.10 ms

<Min>

-96.68 mm at 235.10 ms

Unfiltered

Driver Abdomen Rib 1 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

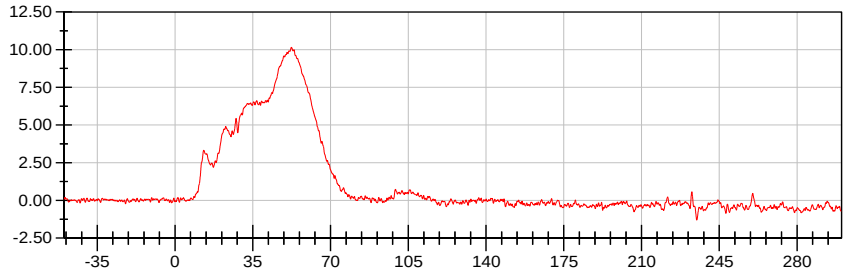
2.99 mm at 33.40 ms

<Min>

-15.25 mm at 60.40 ms

Unfiltered

Driver Abdomen Rib 1 Rear Length Change (mm) vs. Time [ms]



<Max>

10.15 mm at 52.40 ms

<Min>

-1.30 mm at 234.85 ms

CFC_600

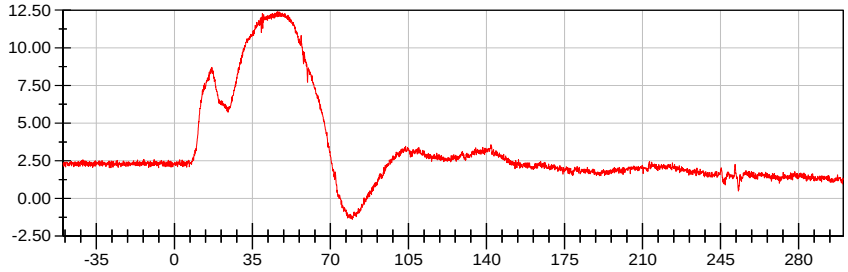
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Abdomen Rib 1 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

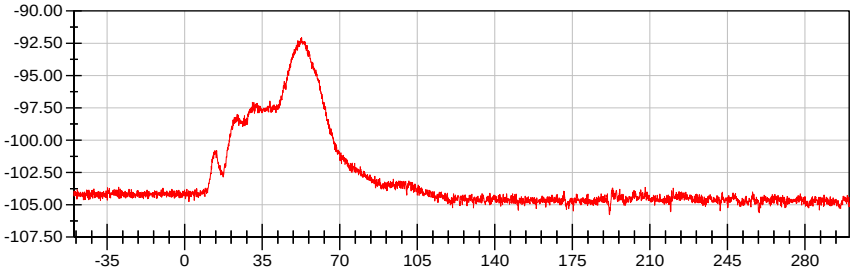
12.39 mm at 46.90 ms

<Min>

-1.39 mm at 79.80 ms

Unfiltered

Driver Abdomen Rib 1 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

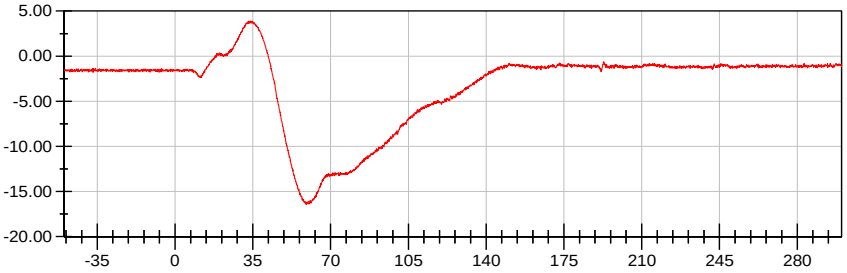
-92.06 mm at 52.80 ms

<Min>

-105.76 mm at 191.75 ms

Unfiltered

Driver Abdomen Rib 1 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

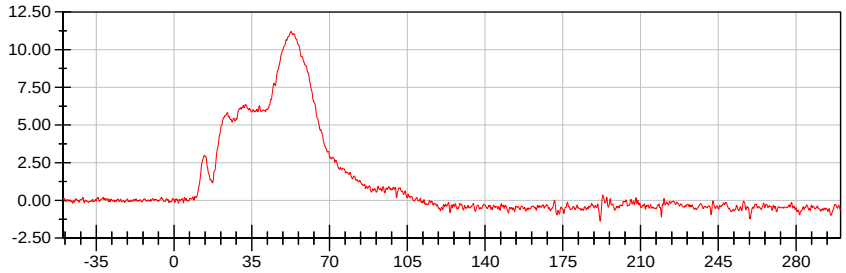
3.89 mm at 33.85 ms

<Min>

-16.43 mm at 58.95 ms

Unfiltered

Driver Abdomen Rib 1 Middle Length Change (mm) vs. Time [ms]



<Max>

11.21 mm at 52.75 ms

<Min>

-1.38 mm at 191.80 ms

CFC_600

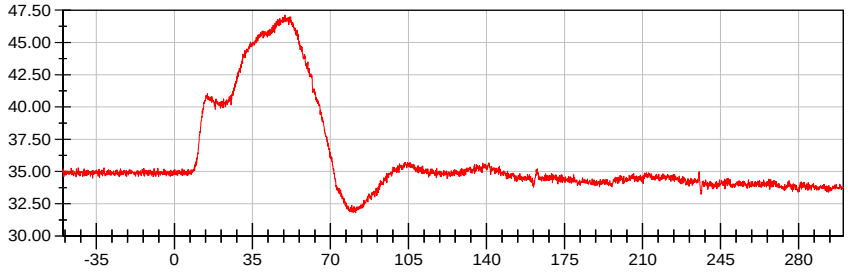
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Abdomen Rib 1 Front Displacement (X) (mm) vs. Time [ms]



<Max>

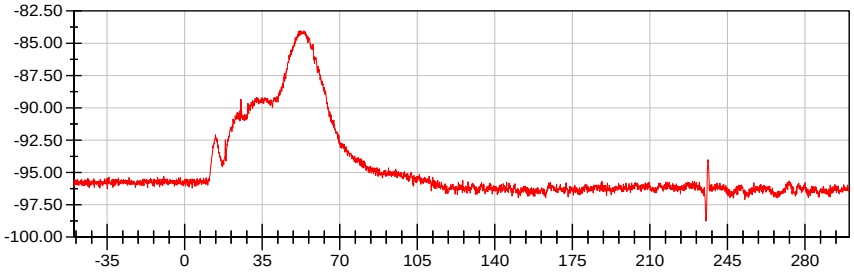
47.13 mm at 49.60 ms

<Min>

31.81 mm at 81.30 ms

Unfiltered

Driver Abdomen Rib 1 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

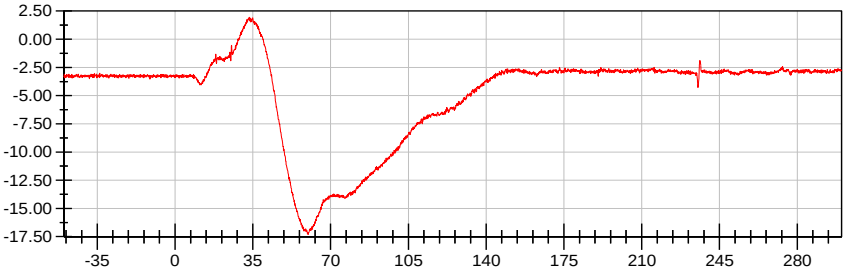
-84.02 mm at 52.00 ms

<Min>

-98.77 mm at 235.30 ms

Unfiltered

Driver Abdomen Rib 1 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

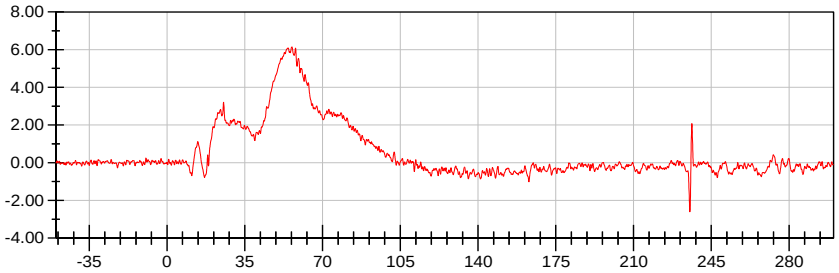
1.94 mm at 33.40 ms

<Min>

-17.30 mm at 59.95 ms

Unfiltered

Driver Abdomen Rib 1 Front Length Change (mm) vs. Time [ms]



<Max>

6.14 mm at 56.25 ms

<Min>

-2.61 mm at 235.35 ms

CFC_600

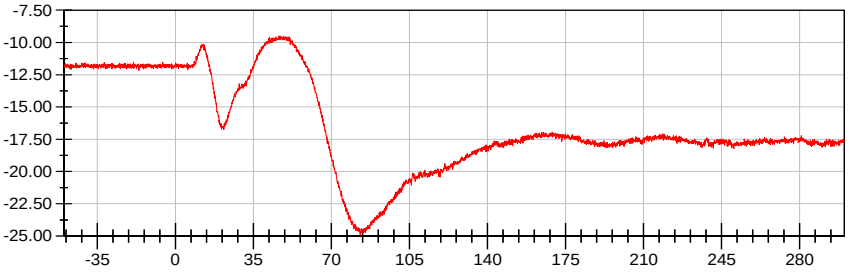
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Abdomen Rib 2 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

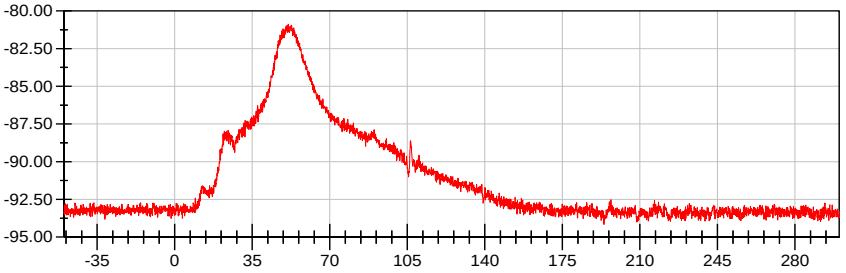
-9.50 mm at 46.90 ms

<Min>

-24.94 mm at 82.90 ms

Unfiltered

Driver Abdomen Rib 2 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

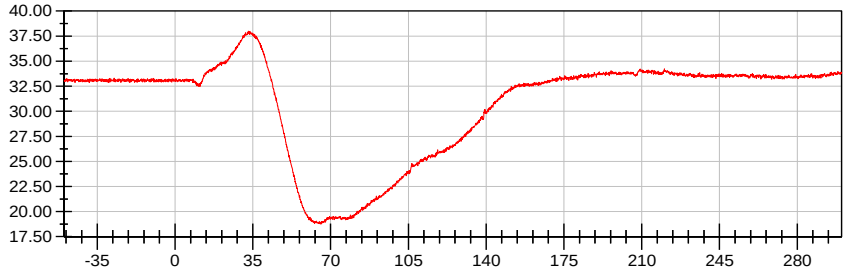
-80.89 mm at 51.30 ms

<Min>

-94.16 mm at 193.80 ms

Unfiltered

Driver Abdomen Rib 2 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

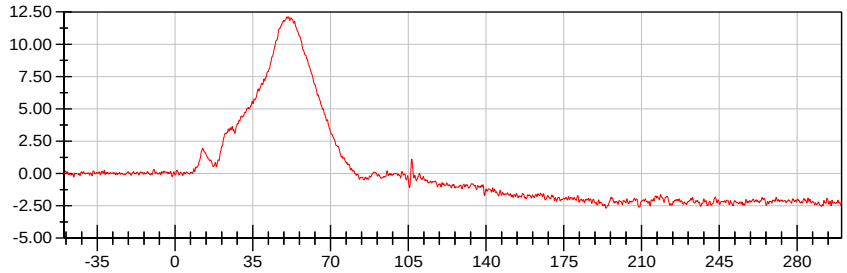
38.00 mm at 33.00 ms

<Min>

18.74 mm at 65.70 ms

Unfiltered

Driver Abdomen Rib 2 Rear Length Change (mm) vs. Time [ms]



<Max>

12.13 mm at 50.35 ms

<Min>

-2.69 mm at 194.00 ms

CFC_600

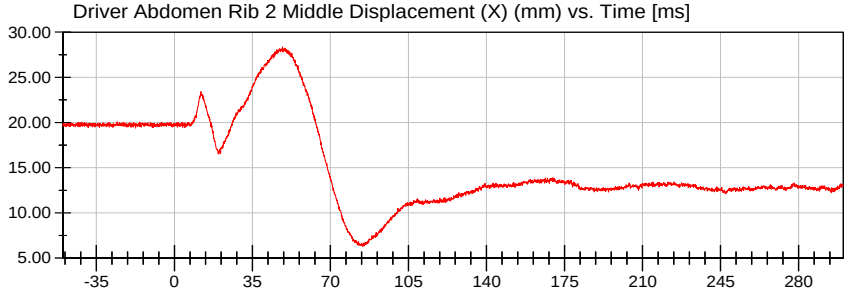
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Abdomen Rib 2 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

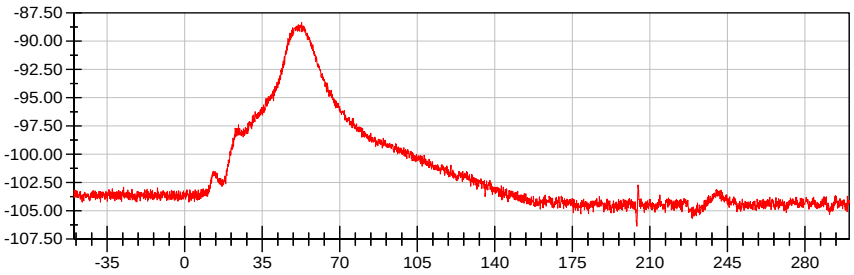
28.35 mm at 48.50 ms

<Min>

6.30 mm at 84.40 ms

Unfiltered

Driver Abdomen Rib 2 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

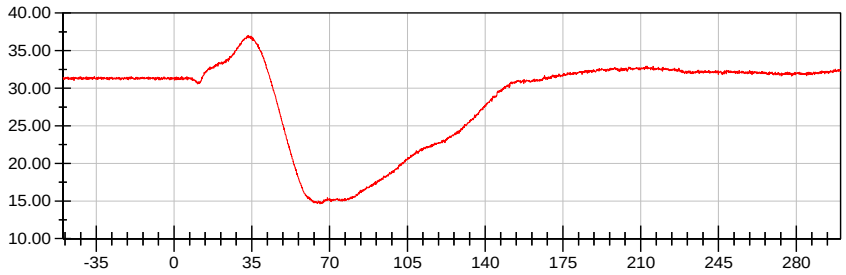
-88.36 mm at 52.80 ms

<Min>

-106.37 mm at 204.10 ms

Unfiltered

Driver Abdomen Rib 2 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

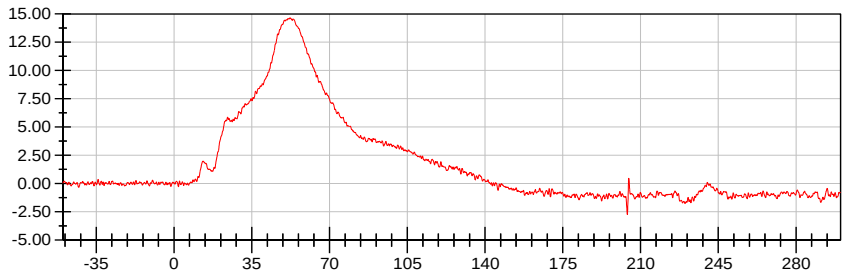
37.03 mm at 33.50 ms

<Min>

14.60 mm at 65.70 ms

Unfiltered

Driver Abdomen Rib 2 Middle Length Change (mm) vs. Time [ms]



<Max>

14.66 mm at 52.25 ms

<Min>

-2.73 mm at 204.05 ms

CFC_600

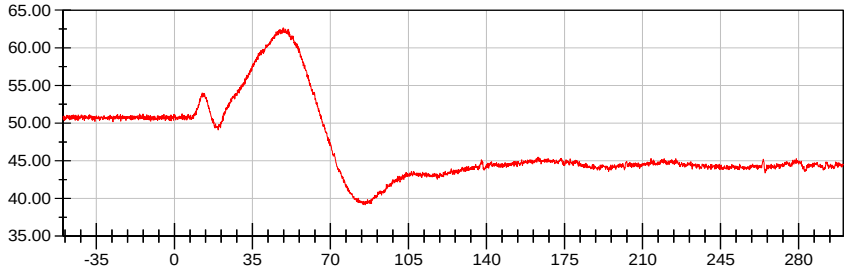
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Abdomen Rib 2 Front Displacement (X) (mm) vs. Time [ms]



<Max>

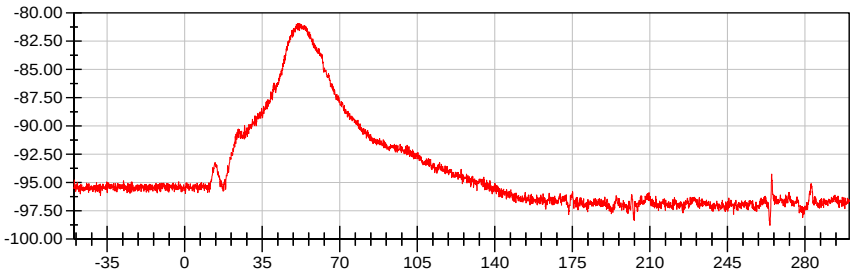
62.66 mm at 48.80 ms

<Min>

39.16 mm at 85.60 ms

Unfiltered

Driver Abdomen Rib 2 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

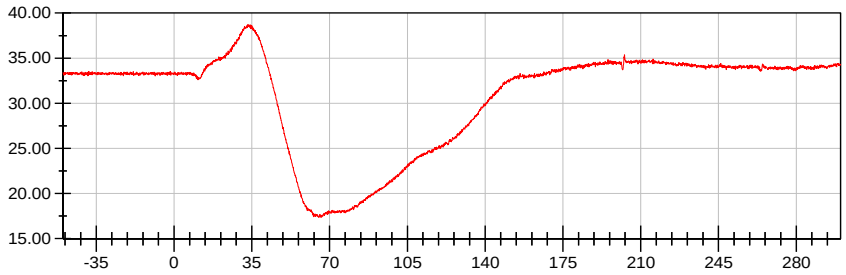
-80.94 mm at 51.10 ms

<Min>

-98.80 mm at 264.15 ms

Unfiltered

Driver Abdomen Rib 2 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

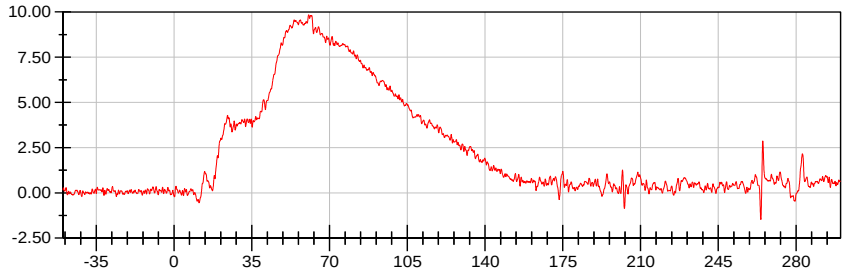
38.70 mm at 33.05 ms

<Min>

17.37 mm at 65.10 ms

Unfiltered

Driver Abdomen Rib 2 Front Length Change (mm) vs. Time [ms]



<Max>

9.85 mm at 60.65 ms

<Min>

-1.47 mm at 264.15 ms

CFC_600

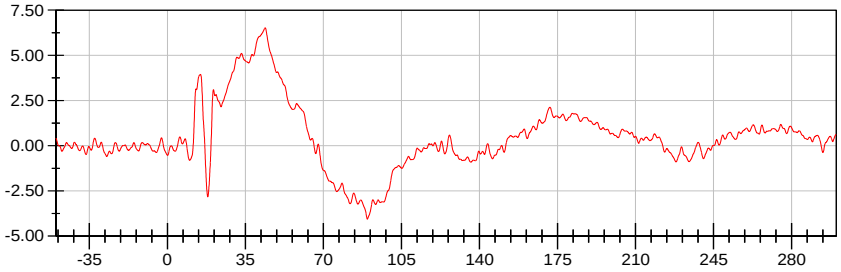
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Spine T1 Acceleration (X) (g) vs. Time [ms]



<Max>

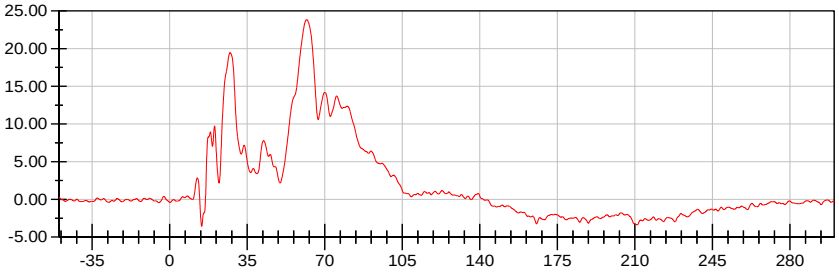
6.52 g at 43.90 ms

<Min>

-4.06 g at 89.70 ms

CFC_180

Driver Spine T1 Acceleration (Y) (g) vs. Time [ms]



<Max>

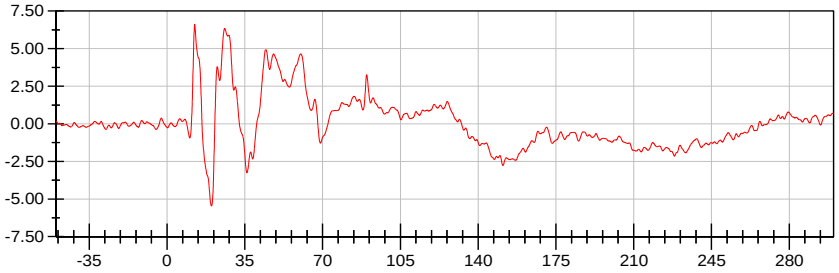
23.83 g at 61.85 ms

<Min>

-3.57 g at 14.45 ms

CFC_180

Driver Spine T1 Acceleration (Z) (g) vs. Time [ms]



<Max>

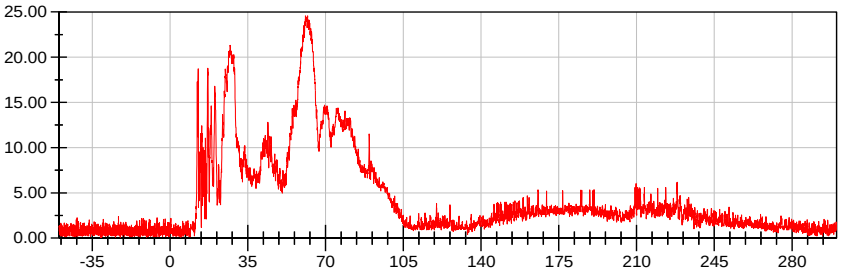
6.61 g at 12.45 ms

<Min>

-5.46 g at 20.00 ms

CFC_180

Driver Spine T1 Acceleration Resultant (g) vs. Time [ms]



<Max>

24.57 g at 61.00 ms

<Min>

0.09 g at -31.35 ms

Prefiltered_> CFC 1000

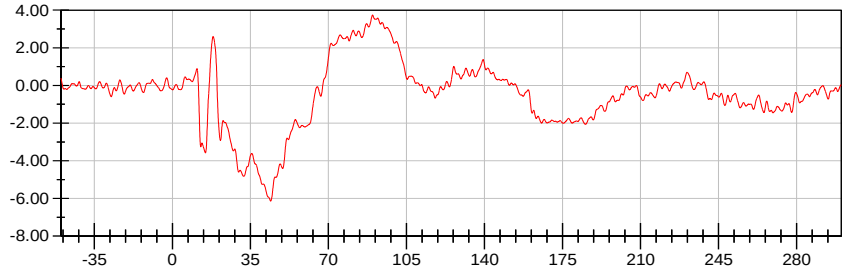
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Spine T4 Acceleration (X) (g) vs. Time [ms]



<Max>

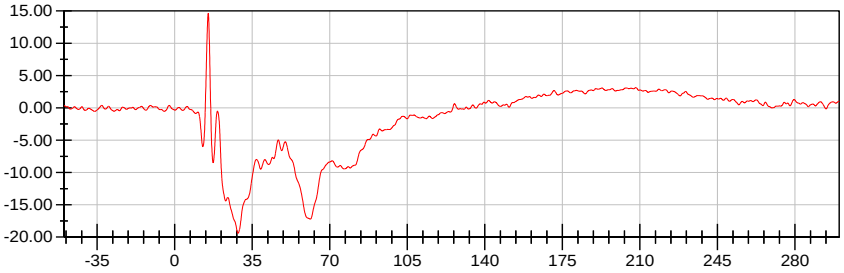
3.74 g at 89.80 ms

<Min>

-6.14 g at 44.10 ms

CFC_180

Driver Spine T4 Acceleration (Y) (g) vs. Time [ms]



<Max>

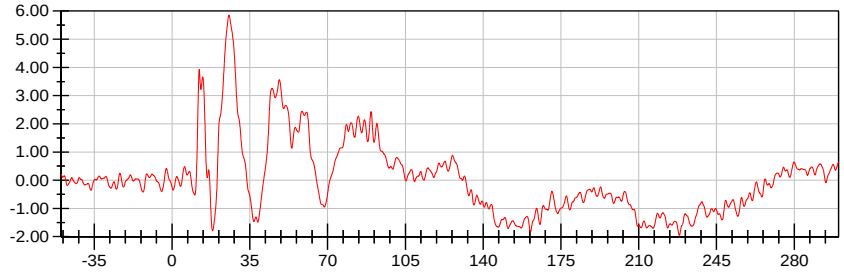
14.62 g at 15.15 ms

<Min>

-19.41 g at 28.60 ms

CFC_180

Driver Spine T4 Acceleration (Z) (g) vs. Time [ms]



<Max>

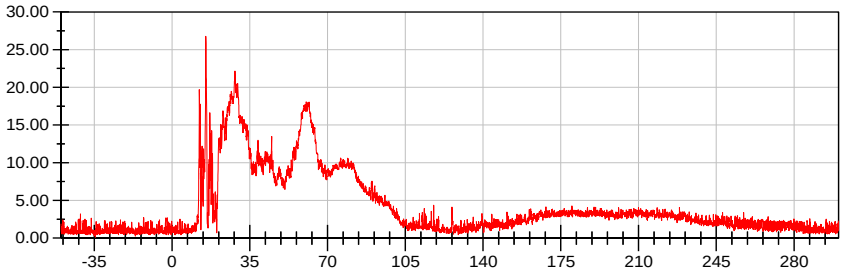
5.86 g at 25.60 ms

<Min>

-1.96 g at 228.30 ms

CFC_180

Driver Spine T4 Acceleration Resultant (g) vs. Time [ms]



<Max>

26.78 g at 15.20 ms

<Min>

0.12 g at -34.50 ms

Prefiltered_> CFC 1000

VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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

<Max>

4.24 g at 32.90 ms

<Min>

-4.65 g at 90.20 ms

CFC_180

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

<Max>

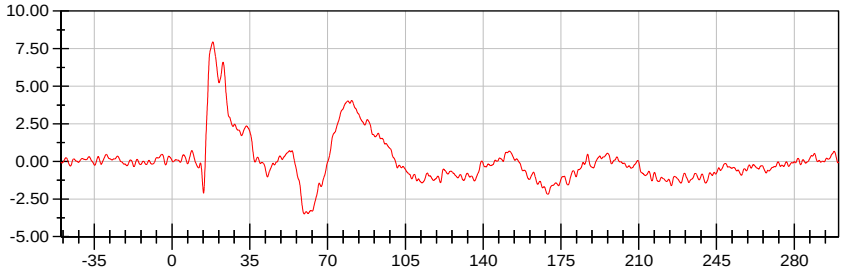
24.99 g at 33.35 ms

<Min>

-8.58 g at 14.05 ms

CFC_180

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



<Max>

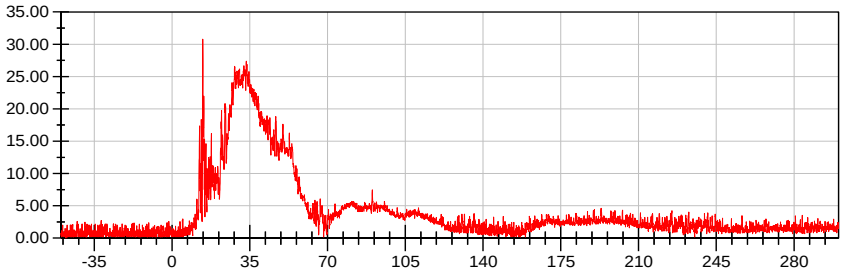
7.95 g at 18.35 ms

<Min>

-3.49 g at 59.50 ms

CFC_180

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



<Max>

30.78 g at 13.85 ms

<Min>

0.02 g at -47.80 ms

Prefiltered_> CFC 1000

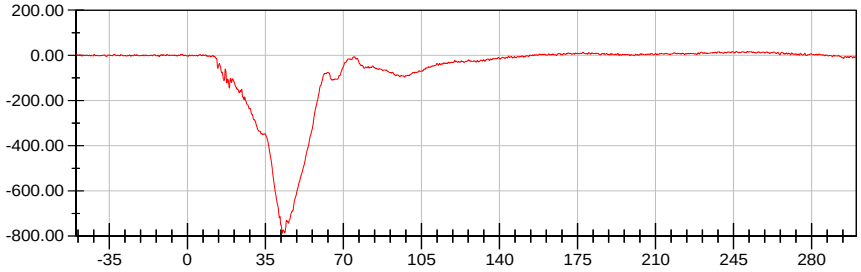
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

17.26 N at 246.25 ms

<Min>

-786.60 N at 42.55 ms

CFC_600

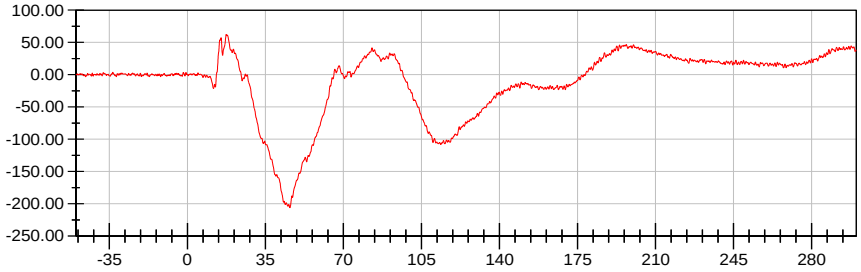
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Sacro-iliac Left Force (X) (N) vs. Time [ms]



<Max>

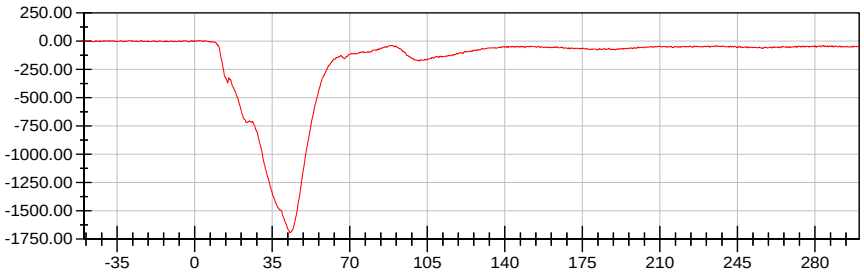
62.30 N at 17.40 ms

<Min>

-205.92 N at 46.00 ms

CFC_600

Driver Sacro-iliac Left Force (Y) (N) vs. Time [ms]



<Max>

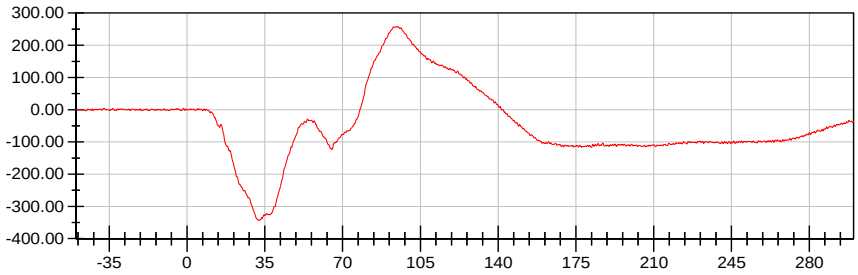
5.79 N at 1.65 ms

<Min>

-1,694.35 N at 43.15 ms

CFC_600

Driver Sacro-iliac Left Force (Z) (N) vs. Time [ms]



<Max>

257.62 N at 94.45 ms

<Min>

-343.63 N at 32.15 ms

CFC_600

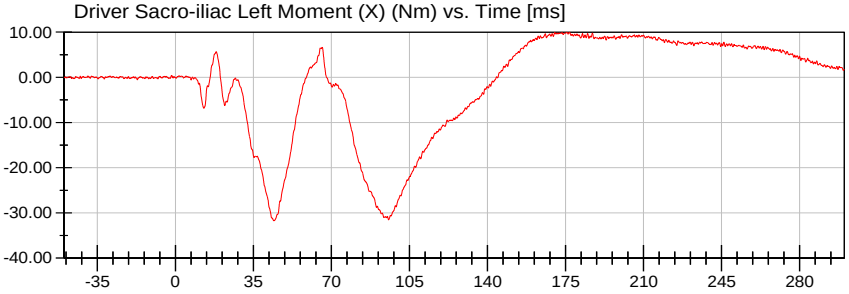
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Sacro-iliac Left Moment (X) (Nm) vs. Time [ms]



<Max>

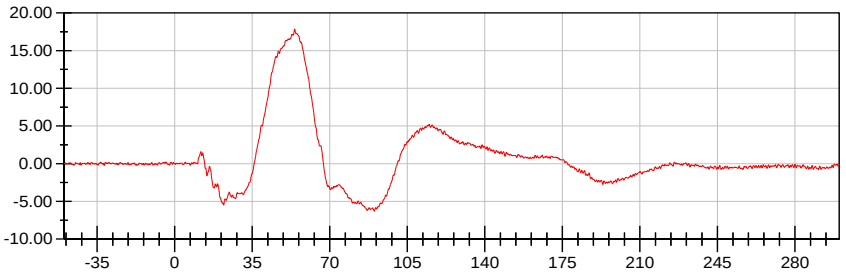
9.95 Nm at 175.60 ms

<Min>

-31.74 Nm at 44.15 ms

CFC_600

Driver Sacro-iliac Left Moment (Y) (Nm) vs. Time [ms]



<Max>

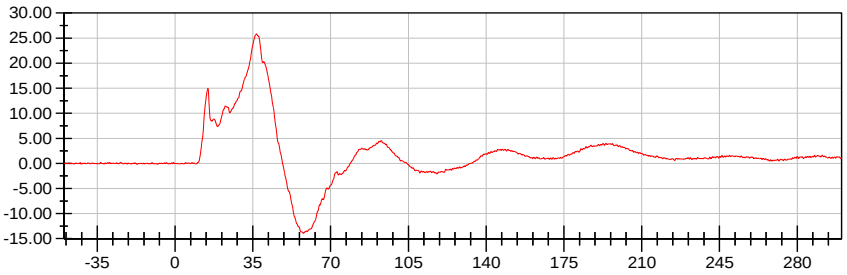
17.86 Nm at 54.20 ms

<Min>

-6.31 Nm at 90.10 ms

CFC_600

Driver Sacro-iliac Left Moment (Z) (Nm) vs. Time [ms]



<Max>

25.83 Nm at 36.70 ms

<Min>

-13.91 Nm at 57.75 ms

CFC_600

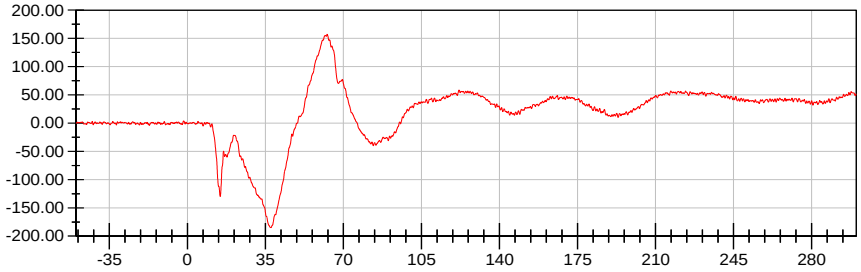
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Sacro-iliac Right Force (X) (N) vs. Time [ms]



<Max>

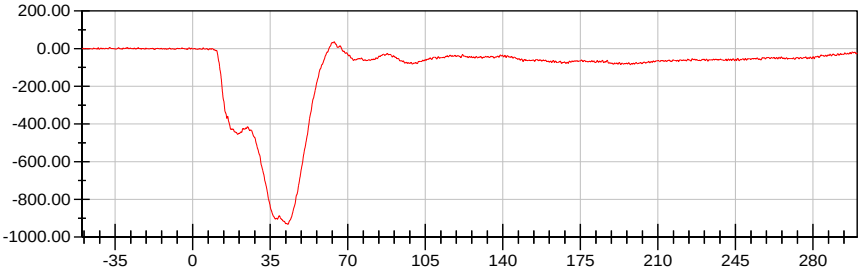
157.14 N at 62.70 ms

<Min>

-184.98 N at 37.35 ms

CFC_600

Driver Sacro-iliac Right Force (Y) (N) vs. Time [ms]



<Max>

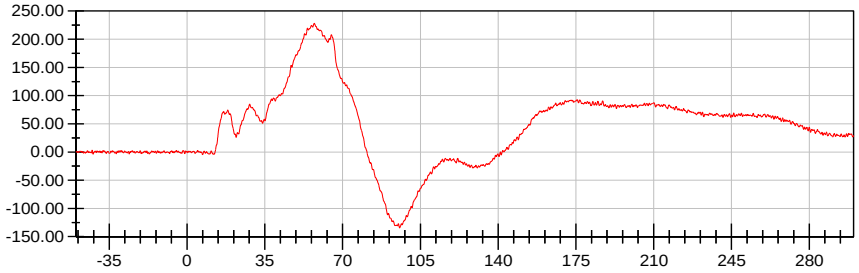
36.03 N at 63.90 ms

<Min>

-932.05 N at 43.05 ms

CFC_600

Driver Sacro-iliac Right Force (Z) (N) vs. Time [ms]



<Max>

228.16 N at 57.25 ms

<Min>

-134.49 N at 95.65 ms

CFC_600

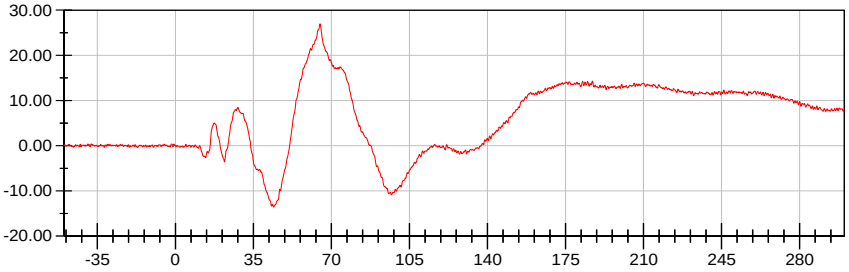
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Sacro-iliac Right Moment (X) (Nm) vs. Time [ms]



<Max>

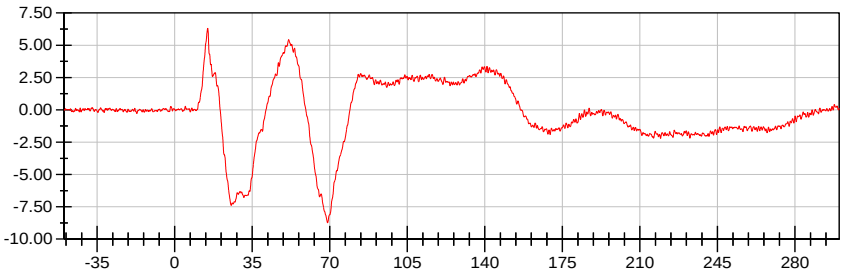
26.96 Nm at 64.90 ms

<Min>

-13.56 Nm at 44.05 ms

CFC_600

Driver Sacro-iliac Right Moment (Y) (Nm) vs. Time [ms]



<Max>

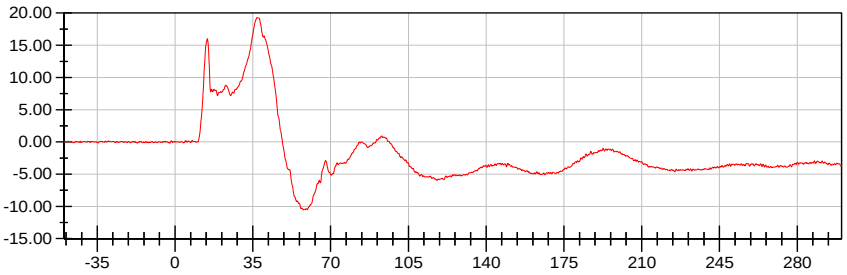
6.32 Nm at 14.95 ms

<Min>

-8.73 Nm at 69.05 ms

CFC_600

Driver Sacro-iliac Right Moment (Z) (Nm) vs. Time [ms]



<Max>

19.31 Nm at 36.90 ms

<Min>

-10.53 Nm at 57.80 ms

CFC_600

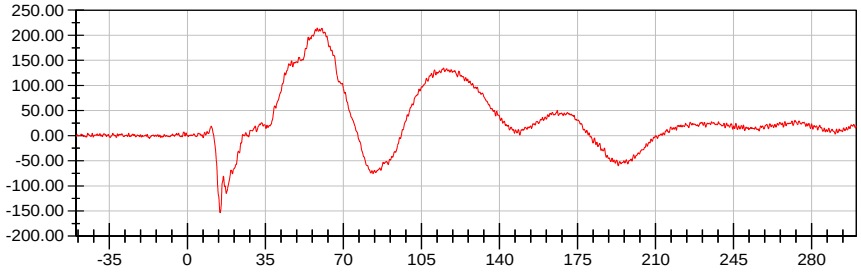
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Lumbar Force (X) (N) vs. Time [ms]



<Max>

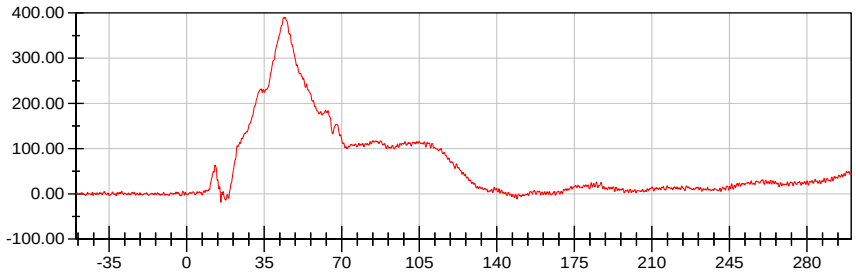
214.33 N at 58.25 ms

<Min>

-153.35 N at 14.65 ms

CFC_600

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



<Max>

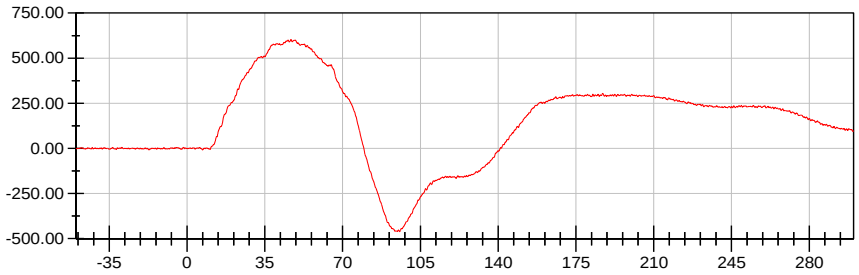
390.34 N at 44.40 ms

<Min>

-18.83 N at 15.45 ms

CFC_600

Driver Lumbar Force (Z) (N) vs. Time [ms]



<Max>

603.72 N at 46.75 ms

<Min>

-461.62 N at 95.70 ms

CFC_600

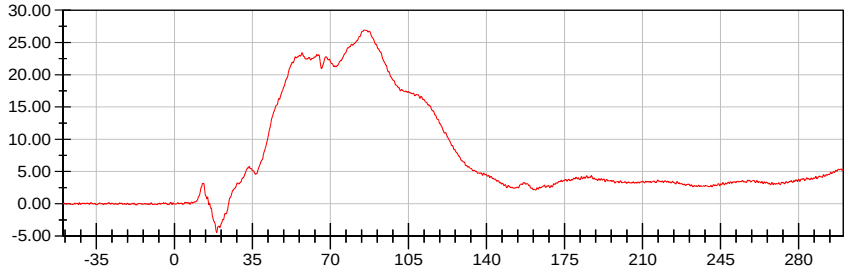
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Lumbar Moment (X) (Nm) vs. Time [ms]



<Max>

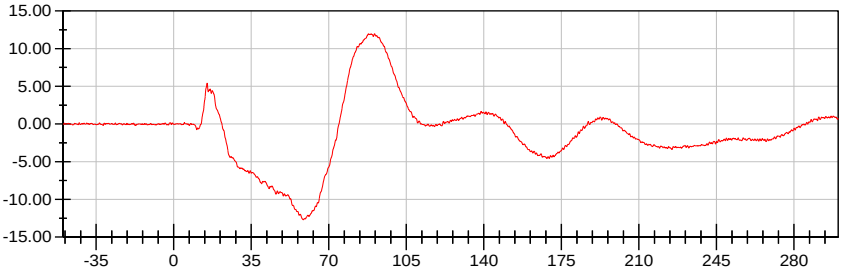
26.92 Nm at 85.50 ms

<Min>

-4.47 Nm at 18.95 ms

CFC_600

Driver Lumbar Moment (Y) (Nm) vs. Time [ms]



<Max>

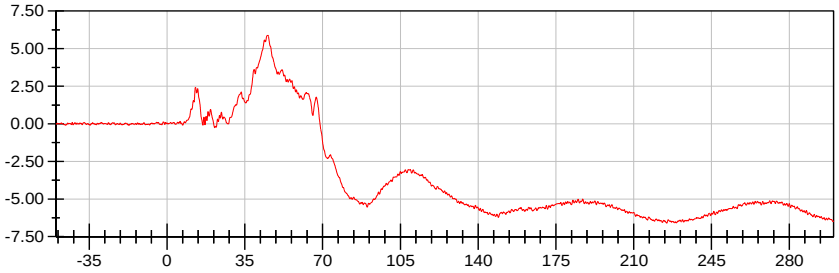
11.98 Nm at 90.65 ms

<Min>

-12.70 Nm at 58.50 ms

CFC_600

Driver Lumbar Moment (Z) (Nm) vs. Time [ms]



<Max>

5.89 Nm at 45.40 ms

<Min>

-6.61 Nm at 224.90 ms

CFC_600

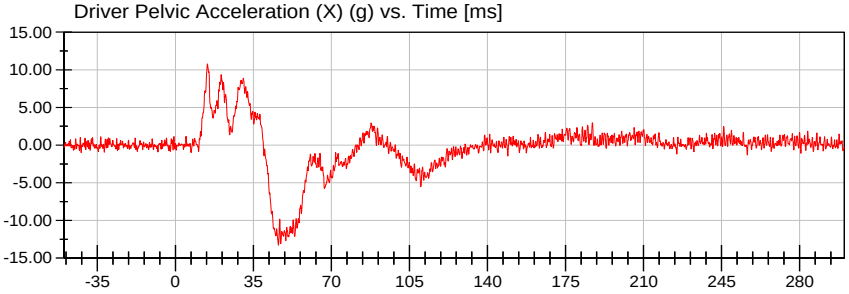
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

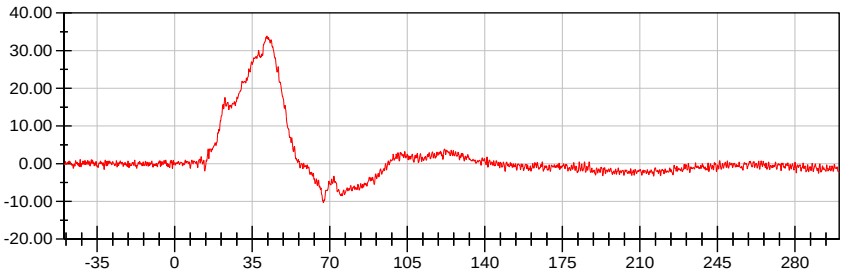
10.79 g at 14.40 ms

<Min>

-13.30 g at 46.20 ms

CFC_1000

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



<Max>

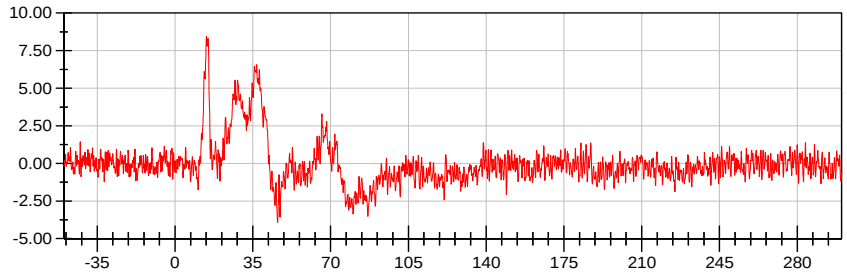
33.90 g at 41.60 ms

<Min>

-10.28 g at 67.10 ms

CFC_1000

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



<Max>

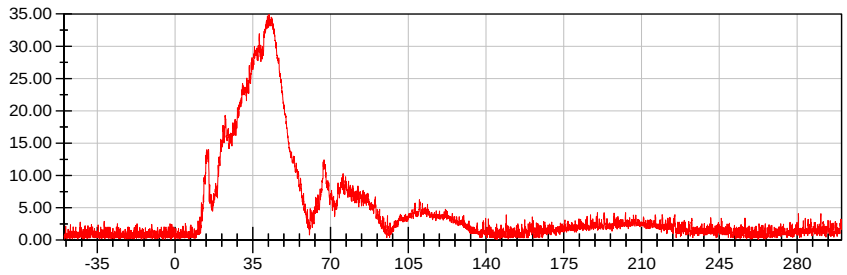
8.45 g at 14.10 ms

<Min>

-3.91 g at 46.20 ms

CFC_1000

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



<Max>

34.92 g at 42.35 ms

<Min>

0.07 g at 144.90 ms

Prefiltered_> CFC 1000

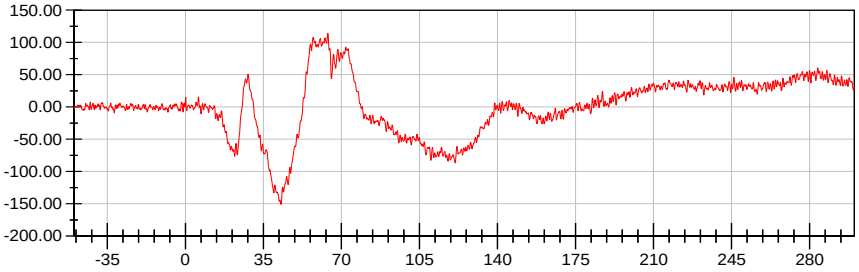
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Left Femur Force (X) (N) vs. Time [ms]



<Max>

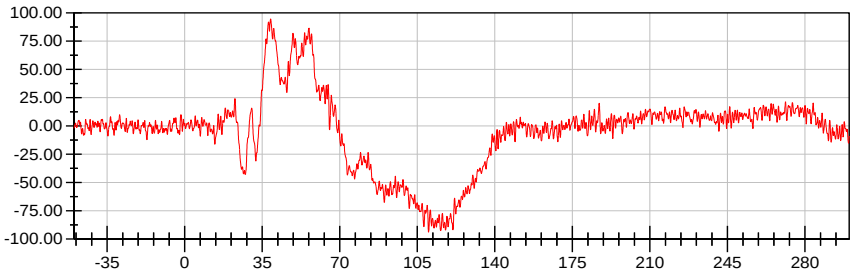
114.17 N at 63.90 ms

<Min>

-151.05 N at 42.90 ms

CFC_600

Driver Left Femur Force (Y) (N) vs. Time [ms]



<Max>

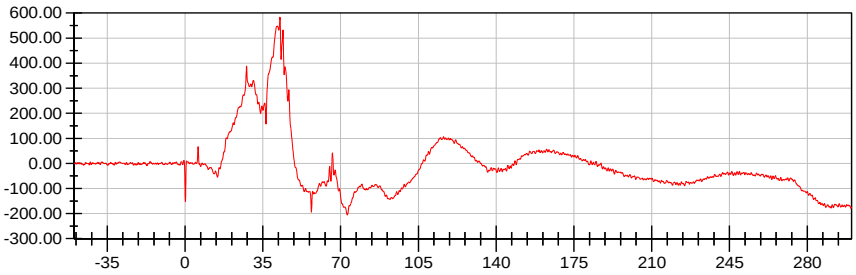
94.67 N at 38.80 ms

<Min>

-93.87 N at 110.10 ms

CFC_600

Driver Left Femur Force (Z) (N) vs. Time [ms]



<Max>

583.64 N at 42.70 ms

<Min>

-205.77 N at 73.00 ms

CFC_600

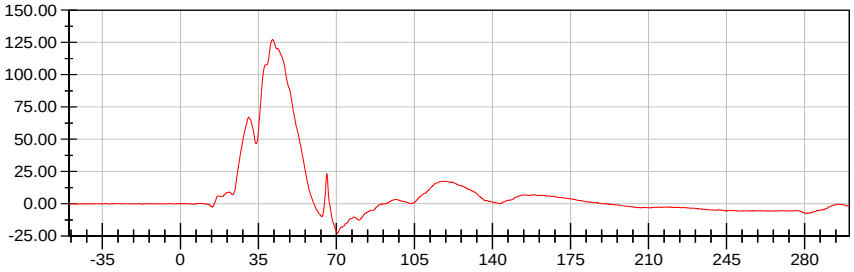
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Left Femur Moment (X) (Nm) vs. Time [ms]



<Max>

127.27 Nm at 41.35 ms

<Min>

-22.69 Nm at 70.40 ms

CFC_600

Driver Left Femur Moment (Y) (Nm) vs. Time [ms]

<Max>

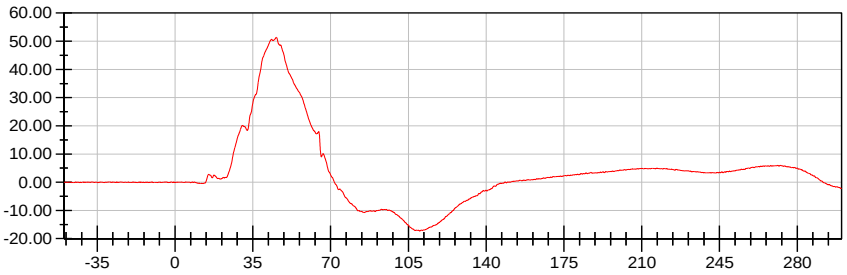
35.73 Nm at 29.50 ms

<Min>

-22.49 Nm at 110.00 ms

CFC_600

Driver Left Femur Moment (Z) (Nm) vs. Time [ms]



<Max>

51.38 Nm at 45.55 ms

<Min>

-17.31 Nm at 110.10 ms

CFC_600

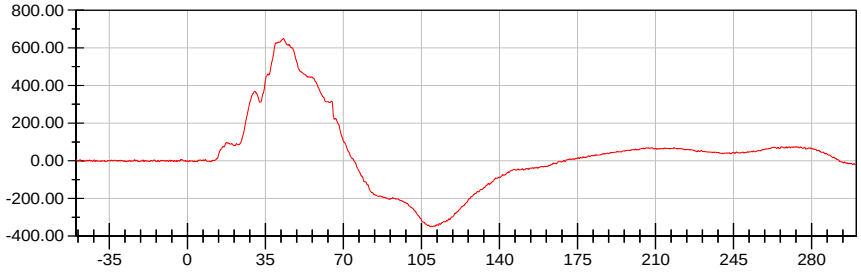
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Femoral Neck Force (X) (N) vs. Time [ms]



<Max>

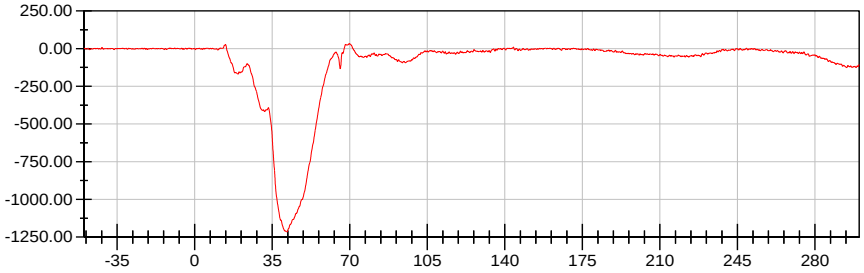
649.31 N at 43.05 ms

<Min>

-350.35 N at 109.10 ms

CFC_600

Driver Femoral Neck Force (Y) (N) vs. Time [ms]



<Max>

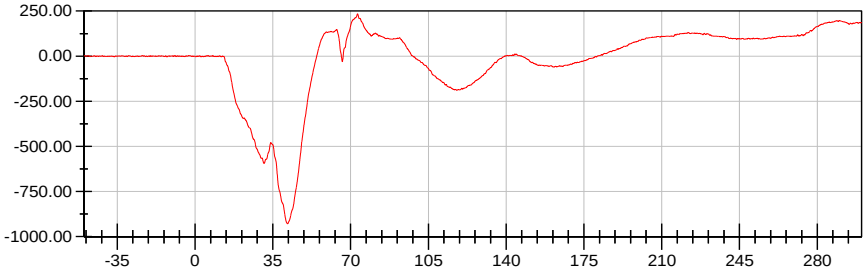
32.50 N at 69.80 ms

<Min>

-1,214.87 N at 41.65 ms

CFC_600

Driver Femoral Neck Force (Z) (N) vs. Time [ms]



<Max>

234.40 N at 73.10 ms

<Min>

-928.70 N at 41.60 ms

CFC_600

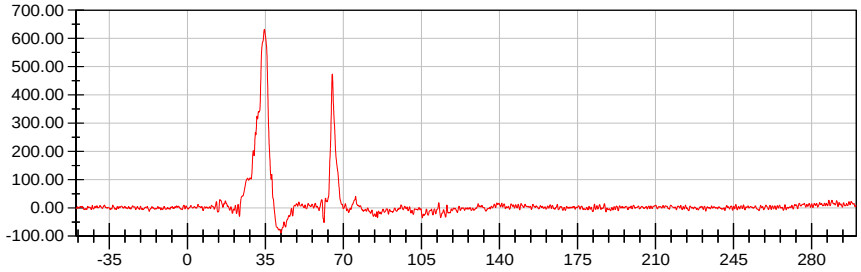
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Driver Left Outer Knee Force (Y) (N) vs. Time [ms]



<Max>

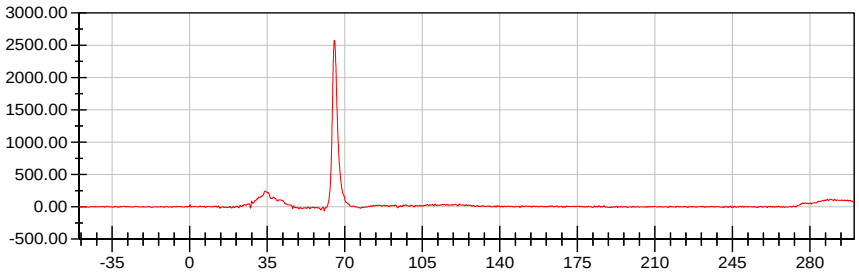
632.22 N at 34.55 ms

<Min>

-88.69 N at 42.00 ms

CFC_600

Driver Left Inner Knee Force (Y) (N) vs. Time [ms]



<Max>

2,578.03 N at 65.30 ms

<Min>

-65.32 N at 60.80 ms

CFC_600

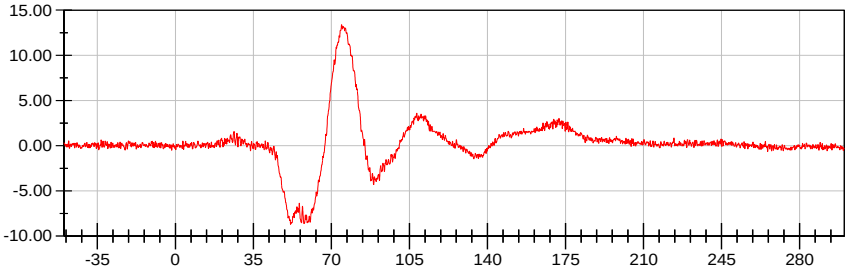
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

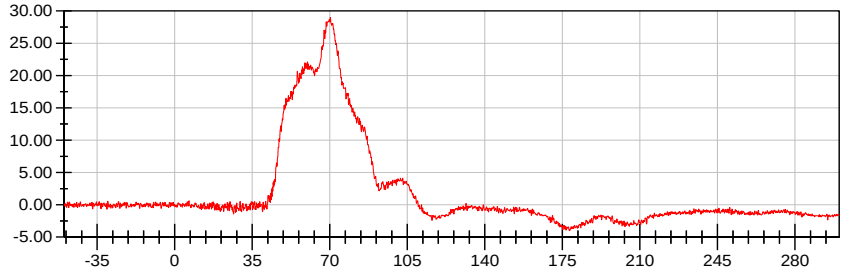
13.39 g at 74.55 ms

<Min>

-8.69 g at 51.70 ms

CFC_1000

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



<Max>

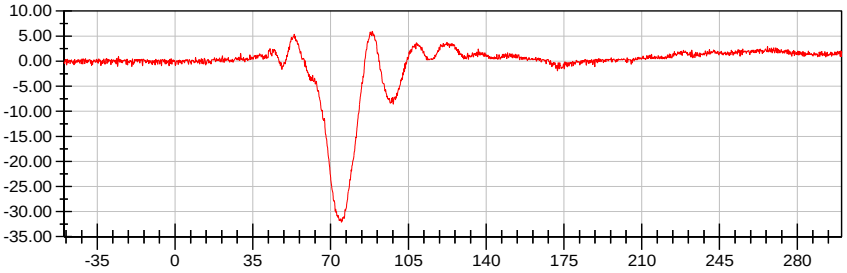
28.97 g at 70.30 ms

<Min>

-3.99 g at 178.35 ms

CFC_1000

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



<Max>

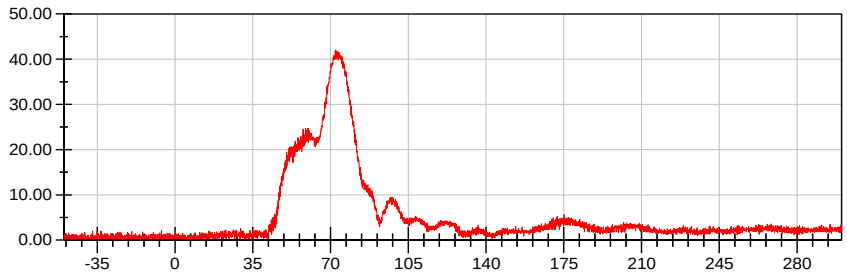
5.94 g at 88.70 ms

<Min>

-32.13 g at 74.90 ms

CFC_1000

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



<Max>

42.01 g at 72.15 ms

<Min>

0.27 g at -40.10 ms

Prefiltered_> CFC 1000

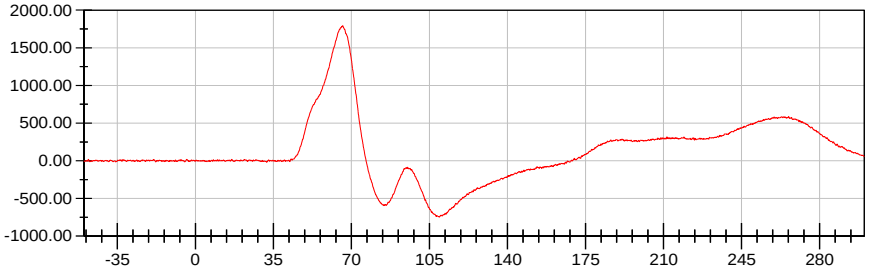
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Head Angular Rate (X) (º/s) vs. Time [ms]



<Max>

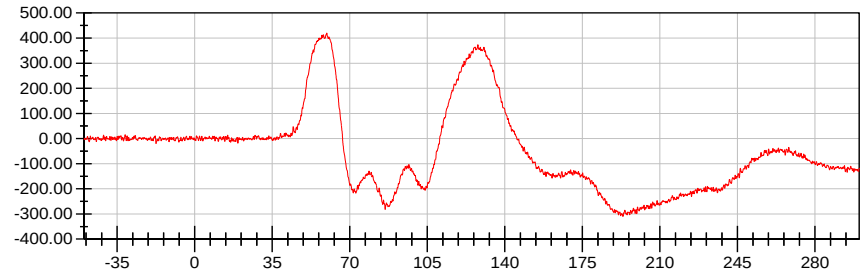
1,792.25 º/s at 66.10 ms

<Min>

-748.42 º/s at 109.35 ms

CFC_1000

Passenger Head Angular Rate (Y) (º/s) vs. Time [ms]



<Max>

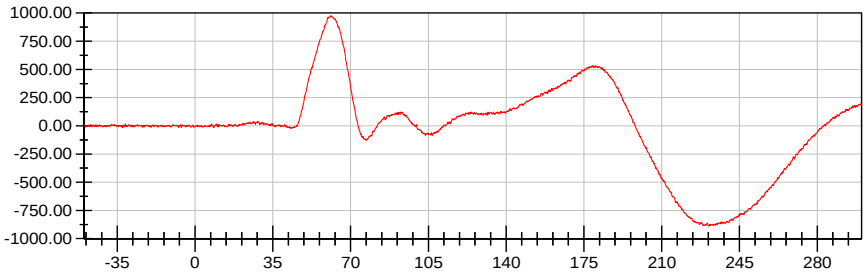
419.58 º/s at 59.60 ms

<Min>

-310.03 º/s at 193.30 ms

CFC_1000

Passenger Head Angular Rate (Z) (º/s) vs. Time [ms]



<Max>

976.62 º/s at 61.15 ms

<Min>

-888.31 º/s at 231.20 ms

CFC_1000

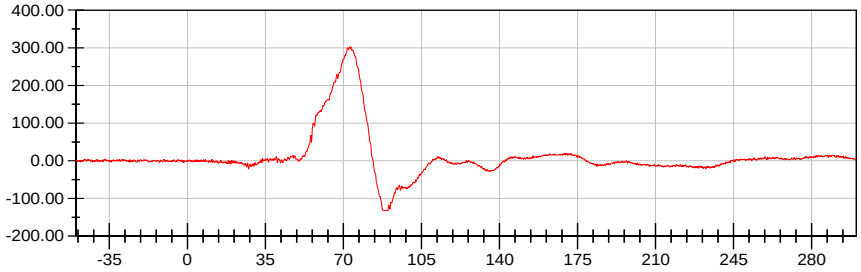
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Upper Neck Force (X) (N) vs. Time [ms]



<Max>

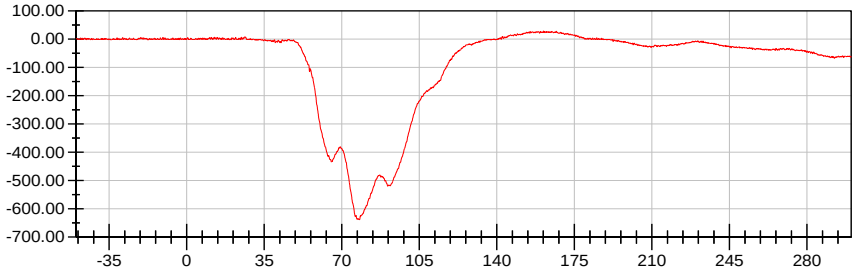
303.11 N at 73.35 ms

<Min>

-133.03 N at 88.50 ms

CFC_1000

Passenger Upper Neck Force (Y) (N) vs. Time [ms]



<Max>

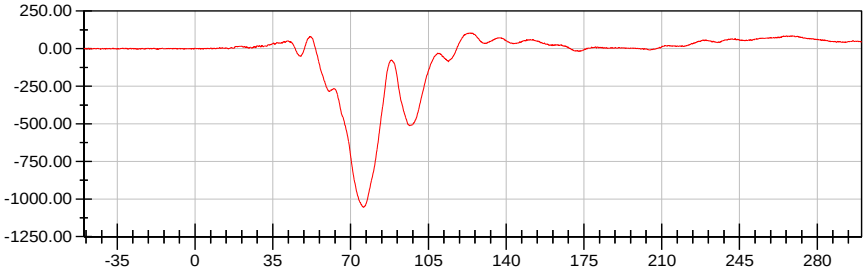
28.66 N at 161.05 ms

<Min>

-638.23 N at 77.95 ms

CFC_1000

Passenger Upper Neck Force (Z) (N) vs. Time [ms]



<Max>

104.25 N at 124.25 ms

<Min>

-1,054.79 N at 75.85 ms

CFC_1000

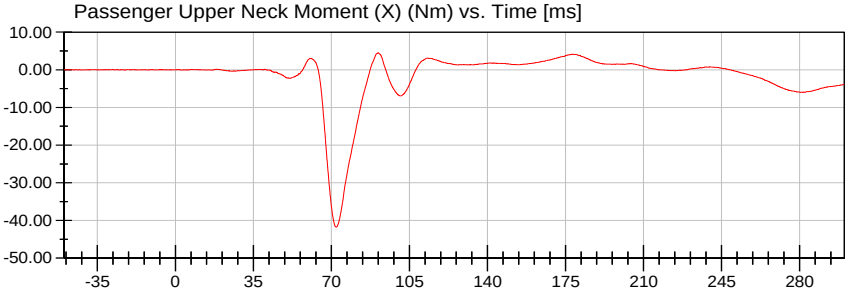
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Upper Neck Moment (X) (Nm) vs. Time [ms]



<Max>

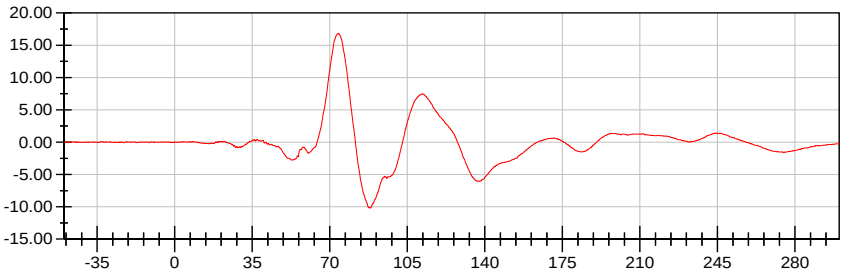
4.51 Nm at 91.05 ms

<Min>

-41.75 Nm at 72.25 ms

CFC_600

Passenger Upper Neck Moment (Y) (Nm) vs. Time [ms]



<Max>

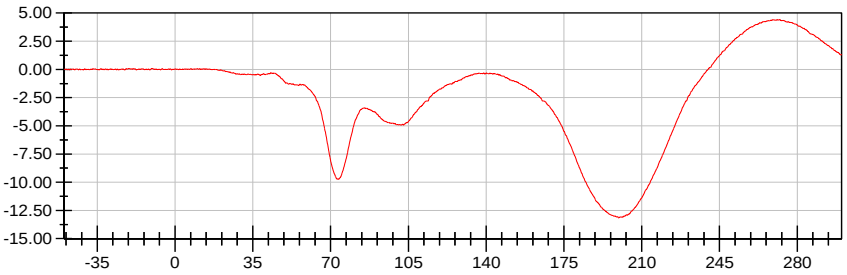
16.80 Nm at 74.00 ms

<Min>

-10.18 Nm at 88.35 ms

CFC_600

Passenger Upper Neck Moment (Z) (Nm) vs. Time [ms]



<Max>

4.42 Nm at 272.00 ms

<Min>

-13.16 Nm at 199.65 ms

CFC_600

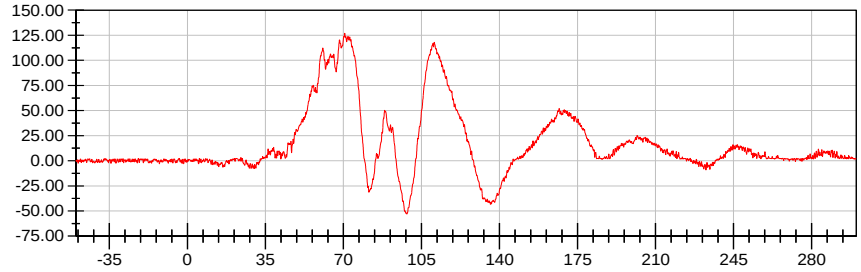
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Lower Neck Force (X) (N) vs. Time [ms]



<Max>

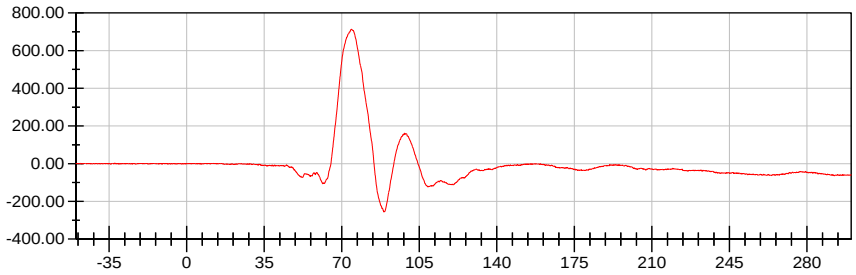
126.90 N at 70.55 ms

<Min>

-52.95 N at 98.45 ms

CFC_1000

Passenger Lower Neck Force (Y) (N) vs. Time [ms]



<Max>

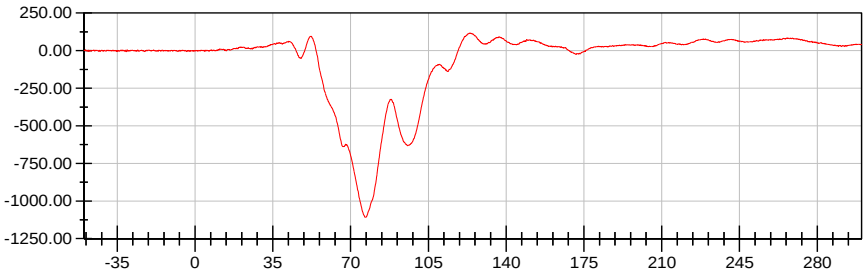
713.14 N at 74.40 ms

<Min>

-256.14 N at 89.05 ms

CFC_1000

Passenger Lower Neck Force (Z) (N) vs. Time [ms]



<Max>

115.86 N at 123.50 ms

<Min>

-1,108.77 N at 76.55 ms

CFC_1000

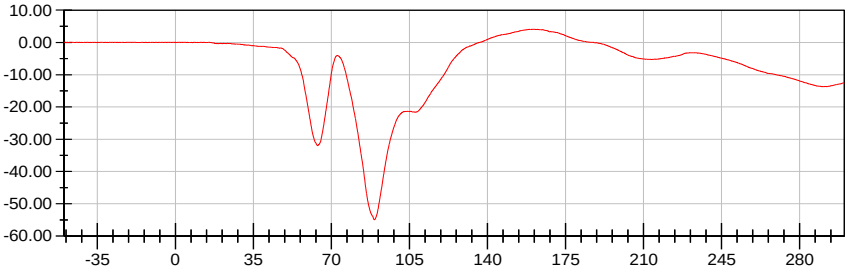
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Lower Neck Moment (X) (Nm) vs. Time [ms]



<Max>

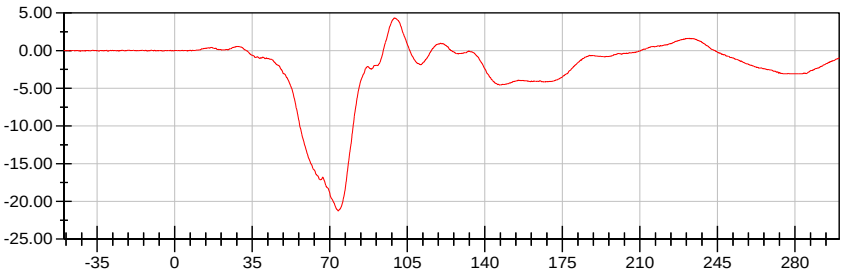
4.08 Nm at 161.05 ms

<Min>

-54.93 Nm at 89.20 ms

CFC_600

Passenger Lower Neck Moment (Y) (Nm) vs. Time [ms]



<Max>

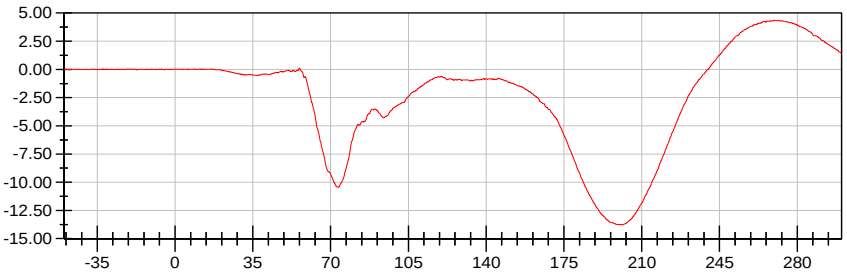
4.34 Nm at 99.20 ms

<Min>

-21.25 Nm at 73.75 ms

CFC_600

Passenger Lower Neck Moment (Z) (Nm) vs. Time [ms]



<Max>

4.37 Nm at 269.70 ms

<Min>

-13.78 Nm at 201.05 ms

CFC_600

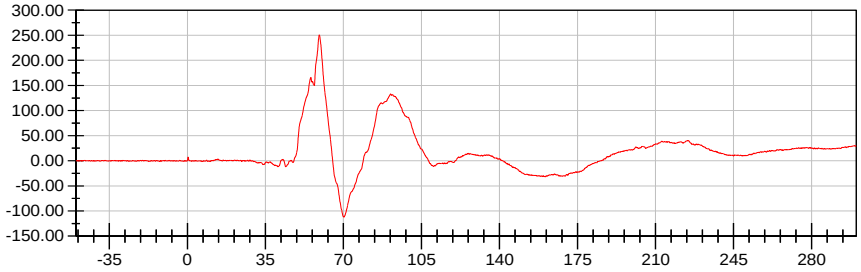
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Shoulder Force (X) (N) vs. Time [ms]



<Max>

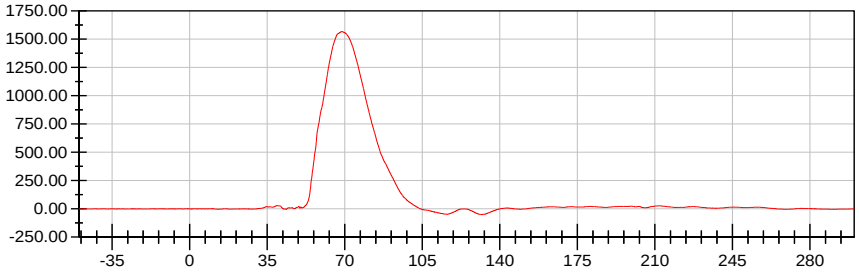
250.92 N at 59.20 ms

<Min>

-112.15 N at 70.25 ms

CFC_600

Passenger Shoulder Force (Y) (N) vs. Time [ms]



<Max>

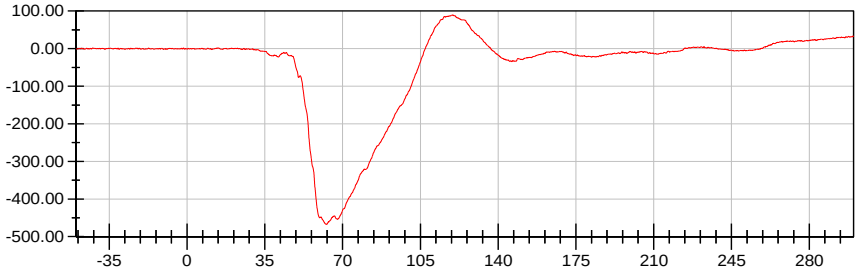
1,567.46 N at 68.55 ms

<Min>

-51.60 N at 131.85 ms

CFC_600

Passenger Shoulder Force (Z) (N) vs. Time [ms]



<Max>

89.38 N at 119.60 ms

<Min>

-467.29 N at 62.85 ms

CFC_600

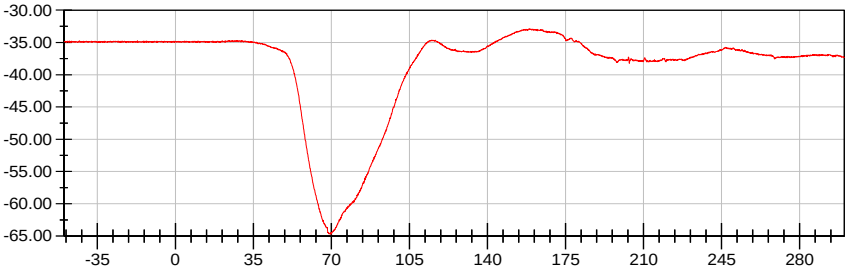
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Shoulder Rear Displacement (X) (mm) vs. Time [ms]



<Max>

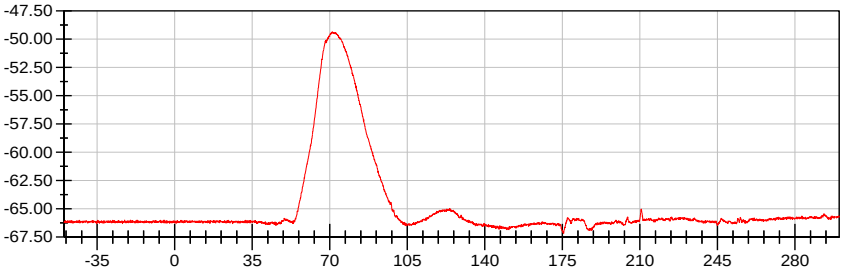
-32.88 mm at 158.70 ms

<Min>

-64.73 mm at 69.85 ms

Unfiltered

Passenger Shoulder Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

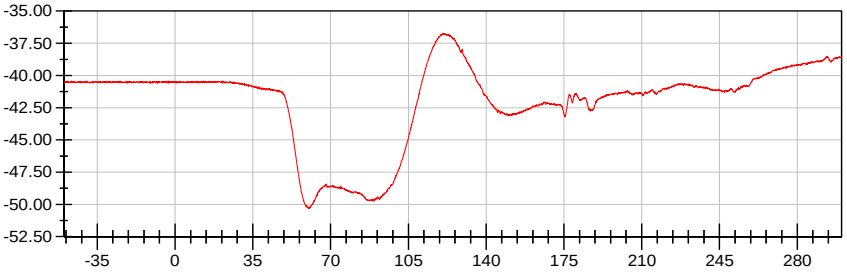
-49.35 mm at 71.20 ms

<Min>

-67.16 mm at 175.60 ms

Unfiltered

Passenger Shoulder Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

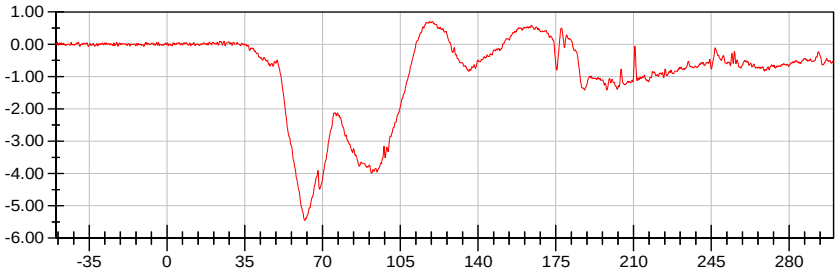
-36.76 mm at 120.65 ms

<Min>

-50.32 mm at 60.15 ms

Unfiltered

Passenger Shoulder Rear Length Change (mm) vs. Time [ms]



<Max>

0.71 mm at 118.30 ms

<Min>

-5.45 mm at 62.05 ms

CFC_600

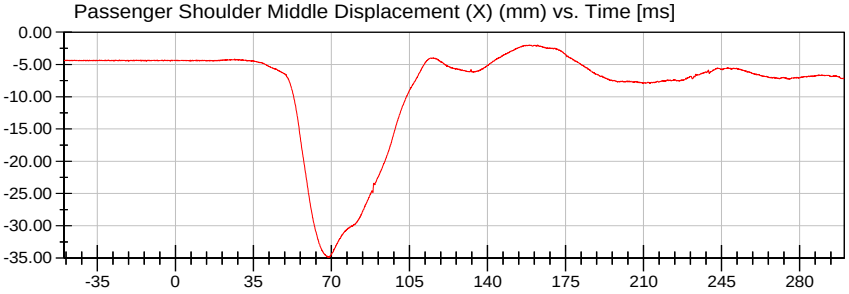
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Shoulder Middle Displacement (X) (mm) vs. Time [ms]



<Max>

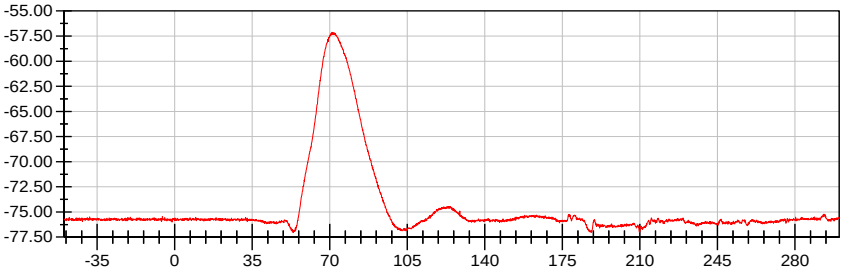
-1.99 mm at 158.80 ms

<Min>

-34.90 mm at 68.50 ms

Unfiltered

Passenger Shoulder Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

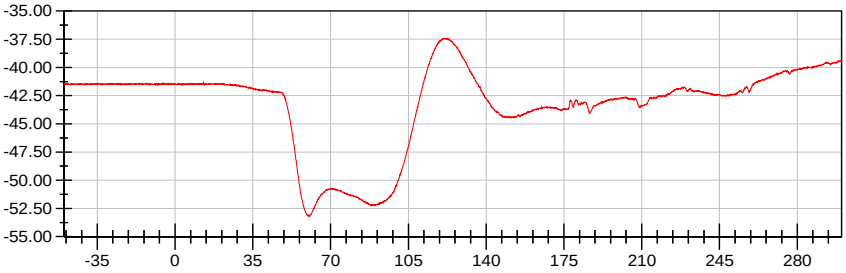
-57.12 mm at 71.00 ms

<Min>

-77.05 mm at 53.55 ms

Unfiltered

Passenger Shoulder Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

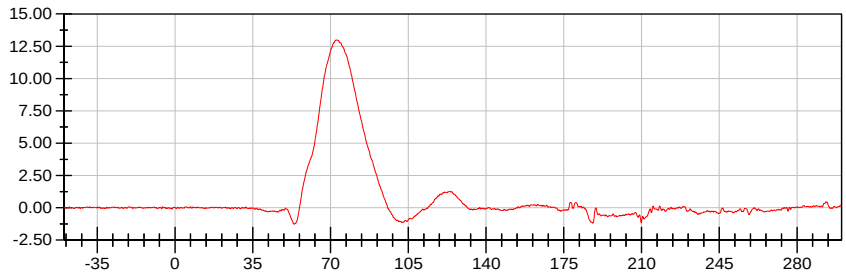
-37.39 mm at 120.70 ms

<Min>

-53.19 mm at 60.10 ms

Unfiltered

Passenger Shoulder Middle Length Change (mm) vs. Time [ms]



<Max>

12.99 mm at 72.60 ms

<Min>

-1.26 mm at 53.60 ms

CFC_600

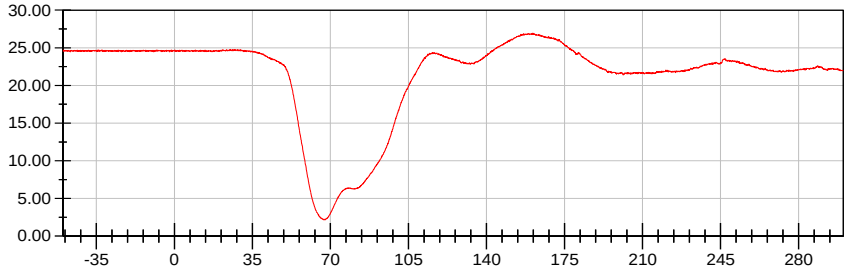
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Shoulder Front Displacement (X) (mm) vs. Time [ms]



<Max>

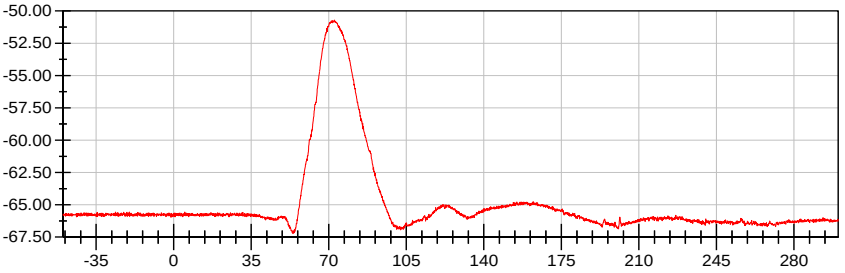
26.95 mm at 160.70 ms

<Min>

2.13 mm at 67.60 ms

Unfiltered

Passenger Shoulder Front Displacement (Y) (mm) vs. Time [ms]



<Max>

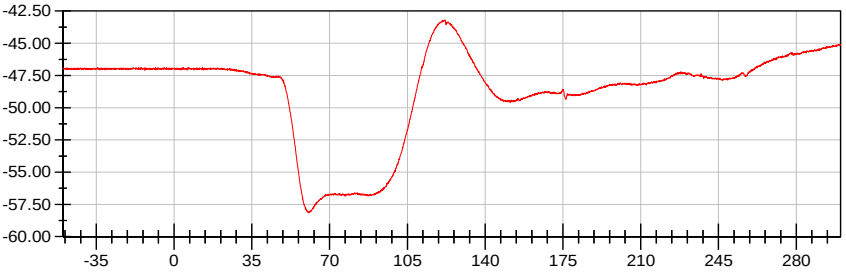
-50.71 mm at 72.55 ms

<Min>

-67.23 mm at 53.90 ms

Unfiltered

Passenger Shoulder Front Displacement (Z) (mm) vs. Time [ms]



<Max>

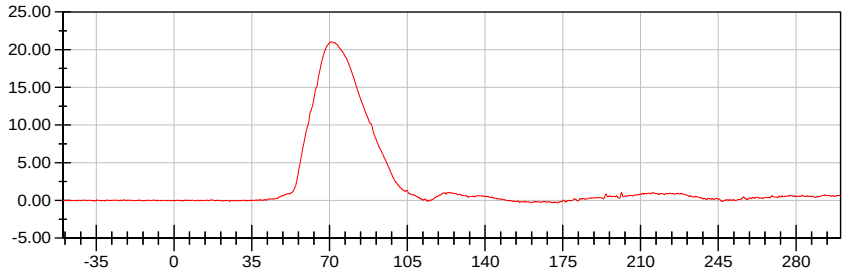
-43.20 mm at 121.90 ms

<Min>

-58.15 mm at 60.60 ms

Unfiltered

Passenger Shoulder Front Length Change (mm) vs. Time [ms]



<Max>

21.04 mm at 71.10 ms

<Min>

-0.34 mm at 172.55 ms

CFC_600

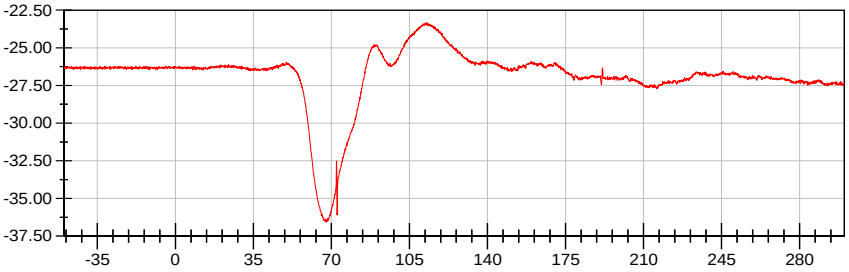
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Thorax Rib 1 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

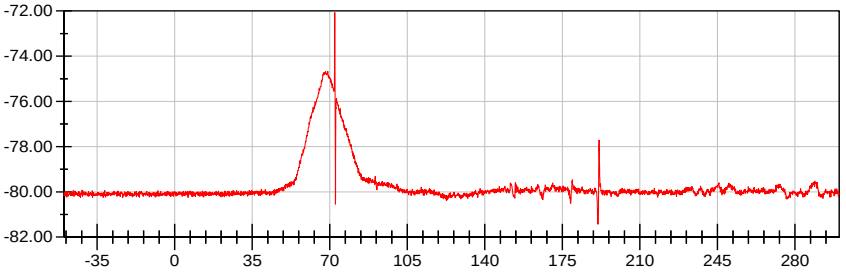
-23.34 mm at 112.75 ms

<Min>

-36.57 mm at 67.65 ms

Unfiltered

Passenger Thorax Rib 1 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

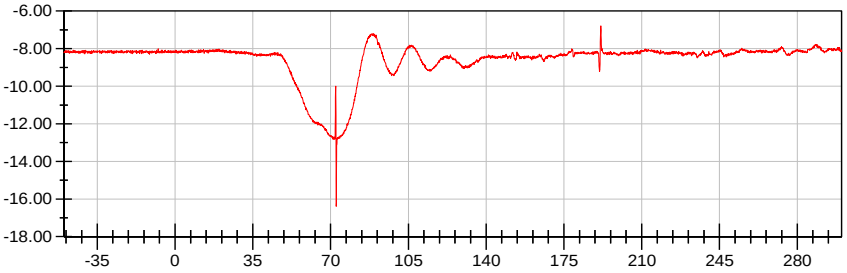
-72.07 mm at 72.30 ms

<Min>

-81.43 mm at 191.10 ms

Unfiltered

Passenger Thorax Rib 1 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

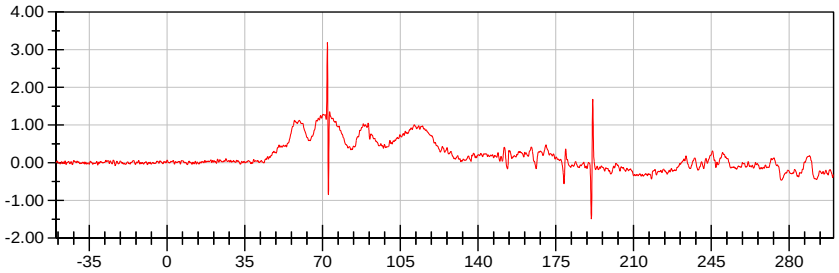
-6.79 mm at 191.60 ms

<Min>

-16.39 mm at 72.55 ms

Unfiltered

Passenger Thorax Rib 1 Rear Length Change (mm) vs. Time [ms]



<Max>

3.19 mm at 72.20 ms

<Min>

-1.49 mm at 191.00 ms

CFC_600

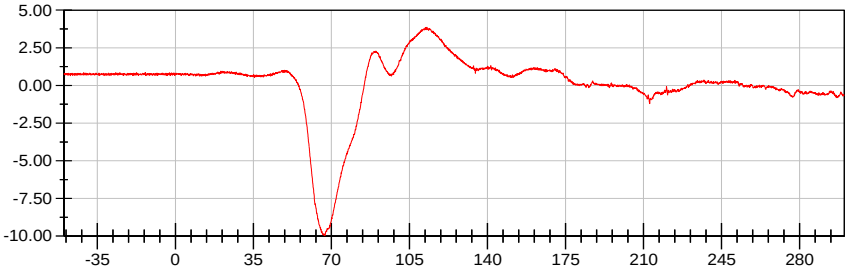
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Thorax Rib 1 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

