REPORT NUMBER: SINCAP-CAL-15-005

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

Ford Motor Co.
2015 Ford Focus
Four Door Sedan

NHTSA No: M20150224

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

April 10, 2015

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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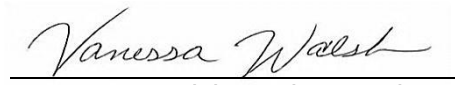
Prepared by:  Date: April 10, 2015

Vanessa Walsh, Project Engineer

Approved by:  Date: April 10, 2015

Edward Dutton, Test Engineer
Transportation Test Operations

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

_____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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SINCAP-CAL-15-005		

4. Title and Subtitle	5. Report Date
Final Report of New Car Assessment Program Side Impact MDB Testing of a 2015 Ford Focus four door sedan NHTSA No.: M20150224	April 10, 2015
	6. Performing Organization Code CAL
Vanessa Walsh, Test Engineer Edward Dutton , Senior Test Engineer	**8. Performing Organization Report No.** CAL-DOT-2015-005
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225	**10. Work Unit No.**
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	14. Sponsoring Agency Code NVS-111

15. *Supplementary Notes*

16. *Abstract*

A 55/28, (61.90 kph / 38.5 mph), 90^0 Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2015 Ford Focus four door sedan 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 February 11, 2015.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.35 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 182 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	125.256
Maximum Thoracic Rib Deflection	mm	44	25.924
Total Abdominal Force	N	2500	969.349
Pubic Symphysis Force	N	6000	1302.316

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	346.514
Lower Spine Resultant Acceleration	G	82	59.864
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2784.928
Maximum Thoracic Rib Deflection	mm	38*	36.494
Maximum Abdominal Rib Deflection	mm	45*	32.618

** Proposed IARV*

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

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

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UNCLASSIFIED	UNCLASSIFIED	188	

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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2015 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 2015 Ford Focus four door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated August 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A 2015 Ford Focus four door sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.35 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 February 11, 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 August 2013. 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	125.256
Maximum Thorax Rib Deflection	mm	44	25.924
Combined Abdominal Force	N	2500	969.349
Pubic Symphysis Force	N	6000	1302.316

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	346.514
Lower Spine (T12) Resultant Acceleration	G	82	59.864
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2784.928
Maximum Thoracic Rib Deflection	mm	38*	36.494
Maximum Abdominal Rib Deflection	mm	45*	32.618

*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	Yes	No		
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:

- Engine Top Y Acceleration: Questionable Offset from 1ms

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: 2015 Ford Focus four door sedan
NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test
Test Date: 2/11/15

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20150224
Model Year	2015
Make	Ford
Model	Focus
Body Style	Four Door Sedan
VIN	1FADP3F24FL200562
Body Color	Charcoal Gray
Odometer Reading (km/mi)	251 km / 156 mi
Engine Displacement (L)	2.0
Type/No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof/T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	12/14
Vehicle Type	Passenger

GVWR (kg)	1810
GAWR Front (kg)	972
GAWR Rear (kg)	880

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	-	5	
Capacity Weight (VCW) (kg)				375	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				34.8	(A-B)

VEHICLE SEAT TYPE

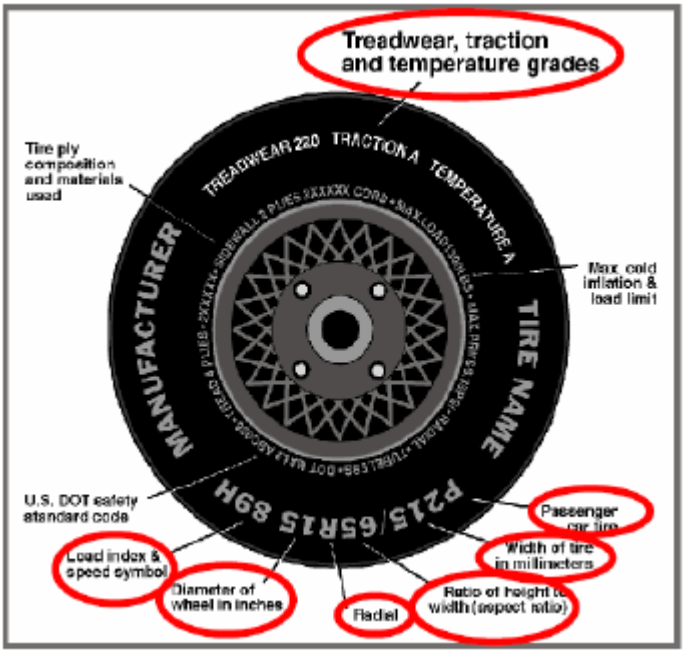
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable W/ Lever	Adjustable W/ Knob
Front Seat	X					X	
Rear or Second Row Seat		X			X		
Third Row seat							

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

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15

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)	250	250
Recommended Tire Size	P215/55R16	P215/55R16
Tire Size on Vehicle	P215/55R16	P215/55R16
Tire Manufacturer	Continental	Continental
Tire Model	Conti Touring Contact	Conti Touring Contact
Treadwear	360	360
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	93H	93H
Tire Material	Rubber	Rubber
DOT Safety Code Left	A3B347PB4814	A3B347PB4814
DOT Safety Code Right	A3B347PB4814	A3B347PB4814

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

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	274	270	272	268
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	420	267		441	352		460	344	
Right	kg	394	292		426	311		398	338	
Ratio	%	59%	41%		57%	43%		56%	44%	
Totals	kg	814	559	1373	867	663	1530	858	682	1540

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1373	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	129	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	34.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1536.8	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range

(i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? [X] **Yes** [ ] **No**

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	677	675	Yes
RF	mm	685	678	Yes
RR	mm	668	667	Yes
LR	mm	658	658	Yes
Vehicle CG (Aft of Front Axle)	mm	1174	1148	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	34	28	

*** 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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	8
Spare Tire & Jack	17
Tail Light	2
Rear interior deck	3
Passenger Side Windows	7
Ballast / Equipment Added	0

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

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15

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	18.0	13.2	15.6
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	15.6	31	Max	42	53	64
			Mid	20	31	43
			Min	0	10	23
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: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

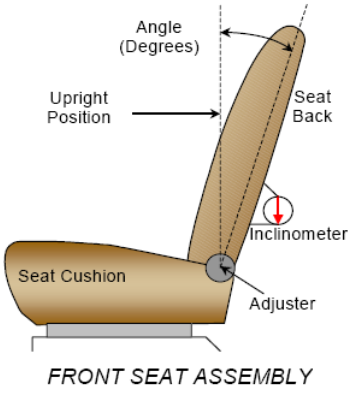
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	252	38	129	19
Front Passenger Seat	254	38	127	19
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

**if applicable*

SEAT BACK ANGLE ADJUSTMENT

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



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	-10.5 to 39.8	N/A	+4.3	N/A
Front Passenger Seat	-9.7 to 40.7	N/A	+3.9	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: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

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

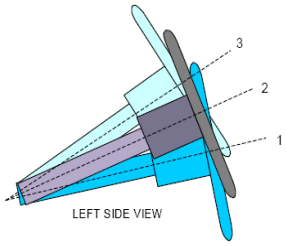
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3	0 - Uppermost
Rear Seat	2	1 – Lowest

STEERING COLUMN ADJUSTMENT

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

	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	19.3	
Geometric Center – Position 2	22.3	
Uppermost – Position 3	25.4	
Telescoping Steering Wheel Travel		40
Test Position	22.3	20

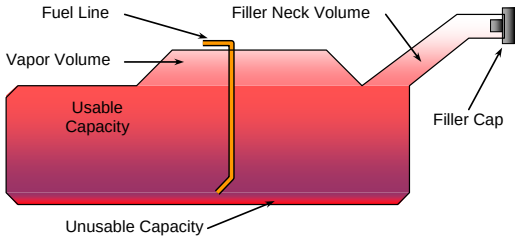


STEERING COLUMN ASSEMBLY

FUEL PUMP

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

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



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

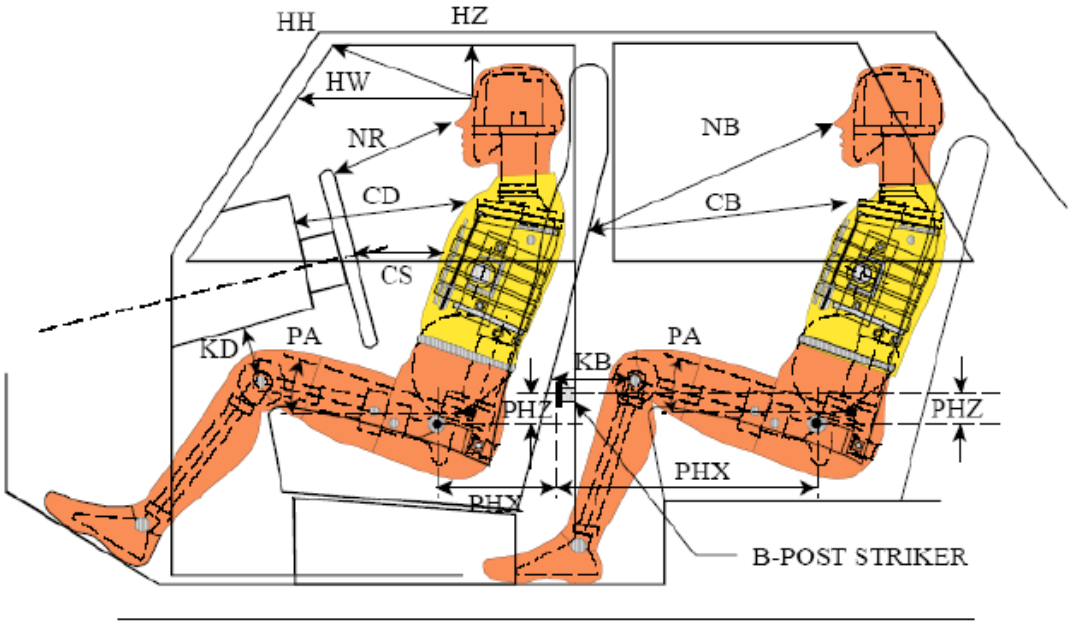
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	46.9
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	46.9
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	43.6
Actual Amount of Solvent Used in Test	43.6
1/3 of Usable Capacity	15.6

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



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

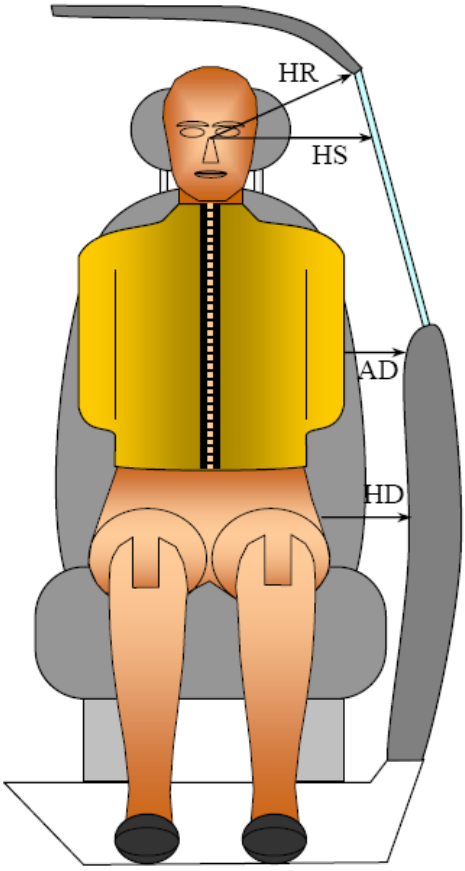
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No. 303)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	398			
HW		Header to Windshield	755			
HZ	HZ	Head to Roof Liner	140		245	
NR	NB	Nose to Rim/Seat Back	458		538	
CD	CB	Chest to Dash/Seat Back	598		508	
CS		Chest to Steering Wheel	405			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	157	37.5	214	16.4
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	169	45.3	215	15.3
PAX°	PAX°	Pelvic Tilt Angle X		23.7		20.9
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	149		691	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	120		84	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



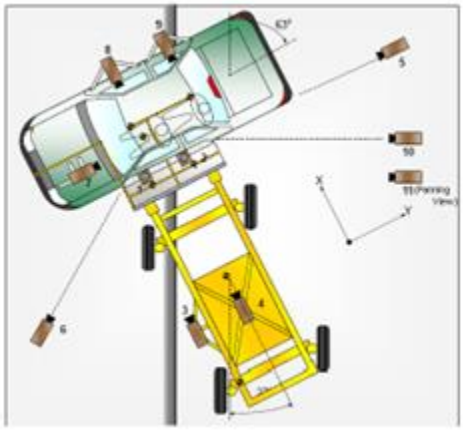
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 303)
HR	Head to Side Header	mm	183	239
HS	Head to Side Window	mm	325	362
AD	Arm to Door	mm	100	148
HD	Hip Point to Door	mm	154	159

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	240	789	-5320	14	1000
2	Overhead Close-up	-218	682	-5320	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	0	9816	-1409	24	1000
6	Left Front	-2241	-3736	-1378	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.*

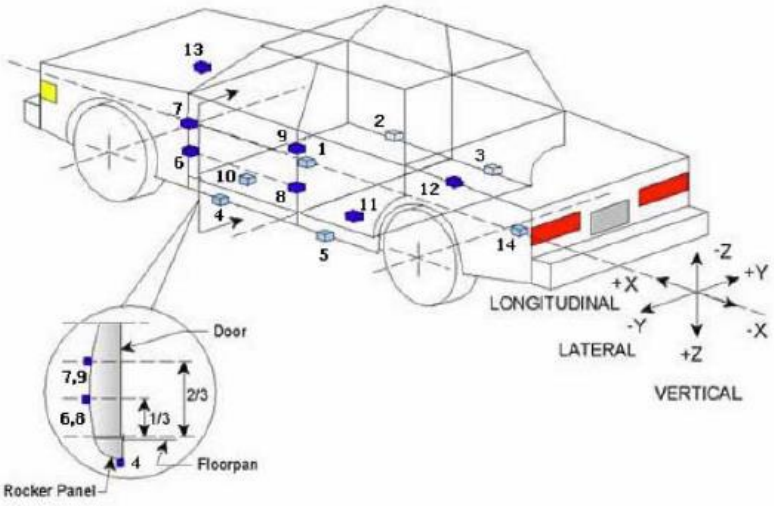
If applicable, explain why camera(s) did not operate as intended: All cameras operated normally

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: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15



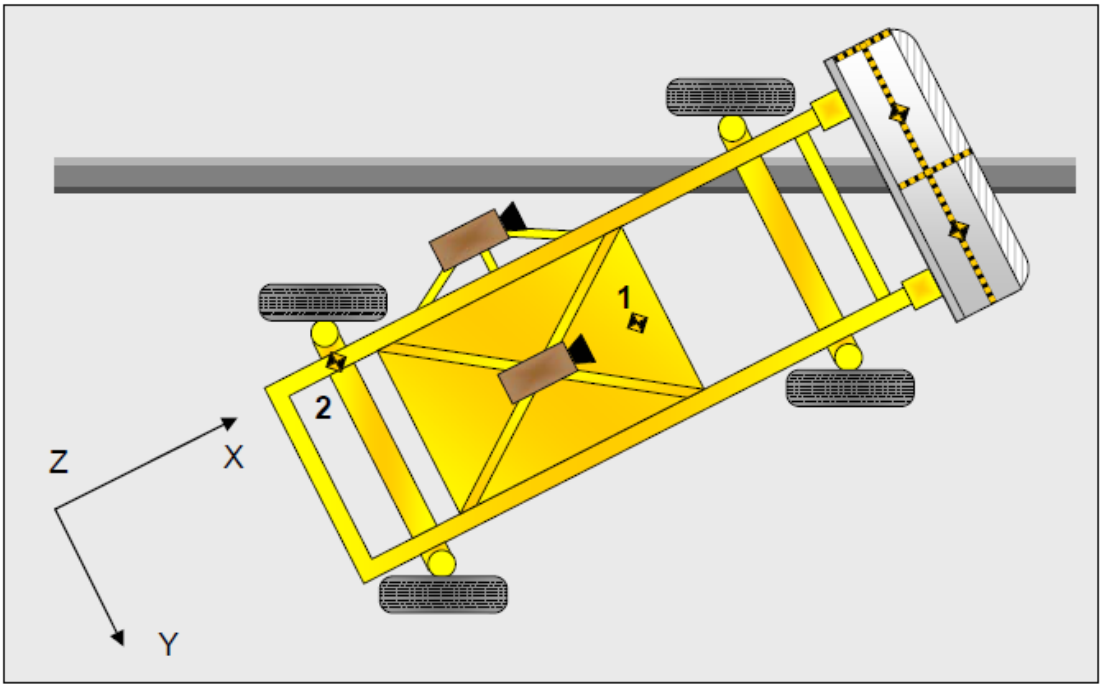
TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2266	37	-72
2	Right Sill at Front Seat	2738	662	199
3	Right Sill at Rear Seat	1983	661	198
4	Left Sill at Front Door	2699	-653	189
5	Left Sill at Rear Door	1937	-659	201
6	A-Post Lower	3078	-633	-37
7	A-Post Middle	3089	-634	-484
8	B-Post Lower	2150	-672	4
9	B-Post Middle	2136	-680	-244
10	Front Seat Track	2389	-531	214
11	Rear Seat Structure	1139	-537	-93
12	Rt. Rear Occ. Compartment	2049	369	314
13	Engine Block	3778	121	-289
14	Rear Above Axle	1147	-140	20

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



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: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

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	Side Headliner & Curtain Airbag	Curtain Airbag
Back of Head	Headrest & Side Headliner	Curtain Airbag, Headrest
Left Shoulder	Torso/Pelvis & Curtain Airbag	Passenger Door
Upper Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Lower Torso	Seatback	Passenger Door
Left Hip	Seatback & Torso/Pelvis Airbag	Seat pan & Passenger Door
Left Knee	Driver's Door	Passenger Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	0	0	0	0	0

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	B-Pillar & C-Pillar Buckled
Sill Separation	None
Windshield Damage	None
Side Window Damage	Driver's Window Shattered During Impact
Other Notable Effects	None

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

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
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		2650
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		387
Actual Impact Point (Aft of Frontal Axle)	mm		387
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-9

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

MDB SPECIFICATIONS

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

MDB WEIGHTS

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

SPEED AND ANGLE AT IMPACT DATA

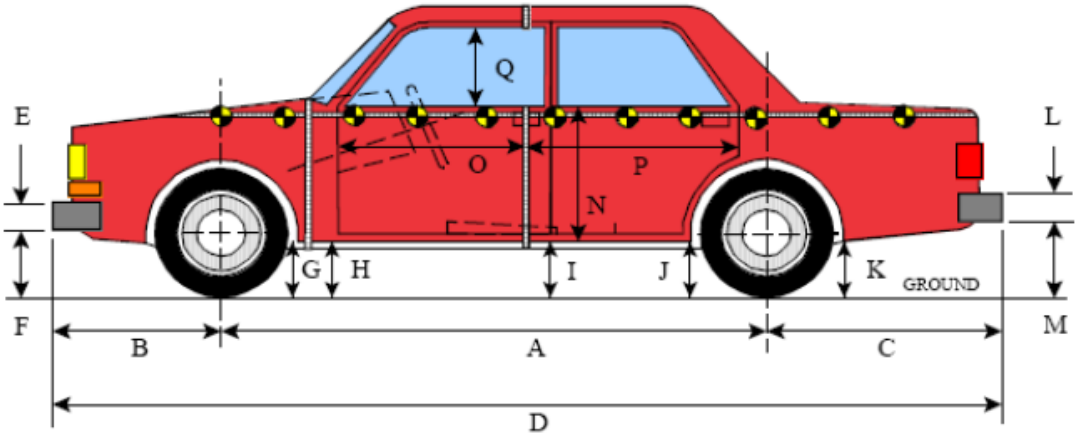
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.35
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.44
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle 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	184
B	Top of Bumper	533	800	Left	143
C	Mid-Level	686	800	Left	140
D	Top of Stack	813	800	Left	135

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15



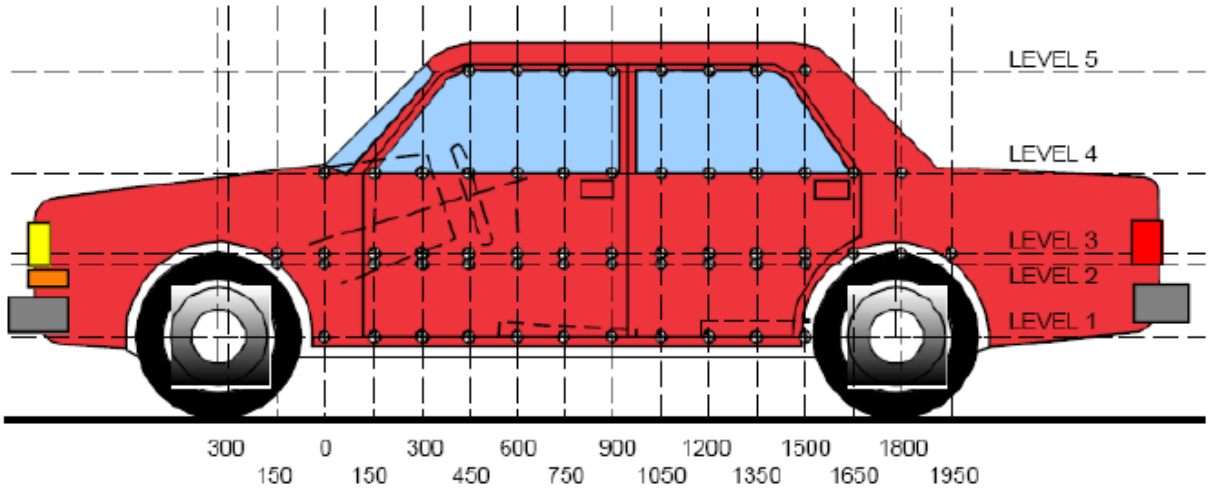
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2650	2637	-13
B	Front Axle to FSOV	902	910	8
C	Rear Axle to RSOV	989	988	-1
D	Total Length at Centerline	4542	4534	-7
E	Front Bumper Thickness	80	80	0
F	Front Bumper Bottom to Ground	414	418	4
G	Sill Height at Front Wheel Well	150	161	11
H	Sill Height at Front Door Leading Edge	151	160	9
I	Sill Height at B Pillar	155	158	3
J1	Sill Height at Rear Wheel Well	165	163	-2
J2	Pinch Weld Height at Rear Wheel Well	148	143	-5
K	Sill Height Aft of Rear Wheel Well	216	209	-7
L	Rear Bumper Thickness	80	80	0
M	Rear Bumper Bottom to Ground	380	362	-18
N	Sill Height to Window Bottom of Front Window Sill	699	682	-17
O	Front Door Leading Edge to Impact CL	769	754	-15
P	Rear Door Trailing Edge to Impact CL	1249	1214	-35
Q	Front Window Opening	444	448	4
R	Right Side Length	4399	4398	-1
S	Left Side Length	4400	4380	-20
T	Maximum Vehicle Width	1784	1624	-160

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	237	24	900
2	Driver Hip Point	mm	537	178	1050
3	Mid-Door	mm	648	182	1350
4	Window Sill	mm	879	174	1650
5	Window Top	mm	1401	43	1350

*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: 2015 Ford Focus four door sedan NHTSA No.: M20150224
Test Program: NCAP Side MDB Impact Test Test Date: 2/11/15

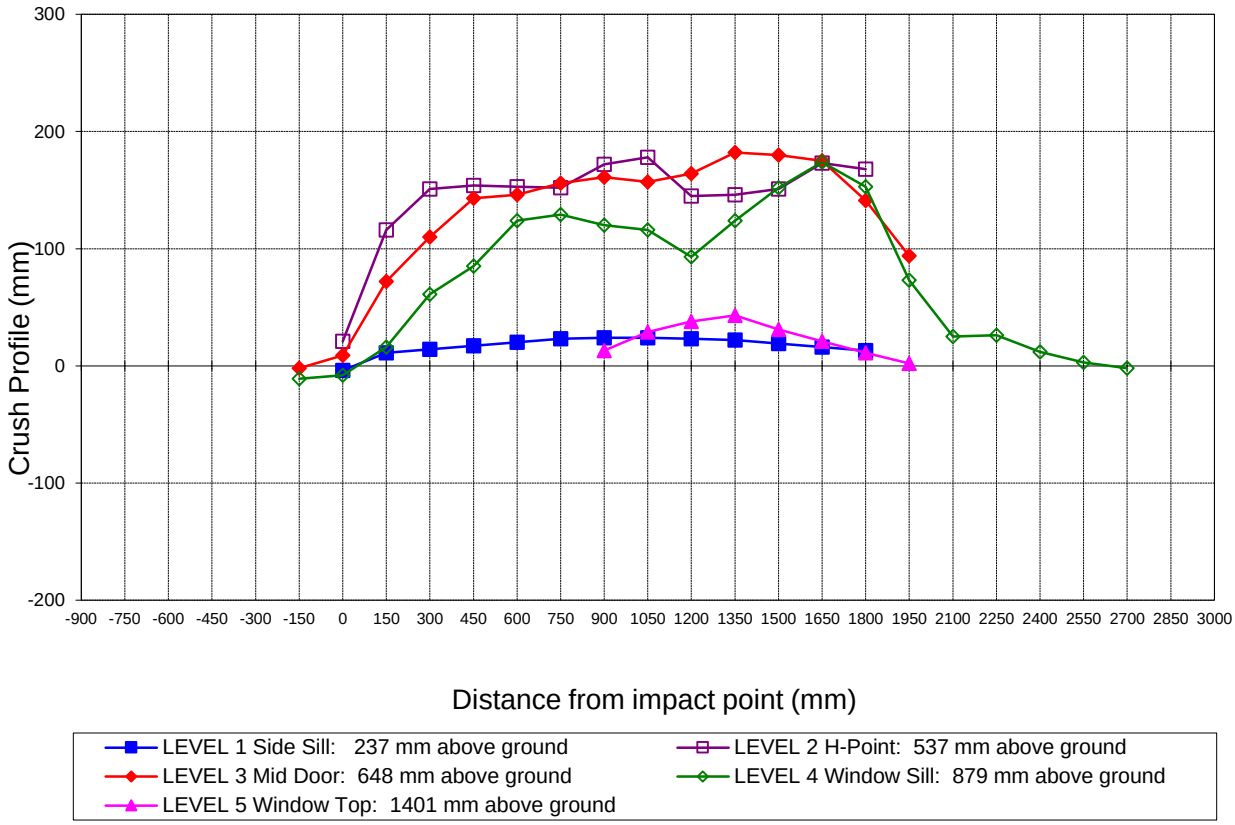
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			905	793				907	804				-2	-11	
0	861	895	895	815		865	874	881	823		-4	21	14	-8	
150	860	886	886	829		849	770	814	813		11	116	72	16	
300	859	886	889	840		845	735	779	779		14	151	110	61	
450	857	888	892	850		840	734	749	765		17	154	143	85	
600	855	889	893	860		835	736	747	736		20	153	146	124	
750	851	888	894	867		828	736	738	738		23	152	156	129	
900	846	887	893	865	600	822	715	732	745	587	24	172	161	120	13
1050	840	886	893	877	614	816	708	736	761	585	24	178	157	116	29
1200	835	881	889	877	617	812	736	725	784	579	23	145	164	93	38
1350	833	877	886	877	617	811	731	704	753	574	22	146	182	124	43
1500	832	873	882	875	617	813	722	702	723	586	19	151	180	152	31
1650	830	868	877	872	614	814	695	702	698	593	16	173	175	174	21
1800	827	867	873	868	605	814	699	732	715	594	13	168	141	153	11
1950			882	863	577			788	790	575			94	73	2
2100				856					831					25	
2250				852					826					26	
2400				844					832					12	
2550				833					830					3	
2700				817					819					-2	
2850															
3000															

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

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

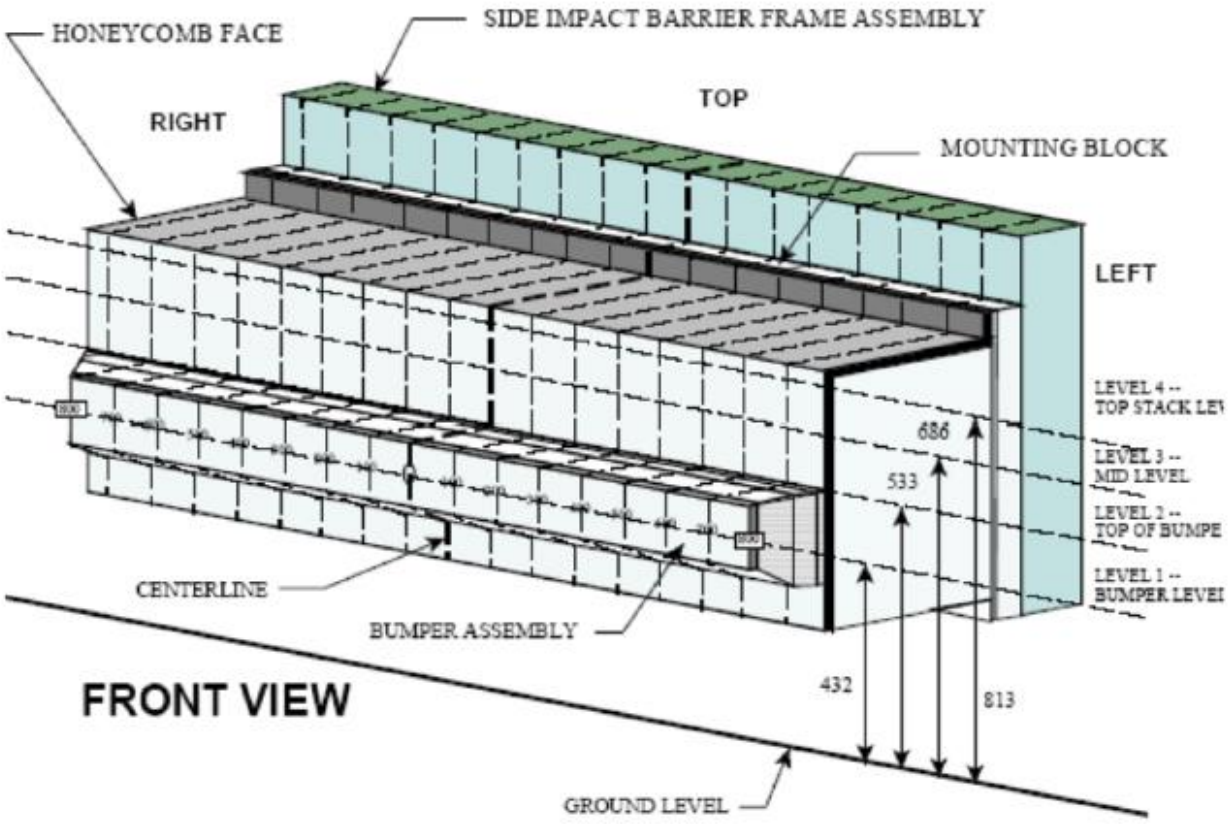
Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



NOTE: Dimensions are shown in millimeters, mm

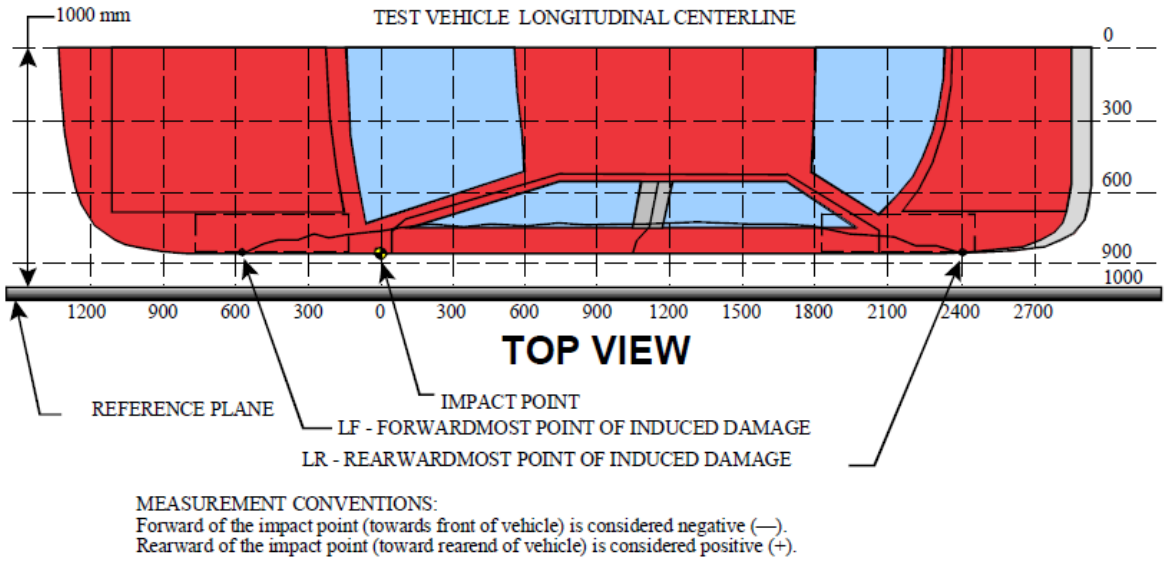
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	153	154	154	154	155	161	158	154	151	147	148	148	149	150	151	163	184
2	107	112	113	115	113	113	101	99	114	112	114	114	115	117	119	125	143
3	58	36	21	22	26	30	38	51	31	25	25	25	28	40	62	90	140
4	36	13	12	14	23	37	59	47	41	40	23	22	26	41	58	83	135

DATA SHEET NO. 13
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15

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



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

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-150	3	93	95	-2
2	270	3	214	112	102
3	690	3	258	106	152
4	1110	3	268	109	159
5	1530	3	298	119	179
6	1950	3	212	118	94

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	184
2	480 mm left of center	1	150
3	160 mm left of center	1	148
4	160 mm right of center	1	156
5	480 mm right of center	1	154
6	800 mm right of center	1	153

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

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15
Test Time:	1:03 PM	Temperature:	21˚C

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

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

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

D. Spillage Details: — No Spillage Occurred

FMVSS NO. 301 STATIC ROLLOVER DATA

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	75	300	375
90° to 180°	63	300	363
180° to 270°	61	300	361
270° to 360°	65	300	365

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

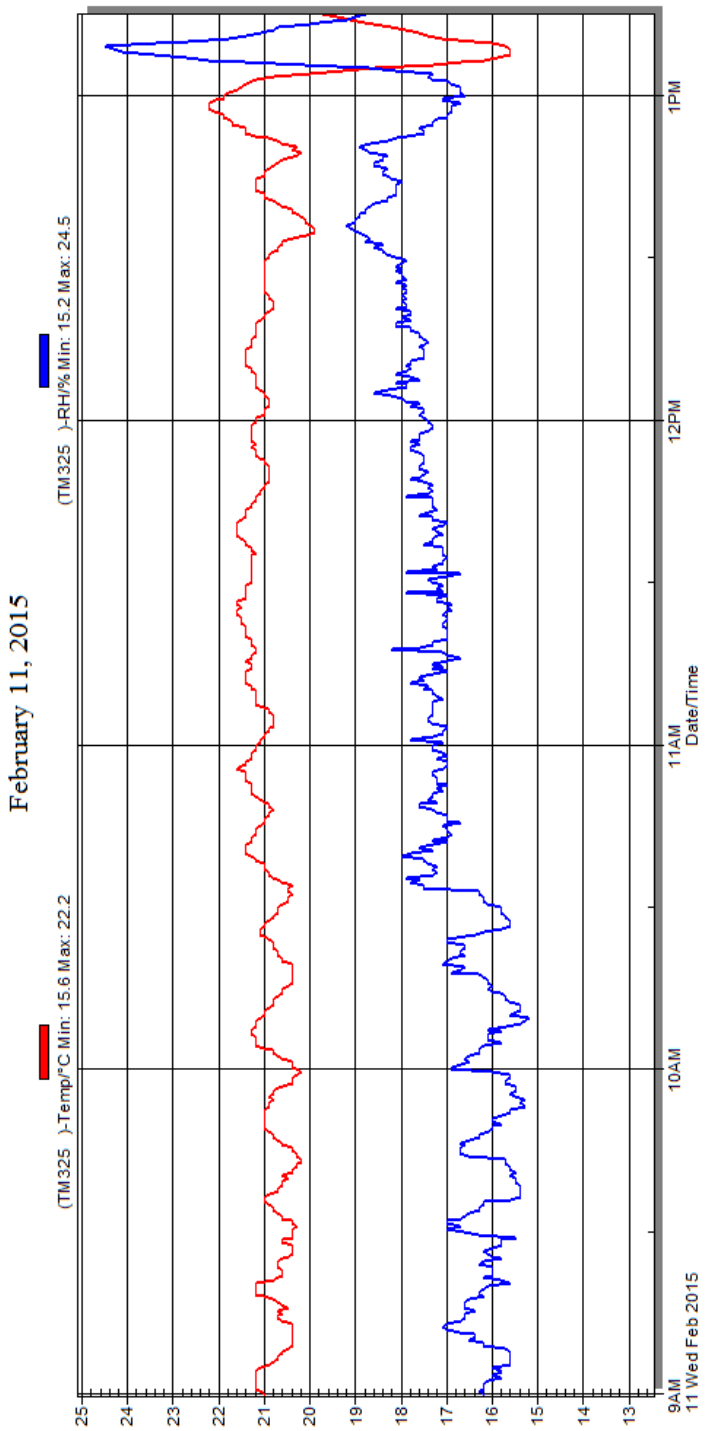
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150224
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/11/15



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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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 ¾ View of Test Vehicle

Figure A-6: Post-Test Left Front ¾ 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

