

REPORT NUMBER: SINCAP-CAL-17-011

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

**Mazda Motor Corporation
2017 Mazda CX-5
4 Door SUV**

NHTSA No: M20175402

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



June 2, 2017

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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WASHINGTON, D.C. 20590**

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Date: June 2, 2017

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Transportation Test Operations

Date: June 2, 2017

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° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2017 Mazda CX-5 SUV 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 May 9, 2017. The impact velocity of the Moving Deformable Barrier (MDB) was 62.11 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 126mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>73.441</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>13.727</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>658.203</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>958.966</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>264.014</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>G</td> <td>82</td> <td>66.644</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>4316.114</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>22.494</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>27.401</td> </tr> </tbody> </table> * Proposed IARV 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.				Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	73.441	Maximum Thoracic Rib Deflection	mm	44	13.727	Total Abdominal Force	N	2500	658.203	Pubic Symphysis Force	N	6000	958.966	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	264.014	Lower Spine Resultant Acceleration	G	82	66.644	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4316.114	Maximum Thoracic Rib Deflection	mm	38*	22.494	Maximum Abdominal Rib Deflection	mm	45*	27.401
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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 Mazda CX-5 SUV. 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 Mazda CX-5 SUV 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 62.11 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 May 9, 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	73.441
Maximum Thorax Rib Deflection	mm	44	13.727
Combined Abdominal Force	N	2500	658.203
Pubic Symphysis Force	N	6000	958.966

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	264.014
Lower Spine (T12) Resultant Acceleration	G	82	66.644
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4316.114
Maximum Thoracic Rib Deflection	mm	38*	22.494
Maximum Abdominal Rib Deflection	mm	45*	27.401

*Proposed IARV

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	N/A		
Side 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

- Left B-Pillar Lower Y Acceleration, Spike at 9ms exceeded the calibration limit
- Left B-Pillar Middle Y Acceleration, Spike at 9ms exceeded the calibration limit,
- Rear Floorpan Y Acceleration, Questionable data throughout

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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20175402
Model Year	2017
Make	Mazda
Model	CX-5
Body Style	SUV
VIN	JM3KFABL1H0113057
Body Color	Silver
Odometer Reading (km/mi)	11 mi
Engine Displacement (L)	2.5
Type/No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front 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?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	03/17
Vehicle Type	MPV

GVWR (kg)	2048
GAWR Front (kg)	1057
GAWR Rear (kg)	994

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Capacity Weight (VCW) (kg)				385
DSC X 68.04 kg				340.2
Cargo Weight (RCLW) (kg)				44.8

(A)

(B)

(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							

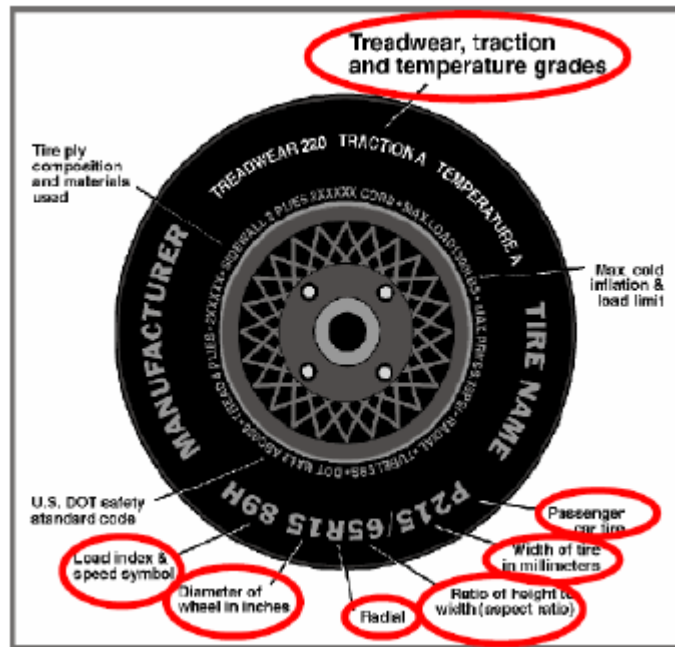
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2017 Mazda CX-5 SUV
Test Program:	NCAP Side MDB Impact Test

NHTSA No.: M20175402
Test Date: 5/9/2017

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)	275	275
Cold Pressure (kPa)	230	230
Recommended Tire Size	P225/65R17	P225/65R17
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander	Geolander
Treadwear	280	280
Traction	B	B
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	100H	100H
Tire Material	Rubber	Rubber
DOT Safety Code Left	FDF5PC50917	FDF5PC50917
DOT Safety Code Right	FDF5PC50917	FDF5PC50917

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

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	230	230	230
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

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	464	315		490	399		504	389	
Right	kg	436	320		458	352		447	369	
Ratio	%	59	41		56	44		56	44	
Totals	kg	900	635	1535	948	751	1699	951	758	1709

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1535	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1706.8	(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)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	856	861	Yes
RF	mm	863	863	Yes
RR	mm	890	883	Yes
LR	mm	882	877	Yes
Vehicle CG (Aft of Front Axle)	mm	1196	1192	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	36	37	

*** 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:	<u>2017 Mazda CX-5 SUV</u>	NHTSA No.:	<u>M20175402</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/9/2017</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	11
Spare Tire	14
Jack	4
Tail Light	1
Passenger Side Door Internals	8
Ballast / Equipment Added	8

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

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

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	14.3	9.4	11.85
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	11.85	18	Max	36	41	47
			Mid	14	18	25
			Min	0	6	10
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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

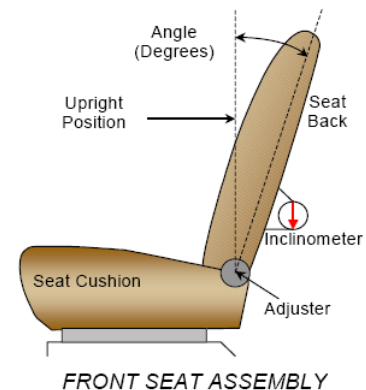
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	260	27	130	13
Front Passenger Seat	260	27	130	13
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.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	-6 to 53.7	N/A	6.2	N/A
Front Passenger Seat	-8.9 to 53.1	N/A	3.0	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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

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

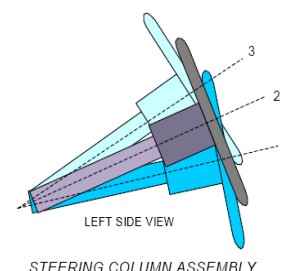
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	4	0 - Uppermost
Rear Seat	3	3 - 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.

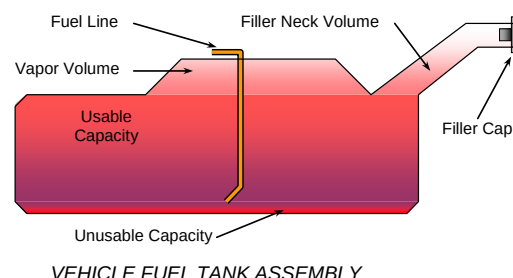
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	23.1	
Geometric Center – Position 2	25.45	
Uppermost – Position 3	27.8	
Telescoping Steering Wheel Travel		50
Test Position	25.5	25



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.



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

Test Vehicle: 2017 Mazda CX-5 SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
Test Date: 5/9/2017

FUEL TANK CAPACITY

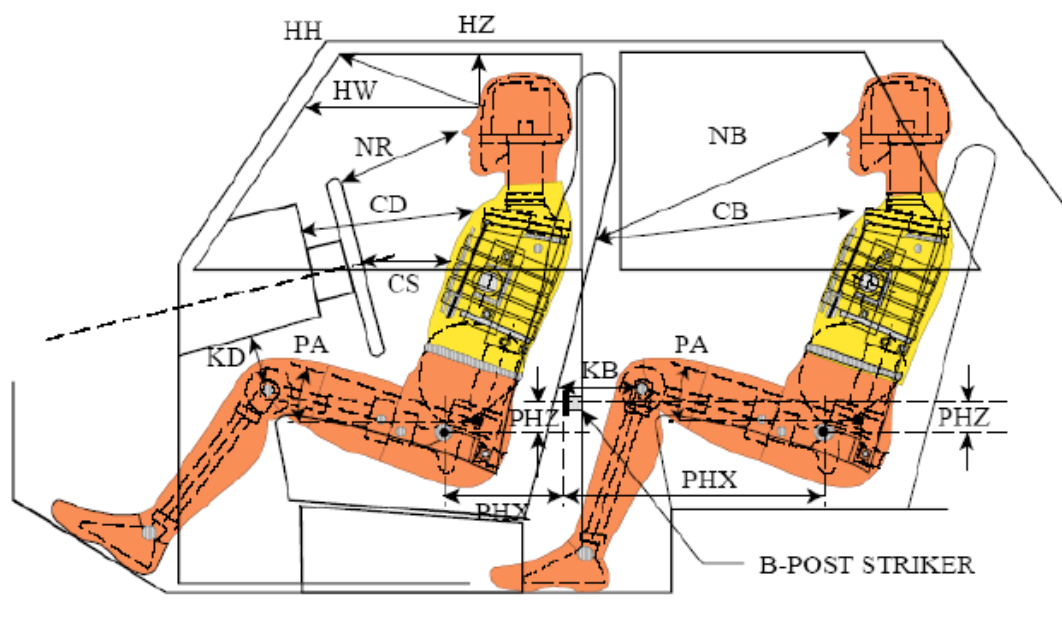
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	56
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	56
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	52.08
Actual Amount of Solvent Used in Test	52.08
1/3 of Usable Capacity	18.6

Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in Form No. 1? ☒ **Yes** ☐ **No**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



LEFT SIDE VIEW

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

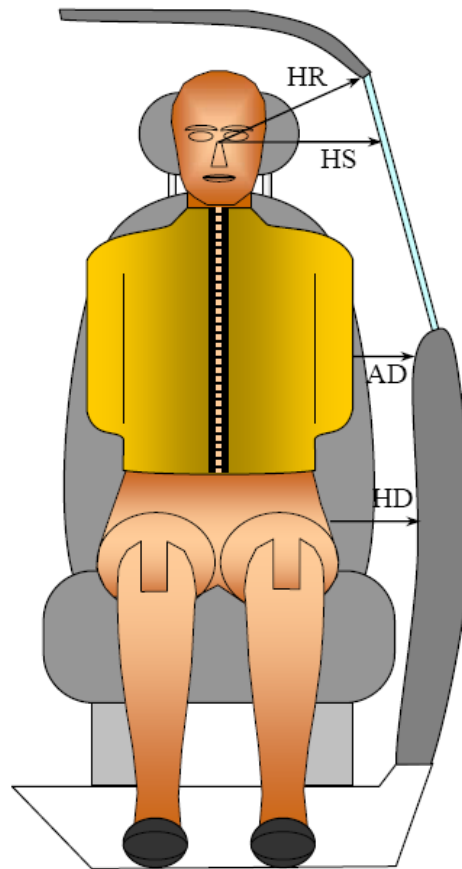
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No. DG8012)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	337			
HW		Header to Windshield	573			
HZ	HZ	Head to Roof Liner	160		305	
NR	NB	Nose to Rim/Seat Back	440		550	
CD	CB	Chest to Dash/Seat Back	531		560	
CS		Chest to Steering Wheel	321			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	153	30.2	284	16.8
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	150	11.2	284	16.1
PAX°	PAX°	Pelvic Tilt Angle X		20.5		20.3
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	211		294	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	170		293	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



FRONT VIEW OF DUMMY

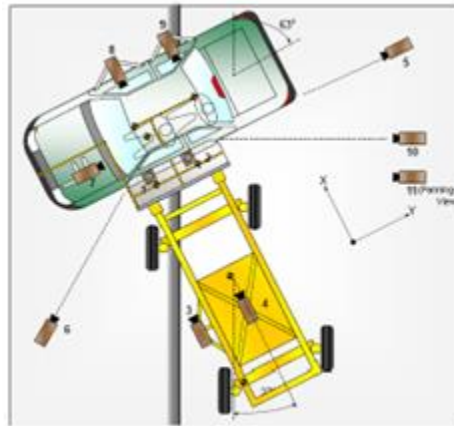
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. DG8012)
HR	Head to Side Header	mm	197	274
HS	Head to Side Window	mm	332	375
AD	Arm to Door	mm	100	166
HD	Hip Point to Door	mm	150	203

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	315	1085	-5305	14	1000
2	Overhead Close-up	0	890	-5305	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	0	9820	-1314	24	1000
6	Left Front	-1966	-4582	-1325	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

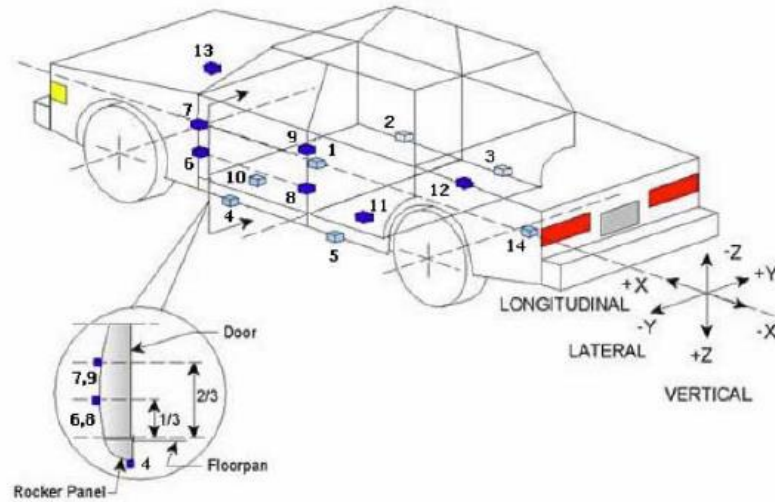
INSTRUMENTATION

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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



TEST VEHICLE ACCELEROMETER LOCATIONS

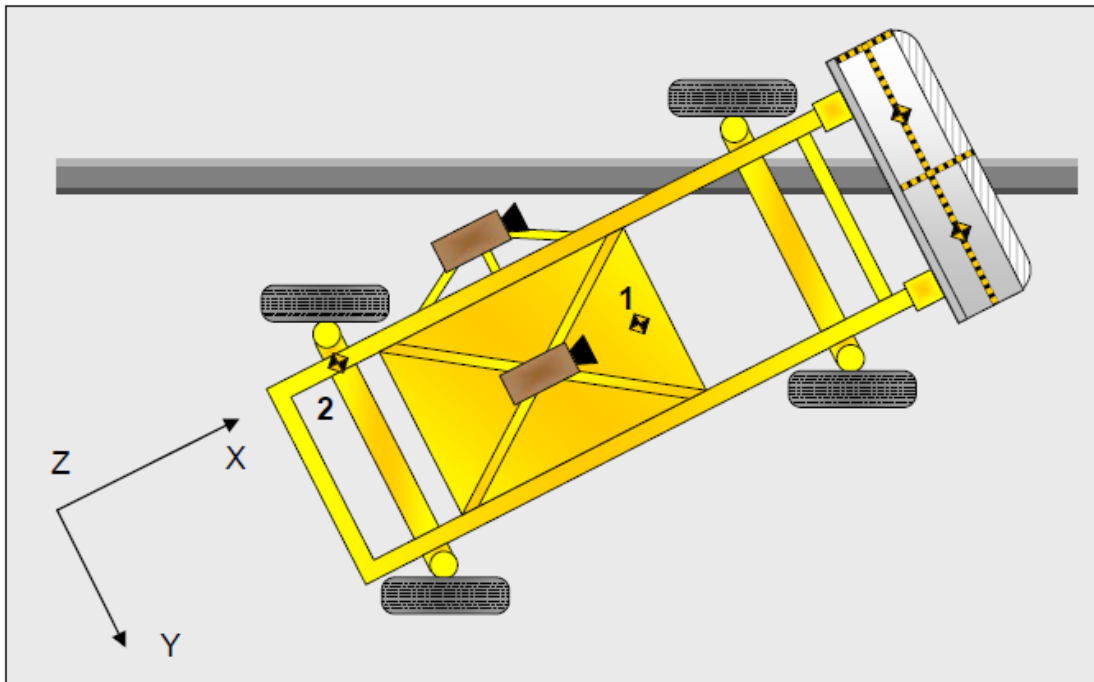
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2261	4	-37
2	Right Sill at Front Seat	2687	673	273
3	Right Sill at Rear Seat	1795	672	259
4	Left Sill at Front Door	2699	-666	285
5	Left Sill at Rear Door	1794	-667	270
6	A-Post Lower	3066	-606	19
7	A-Post Middle	2939	-634	-473
8	B-Post Lower	2040	-688	-51
9	B-Post Middle	2007	-698	-320
10	Front Seat Track	2365	-589	254
11	Rear Seat Structure	1724	-309	211
12	Rt. Rear Occ. Compartment	1853	388	343
13	Engine Block	3746	136	-148
14	Rear Above Axle	1070	-2	43

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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



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 Mazda CX-5 SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
Test Date: 5/9/2017

TEST DUMMY INFORMATION AND CONTACT POINTS

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

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	B-Pillar Buckled
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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
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		2697
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		409
Actual Impact Point (Aft of Frontal Axle)	mm		399
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	+10
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	+2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Mazda CX-5 SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
Test Date: 5/9/2017

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	62.11
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	62.05
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

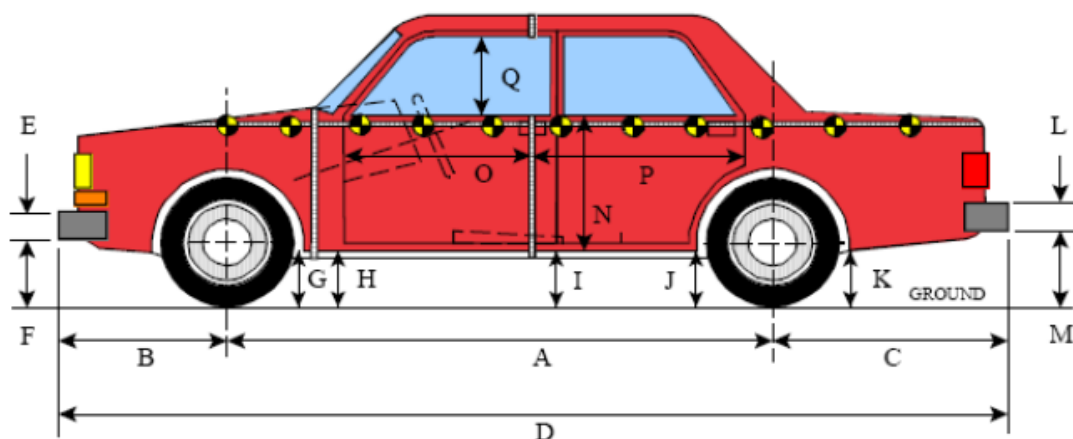
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

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	157
C	Mid-Level	686	800	Left	138
D	Top of Stack	813	800	Left	168

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



LEFT SIDE VIEW

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

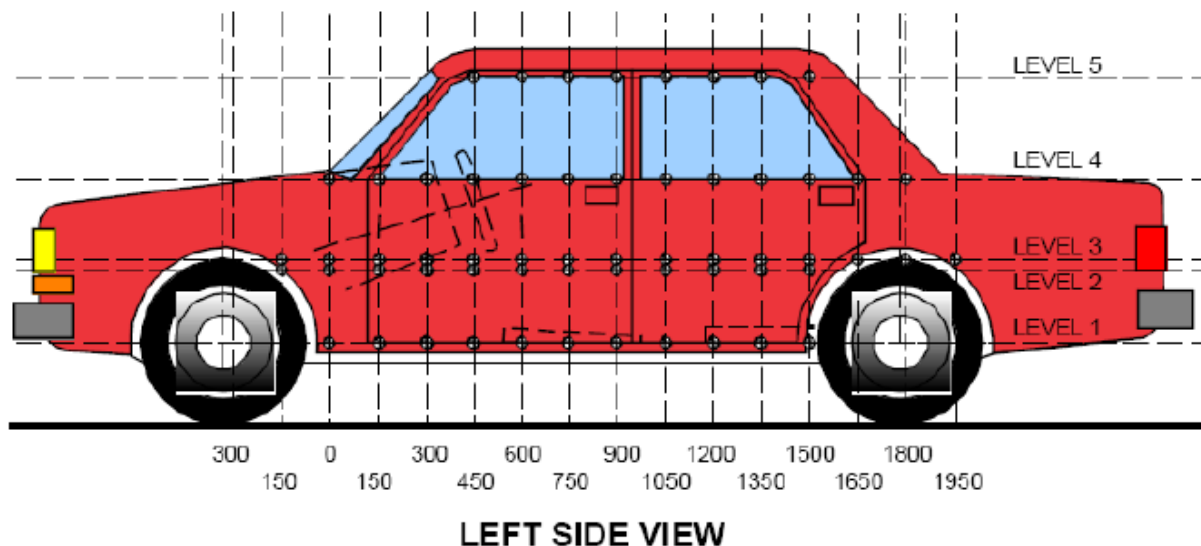
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2697	2694	-3
B	Front Axle to FSOV	956	961	5
C	Rear Axle to RSOV	905	897	-8
D	Total Length at Centerline	4554	4552	-2
E	Front Bumper Thickness	80	80	0
F	Front Bumper Bottom to Ground	466	469	3
G	Sill Height at Front Wheel Well	255	248	-7
H	Sill Height at Front Door Leading Edge	243	255	12
I	Sill Height at B Pillar	241	245	4
J1	Sill Height at Rear Wheel Well	250	258	8
J2	Pinch Weld Height at Rear Wheel Well	248	255	7
K	Sill Height Aft of Rear Wheel Well	298	299	1
L	Rear Bumper Thickness	180	180	0
M	Rear Bumper Bottom to Ground	480	486	6
N	Sill Height to Window Bottom of Front Window Sill	761	746	-15
O	Front Door Leading Edge to Impact CL	741	716	-25
P	Rear Door Trailing Edge to Impact CL	1098	1082	-16
Q	Front Window Opening	455	479	24
R	Right Side Length	4440	4443	3
S	Left Side Length	4438	4436	-2
T	Maximum Vehicle Width	1832	1718	-114

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	364	61	750
2	Driver Hip Point	mm	704	124	900
3	Mid-Door	mm	770	126	1050
4	Window Sill	mm	1101	38	1650
5	Window Top	mm	1608	0	1500

*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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

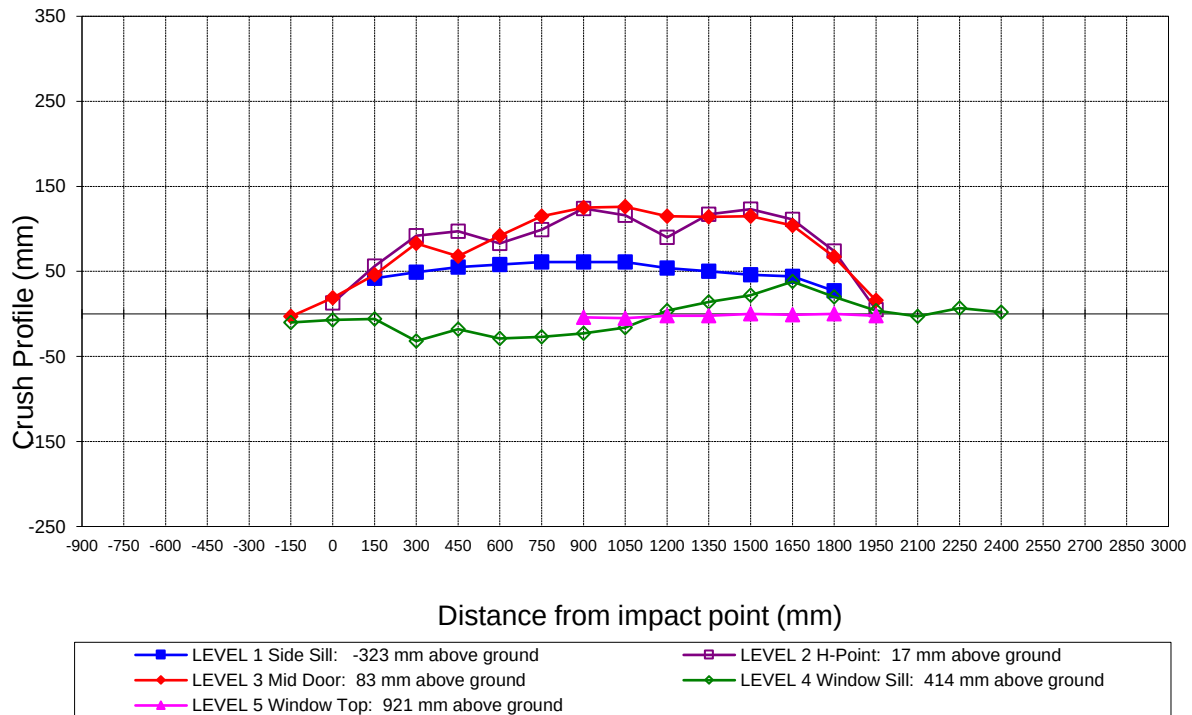
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			922	790				925	800				-3	-10	
0		918	918	815			905	902	822			13	16	-7	
150	903	910	908	827		861	854	862	833		42	56	46	-6	
300	904	902	903	835		855	810	820	867		49	92	83	-32	
450	907	903	905	889		852	806	837	907		55	97	68	-18	
600	908	904	907	845		850	821	815	874		58	83	92	-29	
750	909	905	907	848		848	806	792	875		61	99	115	-27	
900	908	905	907	850	587	847	781	782	873	591	61	124	125	-23	-4
1050	907	904	906	849	604	846	788	780	865	609	61	116	126	-16	-5
1200	905	904	905	850	609	851	814	790	846	611	54	90	115	4	-2
1350	904	903	904	847	609	854	786	790	833	611	50	117	114	14	-2
1500	902	903	903	845	608	856	780	788	823	608	46	123	115	22	0
1650	901	907	906	841	602	857	796	802	803	603	44	111	104	38	-1
1800	906	918	915	843	595	879	844	848	823	595	27	74	67	20	0
1950		920	919	850	582		915	903	846	584		5	16	4	-2
2100				862					865					-3	
2250				864					857					7	
2400				859					857					2	
2550															
2700															
2850															
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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

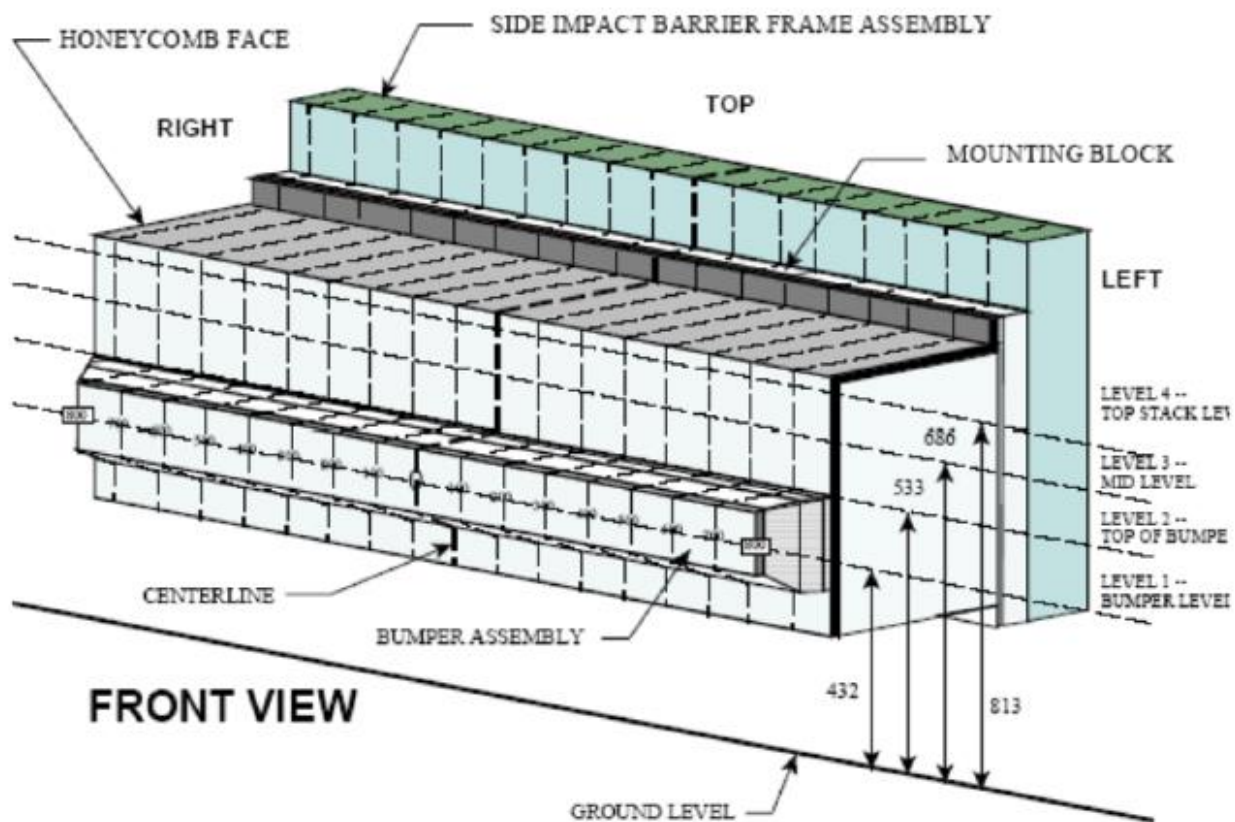


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

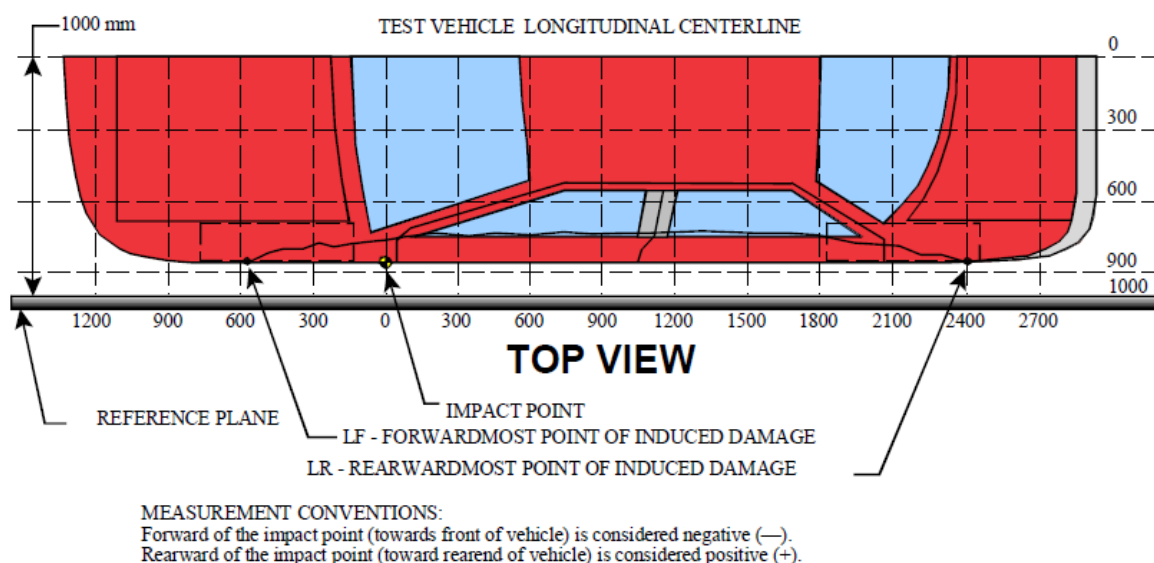
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	208	209	209	209	209	209	209	208	208	205	205	206	206	206	208	219	223
2	141	141	140	139	136	136	135	134	131	127	126	127	129	129	131	136	157
3	112	79	61	64	75	106	103	75	62	63	67	67	69	76	88	135	138
4	95	68	55	60	77	104	111	82	82	82	86	94	102	119	130	153	168

DATA SHEET NO. 13
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017

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



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-150	3	75	78	-3
2	270	3	172	96	76
3	690	3	199	93	106
4	1110	3	216	94	122
5	1530	3	209	96	113
6	1950	3	97	81	16

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	206
3	160 mm left of center	1	205
4	160 mm right of center	1	209
5	480 mm right of center	1	209
6	800 mm right of center	1	208

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

Test Vehicle: <u>2017 Mazda CX-5 SUV</u>	NHTSA No.: <u>M20175402</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/9/2017</u>
Test Time: <u>10:47 AM</u>	Temperature: <u>21°C</u>

- | | |
|---|-----------------------------|
| 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: | <u>No Spillage Occurred</u> |

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	72	300	372
90° to 180°	64	300	364
180° to 270°	61	300	361
270° to 360°	63	300	363

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	

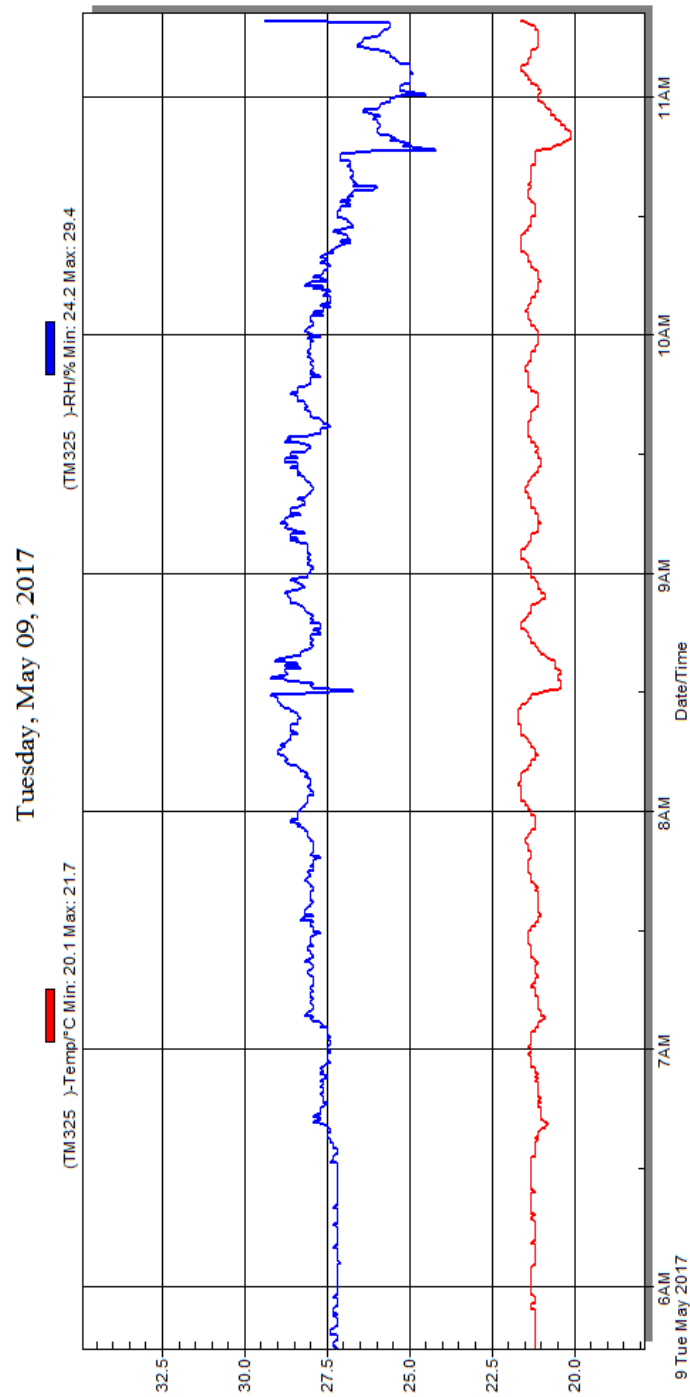
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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 Mazda CX-5 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20175402
 Test Date: 5/9/2017



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

APPENDIX A
PHOTOGRAPHS

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Figure A-1: As-Delivered Right Front 3/4 View of Test Vehicle



Figure A-2: As-Delivered Left Rear 3/4 View of Test Vehicle

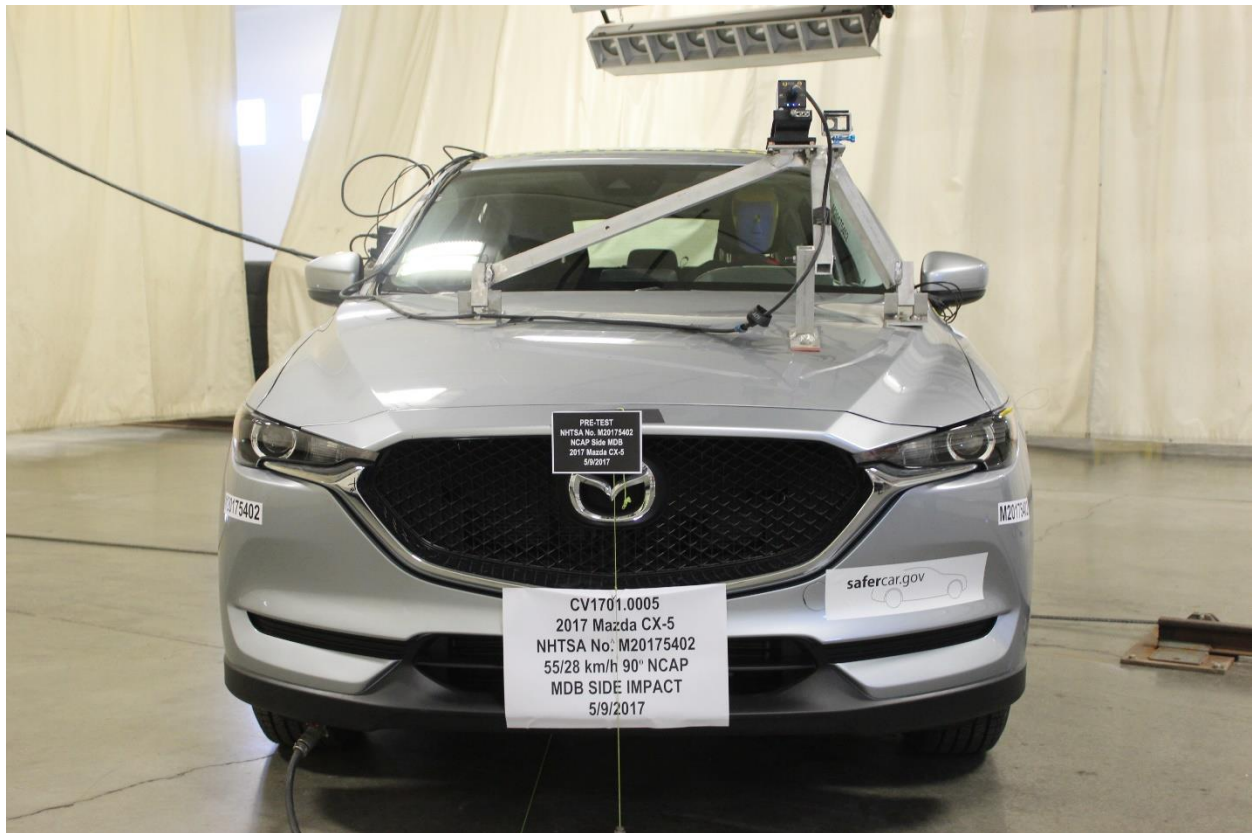


Figure A-3: Pre-Test Frontal View of Test Vehicle



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



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



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 $\frac{3}{4}$ View of Test Vehicle



Figure A-10: Post-Test Left Rear $\frac{3}{4}$ 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

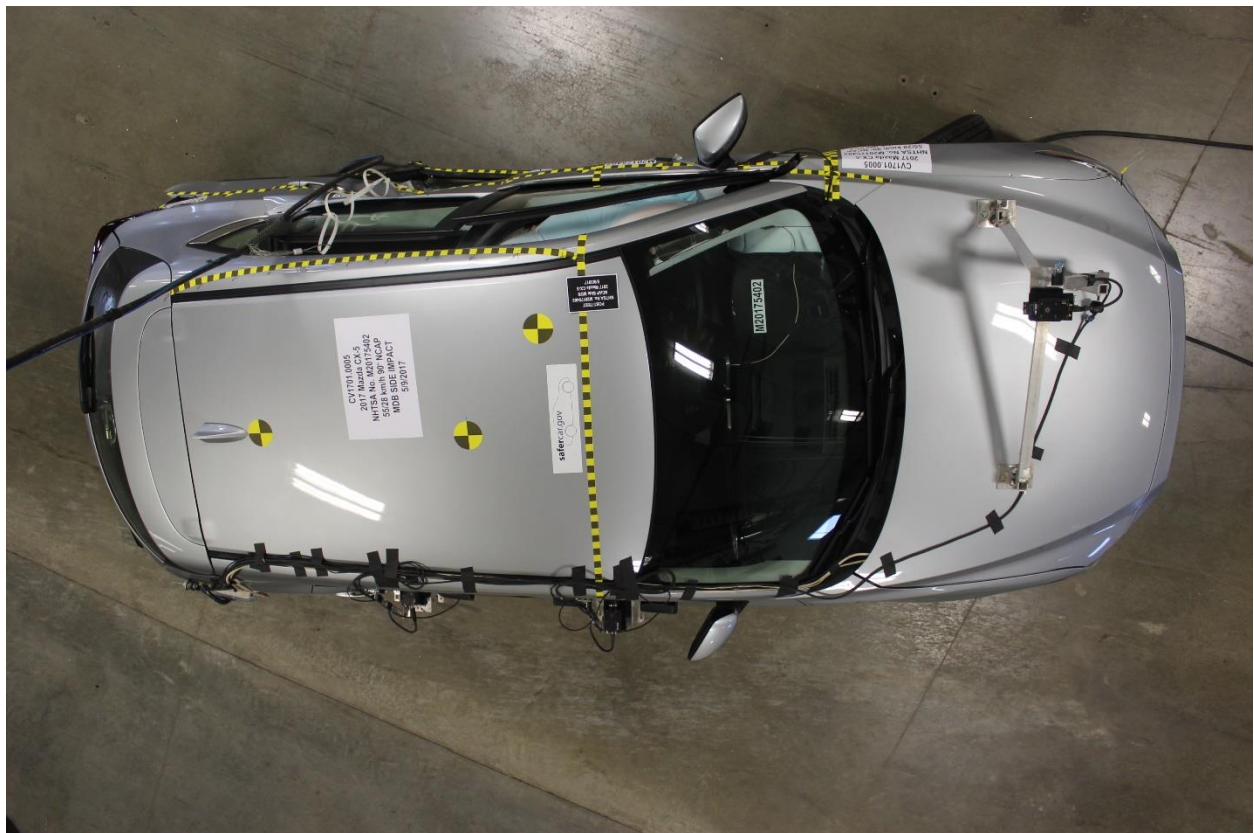


Figure A-16: Post-Test Overhead View of Test Area



Figure A-17: Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



Figure A-18: Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



Figure A-19: Pre-Test Close-up View of Impact Point Target



Figure A-20: Post-Test Close-up View of Impact Point Target

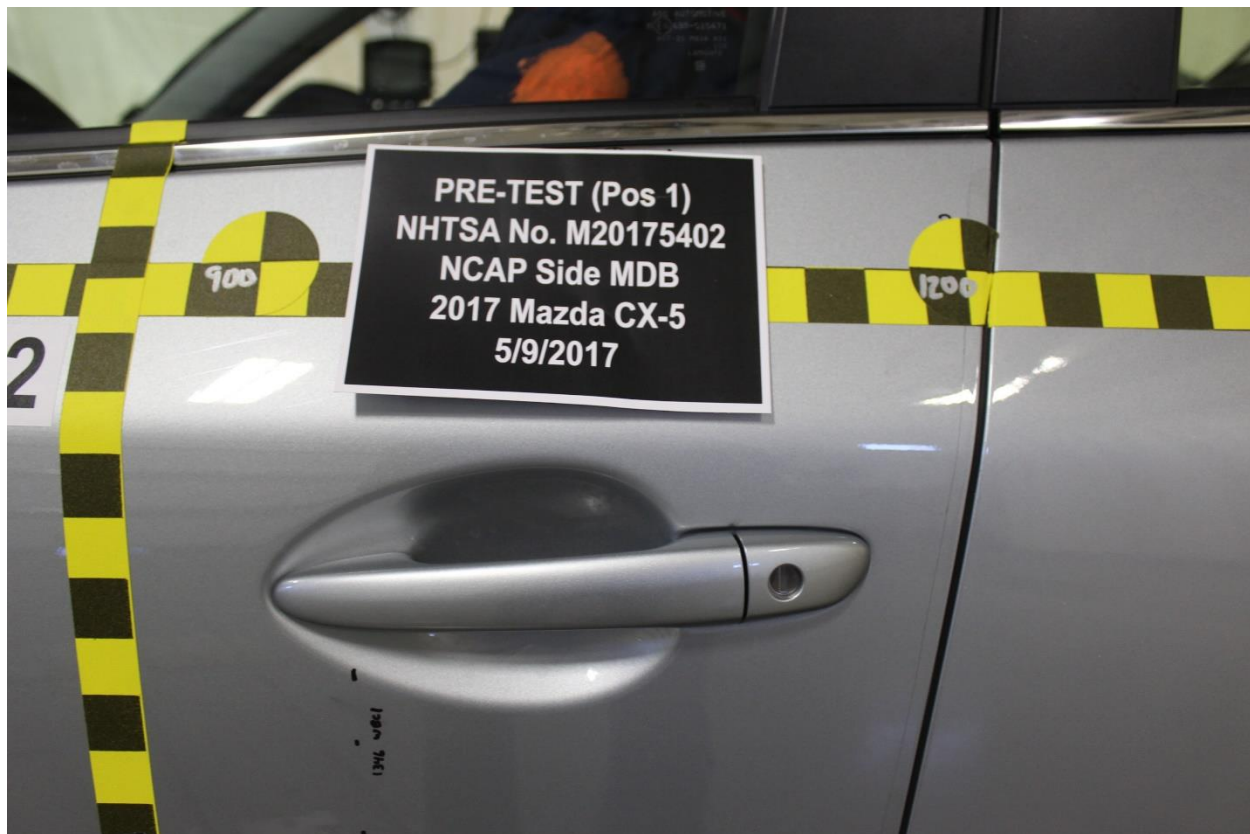


Figure A-21: Pre-Test Left Front Door Latch Close-Up

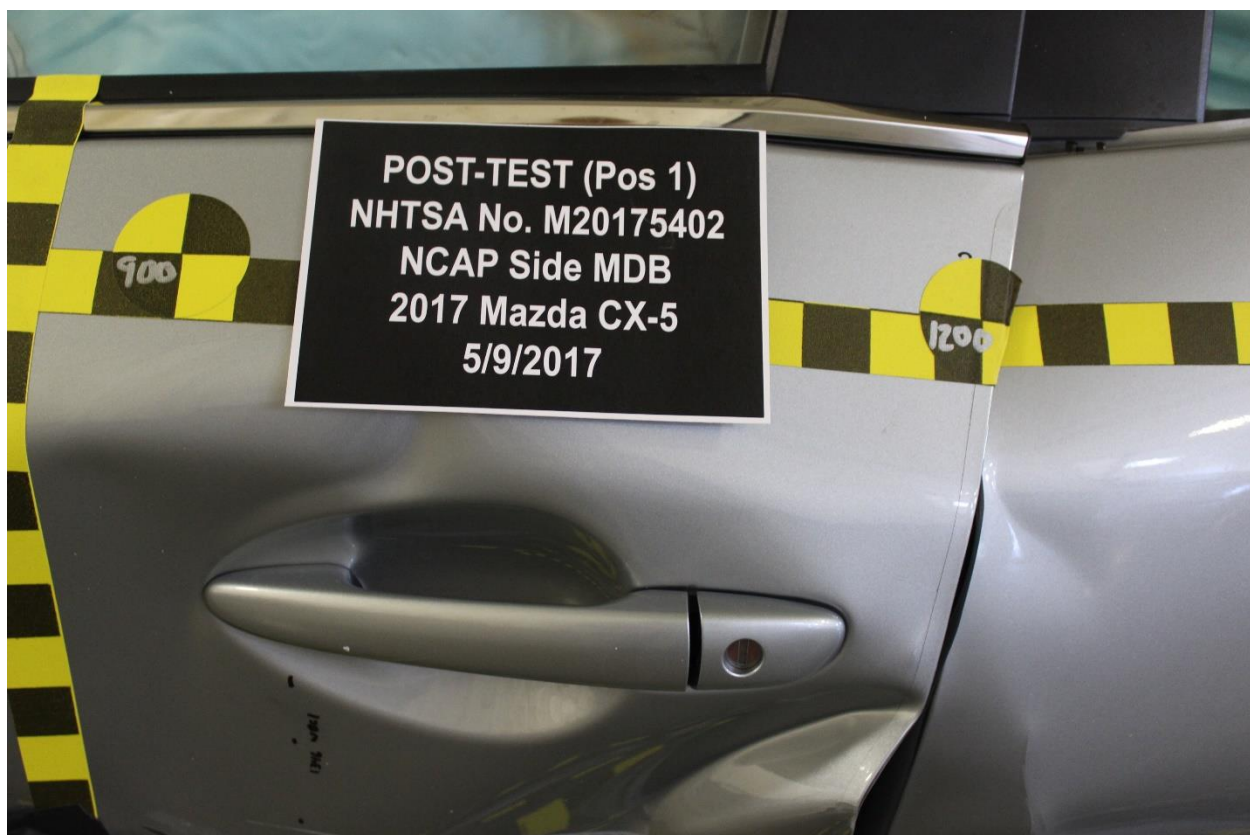


Figure A-22: Post-Test Left Front Door Latch Close-Up



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

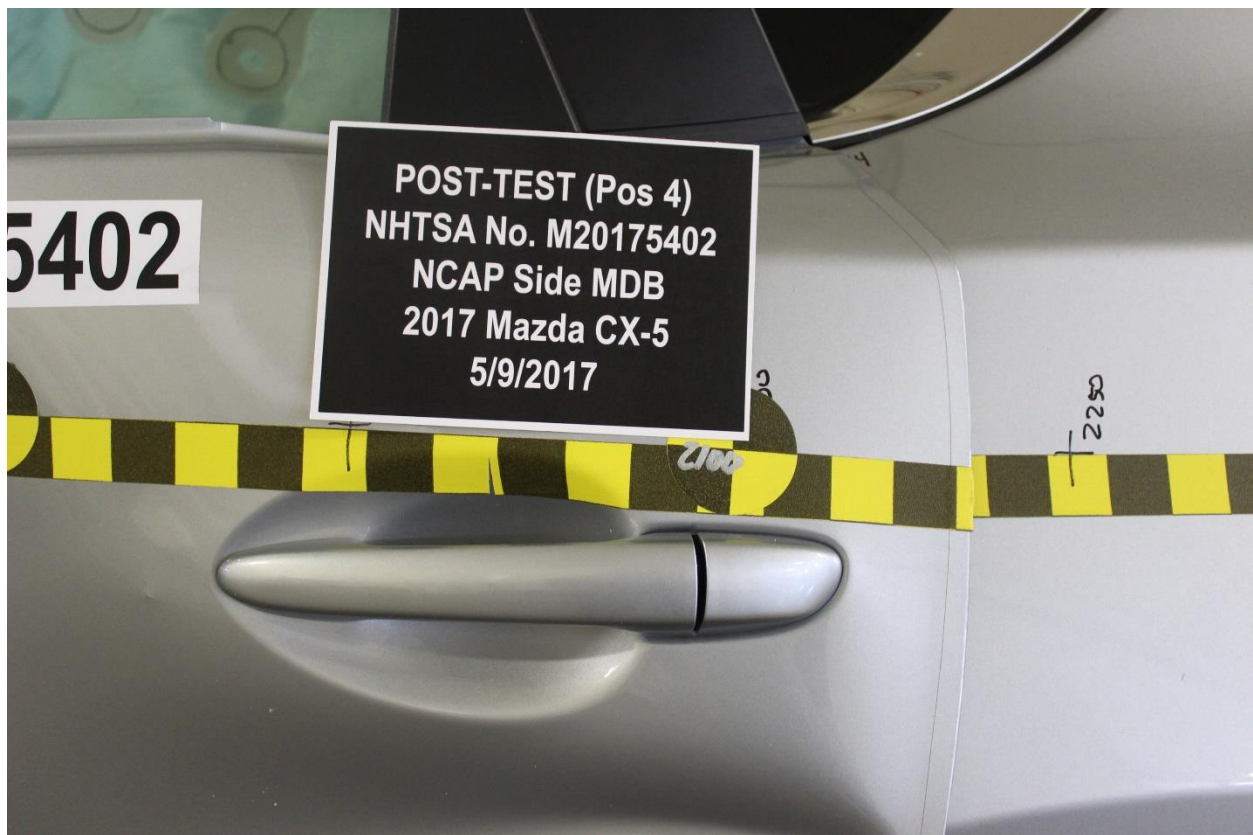


Figure A-24: Post-Test Left Rear Door Latch Close-Up



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



Figure A-26: Post-Test Front Close-up View of Driver Dummy



Figure A-27: Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking

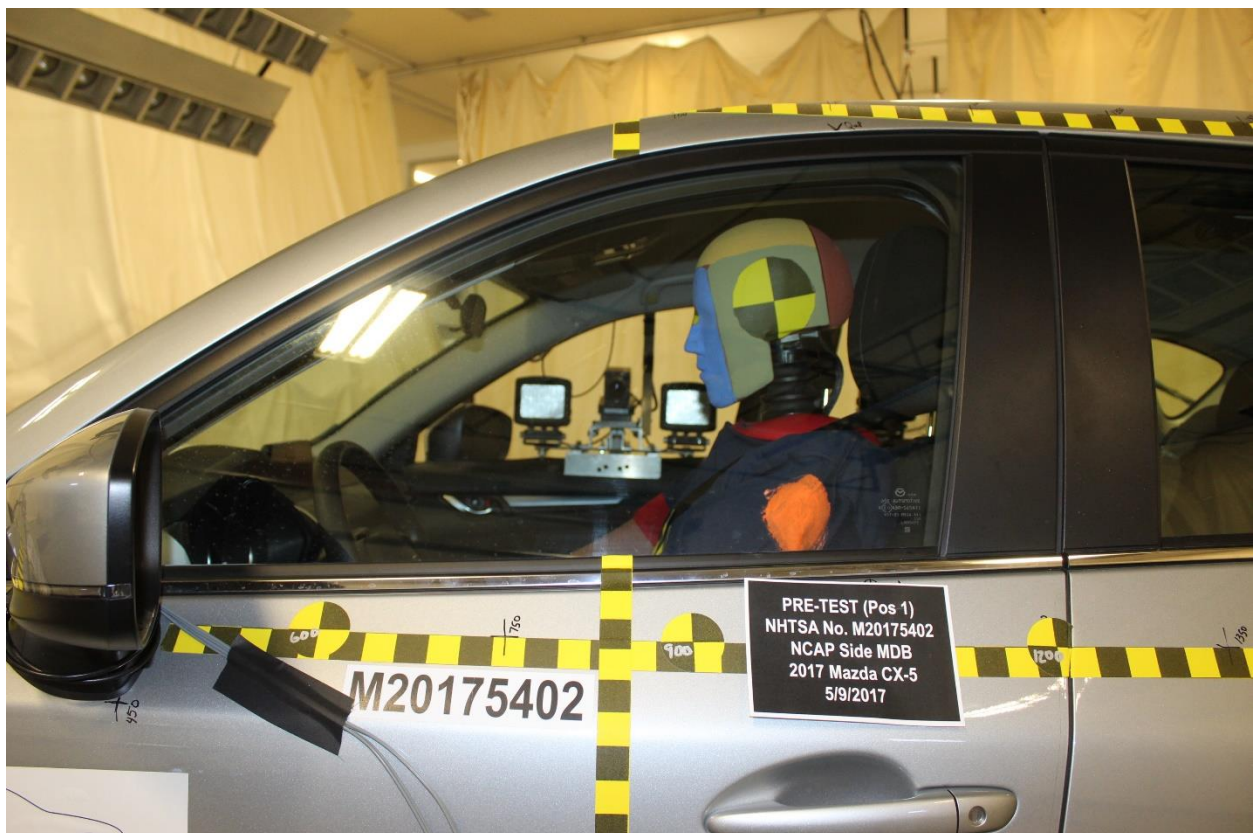


Figure A-28: Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-29: Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-30: Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