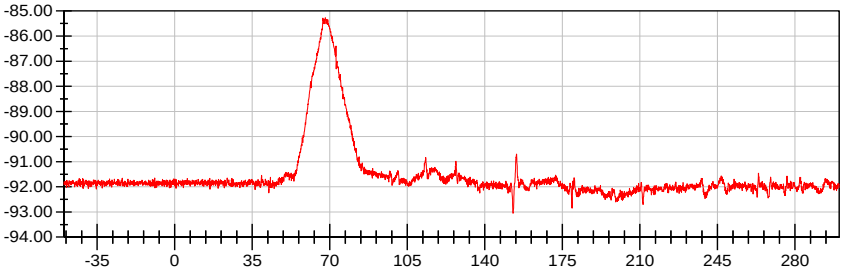
3.87 mm at 112.80 ms

<Min>

-9.97 mm at 67.05 ms

Unfiltered

Passenger Thorax Rib 1 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

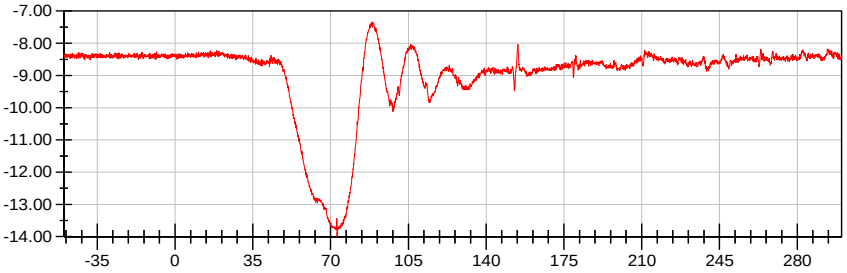
-85.26 mm at 68.00 ms

<Min>

-93.05 mm at 152.75 ms

Unfiltered

Passenger Thorax Rib 1 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

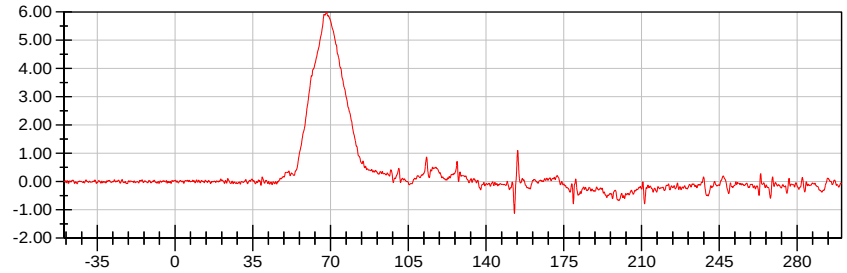
-7.34 mm at 88.95 ms

<Min>

-13.99 mm at 72.95 ms

Unfiltered

Passenger Thorax Rib 1 Middle Length Change (mm) vs. Time [ms]



<Max>

5.99 mm at 68.15 ms

<Min>

-1.12 mm at 152.75 ms

CFC_600

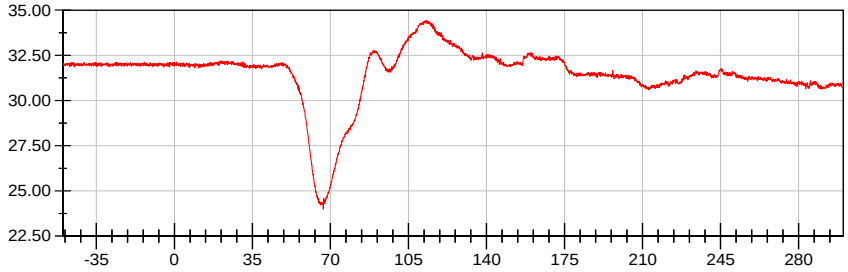
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Thorax Rib 1 Front Displacement (X) (mm) vs. Time [ms]



<Max>

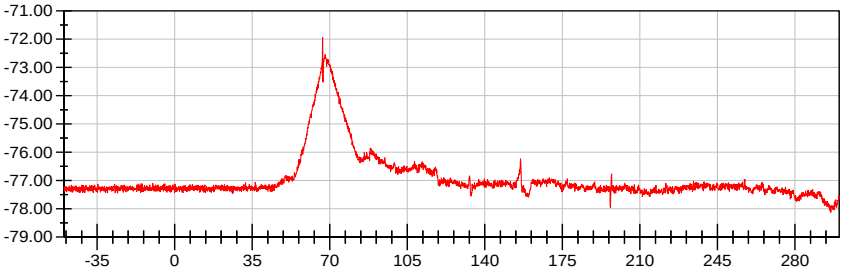
34.42 mm at 113.00 ms

<Min>

23.99 mm at 66.80 ms

Unfiltered

Passenger Thorax Rib 1 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

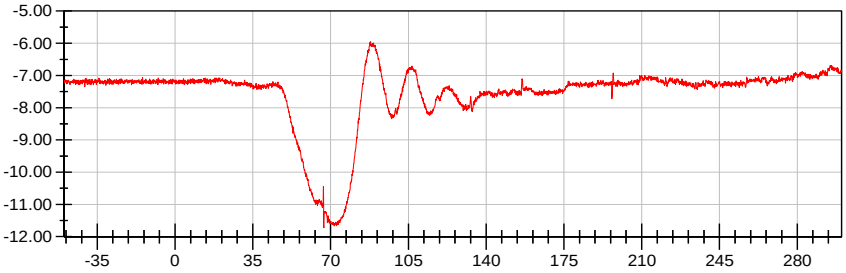
-71.94 mm at 66.80 ms

<Min>

-78.12 mm at 296.20 ms

Unfiltered

Passenger Thorax Rib 1 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

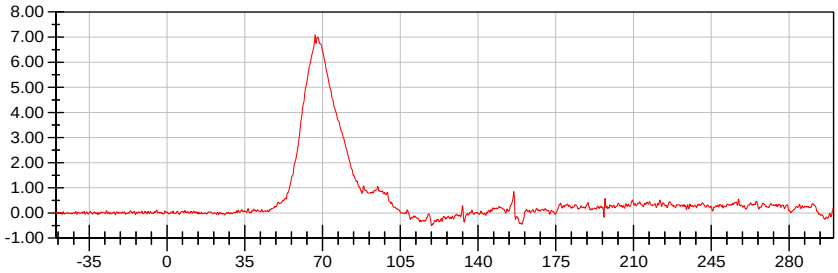
-5.95 mm at 88.00 ms

<Min>

-11.72 mm at 66.95 ms

Unfiltered

Passenger Thorax Rib 1 Front Length Change (mm) vs. Time [ms]



<Max>

7.10 mm at 66.70 ms

<Min>

-0.51 mm at 119.10 ms

CFC_600

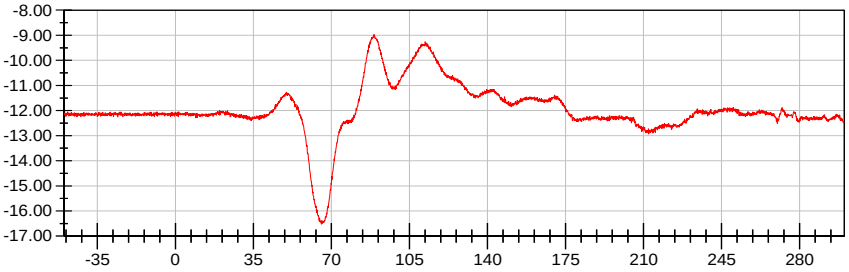
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

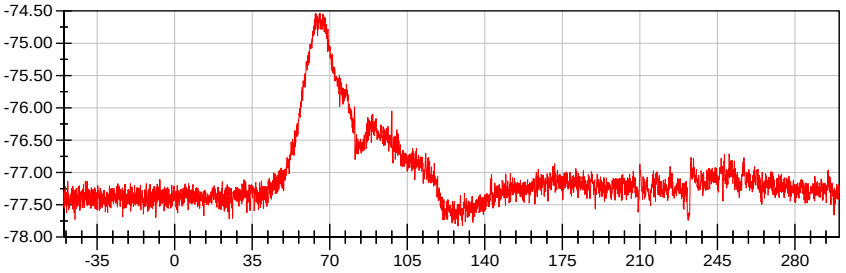
-8.97 mm at 89.10 ms

<Min>

-16.52 mm at 65.50 ms

Unfiltered

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



<Max>

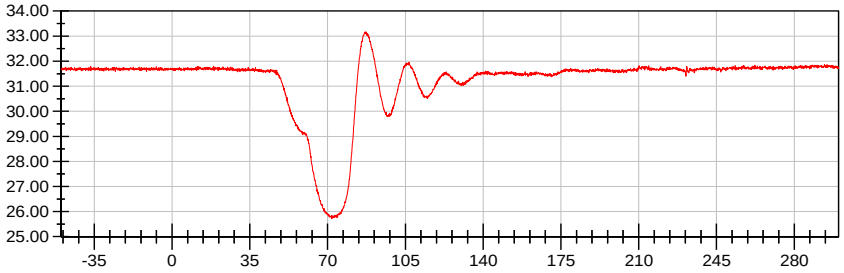
-74.54 mm at 63.55 ms

<Min>

-77.83 mm at 127.85 ms

Unfiltered

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



<Max>

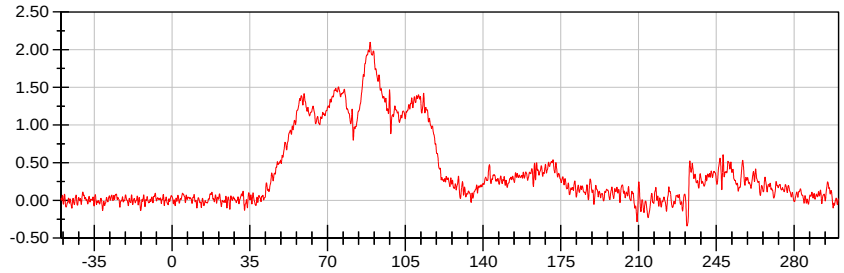
33.17 mm at 87.10 ms

<Min>

25.71 mm at 71.90 ms

Unfiltered

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



<Max>

2.10 mm at 89.15 ms

<Min>

-0.34 mm at 231.80 ms

CFC_600

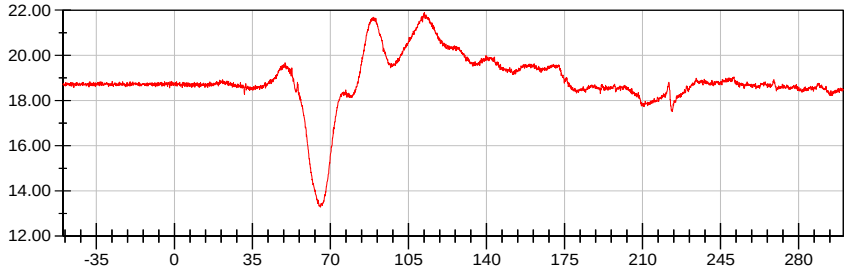
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

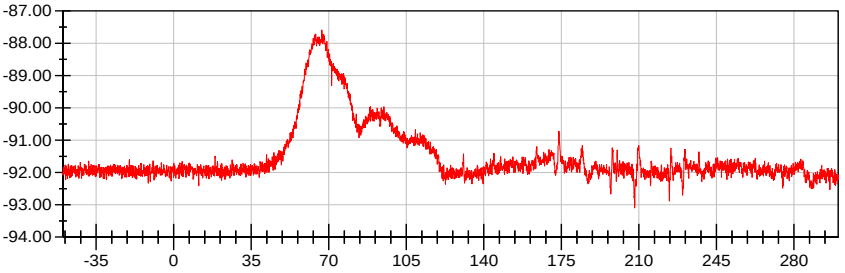
21.89 mm at 112.15 ms

<Min>

13.28 mm at 65.55 ms

Unfiltered

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



<Max>

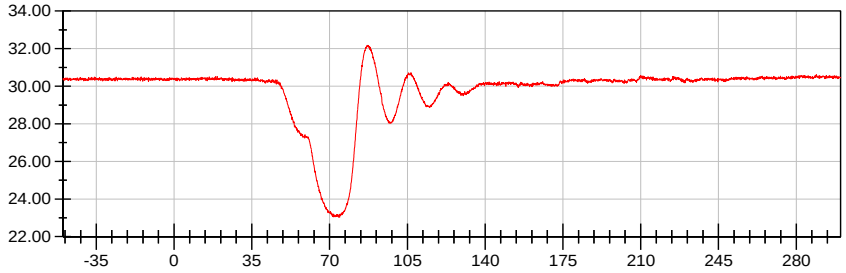
-87.59 mm at 66.90 ms

<Min>

-93.10 mm at 208.10 ms

Unfiltered

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



<Max>

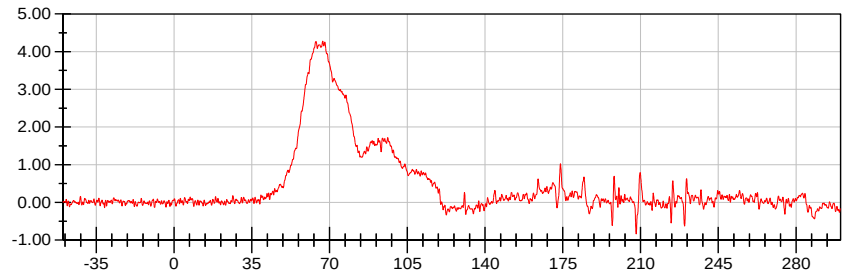
32.18 mm at 86.90 ms

<Min>

23.03 mm at 74.00 ms

Unfiltered

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



<Max>

4.28 mm at 66.95 ms

<Min>

-0.83 mm at 208.05 ms

CFC_600

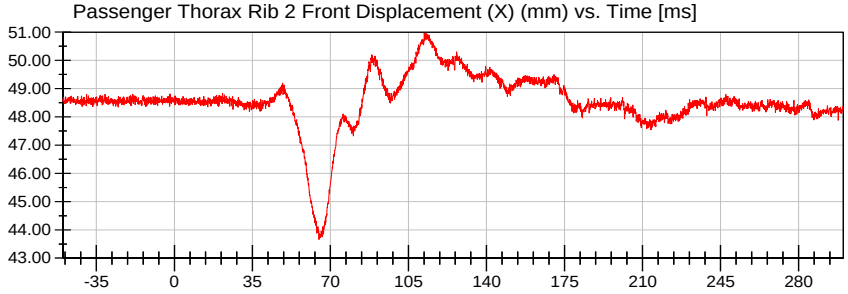
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

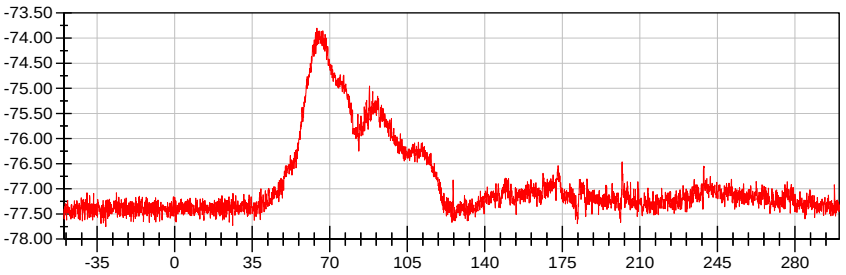
50.97 mm at 112.10 ms

<Min>

43.66 mm at 64.90 ms

Unfiltered

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



<Max>

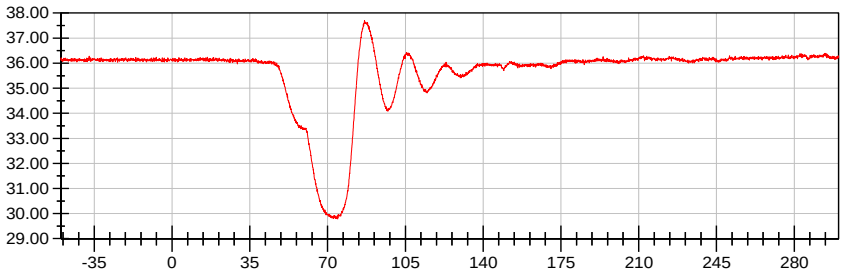
-73.80 mm at 64.20 ms

<Min>

-77.75 mm at -31.10 ms

Unfiltered

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



<Max>

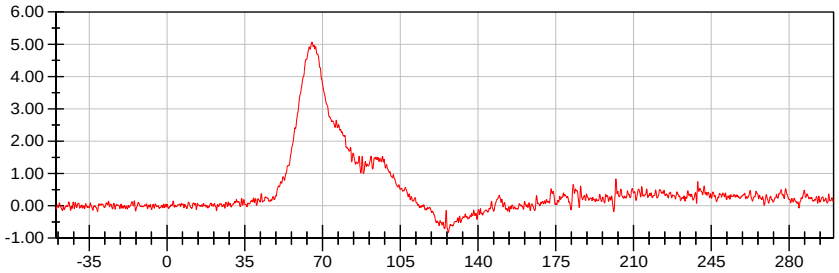
37.70 mm at 86.60 ms

<Min>

29.78 mm at 74.50 ms

Unfiltered

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



<Max>

5.06 mm at 65.25 ms

<Min>

-0.83 mm at 126.60 ms

CFC_600

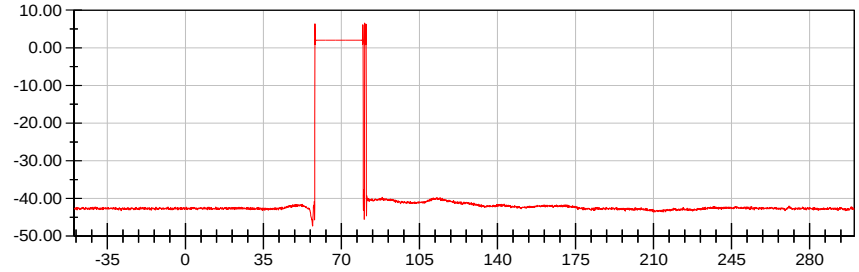
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

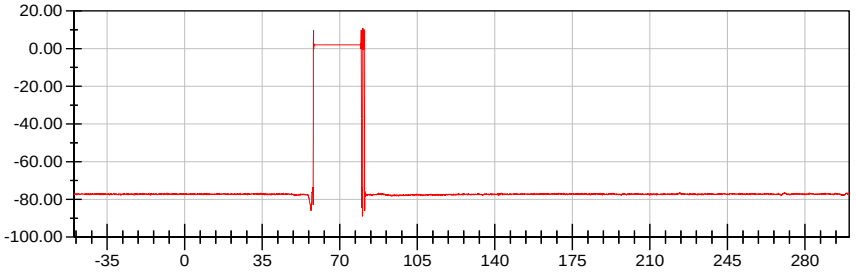
6.56 mm at 80.45 ms

<Min>

-47.35 mm at 57.05 ms

Unfiltered

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



<Max>

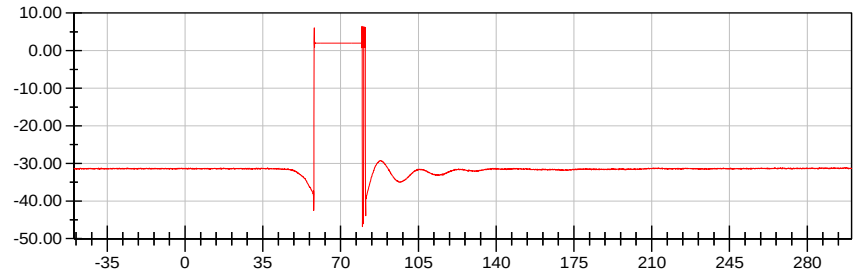
10.76 mm at 80.45 ms

<Min>

-88.94 mm at 80.25 ms

Unfiltered

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



<Max>

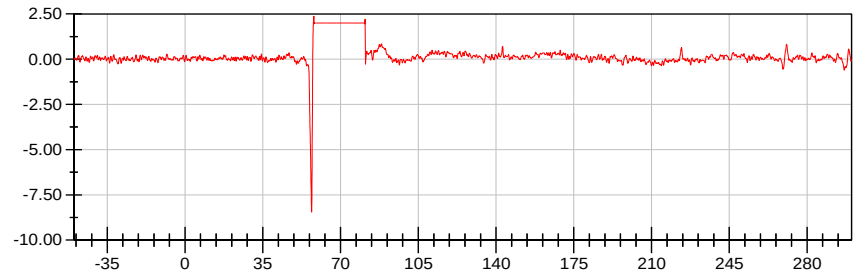
6.47 mm at 79.65 ms

<Min>

-46.81 mm at 79.85 ms

Unfiltered

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



<Max>

2.37 mm at 58.00 ms

<Min>

-8.45 mm at 57.00 ms

CFC_600

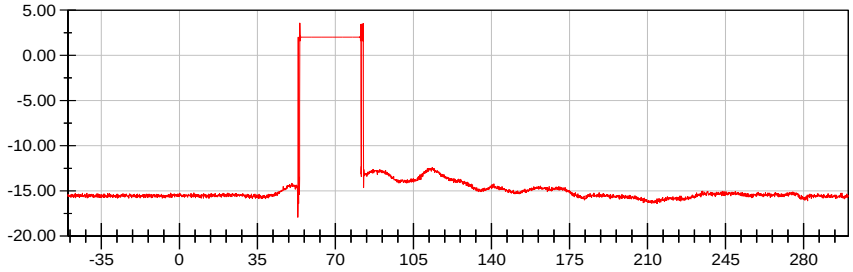
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

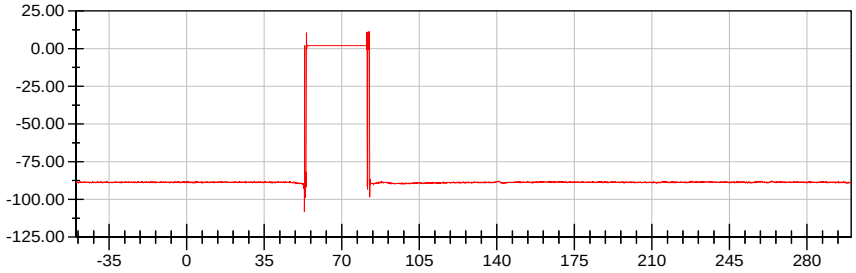
3.57 mm at 54.05 ms

<Min>

-17.91 mm at 53.15 ms

Unfiltered

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



<Max>

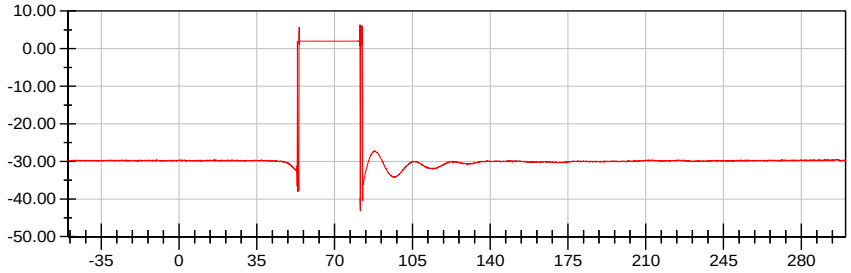
11.21 mm at 82.45 ms

<Min>

-107.96 mm at 53.15 ms

Unfiltered

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



<Max>

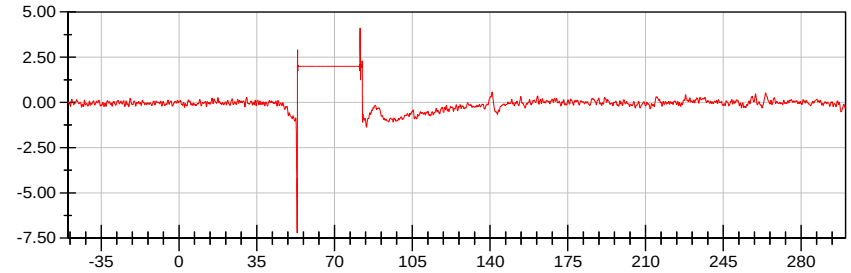
6.34 mm at 81.35 ms

<Min>

-43.18 mm at 81.55 ms

Unfiltered

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



<Max>

4.10 mm at 81.50 ms

<Min>

-7.21 mm at 53.15 ms

CFC_600

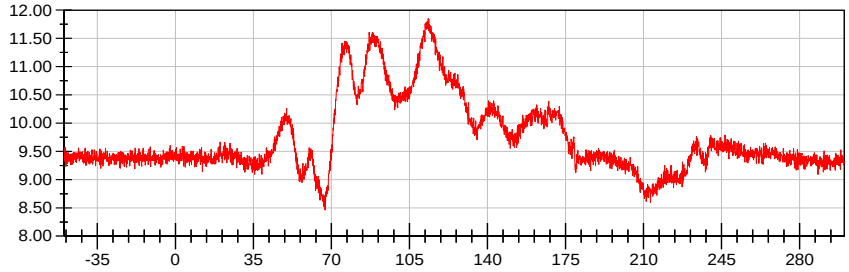
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

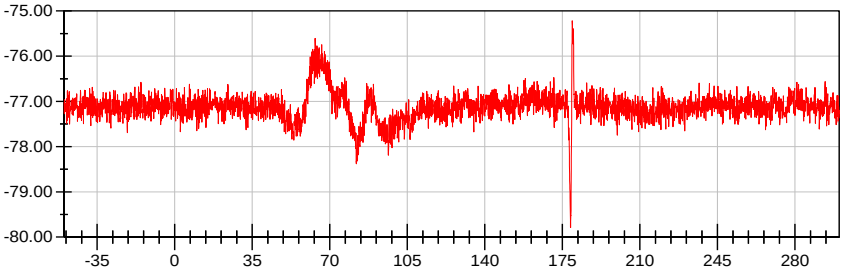
11.85 mm at 113.40 ms

<Min>

8.46 mm at 67.10 ms

Unfiltered

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



<Max>

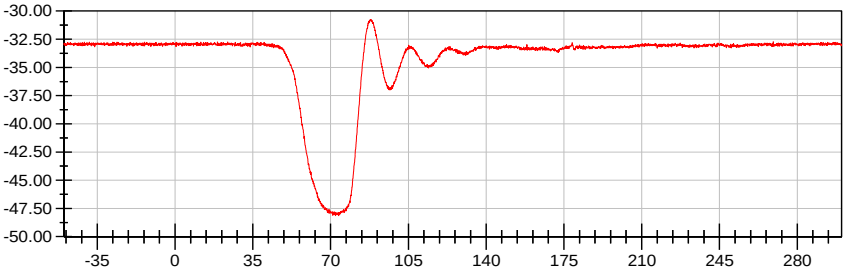
-75.22 mm at 179.50 ms

<Min>

-79.79 mm at 178.70 ms

Unfiltered

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



<Max>

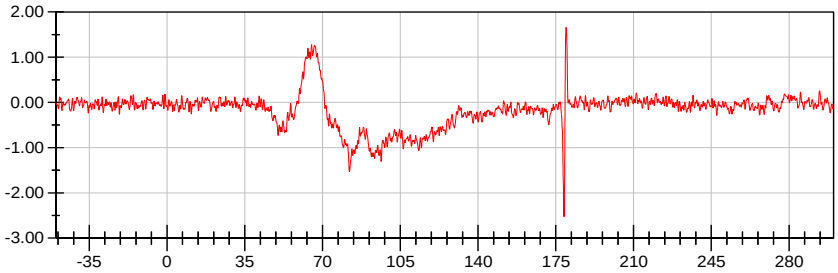
-30.77 mm at 88.35 ms

<Min>

-48.14 mm at 73.50 ms

Unfiltered

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



<Max>

1.65 mm at 179.60 ms

<Min>

-2.52 mm at 178.70 ms

CFC_600

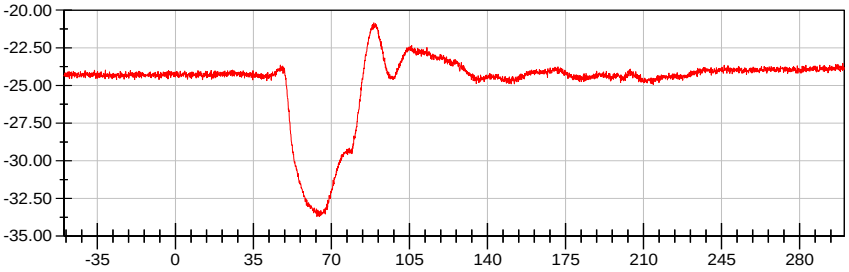
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Abdomen Rib 1 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

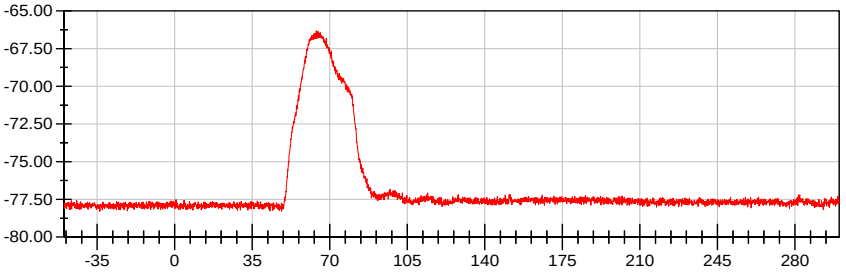
-20.83 mm at 88.95 ms

<Min>

-33.70 mm at 64.60 ms

Unfiltered

Passenger Abdomen Rib 1 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

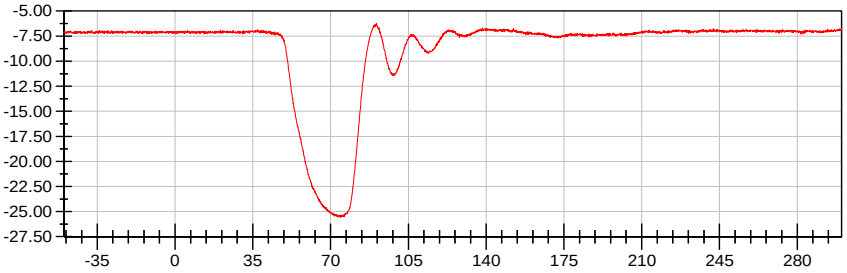
-66.31 mm at 63.90 ms

<Min>

-78.29 mm at -33.80 ms

Unfiltered

Passenger Abdomen Rib 1 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

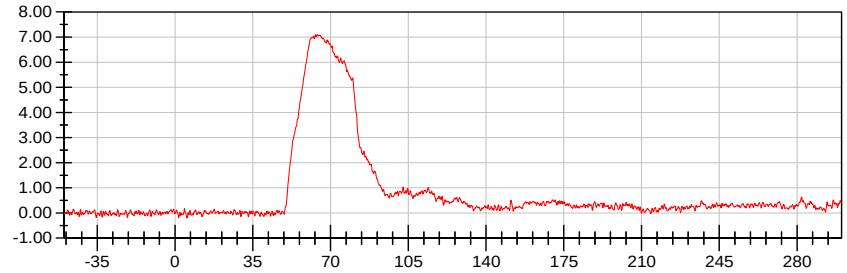
-6.23 mm at 90.60 ms

<Min>

-25.59 mm at 74.40 ms

Unfiltered

Passenger Abdomen Rib 1 Rear Length Change (mm) vs. Time [ms]



<Max>

7.10 mm at 63.25 ms

<Min>

-0.20 mm at 5.40 ms

CFC_600

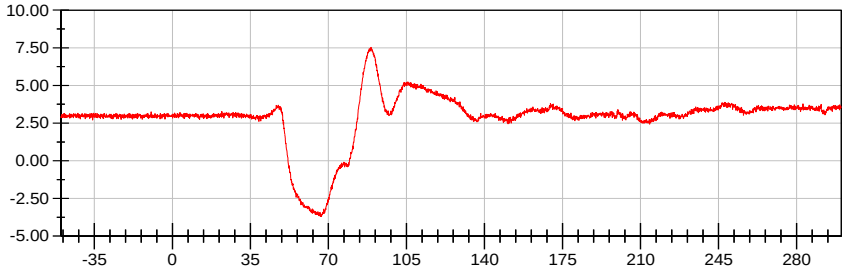
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Abdomen Rib 1 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

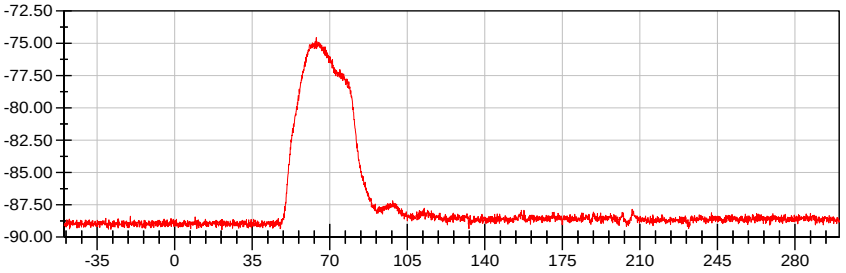
7.54 mm at 89.10 ms

<Min>

-3.70 mm at 66.50 ms

Unfiltered

Passenger Abdomen Rib 1 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

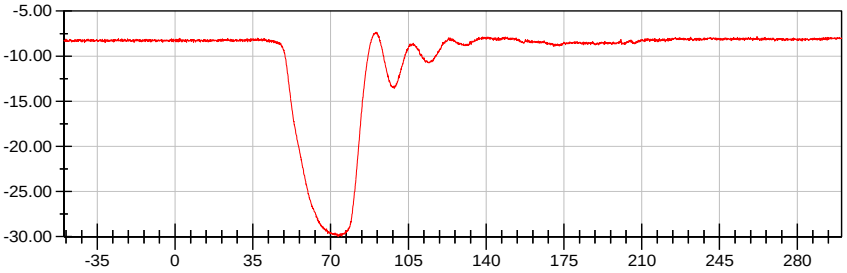
-74.56 mm at 63.90 ms

<Min>

-89.43 mm at 21.30 ms

Unfiltered

Passenger Abdomen Rib 1 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

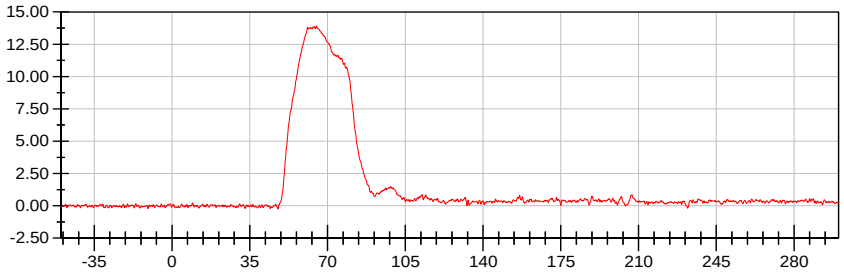
-7.35 mm at 90.40 ms

<Min>

-29.99 mm at 73.60 ms

Unfiltered

Passenger Abdomen Rib 1 Middle Length Change (mm) vs. Time [ms]



<Max>

13.90 mm at 65.05 ms

<Min>

-0.25 mm at 47.70 ms

CFC_600

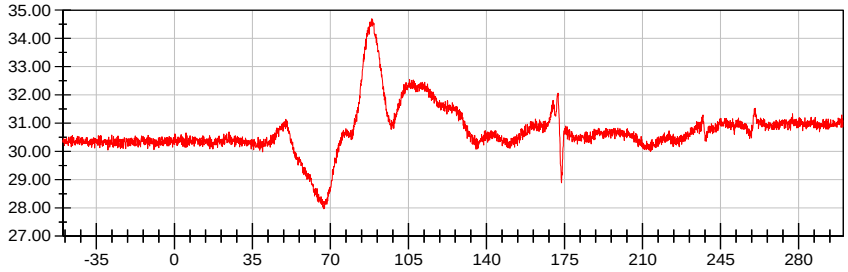
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Abdomen Rib 1 Front Displacement (X) (mm) vs. Time [ms]



<Max>

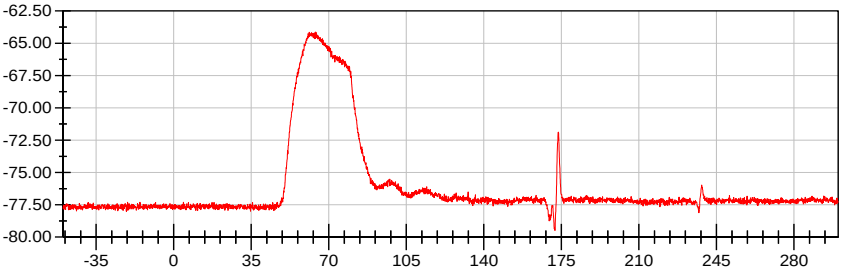
34.69 mm at 88.40 ms

<Min>

27.97 mm at 67.05 ms

Unfiltered

Passenger Abdomen Rib 1 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

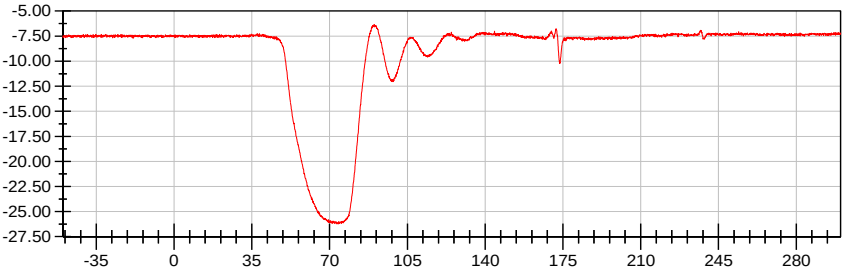
-64.14 mm at 63.90 ms

<Min>

-79.50 mm at 172.10 ms

Unfiltered

Passenger Abdomen Rib 1 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

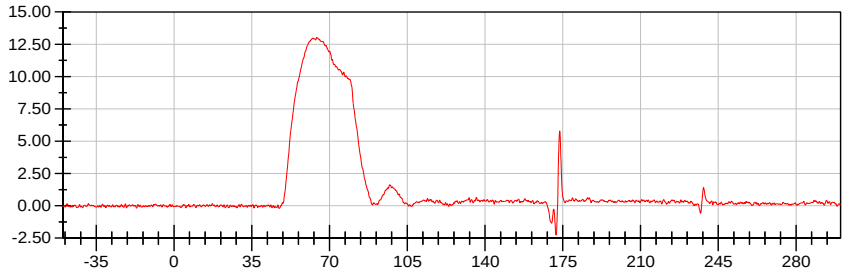
-6.34 mm at 90.10 ms

<Min>

-26.24 mm at 73.25 ms

Unfiltered

Passenger Abdomen Rib 1 Front Length Change (mm) vs. Time [ms]



<Max>

13.02 mm at 64.25 ms

<Min>

-2.26 mm at 171.95 ms

CFC_600

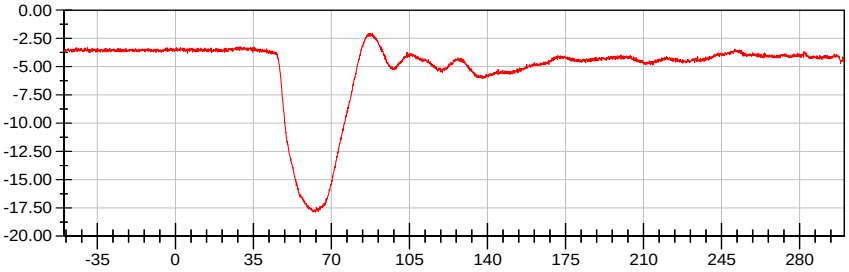
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

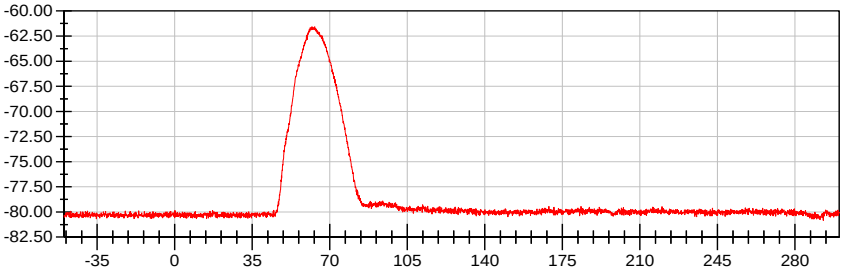
-2.04 mm at 88.30 ms

<Min>

-17.87 mm at 62.90 ms

Unfiltered

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



<Max>

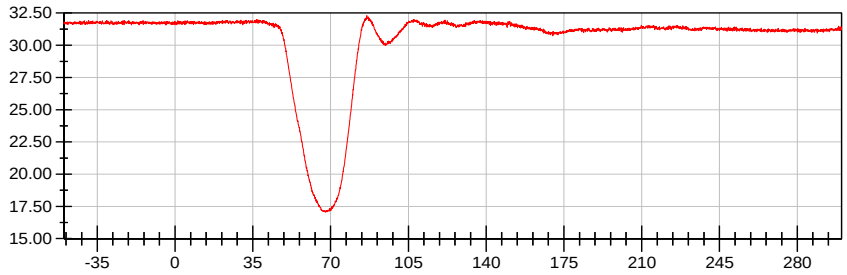
-61.56 mm at 61.95 ms

<Min>

-80.84 mm at 292.80 ms

Unfiltered

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



<Max>

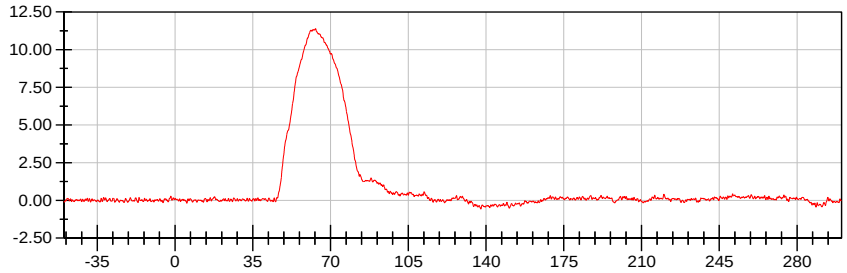
32.30 mm at 86.30 ms

<Min>

17.05 mm at 67.60 ms

Unfiltered

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



<Max>

11.40 mm at 63.25 ms

<Min>

-0.57 mm at 137.65 ms

CFC_600

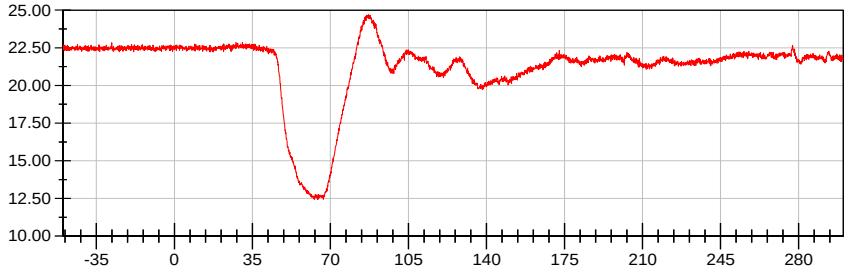
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Abdomen Rib 2 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

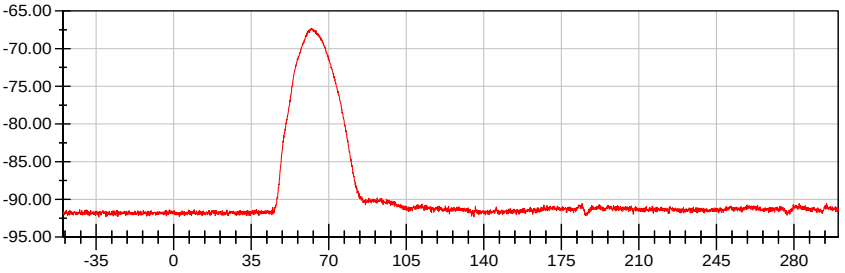
24.70 mm at 87.10 ms

<Min>

12.43 mm at 64.20 ms

Unfiltered

Passenger Abdomen Rib 2 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

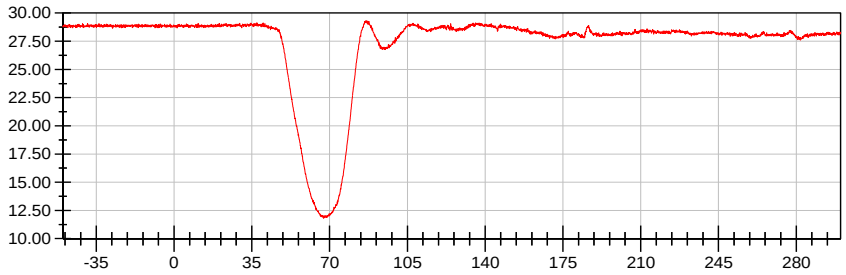
-67.30 mm at 62.25 ms

<Min>

-92.34 mm at -33.80 ms

Unfiltered

Passenger Abdomen Rib 2 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

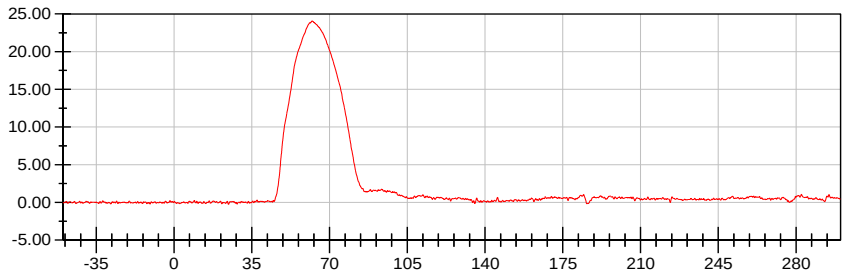
29.31 mm at 86.30 ms

<Min>

11.80 mm at 67.30 ms

Unfiltered

Passenger Abdomen Rib 2 Middle Length Change (mm) vs. Time [ms]



<Max>

24.07 mm at 62.20 ms

<Min>

-0.26 mm at 24.50 ms

CFC_600

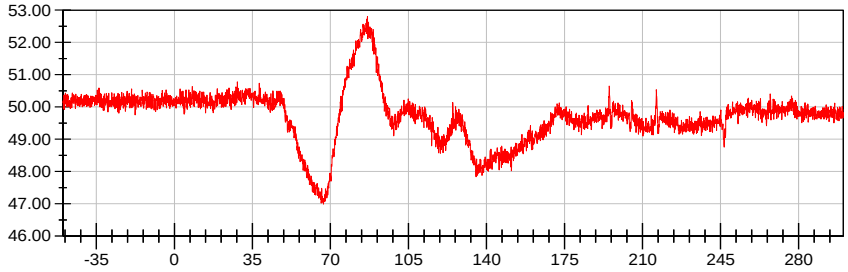
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Abdomen Rib 2 Front Displacement (X) (mm) vs. Time [ms]



<Max>

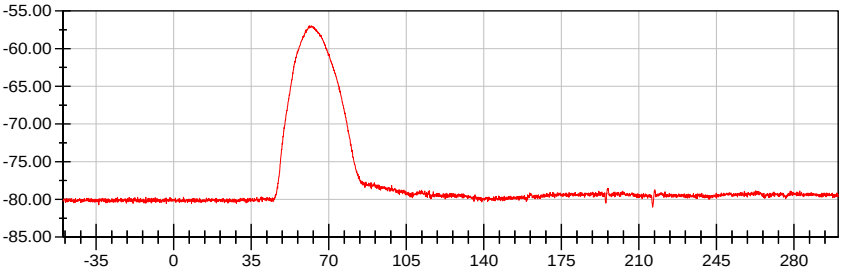
52.80 mm at 86.60 ms

<Min>

46.99 mm at 66.90 ms

Unfiltered

Passenger Abdomen Rib 2 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

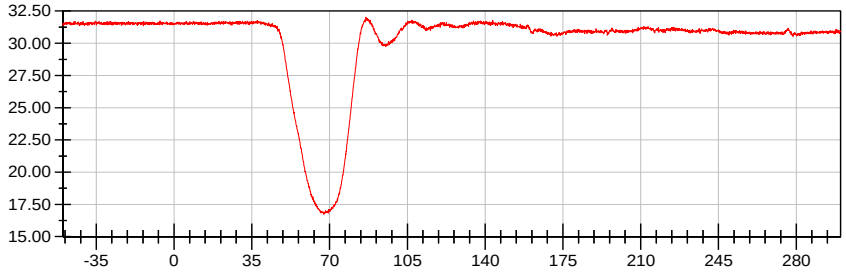
-56.98 mm at 61.20 ms

<Min>

-81.03 mm at 216.20 ms

Unfiltered

Passenger Abdomen Rib 2 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

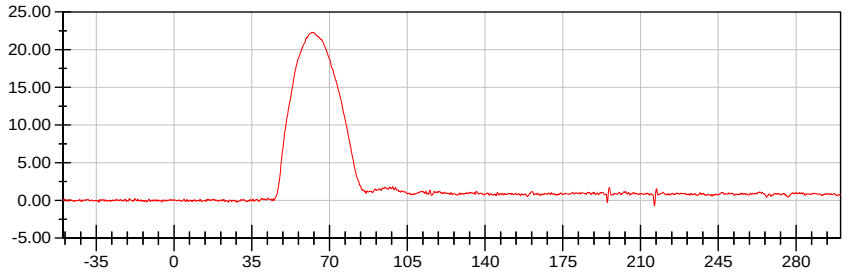
32.02 mm at 86.35 ms

<Min>

16.73 mm at 67.40 ms

Unfiltered

Passenger Abdomen Rib 2 Front Length Change (mm) vs. Time [ms]



<Max>

22.29 mm at 62.15 ms

<Min>

-0.73 mm at 216.25 ms

CFC_600

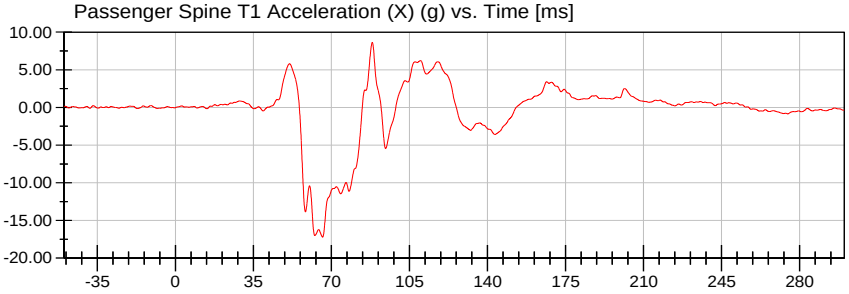
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Spine T1 Acceleration (X) (g) vs. Time [ms]



<Max>

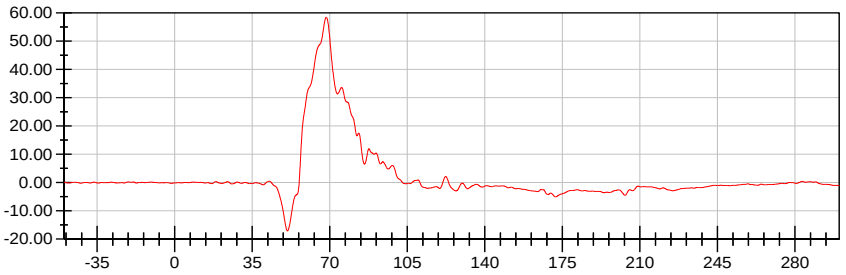
8.62 g at 88.30 ms

<Min>

-17.21 g at 66.05 ms

CFC_180

Passenger Spine T1 Acceleration (Y) (g) vs. Time [ms]



<Max>

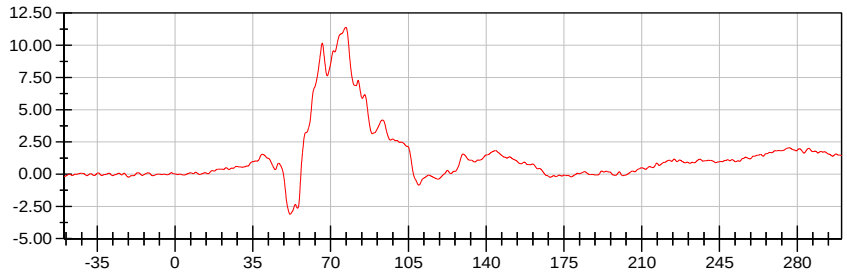
58.45 g at 68.40 ms

<Min>

-17.12 g at 50.90 ms

CFC_180

Passenger Spine T1 Acceleration (Z) (g) vs. Time [ms]



<Max>

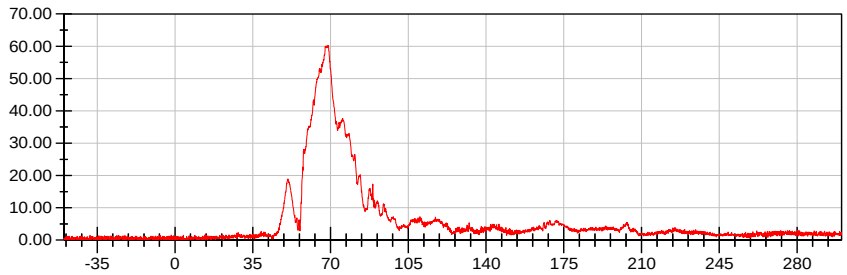
11.40 g at 76.85 ms

<Min>

-3.11 g at 51.80 ms

CFC_180

Passenger Spine T1 Acceleration Resultant (g) vs. Time [ms]



<Max>

60.25 g at 68.85 ms

<Min>

0.05 g at 0.00 ms

Prefiltered_> CFC 1000

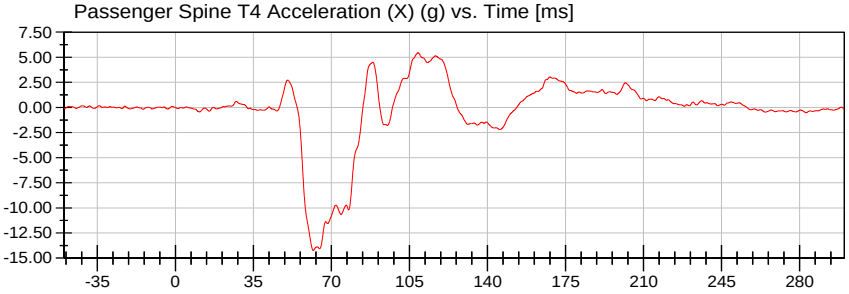
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Spine T4 Acceleration (X) (g) vs. Time [ms]



<Max>

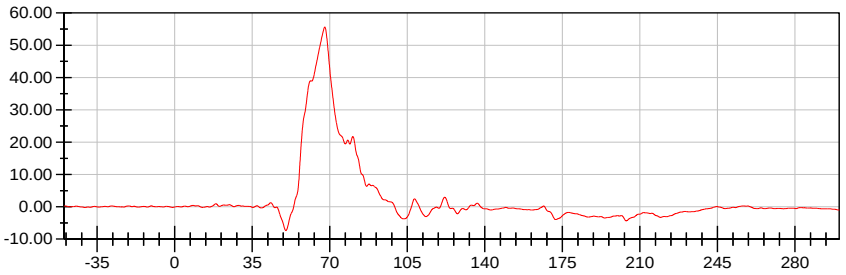
5.46 g at 108.85 ms

<Min>

-14.25 g at 61.85 ms

CFC_180

Passenger Spine T4 Acceleration (Y) (g) vs. Time [ms]



<Max>

55.65 g at 67.75 ms

<Min>

-7.35 g at 50.20 ms

CFC_180

Passenger Spine T4 Acceleration (Z) (g) vs. Time [ms]

<Max>

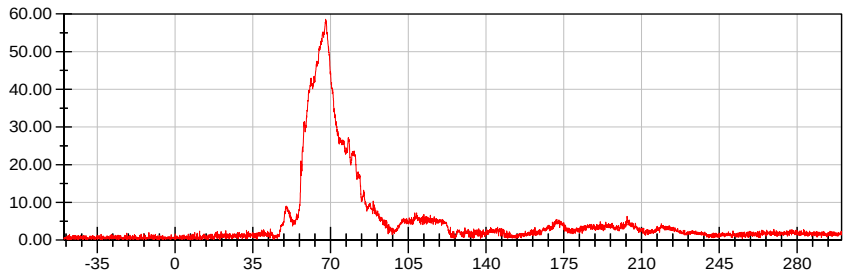
10.00 g at 77.30 ms

<Min>

-5.00 g at 55.40 ms

CFC_180

Passenger Spine T4 Acceleration Resultant (g) vs. Time [ms]



<Max>

58.61 g at 67.80 ms

<Min>

0.07 g at -25.40 ms

Prefiltered_> CFC 1000

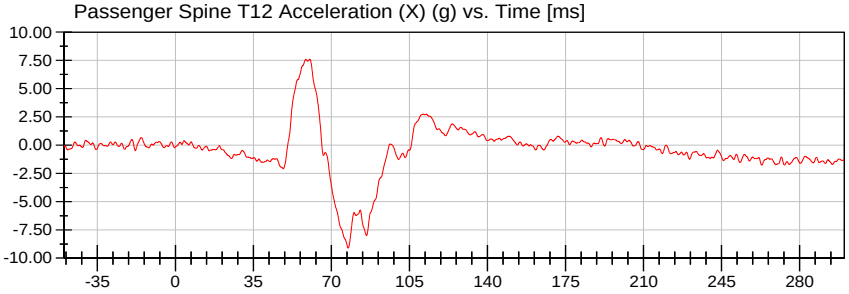
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

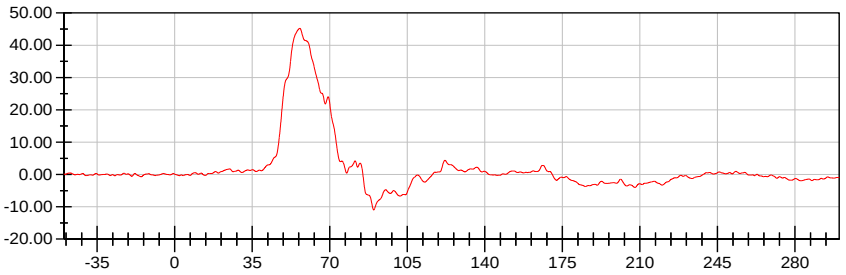
7.61 g at 60.30 ms

<Min>

-9.11 g at 77.50 ms

CFC_180

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



<Max>

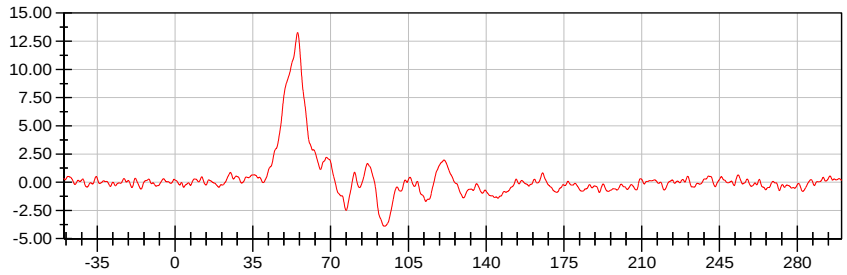
45.23 g at 56.50 ms

<Min>

-10.97 g at 89.85 ms

CFC_180

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



<Max>

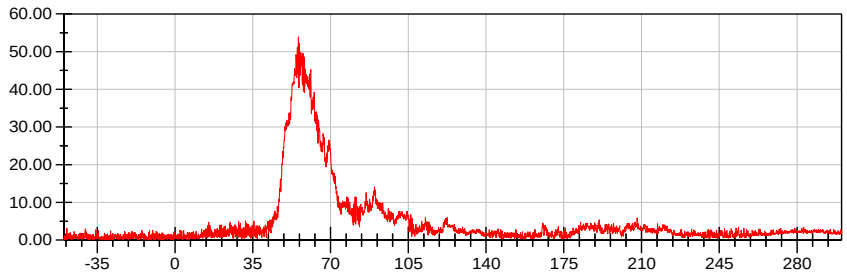
13.28 g at 55.15 ms

<Min>

-3.89 g at 94.25 ms

CFC_180

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



<Max>

53.90 g at 55.50 ms

<Min>

0.07 g at -31.70 ms

Prefiltered_> CFC 1000

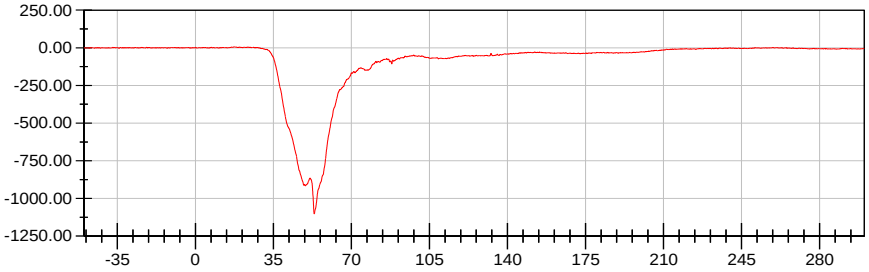
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

6.45 N at 17.35 ms

<Min>

-1,102.18 N at 53.35 ms

CFC_600

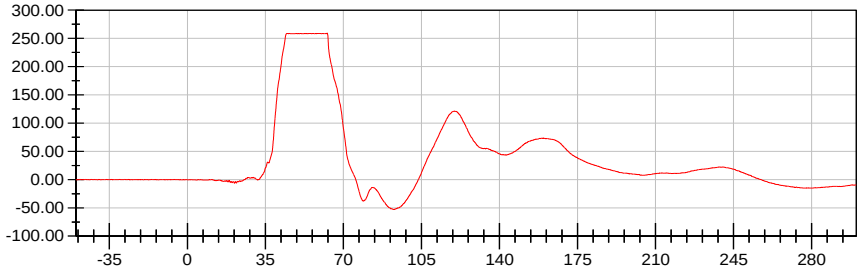
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Sacro-iliac Left Force (X) (N) vs. Time [ms]



<Max>

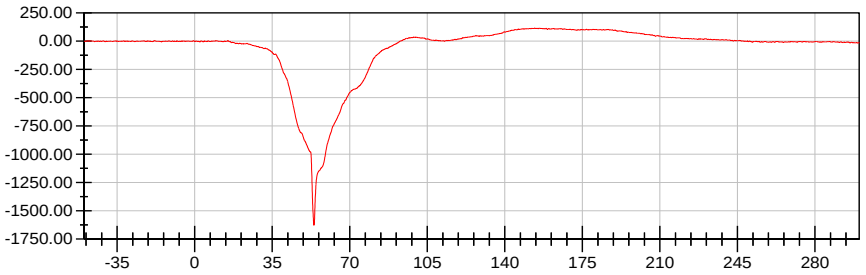
259.22 N at 62.70 ms

<Min>

-52.94 N at 92.60 ms

CFC_600

Passenger Sacro-iliac Left Force (Y) (N) vs. Time [ms]



<Max>

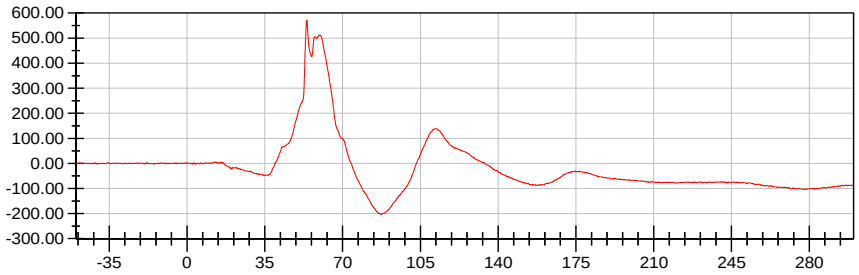
116.18 N at 153.45 ms

<Min>

-1,628.19 N at 53.85 ms

CFC_600

Passenger Sacro-iliac Left Force (Z) (N) vs. Time [ms]



<Max>

571.20 N at 53.90 ms

<Min>

-203.49 N at 87.20 ms

CFC_600

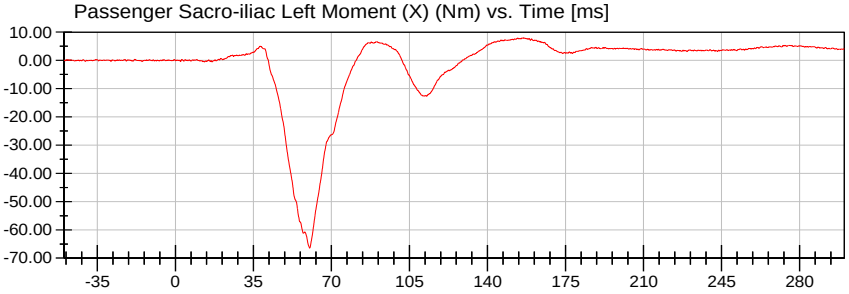
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Sacro-iliac Left Moment (X) (Nm) vs. Time [ms]



<Max>

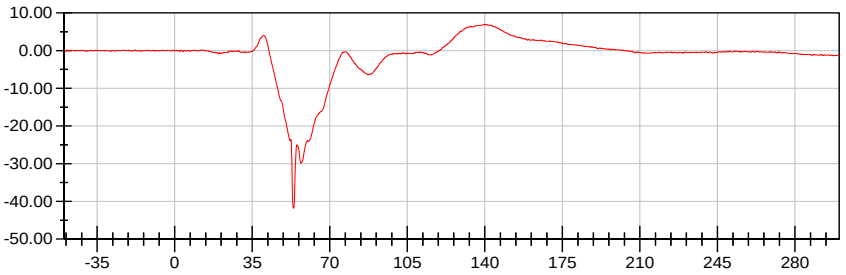
7.97 Nm at 156.25 ms

<Min>

-66.45 Nm at 60.25 ms

CFC_600

Passenger Sacro-iliac Left Moment (Y) (Nm) vs. Time [ms]



<Max>

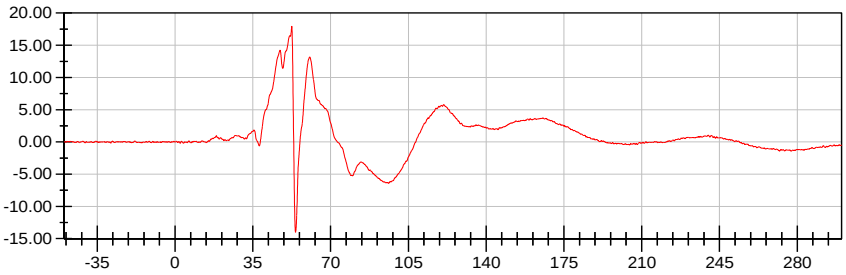
6.97 Nm at 139.70 ms

<Min>

-41.84 Nm at 53.65 ms

CFC_600

Passenger Sacro-iliac Left Moment (Z) (Nm) vs. Time [ms]



<Max>

17.95 Nm at 52.55 ms

<Min>

-14.00 Nm at 54.25 ms

CFC_600

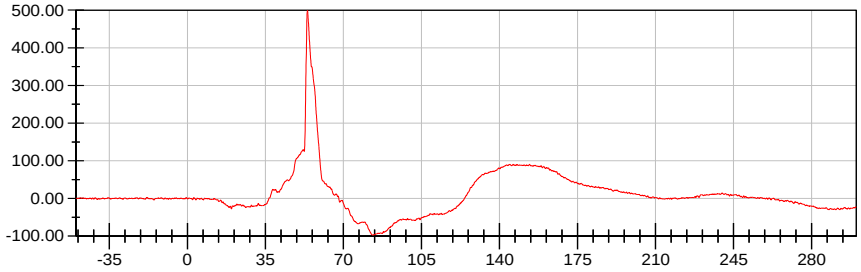
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Sacro-iliac Right Force (X) (N) vs. Time [ms]



<Max>

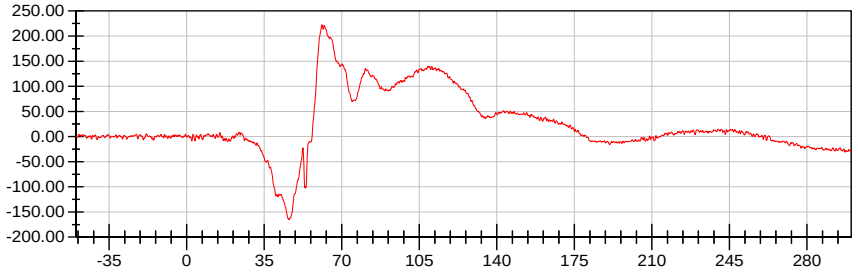
499.46 N at 53.85 ms

<Min>

-97.44 N at 83.25 ms

CFC_600

Passenger Sacro-iliac Right Force (Y) (N) vs. Time [ms]



<Max>

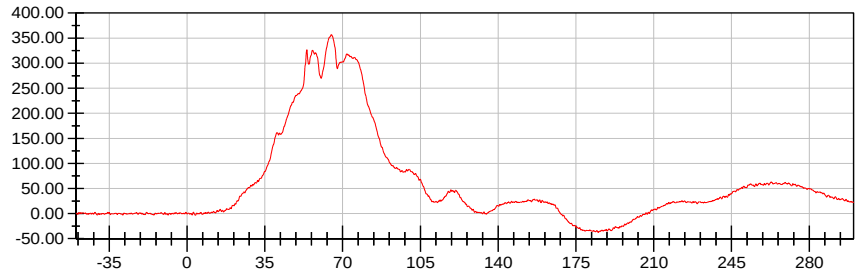
222.30 N at 61.05 ms

<Min>

-165.09 N at 46.25 ms

CFC_600

Passenger Sacro-iliac Right Force (Z) (N) vs. Time [ms]



<Max>

356.92 N at 64.95 ms

<Min>

-37.49 N at 185.00 ms

CFC_600

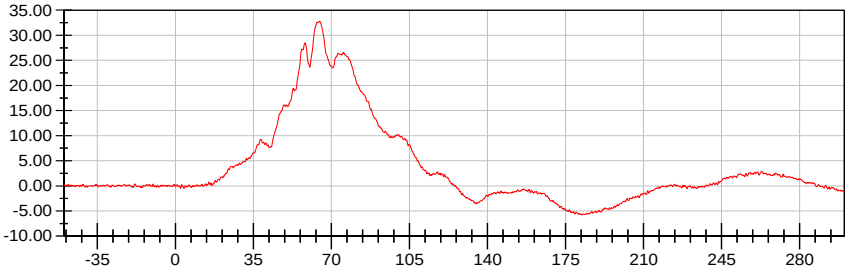
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Sacro-iliac Right Moment (X) (Nm) vs. Time [ms]



<Max>

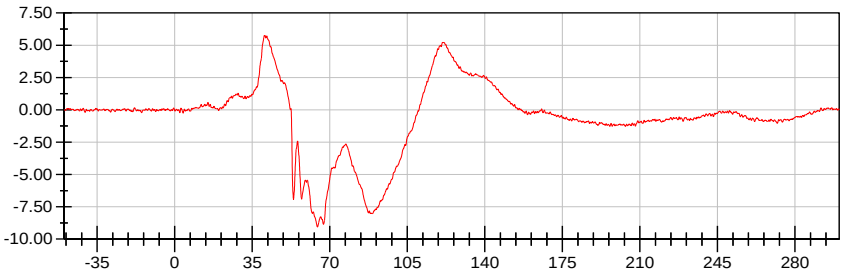
32.77 Nm at 64.75 ms

<Min>

-5.79 Nm at 182.45 ms

CFC_600

Passenger Sacro-iliac Right Moment (Y) (Nm) vs. Time [ms]



<Max>

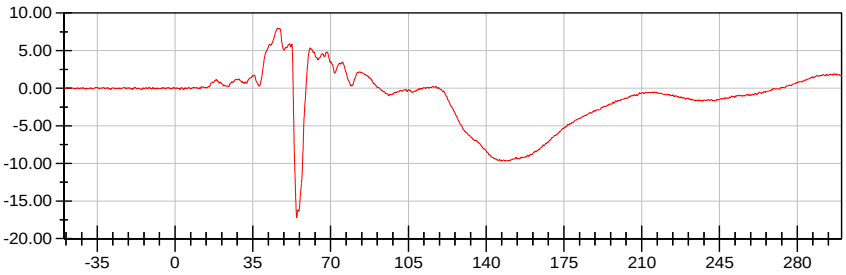
5.75 Nm at 40.45 ms

<Min>

-9.05 Nm at 64.45 ms

CFC_600

Passenger Sacro-iliac Right Moment (Z) (Nm) vs. Time [ms]



<Max>

7.96 Nm at 46.80 ms

<Min>

-17.21 Nm at 54.75 ms

CFC_600

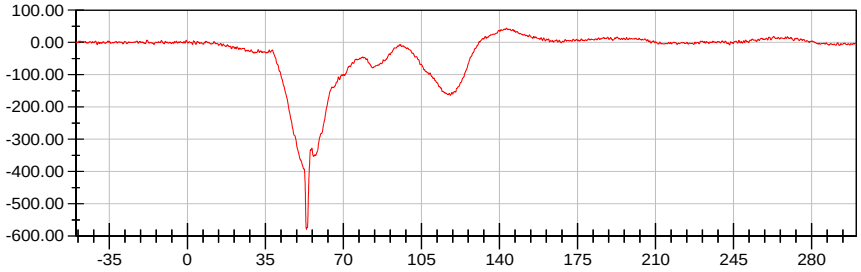
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Lumbar Force (X) (N) vs. Time [ms]



<Max>

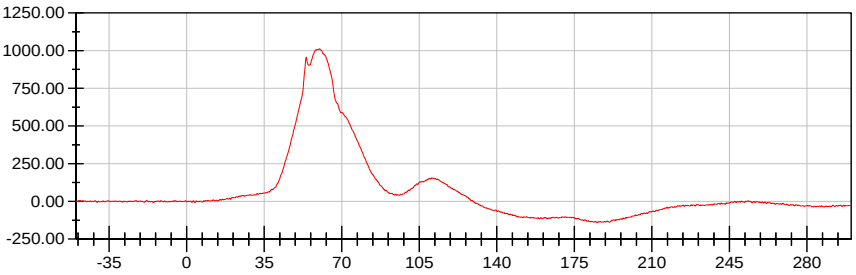
44.22 N at 143.15 ms

<Min>

-578.92 N at 53.40 ms

CFC_600

Passenger Lumbar Force (Y) (N) vs. Time [ms]



<Max>

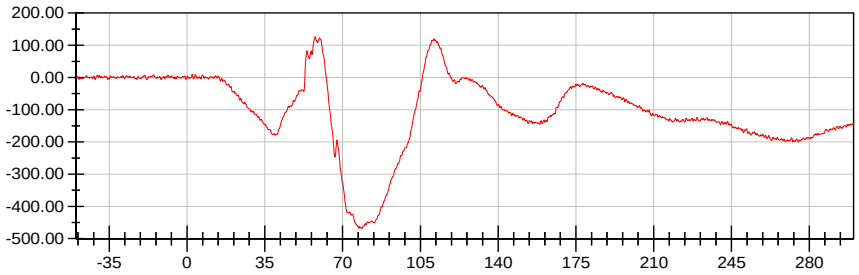
1,012.21 N at 59.95 ms

<Min>

-139.36 N at 185.00 ms

CFC_600

Passenger Lumbar Force (Z) (N) vs. Time [ms]



<Max>

126.11 N at 57.55 ms

<Min>

-468.70 N at 78.70 ms

CFC_600

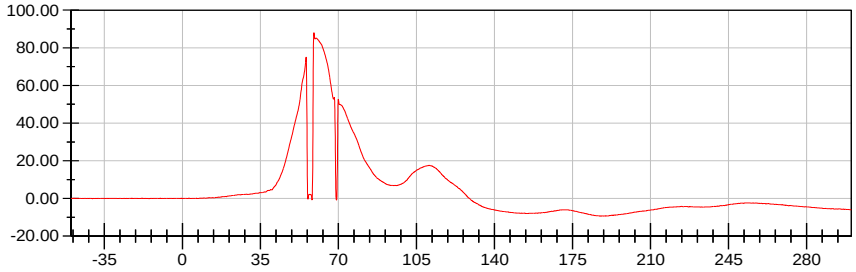
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Lumbar Moment (X) (Nm) vs. Time [ms]



<Max>

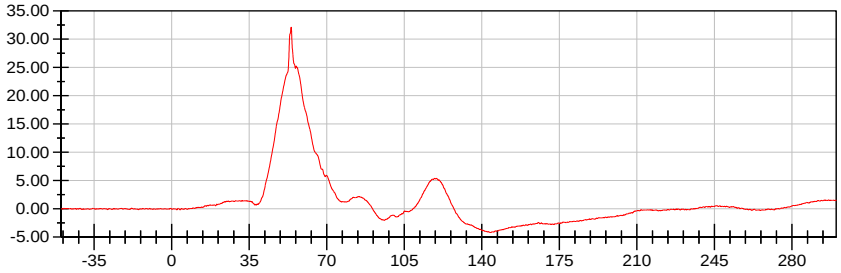
87.98 Nm at 59.00 ms

<Min>

-9.35 Nm at 187.35 ms

CFC_600

Passenger Lumbar Moment (Y) (Nm) vs. Time [ms]



<Max>

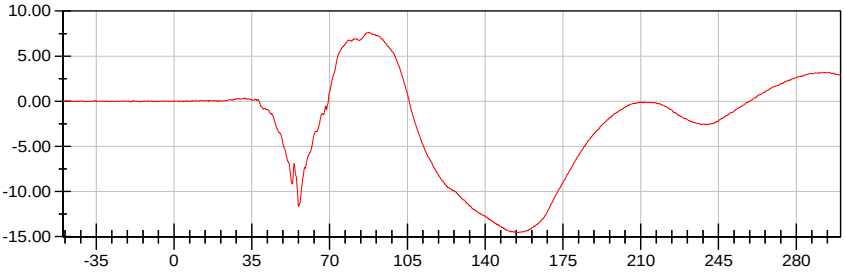
32.12 Nm at 53.90 ms

<Min>

-4.17 Nm at 143.75 ms

CFC_600

Passenger Lumbar Moment (Z) (Nm) vs. Time [ms]



<Max>

7.62 Nm at 87.80 ms

<Min>

-14.56 Nm at 154.95 ms

CFC_600

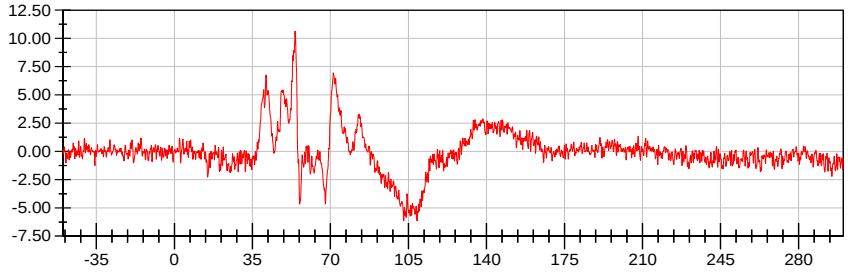
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

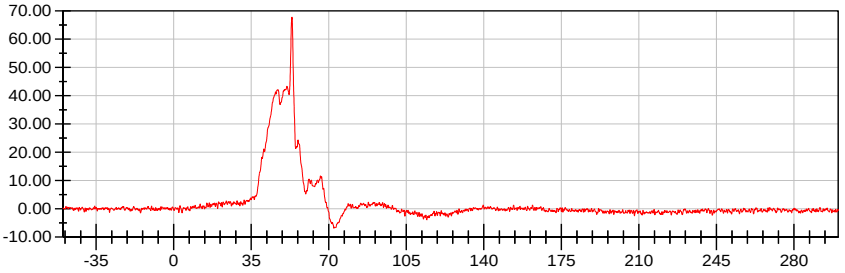
10.65 g at 54.15 ms

<Min>

-6.16 g at 108.85 ms

CFC_1000

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



<Max>

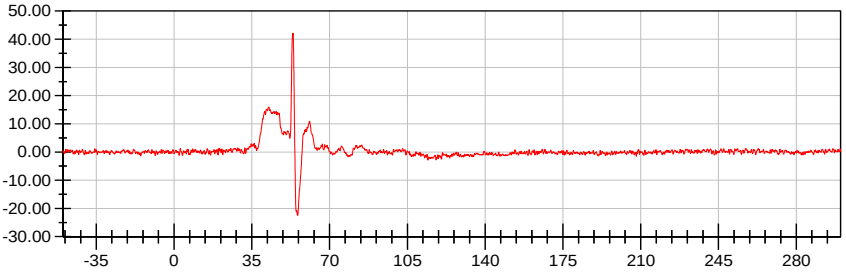
67.82 g at 53.40 ms

<Min>

-6.87 g at 72.35 ms

CFC_1000

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



<Max>

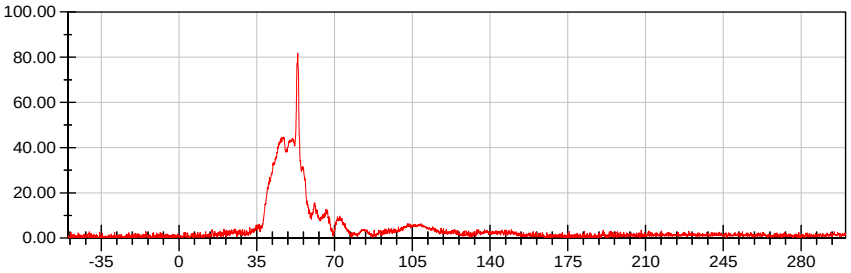
42.18 g at 53.50 ms

<Min>

-22.47 g at 55.65 ms

CFC_1000

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



<Max>

81.69 g at 53.45 ms

<Min>

0.07 g at -34.05 ms

Prefiltered_> CFC 1000

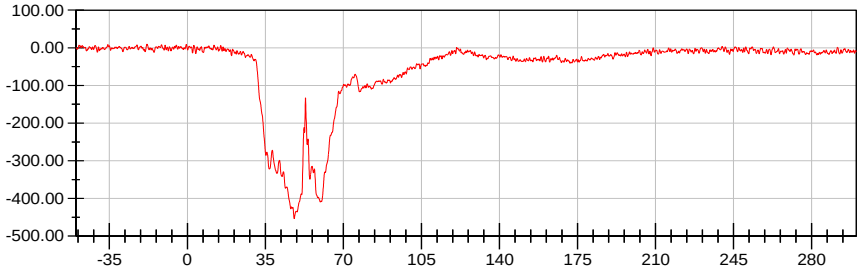
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Left Femur Force (X) (N) vs. Time [ms]



<Max>

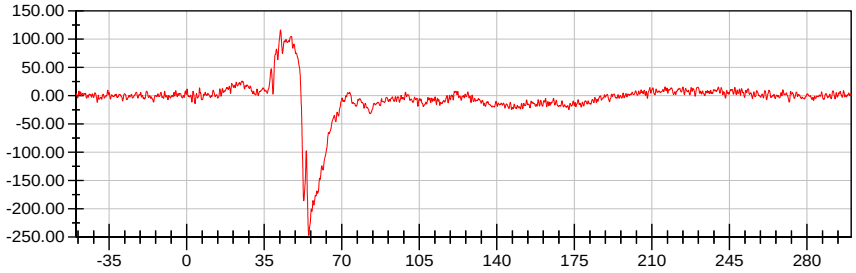
9.39 N at -18.15 ms

<Min>

-453.58 N at 47.90 ms

CFC_600

Passenger Left Femur Force (Y) (N) vs. Time [ms]



<Max>

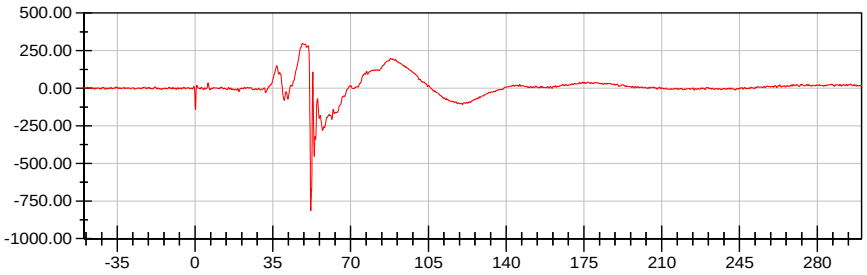
116.52 N at 42.35 ms

<Min>

-247.12 N at 55.10 ms

CFC_600

Passenger Left Femur Force (Z) (N) vs. Time [ms]



<Max>

297.05 N at 48.35 ms

<Min>

-814.19 N at 52.10 ms

CFC_600

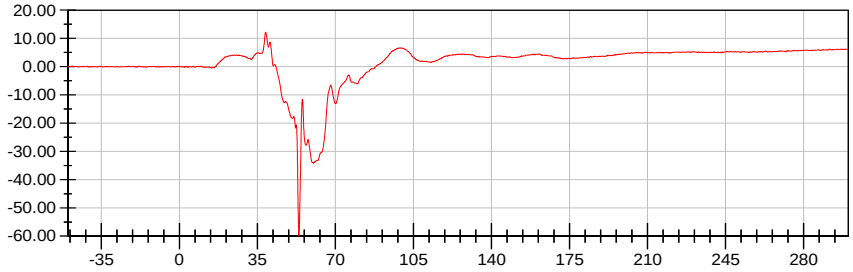
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Left Femur Moment (X) (Nm) vs. Time [ms]



<Max>

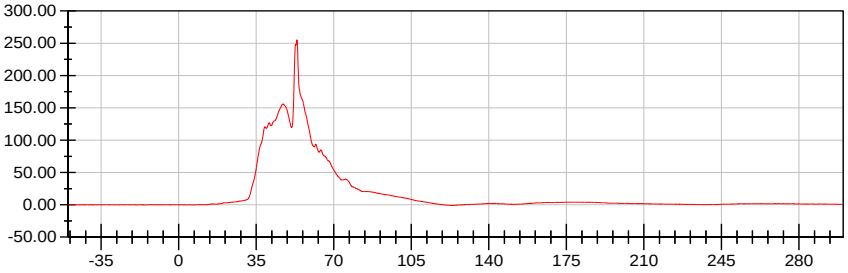
12.17 Nm at 38.70 ms

<Min>

-59.82 Nm at 53.60 ms

CFC_600

Passenger Left Femur Moment (Y) (Nm) vs. Time [ms]



<Max>

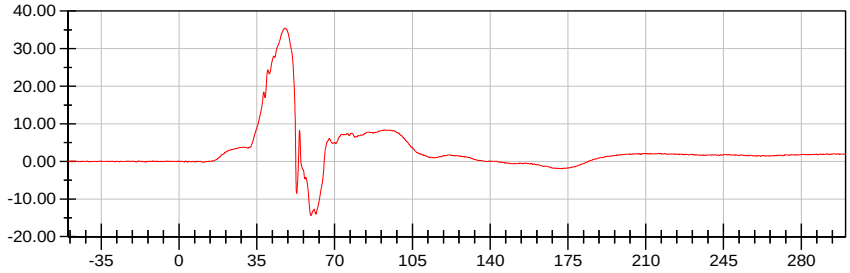
255.32 Nm at 53.35 ms

<Min>

-1.09 Nm at 123.85 ms

CFC_600

Passenger Left Femur Moment (Z) (Nm) vs. Time [ms]



<Max>

35.44 Nm at 47.65 ms

<Min>

-14.38 Nm at 59.40 ms

CFC_600

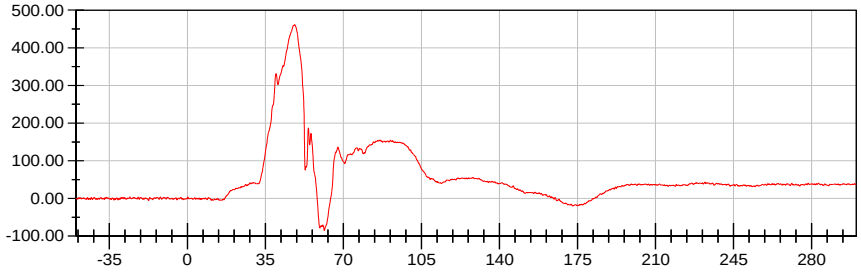
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Passenger Femoral Neck Force (X) (N) vs. Time [ms]



<Max>

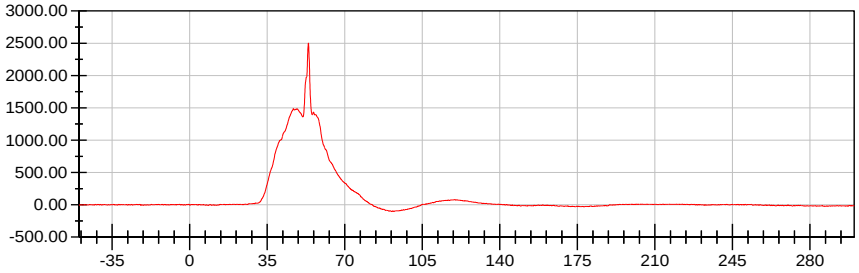
461.42 N at 48.10 ms

<Min>

-85.02 N at 61.45 ms

CFC_600

Passenger Femoral Neck Force (Y) (N) vs. Time [ms]



<Max>

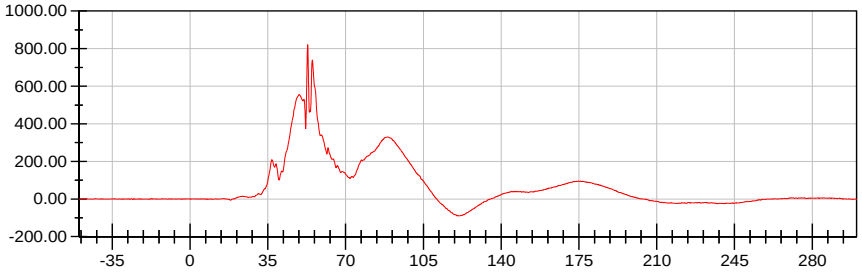
2,501.81 N at 53.60 ms

<Min>

-103.80 N at 91.15 ms

CFC_600

Passenger Femoral Neck Force (Z) (N) vs. Time [ms]



<Max>

820.46 N at 52.95 ms

<Min>

-89.55 N at 121.20 ms

CFC_600

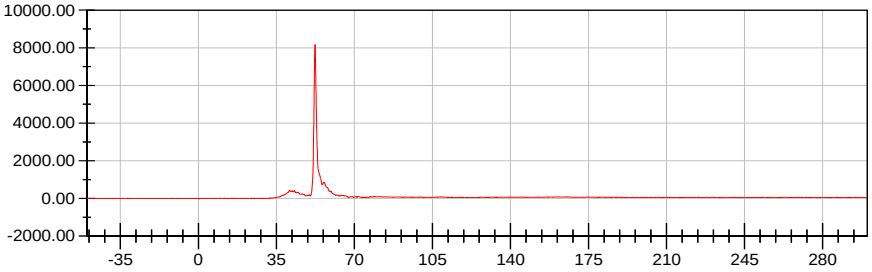
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

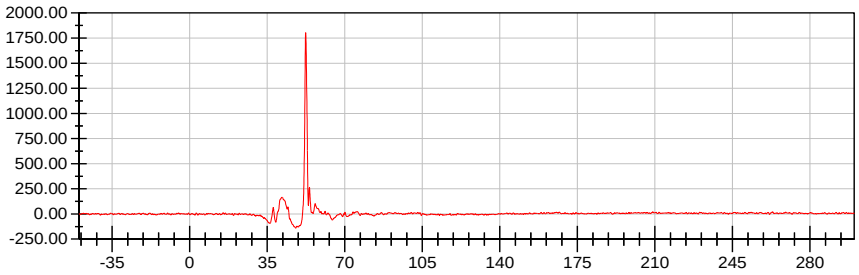
8,174.85 N at 52.35 ms

<Min>

-24.22 N at 0.45 ms

CFC_600

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



<Max>

1,803.30 N at 52.35 ms

<Min>

-140.89 N at 47.85 ms

CFC_600

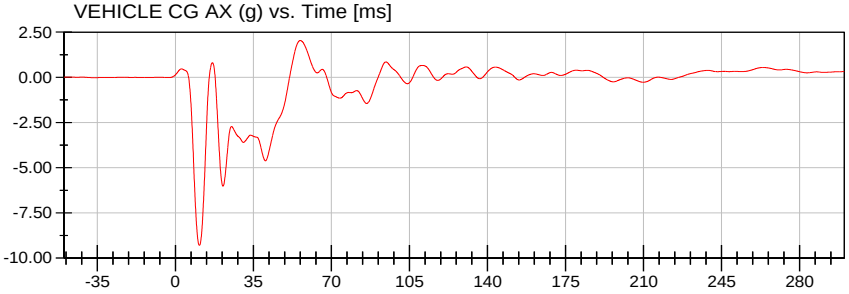
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

VEHICLE CG AX (g) vs. Time [ms]



<Max>

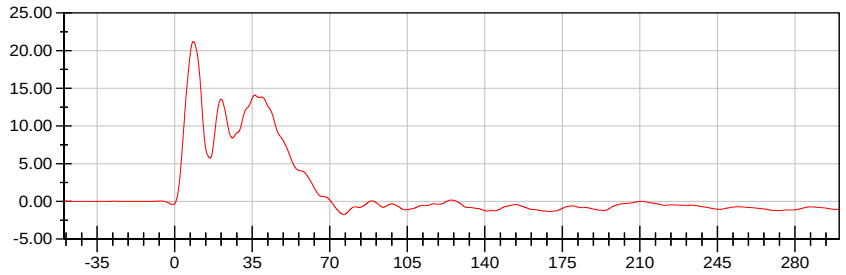
2.04 g at 56.05 ms

<Min>

-9.30 g at 10.80 ms

CFC_60

VEHICLE CG AY (g) vs. Time [ms]



<Max>

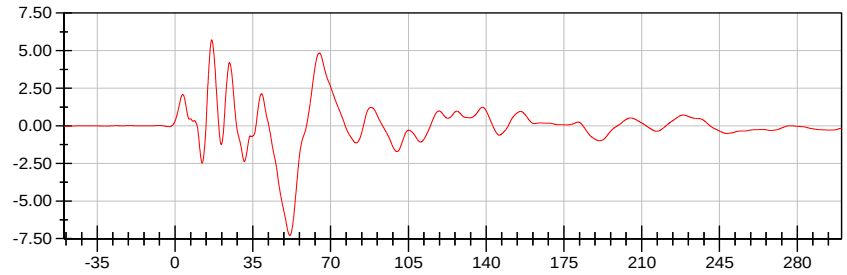
21.23 g at 8.40 ms

<Min>

-1.73 g at 76.25 ms

CFC_60

VEHICLE CG AZ (g) vs. Time [ms]



<Max>

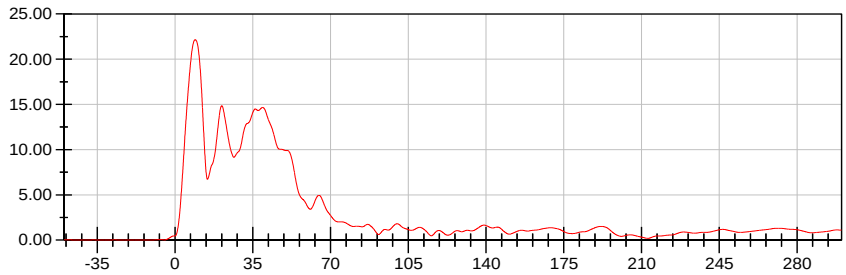
5.72 g at 16.50 ms

<Min>

-7.29 g at 51.70 ms

CFC_60

VEHICLE CG A RESULTANT (g) vs. Time [ms]



<Max>

22.16 g at 9.10 ms

<Min>

0.01 g at -44.75 ms

CFC_60

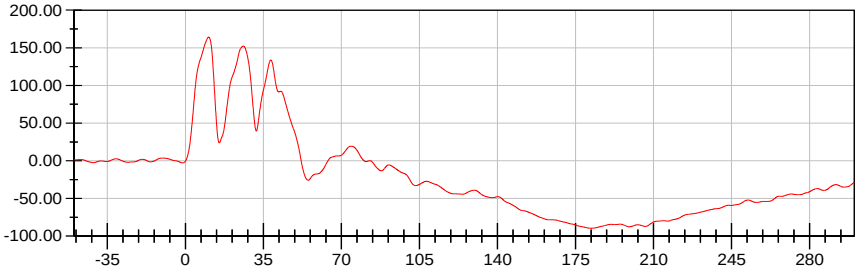
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

VEHICLE CG ARS X (º/s) vs. Time [ms]



