

REPORT NUMBER: SINCAP-CAL-15-003

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

**Toyota Motor Corporation
2015 Toyota RAV-4
SUV**

NHTSA No: M20155311

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



April 3, 2015

FINAL REPORT

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

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Date: April 3, 2015

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Date: April 3, 2015

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract A 55/28, (61.90 kph / 38.5 mph), 90⁰ Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2015 Toyota RAV-4 SUV in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 28, 2015. The impact velocity of the Moving Deformable Barrier (MDB) was 62.24 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 198 mm located at level 2. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>168.389</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>14.594</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>722.944</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1696.713</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>188.852</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>G</td> <td>82</td> <td>53.781</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>1780.025</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>5.752</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>17.167</td> </tr> </tbody> </table> * Proposed IARV The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.						Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	168.389	Maximum Thoracic Rib Deflection	mm	44	14.594	Total Abdominal Force	N	2500	722.944	Pubic Symphysis Force	N	6000	1696.713	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	188.852	Lower Spine Resultant Acceleration	G	82	53.781	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1780.025	Maximum Thoracic Rib Deflection	mm	38*	5.752	Maximum Abdominal Rib Deflection	mm	45*	17.167
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17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs			18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																																																				
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 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 Toyota RAV-4 SUV. 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 Toyota RAV-4 SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.24 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation's Transportation Test Operations Center in Buffalo, New York on January 28, 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	168.389
Maximum Thorax Rib Deflection	mm	44	14.594
Combined Abdominal Force	N	2500	722.944
Pubic Symphysis Force	N	6000	1696.713

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	188.852
Lower Spine (T12) Resultant Acceleration	G	82	53.781
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1780.025
Maximum Thoracic Rib Deflection	mm	38*	5.752
Maximum Abdominal Rib Deflection	mm	45*	17.167

*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 Data after 18ms
- Head CG X Acceleration - Questionable Spike at 18ms

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 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20155311
Model Year	2015
Make	Toyota
Model	RAV-4
Body Style	SUV
VIN	JTMZFREV5FD046861
Body Color	Red
Odometer Reading (km/mi)	40.23 km / 25 mi
Engine Displacement (L)	2.5
Type/No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	-
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	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	Toyota Motor Corporation
Date of Manufacture	11/14
Vehicle Type	Passenger

GVWR (kg)	2055
GAWR Front (kg)	1150
GAWR Rear (kg)	1150

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Capacity Weight (VCW) (kg)				404
DSC X 68.04 kg				340.2
Cargo Weight (RCLW) (kg)				63.8

(A)

(B)

(A-B)

VEHICLE SEAT TYPE

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

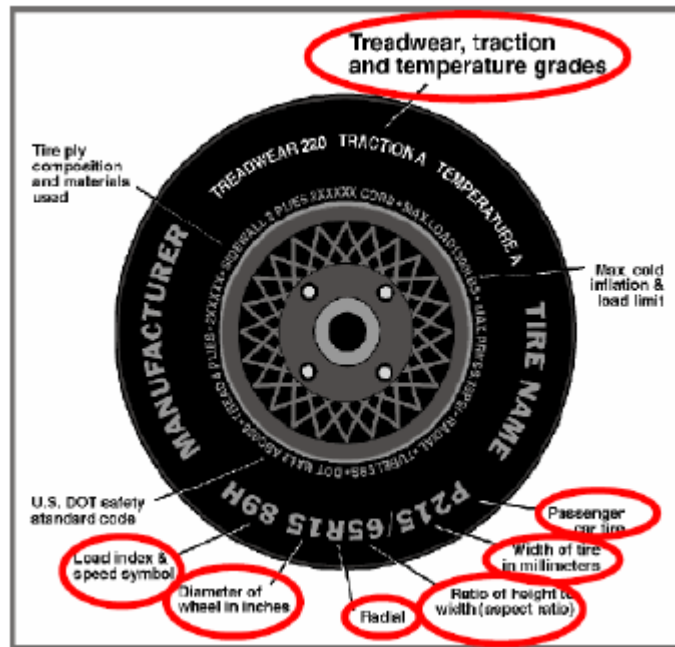
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

VEHICLE TIRE INFORMATION

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



TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	P225/65R17	P225/65R17
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander G91	Geolander G91
Treadwear	280	280
Traction	B	B
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	102H	102H
Tire Material	Rubber	Rubber
DOT Safety Code Left	PEK4014	PEK4414
DOT Safety Code Right	PEK4314	PEK4414

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

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	270	265	260	270
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	484	329		532	401.5		520	417	
Right	kg	448	314		439	388.5		456	381	
Ratio	%	59%	41%		55.6%	45%		55%	45%	
Totals	kg	932	643	1575	971	790	1761	976	798	1774

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1575.0	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	129.0	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	63.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1767.8	(A+B+C)

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

(i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	805	803	Yes
RF	mm	819	813	Yes
RR	mm	823	822	Yes
LR	mm	803	798	Yes
Vehicle CG (Aft of Front Axle)	mm	1196	1193	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	44.3	47	

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

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

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

Test Vehicle:	<u>2015 Toyota RAV-4 SUV</u>	NHTSA No.:	<u>M20155311</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>1/28/2015</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	2
Spare Tire & Jack	20
Trim Panel	10
Ballast / Equipment Added	45

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

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

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	18.3	11.3	14.8
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 SCRП Height (mm)	SCRП Height Position	SCRП Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	14.8	22	Max	44	44	44
			Mid	22	22	22
			Min	0	0	0
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 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

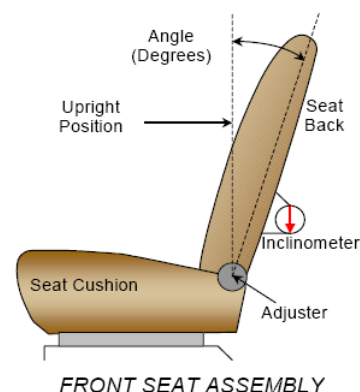
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	25	120	12
Front Passenger Seat	260	27	130	13
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

**if applicable*

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	-8.2 to 45	N/A	6.0	N/A
Front Passenger Seat	-7.9 to 44.5	N/A	4.2	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	2.7 to 27	N/A	2.7	N/A
Non-Struck Side Rear Seat	2.7 to 27	N/A	2.7	N/A
Rear Center Seat*	2.9 to 26.5	N/A	2.9	N/A

**if applicable*

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

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4	0 – Uppermost
Rear Seat	Not Adjustable	Not Adjustable

HEAD RESTRAINT ADJUSTMENT

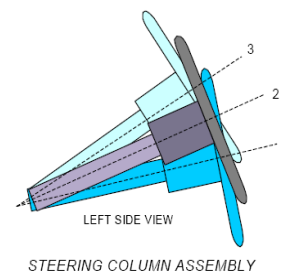
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	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.

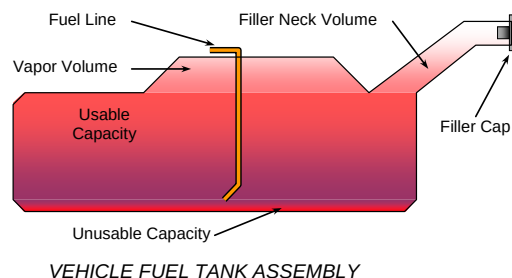
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	23.2	
Geometric Center – Position 2	25.2	
Uppermost – Position 3	27.2	
Telescoping Steering Wheel Travel		38
Test Position	25.2	19



FUEL PUMP

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

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



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

Test Vehicle: <u>2015 Toyota RAV-4 SUV</u>	NHTSA No.: <u>M20155311</u>	
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>1/28/2015</u>	

FUEL TANK CAPACITY

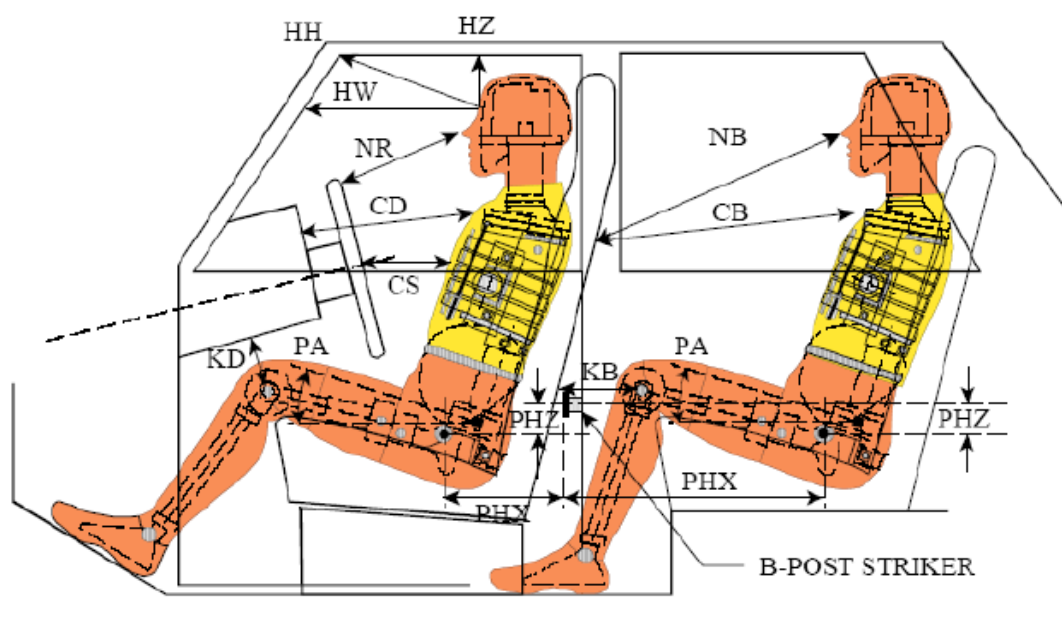
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	60.2
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	60.2
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	56.0
Actual Amount of Solvent Used in Test	56.0
1/3 of Usable Capacity	20.0

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



LEFT SIDE VIEW

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

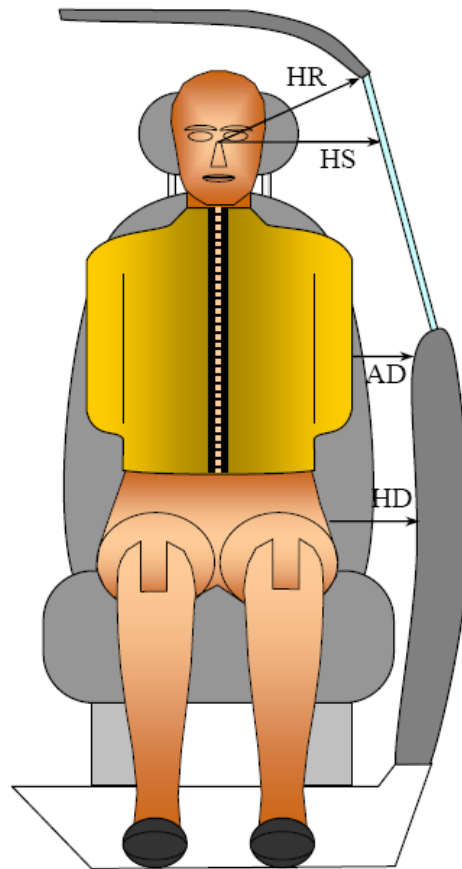
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No. 303)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	375			
HW		Header to Windshield	603			
HZ	HZ	Head to Roof Liner	178		283	
NR	NB	Nose to Rim/Seat Back	465		514	
CD	CB	Chest to Dash/Seat Back	544		532	
CS		Chest to Steering Wheel	354			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	150	29.1	302	19.4
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	130	24.2	303	18.2
PAX°	PAX°	Pelvic Tilt Angle X		22.5		19.4
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	188		726	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	195		160	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



FRONT VIEW OF DUMMY

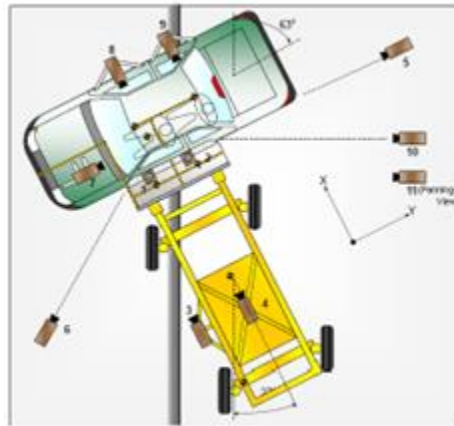
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 303)
HR	Head to Side Header	mm	203	280
HS	Head to Side Window	mm	310	375
AD	Arm to Door	mm	101	190
HD	Hip Point to Door	mm	145	186

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

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



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	24	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	0	9595	-1154	24	1000
6	Left Front	-2852	-4007	-1195	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

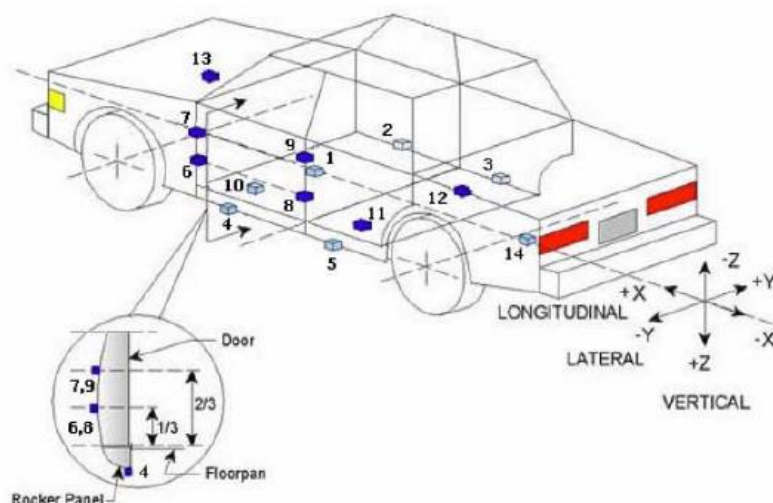
INSTRUMENTATION

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 Toyota RAV-4 SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
Test Date: 1/28/2015



TEST VEHICLE ACCELEROMETER LOCATIONS

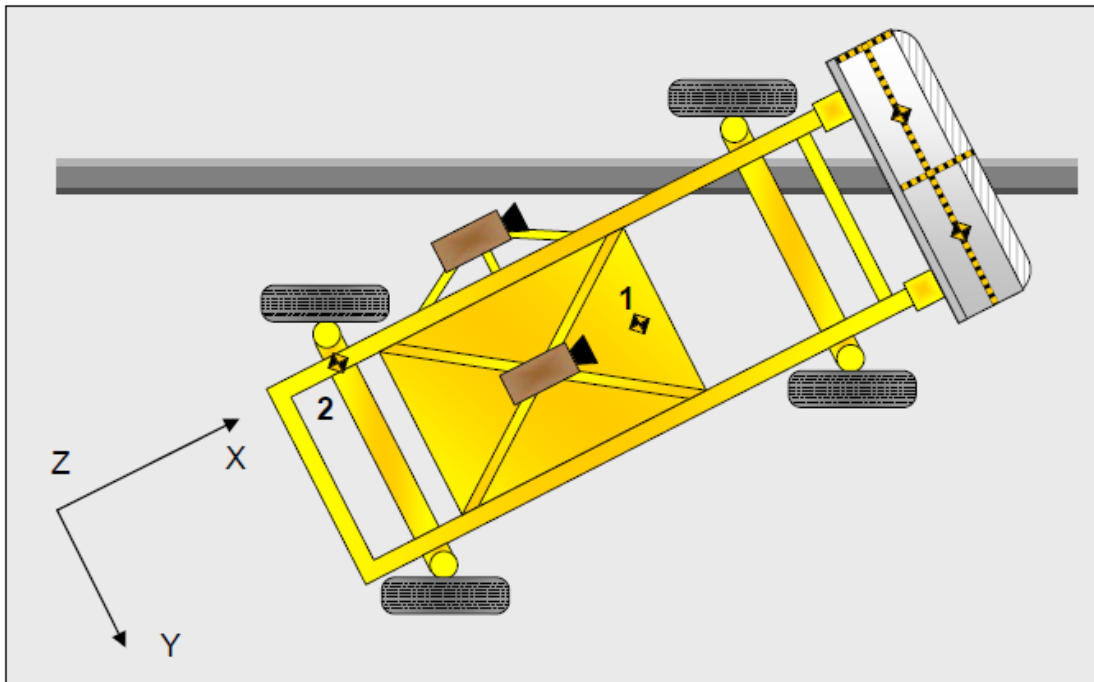
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2479	38	-65
2	Right Sill at Front Seat	2678	679	93
3	Right Sill at Rear Seat	1812	676	97
4	Left Sill at Front Door	2727	-671	109
5	Left Sill at Rear Door	1810	-672	109
6	A-Post Lower	3178	-637	-100
7	A-Post Middle	3088	-675	-633
8	B-Post Lower	2169	-693	-131
9	B-Post Middle	2122	-693	-388
10	Front Seat Track	2336	-556	60
11	Rear Seat Structure	1366	-529	10
12	Rt. Rear Occ. Compartment	1966	348	120
13	Engine Block	3852	-85	-358
14	Rear Above Axle	1001	3	-4

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 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



MDB ACCELEROMETER LOCATIONS

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

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

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2015 Toyota RAV-4 SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
Test Date: 1/28/2015

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Curtain Airbag & Side Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Headrest & Curtain Airbag	Curtain Airbag & Headrest
Left Shoulder	Curtain Airbag	Passenger Door
Upper Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Lower Torso	Seatback	Passenger Door
Left Hip	Seatback & Torso/Pelvis Airbag	Passenger Door
Left Knee	Driver'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 Buckled
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

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		2659
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		391
Actual Impact Point (Aft of Frontal Axle)	mm		391
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	0

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2015 Toyota RAV-4 SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
Test Date: 1/28/2015

MDB SPECIFICATIONS

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

MDB WEIGHTS

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

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	62.24
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	62.26
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5
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

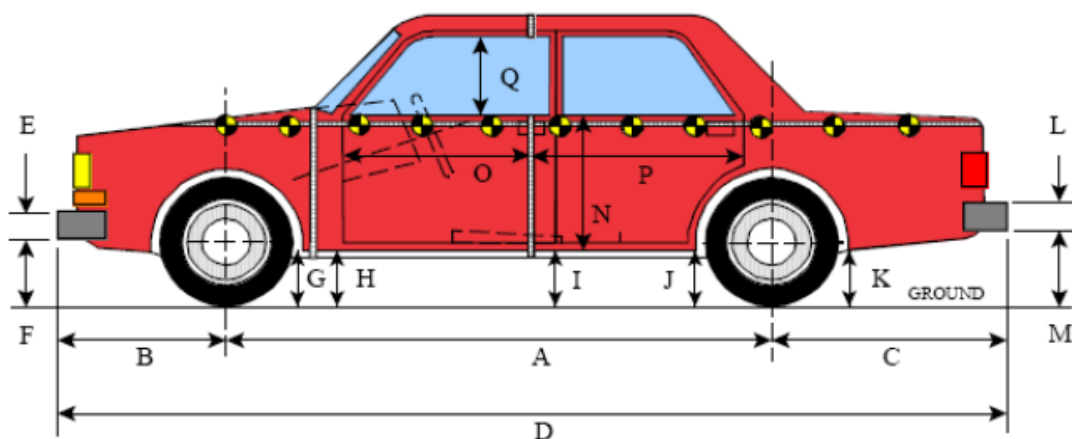
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	229
B	Top of Bumper	533	800	Left	162
C	Mid-Level	686	800	Left	143
D	Top of Stack	813	800	Left	180

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



LEFT SIDE VIEW

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

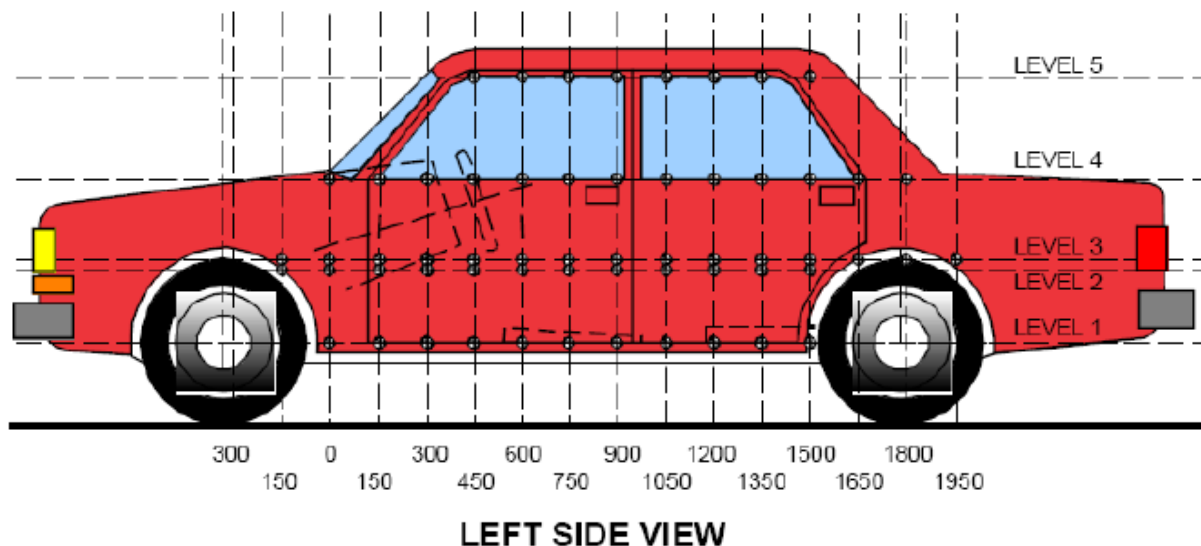
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2659	2661	2
B	Front Axle to FSOV	908	913	6
C	Rear Axle to RSOV	1003	990	-13
D	Total Length at Centerline	4568	4564	-4
E	Front Bumper Thickness	90	90	0
F	Front Bumper Bottom to Ground	494	498	4
G	Sill Height at Front Wheel Well	259	255	-4
H	Sill Height at Front Door Leading Edge	259	255	-4
I	Sill Height at B Pillar	280	297	17
J1	Sill Height at Rear Wheel Well	284	282	-2
J2	Pinch Weld Height at Rear Wheel Well	235	230	-5
K	Sill Height Aft of Rear Wheel Well	302	302	0
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	414	407	-7
N	Sill Height to Window Bottom of Front Window Sill	730	685	-45
O	Front Door Leading Edge to Impact CL	775	759	-16
P	Rear Door Trailing Edge to Impact CL	1168	1140	-27
Q	Front Window Opening	456	472	16
R	Right Side Length	4471	4472	1
S	Left Side Length	4471	4464	-7
T	Maximum Vehicle Width	1827	1657	-170

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	361	74	1650
2	Driver Hip Point	mm	690	198	1350
3	Mid-Door	mm	785	188	1500
4	Window Sill	mm	1022	79	1350
5	Window Top	mm	1567	6	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 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

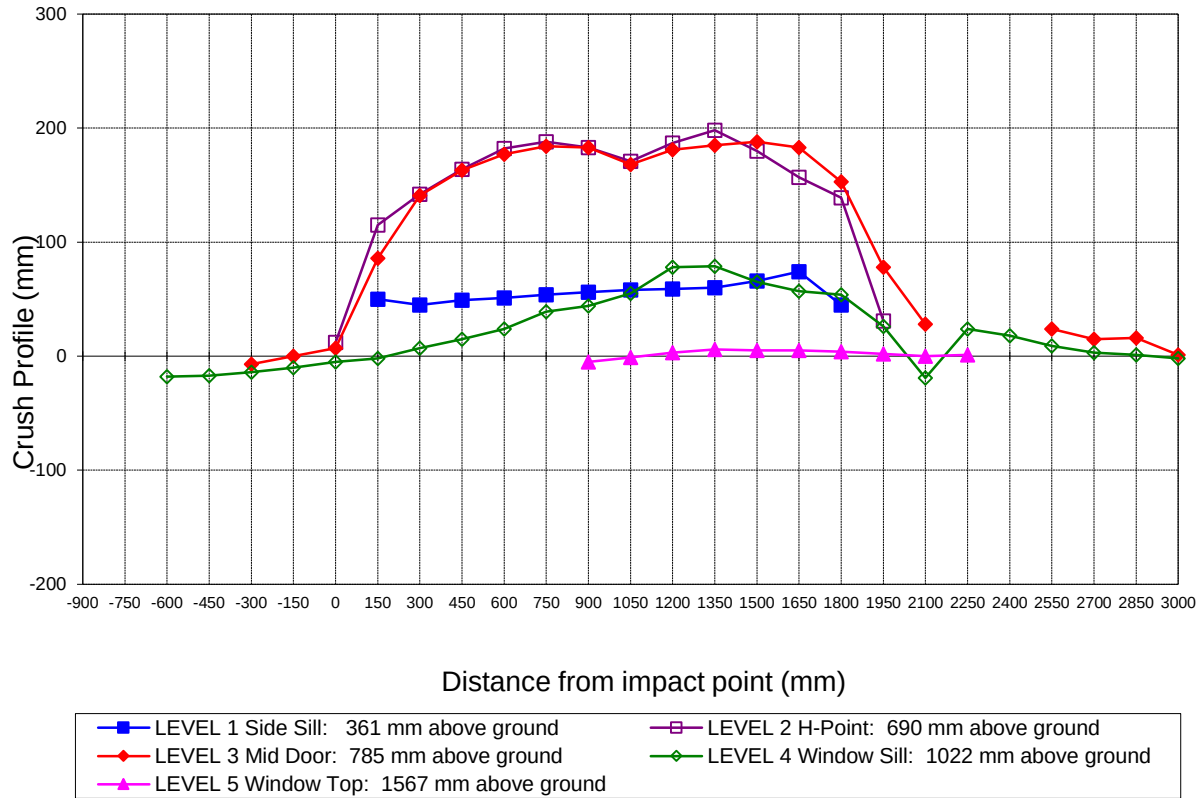
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600				794					812					-18	
-450				813					830					-17	
-300			915	821				922	835				-7	-14	
-150			915	822				915	832				0	-10	
0		914	914	824			902	905	829			12	9	-5	
150	861	906	902	831		811	791	816	833		50	115	86	-2	
300	854	905	903	844		809	763	762	837		45	142	141	7	
450	853	906	907	861		804	742	744	846		49	164	163	15	
600	852	908	909	869		801	726	732	845		51	182	177	24	
750	852	908	911	876		798	720	727	837		54	188	184	39	
900	851	909	913	879	611	795	726	730	835	616	56	183	183	44	-5
1050	851	909	914	881	625	793	738	746	826	626	58	171	168	55	-1
1200	850	908	914	882	628	791	721	733	804	625	59	187	181	78	3
1350	849	908	913	881	628	789	710	728	802	622	60	198	185	79	6
1500	853	906	912	881	626	787	726	724	816	621	66	180	188	65	5
1650	870	905	910	879	627	796	748	727	822	622	74	157	183	57	5
1800	880	908	908	877	625	835	769	755	823	621	45	139	153	54	4
1950		913	916	904	620		882	838	878	618		31	78	26	2
2100			915	896	608			887	915	608			28	-19	0
2250				863	592				839	591				24	1
2400				855					837					18	
2550			906	844				882	835				24	9	
2700			885	832				870	829				15	3	
2850			847	820				831	819				16	1	
3000			788	766				787	768				1	-2	

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 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

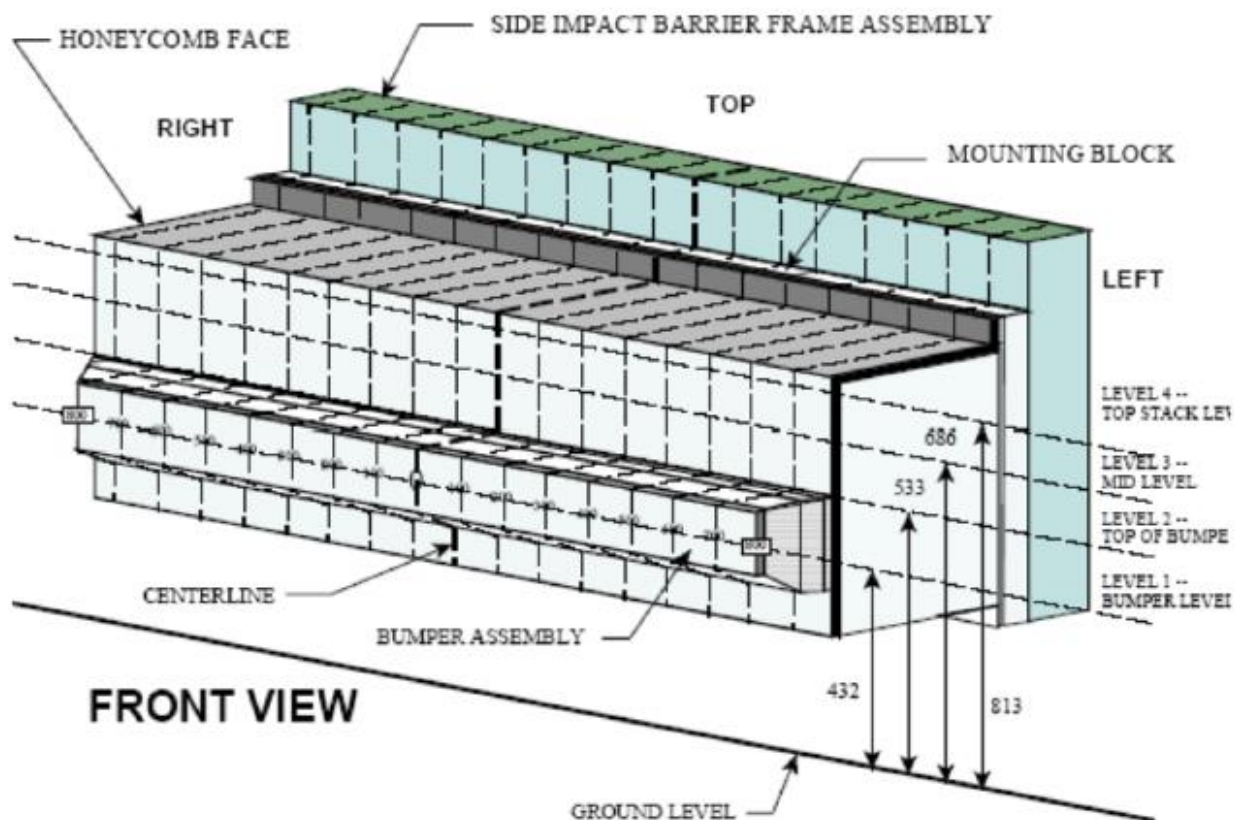


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

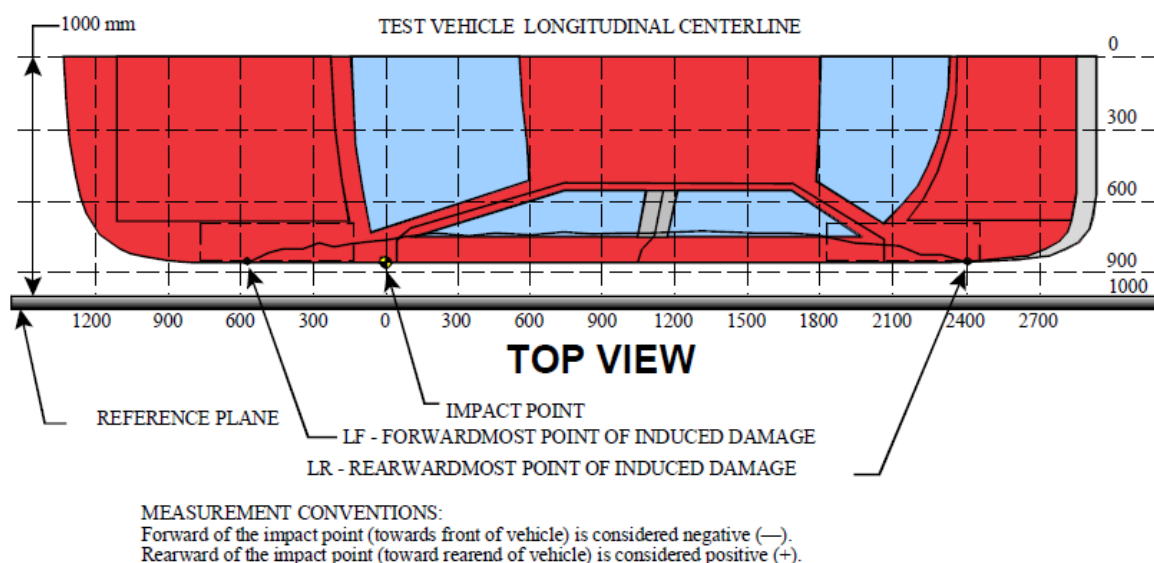
Stack Level	Distance Right of Center									C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0		100	200	300	400	500	600	700	800
1	215	219	218	219	219	219	219	220	220	220	221	221	221	221	219	223	229	
2	126	126	127	125	80	81	100	92	83	125	124	124	125	127	128	134	162	
3	98	87	73	56	60	69	90	91	79	74	63	61	68	80	97	121	143	
4	96	75	68	66	74	83	106	102	87	77	79	82	86	100	116	142	180	

DATA SHEET NO. 13 **MDB EXTERIOR STATIC CRUSH MEASUREMENTS**

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015

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



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-300	3	78	85	-7
2	180	3	195	98	97
3	660	3	270	90	180
4	1140	3	262	86	176
5	1620	3	274	90	184
6	2100	3	113	85	28

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	229
2	480 mm left of center	1	221
3	160 mm left of center	1	220
4	160 mm right of center	1	220
5	480 mm right of center	1	219
6	800 mm right of center	1	215

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

Test Vehicle: <u>2015 Toyota RAV-4 SUV</u>	NHTSA No.: <u>M20155311</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>1/28/2015</u>

Test Time: <u>6:33 PM</u>	Temperature: <u>21°C</u>
---------------------------	--------------------------

- | | |
|---|-----------------------------|
| A. From impact until vehicle motion ceases:
(Maximum allowable is 1 oz.) | <u>0</u> oz. |
| B. For the 5-minute period after motion ceases:
(Maximum allowable is 5 oz.) | <u>0</u> oz. |
| C. For the following 25 minutes:
(Maximum allowable is 1 oz./minute) | <u>0</u> oz. |
| D. Spillage Details: | <u>No Spillage Occurred</u> |

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	73	300	373
90° to 180°	71	300	371
180° to 270°	62	300	362
270° to 360°	67	300	367

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

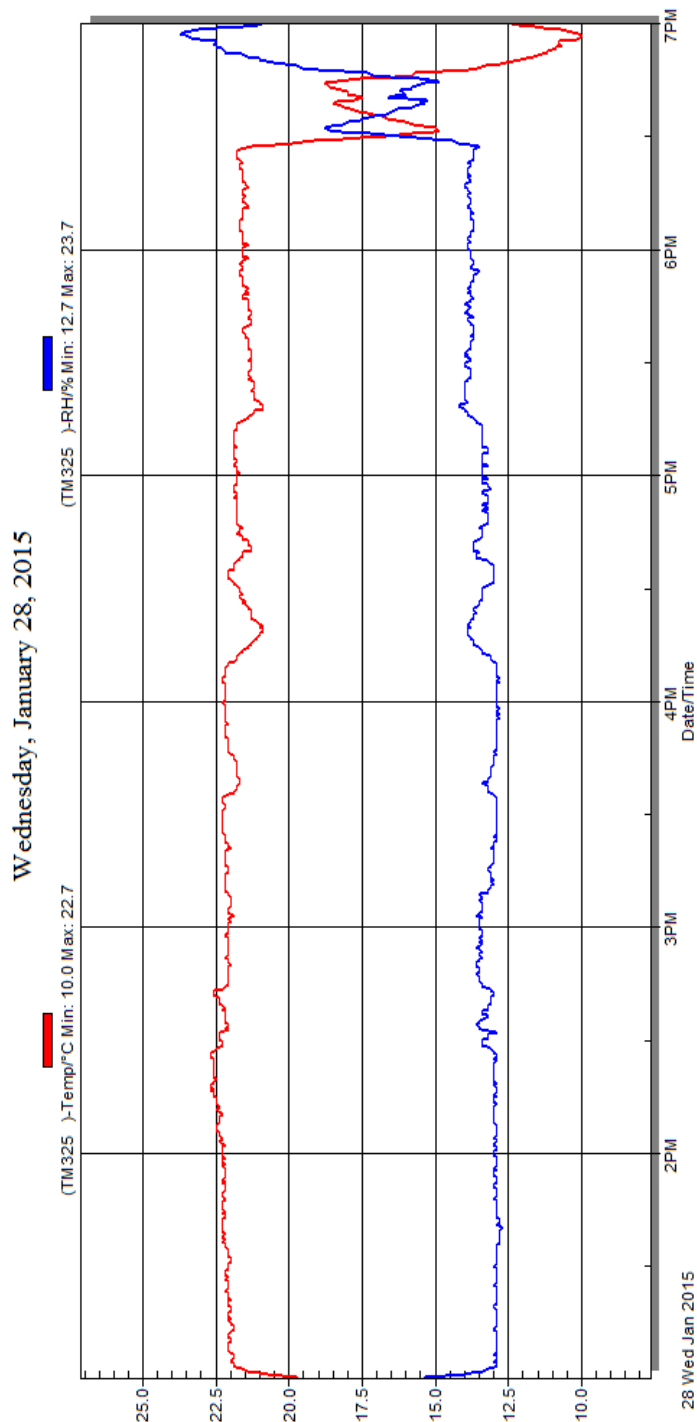
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

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

Test Vehicle: 2015 Toyota RAV-4 SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20155311
 Test Date: 1/28/2015



