

REPORT NUMBER: SINCAP-CAL-16-004

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

**General Motors LLC
2016 Chevrolet Colorado
Crew Cab Pickup Truck**

NHTSA No: M20160102

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



January 25, 2016

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

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Date: January 25, 2016

Approved by: Edward Dutton
Edward Dutton, Test Engineer
Transportation Test Operations

Date: January 25, 2016

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: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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16. Abstract A 55/28, (61.90 kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2016 Chevrolet Colorado Crew Cab Pickup 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 December 14, 2015. The impact velocity of the Moving Deformable Barrier (MDB) was 62.17 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 240mm located at level 1. The test vehicle's occupant performance data is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">53.567</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">26.131</td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">713.617</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">1162.361</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Measurement Description</th> <th colspan="3" style="text-align: center;">Passenger ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">105.309</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td style="text-align: center;">G</td> <td style="text-align: center;">82</td> <td style="text-align: center;">29.954</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">2052.566</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38*</td> <td style="text-align: center;">13.737</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45*</td> <td style="text-align: center;">22.931</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	53.567	Maximum Thoracic Rib Deflection	mm	44	26.131	Total Abdominal Force	N	2500	713.617	Pubic Symphysis Force	N	6000	1162.361	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	105.309	Lower Spine Resultant Acceleration	G	82	29.954	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2052.566	Maximum Thoracic Rib Deflection	mm	38*	13.737	Maximum Abdominal Rib Deflection	mm	45*	22.931
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2016 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 2016 Chevrolet Colorado Crew Cab Pickup . 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 2016 Chevrolet Colorado Crew Cab Pickup 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 62.17 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 December 14, 2015. 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	53.567
Maximum Thorax Rib Deflection	mm	44	26.131
Combined Abdominal Force	N	2500	713.617
Pubic Symphysis Force	N	6000	1162.361

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	105.309
Lower Spine (T12) Resultant Acceleration	G	82	29.954
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2052.566
Maximum Thoracic Rib Deflection	mm	38*	13.737
Maximum Abdominal Rib Deflection	mm	45*	22.931

*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 – 303

Data Anomalies:

- None

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: 2016 Chevrolet Colorado Crew Cab Pickup
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
Test Date: 12/14/2015

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20160102
Model Year	2016
Make	Chevrolet
Model	Colorado
Body Style	Crew Cab Pickup
VIN	1GCGSBEA1G1122621
Body Color	Charcoal Gray
Odometer Reading (km/mi)	128.7 km / 80 mi
Engine Displacement (L)	2.5
Type/No. Cylinders	I4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Rear Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

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

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	08/15
Vehicle Type	Truck

GVWR (kg)	2495
GAWR Front (kg)	1315
GAWR Rear (kg)	1497

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	-	5	
Capacity Weight (VCW) (kg)				665	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				324.8	(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							

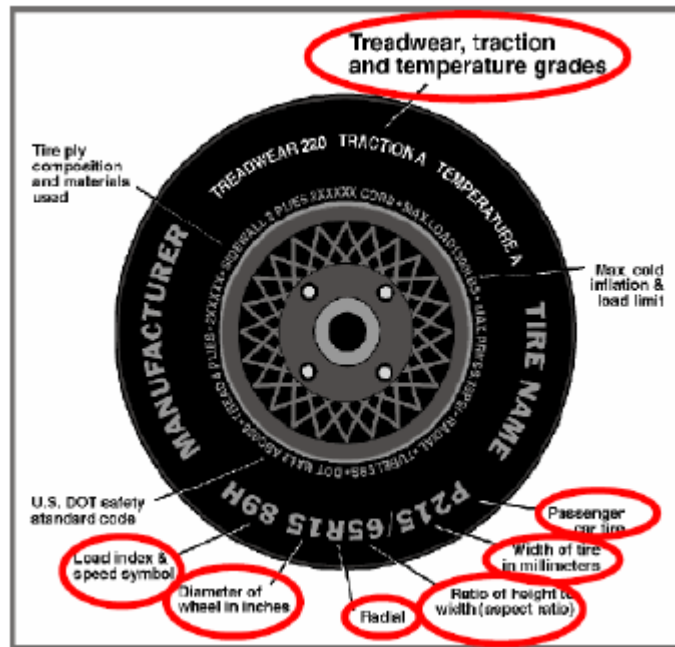
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GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

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)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P265/70R16	P265/70R16
Tire Size on Vehicle	P265/70R16	P265/70R16
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler	Wrangler
Treadwear	All Season	All Season
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel	2 Polyester, 2 Steel
Load Index/Speed Symbol	112T	112T
Tire Material	Rubber	Rubber
DOT Safety Code Left	PJC2JY1R3215	PJC2JY1R3215
DOT Safety Code Right	PJC2JY1R3215	PJC2JY1R3215

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

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	220	216	216	220
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	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	525	423		562	535		575	539	
Right	kg	484	397		485	505		487	495	
Ratio	%	55.2%	44.8%		50%	50%		51%	49%	
Totals	kg	1009	820	1829	1047	1040	2087	1062	1034	2096

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1829	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	129	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2094	(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	860	862	Yes
RF	mm	885	880	Yes
RR	mm	918	917	Yes
LR	mm	895	889	Yes
Vehicle CG (Aft of Front Axle)	mm	1608	1624	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	49.5	40.5	

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

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

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

Test Vehicle:	<u>2016 Chevrolet Colorado Crew Cab Pickup</u>	NHTSA No.:	<u>M20160102</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>12/14/2015</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Jack	5
Passenger Side Windows	10
Ballast / Equipment Added	90

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

Test Vehicle: <u>2016 Chevrolet Colorado Crew Cab Pickup</u>	NHTSA No.: <u>M20160102</u>	
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>12/14/2015</u>	

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	19.3	13.9	16.6
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	16.6	7	Max	55	62	69
			Mid	26	33	40
			Min	0	7	14
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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

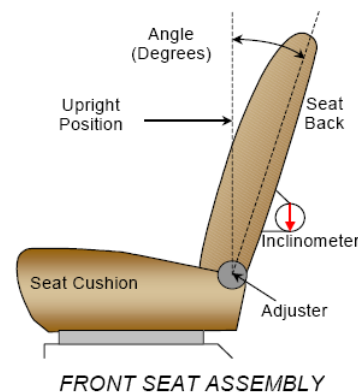
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	235	N/A	117.5	N/A
Front Passenger Seat	235	N/A	117.5	N/A
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	-33.6 to 42.2	N/A	2.3	N/A
Front Passenger Seat	-36.1 to 41.8	N/A	3.2	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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

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

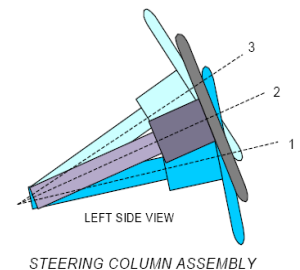
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	7 (0-6)	0 - Uppermost
Rear Seat	FIXED	FIXED

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.

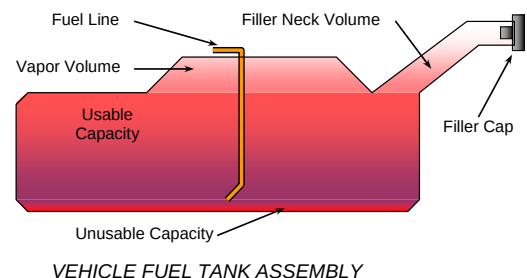
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	21.2	
Geometric Center – Position 2	22.9	
Uppermost – Position 3	24.7	
Telescoping Steering Wheel Travel		N/A
Test Position	22.9	N/A



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: 2016 Chevrolet Colorado Crew Cab Pickup
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
Test Date: 12/14/2015

FUEL TANK CAPACITY

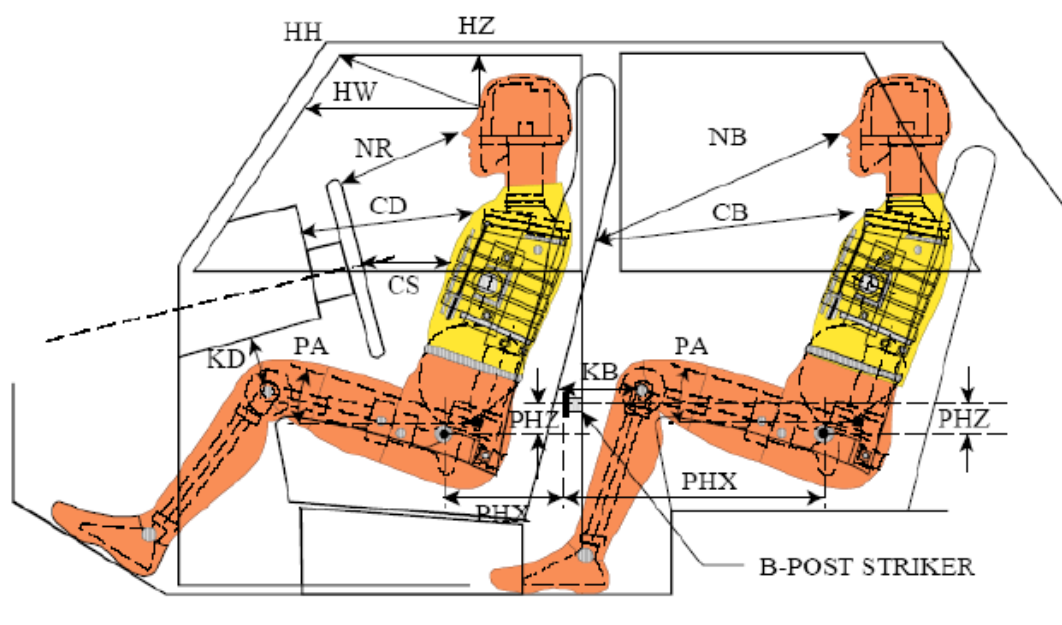
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	80
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank (see Owner's Manual)	80
Usable Capacity of Optional Tank (see Owner's Manual)	
93% of Usable Capacity	74.4
Actual Amount of Solvent Used in Test	74.4
1/3 of Usable Capacity	26.7

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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



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

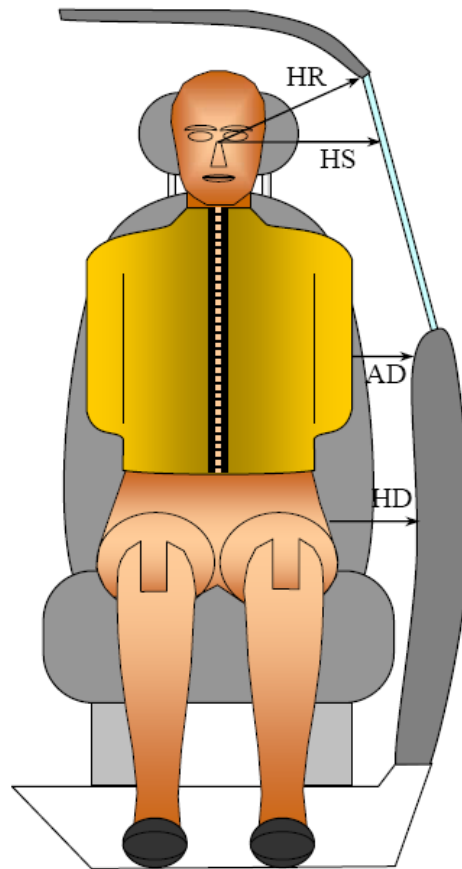
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No. 303)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	490			
HW		Header to Windshield	731			
HZ	HZ	Head to Roof Liner	235		277	
NR	NB	Nose to Rim/Seat Back	474		473	
CD	CB	Chest to Dash/Seat Back	614		452	
CS		Chest to Steering Wheel	394			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	207	23.1	192	17.7
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	205	19.7	187	17.2
PAX°	PAX°	Pelvic Tilt Angle X		22.7		19.0
	PAY°	Pelvic Tilt Angle Y				0.4
PHX	PHX	Hip Point to Striker (X-Axis)	183		208	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	111		46	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



FRONT VIEW OF DUMMY

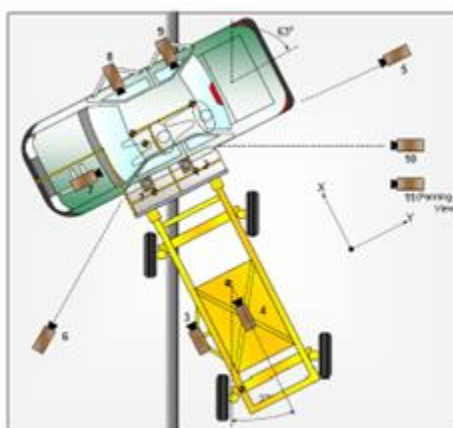
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 303)
HR	Head to Side Header	mm	230	258
HS	Head to Side Window	mm	350	370
AD	Arm to Door	mm	121	142
HD	Hip Point to Door	mm	160	148

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

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	99	839	-5326	14	1000
2	Overhead Close-up	593	839	-5326	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	8	1000
5	Rear	0	10011	-1197	24	1000
6	Left Front	-3241	-4826	-1182	24	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

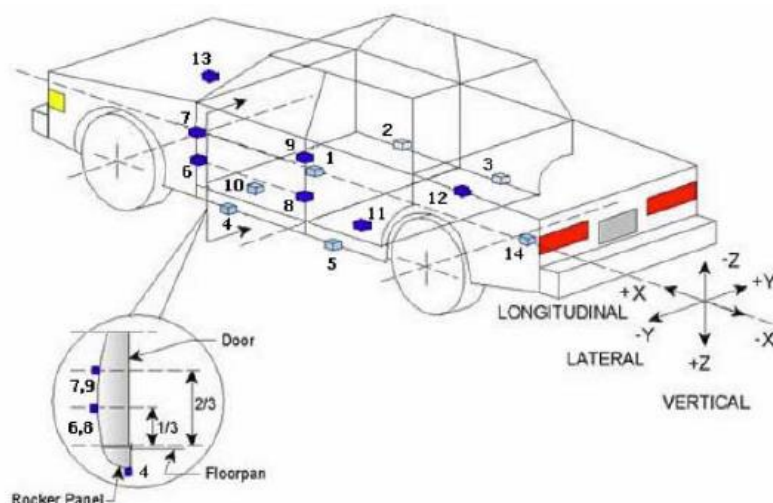
INSTRUMENTATION

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: 2016 Chevrolet Colorado Crew Cab Pickup
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
Test Date: 12/14/2015



TEST VEHICLE ACCELEROMETER LOCATIONS

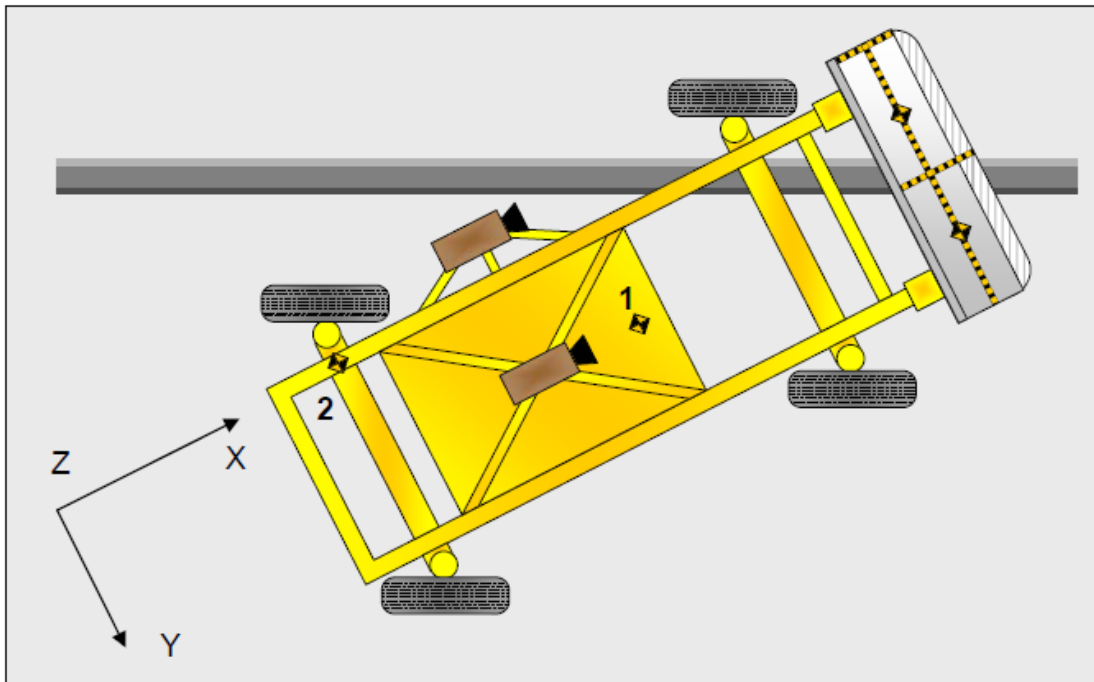
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3137	-2	-262
2	Right Sill at Front Seat	3482	670	-12
3	Right Sill at Rear Seat	2535	669	-41
4	Left Sill at Front Door	3484	-667	2
5	Left Sill at Rear Door	2533	-669	-32
6	A-Post Lower	3807	-670	-250
7	A-Post Middle	3873	-667	-745
8	B-Post Lower	2788	-684	-255
9	B-Post Middle	2775	-687	-492
10	Front Seat Track	3023	-567	-53
11	Rear Seat Structure	1966	-578	-193
12	Rt. Rear Occ. Compartment	2718	404	-5
13	Engine Block	4454	-131	-459
14	Rear Above Axle	758	1	-275

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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



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: 2016 Chevrolet Colorado Crew Cab Pickup
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
Test Date: 12/14/2015

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 Headliner	Side Headliner & Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Curtain Airbag, Side Headliner, Headrest	Curtain Airbag
Left Shoulder	None	Passenger Door
Upper Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Lower Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Left Hip	Torso/Pelvis Airbag	Passenger Door
Left Knee	None	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	No
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	Full Open
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	Yes
Disengaged from Latched Position	No	No	No	No	Yes
Latch Separated from Striker	No	No	No	No	Yes
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	0	0	0	0	Full Open

*Tailgate opened during impact but is still operational.

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

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		3260
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		523
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-15
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-10

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
Test Date: 12/14/2015

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	62.17
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	62.19
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

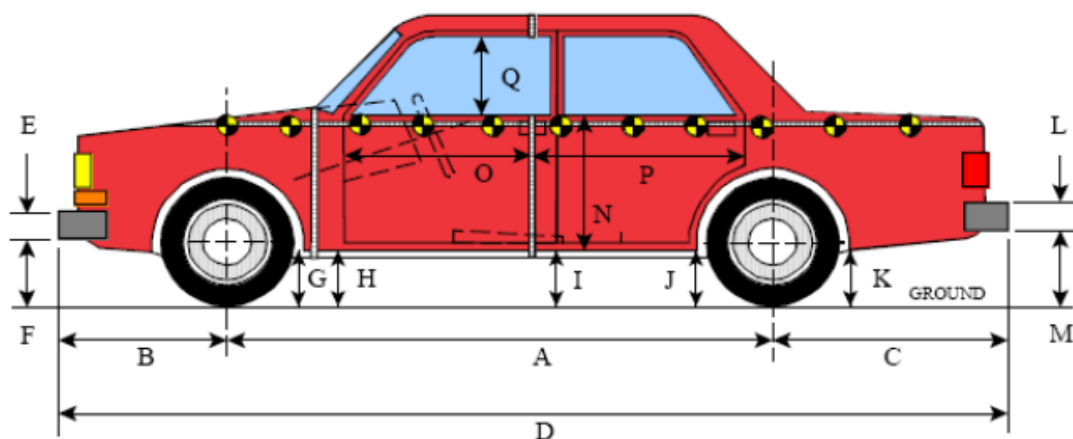
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	255
B	Top of Bumper	533	800	Left	173
C	Mid-Level	686	800	Left	110
D	Top of Stack	813	800	Left	136

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



LEFT SIDE VIEW

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

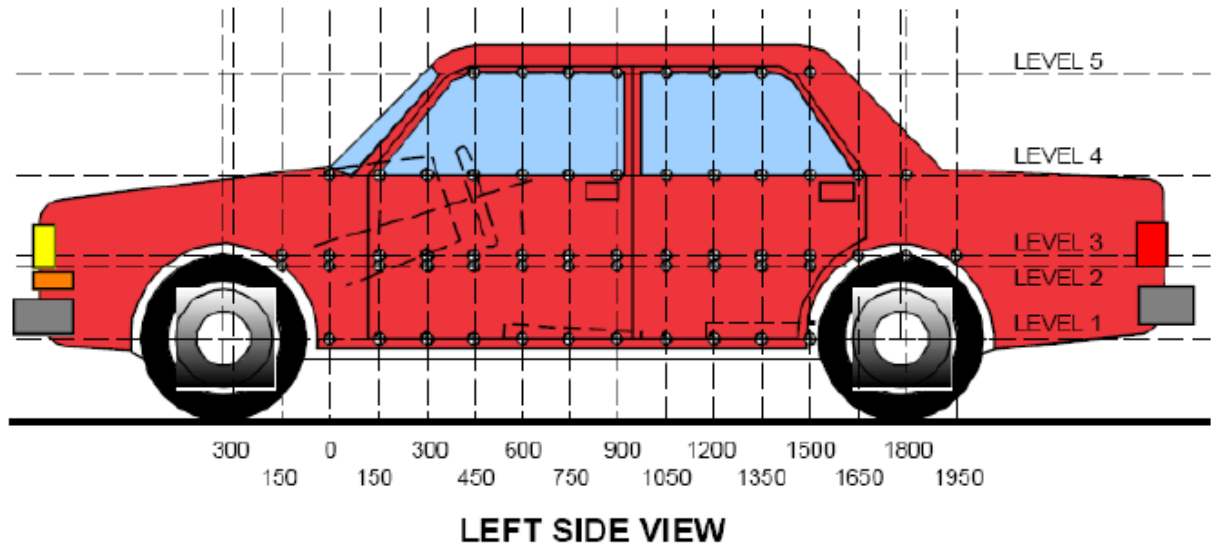
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3260	3243	-18
B	Front Axle to FSOV	950	1017	67
C	Rear Axle to RSOV	1186	1127	-59
D	Total Length at Centerline	5393	5383	-10
E	Front Bumper Thickness	160	160	0
F	Front Bumper Bottom to Ground	502	498	-4
G	Sill Height at Front Wheel Well	382	373	-9
H	Sill Height at Front Door Leading Edge	389	388	-1
I	Sill Height at B Pillar	405	401	-4
J1	Sill Height at Rear Wheel Well	290	293	3
J2	Pinch Weld Height at Rear Wheel Well	373	370	-3
K	Sill Height Aft of Rear Wheel Well	442	473	31
L	Rear Bumper Thickness	220	220	0
M	Rear Bumper Bottom to Ground	461	464	3
N	Sill Height to Window Bottom of Front Window Sill	803	825	22
O	Front Door Leading Edge to Impact CL	779	779	0
P	Rear Door Trailing Edge to Impact CL	1250	1225	-25
Q	Front Window Opening	507	505	-3
R	Right Side Length	5346	5339	-7
S	Left Side Length	5351	5331	-20
T	Maximum Vehicle Width	1757	1686	-70

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	475	240	1800
2	Driver Hip Point	mm	805	191	1650
3	Mid-Door	mm	877	183	1650
4	Window Sill	mm	1168	107	1500
5	Window Top	mm	1737	65	1950

*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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

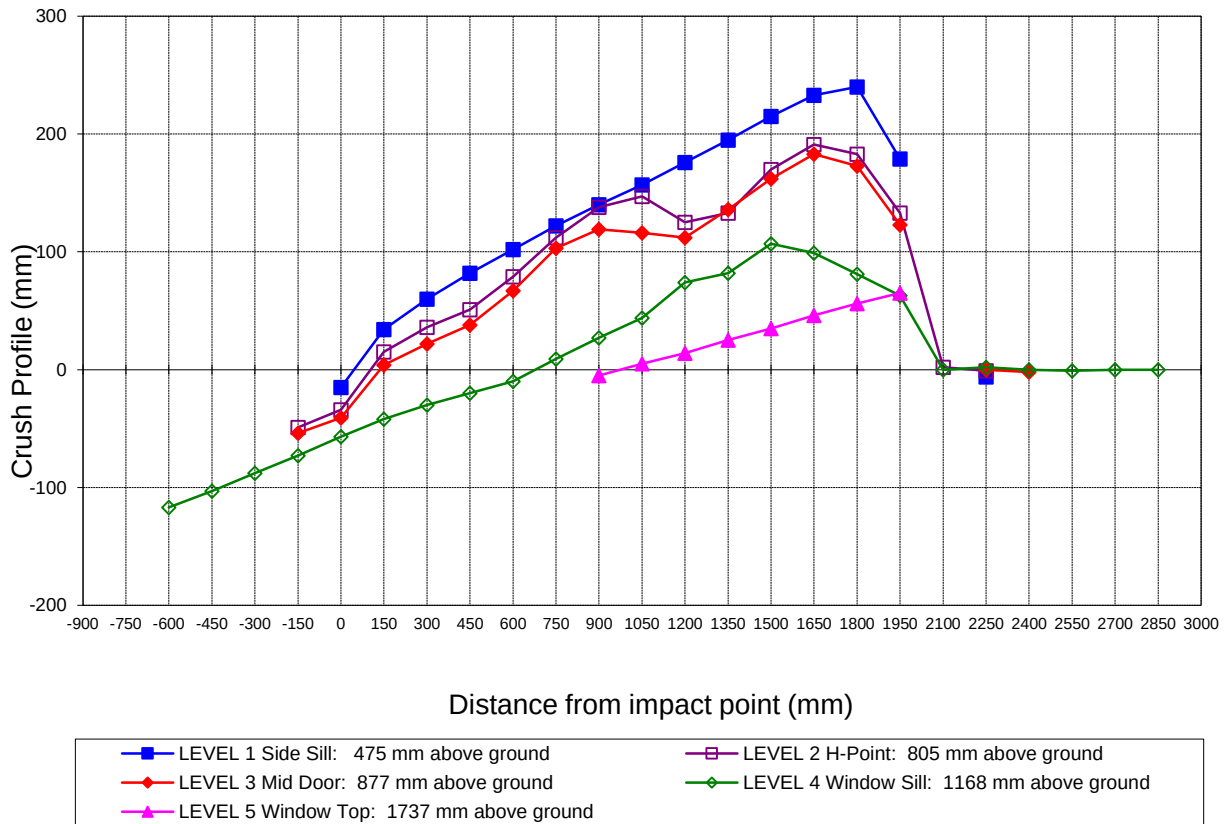
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600				804					921					-117	
-450				814					917					-103	
-300				822					910					-88	
-150		954	952	829			1003	1006	902			-49	-54	-73	
0	892	898	898	836		907	932	933	893		-15	-34	-35	-57	
150	841	873	875	828		807	858	871	870		34	15	4	-42	
300	845	874	877	836		785	838	855	866		60	36	22	-30	
450	847	875	878	845		765	824	840	865		82	51	38	-20	
600	847	875	878	851		745	796	811	861		102	79	67	-10	
750	846	875	878	856		724	763	775	847		122	112	103	9	
900	844	874	878	859	515	704	736	759	832	520	140	138	119	27	-5
1050	843	874	878	861	619	686	727	762	817	614	157	147	116	44	5
1200	843	873	877	863	628	667	748	765	789	614	176	125	112	74	14
1350	842	871	875	863	633	647	738	739	781	608	195	133	136	82	25
1500	841	869	873	863	635	626	699	711	756	600	215	170	162	107	35
1650	841	866	871	863	636	608	675	688	764	590	233	191	183	99	46
1800	841	864	868	859	635	601	681	695	778	579	240	183	173	81	56
1950	841	861	865	861	626	662	728	742	798	561	179	133	123	63	65
2100		854		860			852					2			
2250	895	897	889	858		901	898	889	856		-6	-1	0	2	
2400			952	860				954	860				-2	0	
2550				862					863					-1	
2700				864					864					0	
2850				865					865					0	
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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

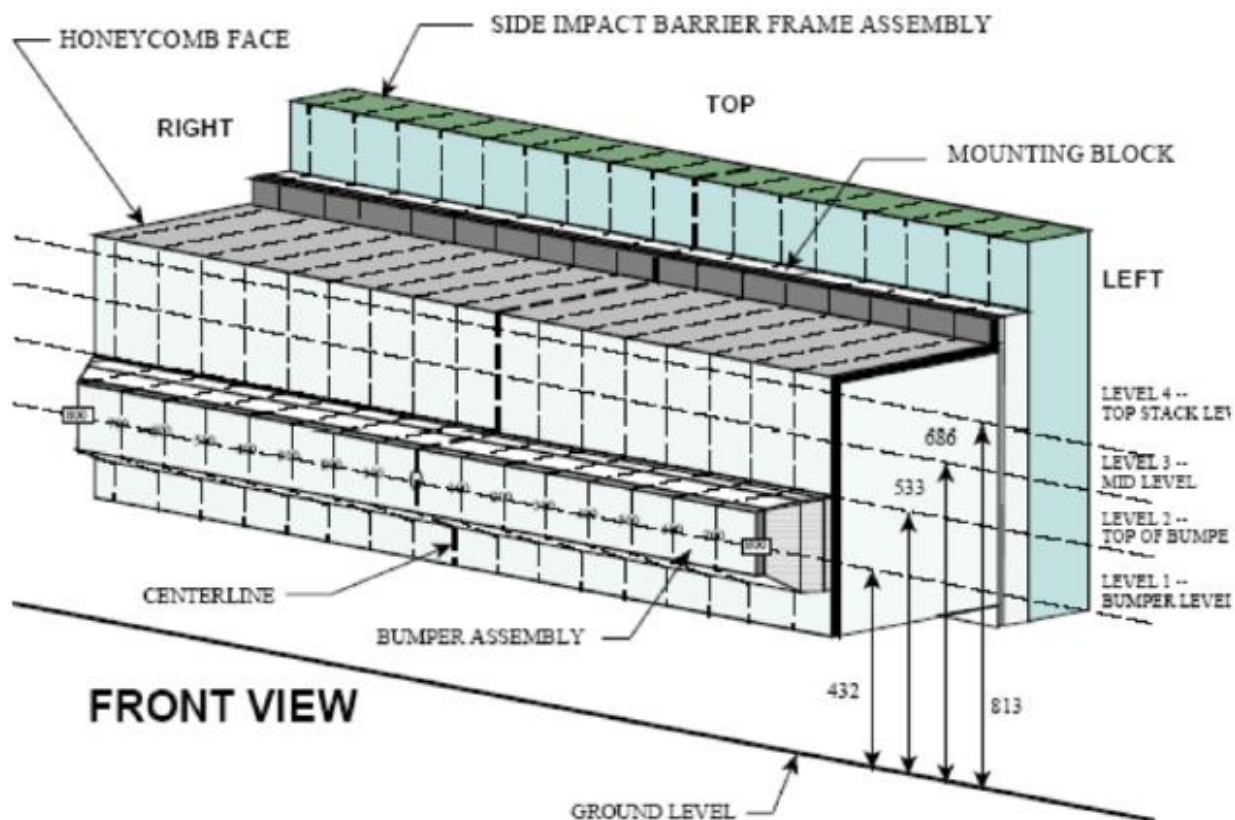


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

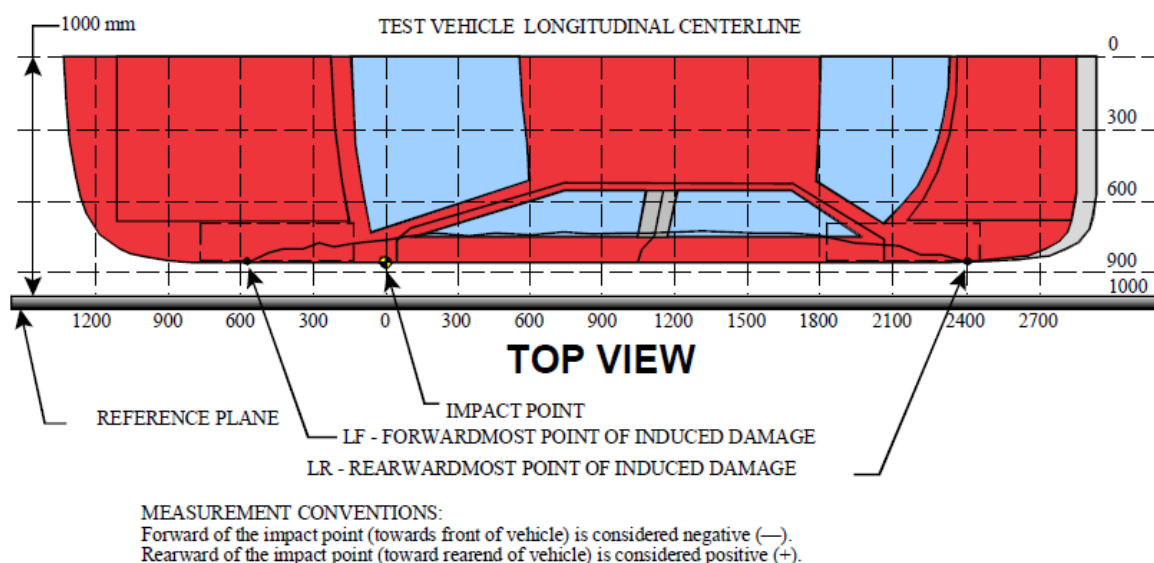
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	127	88	93	100	107	114	121	130	137	144	151	158	166	173	182	194	255
2	88	95	101	87	71	60	67	75	89	104	119	136	149	163	164	166	173
3	111	77	43	20	27	40	58	40	52	48	51	57	63	69	78	91	110
4	129	88	67	64	68	80	102	80	58	65	75	86	94	105	112	125	136

DATA SHEET NO. 13
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015

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	98	171	-73
2	270	3	211	156	55
3	690	3	268	154	114
4	1110	3	322	157	165
5	1530	3	378	159	219
6	1950	3	338	159	179

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	255
2	480 mm left of center	1	172
3	160 mm left of center	1	148
4	160 mm right of center	1	126
5	480 mm right of center	1	105
6	800 mm right of center	1	127

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

Test Vehicle: <u>2016 Chevrolet Colorado Crew Cab Pickup</u>	NHTSA No.: <u>M20160102</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>12/14/2015</u>
Test Time: <u>12:44 PM</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°	74	300	374
90° to 180°	65	300	365
180° to 270°	64	300	364
270° to 360°	65	300	365

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	

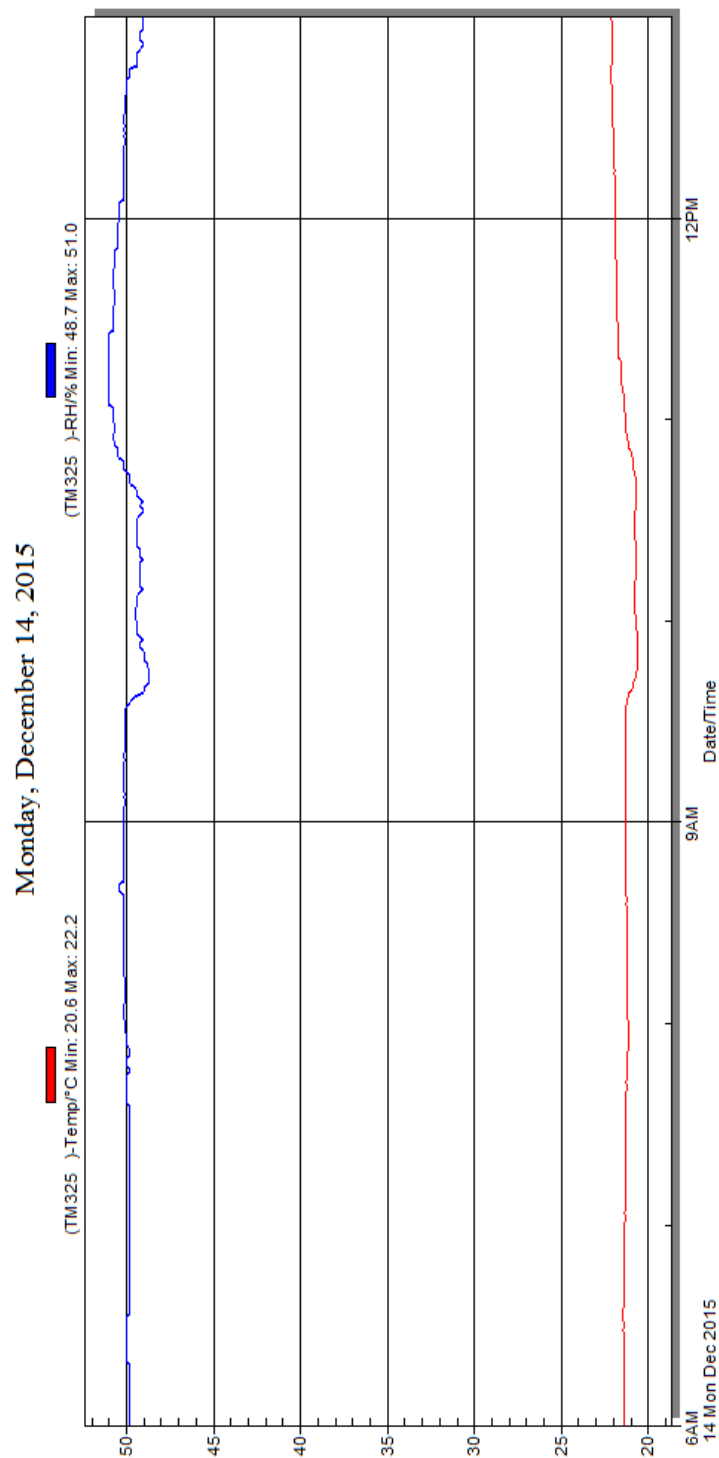
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2016 Chevrolet Colorado Crew Cab Pickup
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20160102
 Test Date: 12/14/2015



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

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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2	As-Delivered Left Rear 3/4 View of Test Vehicle	A-5
3	Pre-Test Frontal View of Test Vehicle	A-6
4	Post-Test Frontal View of Test Vehicle	A-6
5	Pre-Test Left Front 3/4 View of Test Vehicle	A-7
6	Post-Test Left Front 3/4 View of Test Vehicle	A-7
7	Pre-Test Left Side View of Test Vehicle	A-8
8	Post-Test Left Side View of Test Vehicle	A-8
9	Pre-Test Left Rear 3/4 View of Test Vehicle	A-9
10	Post-Test Left Rear 3/4 View of Test Vehicle	A-9
11	Pre-Test Rear View of Test Vehicle	A-10
12	Post-Test Rear Side View of Test Vehicle	A-10
13	Pre-Test Right Side View of Test Vehicle	A-11
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15	Pre-Test Overhead View of Test Area	A-12
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17	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-13
18	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-13
19	Pre-Test Close-Up View of Impact Point Target	A-14
20	Post-Test Close-up View of Impact Point Target	A-14
21	Pre-Test Left Front Door Latch Close-Up	A-15
22	Post-Test Left Front Door Latch Close-Up	A-15
23	Pre-Test Left Rear Door Latch Close-Up	A-16
24	Post-Test Left Rear Door Latch Close-Up	A-16
25	Pre-Test Front Close-up View of Driver Dummy	A-17
26	Post-Test Front Close-up View of Driver Dummy	A-17
27	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-18
28	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-18
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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