Figure A-33: Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Figure A-34: Pre-Test Placement of Driver Dummy's Feet



Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy

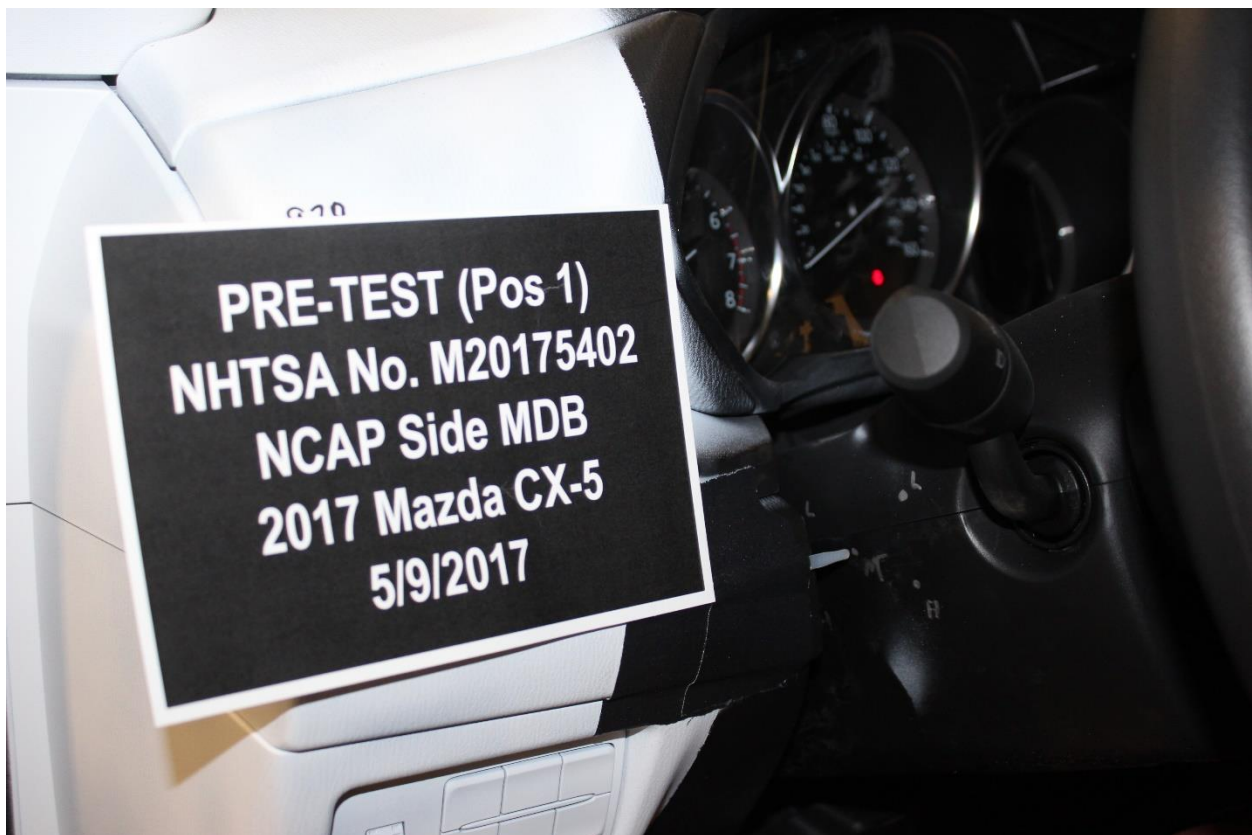


Figure A-36: Pre-Test Left Side View of Steering Wheel



Figure A-37: View of Disengaged Parking Brake



Figure A-38: Pre-Test View of Parking Brake



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



Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-41: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-42: Pre-Test Driver Dummy and Door Clearance View



Figure A-43: Post-Test Driver Dummy and Door Clearance View



Figure A-44: Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-45: Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-46: Pre-Test Driver Inner Door Panel View



Figure A-47: Post-Test Driver Inner Door Panel View



Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View



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

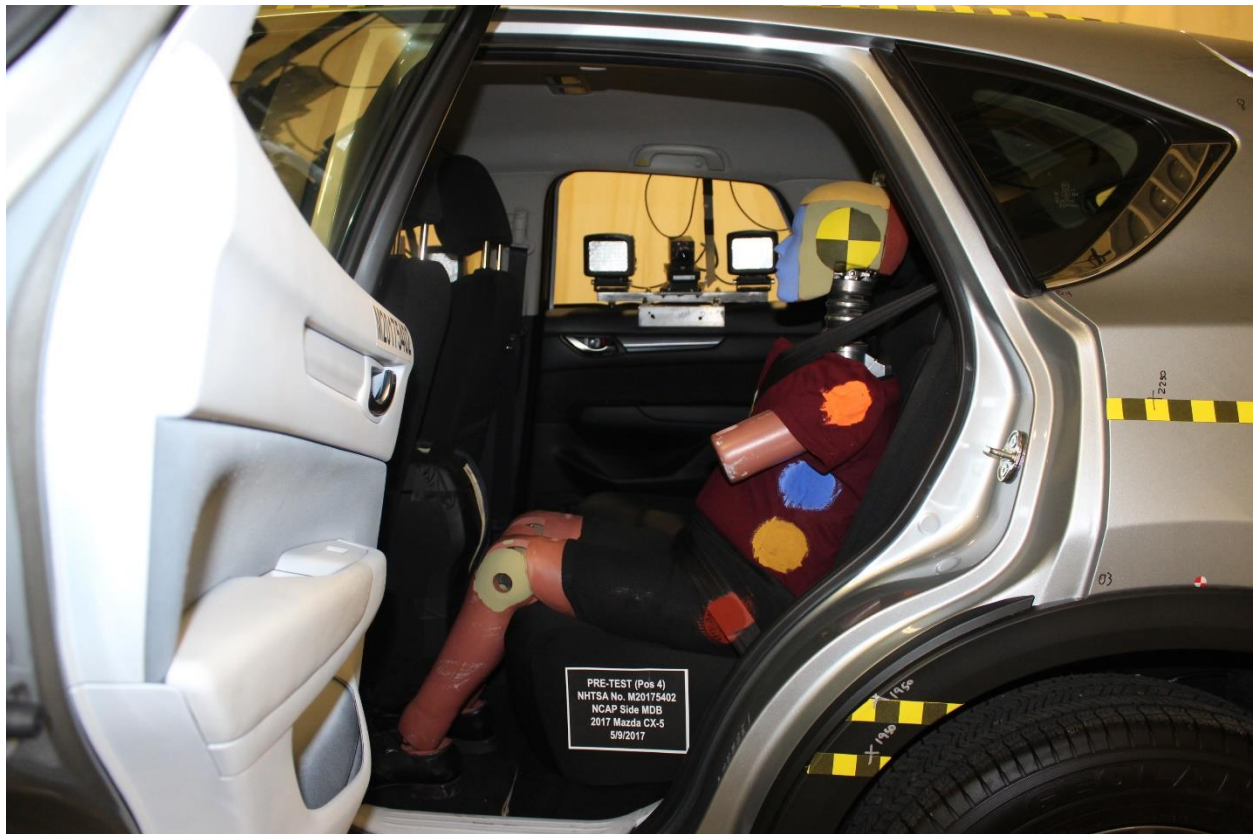


Figure A-55: Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking



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



Figure A-61: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-63: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



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



Figure A-67: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back

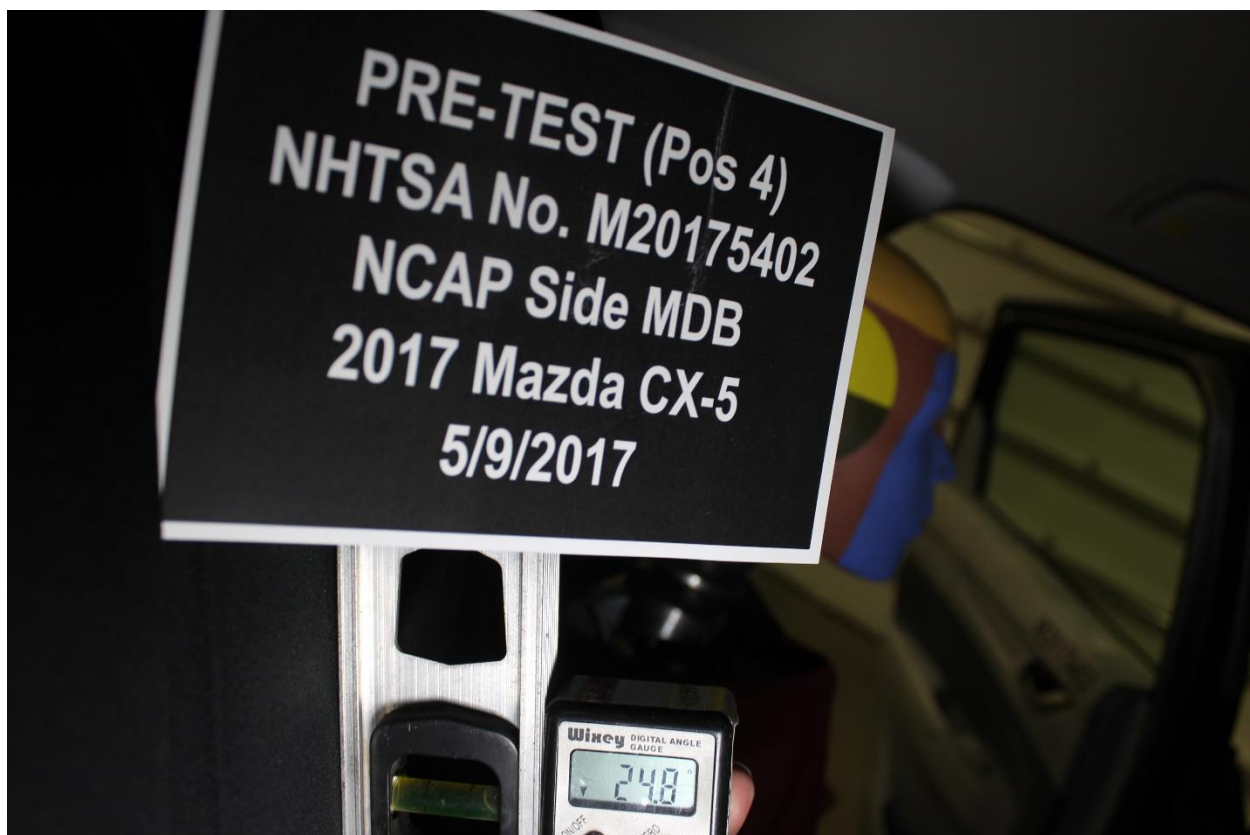


Figure A-68: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



Figure A-69: Pre-Test Passenger Dummy and Door Clearance View



Figure A-70: Post-Test Passenger Dummy and Door Clearance View



Figure A-71: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-72: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



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



Figure A-74: Post-Test Passenger Inner Door Panel View



Figure A-75: Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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

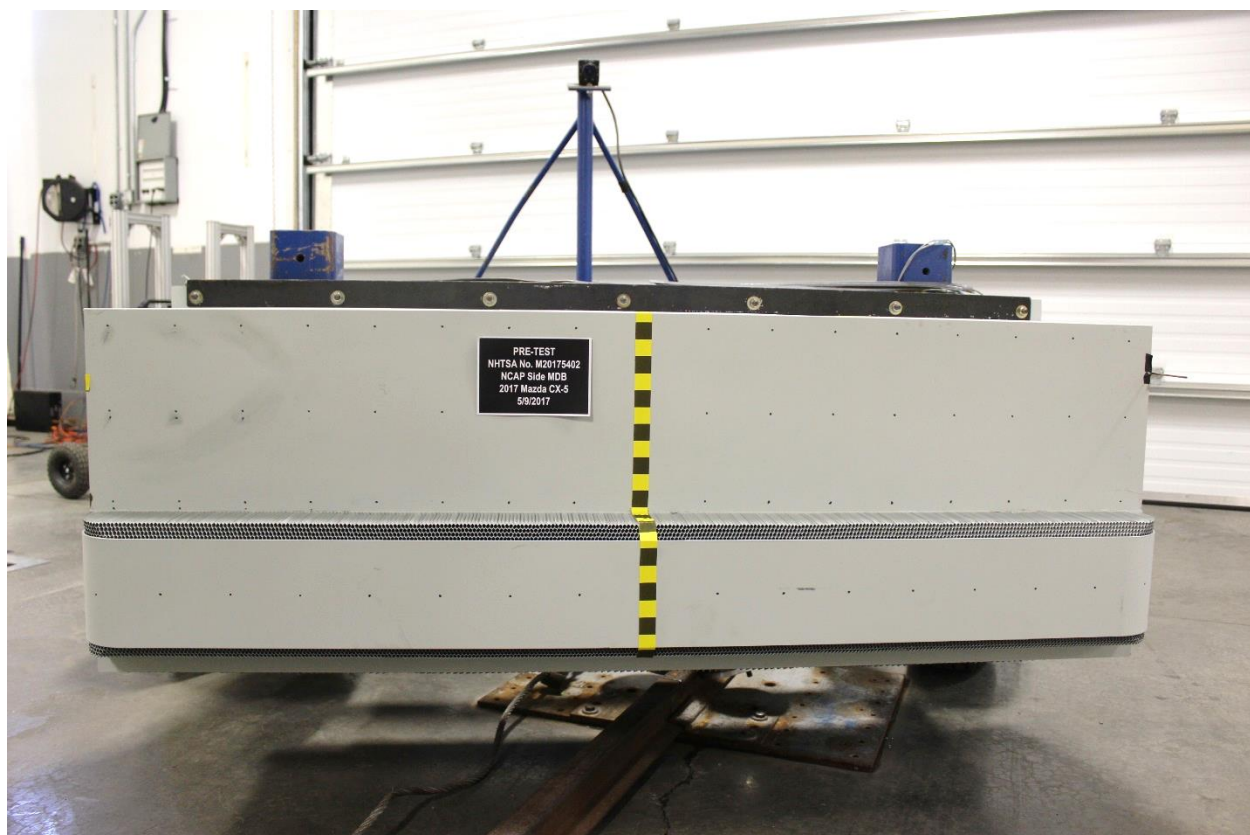


Figure A-84: Pre-Test Front View of MDB Impactor Face



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

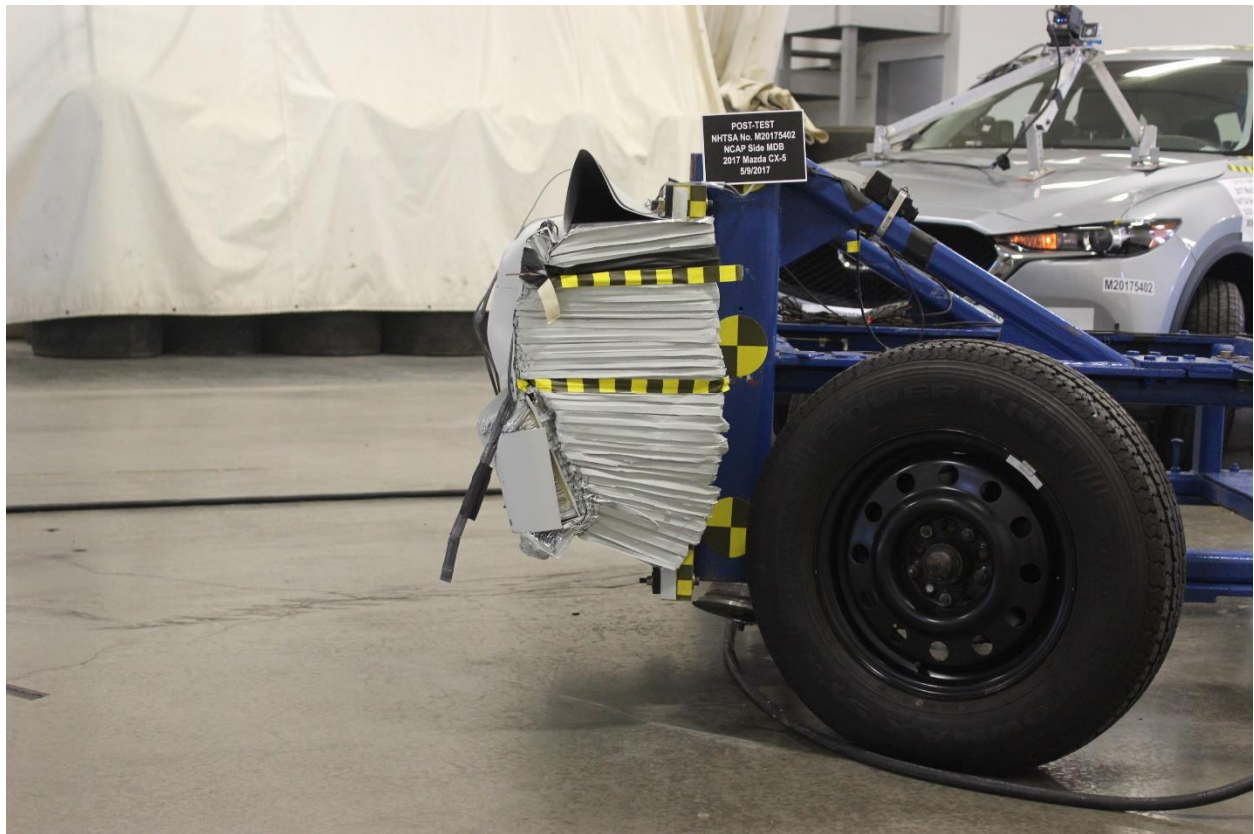


Figure A-89: Post-Test Left Side View of MDB Impactor Face



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

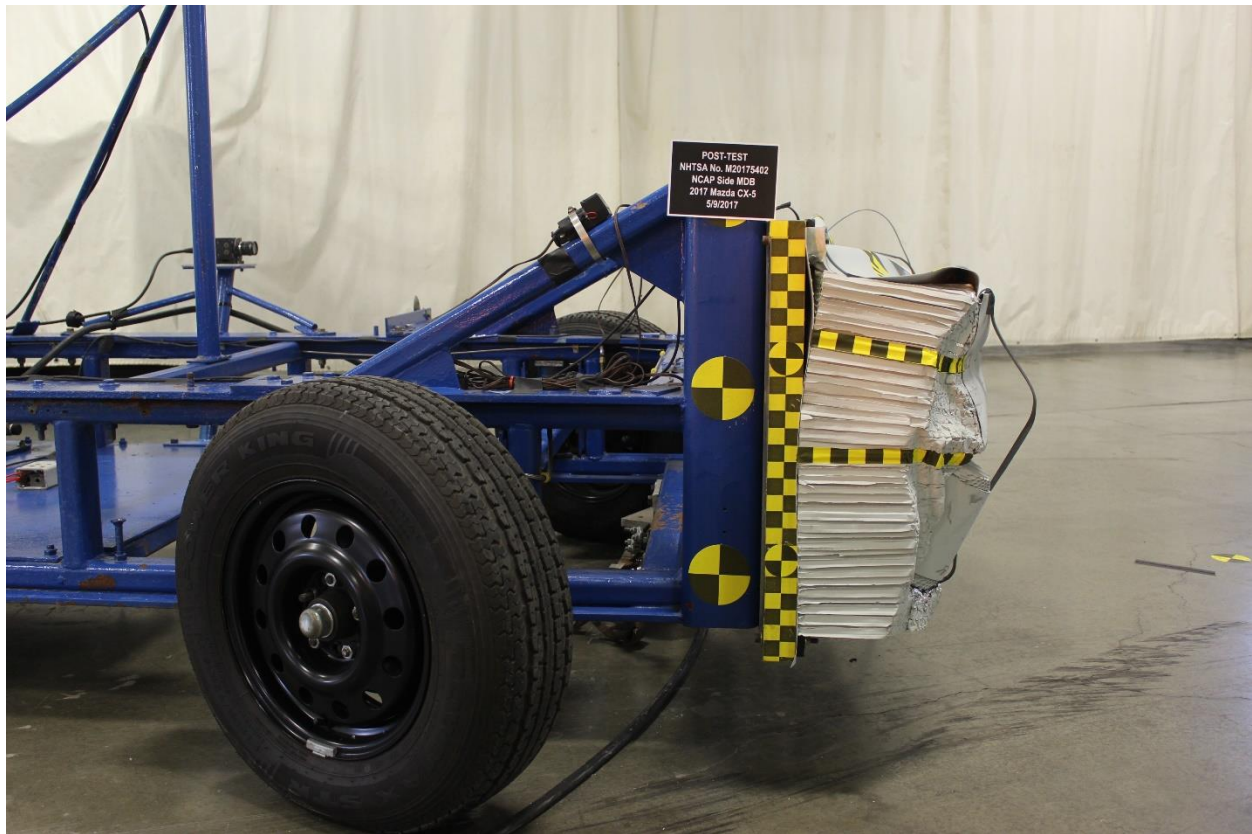


Figure A-91: Post-Test Right Side View of MDB Impactor Face

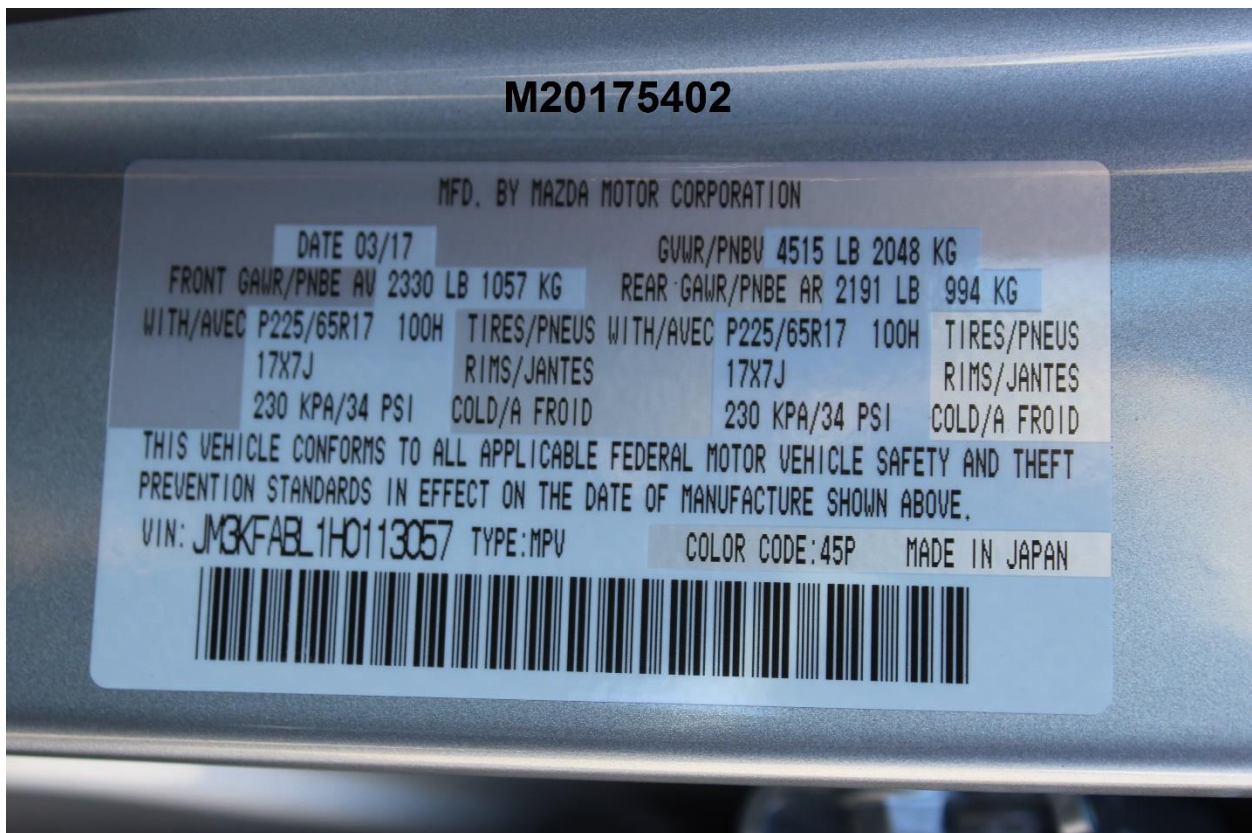


Figure A-92: Close-Up View of Vehicle's Certification Label

M20175402

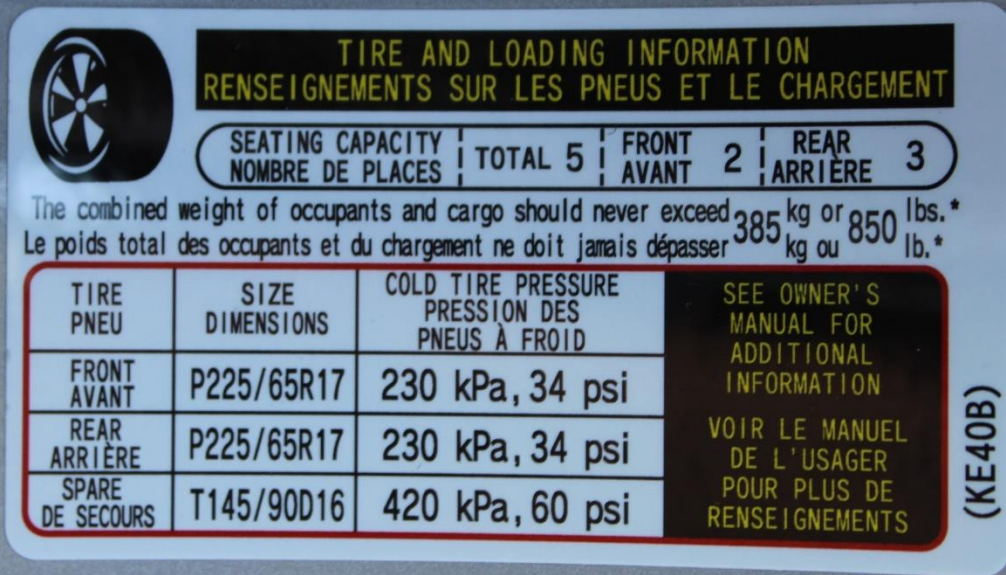


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label

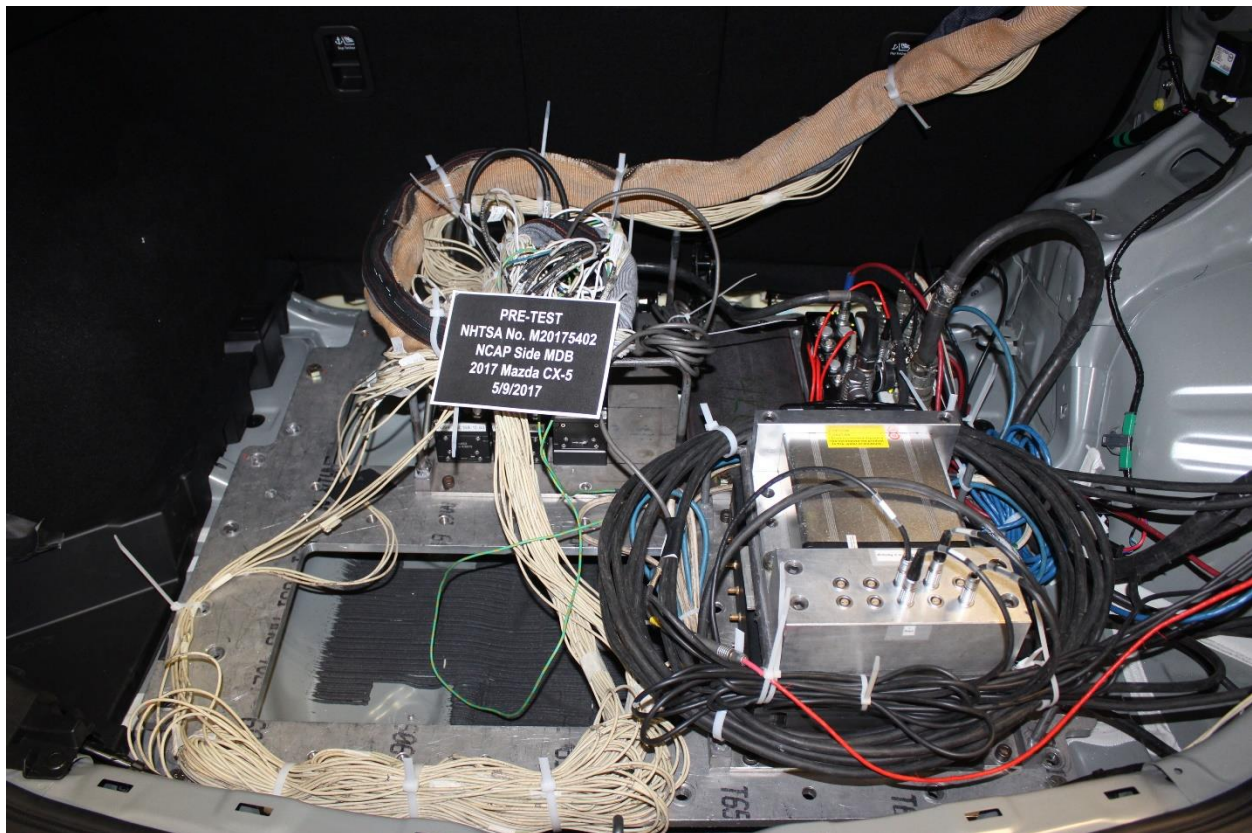


Figure A-94: Pre-Test Ballast View



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



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

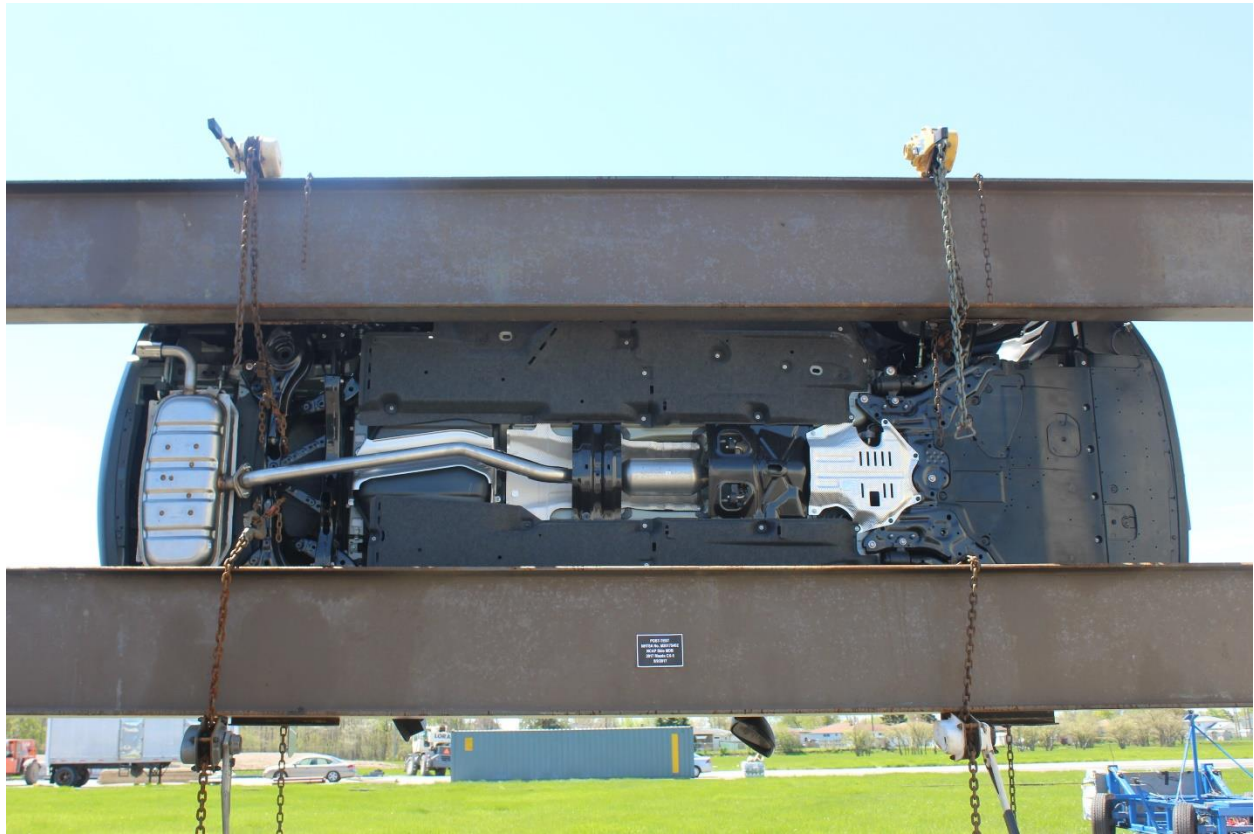


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

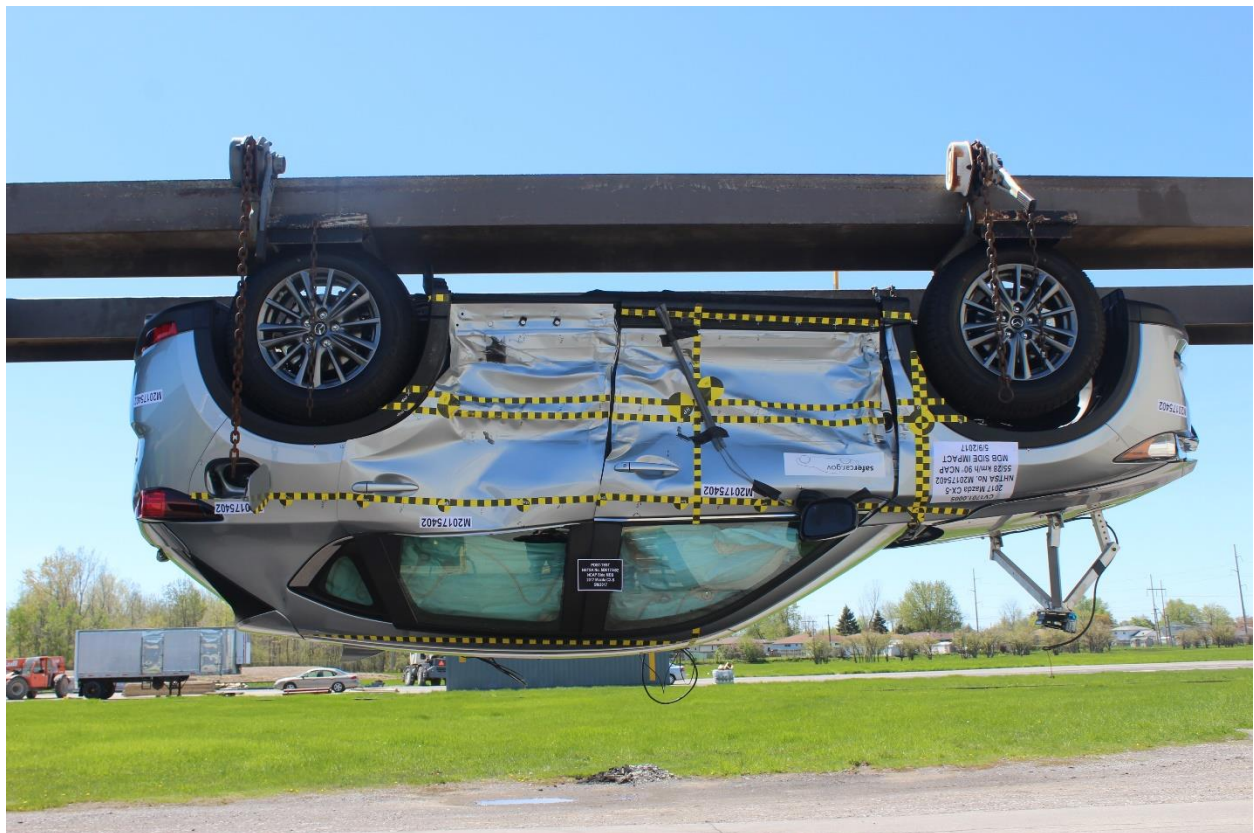


Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees



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



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



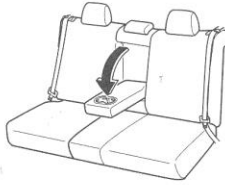
Figure A-101: Impact Event

[illegible]

Figure A-102: Monroney Label

▼ Armrest *

The rear armrest in the center of the rear seatback can be used (no occupant in the center seat) or placed upright.



▲ WARNING

Never put your hands and fingers around the moving parts of the seat and armrest:

Putting your hands and fingers around the moving parts of the seat and armrest is dangerous as they could get injured.

Head Restraints

Your vehicle is equipped with head restraints on all outboard seats and the rear center seat. The head restraints are intended to help protect you and the passengers from neck injury.

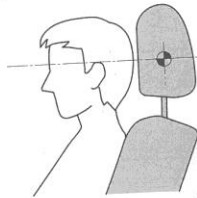
▲ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted. In addition, always raise the head restraint on all rear seat positions when they are in use:

Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

▼ Height Adjustment

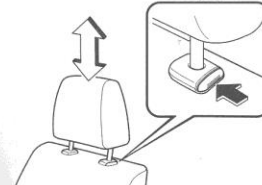
Adjust the head restraint so that the center is even with the top of the passenger's ears.



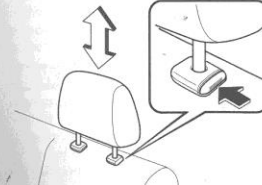
To raise a head restraint, pull it up to the desired position.

To lower the head restraint, press the stop

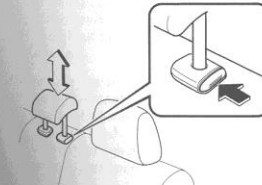
Front outboard seat



Rear outboard seat



Rear center seat



▼ Removal/Installation

To remove the head restraint, pull it up while pressing the stop-catch. To install the head restraint, insert the legs into the holes while pressing the stop-catch.

▲ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly installed:

Driving with the head restraints not installed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

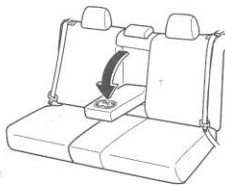
After installing a head restraint, try lifting it to make sure that it does not pull out:

Driving with an unsecured head restraint is dangerous as the effectiveness of the head restraint will be compromised which could cause it to unexpectedly detach from the seat.

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

▼ Armrest *

The rear armrest in the center of the rear seatback can be used (no occupant in the center seat) or placed upright.



▲ WARNING

Never put your hands and fingers around the moving parts of the seat and armrest:

Putting your hands and fingers around the moving parts of the seat and armrest is dangerous as they could get injured.

Head Restraints

Your vehicle is equipped with head restraints on all outboard seats and the rear center seat. The head restraints are intended to help protect you and the passengers from neck injury.

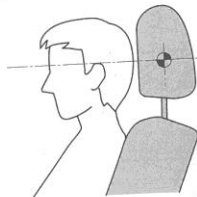
▲ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted. In addition, always raise the head restraint on all rear seat positions when they are in use:

Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

▼ Height Adjustment

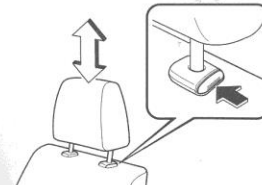
Adjust the head restraint so that the center is even with the top of the passenger's ears.



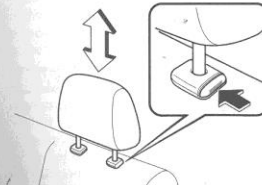
To raise a head restraint, pull it up to the desired position.

To lower the head restraint, press the stop

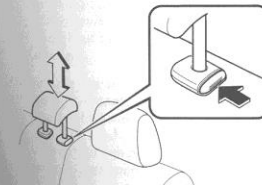
Front outboard seat



Rear outboard seat



Rear center seat



▼ Removal/Installation

To remove the head restraint, pull it up while pressing the stop-catch. To install the head restraint, insert the legs into the holes while pressing the stop-catch.

▲ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly installed:

Driving with the head restraints not installed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

After installing a head restraint, try lifting it to make sure that it does not pull out:

Driving with an unsecured head restraint is dangerous as the effectiveness of the head restraint will be compromised which could cause it to unexpectedly detach from the seat.

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

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
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7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
8	Driver Thorax Rib Deflection Maximum vs. Time	B-6
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14	Passenger Head Acceleration (X) vs. Time Primary	B-8
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16	Passenger Head Acceleration (Z) vs. Time Primary	B-8
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-9
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

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

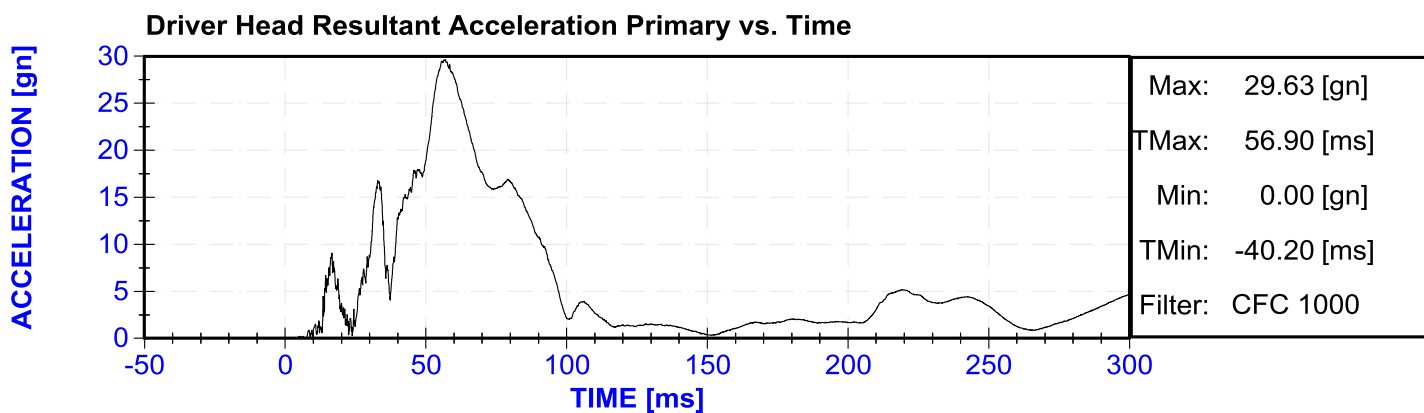
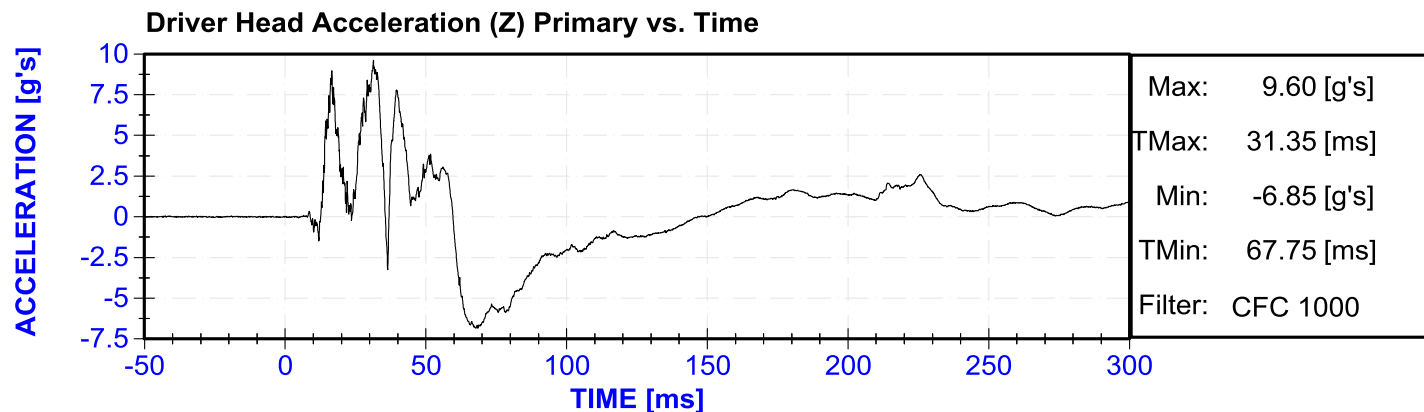
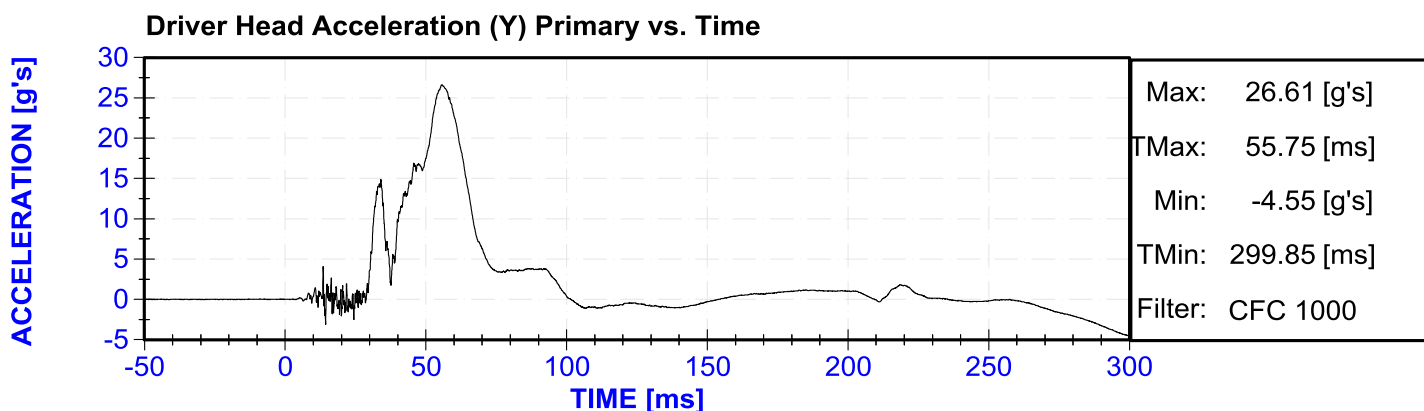
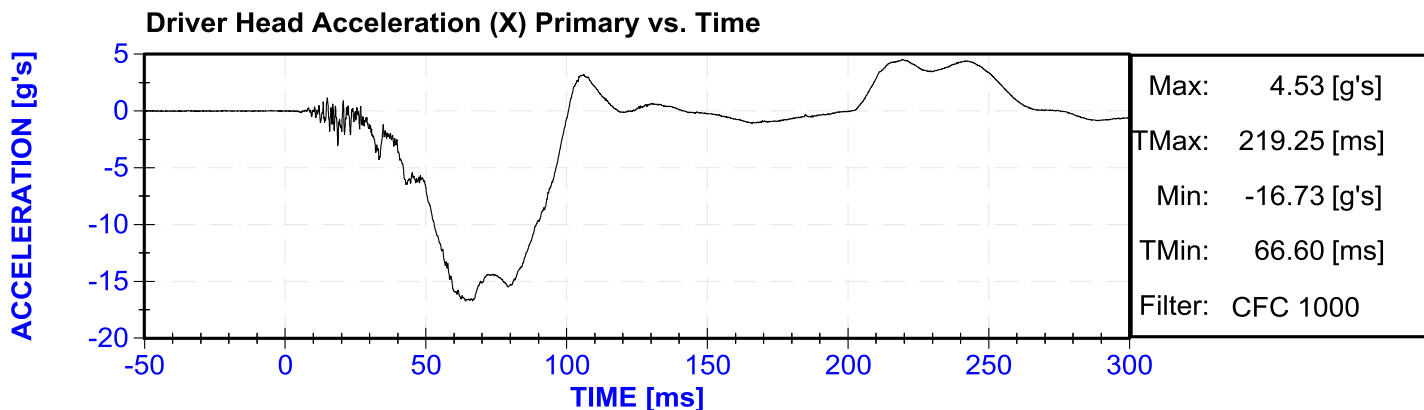
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Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)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

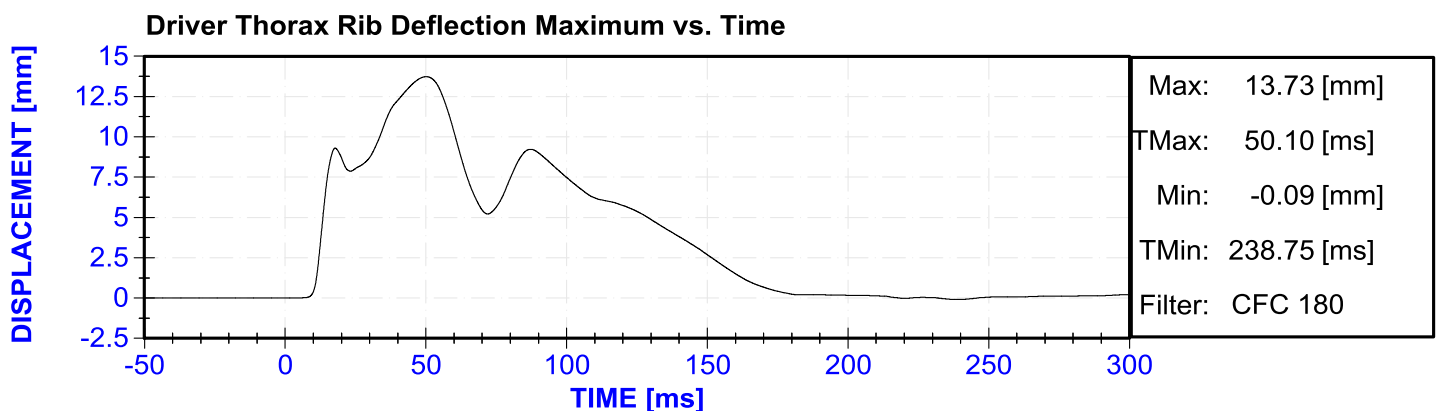
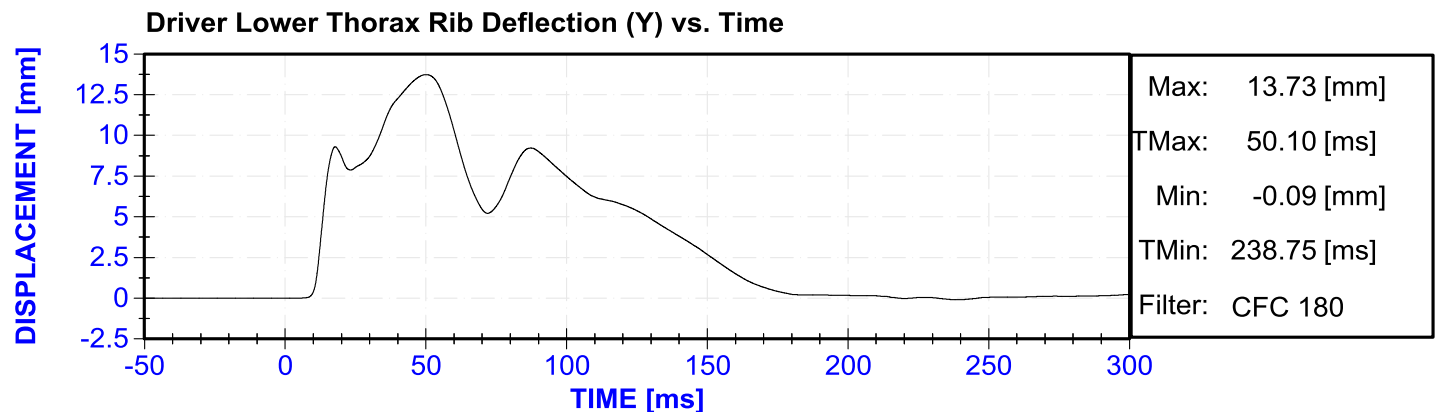
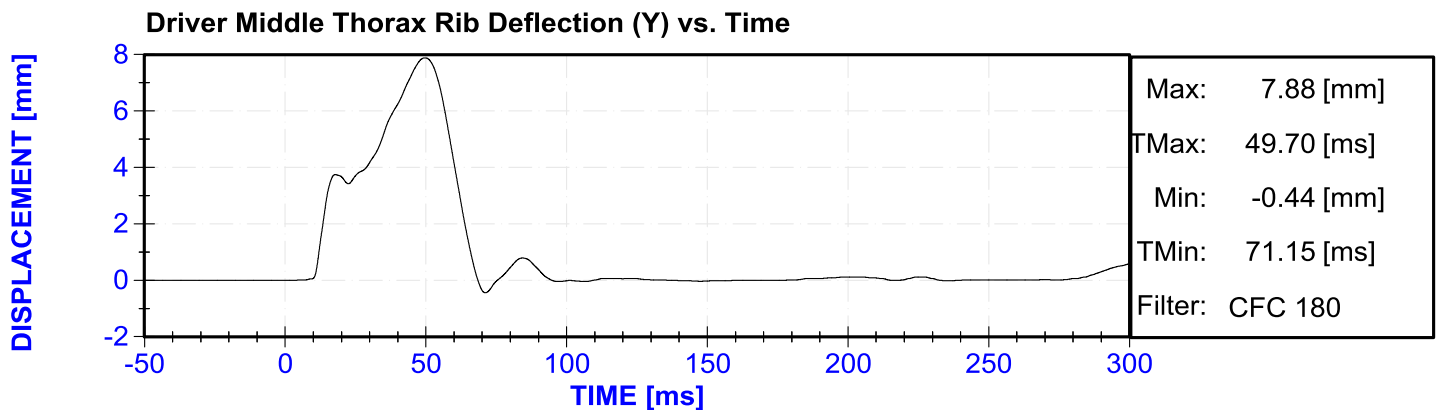
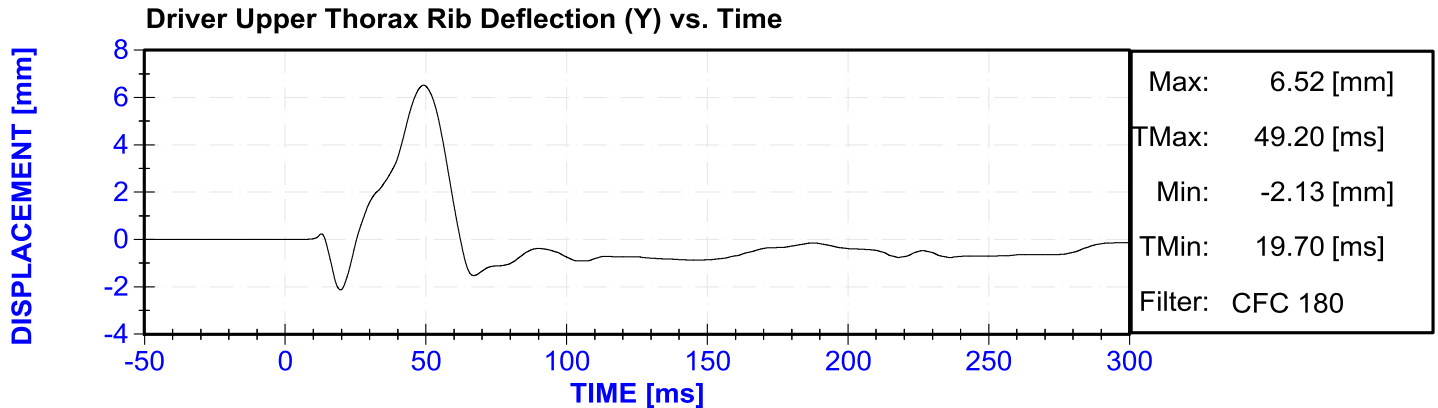
Vehicle Instrumentation Data