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

APPENDIX A
PHOTOGRAPHS

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



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

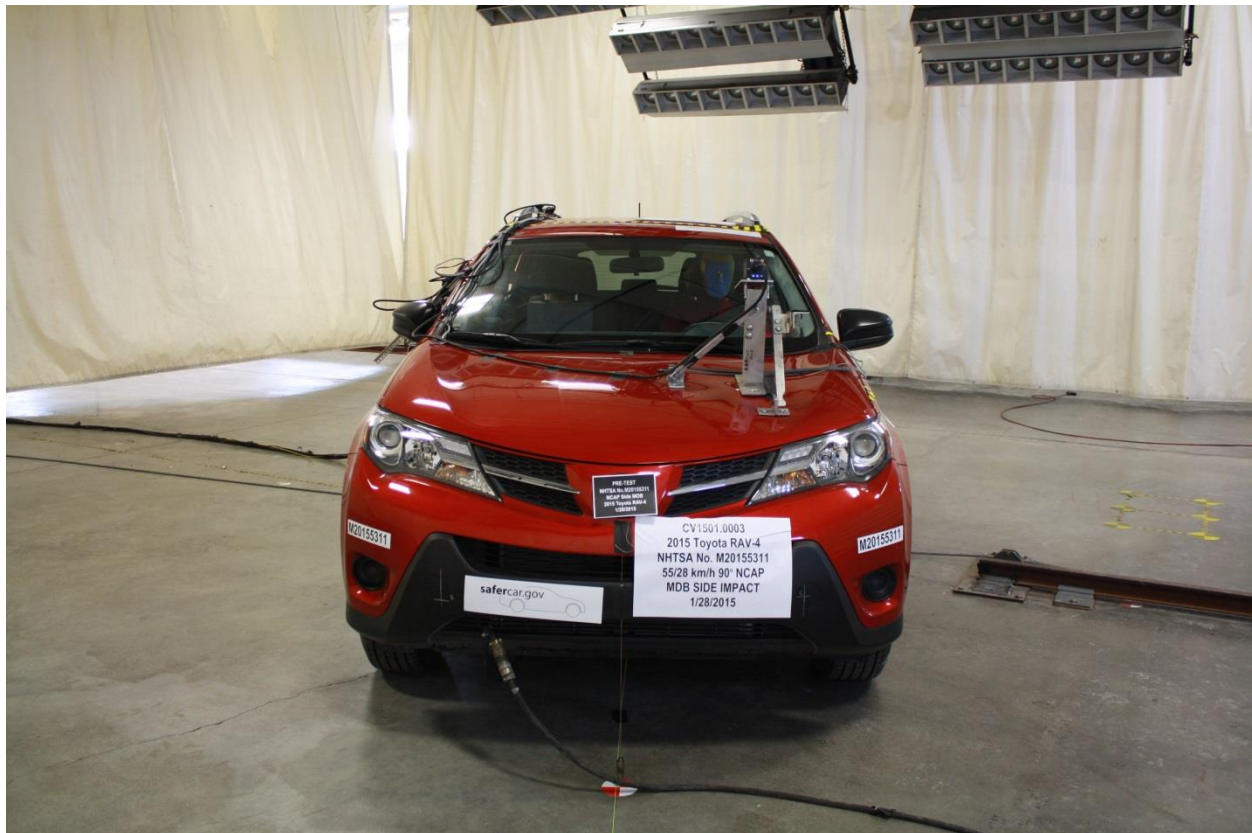


Figure A-3: Pre-Test Frontal View of Test Vehicle



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



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



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



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



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

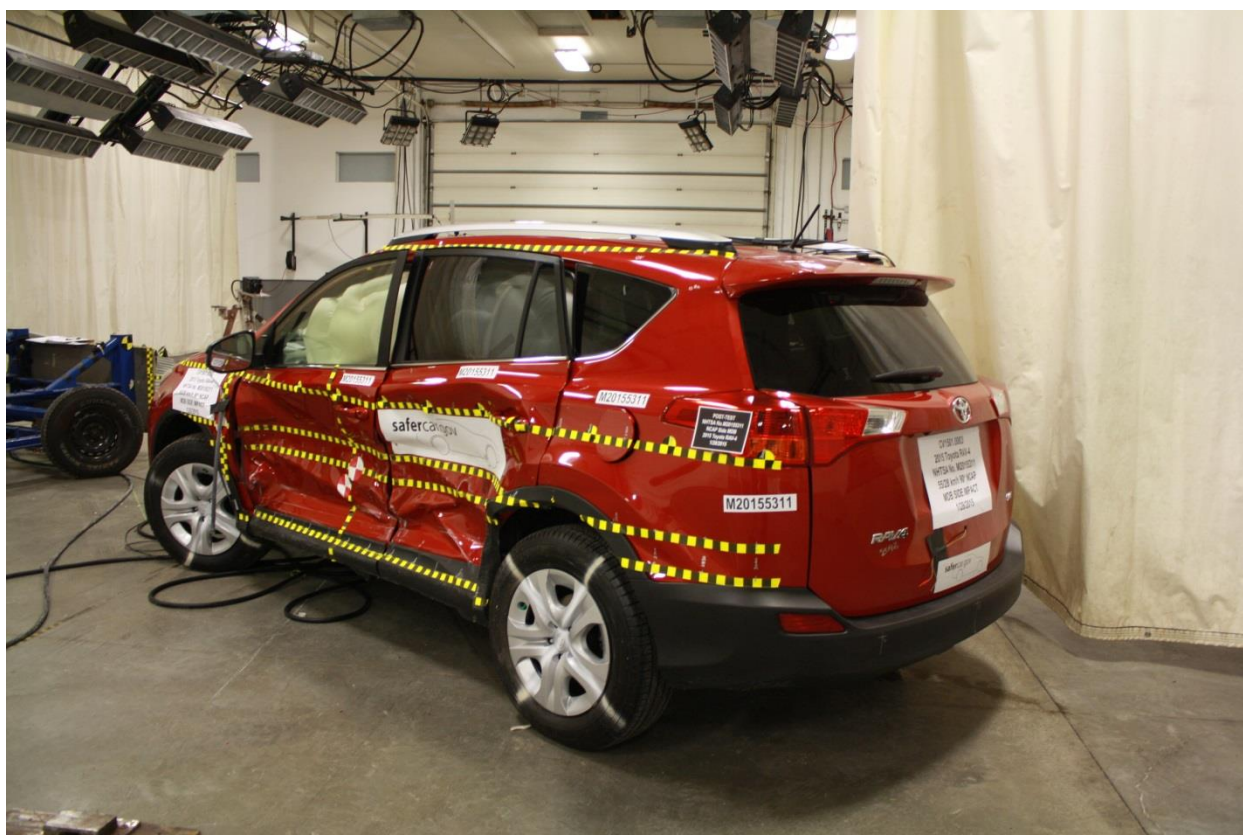




Figure A-11: Pre-Test Rear View of Test Vehicle



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

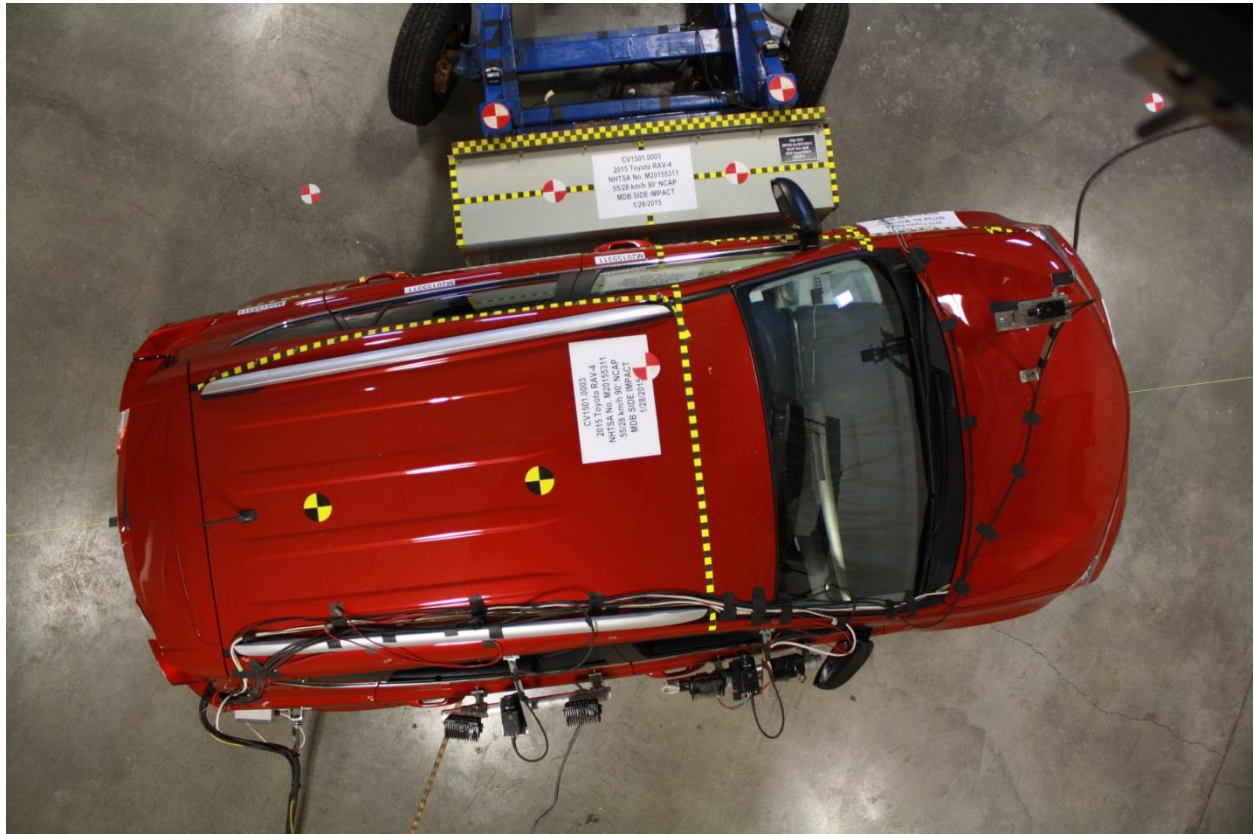


Figure A-15: Pre-Test Overhead View of the Test Area



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

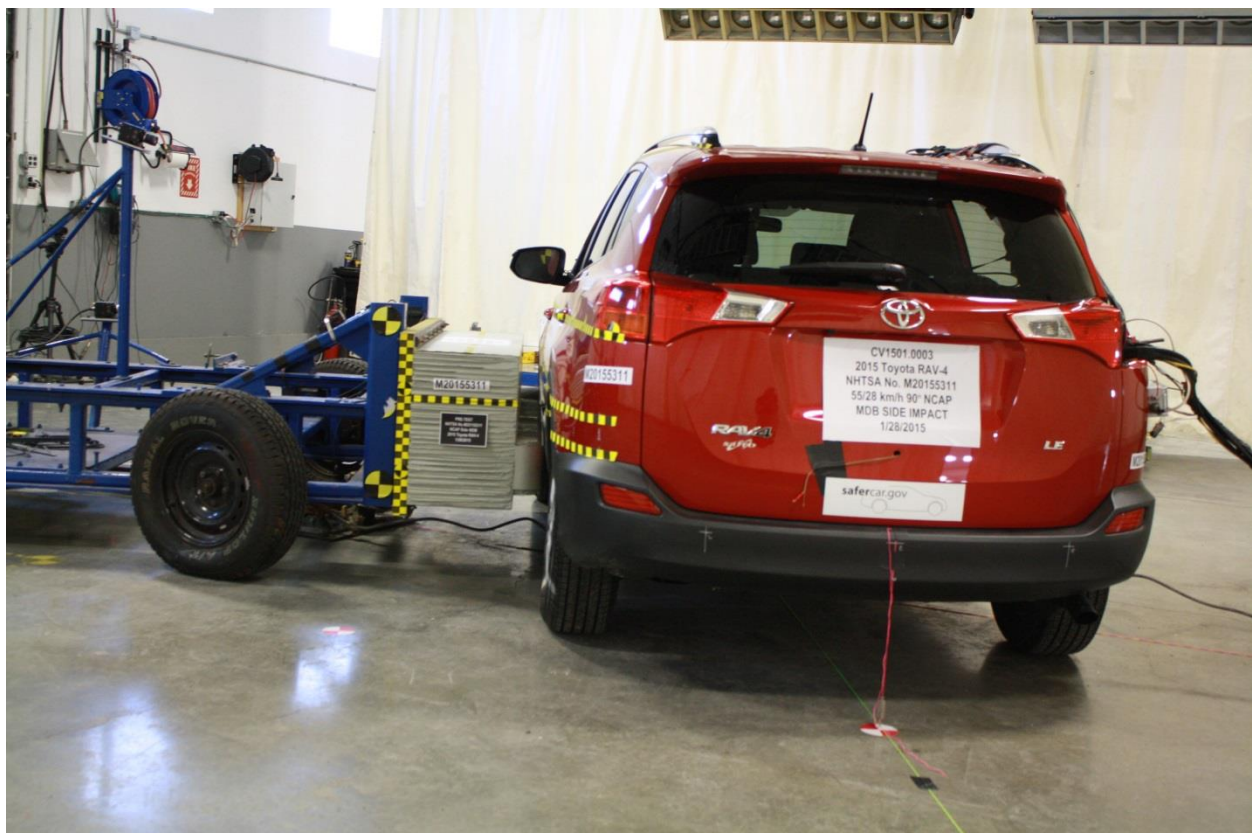


Figure A-18: Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



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

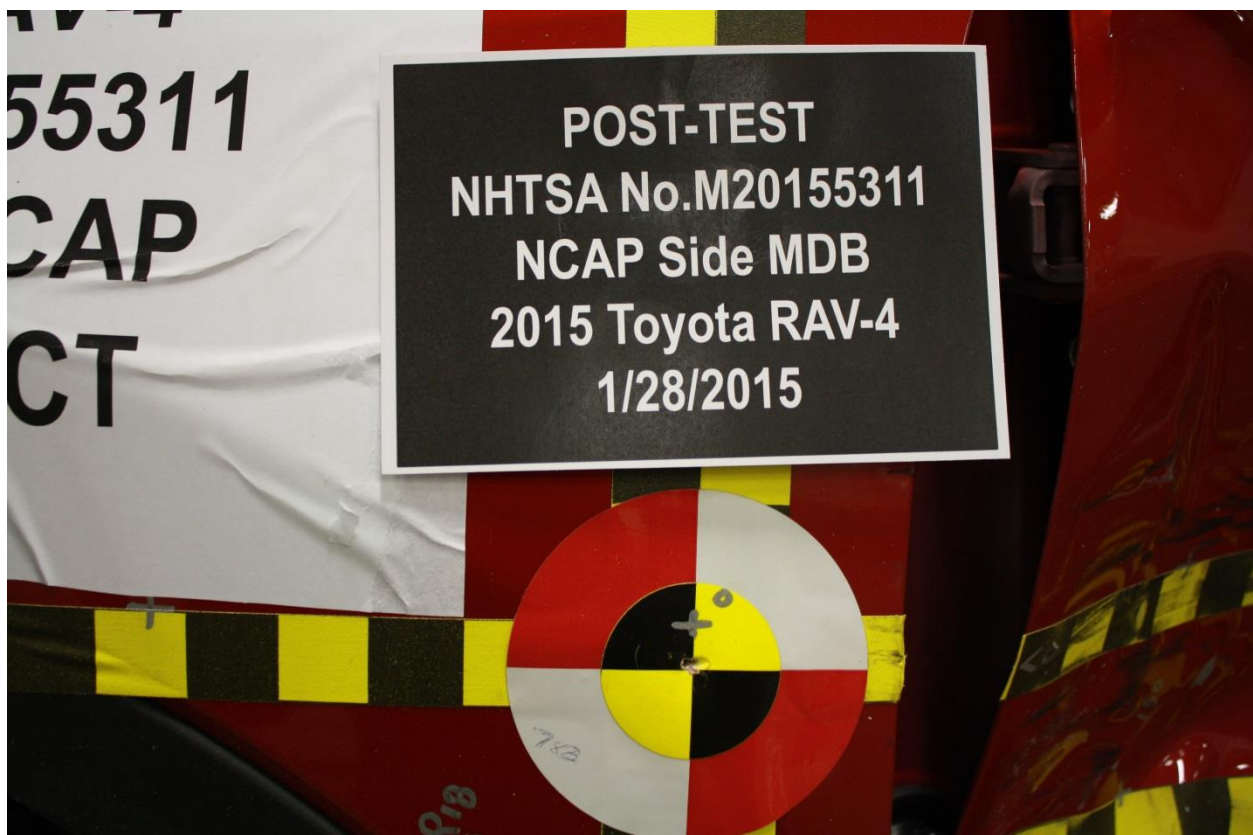


Figure A-20: Post-Test Close-up View of Impact Point Target



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

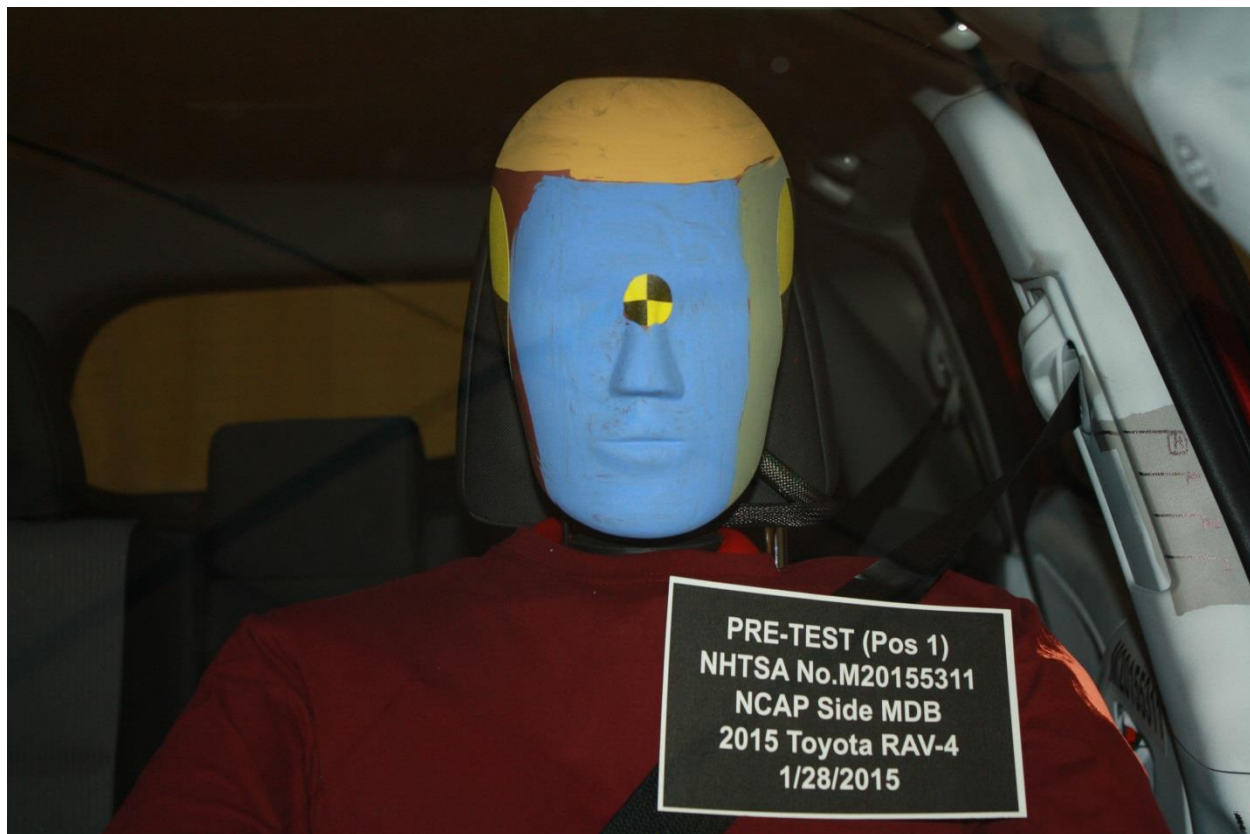


Figure A-25: Pre-Test Front Close-up View of Driver Dummy



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

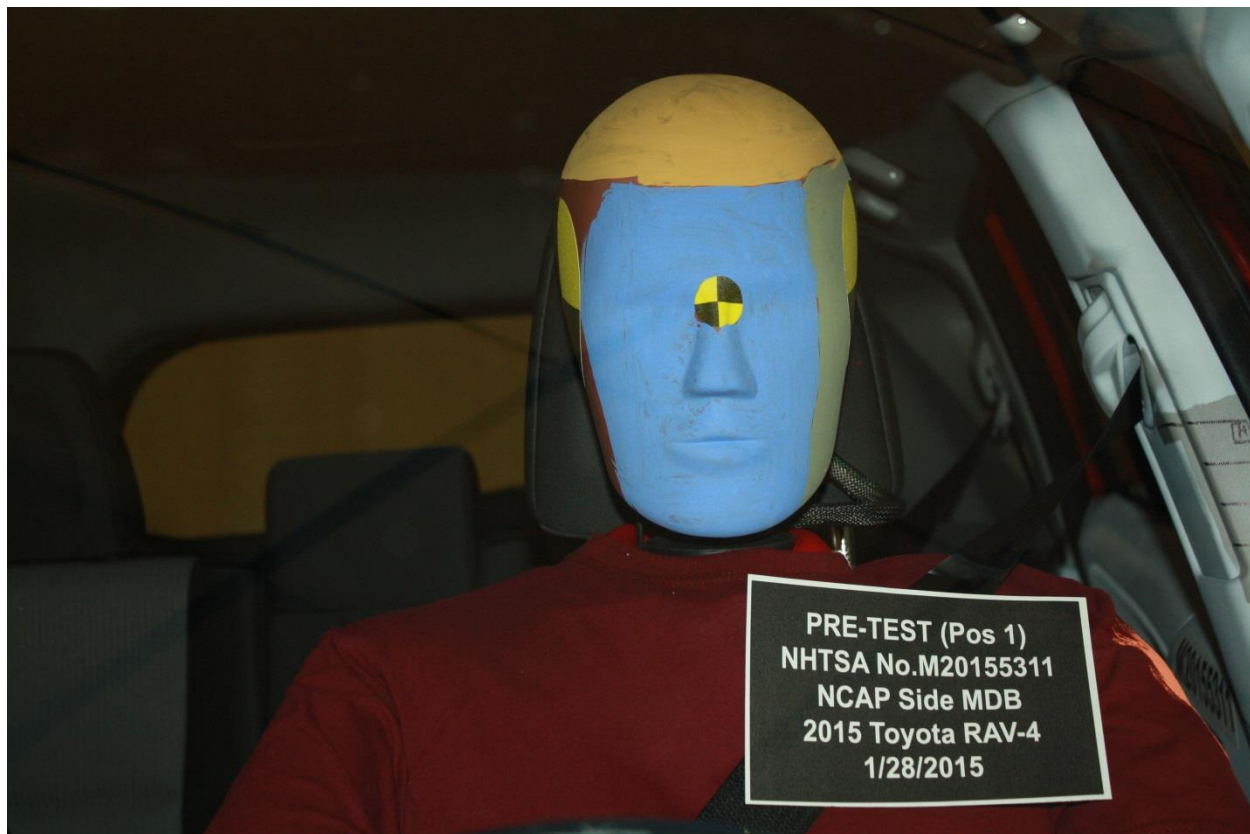


Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



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

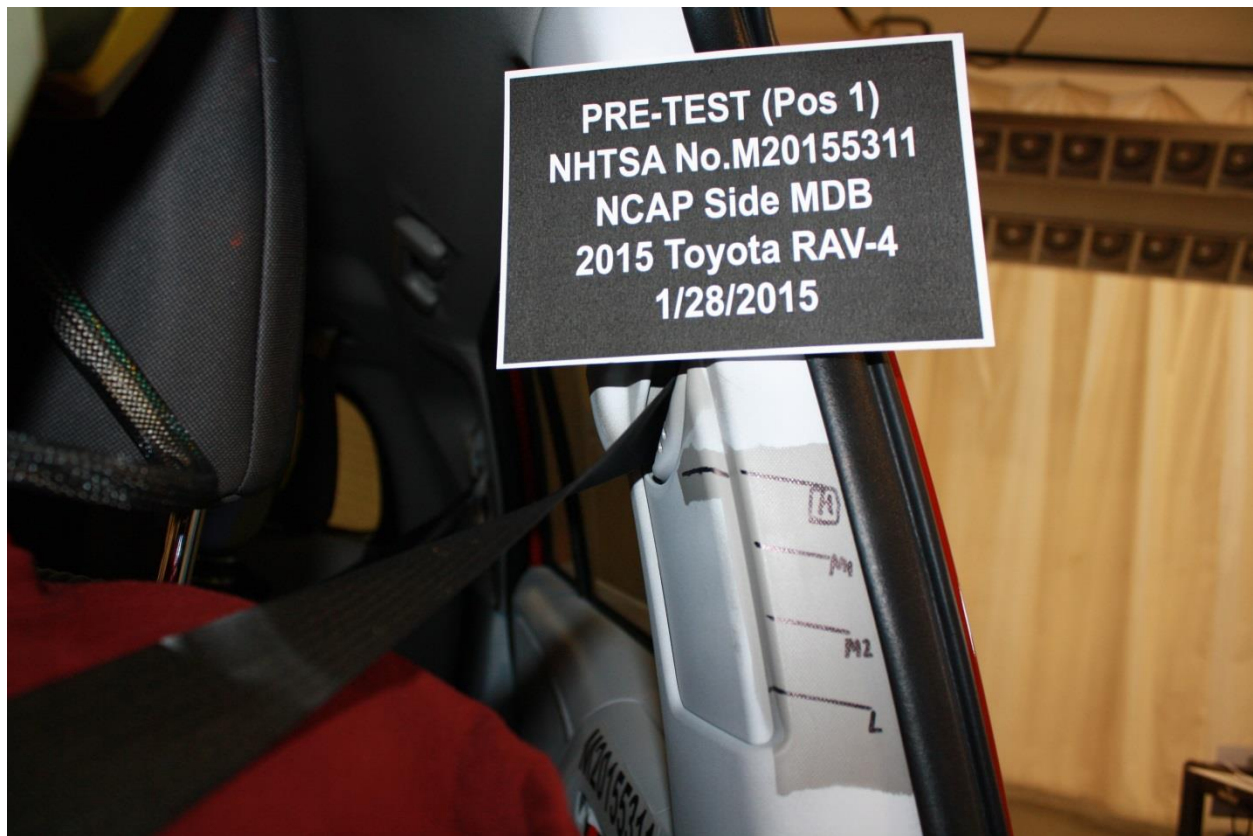


Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy



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

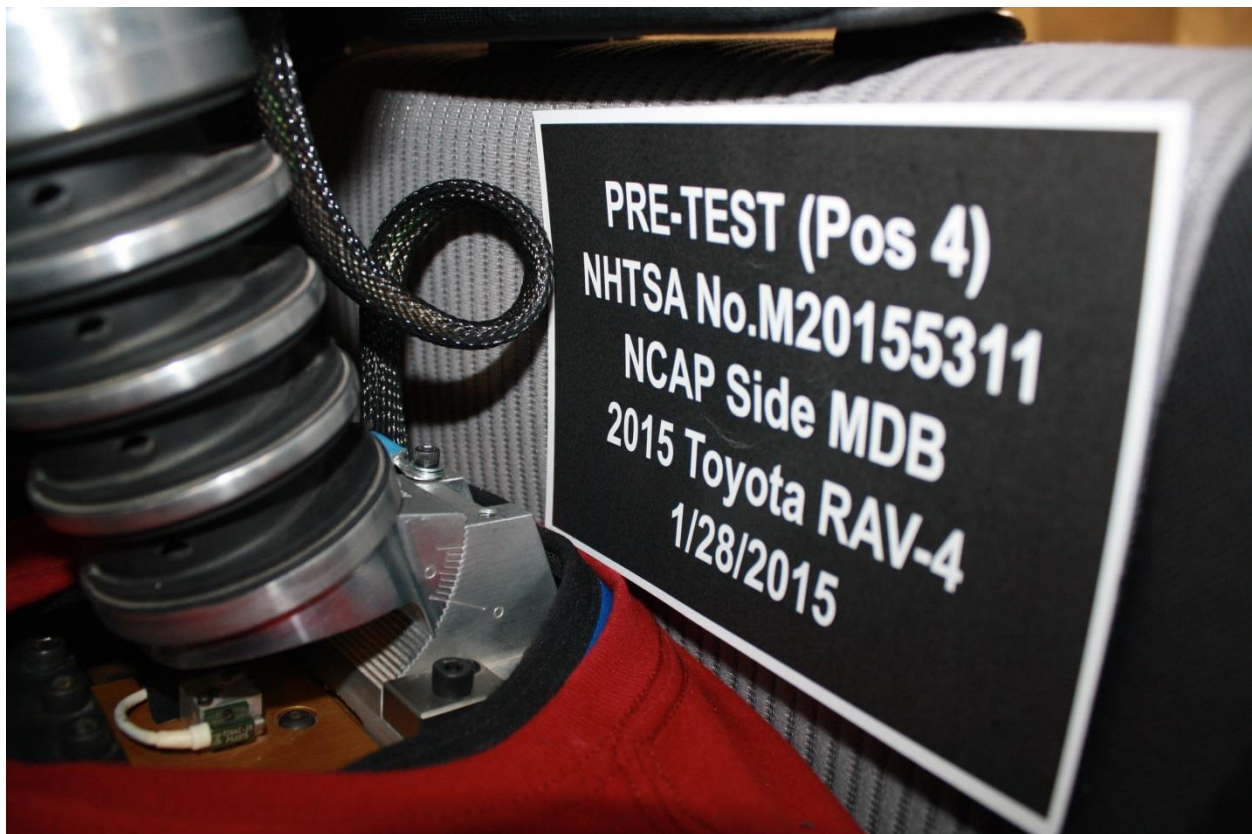


Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



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

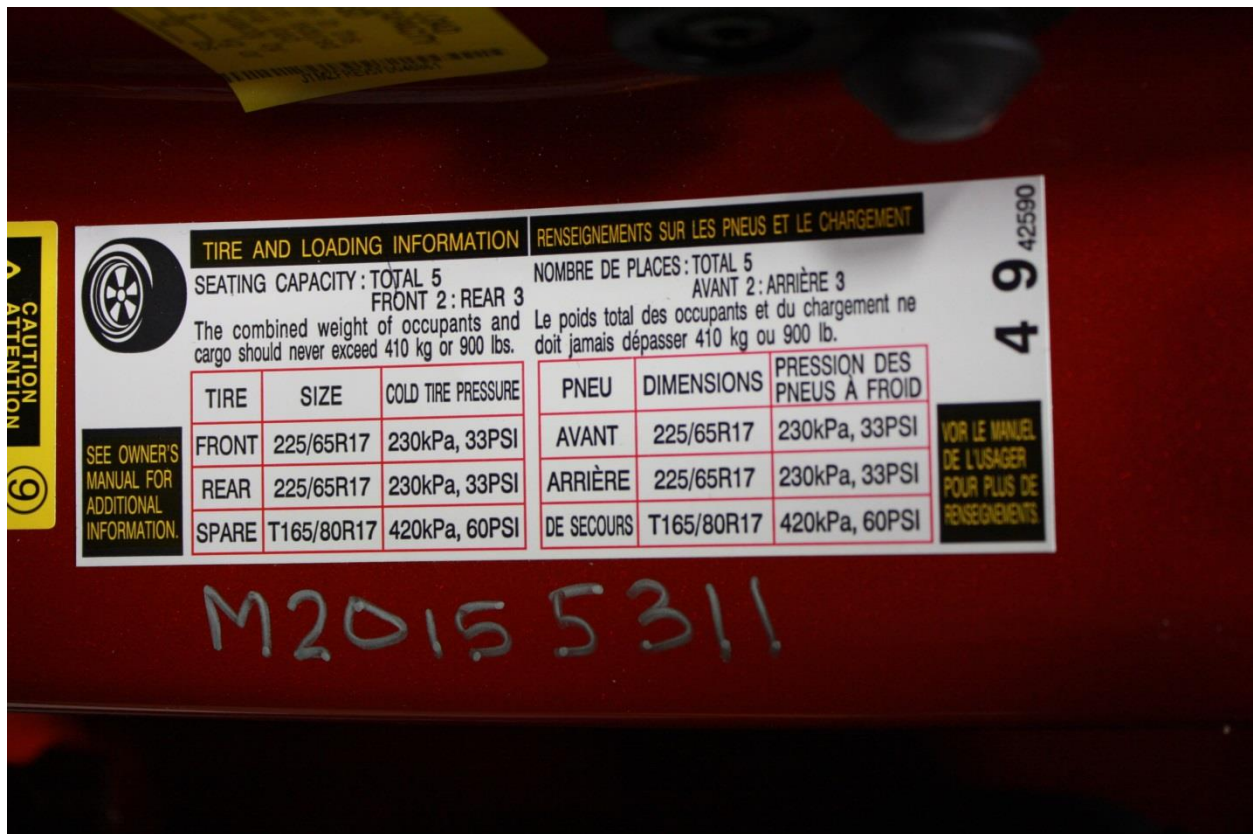


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label

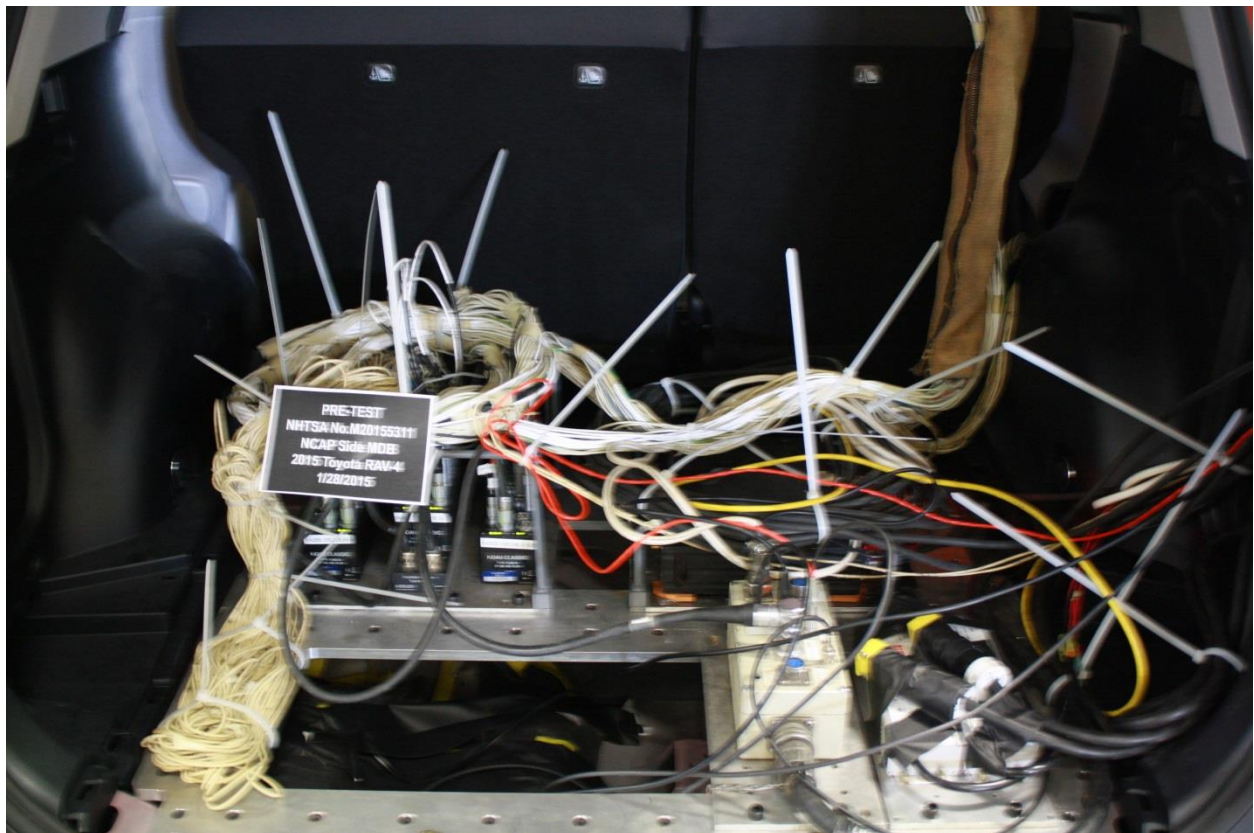


Figure A-94: Pre-Test Ballast View



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



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

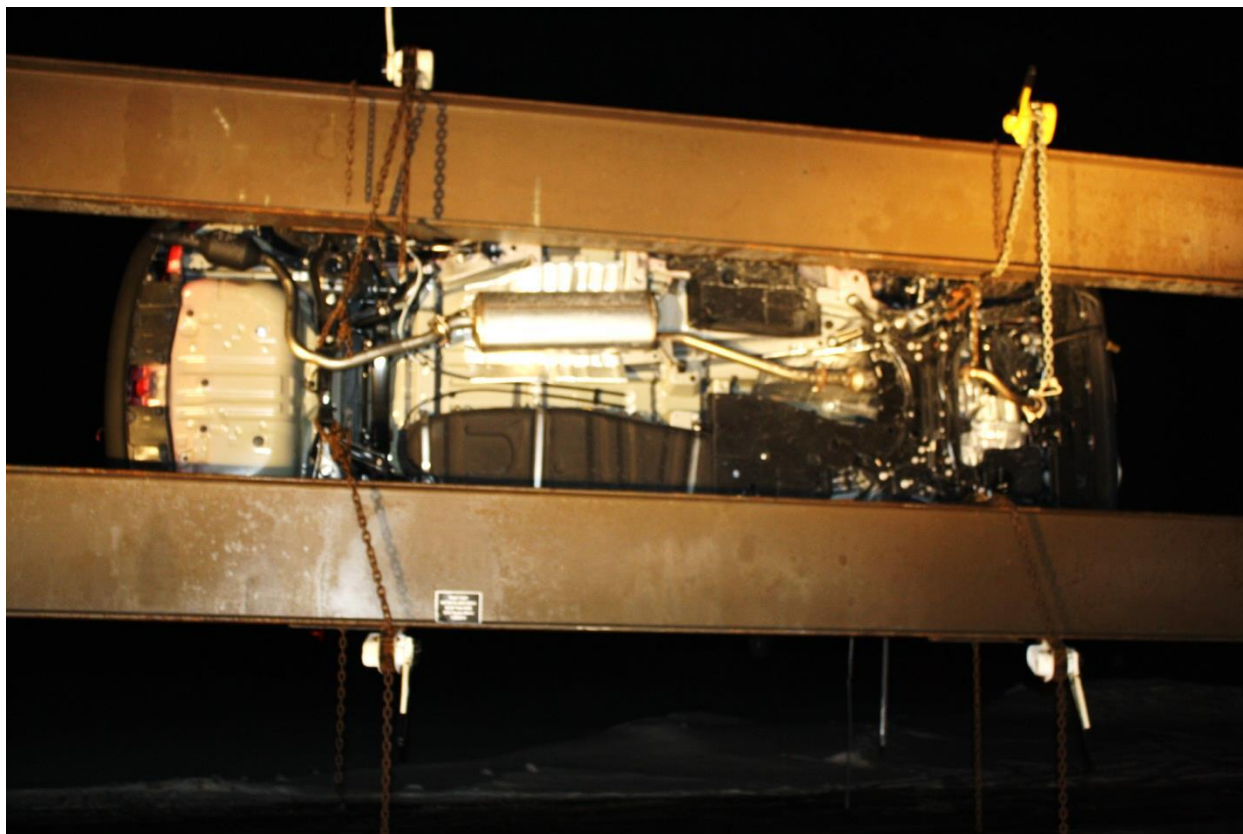


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

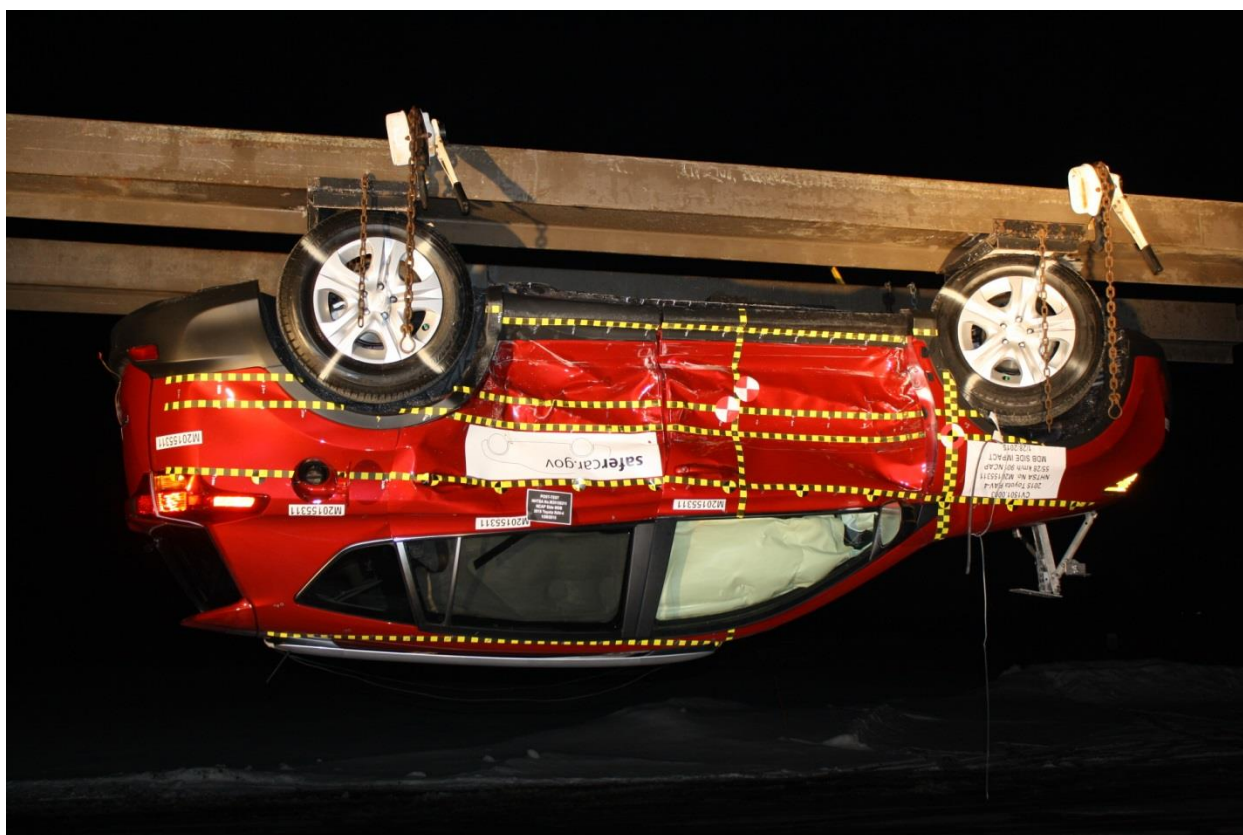


Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees



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

TOYOTA
Let's Go Places

DESC.: **RAV4** LE FWD SUV
VIN: **JTMZFREV5FD046861**
YR/MDL: 2015/4430C
CLR: BARCELONA RED MET/FB10 (R3R3/10)
PORT/PLANT: Portland, OR RAILHEAD:

STANDARD EQUIPMENT

MECHANICAL & PERFORMANCE

- 2.5L DOHC 4-Cylinder Engine w/Dual VVT-i
- 176 hp @ 6000 rpm / 172 lb-ft @ 4100 rpm
- 6-Speed Automatic Transmission
- Front Wheel Drive (FWD)
- Eco and Sport Modes

SAFETY & CONVENIENCE

- Star Safety System: Enhanced Vehicle Stability Control, Traction Control, Anti-Lock Brakes, Electronic Brake Force Distribution, Brake Assist and Smart Stop Technology
- LATCH-Lower Anchor & Tether for Children

MANUFACTURER'S SUGGESTED RETAIL PRICE \$23,680.00

OPTIONAL EQUIPMENT

FE	50 State Emissions	150.00
RR	Roof Rails	90.00
TC	Tonneau Cover	200.00
ZQ	All Weather Mats/Cargo Tray	

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver	Not Rated
	Passenger	Not Rated

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash	Front seat	Not Rated
	Rear seat	Not Rated

Based on the risk of injury in a side impact.

Rollover Not Rated
Based on the risk of rollover in a single-vehicle crash.

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

EPA DOT Fuel Economy and Environment

Fuel Economy

26 MPG
combined city/hwy
3.8 gallons per 100 miles

Small SUVs range from 16 to 31 MPG. The best vehicle rates 31 MPG.

You save \$1,000 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$2,000

Fuel Economy & Greenhouse Gas Rating (EPA scale 1-10, 10 is best)

Smog Rating (EPA scale 1-5, 5 is best)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$11,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Gasoline Vehicle

DELIVERY PROCESSING AND HANDLING FEE 885.00

TOTAL \$25,005.00

The New Vehicle Limited Warranty provides 3-year/36,000 mile basic coverage, 5-year/60,000 mile powertrain coverage, plus 1-year/unlimited mile corrosion perforation coverage. See Warranty and Maintenance Guide for details. An extended service contract may be available for the vehicle. Ask dealer for details. Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline, license and 5 to 10% applicable federal, state and local taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price.

ToyotaCare, which covers normal factory scheduled maintenance for two years or 25,000 miles, whichever occurs first, is included as part of the value price of the vehicle for qualifying buyers. See participating dealer for eligibility and coverage details.

Dealer Name / Address: 48036
HEISER TOYOTA
11501 W. METRO AUTO MALL
MILWAUKEE WIS224

Ship to:

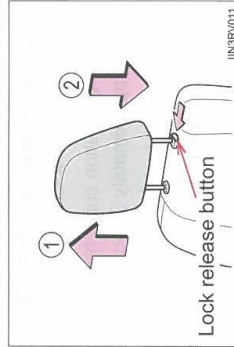
Figure A-102: Monroney Label

Head restraints

Head restraints are provided for all seats.

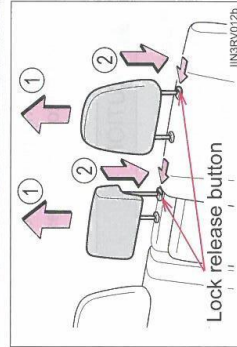
Front seats

- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.



Rear seats

- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.



Folding the head restraints (outboard rear seats only)

- ① To use
Lift up the head restraint until it locks.
- ② To fold
Push the head restraint lock release button to fold the head restraint.

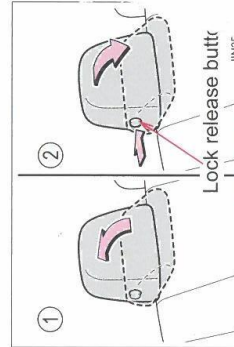
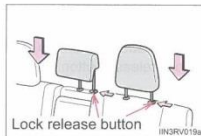


Figure A-103: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Rear seats

Align the head restraint with the installation holes and push it down while pressing the lock release button.



Adjusting the height of the head restraints

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.



Adjusting the rear center seat head restraint

Always raise the head restraint one level from the stowed position when using.

CAUTION

Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

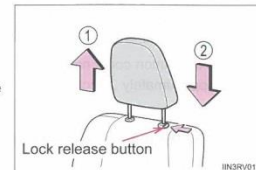
- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.

Head restraints

Head restraints are provided for all seats.

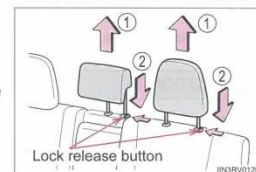
Front seats

- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.



Rear seats

- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.



Folding the head restraints (outboard rear seats only)

- ① To use
Lift up the head restraint until it locks.
- ② To fold
Push the head restraint lock release button to fold the head restraint.

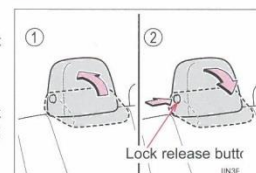


Figure A-104: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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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

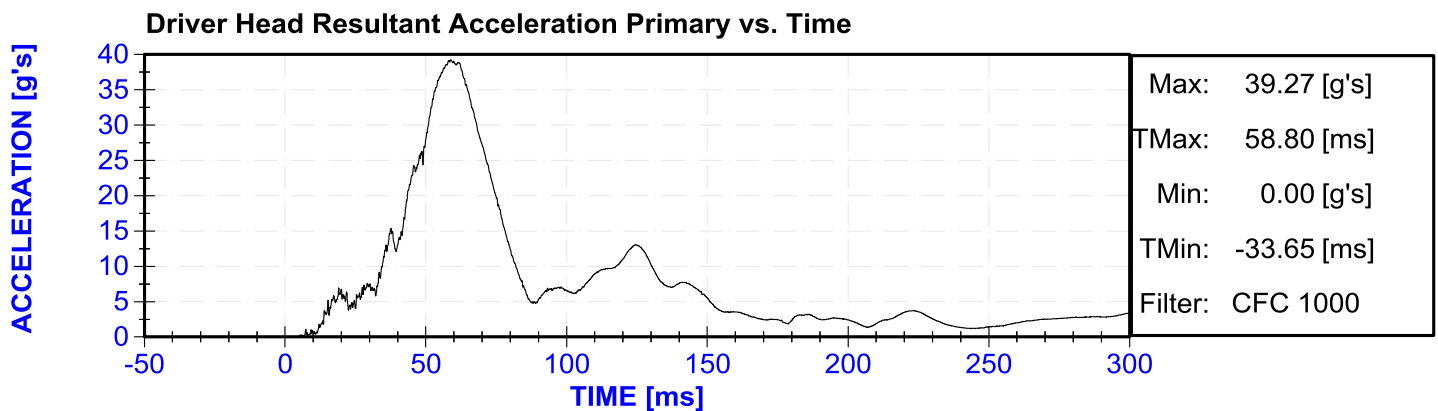
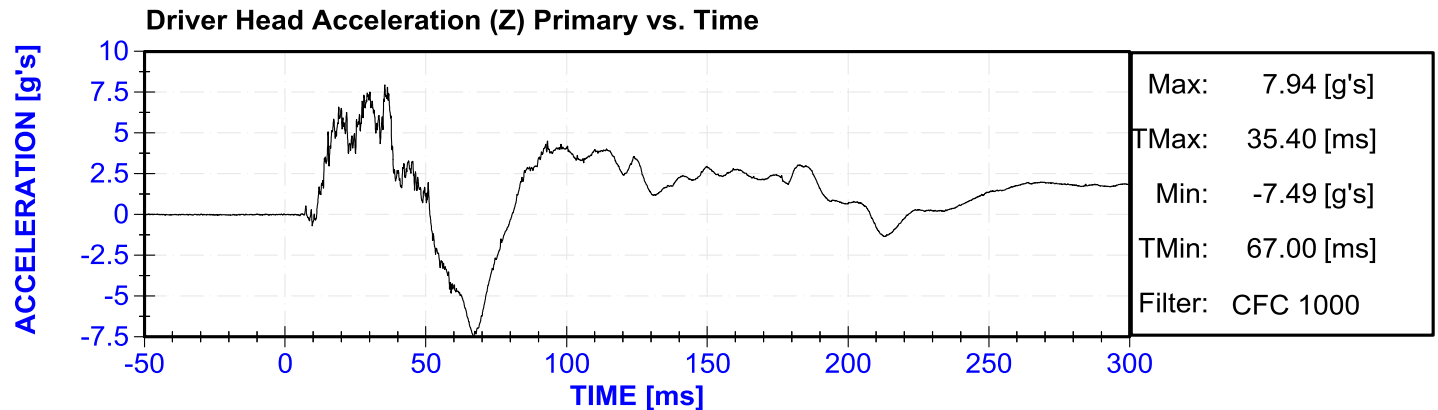
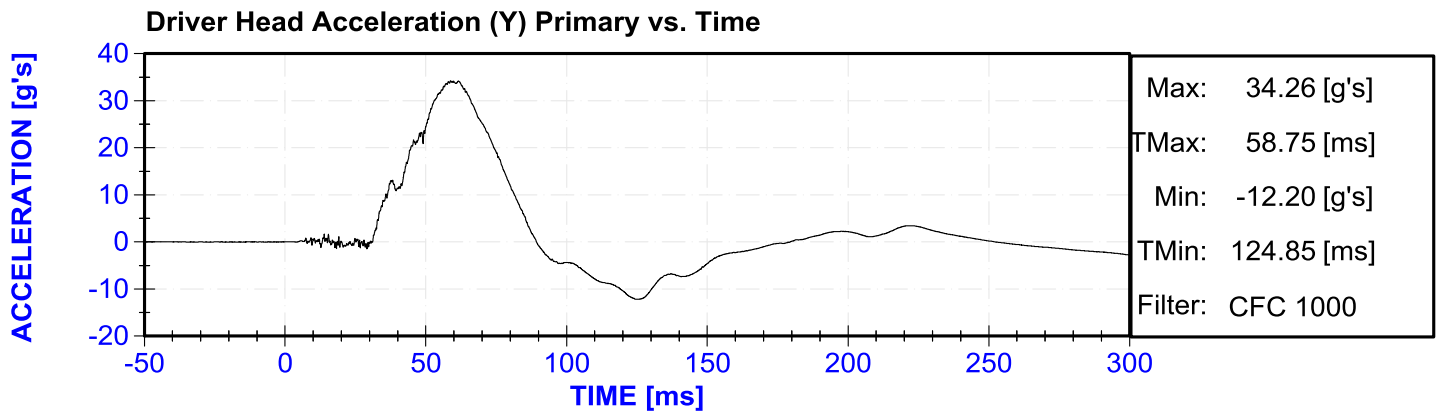
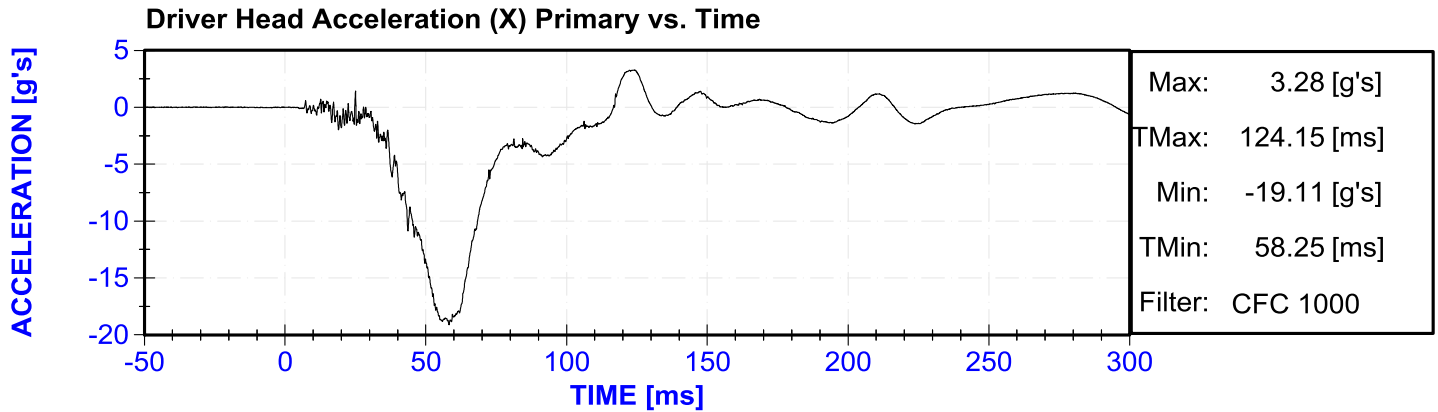
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower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

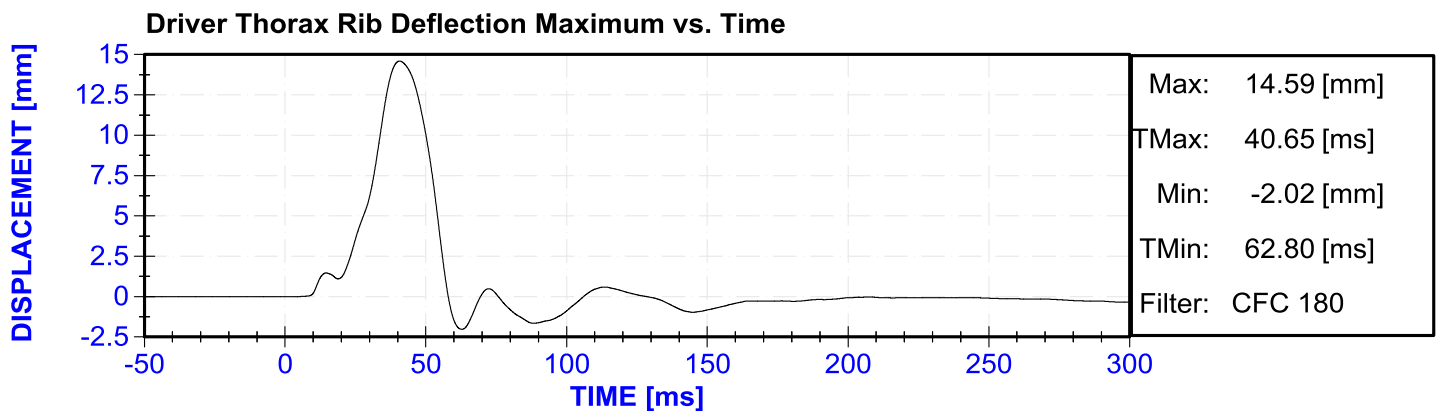
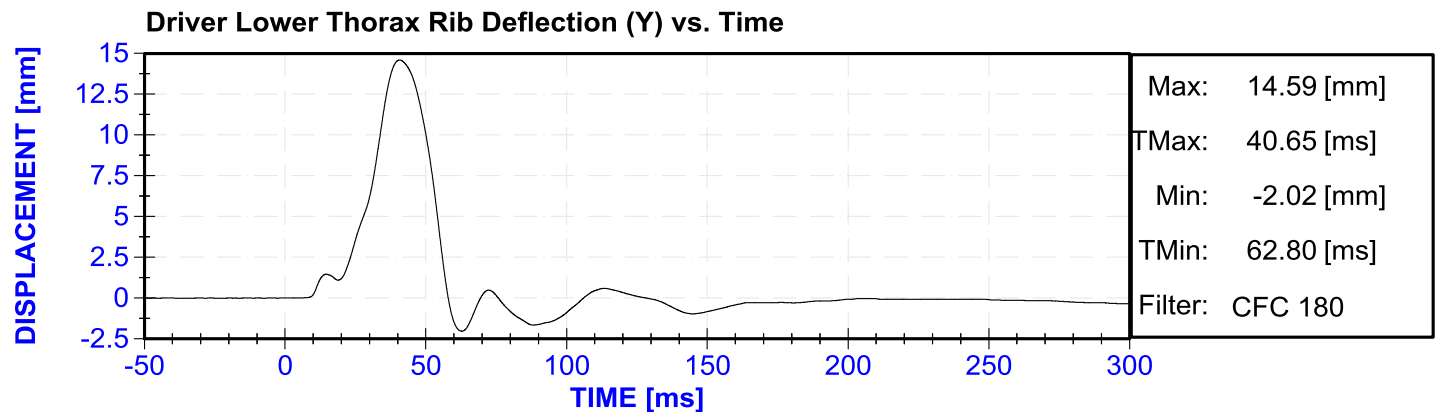
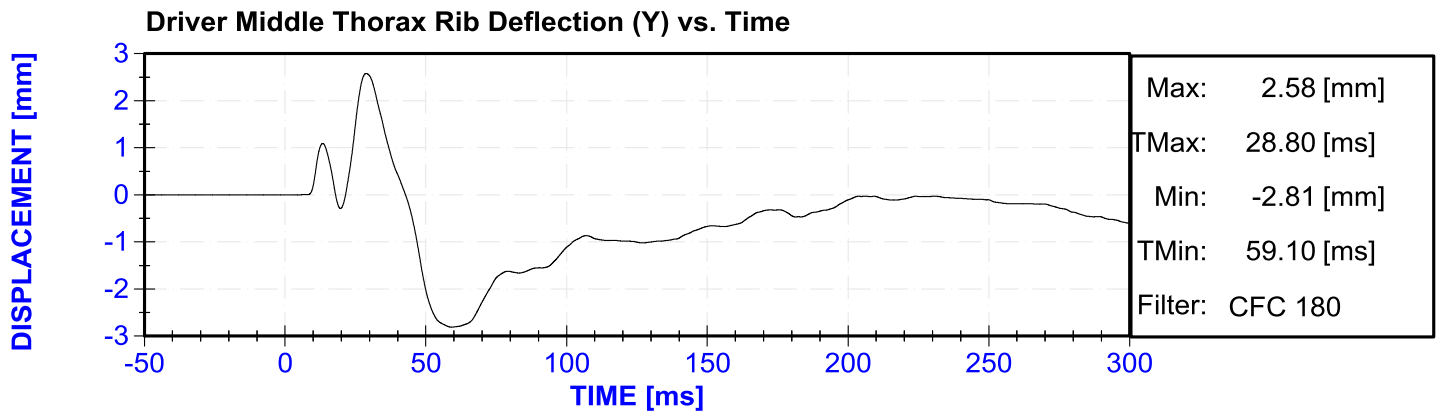
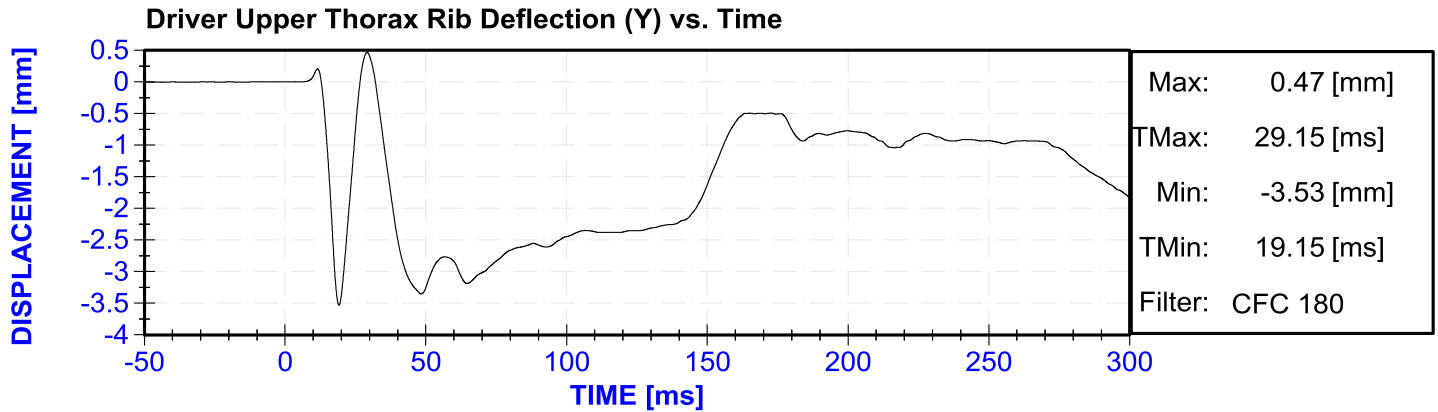
Vehicle Instrumentation Data