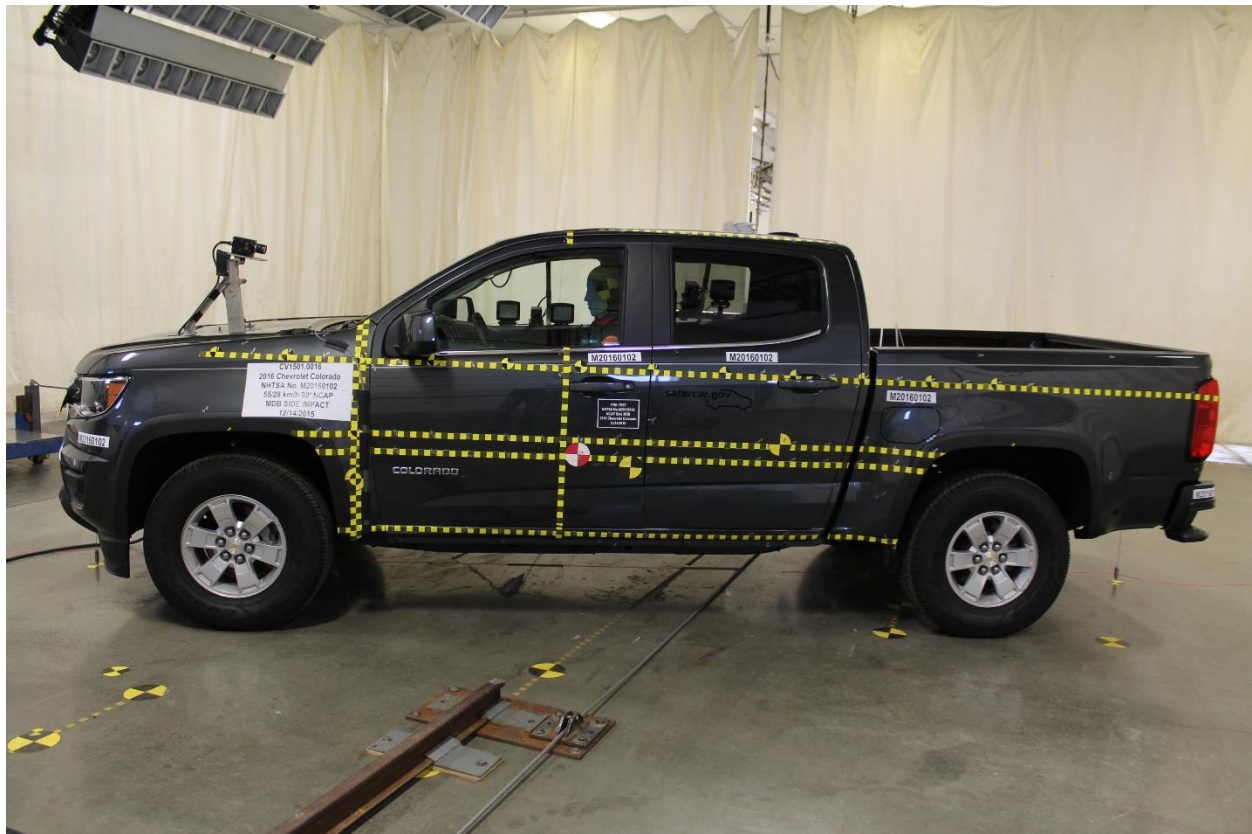


Figure A-7: Pre-Test Left Side View of Test Vehicle



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

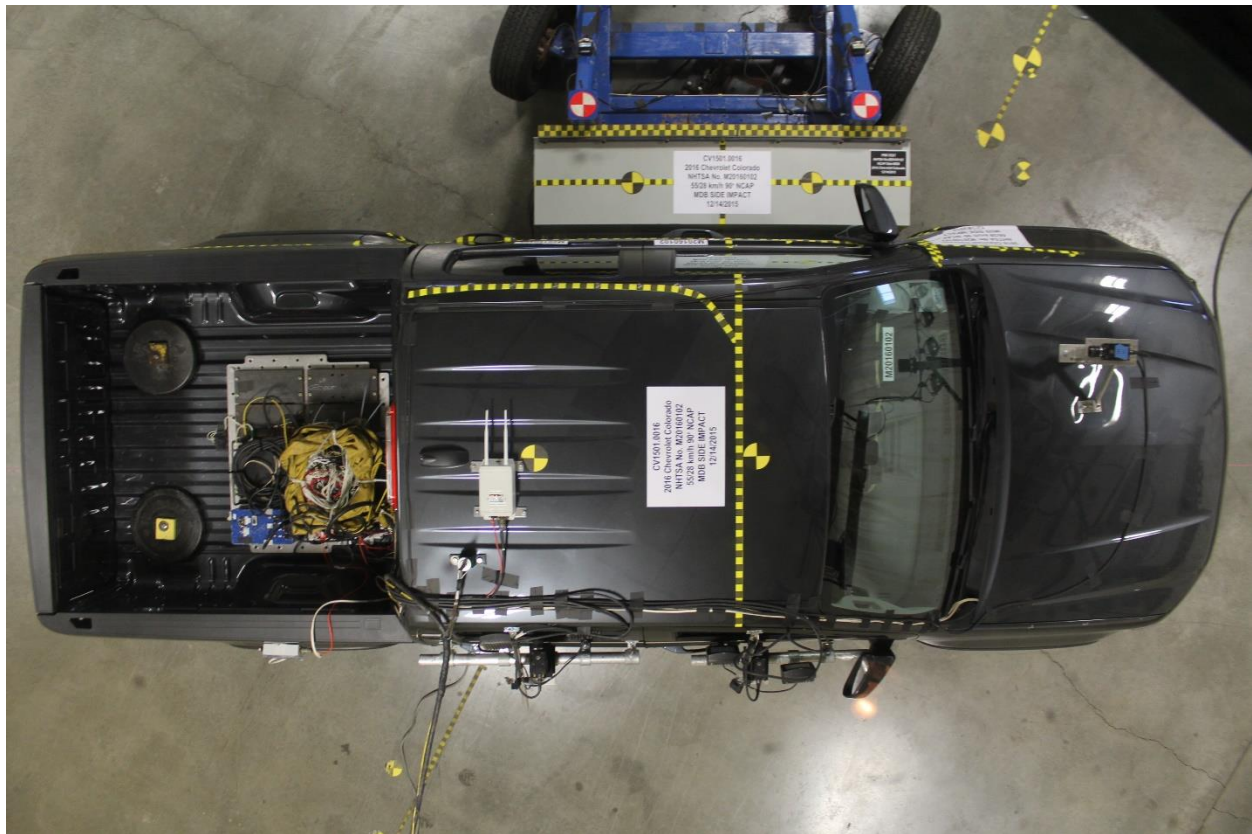


Figure A-15: Pre-Test Overhead View of the Test Area

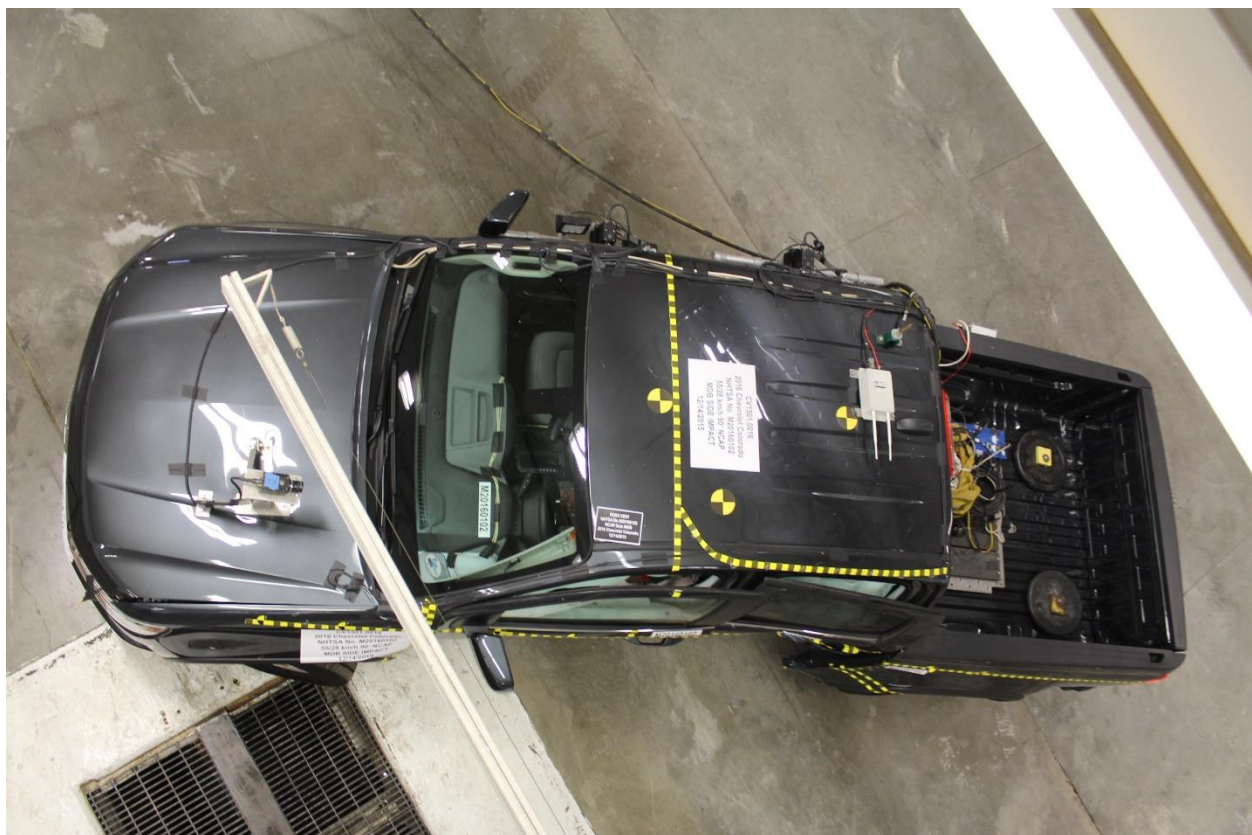


Figure A-16: Post-Test Overhead View of Test Area

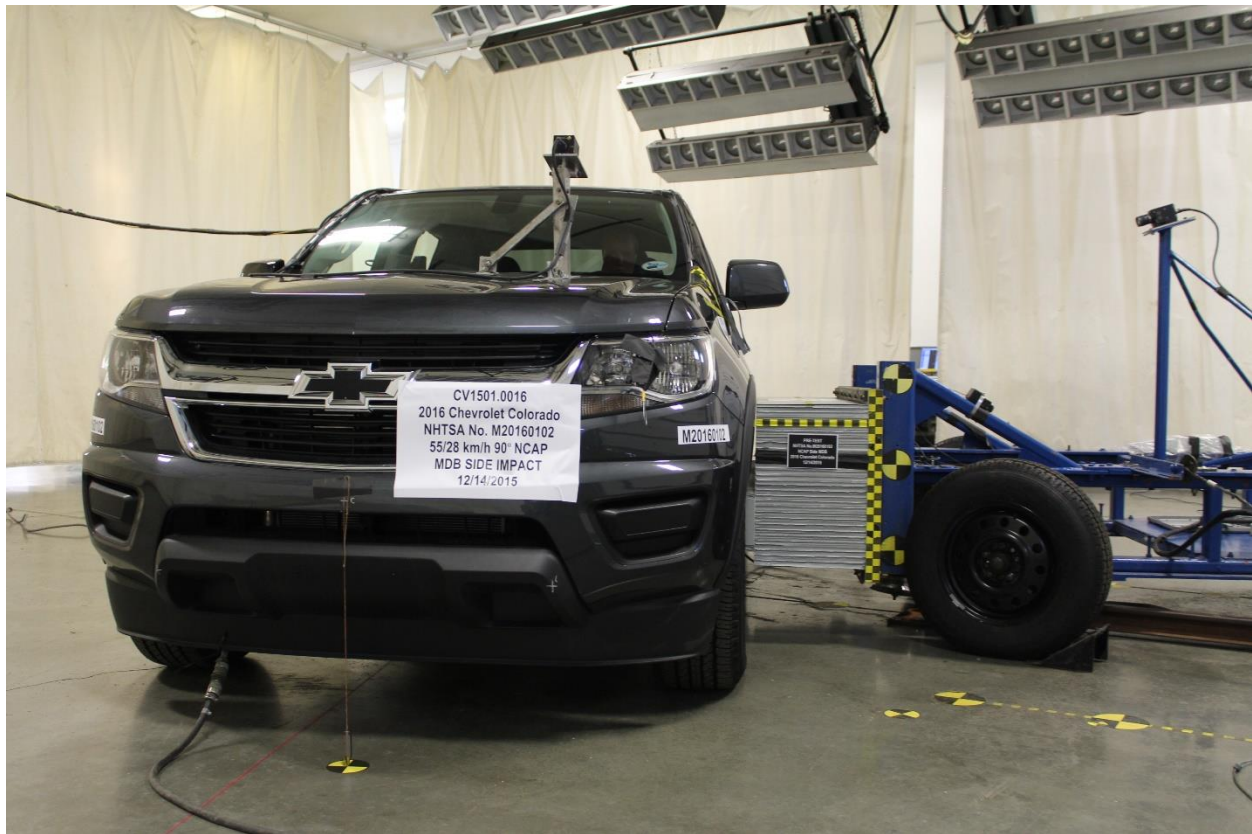


Figure A-17: Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



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

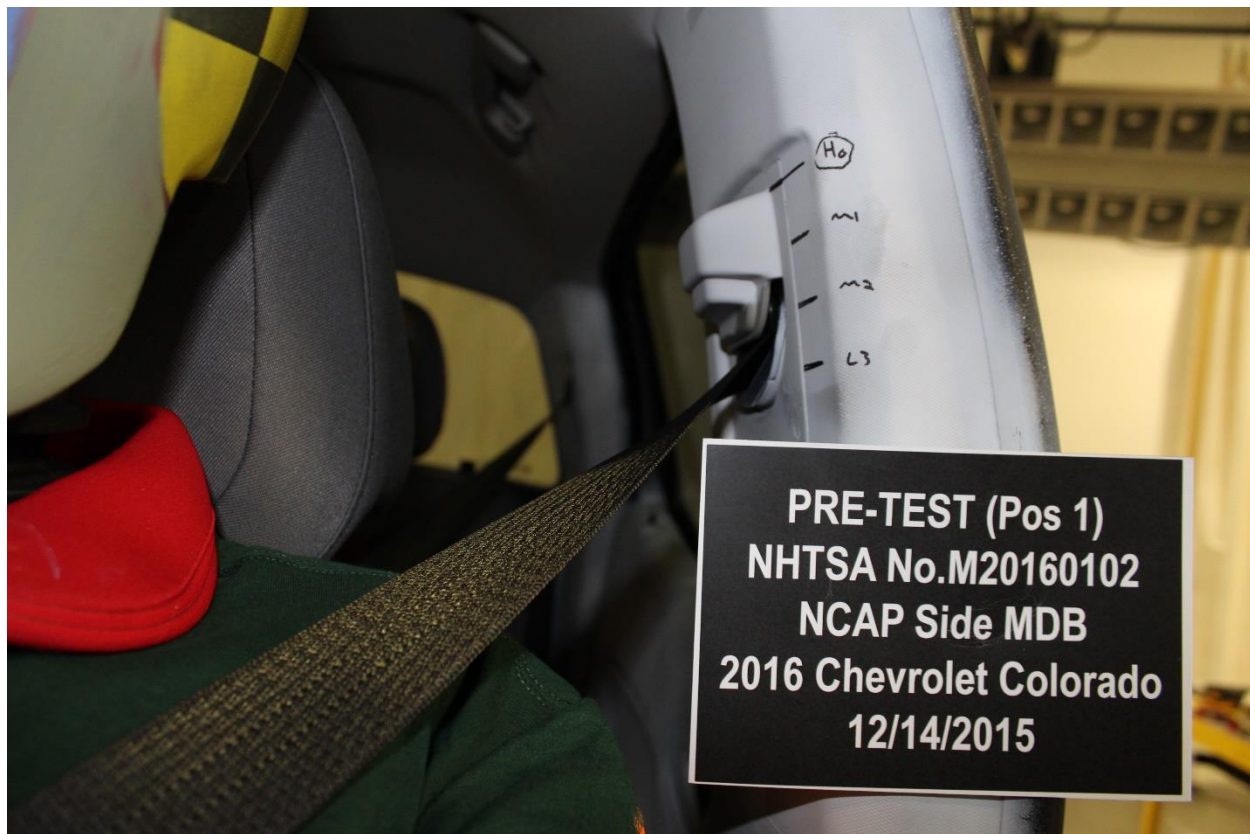


Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy



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

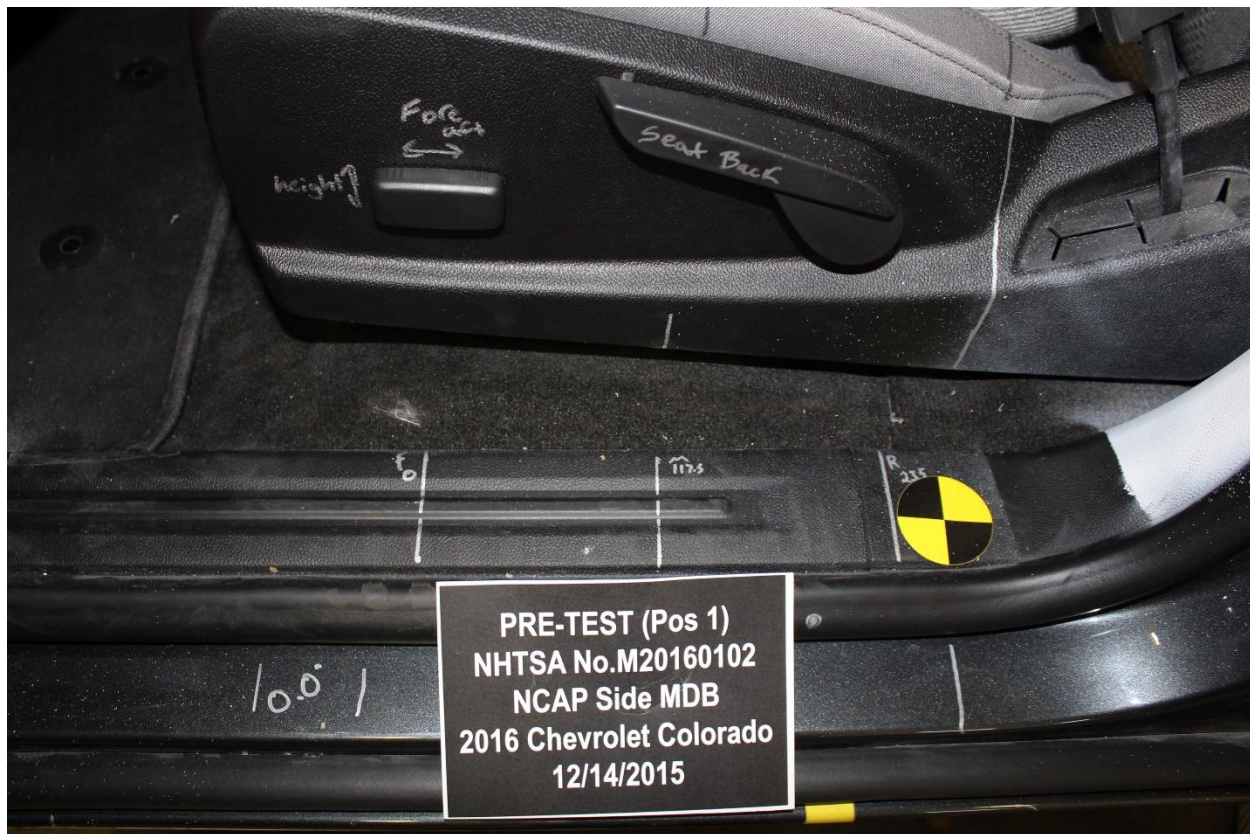


Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track



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

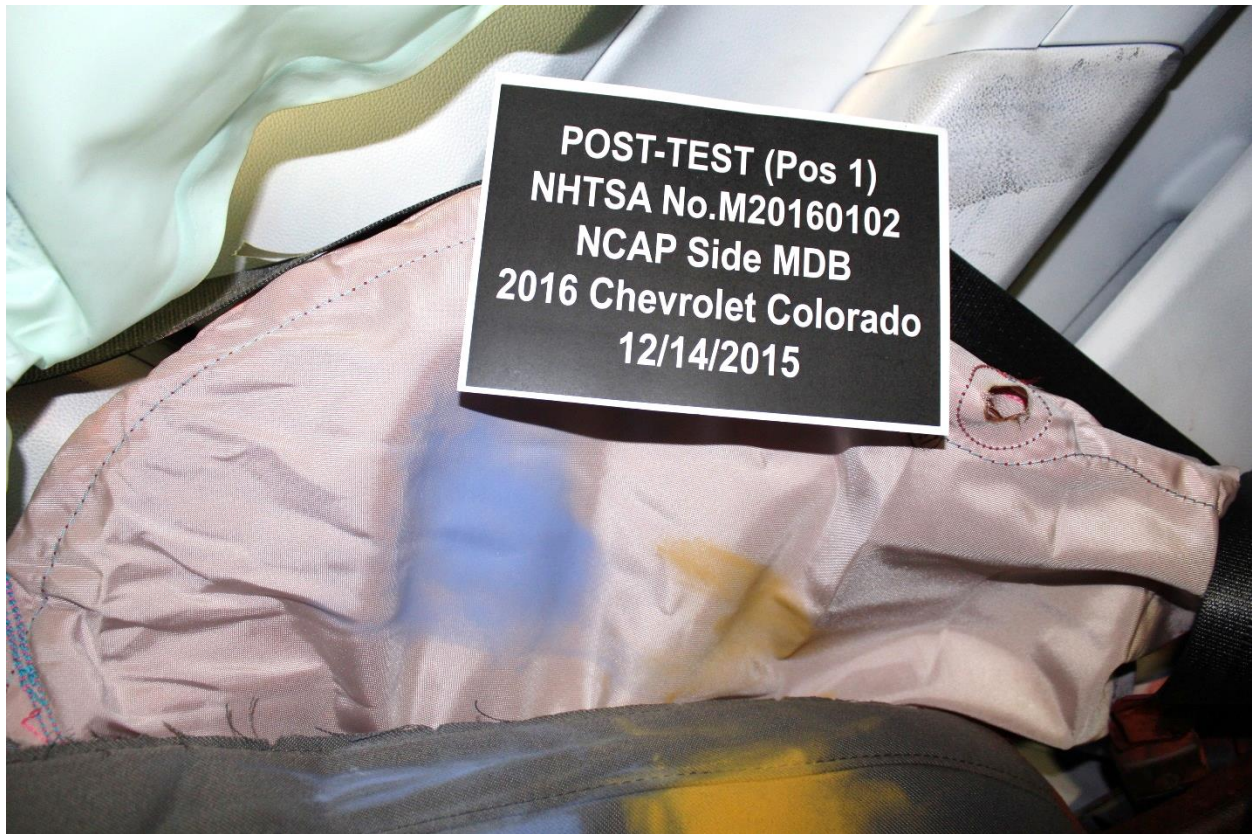


Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



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

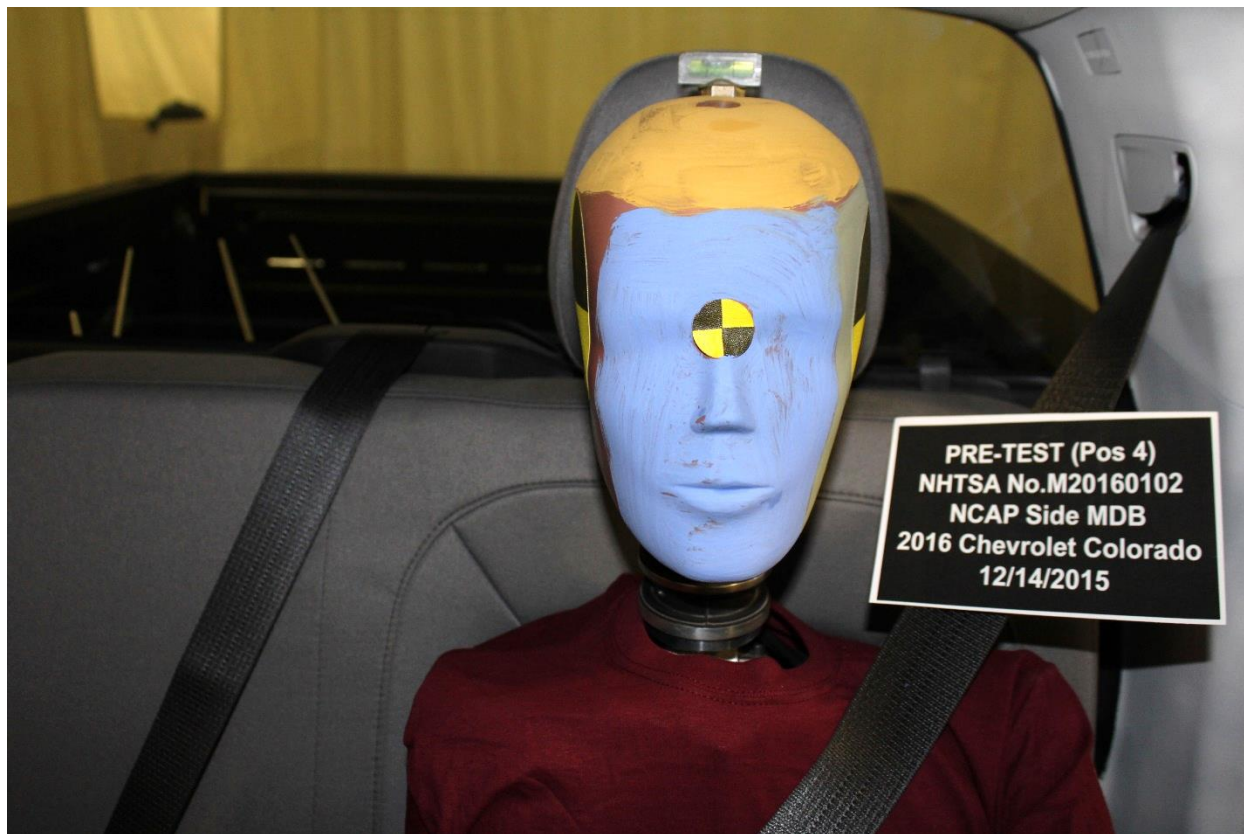


Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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

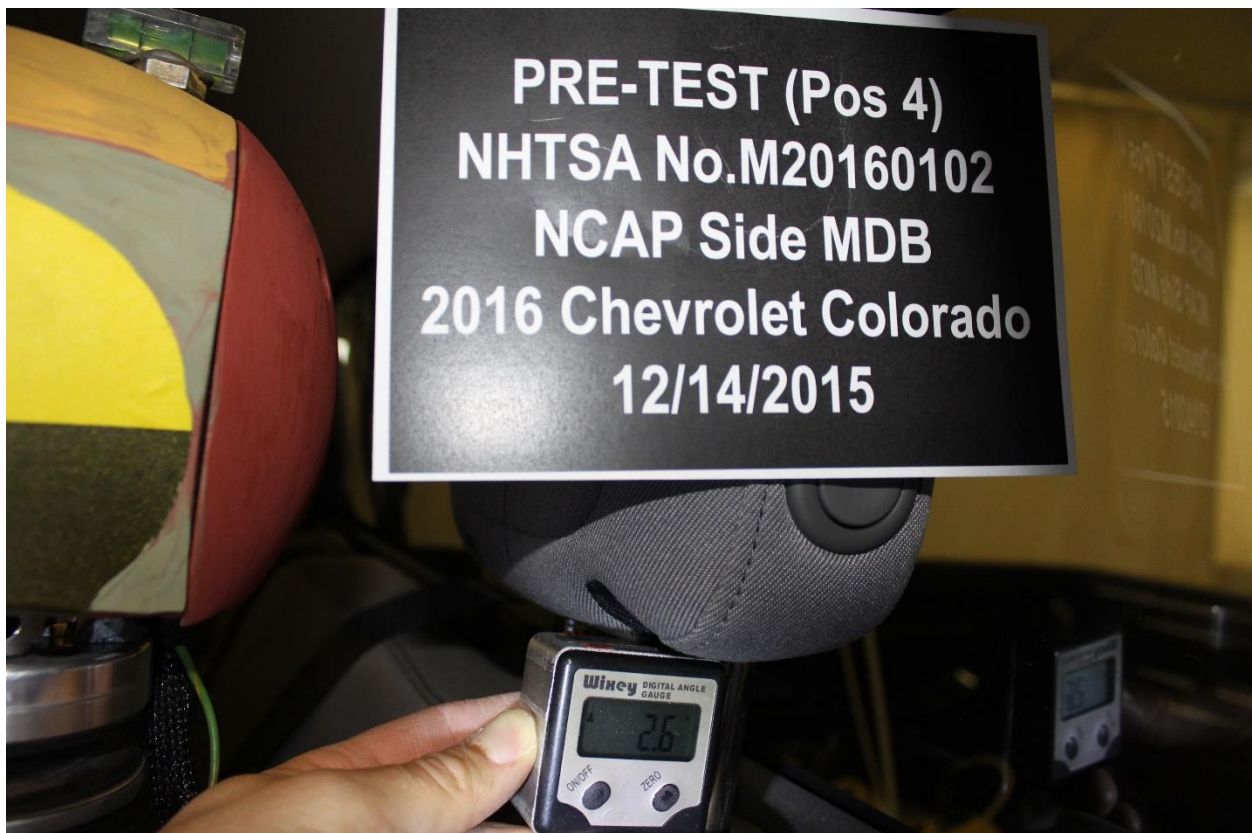


Figure A-68: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



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

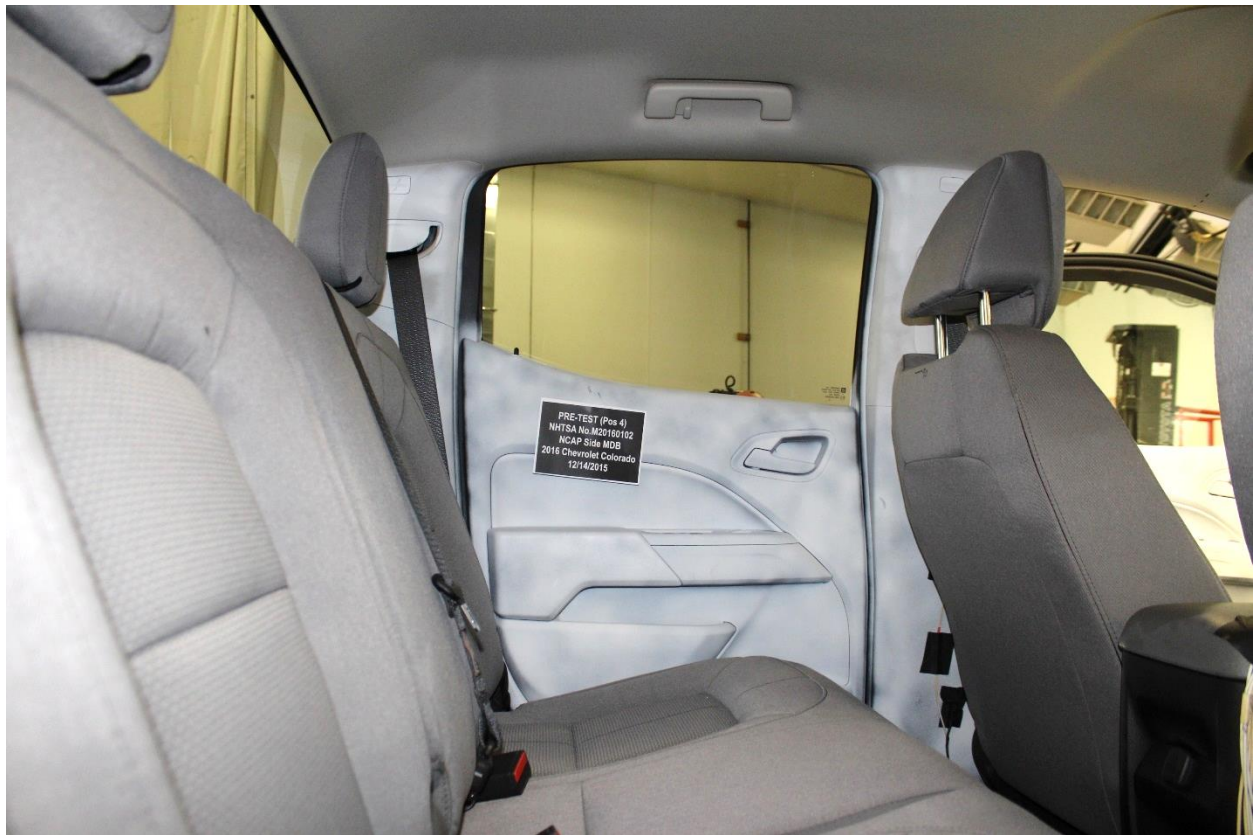


Figure A-73: Pre-Test Passenger Inner Door Panel View



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

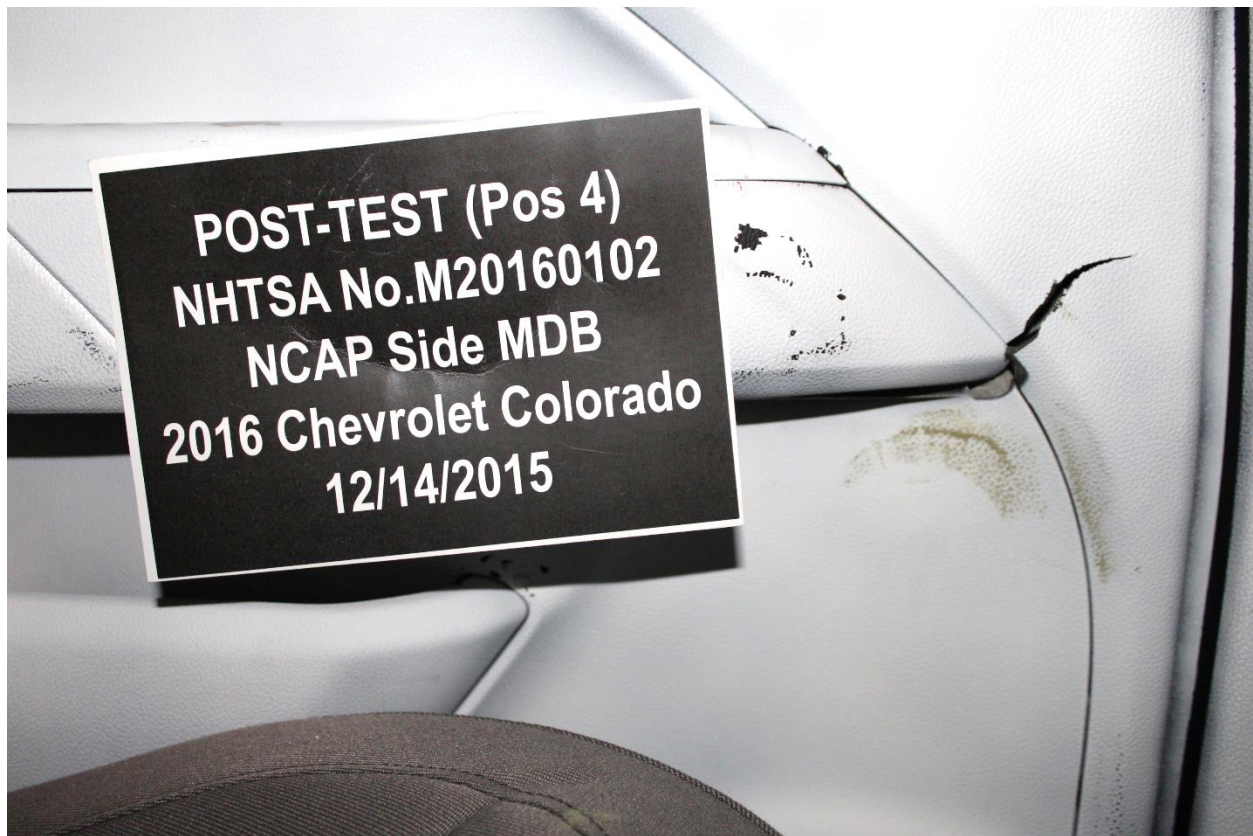


Figure A-81: Post-Test Rear Passenger Dummy Close-Up Knee Contact View



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

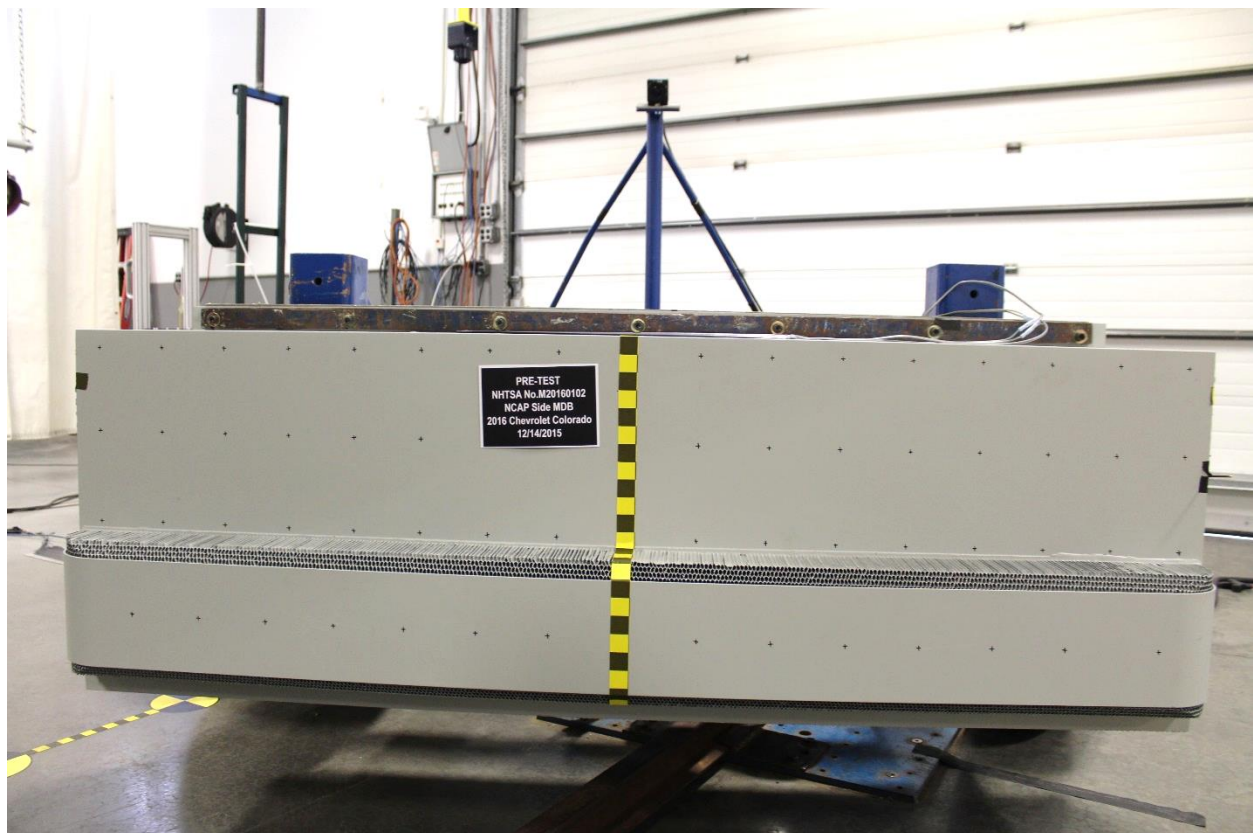


Figure A-84: Pre-Test Front View of MDB Impactor Face



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

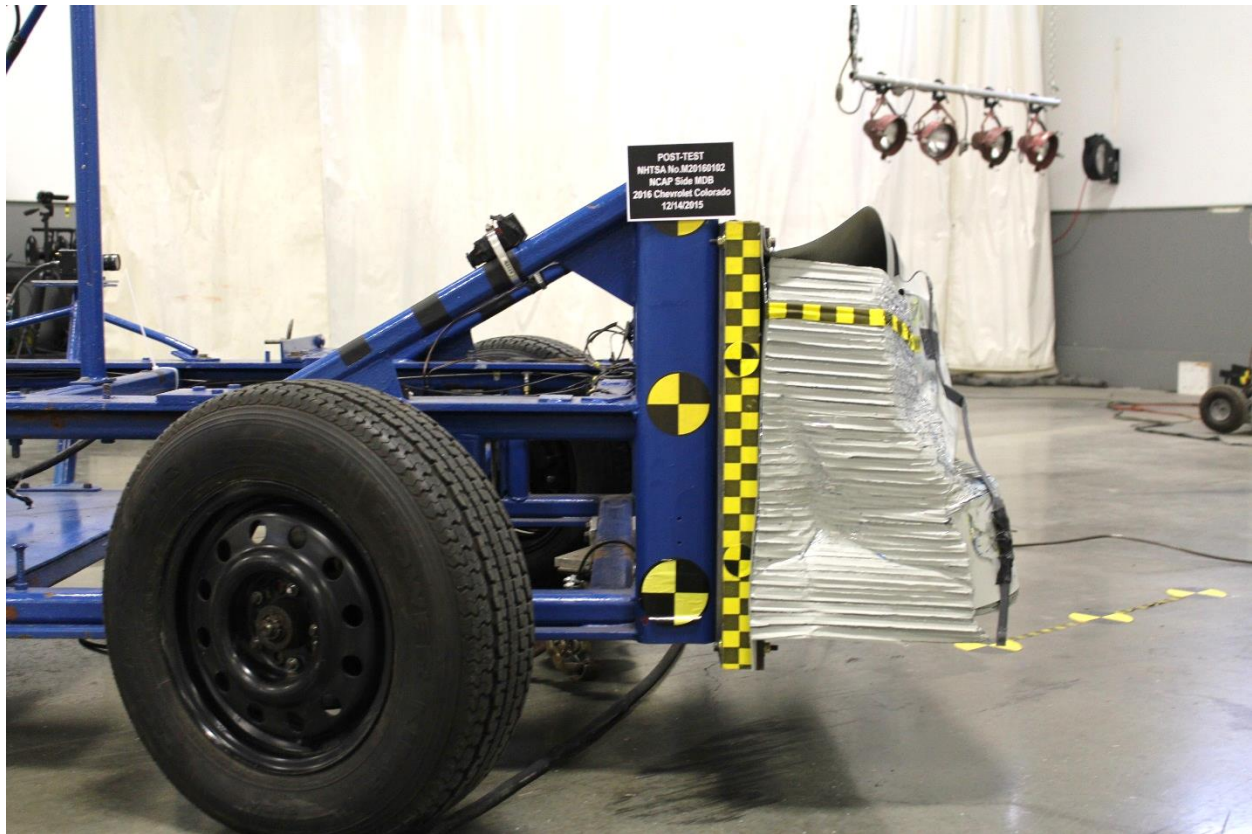


Figure A-91: Post-Test Right Side View of MDB Impactor Face

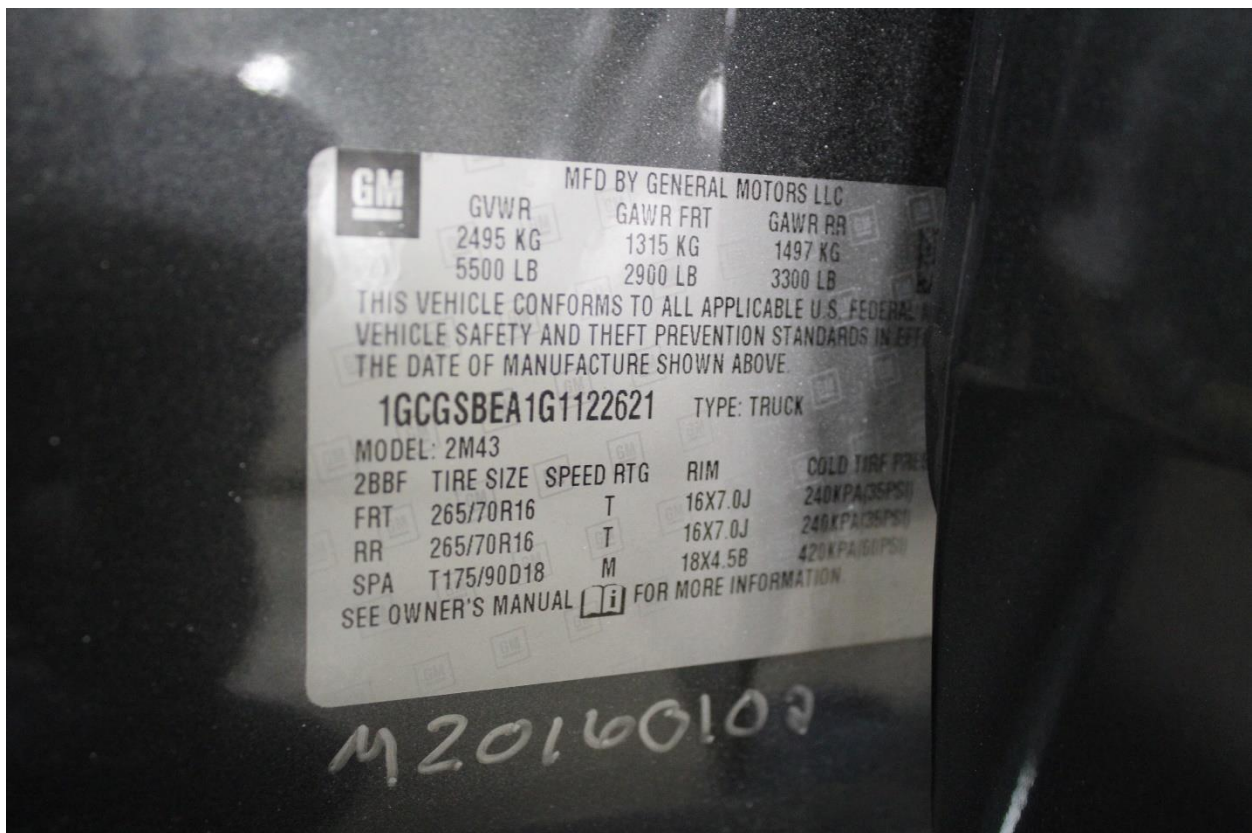


Figure A-92: Close-Up View of Vehicle's Certification Label

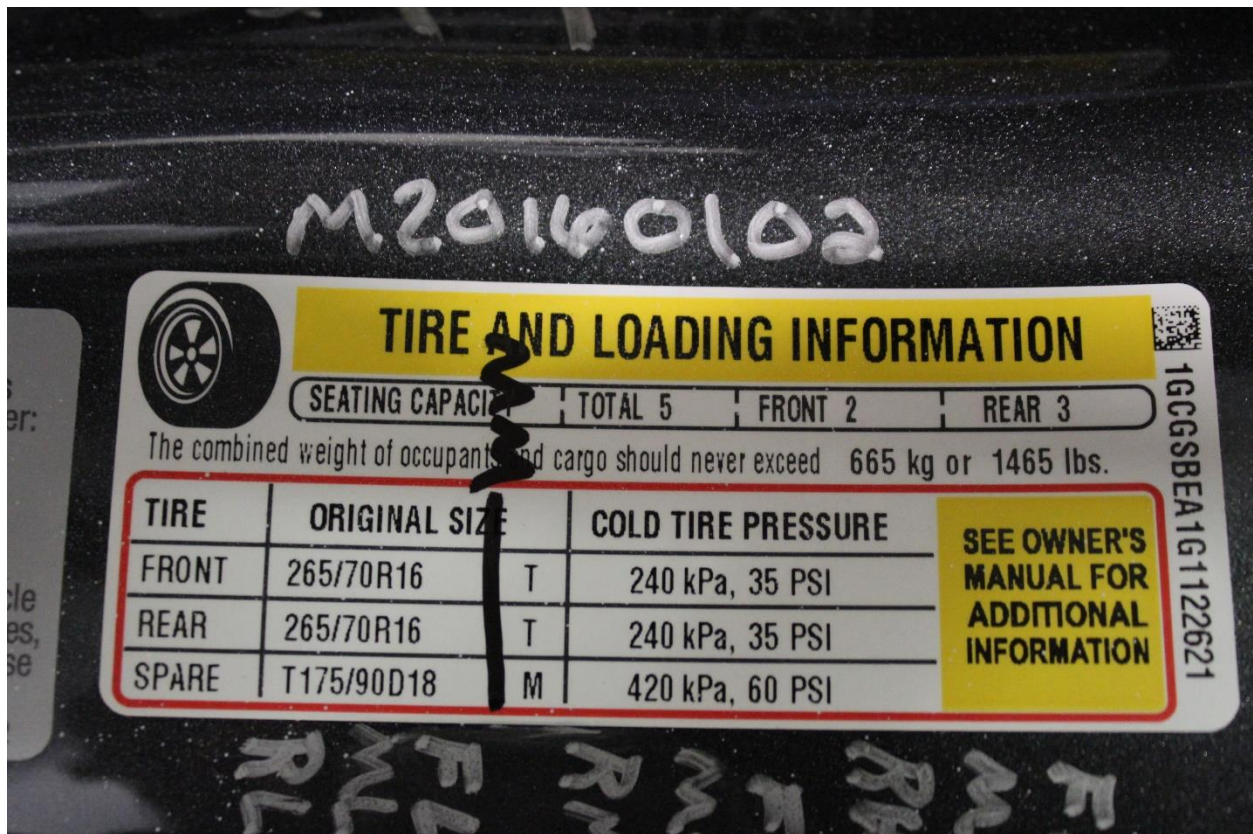


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label



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

Head Restraints

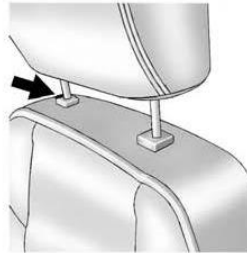
The vehicle's front seats have adjustable head restraints in the outboard seating positions.

Warning

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.



Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.



Driver Seat, Inboard Button

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

To lower the head restraint, press the button, located on the top of the seatback, and push the restraint down. Try to move the head

restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

Rear Head Restraints

Crew Cab

The vehicle's rear seats have head restraints in the outboard seating positions that cannot be adjusted up or down.



The rear outboard head restraints are designed to be folded. When folding the seatback down the head

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

44 Seats and Restraints

restraint must first be manually folded forward out of the way to fold the seatback down.

The head restraint can be folded forward to allow for better visibility when the rear seat is unoccupied. To fold the head restraint, press the button on the side of the head restraint.

When an occupant is in the seat, always return the head restraint to the upright position until it locks into place. Push and pull on the head restraint to make sure that it is locked.

If you are installing a child restraint in the rear seat, see *Lower Anchors and Tethers for Children (LATCH System)* → 75.

Extended Cab

The vehicle's rear seats have headrests in the outboard seating positions that cannot be adjusted.

If you are installing a child restraint in the rear seat, see *Lower Anchors and Tethers for Children (LATCH System)* → 75.

Front Seats

Seat Adjustment

Warning

You can lose control of the vehicle if you try to adjust a driver seat while the vehicle is moving. Adjust the driver seat only when the vehicle is not moving.

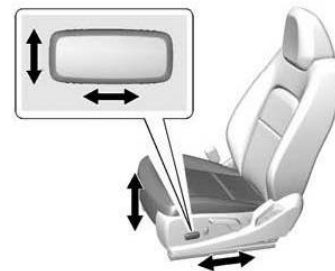


To adjust the seat:

1. Pull the handle at the front of the seat.

2. Slide the seat to the desired position and release the handle.
3. Try to move the seat back and forth to be sure the seat is locked in place.

Power Seat Adjustment



To adjust the seat, if equipped:

- Move the seat forward or rearward by sliding the control forward or rearward.
- Raise or lower the entire seat by moving the entire control up or down.

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

Fig.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-5
2	Driver Head Acceleration (Y) Primary vs. Time	B-5
3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
8	Driver Thorax Rib Deflection Maximum vs. Time	B-6
9	Driver Anterior Abdominal Force (Y) vs. Time	B-7
10	Driver Middle Abdominal Force (Y) vs. Time	B-7
11	Driver Posterior Abdominal Force (Y) vs. Time	B-7
12	Driver Total Abdominal Force (Y) vs. Time	B-7
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14	Passenger Head Acceleration (X) vs. Time Primary	B-8
15	Passenger Head Acceleration (Y) vs. Time Primary	B-8
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
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21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
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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

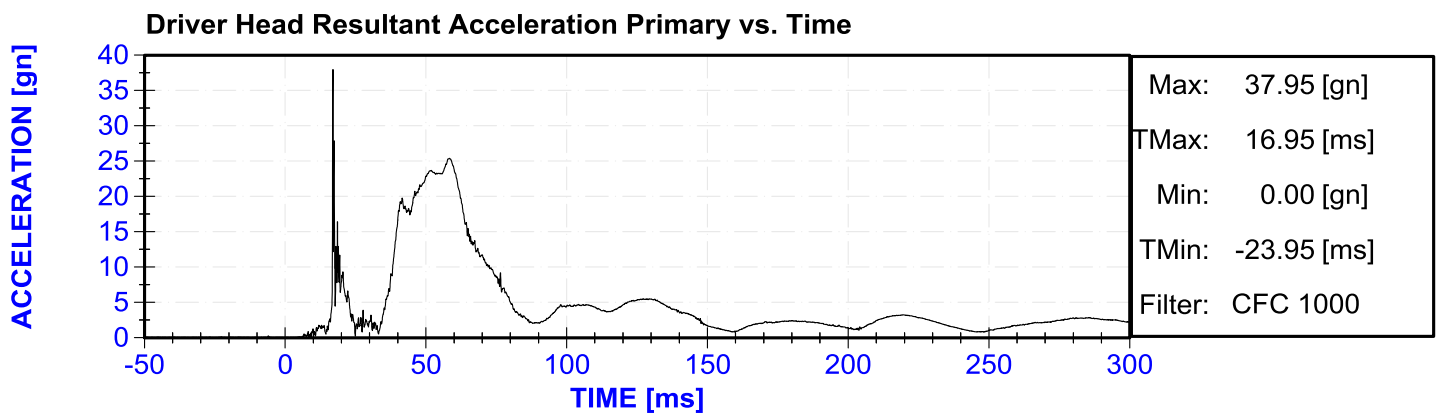
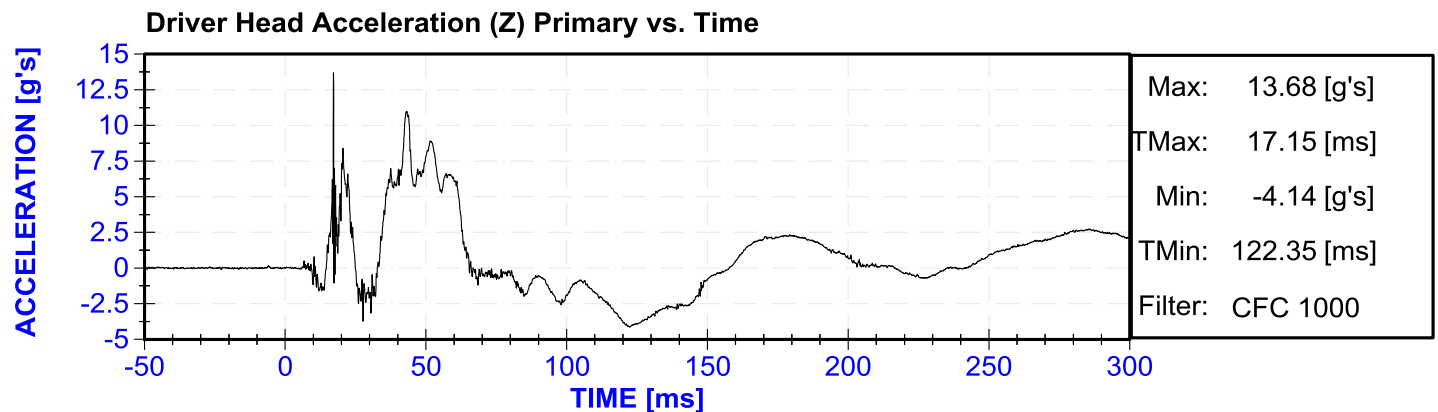
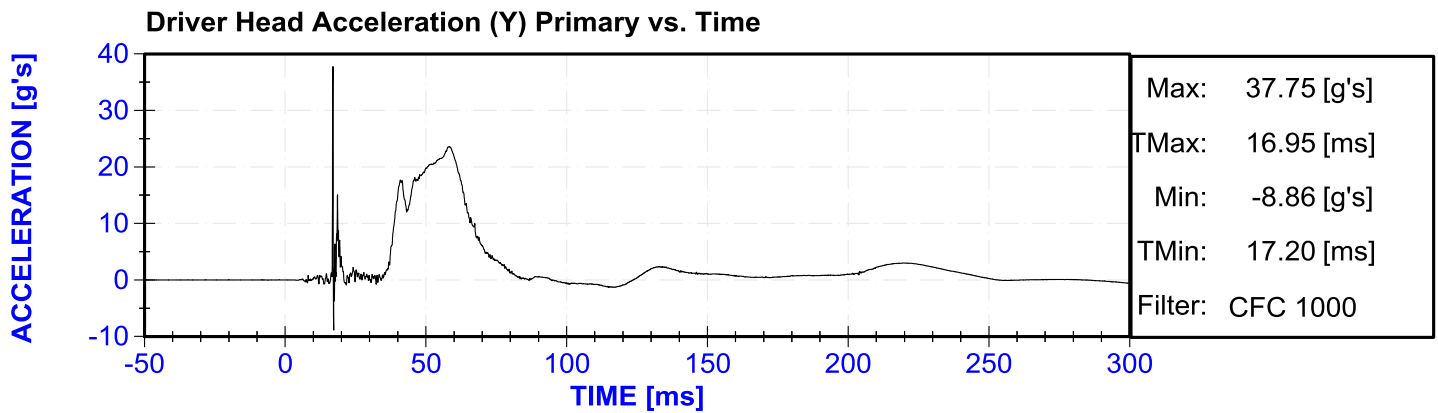
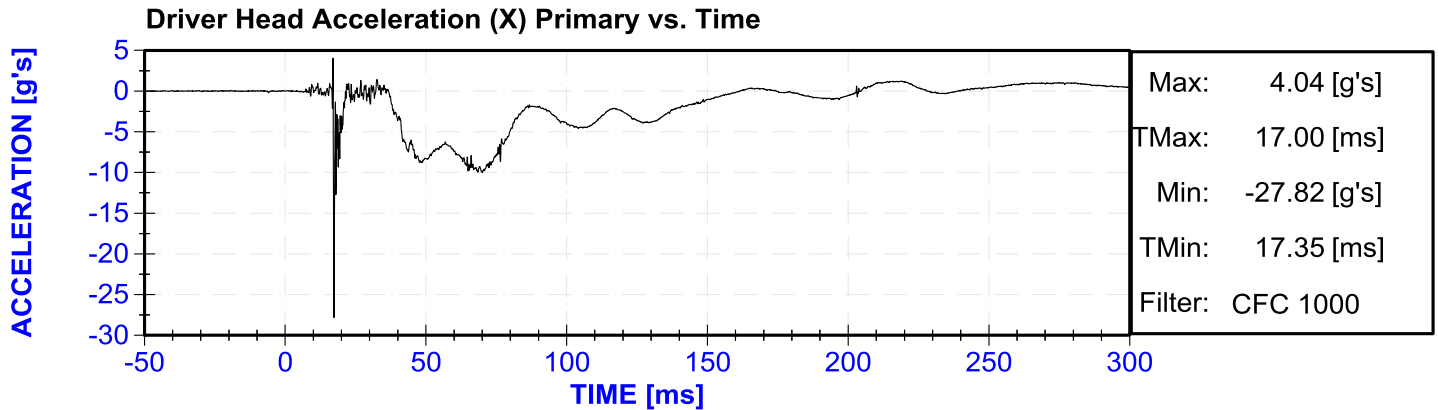
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Driver Lower Spine T12 Acceleration (Z)
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Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
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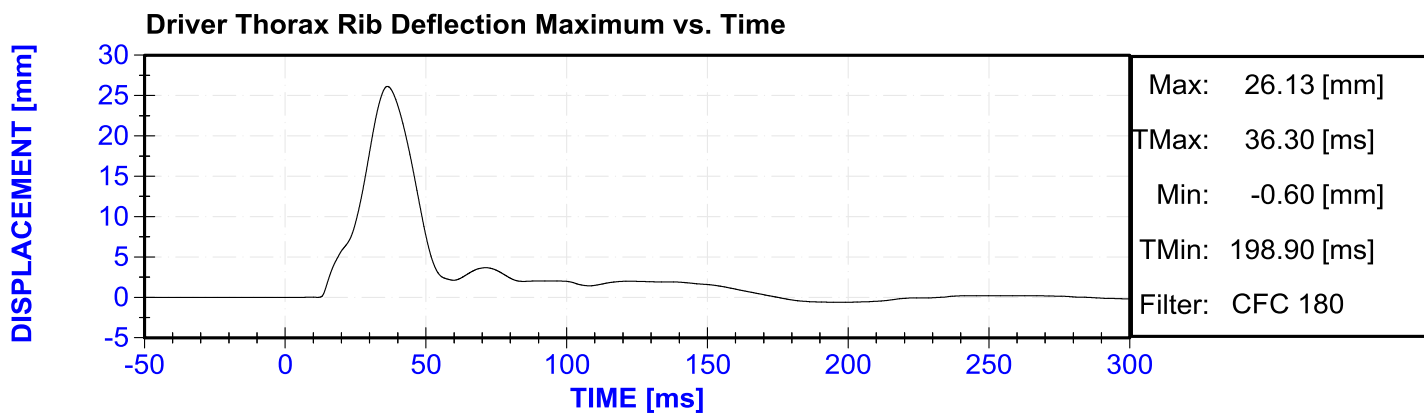
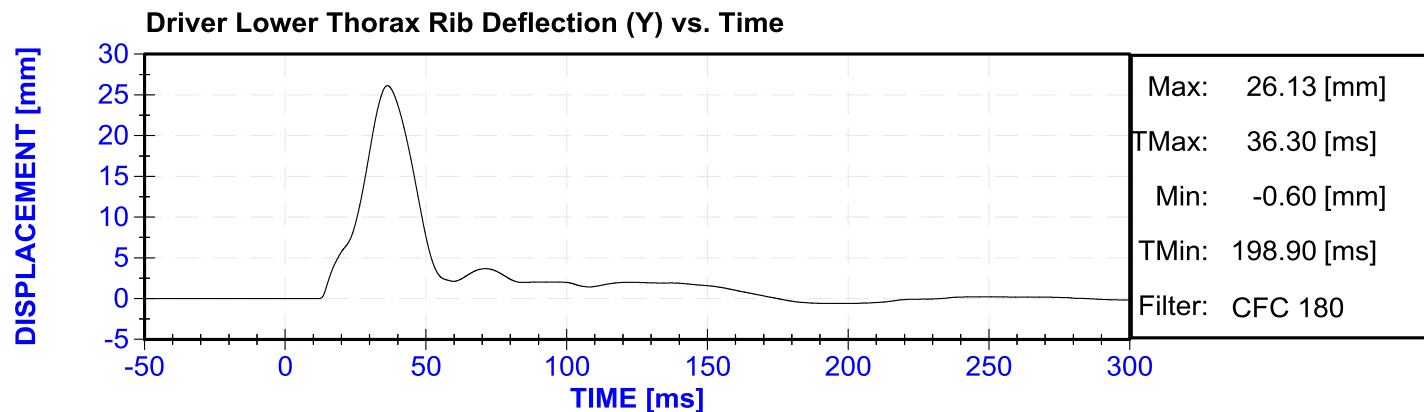
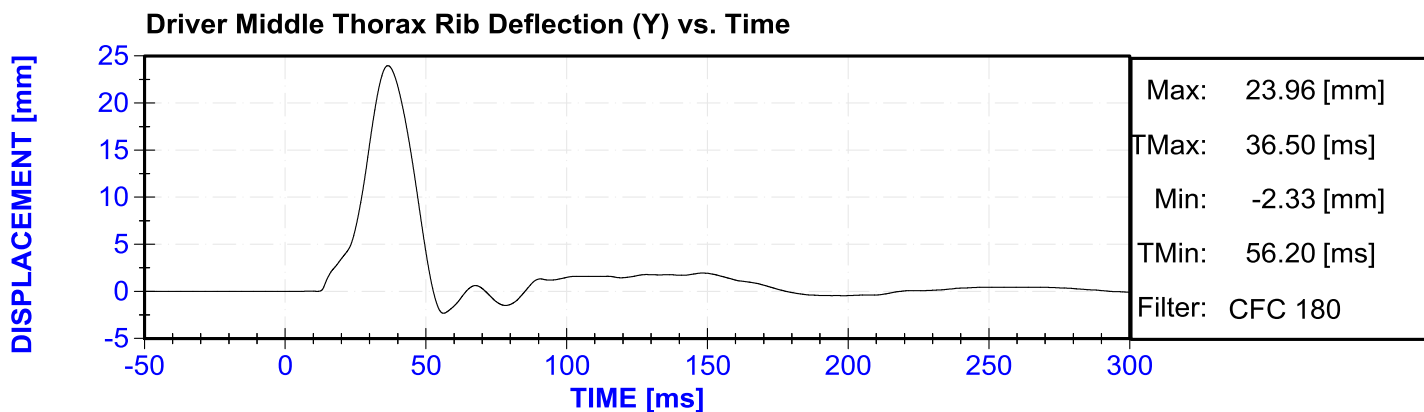
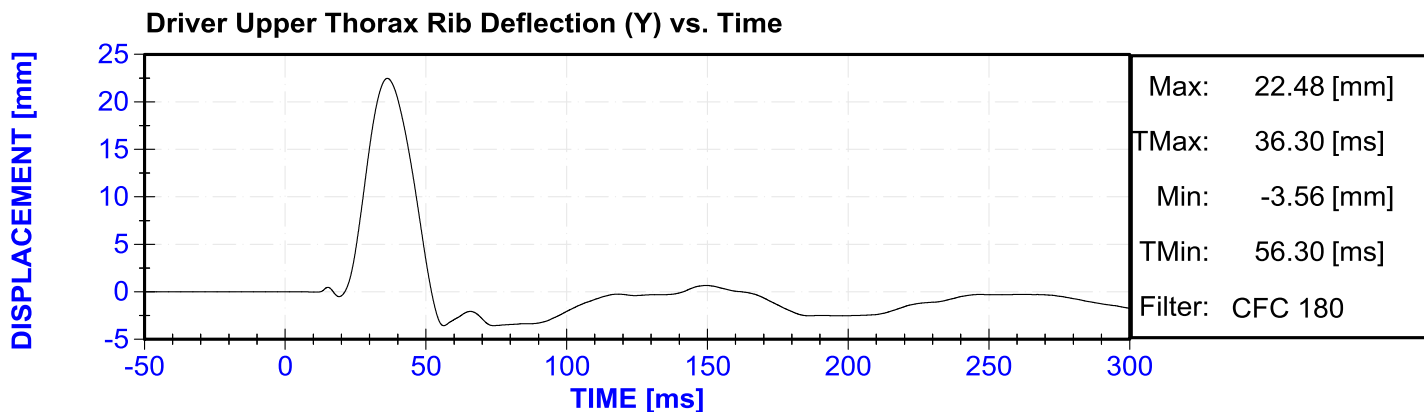
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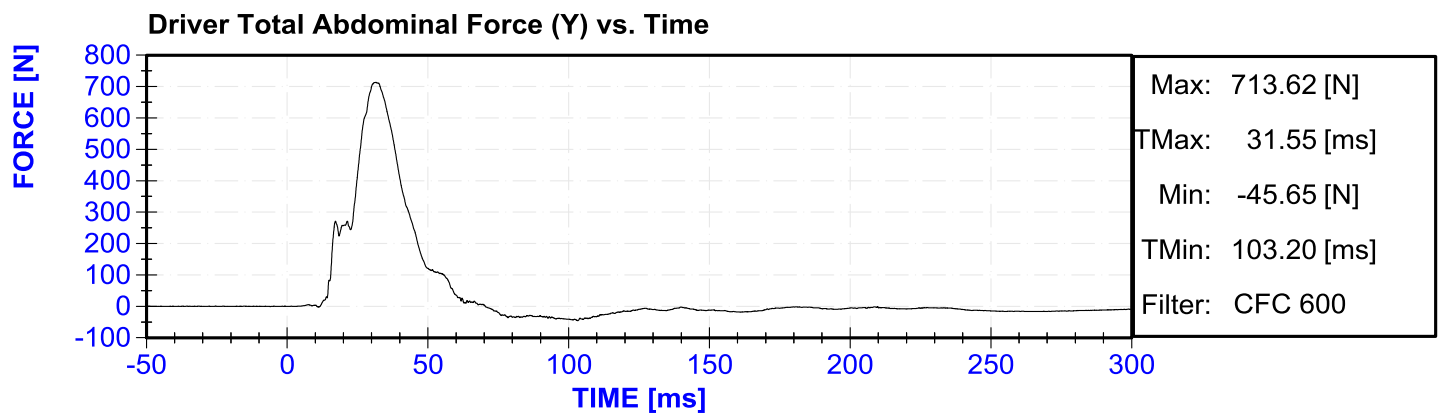
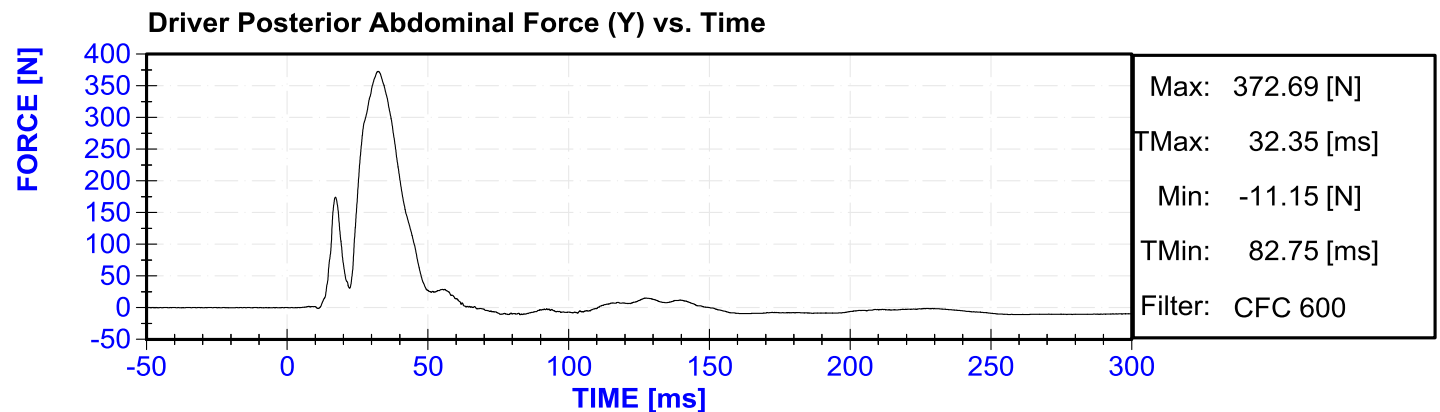
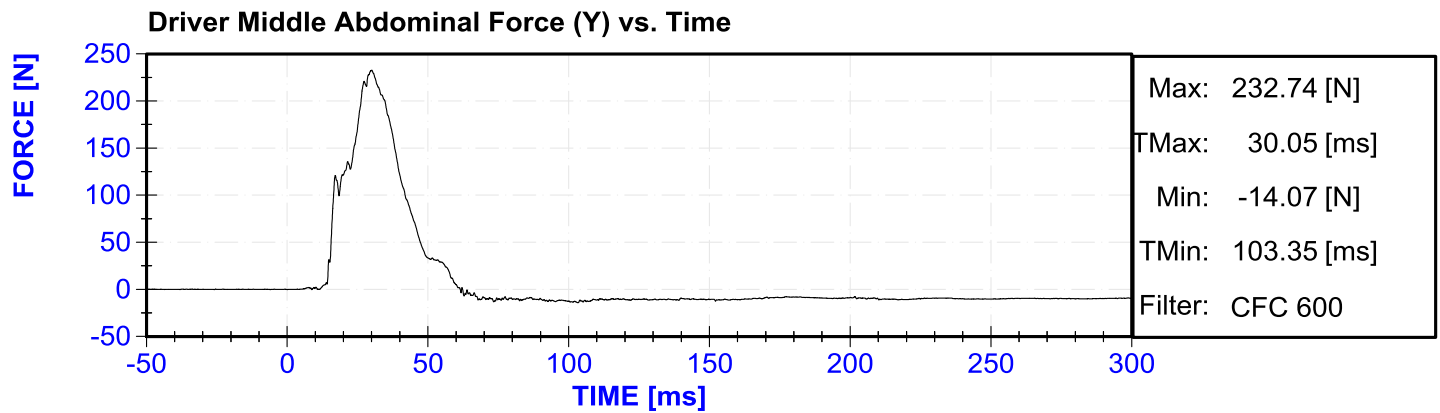
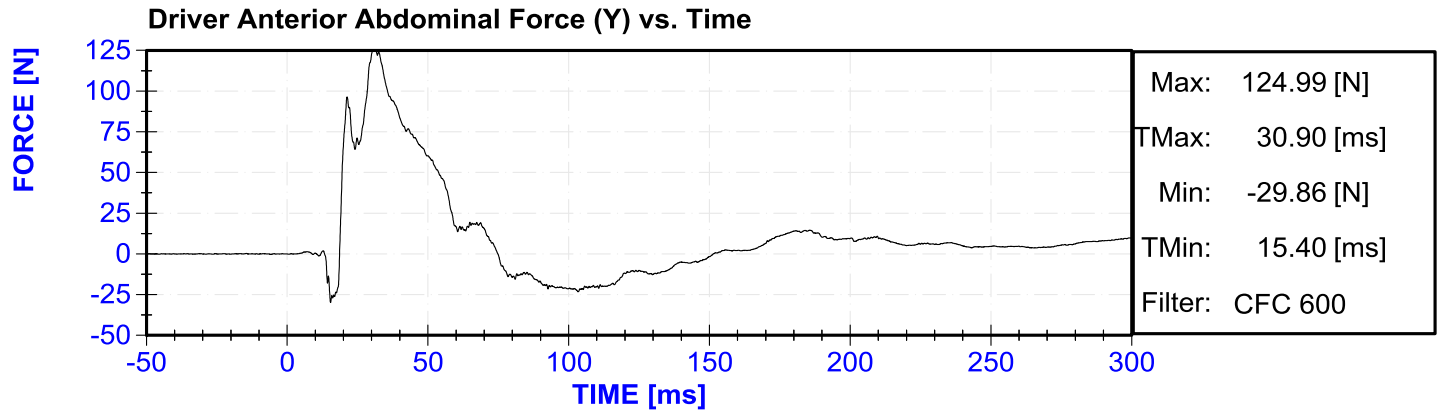
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Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at 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)

