

REPORT NUMBER: SPNCAP-CAL-20-001

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**Mitsubishi Motors Corporation
2020 Mitsubishi Eclipse Cross
SUV**

NHTSA No: M20205601

**PREPARED BY:
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December 19, 2019

FINAL REPORT

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

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Date: December 19, 2019

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Edward Dutton, Director

Date: December 19, 2019

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

Date: _____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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16. Abstract A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2020 Mitsubishi Eclipse Cross SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 4, 2019. The impact velocity of the vehicle was 32.39 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 352 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No. DG8012)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>357.644</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>44.167</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2766.827</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>25.074</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>39.390</td> </tr> </tbody> </table> 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 (SID-IIs) (Serial No. DG8012)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	357.644	Resultant Lower Spine Acceleration	G	82	44.167	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2766.827	Maximum Thoracic Rib Deflection	mm	38	25.074	Maximum Abdomen Rib Deflection	mm	45	39.390
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V 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																												
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2020 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2020 Mitsubishi Eclipse Cross SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2020 Mitsubishi Eclipse Cross SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.39 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 4, 2019. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included on page 3-11 in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG tri-axial accelerometers

Thorax upper, middle, and lower rib displacement potentiometers

Abdomen upper and lower rib displacement potentiometers

Lower spine tri-axial accelerometers

Iliac load cell

Acetabulum load cell

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D identifies all serial numbers, manufacturers, and calibration dates for test equipment, dummy sensors, potentiometers, and load cells used to collect data during the test.

Injury readings for the SID-IIs dummy were recorded as follows:

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	357.644
Resultant Lower Spine Acceleration	g	82	44.167
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2766.827
Maximum Thoracic Rib Deflection	mm	38*	25.074
Maximum Abdominal Rib Deflection	mm	45*	39.390

*Proposed IARV

Supplemental restraint information was recorded as follows:

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	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 – DG8012

Data Anomalies:

- Engine Top Y Acceleration, Questionable data throughout
- Left Lower A-Pillar Y Acceleration, Questionable data after 79.4 ms
- Left Sill A-Pillar Y Acceleration, Questionable data after 116.7 ms
- Left Front Sill Y Acceleration, Questionable data after 63.7 ms

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 Systems 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 – Vehicle Accelerometer Data

Data Sheet No. 7 – Rigid Pole Load Cell Data

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – Test Vehicle Profile Measurements

Data Sheet No. 10 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 – Vehicle Damage Profile Distances

Data Sheet No. 12 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 13 – Dummy / Vehicle Temperature and Humidity Stabilization Data

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20205601
Model Year	2020
Make	Mitsubishi
Model	Eclipse Cross
Body Style	SUV
VIN	JA4AS3AA0LZ005636
Body Color	Blue
Odometer Reading (km/mi)	119 miles
Engine Displacement (L)	1.5
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
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 Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	No

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Mitsubishi Motors Corporation
Date of Manufacture	JUL 2019
Vehicle Type	MPV

GVWR (kg)	2100
GAWR Front (kg)	1200
GAWR Rear (kg)	1160

VEHICLE SEATING AND WEIGHT CAPACITY DATA

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

(A)

(B)

(A-B)

VEHICLE SEAT TYPE

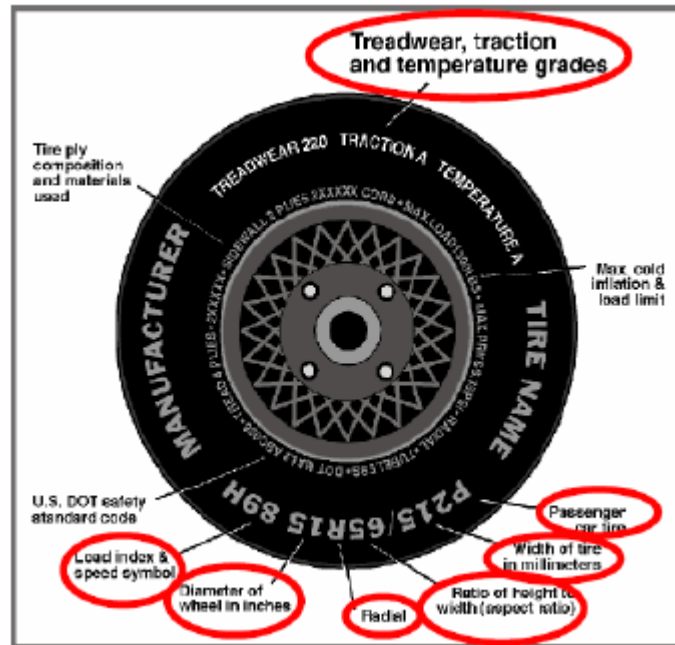
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat			X			X	
Third Row seat							

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

Test Vehicle:	2020 Mitsubishi Eclipse Cross SUV
Test Program:	NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P215/70R16	P215/70R16
Tire Size on Vehicle	P215/70R16	P215/70R16
Tire Manufacturer	Falken	Falken
Tire Model	Sincera N250	Sincera N250
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	99H	99H
Tire Material	Rubber	Rubber
DOT Safety Code Left	EUYV3MHR2219	EUYV3MHR2219
DOT Safety Code Right	EUYV3MHR2219	EUYV3MHR2219

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

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	261	258	260	262
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	447	315		467	332		463	352	
Right	kg	431	298		453	316		438	322	
Ratio	%	59	41		59	41		57	43	
Totals	kg	878	613	1491	920	648	1568	901	674	1575

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1491	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	34.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1575.8	(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	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-0.55	-0.10	-0.05	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.35	-0.35	-0.55	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.15	0.0	0.0	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	+0.25	0.0	-0.05	Yes
Vehicle CG (Aft of Front Axle)	mm	1096	1102	1141	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	17	15	26	

* ND = Nose Down (-), NU = Nose Up (+)

** LD = Left Down (-), LU = Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement

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

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	8
Spare Tire	14
Jack	3
Ballast / Equipment Added	7.3

Test Height – Adjustable Suspension Setting, if Applicable	N/A
--	-----

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

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	12.9	9.4	11.15
Front Passenger Seat	Not Adjustable		
Front Center Seat	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

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	11.15	30	Max	-	-	-
			Mid	20	25	30
			Min	-	-	-
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat	N/A	N/A	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

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

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

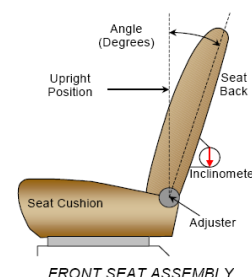
NHTSA No.: M20205601
 Test Date: 11/4/2019

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	220	23 (0-22)	0	0
Front Passenger Seat	220	23 (0-22)	0	0
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	200	21 (0-20)	200	20
Non-Struck Side Rear Seat	200	21 (0-20)	200	20
Rear Center Seat	200	21 (0-20)	200	20

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. 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 passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back are set to match 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	61.6	N/A	-12.1	1
Front Passenger Seat	56.5	N/A	-12.0	1
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	16	9 (0-8)	-10	0
Non-Struck Side Rear Seat	16	9 (0-8)	-10	0
Rear Center Seat	16	9 (0-8)	-10	0

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. Zero is defined as the uppermost detent

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

HEAD RESTRAINT ADJUSTMENT

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

Seat	Total # of Positions	Placed in Position #
Driver Seat	4	Lowermost

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

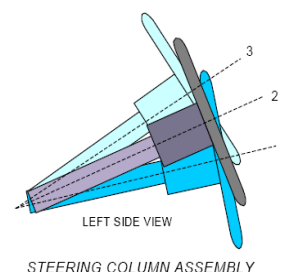
Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019

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.

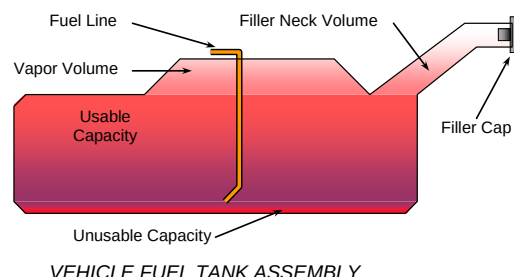
		Degrees	Fore / Aft Position (mm)
Lowermost	– Position 1	25.4	
Geometric Center	– Position 2	27.8	
Uppermost	– Position 3	30.1	
Telescoping Steering Wheel Travel			45
Test Position		27.8	22.5



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.



FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	63
Usable Capacity of "Optional Tank" - see Form No. 1	N/A
Usable Capacity of "Standard Tank" - see Owner's Manual	63
Usable Capacity of "Optional Tank" - see Owner's Manual	N/A
93% of Usable Capacity	58.6
Actual Amount of Solvent Used in Test	58.6
1/3 of Usable Capacity	21

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

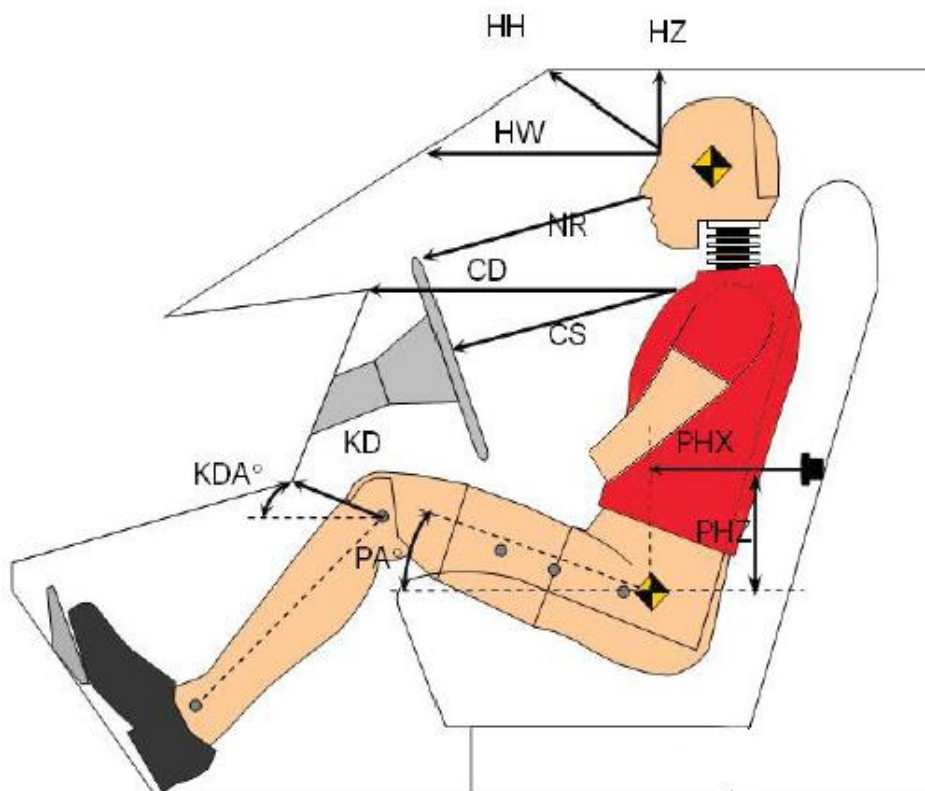


No

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019



Left Side View

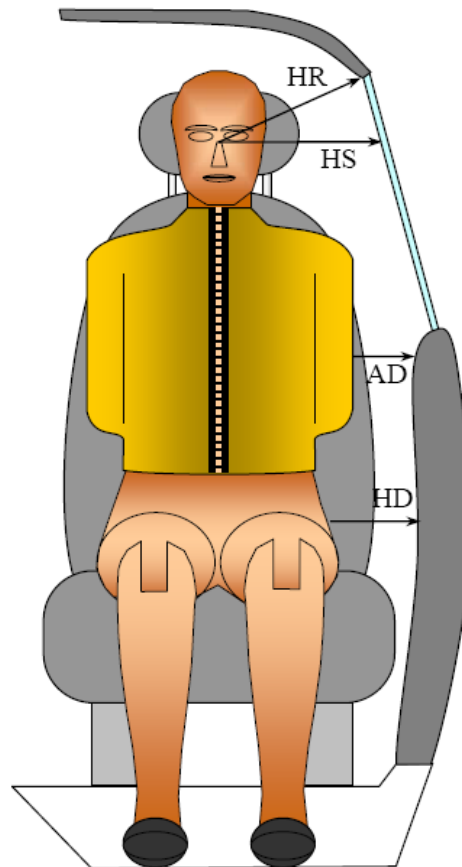
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. DG8012)	
		Length (mm)	Angle (°)
HH	Head to Header	298	
HW	Head to Windshield	605	
HZ	Head to Roof Liner	182	
NR	Nose to Rim	232	
CD	Chest to Dash	393	
CS	Chest to Steering Wheel	156	
KD(L) / KDA(L)°	Left Knee to Dash	118	25.1
KD(R) / KDA(R)°	Right Knee to Dash	122	21.8
PAX°	Pelvic Tilt Angle (X-Axis)		19.2
PAY°	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	388	
PHZ	Hip Point to Striker (Z-Axis)	161	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019



FRONT VIEW OF DUMMY

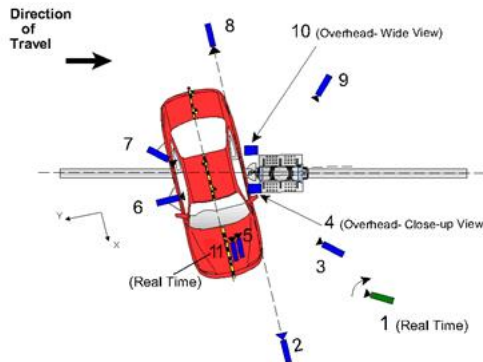
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. DG8012)
HR	Head To Side Header	mm	257
HS	Head to Side Window	mm	380
AD	Arm to Door	mm	152
HD	Hip Point to Door	mm	150

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7231	0	-1338	28	1000
3	Impact side 45° - forward pole view	6213	-1332	-1320	24	1000
4	Overhead Close-up view of impact	0	0	-9375	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				8	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-8483	0	-1444	28	1000
9	Impact side 45° - rearward pole view	-4142	-3246	-1421	24	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

Notes: Reference - From Point of Impact for X and Y; from Ground for Z
+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down
* All measurements accurate to ± 6 mm. Vehicle is at a 75° angle to the rigid pole.

Comments: All cameras operated as intended.

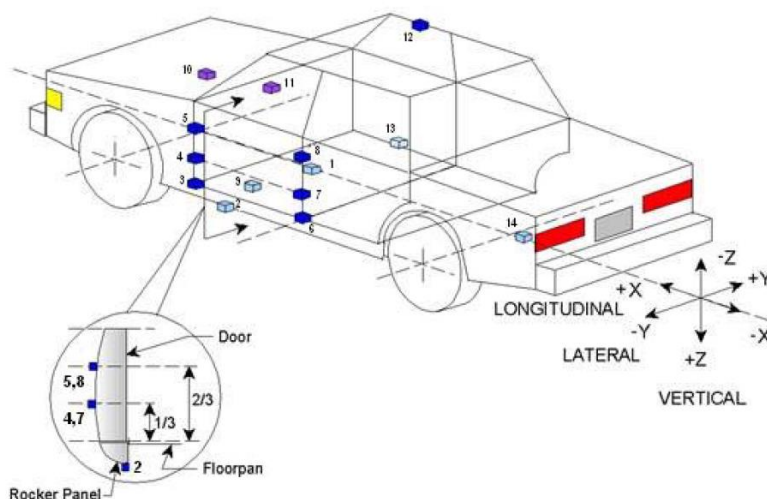
INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

DATA SHEET NO. 6 VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2241	-35	24
2	Left Floor Sill	2520	-647	320
3	A-Pillar Sill	2923	-620	294
4	A-Pillar Low	2970	-594	89
5	A-Pillar Mid	2930	-663	-440
6	B-Pillar Sill	1914	-649	263
7	B-Pillar Low	1893	-659	-30
8	B-Pillar Mid	1844	-659	-384
9	Driver Seat Track	2153	-554	212
10	Engine Top	3609	180	-103
11	Firewall	3183	256	-140
12	Right Roof	1864	580	-933
13	Right Floor Sill	2514	624	329
14	Rear Floorpan	828	6	134

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019

POLE BARRIER



RIGID POLE LOAD CELL LOCATIONS

ID	Units	Height From Ground
1	mm	200
2	mm	590
3	mm	750
4	mm	1075
5	mm	1260
6	mm	1740
7	mm	1920
8	mm	2300

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

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag & Headrest
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Seatback & Torso/Pelvis Airbag
Lower Torso	Seatback & Torso/Pelvis Airbag
Left Hip	Seat pan & Torso/Pelvis Airbag
Left Knee	None

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

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

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar & C-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracks throughout
Side Window Damage	Driver Window Shattered
Other Notable Effects	None

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	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1075
Actual Impact Point - Aft of Front Axle	mm		1076
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 *	-1
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75.0
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.39
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	6.44**

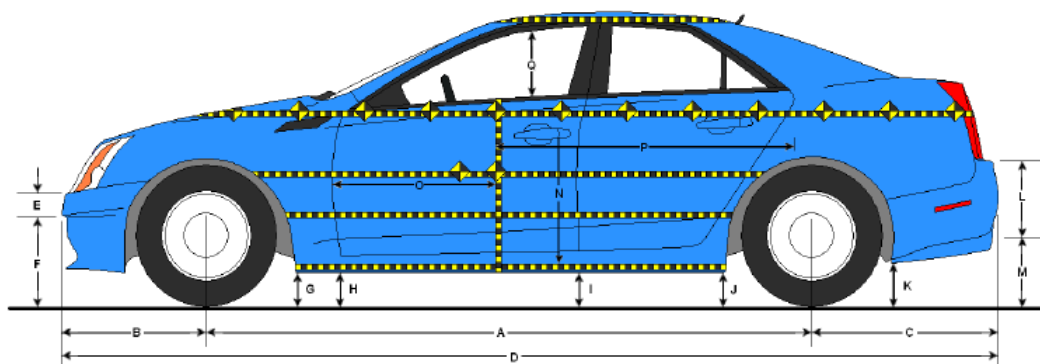
* Of Intended Impact Point

** Secondary Speed Malfunctioned

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

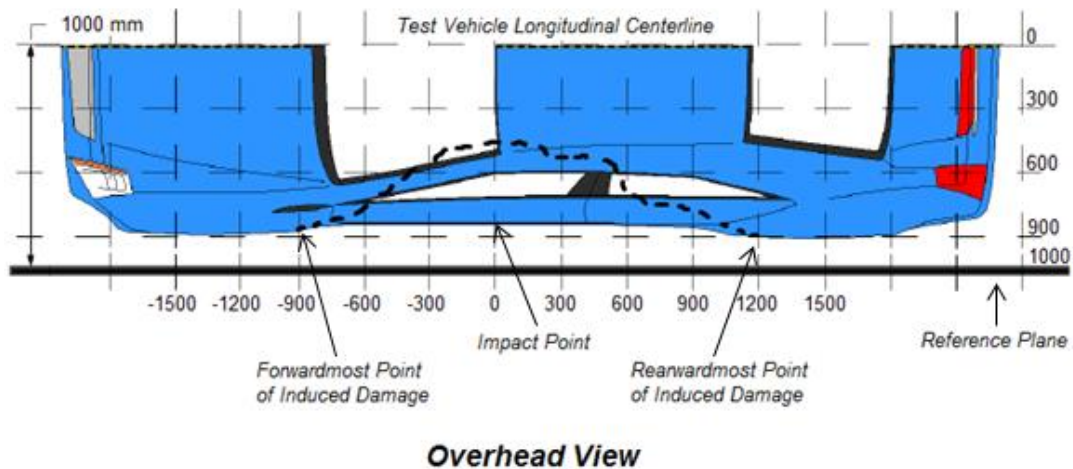
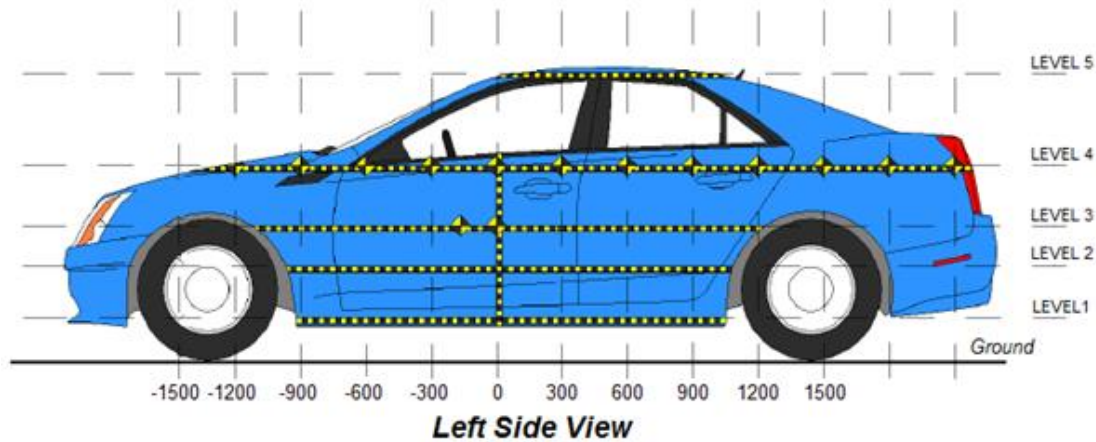
Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2666	2599	67
B	Front Axle to FSOV	953	986	-33
C	Rear Axle to RSOV	783	786	-3
D	Total Length at Centerline	4402	4371	31
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	439	472	-33
G	Sill Height at Front Wheel Well	259	254	5
H	Sill Height at Front Door Leading Edge	244	235	9
I	Sill Height at B-Pillar	251	233	18
J1	Sill Height at Rear Wheel Well	258	256	2
J2	Pinch Weld Height at Rear Wheel Well	255	262	-7
K	Sill Height Aft of Rear Wheel Well	284	278	6
L	Rear Bumper Thickness	220	220	0
M	Rear Bumper Bottom to Ground	484	477	7
N	Sill Height to Bottom of Front Window Sill	900	903	-3
O	Front Door Leading Edge to Impact CL	580	475	105
P	Rear Door Trailing Edge to Impact CL	1432	1345	87
Q	Front Window Opening	399	396	3
R	Right Side Length	4323	4318	5
S	Left Side Length	4322	4265	57
T	Vehicle Width at B-Pillars	1808	1710	98

* All measurements in mm with tolerance of $\pm 3\text{mm}$

DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	306	320	0
2	Occupant Hip Point	mm	691	349	0
3	Mid - Door	mm	753	352	0
4	Window Sill	mm	1046	315	0
5	Window Top	mm	1578	104	0

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. 10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

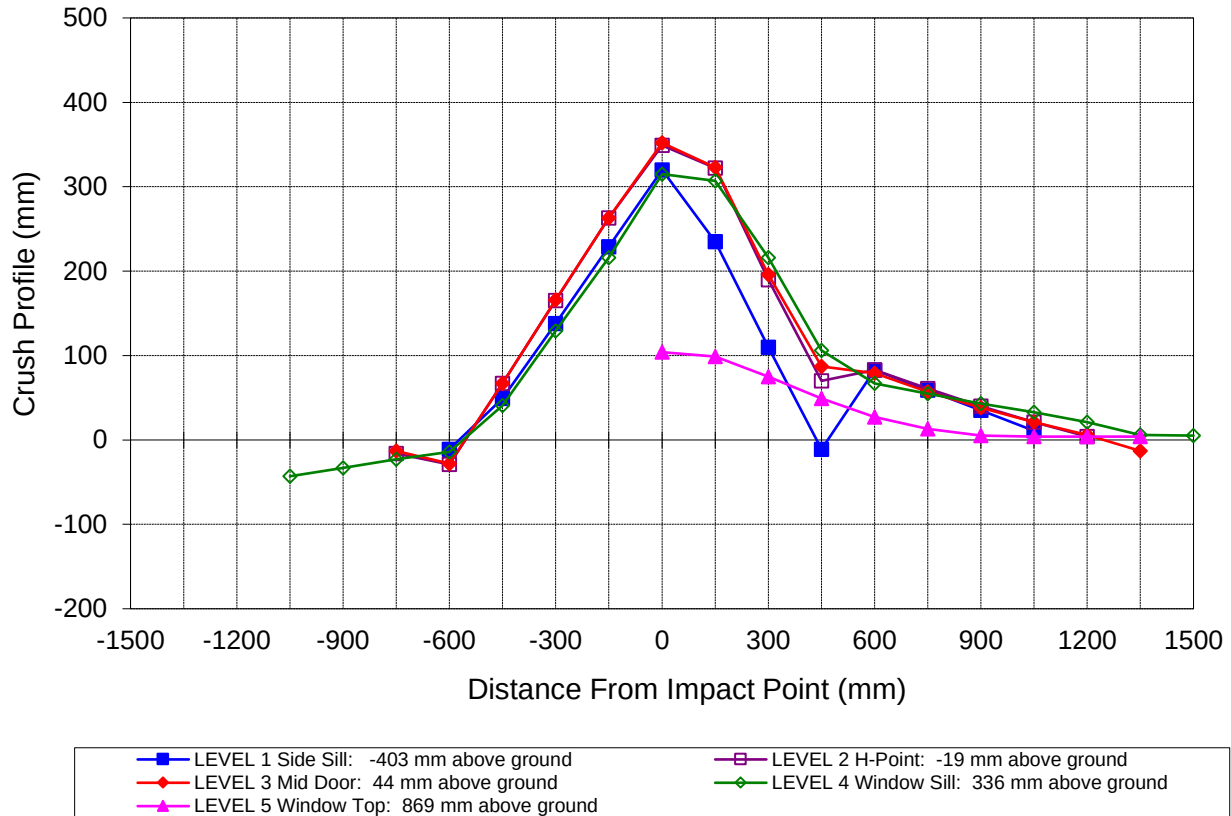
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050				826					869					-43	
-900				832					865					-33	
-750		902	904	829			918	917	852			-16	-13	-23	
-600	889	901	902	825		900	930	930	839		-11	-29	-28	-14	
-450	890	899	901	832		841	832	834	791		49	67	67	41	
-300	893	899	901	842		755	734	735	713		138	165	166	129	
-150	893	898	901	850		664	635	638	634		229	263	263	216	
0	892	898	900	857	597	572	549	548	542	493	320	349	352	315	104
150	891	897	899	864	621	656	575	576	557	522	235	322	323	307	99
300	889	896	898	868	624	779	706	702	652	549	110	190	196	216	75
450	889	894	897	871	623	900	824	810	765	574	-11	70	87	106	49
600	886	893	895	872	621	803	810	816	805	594	83	83	79	67	27
750	884	892	893	872	617	825	831	836	817	604	59	61	57	55	13
900	881	895	895	864	609	846	855	857	821	604	35	40	38	43	5
1050	878	905	903	851	599	867	884	882	818	595	11	21	21	33	4
1200		903	906	842	585		899	900	821	581		4	6	21	4
1350			906	843	556			919	837	552			-13	6	4
1500				848					843					5	

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 the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy’s head.