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)

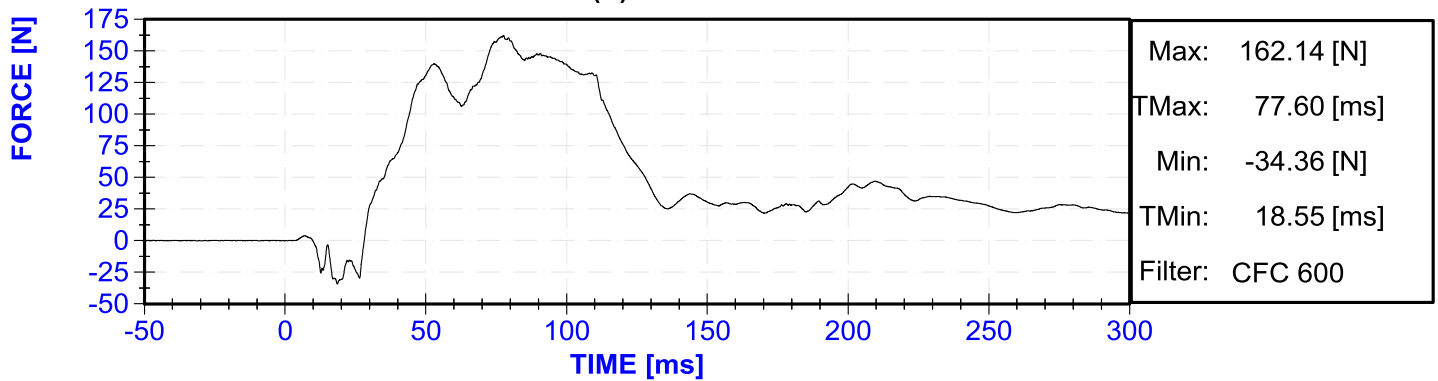
MDB Instrumentation Data

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

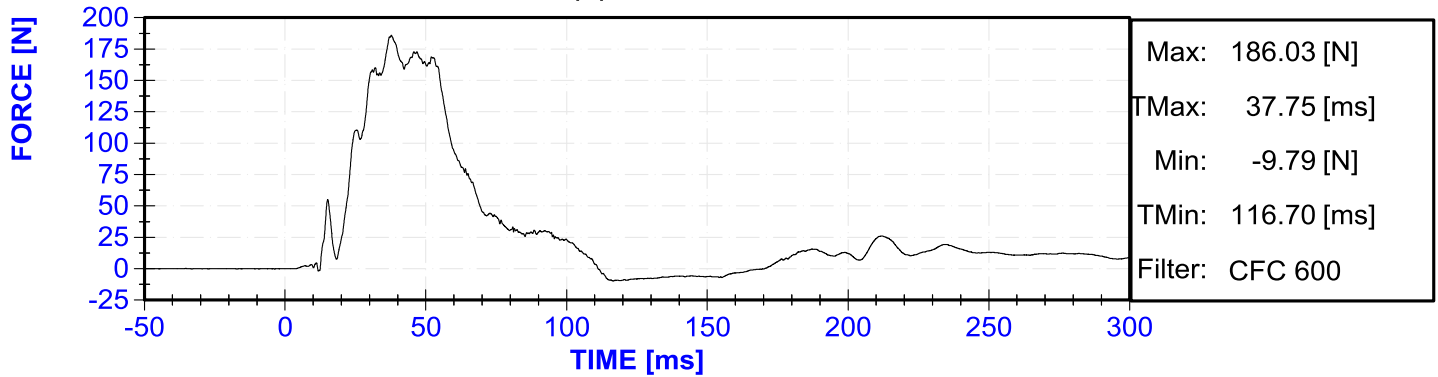




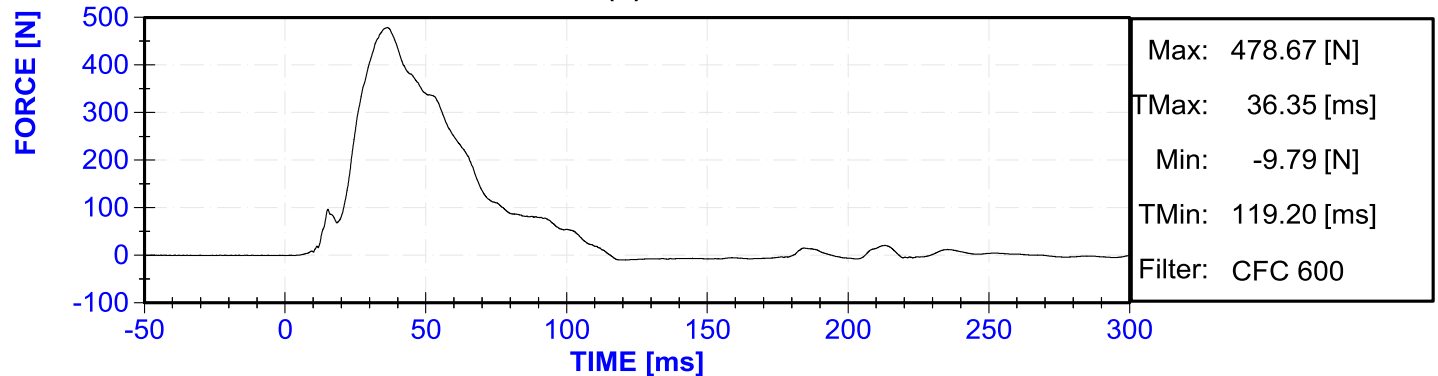
Driver Anterior Abdominal Force (Y) vs. Time



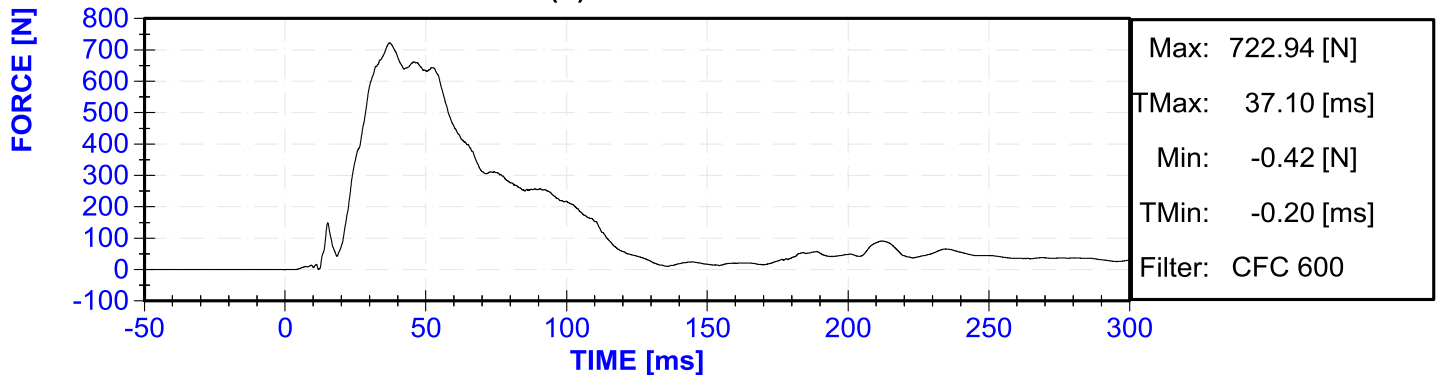
Driver Middle Abdominal Force (Y) vs. Time

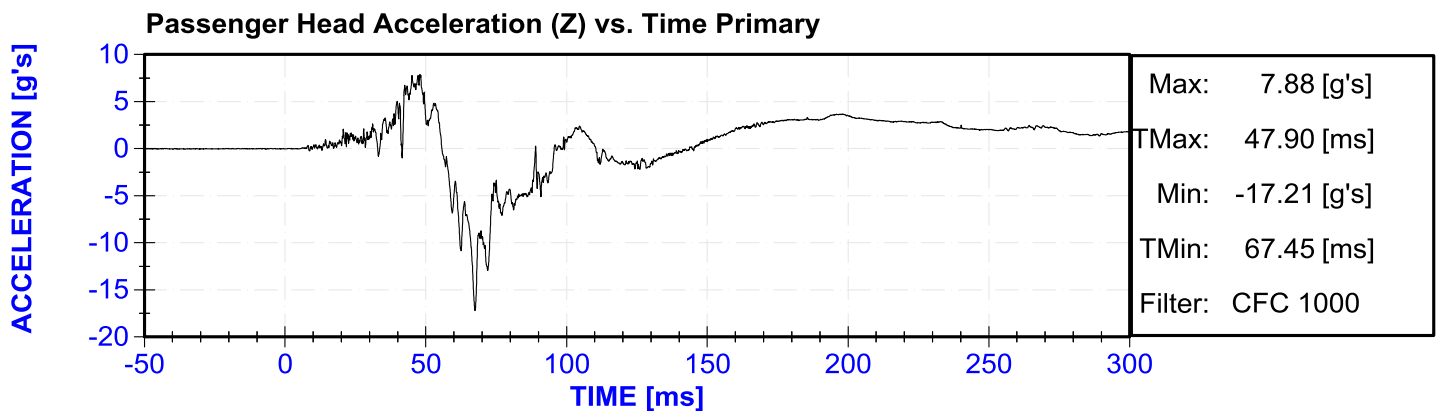
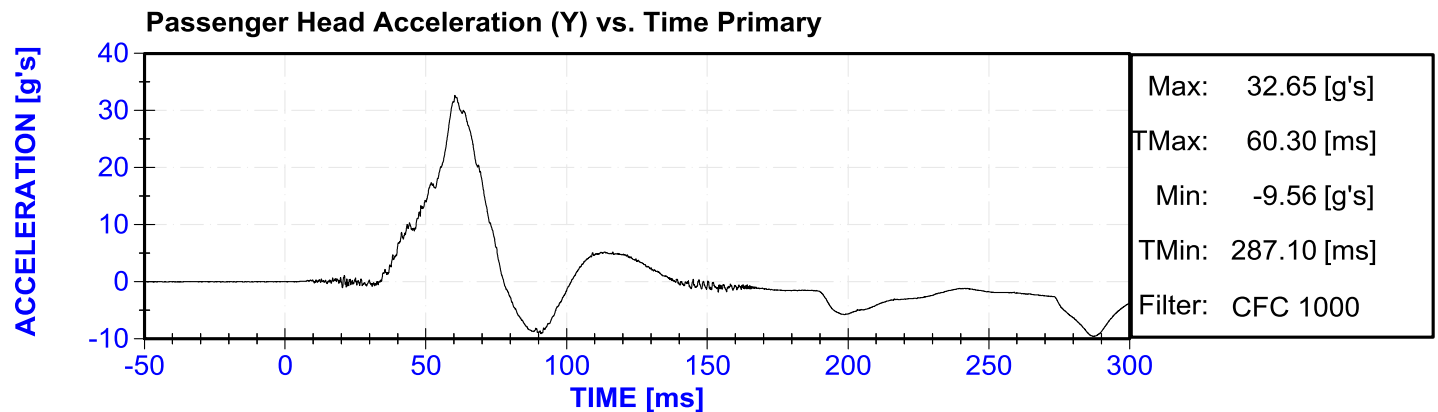
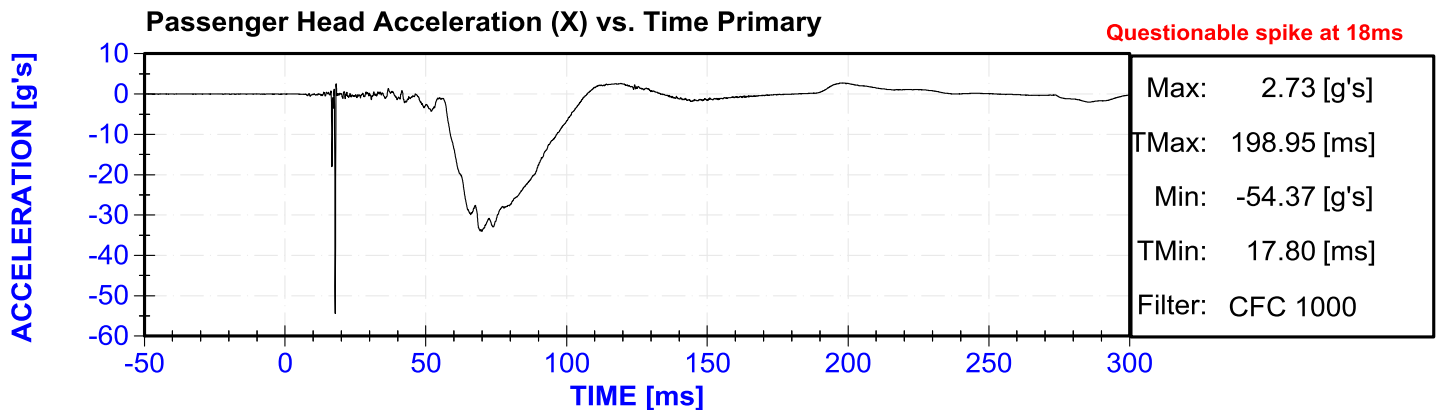
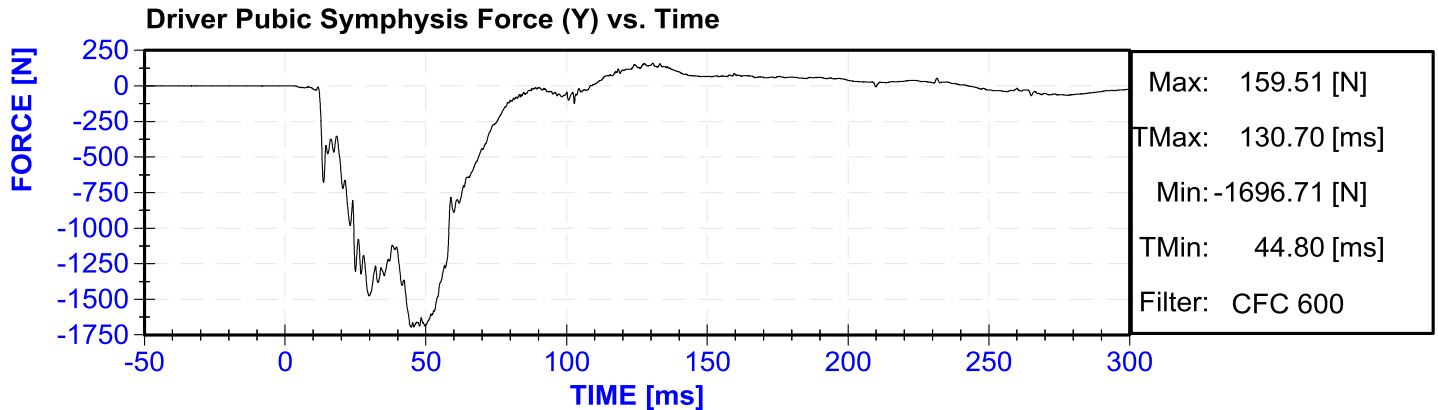


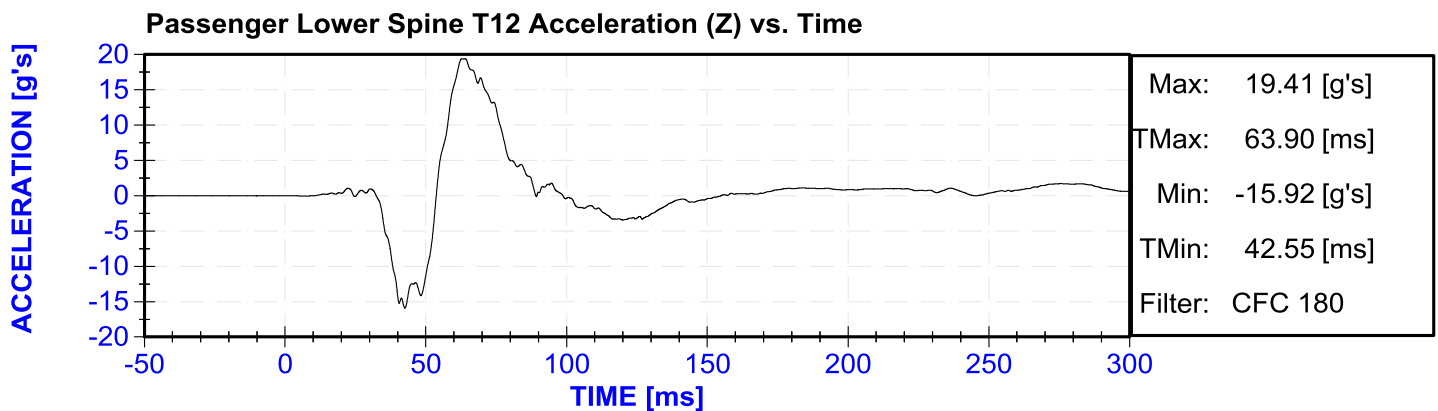
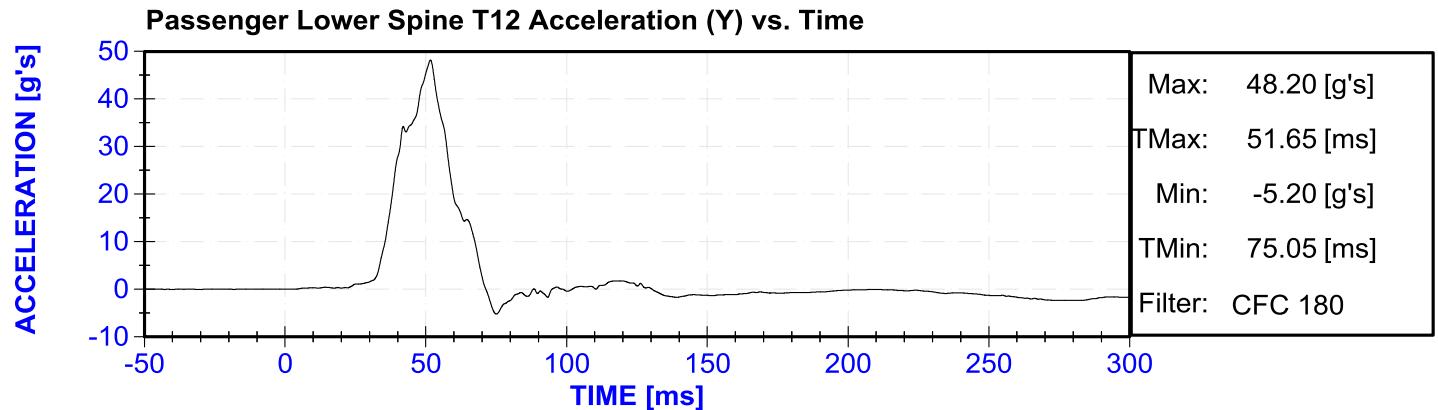
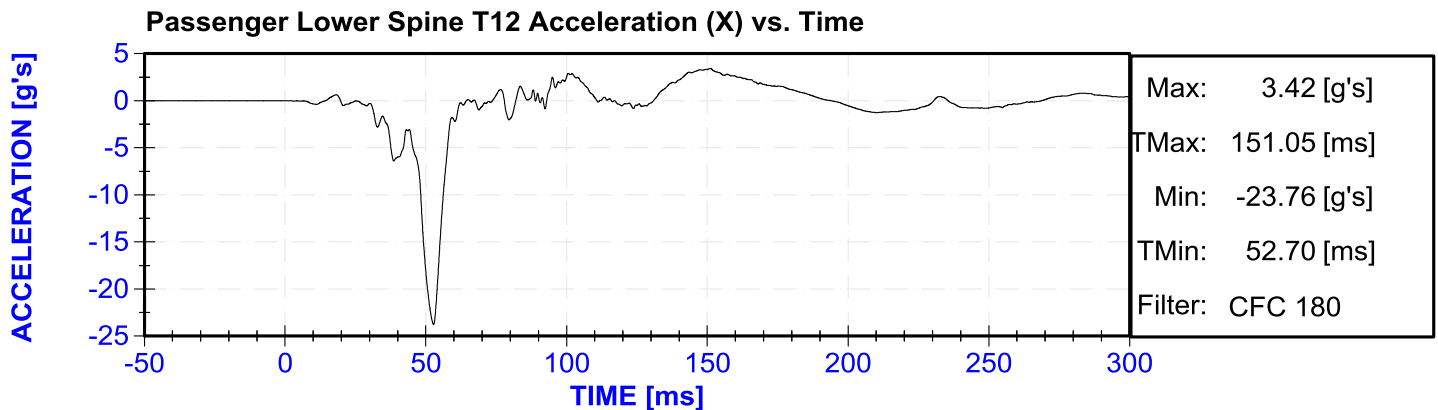
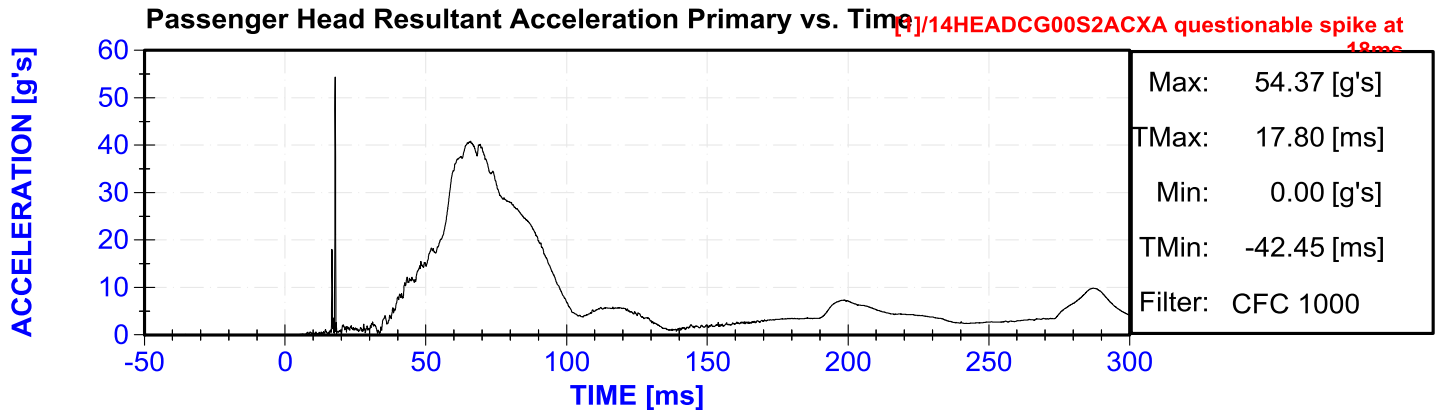
Driver Posterior Abdominal Force (Y) vs. Time



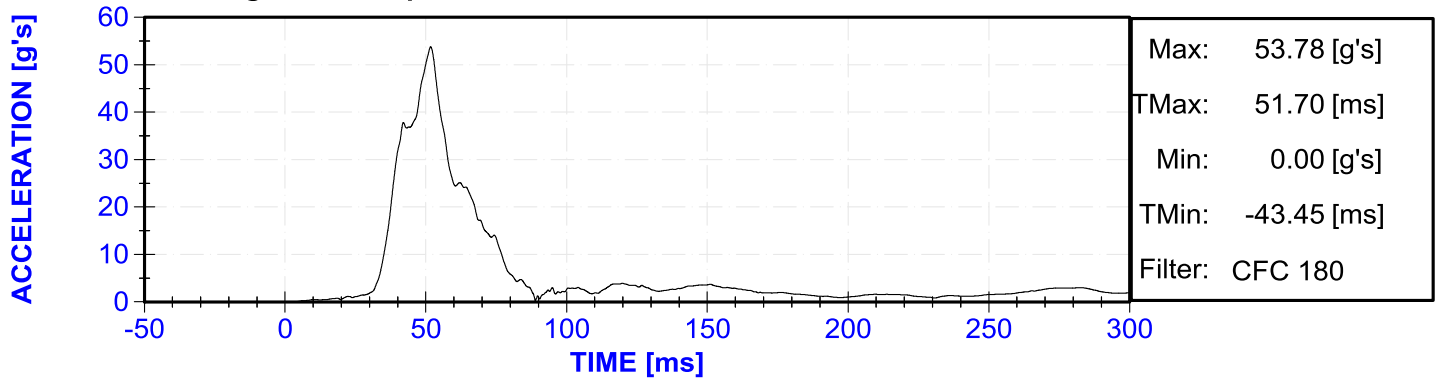
Driver Total Abdominal Force (Y) vs. Time



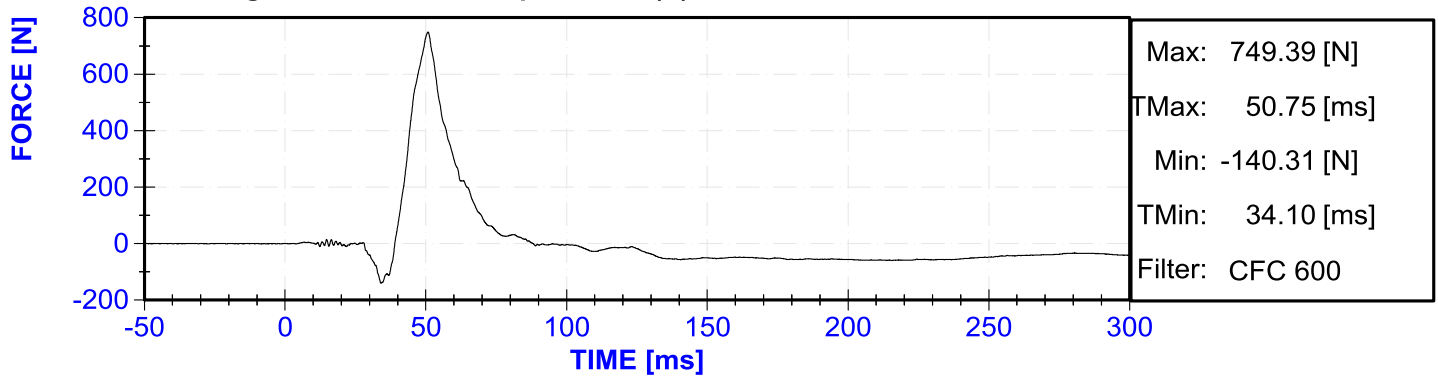




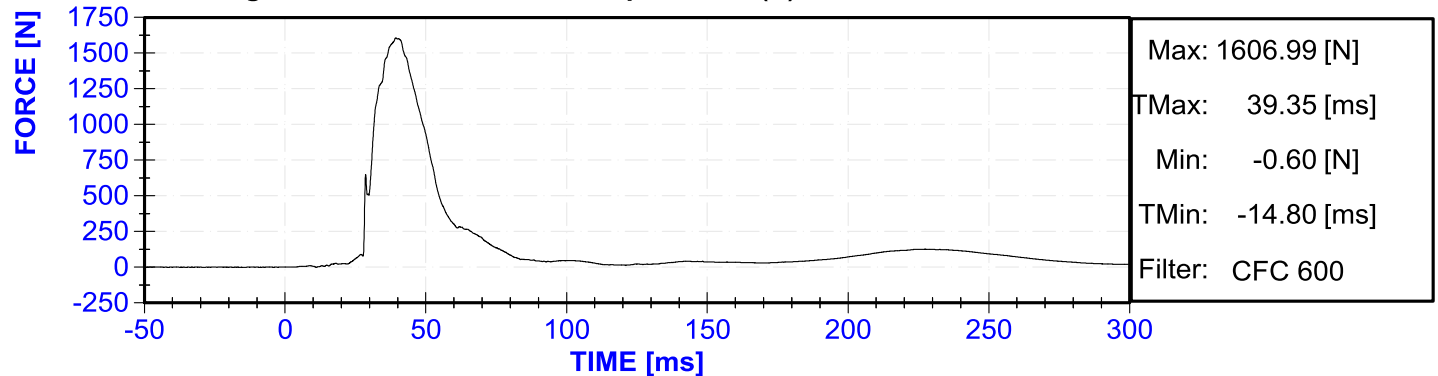
Passenger Lower Spine T12 Resultant Acceleration vs. Time



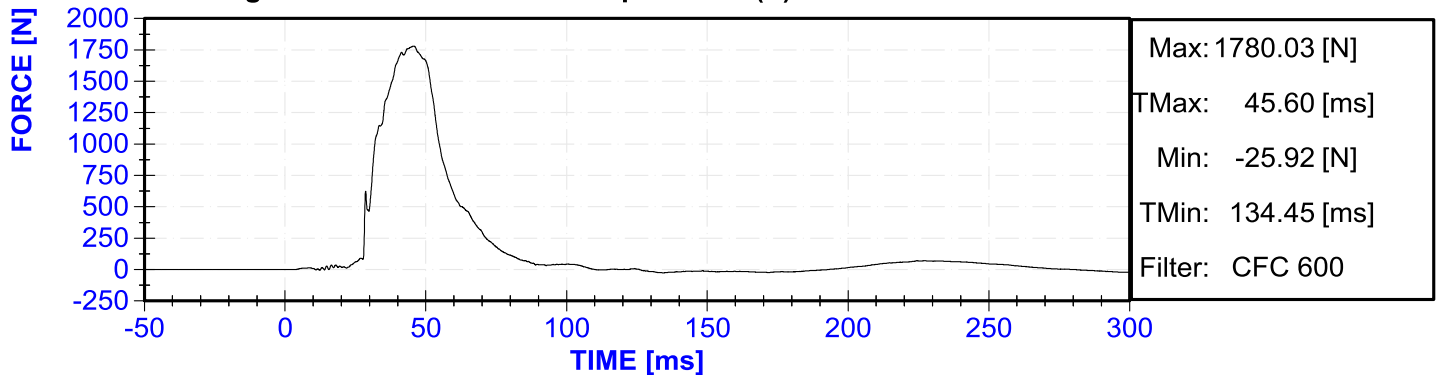
Passenger Iliac Force on Impact Side (Y) vs. Time



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)

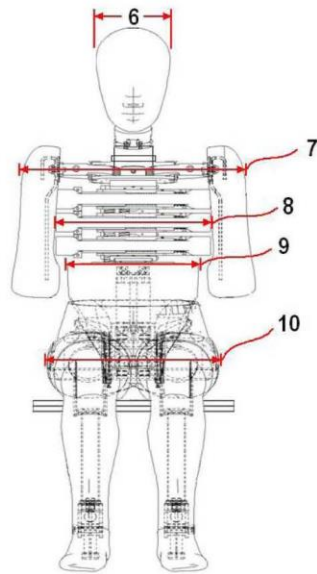


External Measurements - EuroSID-2re

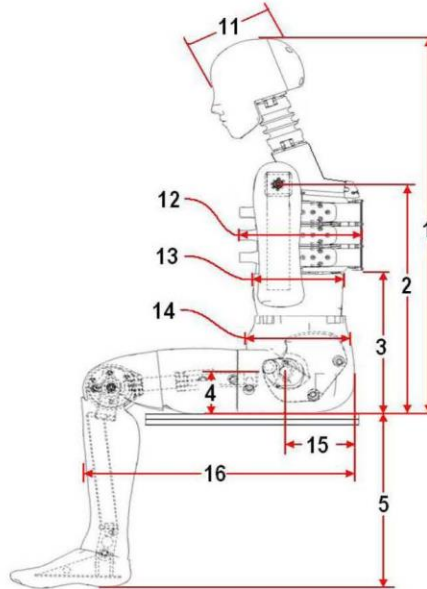
Technician: Rick Weil

Date: 12/16/2014

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	911	Pass
2	Seat to Shoulder Joint	558	572	561	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	347	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	475	Pass
8	Thorax Width	322	332	327	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	368	Pass
11	Head Depth	196	206	198	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	200	Pass
14	Pelvis Depth	235	245	237	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	152	Pass
16	Back of Buttocks to Front Knee	597	615	604	Pass



VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:			
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Head Drop	Test Date:	12/16/2014
		Test Time:	9:35:16 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.40 deg C	P
Humidity	10	--	70	29.00 %RH	P
Resultant Acceleration	125	--	155	132.1 G's	P
Oscillation	0	--	15	2.3 %	P
Fore-Aft Accelerometer	-15	--	15	9.1 G's	P

All test parameters are within specifications

Technician: R. Weil
Supervisor: M. Goehle



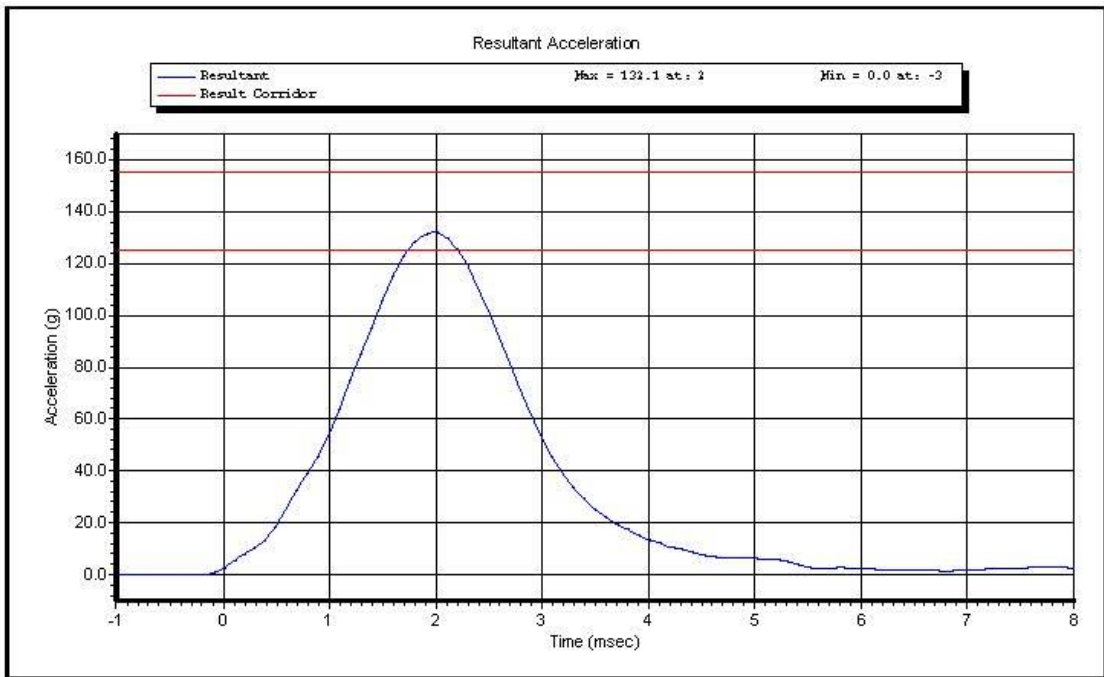
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	8/29/2014
Endevco	7264-2000	P58911	8/29/2014
Endevco	7264-2000	P58776	8/29/2014



Test Name:	Head Drop
Sub Test Name:	
ATD Type:	ES-2re
ATD Serial Number:	F034

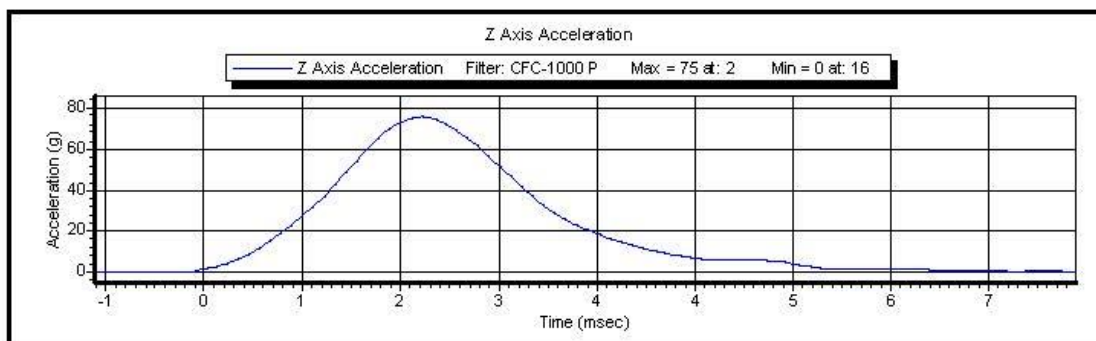
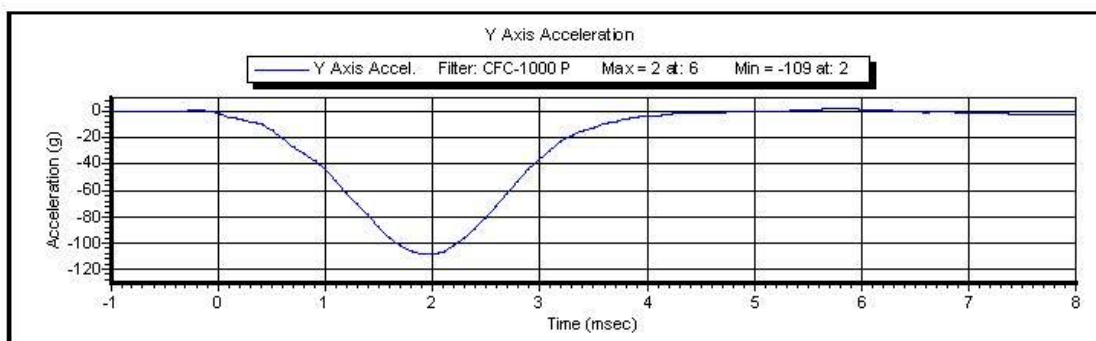
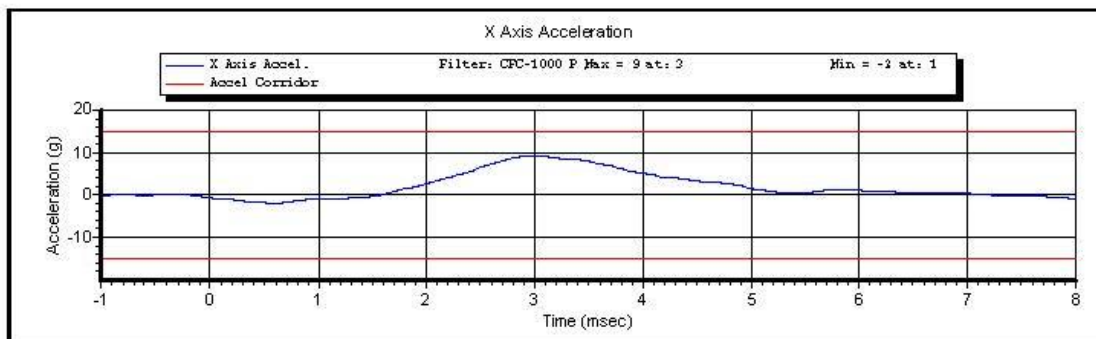


Test ID: **Head Drop**

Test Time: **9:35:16 AM**

Test Date: **12/16/2014**

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Test ID: **Head Drop**

Test Time: **9:35:16 AM**

Test Date: **12/16/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:			
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Neck Flexion	Test Date:	12/16/2014
		Test Time:	11:46:19 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.70 deg C	P
Humidity	10	--	70	31.30 %RH	P
Velocity	3.3	--	3.5	3.35 m/s	P
Maximum Neck Flexion Angle	49	--	59	51.7 degrees	P
Time At Maximum Neck Flexion	54	--	66	59.2 ms	P
Decay Time to Zero Degrees	53	--	88	55.7 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **M. Goehle**



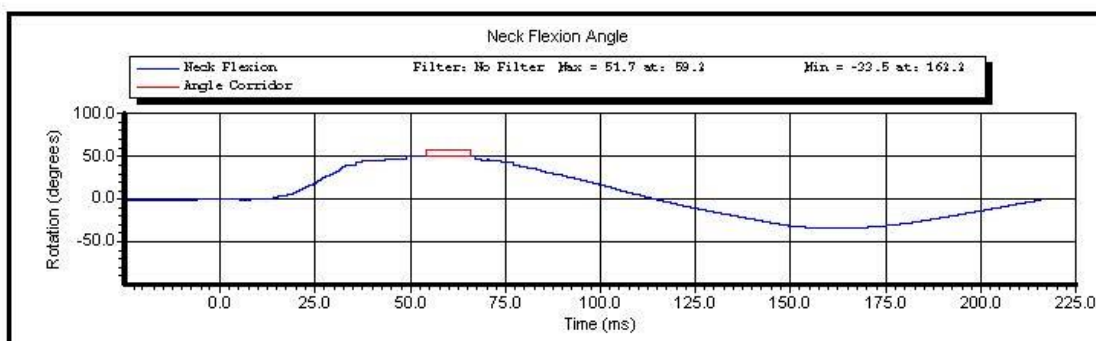
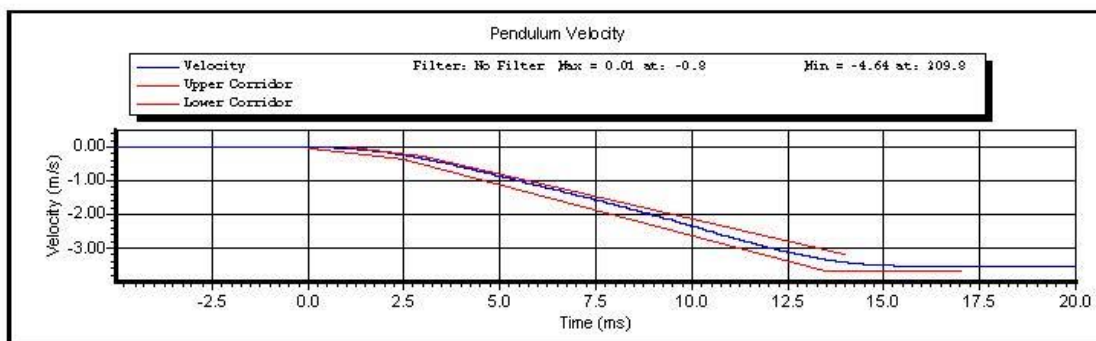
VERIFICATION REPORT

REFERENCE EQUIPMENT

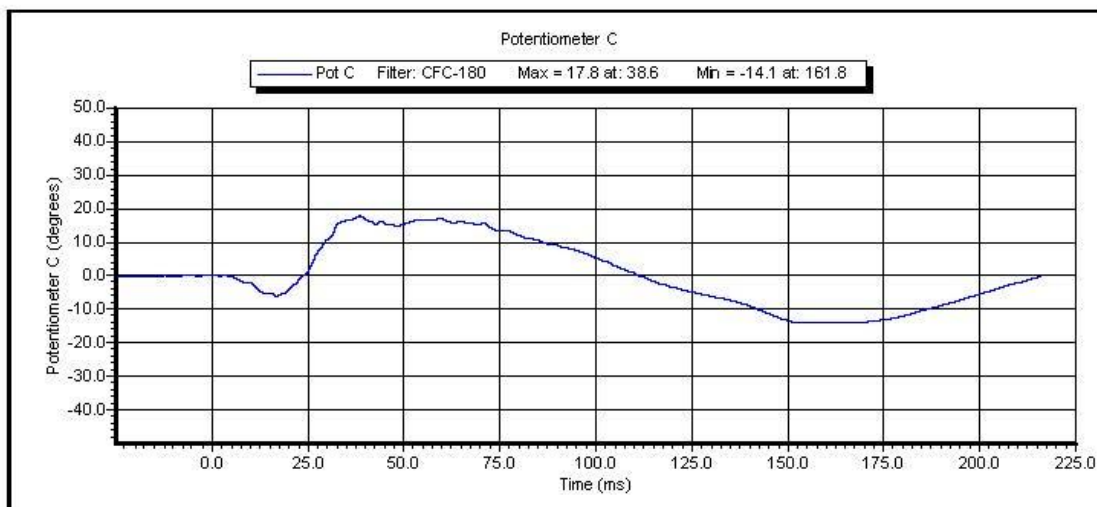
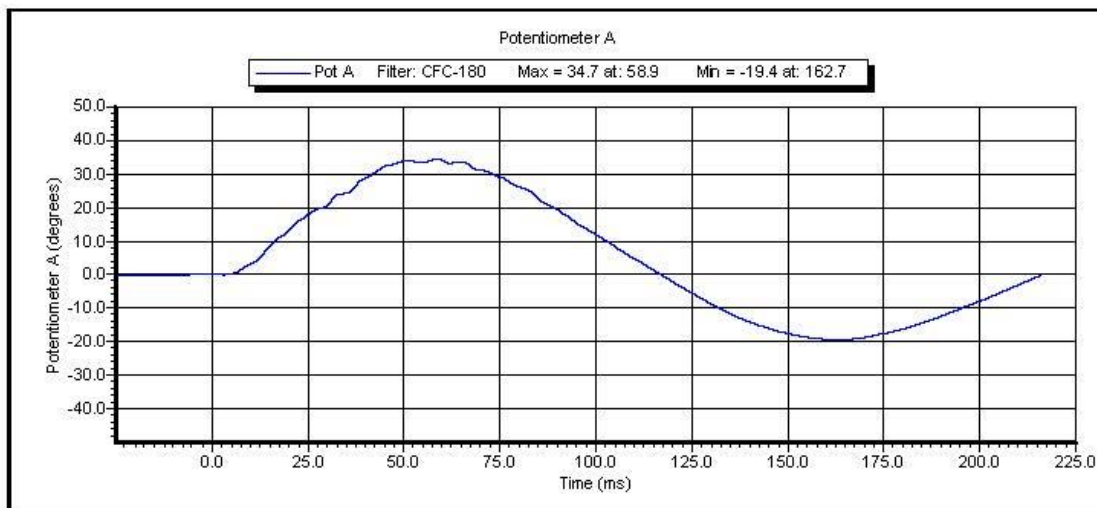
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	11/6/2014
DentonATD	156ESDT-102	094	11/13/2014
DentonATD	156ESDT-102	095	11/13/2014



Test Name:	Neck Flexion
Sub Test Name:	
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Neck Flexion** Test Time: **11:46:19 AM** Test Date: **12/16/2014**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Neck Flexion** Test Time: **11:46:19 AM** Test Date: **12/16/2014**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:			
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Shoulder Impact	Test Date:	12/15/2014
		Test Time:	11:16:29 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.20 deg C	P
Humidity	10	--	70	29.70 %RH	P
Velocity	4.2	--	4.4	4.26 m/s	P
Pendulum Acceleration	-10.5	--	-7.5	-10.32 G's	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **M. Goehle**