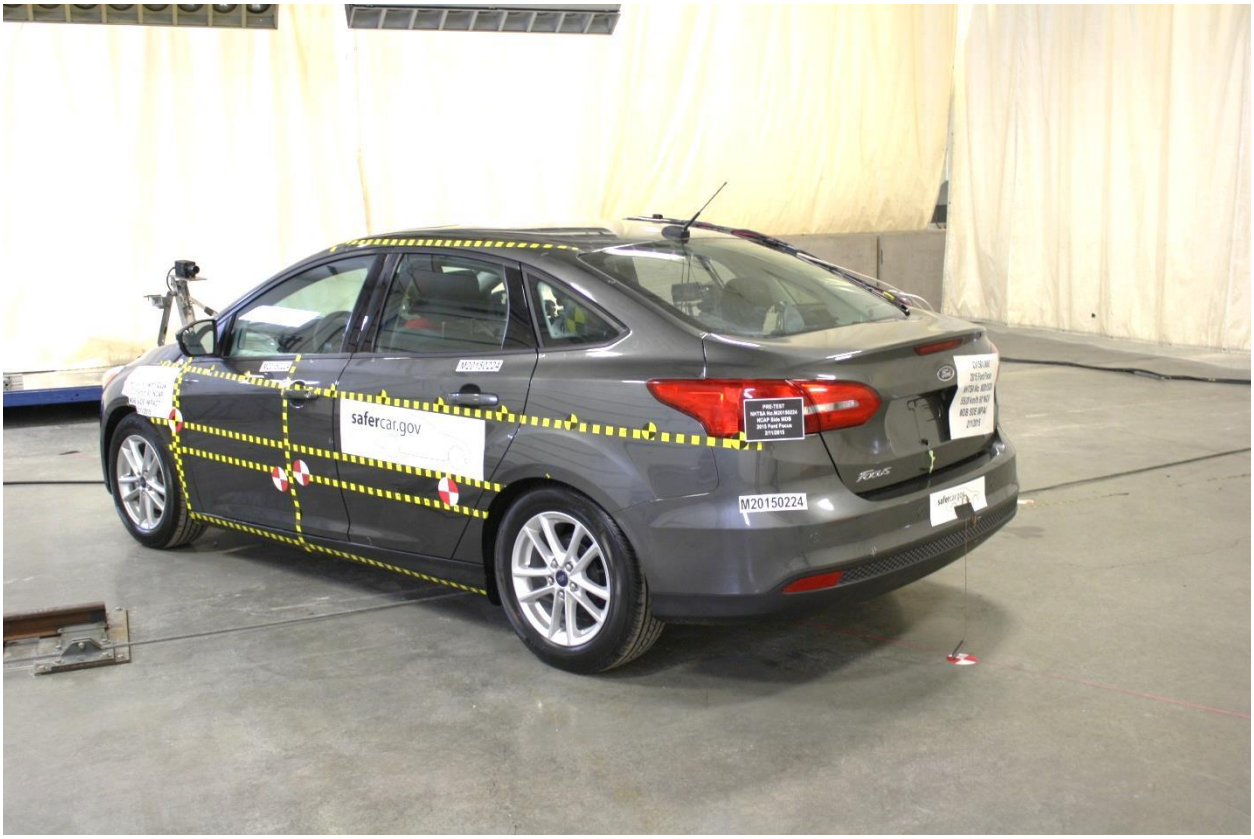


Figure A-9: Pre-Test Left Rear ¾ View of Test Vehicle

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

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

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

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

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

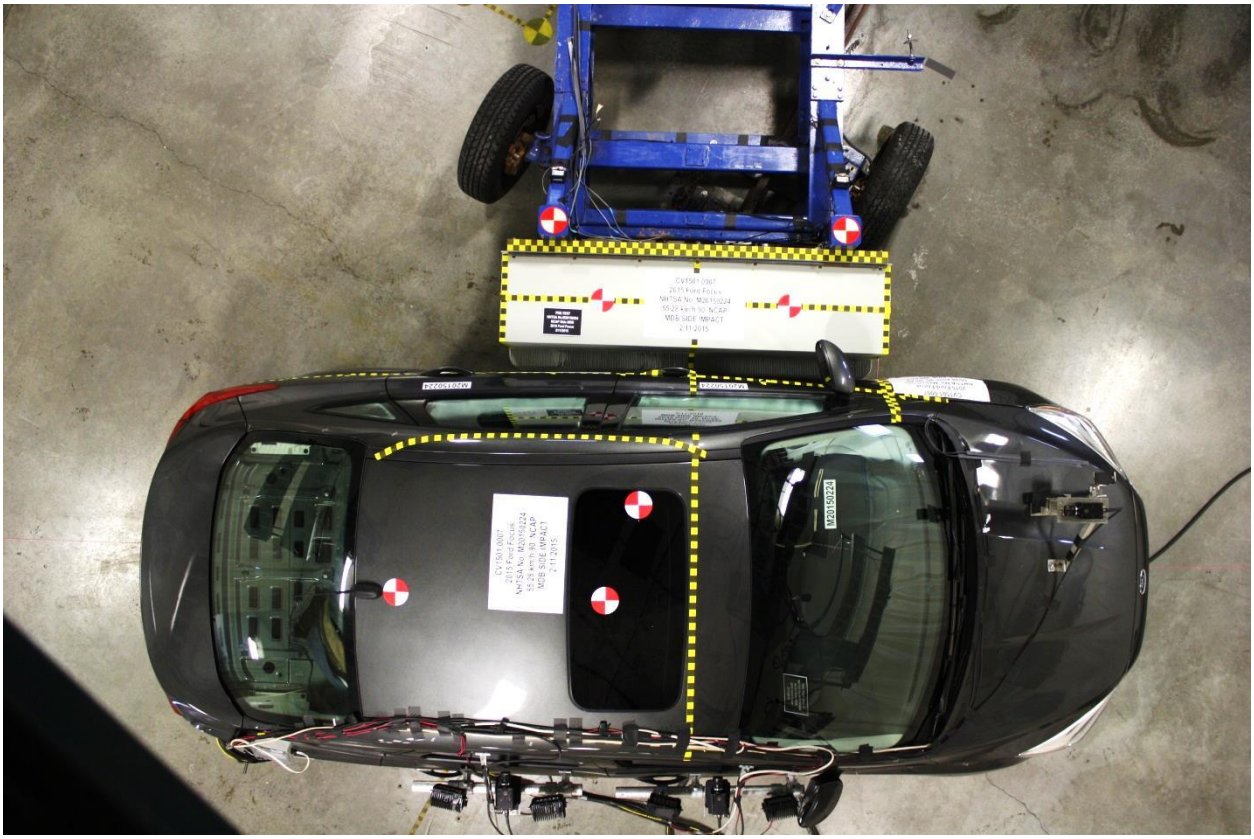


Figure A-15: Pre-Test Overhead View of the Test Area

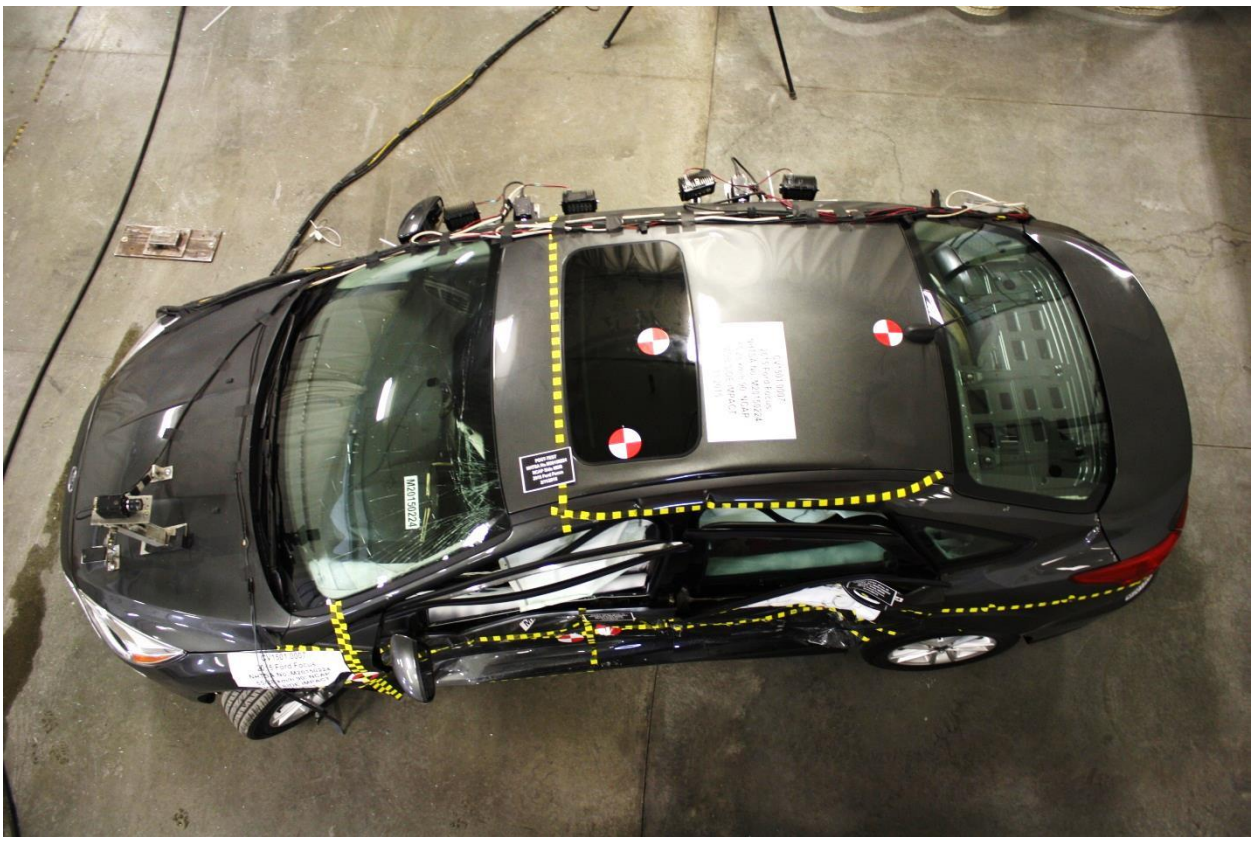


Figure A-16: Post-Test Overhead View of Test Area

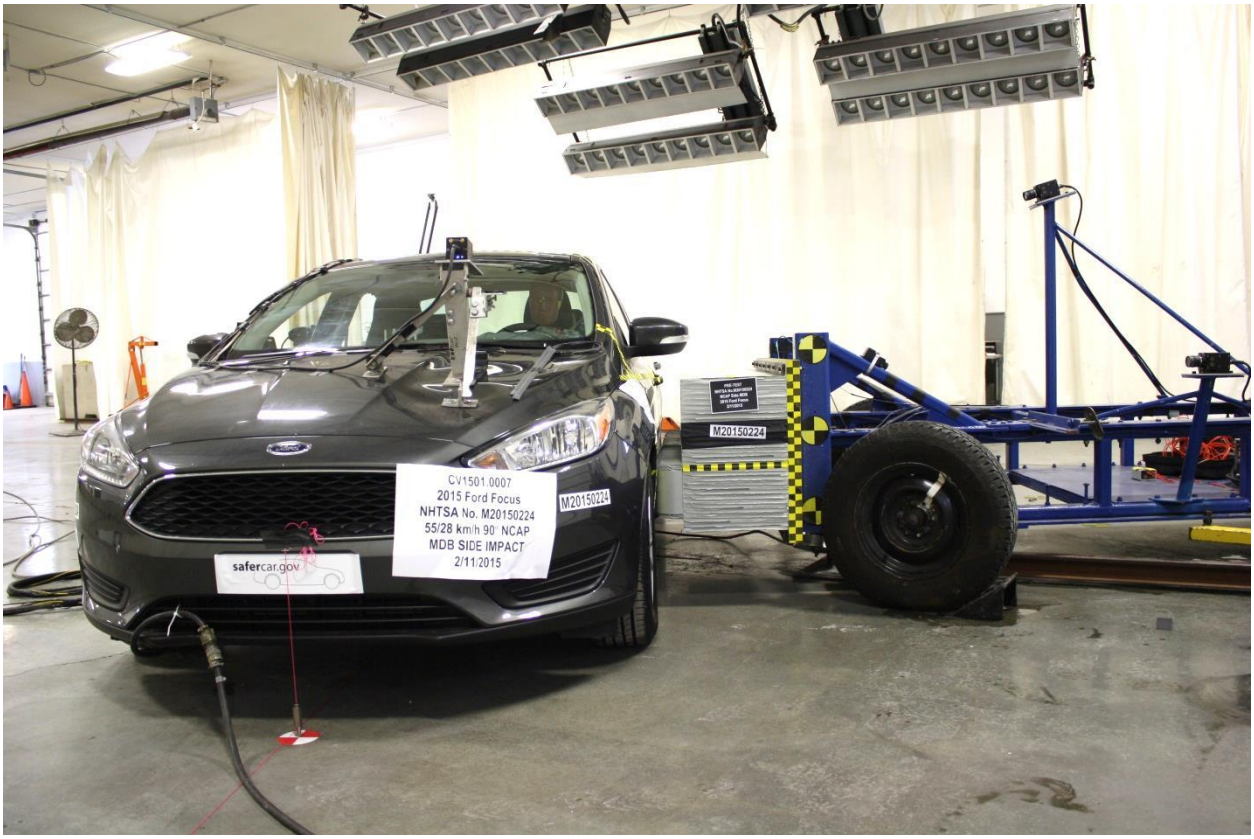


Figure A-17: Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle

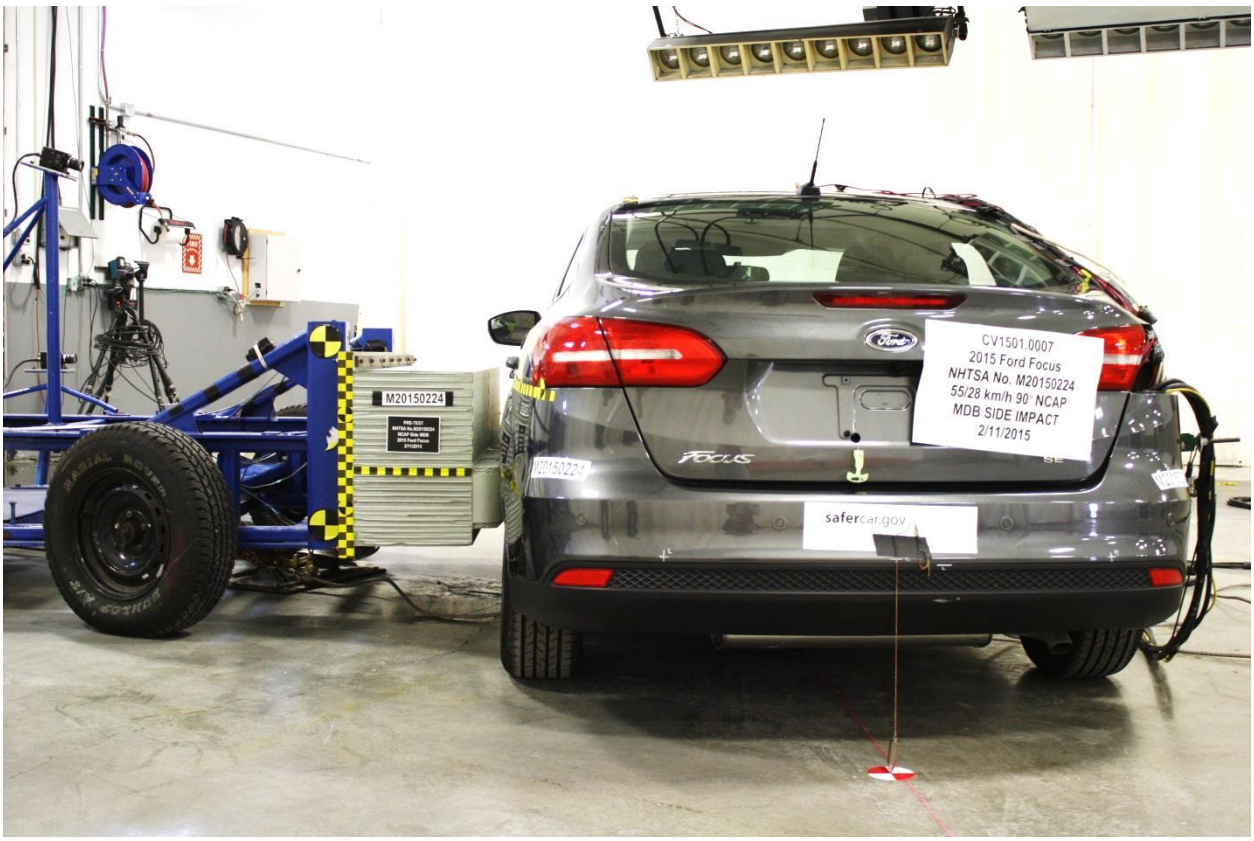


Figure A-18: Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle

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

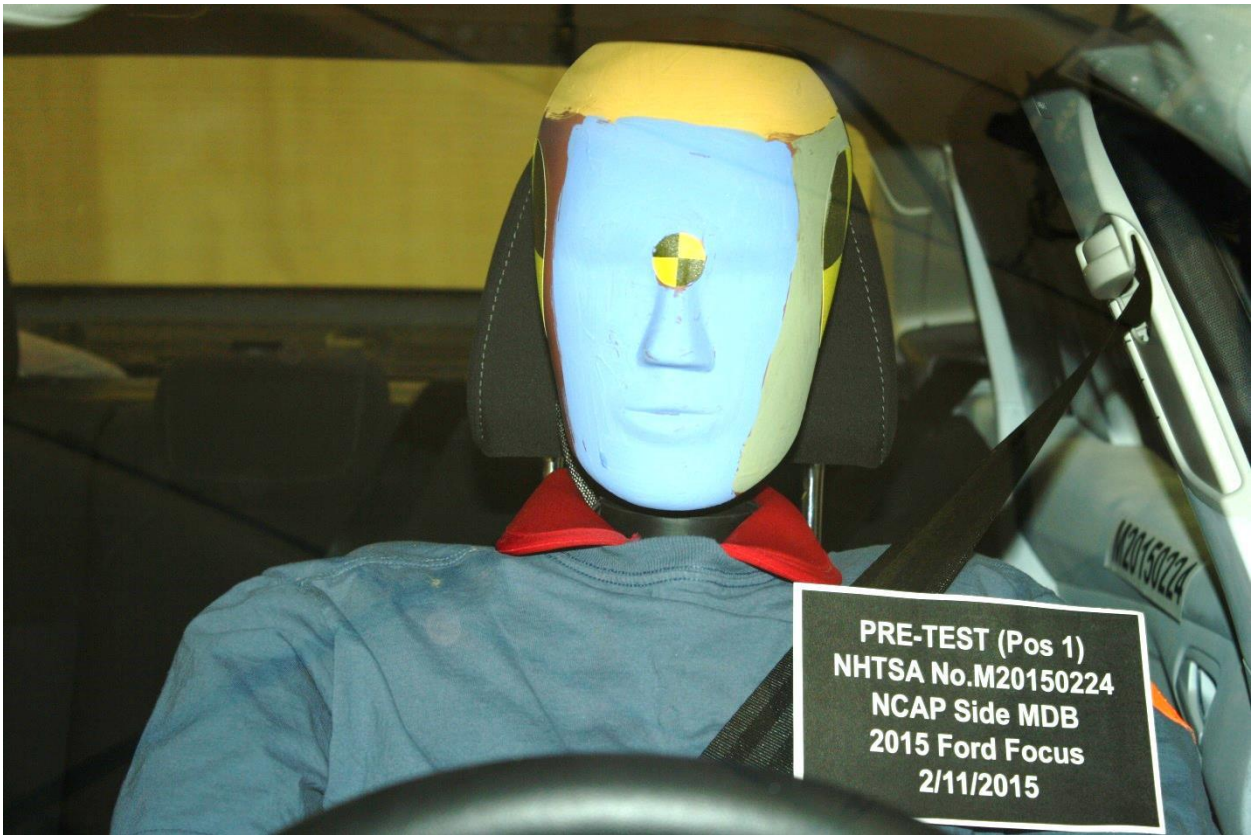


Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint

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

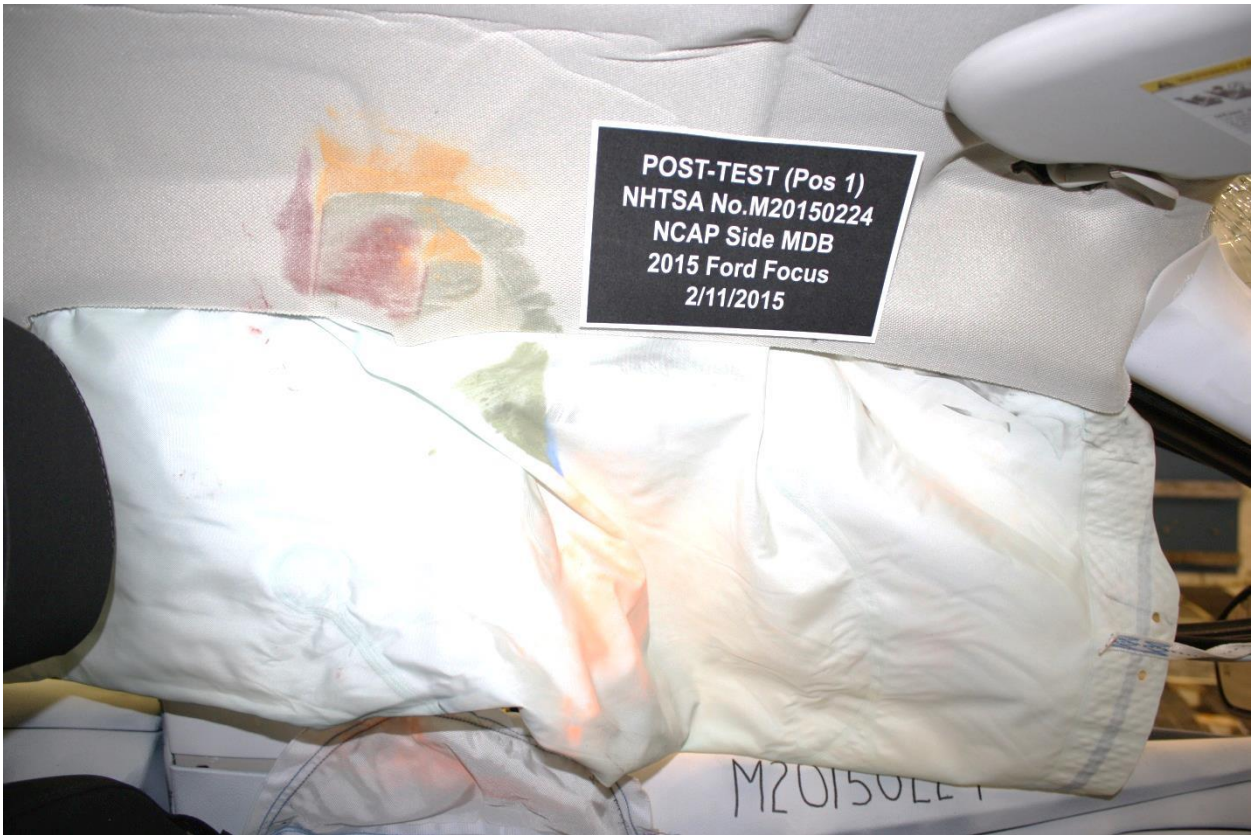


Figure A-49: Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

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

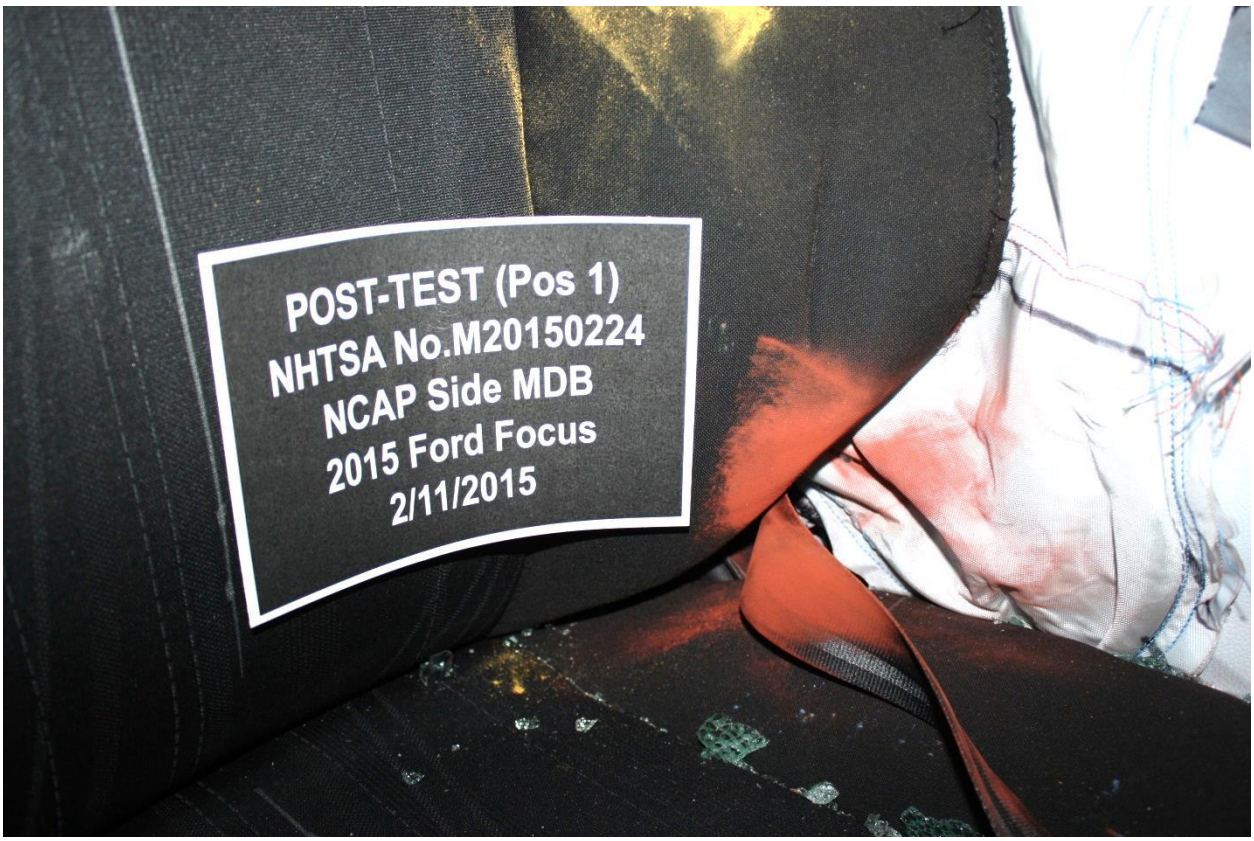


Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View

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

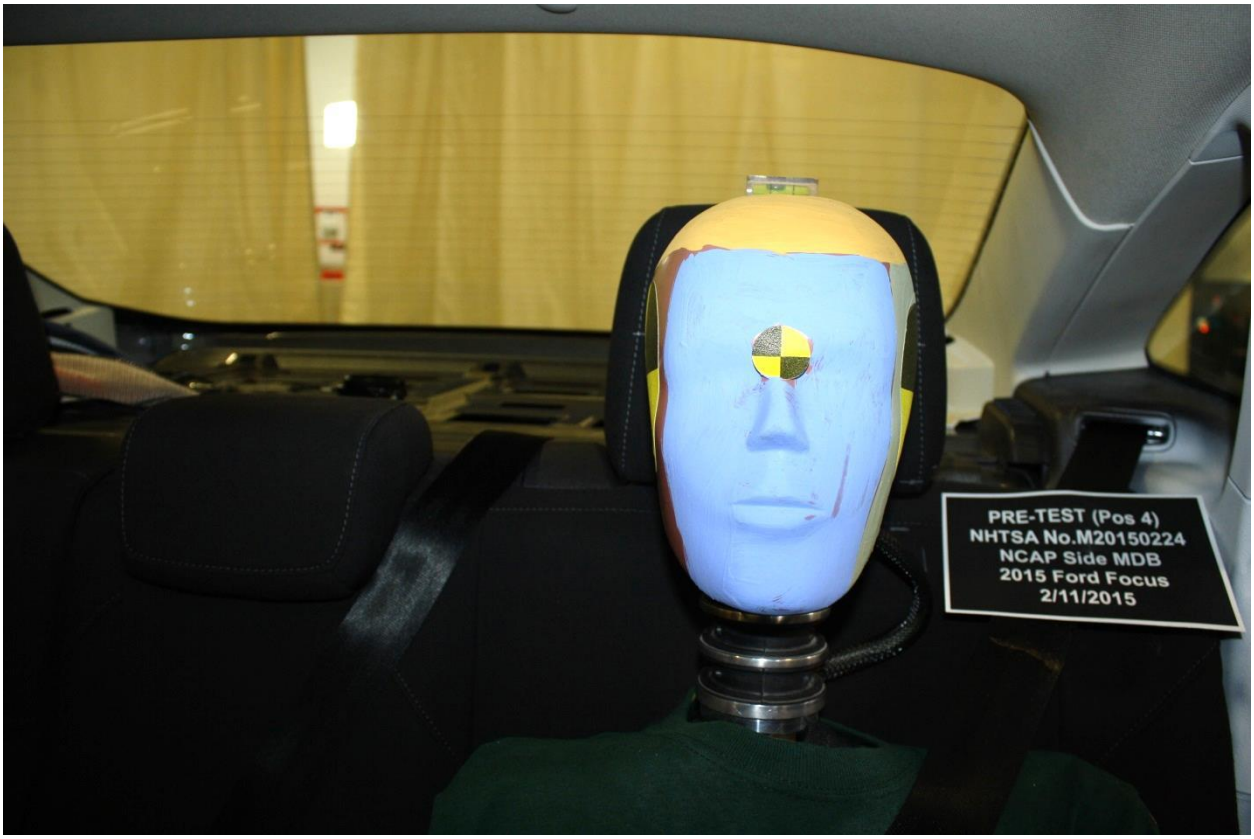


Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

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

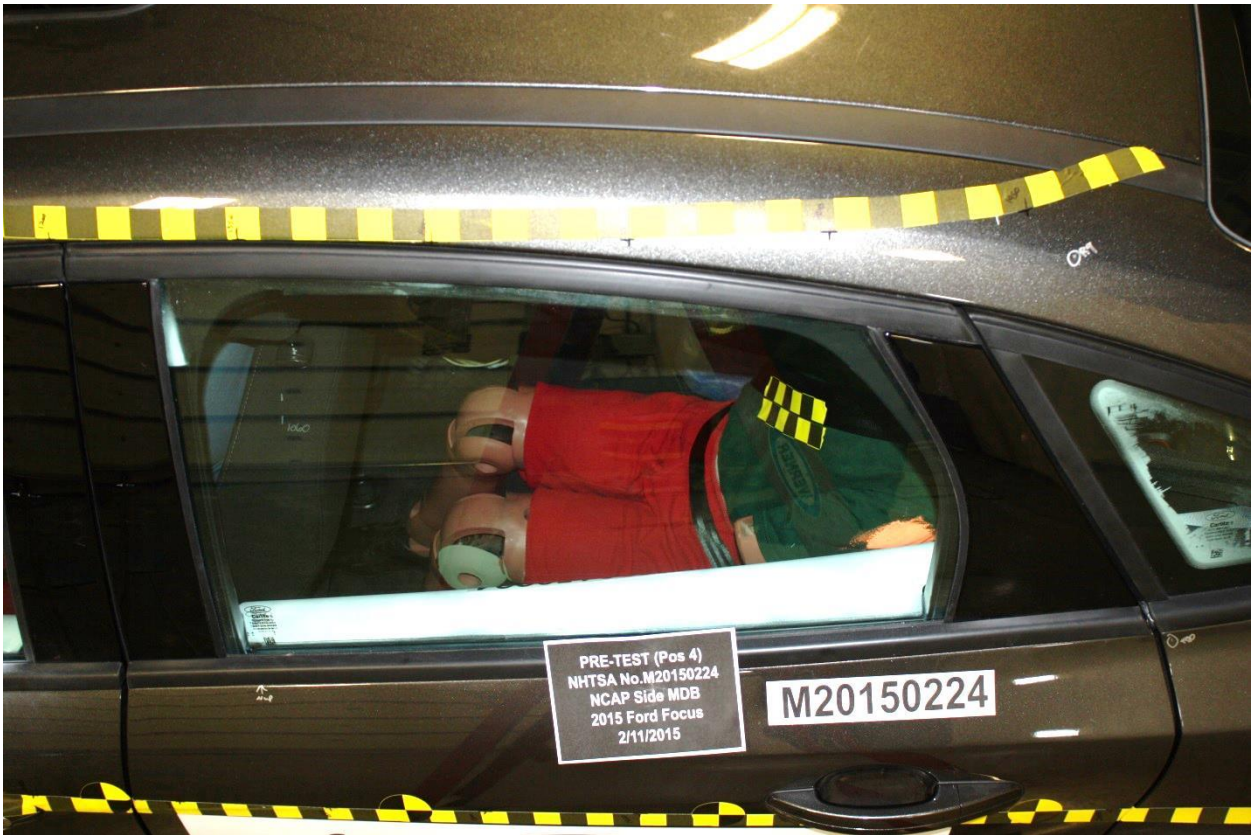


Figure A-69: Pre-Test Passenger Dummy and Door Clearance View

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

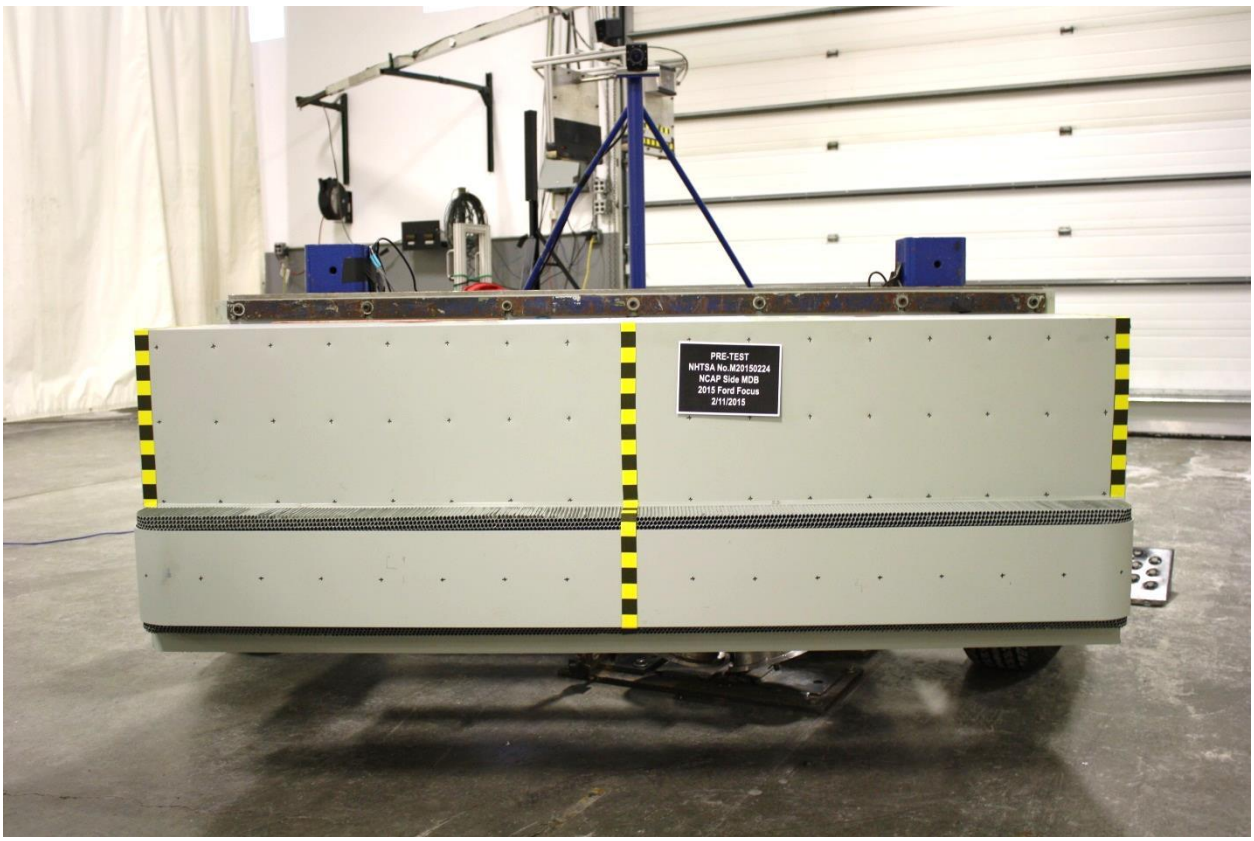


Figure A-84: Pre-Test Front View of MDB Impactor Face

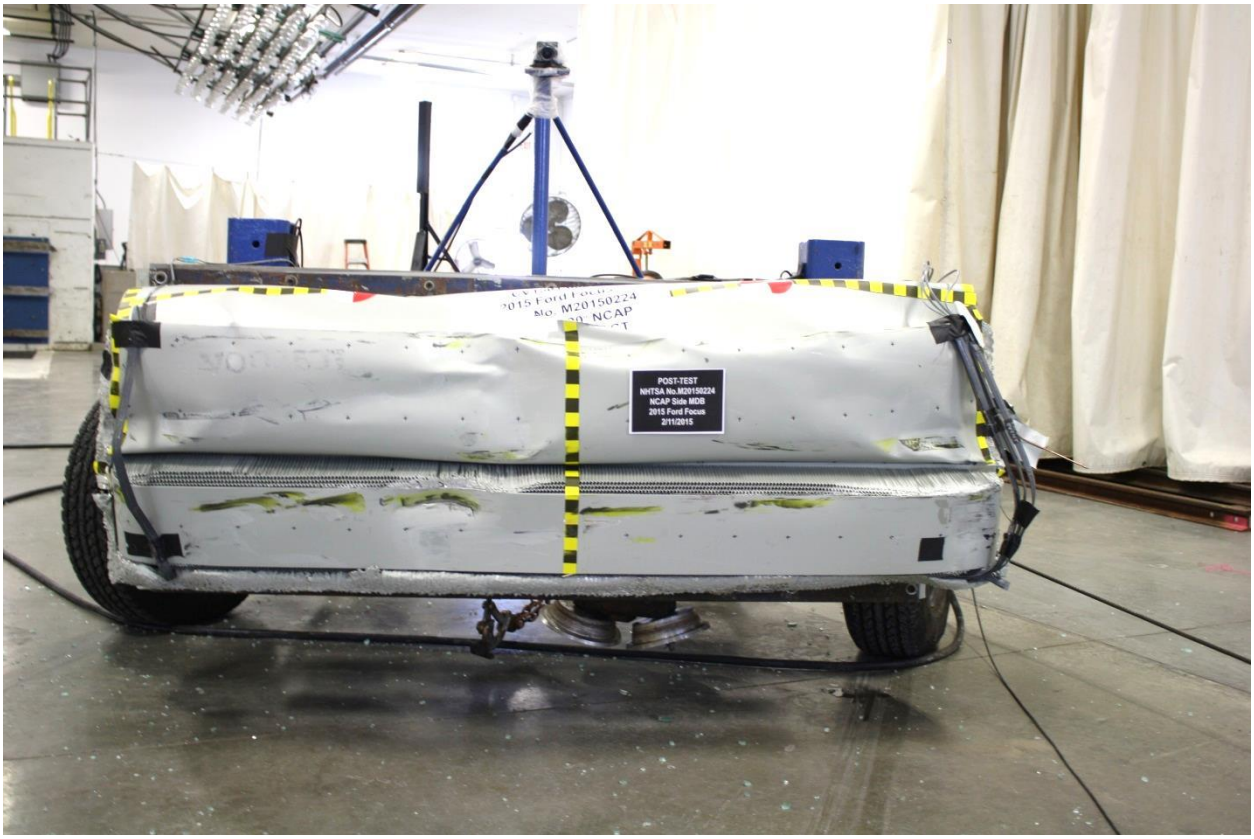


Figure A-85: Post-Test Front View of MDB Impactor Face

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

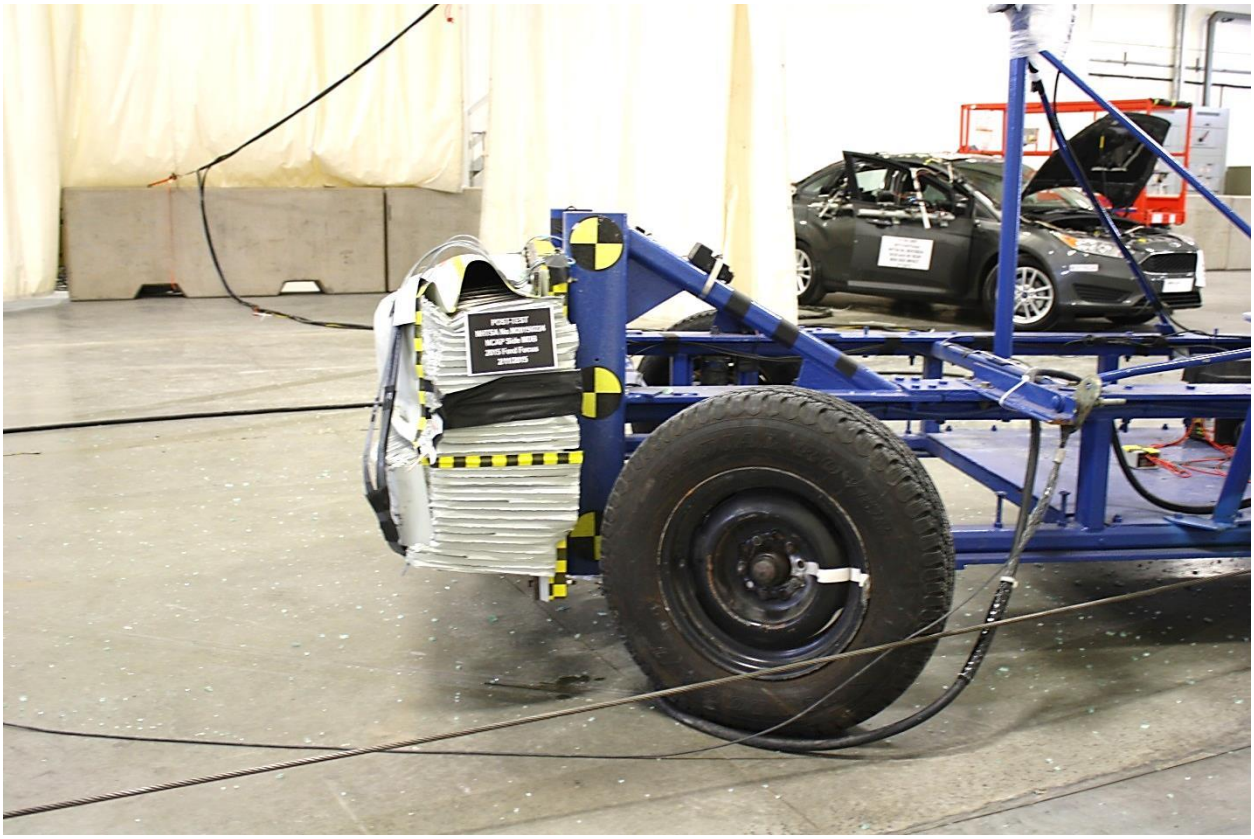


Figure A-89: Post-Test Left Side View of MDB Impactor Face

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

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

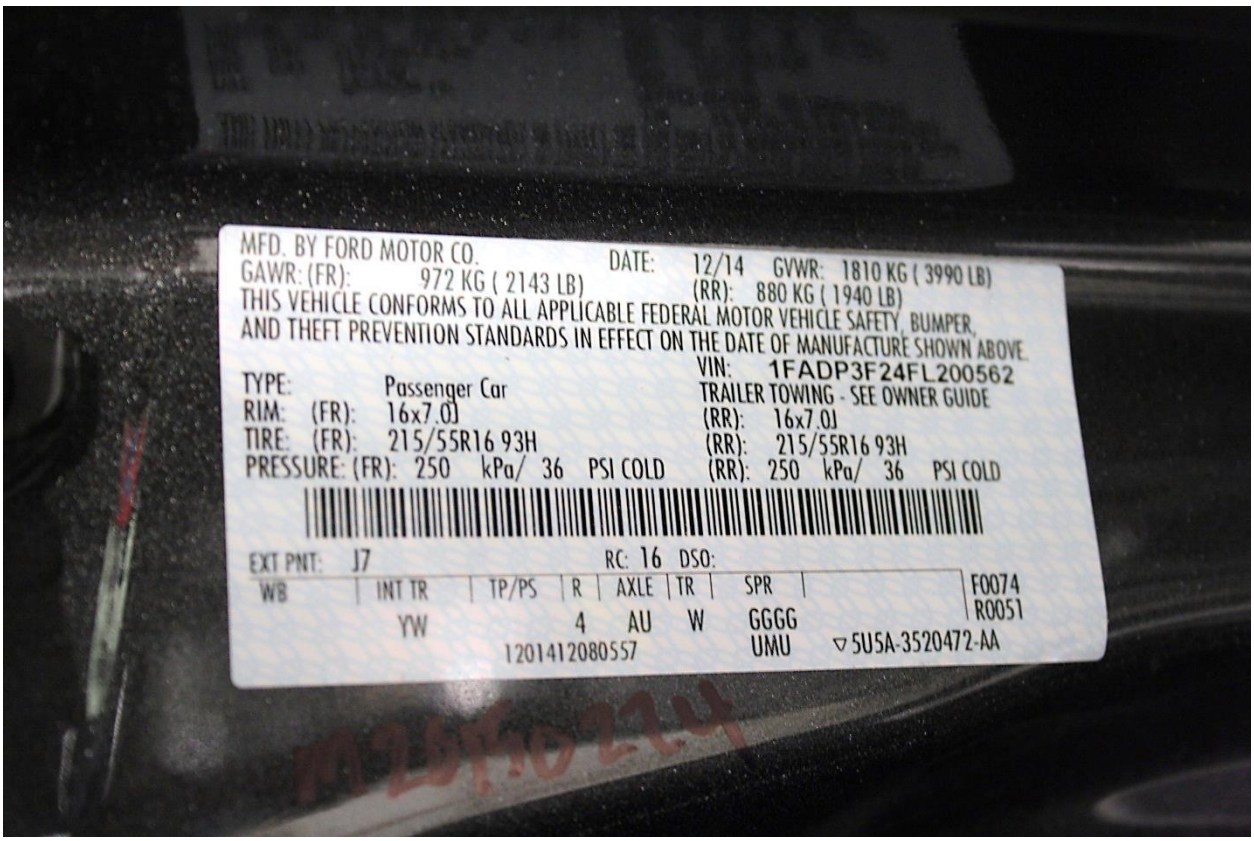


Figure A-92: Close-Up View of Vehicle's Certification Label

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

Figure A-94: Pre-Test Ballast View

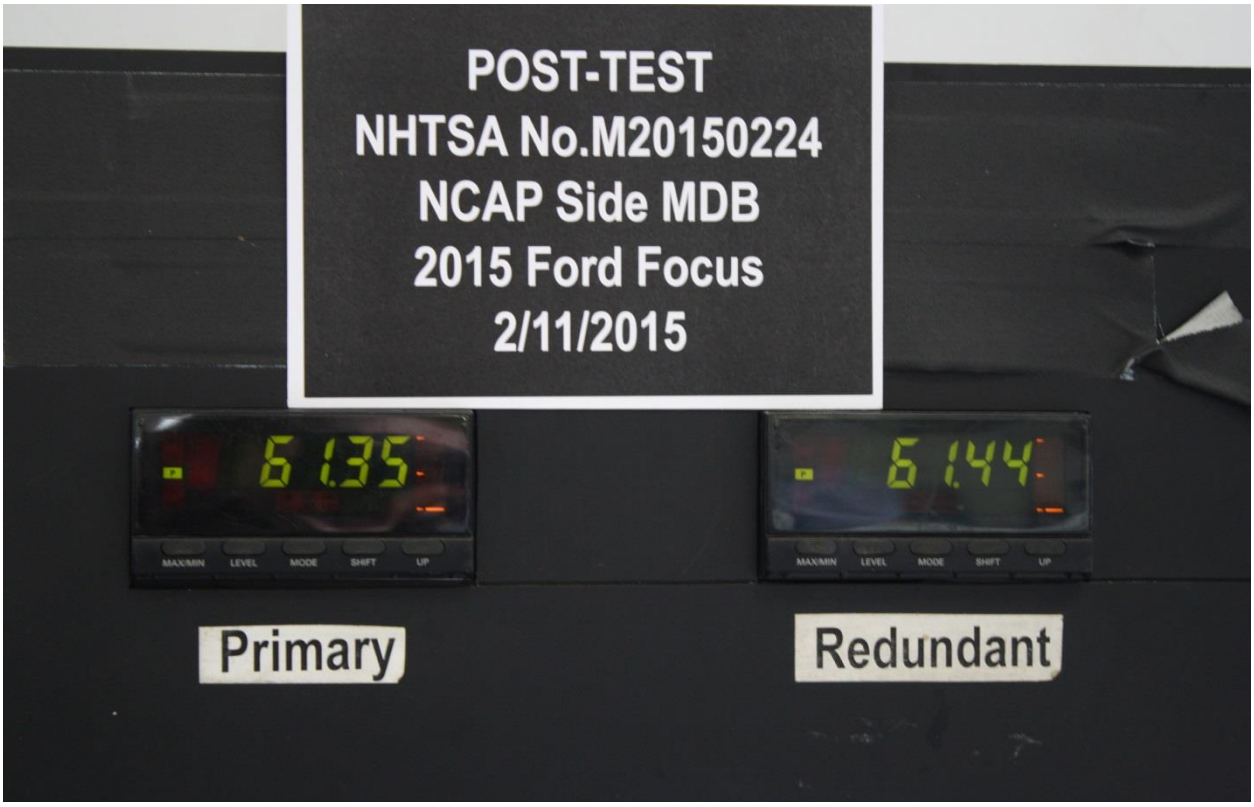


Figure A-95: Post-Test Primary and Redundant Speed Trap Read-Out

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

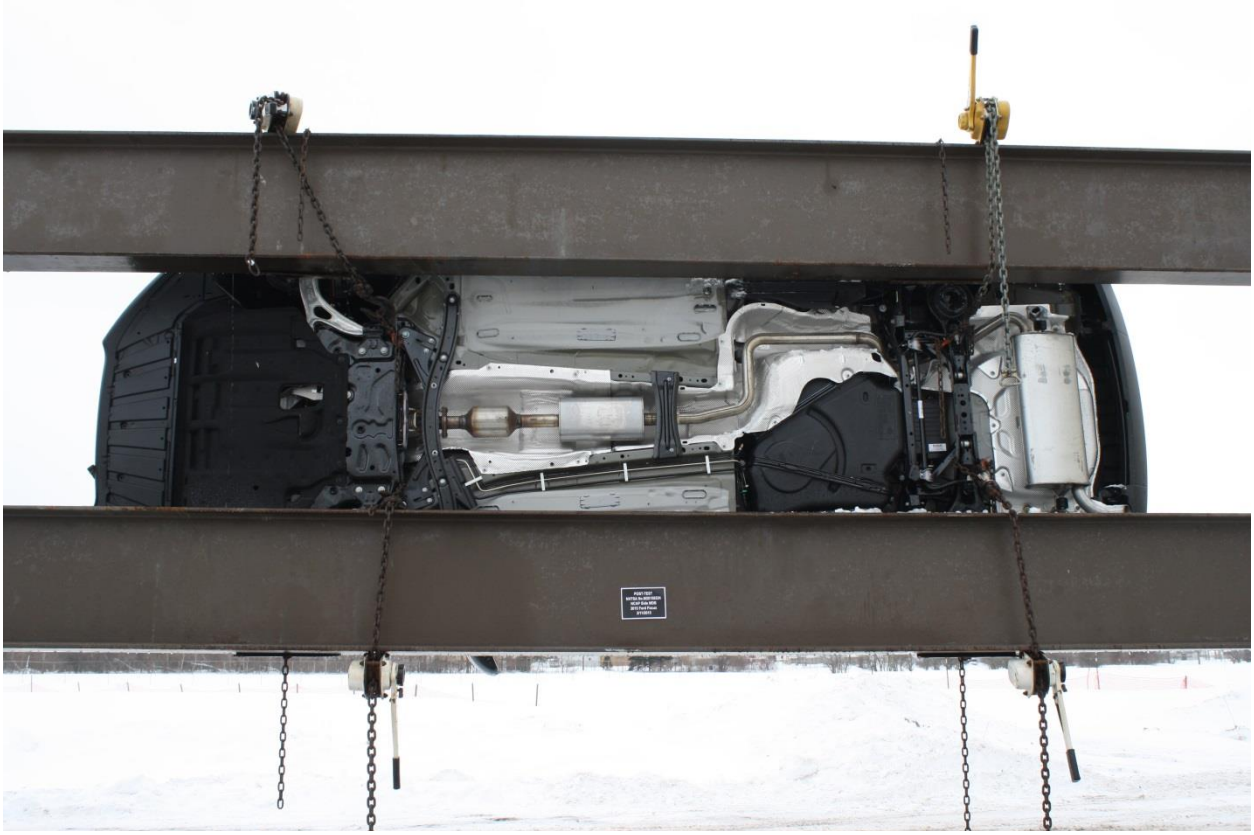


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

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

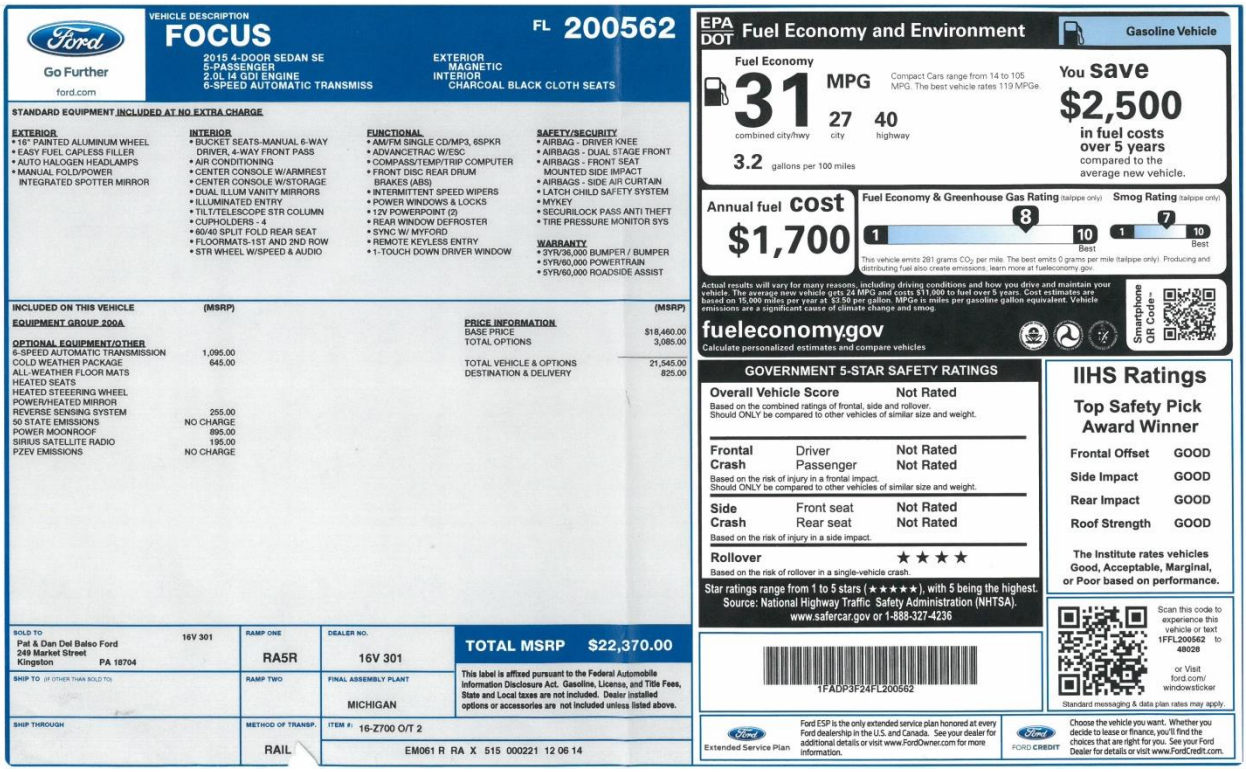
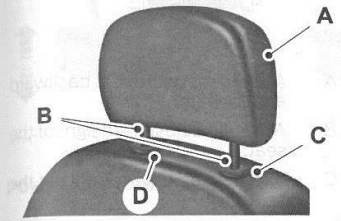


Figure A-102: Monroney Label

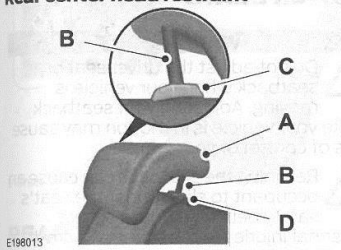
Note: *Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.*

Front seat and rear seat outboard head restraints



E138642

Rear center head restraint



E198013

The head restraints consist of:

A	An energy absorbing head restraint.
B	Two steel stems.
C	Guide sleeve adjust and release button.
D	Guide sleeve unlock and remove button.

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold buttons C and D.
3. Pull the head restraint up.

Note: *For the front head restraints, you may need to use a key or similar object to release the head restraint. Press the key into the guide sleeve unlock and remove button to release the head restraint.*

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Tilting Head Restraints

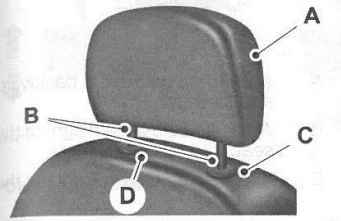
The front head restraints tilt for extra comfort. To tilt the head restraint, do the following:

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

Seats

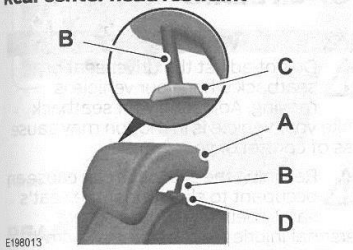
Note: *Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.*

Front seat and rear seat outboard head restraints



E138642

Rear center head restraint



E198013

The head restraints consist of:

A	An energy absorbing head restraint.
B	Two steel stems.
C	Guide sleeve adjust and release button.
D	Guide sleeve unlock and remove button.

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold buttons C and D.
3. Pull the head restraint up.

Note: *For the front head restraints, you may need to use a key or similar object to release the head restraint. Press the key into the guide sleeve unlock and remove button to release the head restraint.*

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Tilting Head Restraints

The front head restraints tilt for extra comfort. To tilt the head restraint, do the following:

115

Figure A-103: Driver 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

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

Additional Driver & Passenger Dummy Instrumentation Data

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

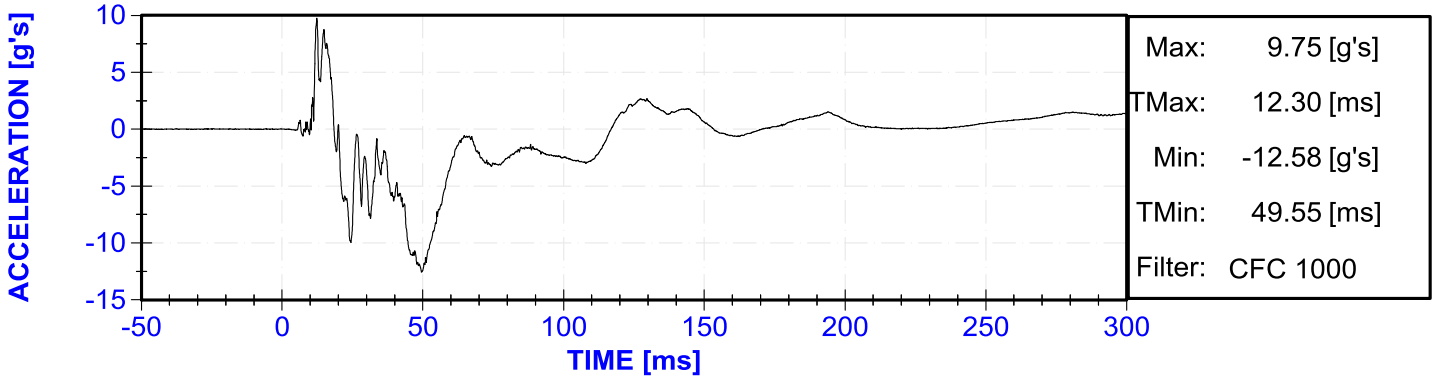
Vehicle Instrumentation Data

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

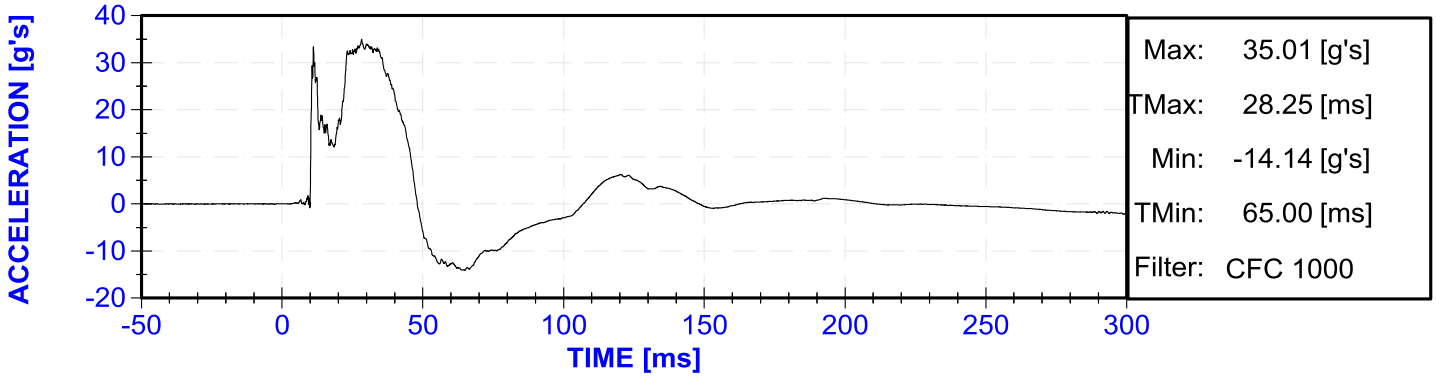
MDB Instrumentation Data

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

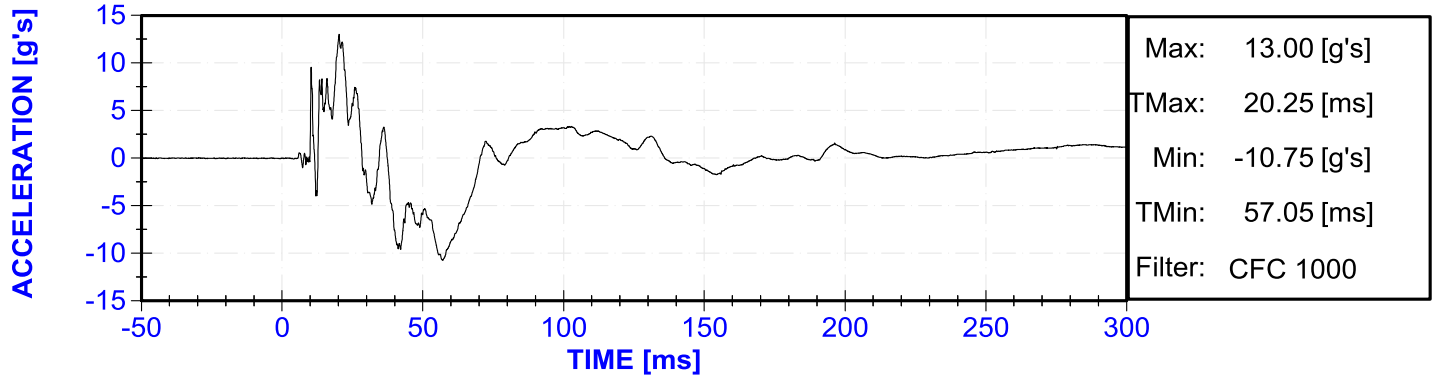
Driver Head Acceleration (X) Primary vs. Time



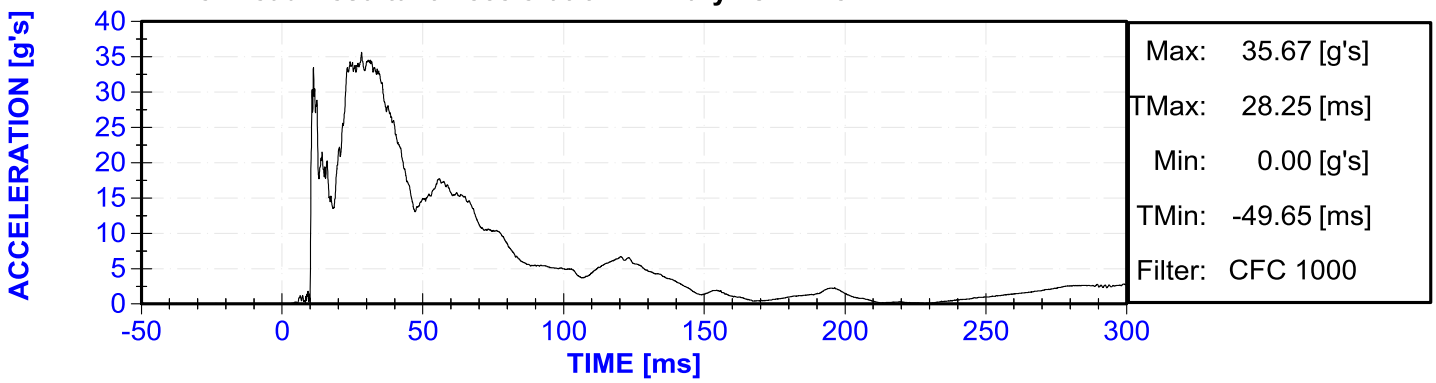
Driver Head Acceleration (Y) Primary vs. Time



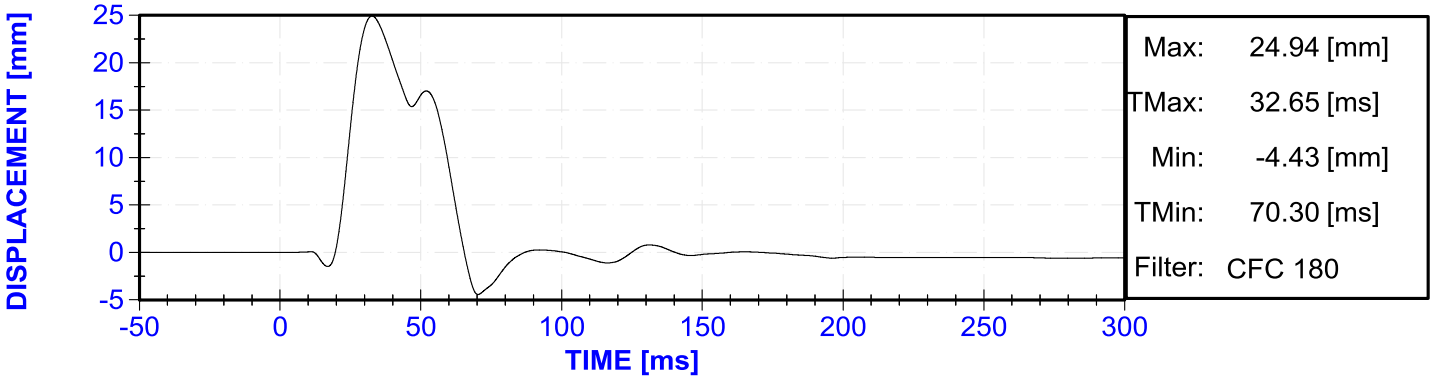
Driver Head Acceleration (Z) Primary vs. Time



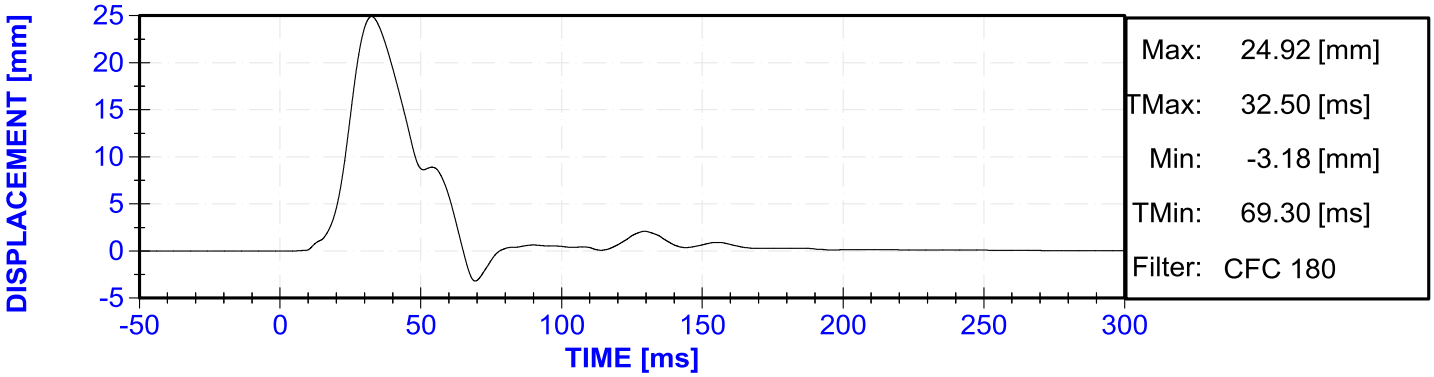
Driver Head Resultant Acceleration Primary vs. Time



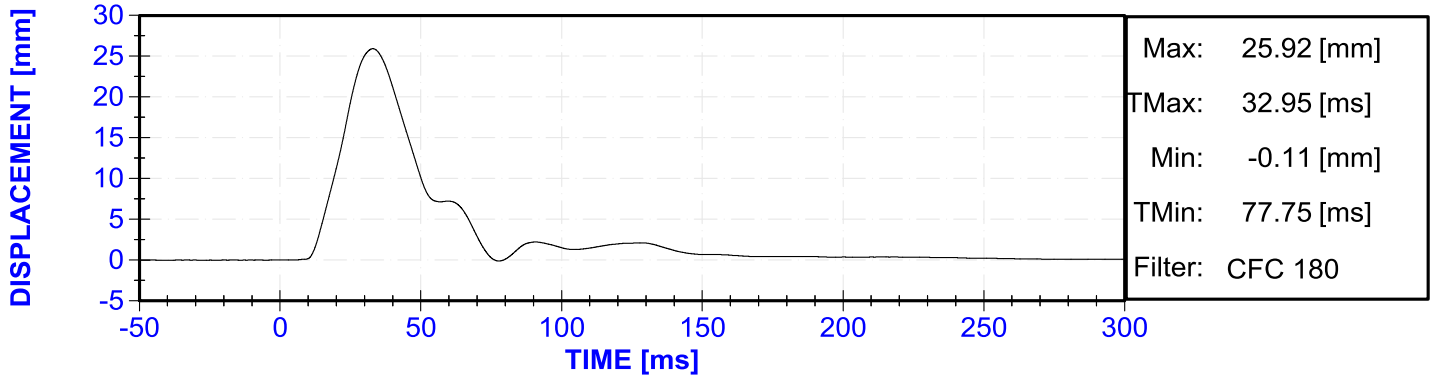
Driver Upper Thorax Rib Deflection (Y) vs. Time



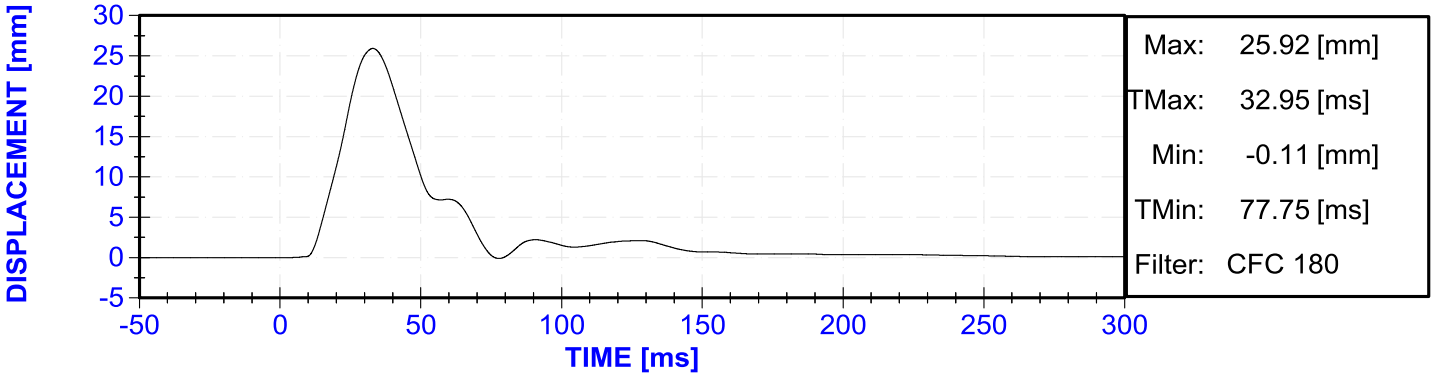
Driver Middle Thorax Rib Deflection (Y) vs. Time



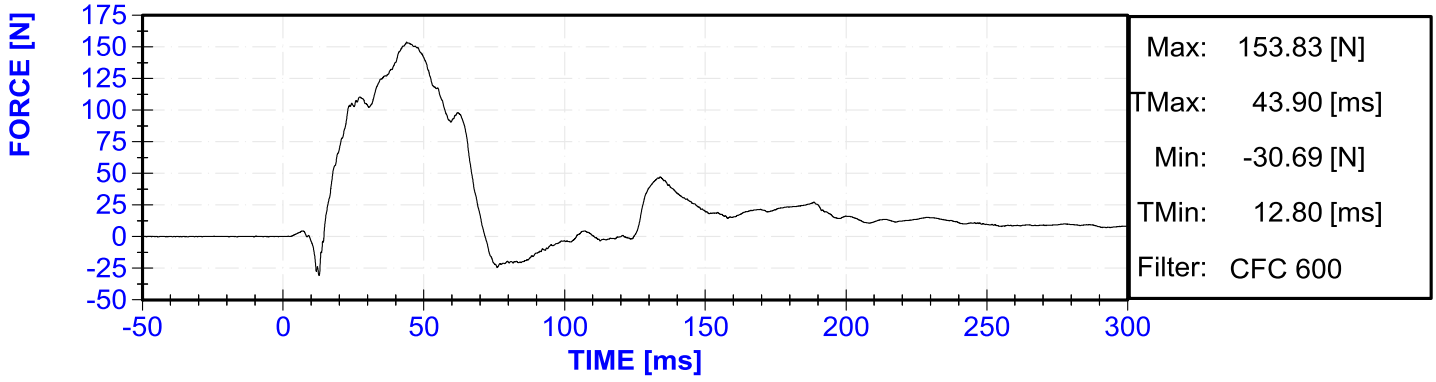
Driver Lower Thorax Rib Deflection (Y) vs. Time