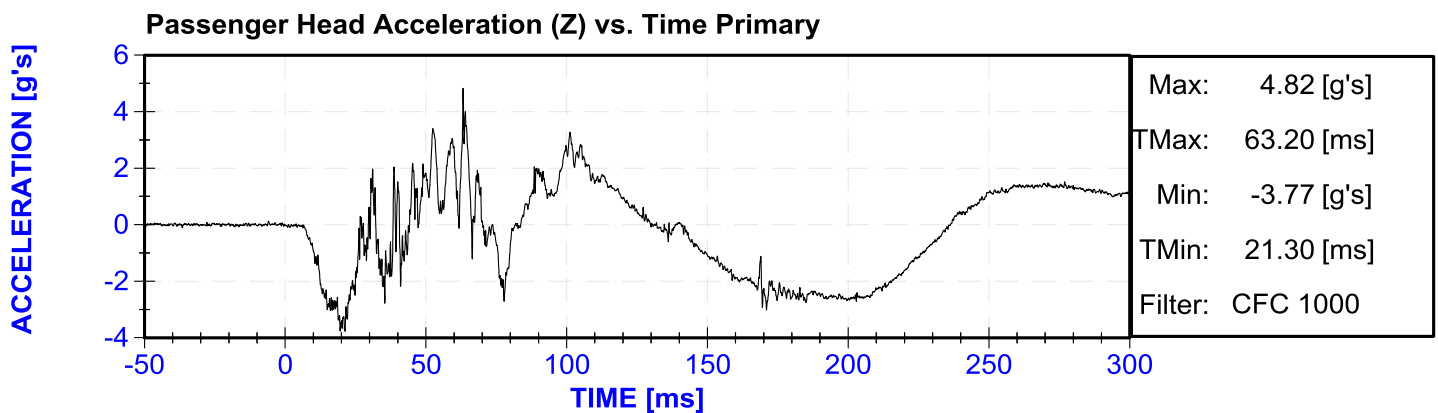
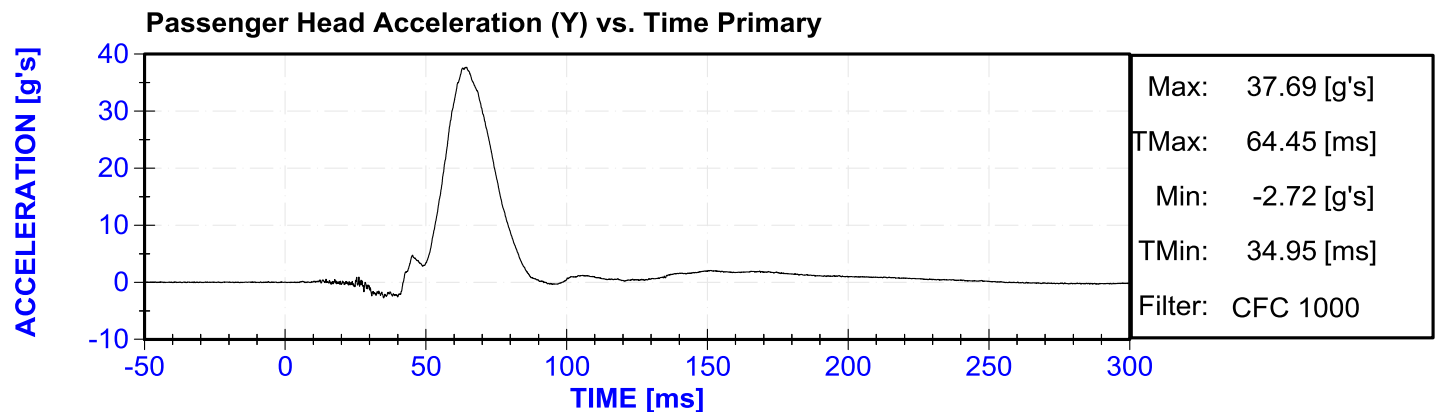
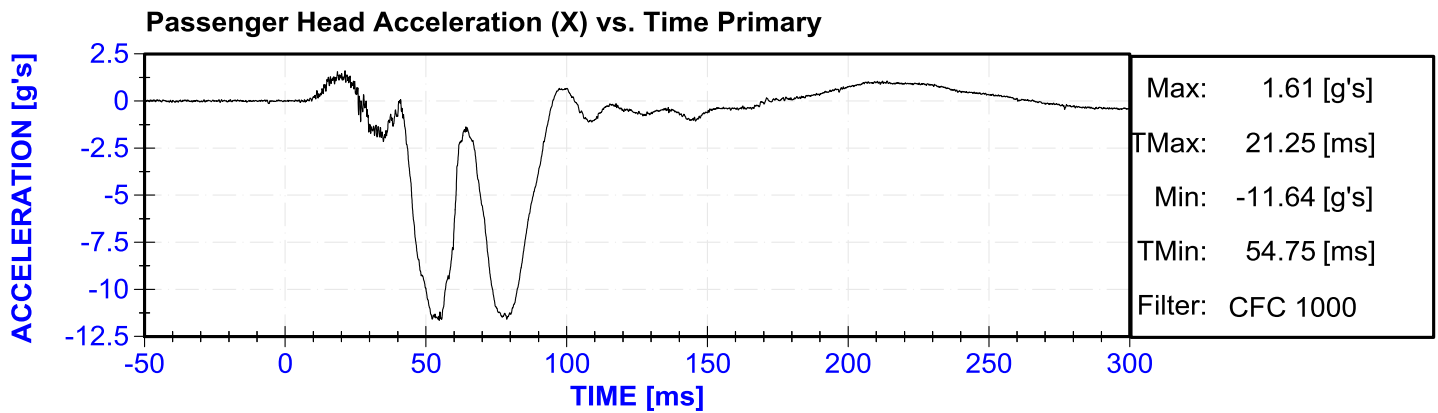
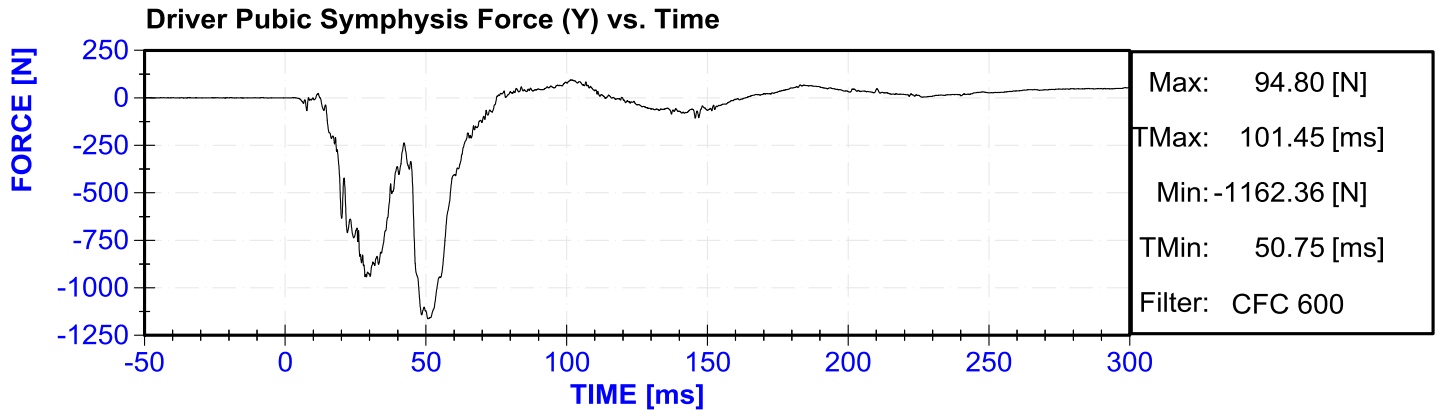
MDB Instrumentation Data

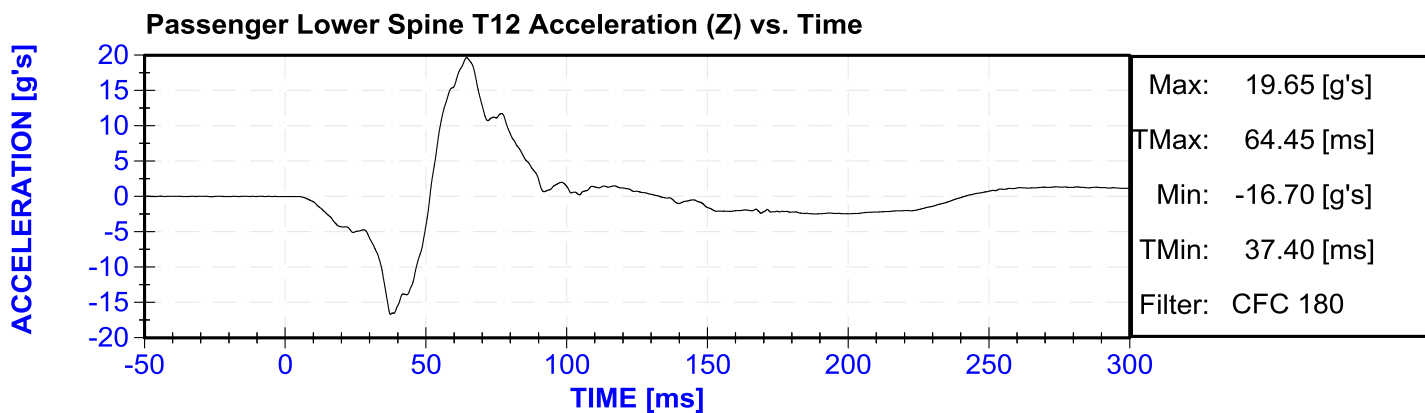
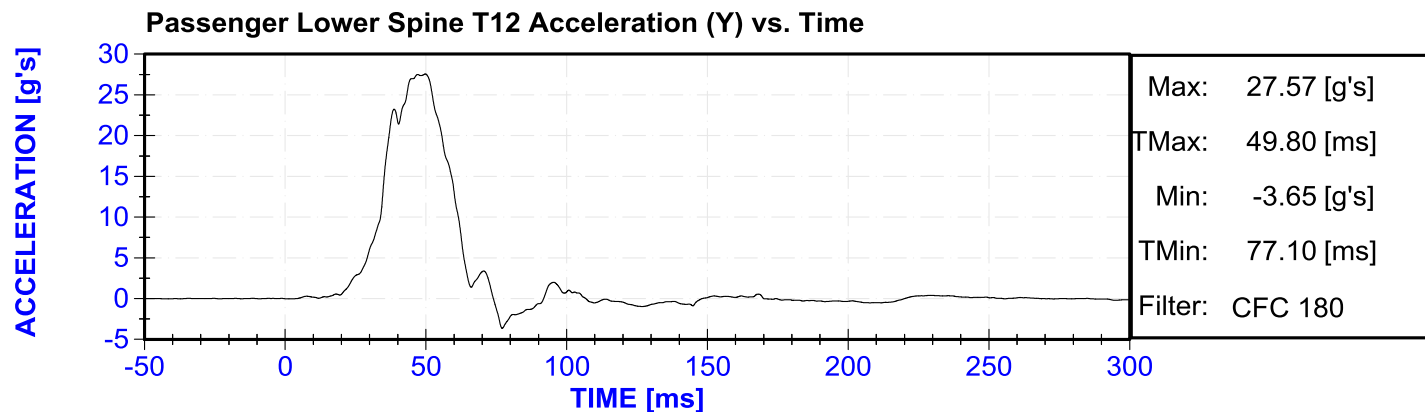
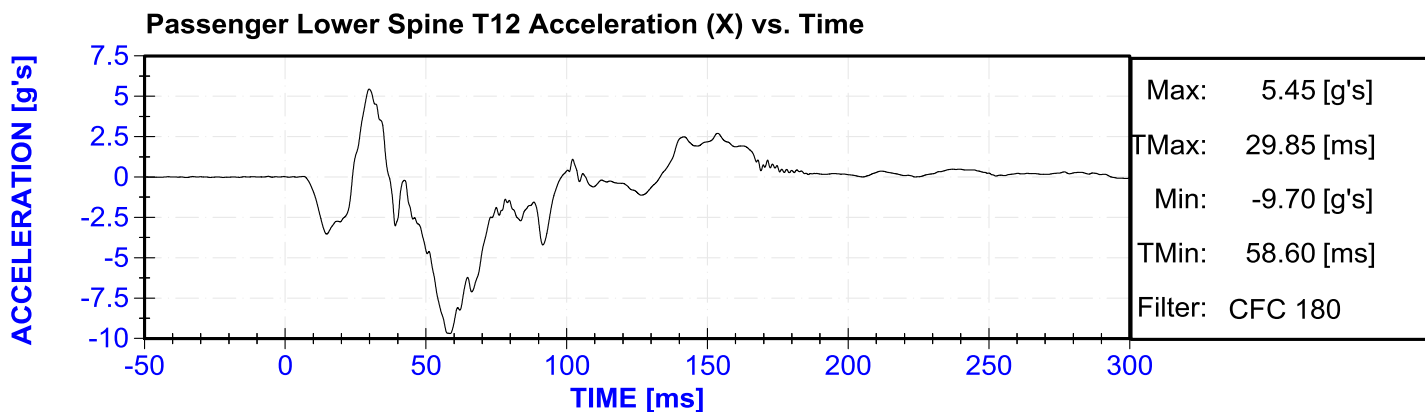
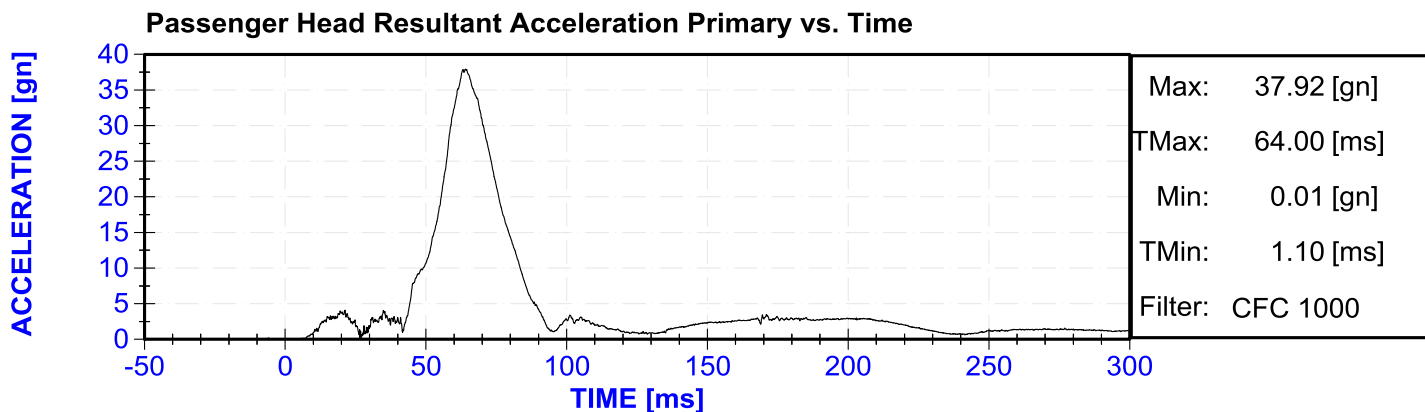
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

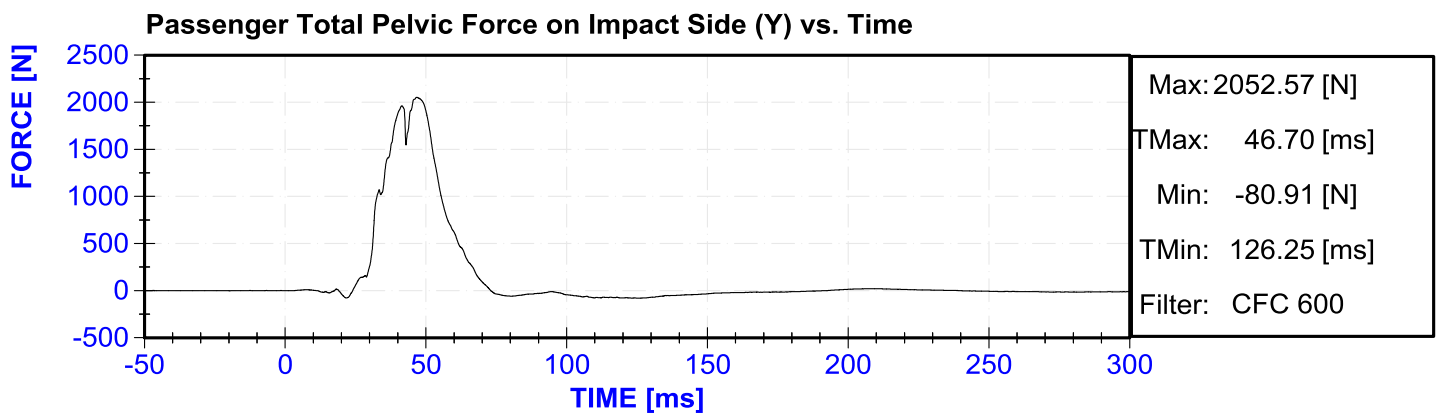
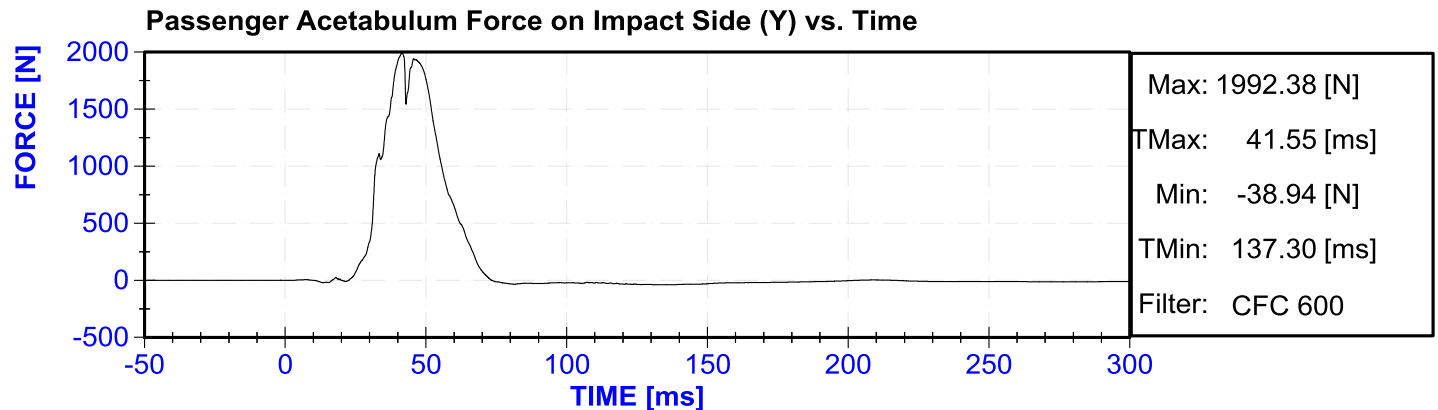
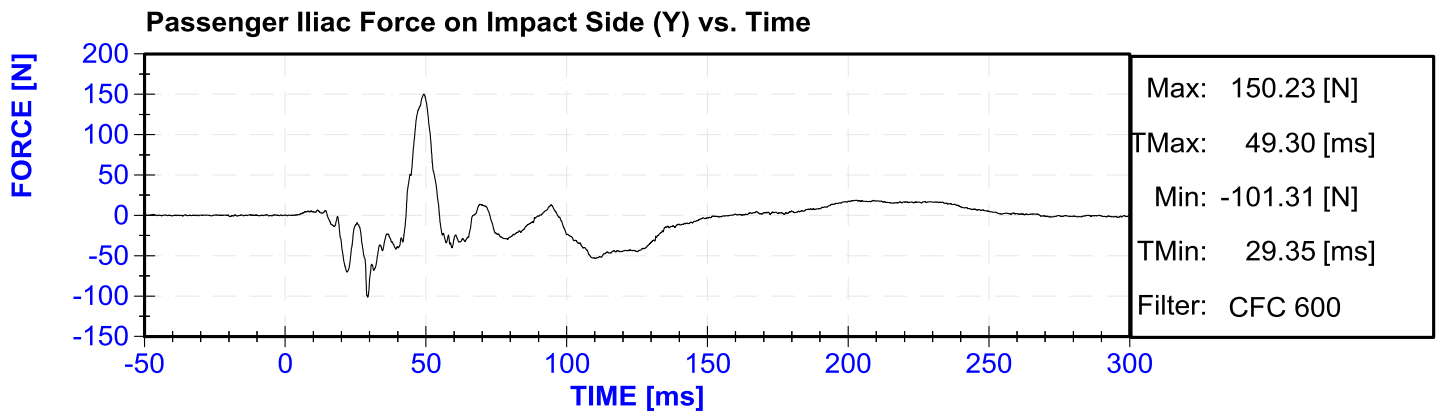
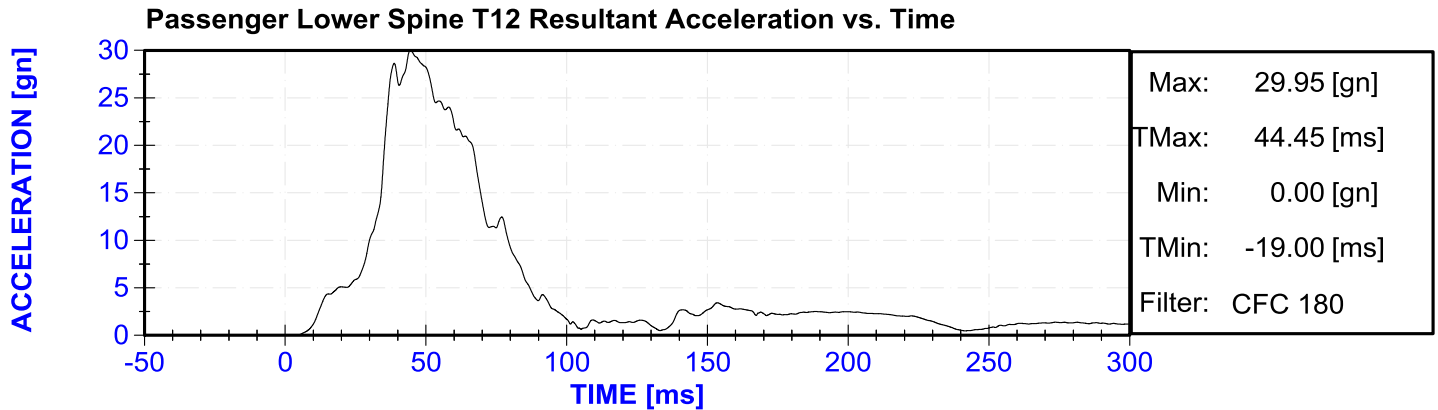












APPENDIX C

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)

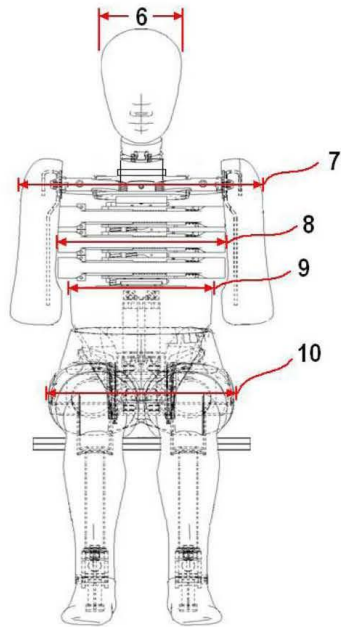


External Measurements - EuroSID-2re

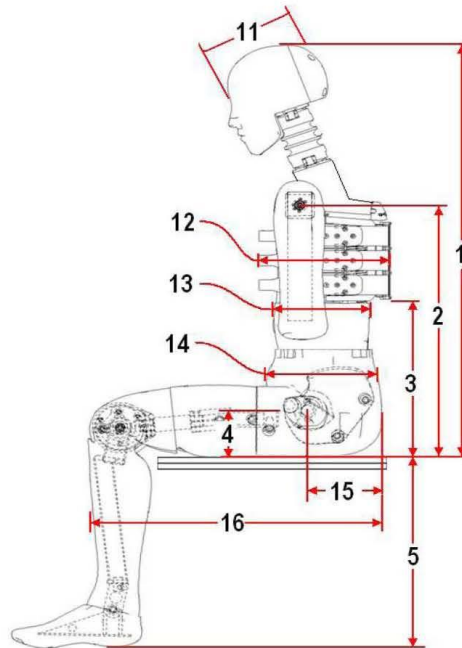
Technician: M.Hartung

Date: 12/1/2015

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)			Result (mm)	Pass/Fail
1	Sitting Height	900	918	909	909	Pass
2	Seat to Shoulder Joint	558	572	560	560	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	351	351	Pass
4	Seat to Hip Joint (center of bolt)	97	103	99	99	Pass
5	Sole to Seat, Sitting	333	451	412	412	Pass
6	Head Width	152	158	154	154	Pass
7	Shoulder/Arm Width	461	479	475	475	Pass
8	Thorax Width	322	332	329	329	Pass
9	Abdomen Width	273	287	284	284	Pass
10	Pelvis Lap Width	359	373	368	368	Pass
11	Head Depth	196	206	201	201	Pass
12	Thorax Depth	262	272	266	266	Pass
13	Abdomen Depth	194	204	198	198	Pass
14	Pelvis Depth	235	245	240	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	155	Pass
16	Back of Buttocks to Front Knee	597	615	603	603	Pass

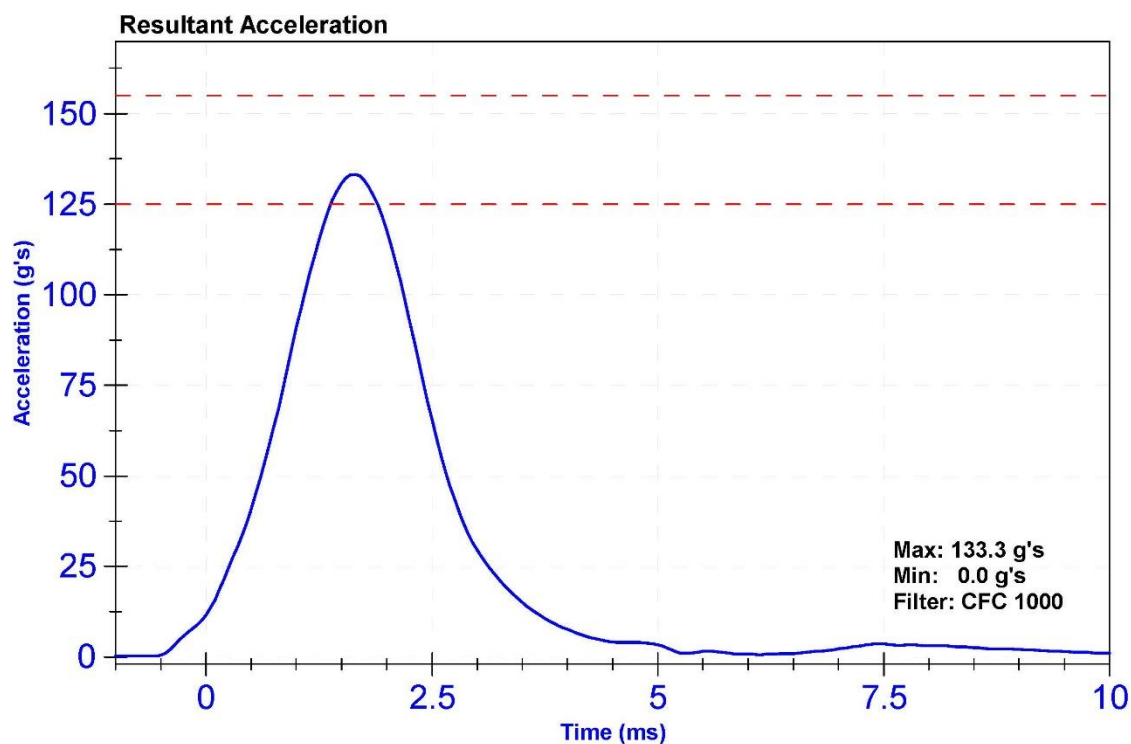
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

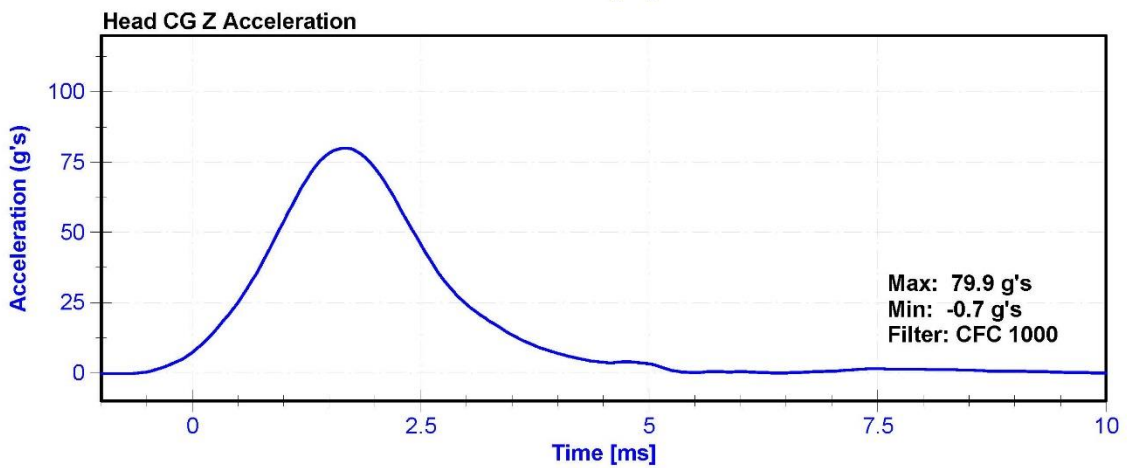
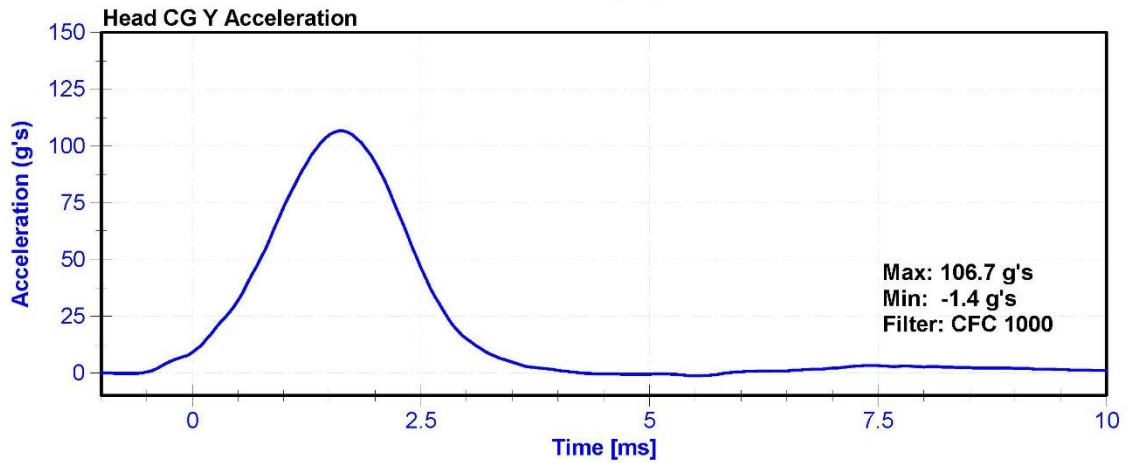
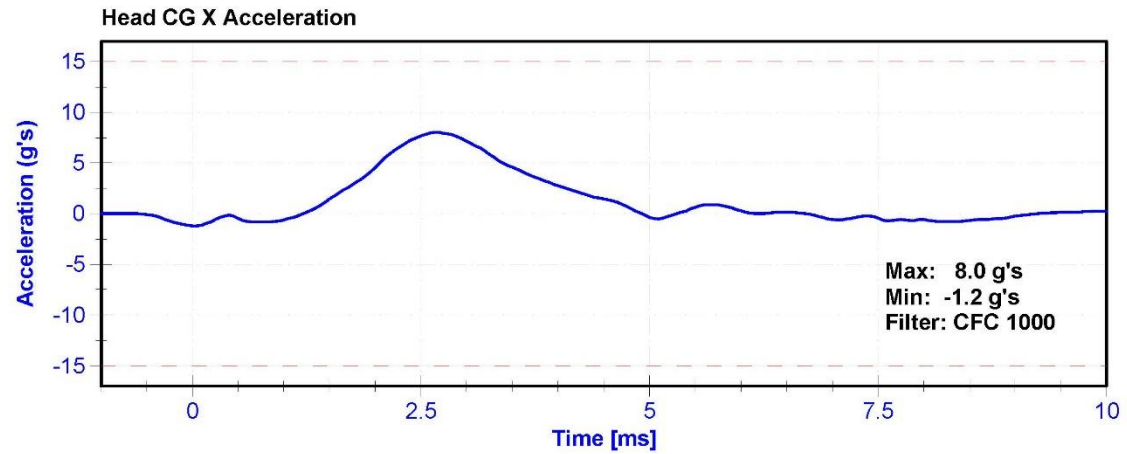
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	22.8	Pass
Resultant Acceleration	125	155	g's	133.3	Pass
Oscillation	0	15	%	3.04	Pass
Fore-Aft Acceleration	-15	15	g's	8.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	10/19/2015	4/18/2016
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	10/19/2015	4/18/2016
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	10/19/2015	4/18/2016





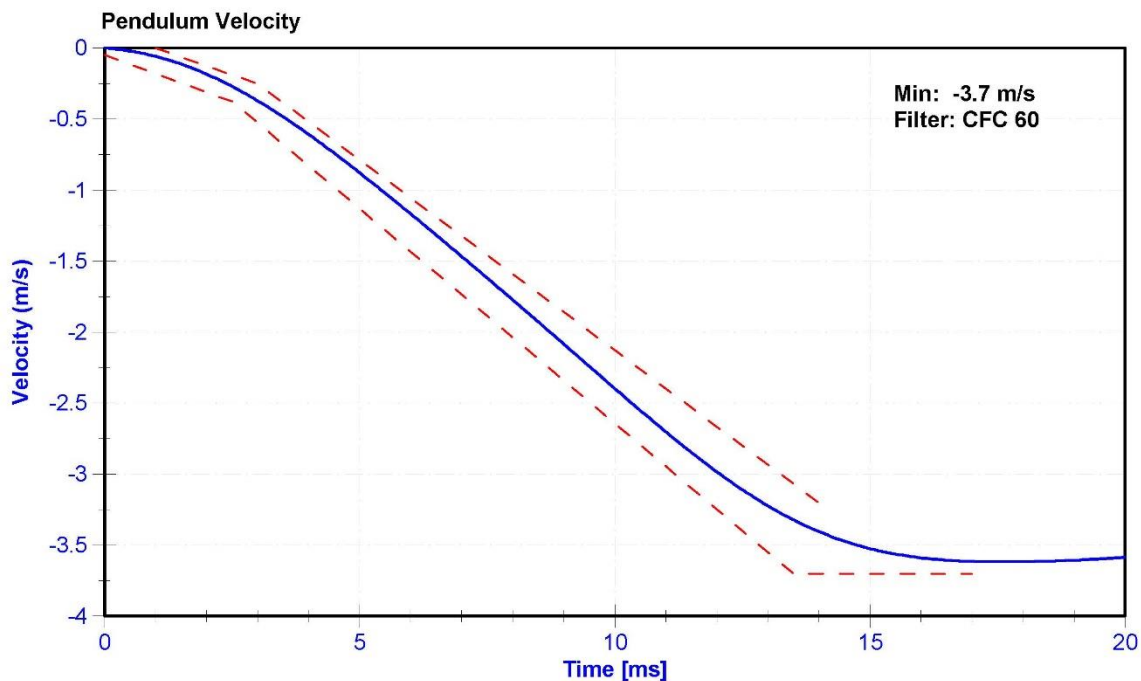
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

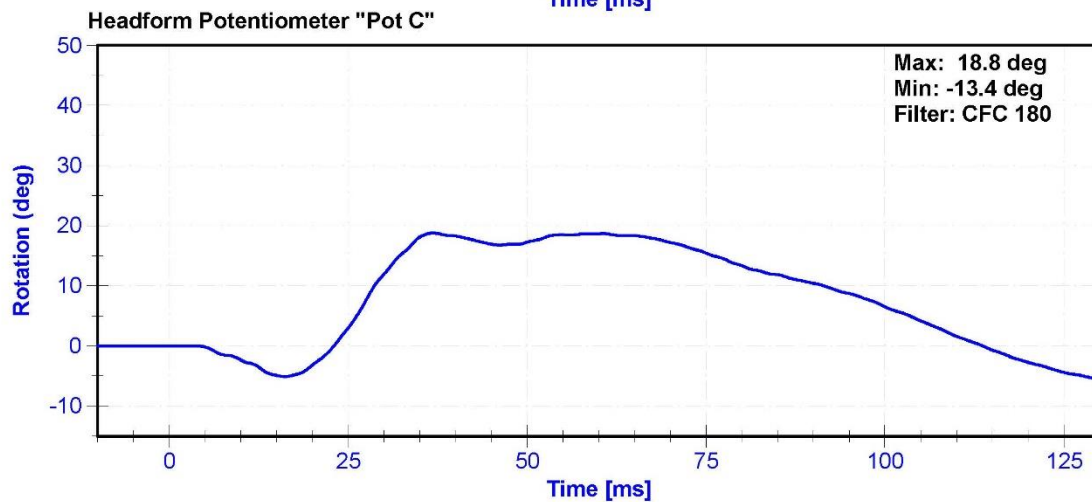
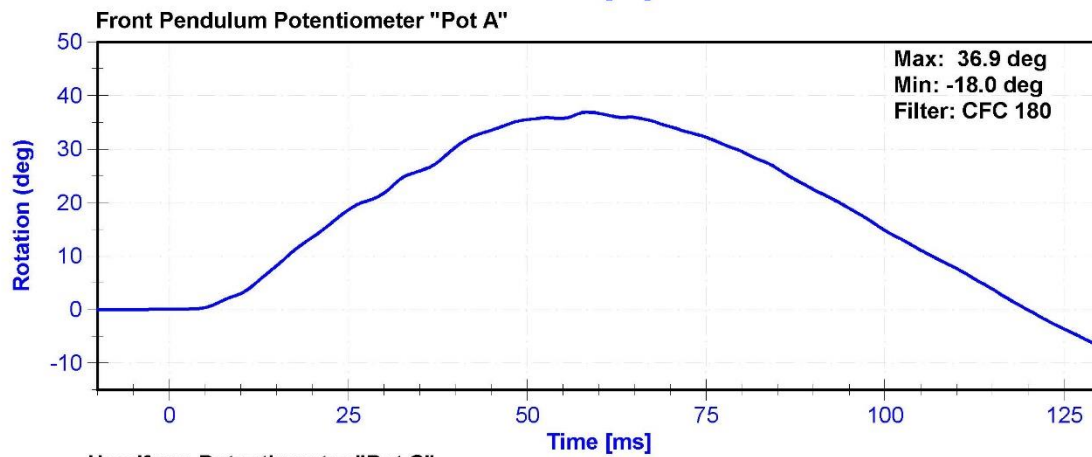
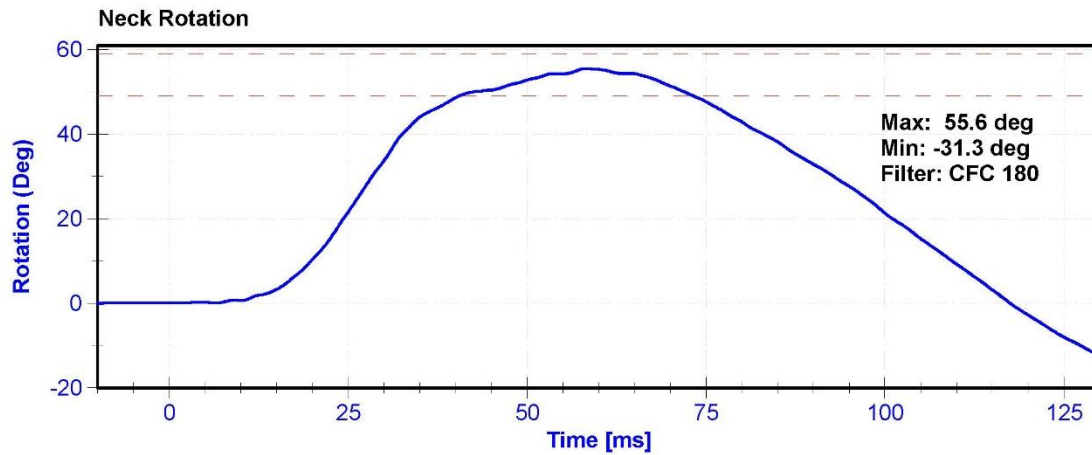
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	23.3	Pass
Velocity	3.3	3.5	m/s	3.45	Pass
Lateral Neck Rotation	49	59	deg	55.6	Pass
Time at Maximum Rotation	54	66	ms	58.2	Pass
Time of Rotation Decay from Maximum	53	88	ms	59.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Front Pendulum Potentiometer	SP22G	DS-094	9/24/2015	9/23/2016
Headform Potentiometer	SP22G	DS-095	9/24/2015	9/23/2016





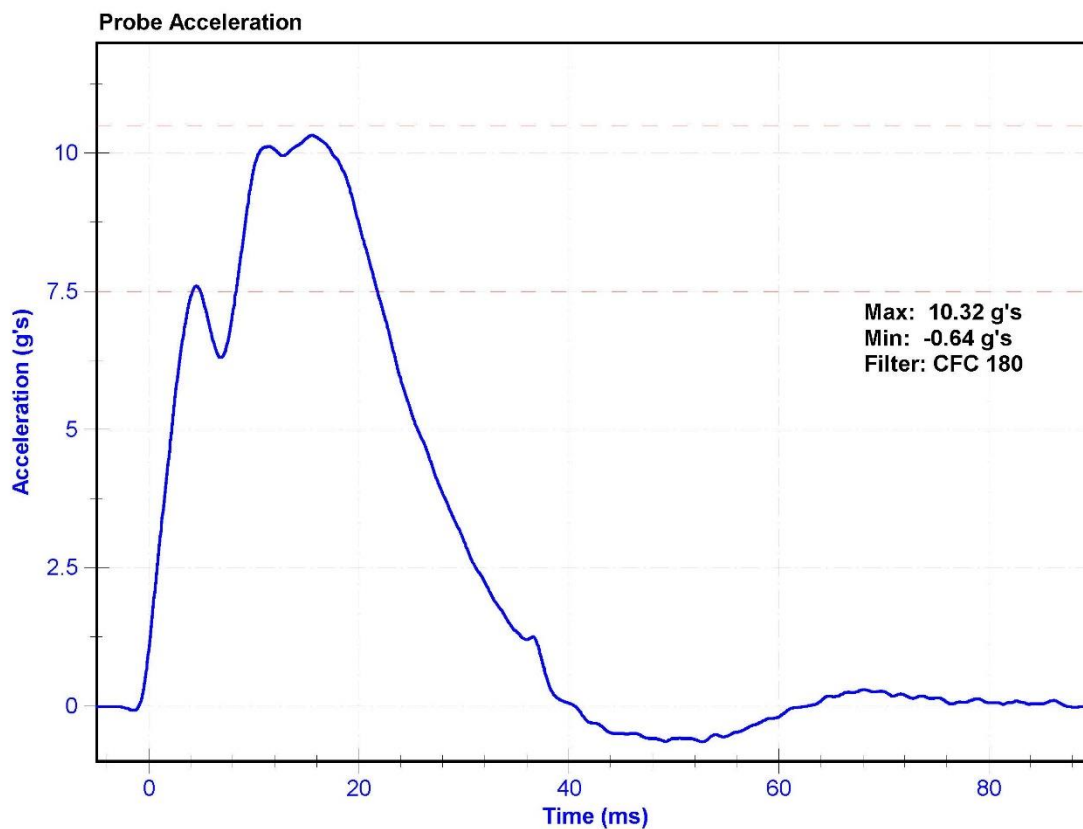
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	21.6	Pass
Velocity	4.2	4.4	m/s	4.26	Pass
Probe Acceleration	7.5	10.5	g's	10.32	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016



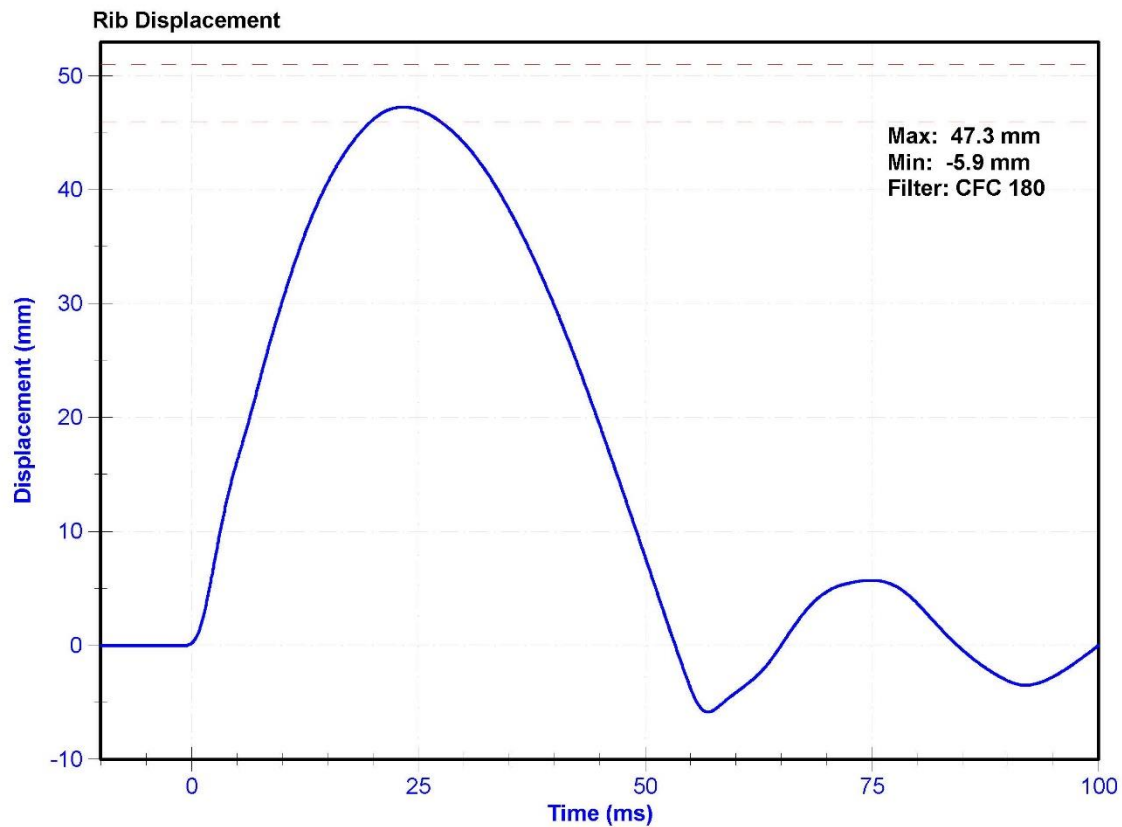
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	22.4	Pass
Rib Displacement	46	51	mm	47.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	10/19/2015	10/18/2016



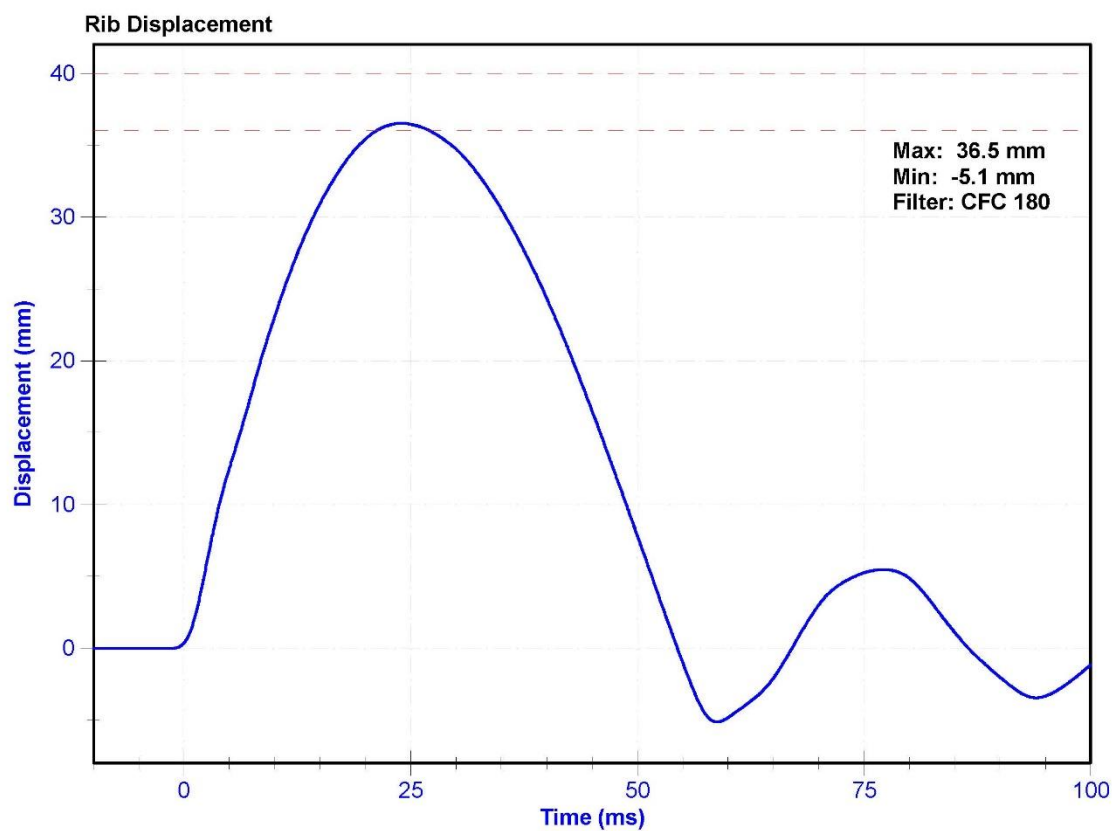
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	22.4	Pass
Rib Displacement	36	40	mm	36.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	10/19/2015	10/18/2016