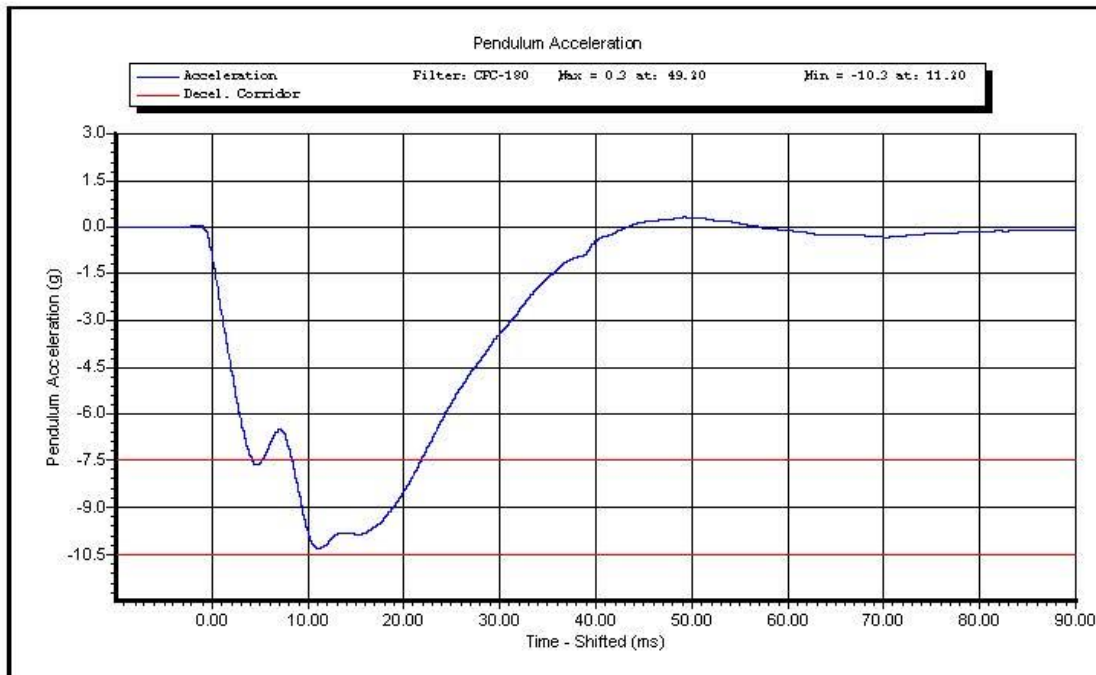
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 7/30/2014



Test Name:	Shoulder Impact
Sub Test Name:	
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Shoulder Impact** Test Time: **11:16:29 AM** Test Date: **12/15/2014**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 3 m/s	Test Date:	12/15/2014
		Test Time:	2:33:44 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.90 deg C P
Humidity	10 -- 70	31.80 %RH P
Rib Displacement	-40 -- -36	-36.0 mm P

All test parameters are within specifications

Technician: R. Weil
Supervisor: M. Goehle



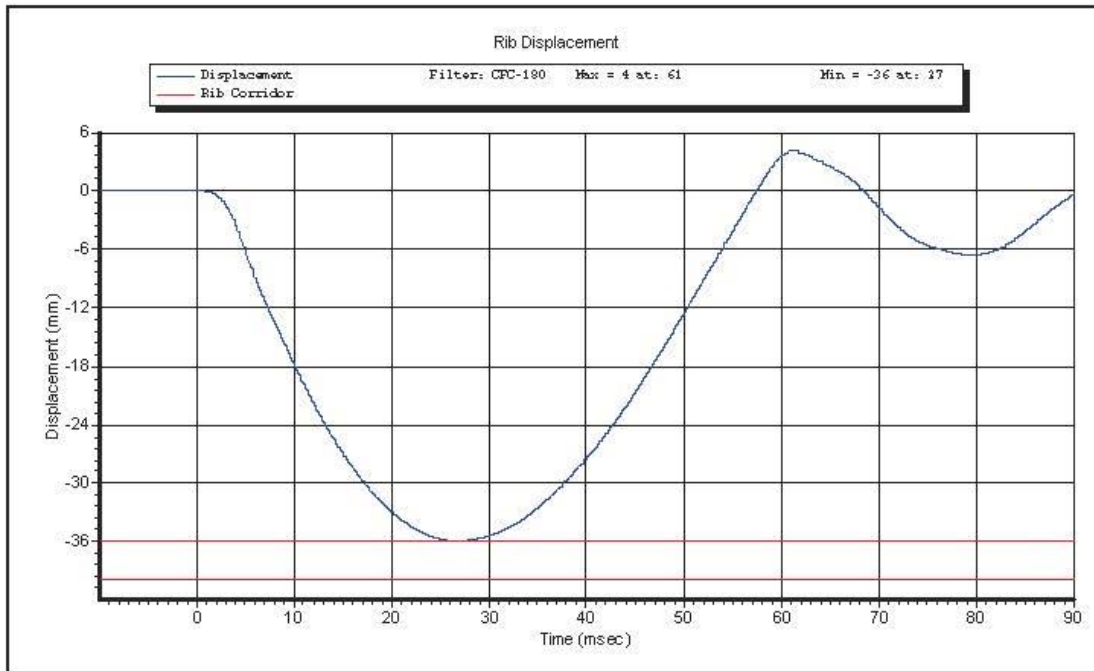
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-183GFE	8/4/2014
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7264-2000	P17283	9/19/2014



Test Name:	Full Rib Module Impact
Sub Test Name:	3.0 Meters/Second
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: Upper Rib 3 m/s Test Time: 2:33:44 PM
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Test Date: 12/15/2014



VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4 m/s	Test Date:	12/15/2014
		Test Time:	2:44:19 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.90 deg C P
Humidity	10 -- 70	31.80 %RH P
Rib Displacement	-51 -- -46	-46.2 mm P

All test parameters are within specifications

Technician: R. Weil
Supervisor: J. Goehle



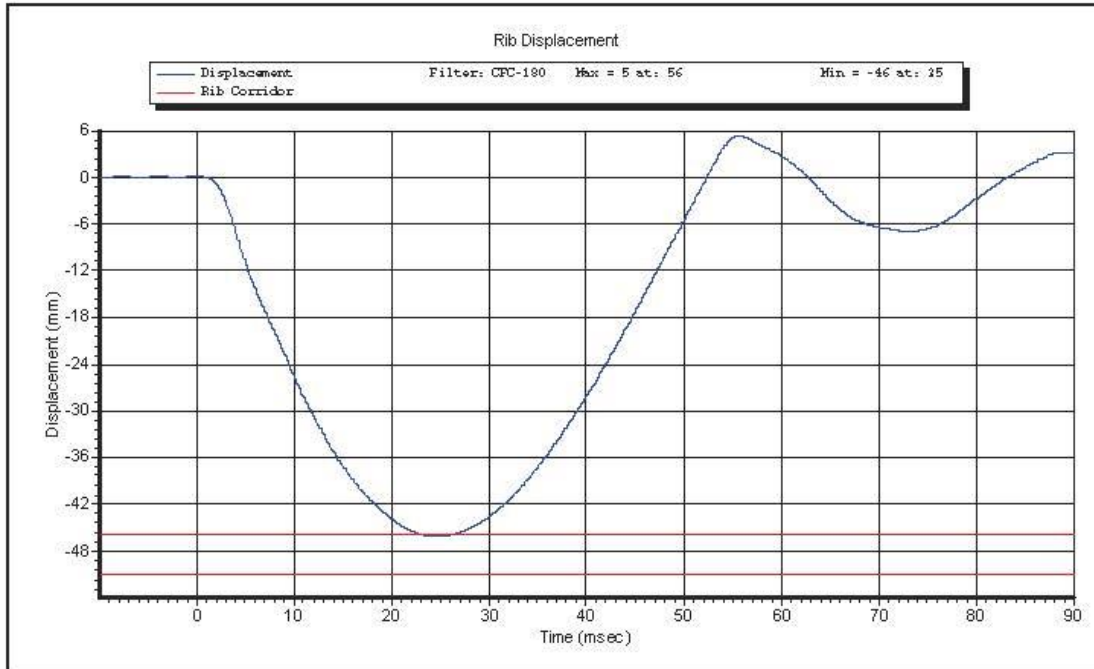
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-183GFE	8/4/2014
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7264-2000	P17283	9/19/2014



Test Name:	Full Rib Module Impact
Sub Test Name:	4.0 Meters/Second
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Upper Rib 4 m/s** Test Time: **2:44:19 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **12/15/2014**



VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3m/s	Test Date:	12/15/2014
		Test Time:	2:57:09 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.80 deg C	P
Humidity	10	--	70	32.30 %RH	P
Rib Displacement	-40	--	-36	-37.3 mm	P

All test parameters are within specifications

Technician: **R. Weil**
Supervisor: **M. Goehle**



VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-184 GFE	8/4/2014
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7264-2000	P17283	9/19/2014



Test Name:	Full Rib Module Impact
Sub Test Name:	3.0 Meters/Second
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Middle Rib 3m/s** Test Time: **2:57:09 PM**

Test Date: **12/15/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4 m/s	Test Date:	12/15/2014
		Test Time:	3:04:02 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.80 deg C P
Humidity	10 -- 70	32.30 %RH P
Rib Displacement	-51 -- -46	-47.7 mm P

All test parameters are within specifications

Technician: R. weil
Supervisor: M. Goehle



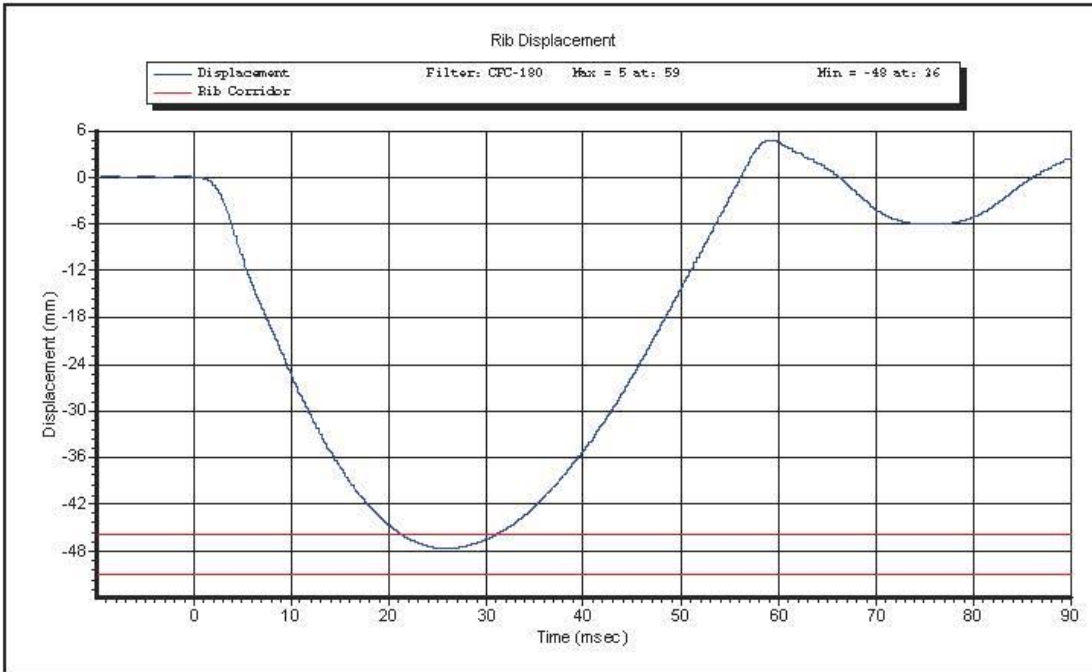
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-184 GFE	8/4/2014
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7264-2000	P17283	9/19/2014



Test Name:	Full Rib Module Impact
Sub Test Name:	4.0 Meters/Second
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Middle Rib 4 m/s** Test Time: **3:04:02 PM**

Test Date: **12/15/2014**

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3 m/s	Test Date:	12/15/2014
		Test Time:	3:11:54 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.70 deg C P
Humidity	10 -- 70	36.20 %RH P
Rib Displacement	-40 -- -36	-37.2 mm P

All test parameters are within specifications

Technician: R. Weil
Supervisor: M. Goehle



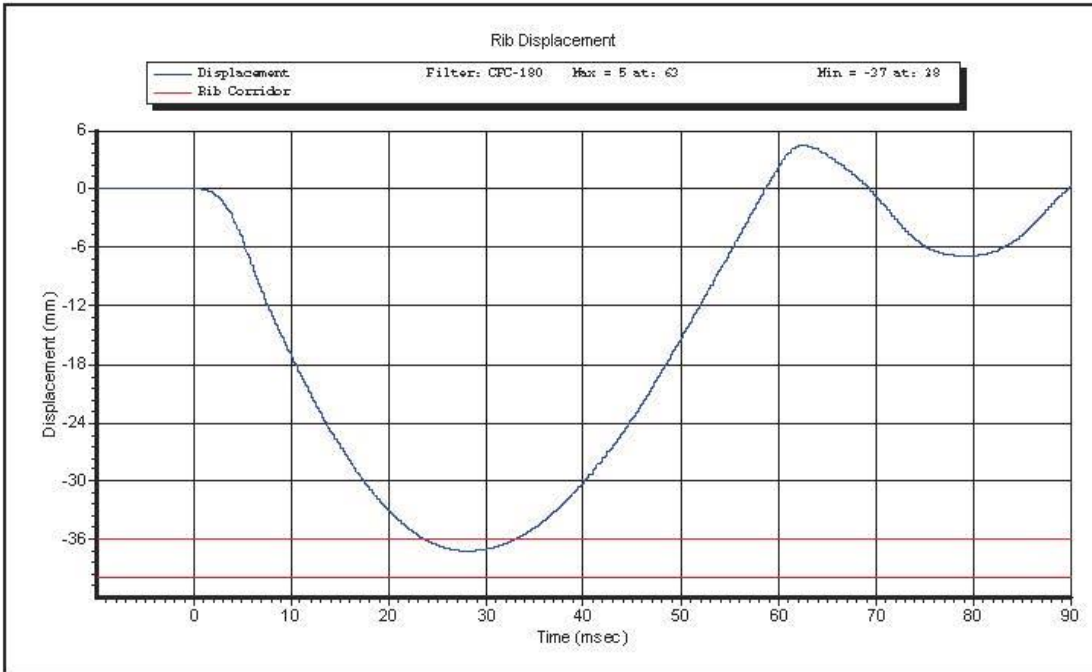
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-182 GFE	8/4/2014
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7264-2000	P17283	9/19/2014



Test Name:	Full Rib Module Impact
Sub Test Name:	3.0 Meters/Second
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: Lower Rib 3 m/s Test Time: 3:11:54 PM

Test Date: 12/15/2014

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4 m/s	Test Date:	12/15/2014
		Test Time:	3:17:11 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.70 deg C	P
Humidity	10	--	70	32.60 %RH	P
Rib Displacement	-51	--	-46	-48.0 mm	P

All test parameters are within specifications

Technician: R. Weil
Supervisor: M. Goehle



VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-182 GFE	8/4/2014
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7264-2000	P17283	9/19/2014



Test Name:	Full Rib Module Impact
Sub Test Name:	4.0 Meters/Second
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: Lower Rib 4 m/s Test Time: 3:17:11 PM

Test Date: 12/15/2014

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:			
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Thorax Impact	Test Date:	12/15/2014
		Test Time:	11:53:13 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.3 deg C	P
Humidity	10	--	70	29.8 %RH	P
Velocity	5.4	--	5.6	5.48 m/s	P
Upper Rib Displacement	34	--	41	36.9 mm	P
Middle Rib Displacement	37	--	45	40.7 mm	P
Lower Rib Displacement	37	--	44	39.9 mm	P
Impactor Force	5100	--	6200	5946.2 N	P

All test parameters are within specifications

Technician: **R. Weil**
Supervisor: **M. Goehle**



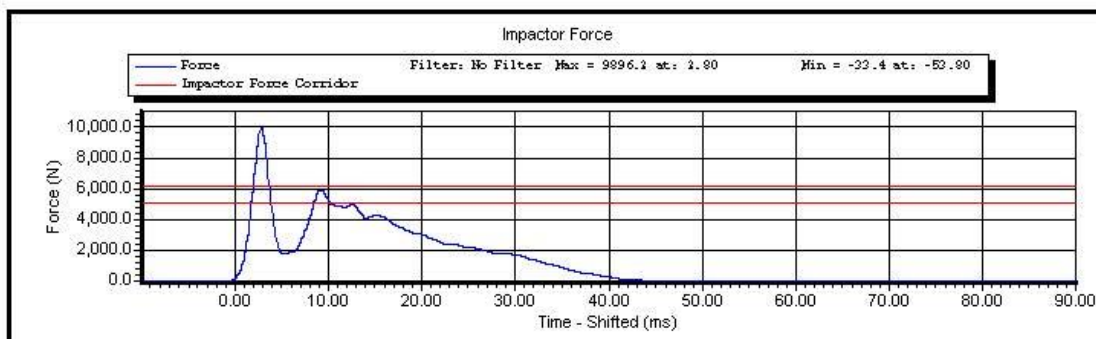
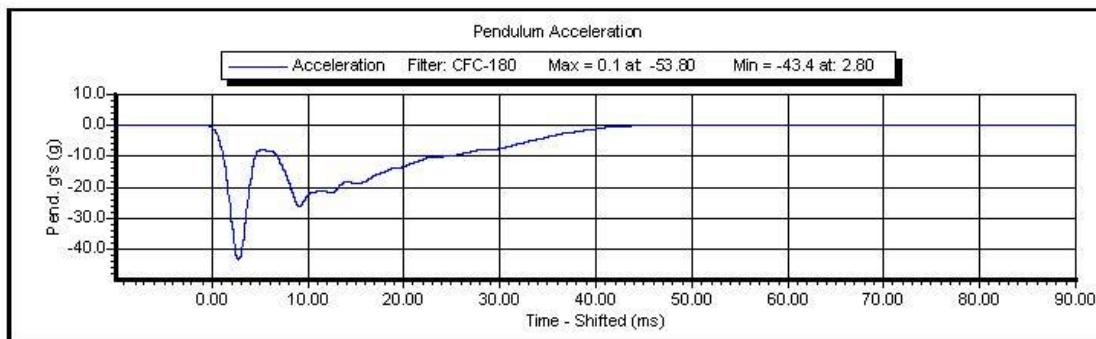
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Honeywell	MLT 38000	DS-183GFE	8/4/2014
Honeywell	MLT 38000	DS-184GFE	8/4/2014
Honeywell	MLT 38000	DS-182GFE	8/4/2014

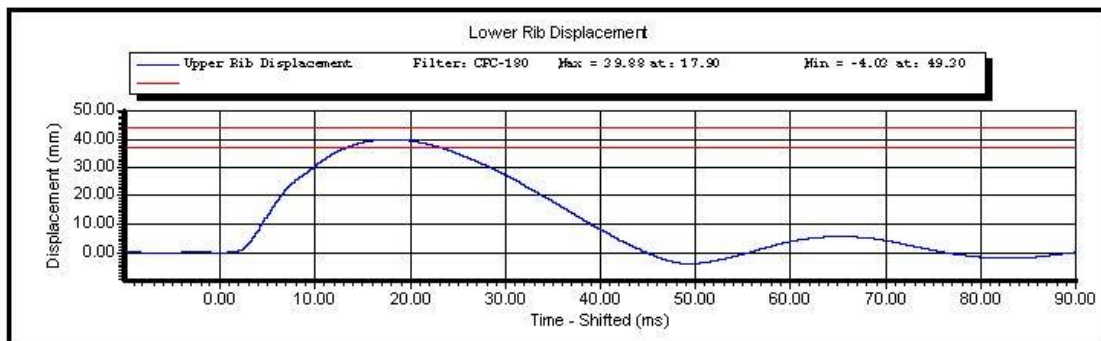
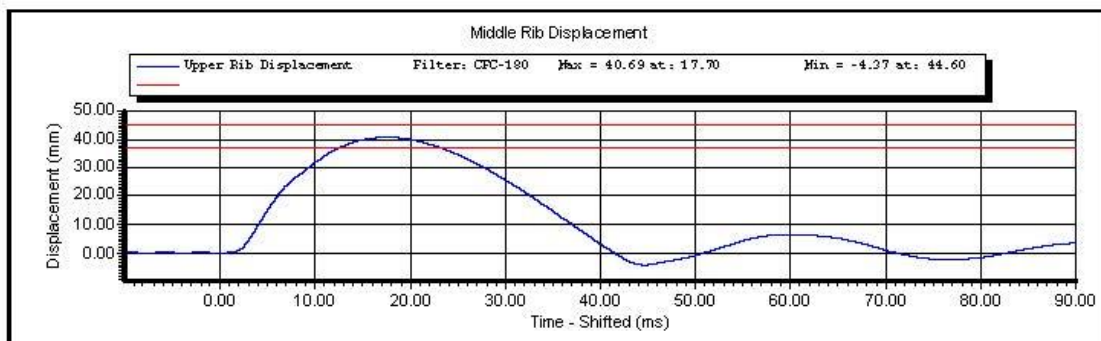
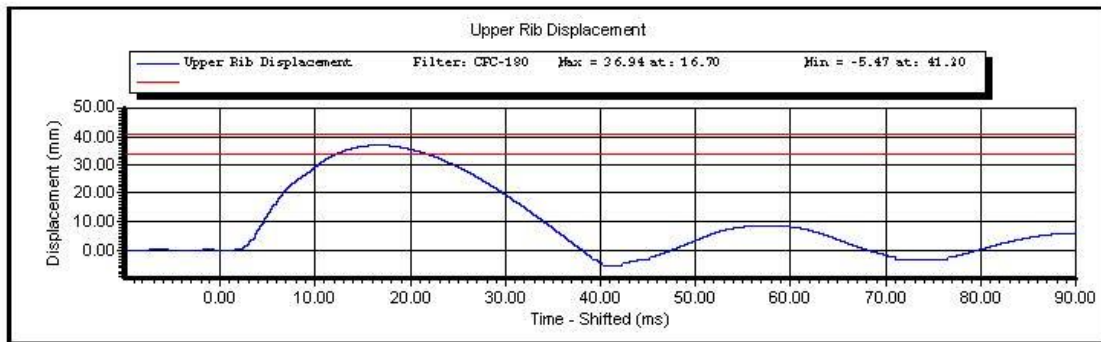


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Thorax Impact** Test Time: **11:53:13 AM** Test Date: **12/15/2014**

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Test ID: **Thorax Impact** Test Time: **11:53:13 AM** Test Date: **12/15/2014**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Abdomen Impact	Revision:	12/14/2006
Sub Test Name:	Left Side		
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Abdomen Impact	Test Date:	12/15/2014
		Test Time:	12:20:51 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.00 deg C	P
Humidity	10	--	70	35.00 %RH	P
Velocity	3.9	--	4.1	4.05 m/s	P
Peak Abdominal Force	-2.7	--	-2.2	-2.41 kN	P
Time At Peak Abdominal Force	10.0	--	12.3	10.09 ms	P
Maximum Pendulum Force	-4.8	--	-4.0	-4.64 kN	P
Time At Peak Pendulum Force	10.6	--	13.0	10.99 ms	P

All test parameters are within specifications

Technician: **R. Weil**
Supervisor: **M. Goehle**



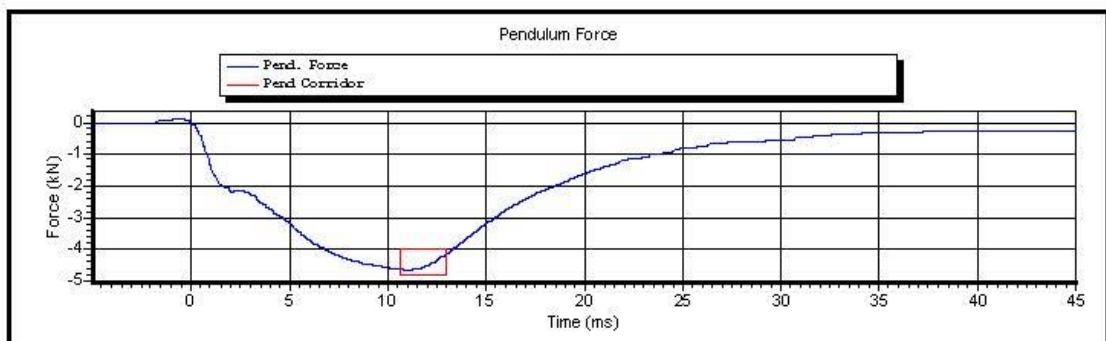
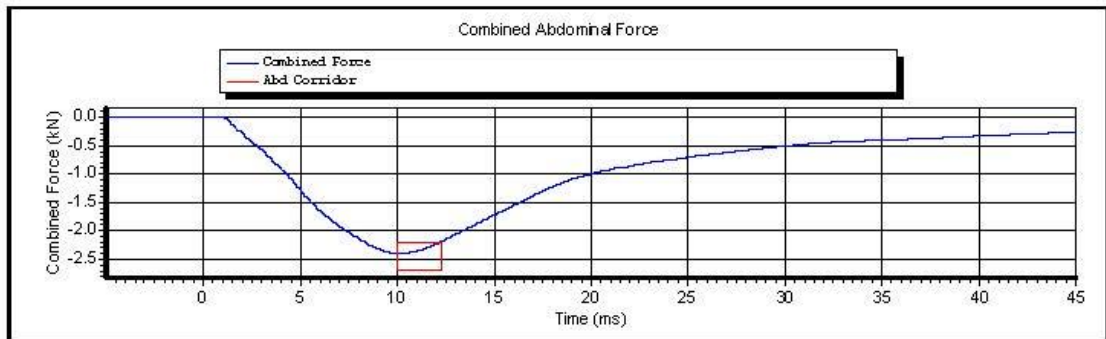
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Denton	2631	LC-1512	5/13/2014
Denton	2631	LC-1526	5/13/2014
Denton	2631	LC-1516	5/13/2014



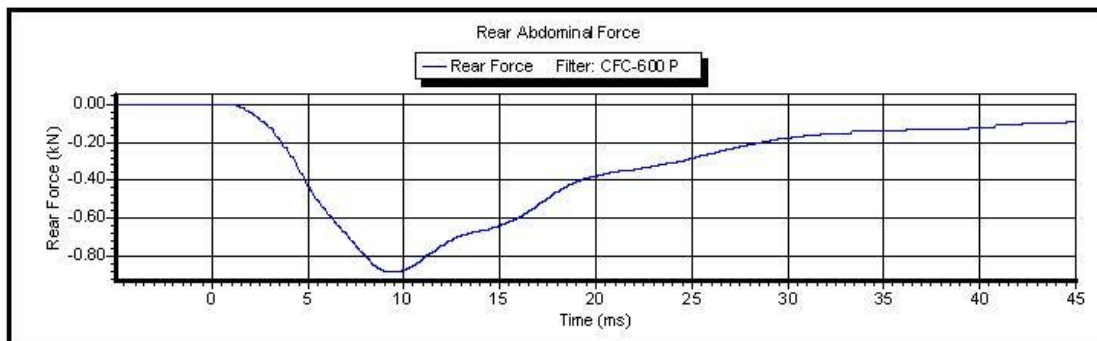
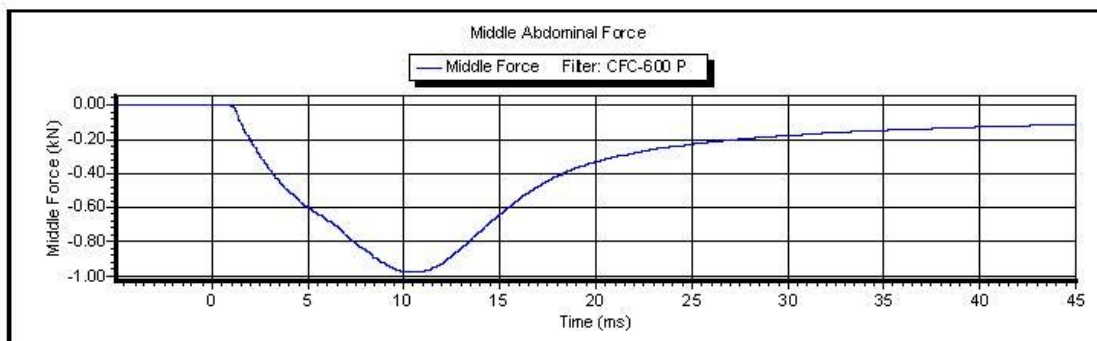
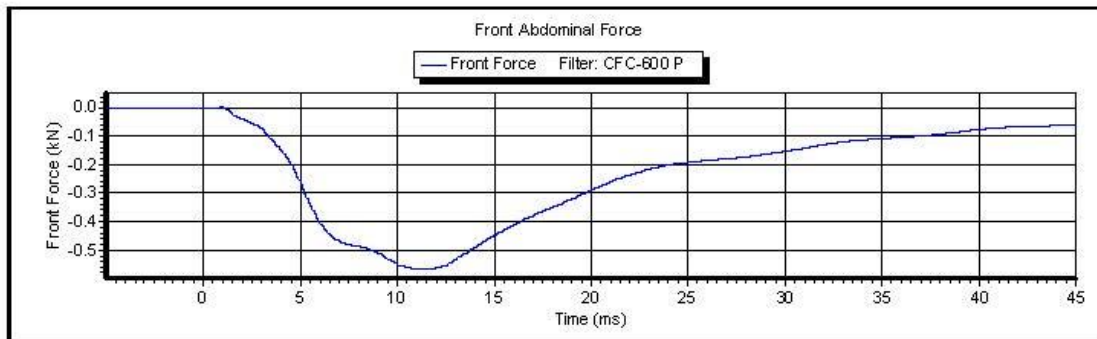
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Sub Test Name:	Left Side
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Abdomen Impact** Test Time: **12:20:51 PM**

Test Date: **12/15/2014**

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Test ID: **Abdomen Impact** Test Time: **12:20:51 PM**

Test Date: **12/15/2014**

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VERIFICATION REPORT

Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:			
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lumbar Flexion	Test Date:	12/17/2014
		Test Time:	2:03:48 PM

Test Parameters	Test Specifications			Test Results	
Temperature	21	--	22	21.70 deg C	P
Humidity	10	--	70	30.80 %RH	P
Velocity	5.95	--	6.15	6.030 m/s	P
Maximum Headform Flexion Angle	45	--	55	48.3 degrees	P
Time At Maximum Neck Flexion	39	--	53	43.2 ms	P
Decay Time to Zero Degrees	37	--	57	38.0 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **M. Goehle**



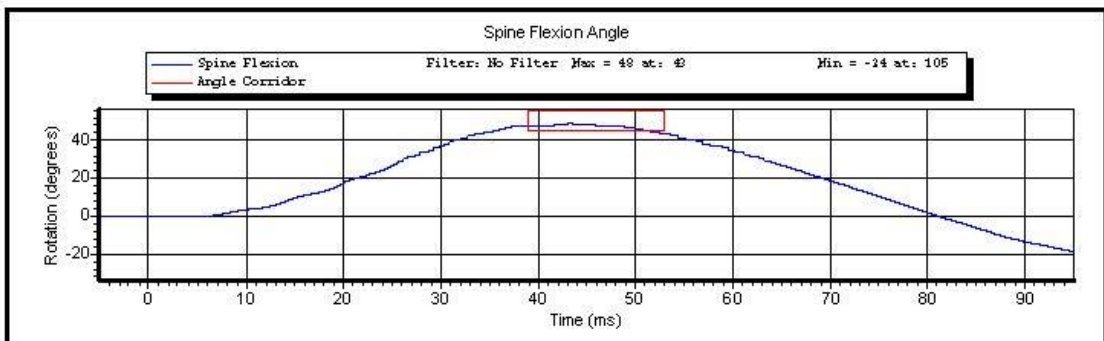
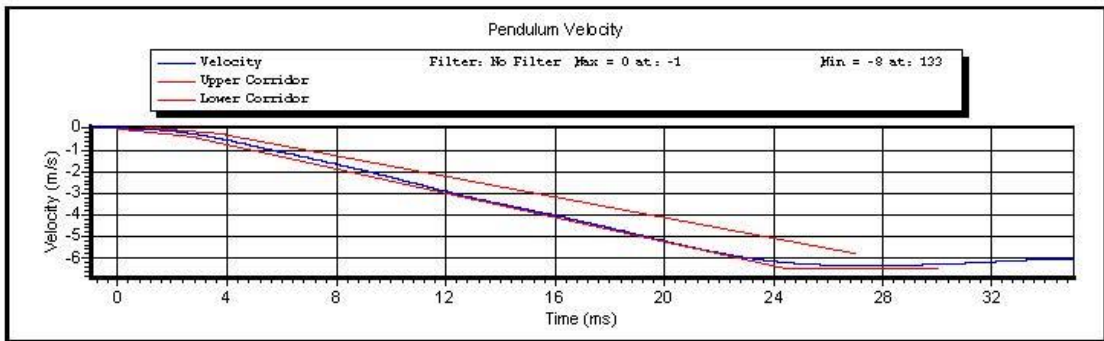
VERIFICATION REPORT

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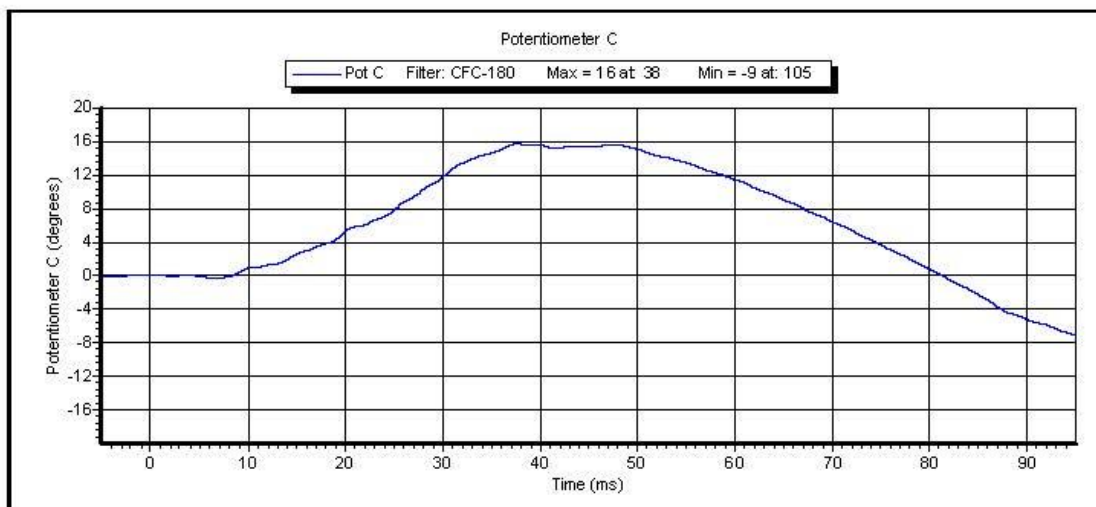
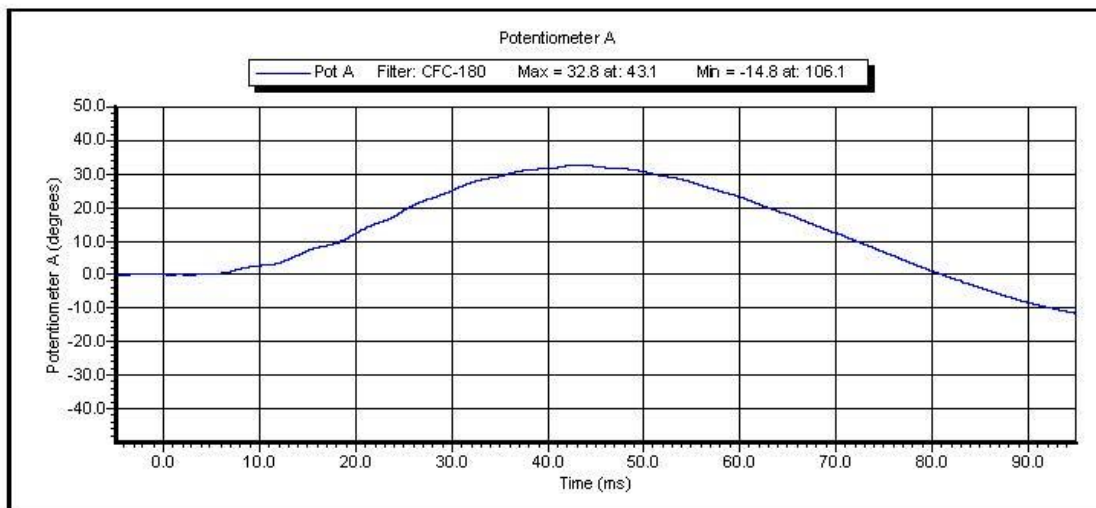
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DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	11/6/2014
DentonATD	156ESDT-102	094	11/13/2014
DentonATD	156ESDT-102	095	11/13/2014



Test Name:	Lumbar Spine
Sub Test Name:	
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Lumbar Flexion** Test Time: **2:03:48 PM** Test Date: **12/17/2014**
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Test ID: **Lumbar Flexion** Test Time: **2:03:48 PM**

Test Date: **12/17/2014**

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VERIFICATION REPORT

Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:			
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Pelvis Impact	Test Date:	12/15/2014
		Test Time:	1:42:40 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.00 deg C	P
Humidity	10	--	70	31.00 %RH	P
Velocity	4.2	--	4.4	4.34 m/s	P
Peak Pendulum Force	-5.4	--	-4.7	-4.95 kN	P
Time at Peak Pendulum Force	11.8	--	16.1	13.64 ms	P
Peak Pubic Symphysis Force	-1.59	--	-1.23	-1.407 kN	P
Time at Peak Pubic Symphysis Force	12.2	--	17.0	14.64 ms	P

All test parameters are within specifications

Technician: **R. Weil**
Supervisor: **M. Goehle**



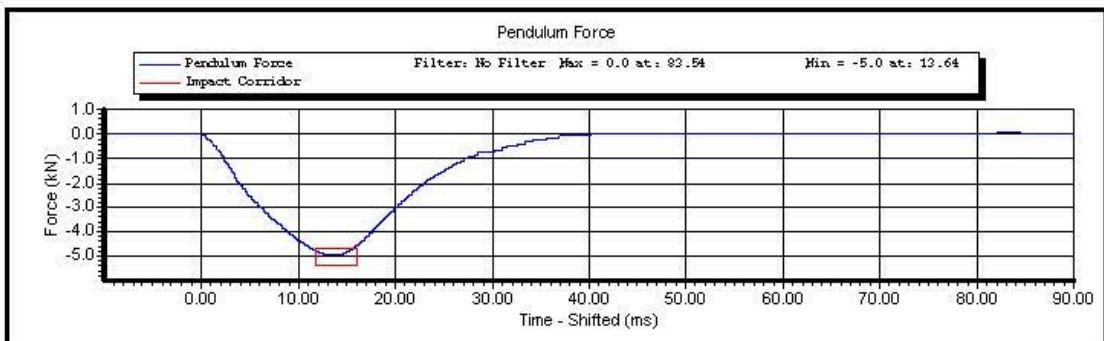
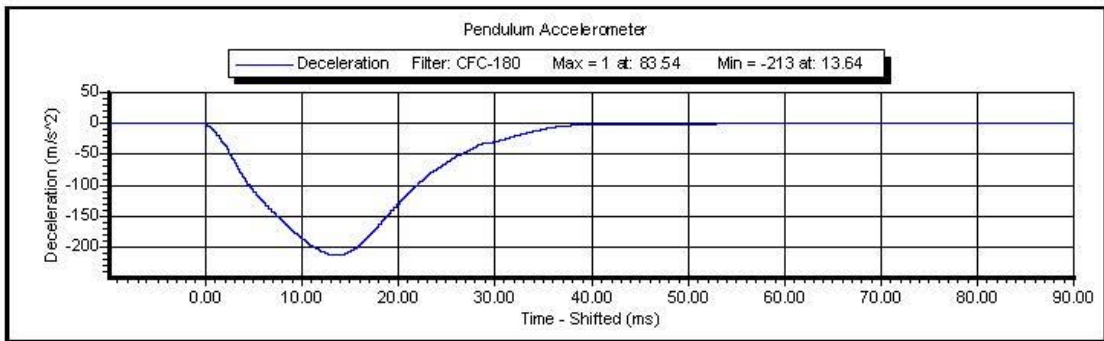
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Denton	3096	LC-465Fy	5/13/2014

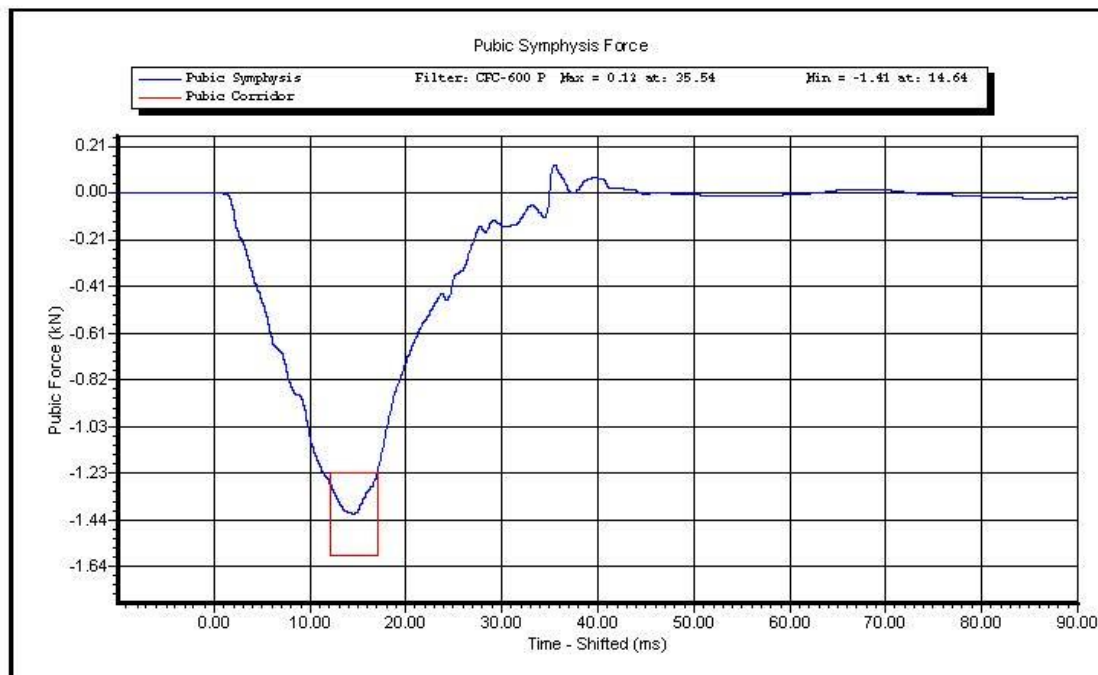


Test Name:	Pelvis Impact
Sub Test Name:	
ATD Type:	ES-2re
ATD Serial Number:	F034



Test ID: **Pelvis Impact** Test Time: **1:42:40 PM** Test Date: **12/15/2014**

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Test ID: **Pelvis Impact**

Test Time: **1:42:40 PM**

Test Date: **12/15/2014**

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CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 303

(CONFIGURED FOR LEFT SIDE IMPACT)

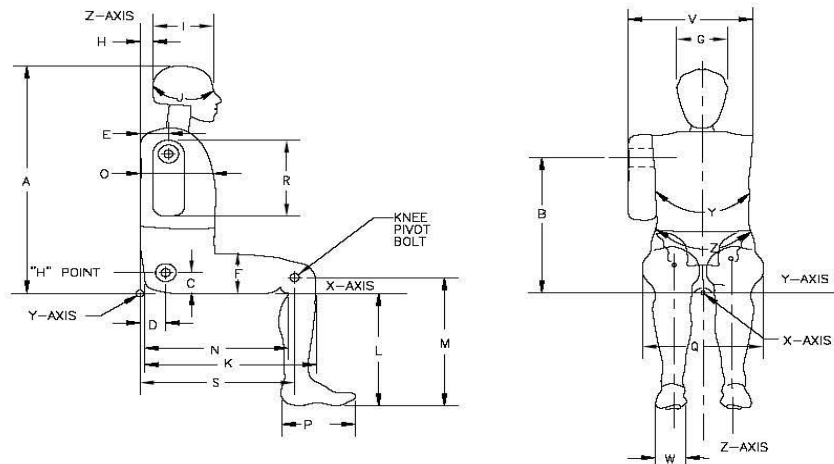


External Measurements - SID-IIs

Technician: M. Geesey

Date: 12/10/2014

Dummy Serial Number: 303



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	446	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	144	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	530	Pass
L	Popliteal Height	343	369	358	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	220	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	84	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

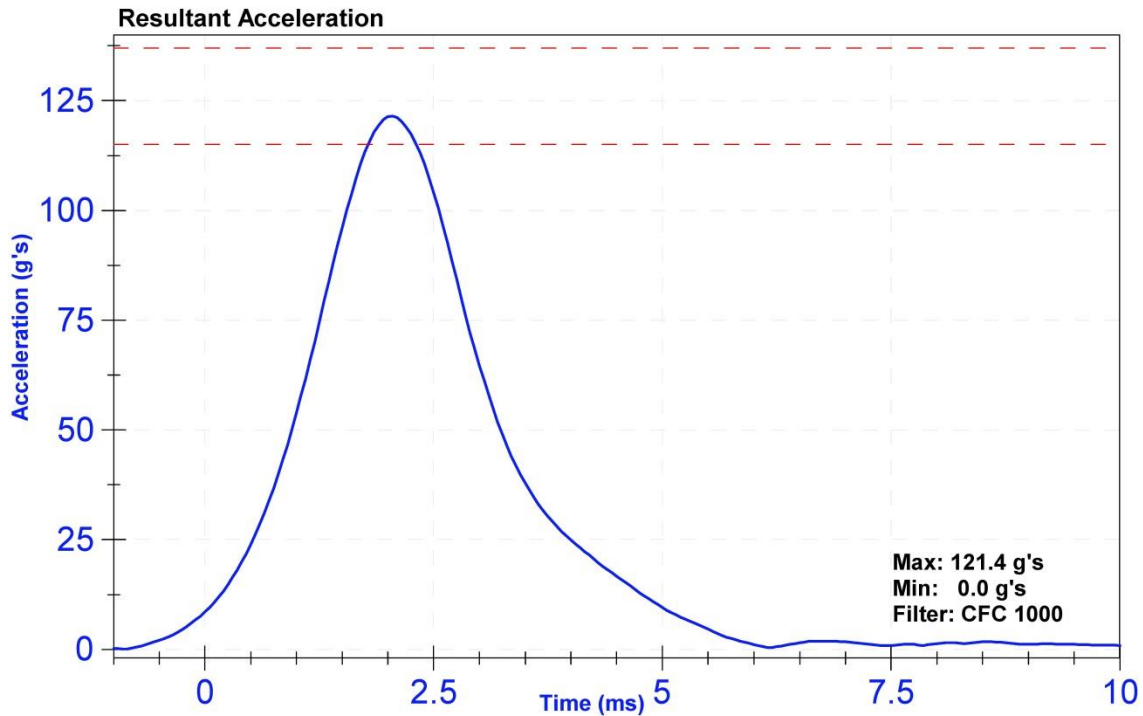
ATD Manufacturer	First Technology	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

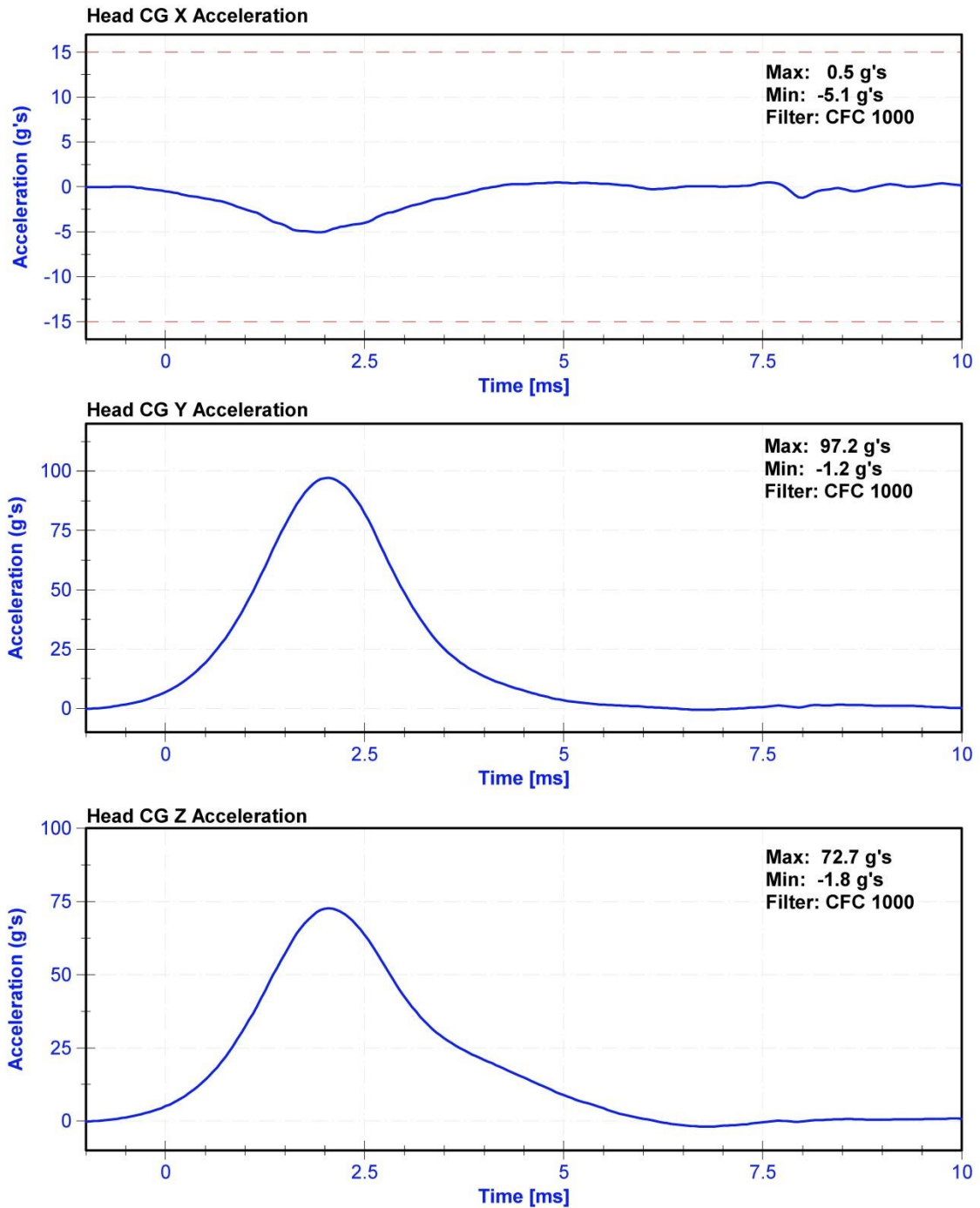
Results

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
Resultant Acceleration	115	137	g's	121.4	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-P52022	10/8/2014	4/8/2015
Y Accelerometer	ENDEVCO 7264	AC-P52040	10/8/2014	4/8/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P58737	10/8/2014	4/8/2015