<Max>

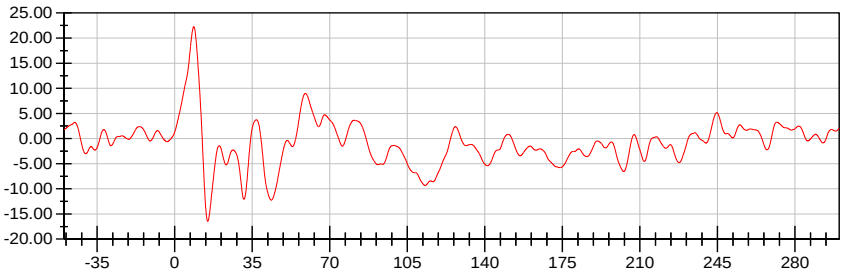
164.19 º/s at 10.40 ms

<Min>

-89.61 º/s at 182.05 ms

CFC_60

VEHICLE CG ARS Y (º/s) vs. Time [ms]



<Max>

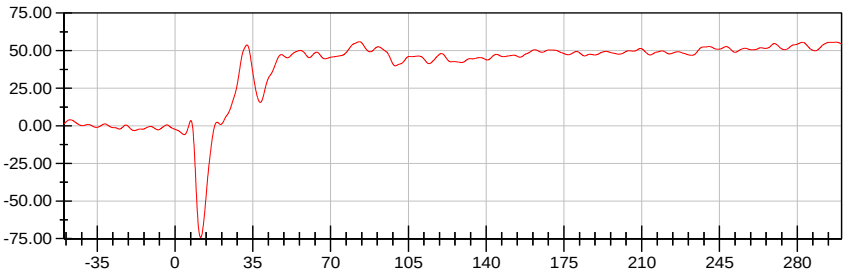
22.28 º/s at 8.60 ms

<Min>

-16.47 º/s at 14.90 ms

CFC_60

VEHICLE CG ARS Z (º/s) vs. Time [ms]



<Max>

55.94 º/s at 83.00 ms

<Min>

-74.27 º/s at 11.50 ms

CFC_60

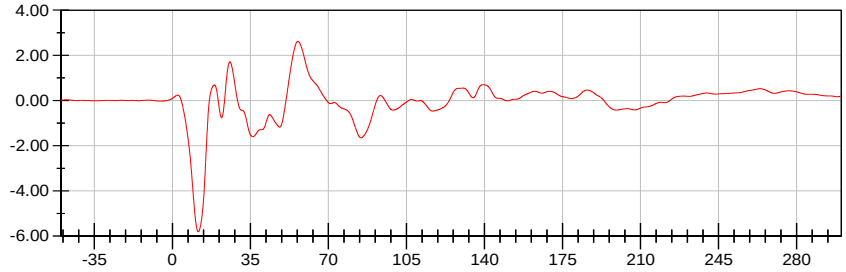
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

RIGHT SIDE SILL AT FRONT SEAT AX (g) vs. Time [ms]



<Max>

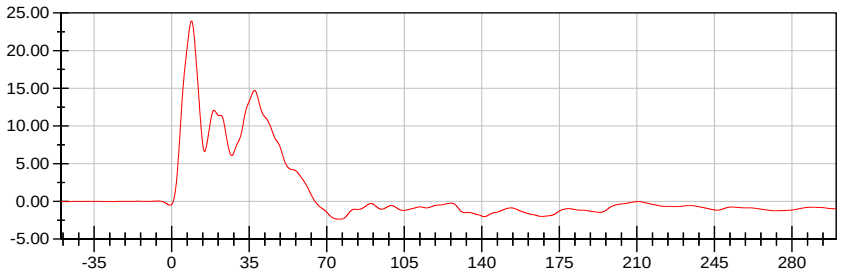
2.62 g at 56.30 ms

<Min>

-5.81 g at 11.60 ms

CFC_60

RIGHT SIDE SILL AT FRONT SEAT AY (g) vs. Time [ms]



<Max>

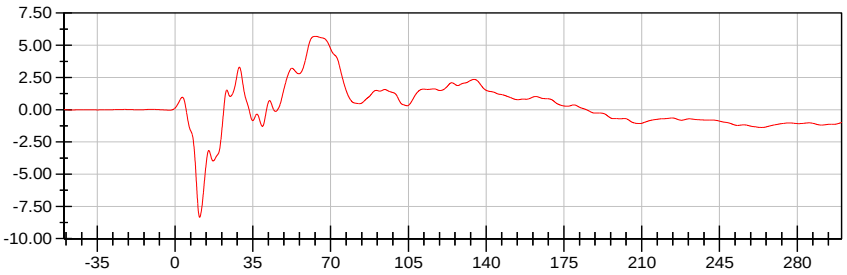
23.93 g at 8.95 ms

<Min>

-2.35 g at 75.25 ms

CFC_60

RIGHT SIDE SILL AT FRONT SEAT AZ (g) vs. Time [ms]



<Max>

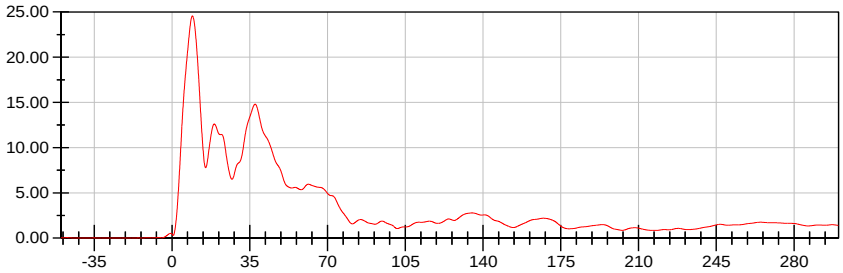
5.69 g at 63.25 ms

<Min>

-8.34 g at 11.10 ms

CFC_60

RIGHT SIDE SILL AT FRONT SEAT A RESULTANT (g) vs. Time [ms]



<Max>

24.56 g at 9.20 ms

<Min>

0.00 g at -43.00 ms

CFC_60

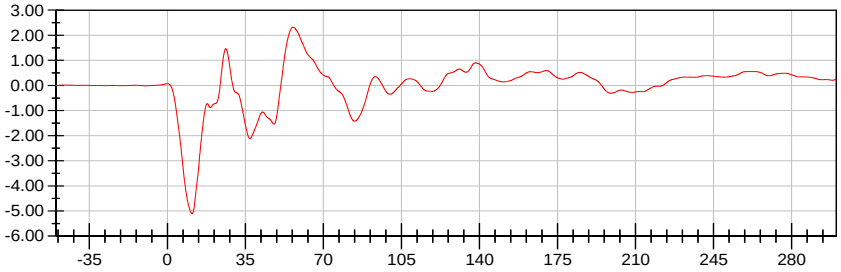
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

RIGHT SIDE SILL AT REAR SEAT AX (g) vs. Time [ms]



<Max>

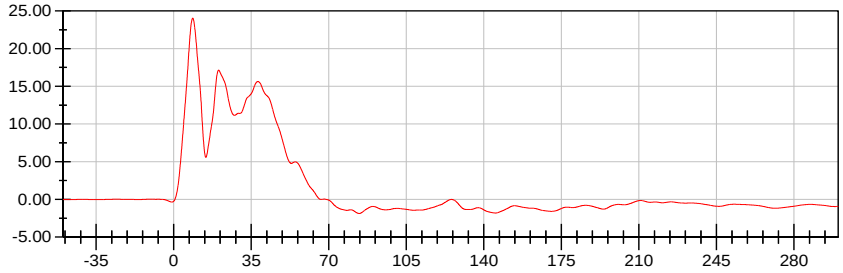
2.32 g at 56.35 ms

<Min>

-5.11 g at 11.10 ms

CFC_60

RIGHT SIDE SILL AT REAR SEAT AY (g) vs. Time [ms]



<Max>

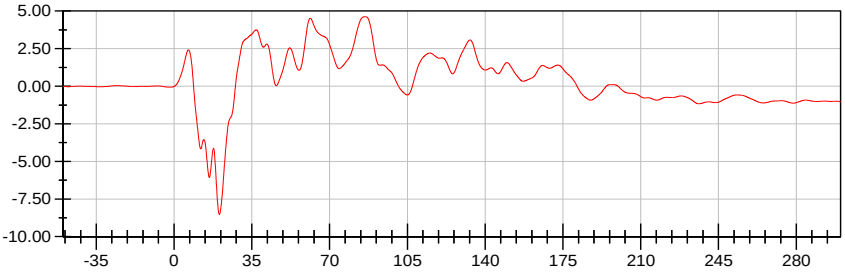
24.05 g at 8.60 ms

<Min>

-1.87 g at 83.75 ms

CFC_60

RIGHT SIDE SILL AT REAR SEAT AZ (g) vs. Time [ms]



<Max>

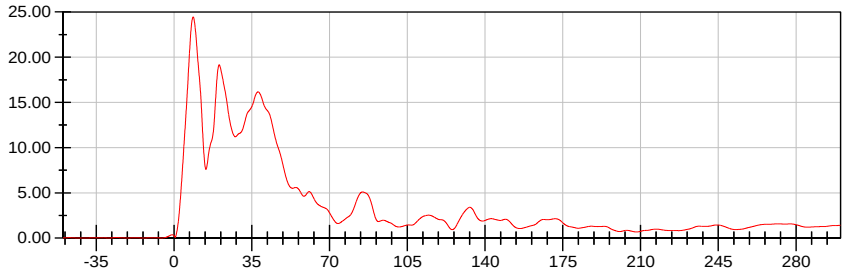
4.62 g at 86.10 ms

<Min>

-8.53 g at 20.40 ms

CFC_60

RRIGHT SIDE SILL AT REAR SEAT A ESULTANT (g) vs. Time [ms]



<Max>

24.45 g at 8.65 ms

<Min>

0.00 g at -41.20 ms

CFC_60

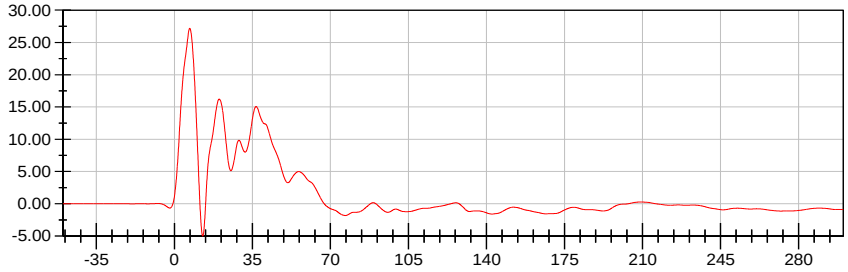
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

LEFT SIDE SILL AT FRONT SEAT AY (g) vs. Time [ms]



<Max>

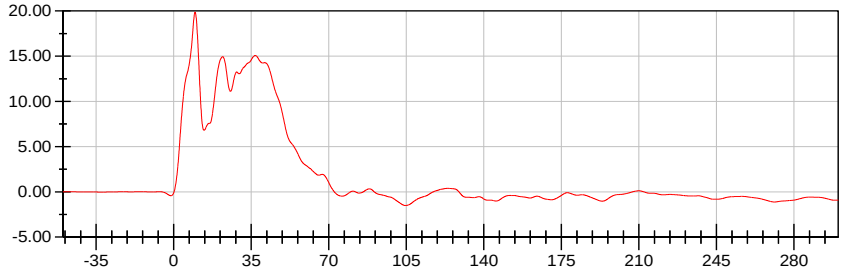
27.18 g at 6.90 ms

<Min>

-4.99 g at 12.75 ms

CFC_60

LEFT SIDE SILL AT REAR SEAT AY (g) vs. Time [ms]



<Max>

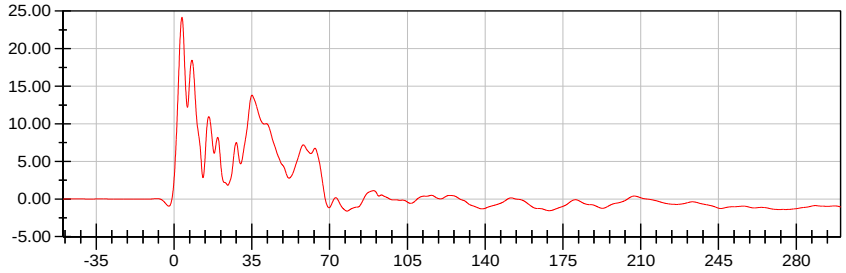
19.87 g at 9.65 ms

<Min>

-1.51 g at 104.60 ms

CFC_60

LEFT LOWER A-PILLAR AY (g) vs. Time [ms]



<Max>

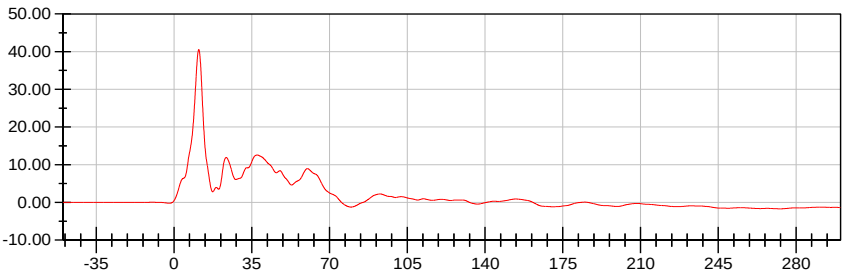
24.18 g at 3.55 ms

<Min>

-1.61 g at 77.80 ms

CFC_60

LEFT MIDDLE A-PILLAR AY (g) vs. Time [ms]



<Max>

40.57 g at 11.15 ms

<Min>

-1.70 g at 272.85 ms

CFC_60

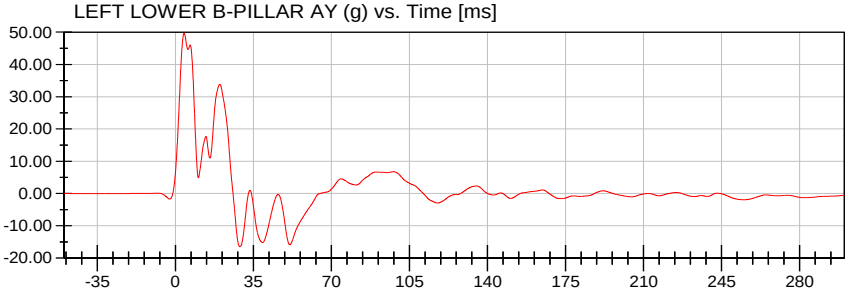
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

LEFT LOWER B-PILLAR AY (g) vs. Time [ms]



<Max>

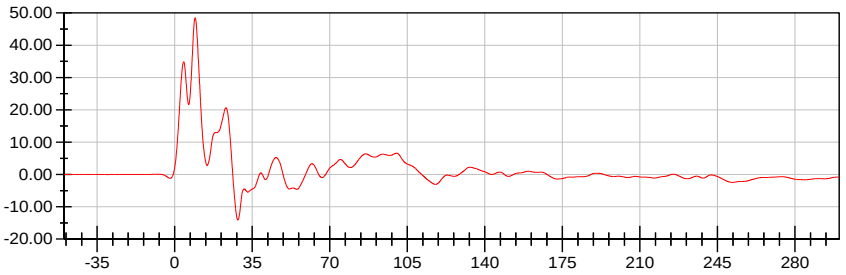
49.66 g at 3.90 ms

<Min>

-16.46 g at 28.95 ms

CFC_60

LEFT MIDDLE B-PILLAR AY (g) vs. Time [ms]



<Max>

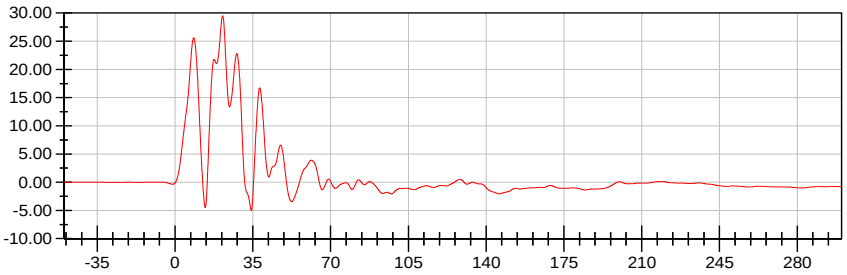
48.51 g at 9.25 ms

<Min>

-14.09 g at 28.50 ms

CFC_60

FRONT SEAT TRACK AY (g) vs. Time [ms]



<Max>

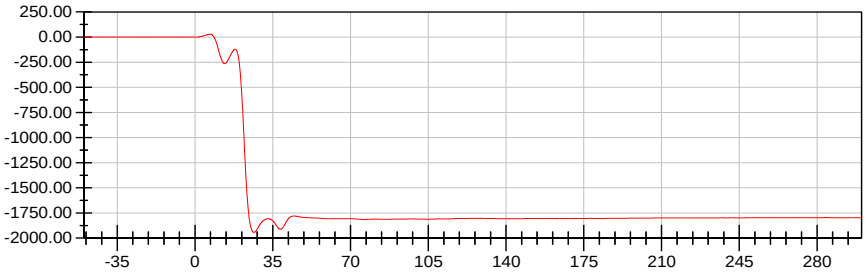
29.50 g at 21.40 ms

<Min>

-5.02 g at 34.30 ms

CFC_60

LEFT REAR SEAT STRUCTURE AY (g) vs. Time [ms]



<Max>

28.26 g at 6.70 ms

<Min>

-1,942.75 g at 26.55 ms

CFC_60

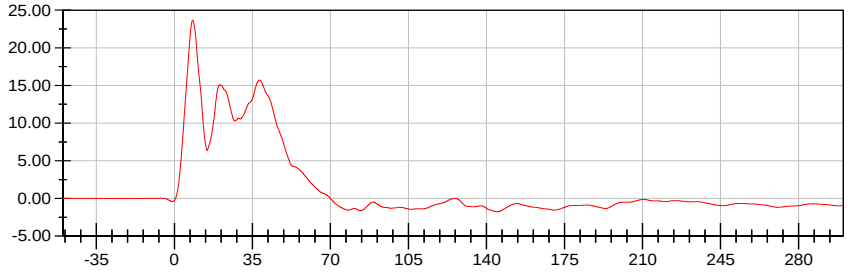
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

RIGHT REAR OCCUPANT COMPARTMENT AY (g) vs. Time [ms]



<Max>

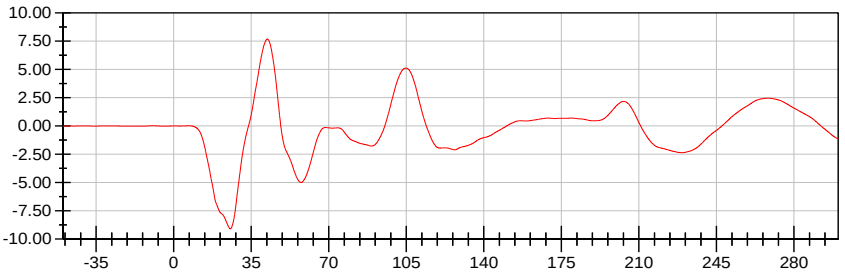
23.66 g at 8.20 ms

<Min>

-1.78 g at 144.95 ms

CFC_60

ENGINE BLOCK AX (g) vs. Time [ms]



<Max>

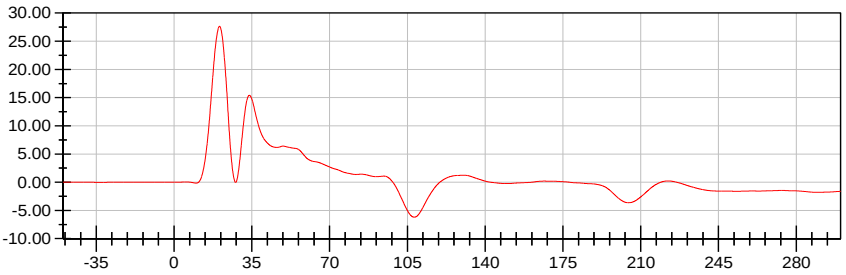
7.69 g at 42.25 ms

<Min>

-9.10 g at 25.55 ms

CFC_60

ENGINE BLOCK AY (g) vs. Time [ms]



<Max>

27.66 g at 20.45 ms

<Min>

-6.19 g at 108.10 ms

CFC_60

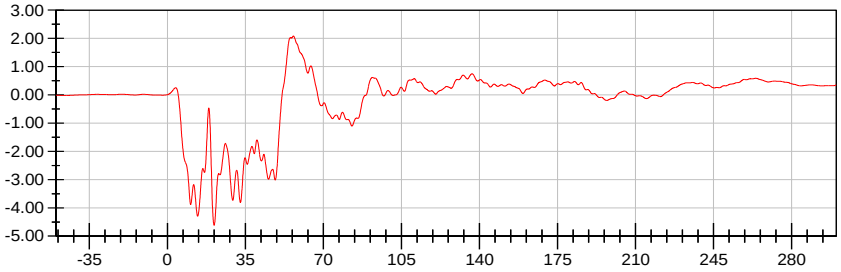
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

FLOORPAN ABOVE REAR AXLE AX (g) vs. Time [ms]



<Max>

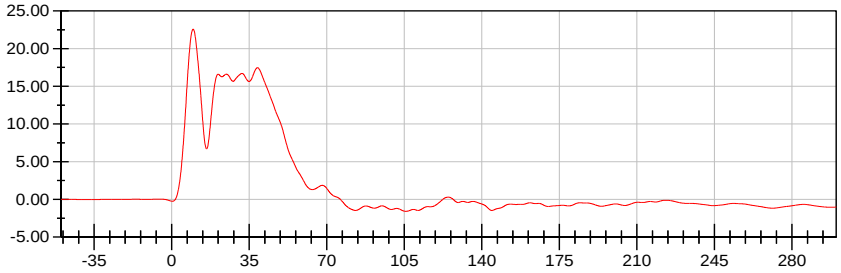
2.08 g at 56.55 ms

<Min>

-4.62 g at 20.95 ms

CFC_60

FLOORPAN ABOVE REAR AXLE AY (g) vs. Time [ms]



<Max>

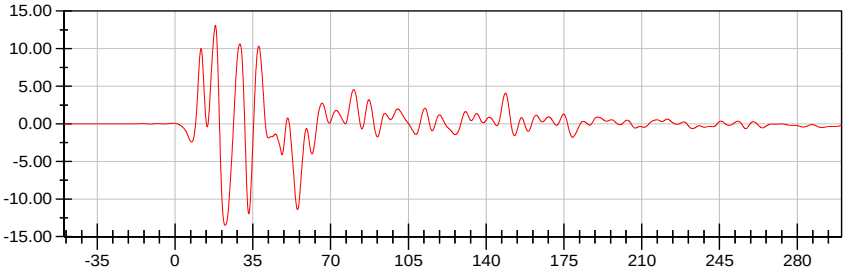
22.58 g at 9.65 ms

<Min>

-1.58 g at 105.70 ms

CFC_60

FLOORPAN ABOVE REAR AXLE AZ (g) vs. Time [ms]



<Max>

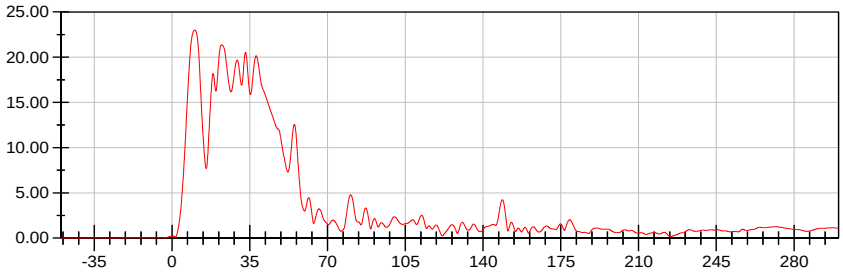
13.10 g at 18.15 ms

<Min>

-13.50 g at 22.55 ms

CFC_60

FLOORPAN ABOVE REAR AXLE A RESULTANT (g) vs. Time [ms]



<Max>

23.01 g at 10.25 ms

<Min>

0.01 g at -12.85 ms

CFC_60

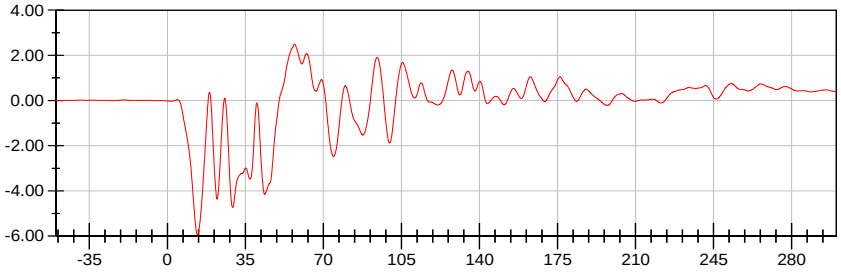
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

REAR DECK AX (g) vs. Time [ms]



<Max>

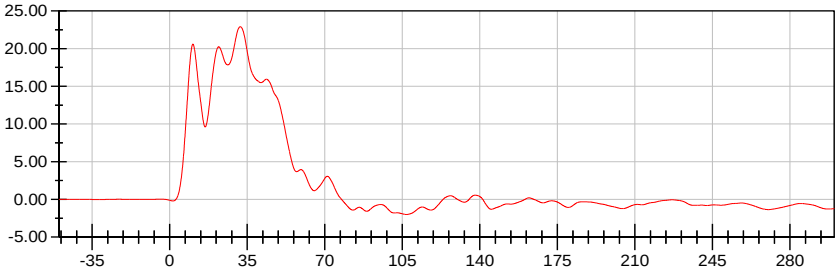
2.49 g at 57.05 ms

<Min>

-5.96 g at 13.55 ms

CFC_60

REAR DECK AY (g) vs. Time [ms]



<Max>

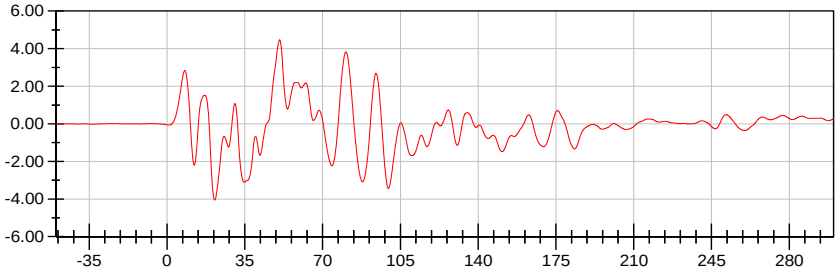
22.90 g at 31.90 ms

<Min>

-2.00 g at 106.85 ms

CFC_60

REAR DECK AZ (g) vs. Time [ms]



<Max>

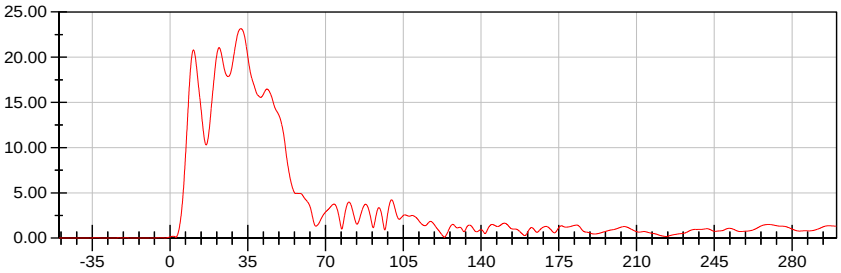
4.47 g at 50.65 ms

<Min>

-4.06 g at 21.45 ms

CFC_60

REAR DECK A RESULTANT (g) vs. Time [ms]



<Max>

23.15 g at 31.90 ms

<Min>

0.00 g at -47.10 ms

CFC_60

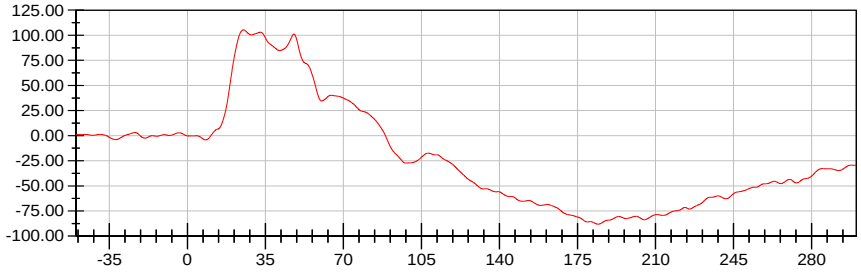
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

REAR DECK ARS X (º/s) vs. Time [ms]



<Max>

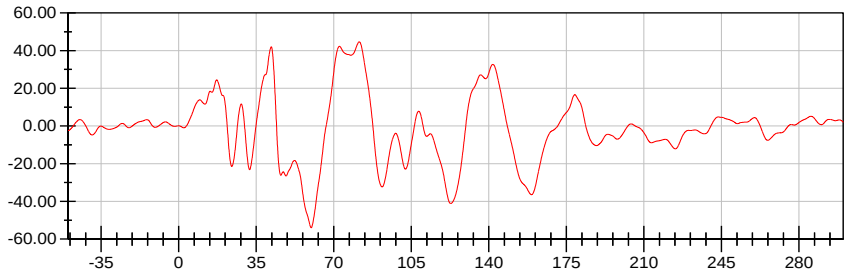
105.35 º/s at 25.20 ms

<Min>

-88.12 º/s at 184.25 ms

CFC_60

REAR DECK ARS Y (º/s) vs. Time [ms]



<Max>

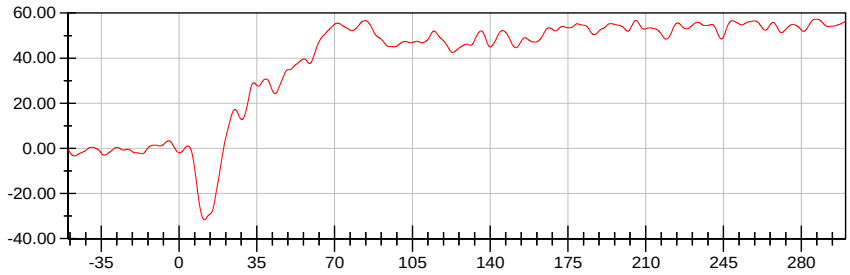
44.67 º/s at 81.55 ms

<Min>

-53.97 º/s at 59.80 ms

CFC_60

REAR DECK ARS Z (º/s) vs. Time [ms]



<Max>

57.26 º/s at 286.00 ms

<Min>

-31.65 º/s at 11.40 ms

CFC_60

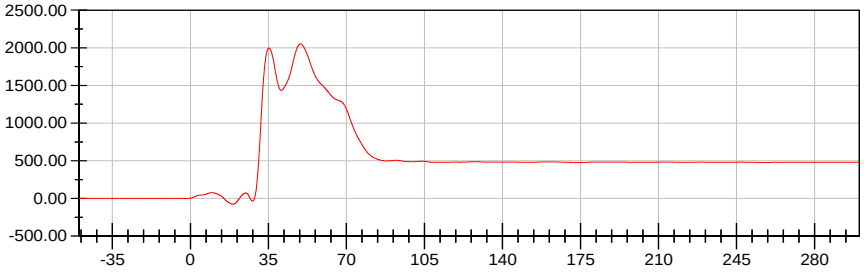
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Left Front Door Mid Centerline (Y) (g) vs. Time [ms]



<Max>

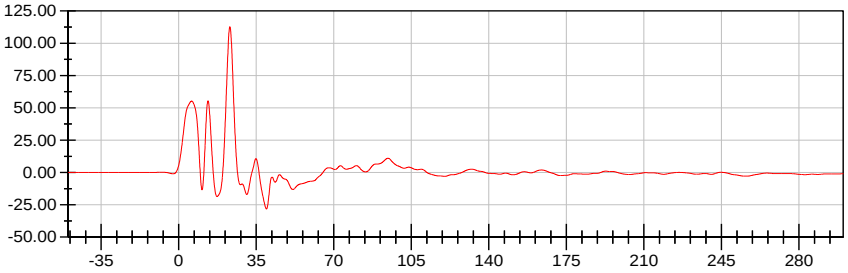
2,052.55 g at 49.35 ms

<Min>

-76.66 g at 19.20 ms

CFC_60

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



<Max>

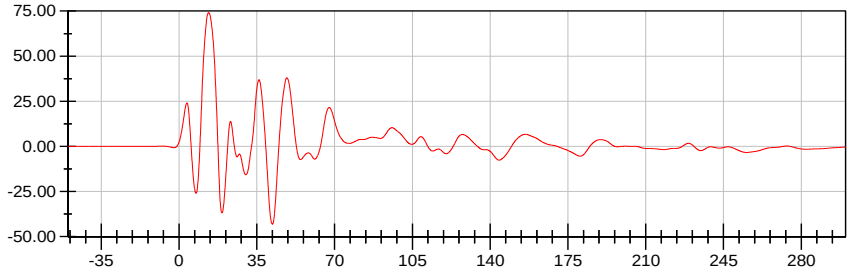
112.82 g at 23.10 ms

<Min>

-28.21 g at 39.60 ms

CFC_60

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



<Max>

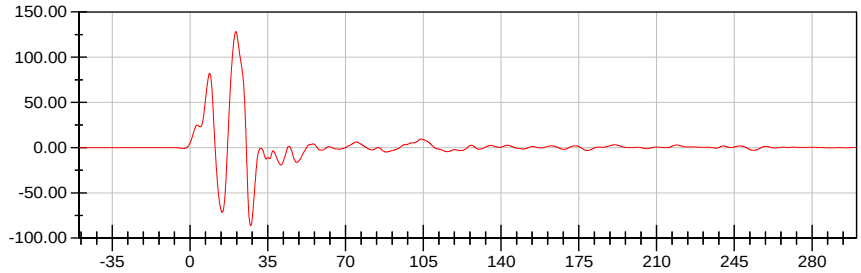
74.15 g at 13.35 ms

<Min>

-43.15 g at 42.05 ms

CFC_60

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



<Max>

128.37 g at 20.65 ms

<Min>

-86.15 g at 27.30 ms

CFC_60

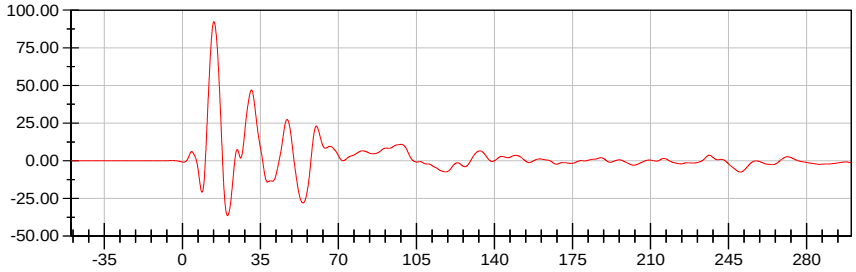
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

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



<Max>

92.36 g at 14.15 ms

<Min>

-36.43 g at 20.25 ms

CFC_60

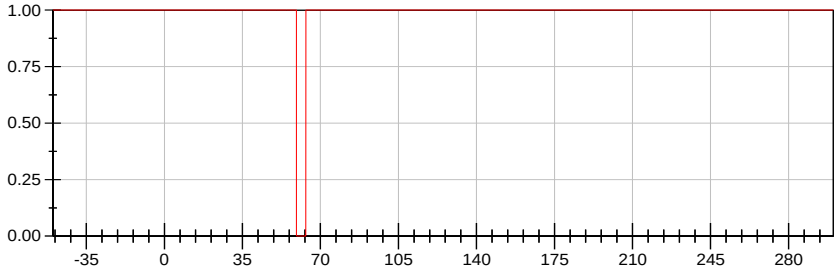
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Head Contact (Logic) vs. Time [ms]



<Max>

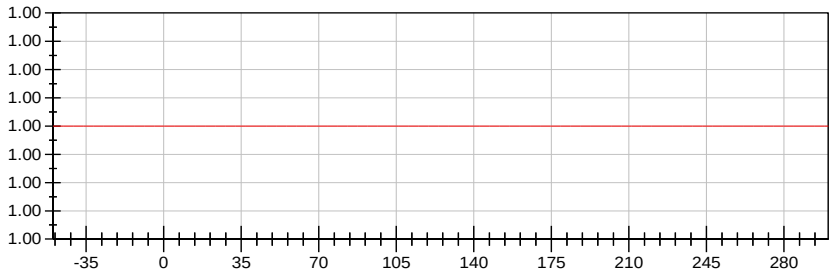
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 59.25 ms

Unfiltered

Shoulder Contact (Logic) vs. Time [ms]



<Max>

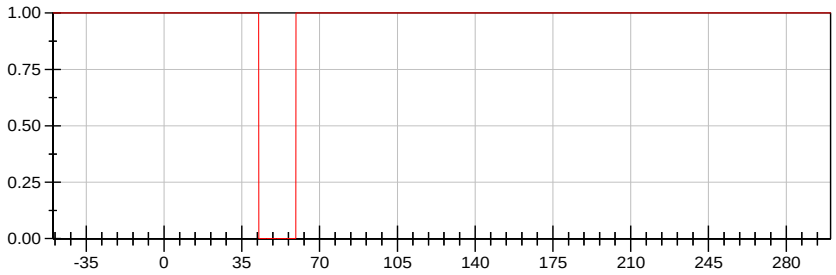
1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered

Thorax Contact (Logic) vs. Time [ms]



<Max>

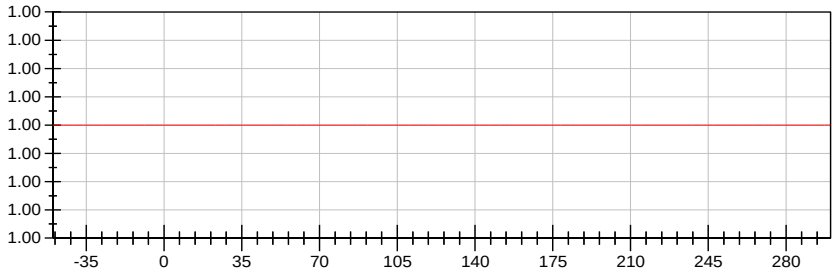
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 42.65 ms

Unfiltered

Pelvis Contact (Logic) vs. Time [ms]



<Max>

1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered

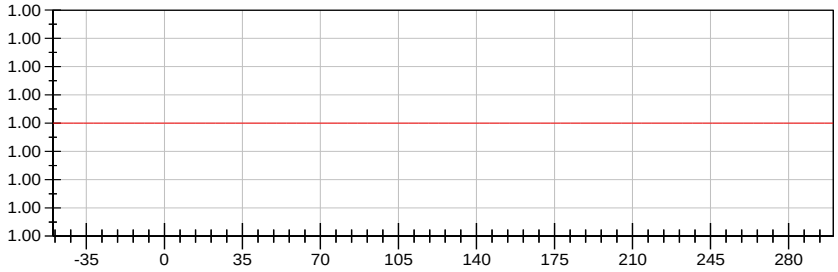
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

Head Contact (Logic) vs. Time [ms]



<Max>

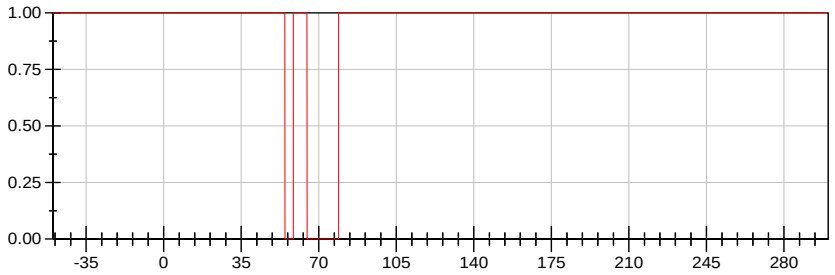
1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered

Shoulder Contact (Logic) vs. Time [ms]



<Max>

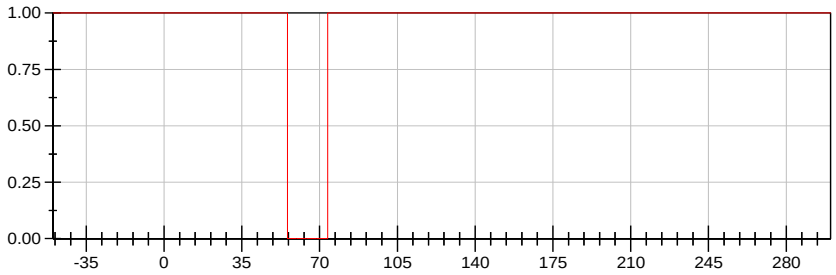
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 54.75 ms

Unfiltered

Thorax Contact (Logic) vs. Time [ms]



<Max>

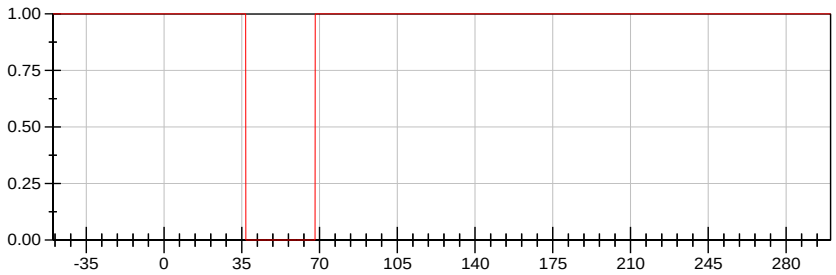
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 55.55 ms

Unfiltered

Pelvis Contact (Logic) vs. Time [ms]



<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 36.80 ms

Unfiltered

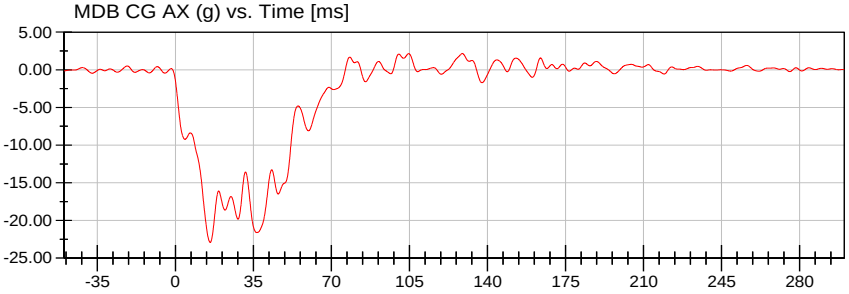
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

MDB CG AX (g) vs. Time [ms]



<Max>

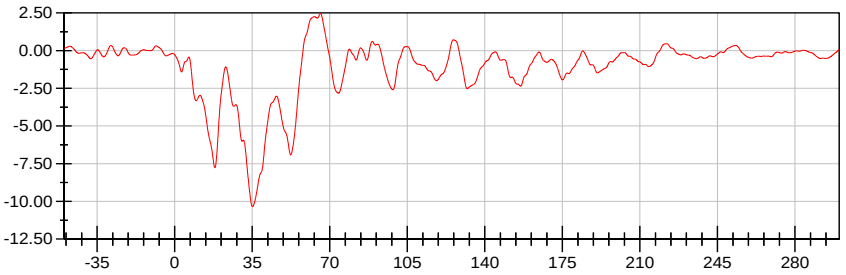
2.16 g at 128.70 ms

<Min>

-22.92 g at 15.60 ms

CFC_60

MDB CG AY (g) vs. Time [ms]



<Max>

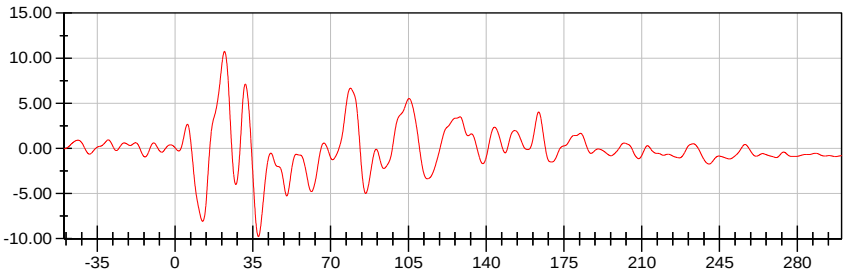
2.47 g at 65.85 ms

<Min>

-10.34 g at 35.15 ms

CFC_60

MDB CG AZ (g) vs. Time [ms]



<Max>

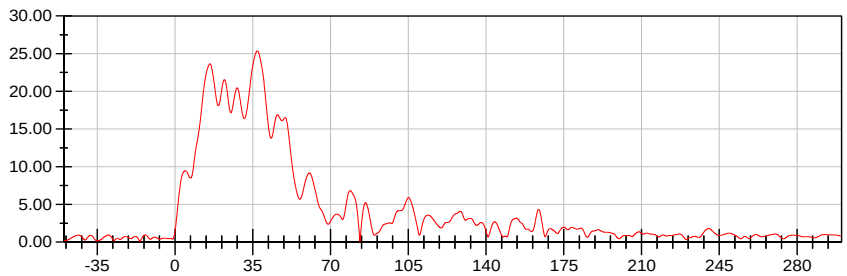
10.75 g at 22.25 ms

<Min>

-9.78 g at 37.55 ms

CFC_60

MDB CG A RESULTANT (g) vs. Time [ms]



<Max>

25.36 g at 37.05 ms

<Min>

0.10 g at -15.80 ms

CFC_60

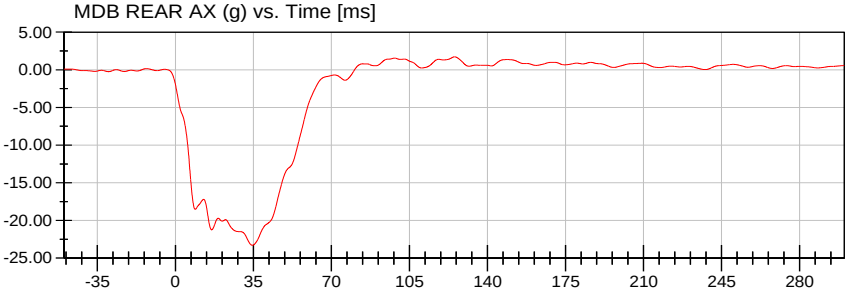
VRTC

Test Date: 01/28/2021

Test Lab: CTF

Test Number: 210128 ()

MDB REAR AX (g) vs. Time [ms]



<Max>

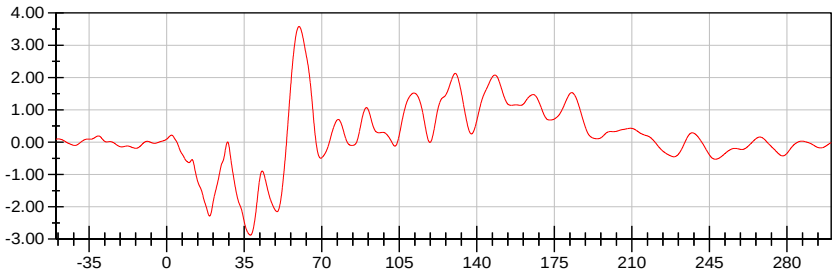
1.72 g at 125.25 ms

<Min>

-23.30 g at 34.50 ms

CFC_60

MDB REAR AY (g) vs. Time [ms]



<Max>

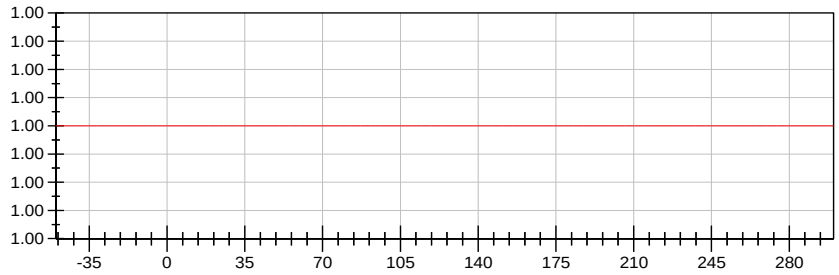
3.58 g at 59.75 ms

<Min>

-2.88 g at 37.80 ms

CFC_60

LEFT MDB CONTACT (Logic) vs. Time [ms]



<Max>

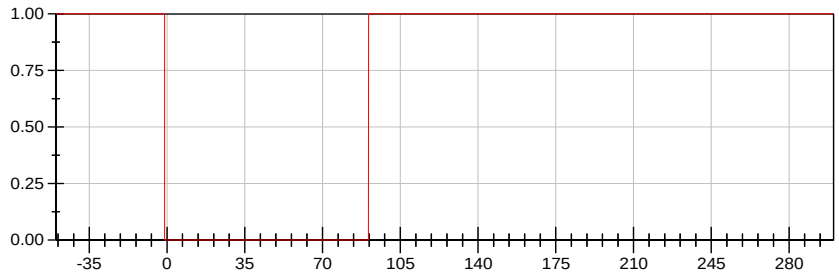
1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered

RIGHT MDB CONTACT (Logic) vs. Time [ms]



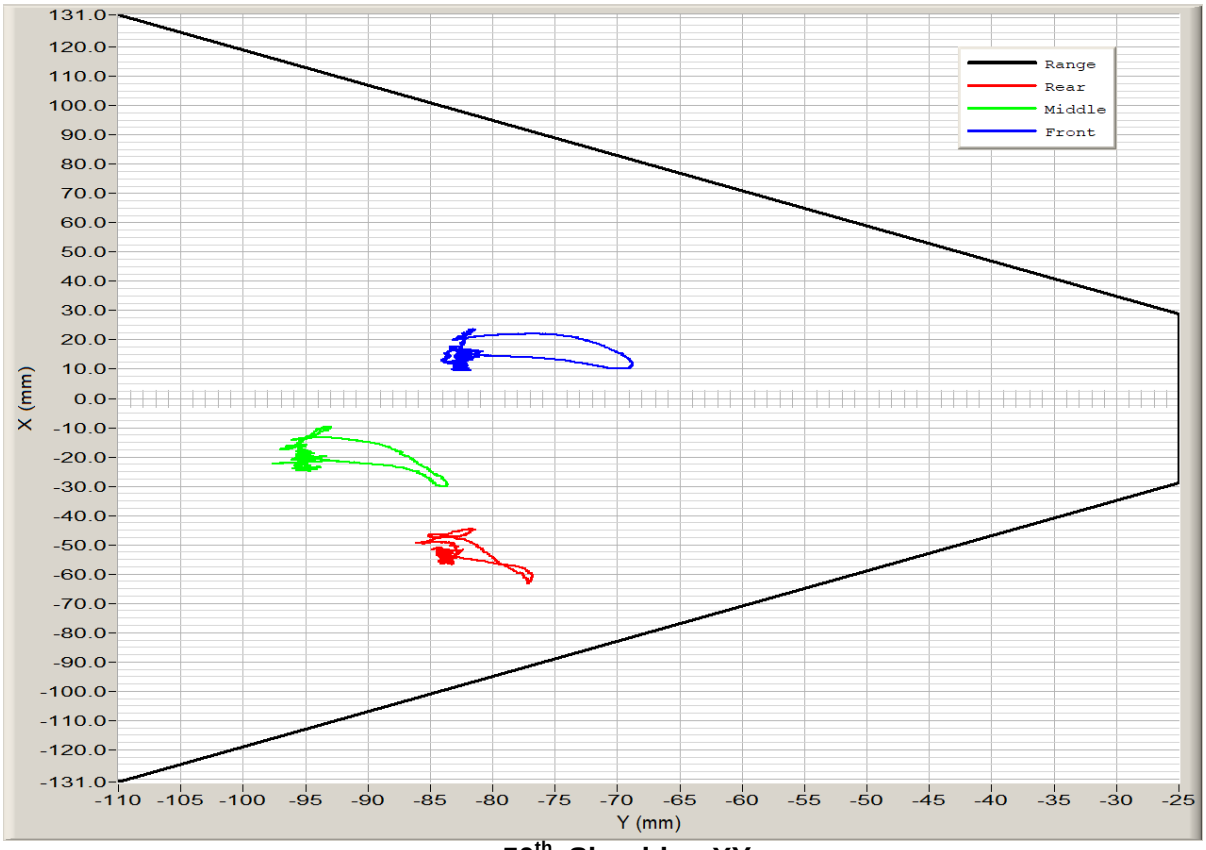
<Max>

1.00 Logic at -50.00 ms

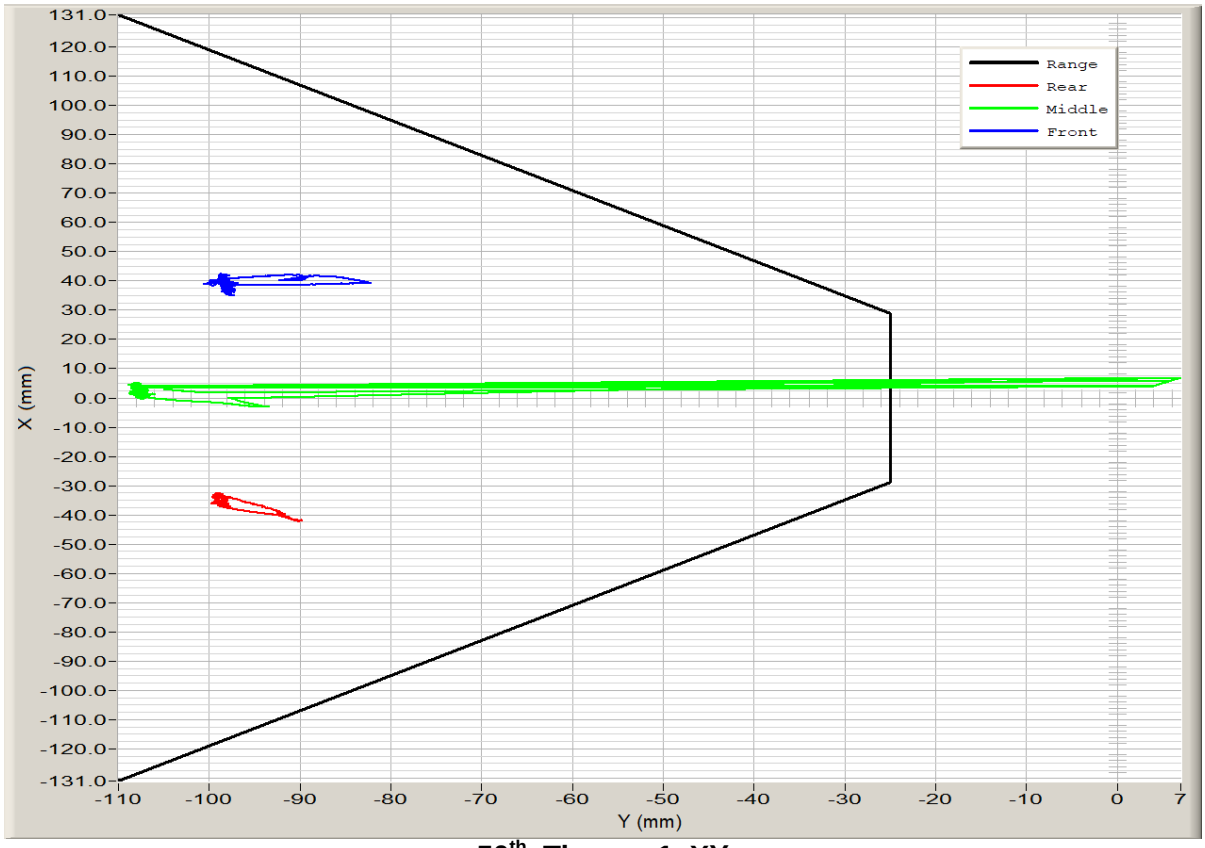
<Min>

0.00 Logic at -1.05 ms

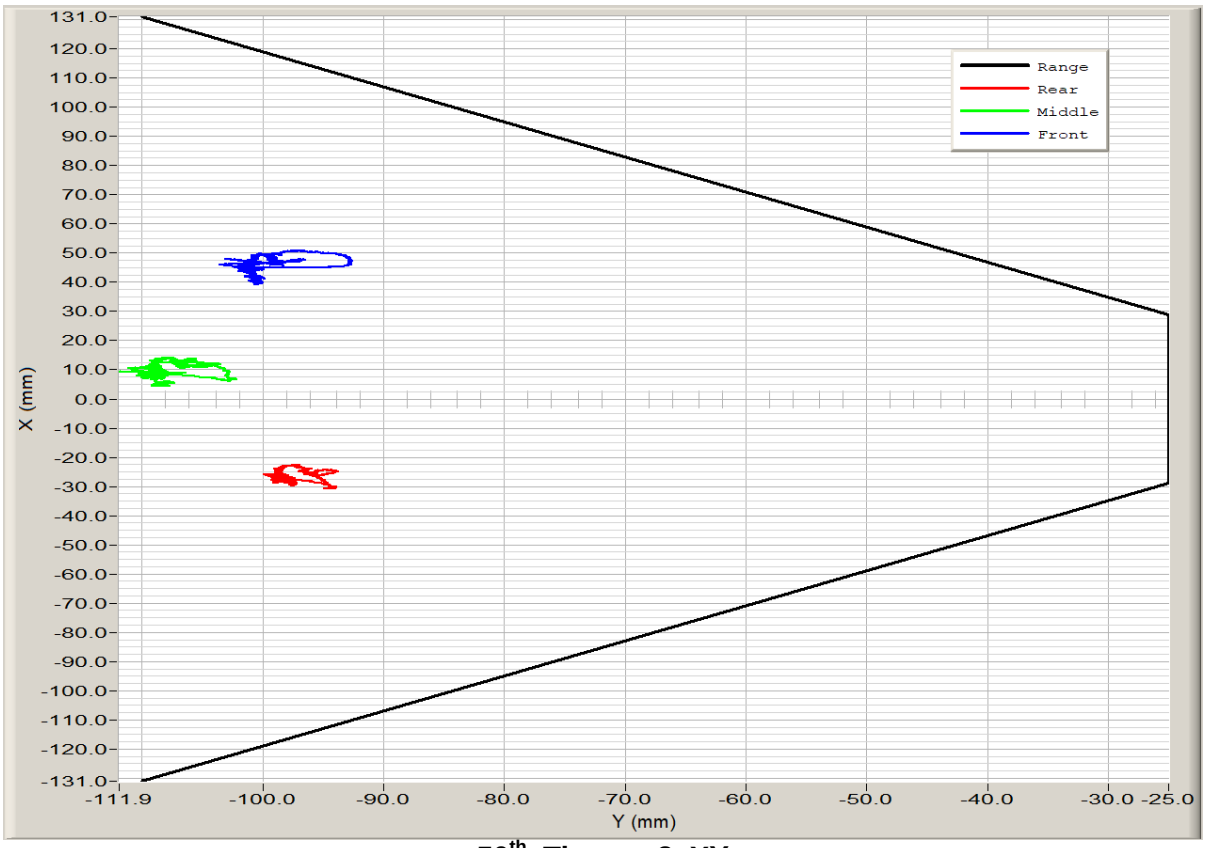
Unfiltered



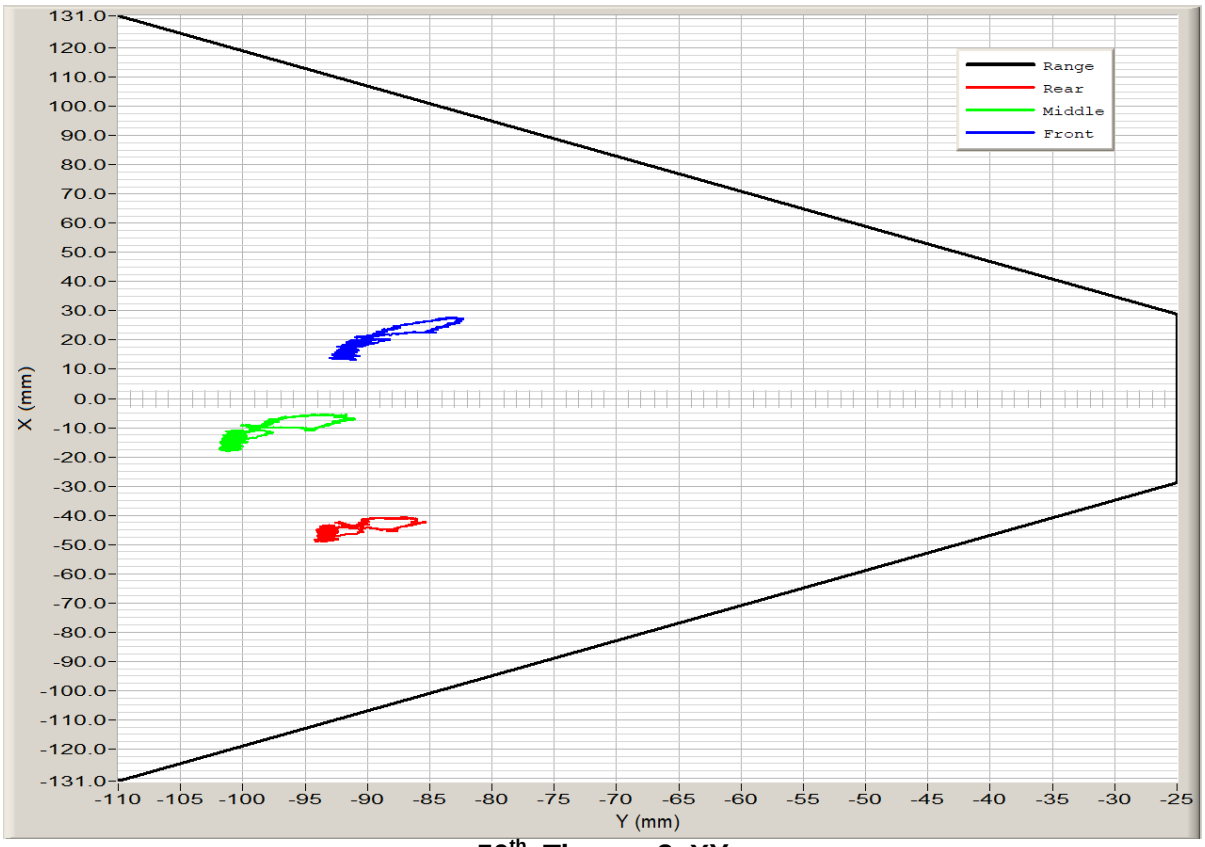
50th_Shoulder_XY



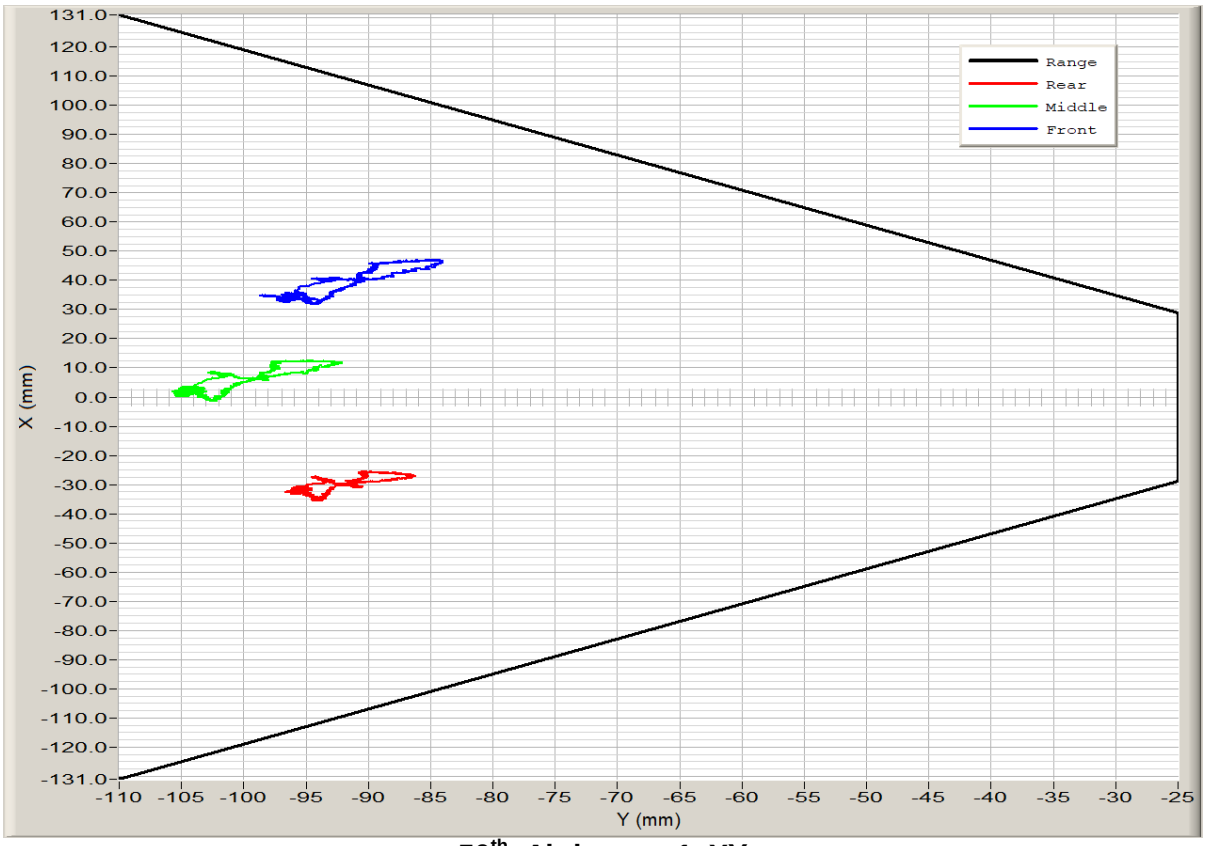
50th_Thorax_1_XY



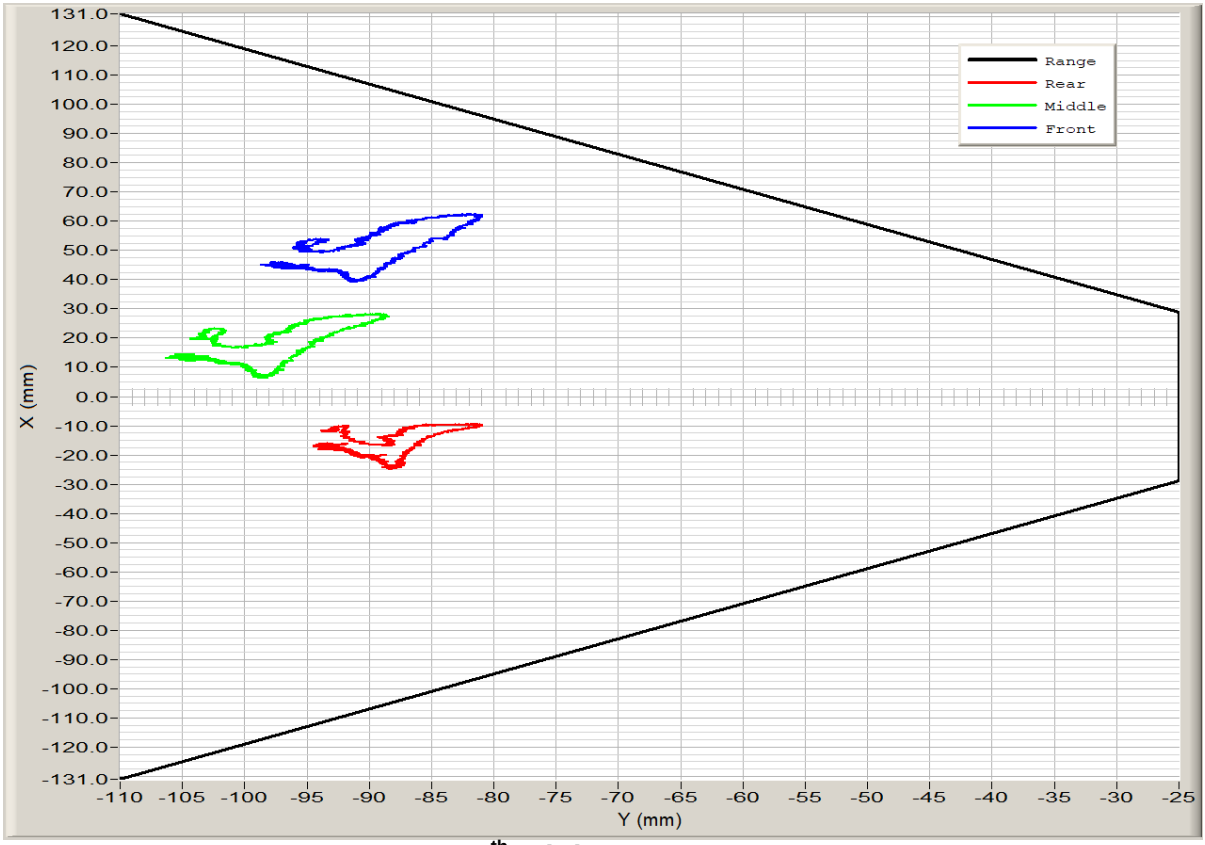
50th_Thorax_2_XY



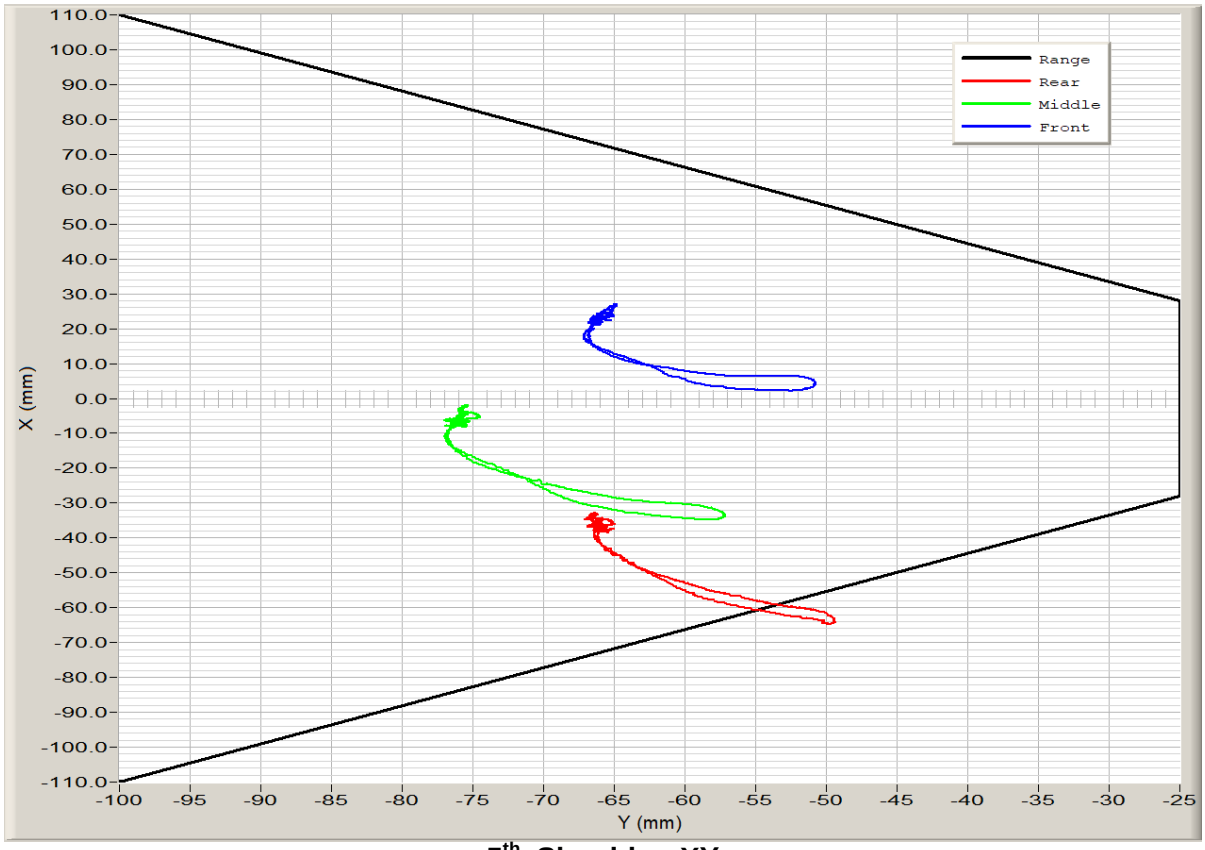
50th_Thorax_3_XY



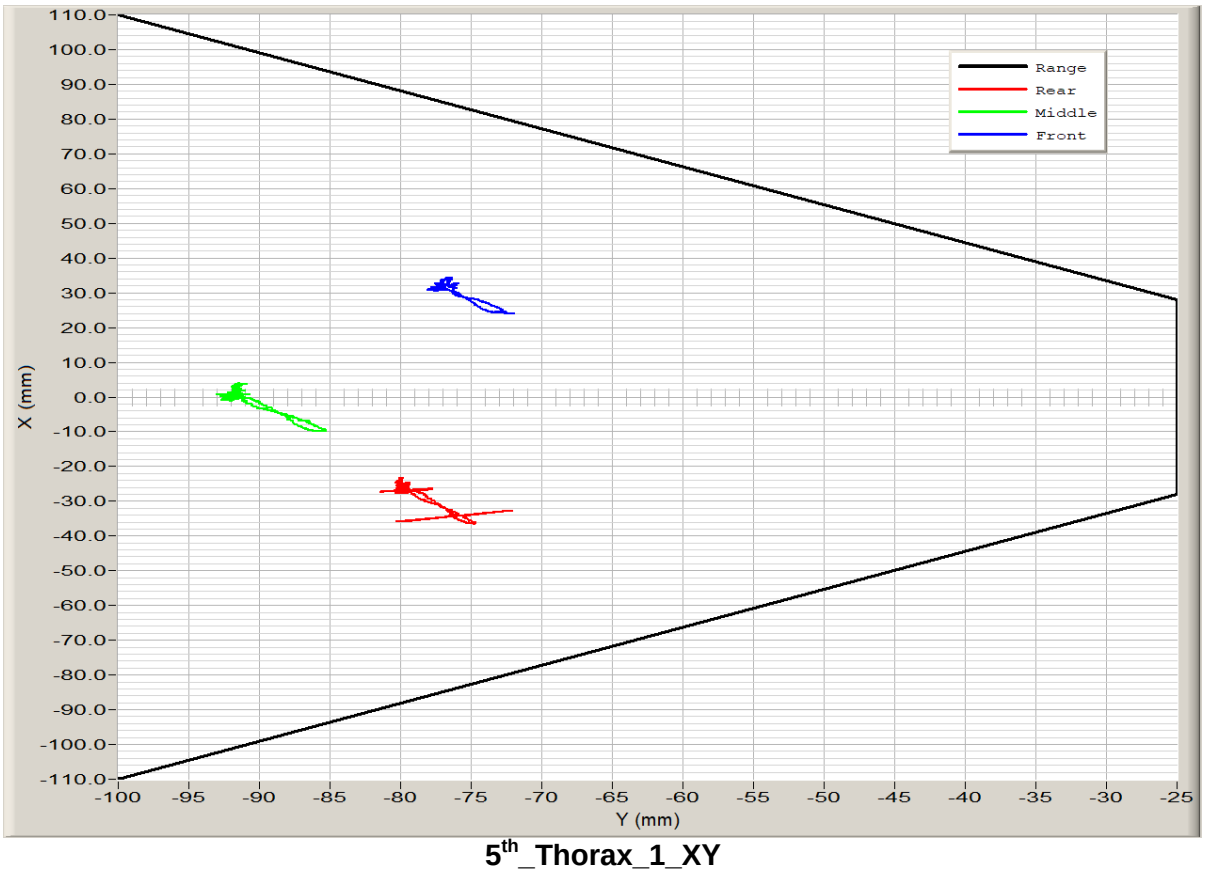
50th_Abdomen_1_XY



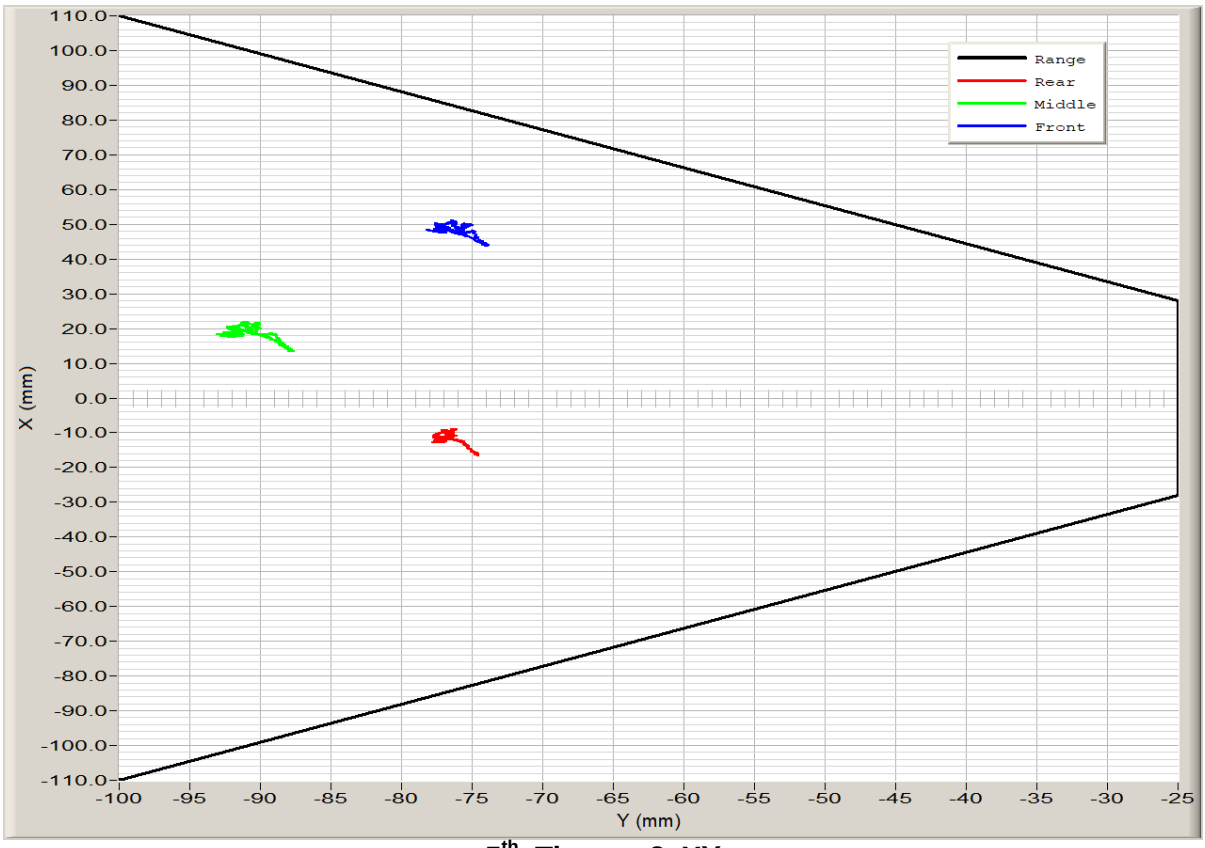
50th_Abdomen_2_XY



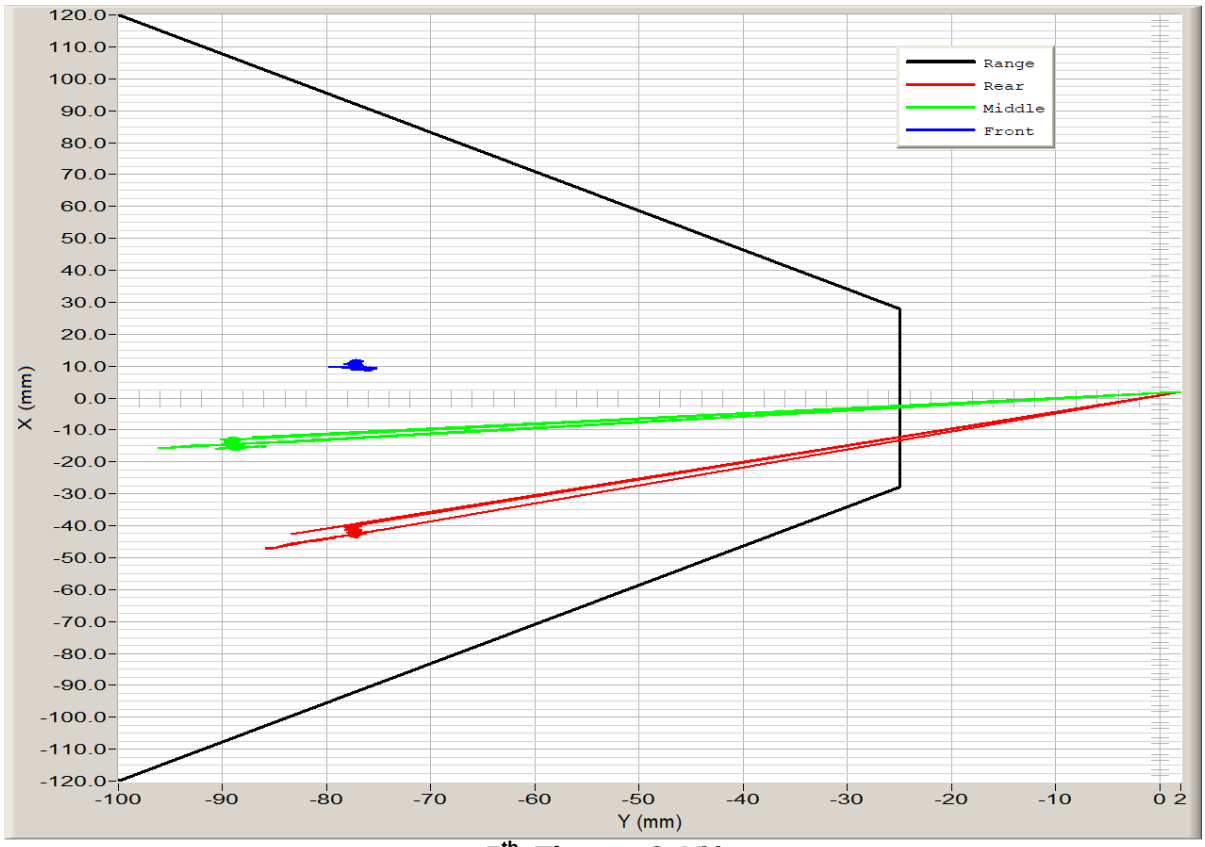
5th_Shoulder_XY



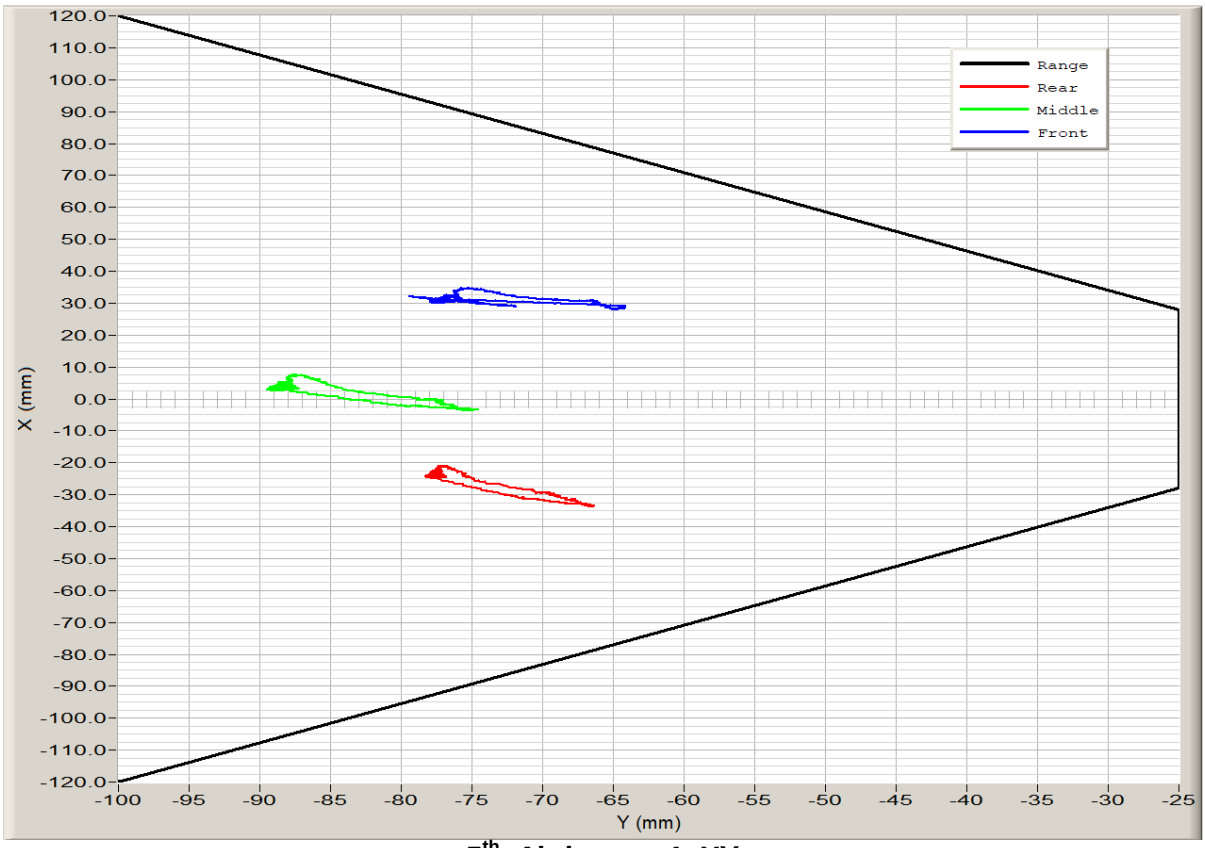
5th_Thorax_1_XY



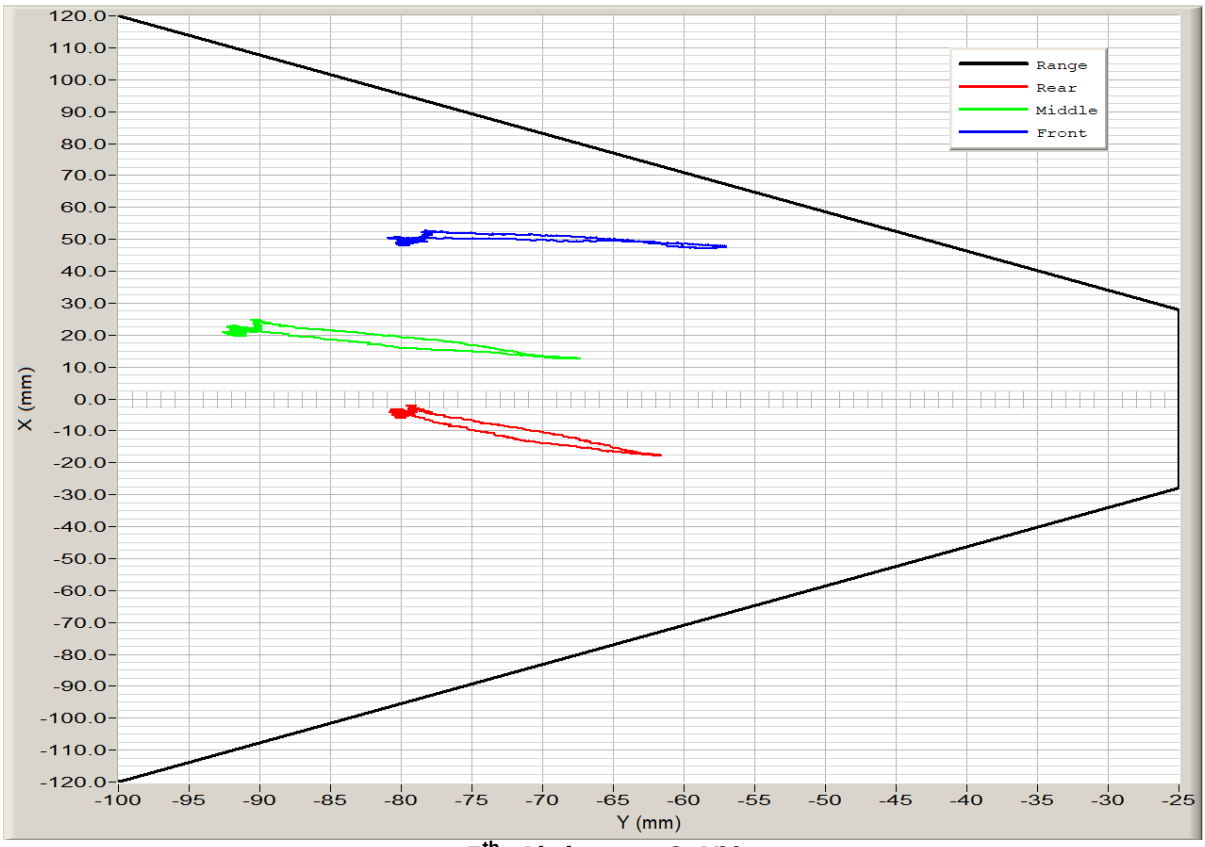
5th_Thorax_2_XY



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 (Driver) 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 Occiptal 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 Occiptal 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 (Driver) 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 Occiptal 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 Occiptal 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
Driver S/N EB8888

Transportation Research Center Inc.
WorldSID-50M
External Measurements
Serial No. EB8888 Certification No. 05

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	33.1	33.9

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	177
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. EB8888 Certification No. 6-2
Test Date: 1/18/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	211 - 261 g	219.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.58 %	Yes

Test meets specifications.

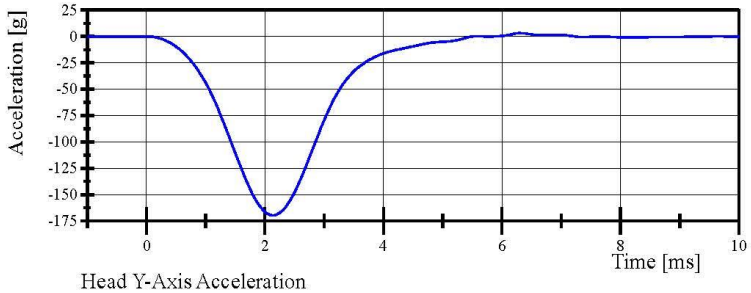
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

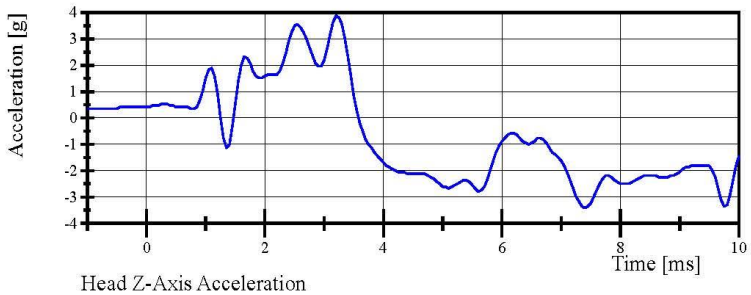
Front Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 6-2
Test Date: 1/18/2021

Head X-Axis Acceleration



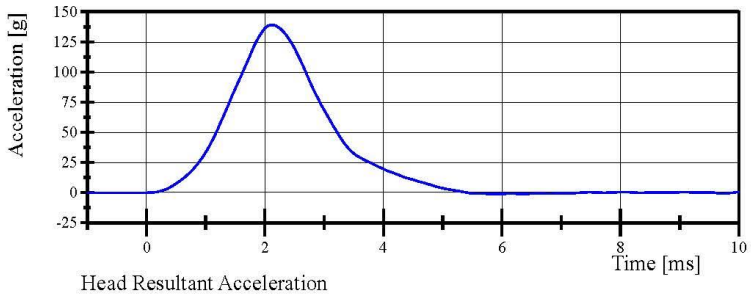
Filter Class: CFC_1000
Max: 3.2 g at 6.3 ms
Min: -169.7 g at 2.2 ms

Head Y-Axis Acceleration



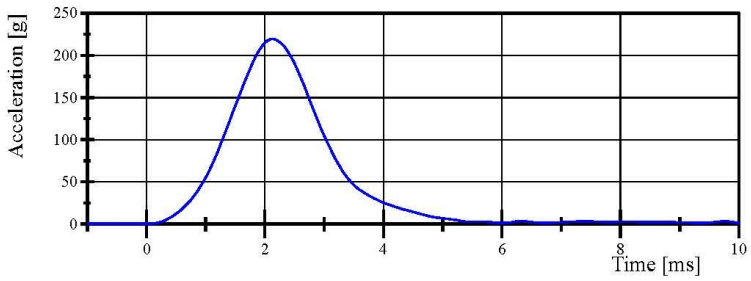
Filter Class: CFC_1000
Max: 3.9 g at 3.2 ms
Min: -3.4 g at 7.4 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 139.2 g at 2.1 ms
Min: -1.3 g at 6.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 219.4 g at 2.2 ms
Min: 0.4 g at -1.0 ms

Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	110.9 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-1.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.87 %	Yes

Test meets specifications.

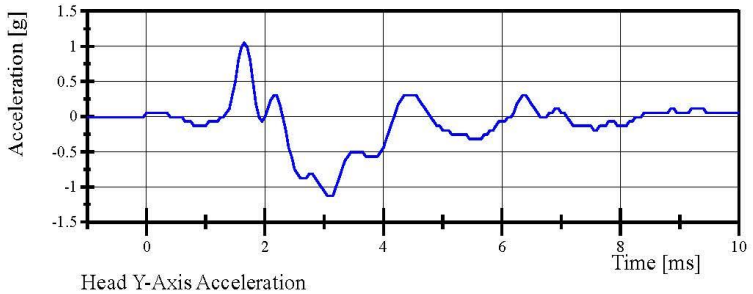
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

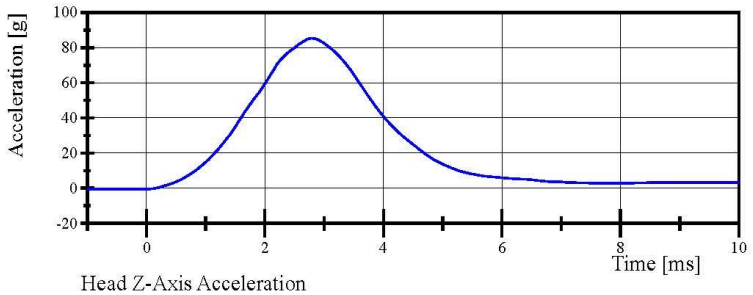
Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Head X-Axis Acceleration



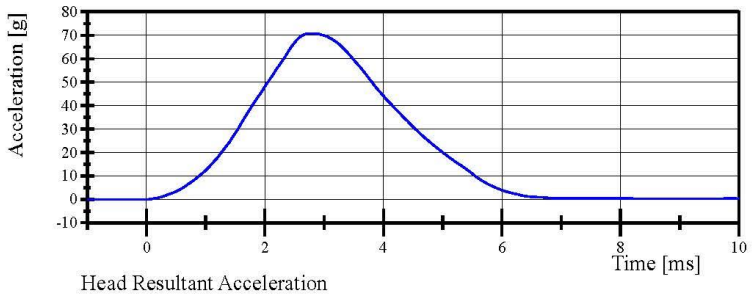
Filter Class: CFC_1000
Max: 1.0 g at 1.7 ms
Min: -1.1 g at 3.1 ms

Head Y-Axis Acceleration



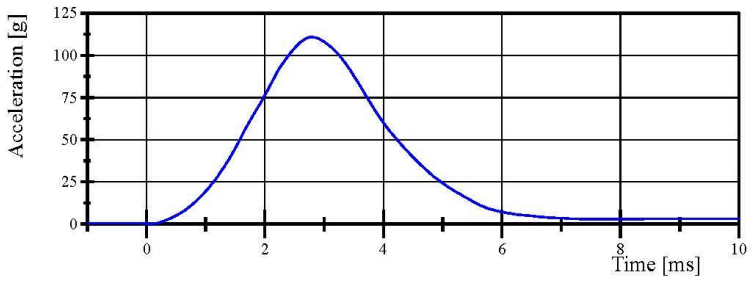
Filter Class: CFC_1000
Max: 85.3 g at 2.8 ms
Min: -0.5 g at -0.5 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 70.8 g at 2.8 ms
Min: -0.1 g at -1.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 110.9 g at 2.8 ms
Min: 0.3 g at 0.1 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. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	113.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-5.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.64 %	Yes

Test meets specifications.