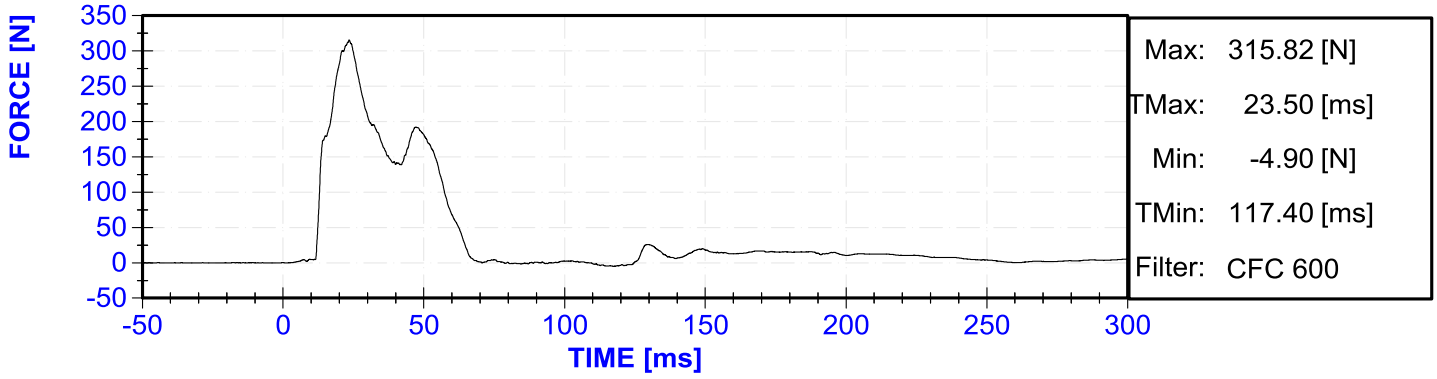
Driver Thorax Rib Deflection Maximum vs. Time



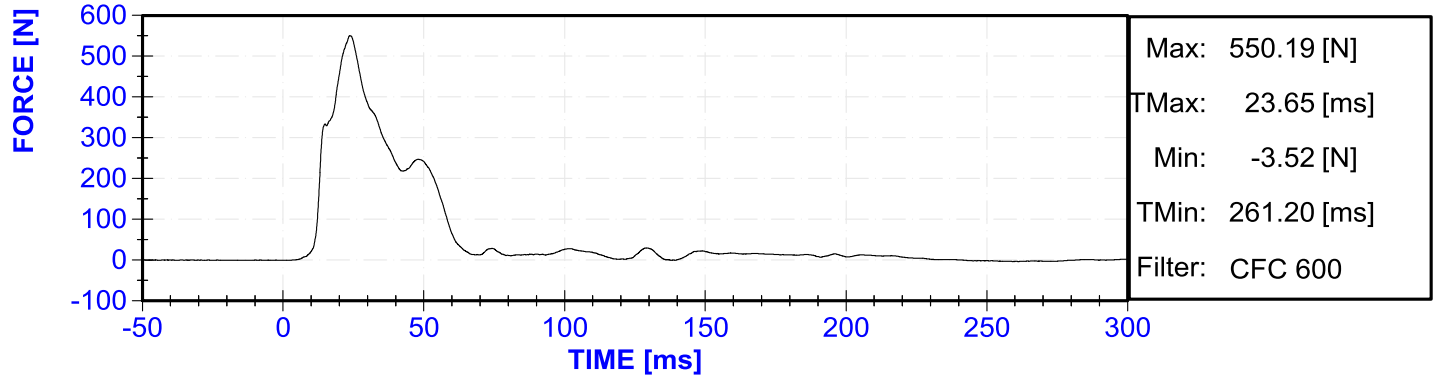
Driver Anterior Abdominal Force (Y) vs. Time



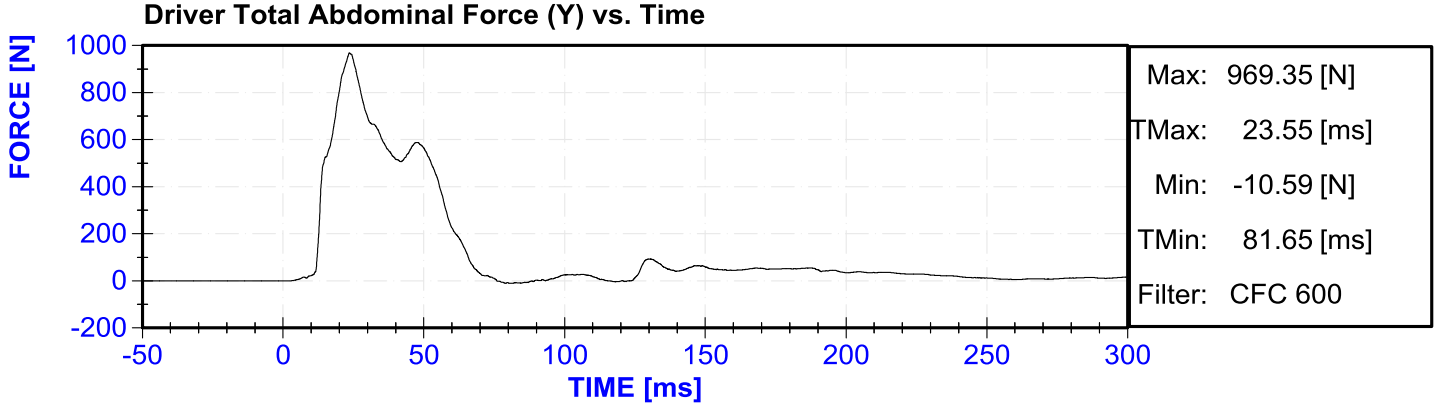
Driver Middle Abdominal Force (Y) vs. Time



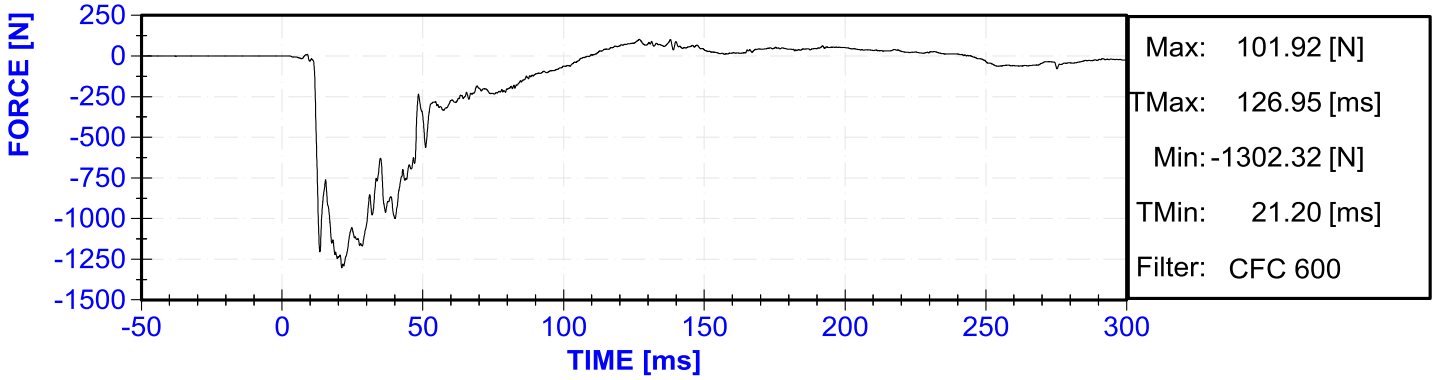
Driver Posterior Abdominal Force (Y) vs. Time



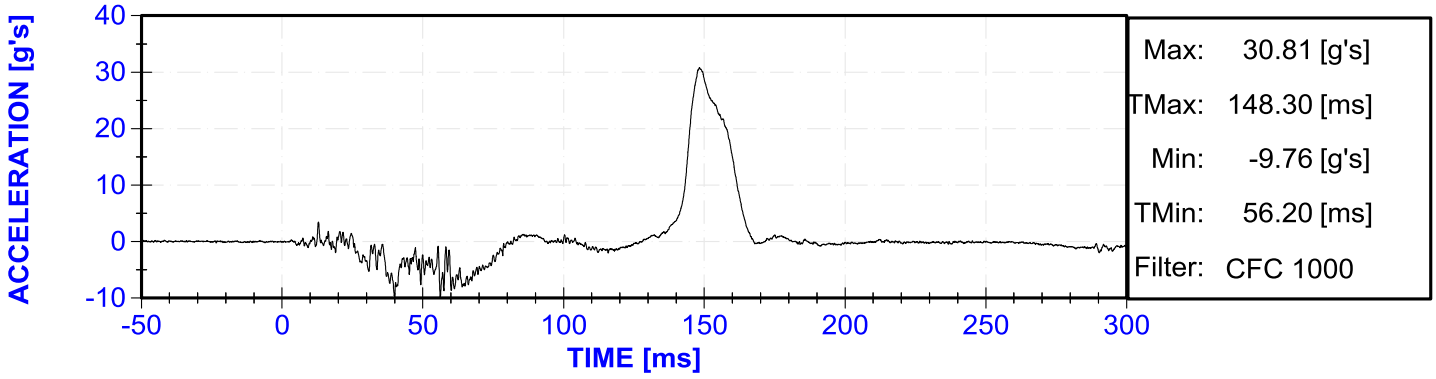
Driver Total Abdominal Force (Y) vs. Time



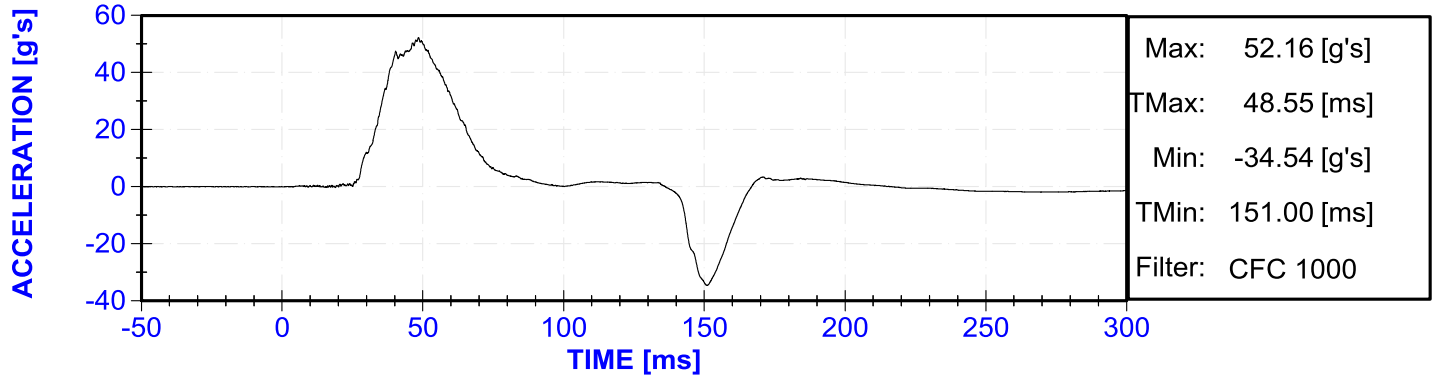
Driver Pubic Symphysis Force (Y) vs. Time



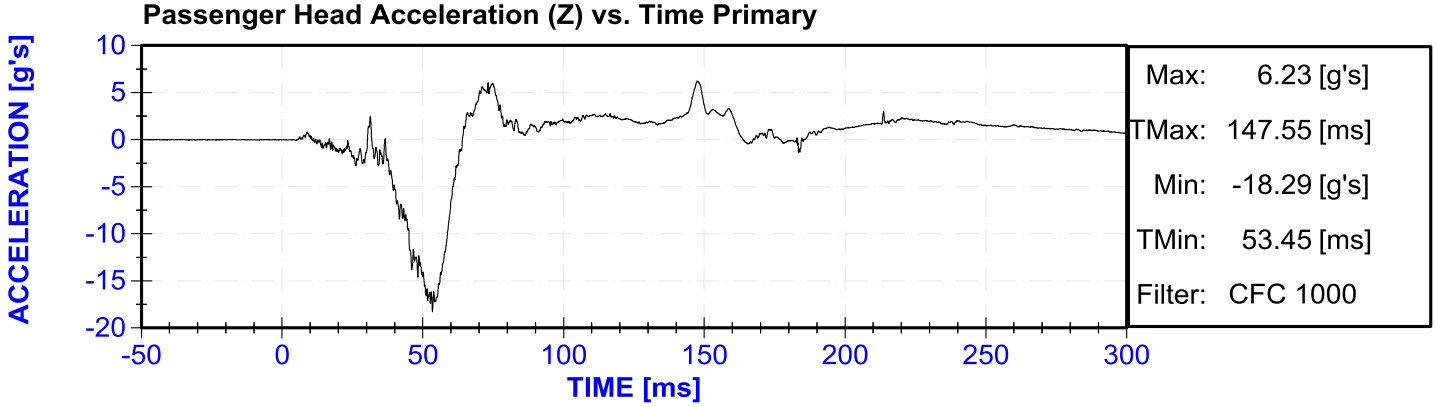
Passenger Head Acceleration (X) vs. Time Primary



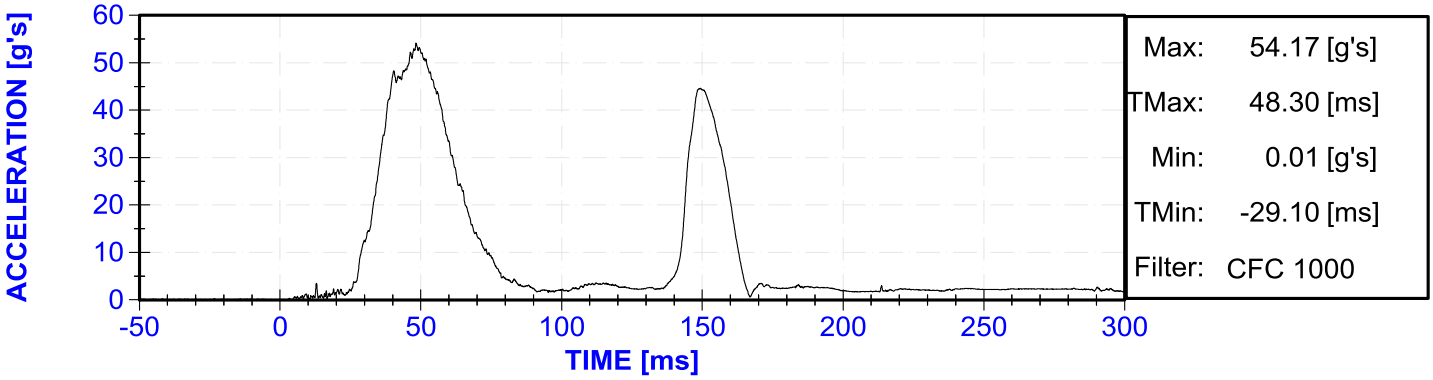
Passenger Head Acceleration (Y) vs. Time Primary



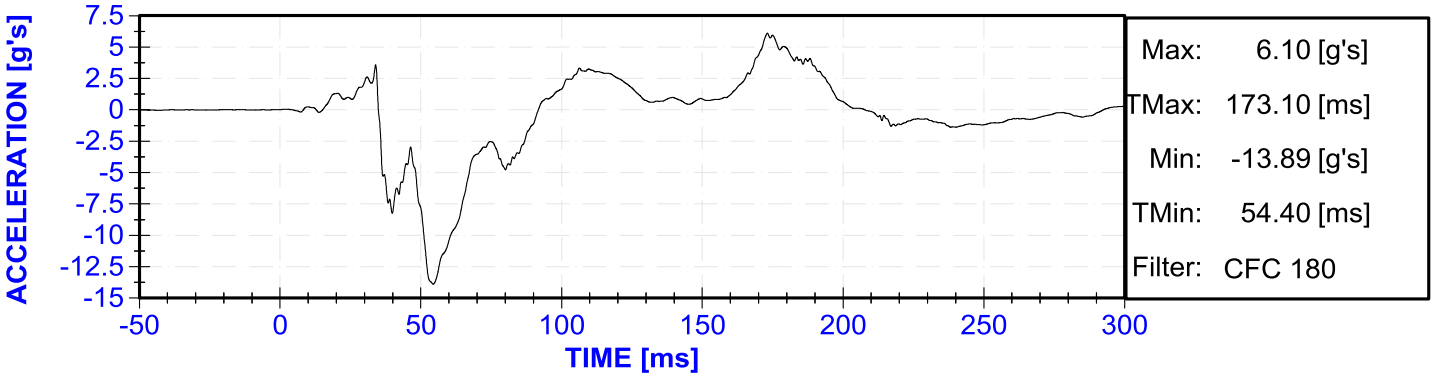
Passenger Head Acceleration (Z) vs. Time Primary



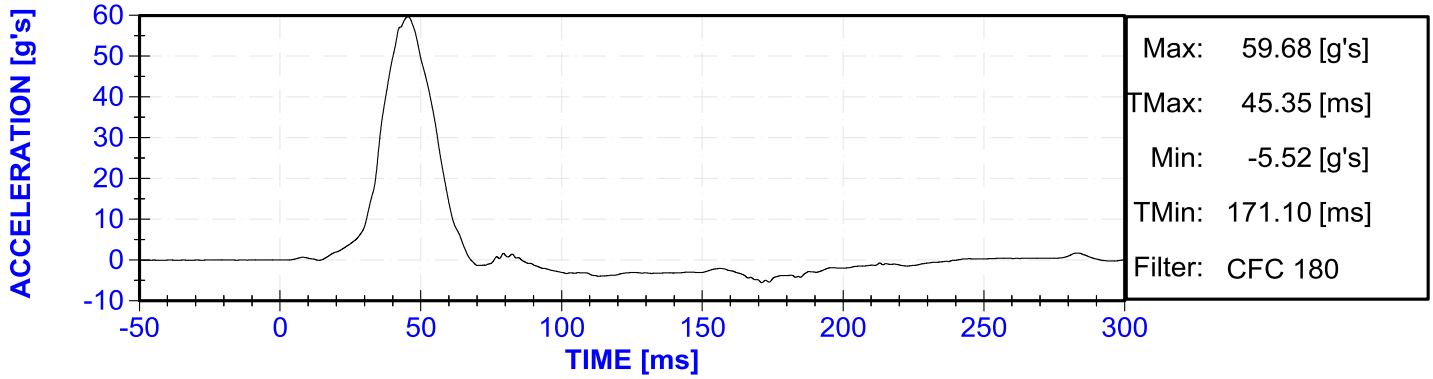
Passenger Head Resultant Acceleration Primary vs. Time



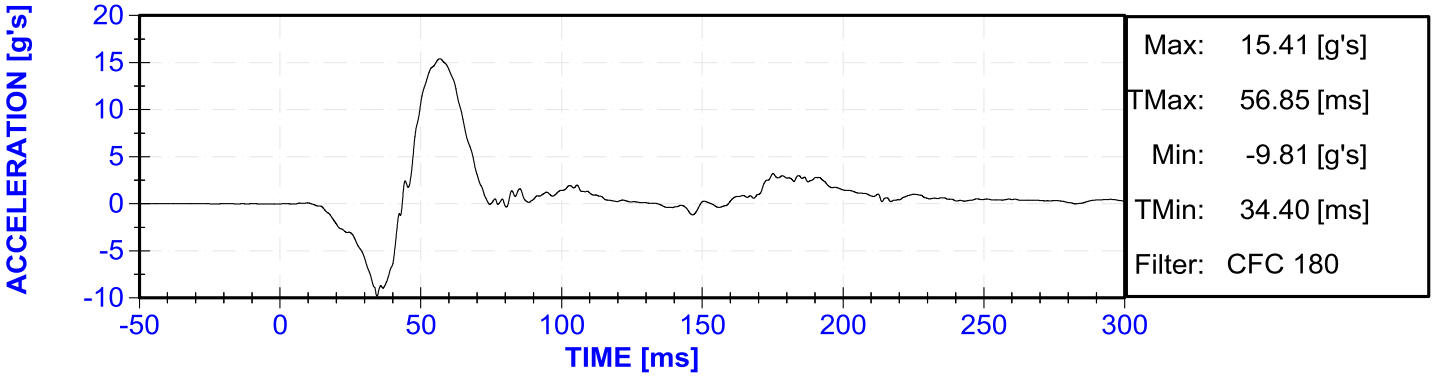
Passenger Lower Spine T12 Acceleration (X) vs. Time



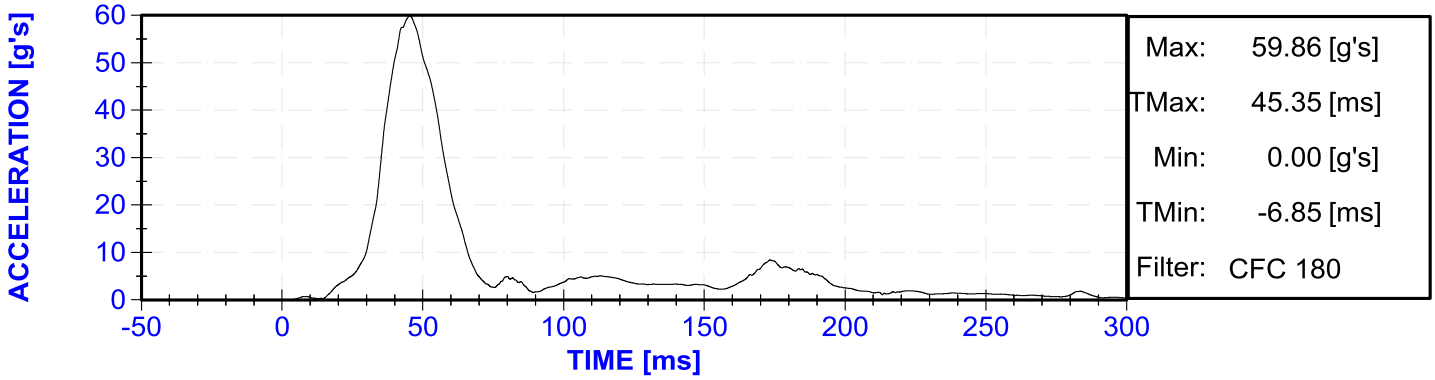
Passenger Lower Spine T12 Acceleration (Y) vs. Time



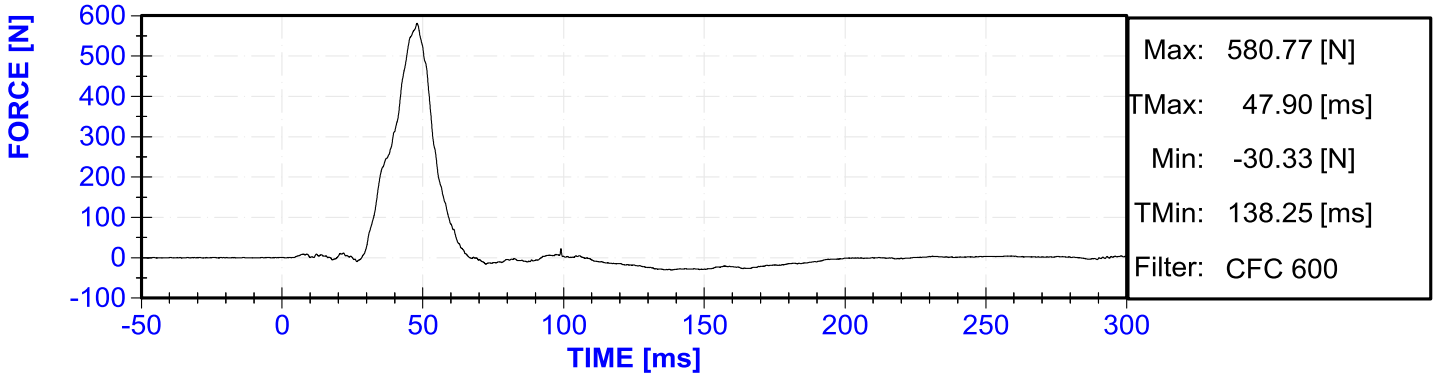
Passenger Lower Spine T12 Acceleration (Z) vs. Time



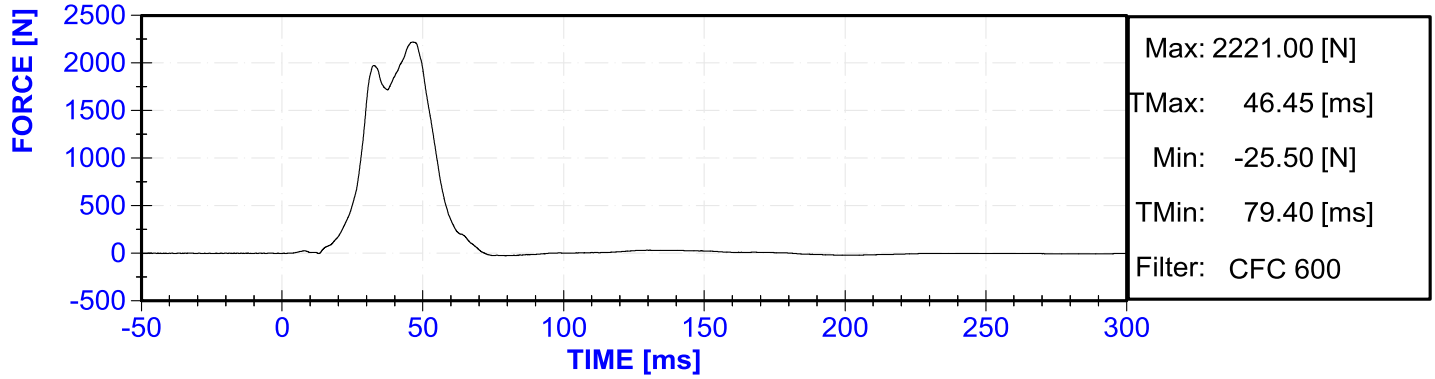
Passenger Lower Spine T12 Resultant Acceleration vs. Time



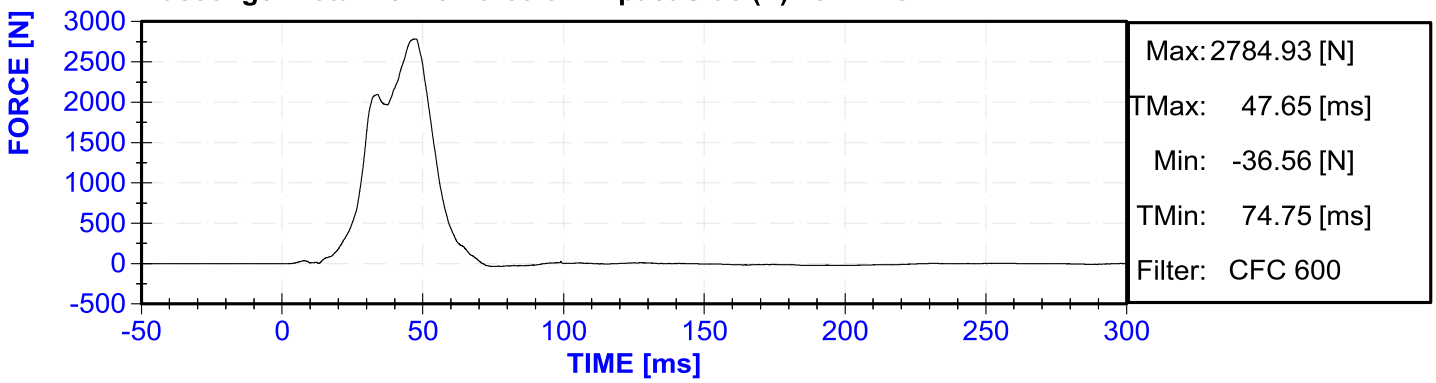
Passenger Iliac Force on Impact Side (Y) vs. Time



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



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



APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

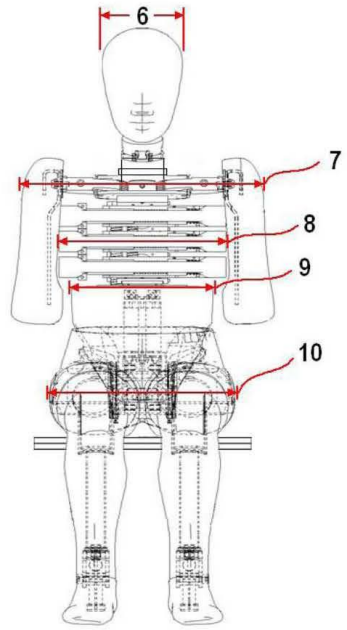
SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

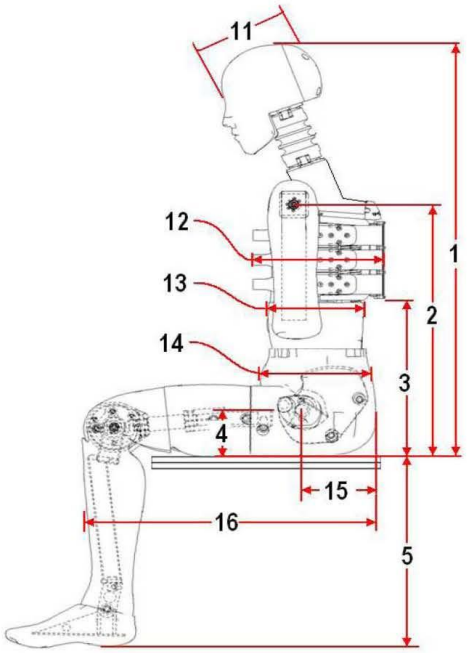
External Measurements - EuroSID-2re

Technician: M.Hartung Date: 2/10/2015

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	912	Pass
2	Seat to Shoulder Joint	558	572	561	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	348	Pass
4	Seat to Hip Joint (center of bolt)	97	103	99	Pass
5	Sole to Seat, Sitting	333	451	417	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	477	Pass
8	Thorax Width	322	332	328	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	369	Pass
11	Head Depth	196	206	199	Pass
12	Thorax Depth	262	272	268	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	153	Pass
16	Back of Buttocks to Front Knee	597	615	601	Pass

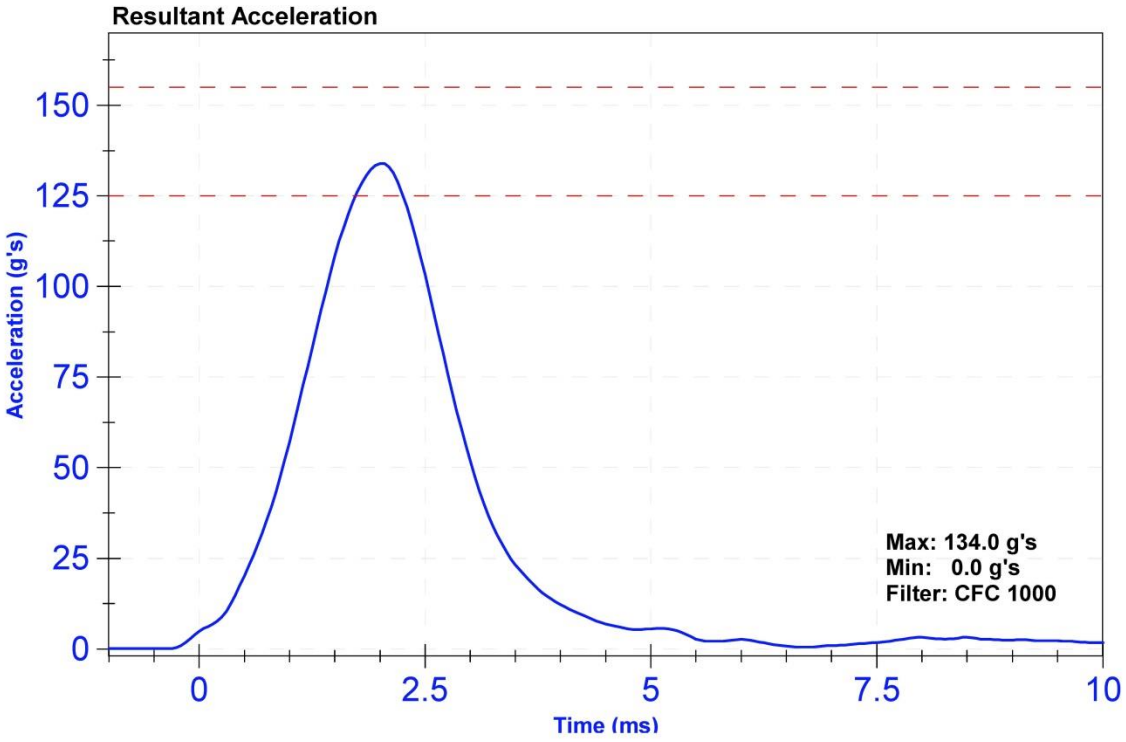
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

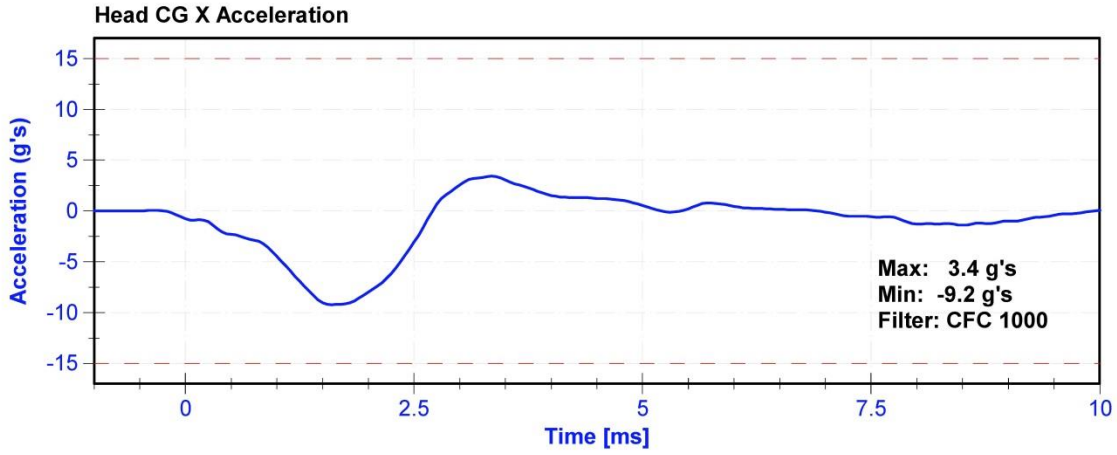
Results

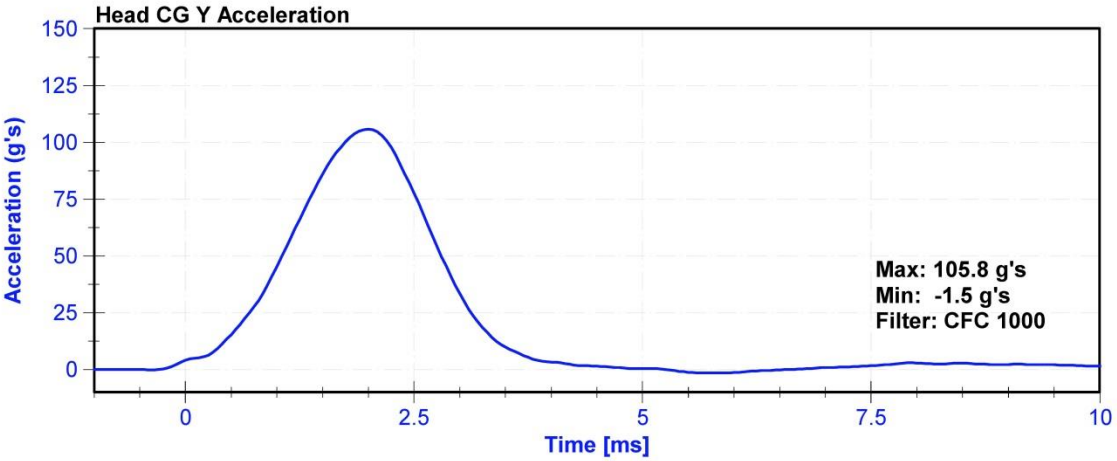
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	14.3	Pass
Resultant Acceleration	125	155	g's	134.0	Pass
Oscillation	0	15	%	4.21	Pass
Fore-Aft Acceleration	-15	15	g's	3.4	Pass

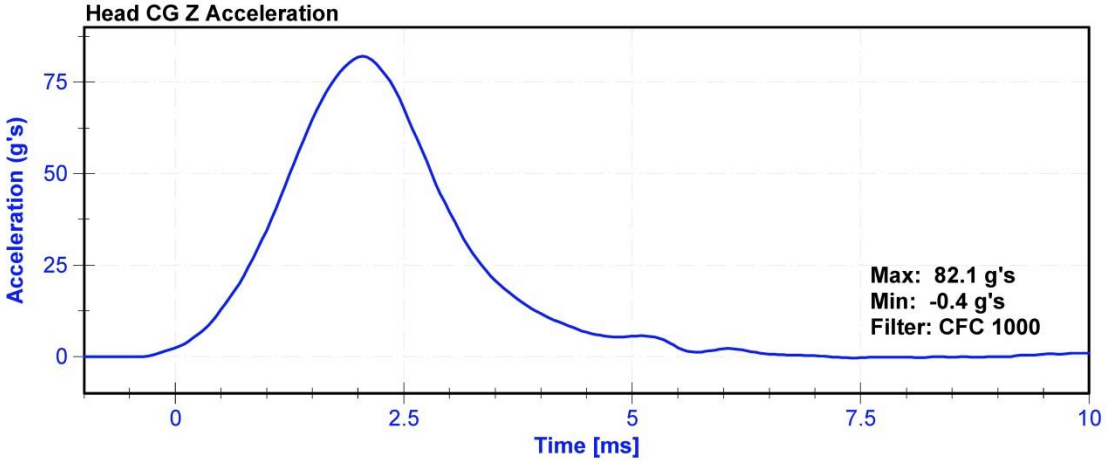
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	8/29/2014	2/27/2015
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	8/29/2014	2/27/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	8/29/2014	2/27/2015




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 3.4 g's
Min: -9.2 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
150
125
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]
Max: 105.8 g's
Min: -1.5 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
75
50
25
0
0
2.5
5
7.5
10
Time [ms]
Max: 82.1 g's
Min: -0.4 g's
Filter: CFC 1000

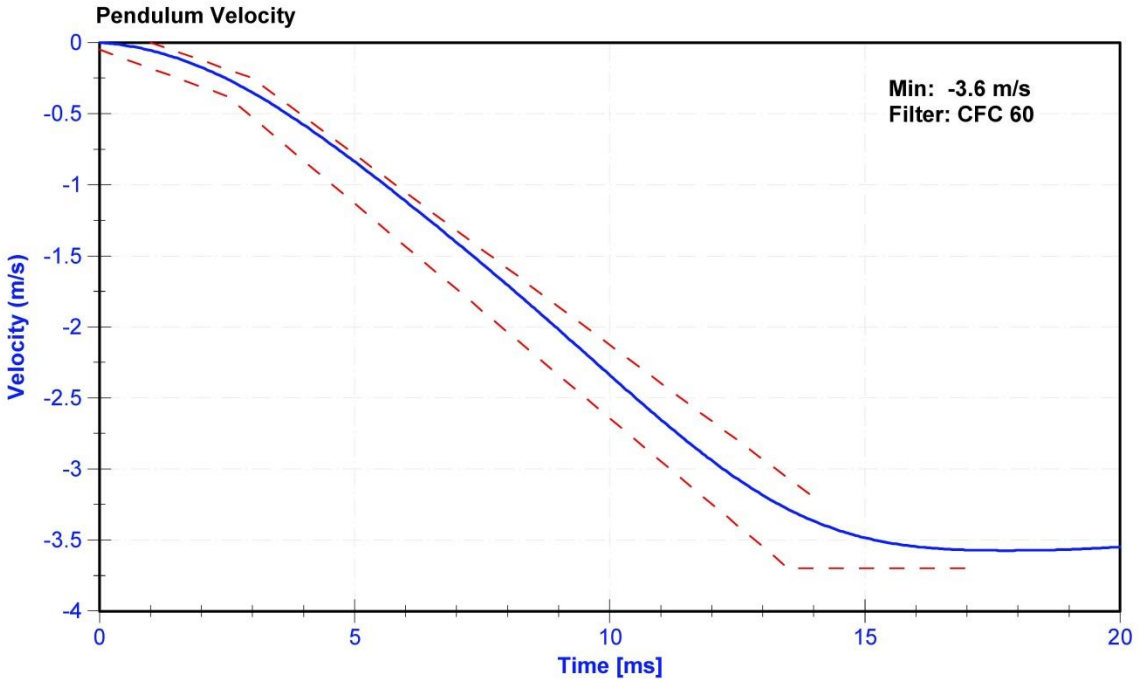
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

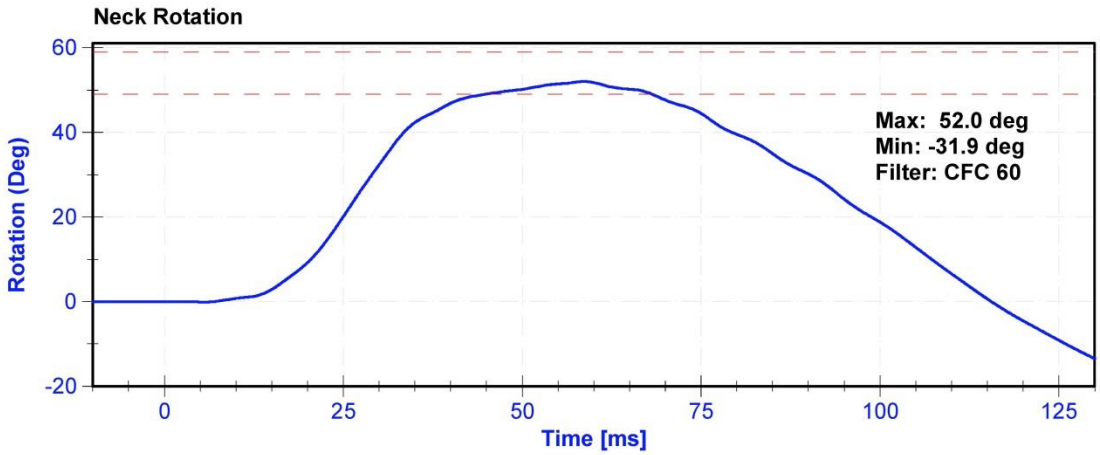
Results

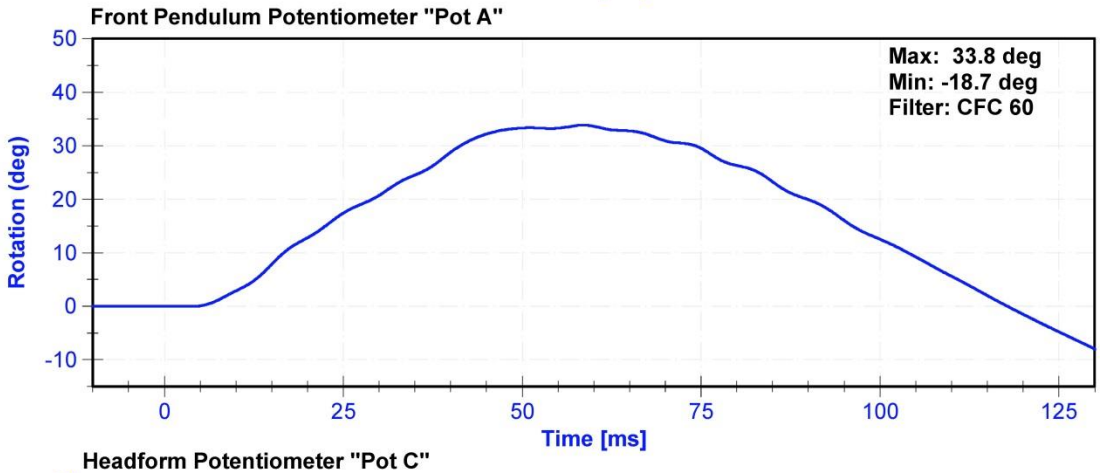
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	15.7	Pass
Velocity	3.3	3.5	m/s	3.35	Pass
Lateral Neck Rotation	49	59	deg	52.0	Pass
Time at Maximum Rotation	54	66	ms	58.6	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.9	Pass

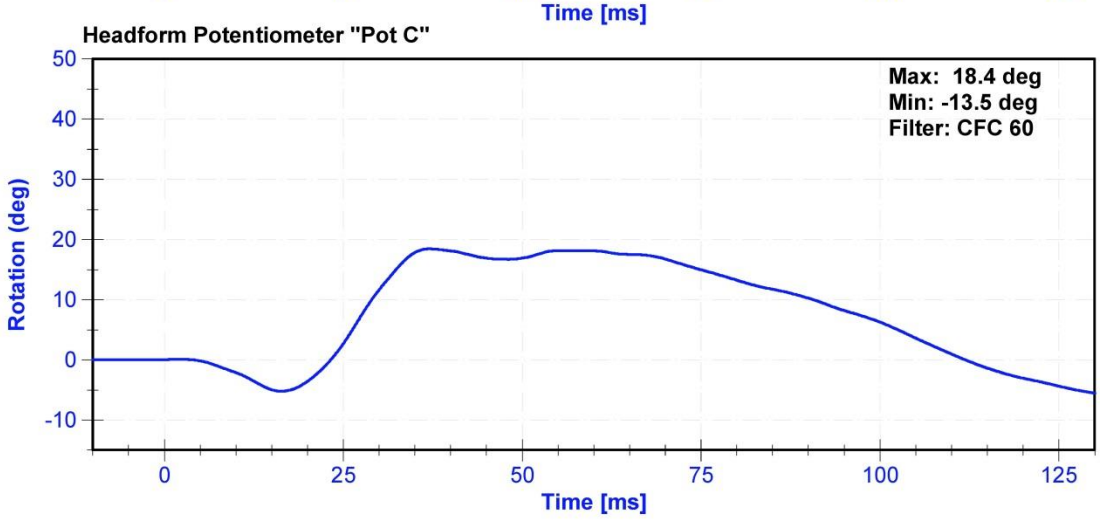
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Front Pendulum Potentiometer	SP22G	DS-094	11/13/2014	11/13/2015
Headform Potentiometer	SP22G	DS-095	11/13/2014	11/13/2015




Neck Rotation
Rotation (Deg)
Time [ms]
Max: 52.0 deg
Min: -31.9 deg
Filter: CFC 60


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 33.8 deg
Min: -18.7 deg
Filter: CFC 60


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 18.4 deg
Min: -13.5 deg
Filter: CFC 60

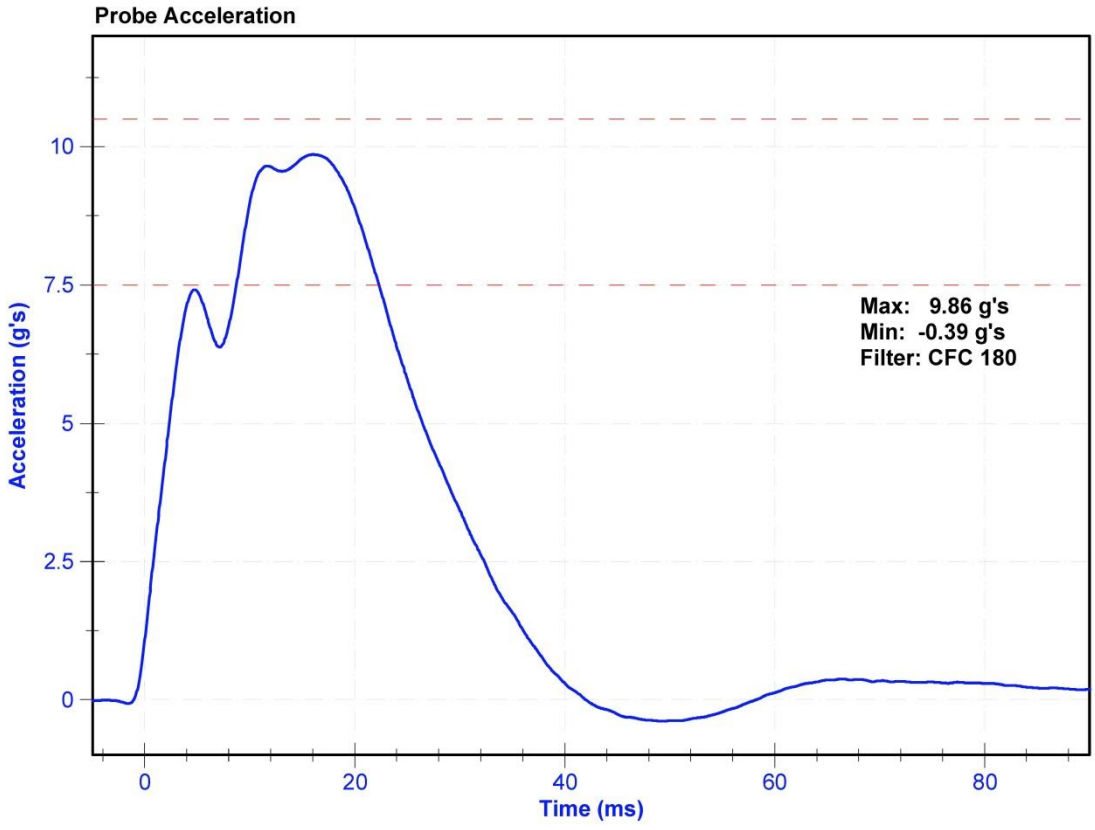
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.7	Pass
Humidity	10	70	%	18.3	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	9.86	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015



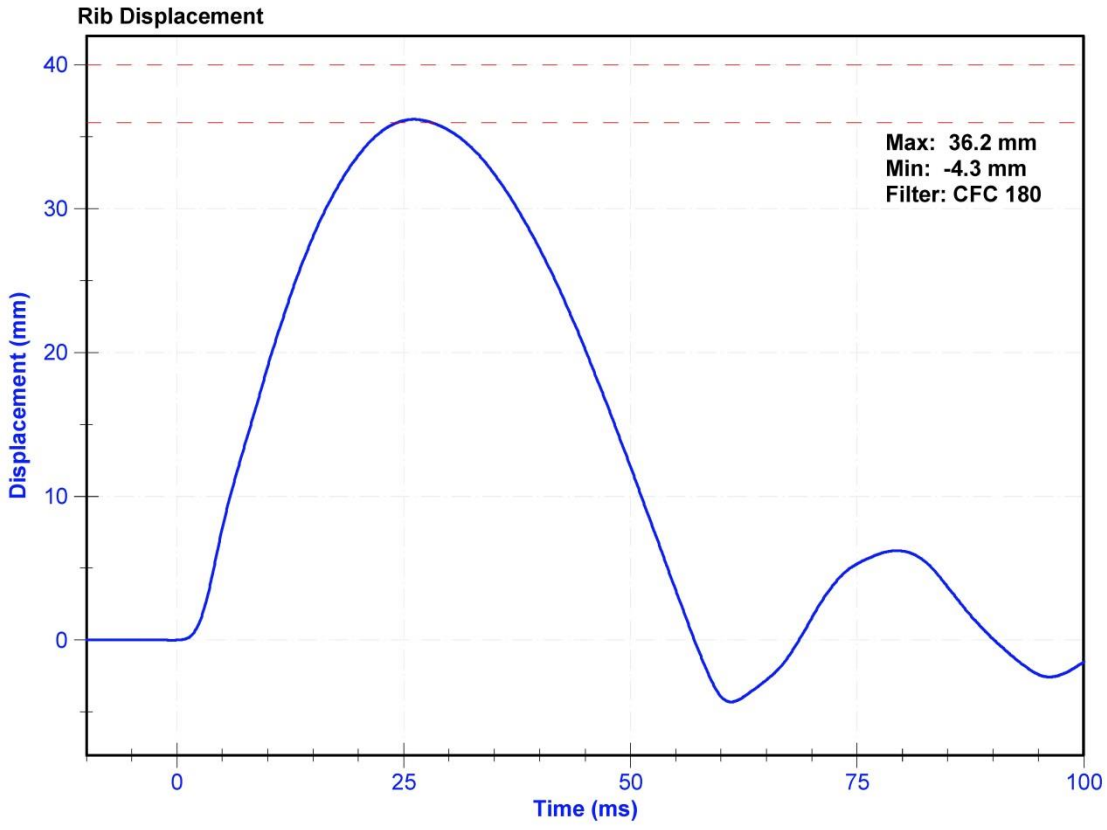
ATD Manufacturer	FTSS	Test Technician	M. Hartung
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.7	Pass
Humidity	10	70	%	17.1	Pass
Rib Displacement	36	40	mm	36.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	8/4/2014	8/4/2015



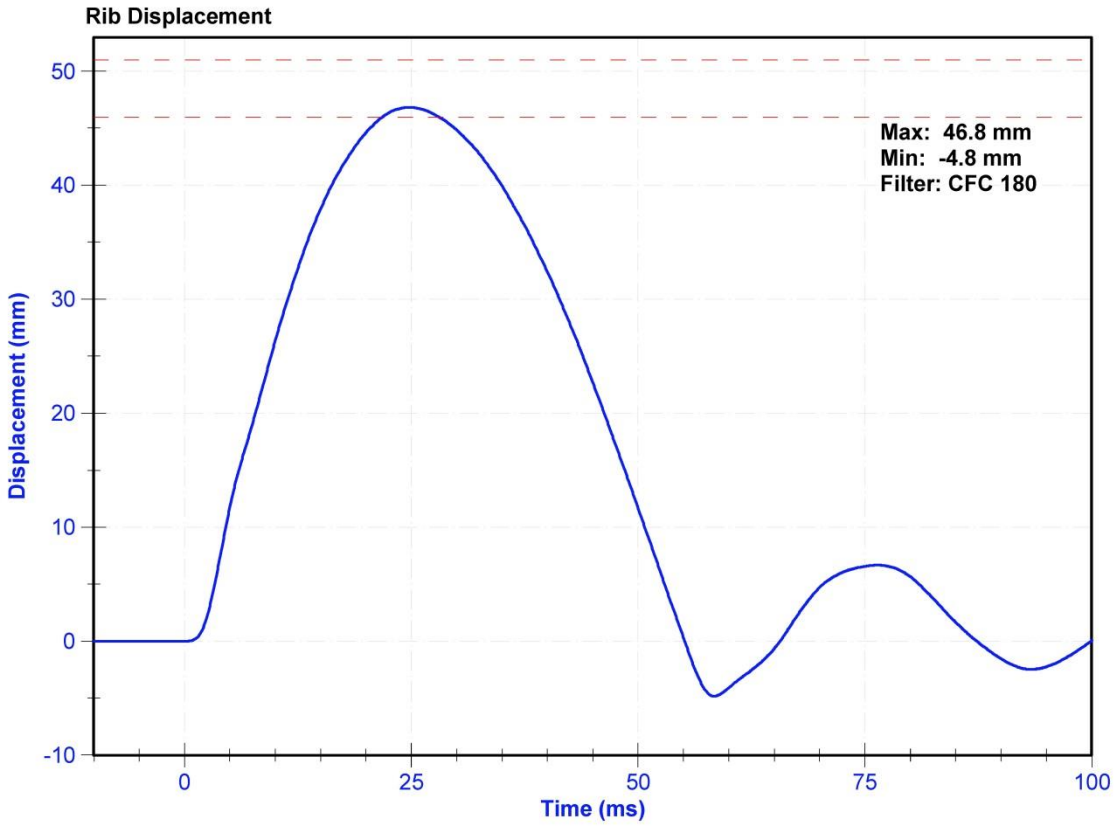
ATD Manufacturer	FTSS	Test Technician	M. Hartung
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.7	Pass
Humidity	10	70	%	17.1	Pass
Rib Displacement	46	51	mm	46.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	8/4/2014	8/4/2015