DATA SHEET NO. 10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019



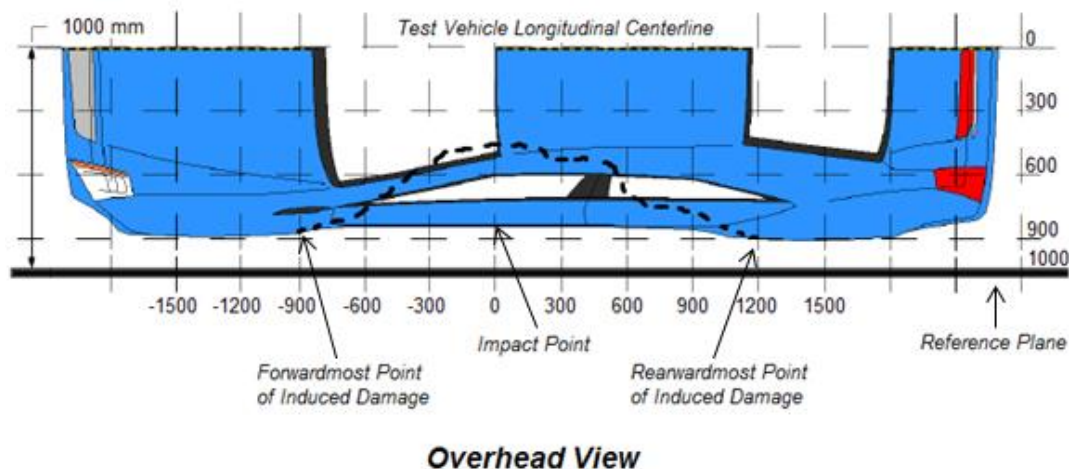
Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
 Test Date: 11/4/2019

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	-750	3	83	96	-13
2	-330	3	245	99	146
3	90	3	435	101	334
4	510	3	188	104	84
5	930	3	138	103	35
6	1350	3	81	94	-13

DATA SHEET NO. 12
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: <u>2020 Mitsubishi Eclipse Cross SUV</u>	NHTSA No.: <u>M20205601</u>
Test Program: <u>NCAP Side Pole Impact Test</u>	Test Date: <u>11/4/2019</u>
Test Time: <u>11:00 AM</u>	Temperature: <u>21° C</u>

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	69	300	369
90° to 180°	66	300	366
180° to 270°	60	300	360
270° to 360°	68	300	368

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

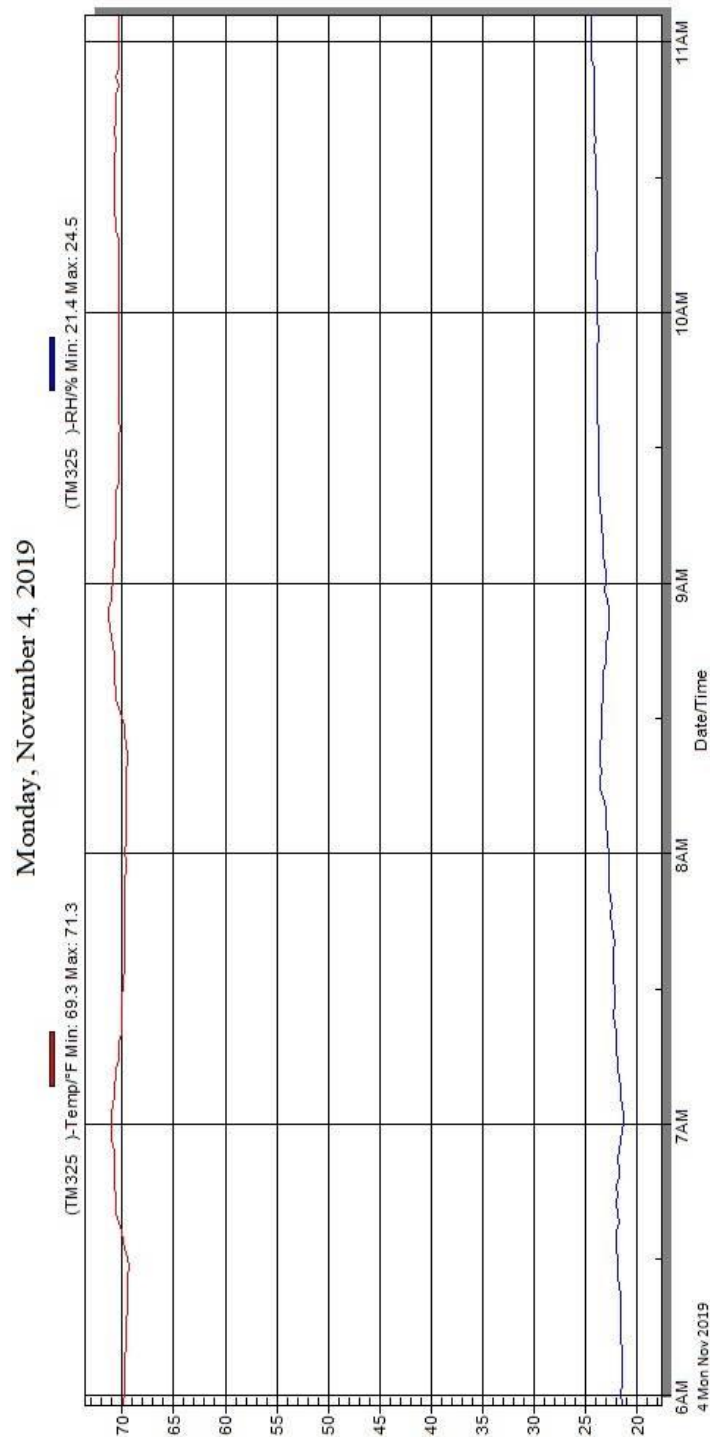
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	No Spillage Occurred
90° to 180°	No Spillage Occurred
180° to 270°	No Spillage Occurred
270° to 360°	No Spillage Occurred

DATA SHEET NO. 13
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2020 Mitsubishi Eclipse Cross SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20205601
Test Date: 11/4/2019



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



Figure A-2: As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



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



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



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



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



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



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



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



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



Figure A-12: Post-Test Rear 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

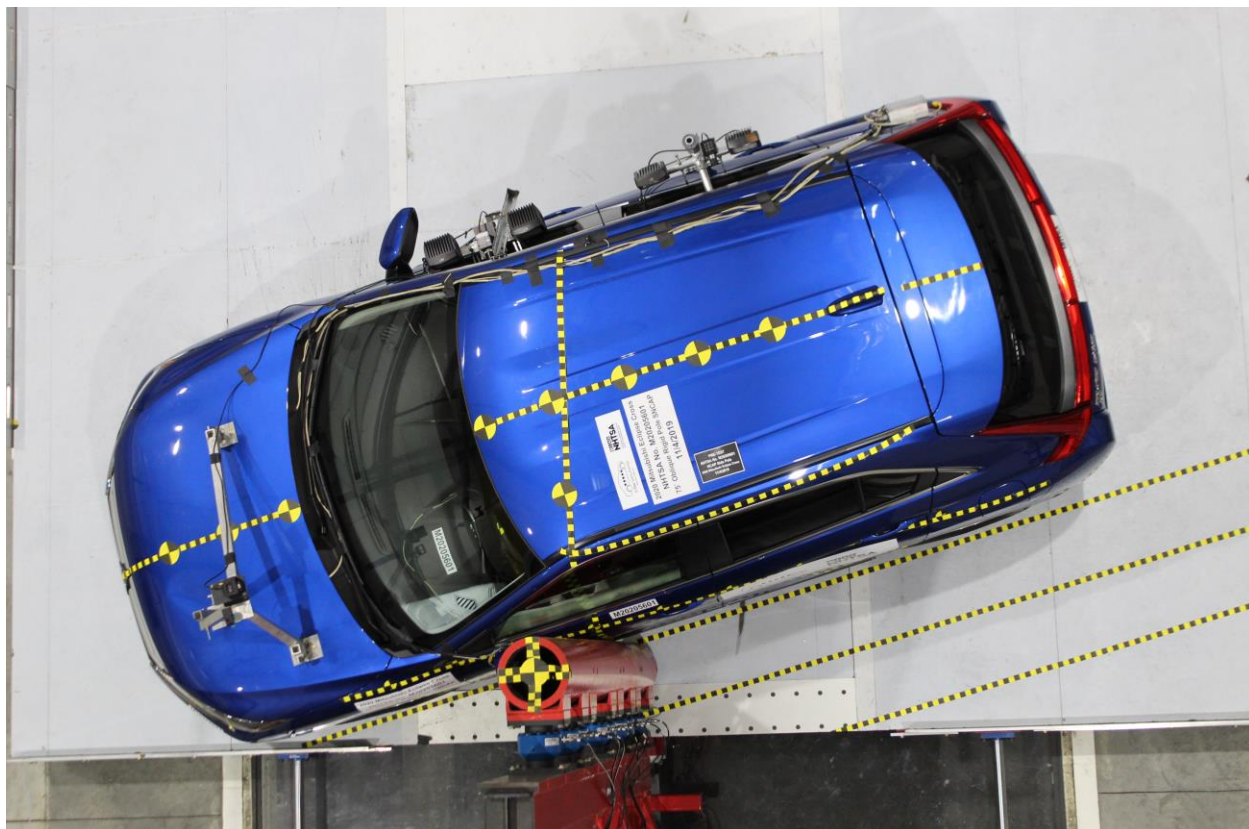


Figure A-15: Pre-Test Overhead View of Test Area



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

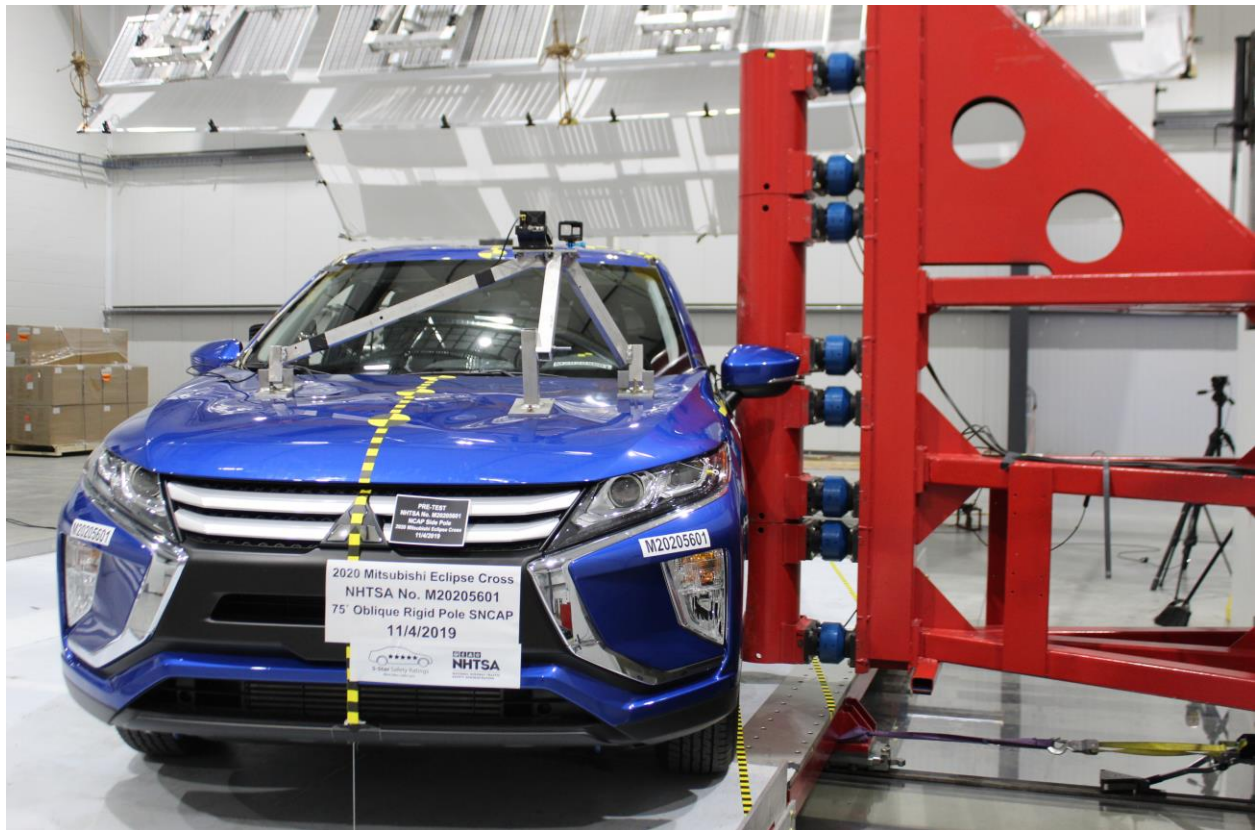


Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of 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 Showing Impact Location



Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest



Figure A-22: Post-Test Front Close-Up View of Dummy



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt and Chalking



Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan



Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Figure A-32: Pre-Test Placement of Dummy's Feet



Figure A-33: Pre-Test View of Belt Anchorage for Dummy



Figure A-34: Pre-Test Left Side View of Steering Wheel



Figure A-35: Pre-Test View of Disengaged Parking Brake



Figure A-36: Pre-Test View of Parking Brake



Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track

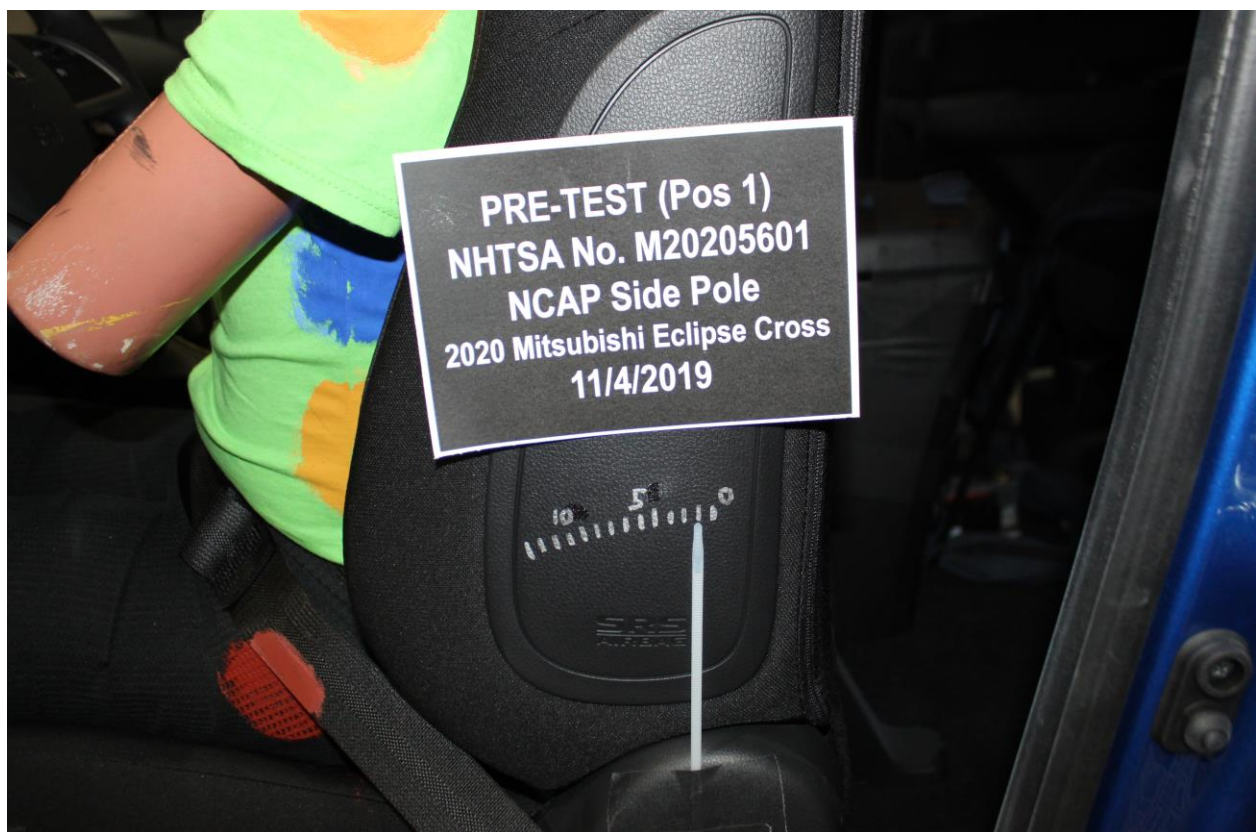


Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-40: Pre-Test Dummy and Door Clearance View



Figure A-41: Post-Test Dummy and Door Clearance View

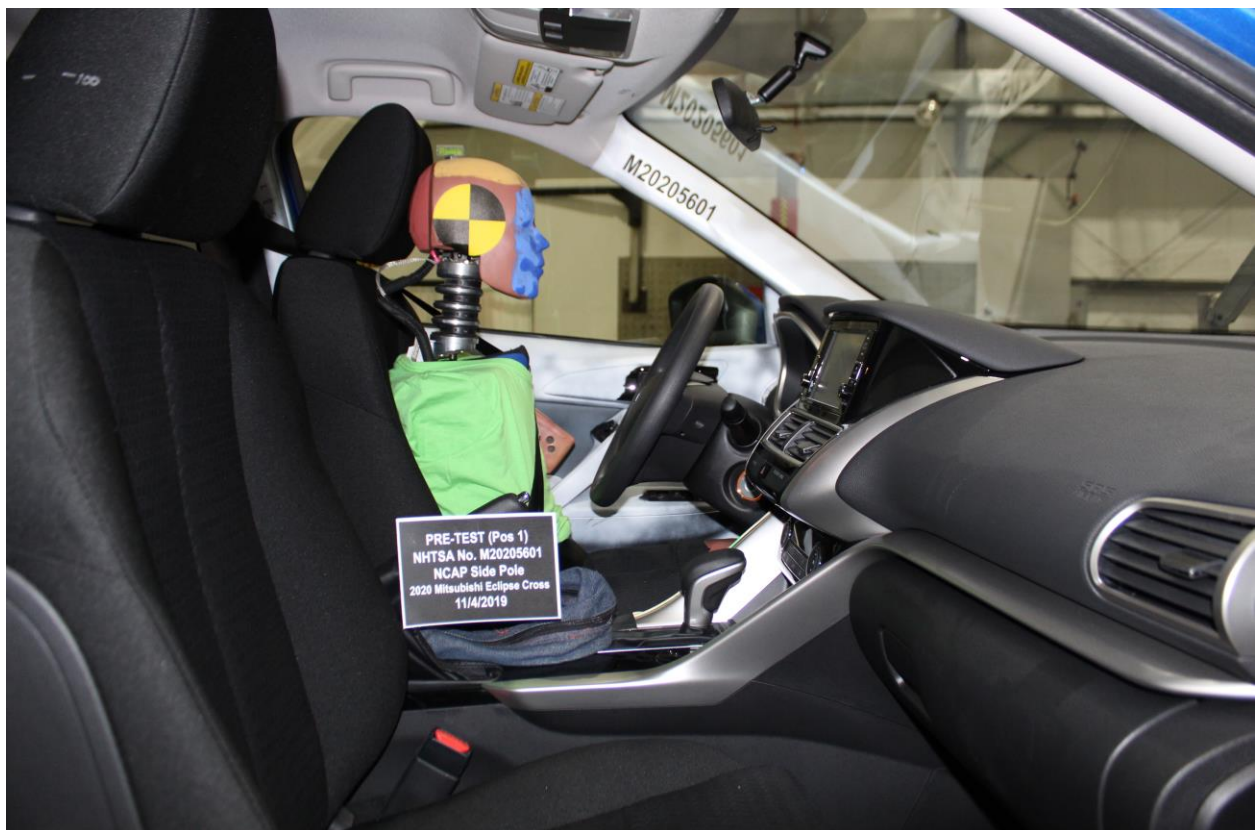


Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-43: Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-44: Pre-Test Inner Door Panel View



Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Figure A-47: Post-Test Dummy Close-Up Head Contact with Side Airbag View

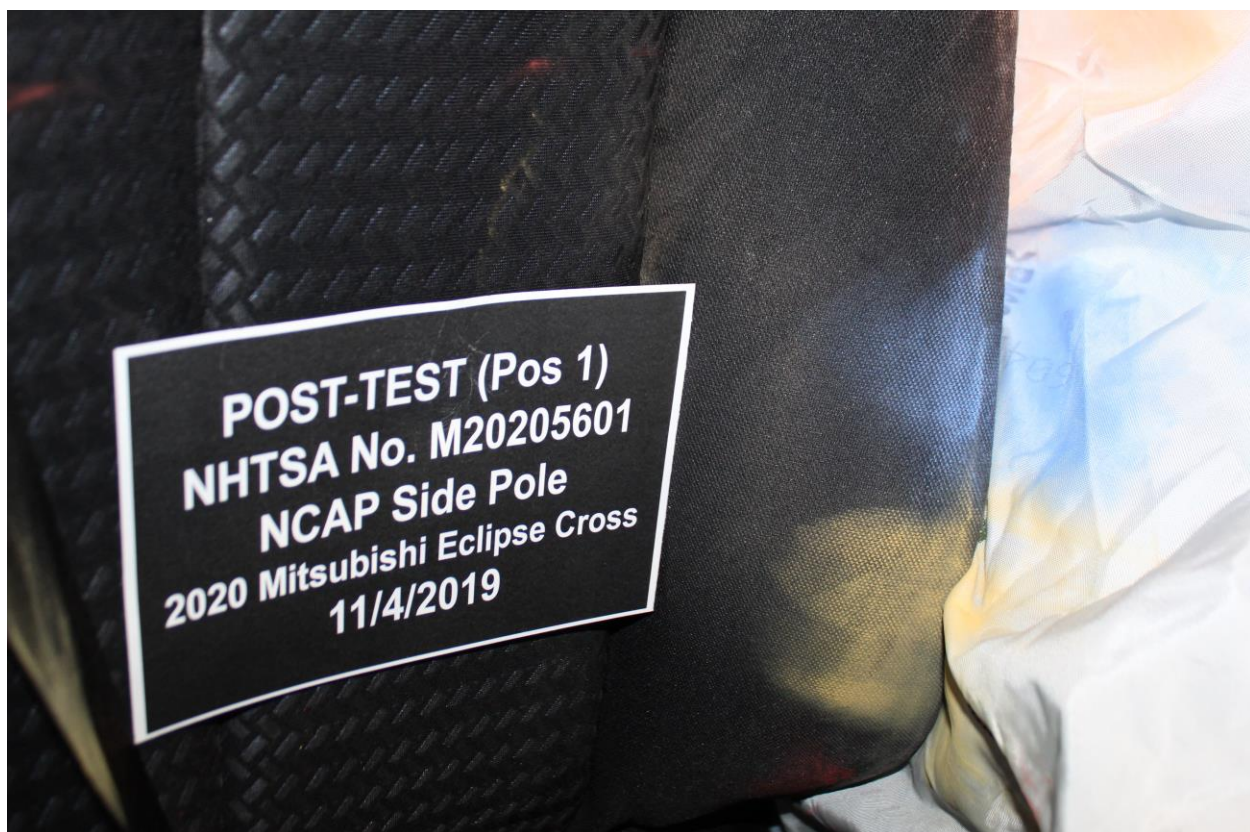


Figure A-48: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



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



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



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

Photo Not Applicable

Figure A-52: Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



Figure A-53: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-54: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-55: Close-Up View of Vehicle's Certification Label