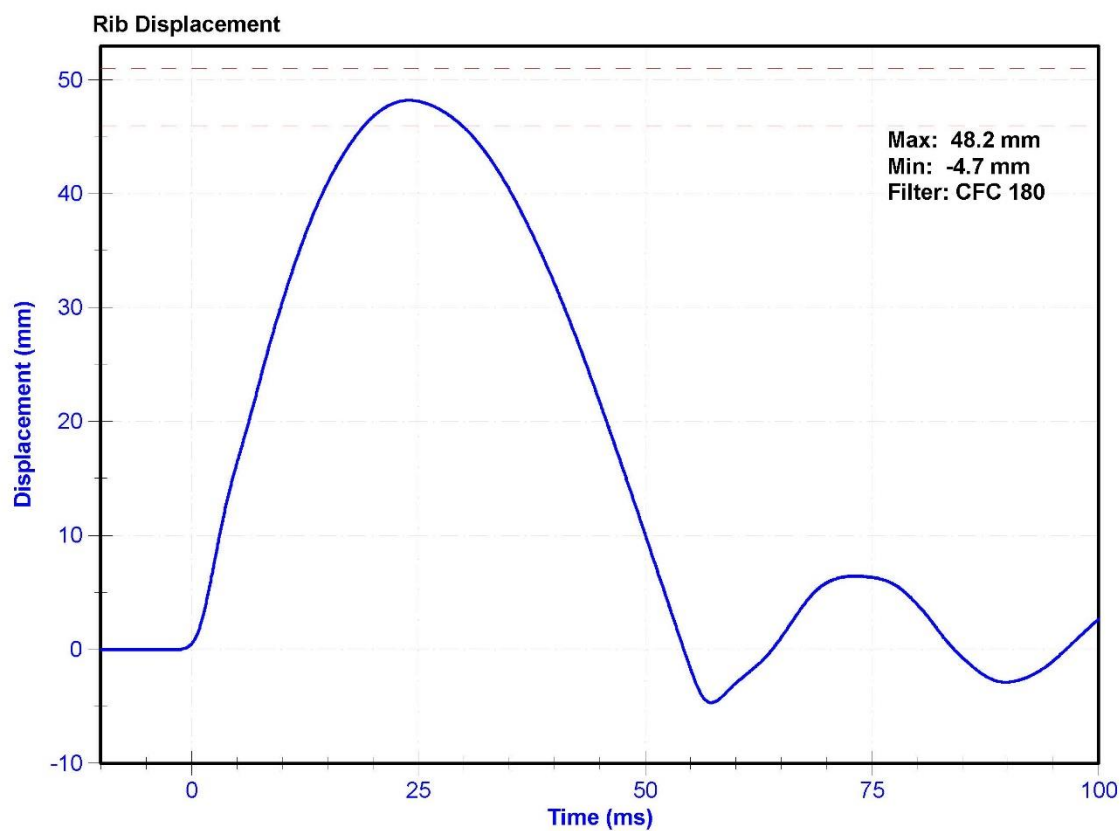
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	22.4	Pass
Rib Displacement	46	51	mm	48.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	10/19/2015	10/18/2016



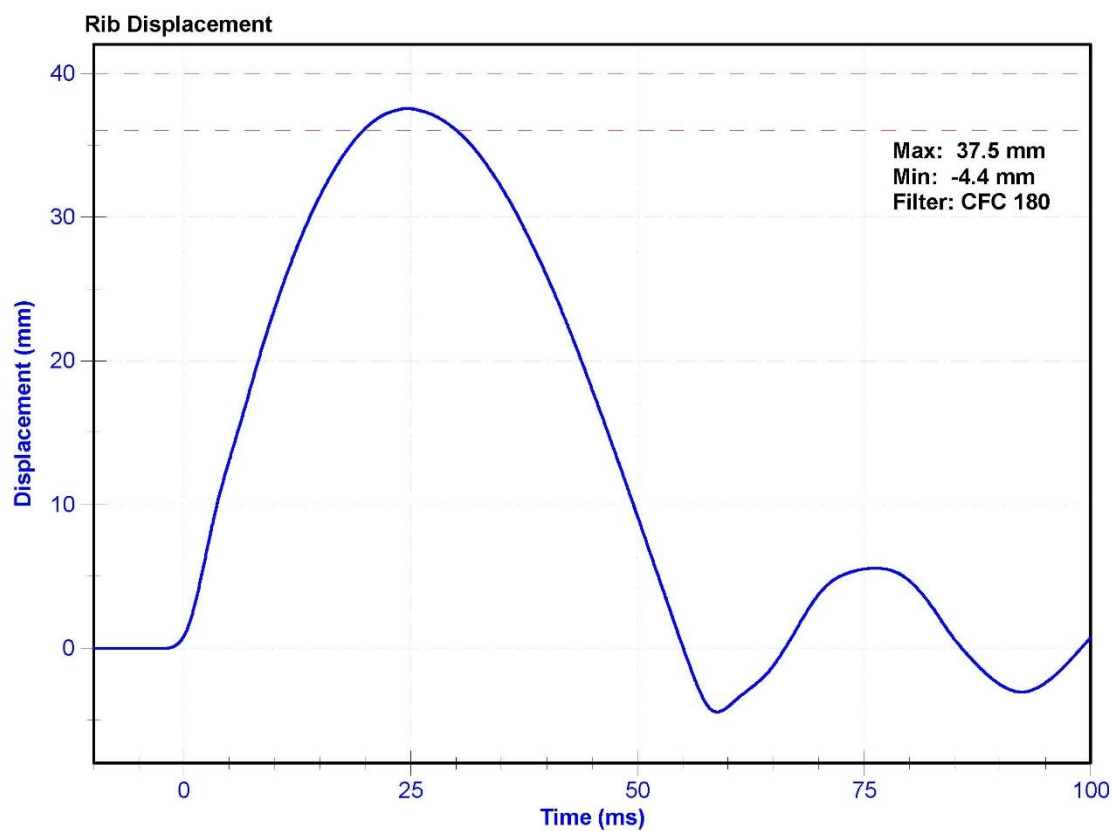
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	22.4	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	10/19/2015	10/18/2016



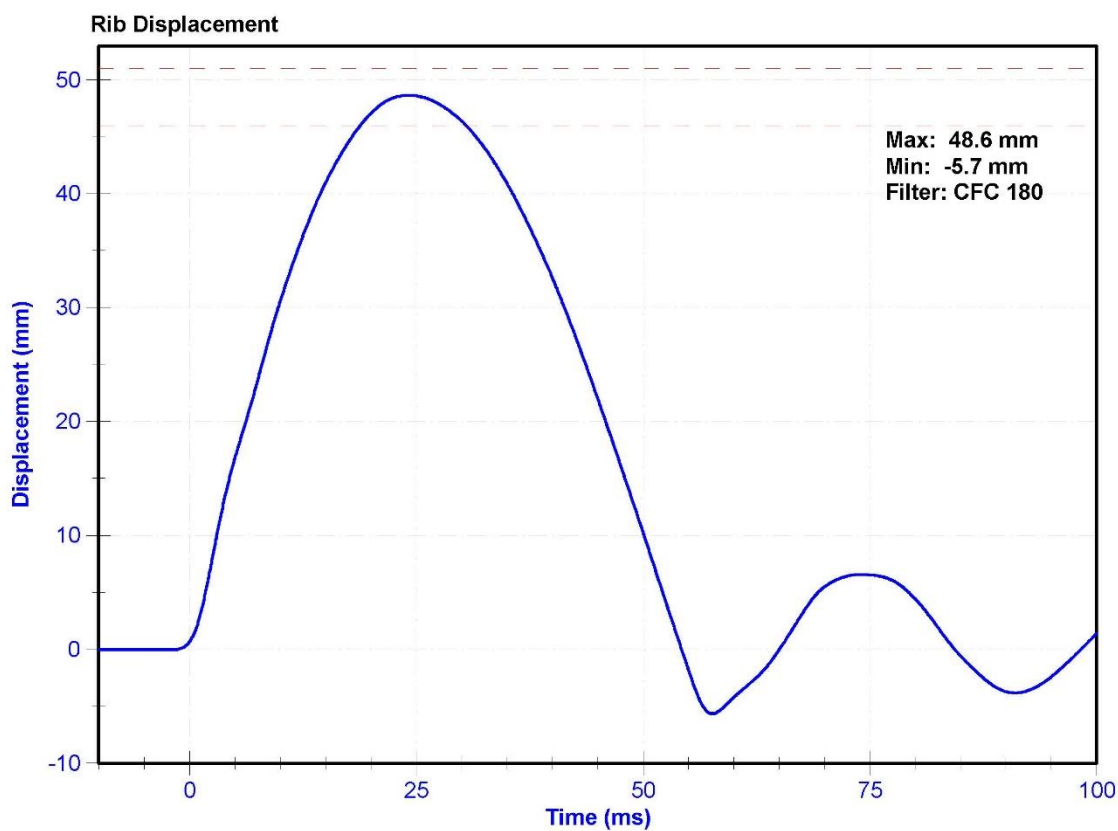
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	22.4	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-182GFE	10/19/2015	10/18/2016



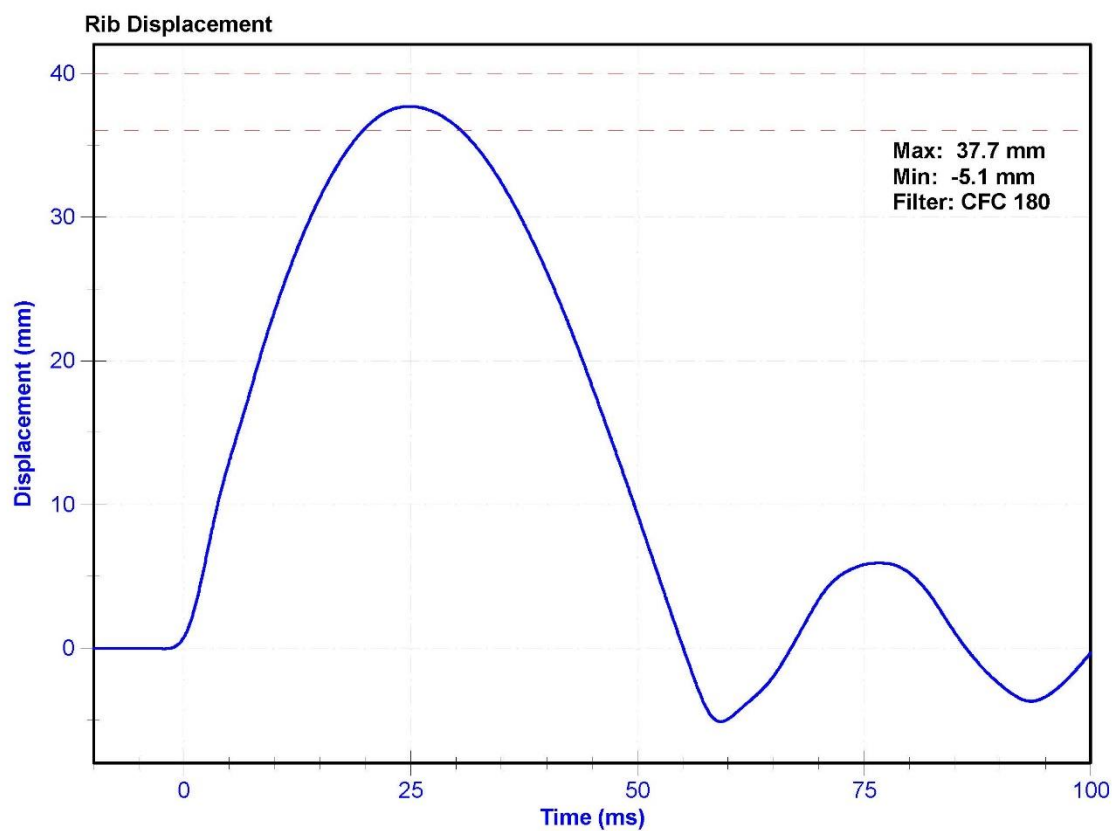
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	22.4	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	10/19/2015	10/18/2016



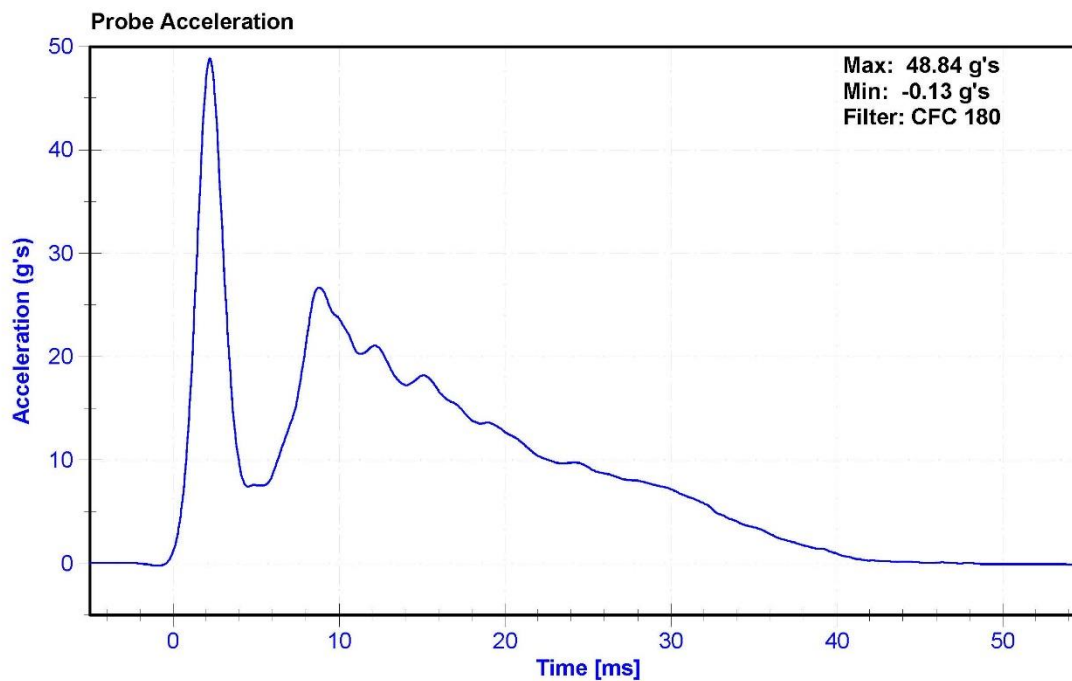
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

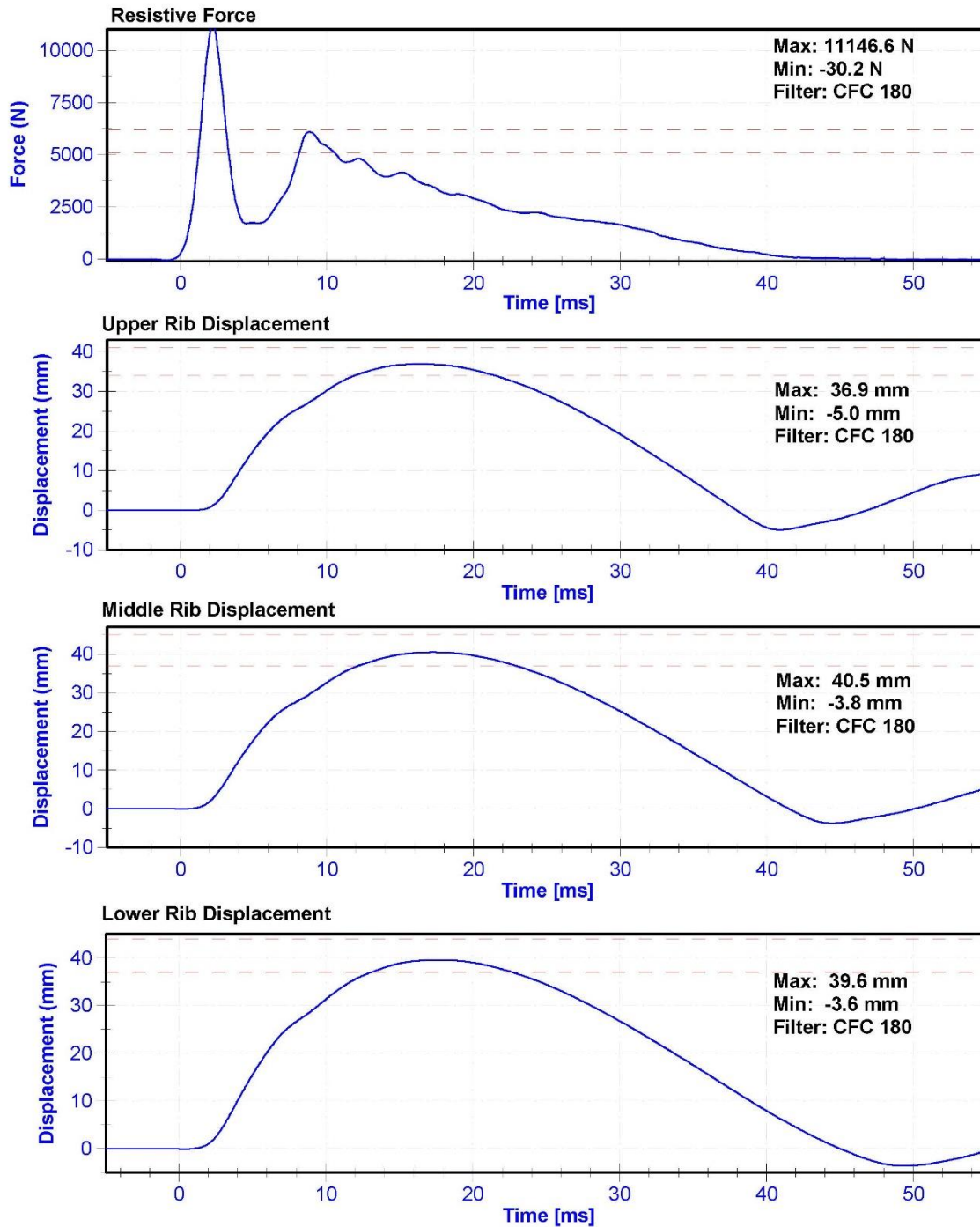
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	21.5	Pass
Velocity	5.4	5.6	m/s	5.40	Pass
Resistive Force after 6ms	5,100	6,200	N	6087.0	Pass
Upper Thorax Rib Deflection	34	41	mm	36.9	Pass
Mid Thorax Rib Deflection	37	45	mm	40.5	Pass
Lower Thorax Rib Deflection	37	44	mm	39.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	10/19/2015	10/18/2016
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	10/19/2015	10/18/2016
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	10/19/2015	10/18/2016





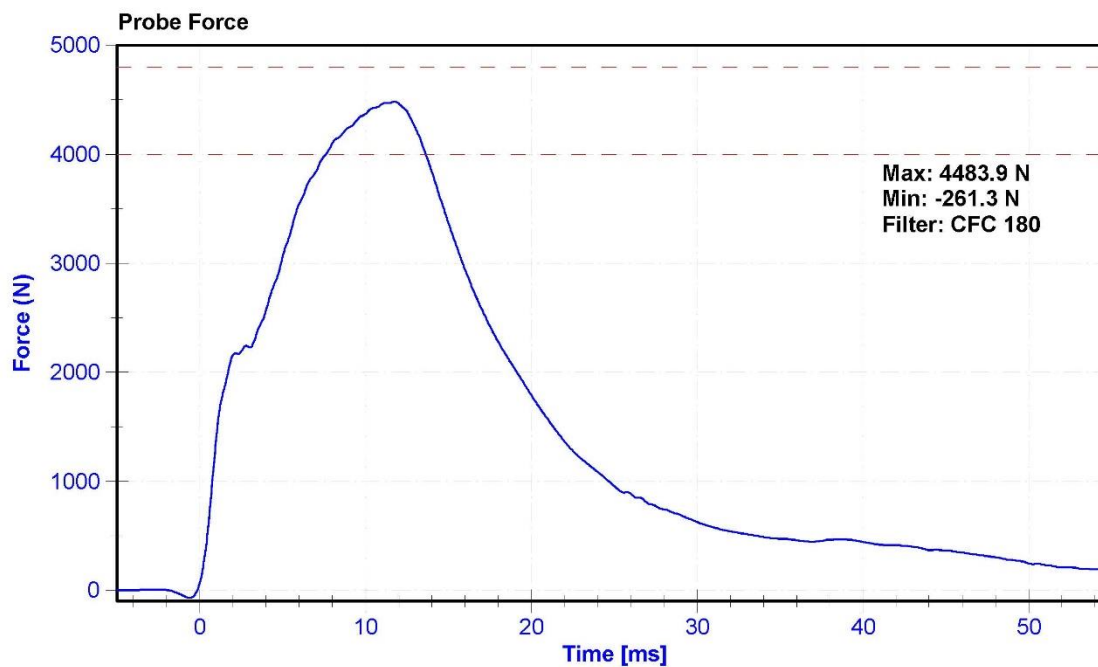
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

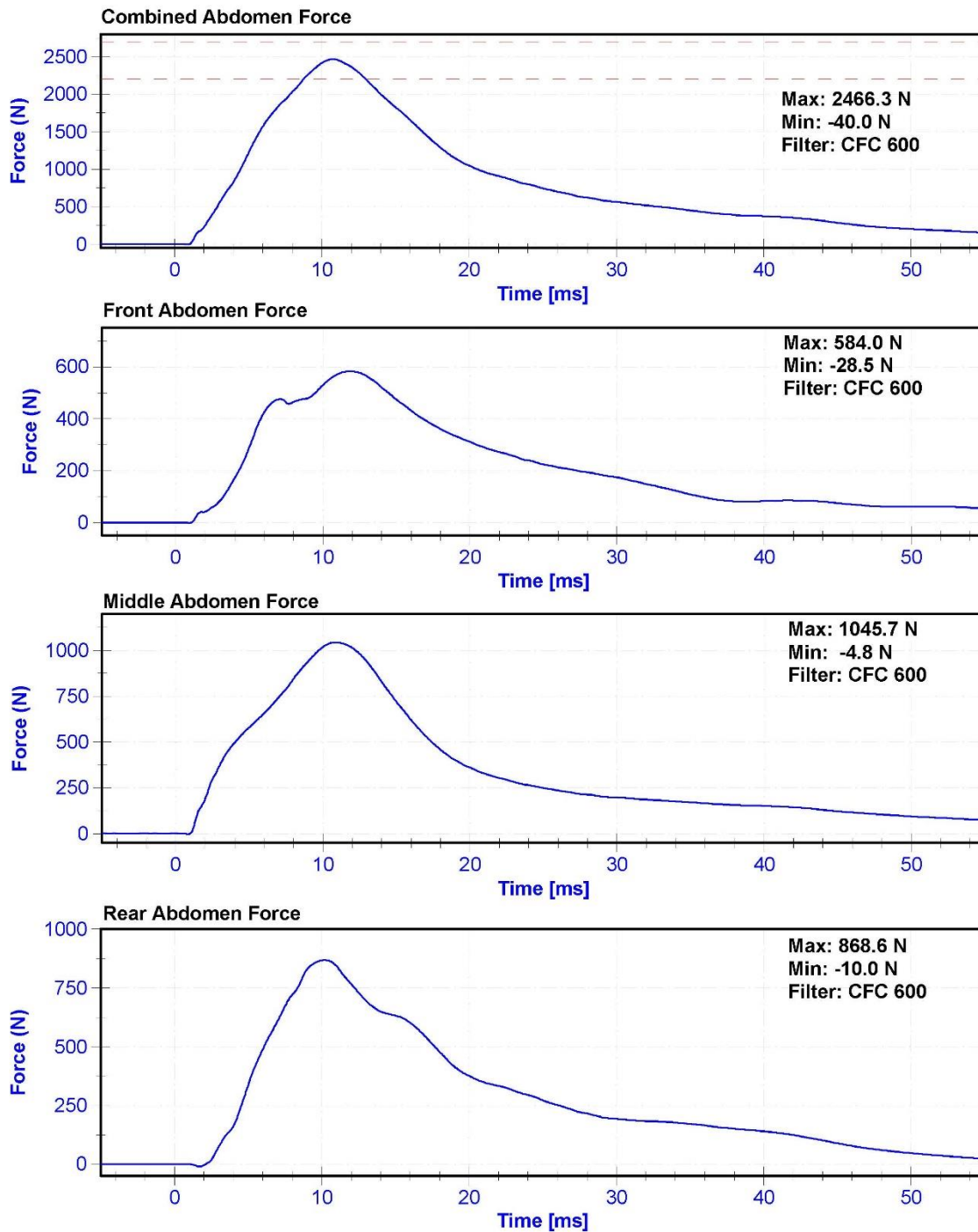
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	22.2	Pass
Velocity	3.9	4.1	m/s	4.01	Pass
Combined Abdomen Force	2,200	2,700	N	2466.3	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.75	Pass
Resistive Probe Force	4,000	4,800	N	4483.9	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.75	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Front Abdomen Load Cell	DENTON 2631	LC-1512	6/25/2015	6/24/2016
Middle Abdomen Load Cell	DENTON 2631	LC-1526	6/25/2015	6/24/2016
Rear Abdomen Load Cell	DENTON 2631	LC-1516	6/25/2015	6/24/2016







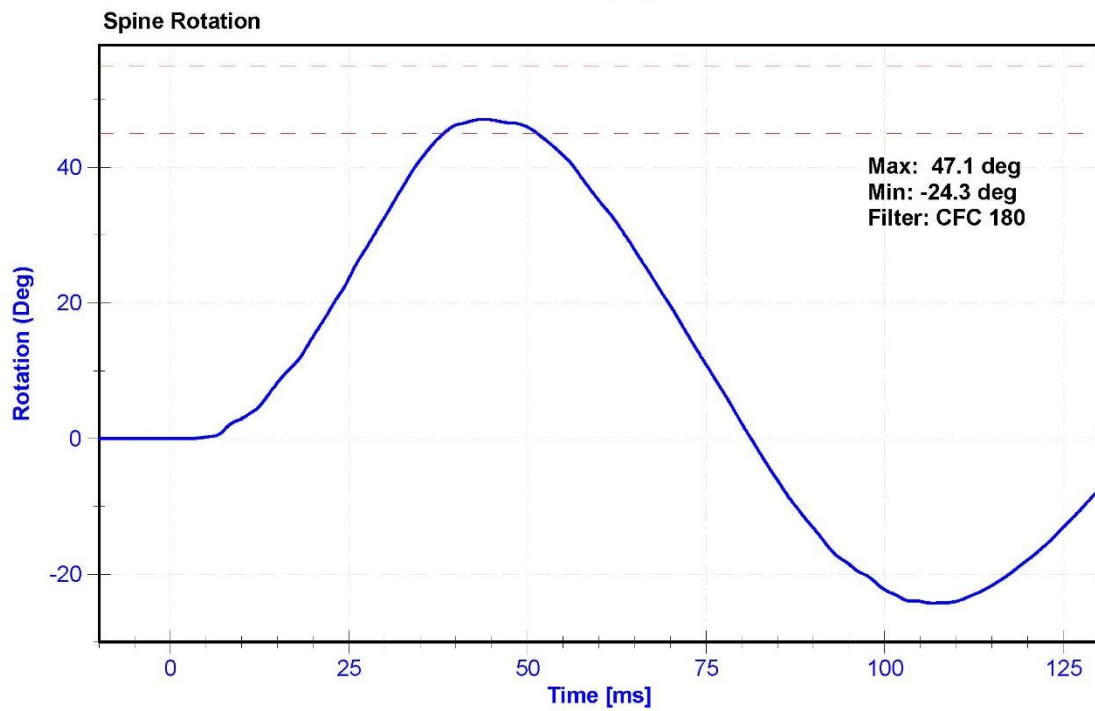
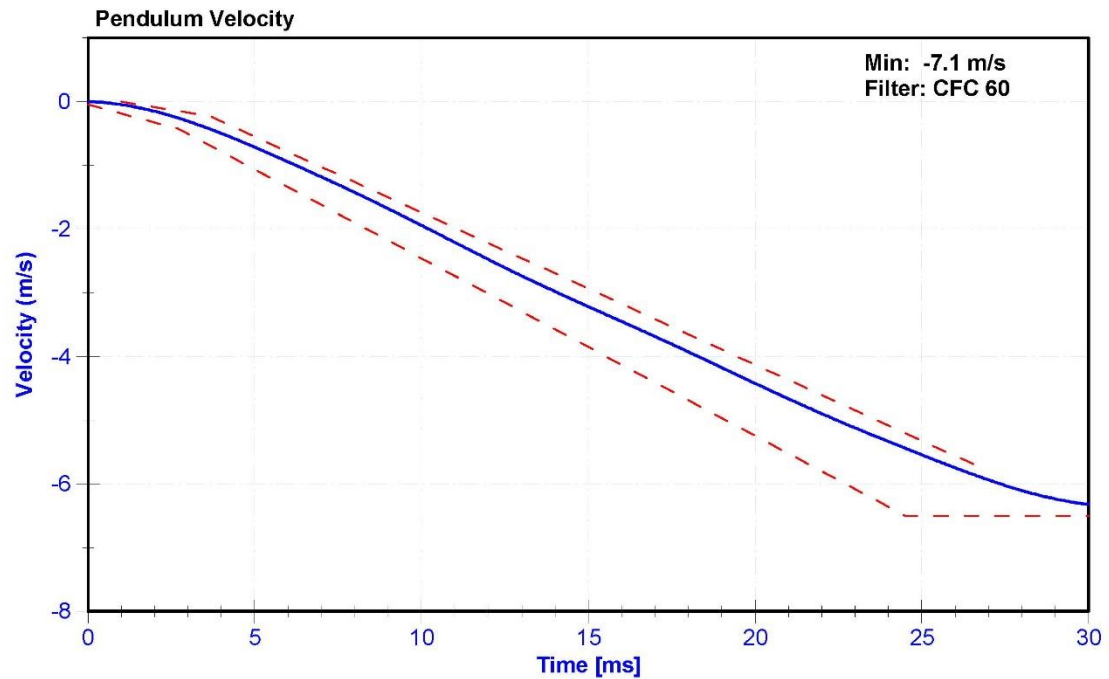
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

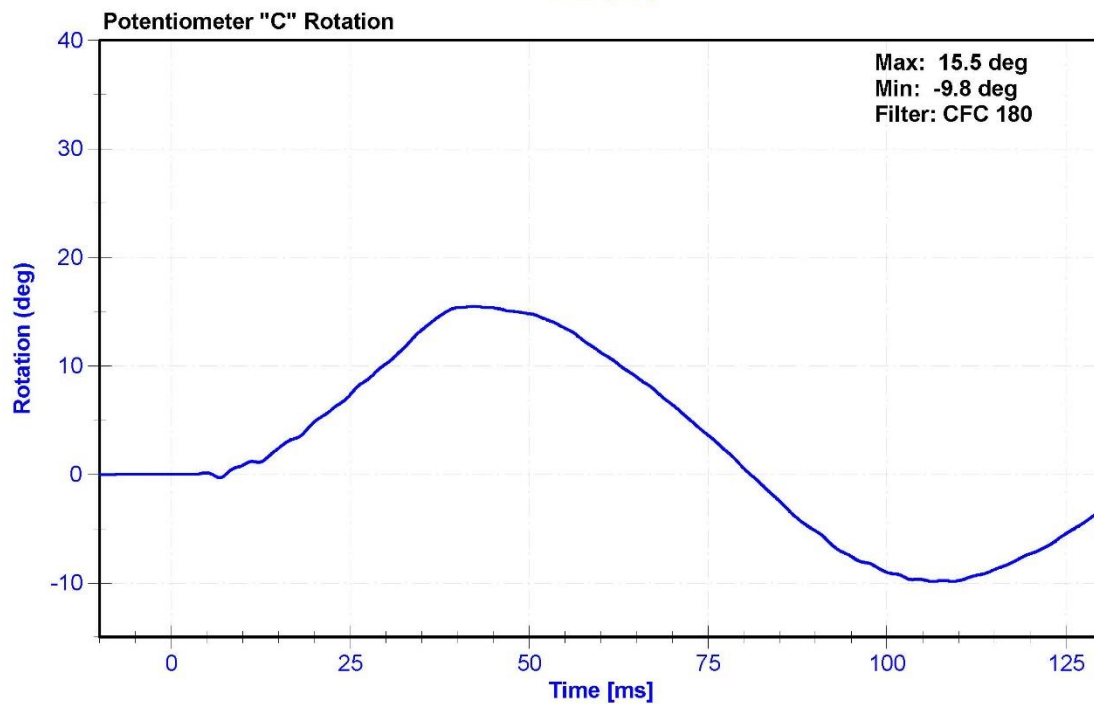
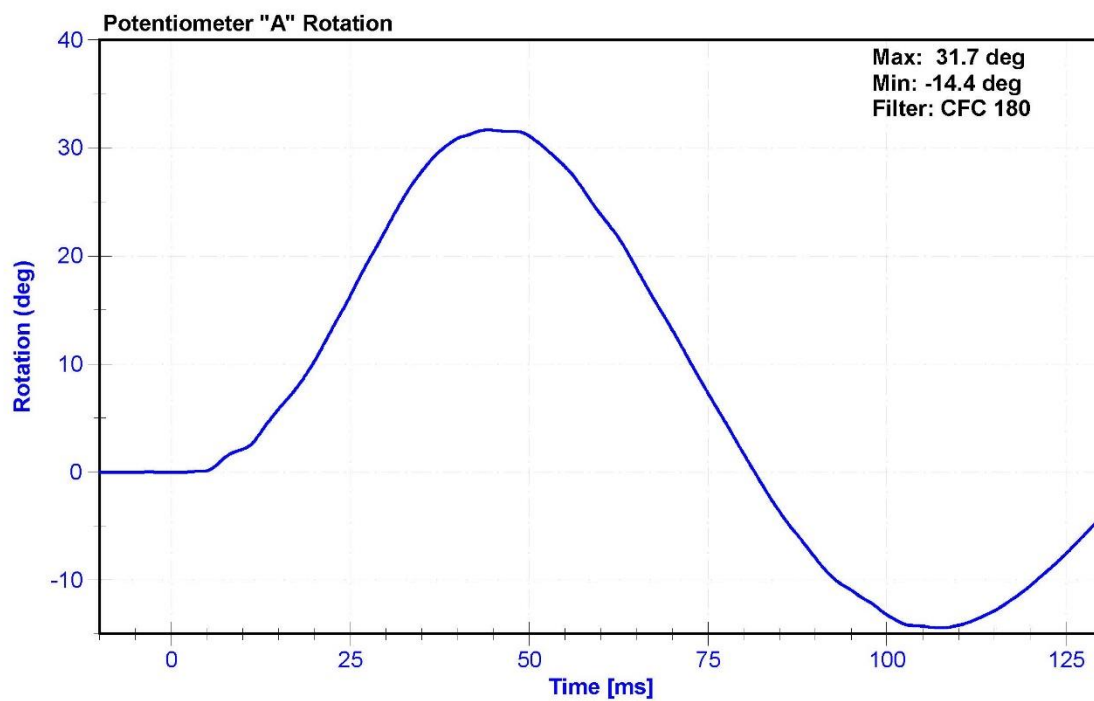
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	22.5	Pass
Velocity	5.95	6.15	m/s	6.068	Pass
Lateral Spine Rotation	45	55	deg	47.1	Pass
Time at Maximum Rotation	39	53	ms	43.8	Pass
Time of Decay to Zero Degrees	37	57	ms	37.5	Pass
Pulse within Corridor?	-	-	-	Yes	

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Pendulum "A" Potentiometer	SP22G	DS-094	9/24/2015	9/23/2016
Condyle "B" Potentiometer	SP22G	DS-095	9/24/2015	9/23/2016





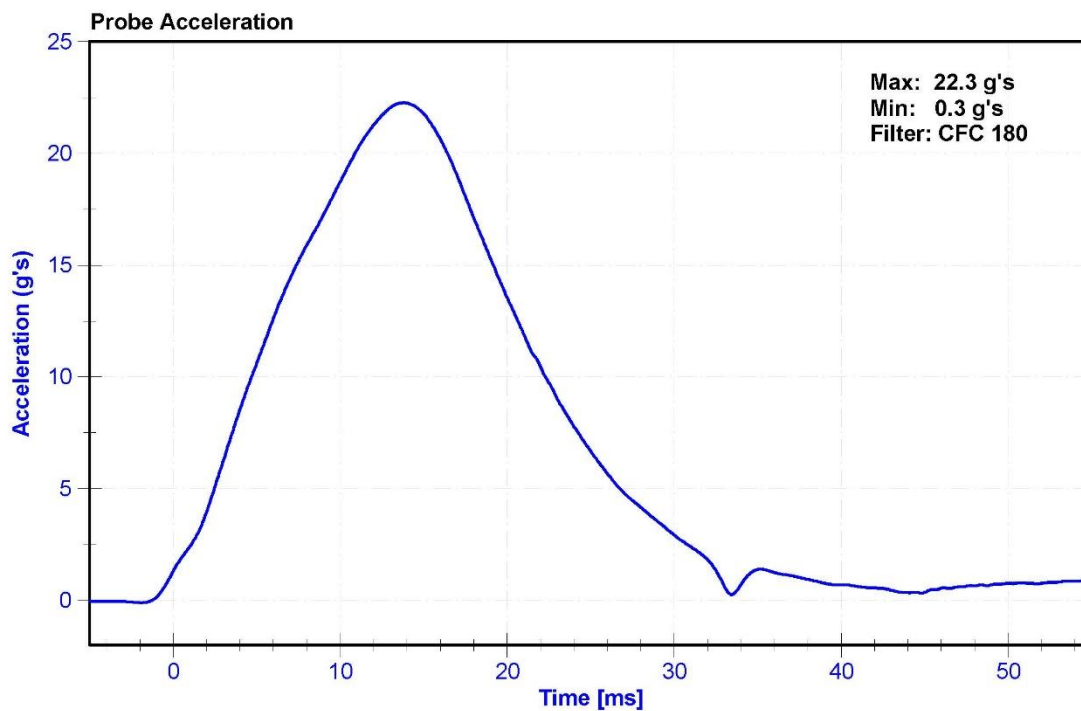
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

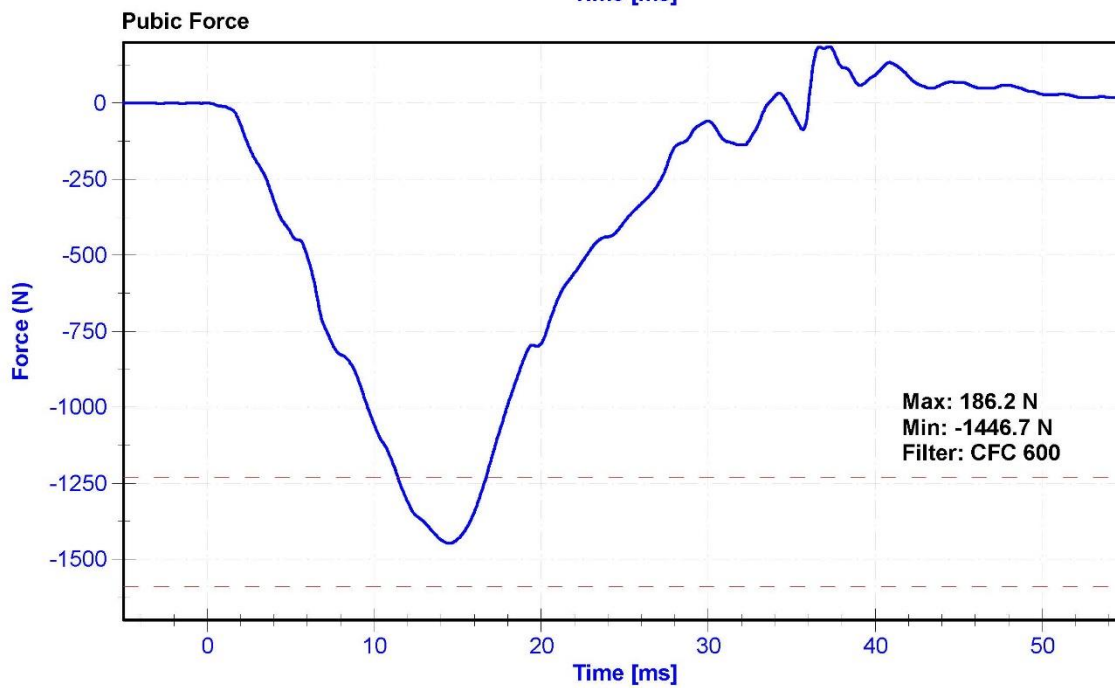
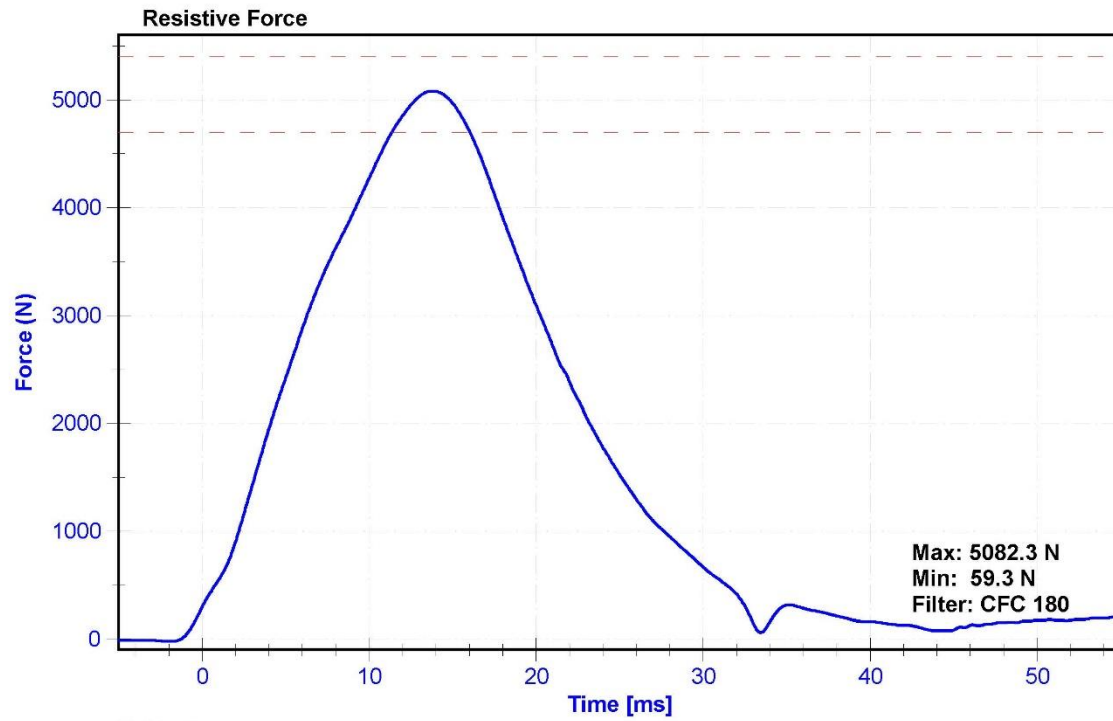
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	21.7	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Resistive Force	4,700	5,400	N	5082.3	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.80	Pass
Pubic Force	-1,590	-1,230	N	-1446.7	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.50	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pubic Load Cell	Denton 3096JFL	LC-465Fy	6/25/2015	6/24/2016





CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 303

(CONFIGURED FOR LEFT SIDE IMPACT)

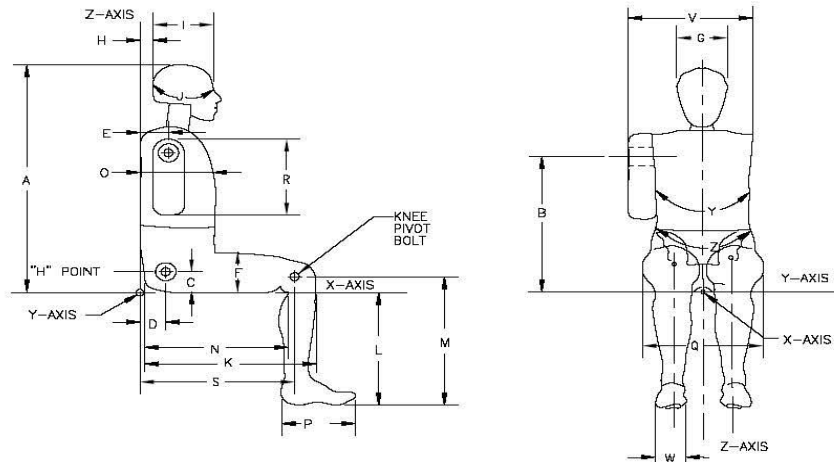


External Measurements - SID-IIs

Technician: M.Hartung

Date: 12/1/2015

Dummy Serial Number: 303



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	445	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	131	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	353	Pass
M	Knee Pivot to floor height	392	409	405	Pass
N	Buttock Popliteal Length	416	442	436	Pass
O	Chest Depth w/o jacket	195	211	202	Pass
P	Foot Length	216	232	224	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	488	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	871	Pass
Z	Waist Circumference	761	791	772	Pass

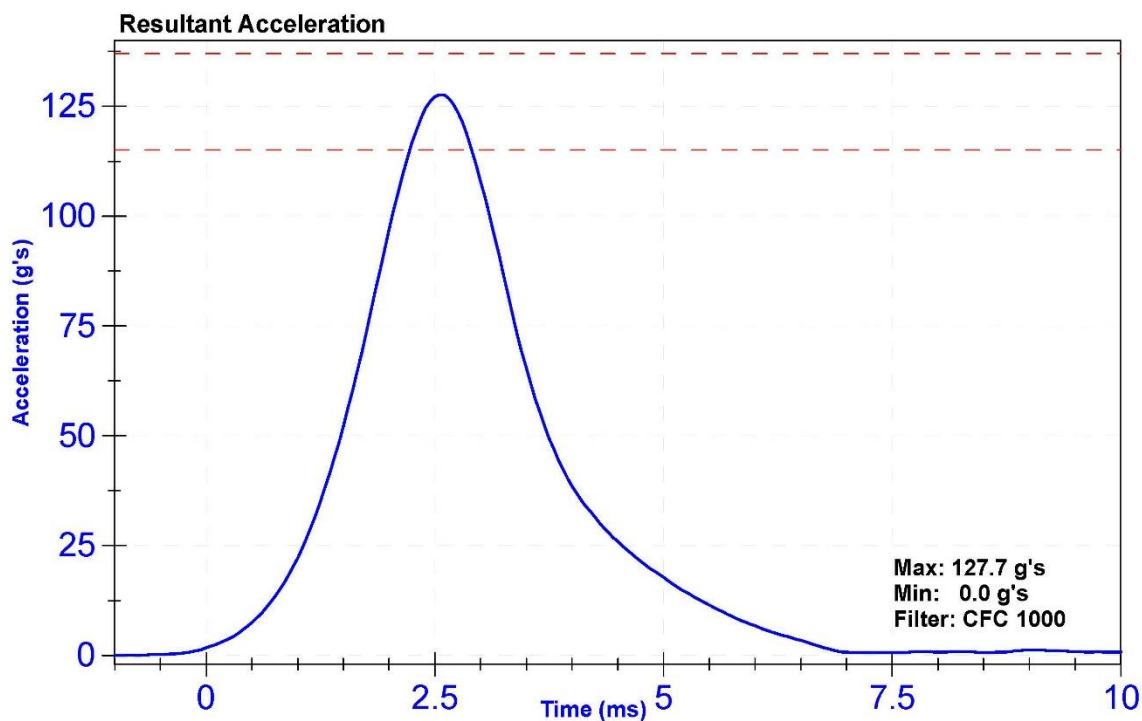
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

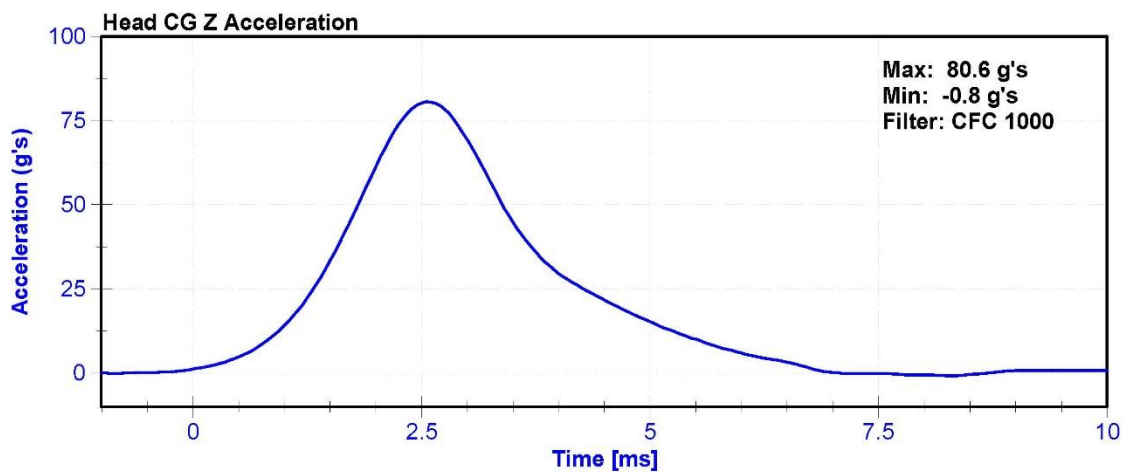
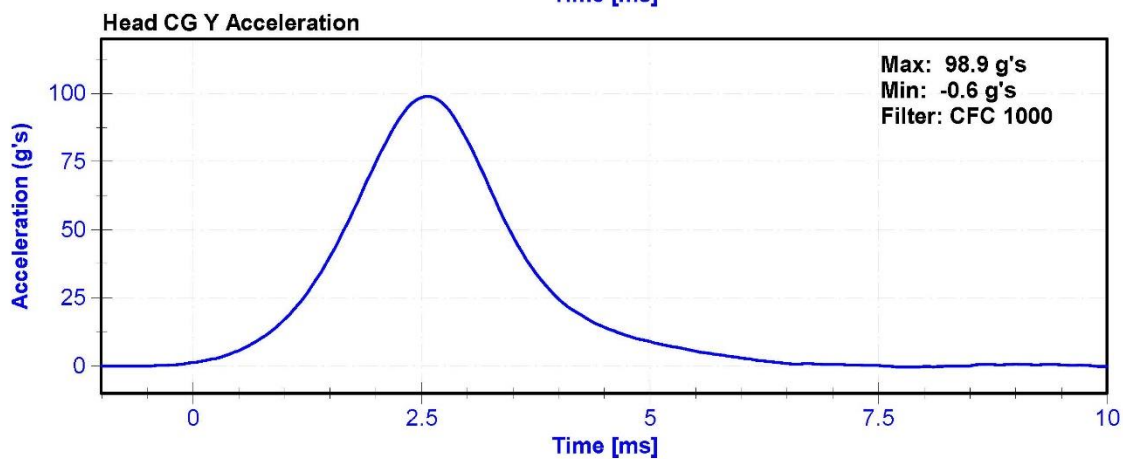
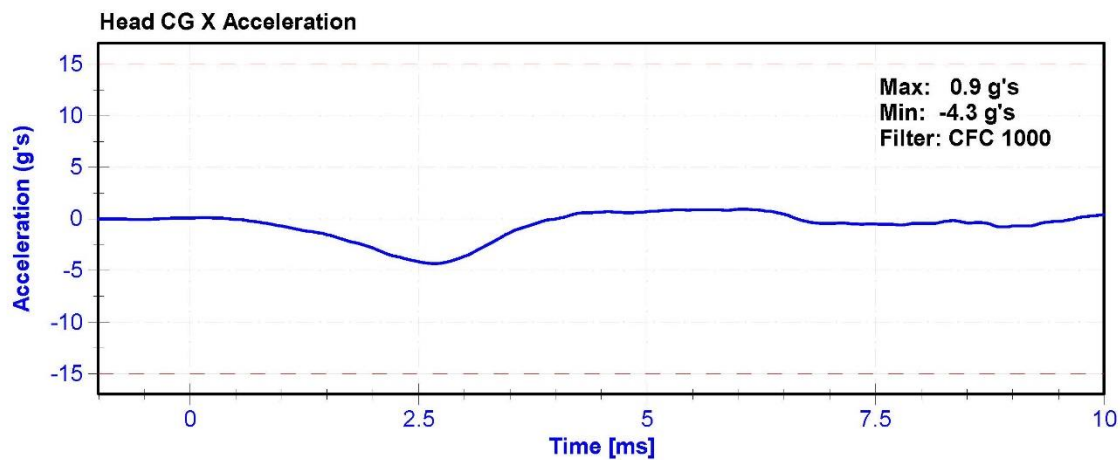
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	37	Pass
Resultant Acceleration	115	137	g's	127.7	Pass
Oscillation	0	15	%	0.9	Pass
Fore-Aft Acceleration	-15	15	g's	-4.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P83420	10/16/2015	4/15/2016
Y Accelerometer	ENDEVCO 7264	AC-P52040	10/14/2015	4/13/2016
Z Accelerometer	ENDEVCO 7264CT	AC-P58737	10/14/2015	4/13/2016





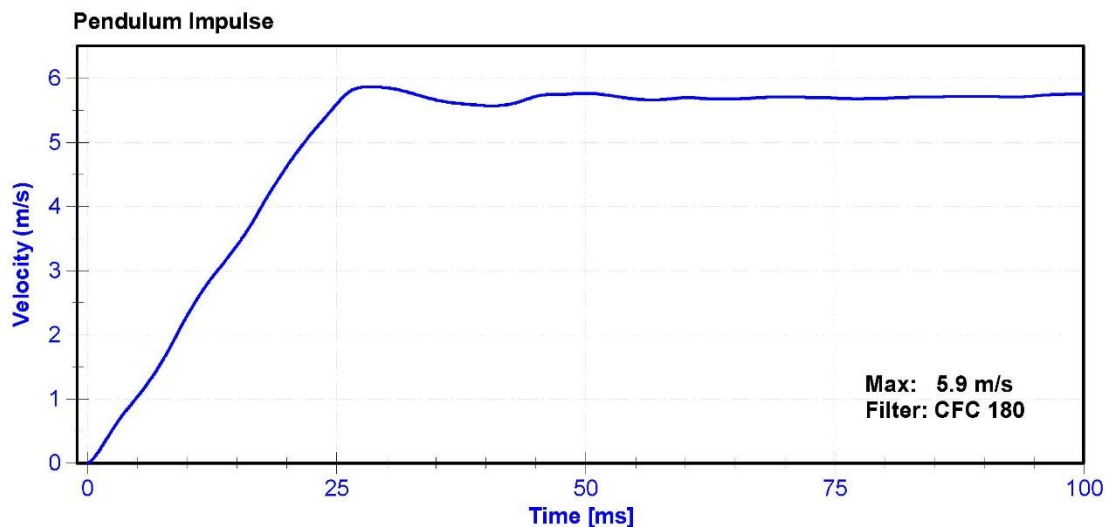
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