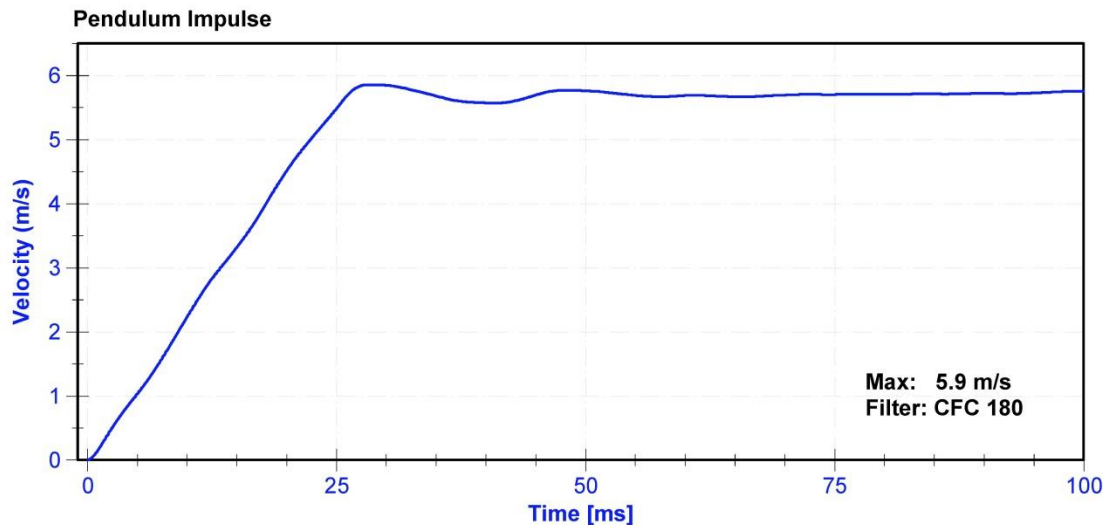
ATD Manufacturer	First Technology	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

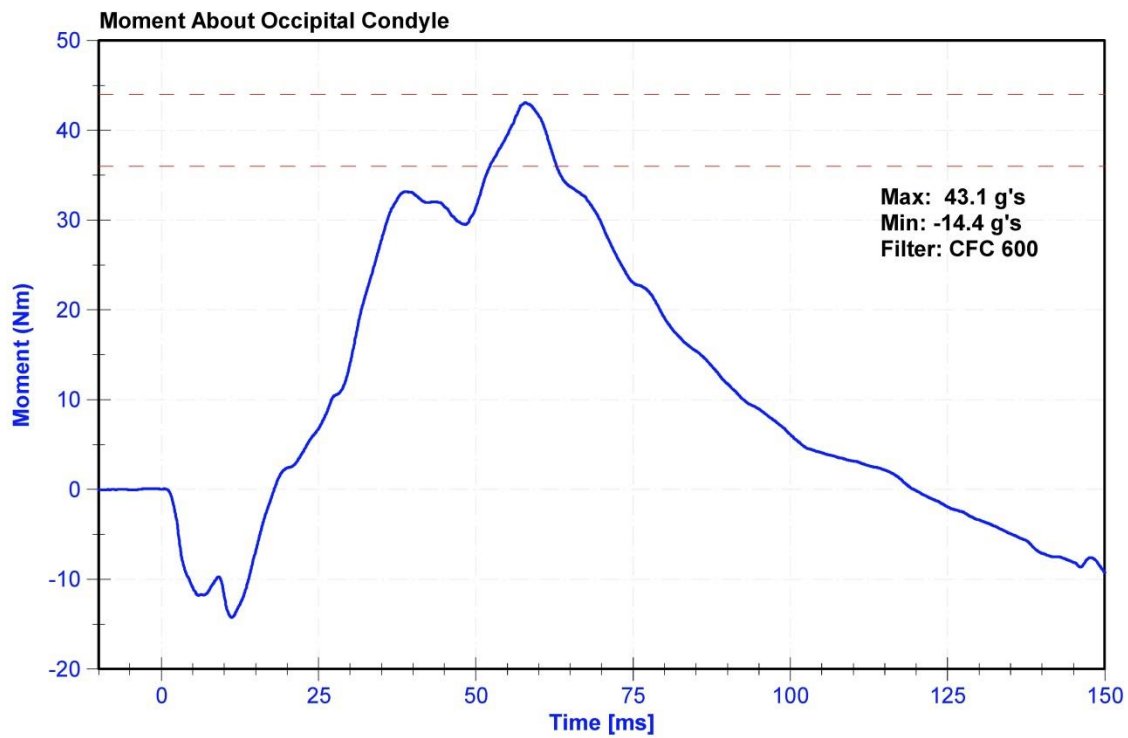
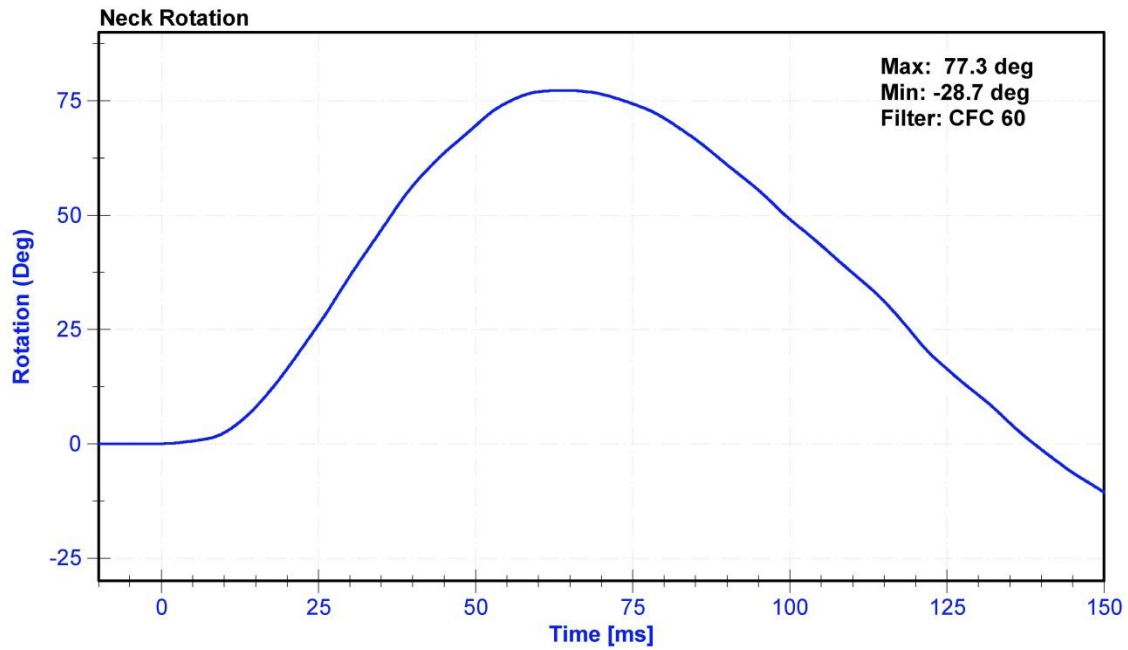
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	19.8	Pass
Velocity	5.51	5.63	m/s	5.537	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.23	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.32	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.52	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.49	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.86	Pass
Neck Rotation	71	81	deg	77.3	Pass
Time at Maximum Rotation	50	70	ms	65.1	Pass
Moment about the OC	36	44	Nm	43.1	Pass
Moment Decay to 0 Nm	102	126	ms	119.6	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-2019Fy	5/19/2014	5/19/2015







VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:			
ATD Type:	SID-IIs		
ATD Serial Number:	303		
Test ID:	Shoulder Impact	Test Date:	12/11/2014
		Test Time:	11:43:01 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.30 deg C	P
Humidity	10	--	70	20.7 %RH	P
Velocity	4.2	--	4.4	4.31 m/s	P
Probe Acceleration	13	--	18	15.6 g	P
Shoulder Deflection	28	--	37	31.3 mm	P
T1 Acceleration	17	--	22	20.4 g	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **M. Goehle**



VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Servo	180-3885	DS-8GFE	12/4/2014
Endevco	7264-2000	P63315	10/9/2014



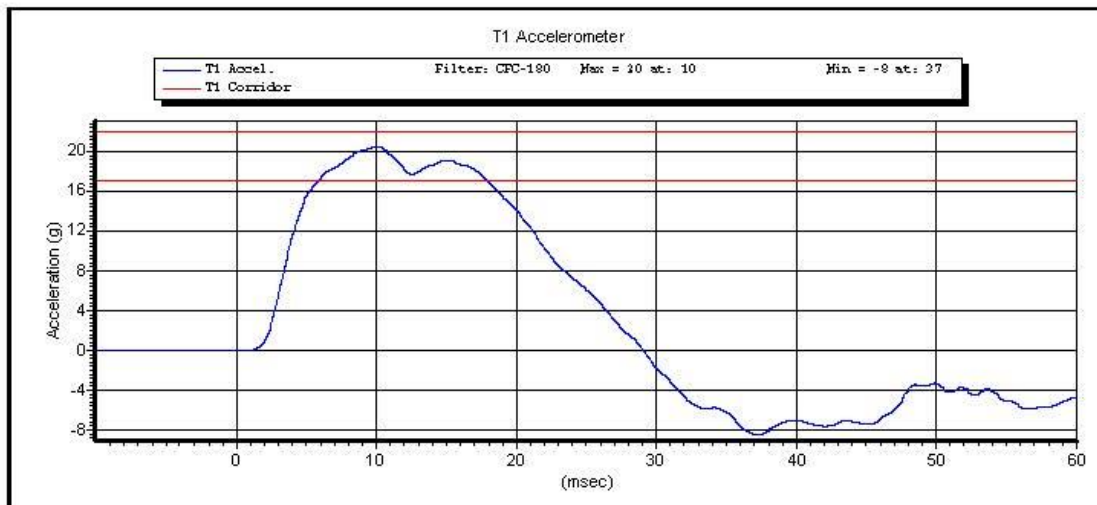
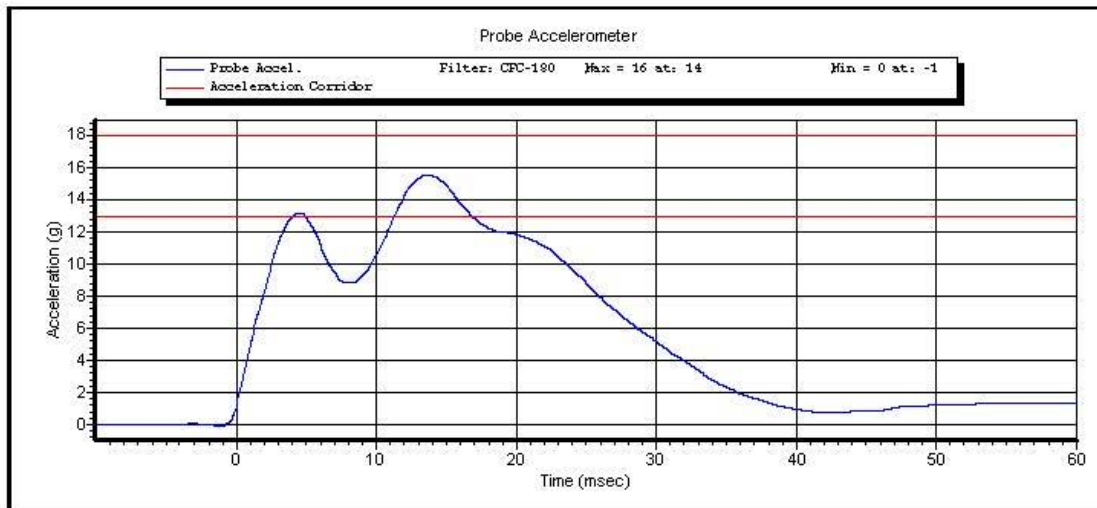
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Sub Test Name:	
ATD Type:	SID-IIs
ATD Serial Number:	303



Test ID: **Shoulder Impact** Test Time: **11:43:01 AM**

Test Date: **12/11/2014**

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Test ID: **Shoulder Impact** Test Time: **11:43:01 AM**

Test Date: **12/11/2014**

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VERIFICATION REPORT

Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:			
ATD Type:	SID-11s		
ATD Serial Number:	303		
Test ID:	Thorax w/Arm Impact	Test Date:	12/11/2014
		Test Time:	1:15:32 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.8 deg C	P
Humidity	10	--	70	20.9 %RH	P
Velocity	6.6	--	6.8	6.69 m/s	P
Probe Acceleration after 5ms	30	--	36	34.2 g	P
Upper Thorax Rib Deflection	25	--	32	27.5 mm	P
Mid Thorax Rib Deflection	30	--	36	31.0 mm	P
Lower Thorax Rib Deflection	32	--	38	32.4 mm	P
Upper Spine Acceleration ("y")	34	--	43	42.5 g	P
Lower Spine Acceleration ("y")	29	--	37	36.3 g	P
Shoulder Deflection	31	--	40	36.5 mm	P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **M. Goehle**



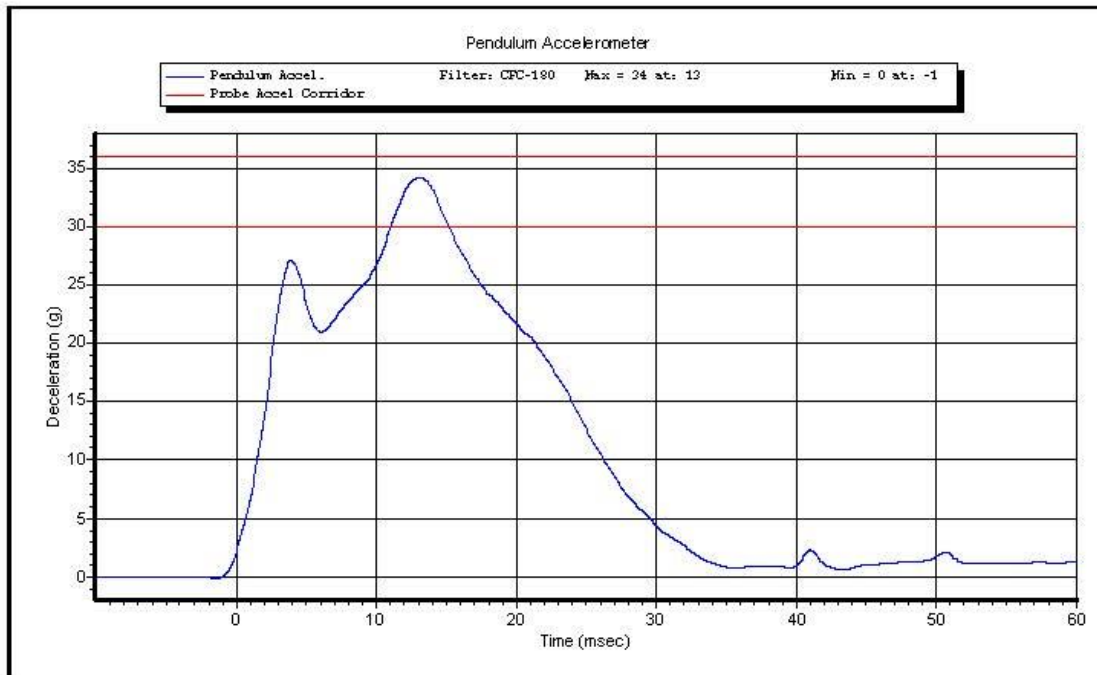
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Servo	180-3885	DS-1199GFE	8/6/2014
Servo	180-3885	DS-1246GFE	8/6/2014
Servo	180-3885	DS-1256GFE	8/6/2014
Endevco	7264-2000	P63315	10/9/2014
Endevco	7264-2000	P51974	10/9/2014
Servo	180-3885	DS-8GFE	12/4/2014



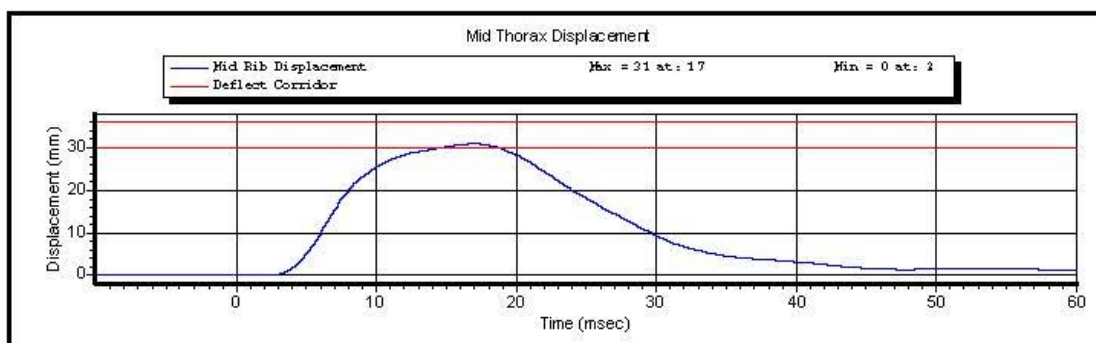
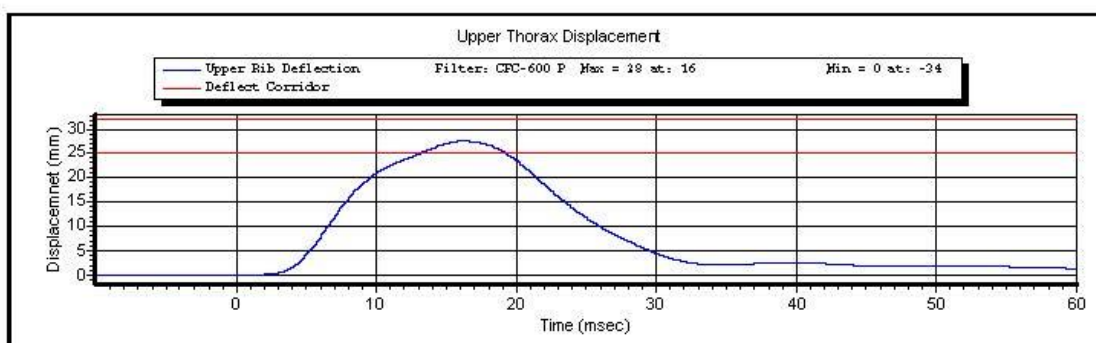
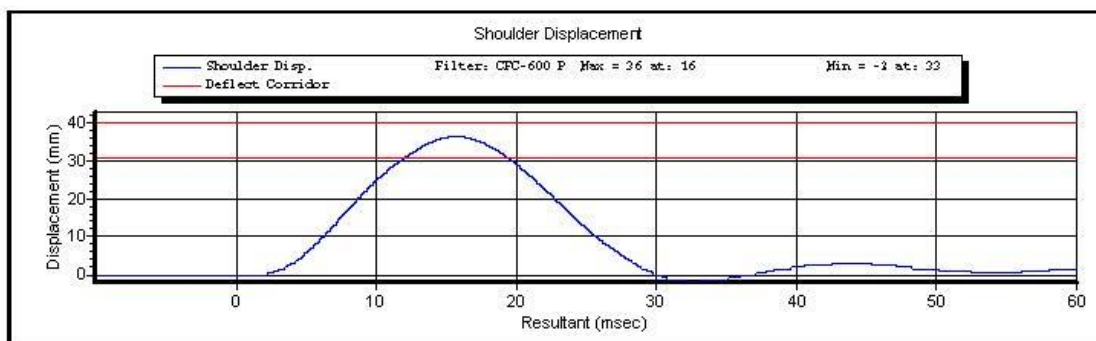
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Sub Test Name:	
ATD Type:	SID-IIs
ATD Serial Number:	303



Test ID: Thorax w/Arm Impact Test Time: 1:15:32 PM

Test Date: 12/11/2014

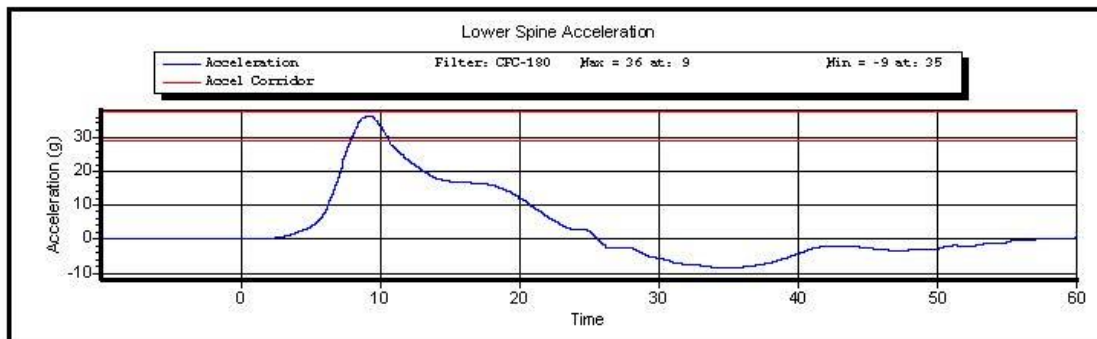
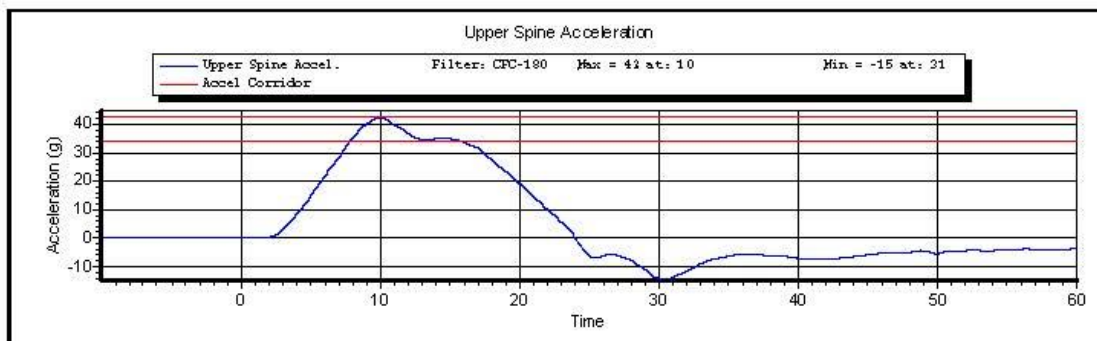
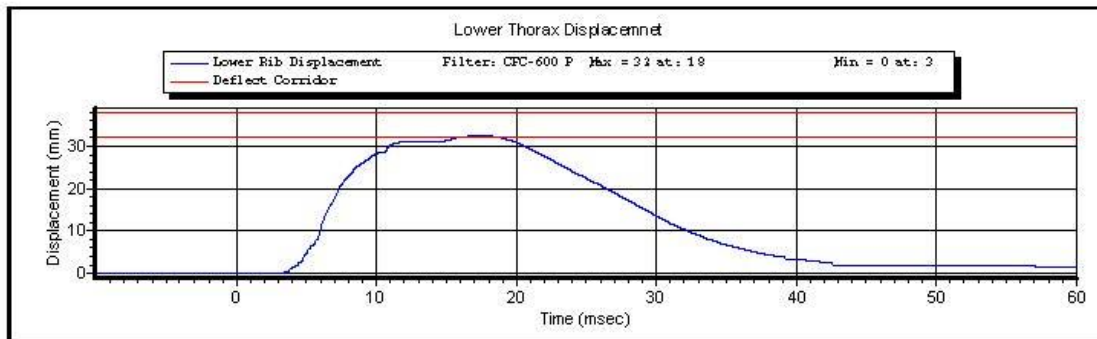
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Test ID: **Thorax w/Arm Impact** Test Time: **1:15:32 PM**

Test Date: **12/11/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: Thorax w/Arm Impact Test Time: 1:15:32 PM

Test Date: 12/11/2014

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VERIFICATION REPORT

Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:			
ATD Type:	SID-11s		
ATD Serial Number:	303		
Test ID:	Thorax w/o Arm	Test Date:	12/11/2014
		Test Time:	11:05:28 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.9 deg C	P
Humidity	10	--	70	21.1 %RH	P
Velocity	4.2	--	4.4	4.31 m/s	P
Probe Acceleration	14	--	18	16.0 g	P
Upper Thorax Rib Deflection	32	--	40	38.8 mm	P
Mid Thorax Rib Deflection	39	--	45	42.2 mm	P
Lower Thorax Rib Deflection	35	--	43	35.7 mm	P
Upper Spine Acceleration T1	13	--	17	17.0 g	P
Lower Spine Acceleration T12	7	--	11	9.9 g	P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **M. Goehle**



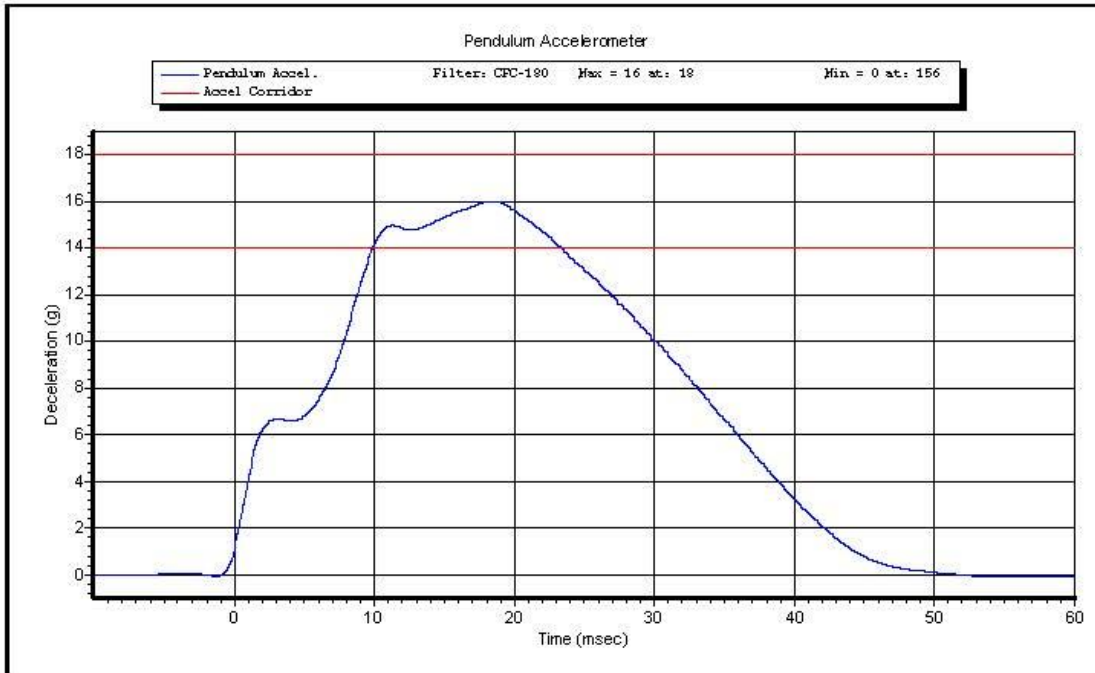
VERIFICATION REPORT

REFERENCE EQUIPMENT

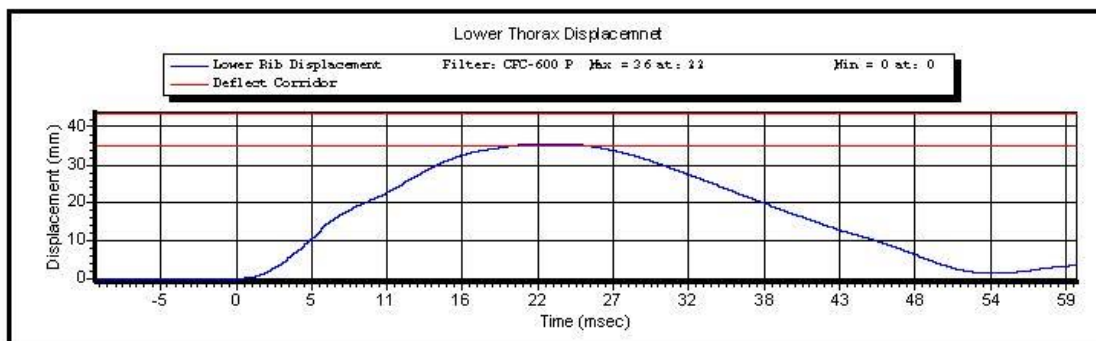
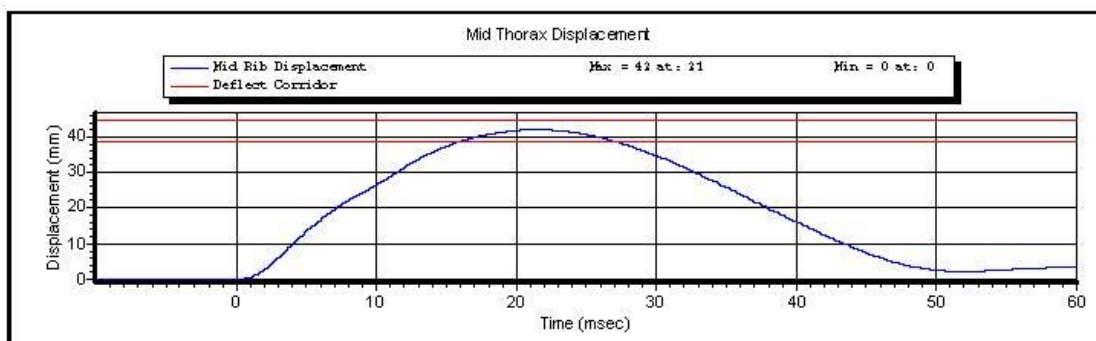
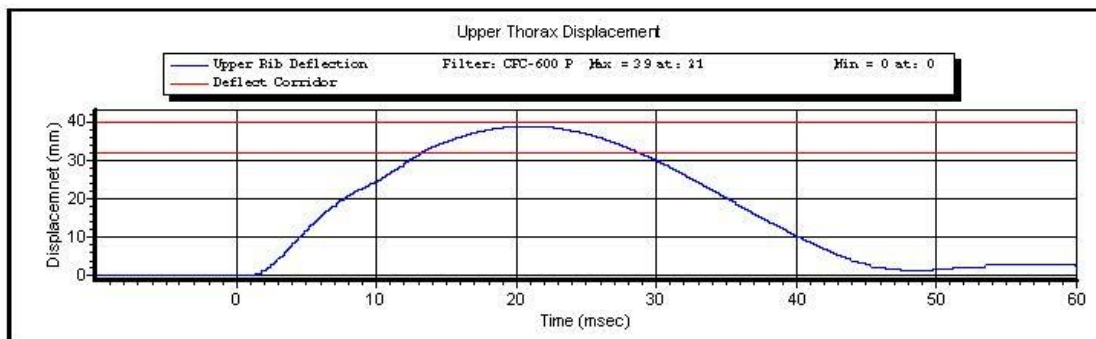
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DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Servo	180-3885	DS-1199GFE	8/6/2014
Servo	180-3885	DS-1246GFE	8/6/2014
Servo	180-3885	DS-1256GFE	8/6/2014
Endevco	7264-2000	P63315	10/9/2014
Endevco	7264-2000	P51974	10/9/2014



Test Name:	Thorax Impact without Arm
Sub Test Name:	
ATD Type:	SID-IIs
ATD Serial Number:	303



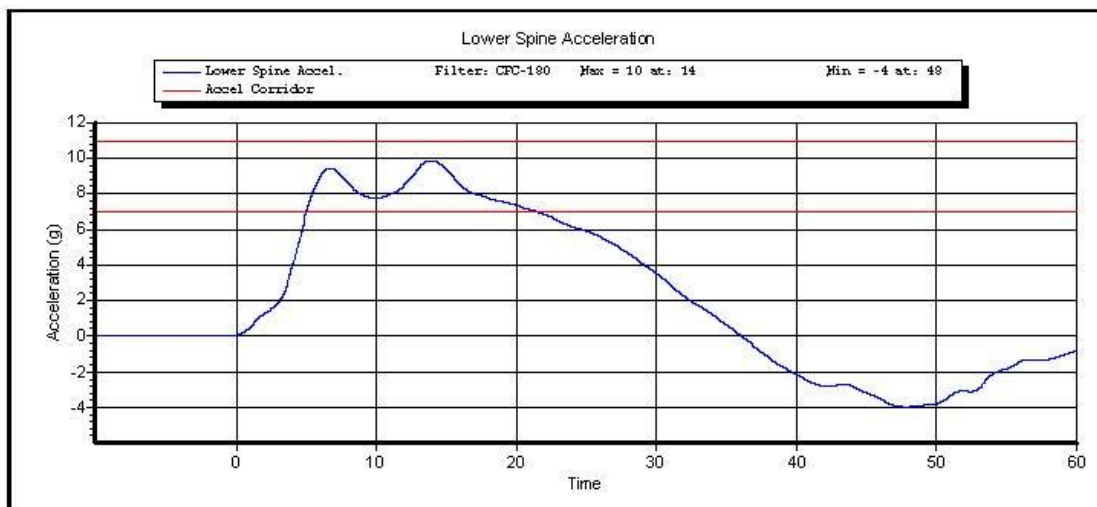
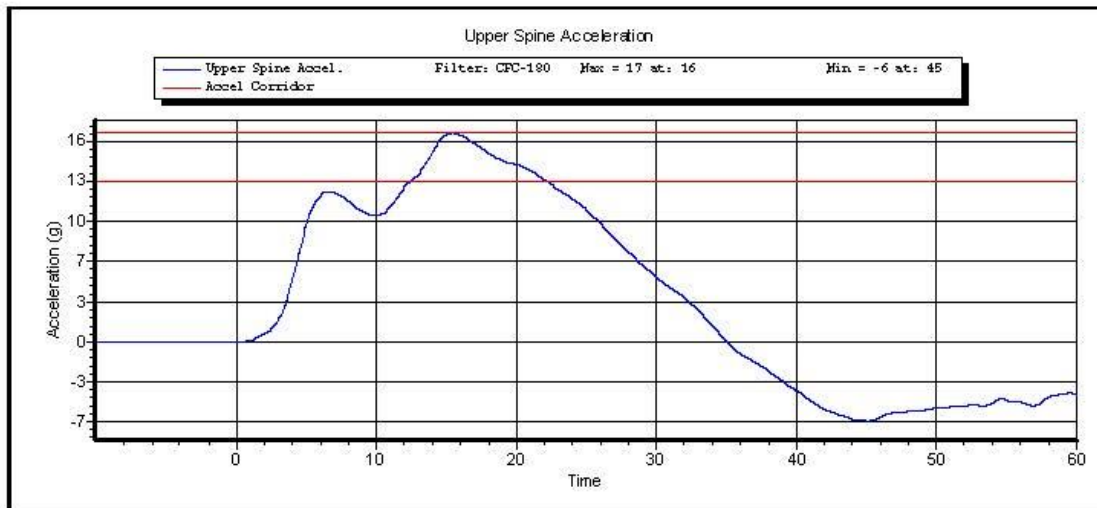
Test ID: **Thorax w/o Arm** Test Time: **11:05:28 AM** Test Date: **12/11/2014**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: Thorax w/o Arm Test Time: 11:05:28 AM

Test Date: 12/11/2014

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Test ID: **Thorax w/o Arm** Test Time: **11:05:28 AM**

Test Date: **12/11/2014**

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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:			
ATD Type:	SID-IIs		
ATD Serial Number:	303		
Test ID:	Abdomen Impact	Test Date:	12/11/2014
		Test Time:	10:39:57 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.30 deg C	P
Humidity	10	--	70	20.80 %RH	P
Velocity	4.2	--	4.4	4.35 m/s	P
Probe Deceleration	12	--	16	15.5 G's	P
Upper Abdominal Rib Deflection	36	--	47	38.1 mm	P
Lower Abdominal Rib Deflection	33	--	44	37.0 mm	P
Lower Spine Acceleration - T12	9	--	14	11.7 G's	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **M. Goehle**



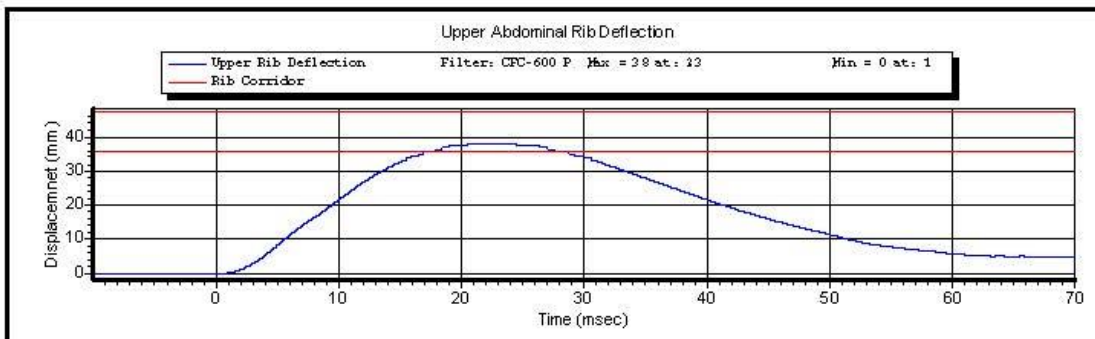
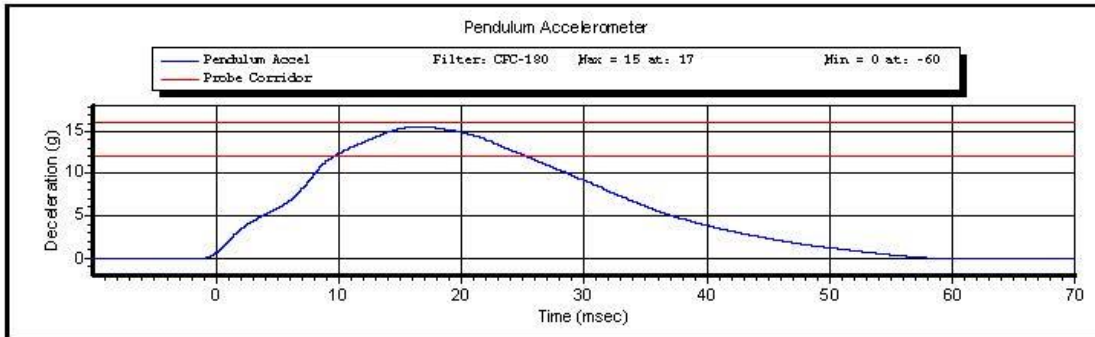
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Servo	180-3885	DS-1274GFE	8/6/2014
Servo	180-3885	DS-1285GFE	8/6/2014
Endevco	7264-2000	P51974	10/9/2014



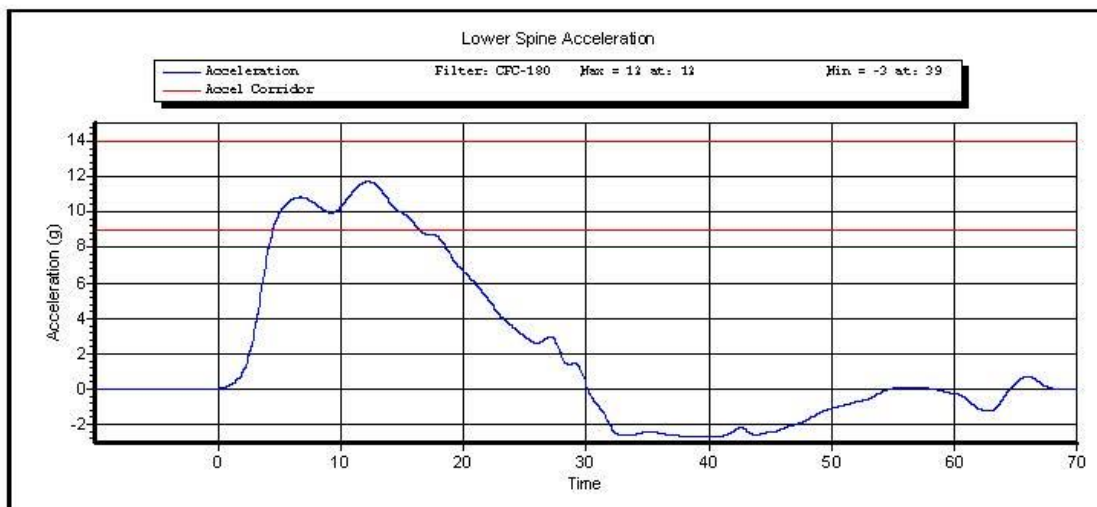
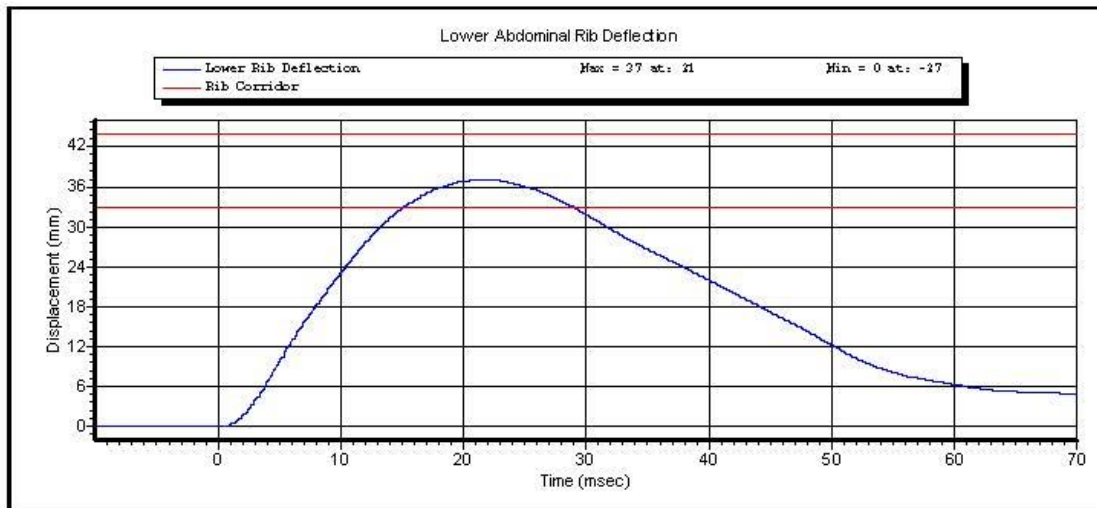
Test Name:	Abdominal Impact
Sub Test Name:	
ATD Type:	SID-IIs
ATD Serial Number:	303



Test ID: **Abdomen Impact** Test Time: **10:39:57 AM**

Test Date: **12/11/2014**

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Test ID: **Abdomen Impact** Test Time: **10:39:57 AM**

Test Date: **12/11/2014**

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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact		
ATD Type:	SID-IIs		
ATD Serial Number:	303		
Test ID:	Acetabulum Impact	Test Date:	12/11/2014
		Test Time:	8:31:56 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.8 deg C	P
Humidity	10	--	70	20.3 %RH	P
Velocity	6.6	--	6.8	6.64 m/s	P
Peak Probe Acceleration	38	--	47	44.1 g	P
Peak Pelvis Acceleration	34	--	42	40.5 g	P
Peak Acetabulum Force	3.6	--	4.3	3.98 kN	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **M. Goehle**



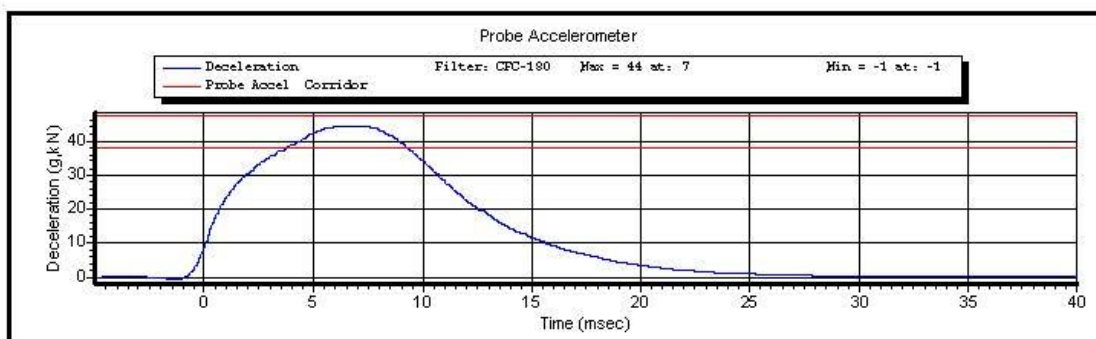
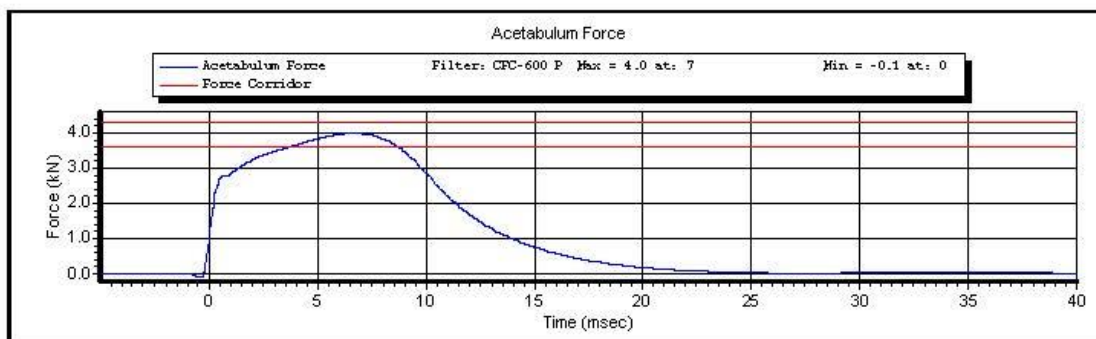
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Endevco	7264-2000	P51259	7/7/2014
FTSS	IF-520	LC-236Fy	5/13/2014
Endevco	7264-2000	P32139	12/10/2014
Endevco	7264-2000	P64147	8/28/2014



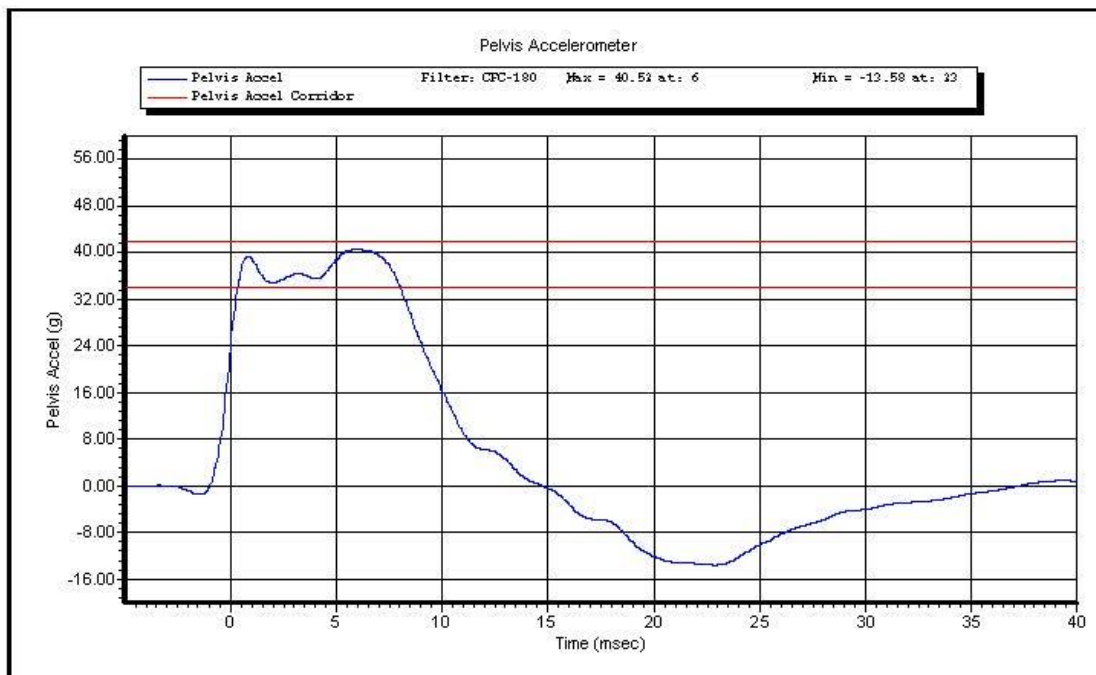
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Sub Test Name:	Acetabulum Impact
ATD Type:	SID-IIs
ATD Serial Number:	303