Photo Not Applicable

Figure A-55a: Close-Up View of Reduced Load Capacity Label



Figure A-56: Close-Up View of Vehicle's Tire Information Placard or Label

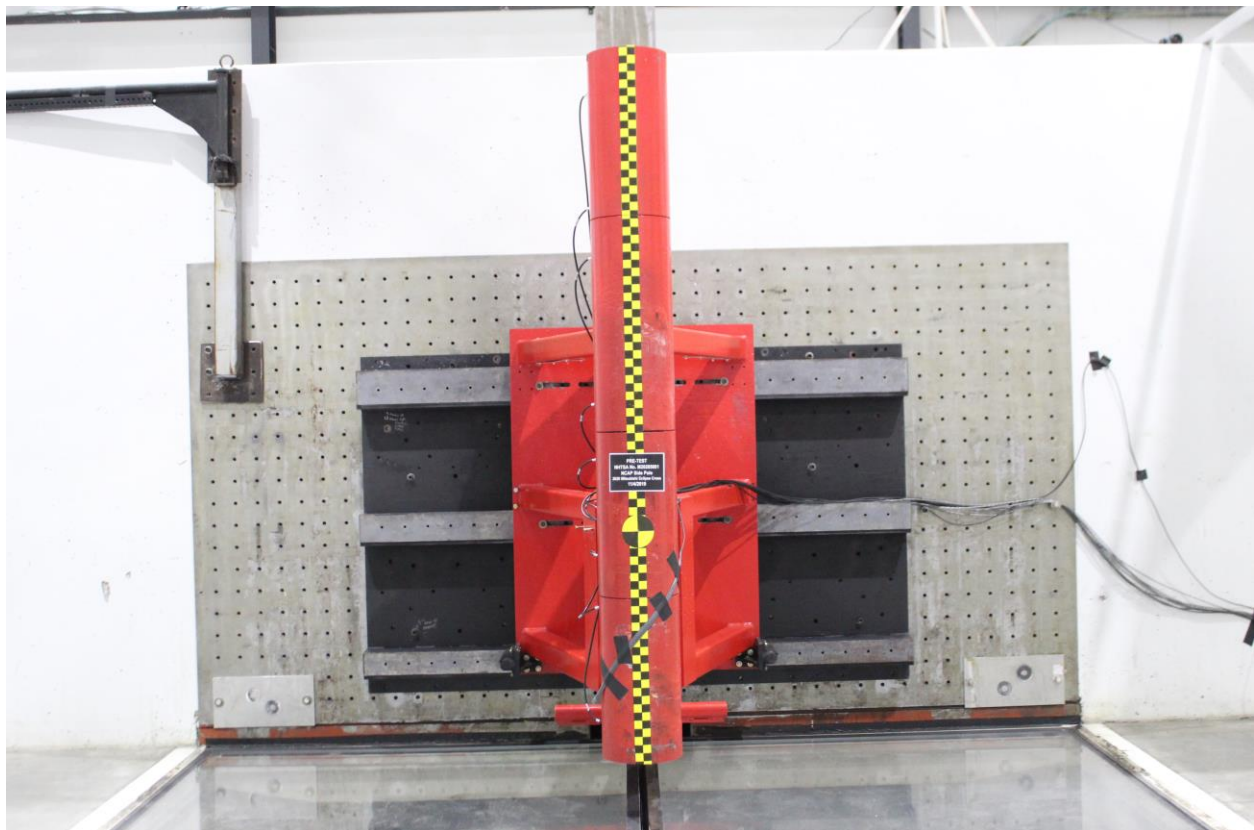


Figure A-57: Pre-Test Pole Barrier Front View



Figure A-58: Post-Test Pole Barrier Front View

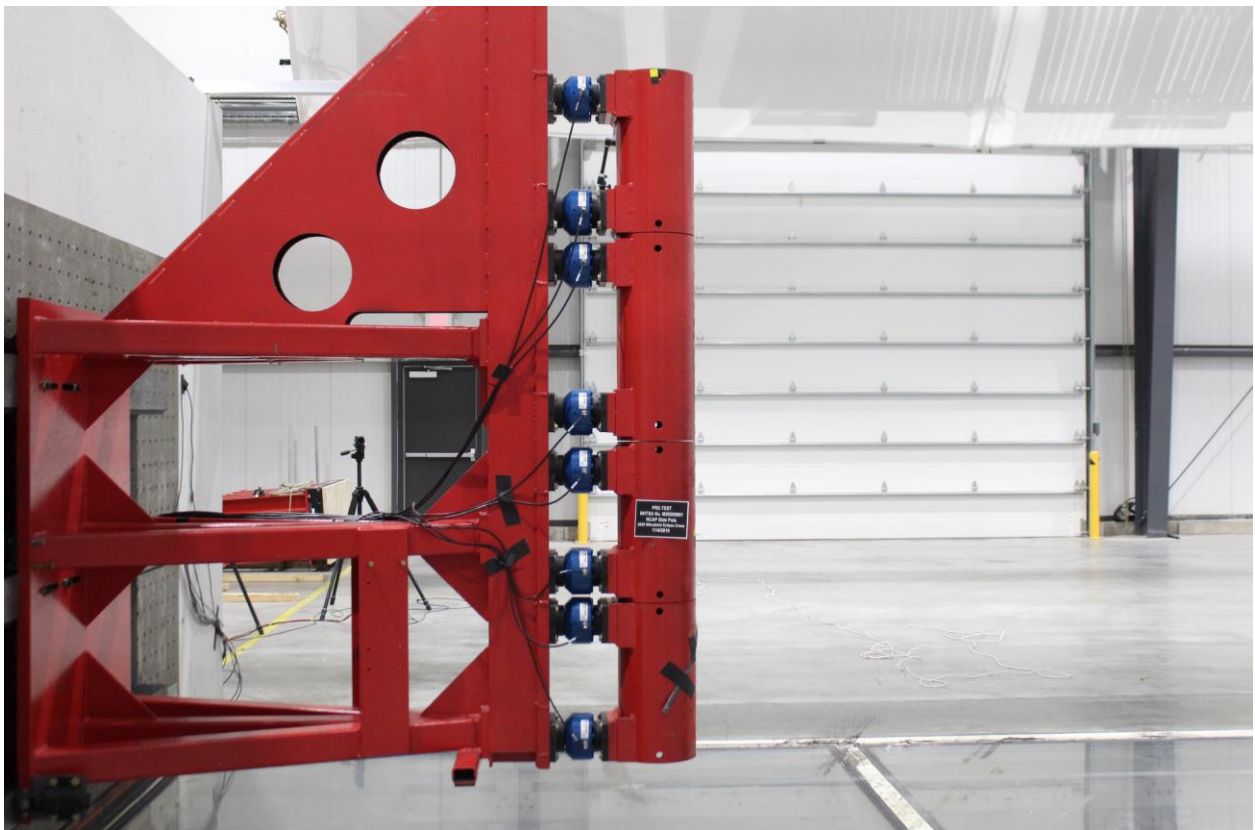


Figure A-59: Pre-Test Pole Barrier Side View

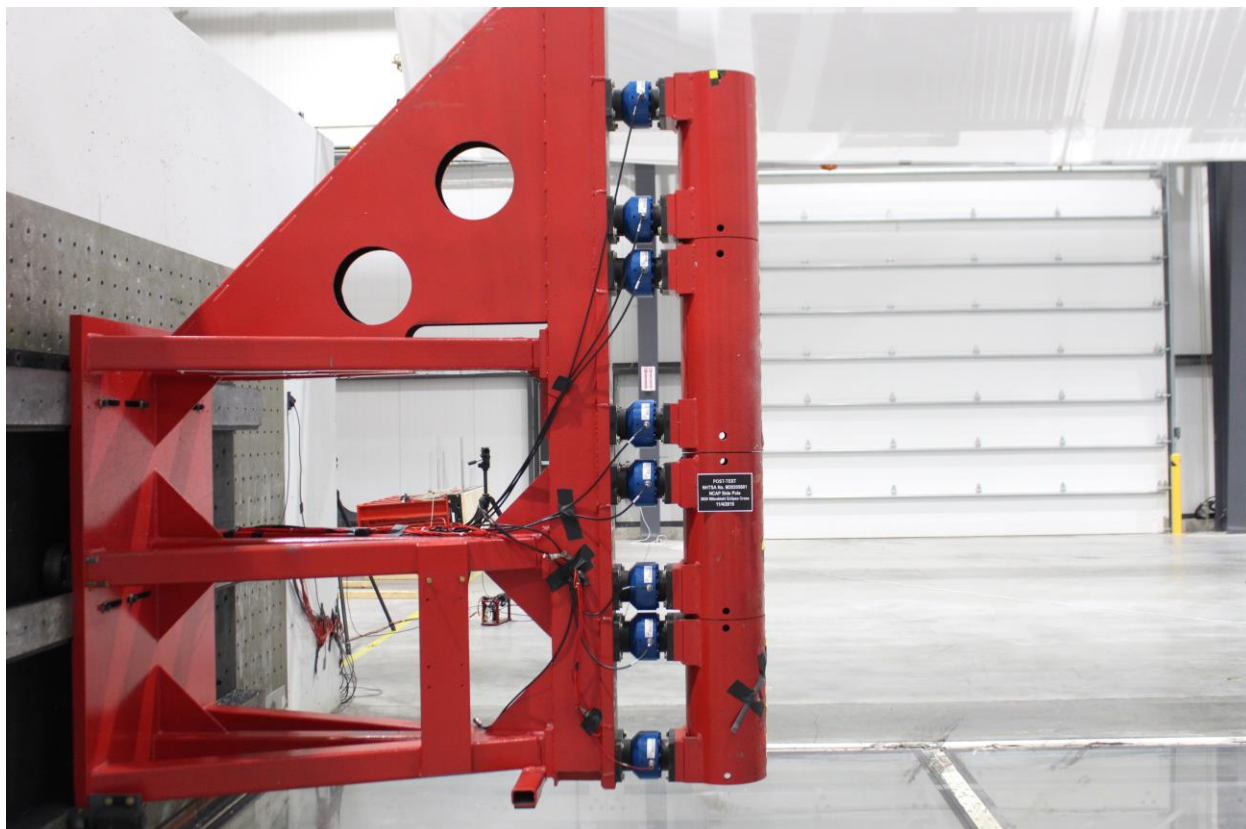


Figure A-60: Post-Test Pole Barrier Side View

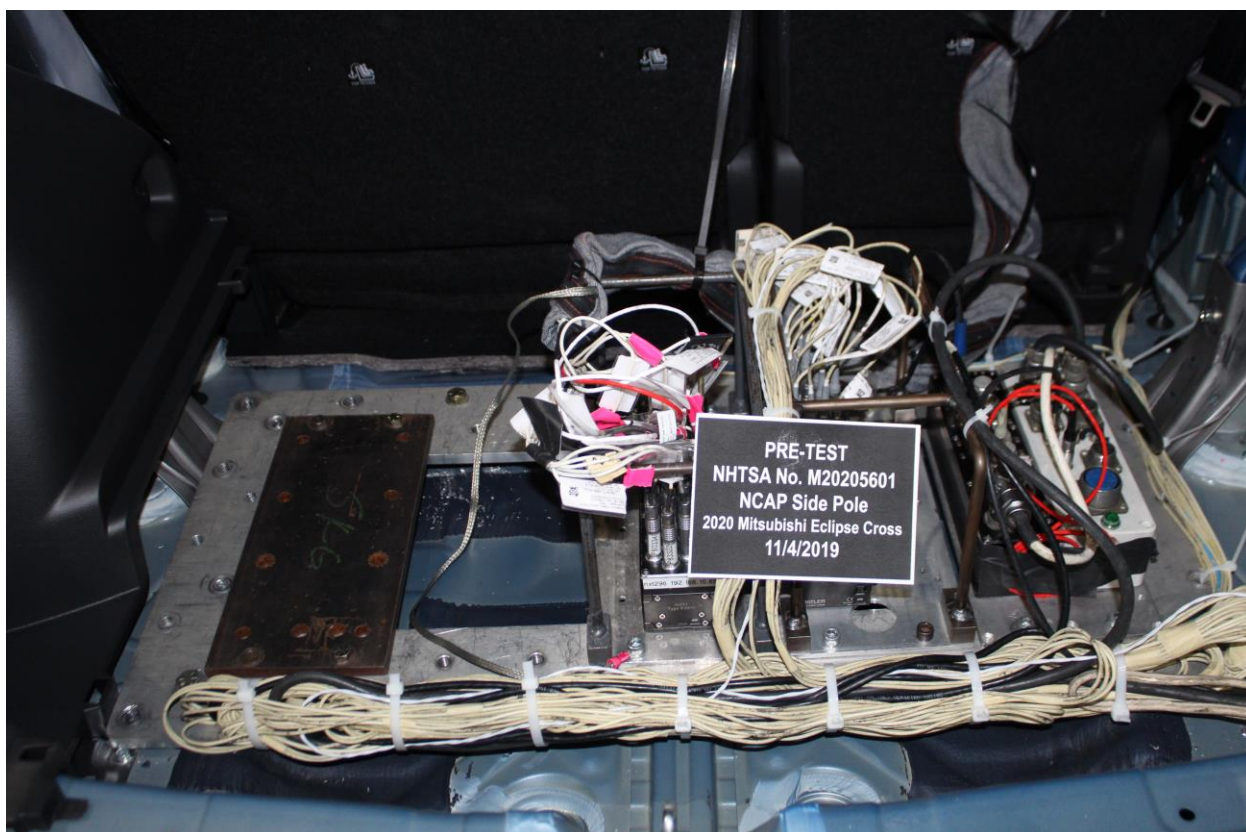


Figure A-61: Pre-Test Ballast View



Figure A-62: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-63: FMVSS No. 301 Static Rollover 0 Degrees

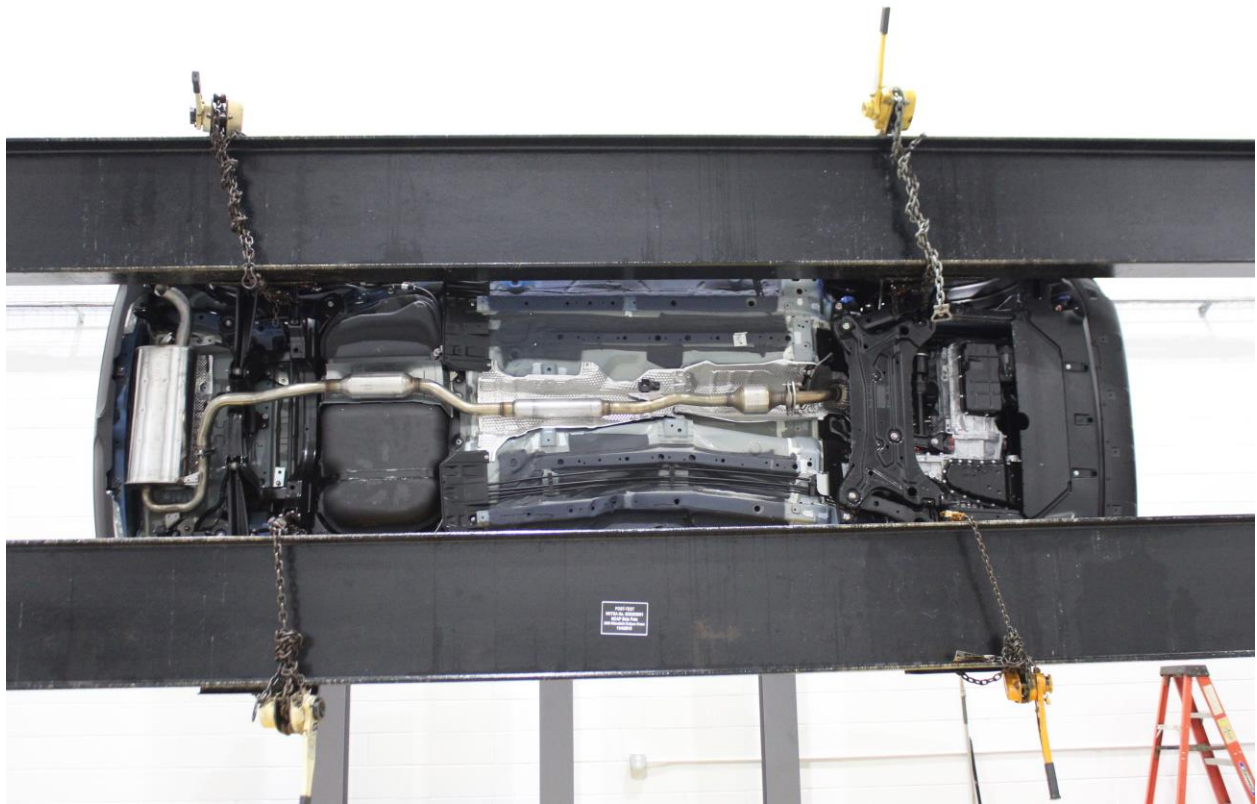


Figure A-64: FMVSS No. 301 Static Rollover 90 Degrees

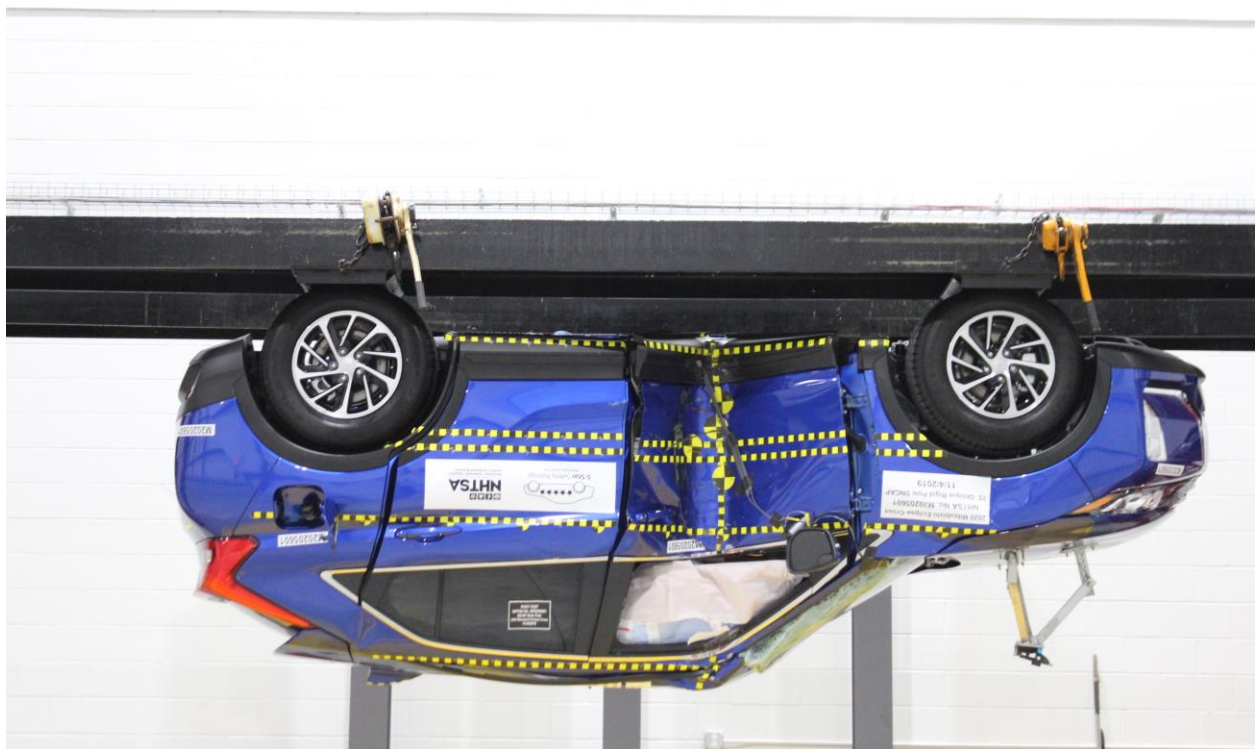


Figure A-65: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-66: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-67: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-68: Impact Event

2020 ECLIPSE CROSS ES 1.5T 2WD
4-DOOR SUV
OCTANE BLUE METALLIC / BLACK

1.5L DIRECT-INJECTION TURBO ENGINE
CONTINUOUSLY VARIABLE TRANSMISSION
50-STATE EMISSIONS STANDARD

Mechanical Features

- 1.5L MIVEC DOHC 4-cylinder Direct-Injection Turbocharged
- Electric power steering
- Front MacPherson strut suspension with stabilizer bar
- Rear Multi-link suspension with stabilizer bar
- Continuously Variable Transmission (CVT) with 8-step Sport Mode
- Front-Wheel Drive (FWD)
- Active Yaw Control (AYC)

Exterior Features

- Halogen headlights
- Fog lights
- LED daytime running lights
- LED tail lights
- LED high-mount stop light
- Chrome side-window molding
- Wheel arch moldings
- Body-colored side mirrors with turn indicators
- Heated power side mirrors
- Front variable intermittent wipers
- Rear intermittent wiper
- Rear window defroster with timer
- Rear privacy glass
- Roof spoiler
- Shark fin antenna
- ES badge
- 16-inch two-tone alloy wheels
- 215/70R16 all-season tires
- Temporary spare tire

Interior Features

- High-contrast meters
- Color multi-information display
- Dual sunvisor vanity mirrors
- Sunvisors with extension function
- Front map lights
- Cargo light
- 6-way adjustable driver seat
- 4-way adjustable passenger seat
- Fabric seating surfaces
- 60/40 rear seat folding function with slide and recline adjustments
- Passenger seatback pocket
- Tilt and telescopic steering wheel

Convenience Features

- 7.0" display audio
- HD Radio
- Bluetooth® wireless technology
- Steering wheel audio and phone controls
- Front USB port
- Rearview camera
- ECO indicator
- ECO mode switch
- Cruise control
- Automatic climate control
- Micron air filtration

Additional Equipment

Full Tank of Gas INCLUDED

Accy Carpeted Floor Mats and Portfolio \$145.00

MSRP: \$22,845.00

Total Additional Equipment: **\$145.00**

Subtotal: **\$22,990.00**

Destination/Handling: **\$1,095.00**

Total MSRP: **\$24,085.00**

*MSRP (Manufacturer's Suggested Retail Price)

Fuel Economy and Environment

27 MPG combined city/hwy

26 city 29 highway

3.7 gallons per 100 miles

Annual fuel Cost \$1,500

Fuel Economy & Greenhouse Gas Rating

6 (Best)

Smog Rating 10 (Best)

Government 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash, or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA).
www.safercar.gov or 1-888-327-4236

MITSUBISHI MOTORS

Visit us at www.mitsubishicars.com

Figure A-69: Monroney Label

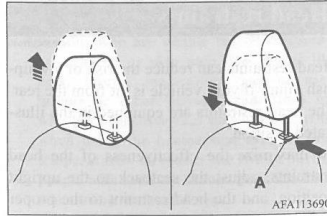
Head restraints

Adjustment of the head restraint height

4 Front seats and rear outboard seats

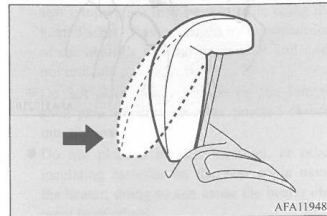
To reduce the risk of injury in an accident, adjust the head restraint height so that the center of the restraint is at your ear level when seated. Any person too tall for the restraint to reach their ear level when seated should raise the restraint to the highest locked position.

- To raise the head restraint, pull it straight up.
- To lower the restraint, push down on it while pressing the lock knob (A) in the direction shown by the arrow.
- After adjusting the height, push down on the restraint to make sure it is locked in position.



Rear outboard seats

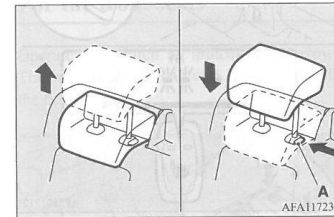
To raise the head restraint, move it upward, and then push the bottom of the restraint rearward.



Rear center seat

To reduce the risk of injury in an accident, pull up the head restraint to the locked position.

- To raise the head restraint, move it upward.
- After adjustment, push the head restraint downward and make sure that it is locked.
- To lower the restraint, move it downward while pushing the height adjusting knob (A) in the direction of the arrow.



4-10 Seat and restraint systems

Figure A-70: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Figure A-71: Post-Test View of Shattered Vehicle Inner Door Panel (if applicable)

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver Dummy Instrumentation Plots

Fig.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-4
4	Driver Head Resultant Acceleration Primary vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

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.gov.

Additional Driver Dummy Instrumentation Data

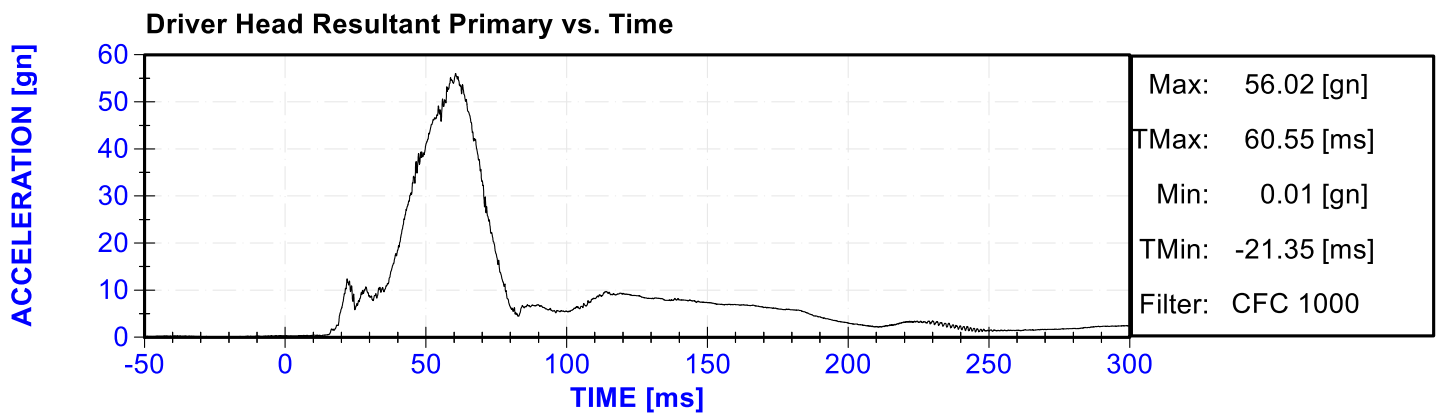
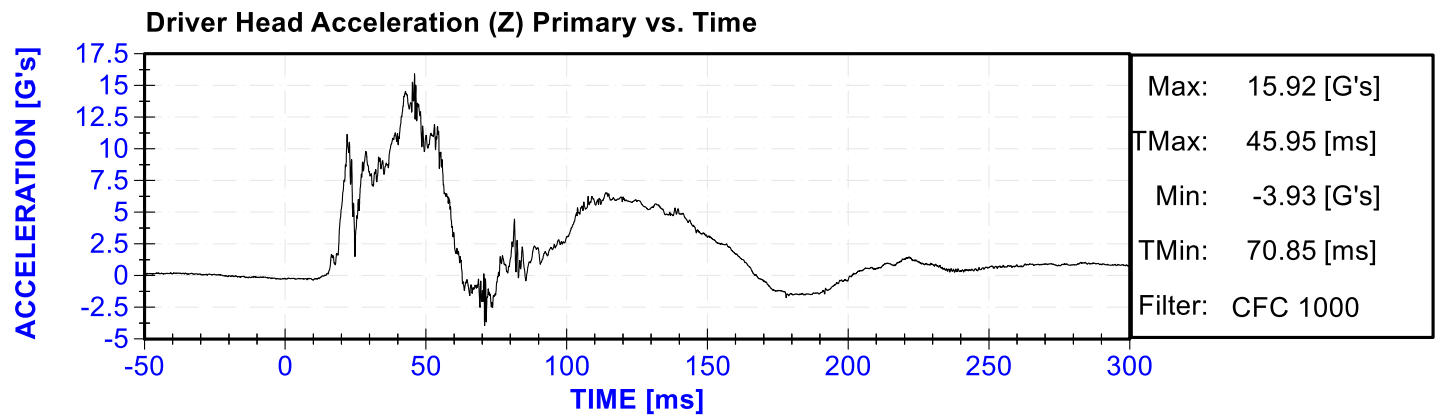
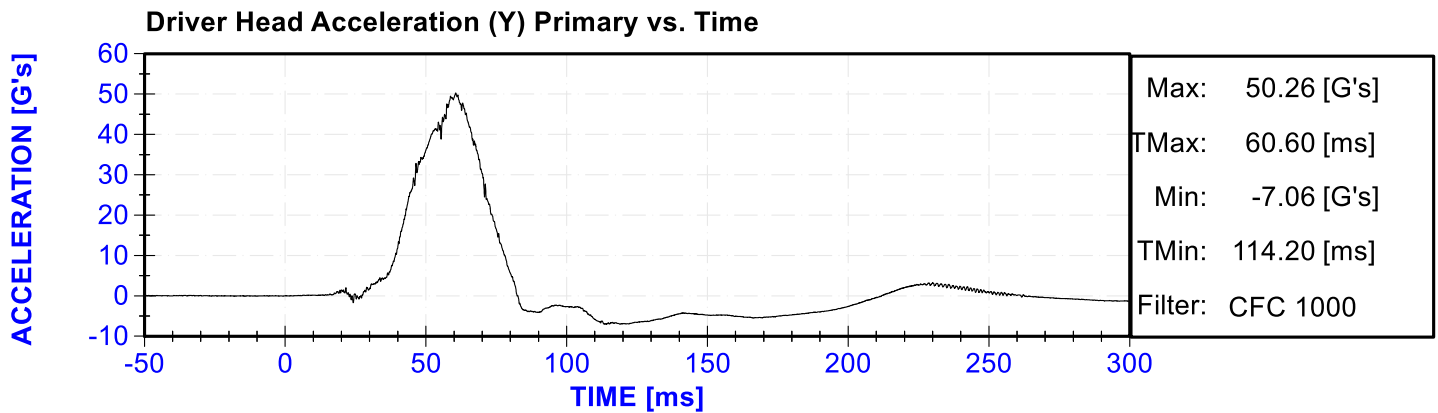
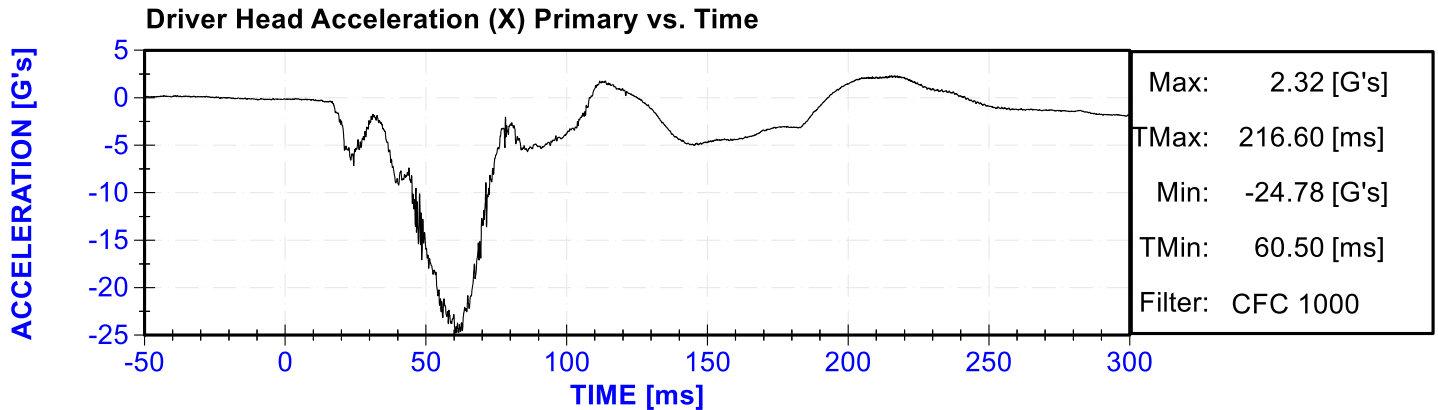
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection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

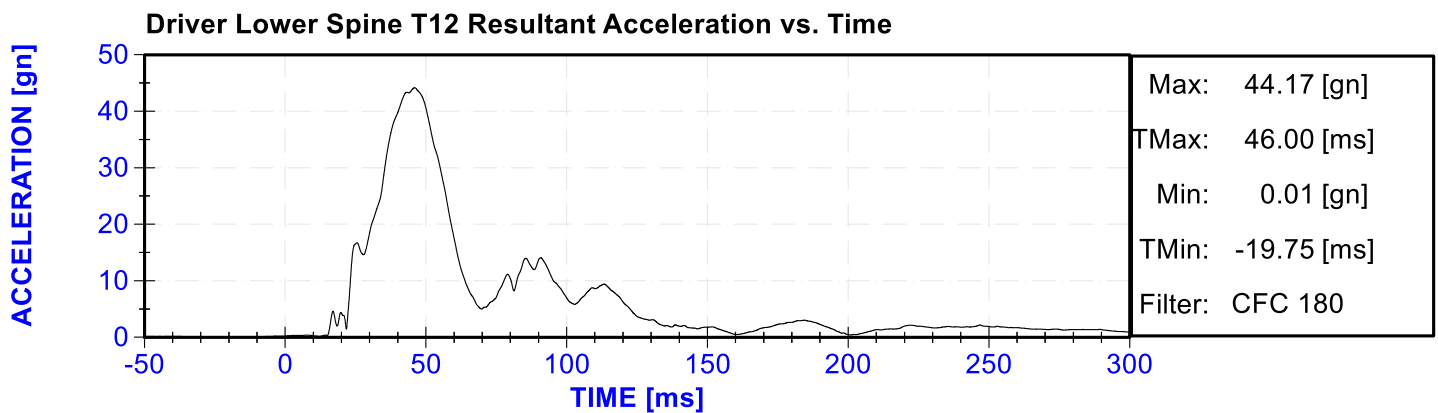
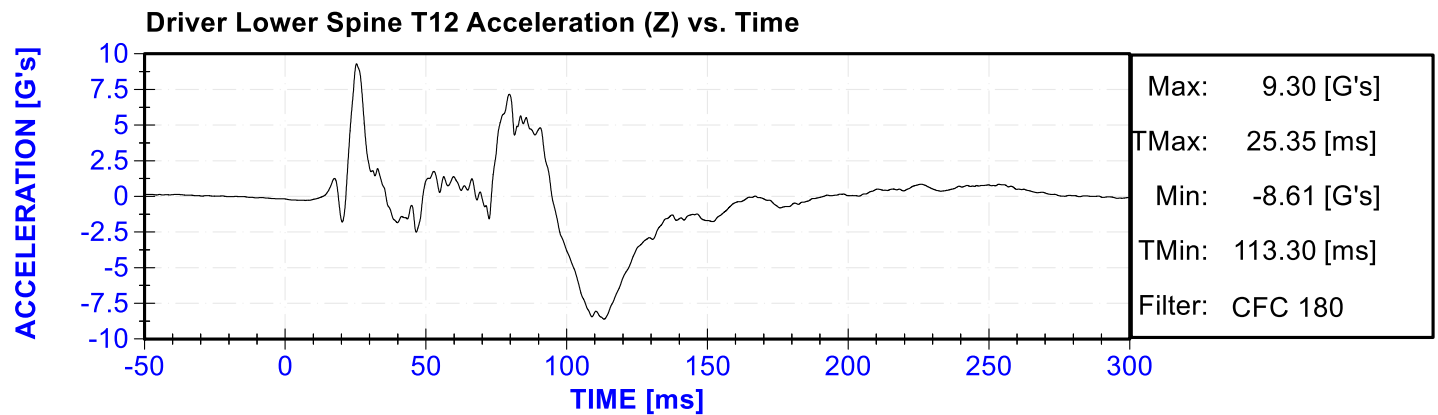
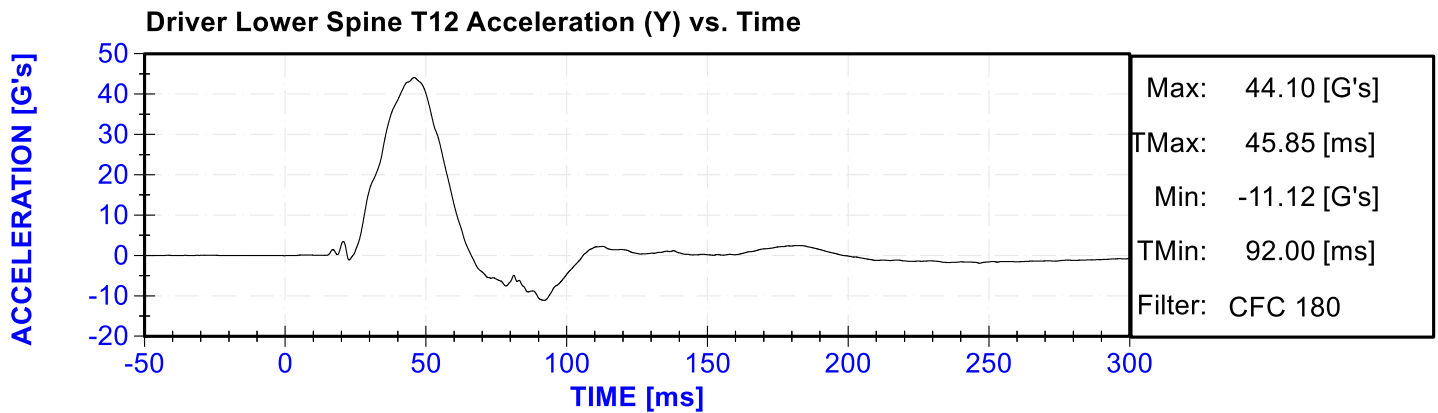
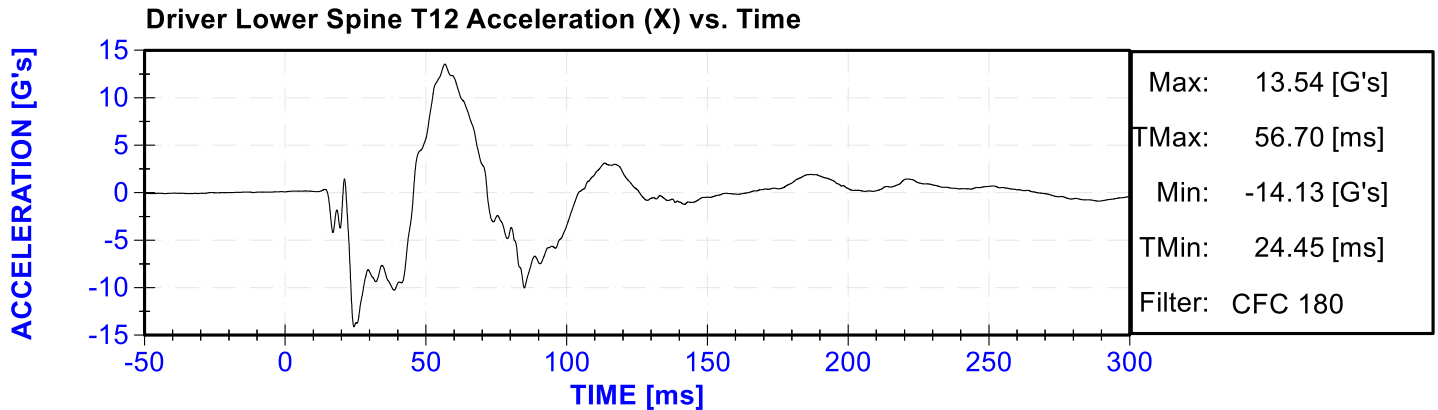
Vehicle Instrumentation Data