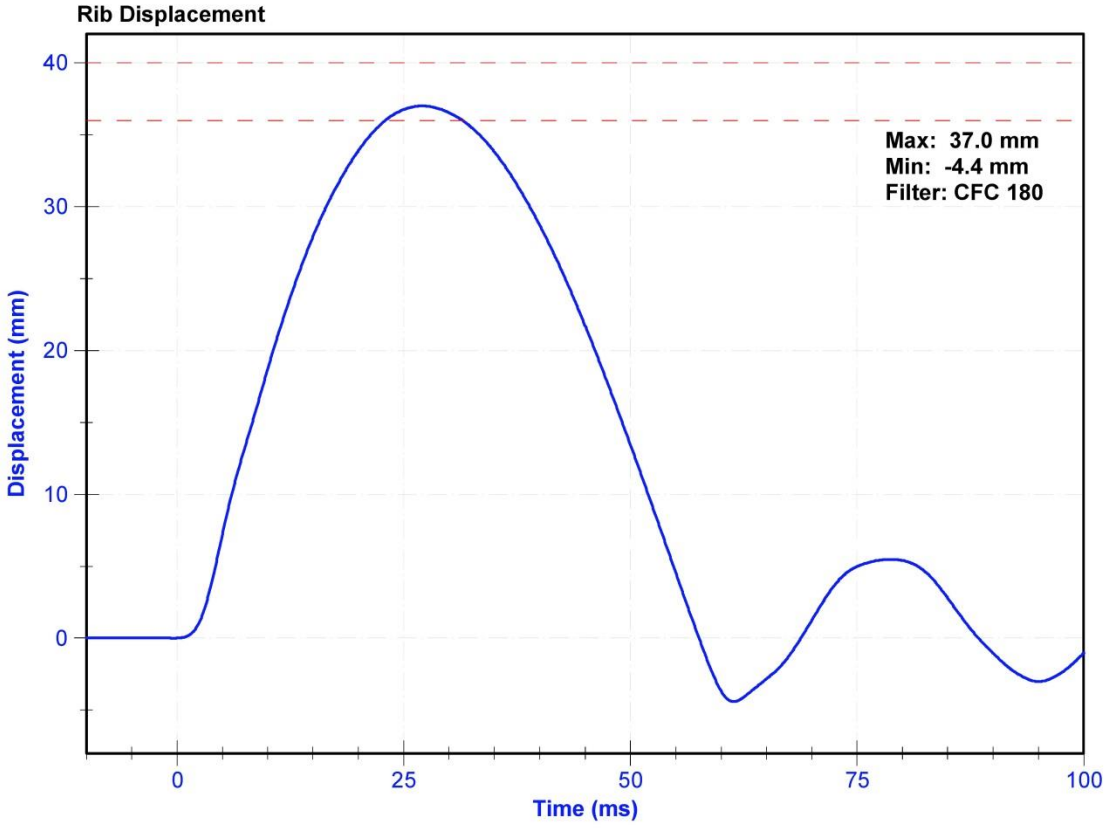
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	17.0	Pass
Rib Displacement	36	40	mm	37.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	8/4/2014	8/4/2015



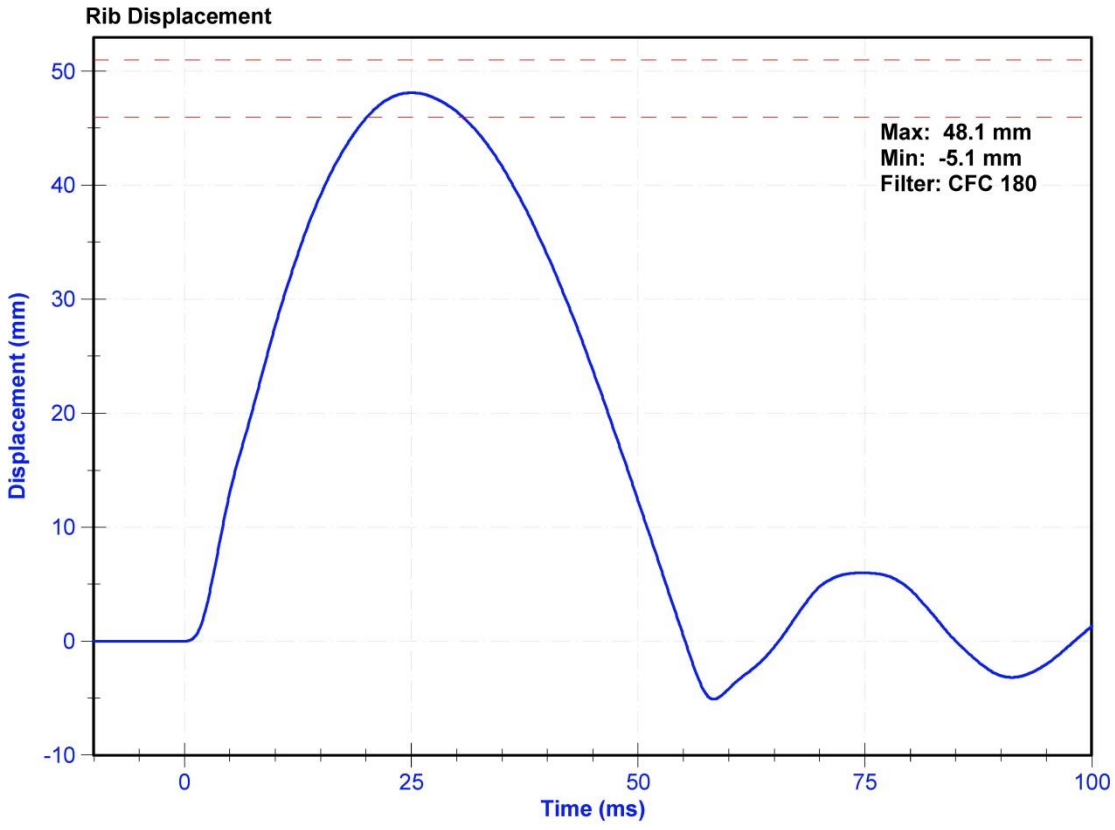
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.7	Pass
Humidity	10	70	%	17.0	Pass
Rib Displacement	46	51	mm	48.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	8/4/2014	8/4/2015



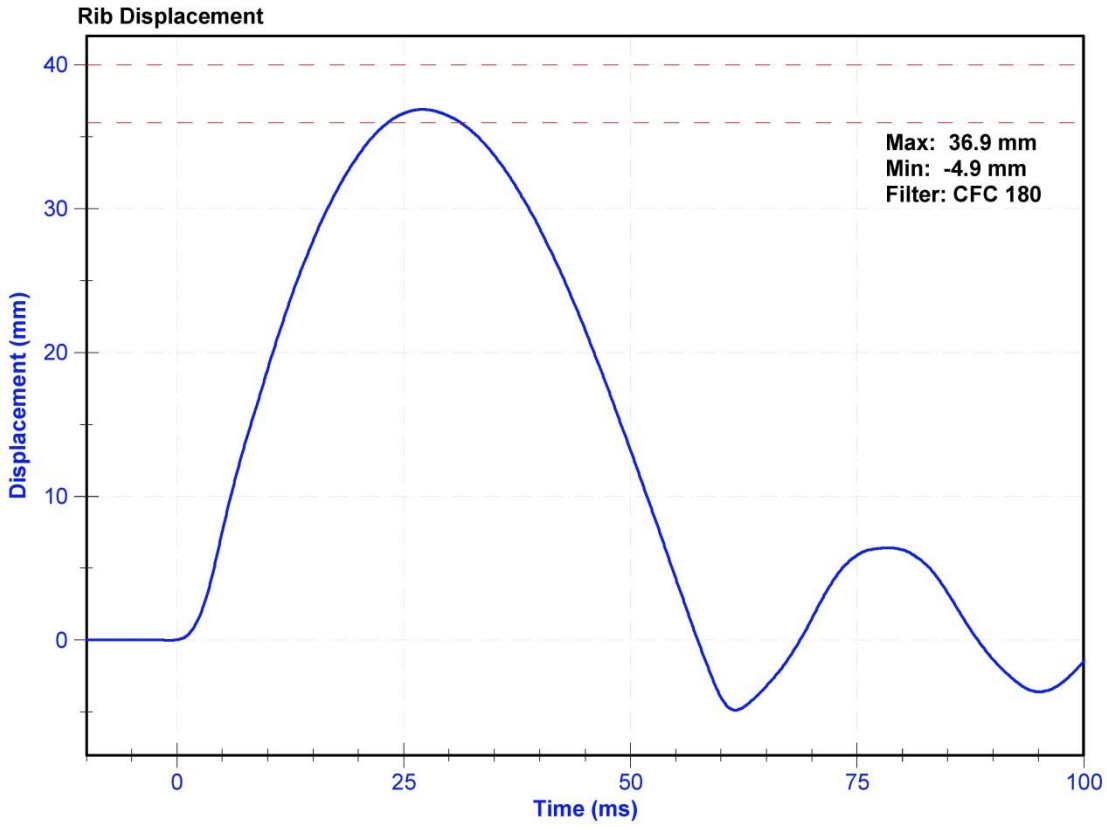
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	17.4	Pass
Rib Displacement	36	40	mm	36.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	8/4/2014	8/4/2015



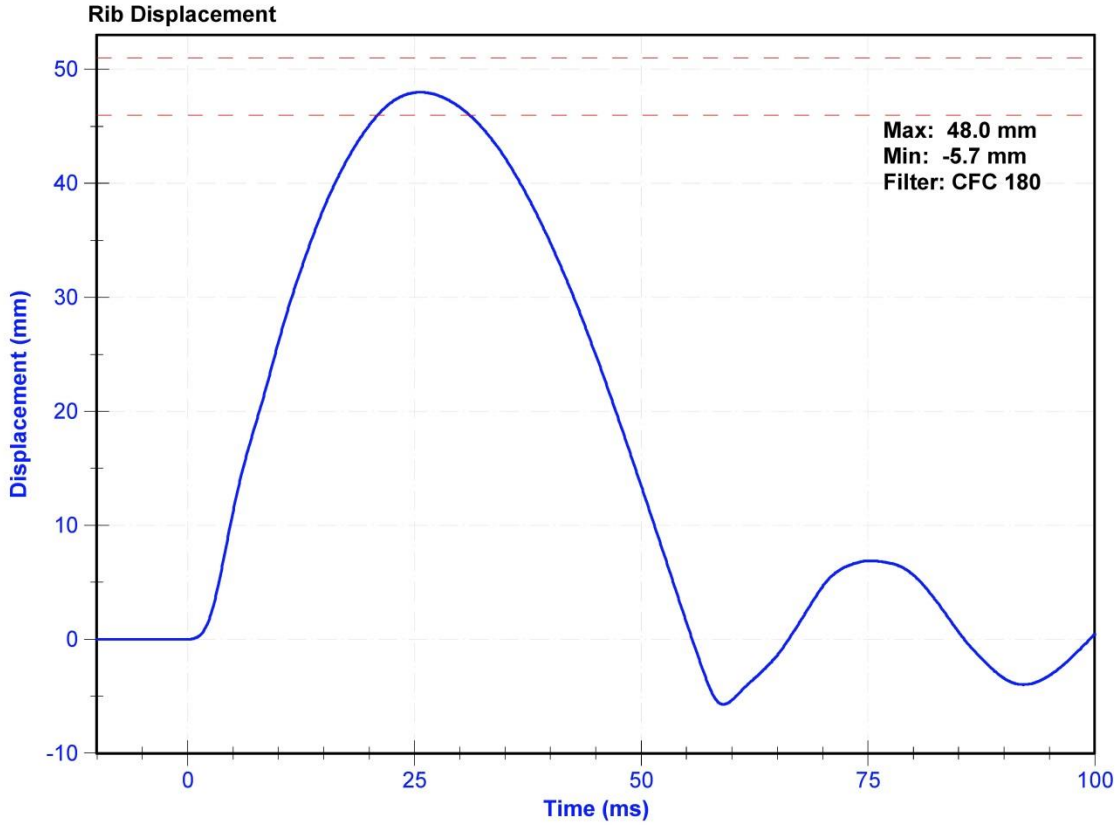
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	17.4	Pass
Rib Displacement	46	51	mm	48.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	8/4/2014	8/4/2015



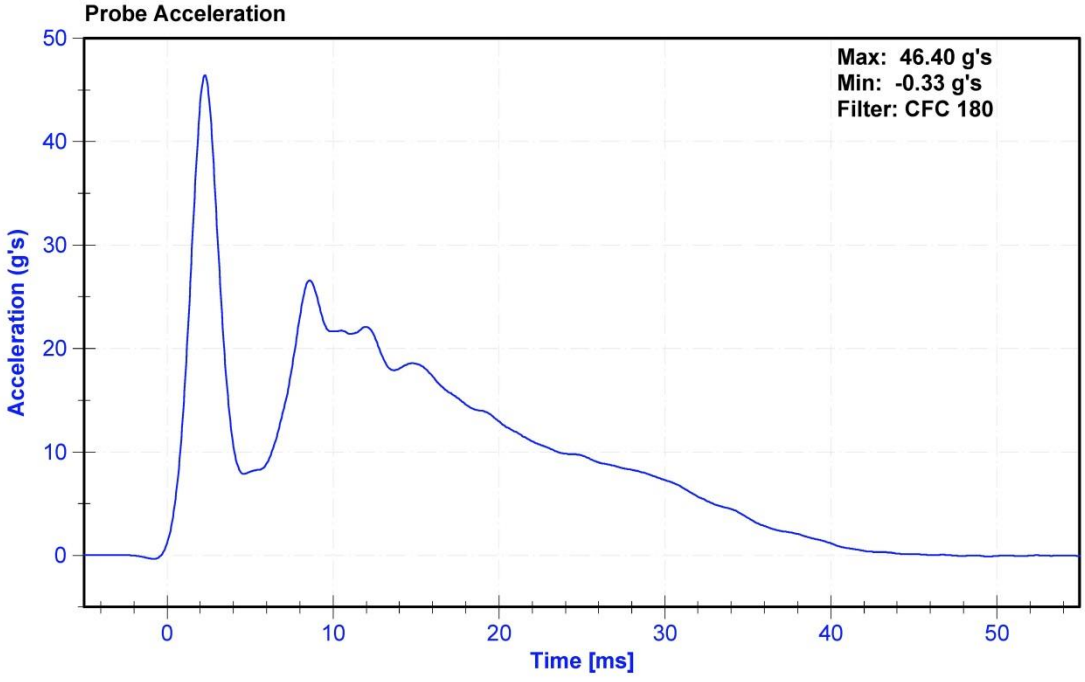
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

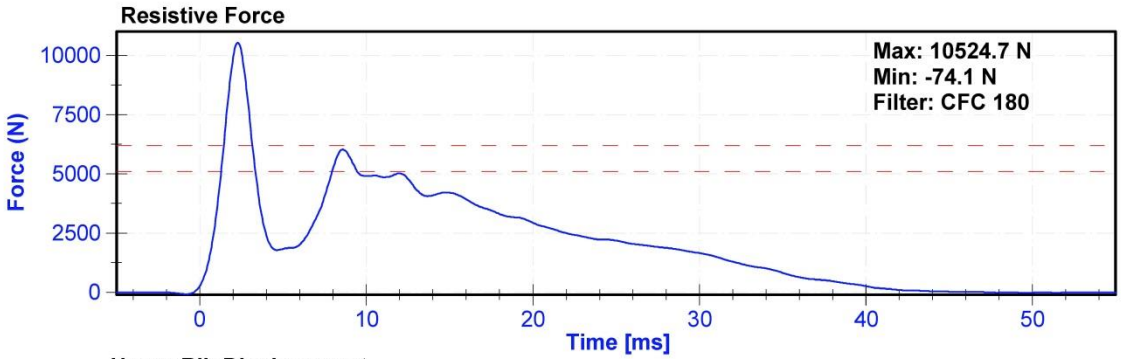
Results

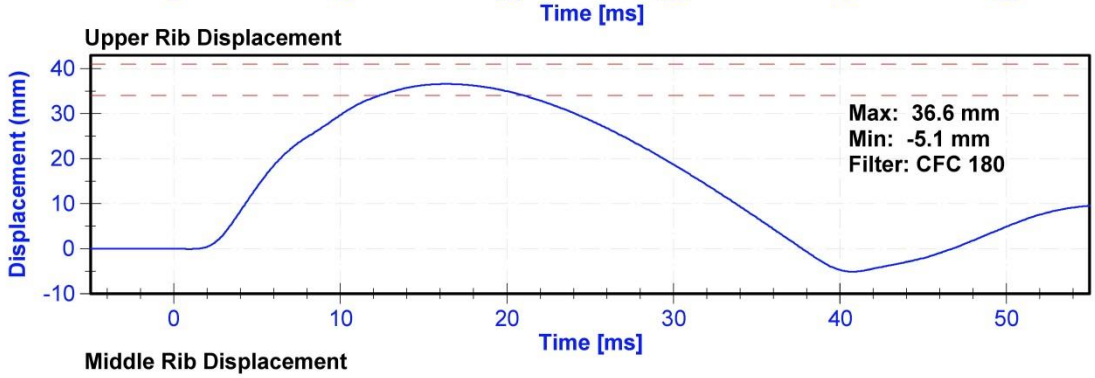
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.9	Pass
Humidity	10	70	%	18.3	Pass
Velocity	5.4	6.8	m/s	5.43	Pass
Resistive Force after 6ms	5,100	6,200	N	6024.2	Pass
Upper Thorax Rib Deflection	34	41	mm	36.6	Pass
Mid Thorax Rib Deflection	37	45	mm	41.2	Pass
Lower Thorax Rib Deflection	37	44	mm	40.3	Pass

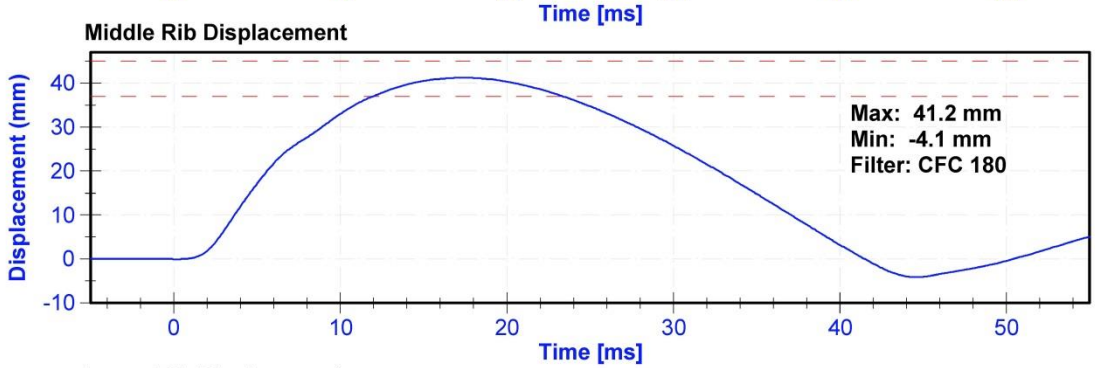
Transducer Calibrations

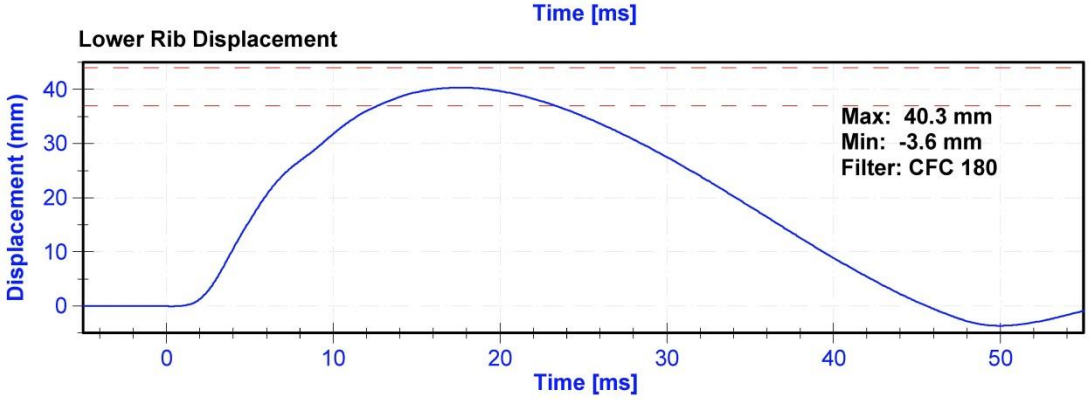
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	8/4/2014	8/4/2015
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	8/4/2014	8/4/2015
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	8/4/2014	8/4/2015




Resistive Force
Force (N)
10000
7500
5000
2500
0
Max: 10524.7 N
Min: -74.1 N
Filter: CFC 180
0
10
20
30
40
50
Time [ms]


Upper Rib Displacement
Displacement (mm)
40
30
20
10
0
-10
Max: 36.6 mm
Min: -5.1 mm
Filter: CFC 180
0
10
20
30
40
50
Time [ms]


Middle Rib Displacement
Displacement (mm)
40
30
20
10
0
-10
Max: 41.2 mm
Min: -4.1 mm
Filter: CFC 180
0
10
20
30
40
50
Time [ms]


Lower Rib Displacement
Displacement (mm)
40
30
20
10
0
Max: 40.3 mm
Min: -3.6 mm
Filter: CFC 180
0
10
20
30
40
50
Time [ms]

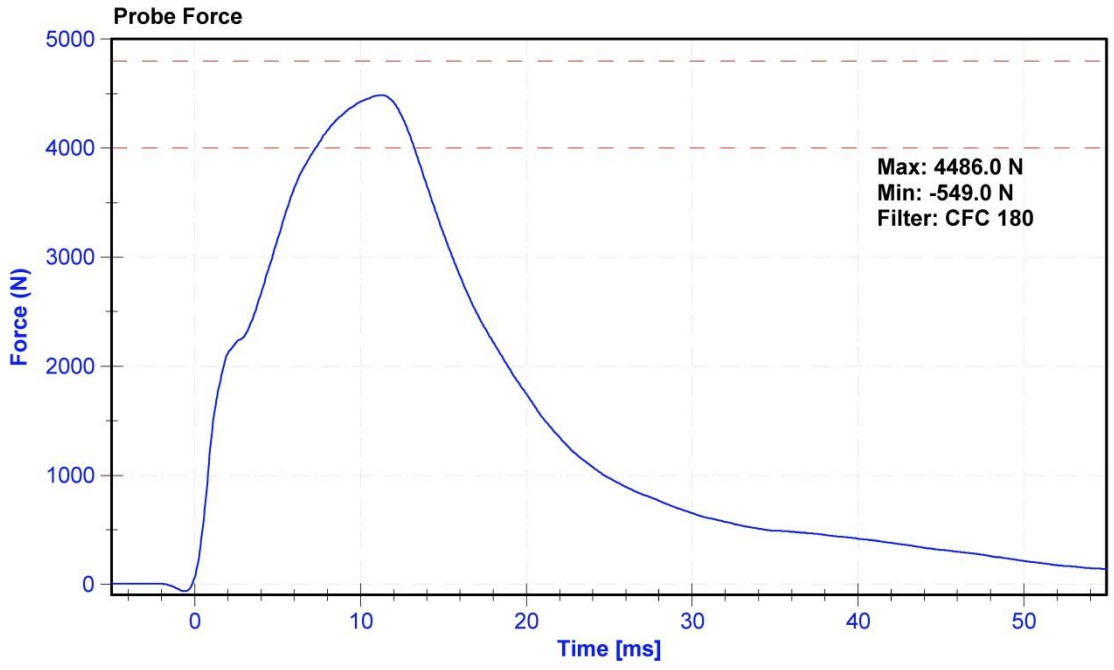
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

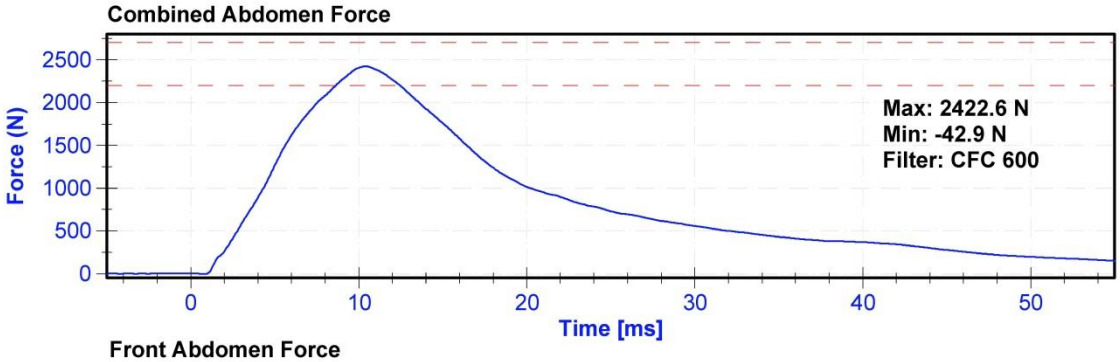
Results

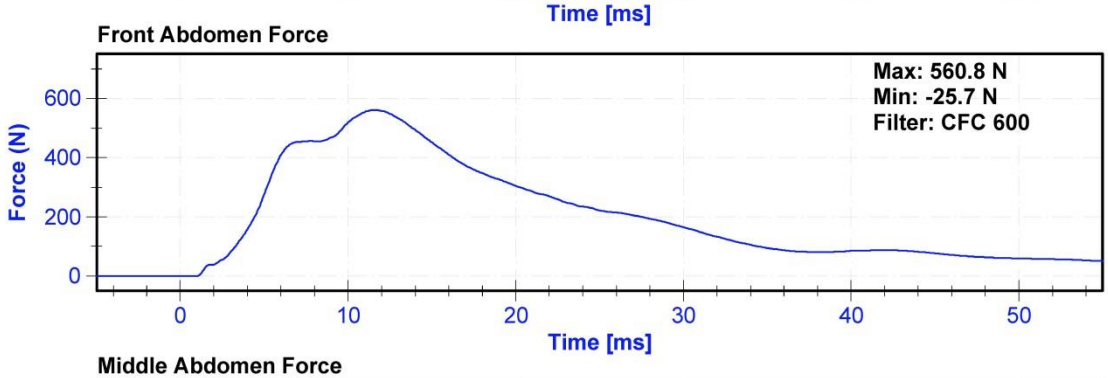
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	18.2	Pass
Velocity	3.9	4.1	m/s	3.93	Pass
Combined Abdomen Force	2,200	2,700	N	2422.6	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.40	Pass
Resistive Probe Force	4,000	4,800	N	4486.0	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.25	Pass

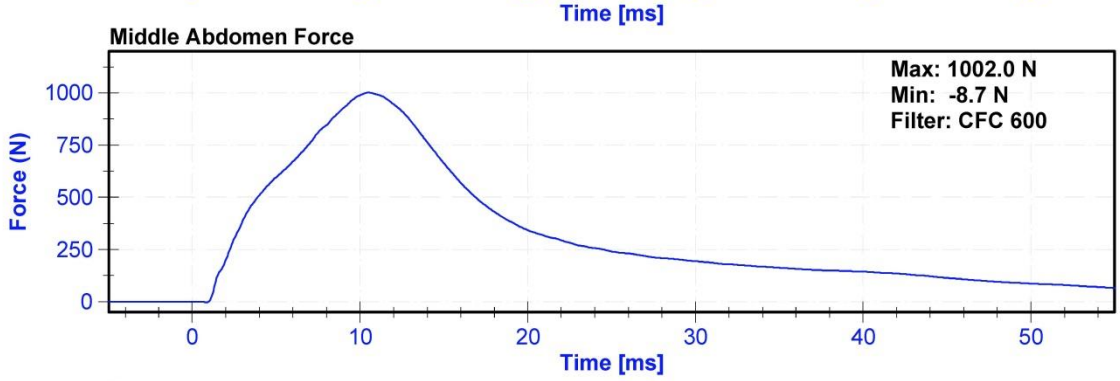
Transducer Calibrations

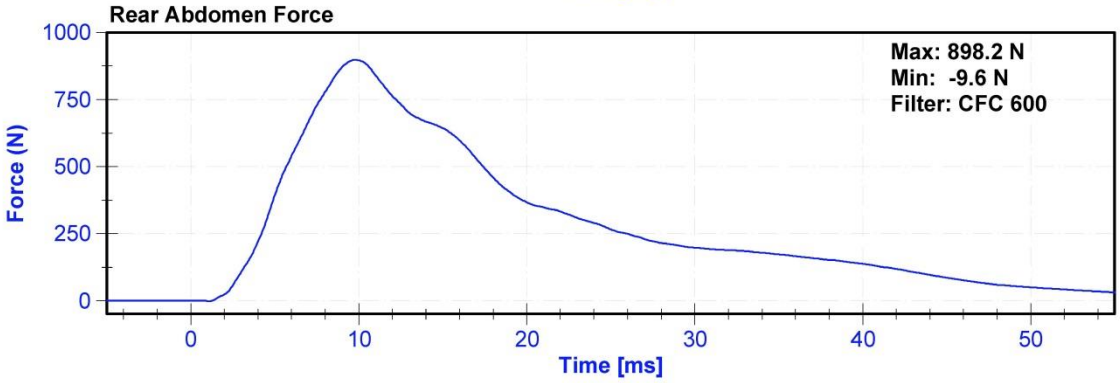
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Front Abdomen Load Cell	DENTON 2631	LC-1512	5/13/2014	5/13/2015
Middle Abdomen Load Cell	DENTON 2631	LC-1526	5/13/2014	5/13/2015
Rear Abdomen Load Cell	DENTON 2631	LC-1512	5/13/2014	5/13/2015




Combined Abdomen Force
Force (N)
2500
2000
1500
1000
500
0
0
10
20
30
40
50
Time [ms]
Max: 2422.6 N
Min: -42.9 N
Filter: CFC 600


Front Abdomen Force
Force (N)
600
400
200
0
0
10
20
30
40
50
Time [ms]
Max: 560.8 N
Min: -25.7 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
1000
750
500
250
0
0
10
20
30
40
50
Time [ms]
Max: 1002.0 N
Min: -8.7 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
1000
750
500
250
0
0
10
20
30
40
50
Time [ms]
Max: 898.2 N
Min: -9.6 N
Filter: CFC 600

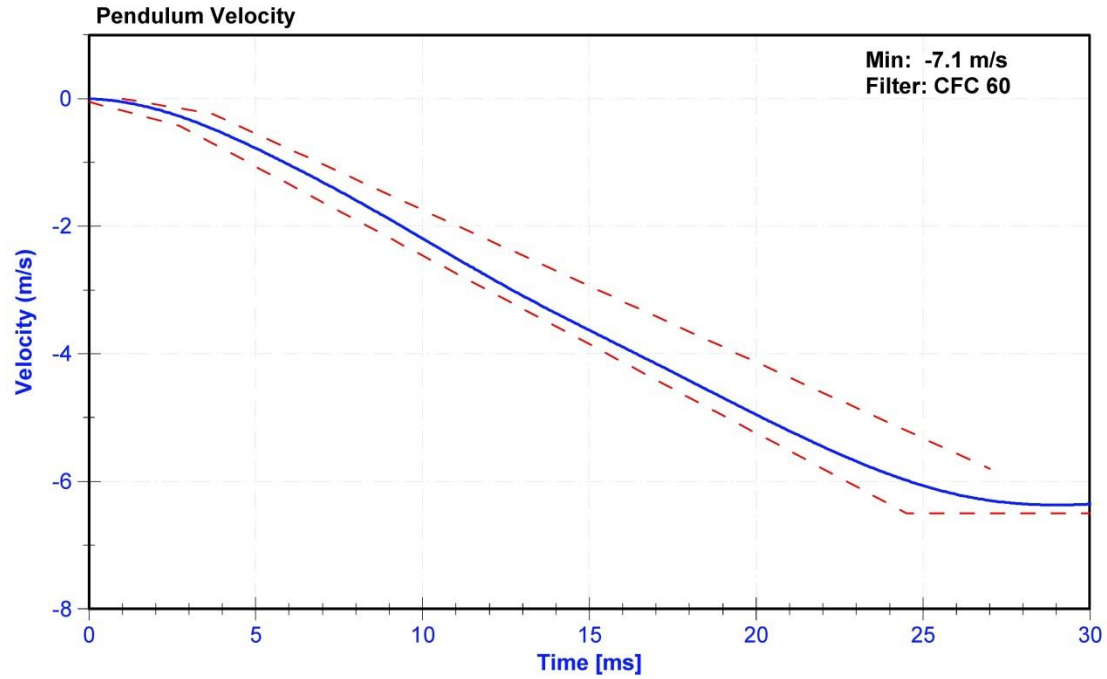
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

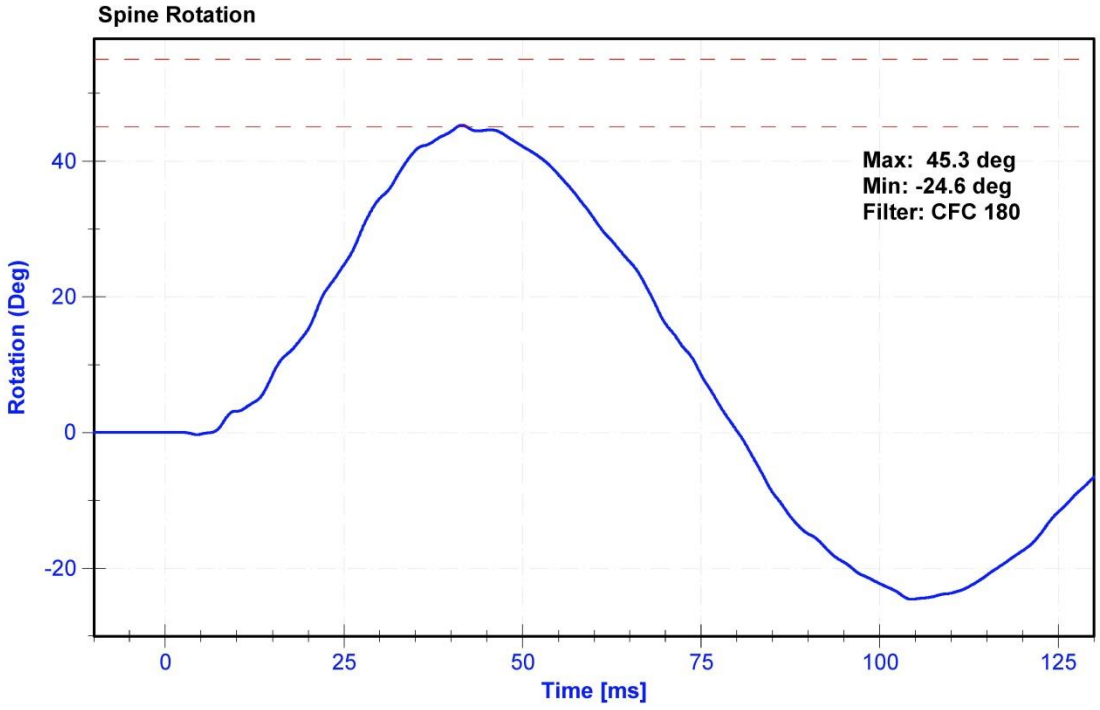
Results

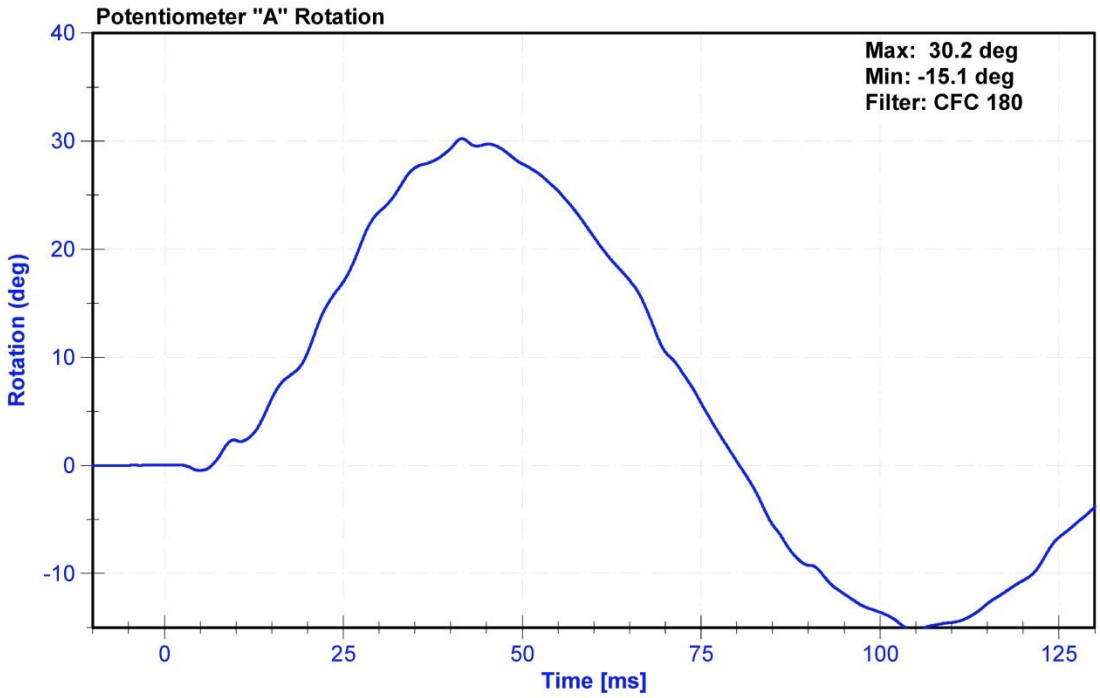
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	16.3	Pass
Velocity	5.95	6.15	m/s	6.025	Pass
Lateral Spine Rotation	45	55	deg	45.3	Pass
Time at Maximum Rotation	39	53	ms	41.5	Pass
Time of Decay to Zero Degrees	37	57	ms	38.7	Pass
Pulse within Corridor?	-	-	-	Yes	Pass

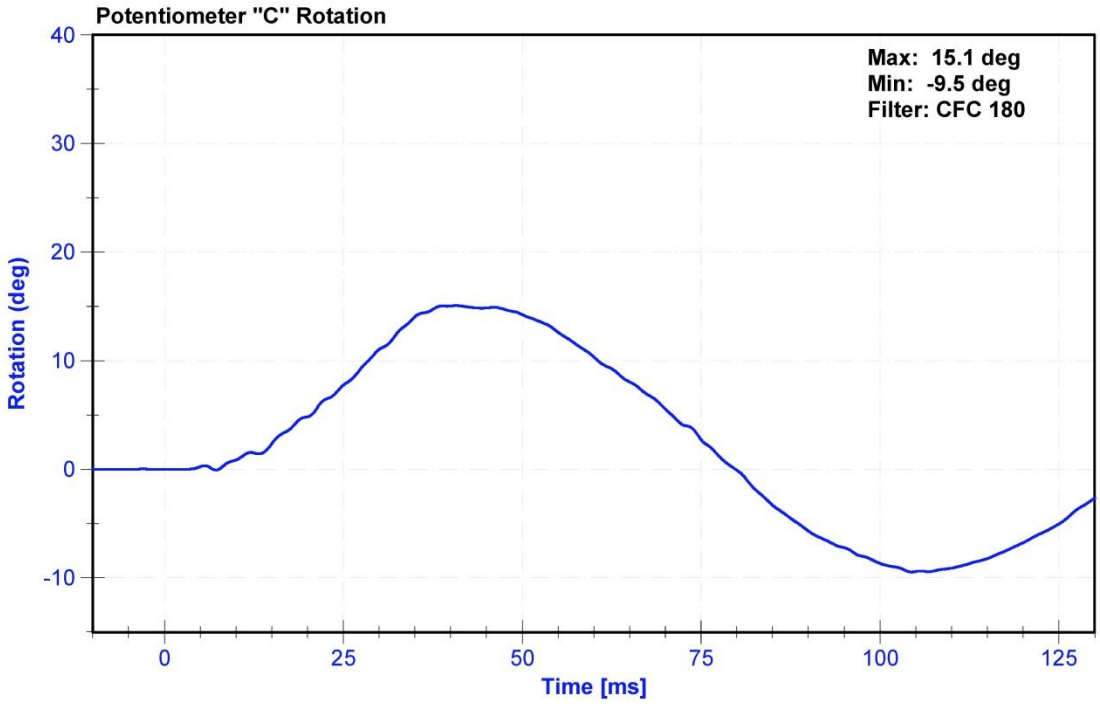
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum "A" Potentiometer	SP22G	DS-094	11/13/2014	11/13/2015
Condyle "B" Potentiometer	SP22G	DS-095	11/13/2014	11/13/2015


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


Spine Rotation
Max: 45.3 deg
Min: -24.6 deg
Filter: CFC 180
Rotation (Deg)
40
20
0
-20
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 30.2 deg
Min: -15.1 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
0
25
50
75
100
125
Time [ms]


Potentiometer "C" Rotation
Max: 15.1 deg
Min: -9.5 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
0
25
50
75
100
125
Time [ms]

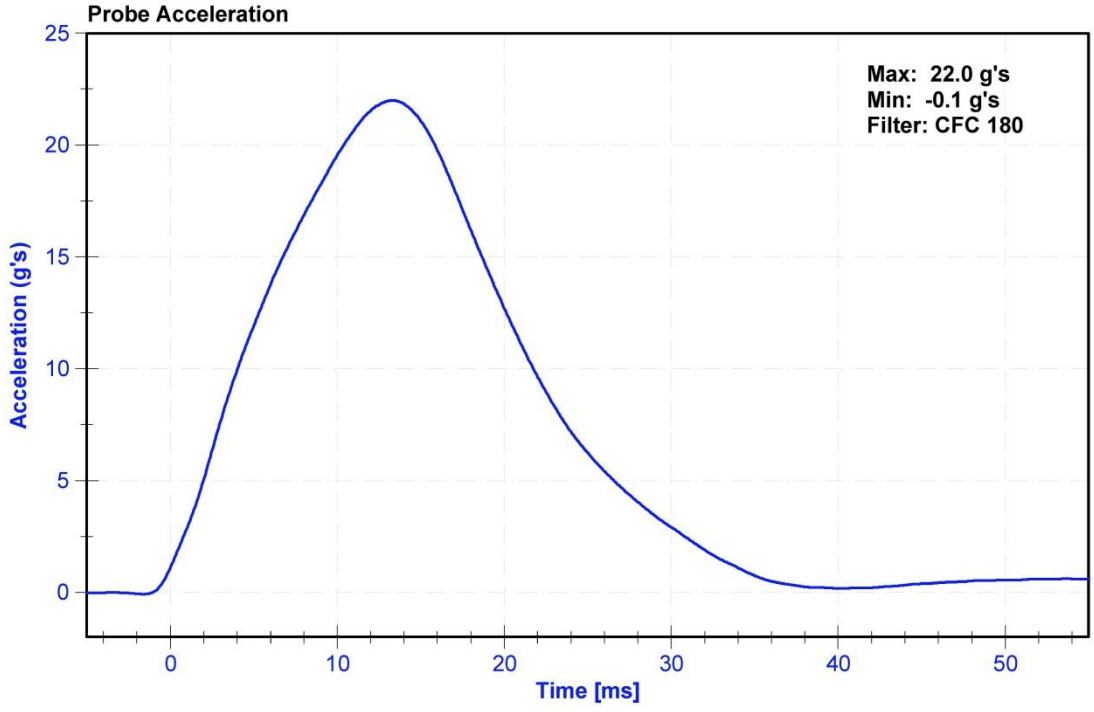
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

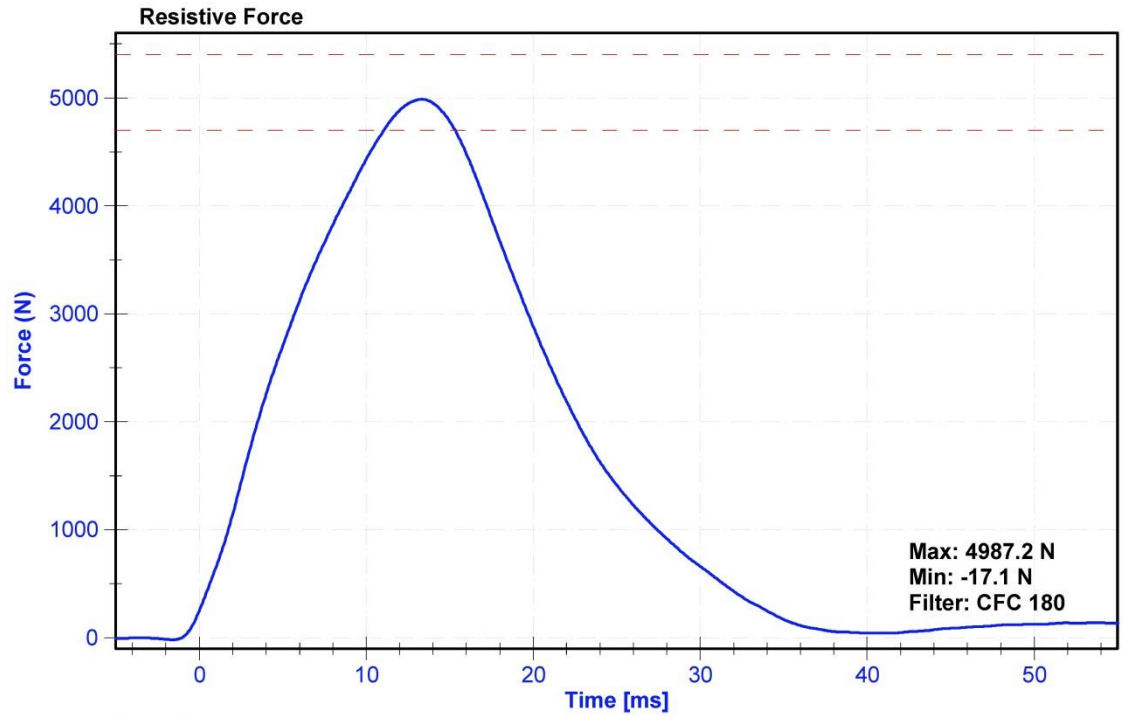
Results

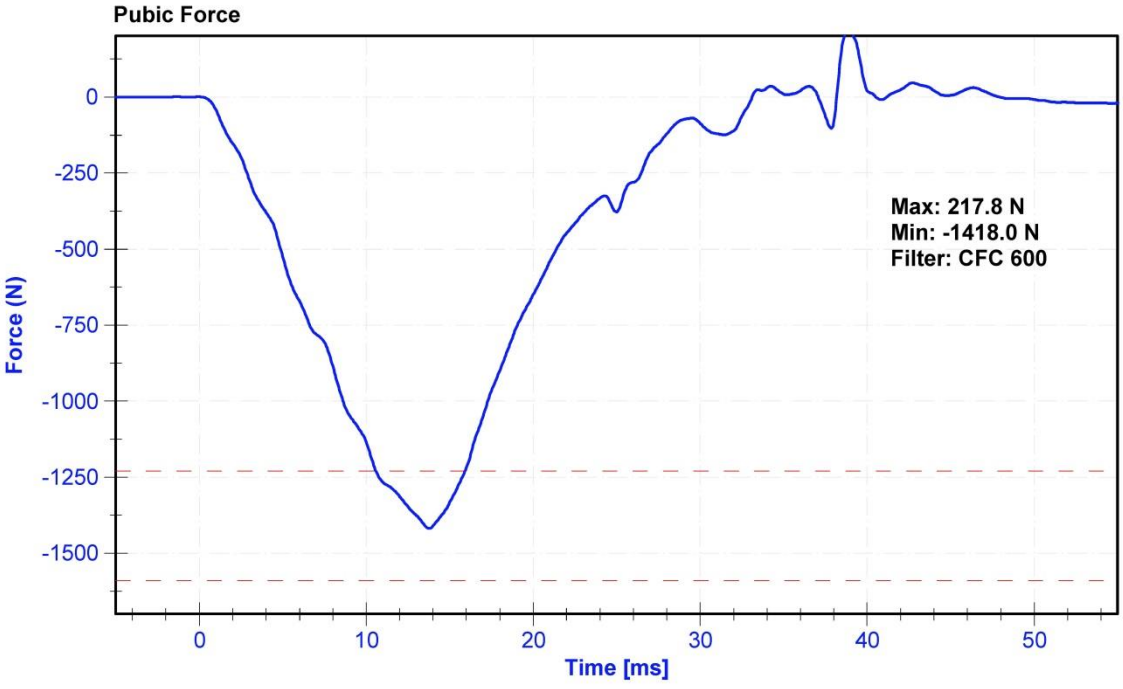
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.7	Pass
Humidity	10	70	%	17.9	Pass
Velocity	4.2	4.4	m/s	4.26	Pass
Resistive Force	4,700	5,400	N	4987.2	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.30	Pass
Pubic Force	-1,590	-1,230	N	-1418.0	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.75	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/13/2014	5/13/2015




Resistive Force
5000
4000
3000
2000
1000
0
Force (N)
0
10
20
30
40
50
Time [ms]
Max: 4987.2 N
Min: -17.1 N
Filter: CFC 180


Pubic Force
0
-250
-500
-750
-1000
-1250
-1500
Force (N)
0
10
20
30
40
50
Time [ms]
Max: 217.8 N
Min: -1418.0 N
Filter: CFC 600

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

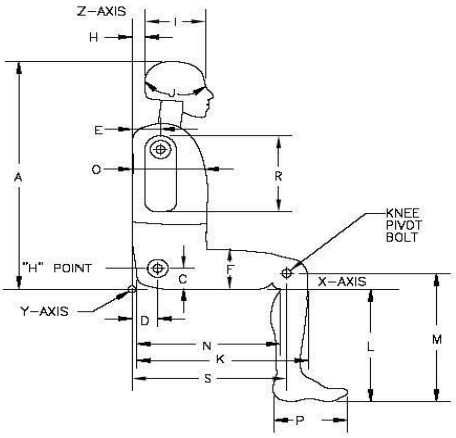
SERIAL No: 303

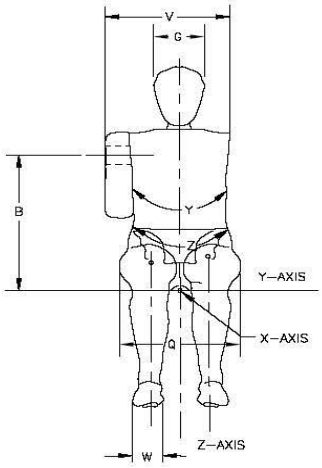
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: M. Goehle Date: 2/10/2015

Dummy Serial Number: 303





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	87	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	128	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	358	Pass
M	Knee Pivot to floor height	392	409	403	Pass
N	Buttock Popliteal Length	416	442	436	Pass
O	Chest Depth w/o jacket	195	211	204	Pass
P	Foot Length	216	232	219	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	316	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	483	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

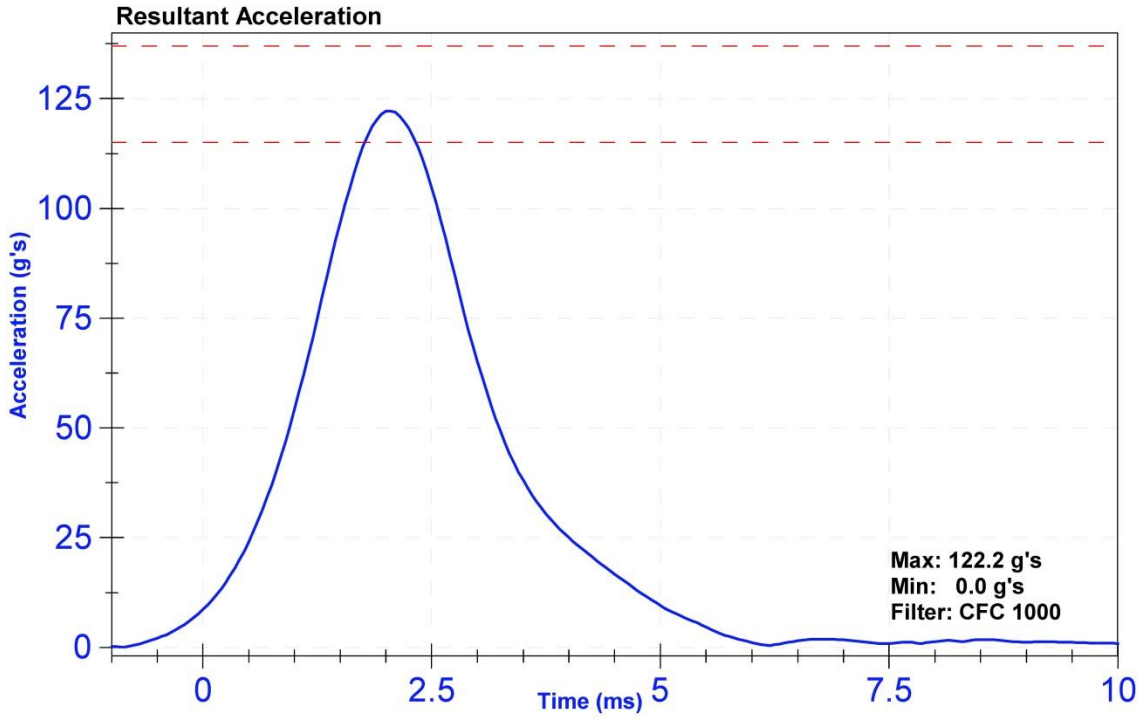
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

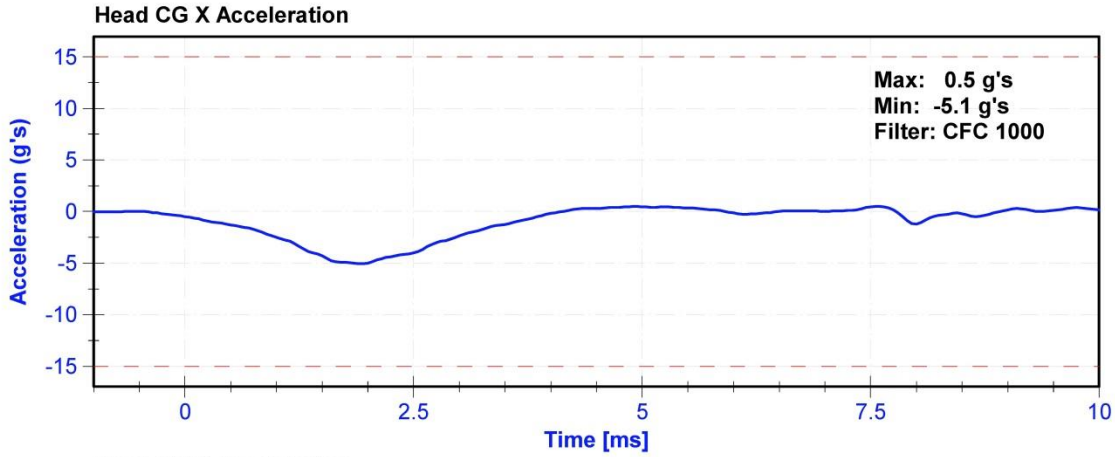
Results

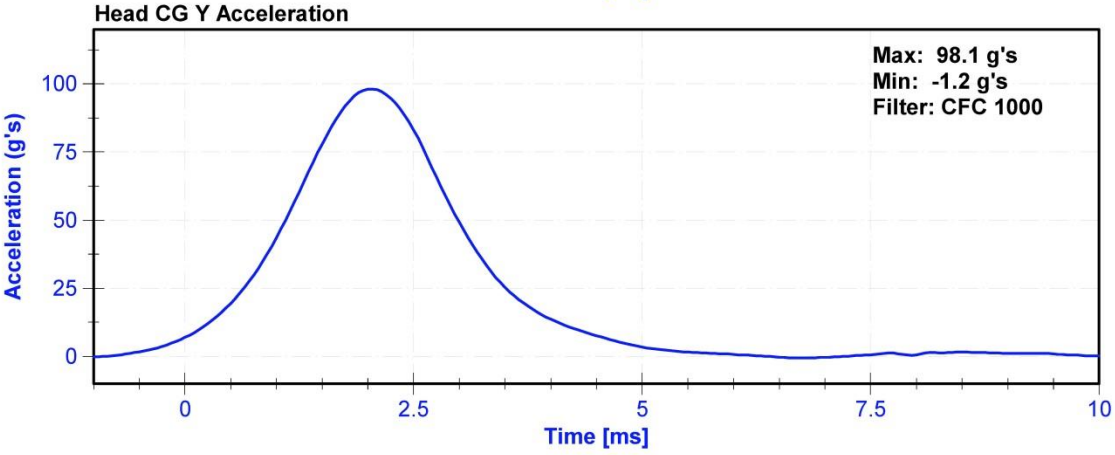
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	16.2	Pass
Resultant Acceleration	115	137	g's	122.2	Pass
Oscillation	0	15	%	1.5	Pass
Fore-Aft Acceleration	-15	15	g's	-5.1	Pass