Test ID: **Acetabulum Impact** Test Time: **8:31:56 AM**

Test Date: **12/11/2014**

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Test ID: **Acetabulum Impact** Test Time: **8:31:56 AM**

Test Date: **12/11/2014**

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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact		
ATD Type:	SID-IIs		
ATD Serial Number:	303		
Test ID:	Pelvis Iliac Impact	Test Date:	12/11/2014
		Test Time:	2:04:43 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.3 deg C	P
Humidity	10	--	70	20.6 %RH	P
Velocity	4.2	--	4.4	4.36 m/s	P
Peak Probe Acceleration	36	--	45	40.3 g	P
Peak Pelvis Acceleration	28	--	39	31.7 g	P
Peak Iliac Force	4.1	--	5.1	4.32 kN	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **M. Goehle**



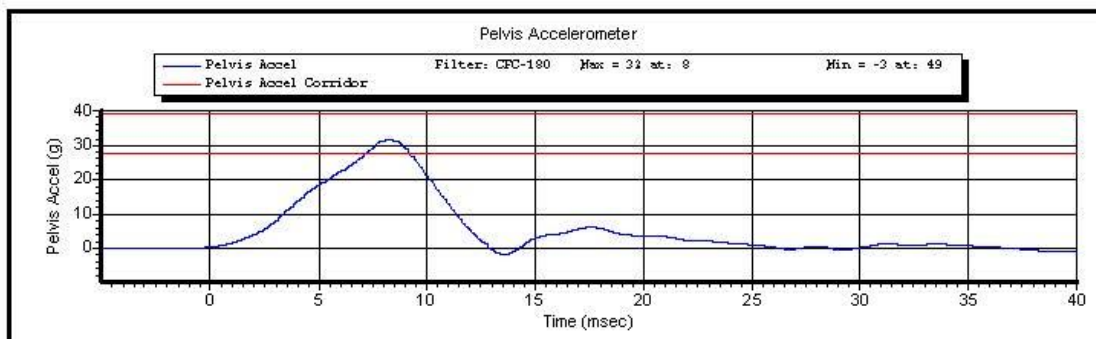
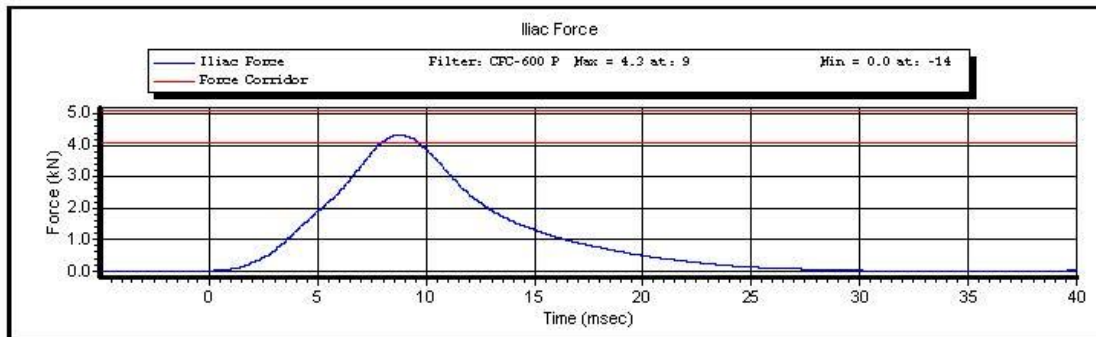
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	7/30/2014
Endevco	7264-2000	P51259	7/7/2014
DentonATD	3228J	LC-280 Fy	5/14/2014



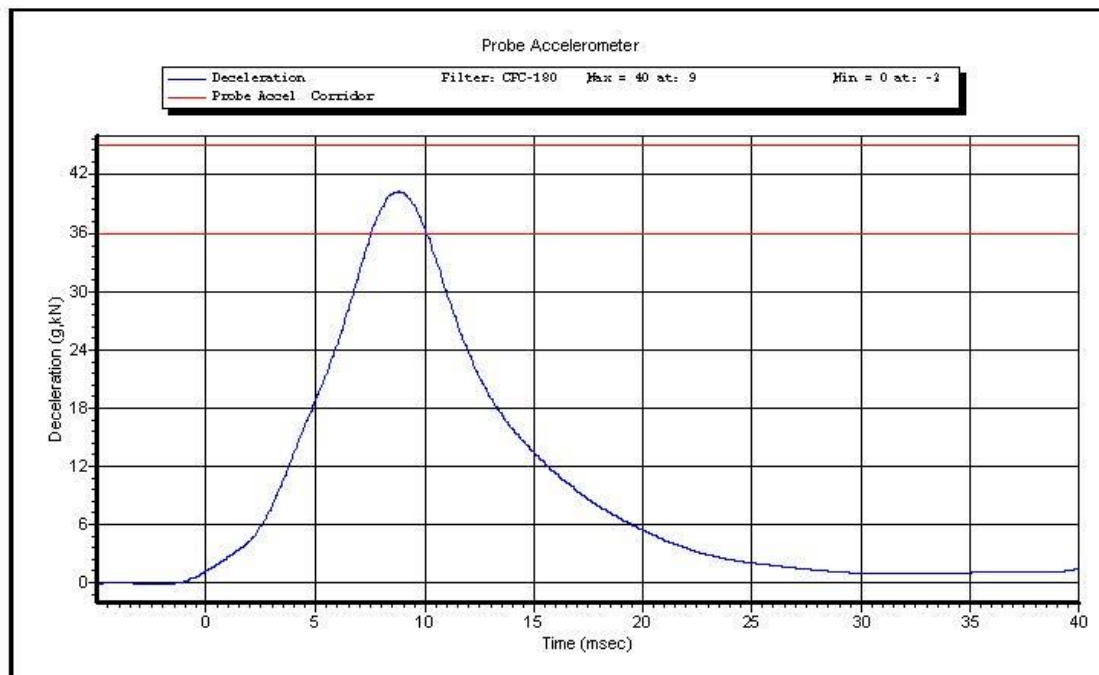
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Sub Test Name:	Iliac Impact
ATD Type:	SID-IIs
ATD Serial Number:	303



Test ID: Pelvis Iliac Impact Test Time: 2:04:43 PM

Test Date: 12/11/2014

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Test ID: **Pelvis Iliac Impact** Test Time: **2:04:43 PM**

Test Date: **12/11/2014**

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CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

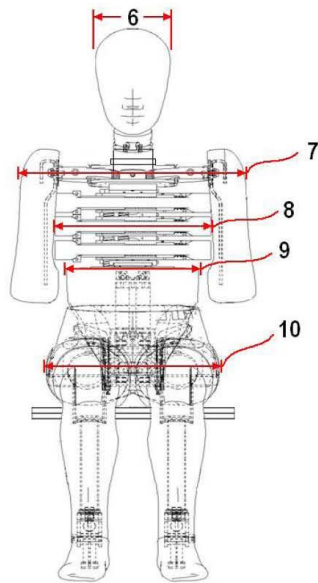


External Measurements - EuroSID-2re

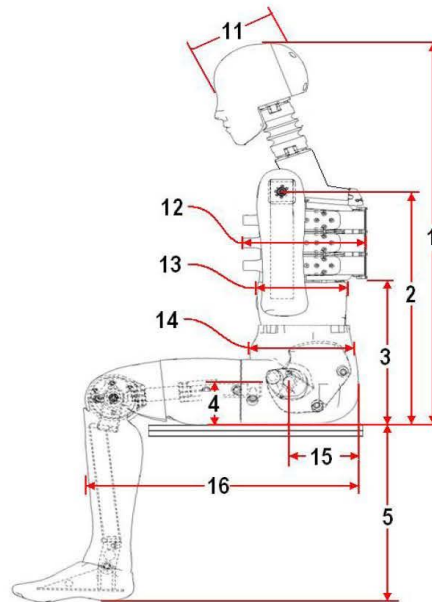
Technician: M. Geesey

Date: 1/30/2015

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	562	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	347	Pass
4	Seat to Hip Joint (center of bolt)	97	103	100	Pass
5	Sole to Seat, Sitting	333	451	417	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	474	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	283	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	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	605	Pass

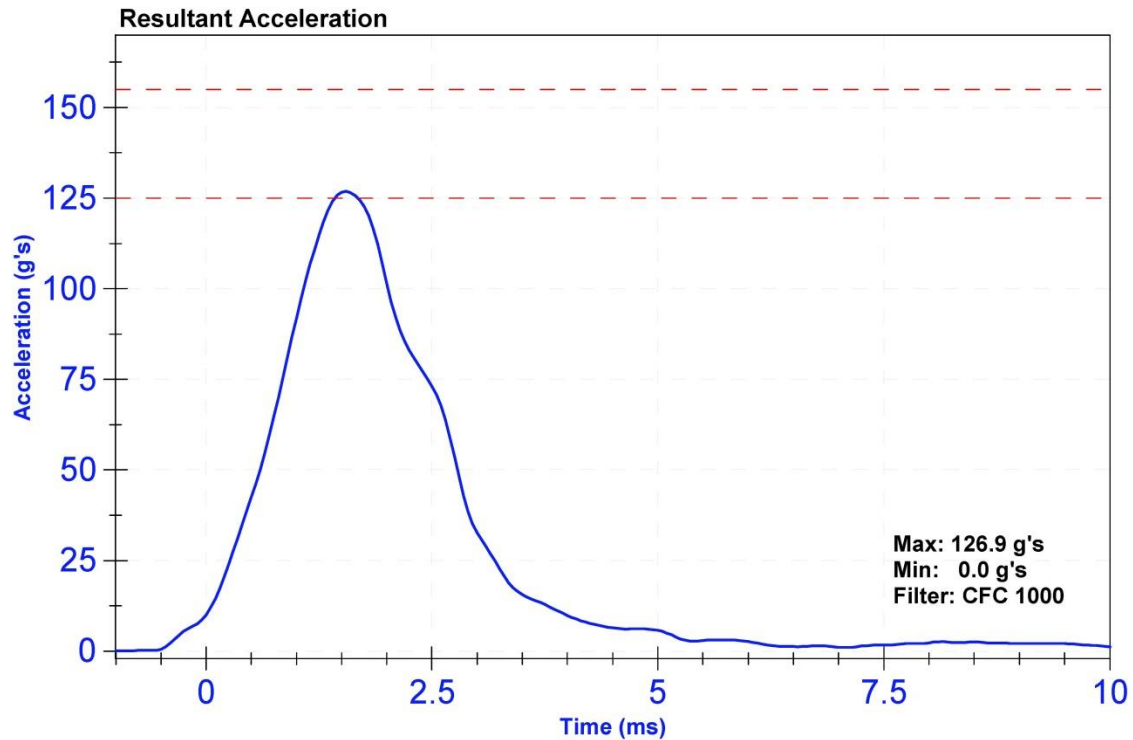
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

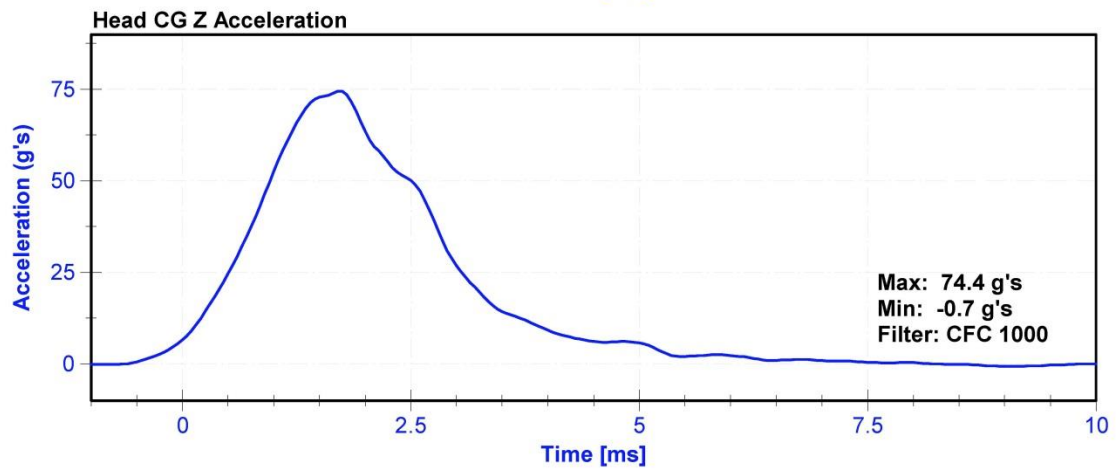
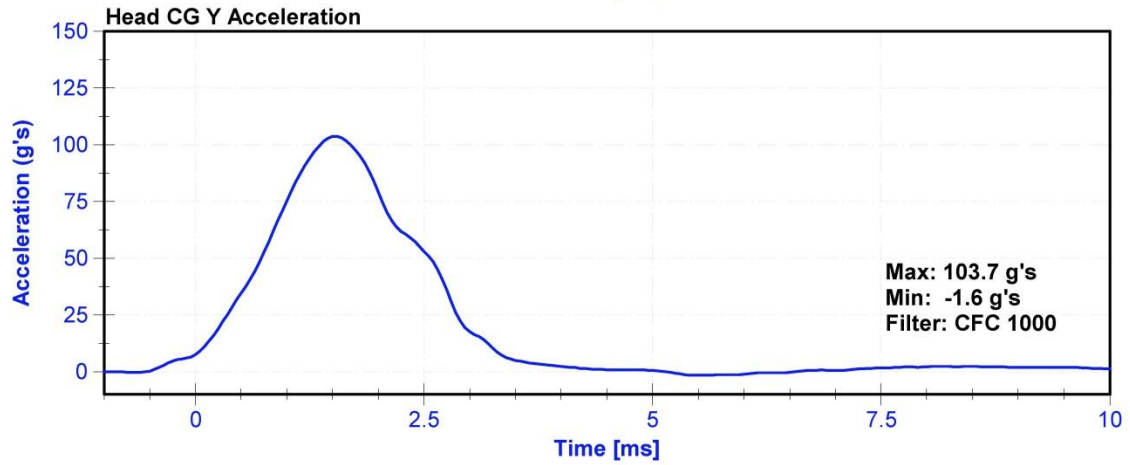
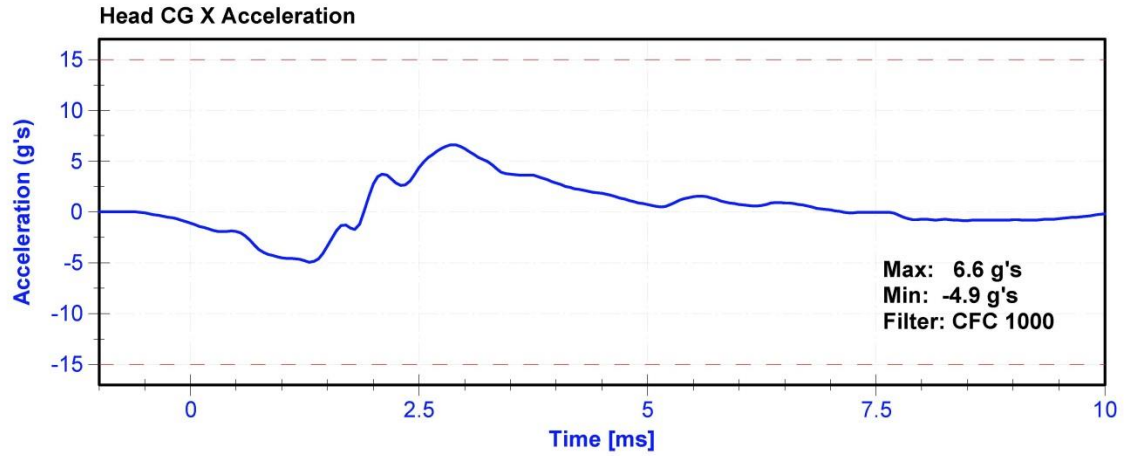
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	12.5	Pass
Resultant Acceleration	125	155	g's	126.9	Pass
Oscillation	0	15	%	4.93	Pass
Fore-Aft Acceleration	-15	15	g's	6.6	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





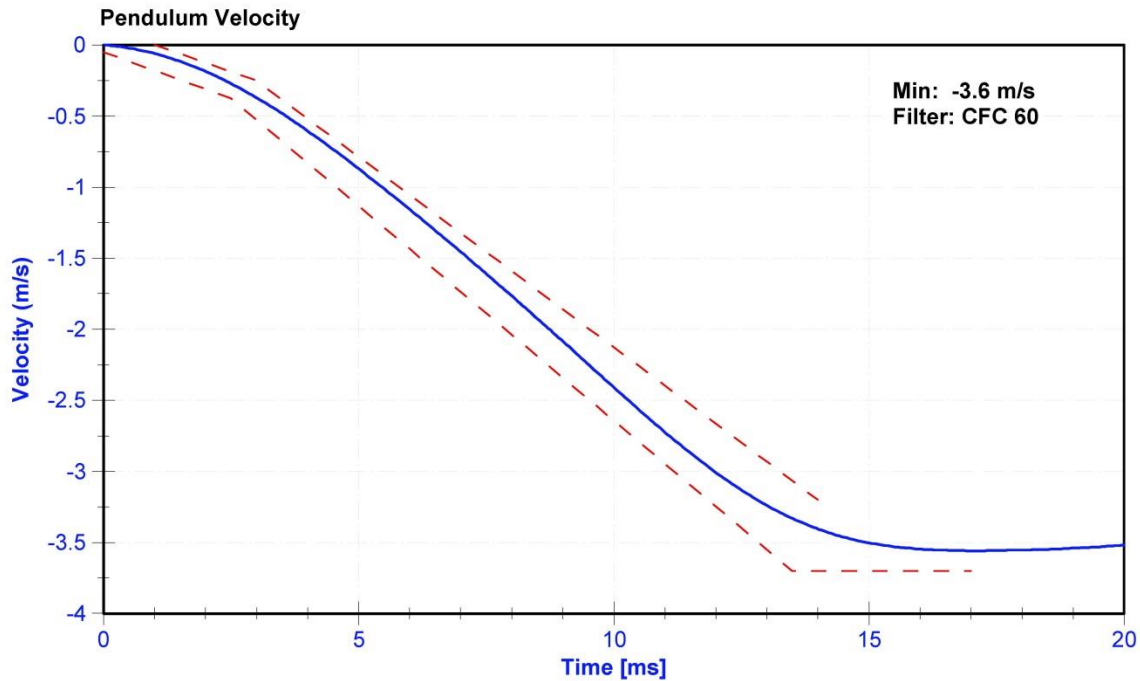
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

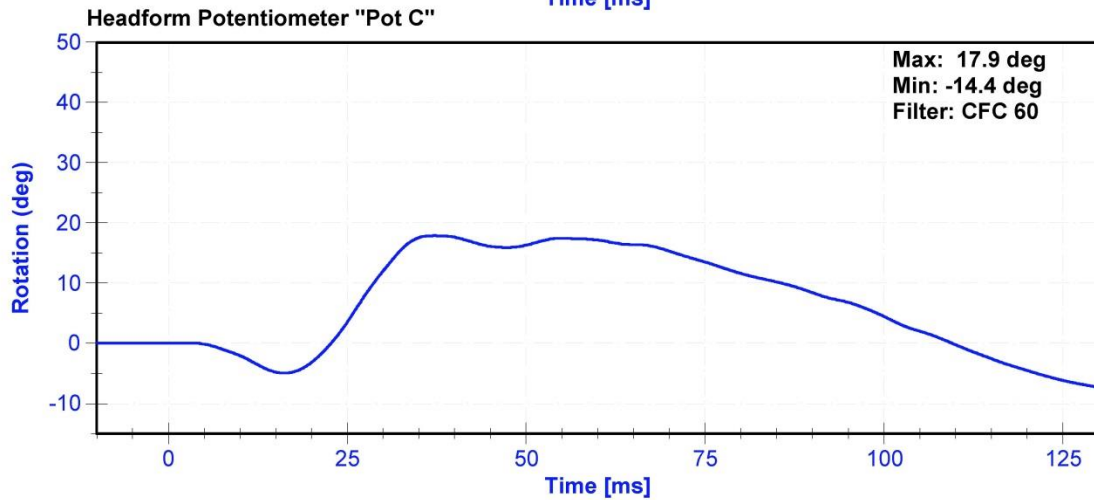
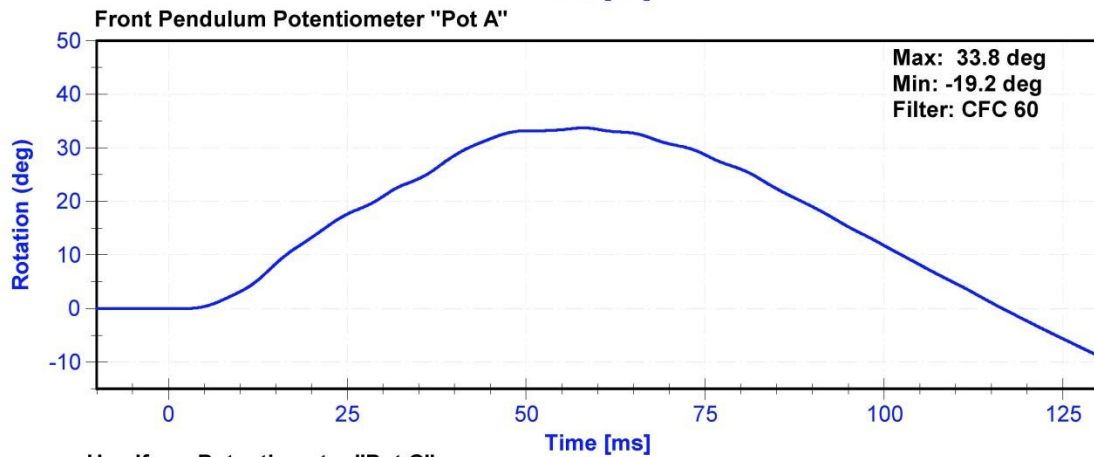
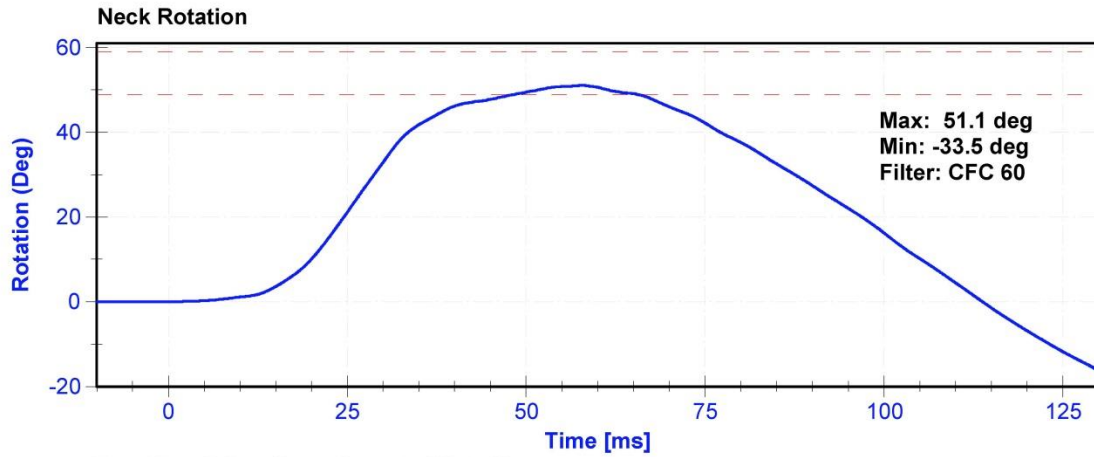
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	19.8	Pass
Velocity	3.3	3.5	m/s	3.36	Pass
Lateral Neck Rotation	49	59	deg	51.1	Pass
Time at Maximum Rotation	54	66	ms	57.8	Pass
Time of Rotation Decay from Maximum	53	88	ms	55.9	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





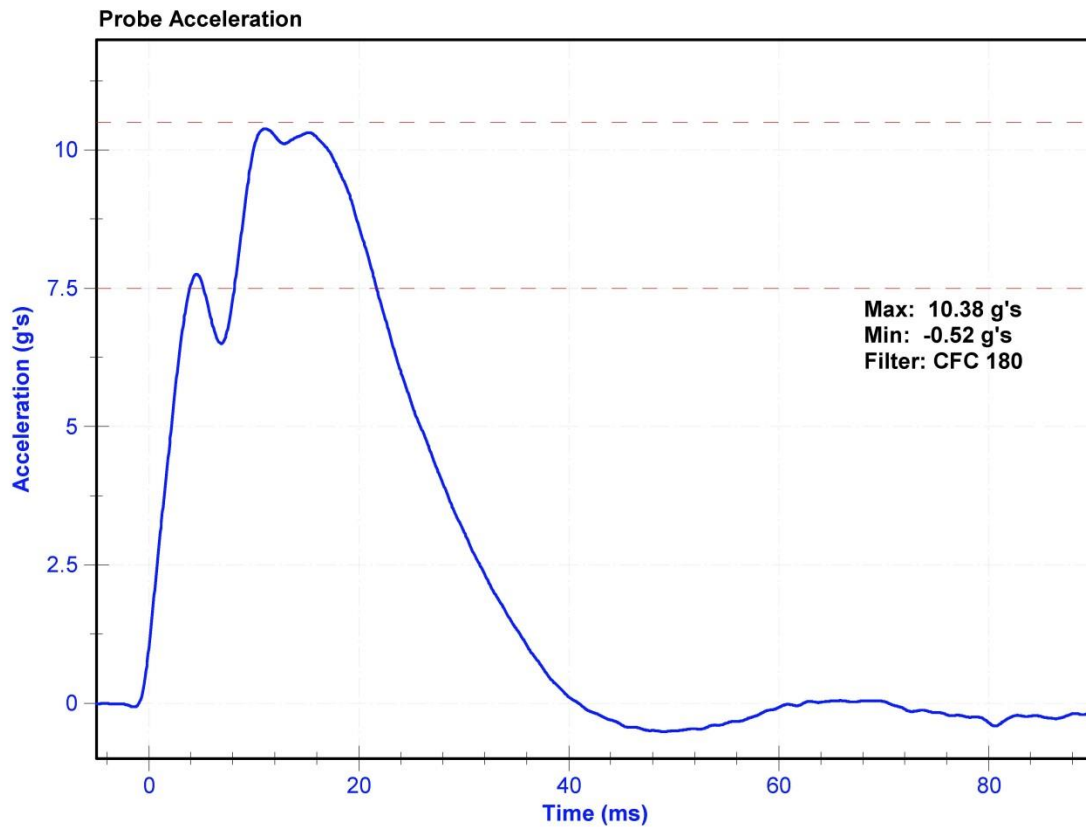
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	23.6	Pass
Velocity	4.2	4.4	m/s	4.26	Pass
Probe Acceleration	7.5	10.5	g's	10.38	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015



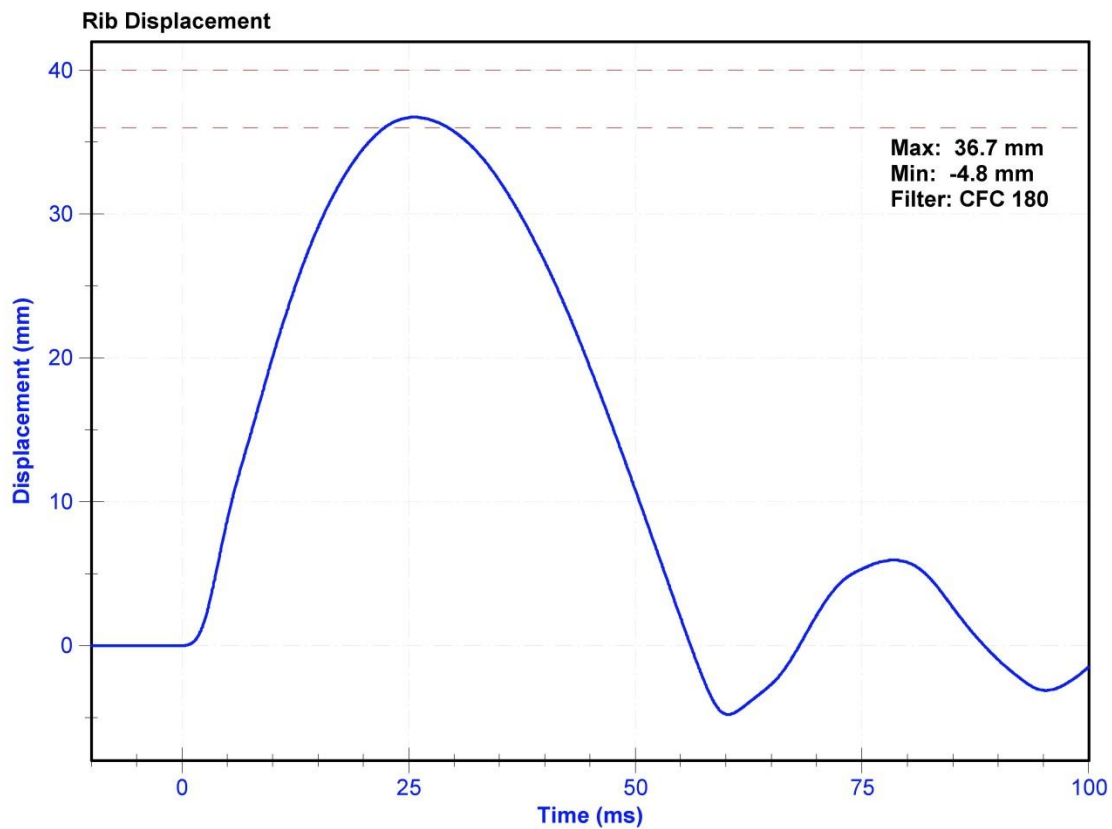
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	18.1	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



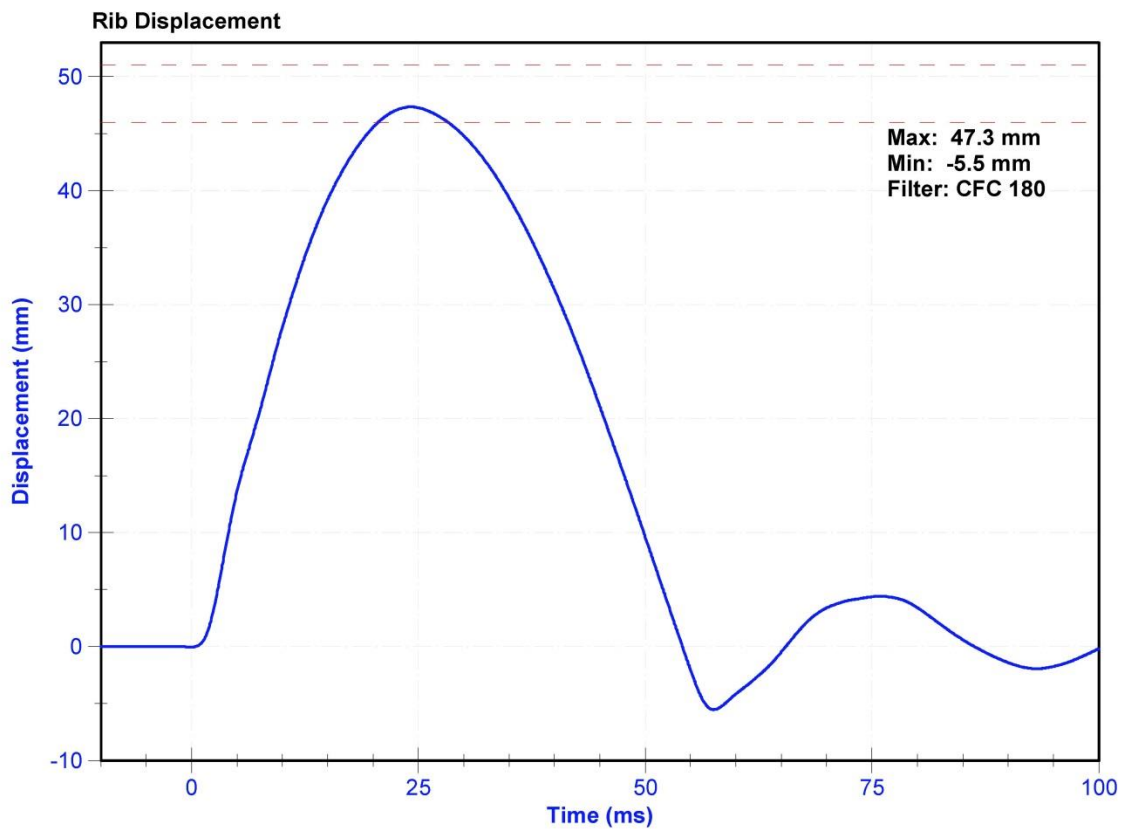
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	18.1	Pass
Rib Displacement	46	51	mm	47.3	Pass

Transducer Calibrations

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



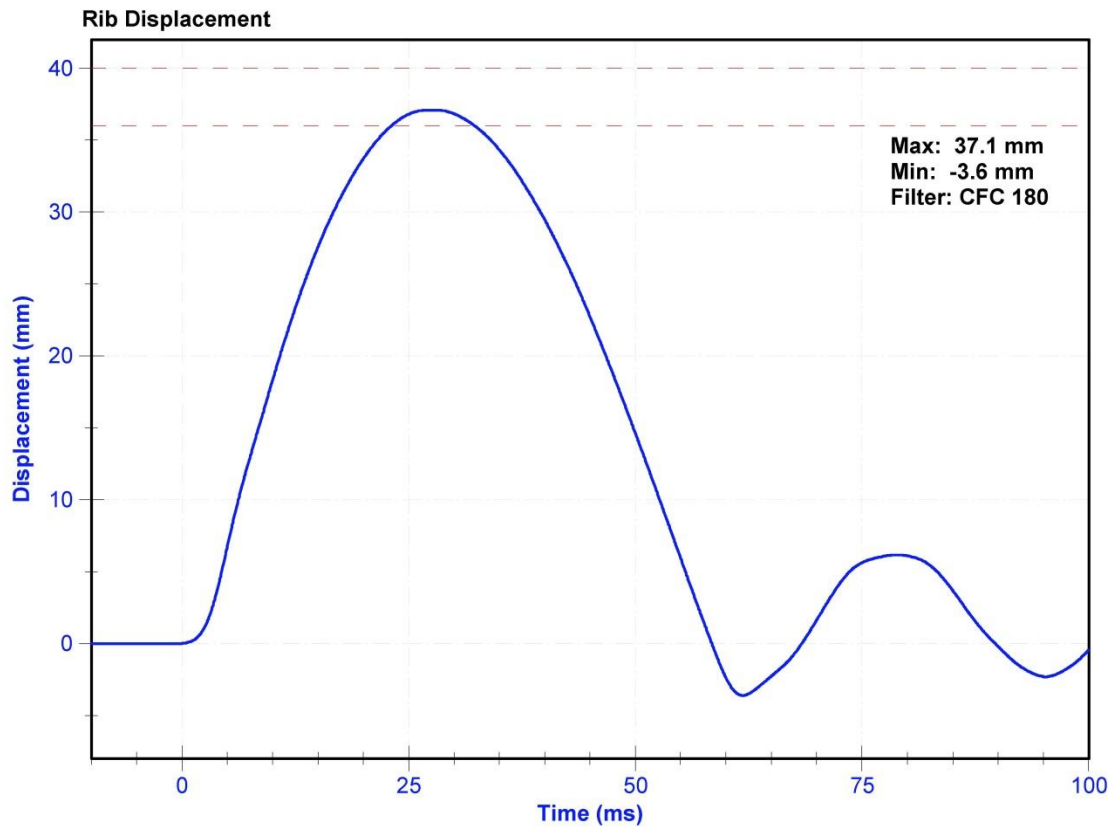
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	20.5	Pass
Rib Displacement	36	40	mm	37.1	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



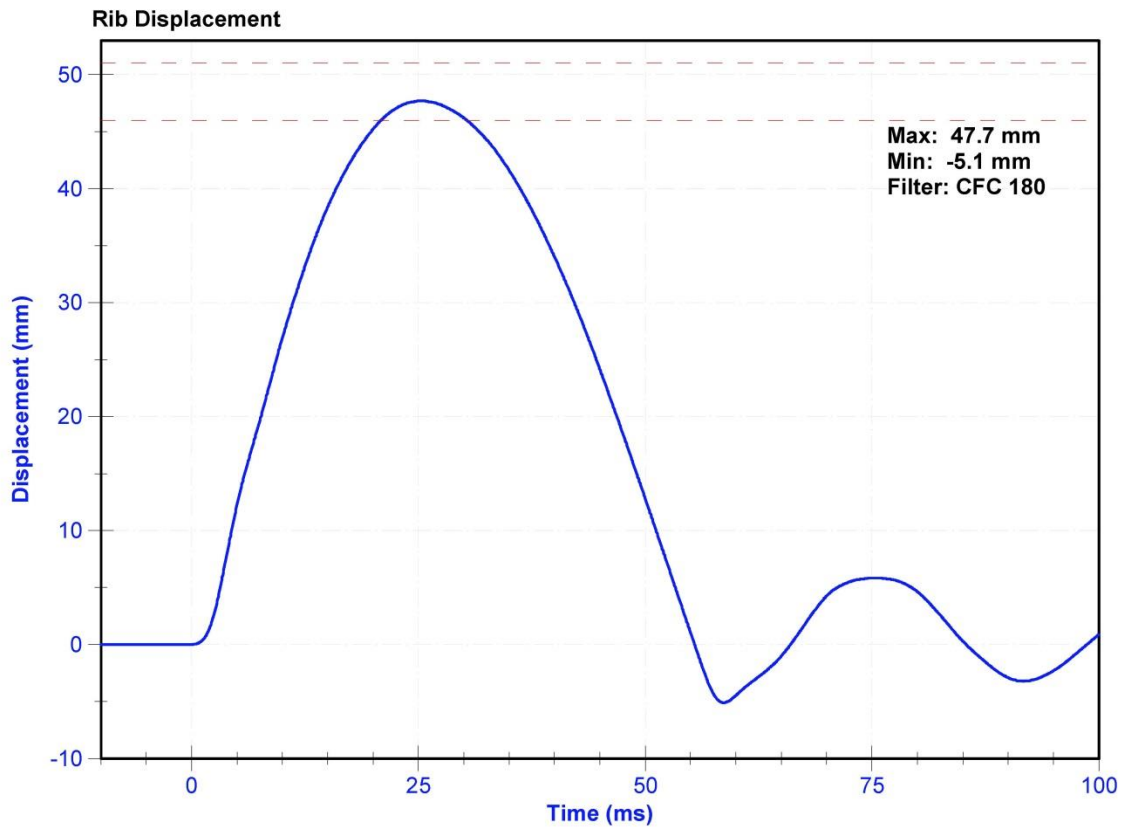
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	20.5	Pass
Rib Displacement	46	51	mm	47.7	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



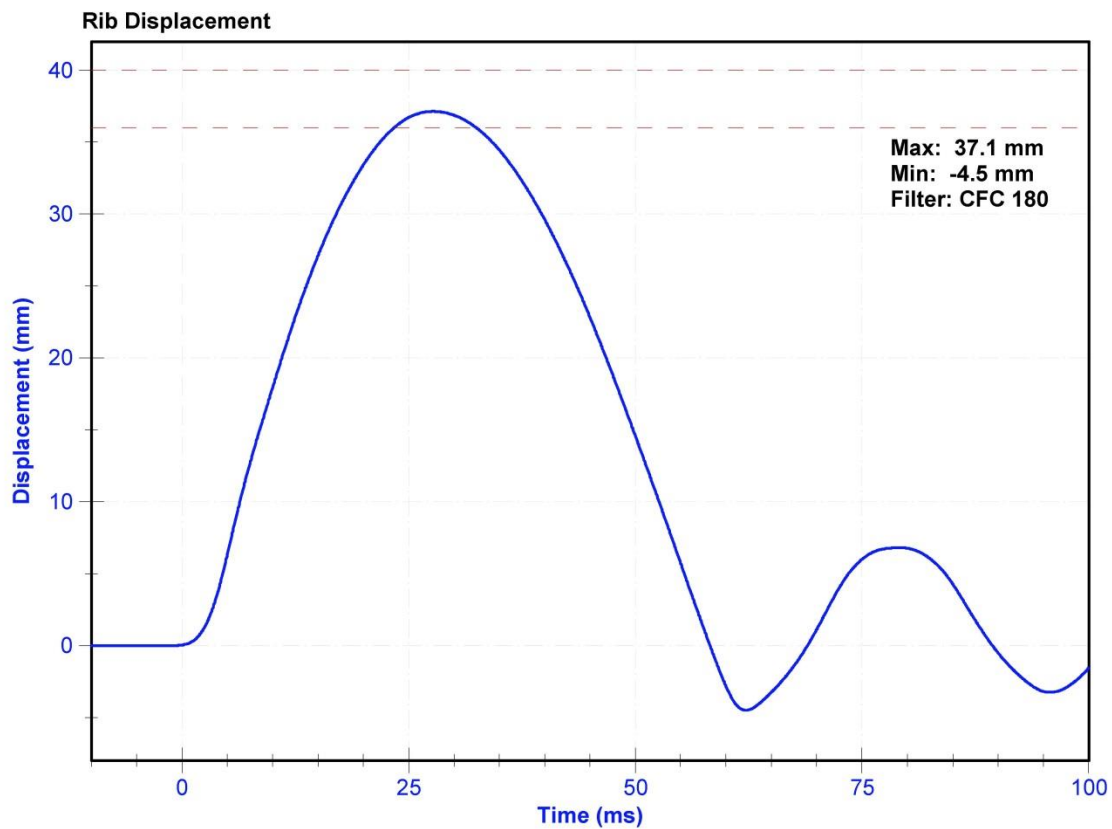
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	20.5	Pass
Rib Displacement	36	40	mm	37.1	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



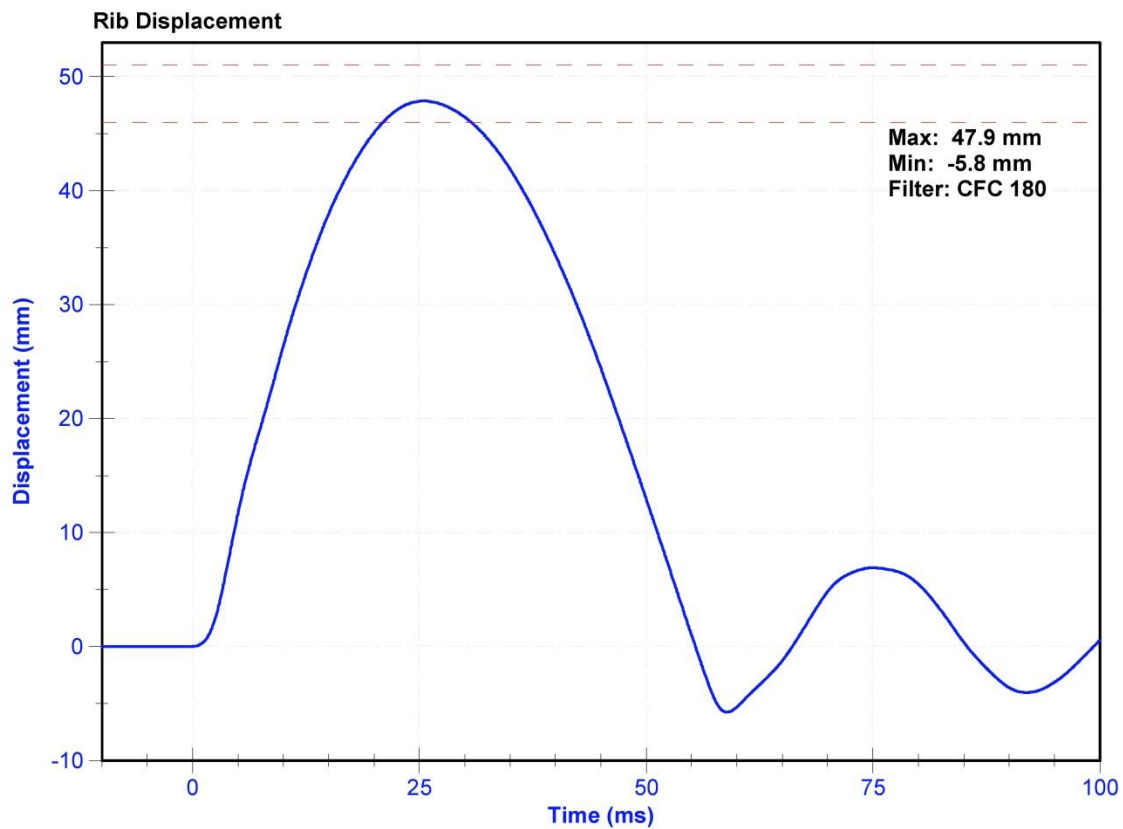
ATD Manufacturer	First Technology	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	20.5	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-182GFE	8/4/2014	8/4/2015



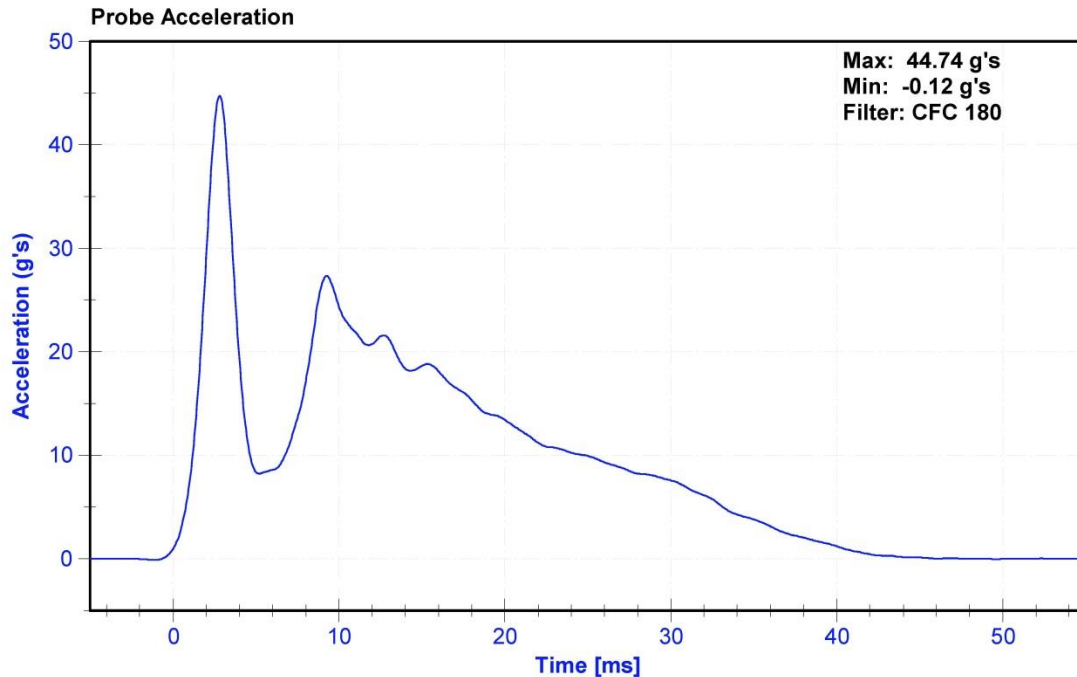
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ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