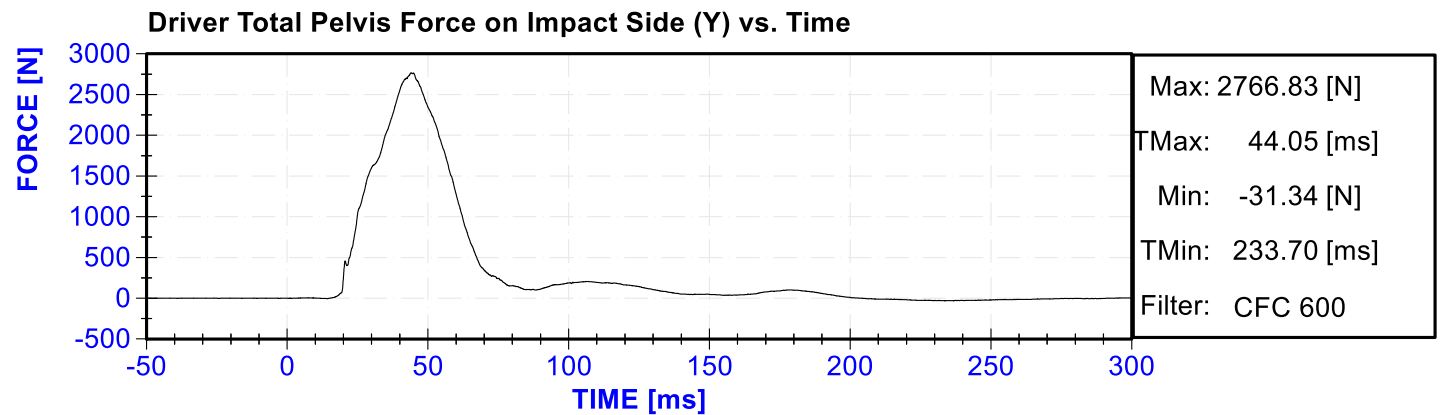
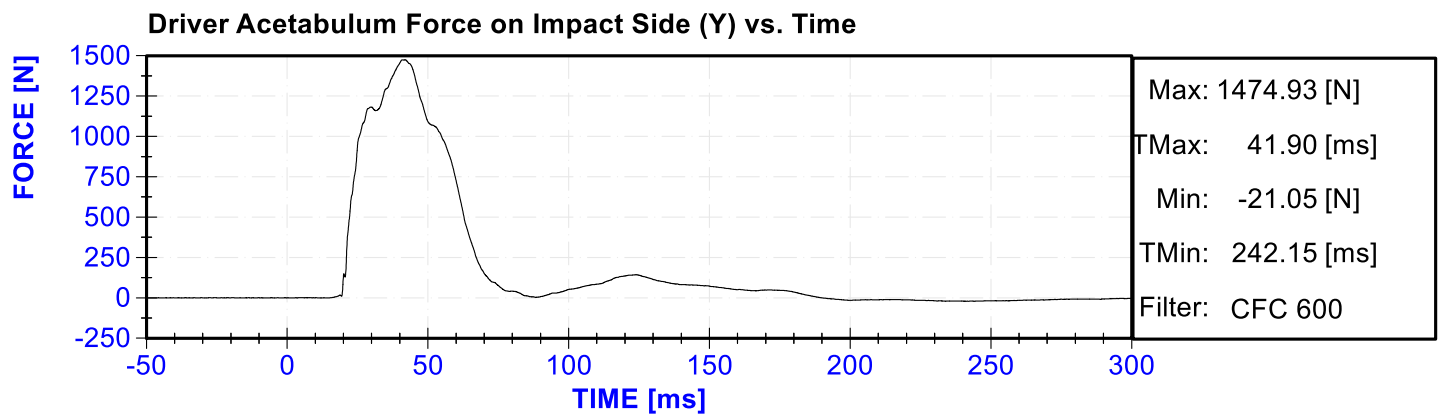
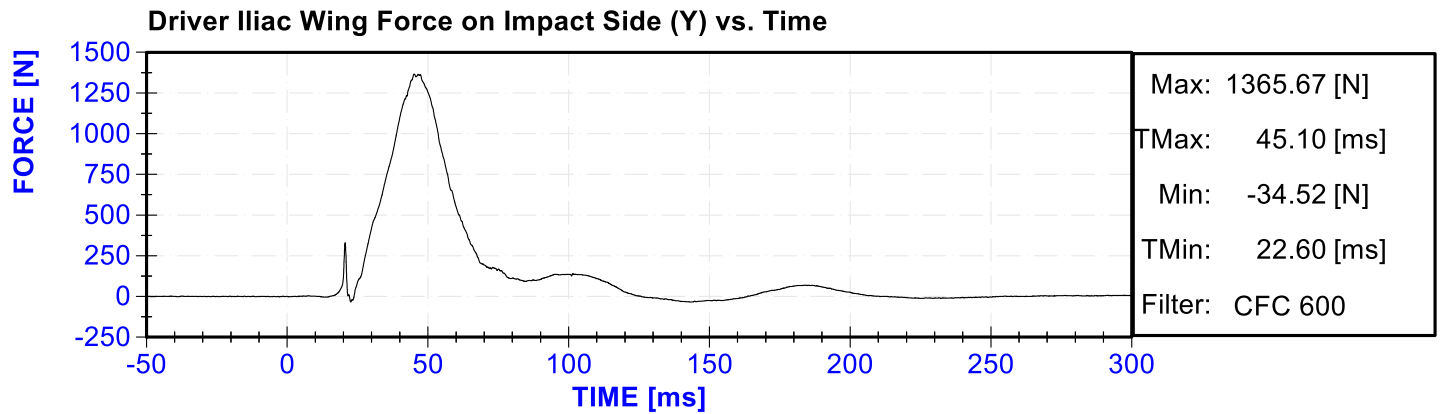
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)







APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

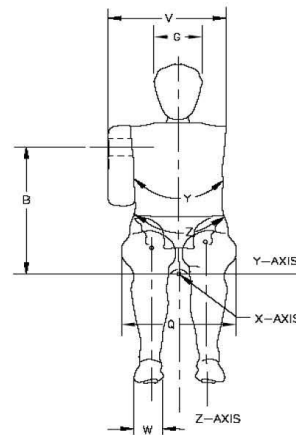
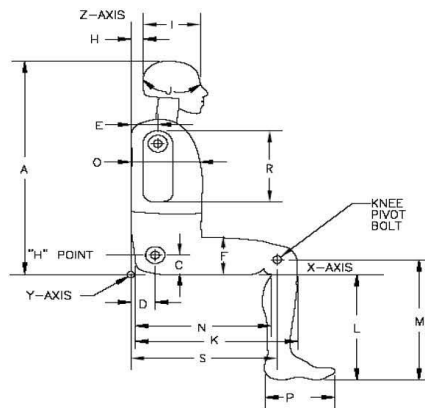


External Measurements - SID-IIs

Technician: **K. Dutton**

Date: **10/28/2019**

Dummy Serial Number: **DG8012**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	44	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	433	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	223	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	345	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	867	Pass
Z	Waist Circumference	761	791	781	Pass

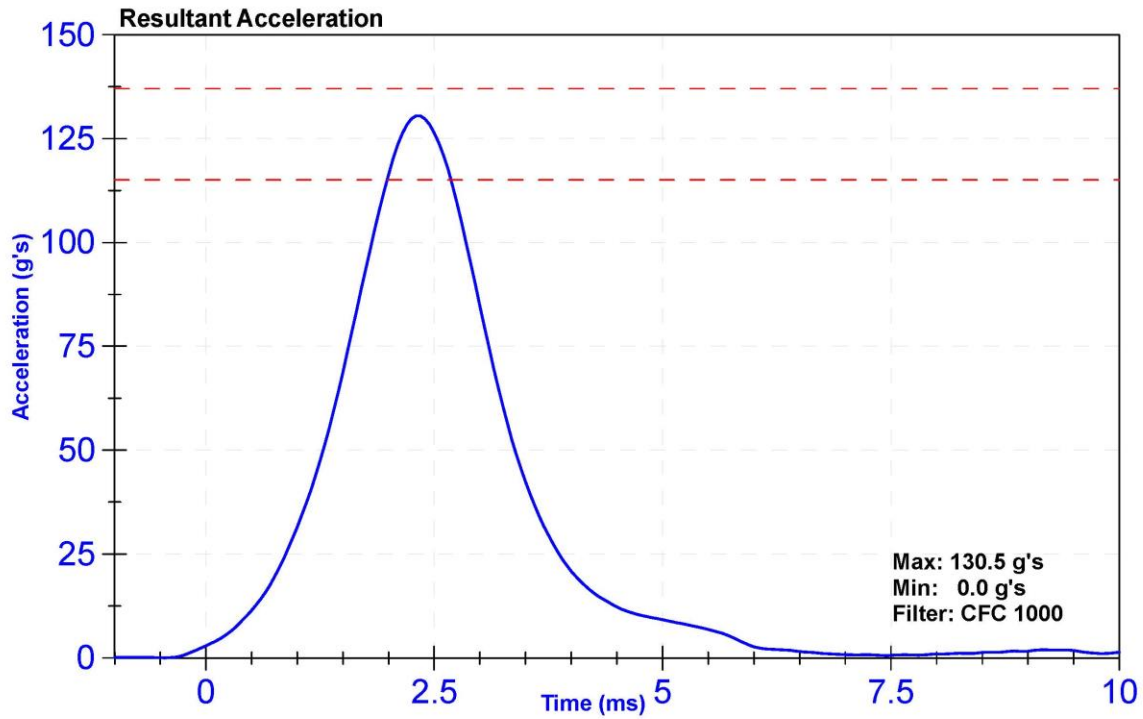
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

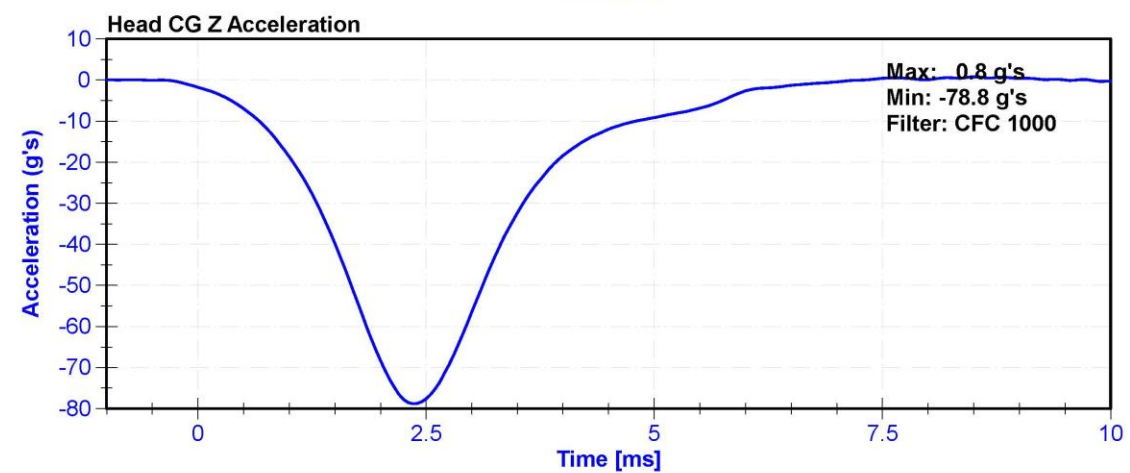
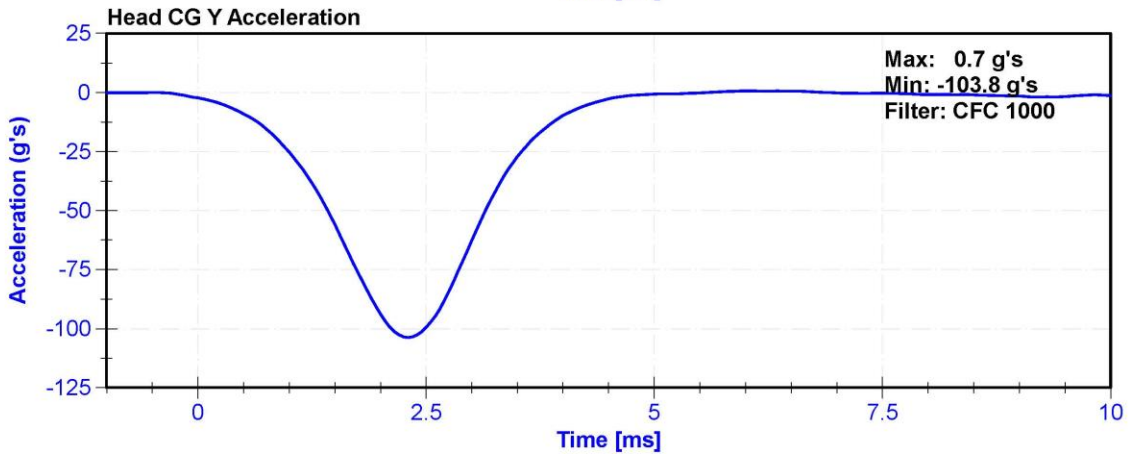
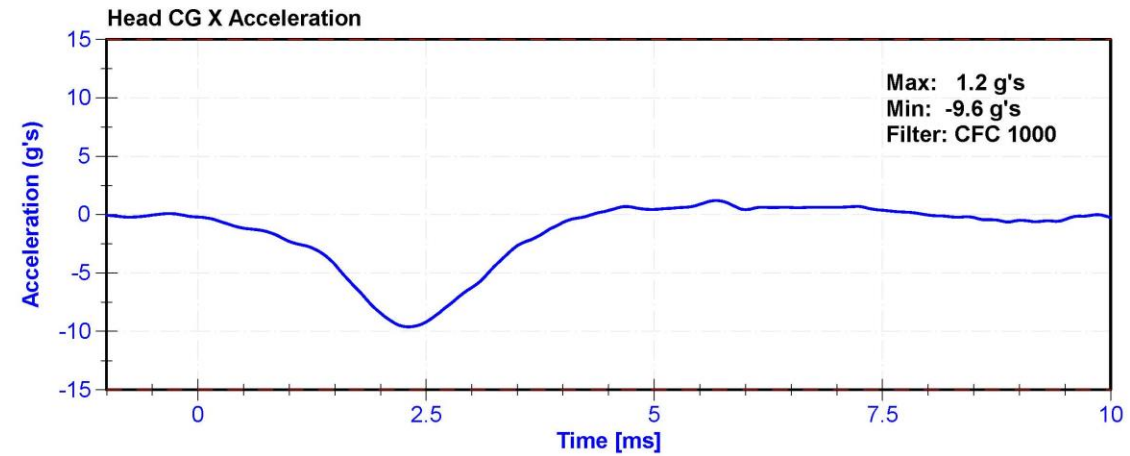
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	43	Pass
Resultant Acceleration	115	137	g's	130.5	Pass
Oscillation	0	15	%	1.5	Pass
Fore-Aft Acceleration	-15	15	g's	-9.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P74788	10/28/2019	4/28/2020
Y Accelerometer	Endevco	P83432	10/28/2019	4/28/2020
Z Accelerometer	Endevco	P83319	10/28/2019	4/28/2020





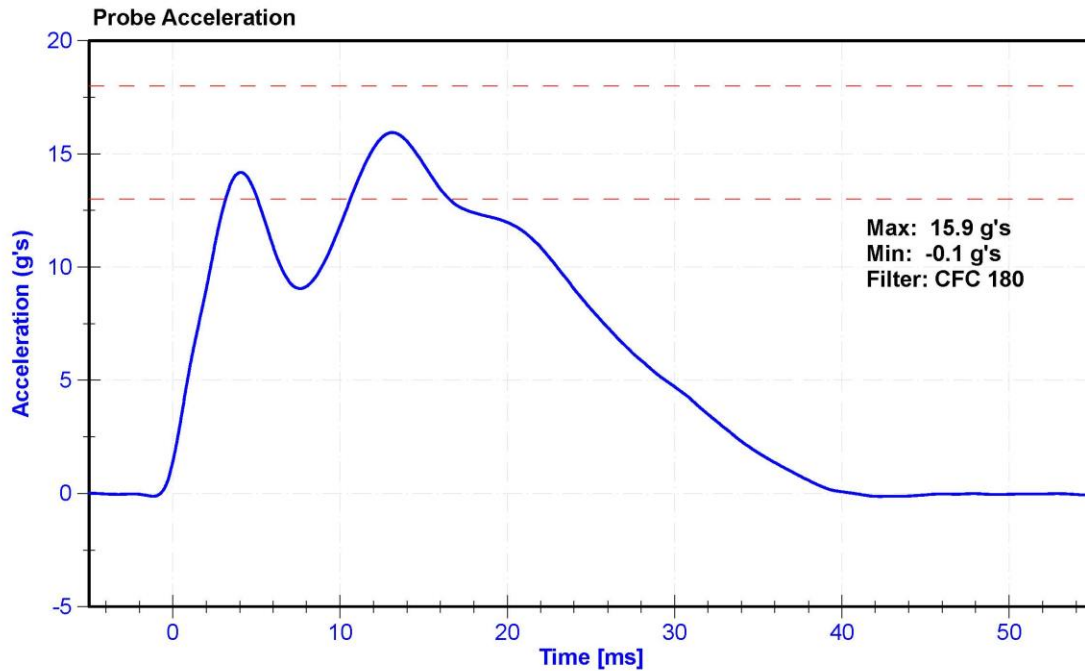
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

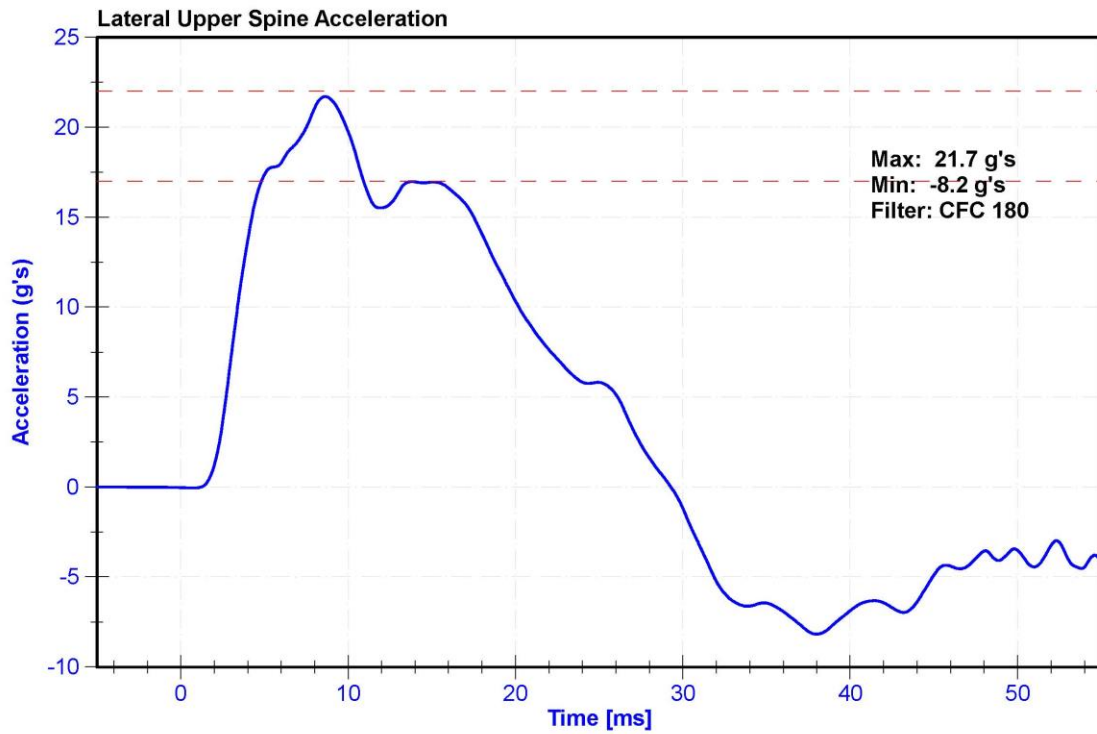
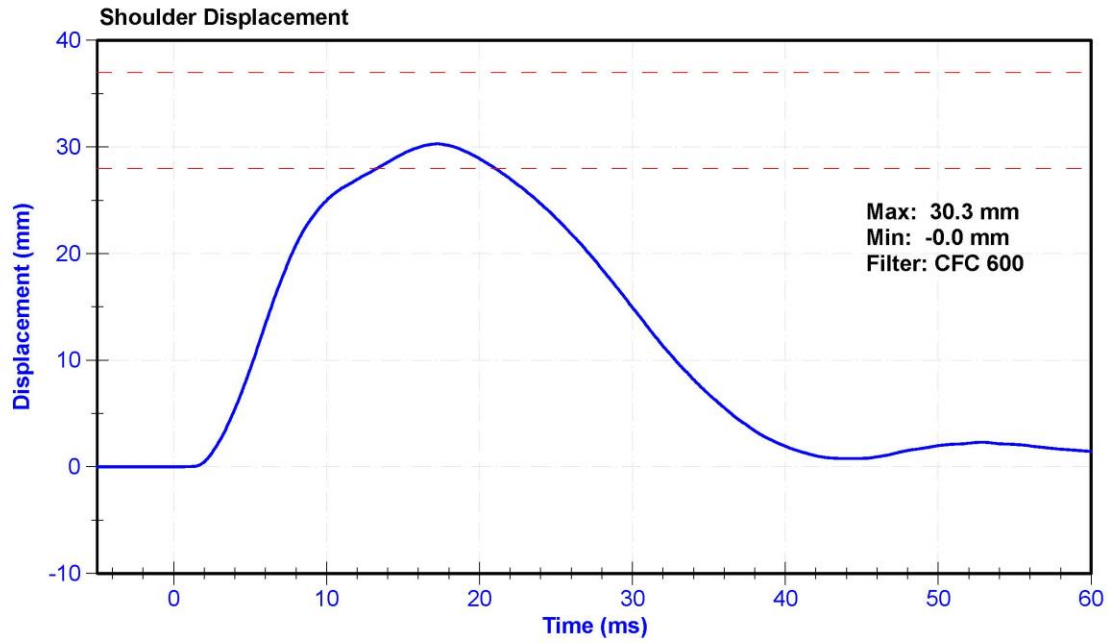
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	50	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	13	18	g's	15.9	Pass
Shoulder Deflection	28	37	mm	30.3	Pass
Lateral Upper Spine Acceleration	17	22	g's	21.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	10/28/2019	4/27/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	10/28/2019	4/27/2020





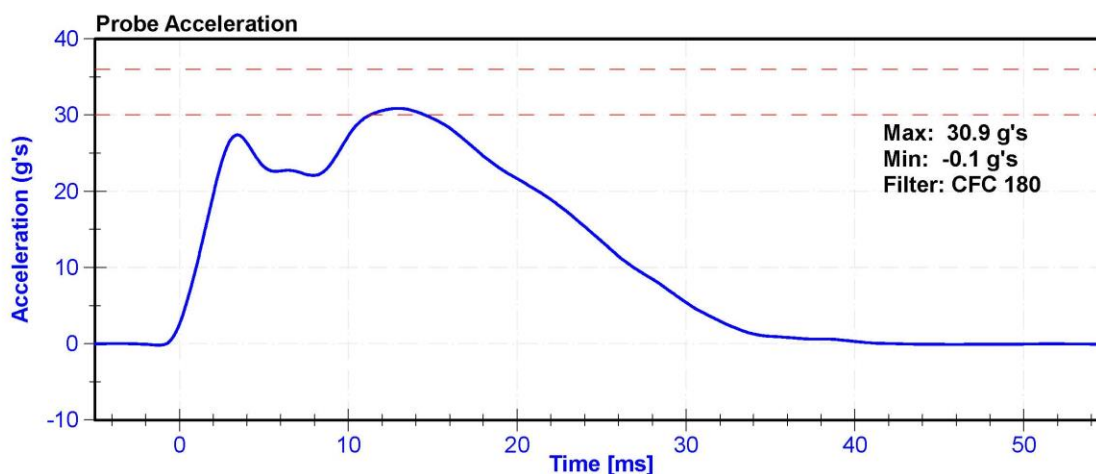
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ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