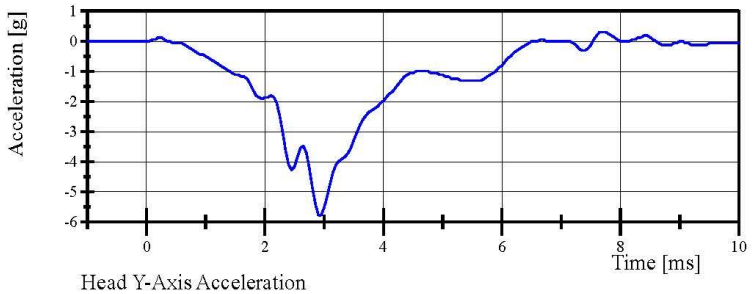
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

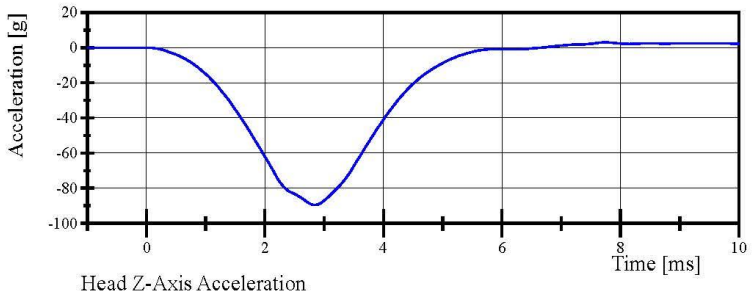
Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Head X-Axis Acceleration



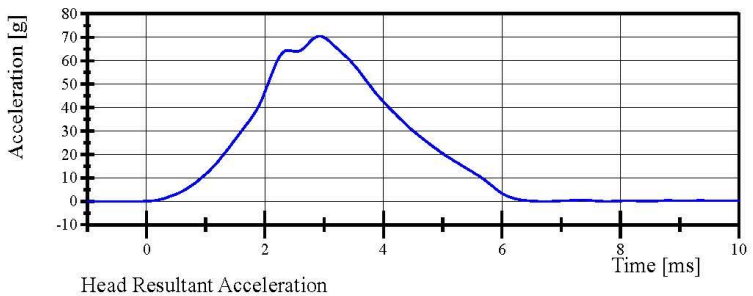
Filter Class: CFC_1000
Max: 0.3 g at 7.7 ms
Min: -5.8 g at 2.9 ms

Head Y-Axis Acceleration



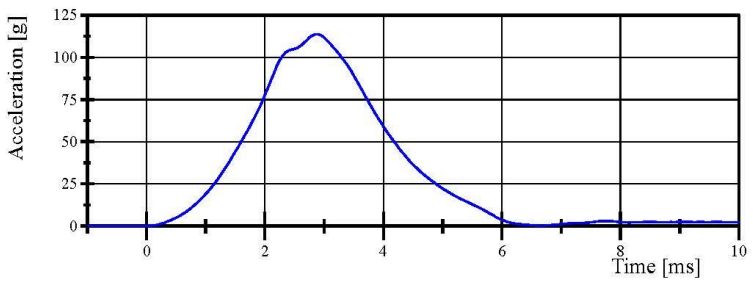
Filter Class: CFC_1000
Max: 3.0 g at 7.8 ms
Min: -89.5 g at 2.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 70.5 g at 2.9 ms
Min: -0.1 g at 7.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 113.8 g at 2.9 ms
Min: 0.0 g at -0.3 ms

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

Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/15/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	39 %	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	0.976 m/s	Yes
Change at 8 ms	1.72 - 2.1 m/s	1.899 m/s	Yes
Change at 12 ms	2.63 - 3.17 m/s	2.884 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-54.7 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	61.0 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	75.9 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-35.2 °	Yes
Time of Peak	56 - 68 ms	60.9 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-29) - (-36) °	-31.5 °	Yes
Time of Peak	56 - 68 ms	62.2 ms	Yes
Maximum Headform Angular Rate	(-2,047) - (-2,503) °/s	-2,287.4 °/s	Yes

Test meets specifications.

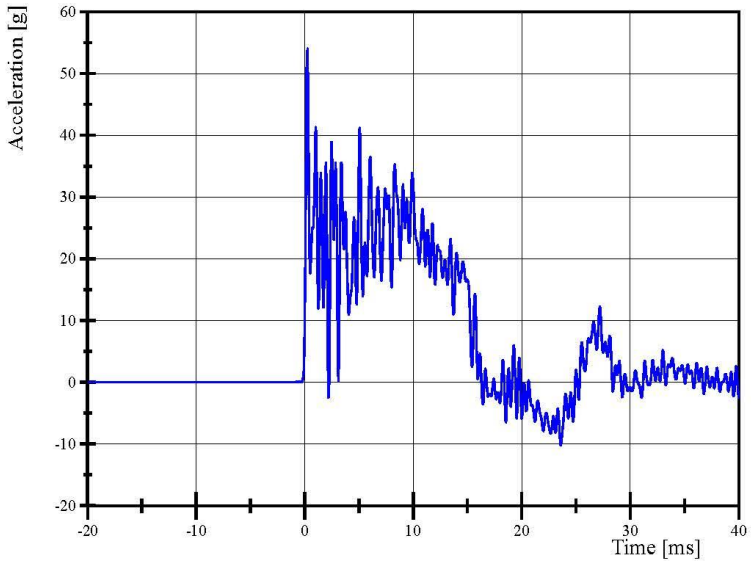
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

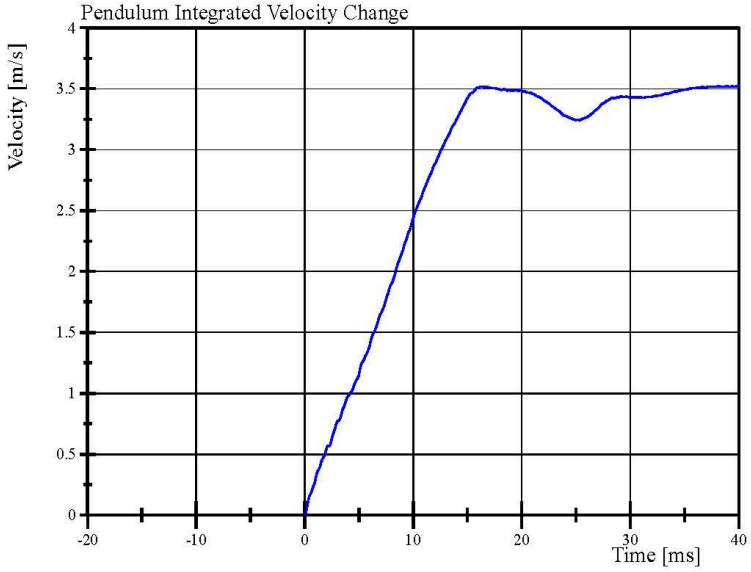
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/15/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 54.0 g at 0.3 ms
Min: -10.2 g at 23.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_1000
Max: 3.5 m/s at 39.9 ms
Min: 0.0 m/s at -0.0 ms

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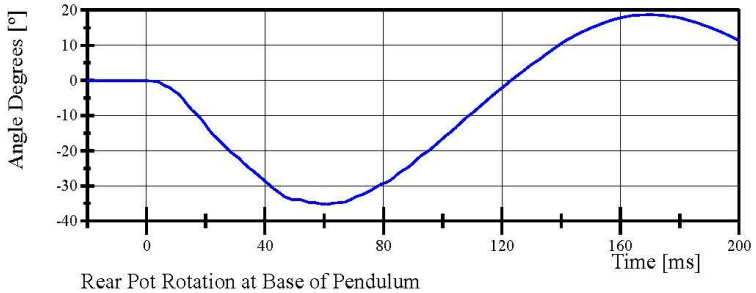
Transportation Research Center Inc.

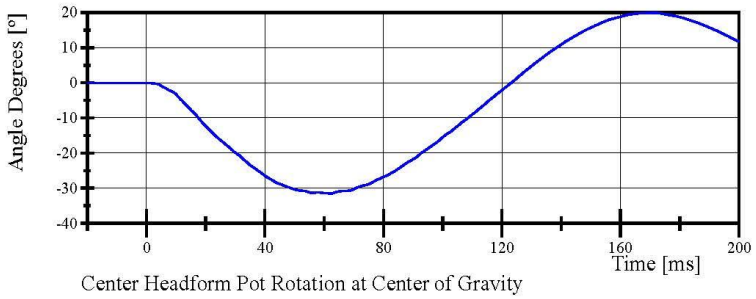
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/15/2021

Forward Pot Rotation at Base of Pendulum



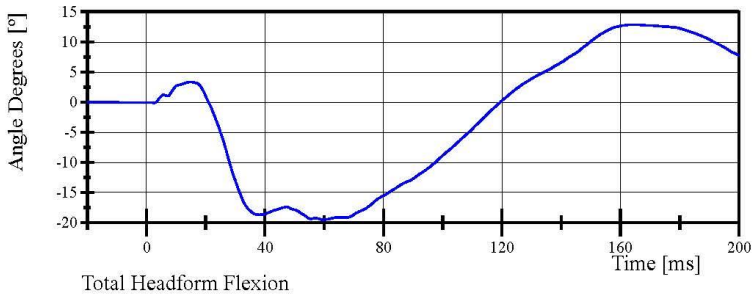
Filter Class: CFC_180
Max: 18.7 ° at 170.1 ms
Min: -35.2 ° at 60.9 ms

Rear Pot Rotation at Base of Pendulum



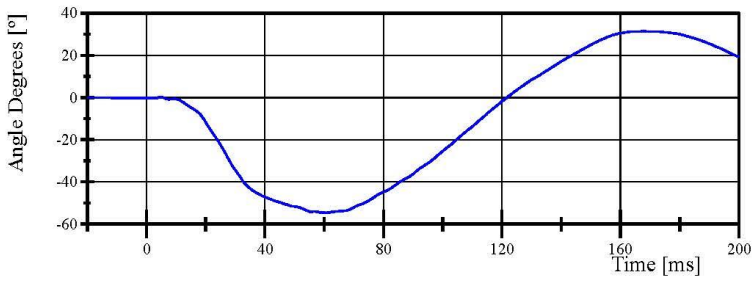
Filter Class: CFC_180
Max: 19.9 ° at 170.9 ms
Min: -31.5 ° at 62.2 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 12.9 ° at 164.5 ms
Min: -19.4 ° at 59.4 ms

Total Headform Flexion

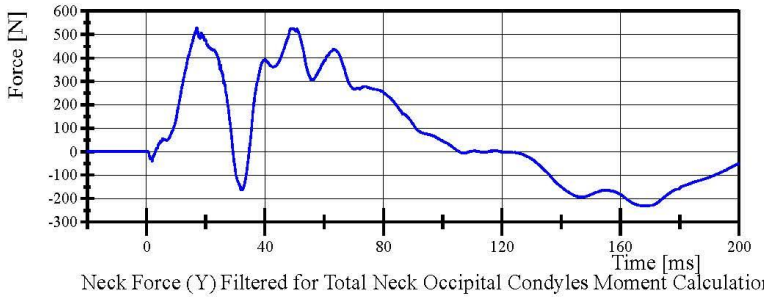


Filter Class: CFC_180
Max: 31.4 ° at 167.8 ms
Min: -54.7 ° at 60.7 ms

Transportation Research Center Inc.

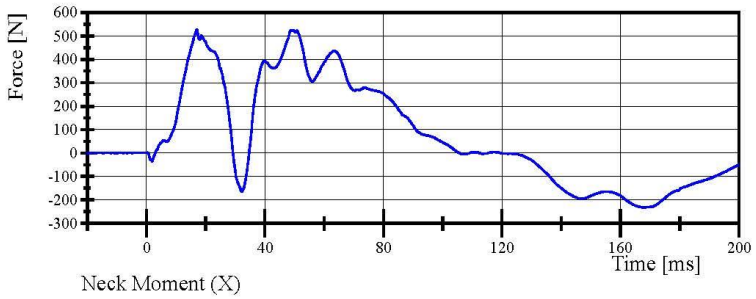
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/15/2021

Neck Force (Y)



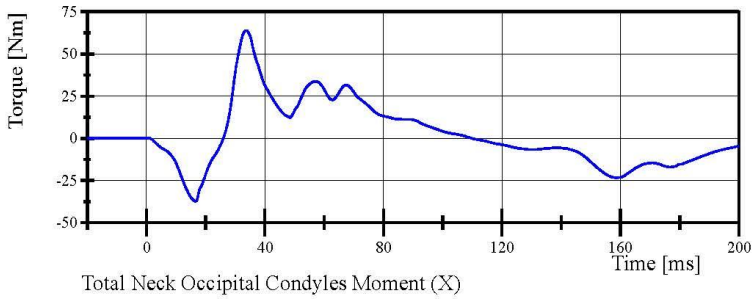
Filter Class: CFC_1000
Max: 528.2 N at 17.0 ms
Min: -232.0 N at 167.8 ms

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



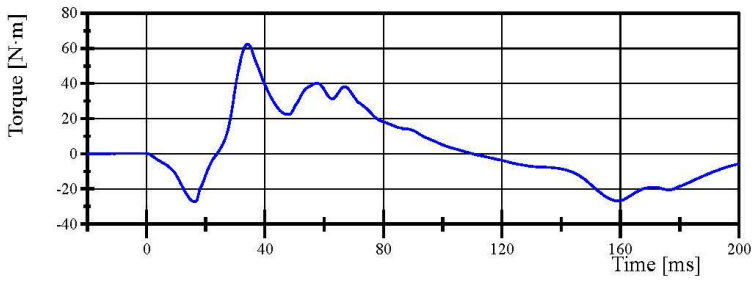
Filter Class: CFC_600
Max: 526.9 N at 17.0 ms
Min: -231.8 N at 167.8 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 64.0 Nm at 33.6 ms
Min: -37.2 Nm at 16.6 ms

Total Neck Occipital Condyles Moment (X)

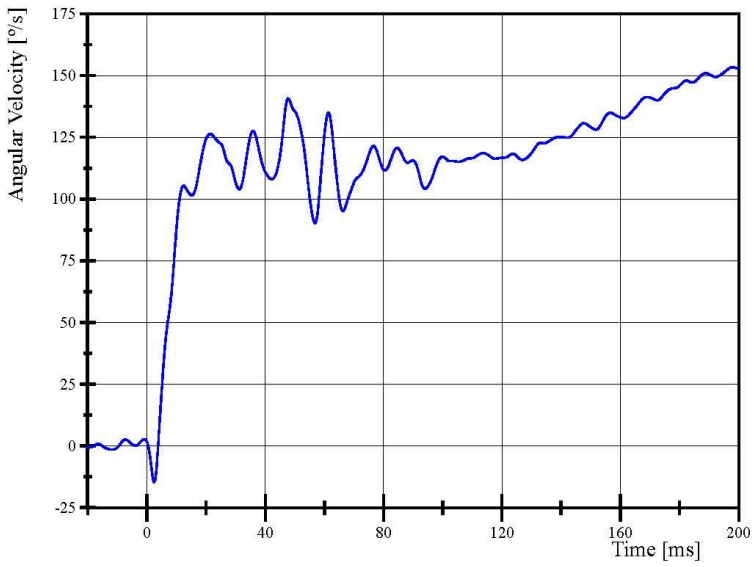


Filter Class: Without_(Constar
Max: 62.4 N·m at 34.1 ms
Min: -27.3 N·m at 16.2 ms

Transportation Research Center Inc.

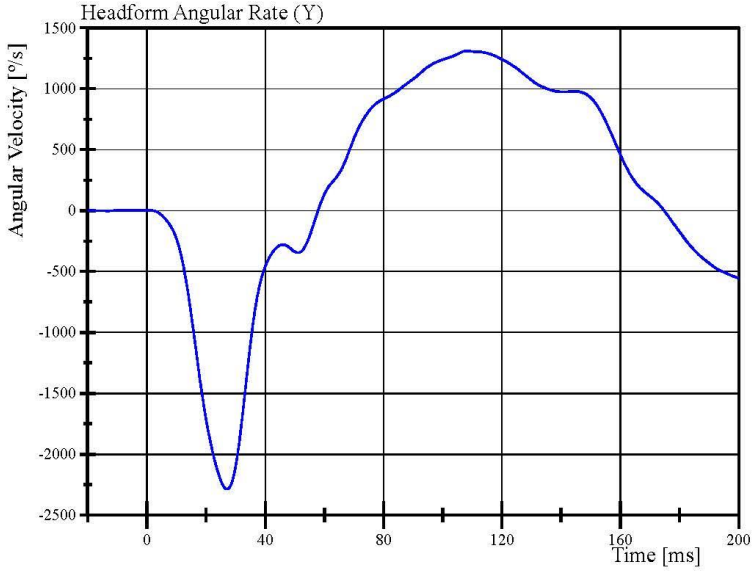
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/15/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 153.4 °/s at 197.9 ms
Min: -14.6 °/s at 2.5 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 1,309.1 °/s at 108.0 ms
Min: -2,287.4 °/s at 27.1 ms

Transportation Research Center Inc.

Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	3.30 - 3.50 m/s	3.333 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	(-0.87) - (-1.09) m/s	-1.021 m/s	Yes
Change at 8 ms	(-1.72) - (-2.1) m/s	-1.981 m/s	Yes
Change at 12 ms	(-2.63) - (-3.17) m/s	-3.016 m/s	Yes
Maximum Headform Flexion	50 - 61 deg	53.8 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	60.1 ms	Yes
Total Neck Occipital Condyles Moment	(-54) - (-67) N·m	-63.6 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	76.7 ms	Yes
Maximum Forward Pot Rotation			
Peak	32 - 39 °	34.8 °	Yes
Time of Peak	56 - 68 ms	60.9 ms	Yes
Maximum Rear Pot Rotation			
Peak	29 - 36 °	30.8 °	Yes
Time of Peak	56 - 68 ms	59.9 ms	Yes
Maximum Headform Angular Rate	2,047 - 2,503 °/s	2,302.2 °/s	Yes

Test meets specifications.

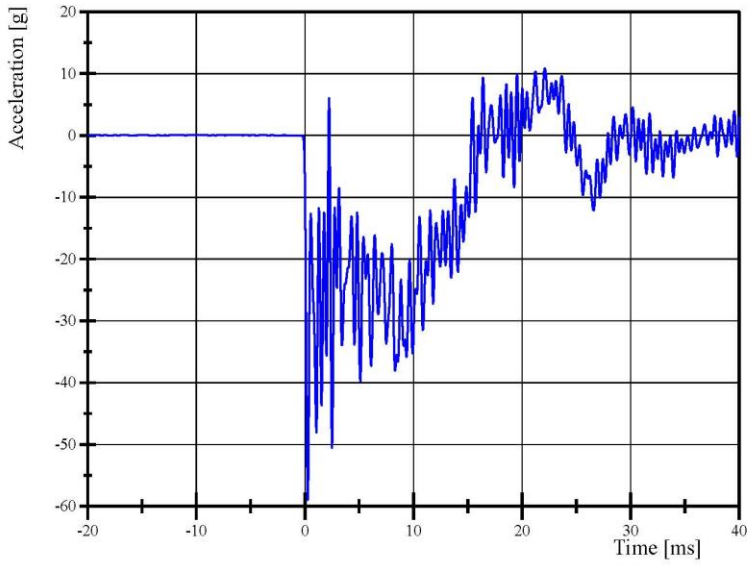
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

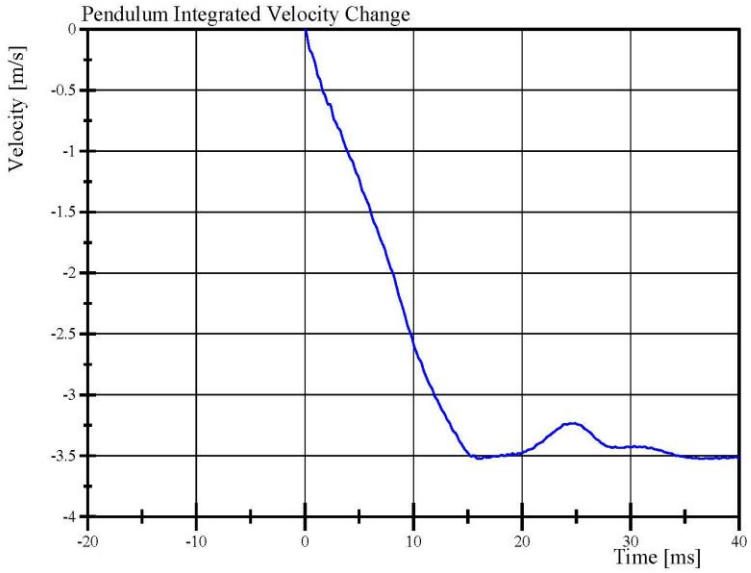
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 10.9 g at 22.1 ms
Min: -59.0 g at 0.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_1000
Max: 0.0 m/s at 0.0 ms
Min: -3.5 m/s at 16.3 ms

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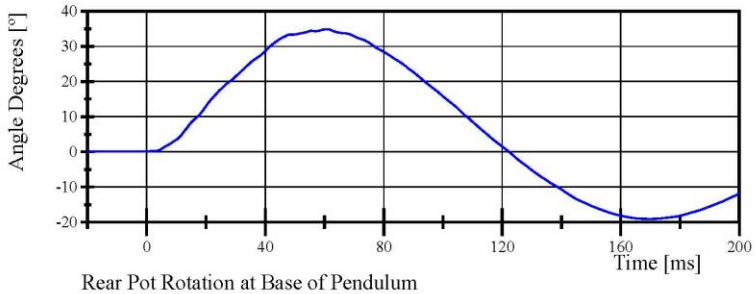
Transportation Research Center Inc.

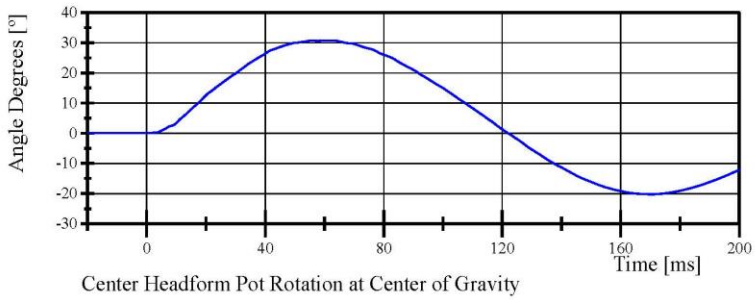
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Forward Pot Rotation at Base of Pendulum



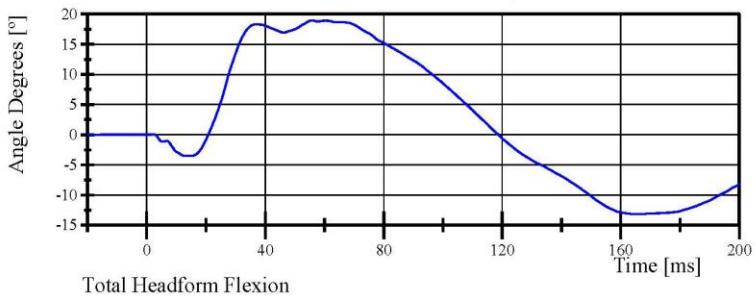
Filter Class: CFC_180
Max: 34.8 ° at 60.9 ms
Min: -19.1 ° at 169.9 ms

Rear Pot Rotation at Base of Pendulum



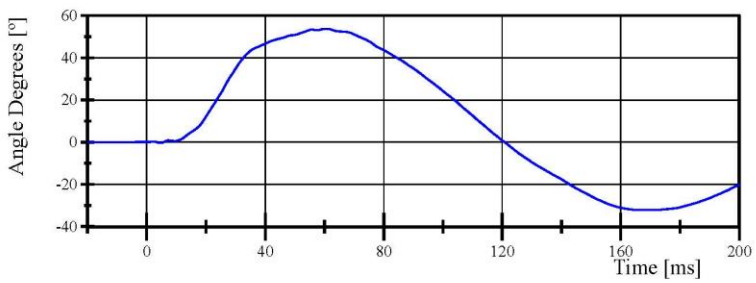
Filter Class: CFC_180
Max: 30.8 ° at 59.9 ms
Min: -20.2 ° at 170.5 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 19.0 ° at 55.8 ms
Min: -13.1 ° at 165.3 ms

Total Headform Flexion

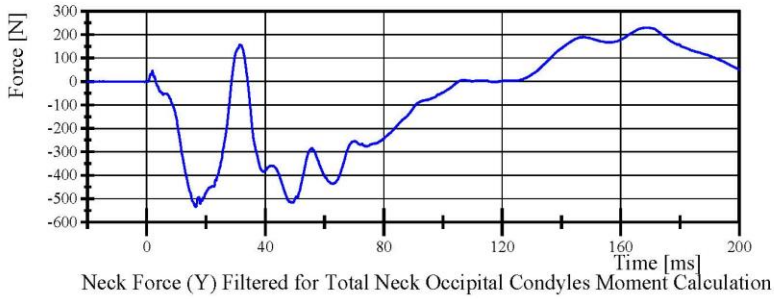


Filter Class: CFC_180
Max: 53.8 ° at 60.7 ms
Min: -32.2 ° at 169.2 ms

Transportation Research Center Inc.

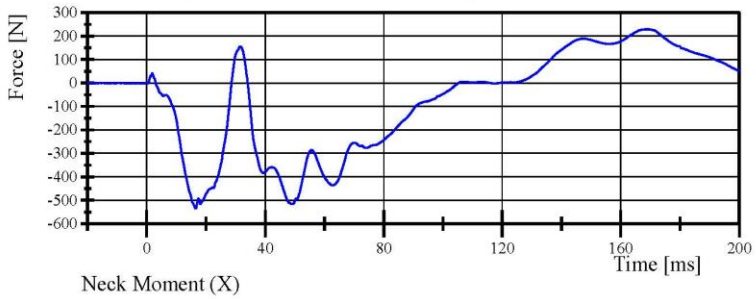
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Neck Force (Y)



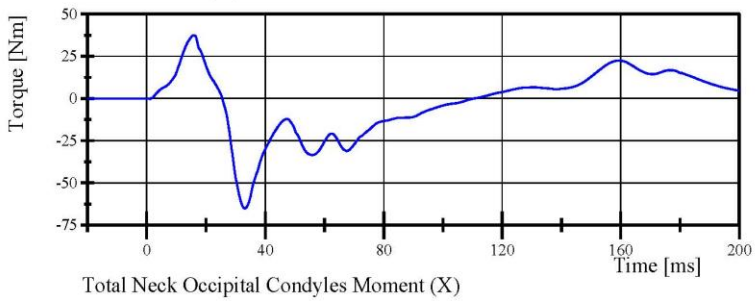
Filter Class: CFC_1000
Max: 229.7 N at 169.2 ms
Min: -534.5 N at 16.5 ms

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



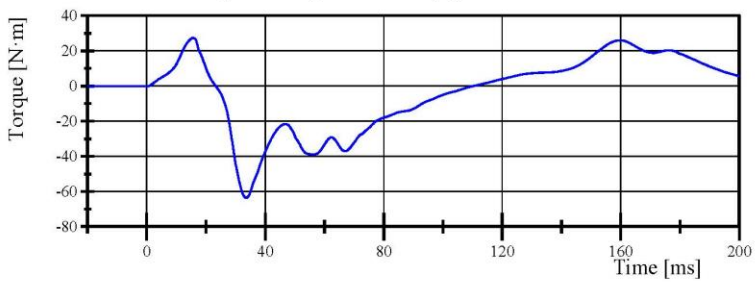
Filter Class: CFC_600
Max: 229.5 N at 169.2 ms
Min: -534.9 N at 16.6 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 37.4 Nm at 16.1 ms
Min: -65.1 Nm at 33.2 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constar
Max: 27.3 N·m at 15.6 ms
Min: -63.6 N·m at 33.6 ms

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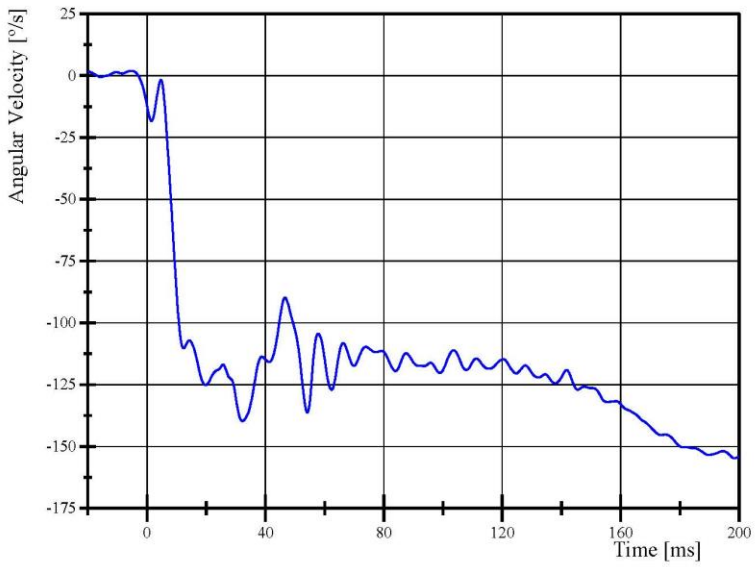
Transportation Research Center Inc.

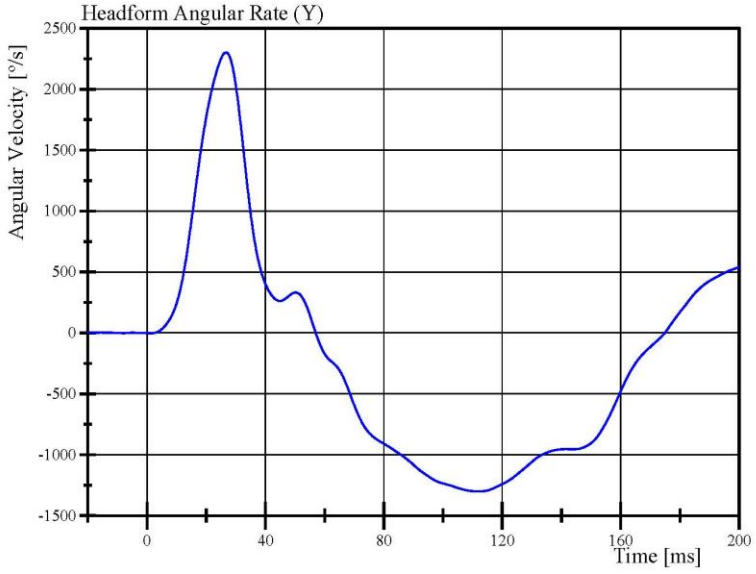
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/18/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 1.9 °/s at -5.3 ms
Min: -154.7 °/s at 198.5 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 2,302.2 °/s at 26.7 ms
Min: -1,301.7 °/s at 111.9 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. EB8888 Certification No. 6-3
Test Date: 1/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ℃	21.2 ℃	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	2.149 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.246 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.323 m/s	Yes
Peak Fixture Rotation	(-41.5) - (-51) °	-46.61 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.3 ms	Yes
Peak Head Angular Velocity Z-axis	(-1,345) - (-1,655) °/s	-1,504.4 °/s	Yes
Peak Lower Neck Moment Z-axis	34 - 42 N·m	37.5 N·m	Yes

Test meets specifications.

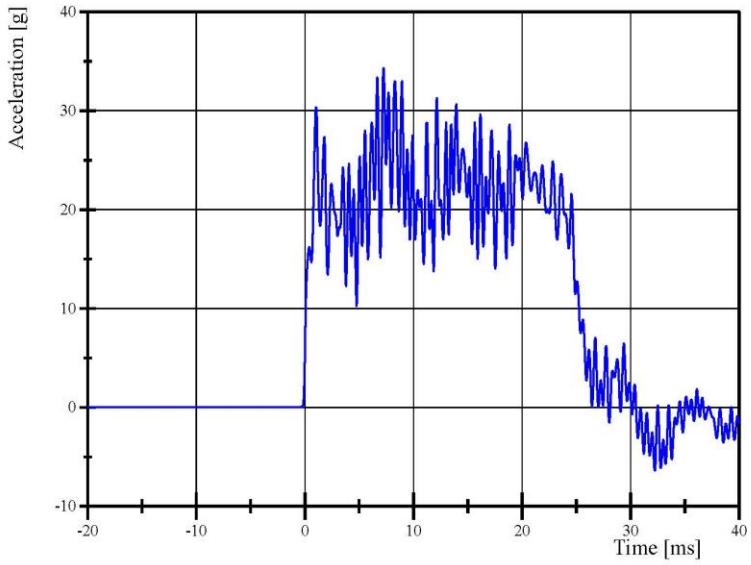
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

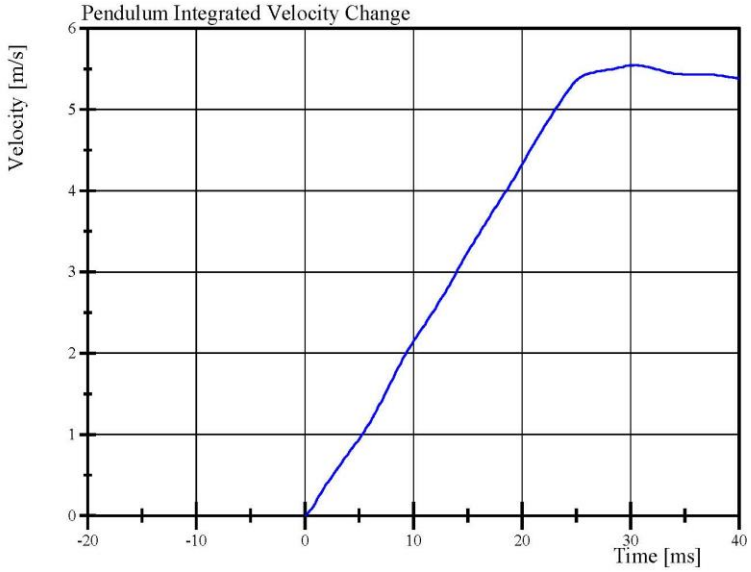
Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 6-3
Test Date: 1/19/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 34.3 g at 7.3 ms
Min: -6.4 g at 32.2 ms

Pendulum Integrated Velocity Change



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
WorldSID 50th_Qalification Manual 11_09_2020

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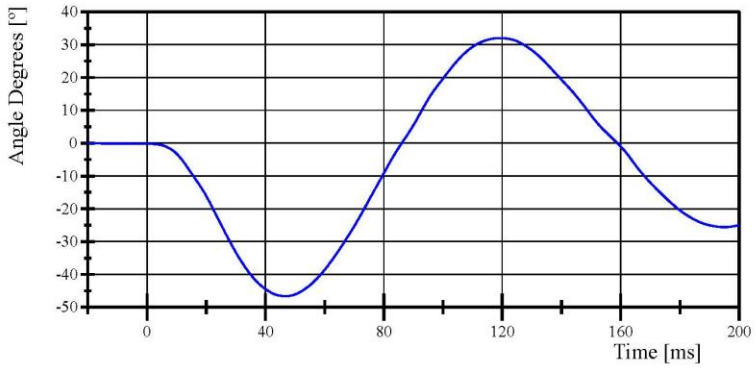
Transportation Research Center Inc.

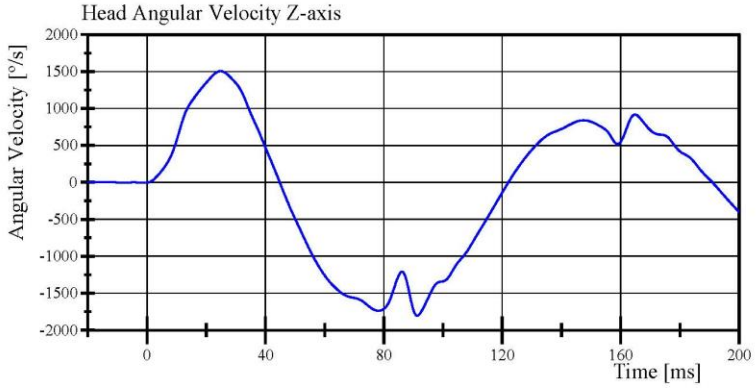
Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 6-3
Test Date: 1/19/2021

Torsion Fixture Rotation



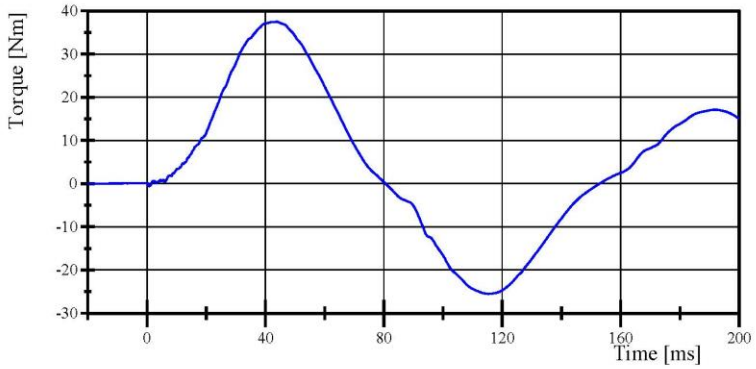
Filter Class: CFC_60
Max: 32.0 ° at 119.2 ms
Min: -46.6 ° at 46.8 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,504.4 °/s at 24.9 ms
Min: -1,804.8 °/s at 91.3 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 37.5 Nm at 43.9 ms
Min: -25.5 Nm at 115.3 ms

Transportation Research Center Inc.

Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 6-2
Test Date: 1/20/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.241 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.403 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.574 m/s	Yes
Peak Fixture Rotation	41.5 - 51 °	46.23 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.0 ms	Yes
Peak Head Angular Velocity Z-axis	1,345 - 1,655 °/s	1,559.9 °/s	Yes
Peak Lower Neck Moment Z-axis	(-34) - (-42) N·m	-38.3 N·m	Yes

Test meets specifications.

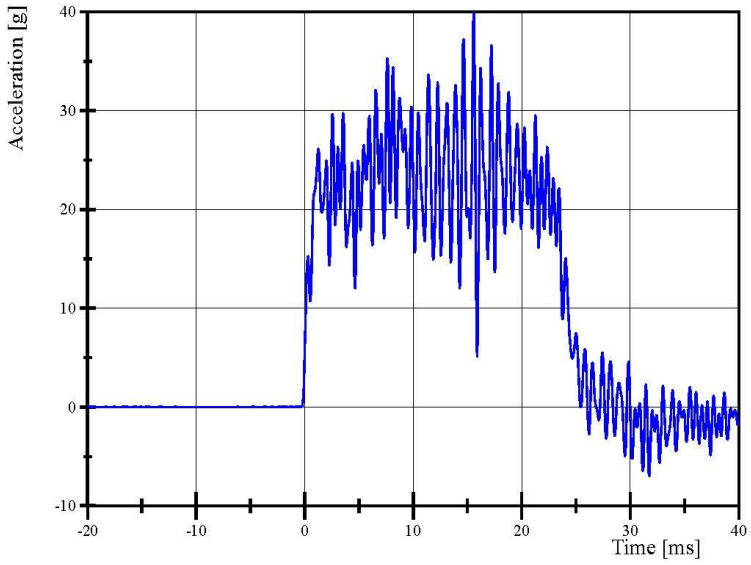
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

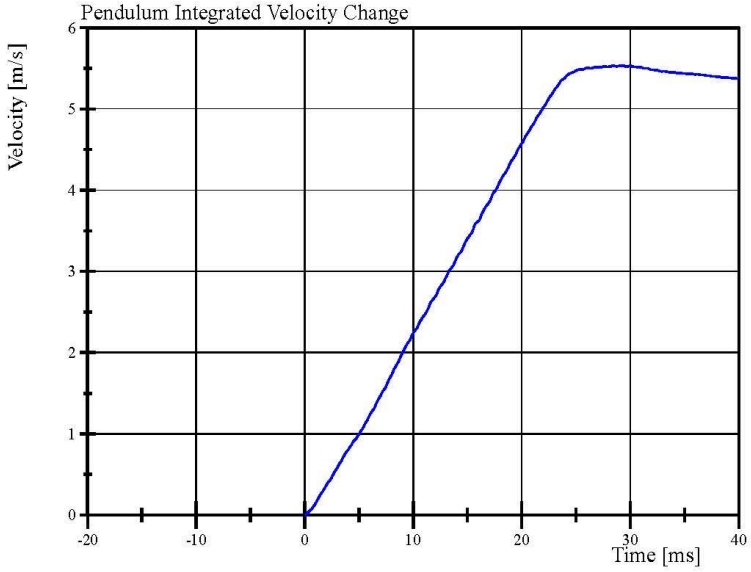
Right Lateral
WorldSID 50th Serial No. EB8888 Certification No. 6-2
Test Date: 1/20/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 39.9 g at 15.6 ms
Min: -7.0 g at 31.8 ms

Pendulum Integrated Velocity Change

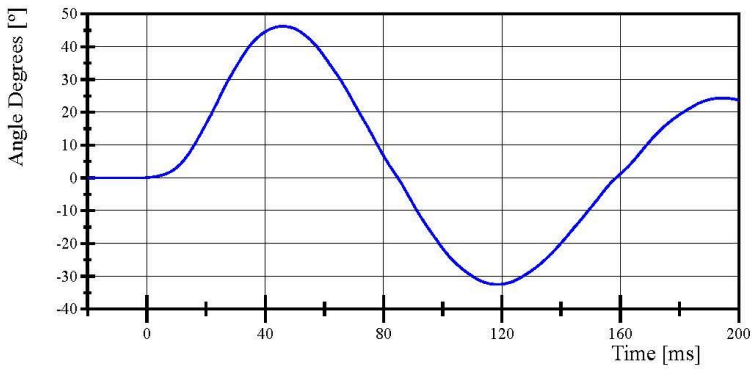


Filter Class: CFC_1000
Max: 5.5 m/s at 29.3 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

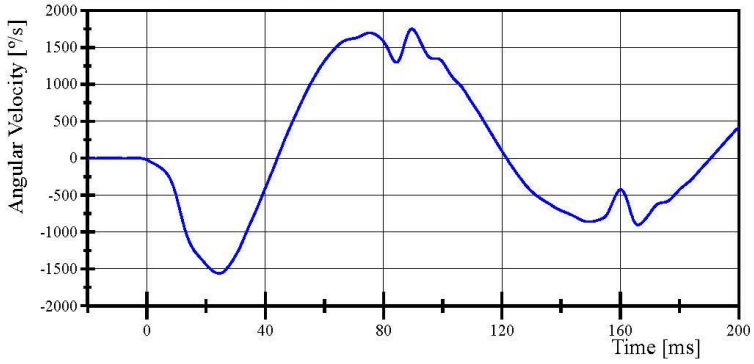
Right Lateral
WorldSID 50th Serial No. EB8888 Certification No. 6-2
Test Date: 1/20/2021

Torsion Fixture Rotation



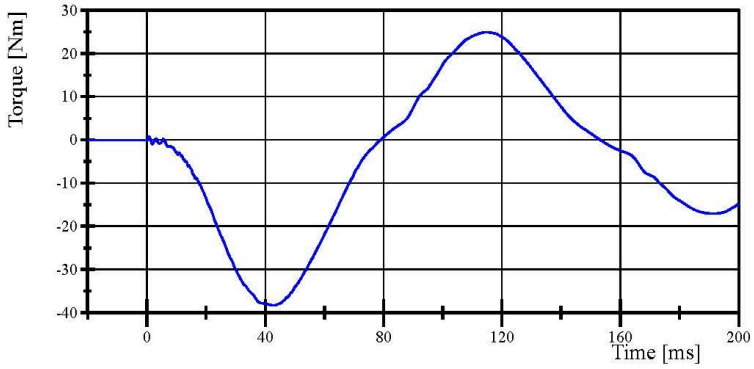
Filter Class: CFC_60
Max: 46.2 ° at 45.9 ms
Min: -32.5 ° at 118.4 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,749.6 °/s at 89.5 ms
Min: -1,559.9 °/s at 24.5 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 24.9 Nm at 114.8 ms
Min: -38.3 Nm at 42.5 ms

Transportation Research Center Inc.

Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Force	2,600 - 3,300 N	2,978.2 N	Yes
Shoulder Force	(-1,470) - (-1,800) N	-1,628.5 N	Yes
S1 RibEye Max	37 - 46 mm	39.9 mm	Yes

Test meets specifications.

Condition: Used

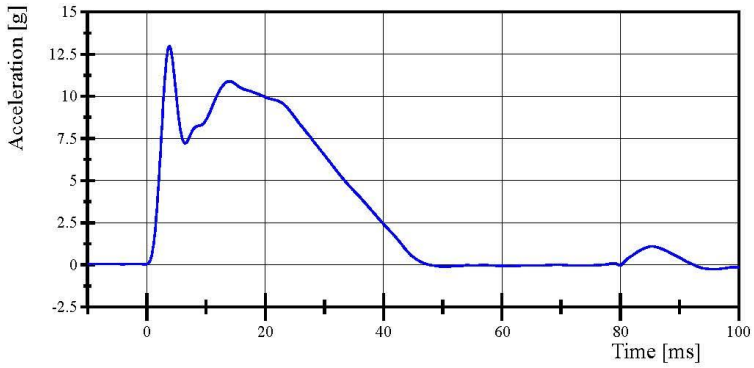
Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916

Tilt:
Head X -0.5
Y -0.6
Spine X 1.00
Y 1.00
Pelvis X 0.6
Y 5.1

Transportation Research Center Inc.

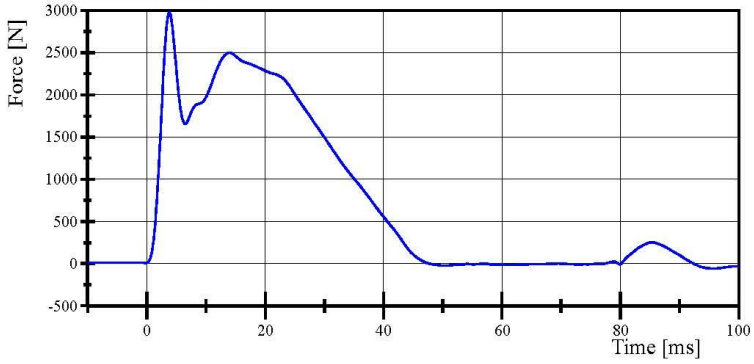
Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/19/2021

Impactor Acceleration



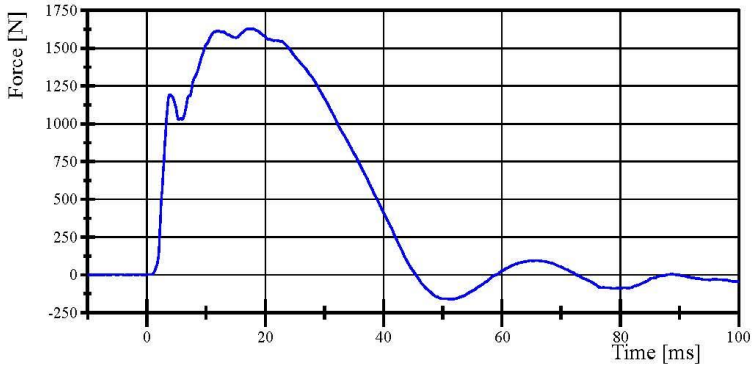
Filter Class: CFC_180
Max: 13.0 g at 3.8 ms
Min: -0.3 g at 95.8 ms

Impactor Force



Filter Class: CFC_180
Max: 2,978.2 N at 3.8 ms
Min: -59.1 N at 95.8 ms

Shoulder Force



Filter Class: CFC_600
Max: 1,628.5 N at 17.6 ms
Min: -162.3 N at 51.3 ms

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

Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.69 m/s	Yes
Impactor Force	5,300 - 6,200 N	5,856.7 N	Yes
Upper Thorax Rib Displacement	35 - 47 mm	41.0 mm	Yes
Center Thorax Rib Displacement	46 - 56 mm	46.8 mm	Yes
Lower Thorax Rib Displacement	33.5 - 40.5 mm	35.57 mm	Yes
Upper Spine Lateral Acceleration	28 - 37 g	35.9 g	Yes
Lower Spine Lateral Acceleration	22 - 28 g	27.0 g	Yes

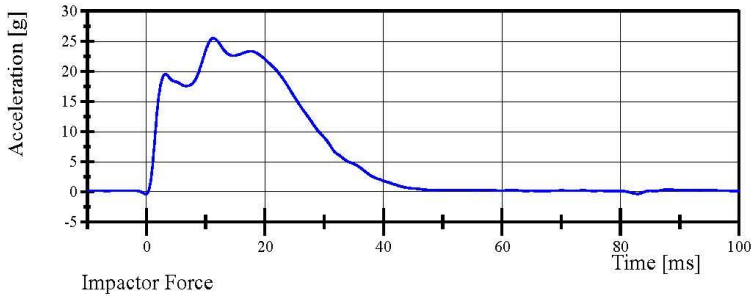
Test meets specifications.

Condition: Used
Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 125
Tilt:
Head X -0.6
Y -0.5
Spine X -0.1
Y 1.4
Pelvis X -0.5
Y 4.9

Transportation Research Center Inc.

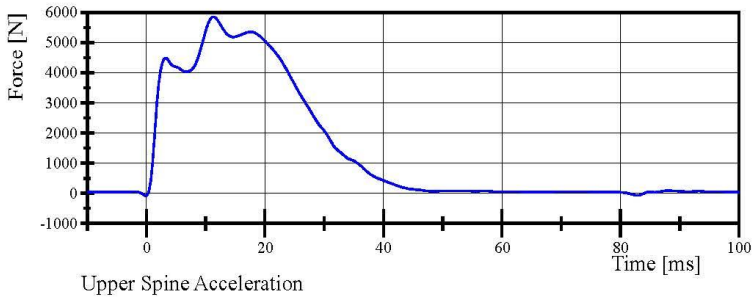
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Impactor Acceleration



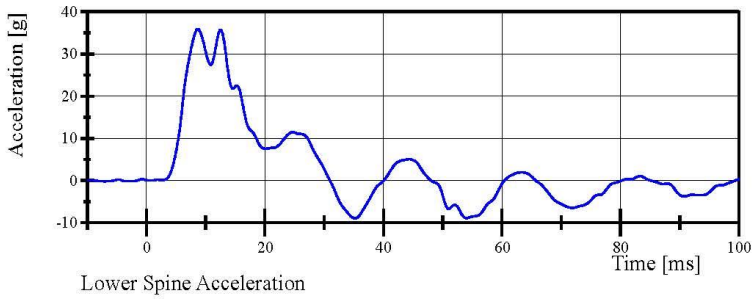
Filter Class: CFC_180
Max: 25.5 g at 11.3 ms
Min: -0.4 g at -0.1 ms

Impactor Force



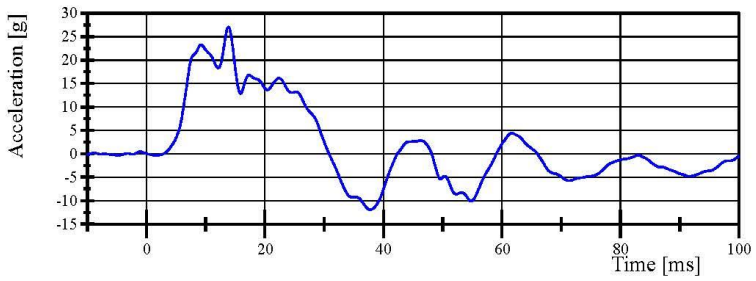
Filter Class: CFC_180
Max: 5,856.7 N at 11.3 ms
Min: -80.7 N at -0.1 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 35.9 g at 8.7 ms
Min: -9.0 g at 35.2 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 27.0 g at 13.9 ms
Min: -11.9 g at 37.8 ms

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

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Impactor Force	3,200 - 3,800 N	3,506.3 N	Yes
Upper Thorax Rib Displacement	33 - 43 mm	36.8 mm	Yes
Center Thorax Rib Displacement	35 - 43 mm	41.3 mm	Yes
Lower Thorax Rib Displacement	32 - 40 mm	36.1 mm	Yes
Upper Spine Lateral Acceleration	14 - 20 g	17.1 g	Yes
Lower Spine Lateral Acceleration	14 - 22 g	16.8 g	Yes

Test meets specifications.

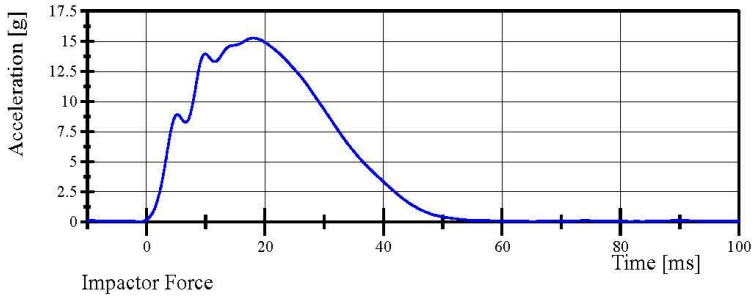
Condition: Used
Comments:
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 125
Tilt:

Head	**X**	**-0.2**
	Y	**0.0**
Spine	**X**	**0.1**
	Y	**1.8**
Pelvis	**X**	**0.7**
	Y	**4.6**

Transportation Research Center Inc.

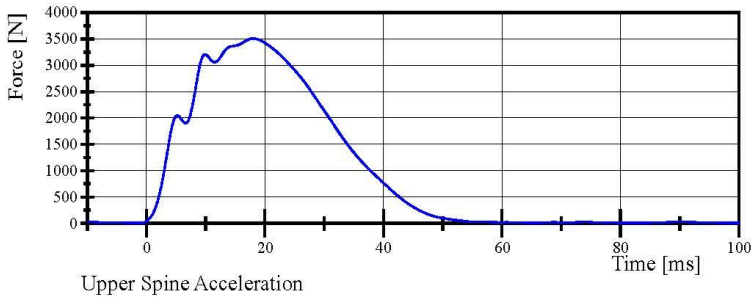
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Impactor Acceleration



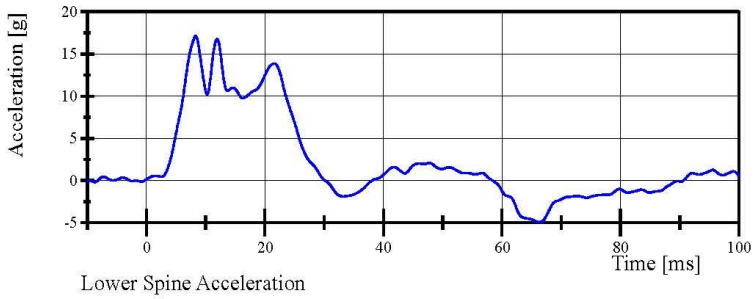
Filter Class: CFC_180
Max: 15.3 g at 18.0 ms
Min: 0.0 g at -1.0 ms

Impactor Force



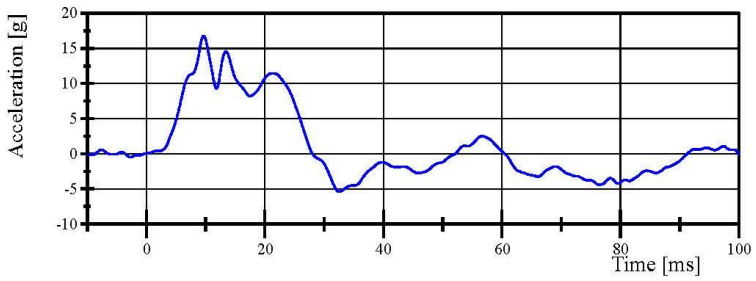
Filter Class: CFC_180
Max: 3,506.3 N at 18.0 ms
Min: 6.4 N at -1.0 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 17.1 g at 8.3 ms
Min: -4.9 g at 66.3 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 16.8 g at 9.7 ms
Min: -5.4 g at 32.5 ms

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

Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

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	4.33 m/s	Yes
Impactor Force	2,700 - 3,100 N	2,853.6 N	Yes
Upper Abdominal Rib Displacement	32.5 - 39.5 mm	34.43 mm	Yes
Lower Abdominal Rib Displacement	32 - 38 mm	35.1 mm	Yes
Lower Spine Lateral Acceleration	14.5 - 19.5 g	17.25 g	Yes

Test meets specifications.

Condition: Used

Comments:
Abdomen Rib #1 S/N: DY5252
Abdomen Rib #2 S/N: DY5253

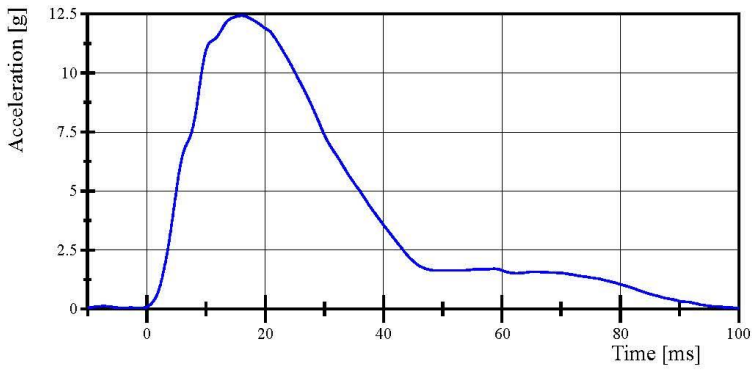
Tilt:

Head	**X**	**0.8**
	Y	**-0.8**
Spine	**X**	**1.5**
	Y	**1.1**
Pelvis	**X**	**0.0**
	Y	**4.5**

Transportation Research Center Inc.

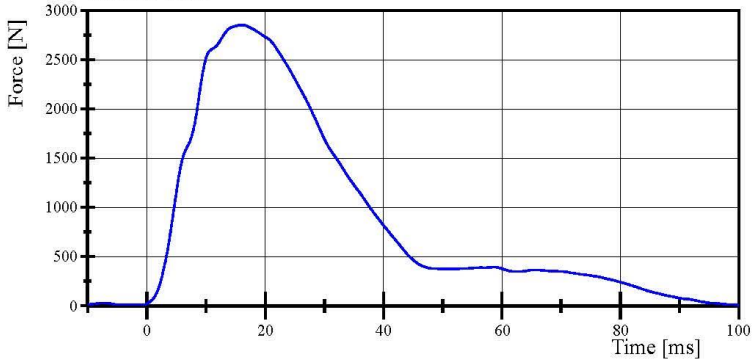
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Impactor Acceleration



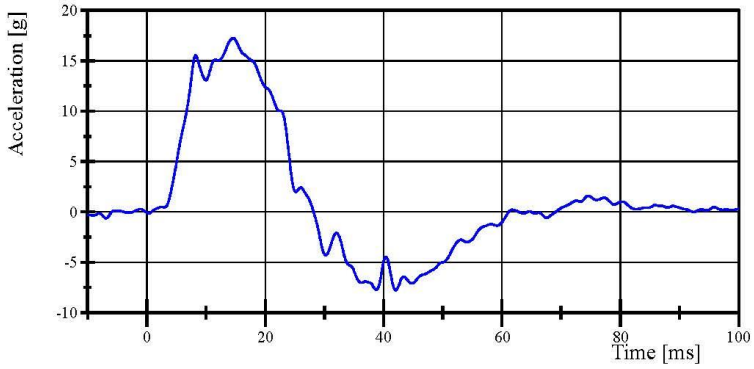
Filter Class: CFC_180
Max: 12.4 g at 16.0 ms
Min: 0.0 g at 100.0 ms

Impactor Force



Filter Class: CFC_180
Max: 2,853.6 N at 16.0 ms
Min: 6.0 N at 100.0 ms

Lower Spine Acceleration (Y)



Filter Class: CFC_180
Max: 17.3 g at 14.6 ms
Min: -7.8 g at 42.1 ms

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

Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.74 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,419.5 N	Yes
Pelvis Lateral Acceleration	38.5 - 48.5 g	39.38 g	Yes
Lower Spine Lateral Acceleration	10 - 14 g	11.2 g	Yes
Pubic Lateral Force	(-1,300) - (-1,590) N	-1,384.5 N	Yes
Sacroiliac Lateral Force	(-1,860) - (-2,280) N	-2,018.9 N	Yes

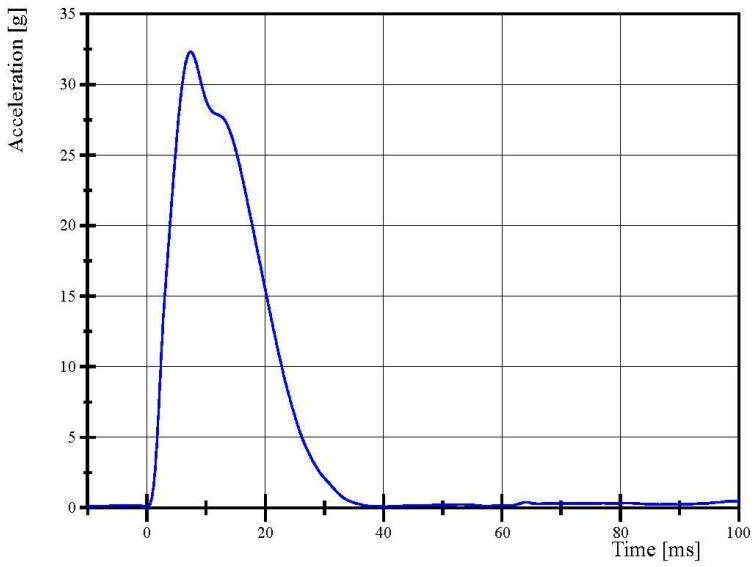
Test meets specifications.

Condition: Used
Comments:
Pelvis S/N: EC3628
Tilt:
Head X 0.3
Y -0.4
Spine X 1.9
Y 1.2
Pelvis X 0.3
Y 5.0

Transportation Research Center Inc.

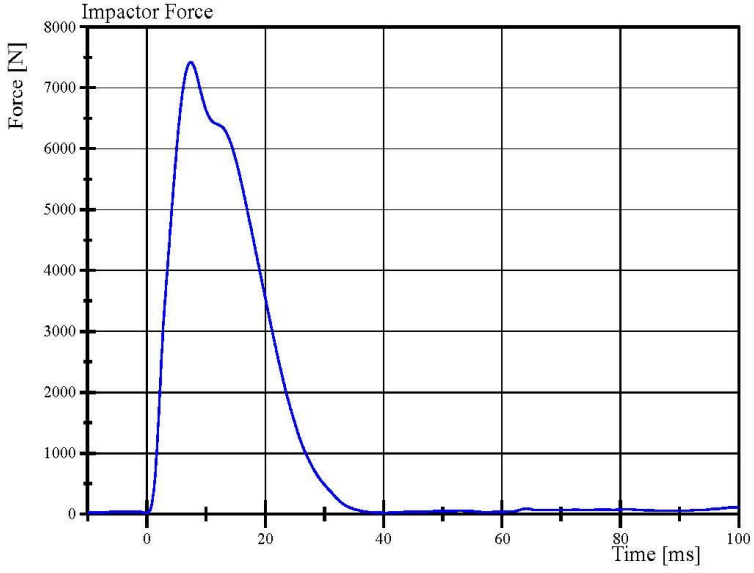
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Impactor Acceleration



Filter Class: CFC_180
Max: 32.3 g at 7.4 ms
Min: 0.1 g at -0.1 ms

Impactor Force



Filter Class: CFC_180
Max: 7,419.5 N at 7.4 ms
Min: 17.4 N at -0.1 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
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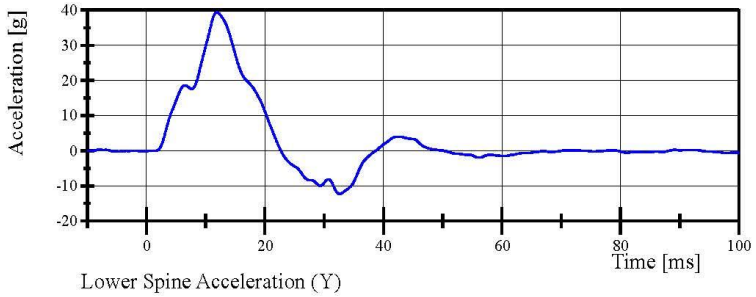
Report Number: EB8888_WSH06

Transportation Research Center Inc.

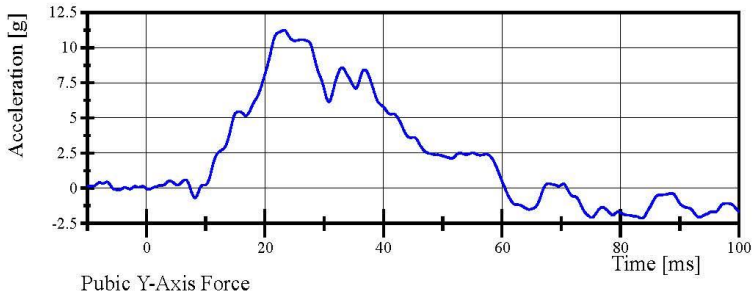
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 6-1
Test Date: 1/20/2021

Pelvis Y-Axis Acceleration



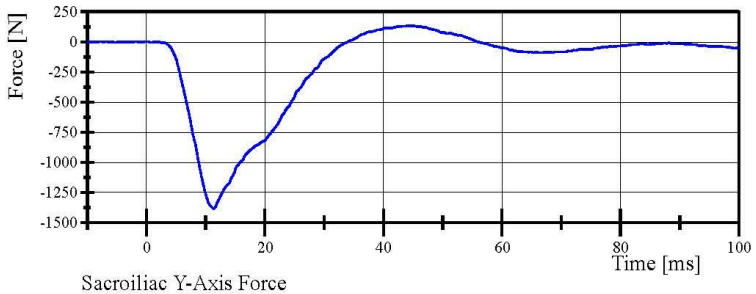
Filter Class: CFC_180
Max: 39.4 g at 11.9 ms
Min: -12.3 g at 32.7 ms

Lower Spine Acceleration (Y)



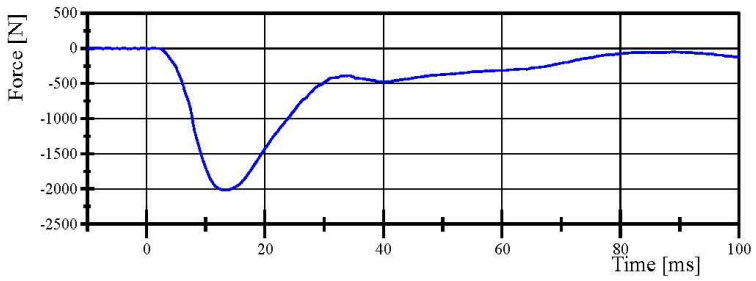
Filter Class: CFC_180
Max: 11.2 g at 23.2 ms
Min: -2.1 g at 83.6 ms

Pubic Y-Axis Force



Filter Class: CFC_600
Max: 133.8 N at 44.9 ms
Min: -1,384.5 N at 11.4 ms

Sacroiliac Y-Axis Force



Filter Class: CFC_600
Max: 5.9 N at -8.0 ms
Min: -2,018.9 N at 13.3 ms

Post-Test Calibration Sheets
Driver S/N EB8888

Transportation Research Center Inc.
WorldSID-50M
External Measurments
Serial No. EB8888 Certification No. 07

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	33.1	33.9

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	177
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. EB8888 Certification No. 7-1
Test Date: 2/24/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	211 - 261 g	238.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-7.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.76 %	Yes

Test meets specifications.

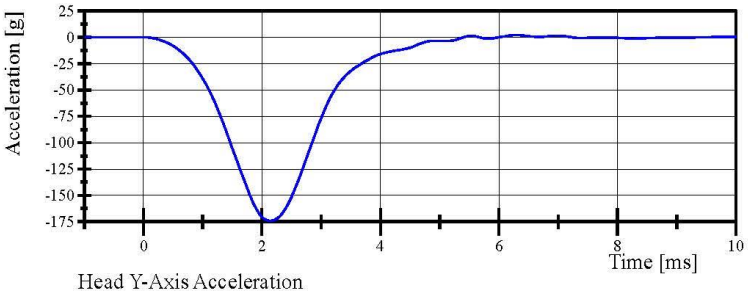
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

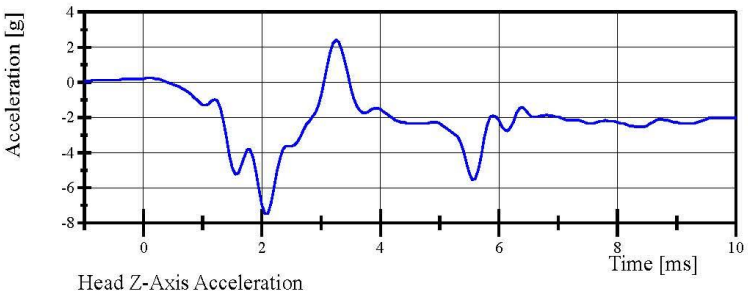
Front Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/24/2021

Head X-Axis Acceleration



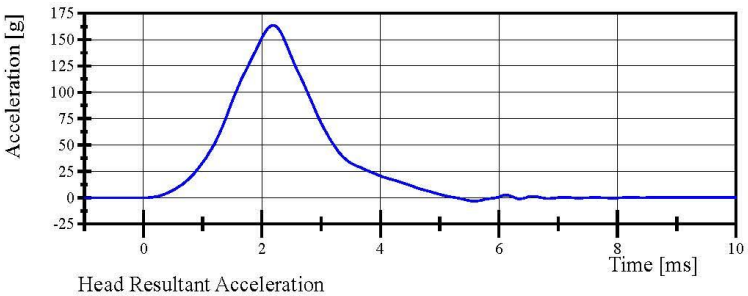
Filter Class: CFC_1000
Max: 2.1 g at 6.3 ms
Min: -174.2 g at 2.2 ms

Head Y-Axis Acceleration



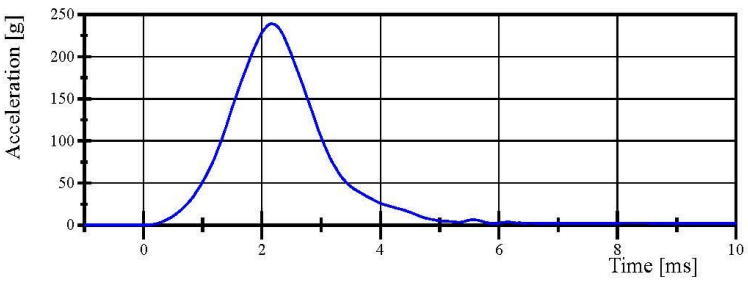
Filter Class: CFC_1000
Max: 2.4 g at 3.3 ms
Min: -7.5 g at 2.1 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 163.7 g at 2.2 ms
Min: -3.3 g at 5.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 238.8 g at 2.2 ms
Min: 0.1 g at -1.0 ms

Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/24/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	117.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-1.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.95 %	Yes

Test meets specifications.

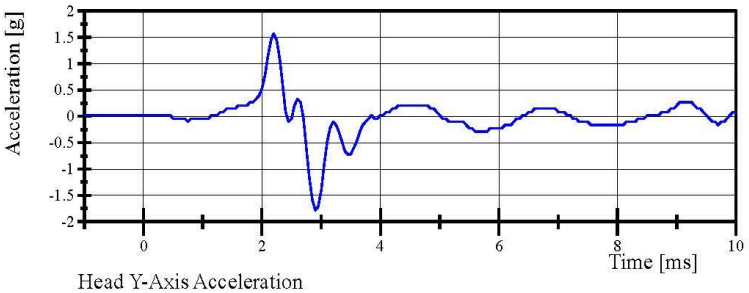
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

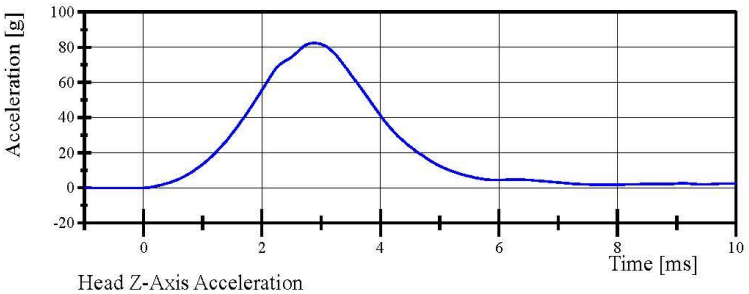
Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/24/2021

Head X-Axis Acceleration



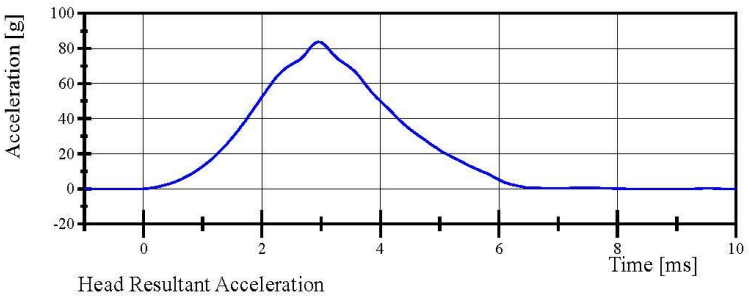
Filter Class: CFC_1000
Max: 1.6 g at 2.2 ms
Min: -1.8 g at 2.9 ms

Head Y-Axis Acceleration



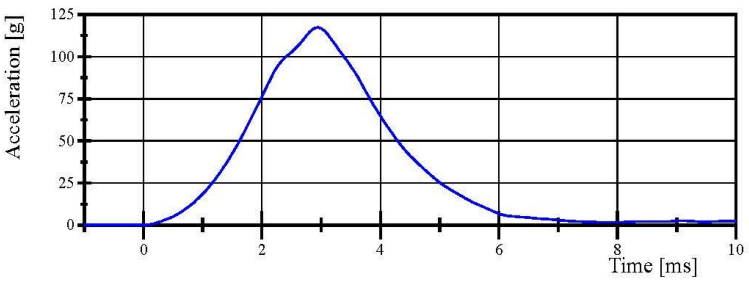
Filter Class: CFC_1000
Max: 82.3 g at 2.9 ms
Min: -0.1 g at -0.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 83.7 g at 3.0 ms
Min: -0.0 g at -0.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 117.3 g at 3.0 ms
Min: 0.1 g at -1.0 ms

Transportation Research Center Inc.

Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/24/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	115.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.94 %	Yes

Test meets specifications.

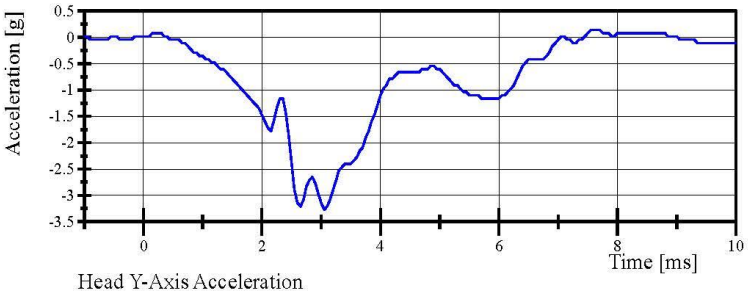
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

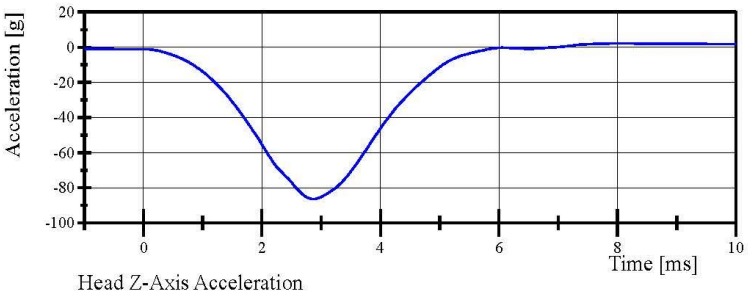
Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/24/2021

Head X-Axis Acceleration



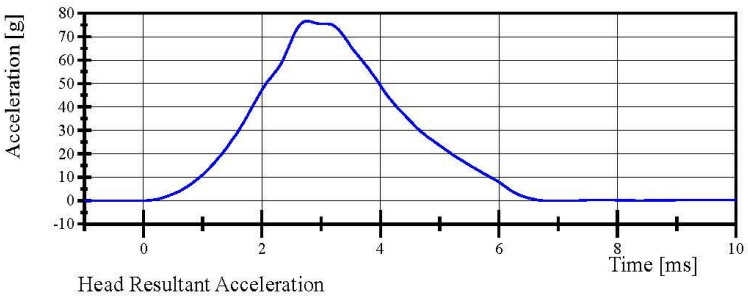
Filter Class: CFC_1000
Max: 0.1 g at 7.6 ms
Min: -3.3 g at 3.1 ms

Head Y-Axis Acceleration



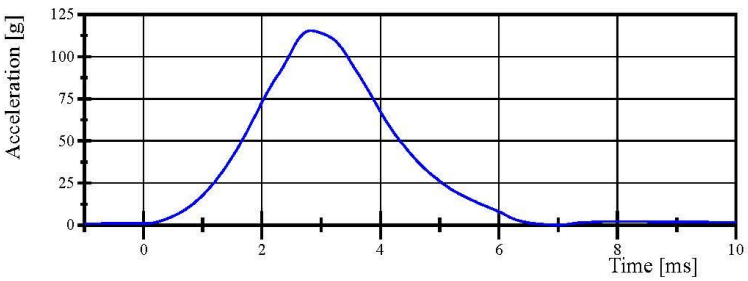
Filter Class: CFC_1000
Max: 2.2 g at 8.0 ms
Min: -86.5 g at 2.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 76.7 g at 2.8 ms
Min: -0.2 g at 6.9 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 115.3 g at 2.9 ms
Min: 0.2 g at 7.0 ms

Transportation Research Center Inc.

Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	(-3.30) - (-3.50) m/s	-3.333 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	0.87 - 1.09 m/s	0.986 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	2.844 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-53.5 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	59.5 ms	Yes
Total Neck Occipital Condyles Moment	54 - 67 N·m	61.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	75.4 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-34.9 °	Yes
Time of Peak	56 - 68 ms	61.1 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-29) - (-36) °	-31.1 °	Yes
Time of Peak	56 - 68 ms	56.7 ms	Yes
Maximum Headform Angular Rate	(-2,047) - (-2,503) °/s	-2,292.5 °/s	Yes

Test meets specifications.

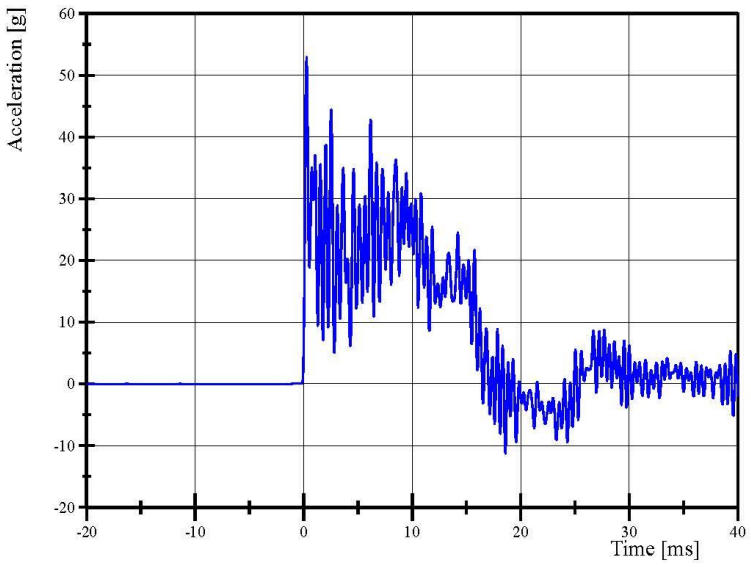
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

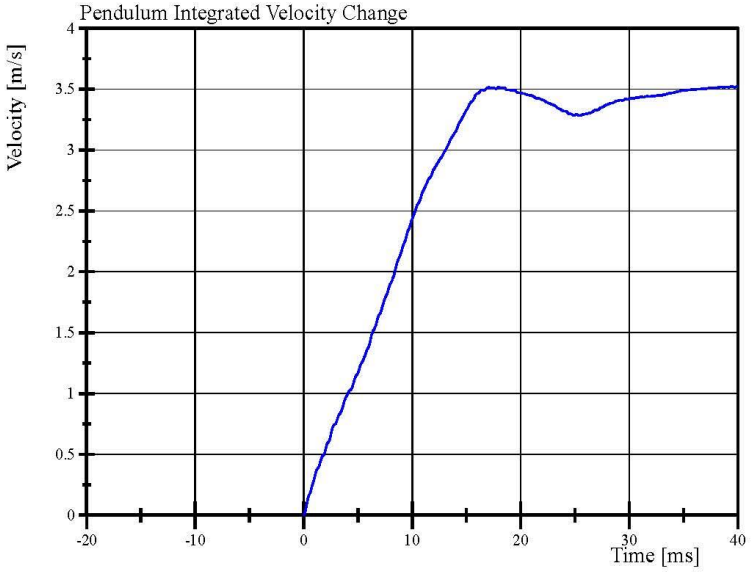
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 53.0 g at 0.3 ms
Min: -11.3 g at 18.6 ms

Pendulum Integrated Velocity Change

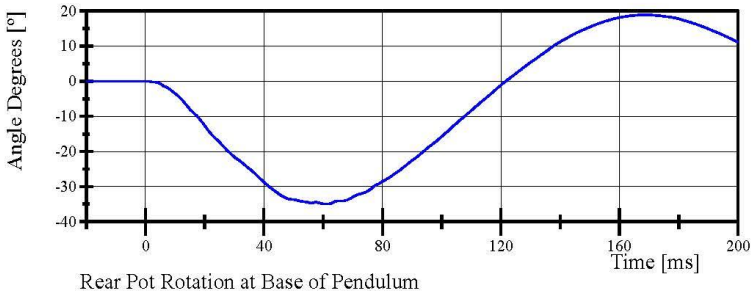


Filter Class: CFC_1000
Max: 3.5 m/s at 39.5 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

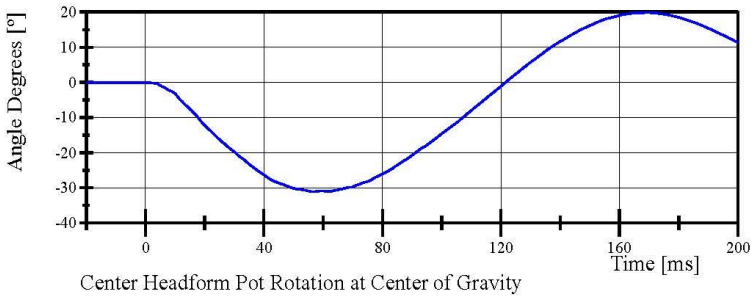
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Forward Pot Rotation at Base of Pendulum



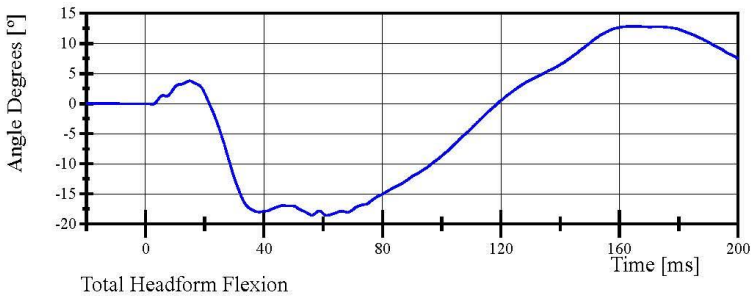
Filter Class: CFC_180
Max: 18.8 ° at 169.2 ms
Min: -34.9 ° at 61.1 ms

Rear Pot Rotation at Base of Pendulum



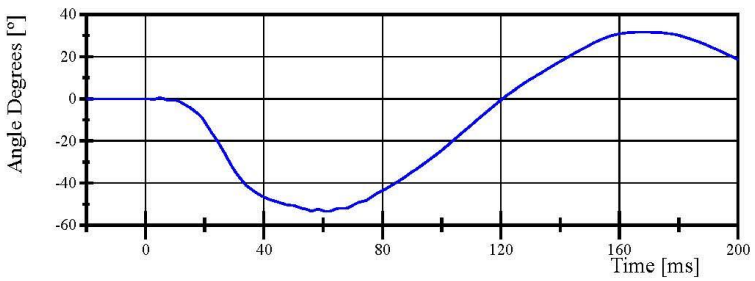
Filter Class: CFC_180
Max: 19.9 ° at 169.5 ms
Min: -31.1 ° at 56.7 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 12.8 ° at 164.7 ms
Min: -18.6 ° at 61.1 ms

Total Headform Flexion

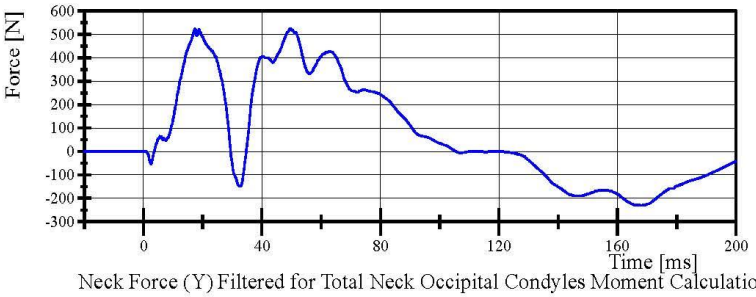


Filter Class: CFC_180
Max: 31.6 ° at 167.0 ms
Min: -53.5 ° at 61.1 ms

Transportation Research Center Inc.

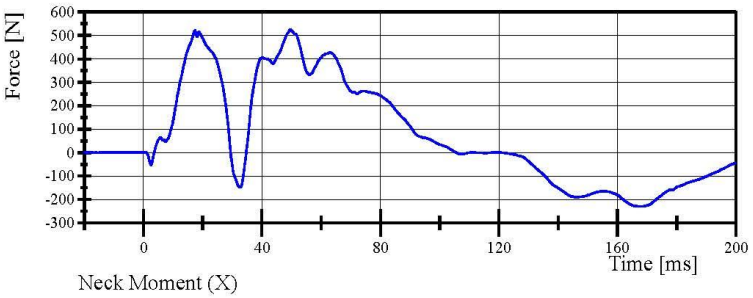
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Neck Force (Y)



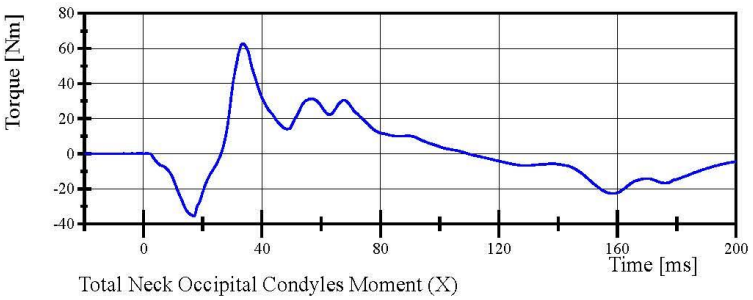
Filter Class: CFC_1000
Max: 525.5 N at 49.6 ms
Min: -230.5 N at 167.7 ms

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



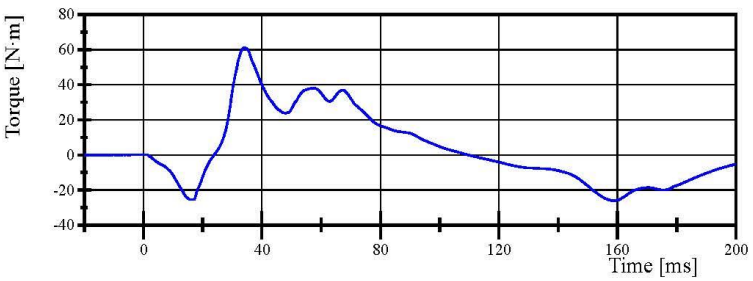
Filter Class: CFC_600
Max: 525.1 N at 49.6 ms
Min: -230.4 N at 168.1 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 62.8 Nm at 33.5 ms
Min: -35.4 Nm at 17.0 ms

Total Neck Occipital Condyles Moment (X)

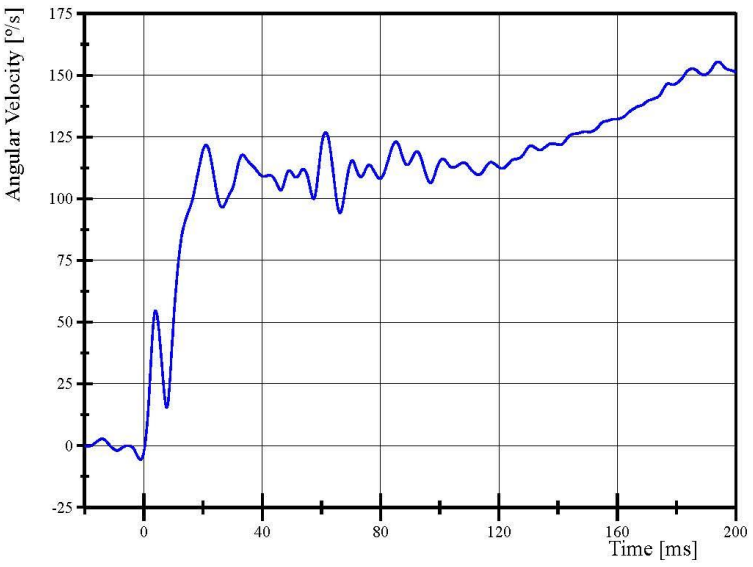


Filter Class: Without_(Constar
Max: 61.0 N·m at 34.2 ms
Min: -26.0 N·m at 158.6 ms

Transportation Research Center Inc.

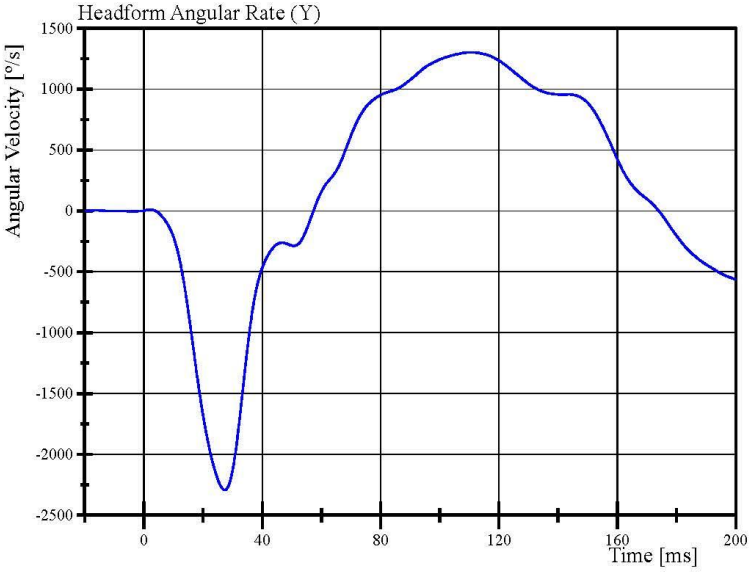
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 155.6 °/s at 194.0 ms
Min: -5.6 °/s at -1.2 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 1,302.2 °/s at 110.6 ms
Min: -2,292.5 °/s at 27.3 ms

Transportation Research Center Inc.

Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	3.30 - 3.50 m/s	3.332 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	(-0.87) - (-1.09) m/s	-0.951 m/s	Yes
Change at 8 ms	(-1.72) - (-2.1) m/s	-1.869 m/s	Yes
Change at 12 ms	(-2.63) - (-3.17) m/s	-2.864 m/s	Yes
Maximum Headform Flexion	50 - 61 deg	53.0 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	59.3 ms	Yes
Total Neck Occipital Condyles Moment	(-54) - (-67) N·m	-62.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	75.5 ms	Yes
Maximum Forward Pot Rotation			
Peak	32 - 39 °	34.4 °	Yes
Time of Peak	56 - 68 ms	61.5 ms	Yes
Maximum Rear Pot Rotation			
Peak	29 - 36 °	30.7 °	Yes
Time of Peak	56 - 68 ms	62.0 ms	Yes
Maximum Headform Angular Rate	2,047 - 2,503 °/s	2,286.4 °/s	Yes

Test meets specifications.

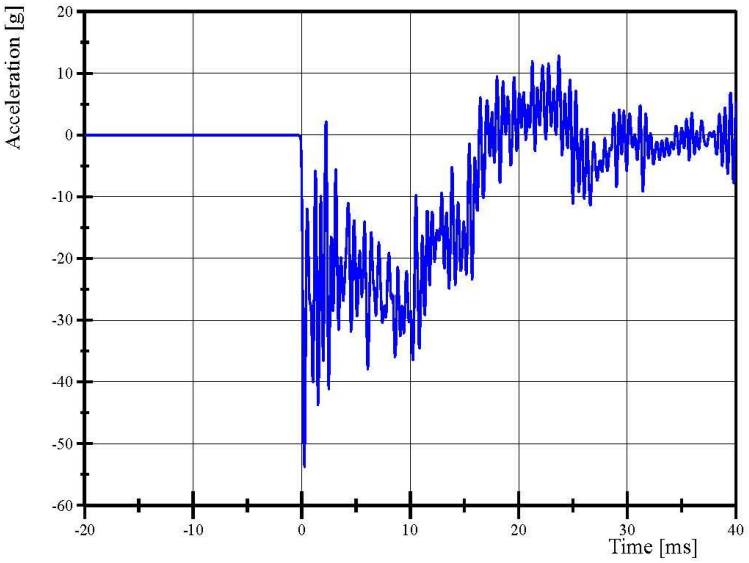
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

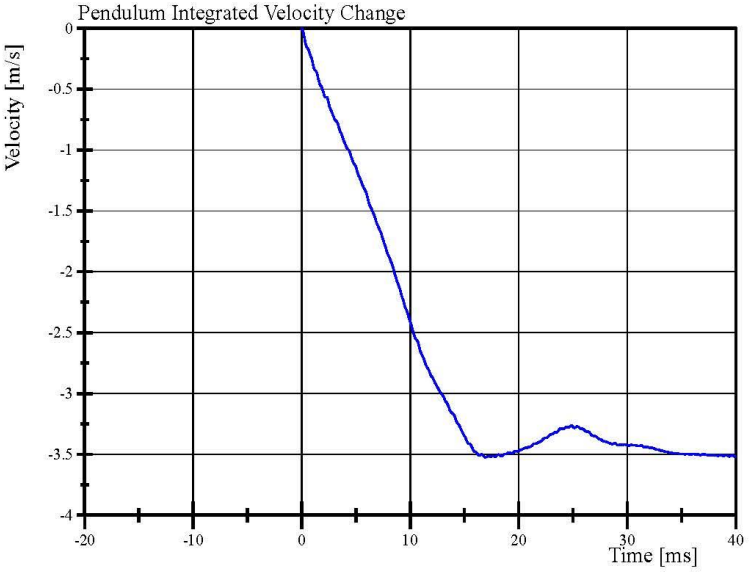
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 12.9 g at 23.7 ms
Min: -53.8 g at 0.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_1000
Max: 0.0 m/s at -0.0 ms
Min: -3.5 m/s at 17.0 ms

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

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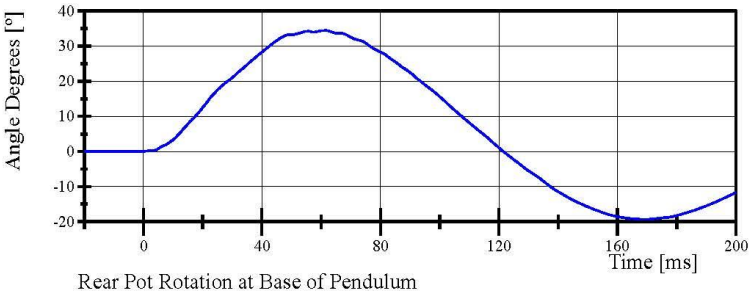
Transportation Research Center Inc.