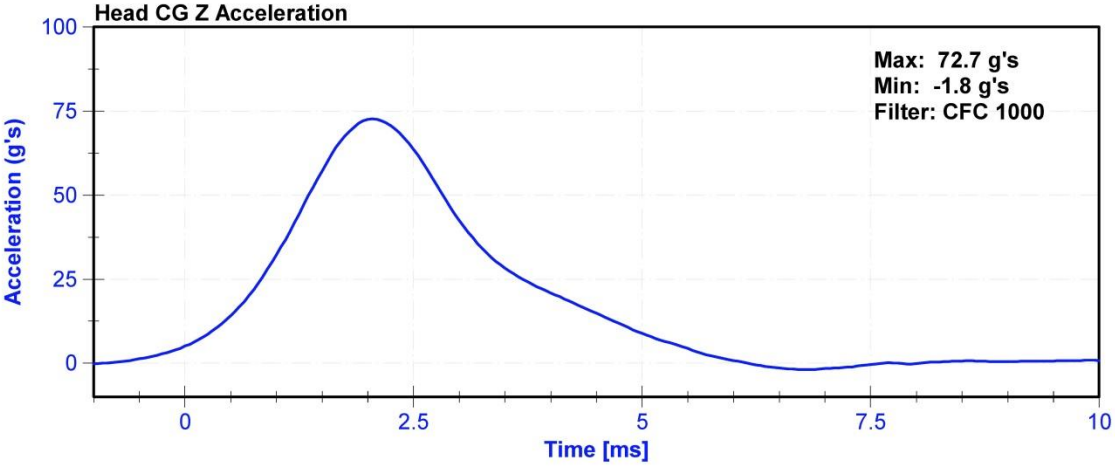
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P63841	12/17/2014	6/17/2015
Y Accelerometer	ENDEVCO 7264	AC-P52040	10/8/2014	4/8/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P58737	10/8/2014	4/8/2015




Head CG X Acceleration
Max: 0.5 g's
Min: -5.1 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 98.1 g's
Min: -1.2 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 72.7 g's
Min: -1.8 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]

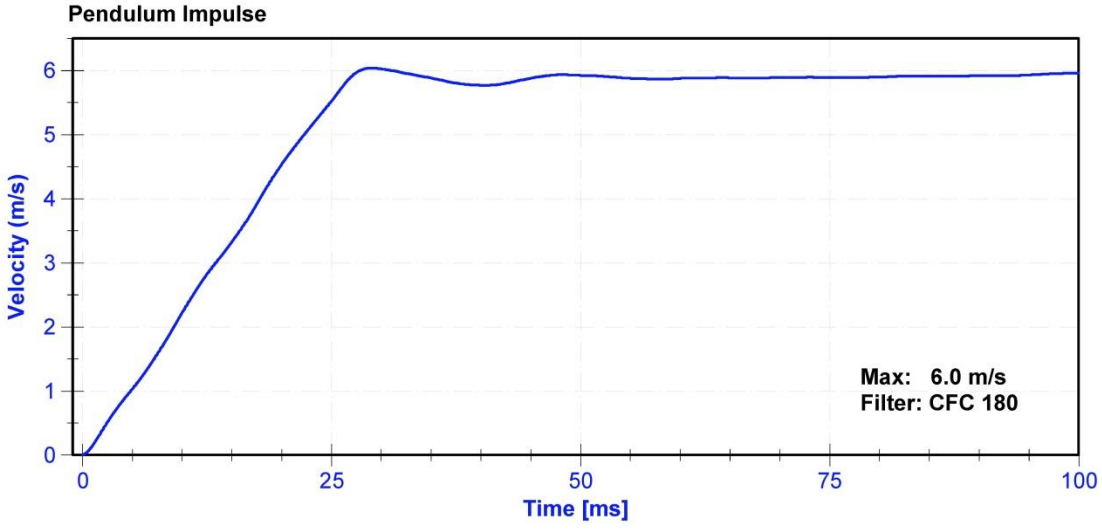
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

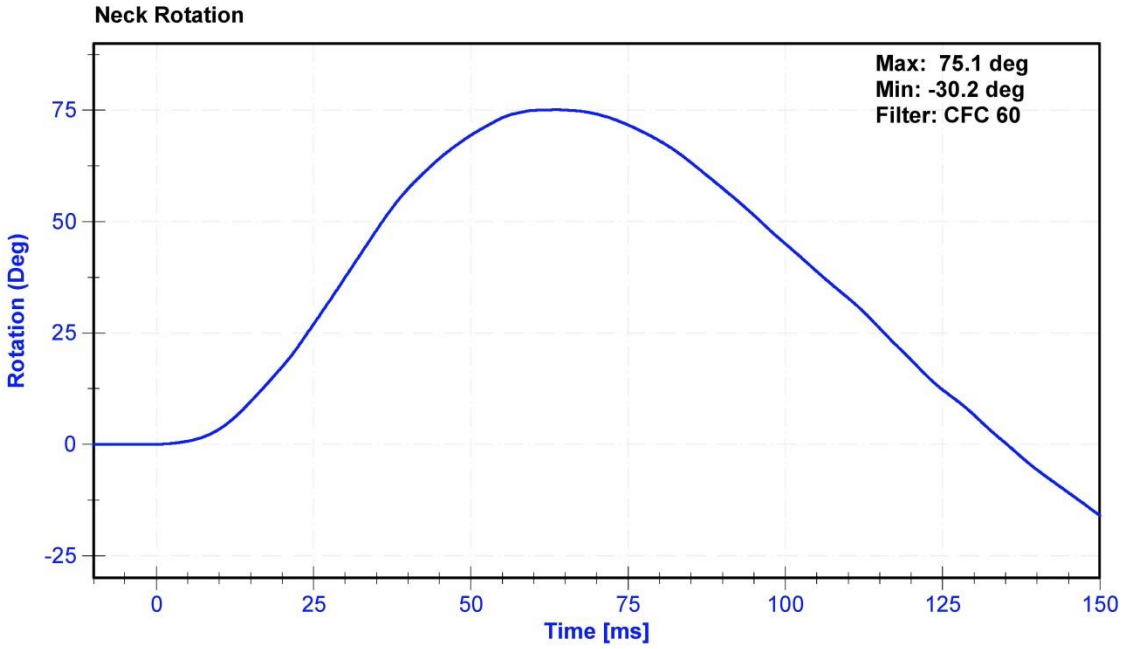
Results

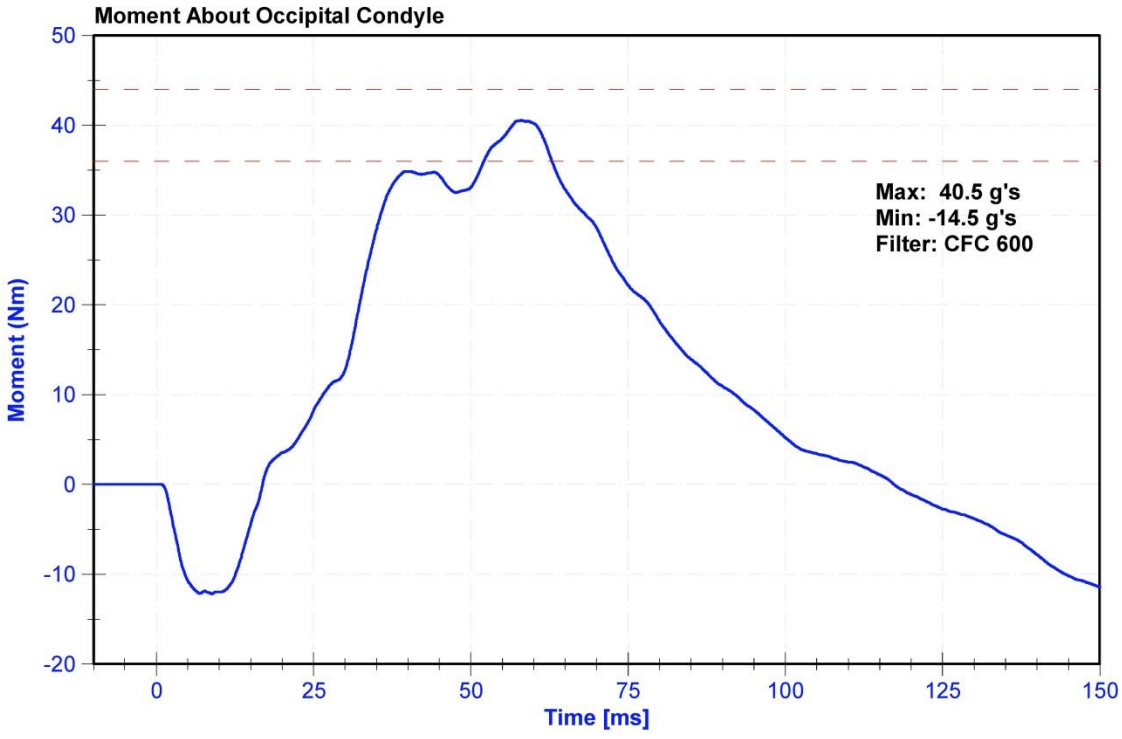
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	16.5	Pass
Velocity	5.51	5.63	m/s	5.583	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.22	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.33	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.54	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.53	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.04	Pass
Neck Rotation	71	81	deg	75.1	Pass
Time at Maximum Rotation	50	70	ms	63.6	Pass
Moment about the OC	36	44	Nm	40.5	Pass
Moment Decay to 0 Nm	102	126	ms	117.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/13/2014	11/13/2015
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/13/2014	11/13/2015
Upper Neck Load Cell	DENTON 1716A	LC-130Fy	9/12/2014	9/12/2015




Neck Rotation
Max: 75.1 deg
Min: -30.2 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 40.5 g's
Min: -14.5 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

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

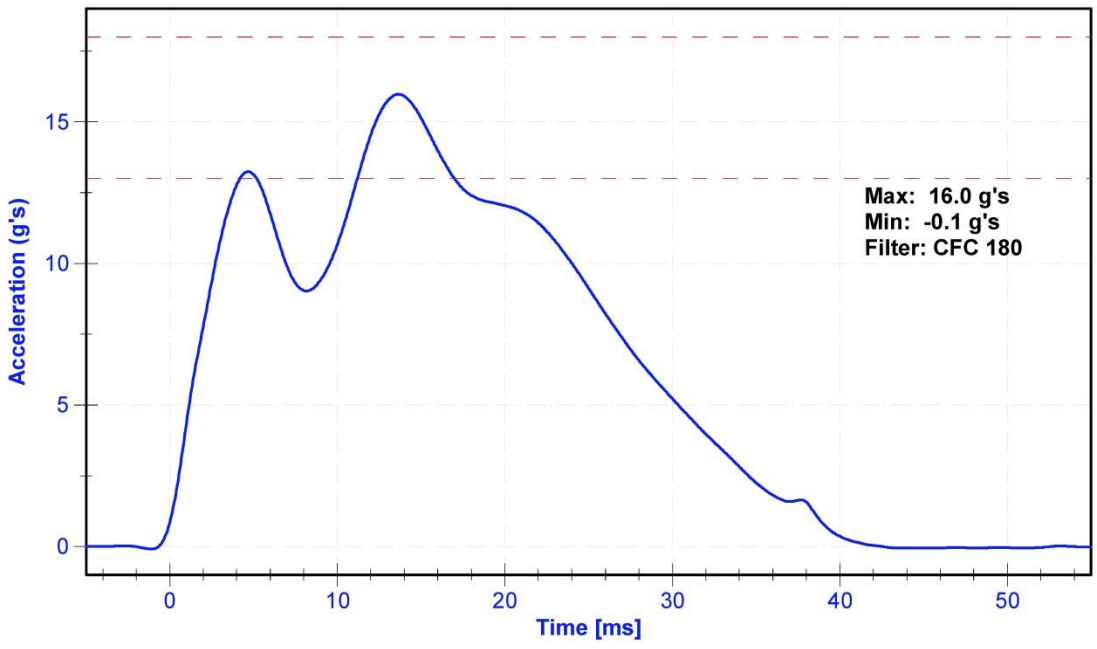
Results

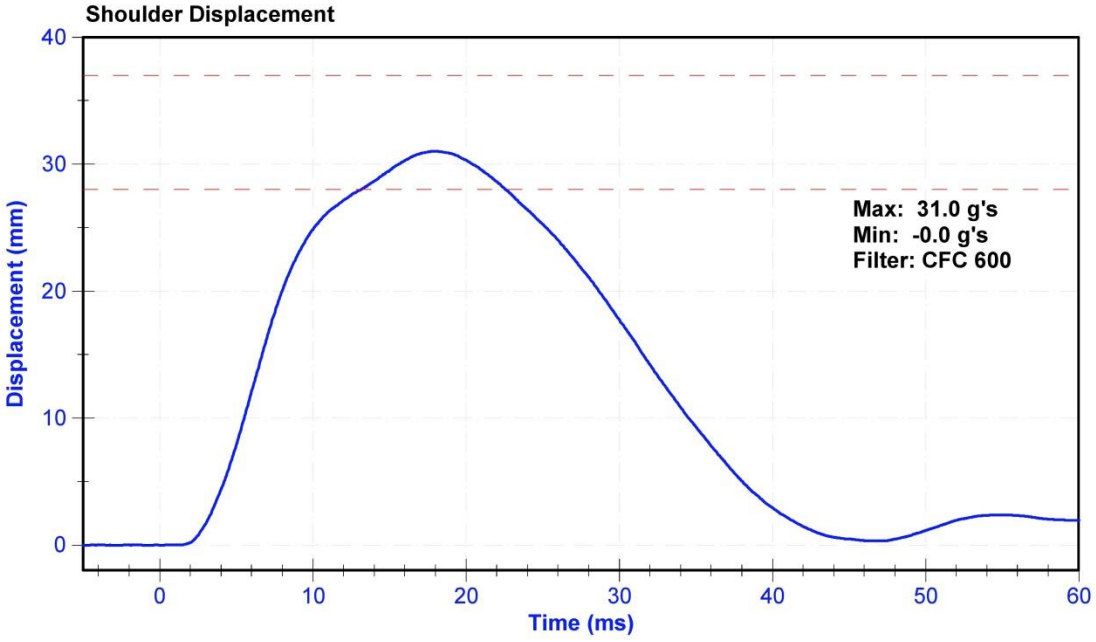
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	15.1	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	31.0	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.7	Pass

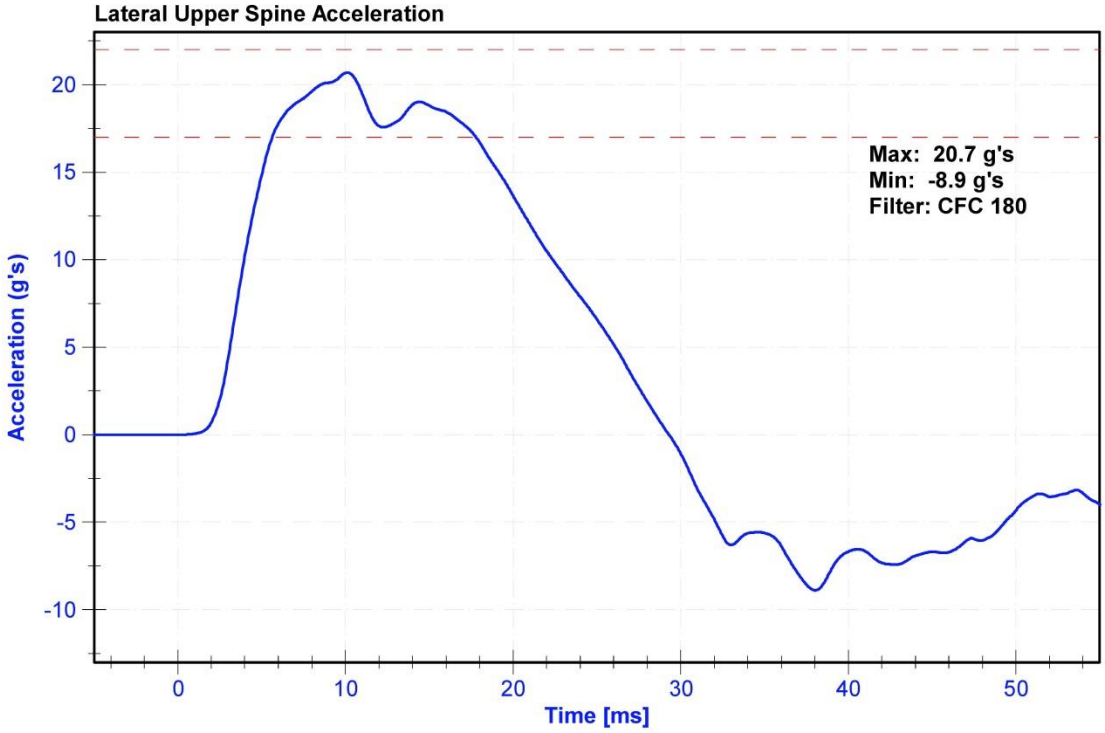
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Shoulder Potentiometer	Servo 08CT1-3725	DS-8GFE	12/4/2014	12/4/2015
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/9/2014	4/9/2015

Probe Acceleration




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 31.0 g's
Min: -0.0 g's
Filter: CFC 600
0
10
20
30
40
50
60


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 20.7 g's
Min: -8.9 g's
Filter: CFC 180
-10
-5
0
5
10
15
20
30
40
50

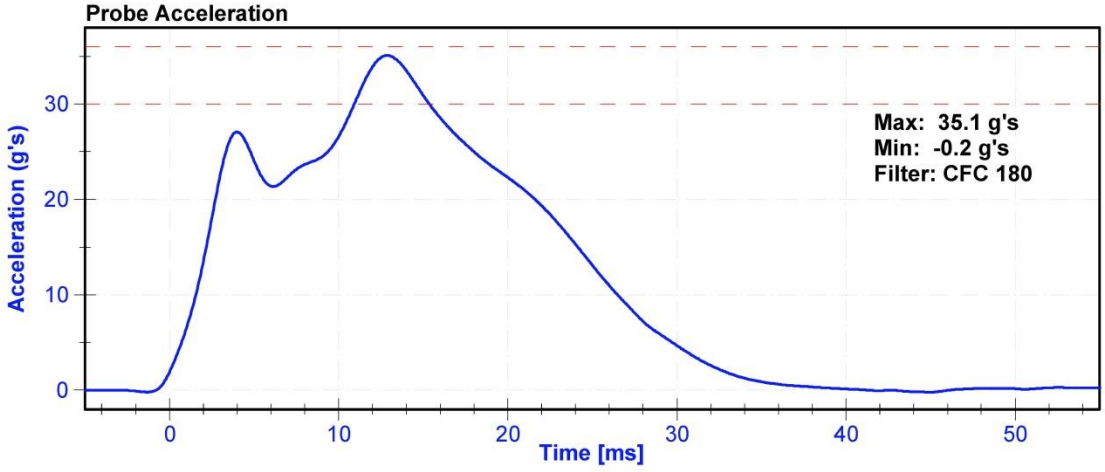
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

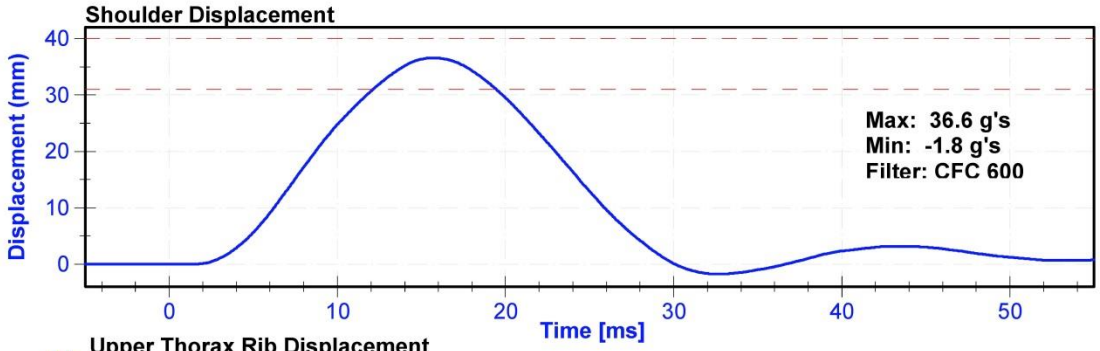
Results

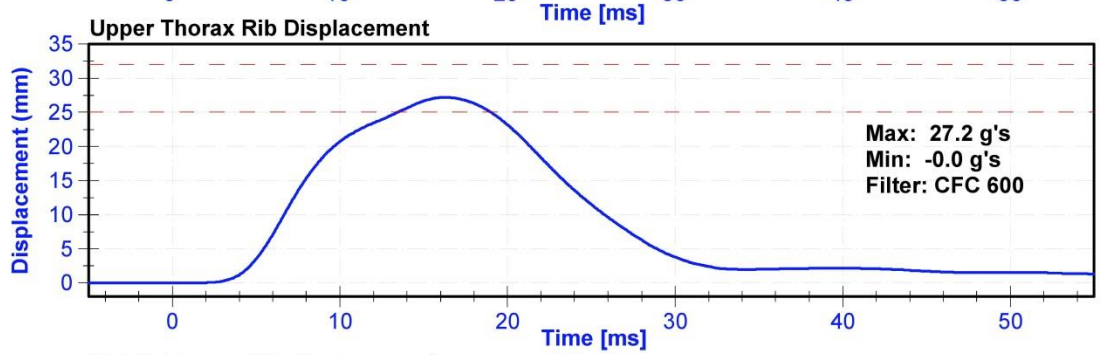
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	15.1	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	35.1	Pass
Lateral Upper Spine Acceleration	34	43	g's	42.6	Pass
Lateral Lower Spine Acceleration	29	37	g's	36.4	Pass
Shoulder Deflection	31	40	mm	36.6	Pass
Upper Thorax Rib Deflection	25	32	mm	27.2	Pass
Mid Thorax Rib Deflection	30	36	mm	31.0	Pass
Lower Thorax Rib Deflection	32	38	mm	32.4	Pass

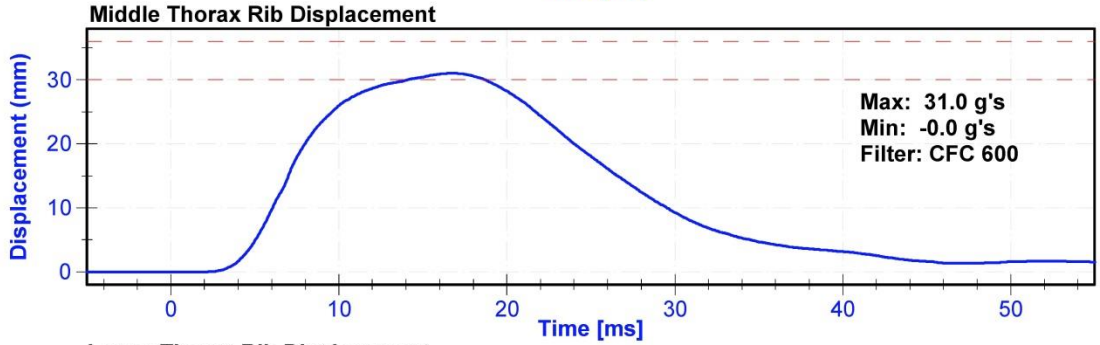
Transducer Calibrations

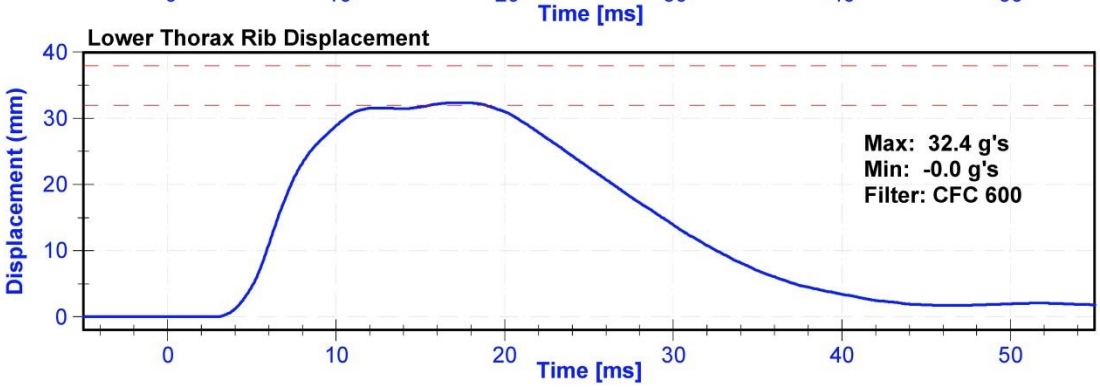
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/9/2014	4/9/2015
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/9/2014	4/9/2015
Shoulder Potentiometer	Servo 08CT1-3725	DS-8GFE	12/4/2014	12/4/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	8/6/2014	8/6/2015
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	8/6/2014	8/6/2015
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	8/6/2014	8/6/2015

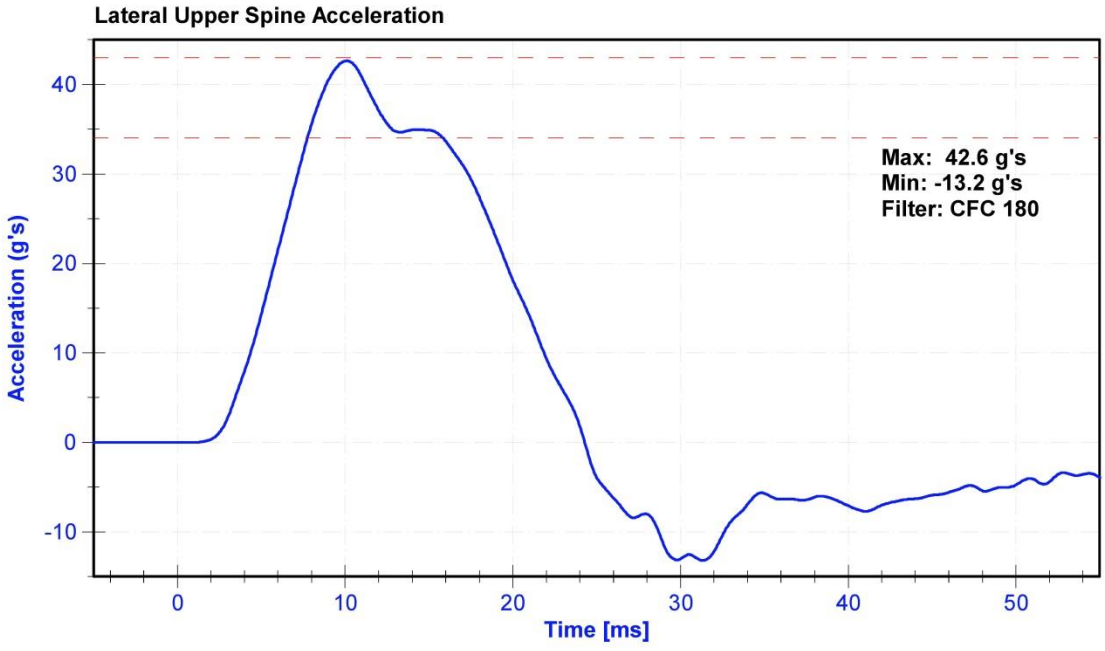


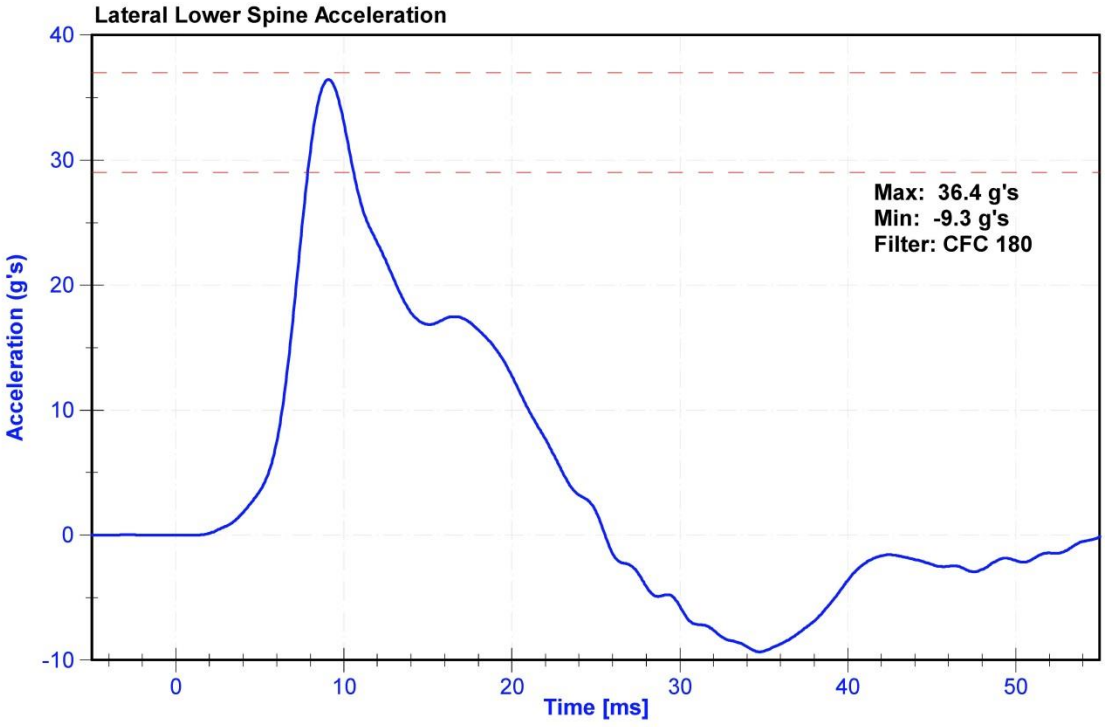

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 36.6 g's
Min: -1.8 g's
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.2 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.0 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.4 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 42.6 g's
Min: -13.2 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 36.4 g's
Min: -9.3 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

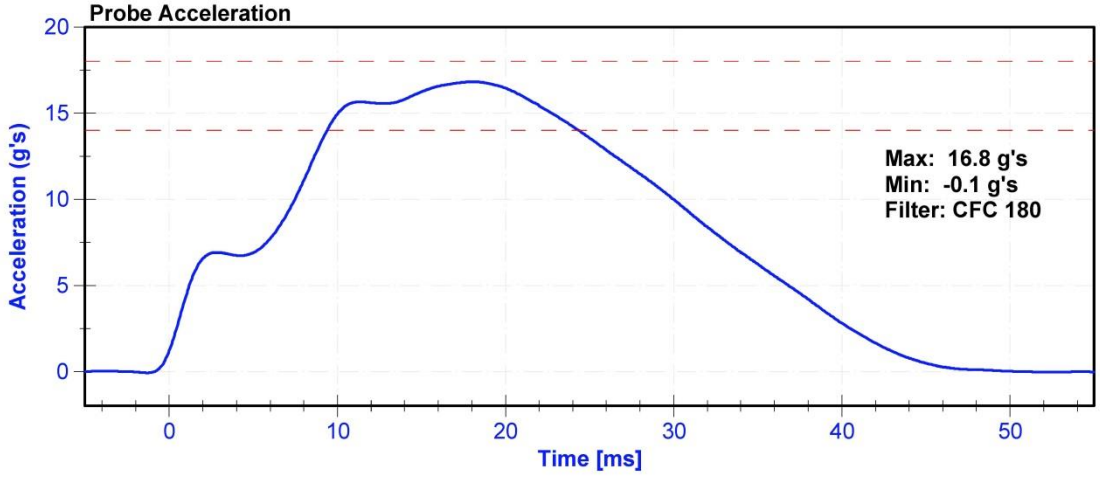
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	303	Laboratory Supervisor	M.Goehle

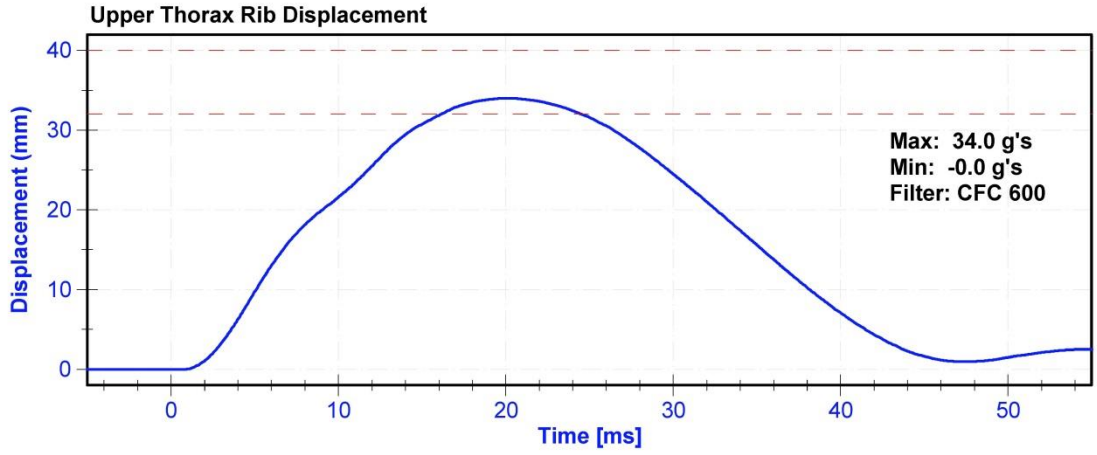
Results

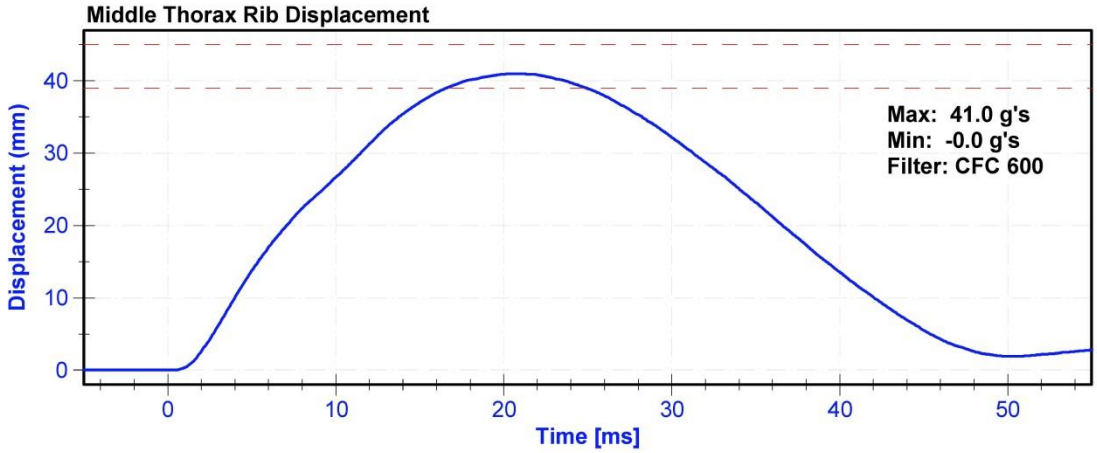
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.2	Pass
Humidity	10	70	%	15.3	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	14	18	g's	16.8	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.1	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.2	Pass
Upper Thorax Rib Deflection	32	40	mm	34.0	Pass
Middle Thorax Rib Deflection	39	45	mm	41.0	Pass
Lower Thorax Rib Deflection	35	43	mm	39.5	Pass

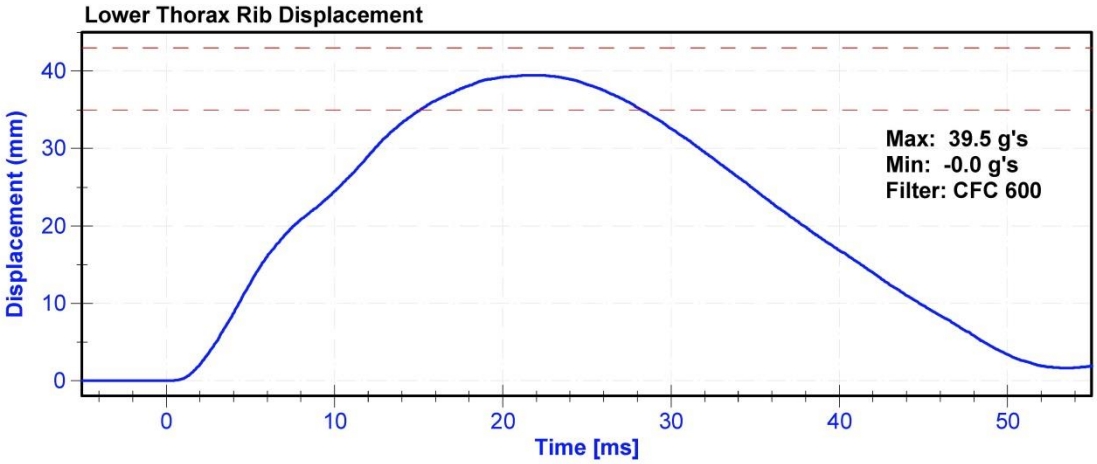
Transducer Calibrations

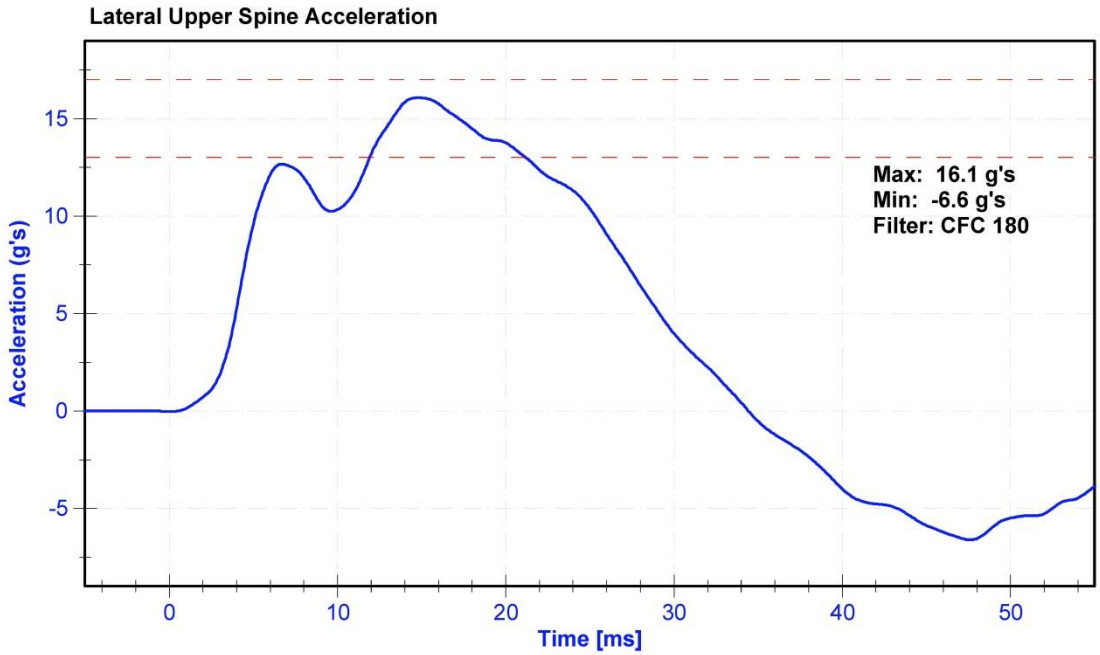
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/9/2014	4/9/2015
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/9/2014	4/9/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	8/6/2014	8/6/2015
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	8/6/2014	8/6/2015
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	8/6/2014	8/6/2015

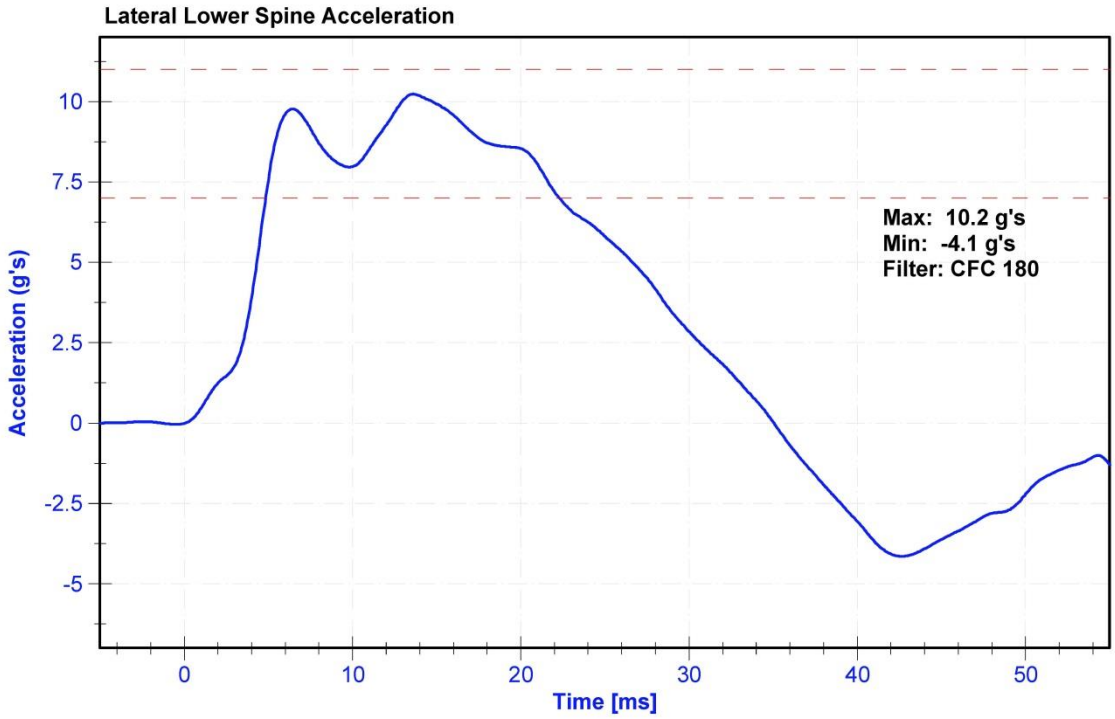



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.0 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.0 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.5 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 16.1 g's
Min: -6.6 g's
Filter: CFC 180
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
Time [ms]


Lateral Lower Spine Acceleration
Max: 10.2 g's
Min: -4.1 g's
Filter: CFC 180
Acceleration (g's)
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
Time [ms]

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

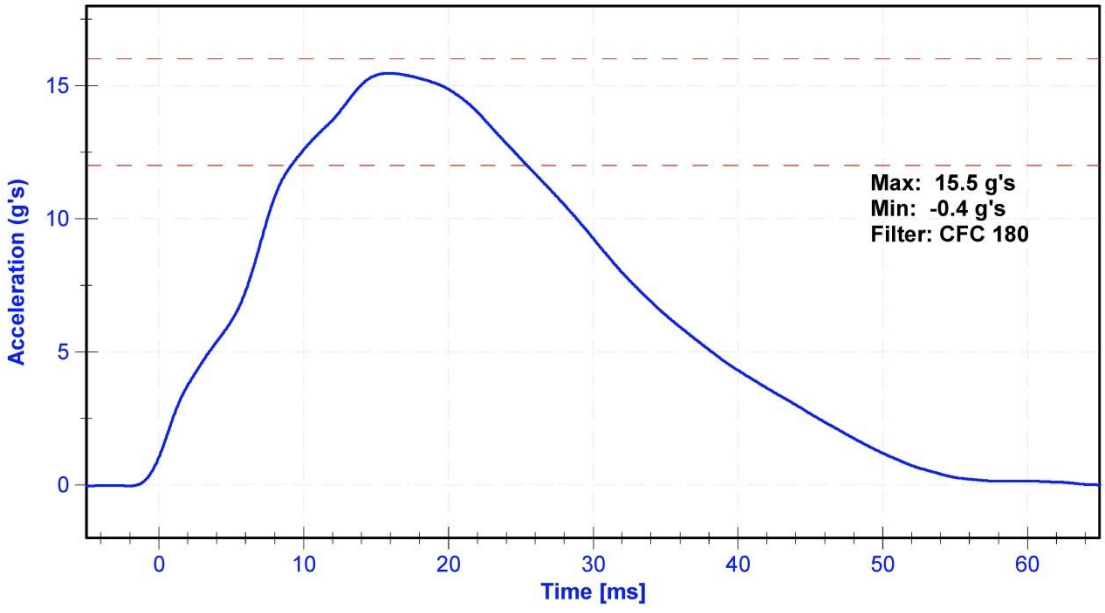
Results

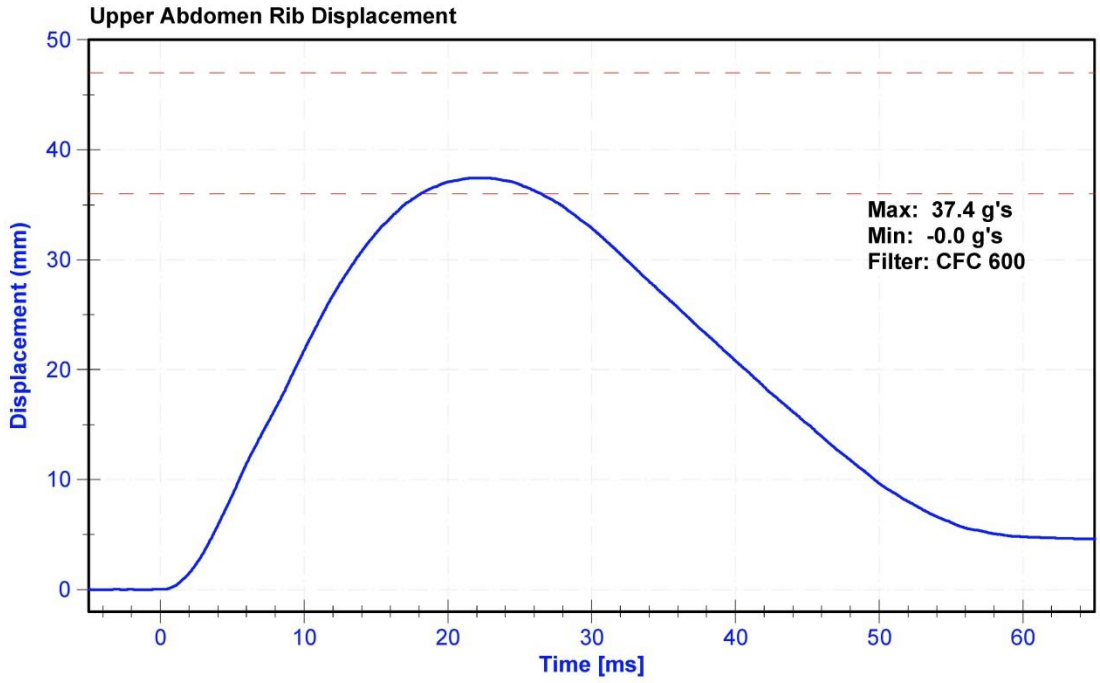
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	14.9	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	12	16	g's	15.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.8	Pass
Upper Abdomen Rib Deflection	36	47	mm	37.4	Pass
Lower Abdomen Rib Deflection	33	44	mm	38.4	Pass

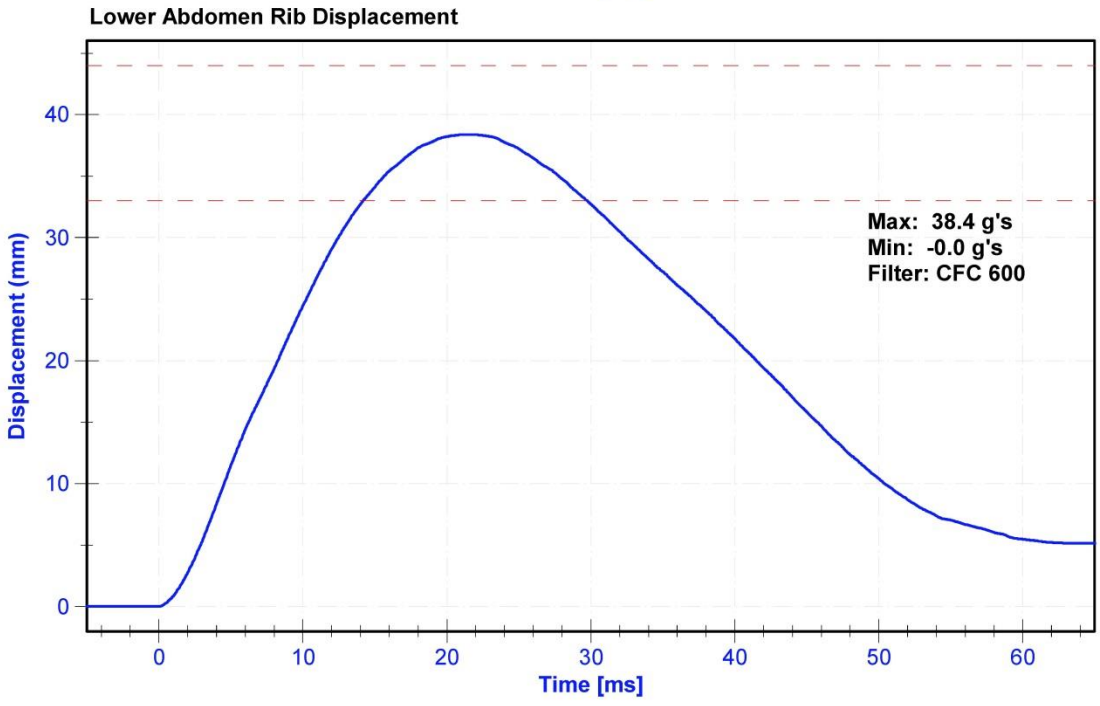
Transducer Calibrations

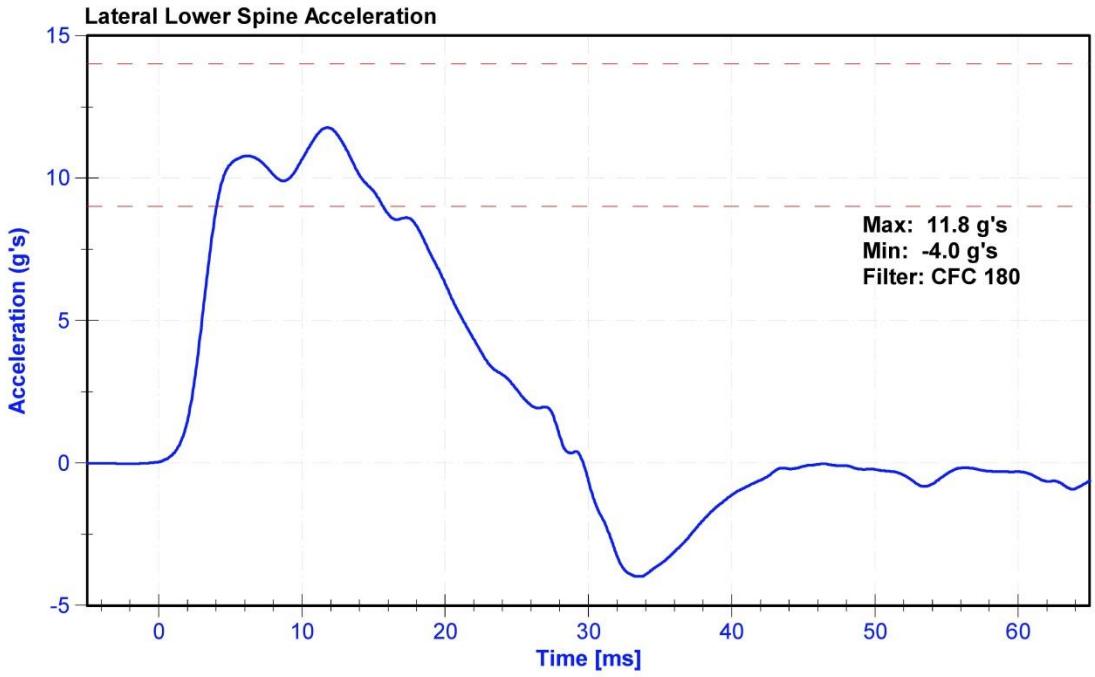
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/9/2014	4/9/2015
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-1274GFE	8/6/2014	8/6/2015
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-1285GFE	8/6/2014	8/6/2015

Probe Acceleration




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.4 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.4 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
60
Time [ms]
Max: 11.8 g's
Min: -4.0 g's
Filter: CFC 180

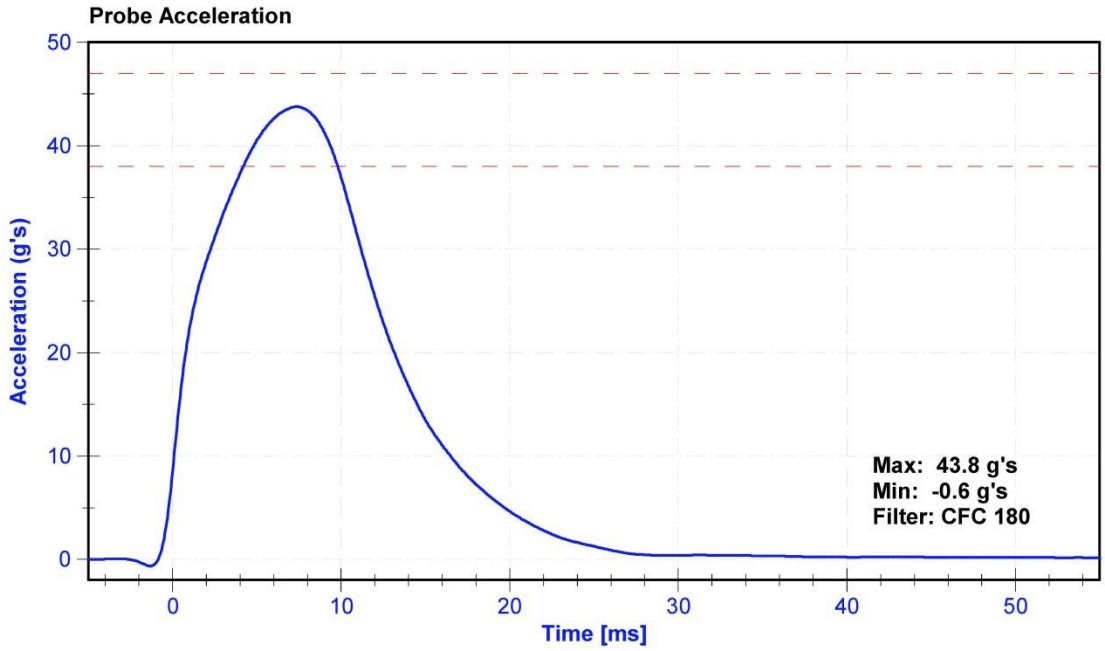
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