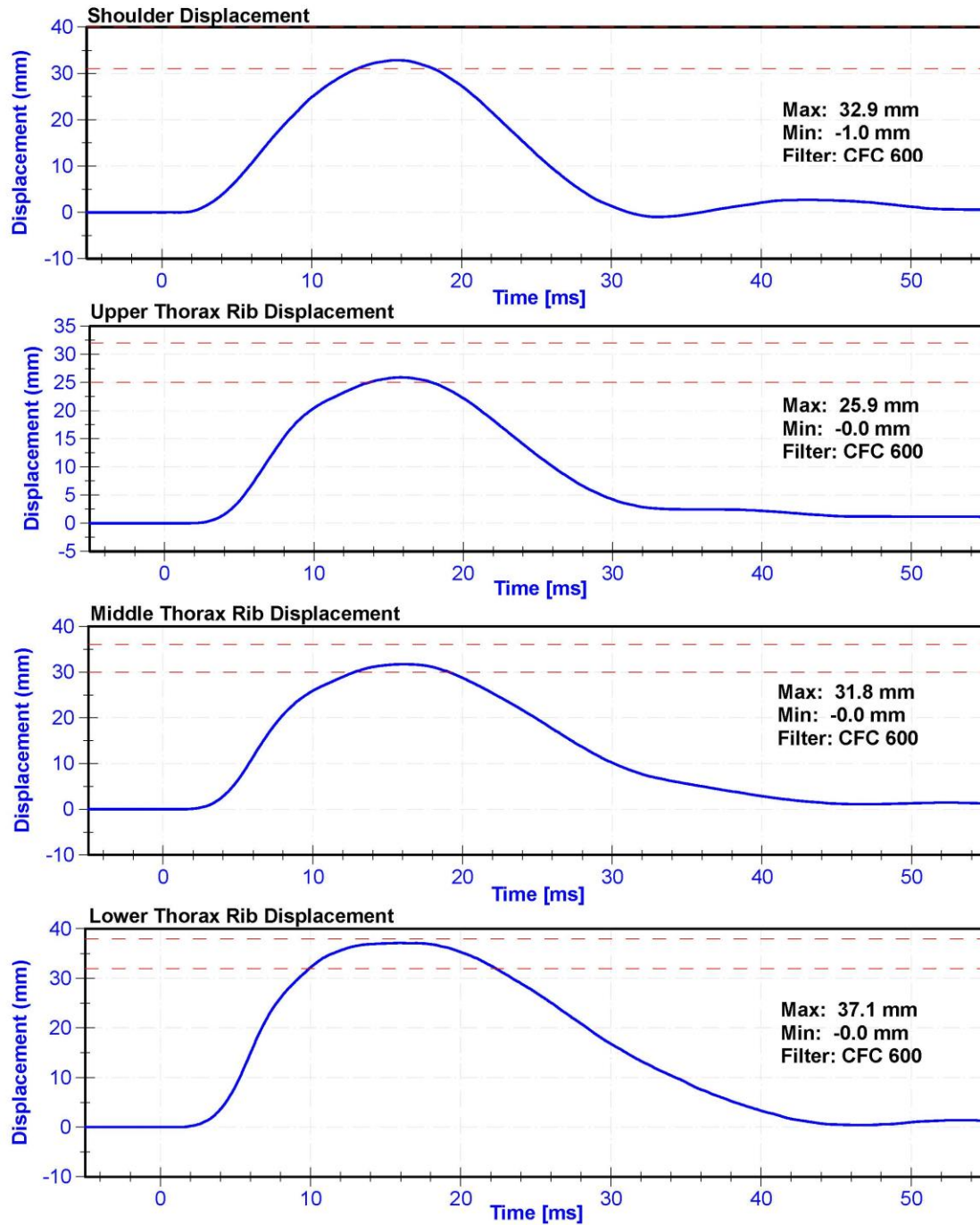
Results

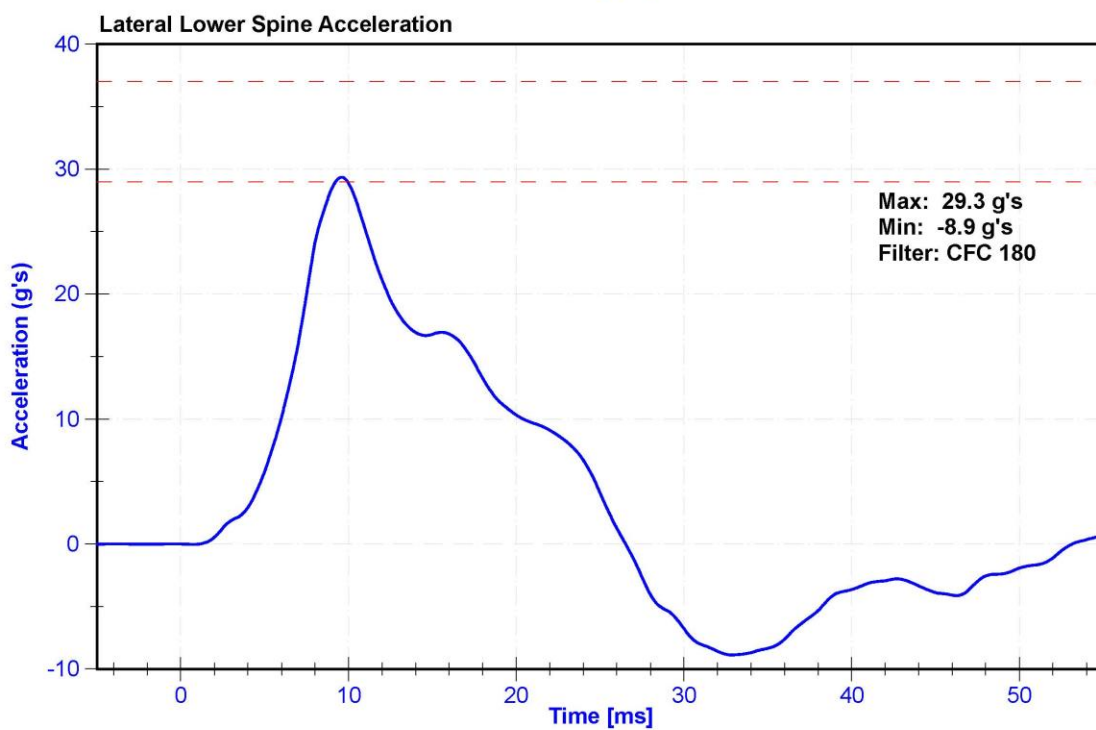
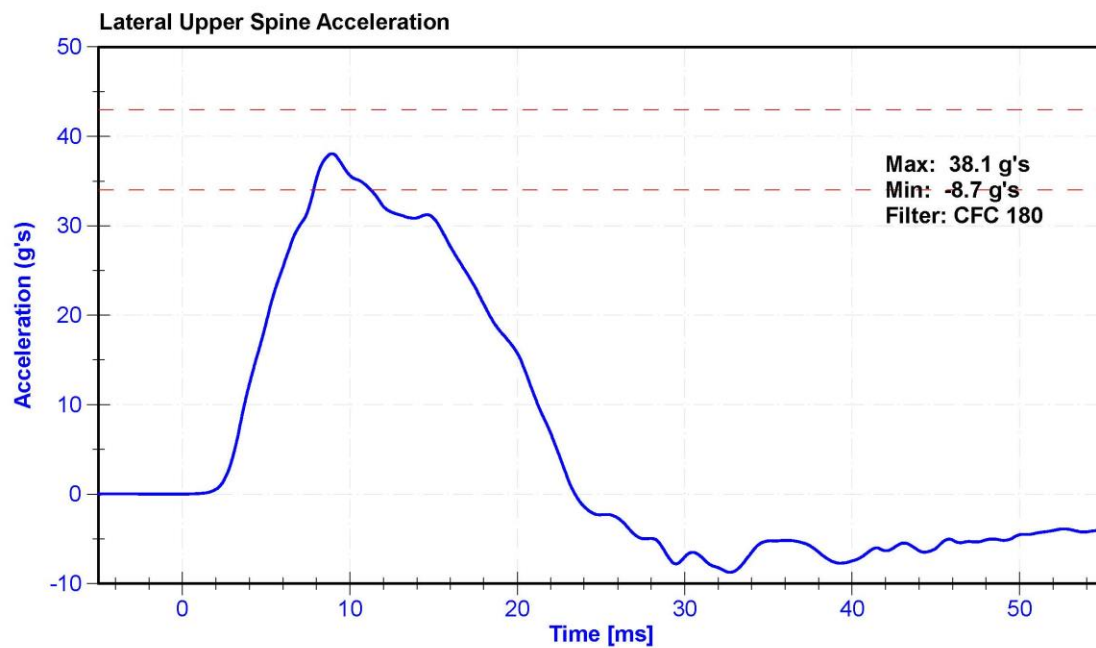
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	49.7	Pass
Velocity	6.6	6.8	m/s	6.71	Pass
Probe Acceleration after 5 ms	30	36	g's	30.9	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	29.3	Pass
Shoulder Deflection	31	40	mm	32.9	Pass
Upper Thorax Rib Deflection	25	32	mm	25.9	Pass
Mid Thorax Rib Deflection	30	36	mm	31.8	Pass
Lower Thorax Rib Deflection	32	38	mm	37.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P64148	10/28/2019	4/27/2020
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51327	9/30/2019	3/31/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	10/28/2019	4/27/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	10/28/2019	4/27/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	10/28/2019	4/27/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	10/28/2019	4/27/2020







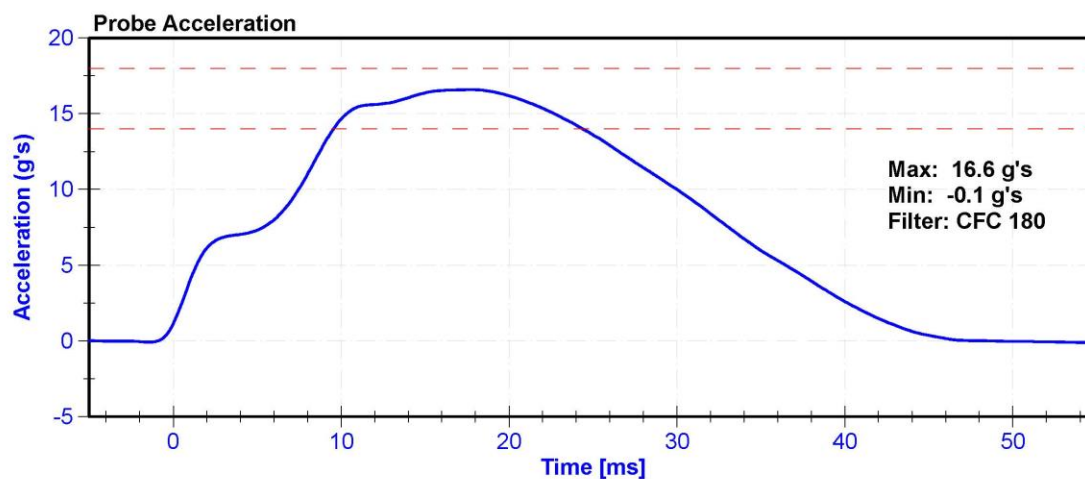
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

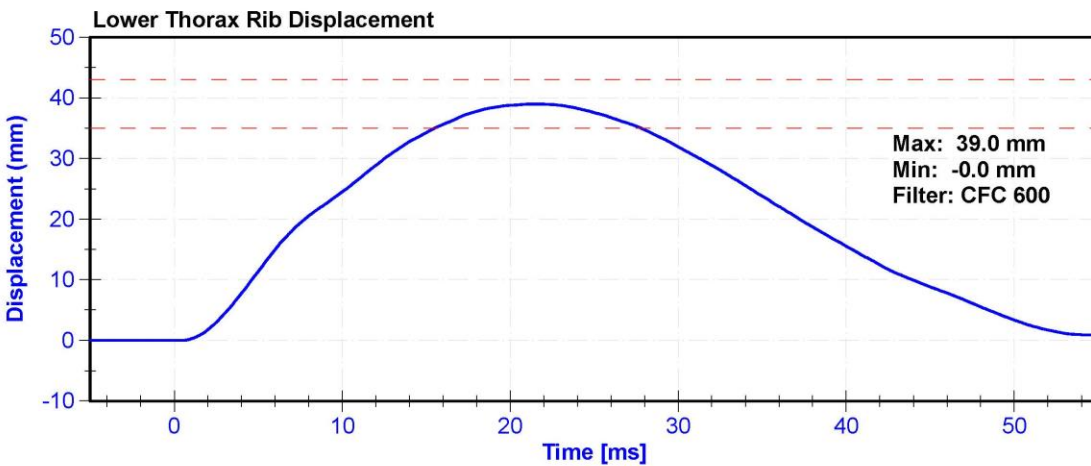
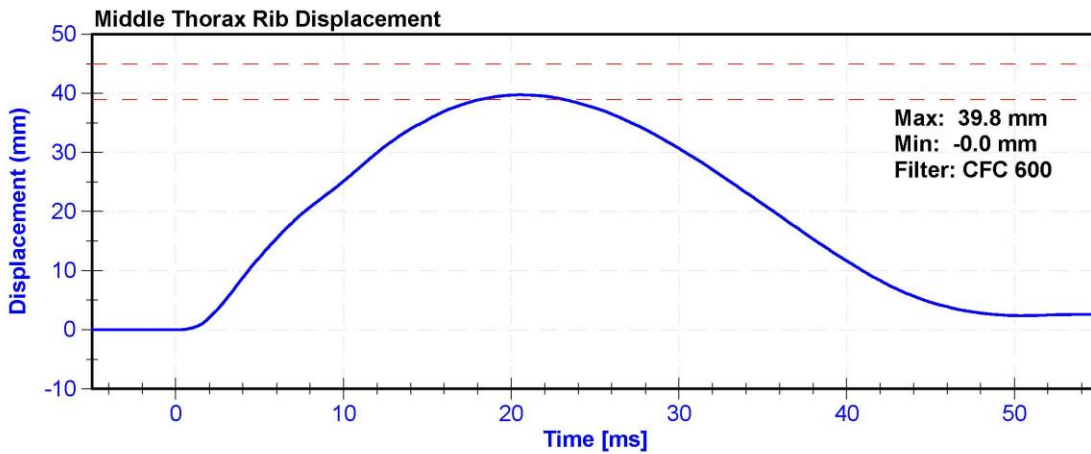
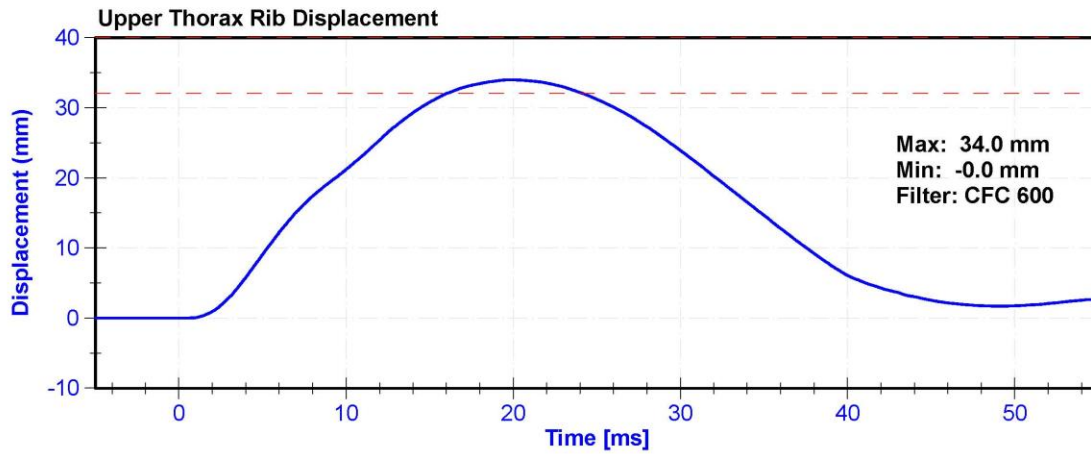
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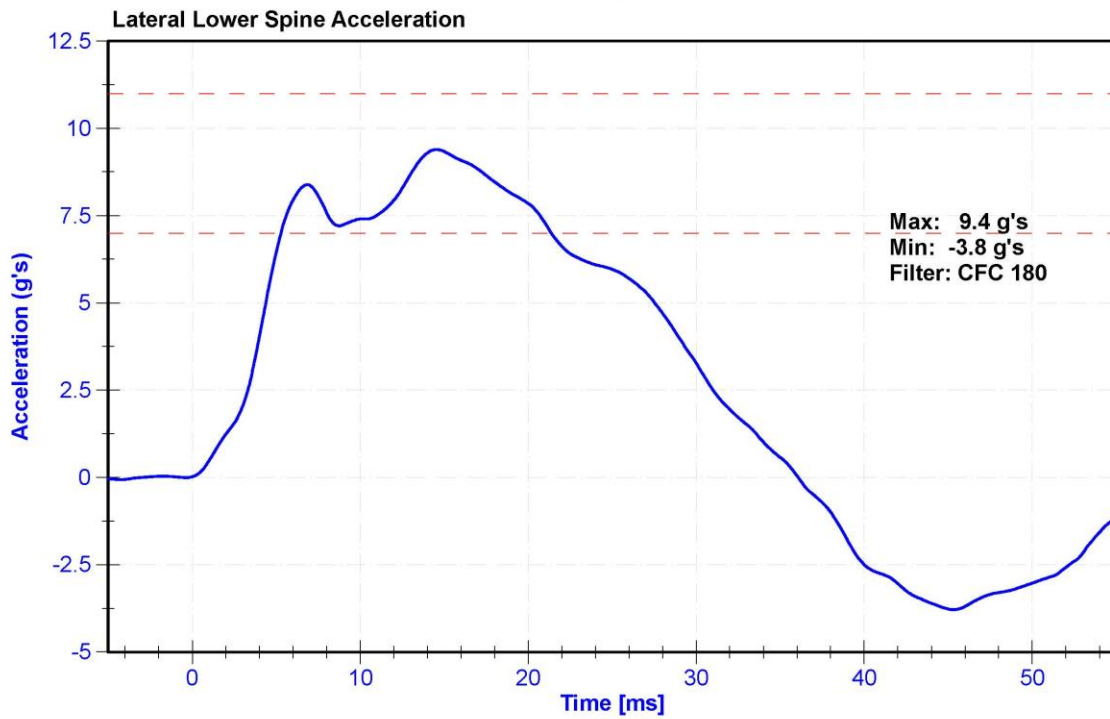
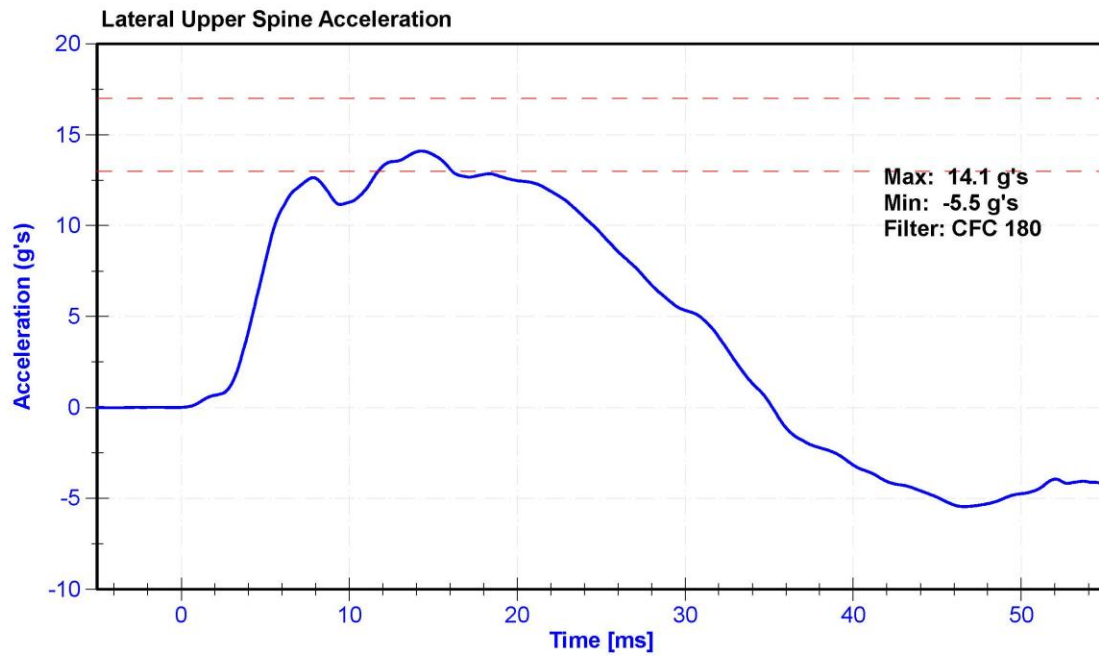
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	50.2	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	14	18	g's	16.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.1	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.4	Pass
Upper Thorax Rib Deflection	32	40	mm	34.0	Pass
Middle Thorax Rib Deflection	39	45	mm	39.8	Pass
Lower Thorax Rib Deflection	35	43	mm	39.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	10/28/2019	4/27/2020
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51327	9/30/2019	3/31/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	10/28/2019	4/27/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	10/28/2019	4/27/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	10/28/2019	4/27/2020







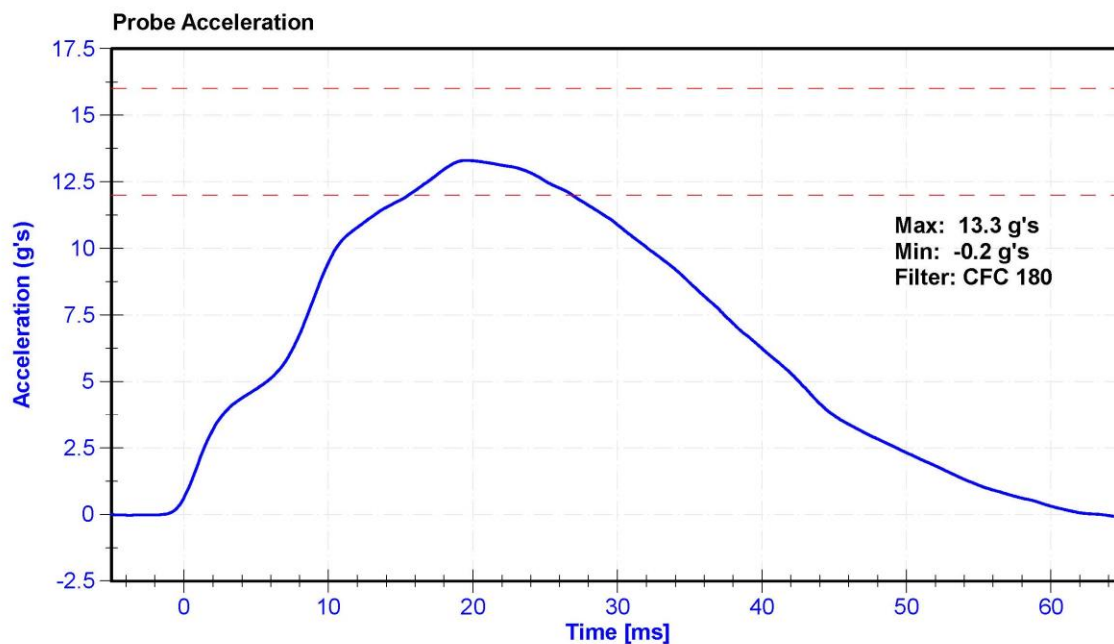
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

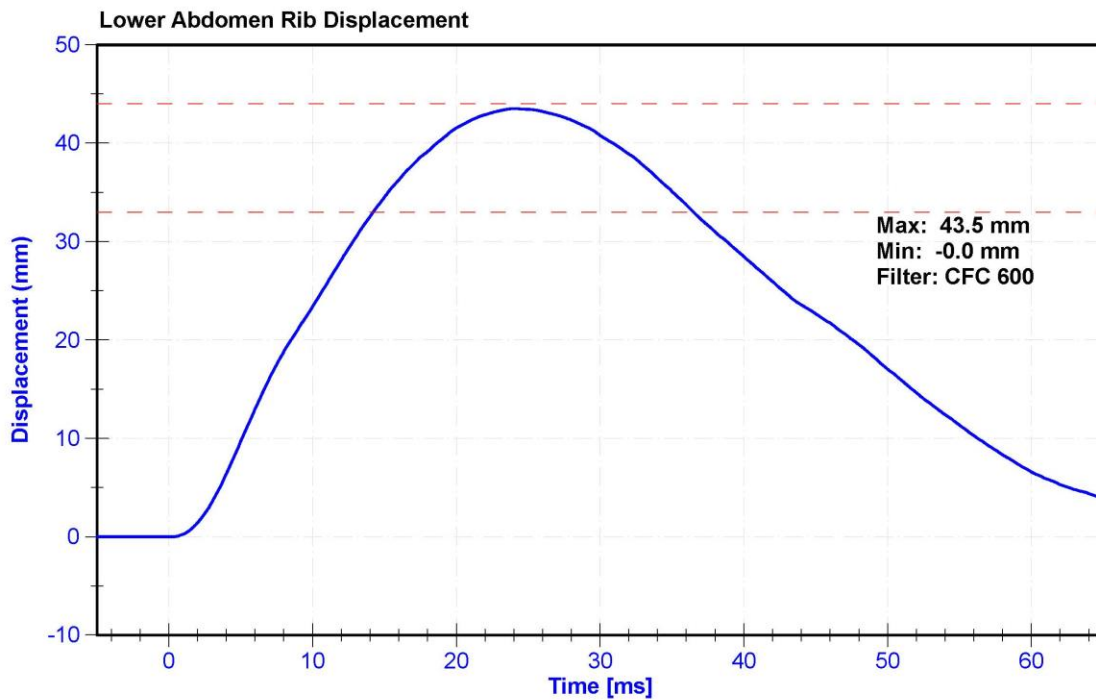
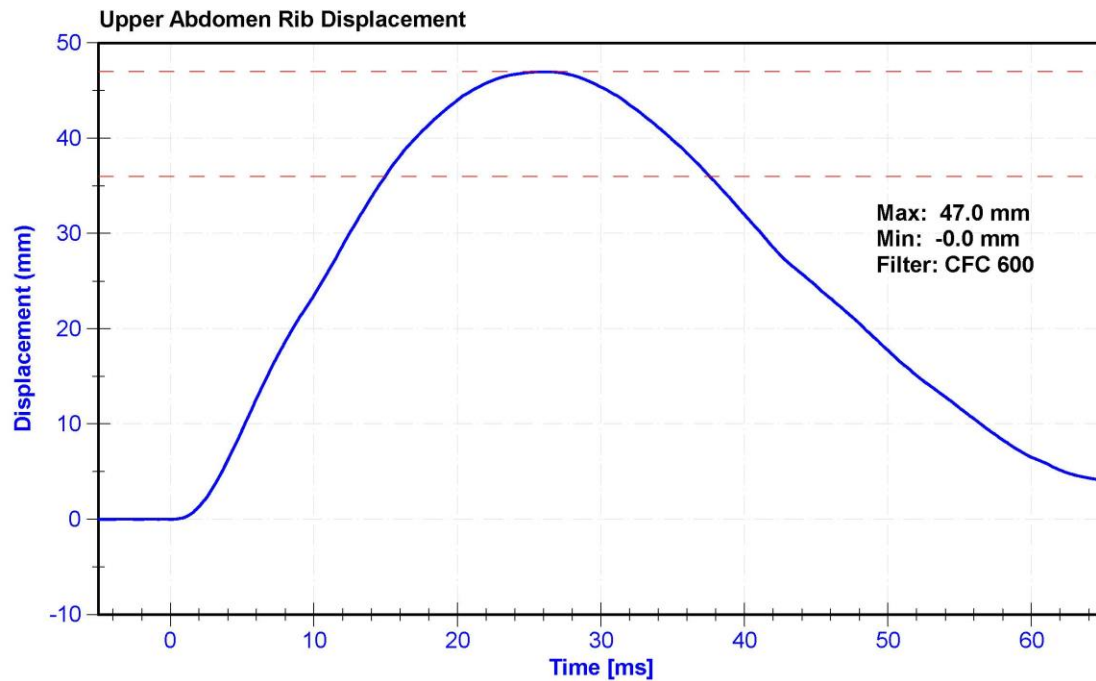
Results

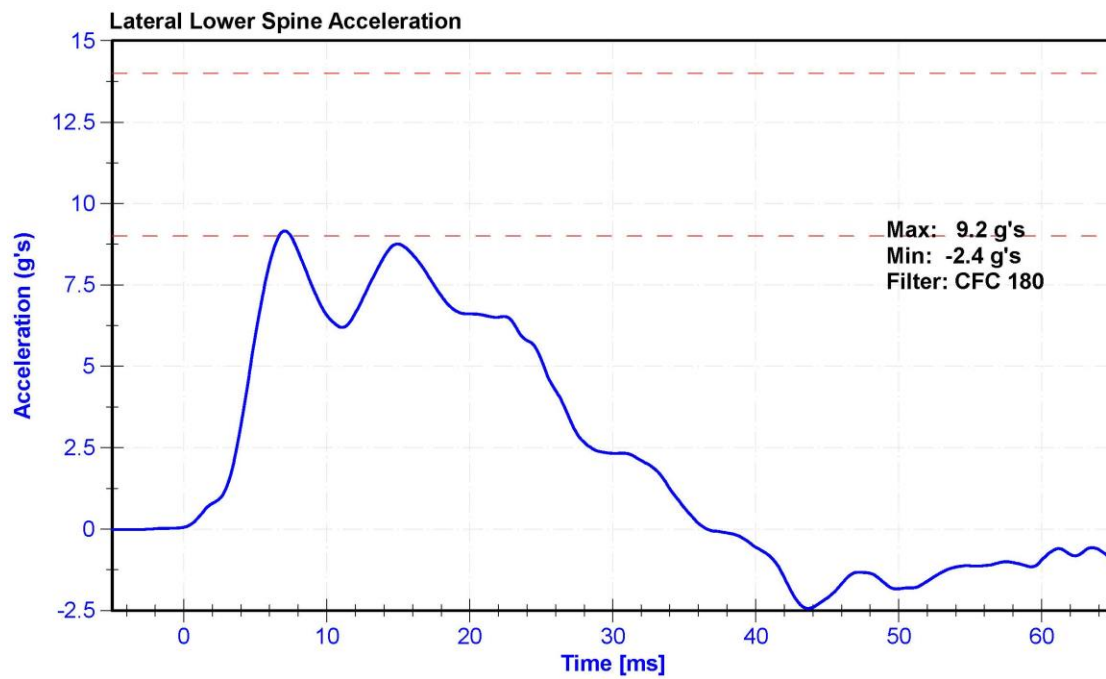
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	49.9	Pass
Velocity	4.2	4.4	m/s	4.23	Pass
Probe Acceleration	12	16	g's	13.3	Pass
Lateral Lower Spine Acceleration	9	14	g's	9.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	47.0	Pass
Lower Abdomen Rib Deflection	33	44	mm	43.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51327	9/30/2019	3/31/2020
Upper Abdomen Rib Potentiometer	Servo 08TC1-3725	DS-008GFE	10/28/2019	4/27/2020
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	10/28/2019	4/27/2020