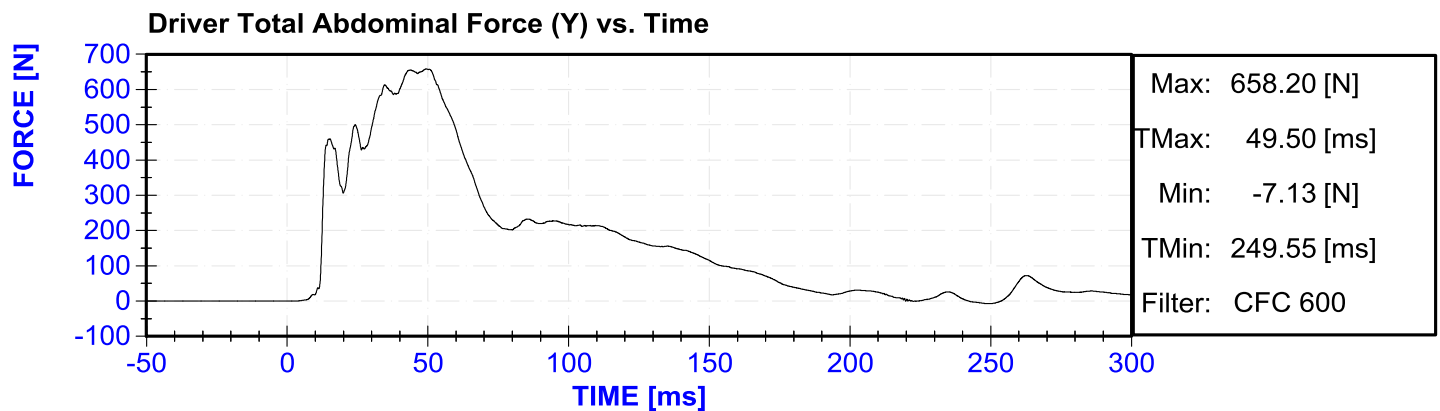
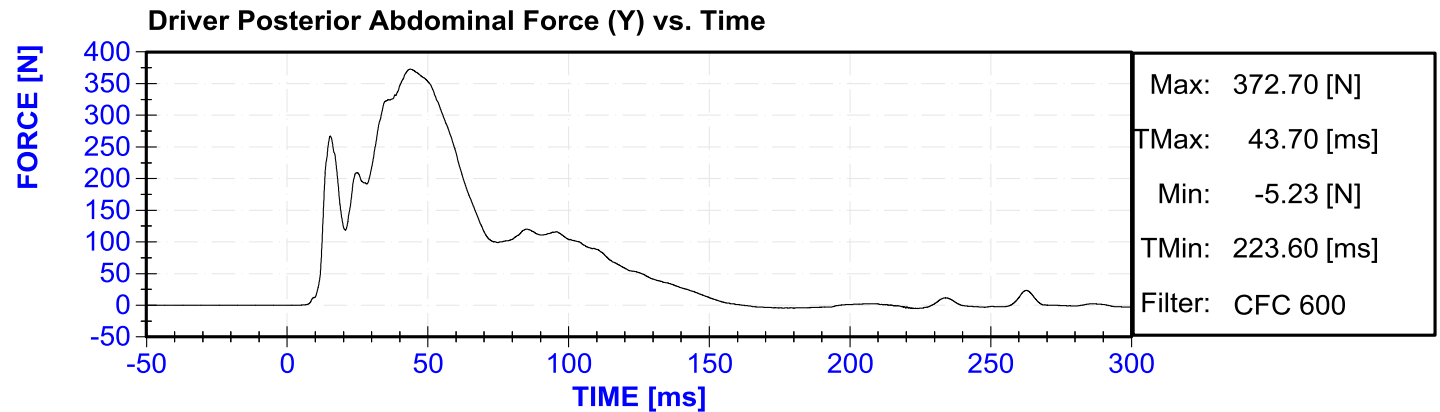
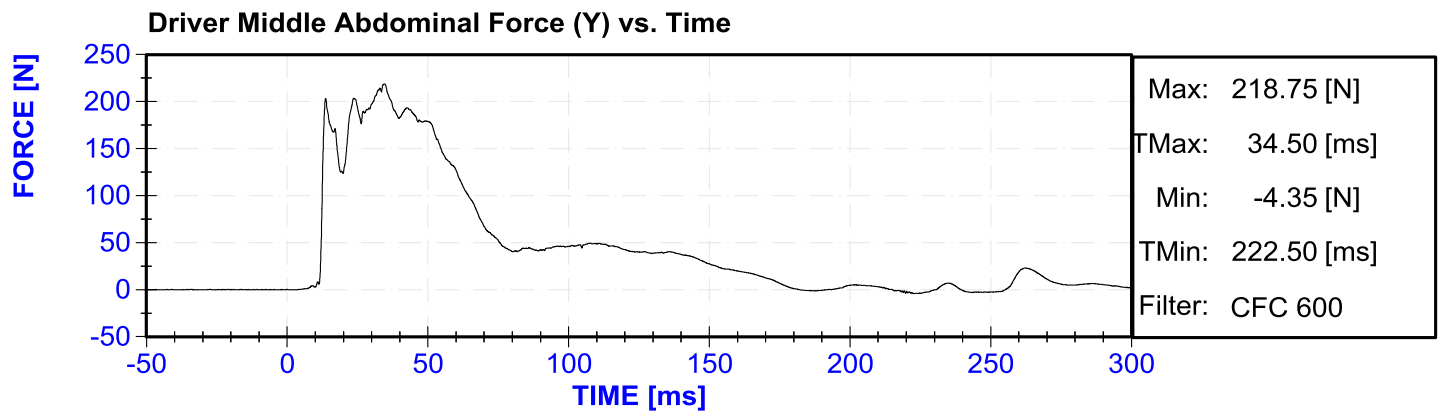
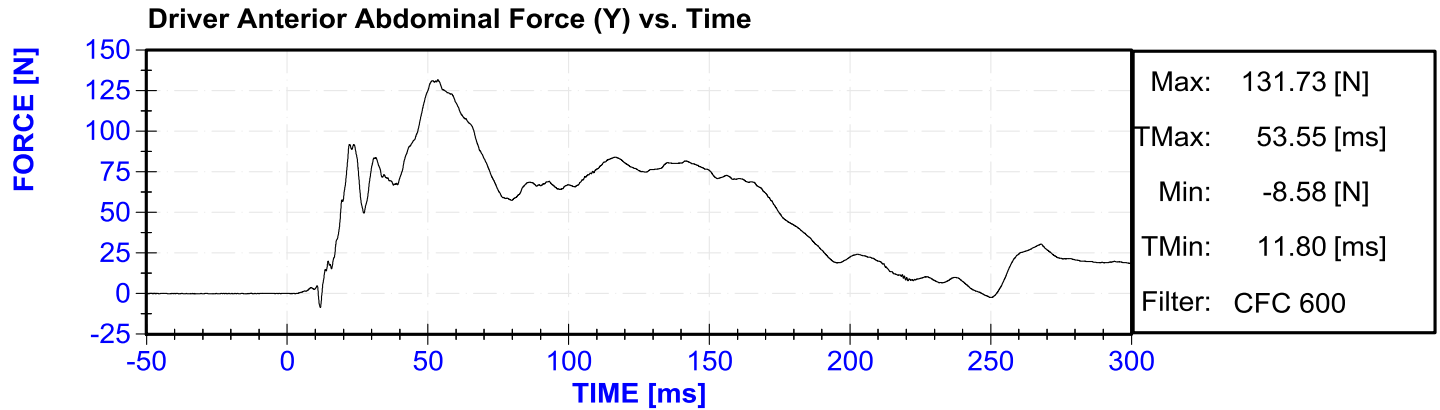
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (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)

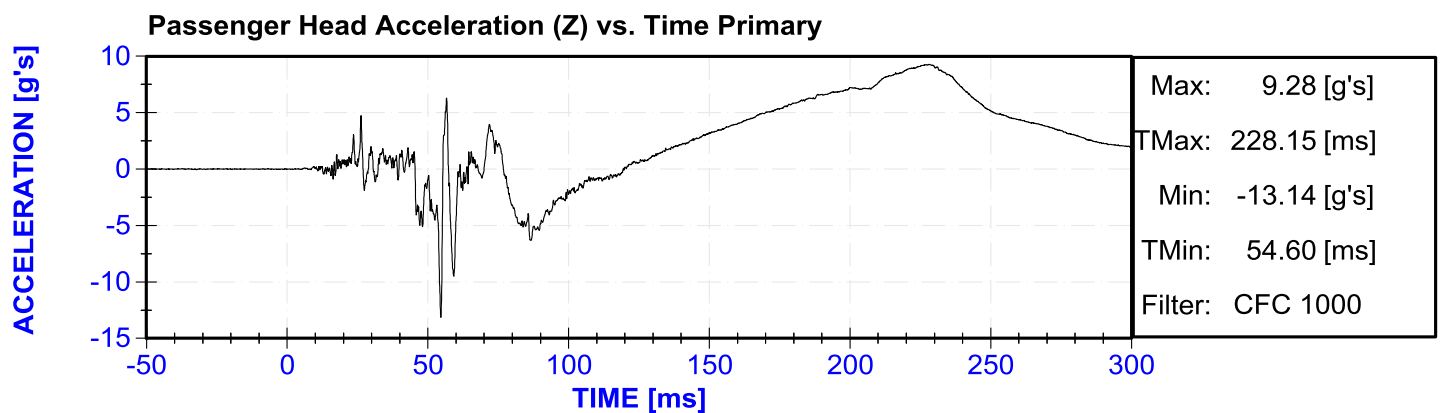
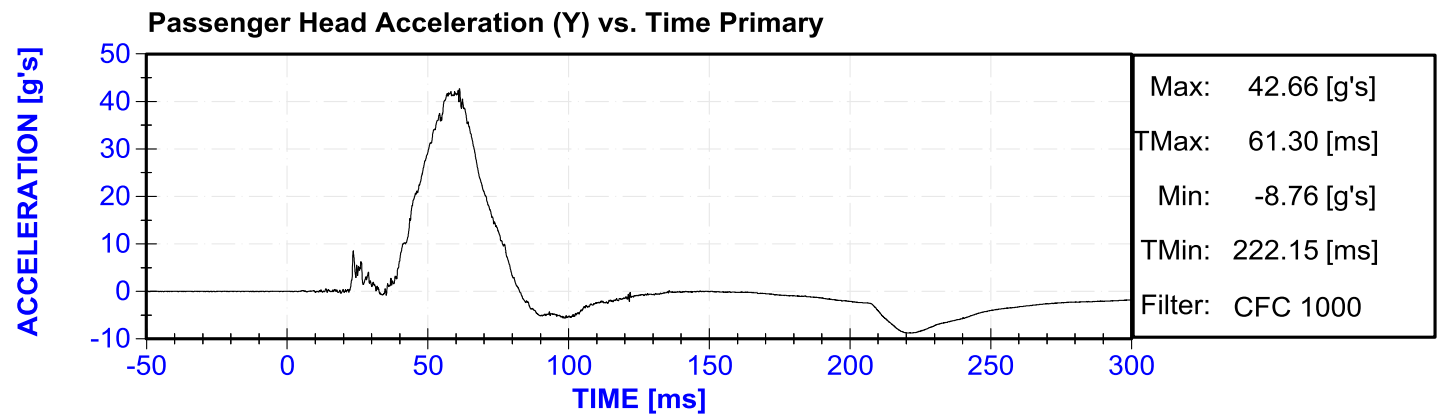
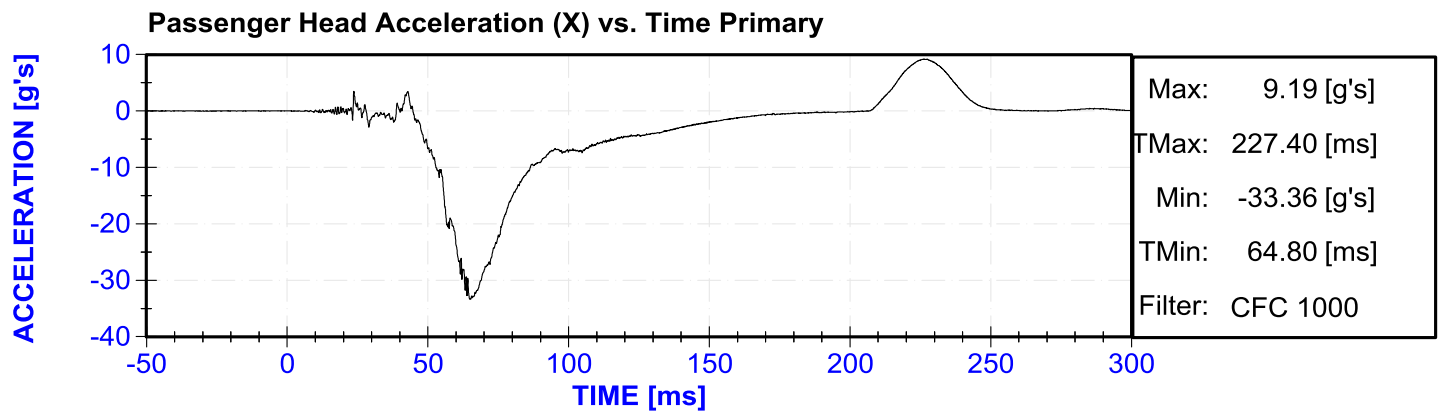
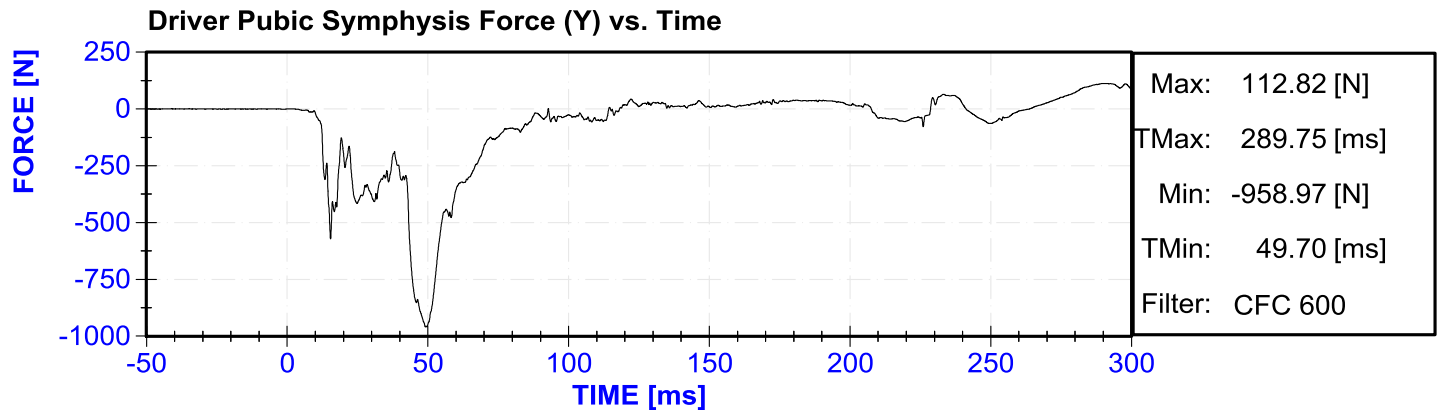
MDB Instrumentation Data

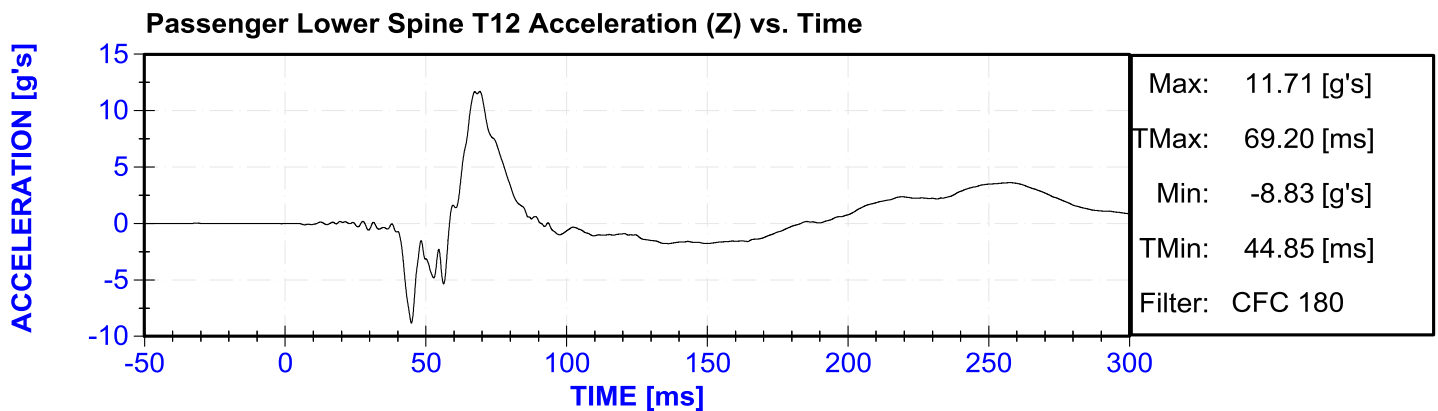
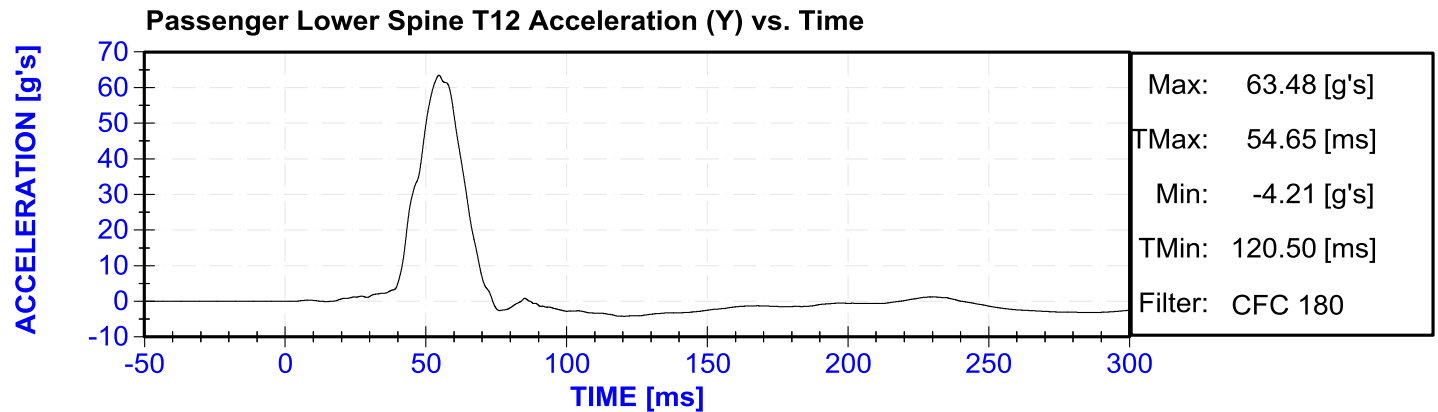
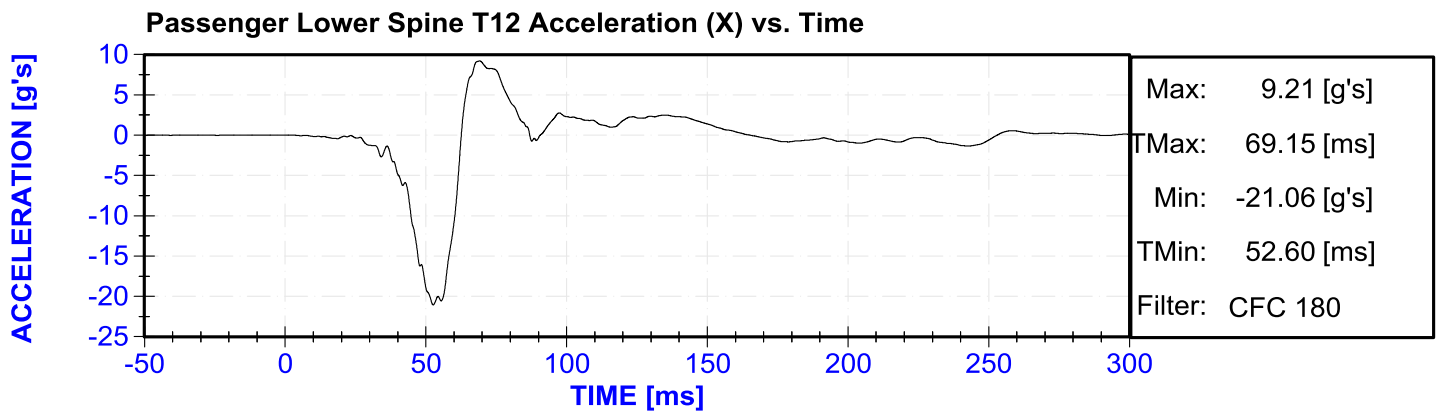
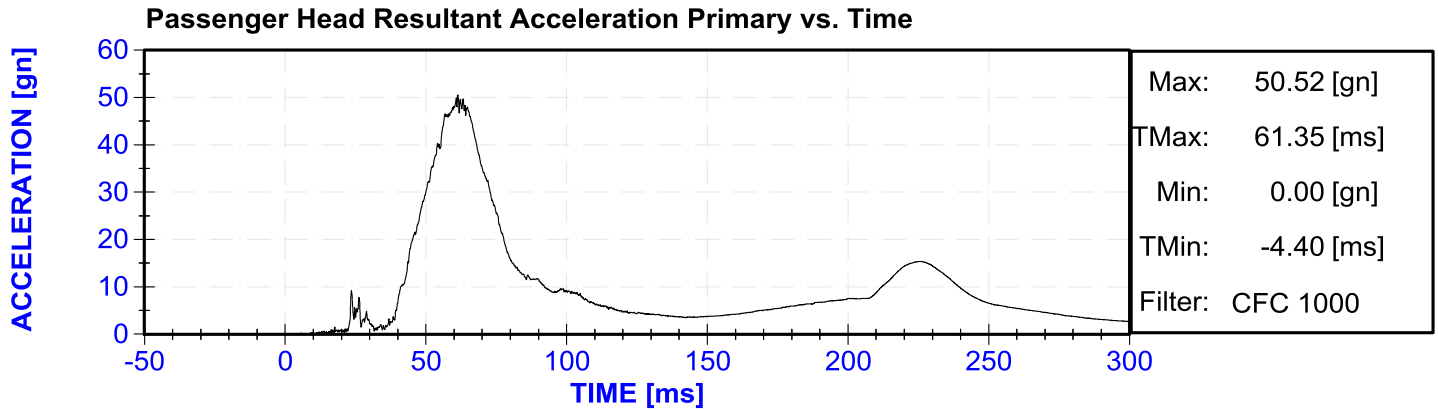
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

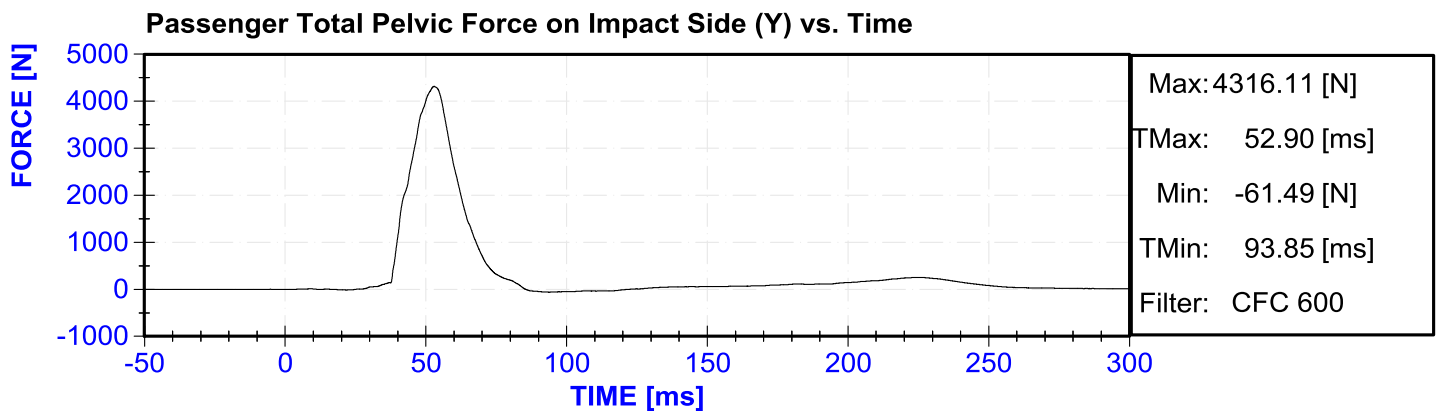
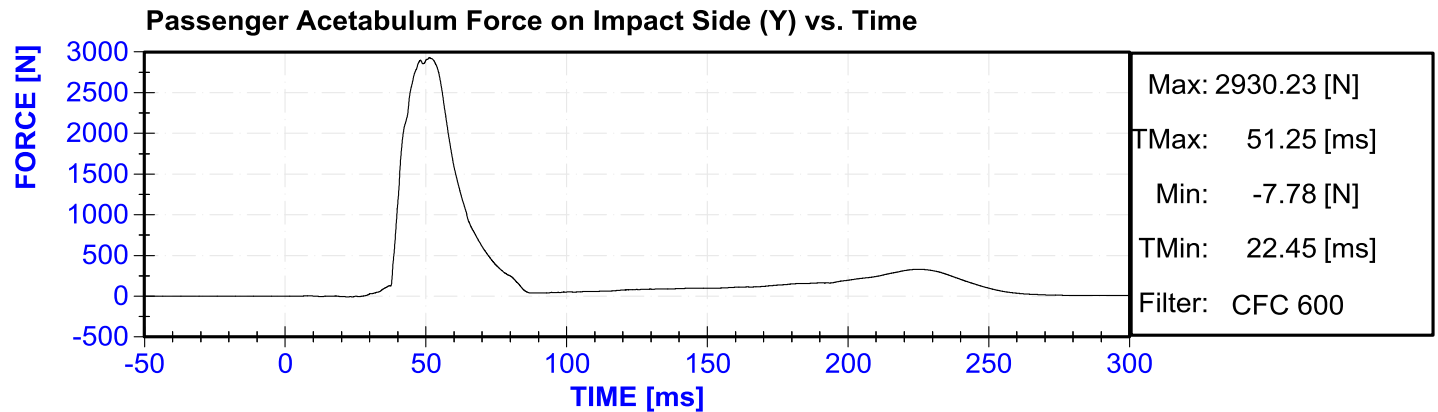
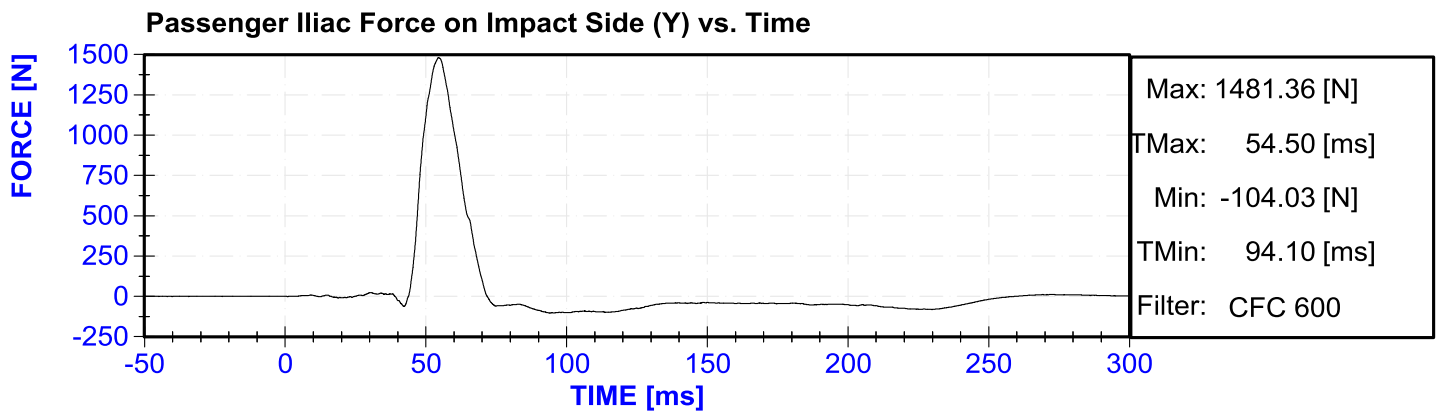
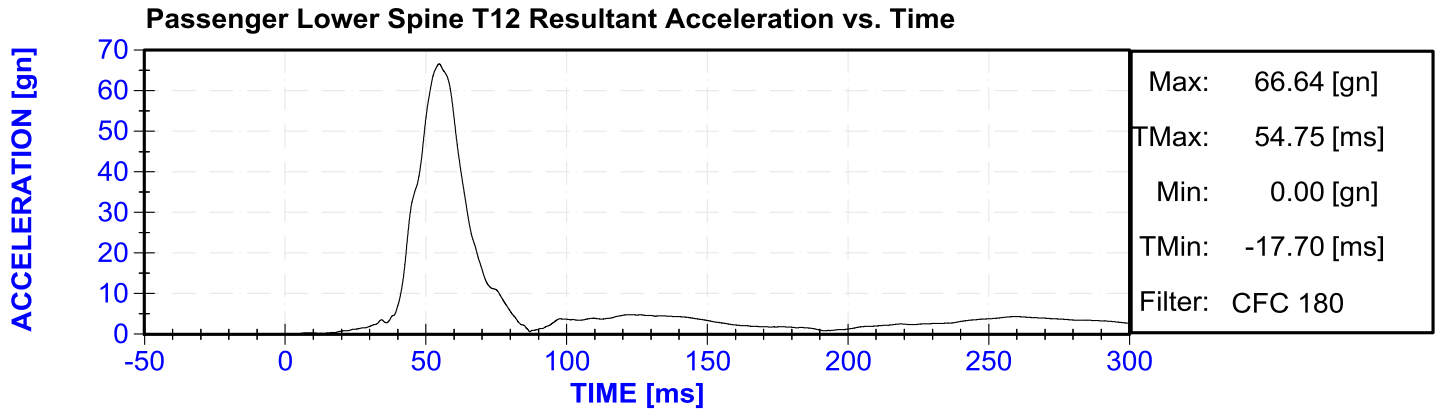












APPENDIX C

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)

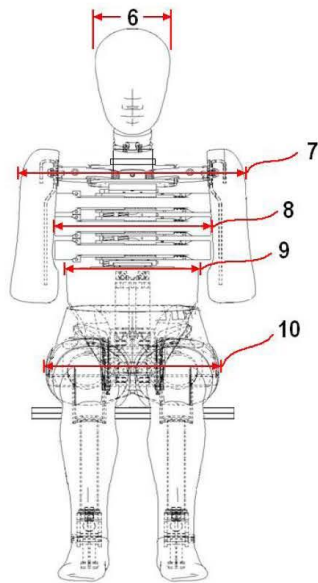


External Measurements - EuroSID-2re

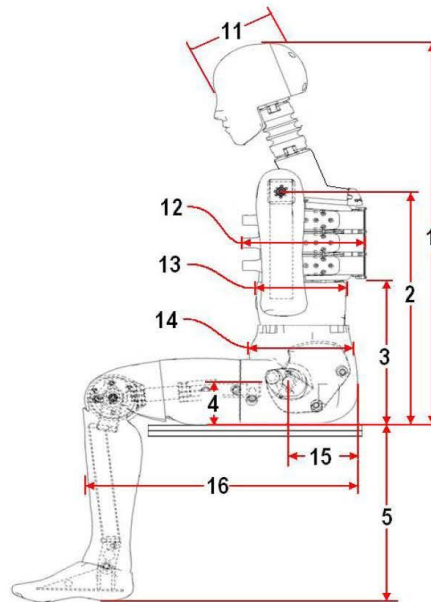
Technician: M.Hartung

Date: 5/1/2017

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	913	Pass
2	Seat to Shoulder Joint	558	572	567	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	351	Pass
4	Seat to Hip Joint (center of bolt)	97	103	100	Pass
5	Sole to Seat, Sitting	333	451	418	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	280	Pass
10	Pelvis Lap Width	359	373	366	Pass
11	Head Depth	196	206	201	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	199	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	602	Pass

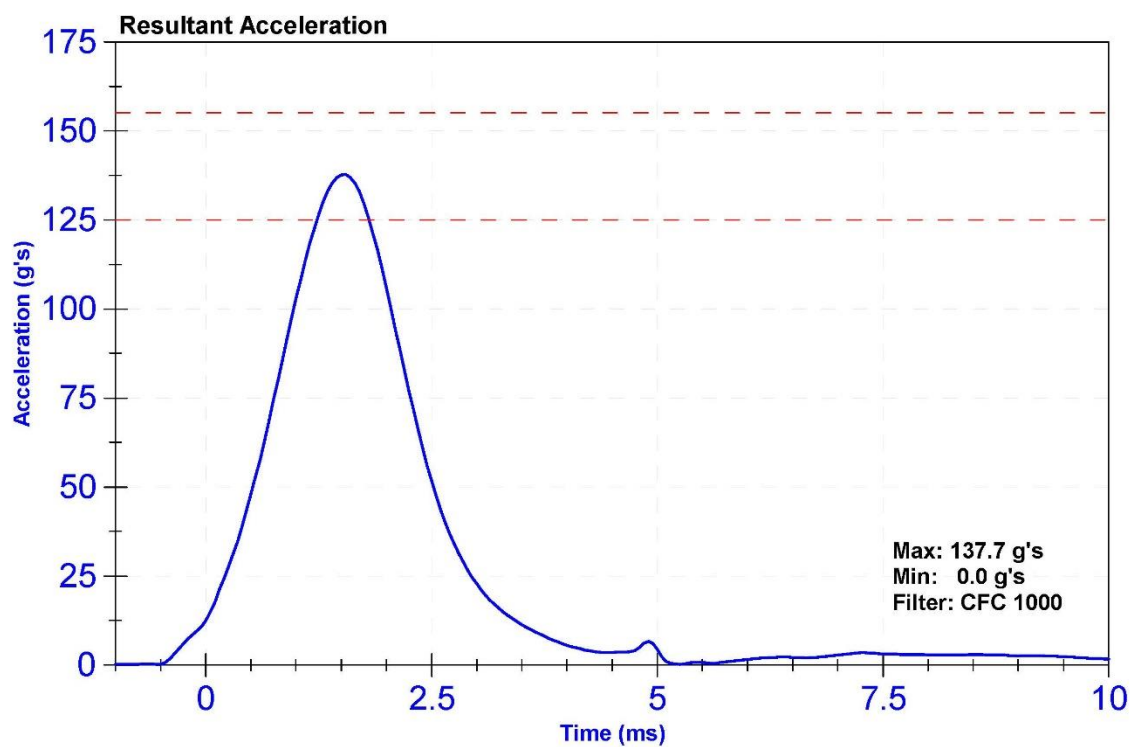
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

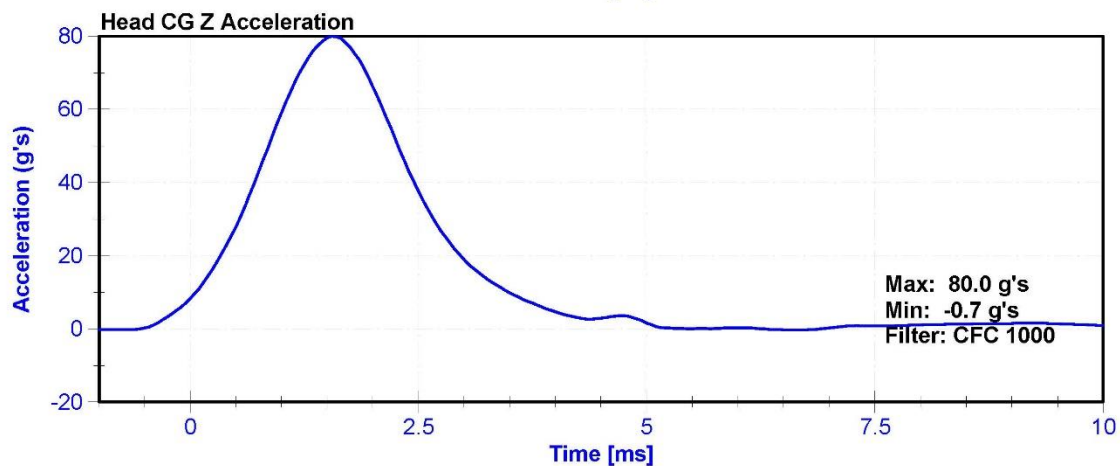
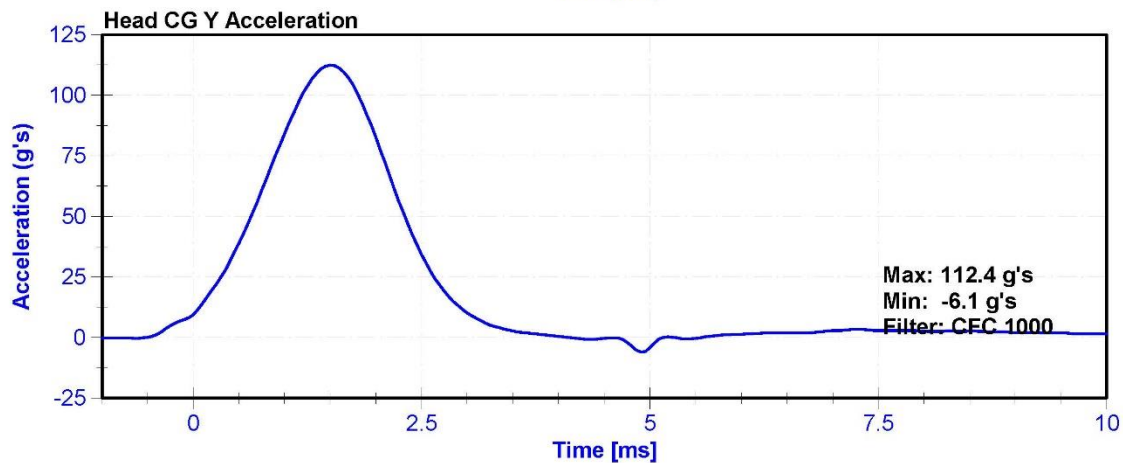
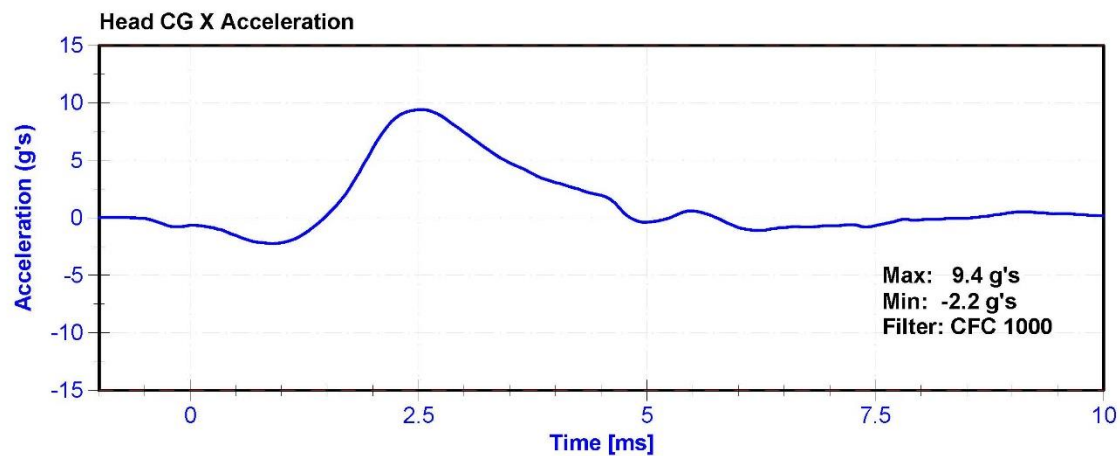
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	44.0	Pass
Resultant Acceleration	125	155	g's	137.7	Pass
Oscillation	0	15	%	4.83	Pass
Fore-Aft Acceleration	-15	15	g's	9.4	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





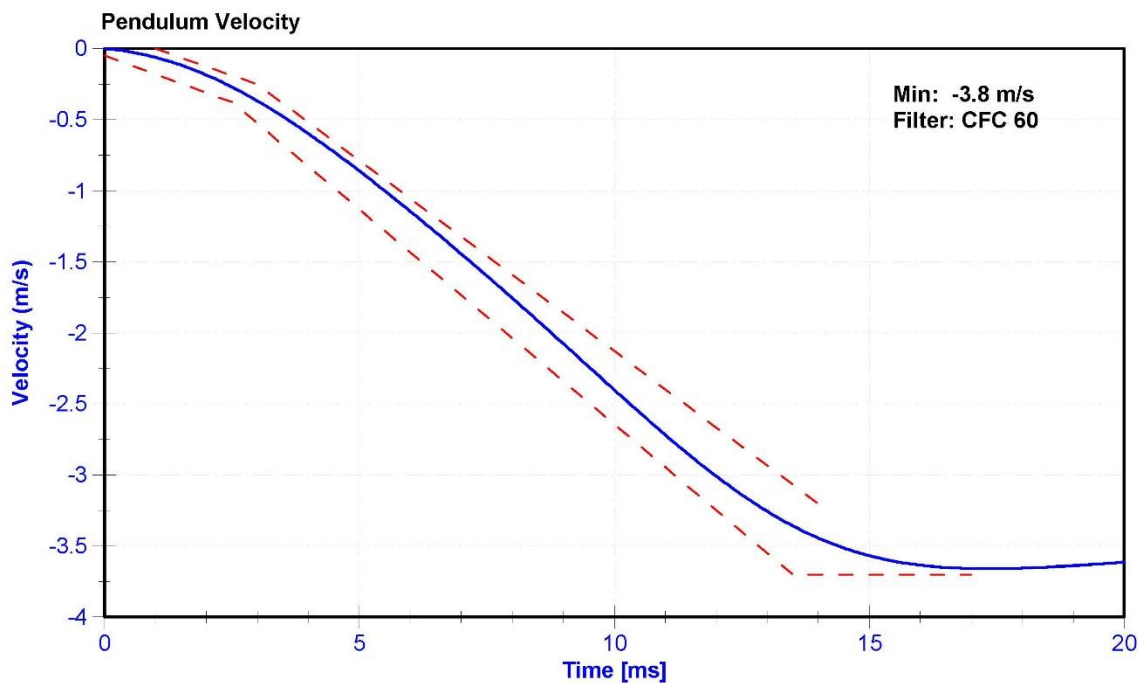
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

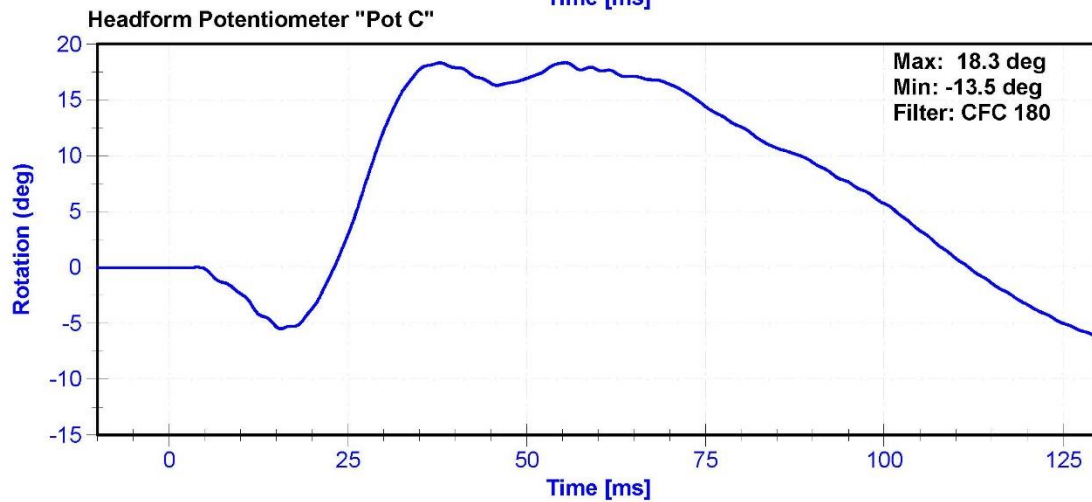
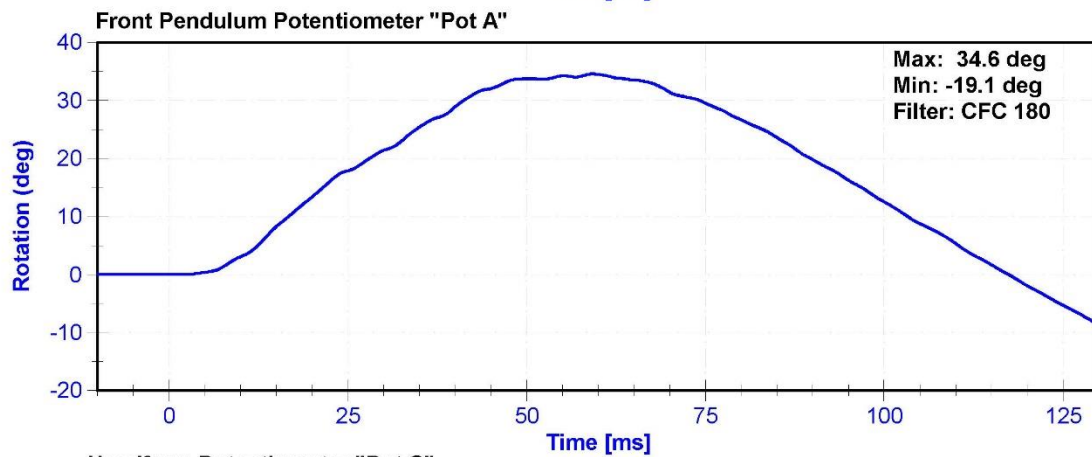
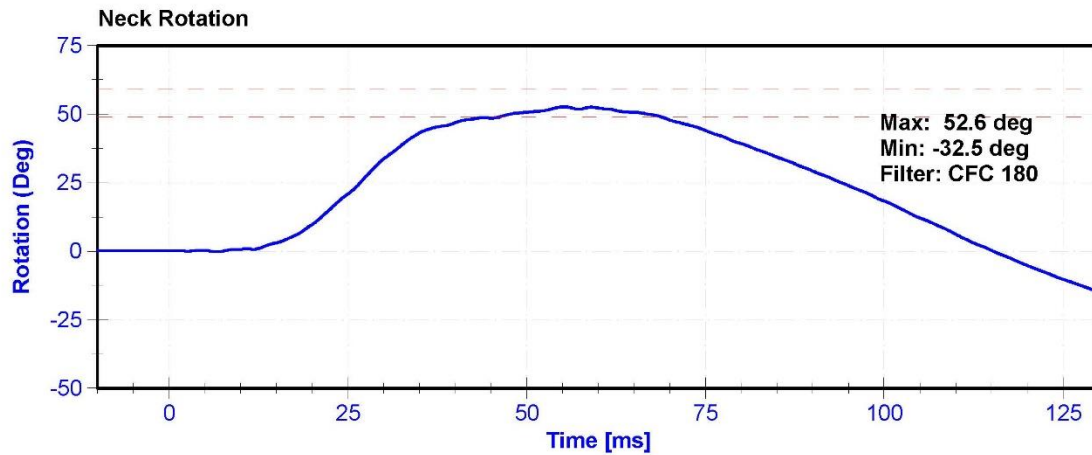
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.6	Pass
Velocity	3.3	3.5	m/s	3.43	Pass
Lateral Neck Rotation	49	59	deg	52.6	Pass
Time at Maximum Rotation	54	66	ms	55.3	Pass
Time of Rotation Decay from Maximum	53	88	ms	60.0	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





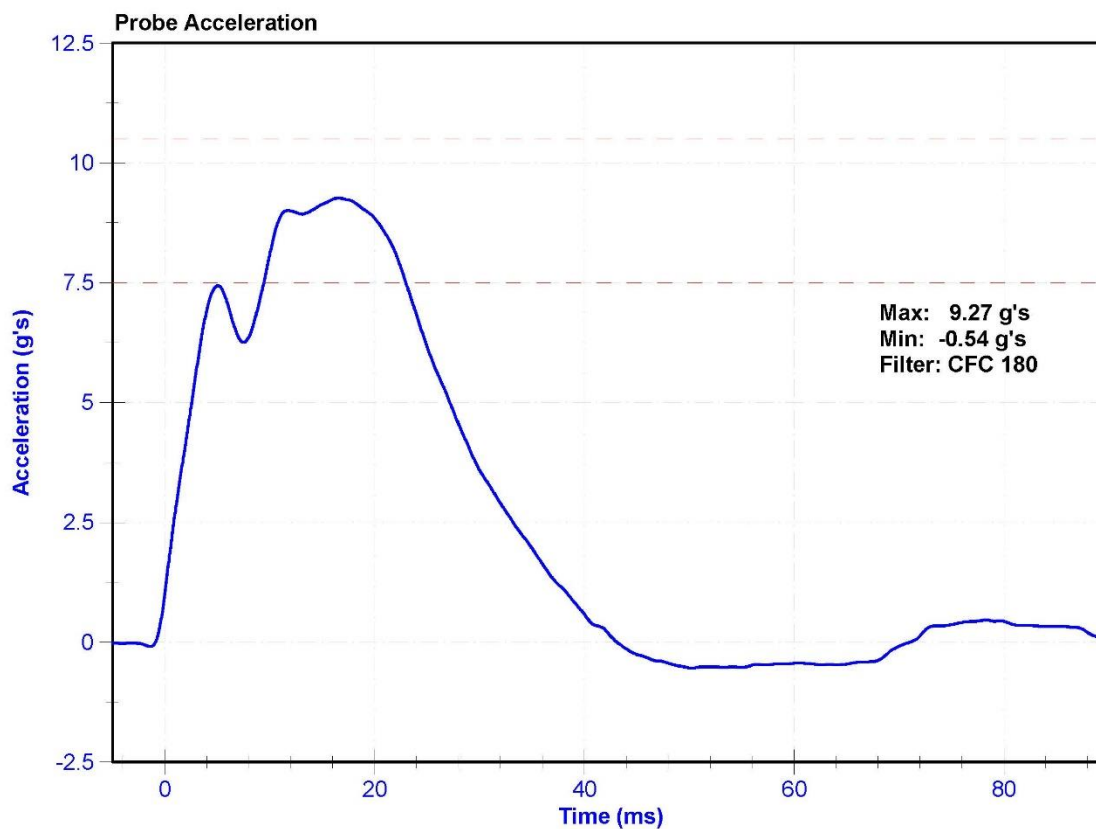
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	64.8	Pass
Velocity	4.2	4.4	m/s	4.21	Pass
Probe Acceleration	7.5	10.5	g's	9.27	Pass