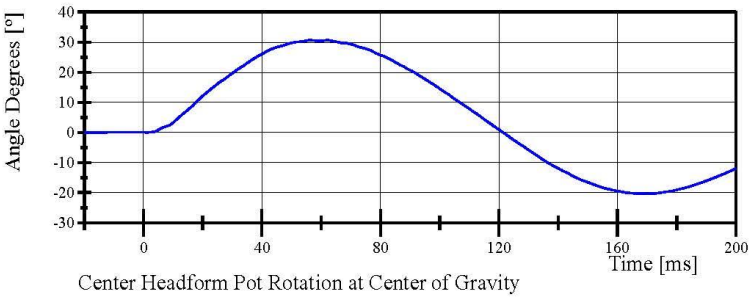
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Forward Pot Rotation at Base of Pendulum



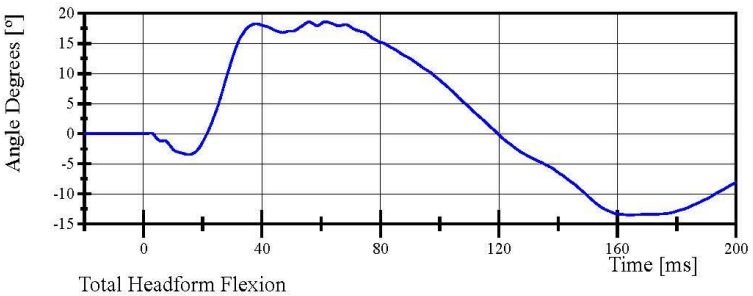
Filter Class: CFC_180
Max: 34.4 ° at 61.5 ms
Min: -19.3 ° at 169.4 ms

Rear Pot Rotation at Base of Pendulum



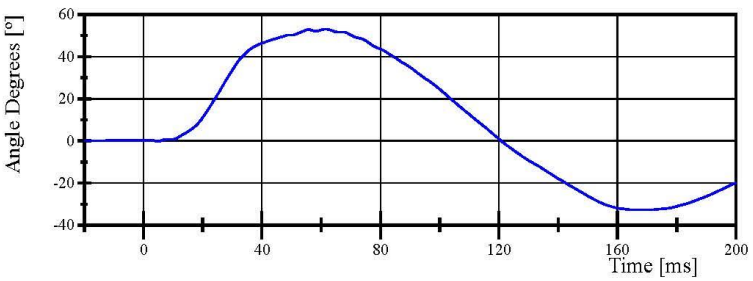
Filter Class: CFC_180
Max: 30.7 ° at 62.0 ms
Min: -20.4 ° at 170.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 18.6 ° at 61.4 ms
Min: -13.5 ° at 164.3 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 53.0 ° at 61.5 ms
Min: -32.7 ° at 169.0 ms

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

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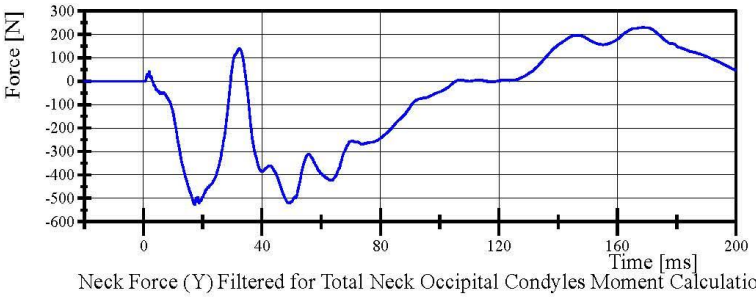
Transportation Research Center Inc.

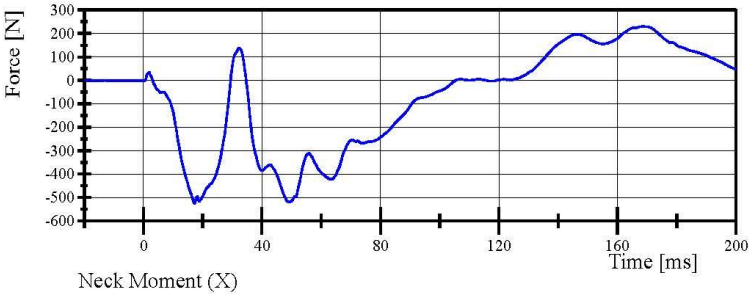
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Neck Force (Y)



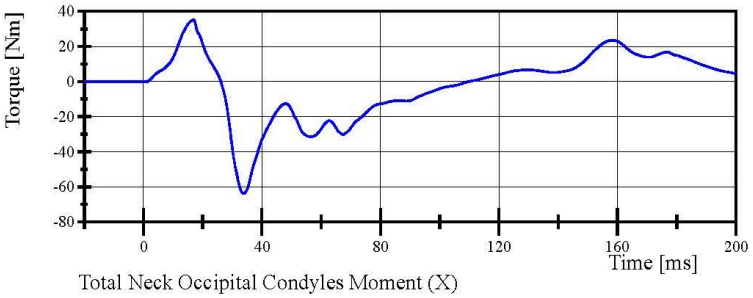
Filter Class: CFC_1000
Max: 229.9 N at 168.4 ms
Min: -527.0 N at 17.3 ms

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



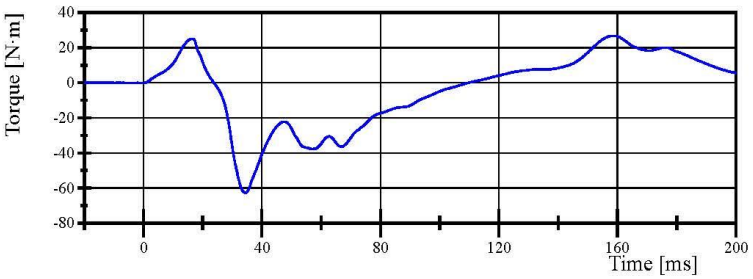
Filter Class: CFC_600
Max: 229.8 N at 168.9 ms
Min: -526.4 N at 17.3 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 35.0 Nm at 16.9 ms
Min: -63.9 Nm at 33.8 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constar
Max: 26.7 N·m at 158.7 ms
Min: -62.7 N·m at 34.3 ms

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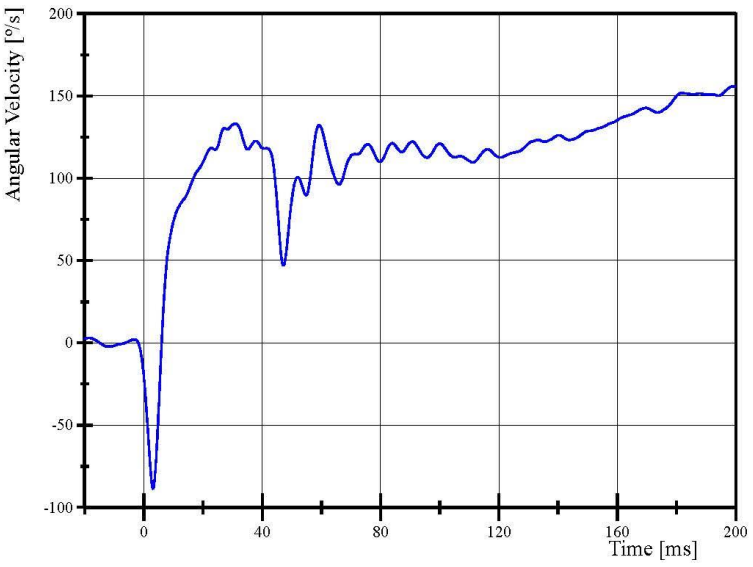
Transportation Research Center Inc.

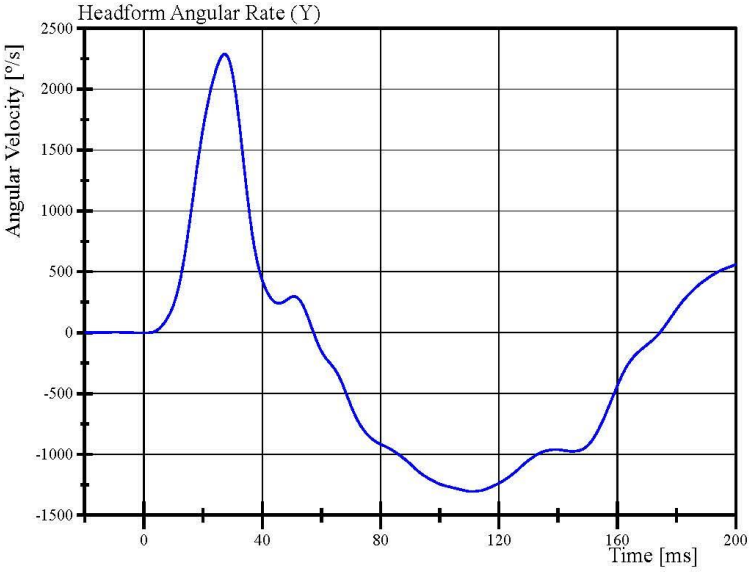
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 155.9 °/s at 199.2 ms
Min: -88.6 °/s at 3.1 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 2,286.4 °/s at 27.3 ms
Min: -1,304.1 °/s at 110.8 ms

Transportation Research Center Inc.

Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ℃	21.3 ℃	Yes
Relative Humidity	10 - 70 %	37 %	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	2.355 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.516 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.670 m/s	Yes
Peak Fixture Rotation	(-41.5) - (-51) °	-47.10 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.5 ms	Yes
Peak Head Angular Velocity Z-axis	(-1,345) - (-1,655) °/s	-1,548.5 °/s	Yes
Peak Lower Neck Moment Z-axis	34 - 42 N·m	38.3 N·m	Yes

Test meets specifications.

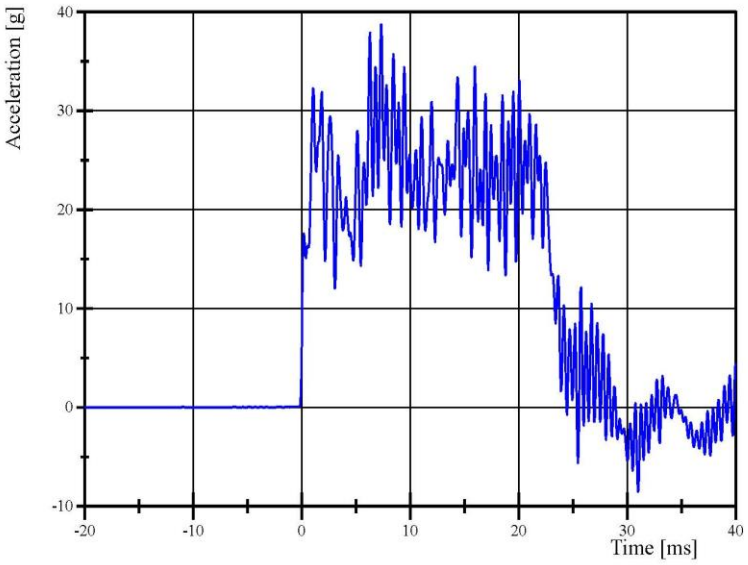
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

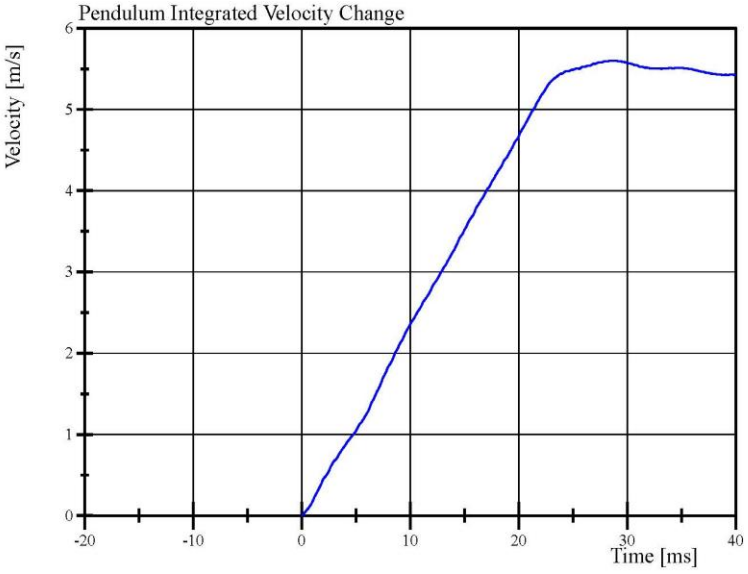
Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 38.7 g at 7.4 ms
Min: -8.5 g at 31.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_1000
Max: 5.6 m/s at 28.5 ms
Min: 0.0 m/s at 0.0 ms

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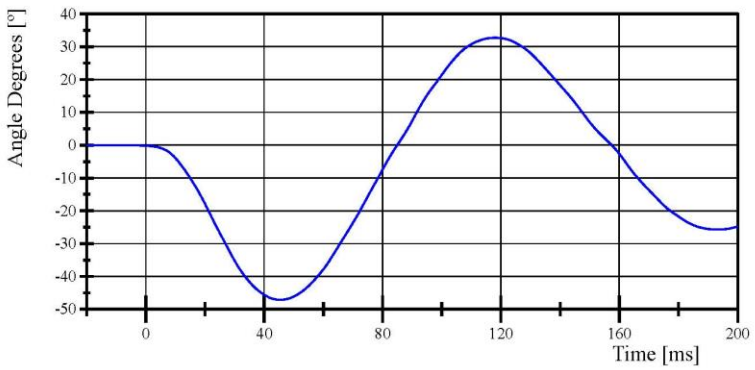
Transportation Research Center Inc.

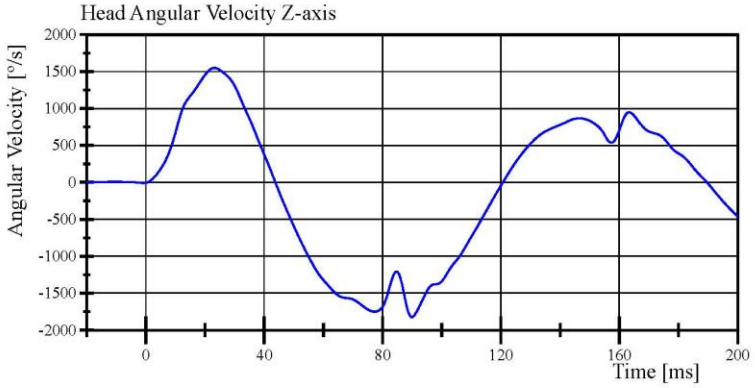
Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Torsion Fixture Rotation



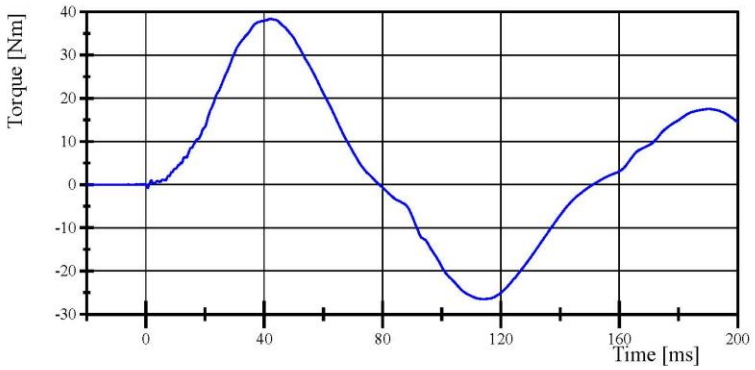
Filter Class: CFC_60
Max: 32.7 ° at 118.0 ms
Min: -47.1 ° at 45.5 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,548.5 °/s at 23.2 ms
Min: -1,822.7 °/s at 89.9 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 38.3 Nm at 42.4 ms
Min: -26.5 Nm at 113.9 ms

Transportation Research Center Inc.

Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ℃	21.4 ℃	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	2.352 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.559 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.712 m/s	Yes
Peak Fixture Rotation	41.5 - 51 °	46.26 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	38.8 ms	Yes
Peak Head Angular Velocity Z-axis	1,345 - 1,655 °/s	1,564.2 °/s	Yes
Peak Lower Neck Moment Z-axis	(-34) - (-42) N·m	-38.9 N·m	Yes

Test meets specifications.

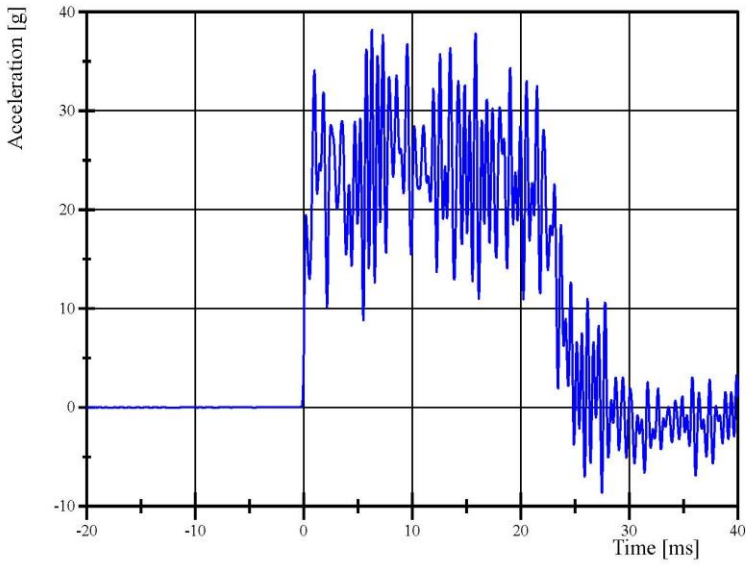
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

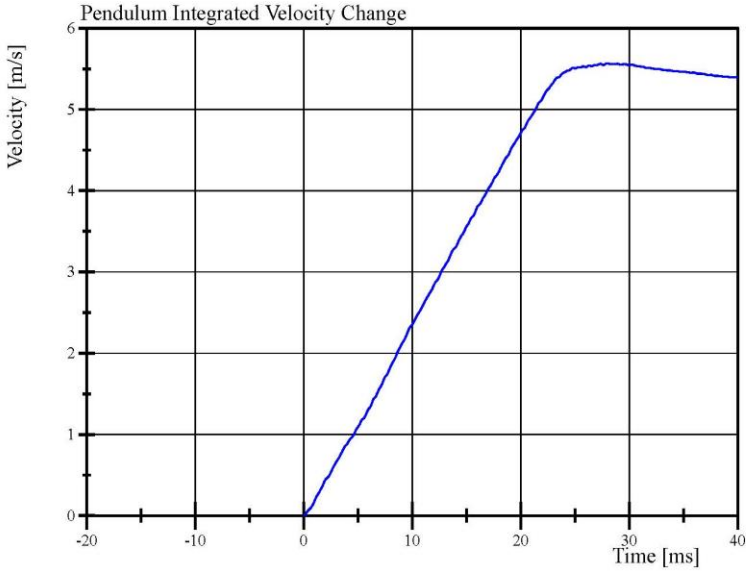
Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 38.2 g at 6.3 ms
Min: -8.6 g at 27.5 ms

Pendulum Integrated Velocity Change

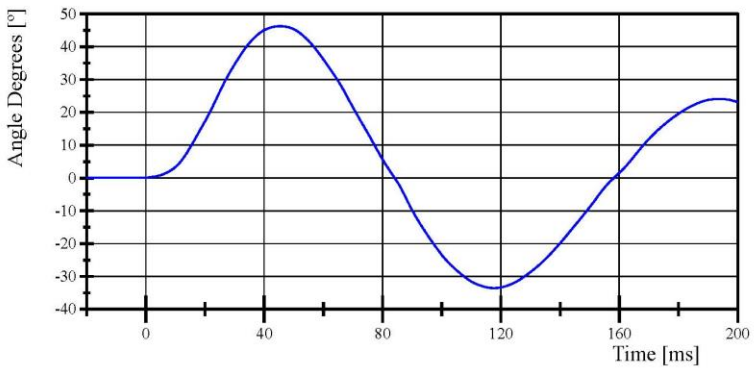


Filter Class: CFC_1000
Max: 5.6 m/s at 28.0 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

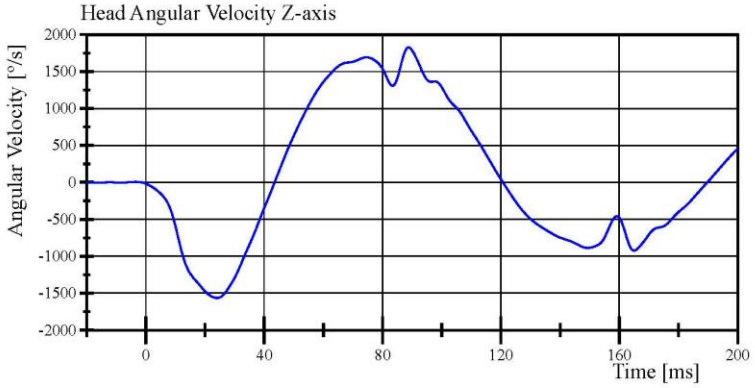
Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/23/2021

Torsion Fixture Rotation



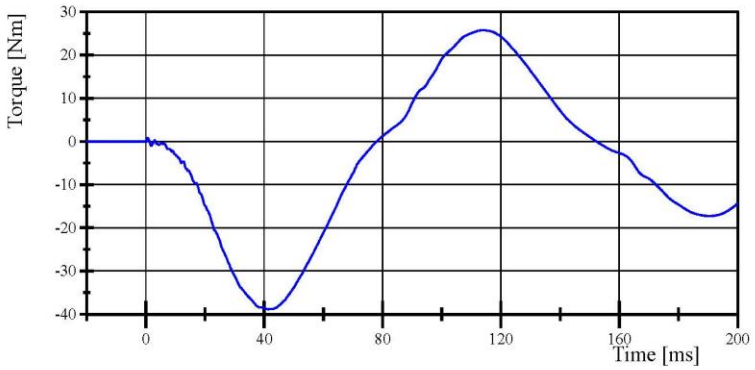
Filter Class: CFC_60
Max: 46.3 ° at 45.3 ms
Min: -33.6 ° at 117.7 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,826.8 °/s at 88.8 ms
Min: -1,564.2 °/s at 24.1 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 25.8 Nm at 114.1 ms
Min: -38.9 Nm at 41.4 ms

Transportation Research Center Inc.

Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Force	2,600 - 3,300 N	3,029.0 N	Yes
Shoulder Force	(-1,470) - (-1,800) N	-1,657.3 N	Yes
Shoulder Rib Length Change	37 - 46 mm	38.7 mm	Yes

Test meets specifications.

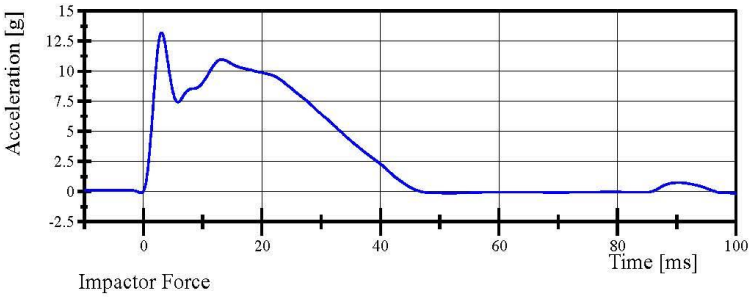
Condition: Used

Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
RibEye S/N: 124

Transportation Research Center Inc.

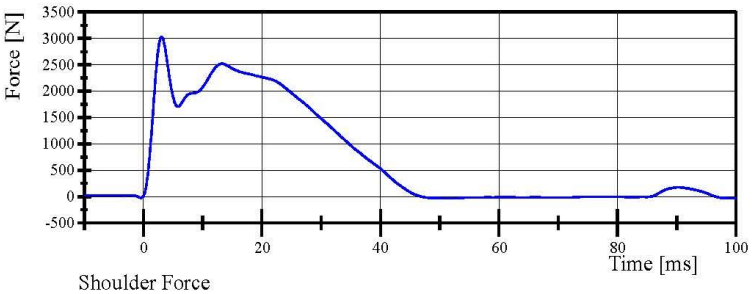
Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Impactor Acceleration



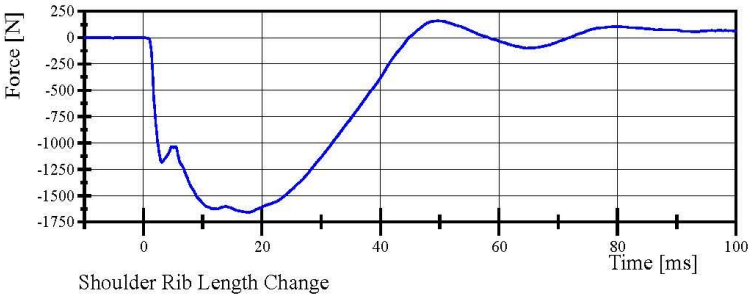
Filter Class: CFC_180
Max: 13.2 g at 3.1 ms
Min: -0.2 g at 100.0 ms

Impactor Force



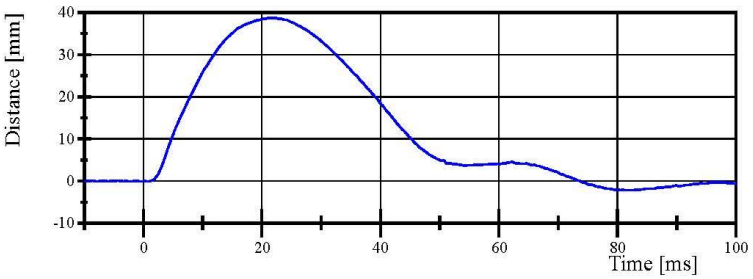
Filter Class: CFC_180
Max: 3,029.0 N at 3.1 ms
Min: -36.2 N at 100.0 ms

Shoulder Force



Filter Class: CFC_600
Max: 158.8 N at 49.8 ms
Min: -1,657.3 N at 17.6 ms

Shoulder Rib Length Change



Filter Class: CFC_600
Max: 38.7 mm at 22.1 ms
Min: -2.2 mm at 81.6 ms

Transportation Research Center Inc.

Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.68 m/s	Yes
Impactor Force	5,300 - 6,200 N	6,073.4 N	Yes
Peak Thorax Rib 1 Length Change	35 - 47 mm	38.0 mm	Yes
Peak Thorax Rib 2 Length Change	46 - 56 mm	47.0 mm	Yes
Peak Thorax Rib 3 Length Change	33.5 - 40.5 mm	35.18 mm	Yes
Peak T4 Acceleration, y-axis	28 - 37 g	36.1 g	Yes
Peak T12 Acceleration, y-axis	22 - 28 g	26.4 g	Yes

Test meets specifications.

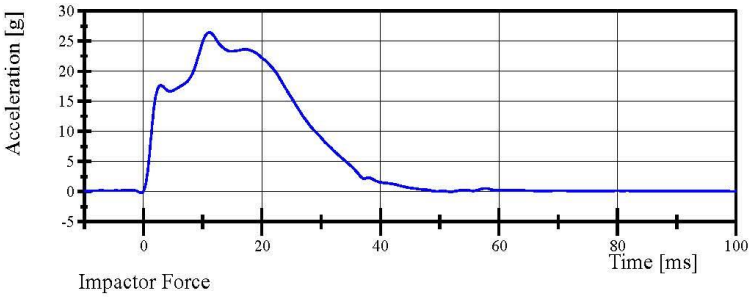
Condition: Used

Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 124

Transportation Research Center Inc.

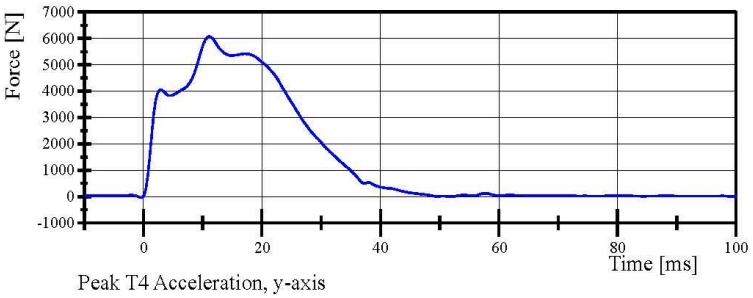
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Impactor Acceleration



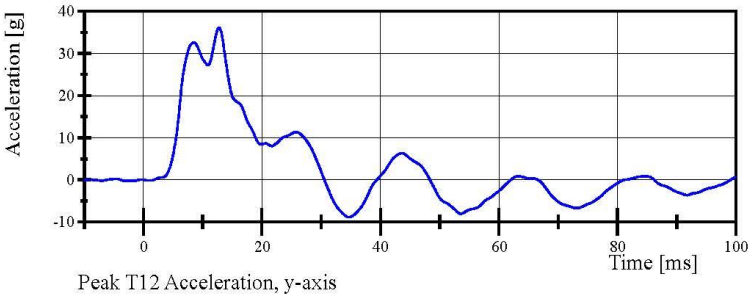
Filter Class: CFC_180
Max: 26.5 g at 11.2 ms
Min: -0.2 g at -0.4 ms

Impactor Force



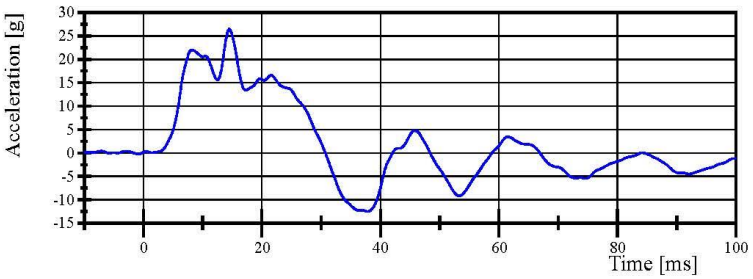
Filter Class: CFC_180
Max: 6,073.4 N at 11.2 ms
Min: -40.8 N at -0.4 ms

Peak T4 Acceleration, y-axis



Filter Class: CFC_180
Max: 36.1 g at 12.8 ms
Min: -8.9 g at 34.7 ms

Peak T12 Acceleration, y-axis

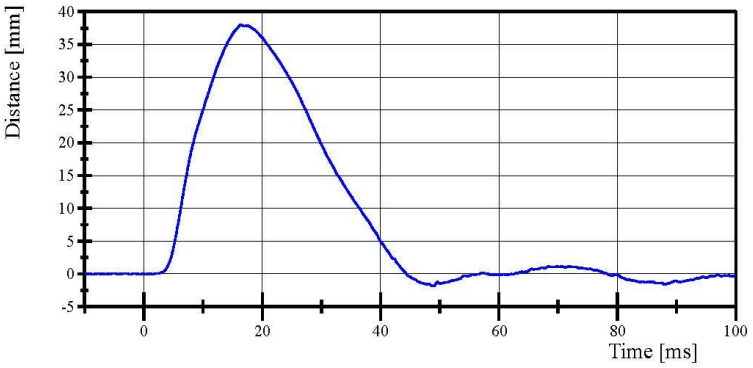


Filter Class: CFC_180
Max: 26.4 g at 14.5 ms
Min: -12.5 g at 37.8 ms

Transportation Research Center Inc.

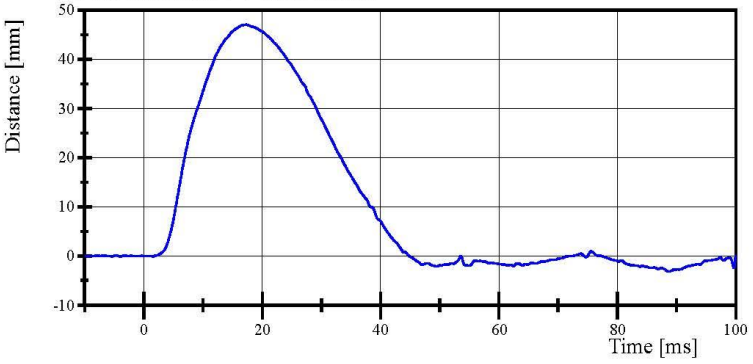
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Peak Thorax Rib 1 Length Change



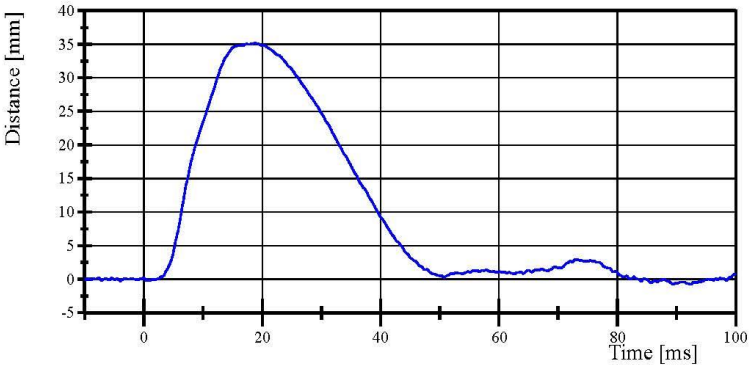
Filter Class: CFC_600
Max: 38.0 mm at 16.4 ms
Min: -1.9 mm at 48.9 ms

Peak Thorax Rib 2 Length Change



Filter Class: CFC_600
Max: 47.0 mm at 17.3 ms
Min: -3.2 mm at 88.7 ms

Peak Thorax Rib 3 Length Change



Filter Class: CFC_600
Max: 35.2 mm at 18.8 ms
Min: -0.8 mm at 92.5 ms

Transportation Research Center Inc.

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Force	3,200 - 3,800 N	3,560.8 N	Yes
Peak Thorax Rib 1 Length Change	33 - 43 mm	36.2 mm	Yes
Peak Thorax Rib 2 Length Change	35 - 43 mm	39.4 mm	Yes
Peak Thorax Rib 3 Length Change	32 - 40 mm	33.4 mm	Yes
Peak T4 Acceleration, y-axis	14 - 20 g	17.3 g	Yes
Peak T12 Acceleration, y-axis	14 - 22 g	17.8 g	Yes

Test meets specifications.

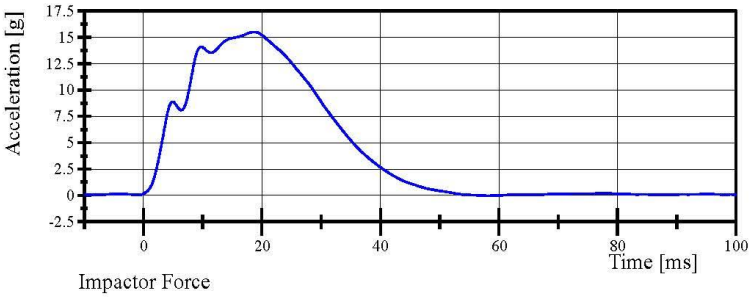
Condition: Used

Comments:
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 124

Transportation Research Center Inc.

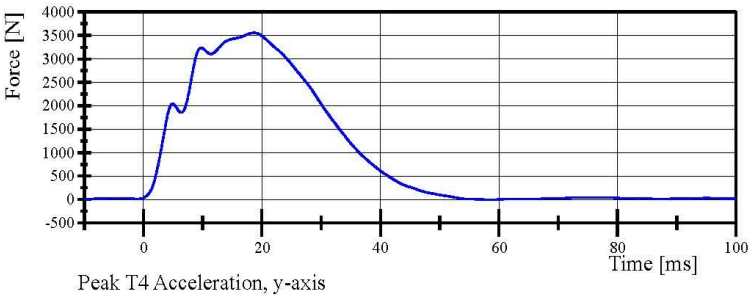
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Impactor Acceleration



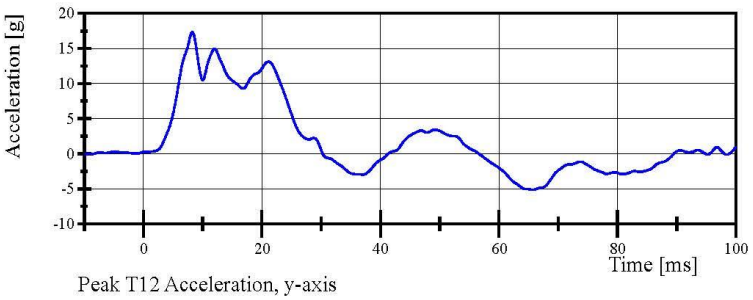
Filter Class: CFC_180
Max: 15.5 g at 18.7 ms
Min: -0.0 g at 58.2 ms

Impactor Force



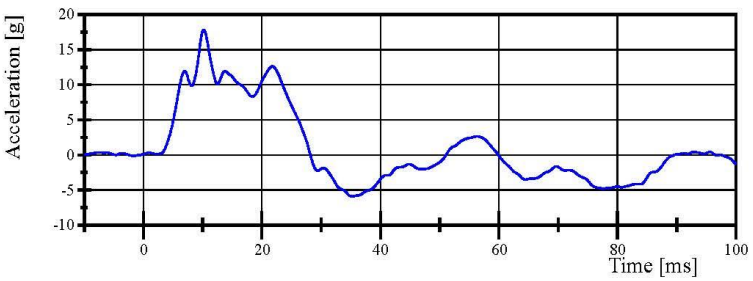
Filter Class: CFC_180
Max: 3,560.8 N at 18.7 ms
Min: -4.9 N at 58.2 ms

Peak T4 Acceleration, y-axis



Filter Class: CFC_180
Max: 17.3 g at 8.3 ms
Min: -5.1 g at 65.8 ms

Peak T12 Acceleration, y-axis



Filter Class: CFC_180
Max: 17.8 g at 10.2 ms
Min: -5.9 g at 35.2 ms

Transportation Research Center Inc.

Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Force	2,700 - 3,100 N	3,045.1 N	Yes
Peak Abdomen Rib 1 Length Change	32.5 - 39.5 mm	34.64 mm	Yes
Peak Abdomen Rib 2 Length Change	32 - 38 mm	33.7 mm	Yes
Peak T12 Acceleration, y-axis	14.5 - 19.5 g	16.77 g	Yes

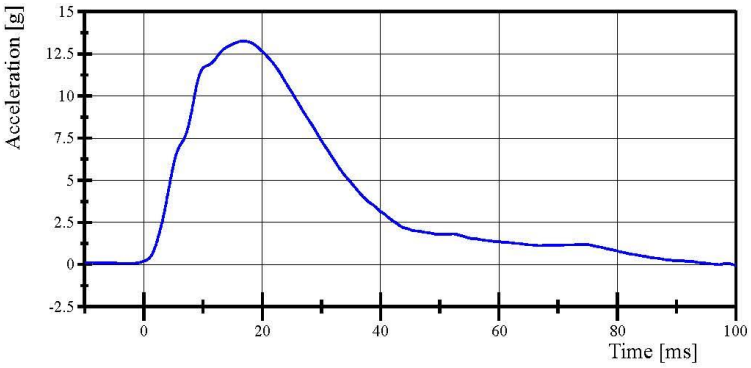
Test meets specifications.

Condition: Used
Comments:
Abdomen Rib #1 S/N: DY5252
Abdomen Rib #2 S/N: DY5253
RibEye S/N: 124

Transportation Research Center Inc.

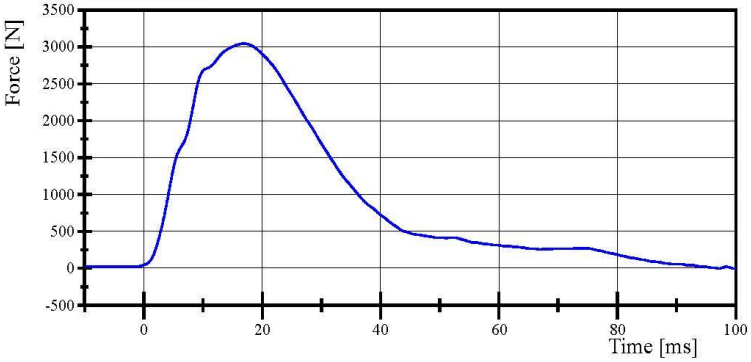
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Impactor Acceleration



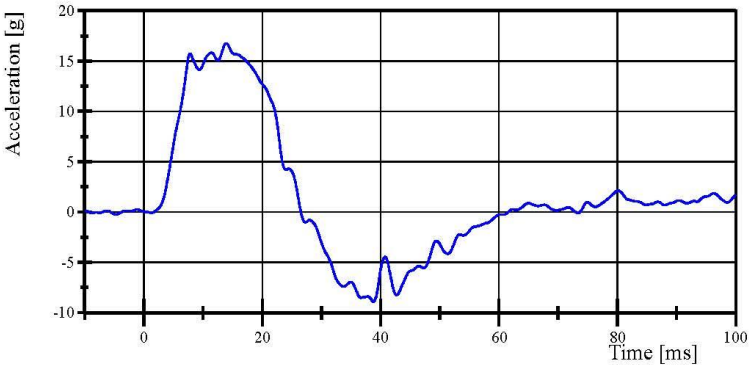
Filter Class: CFC_180
Max: 13.3 g at 16.9 ms
Min: -0.0 g at 100.0 ms

Impactor Force



Filter Class: CFC_180
Max: 3,045.1 N at 16.9 ms
Min: -6.6 N at 100.0 ms

Peak T12 Acceleration, y-axis

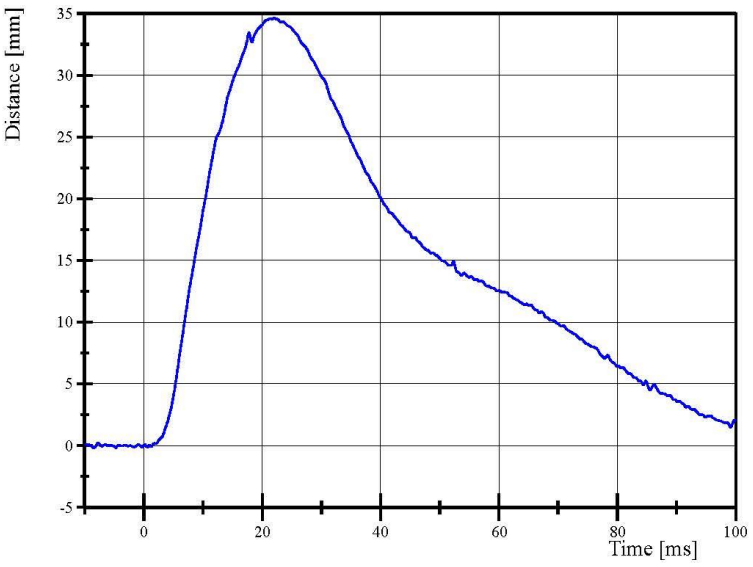


Filter Class: CFC_180
Max: 16.8 g at 13.9 ms
Min: -8.9 g at 38.8 ms

Transportation Research Center Inc.

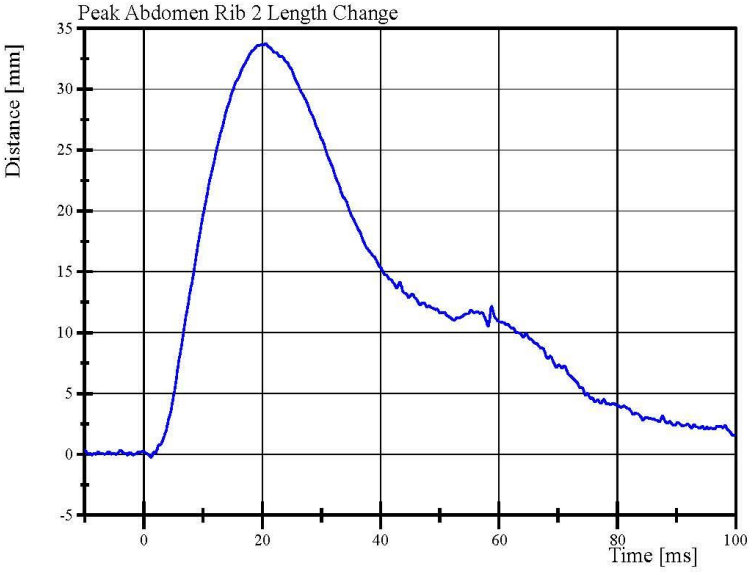
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Peak Abdomen Rib 1 Length Change



Filter Class: CFC_600
Max: 34.6 mm at 22.1 ms
Min: -0.2 mm at -8.4 ms

Peak Abdomen Rib 2 Length Change



Filter Class: CFC_600
Max: 33.7 mm at 20.6 ms
Min: -0.2 mm at 1.2 ms

Transportation Research Center Inc.

Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.71 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,502.0 N	Yes
Pelvis Lateral Acceleration	38.5 - 48.5 g	41.70 g	Yes
Peak T12 Acceleration, y-axis	10 - 14 g	12.6 g	Yes
Pubic Lateral Force	(-1,300) - (-1,590) N	-1,372.9 N	Yes
Sacroiliac Lateral Force	(-1,860) - (-2,280) N	-2,083.6 N	Yes

Test meets specifications.

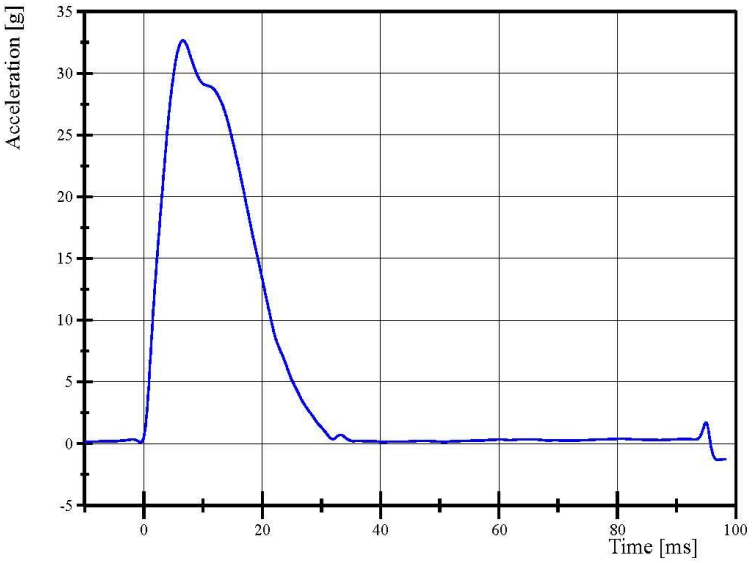
Condition: Used

Comments:
Pelvis S/N: EC3628

Transportation Research Center Inc.

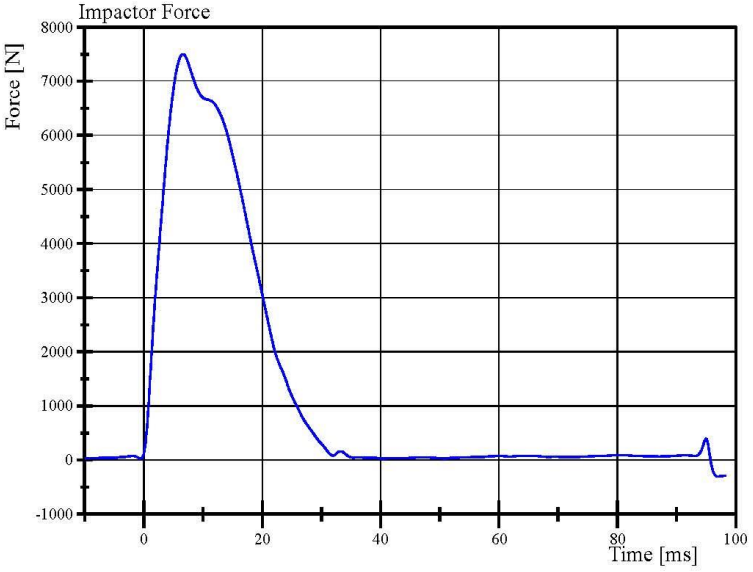
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Impactor Acceleration



Filter Class: CFC_180
Max: 32.7 g at 6.6 ms
Min: -1.3 g at 97.0 ms

Impactor Force



Filter Class: CFC_180
Max: 7,502.0 N at 6.6 ms
Min: -302.4 N at 97.0 ms

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

02.25.2021 13:58:39 1033

Report Number: EB8888_WSH07

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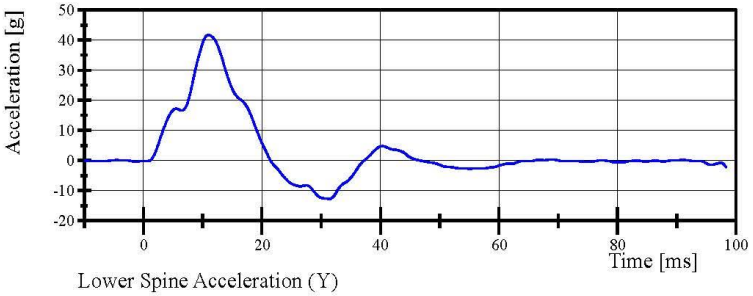
Transportation Research Center Inc.

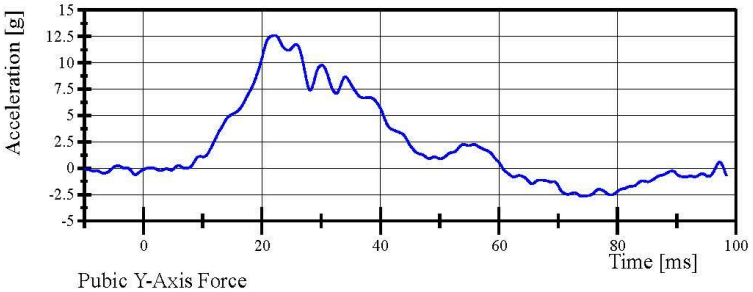
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 7-1
Test Date: 2/25/2021

Pelvis Y-Axis Acceleration



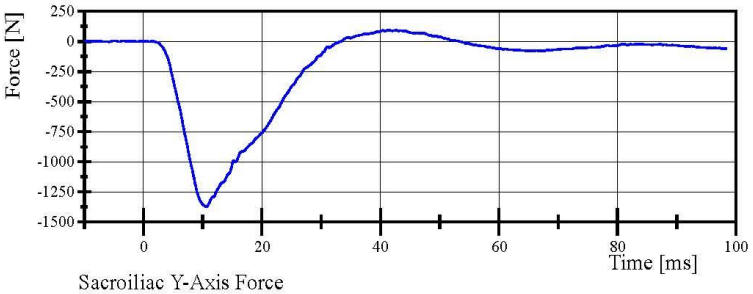
Filter Class: CFC_180
Max: 41.7 g at 11.0 ms
Min: -12.8 g at 31.3 ms

Lower Spine Acceleration (Y)



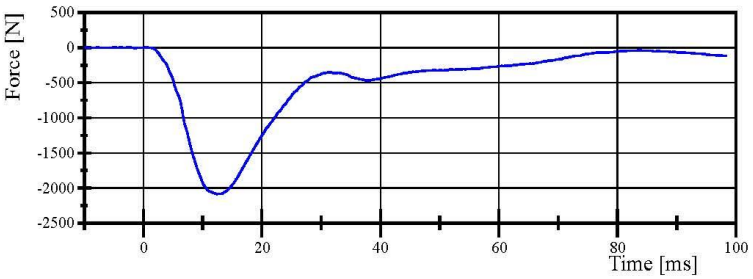
Filter Class: CFC_180
Max: 12.6 g at 22.2 ms
Min: -2.7 g at 74.0 ms

Pubic Y-Axis Force



Filter Class: CFC_600
Max: 92.7 N at 41.3 ms
Min: -1,372.9 N at 10.6 ms

Sacroiliac Y-Axis Force



Filter Class: CFC_600
Max: 3.8 N at -2.6 ms
Min: -2,083.6 N at 12.4 ms

Pre-Test Calibration Sheets
Passenger S/N DK1774

WorldSID-50M Head Front Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Head: DK1637

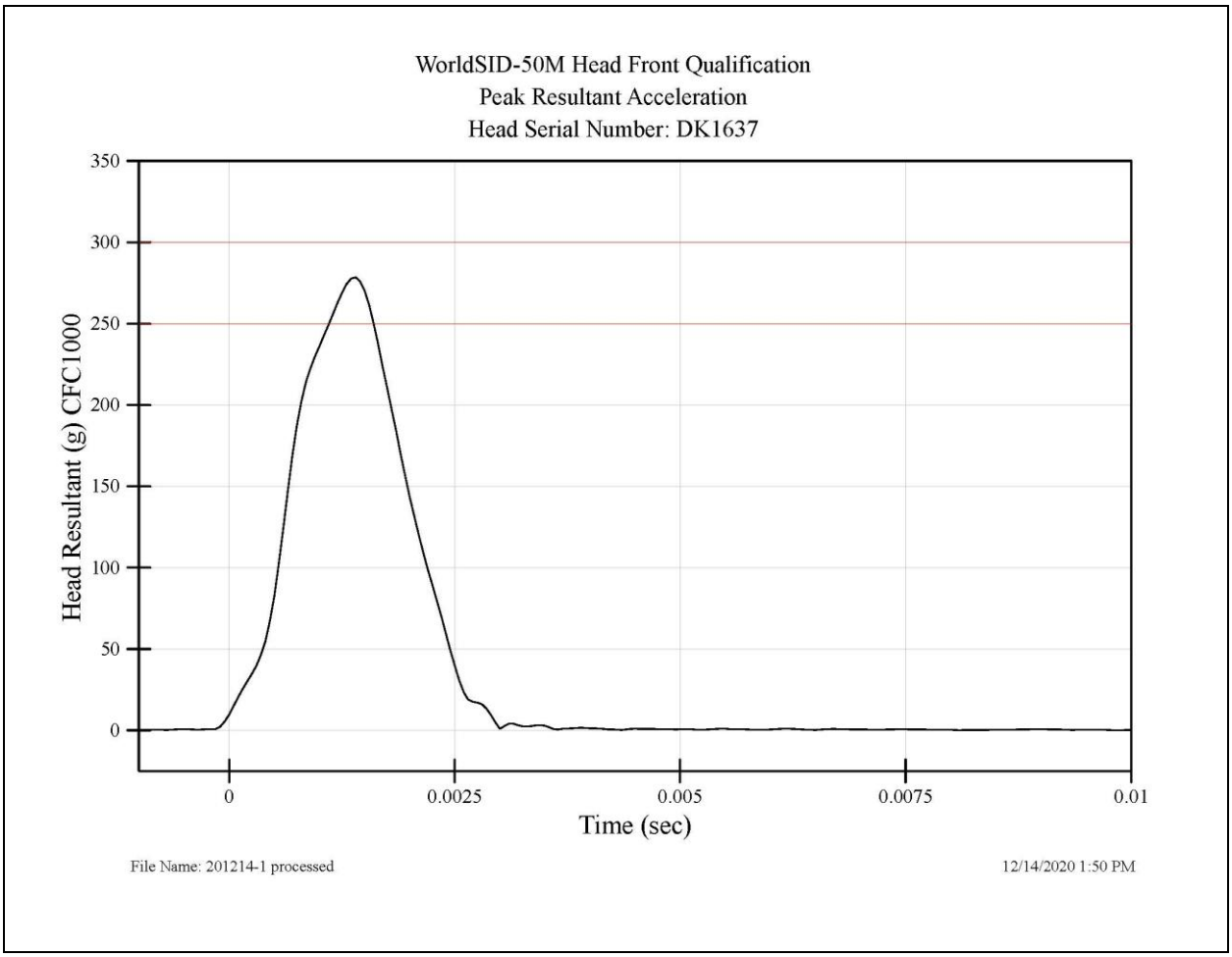
Test ID: 201214-1
Test Date: 12/14/2020
Test Time: 1:50 PM

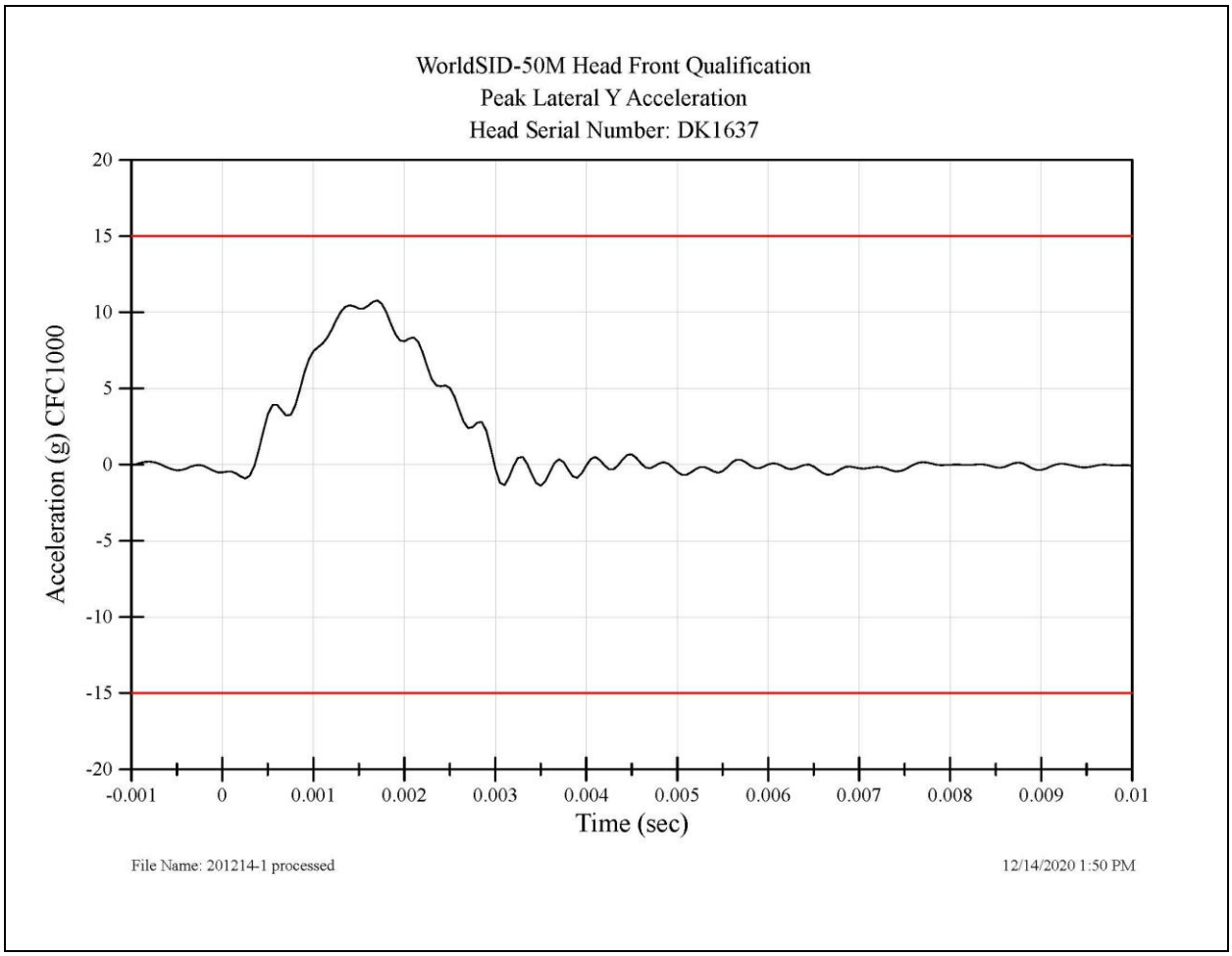
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.8	Pass
Test Humidity (%)	10 - 70	31	Pass
Peak Resultant Acceleration (g)	250.0 - 300.0	278.4	Pass
Peak Acceleration, y-axis (g)	-15.00 - 15.00	10.78	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	1.45	Pass

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

File Name: 201214-1 processed


WorldSID-50M Head Front Qualification
Peak Resultant Acceleration
Head Serial Number: DK1637
Head Resultant (g) CFC1000
350
300
250
200
150
100
50
0
0
0.0025
0.005
0.0075
0.01
Time (sec)
File Name: 201214-1 processed
12/14/2020 1:50 PM


WorldSID-50M Head Front Qualification
Peak Lateral Y Acceleration
Head Serial Number: DK1637
Acceleration (g) CFC1000
20
15
10
5
0
-5
-10
-15
-20
-0.001
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
Time (sec)
File Name: 201214-1 processed
12/14/2020 1:50 PM

WorldSID-05F Head Left Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Head: DK1637

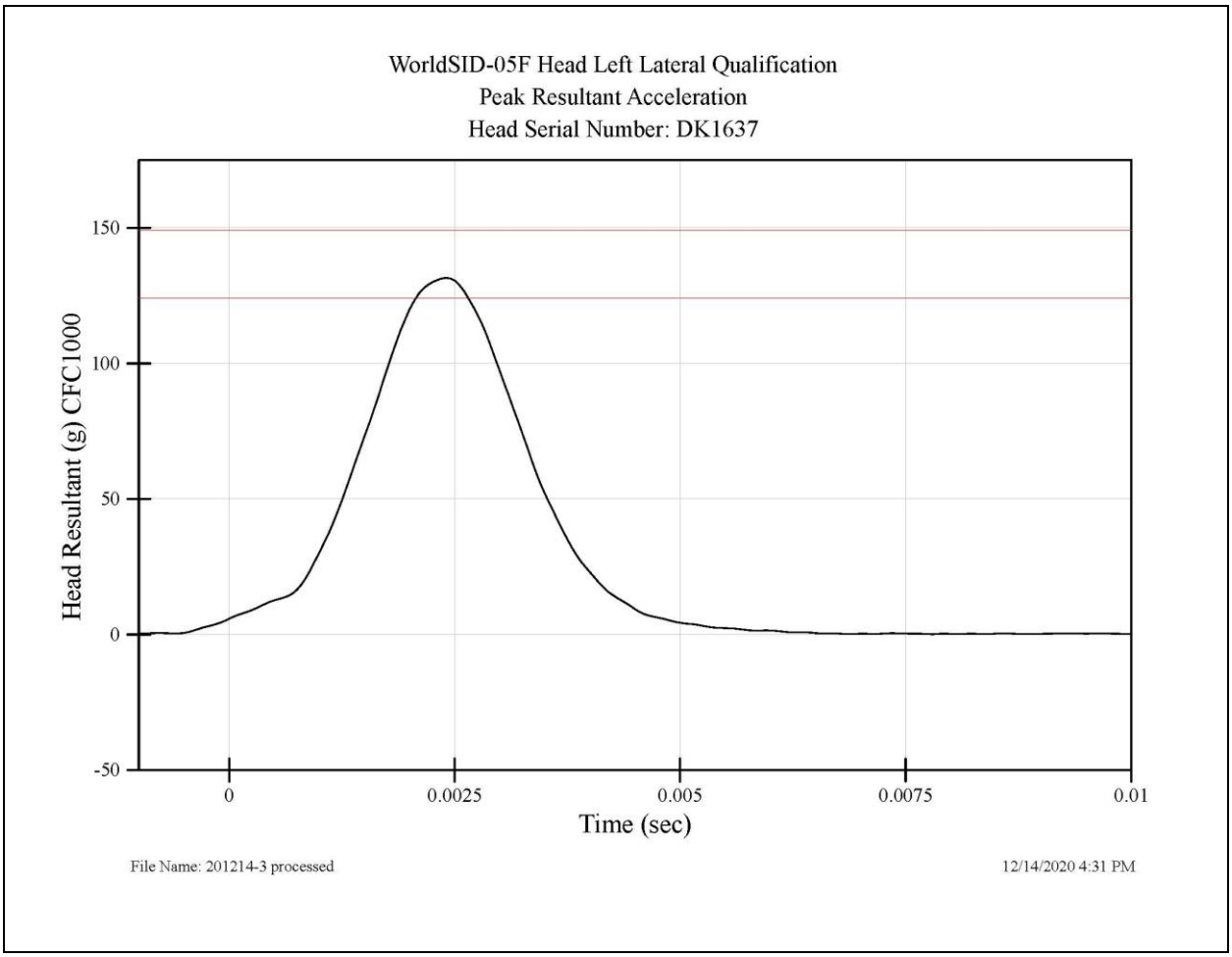
Test ID: 201214-3
Test Date: 12/14/2020
Test Time: 4:31 PM

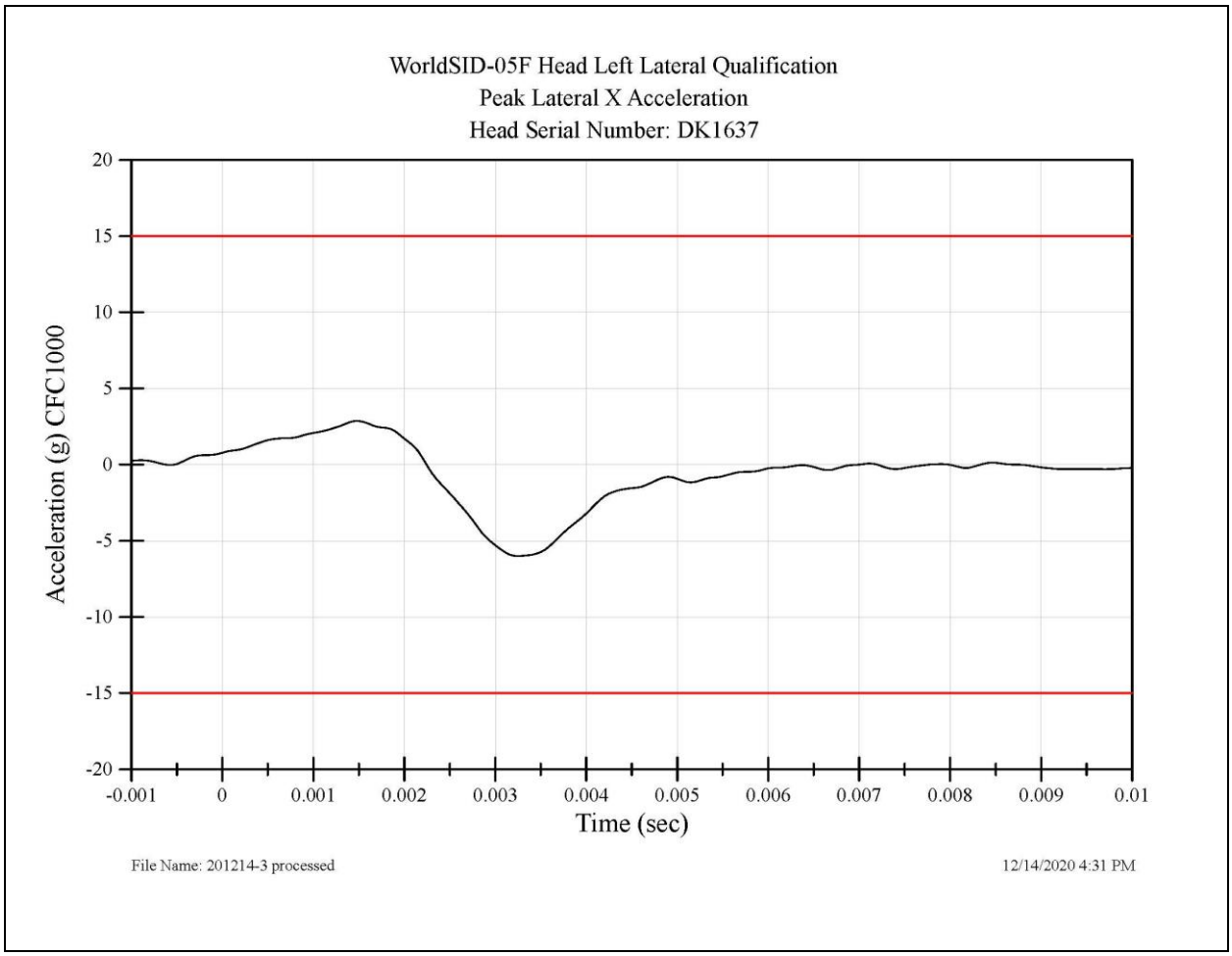
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.9	Pass
Test Humidity (%)	10 - 70	30	Pass
Peak Resultant Acceleration (g)	124.0 - 149.0	131.5	Pass
Peak Acceleration, x-axis (g)	-15.00 - 15.00	-6.00	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	1.15	Pass

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

File Name: 201214-3 processed


WorldSID-05F Head Left Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DK1637
Head Resultant (g) CFC1000
150
100
50
0
-50
0
0.0025
0.005
0.0075
0.01
Time (sec)
File Name: 201214-3 processed
12/14/2020 4:31 PM


WorldSID-05F Head Left Lateral Qualification
Peak Lateral X Acceleration
Head Serial Number: DK1637
Acceleration (g) CFC1000
20
15
10
5
0
-5
-10
-15
-20
-0.001
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
Time (sec)
File Name: 201214-3 processed
12/14/2020 4:31 PM

WorldSID-05F Head Right Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Head: DK1637

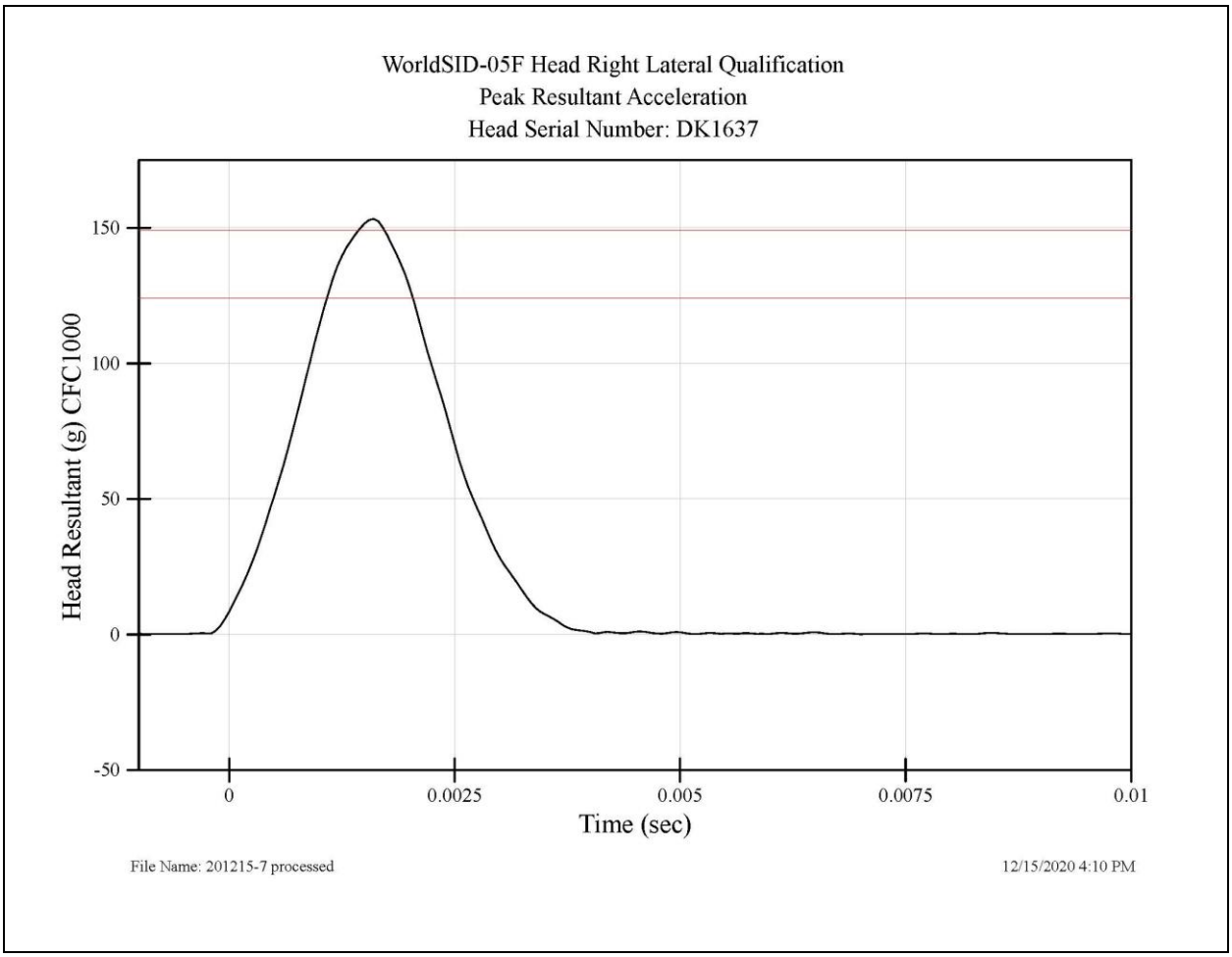
Test ID: 201215-7
Test Date: 12/15/2020
Test Time: 4:10 PM

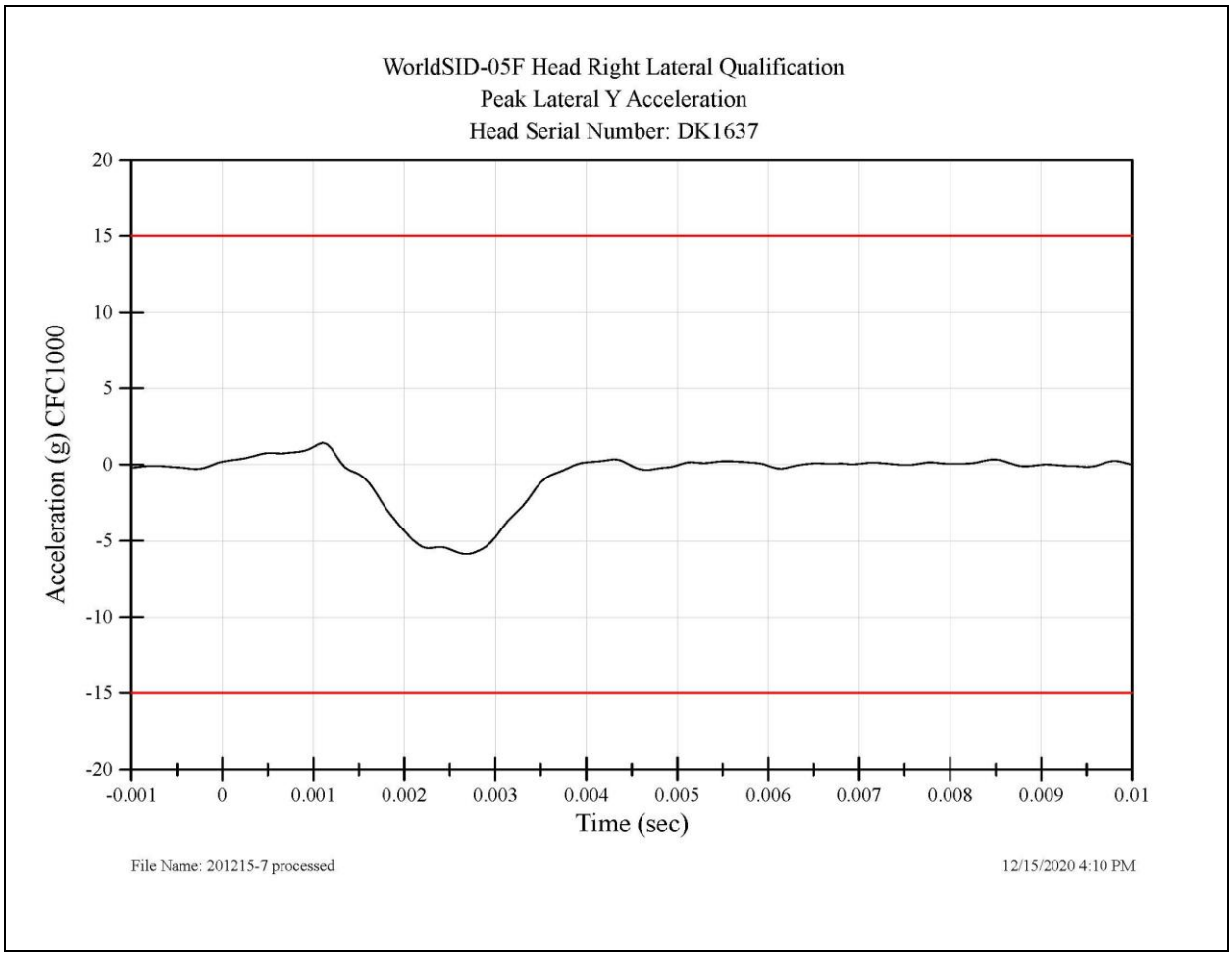
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	25	Pass
Peak Resultant Acceleration (g)	124.0 - 149.0	153.3	Fail
Peak Acceleration, x-axis (g)	-15.00 - 15.00	-5.87	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	0.75	Pass

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

File Name: 201215-7 processed


WorldSID-05F Head Right Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DK1637
Head Resultant (g) CFC1000
150
100
50
0
-50
0
0.0025
0.005
0.0075
0.01
Time (sec)
File Name: 201215-7 processed
12/15/2020 4:10 PM


WorldSID-05F Head Right Lateral Qualification
Peak Lateral Y Acceleration
Head Serial Number: DK1637
Acceleration (g) CFC1000
20
15
10
5
0
-5
-10
-15
-20
-0.001
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
Time (sec)
File Name: 201215-7 processed
12/15/2020 4:10 PM

WorldSID-05F Neck Left Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Neck: DX6209

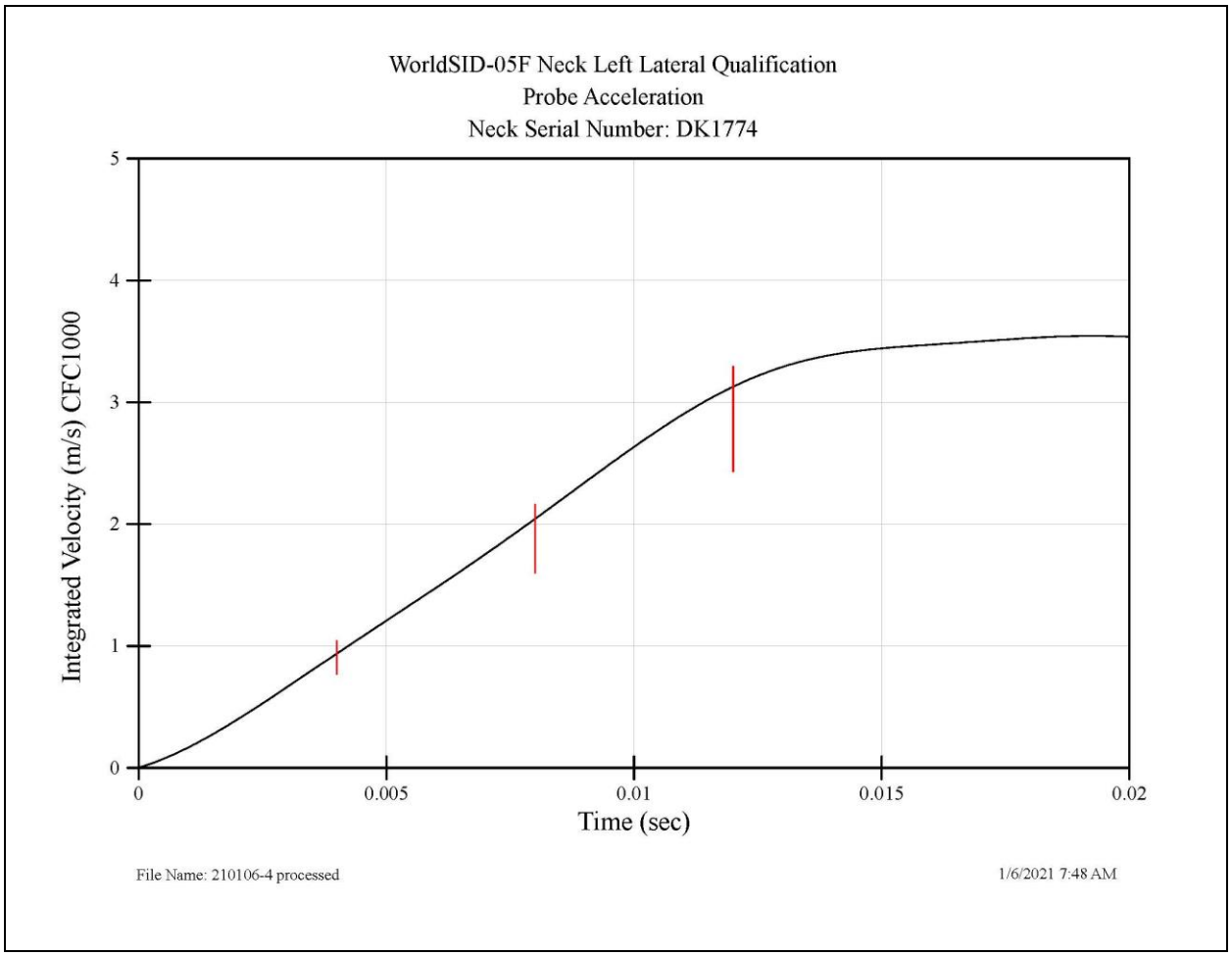
Test ID: 210106-4
Test Date: 1/6/2021
Test Time: 7:48 AM

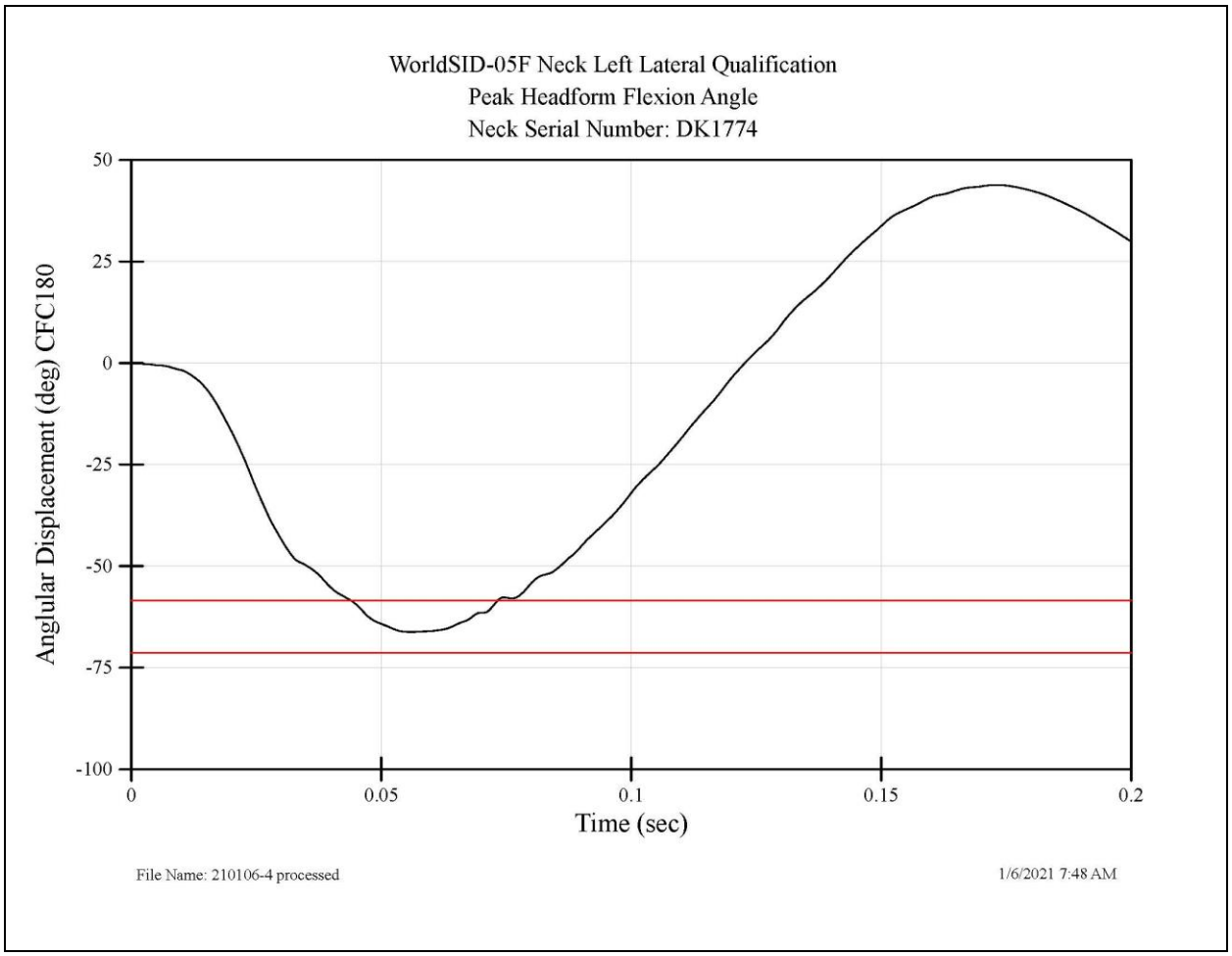
Test Results

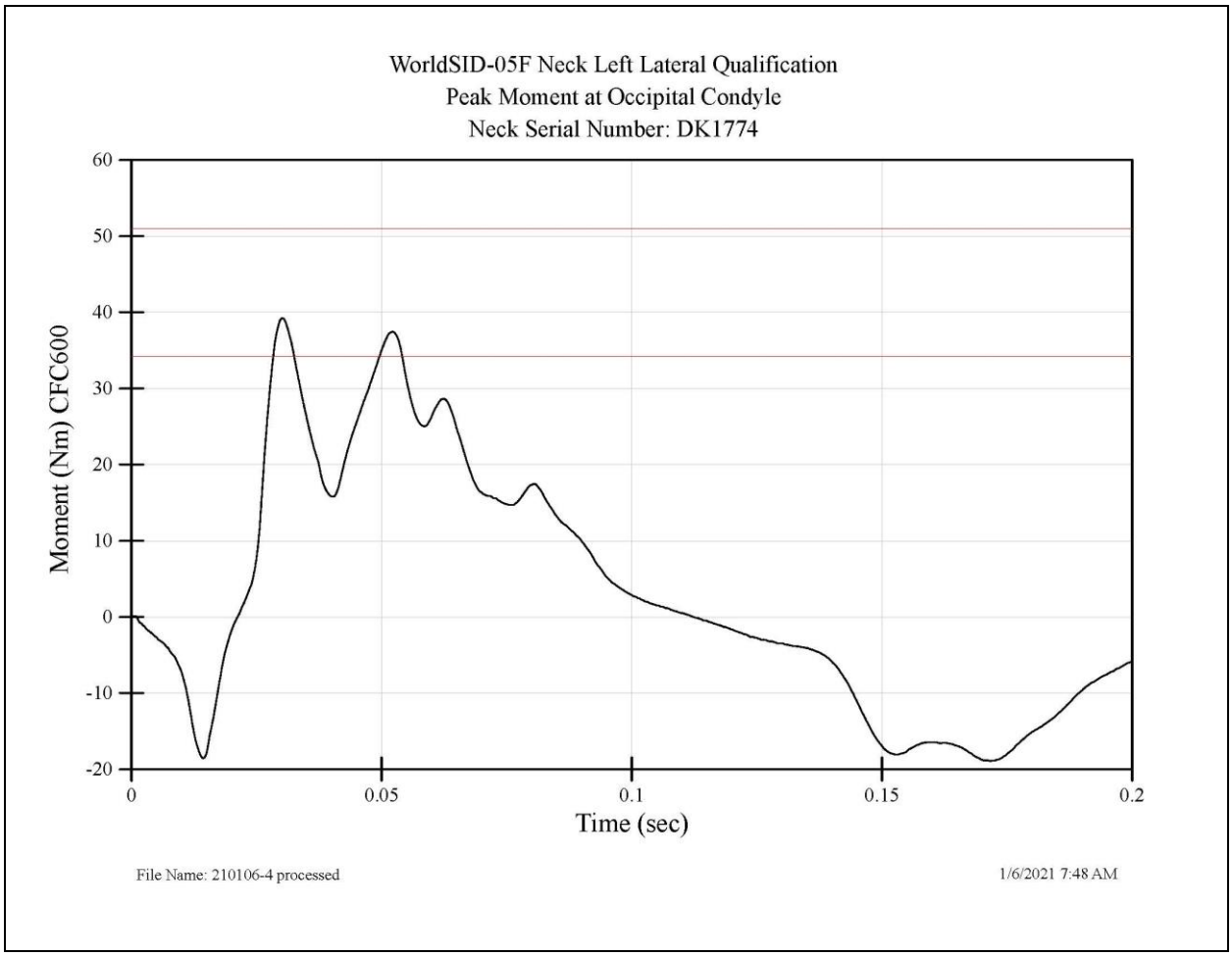
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.1	Pass
Test Humidity (%)	10 - 70	30	Pass
Test Velocity (m/s)	3.30 - 3.50	3.41	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.94	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.04	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.13	Pass
Peak Headform Flexion Angle (deg)	-71.4 - (-58.5)	-66.2	Pass
Peak Headform Flexion Angle Decay Time to 0 degrees (ms)	57.3 - 76.5	66.8	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	34.2 - 51.0	39.2	Pass
Peak X-Axis Moment at Occipital Condyle Decay Time to 0 Nm (ms)	69.4 - 93.3	82.2	Pass

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

File Name: 210106-4 processed


WorldSID-05F Neck Left Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774
Integrated Velocity (m/s) CFC1000
5
4
3
2
1
0
0
0.005
0.01
0.015
0.02
Time (sec)
File Name: 210106-4 processed
1/6/2021 7:48 AM


WorldSID-05F Neck Left Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774
Anglular Displacement (deg) CFC180
50
25
0
-25
-50
-75
-100
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210106-4 processed
1/6/2021 7:48 AM


WorldSID-05F Neck Left Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774
Moment (Nm) CFC600
60
50
40
30
20
10
0
-10
-20
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210106-4 processed
1/6/2021 7:48 AM

WorldSID-05F Neck Right Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Neck: DX6209

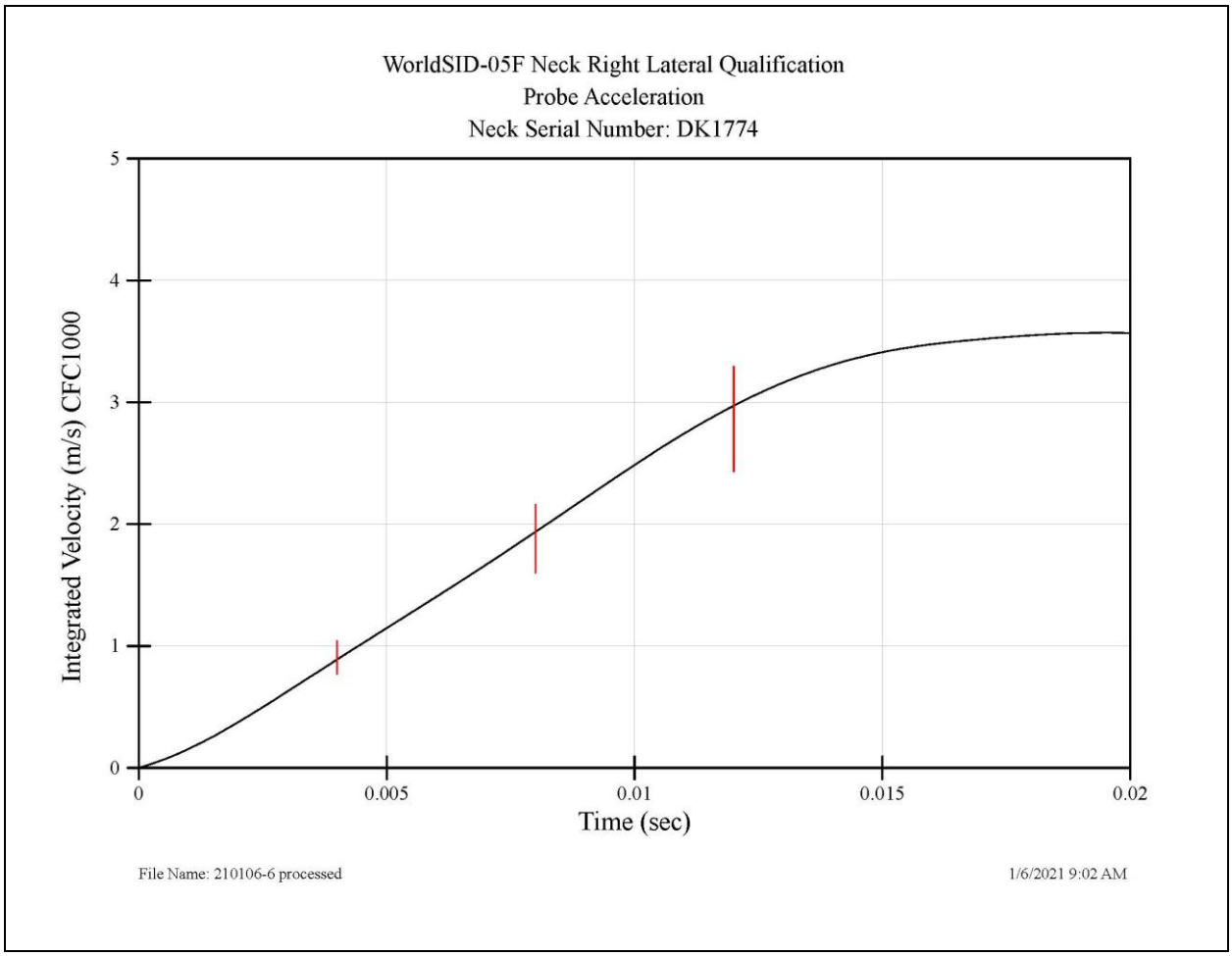
Test ID: 210106-6
Test Date: 1/6/2021
Test Time: 9:02 AM

