REPORT NUMBER: SINCAP-CAL-17-007

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

Nissan Motor Co., LTD
2017 Nissan Titan
Crew Cab Truck

NHTSA No: M20175205

PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 14225

June 21, 2017

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NRM-110
1200 NEW JERSEY AVE SE, ROOM W43-410
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Prepared by: Vanessa Hansen Date: June 21, 2017
Vanessa Hansen, Project Engineer

Approved by: Edward Dutton Date: June 21, 2017
Edward Dutton, Test Engineer
Transportation Test Operations

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

_____
COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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15. *Supplementary Notes*

16. Abstract

A 55/28, (61.90kph / 38.5 mph), 90^0 Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2017 Nissan Titan Crew Cab Truck in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 17, 2017.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.97 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The target vehicle's maximum post-test static crush was 241mm located at level 1. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	38.939
Maximum Thoracic Rib Deflection	mm	44	20.484**
Total Abdominal Force	N	2500	743.915
Pubic Symphysis Force	N	6000	827.720

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	17.915
Lower Spine Resultant Acceleration	G	82	24.730
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1723.014
Maximum Thoracic Rib Deflection	mm	38*	12.578**
Maximum Abdominal Rib Deflection	mm	45*	25.943

** Proposed IARV*

***After thoroughly analyzing the data from this test, it was determined that the driver and rear passenger's upper thoracic rib, for which questionable data was recorded, would not have experienced the maximum deflection. Therefore, the lower thoracic rib for each occupant could safely be presumed to have yielded the maximum deflection reading.*

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2017 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2017 Nissan Titan Crew Cab Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2017 Nissan Titan Crew Cab Truck was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.97 km/h. 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 Calspan Corporation's Transportation Test Operations Center in Buffalo, New York on January 17, 2017. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated October 2015. The side impact event was documented by 9 high-speed and 2 real-time cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (T12) tri-axial accelerometers
Public symphysis y-axis load cell

PASSENGER ATD (SID-IIs)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen upper rib and lower rib y-axis displacement potentiometers
Lower spine (T12) tri-axial accelerometers
Acetabulum and iliac wing y-axis load cells

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

DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	38.939
Maximum Thorax Rib Deflection	mm	44	20.484**
Combined Abdominal Force	N	2500	743.915
Pubic Symphysis Force	N	6000	827.720

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	17.915
Lower Spine (T12) Resultant Acceleration	G	82	24.730
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1723.014
Maximum Thoracic Rib Deflection	mm	38*	12.578**
Maximum Abdominal Rib Deflection	mm	45*	25.943

**Proposed IARV*

***After thoroughly analyzing the data from this test, it was determined that the driver and rear passenger's upper thoracic rib, for which questionable data was recorded, would not have experienced the maximum deflection. Therefore, the lower thoracic rib for each occupant could safely be presumed to have yielded the maximum deflection reading.*

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes		
Knee Airbag	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

GENERAL COMMENTS:

1. P1 serial number – F034
2. P4 serial number – DG8012

Data Anomalies:

The following channel was questionable for

- Driver Upper Thorax Rib Y Displacement, Questionable data throughout
- Rear Passenger Upper Thorax Rib Y Displacement, Questionable spike 70ms
- Driver Seat Track Y Acceleration, Questionable data after 80ms
- Left B-Pillar Lower Y Acceleration, Questionable spike 87.3ms
- Left B-Pillar Middle Y Acceleration ,Questionable spike 12.6ms
- Left Rear Sill Y Acceleration, Questionable spike 12.6ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 - General Test and Vehicle Parameter Data

Data Sheet No. 2 – Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and Instrumentation Data

Data Sheet No. 6 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

Data Sheet No. 13 – Vehicle and MDB Damage Profile Distances

Data Sheet No. 14 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 15 – Dummy/Vehicle Temperature and Humidity Stabilization Data

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Nissan Titan Crew Cab Truck
Test Program: NCAP Side MDB Impact Test
NHTSA No.: M20175205
Test Date: 1/17/2017

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20175205
Model Year	2017
Make	Nissan
Model	Titan
Body Style	Crew Cab Truck
VIN	1N6AA1EK8HN514935
Body Color	Silver
Odometer Reading (km/mi)	27 km / 17 mi
Engine Displacement (L)	5.6
Type/No. Cylinders	V8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	7-Speed
Overdrive	Yes
Final Drive	Rear Wheel Drive
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	No
Other Optional Feature	-
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 Pretensioners	Yes
Rear Pass. Seat Belt Pretensioners	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	-

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., LTD
Date of Manufacture	10/16
Vehicle Type	Truck

GVWR (kg)	3221
GAWR Front (kg)	1724
GAWR Rear (kg)	1820

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	3	3	-	6	
Capacity Weight (VCW) (kg)				650	(A)
DSC X 68.04 kg				408.24	(B)
Cargo Weight (RCLW) (kg)				136	(A-B)

VEHICLE SEAT TYPE

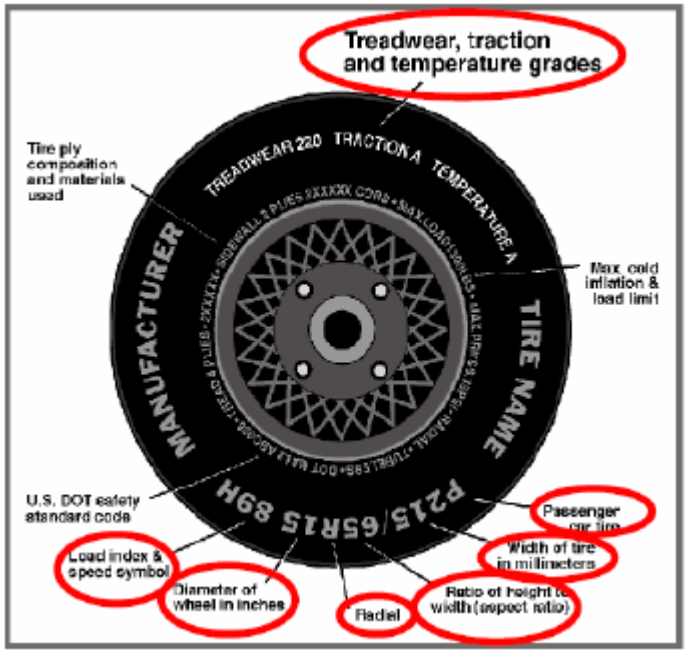
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat		X			X		
Third Row seat							

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

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017

VEHICLE TIRE INFORMATION

Collected for year, make, model, & VIN, all items circled in red, tire manufacturer and tire name.



TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	P265/70R18	P265/70R18
Tire Size on Vehicle	P265/70R18	P265/70R18
Tire Manufacturer	Toyo A26	Toyo A26
Tire Model	Open Country	Open Country
Treadwear	400	400
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2Polyester, 1 Nylon	2 Steel, 2Polyester, 1 Nylon
Load Index/Speed Symbol	114S	114S
Tire Material	Rubber	Rubber
DOT Safety Code Left	73D63KD3916	73D63KD3916
DOT Safety Code Right	73D63KD3916	73D63KD3916

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

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	300	302	298	298
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

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	207	207	207	207

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	725	553		767	666		778	671	
Right	kg	707	545		719	633		720	632	
Ratio	%	57	43		53	47		53	47	
Totals	kg	1432	1098	2530	1486	1299	2785	1498	1303	2801

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2530	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2793	(A+B+C)

Does the measured As Test 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

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	933	935	Yes
RF	mm	944	941	Yes
RR	mm	943	945	Yes
LR	mm	940	938	Yes
Vehicle CG (Aft of Front Axle)	mm	1654	1658	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	29.5	25.5	

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

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

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

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Right side passenger floor mats	2
Jack	6
Passenger Side Door Internals	16
Ballast / Equipment Added	100

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

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passengers' seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	Not Adjustable		
Front Passenger Seat	Not Adjustable		
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

**if applicable*

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat*	N/A	N/A	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat*	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

**if applicable*

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

Test Vehicle: 2017 Nissan Titan Crew Cab Truck
Test Program: NCAP Side MDB Impact Test
NHTSA No.: M20175205
Test Date: 1/17/2017

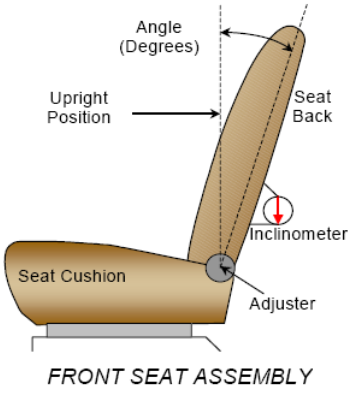
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	25	120	12
Front Passenger Seat	240	25	120	12
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat*	FIXED	FIXED	FIXED	FIXED

**if applicable*

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	-17.4 to 50.5	N/A	-3.4	N/A
Front Passenger Seat	-16.7 to 54.3	N/A	-3.4	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat*	FIXED	FIXED	FIXED	FIXED

**if applicable*

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

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. For this test zero is defined as the uppermost position.

	Total # of Positions	Placed in Position #
Driver Seat	4	0 – Uppermost
Rear Seat	FIXED	FIXED

HEAD RESTRAINT ADJUSTMENT

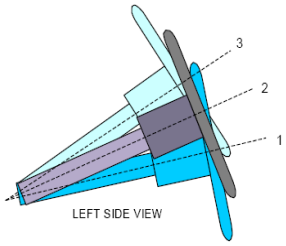
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	5	0 - Uppermost
Rear Seat	0	Lowest

STEERING COLUMN ADJUSTMENT

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

	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	24.1	
Geometric Center – Position 2	26.7	
Uppermost – Position 3	29.3	
Telescoping Steering Wheel Travel		35
Test Position	26.7	17.5

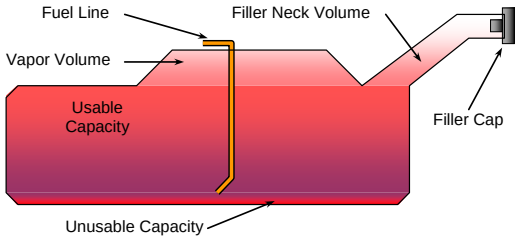


STEERING COLUMN ASSEMBLY

FUEL PUMP

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

The vehicle is equipped with an electric fuel pump. The fuel filler neck is on the left side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017

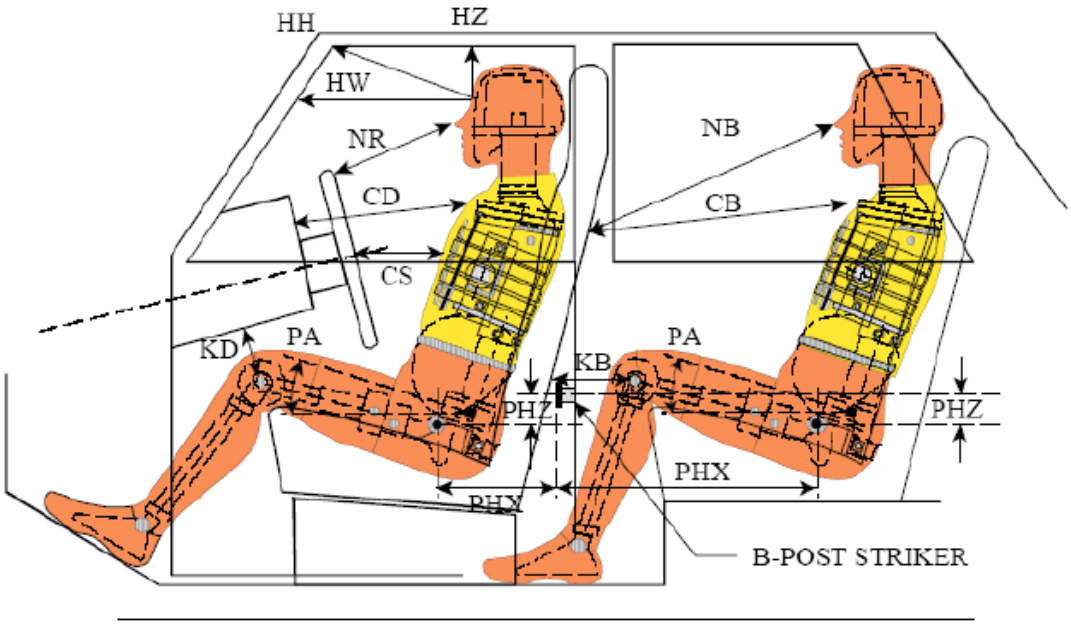
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	96.9
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	98.4
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	90.1
Actual Amount of Solvent Used in Test	90.1
1/3 of Usable Capacity	32.3

Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in Form No. 1? [X] **Yes** [ ] **No**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017



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

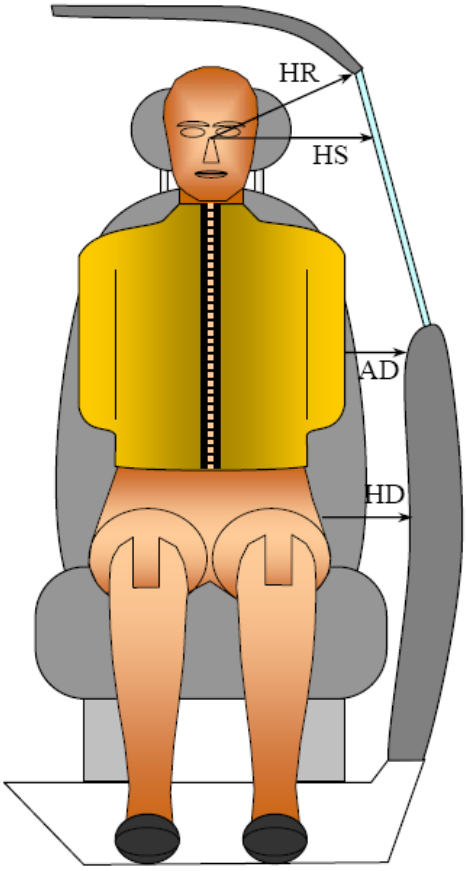
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No. DG8012)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	427			
HW		Header to Windshield	685			
HZ	HZ	Head to Roof Liner	204		300	
NR	NB	Nose to Rim/Seat Back	400		622	
CD	CB	Chest to Dash/Seat Back	536		636	
CS		Chest to Steering Wheel	295			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	178	21.9	389	19.8
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	166	13.9	380	19.8
PAX°	PAX°	Pelvic Tilt Angle X		-18.1		17.5
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	267		245	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	32		46	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017



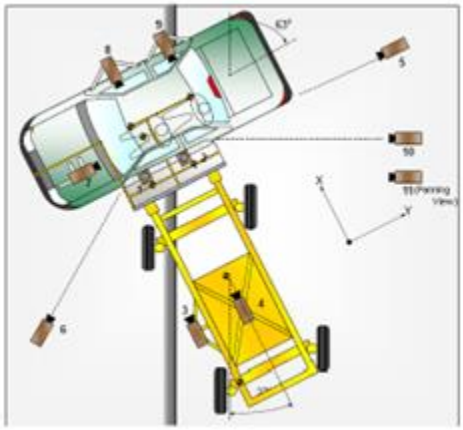
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. DG8012)
HR	Head to Side Header	mm	214	272
HS	Head to Side Window	mm	338	362
AD	Arm to Door	mm	98	127
HD	Hip Point to Door	mm	148	157

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	325	1096	-5305	14	1000
2	Overhead Close-up	0	-912	-5305	28	1000
3	Left Impact Point (MDB)	-1147	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	0	8412	-1154	12.5	1000
6	Left Front	-3241	-4464	-1094	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	60
11	Real-time In run				Zoom	60

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

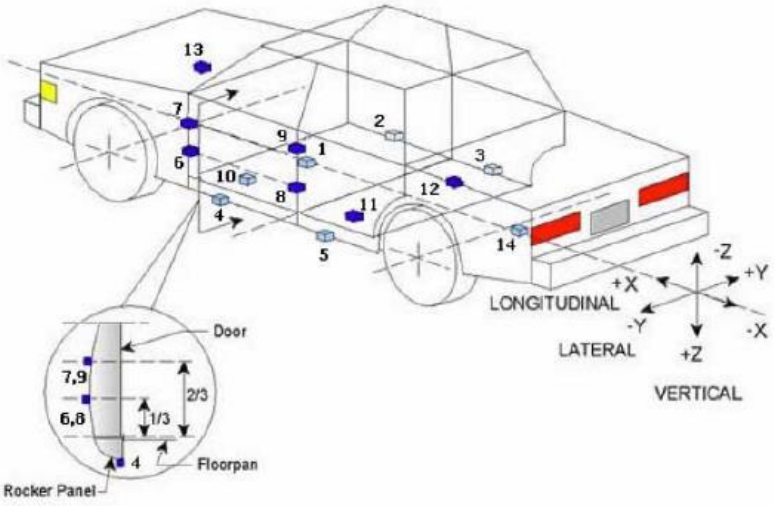
If applicable, explain why camera(s) did not operate as intended: All cameras operated normally

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
Total	62

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017



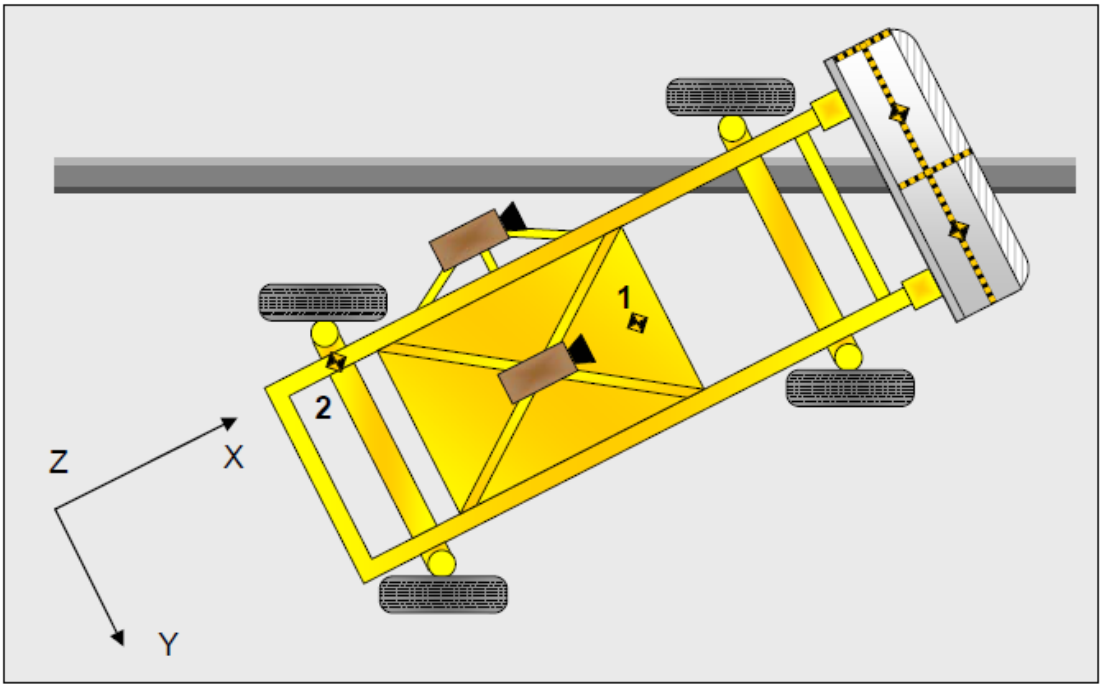
TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3528	-2	184
2	Right Sill at Front Seat	3720	704	-47
3	Right Sill at Rear Seat	2639	737	-54
4	Left Sill at Front Door	3734	-728	-56
5	Left Sill at Rear Door	2643	-731	-45
6	A-Post Lower	4211	-726	303
7	A-Post Middle	4112	-713	808
8	B-Post Lower	3026	-745	286
9	B-Post Middle	2983	-749	555
10	Front Seat Track	3295	-626	90
11	Rear Seat Structure	2626	-463	212
12	Rt. Rear Occ. Compartment	2868	482	-6
13	Engine Block	4903	44	650
14	Rear Above Axle	1649	57	235

Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017



MDB ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	1859	0	-330
2	MDB Rear	386	-660	-660

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag & Visor	Curtain Airbag
Top of Head	Curtain Airbag, Side Headliner & Visor	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Headrest	Headrest
Left Shoulder	Curtain & Torso/Pelvis Airbag	Passenger Door
Upper Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Lower Torso	Seatback	Passenger Door
Left Hip	Seatback & Torso/Pelvis Airbag	Seatback & Passenger Door
Left Knee	Driver's Door	Passenger Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other*
	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, Width of Opening at Striker (mm)	0	0	0	0	0

*Tailgate opened during impact but is still operational.

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Remained in Good Condition
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes		
Knee Airbag	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3555
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		508
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-7

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Nissan Titan Crew Cab Truck
Test Program: NCAP Side MDB Impact Test
NHTSA No.: M20175205
Test Date: 1/17/2017

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1,250
Overall Length Including Honeycomb Frame	4,120
Wheelbase of Framework Carriage	2,600
CG Location of Front Axle	1,120

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	392.5	297.5	690.0
Right	kg	386.0	291.5	677.5
Ratio	%	57.4%	42.6%	100.0%
Totals	kg	778.5	589.0	1367.5

SPEED AND ANGLE AT IMPACT DATA

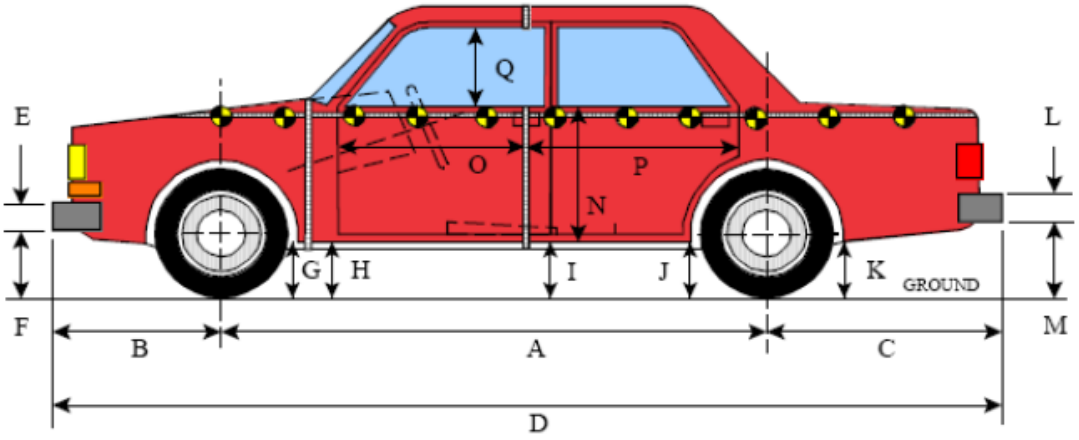
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.97
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.96
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.0

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	223
B	Top of Bumper	533	800	Left	188
C	Mid-Level	686	800	Left	183
D	Top of Stack	813	800	Left	159

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017



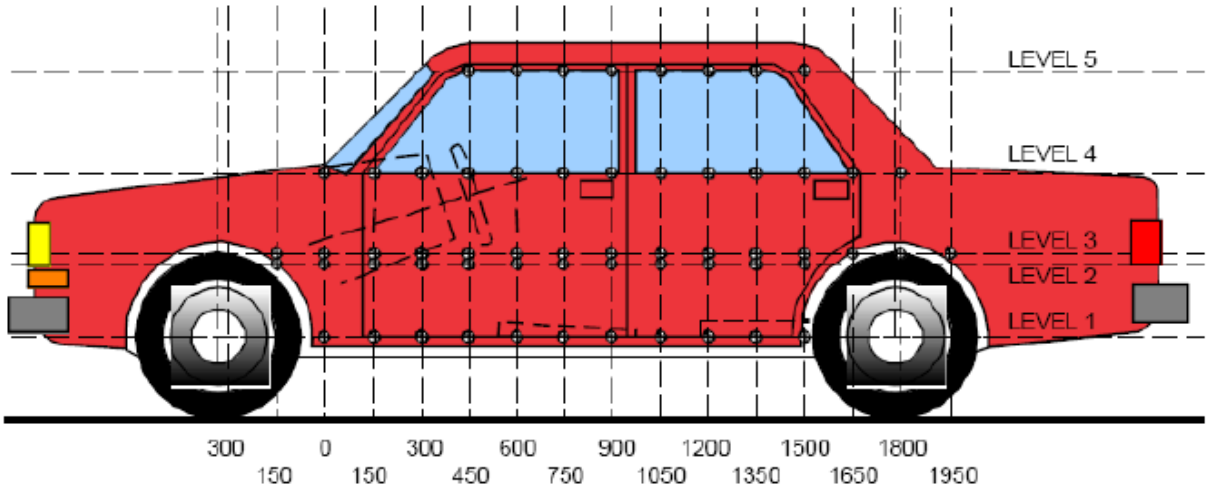
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3555	3533	-22
B	Front Axle to FSOV	988	997	9
C	Rear Axle to RSOV	1255	1272	18
D	Total Length at Centerline	5798	5801	4
E	Front Bumper Thickness	125	125	0
F	Front Bumper Bottom to Ground	616	618	2
G	Sill Height at Front Wheel Well	360	349	-11
H	Sill Height at Front Door Leading Edge	382	374	-8
I	Sill Height at B Pillar	386	381	-5
J1	Sill Height at Rear Wheel Well	390	389	-1
J2	Pinch Weld Height at Rear Wheel Well	318	309	-9
K	Sill Height Aft of Rear Wheel Well	398	413	15
L	Rear Bumper Thickness	225	225	0
M	Rear Bumper Bottom to Ground	485	494	9
N	Sill Height to Window Bottom of Front Window Sill	850	825	-25
O	Front Door Leading Edge to Impact CL	755	754	-1
P	Rear Door Trailing Edge to Impact CL	1413	1369	-43
Q	Front Window Opening	481	478	-3
R	Right Side Length	5751	5744	-7
S	Left Side Length	5754	5740	-14
T	Maximum Vehicle Width	2004	1892	-112

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Nissan Titan Crew Cab Truck
Test Program: NCAP Side MDB Impact Test
NHTSA No.: M20175205
Test Date: 1/17/2017



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	487	241	1650
2	Driver Hip Point	mm	851	197	1350
3	Mid-Door	mm	894	185	1350
4	Window Sill	mm	1178	93	1350
5	Window Top	mm	1856	4	1200

*window top level bent outward from original position

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)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Nissan Titan Crew Cab Truck NHTSA No.: M20175205
Test Program: NCAP Side MDB Impact Test Test Date: 1/17/2017

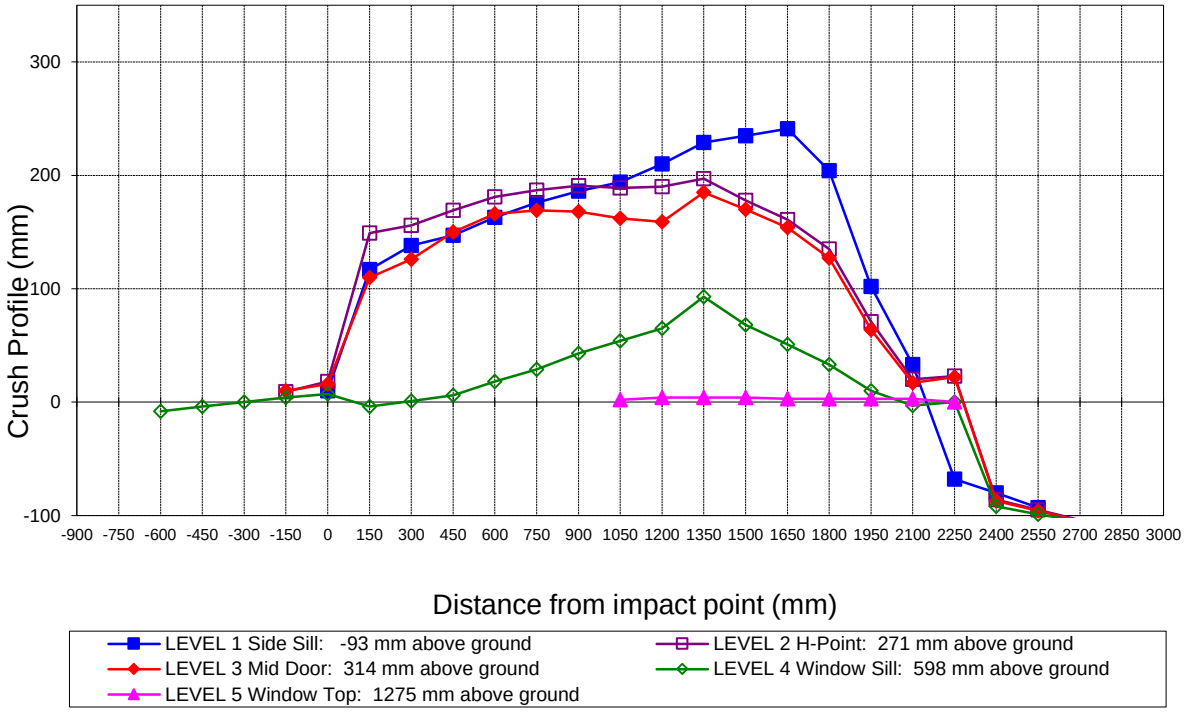
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600				972					980					-8	
-450				978					982					-4	
-300				979					979					0	
-150		1008	1010	973			999	1000	969			9	10	4	
0	1004	1007	1007	954		994	989	990	947		10	18	17	7	
150	965	998	997	948		848	849	887	952		117	149	110	-4	
300	958	989	989	953		820	833	863	952		138	156	126	1	
450	957	987	989	962		810	818	839	956		147	169	150	6	
600	959	990	992	971		796	809	826	953		163	181	166	18	
750	960	992	995	977		784	805	826	948		176	187	169	29	
900	961	994	997	983		775	803	829	940		186	191	168	43	
1050	960	995	998	982	654	766	806	836	928	652	194	189	162	54	2
1200	960	996	998	989	703	750	806	839	924	699	210	190	159	65	4
1350	959	995	998	990	708	730	798	813	897	704	229	197	185	93	4
1500	957	995	997	990	711	722	817	827	922	707	235	178	170	68	4
1650	955	993	996	990	712	714	832	842	939	709	241	161	154	51	3
1800	952	991	993	987	712	748	856	866	954	709	204	135	127	33	3
1950	948	987	990	983	711	846	916	926	973	708	102	71	64	10	3
2100	943	983	986	976	709	910	963	969	979	706	33	20	17	-3	3
2250	927	978	981	975	695	995	955	959	975	695	-68	23	22	0	0
2400	945	975	976	966		1025	1061	1063	1058		-80	-86	-87	-92	
2550	954	996	995	969		1047	1091	1091	1068		-93	-95	-96	-99	
2700		1000	1004	987			1104	1109	1092			-104	-105	-105	
2850				993					1105					-112	
3000															

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 test based on an estimated impact point.

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

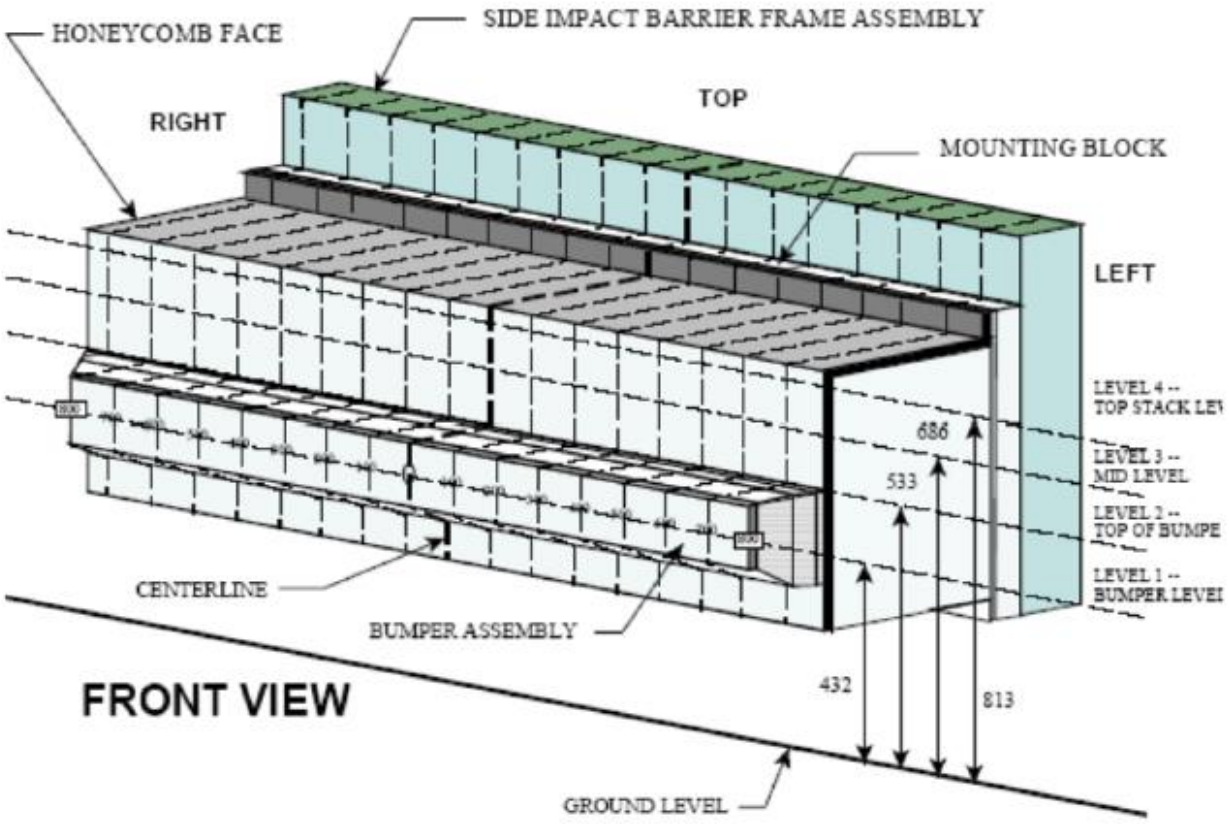
Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017



Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017



NOTE: Dimensions are shown in millimeters, mm

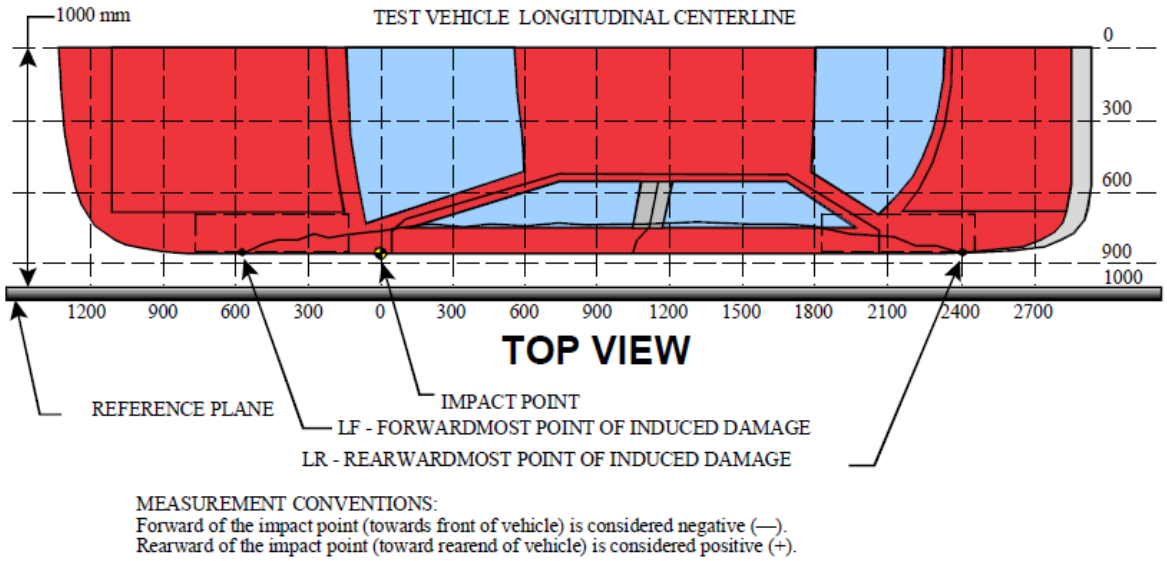
DEFORMABLE BARRIER STATIC CRUSH

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	96	101	106	112	119	126	132	140	148	155	163	172	180	189	197	206	223
2	73	77	82	86	89	94	109	119	128	138	144	153	153	162	171	182	188
3	63	48	48	57	82	98	84	74	67	61	62	67	77	89	103	124	183
4	158	135	115	95	99	102	79	73	72	74	78	77	87	98	109	131	159

DATA SHEET NO. 13
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017

For guidance regarding damage profile distance measurements, pelase refer to the latest version of the *NHTSA Test Reference Guide, Volume 1: Vehicle Tests.*



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	-150	3	0	-10	10
2	420	3	156	11	145
3	990	3	167	2	165
4	1560	3	167	3	164
5	2130	3	33	15	18
6	2700	3	-109	-4	-105

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	223
2	480 mm left of center	1	187
3	160 mm left of center	1	160
4	160 mm right of center	1	135
5	480 mm right of center	1	113
6	800 mm right of center	1	96

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

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017
Test Time:	11:16 AM	Temperature:	21˚C

A. From impact until vehicle motion ceases: (Maximum allowable is 1 oz.) — 0 oz.

B. For the 5-minute period after motion ceases: (Maximum allowable is 5 oz.) — 0 oz.

C. For the following 25 minutes: (Maximum allowable is 1 oz./minute) — 0 oz.

D. Spillage Details: — No Spillage Occurred

FMVSS NO. 301 STATIC ROLLOVER DATA

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	66	300	366
90° to 180°	67	300	367
180° to 270°	62	300	362
270° to 360°	67	300	367

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

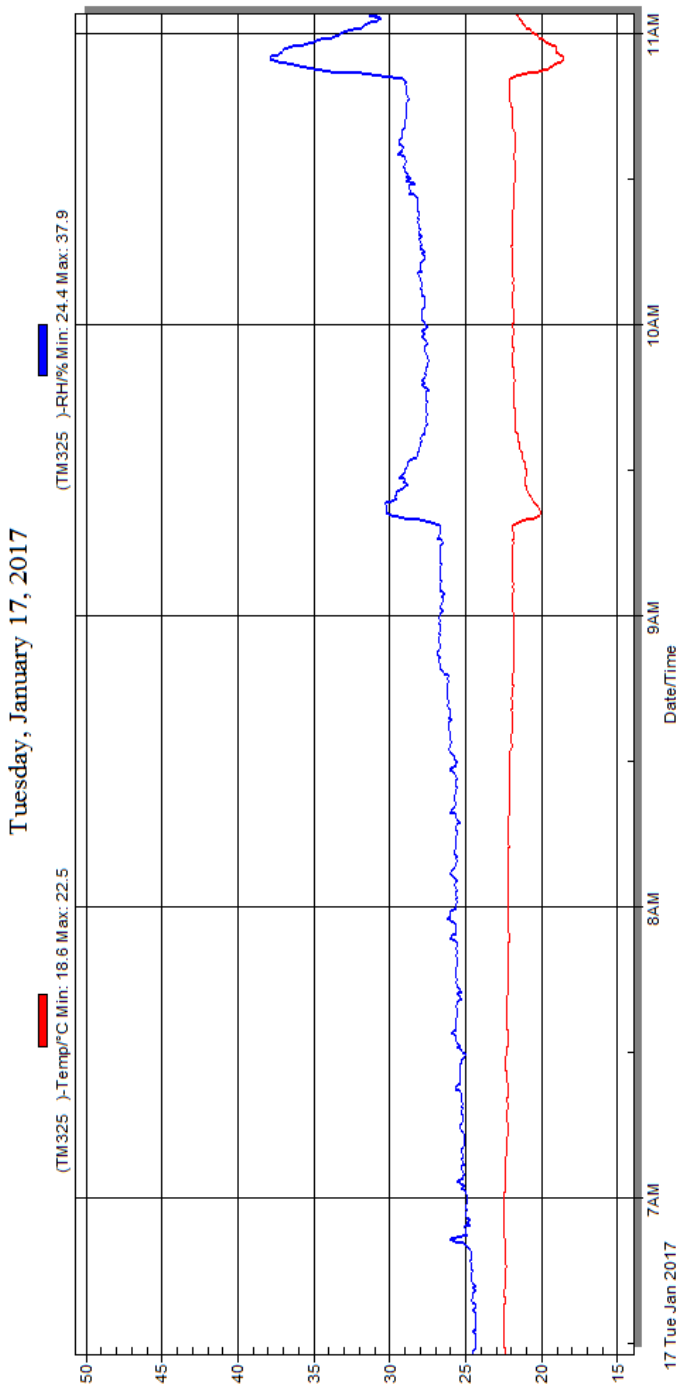
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

DATA SHEET NO. 15
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle:	2017 Nissan Titan Crew Cab Truck	NHTSA No.:	M20175205
Test Program:	NCAP Side MDB Impact Test	Test Date:	1/17/2017



Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle

APPENDIX A

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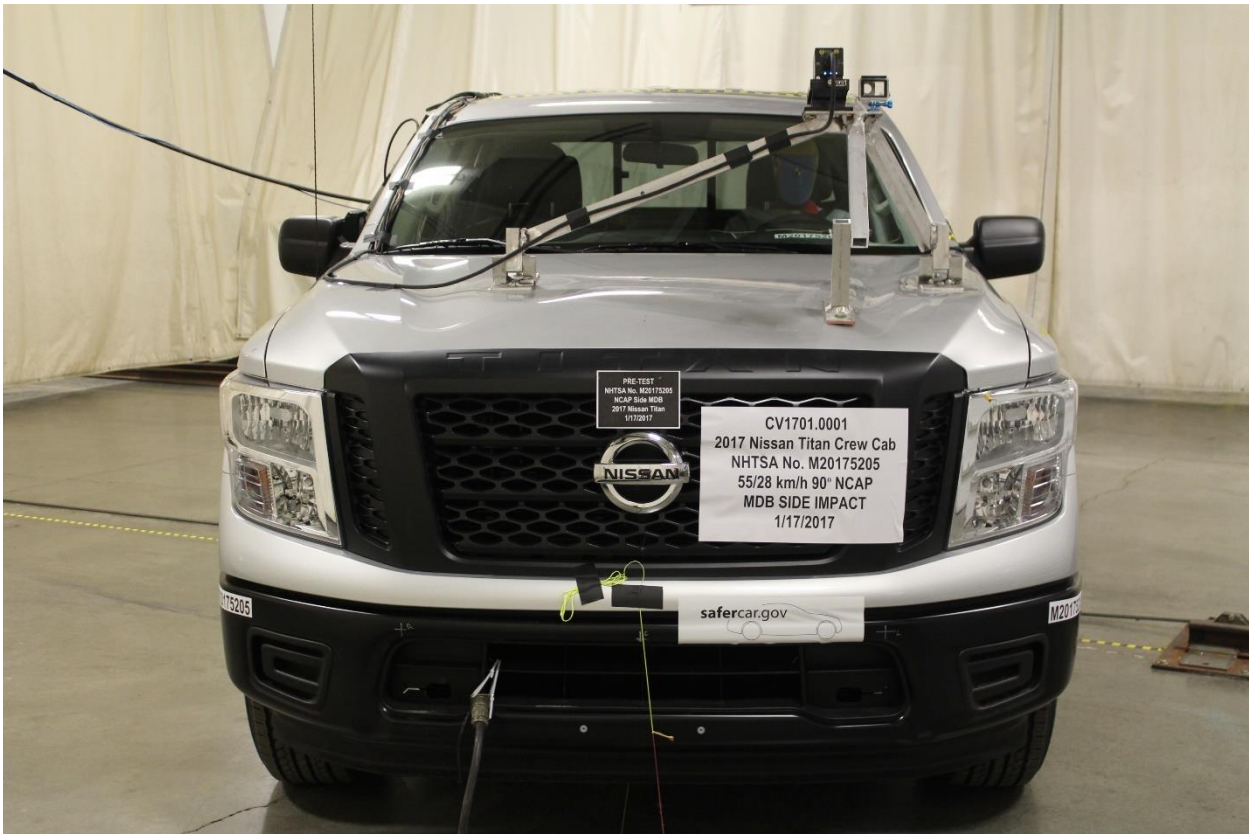

Figure A-3: Pre-Test Frontal View of Test Vehicle

Figure A-4: Post-Test Frontal View of Test Vehicle

Figure A-5: Pre-Test Left Front ¾ View of Test Vehicle

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Figure A-7: Pre-Test Left Side View of Test Vehicle

Figure A-8: Post-Test Left Side View of Test Vehicle

Figure A-9: Pre-Test Left Rear ¾ View of Test Vehicle

Figure A-10: Post-Test Left Rear ¾ View of Test Vehicle

Figure A-11: Pre-Test Rear View of Test Vehicle

Figure A-12: Post-Test Rear Side View of Test Vehicle

Figure A-13: Pre-Test Right Side View of Test Vehicle

Figure A-14: Post-Test Right Side View of Test Vehicle

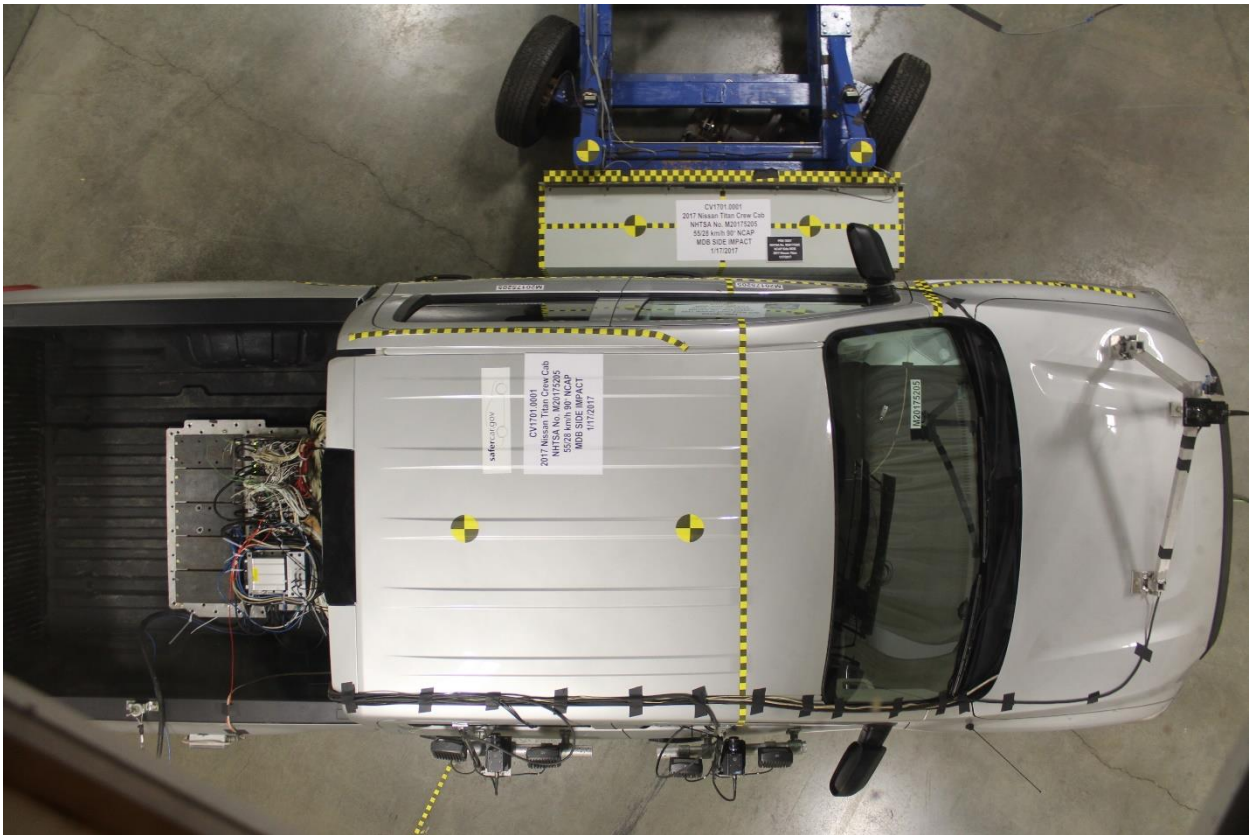

Figure A-15: Pre-Test Overhead View of the Test Area

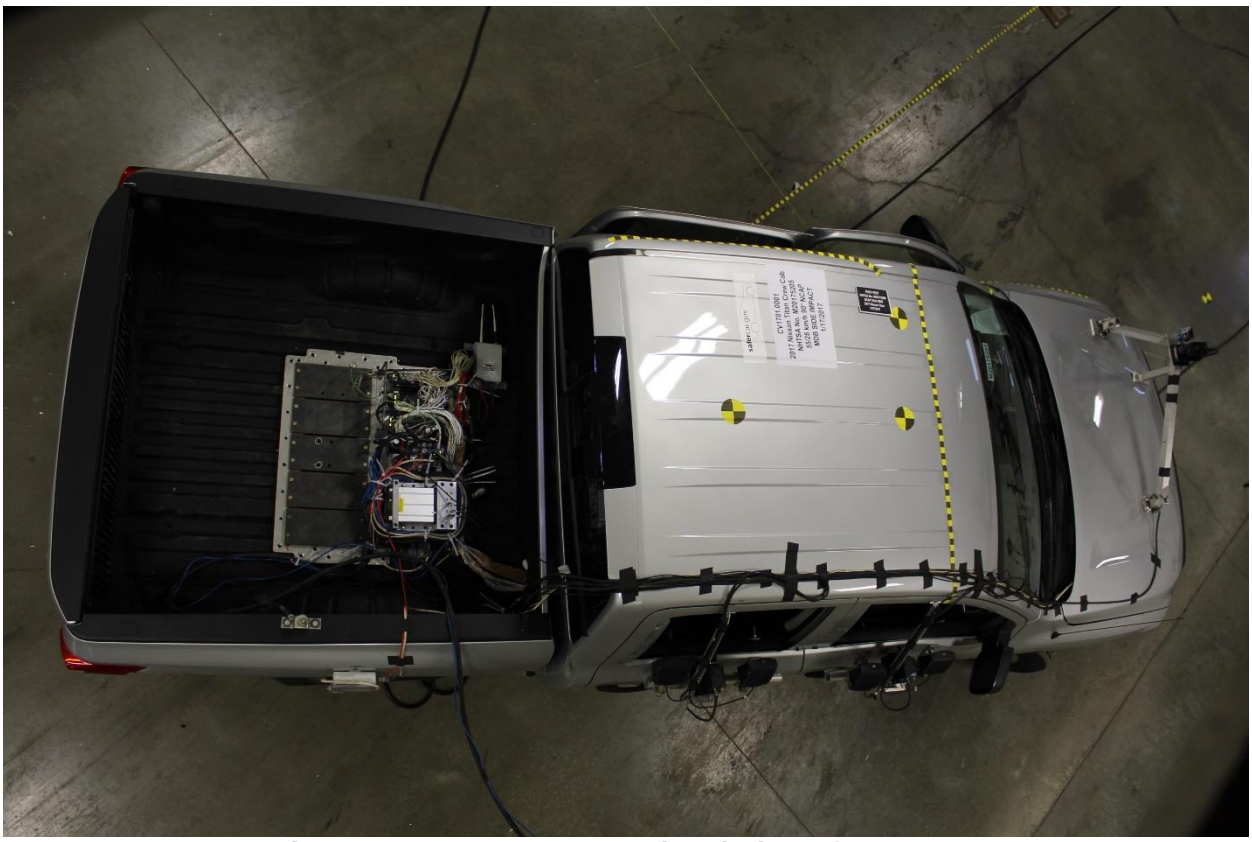

Figure A-16: Post-Test Overhead View of Test Area

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Figure A-23: Pre-Test Left Rear Door Latch Close-Up

Figure A-24: Post-Test Left Rear Door Latch Close-Up

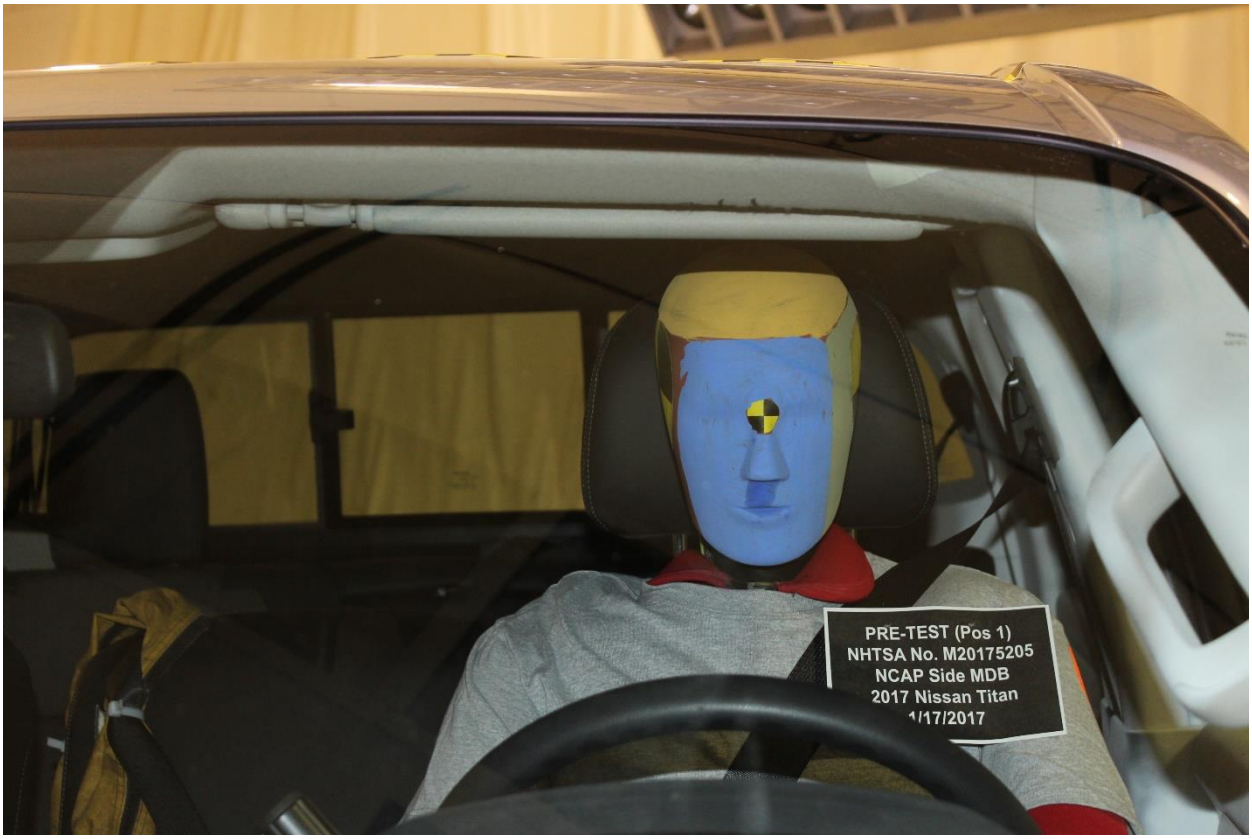

Figure A-25: Pre-Test Front Close-up View of Driver Dummy

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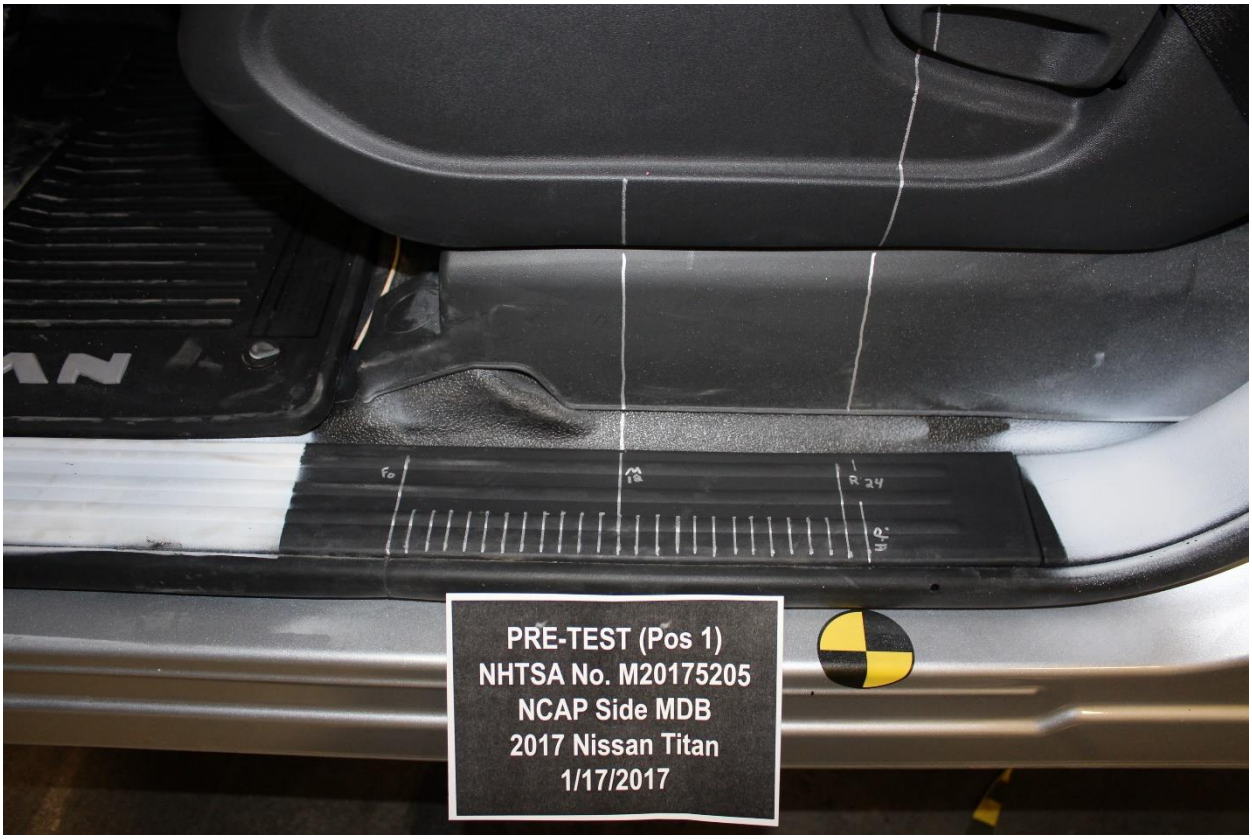

Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track

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Figure A-49: Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

Figure A-50: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View

Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View

Figure A-54: Post-Test Driver Dummy Close-Up Knee Contact View

Figure A-55: Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking

Figure A-56: Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View

Figure A-57: Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View

Figure A-58: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

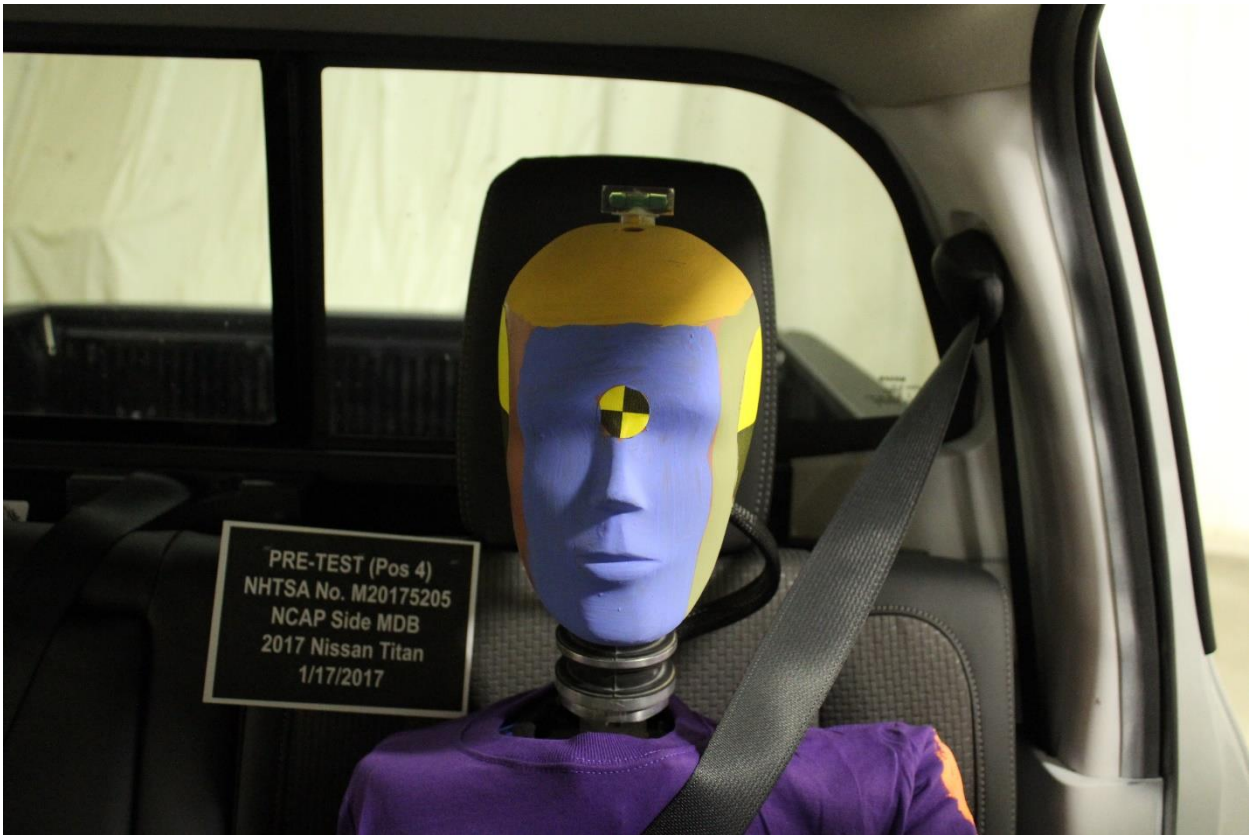

Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

Figure A-60: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

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Figure A-64: Pre-Test Placement of Rear Passenger Dummy's Feet

Figure A-65: Pre-Test View of Belt Anchorage for Rear Passenger Dummy

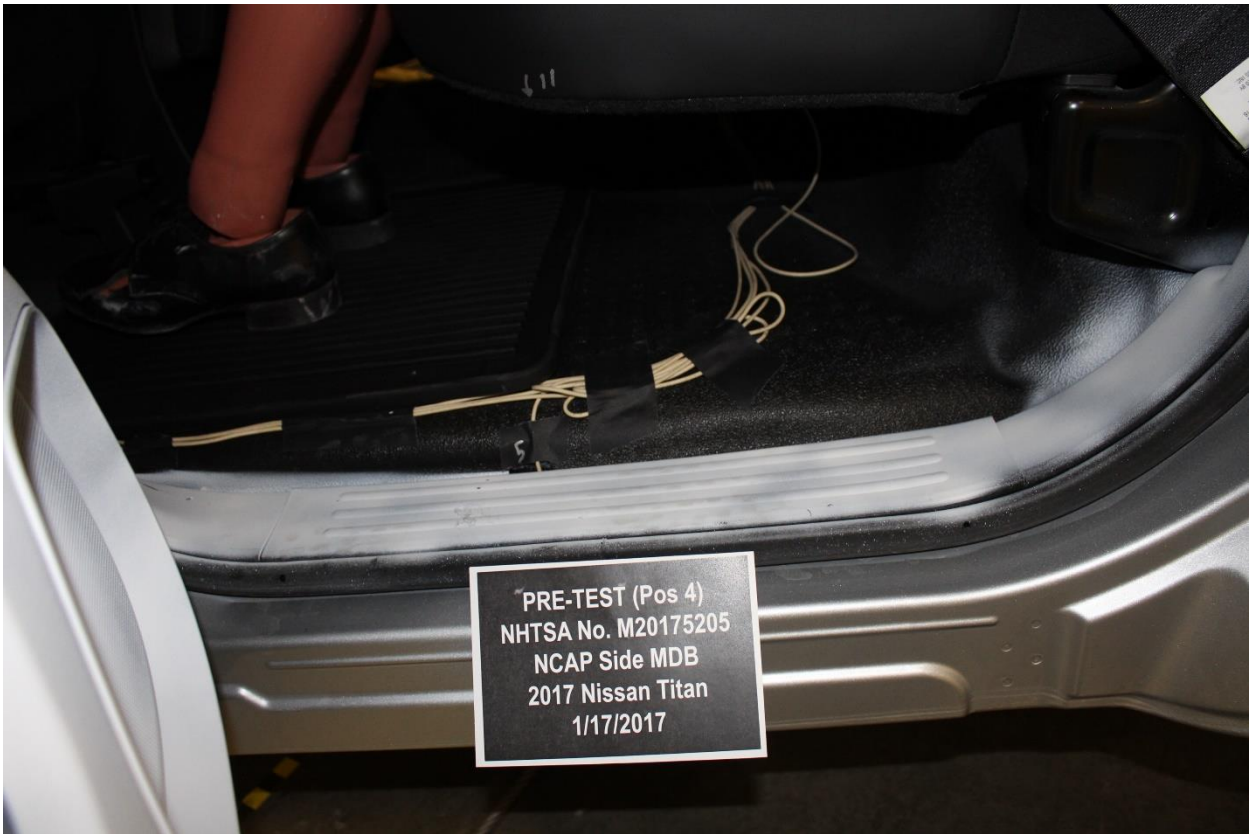

Figure A-66: Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

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Figure A-73: Pre-Test Passenger Inner Door Panel View

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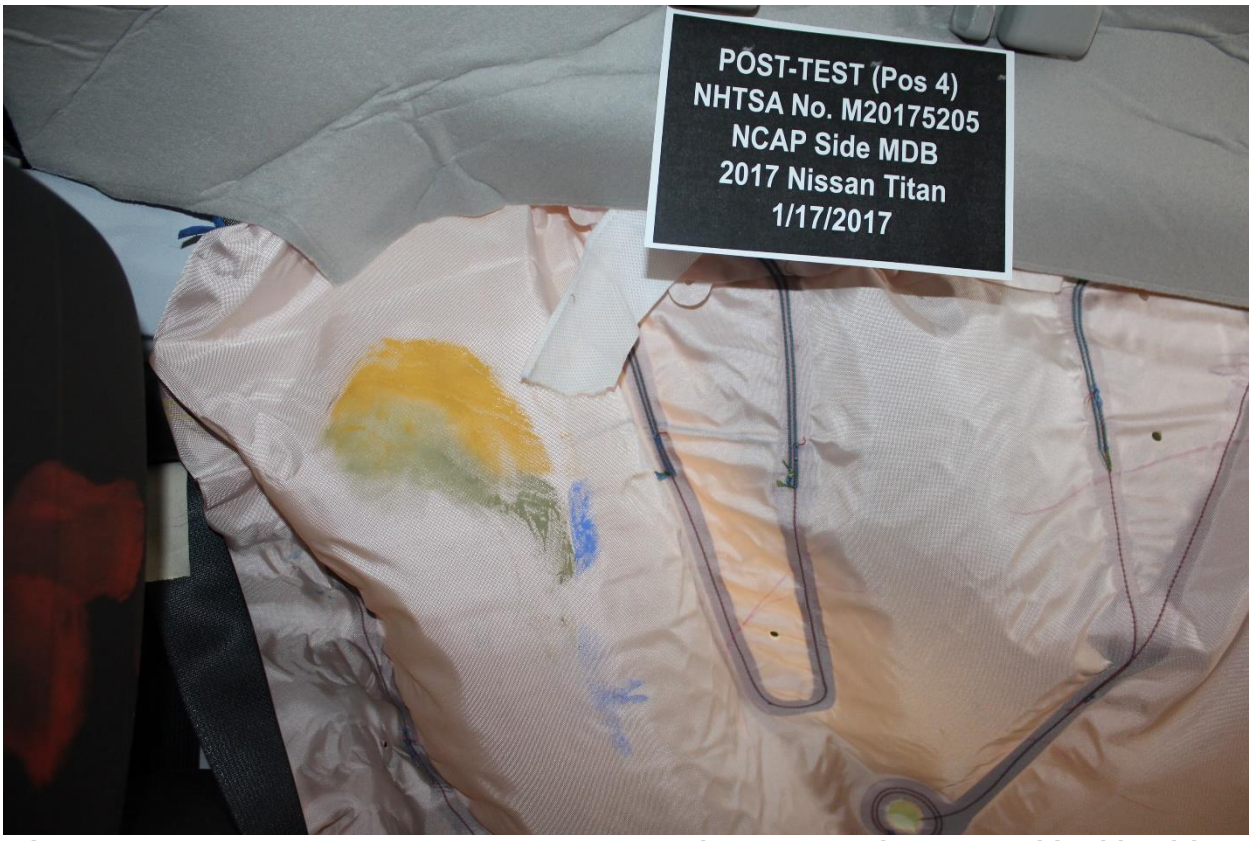

Figure A-76: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

Photo Not Applicable

Figure A-78: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View

Figure A-79: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

Photo Not Applicable

Figure A-80: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

Figure A-81: Post-Test Rear Passenger Dummy Close-Up Knee Contact View

Figure A-82: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

Figure A-83: Post-Test View of Fuel Filler Cap or Fuel Filler Neck

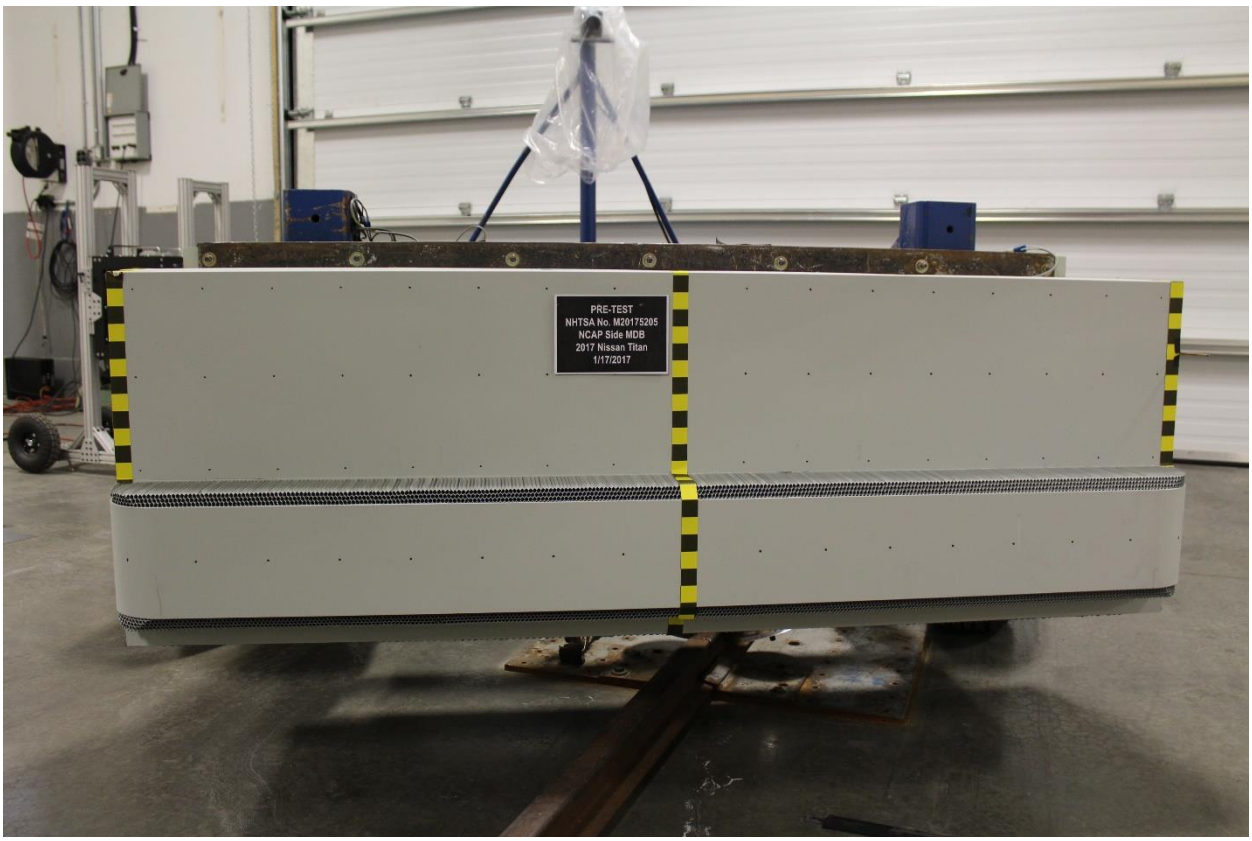

Figure A-84: Pre-Test Front View of MDB Impactor Face

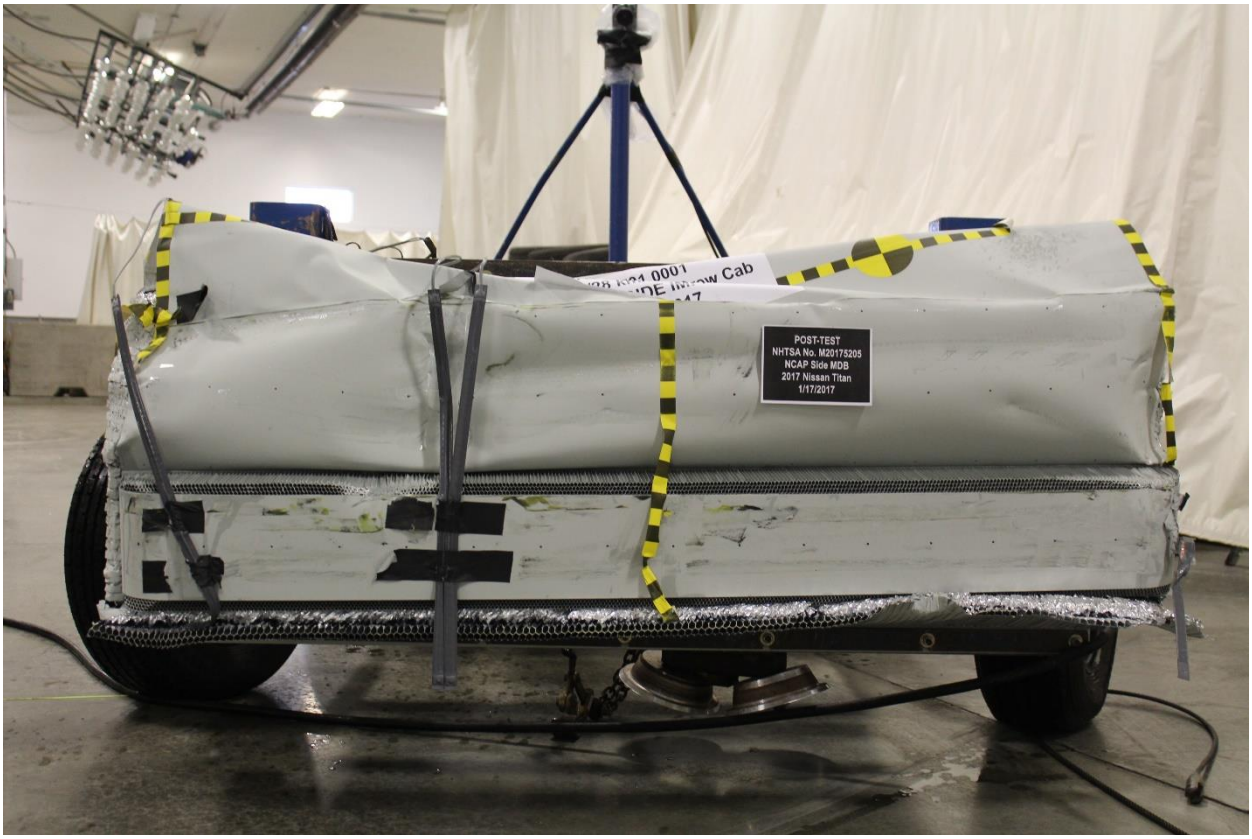

Figure A-85: Post-Test Front View of MDB Impactor Face

Figure A-86: Pre-Test Top View of MDB Impactor Face

Figure A-87: Post-Test Top View of MDB Impactor Face

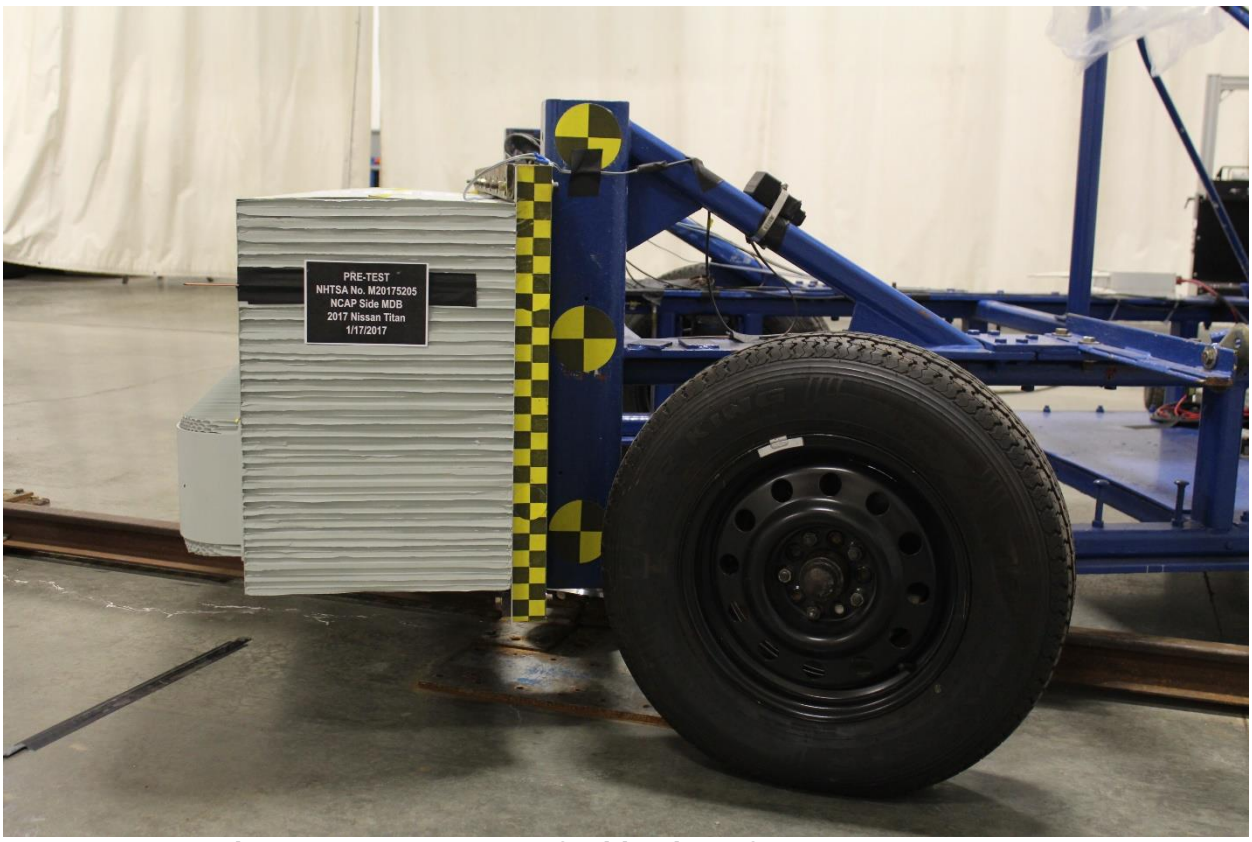

Figure A-88: Pre-Test Left Side View of MDB Impactor Face

Figure A-89: Post-Test Left Side View of MDB Impactor Face

Figure A-90: Pre-Test Right Side View of MDB Impactor Face

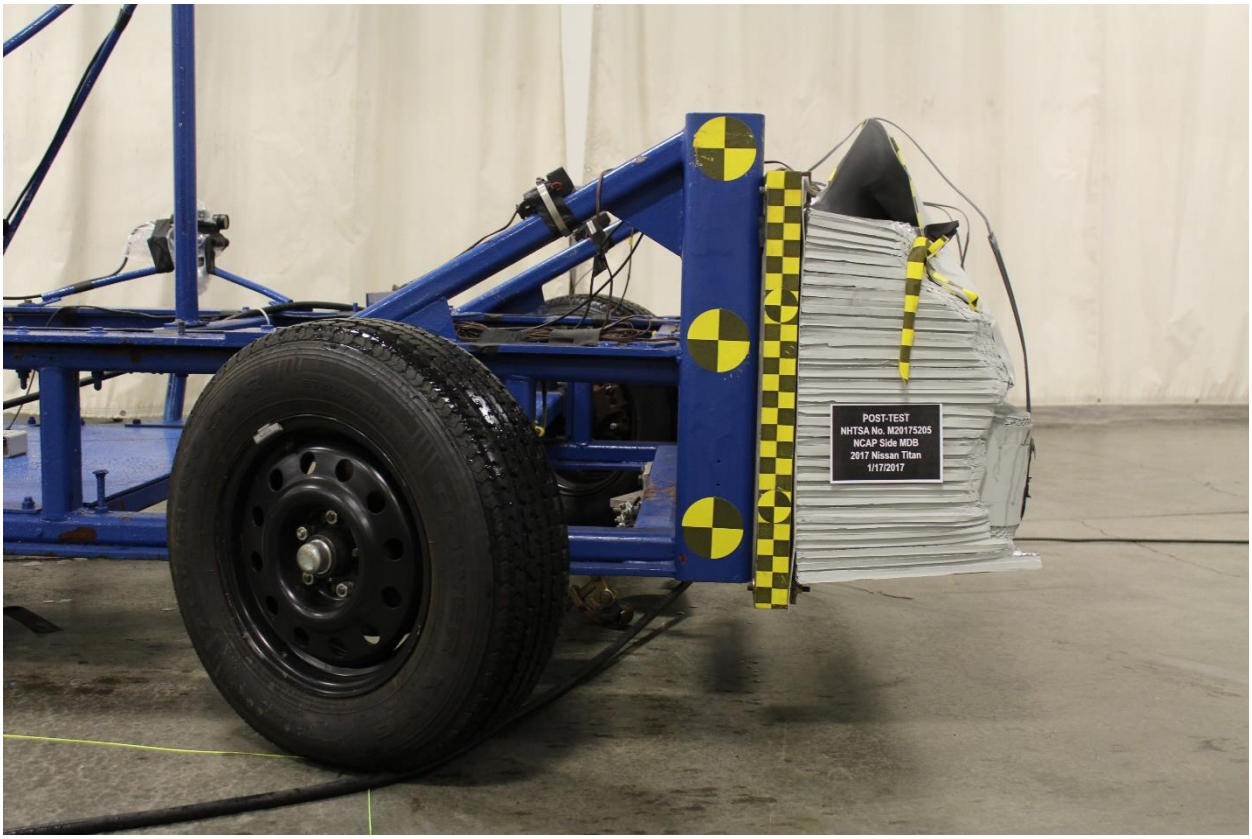

Figure A-91: Post-Test Right Side View of MDB Impactor Face

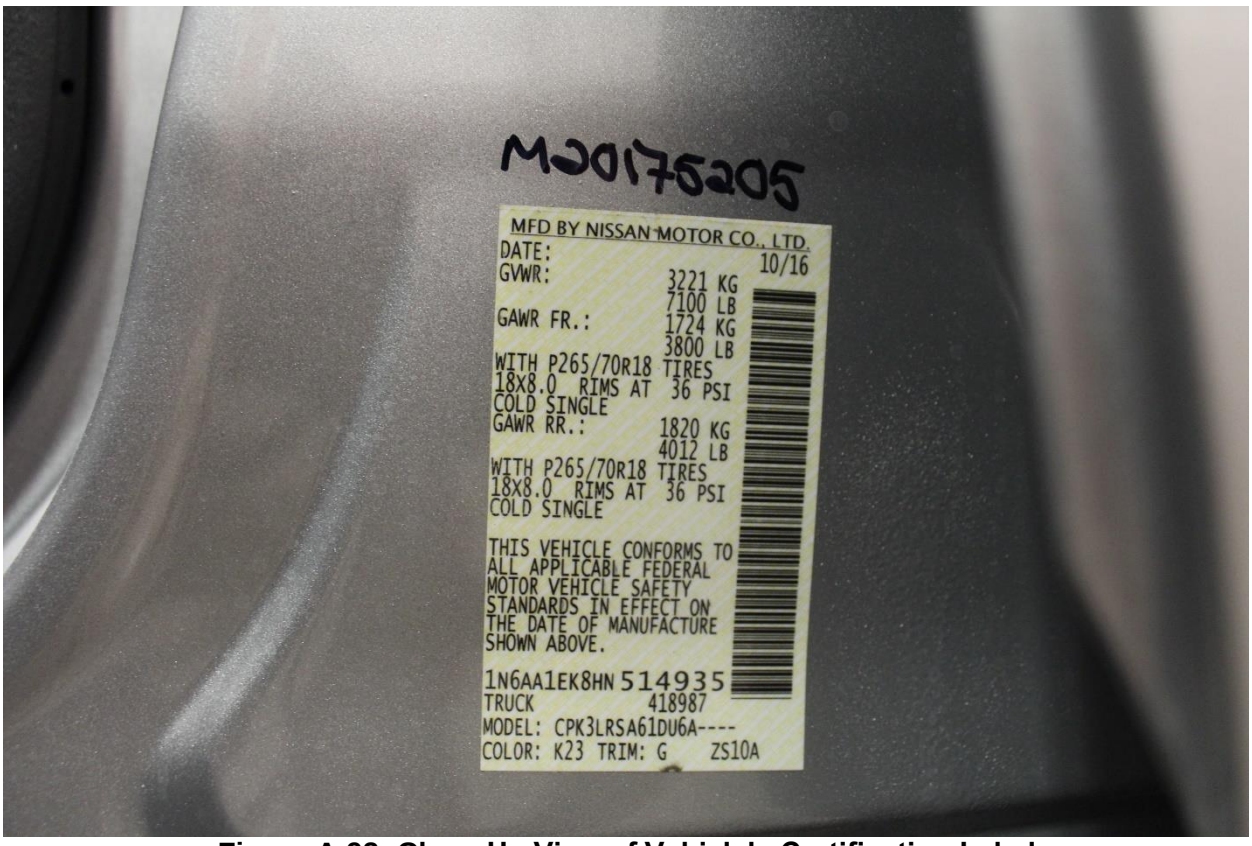

Figure A-92: Close-Up View of Vehicle's Certification Label

Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label

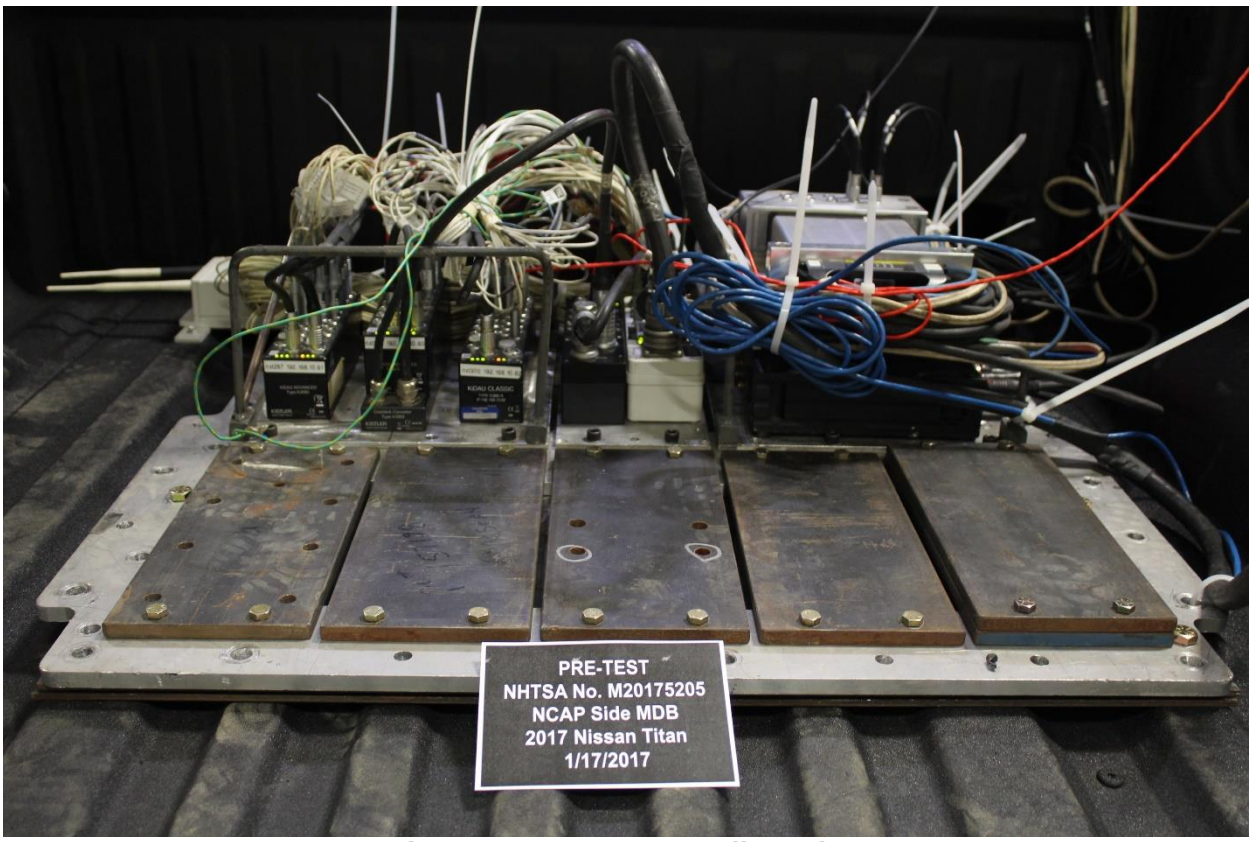

Figure A-94: Pre-Test Ballast View

Figure A-95: Post-Test Primary and Redundant Speed Trap Read-Out

Figure A-96: FMVSS No. 301 Static Rollover 0 Degrees

Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees

Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees

Figure A-100: FMVSS No. 301 Static Rollover 360 Degrees

Figure A-101: Impact Event

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5.6-Liter Endurance® V8
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EVERY DUTY TRUCK™

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE
5.6-Liter Endurance® V8 Engine
390 Horsepower and 394 lb-ft of Torque
7-Speed Automatic Transmission
4-Wheel Power Disc Brakes
18" Styled Steel Wheels
Full Size Spare Tire
P265/70R18 Tires

SAFETY & SECURITY
Driver & Front Passenger, Side-Impact, & Curtain Air Bags
Lower Anchors & Tethers for Children (LATCH)
4-Wheel Anti-Lock Braking System (ABS)
Vehicle Dynamic Control (VDC)
Electronic Brake Force Distribution (EBD)
Tire Pressure Monitoring System (TPMS)
Nissan Vehicle Immobilizer System
Vehicle Security System (VSS)

COMFORT & CONVENIENCE
40/20/40 Front Manual Split Cloth Bench Seat with Vinyl Bolsters
Flip Down Center Seat with Armrest, Dual Cupholders, Seat Back and Under Seat Storage
60/40 Rear Flip Up Bench Seat
Column Shifter with Manual Gear Select
Cruise Control
Easy Clean Vinyl Floor
Glovebox with Lock
Power Windows and Power Door Locks
Remote Keyless Entry w/ Push Button Start
6-Speaker AM/FM/CD Audio System
NissanConnect™ with Mobile Apps+++
5" Color Display
USB Connection for iPod® Interface and Other Compatible Devices
Bluetooth® Hands-free Phone System++++
Streaming Audio via Bluetooth®
Sun Visors with Extension

EXTERIOR
Black Front Grille
Black Front and Rear Bumper
Black Door Handles and Mirrors
Removable Locking Tailgate
Cab Mounted LED Cargo Bed Lamp
Front Chin Spoiler
Variable Intermittent Wipers

+++NissanConnect™ with Mobile Apps
Only use features when safe to do so. App availability is dependent upon vehicle model, trim level, packaging, and/or options. See NissanUSA.com/Connect for complete app availability details. Compatible smartphone required. Cellular network and GPS signals not available in all areas and/or at all times. Nissan is not responsible for associated costs, if any, for continued operation due to cellular network or other third party termination/changes. Cellular or other third party provider may terminate/restrict respective service without notice. Subscription Agreement required. See www.NissanUSA.com/Connect for details. Text rates and/or data usage may apply.
++++Compatible smartphone required. Text rates and/or data usage may apply.

...stalled options and accessories, local taxes or license fees. This label has ...l law. Do not remove prior to delivery to the ultimate purchaser.

Manufacturer's Suggested Retail Base Price:	$34,780.00
Options Included by Manufacturer	
S CONVENIENCE AND UTILITY PACKAGE	800.00
Front Overhead Console	
Spray-On Bedliner	
Class IV Integrated Receiver Hitch***	
4-pin/7-pin Wiring Harness Connector***	
SPLASH GUARDS	235.00
ALL SEASON FLOOR MATS	145.00
DESTINATION CHARGES	1,195.00
Total*	**$37,155.00**

***Towing capability varies by configuration. See Nissan towing guide and owner's manual for additional information.

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy: **18** MPG combined city/hwy (15 city, 21 highway)
5.6 gallons per 100 miles
STANDARD PICKUP TRUCKS range from 15 to 24 MPG. The best vehicle rates 119 MPGe.

You spend **$3,250** more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$2,050**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 3 (1 Worst, 10 Best)
Smog Rating (tailpipe only): 6 (1 Worst, 10 Best)
This vehicle emits 505 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 26 MPG and costs $7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $2.45 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

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		**Not Rated**
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.		
Frontal Crash	Driver	**Not Rated**
	Passenger	**Not Rated**
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
Side Crash	Front seat	**Not Rated**
	Rear seat	**Not Rated**
Based on the risk of injury in a side impact.		
Rollover		**Not Rated**
Based on the risk of rollover in a single-vehicle crash.		

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

This Vehicle qualifies for Nissan's

Security+Plus Extended Protection Plan

The only service agreement backed by Nissan Extended Services North America!
Ask your dealer for details, or call 1-800-NISSAN-1 for more information

DELIVERY

VEHICLE COLORS:
EXT: BRILLIANT SILVE
INT: BLACK

FINAL ASSEMBLY POINT:
CANTON

TRANSPORT METHOD:
TRUCK

DEALER:
RICART NISSAN
4255 S HAMILTON RD
GROVEPORT OH
43125

VIN: 1N6AA1EK8HN514935
EMS: 50 STATE EMISSIONS
MDL: 38117-514935 K23-G
OPT: D-K01B93L94C03

20161021233946AS2960

Figure A-102: Monroney Label

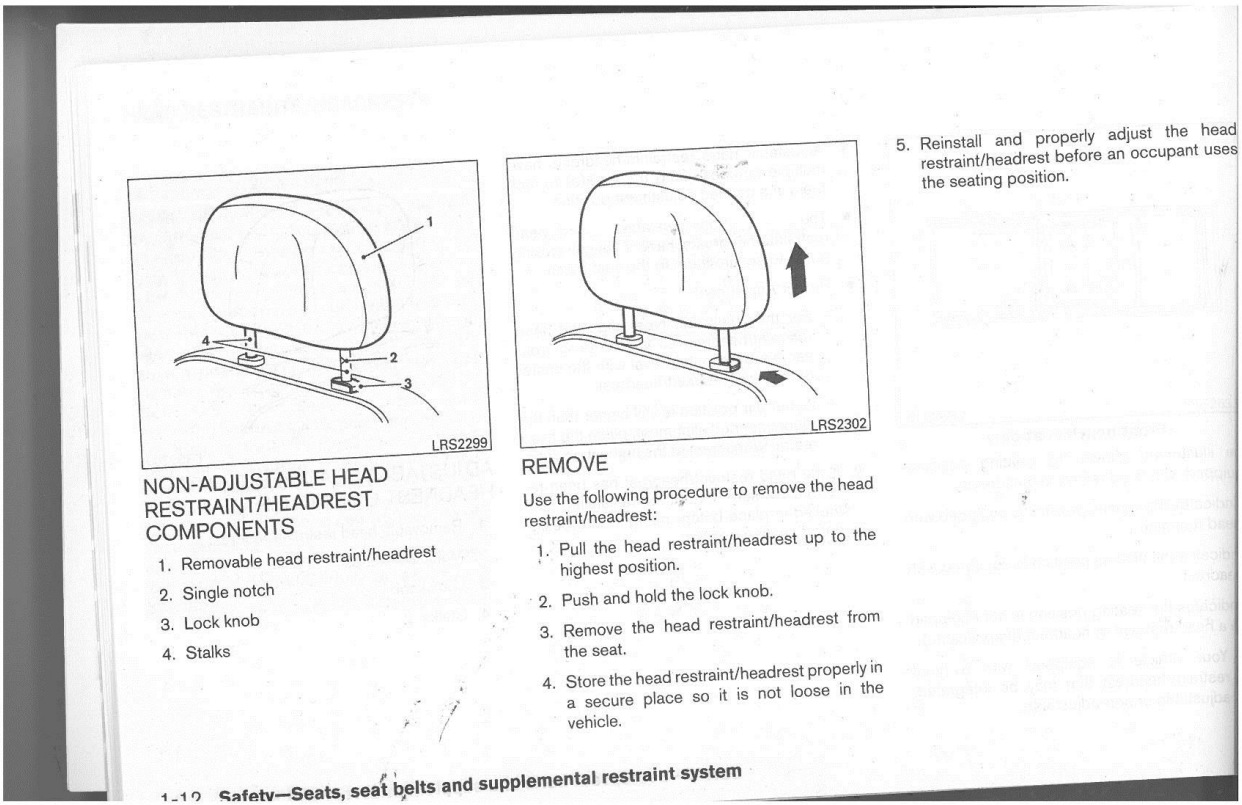

Figure A-103: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Photo Not Applicable

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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

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Driver & Passenger Dummy Instrumentation Plots

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

Additional Driver & Passenger Dummy Instrumentation Data

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

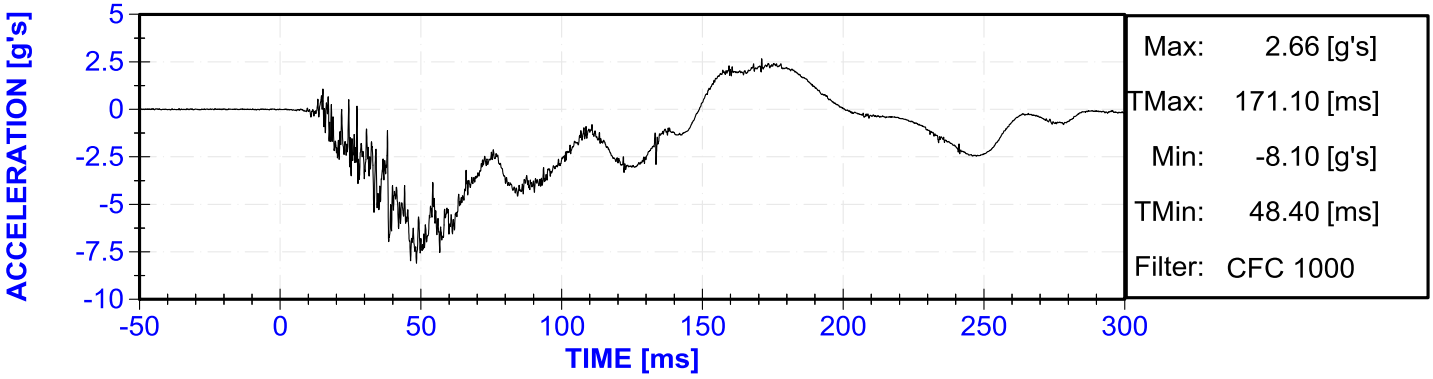
Vehicle Instrumentation Data

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

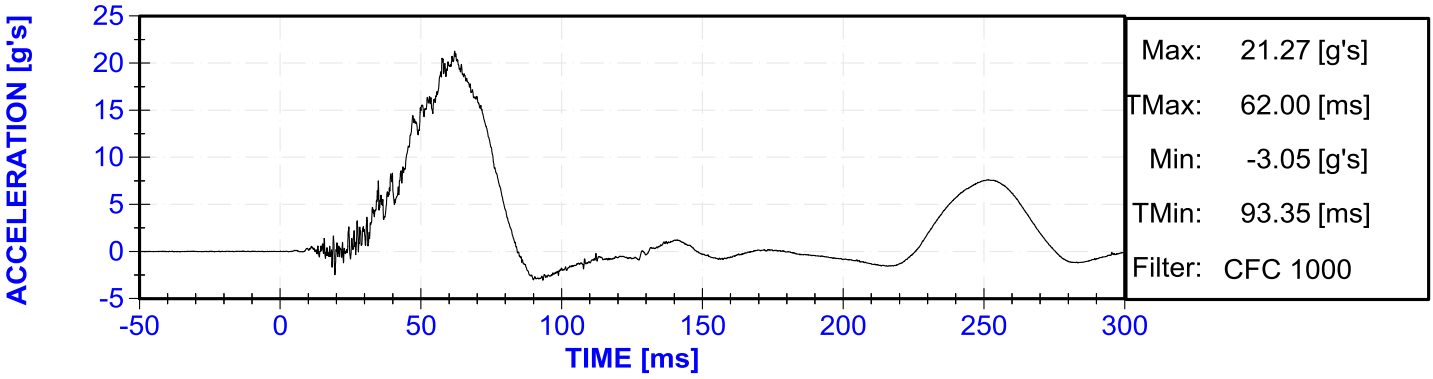
MDB Instrumentation Data

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

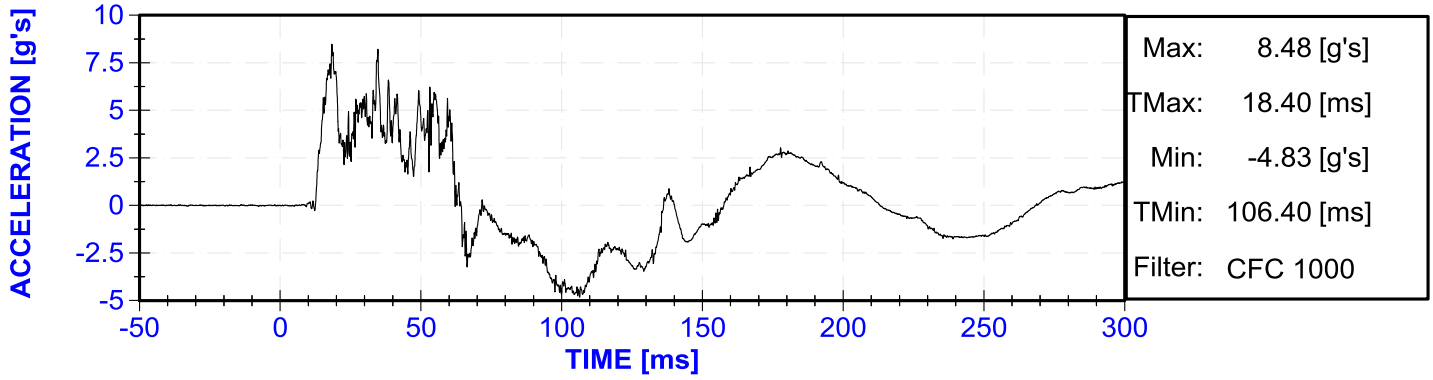
Driver Head Acceleration (X) Primary vs. Time



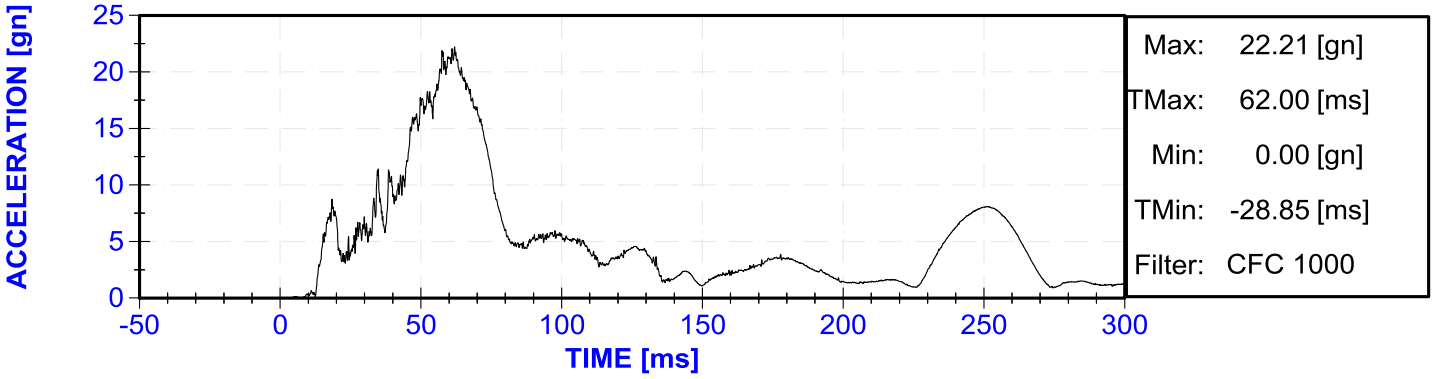
Driver Head Acceleration (Y) Primary vs. Time



Driver Head Acceleration (Z) Primary vs. Time

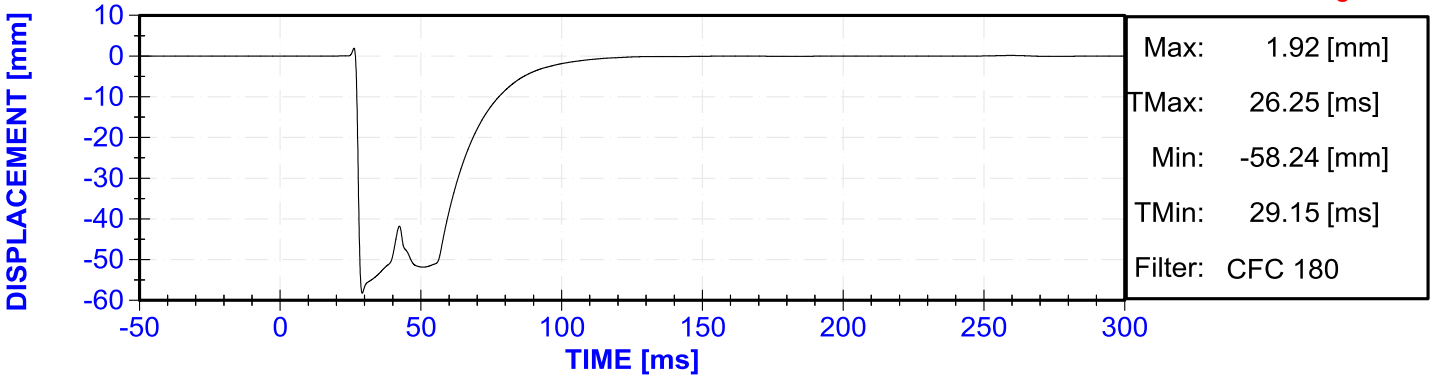


Driver Head Resultant Acceleration Primary vs. Time

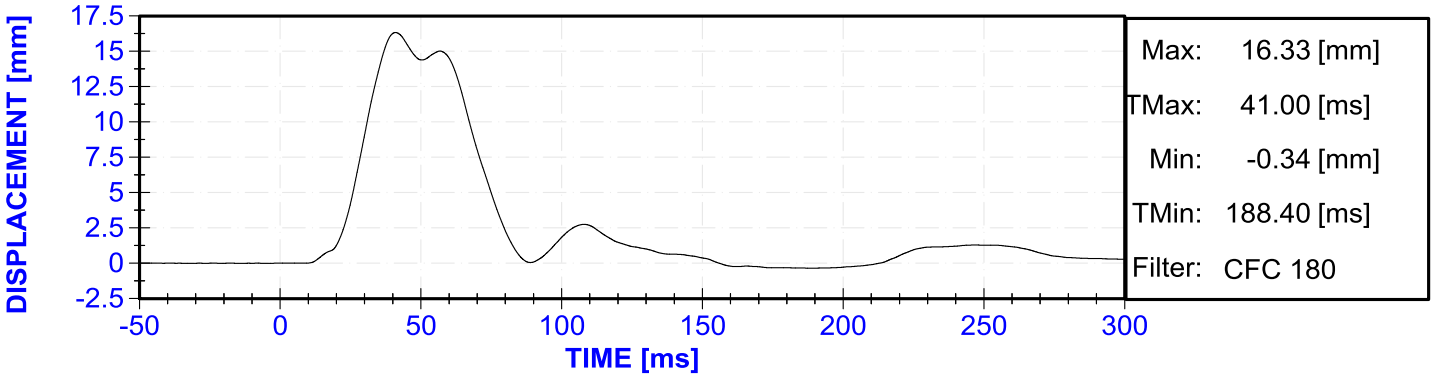


Driver Upper Thorax Rib Deflection (Y) vs. Time

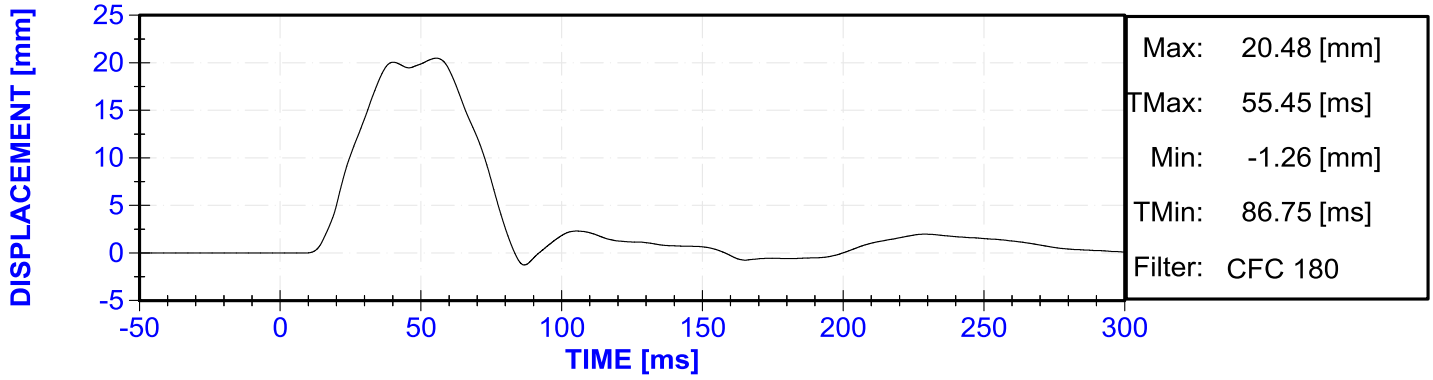
Questionable data throughout



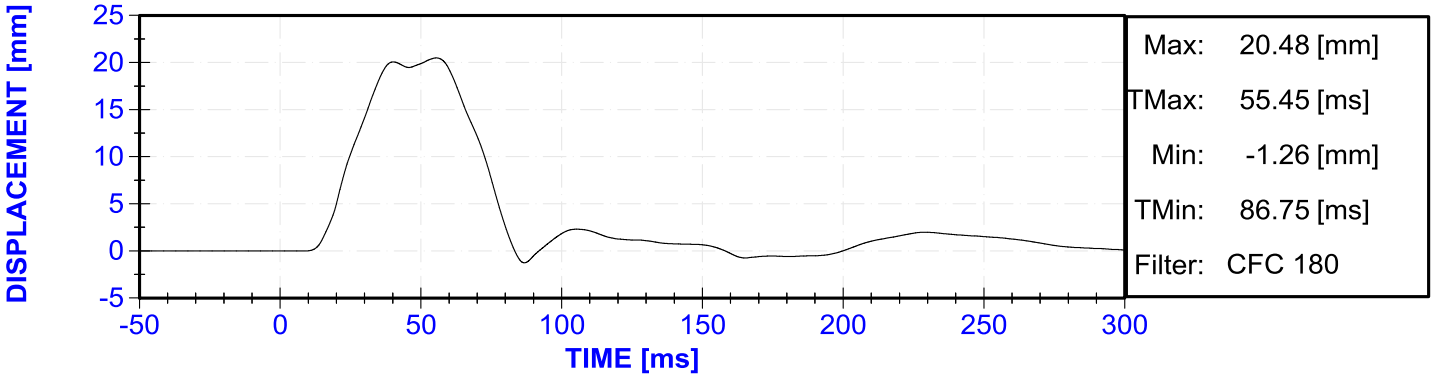
Driver Middle Thorax Rib Deflection (Y) vs. Time



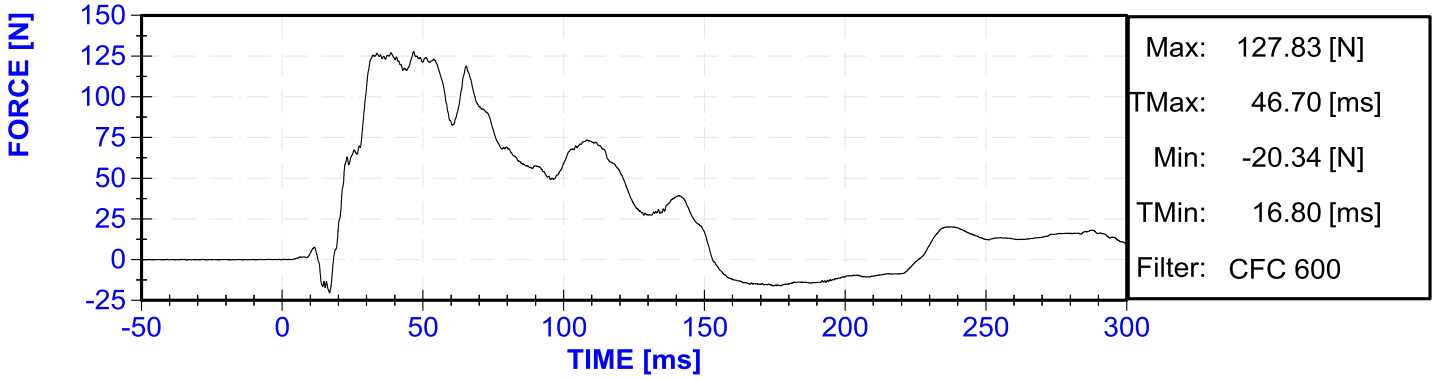
Driver Lower Thorax Rib Deflection (Y) vs. Time