Transducer Calibrations

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



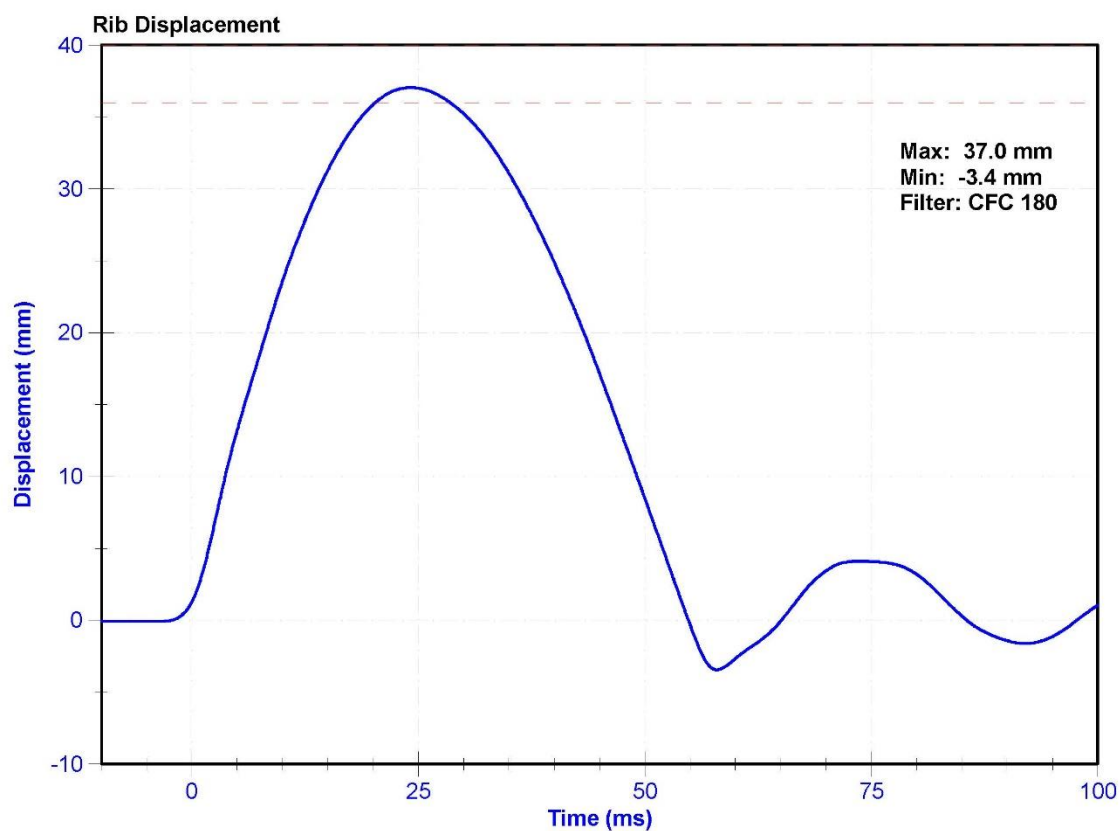
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.5	Pass
Rib Displacement	36	40	mm	37.0	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



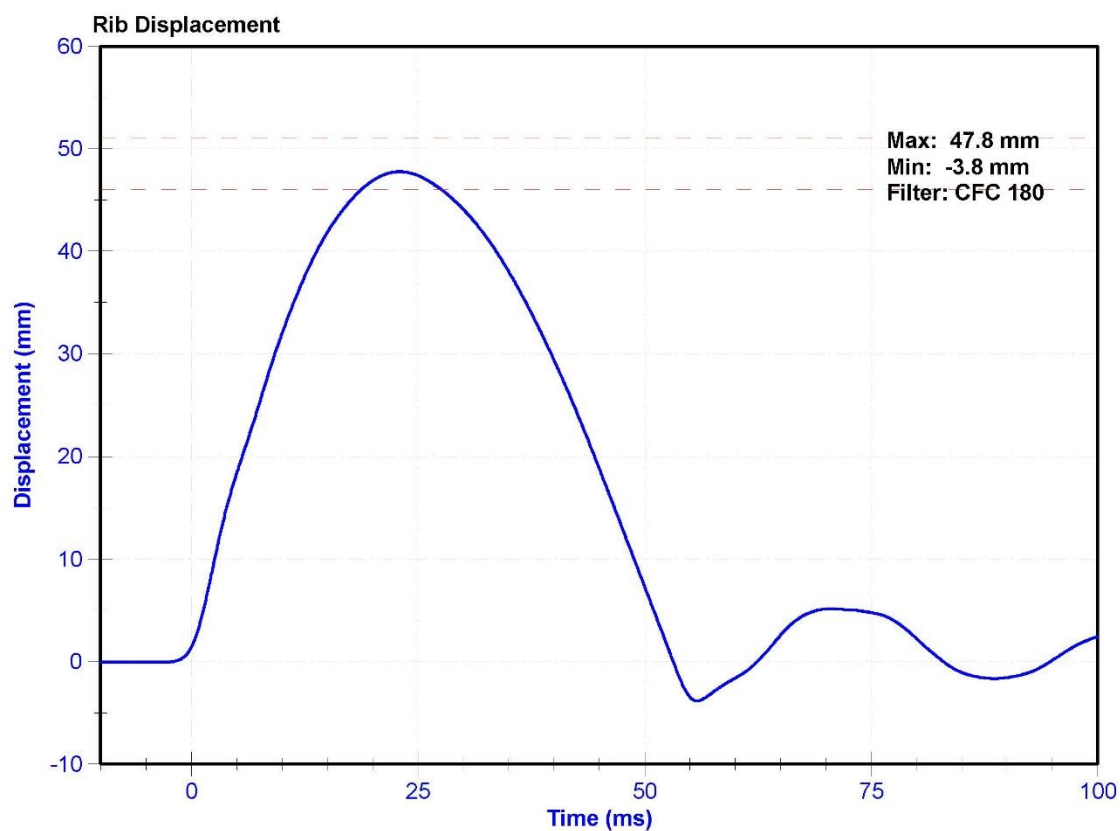
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.5	Pass
Rib Displacement	46	51	mm	47.8	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



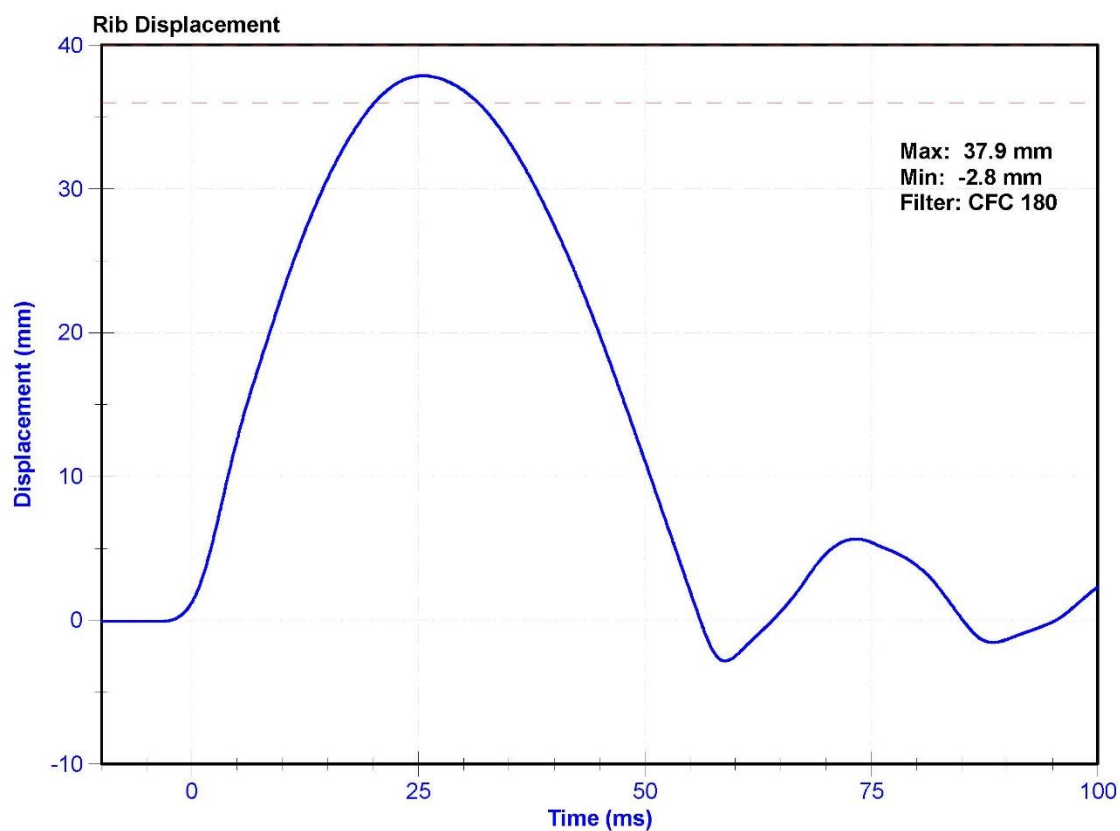
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.5	Pass
Rib Displacement	36	40	mm	37.9	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



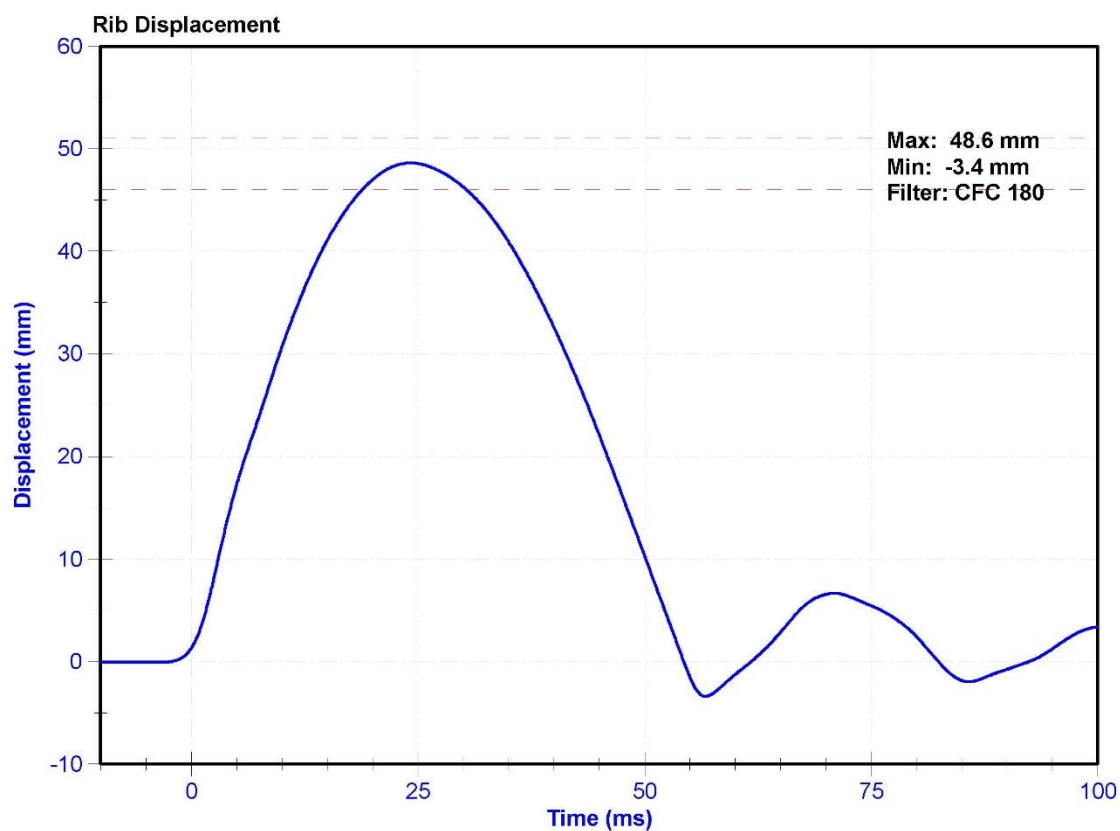
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.5	Pass
Rib Displacement	46	51	mm	48.6	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



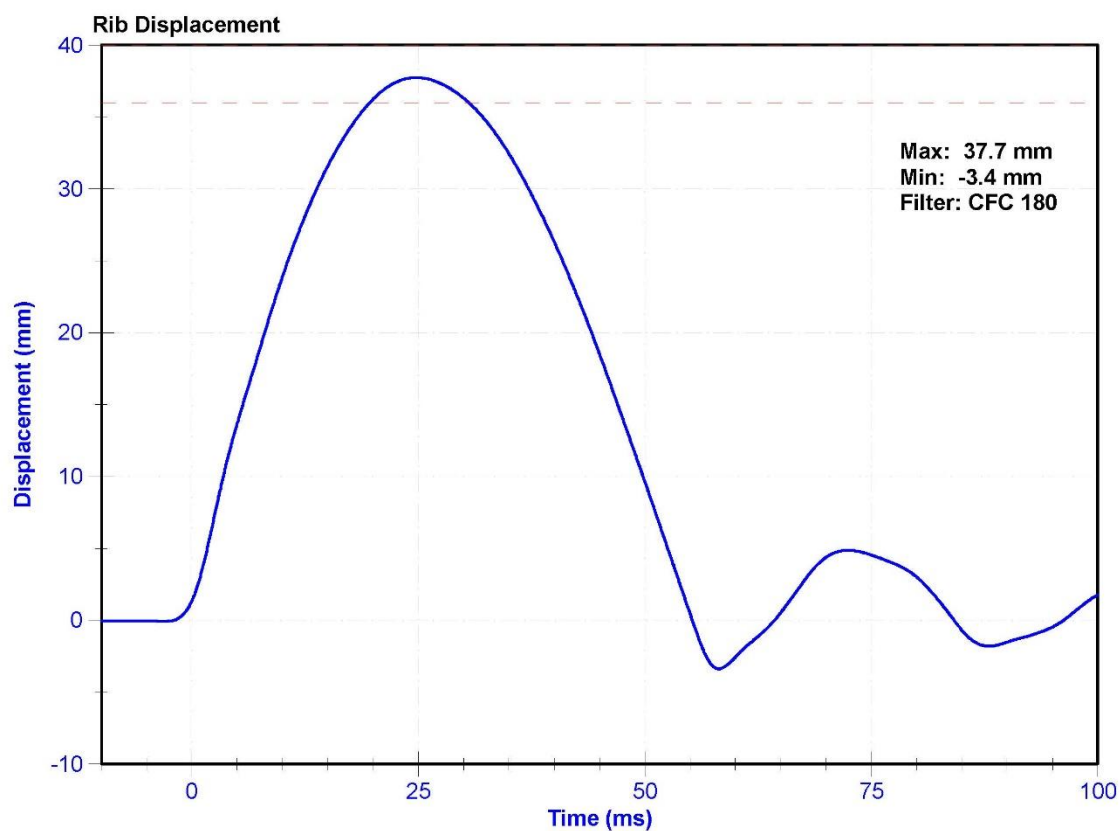
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.5	Pass
Rib Displacement	36	40	mm	37.7	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



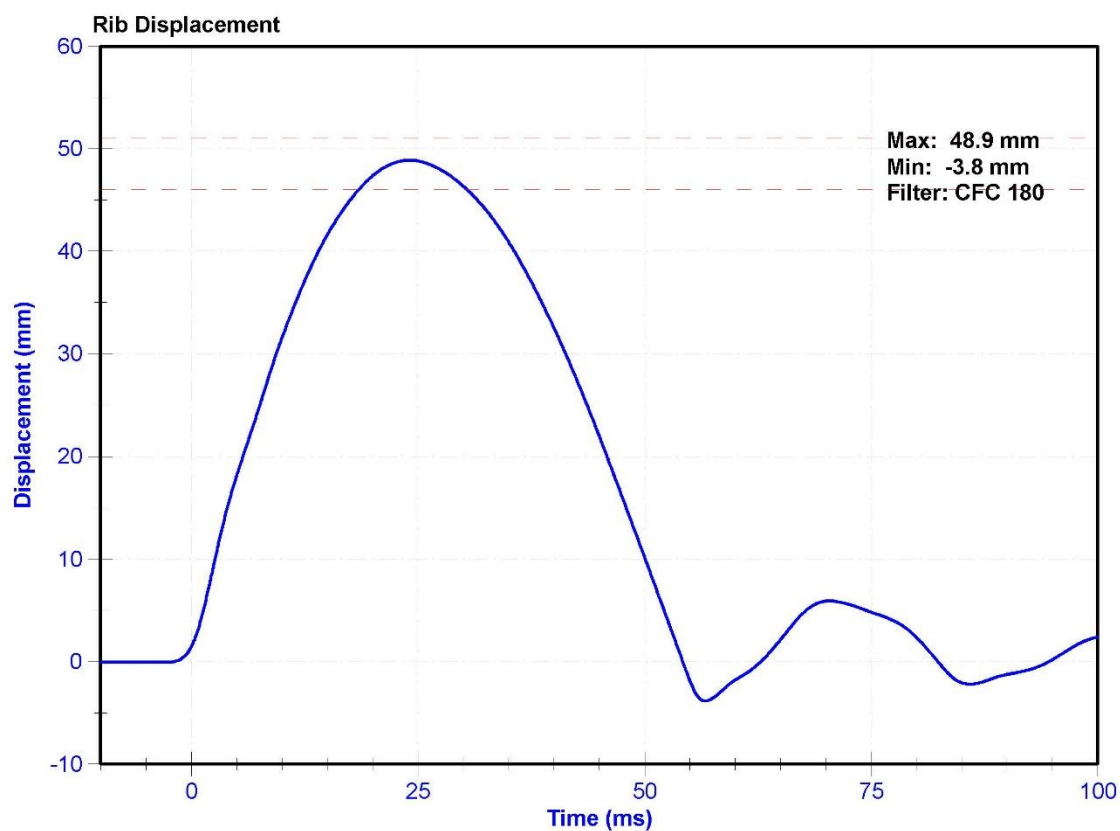
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.5	Pass
Rib Displacement	46	51	mm	48.9	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



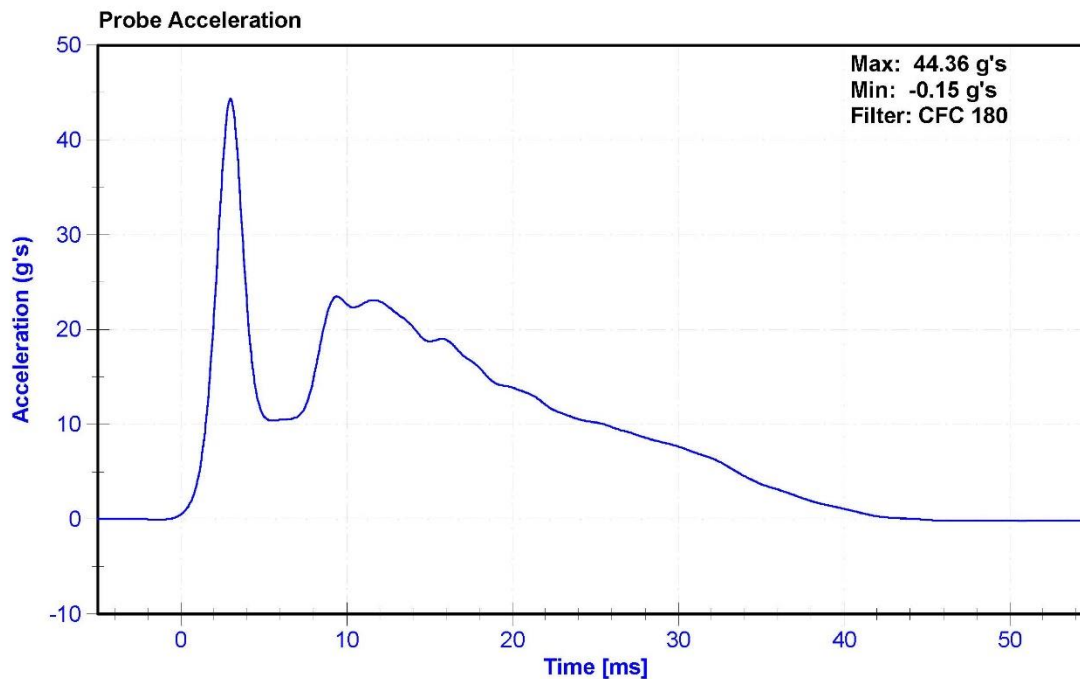
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

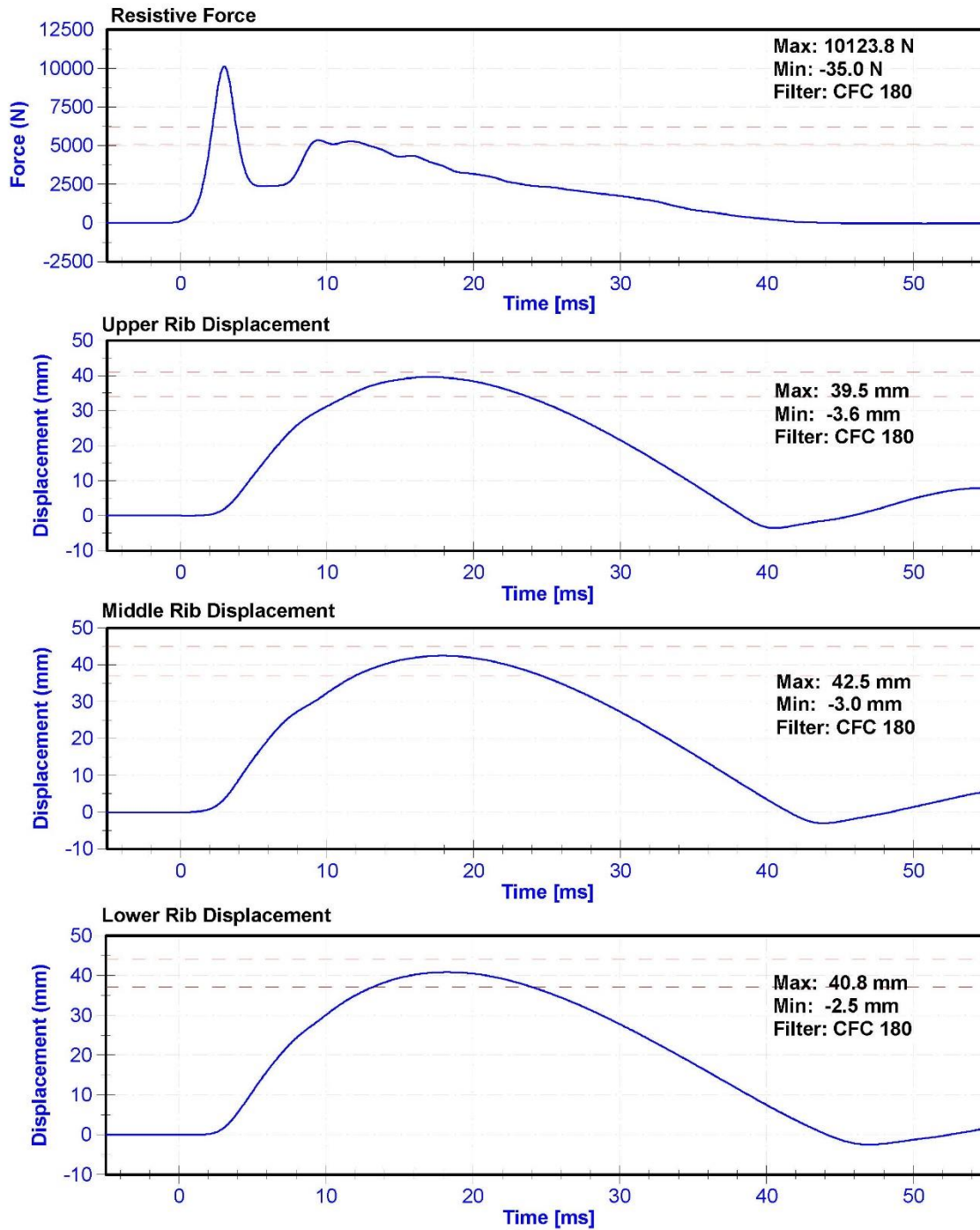
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	57.2	Pass
Velocity	5.4	5.6	m/s	5.56	Pass
Resistive Force after 6ms	5100	6200	N	5362.6	Pass
Upper Thorax Rib Deflection	34	41	mm	39.5	Pass
Mid Thorax Rib Deflection	37	45	mm	42.5	Pass
Lower Thorax Rib Deflection	37	44	mm	40.8	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





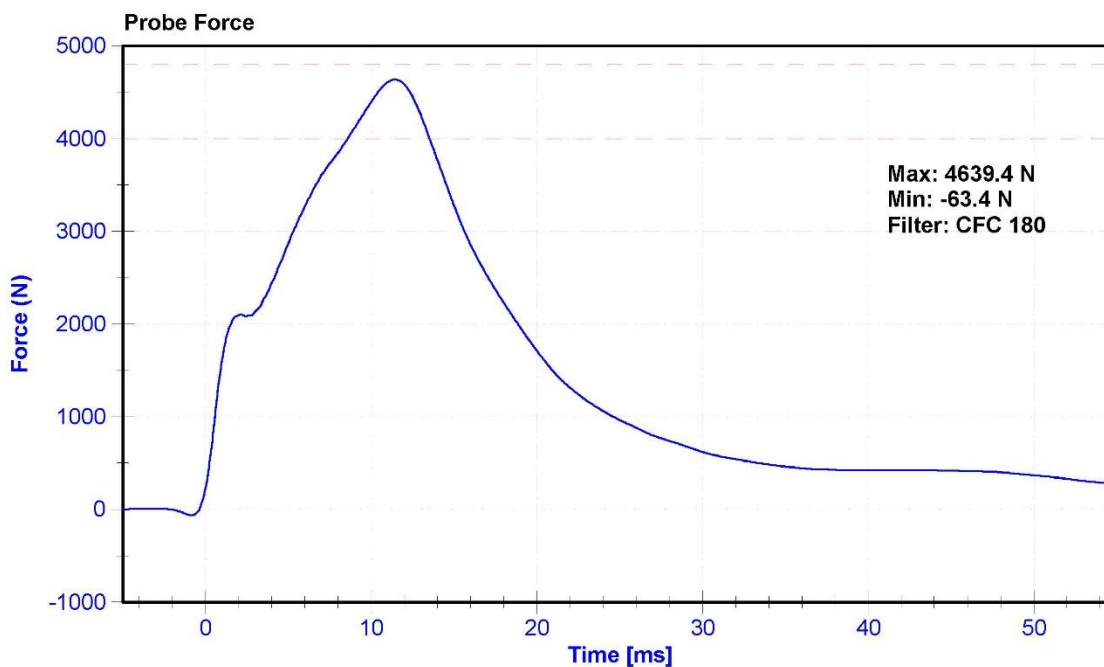
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

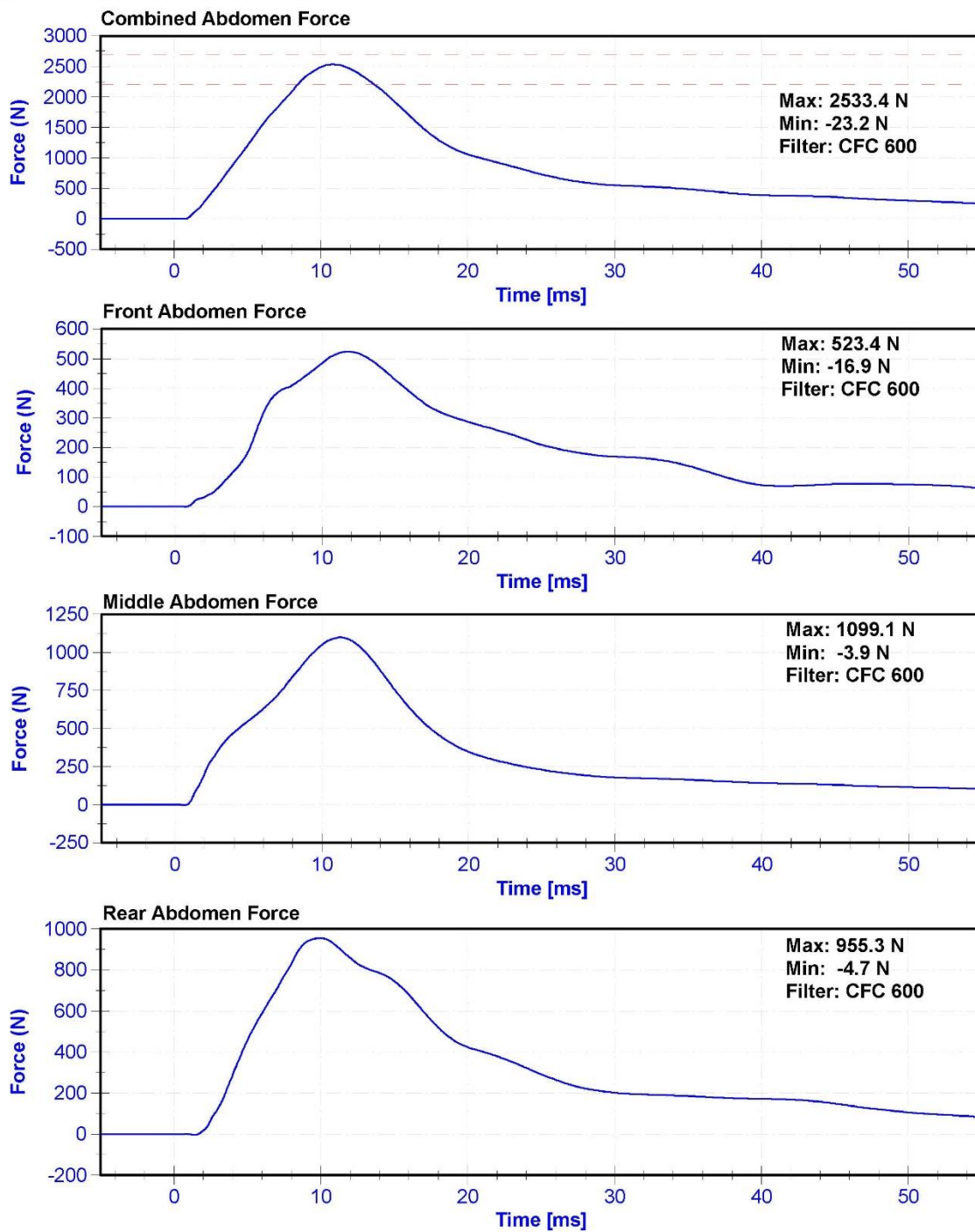
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	55.1	Pass
Velocity	3.9	4.1	m/s	4.06	Pass
Combined Abdomen Force	2200	2700	N	2533.4	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.75	Pass
Resistive Probe Force	4000	4800	N	4639.4	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.40	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







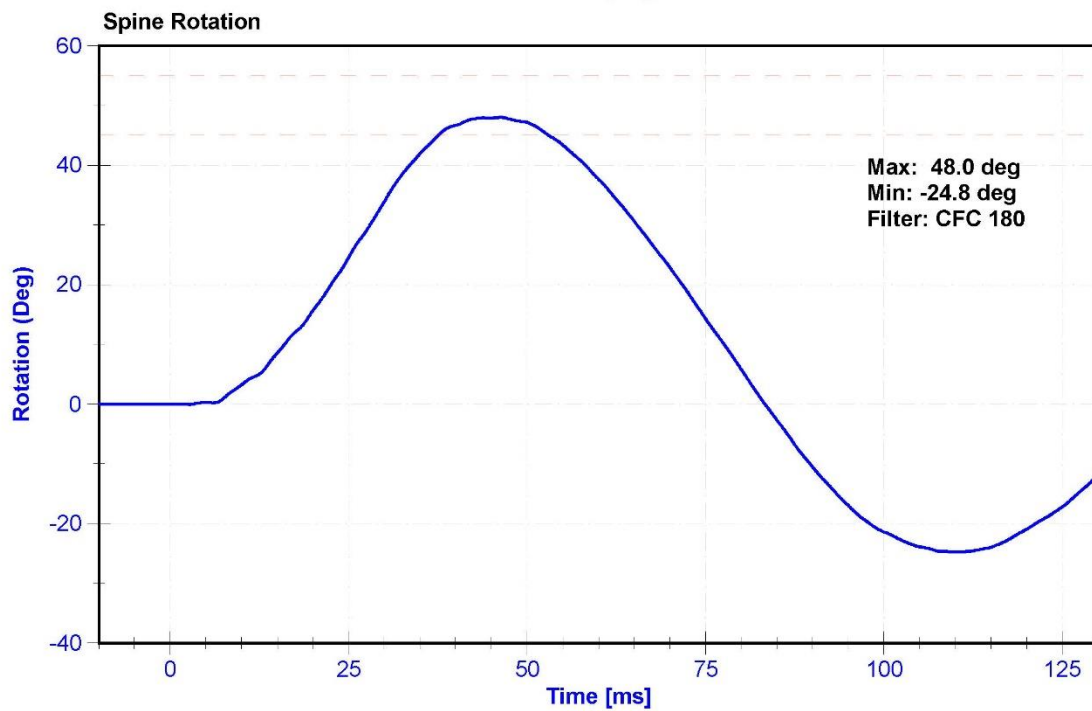
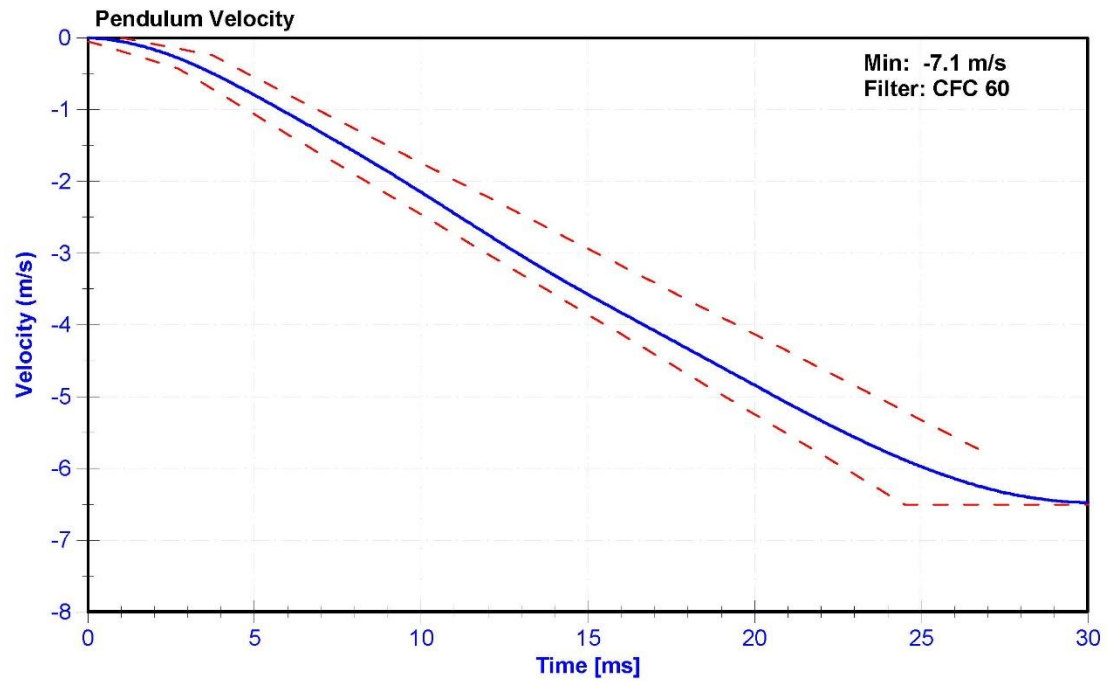
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

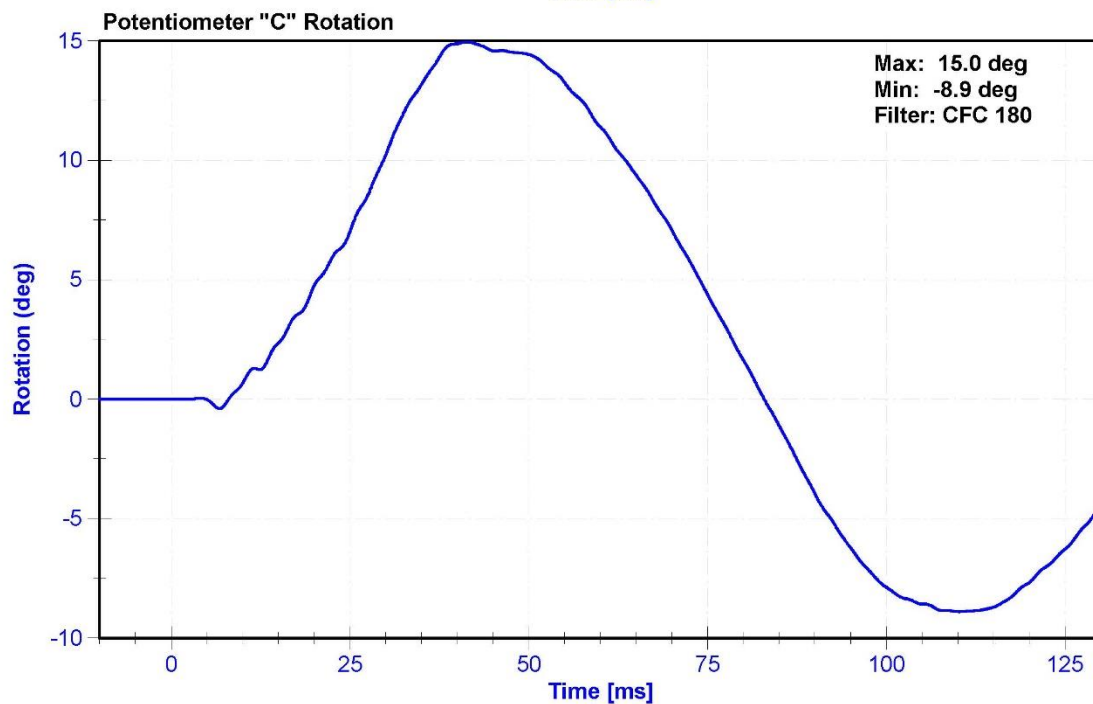
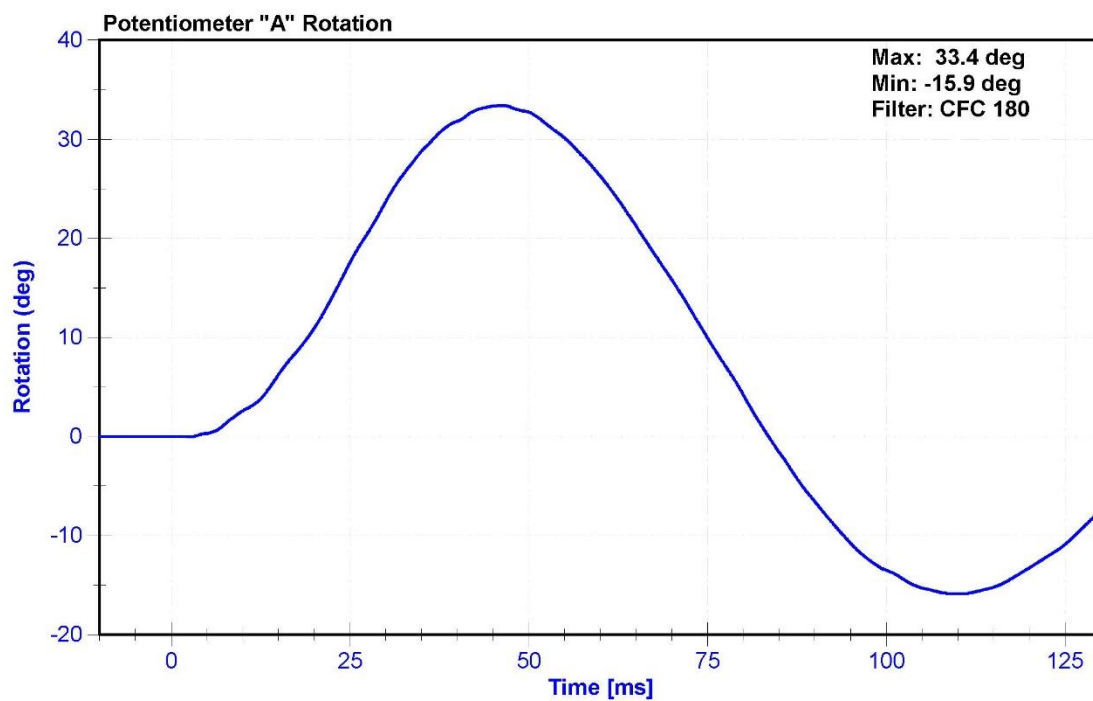
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	43.8	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	46.3	Pass
Time of Decay to Zero Degrees	37	57	ms	37.1	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





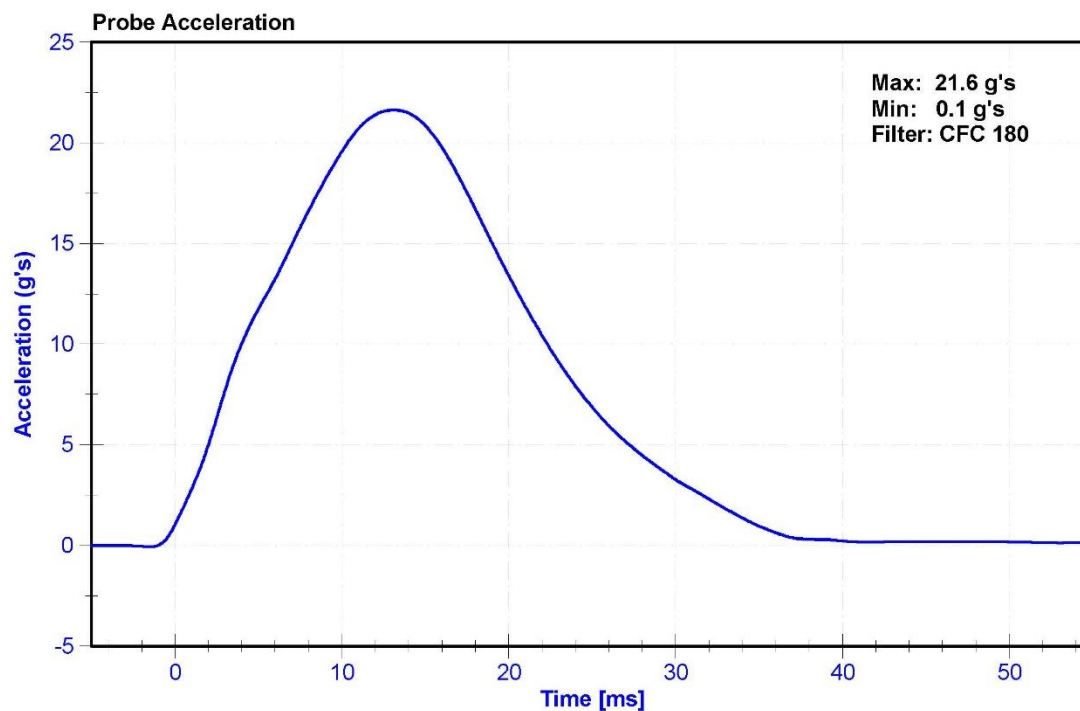
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

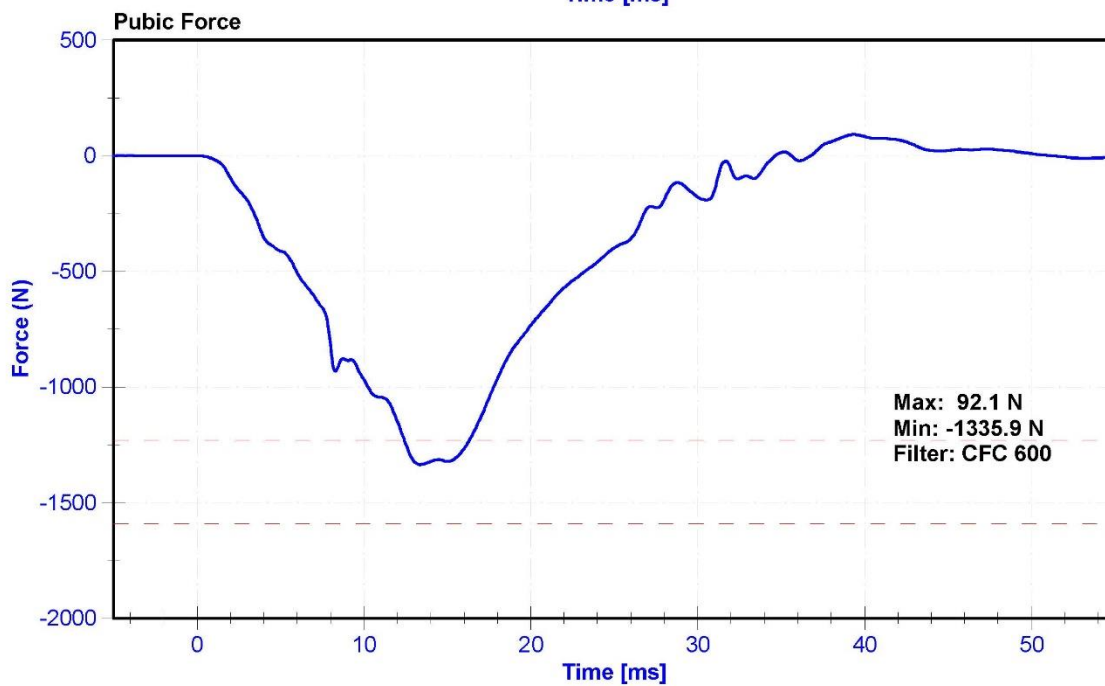
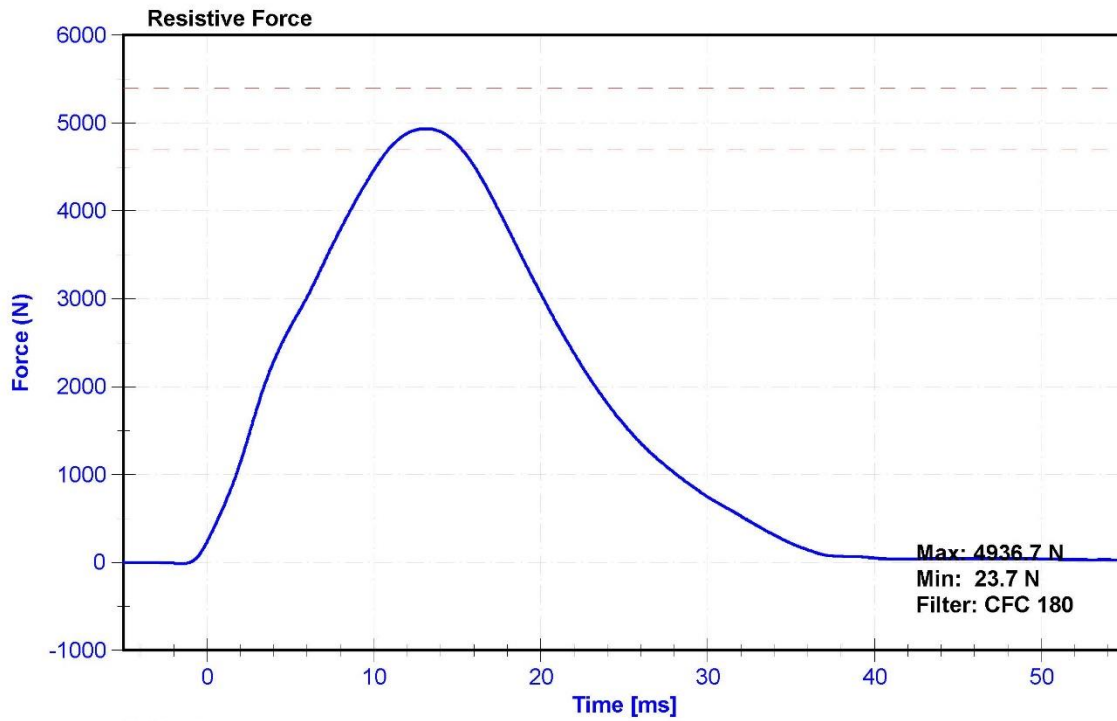
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	65.0	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Resistive Force	4700	5400	N	4936.7	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.10	Pass
Pubic Force	-1590	-1230	N	-1335.9	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





CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

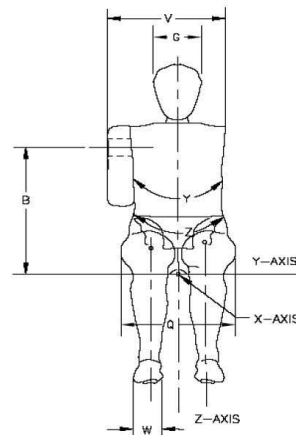
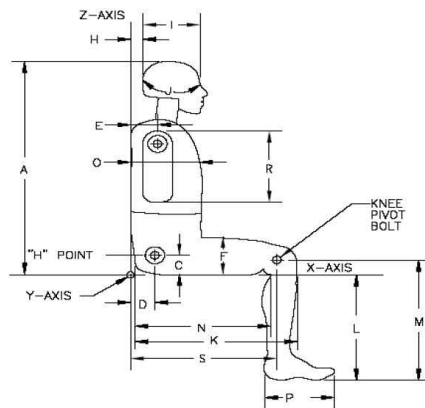


External Measurements - SID-IIs

Technician: **MKG**

Date: **5/2/2017**

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	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	102	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	182	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	350	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	428	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	254	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	860	Pass
Z	Waist Circumference	761	791	771	Pass

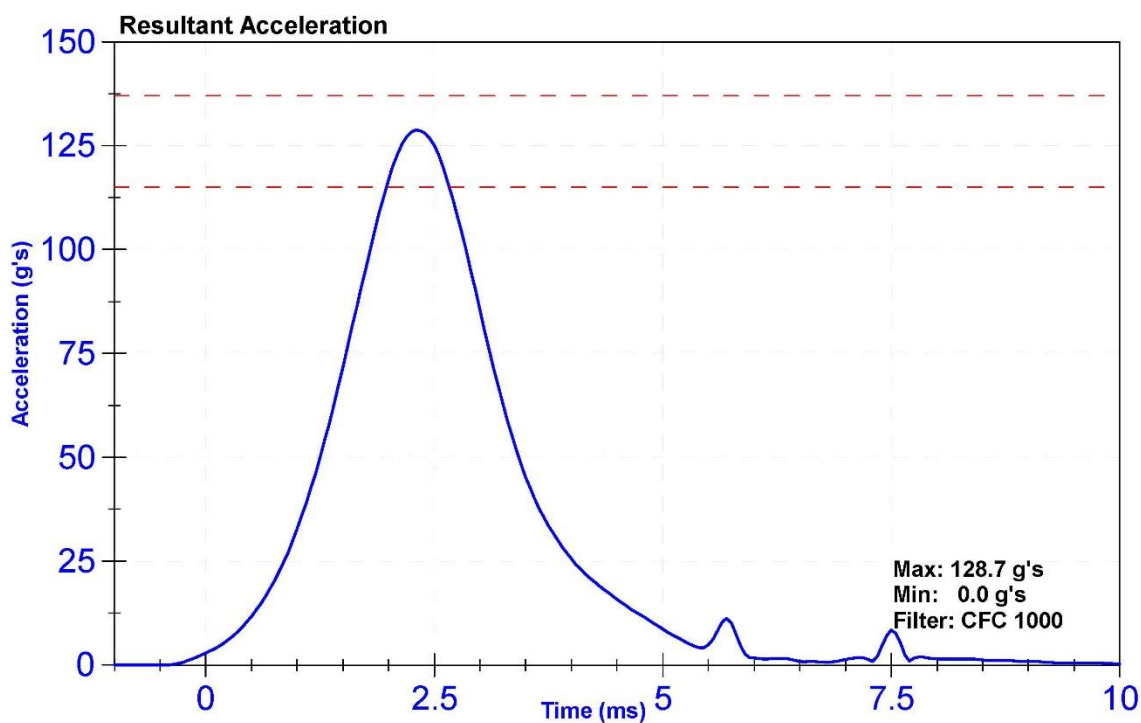
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

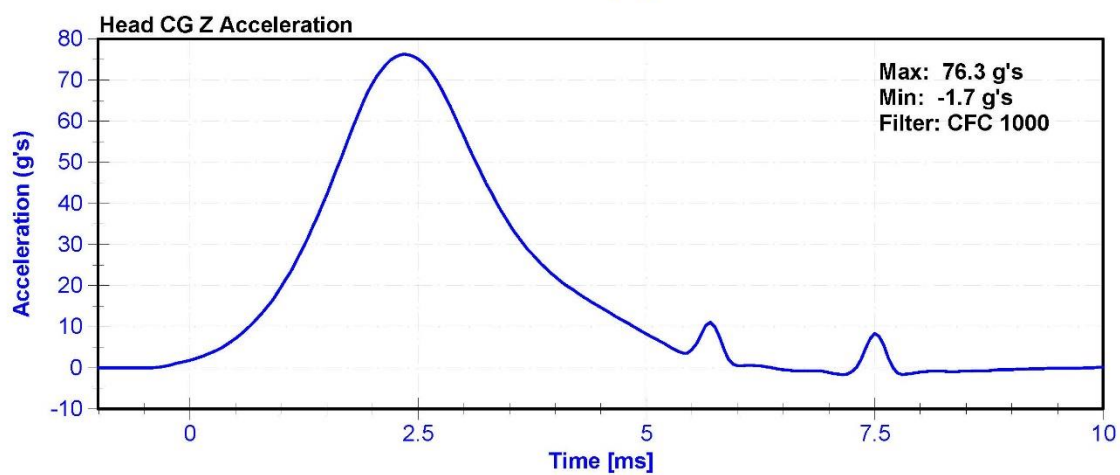
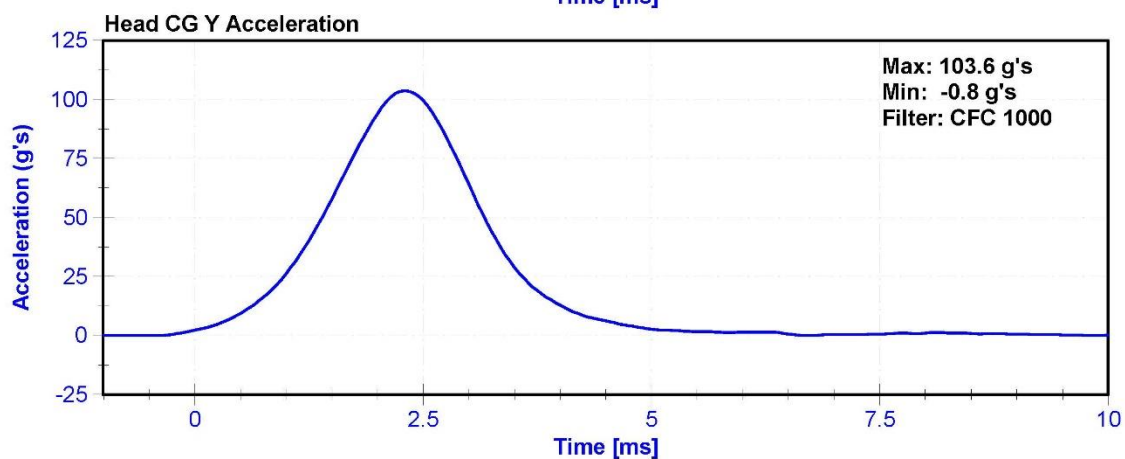
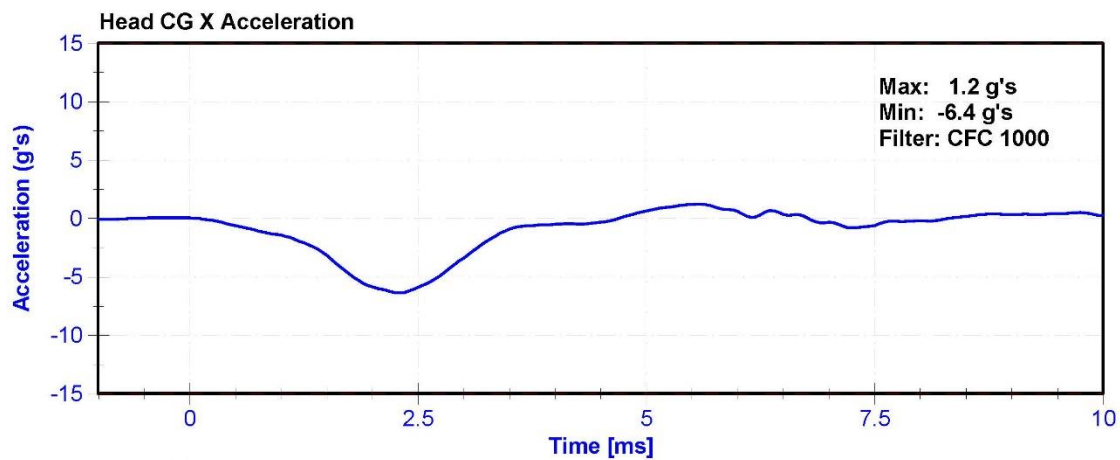
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	47	Pass
Resultant Acceleration	115	137	g's	128.7	Pass
Oscillation	0	15	%	8.6	Pass
Fore-Aft Acceleration	-15	15	g's	-6.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	5/1/2017	10/30/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	5/1/2017	10/30/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	5/2/2017	10/31/2017