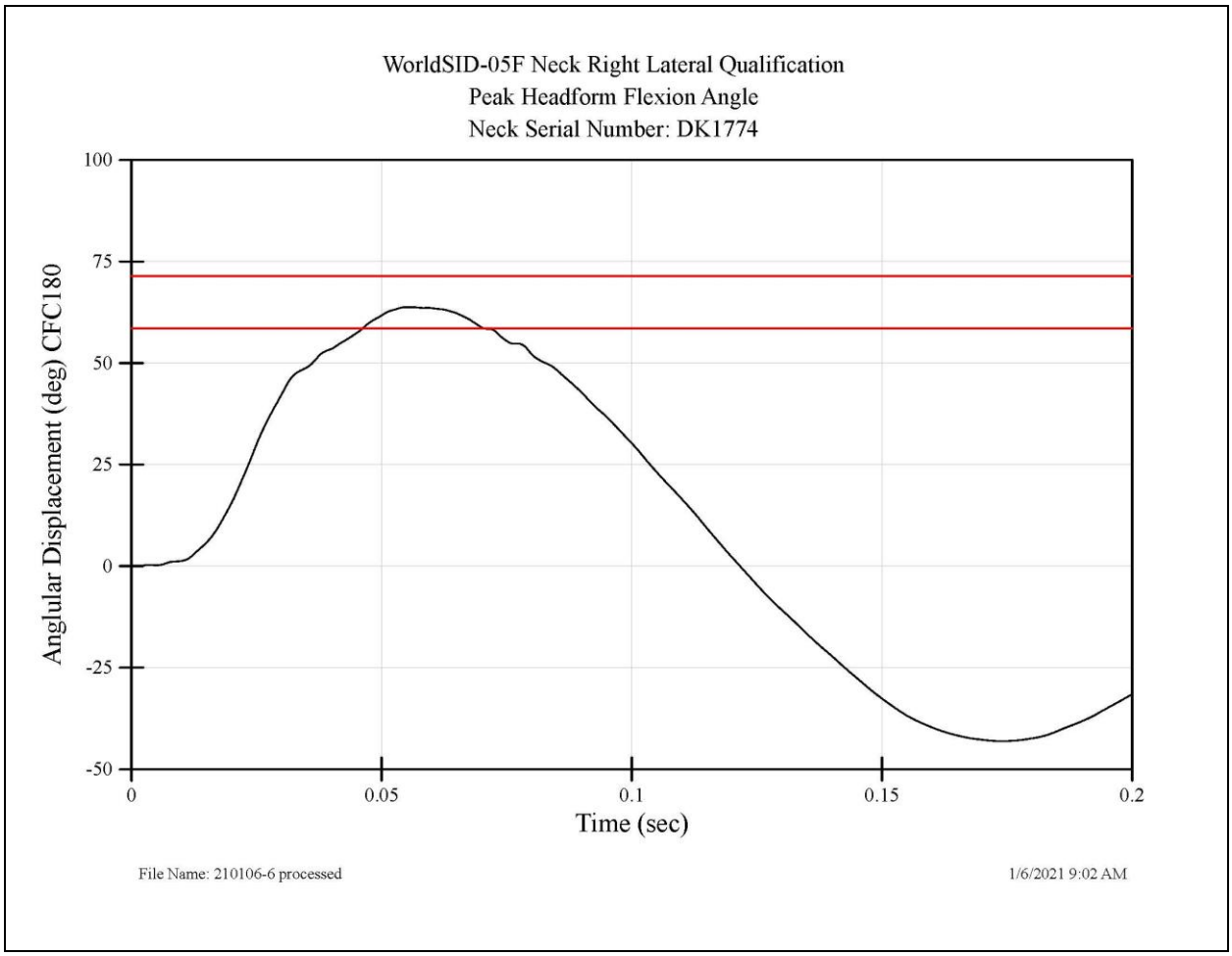
Test Results

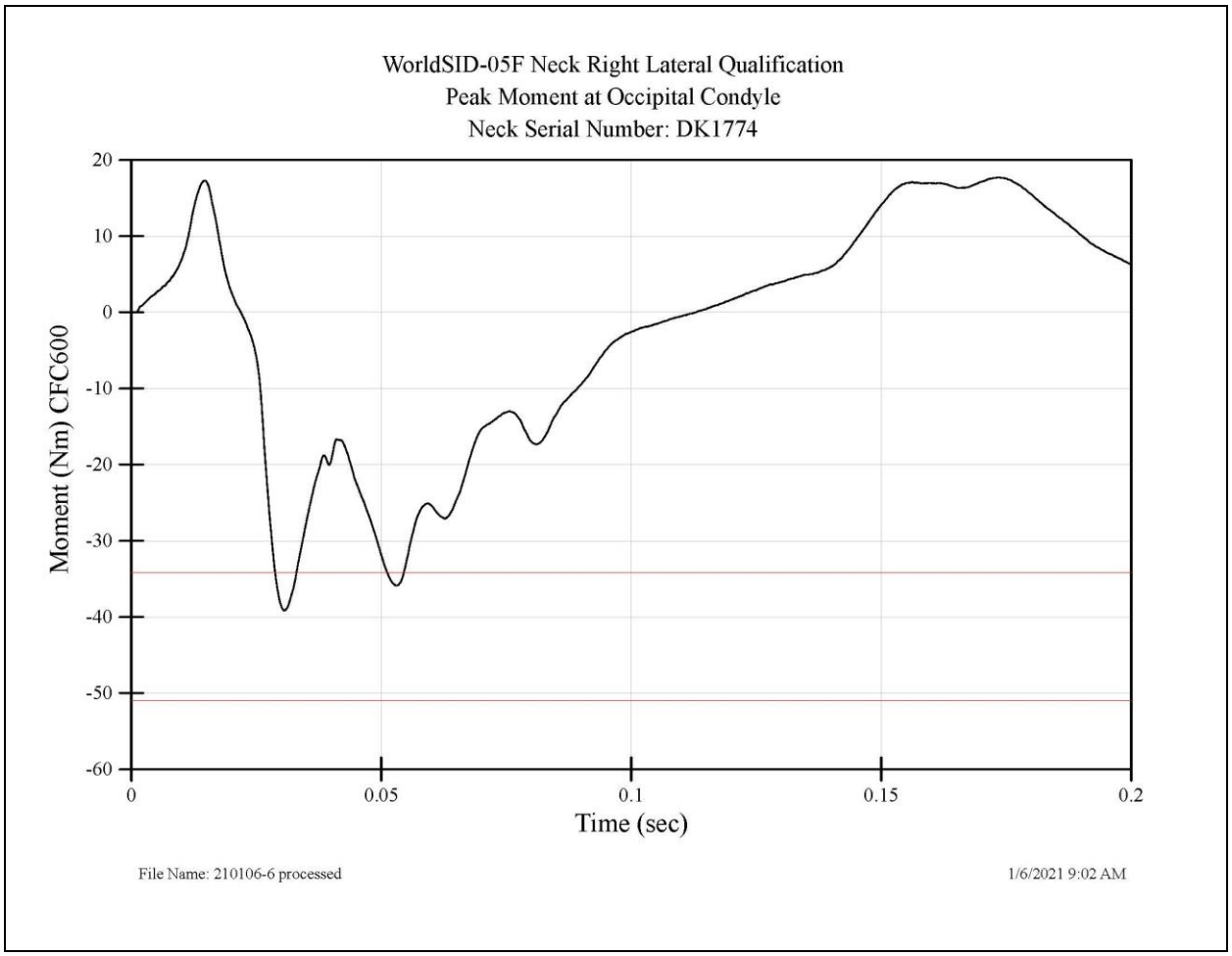
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.8	Pass
Test Humidity (%)	10 - 70	31	Pass
Test Velocity (m/s)	3.30 - 3.50	3.41	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.89	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	1.93	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	2.97	Pass
Peak Headform Flexion Angle (deg)	58.5 - 71.4	63.7	Pass
Peak Headform Flexion Angle Decay Time to 0 degrees (ms)	57.3 - 76.5	66.7	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	-51.0 - (-34.2)	-39.2	Pass
Peak X-Axis Moment at Occipital Condyle Decay Time to 0 Nm (ms)	69.4 - 93.3	82.5	Pass

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

File Name: 210106-6 processed


WorldSID-05F Neck Right Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774
Integrated Velocity (m/s) CFC1000
5
4
3
2
1
0
0
0.005
0.01
0.015
0.02
Time (sec)
File Name: 210106-6 processed
1/6/2021 9:02 AM


WorldSID-05F Neck Right Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774
Anglular Displacement (deg) CFC180
100
75
50
25
0
-25
-50
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210106-6 processed
1/6/2021 9:02 AM


WorldSID-05F Neck Right Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774
Moment (Nm) CFC600
20
10
0
-10
-20
-30
-40
-50
-60
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210106-6 processed
1/6/2021 9:02 AM

WorldSID-05F Shoulder Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270	Abdomen Rib 1: DM5165
Thorax Rib 1: DM2783	Abdomen Rib 2: DM5167
Thorax Rib 2: DM2784	RibEye: 161
Thorax Rib 3: DM2787	Impacted Arm: DJ1634

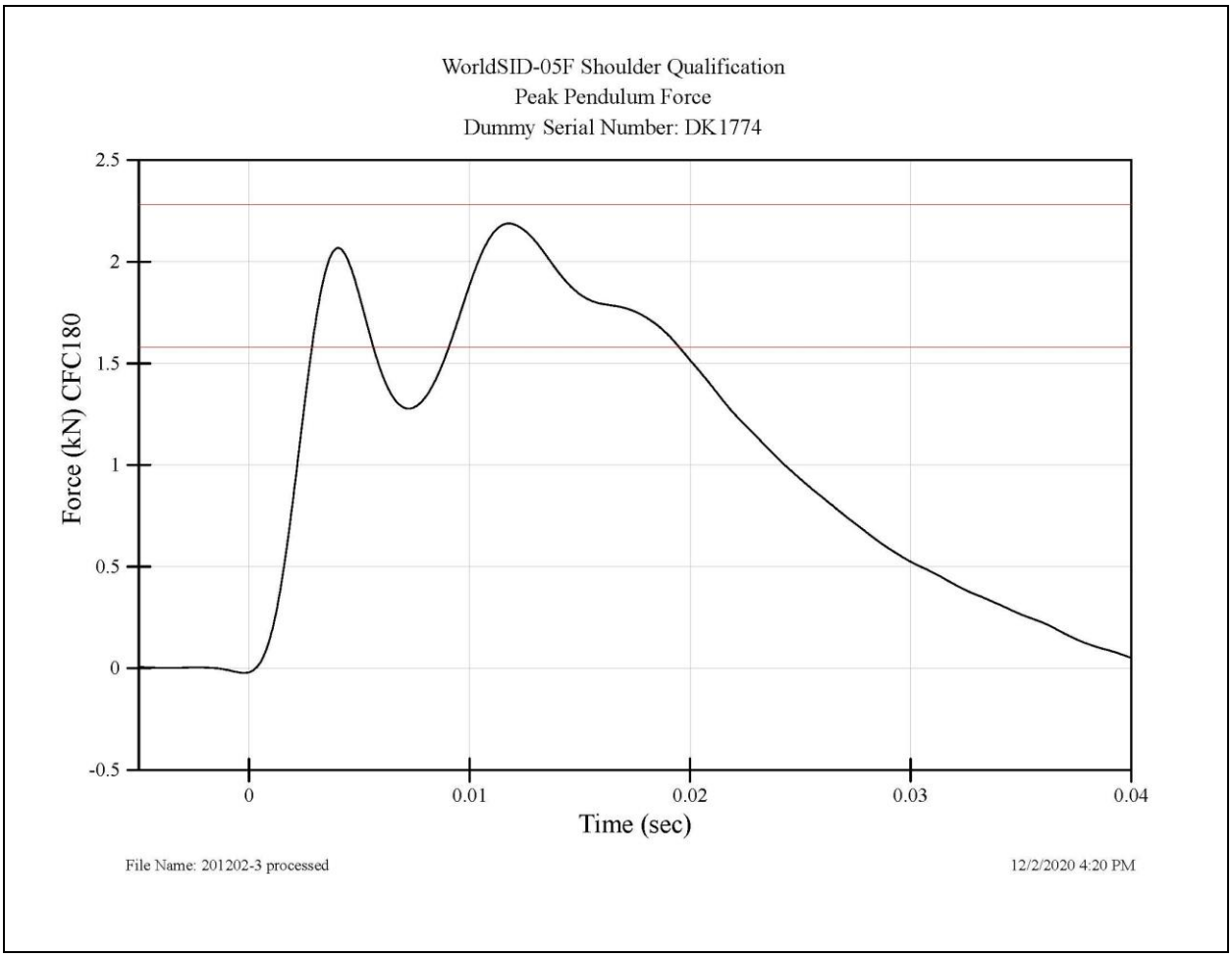
Test ID: 201202-3
Test Date: 12/2/2020
Test Time: 4:20 PM

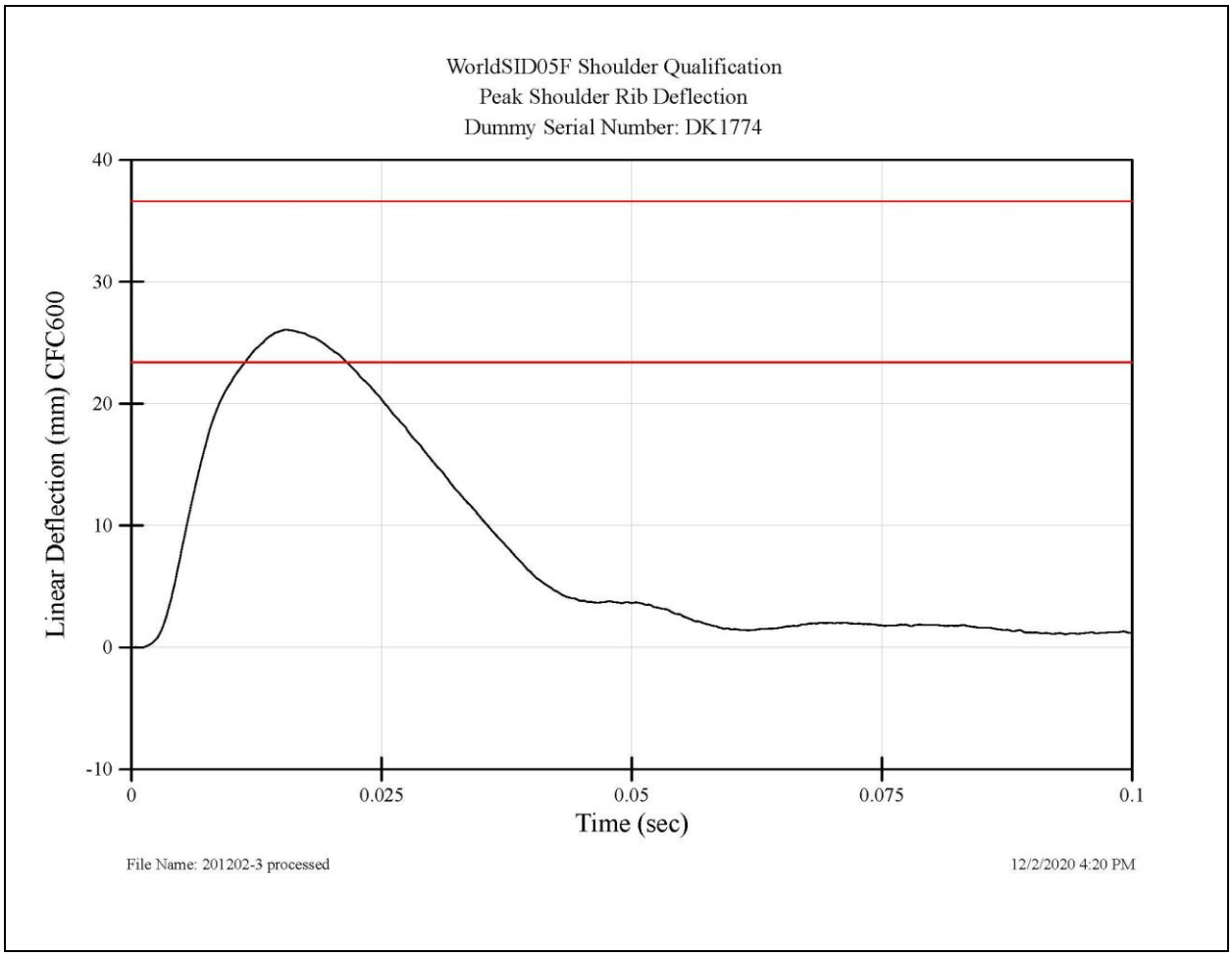
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.8	Pass
Test Humidity (%)	10 - 70	29	Pass
Test Velocity (m/s)	4.20 - 4.40	4.303	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	23.4	Pass
Peak Probe Force (kN)	1.58 - 2.28	2.19	Pass
Peak Shoulder Rib Length Change (mm)	23.4 - 36.6	26.06	Pass

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

File Name: 201202-3 processed


WorldSID-05F Shoulder Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
2.5
2
1.5
1
0.5
0
-0.5
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 201202-3 processed
12/2/2020 4:20 PM


WorldSID05F Shoulder Qualification
Peak Shoulder Rib Deflection
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
40
30
20
10
0
-10
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201202-3 processed
12/2/2020 4:20 PM

WorldSID-05F Thorax with Arm Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270
Thorax Rib 1: DM2783
Thorax Rib 2: DM2784
Thorax Rib 3: DM2787
Abdomen Rib 1: DM5165
Abdomen Rib 2: DM5167
RibEye: 161
Impacted Arm: DJ1634

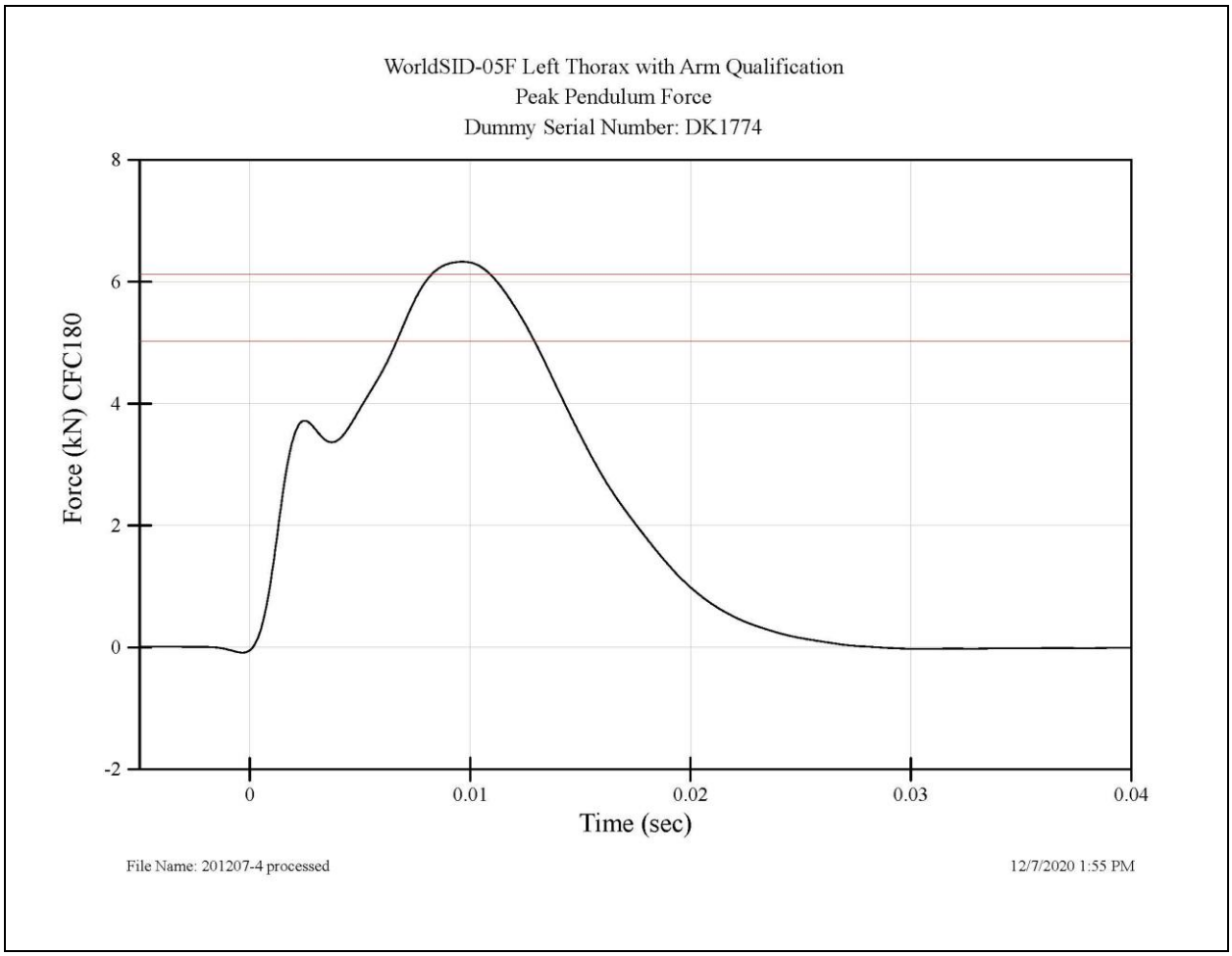
Test ID: 201207-4
Test Date: 12/7/2020
Test Time: 1:55 PM

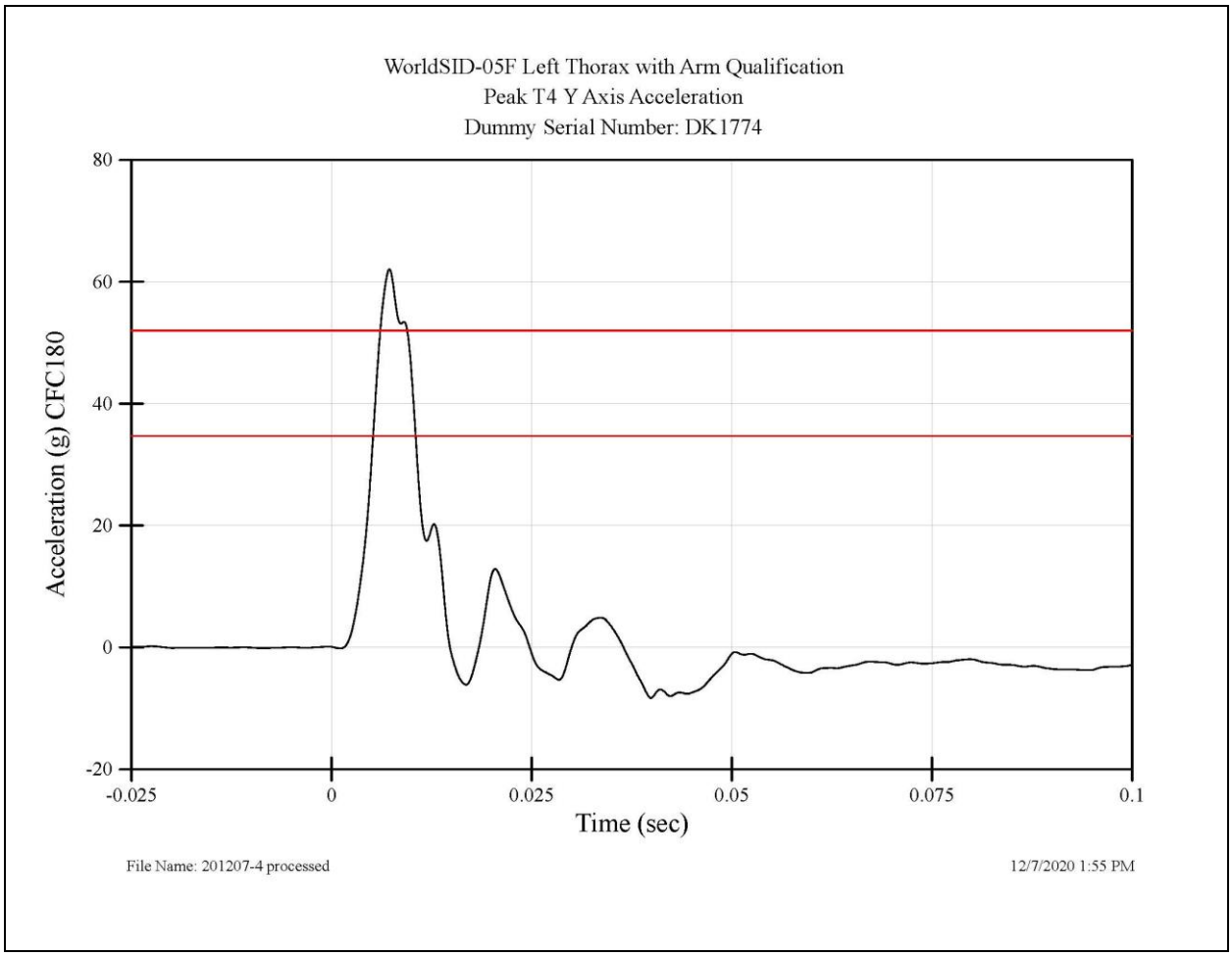
Test Results

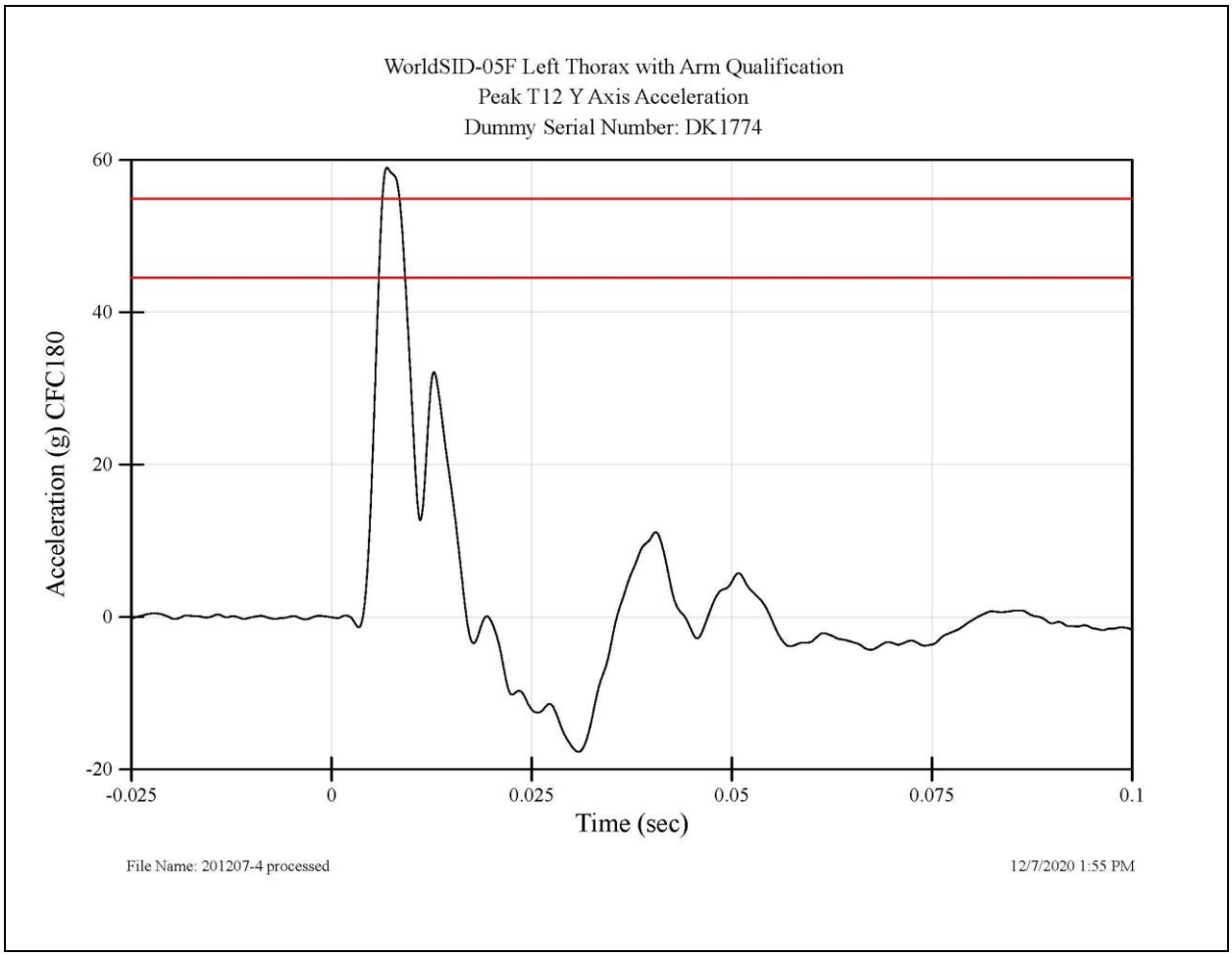
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.9	Pass
Test Humidity (%)	10 - 70	26	Pass
Test Velocity (m/s)	6.60 - 6.80	6.693	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	21.5	Pass
Peak Probe Force (kN)	5.02 - 6.13	6.33	Fail
Peak T4 Y Acceleration	34.7 - 52.0	62.07	Fail
Peak T12 Y Acceleration	44.5 - 54.9	58.97	Fail
Peak Thorax Rib 1 Y Length Change (mm)	18.3 - 26.4	15.71	Fail
Peak Thorax Rib 2 Y Length Change (mm)	21.6 - 26.4	18.95	Fail
Peak Thorax Rib 3 Y Length Change (mm)	19.7 - 26.6	15.46	Fail

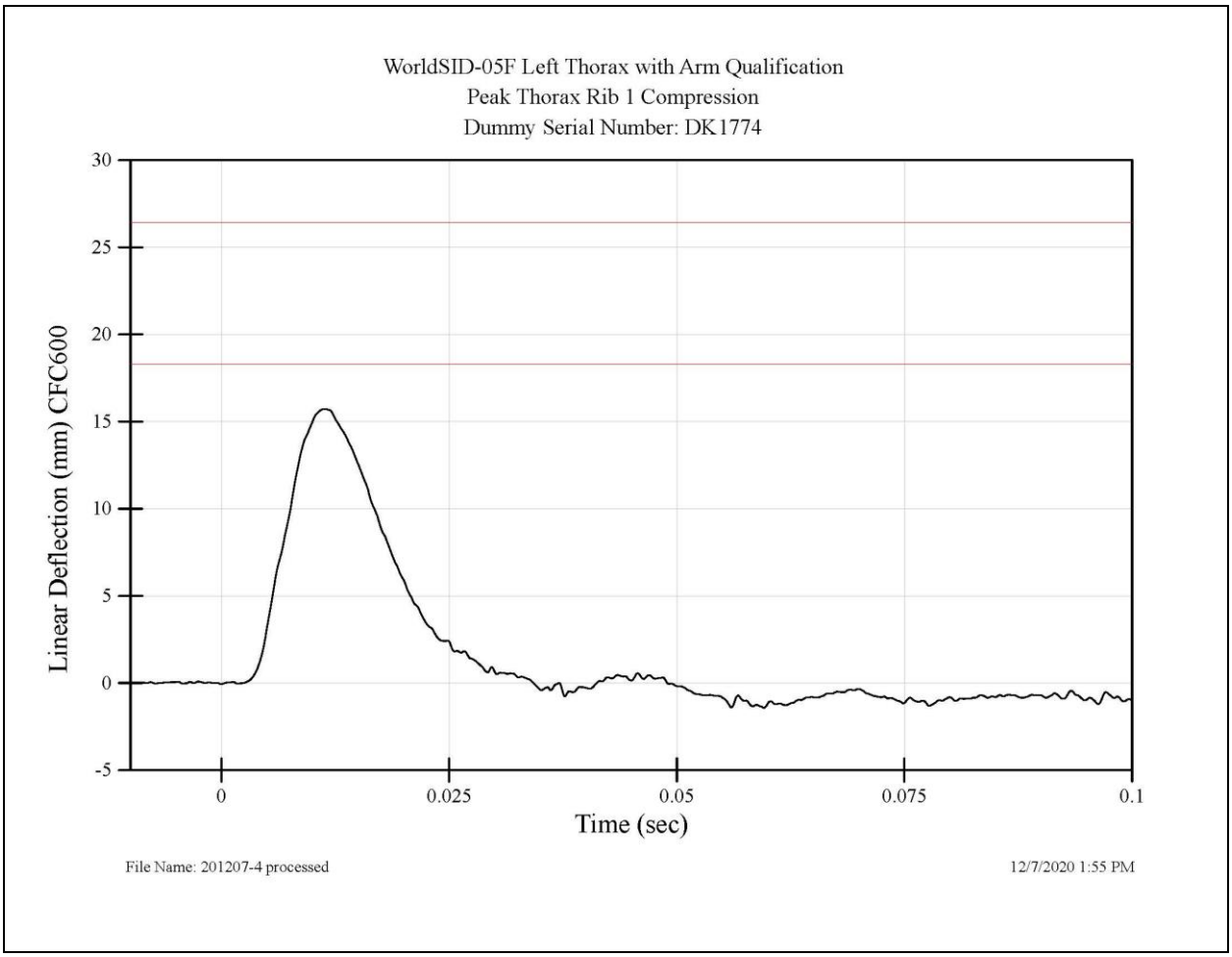
* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

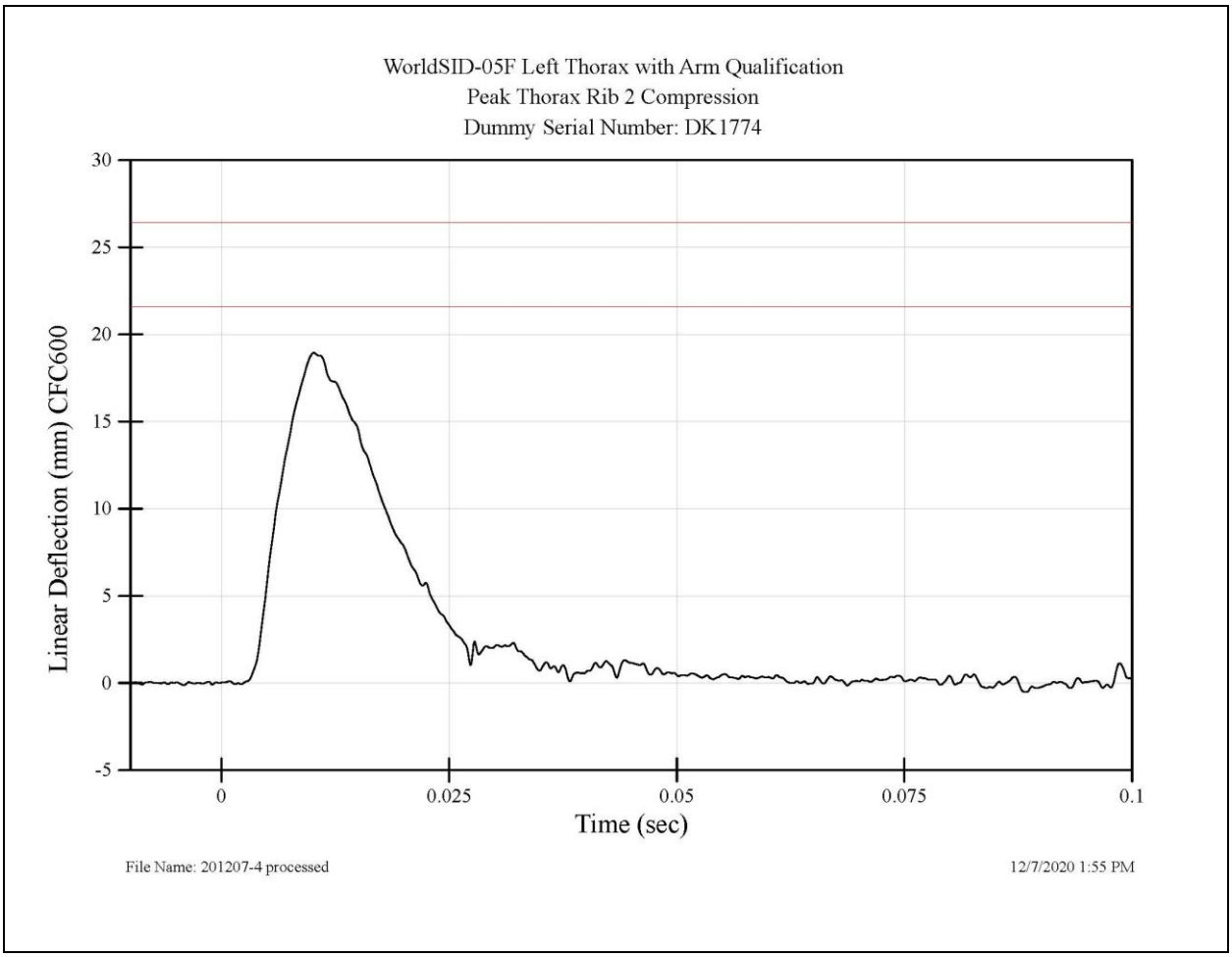
File Name: 201207-4 processed

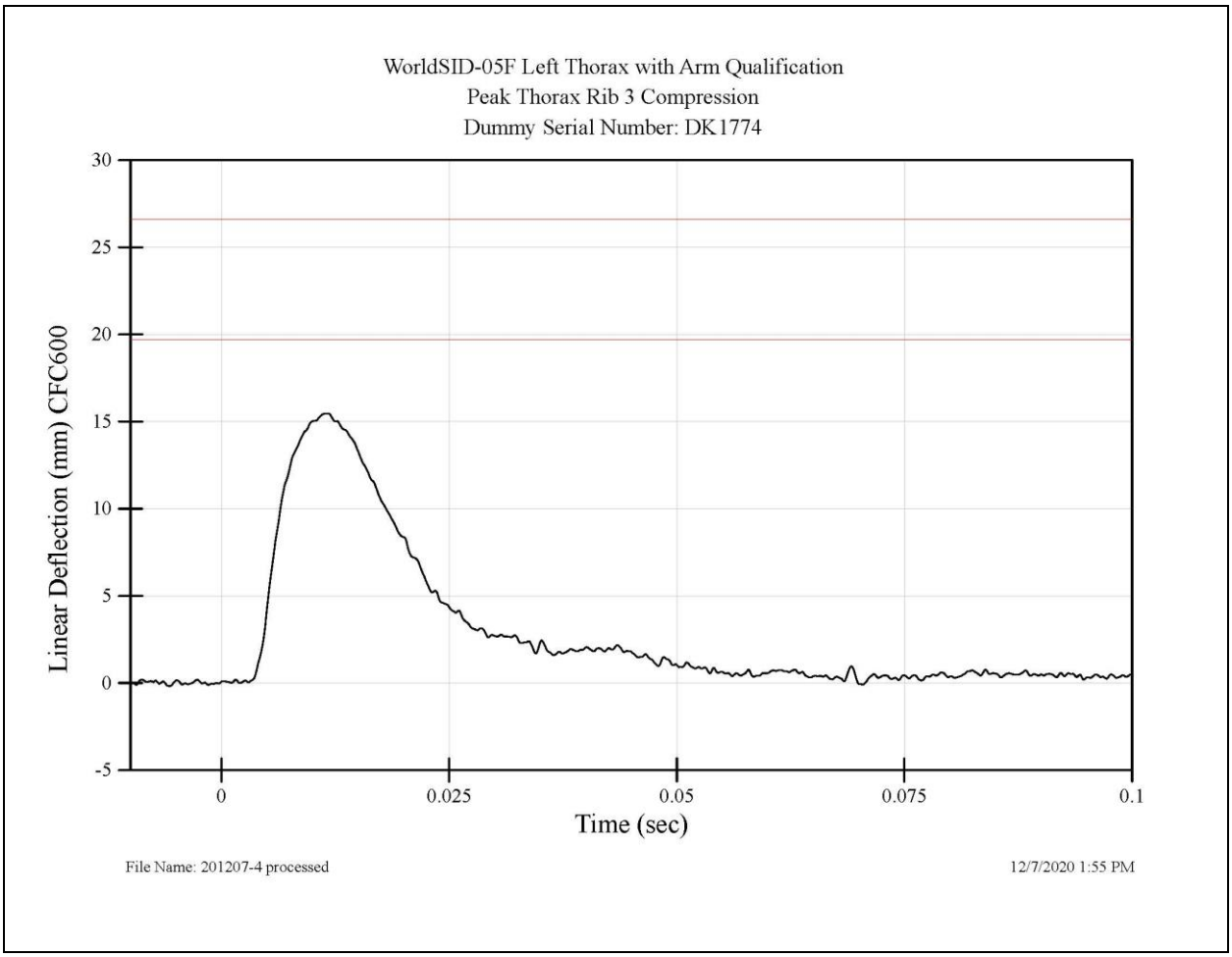

WorldSID-05F Left Thorax with Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
8
6
4
2
0
-2
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 201207-4 processed
12/7/2020 1:55 PM


WorldSID-05F Left Thorax with Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
80
60
40
20
0
-20
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-4 processed
12/7/2020 1:55 PM


WorldSID-05F Left Thorax with Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
60
40
20
0
-20
Acceleration (g) CFC180
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-4 processed
12/7/2020 1:55 PM


WorldSID-05F Left Thorax with Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-4 processed
12/7/2020 1:55 PM


WorldSID-05F Left Thorax with Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-4 processed
12/7/2020 1:55 PM


WorldSID-05F Left Thorax with Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-4 processed
12/7/2020 1:55 PM

WorldSID-05F Thorax without Arm Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270
Thorax Rib 1: DM2783
Thorax Rib 2: DM2784
Thorax Rib 3: DM2787
Abdomen Rib 1: DM5165
Abdomen Rib 2: DM5167
RibEye: 161

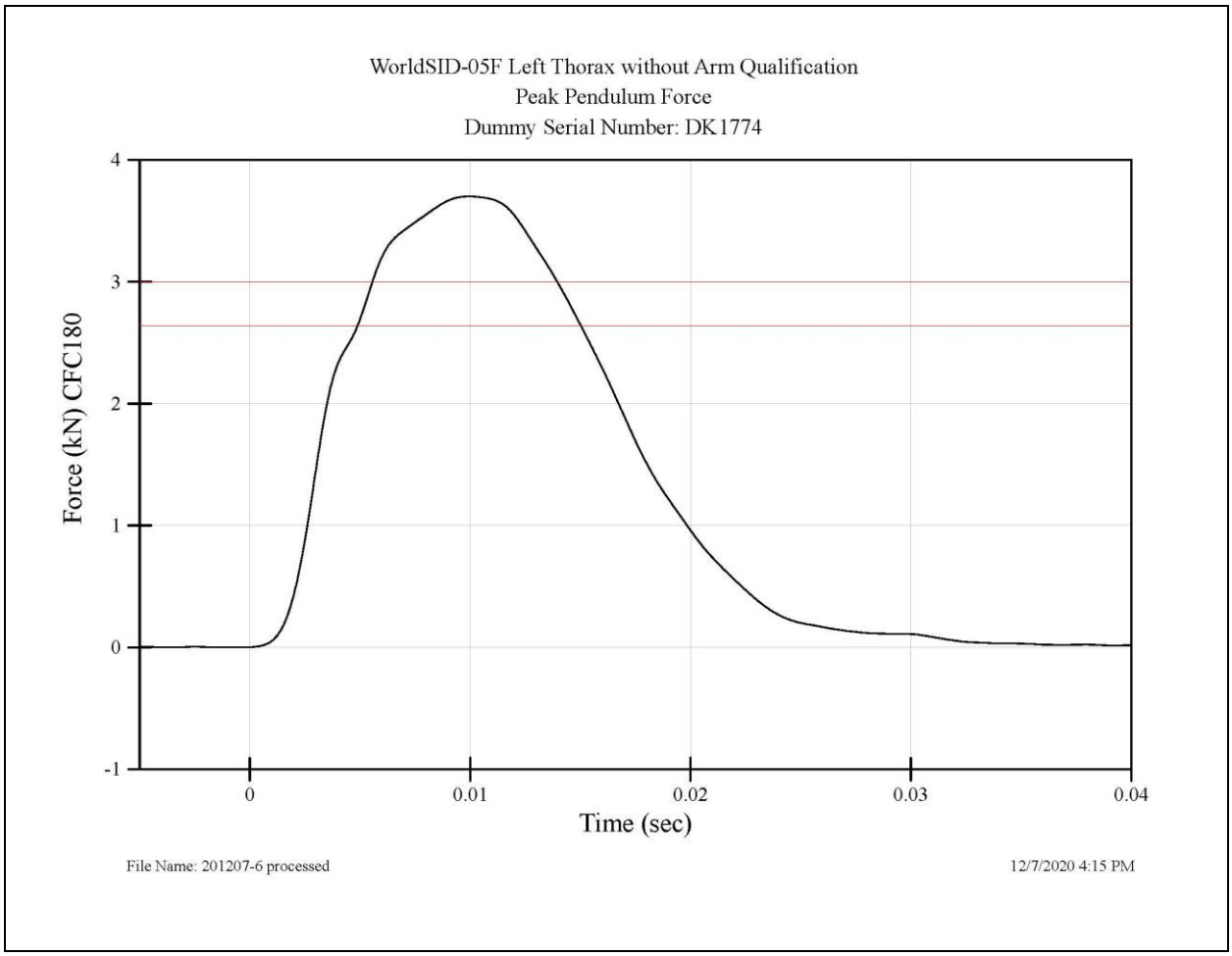
Test ID: 201207-6
Test Date: 12/7/2020
Test Time: 4:15 PM

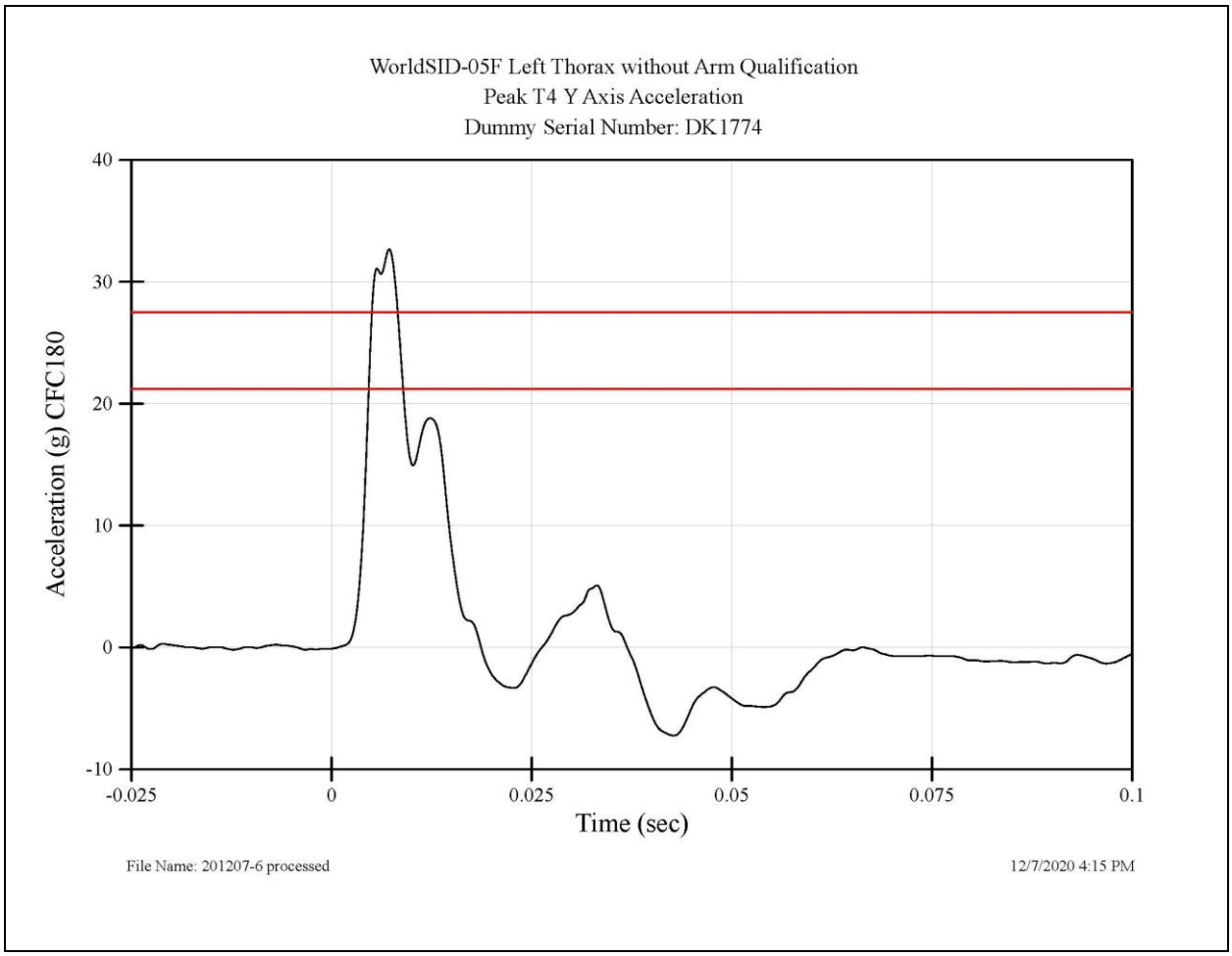
Test Results

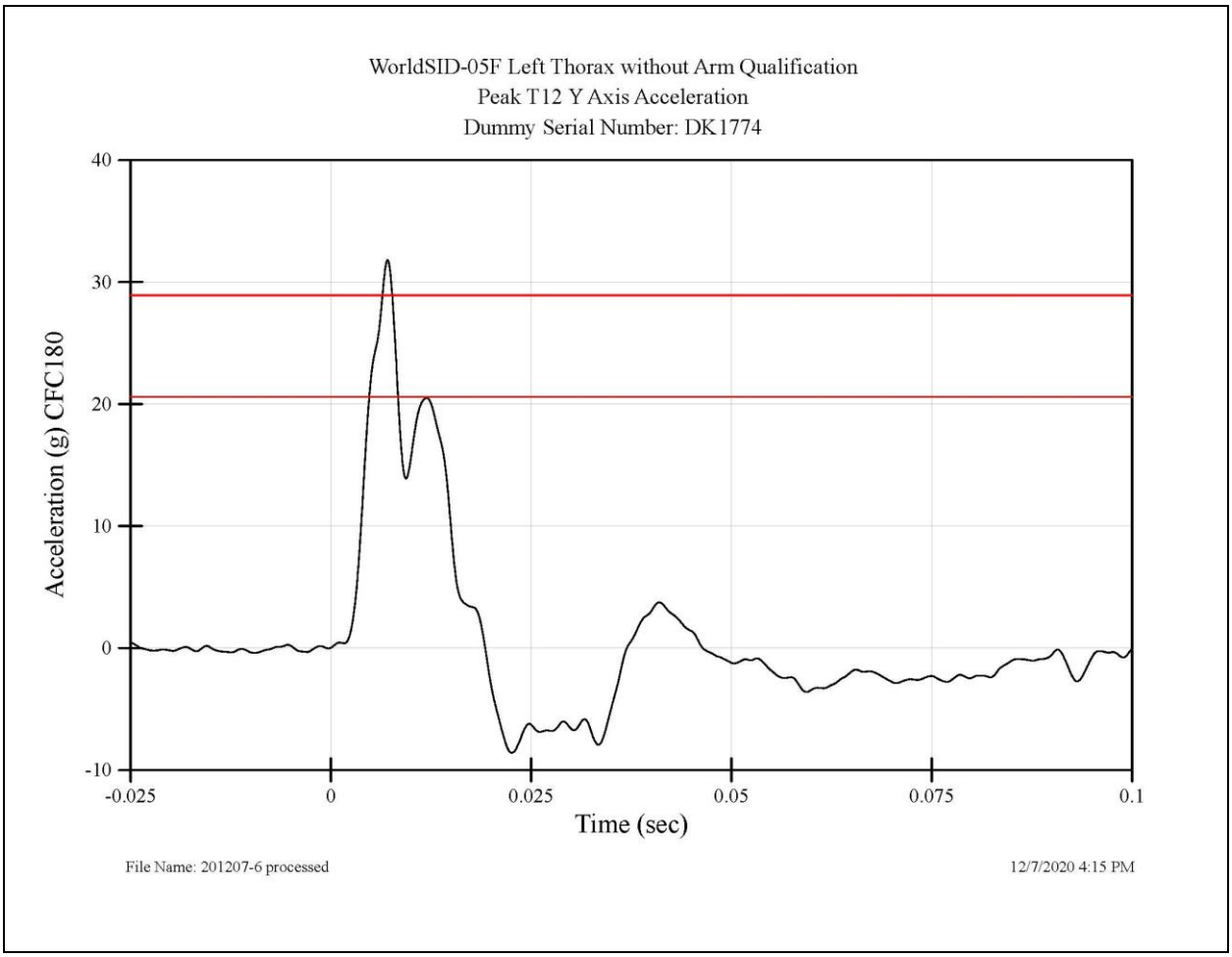
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.9	Pass
Test Humidity (%)	10 - 70	26	Pass
Test Velocity (m/s)	4.30 - 4.50	4.303	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.3	Pass
Peak Probe Force (kN)	2.64 - 3.22	3.70	Fail
Peak T4 Y Acceleration	21.2 - 27.5	32.67	Fail
Peak T12 Y Acceleration	20.6 - 28.9	31.80	Fail
Peak Thorax Rib 1 Y Length Change (mm)	20.5 - 27.7	17.82	Fail
Peak Thorax Rib 2 Y Length Change (mm)	21.7 - 26.7	18.94	Fail
Peak Thorax Rib 3 Y Length Change (mm)	20.9 - 27.3	18.69	Fail

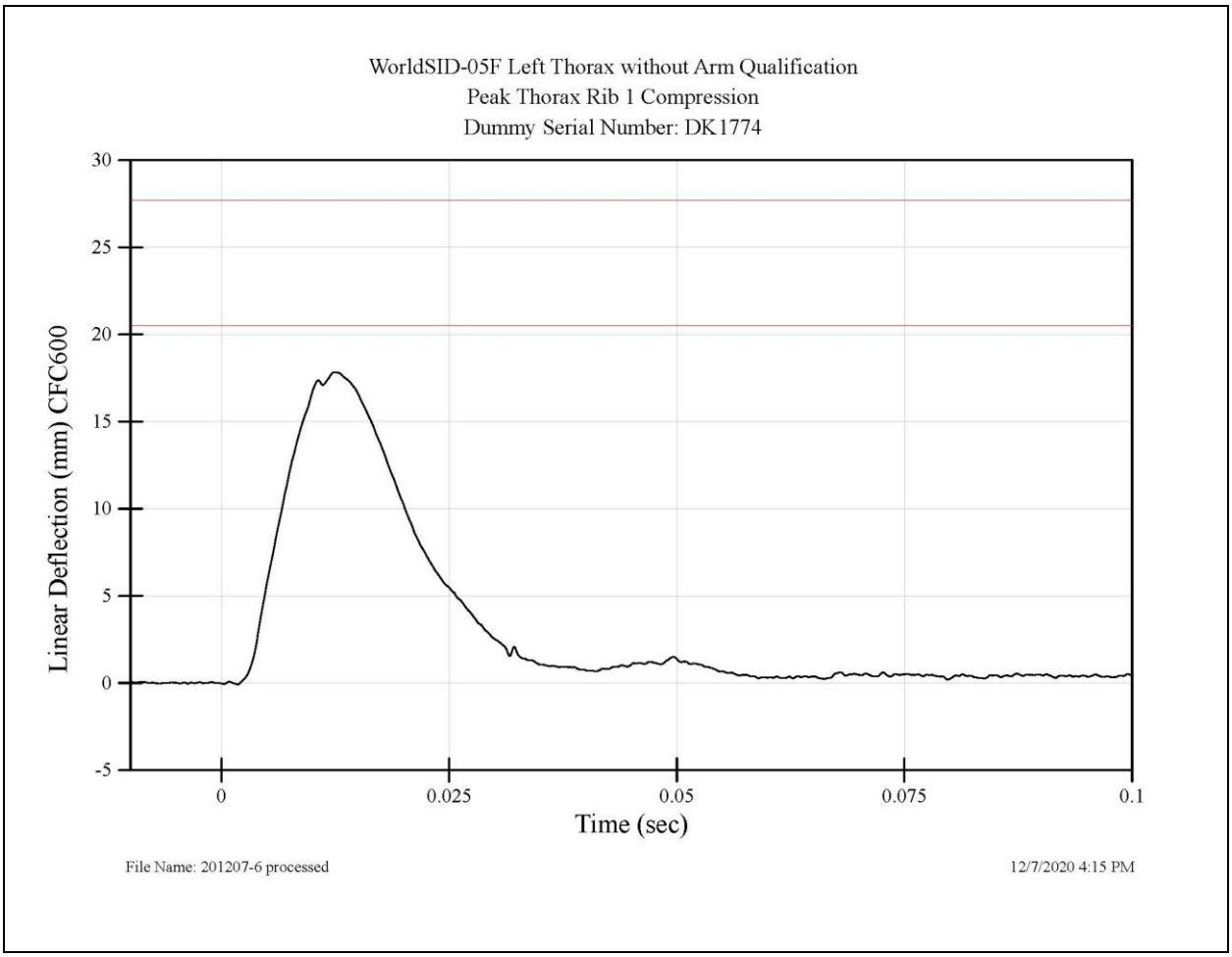
* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

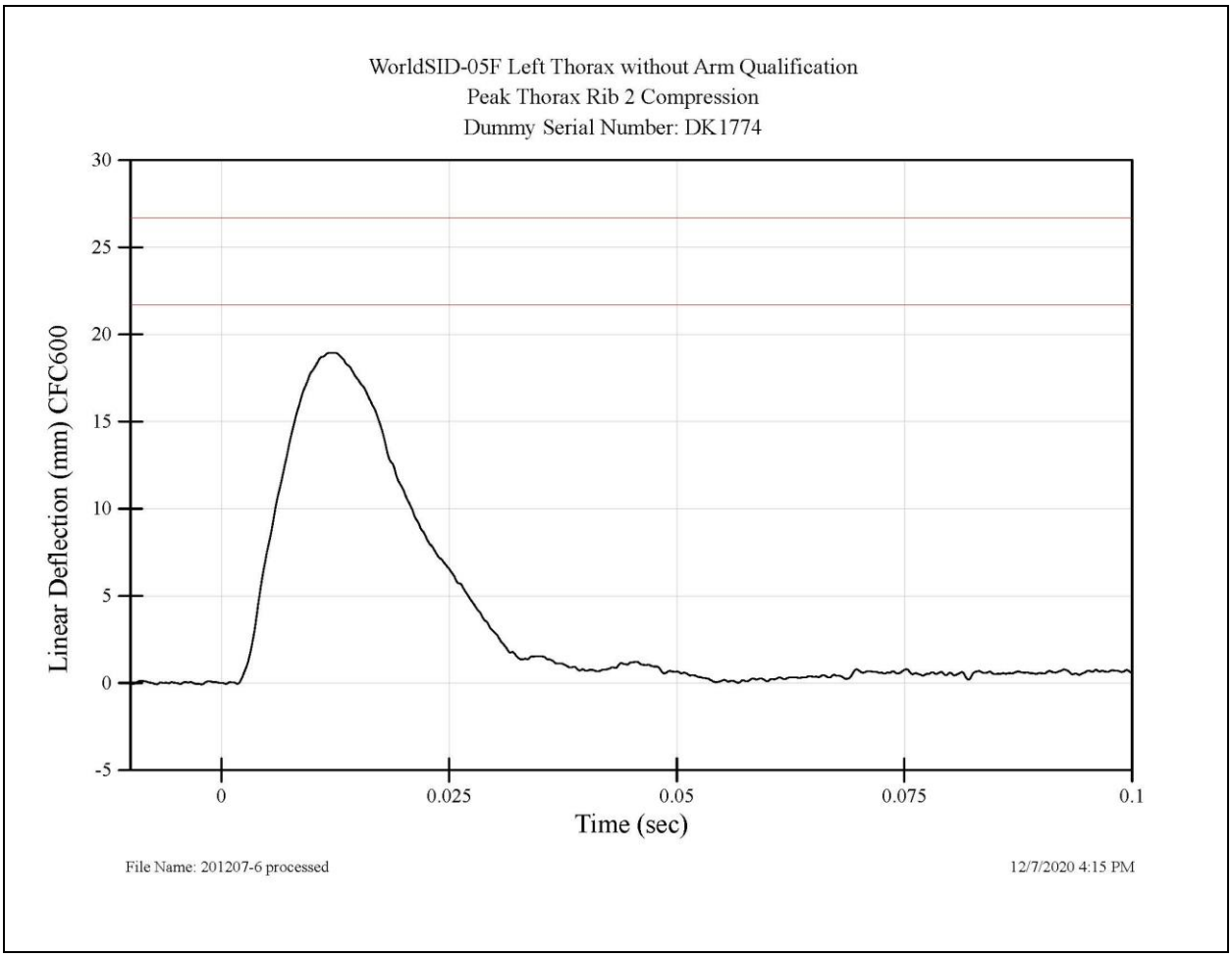
File Name: 201207-6 processed

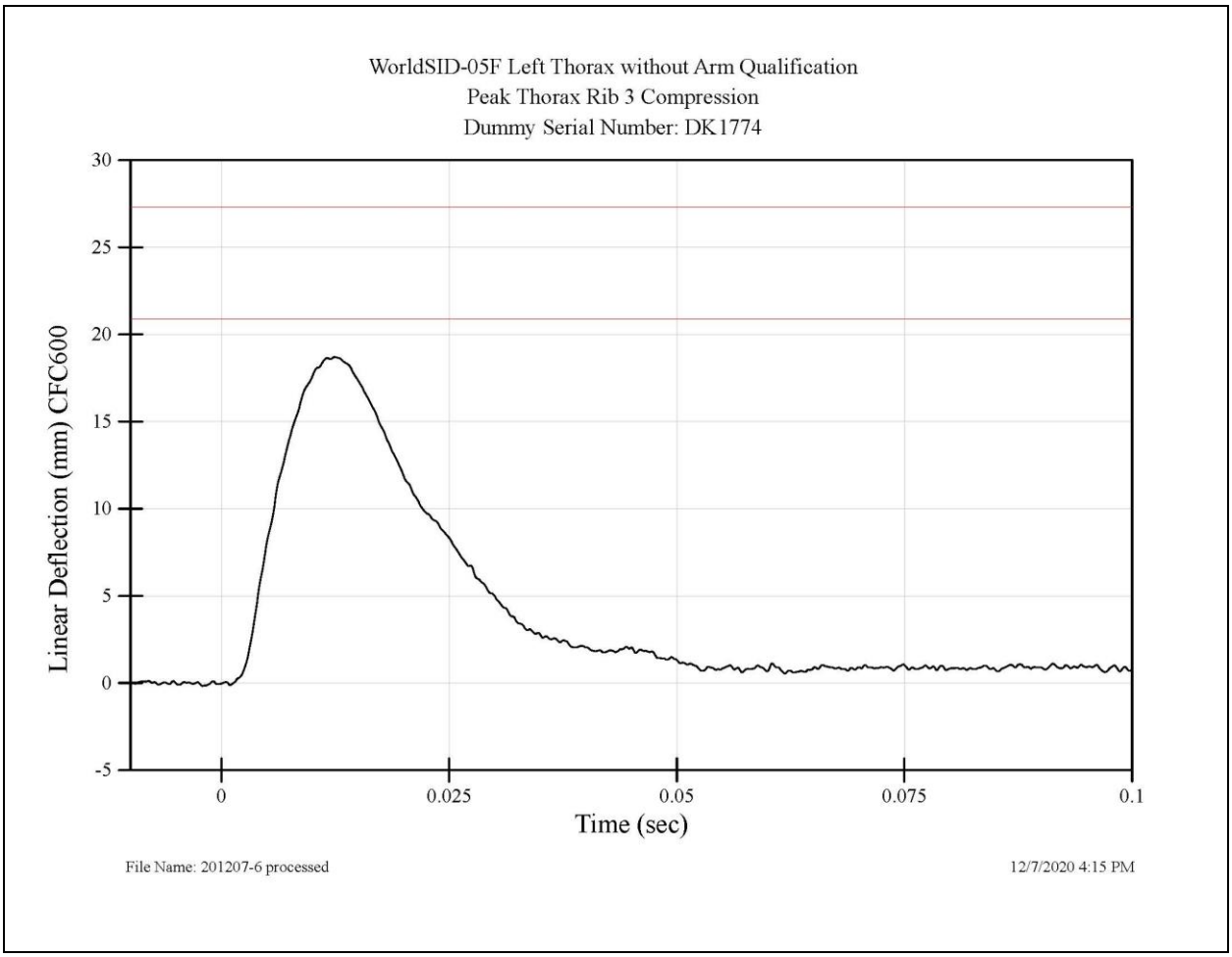

WorldSID-05F Left Thorax without Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
4
3
2
1
0
-1
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 201207-6 processed
12/7/2020 4:15 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
40
30
20
10
0
-10
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-6 processed
12/7/2020 4:15 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
40
30
20
10
0
-10
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-6 processed
12/7/2020 4:15 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-6 processed
12/7/2020 4:15 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-6 processed
12/7/2020 4:15 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201207-6 processed
12/7/2020 4:15 PM

WorldSID-05F Left Abdomen Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270
Thorax Rib 1: DM2783
Thorax Rib 2: DM2784
Thorax Rib 3: DM2787
Abdomen Rib 1: DM5165
Abdomen Rib 2: DM5167
RibEye: 161

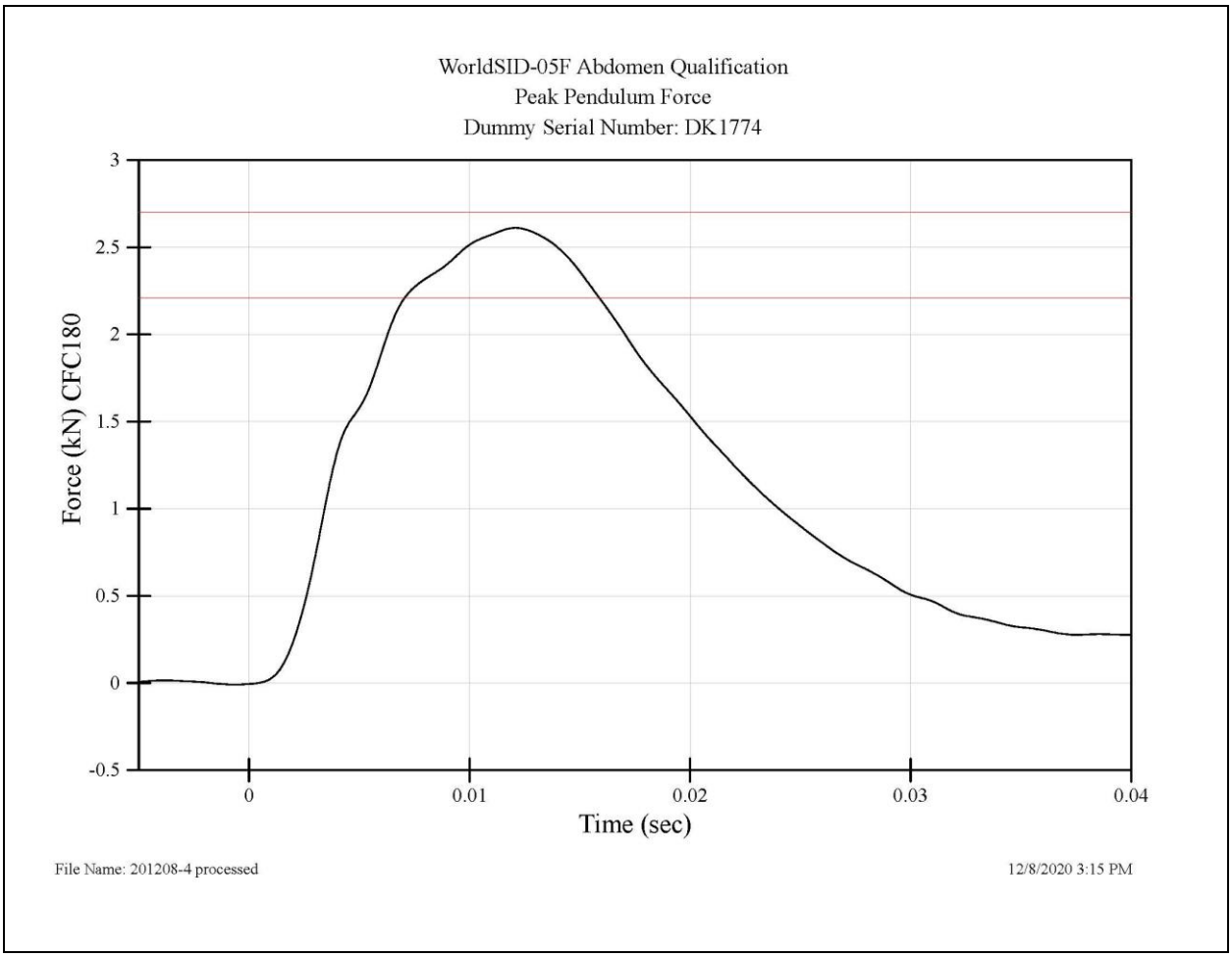
Test ID: 201208-4
Test Date: 12/8/2020
Test Time: 3:15 PM

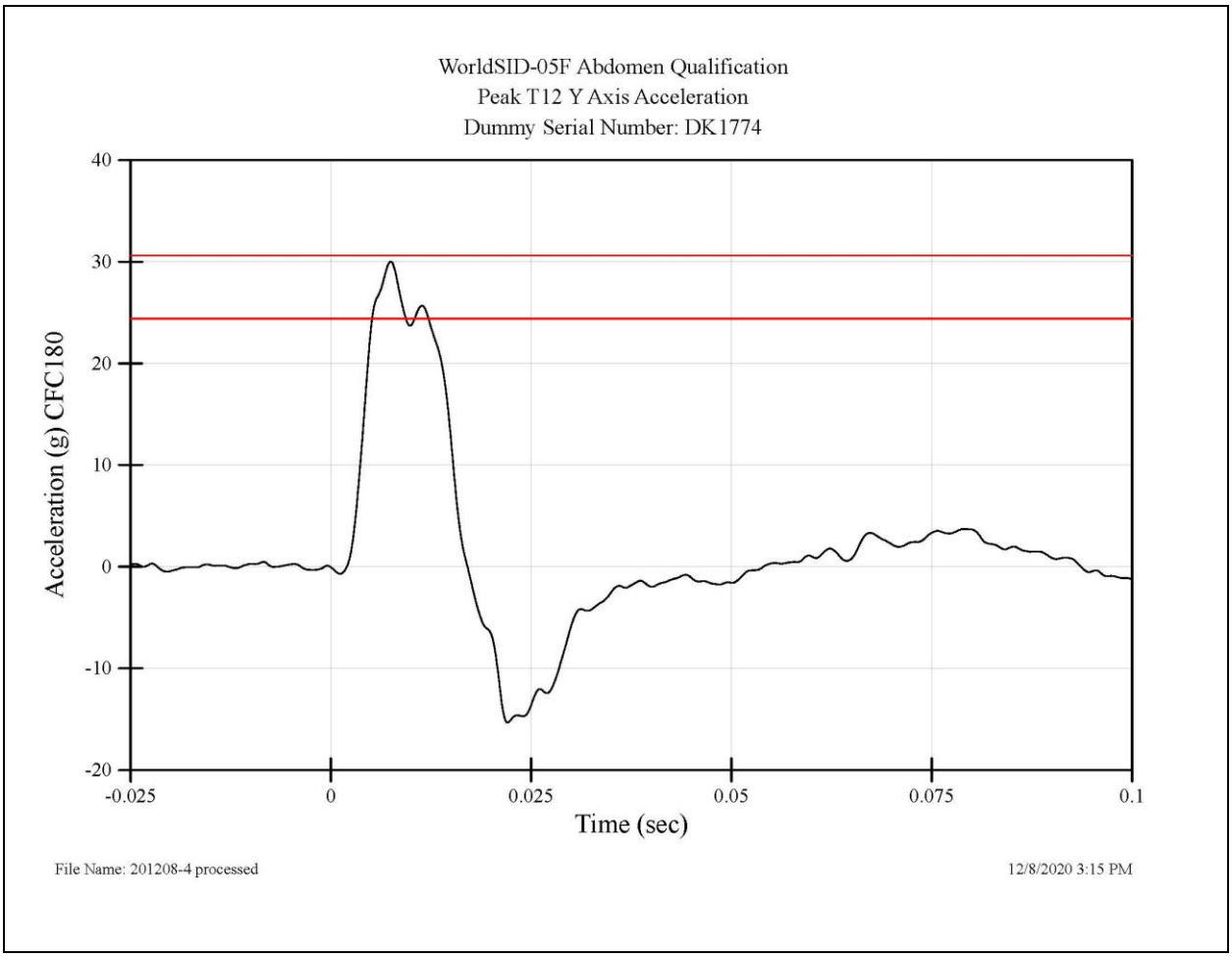
Test Results

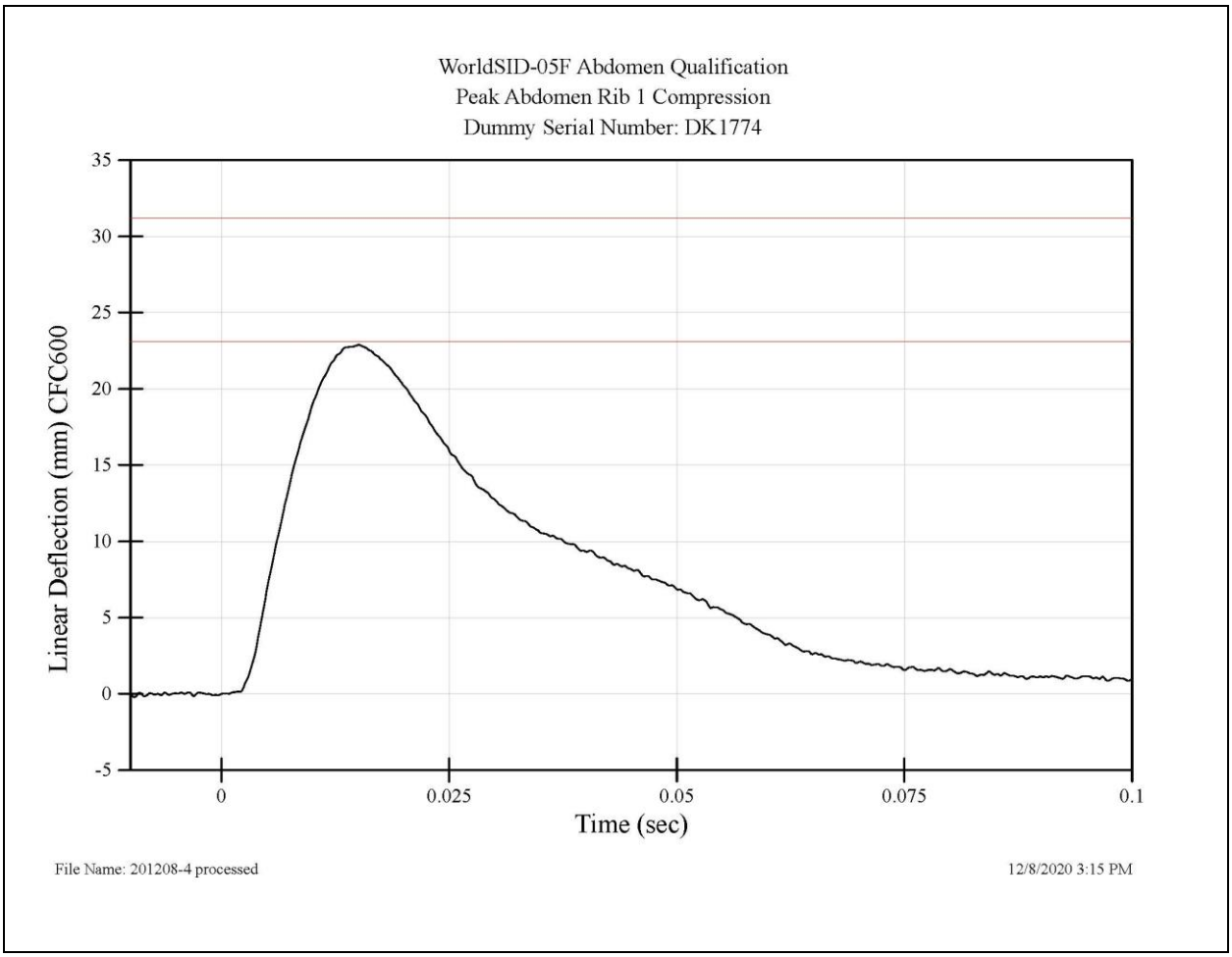
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.9	Pass
Test Humidity (%)	10 - 70	26	Pass
Test Velocity (m/s)	4.20 - 4.40	4.305	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	23.0	Pass
Peak Probe Force (kN)	2.21 - 2.70	2.61	Pass
Peak T12 Acceleration (g)	24.4 - 30.6	30.02	Pass
Peak Abdomen Rib 1 Length Change (mm)	23.1 - 31.2	22.88	Fail
Peak Abdomen Rib 2 Length Change (mm)	22.7 - 27.8	22.58	Fail

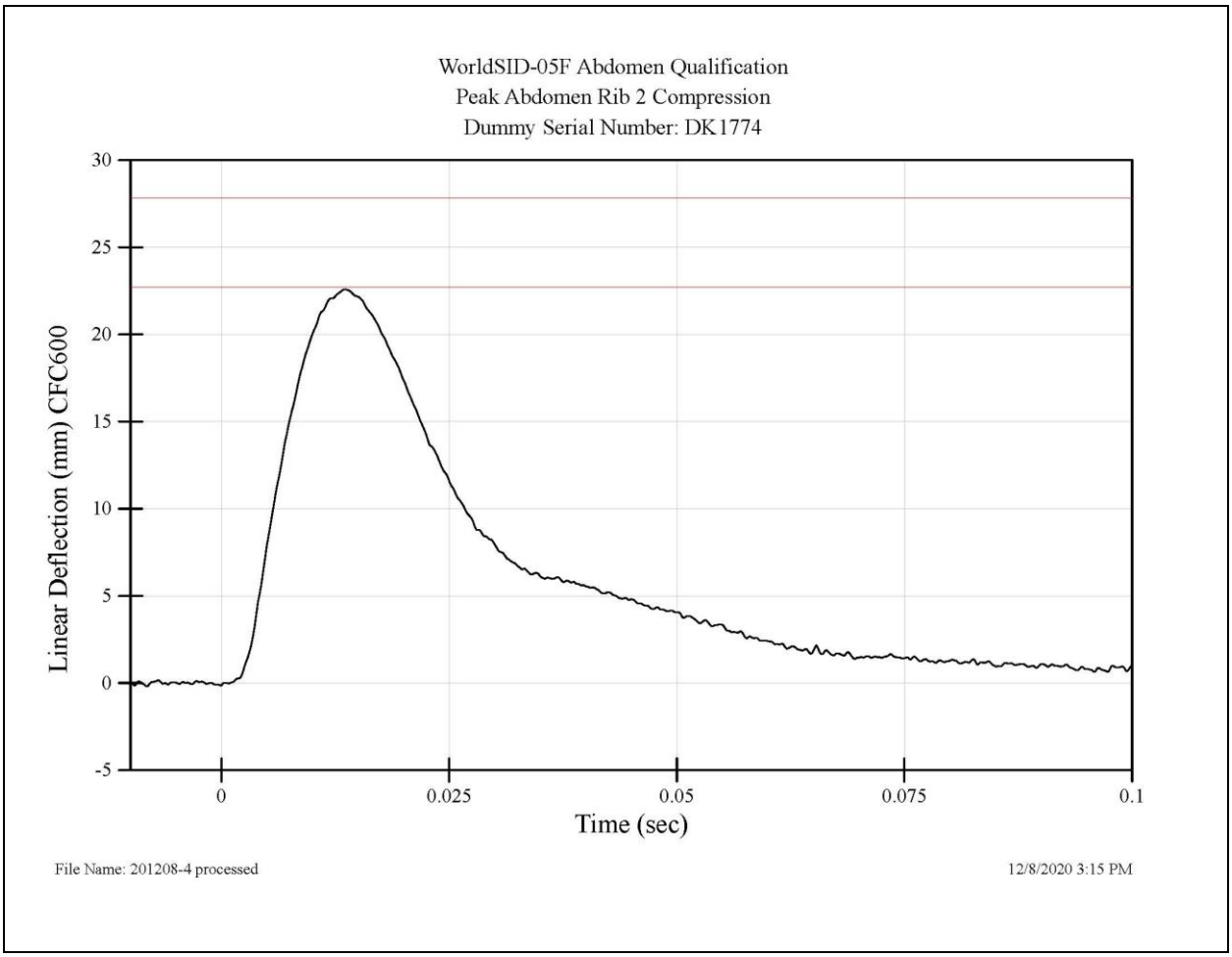
* WorldSID-50M Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 201208-4 processed


WorldSID-05F Abdomen Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
3
2.5
2
1.5
1
0.5
0
-0.5
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 201208-4 processed
12/8/2020 3:15 PM


WorldSID-05F Abdomen Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
40
30
20
10
0
-10
-20
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201208-4 processed
12/8/2020 3:15 PM


WorldSID-05F Abdomen Qualification
Peak Abdomen Rib 1 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
35
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201208-4 processed
12/8/2020 3:15 PM


WorldSID-05F Abdomen Qualification
Peak Abdomen Rib 2 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201208-4 processed
12/8/2020 3:15 PM

WorldSID-05F Left Pelvis Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Pelvis Bone: DW2458

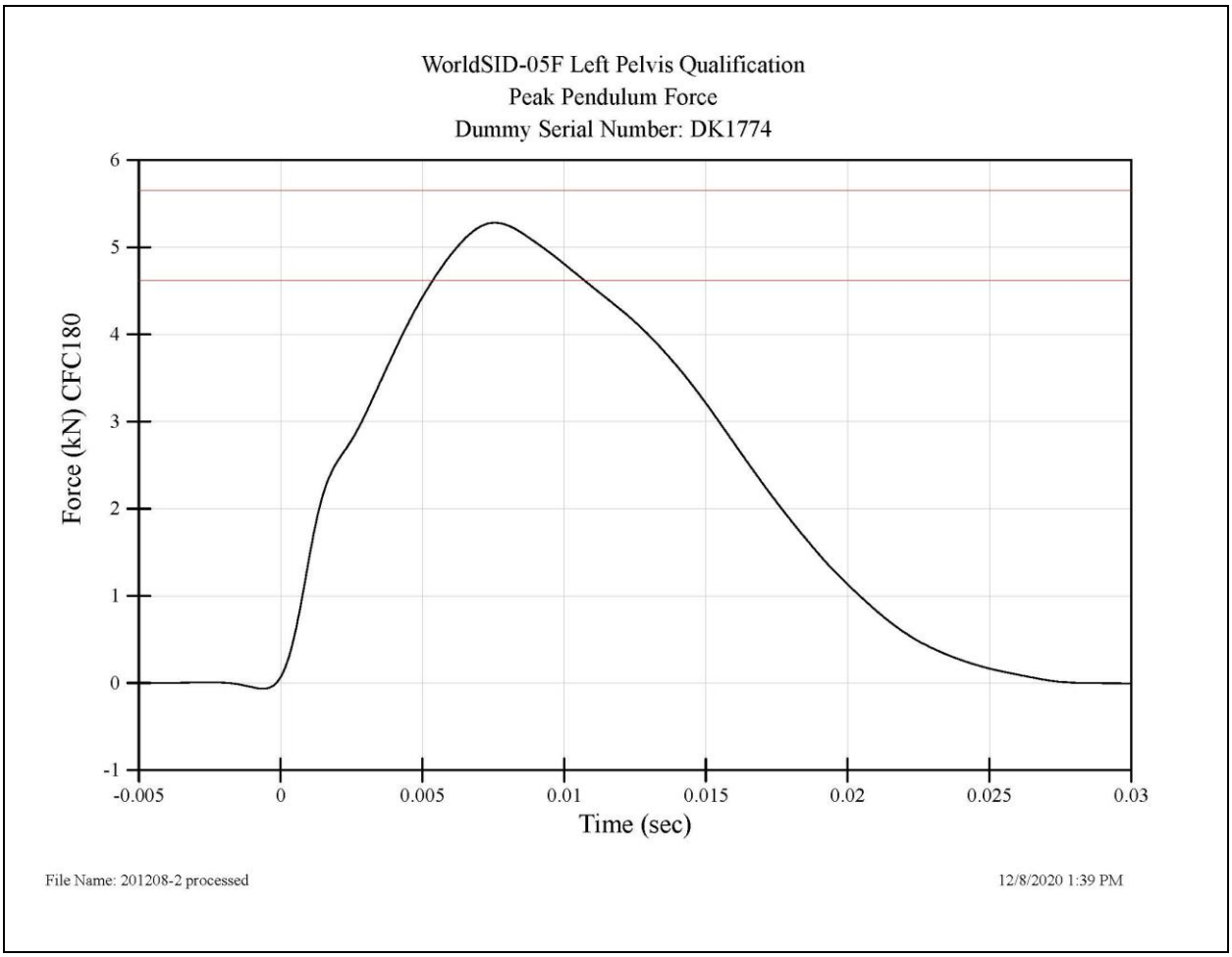
Test ID: 201208-2
Test Date: 12/8/2020
Test Time: 1:39 PM

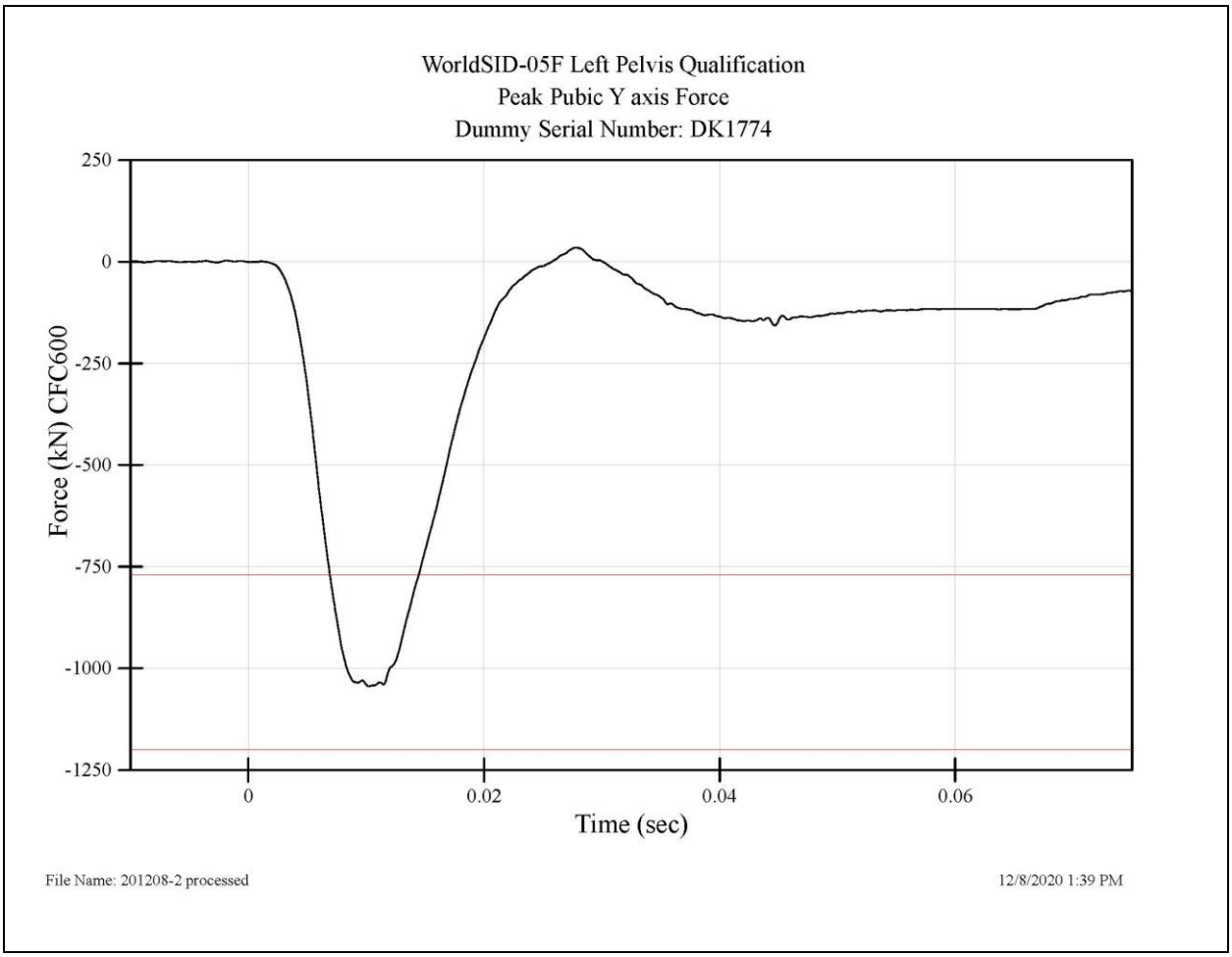
Test Results

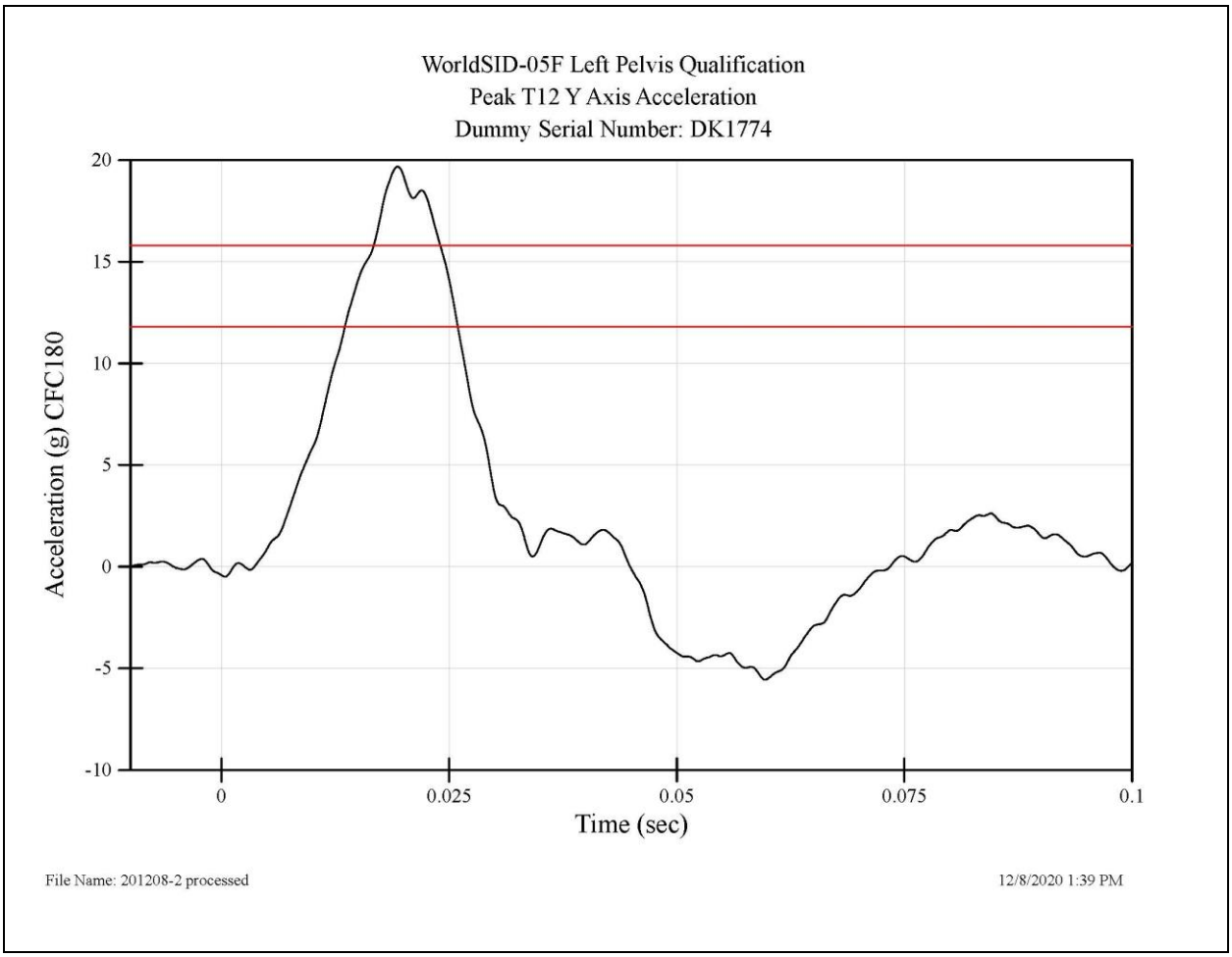
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.9	Pass
Test Humidity (%)	10 - 70	25	Pass
Test Velocity (m/s)	6.60 - 6.80	6.693	Pass
Peak Probe Force (kN)	4.62 - 5.65	5.28	Pass
Peak Pubic Force FY (N)	-1200.0 - (-770.0)	-1044.06	Pass
Peak T12 Acceleration (g)	11.8 - 15.8	19.67	Fail
Peak Pelvis Acceleration (g)	48.6 - 74.4	43.34	Fail

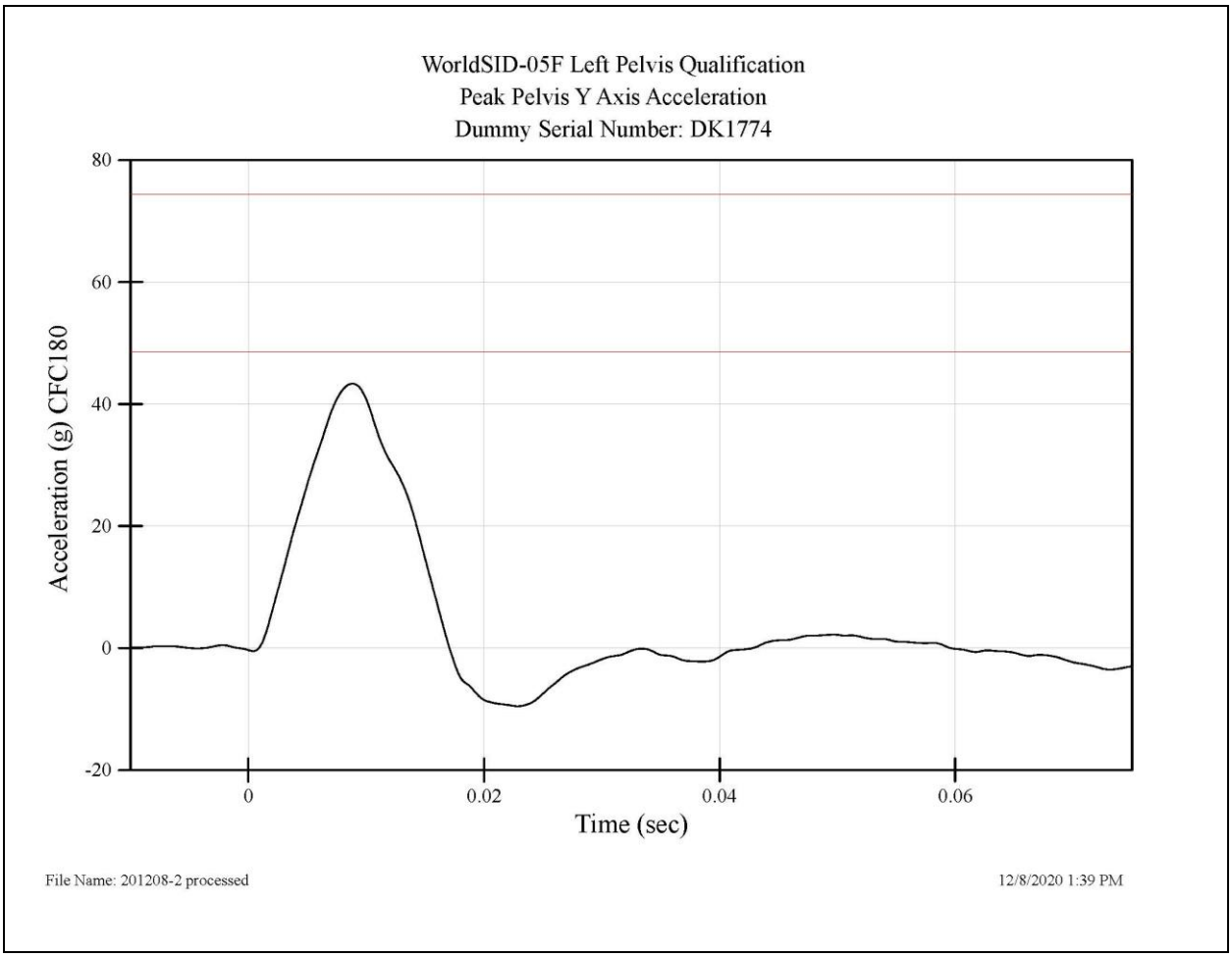
* WorldSID-50M Qualification Manual - Humanetics WorldSID Small Female - Rev E

File Name: 201208-2 processed


WorldSID-05F Left Pelvis Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
6
5
4
3
2
1
0
-1
-0.005
0
0.005
0.01
0.015
0.02
0.025
0.03
Time (sec)
File Name: 201208-2 processed
12/8/2020 1:39 PM


WorldSID-05F Left Pelvis Qualification
Peak Pubic Y axis Force
Dummy Serial Number: DK1774
250
0
-250
-500
-750
-1000
-1250
Force (kN) CFC600
0
0.02
0.04
0.06
Time (sec)
File Name: 201208-2 processed
12/8/2020 1:39 PM


WorldSID-05F Left Pelvis Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
20
15
10
5
0
-5
-10
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 201208-2 processed
12/8/2020 1:39 PM


WorldSID-05F Left Pelvis Qualification
Peak Pelvis Y Axis Acceleration
Dummy Serial Number: DK1774
80
60
40
20
0
-20
Acceleration (g) CFC180
0
0.02
0.04
0.06
Time (sec)
File Name: 201208-2 processed
12/8/2020 1:39 PM

Post-Test Calibration Sheets
Passenger S/N DK1774

WorldSID-05F Head Front Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Head: DM1000