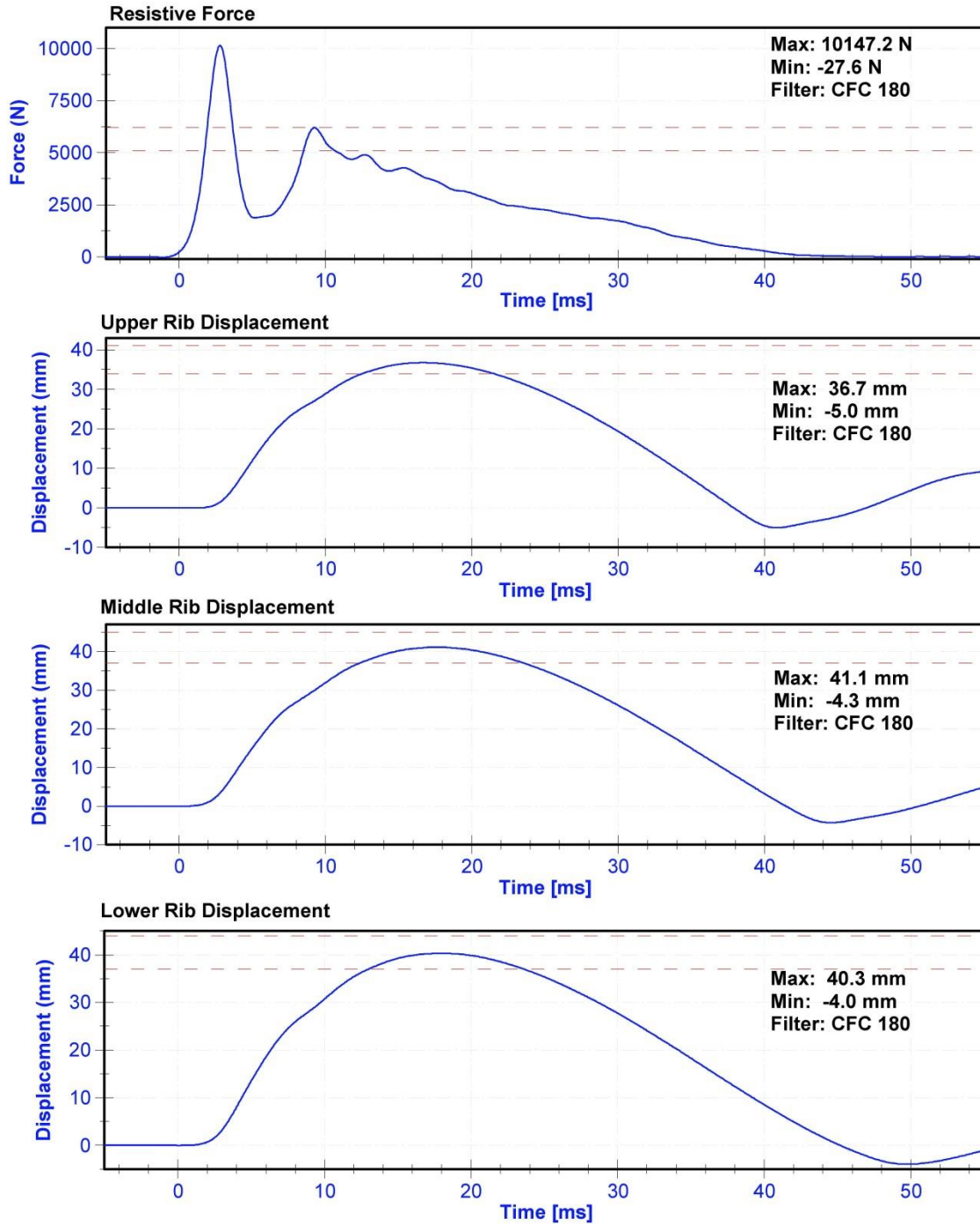
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	23.1	Pass
Velocity	5.4	6.8	m/s	5.51	Pass
Resistive Force after 6ms	5,100	6,200	N	6198.9	Pass
Upper Thorax Rib Deflection	34	41	mm	36.7	Pass
Mid Thorax Rib Deflection	37	45	mm	41.1	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-C14953	1/29/2015	7/30/2015
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





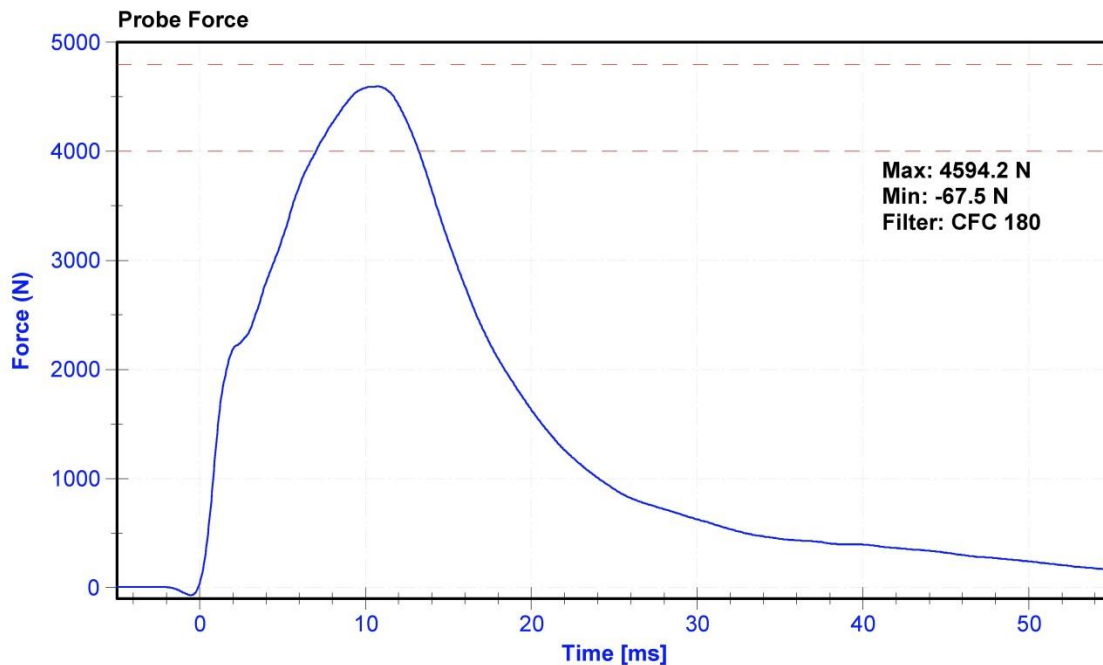
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

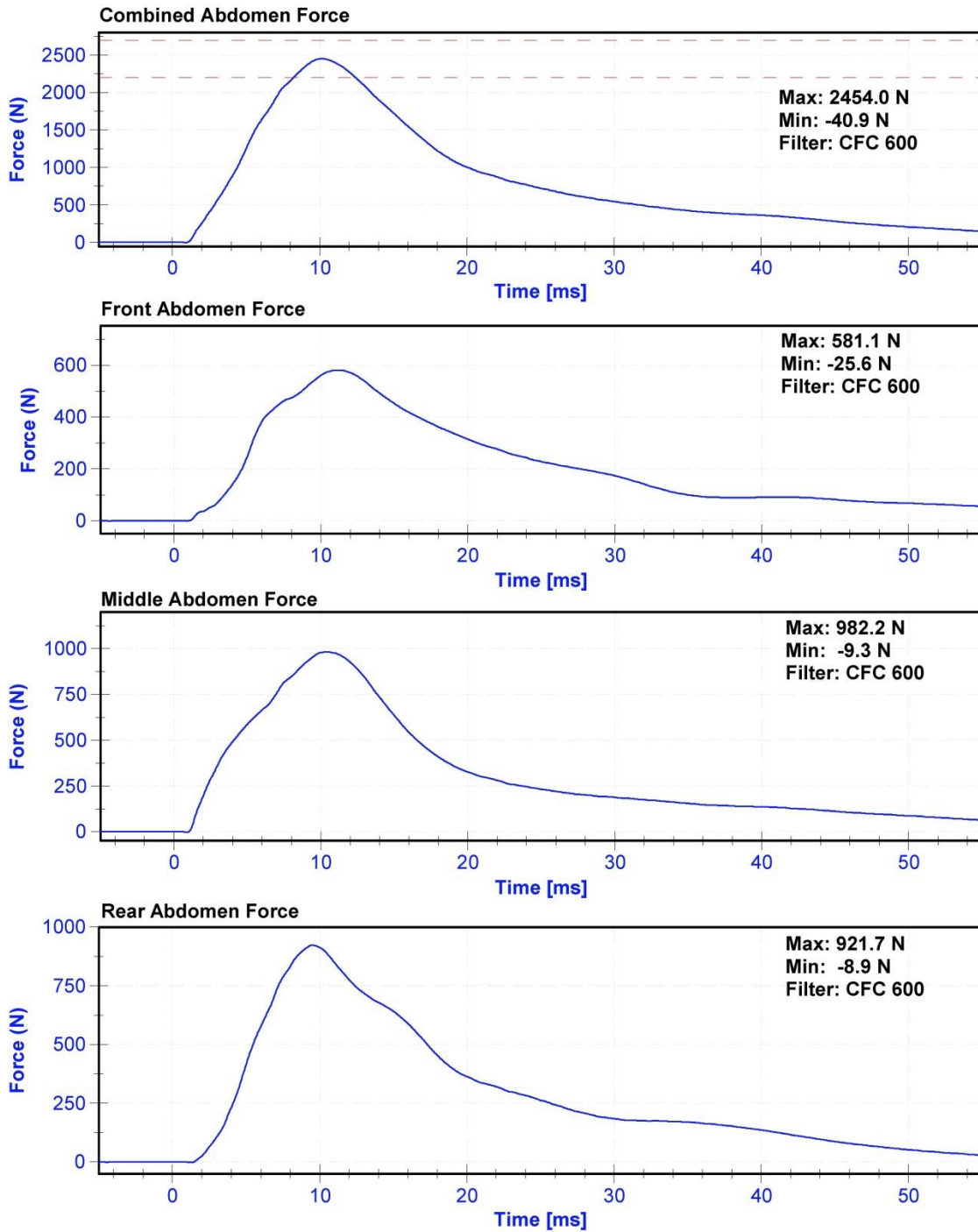
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	23.7	Pass
Velocity	3.9	4.1	m/s	3.97	Pass
Combined Abdomen Force	2,200	2,700	N	2454.0	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.15	Pass
Resistive Probe Force	4,000	4,800	N	4594.2	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.75	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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





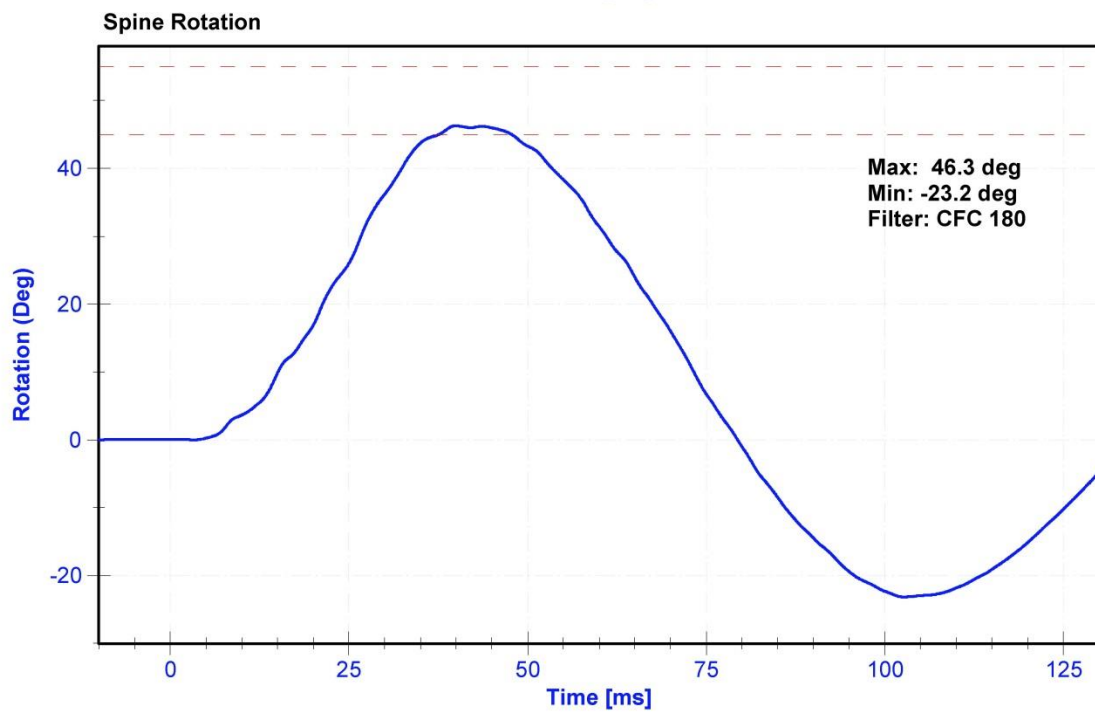
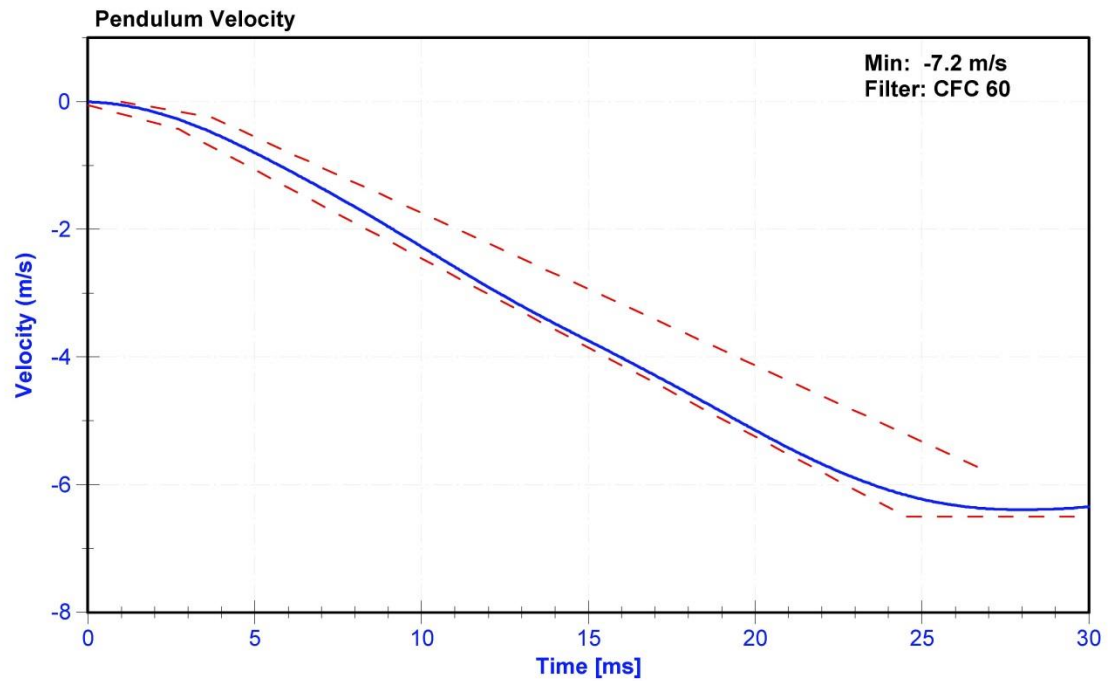
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

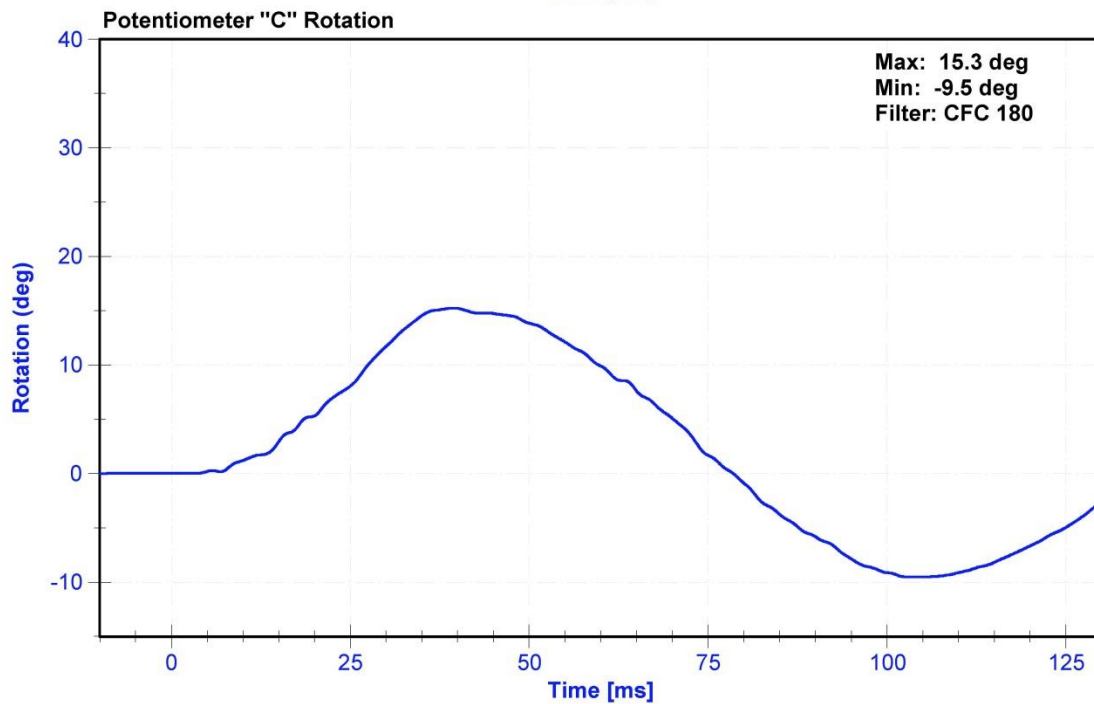
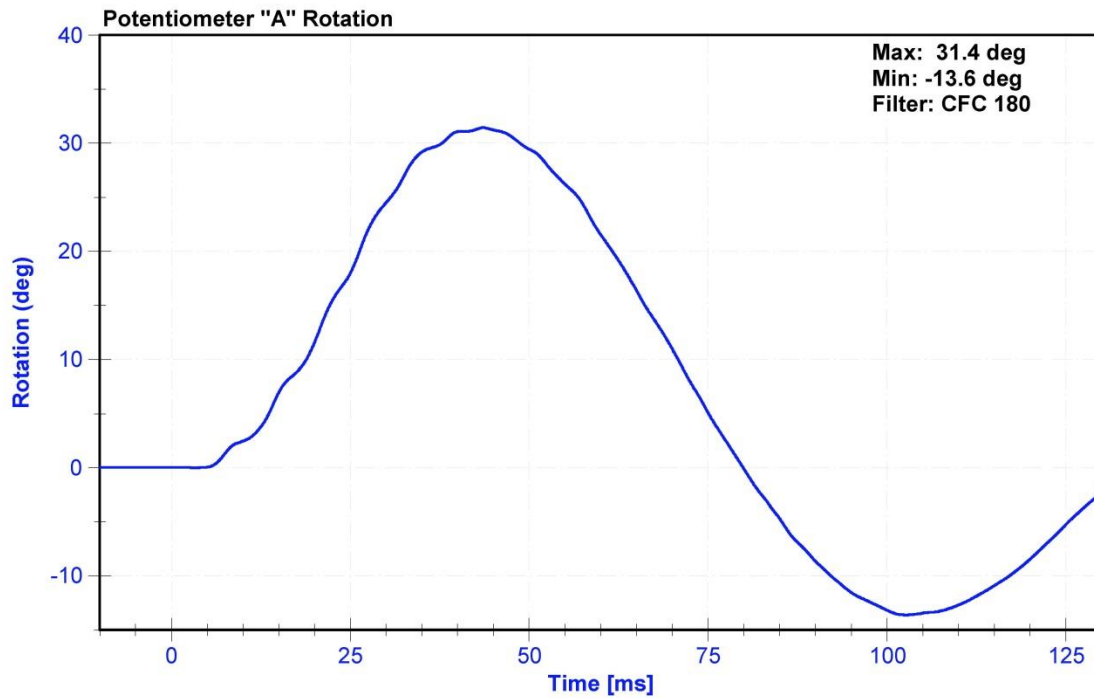
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	20.2	Pass
Velocity	5.95	6.15	m/s	6.025	Pass
Lateral Spine Rotation	45	55	deg	46.3	Pass
Time at Maximum Rotation	39	53	ms	39.9	Pass
Time of Decay to Zero Degrees	37	57	ms	39.5	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





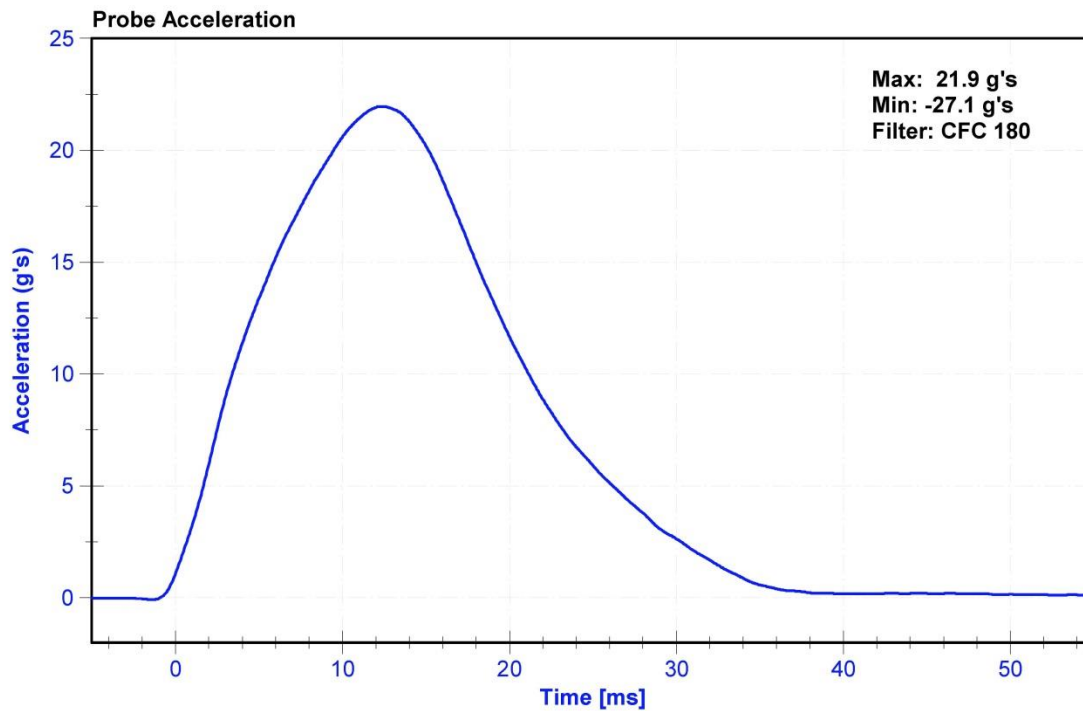
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

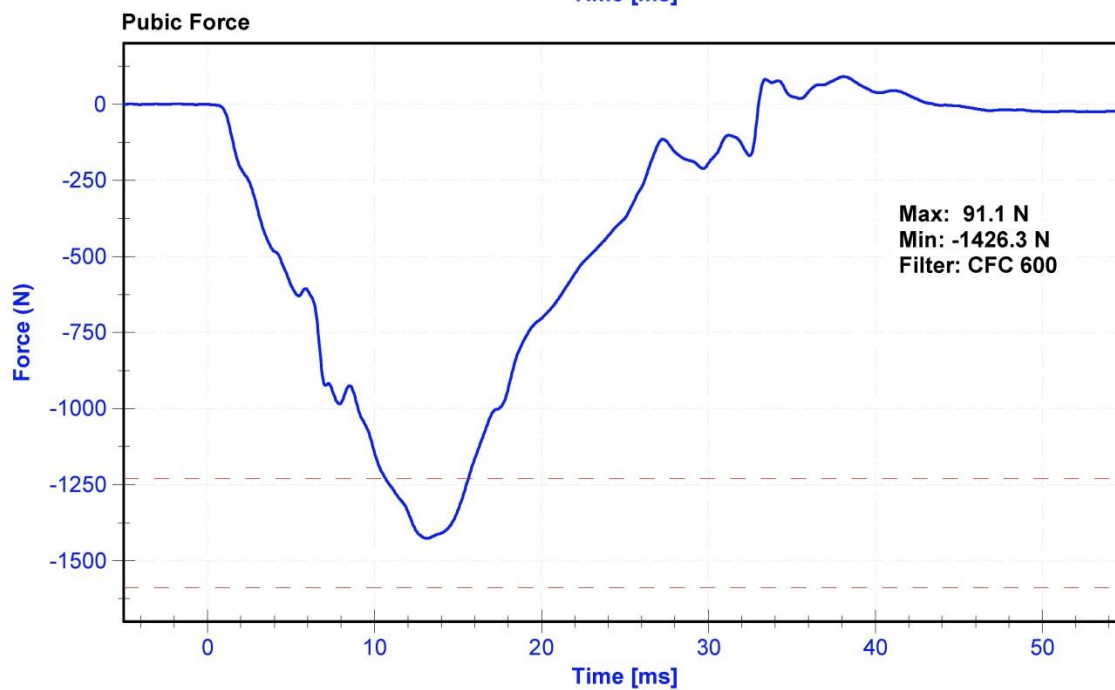
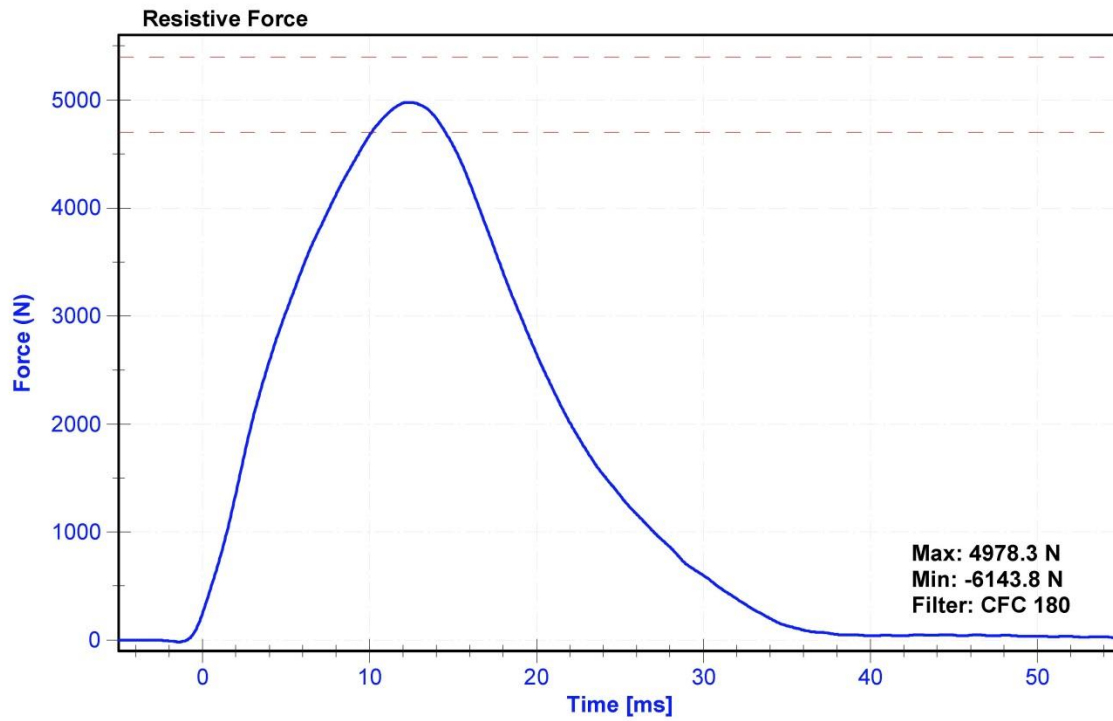
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	24.9	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Resistive Force	4,700	5,400	N	4978.3	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.30	Pass
Pubic Force	-1,590	-1,230	N	-1426.3	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.15	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/13/2014	5/13/2015





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 303

(CONFIGURED FOR LEFT SIDE IMPACT)

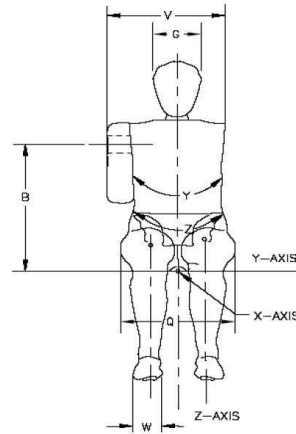
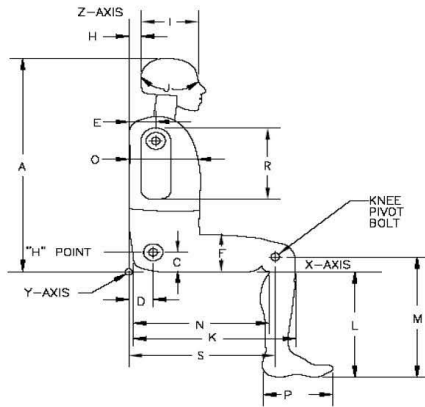


External Measurements - SID-IIs

Technician: M. Hartung

Date: 1/30/2015

Dummy Serial Number: 303



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	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	104	Pass
F	Thigh Clearance	119	135	128	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	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	485	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

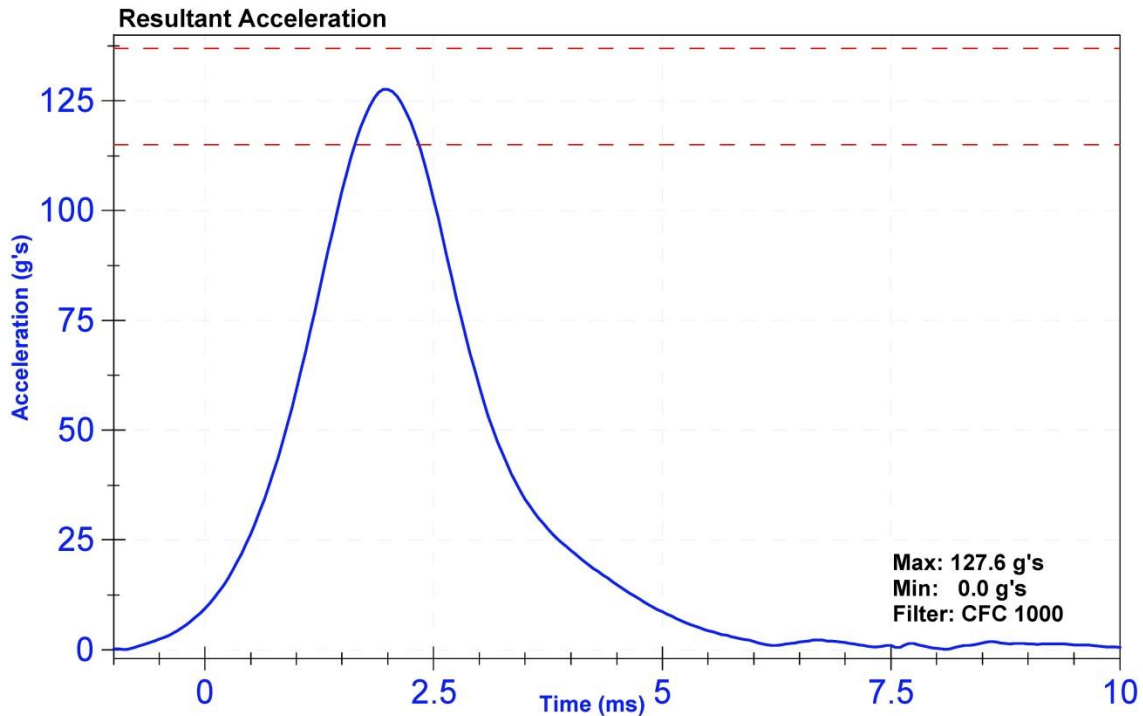
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

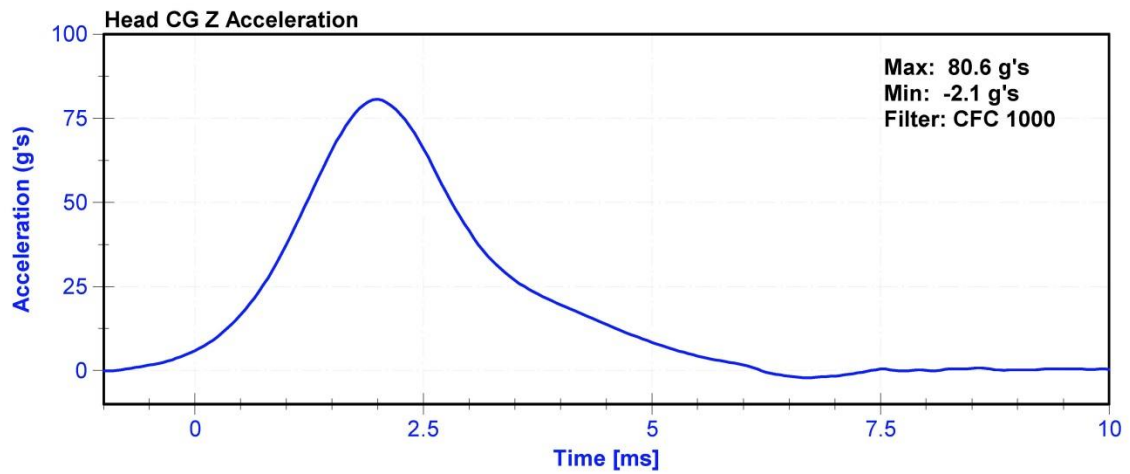
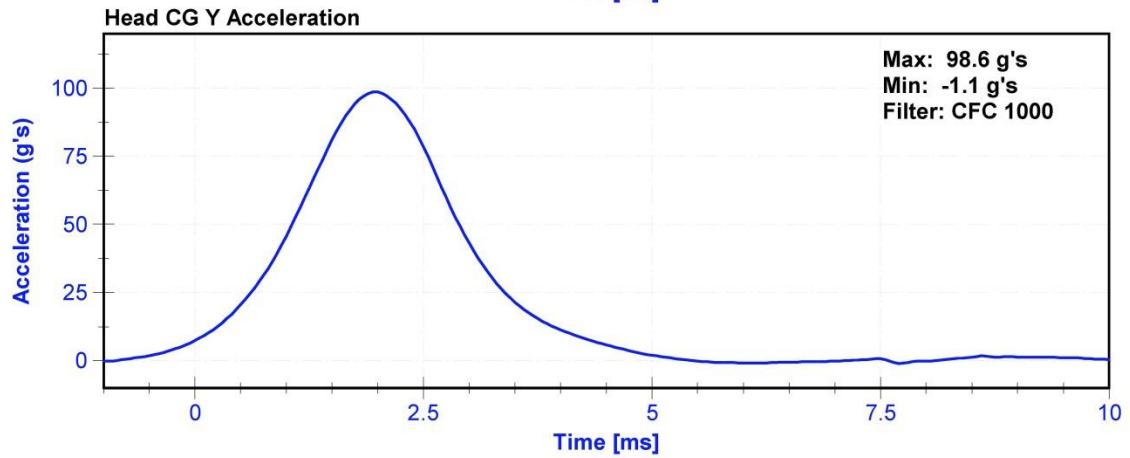
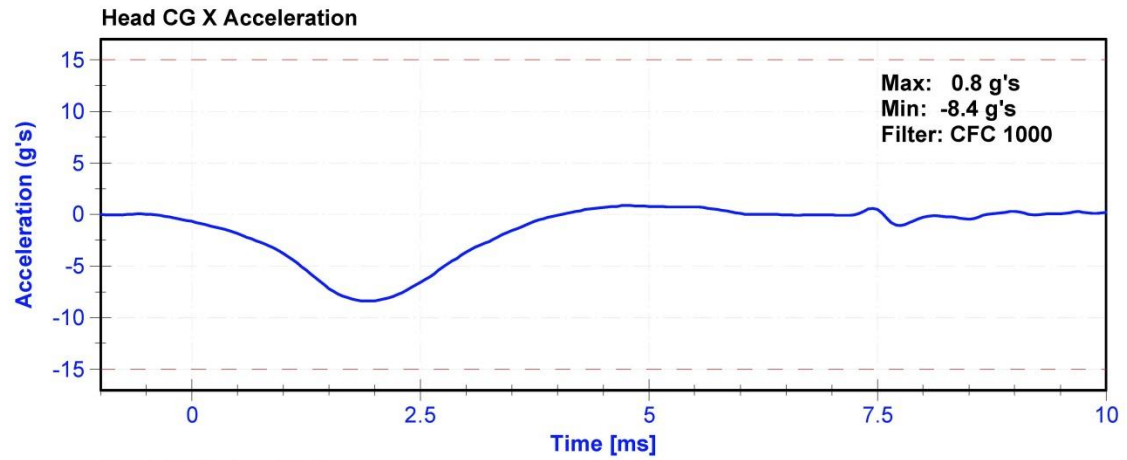
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	16.5	Pass
Resultant Acceleration	115	137	g's	127.6	Pass
Oscillation	0	15	%	1.7	Pass
Fore-Aft Acceleration	-15	15	g's	-8.4	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





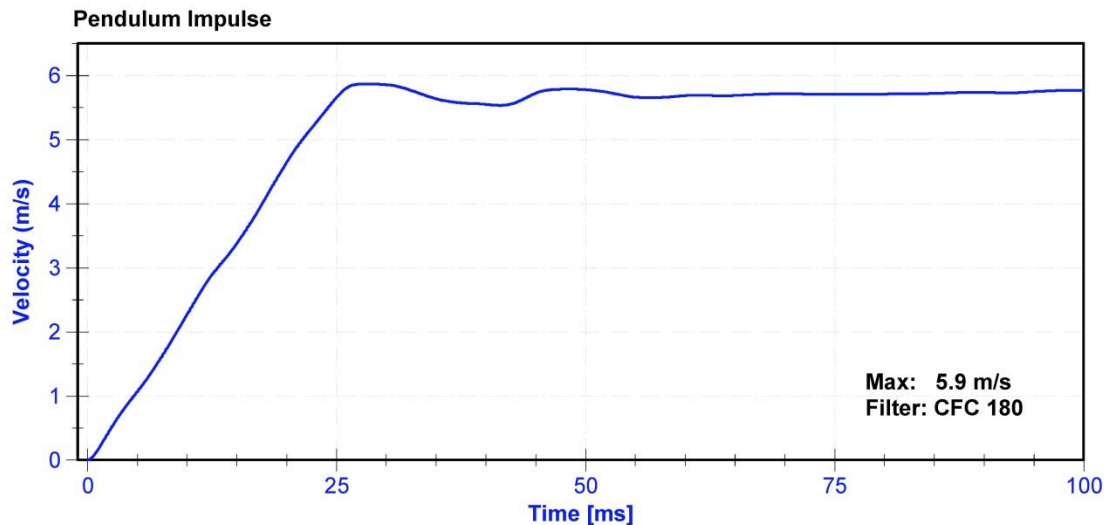
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

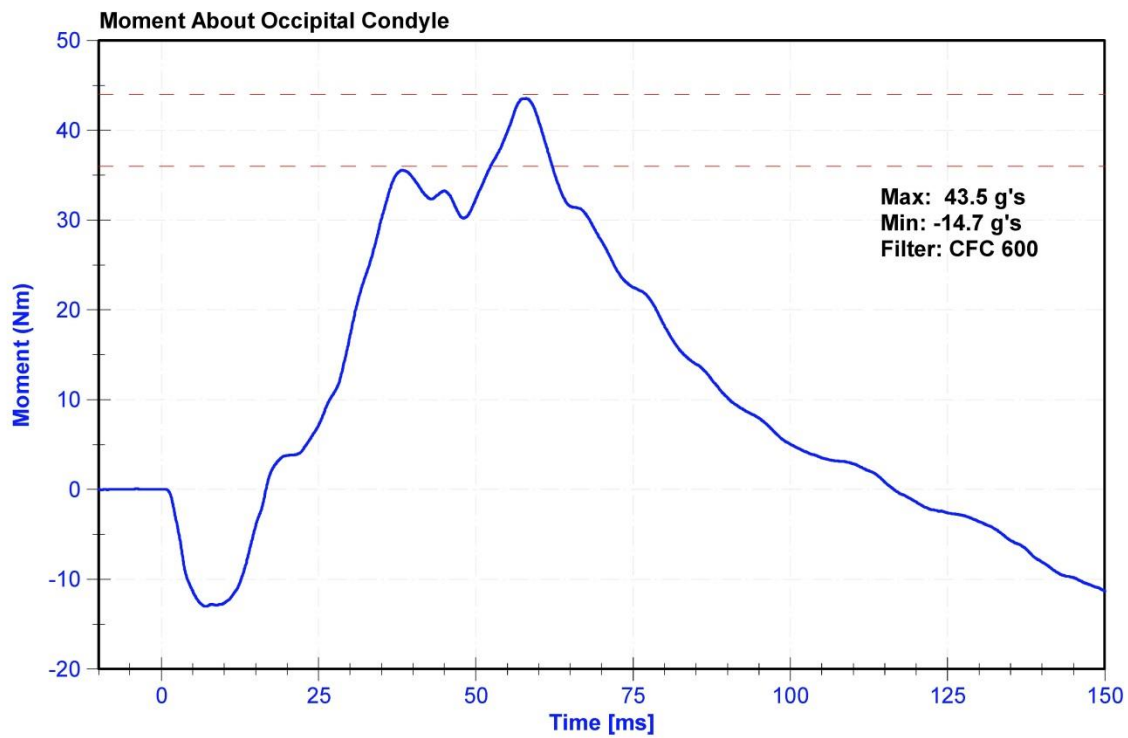
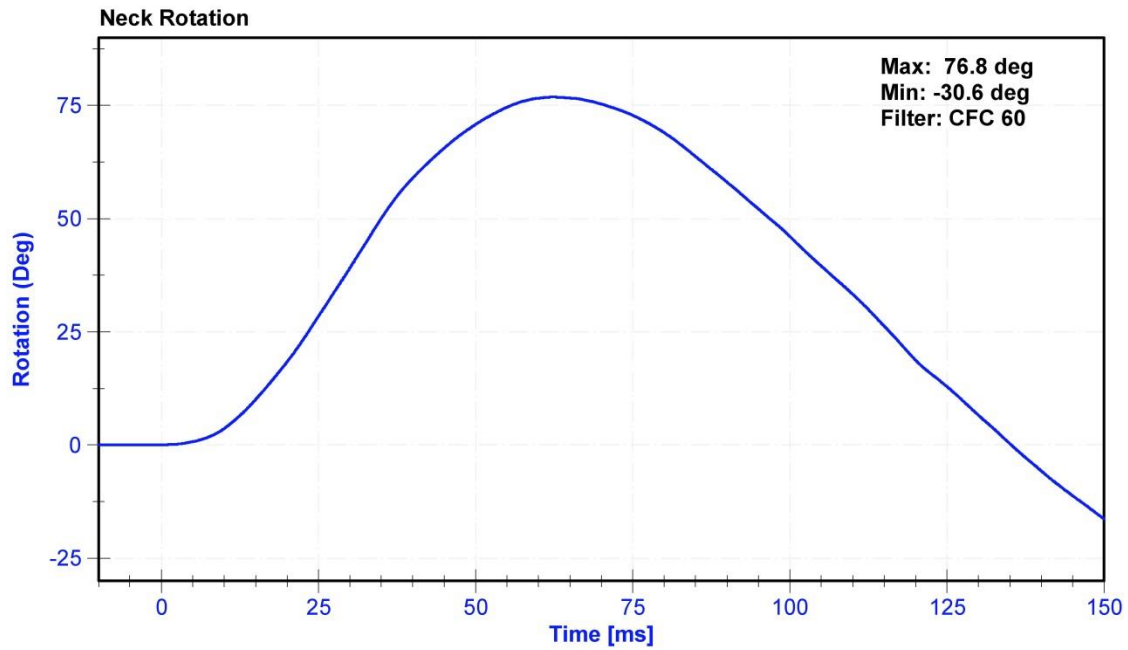
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	14.5	Pass
Velocity	5.51	5.63	m/s	5.537	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.27	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.38	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.65	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.66	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	76.8	Pass
Time at Maximum Rotation	50	70	ms	62.3	Pass
Moment about the OC	36	44	Nm	43.5	Pass
Moment Decay to 0 Nm	102	126	ms	116.5	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





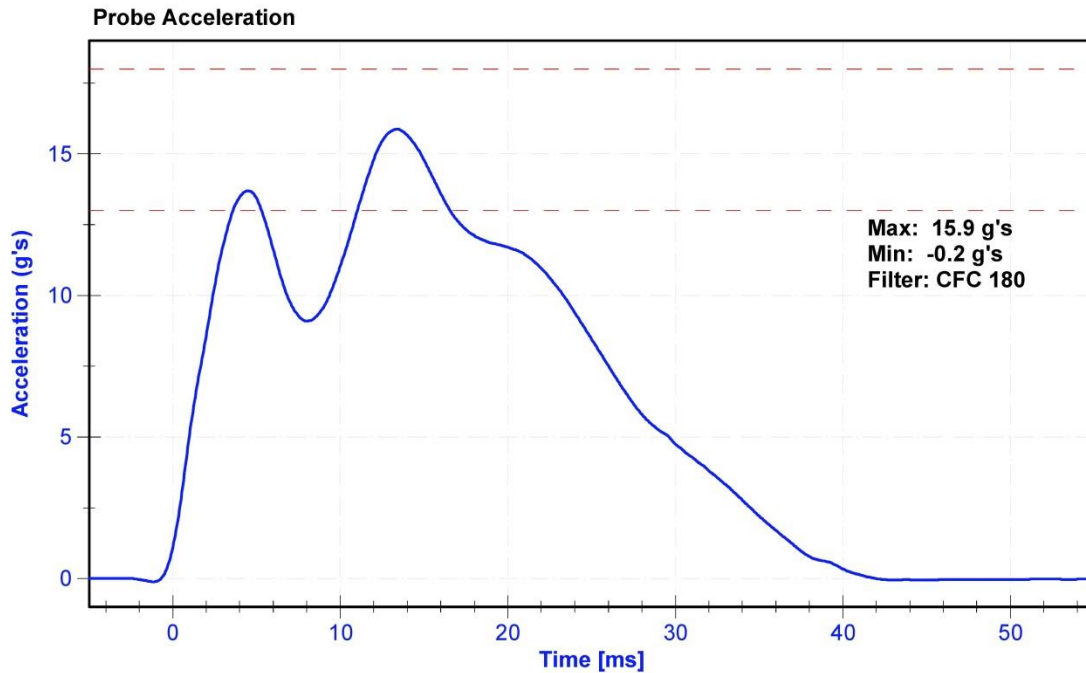
ATD Manufacturer	First Technology	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

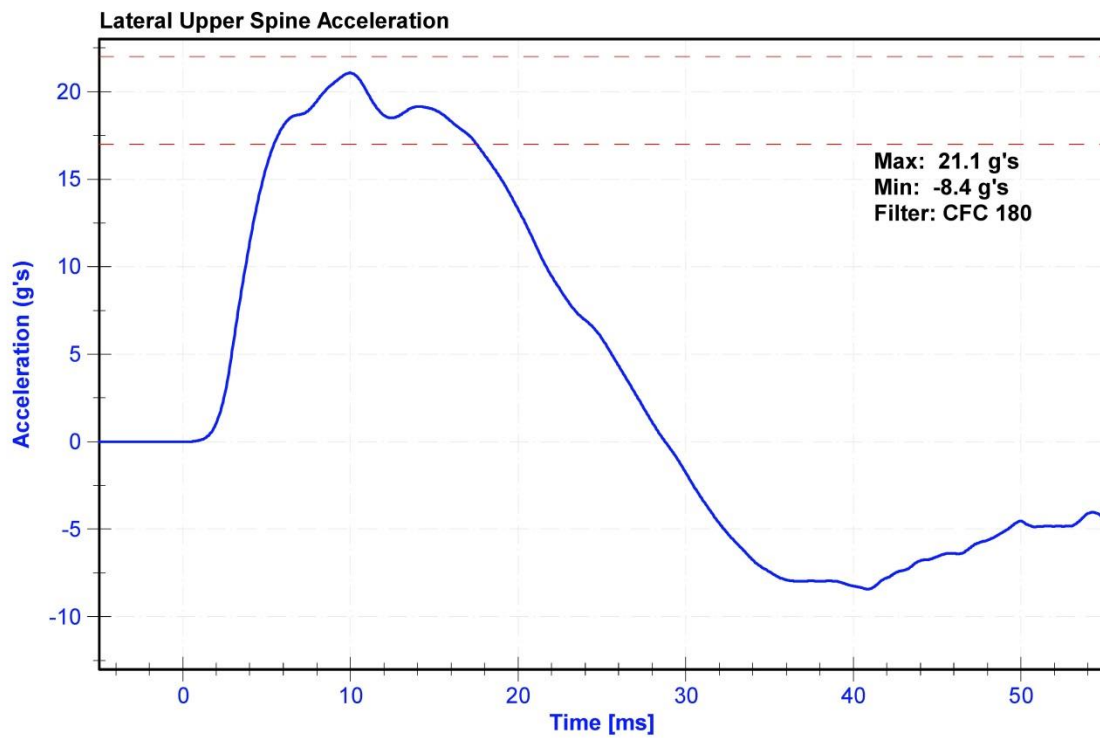
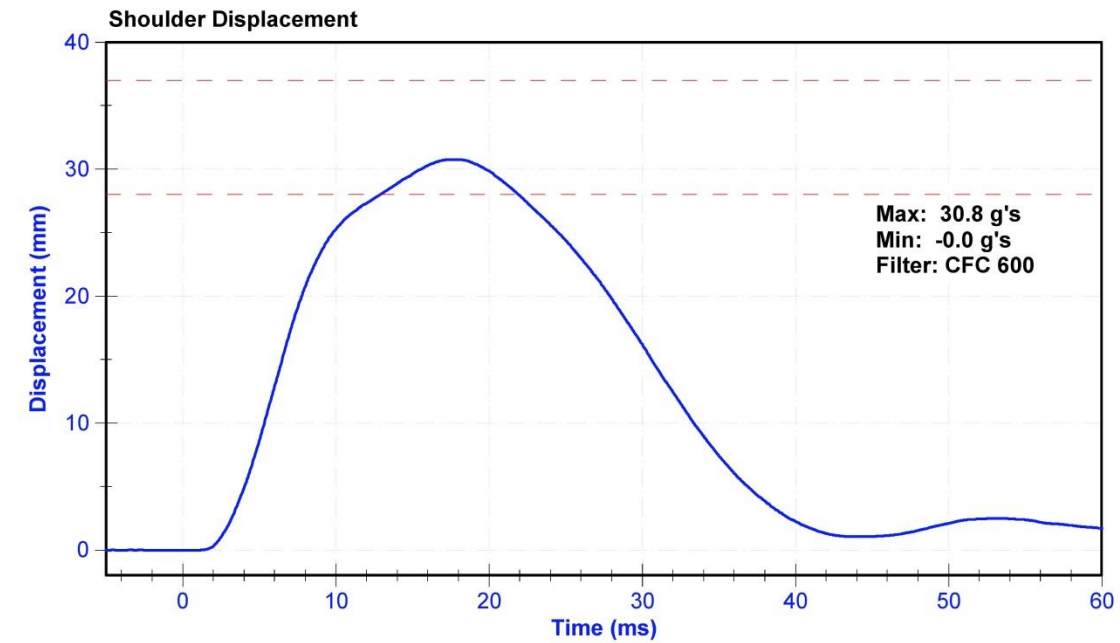
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	13.6	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	13	18	g's	15.9	Pass
Shoulder Deflection	28	37	mm	30.8	Pass
Lateral Upper Spine Acceleration	17	22	g's	21.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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