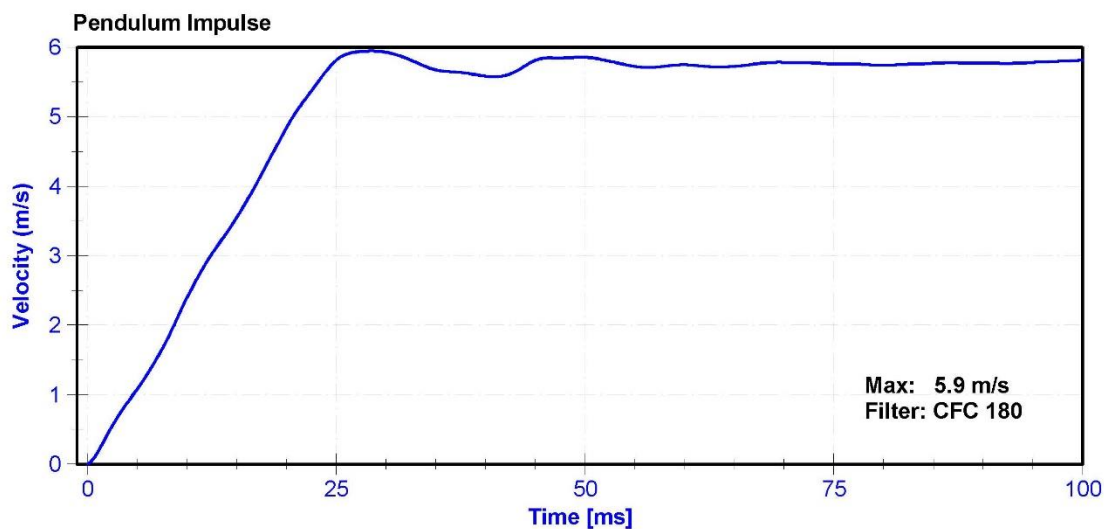
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

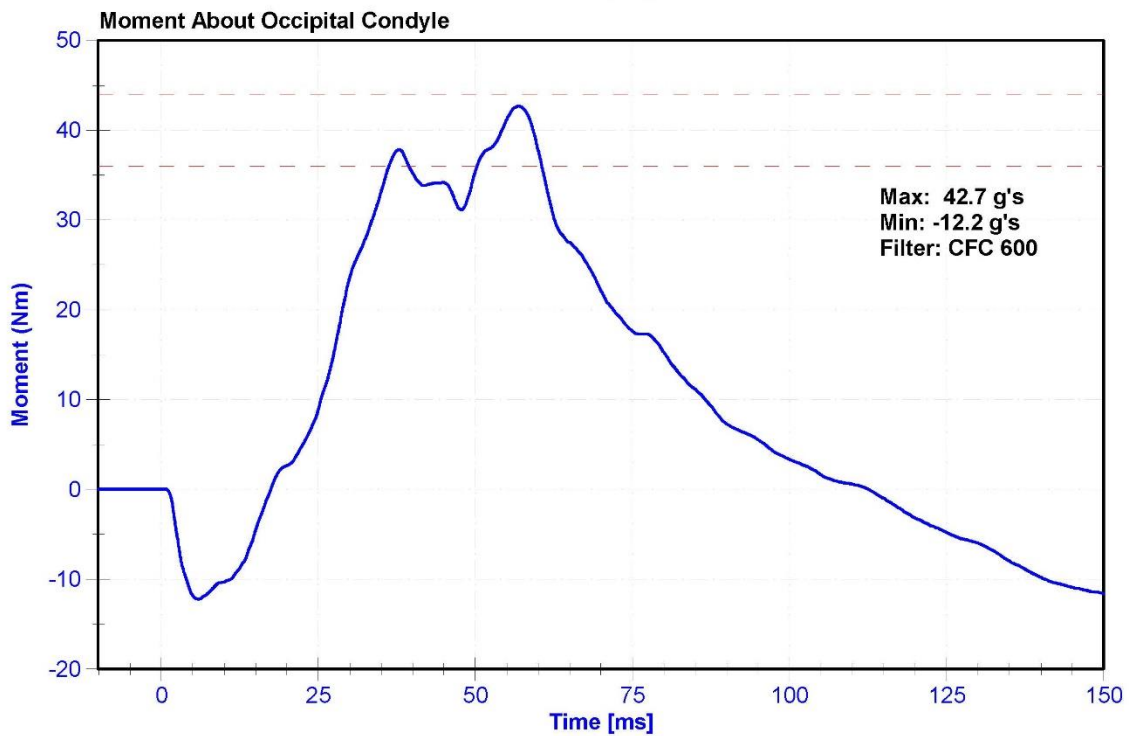
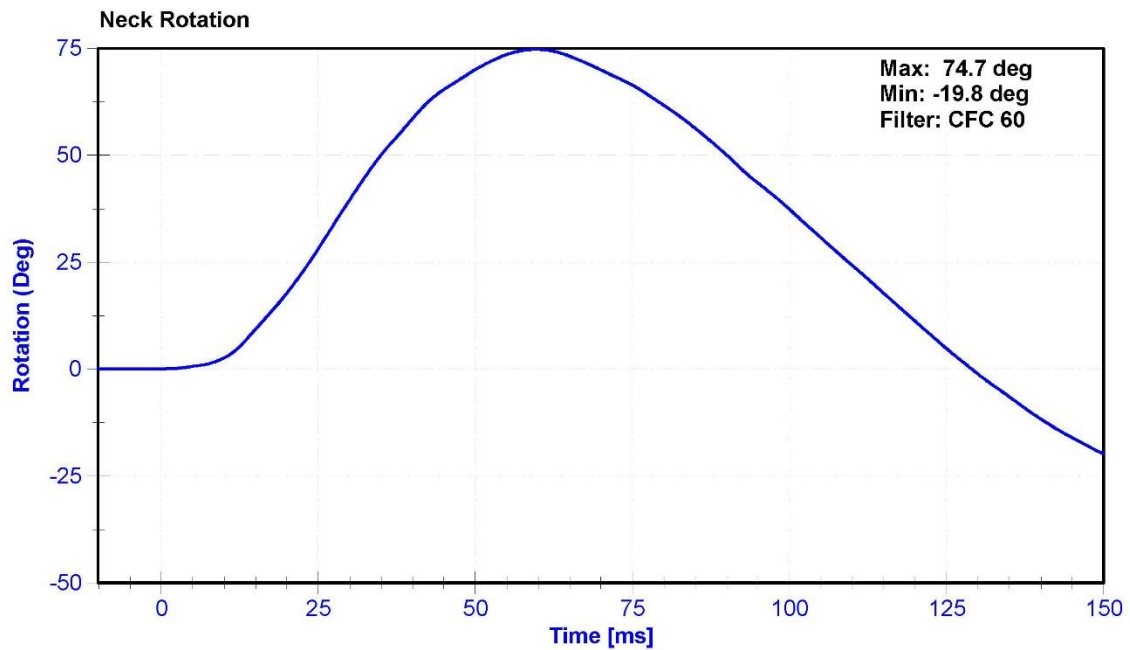
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	36.9	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.39	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.55	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.84	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.82	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.95	Pass
Neck Rotation	71	81	deg	74.7	Pass
Time at Maximum Rotation	50	70	ms	59.6	Pass
Moment about the OC	36	44	Nm	42.7	Pass
Moment Decay to 0 Nm	102	126	ms	112.6	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





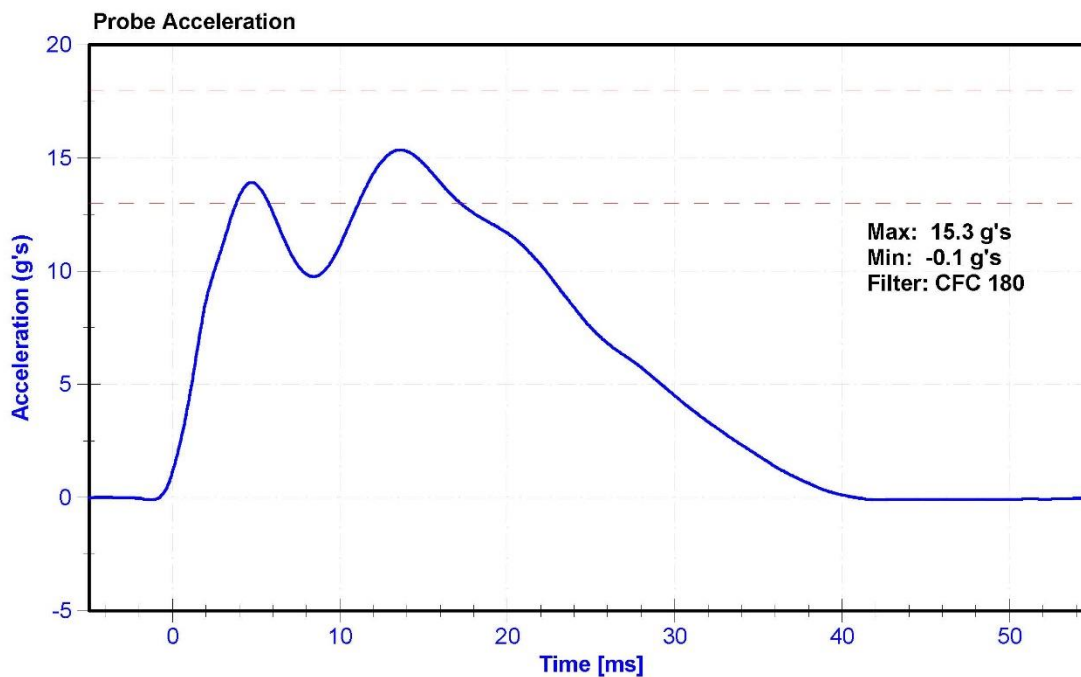
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

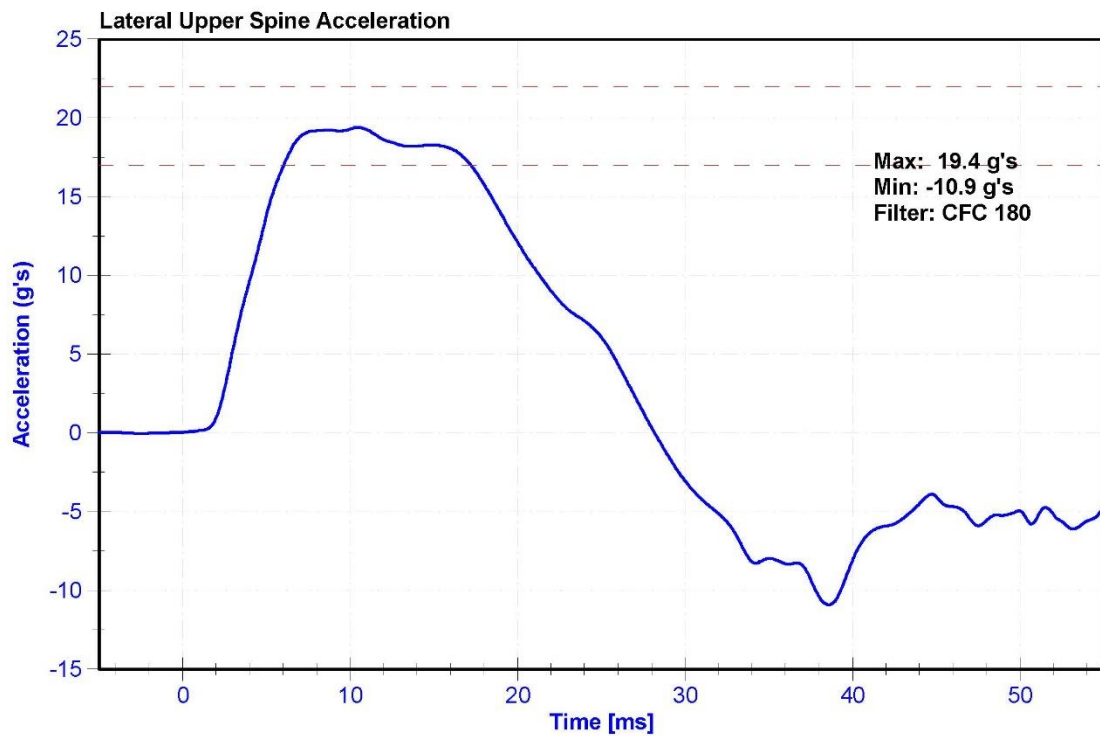
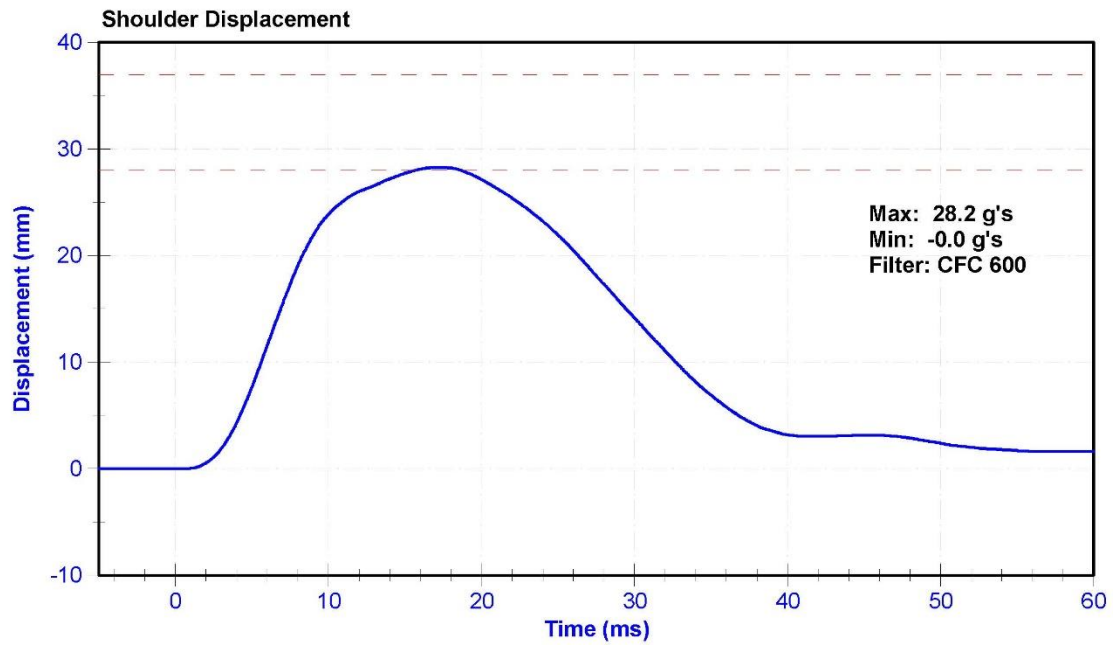
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	31.7	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	13	18	g's	15.3	Pass
Shoulder Deflection	28	37	mm	28.2	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.4	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	5/2/2017	10/31/2017





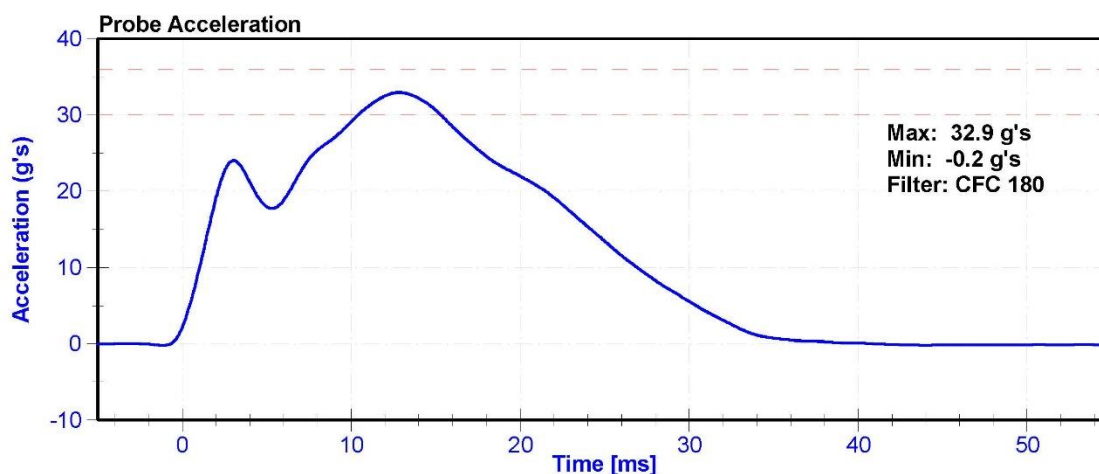
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

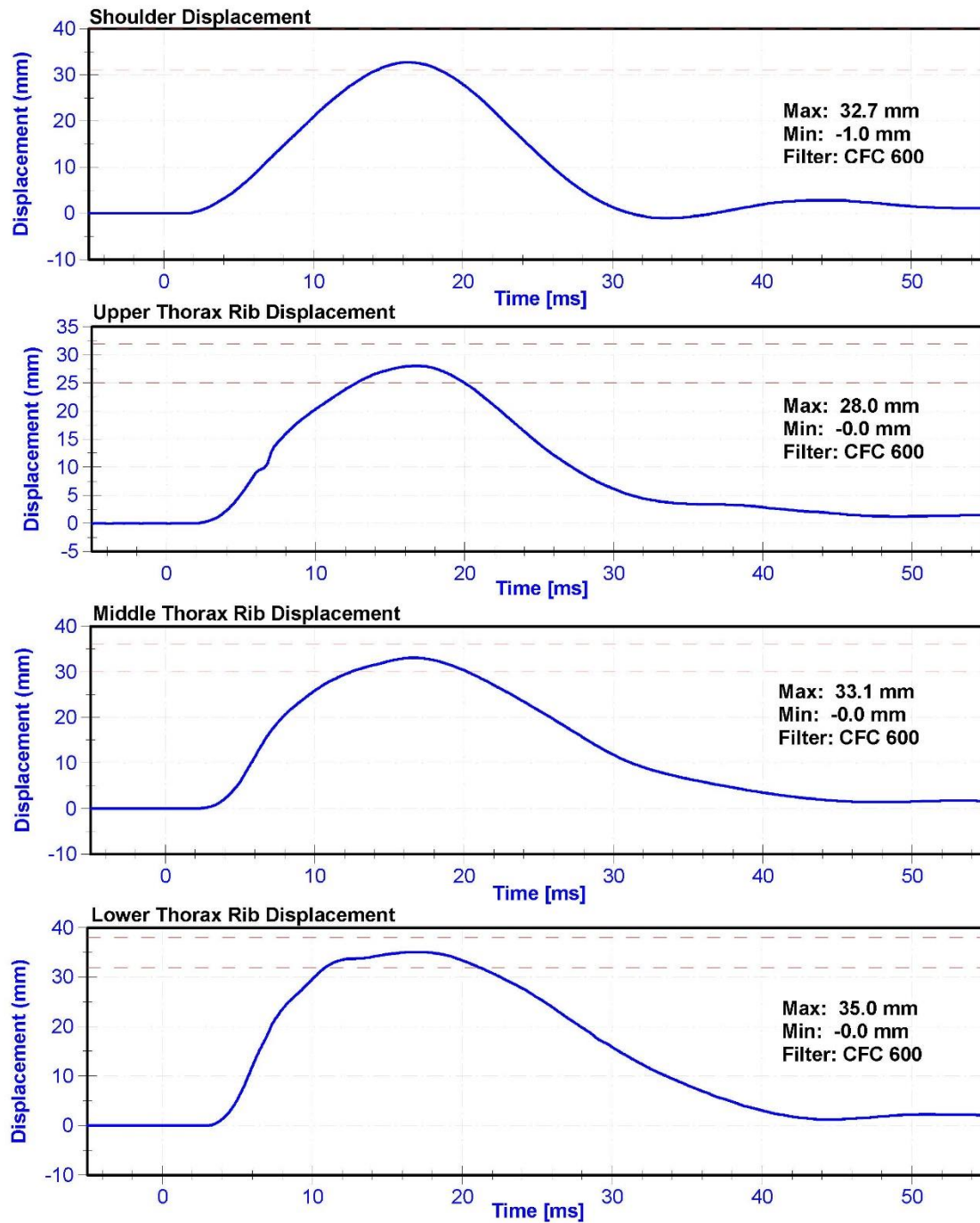
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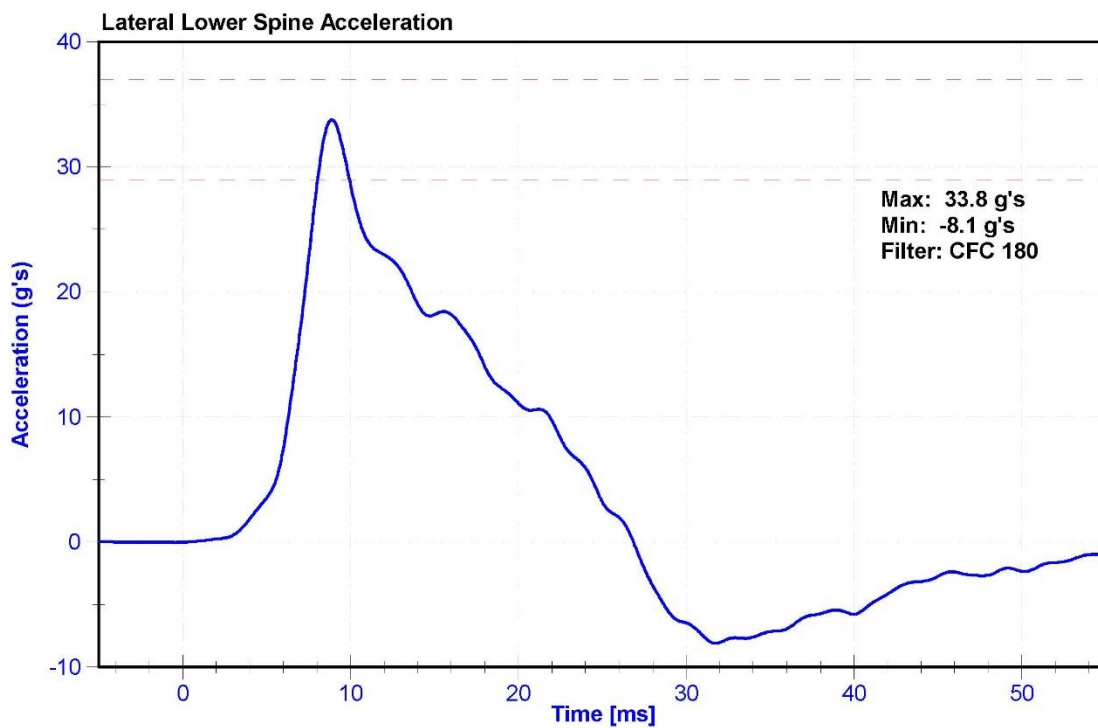
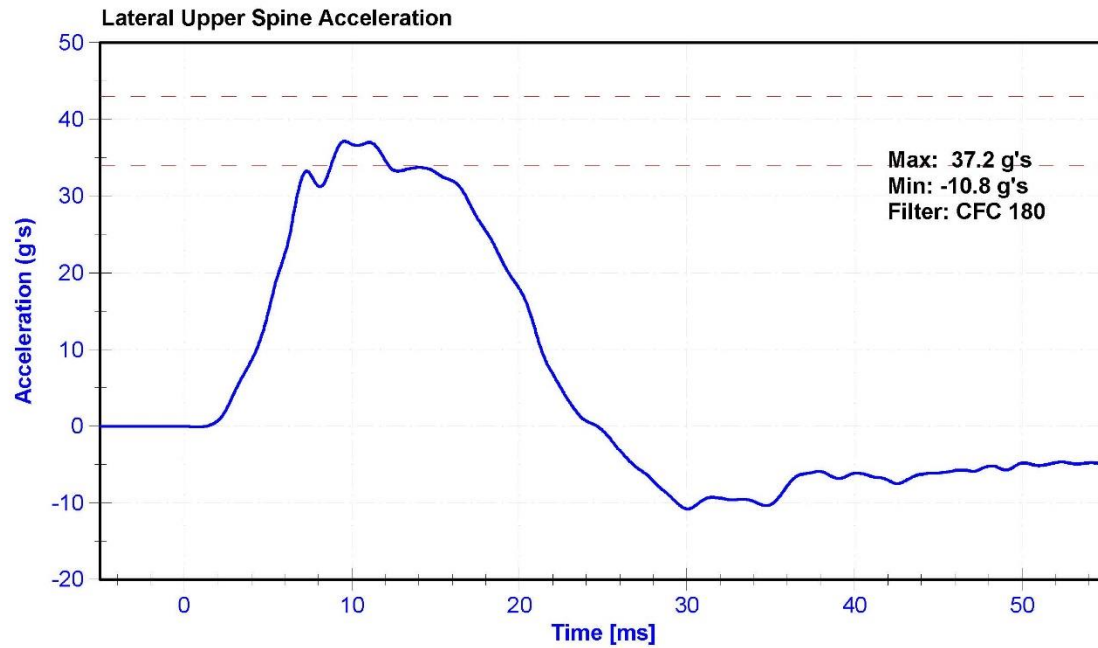
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	34.6	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	32.9	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.2	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.8	Pass
Shoulder Deflection	31	40	mm	32.7	Pass
Upper Thorax Rib Deflection	25	32	mm	28.0	Pass
Mid Thorax Rib Deflection	30	36	mm	33.1	Pass
Lower Thorax Rib Deflection	32	38	mm	35.0	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	5/2/2017	10/31/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	5/1/2017	10/30/2017
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







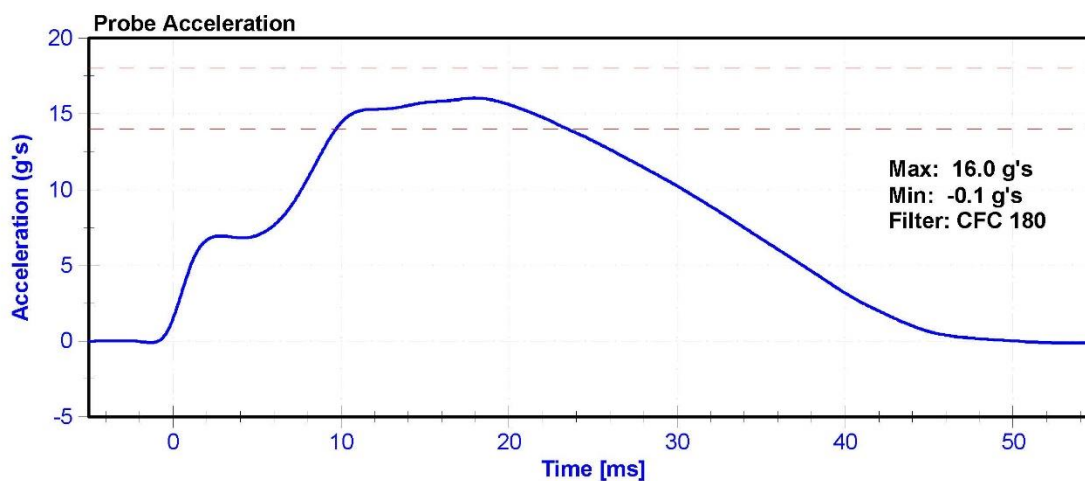
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

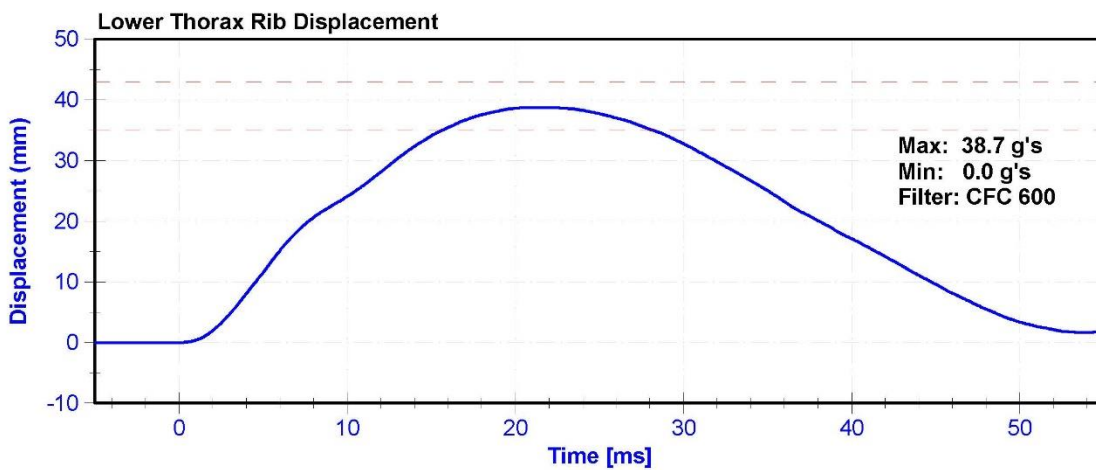
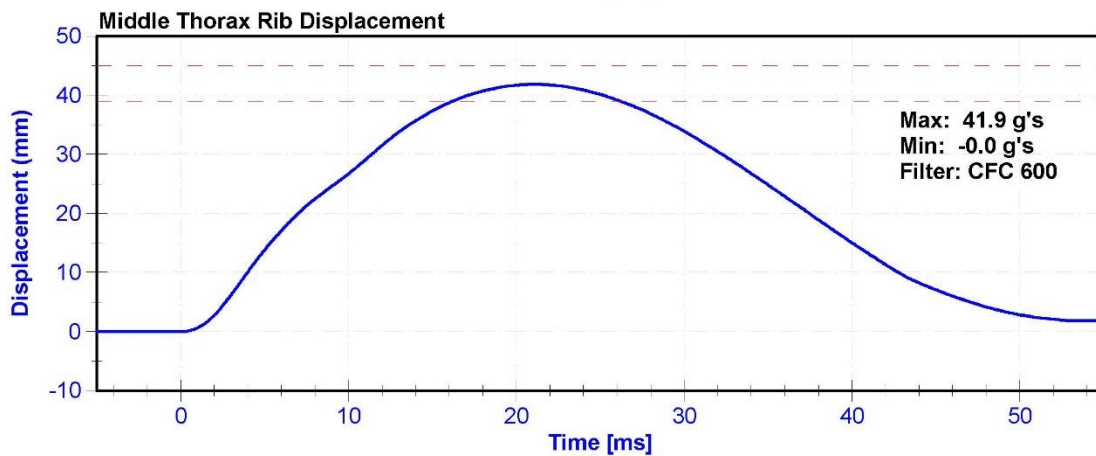
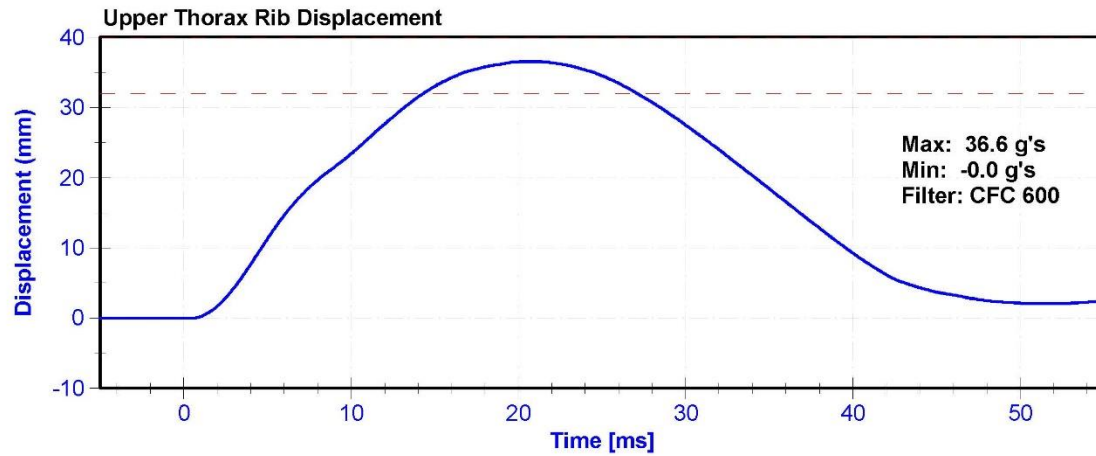
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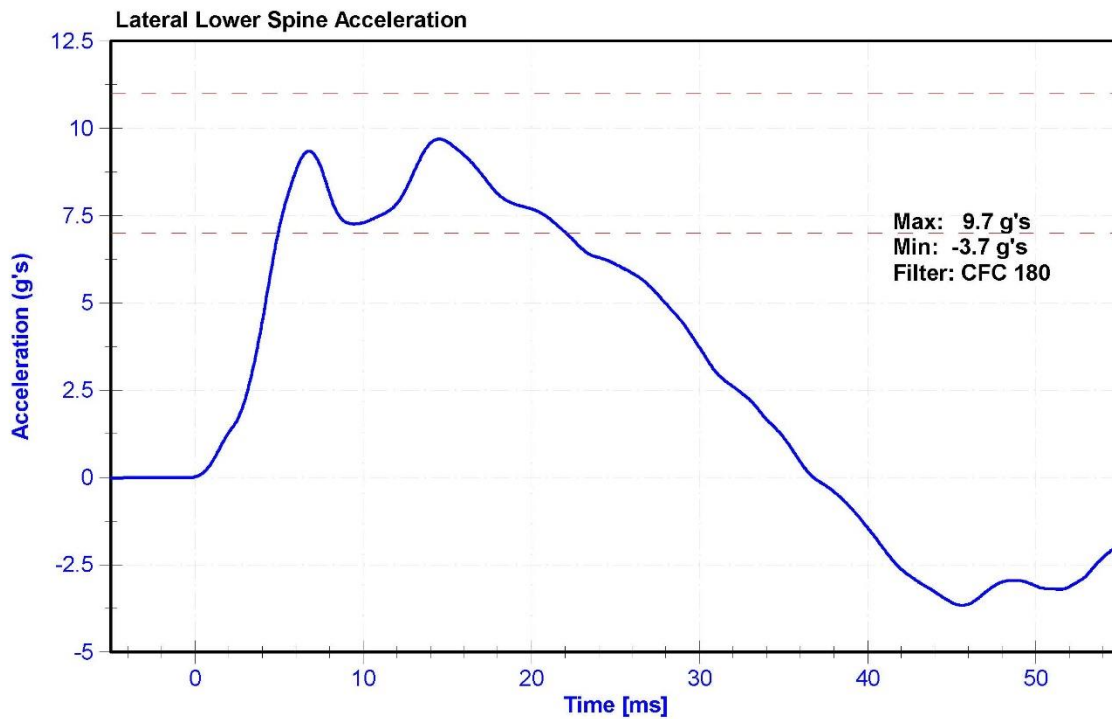
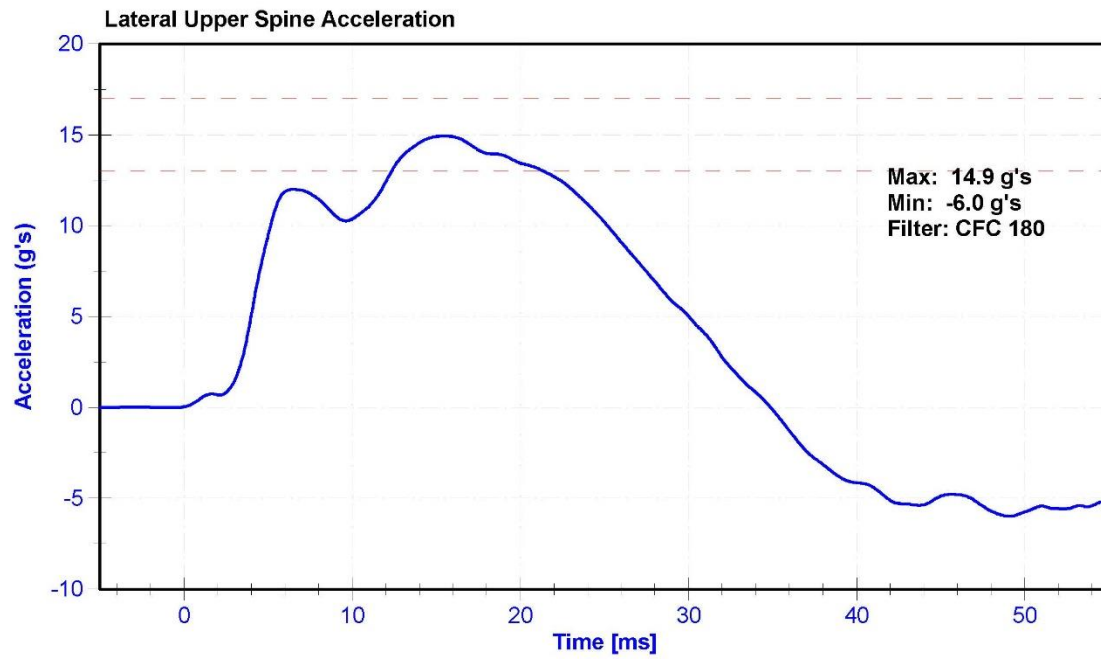
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	35.6	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	14	18	g's	16.0	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.9	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.7	Pass
Upper Thorax Rib Deflection	32	40	mm	36.6	Pass
Middle Thorax Rib Deflection	39	45	mm	41.9	Pass
Lower Thorax Rib Deflection	35	43	mm	38.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	5/2/2017	10/31/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	5/1/2017	10/30/2017
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







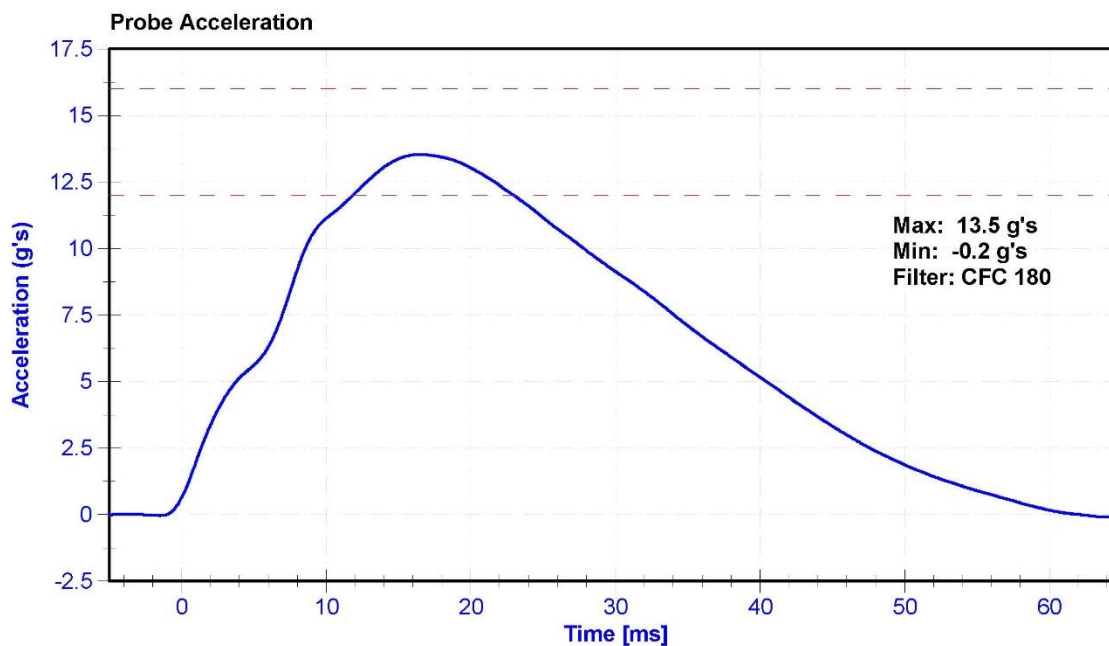
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

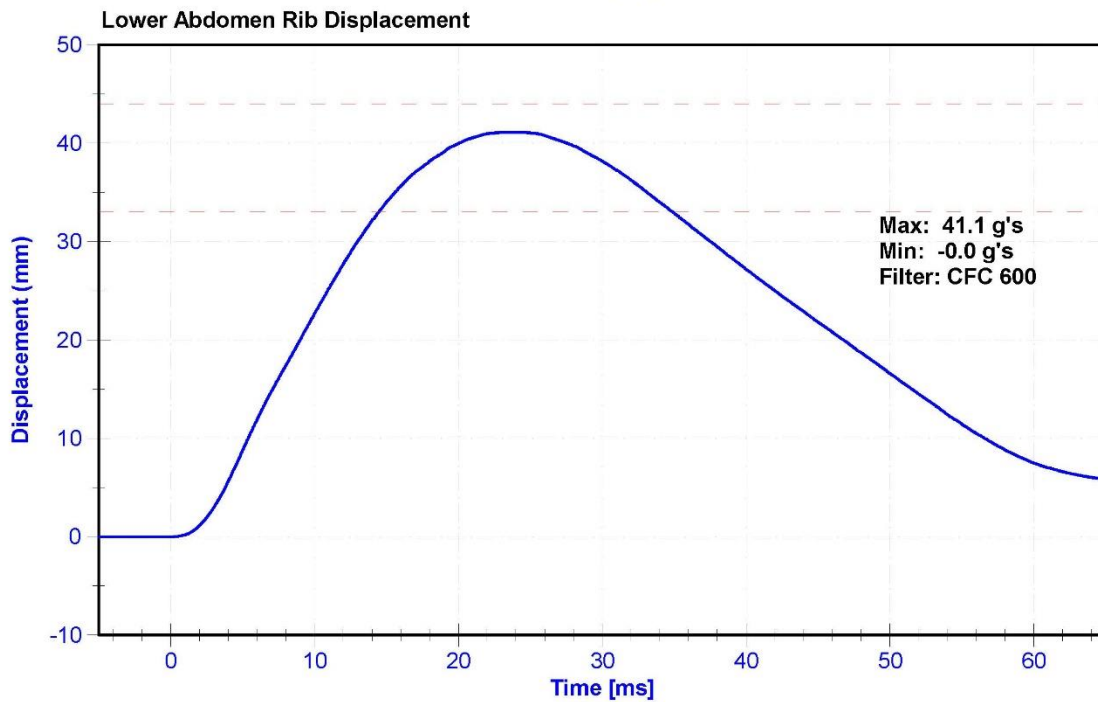
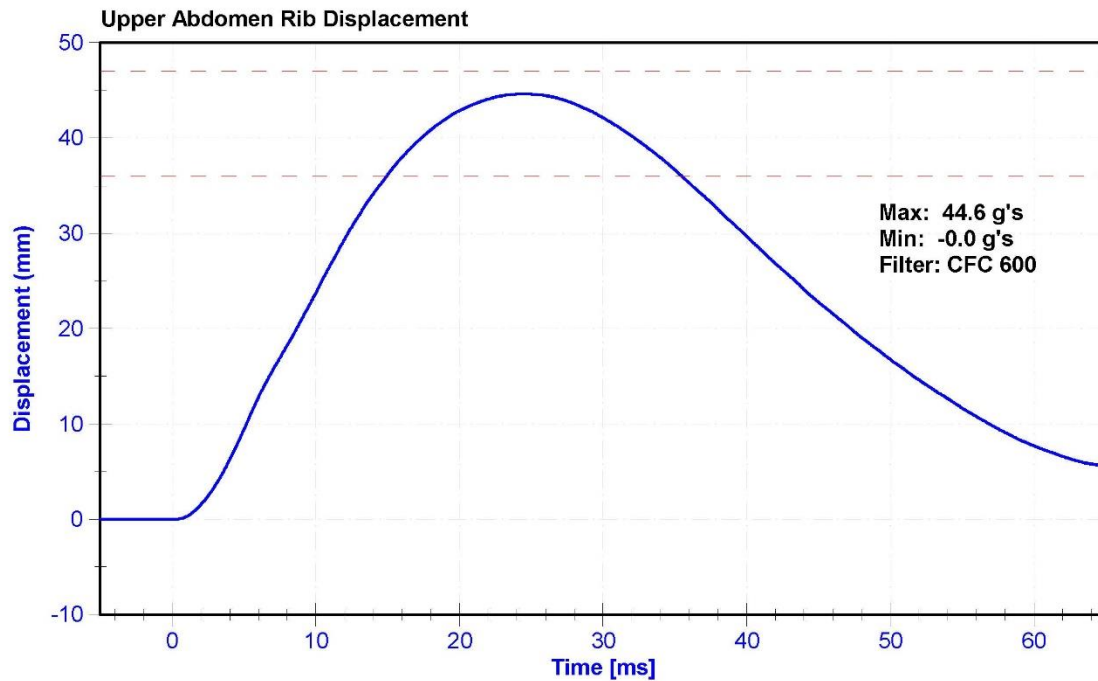
Results

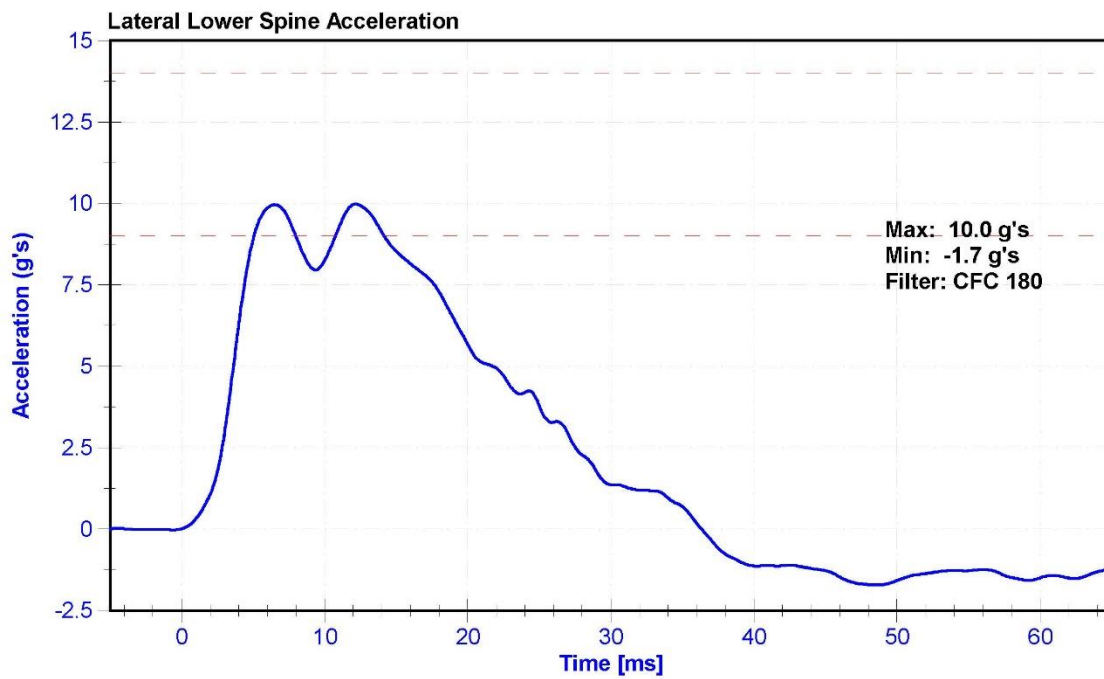
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	39.4	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	13.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	44.6	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.1	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	5/1/2017	10/30/2017
Upper Abdomen Rib Potentiometer	Servo 08TC1-3725	DS-008GFE	5/3/2017	5/3/2018
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	6/15/2016	6/15/2017







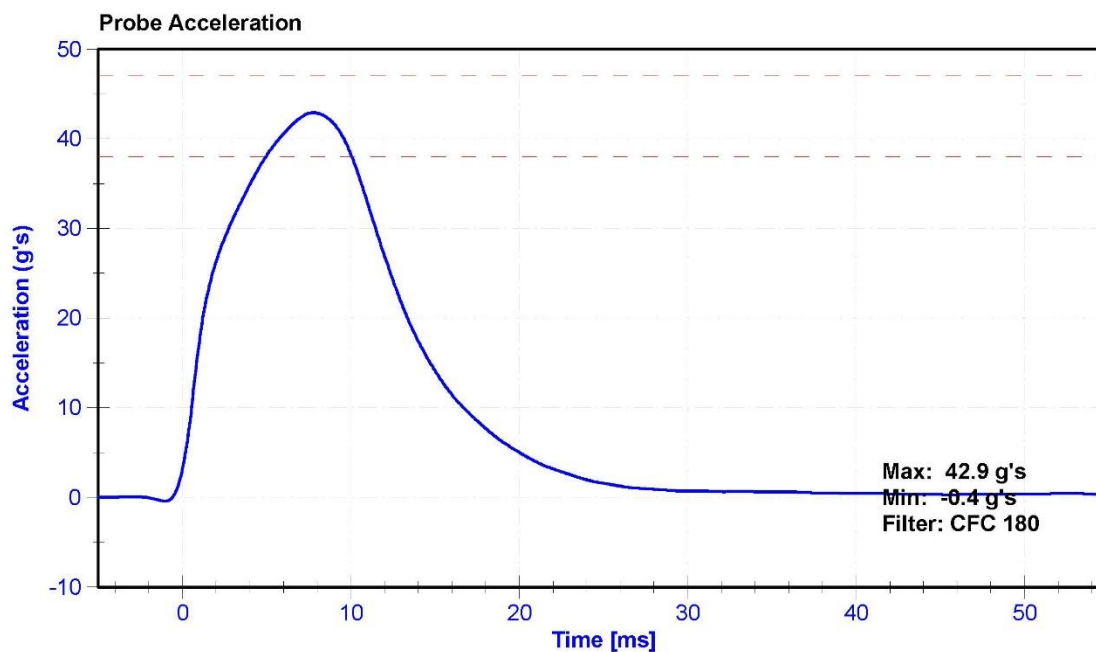
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

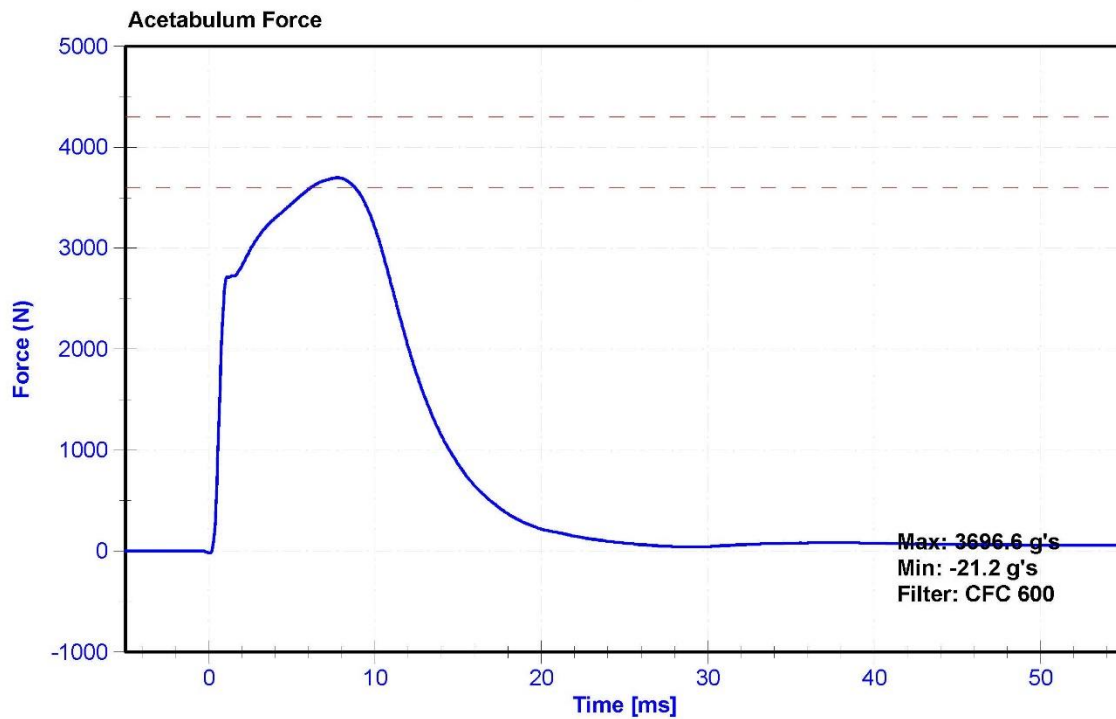
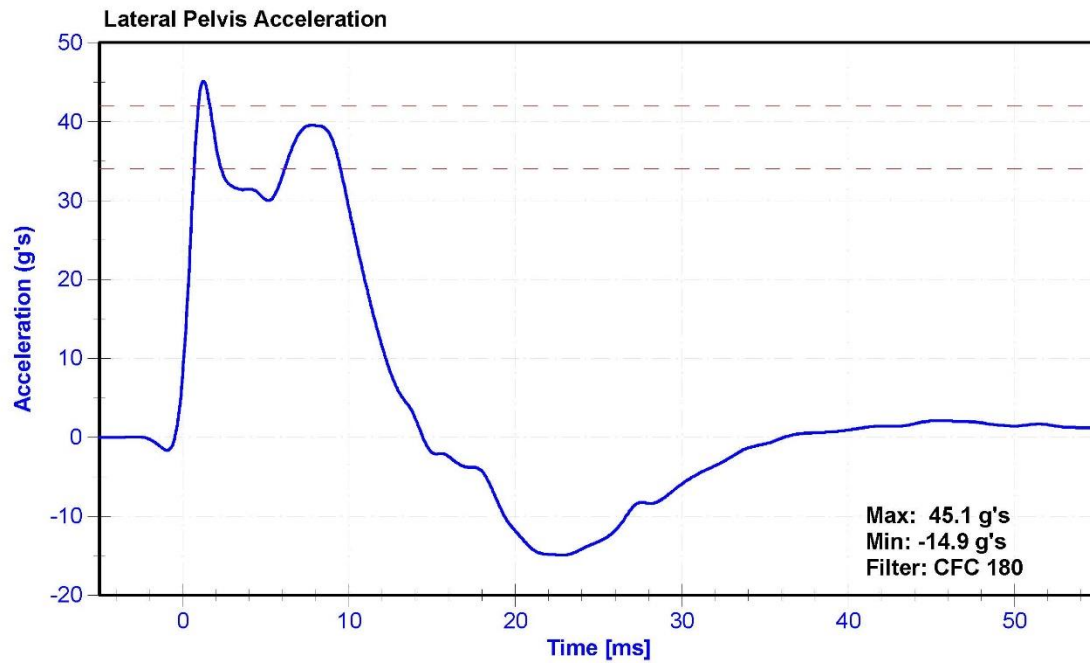
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	37.6	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	42.9	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.5	Pass
Acetabulum Force	3600	4300	N	3696.6	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	5/2/2017	10/31/2017
Acetabulum Load Cell	Denton 3249J	LC-267Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	11068	04/08/2016	N/A
Crash Test Plug	Humanetics	88010	07/22/2015	N/A