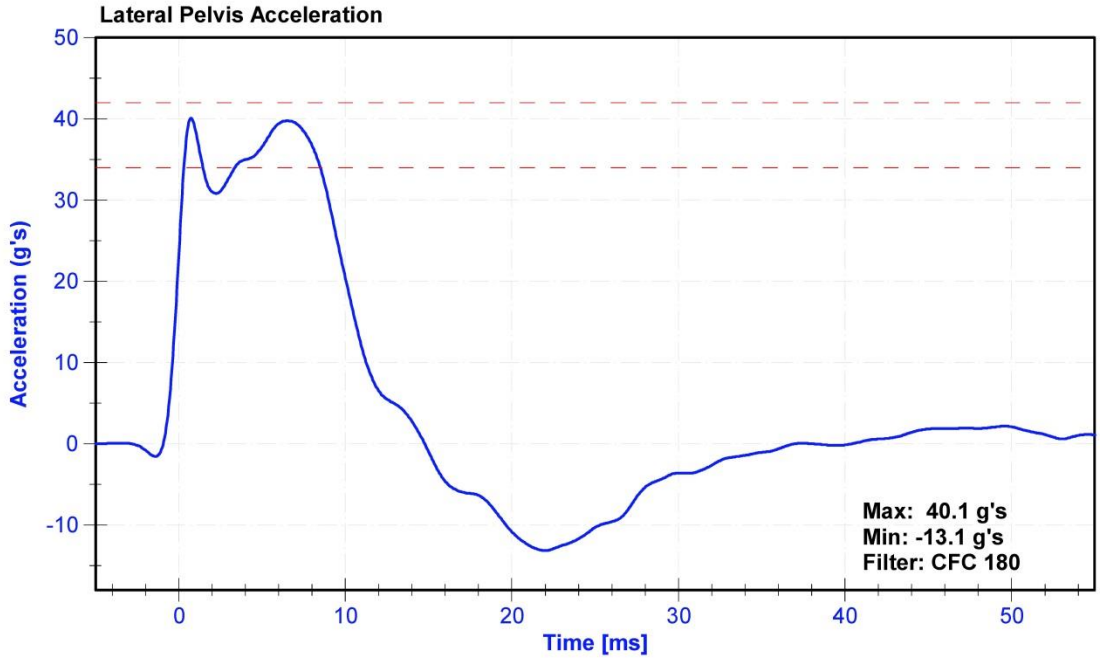
Results

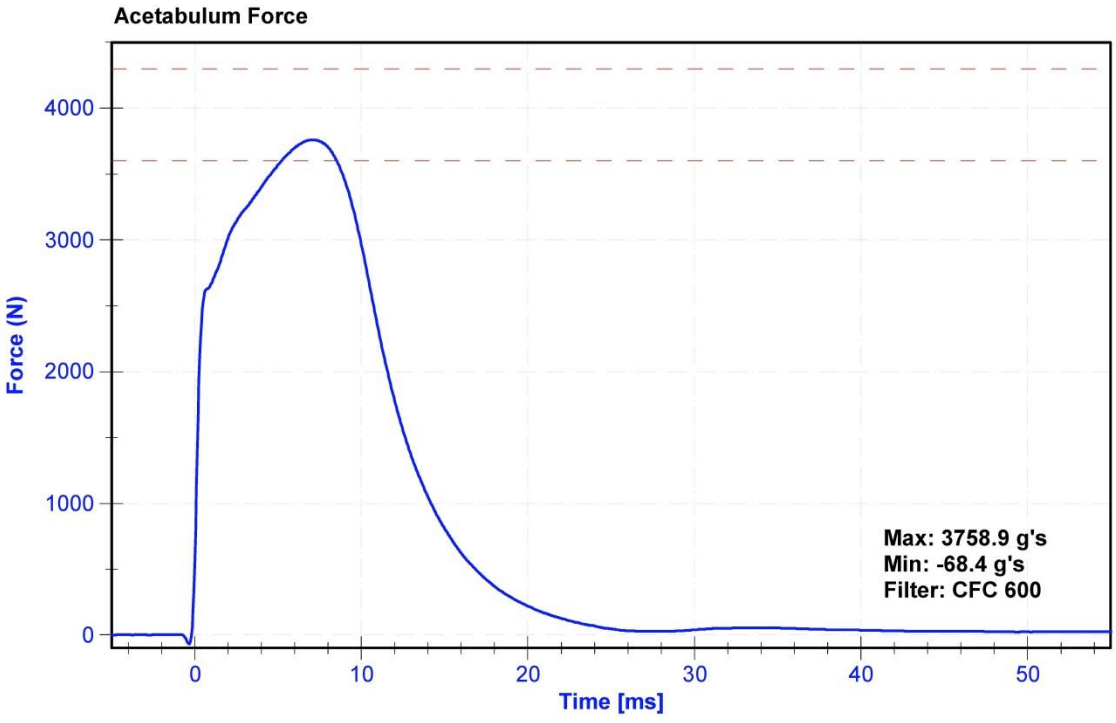
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	16.1	Pass
Velocity	6.6	6.8	m/s	6.61	Pass
Probe Acceleration	38	47	g's	43.8	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.8	Pass
Acetabulum Force	3,600	4,300	N	3758.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	1/23/2015	7/24/2015
Acetabulum Load Cell	Denton IF-520	LC-236Fy	5/13/2014	5/13/2015
Certification Plug	Humanetics	47103	10/15/2011	N/A
Crash Test Plug	Humanetics	47100	10/15/2011	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 40.1 g's
Min: -13.1 g's
Filter: CFC 180


Acetabulum Force
Force (N)
4000
3000
2000
1000
0
0
10
20
30
40
50
Time [ms]
Max: 3758.9 g's
Min: -68.4 g's
Filter: CFC 600

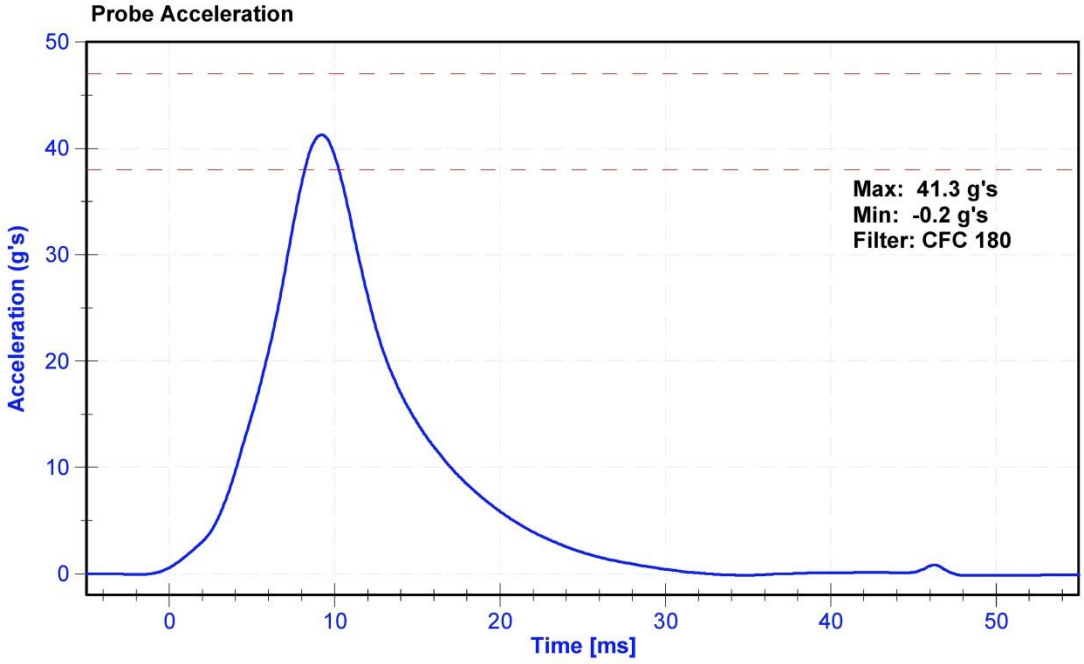
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

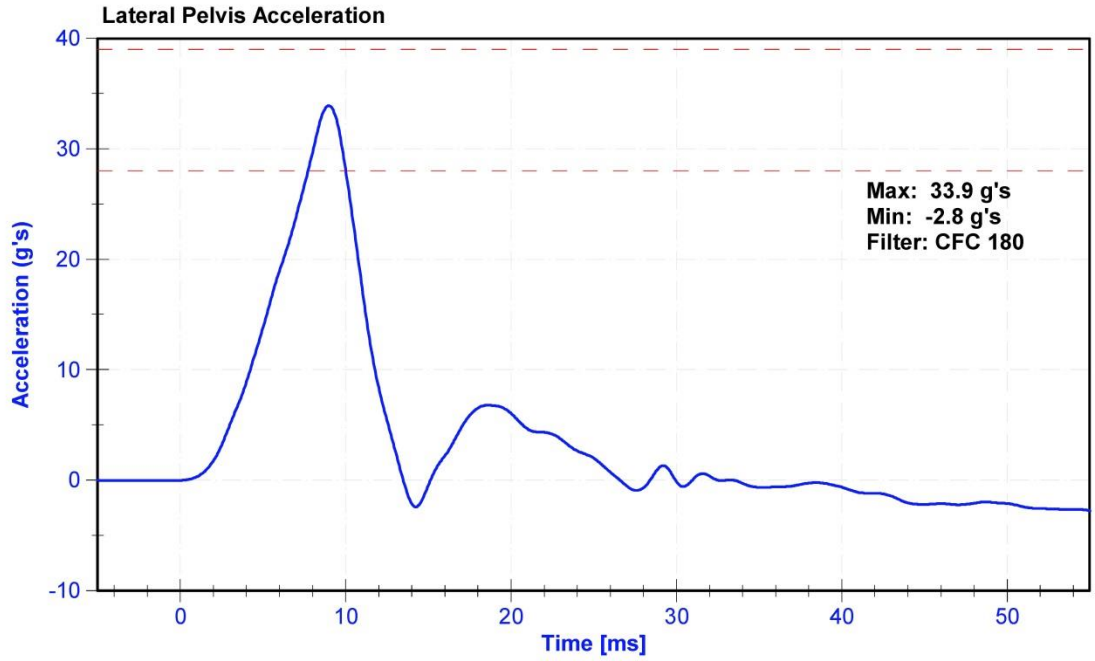
Results

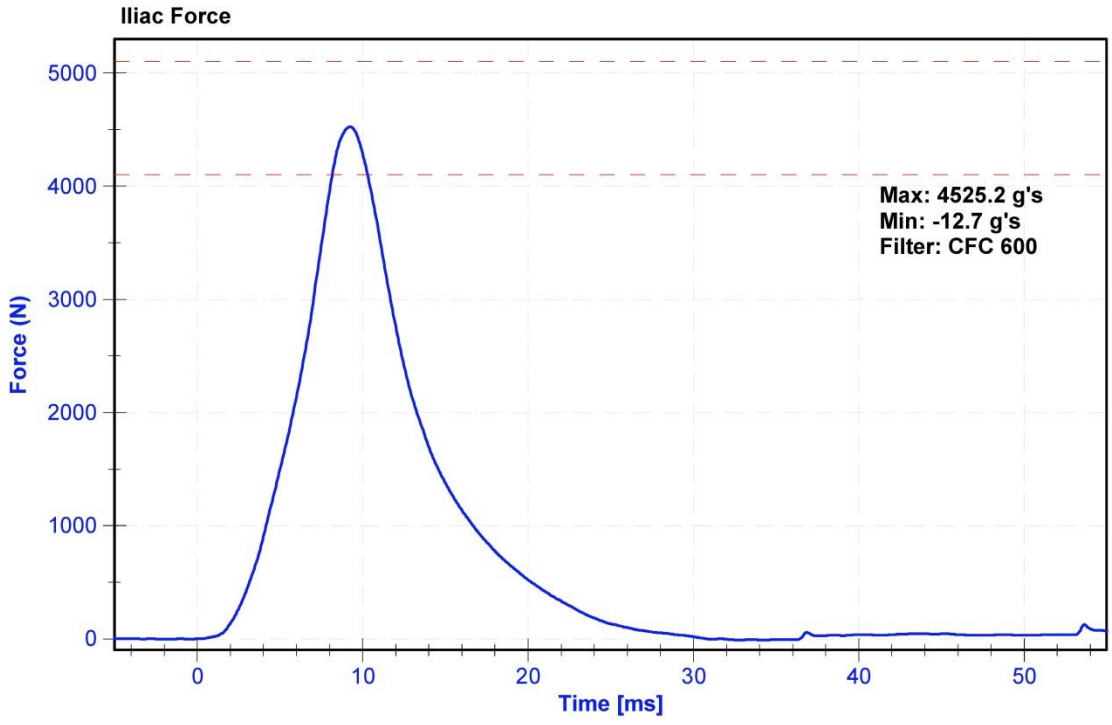
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	17.1	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	36	45	g's	41.3	Pass
Lateral Pelvis Acceleration	28	39	g's	33.9	Pass
Iliac Force	4,100	5,100	N	4525.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	1/23/2015	7/24/2015
Iliac Load Cell	DENTON 3228J	LC-280Fy	5/14/2014	5/14/2015




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 33.9 g's
Min: -2.8 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4525.2 g's
Min: -12.7 g's
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

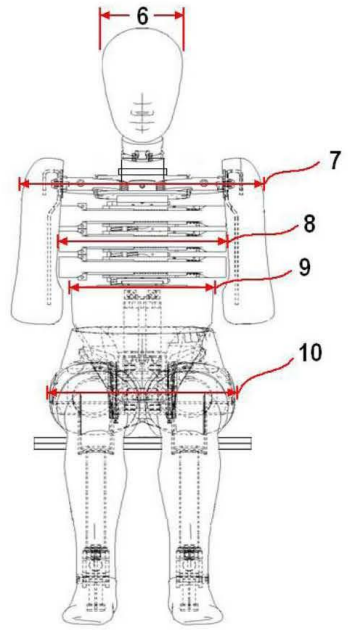
SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

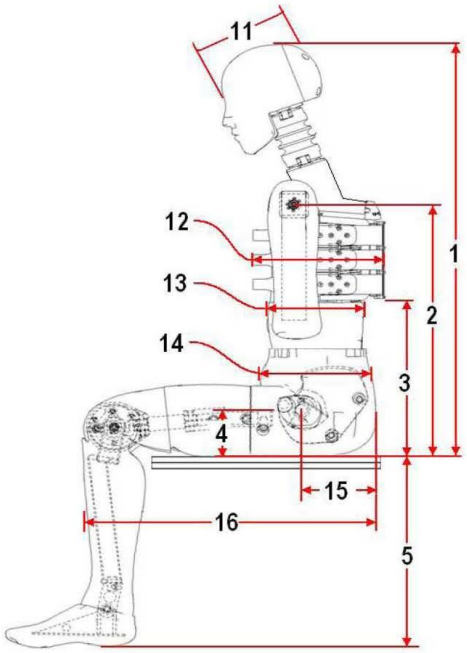
External Measurements - EuroSID-2re

Technician: M.Hartung Date: 2/13/2015

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	912	Pass
2	Seat to Shoulder Joint	558	572	562	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	349	Pass
4	Seat to Hip Joint (center of bolt)	97	103	99	Pass
5	Sole to Seat, Sitting	333	451	416	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	476	Pass
8	Thorax Width	322	332	328	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	368	Pass
11	Head Depth	196	206	199	Pass
12	Thorax Depth	262	272	269	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	154	Pass
16	Back of Buttocks to Front Knee	597	615	602	Pass

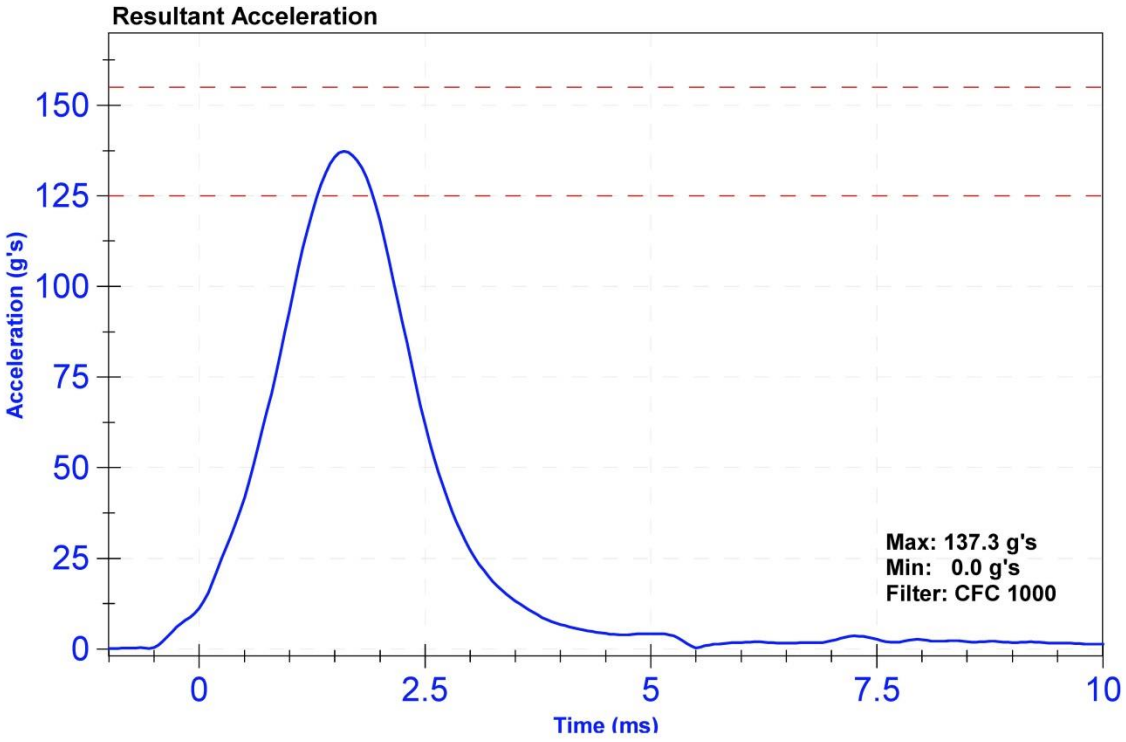
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

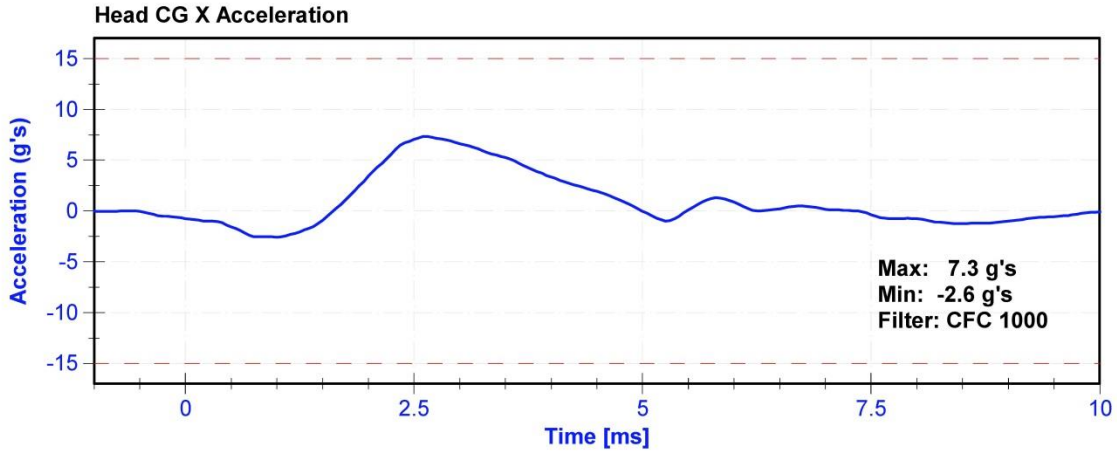
Results

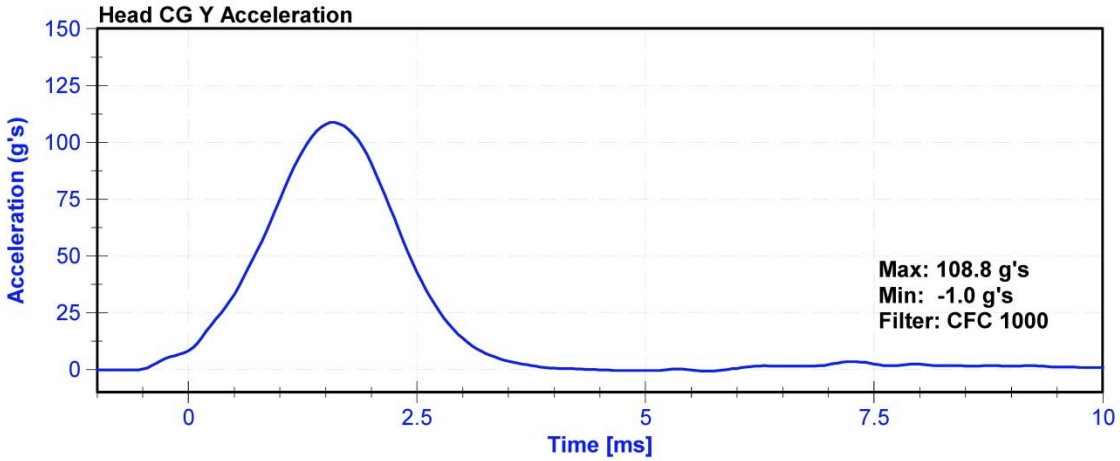
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	16.2	Pass
Resultant Acceleration	125	155	g's	137.3	Pass
Oscillation	0	15	%	3.05	Pass
Fore-Aft Acceleration	-15	15	g's	7.3	Pass

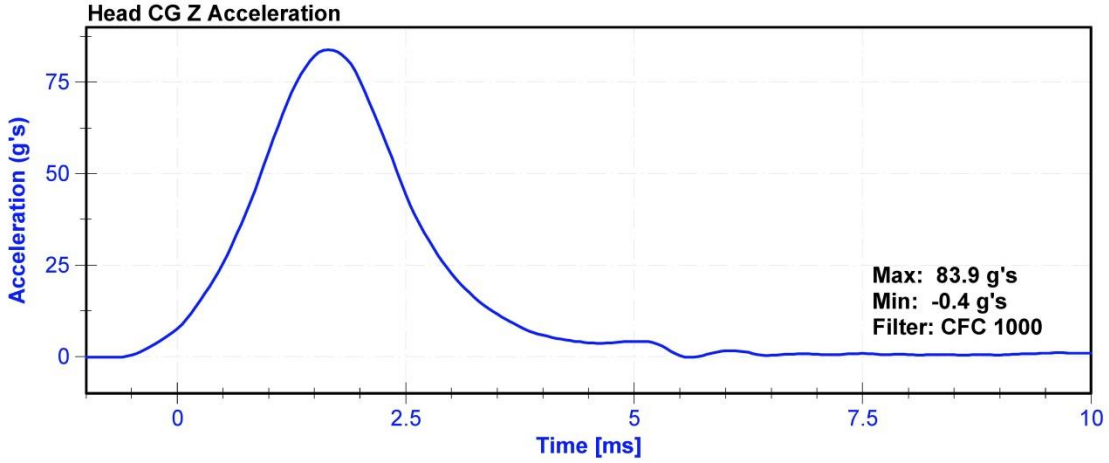
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	8/29/2014	2/27/2015
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	8/29/2014	2/27/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	8/29/2014	2/27/2015




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 7.3 g's
Min: -2.6 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
150
125
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]
Max: 108.8 g's
Min: -1.0 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
75
50
25
0
0
2.5
5
7.5
10
Time [ms]
Max: 83.9 g's
Min: -0.4 g's
Filter: CFC 1000

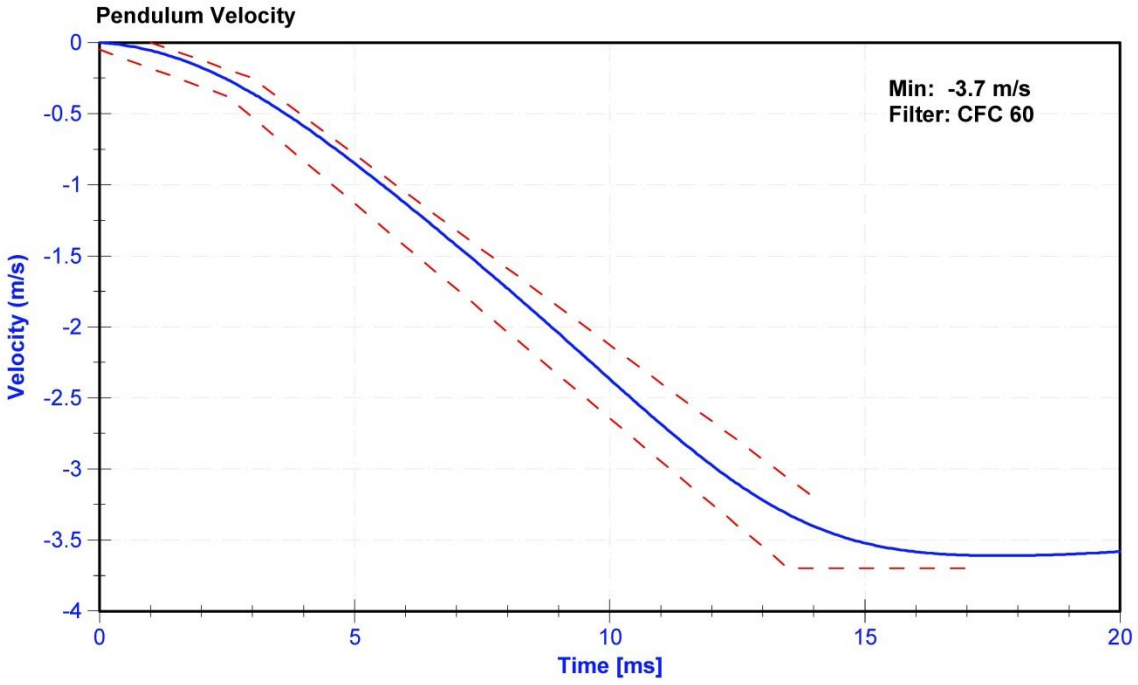
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

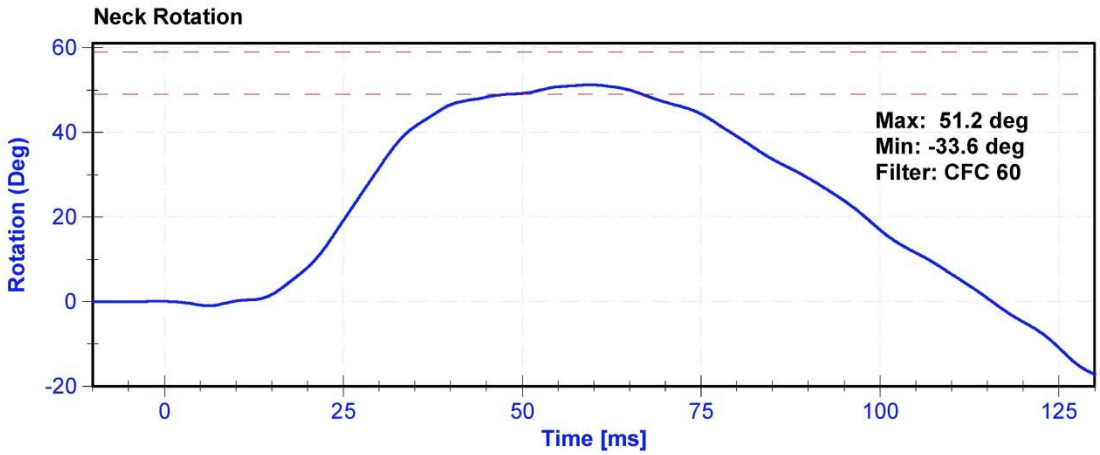
Results

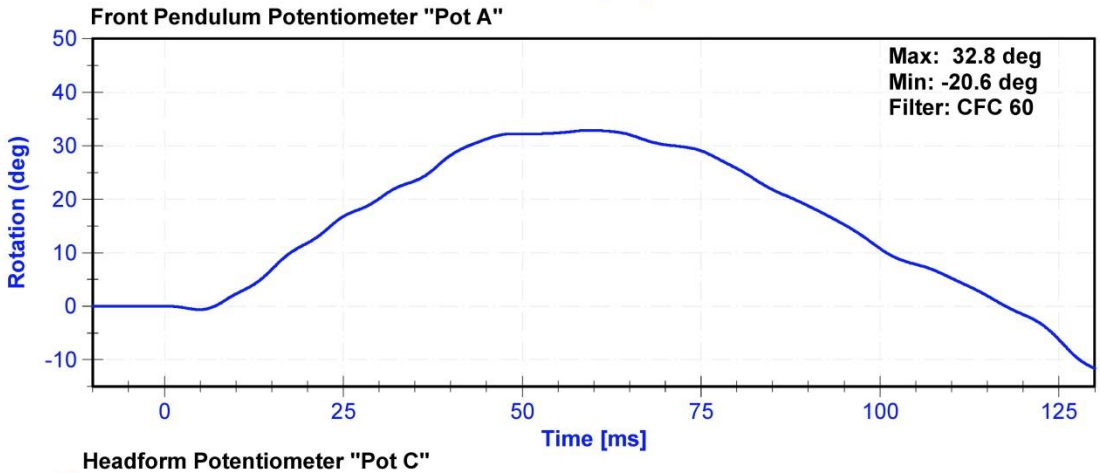
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	17.2	Pass
Velocity	3.3	3.5	m/s	3.43	Pass
Lateral Neck Rotation	49	59	deg	51.2	Pass
Time at Maximum Rotation	54	66	ms	59.6	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.1	Pass

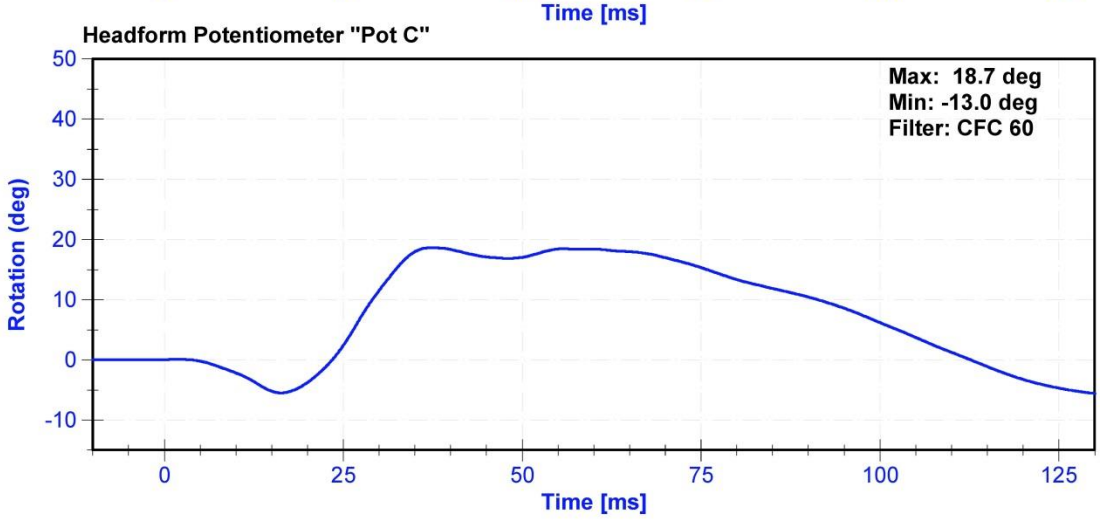
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Front Pendulum Potentiometer	SP22G	DS-094	11/13/2014	11/13/2015
Headform Potentiometer	SP22G	DS-095	11/13/2014	11/13/2015




Neck Rotation
Rotation (Deg)
Time [ms]
Max: 51.2 deg
Min: -33.6 deg
Filter: CFC 60


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 32.8 deg
Min: -20.6 deg
Filter: CFC 60


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 18.7 deg
Min: -13.0 deg
Filter: CFC 60

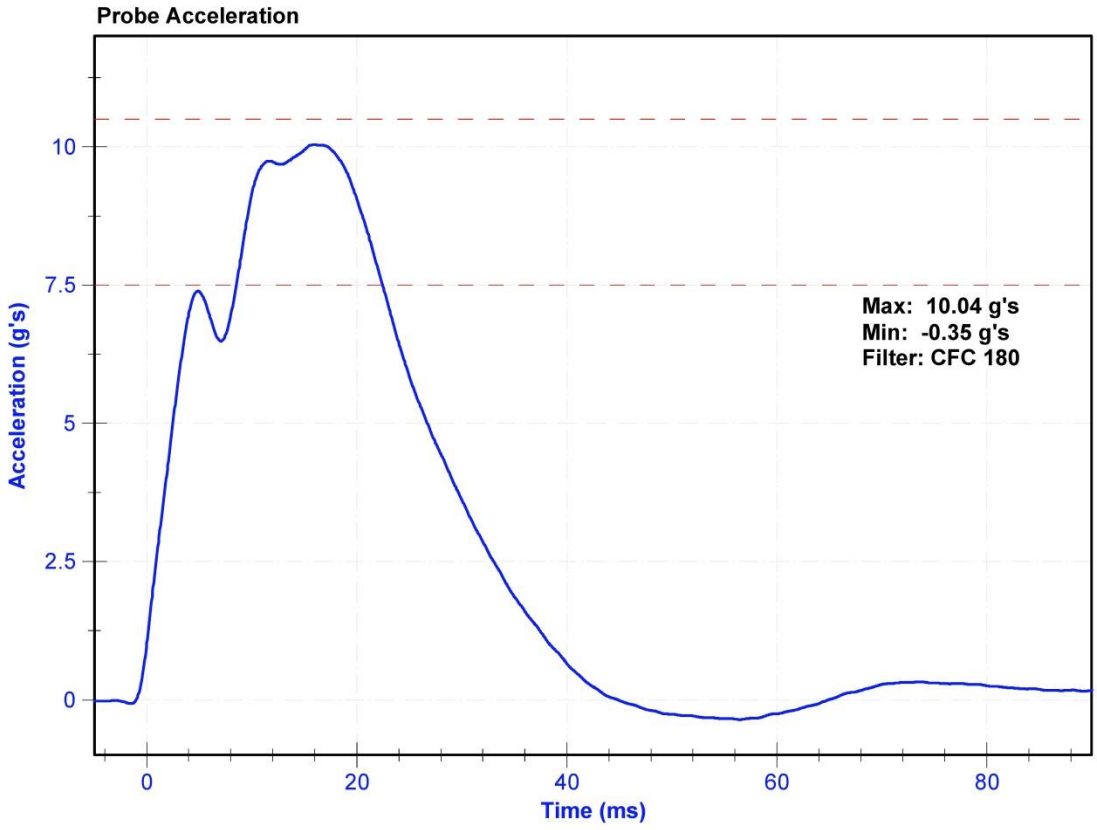
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	14.1	Pass
Velocity	4.2	4.4	m/s	4.21	Pass
Probe Acceleration	7.5	10.5	g's	10.04	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015



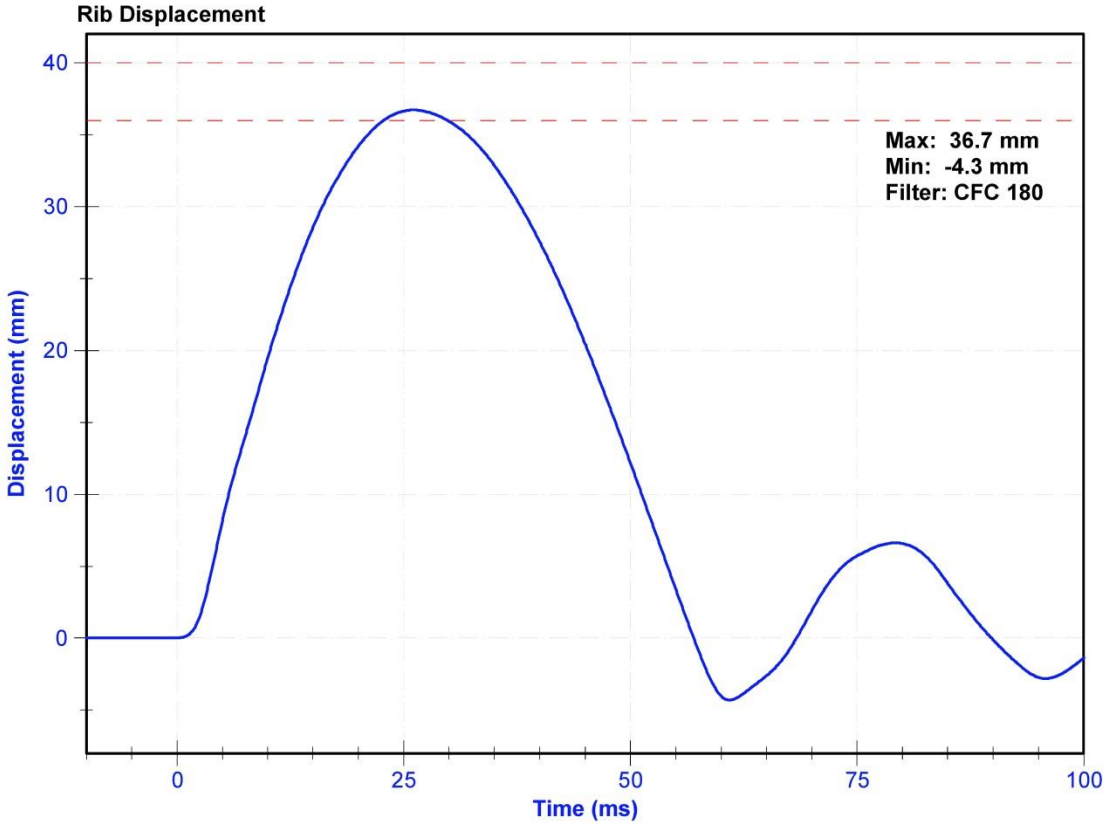
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	14.5	Pass
Rib Displacement	36	40	mm	36.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	8/4/2014	8/4/2015



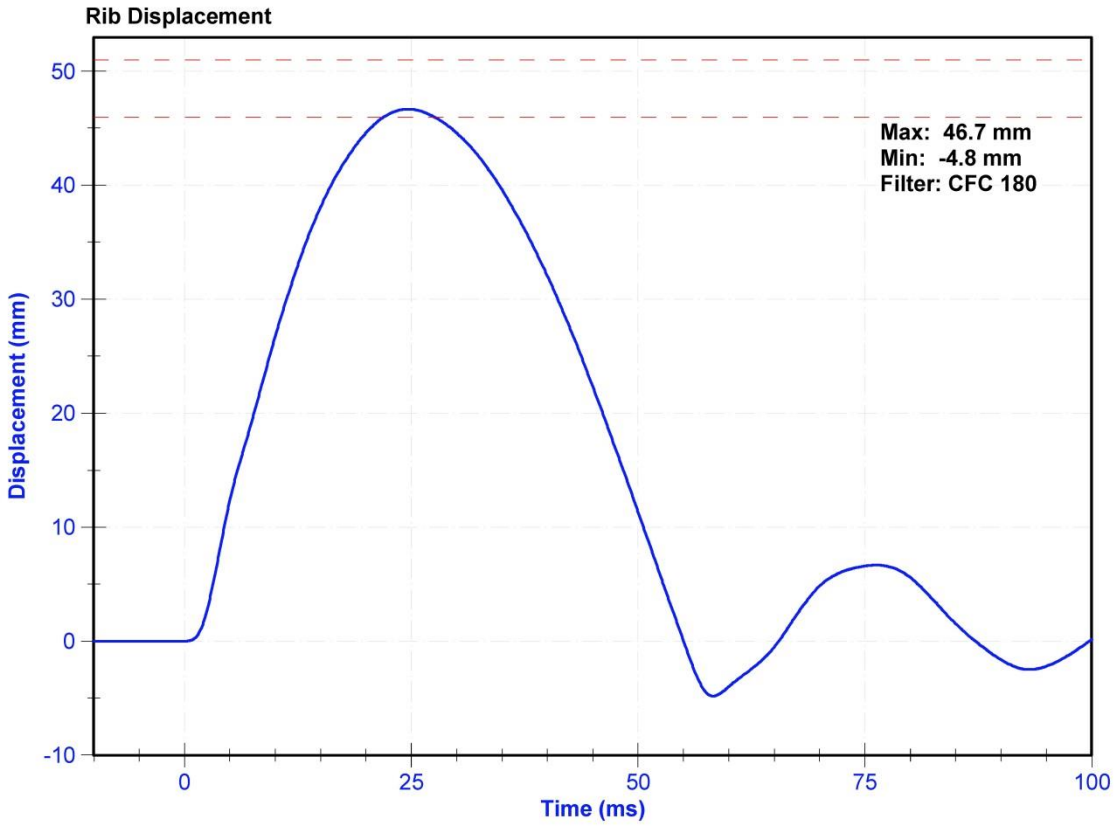
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.3	Pass
Humidity	10	70	%	14.5	Pass
Rib Displacement	46	51	mm	46.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	8/4/2014	8/4/2015



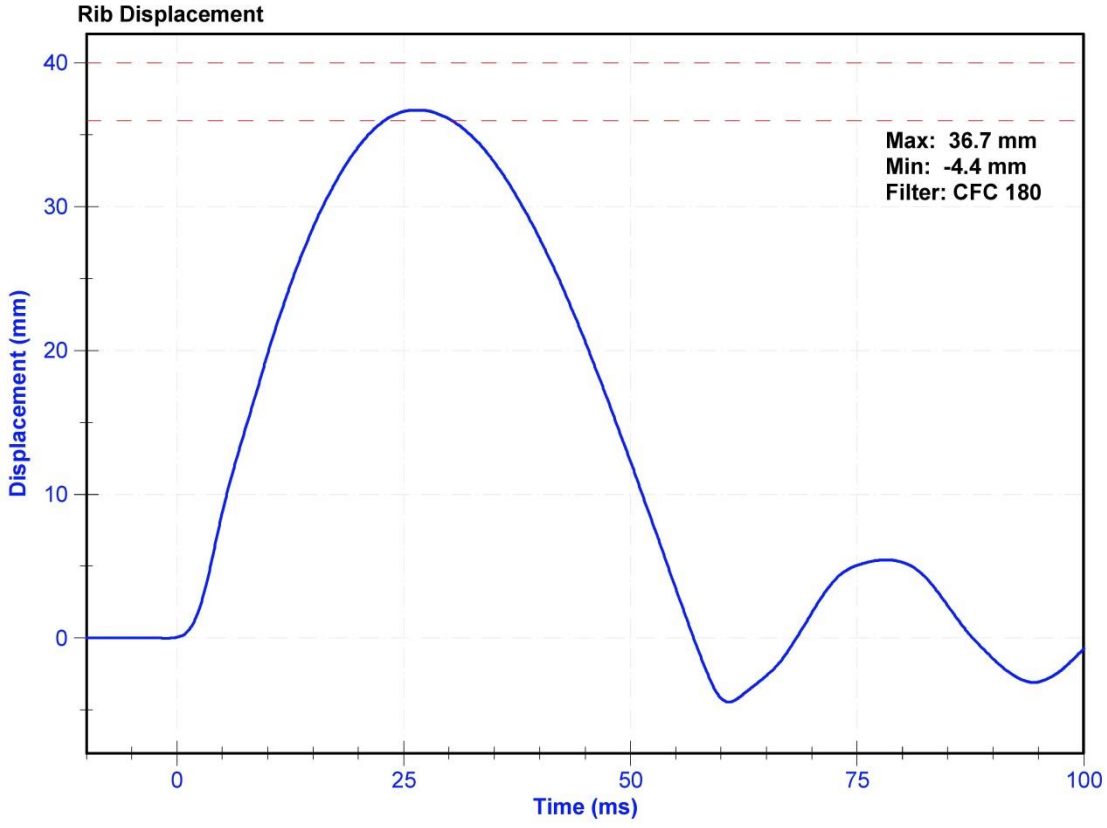
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	14.9	Pass
Rib Displacement	36	40	mm	36.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	8/4/2014	8/4/2015



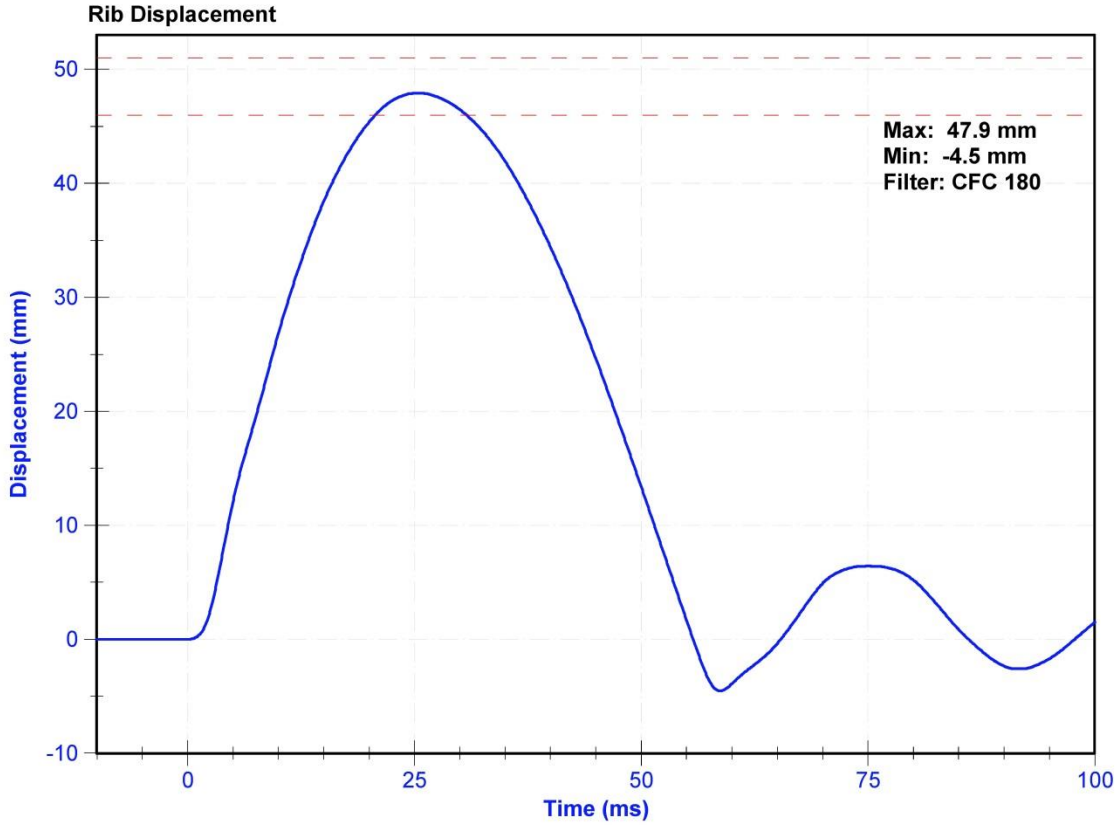
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	14.9	Pass
Rib Displacement	46	51	mm	47.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	8/4/2014	8/4/2015



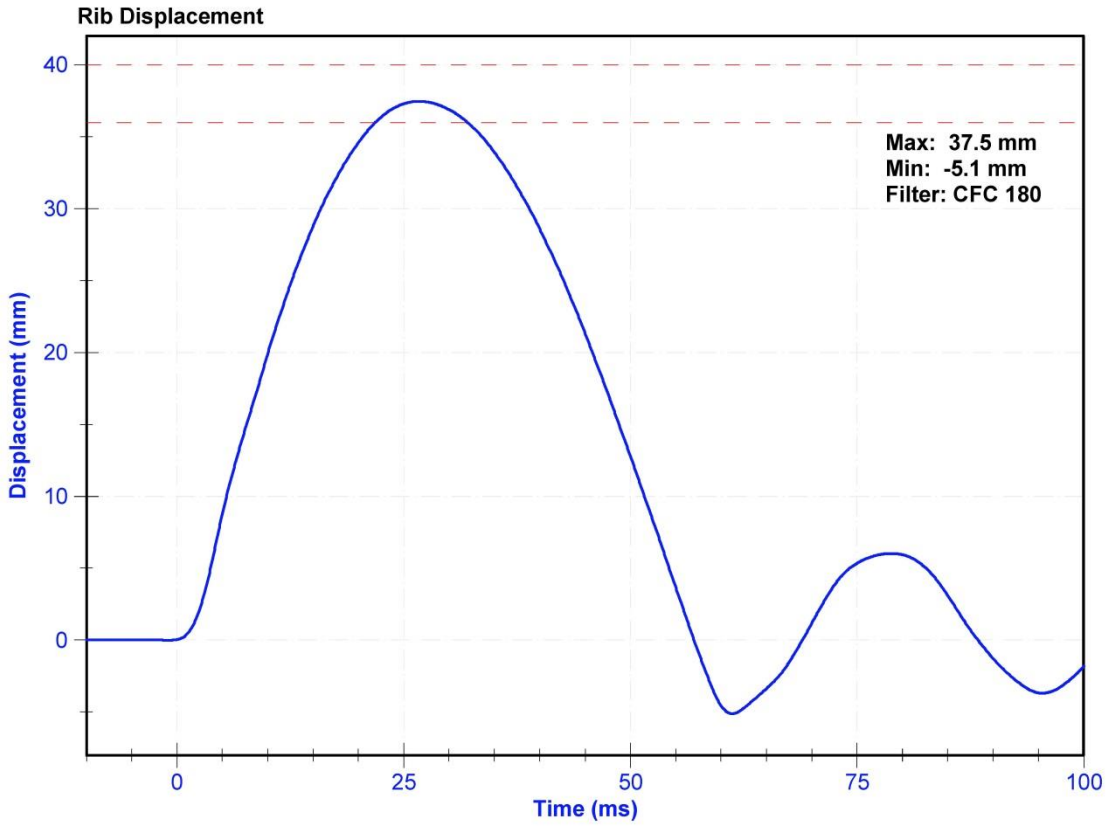
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	14.7	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	8/4/2014	8/4/2015



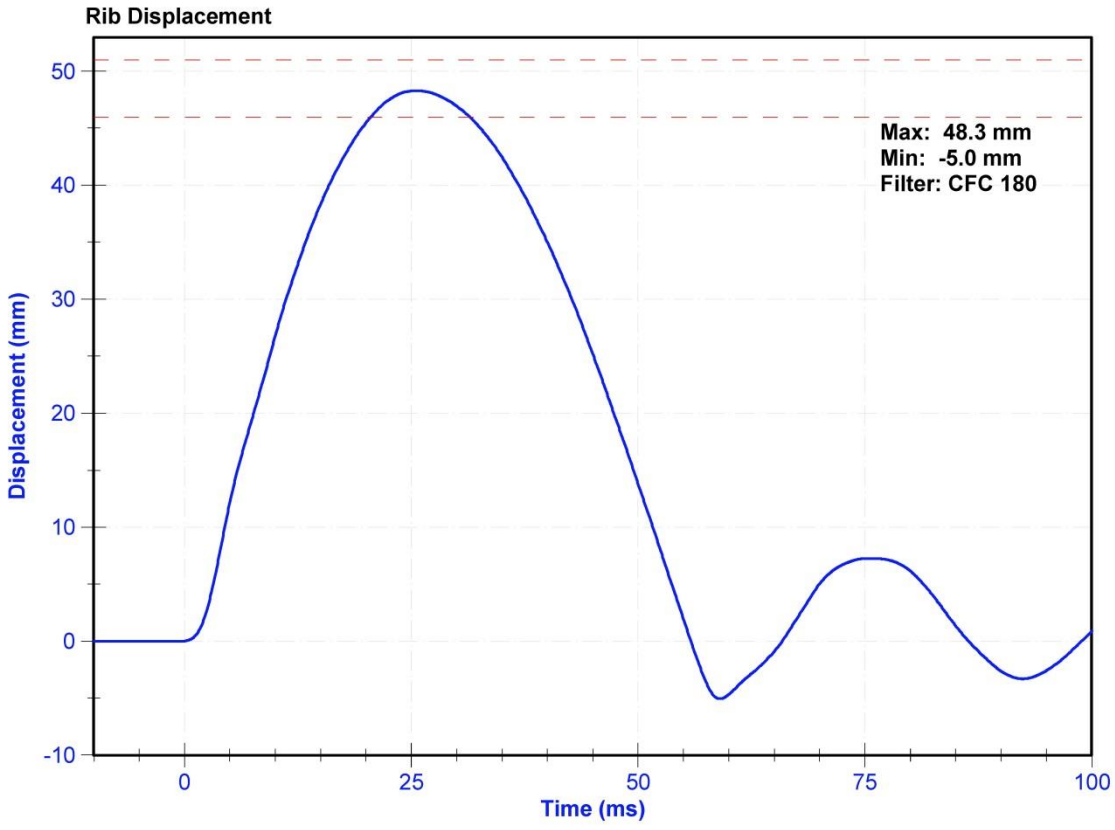
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	14.7	Pass
Rib Displacement	46	51	mm	48.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	8/4/2014	8/4/2015



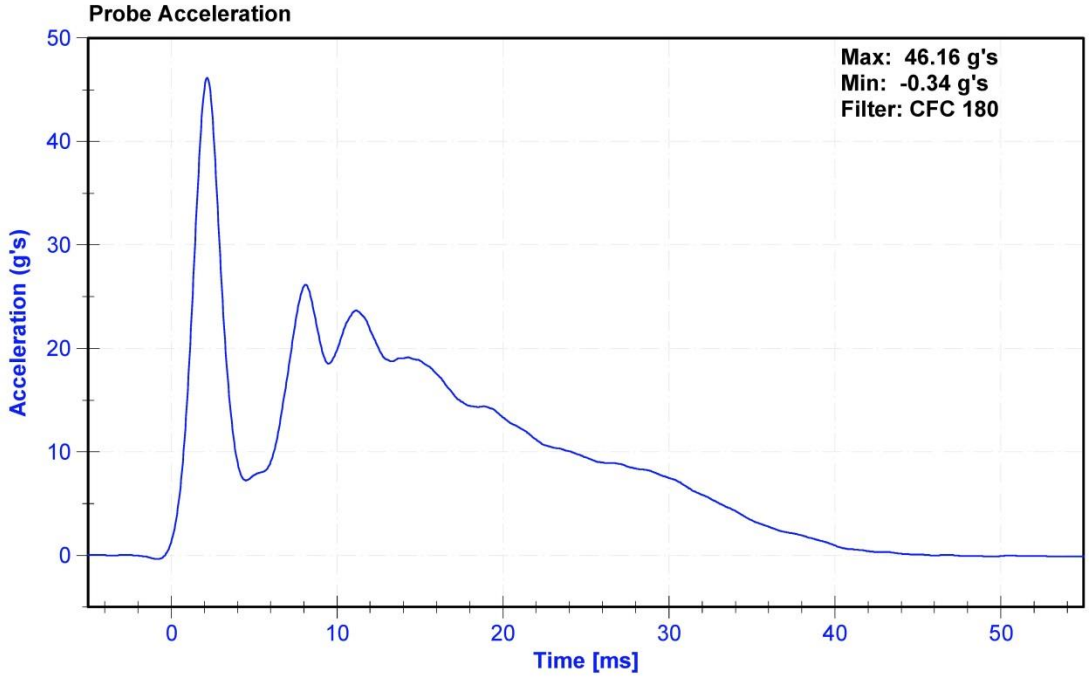
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

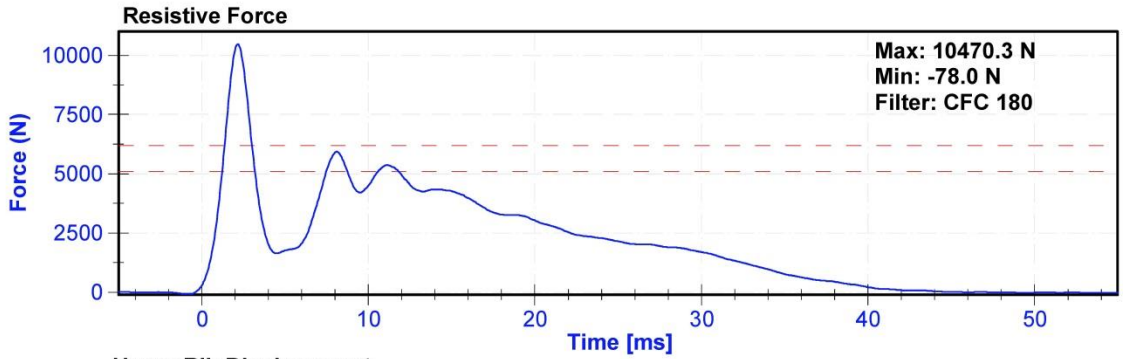
Results

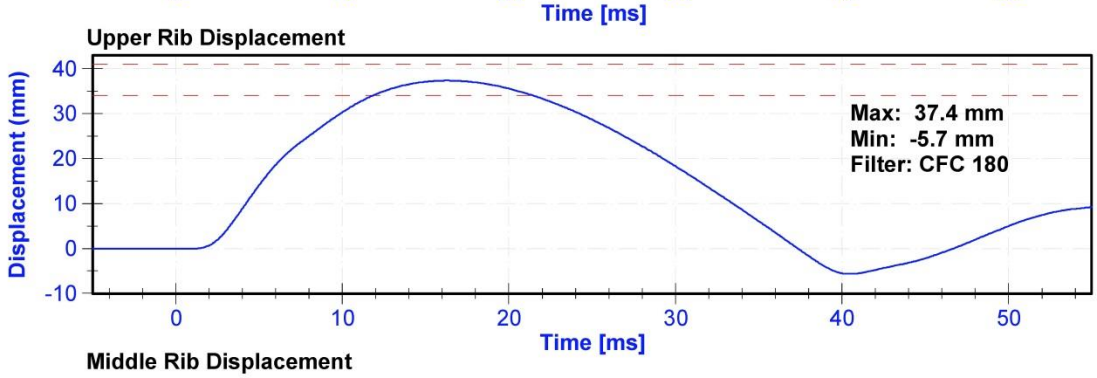
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	12.3	Pass
Velocity	5.4	6.8	m/s	5.44	Pass
Resistive Force after 6ms	5,100	6,200	N	5931.7	Pass
Upper Thorax Rib Deflection	34	41	mm	37.4	Pass
Mid Thorax Rib Deflection	37	45	mm	41.7	Pass
Lower Thorax Rib Deflection	37	44	mm	40.9	Pass