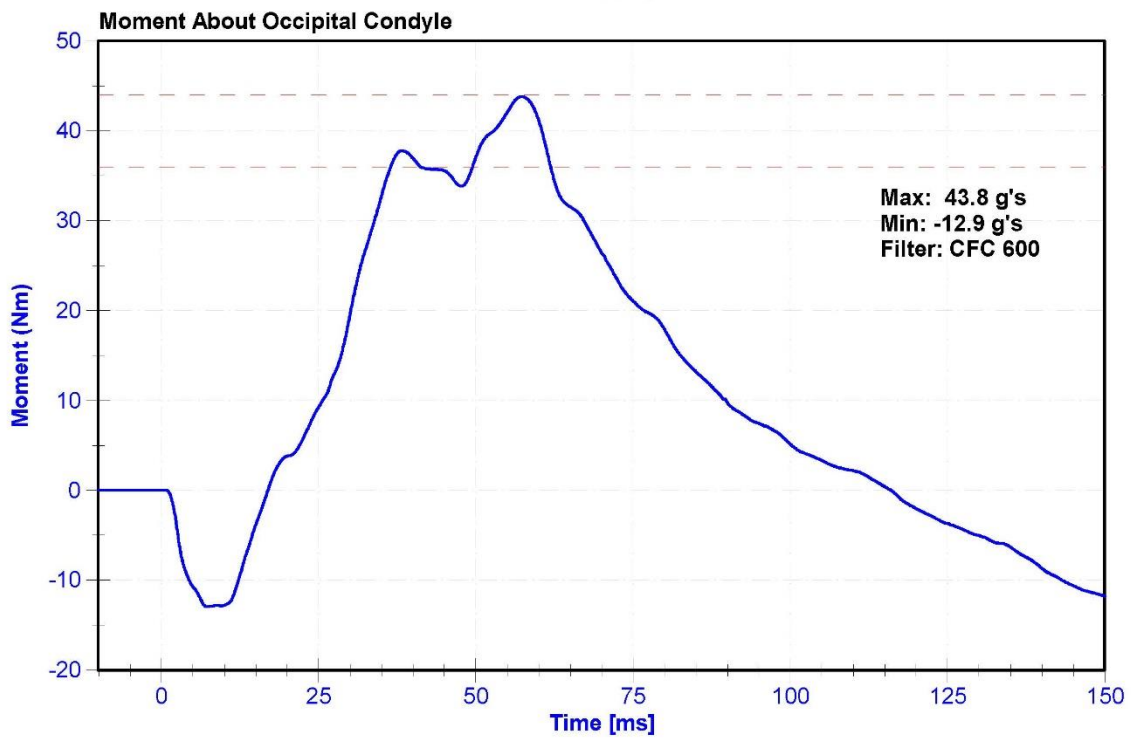
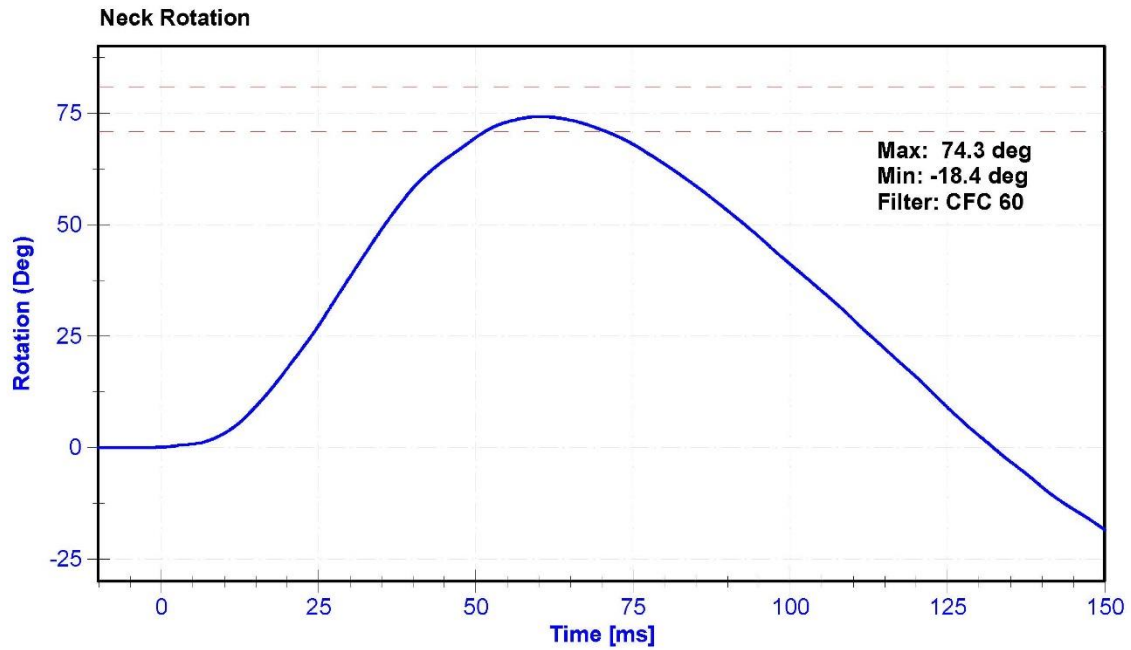
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	36	Pass
Velocity	5.51	5.63	m/s	5.583	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.30	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.39	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.63	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.60	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	74.3	Pass
Time at Maximum Rotation	50	70	ms	60.2	Pass
Moment about the OC	36	44	Nm	43.8	Pass
Moment Decay to 0 Nm	102	126	ms	116.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	9/24/2015	9/23/2016
Condyle Potentiometer	Denton 78051-342	DS-185Pend	9/25/2015	9/24/2016
Upper Neck Load Cell	Denton 1716A	LC-1916Fy	6/29/2015	6/28/2016





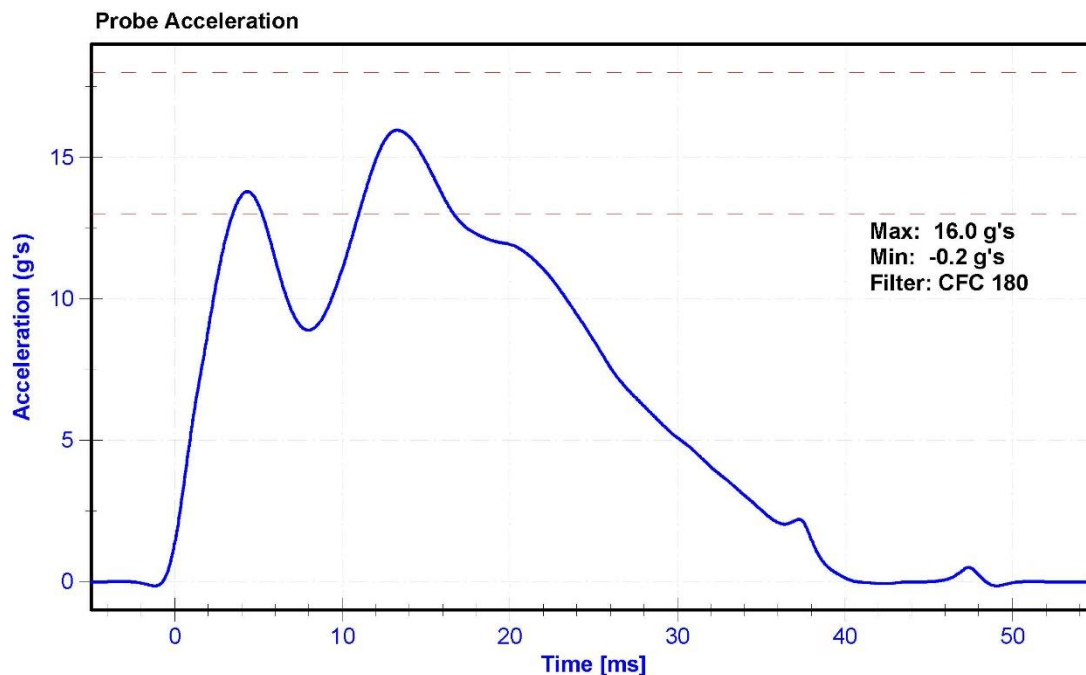
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

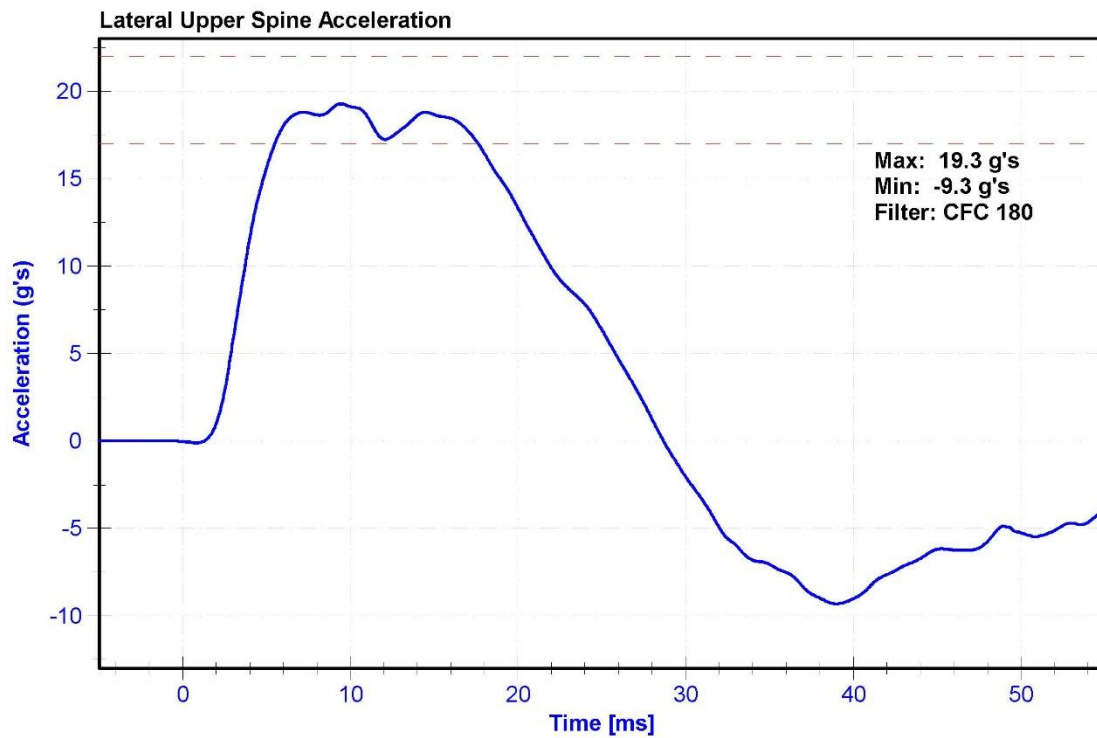
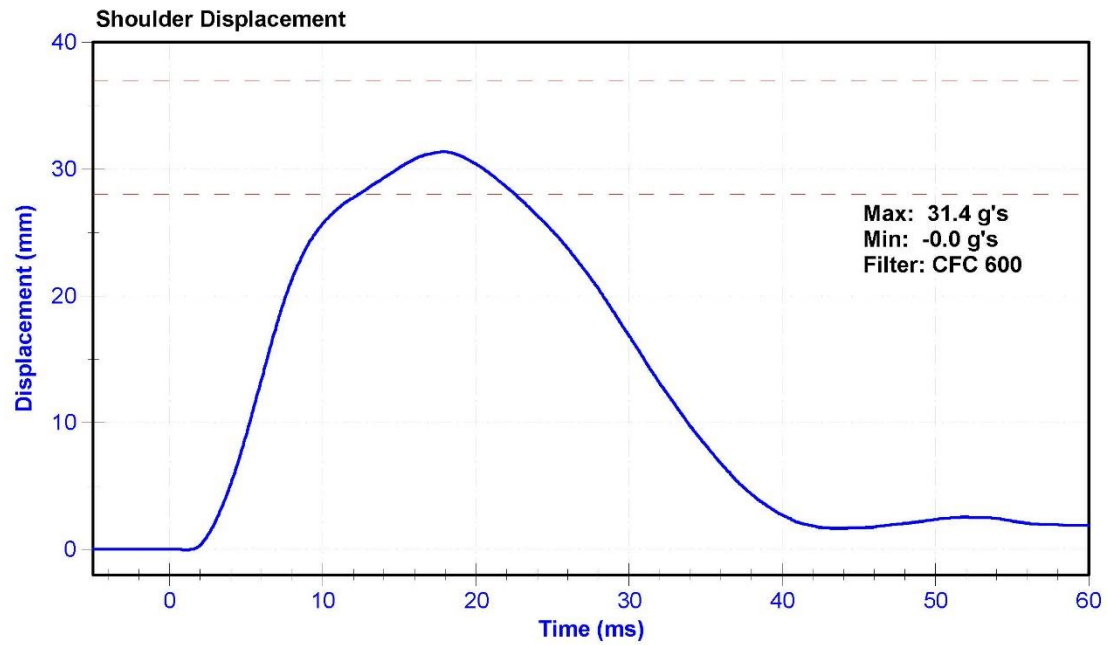
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	34.6	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	31.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Shoulder Potentiometer	Servo 08TC1-3725	DS-008GFE	10/19/2015	10/18/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/19/2015	4/18/2016





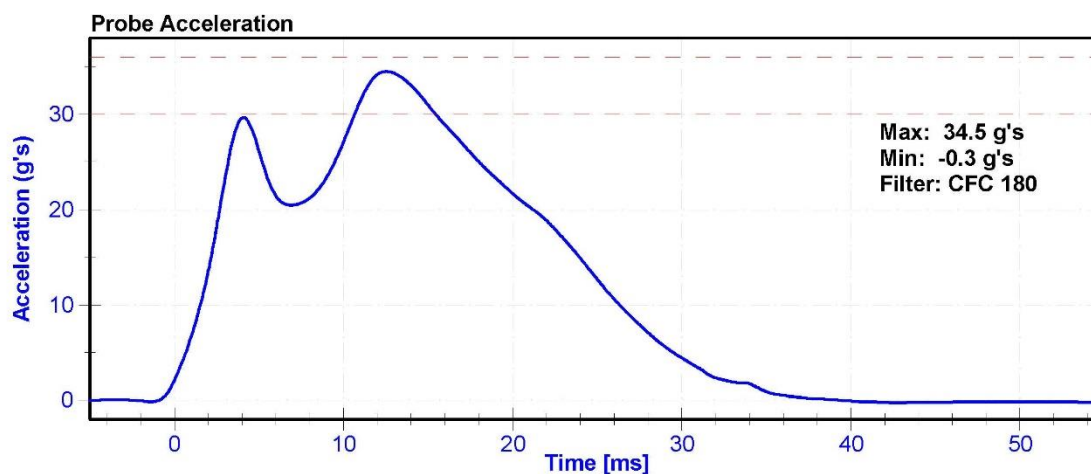
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

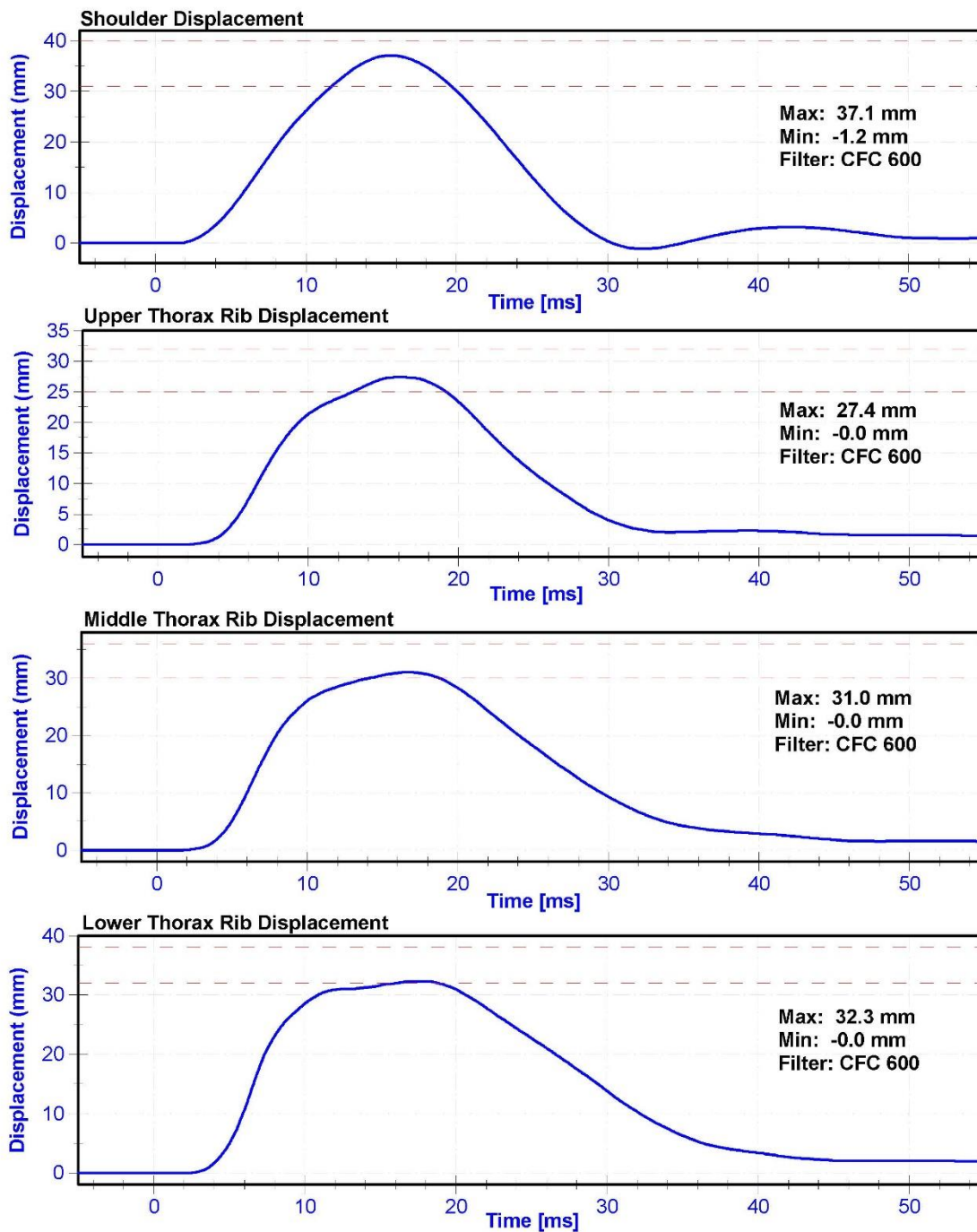
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	35.7	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	34.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	40.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.9	Pass
Shoulder Deflection	31	40	mm	37.1	Pass
Upper Thorax Rib Deflection	25	32	mm	27.4	Pass
Mid Thorax Rib Deflection	30	36	mm	31.0	Pass
Lower Thorax Rib Deflection	32	38	mm	32.3	Pass

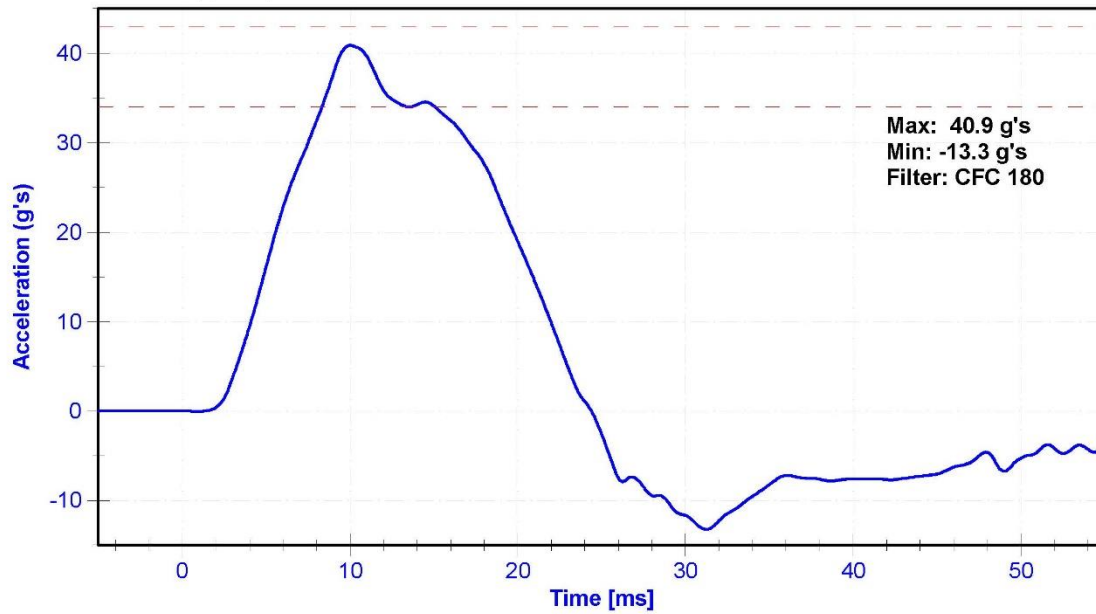
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/19/2015	4/18/2016
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/19/2015	4/18/2016
Shoulder Potentiometer	Servo 08TC1-3725	DS-008GFE	10/19/2015	10/18/2016
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	10/19/2015	10/18/2016
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	10/19/2015	10/18/2016
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	10/19/2015	10/18/2016

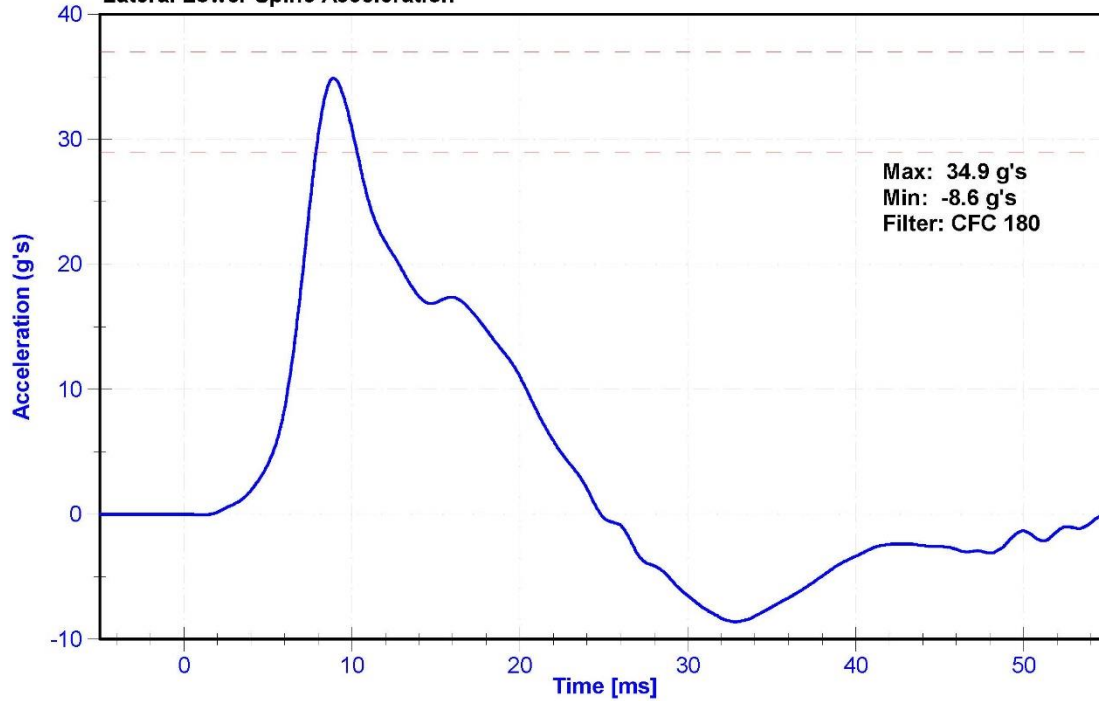




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



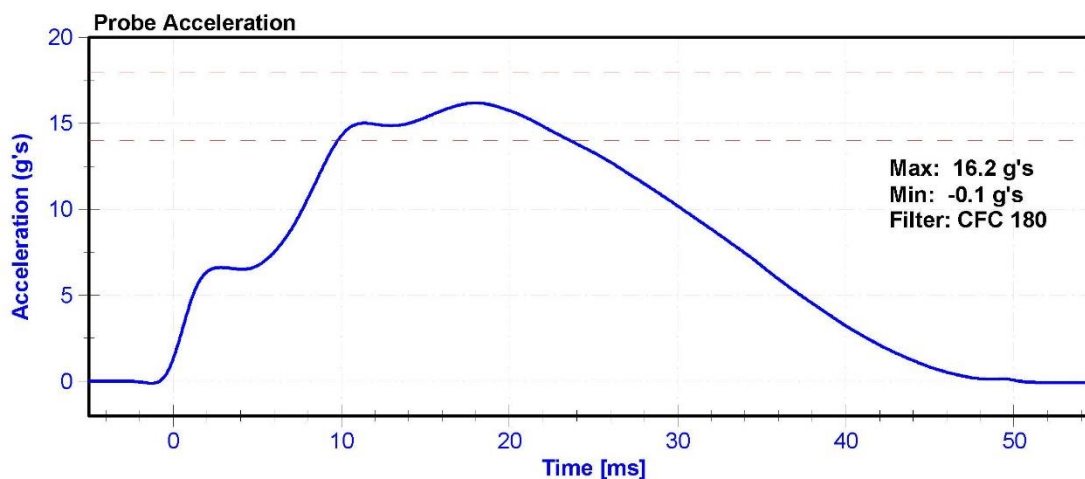
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

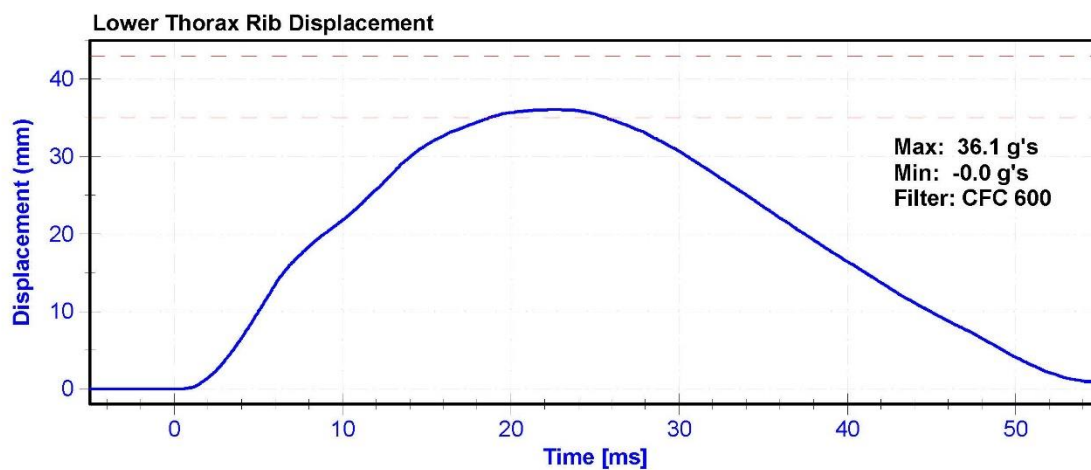
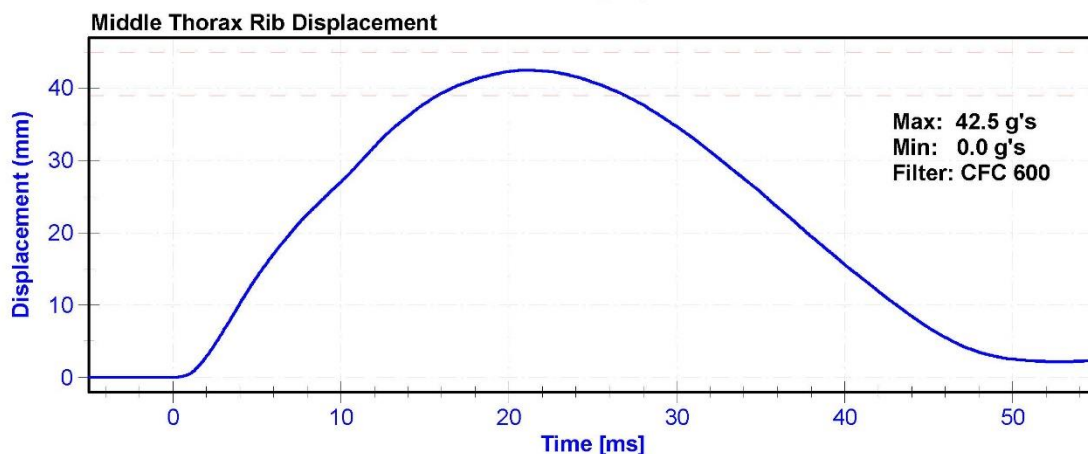
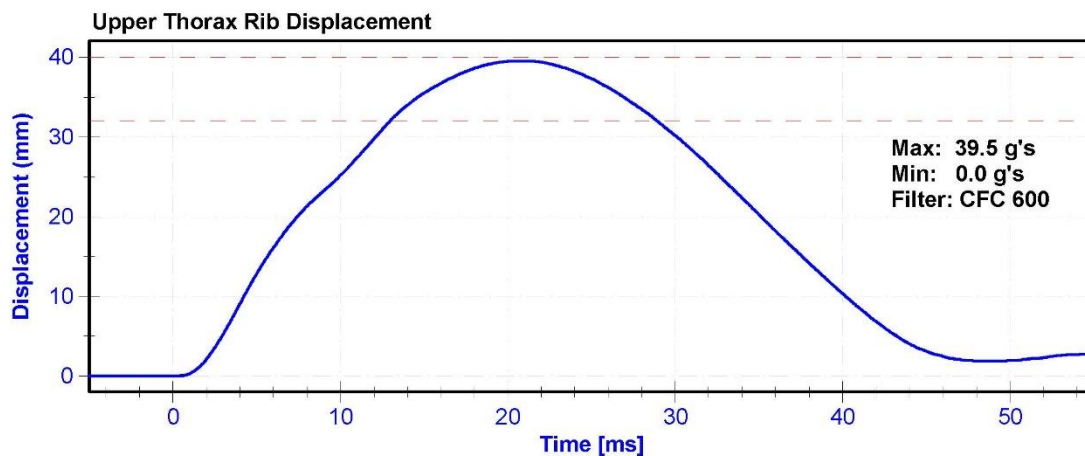
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	36.5	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.8	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.4	Pass
Upper Thorax Rib Deflection	32	40	mm	39.5	Pass
Middle Thorax Rib Deflection	39	45	mm	42.5	Pass
Lower Thorax Rib Deflection	35	43	mm	36.1	Pass

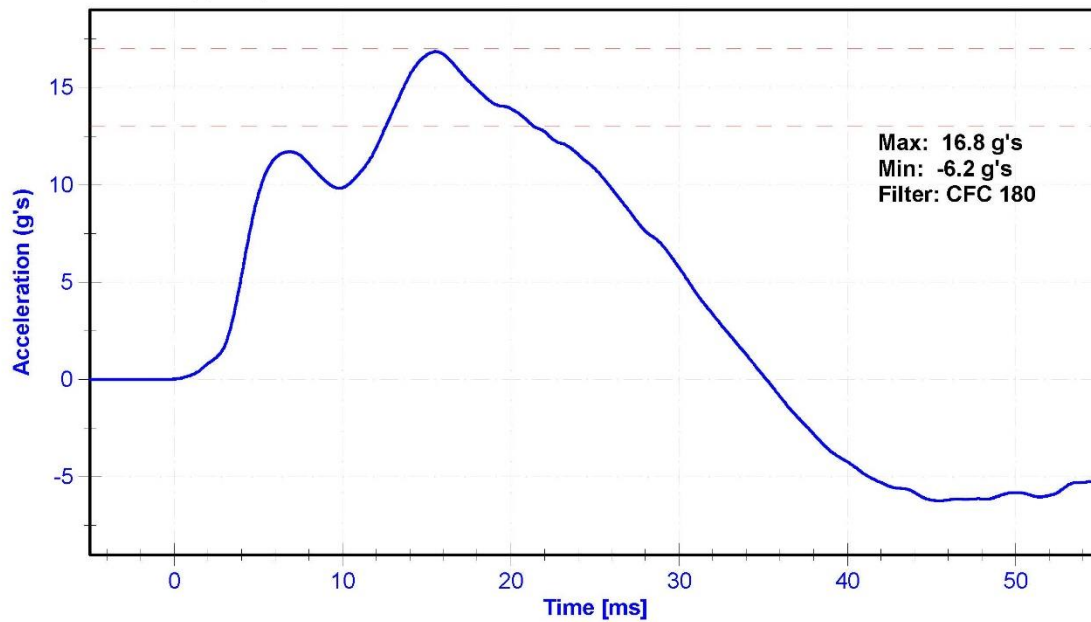
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/19/2015	4/18/2016
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/19/2015	4/18/2016
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	10/19/2015	10/18/2016
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	10/19/2015	10/18/2016
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	10/19/2015	10/18/2016

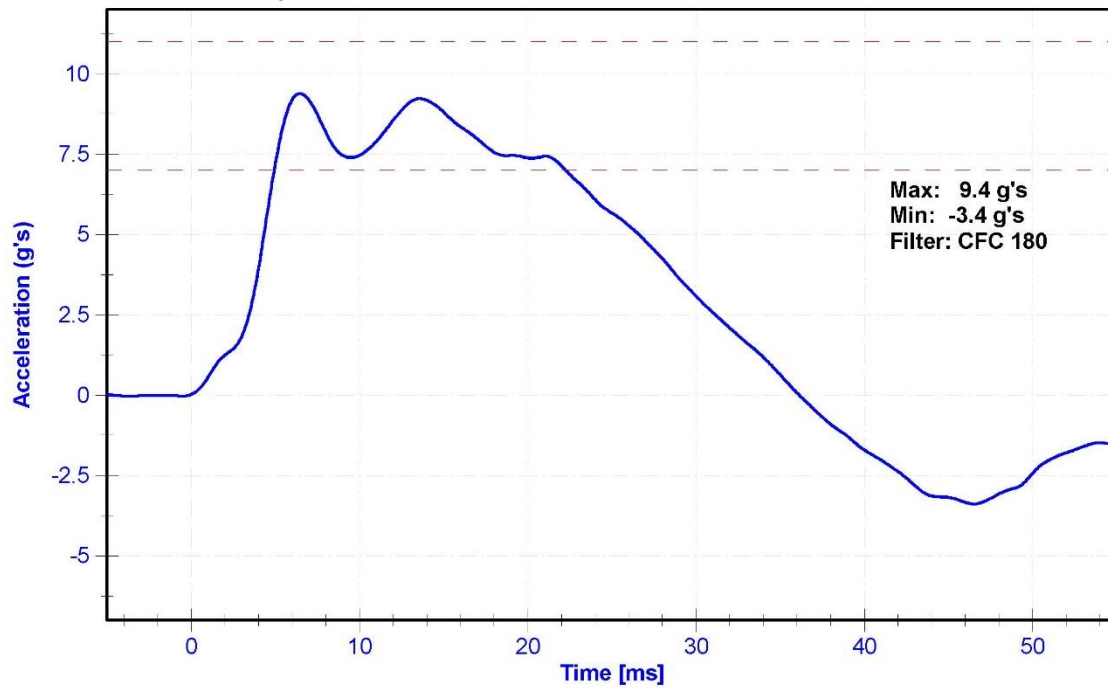




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



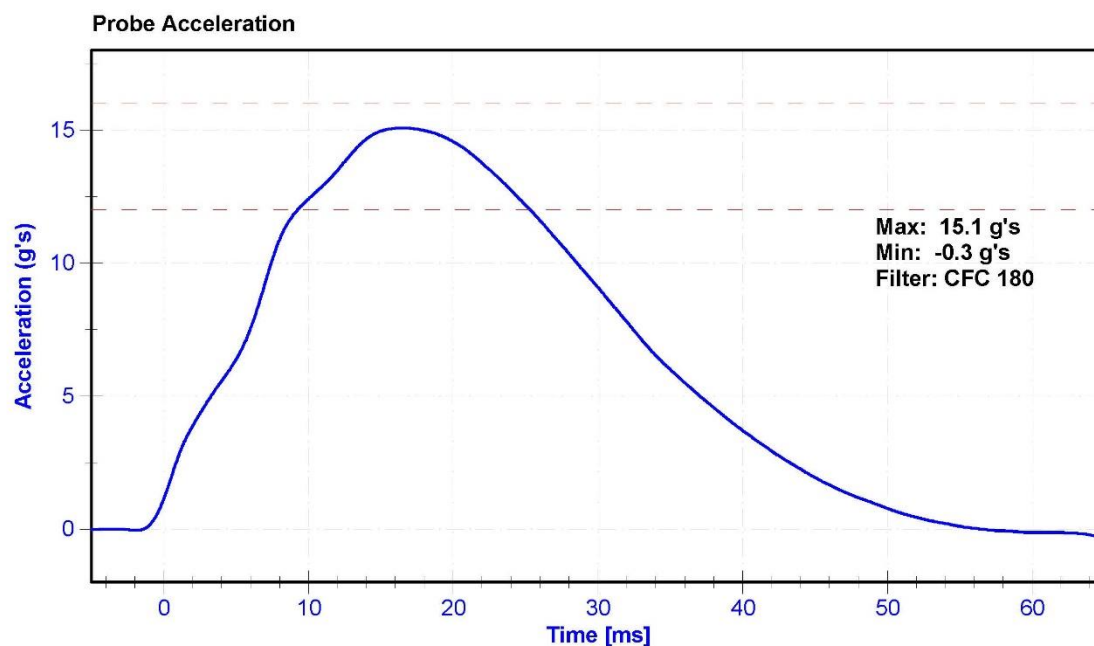
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

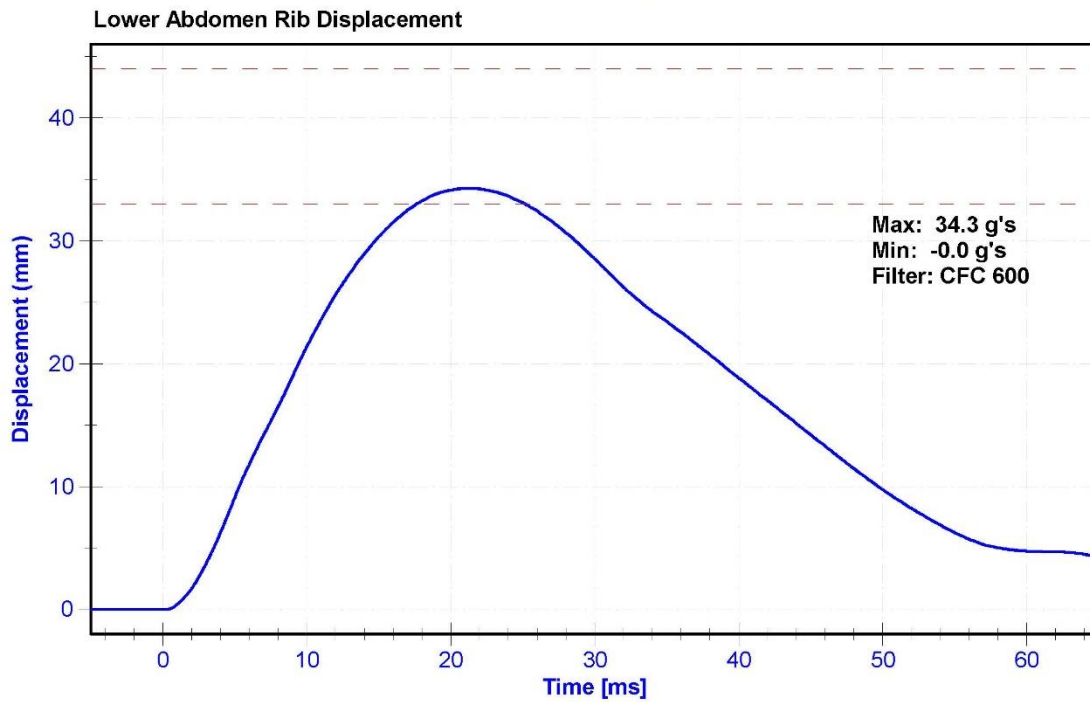
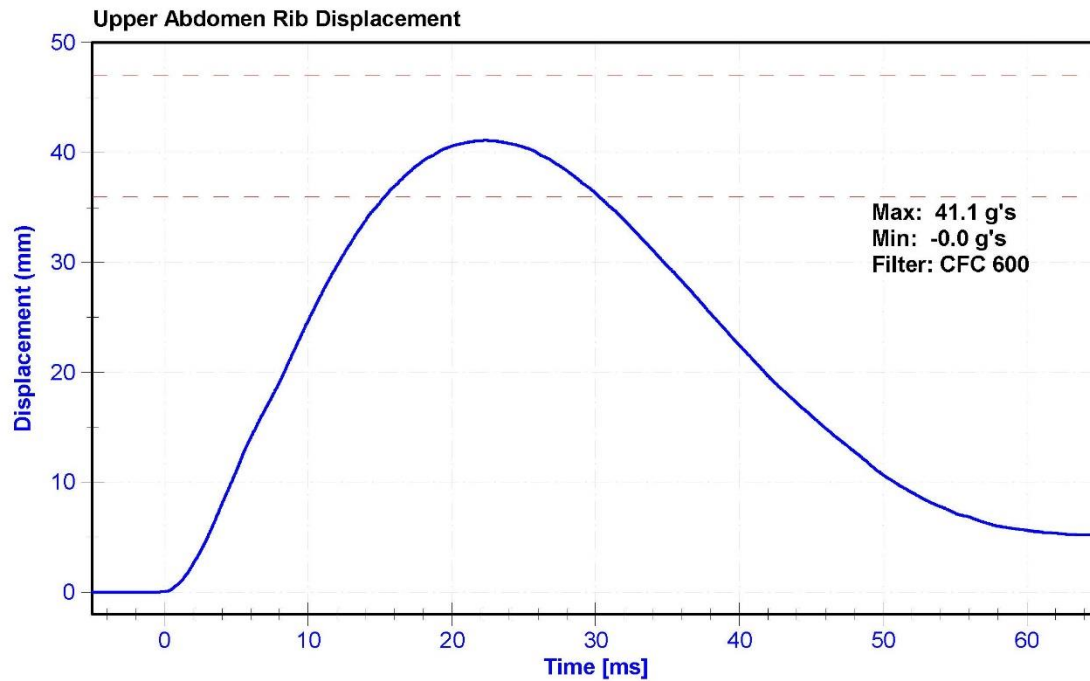
Results

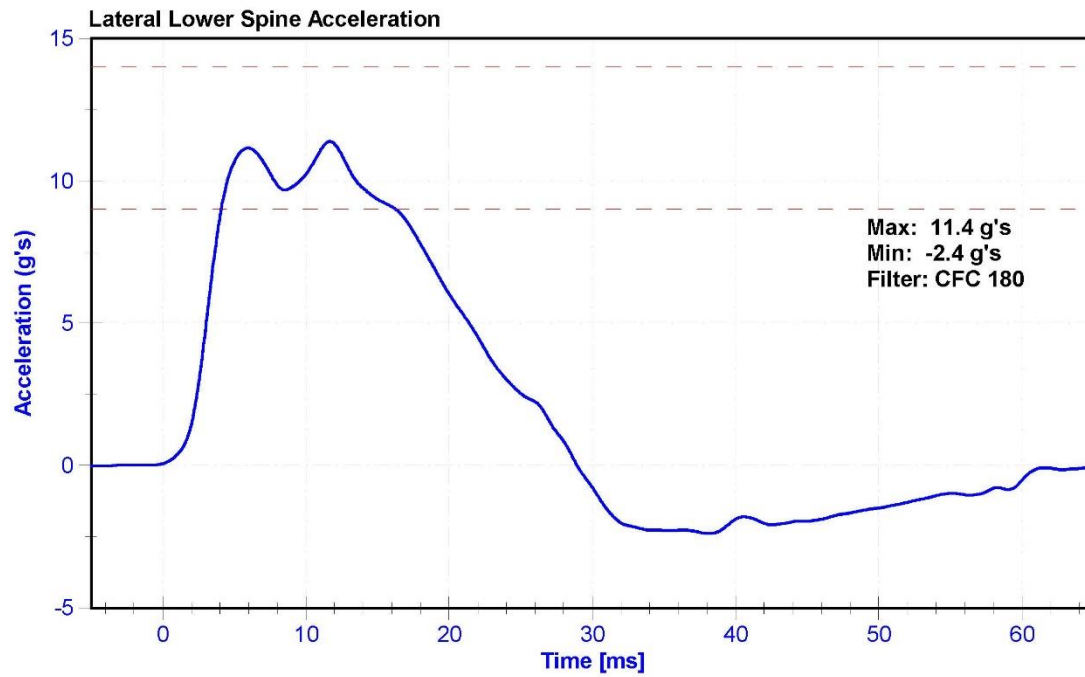
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	36.9	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	12	16	g's	15.1	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.4	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.1	Pass
Lower Abdomen Rib Deflection	33	44	mm	34.3	Pass

Transducer Calibrations

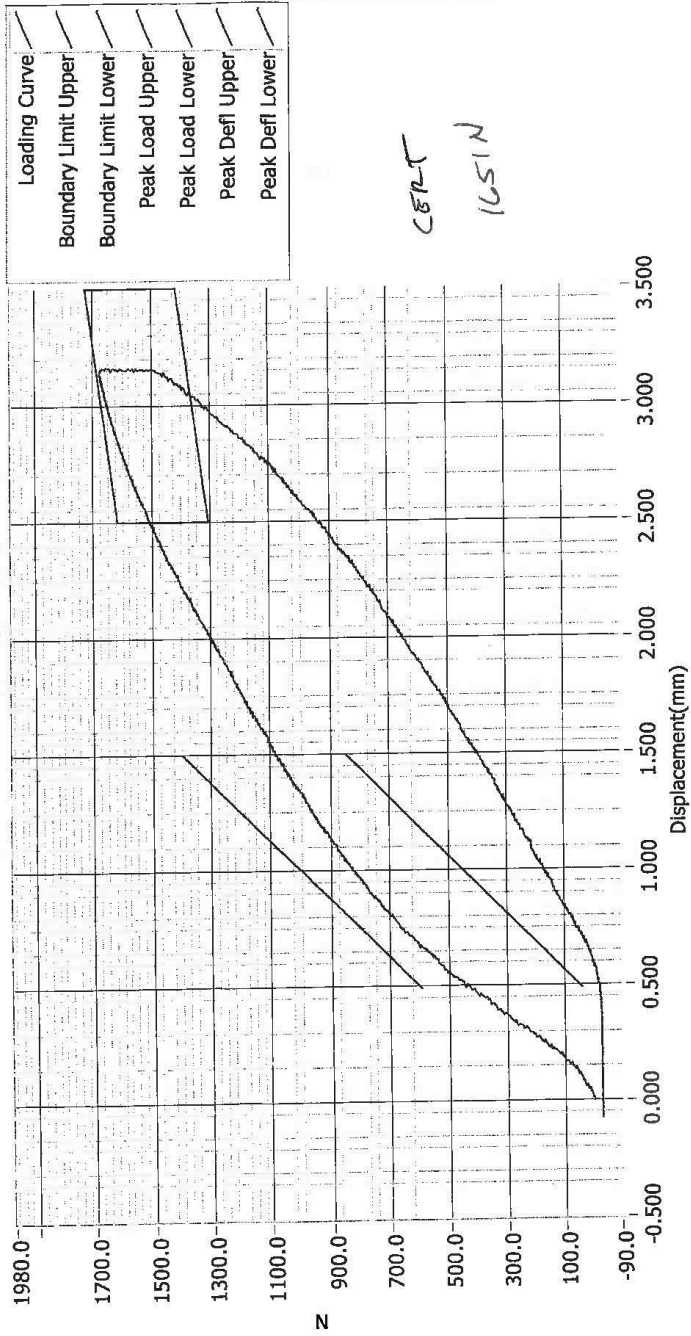
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/19/2015	4/18/2016
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-1274GFE	10/19/2015	10/18/2016
Lower Abdomen Rib Potentiometer	Servo 08CT1-3745	DS-2316GFE	10/28/2015	10/27/2016







Resultant Data - SIDIIs Plug Compression

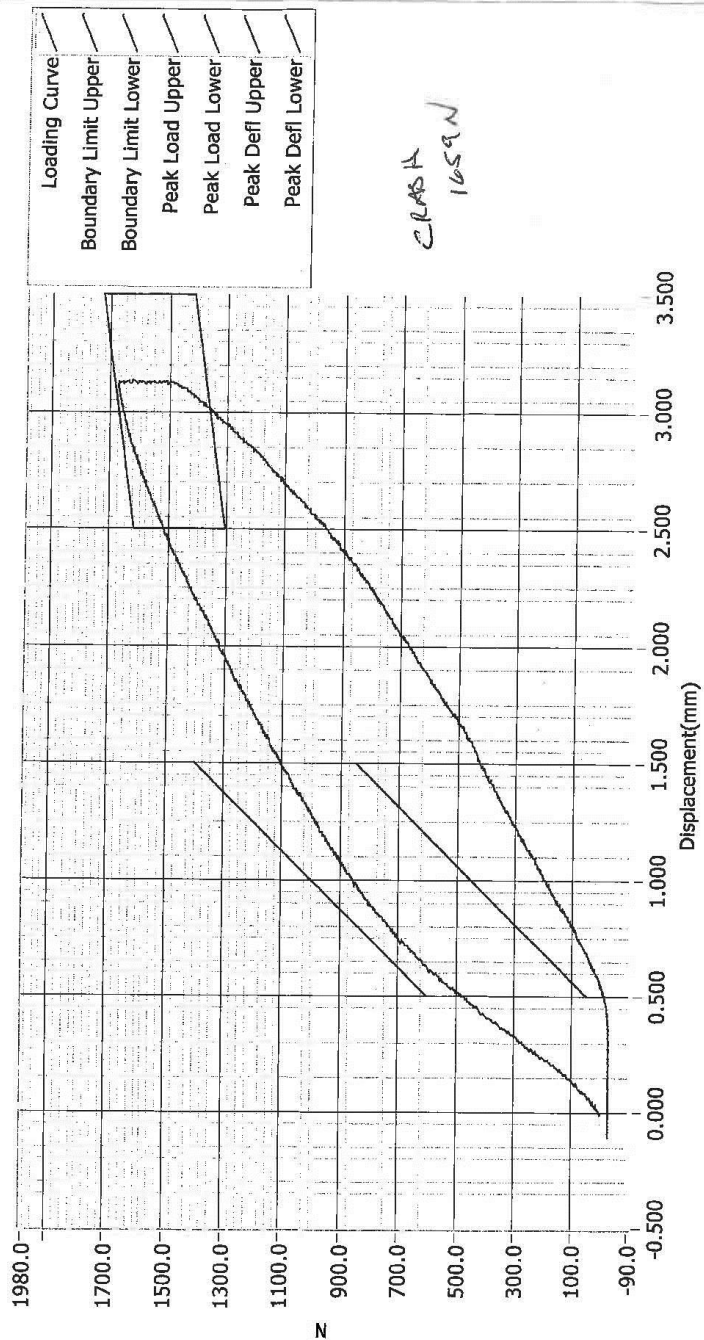


ATD Calibration Lab

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	81136	12/4/2014	11:38 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/4/2014 Current Time : 23:40:19

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	81132	12/4/2014	11:25 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

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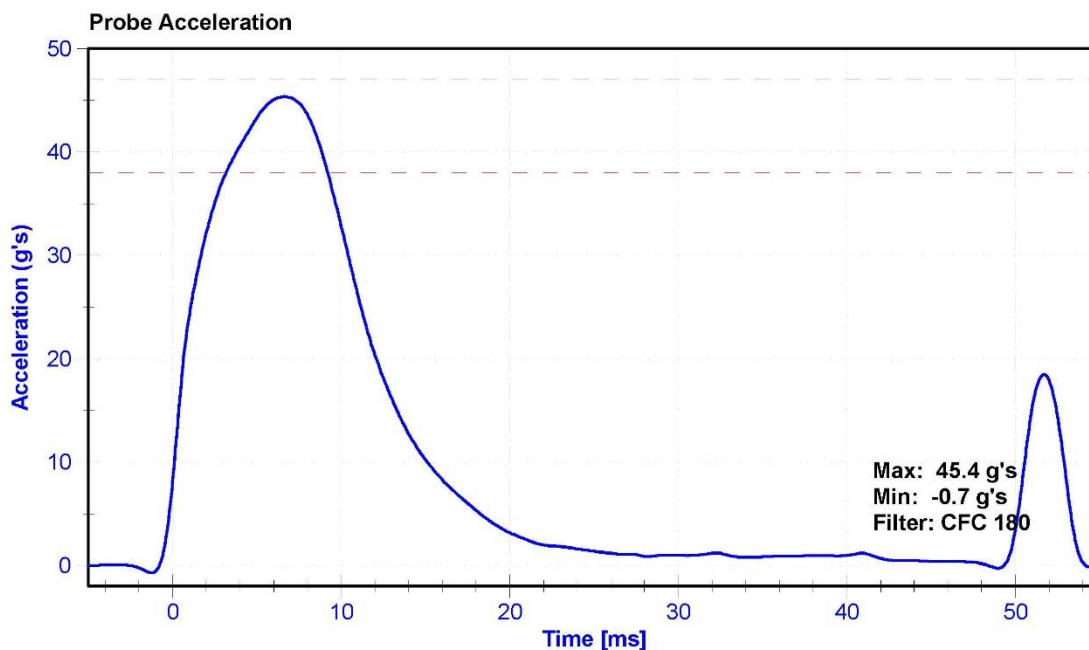
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