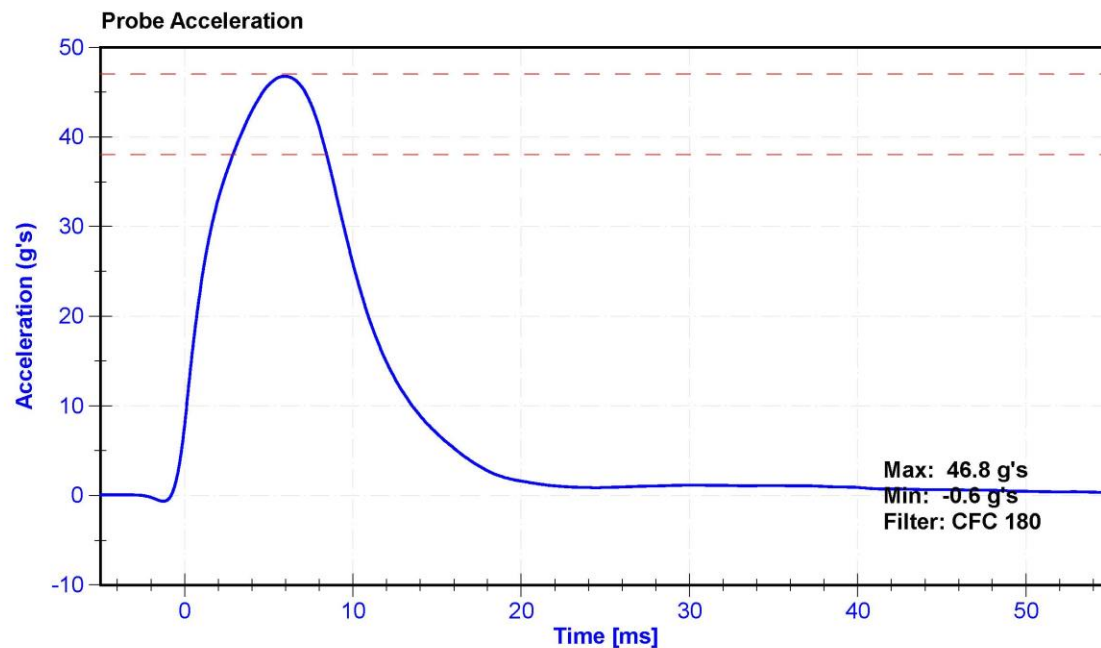
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

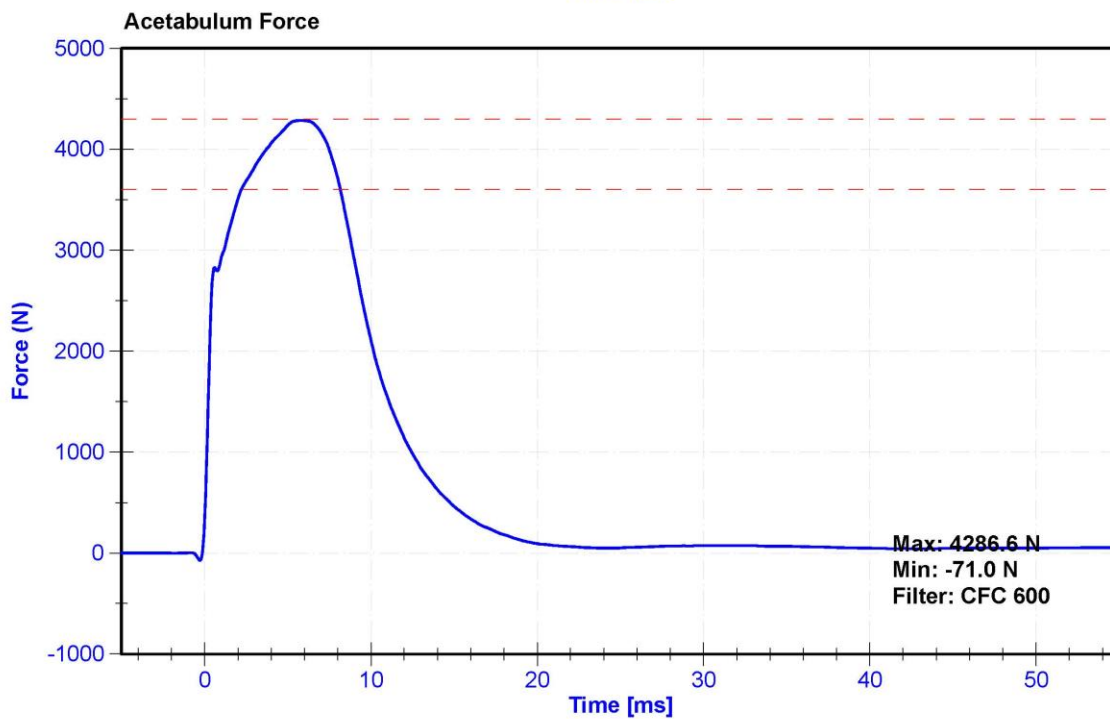
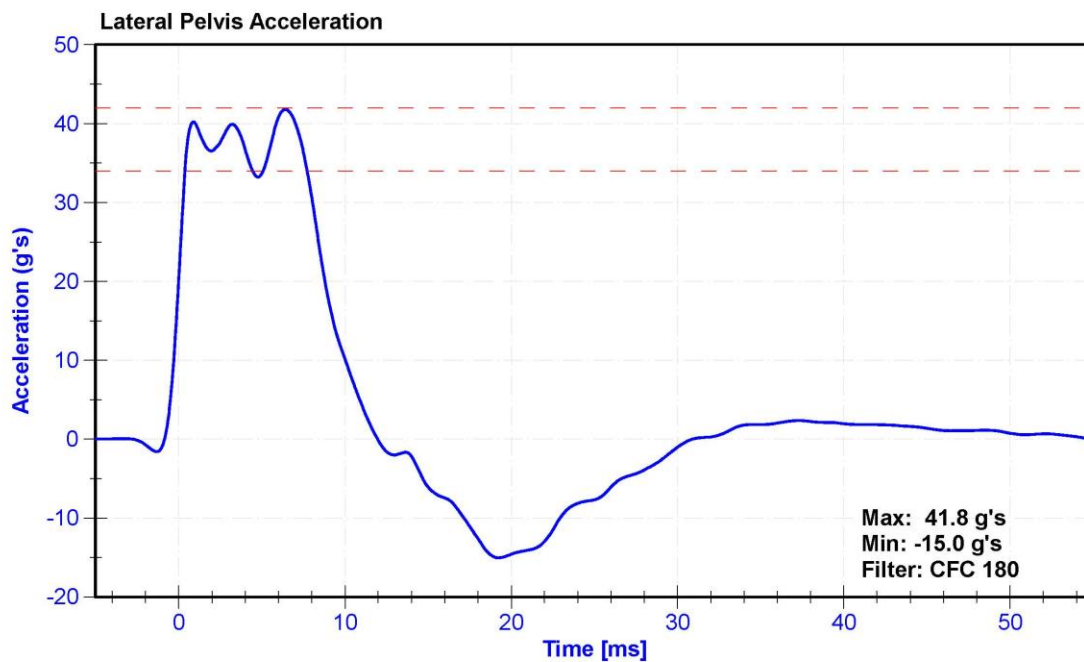
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	54.5	Pass
Velocity	6.6	6.8	m/s	6.64	Pass
Probe Acceleration	38	47	g's	46.8	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.8	Pass
Acetabulum Force	3600	4300	N	4286.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/28/2019	4/27/2020
Acetabulum Load Cell	Denton 3249J	LC-4986Fy	6/14/2019	6/13/2020
Certification Plug	Humanetics	12392	3/23/2018	N/A
Crash Test Plug	Humanetics	12519	10/2/2018	N/A







DG8012
10/31/2019

Crash

SID-Ils Pelvis Plug Certification Test

Plug S/N 12519

Test Number 7446

Report Number 7460

Test Date 10/2/2018 8:24:49 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	347.35	600.00
Force @ 1.5 mm (N)	1,208.16	1,400.00
Force @ 2.5 mm (N)	1,468.26	1,618.00
Force @ 3.0 mm (N)	1,519.63	1,673.00

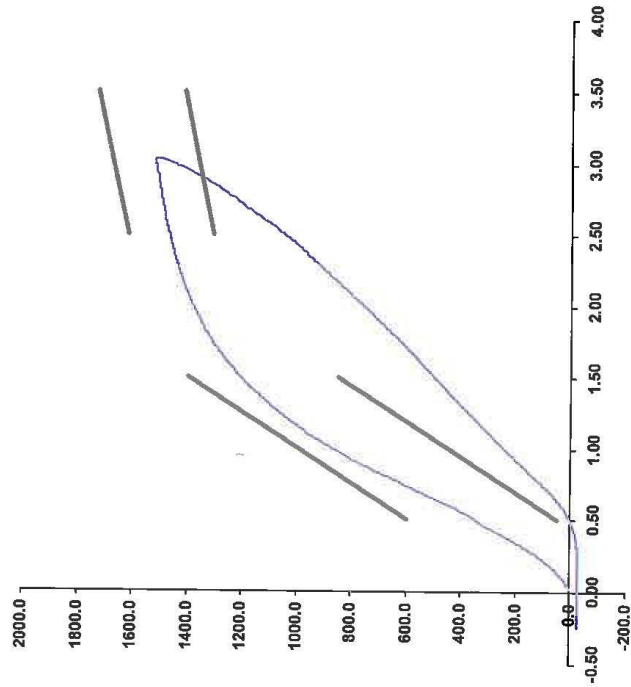
Testing Machine STM-20 5965542

Load Cell S/N (F1380947), Units (LBS) 1000

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

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 02-Oct-18

SACO Research

By : DC Date : 10/2/18

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-594-2082 FAX

SID-Ils Pelvis Plug Certification Test

Plug S/N 12392

Test Number 6780

Report Number 6795

Test Date 3/23/2018 10:15:06 AM

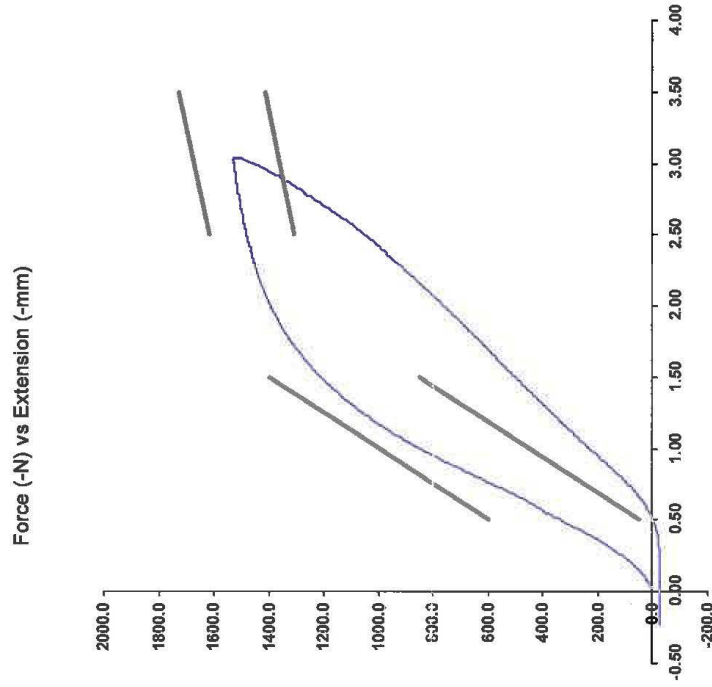
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

Testing Machine STM-20 5965542

Load Cell S/N (F1360947), Units (LBS) 1000

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

Notes:



Operator	Part Number 180-4450
Template No 107 23-Mar-18 SACO Research	

By: *DC* Date: 3/23/18

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

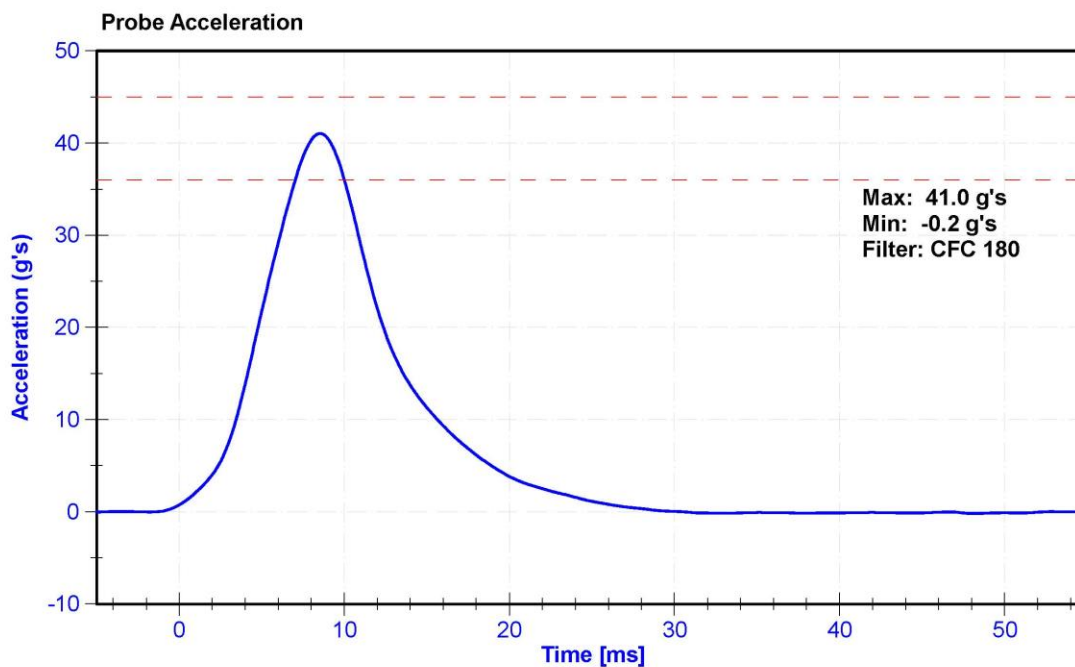
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K.Brogan

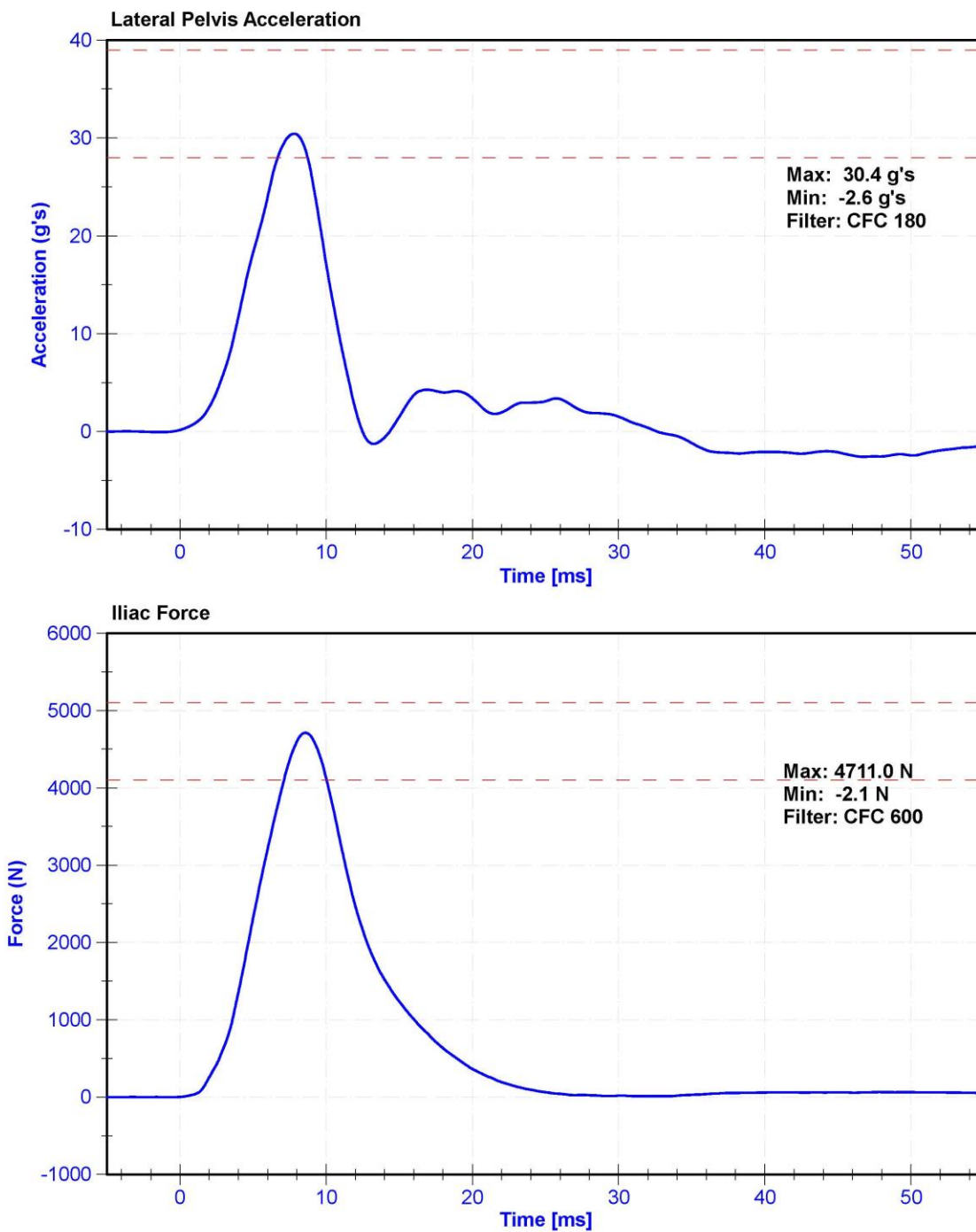
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	49.1	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	36	45	g's	41.0	Pass
Lateral Pelvis Acceleration	28	39	g's	30.4	Pass
Iliac Force	4100	5100	N	4711.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/28/2019	4/27/2020
Iliac Load Cell	DENTON 3228J	LC-290Fy	9/25/2019	9/24/2020





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

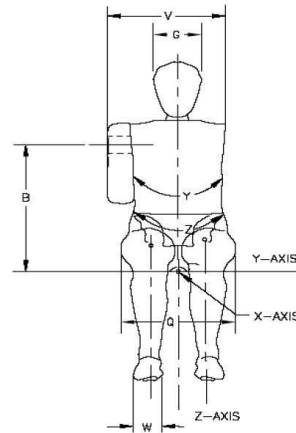
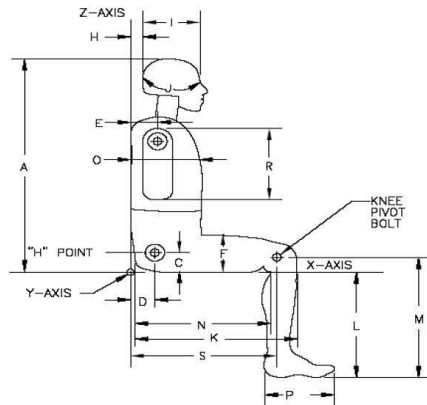


External Measurements - SID-IIs

Technician: K. Dutton

Date: 11/04/2019

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	44	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	355	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	433	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	223	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	345	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	867	Pass
Z	Waist Circumference	761	791	781	Pass

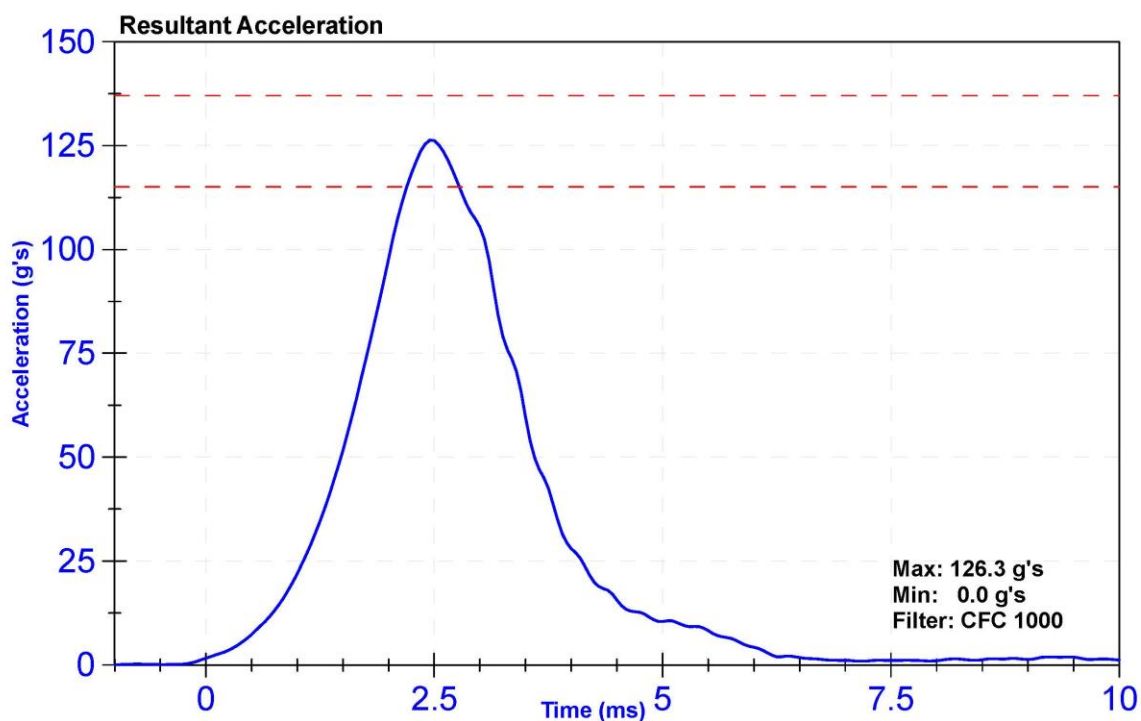
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

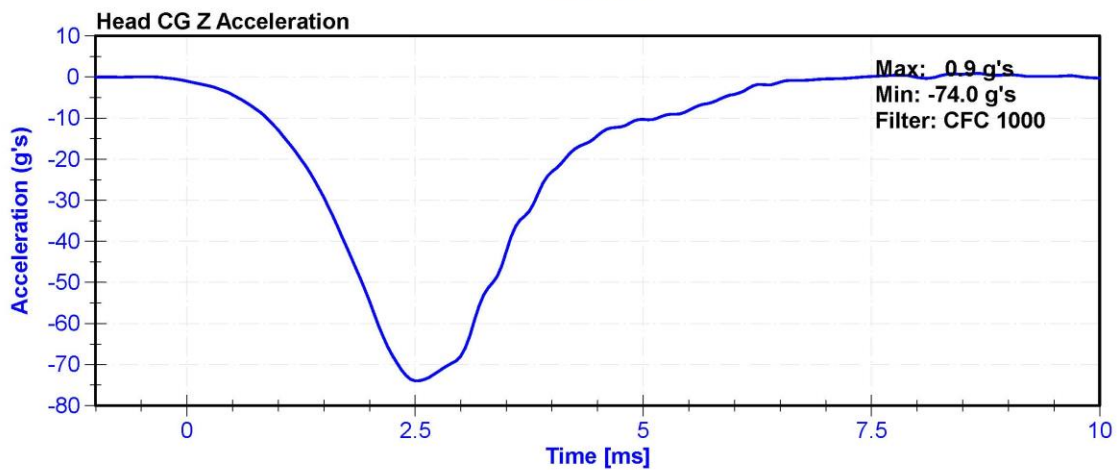
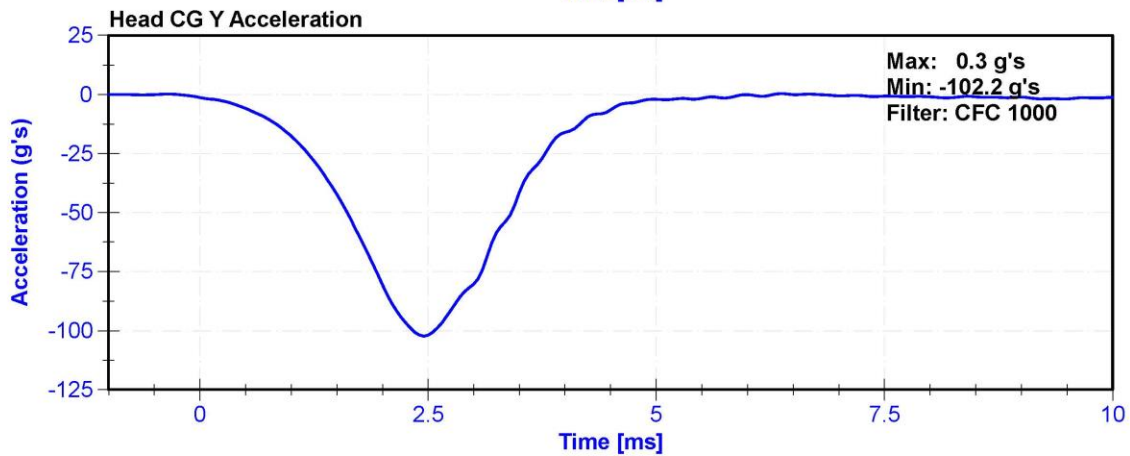
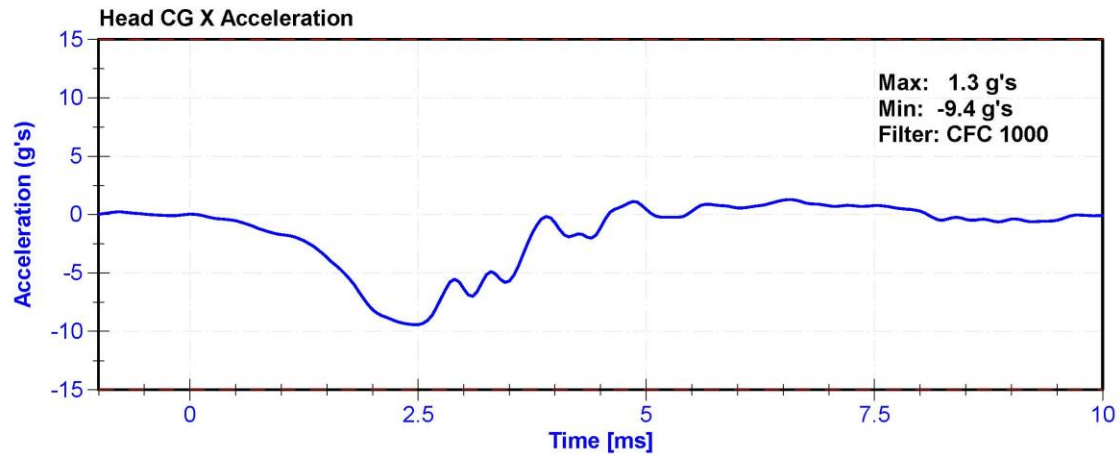
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	29.1	Pass
Resultant Acceleration	115	137	g's	126.3	Pass
Oscillation	0	15	%	8.4	Pass
Fore-Aft Acceleration	-15	15	g's	-9.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P74788	10/28/2019	4/28/2020
Y Accelerometer	Endevco	P83432	10/28/2019	4/28/2020
Z Accelerometer	Endevco	P83319	10/28/2019	4/28/2020





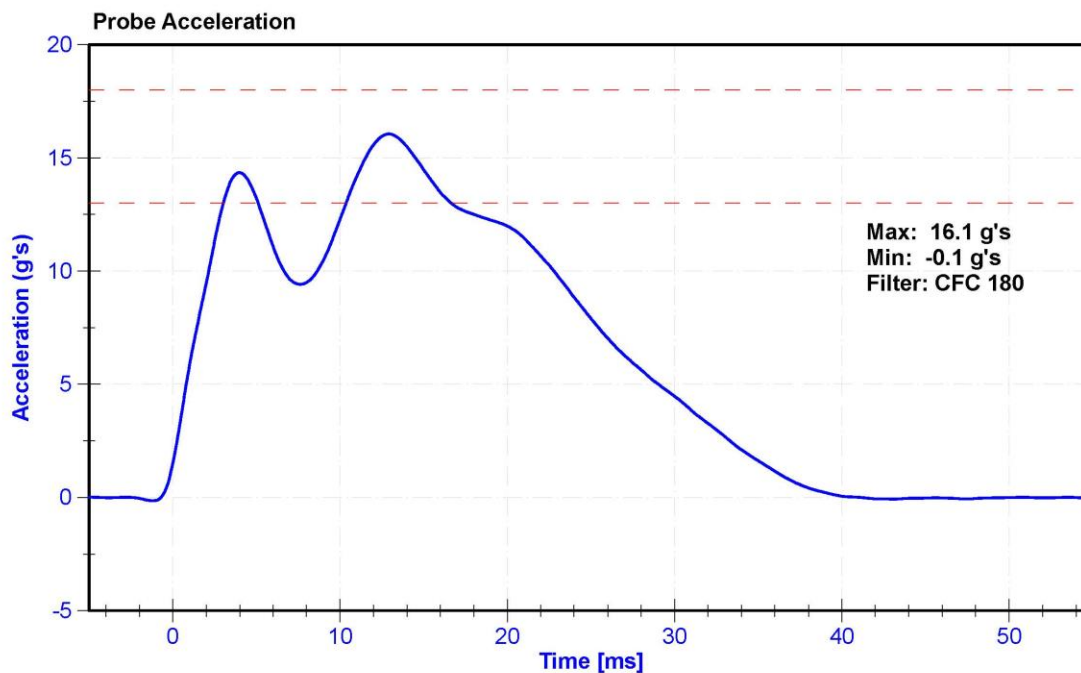
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