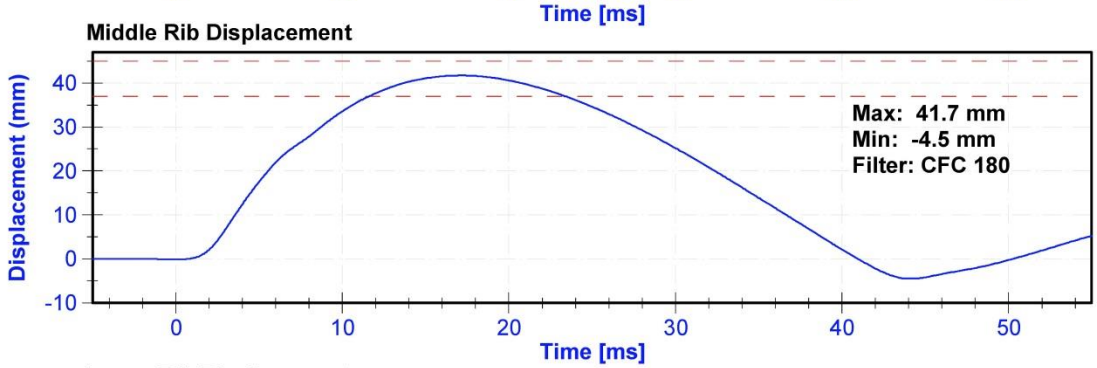
Transducer Calibrations

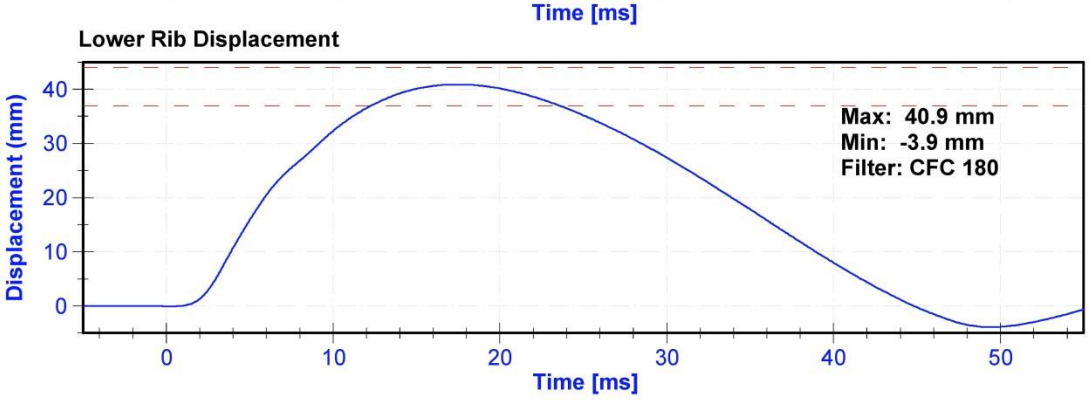
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	8/4/2014	8/4/2015
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	8/4/2014	8/4/2015
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	8/4/2014	8/4/2015




Resistive Force
Force (N)
10000
7500
5000
2500
0
0
10
20
30
40
50
Time [ms]
Max: 10470.3 N
Min: -78.0 N
Filter: CFC 180


Upper Rib Displacement
Displacement (mm)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 37.4 mm
Min: -5.7 mm
Filter: CFC 180


Middle Rib Displacement
Displacement (mm)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 41.7 mm
Min: -4.5 mm
Filter: CFC 180


Lower Rib Displacement
Displacement (mm)
40
30
20
10
0
0
10
20
30
40
50
Time [ms]
Max: 40.9 mm
Min: -3.9 mm
Filter: CFC 180

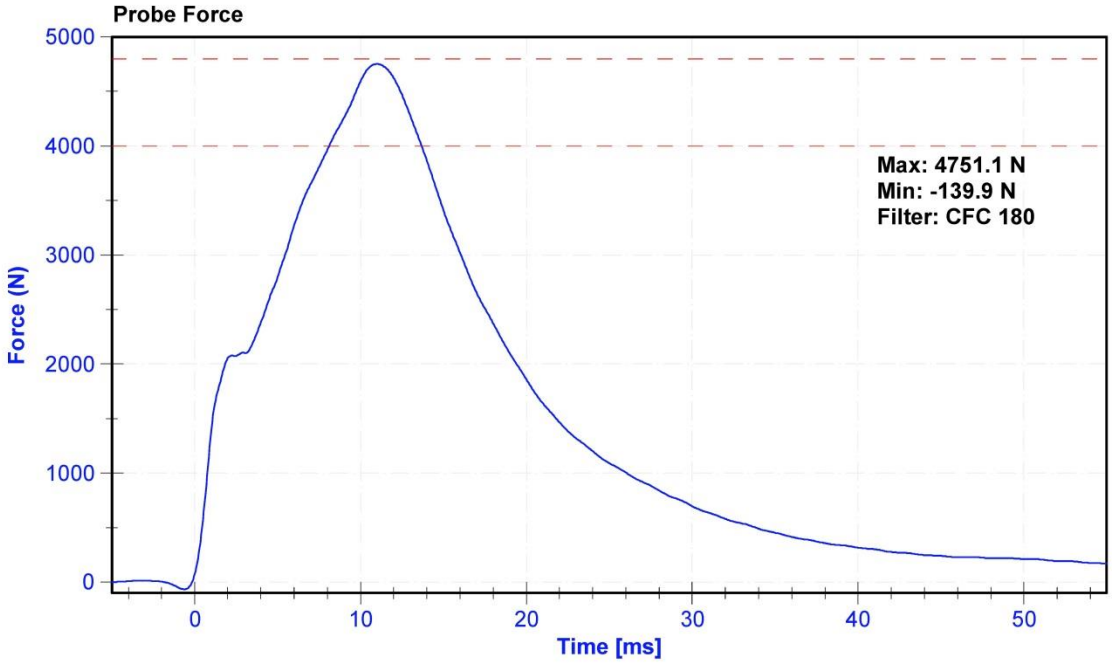
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

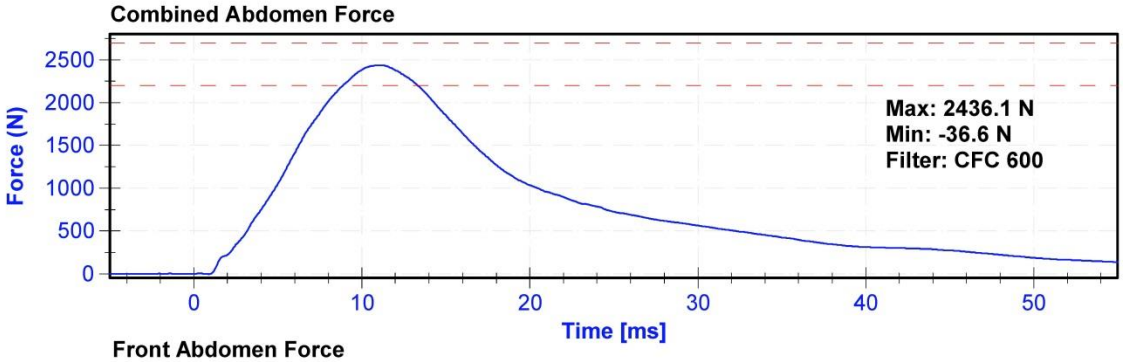
Results

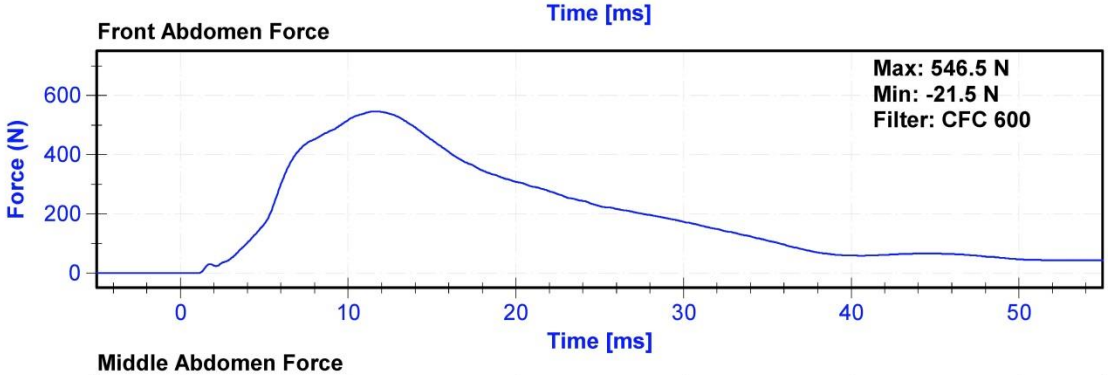
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	10.6	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2,200	2,700	N	2436.1	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.05	Pass
Resistive Probe Force	4,000	4,800	N	4751.1	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.00	Pass

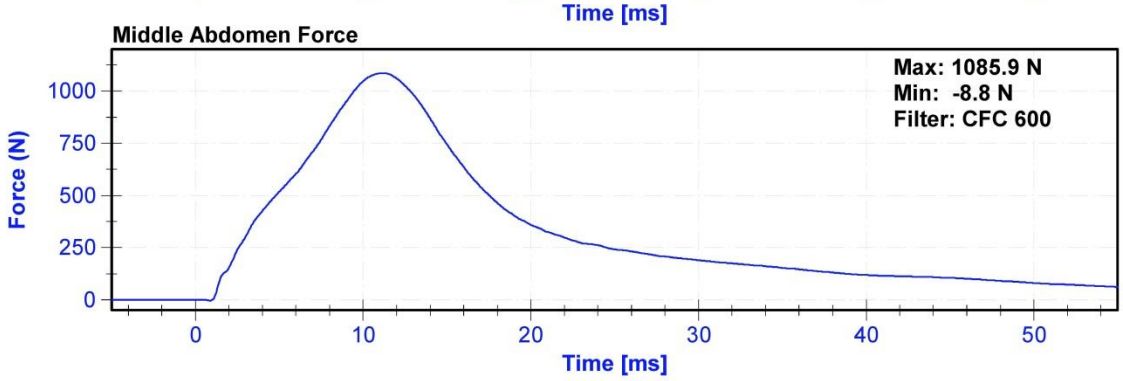
Transducer Calibrations

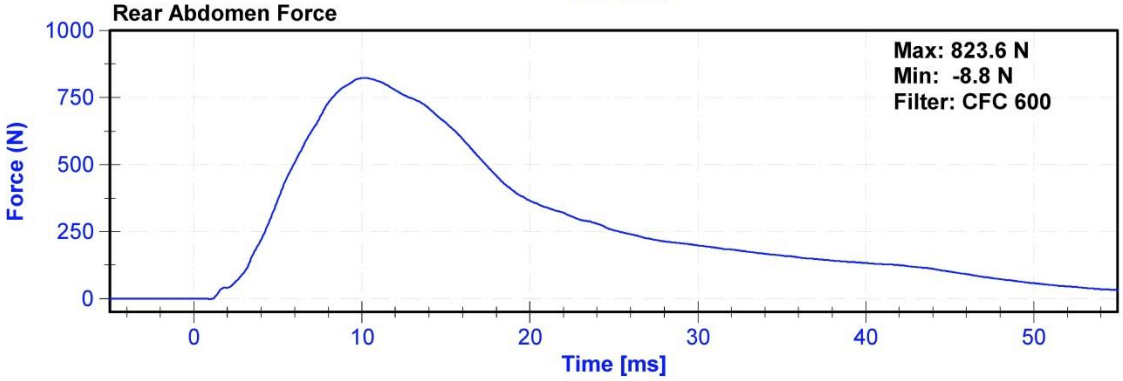
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Front Abdomen Load Cell	DENTON 2631	LC-1512	5/13/2014	5/13/2015
Middle Abdomen Load Cell	DENTON 2631	LC-1526	5/13/2014	5/13/2015
Rear Abdomen Load Cell	DENTON 2631	LC-1512	5/13/2014	5/13/2015




Combined Abdomen Force
Force (N)
2500
2000
1500
1000
500
0
0
10
20
30
40
50
Time [ms]
Max: 2436.1 N
Min: -36.6 N
Filter: CFC 600


Front Abdomen Force
Force (N)
600
400
200
0
0
10
20
30
40
50
Time [ms]
Max: 546.5 N
Min: -21.5 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
1000
750
500
250
0
0
10
20
30
40
50
Time [ms]
Max: 1085.9 N
Min: -8.8 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
1000
750
500
250
0
0
10
20
30
40
50
Time [ms]
Max: 823.6 N
Min: -8.8 N
Filter: CFC 600

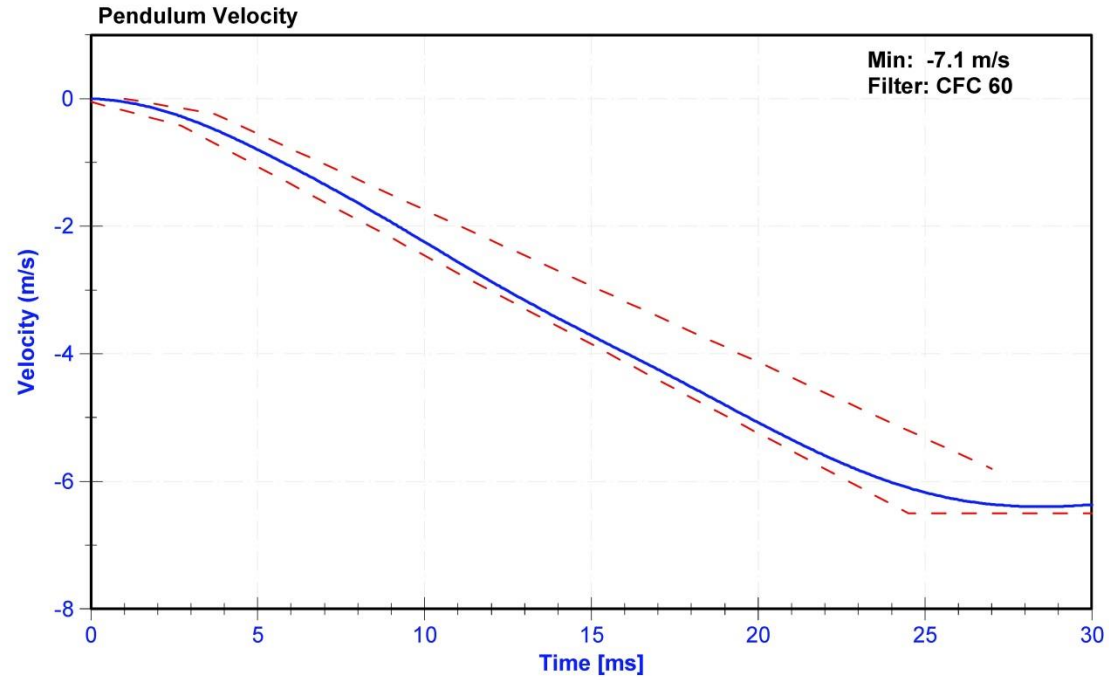
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

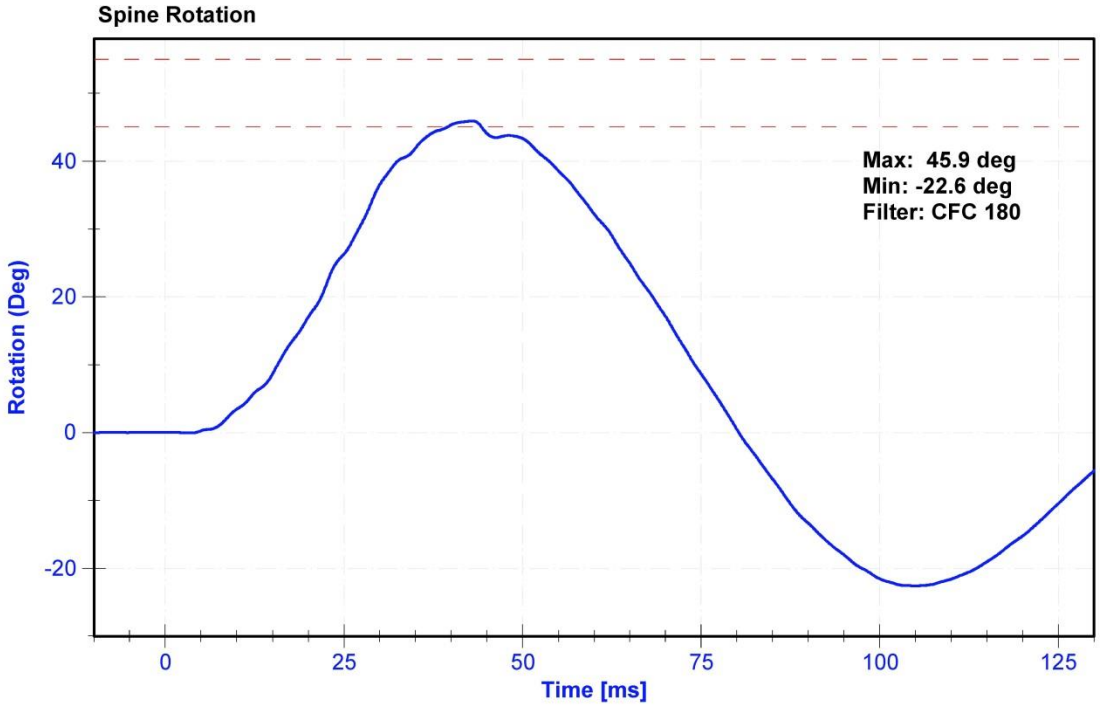
Results

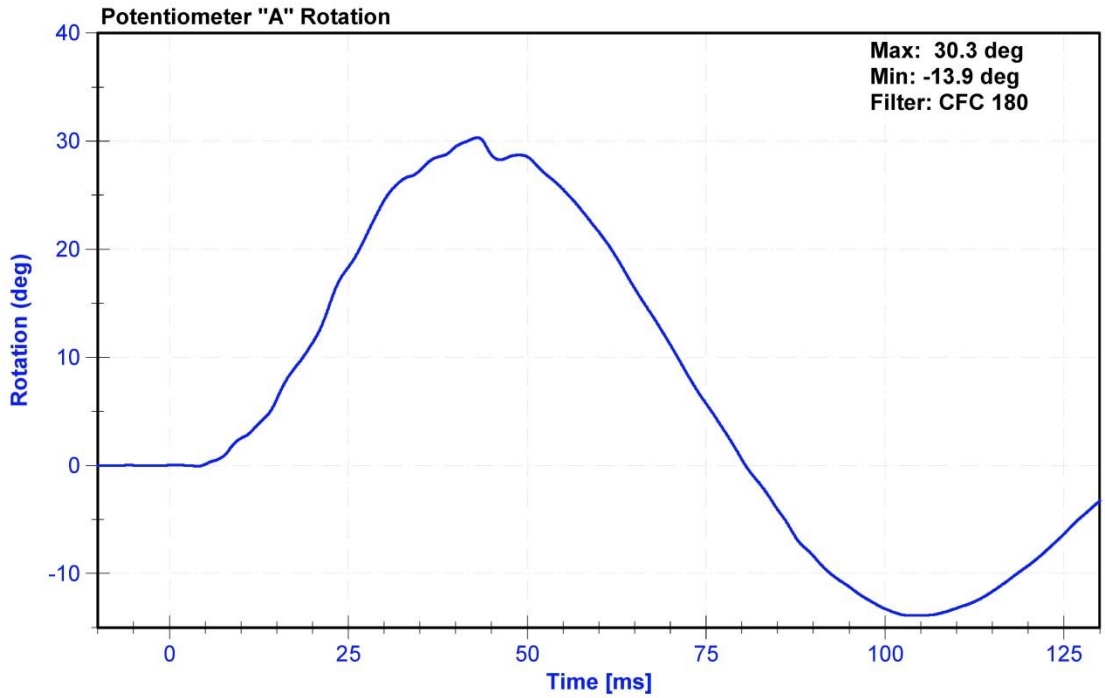
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	16.7	Pass
Velocity	5.95	6.15	m/s	6.025	Pass
Lateral Spine Rotation	45	55	deg	45.9	Pass
Time at Maximum Rotation	39	53	ms	42.9	Pass
Time of Decay to Zero Degrees	37	57	ms	37.4	Pass
Pulse within Corridor?	-	-	-	Yes	Pass

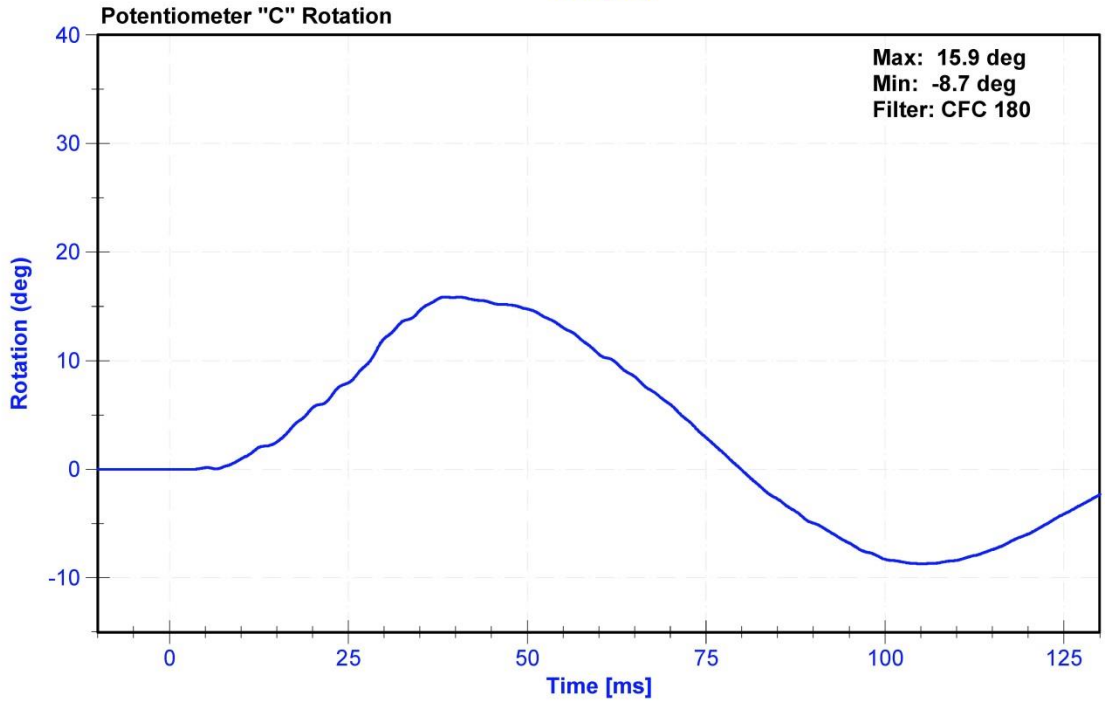
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum "A" Potentiometer	SP22G	DS-094	11/13/2014	11/13/2015
Condyle "B" Potentiometer	SP22G	DS-095	11/13/2014	11/13/2015


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


Spine Rotation
Max: 45.9 deg
Min: -22.6 deg
Filter: CFC 180
Rotation (Deg)
40
20
0
-20
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 30.3 deg
Min: -13.9 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
0
25
50
75
100
125
Time [ms]


Potentiometer "C" Rotation
Max: 15.9 deg
Min: -8.7 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
0
25
50
75
100
125
Time [ms]

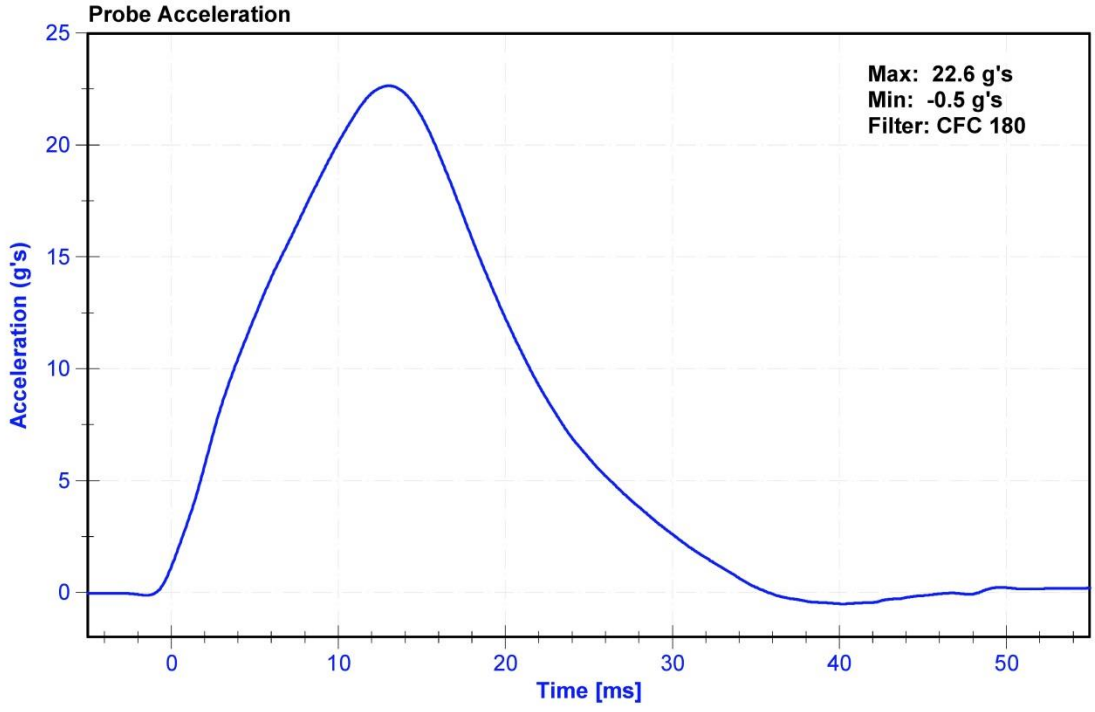
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

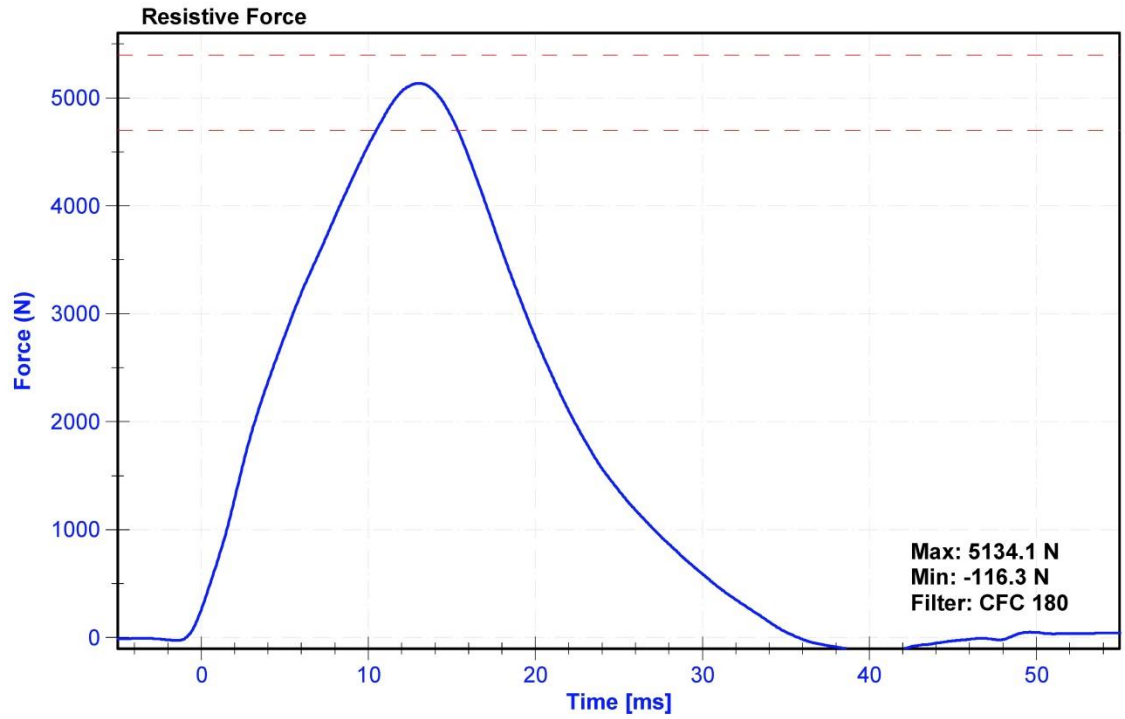
Results

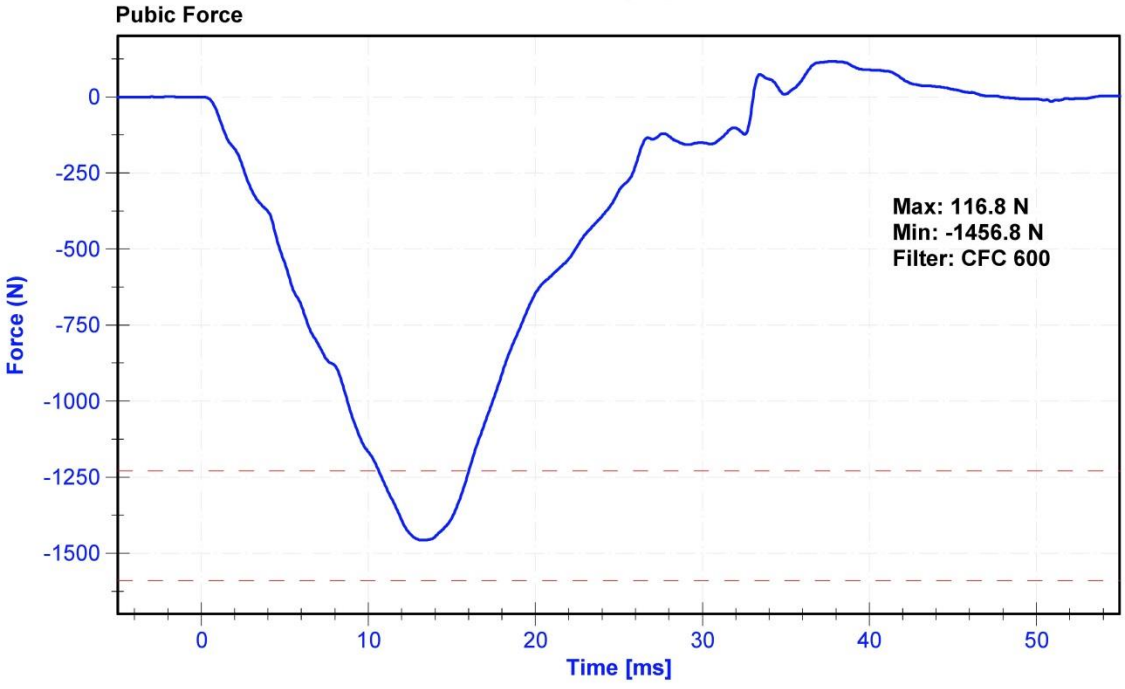
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	11.3	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Resistive Force	4,700	5,400	N	5134.1	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.00	Pass
Pubic Force	-1,590	-1,230	N	-1456.8	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.25	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/13/2014	5/13/2015




Resistive Force
Force (N)
5000
4000
3000
2000
1000
0
0
10
20
30
40
50
Time [ms]
Max: 5134.1 N
Min: -116.3 N
Filter: CFC 180


Pubic Force
Force (N)
0
-250
-500
-750
-1000
-1250
-1500
0
10
20
30
40
50
Time [ms]
Max: 116.8 N
Min: -1456.8 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

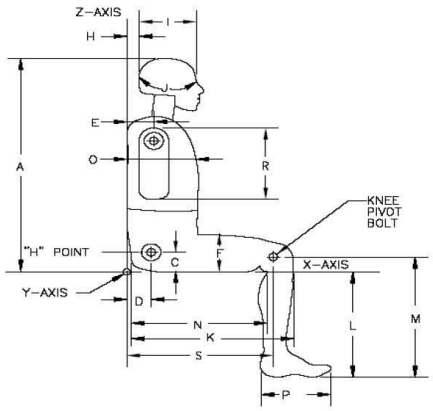
SERIAL No: 303

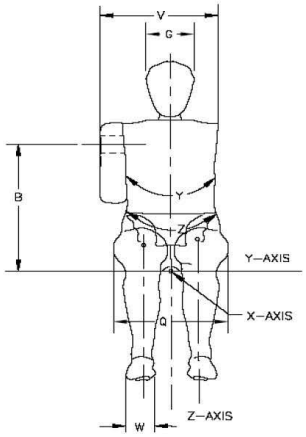
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: M. Geesey Date: 2/13/2015

Dummy Serial Number: 303





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	447	Pass
C	H-point Height	79	89	87	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	104	Pass
F	Thigh Clearance	119	135	129	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	181	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	404	Pass
N	Buttock Popliteal Length	416	442	438	Pass
O	Chest Depth w/o jacket	195	211	203	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	316	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

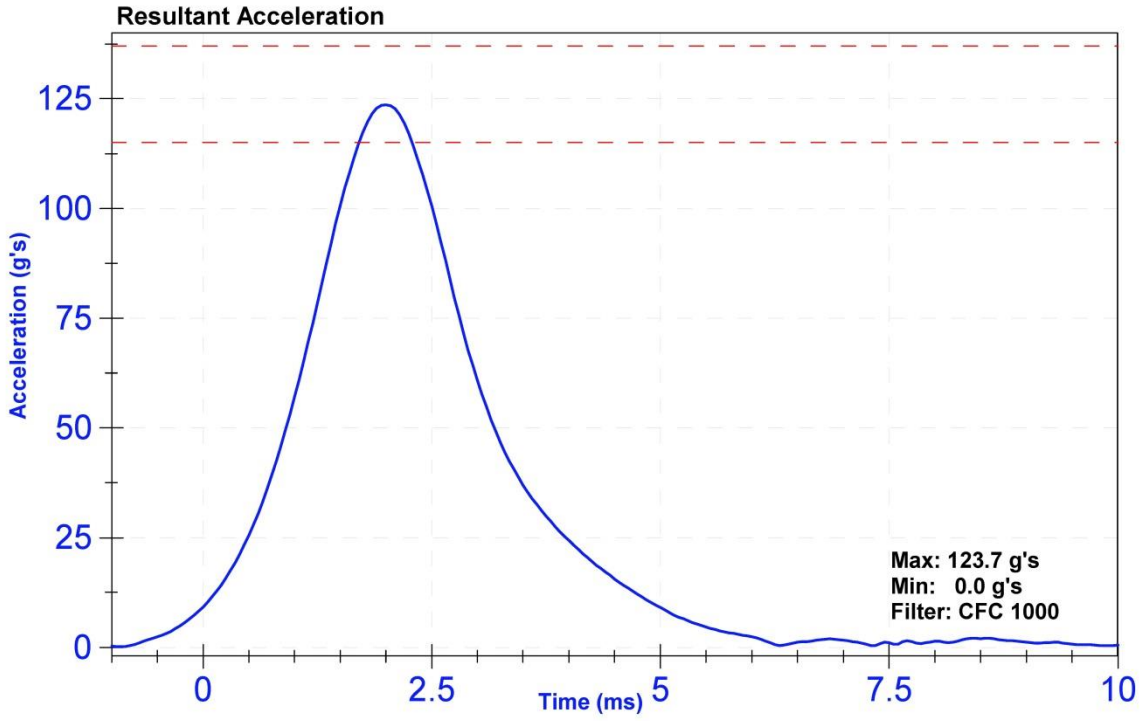
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

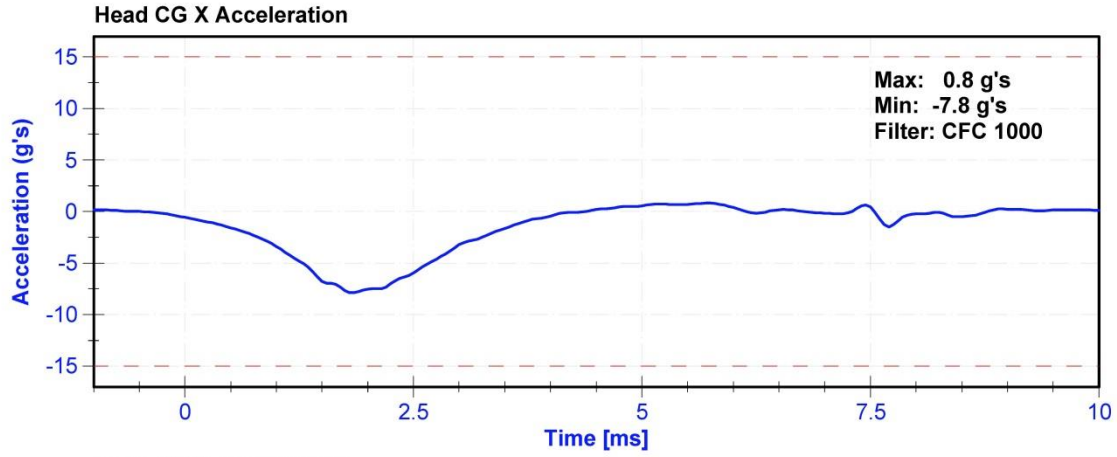
Results

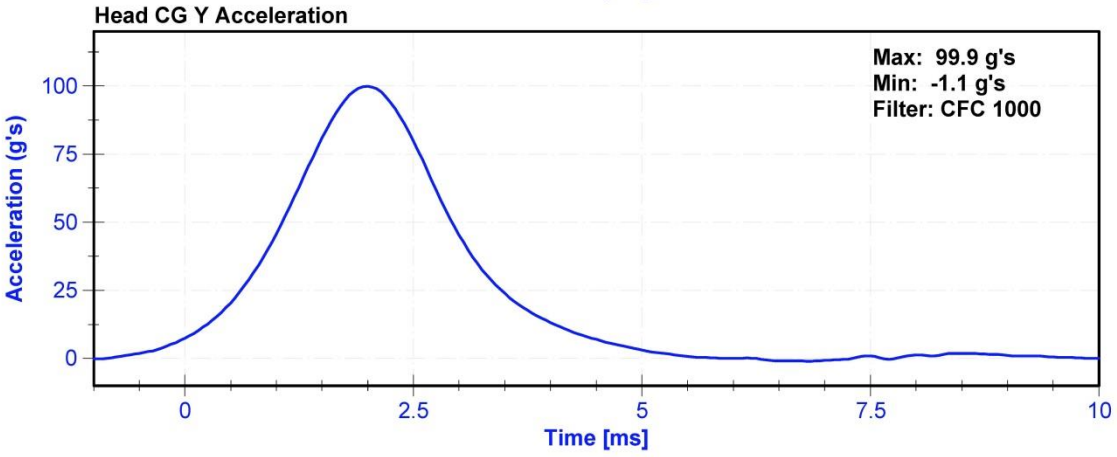
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.6	Pass
Humidity	10	70	%	11	Pass
Resultant Acceleration	115	137	g's	123.7	Pass
Oscillation	0	15	%	1.6	Pass
Fore-Aft Acceleration	-15	15	g's	-7.8	Pass

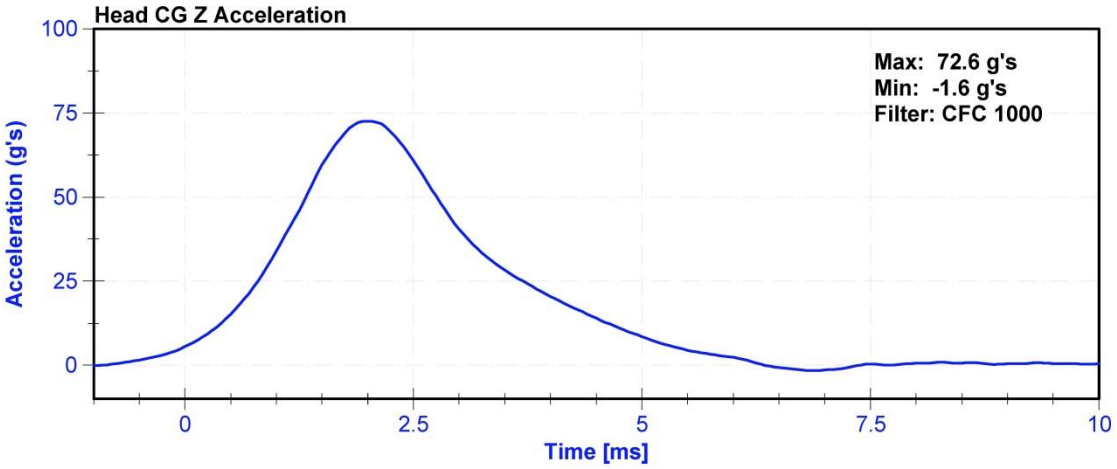
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco 7264	AC-P63841	12/17/2014	6/17/2015
Y Accelerometer	ENDEVCO 7264	AC-P52040	10/8/2014	4/8/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P58737	10/8/2014	4/8/2015




Head CG X Acceleration
Max: 0.8 g's
Min: -7.8 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 99.9 g's
Min: -1.1 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 72.6 g's
Min: -1.6 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]

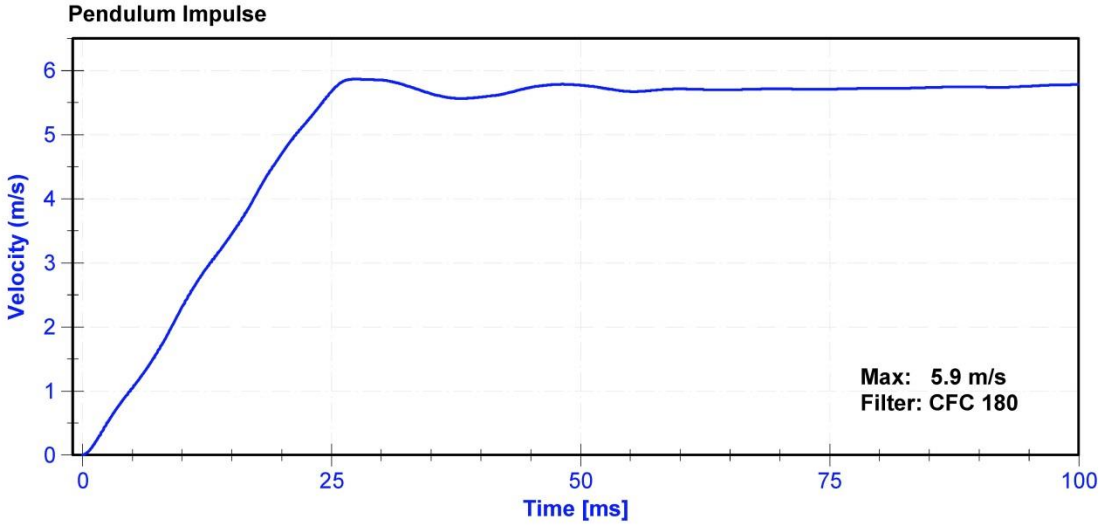
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

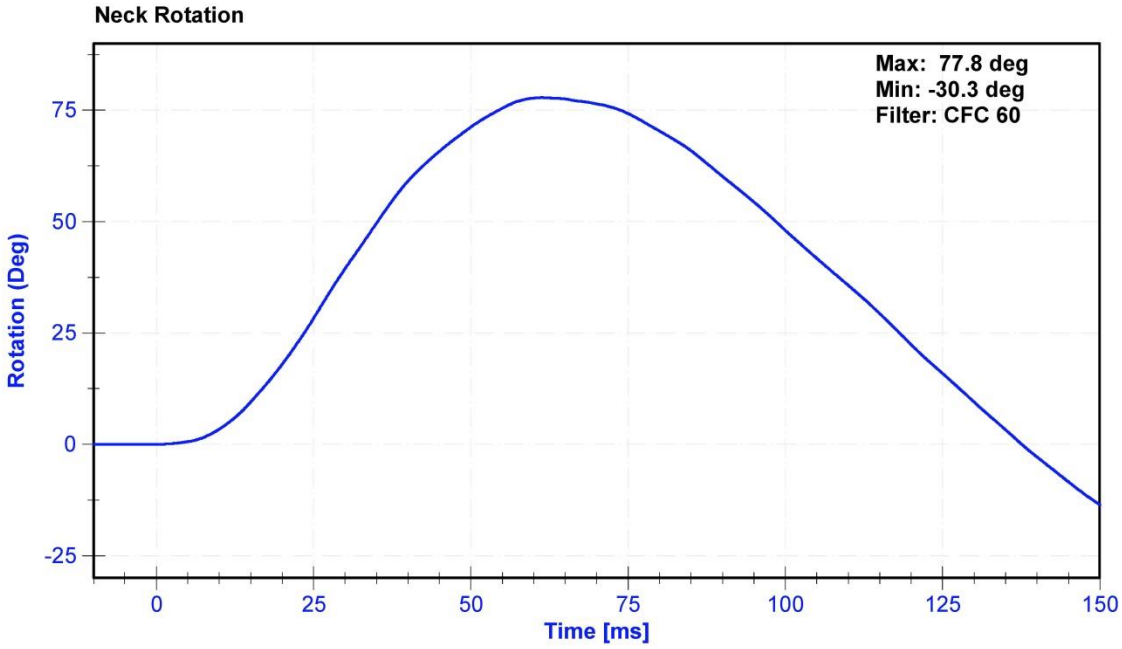
Results

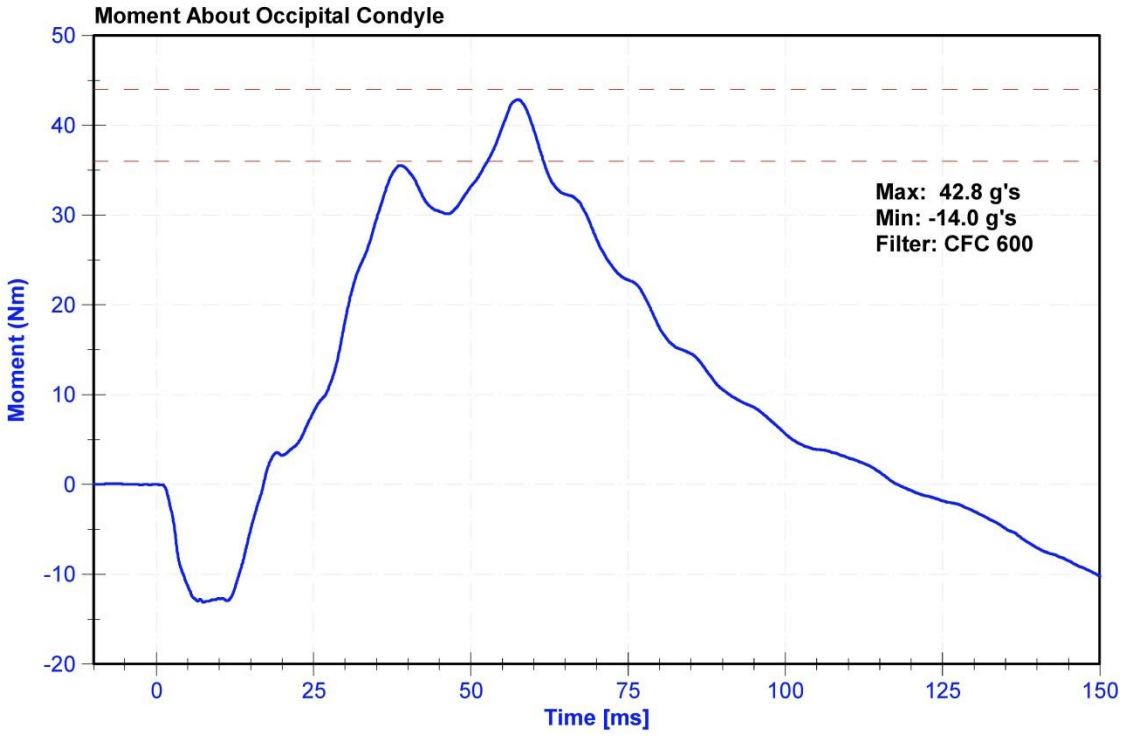
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	10.9	Pass
Velocity	5.51	5.63	m/s	5.546	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.31	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.45	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.71	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.68	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	77.8	Pass
Time at Maximum Rotation	50	70	ms	61.3	Pass
Moment about the OC	36	44	Nm	42.8	Pass
Moment Decay to 0 Nm	102	126	ms	117.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/13/2014	11/13/2015
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/13/2014	11/13/2015
Upper Neck Load Cell	DENTON 1716A	LC-130Fy	9/12/2014	9/12/2015




Neck Rotation
Max: 77.8 deg
Min: -30.3 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.8 g's
Min: -14.0 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

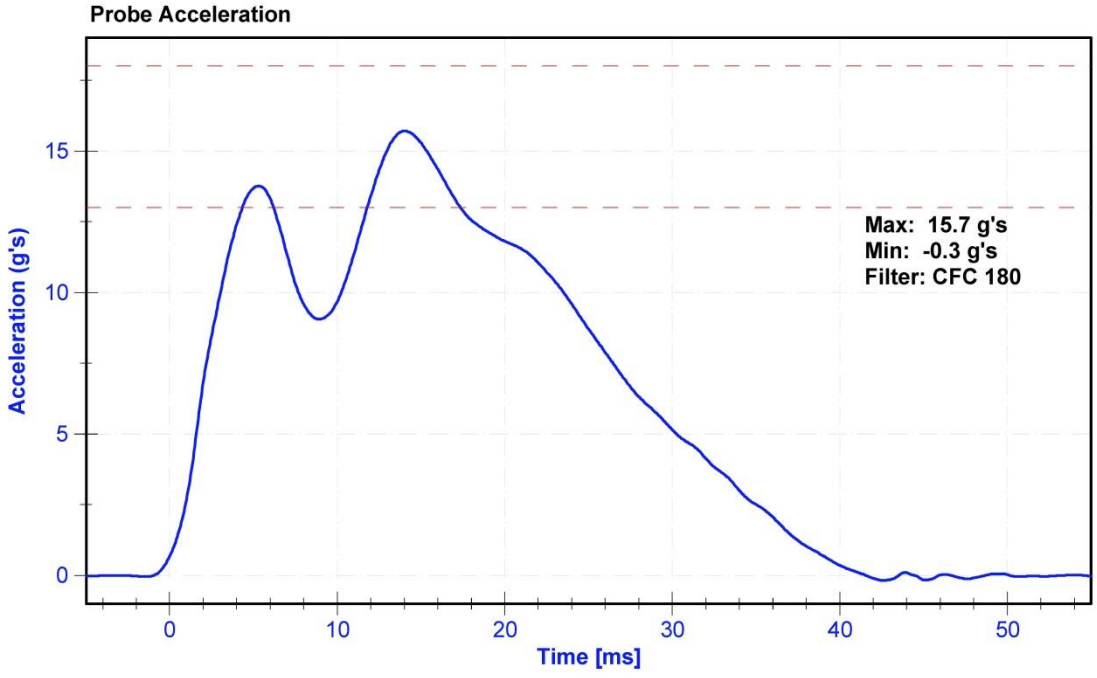
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

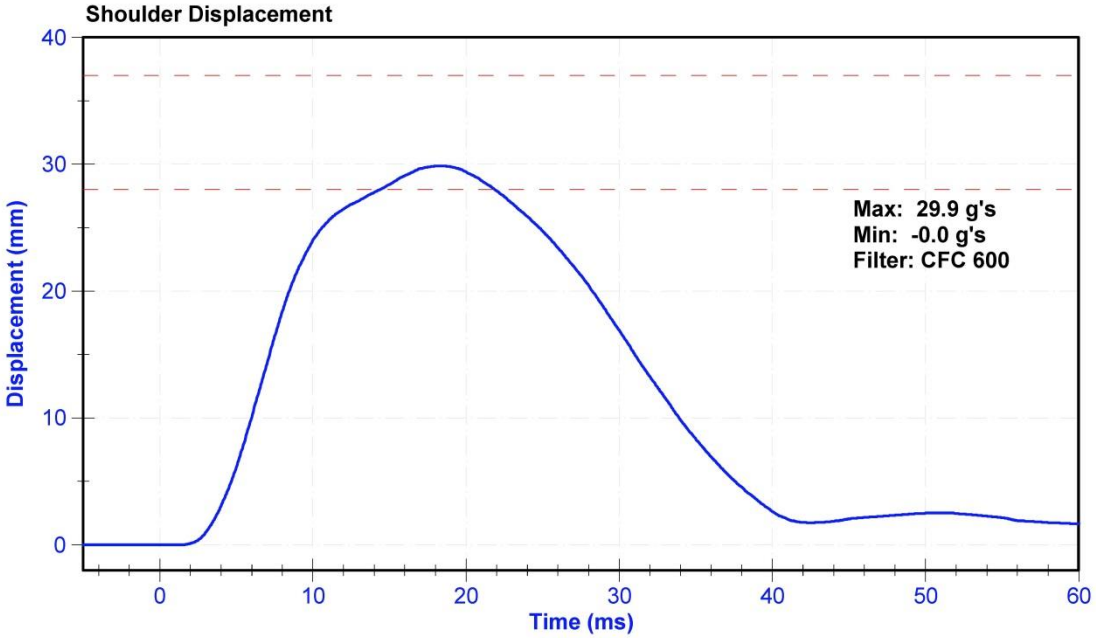
Results

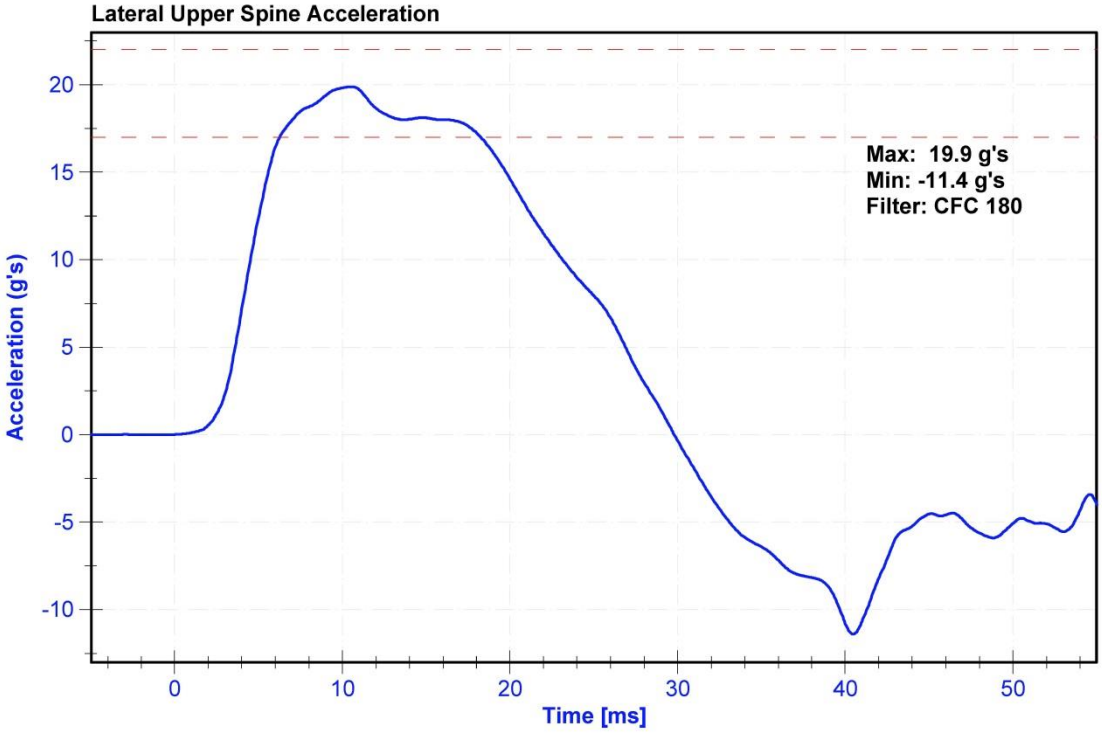
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	15.2	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	15.7	Pass
Shoulder Deflection	28	37	mm	29.9	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Shoulder Potentiometer	Servo 08CT1-3725	DS-8GFE	12/4/2014	12/4/2015
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/9/2014	4/9/2015