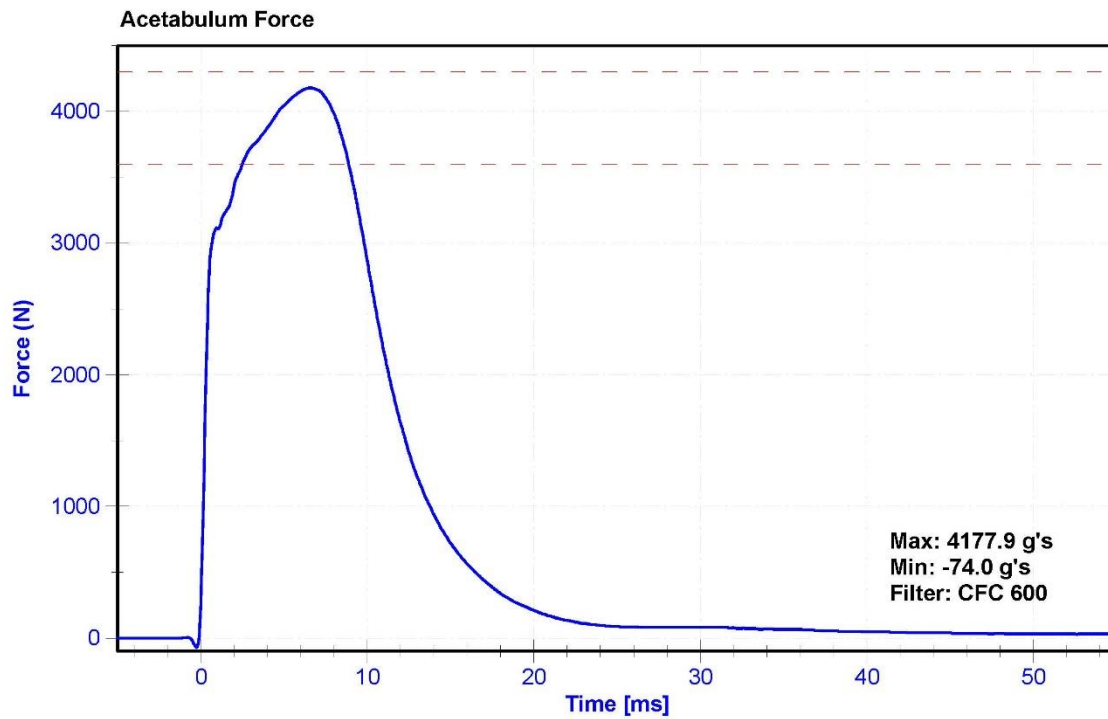
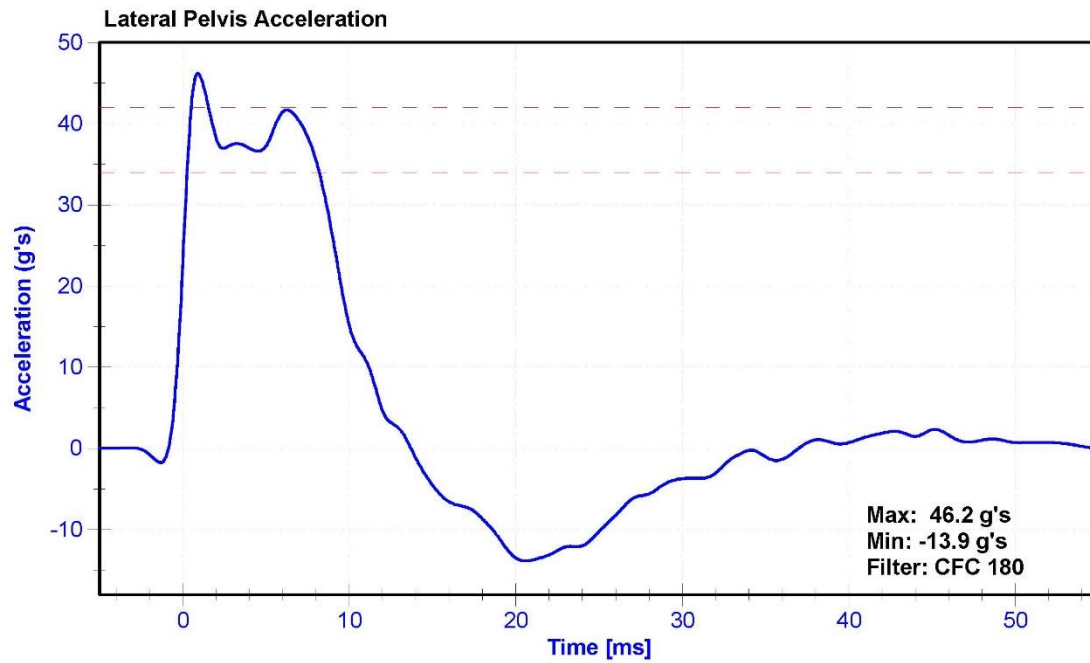
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	40.8	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration	38	47	g's	45.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.7	Pass
Acetabulum Force	3,600	4,300	N	4177.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	10/19/2015	4/18/2016
Acetabulum Load Cell	Denton IF-520	LC-236Fy	6/29/2015	6/28/2016
Certification Plug	Humanetics	81136	12/04/14	N/A
Crash Test Plug	Humanetics	81132	12/04/2014	N/A





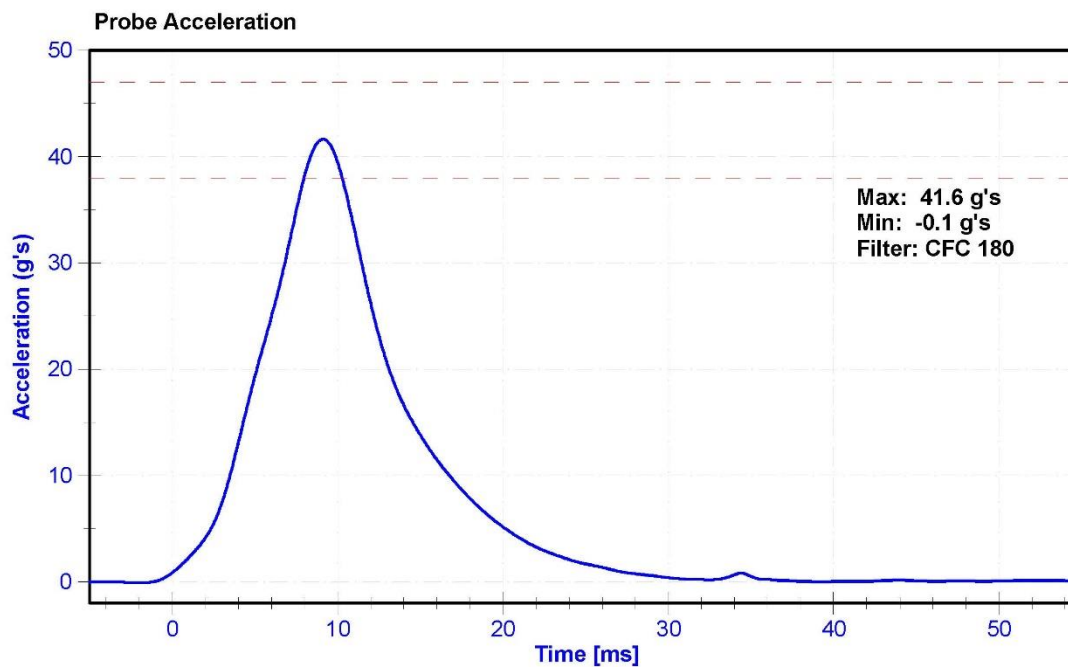
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

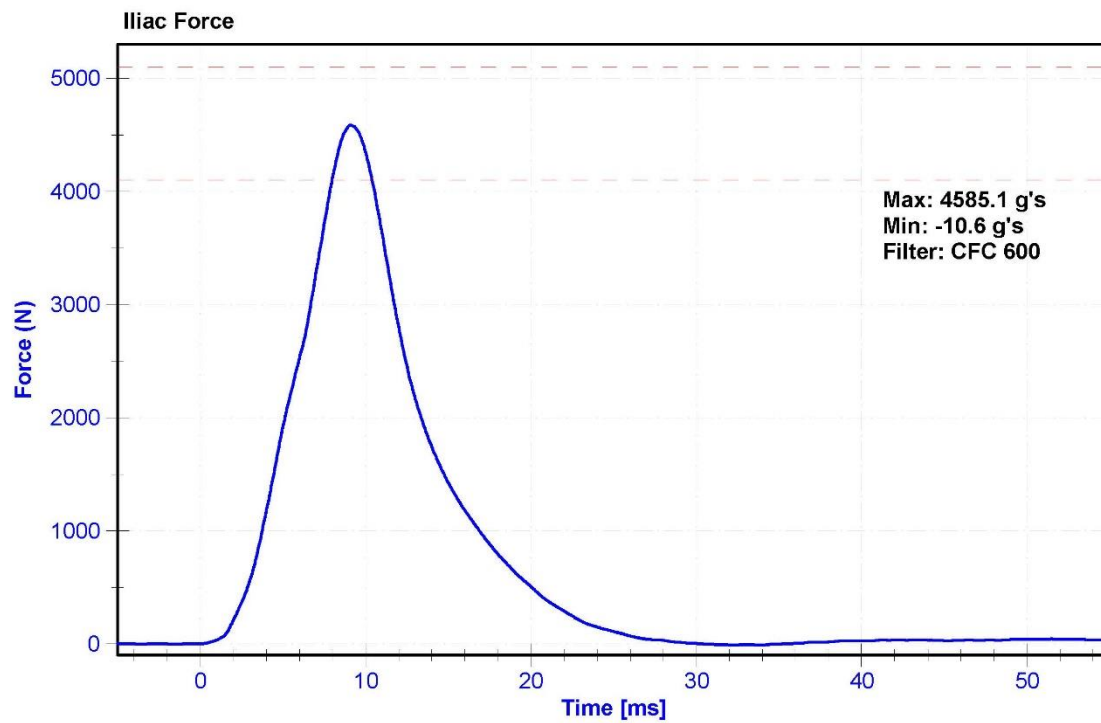
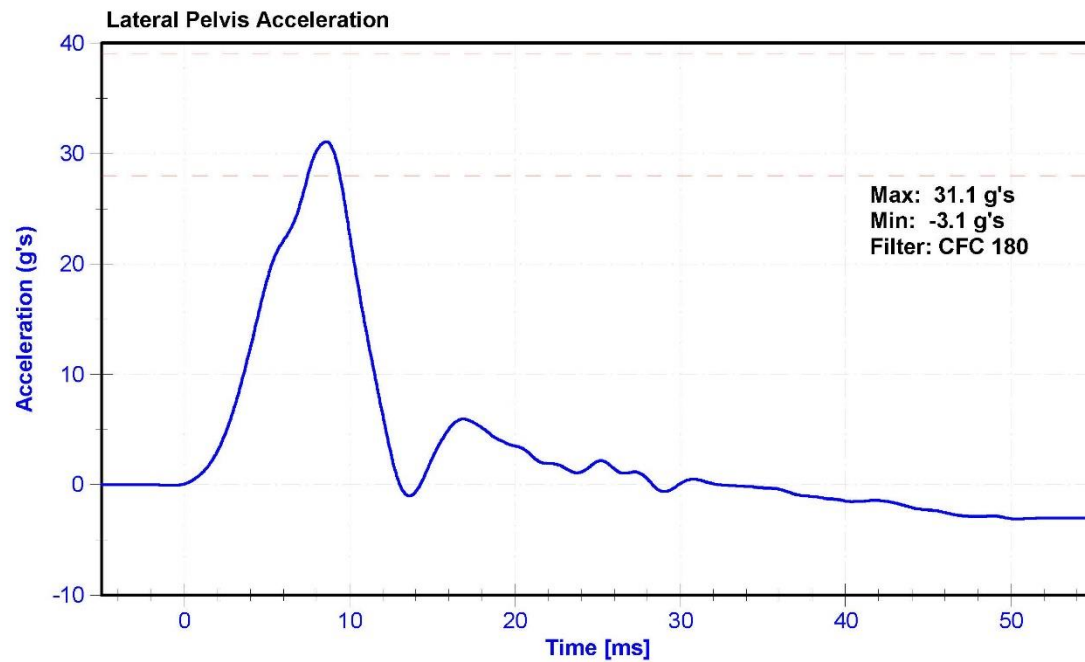
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	30.8	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	36	45	g's	41.6	Pass
Lateral Pelvis Acceleration	28	39	g's	31.1	Pass
Iliac Force	4,100	5,100	N	4585.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	10/19/2015	4/18/2016
Iliac Load Cell	DENTON 3228J	LC-285Fy	7/21/2015	7/20/2016





CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

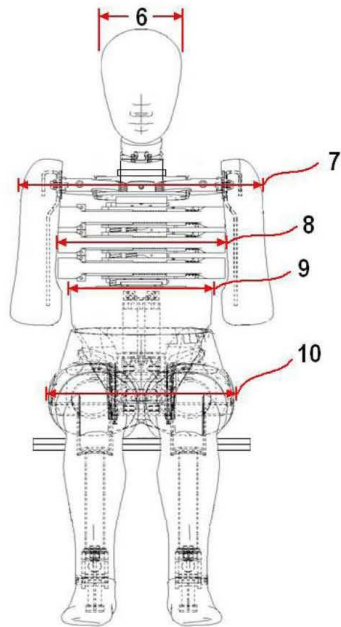


External Measurements - EuroSID-2re

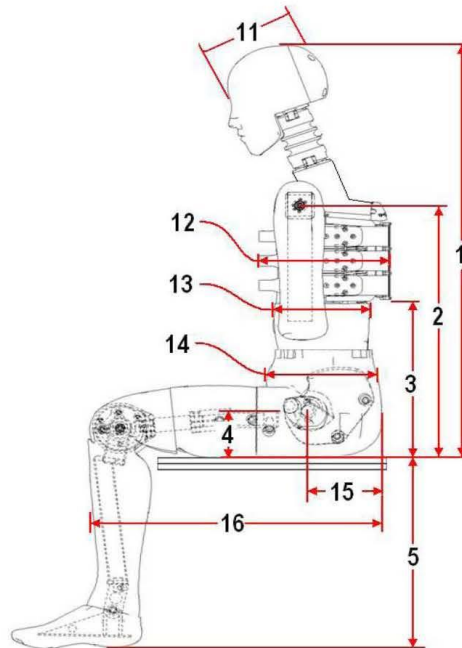
Technician: M.Hartung

Date: 12/14/2015

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	558	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	414	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	473	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	284	Pass
10	Pelvis Lap Width	359	373	367	Pass
11	Head Depth	196	206	200	Pass
12	Thorax Depth	262	272	267	Pass
13	Abdomen Depth	194	204	200	Pass
14	Pelvis Depth	235	245	238	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	604	Pass

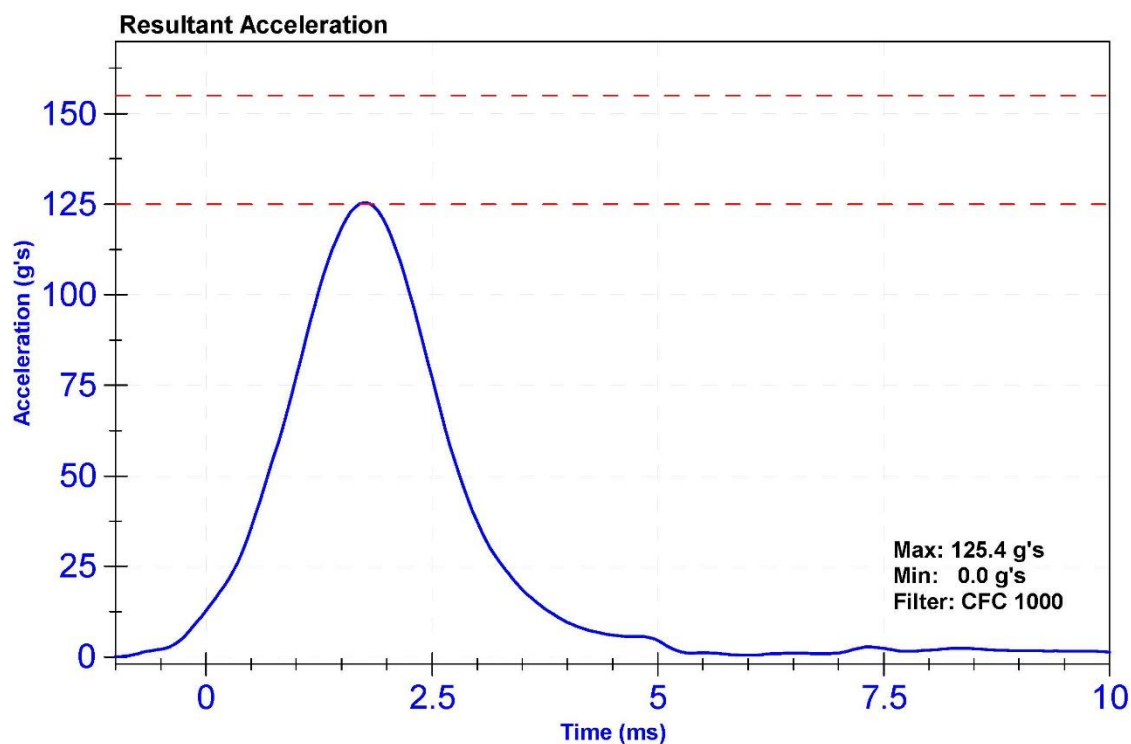
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

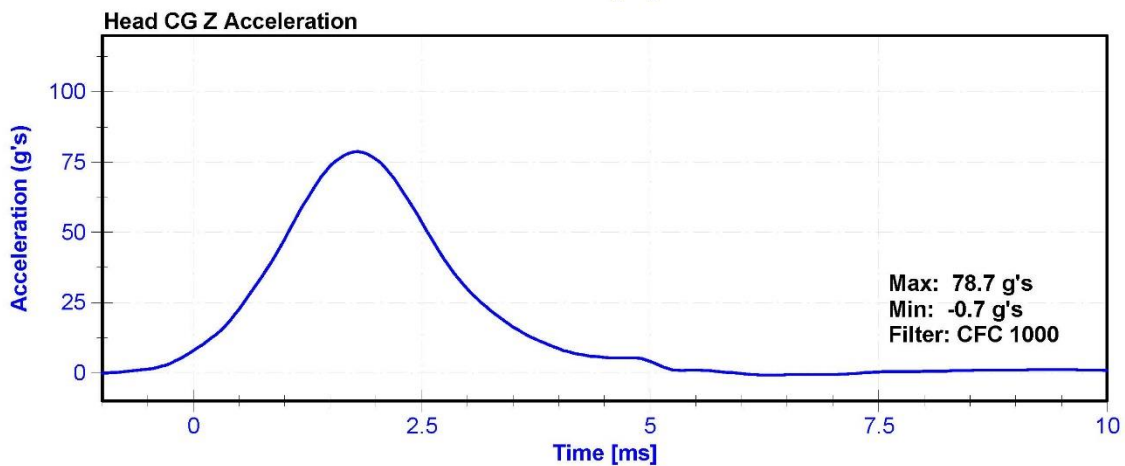
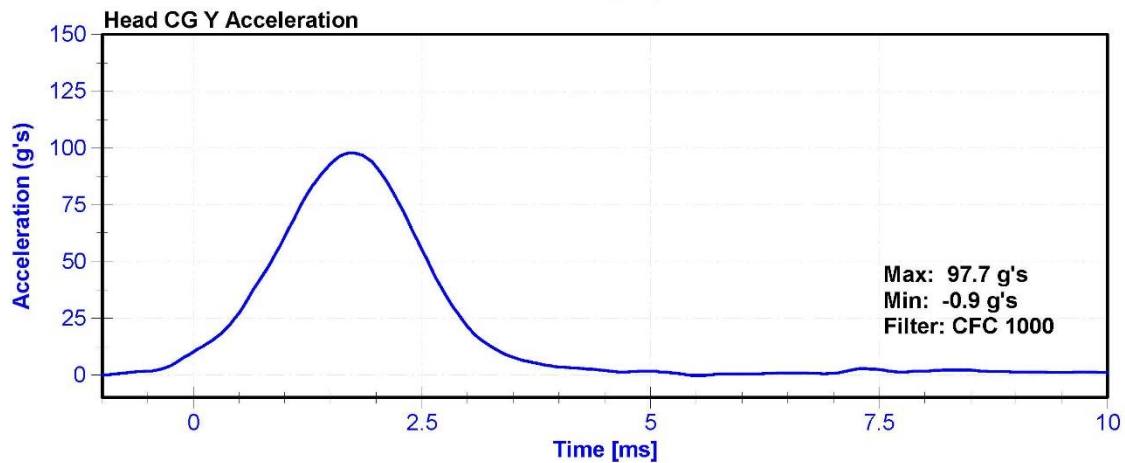
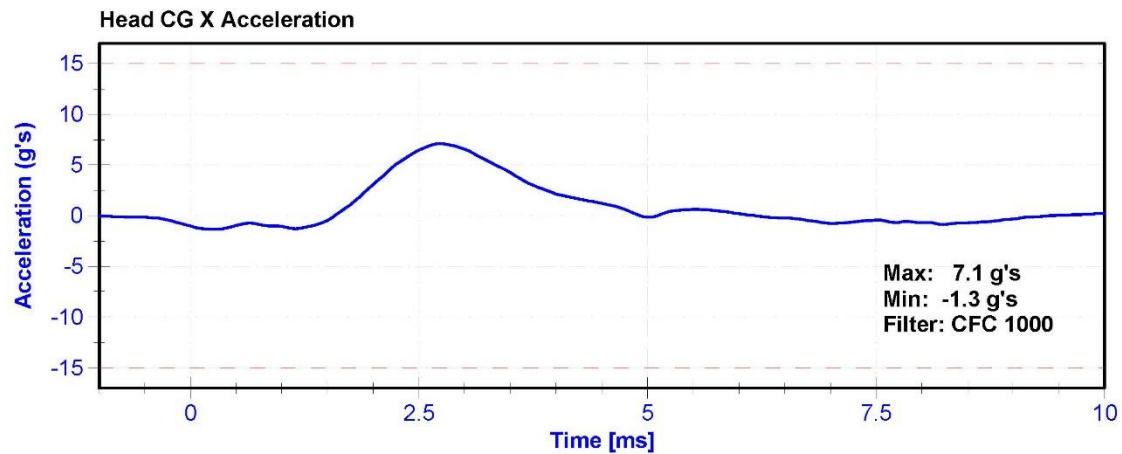
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	44.1	Pass
Resultant Acceleration	125	155	g's	125.4	Pass
Oscillation	0	15	%	4.52	Pass
Fore-Aft Acceleration	-15	15	g's	7.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	10/19/2015	4/18/2016
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	10/19/2015	4/18/2016
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	10/19/2015	4/18/2016





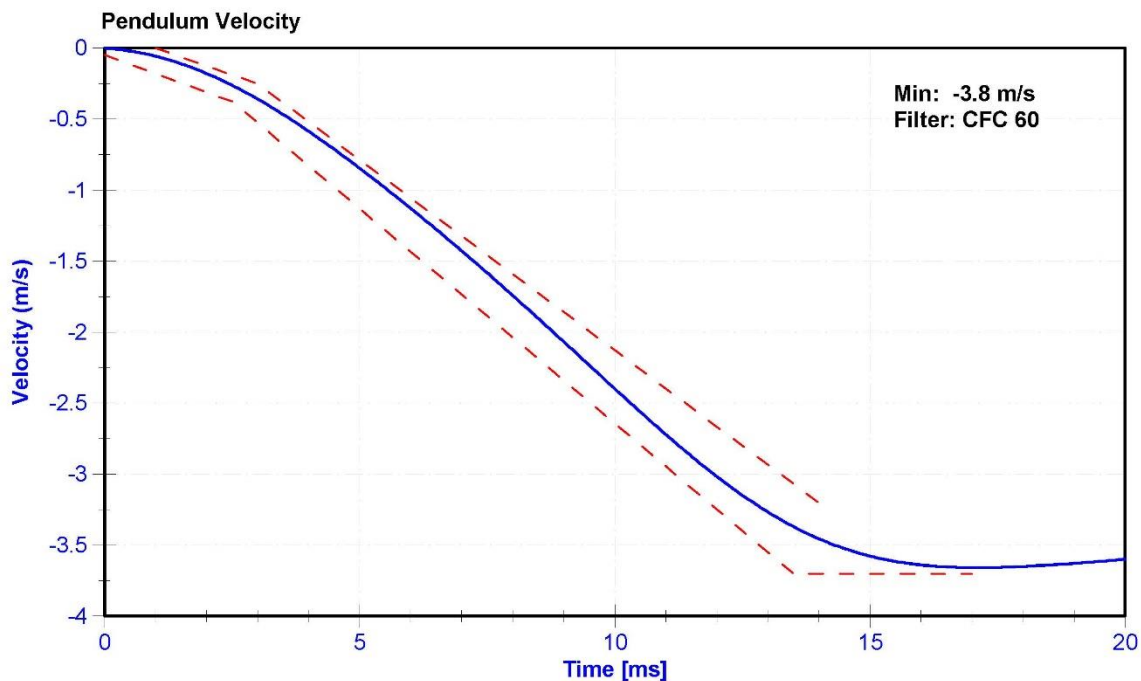
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

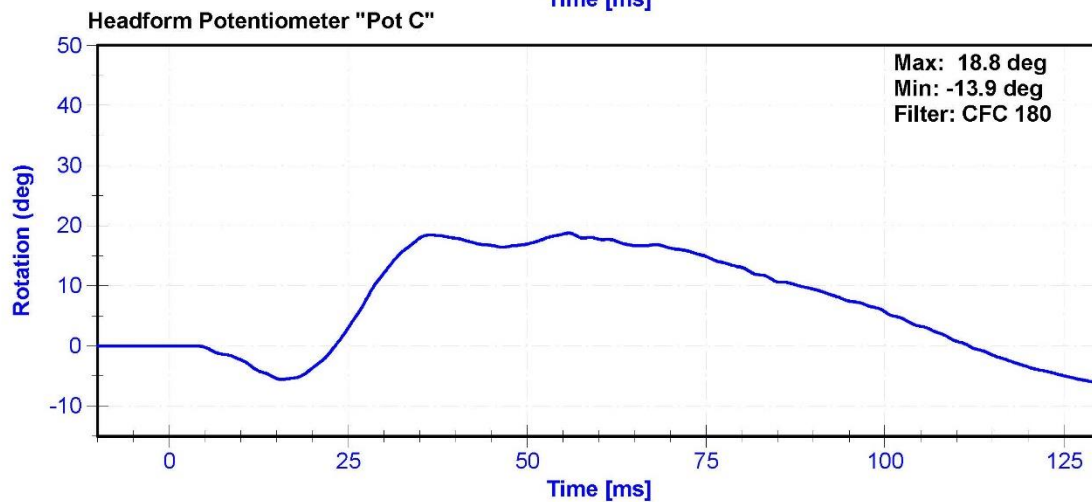
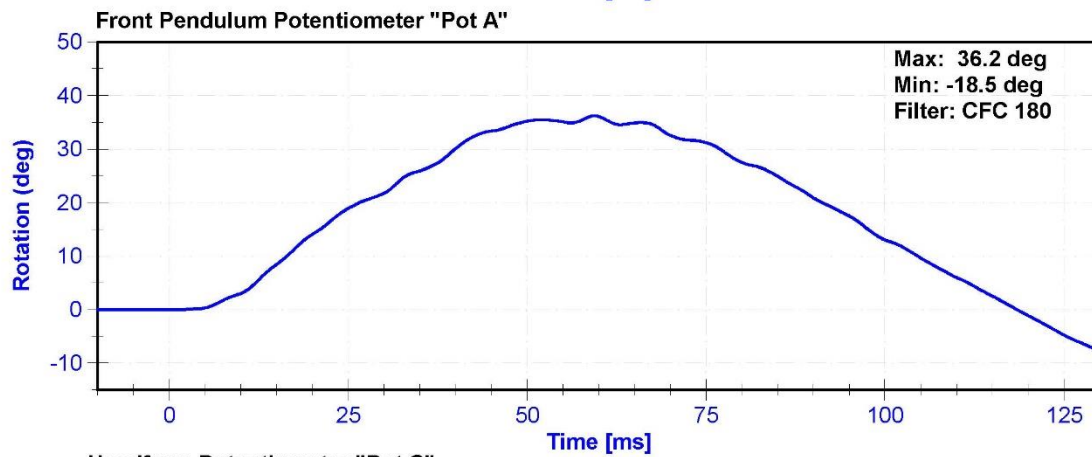
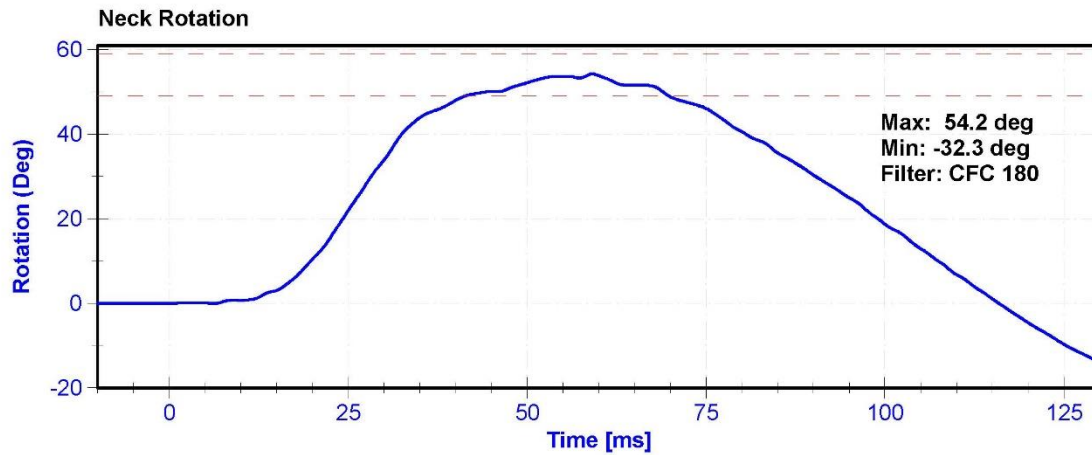
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	38.9	Pass
Velocity	3.3	3.5	m/s	3.46	Pass
Lateral Neck Rotation	49	59	deg	54.2	Pass
Time at Maximum Rotation	54	66	ms	59.1	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Front Pendulum Potentiometer	SP22G	DS-094	9/24/2015	9/23/2016
Headform Potentiometer	SP22G	DS-095	9/24/2015	9/23/2016





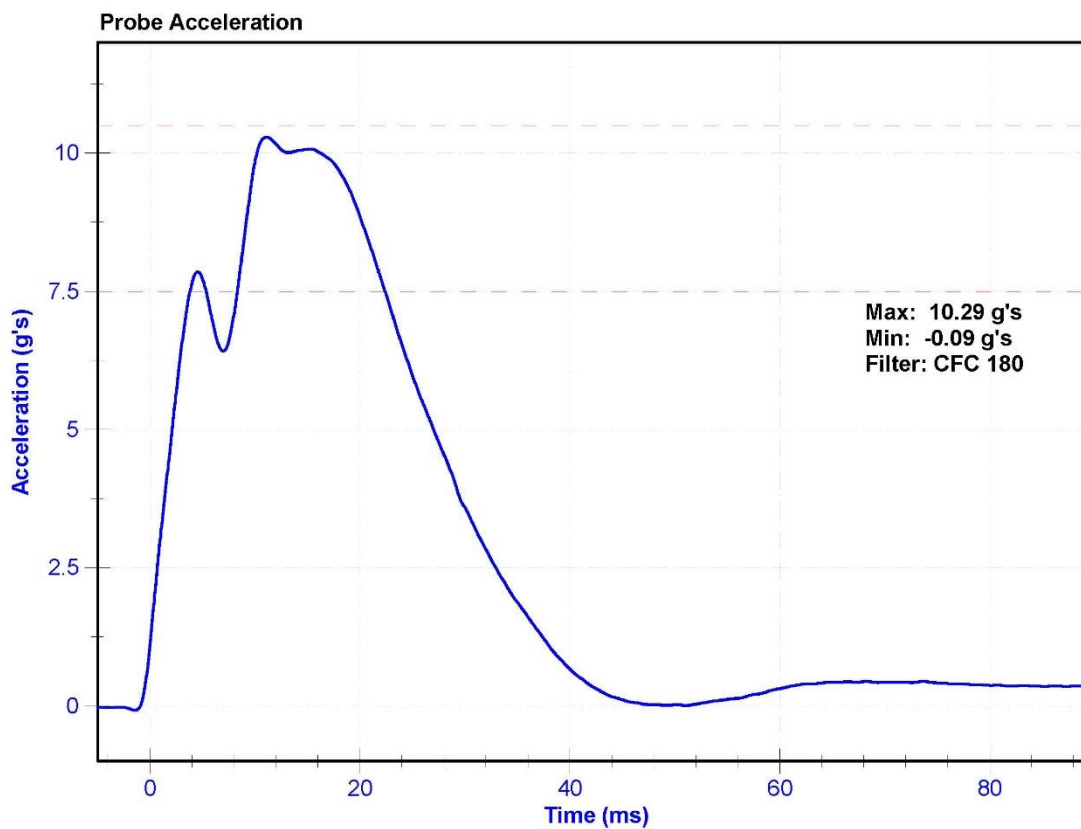
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	32.8	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	7.5	10.5	g's	10.29	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016



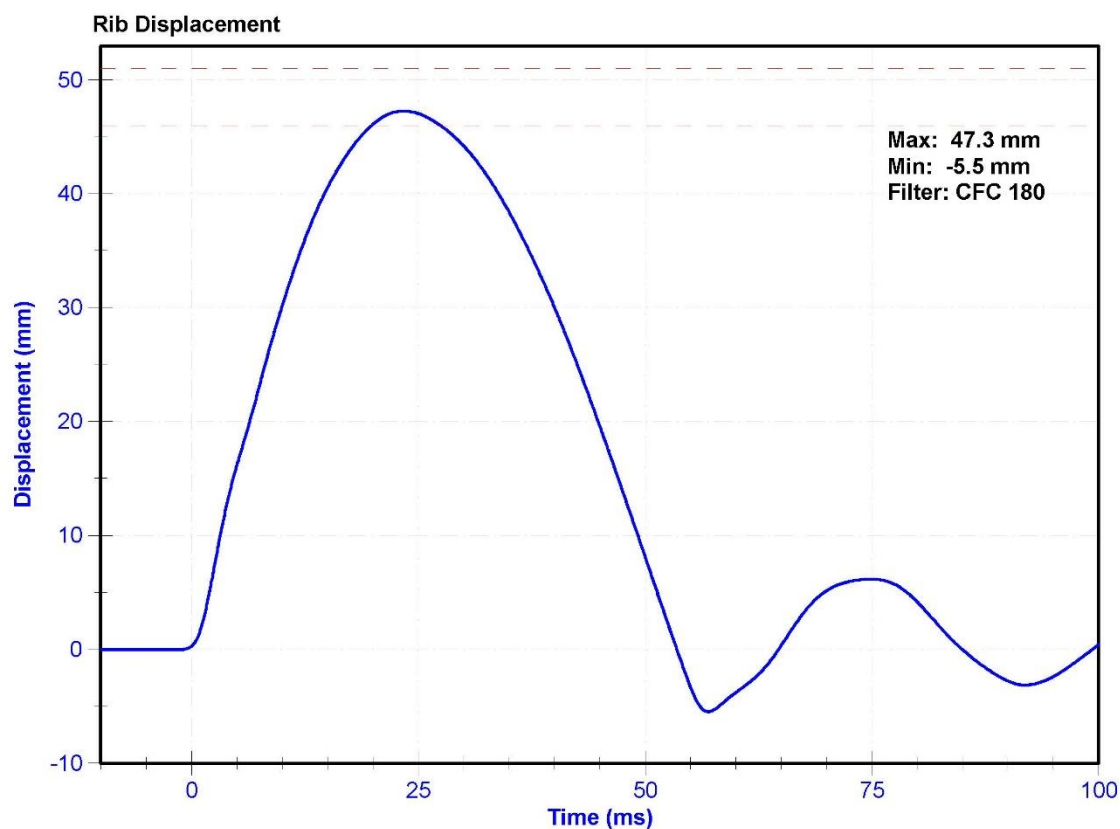
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.9	Pass
Rib Displacement	46	51	mm	47.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	10/19/2015	10/18/2016



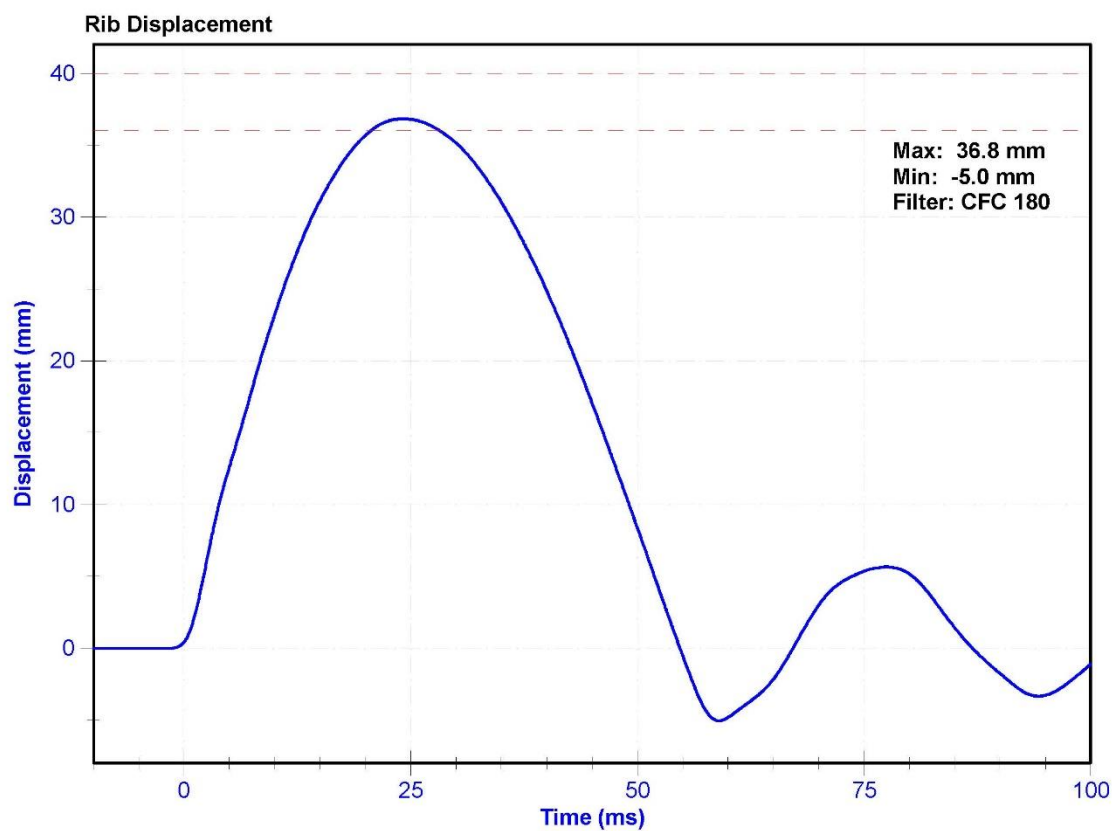
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.9	Pass
Rib Displacement	36	40	mm	36.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	10/19/2015	10/18/2016



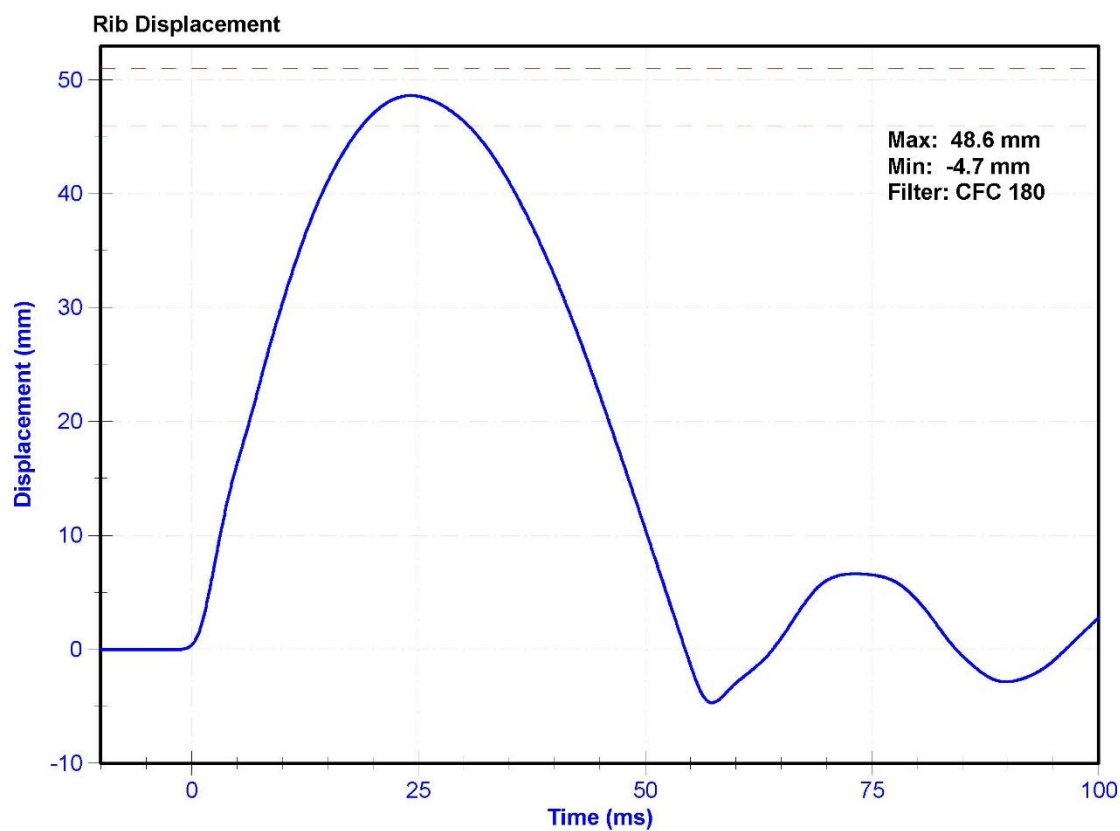
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.9	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	10/19/2015	10/18/2016



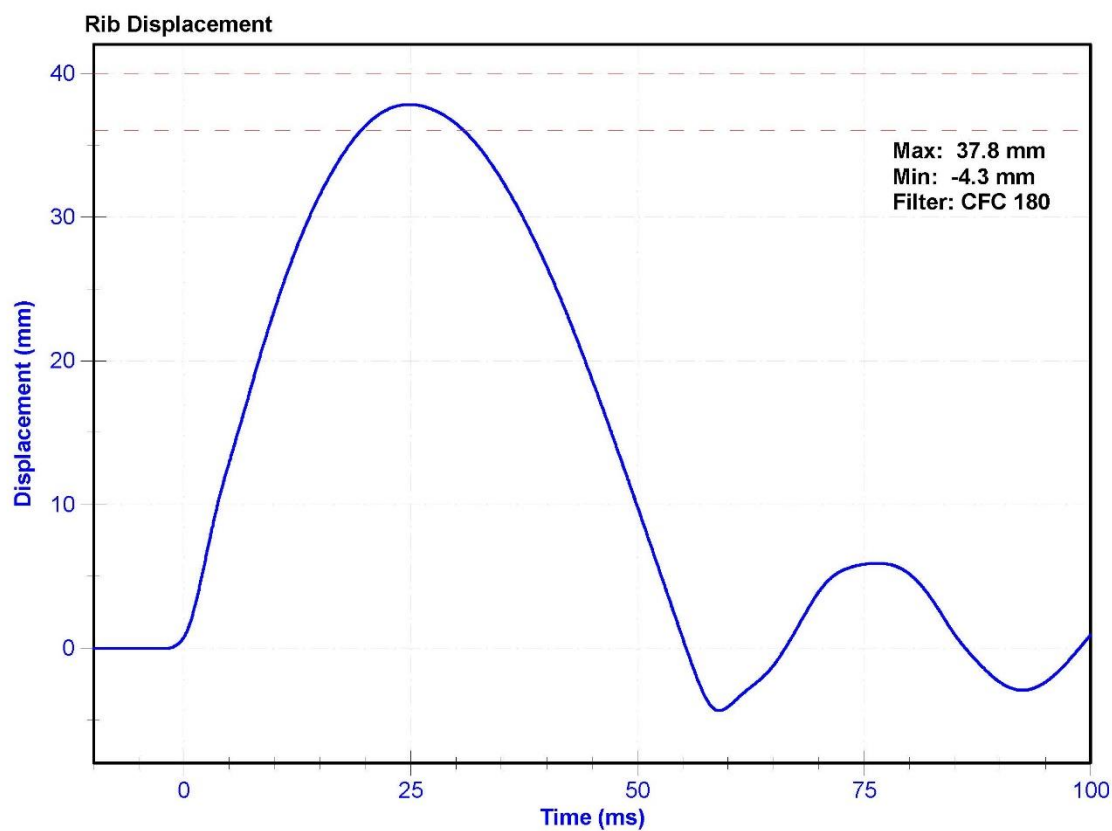
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.9	Pass
Rib Displacement	36	40	mm	37.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	10/19/2015	10/18/2016



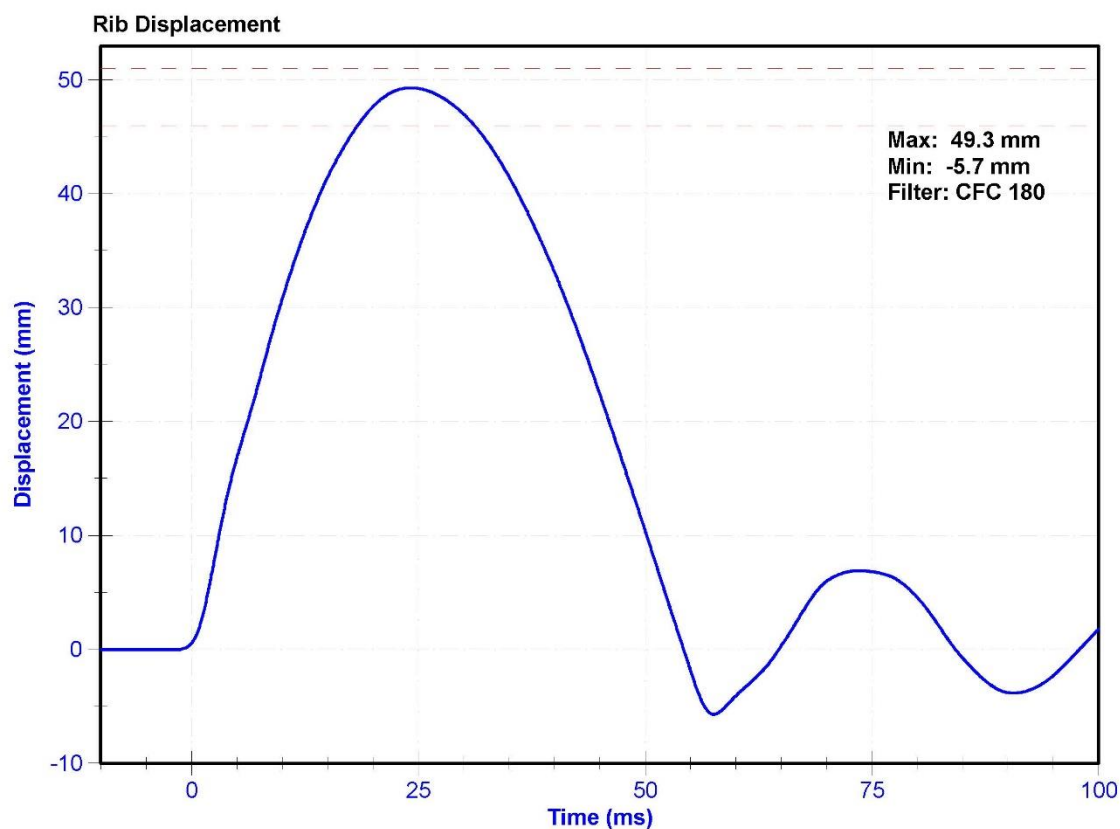
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.9	Pass
Rib Displacement	46	51	mm	49.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	10/19/2015	10/18/2016



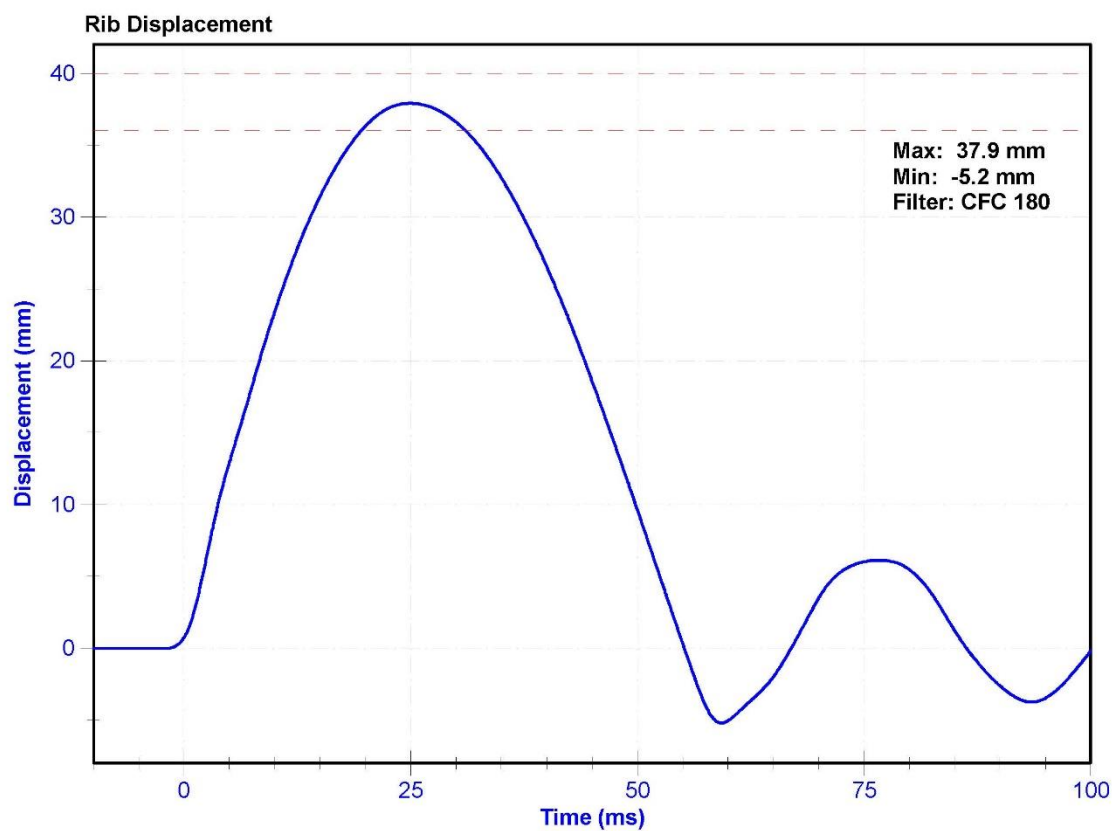
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.9	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	10/19/2015	10/18/2016



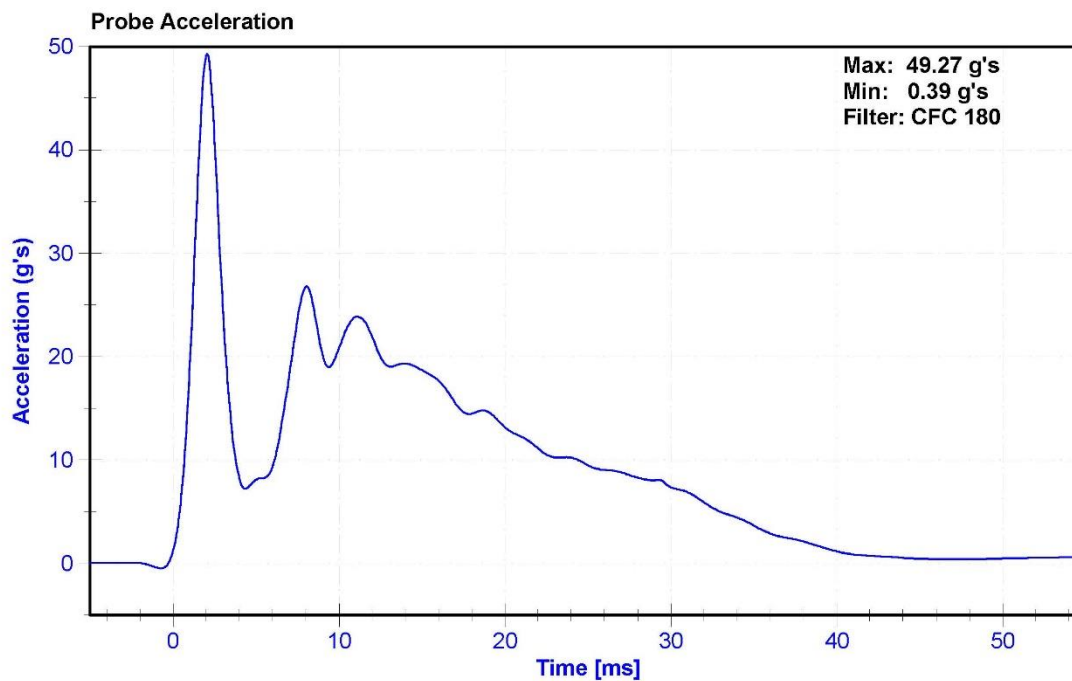
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