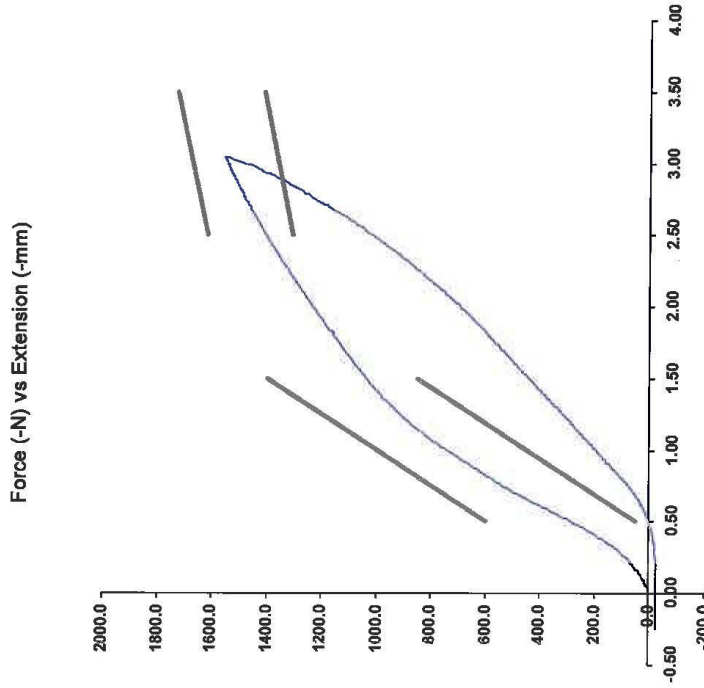
SID-Is Pelvis Plug Certification Test

Plug S/N 11068 1547N
 Test Number 2208 CERT
 Report Number 2202 5/4/17 MKG
 Test Date 4/8/2016 1:25:06 PM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	291.70	600.00
Force @ 1.5 mm (N)	1,044.46	1,400.00
Force @ 2.5 mm (N)	1,408.35	1,618.00
Force @ 3.0 mm (N)	1,546.71	1,673.00

Testing Machine STM-20 5965542
 Load Cell S/N (T1240813), Units (LBS) 1000
 Crosshead Speed (mm/min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

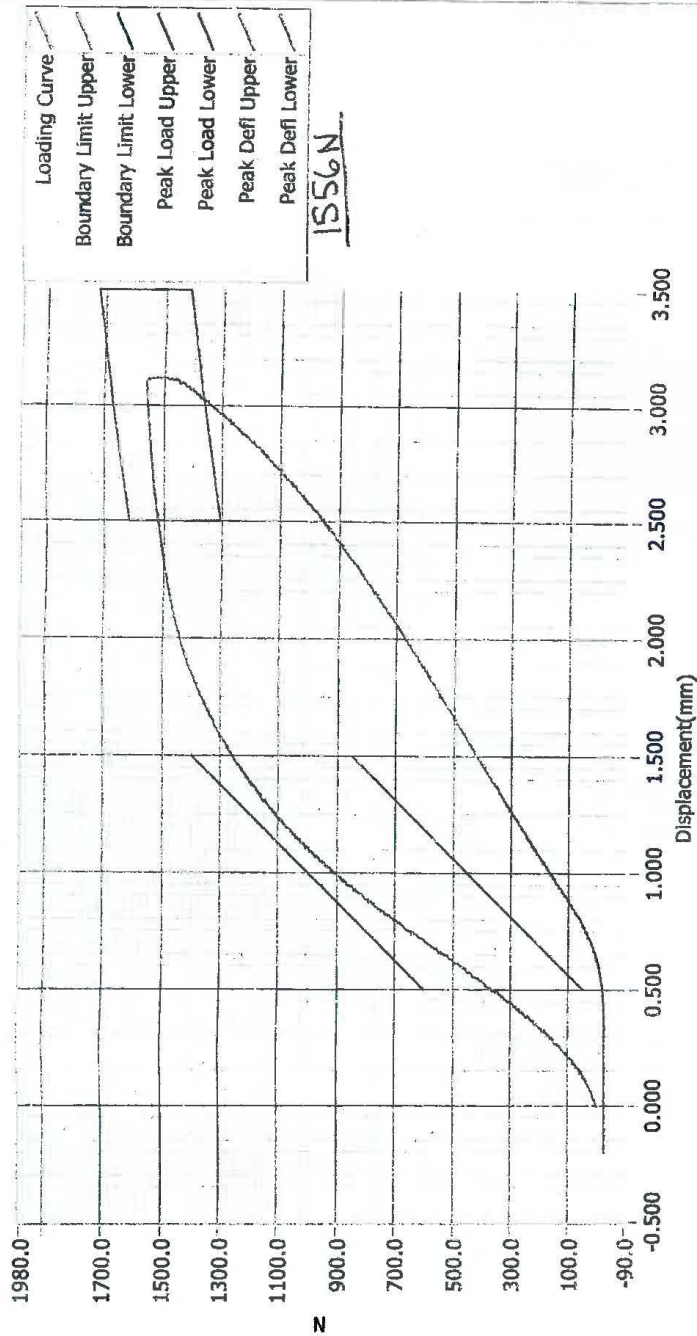
Notes:



Template No 107	08-Apr-16	Operator DC
SACO Research		Part Number 180-4450

By: DC Date: 4/8/16
 SACO Research 41735 Elm St, #401 Murietta, CA 92562 Tel 310-694-2082 FAX

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

CRASH

5/4/17

NKG

Test ID

Part Serial Number

88010

Test Date

7/22/2015

Test Time

3:54 PM

Cert ID

ATD Serial Number

N/A

ATD Type

SIDIIs

Current Date : 7/22/2015

Current Time : 15:55:03

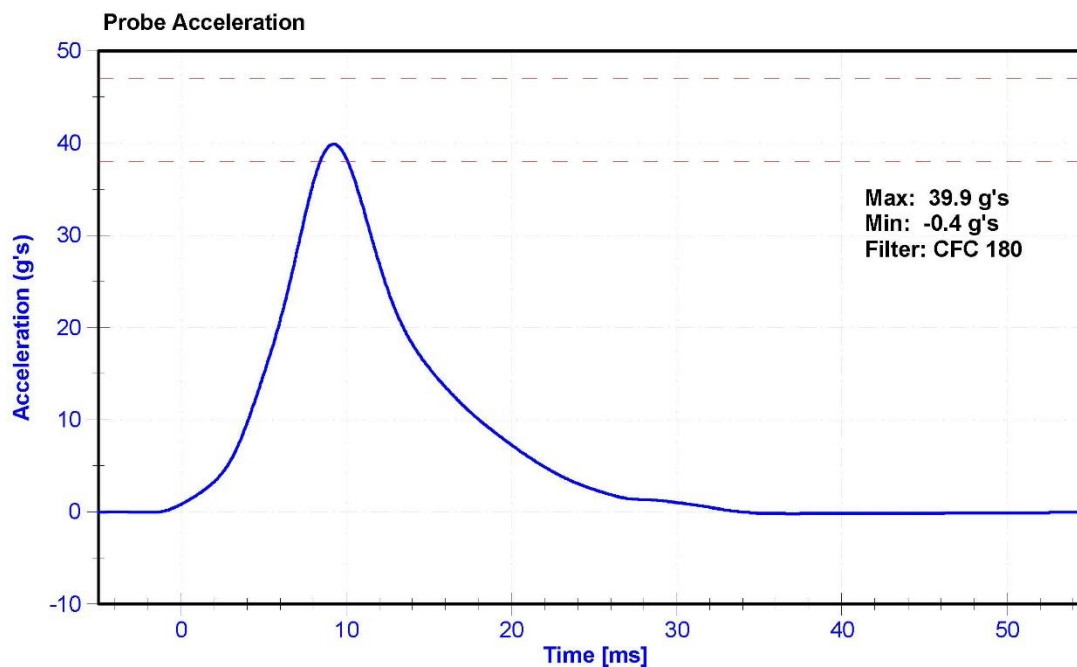
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

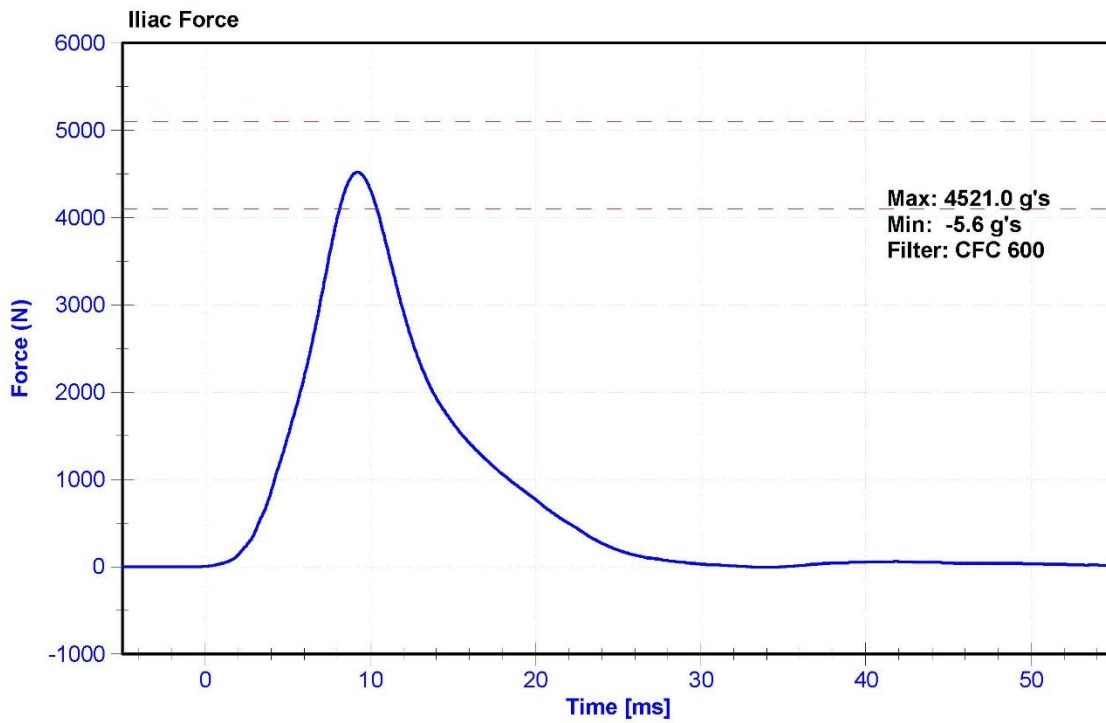
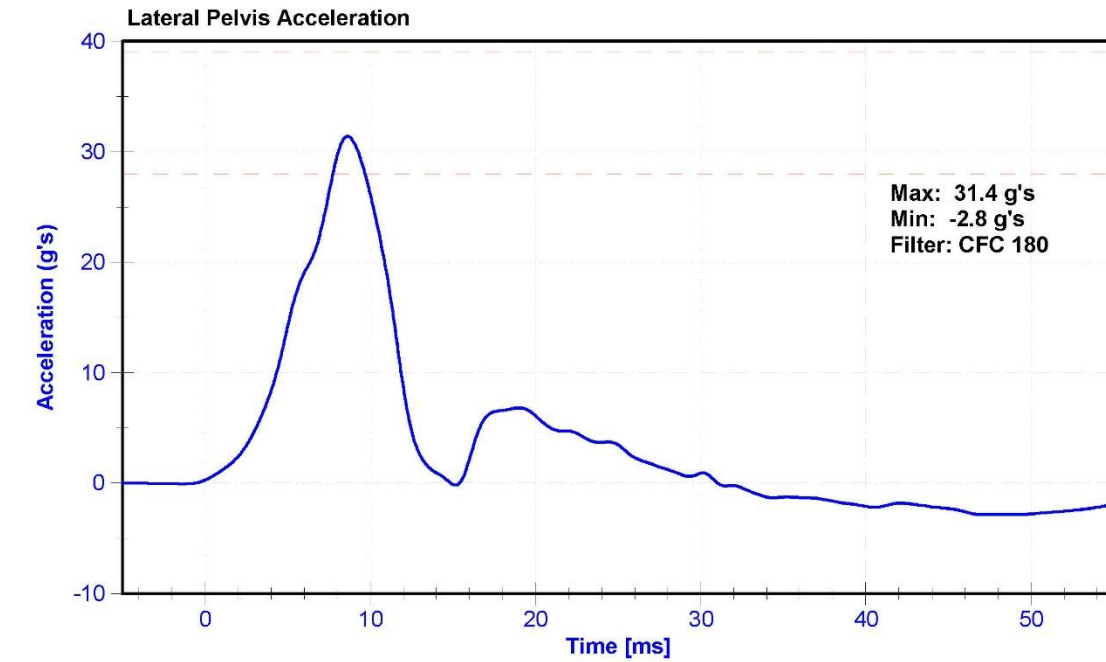
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	41.0	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	39.9	Pass
Lateral Pelvis Acceleration	28	39	g's	31.4	Pass
Iliac Force	4100	5100	N	4521.0	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	5/2/2017	10/31/2017
Iliac Load Cell	DENTON 3228J	LC-281Fy	5/24/2016	5/24/2017





CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

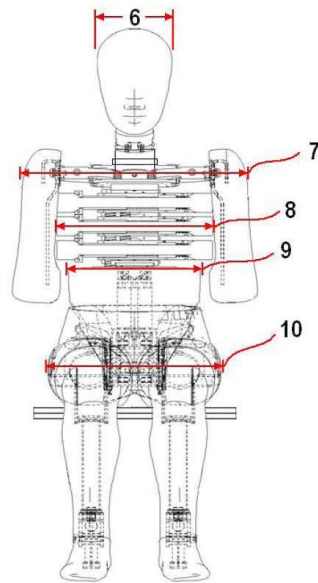


External Measurements - EuroSID-2re

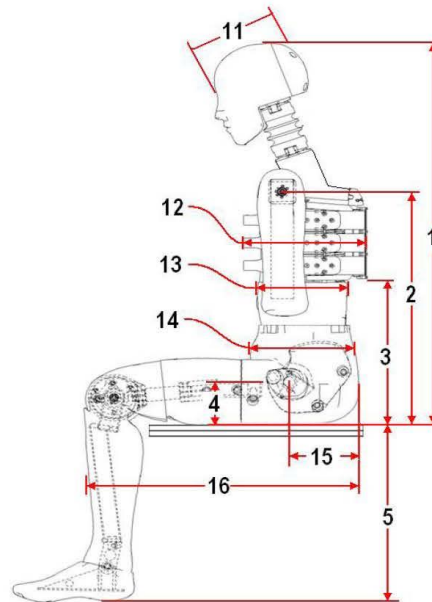
Technician: M.Hartung

Date: 5/11/2017

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	913	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	100	Pass
5	Sole to Seat, Sitting	333	451	420	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	469	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	199	Pass
14	Pelvis Depth	235	245	241	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	600	Pass

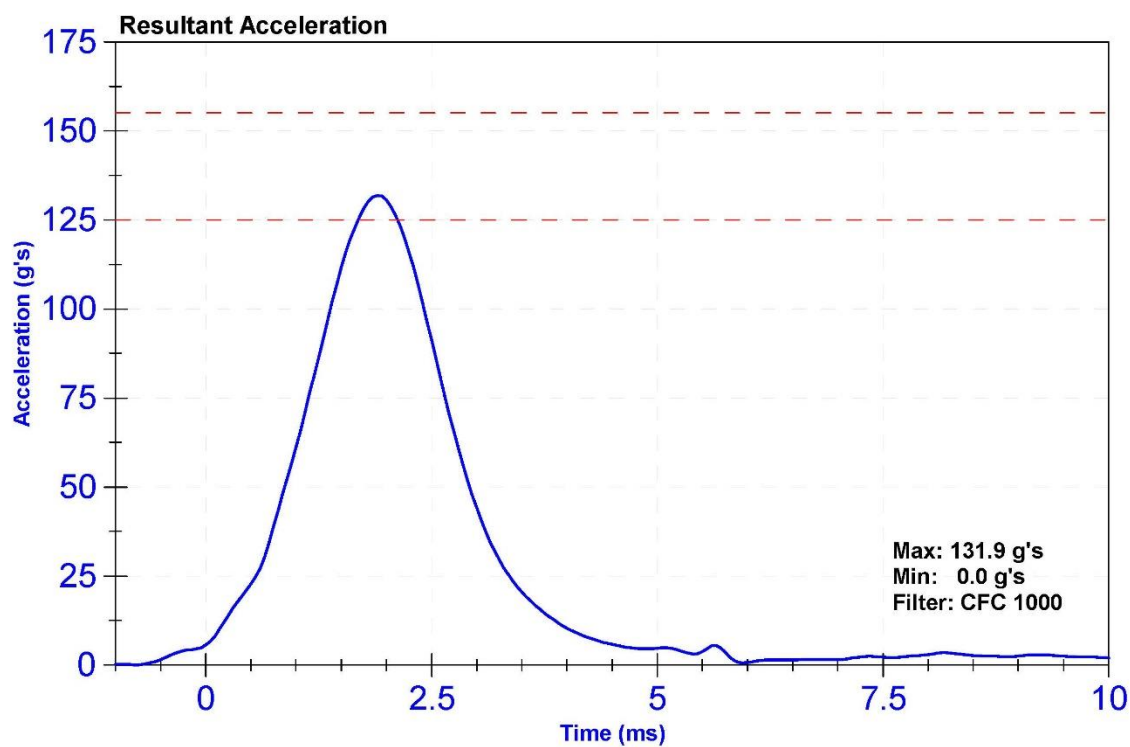
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

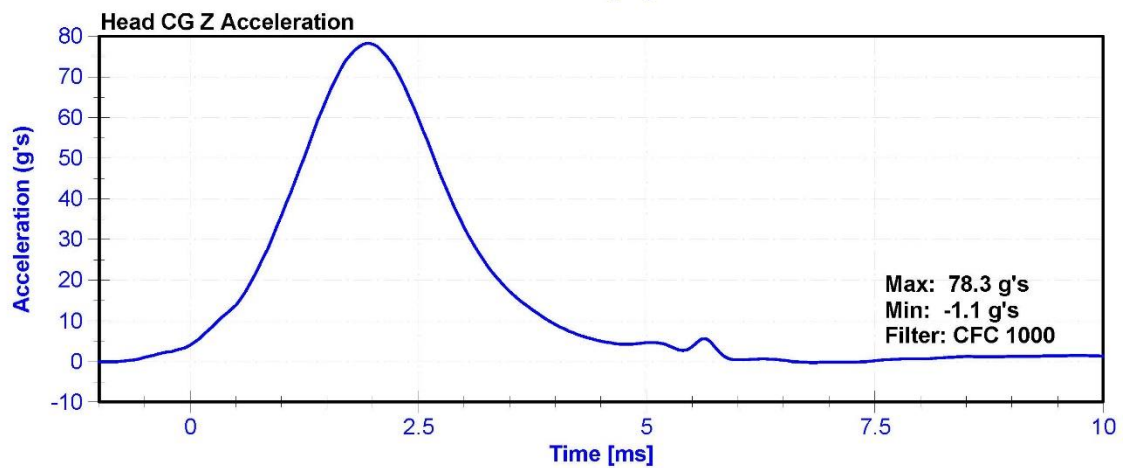
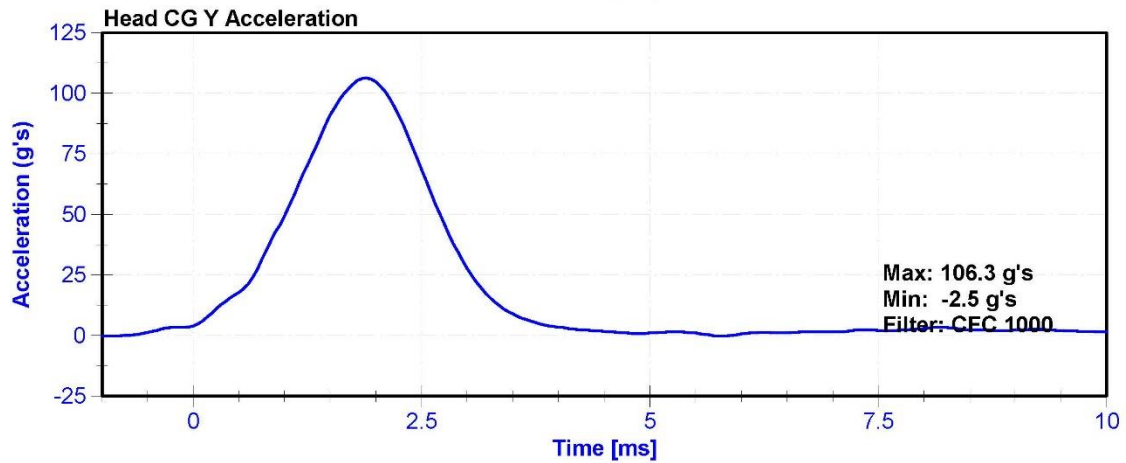
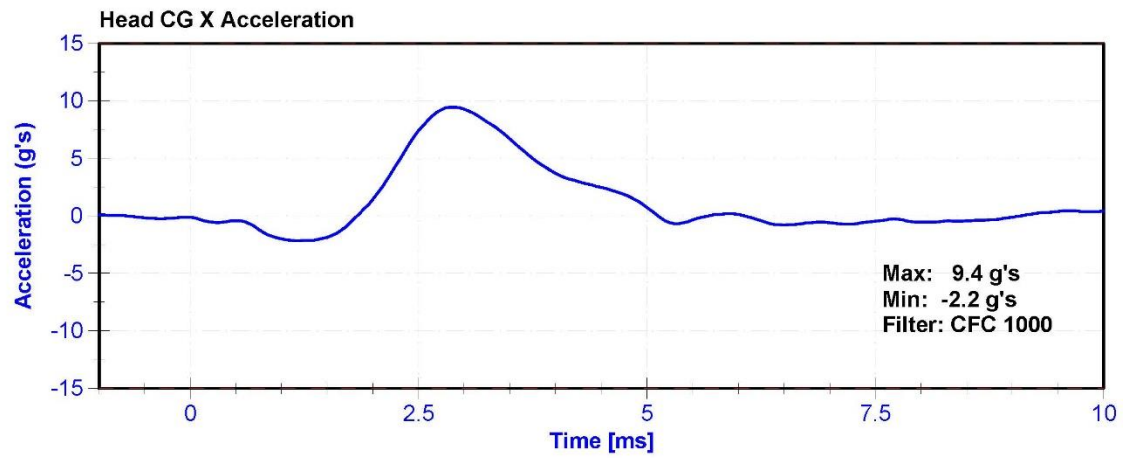
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	28.2	Pass
Resultant Acceleration	125	155	g's	131.9	Pass
Oscillation	0	15	%	4.25	Pass
Fore-Aft Acceleration	-15	15	g's	9.4	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





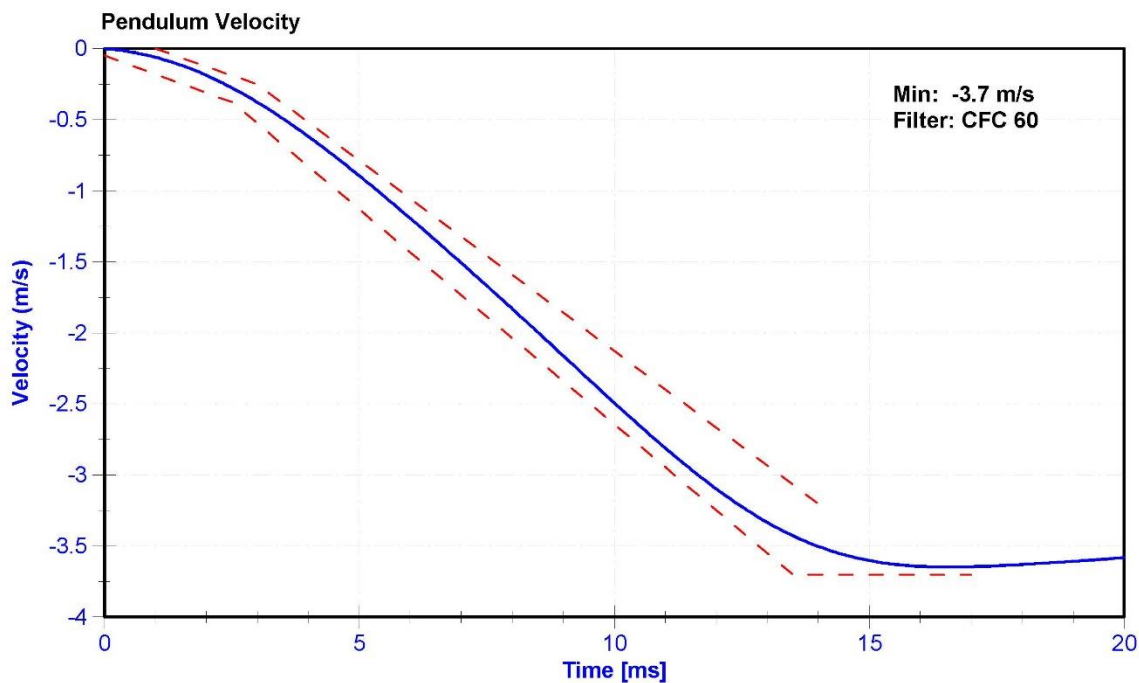
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

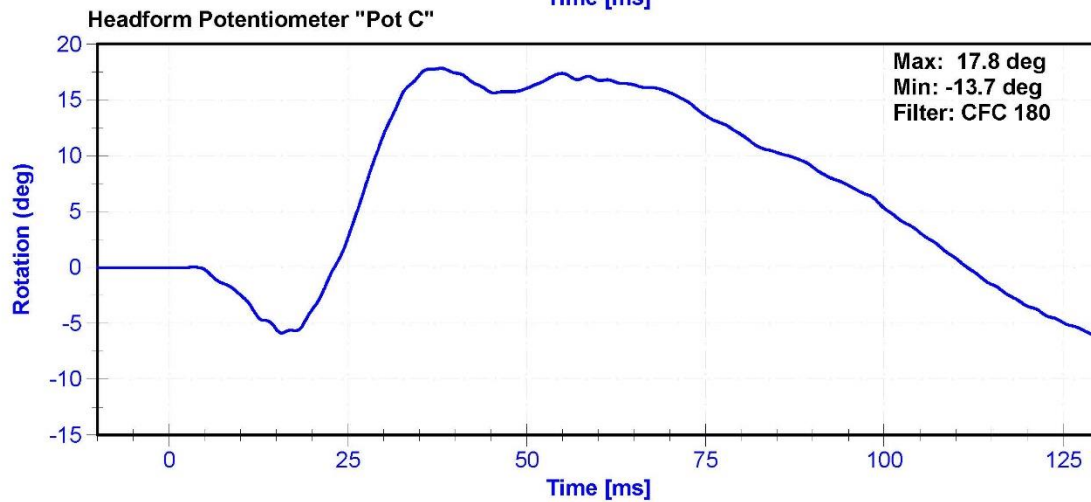
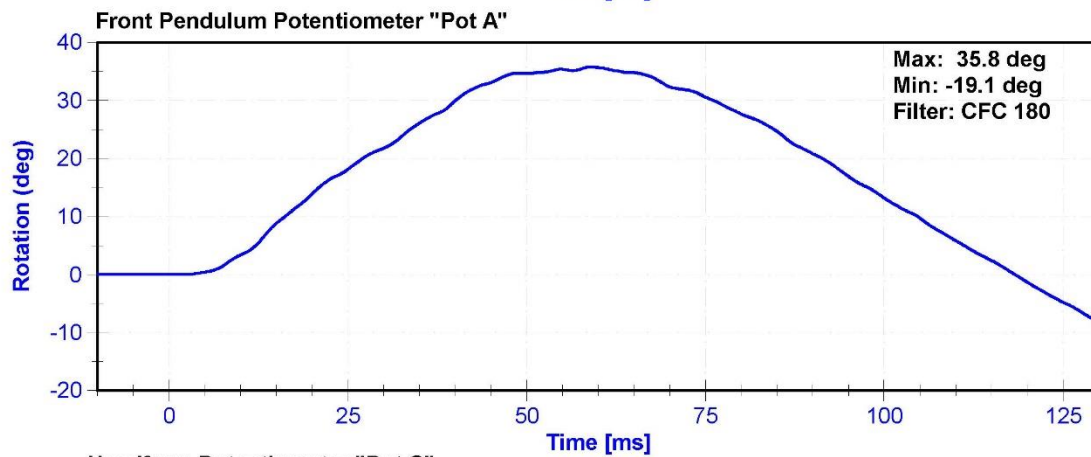
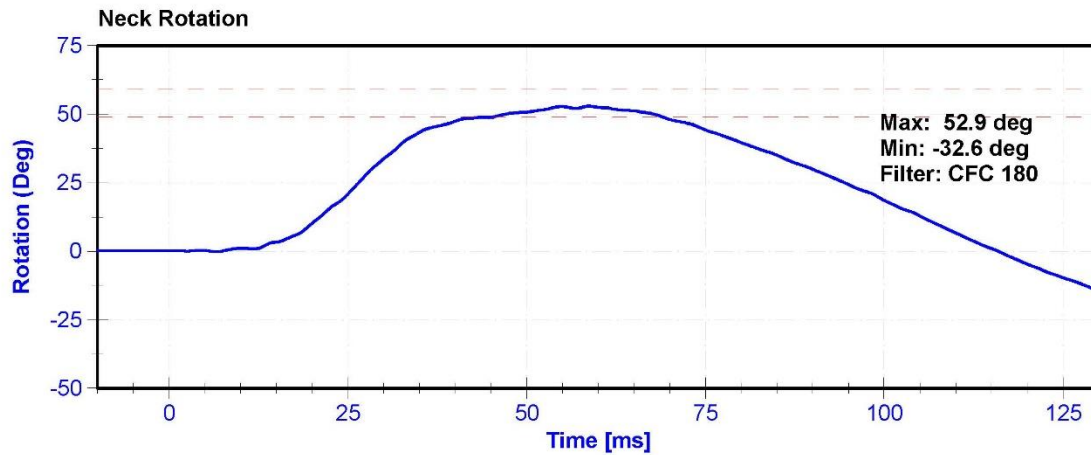
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	28.5	Pass
Velocity	3.3	3.5	m/s	3.43	Pass
Lateral Neck Rotation	49	59	deg	52.9	Pass
Time at Maximum Rotation	54	66	ms	58.7	Pass
Time of Rotation Decay from Maximum	53	88	ms	57.2	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





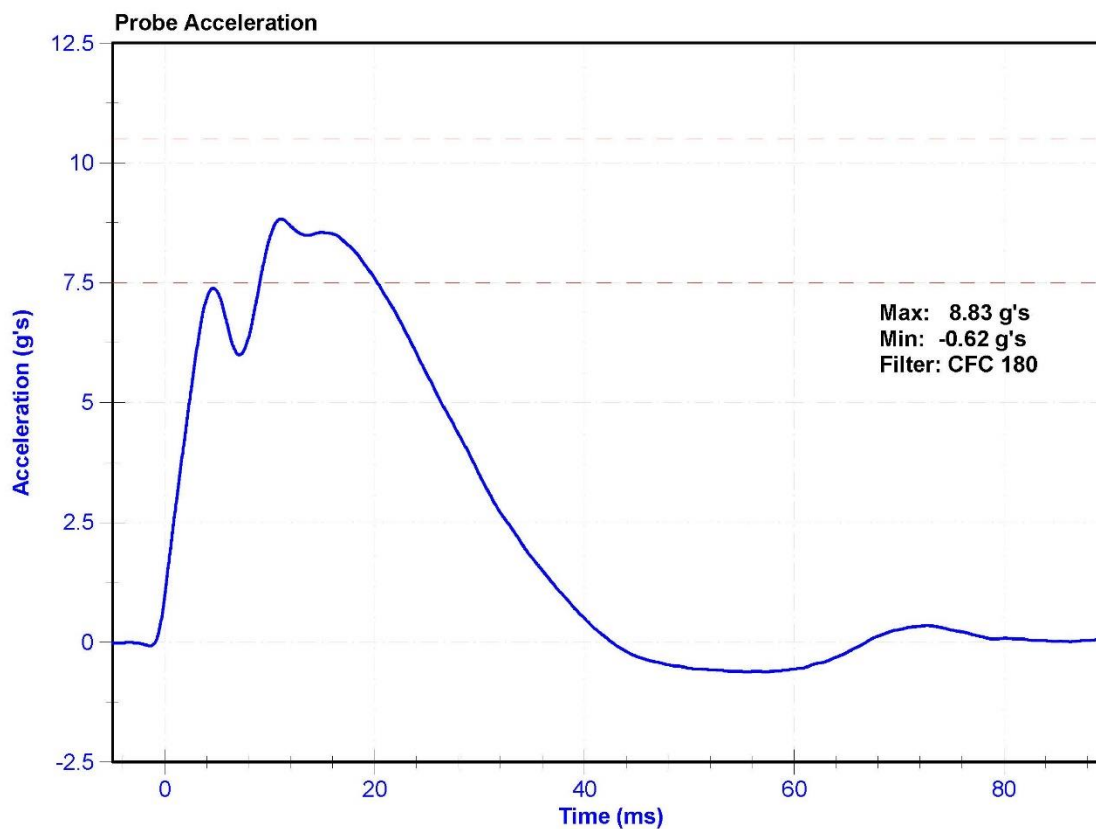
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	30.0	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	8.83	Pass

Transducer Calibrations

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



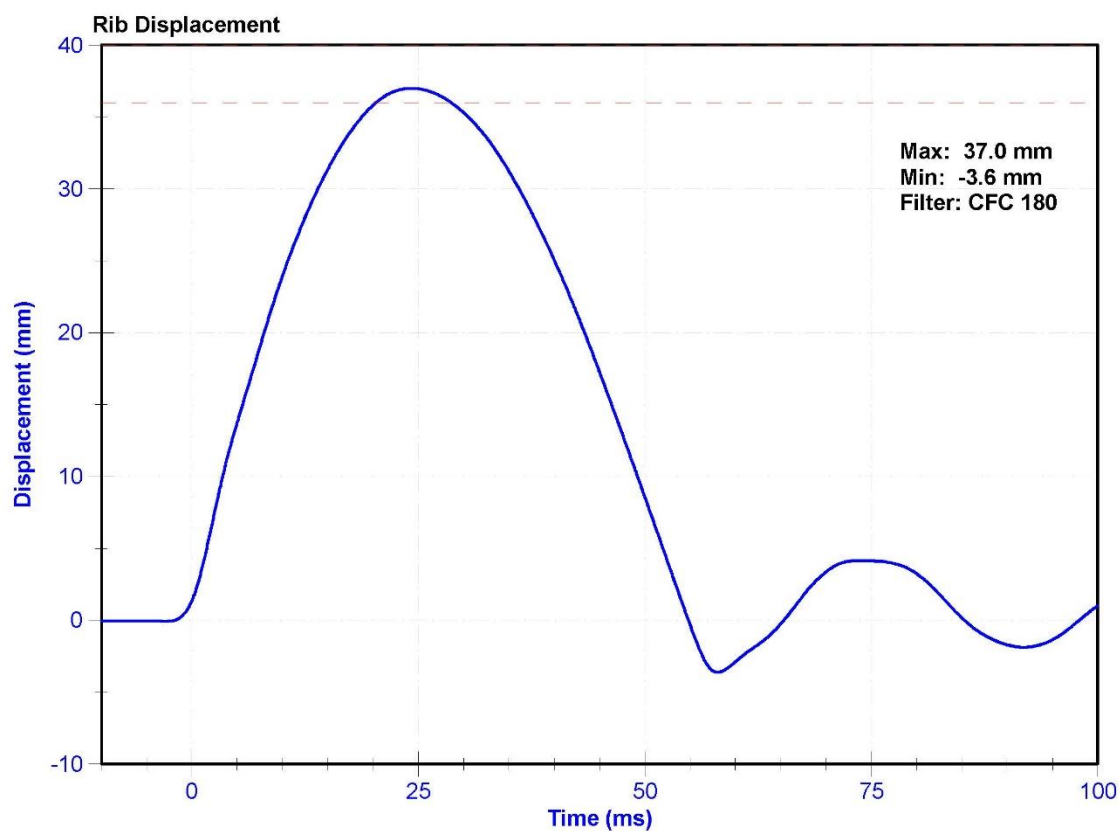
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	27.6	Pass
Rib Displacement	36	40	mm	37.0	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



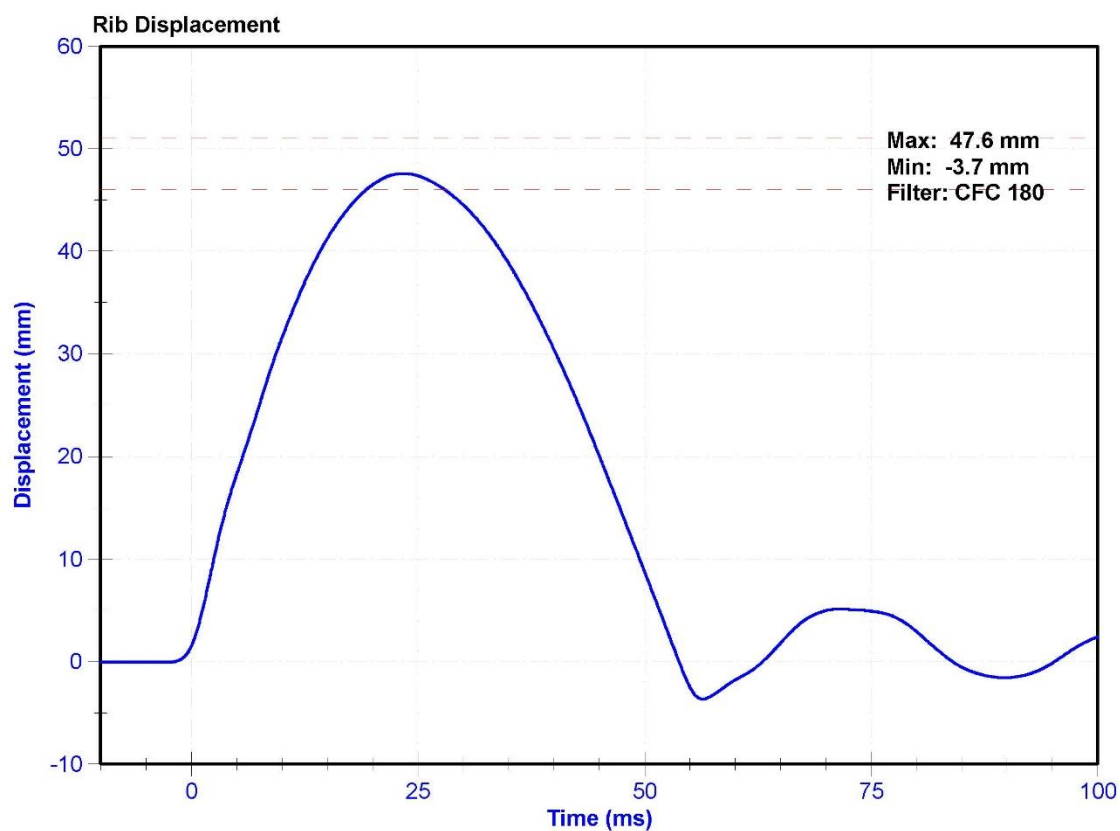
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	27.6	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



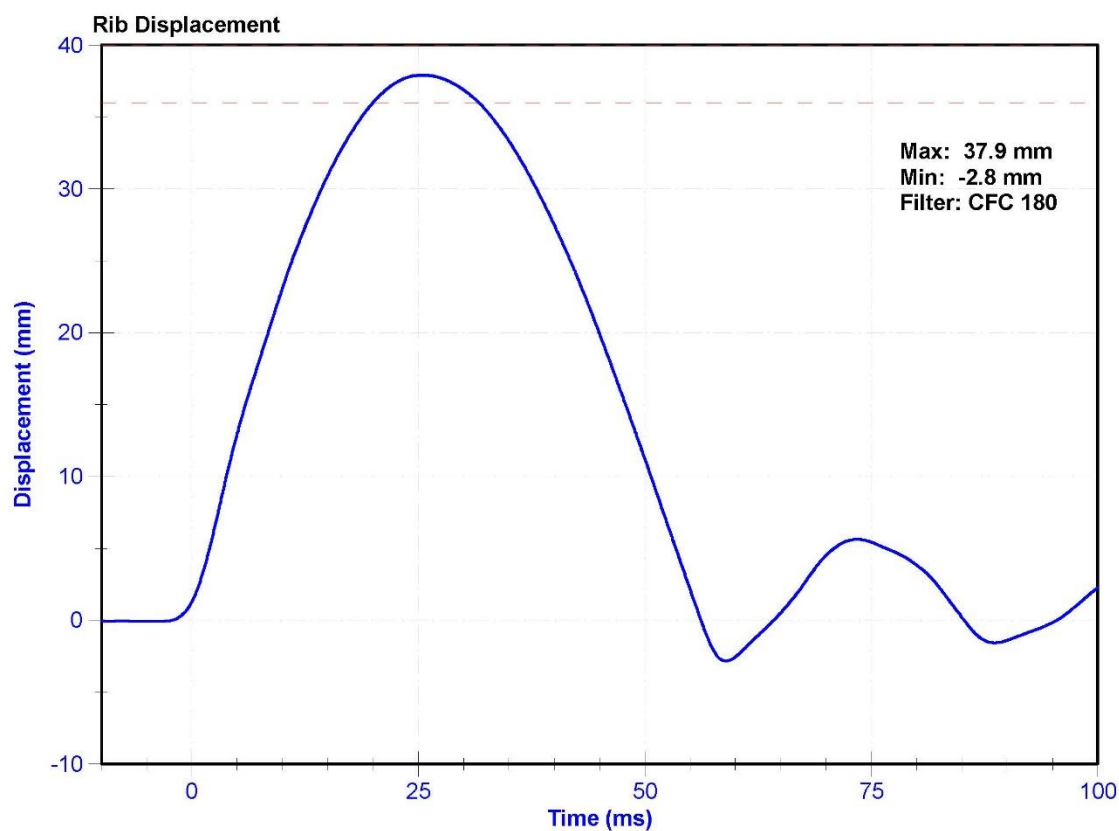
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	27.6	Pass
Rib Displacement	36	40	mm	37.9	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



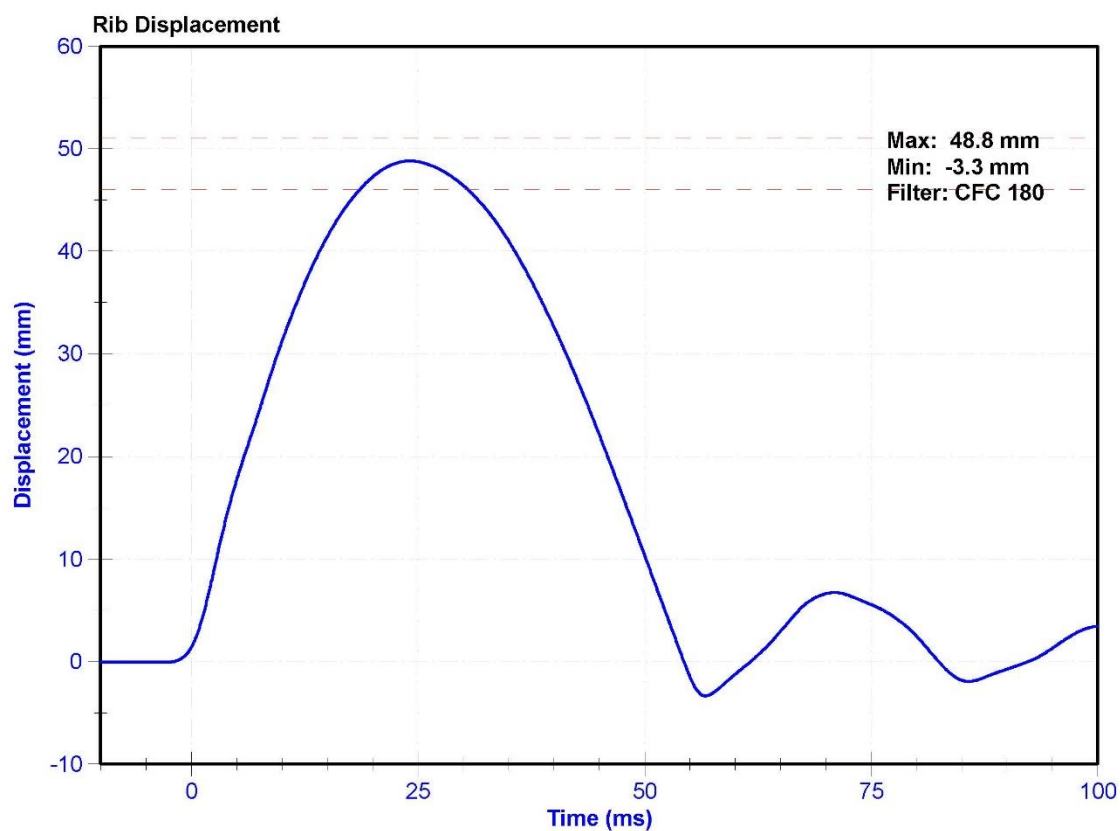
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	27.6	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-184GFE	6/20/2016	6/20/2017



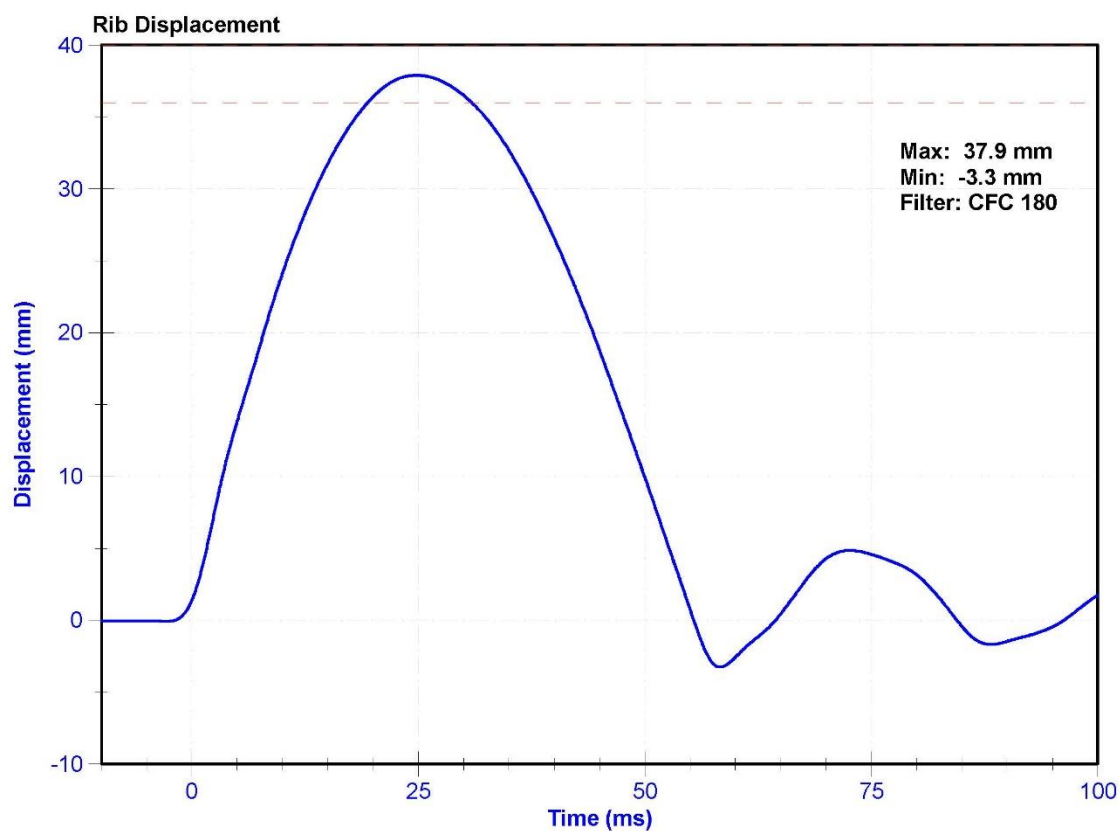
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	27.6	Pass
Rib Displacement	36	40	mm	37.9	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



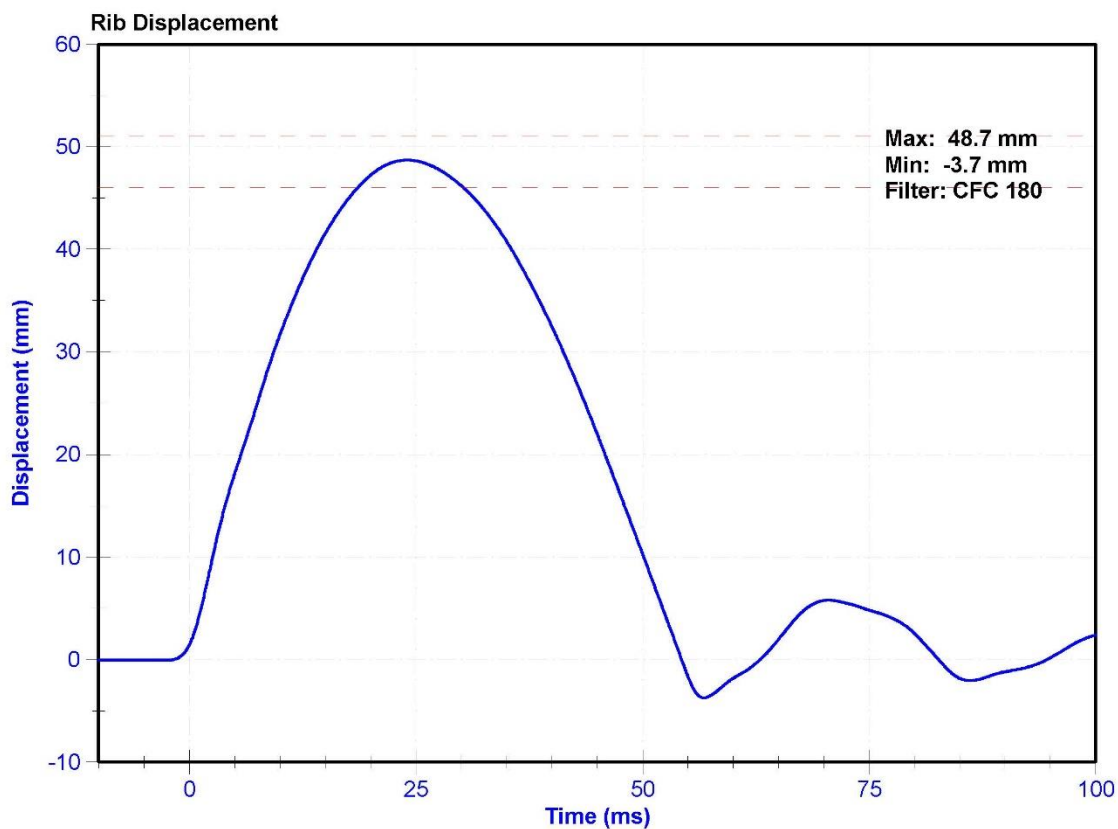
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	27.6	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



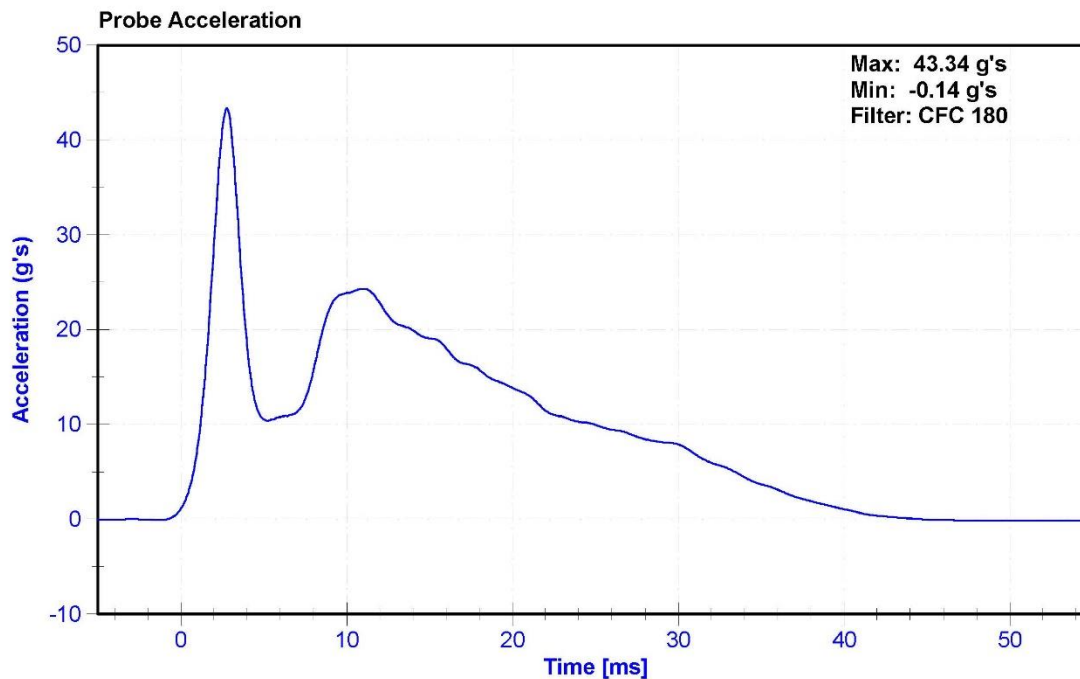
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