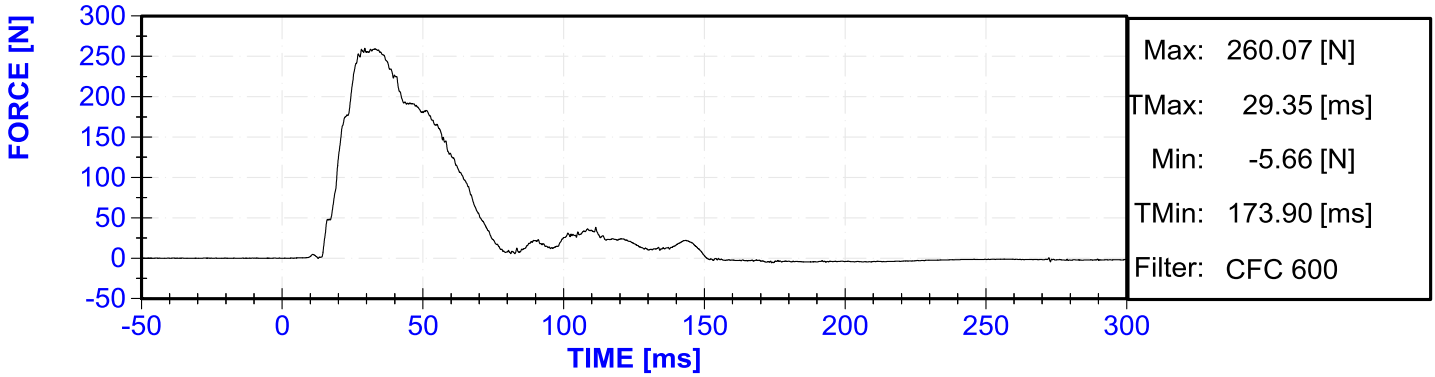
Driver Thorax Rib Deflection Maximum vs. Time



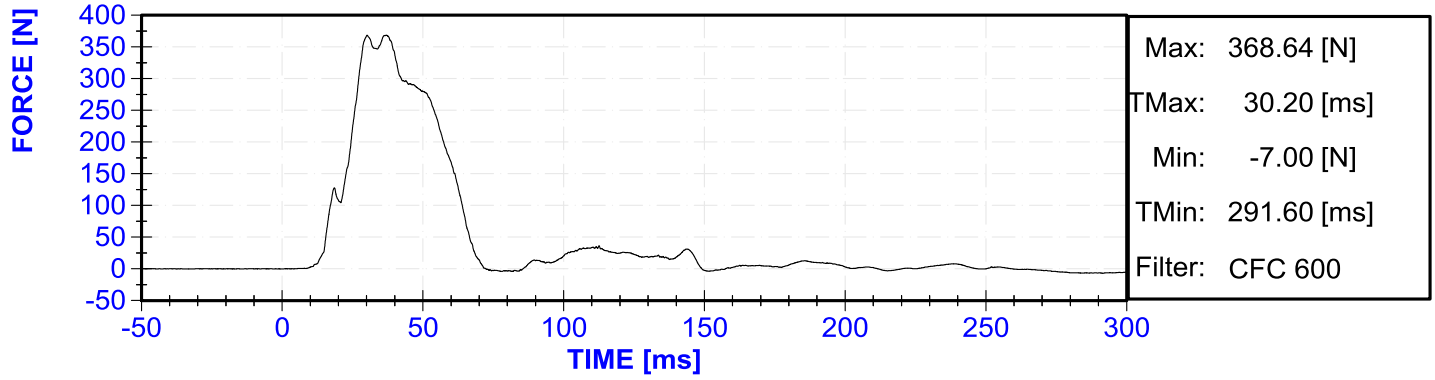
Driver Anterior Abdominal Force (Y) vs. Time



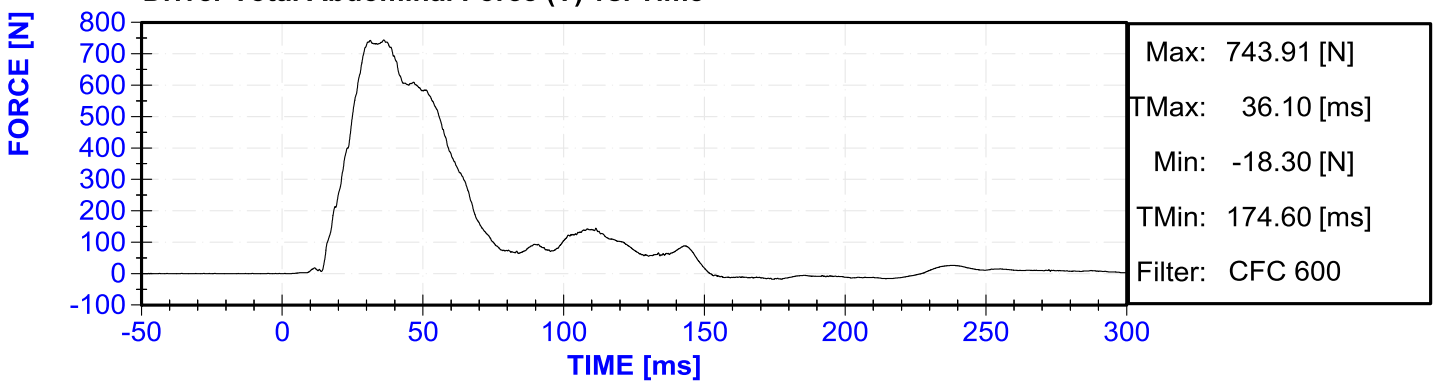
Driver Middle Abdominal Force (Y) vs. Time

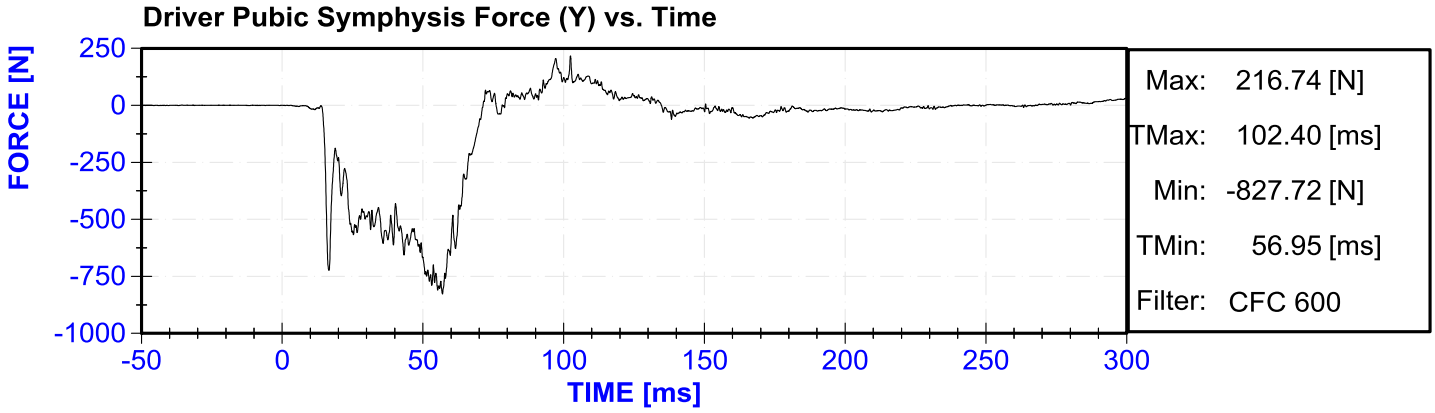


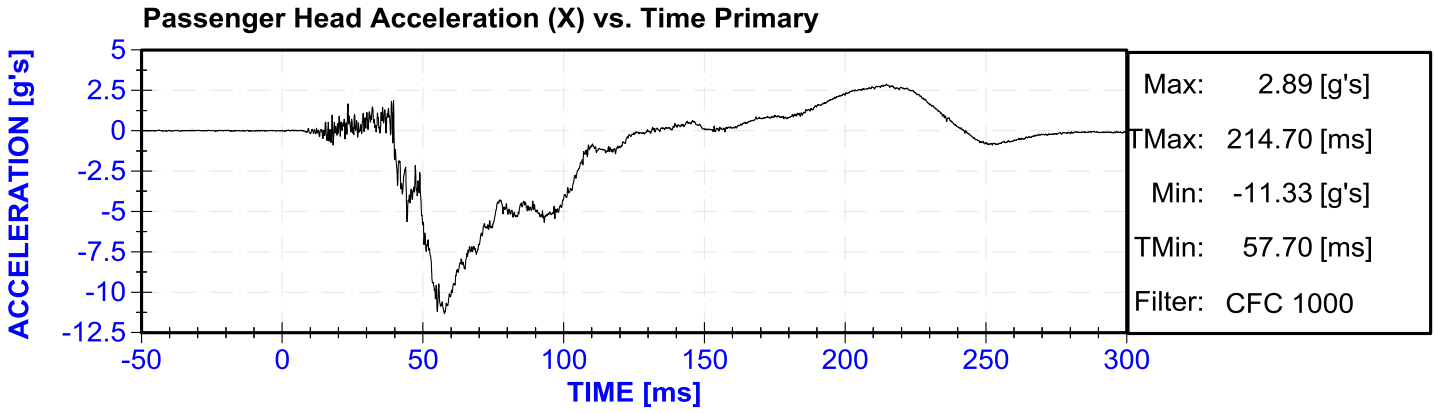
Driver Posterior Abdominal Force (Y) vs. Time

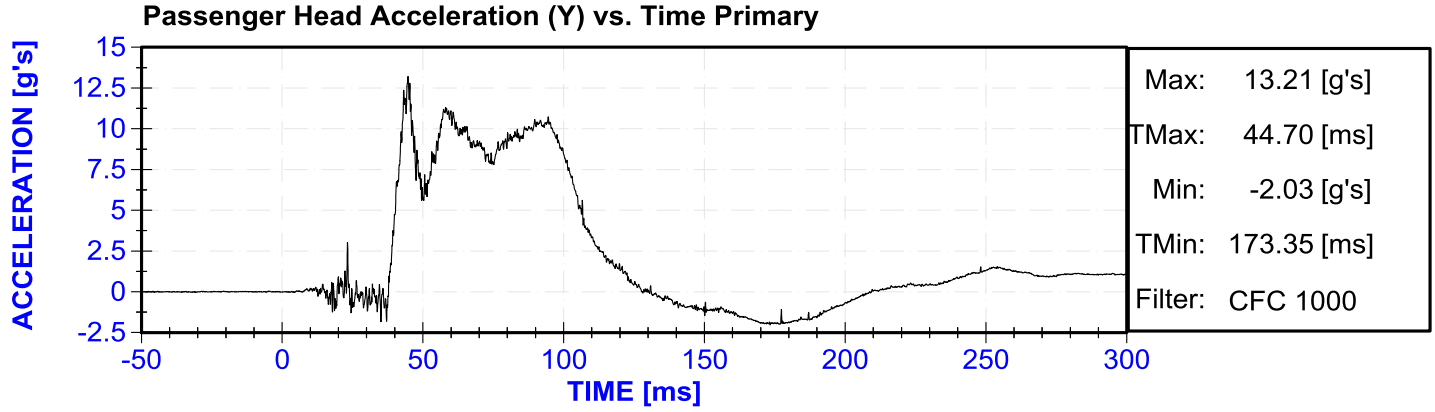


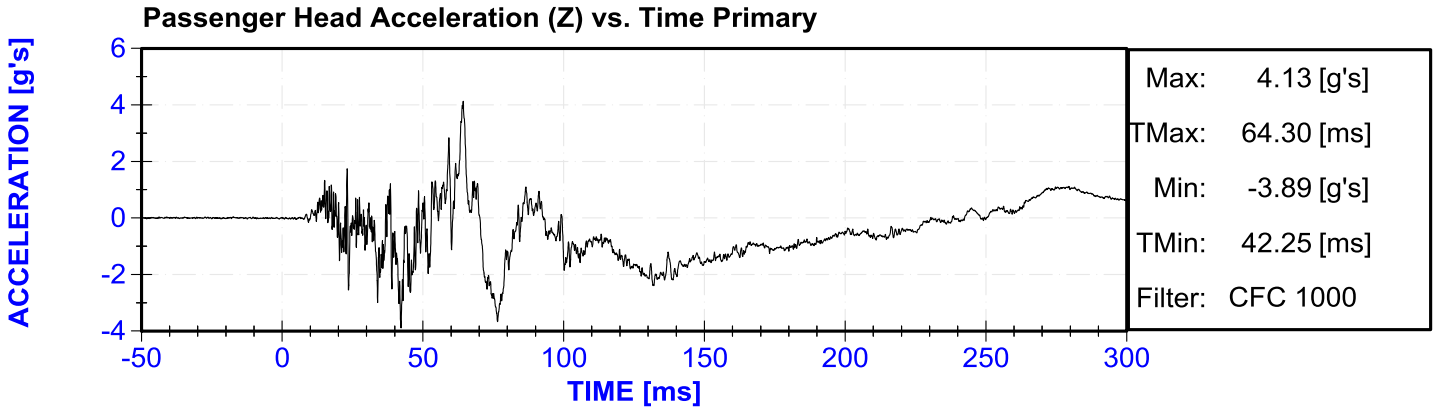
Driver Total Abdominal Force (Y) vs. Time

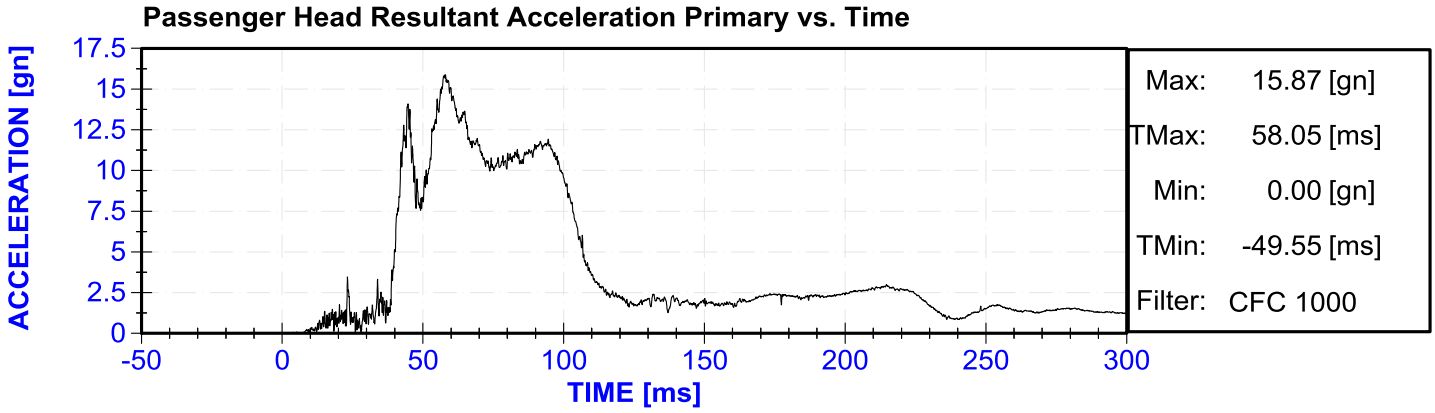


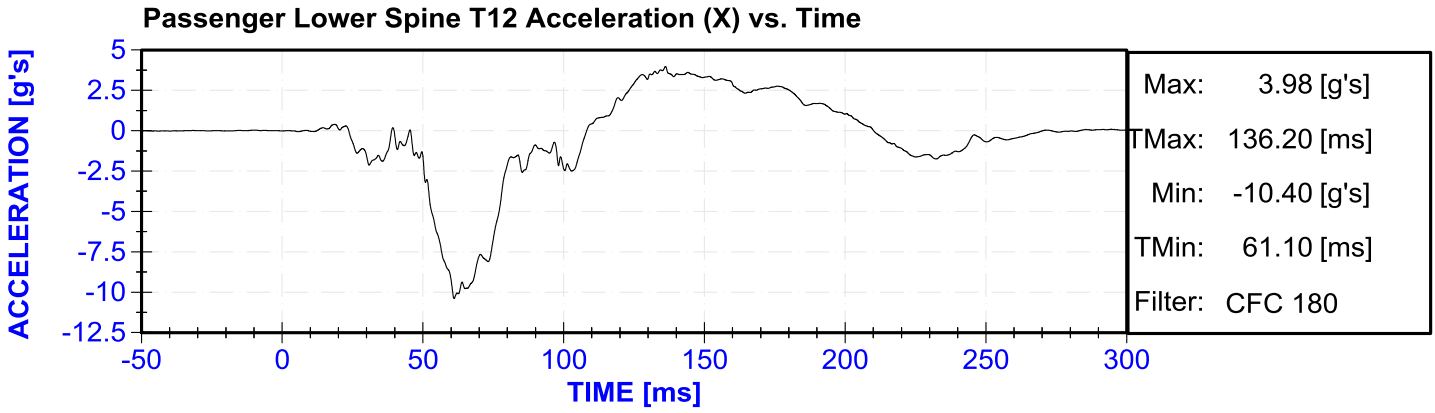

Driver Pubic Symphysis Force (Y) vs. Time
FORCE [N]
250
0
-250
-500
-750
-1000
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 216.74 [N]
TMax: 102.40 [ms]
Min: -827.72 [N]
TMin: 56.95 [ms]
Filter: CFC 600

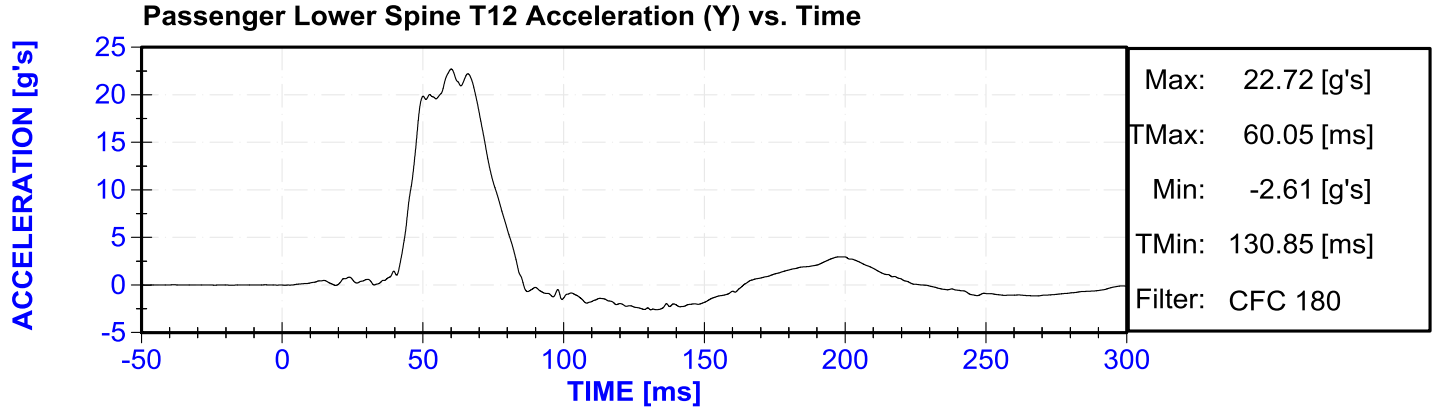

Passenger Head Acceleration (X) vs. Time Primary
ACCELERATION [g's]
5
2.5
0
-2.5
-5
-7.5
-10
-12.5
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 2.89 [g's]
TMax: 214.70 [ms]
Min: -11.33 [g's]
TMin: 57.70 [ms]
Filter: CFC 1000

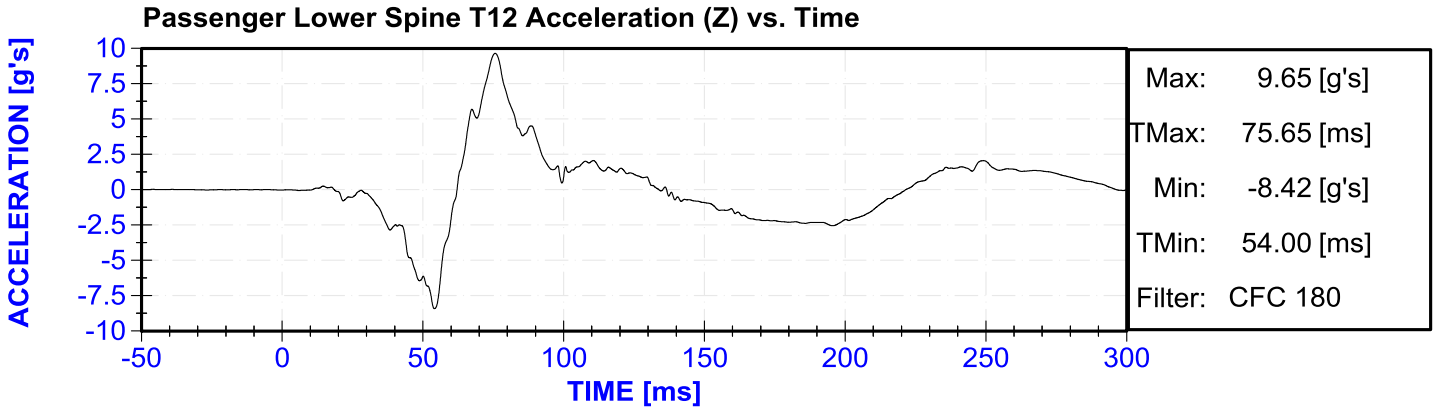

Passenger Head Acceleration (Y) vs. Time Primary
ACCELERATION [g's]
15
12.5
10
7.5
5
2.5
0
-2.5
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 13.21 [g's]
TMax: 44.70 [ms]
Min: -2.03 [g's]
TMin: 173.35 [ms]
Filter: CFC 1000


Passenger Head Acceleration (Z) vs. Time Primary
ACCELERATION [g's]
6
4
2
0
-2
-4
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 4.13 [g's]
TMax: 64.30 [ms]
Min: -3.89 [g's]
TMin: 42.25 [ms]
Filter: CFC 1000

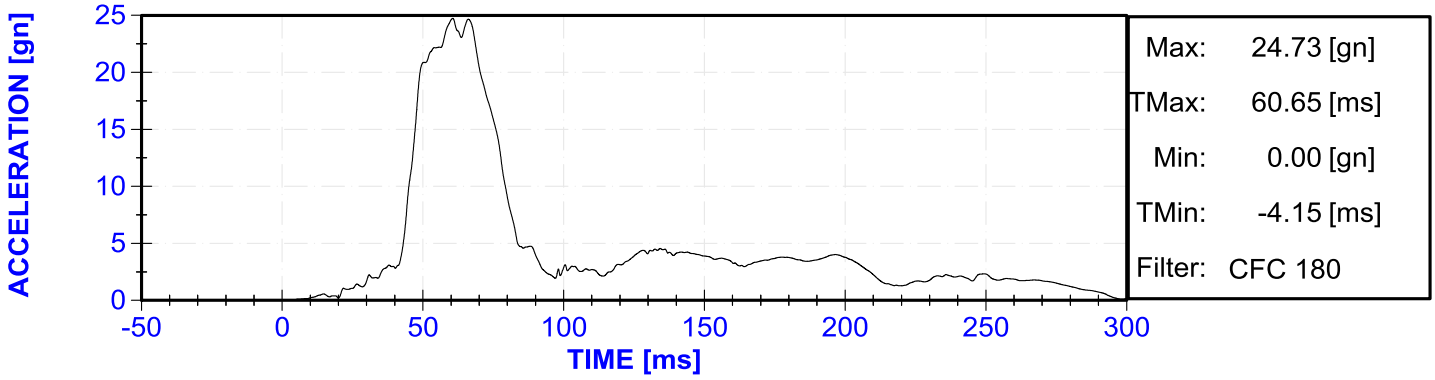

Passenger Head Resultant Acceleration Primary vs. Time
ACCELERATION [gn]
17.5
15
12.5
10
7.5
5
2.5
0
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 15.87 [gn]
TMax: 58.05 [ms]
Min: 0.00 [gn]
TMin: -49.55 [ms]
Filter: CFC 1000


Passenger Lower Spine T12 Acceleration (X) vs. Time
ACCELERATION [g's]
5
2.5
0
-2.5
-5
-7.5
-10
-12.5
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 3.98 [g's]
TMax: 136.20 [ms]
Min: -10.40 [g's]
TMin: 61.10 [ms]
Filter: CFC 180

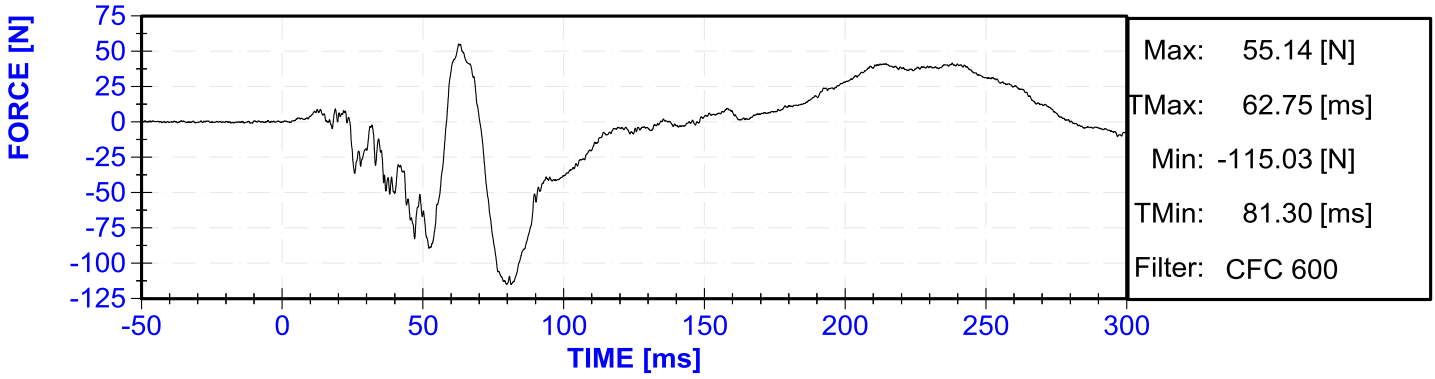

Passenger Lower Spine T12 Acceleration (Y) vs. Time
ACCELERATION [g's]
25
20
15
10
5
0
-5
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 22.72 [g's]
TMax: 60.05 [ms]
Min: -2.61 [g's]
TMin: 130.85 [ms]
Filter: CFC 180


Passenger Lower Spine T12 Acceleration (Z) vs. Time
ACCELERATION [g's]
10
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 9.65 [g's]
TMax: 75.65 [ms]
Min: -8.42 [g's]
TMin: 54.00 [ms]
Filter: CFC 180

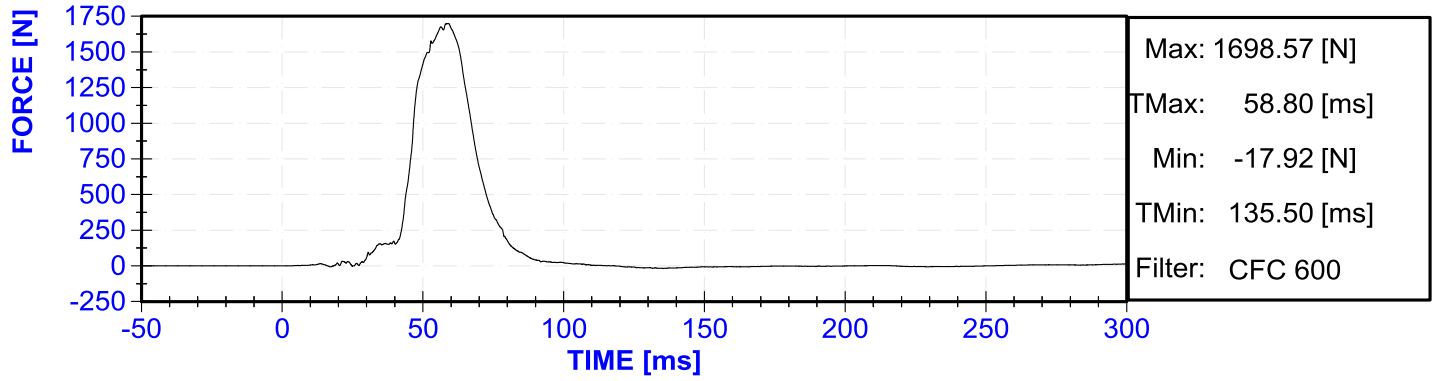
Passenger Lower Spine T12 Resultant Acceleration vs. Time



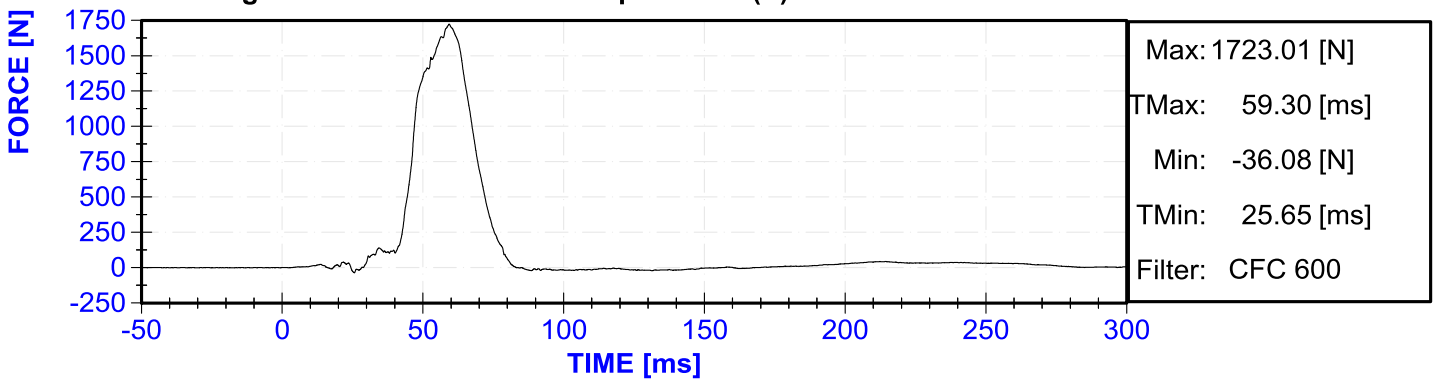
Passenger Iliac Force on Impact Side (Y) vs. Time



Passenger Acetabulum Force on Impact Side (Y) vs. Time



Passenger Total Pelvic Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

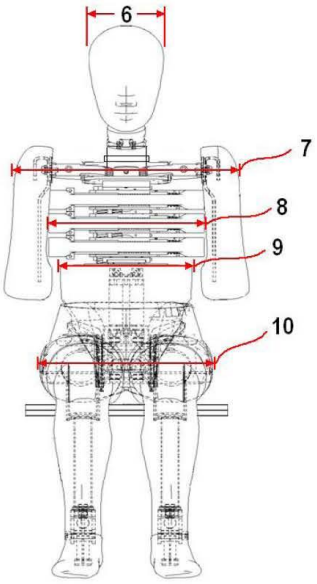
SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

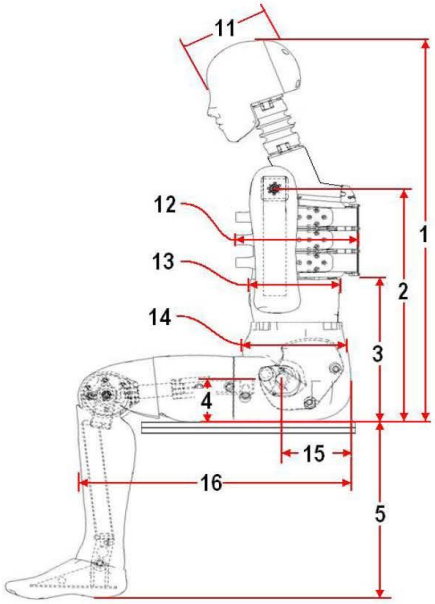
External Measurements - EuroSID-2re

Technician: M.Hartung Date: 1/12/2017

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	565	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	350	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	426	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	473	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	284	Pass
10	Pelvis Lap Width	359	373	364	Pass
11	Head Depth	196	206	201	Pass
12	Thorax Depth	262	272	267	Pass
13	Abdomen Depth	194	204	200	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	605	Pass

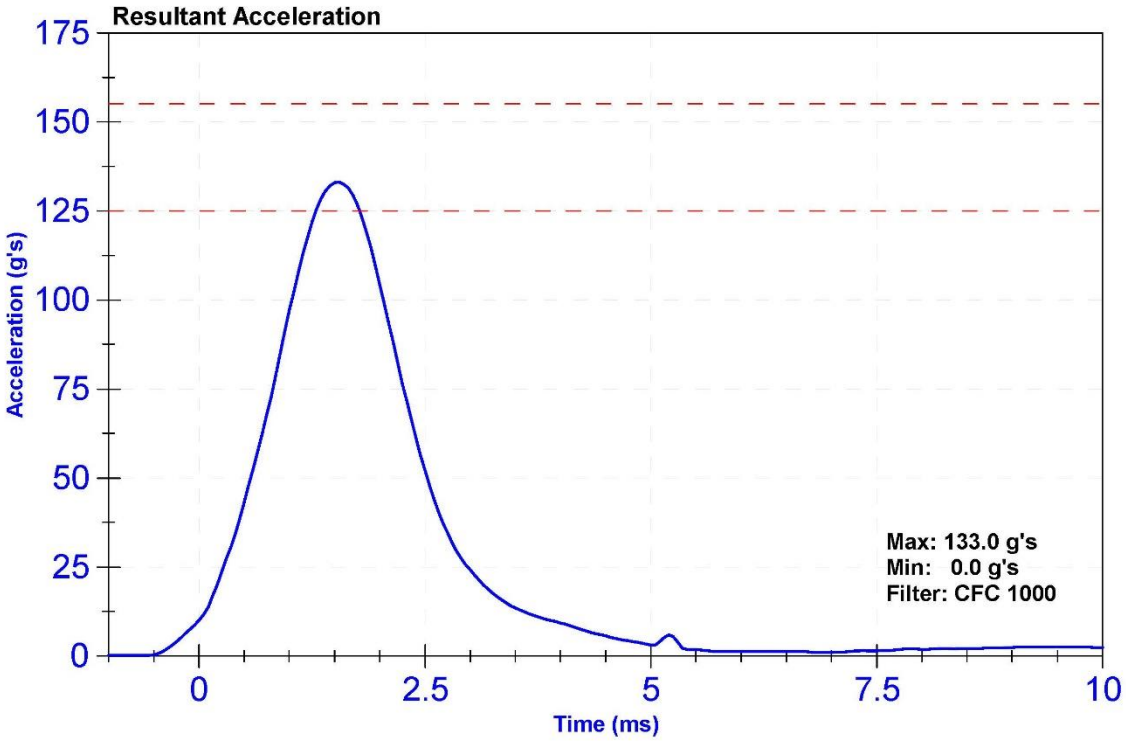
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

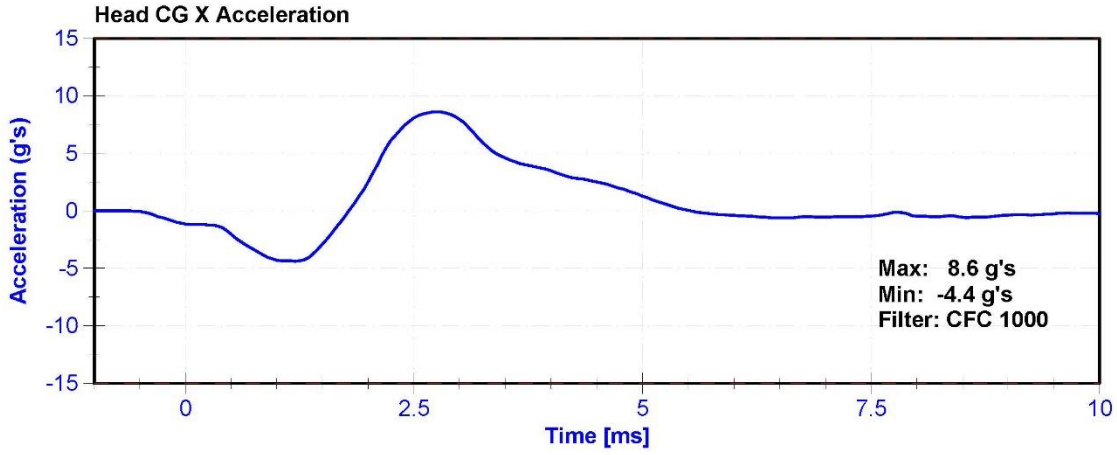
Results

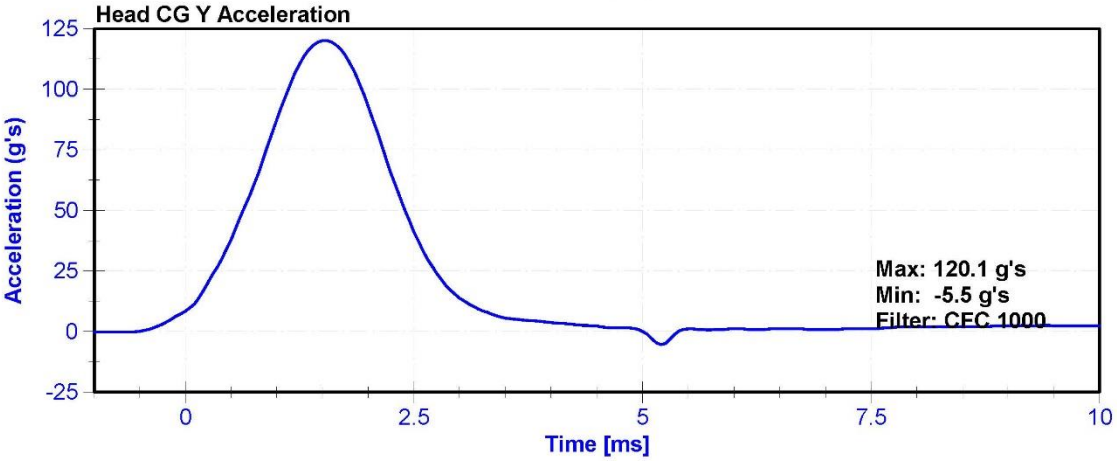
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	34.2	Pass
Resultant Acceleration	125	155	g's	133.0	Pass
Oscillation	0	15	%	4.47	Pass
Fore-Aft Acceleration	-15	15	g's	8.6	Pass

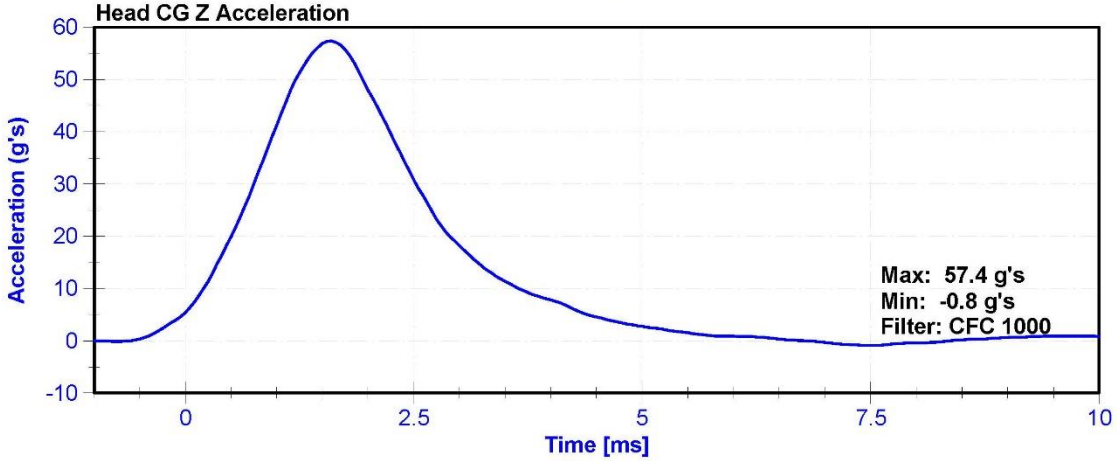
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	1/6/2017	7/6/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	1/6/2017	7/6/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	1/6/2017	7/6/2017




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 8.6 g's
Min: -4.4 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]
Max: 120.1 g's
Min: -5.5 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
60
50
40
30
20
10
0
-10
0
2.5
5
7.5
10
Time [ms]
Max: 57.4 g's
Min: -0.8 g's
Filter: CFC 1000

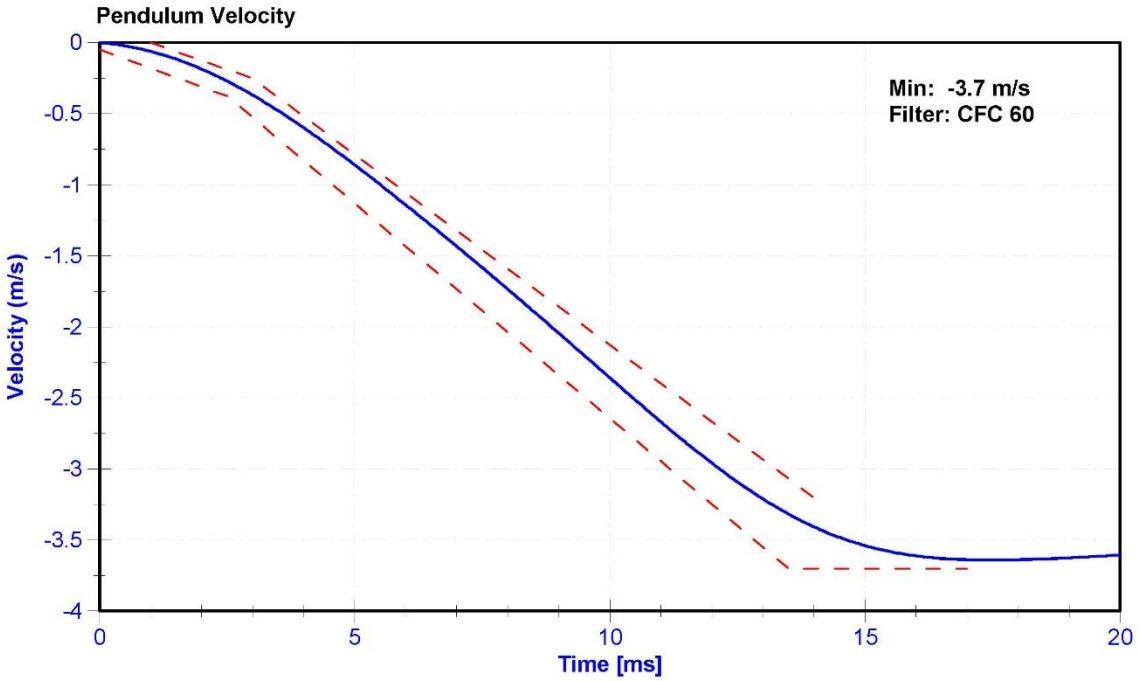
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

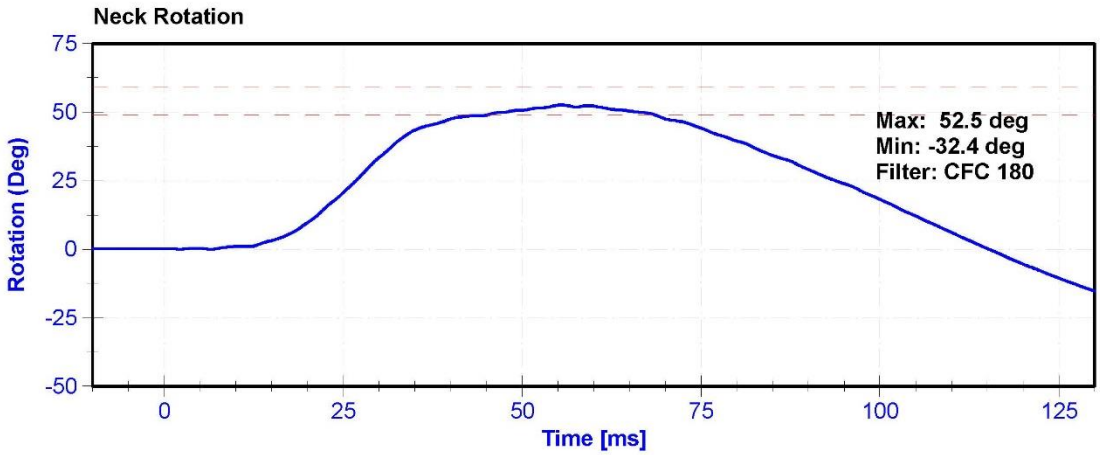
Results

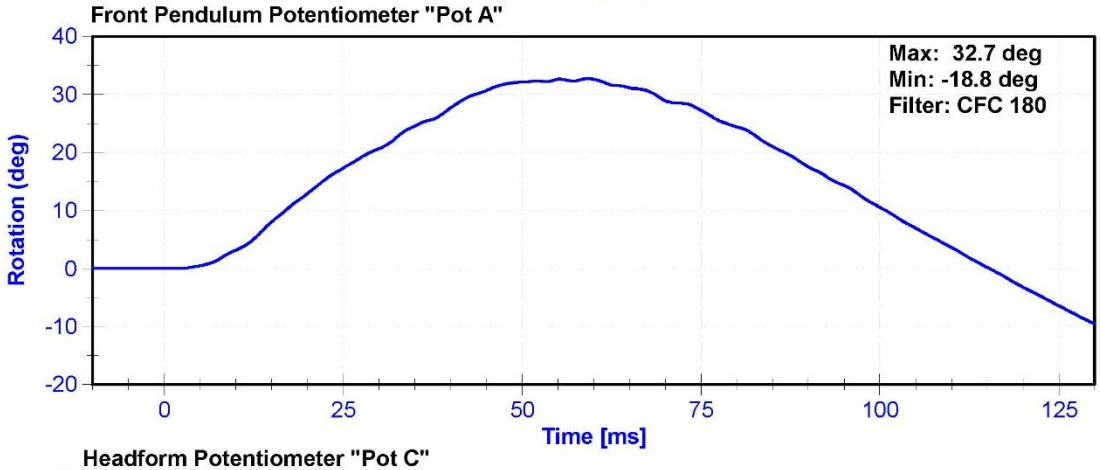
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32.9	Pass
Velocity	3.3	3.5	m/s	3.42	Pass
Lateral Neck Rotation	49	59	deg	52.5	Pass
Time at Maximum Rotation	54	66	ms	55.5	Pass
Time of Rotation Decay from Maximum	53	88	ms	59.7	Pass

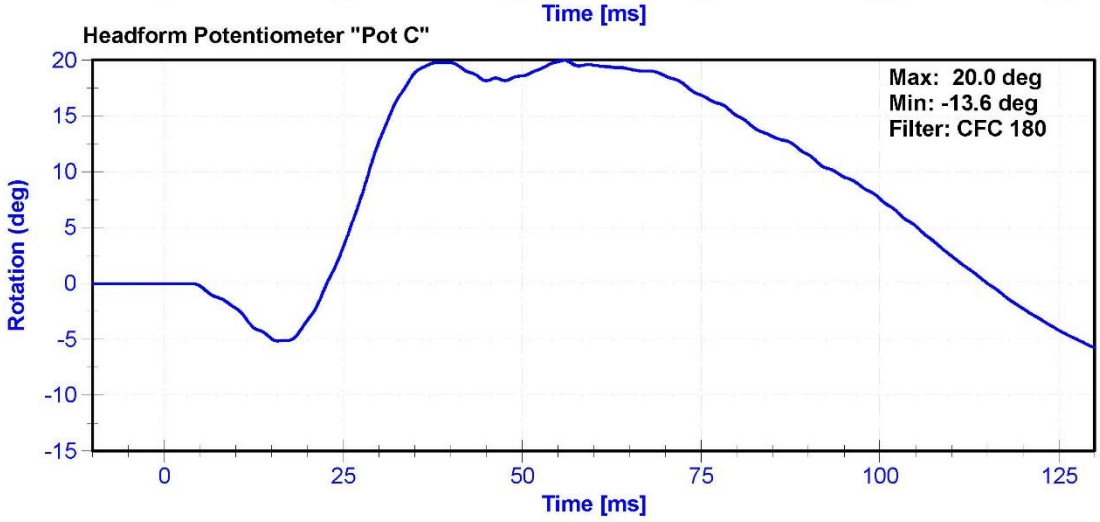
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Front Pendulum Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Headform Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017




Neck Rotation
Rotation (Deg)
Time [ms]
Max: 52.5 deg
Min: -32.4 deg
Filter: CFC 180


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 32.7 deg
Min: -18.8 deg
Filter: CFC 180


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 20.0 deg
Min: -13.6 deg
Filter: CFC 180

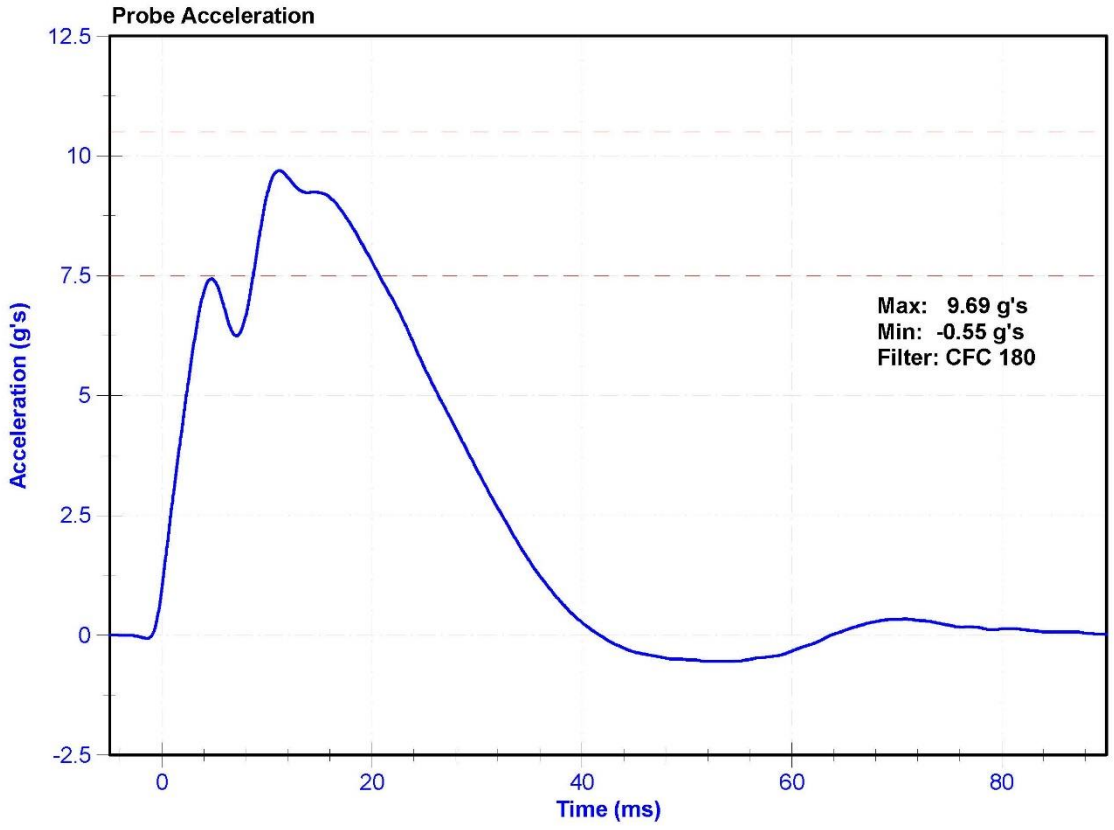
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	43.1	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	9.69	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017



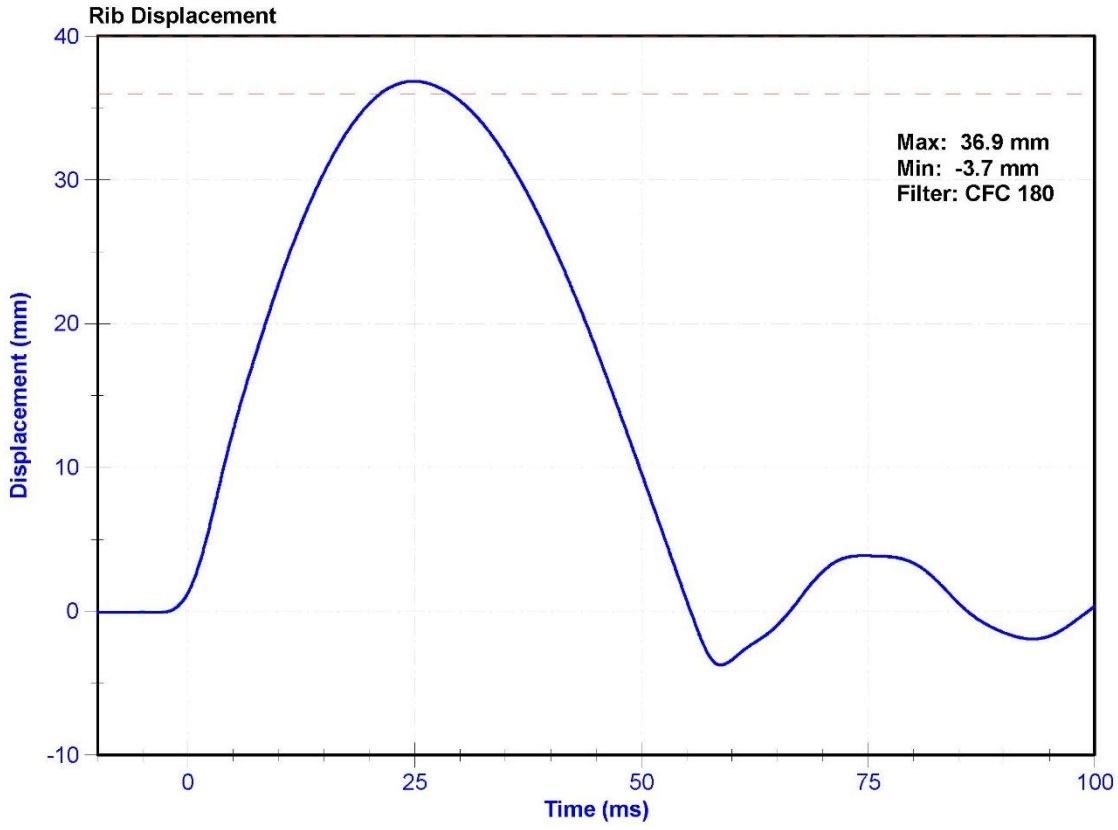
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	36	40	mm	36.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



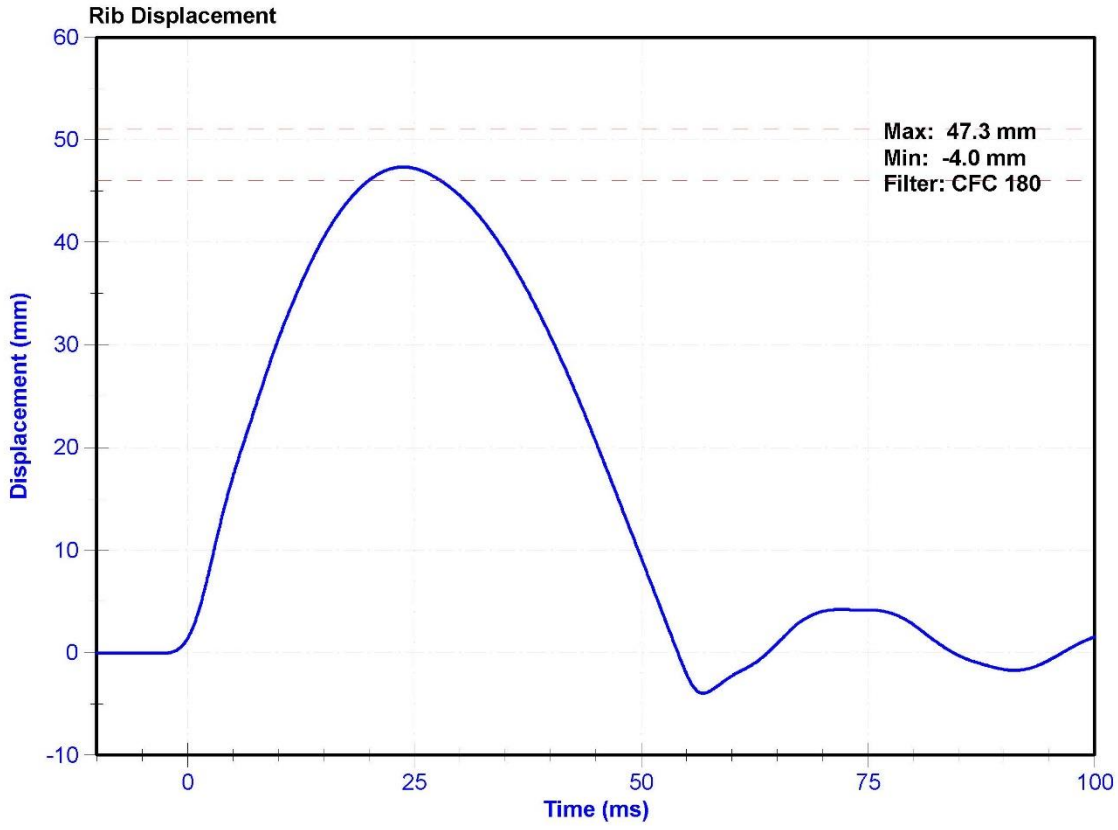
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	46	51	mm	47.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