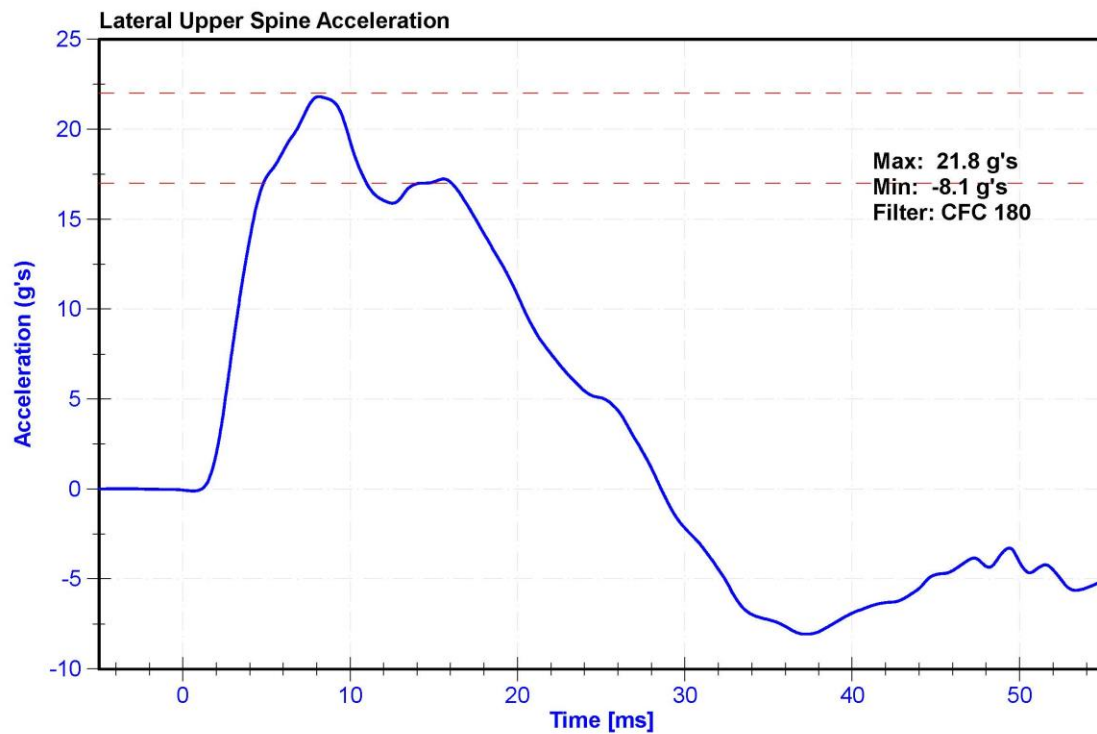
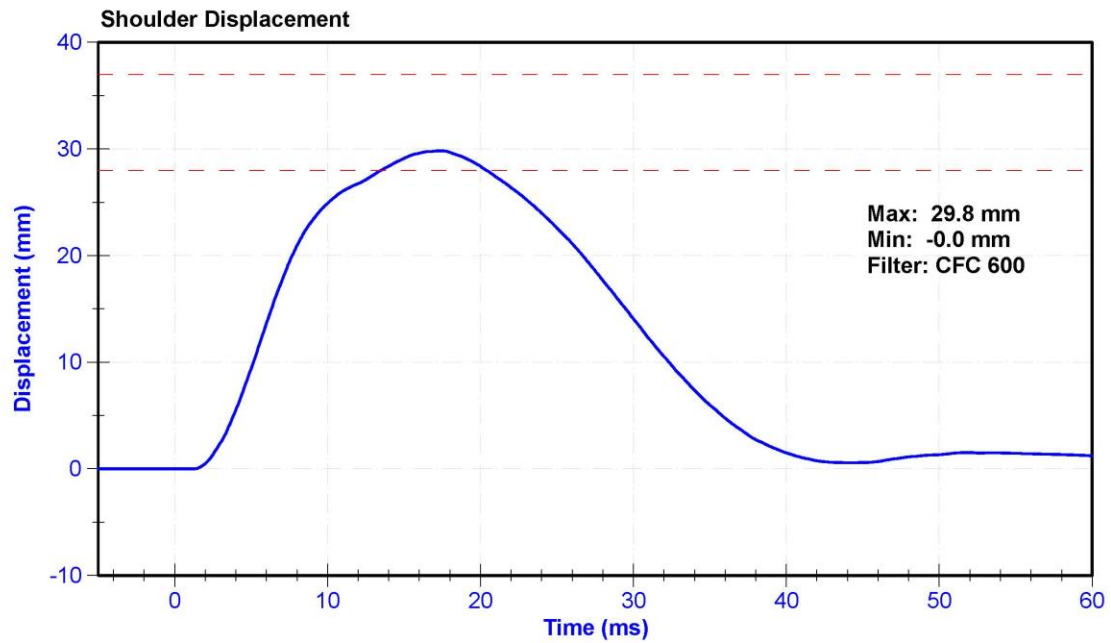
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	40.8	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	13	18	g's	16.1	Pass
Shoulder Deflection	28	37	mm	29.8	Pass
Lateral Upper Spine Acceleration	17	22	g's	21.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	10/28/2019	4/27/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	10/28/2019	4/27/2020





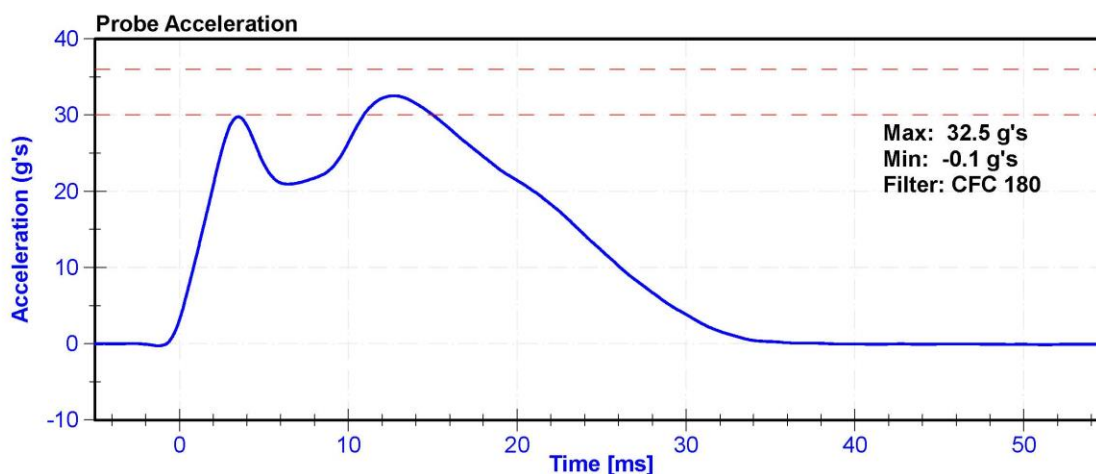
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

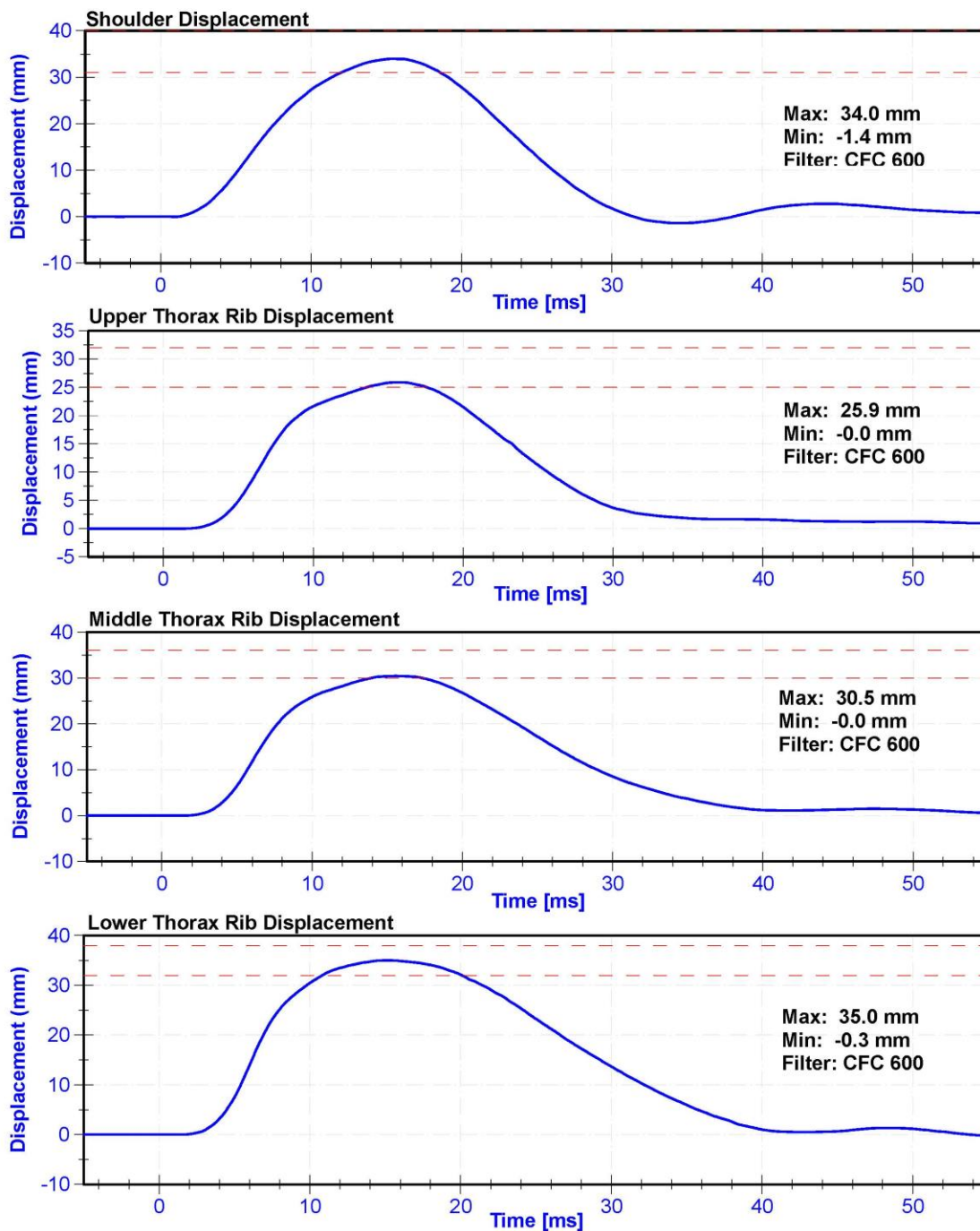
Results

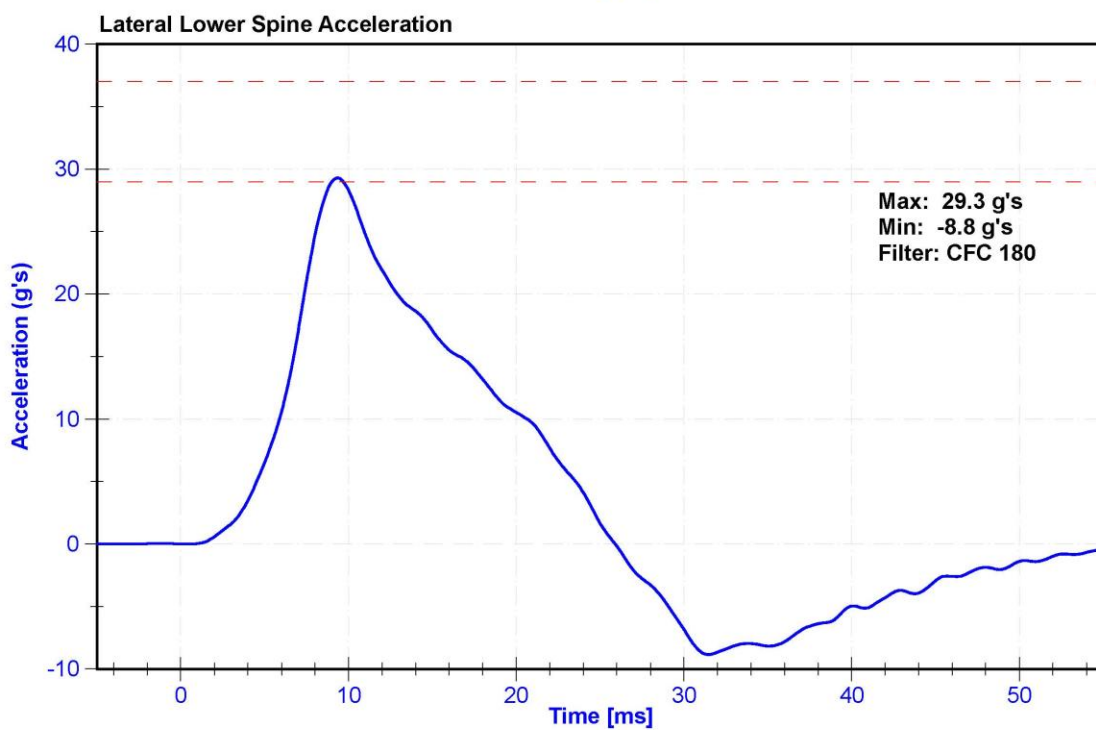
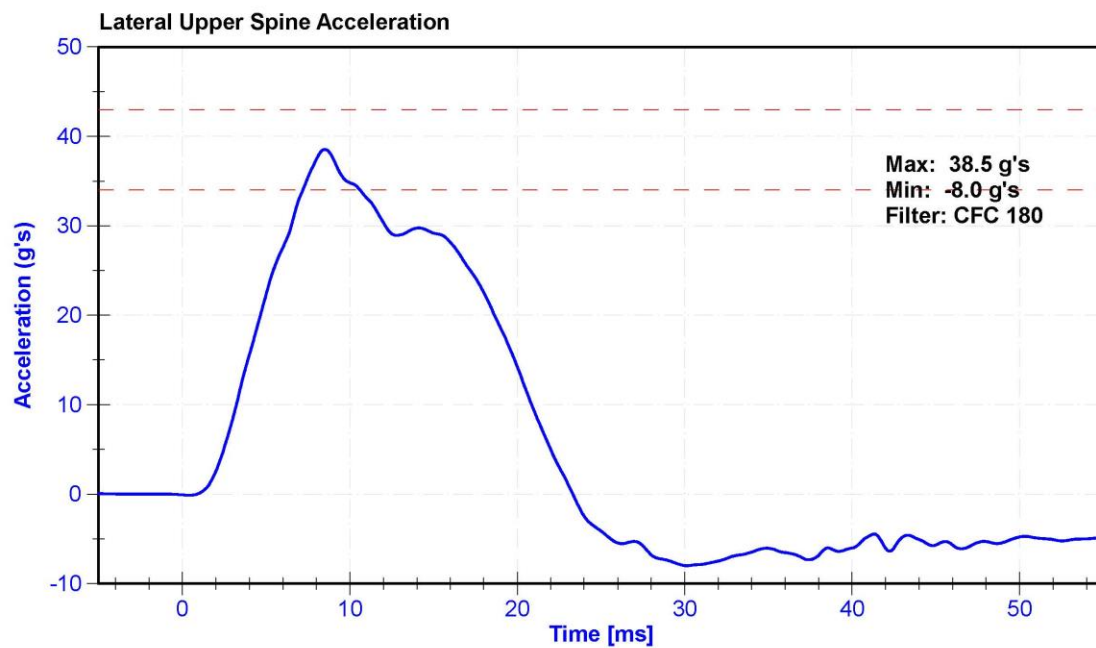
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	39.1	Pass
Velocity	6.6	6.8	m/s	6.73	Pass
Probe Acceleration after 5 ms	30	36	g's	32.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	29.3	Pass
Shoulder Deflection	31	40	mm	34.0	Pass
Upper Thorax Rib Deflection	25	32	mm	25.9	Pass
Mid Thorax Rib Deflection	30	36	mm	30.5	Pass
Lower Thorax Rib Deflection	32	38	mm	35.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P64148	10/28/2019	4/27/2020
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51327	9/30/2019	3/31/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	10/28/2019	4/27/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	10/28/2019	4/27/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	10/28/2019	4/27/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	10/28/2019	4/27/2020







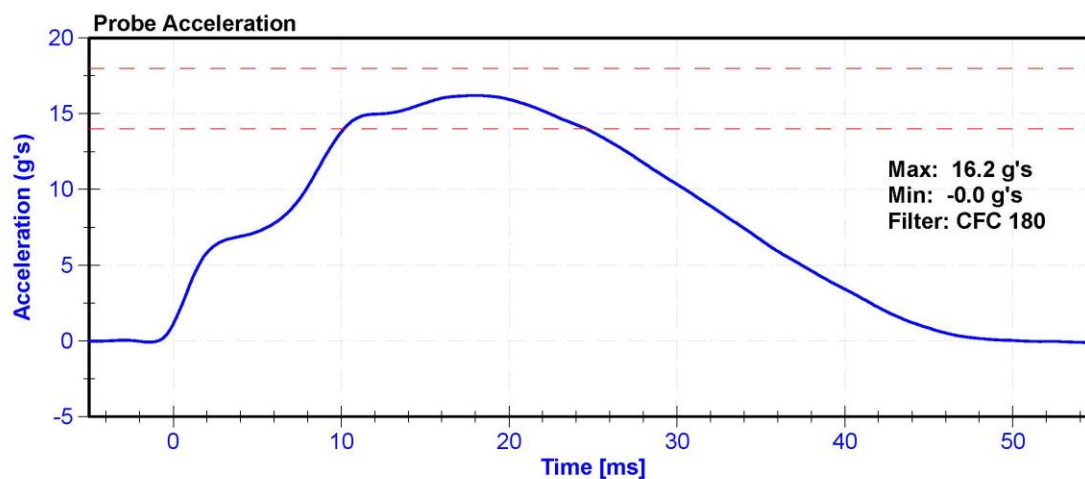
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

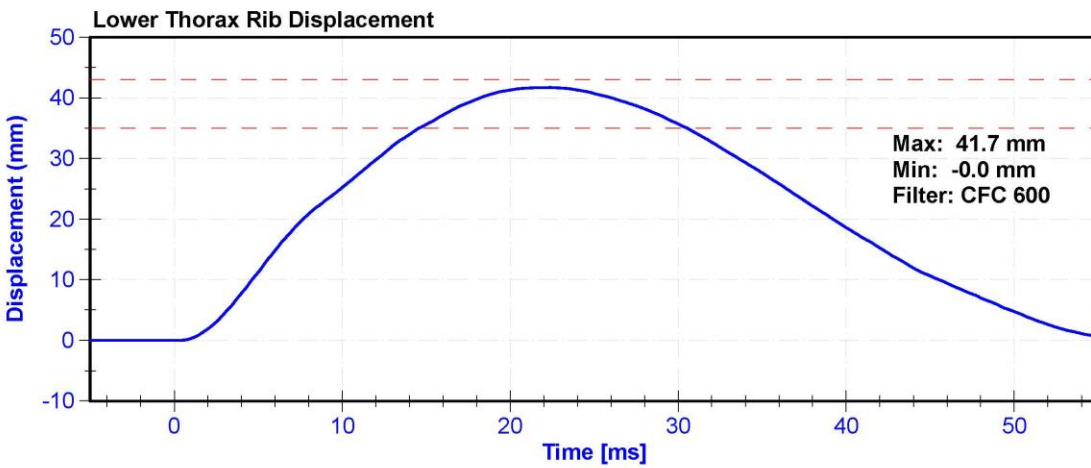
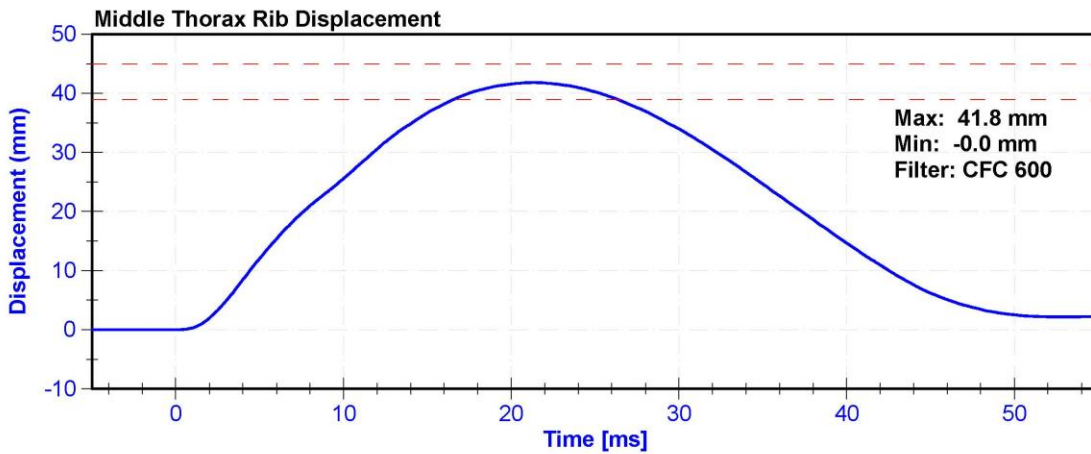
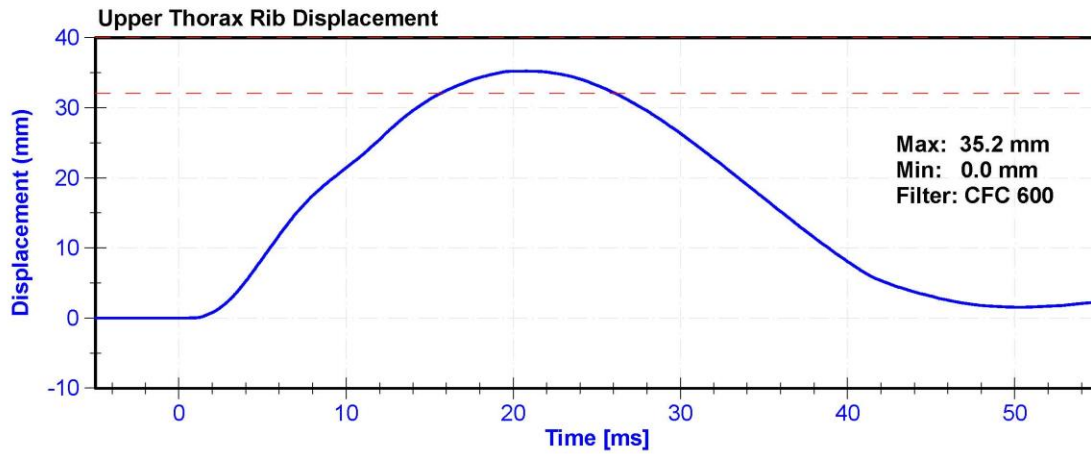
Results

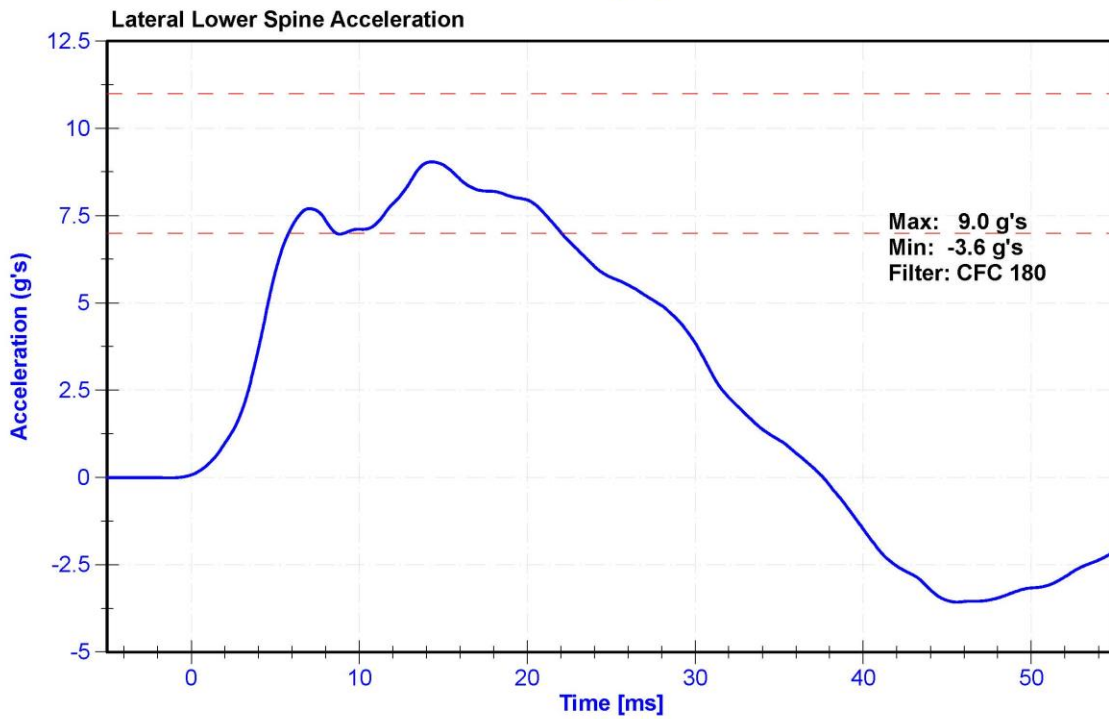
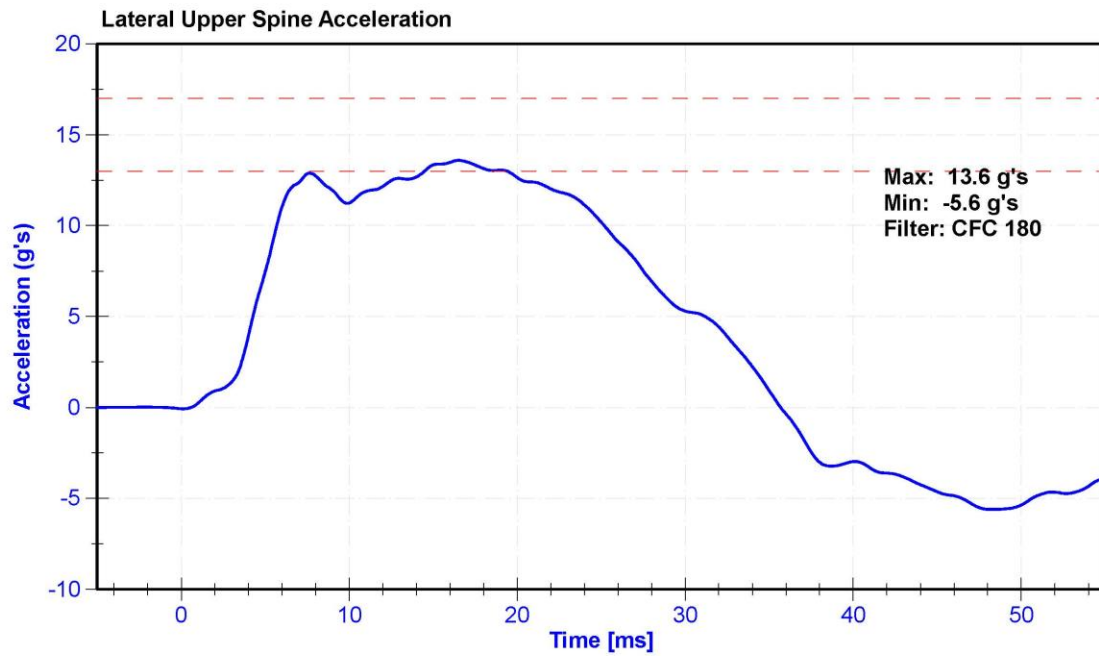
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	35.9	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	13.6	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.0	Pass
Upper Thorax Rib Deflection	32	40	mm	35.2	Pass
Middle Thorax Rib Deflection	39	45	mm	41.8	Pass
Lower Thorax Rib Deflection	35	43	mm	41.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	10/28/2019	4/27/2020
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51327	9/30/2019	3/31/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	10/28/2019	4/27/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	10/28/2019	4/27/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	10/28/2019	4/27/2020







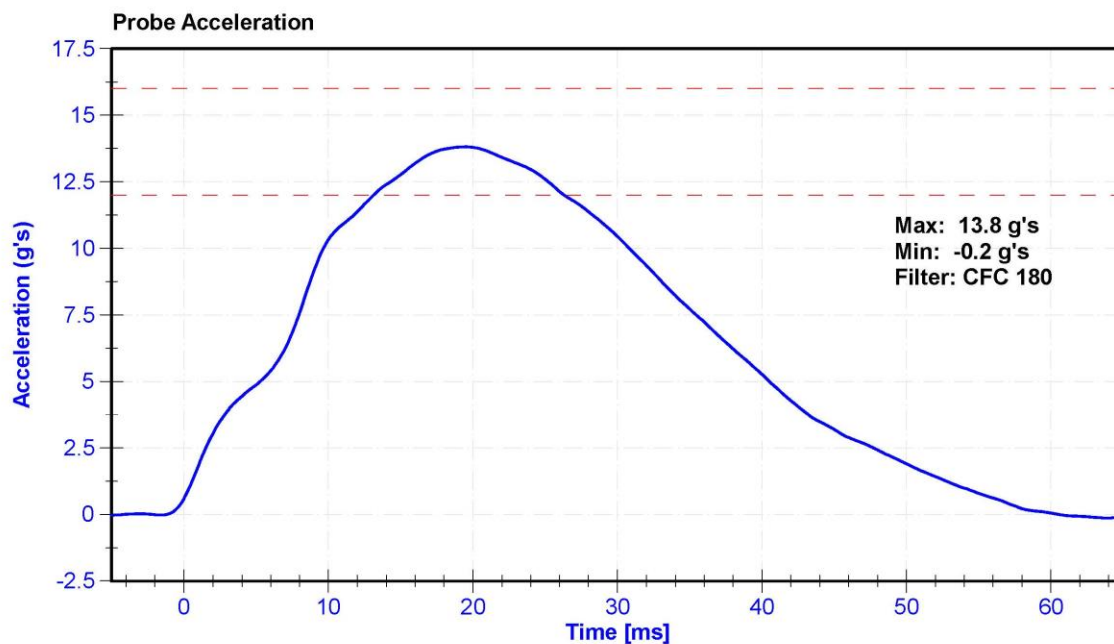
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