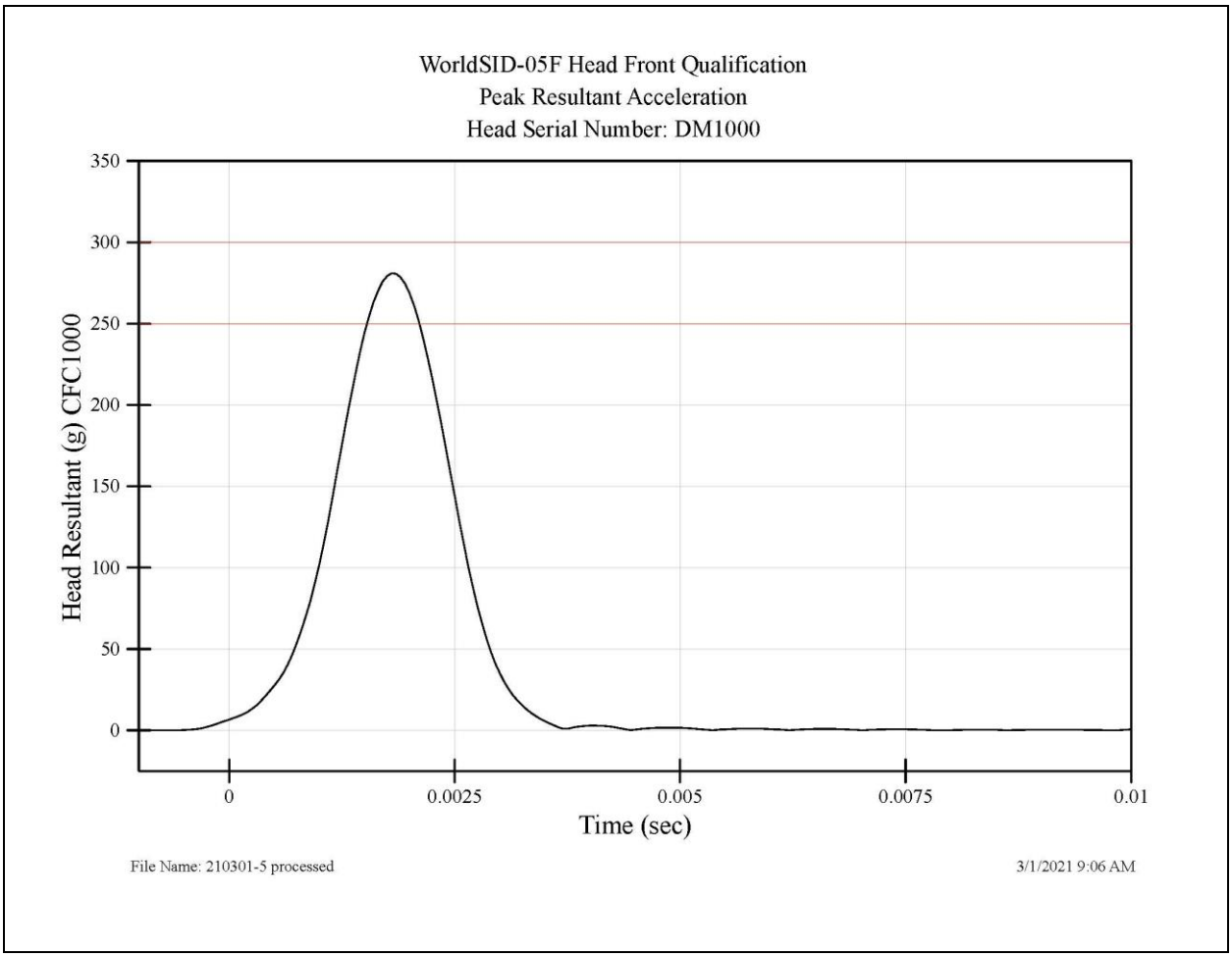
Test ID: 210301-5
Test Date: 3/1/2021
Test Time: 9:06 AM

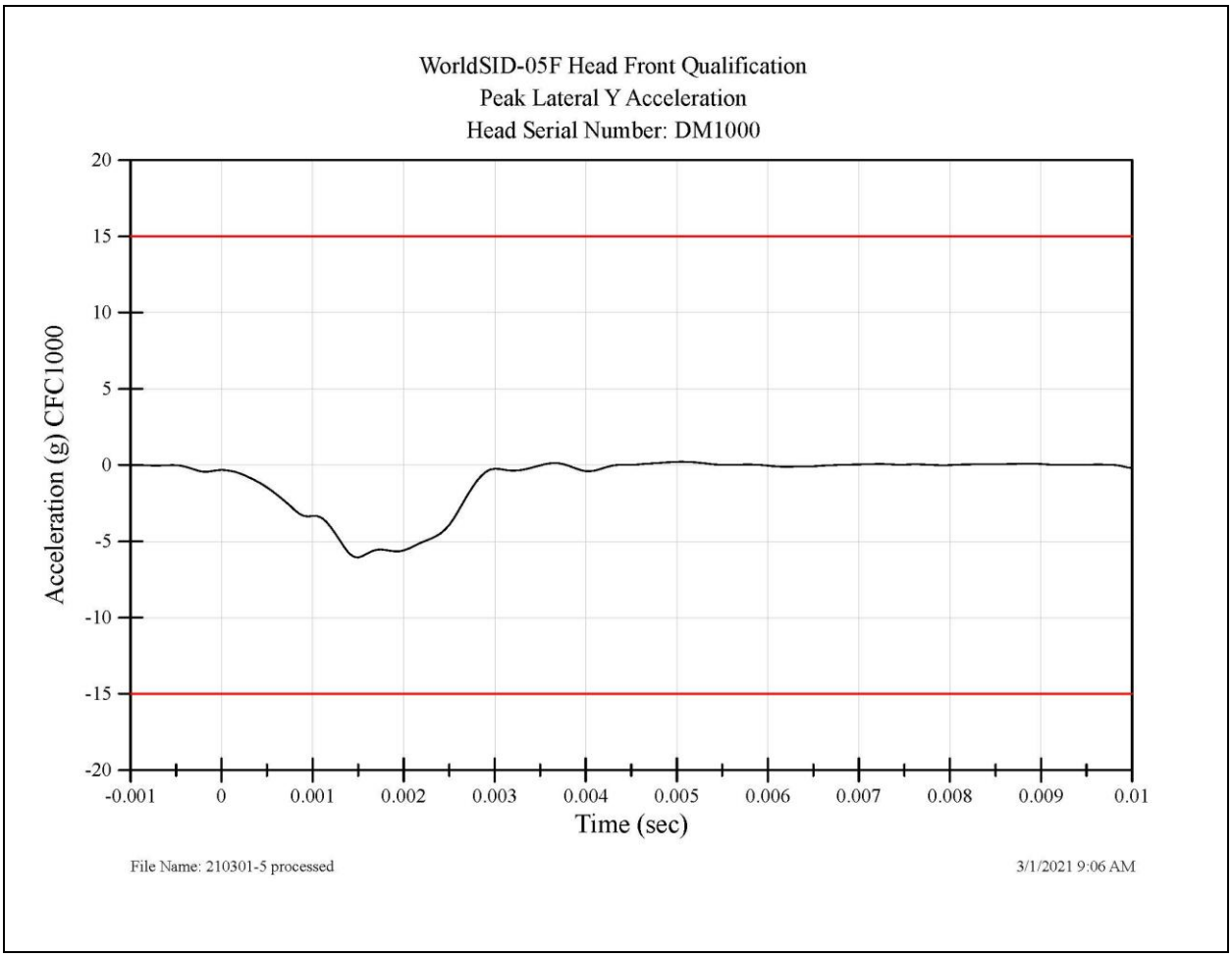
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.7	Pass
Test Humidity (%)	10 - 70	51	Pass
Peak Resultant Acceleration (g)	250.0 - 300.0	280.9	Pass
Peak Acceleration, y-axis (g)	-15.00 - 15.00	-6.07	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	1.0	Pass

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

File Name: 210301-5 processed


WorldSID-05F Head Front Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000
Head Resultant (g) CFC1000
350
300
250
200
150
100
50
0
0
0.0025
0.005
0.0075
0.01
Time (sec)
File Name: 210301-5 processed
3/1/2021 9:06 AM


WorldSID-05F Head Front Qualification
Peak Lateral Y Acceleration
Head Serial Number: DM1000
Acceleration (g) CFC1000
20
15
10
5
0
-5
-10
-15
-20
-0.001
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
Time (sec)
File Name: 210301-5 processed
3/1/2021 9:06 AM

WorldSID-05F Head Left Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Head: DM1000

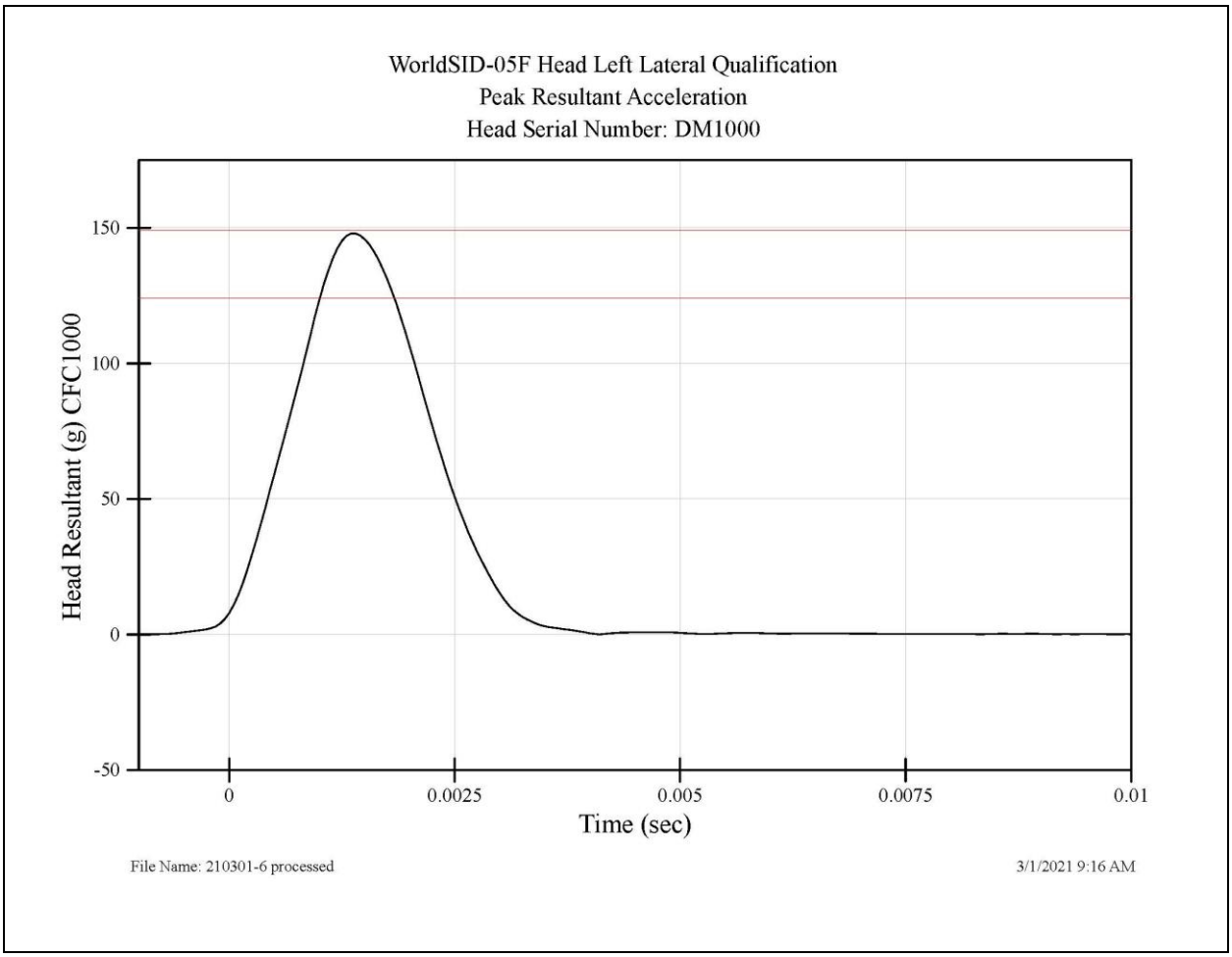
Test ID: 210301-6
Test Date: 3/1/2021
Test Time: 9:16 AM

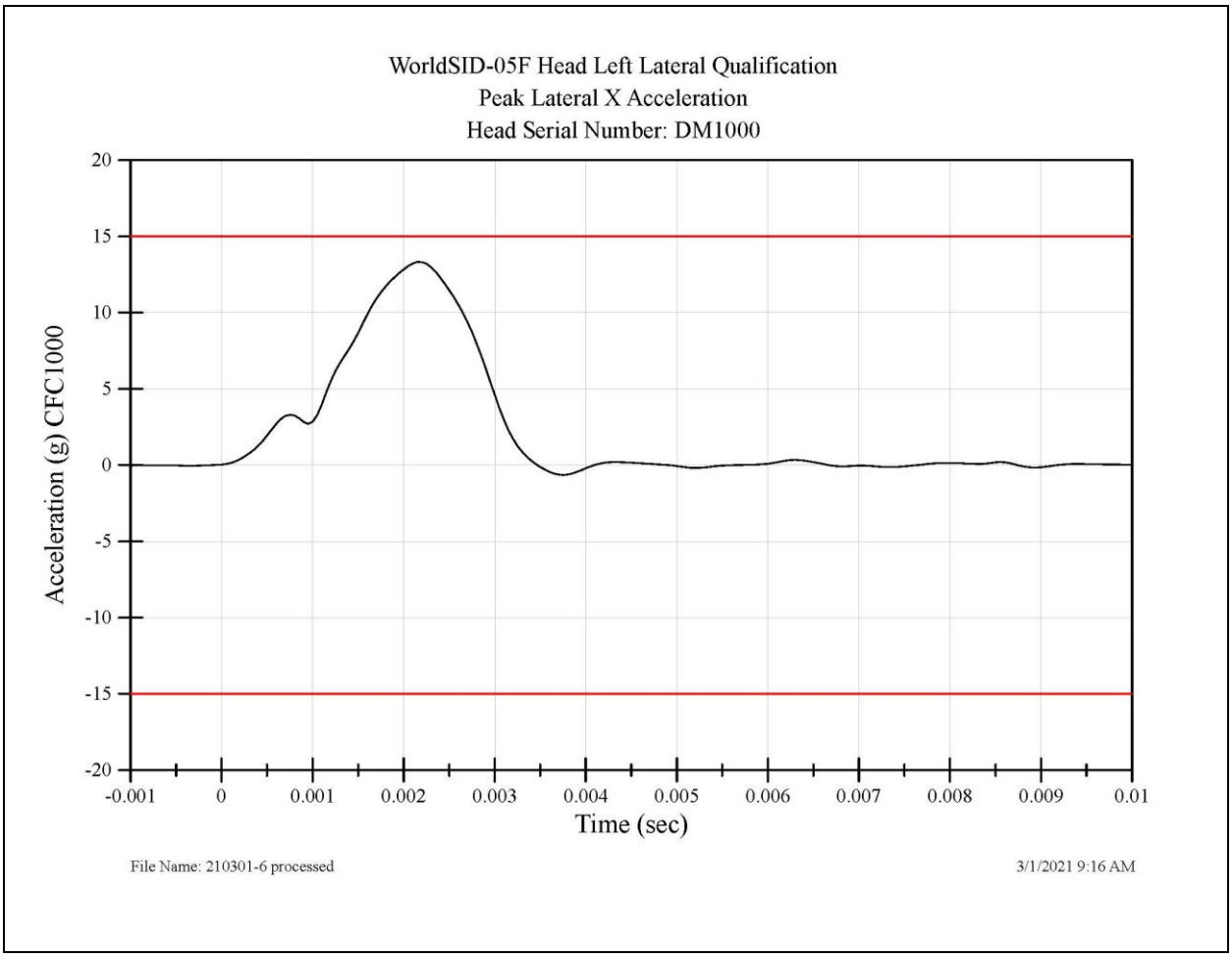
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.9	Pass
Test Humidity (%)	10 - 70	52	Pass
Peak Resultant Acceleration (g)	124.0 - 149.0	147.9	Pass
Peak Acceleration, x-axis (g)	-15.00 - 15.00	13.31	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	0.6	Pass

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

File Name: 210301-6 processed


WorldSID-05F Head Left Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000
Head Resultant (g) CFC1000
150
100
50
0
-50
0
0.0025
0.005
0.0075
0.01
Time (sec)
File Name: 210301-6 processed
3/1/2021 9:16 AM


WorldSID-05F Head Left Lateral Qualification
Peak Lateral X Acceleration
Head Serial Number: DM1000
Acceleration (g) CFC1000
20
15
10
5
0
-5
-10
-15
-20
-0.001
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
Time (sec)
File Name: 210301-6 processed
3/1/2021 9:16 AM

WorldSID-05F Head Right Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Head: DM1000

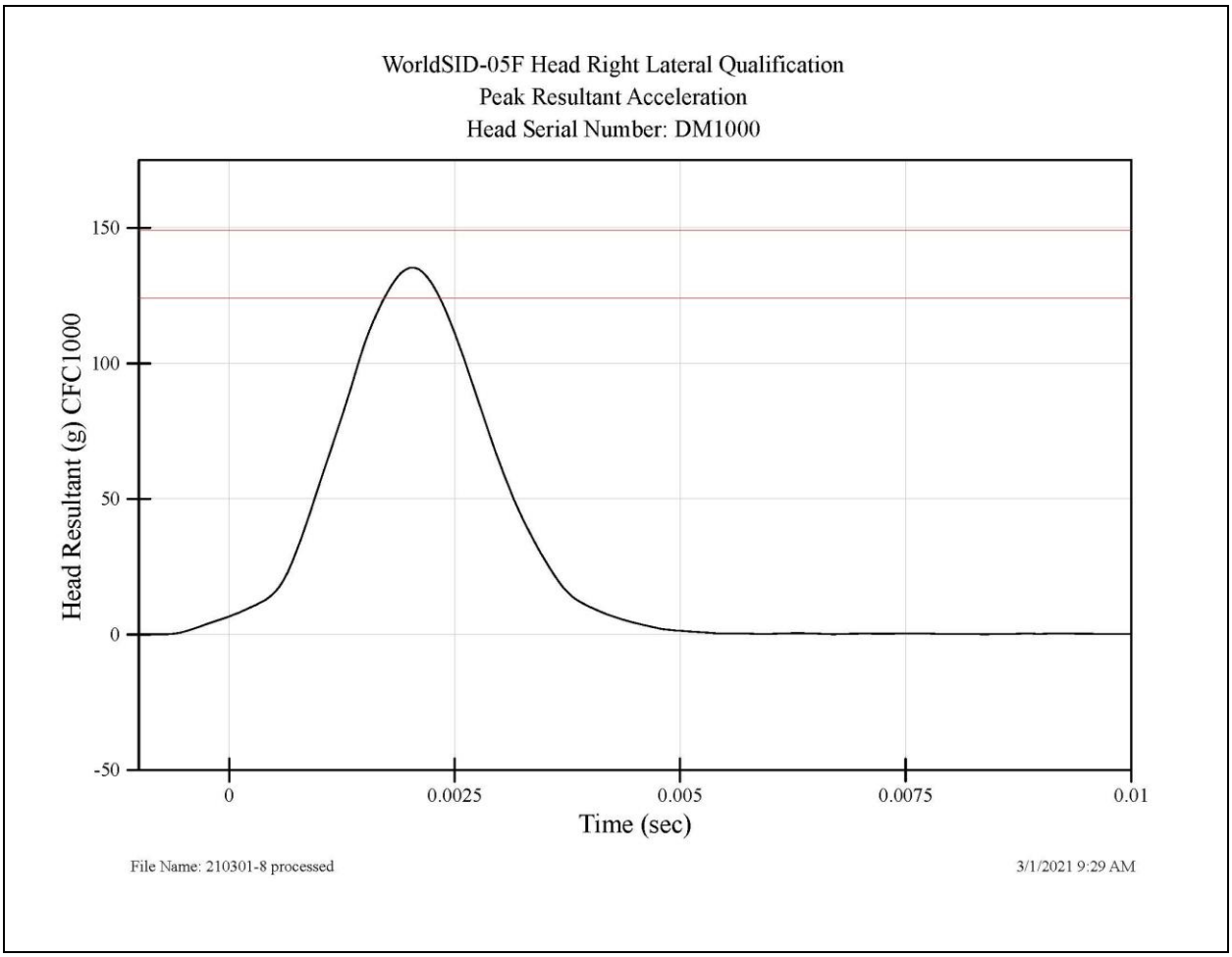
Test ID: 210301-8
Test Date: 3/1/2021
Test Time: 9:29 AM

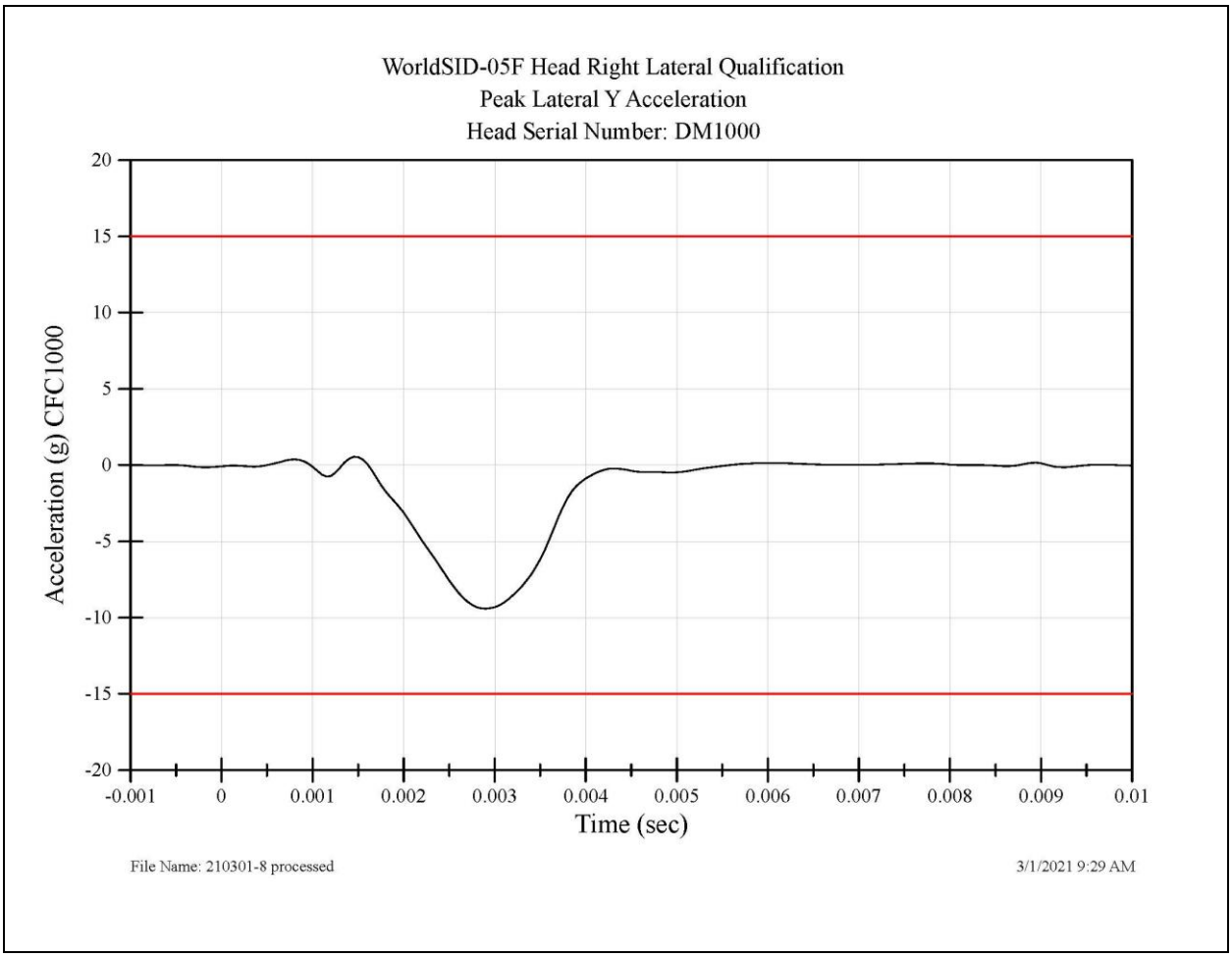
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.9	Pass
Test Humidity (%)	10 - 70	52	Pass
Peak Resultant Acceleration (g)	124.0 - 149.0	135.3	Pass
Peak Acceleration, x-axis (g)	-15.00 - 15.00	-9.41	Pass
Oscillations occurring after the main acceleration pulse (%)	-10.0 - 10.0	0.4	Pass

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

File Name: 210301-8 processed


WorldSID-05F Head Right Lateral Qualification
Peak Resultant Acceleration
Head Serial Number: DM1000
Head Resultant (g) CFC1000
150
100
50
0
-50
0
0.0025
0.005
0.0075
0.01
Time (sec)
File Name: 210301-8 processed
3/1/2021 9:29 AM


WorldSID-05F Head Right Lateral Qualification
Peak Lateral Y Acceleration
Head Serial Number: DM1000
Acceleration (g) CFC1000
20
15
10
5
0
-5
-10
-15
-20
-0.001
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
Time (sec)
File Name: 210301-8 processed
3/1/2021 9:29 AM

WorldSID-05F Neck Left Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Neck: DX6209

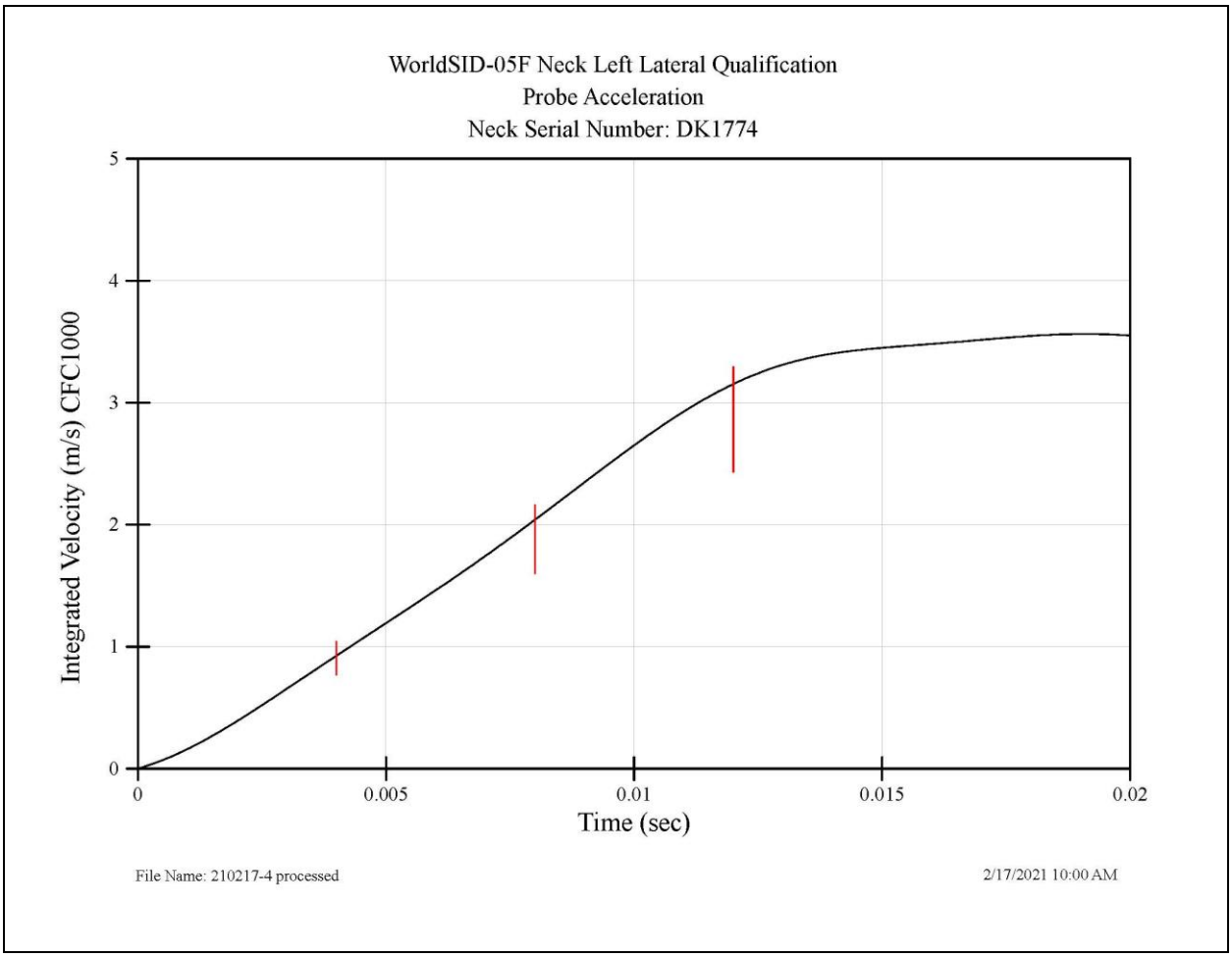
Test ID: 210217-4
Test Date: 2/17/2021
Test Time: 10:00 AM

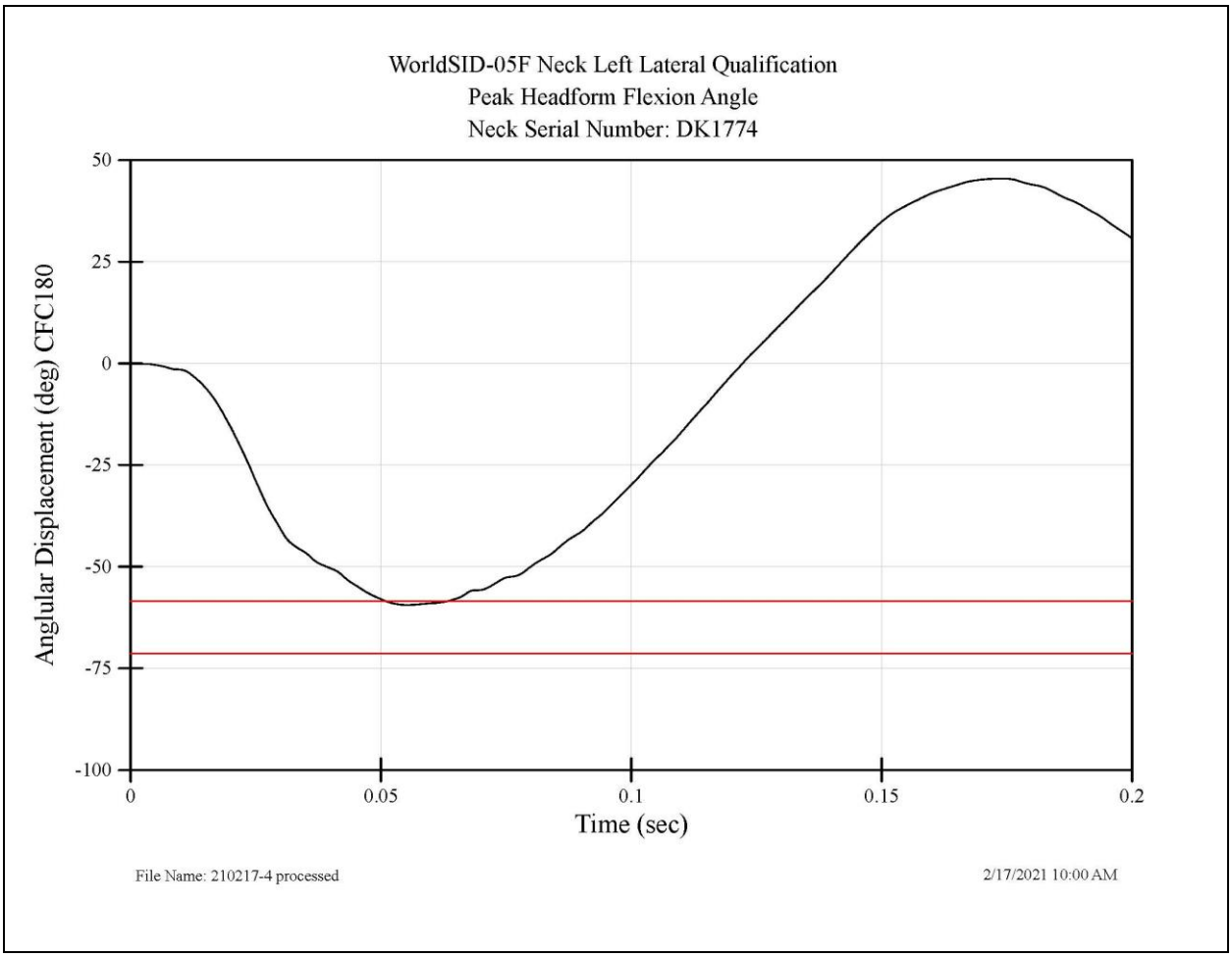
Test Results

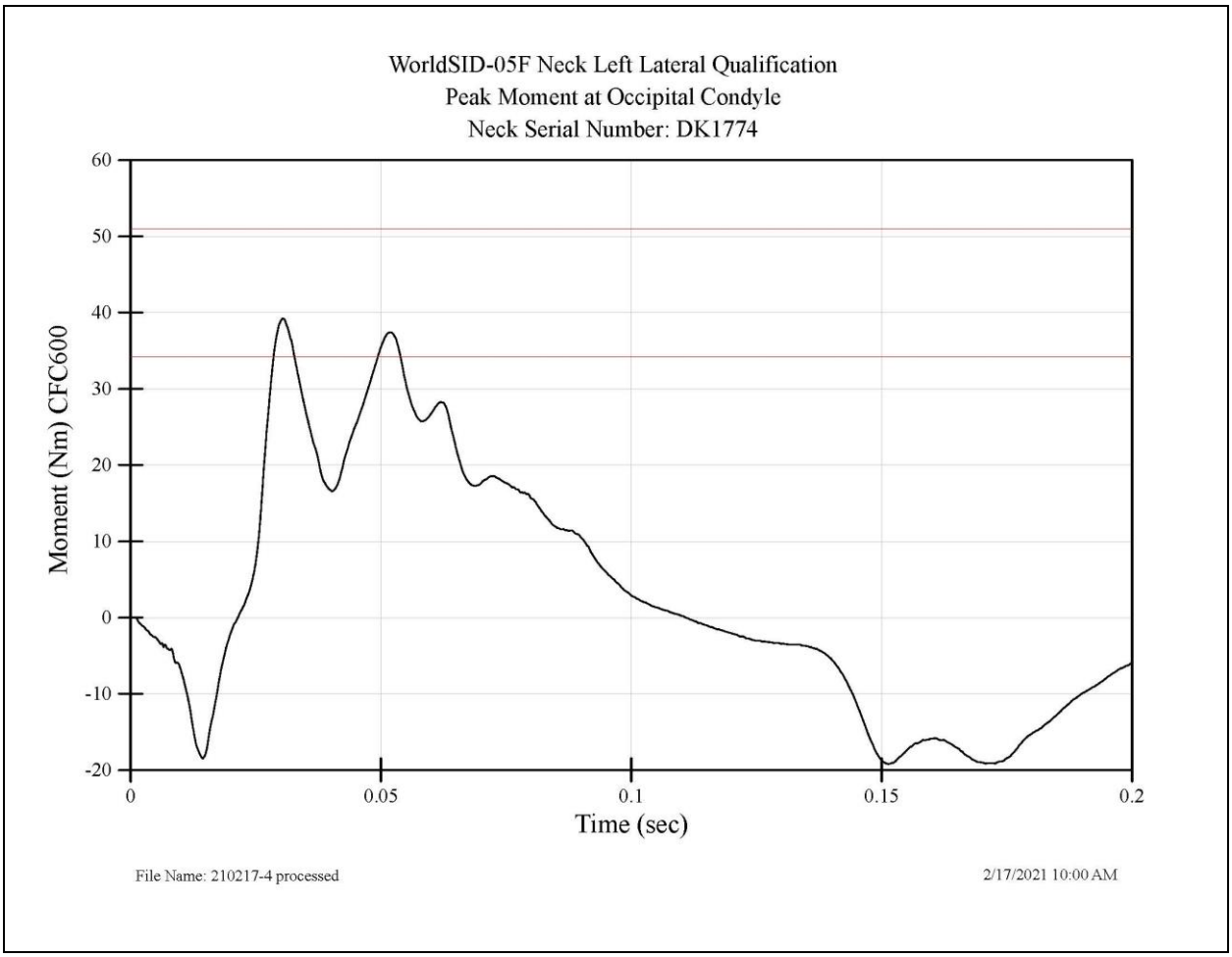
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	20.8	Pass
Test Humidity (%)	10 - 70	18	Pass
Test Velocity (m/s)	3.30 - 3.50	3.43	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.92	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.04	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.15	Pass
Peak Headform Flexion Angle (deg)	-71.4 - (-58.5)	-59.4	Pass
Peak Headform Flexion Angle Decay Time to 0 degrees (ms)	57.3 - 76.5	67.1	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	34.2 - 51.0	39.2	Pass
Peak X-Axis Moment at Occipital Condyle Decay Time to 0 Nm (ms)	69.4 - 93.3	80.5	Pass

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

File Name: 210217-4 processed


WorldSID-05F Neck Left Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774
Integrated Velocity (m/s) CFC1000
5
4
3
2
1
0
0
0.005
0.01
0.015
0.02
Time (sec)
File Name: 210217-4 processed
2/17/2021 10:00 AM


WorldSID-05F Neck Left Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774
Anglular Displacement (deg) CFC180
50
25
0
-25
-50
-75
-100
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210217-4 processed
2/17/2021 10:00 AM


WorldSID-05F Neck Left Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774
Moment (Nm) CFC600
60
50
40
30
20
10
0
-10
-20
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210217-4 processed
2/17/2021 10:00 AM

WorldSID-05F Neck Right Lateral Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Neck: DX6209

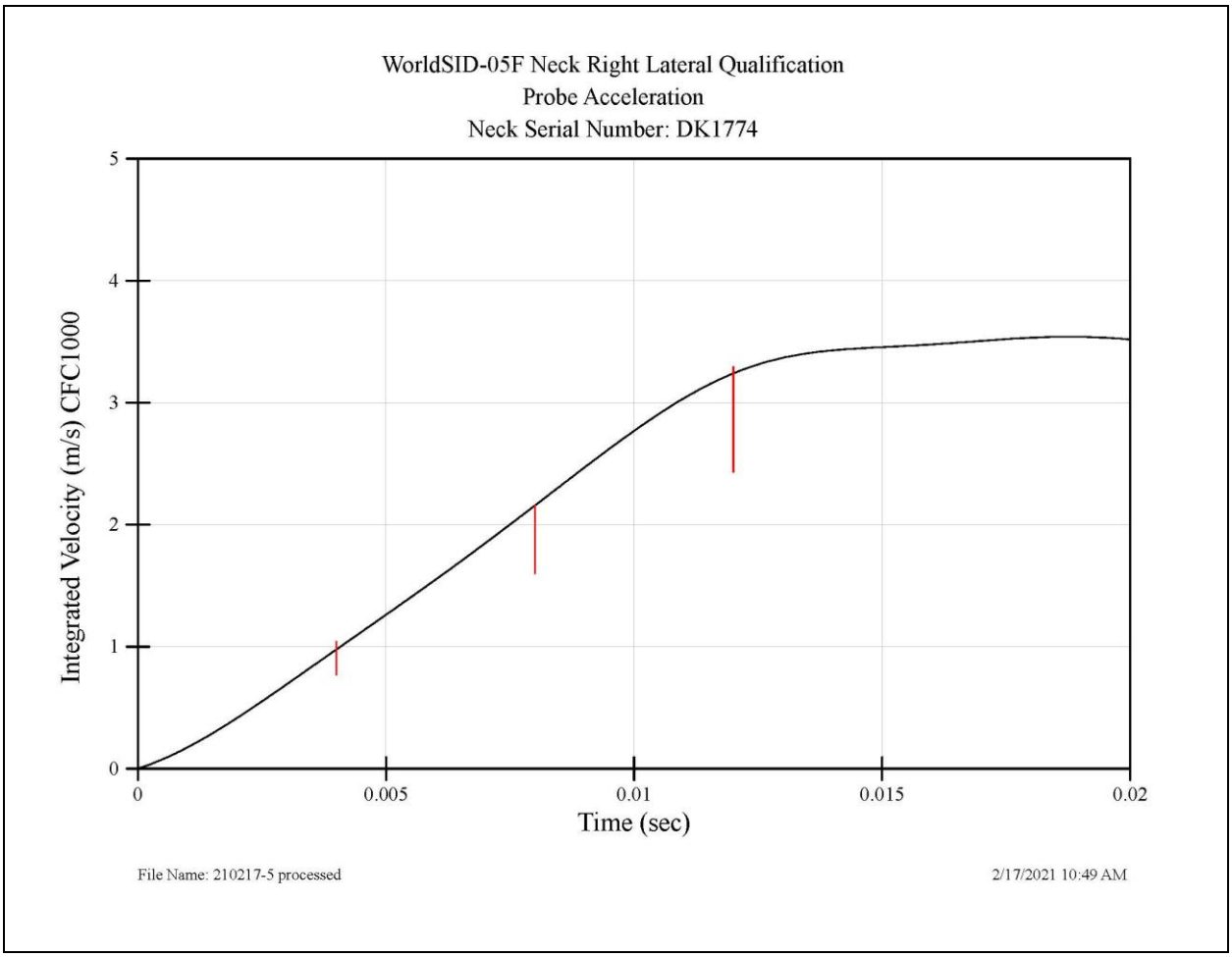
Test ID: 210217-5
Test Date: 2/17/2021
Test Time: 10:49 AM

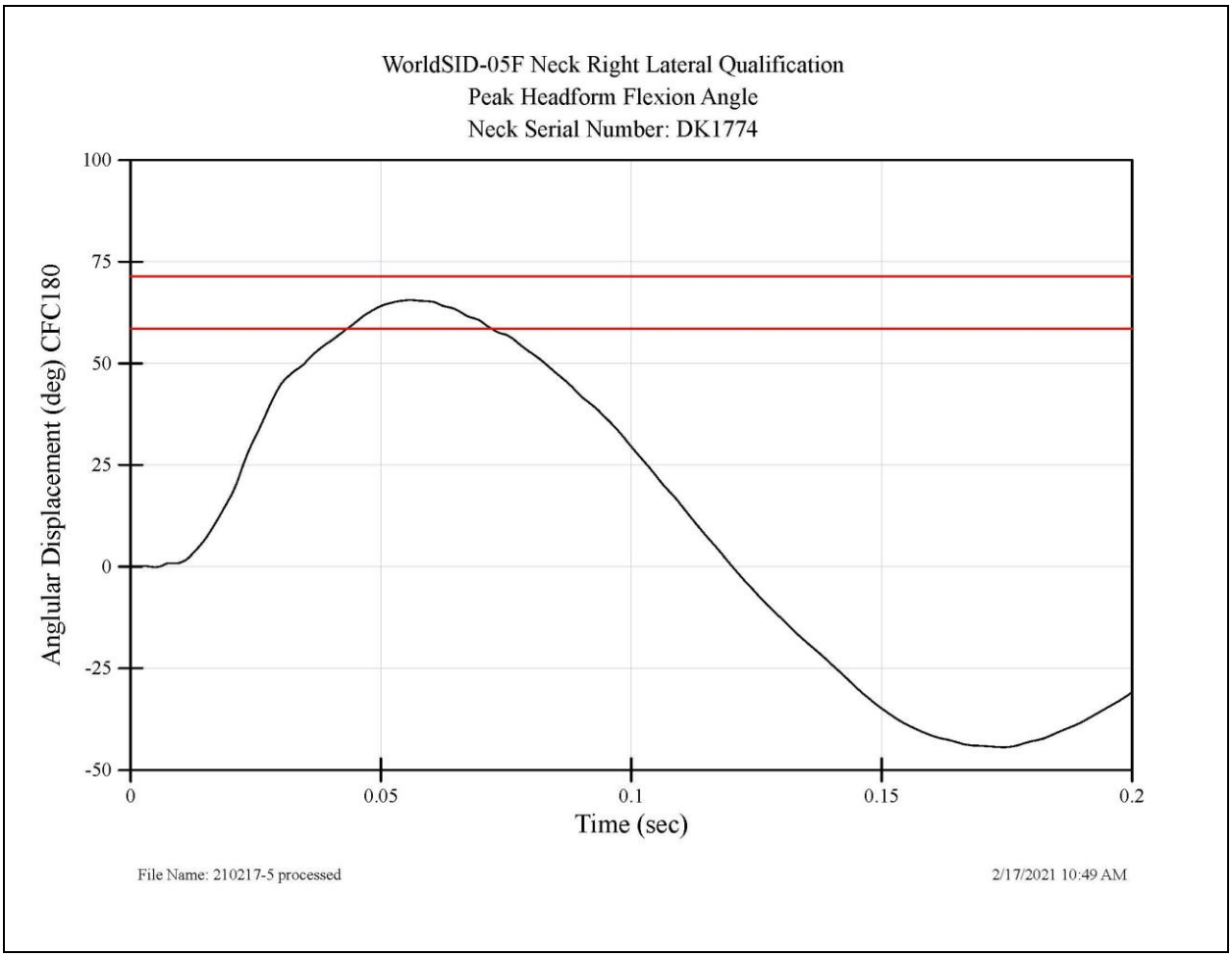
Test Results

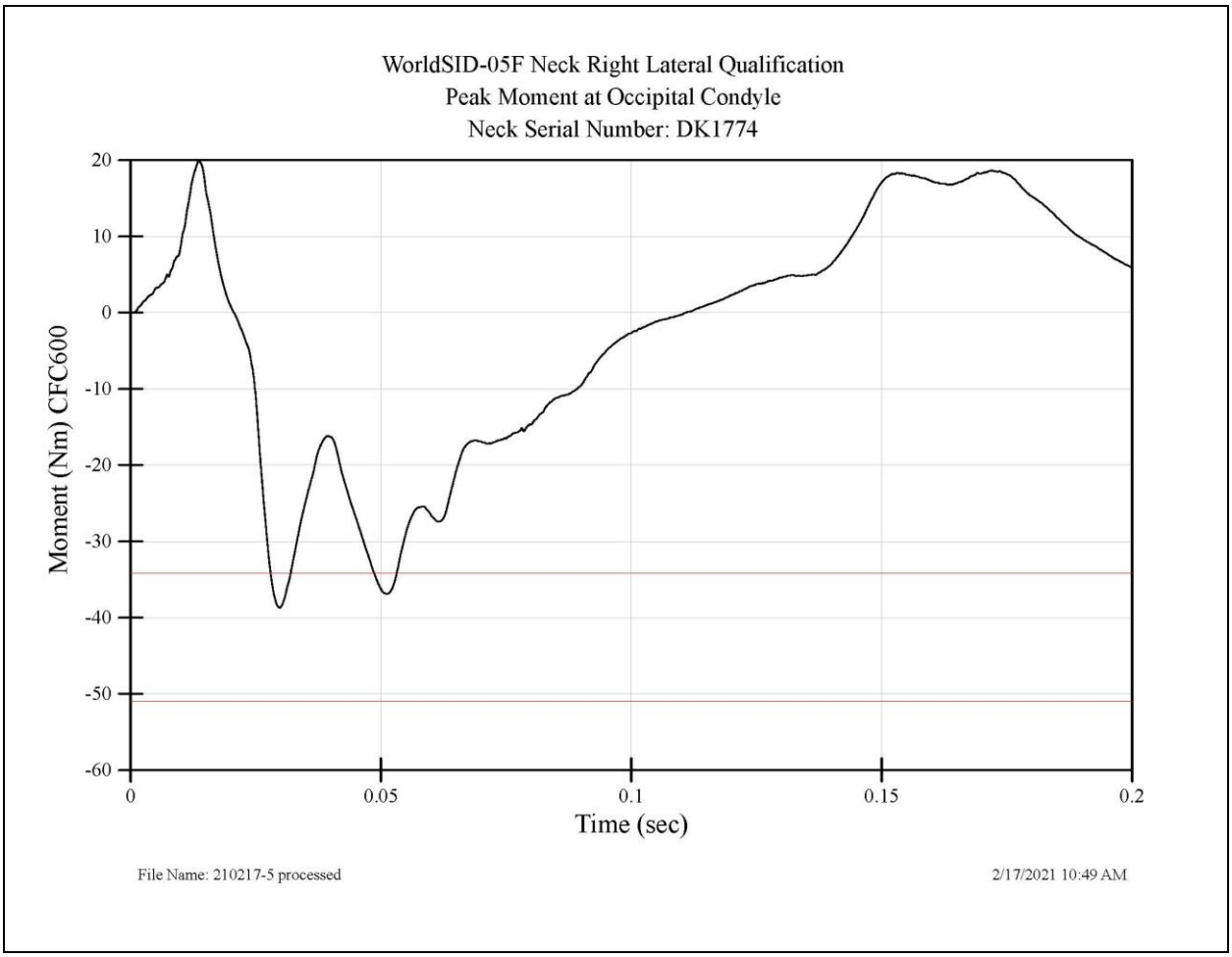
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.2	Pass
Test Humidity (%)	10 - 70	18	Pass
Test Velocity (m/s)	3.30 - 3.50	3.45	Pass
Pendulum Velocity at 4 ms after T0 (m/s)	0.77 - 1.04	0.98	Pass
Pendulum Velocity at 8 ms after T0 (m/s)	1.60 - 2.16	2.16	Pass
Pendulum Velocity at 12 ms after T0 (m/s)	2.43 - 3.29	3.24	Pass
Peak Headform Flexion Angle (deg)	58.5 - 71.4	65.5	Pass
Peak Headform Flexion Angle Decay Time to 0 degrees (ms)	57.3 - 76.5	64.4	Pass
Peak X-Axis Moment at Occipital Condyle (Nm)	-51.0 - (-34.2)	-38.7	Pass
Peak X-Axis Moment at Occipital Condyle Decay Time to 0 Nm (ms)	69.4 - 93.3	81.2	Pass

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

File Name: 210217-5 processed


WorldSID-05F Neck Right Lateral Qualification
Probe Acceleration
Neck Serial Number: DK1774
Integrated Velocity (m/s) CFC1000
5
4
3
2
1
0
0
0.005
0.01
0.015
0.02
Time (sec)
File Name: 210217-5 processed
2/17/2021 10:49 AM


WorldSID-05F Neck Right Lateral Qualification
Peak Headform Flexion Angle
Neck Serial Number: DK1774
Anglular Displacement (deg) CFC180
100
75
50
25
0
-25
-50
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210217-5 processed
2/17/2021 10:49 AM


WorldSID-05F Neck Right Lateral Qualification
Peak Moment at Occipital Condyle
Neck Serial Number: DK1774
Moment (Nm) CFC600
20
10
0
-10
-20
-30
-40
-50
-60
0
0.05
0.1
0.15
0.2
Time (sec)
File Name: 210217-5 processed
2/17/2021 10:49 AM

WorldSID-05F Shoulder Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Pad: W5-P01
Shoulder Rib: DM6270
Thorax Rib 1: DM2783
Thorax Rib 2: DM2784
Thorax Rib 3: DM2787
RibEye: 161
Impacted Arm: DJ1634

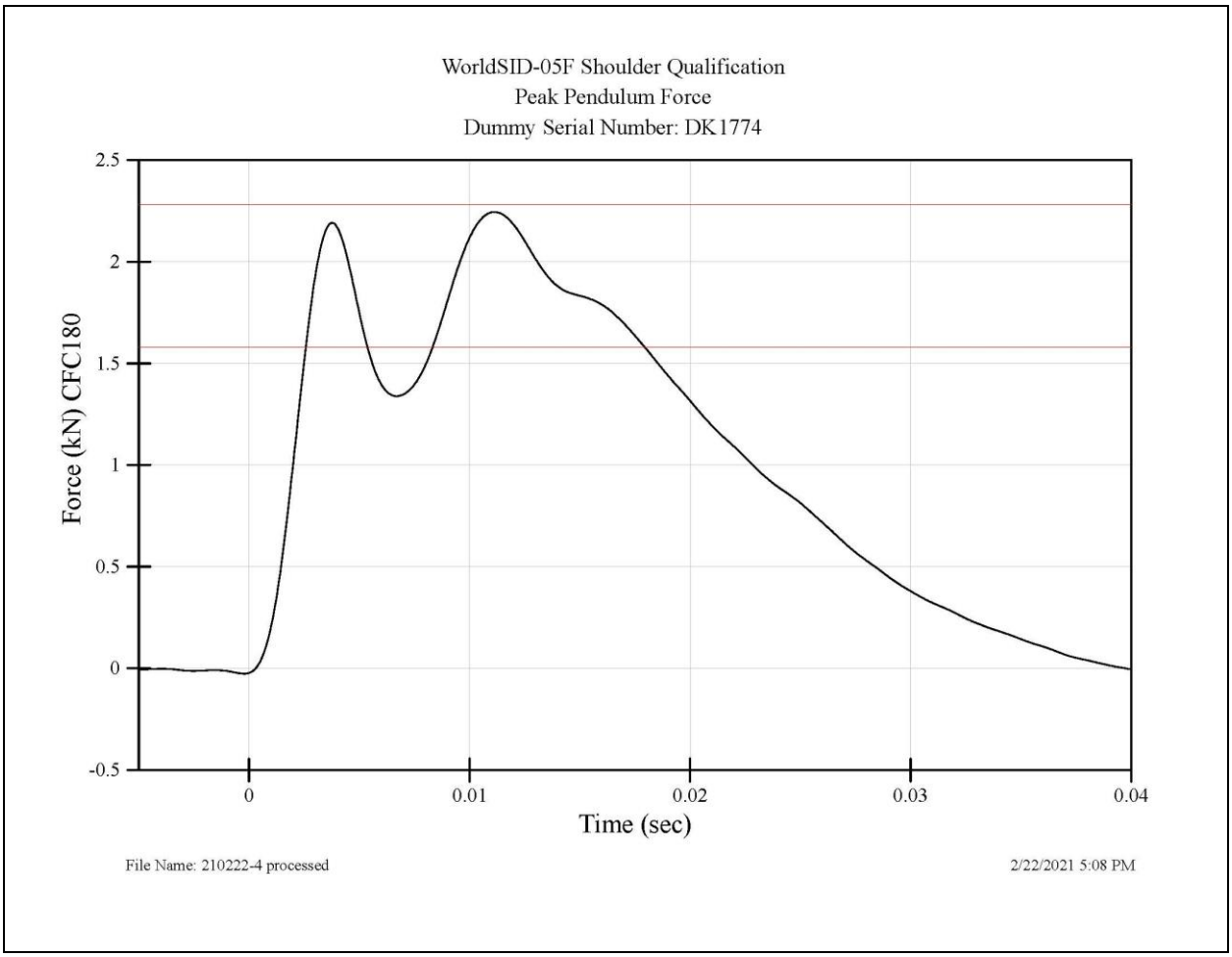
Test ID: 210222-4
Test Date: 2/22/2021
Test Time: 5:08 PM

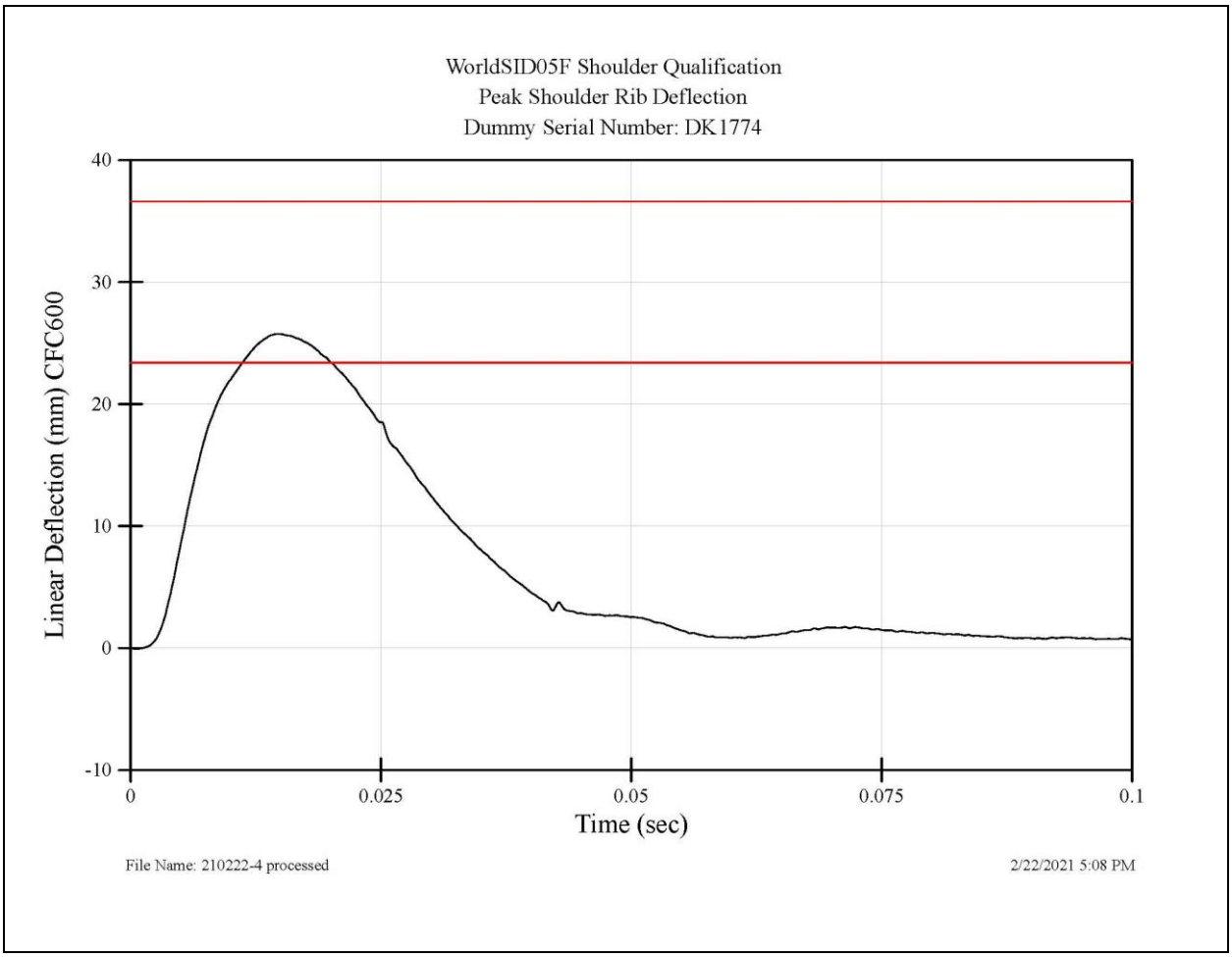
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	58	Pass
Test Velocity (m/s)	4.20 - 4.40	4.305	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	23.5	Pass
Peak Probe Force (kN)	1.58 - 2.28	2.24	Pass
Peak Shoulder Rib Length Change (mm)	23.4 - 36.6	25.7	Pass

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

File Name: 210222-4 processed


WorldSID-05F Shoulder Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
2.5
2
1.5
1
0.5
0
-0.5
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 210222-4 processed
2/22/2021 5:08 PM


WorldSID05F Shoulder Qualification
Peak Shoulder Rib Deflection
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
40
30
20
10
0
-10
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210222-4 processed
2/22/2021 5:08 PM

WorldSID-05F Thorax with Arm Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270	Abdomen Rib 1: DM5165
Thorax Rib 1: DM2783	Abdomen Rib 2: DM5167
Thorax Rib 2: DM2784	RibEye: 161
Thorax Rib 3: DM2787	Impacted Arm: DJ1634

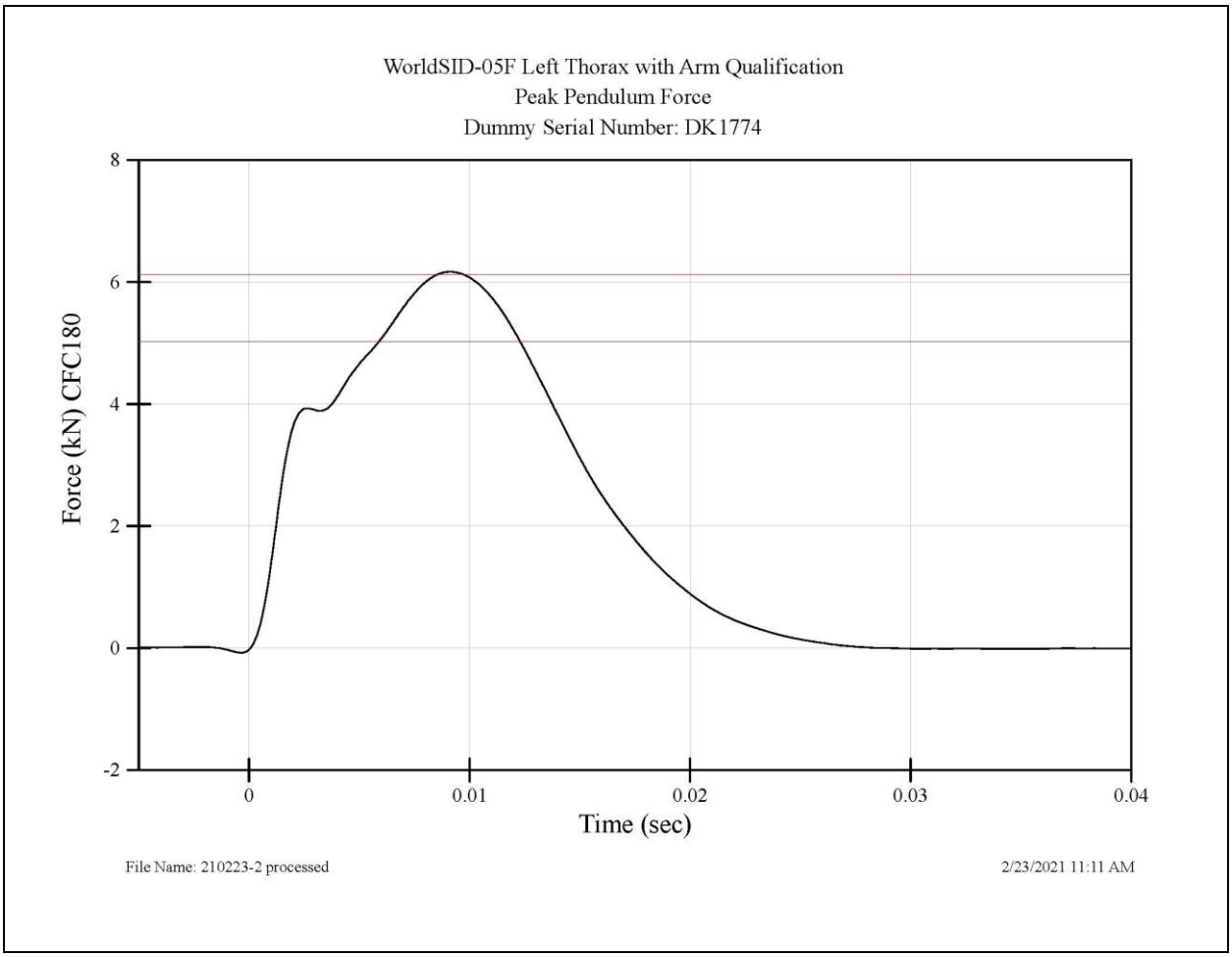
Test ID: 210223-2
Test Date: 2/23/2021
Test Time: 11:11 AM

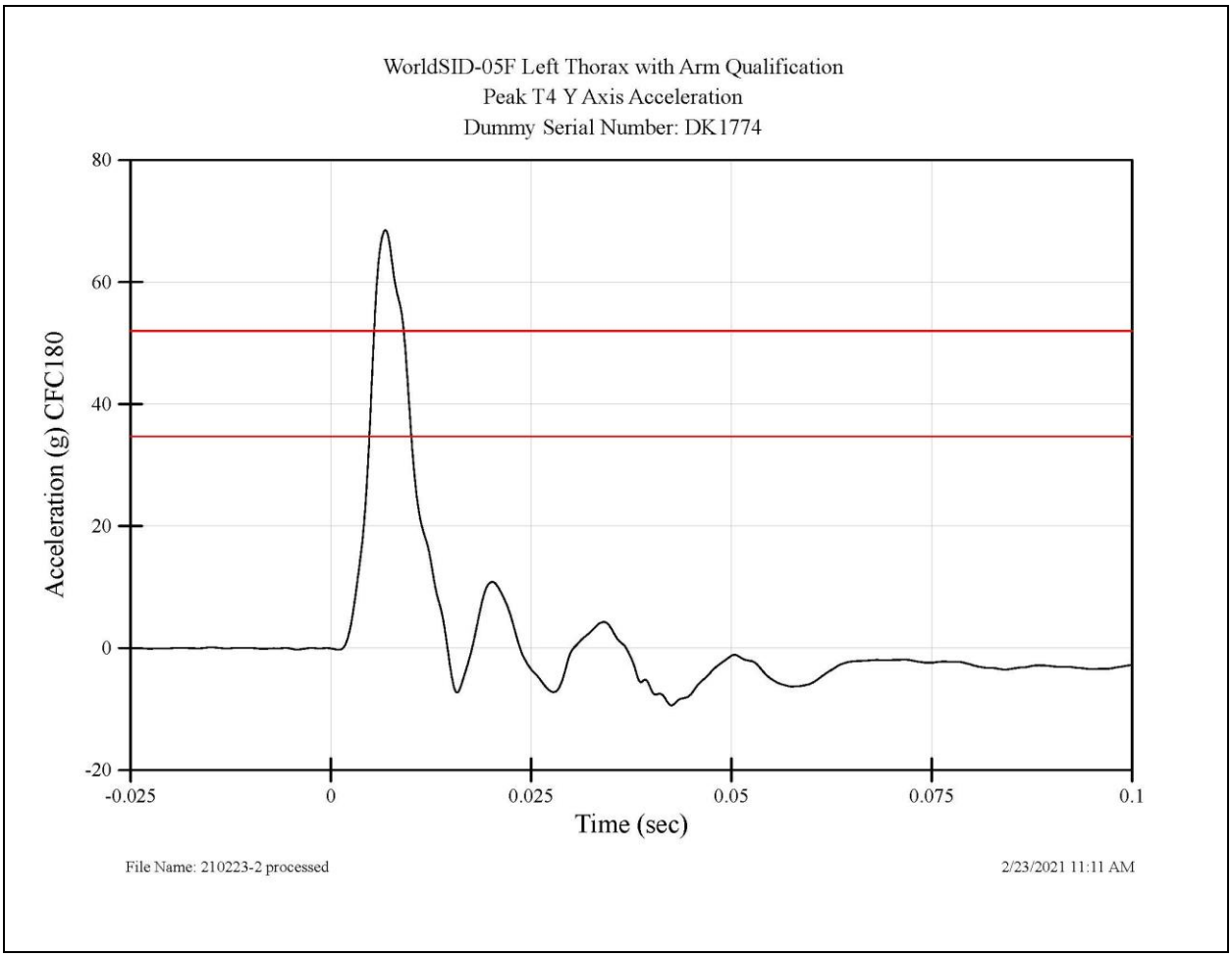
Test Results

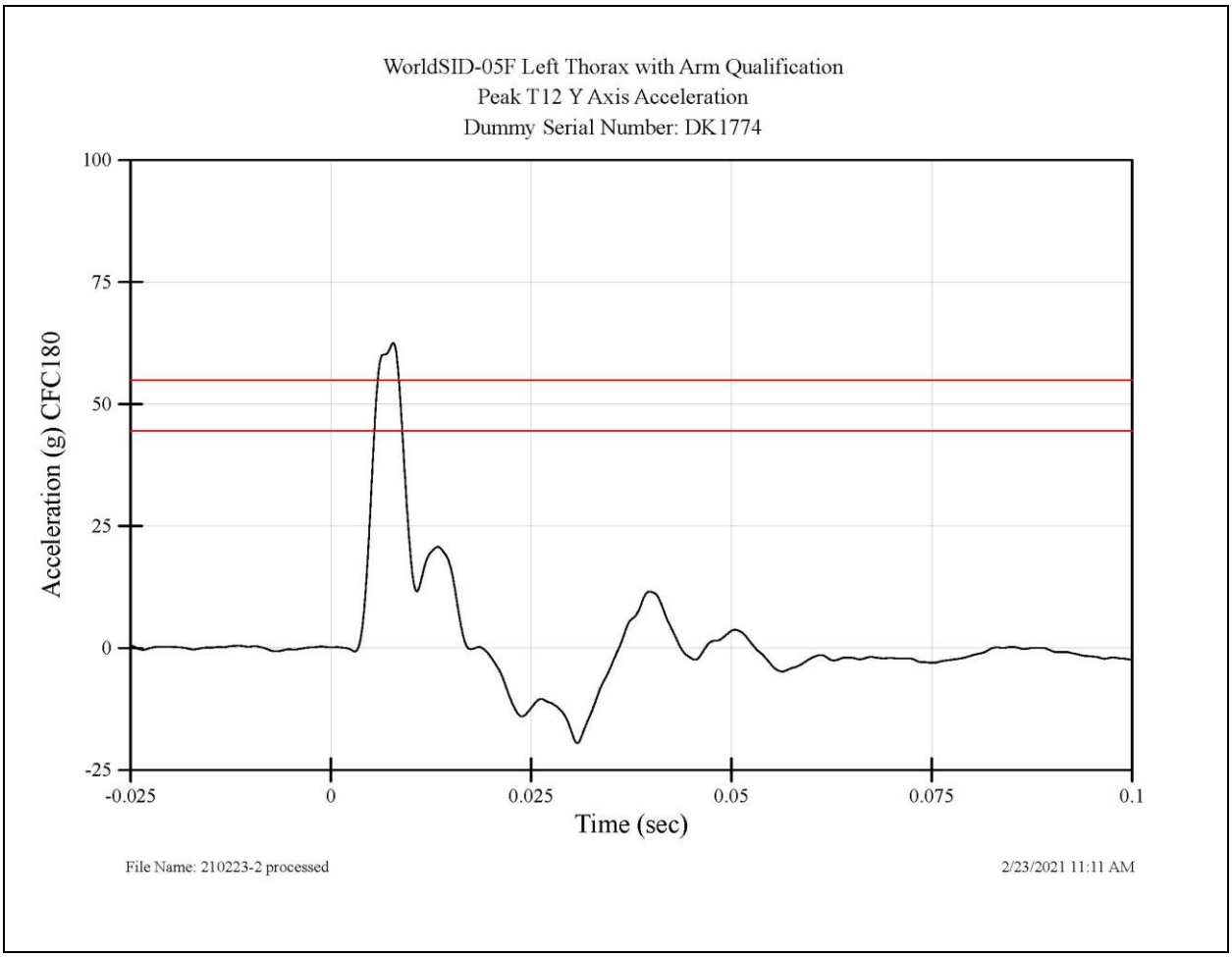
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.4	Pass
Test Humidity (%)	10 - 70	61	Pass
Test Velocity (m/s)	6.60 - 6.80	6.68	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.0	Pass
Peak Probe Force (kN)	5.02 - 6.13	6.17	Fail
Peak T4 Y Acceleration	34.7 - 52.0	68.5	Fail
Peak T12 Y Acceleration	44.5 - 54.9	62.5	Fail
Peak Thorax Rib 1 Y Length Change (mm)	18.3 - 26.4	17.6	Fail
Peak Thorax Rib 2 Y Length Change (mm)	21.6 - 26.4	18.7	Fail
Peak Thorax Rib 3 Y Length Change (mm)	19.7 - 26.6	14.7	Fail

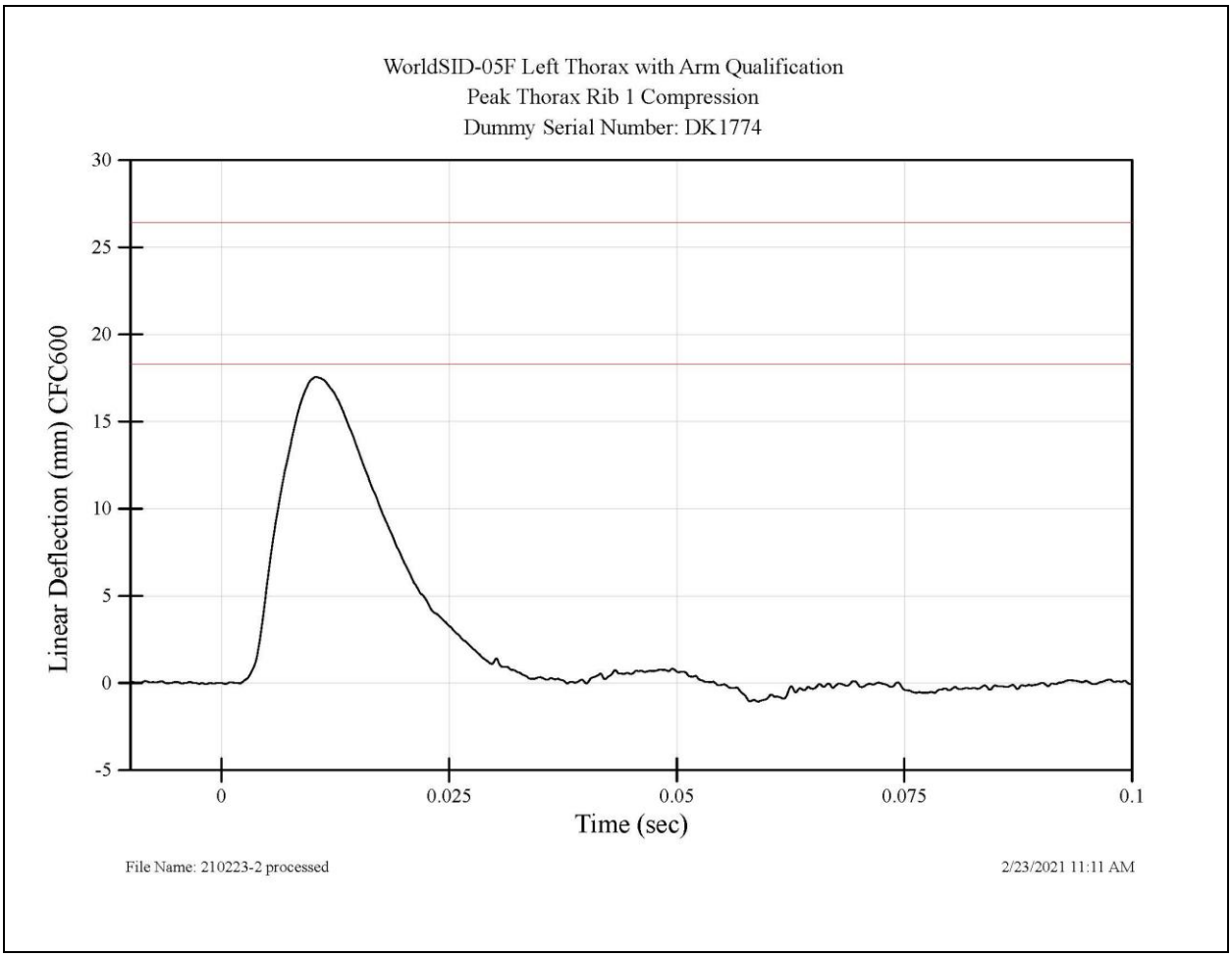
* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

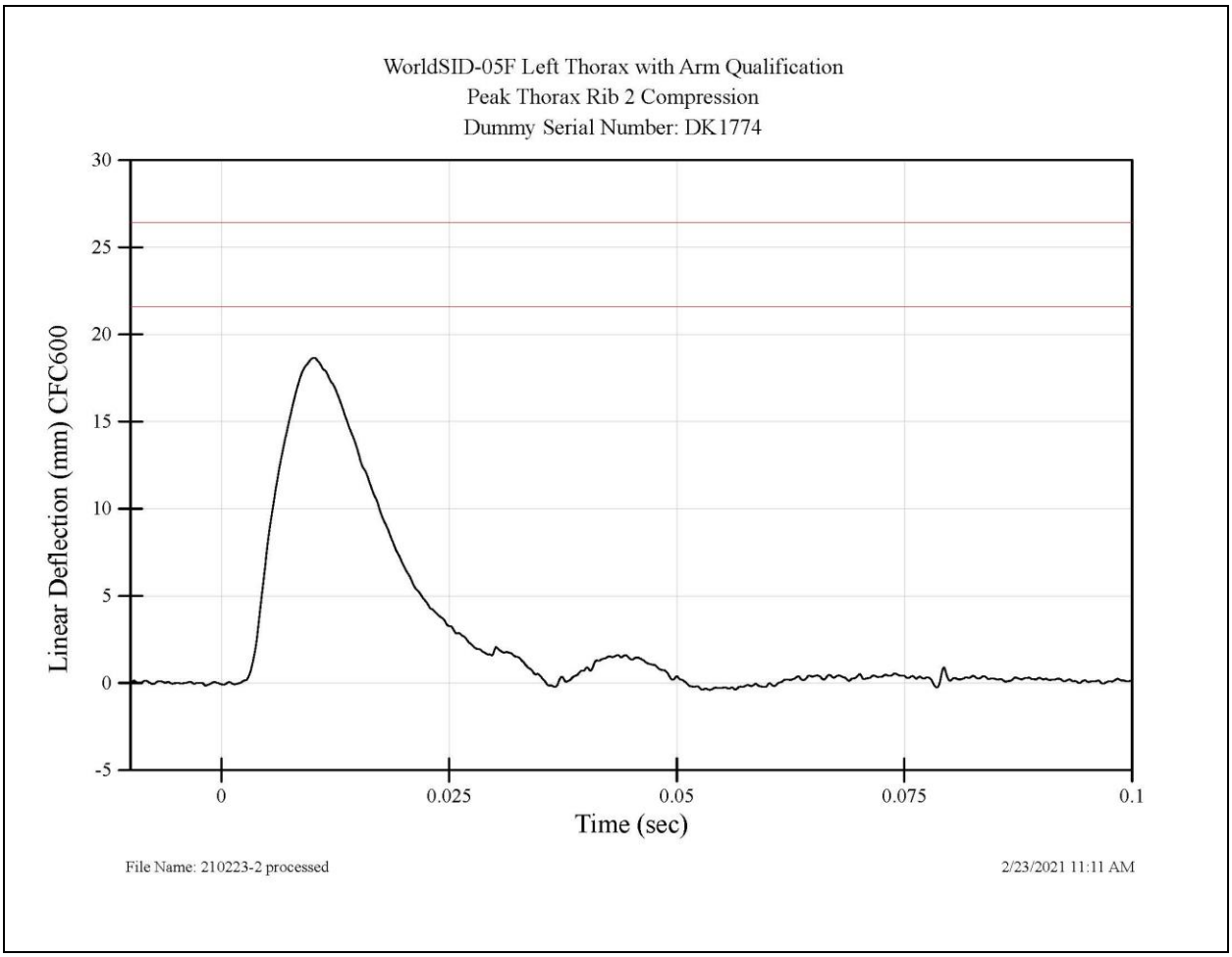
File Name: 210223-2 processed

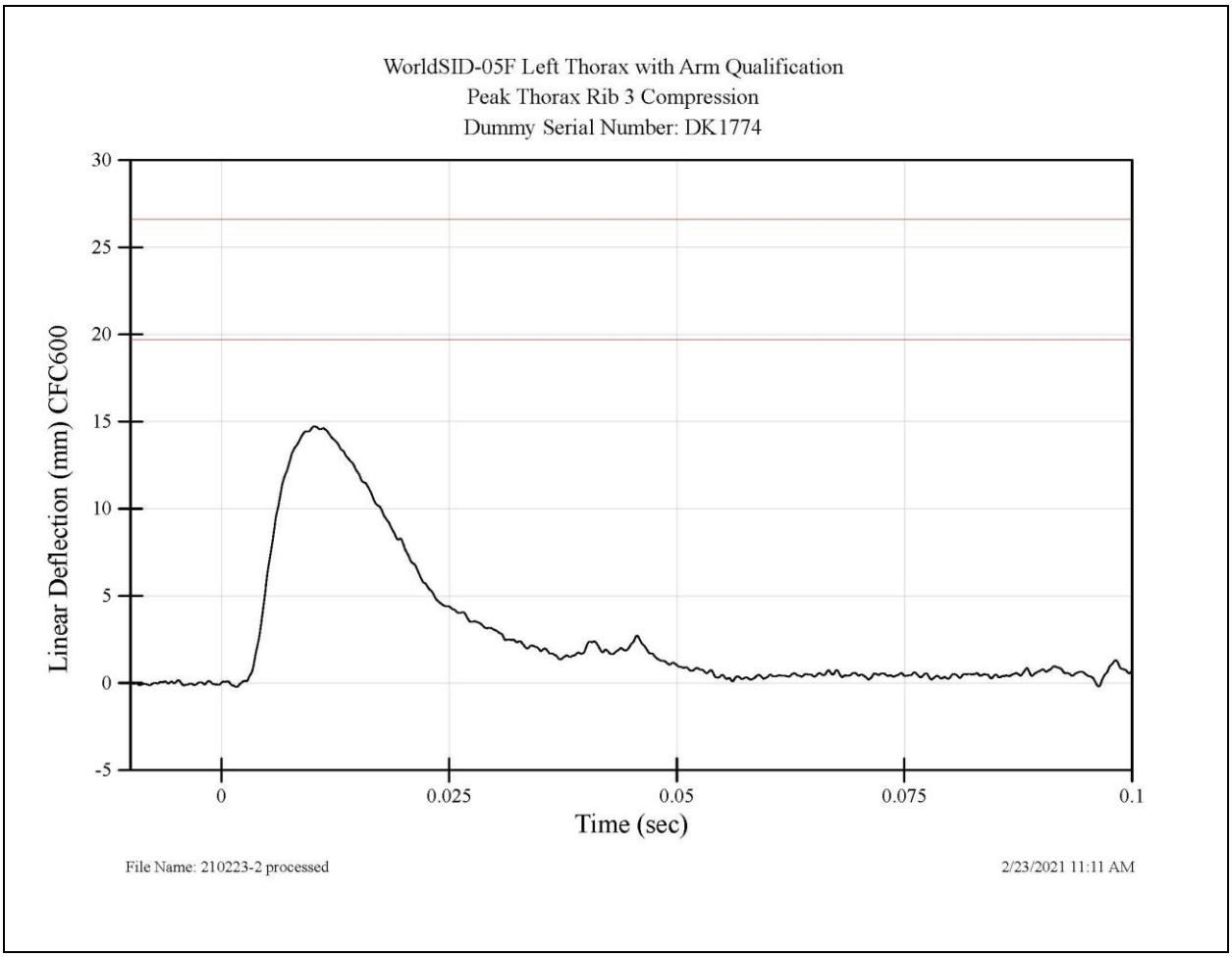

WorldSID-05F Left Thorax with Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
8
6
4
2
0
-2
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 210223-2 processed
2/23/2021 11:11 AM


WorldSID-05F Left Thorax with Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
80
60
40
20
0
-20
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-2 processed
2/23/2021 11:11 AM


WorldSID-05F Left Thorax with Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
100
75
50
25
0
-25
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-2 processed
2/23/2021 11:11 AM


WorldSID-05F Left Thorax with Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-2 processed
2/23/2021 11:11 AM


WorldSID-05F Left Thorax with Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-2 processed
2/23/2021 11:11 AM


WorldSID-05F Left Thorax with Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-2 processed
2/23/2021 11:11 AM

WorldSID-05F Thorax without Arm Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270
Thorax Rib 1: DM2783
Thorax Rib 2: DM2784
Thorax Rib 3: DM2787
Abdomen Rib 1: DM5165
Abdomen Rib 2: DM5167
RibEye: 161

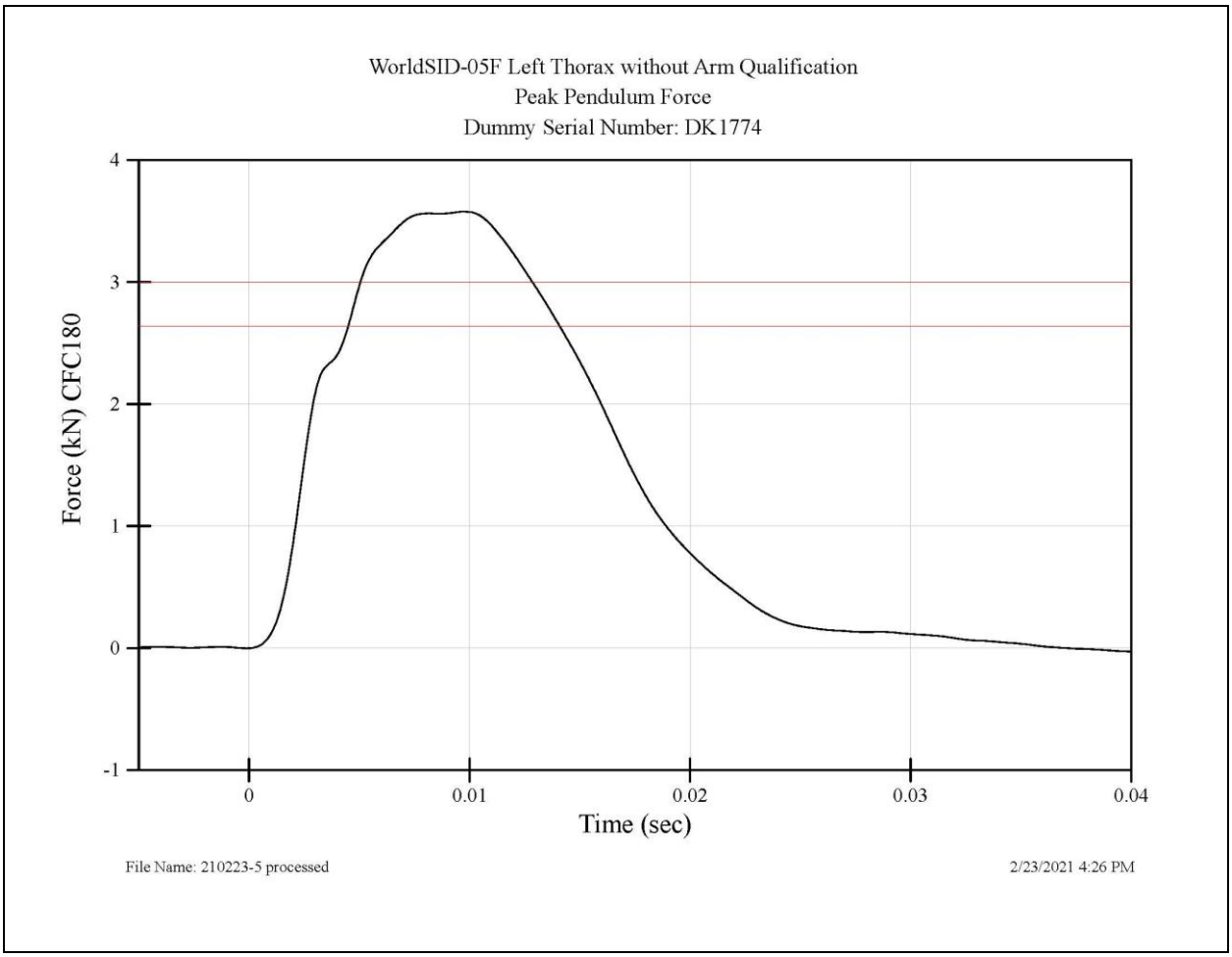
Test ID: 210223-5
Test Date: 2/23/2021
Test Time: 4:26 PM

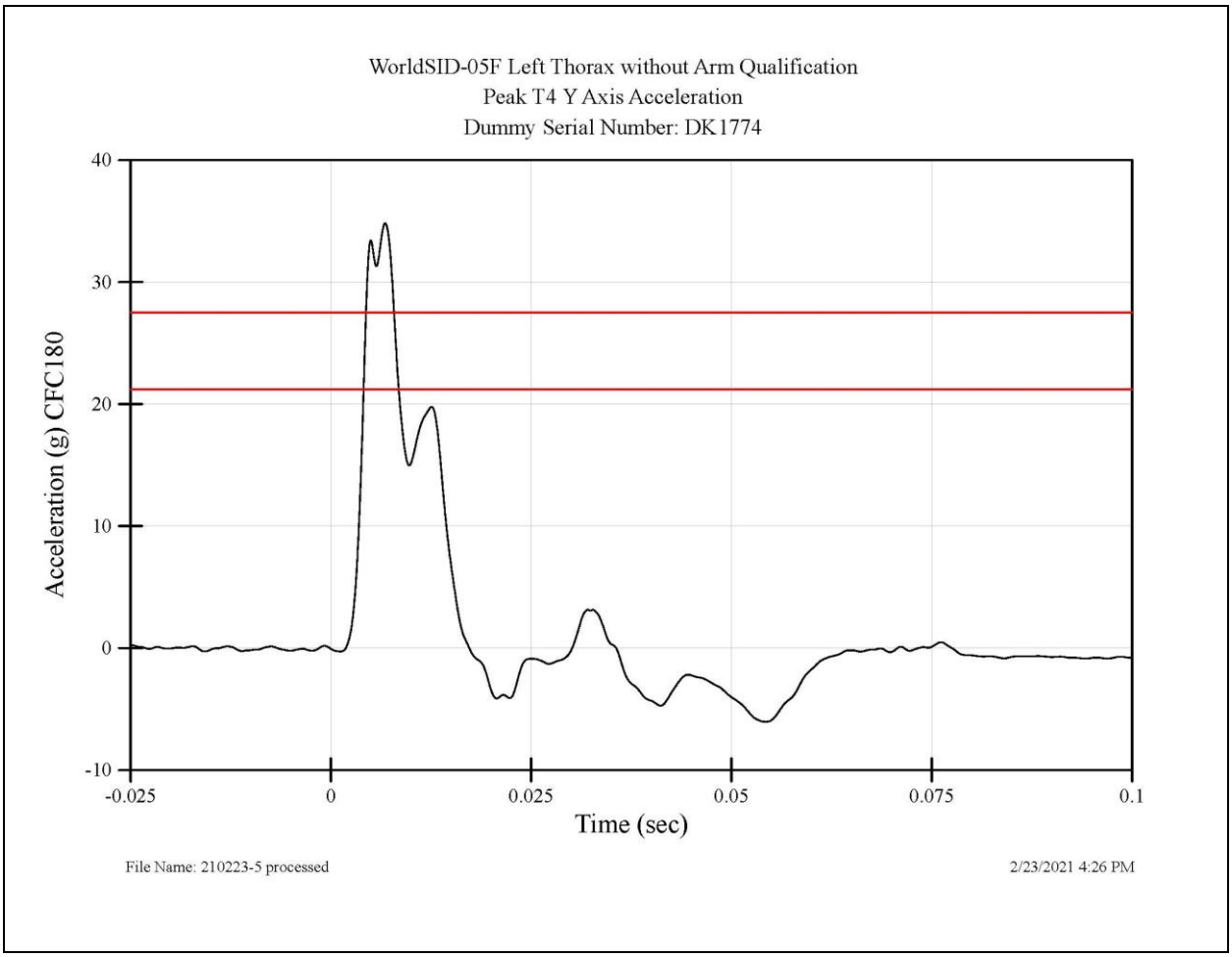
Test Results

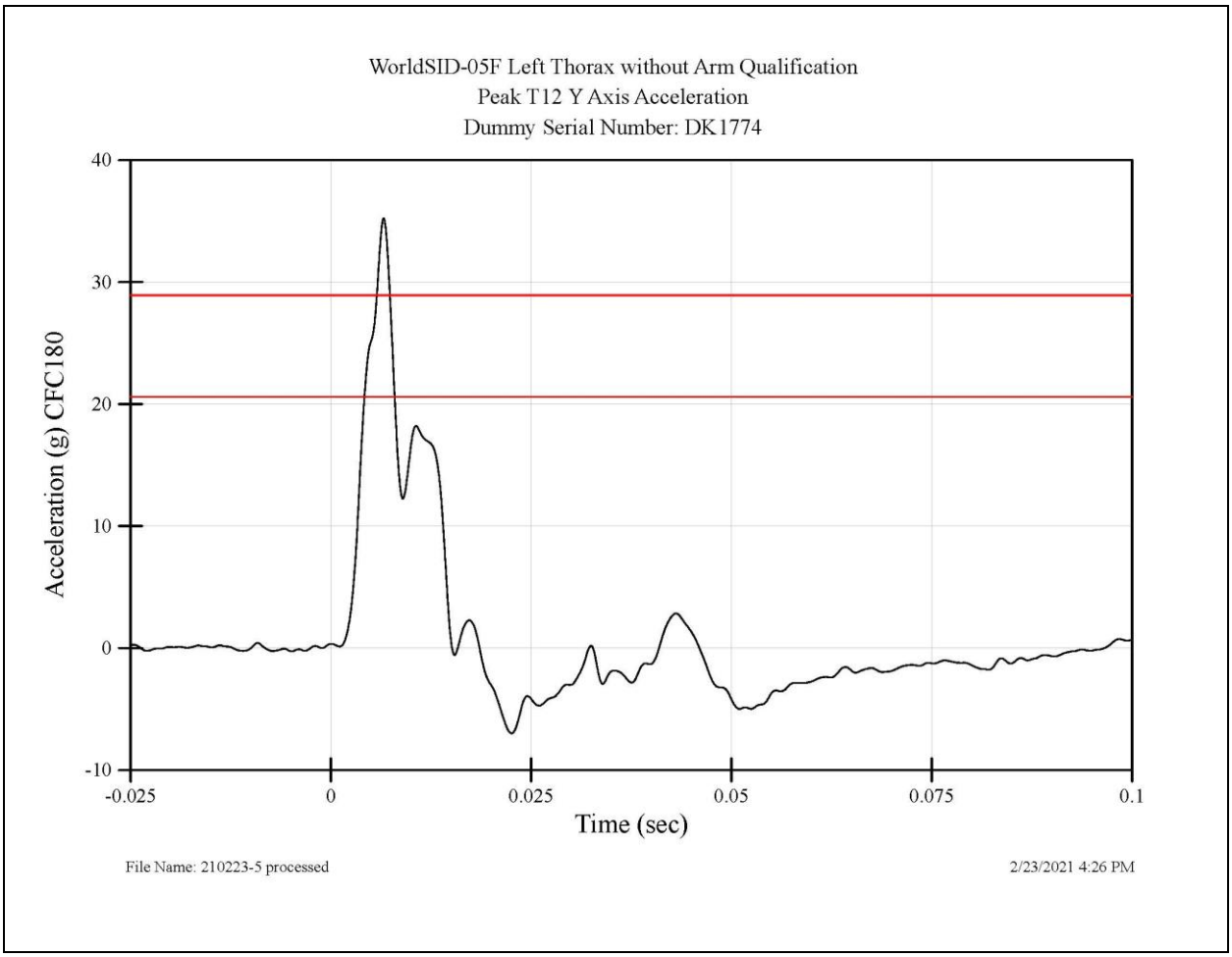
Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.1	Pass
Test Humidity (%)	10 - 70	64	Pass
Test Velocity (m/s)	4.20 - 4.40	4.29	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	22.5	Pass
Peak Probe Force (kN)	2.64 - 3.22	3.58	Fail
Peak T4 Y Acceleration	21.2 - 27.5	34.8	Fail
Peak T12 Y Acceleration	20.6 - 28.9	35.2	Fail
Peak Thorax Rib 1 Y Length Change (mm)	20.5 - 27.7	18.0	Fail
Peak Thorax Rib 2 Y Length Change (mm)	21.7 - 26.7	19.5	Fail
Peak Thorax Rib 3 Y Length Change (mm)	20.9 - 27.3	17.5	Fail