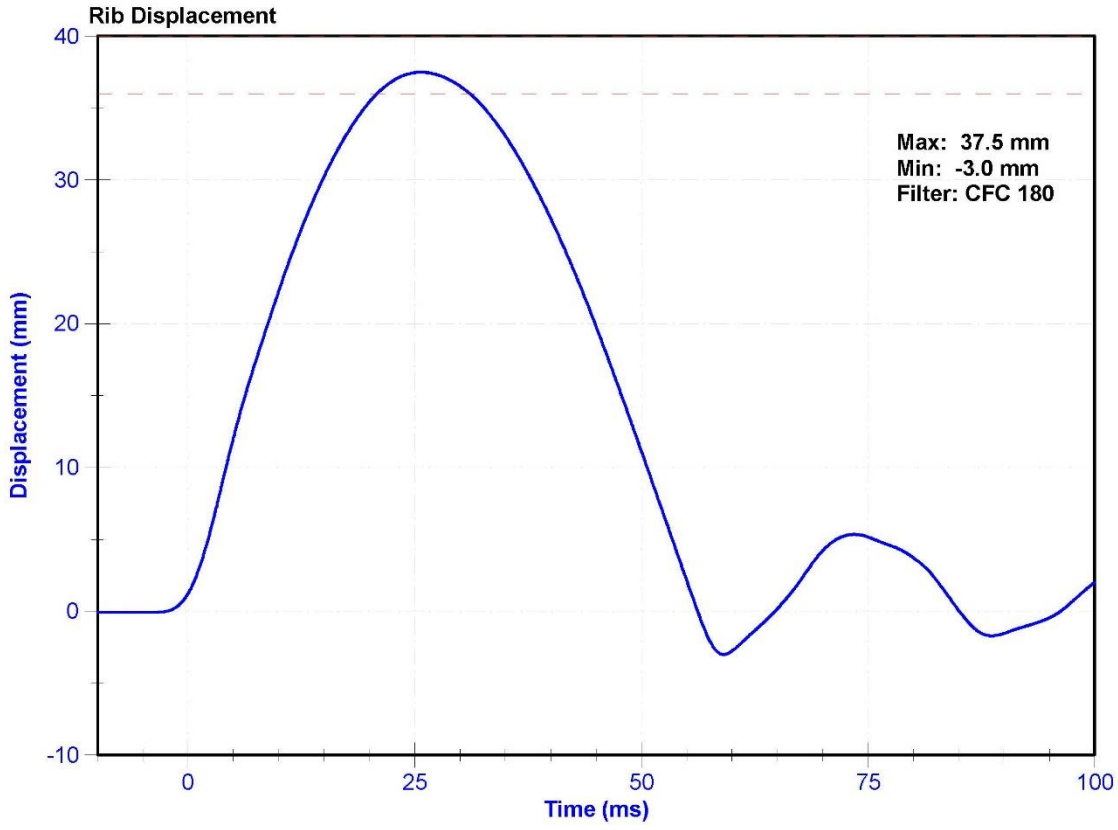
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



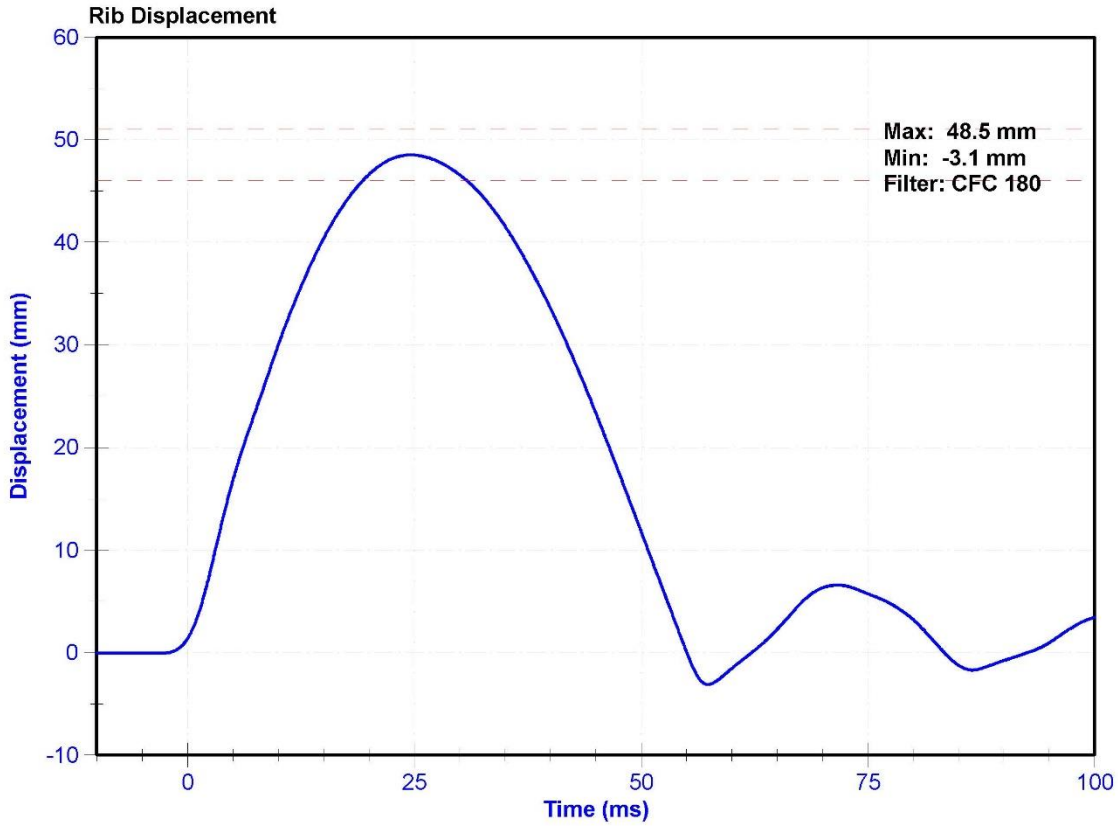
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	46	51	mm	48.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



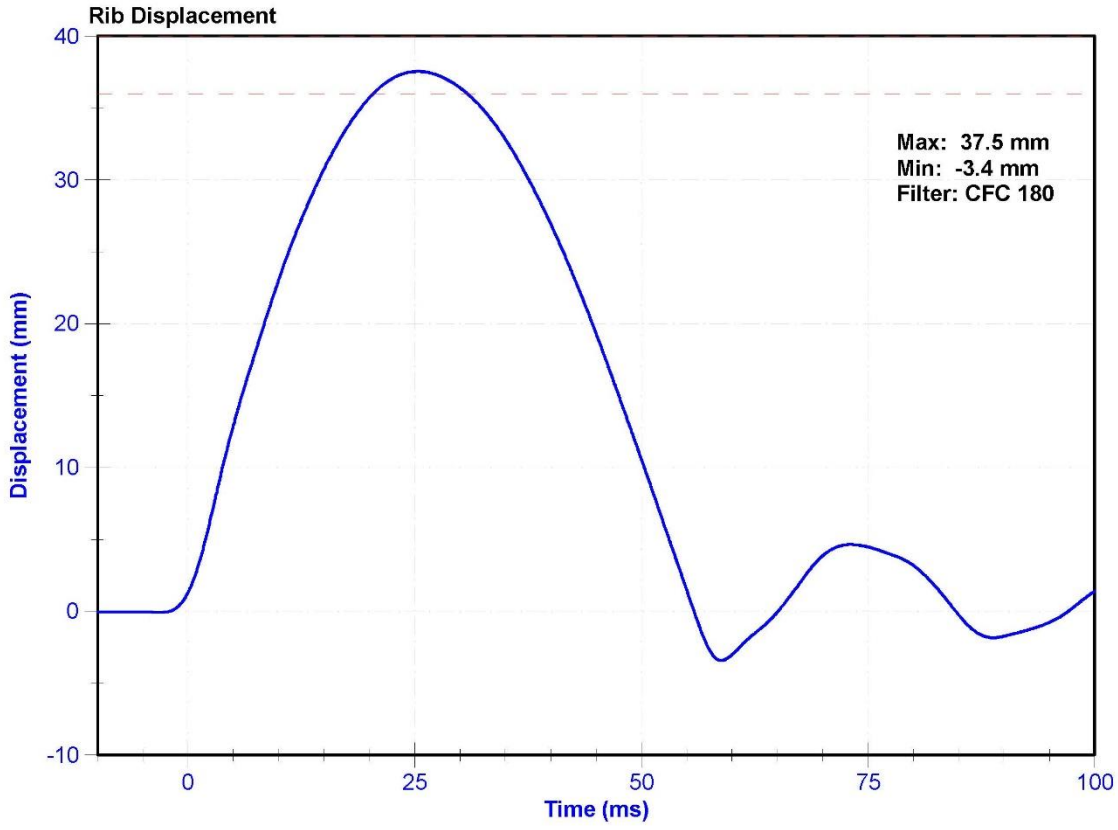
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



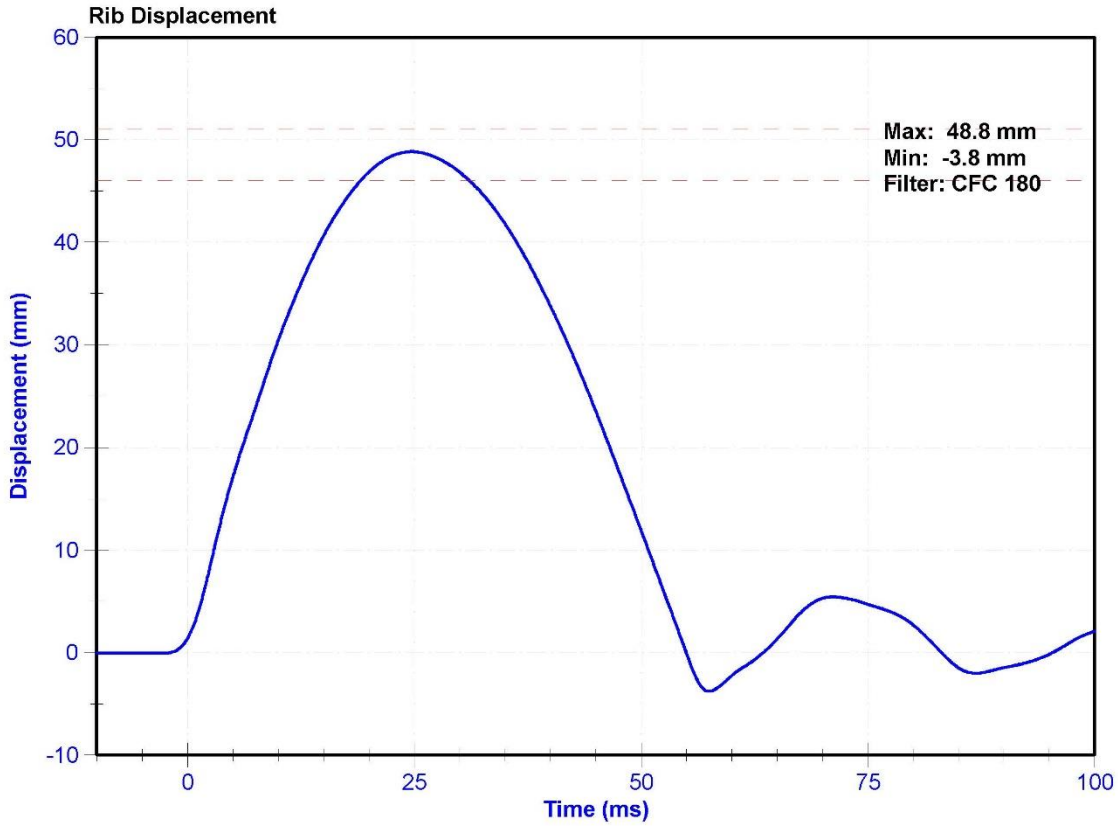
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	46	51	mm	48.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



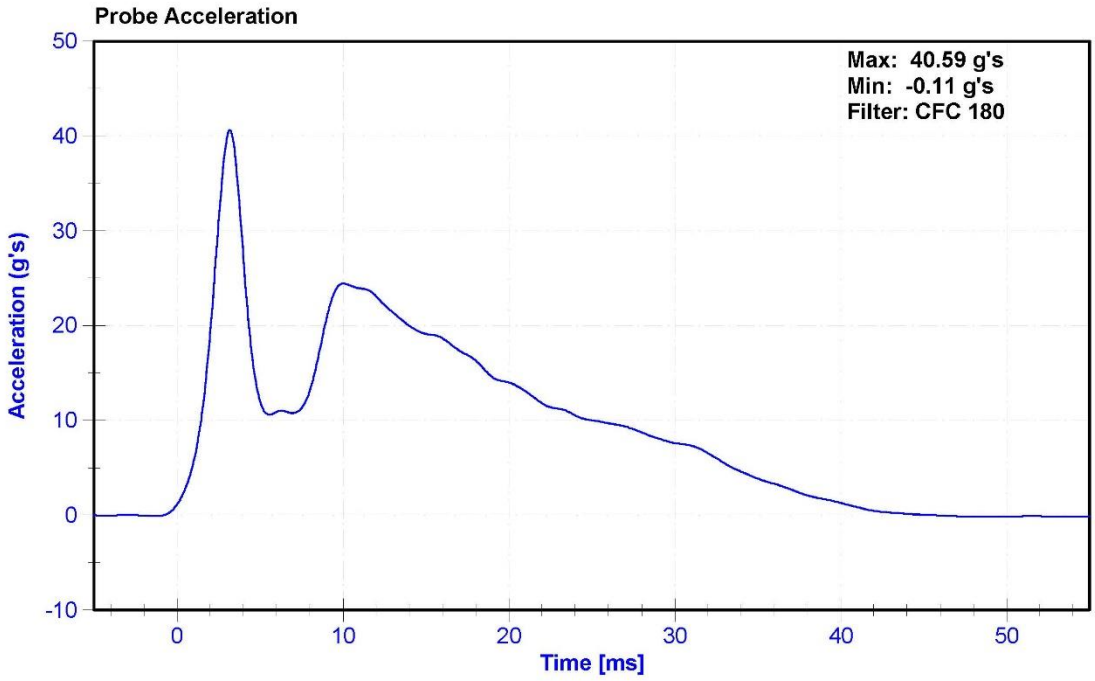
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

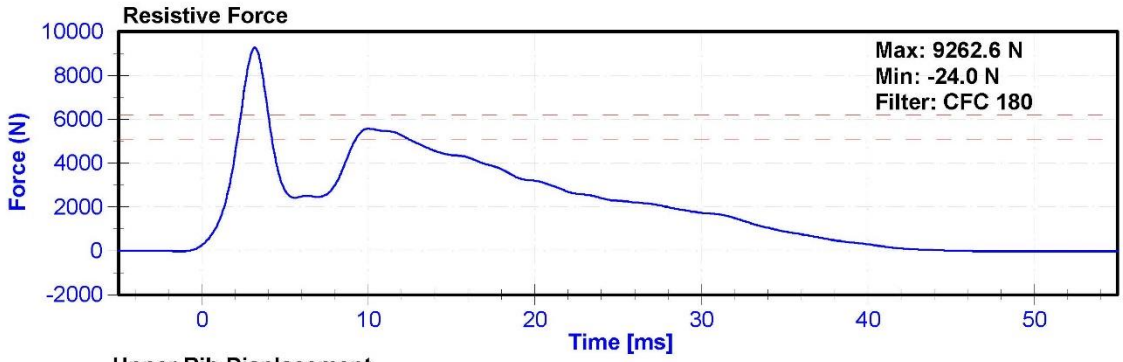
Results

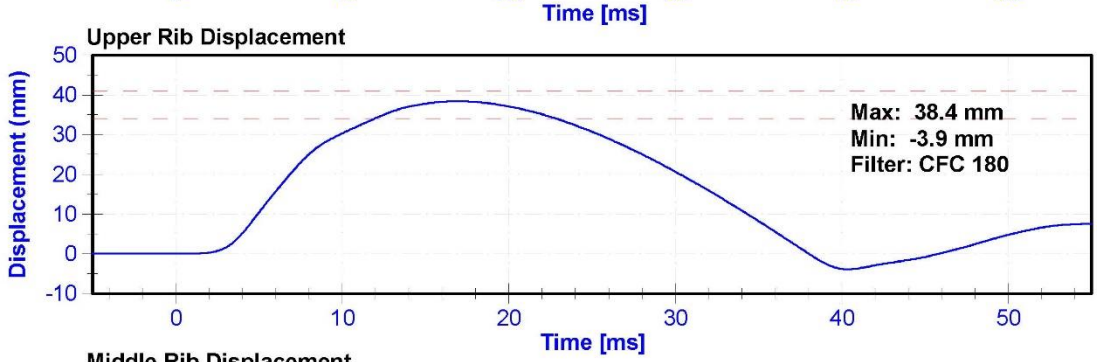
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	43.1	Pass
Velocity	5.4	5.6	m/s	5.60	Pass
Resistive Force after 6ms	5100	6200	N	5577.3	Pass
Upper Thorax Rib Deflection	34	41	mm	38.4	Pass
Mid Thorax Rib Deflection	37	45	mm	42.6	Pass
Lower Thorax Rib Deflection	37	44	mm	41.6	Pass

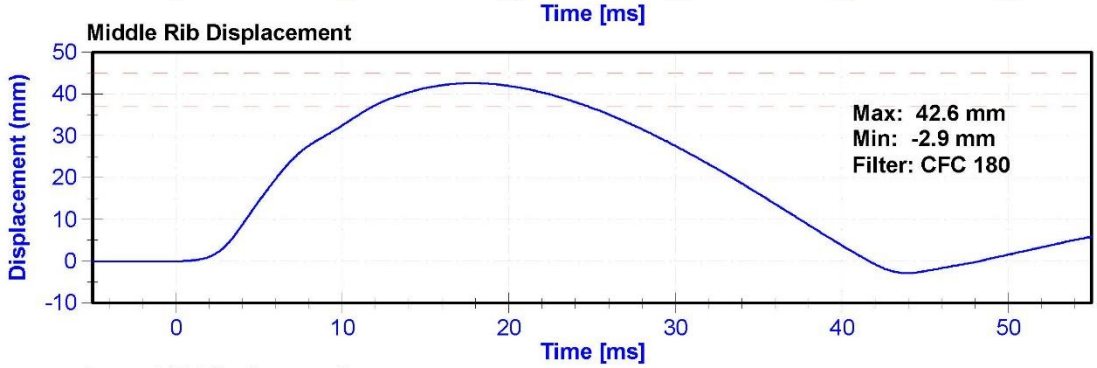
Transducer Calibrations

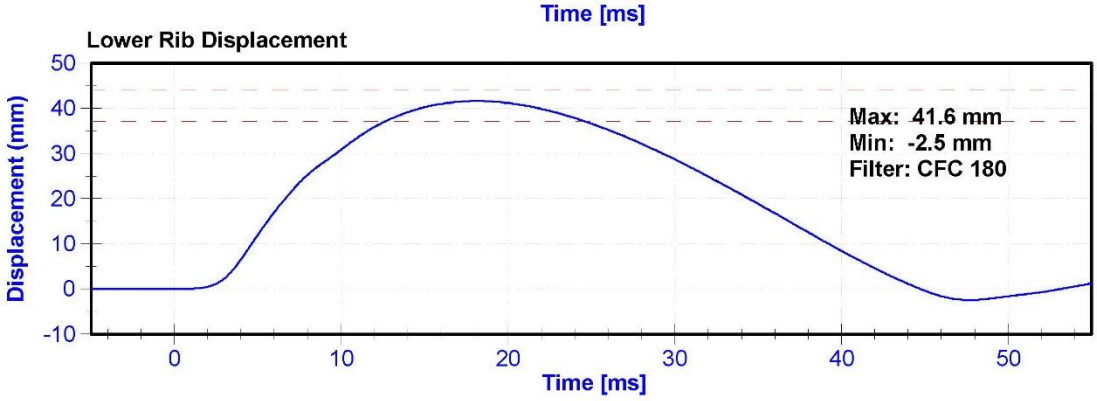
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017




Resistive Force
Max: 9262.6 N
Min: -24.0 N
Filter: CFC 180
Force (N)
10000
8000
6000
4000
2000
0
-2000
0
10
20
30
40
50
Time [ms]


Upper Rib Displacement
Max: 38.4 mm
Min: -3.9 mm
Filter: CFC 180
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]


Middle Rib Displacement
Max: 42.6 mm
Min: -2.9 mm
Filter: CFC 180
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]


Lower Rib Displacement
Max: 41.6 mm
Min: -2.5 mm
Filter: CFC 180
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]

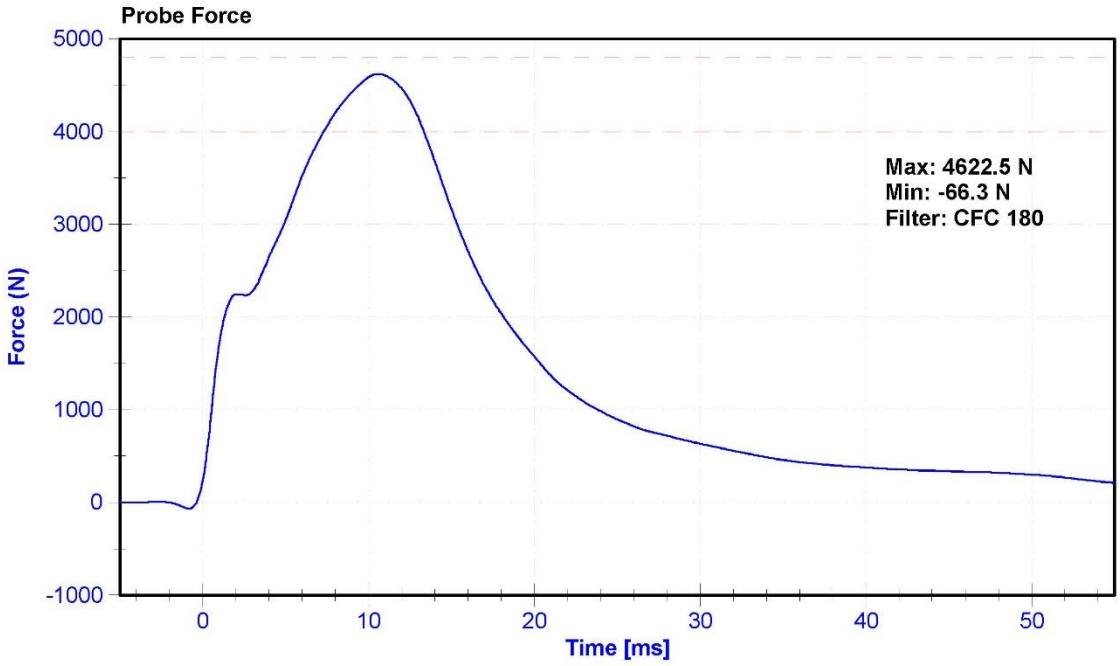
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

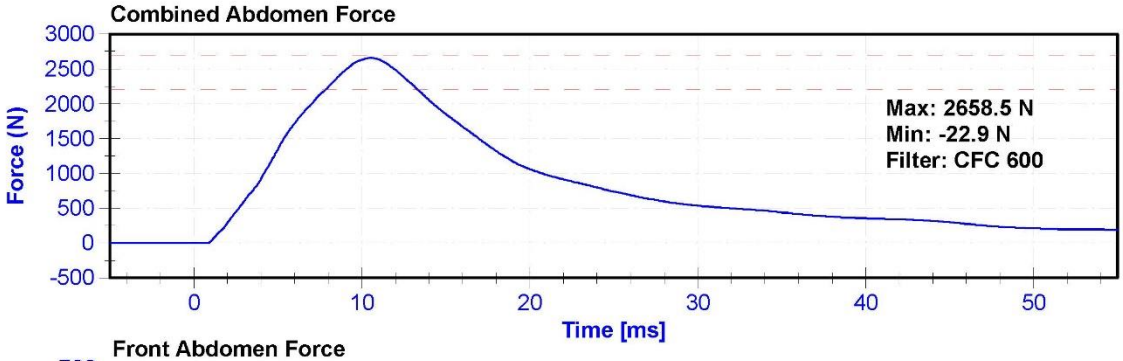
Results

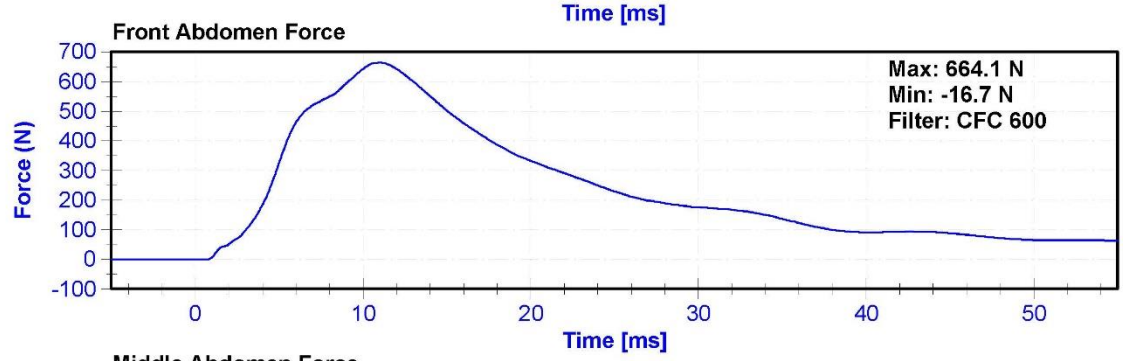
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	42.2	Pass
Velocity	3.9	4.1	m/s	4.06	Pass
Combined Abdomen Force	2200	2700	N	2658.5	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.50	Pass
Resistive Probe Force	4000	4800	N	4622.5	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.60	Pass

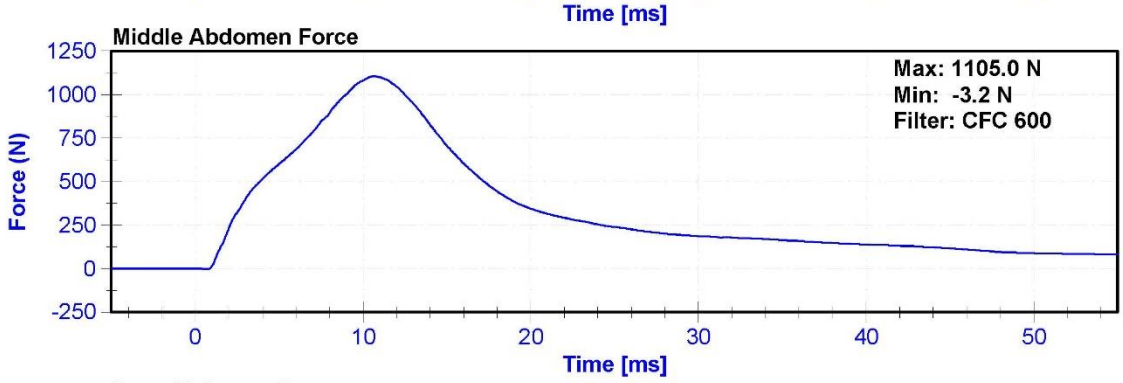
Transducer Calibrations

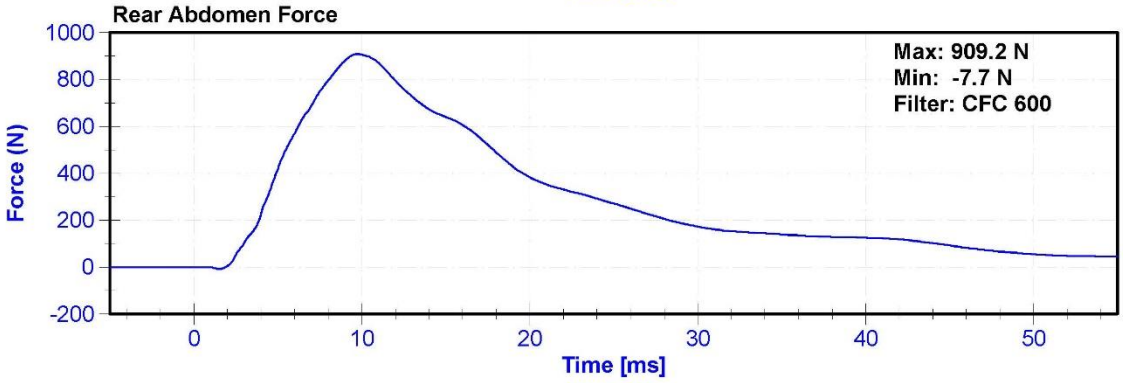
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Front Abdomen Load Cell	DENTON 2631	LC-1512	5/24/2016	5/24/2017
Middle Abdomen Load Cell	DENTON 2631	LC-1526	5/24/2016	5/24/2017
Rear Abdomen Load Cell	DENTON 2631	LC-1516	5/24/2016	5/24/2017




Combined Abdomen Force
Force (N)
3000
2500
2000
1500
1000
500
0
-500
0
10
20
30
40
50
Time [ms]
Max: 2658.5 N
Min: -22.9 N
Filter: CFC 600


Front Abdomen Force
Force (N)
700
600
500
400
300
200
100
0
-100
0
10
20
30
40
50
Time [ms]
Max: 664.1 N
Min: -16.7 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
1250
1000
750
500
250
0
-250
0
10
20
30
40
50
Time [ms]
Max: 1105.0 N
Min: -3.2 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
1000
800
600
400
200
0
-200
0
10
20
30
40
50
Time [ms]
Max: 909.2 N
Min: -7.7 N
Filter: CFC 600

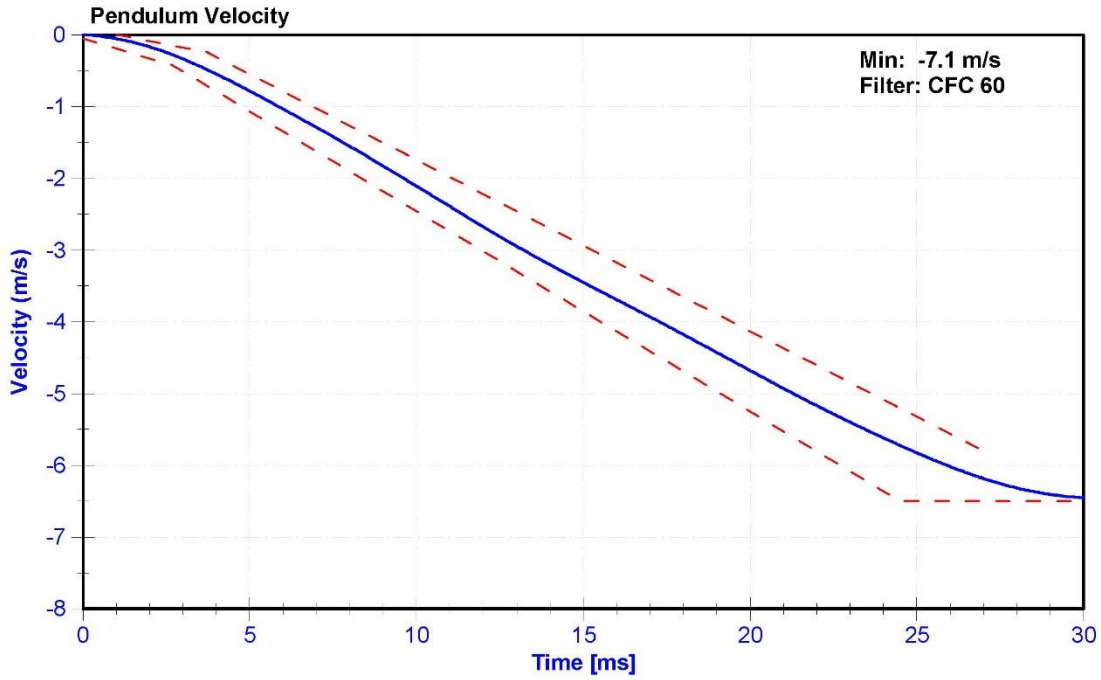
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

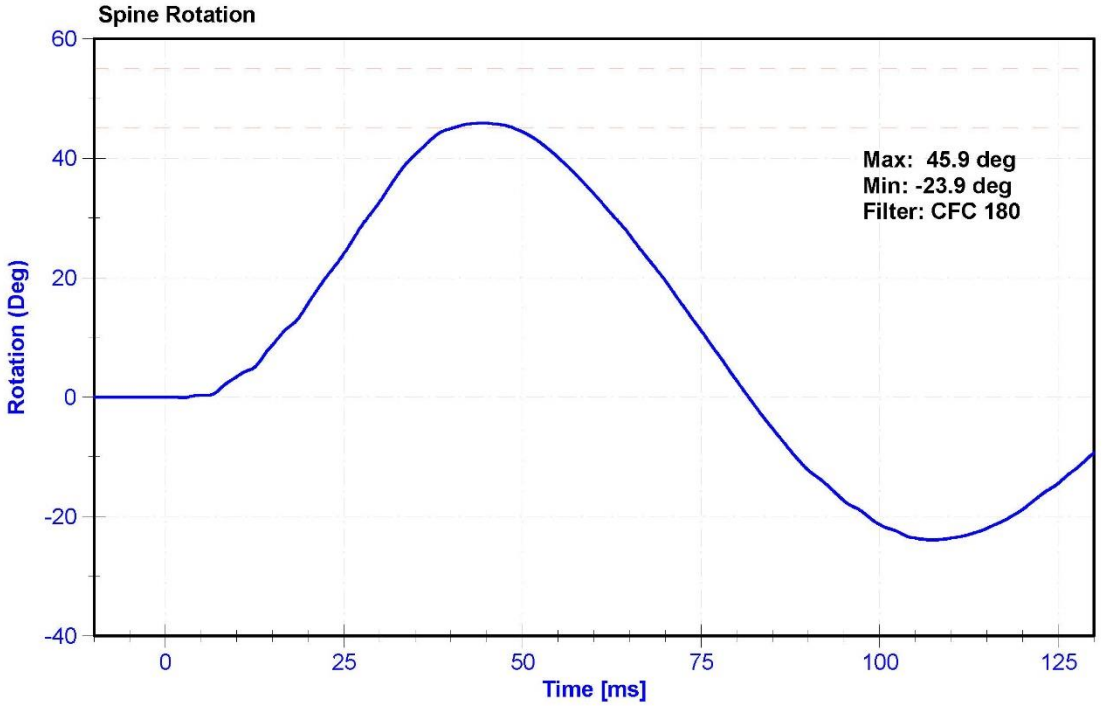
Results

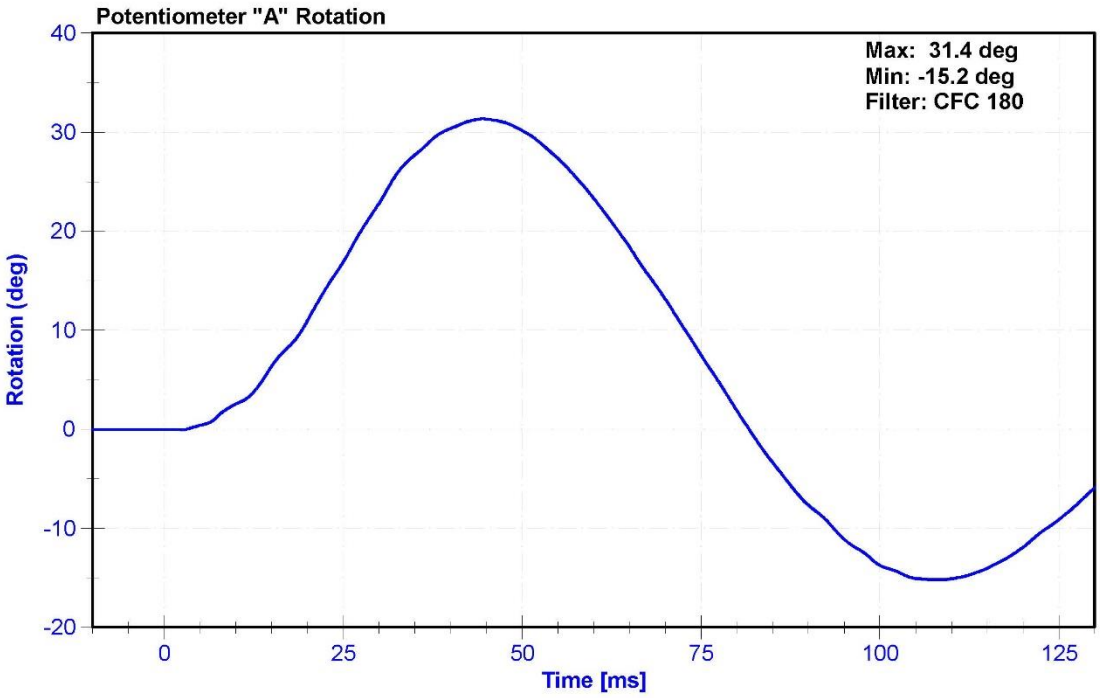
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	33.7	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	45.9	Pass
Time at Maximum Rotation	39	53	ms	44.5	Pass
Time of Decay to Zero Degrees	37	57	ms	37.2	Pass
Pulse within Corridor?	-	-	-		

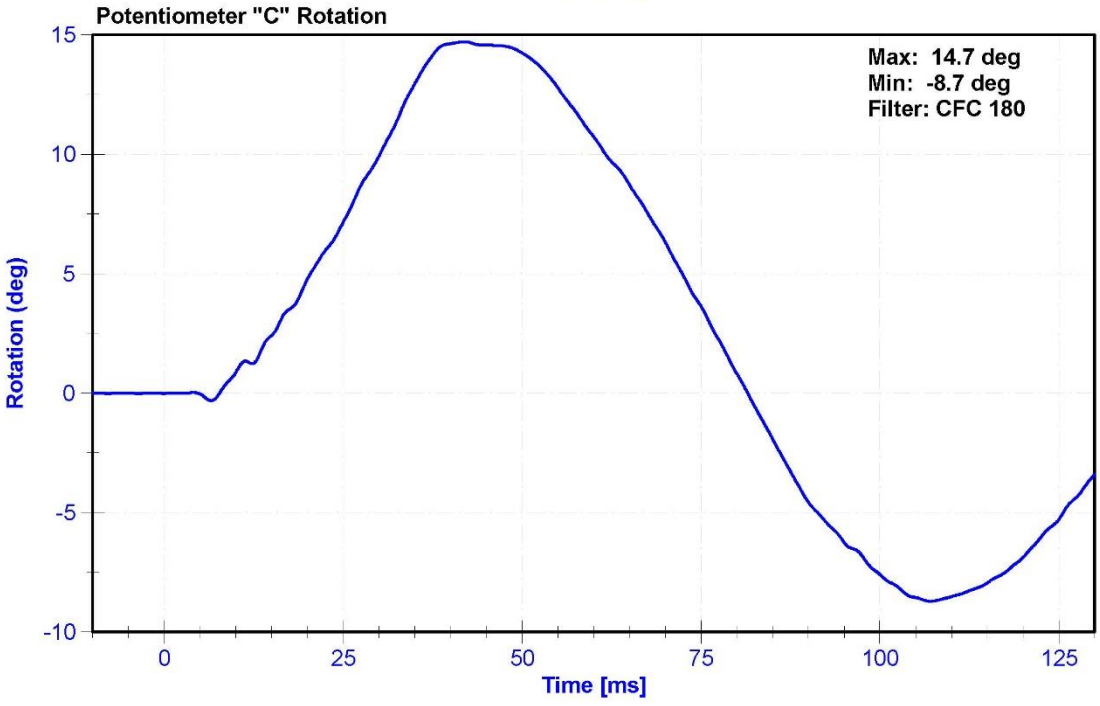
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum "A" Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Condyle "B" Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017


Pendulum Velocity
Min: -7.1 m/s
Filter: CFC 60
Velocity (m/s)
0
-1
-2
-3
-4
-5
-6
-7
-8
0
5
10
15
20
25
30
Time [ms]


Spine Rotation
Max: 45.9 deg
Min: -23.9 deg
Filter: CFC 180
Rotation (Deg)
60
40
20
0
-20
-40
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 31.4 deg
Min: -15.2 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]


Potentiometer "C" Rotation
Max: 14.7 deg
Min: -8.7 deg
Filter: CFC 180
Rotation (deg)
15
10
5
0
-5
-10
0
25
50
75
100
125
Time [ms]

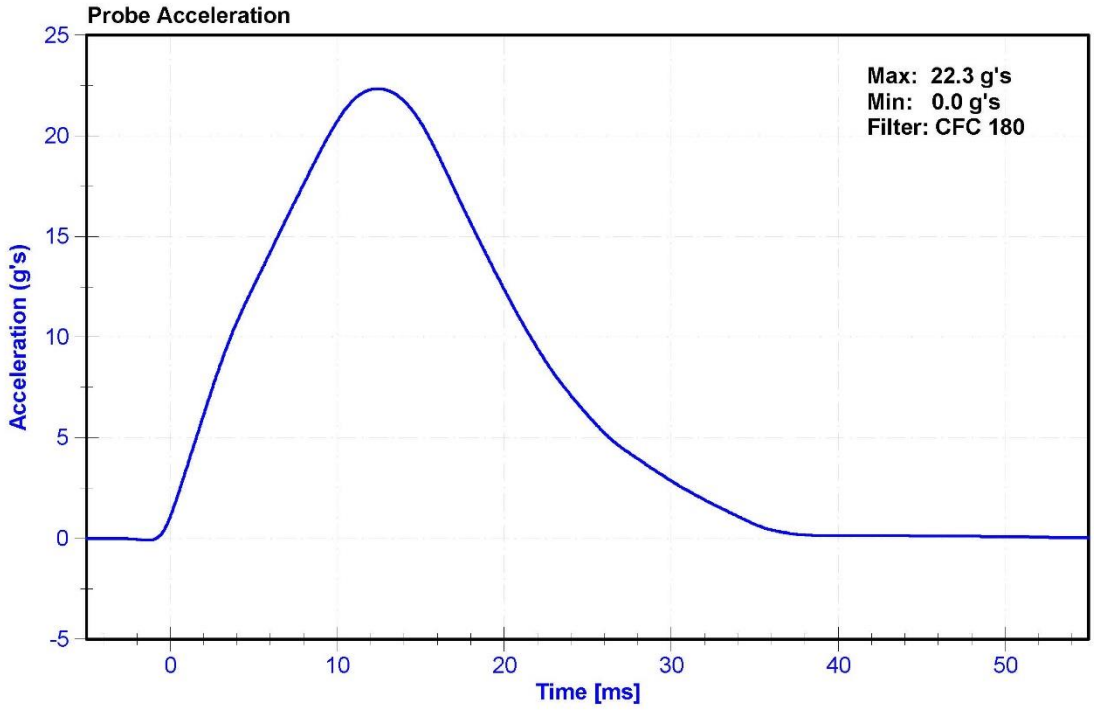
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

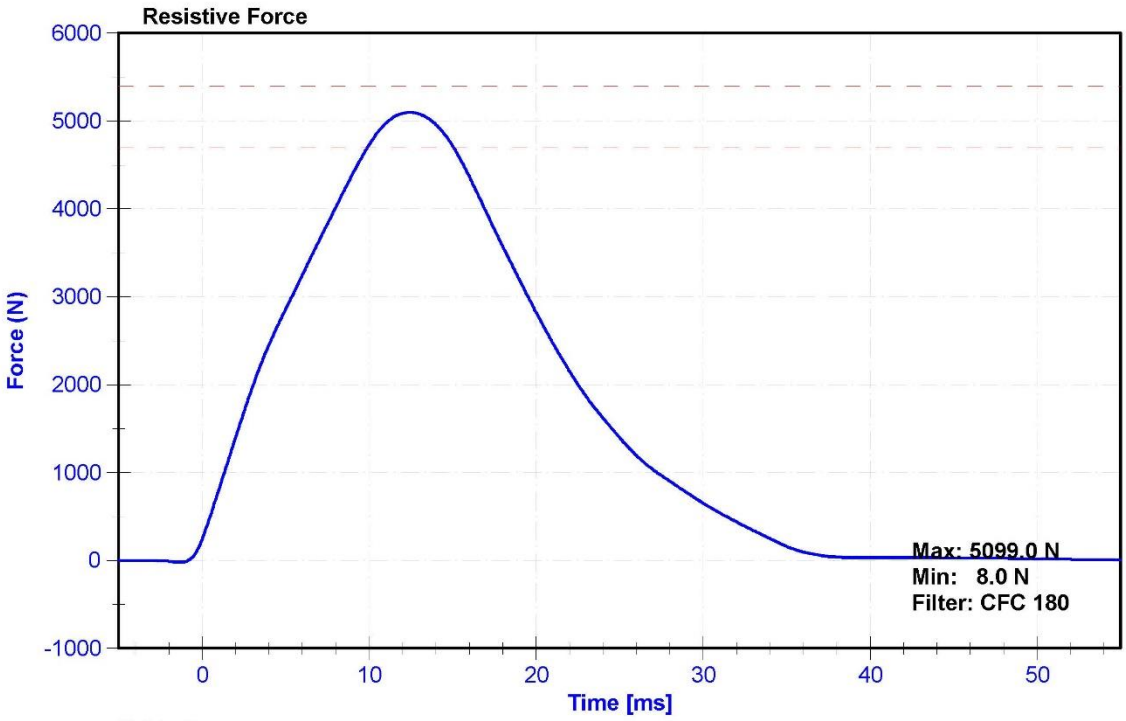
Results

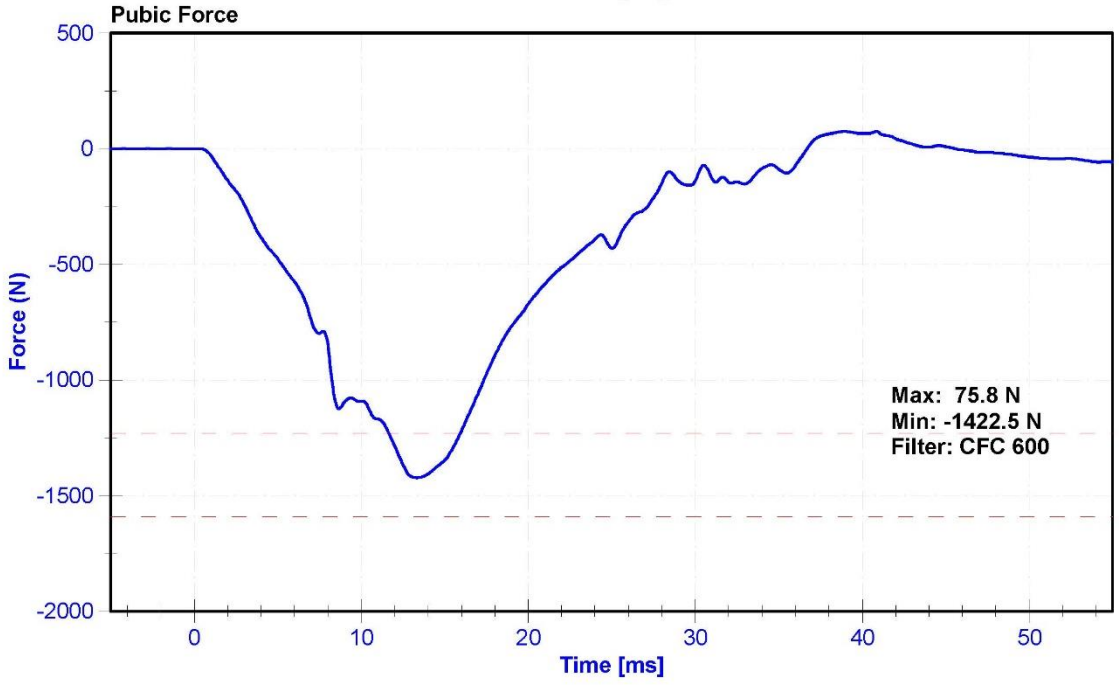
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	43.2	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Resistive Force	4700	5400	N	5099.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.45	Pass
Pubic Force	-1590	-1230	N	-1422.5	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.35	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/24/2016	5/24/2017




Resistive Force
Force (N)
Time [ms]
Max: 5099.0 N
Min: 8.0 N
Filter: CFC 180


Pubic Force
Force (N)
Time [ms]
Max: 75.8 N
Min: -1422.5 N
Filter: CFC 600

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

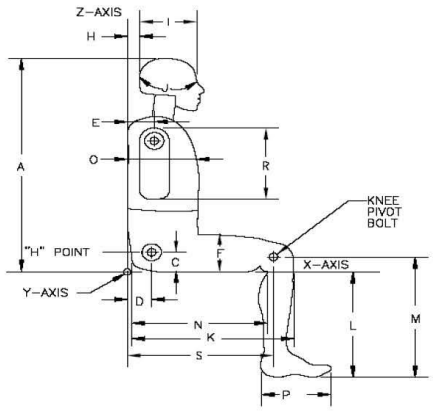
SERIAL No: DG8012

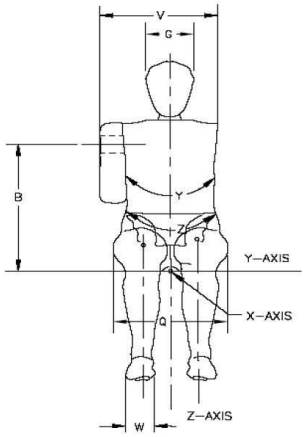
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: MKG Date: 1/10/2017

Dummy Serial Number: DG8012





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	128	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	184	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	352	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	429	Pass
O	Chest Depth w/o jacket	195	211	204	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	347	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	861	Pass
Z	Waist Circumference	761	791	771	Pass

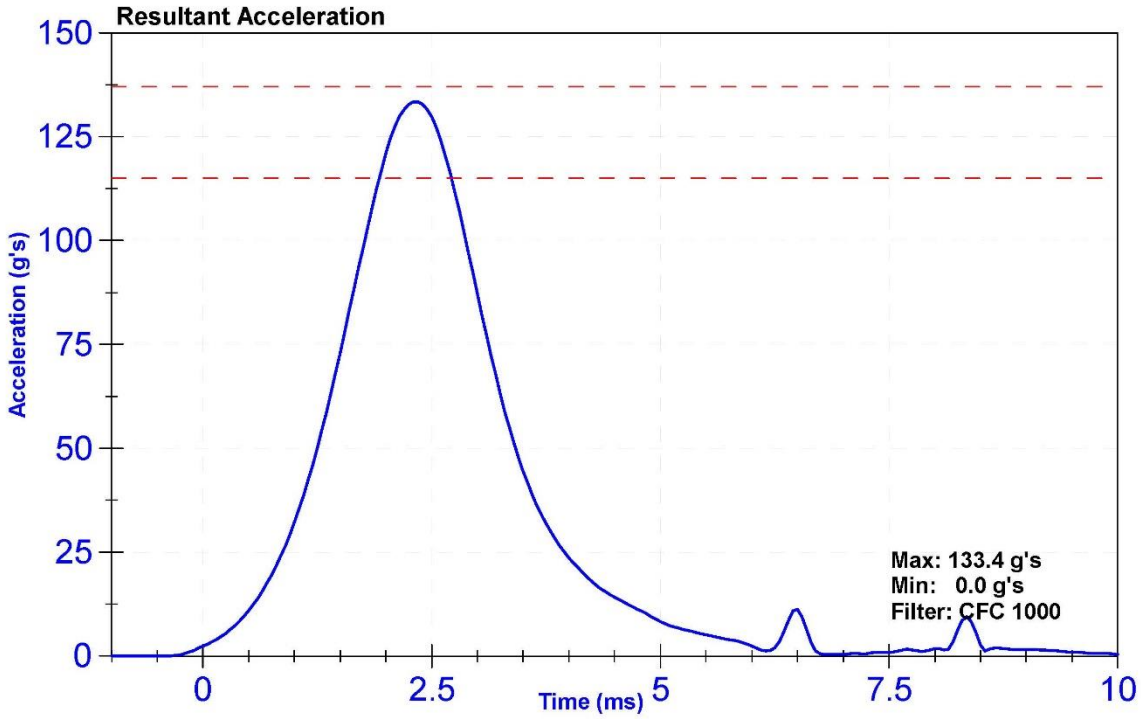
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

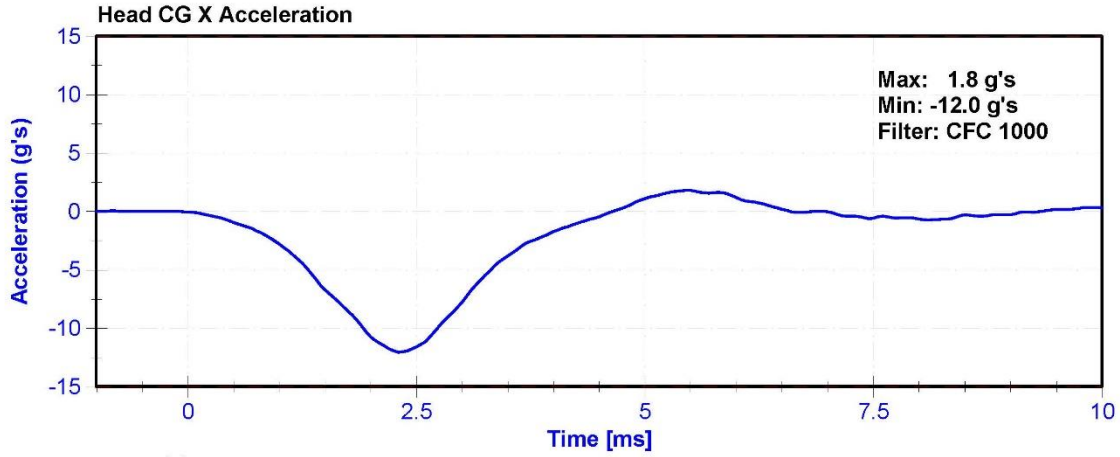
Results

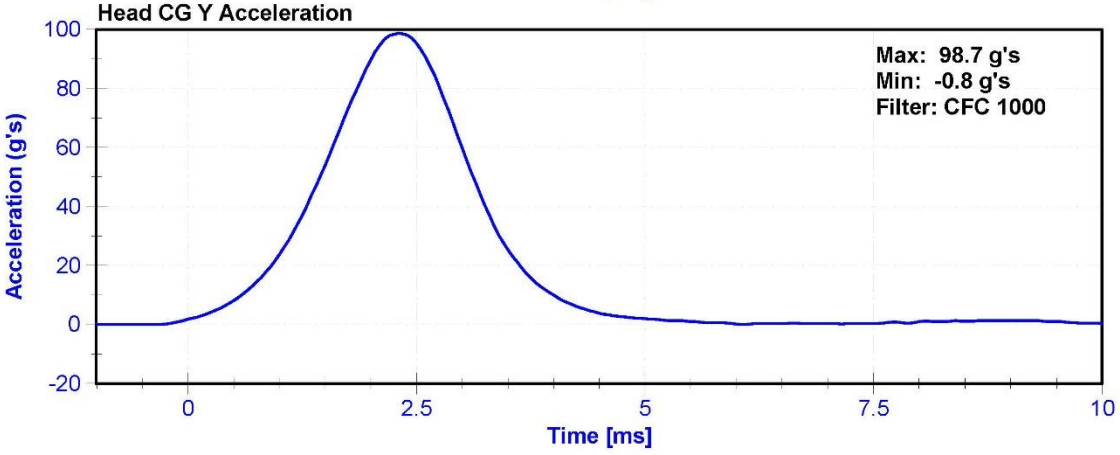
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	32.7	Pass
Resultant Acceleration	115	137	g's	133.4	Pass
Oscillation	0	15	%	8.4	Pass
Fore-Aft Acceleration	-15	15	g's	-12.0	Pass