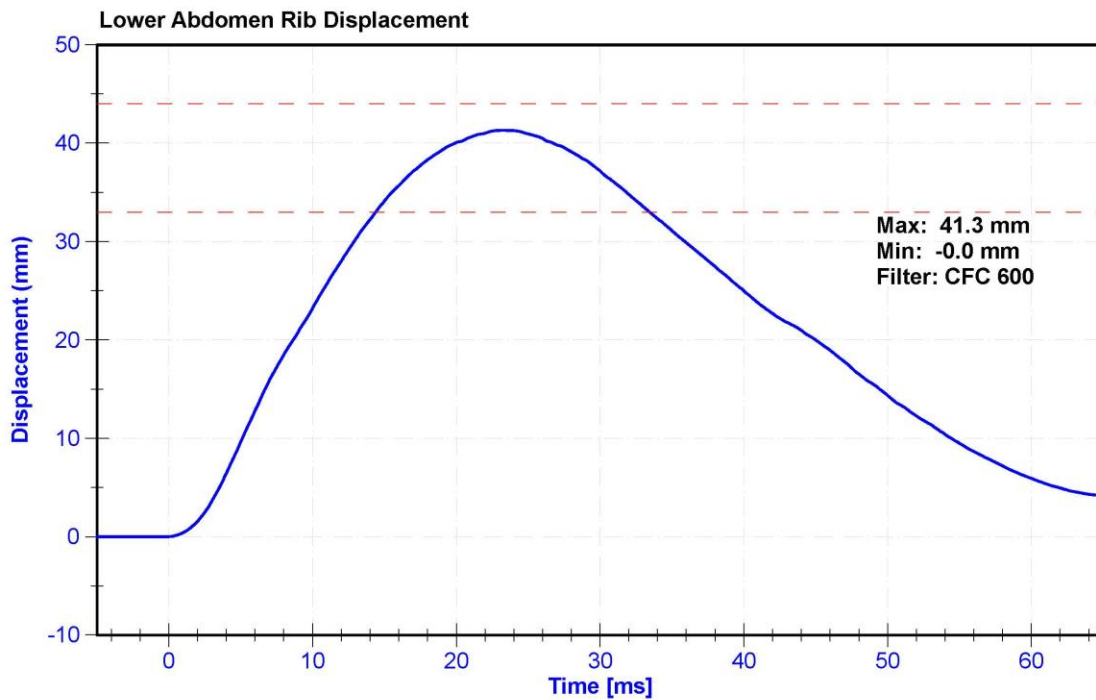
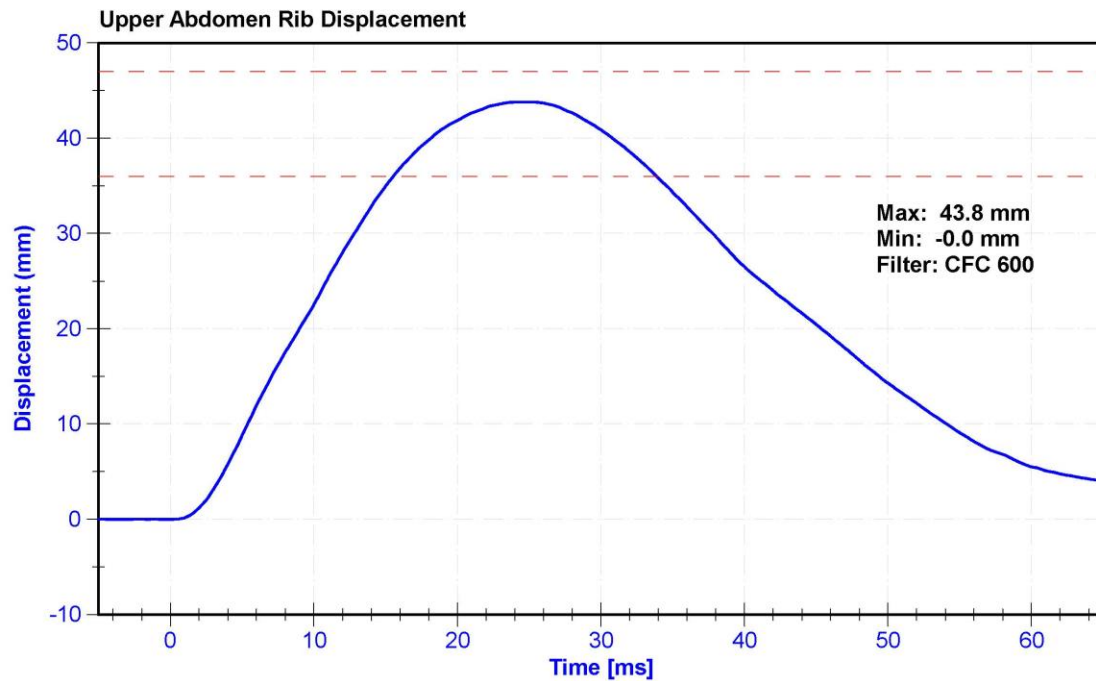
Results

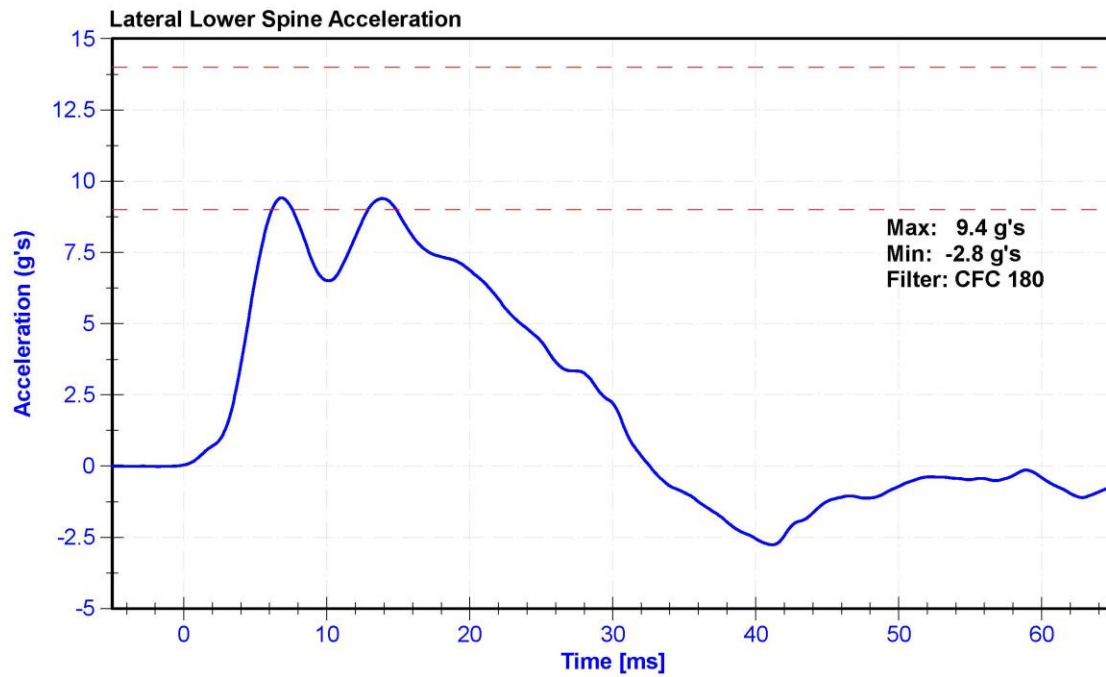
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	34.9	Pass
Velocity	4.2	4.4	m/s	4.20	Pass
Probe Acceleration	12	16	g's	13.8	Pass
Lateral Lower Spine Acceleration	9	14	g's	9.4	Pass
Upper Abdomen Rib Deflection	36	47	mm	43.8	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51327	9/30/2019	3/31/2020
Upper Abdomen Rib Potentiometer	Servo 08TC1-3725	DS-008GFE	10/28/2019	4/27/2020
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	10/28/2019	4/27/2020







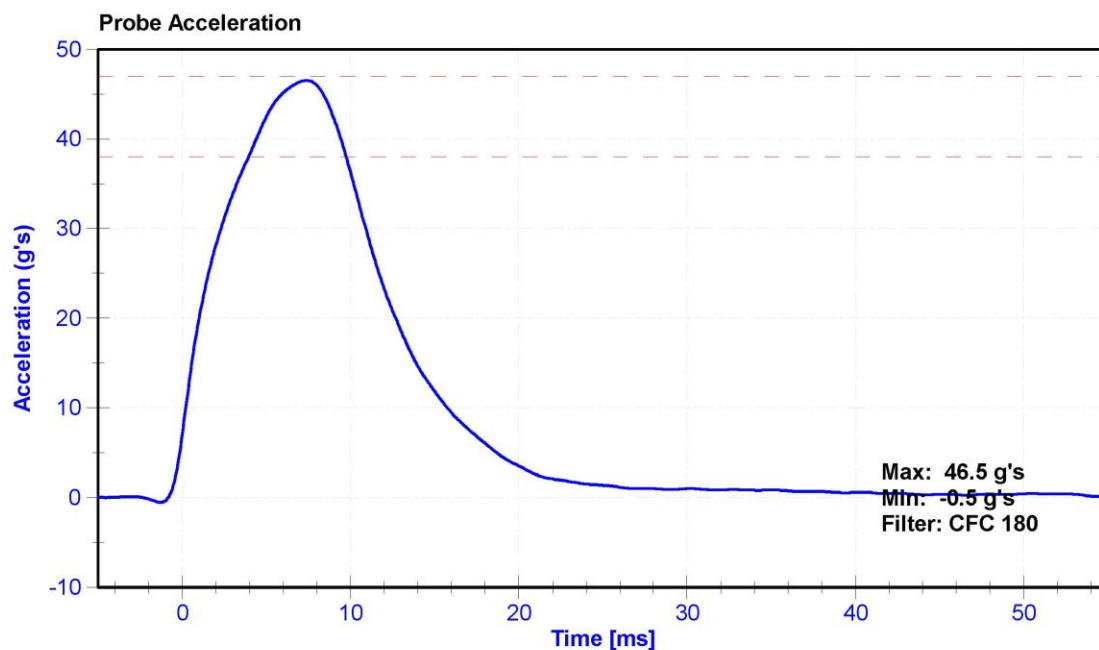
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

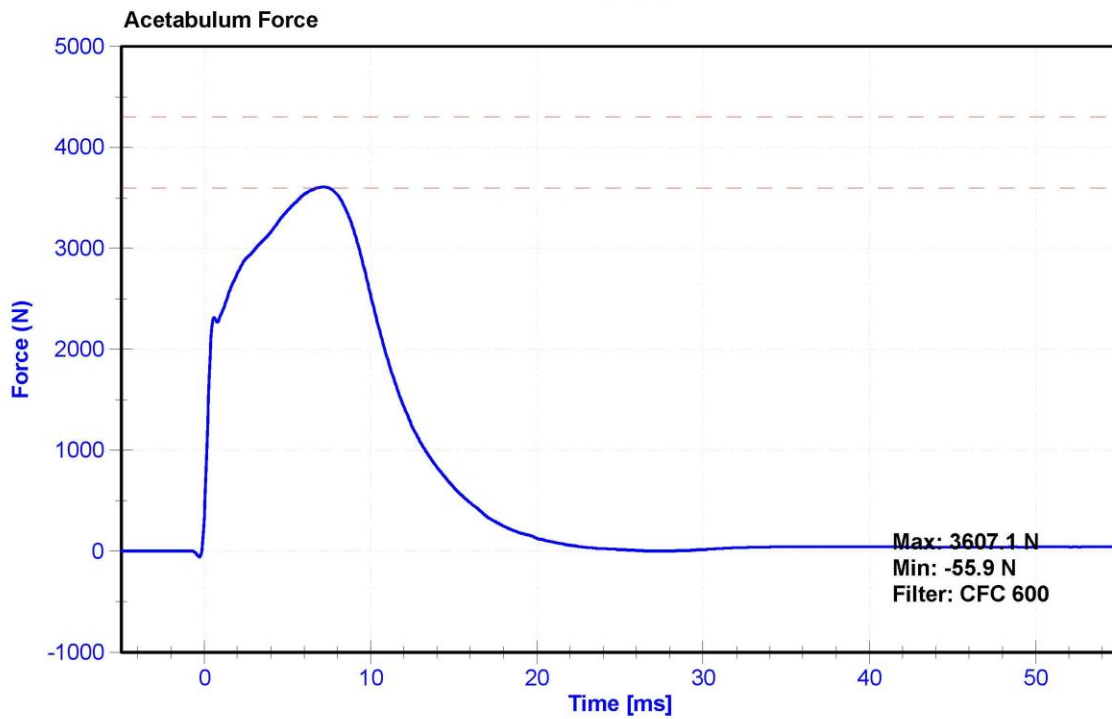
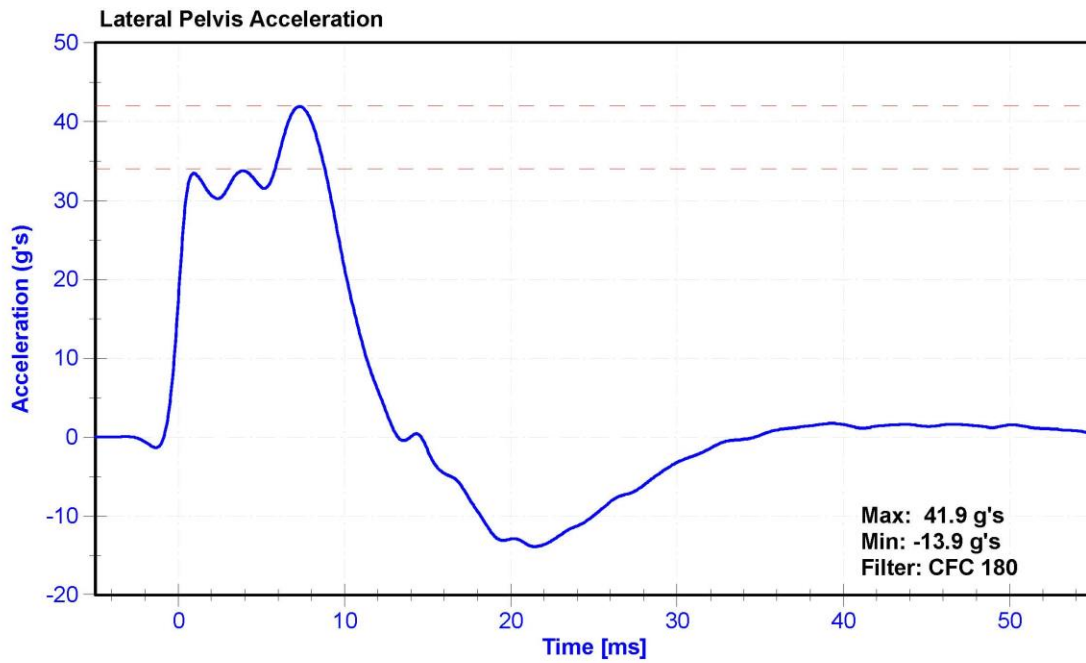
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	35.4	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	46.5	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.9	Pass
Acetabulum Force	3600	4300	N	3607.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	8/22/2019	2/20/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/28/2019	4/27/2020
Acetabulum Load Cell	Denton 3249J	LC-4986Fy	6/14/2019	6/13/2020
Certification Plug	Humanetics	12359	3/23/2018	N/A
Crash Test Plug	Humanetics	11555	9/29/2018	N/A







SID-Its Pelvis Plug Certification Test

Plug S/N 11555

Test Number 3096

Report Number 3089

Test Date 9/29/2016 9:21:14 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	301.49	600.00
Force @ 1.5 mm (N)	1,087.76	1,400.00
Force @ 2.5 mm (N)	1,328.65	1,618.00
Force @ 3.0 mm (N)	1,370.54	1,673.00

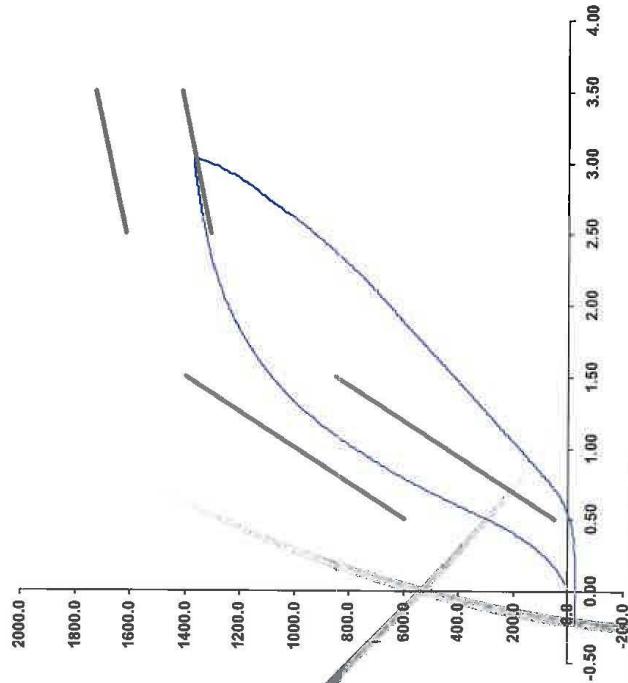
Testing Machine STM-20 5965542

Load Cell S/N (T1240813), Units (LBS) 1000

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

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 29-Sep-16

SACO Research

By: DC Date: 9/29/16

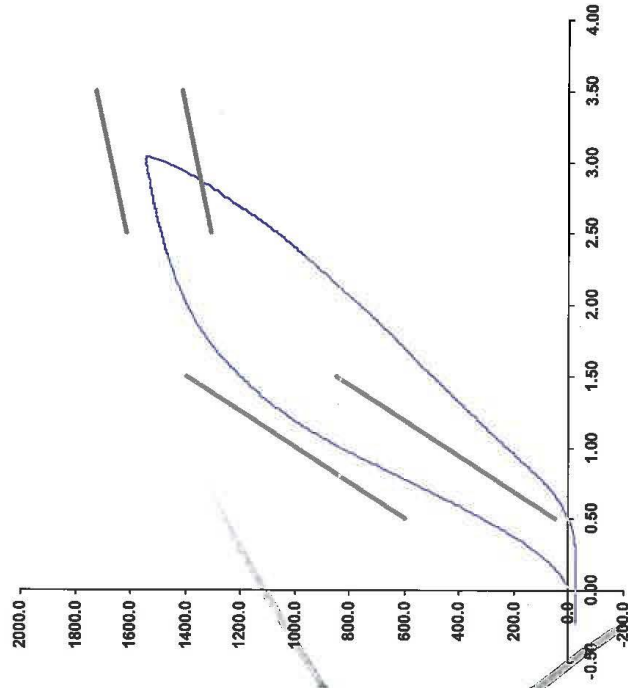
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



SID-Its Pelvis Plug Certification Test

Plug S/N 12359
Test Number 6745
Report Number 6760
Test Date 3/23/2018 9:00:00 AM

Force (-N) vs Extension (-mm)



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

Testing Machine STM-20 5965542
Load Cell S/N (F1380947), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator

Part Number 180-4450

Template No 107 23-Mar-18

SACO Research

By: DC Date: 3/23/18

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

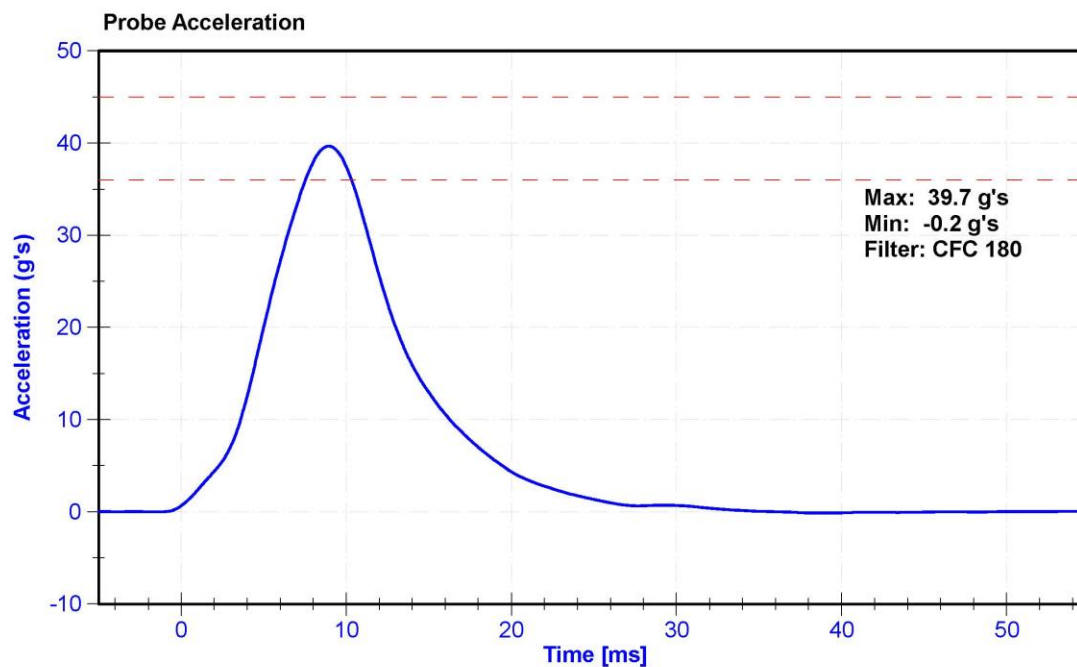
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K.Brogan

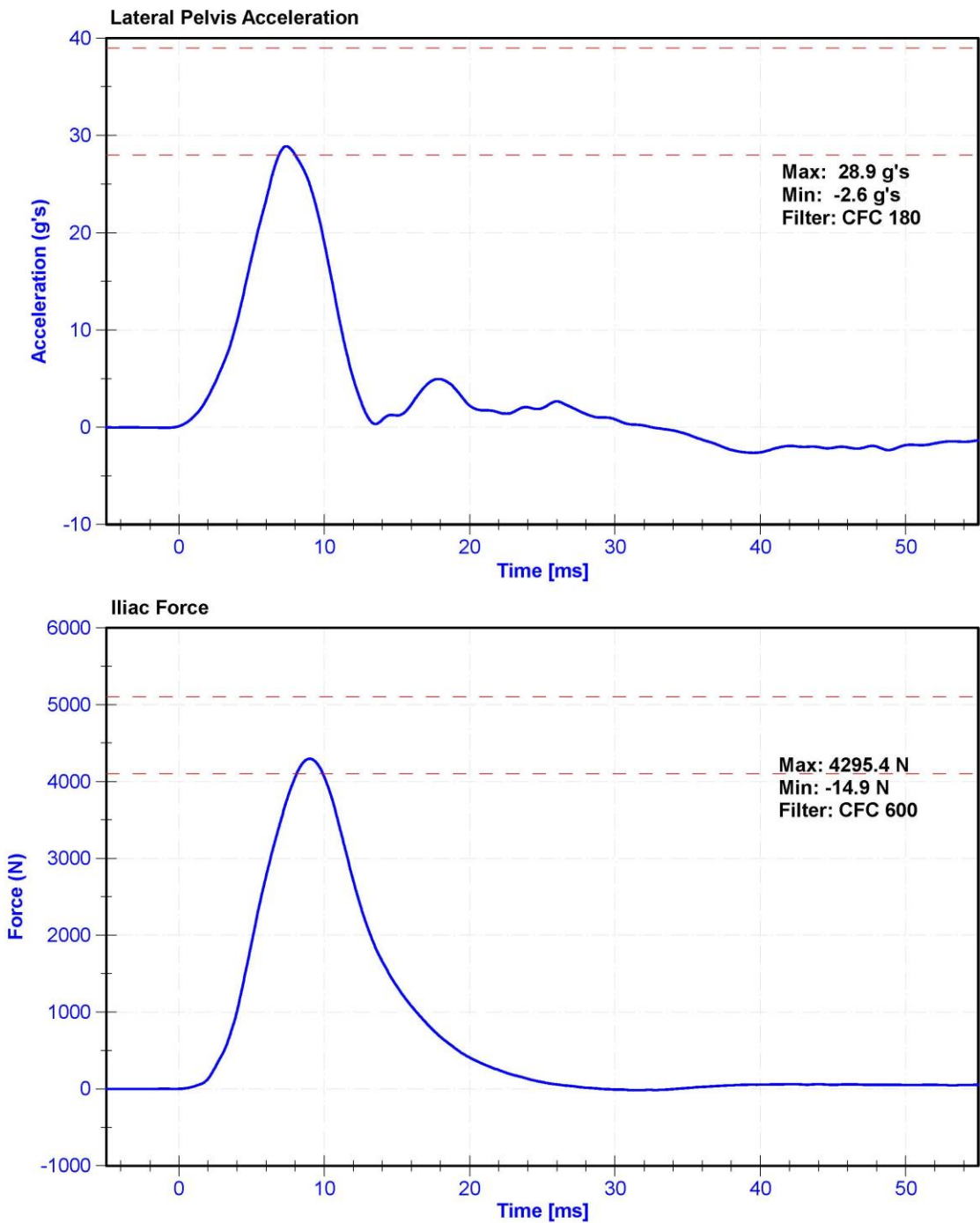
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	29.8	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	36	45	g's	39.7	Pass
Lateral Pelvis Acceleration	28	39	g's	28.9	Pass
Iliac Force	4100	5100	N	4295.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260568	7/29/2019	1/27/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/28/2019	4/27/2020
Iliac Load Cell	DENTON 3228J	LC-290Fy	9/25/2019	9/24/2020





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: DG8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	AC-P74788	ENDEVCO	10/28/2019
			Y	AC-P83432	ENDEVCO	10/28/2019
			Z	AC-P83319	ENDEVCO	10/28/2019
Head Accelerometers - Redundant			X	AC-P80334	ENDEVCO	10/28/2019
			Y	AC-P63841	ENDEVCO	10/28/2019
			Z	AC-P83322	ENDEVCO	10/28/2019
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-2165GFE	Servo	10/28/2019
		Middle	Y	DS-45 GFE	Servo	10/28/2019
		Lower	Y	DS-011GFE	Servo	10/28/2019
	Abdominal Rib	Upper	Y	DS-008GFE	Servo	10/28/2019
		Lower	Y	DS-1774GFE	Servo	10/28/2019
Lower Spine Accelerometers (T12)			X	AC-P52040	ENDEVCO	9/30/2019
			Y	AC-P51327	ENDEVCO	9/30/2019
			Z	AC-P52067	ENDEVCO	9/30/2019
Acetabulum Load Cell			Y	LC-4986Fy	Denton	6/14/2019
Lilac Wing Load Cell			Y	LC-290Fy	Denton	9/25/2019
Pelvis Plug (Struck Side)				12519	SACO	10/2/2018
Pelvis Plug (Non-Struck Side)						

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	AC-A255837	MSI 1201-1000	10/25/2019
Vehicle Center of Gravity	Y	AC-A280355	MSI 1201-1000	10/25/2019
Vehicle Center of Gravity	Z	A284340	MSI 1201-1000	10/25/2019
Left Floor Sill	Y	A284329	MSI 1201-1000	10/25/2019
A-Pillar Sill	Y	A284324	MSI 1201-1000	10/25/2019
A-Pillar Low	Y	AC-A280364	MSI 1201-1000	7/3/2019
A-Pillar Mid	Y	A284368	MSI 1201-1000	7/8/2019
B-Pillar Sill	Y	AC-A262062	MSI 1201-1000	10/9/2019
B-Pillar Low	Y	AC-A280921	MSI 1201-1000	10/9/2019
B-Pillar Mid	Y	AC-A279997	MSI 1201-1000	10/9/2019
Driver Seat	Y	AC-A197021	MSI 1201-1000	8/20/2019
Engine Top	X	AC-A250383	MSI 1201-1000	10/9/2019
Engine Top	Y	AC-A255994	MSI 1201-1000	10/9/2019
Firewall	Y	A284376	MSI 1201-1000	10/25/2019
Right Roof	Y	AC-A262057	MSI 1201-1000	8/15/2019
Right Floor Sill	Y	AC-A280957	MSI 1201-1000	10/18/2019
Rear Floorpan	X	AC-A280385	MSI 1201-1000	9/10/2019
Rear Floorpan	Y	AC-A280964	MSI 1201-1000	9/10/2019

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC_1117012	Interface	10/16/2019
Load Cell 2	LC_1117020	Interface	10/25/2019
Load Cell 3	LC_1117025	Interface	10/25/2019
Load Cell 4	LC_1117019	Interface	10/25/2019
Load Cell 5	LC_1117011	Interface	10/25/2019
Load Cell 6	LC_1117017	Interface	10/25/2019
Load Cell 7	LC_1117035	Interface	10/25/2019
Load Cell 8	LC_1117006	Interface	10/7/2019