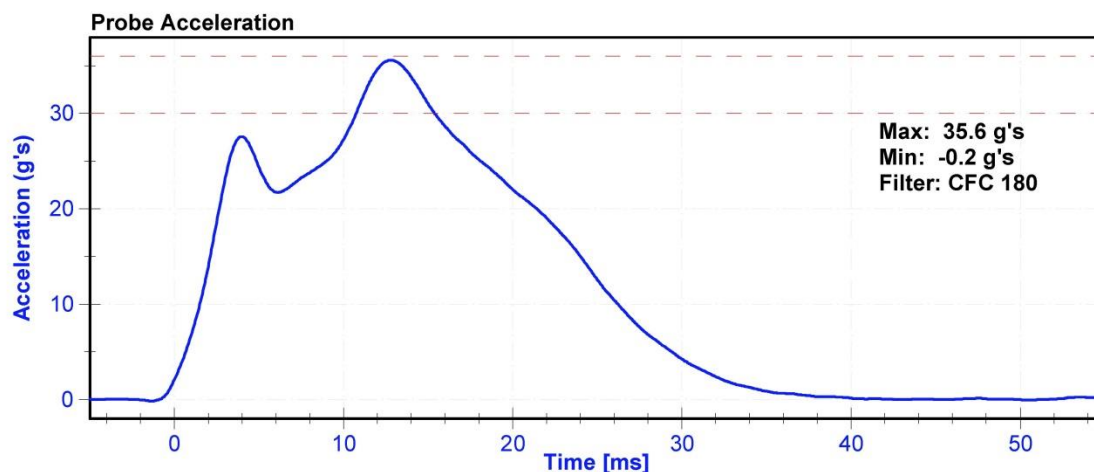
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

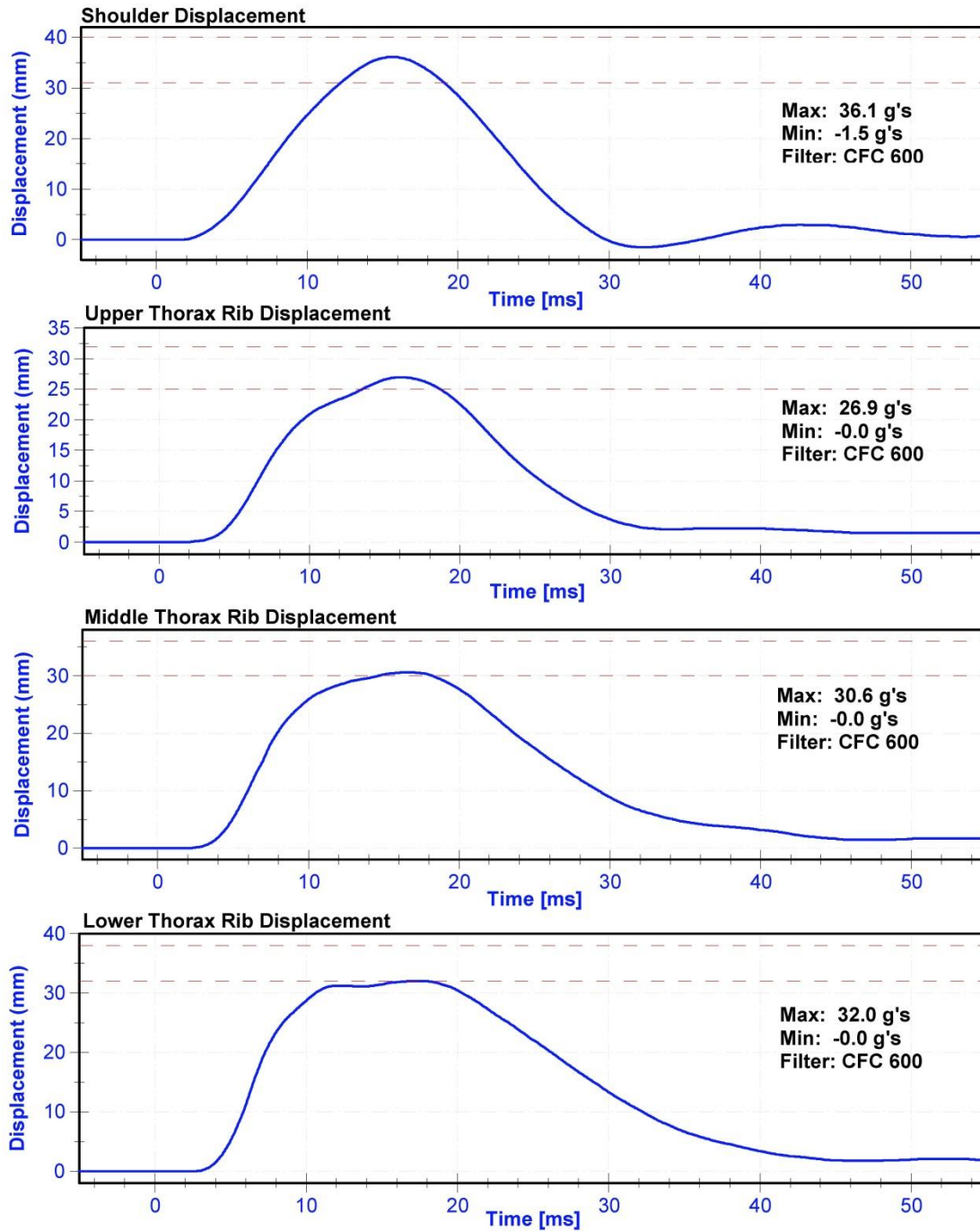
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	17.0	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	35.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	42.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	36.7	Pass
Shoulder Deflection	31	40	mm	36.1	Pass
Upper Thorax Rib Deflection	25	32	mm	26.9	Pass
Mid Thorax Rib Deflection	30	36	mm	30.6	Pass
Lower Thorax Rib Deflection	32	38	mm	32.0	Pass

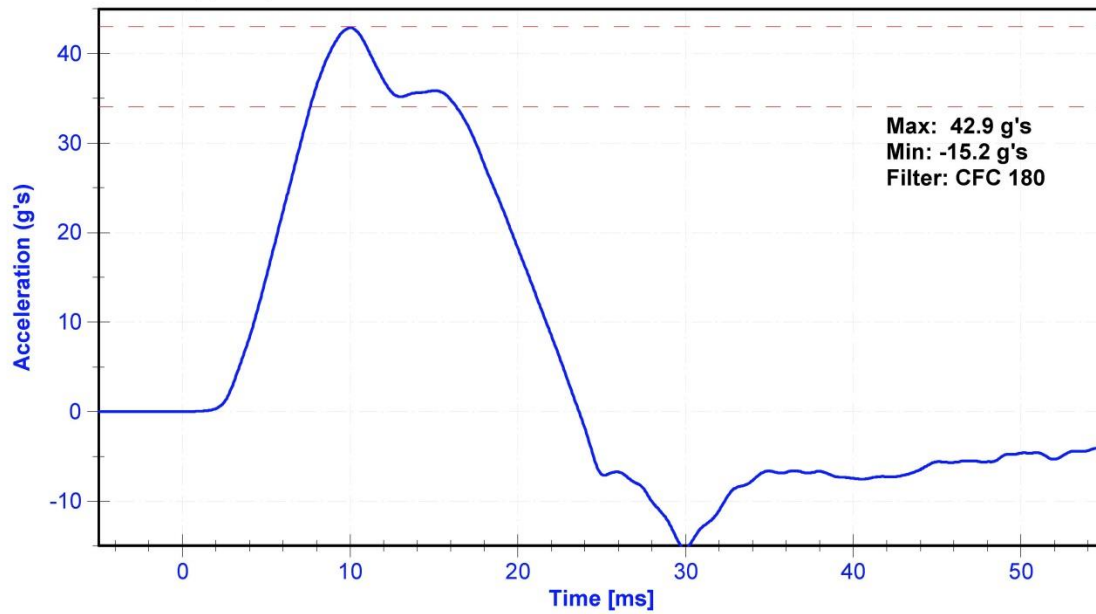
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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

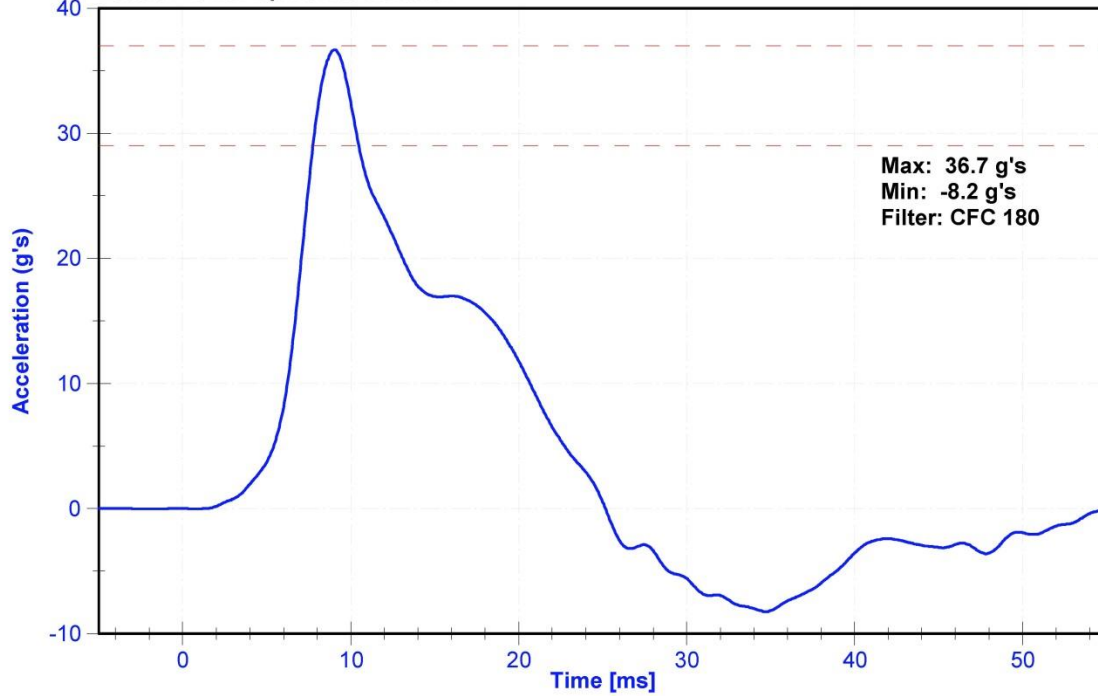




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



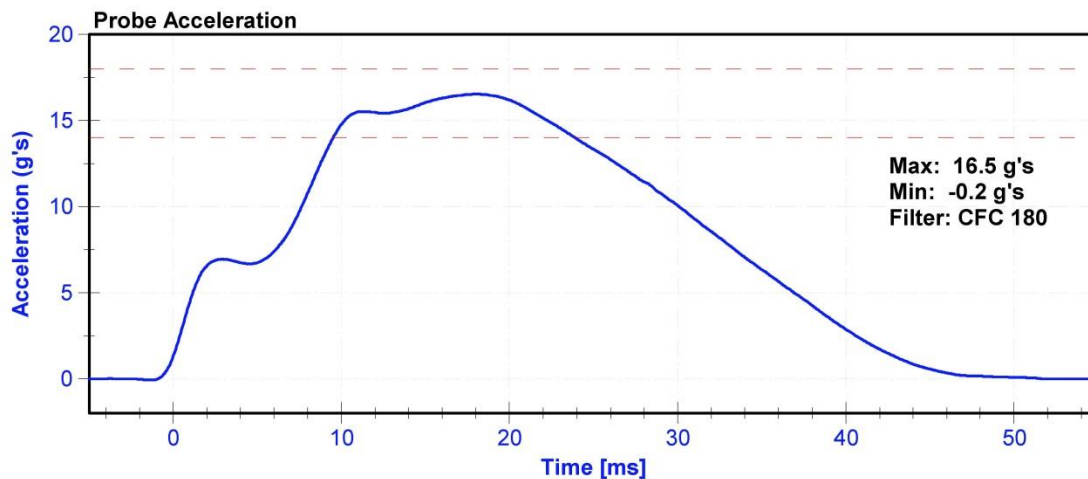
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

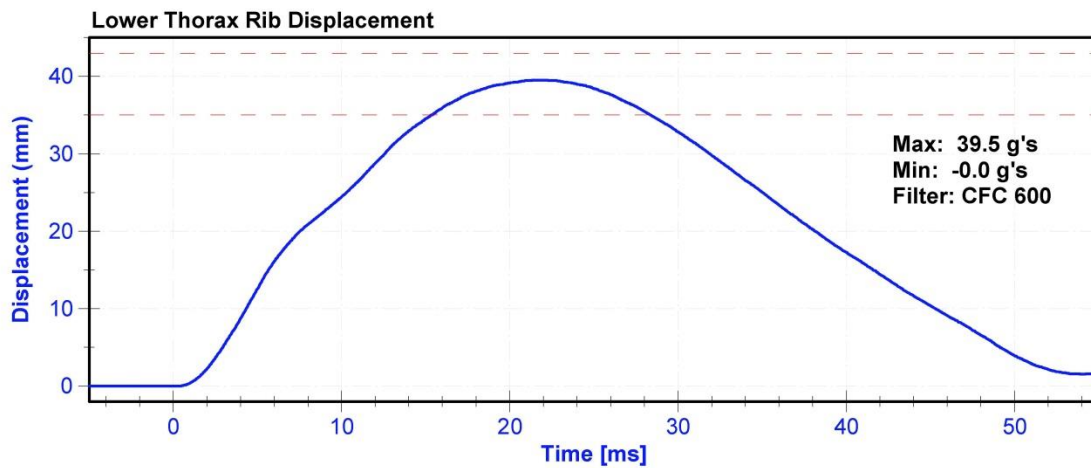
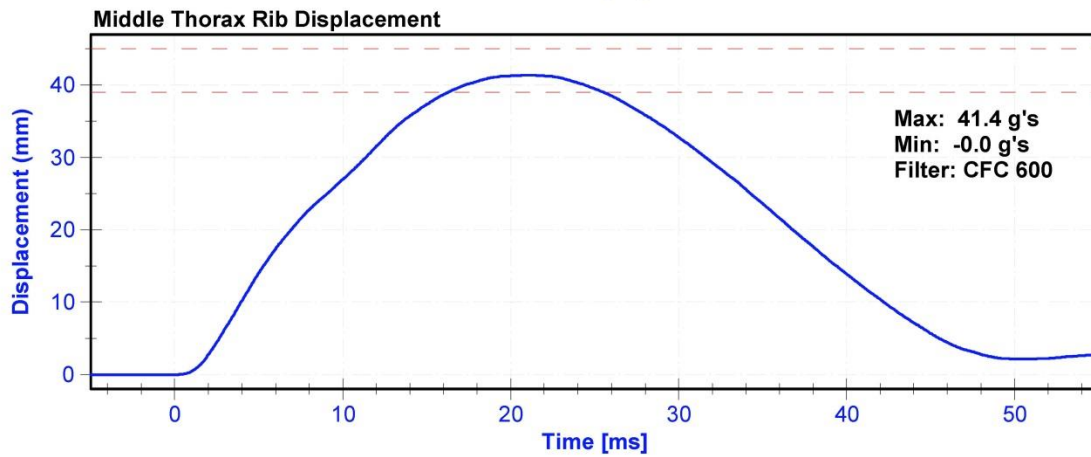
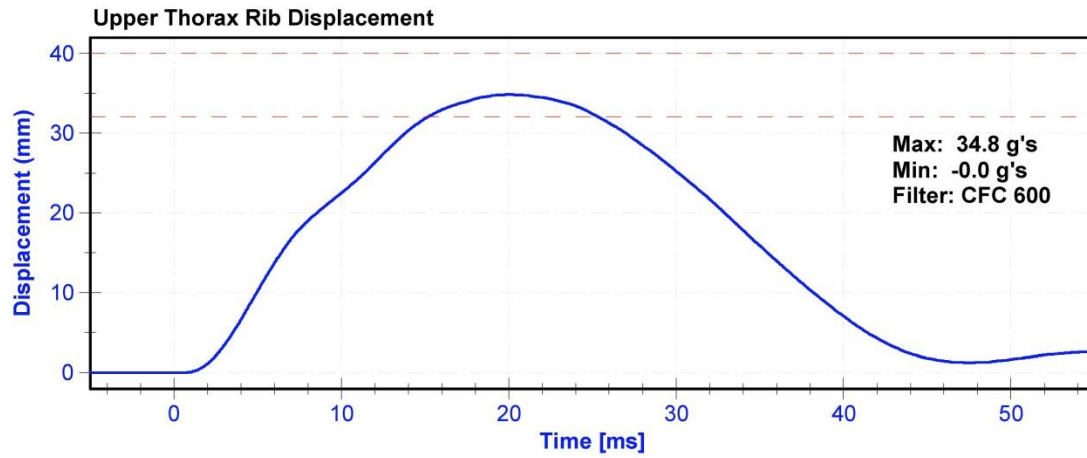
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	13.6	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	14	18	g's	16.5	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.2	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.9	Pass
Upper Thorax Rib Deflection	32	40	mm	34.8	Pass
Middle Thorax Rib Deflection	39	45	mm	41.4	Pass
Lower Thorax Rib Deflection	35	43	mm	39.5	Pass

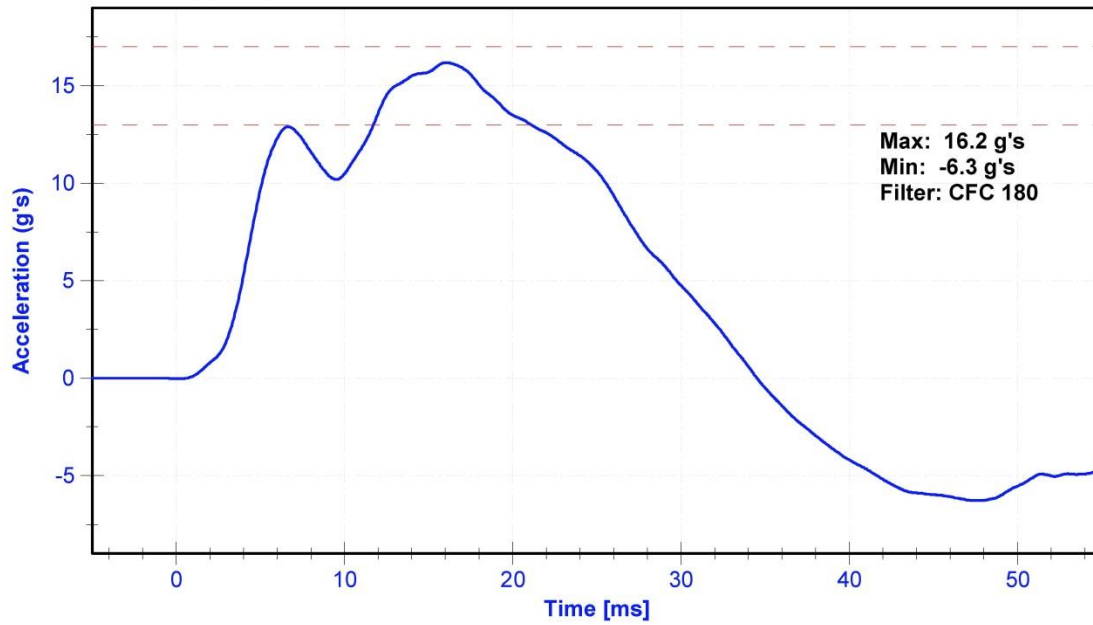
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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

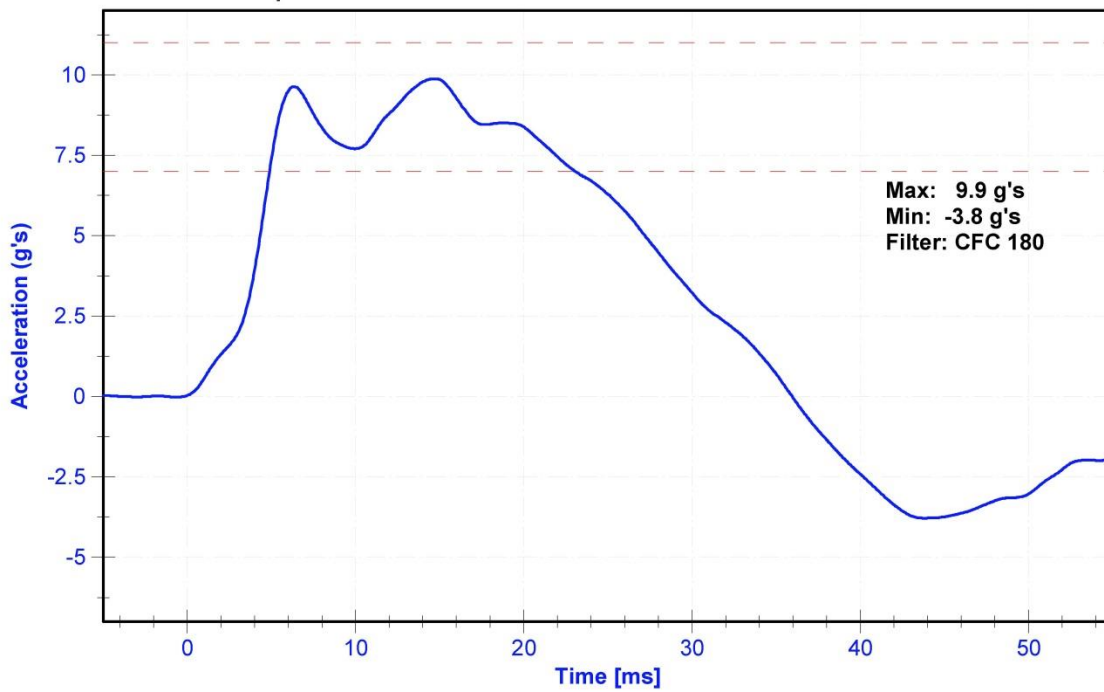




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



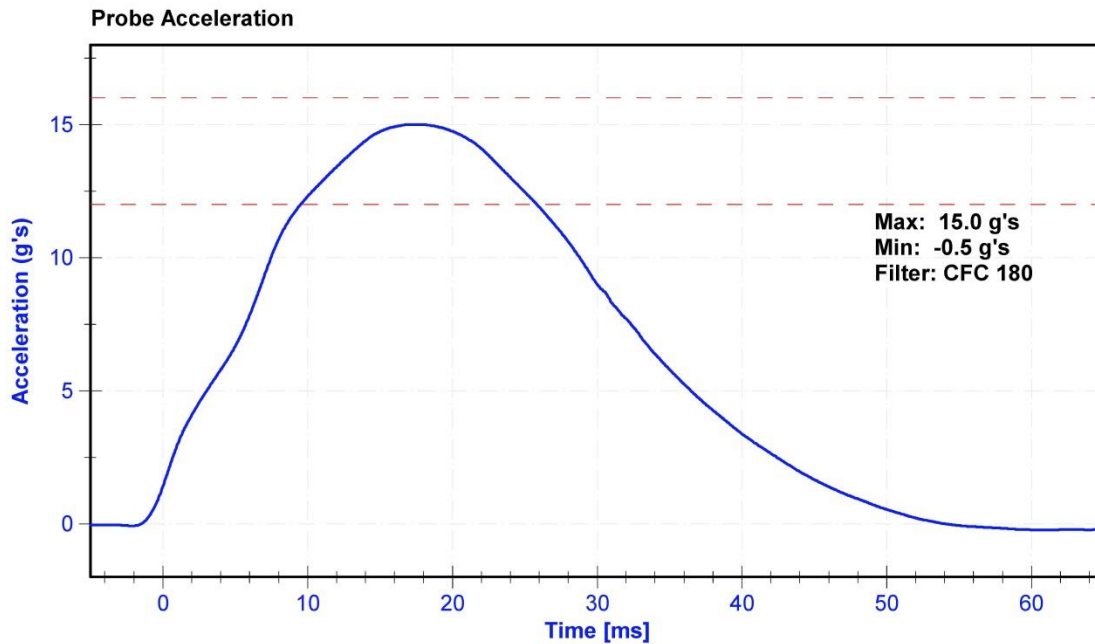
ATD Manufacturer	First Technology	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

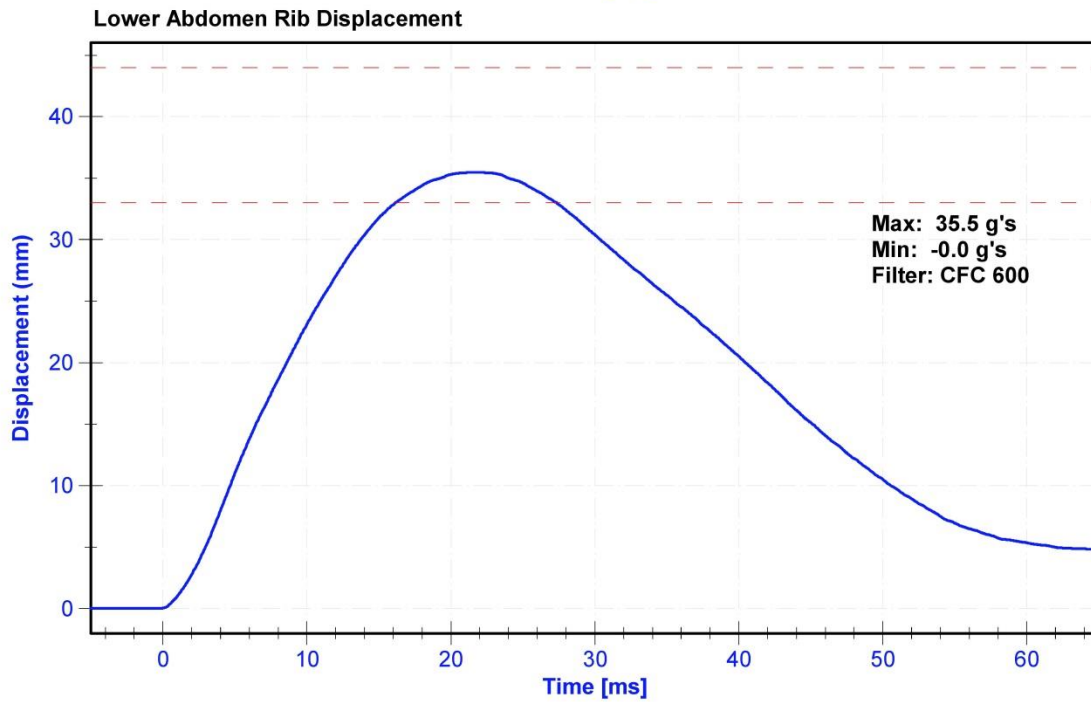
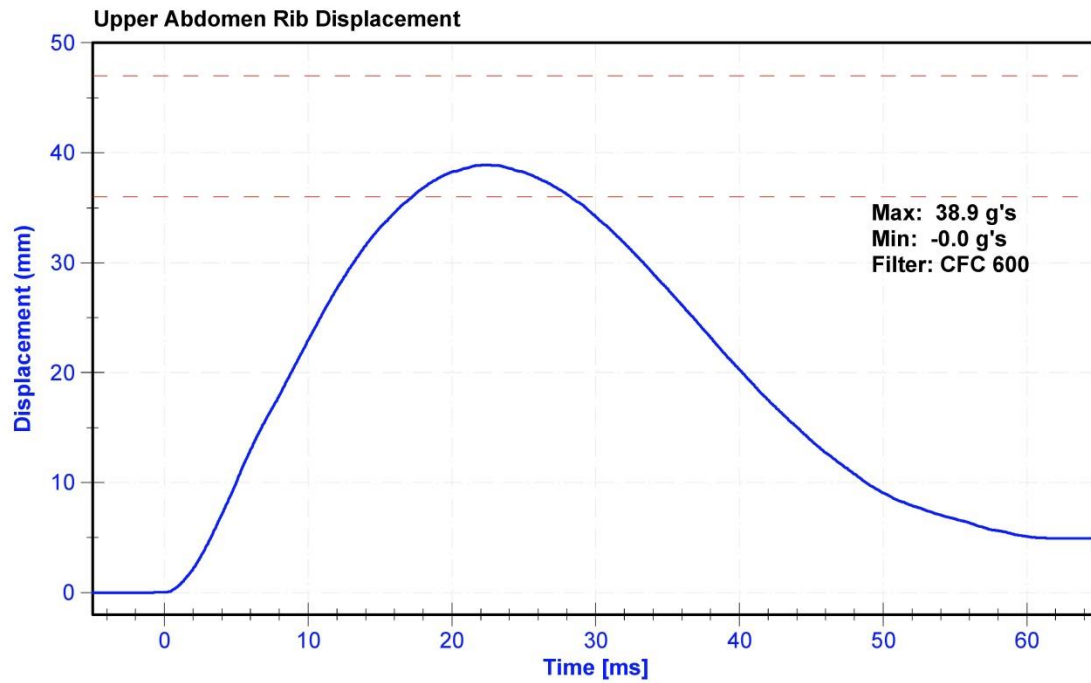
Results

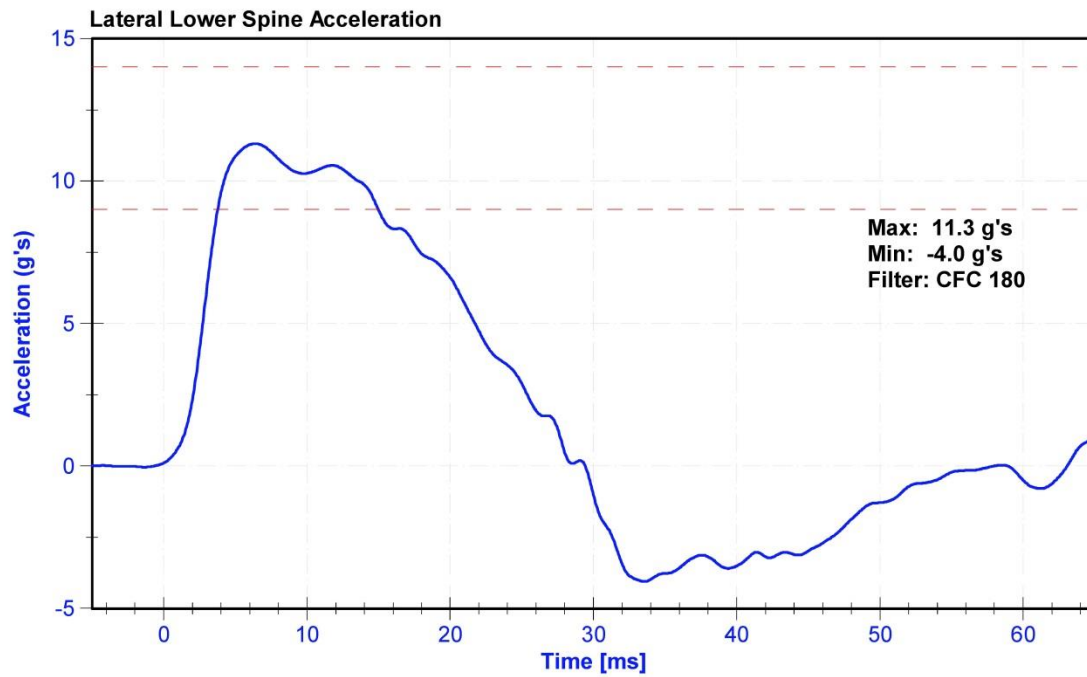
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	12.5	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	15.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	35.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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







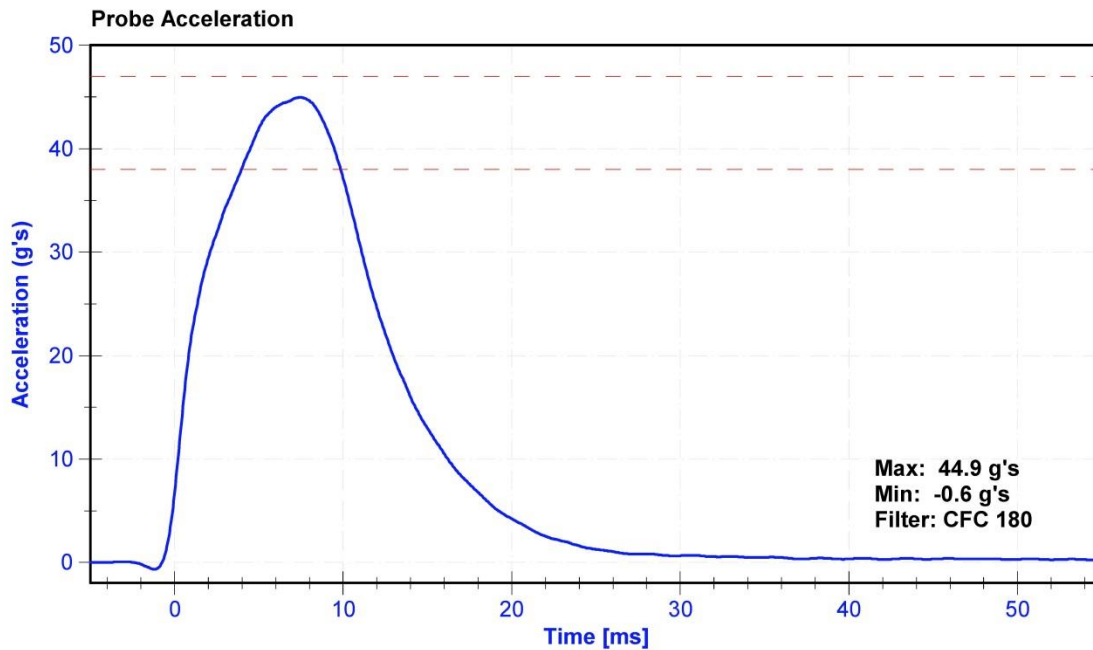
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

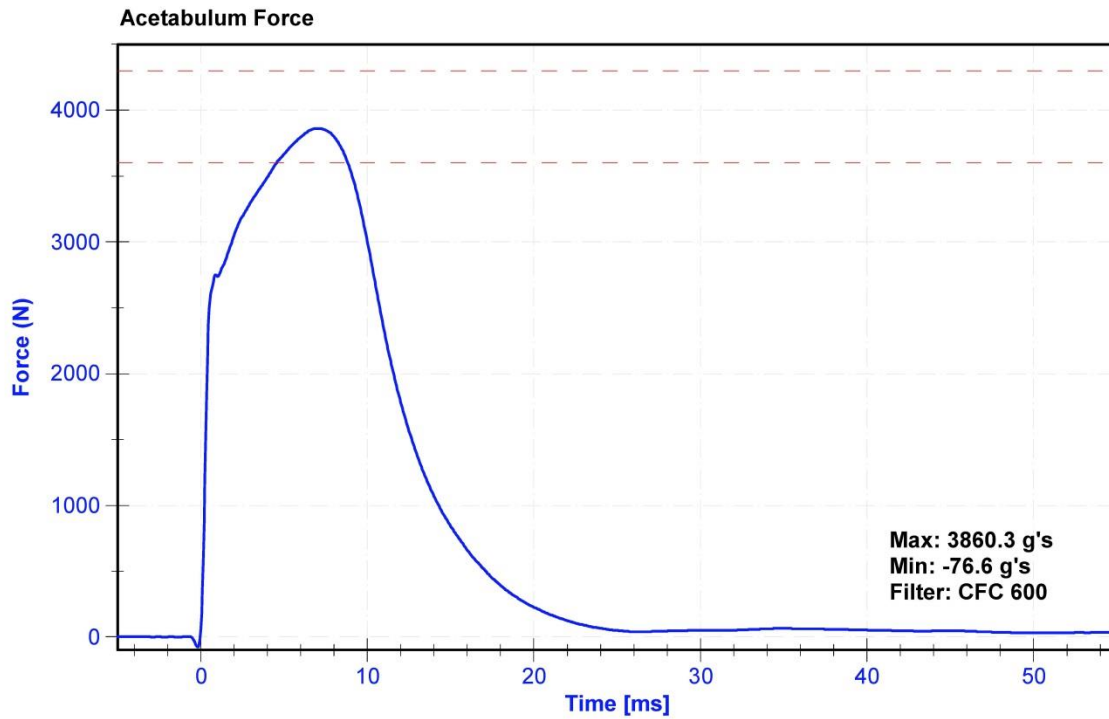
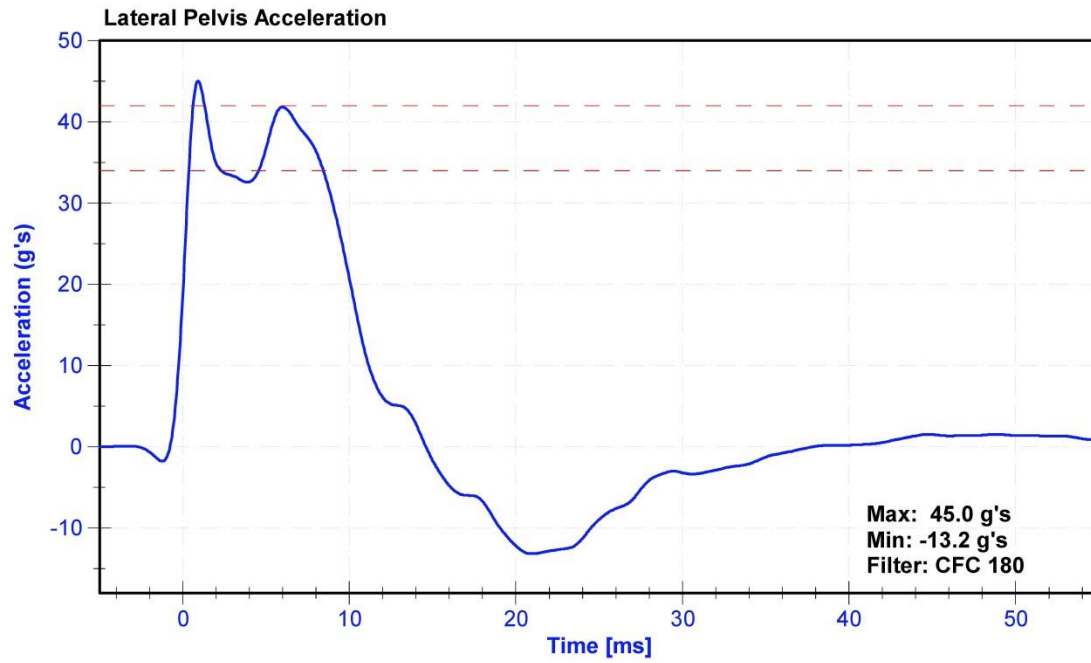
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	21.1	Pass
Velocity	6.6	6.8	m/s	6.64	Pass
Probe Acceleration	38	47	g's	44.9	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.8	Pass
Acetabulum Force	3,600	4,300	N	3860.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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





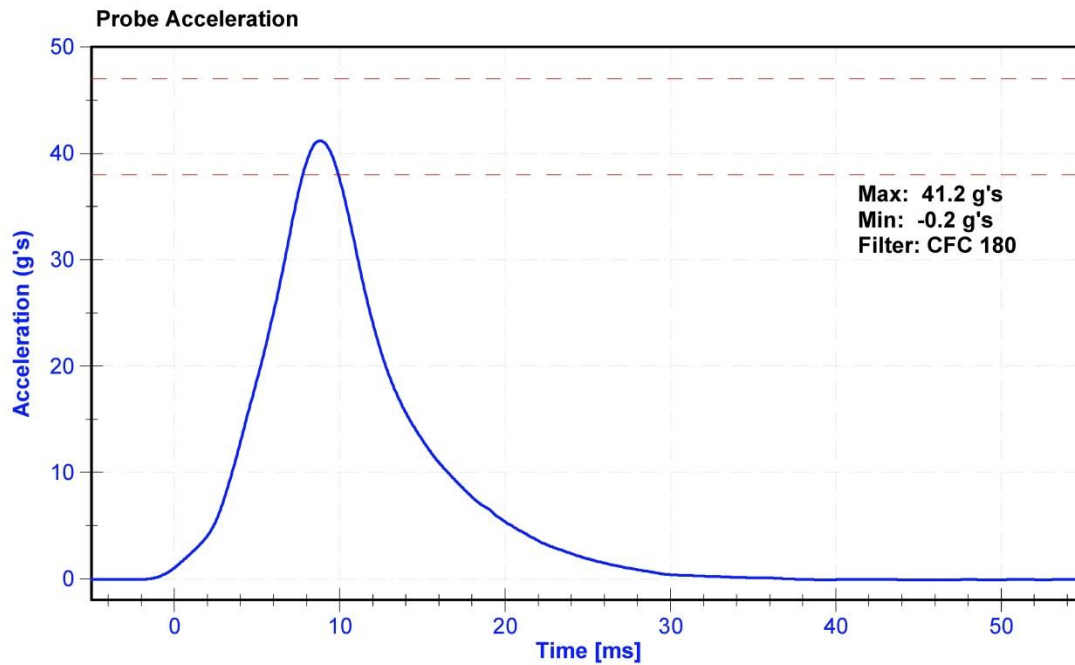
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	303	Laboratory Supervisor	M. Goehle

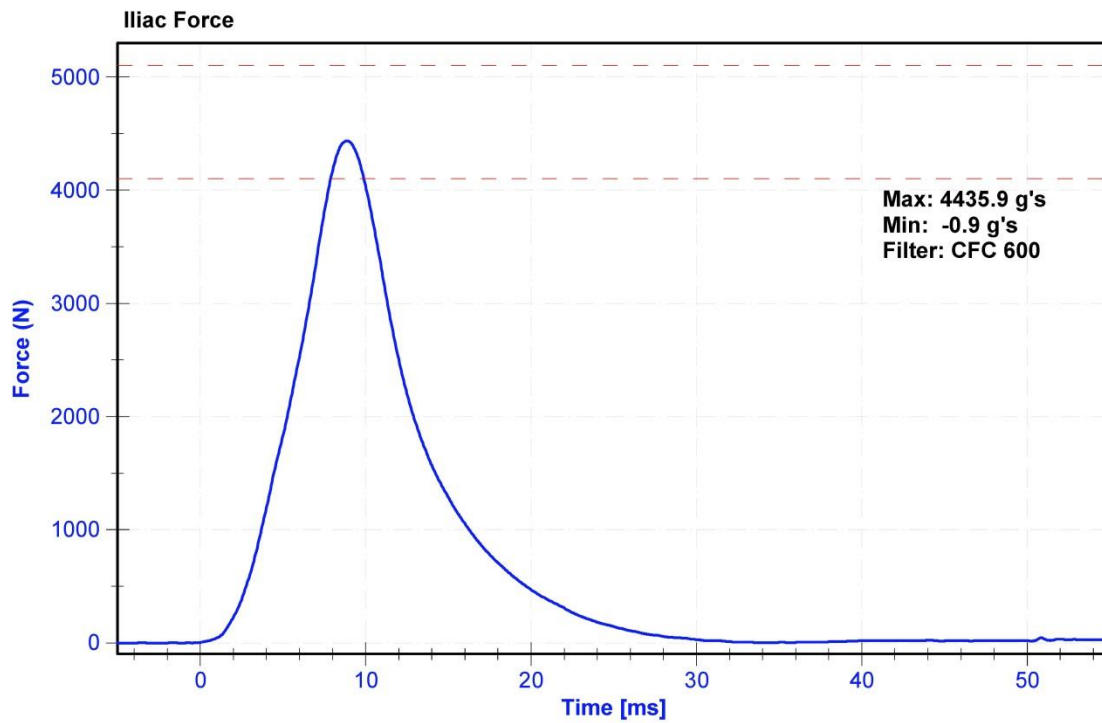
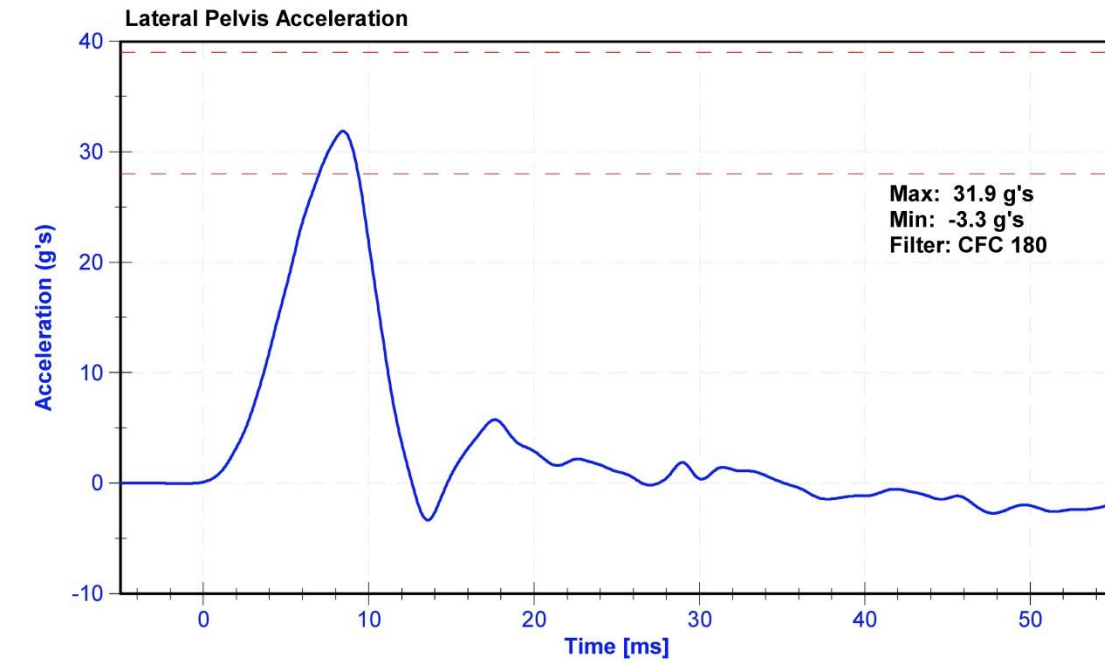
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	23.1	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	41.2	Pass
Lateral Pelvis Acceleration	28	39	g's	31.9	Pass
Iliac Force	4,100	5,100	N	4435.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
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





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-P52022	ENDEVCO	8/28/2014
			Y	AC-P52040	ENDEVCO	8/28/2014
			Z	AC-P58737	ENDEVCO	8/28/2014
Displacement Potentiometers	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-1199GFE	SERVO	8/12/2014
		Middle	Y	DS-1246GFE	SERVO	8/12/2014
		Lower	Y	DS-1256GFE	SERVO	8/12/2014
	Abdominal Rib	Upper	Y	DS-1274GFE	SERVO	8/12/2014
		Lower	Y	DS-1285GFE	SERVO	8/7/2014
Lower Spine Accelerometers (T12)			X	AC-P51945	ENDEVCO	8/28/2014
			Y	AC-P51974	ENDEVCO	8/28/2014
			Z	AC-P51946	ENDEVCO	8/28/2014
Acetabulum Load Cell			Y	LC-236Fy	DENTON	5/13/2014
Iliac Wing Load Cell			Y	LC-280Fy	DENTON	5/14/2014
Pelvis Plug (struck side)				46475	HUMANETICS	9/22/2011
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-A070865	MSI 1201	1/6/2015
	Rear Floorpan Above Axle	Y	AC-A127677	MSI 1201	1/6/2015
	Rear Floorpan Above Axle	Z	AC-A005916	MSI 1201	1/6/2015

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