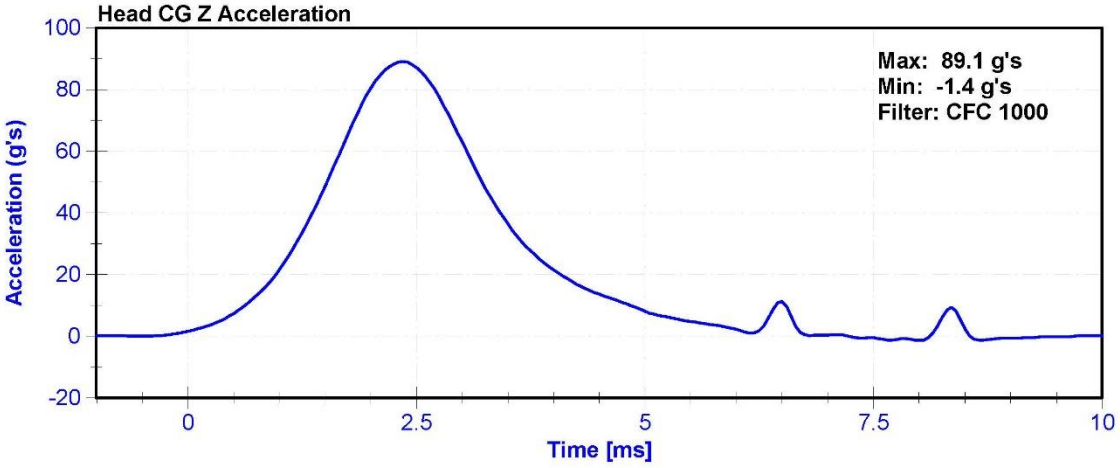
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	9/30/2016	3/31/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	9/30/2016	3/31/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	9/30/2016	3/31/2017




Head CG X Acceleration
Max: 1.8 g's
Min: -12.0 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 98.7 g's
Min: -0.8 g's
Filter: CFC 1000
Acceleration (g's)
100
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 89.1 g's
Min: -1.4 g's
Filter: CFC 1000
Acceleration (g's)
100
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]

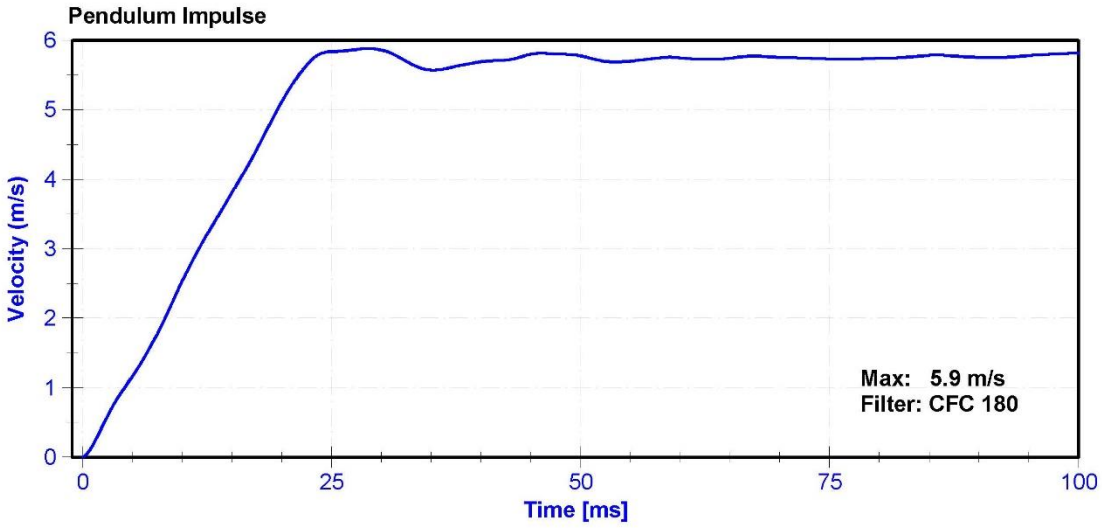
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

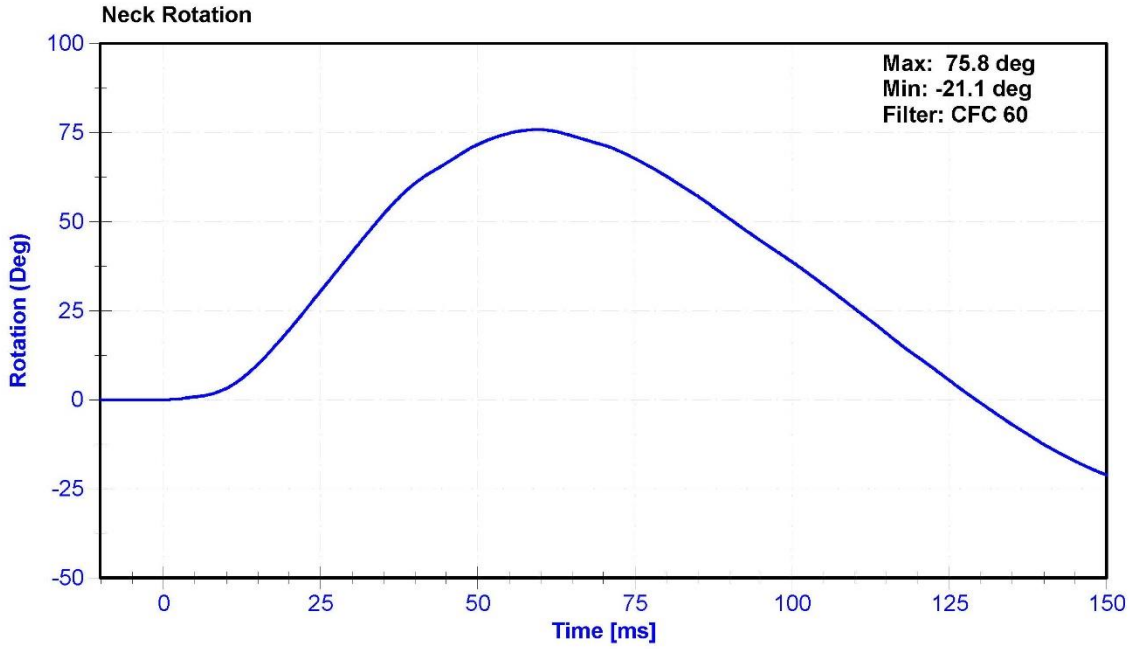
Results

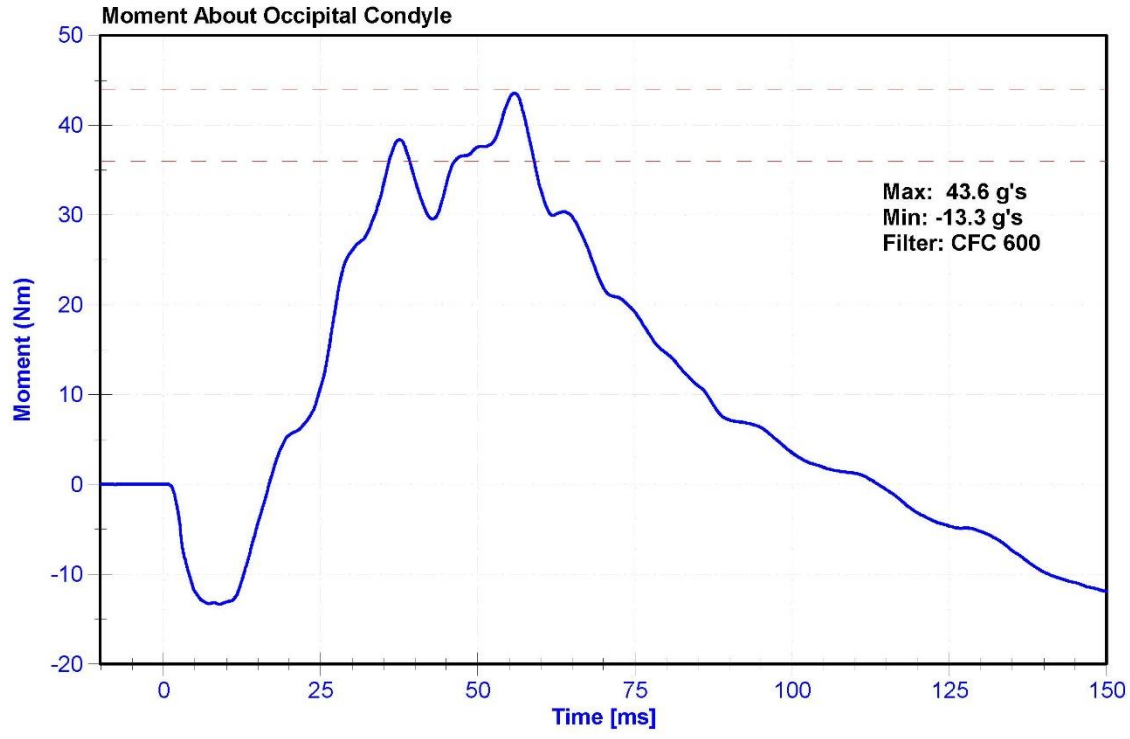
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	32.9	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.53	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.81	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	5.12	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.84	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.88	Pass
Neck Rotation	71	81	deg	75.8	Pass
Time at Maximum Rotation	50	70	ms	59.5	Pass
Moment about the OC	36	44	Nm	43.6	Pass
Moment Decay to 0 Nm	102	126	ms	113.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/12/2016	10/12/2017
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/12/2016	10/12/2017
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017




Neck Rotation
Max: 75.8 deg
Min: -21.1 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 43.6 g's
Min: -13.3 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

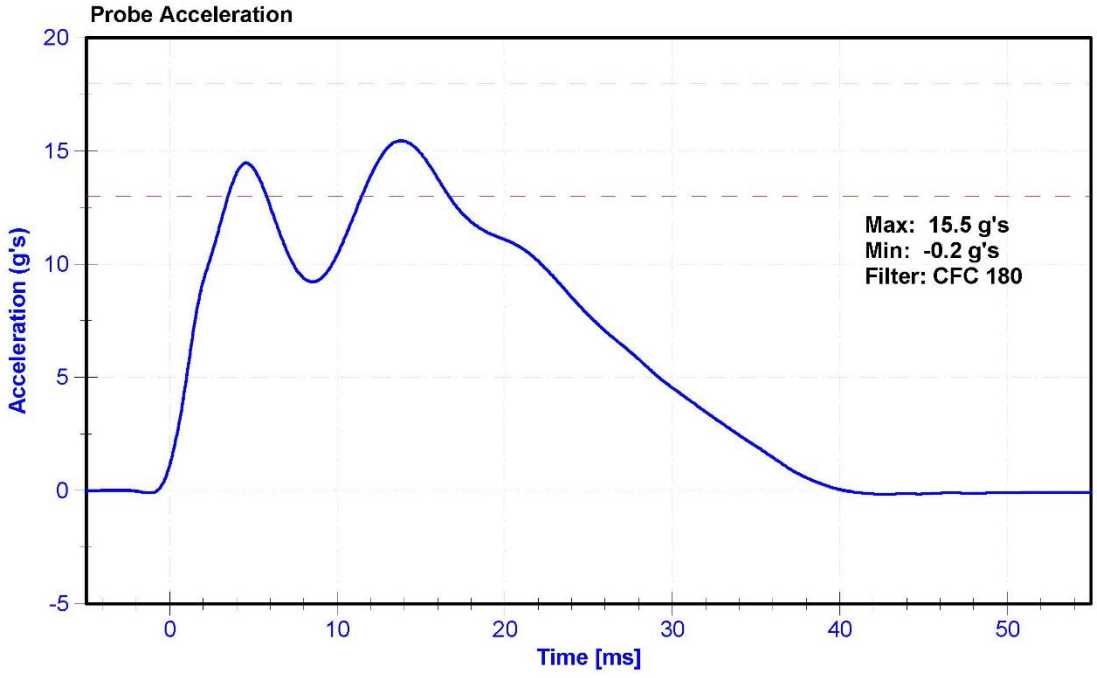
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

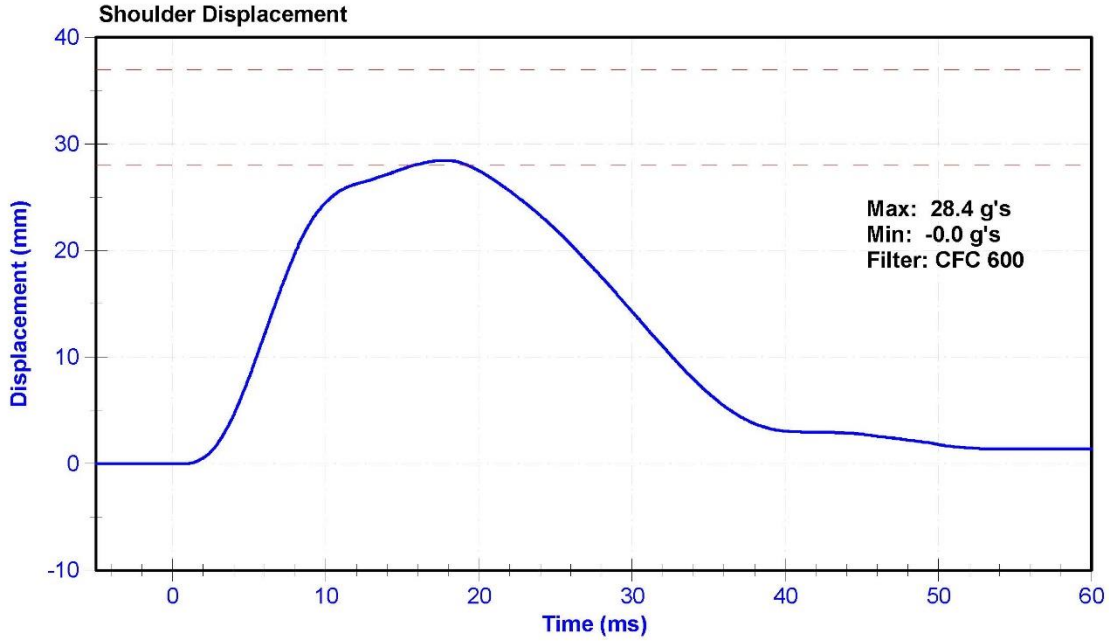
Results

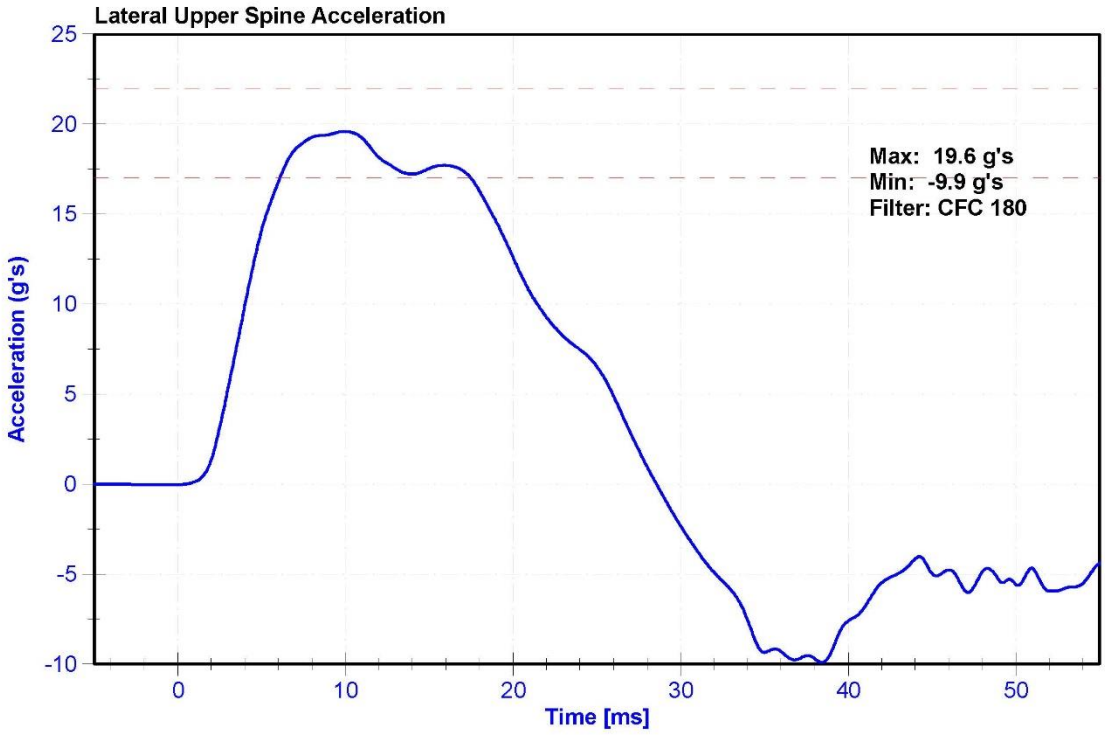
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	30.7	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	15.5	Pass
Shoulder Deflection	28	37	mm	28.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 28.4 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.6 g's
Min: -9.9 g's
Filter: CFC 180

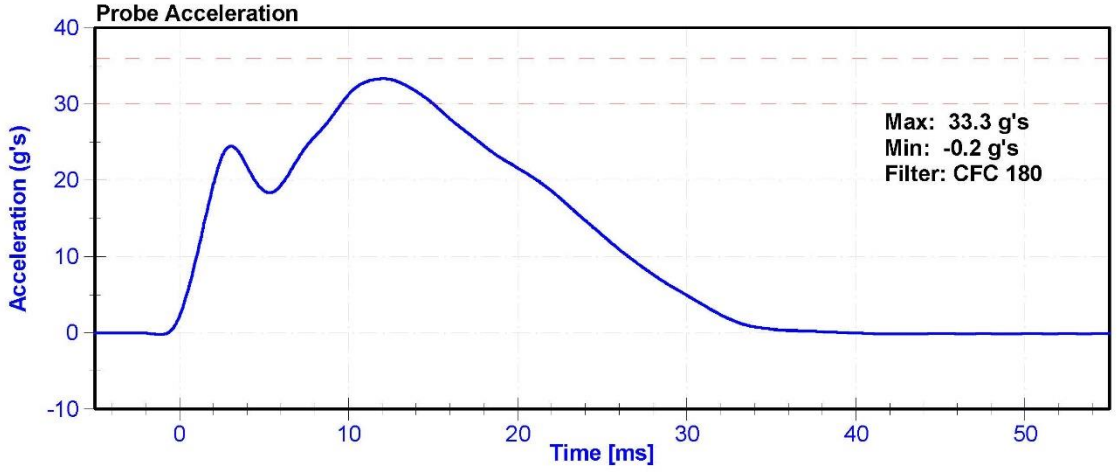
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

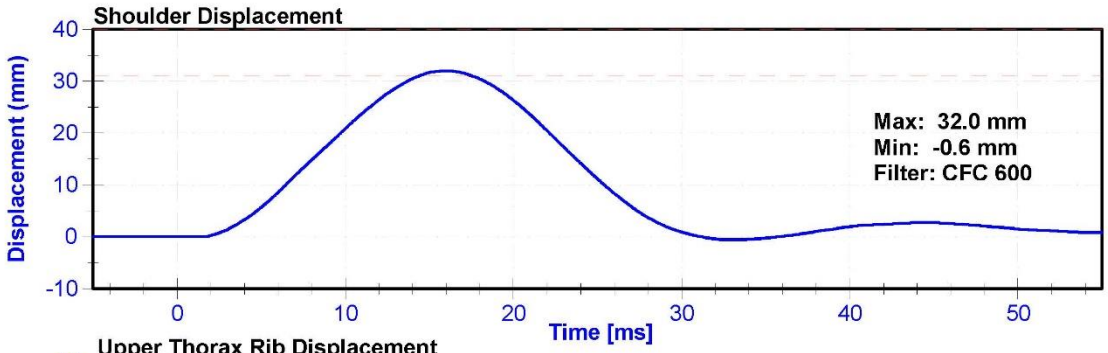
Results

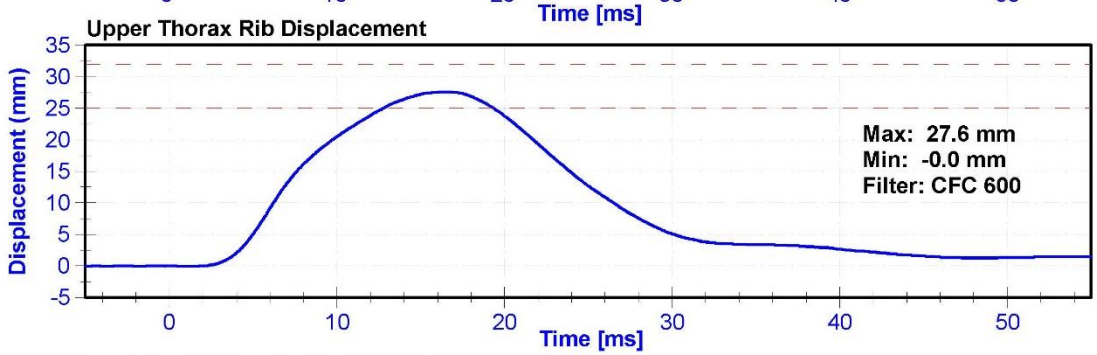
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	41.7	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	33.3	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.0	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.5	Pass
Shoulder Deflection	31	40	mm	32.0	Pass
Upper Thorax Rib Deflection	25	32	mm	27.6	Pass
Mid Thorax Rib Deflection	30	36	mm	32.5	Pass
Lower Thorax Rib Deflection	32	38	mm	34.1	Pass

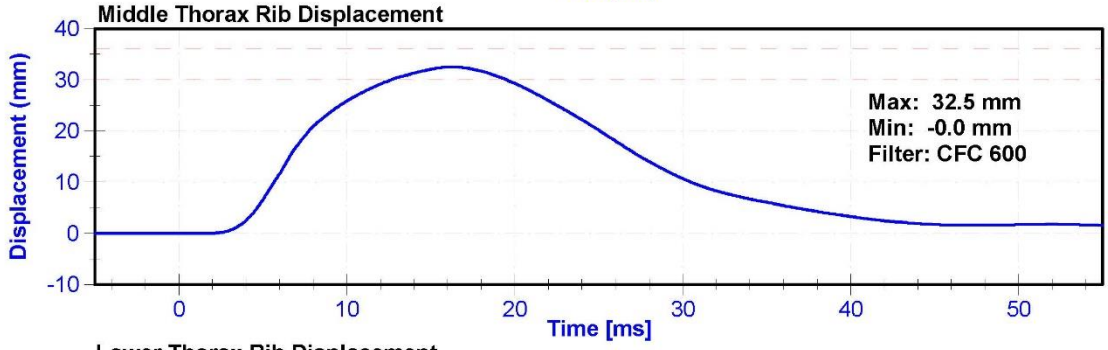
Transducer Calibrations

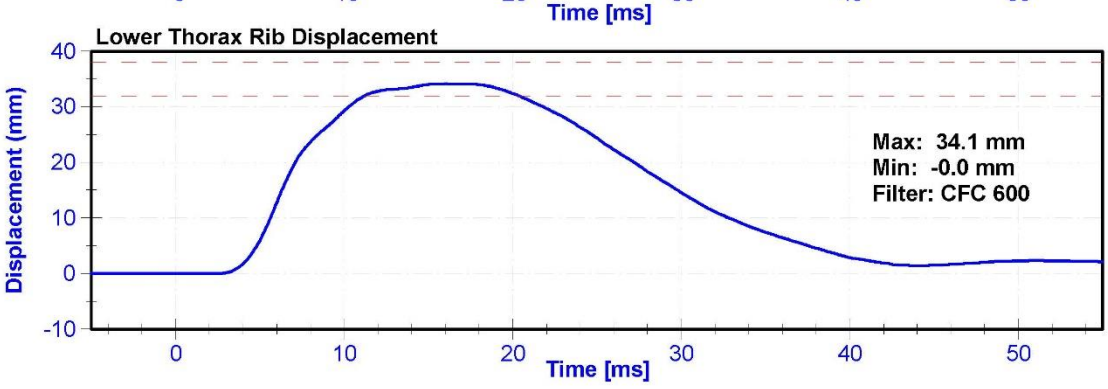
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

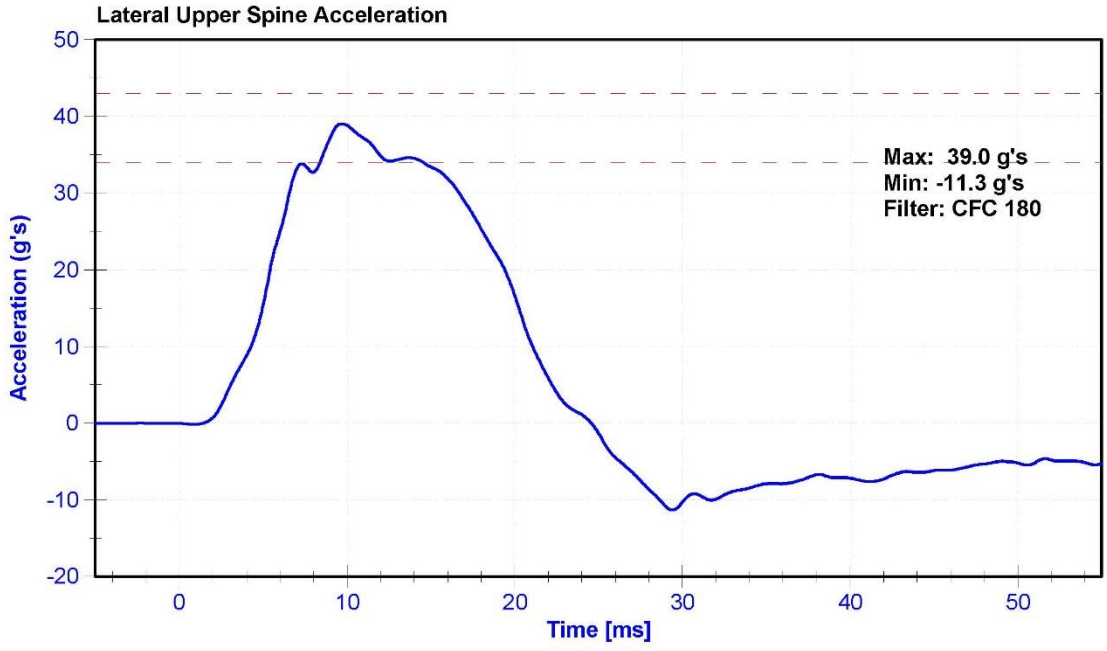


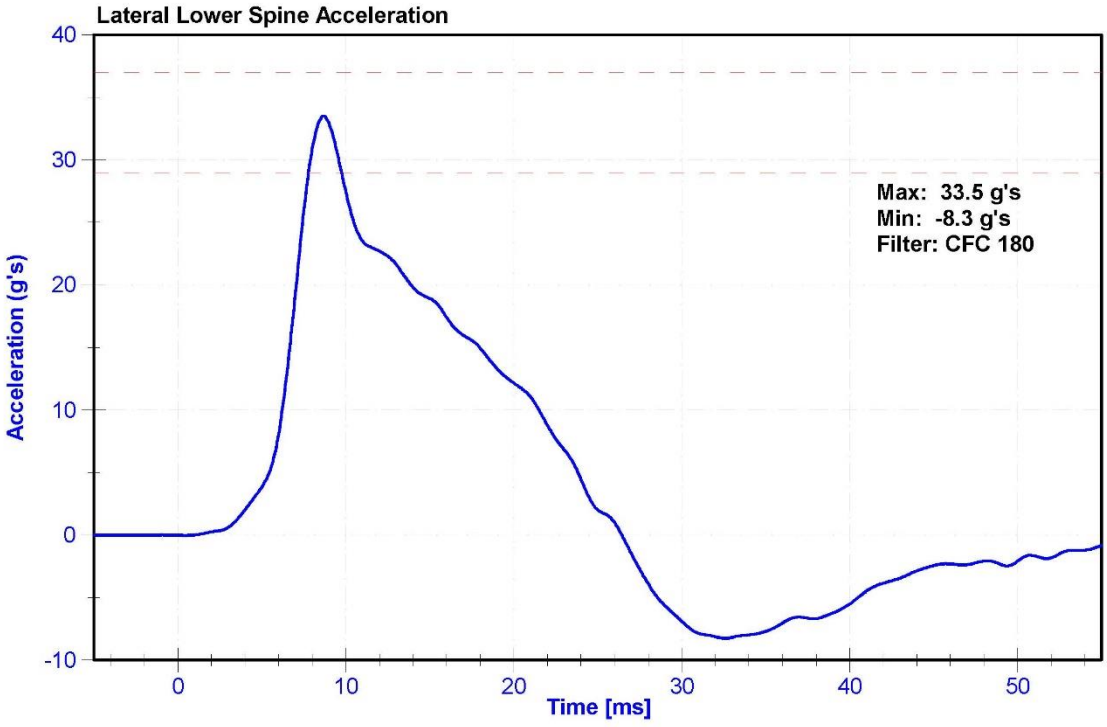

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 32.0 mm
Min: -0.6 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.6 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.5 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.1 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 39.0 g's
Min: -11.3 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 33.5 g's
Min: -8.3 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

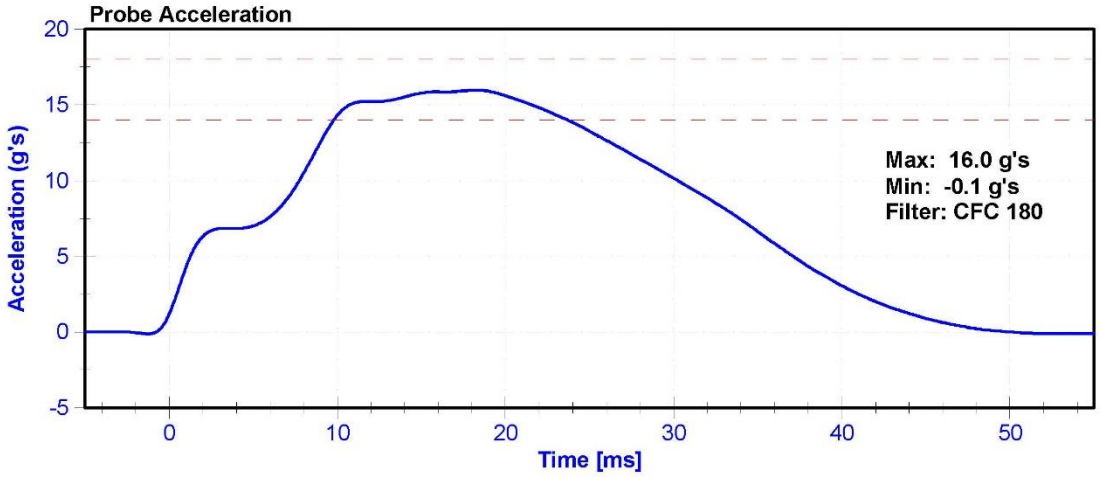
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

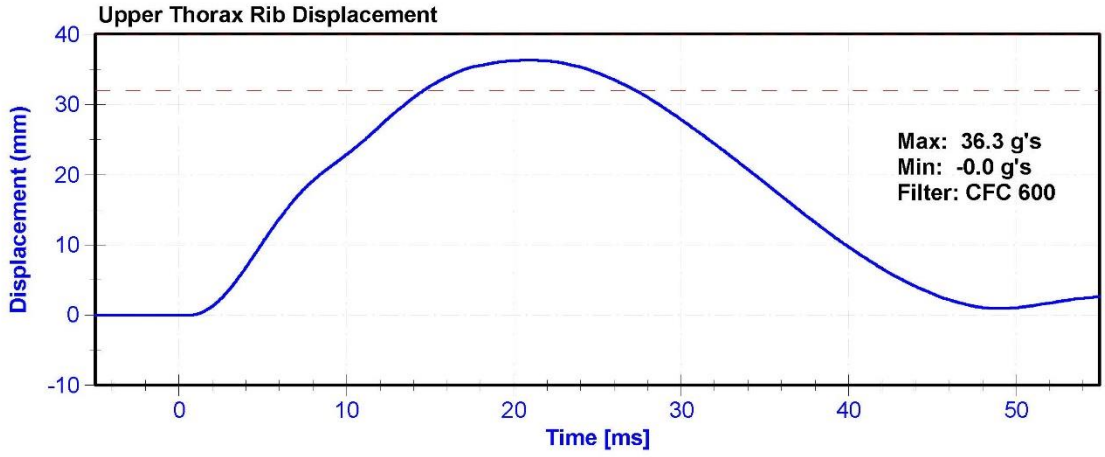
Results

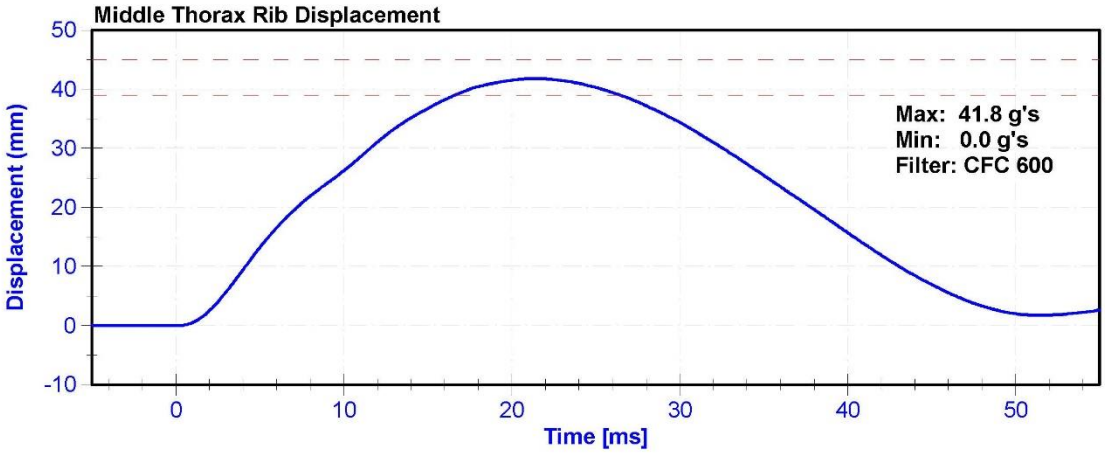
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	30.4	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	14	18	g's	16.0	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.2	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.7	Pass
Upper Thorax Rib Deflection	32	40	mm	36.3	Pass
Middle Thorax Rib Deflection	39	45	mm	41.8	Pass
Lower Thorax Rib Deflection	35	43	mm	38.2	Pass

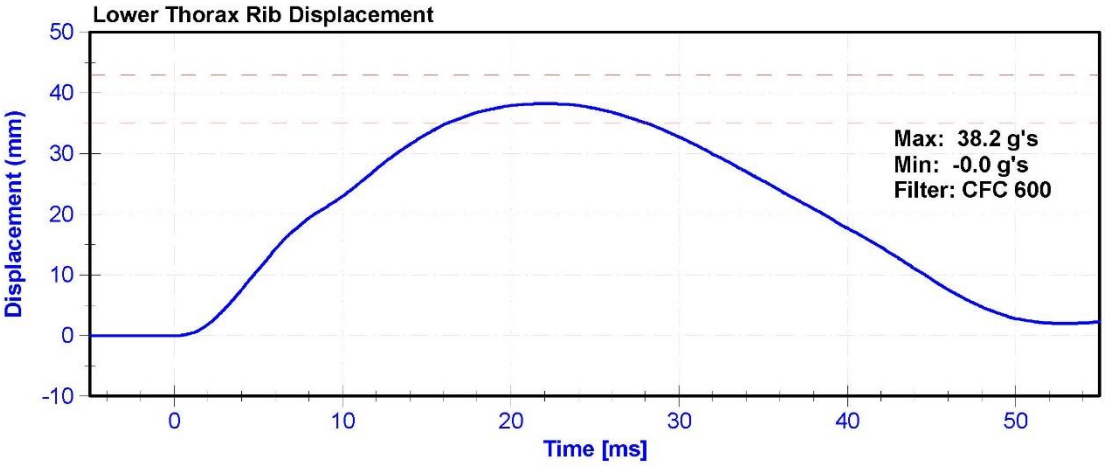
Transducer Calibrations

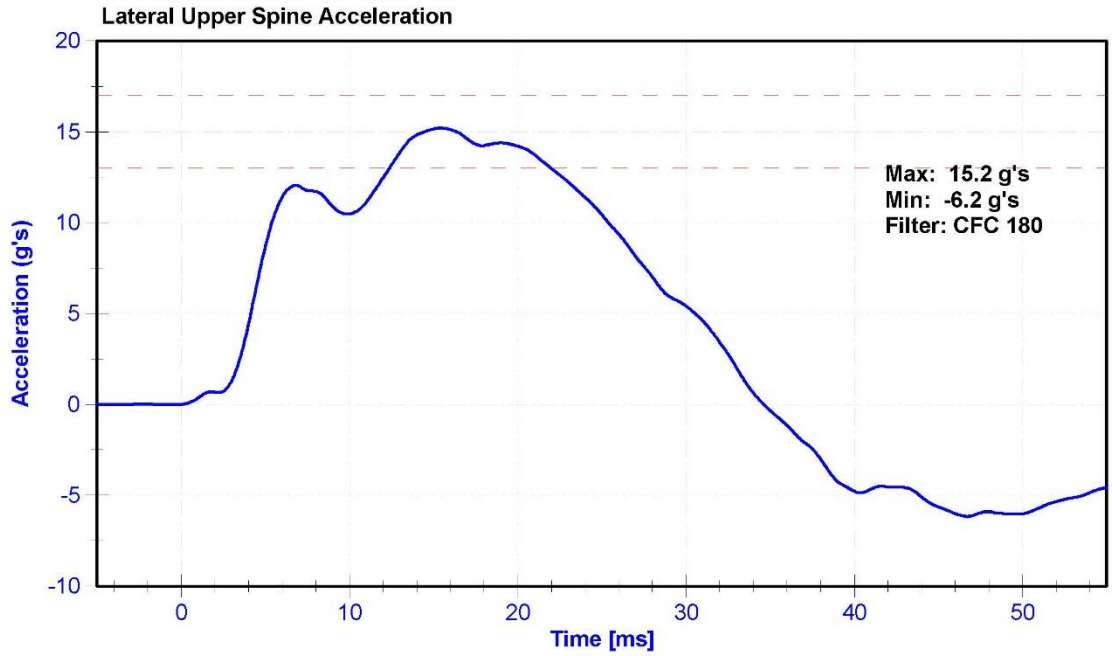
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

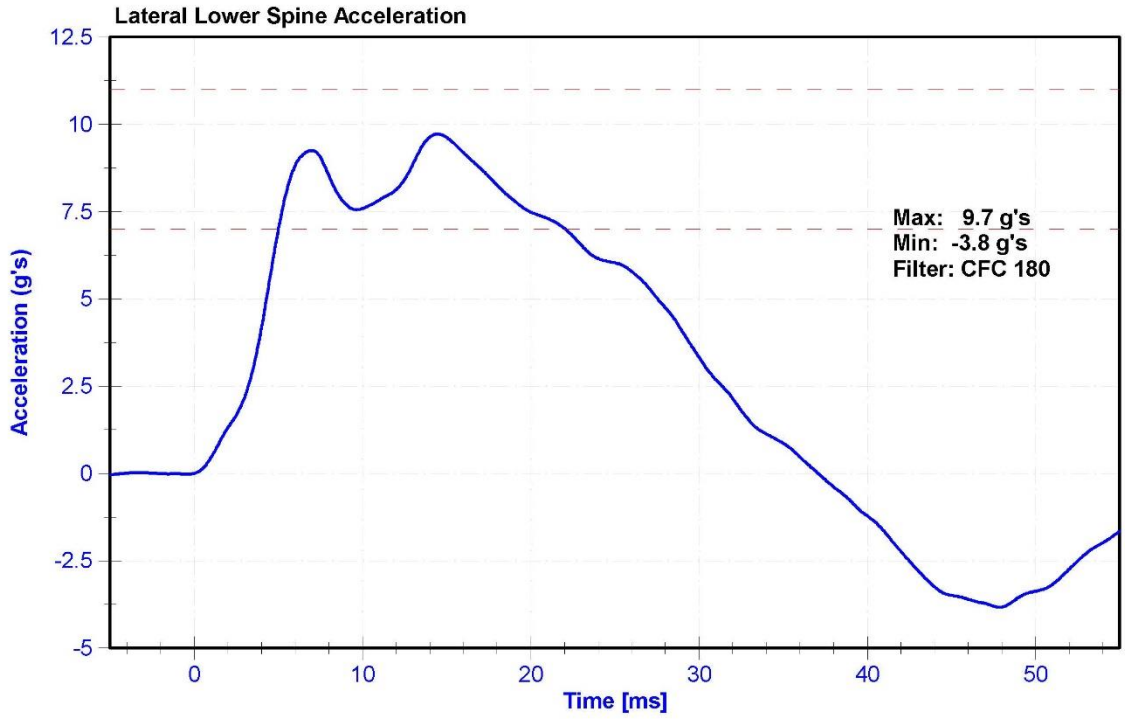



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.3 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.8 g's
Min: 0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.2 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 15.2 g's
Min: -6.2 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 9.7 g's
Min: -3.8 g's
Filter: CFC 180

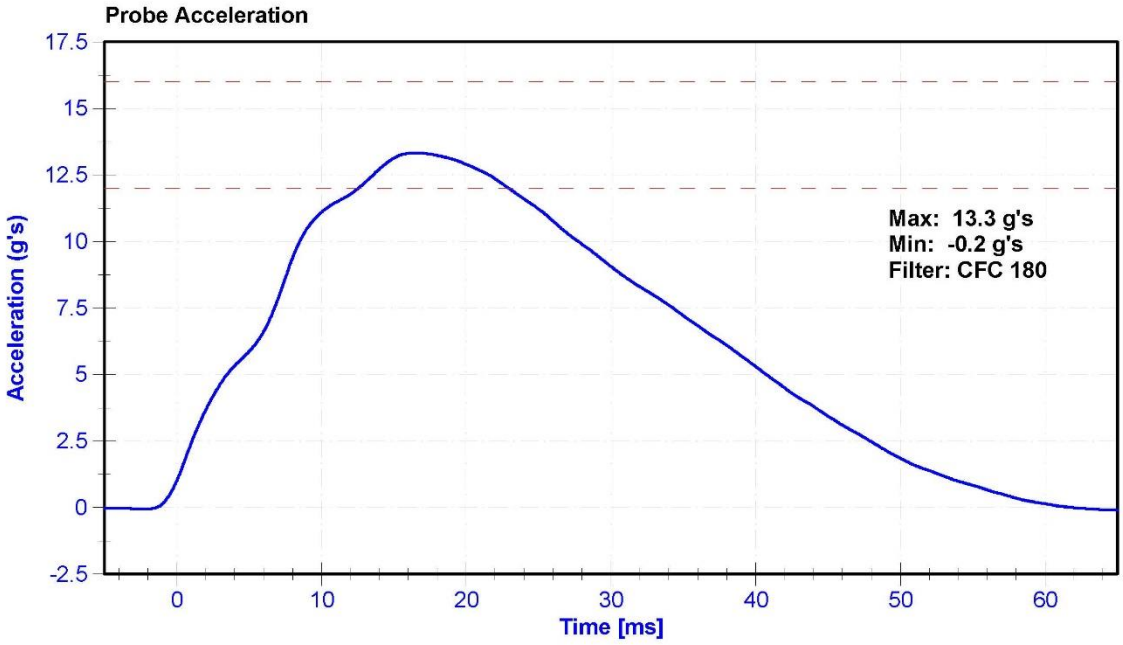
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

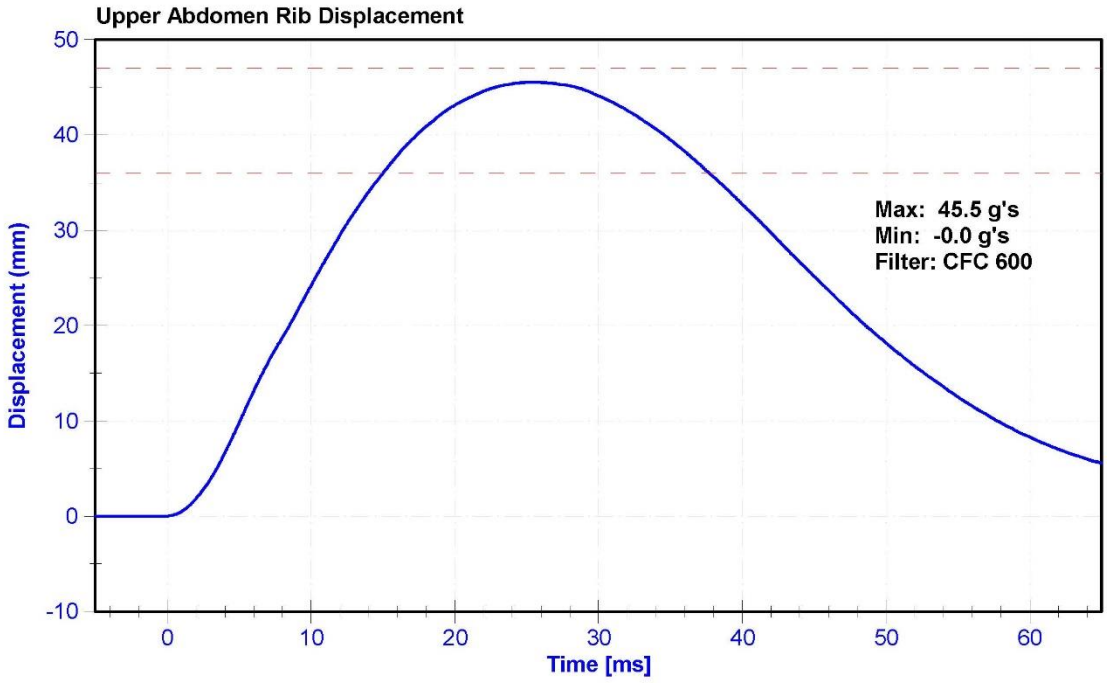
Results

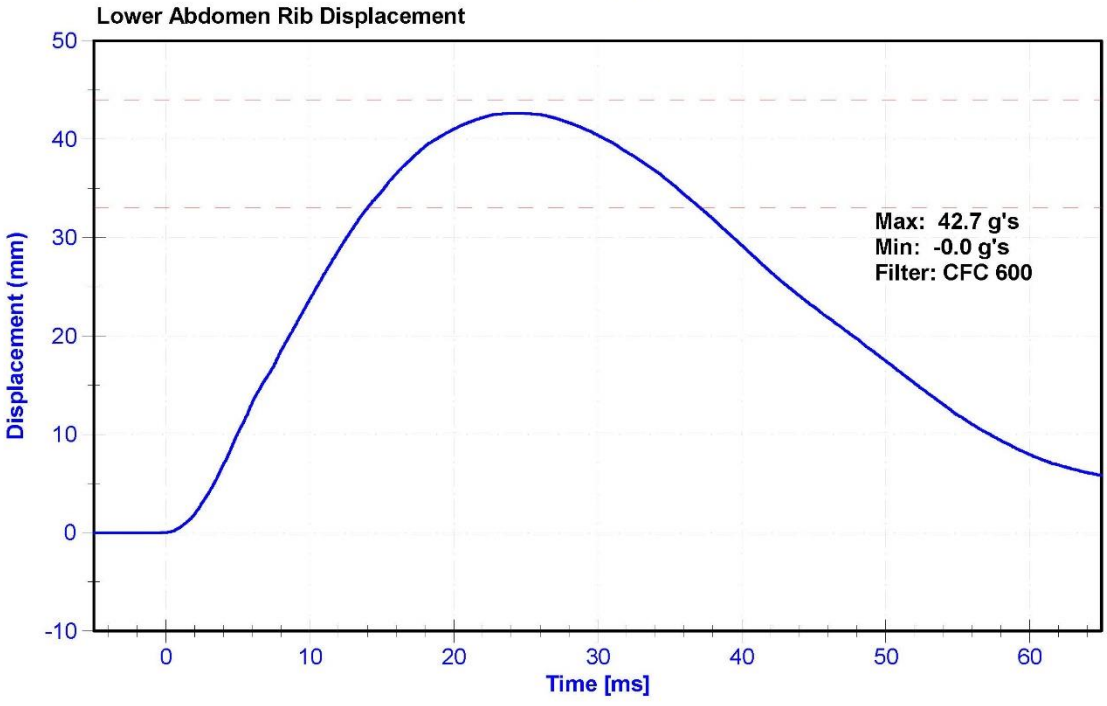
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	30.4	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	12	16	g's	13.3	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	45.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.7	Pass

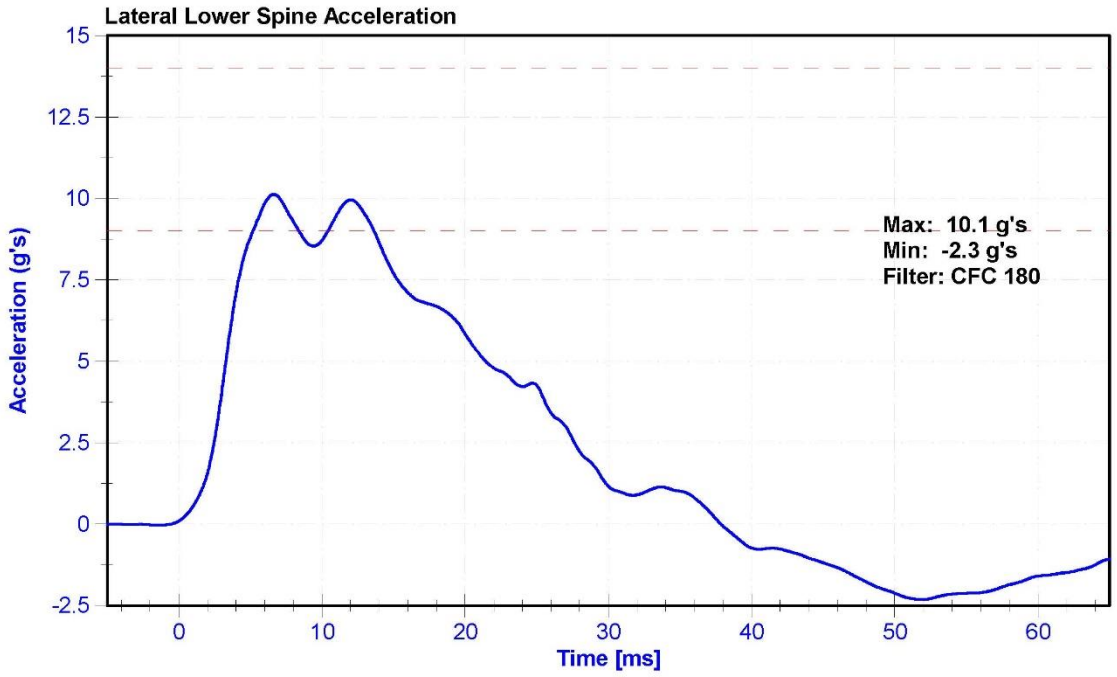
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Abdomen Rib Potentiometer	Servo 08TC1-3787	DS-015GFE	6/15/2016	6/15/2017
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	6/15/2016	6/15/2017




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 45.5 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.7 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
0
10
20
30
40
50
60
Time [ms]
Max: 10.1 g's
Min: -2.3 g's
Filter: CFC 180

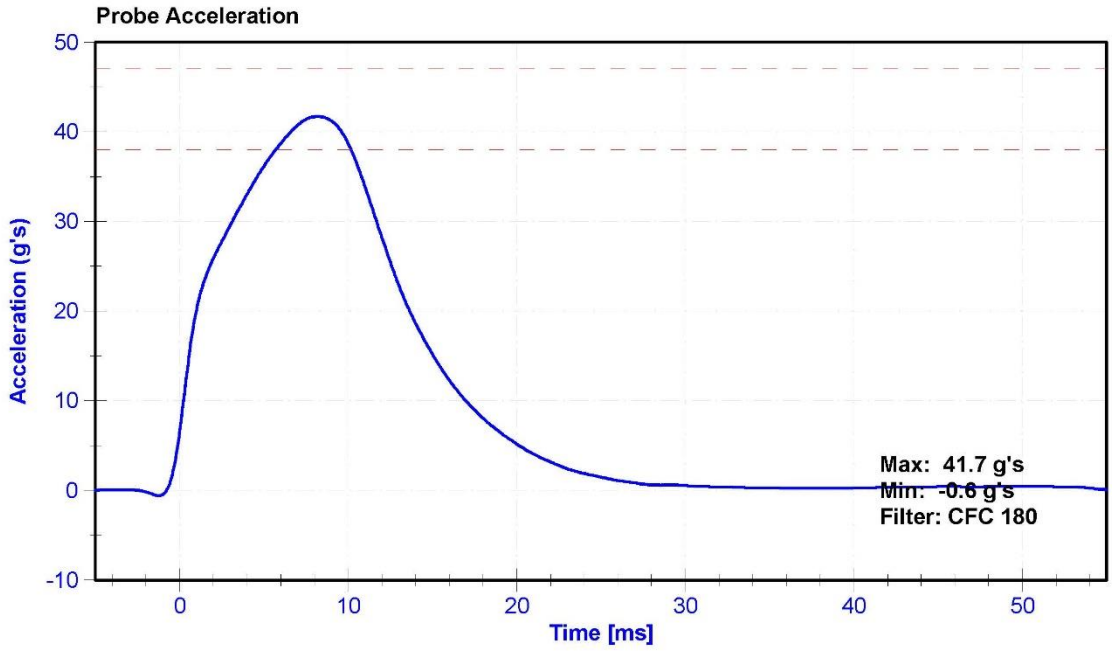
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

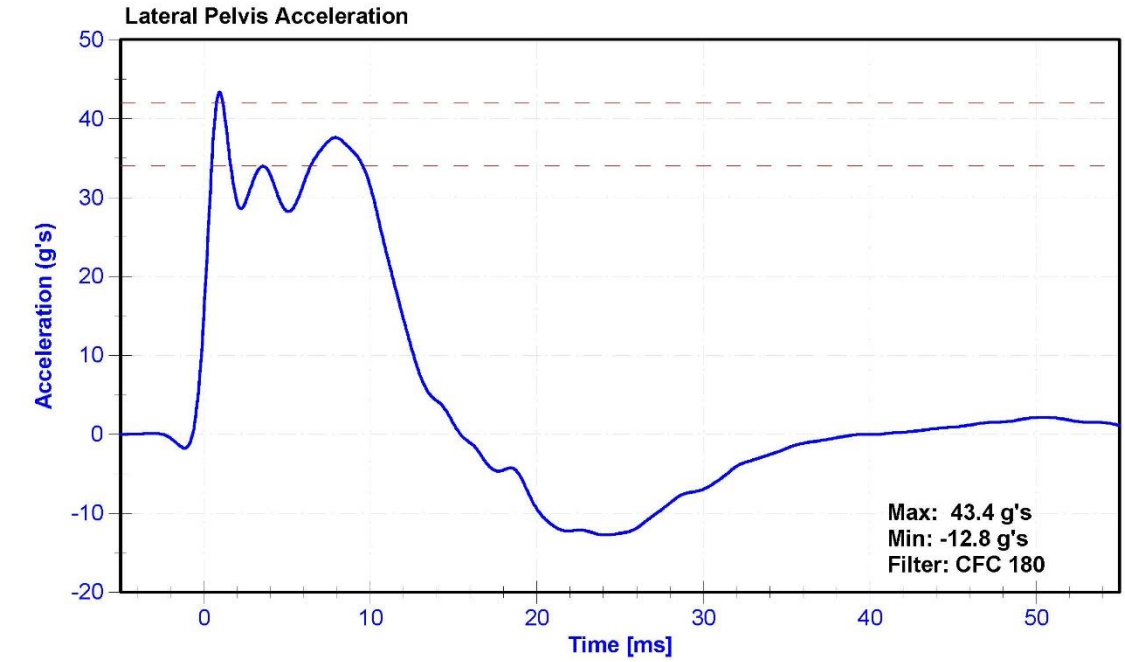
Results

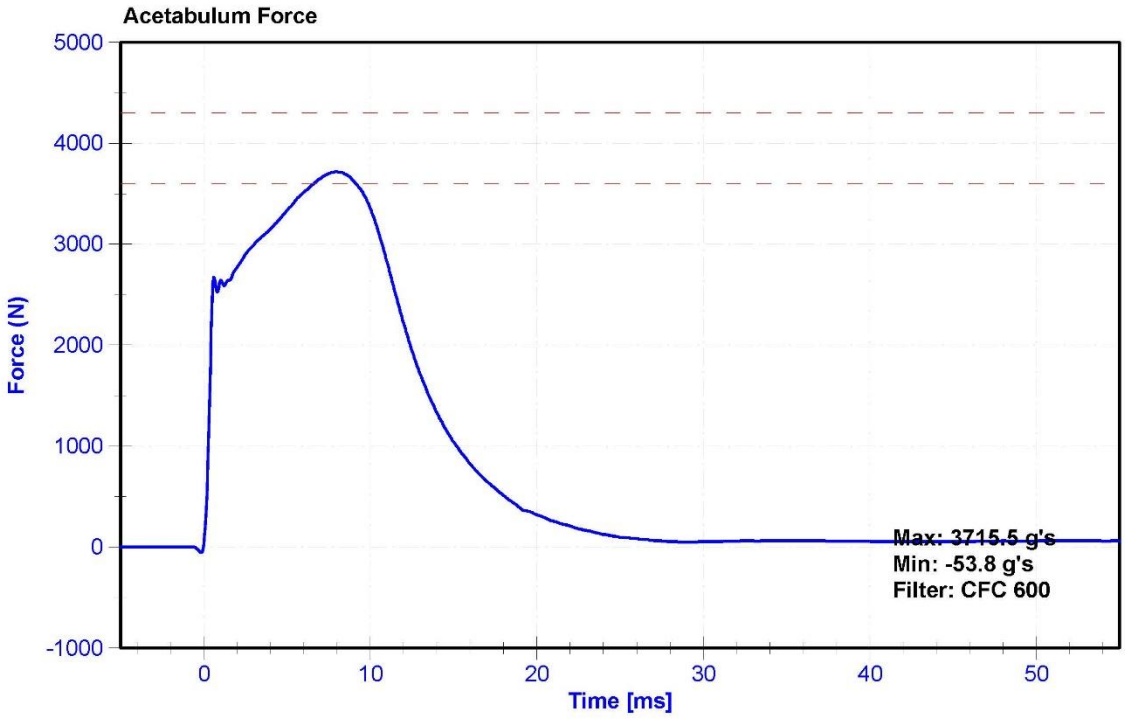
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	31.6	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	41.7	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	37.6	Pass
Acetabulum Force	3600	4300	N	3715.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Acetabulum Load Cell	Denton 3249J	LC-267Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	11005	04/06/2016	N/A
Crash Test Plug	Humanetics	10989	04/06/2016	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]
Max: 43.4 g's
Min: -12.8 g's
Filter: CFC 180