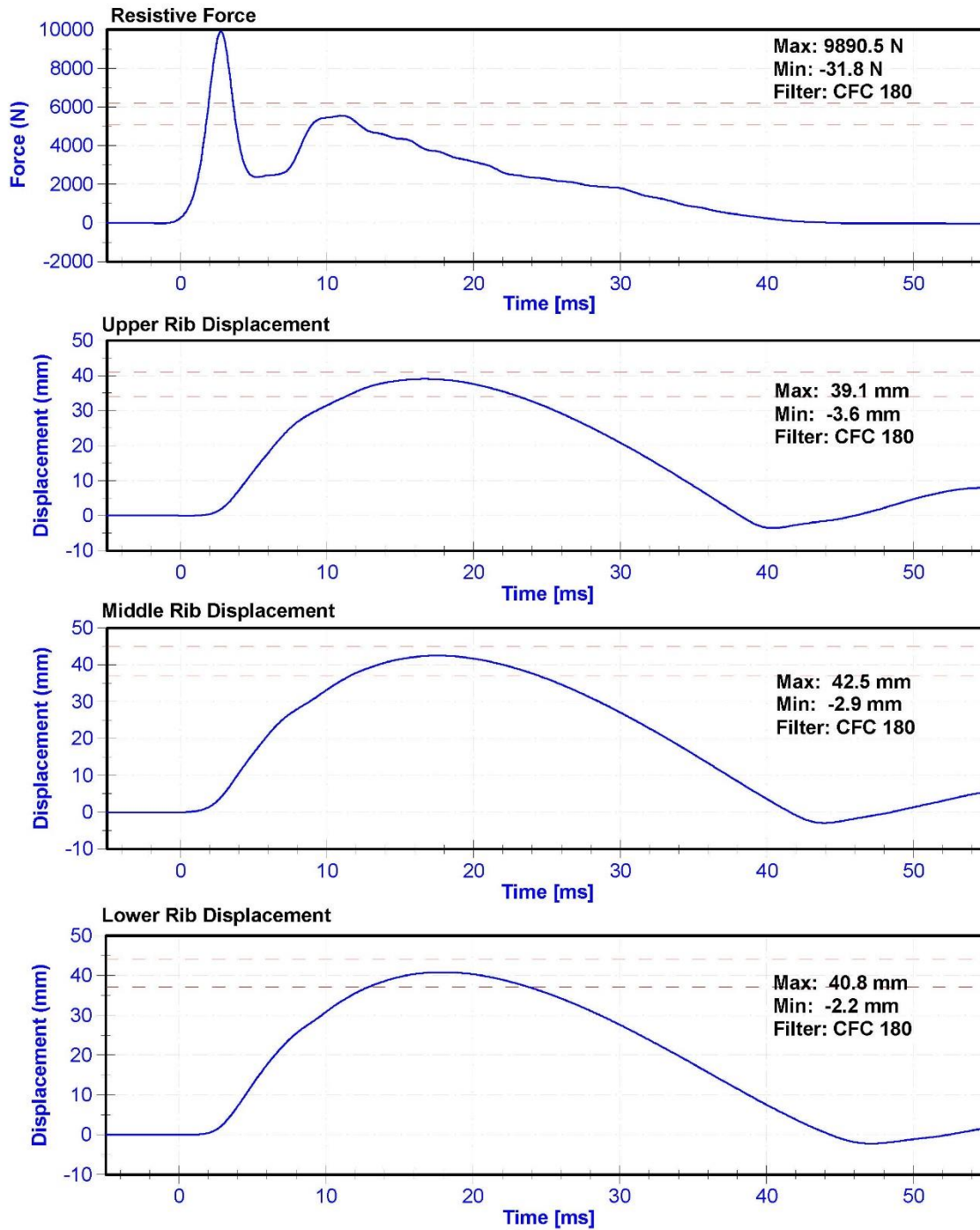
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	29.4	Pass
Velocity	5.4	5.6	m/s	5.57	Pass
Resistive Force after 6ms	5100	6200	N	5547.6	Pass
Upper Thorax Rib Deflection	34	41	mm	39.1	Pass
Mid Thorax Rib Deflection	37	45	mm	42.5	Pass
Lower Thorax Rib Deflection	37	44	mm	40.8	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





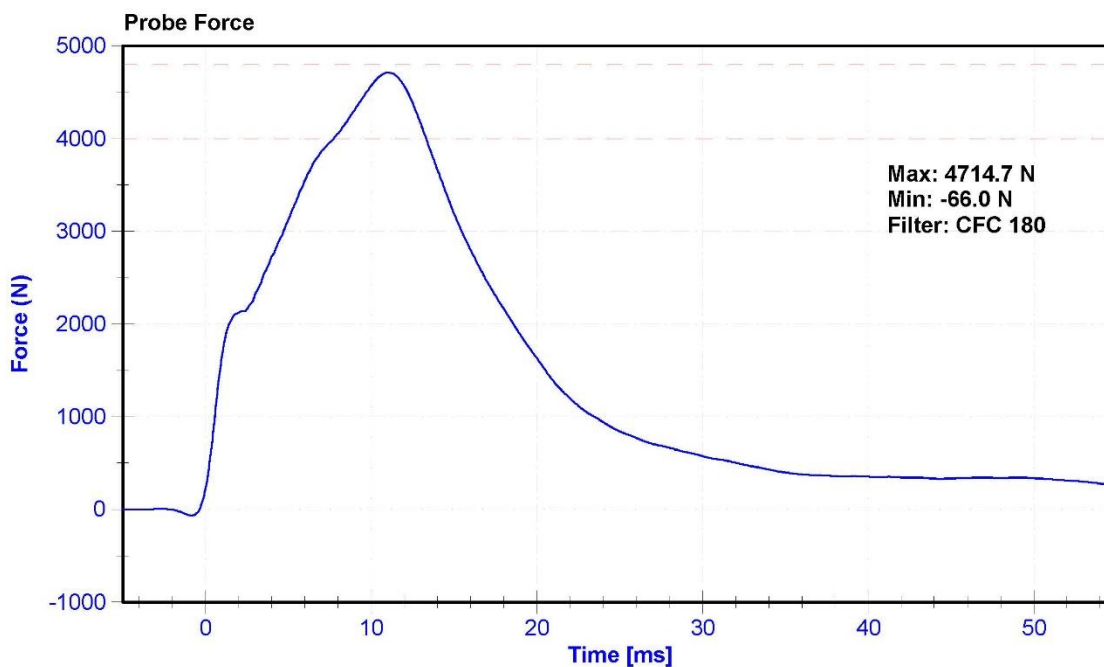
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

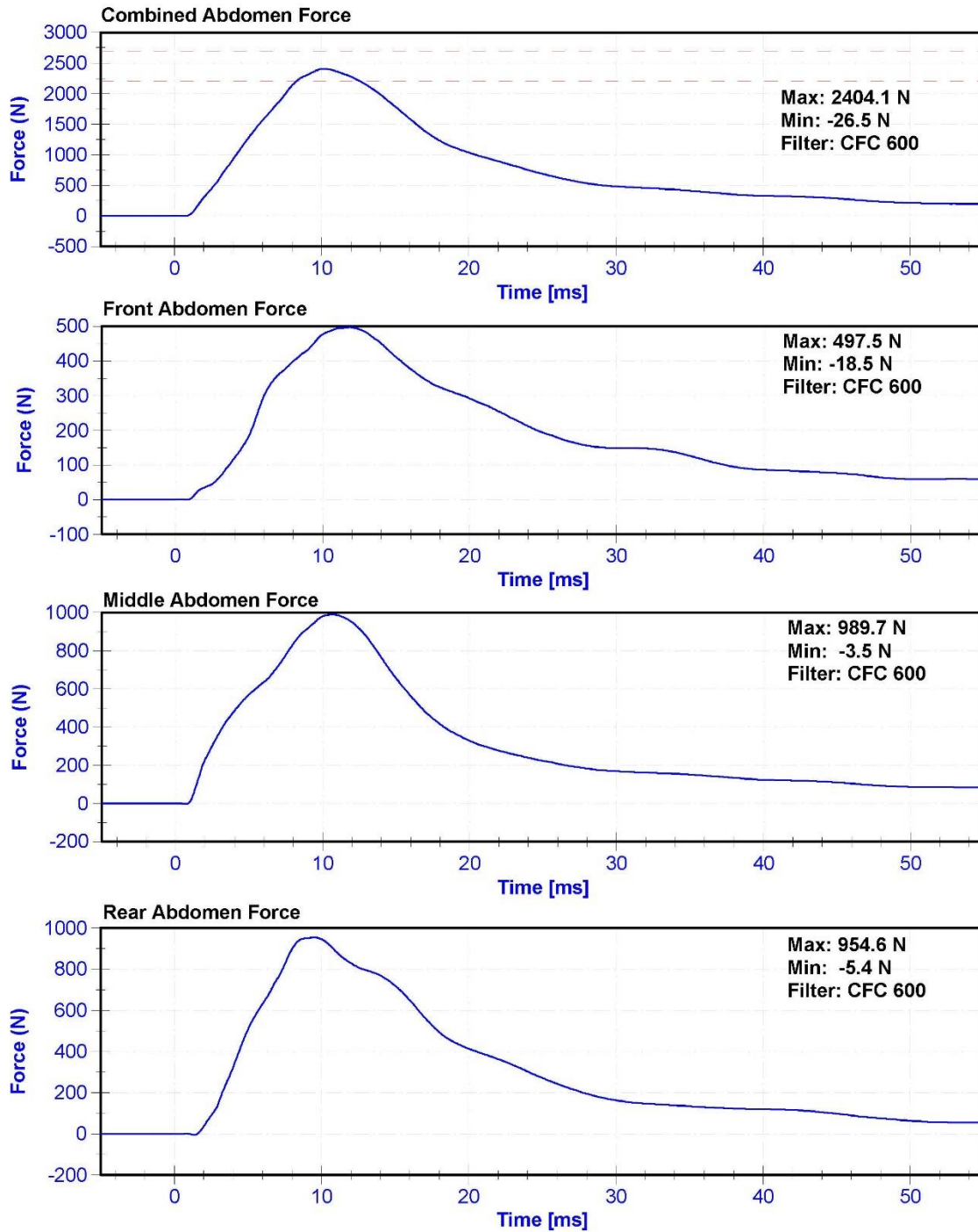
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	29.4	Pass
Velocity	3.9	4.1	m/s	4.05	Pass
Combined Abdomen Force	2200	2700	N	2404.1	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.15	Pass
Resistive Probe Force	4000	4800	N	4714.7	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.00	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





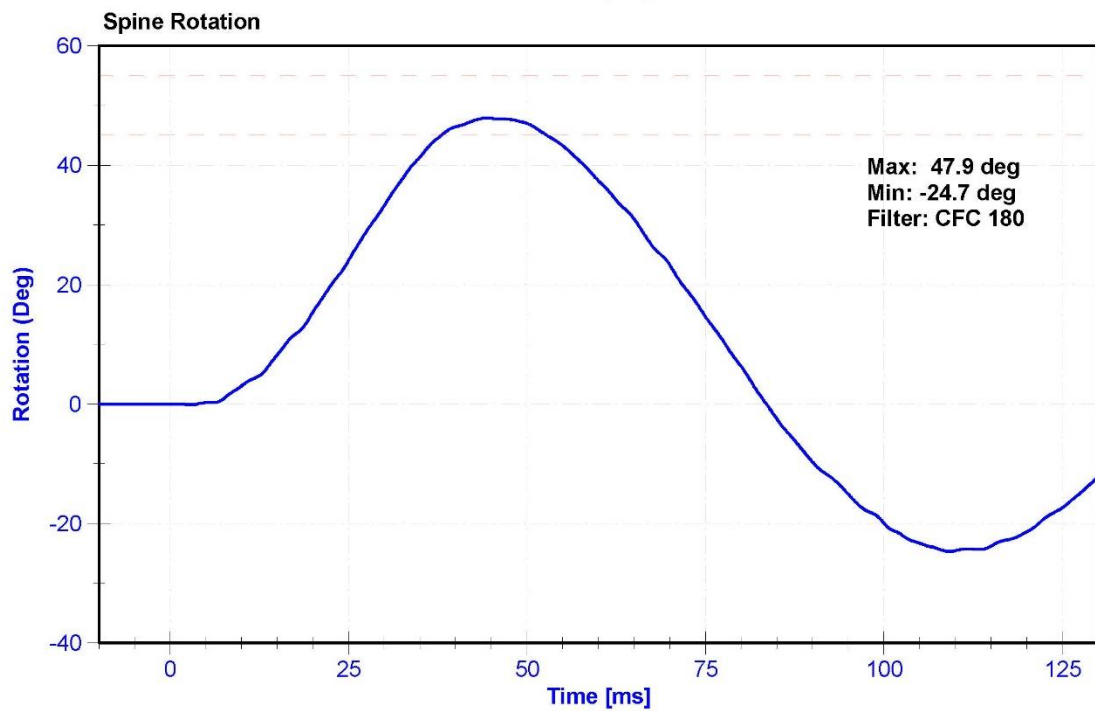
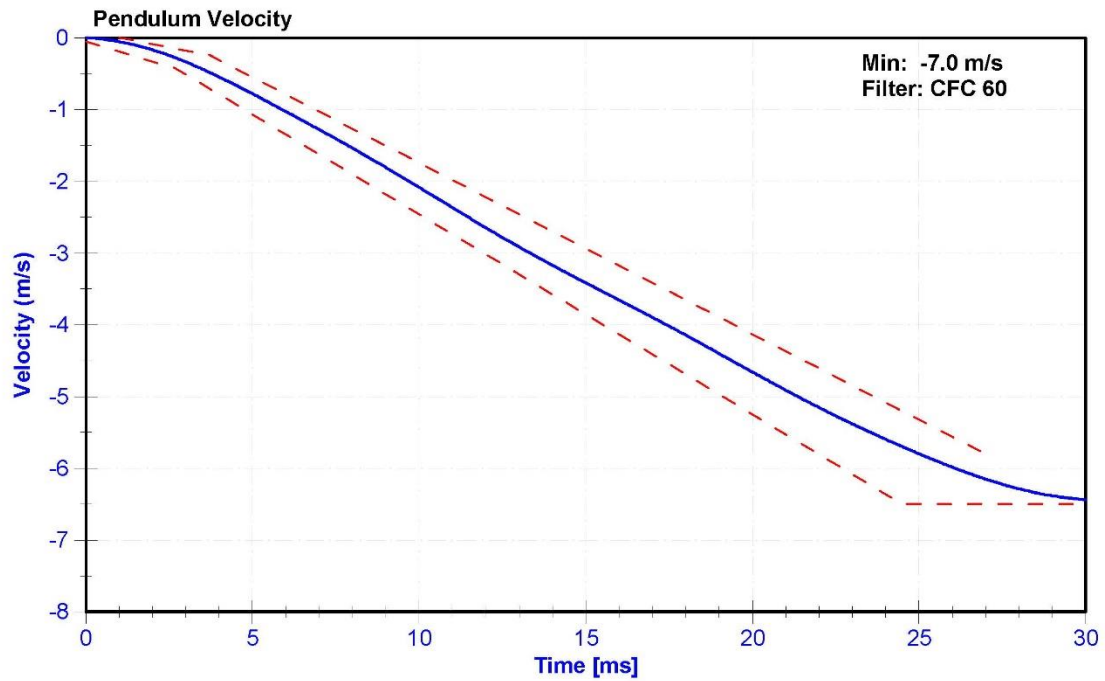
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

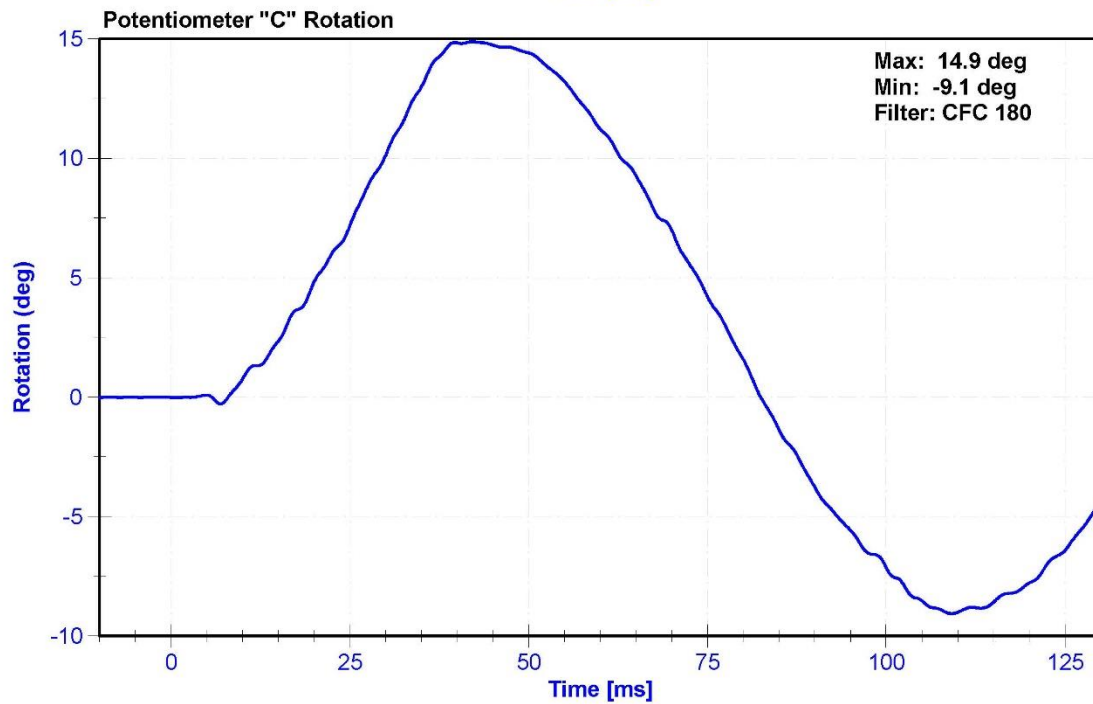
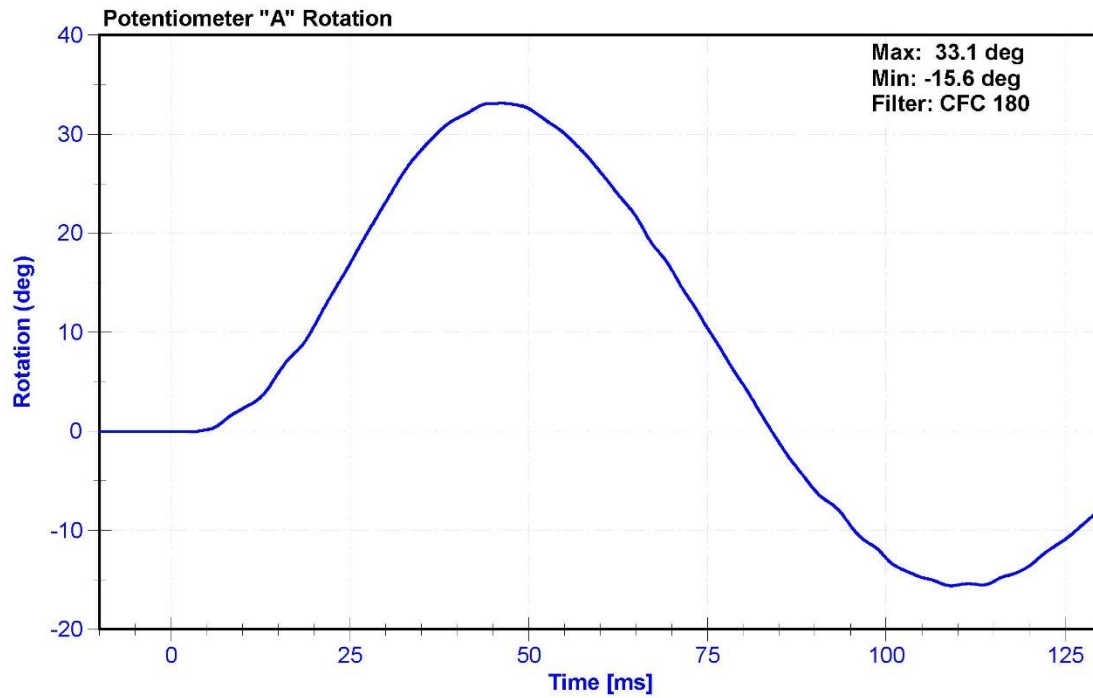
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	28.6	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	47.9	Pass
Time at Maximum Rotation	39	53	ms	44.3	Pass
Time of Decay to Zero Degrees	37	57	ms	39.3	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





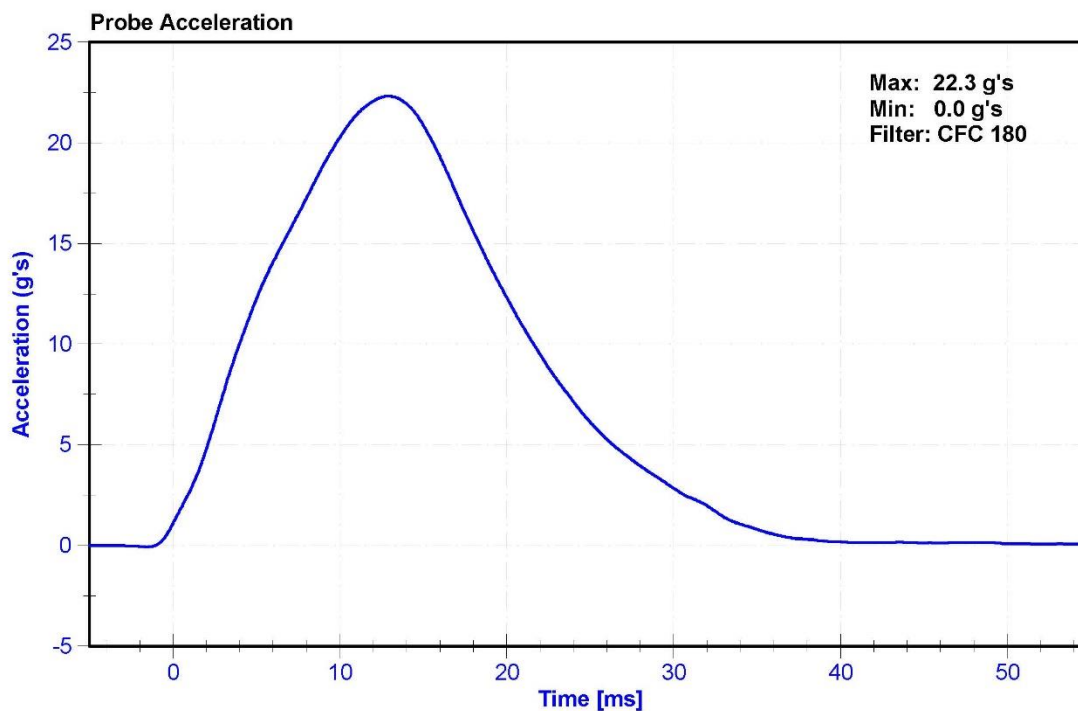
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

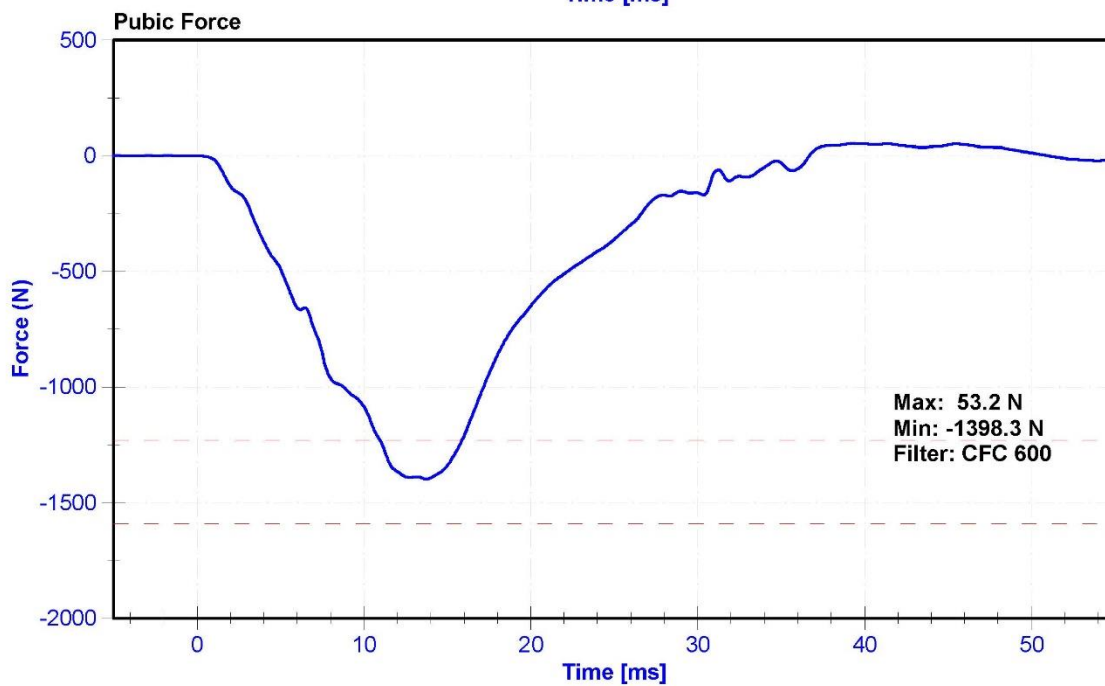
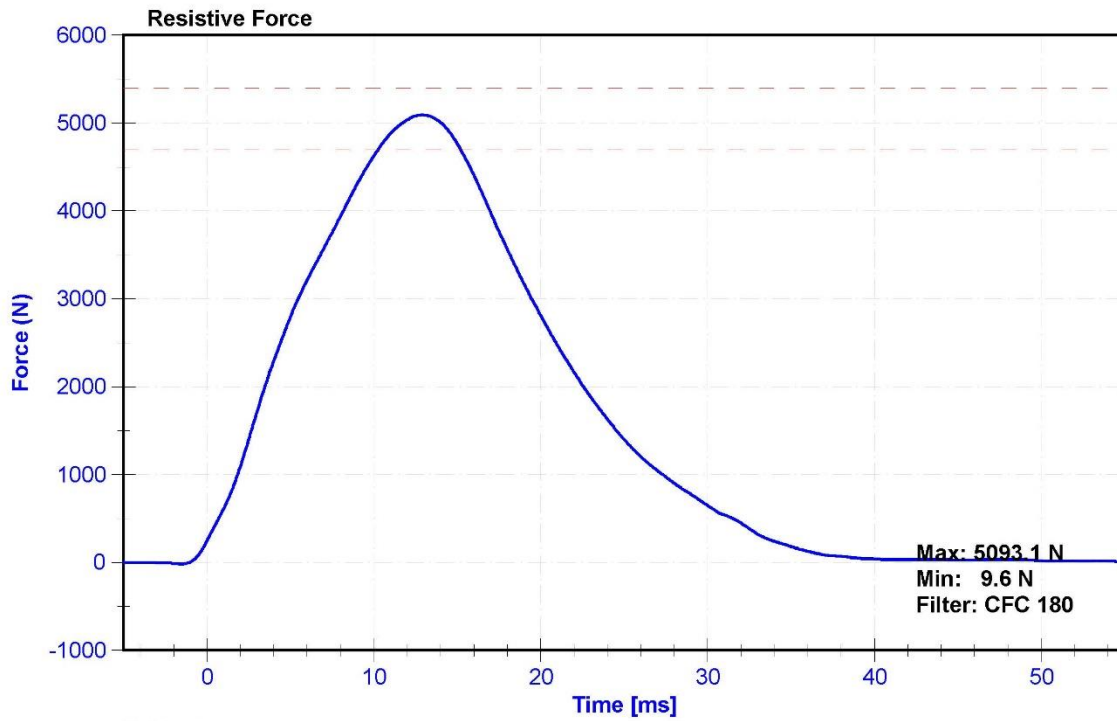
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	29.5	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Resistive Force	4700	5400	N	5093.1	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.90	Pass
Pubic Force	-1590	-1230	N	-1398.3	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.75	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





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: DG8012

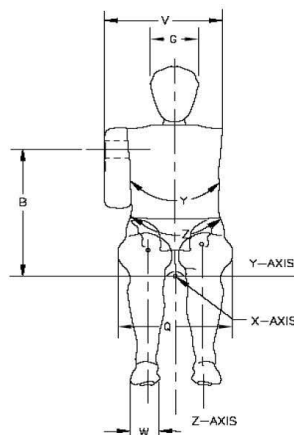
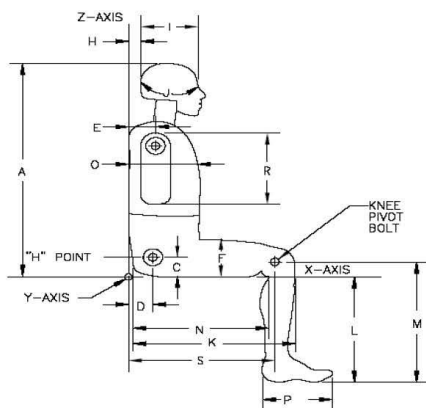


External Measurements - SID-IIs

Technician: **MKG**

Date: **5/11/2017**

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	145	Pass
E	Shoulder Pivot from Backline	97	107	102	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	182	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	350	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	428	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	320	Pass
R	Arm Length	249	259	254	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	860	Pass
Z	Waist Circumference	761	791	771	Pass

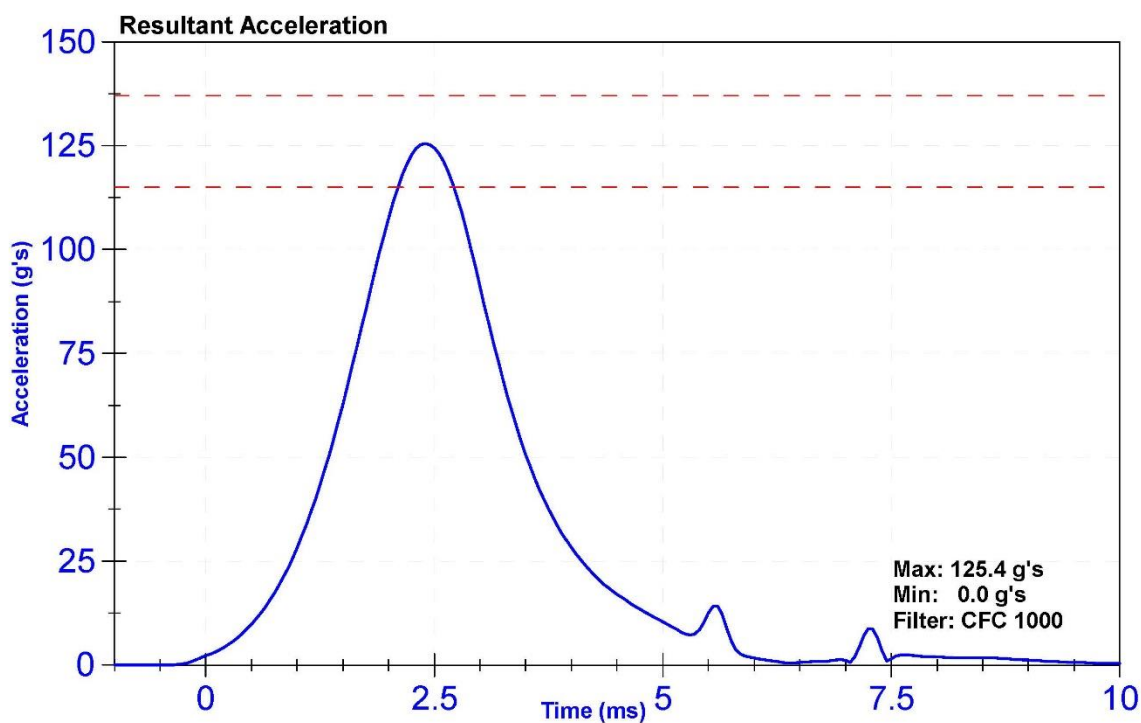
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

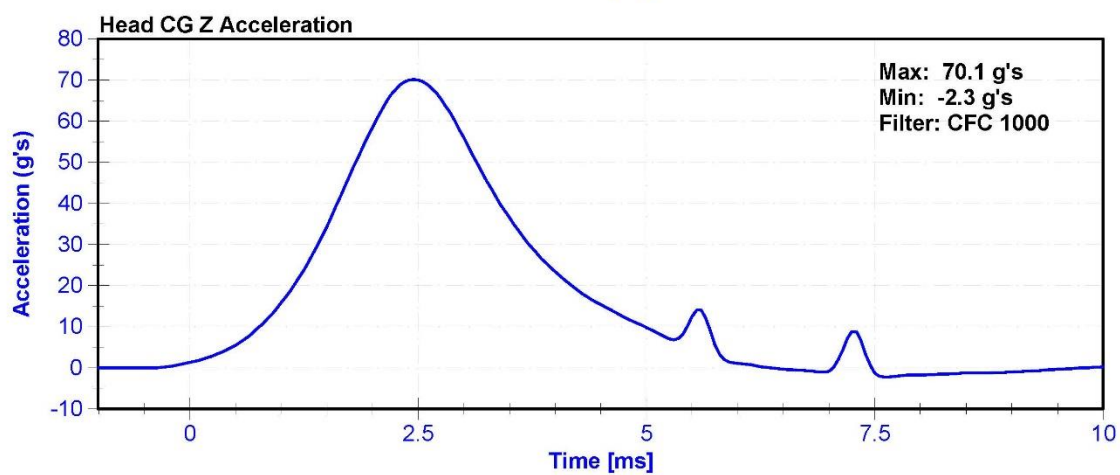
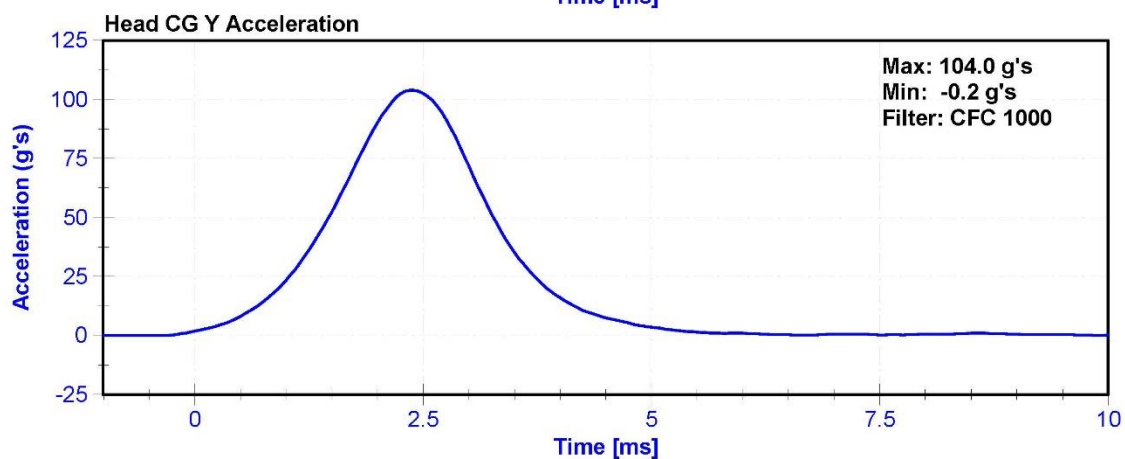
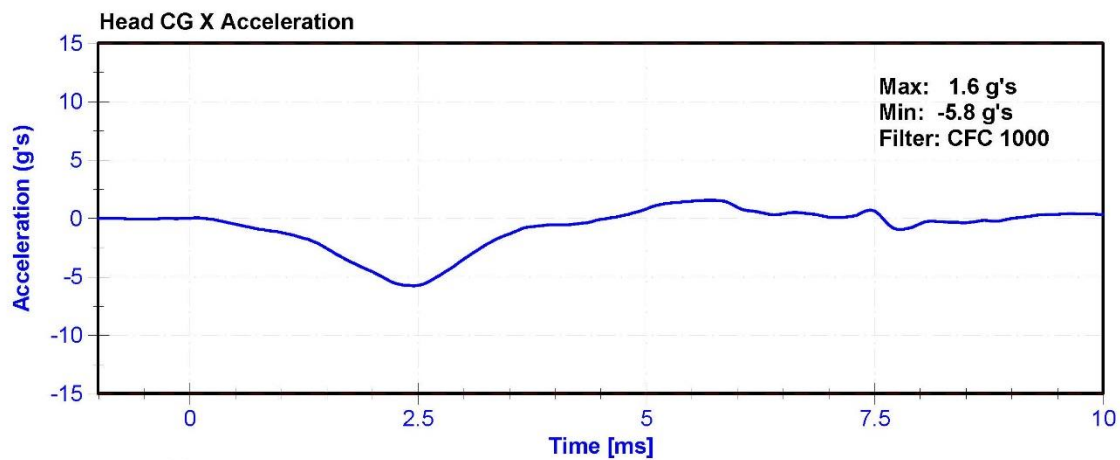
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	26.5	Pass
Resultant Acceleration	115	137	g's	125.4	Pass
Oscillation	0	15	%	11.	Pass
Fore-Aft Acceleration	-15	15	g's	-5.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	5/1/2017	10/30/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	5/1/2017	10/30/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	5/2/2017	10/31/2017





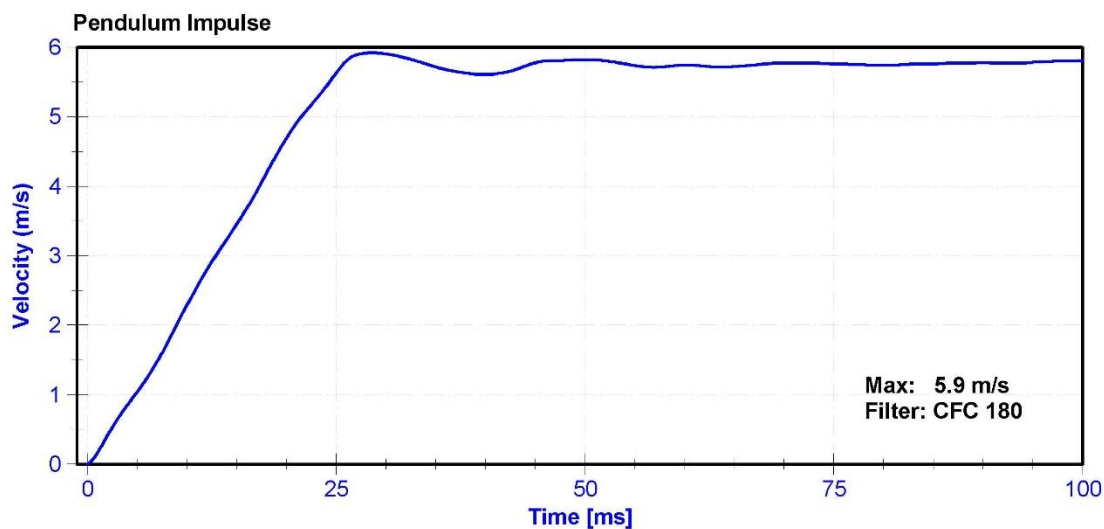
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

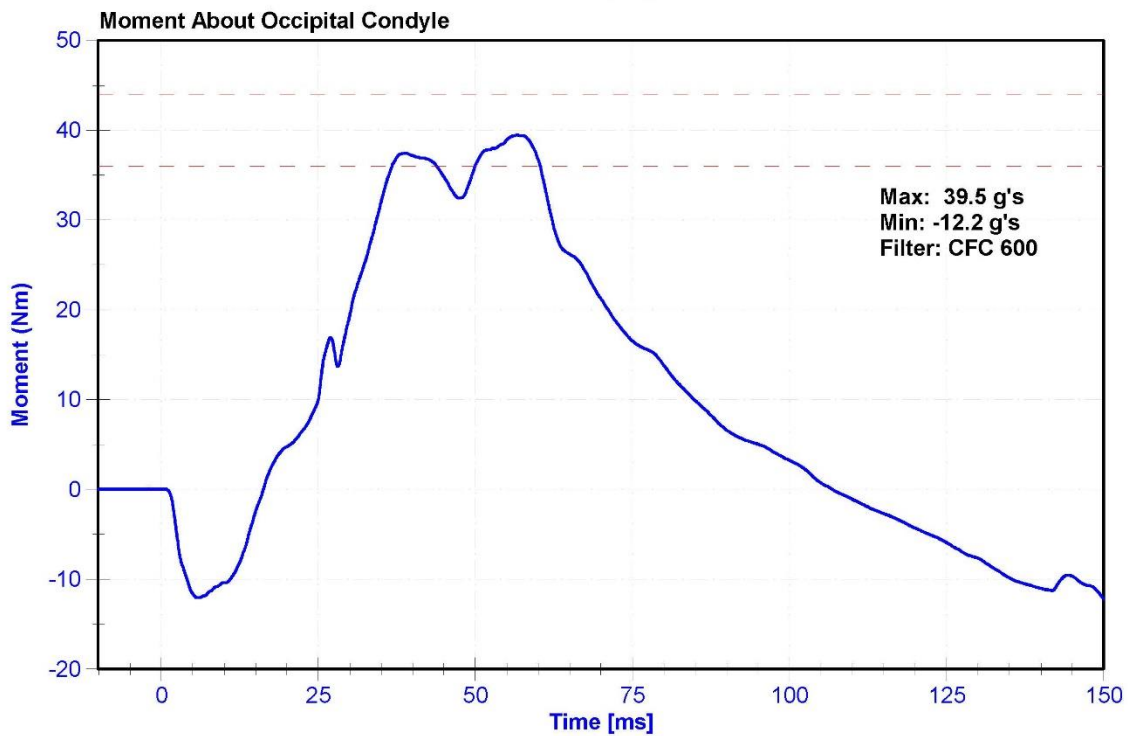
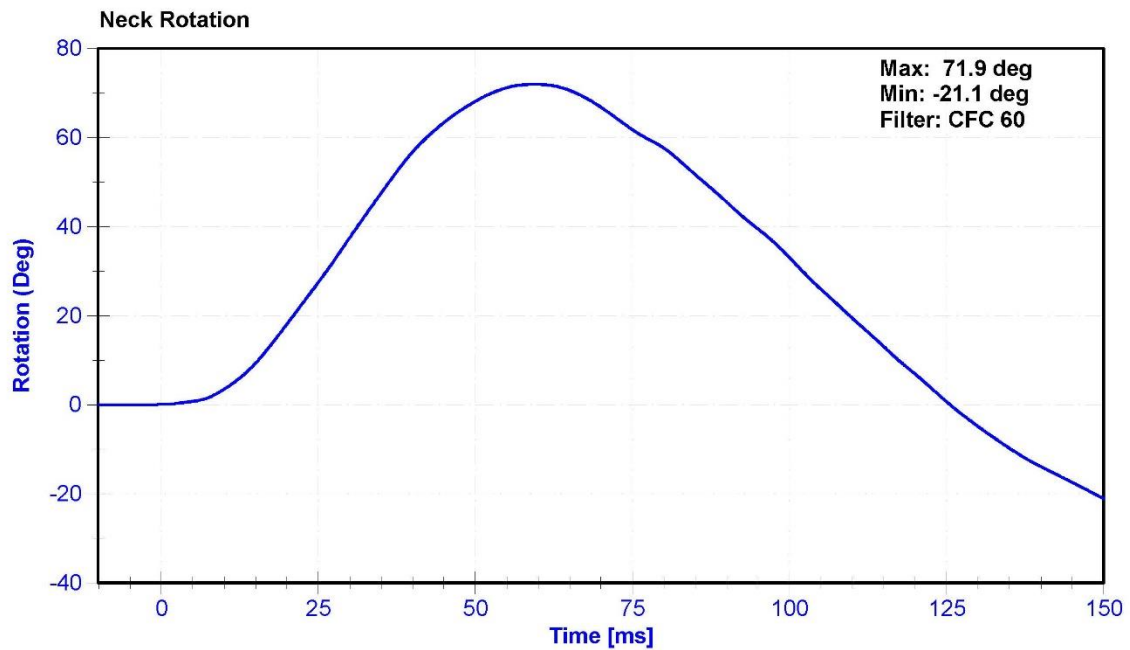
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	37.1	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.29	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.46	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.69	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.63	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.92	Pass
Neck Rotation	71	81	deg	71.9	Pass
Time at Maximum Rotation	50	70	ms	59.5	Pass
Moment about the OC	36	44	Nm	39.5	Pass
Moment Decay to 0 Nm	102	126	ms	106.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
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





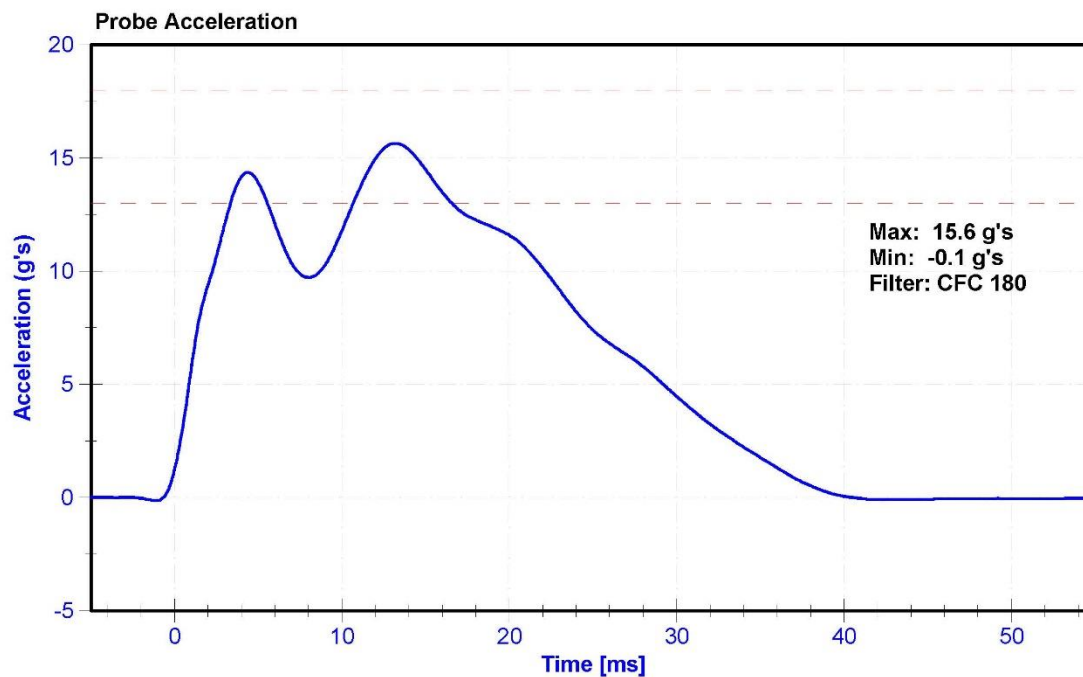
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

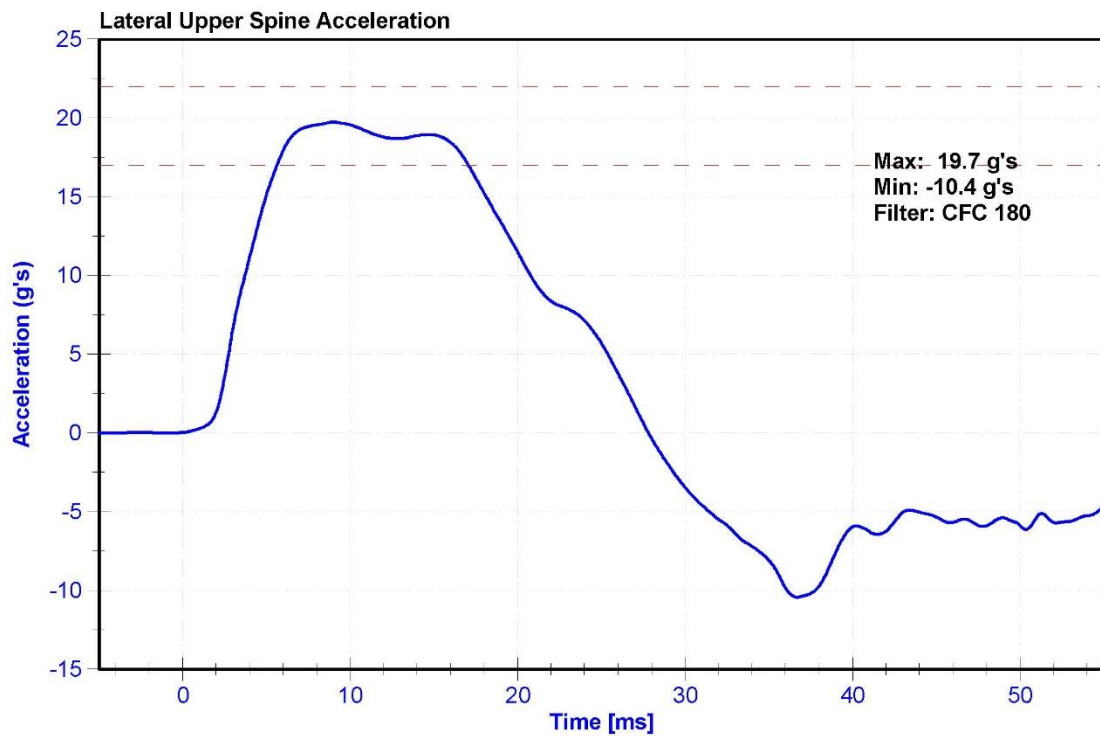
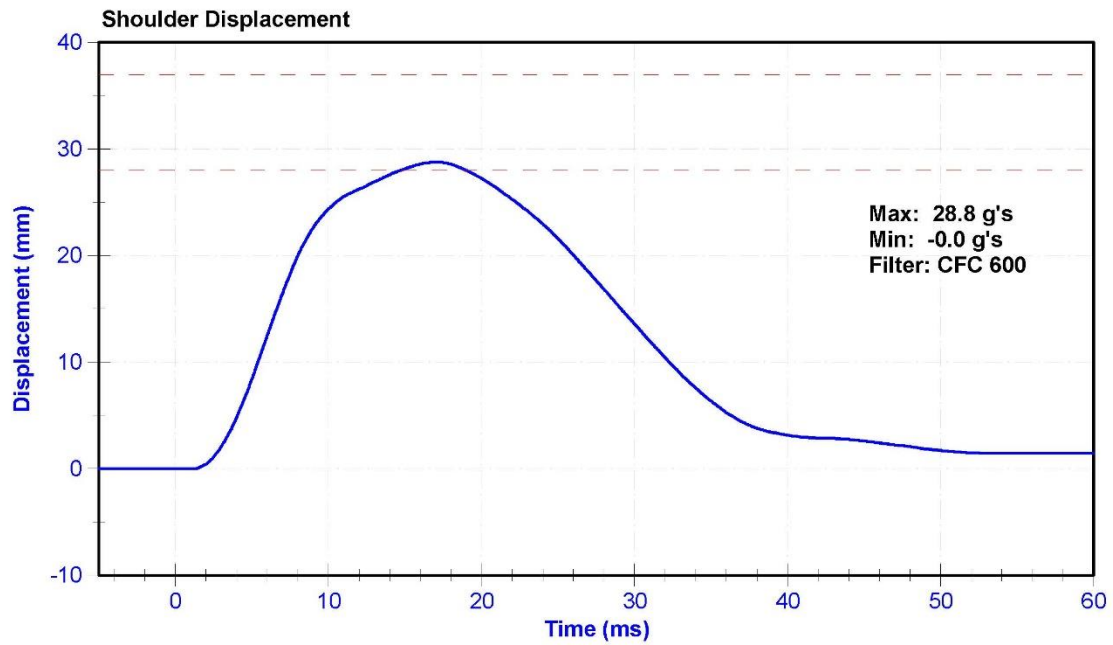
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	33.8	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	13	18	g's	15.6	Pass
Shoulder Deflection	28	37	mm	28.8	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	5/2/2017	10/31/2017





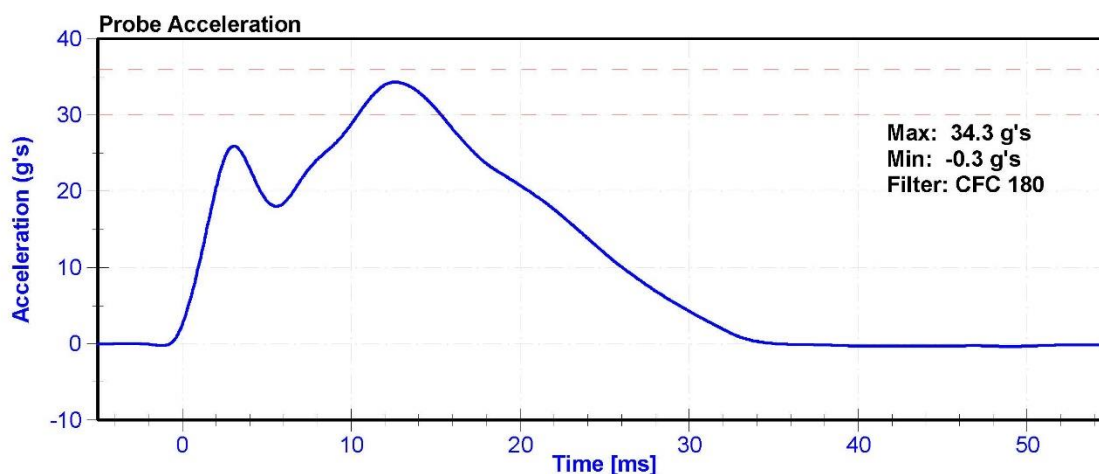
ATD Manufacturer	FTSS	Test Technician	S, Keller
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