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 29.9 g's
Min: -0.0 g's
Filter: CFC 600
0
10
20
30
40
50
60


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.9 g's
Min: -11.4 g's
Filter: CFC 180
-10
-5
0
5
10
15
20
30
40
50

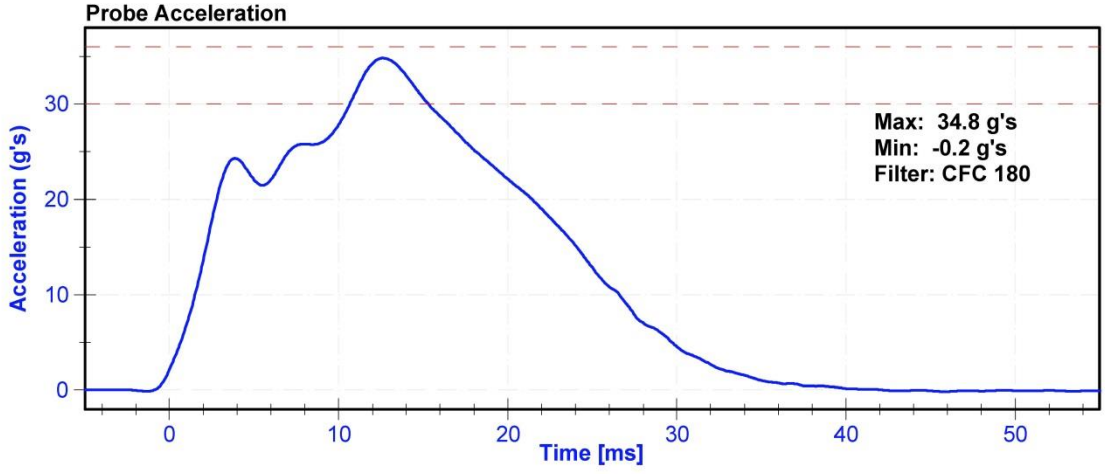
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

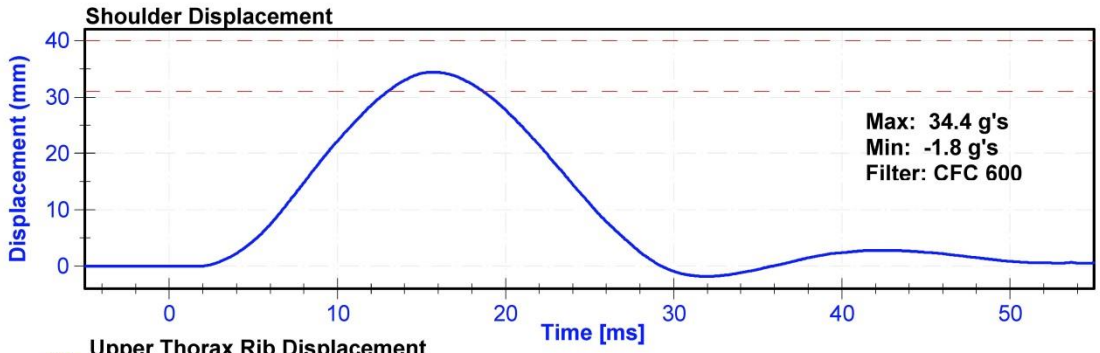
Results

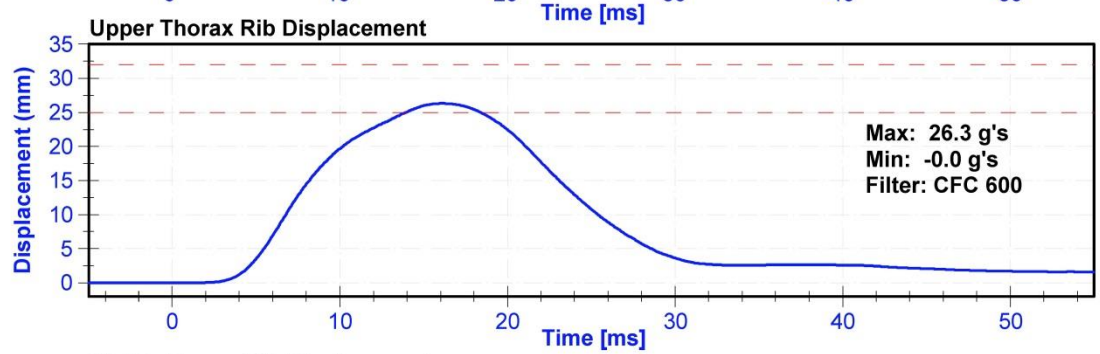
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	14.9	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	34.8	Pass
Lateral Upper Spine Acceleration	34	43	g's	42.3	Pass
Lateral Lower Spine Acceleration	29	37	g's	35.7	Pass
Shoulder Deflection	31	40	mm	34.4	Pass
Upper Thorax Rib Deflection	25	32	mm	26.3	Pass
Mid Thorax Rib Deflection	30	36	mm	31.2	Pass
Lower Thorax Rib Deflection	32	38	mm	33.4	Pass

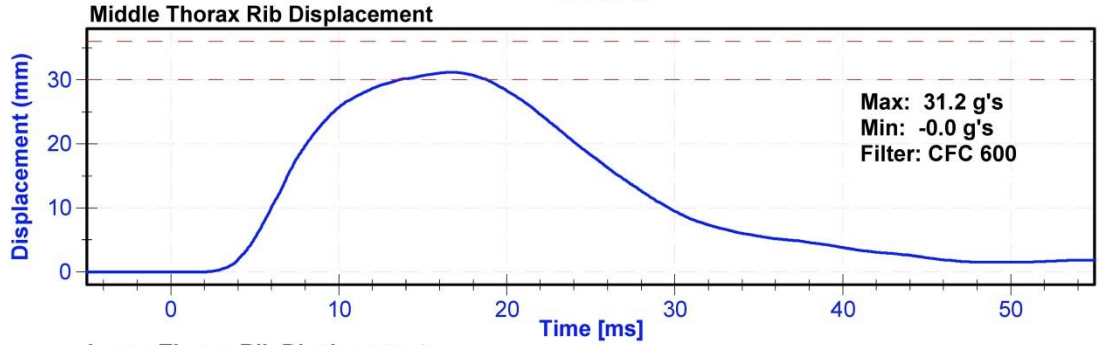
Transducer Calibrations

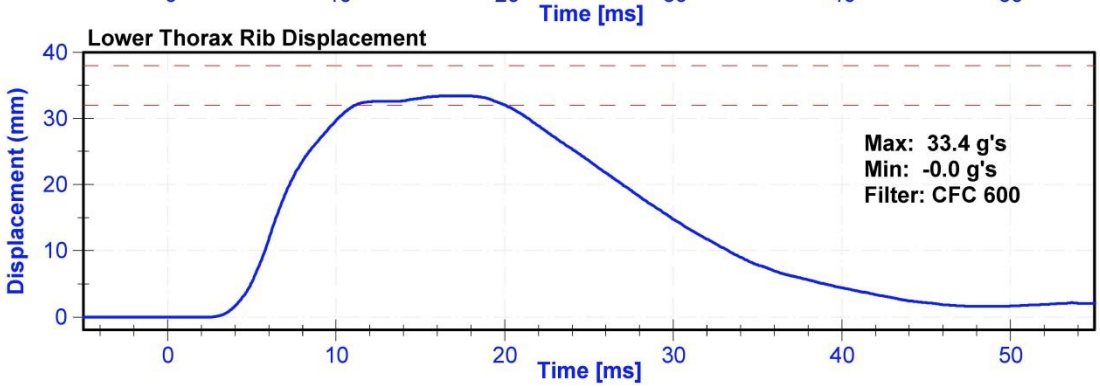
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/9/2014	4/9/2015
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/9/2014	4/9/2015
Shoulder Potentiometer	Servo 08CT1-3725	DS-8GFE	12/4/2014	12/4/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	8/6/2014	8/6/2015
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	8/6/2014	8/6/2015
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	8/6/2014	8/6/2015

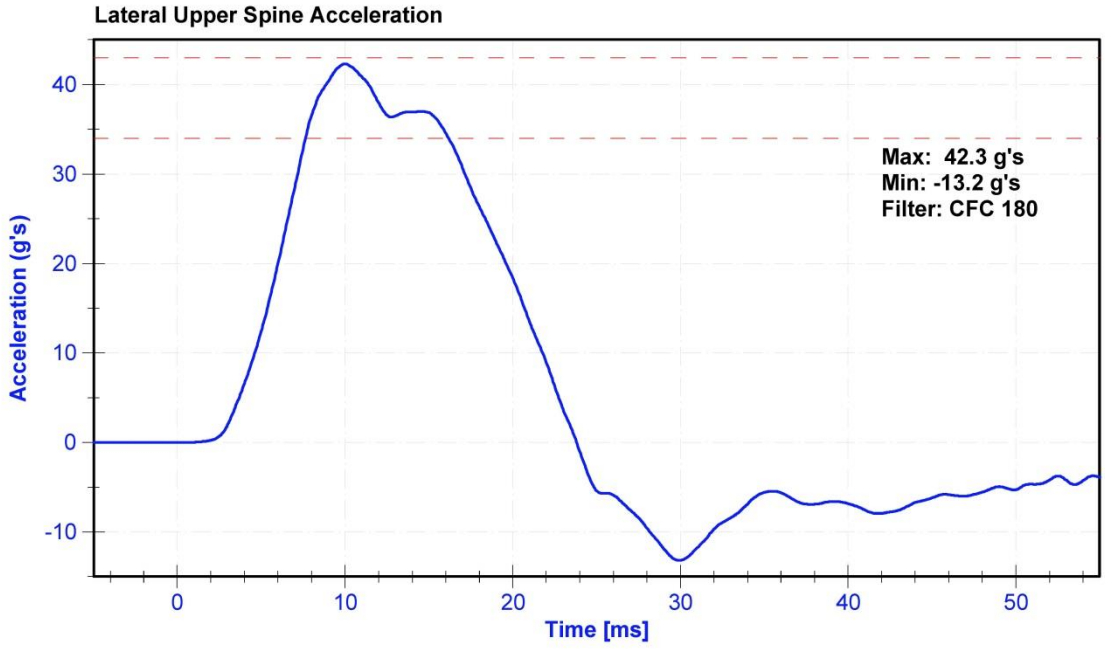


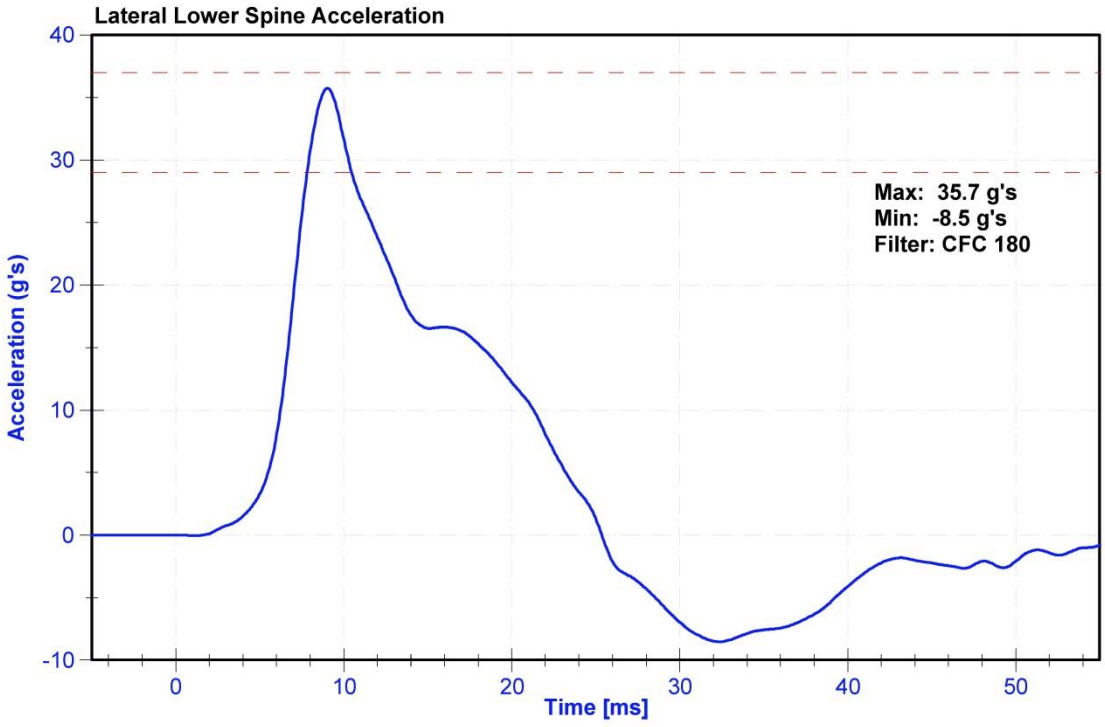

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 34.4 g's
Min: -1.8 g's
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.3 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.2 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.4 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 42.3 g's
Min: -13.2 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 35.7 g's
Min: -8.5 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

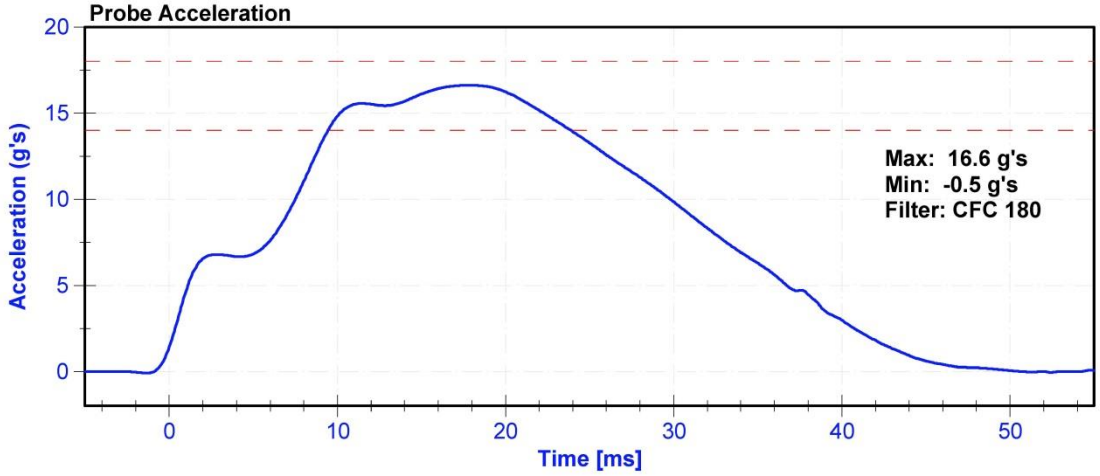
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

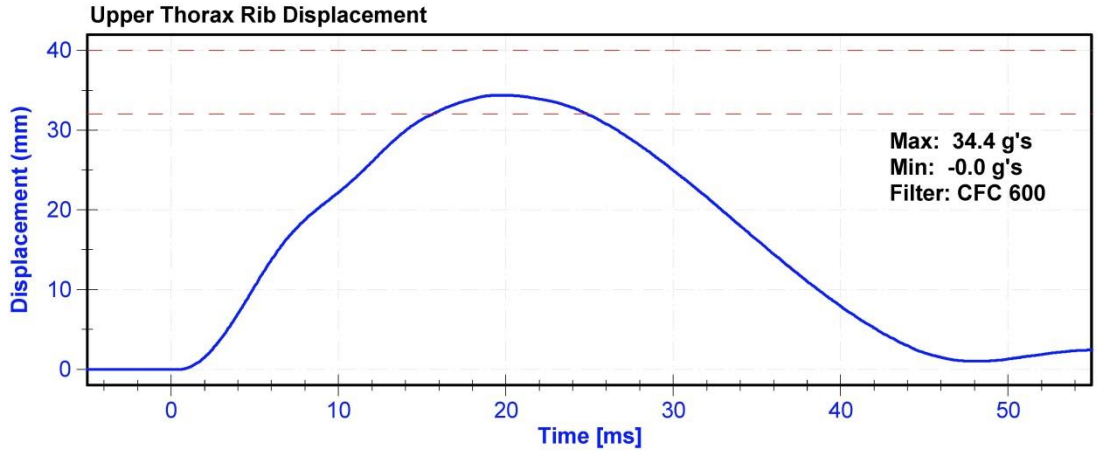
Results

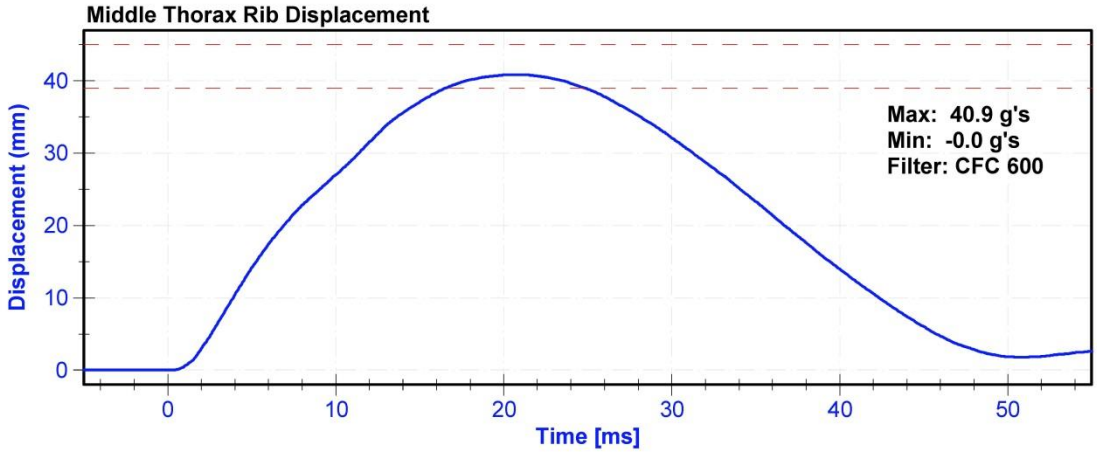
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.9	Pass
Humidity	10	70	%	14.7	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	14	18	g's	16.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.5	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.6	Pass
Upper Thorax Rib Deflection	32	40	mm	34.4	Pass
Middle Thorax Rib Deflection	39	45	mm	40.9	Pass
Lower Thorax Rib Deflection	35	43	mm	38.8	Pass

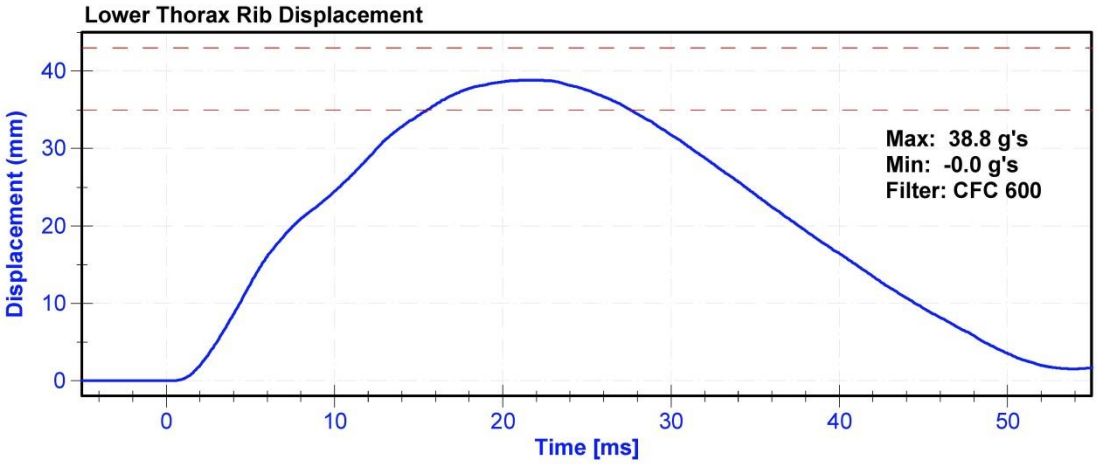
Transducer Calibrations

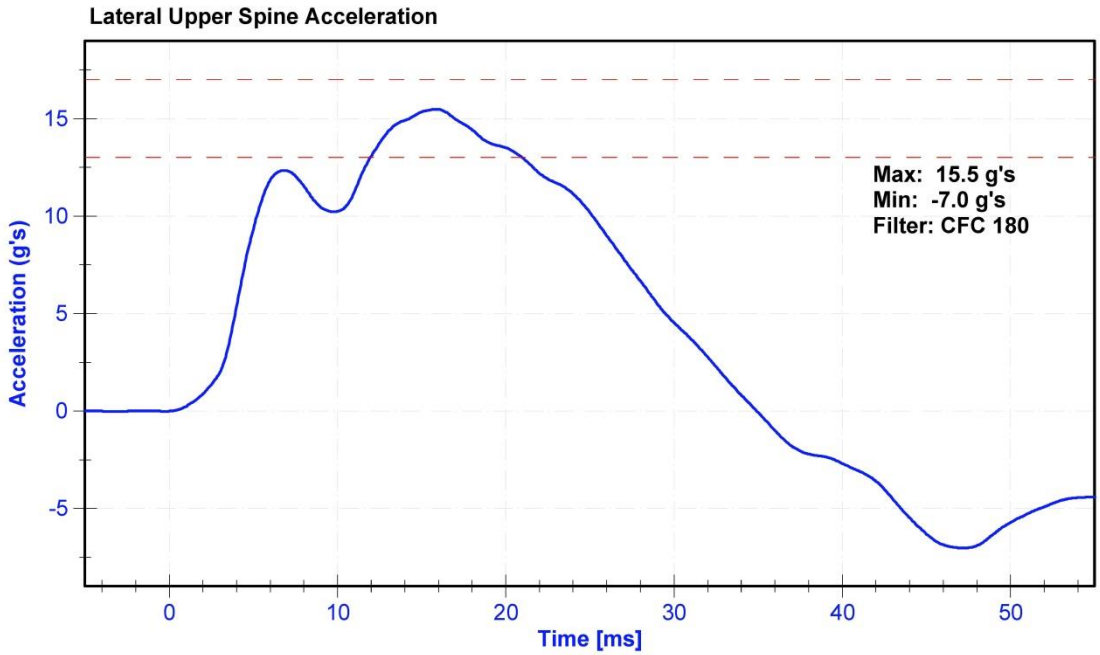
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/9/2014	4/9/2015
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/9/2014	4/9/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1199GFE	8/6/2014	8/6/2015
Middle Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1246GFE	8/6/2014	8/6/2015
Lower Thorax Rib Potentiometer	Servo 08CT1-3725	DS-1256GFE	8/6/2014	8/6/2015

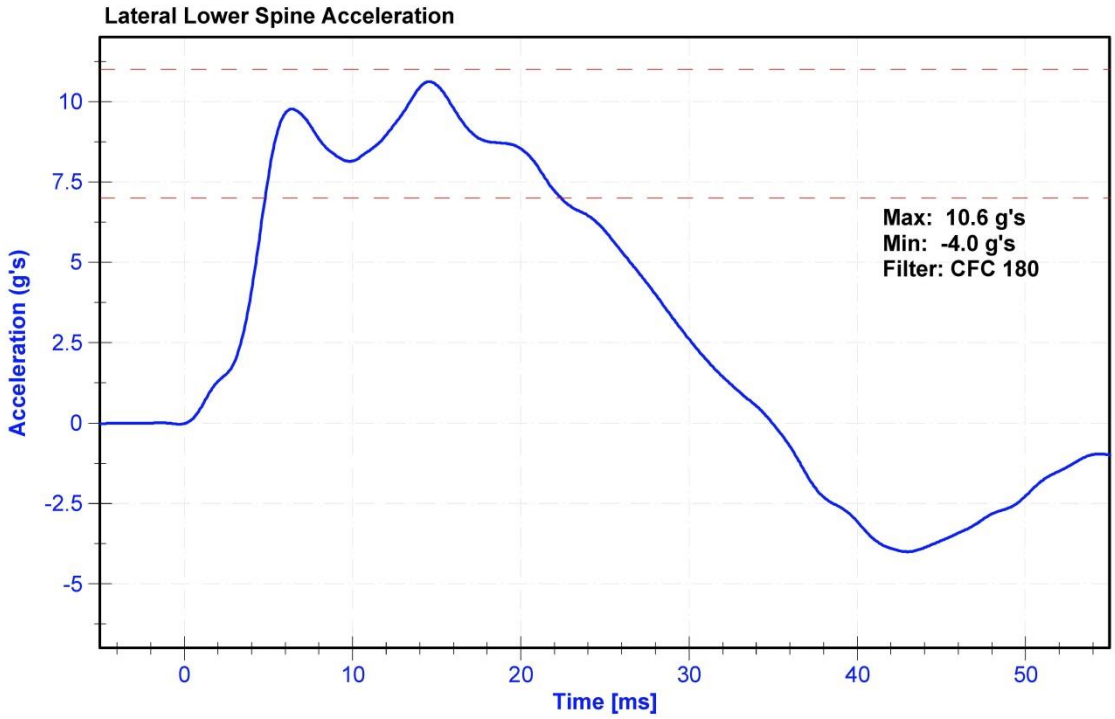



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.4 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.9 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.8 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 15.5 g's
Min: -7.0 g's
Filter: CFC 180
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
Time [ms]


Lateral Lower Spine Acceleration
Max: 10.6 g's
Min: -4.0 g's
Filter: CFC 180
Acceleration (g's)
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
Time [ms]

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

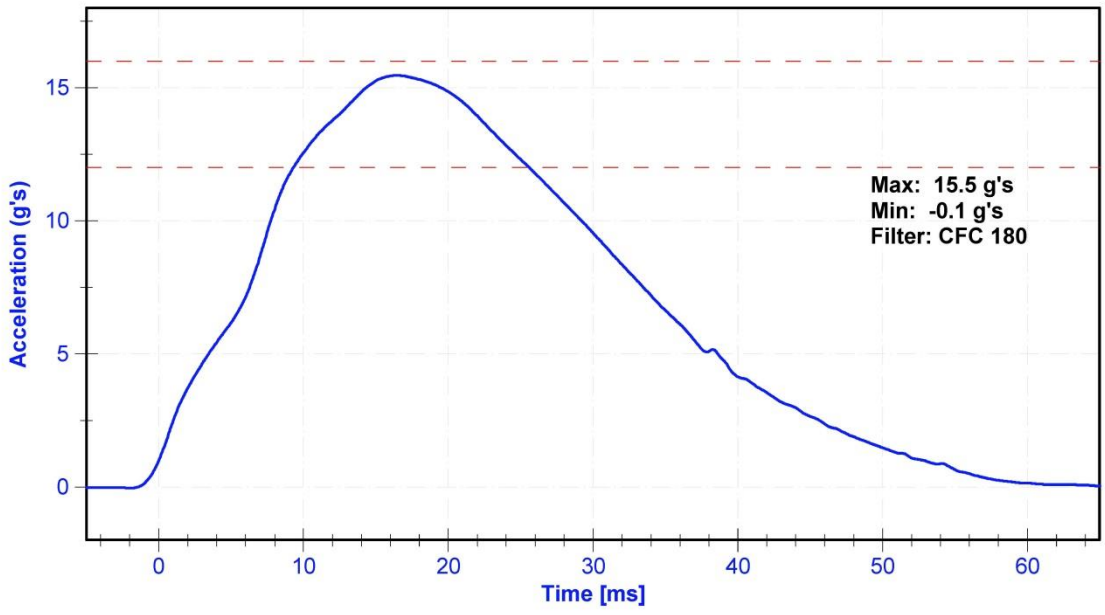
Results

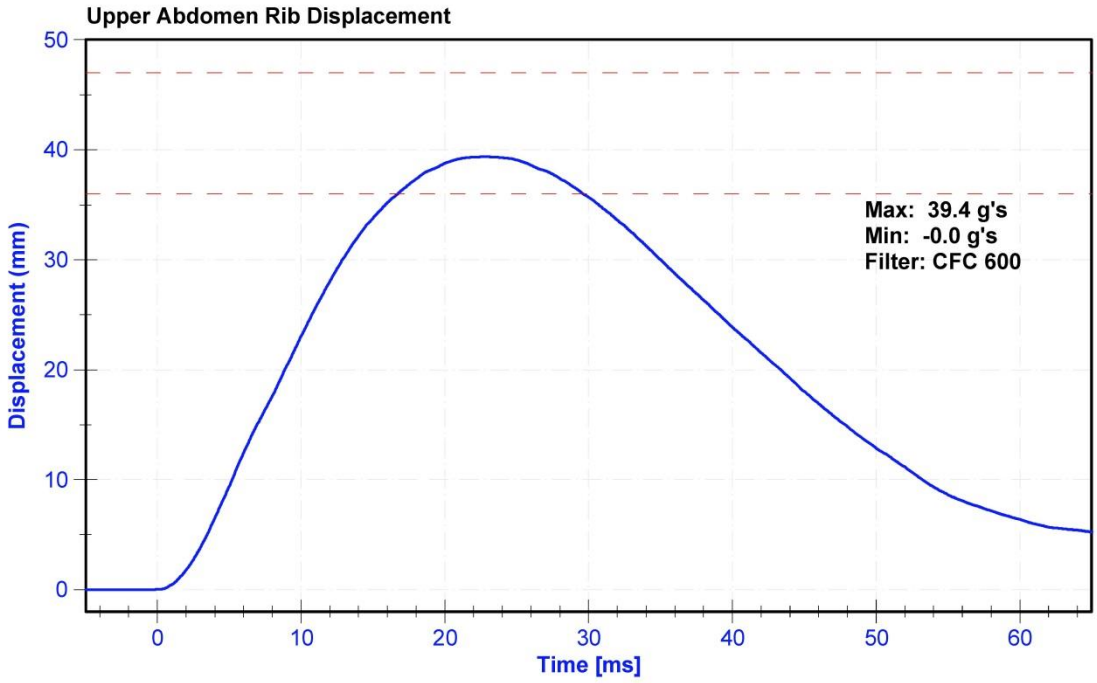
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.8	Pass
Humidity	10	70	%	16.5	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	12	16	g's	15.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	39.4	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.4	Pass

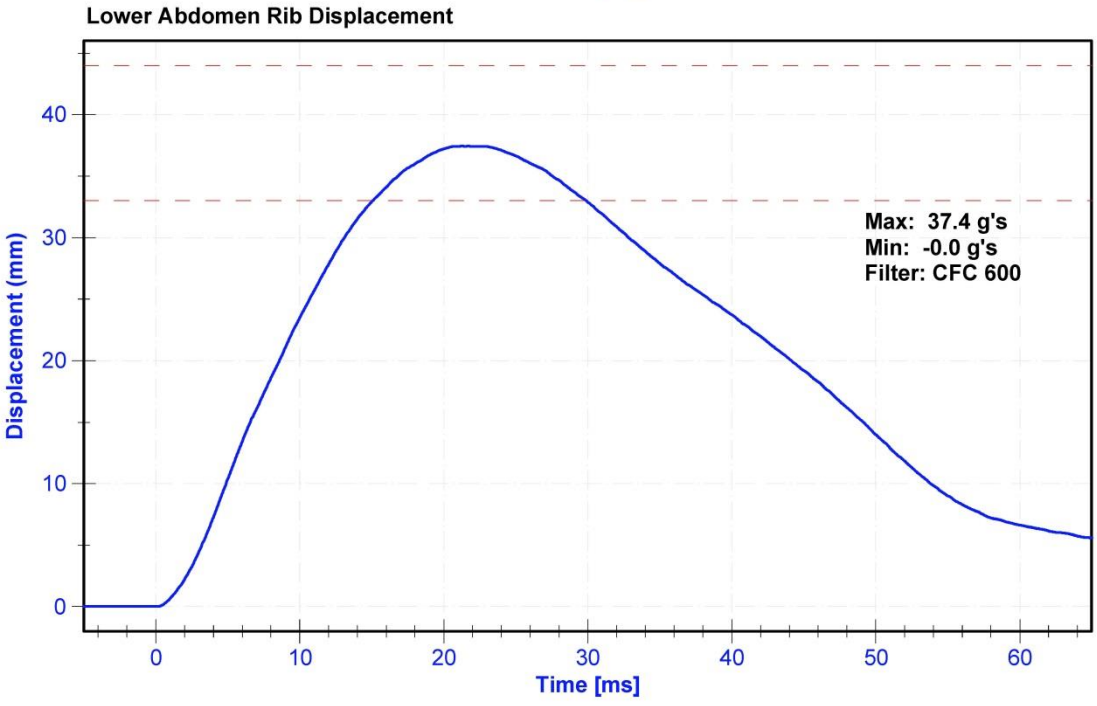
Transducer Calibrations

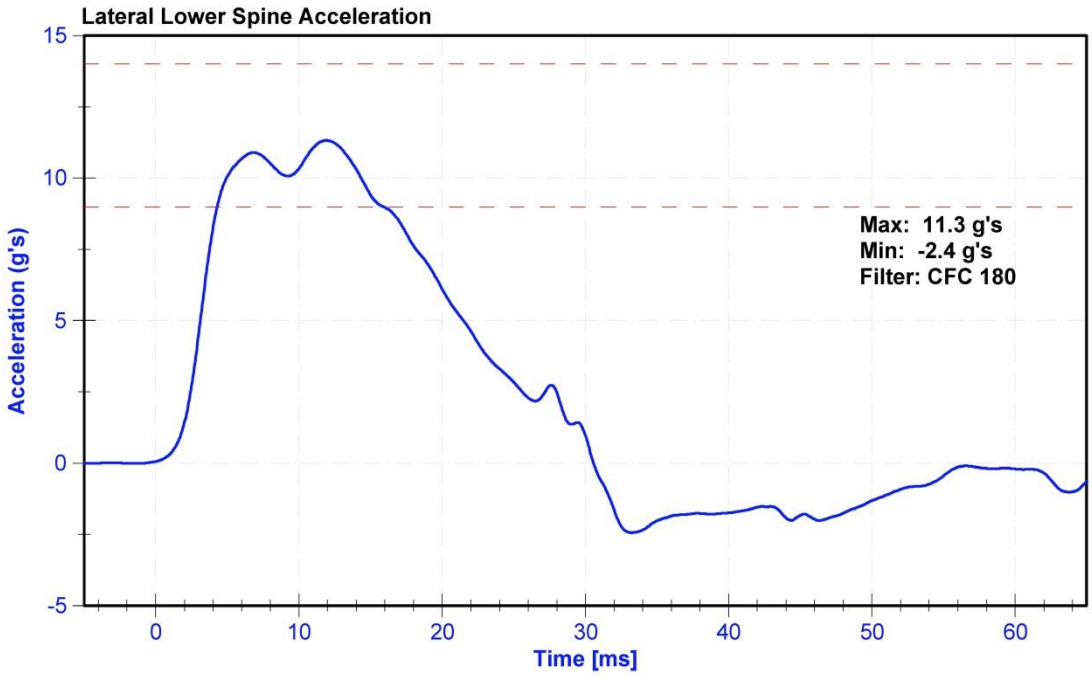
Channel	Manufacturer	Serial Number	Calibratio Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51974	10/9/2014	4/9/2015
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-1274GFE	8/6/2014	8/6/2015
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-1285GFE	8/6/2014	8/6/2015

Probe Acceleration




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.4 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.4 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
60
Time [ms]
Max: 11.3 g's
Min: -2.4 g's
Filter: CFC 180

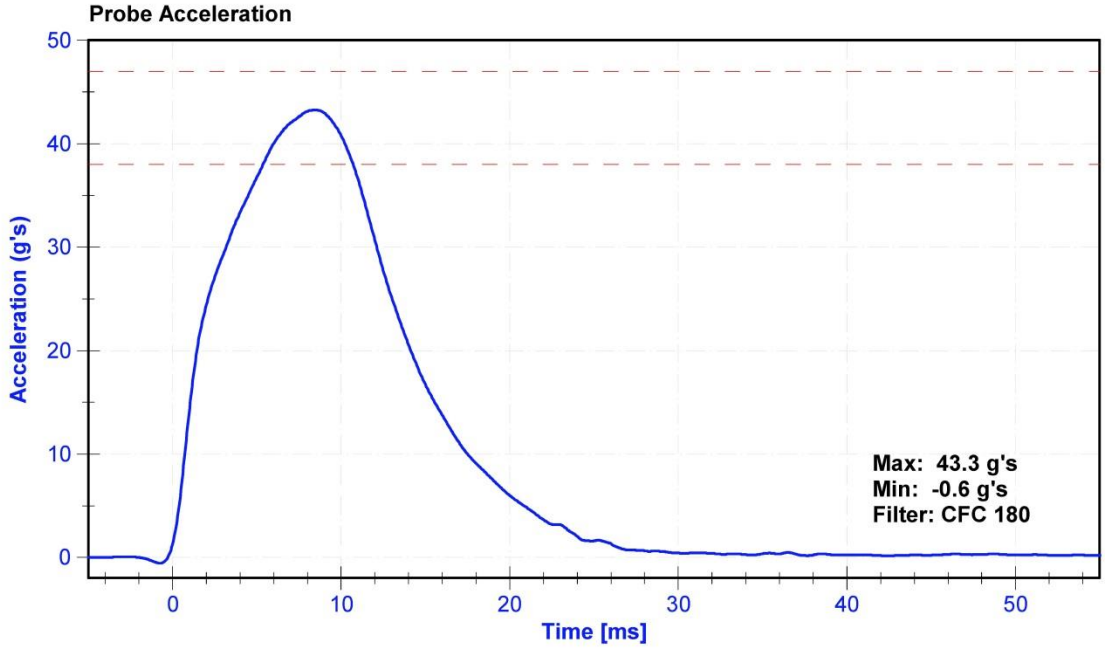
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

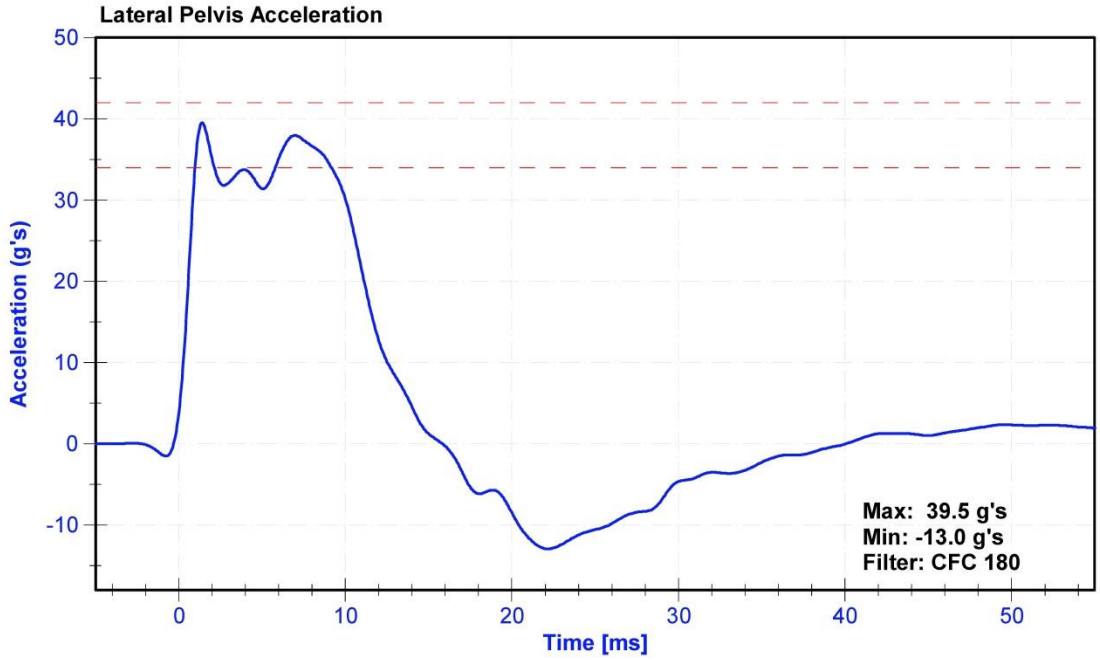
Results

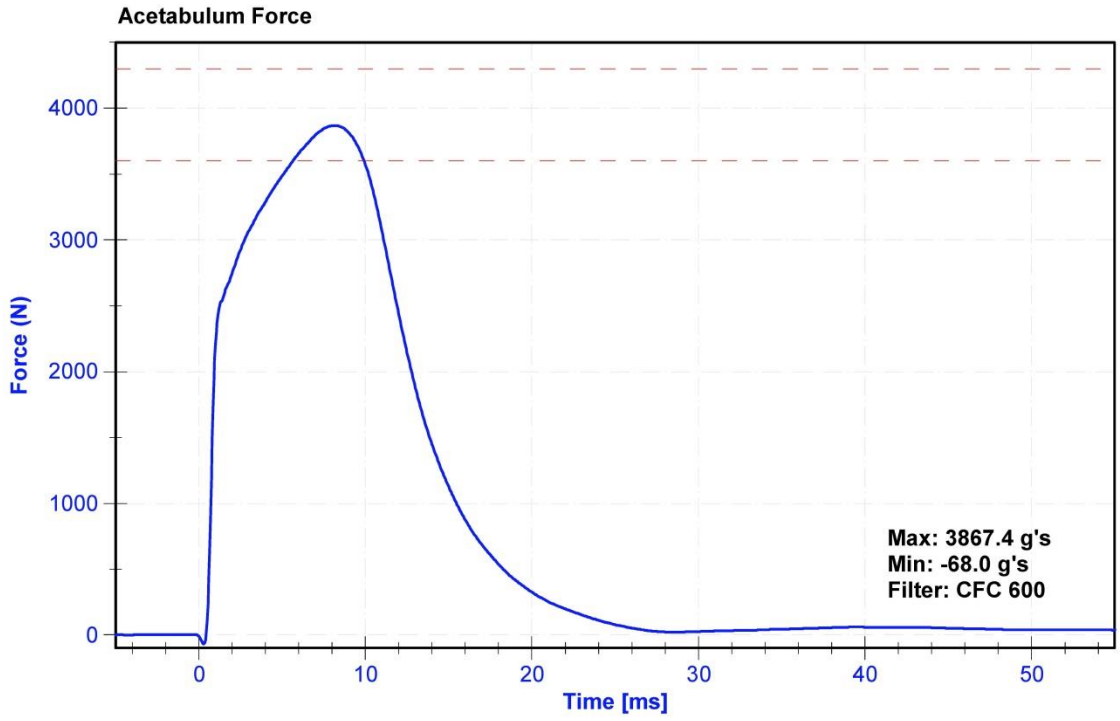
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	17.1	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	43.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.0	Pass
Acetabulum Force	3,600	4,300	N	3867.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	1/23/2015	7/24/2015
Acetabulum Load Cell	Denton IF-520	LC-236Fy	5/13/2014	5/13/2015
Certification Plug	Humanetics	47047	10/15/2011	N/A
Crash Test Plug	Humanetics	49019	12/07/2011	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 39.5 g's
Min: -13.0 g's
Filter: CFC 180


Acetabulum Force
Force (N)
4000
3000
2000
1000
0
0
10
20
30
40
50
Time [ms]
Max: 3867.4 g's
Min: -68.0 g's
Filter: CFC 600

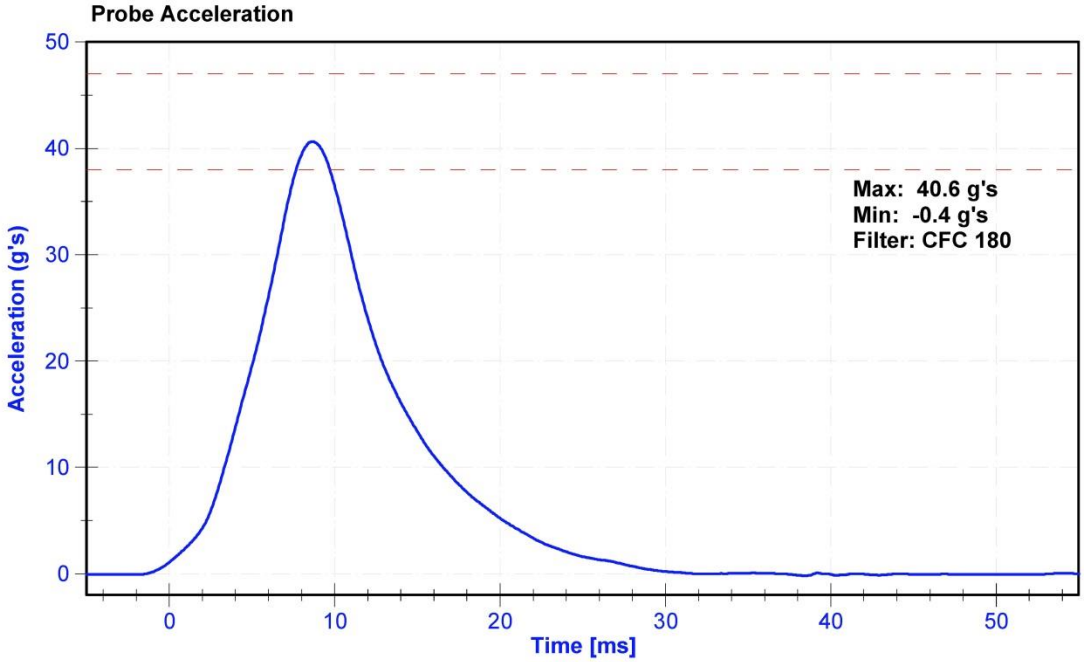
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

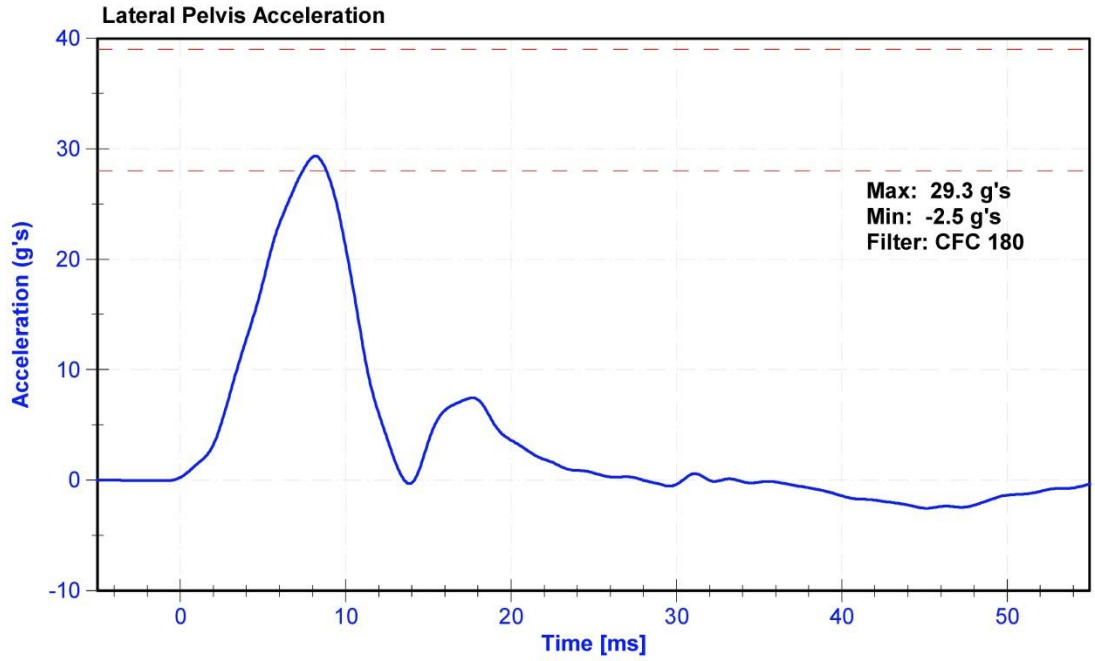
Results

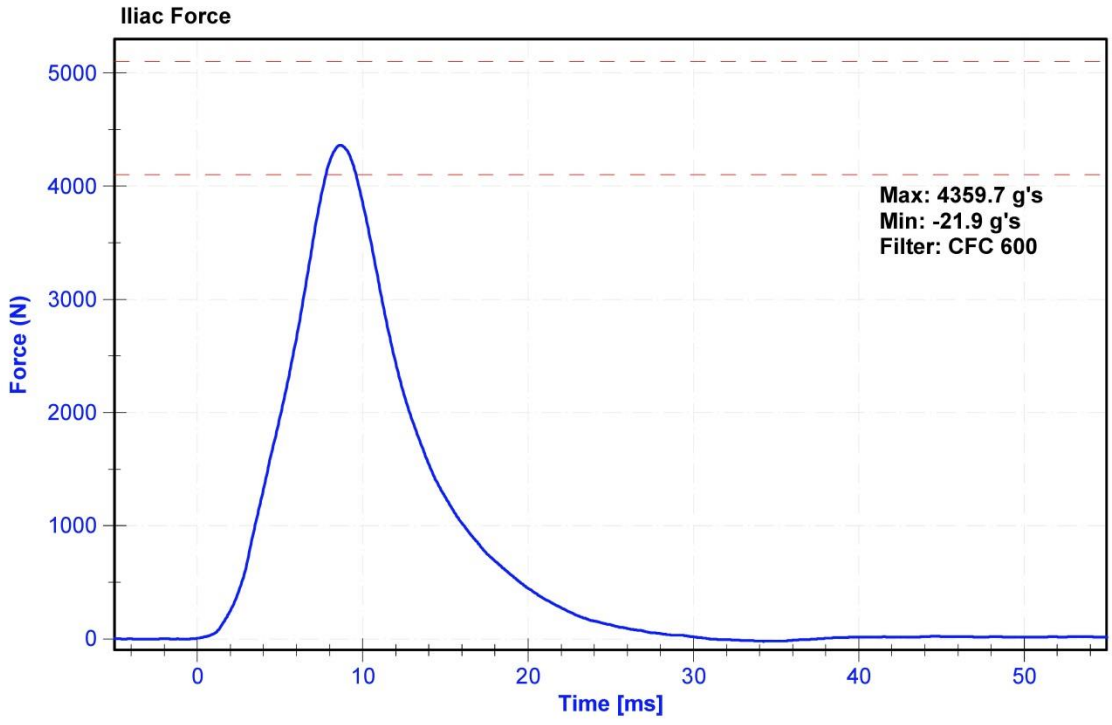
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	17.5	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	36	45	g's	40.6	Pass
Lateral Pelvis Acceleration	28	39	g's	29.3	Pass
Iliac Force	4,100	5,100	N	4359.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264	AC-P51259	1/23/2015	7/24/2015
Iliac Load Cell	DENTON 3228J	LC-280Fy	5/14/2014	5/14/2015




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 29.3 g's
Min: -2.5 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4359.7 g's
Min: -21.9 g's
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F034		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	AC-P58904	ENDEVCO	8/29/2014
		Y	AC-P58911	ENDEVCO	8/29/2014
		Z	AC-P58776	ENDEVCO	8/29/2014
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	HONEYWELL	8/4/2014
	Middle	Y	DS-184GFE	HONEYWELL	8/4/2014
	Lower	Y	DS-182GFE	HONEYWELL	8/4/2014
Abdomen Load Cells	Forward	Y	LC-1512	DENTON	5/13/2014
	Middle	Y	LC-1526	DENTON	5/13/2014
	Rear	Y	LC-1516	DENTON	5/13/2014
Lower Spine Accelerometers (T12)		X	AC-P52079	ENDEVCO	8/29/2014
		Y	AC-P51948	ENDEVCO	8/29/2014
		Z	AC-P51269	ENDEVCO	8/29/2014
Pubic Symphysis Load Cell		Y	LC-465Fy	DENTON	5/13/2014

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 303		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	AC-P63841	ENDEVCO	12/17/2014
			Y	AC-P52040	ENDEVCO	10/8/2014
			Z	AC-P58737	ENDEVCO	10/8/2014
Displacement Potentiometers	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-1199GFE	SERVO	8/6/2014
		Middle	Y	DS-1246GFE	SERVO	8/6/2014
		Lower	Y	DS-1256GFE	SERVO	8/6/2014
	Abdominal Rib	Upper	Y	DS-1274GFE	SERVO	8/6/2014
		Lower	Y	DS-1285GFE	SERVO	8/6/2014
Lower Spine Accelerometers (T12)			X	AC-P51945	ENDEVCO	10/9/2014
			Y	AC-P51974	ENDEVCO	10/9/2014
			Z	AC-P51946	ENDEVCO	10/9/2014
Acetabulum Load Cell			Y	LC-236Fy	DENTON	5/13/2014
Iliac Wing Load Cell			Y	LC-280Fy	DENTON	5/13/2014
Pelvis Plug (struck side)				47100	HUMANETICS	10/15/2011
Pelvis Plug (non-struck side)						

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-A127677	MSI 1201	9/16/2014
	Vehicle Center of Gravity	Y	AC-A126814	MSI 1201	9/16/2014
	Vehicle Center of Gravity	Z	AC-A120631	MSI 1201	9/16/2014
2	Right Sill at Front Seat	X	AC-A126795	MSI 1201	9/18/2014
	Right Sill at Front Seat	Y	AC-A127665	MSI 1201	9/18/2014
	Right Sill at Front Seat	Z	AC-A120610	MSI 1201	9/18/2014
3	Right Sill at Rear Seat	X	AC-A126794	MSI 1201	9/18/2014
	Right Sill at Rear Seat	Y	AC-A127679	MSI 1201	9/18/2014
	Right Sill at Rear Seat	Z	AC-A112915	MSI 1201	9/18/2014
4	Left Sill at Front Door	Y	AC-A127666	MSI 1201	9/18/2014
5	Left Sill at Rear Door	Y	AC-A120629	MSI 1201	9/18/2014
6	Left A-Post Lower	Y	AC-A127674	MSI 1201	9/18/2014
7	Left A-Post Middle	Y	AC-A120620	MSI 1201	9/18/2014
8	Left B-Post Lower	Y	AC-A120614	MSI 1201	11/5/2014
9	Left B-Post Middle	Y	AC-A081451	MSI 1201	11/5/2014
10	Front Seat Track	Y	AC-A081432	MSI 1201	11/5/2014
11	Rear Seat Track or Structure	Y	AC-A126816	MSI 1201	9/18/2014
12	Right Rear Occ. Compartment	Y	AC-A127662	MSI 1201	1/6/2015
13	Engine Block	X	AC-A120627	MSI 1201	9/16/2014
	Engine Block	Y	AC-A112910	MSI 1201	9/18/2014
14	Rear Floorpan Above Axle	X	AC-A120619	MSI 1201	9/18/2014
	Rear Floorpan Above Axle	Y	AC-A005916	MSI 1201	1/6/2015
	Rear Floorpan Above Axle	Z	AC-A120603	MSI 1201	9/18/2014

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	AC-C14901	ENDEVCO	10/14/2014
MDB Center of Gravity	Y	AC-CP30	ENDEVCO	10/14/2014
MDB Center of Gravity	Z	AC-C16680	ENDEVCO	10/14/2014
Left Frame at Rear Axle Centerline	X	AC-AH5M8	ENDEVCO	10/14/2014
Left Frame at Rear Axle Centerline	Y	AC-C16499	ENDEVCO	10/14/2014