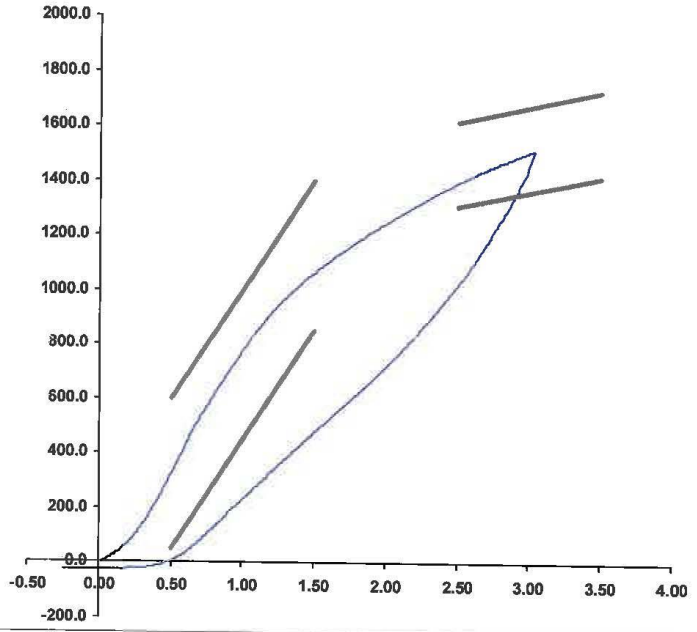

Acetabulum Force
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 3715.5 g's
Min: -53.8 g's
Filter: CFC 600

SID-IIs Pelvis Plug Certification Test

Plug S/N 10989
Test Number 2070 1510 N
Report Number 2064 Crash
Test Date 4/6/2016 8:36:48 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	328.53	50.00	600.00
Force @ 1.5 mm (N)	1,064.89	850.00	1,400.00
Force @ 2.5 mm (N)	1,395.10	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,510.25	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator DC

Part Number 180-4450

Template No 107 06-Apr-16
SACO Research

By : DC Date : 4/6/16

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 11005
Test Number 2080 1511 N
Report Number 2074 Cert
Test Date 4/6/2016 9:05:31 AM

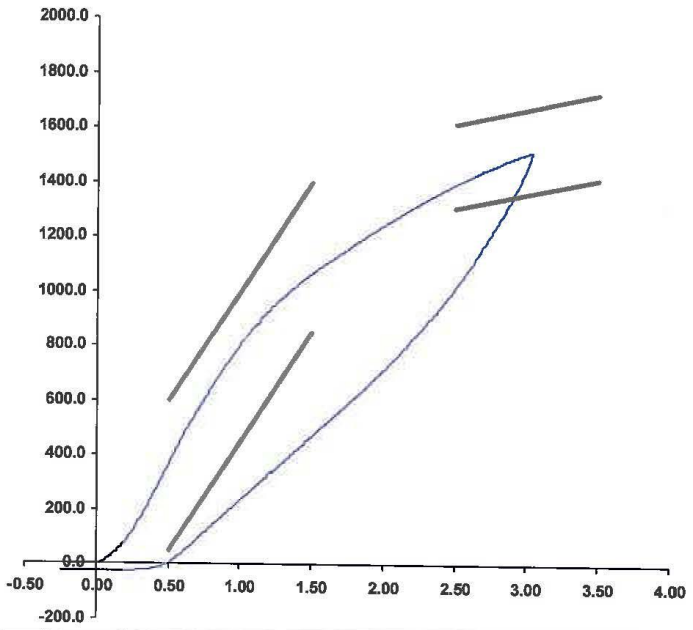
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	369.30	50.00	600.00
Force @ 1.5 mm (N)	1,069.20	850.00	1,400.00
Force @ 2.5 mm (N)	1,396.00	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,511.30	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 06-Apr-16
SACO Research

By : DC Date : 4/6/16

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

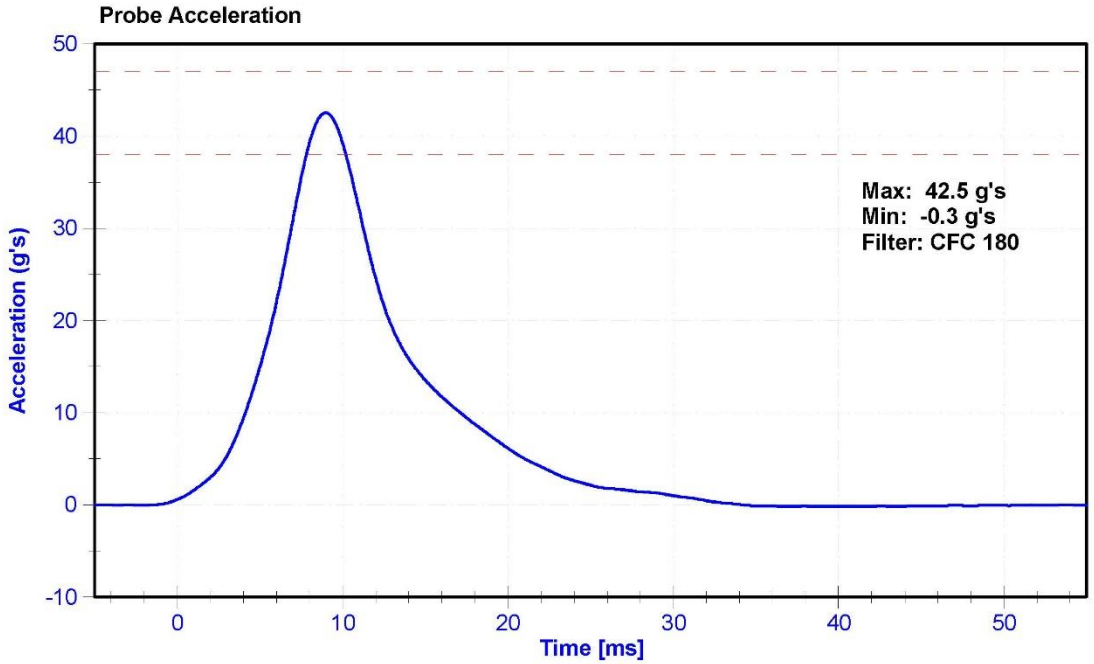
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

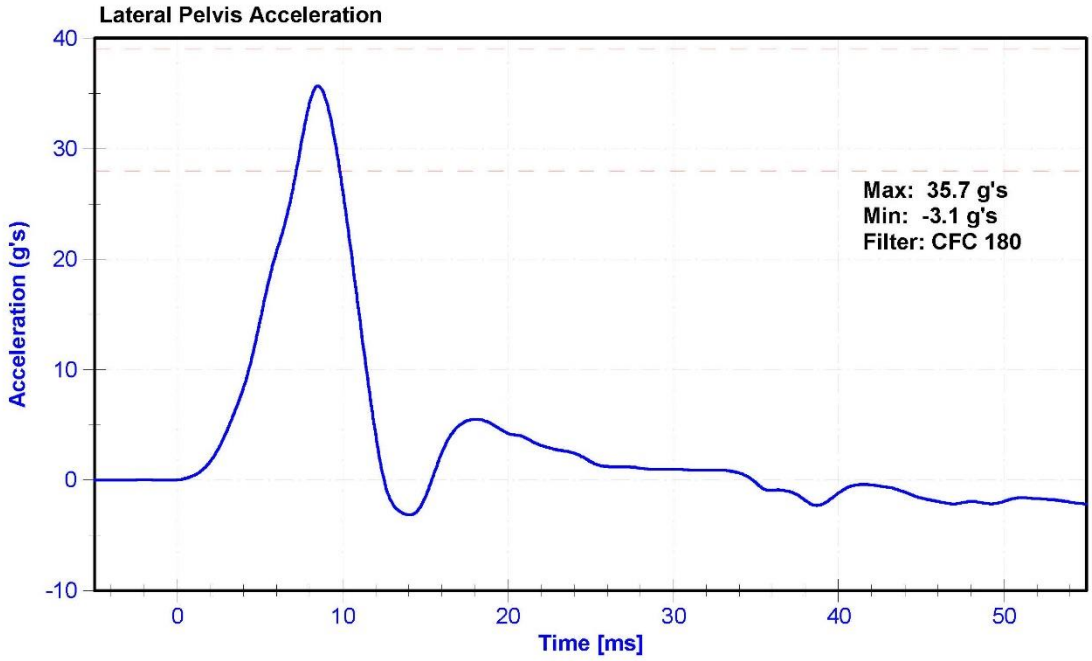
Results

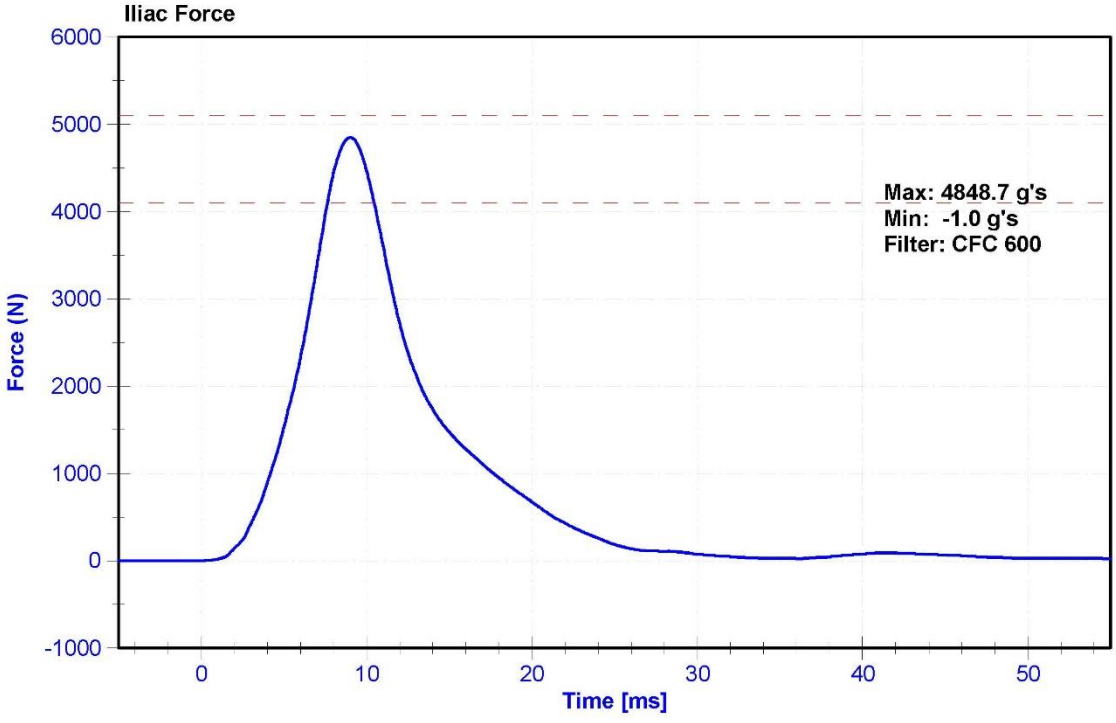
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	41.5	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	36	45	g's	42.5	Pass
Lateral Pelvis Acceleration	28	39	g's	35.7	Pass
Iliac Force	4100	5100	N	4848.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Iliac Load Cell	DENTON 3228J	LC-281Fy	5/24/2016	5/24/2017




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 35.7 g's
Min: -3.1 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4848.7 g's
Min: -1.0 g's
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

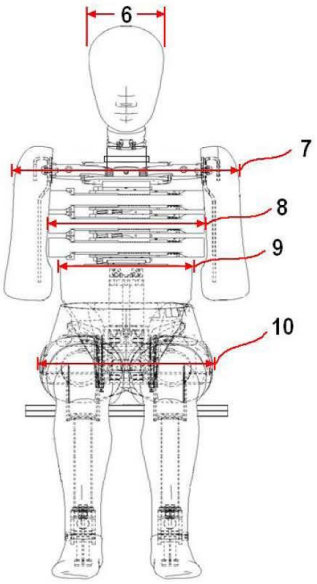
SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

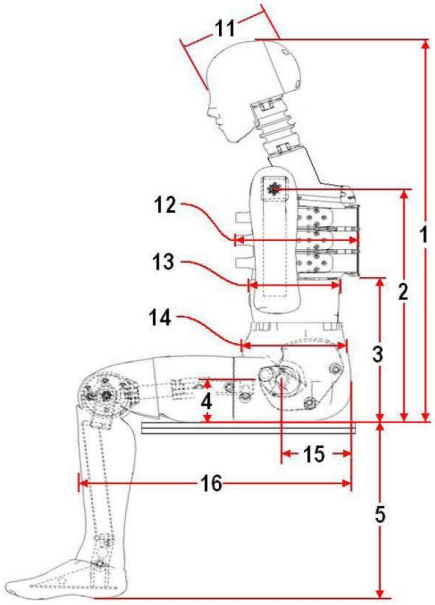
External Measurements - EuroSID-2re

Technician: M.Hartung Date: 1/19/2017

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	911	Pass
2	Seat to Shoulder Joint	558	572	566	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	349	Pass
4	Seat to Hip Joint (center of bolt)	97	103	100	Pass
5	Sole to Seat, Sitting	333	451	424	Pass
6	Head Width	152	158	155	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	325	Pass
9	Abdomen Width	273	287	284	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	201	Pass
12	Thorax Depth	262	272	267	Pass
13	Abdomen Depth	194	204	200	Pass
14	Pelvis Depth	235	245	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	604	Pass

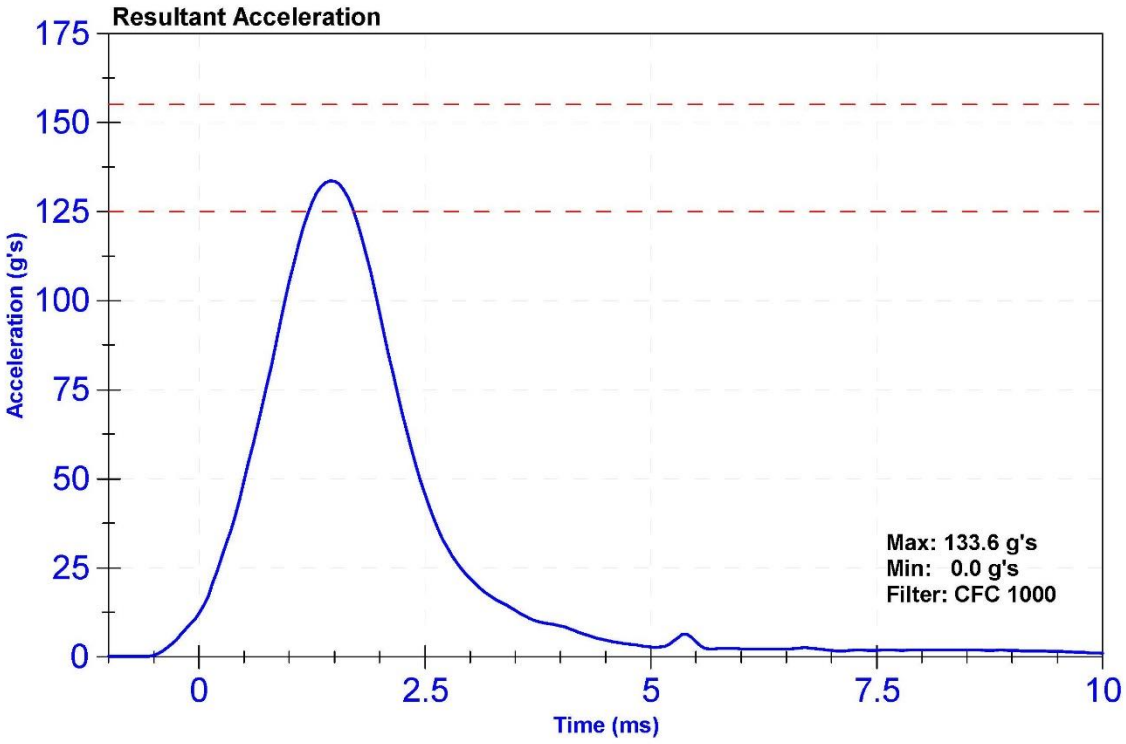
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

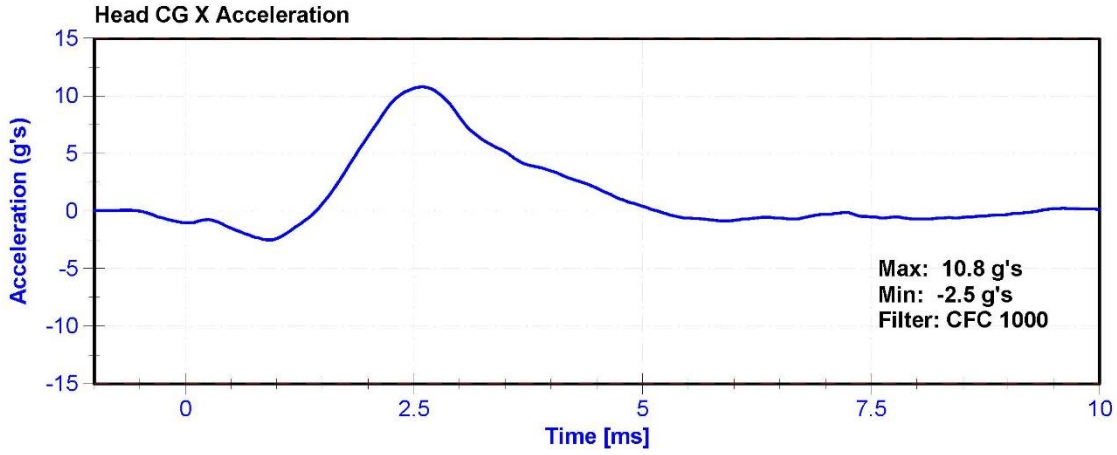
Results

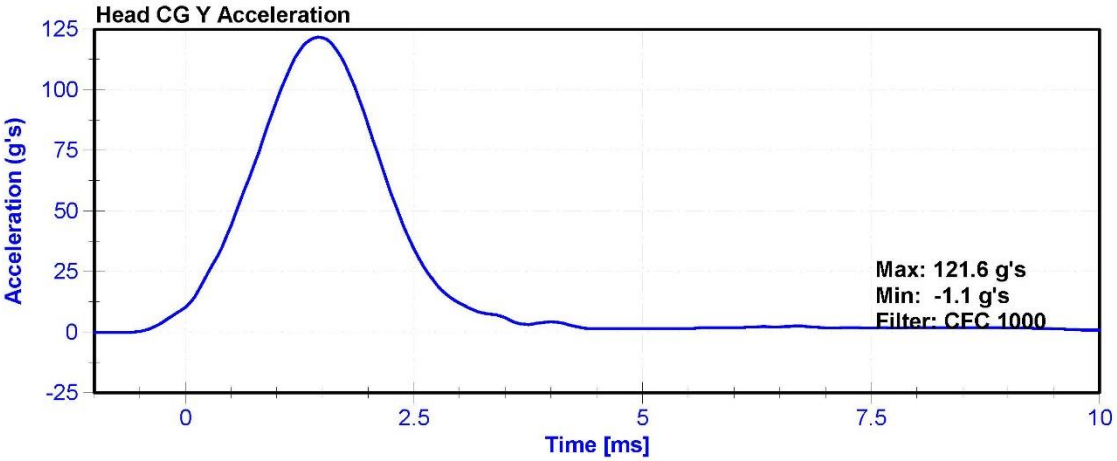
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	41.5	Pass
Resultant Acceleration	125	155	g's	133.6	Pass
Oscillation	0	15	%	4.82	Pass
Fore-Aft Acceleration	-15	15	g's	10.8	Pass

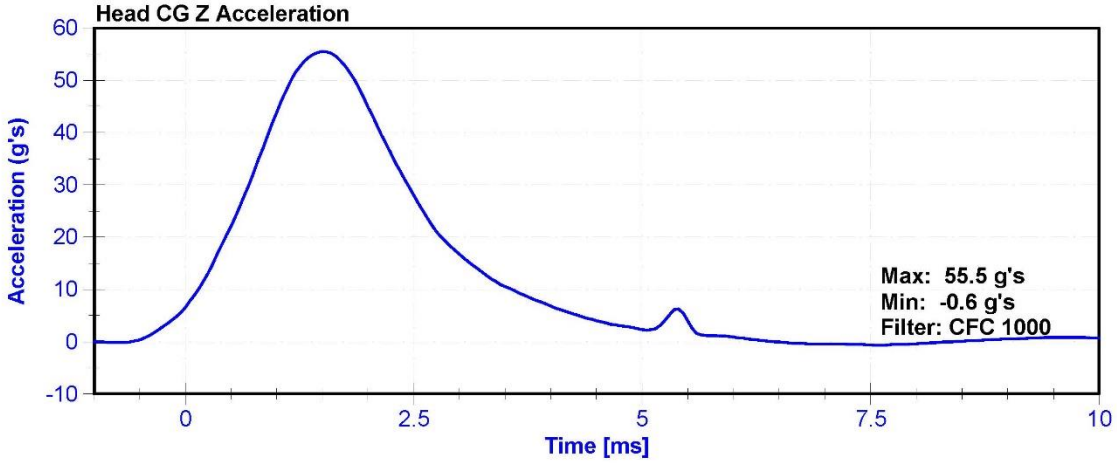
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	1/6/2017	7/6/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	1/6/2017	7/6/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	1/6/2017	7/6/2017




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 10.8 g's
Min: -2.5 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]
Max: 121.6 g's
Min: -1.1 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
60
50
40
30
20
10
0
-10
0
2.5
5
7.5
10
Time [ms]
Max: 55.5 g's
Min: -0.6 g's
Filter: CFC 1000

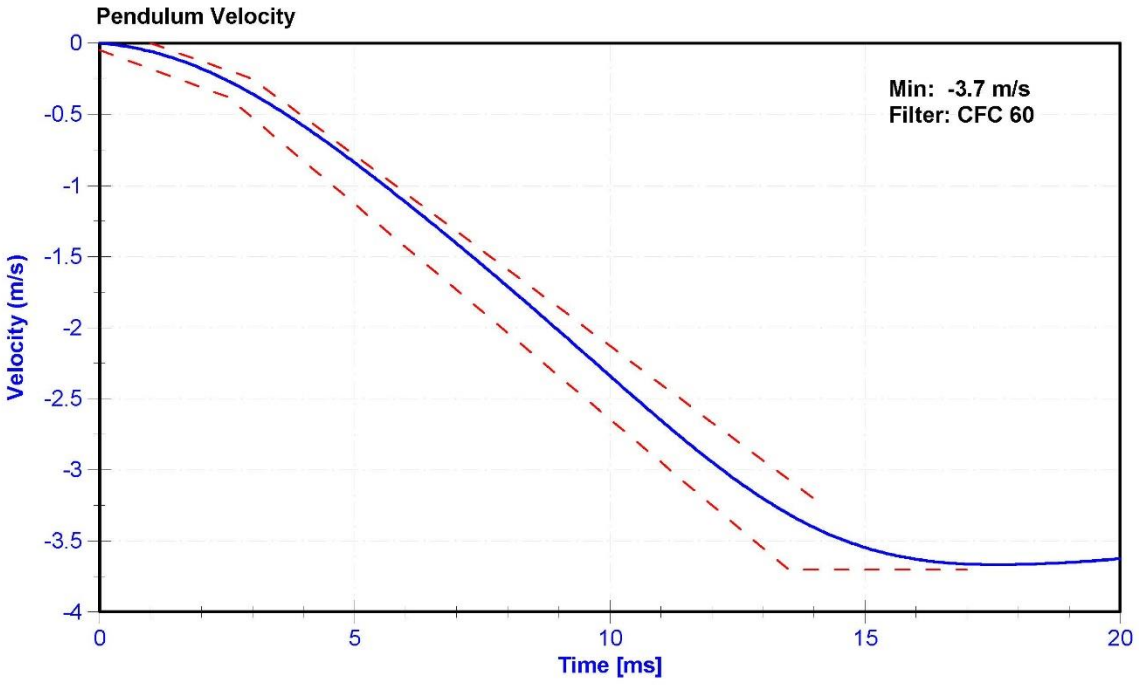
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

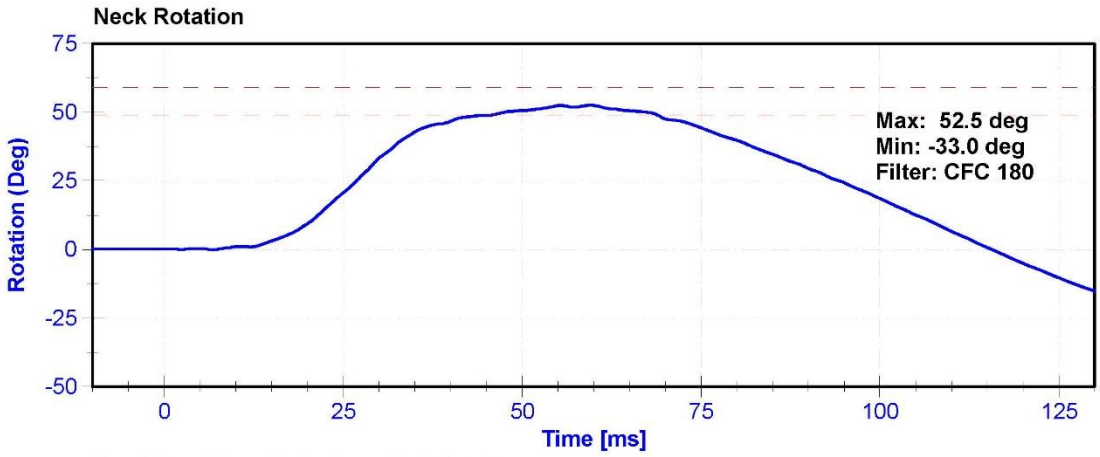
Results

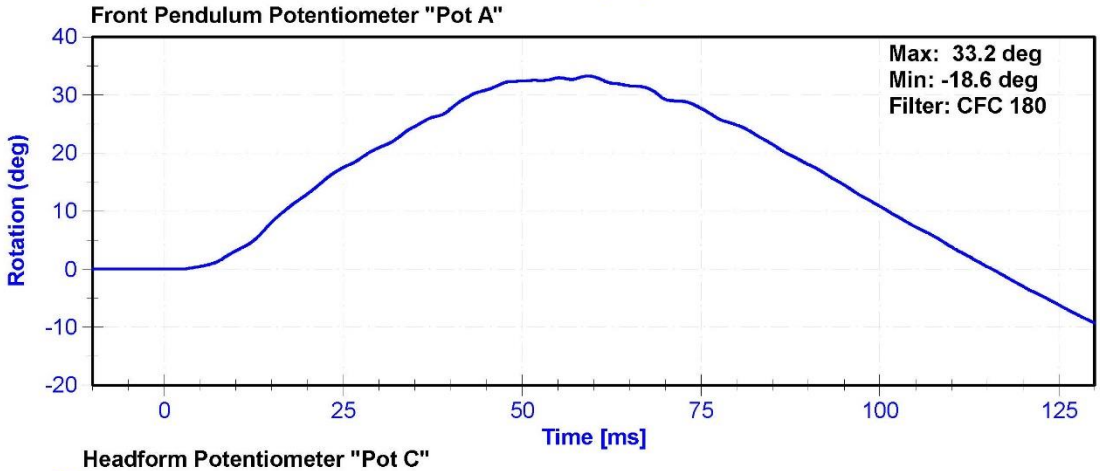
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40.8	Pass
Velocity	3.3	3.5	m/s	3.43	Pass
Lateral Neck Rotation	49	59	deg	52.5	Pass
Time at Maximum Rotation	54	66	ms	59.6	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.1	Pass

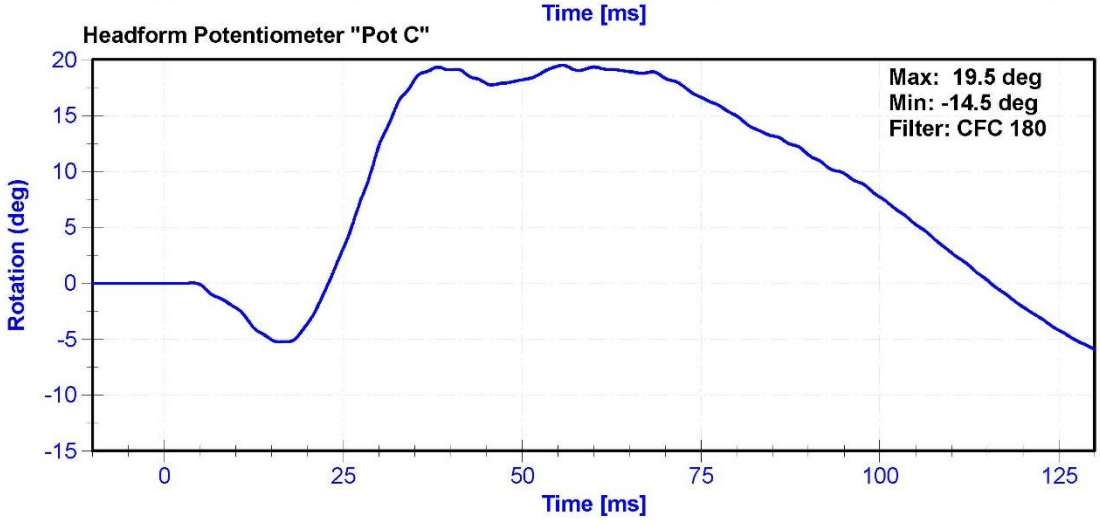
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Front Pendulum Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Headform Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017




Neck Rotation
Rotation (Deg)
Time [ms]
Max: 52.5 deg
Min: -33.0 deg
Filter: CFC 180


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 33.2 deg
Min: -18.6 deg
Filter: CFC 180


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 19.5 deg
Min: -14.5 deg
Filter: CFC 180

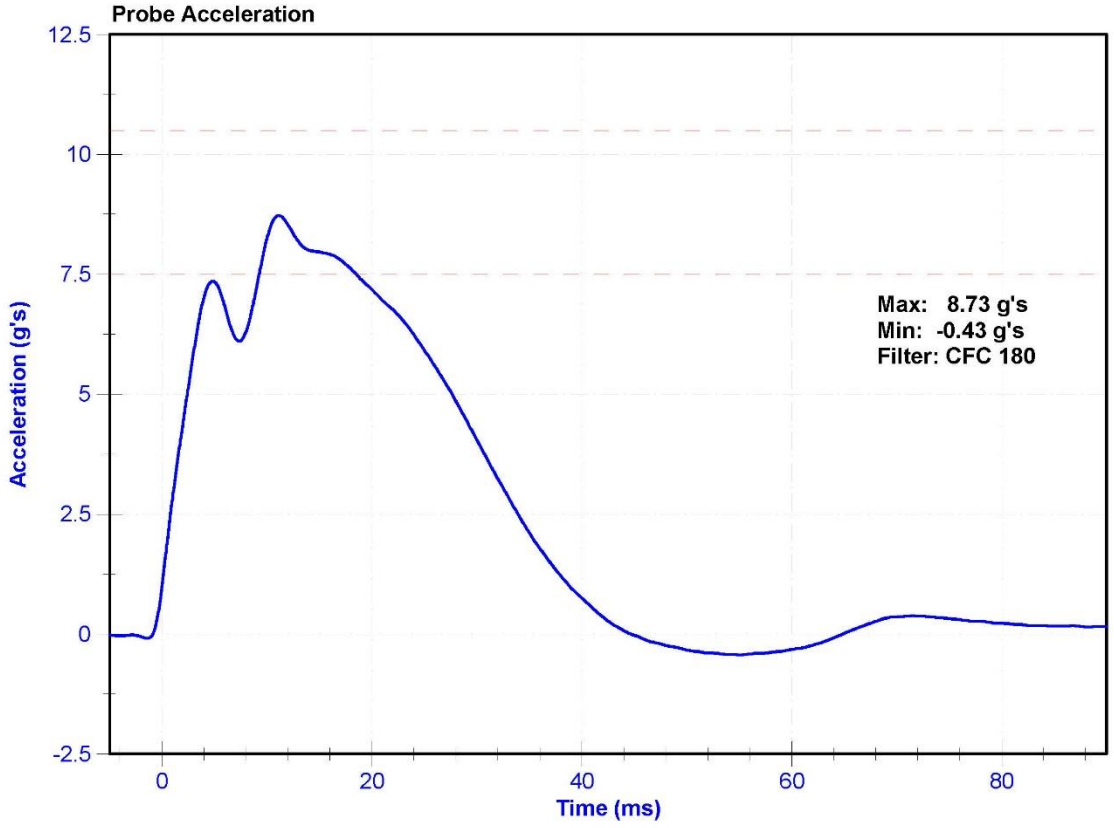
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	37.5	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	8.73	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017



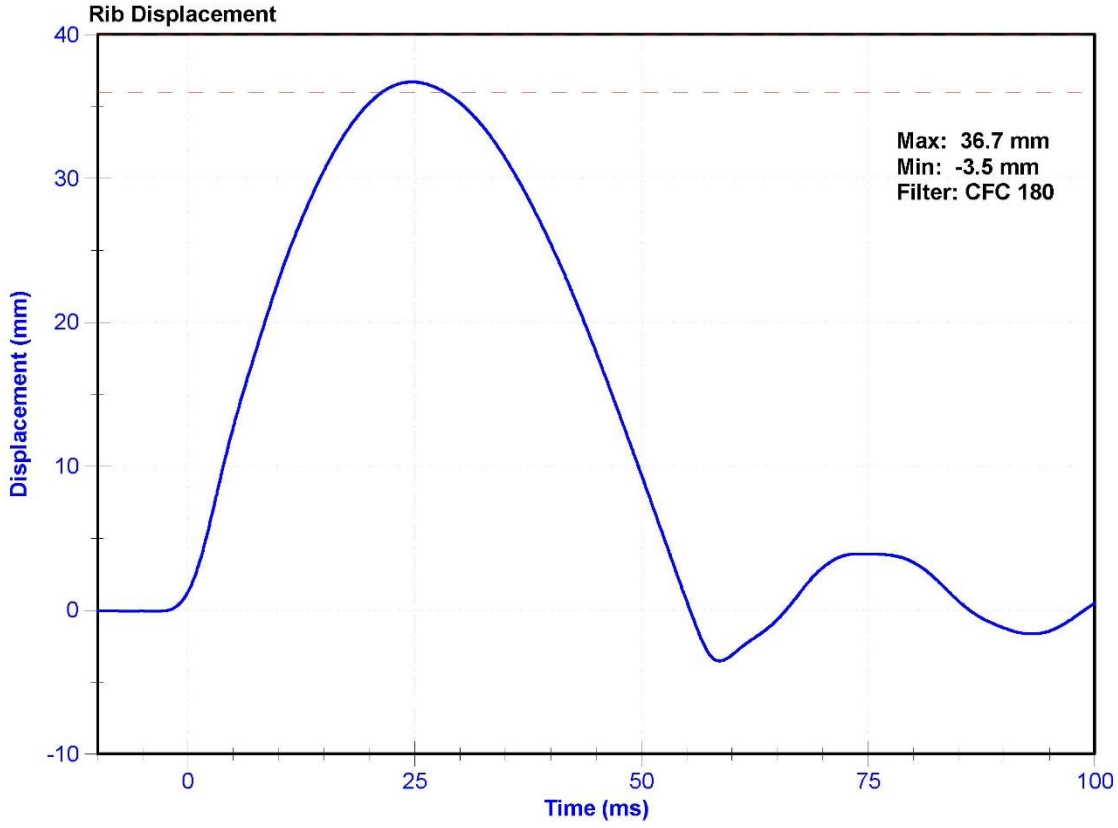
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.5	Pass
Rib Displacement	36	40	mm	36.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



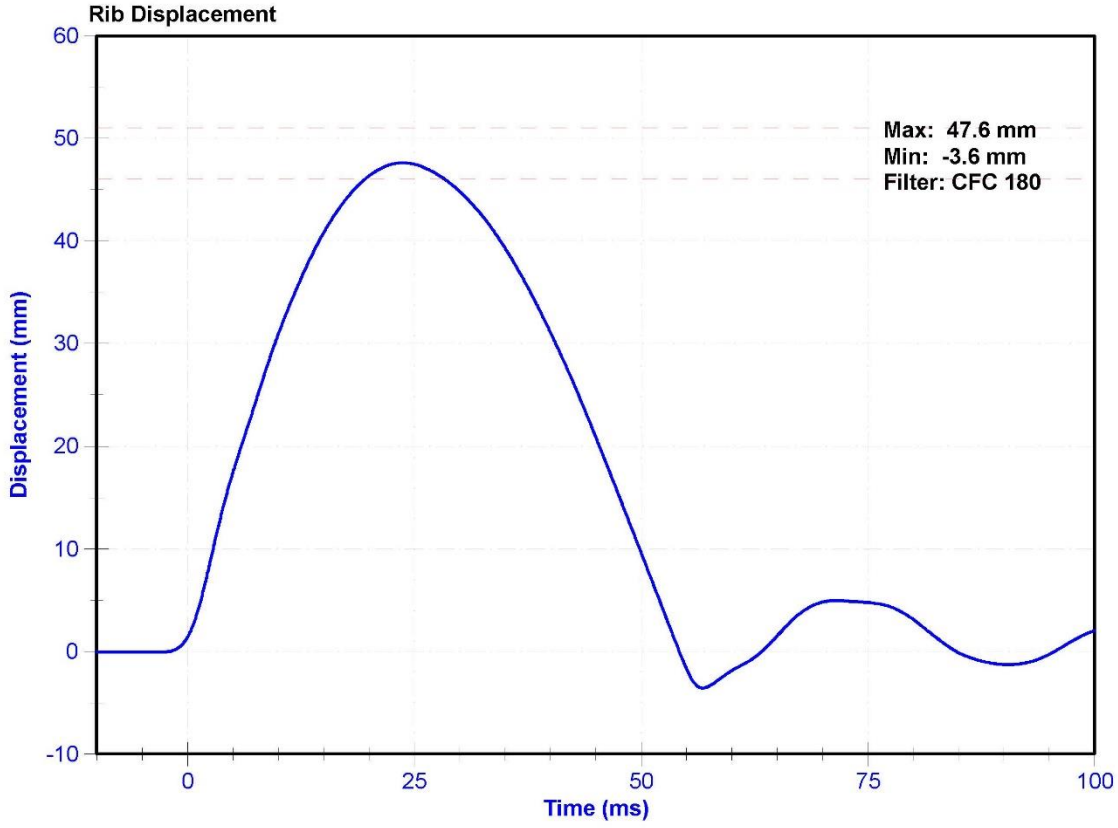
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.5	Pass
Rib Displacement	46	51	mm	47.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



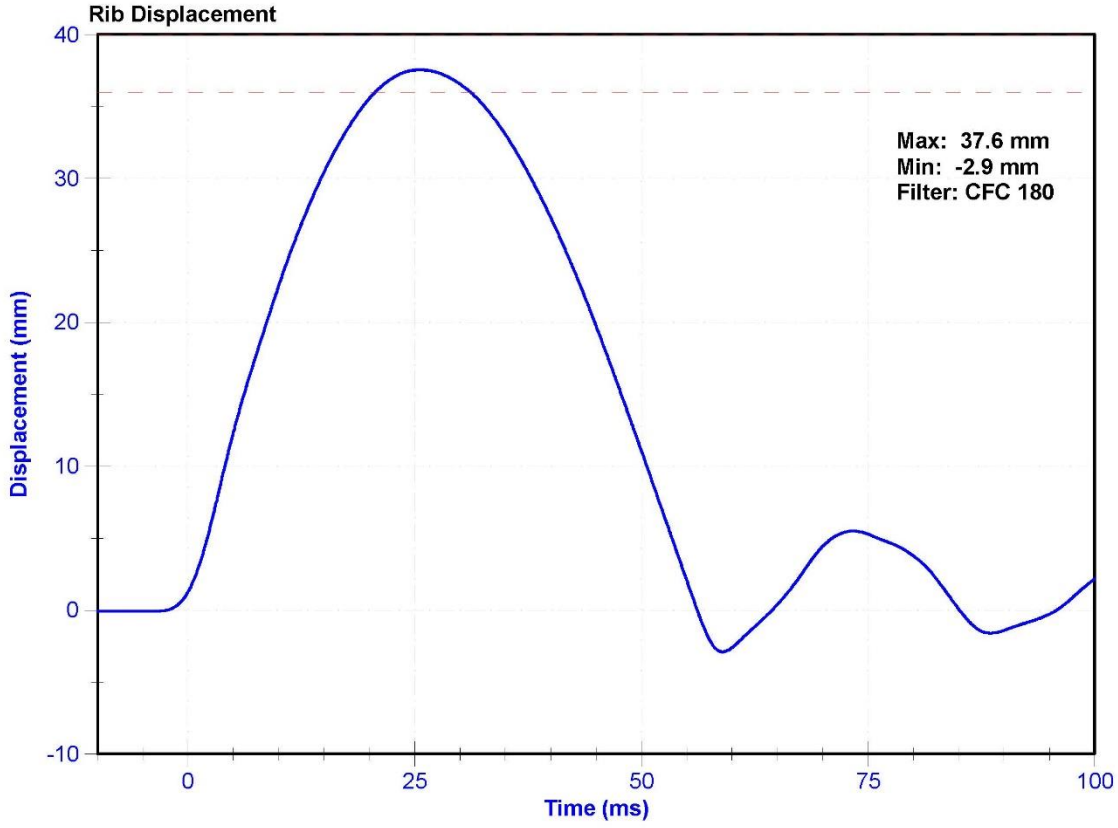
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.5	Pass
Rib Displacement	36	40	mm	37.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



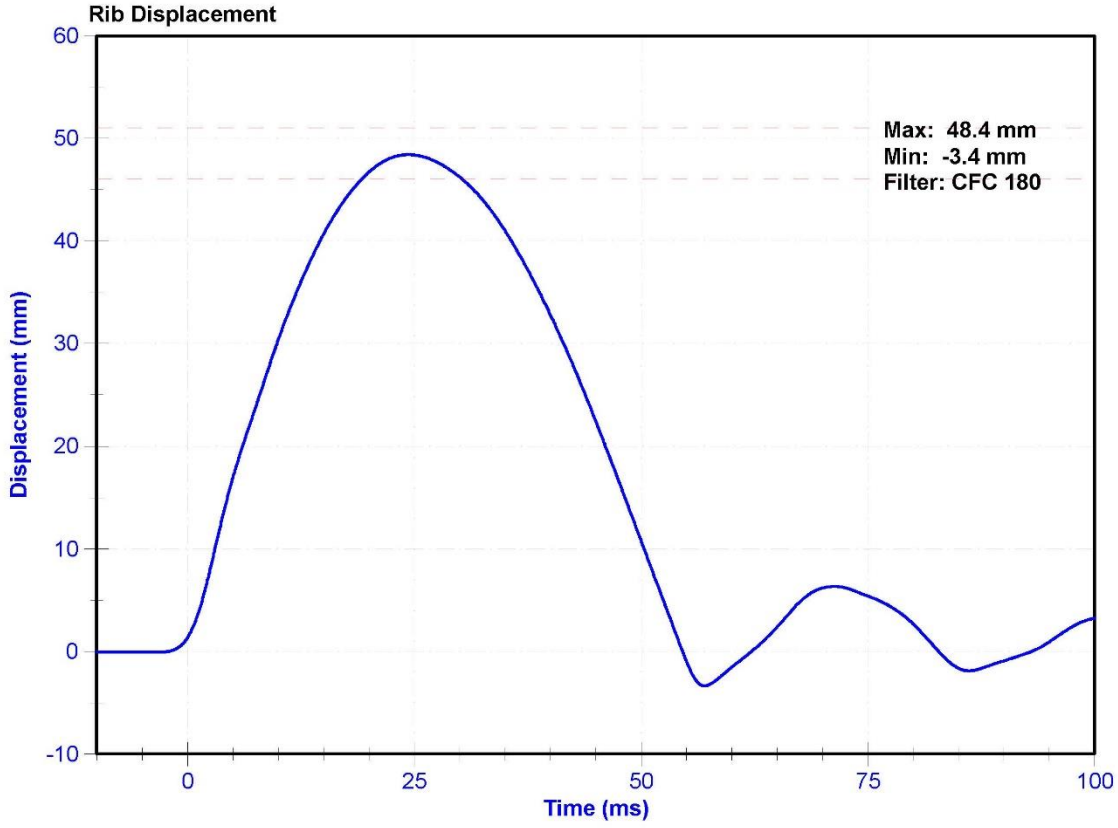
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.5	Pass
Rib Displacement	46	51	mm	48.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



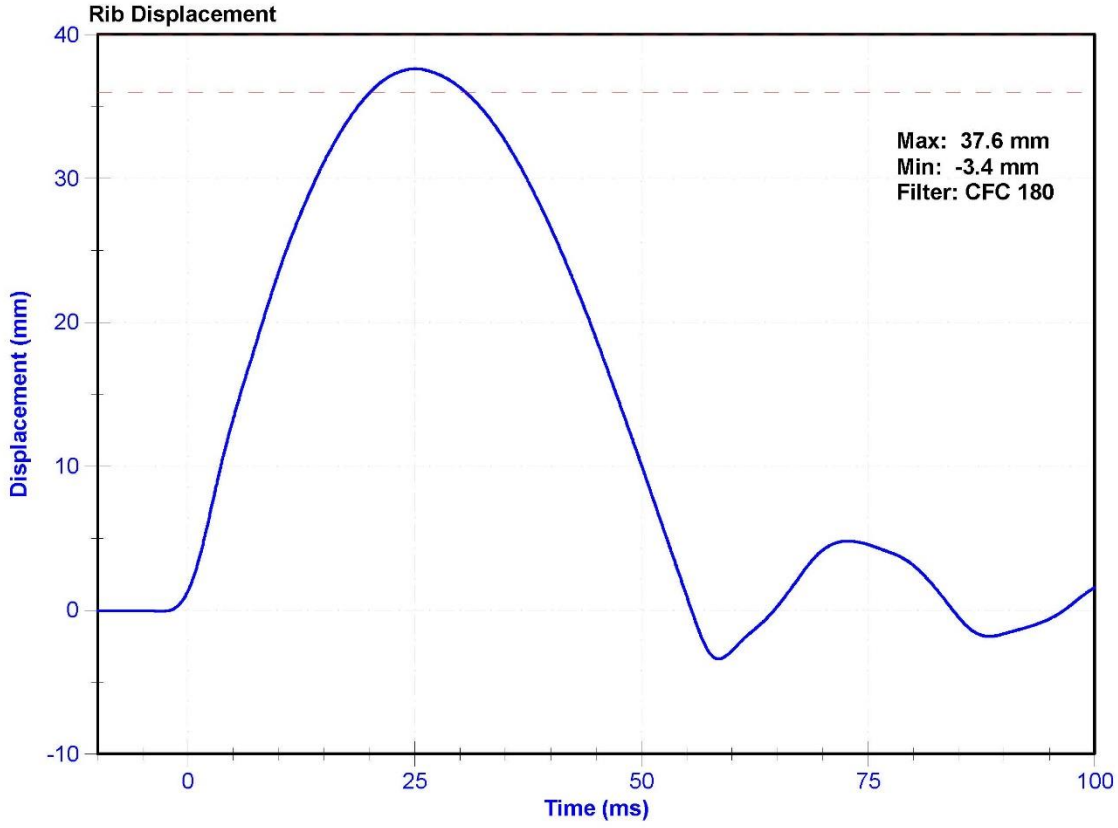
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.5	Pass
Rib Displacement	36	40	mm	37.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



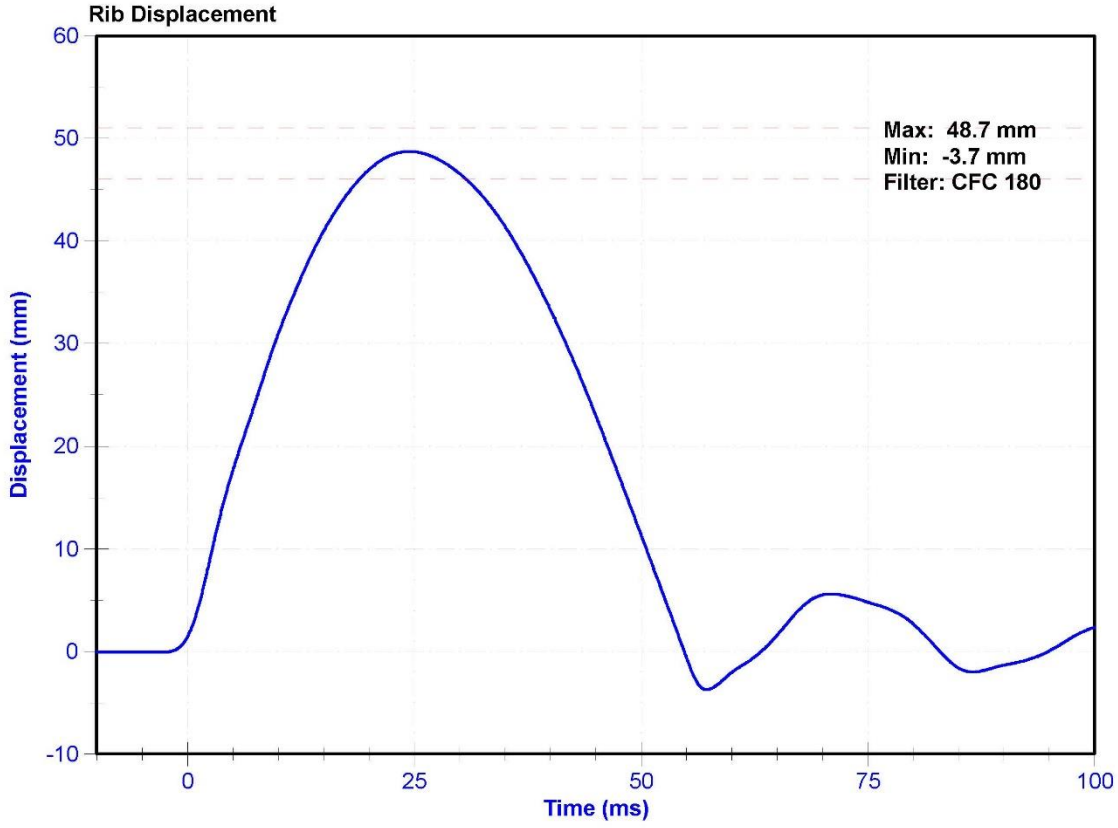
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.5	Pass
Rib Displacement	46	51	mm	48.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



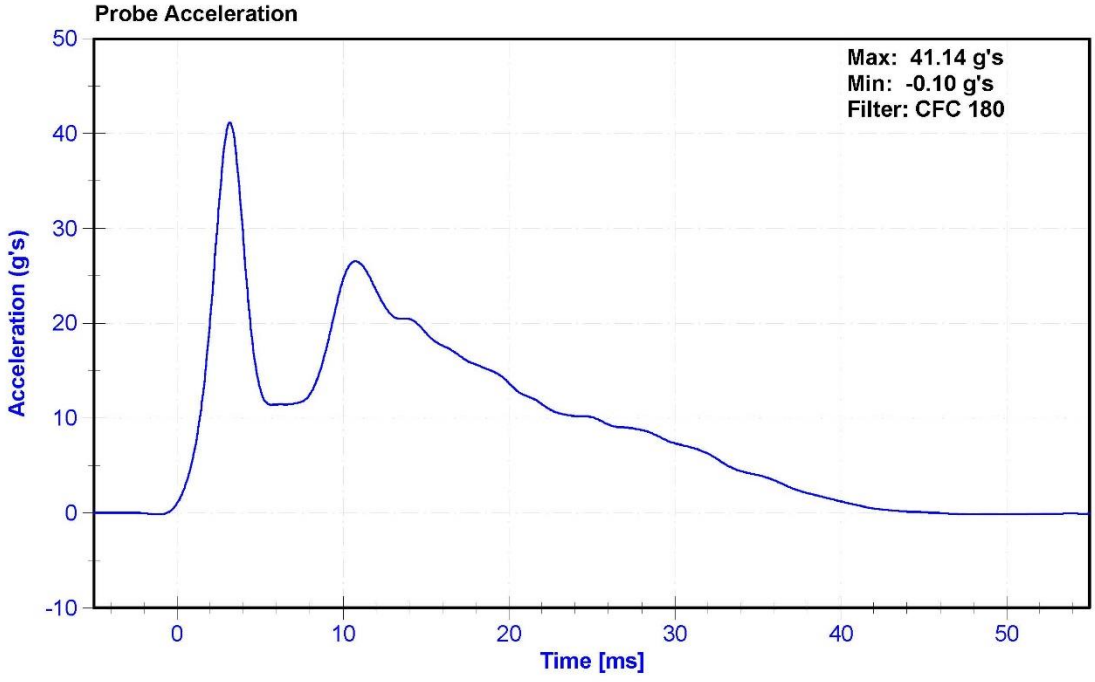
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

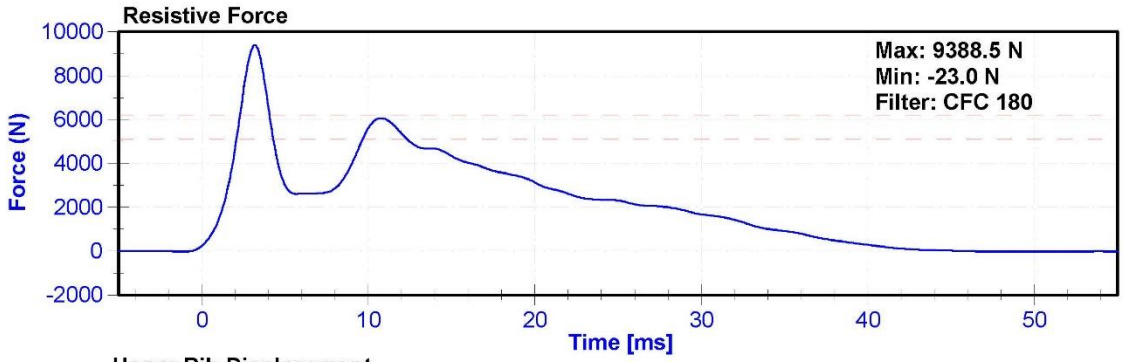
Results

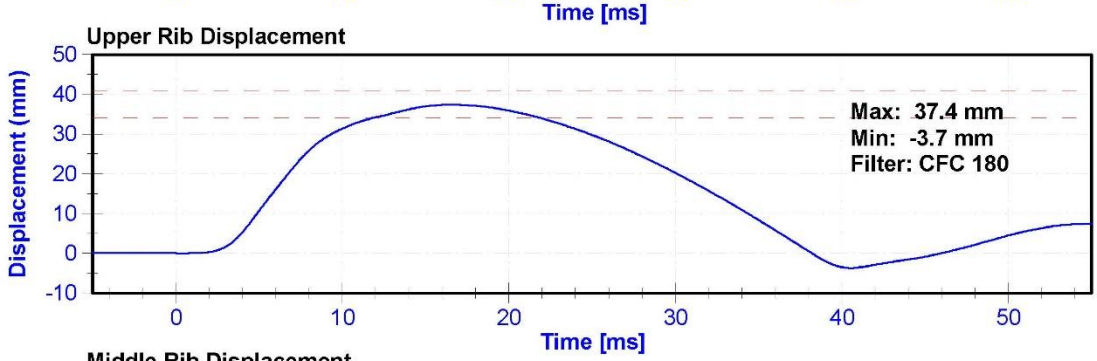
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	36.6	Pass
Velocity	5.4	5.6	m/s	5.57	Pass
Resistive Force after 6ms	5100	6200	N	6057.0	Pass
Upper Thorax Rib Deflection	34	41	mm	37.4	Pass
Mid Thorax Rib Deflection	37	45	mm	41.2	Pass
Lower Thorax Rib Deflection	37	44	mm	40.0	Pass