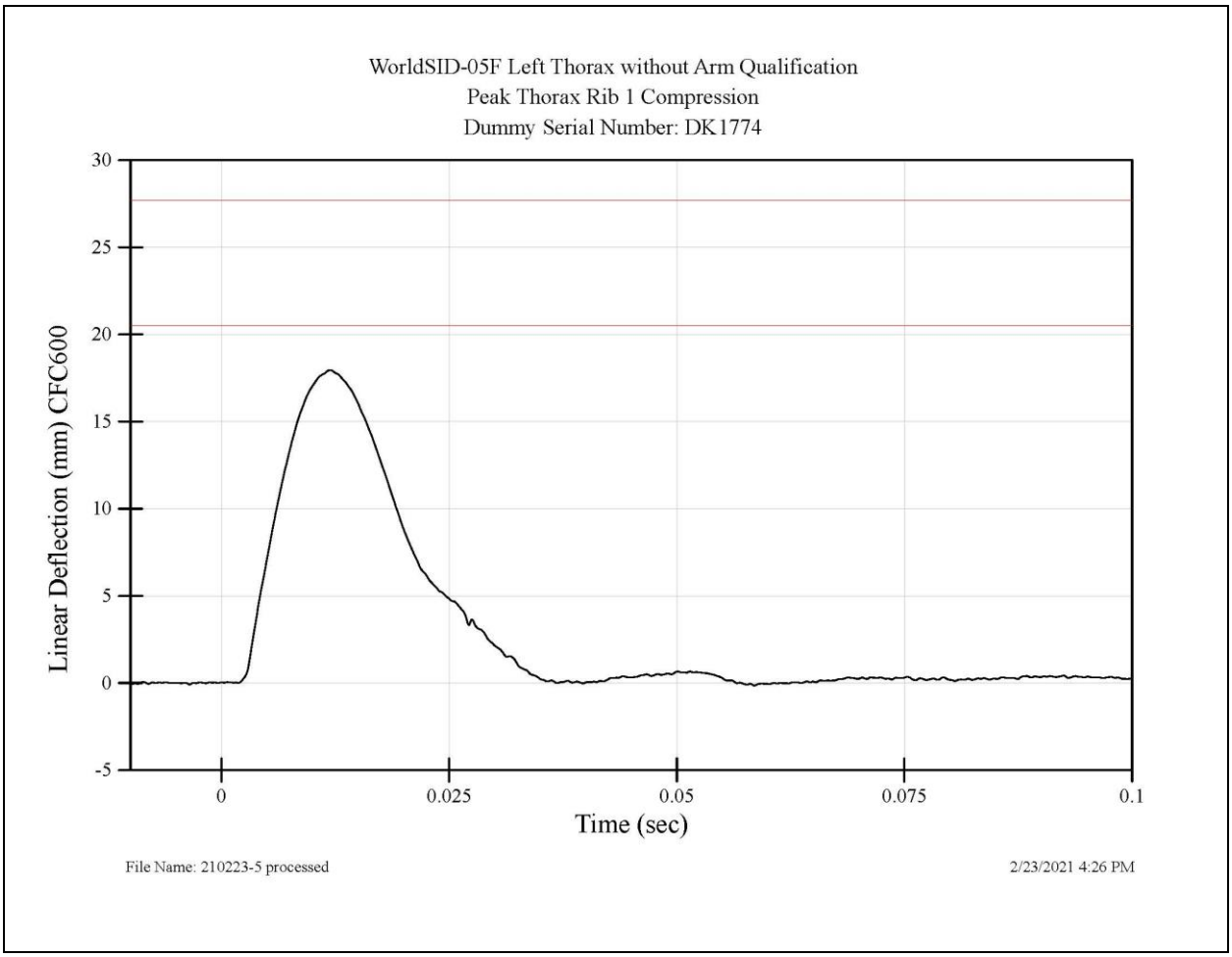
* WorldSID-05F Qualification Manual - Humanetics WorldSID Small Female - Rev E

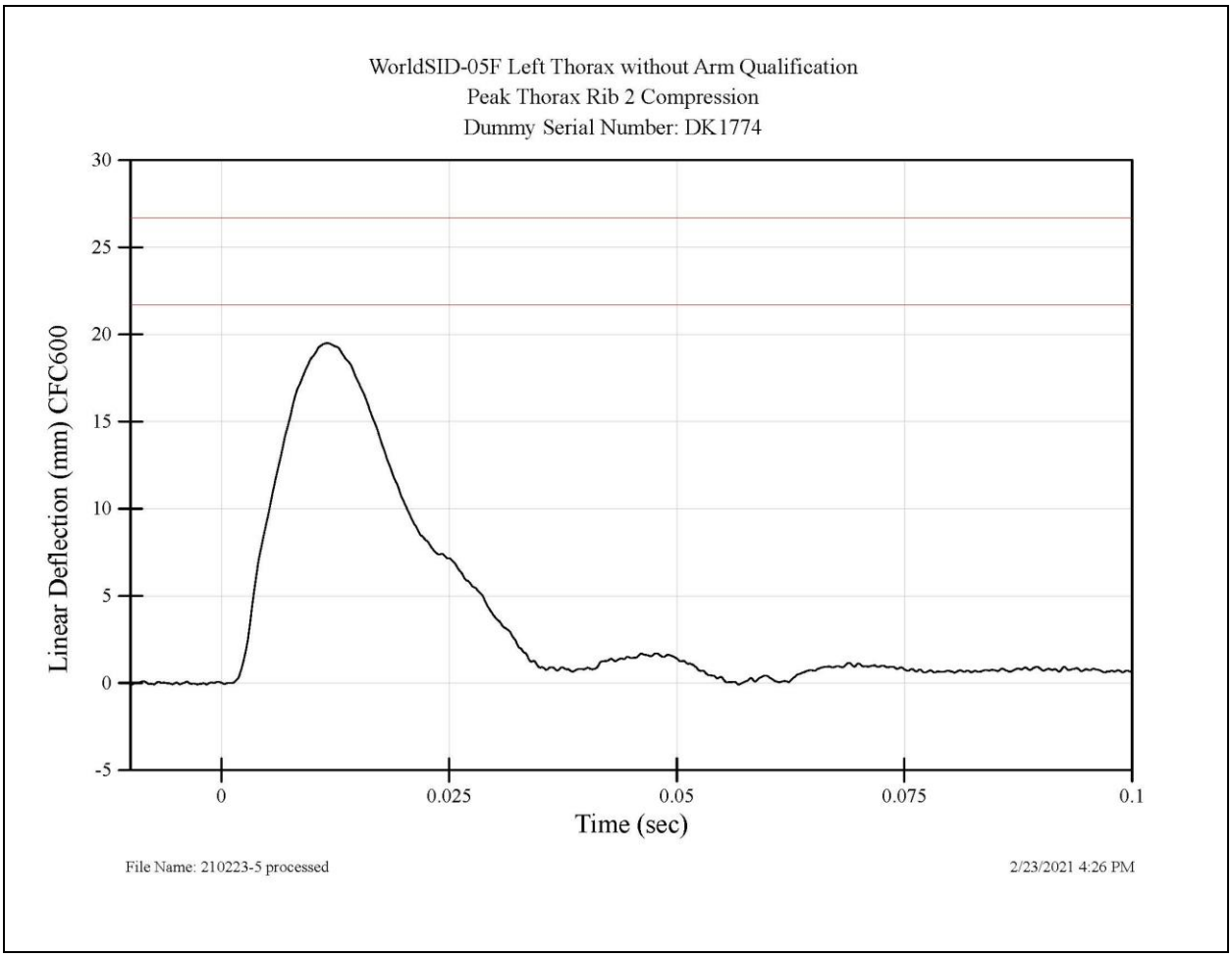
File Name: 210223-5 processed

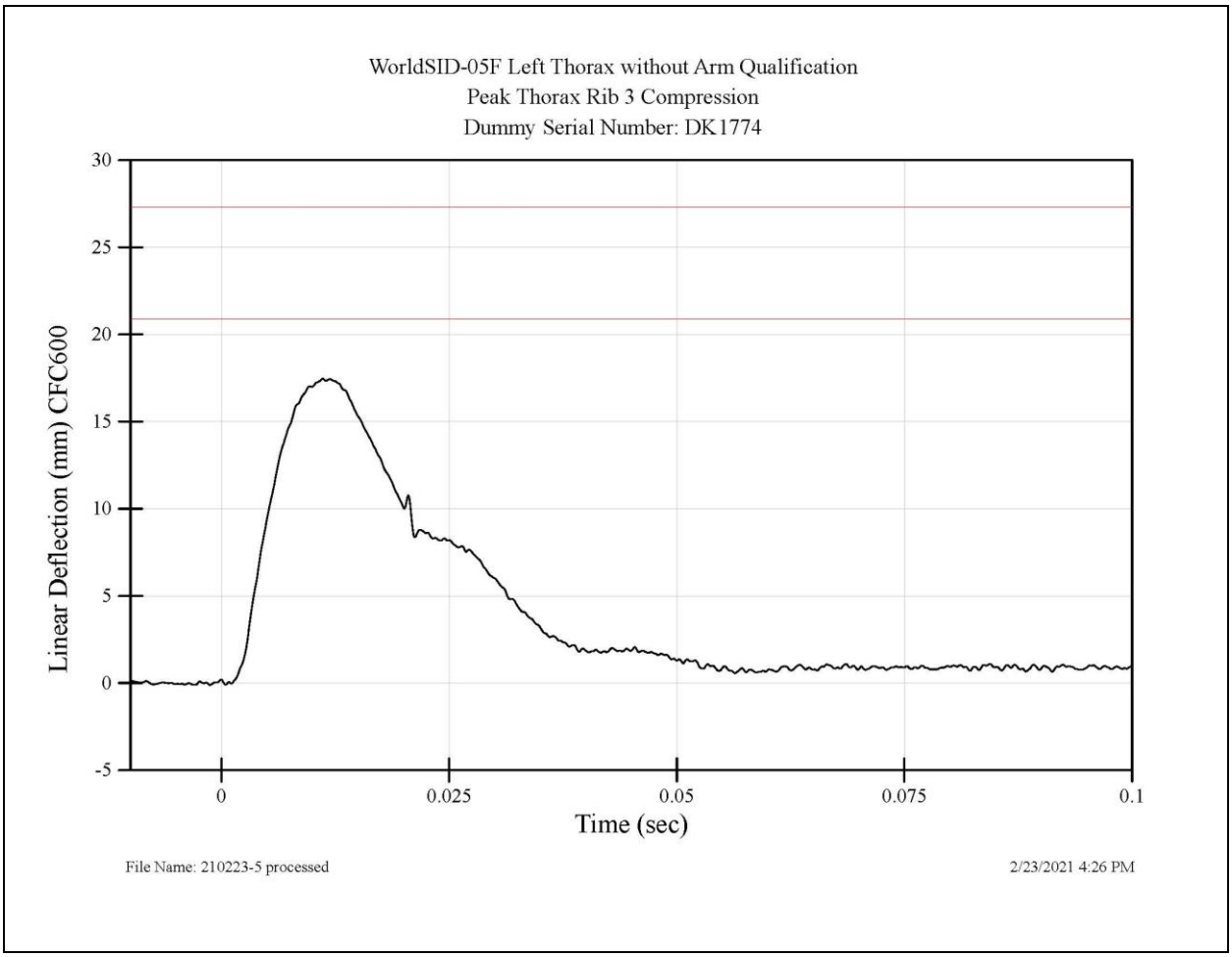

WorldSID-05F Left Thorax without Arm Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
4
3
2
1
0
-1
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 210223-5 processed
2/23/2021 4:26 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak T4 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
40
30
20
10
0
-10
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-5 processed
2/23/2021 4:26 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
40
30
20
10
0
-10
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-5 processed
2/23/2021 4:26 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak Thorax Rib 1 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-5 processed
2/23/2021 4:26 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak Thorax Rib 2 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-5 processed
2/23/2021 4:26 PM


WorldSID-05F Left Thorax without Arm Qualification
Peak Thorax Rib 3 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210223-5 processed
2/23/2021 4:26 PM

WorldSID-05F Left Abdomen Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components

Shoulder Rib: DM6270
Thorax Rib 1: DM2783
Thorax Rib 2: DM2784
Thorax Rib 3: DM2787
Abdomen Rib 1: DM5165
Abdomen Rib 2: DM5167
RibEye: 161

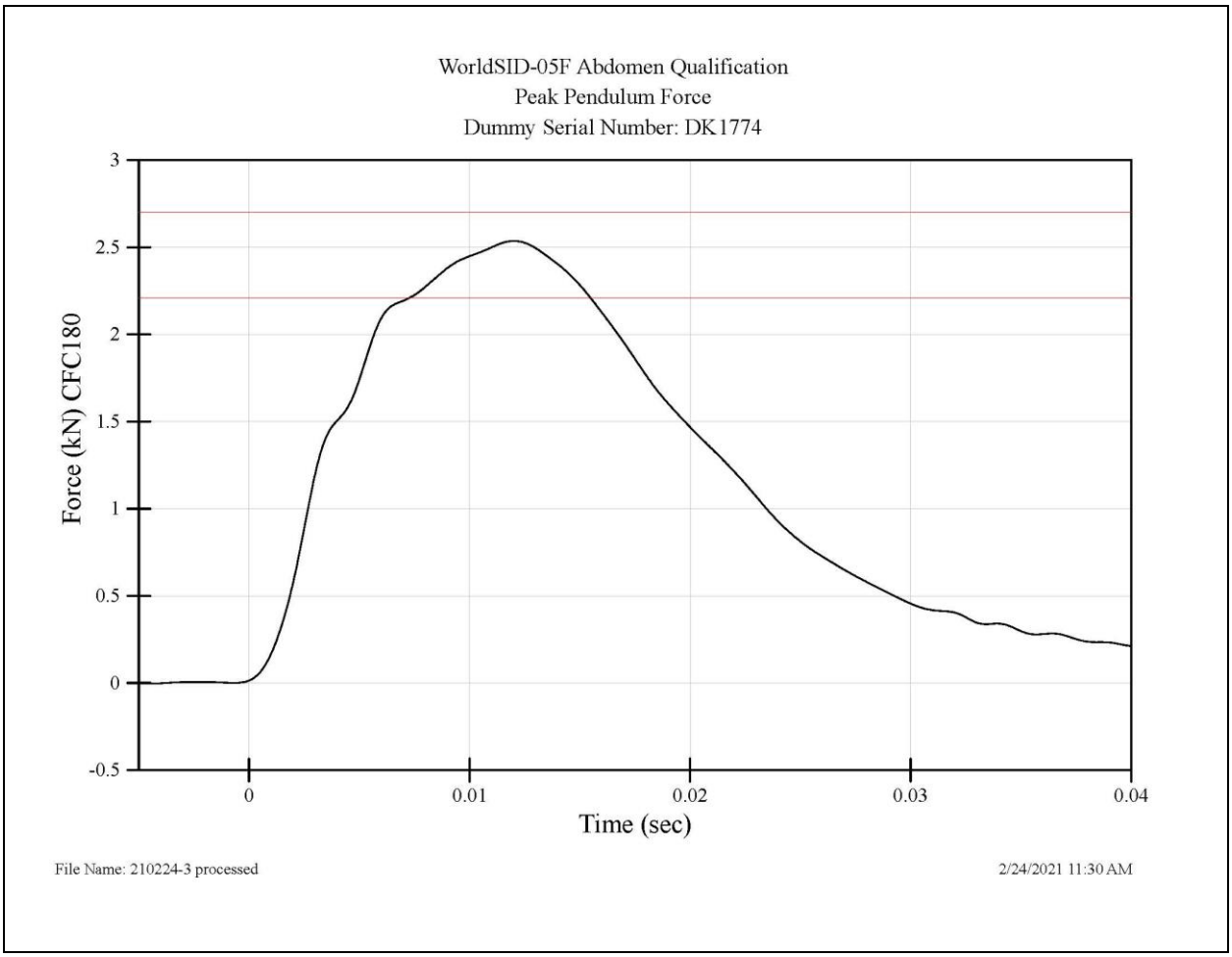
Test ID: 210224-3
Test Date: 2/24/2021
Test Time: 11:30 AM

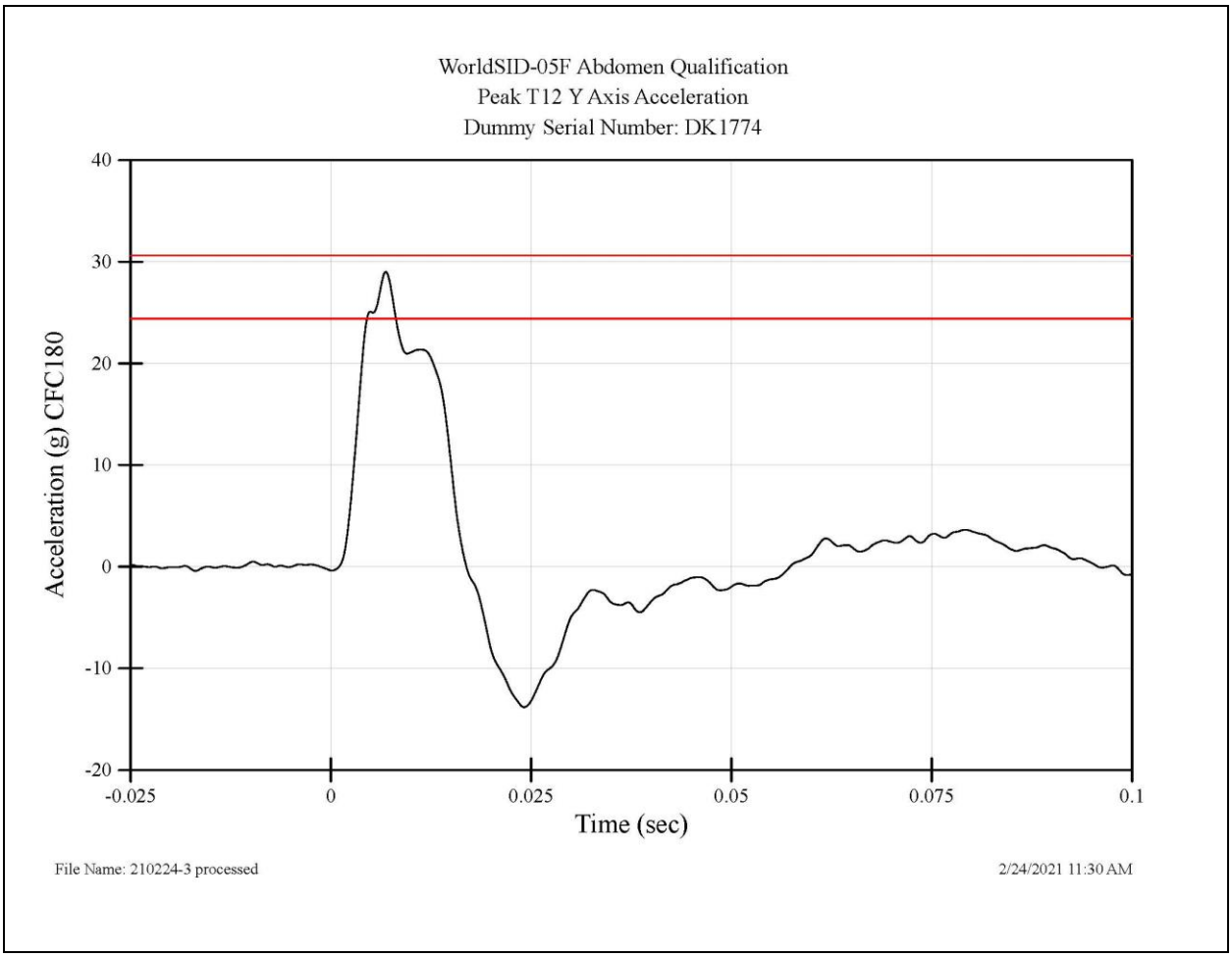
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	22.2	Pass
Test Humidity (%)	10 - 70	62	Pass
Test Velocity (m/s)	4.20 - 4.40	4.29	Pass
Thorax Rib Temperature Sensor (°C)	20.6 - 23.8	23.6	Pass
Peak Probe Force (kN)	2.21 - 2.70	2.54	Pass
Peak T12 Acceleration (g)	24.4 - 30.6	29.0	Pass
Peak Abdomen Rib 1 Length Change (mm)	23.1 - 31.2	23.3	Pass
Peak Abdomen Rib 2 Length Change (mm)	22.7 - 27.8	24.1	Pass

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

File Name: 210224-3 processed


WorldSID-05F Abdomen Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
3
2.5
2
1.5
1
0.5
0
-0.5
0
0.01
0.02
0.03
0.04
Time (sec)
File Name: 210224-3 processed
2/24/2021 11:30 AM


WorldSID-05F Abdomen Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
40
30
20
10
0
-10
-20
-0.025
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210224-3 processed
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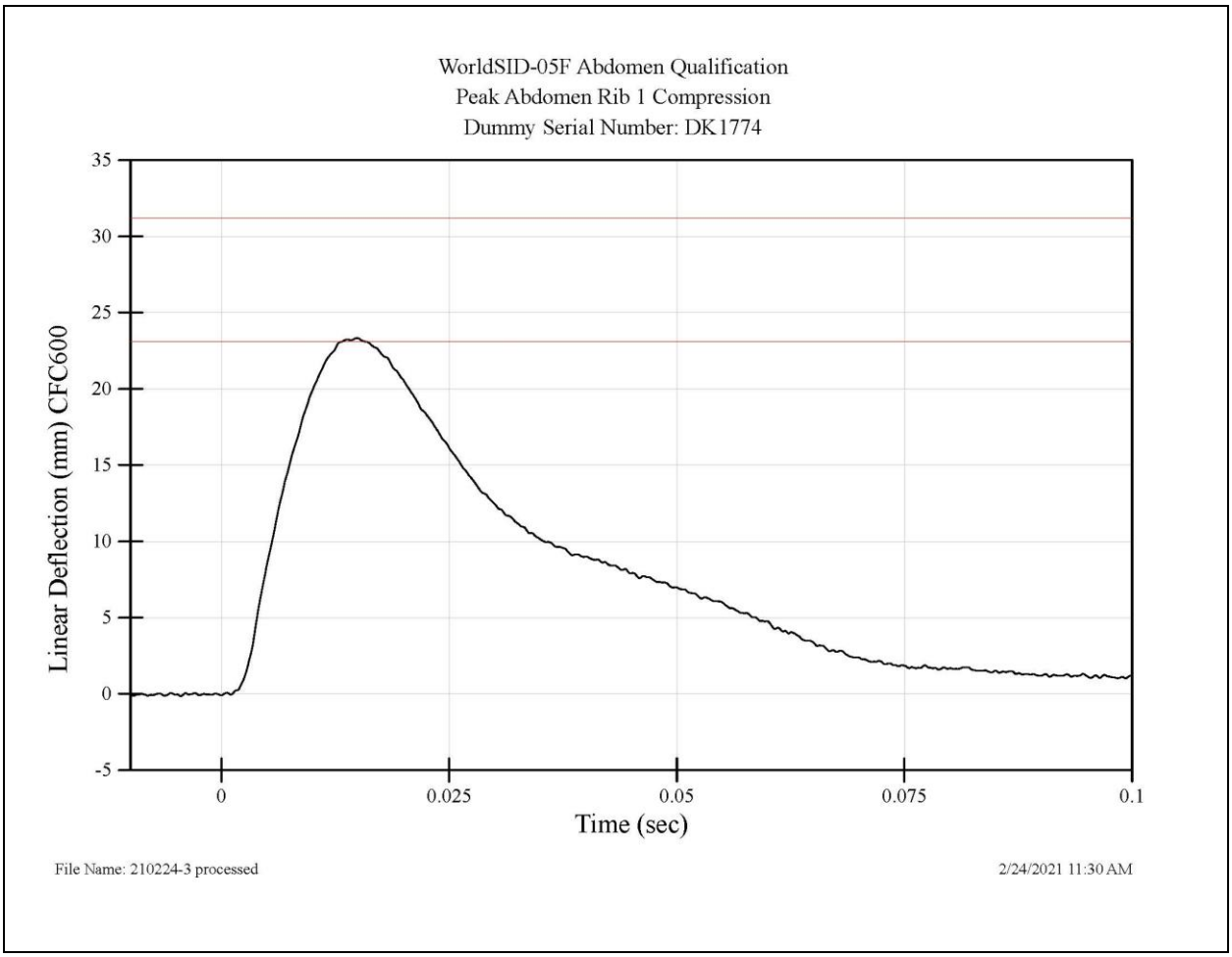
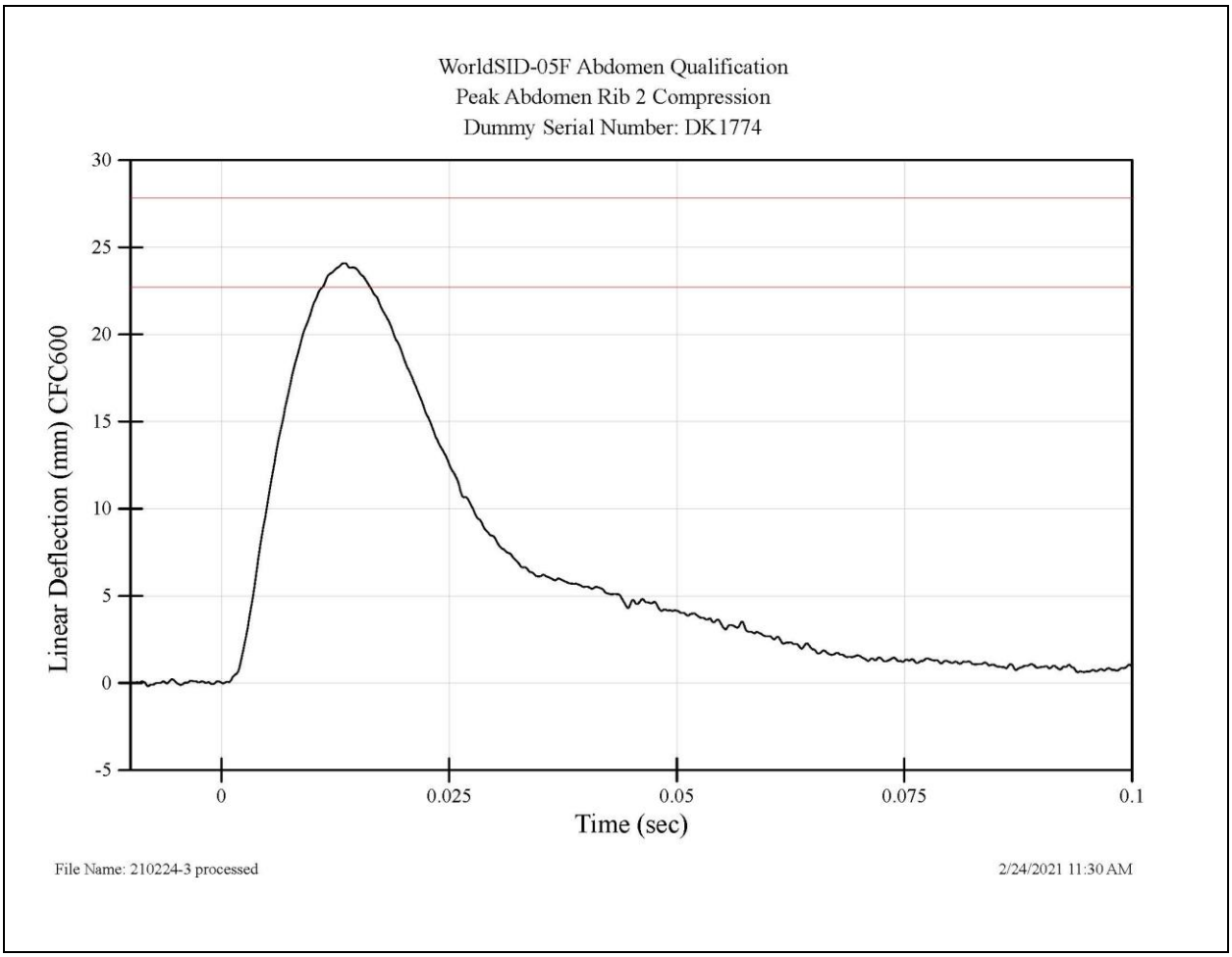

WorldSID-05F Abdomen Qualification
Peak Abdomen Rib 1 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
35
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210224-3 processed
2/24/2021 11:30 AM


WorldSID-05F Abdomen Qualification
Peak Abdomen Rib 2 Compression
Dummy Serial Number: DK1774
Linear Deflection (mm) CFC600
30
25
20
15
10
5
0
-5
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210224-3 processed
2/24/2021 11:30 AM

WorldSID-05F Left Pelvis Qualification
Test Results Summary

Dummy Serial Number: DK1774

Tested Components
Pelvis Bone: DW2458

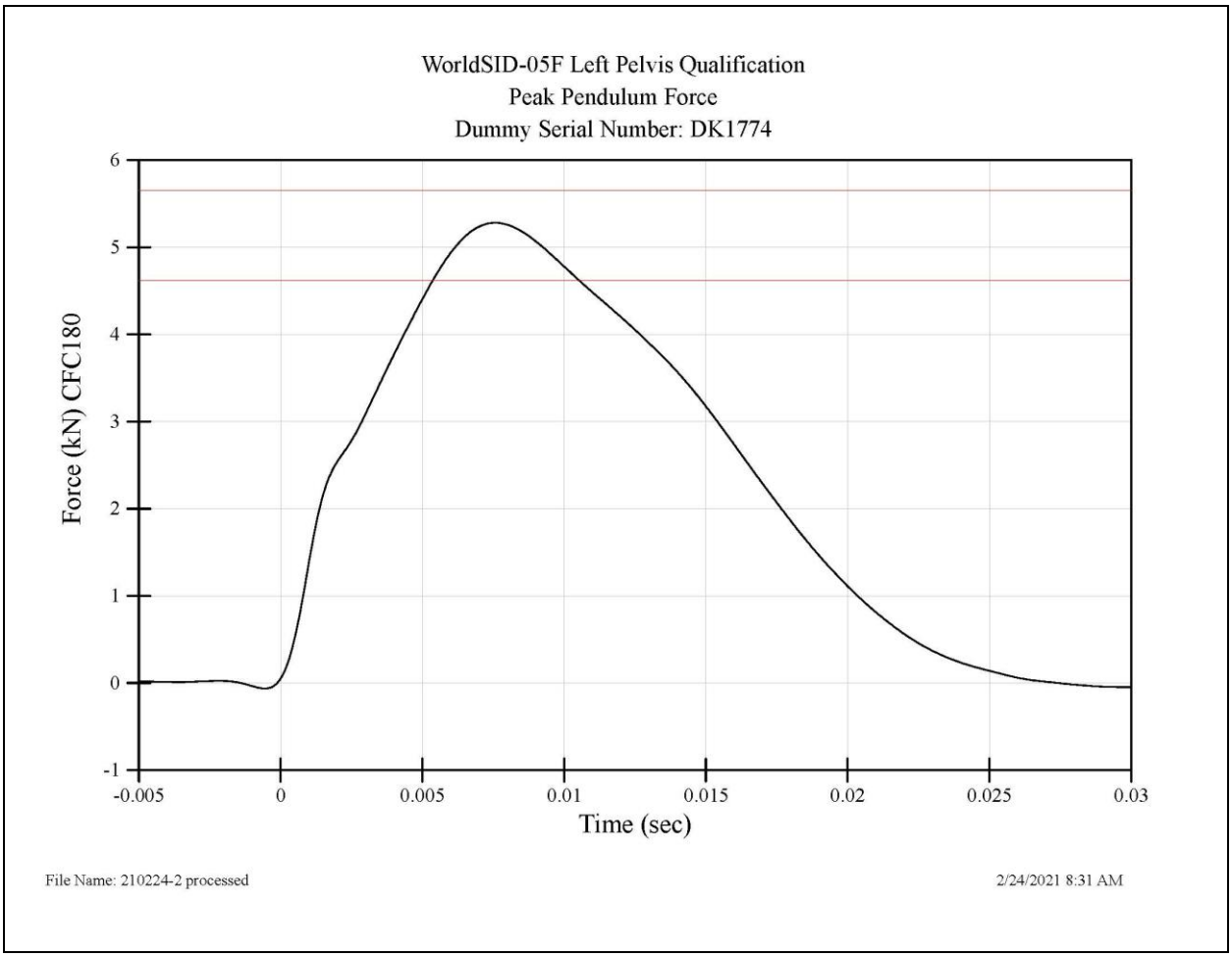
Test ID: 210224-2
Test Date: 2/24/2021
Test Time: 8:38 AM

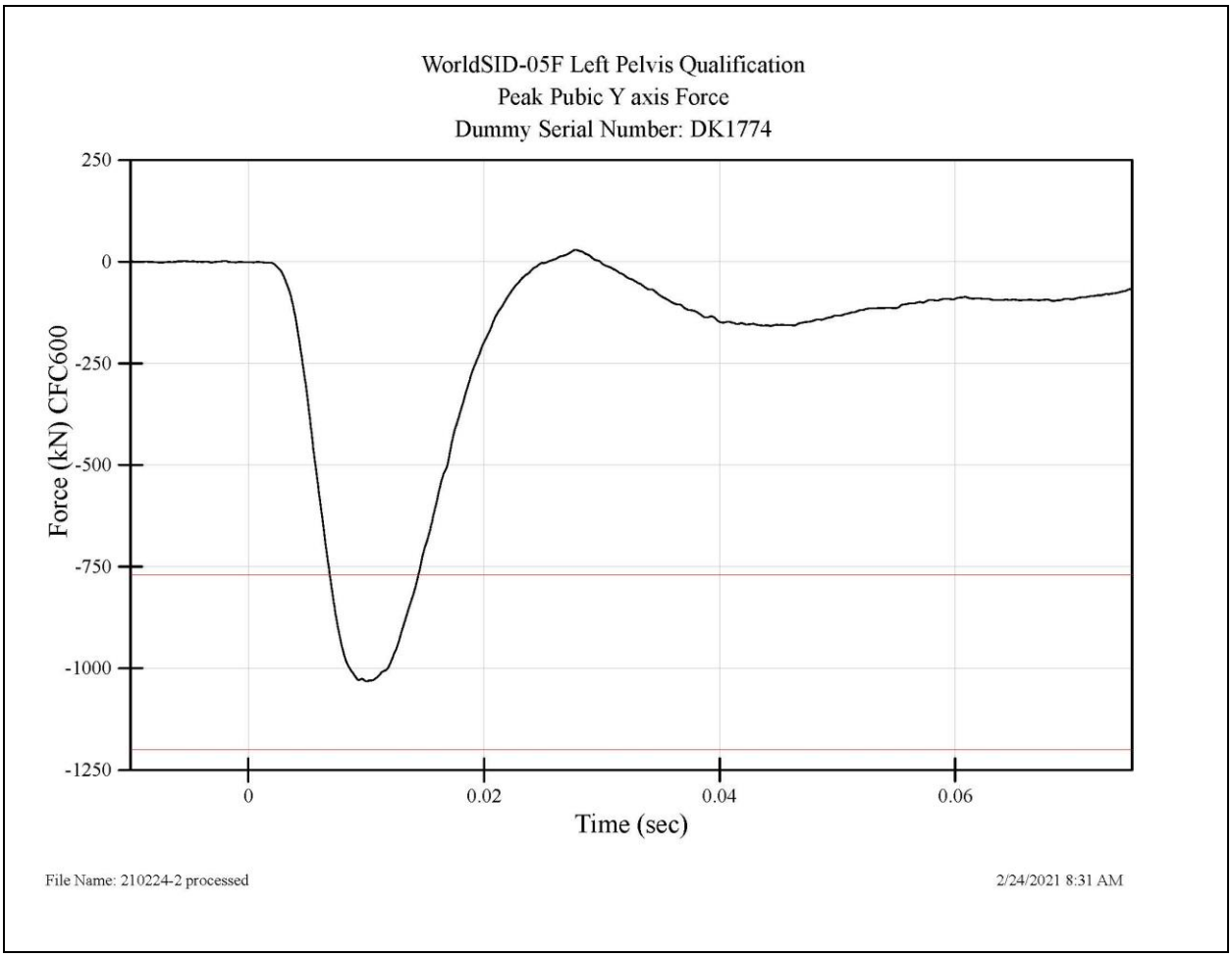
Test Results

Test Parameter	Specification Range*	Result	Pass/Fail
Test Temperature (°C)	20.6 - 22.2	21.7	Pass
Test Humidity (%)	10 - 70	60	Pass
Test Velocity (m/s)	6.60 - 6.80	6.69	Pass
Peak Probe Force (kN)	4.62 - 5.65	5.28	Pass
Peak Pubic Force FY (N)	-1200.0 - (-770.0)	-1031.8	Pass
Peak T12 Acceleration (g)	11.8 - 15.8	19.4	Fail
Peak Pelvis Acceleration (g)	48.6 - 74.4	45.0	Fail

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

File Name: 210224-2 processed


WorldSID-05F Left Pelvis Qualification
Peak Pendulum Force
Dummy Serial Number: DK1774
Force (kN) CFC180
6
5
4
3
2
1
0
-1
-0.005
0
0.005
0.01
0.015
0.02
0.025
0.03
Time (sec)
File Name: 210224-2 processed
2/24/2021 8:31 AM


WorldSID-05F Left Pelvis Qualification
Peak Pubic Y axis Force
Dummy Serial Number: DK1774
250
0
-250
-500
-750
-1000
-1250
Force (kN) CFC600
0
0.02
0.04
0.06
Time (sec)
File Name: 210224-2 processed
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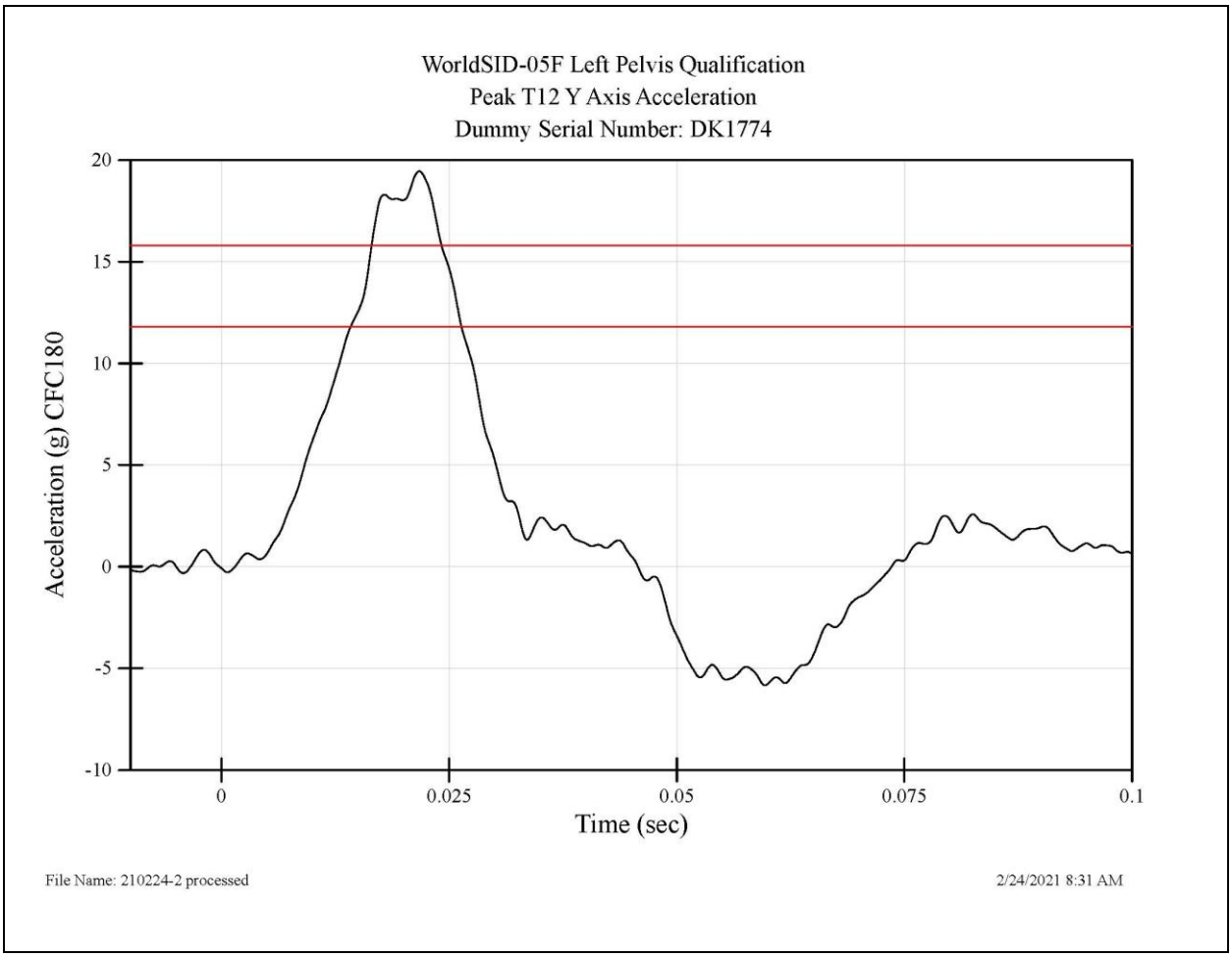
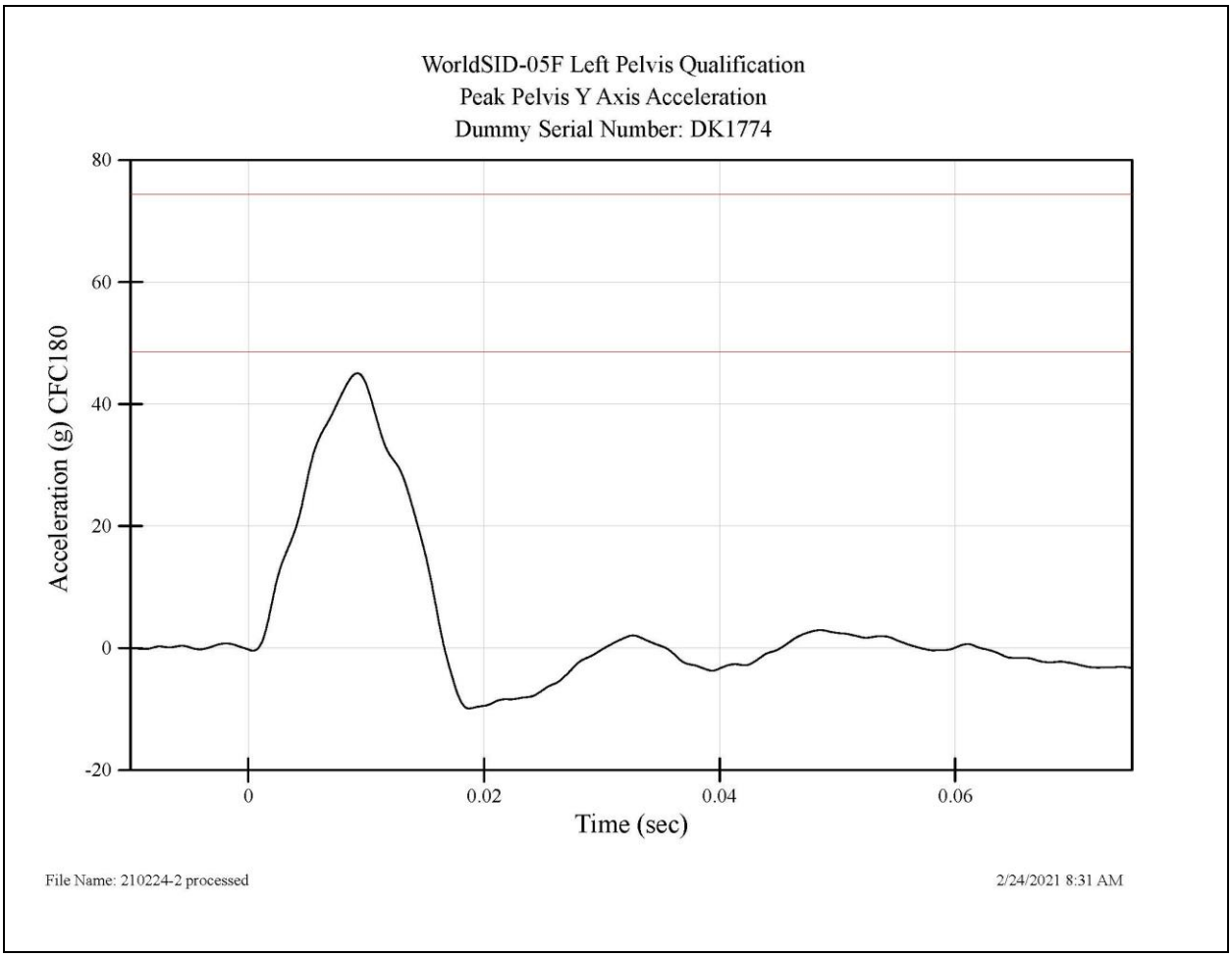

WorldSID-05F Left Pelvis Qualification
Peak T12 Y Axis Acceleration
Dummy Serial Number: DK1774
Acceleration (g) CFC180
20
15
10
5
0
-5
-10
0
0.025
0.05
0.075
0.1
Time (sec)
File Name: 210224-2 processed
2/24/2021 8:31 AM


WorldSID-05F Left Pelvis Qualification
Peak Pelvis Y Axis Acceleration
Dummy Serial Number: DK1774
80
60
40
20
0
-20
Acceleration (g) CFC180
0
0.02
0.04
0.06
Time (sec)
File Name: 210224-2 processed
2/24/2021 8:31 AM

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – DUMMY INSTRUMENTATION (WorldSID-50M with RibEye™)

		WorldSID-50M S/N EB8888		
		Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers (g)	X	12324-1	Endevco	22-Jul-2020
	Y	12324-3	Endevco	22-Jul-2020
	Z	12324-2	Endevco	22-Jul-2020
Head Angular Rates Sensors (deg/sec)	X	ARS12047	DTS	4-Aug-2020
	Y	ARS15094	DTS	4-Aug-2020
	Z	ARS11060	DTS	4-Aug-2020
Upper Neck Force (N)	X	DO9753	Humanetics	21-Jul-2020
	Y	DO9753	Humanetics	21-Jul-2020
	Z	DO9753	Humanetics	21-Jul-2020
Upper Neck Moment (Nm)	X	DO9753	Humanetics	21-Jul-2020
	Y	DO9753	Humanetics	21-Jul-2020
	Z	DO9753	Humanetics	21-Jul-2020
Lower Neck Force (N)	X	EB8143	Humanetics	21-Jul-2020
	Y	EB8143	Humanetics	21-Jul-2020
	Z	EB8143	Humanetics	21-Jul-2020
Lower Neck Moment (Nm)	X	EB8143	Humanetics	21-Jul-2020
	Y	EB8143	Humanetics	21-Jul-2020
	Z	EB8143	Humanetics	21-Jul-2020
Upper Spine Accelerometers (T1) (g)	X	EC1630	Humanetics	21-Jul-2020
	Y	EC1630	Humanetics	21-Jul-2020
	Z	EC1630	Humanetics	21-Jul-2020
Middle Spine Accelerometers (T4) (g)	X	12037-3	Endevco	21-Jul-2020
	Y	12037-2	Endevco	21-Jul-2020
	Z	12037-1	Endevco	21-Jul-2020
Lower Spine Accelerometers (T12) (g)	X	12352-3	Endevco	21-Jul-2020
	Y	12352-2	Endevco	21-Jul-2020
	Z	12352-1	Endevco	21-Jul-2020
Shoulder Force (N)	X	12375-3	Endevco	22-Jul-2020
	Y	12375-2	Endevco	22-Jul-2020
	Z	12375-1	Endevco	22-Jul-2020
Pubic Symphysis Force (N)	Y	EC4386	Humanetics	21-Jul-2020
Sacro-Iliac Left Force (N)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020
Sacro-Iliac Left Moment (Nm)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020

TABLE 1 – DUMMY INSTRUMENTATION (WorldSID-50M with RibEye™) (CONTINUED)

		WorldSID-50M S/N EB8888		
		Serial Number	**Manufacturer**	**Calibration Date**
Sacro-Iliac Right Force (N)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020
Sacro-Iliac Right Moment (Nm)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020
Lumbar Force (N)	X	EC2349	Humanetics	21-Jul-2020
	Y	EC2349	Humanetics	21-Jul-2020
	Z	EC2349	Humanetics	21-Jul-2020
Lumbar Moment (Nm)	X	EC2349	Humanetics	21-Jul-2020
	Y	EC2349	Humanetics	21-Jul-2020
	Z	EC2349	Humanetics	21-Jul-2020
Pelvis Accelerometers (g)	X	11905-3	Endevco	22-Jul-2020
	Y	11905-2	Endevco	22-Jul-2020
	Z	11905-1	Endevco	22-Jul-2020
Left Femur Force (N)	X	EA4925TPS	Humanetics	29-Jul-2020
	Y	EA4925TPS	Humanetics	29-Jul-2020
	Z	EA4925TPS	Humanetics	29-Jul-2020
Left Femur Moment (Nm)	X	EA4925TPS	Humanetics	29-Jul-2020
	Y	EA4925TPS	Humanetics	29-Jul-2020
	Z	EA4925TPS	Humanetics	29-Jul-2020
Left Femoral Neck Force (N)	X	EB6234T	Humanetics	21-Jul-2020
	Y	EB6234T	Humanetics	21-Jul-2020
	Z	EB6234T	Humanetics	21-Jul-2020
Left Outer Knee Force (N)	Y	93	Humanetics	21-Jul-2020
Left Inner Knee Force (N)	Y	95	Humanetics	21-Jul-2020

TABLE 1 – DUMMY INSTRUMENTATION (WorldSID-50M with RibEye™) (CONTINUED)

			WorldSID-50M S/N EB8888		
			Serial Number	**Manufacturer**	**Calibration Date**
Shoulder RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Thorax Rib 1 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Thorax Rib 2 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Thorax Rib 3 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020

TABLE 1 – DUMMY INSTRUMENTATION (WorldSID-50M with RibEye™) (CONTINUED)

			WorldSID-50M S/N EB8888		
			Serial Number	**Manufacturer**	**Calibration Date**
Abdomen Rib 1 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Abdomen Rib 2 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-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	28-Oct-2020
	Y	12346-1	Endevco	28-Oct-2020
	Z	12346-2	Endevco	28-Oct-2020
Head Angular Rates Sensors (deg/sec)	X	ARS11034	DTS	3-Sep-2020
	Y	ARS14271	DTS	4-Aug-2020
	Z	ARS14273	DTS	4-Aug-2020
Upper Neck Force (N)	X	EB8759	Humanetics	27-Oct-2020
	Y	EB8759	Humanetics	27-Oct-2020
	Z	EB8759	Humanetics	27-Oct-2020
Upper Neck Moment (Nm)	X	EB8759	Humanetics	27-Oct-2020
	Y	EB8759	Humanetics	27-Oct-2020
	Z	EB8759	Humanetics	27-Oct-2020
Lower Neck Force (N)	X	DW9074	Humanetics	4-Nov-2020
	Y	DW9074	Humanetics	4-Nov-2020
	Z	DW9074	Humanetics	4-Nov-2020
Lower Neck Moment (Nm)	X	DW9074	Humanetics	4-Nov-2020
	Y	DW9074	Humanetics	4-Nov-2020
	Z	DW9074	Humanetics	4-Nov-2020
Shoulder Force (N)	X	DW9661	Humanetics	3-Sep-2020
	Y	DW9661	Humanetics	3-Sep-2020
	Z	DW9661	Humanetics	3-Sep-2020
Upper Spine Accelerometers (T1) (g)	X	12116-2	Endevco	28-Oct-2020
	Y	12116-1	Endevco	28-Oct-2020
	Z	12116-3	Endevco	28-Oct-2020
Middle Spine Accelerometers (T4) (g)	X	12075-3	Endevco	28-Oct-2020
	Y	12075-2	Endevco	28-Oct-2020
	Z	12075-1	Endevco	28-Oct-2020
Lower Spine Accelerometers (T12) (g)	X	12363-3	Endevco	28-Oct-2020
	Y	12363-2	Endevco	28-Oct-2020
	Z	12363-1	Endevco	28-Oct-2020
Pubic Symphysis Force (N)	Y	EF8492	Humanetics	27-Oct-2020
Sacro-Iliac Left Force (N)	X	EG1102	Humanetics	11-Sep-2020
	Y	EG1102	Humanetics	11-Sep-2020
	Z	EG1102	Humanetics	11-Sep-2020
Sacro-Iliac Left Moment (Nm)	X	EG1102	Humanetics	11-Sep-2020
	Y	EG1102	Humanetics	11-Sep-2020
	Z	EG1102	Humanetics	11-Sep-2020

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	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 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	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 3 – VEHICLE INSTRUMENTATION

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity (g)	X	T23815	Endevco	11-Sep-2020
	Y	T23789	Endevco	15-Sep-2020
	Z	T23777	Endevco	15-Sep-2020
Vehicle Center of Gravity Angular Rate (deg/sec)	X	ARS9185	DTS	6-Jul-2020
	Y	ARS8290	DTS	6-Jul-2020
	Z	ARS8001	DTS	6-Jul-2020
Right Side Sill At Front Seat (g)	X	T16772	Endevco	27-Aug-2020
	Y	T23885	Endevco	27-Aug-2020
	Z	T11805	Endevco	27-Aug-2020
Right Side Sill At Rear Seat (g)	X	P94567	Endevco	20-Nov-2020
	Y	P75115	Endevco	20-Nov-2020
	Z	P33547	Endevco	20-Nov-2020
Left Side Sill At Front Seat (g)	Y	T16770	Endevco	27-Aug-2020
Left Side Sill At Rear Seat (g)	Y	T11871	Endevco	27-Aug-2020
Left Lower A-Pillar (g)	Y	T23852	Endevco	17-Sep-2020
Left Middle A-Pillar (g)	Y	T23795	Endevco	17-Sep-2020
Left Lower B-Pillar (g)	Y	P76171	Endevco	20-Nov-2020
Left Middle B-Pillar (g)	Y	P76114	Endevco	20-Nov-2020
Front Seat Track (g)	Y	P57192	Endevco	27-Aug-2020
Rear Seat Structure (g)	Y	T16768	Endevco	27-Aug-2020
Right Rear Occupant Compartment (g)	Y	T16771	Endevco	27-Aug-2020
Engine Block (g)	X	T23813	Endevco	11-Sep-2020
	Y	T23832	Endevco	29-Sep-2020
Floorpan Above Rear Axle (g)	X	T23807	Endevco	15-Sep-2020
	Y	T23837	Endevco	15-Sep-2020
	Z	T23797	Endevco	11-Sep-2020
Rear Deck (g)	X	P58494	Endevco	20-Nov-2020
	Y	P74456	Endevco	20-Nov-2020
	Z	P58537	Endevco	20-Nov-2020
Rear Deck Angular Rate (deg/sec)	X	ARS8743	DTS	11-Sep-2020
	Y	ARS9194	DTS	11-Sep-2020
	Z	ARS7974	DTS	6-Jul-2020
Left Front Door Mid Centerline Acceleration (g)	Y	T23812	Endevco	29-Sep-2020
Left Front Door Mid Rear Acceleration (g)	Y	T23828	Endevco	29-Sep-2020
Left Front Door Upper Centerline (g)	Y	T23785	Endevco	29-Sep-2020
Left Rear Door Mid Rear (g)	Y	T11815	Endevco	20-Nov-2020
Left Rear Door Upper Centerline (g)	Y	T11841	Endevco	20-Nov-2020

TABLE 4 – MDB INSTRUMENTATION

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity (g)	X	T11875	Endevco	27-Aug-2020
	Y	T11867	Endevco	27-Aug-2020
	Z	T11804	Endevco	27-Aug-2020
MDB Rear (g)	X	T23821	Endevco	11-Sep-2020
	Y	T23805	Endevco	11-Sep-2020

Sign Convention
SAE J211 MAR95

Accelerometers:

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

Potentiometers:

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

Rotation potentiometers:

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

Load cells:

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

Neck load cells:

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

Tibia load cells:

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

Sign Convention (Continued)
SAE J211 MAR95

Lumbar load cells:	+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

Typical Test Measurements	Channel Class
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	11HEAD0000WSACXP	Driver Head Acceleration (X)	1000	+	yes	2000
2	11HEAD0000WSACYP	Driver Head Acceleration (Y)	1000	+	yes	2000
3	11HEAD0000WSACZP	Driver Head Acceleration (Z)	1000	+	yes	2000
3A	11HEAD0000WSACRP	Driver Head Acceleration Resultant	1000			
4	11HEAD0000WSAVXP	Driver Head Angular Rate (X)	1000	+	yes	8000
5	11HEAD0000WSAVYP	Driver Head Angular Rate (Y)	1000	+	yes	8000
6	11HEAD0000WSAVZP	Driver Head Angular Rate (Z)	1000	+	yes	8000
7	11NECKUP00WSFOXP	Driver Upper Neck Force (X)	1000	+	yes	10000
8	11NECKUP00WSFOYP	Driver Upper Neck Force (Y)	1000	+	yes	10000
9	11NECKUP00WSFOZP	Driver Upper Neck Force (Z)	1000	+	yes	12000
10	11NECKUP00WSMOXP	Driver Upper Neck Moment (X)	600	+	yes	300
11	11NECKUP00WSMOYP	Driver Upper Neck Moment (Y)	600	+	yes	300
12	11NECKUP00WSMOZP	Driver Upper Neck Moment (Z)	600	+	yes	200
13	11NECKLO00WSFOXP	Driver Lower Neck Force (X)	1000	+	yes	10000
14	11NECKLO00WSFOYP	Driver Lower Neck Force (Y)	1000	+	yes	10000
15	11NECKLO00WSFOZP	Driver Lower Neck Force (Z)	1000	+	yes	12000
16	11NECKLO00WSMOXP	Driver Lower Neck Moment (X)	600	+	yes	300
17	11NECKLO00WSMOYP	Driver Lower Neck Moment (Y)	600	+	yes	300
18	11NECKLO00WSMOZP	Driver Lower Neck Moment (Z)	600	+	yes	200
19	11SHLDLE00WSFOXP	Driver Shoulder Force (X)	600	+	yes	5000
20	11SHLDLE00WSFOYP	Driver Shoulder Force (Y)	600	+	yes	10000
21	11SHLDLE00WSFOZP	Driver Shoulder Force (Z)	600	+	yes	5000
22	11SHRILEREWSDSX0	Driver Shoulder Rear Displacement (X)	0	+	no	60
23	11SHRILEREWSDSY0	Driver Shoulder Rear Displacement (Y)	0	+	no	60
24	11SHRILEREWSDSZ0	Driver Shoulder Rear Displacement (Z)	0	+	no	60
25	11SHRILEREWSDSLB	Driver Shoulder Rear Length Change	600	+	no	60
26	11SHRILEMIWSDSX0	Driver Shoulder Middle Displacement (X)	0	+	no	60
27	11SHRILEMIWSDSY0	Driver Shoulder Middle Displacement (Y)	0	+	no	60
28	11SHRILEMIWSDSZ0	Driver Shoulder Middle Displacement (Z)	0	+	no	60
29	11SHRILEMIWSDSLB	Driver Shoulder Middle Length Change	600	+	no	60
30	11SHRILEFRWSDSX0	Driver Shoulder Front Displacement (X)	0	+	no	60
31	11SHRILEFRWSDSY0	Driver Shoulder Front Displacement (Y)	0	+	no	60
32	11SHRILEFRWSDSZ0	Driver Shoulder Front Displacement (Z)	0	+	no	60
33	11SHRILEFRWSDSLB	Driver Shoulder Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
34	11TRRILUREWSDSX0	Driver Thorax Rib 1 Rear Displacement (X)	0	+	no	60
35	11TRRILUREWSDSY0	Driver Thorax Rib 1 Rear Displacement (Y)	0	+	no	60
36	11TRRILUREWSDSZ0	Driver Thorax Rib 1 Rear Displacement (Z)	0	+	no	60
37	11TRRILUREWSDSLB	Driver Thorax Rib 1 Rear Length Change	600	+	no	60
38	11TRRILUMIWSDSX0	Driver Thorax Rib 1 Middle Displacement (X)	0	+	no	60
39	11TRRILUMIWSDSY0	Driver Thorax Rib 1 Middle Displacement (Y)	0	+	no	60
40	11TRRILUMIWSDSZ0	Driver Thorax Rib 1 Middle Displacement (Z)	0	+	no	60
41	11TRRILUMIWSDSLB	Driver Thorax Rib 1 Middle Length Change	600	+	no	60
42	11TRRILUFRWSDSX0	Driver Thorax Rib 1 Front Displacement (X)	0	+	no	60
43	11TRRILUFRWSDSY0	Driver Thorax Rib 1 Front Displacement (Y)	0	+	no	60
44	11TRRILUFRWSDSZ0	Driver Thorax Rib 1 Front Displacement (Z)	0	+	no	60
45	11TRRILUFRWSDSLB	Driver Thorax Rib 1 Front Length Change	600	+	no	60
46	11TRRILMREWSDSX0	Driver Thorax Rib 2 Rear Displacement (X)	0	+	no	60
47	11TRRILMREWSDSY0	Driver Thorax Rib 2 Rear Displacement (Y)	0	+	no	60
48	11TRRILMREWSDSZ0	Driver Thorax Rib 2 Rear Displacement (Z)	0	+	no	60
49	11TRRILMREWSDSLB	Driver Thorax Rib 2 Rear Length Change	600	+	no	60
50	11TRRILMMIWSDSX0	Driver Thorax Rib 2 Middle Displacement (X)	0	+	no	60
51	11TRRILMMIWSDSY0	Driver Thorax Rib 2 Middle Displacement (Y)	0	+	no	60
52	11TRRILMMIWSDSZ0	Driver Thorax Rib 2 Middle Displacement (Z)	0	+	no	60
53	11TRRILMMIWSDSLB	Driver Thorax Rib 2 Middle Length Change	600	+	no	60
54	11TRRILMFRWSDSX0	Driver Thorax Rib 2 Front Displacement (X)	0	+	no	60
55	11TRRILMFRWSDSY0	Driver Thorax Rib 2 Front Displacement (Y)	0	+	no	60
56	11TRRILMFRWSDSZ0	Driver Thorax Rib 2 Front Displacement (Z)	0	+	no	60
57	11TRRILMFRWSDSLB	Driver Thorax Rib 2 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
58	11TRRILLREWSDSX0	Driver Thorax Rib 3 Rear Displacement (X)	0	+	no	60
59	11TRRILLREWSDSY0	Driver Thorax Rib 3 Rear Displacement (Y)	0	+	no	60
60	11TRRILLREWSDSZ0	Driver Thorax Rib 3 Rear Displacement (Z)	0	+	no	60
61	11TRRILLREWSDSLB	Driver Thorax Rib 3 Rear Length Change	600	+	no	60
62	11TRRILLMIWSDSX0	Driver Thorax Rib 3 Middle Displacement (X)	0	+	no	60
63	11TRRILLMIWSDSY0	Driver Thorax Rib 3 Middle Displacement (Y)	0	+	no	60
64	11TRRILLMIWSDSZ0	Driver Thorax Rib 3 Middle Displacement (Z)	0	+	no	60
65	11TRRILLMIWSDSLB	Driver Thorax Rib 3 Middle Length Change	600	+	no	60
66	11TRRILLFRWSDSX0	Driver Thorax Rib 3 Front Displacement (X)	0	+	no	60
67	11TRRILLFRWSDSY0	Driver Thorax Rib 3 Front Displacement (Y)	0	+	no	60
68	11TRRILLFRWSDSZ0	Driver Thorax Rib 3 Front Displacement (Z)	0	+	no	60
69	11TRRILLFRWSDSLB	Driver Thorax Rib 3 Front Length Change	600	+	no	60
70	11ABRILUREWSDSX0	Driver Abdomen Rib 1 Rear Displacement (X)	0	+	no	60
71	11ABRILUREWSDSY0	Driver Abdomen Rib 1 Rear Displacement (Y)	0	+	no	60
72	11ABRILUREWSDSZ0	Driver Abdomen Rib 1 Rear Displacement (Z)	0	+	no	60
73	11ABRILUREWSDSLB	Driver Abdomen Rib 1 Rear Length Change	600	+	no	60
74	11ABRILUMIWSDSX0	Driver Abdomen Rib 1 Middle Displacement (X)	0	+	no	60
75	11ABRILUMIWSDSY0	Driver Abdomen Rib 1 Middle Displacement (Y)	0	+	no	60
76	11ABRILUMIWSDSZ0	Driver Abdomen Rib 1 Middle Displacement (Z)	0	+	no	60
77	11ABRILUMIWSDSLB	Driver Abdomen Rib 1 Middle Length Change	600	+	no	60
78	11ABRILUFRWSDSX0	Driver Abdomen Rib 1 Front Displacement (X)	0	+	no	60
79	11ABRILUFRWSDSY0	Driver Abdomen Rib 1 Front Displacement (Y)	0	+	no	60
80	11ABRILUFRWSDSZ0	Driver Abdomen Rib 1 Front Displacement (Z)	0	+	no	60
81	11ABRILUFRWSDSLB	Driver Abdomen Rib 1 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
82	11ABRILLREWSDSX0	Driver Abdomen Rib 2 Rear Displacement (X)	0	+	no	60
83	11ABRILLREWSDSY0	Driver Abdomen Rib 2 Rear Displacement (Y)	0	+	no	60
84	11ABRILLREWSDSZ0	Driver Abdomen Rib 2 Rear Displacement (Z)	0	+	no	60
85	11ABRILLREWSDSLB	Driver Abdomen Rib 2 Rear Length Change	600	+	no	60
86	11ABRILLMIWSDSX0	Driver Abdomen Rib 2 Middle Displacement (X)	0	+	no	60
87	11ABRILLMIWSDSY0	Driver Abdomen Rib 2 Middle Displacement (Y)	0	+	no	60
88	11ABRILLMIWSDSZ0	Driver Abdomen Rib 2 Middle Displacement (Z)	0	+	no	60
89	11ABRILLMIWSDSLB	Driver Abdomen Rib 2 Middle Length Change	600	+	no	60
90	11ABRILLFRWSDSX0	Driver Abdomen Rib 2 Front Displacement (X)	0	+	no	60
91	11ABRILLFRWSDSY0	Driver Abdomen Rib 2 Front Displacement (Y)	0	+	no	60
92	11ABRILLFRWSDSZ0	Driver Abdomen Rib 2 Front Displacement (Z)	0	+	no	60
93	11ABRILLFRWSDSLB	Driver Abdomen Rib 2 Front Length Change	600	+	no	60
94	11THSP0100WSACXP	Driver Spine T1 Acceleration (X)	180	+	yes	2000
95	11THSP0100WSACYP	Driver Spine T1 Acceleration (Y)	180	+	yes	2000
96	11THSP0100WSACZP	Driver Spine T1 Acceleration (Z)	180	+	yes	2000
96A	11THSP0100WSACRP	Driver Spine T1 Acceleration Resultant	180			
97	11THSP0400WSACXP	Driver Spine T4 Acceleration (X)	180	+	yes	2000
98	11THSP0400WSACYP	Driver Spine T4 Acceleration (Y)	180	+	yes	2000
99	11THSP0400WSACZP	Driver Spine T4 Acceleration (Z)	180	+	yes	2000
99A	11THSP0400WSACRP	Driver Spine T4 Acceleration Resultant	180			
100	11THSP1200WSACXP	Driver Spine T12 Acceleration (X)	180	+	yes	2000
101	11THSP1200WSACYP	Driver Spine T12 Acceleration (Y)	180	+	yes	2000
102	11THSP1200WSACZP	Driver Spine T12 Acceleration (Z)	180	+	yes	2000
102A	11THSP1200WSACRP	Driver Spine T12 Acceleration Resultant	180			
103	11PUBC0000WSFOYP	Driver Pubic Symphysis Force (Y)	600	+	yes	12000
104	11SACRLE00WSFOXP	Driver Sacro-iliac Left Force (X)	600	+	yes	6000
105	11SACRLE00WSFOYP	Driver Sacro-iliac Left Force (Y)	600	+	yes	12000
106	11SACRLE00WSFOZP	Driver Sacro-iliac Left Force (Z)	600	+	yes	6000
107	11SACRLE00WSMOXP	Driver Sacro-iliac Left Moment (X)	600	+	yes	800
108	11SACRLE00WSMOYP	Driver Sacro-iliac Left Moment (Y)	600	+	yes	400
109	11SACRLE00WSMOZP	Driver Sacro-iliac Left Moment (Z)	600	+	yes	400
110	11SACRRI00WSFOXP	Driver Sacro-iliac Right Force (X)	600	+	yes	6000
111	11SACRRI00WSFOYP	Driver Sacro-iliac Right Force (Y)	600	+	yes	12000
112	11SACRRI00WSFOZP	Driver Sacro-iliac Right Force (Z)	600	+	yes	6000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
113	11SACRRI00WSMOXP	Driver Sacro-iliac Right Moment (X)	600	+	yes	800
114	11SACRRI00WSMOYP	Driver Sacro-iliac Right Moment (Y)	600	+	yes	400
115	11SACRRI00WSMOZP	Driver Sacro-iliac Right Moment (Z)	600	+	yes	400
116	11LUSP0000WSFOXP	Driver Lumbar Force (X)	600	+	yes	10000
117	11LUSP0000WSFOYP	Driver Lumbar Force (Y)	600	+	yes	10000
118	11LUSP0000WSFOZP	Driver Lumbar Force (Z)	600	+	yes	12000
119	11LUSP0000WSMOXP	Driver Lumbar Moment (X)	600	+	yes	300
120	11LUSP0000WSMOYP	Driver Lumbar Moment (Y)	600	+	yes	300
121	11LUSP0000WSMOZP	Driver Lumbar Moment (Z)	600	+	yes	200
122	11PELV0000WSACXP	Driver Pelvic Acceleration (X)	1000	+	yes	2000
123	11PELV0000WSACYP	Driver Pelvic Acceleration (Y)	1000	+	yes	2000
124	11PELV0000WSACZP	Driver Pelvic Acceleration (Z)	1000	+	yes	2000
124A	11PELV0000WSACRP	Driver Pelvic Acceleration Resultant	1000			
125	11FEMRLE00WSFOXP	Driver Left Femur Force (X)	600	+	yes	15000
126	11FEMRLE00WSFOYP	Driver Left Femur Force (Y)	600	+	yes	15000
127	11FEMRLE00WSFOZP	Driver Left Femur Force (Z)	600	+	yes	15000
128	11FEMRLE00WSMOXP	Driver Left Femur Moment (X)	600	+	yes	350
129	11FEMRLE00WSMOYP	Driver Left Femur Moment (Y)	600	+	yes	200
130	11FEMRLE00WSMOZP	Driver Left Femur Moment (Z)	600	+	yes	350
131	11FEACLE00WSFOXP	Driver Femoral Neck Force (X)	600	+	yes	10000
132	11FEACLE00WSFOYP	Driver Femoral Neck Force (Y)	600	+	yes	25000
133	11FEACLE00WSFOZP	Driver Femoral Neck Force (Z)	600	+	yes	10000
134	11KNEELEOUWSFOYP	Driver Left Outer Knee Force (Y)	600	+	yes	20000
135	11KNEELEINWSFOYP	Driver Left Inner Knee Force (Y)	600	+	yes	20000
136	14HEAD0000WFACXP	Passenger Head Acceleration (X)	1000	+	yes	2000
137	14HEAD0000WFACYP	Passenger Head Acceleration (Y)	1000	+	yes	2000
138	14HEAD0000WFACZP	Passenger Head Acceleration (Z)	1000	+	yes	2000
138A	14HEAD0000WFACRP	Passenger Head Acceleration Resultant	1000			
139	14HEAD0000WFAVXP	Passenger Head Angular Rate (X)	1000	+	yes	8000
140	14HEAD0000WFAVYP	Passenger Head Angular Rate (Y)	1000	+	yes	8000
141	14HEAD0000WFAVZP	Passenger Head Angular Rate (Z)	1000	+	yes	8000
142	14NECKUP00WFFOXP	Passenger Upper Neck Force (X)	1000	+	yes	10000
143	14NECKUP00WFFOYP	Passenger Upper Neck Force (Y)	1000	+	yes	10000
144	14NECKUP00WFFOZP	Passenger Upper Neck Force (Z)	1000	+	yes	12000
145	14NECKUP00WFMOXP	Passenger Upper Neck Moment (X)	600	+	yes	300
146	14NECKUP00WFMOYP	Passenger Upper Neck Moment (Y)	600	+	yes	300
147	14NECKUP00WFMOZP	Passenger Upper Neck Moment (Z)	600	+	yes	200
148	14NECKLO00WFFOXP	Passenger Lower Neck Force (X)	1000	+	yes	10000
149	14NECKLO00WFFOYP	Passenger Lower Neck Force (Y)	1000	+	yes	10000
150	14NECKLO00WFFOZP	Passenger Lower Neck Force (Z)	1000	+	yes	12000
151	14NECKLO00WFMOXP	Passenger Lower Neck Moment (X)	600	+	yes	300
152	14NECKLO00WFMOYP	Passenger Lower Neck Moment (Y)	600	+	yes	300
153	14NECKLO00WFMOZP	Passenger Lower Neck Moment (Z)	600	+	yes	200
154	14SHLDLE00WFFOXP	Passenger Shoulder Force (X)	600	+	yes	4500
155	14SHLDLE00WFFOYP	Passenger Shoulder Force (Y)	600	+	yes	4500
156	14SHLDLE00WFFOZP	Passenger Shoulder Force (Z)	600	+	yes	6000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
157	14SHRILEREWFDSX0	Passenger Shoulder Rear Displacement (X)	0	+	no	60
158	14SHRILEREWFDSY0	Passenger Shoulder Rear Displacement (Y)	0	+	no	60
159	14SHRILEREWFDSZ0	Passenger Shoulder Rear Displacement (Z)	0	+	no	60
160	14SHRILEREWFDSLB	Passenger Shoulder Rear Length Change	600	+	no	60
161	14SHRILEMIWFDSX0	Passenger Shoulder Middle Displacement (X)	0	+	no	60
162	14SHRILEMIWFDSY0	Passenger Shoulder Middle Displacement (Y)	0	+	no	60
163	14SHRILEMIWFDSZ0	Passenger Shoulder Middle Displacement (Z)	0	+	no	60
164	14SHRILEMIWFDSLB	Passenger Shoulder Middle Length Change	600	+	no	60
165	14SHRILEFRWFDSX0	Passenger Shoulder Front Displacement (X)	0	+	no	60
166	14SHRILEFRWFDSY0	Passenger Shoulder Front Displacement (Y)	0	+	no	60
167	14SHRILEFRWFDSZ0	Passenger Shoulder Front Displacement (Z)	0	+	no	60
168	14SHRILEFRWFDSLB	Passenger Shoulder Front Length Change	600	+	no	60
169	14TRRILUREWFDSX0	Passenger Thorax Rib 1 Rear Displacement (X)	0	+	no	60
170	14TRRILUREWFDSY0	Passenger Thorax Rib 1 Rear Displacement (Y)	0	+	no	60
171	14TRRILUREWFDSZ0	Passenger Thorax Rib 1 Rear Displacement (Z)	0	+	no	60
172	14TRRILUREWFDSLB	Passenger Thorax Rib 1 Rear Length Change	600	+	no	60
173	14TRRILUMIWFDSX0	Passenger Thorax Rib 1 Middle Displacement (X)	0	+	no	60
174	14TRRILUMIWFDSY0	Passenger Thorax Rib 1 Middle Displacement (Y)	0	+	no	60
175	14TRRILUMIWFDSZ0	Passenger Thorax Rib 1 Middle Displacement (Z)	0	+	no	60
176	14TRRILUMIWFDSLB	Passenger Thorax Rib 1 Middle Length Change	600	+	no	60
177	14TRRILUFRWFDSX0	Passenger Thorax Rib 1 Front Displacement (X)	0	+	no	60
178	14TRRILUFRWFDSY0	Passenger Thorax Rib 1 Front Displacement (Y)	0	+	no	60
179	14TRRILUFRWFDSZ0	Passenger Thorax Rib 1 Front Displacement (Z)	0	+	no	60
180	14TRRILUFRWFDSLB	Passenger Thorax Rib 1 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
181	14TRRILMREWFDSX0	Passenger Thorax Rib 2 Rear Displacement (X)	0	+	no	60
182	14TRRILMREWFDSY0	Passenger Thorax Rib 2 Rear Displacement (Y)	0	+	no	60
183	14TRRILMREWFDSZ0	Passenger Thorax Rib 2 Rear Displacement (Z)	0	+	no	60
184	14TRRILMREWFDSLB	Passenger Thorax Rib 2 Rear Length Change	600	+	no	60
185	14TRRILMMIWFDSX0	Passenger Thorax Rib 2 Middle Displacement (X)	0	+	no	60
186	14TRRILMMIWFDSY0	Passenger Thorax Rib 2 Middle Displacement (Y)	0	+	no	60
187	14TRRILMMIWFDSZ0	Passenger Thorax Rib 2 Middle Displacement (Z)	0	+	no	60
188	14TRRILMMIWFDSLB	Passenger Thorax Rib 2 Middle Length Change	600	+	no	60
189	14TRRILMFRWFDSX0	Passenger Thorax Rib 2 Front Displacement (X)	0	+	no	60
190	14TRRILMFRWFDSY0	Passenger Thorax Rib 2 Front Displacement (Y)	0	+	no	60
191	14TRRILMFRWFDSZ0	Passenger Thorax Rib 2 Front Displacement (Z)	0	+	no	60
192	14TRRILMFRWFDSLB	Passenger Thorax Rib 2 Front Length Change	600	+	no	60
193	14TRRILLREWFDSX0	Passenger Thorax Rib 3 Rear Displacement (X)	0	+	no	60
194	14TRRILLREWFDSY0	Passenger Thorax Rib 3 Rear Displacement (Y)	0	+	no	60
195	14TRRILLREWFDSZ0	Passenger Thorax Rib 3 Rear Displacement (Z)	0	+	no	60
196	14TRRILLREWFDSLB	Passenger Thorax Rib 3 Rear Length Change	600	+	no	60
197	14TRRILLMIWFDSX0	Passenger Thorax Rib 3 Middle Displacement (X)	0	+	no	60
198	14TRRILLMIWFDSY0	Passenger Thorax Rib 3 Middle Displacement (Y)	0	+	no	60
199	14TRRILLMIWFDSZ0	Passenger Thorax Rib 3 Middle Displacement (Z)	0	+	no	60
200	14TRRILLMIWFDSLB	Passenger Thorax Rib 3 Middle Length Change	600	+	no	60
201	14TRRILLFRWFDSX0	Passenger Thorax Rib 3 Front Displacement (X)	0	+	no	60
202	14TRRILLFRWFDSY0	Passenger Thorax Rib 3 Front Displacement (Y)	0	+	no	60
203	14TRRILLFRWFDSZ0	Passenger Thorax Rib 3 Front Displacement (Z)	0	+	no	60
204	14TRRILLFRWFDSLB	Passenger Thorax Rib 3 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
205	14ABRILUREWFDSX0	Passenger Abdomen Rib 1 Rear Displacement (X)	0	+	no	60
206	14ABRILUREWFDSY0	Passenger Abdomen Rib 1 Rear Displacement (Y)	0	+	no	60
207	14ABRILUREWFDSZ0	Passenger Abdomen Rib 1 Rear Displacement (Z)	0	+	no	60
208	14ABRILUREWFDSLB	Passenger Abdomen Rib 1 Rear Length Change	600	+	no	60
209	14ABRILUMIWFDSX0	Passenger Abdomen Rib 1 Middle Displacement (X)	0	+	no	60
210	14ABRILUMIWFDSY0	Passenger Abdomen Rib 1 Middle Displacement (Y)	0	+	no	60
211	14ABRILUMIWFDSZ0	Passenger Abdomen Rib 1 Middle Displacement (Z)	0	+	no	60
212	14ABRILUMIWFDSLB	Passenger Abdomen Rib 1 Middle Length Change	600	+	no	60
213	14ABRILUFRWFDSX0	Passenger Abdomen Rib 1 Front Displacement (X)	0	+	no	60
214	14ABRILUFRWFDSY0	Passenger Abdomen Rib 1 Front Displacement (Y)	0	+	no	60
215	14ABRILUFRWFDSZ0	Passenger Abdomen Rib 1 Front Displacement (Z)	0	+	no	60
216	14ABRILUFRWFDSLB	Passenger Abdomen Rib 1 Front Length Change	600	+	no	60
217	14ABRILLREWFDSX0	Passenger Abdomen Rib 2 Rear Displacement (X)	0	+	no	60
218	14ABRILLREWFDSY0	Passenger Abdomen Rib 2 Rear Displacement (Y)	0	+	no	60
219	14ABRILLREWFDSZ0	Passenger Abdomen Rib 2 Rear Displacement (Z)	0	+	no	60
220	14ABRILLREWFDSLB	Passenger Abdomen Rib 2 Rear Length Change	600	+	no	60
221	14ABRILLMIWFDSX0	Passenger Abdomen Rib 2 Middle Displacement (X)	0	+	no	60
222	14ABRILLMIWFDSY0	Passenger Abdomen Rib 2 Middle Displacement (Y)	0	+	no	60
223	14ABRILLMIWFDSZ0	Passenger Abdomen Rib 2 Middle Displacement (Z)	0	+	no	60
224	14ABRILLMIWFDSLB	Passenger Abdomen Rib 2 Middle Length Change	600	+	no	60
225	14ABRILLFRWFDSX0	Passenger Abdomen Rib 2 Front Displacement (X)	0	+	no	60
226	14ABRILLFRWFDSY0	Passenger Abdomen Rib 2 Front Displacement (Y)	0	+	no	60
227	14ABRILLFRWFDSZ0	Passenger Abdomen Rib 2 Front Displacement (Z)	0	+	no	60
228	14ABRILLFRWFDSLB	Passenger Abdomen Rib 2 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
229	14THSP0100WFACXP	Passenger Spine T1 Acceleration (X)	180	+	yes	2000
230	14THSP0100WFACYP	Passenger Spine T1 Acceleration (Y)	180	+	yes	2000
231	14THSP0100WFACZP	Passenger Spine T1 Acceleration (Z)	180	+	yes	2000
231A	14THSP0100WFACRP	Passenger Spine T1 Acceleration Resultant	180			
232	14THSP0400WFACXP	Passenger Spine T4 Acceleration (X)	180	+	yes	2000
233	14THSP0400WFACYP	Passenger Spine T4 Acceleration (Y)	180	+	yes	2000
234	14THSP0400WFACZP	Passenger Spine T4 Acceleration (Z)	180	+	yes	2000
234A	14THSP0400WFACRP	Passenger Spine T4 Acceleration Resultant	180			
235	14THSP1200WFACXP	Passenger Spine T12 Acceleration (X)	180	+	yes	2000
236	14THSP1200WFACYP	Passenger Spine T12 Acceleration (Y)	180	+	yes	2000
237	14THSP1200WFACZP	Passenger Spine T12 Acceleration (Z)	180	+	yes	2000
237A	14THSP1200WFACRP	Passenger Spine T12 Acceleration Resultant	180			
238	14PUBC0000WFFOYP	Passenger Pubic Symphysis Force (Y)	600	+	yes	12000
239	14SACRLE00WFFOXP	Passenger Sacro-iliac Left Force (X)	600	+	yes	200
240	14SACRLE00WFFOYP	Passenger Sacro-iliac Left Force (Y)	600	+	yes	10000
241	14SACRLE00WFFOZP	Passenger Sacro-iliac Left Force (Z)	600	+	yes	5000
242	14SACRLE00WFMOXP	Passenger Sacro-iliac Left Moment (X)	600	+	yes	600
243	14SACRLE00WFMOYP	Passenger Sacro-iliac Left Moment (Y)	600	+	yes	275
244	14SACRLE00WFMOZP	Passenger Sacro-iliac Left Moment (Z)	600	+	yes	300
245	14SACRRI00WFFOXP	Passenger Sacro-iliac Right Force (X)	600	+	yes	5000
246	14SACRRI00WFFOYP	Passenger Sacro-iliac Right Force (Y)	600	+	yes	10000
247	14SACRRI00WFFOZP	Passenger Sacro-iliac Right Force (Z)	600	+	yes	5000
248	14SACRRI00WFMOXP	Passenger Sacro-iliac Right Moment (X)	600	+	yes	600
249	14SACRRI00WFMOYP	Passenger Sacro-iliac Right Moment (Y)	600	+	yes	275
250	14SACRRI00WFMOZP	Passenger Sacro-iliac Right Moment (Z)	600	+	yes	300
251	14LUSP0000WFFOXP	Passenger Lumbar Force (X)	600	+	yes	10000
252	14LUSP0000WFFOYP	Passenger Lumbar Force (Y)	600	+	yes	10000
253	14LUSP0000WFFOZP	Passenger Lumbar Force (Z)	600	+	yes	12000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
254	14LUSP0000WFMOXP	Passenger Lumbar Moment (X)	600	+	yes	220
255	14LUSP0000WFMOYP	Passenger Lumbar Moment (Y)	600	+	yes	220
256	14LUSP0000WFMOZP	Passenger Lumbar Moment (Z)	600	+	yes	125
257	14PELV0000WFACXP	Passenger Pelvic Acceleration (X)	1000	+	yes	2000
258	14PELV0000WFACYP	Passenger Pelvic Acceleration (Y)	1000	+	yes	2000
259	14PELV0000WFACZP	Passenger Pelvic Acceleration (Z)	1000	+	yes	2000
259A	14PELV0000WFACRP	Passenger Pelvic Acceleration Resultant	1000			
260	14FEMRLE00WFFOXP	Passenger Left Femur Force (X)	600	+	yes	15000
261	14FEMRLE00WFFOYP	Passenger Left Femur Force (Y)	600	+	yes	15000
262	14FEMRLE00WFFOZP	Passenger Left Femur Force (Z)	600	+	yes	15000
263	14FEMRLE00WFMOXP	Passenger Left Femur Moment (X)	600	+	yes	300
264	14FEMRLE00WFMOYP	Passenger Left Femur Moment (Y)	600	+	yes	350
265	14FEMRLE00WFMOZP	Passenger Left Femur Moment (Z)	600	+	yes	350
266	14FEACLE00WFFOXP	Passenger Femoral Neck Force (X)	600	+	yes	10000
267	14FEACLE00WFFOYP	Passenger Femoral Neck Force (Y)	600	+	yes	25000
268	14FEACLE00WFFOZP	Passenger Femoral Neck Force (Z)	600	+	yes	10000
269	14KNEELEINWFFOYP	Passenger Left Outer Knee Force (Y)	600	+	yes	20000
270	14KNEELEOUWFFOYP	Passenger Left 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	13SILBRIFR00ACXA	RIGHT SIDE SILL AT FRONT SEAT AX	60	+	yes	2000
278	13SILBRIFR00ACYA	RIGHT SIDE SILL AT FRONT SEAT AY	60	+	yes	2000
279	13SILBRIFR00ACZA	RIGHT SIDE SILL AT FRONT SEAT AZ	60	+	yes	2000
279A	13SILBRIFR00ACRA	RIGHT SIDE SILL AT FRONT SEAT A RESULTANT	60			
280	16SILBRIRE00ACXA	RIGHT SIDE SILL AT REAR SEAT AX	60	+	yes	2000
281	16SILBRIRE00ACYA	RIGHT SIDE SILL AT REAR SEAT AY	60	+	yes	2000
282	16SILBRIRE00ACZA	RIGHT SIDE SILL AT REAR SEAT AZ	60	+	yes	2000
282A	16SILBRIRE00ACRA	RIGHT SIDE SILL AT REAR SEAT A ESULTANT	60			
283	11SILBLEFR00ACYA	LEFT SIDE SILL AT FRONT SEAT AY	60	+	yes	2000
284	14SILBLERE00ACYA	LEFT SIDE SILL AT REAR SEAT AY	60	+	yes	2000
285	11APILLO0000ACYA	LEFT LOWER A-PILLAR AY	60	+	yes	2000
286	11APILMI0000ACYA	LEFT MIDDLE A-PILLAR AY	60	+	yes	2000
287	11BPILLO0000ACYA	LEFT LOWER B-PILLAR AY	60	+	yes	2000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
288	11BPILMI0000ACYA	LEFT MIDDLE B-PILLAR AY	60	+	yes	2000
289	11SETR000000ACYA	FRONT SEAT TRACK AY	60	+	yes	2000
290	14SETRLERE00ACYA	LEFT REAR SEAT STRUCTURE AY	60	+	yes	2000
291	16OCCRIRE000ACYA	RIGHT REAR OCCUPANT COMPARTMENT AY	60	+	yes	2000
292	12ENGNTP0000ACXA	ENGINE BLOCK AX	60	+	yes	2000
293	12ENGNTP0000ACYA	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	11DOORMIMI71ACYA	Left Front Door Mid Centerline (Y)	60	+	yes	2000
304	11DOORMIRE71ACYA	Left Front Door Mid Rear (Y)	60	+	yes	2000
305	11DOORMIUP71ACYA	Left Front Door Upper Centerline (Y)	60	+	yes	2000
306	14DOORMIRE71ACYA	Left Rear Door Mid Rear (Y)	60	+	yes	2000
307	14DOORMIUP71ACYA	Left Rear Door Upper Centerline (Y)	60	+	yes	2000
308	11HEADCONT00VO00	Head Contact	0	+	no	1
309	11SHOUCONT00VO00	Shoulder Contact	0	+	no	1
310	11THORCONT00VO00	Thorax Contact	0	+	no	1
311	11PELVCONT00VO00	Pelvis Contact	0	+	no	1
312	14HEADCONT00VO00	Head Contact	0	+	no	1
313	14SHOUCONT00VO00	Shoulder Contact	0	+	no	1
314	14THORCONT00VO00	Thorax Contact	0	+	no	1
315	14PELVCONT00VO00	Pelvis Contact	0	+	no	1
316	M0MBARCG0000ACXA	MDB CG AX	60	+	yes	2000
317	M0MBARCG0000ACYA	MDB CG AY	60	+	yes	2000
318	M0MBARCG0000ACZA	MDB CG AZ	60	+	yes	2000
318A	M0MBARCG0000ACRA	MDB CG A RESULTANT	60	+	yes	
319	M0FRAMRE0000ACXA	MDB REAR AX	60	+	yes	2000
320	M0FRAMRE0000ACYA	MDB REAR AY	60	+	yes	2000
321	M0MBARLE0000VO00	LEFT MDB CONTACT	0	+	no	1
322	M0MBARRI0000VO00	RIGHT MDB CONTACT	0	+	no	1

APPENDIX E
SEATING PROCEDURE WORKSHEETS AND PLOTS

Driver WSID 50th Seating Worksheet

Vehicle	2020 Hyundai Santa Fe	**Technician**	Postle / Xu
VIN #	5NMS23AD5LH261120	**Position**	Driver - Left Front Seat
ATD	WorldSID-50M EB8888	**Date**	1/28/2021
Test #	210128		

SCRL Angle

Max	14.4
Min -	11.7
Difference	2.7
/2	1.35
Min +	1.35
Mid Angle	13.05

WSID 50th Tilt Sensors		**X**	**Y**
Head	0°±2	0.6	-1.9
T6	0°±2	1.7	-0.5
Pelvis	0°±2	1.1	1.7

Seat Back Angle	W/Level °	21.9	**HEAD REST POST**			**FINAL HEAD REST**	
Seat Pan Angle	W/Level °	12.5	**ANGLE**	2.5		**POST ANGLE**	2.6
Pelvis Angle	WSID 50th 0° +/-2.5°		Manual Inclinometer	40.3	Tilt Sensor	1.1	

Collected Points			
Name	**Meas X**	**Meas Y**	**Meas Z**
SBU -	-32.801	4.212563	-11.5364
SBL -	-29.7158	3.136468	19.63616
STRIKER -	0	0	0
FOSB -	459.2697	189.7543	505.8112
FISB -	460.0771	652.5082	503.6488
ROSB -	-28.196	190.021	541.804
RISB -	-27.999	654.221	540.490
PCP - (Pedal Center Point)	1031.685	607.334	407.916
RHP - (Right Heel Point)	901.976	606.731	559.790
LHP - (Left Heel Point)	902.619	264.176	565.533
S0 -	498.347	431.972	-114.952
TS -	583.887	431.487	-272.076
BS -	426.886	431.524	45.290
SC1 -	718.692	332.286	30.778
OSCAR H-POINT -	188.139	234.773	252.704
DR PROJECTED WSID H-POINT AT MID-POSITION -	208.000		233.000
DRIVER STP 15.27 MID-POSITION -	208.000		320.000
DRIVER STP STEP 18.6 TRIAL 1 -	187.740	172.444	321.644
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 1 -	208.000		233.000
DRIVER STP STEP 18.6 TRIAL 2 -	208.287	172.712	320.076
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 2 -	208.000		233.000
DRIVER STP STEP 18.6 TRIAL 3 -			
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 3 -			
RHDCG -	41.915	517.421	-418.379
3DLHCG -	67.375	363.315	-420.449
LHDCG -	43.809	359.907	-422.899
BON -	137.438	443.107	-420.695
TN -	132.859	441.784	-363.535
TC -	117.876	435.302	-295.207
SHLD R1 -	92.398	438.491	-193.808
THX R1 -	127.894	437.250	-115.828
THX R2 -	161.583	438.445	-50.663
THX R3 -	178.674	438.731	-3.714
ABD R1 -	197.448	443.475	50.100
ABD R2 -	216.868	443.385	97.822
TPS -	246.728	428.609	116.178
C1 -	101.800	448.513	-166.144
C2 -	130.551	432.617	-115.281
C3 -	197.516	433.048	45.627
SHT -	23.821	216.665	-157.386
E1 -	219.012	200.914	-18.809
P1 -	158.001	208.058	191.440
H-POINT -	214.533	207.411	237.686
H-POINT 2 -	214.448	216.248	237.182

OK -	596.339	185.609	125.055
IK -	602.237	657.261	149.330
OA -	842.329	241.578	442.791
IA -	889.964	548.171	434.956
OH -	871.119	249.982	573.617
IH -	901.614	597.053	565.418
OP -	-186.584	349.385	-272.873
R -	136.759	442.891	-624.471
H -	505.990	443.597	-563.935
W1 -	798.250	444.217	-420.373
W1 - Outside	811.331	443.565	-420.727
W2 - Outside	1091.953	443.851	-255.976
D1 -	710.522	447.657	-251.484
D2 -	691.899	186.704	52.365
D3 -	708.153	641.303	125.423
HRP -	137.361	254.529	-550.349
HSP -	138.066	85.180	-421.238
ADP -	218.626	45.358	-19.593
HDP -	215.548	80.801	237.570

Calculated Measurements

Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			204		
HH -				395	
HW -	661				
NR -				460	
CD -				615	
CS -	368				
CBS -	229				
IKD -				110	
OKD -				120	
HR -				229	
HS -		358			
AD -		156			
HD -		127			
HLHL -				349	
KK -				472	
SH -				381	
HRA -					2.6
H-POINT TOOL ANGLE -					39.3
TORSO ANGLE -					14.5
WINDSHIELD ANGLE -					59.6

Rear Passenger WSID 5th Seating Worksheet

Vehicle	2020 Hyundai Santa Fe	**Technician**	Postle / Xu
VIN #	5NMS23AD5LH261120	**Position**	Left Rear Seat
ATD	WorldSID-5F DK1774	**Date**	1/28/2021
SEATING #			

Seat Back Angle	W/Level °	16.8	**HEAD REST**			**FINAL HEAD REST**	
Seat Pan Angle	W/Level °	14.0	**POST ANGLE**	5.2		**POST ANGLE**	5.2
Pelvis Angle			Manual Inclinometer	39.9			

Collected Points			
Name	Meas X	Meas Y	Meas Z
SBU -	-1,062.860	12.944	13.753
SBL -	-1,044.260	11.496	39.086
STRIKER -	-1,028.550	11.408	7.369
FOSB -			
FISB -			
ROSB -			
RISB -			
RHP -			
LHP -			
OSCAR H-POINT -			
LHDCG -	80.322	372.636	-383.367
BON -	171.542	444.481	-379.562
TN -	174.126	445.100	-344.852
TC -	169.159	443.644	-275.625
C1 -	156.763	438.336	-150.492
SHT -	58.284	269.270	-151.452
E1 -	204.740	239.563	-14.267
P1 -	219.738	214.651	147.080
H-POINT -	266.897	217.787	203.209
H-POINT 2 -	267.320	252.143	203.930
OK -	629.303	276.825	131.322
IK -	633.052	586.257	119.536
OA -	751.553	311.427	464.328
IA -	738.396	562.760	463.010
OH -	683.717	318.606	559.654
IH -	675.720	546.610	561.470
OP -	-98.002	353.333	-338.237
R -	172.367	445.160	-679.517
SB -	779.275	438.491	-150.642
KBL -	914.921	278.038	131.614
KBR -	910.556	585.714	119.170
HRP -	172.190	264.315	-585.428
HSP -	172.018	65.257	-380.923
ADP -	204.197	44.101	-14.799
HDP -	267.052	80.005	203.559

WS05F Tilt Sensors	X	Y
Head	0.7	-0.2
T6	0.4	24.3
Pelvis	-0.9	21.8

Calculated Measurements					
Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			300		
NB -				636	
CB -				623	
IKB -				278	
OKB -				286	
HR -				274	
HS -		379			
AD -		195			
HD -		138			
HLHL -				228	
KK -				310	
SH -				1,321	
HRA -					5.2
H-POINT TOOL ANGLE -					50.0
TORSO ANGLE -					81.4
SEATBACK ANGLE -					25.7