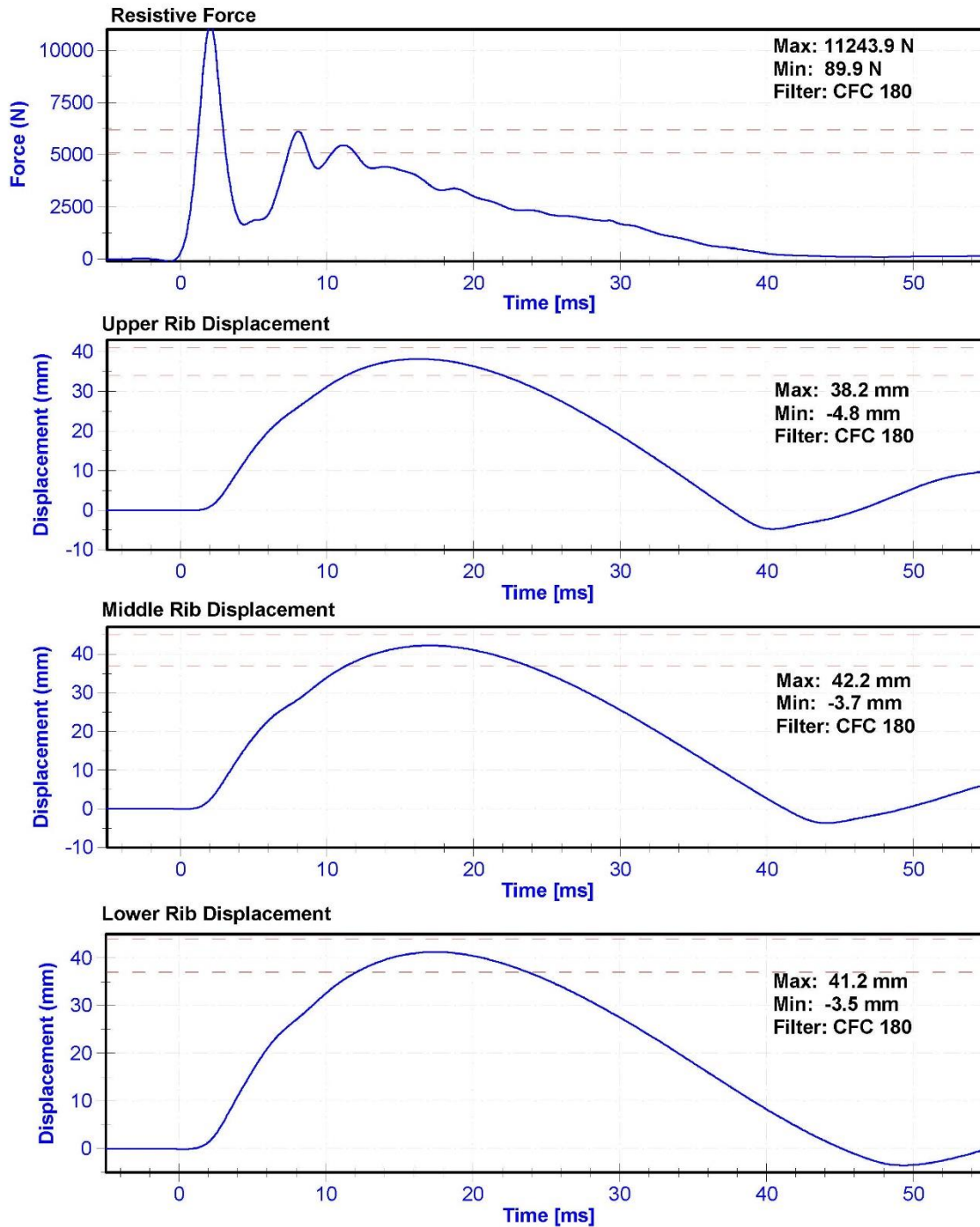
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	31.8	Pass
Velocity	5.4	5.6	m/s	5.51	Pass
Resistive Force after 6ms	5100	6200	N	6116.8	Pass
Upper Thorax Rib Deflection	34	41	mm	38.2	Pass
Mid Thorax Rib Deflection	37	45	mm	42.2	Pass
Lower Thorax Rib Deflection	37	44	mm	41.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	10/19/2015	10/18/2016
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	10/19/2015	10/18/2016
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	10/19/2015	10/18/2016





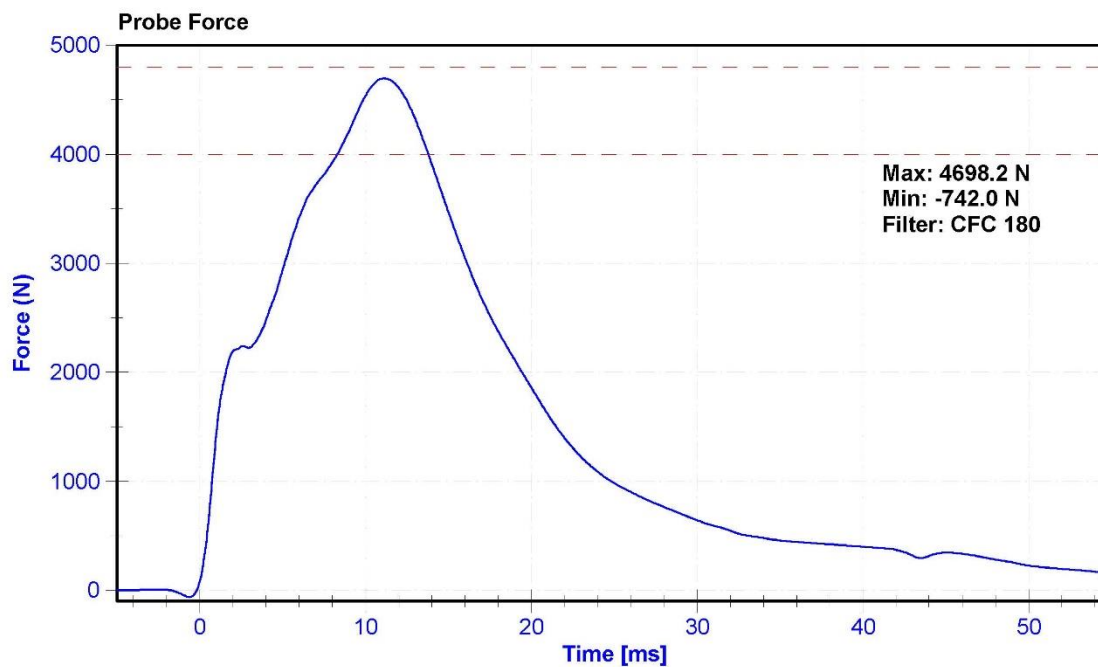
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

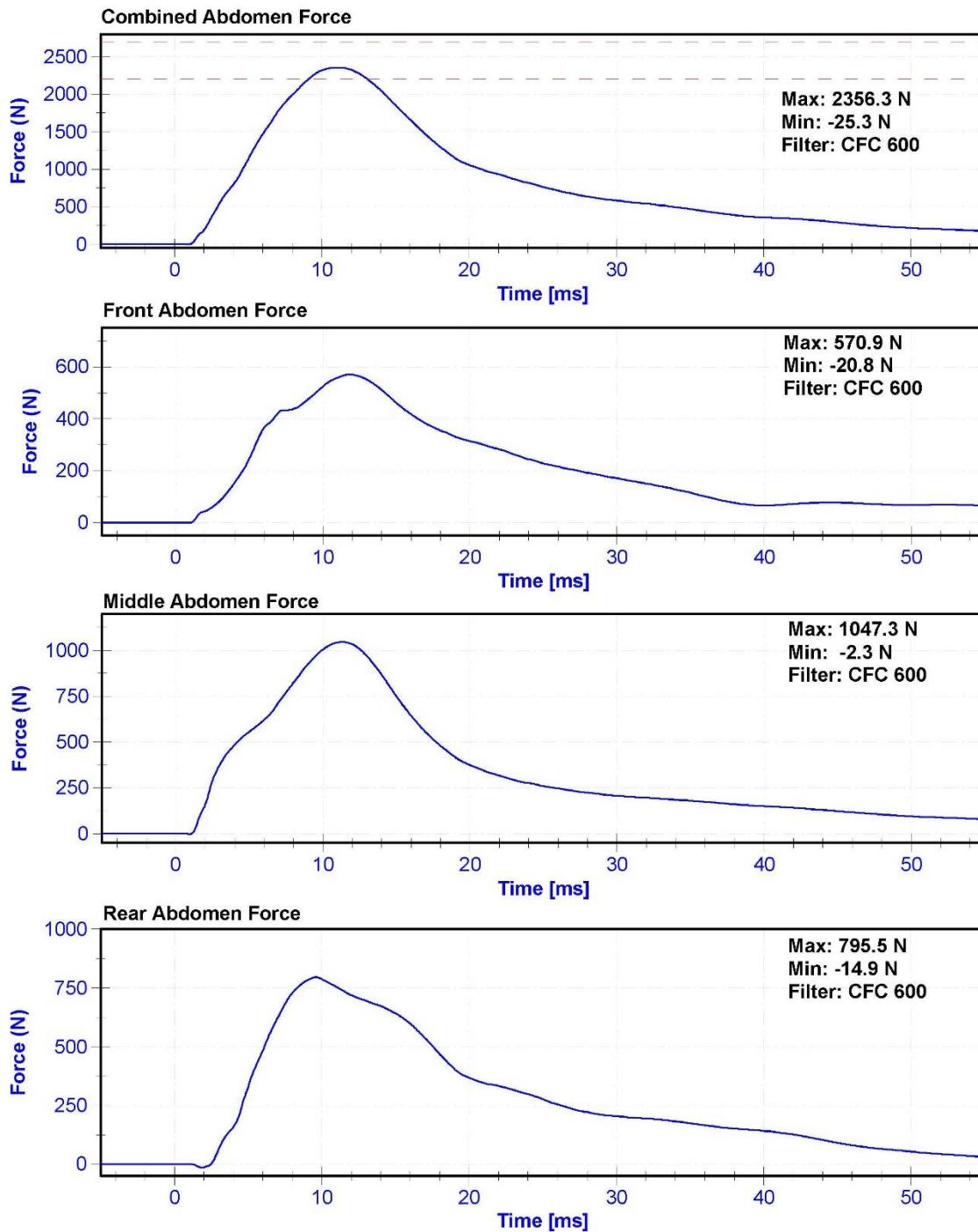
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	31.7	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2356.3	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.05	Pass
Resistive Probe Force	4000	4800	N	4698.2	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.10	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Front Abdomen Load Cell	DENTON 2631	LC-1512	6/25/2015	6/24/2016
Middle Abdomen Load Cell	DENTON 2631	LC-1526	6/25/2015	6/24/2016
Rear Abdomen Load Cell	DENTON 2631	LC-1516	6/25/2015	6/24/2016







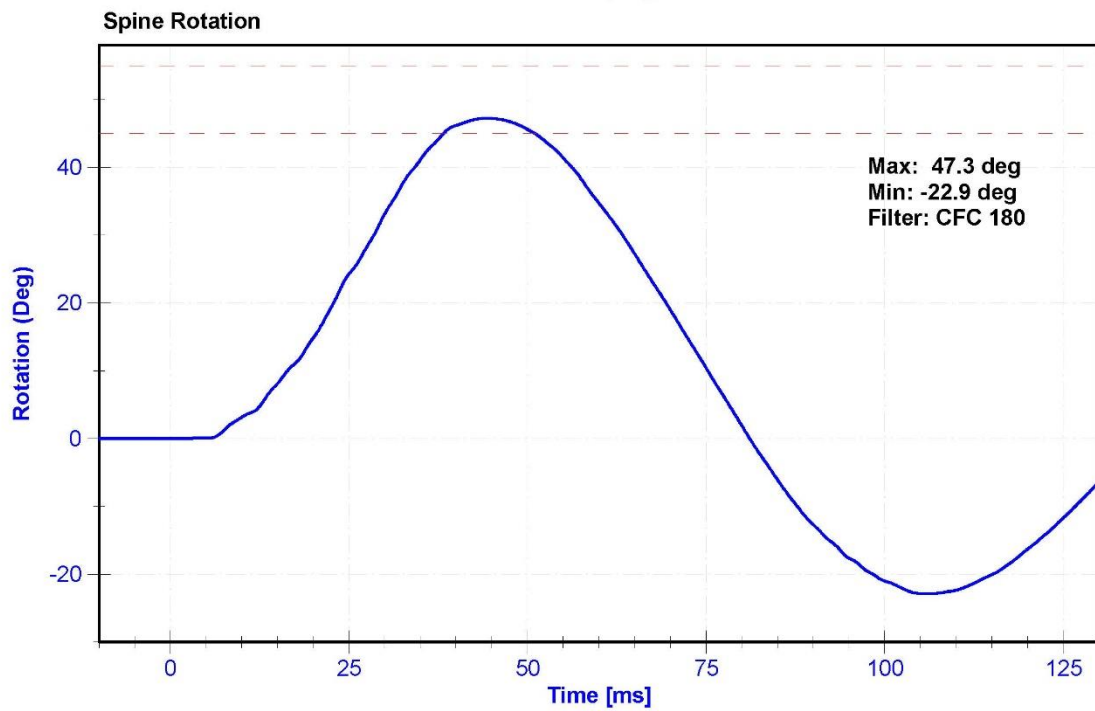
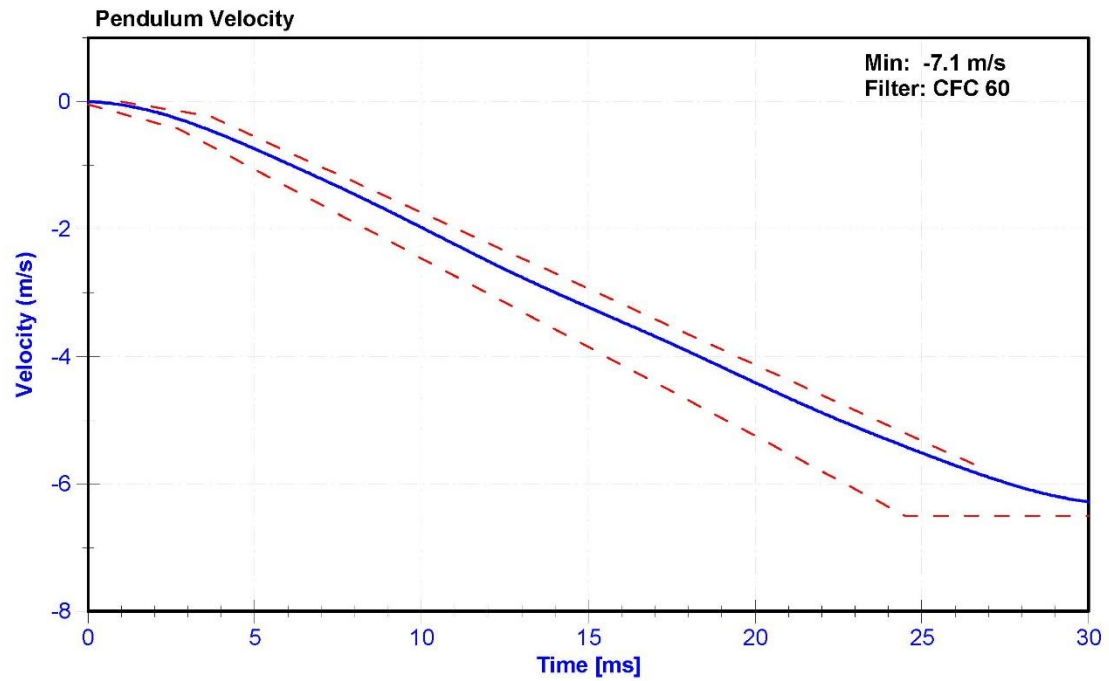
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

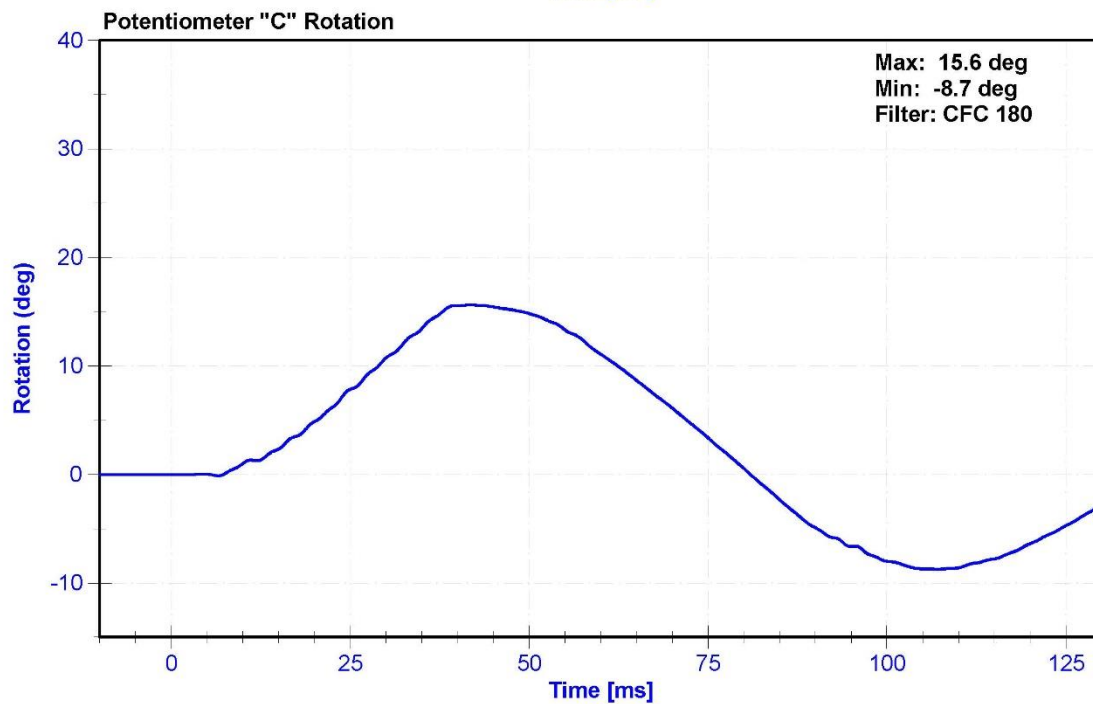
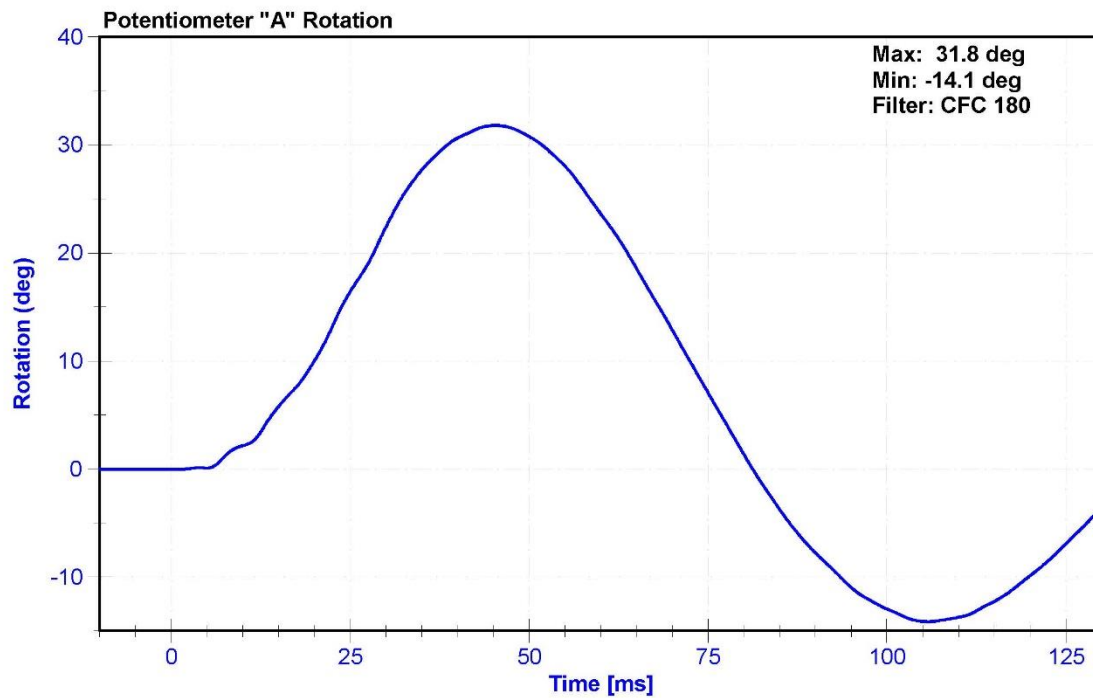
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	39.0	Pass
Velocity	5.95	6.15	m/s	6.068	Pass
Lateral Spine Rotation	45	55	deg	47.3	Pass
Time at Maximum Rotation	39	53	ms	44.2	Pass
Time of Decay to Zero Degrees	37	57	ms	37.0	Pass
Pulse within Corridor?	-	-	-		Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Pendulum "A" Potentiometer	SP22G	DS-094	9/24/2015	9/23/2016
Condyle "B" Potentiometer	SP22G	DS-095	9/24/2015	9/23/2016





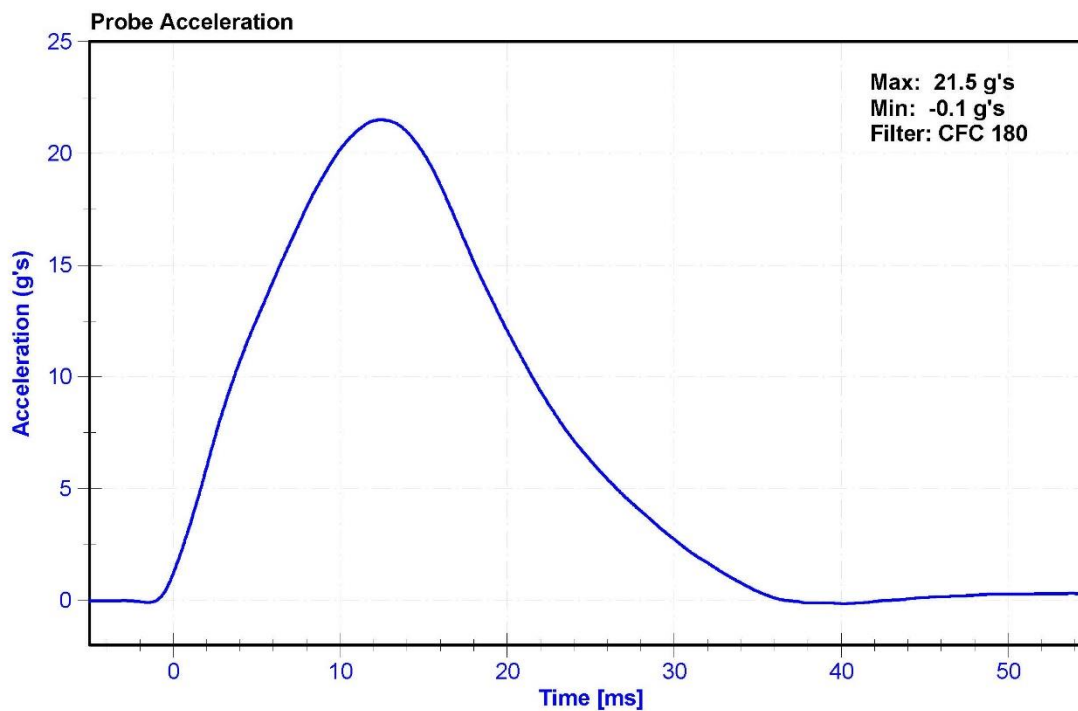
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

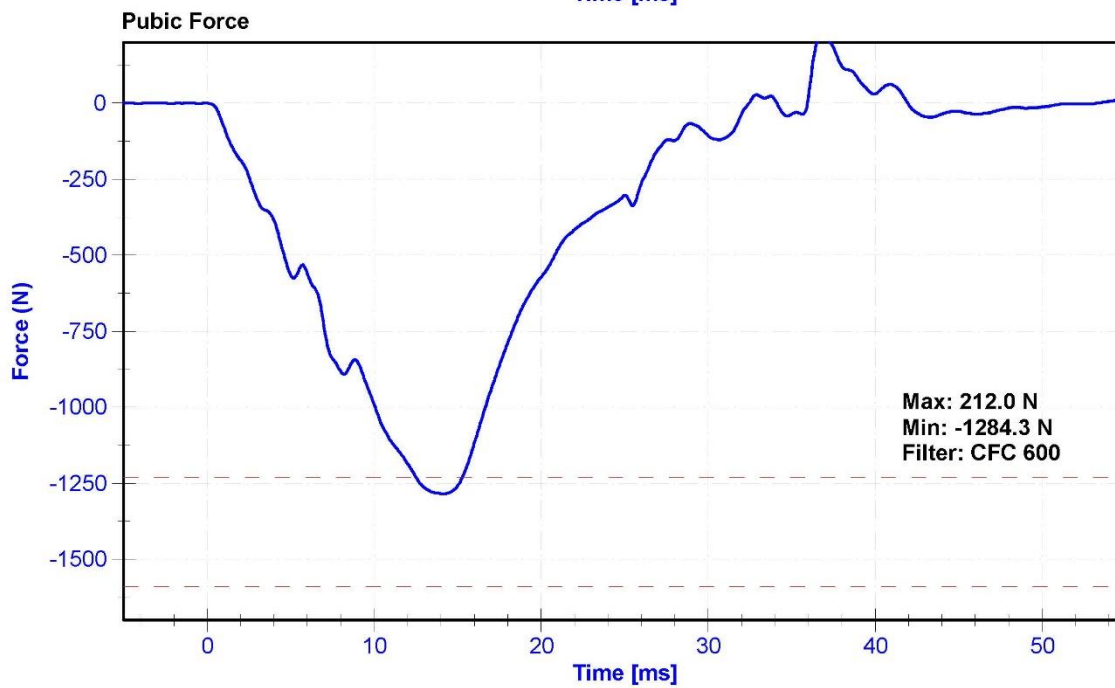
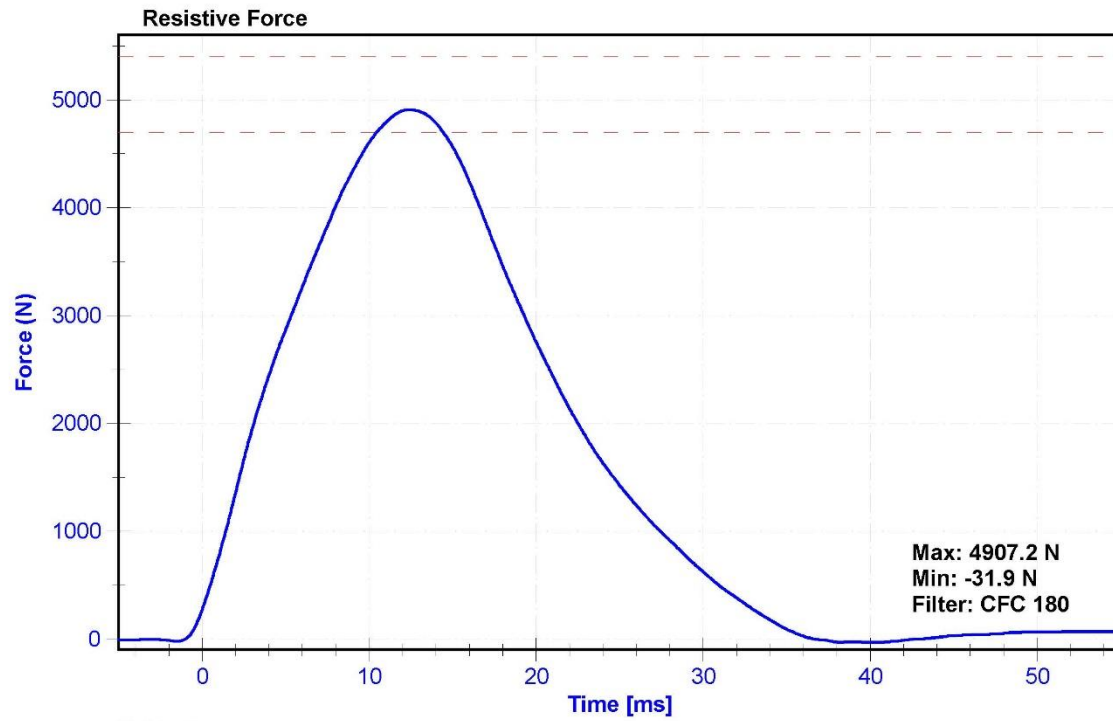
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	31.0	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Resistive Force	4700	5400	N	4907.2	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.40	Pass
Pubic Force	-1590	-1230	N	-1284.3	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.15	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pubic Load Cell	Denton 3096JFL	LC-465Fy	6/25/2015	6/24/2016





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 303

(CONFIGURED FOR LEFT SIDE IMPACT)

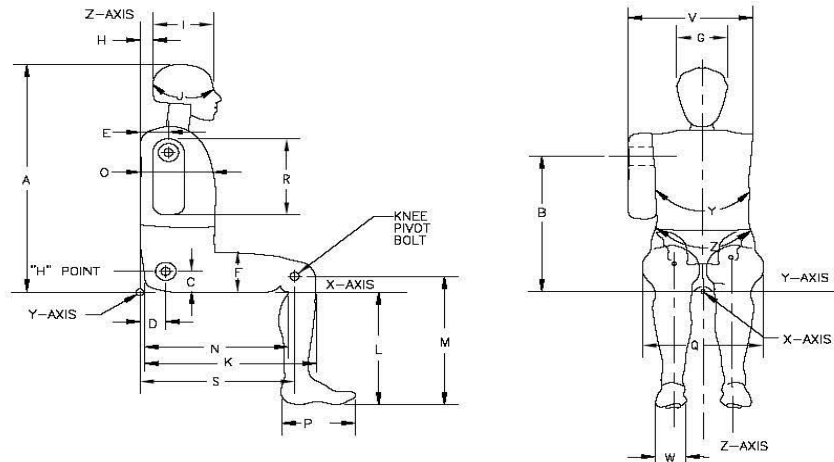


External Measurements - SID-IIs

Technician: M.Hartung

Date: 12/1/2015

Dummy Serial Number: 303



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	445	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	131	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	353	Pass
M	Knee Pivot to floor height	392	409	405	Pass
N	Buttock Popliteal Length	416	442	436	Pass
O	Chest Depth w/o jacket	195	211	202	Pass
P	Foot Length	216	232	224	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	488	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	871	Pass
Z	Waist Circumference	761	791	772	Pass

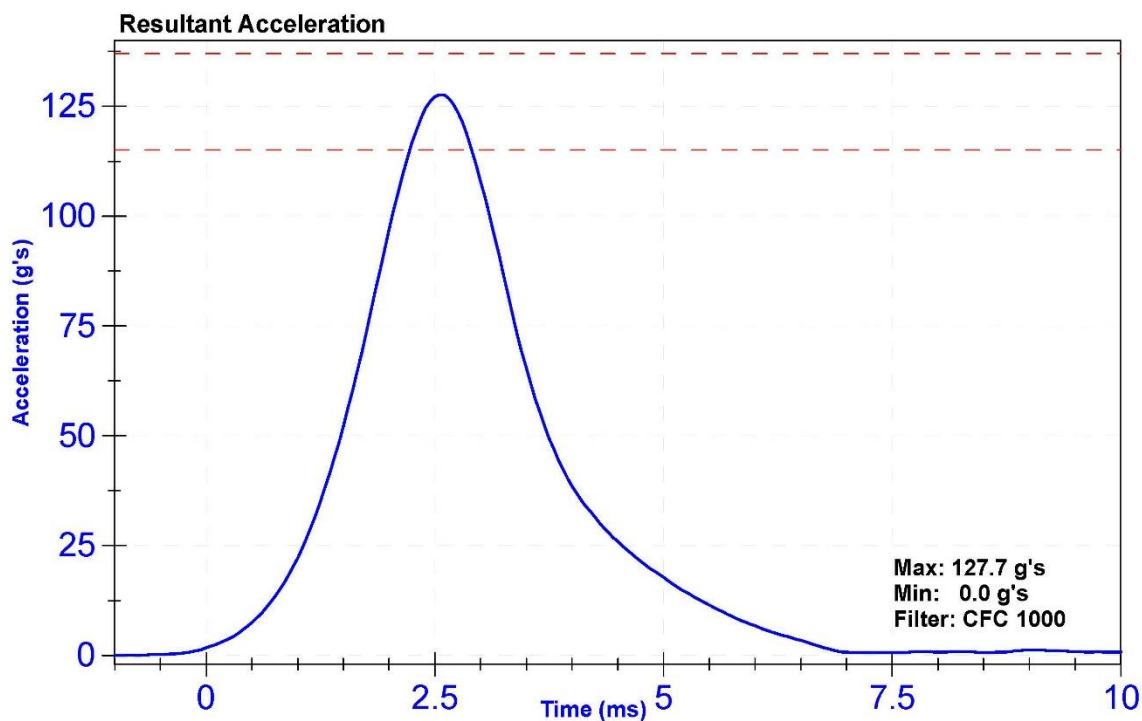
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

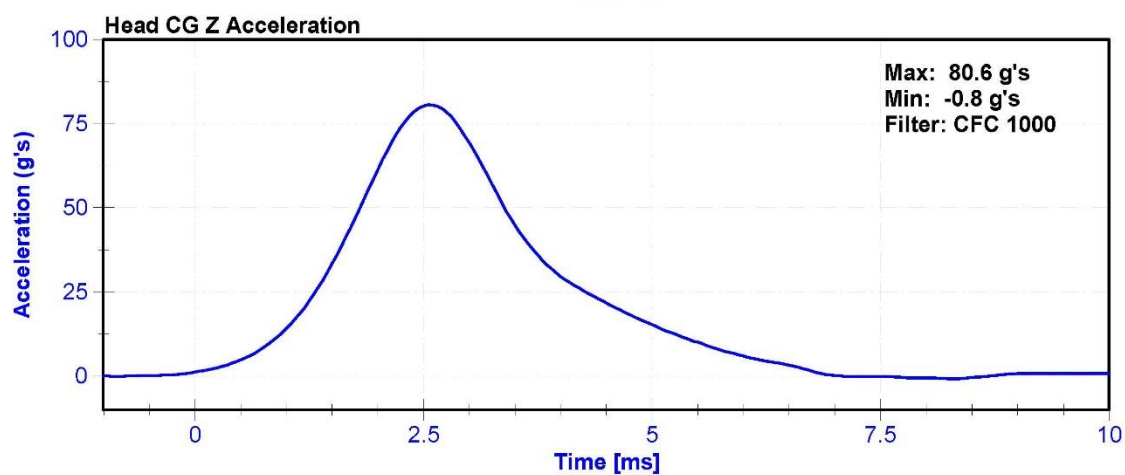
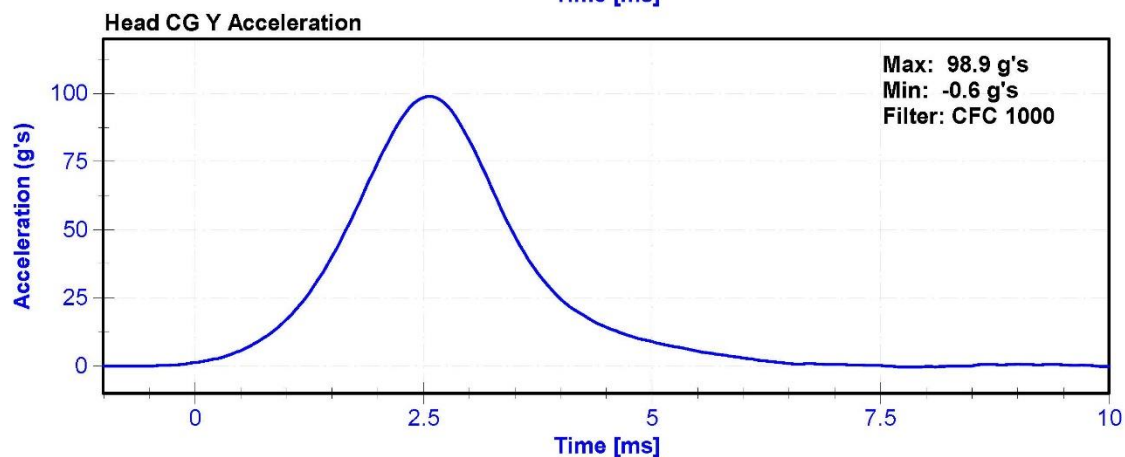
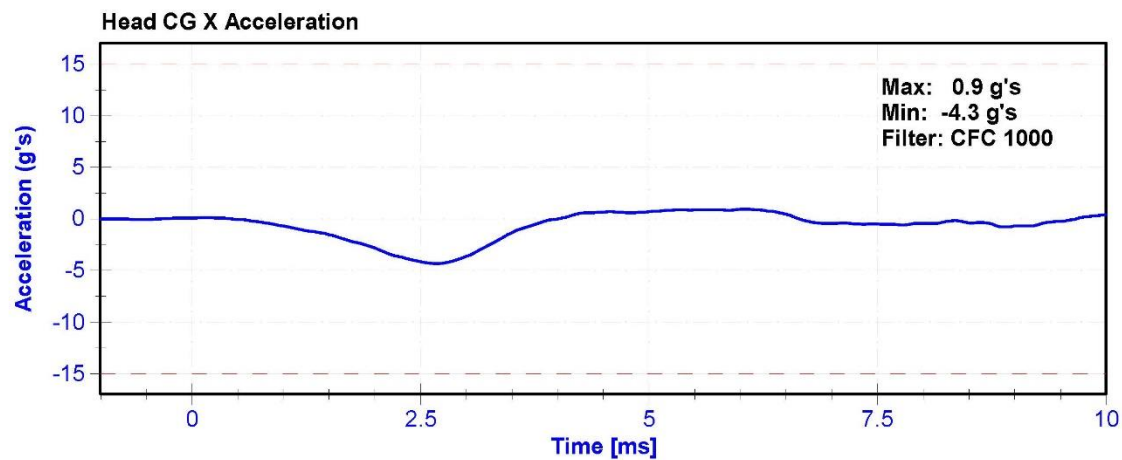
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	37	Pass
Resultant Acceleration	115	137	g's	127.7	Pass
Oscillation	0	15	%	0.9	Pass
Fore-Aft Acceleration	-15	15	g's	-4.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P83420	10/16/2015	4/15/2016
Y Accelerometer	ENDEVCO 7264	AC-P52040	10/14/2015	4/13/2016
Z Accelerometer	ENDEVCO 7264CT	AC-P58737	10/14/2015	4/13/2016





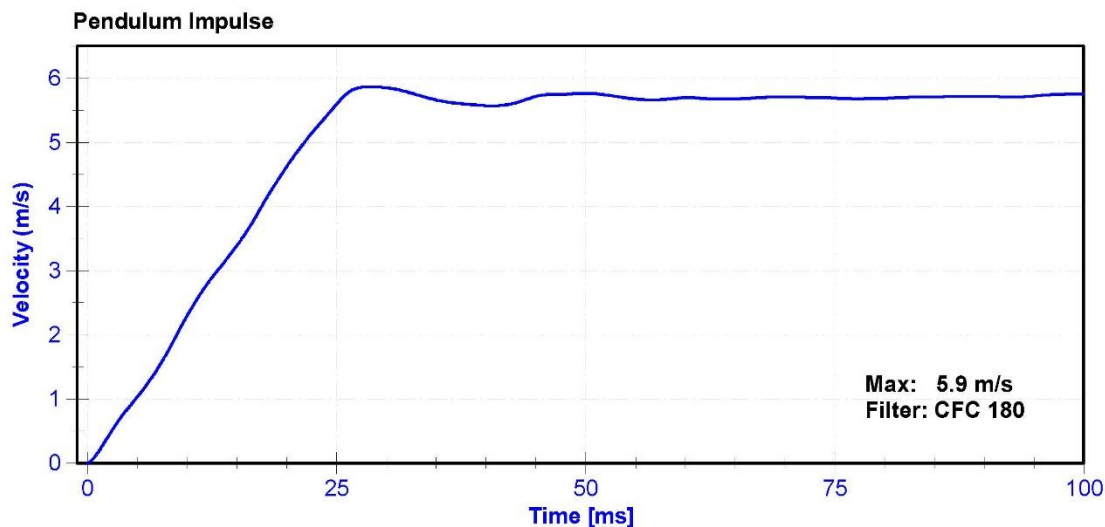
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

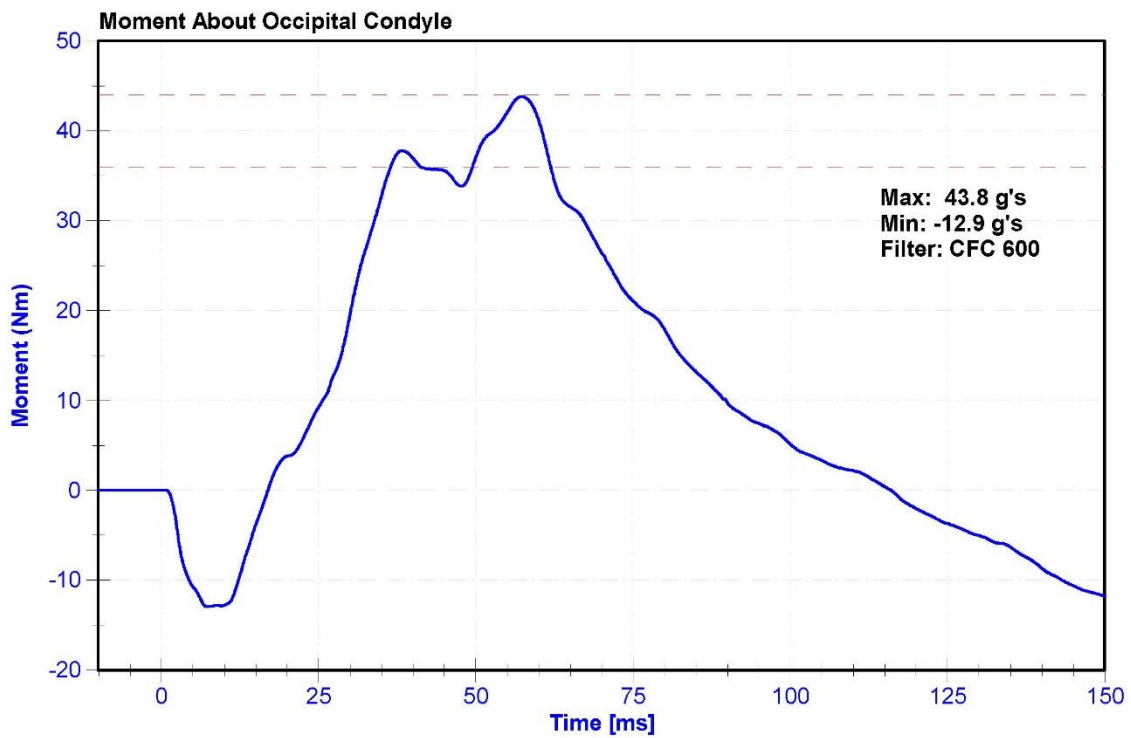
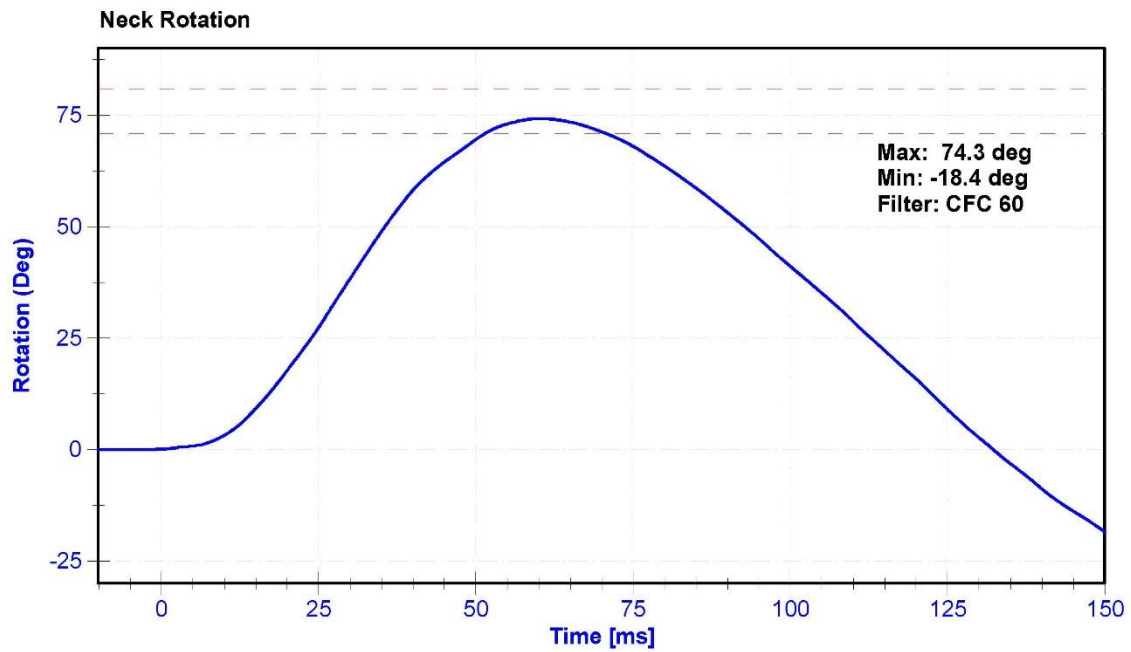
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	36	Pass
Velocity	5.51	5.63	m/s	5.583	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.30	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.39	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.63	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.60	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	74.3	Pass
Time at Maximum Rotation	50	70	ms	60.2	Pass
Moment about the OC	36	44	Nm	43.8	Pass
Moment Decay to 0 Nm	102	126	ms	116.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	9/24/2015	9/23/2016
Condyle Potentiometer	Denton 78051-342	DS-185Pend	9/25/2015	9/24/2016
Upper Neck Load Cell	Denton 1716A	LC-1916Fy	6/29/2015	6/28/2016





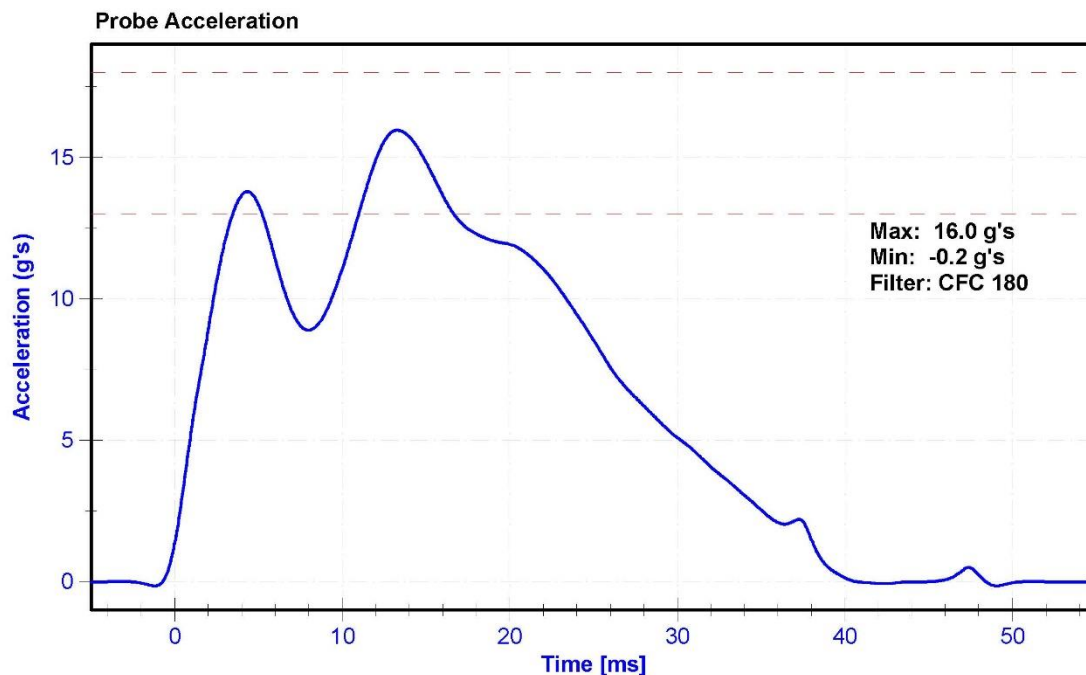
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

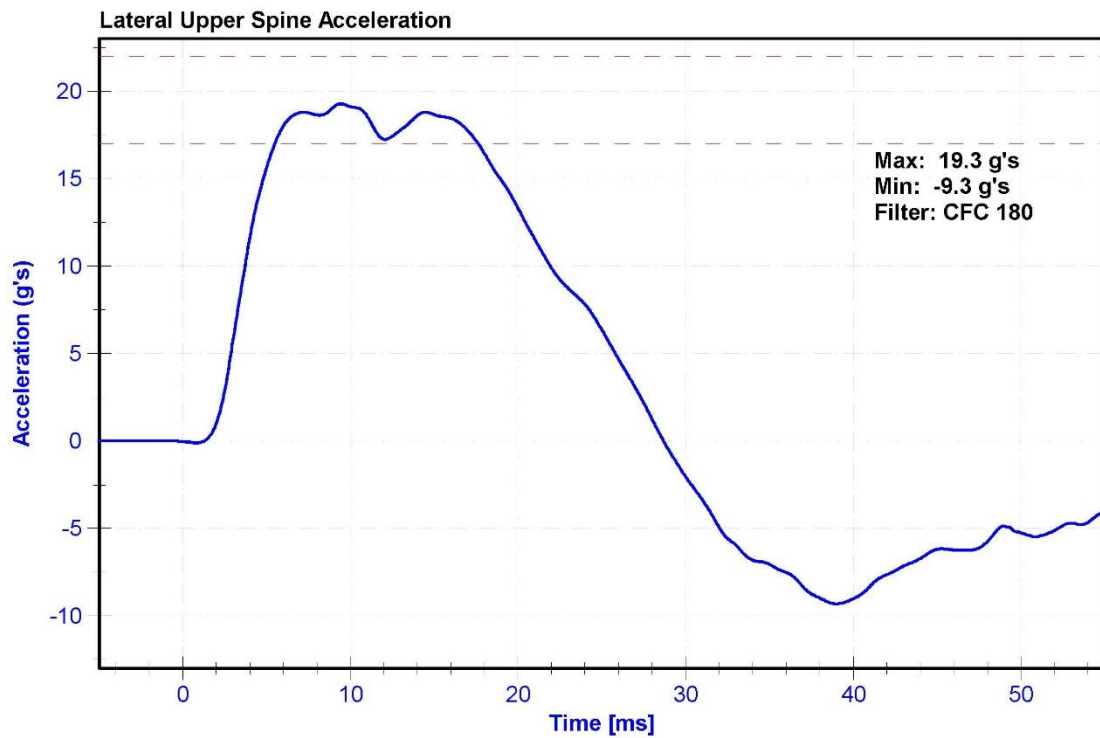
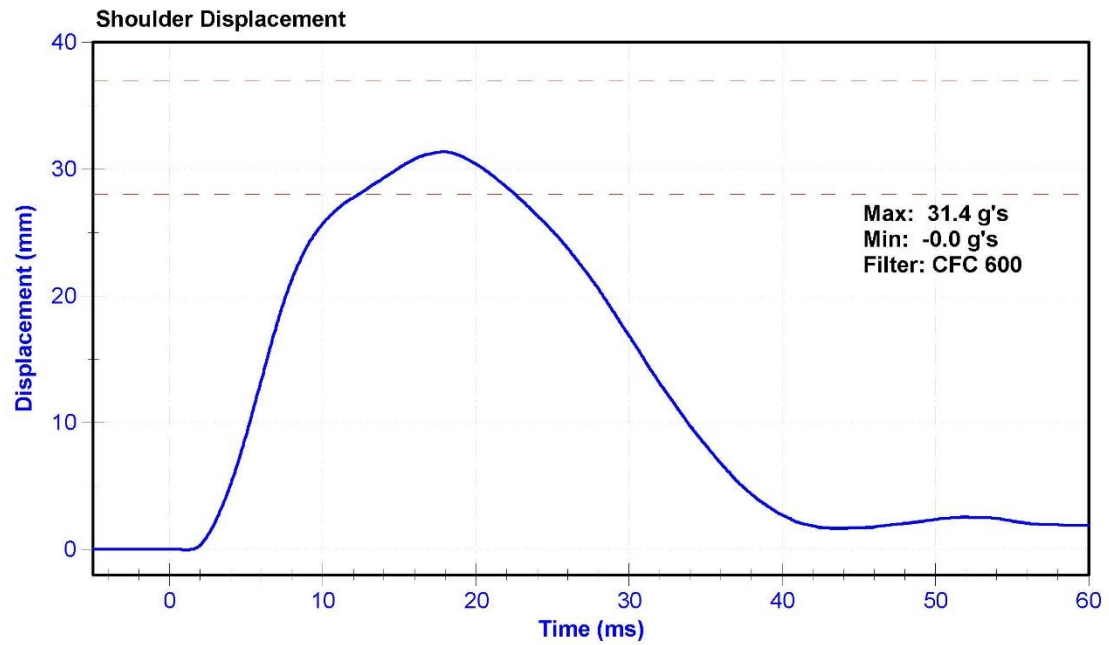
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	34.6	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	31.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Shoulder Potentiometer	Servo 08TC1-3725	DS-008GFE	10/19/2015	10/18/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/19/2015	4/18/2016





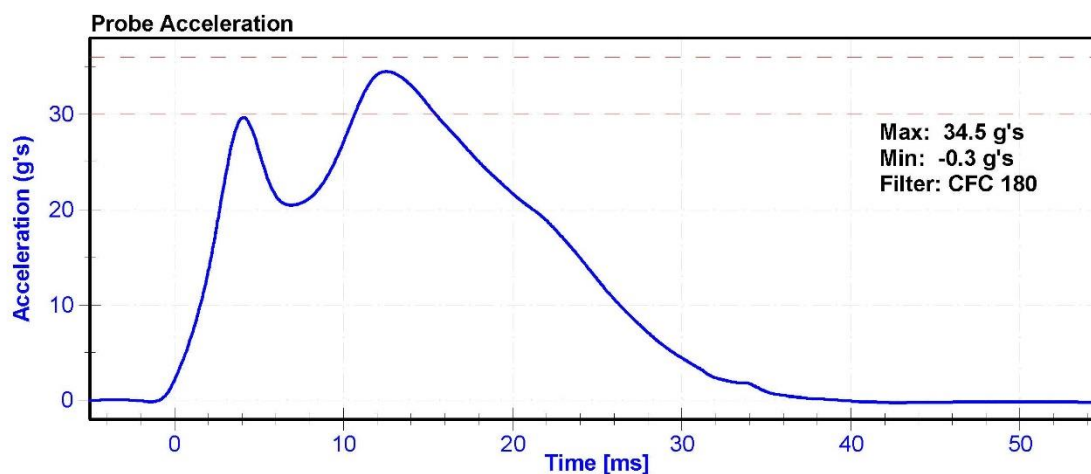
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