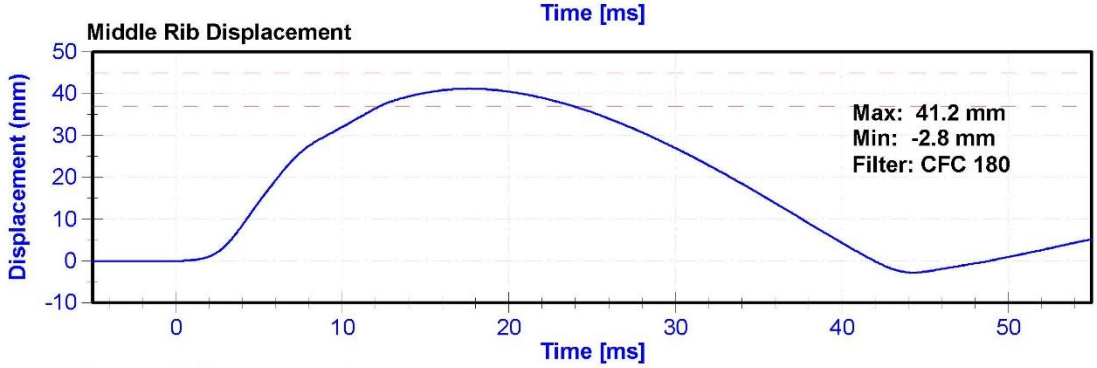
Transducer Calibrations

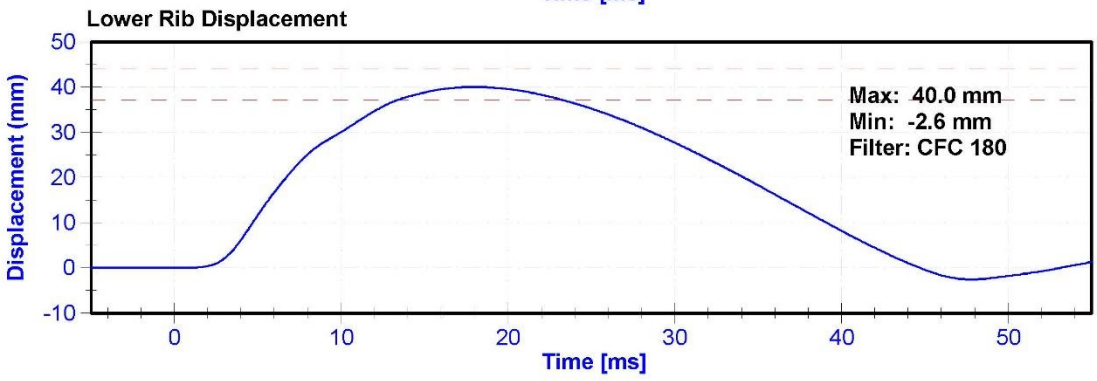
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017




Resistive Force
Max: 9388.5 N
Min: -23.0 N
Filter: CFC 180
Force (N)
10000
8000
6000
4000
2000
0
-2000
0
10
20
30
40
50
Time [ms]


Upper Rib Displacement
Max: 37.4 mm
Min: -3.7 mm
Filter: CFC 180
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]


Middle Rib Displacement
Max: 41.2 mm
Min: -2.8 mm
Filter: CFC 180
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]


Lower Rib Displacement
Max: 40.0 mm
Min: -2.6 mm
Filter: CFC 180
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]

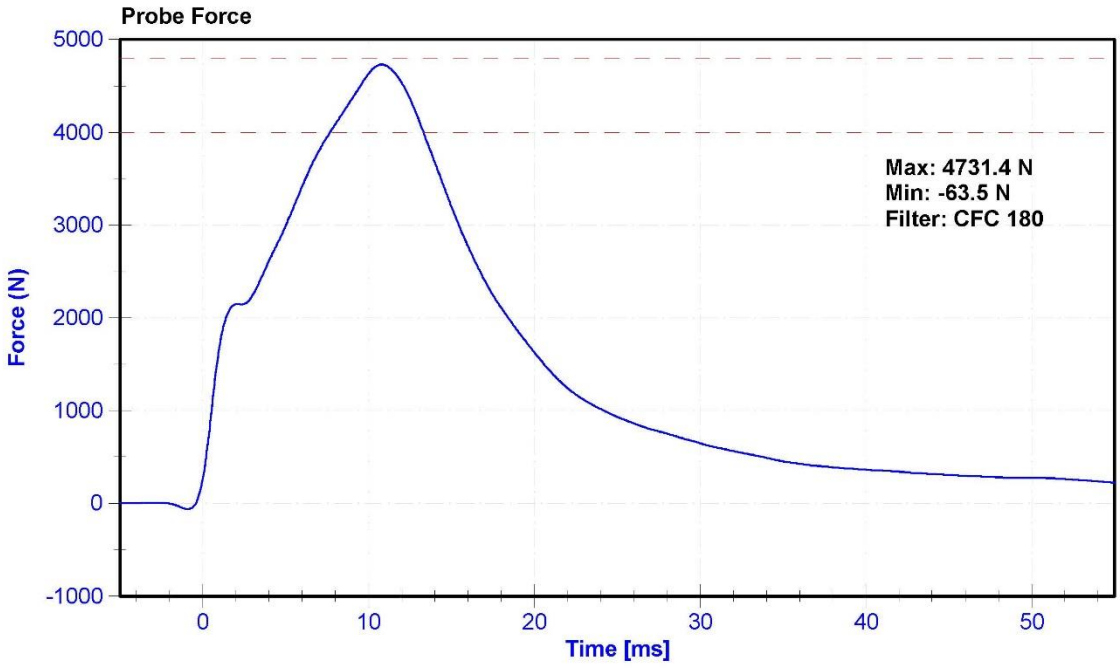
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

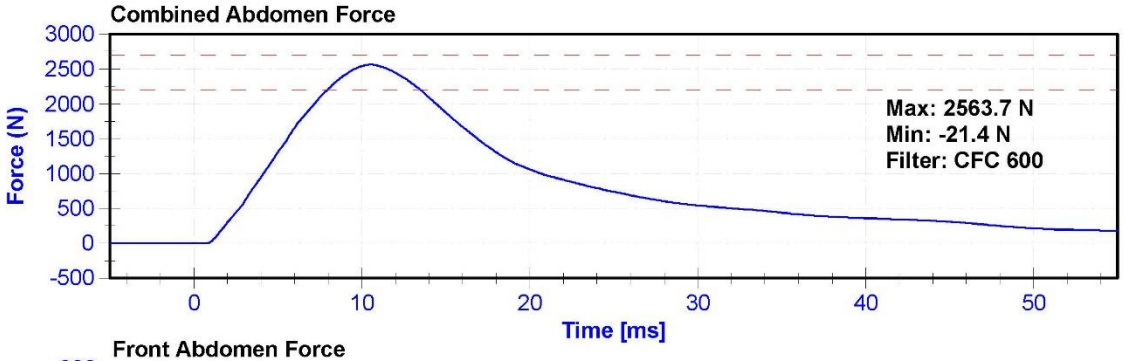
Results

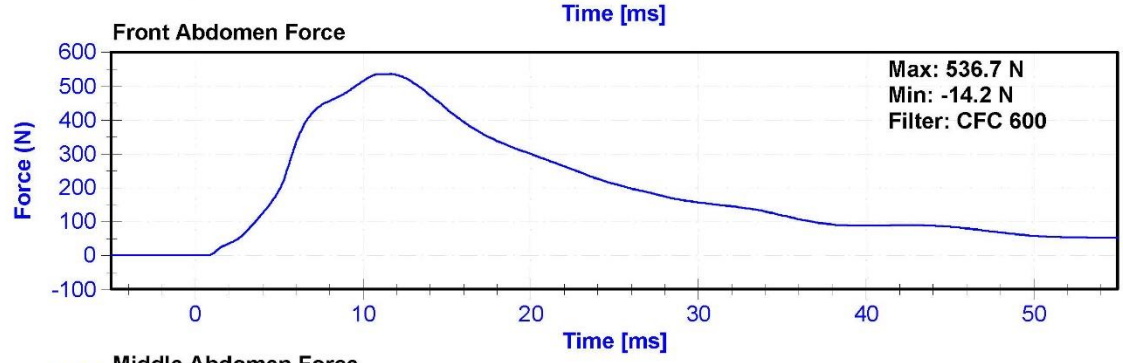
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	37.6	Pass
Velocity	3.9	4.1	m/s	4.07	Pass
Combined Abdomen Force	2200	2700	N	2563.7	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.50	Pass
Resistive Probe Force	4000	4800	N	4731.4	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.80	Pass

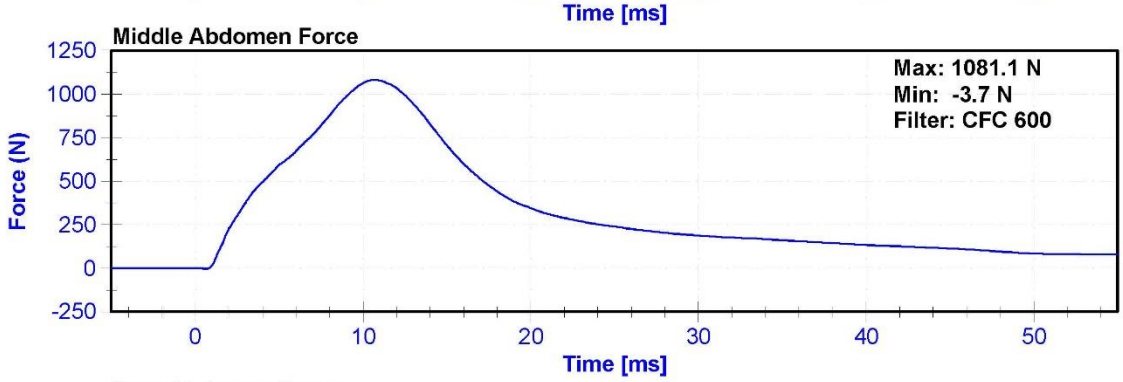
Transducer Calibrations

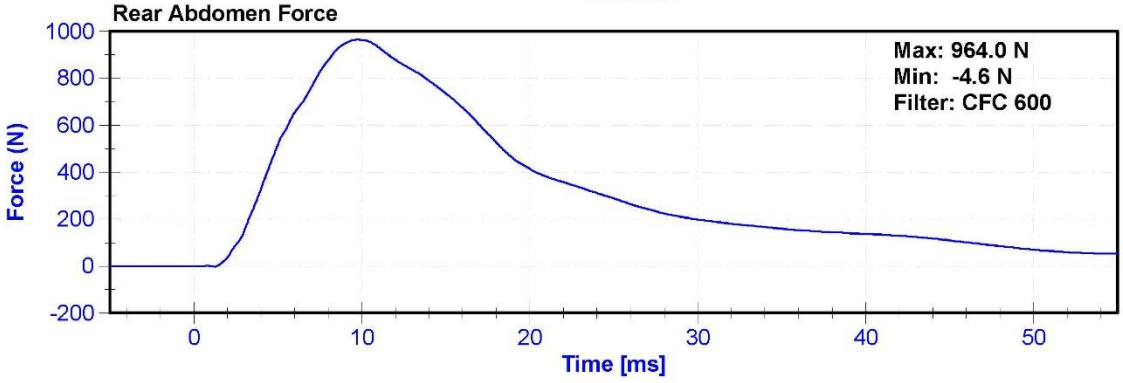
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Front Abdomen Load Cell	DENTON 2631	LC-1512	5/24/2016	5/24/2017
Middle Abdomen Load Cell	DENTON 2631	LC-1526	5/24/2016	5/24/2017
Rear Abdomen Load Cell	DENTON 2631	LC-1516	5/24/2016	5/24/2017




Combined Abdomen Force
Force (N)
Time [ms]
Max: 2563.7 N
Min: -21.4 N
Filter: CFC 600


Front Abdomen Force
Force (N)
Time [ms]
Max: 536.7 N
Min: -14.2 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
Time [ms]
Max: 1081.1 N
Min: -3.7 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
Time [ms]
Max: 964.0 N
Min: -4.6 N
Filter: CFC 600

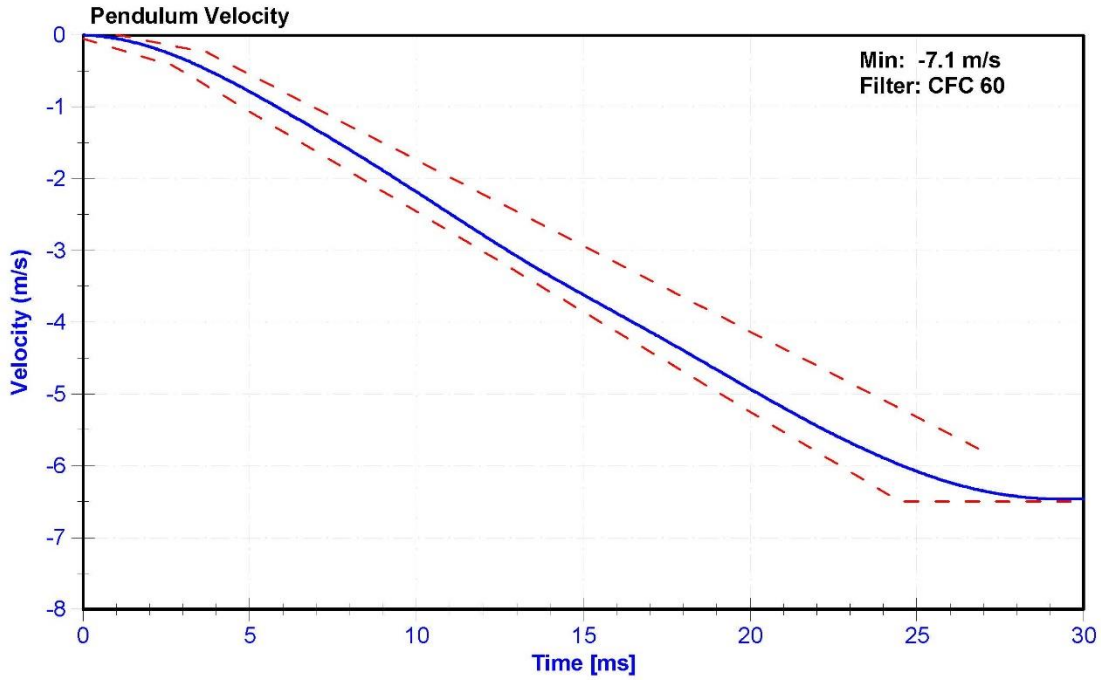
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

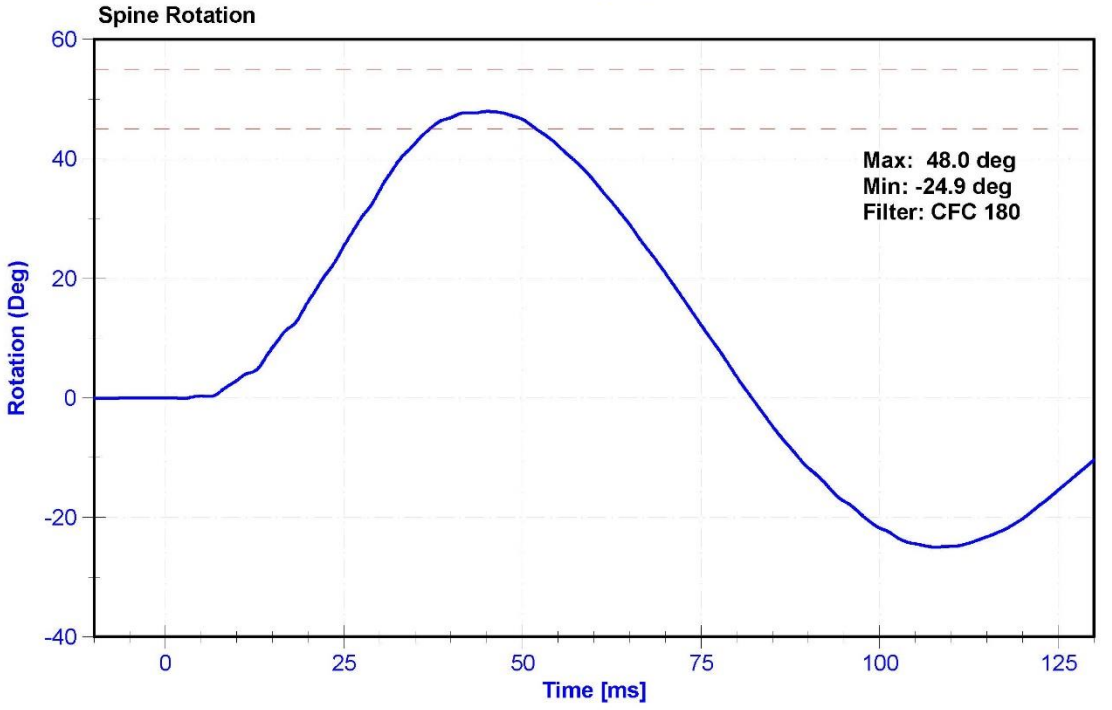
Results

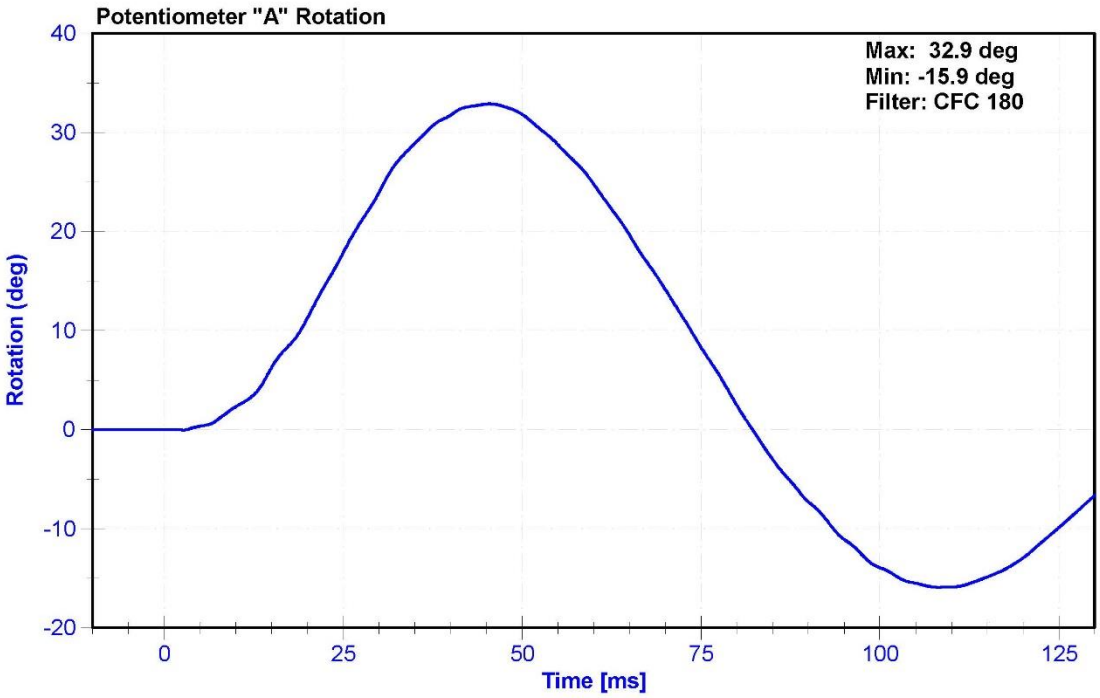
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	35.3	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	48.0	Pass
Time at Maximum Rotation	39	53	ms	45.1	Pass
Time of Decay to Zero Degrees	37	57	ms	37.0	Pass
Pulse within Corridor?	-	-	-		

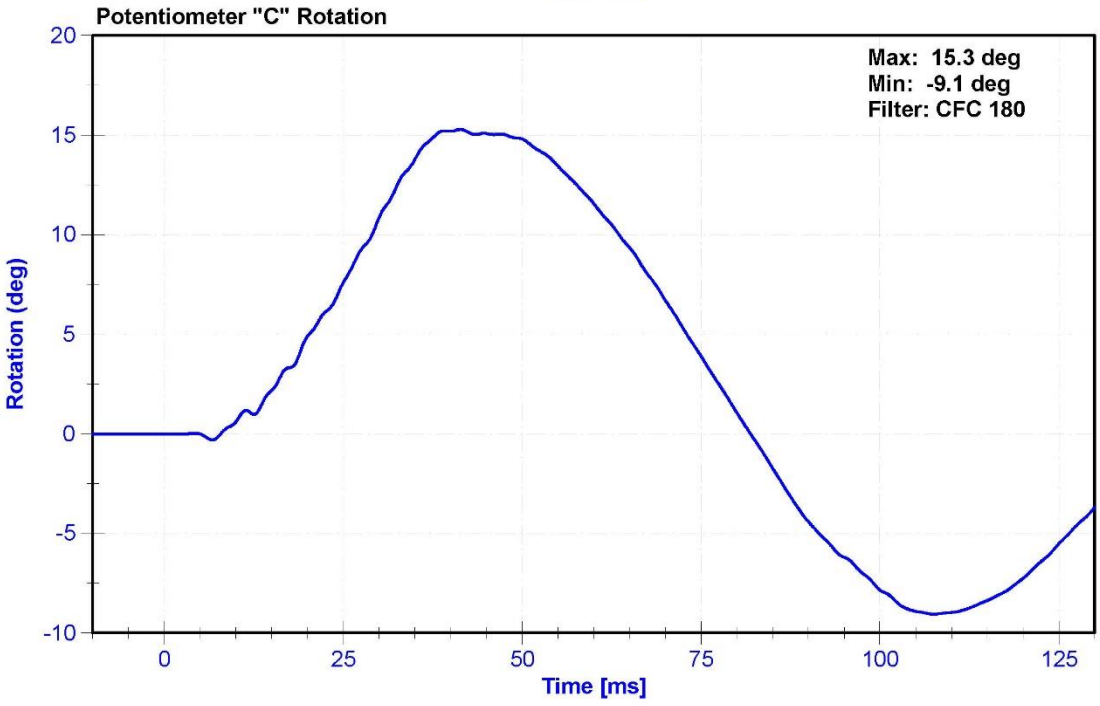
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum "A" Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Condyle "B" Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017


Pendulum Velocity
Min: -7.1 m/s
Filter: CFC 60
Velocity (m/s)
0
-1
-2
-3
-4
-5
-6
-7
-8
0
5
10
15
20
25
30
Time [ms]


Spine Rotation
Max: 48.0 deg
Min: -24.9 deg
Filter: CFC 180
Rotation (Deg)
60
40
20
0
-20
-40
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 32.9 deg
Min: -15.9 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]


Potentiometer "C" Rotation
Max: 15.3 deg
Min: -9.1 deg
Filter: CFC 180
Rotation (deg)
20
15
10
5
0
-5
-10
0
25
50
75
100
125
Time [ms]

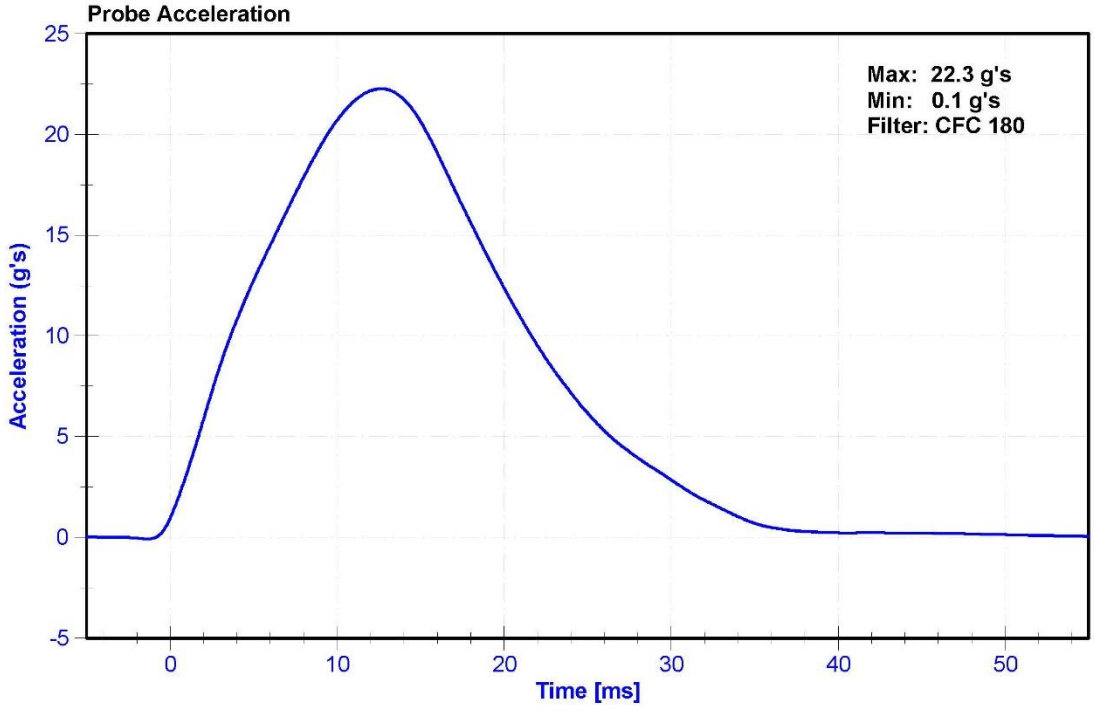
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

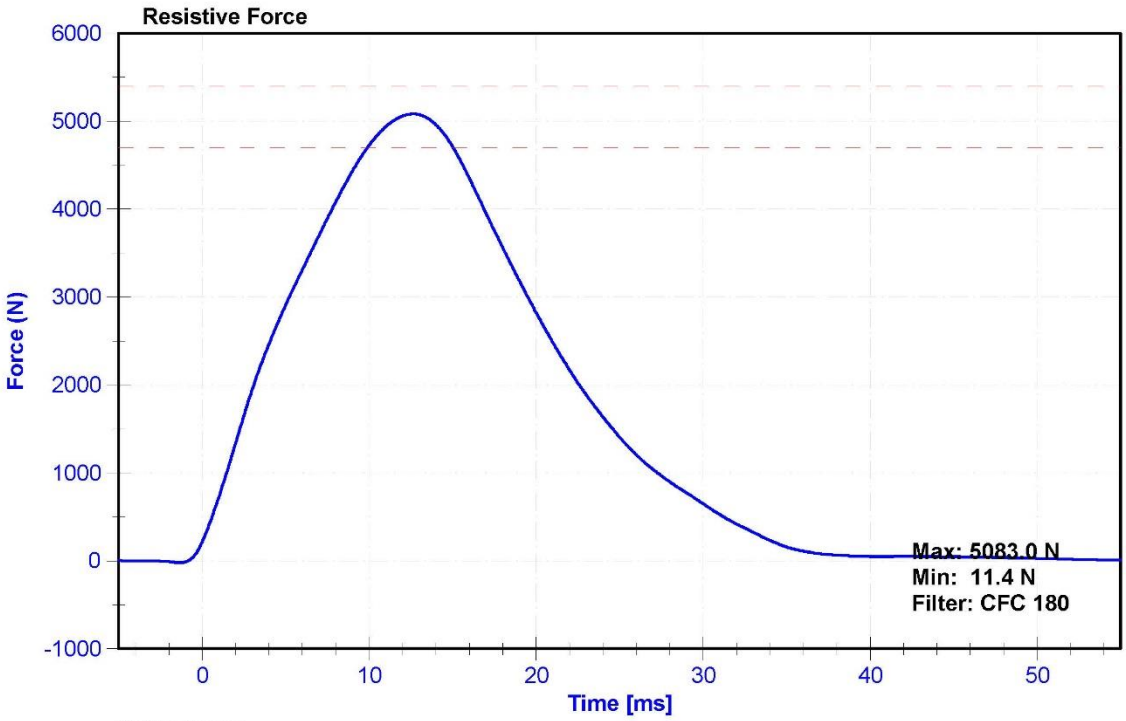
Results

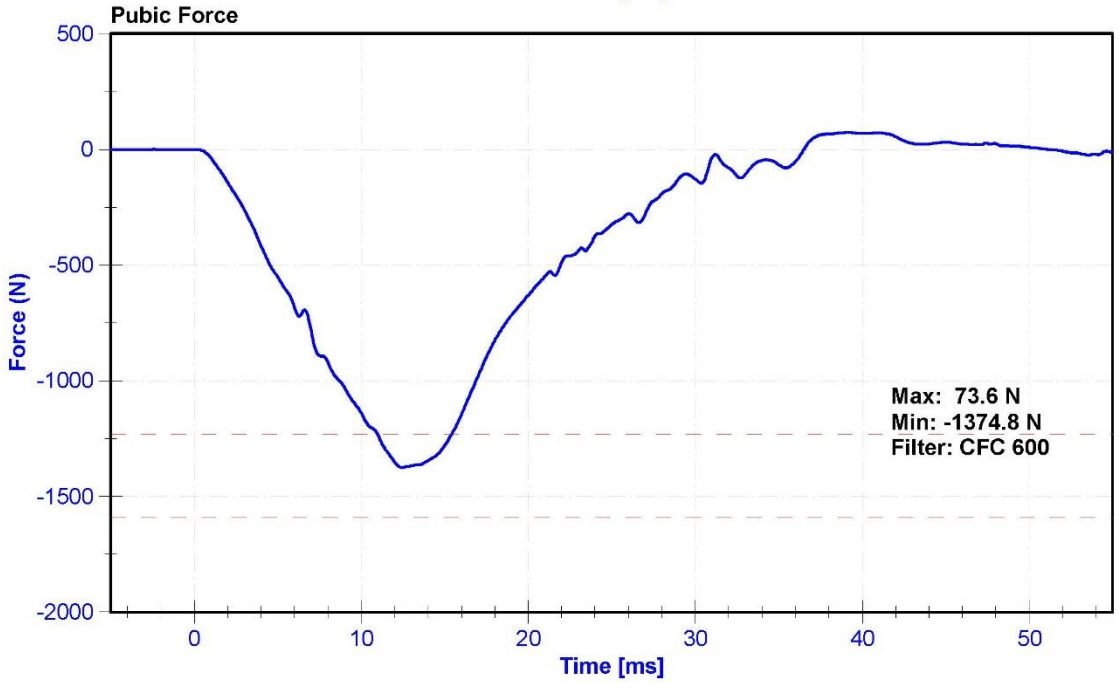
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	37.0	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Resistive Force	4700	5400	N	5083.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.65	Pass
Pubic Force	-1590	-1230	N	-1374.8	Pass
Time at Peak Pubic Force	12.2	17.0	ms	12.45	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/24/2016	5/24/2017




Resistive Force
6000
5000
4000
3000
2000
1000
0
-1000
Force (N)
0
10
20
30
40
50
Time [ms]
Max: 5083.0 N
Min: 11.4 N
Filter: CFC 180


Pubic Force
500
0
-500
-1000
-1500
-2000
Force (N)
0
10
20
30
40
50
Time [ms]
Max: 73.6 N
Min: -1374.8 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

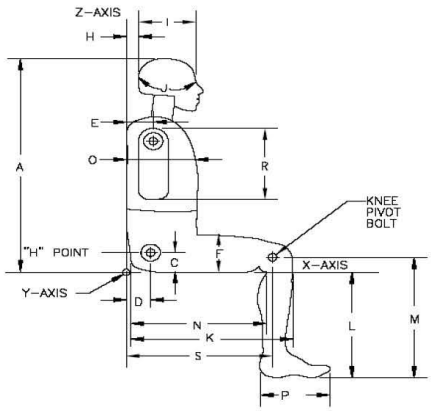
SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

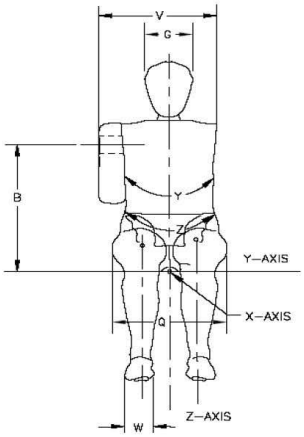
SERIAL No: DG8012

External Measurements - SID-IIs

Technician: MKG Date: 1/19/2017

Dummy Serial Number: DG8012





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	129	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	351	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	429	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	346	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	861	Pass
Z	Waist Circumference	761	791	771	Pass

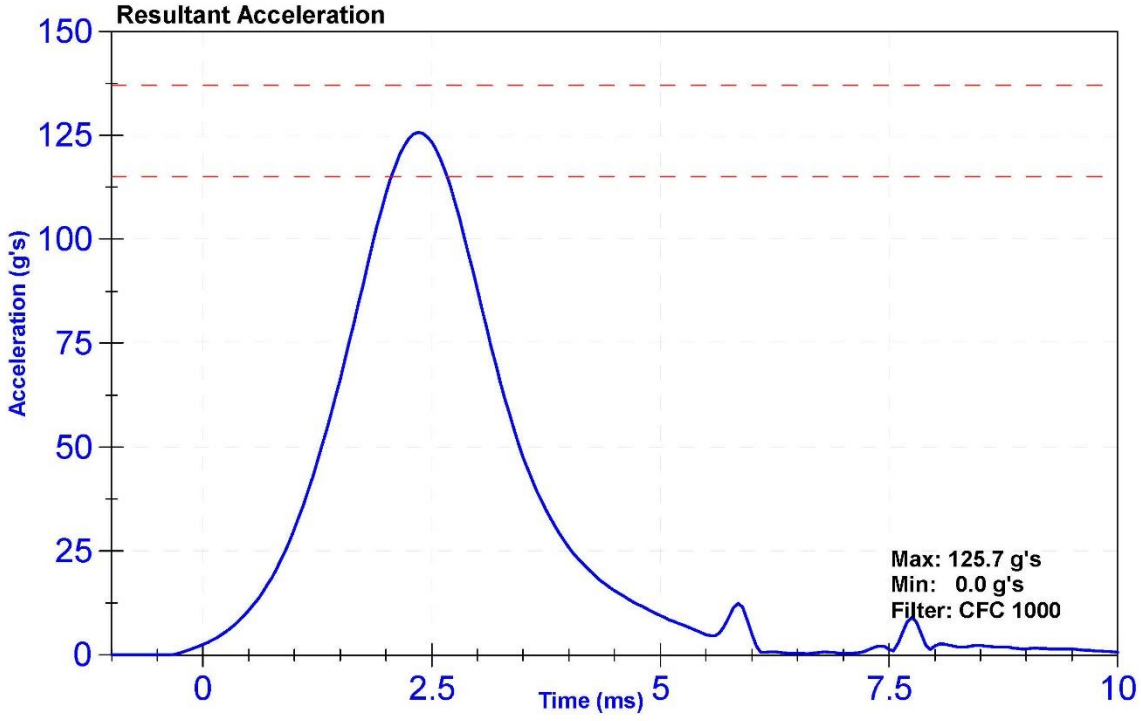
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

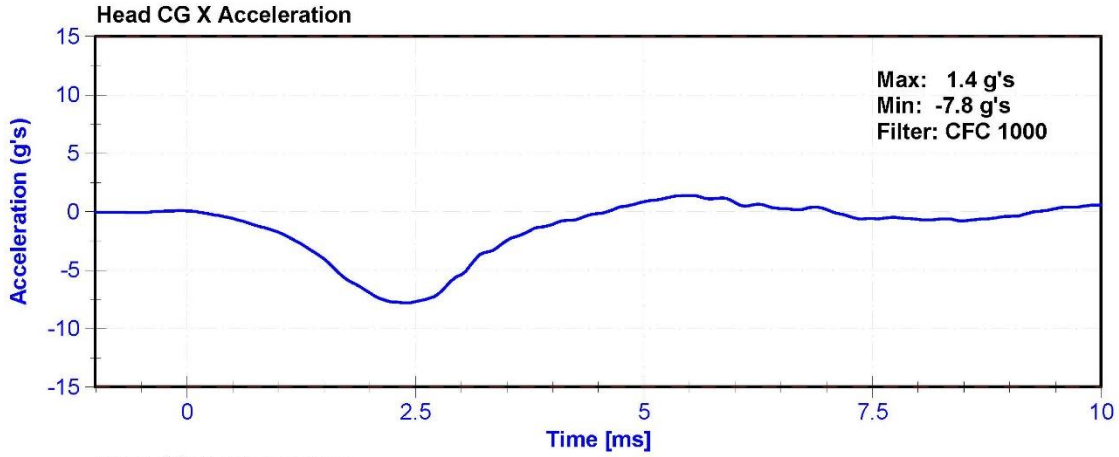
Results

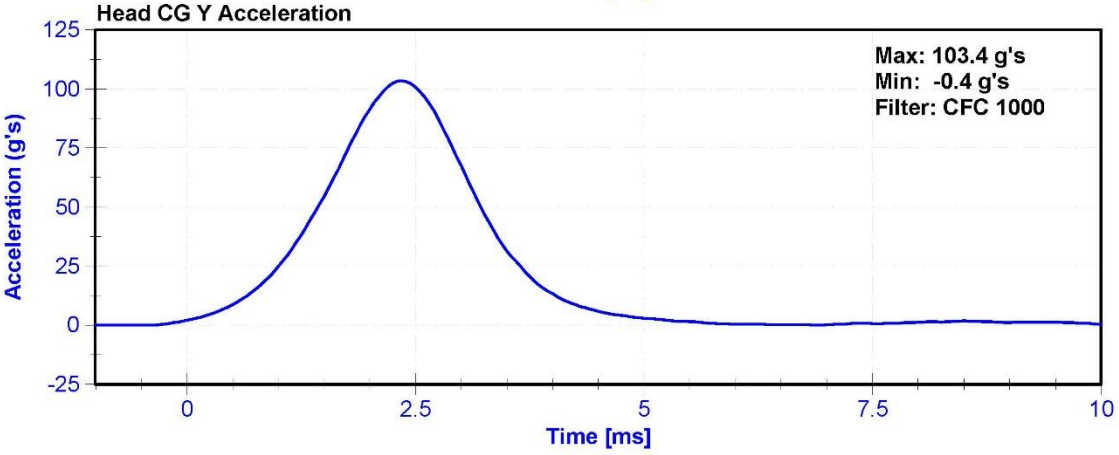
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	37.9	Pass
Resultant Acceleration	115	137	g's	125.7	Pass
Oscillation	0	15	%	9.8	Pass
Fore-Aft Acceleration	-15	15	g's	-7.8	Pass

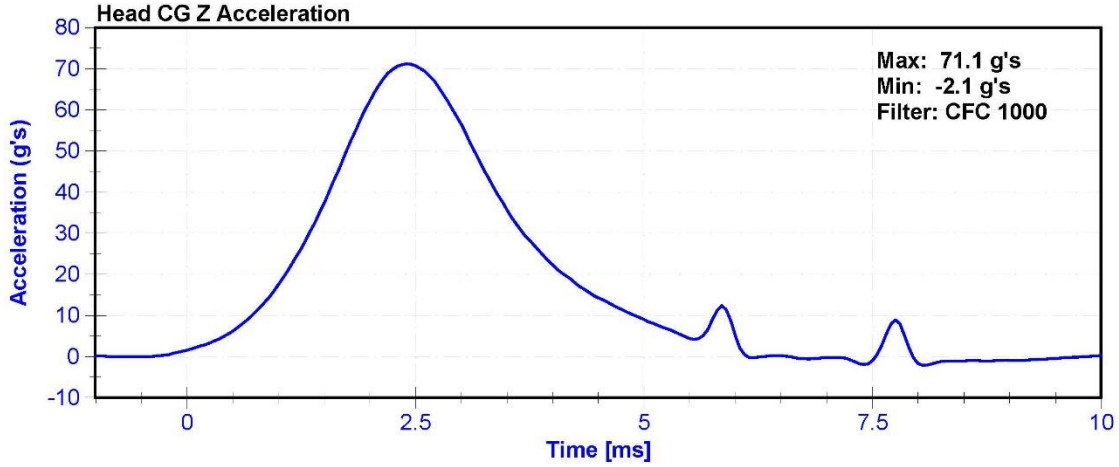
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	9/30/2016	3/31/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	9/30/2016	3/31/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	9/30/2016	3/31/2017




Head CG X Acceleration
Max: 1.4 g's
Min: -7.8 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 103.4 g's
Min: -0.4 g's
Filter: CFC 1000
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 71.1 g's
Min: -2.1 g's
Filter: CFC 1000
Acceleration (g's)
80
70
60
50
40
30
20
10
0
-10
0
2.5
5
7.5
10
Time [ms]

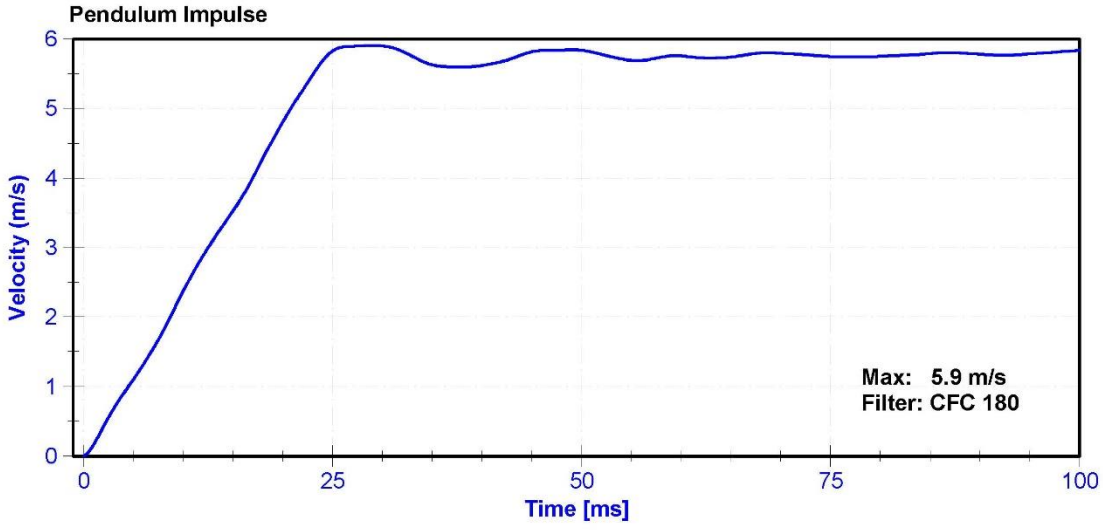
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

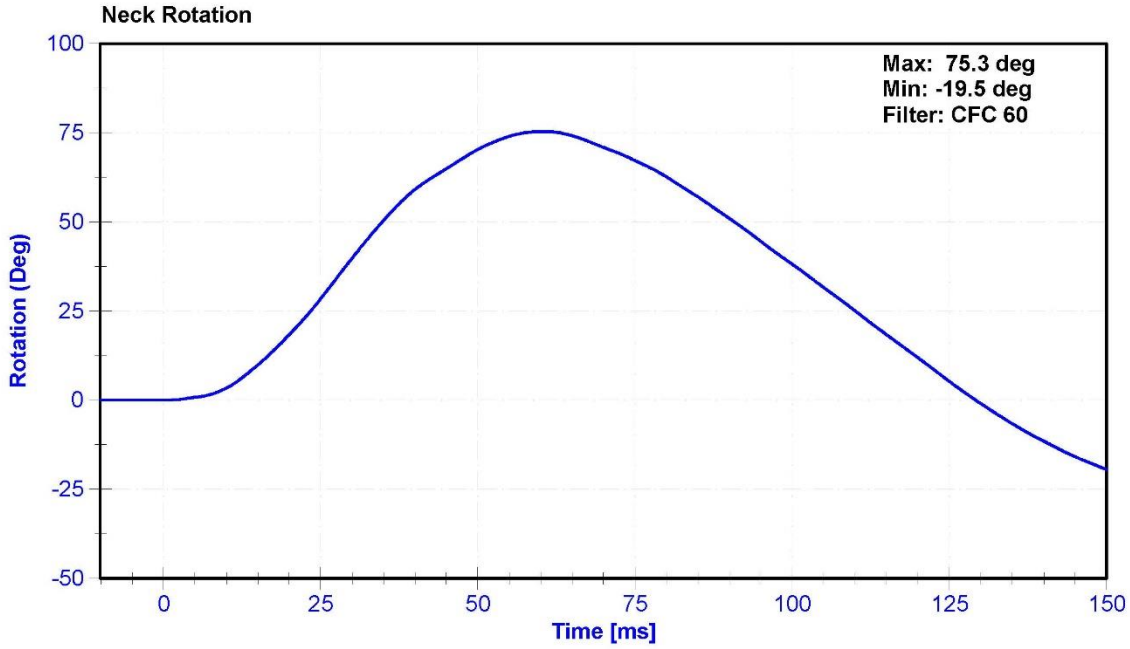
Results

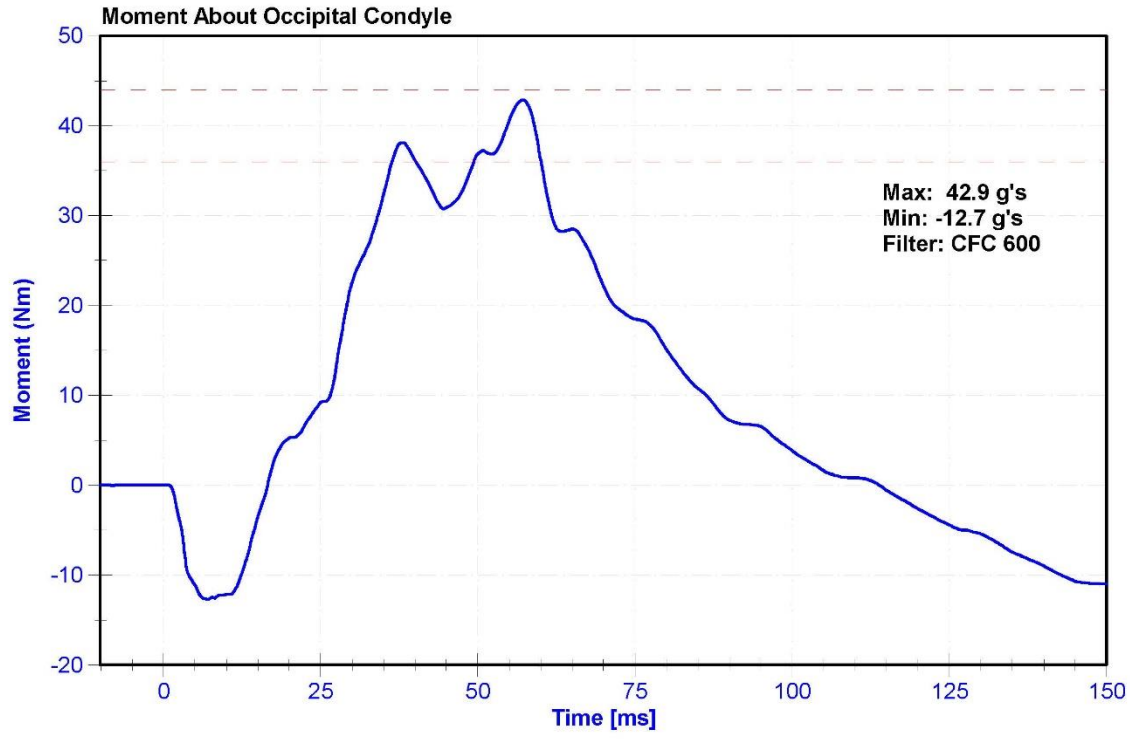
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	34.2	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.37	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.53	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.81	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.83	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.91	Pass
Neck Rotation	71	81	deg	75.3	Pass
Time at Maximum Rotation	50	70	ms	60.4	Pass
Moment about the OC	36	44	Nm	42.9	Pass
Moment Decay to 0 Nm	102	126	ms	113.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/12/2016	10/12/2017
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/12/2016	10/12/2017
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017




Neck Rotation
Max: 75.3 deg
Min: -19.5 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.9 g's
Min: -12.7 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

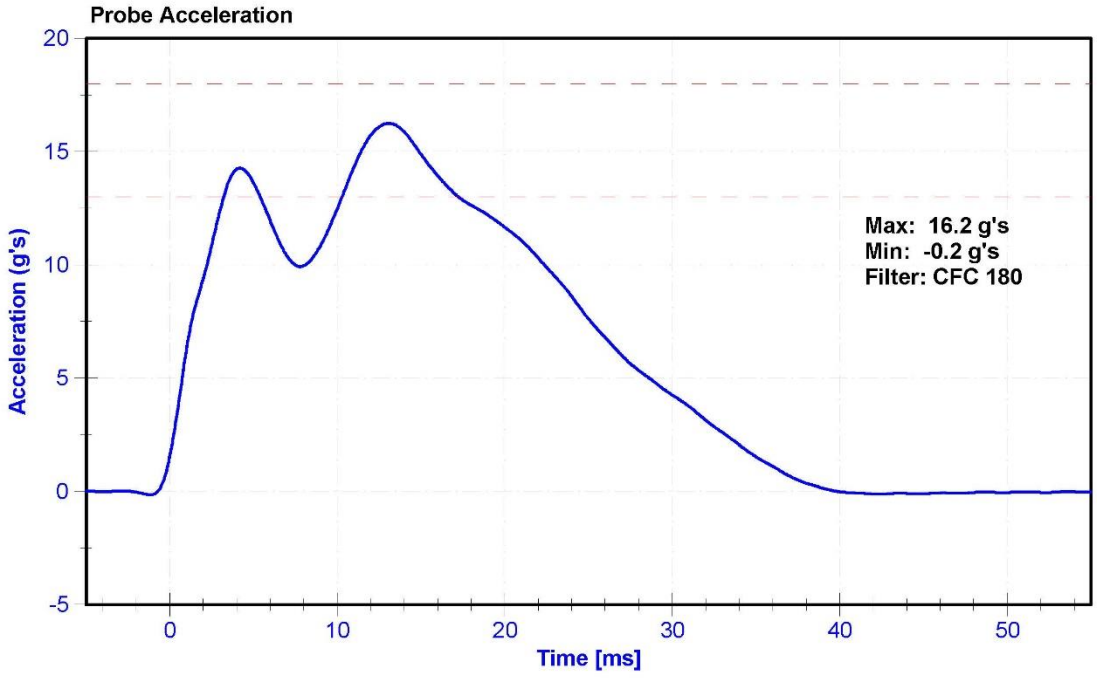
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

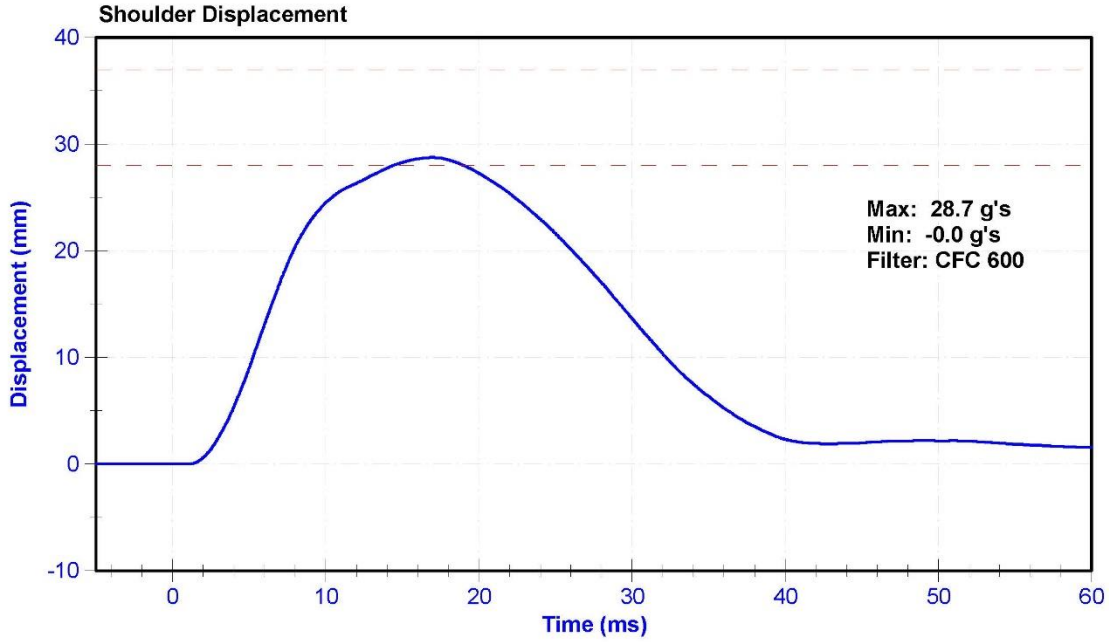
Results

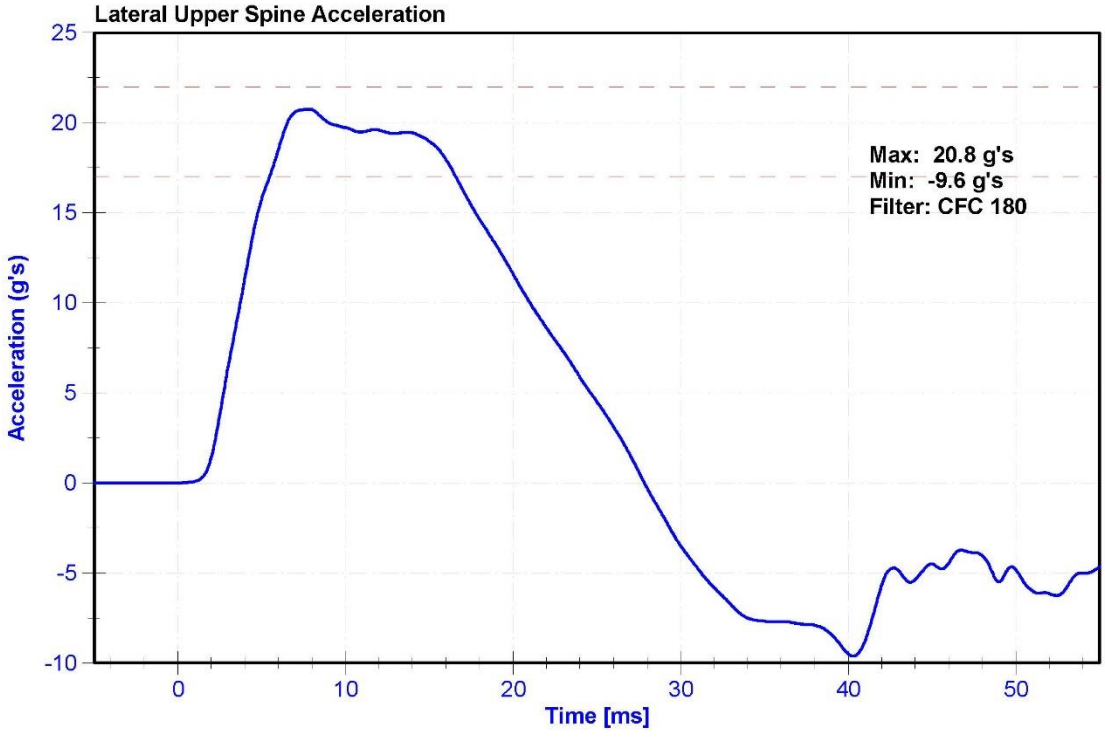
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	30.2	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	13	18	g's	16.2	Pass
Shoulder Deflection	28	37	mm	28.7	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 28.7 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 20.8 g's
Min: -9.6 g's
Filter: CFC 180

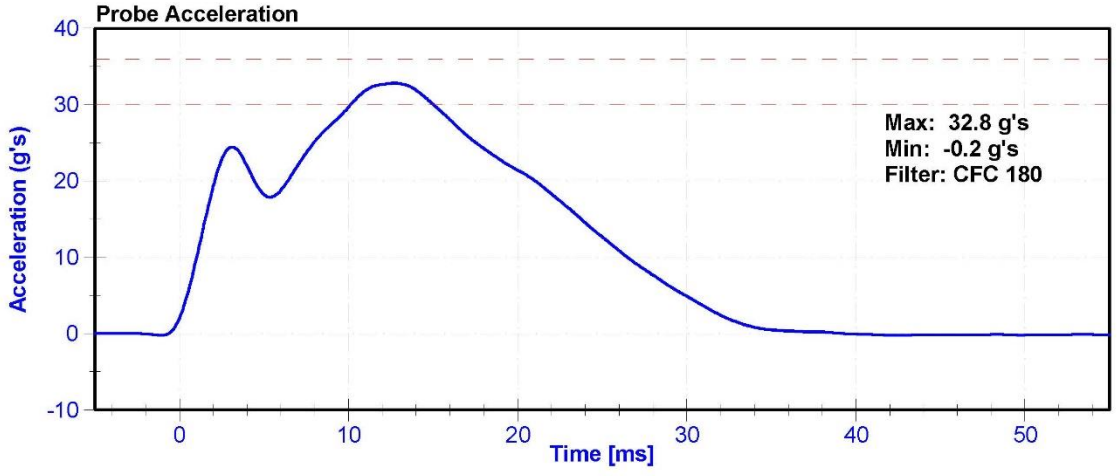
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