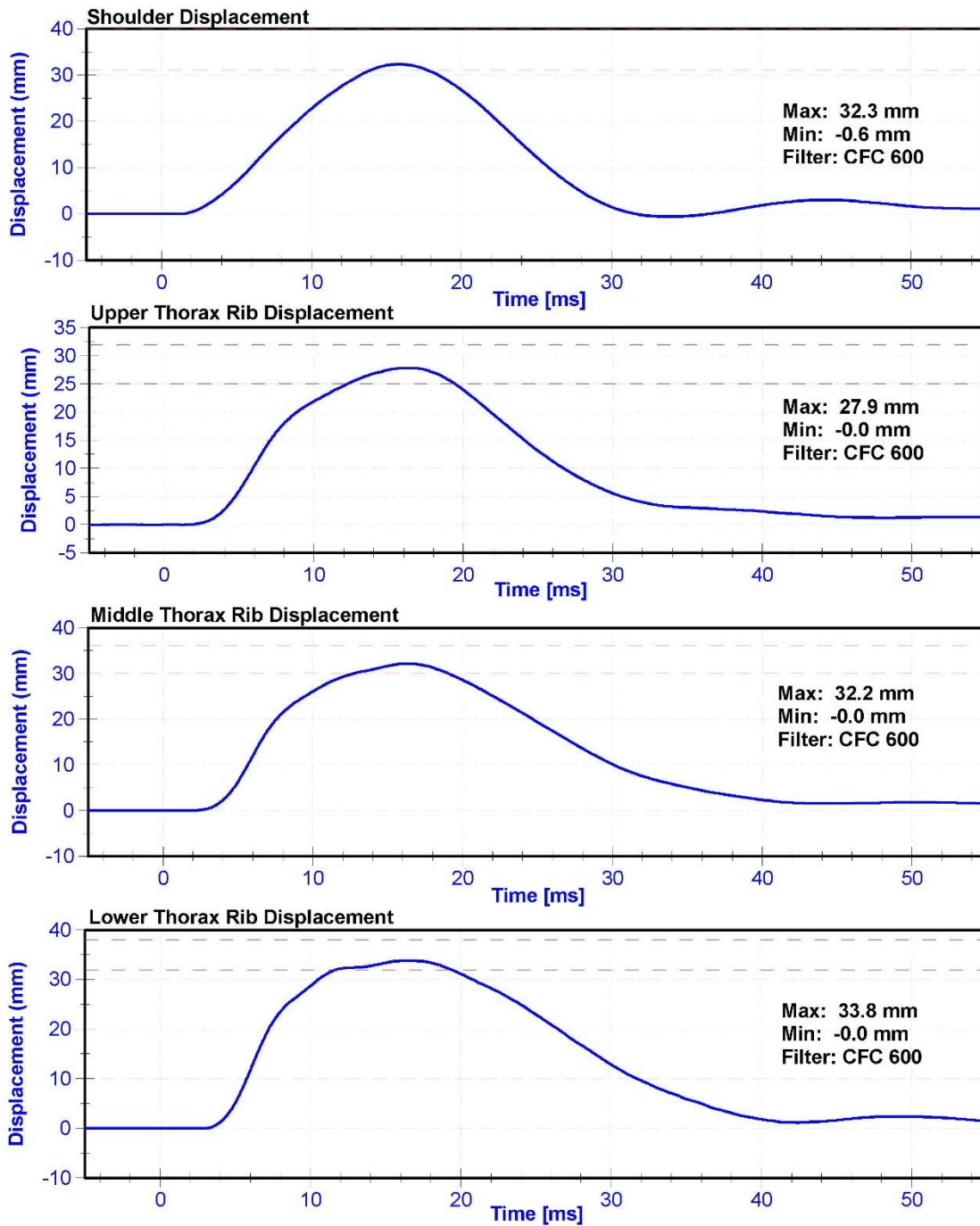
Results

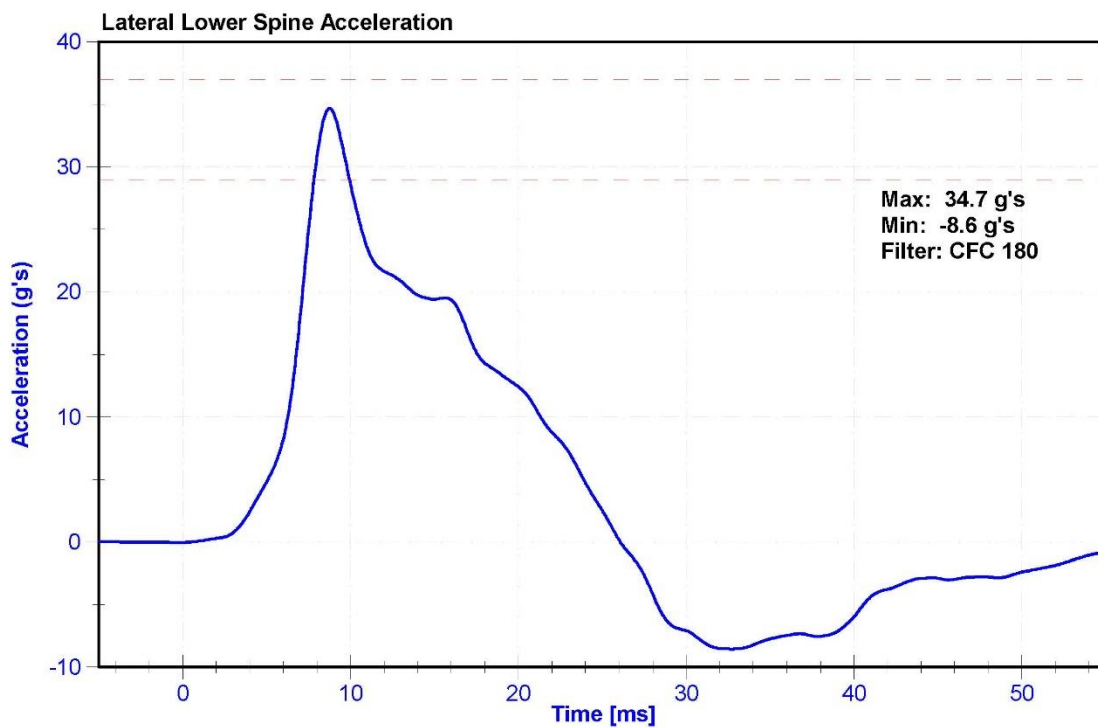
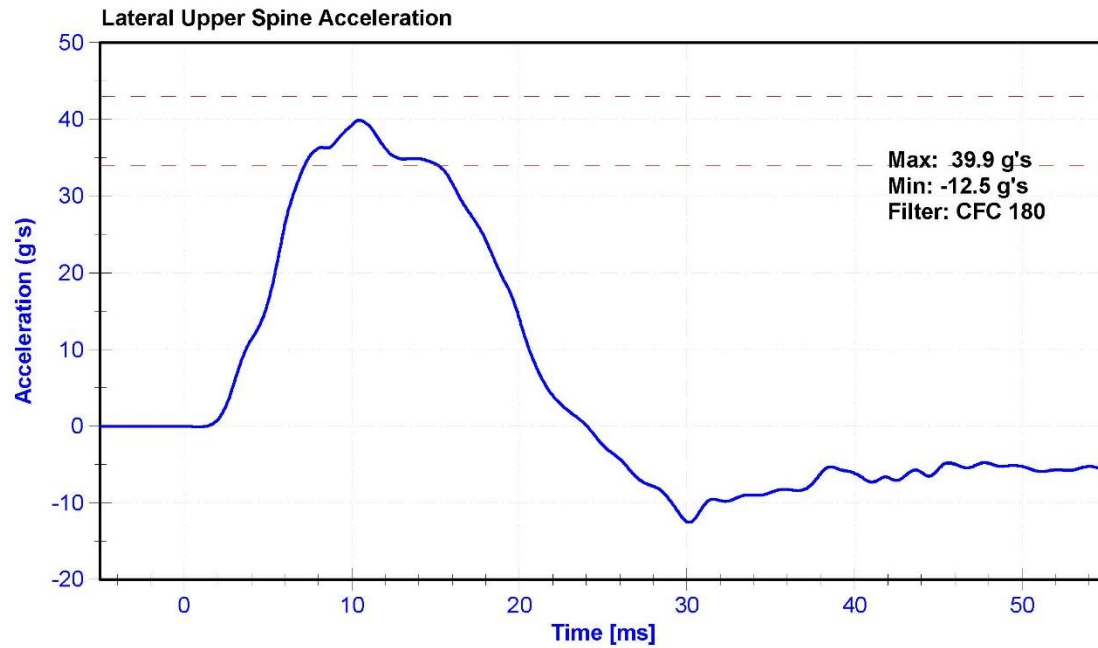
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	32.6	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	34.3	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.7	Pass
Shoulder Deflection	31	40	mm	32.3	Pass
Upper Thorax Rib Deflection	25	32	mm	27.9	Pass
Mid Thorax Rib Deflection	30	36	mm	32.2	Pass
Lower Thorax Rib Deflection	32	38	mm	33.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	5/2/2017	10/31/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	5/1/2017	10/30/2017
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







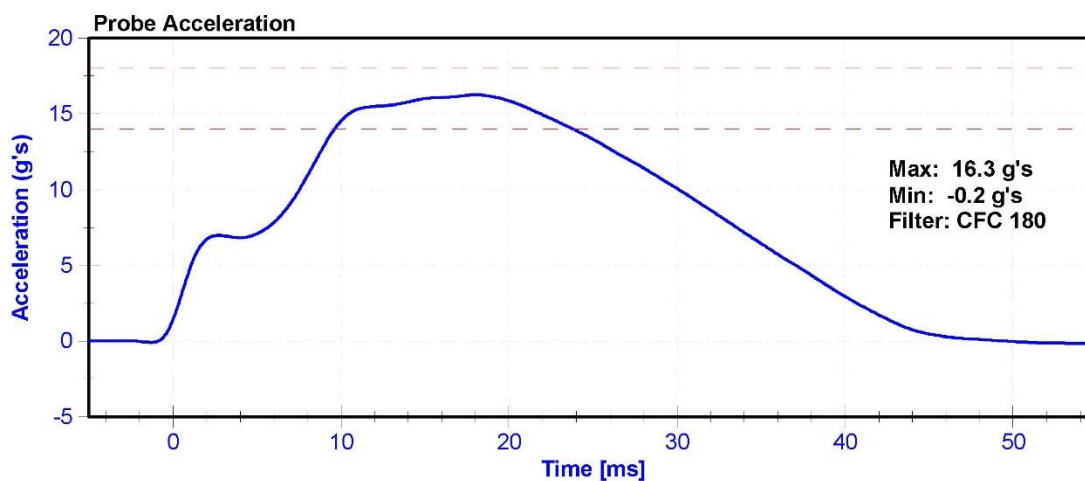
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

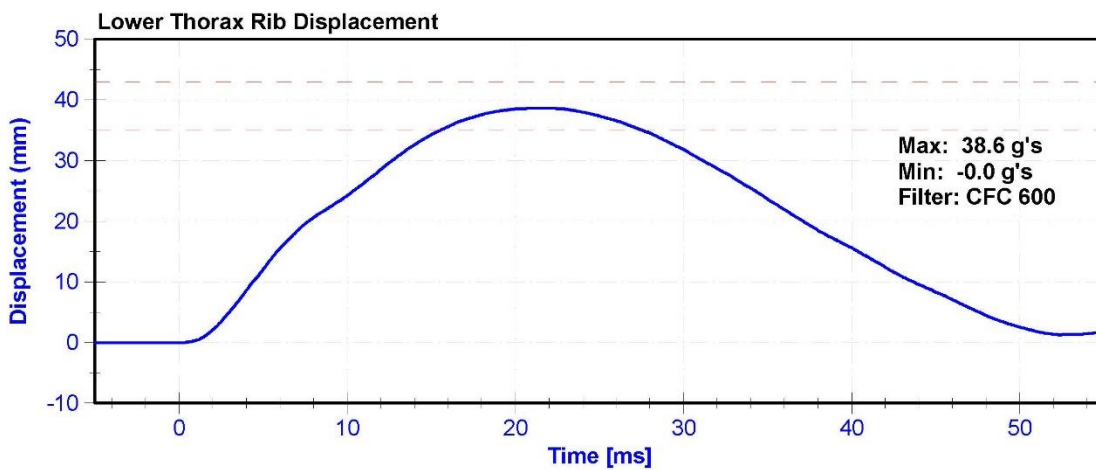
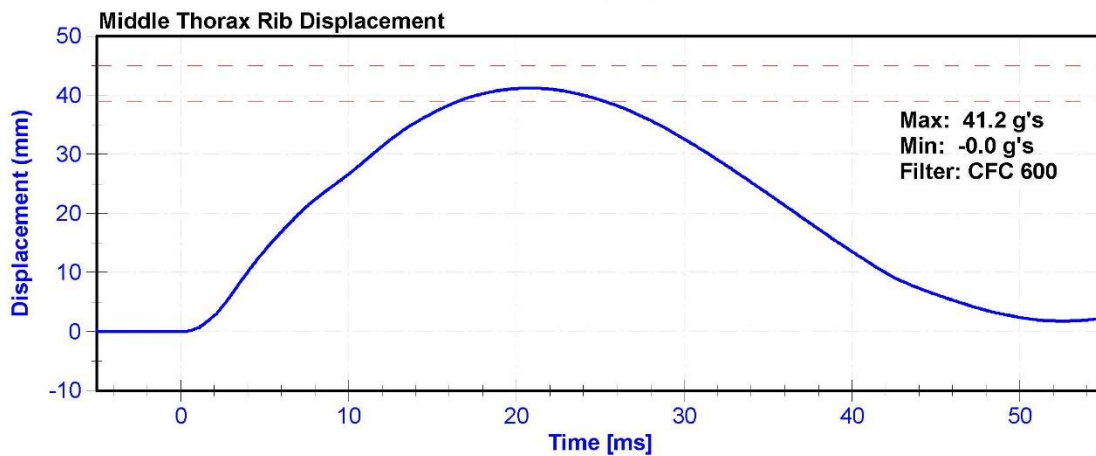
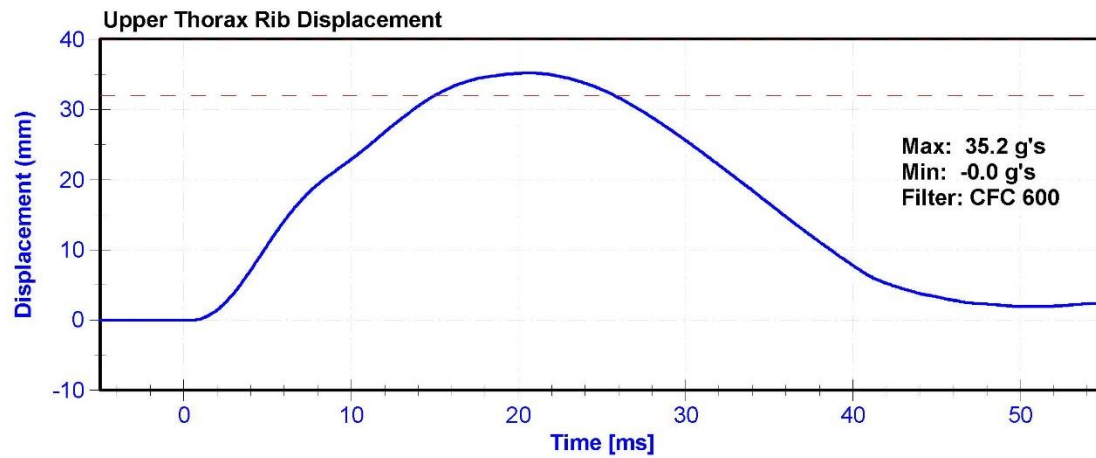
Results

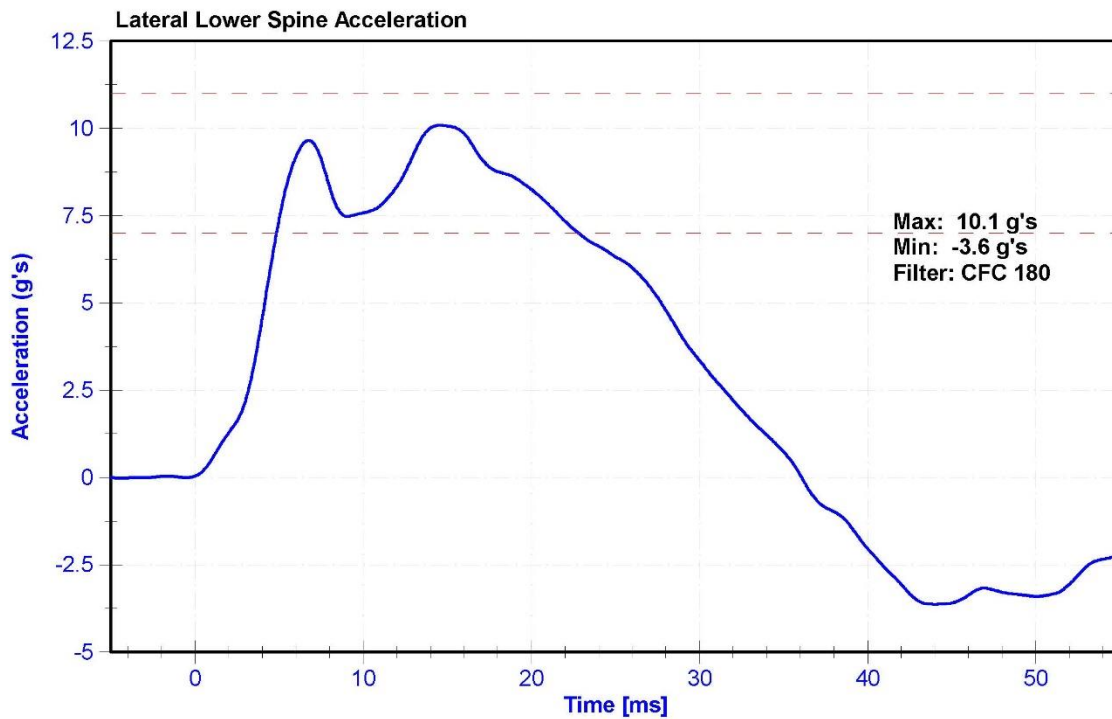
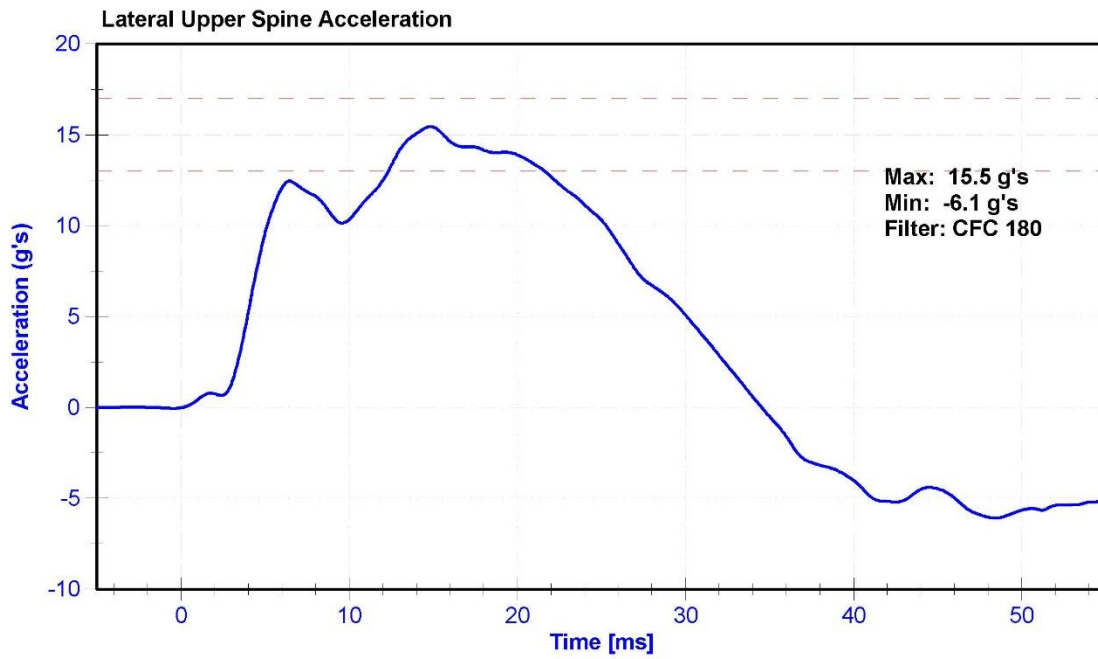
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	32.8	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	14	18	g's	16.3	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.5	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.1	Pass
Upper Thorax Rib Deflection	32	40	mm	35.2	Pass
Middle Thorax Rib Deflection	39	45	mm	41.2	Pass
Lower Thorax Rib Deflection	35	43	mm	38.6	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 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	5/2/2017	10/31/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	5/1/2017	10/30/2017
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







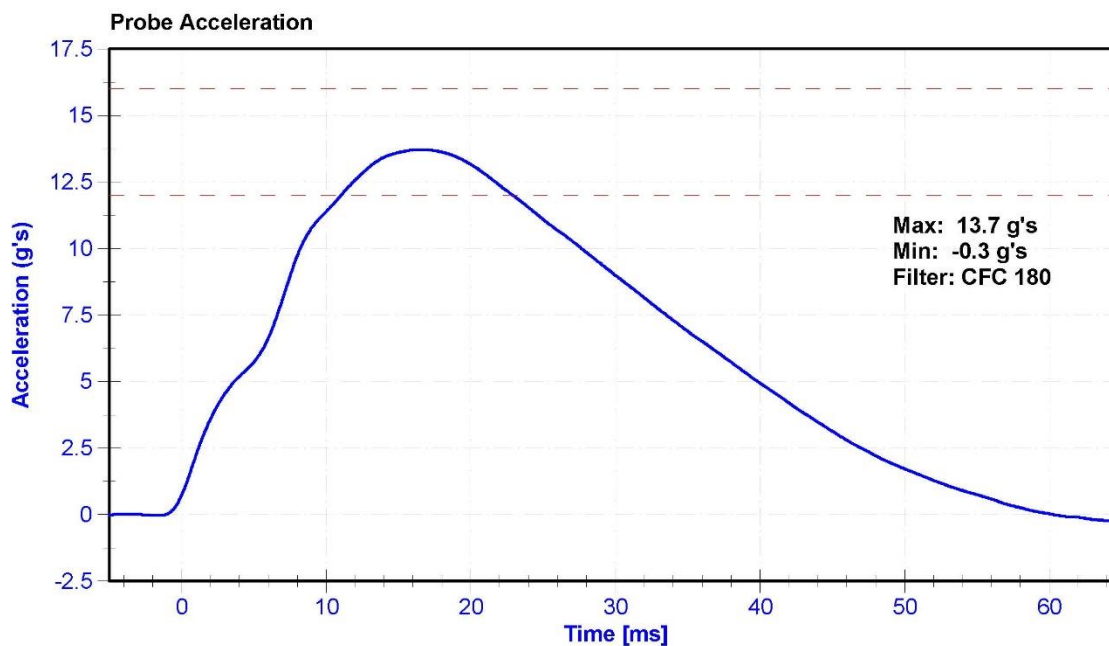
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

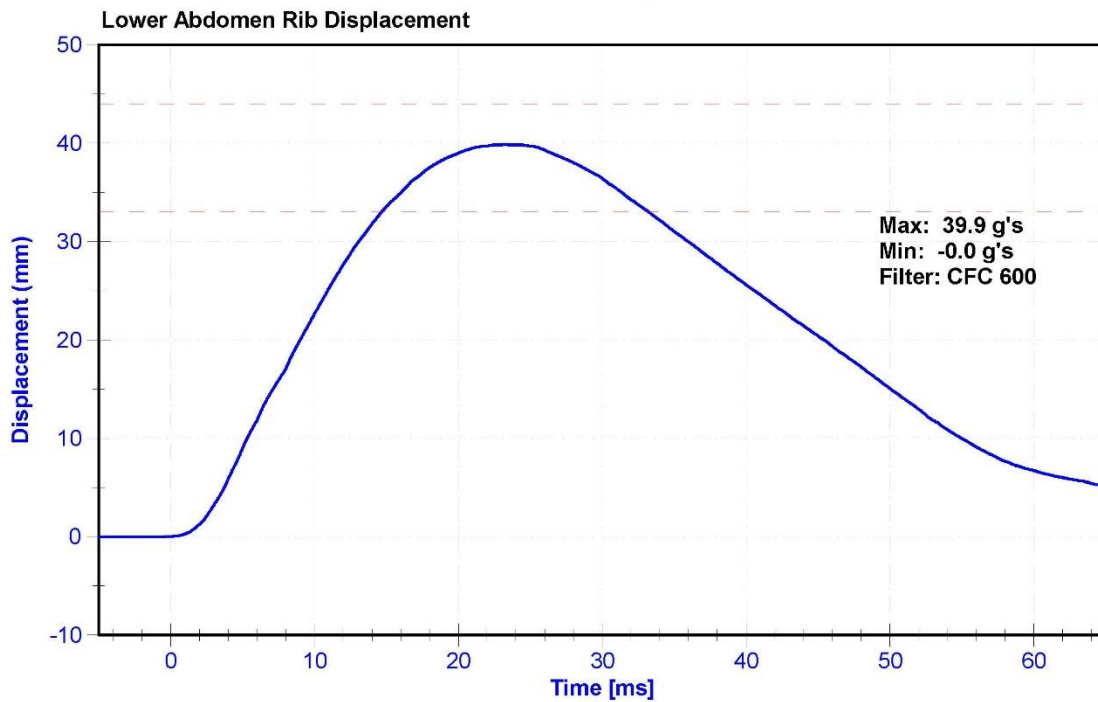
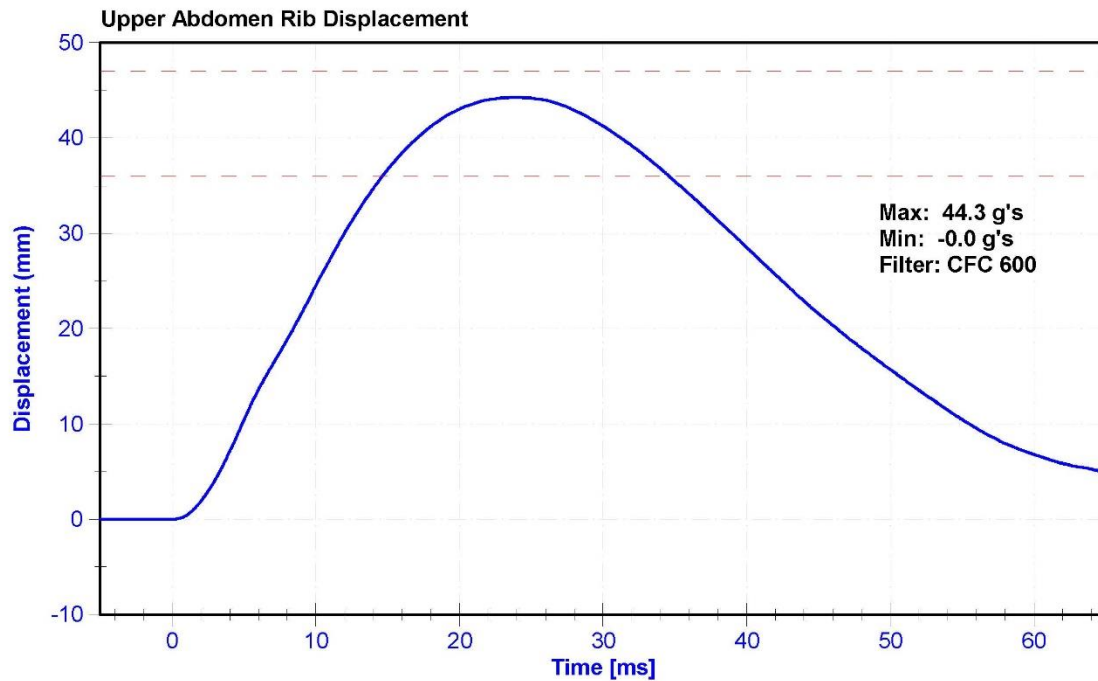
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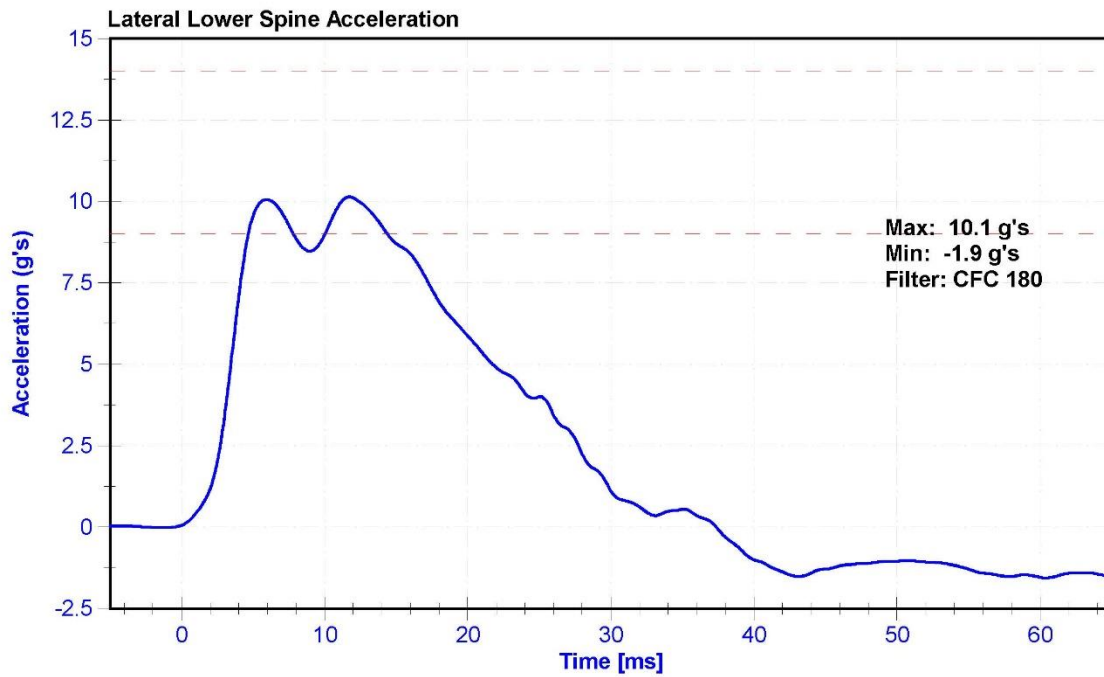
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	33.2	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	13.7	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	44.3	Pass
Lower Abdomen Rib Deflection	33	44	mm	39.9	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	5/1/2017	10/30/2017
Upper Abdomen Rib Potentiometer	Servo 08TC1-3725	DS-008GFE	5/3/2017	5/3/2018
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	6/15/2016	6/15/2017







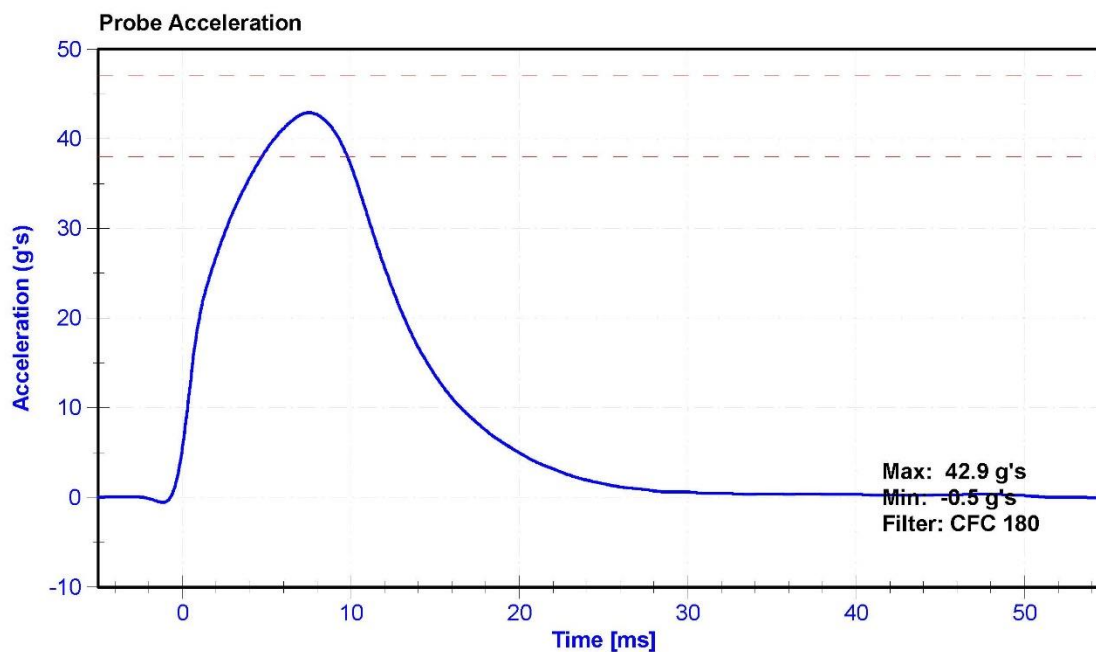
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

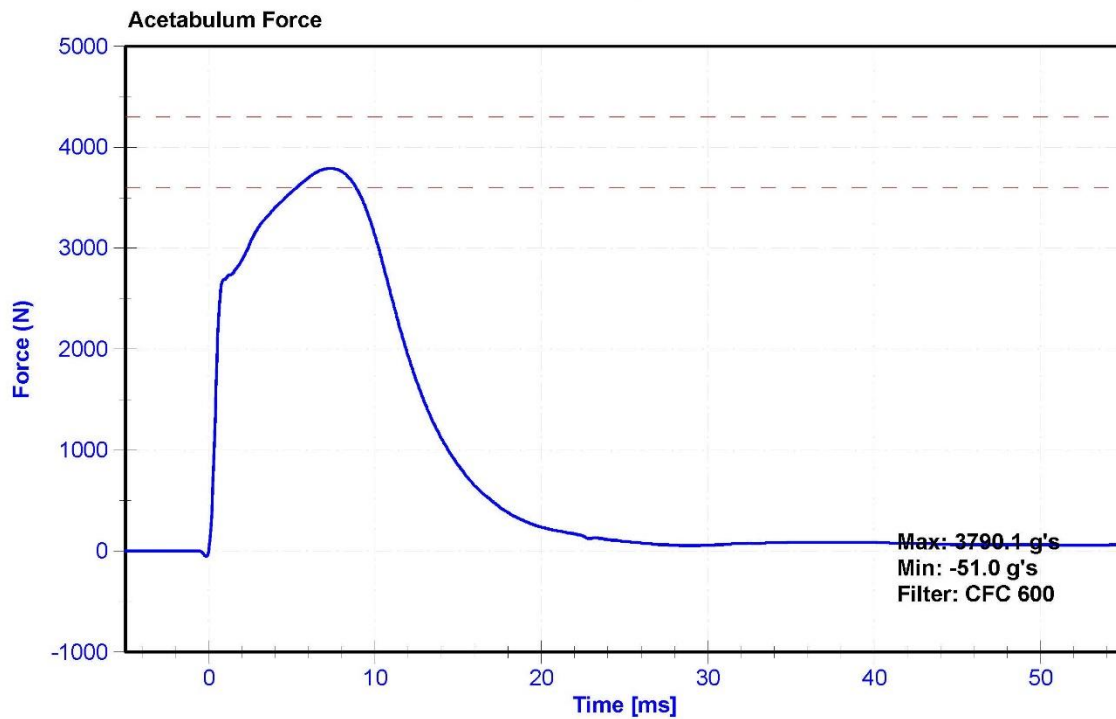
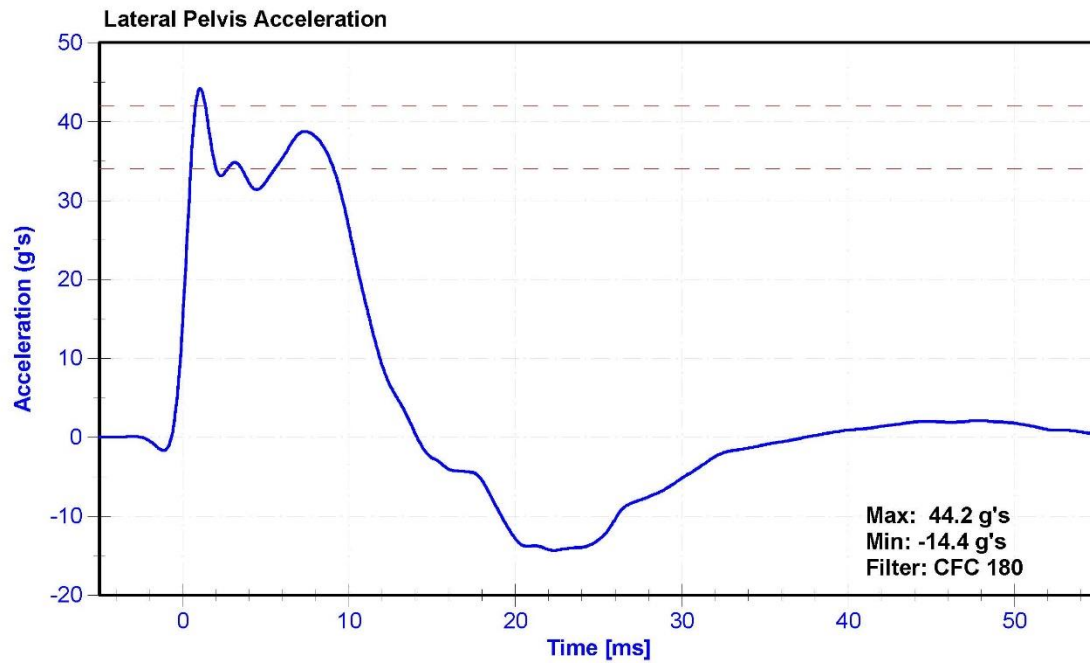
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34.4	Pass
Velocity	6.6	6.8	m/s	6.64	Pass
Probe Acceleration	38	47	g's	42.9	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.8	Pass
Acetabulum Force	3600	4300	N	3790.1	Pass

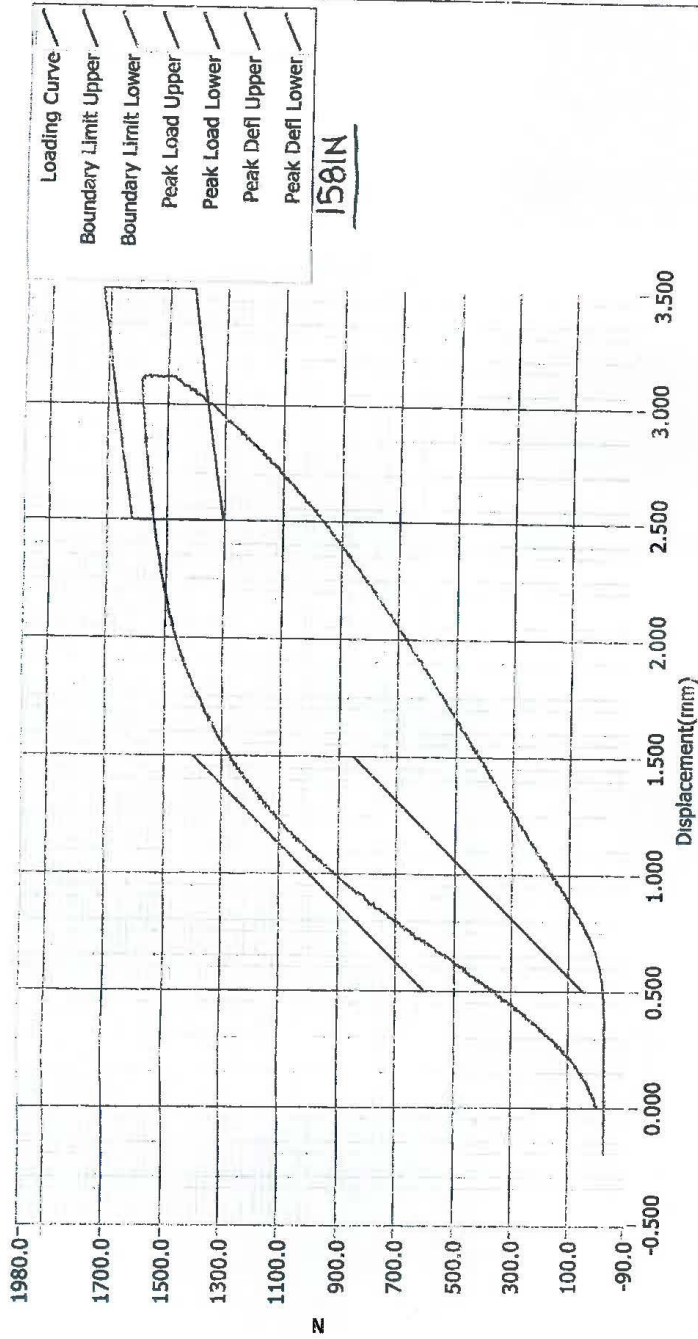
Transducer Calibrations

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	5/2/2017	10/31/2017
Acetabulum Load Cell	Denton 3249J	LC-267Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	88007	07/22/2015	N/A
Crash Test Plug	Humanetics	88018	07/22/2015	N/A





Resultant Data - SIDIIs Plug Compression



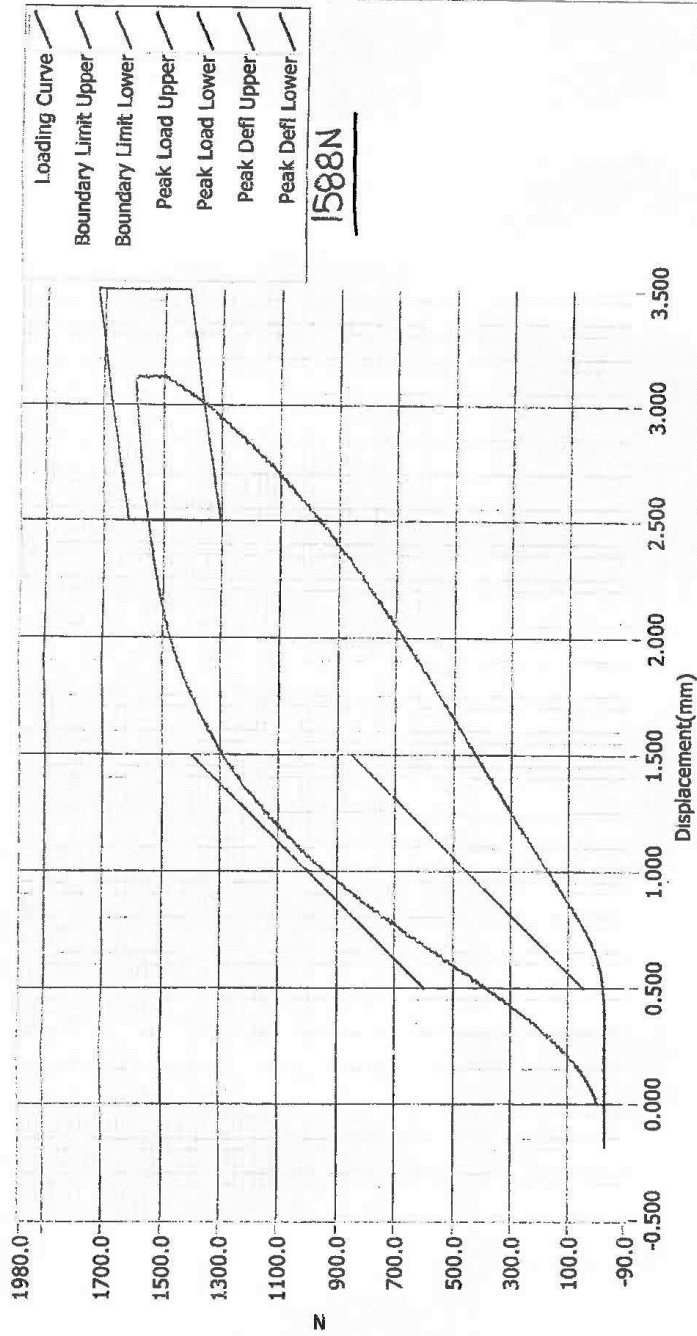
ATD Calibration Lab

CRASH

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	7/22/2015	4:15 PM
	N/A	ATD Type	SIDIIs

Current Date : 7/22/2015 Current Time : 16:15:57

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

CERT

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	88007	7/22/2015	3:44 PM
	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 7/22/2015 Current Time : 15:45:12

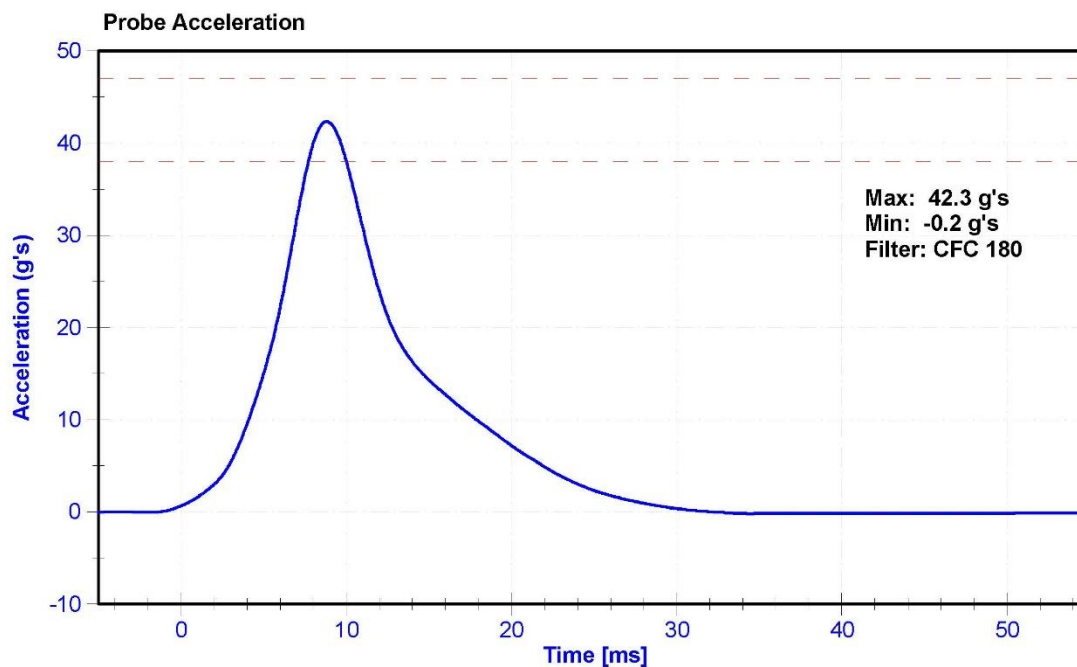
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

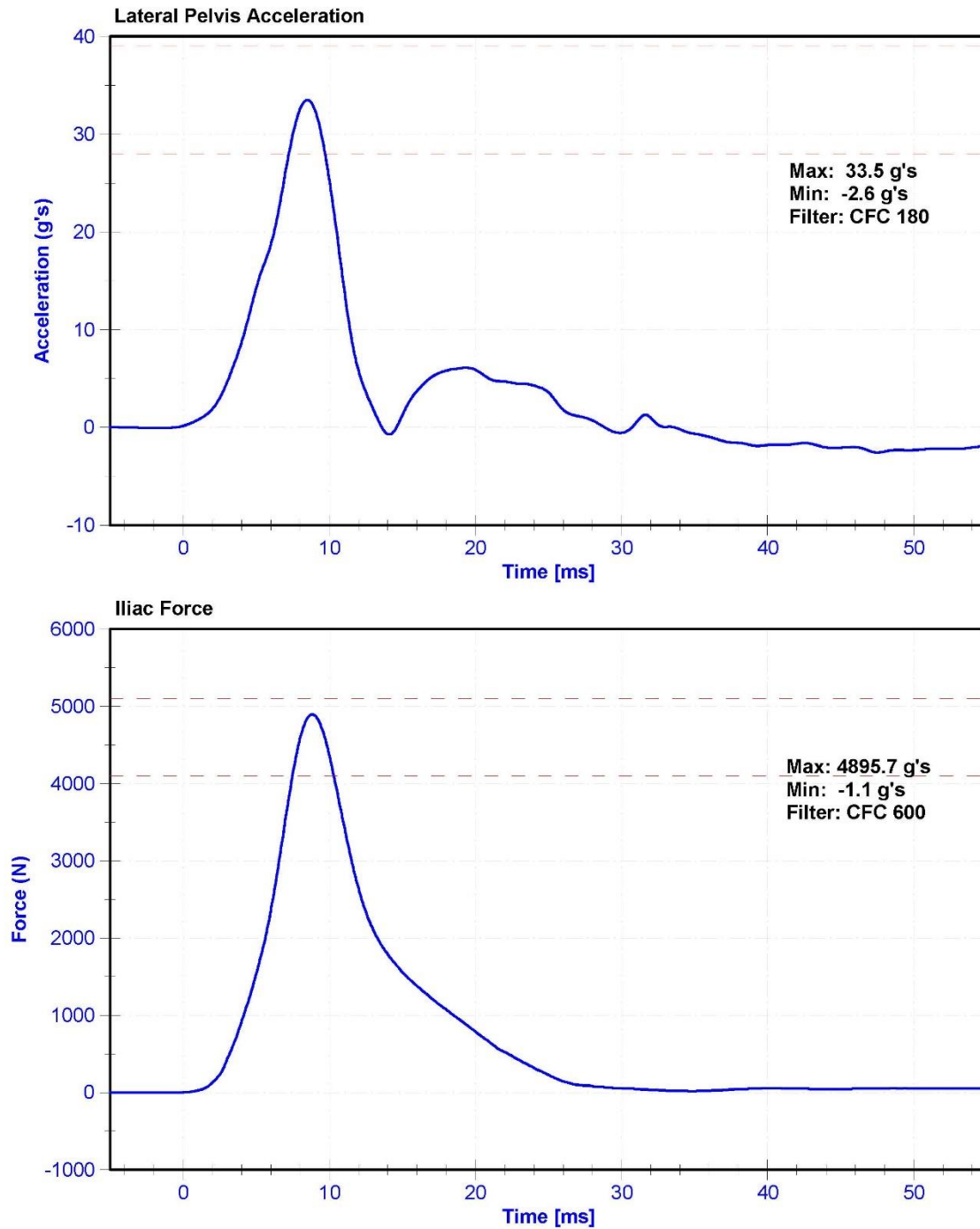
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	28.9	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	36	45	g's	42.3	Pass
Lateral Pelvis Acceleration	28	39	g's	33.5	Pass
Iliac Force	4100	5100	N	4895.7	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	5/2/2017	10/31/2017
Iliac Load Cell	DENTON 3228J	LC-281Fy	5/24/2016	5/24/2017





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	5/1/2017
			Y	AC-P51682	ENDEVCO	5/1/2017
			Z	AC-P51699	ENDEVCO	5/1/2017
		Redundant	X	AC-P51701	ENDEVCO	5/1/2017
			Y	AC-P45019	ENDEVCO	5/1/2017
			Z	AC-P51690	ENDEVCO	5/2/2017
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-008GFE	SERVO	5/3/2017
		Lower	Y	DS-1774GFE	SERVO	6/15/2016
Lower Spine Accelerometers (T12)			X	AC-P74788	ENDEVCO	5/1/2017
			Y	AC-P83319	ENDEVCO	5/1/2017
			Z	AC-P83432	ENDEVCO	5/1/2017
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)				88010	Humanetics	7/22/2015
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-A184932	MSI 1201-1000	4/18/2017
	Vehicle Center of Gravity	Y	AC-A192229	Measurement Specialties 1201-1000	4/18/2017
	Vehicle Center of Gravity	Z	AC-A196978	MSI 1201-1000	4/18/2017
2	Right Sill at Front Seat	X	AC-A197042	MSI 1201-1000	4/17/2017
	Right Sill at Front Seat	Y	AC-A217538	MSI 1201-1000	12/22/2016
	Right Sill at Front Seat	Z	AC-A217543	MSI 1201-1000	11/18/2016
3	Right Sill at Rear Seat	X	AC-A192204	Measurement Specialties 1201-1000	4/17/2017
	Right Sill at Rear Seat	Y	AC-A217558	MSI 1201-1000	12/22/2016
	Right Sill at Rear Seat	Z	AC-A217578	MSI 1201-1000	12/22/2016
4	Left Sill at Front Door	Y	AC-A213654	MSI 1201-1000	4/18/2017
5	Left Sill at Rear Door	Y	AC-A192200	Measurement Specialties 1201-1000	4/17/2017
6	Left A-Post Lower	Y	AC-A197045	MSI 1201-1000	4/18/2017
7	Left A-Post Middle	Y	AC-A156940	MSI 1201	4/18/2017
8	Left B-Post Lower	Y	AC-A192209	Measurement Specialties 1201-1000	4/18/2017
9	Left B-Post Middle	Y	AC-A192221	Measurement Specialties 1201-1000	4/18/2017
10	Front Seat Track	Y	AC-A189610	MSI 1201-1000	1/5/2017
11	Rear Seat Track or Structure	Y	AC-A192201	MSI 1201-1000	11/21/2016
12	Right Rear Occ. Compartment	Y	AC-A197016	MSI 1201-1000	11/21/2016
13	Engine Block	X	AC-A192210	Measurement Specialties 1201-1000	4/17/2017
	Engine Block	Y	AC-A197002	MSI 1201-1000	4/17/2017
14	Rear Floorpan Above Axle	X	AC-A189593	MSI 1201-1000	4/18/2017
	Rear Floorpan Above Axle	Y	AC-A192216	Measurement Specialties 1201-1000	4/18/2017
	Rear Floorpan Above Axle	Z	AC-A206903	MSI 1201-1000	4/18/2017

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	AC-C14901	ENDEVCO	11/9/2016
MDB Center of Gravity	Y	AC-CP30	ENDEVCO	11/9/2016
MDB Center of Gravity	Z	AC-C16680	ENDEVCO	11/9/2016
Left Frame at Rear Axle Centerline	X	AC-C16499	ENDEVCO	11/9/2016
Left Frame at Rear Axle Centerline	Y	AC-AH5M8	ENDEVCO	11/9/2016