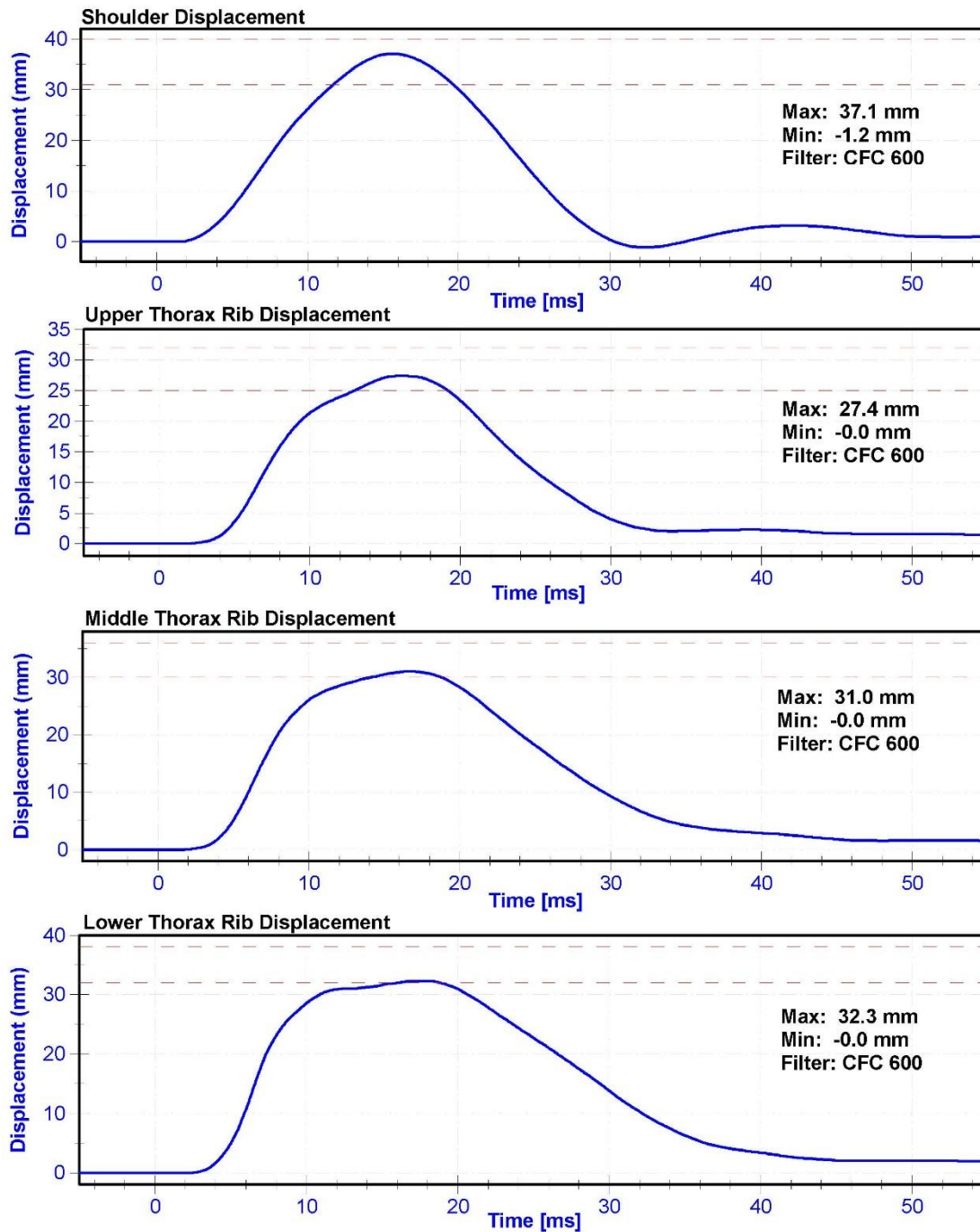
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	35.7	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	34.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	40.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.9	Pass
Shoulder Deflection	31	40	mm	37.1	Pass
Upper Thorax Rib Deflection	25	32	mm	27.4	Pass
Mid Thorax Rib Deflection	30	36	mm	31.0	Pass
Lower Thorax Rib Deflection	32	38	mm	32.3	Pass

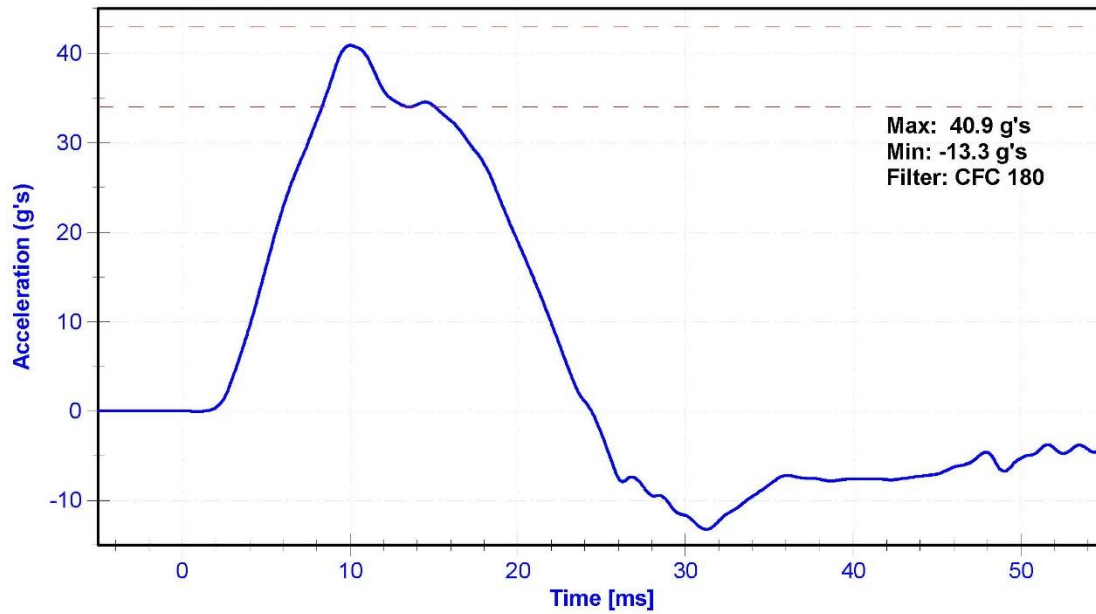
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/19/2015	4/18/2016
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/19/2015	4/18/2016
Shoulder Potentiometer	Servo 08TC1-3725	DS-008GFE	10/19/2015	10/18/2016
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	10/19/2015	10/18/2016
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	10/19/2015	10/18/2016
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	10/19/2015	10/18/2016

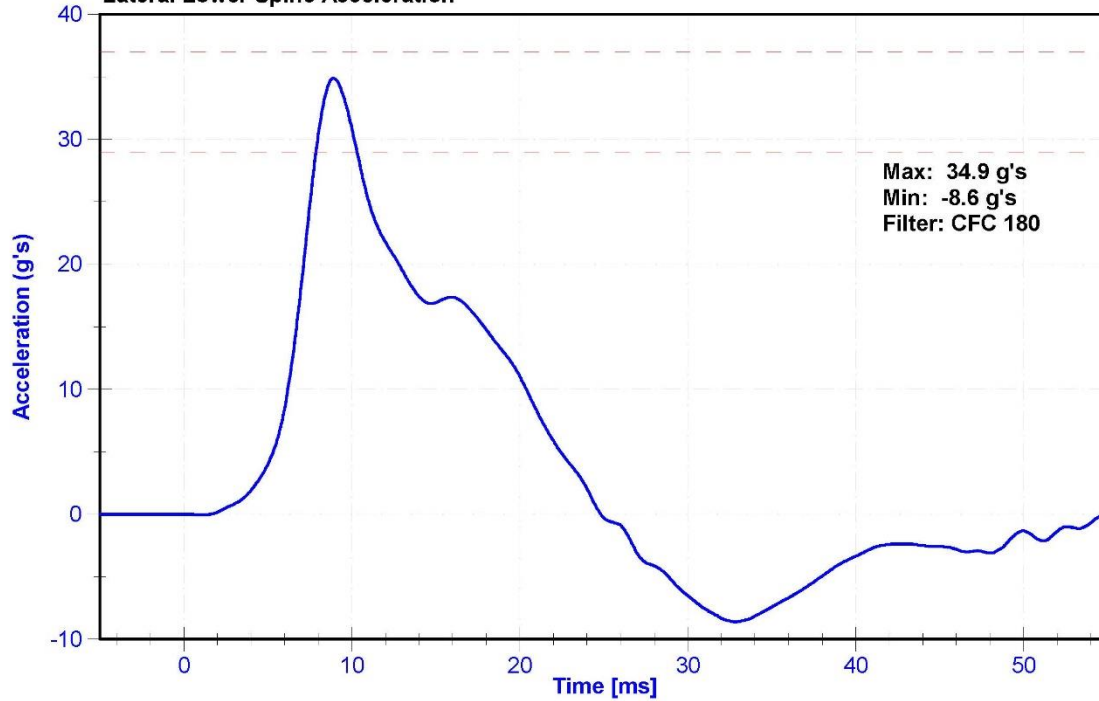




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



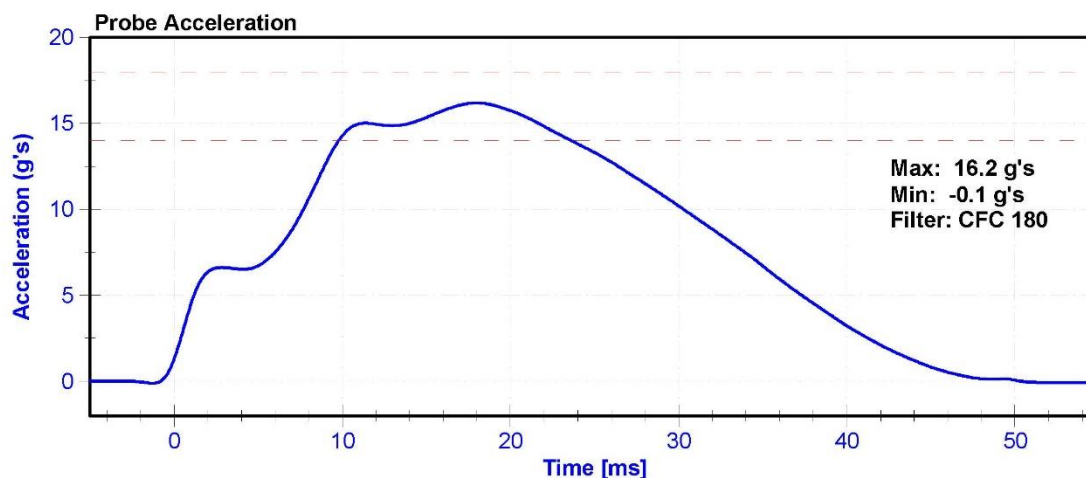
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

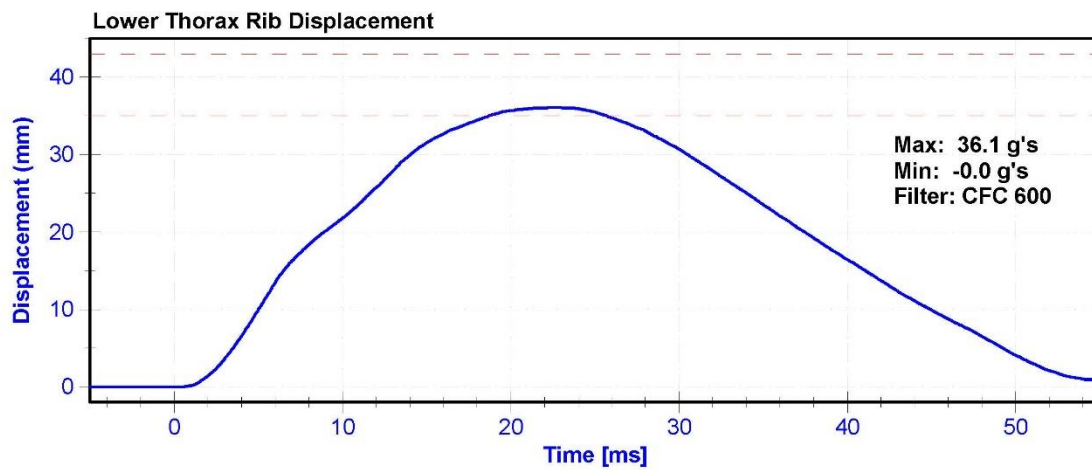
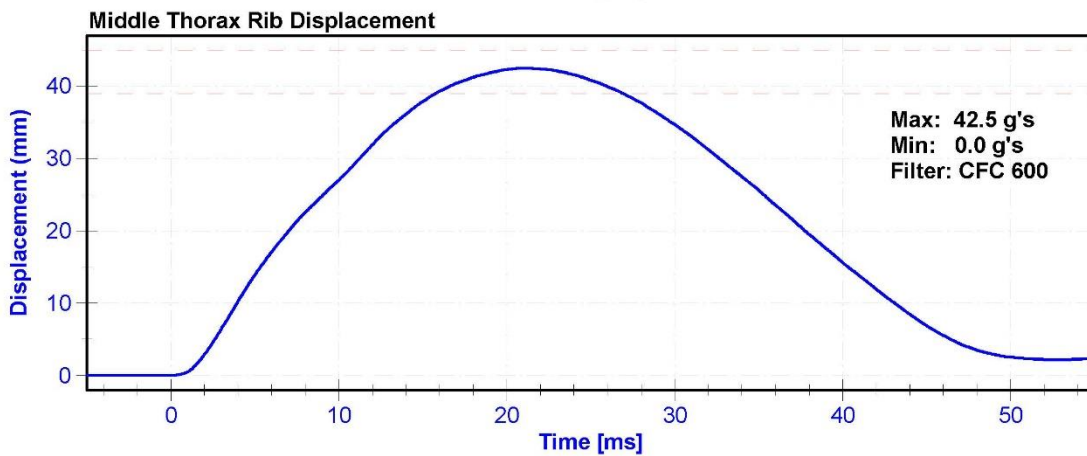
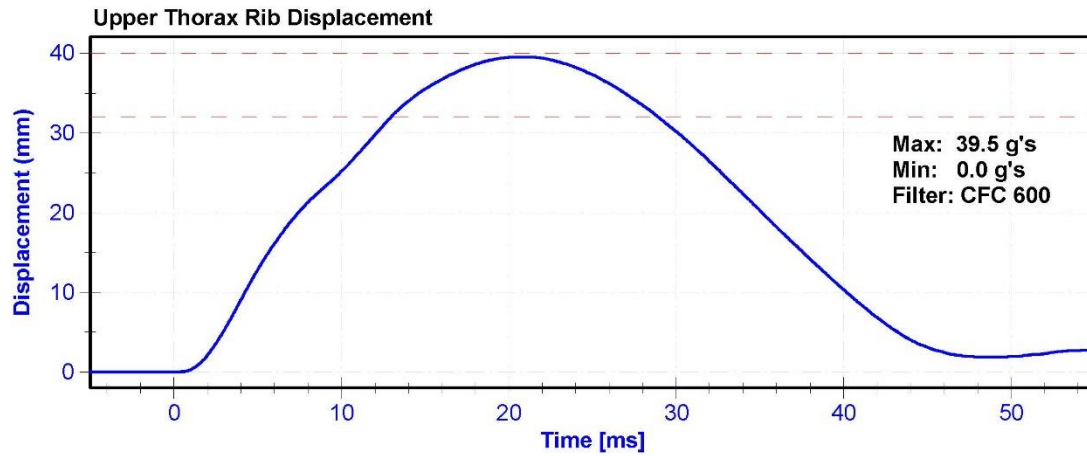
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	36.5	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.8	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.4	Pass
Upper Thorax Rib Deflection	32	40	mm	39.5	Pass
Middle Thorax Rib Deflection	39	45	mm	42.5	Pass
Lower Thorax Rib Deflection	35	43	mm	36.1	Pass

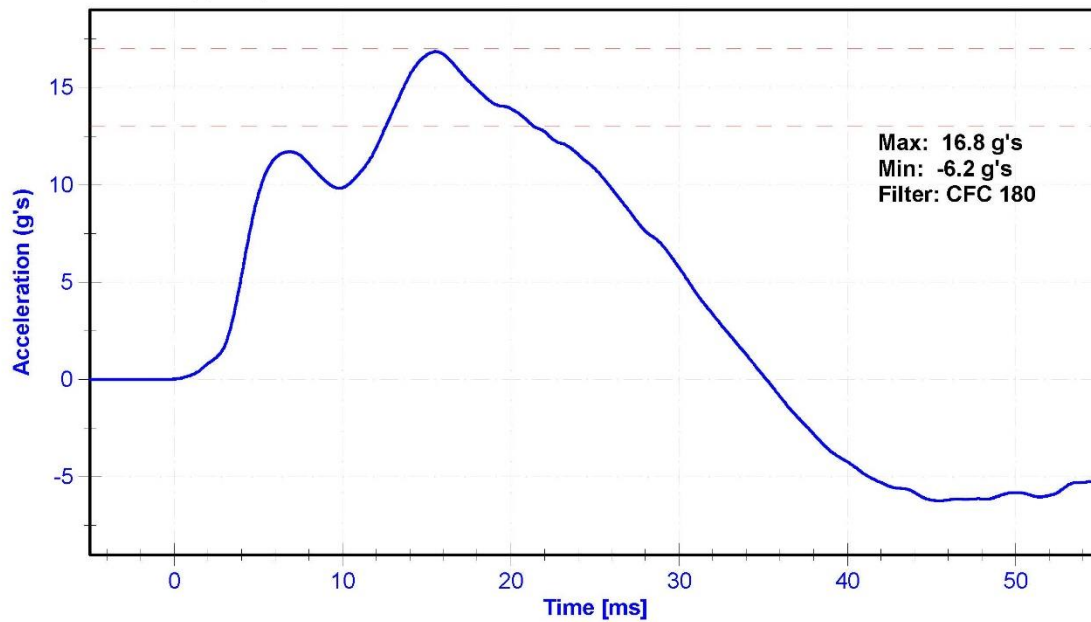
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/19/2015	4/18/2016
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/19/2015	4/18/2016
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	10/19/2015	10/18/2016
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	10/19/2015	10/18/2016
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	10/19/2015	10/18/2016

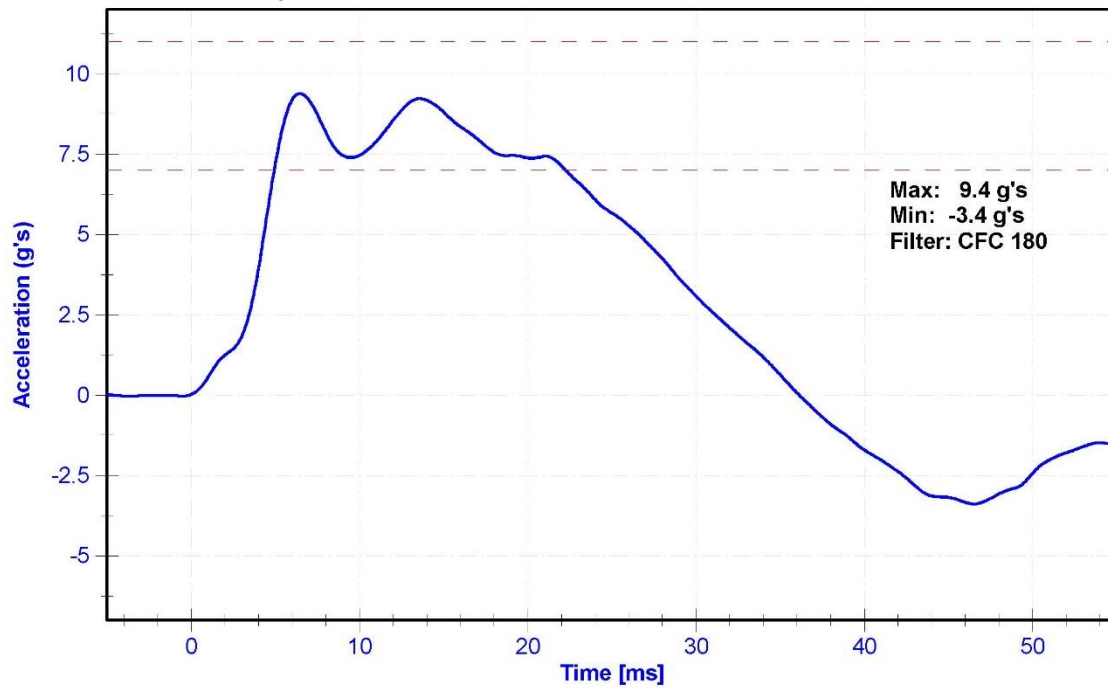




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



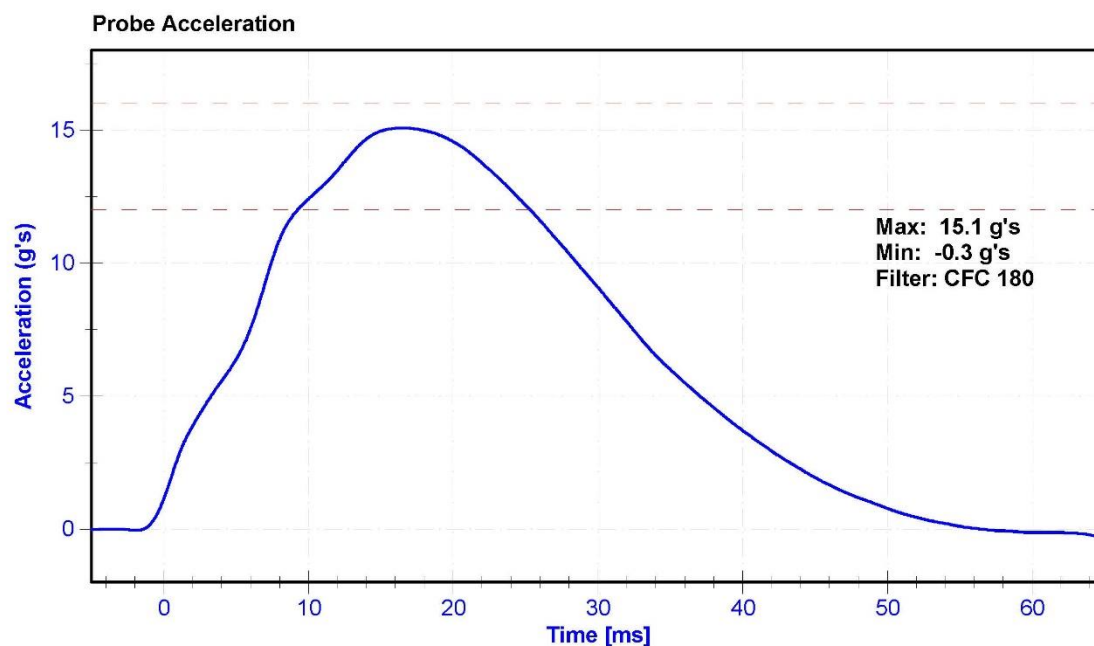
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

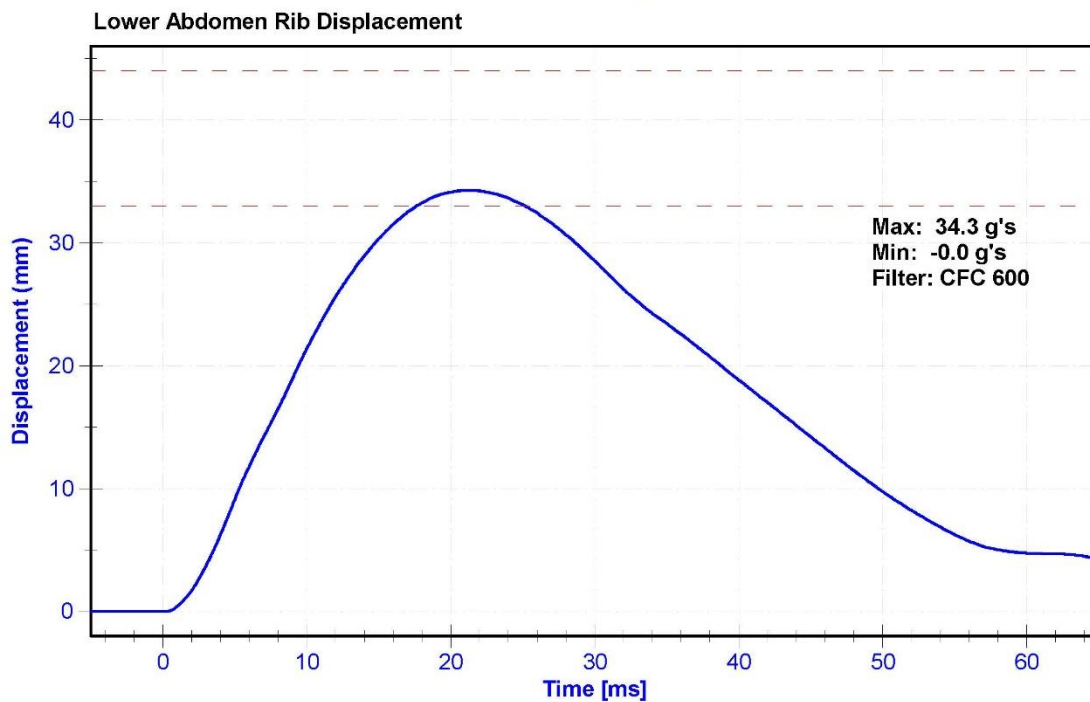
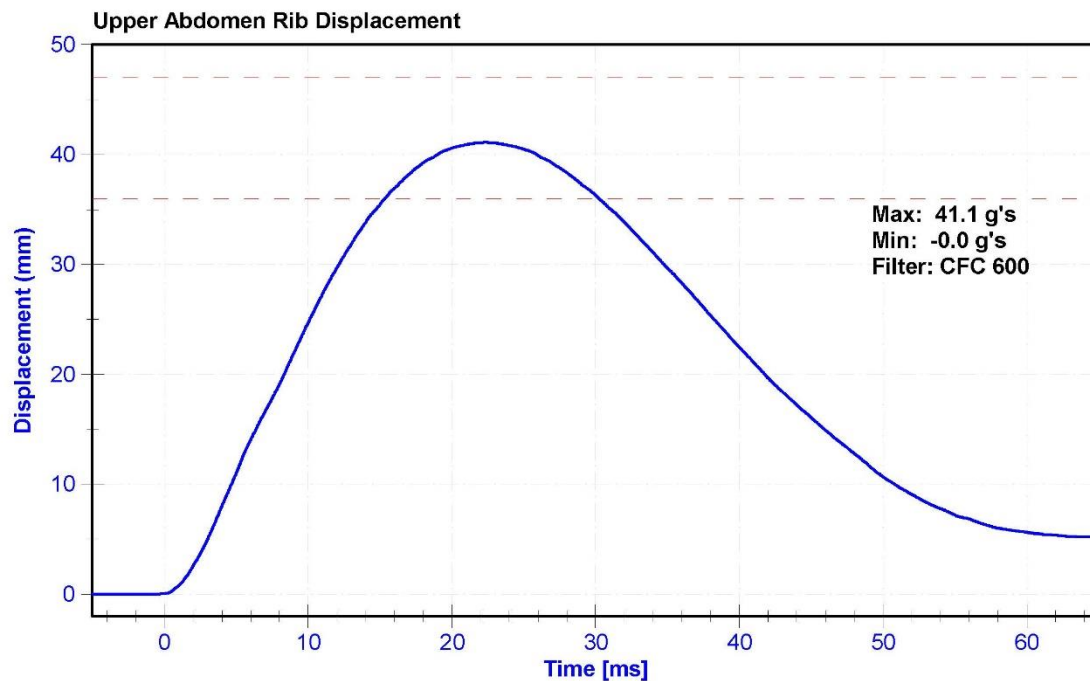
Results

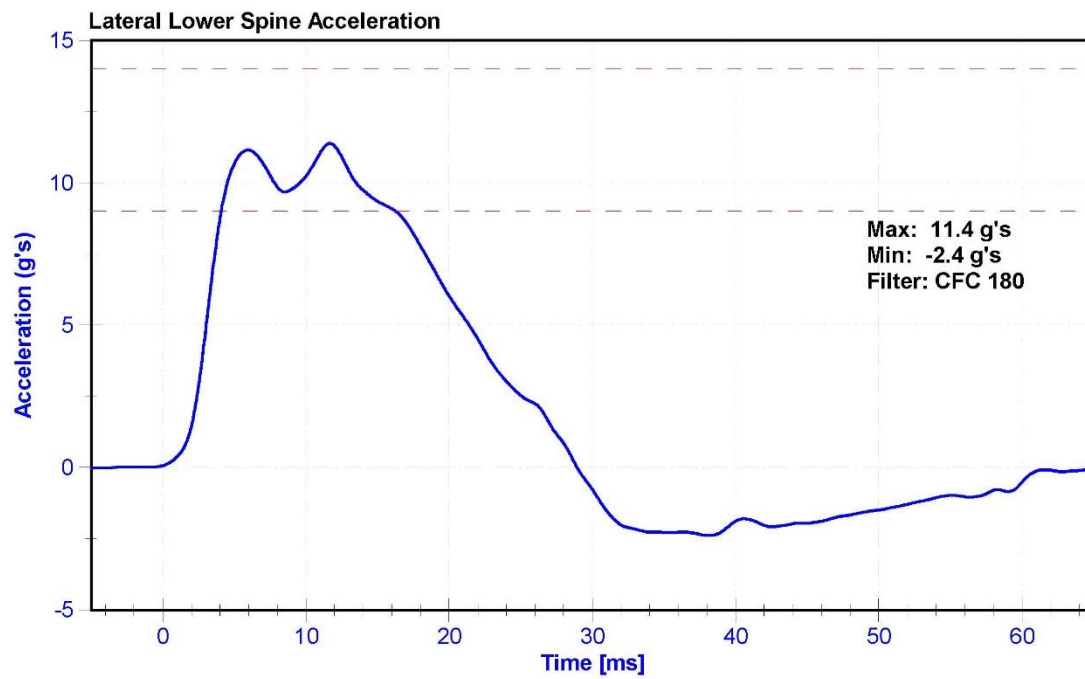
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	36.9	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	12	16	g's	15.1	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.4	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.1	Pass
Lower Abdomen Rib Deflection	33	44	mm	34.3	Pass

Transducer Calibrations

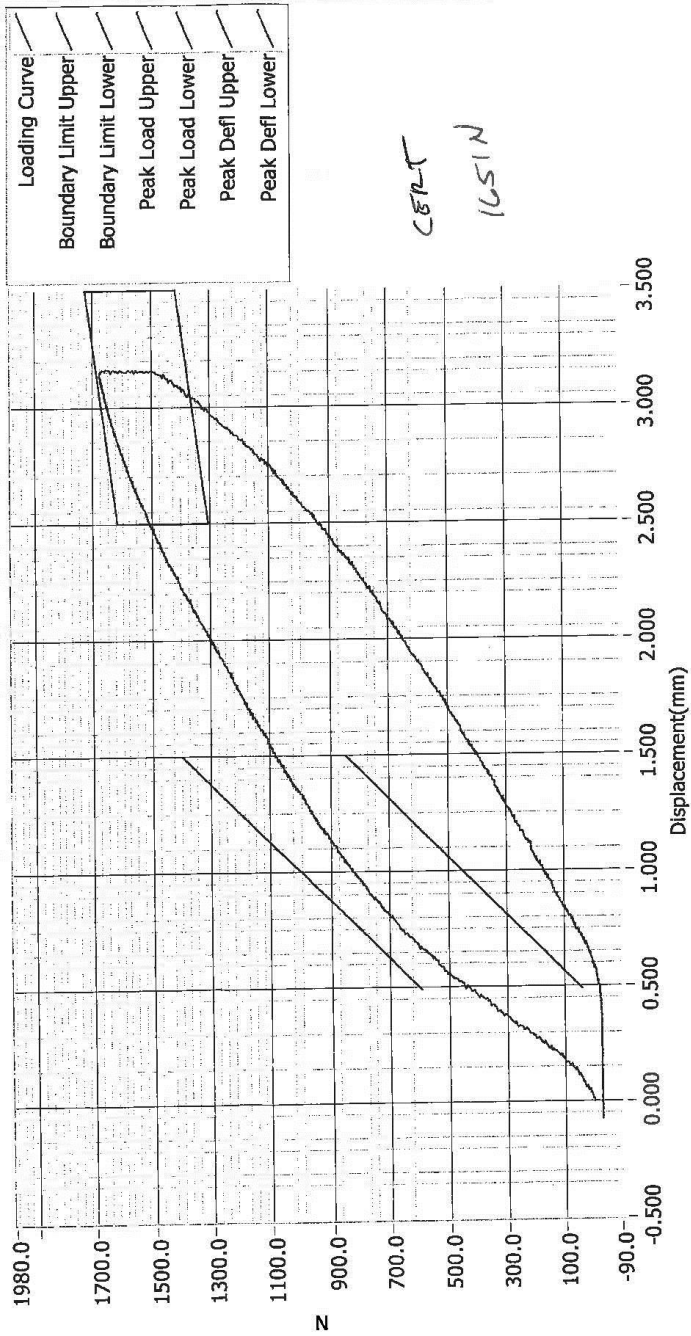
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/19/2015	4/18/2016
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-1274GFE	10/19/2015	10/18/2016
Lower Abdomen Rib Potentiometer	Servo 08CT1-3745	DS-2316GFE	10/28/2015	10/27/2016







Resultant Data - SIDIIs Plug Compression

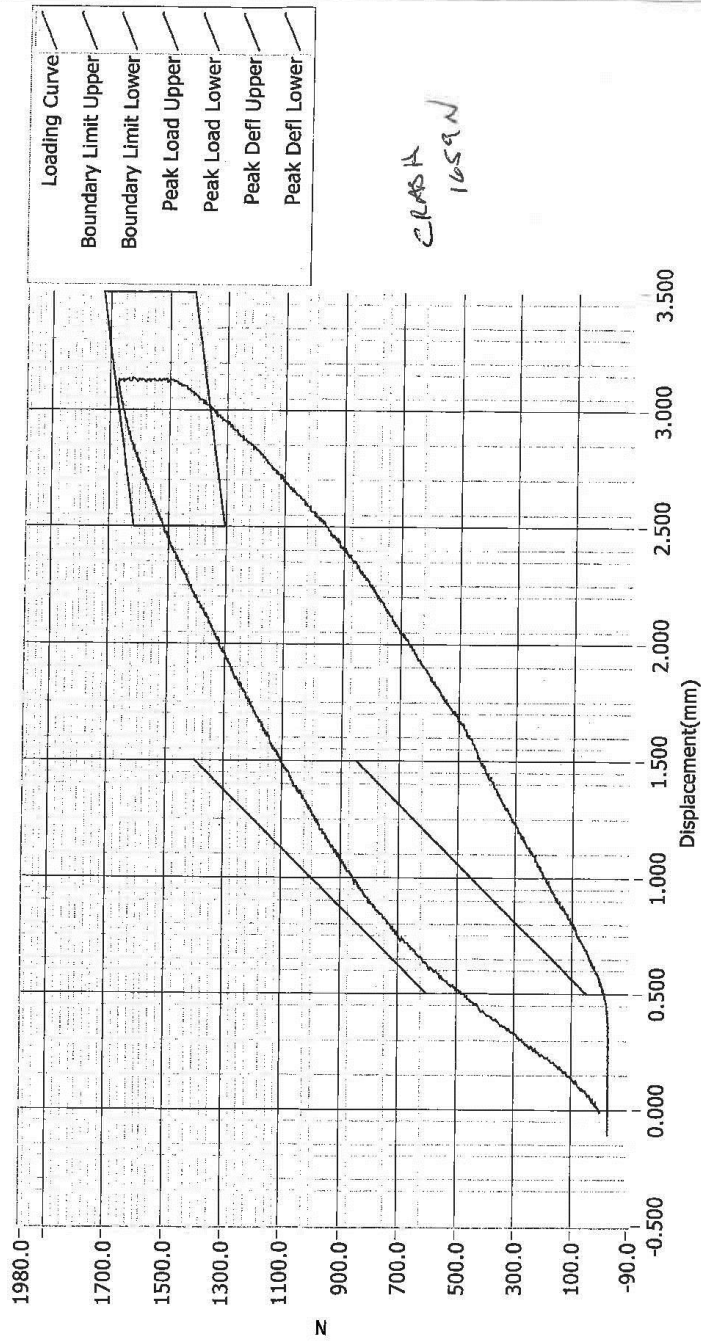


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	81136	12/4/2014	11:38 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/4/2014 Current Time : 23:40:19

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
	81132	12/4/2014	11:25 PM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDIIs	

Current Date : 12/4/2014 Current Time : 23:27:24

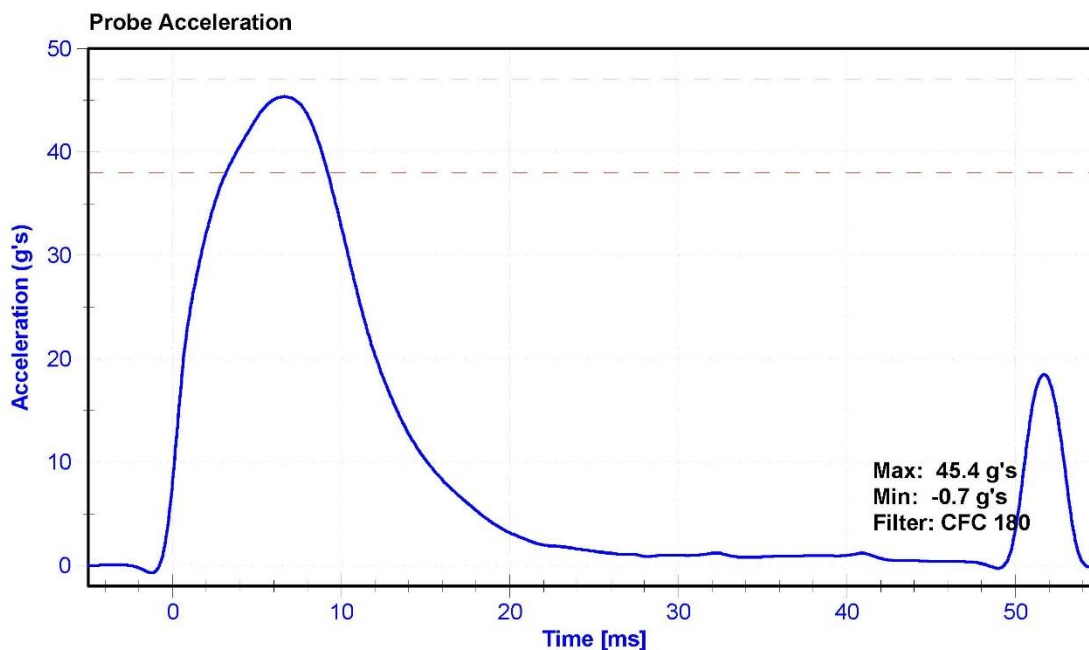
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

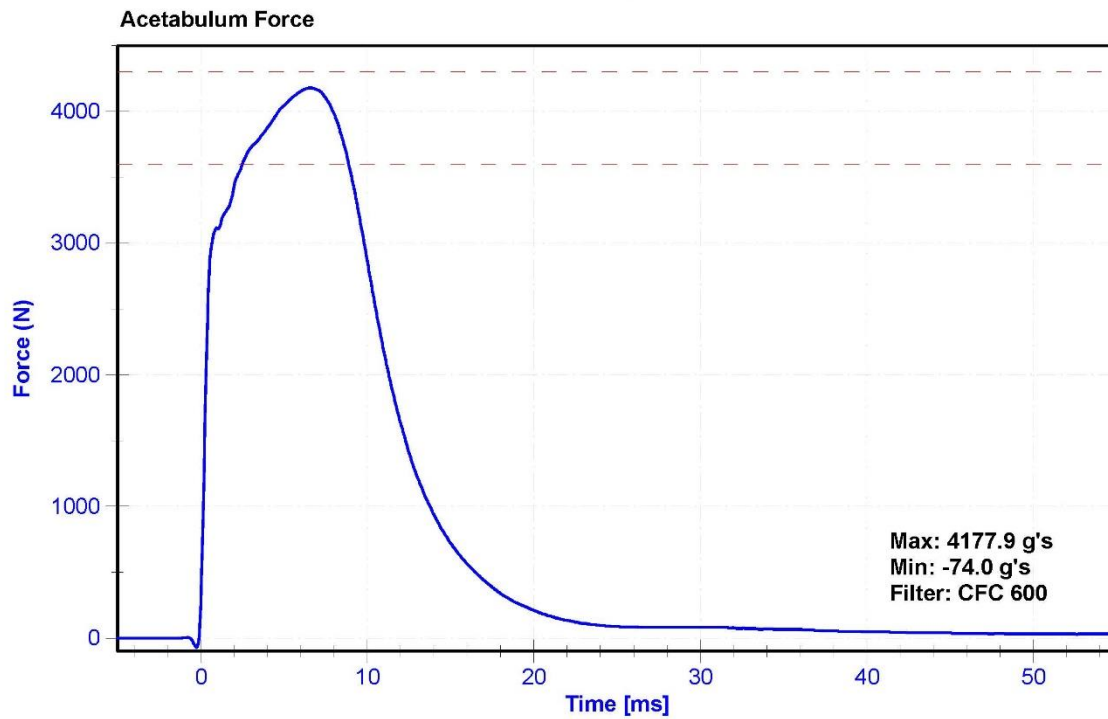
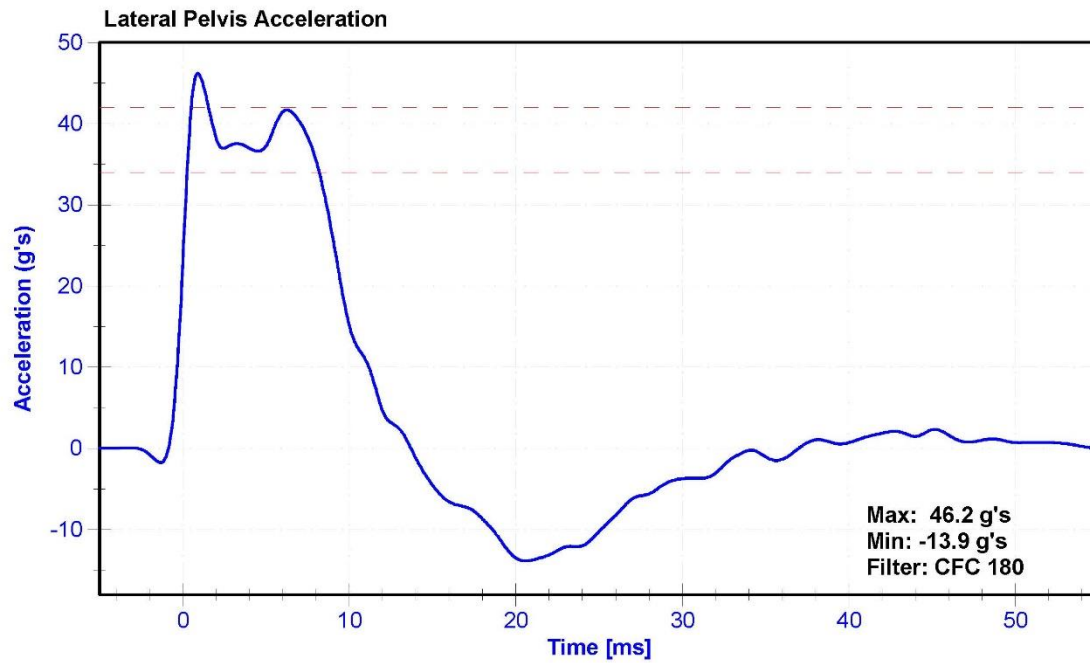
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	40.8	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration	38	47	g's	45.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.7	Pass
Acetabulum Force	3,600	4,300	N	4177.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	10/19/2015	4/18/2016
Acetabulum Load Cell	Denton IF-520	LC-236Fy	6/29/2015	6/28/2016
Certification Plug	Humanetics	81136	12/04/14	N/A
Crash Test Plug	Humanetics	81132	12/04/2014	N/A





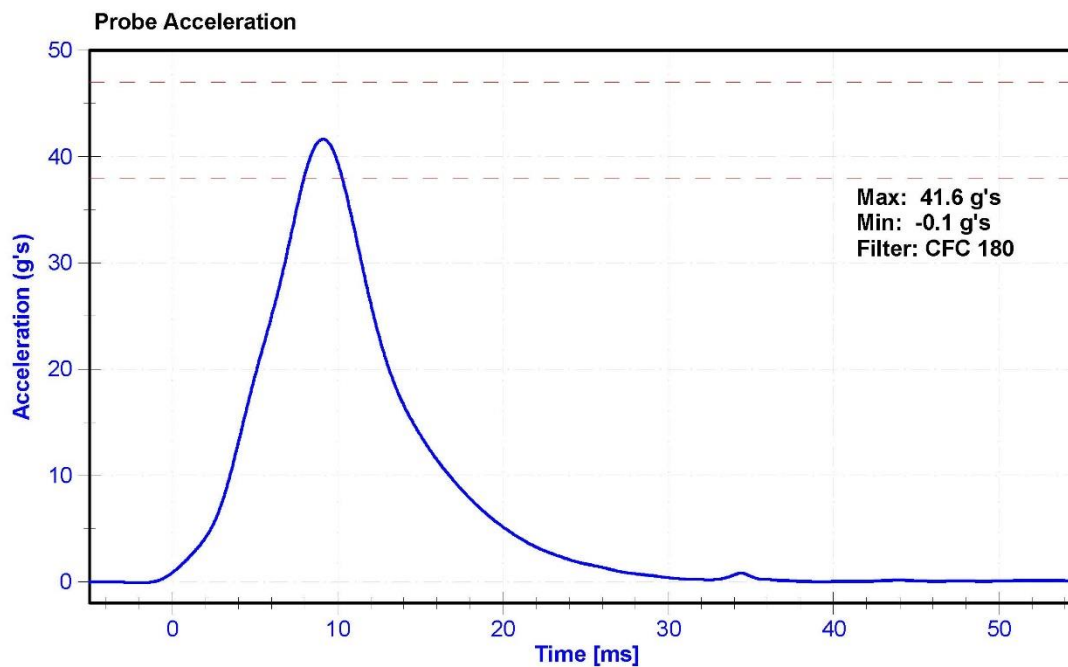
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

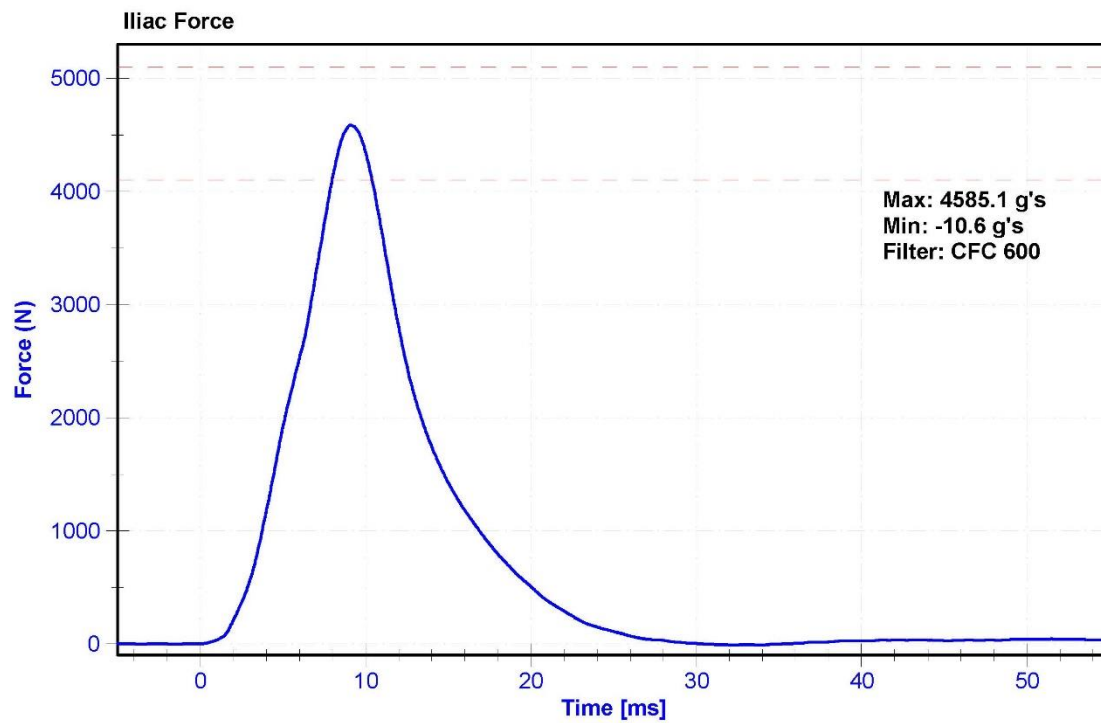
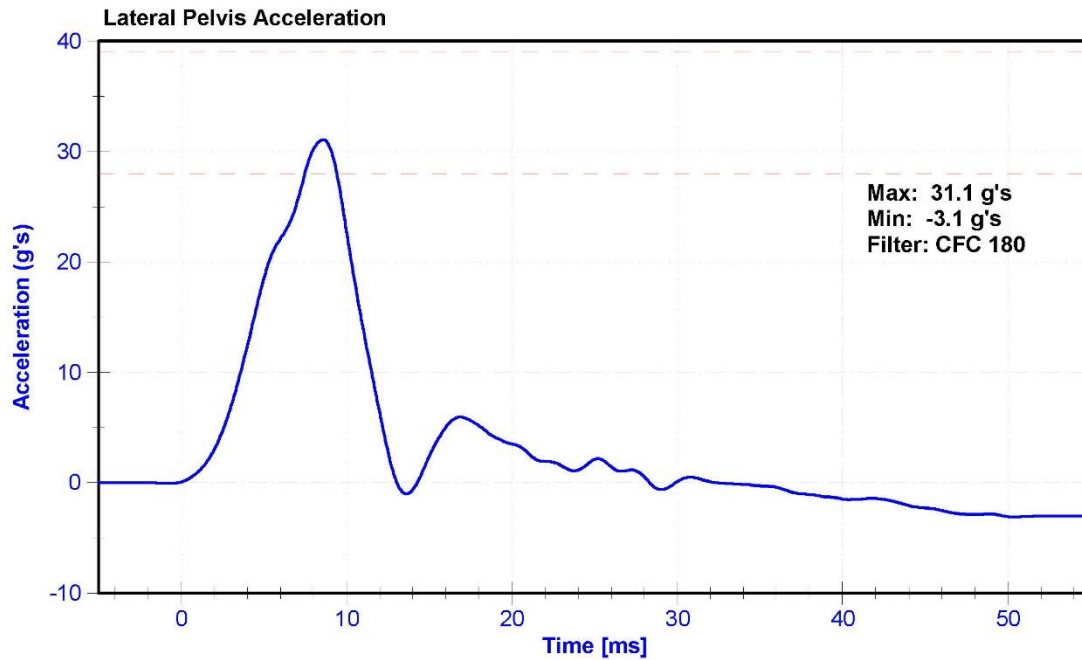
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	30.8	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	36	45	g's	41.6	Pass
Lateral Pelvis Acceleration	28	39	g's	31.1	Pass
Iliac Force	4,100	5,100	N	4585.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	10/19/2015	4/18/2016
Iliac Load Cell	DENTON 3228J	LC-285Fy	7/21/2015	7/20/2016





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	10/19/2015
		Y	AC-P58911	ENDEVCO	10/19/2015
		Z	AC-P58776	ENDEVCO	10/19/2015
	Redundant	X	AC-P58887	ENDEVCO	10/19/2015
		Y	AC-P58888	ENDEVCO	10/19/2015
		Z	AC-P51734	ENDEVCO	10/19/2015
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	Honeywell	10/19/2015
	Middle	Y	DS-184GFE	Honeywell	10/19/2015
	Lower	Y	DS-182GFE	Honeywell	10/19/2015
Abdomen Load Cells	Forward	Y	LC-1512	DENTON	6/25/2015
	Middle	Y	LC-1526	DENTON	6/25/2015
	Rear	Y	LC-1516	DENTON	6/25/2015
Lower Spine Accelerometers (T12)		X	AC-P52079	ENDEVCO	10/16/2015
		Y	AC-P51948	ENDEVCO	10/16/2015
		Z	AC-P51269	ENDEVCO	10/16/2015
Pubic Symphysis Load Cell		Y	LC-465Fy	DENTON	6/25/2015

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 303		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	AC-P83420	Endevco	10/16/2015
			Y	AC-P52040	ENDEVCO	10/14/2015
			Z	AC-P58737	ENDEVCO	10/14/2015
		Redundant	X	AC-P51668	ENDEVCO	10/14/2015
			Y	AC-P51327	ENDEVCO	10/14/2015
			Z	AC-P51695	ENDEVCO	10/14/2015
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-1199GFE	SERVO	10/19/2015
		Middle	Y	DS-1246GFE	SERVO	10/19/2015
		Lower	Y	DS-1256GFE	SERVO	10/19/2015
	Abdominal Rib	Upper	Y	DS-1274GFE	SERVO	10/19/2015
		Lower	Y	DS-2316GFE	SERVO	10/28/2015
Lower Spine Accelerometers (T12)			X	AC-P51945	ENDEVCO	10/19/2015
			Y	AC-P51974	ENDEVCO	10/19/2015
			Z	AC-P51946	ENDEVCO	10/19/2015
Acetabulum Load Cell			Y	LC-236Fy	DENTON	6/29/2015
Iliac Wing Load Cell			Y	LC-285Fy	DENTON	7/21/2015
Pelvis Plug (struck side)				81132	HUMANETICS	12/7/2011
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-P71266	ENDEVCO	9/9/2015
	Vehicle Center of Gravity	Y	AC-P71265	ENDEVCO	9/9/2015
	Vehicle Center of Gravity	Z	AC-P71300	ENDEVCO	9/9/2015
2	Right Sill at Front Seat	X	AC-A127679	MSI 1201	10/20/2015
	Right Sill at Front Seat	Y	AC-A120629	MSI 1201	10/20/2015
	Right Sill at Front Seat	Z	AC-A002369	MSI 1201	10/8/2015
3	Right Sill at Rear Seat	X	AC-A156912	MSI 1201	10/15/2015
	Right Sill at Rear Seat	Y	AC-A127663	MSI 1201	10/9/2015
	Right Sill at Rear Seat	Z	AC-A005916	MSI 1201	10/9/2015
4	Left Sill at Front Door	Y	AC-A156945	MSI 1201	10/9/2015
5	Left Sill at Rear Door	Y	AC-A032569	MSI 1201	10/9/2015
6	Left A-Post Lower	Y	AC-A156927	MSI 1201	10/9/2015
7	Left A-Post Middle	Y	AC-A156919	MSI 1201	10/9/2015
8	Left B-Post Lower	Y	AC-A126821	MSI 1201	11/17/2015
9	Left B-Post Middle	Y	AC-A120604	MSI 1201	9/17/2015
10	Front Seat Track	Y	AC-P23155	ENDEVCO	8/27/2015
11	Rear Seat Track or Structure	Y	AC-P19343	ENDEVCO	8/27/2015
12	Right Rear Occ. Compartment	Y	AC-P23139	ENDEVCO	8/27/2015
13	Engine Block	X	AC-A127673	MSI 1201	9/17/2015
	Engine Block	Y	AC-A079084	MSI 1201	10/8/2015
14	Rear Floorpan Above Axle	X	AC-P71263	ENDEVCO	9/10/2015
	Rear Floorpan Above Axle	Y	AC-P71262	ENDEVCO	9/10/2015
	Rear Floorpan Above Axle	Z	AC-P18551	ENDEVCO	9/10/2015

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	AC-C14901	ENDEVCO	6/15/2015
MDB Center of Gravity	Y	AC-CP30	ENDEVCO	6/15/2015
MDB Center of Gravity	Z	AC-C16680	ENDEVCO	6/15/2015
Left Frame at Rear Axle Centerline	X	AC-AH5M8	ENDEVCO	6/15/2015
Left Frame at Rear Axle Centerline	Y	AC-C16499	ENDEVCO	6/15/2015