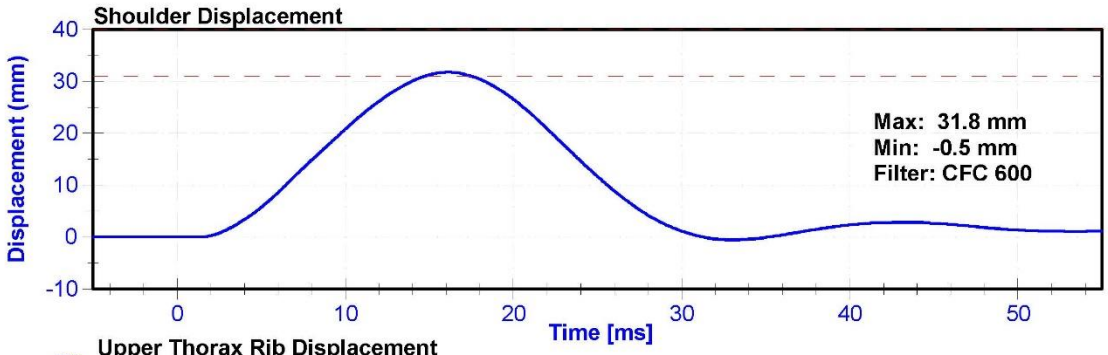
Results

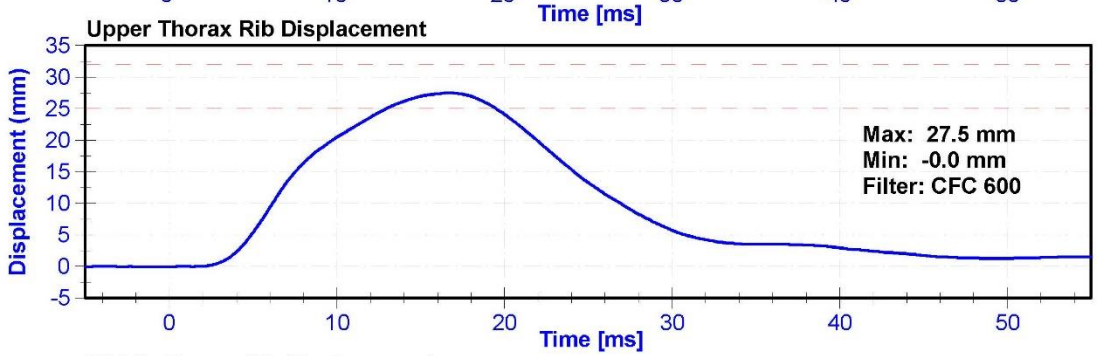
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	30.3	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	32.8	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.9	Pass
Shoulder Deflection	31	40	mm	31.8	Pass
Upper Thorax Rib Deflection	25	32	mm	27.5	Pass
Mid Thorax Rib Deflection	30	36	mm	32.4	Pass
Lower Thorax Rib Deflection	32	38	mm	34.6	Pass

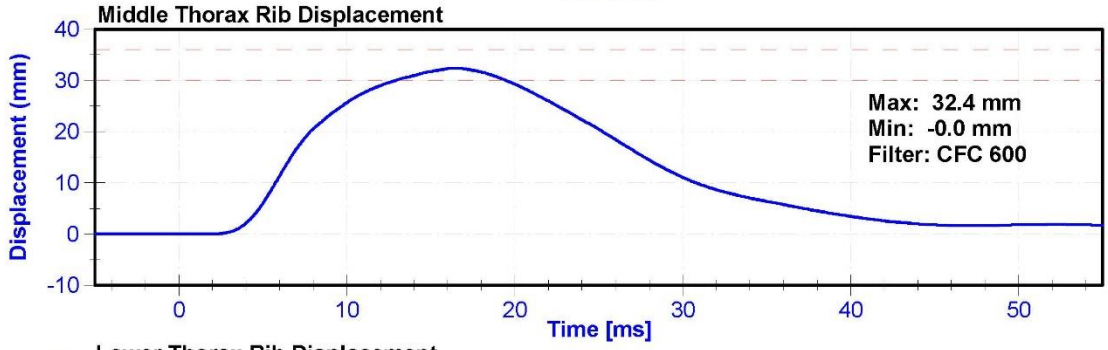
Transducer Calibrations

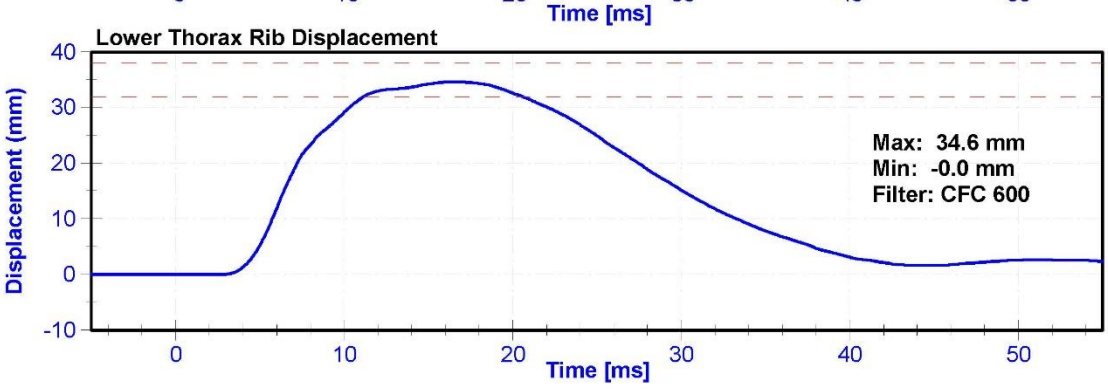
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

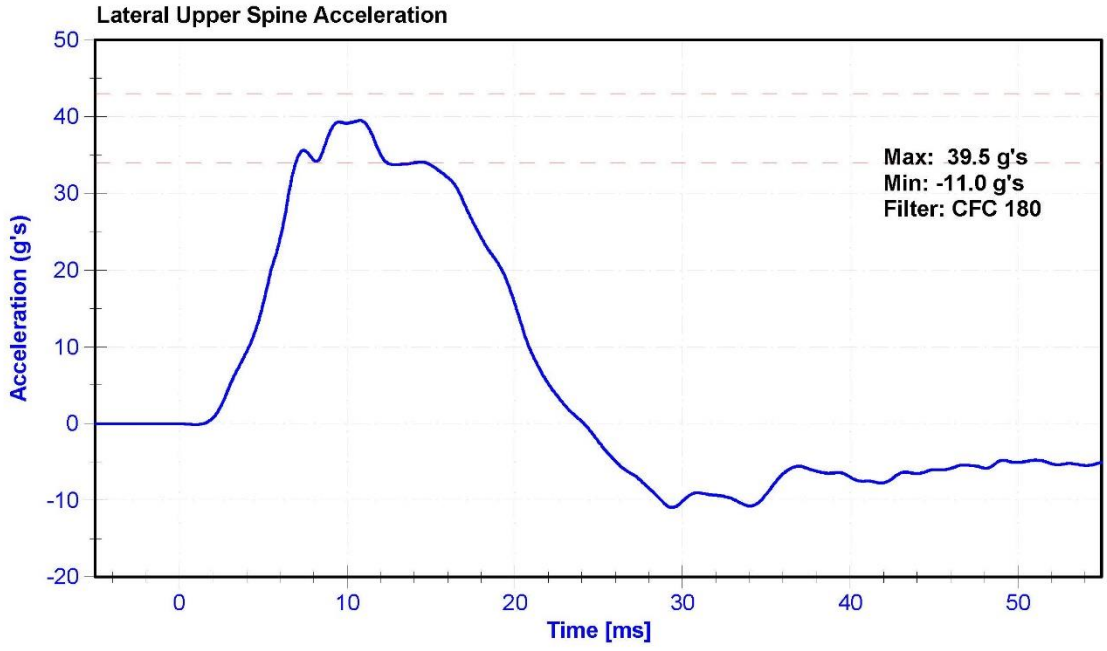


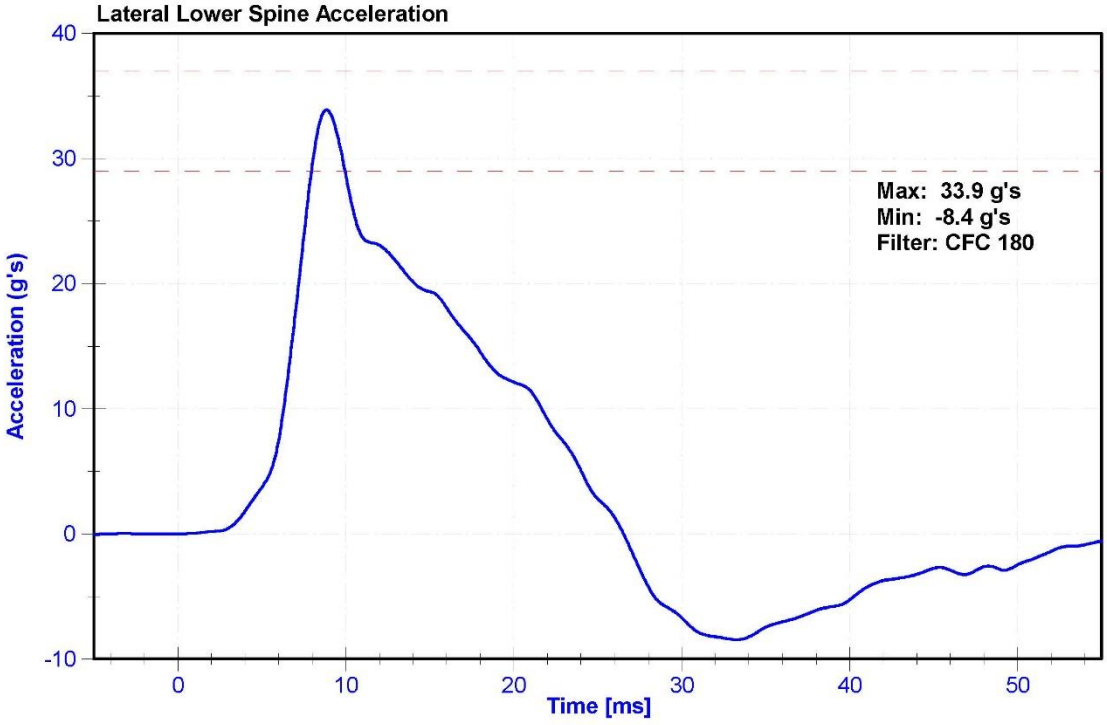

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 31.8 mm
Min: -0.5 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.5 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.4 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.6 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 39.5 g's
Min: -11.0 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 33.9 g's
Min: -8.4 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

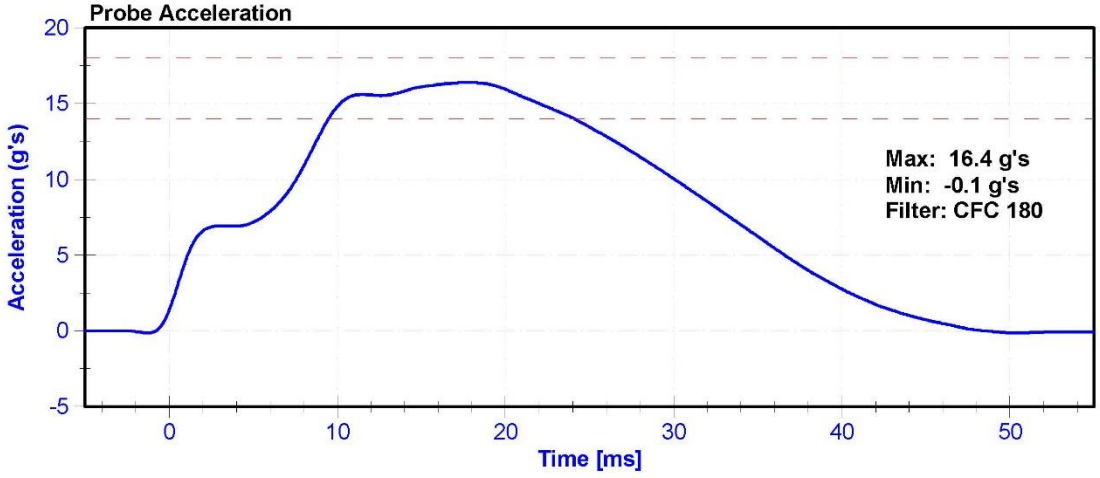
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

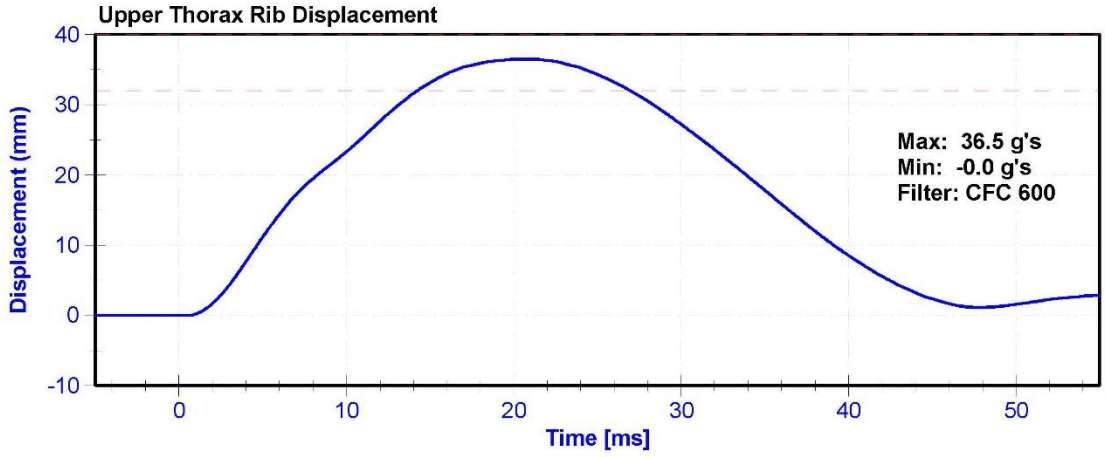
Results

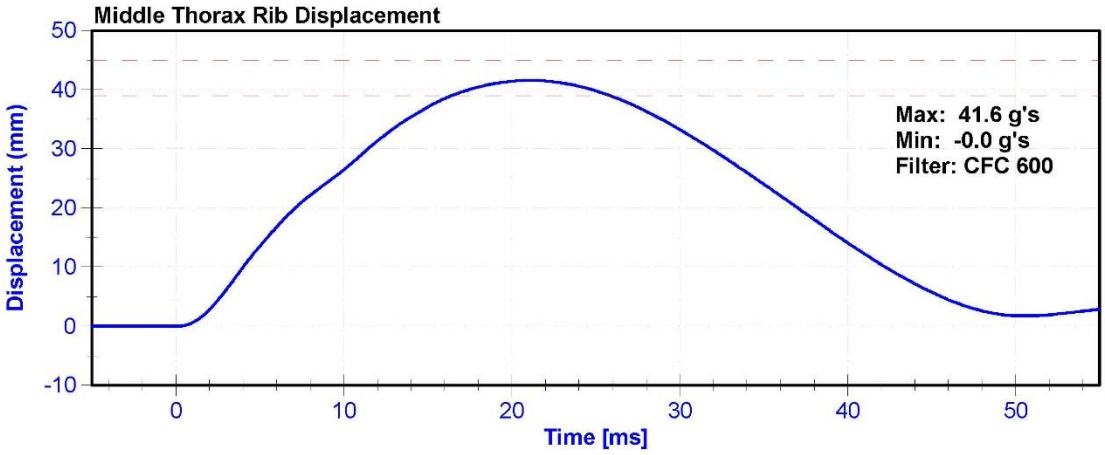
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	30.2	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	14	18	g's	16.4	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.5	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.2	Pass
Upper Thorax Rib Deflection	32	40	mm	36.5	Pass
Middle Thorax Rib Deflection	39	45	mm	41.6	Pass
Lower Thorax Rib Deflection	35	43	mm	37.9	Pass

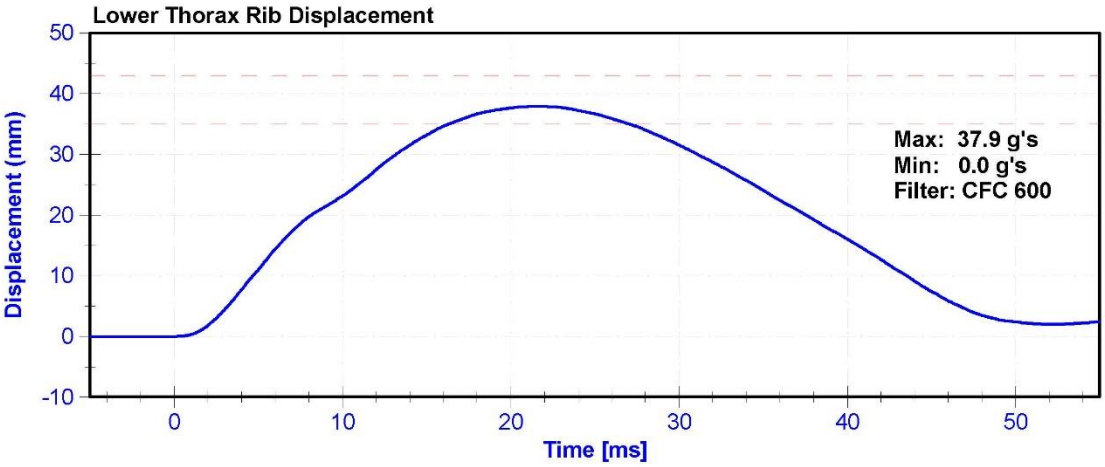
Transducer Calibrations

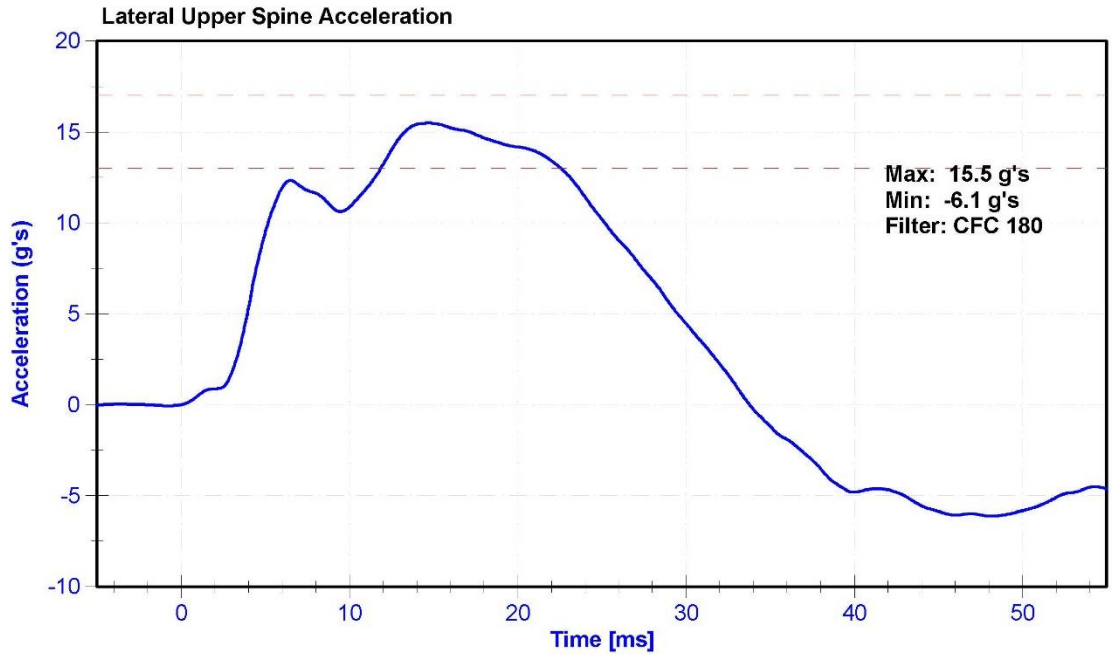
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

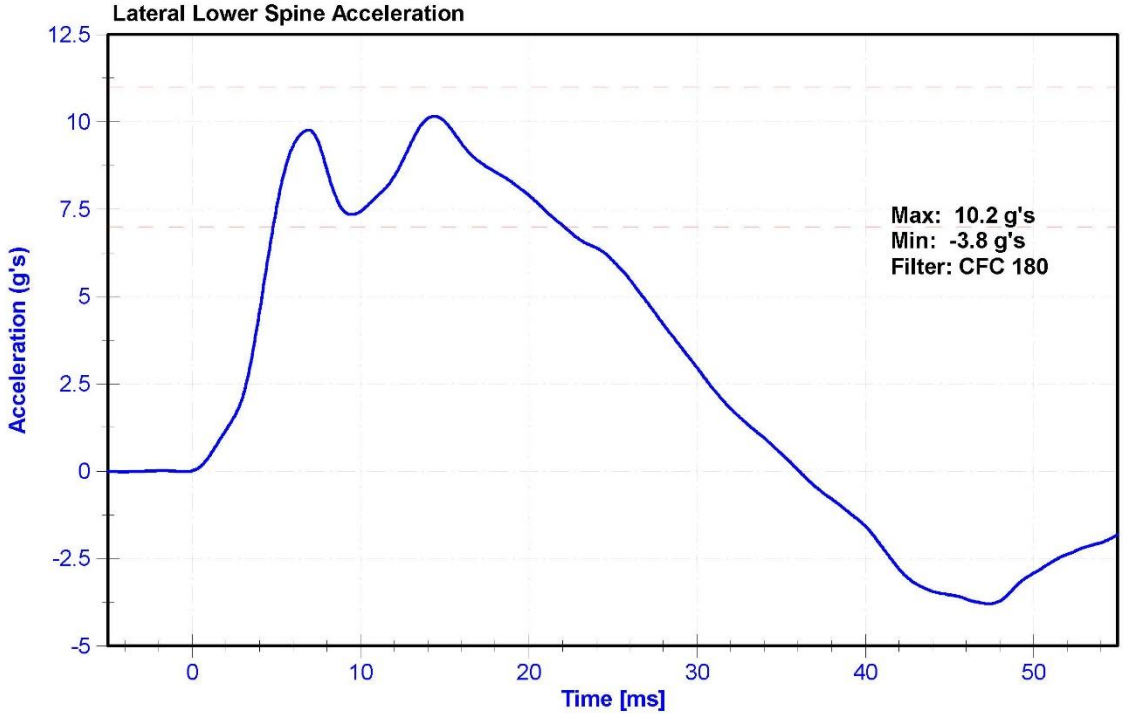



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.5 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.6 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.9 g's
Min: 0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 15.5 g's
Min: -6.1 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
20
15
10
5
0
-5
-10
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 10.2 g's
Min: -3.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50

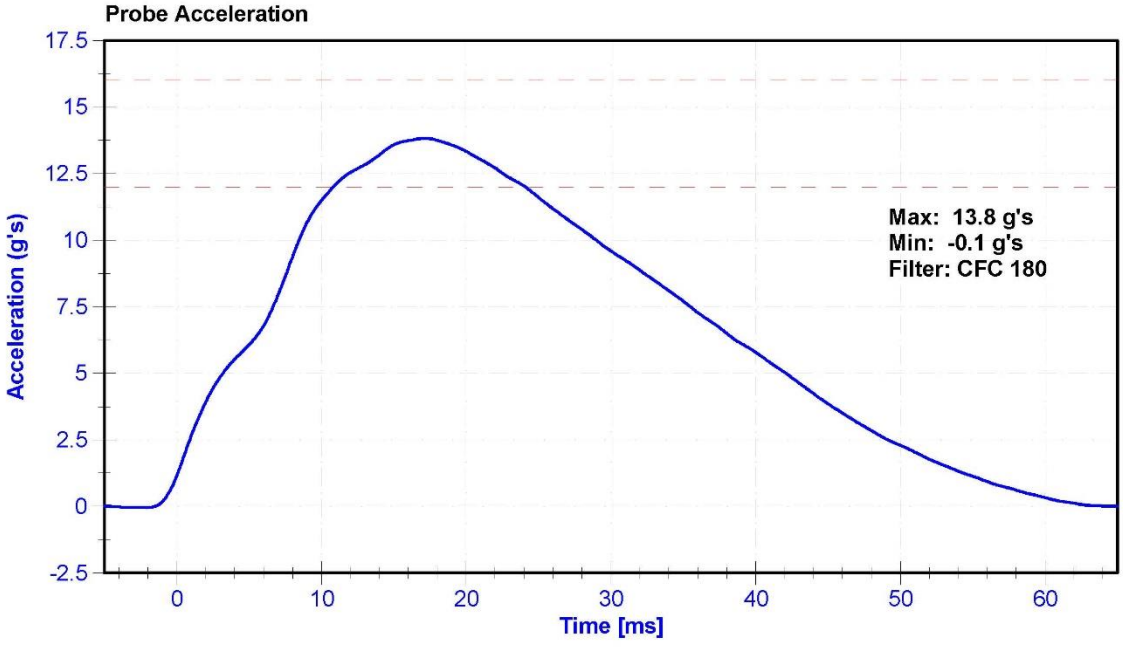
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

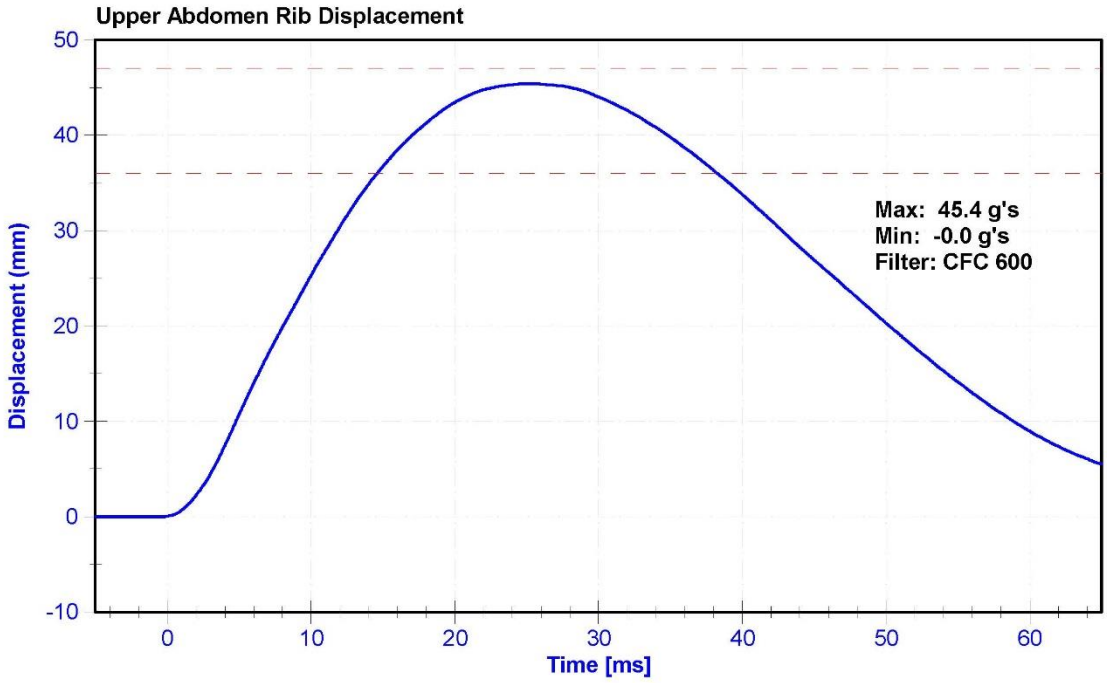
Results

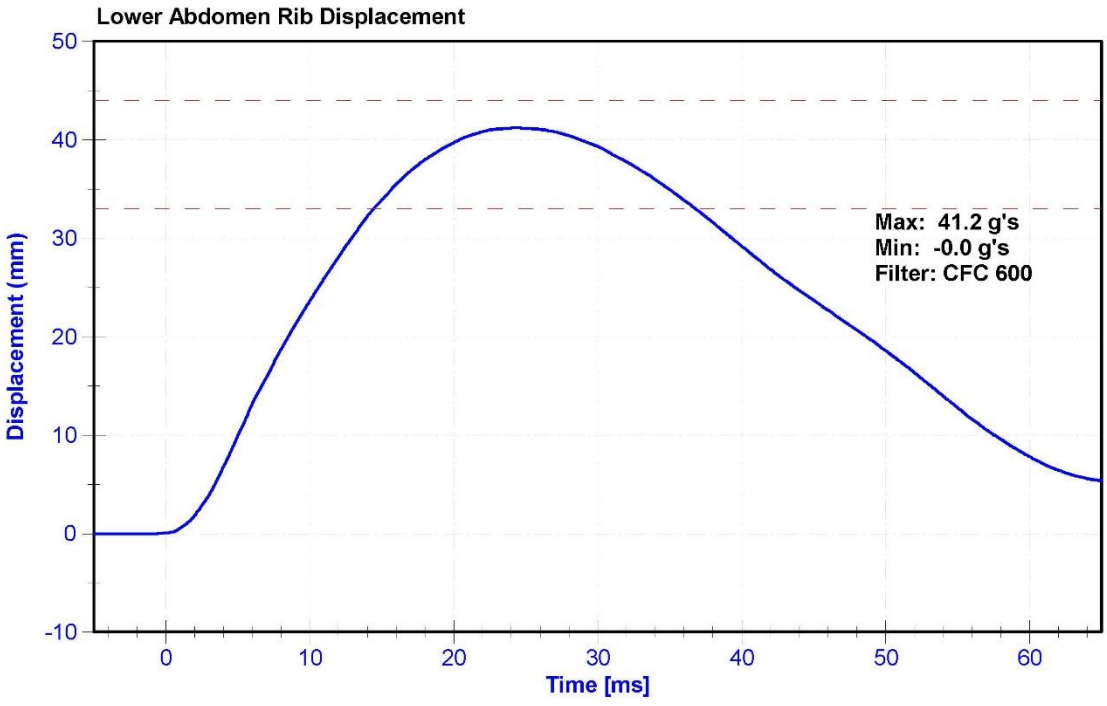
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	30.1	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	13.8	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	45.4	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.2	Pass

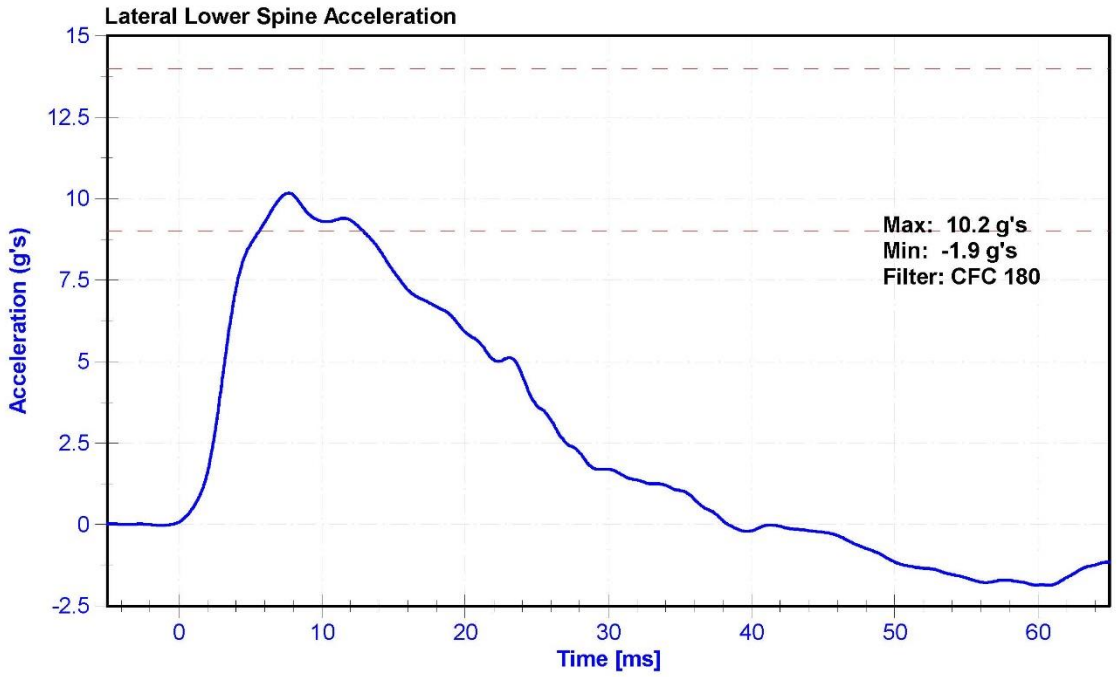
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Abdomen Rib Potentiometer	Servo 08TC1-3787	DS-015GFE	6/15/2016	6/15/2017
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	6/15/2016	6/15/2017




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 45.4 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.2 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
0
10
20
30
40
50
60
Time [ms]
Max: 10.2 g's
Min: -1.9 g's
Filter: CFC 180

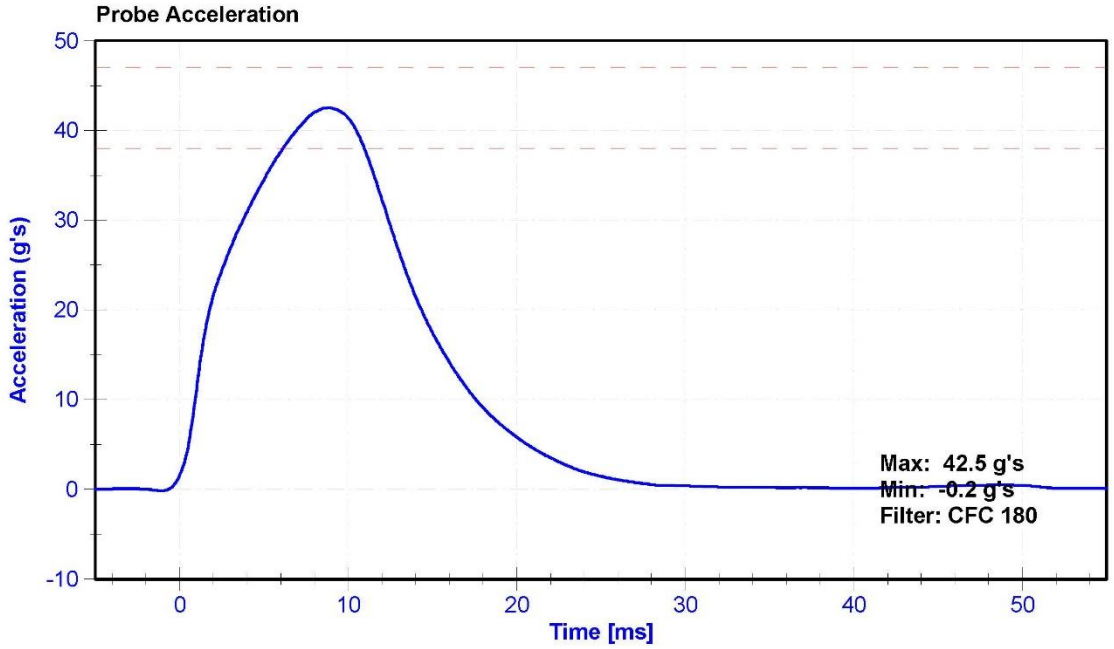
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

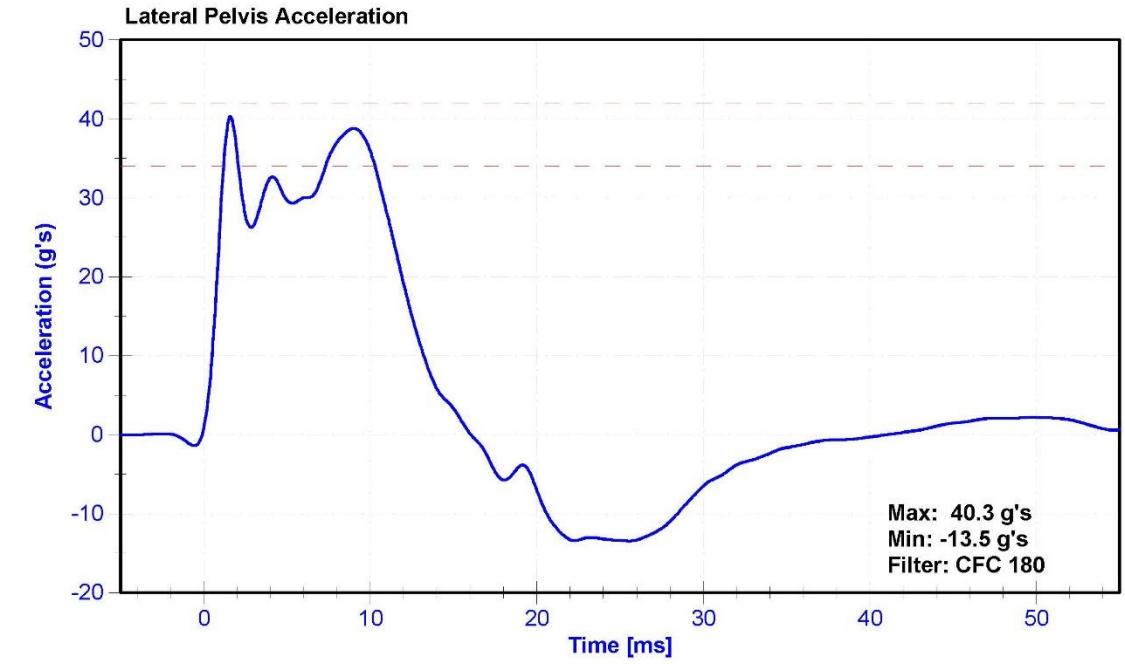
Results

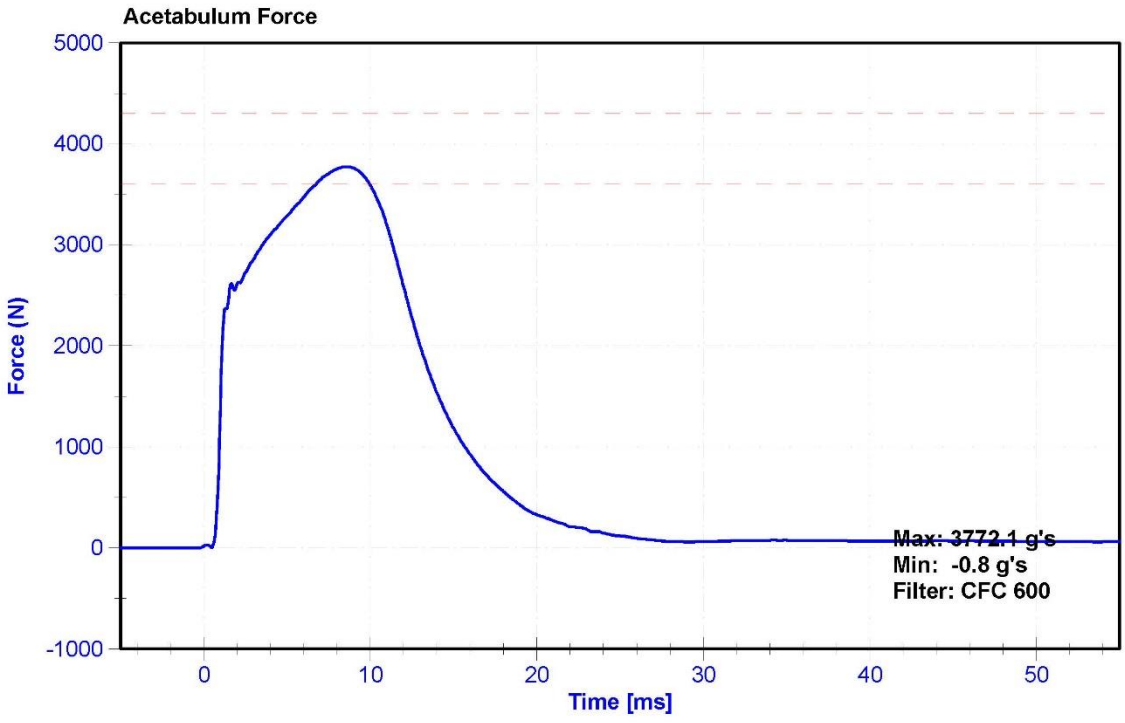
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	30.1	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	42.5	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.8	Pass
Acetabulum Force	3600	4300	N	3772.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Acetabulum Load Cell	Denton 3249J	LC-267Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	10964	04/05/2016	N/A
Crash Test Plug	Humanetics	10987	04/06/2016	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]
Max: 40.3 g's
Min: -13.5 g's
Filter: CFC 180


Acetabulum Force
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 3772.1 g's
Min: -0.8 g's
Filter: CFC 600

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 10964 1518N

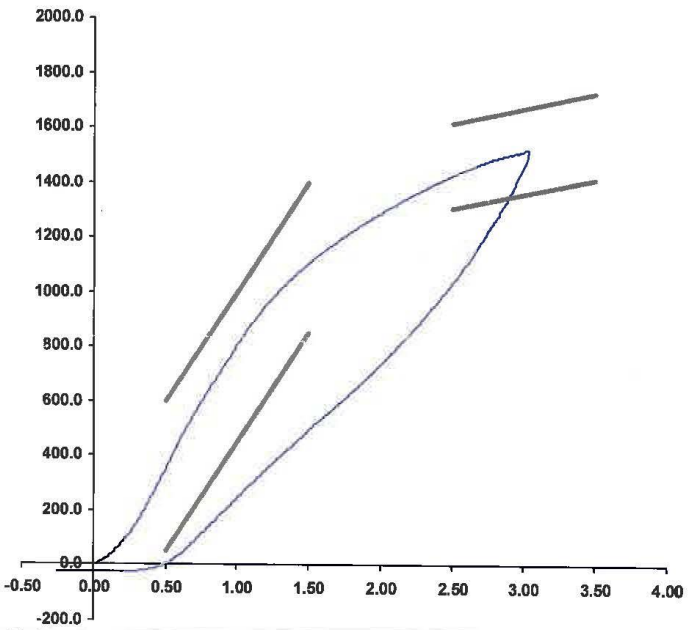
Test Number 2027

Report Number 2021 CERTIFICATION

Test Date 4/5/2016 8:54:40 AM DG8012

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	360.06	50.00	600.00
Force @ 1.5 mm (N)	1,113.02	850.00	1,400.00
Force @ 2.5 mm (N)	1,429.75	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,518.02	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542

Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator DC

Part Number 180-4450

Template No 107 05-Apr-16

SACO Research

By : DC Date : 4/5/16

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

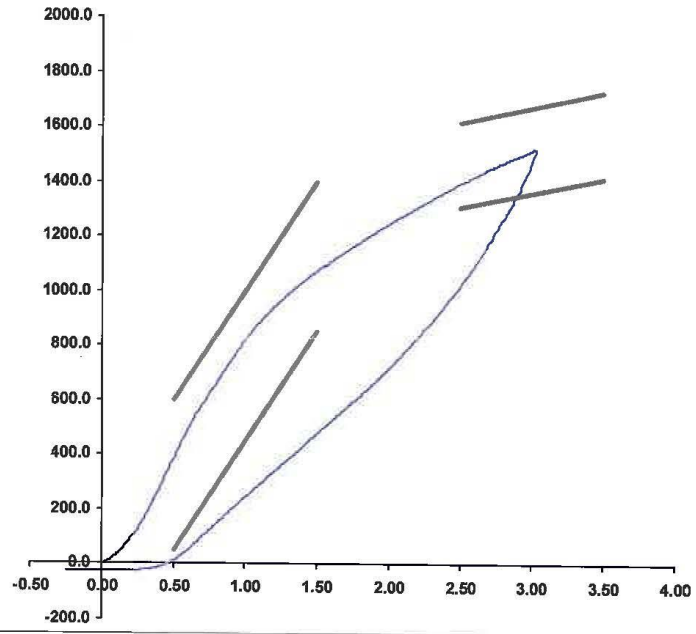
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 10987 1518N
Test Number 2069 CRASH
Report Number 2063 DG8012
Test Date 4/6/2016 8:33:18 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	388.29	50.00	600.00
Force @ 1.5 mm (N)	1,075.50	850.00	1,400.00
Force @ 2.5 mm (N)	1,396.44	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,518.15	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator DC

Part Number 180-4450

Template No 107 08-Apr-16
SACO Research

By : DC Date : 4/6/16

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

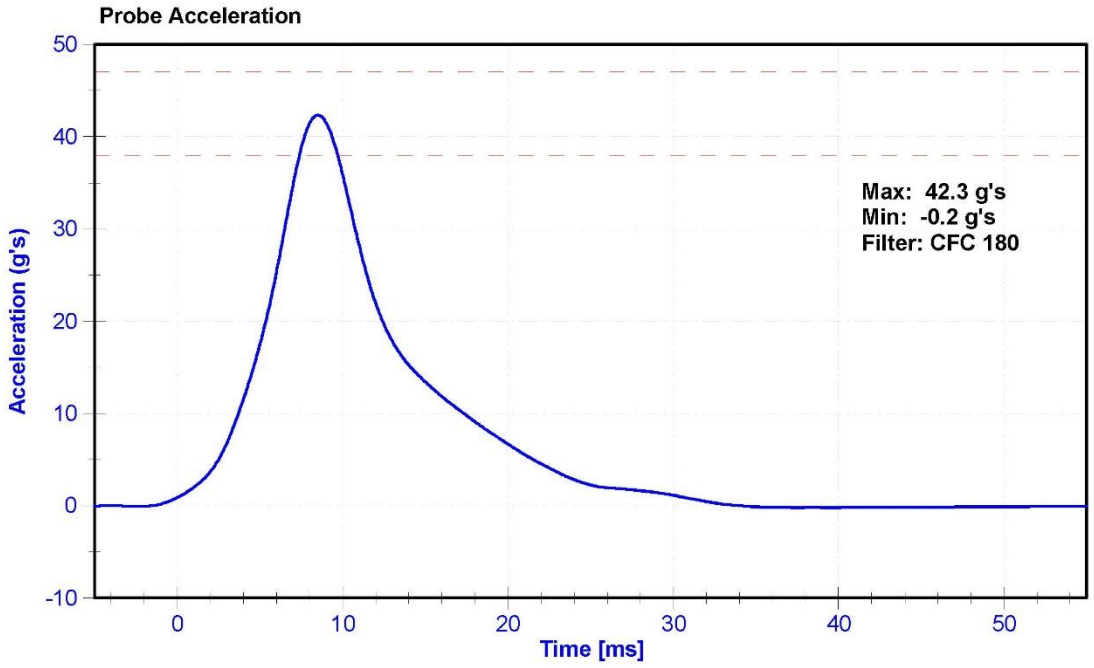
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

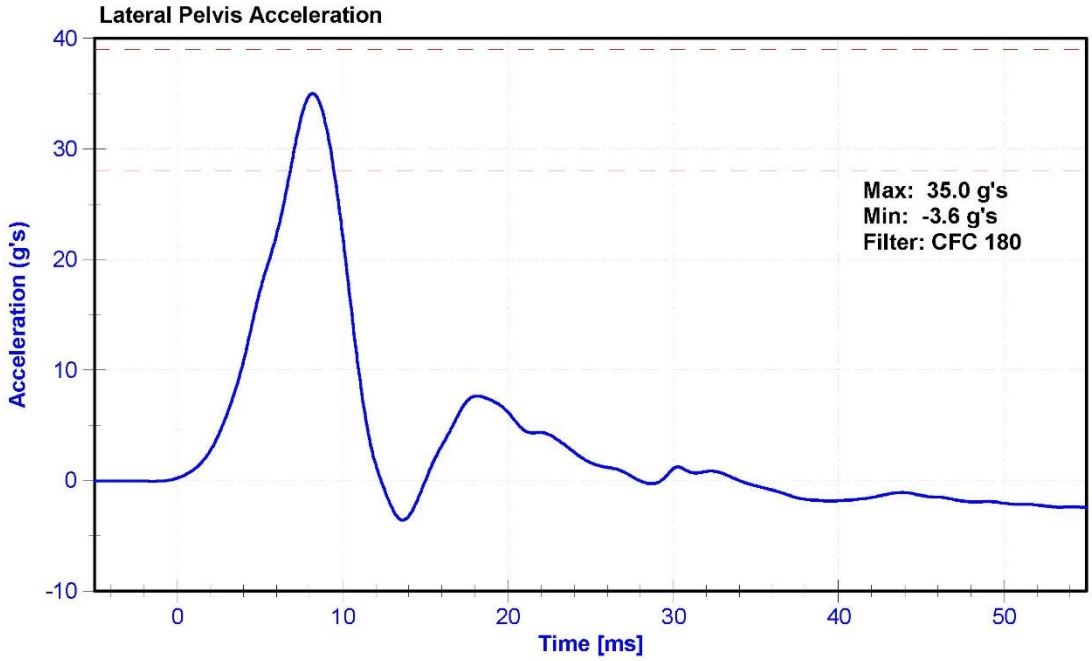
Results

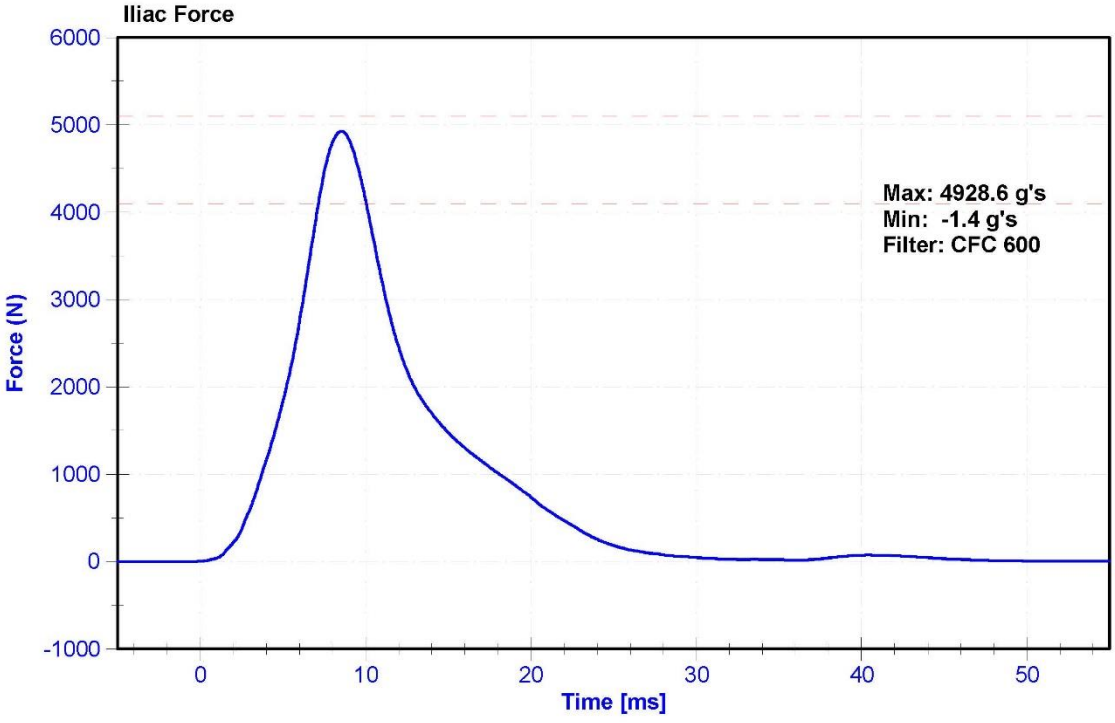
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	30.7	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	36	45	g's	42.3	Pass
Lateral Pelvis Acceleration	28	39	g's	35.0	Pass
Iliac Force	4100	5100	N	4928.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Iliac Load Cell	DENTON 3228J	LC-281Fy	5/24/2016	5/24/2017




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 35.0 g's
Min: -3.6 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4928.6 g's
Min: -1.4 g's
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F034		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	AC-P58904	ENDEVCO	1/6/2017
		Y	AC-P58911	ENDEVCO	1/6/2017
		Z	AC-P58776	ENDEVCO	1/6/2017
	Redundant	X	AC-P58887	ENDEVCO	1/6/2017
		Y	AC-P58888	ENDEVCO	1/6/2017
		Z	AC-P51734	ENDEVCO	1/6/2017
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	HONEYWELL	6/20/2016
	Middle	Y	DS-184GFE	HONEYWELL	6/20/2016
	Lower	Y	DS-182GFE	HONEYWELL	6/20/2016
Abdomen Load Cells	Forward	Y	LC-1512	DENTON	5/24/2016
	Middle	Y	LC-1526	DENTON	5/24/2016
	Rear	Y	LC-1516	DENTON	5/24/2016
Lower Spine Accelerometers (T12)		X	AC-P52079	ENDEVCO	1/6/2017
		Y	AC-P51948	ENDEVCO	1/6/2017
		Z	AC-P51269	ENDEVCO	1/6/2017
Pubic Symphysis Load Cell		Y	LC-465Fy	DENTON	5/24/2016

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: DG8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	AC-P51685	ENDEVCO	9/30/2016
			Y	AC-P51682	ENDEVCO	9/30/2016
			Z	AC-P51699	ENDEVCO	9/30/2016
		Redundant	X	AC-P51701	ENDEVCO	9/30/2016
			Y	AC-P45019	ENDEVCO	9/30/2016
			Z	AC-P51690	ENDEVCO	9/30/2016
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-808GFE	SERVO	6/15/2016
		Middle	Y	DS-1514GFE	SERVO	6/15/2016
		Lower	Y	DS-011GFE	SERVO	6/15/2016
	Abdominal Rib	Upper	Y	DS-015GFE	SERVO	6/15/2016
		Lower	Y	DS-1774GFE	SERVO	6/15/2016
Lower Spine Accelerometers (T12)			X	AC-P74788	ENDEVCO	10/4/2016
			Y	AC-P83319	ENDEVCO	10/4/2016
			Z	AC-P83432	ENDEVCO	10/4/2016
Acetabulum Load Cell			Y	LC-267Fy	DENTON	5/24/2016
Iliac Wing Load Cell			Y	LC-281Fy	DENTON	5/24/2016
Pelvis Plug (struck side)				10989	SACO	4/6/2016
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-A196989	MSI 1201-1000	10/26/2016
	Vehicle Center of Gravity	Y	AC-A196992	MSI 1201-1000	10/26/2016
	Vehicle Center of Gravity	Z	AC-A196997	MSI 1201-1000	10/26/2016
2	Right Sill at Front Seat	X	AC-A192215	Measurement Specialties 1201-1000	10/12/2016
	Right Sill at Front Seat	Y	AC-A192219	Measurement Specialties 1201-1000	10/12/2016
	Right Sill at Front Seat	Z	AC-A192227	Measurement Specialties 1201-1000	10/12/2016
3	Right Sill at Rear Seat	X	AC-A196983	MSI 1201-1000	11/18/2016
	Right Sill at Rear Seat	Y	AC-A197014	MSI 1201-1000	11/18/2016
	Right Sill at Rear Seat	Z	AC-A197059	MSI 1201-1000	11/18/2016
4	Left Sill at Front Door	Y	AC-A192206	Measurement Specialties 1201-1000	10/17/2016
5	Left Sill at Rear Door	Y	AC-A192222	Measurement Specialties 1201-1000	10/13/2016
6	Left A-Post Lower	Y	AC-A189596	MSI 1201-1000	10/17/2016
7	Left A-Post Middle	Y	AC-A189589	MSI 1201-1000	10/17/2016
8	Left B-Post Lower	Y	AC-A192203	Measurement Specialties 1201-1000	10/13/2016
9	Left B-Post Middle	Y	AC-A192208	Measurement Specialties 1201-1000	10/13/2016
10	Front Seat Track	Y	AC-A192217	Measurement Specialties 1201-1000	10/13/2016
11	Rear Seat Track or Structure	Y	AC-A197043	MSI 1201-1000	10/26/2016
12	Right Rear Occ. Compartment	Y	AC-A206913	MSI 1201-1000	10/25/2016
13	Engine Block	X	AC-A189598	MSI 1201-1000	1/5/2017
	Engine Block	Y	AC-A189609	MSI 1201-1000	1/5/2017
14	Rear Floorpan Above Axle	X	AC-A196607	MSI 1201-1000	10/25/2016
	Rear Floorpan Above Axle	Y	AC-A196609	MSI 1201-1000	10/25/2016
	Rear Floorpan Above Axle	Z	AC-A213653	MSI 1201-1000	10/25/2016

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	AC-C14901	ENDEVCO	10/7/2016
MDB Center of Gravity	Y	AC-CP30	ENDEVCO	10/7/2016
MDB Center of Gravity	Z	AC-C16680	ENDEVCO	10/7/2016
Left Frame at Rear Axle Centerline	X	AC-C16499	ENDEVCO	10/7/2016
Left Frame at Rear Axle Centerline	Y	AC-AH5M8	ENDEVCO	10/7/2016