REPORT NUMBER: SINCAP-MCW-14-003

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

CHRYSLER GROUP, LLC
2014 JEEP COMPASS 5-DOOR SUV
NHTSA NUMBER: M20140306

PREPARED BY:
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RESEARCH 151
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TEST DATE: 20 NOVEMBER 2013

REPORT DATE: 20 JANUARY 2014

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave, SE, Room W43-410
Washington, DC 20590

Test Vehicle: 2014 Jeep Compass 5-Door SUV
Test Program: SINCAP

NHTSA Number: M20140306
Test Date: November 20, 2013

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Prepared by: Mark Mr/n

Date: 3/19/14

Approved by: Brad D Stemper

Date: March 18, 2014

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date:______________________________

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

Date:______________________________

Technical Report Documentation Page

1. Report No. SINCAP-MCW-14-003	*2. Government Accession No.*	*3. Recipient's Catalog No.*
4. Title and Subtitle Final report of New Car Assessment Program Side Impact MDB Test of a 2014 Jeep Compass 5-Door SUV NHTSA No. M20140306		*5. Report Date* January 20, 2014 *6. Performing Organization Code* MCW
7. Author(s) Brian D. Stemper, Ph. D, Project Manager Mark Meyer, Project Engineer		*8. Performing Organization Report No.* MCW-DOT-2014-003
9. Performing Organization Name and Address Medical College of Wisconsin 5000 W. National Ave. Research 151 Milwaukee, WI 53295		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-09-D-00123
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		*13. Type of Report and Period Covered:* Final Test Report November 20 to January 20, 2014 *14. Sponsoring Agency Code* NVS-111
15. Supplementary Notes		

16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2014 Jeep Compass 5-Door 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. The test was conducted at the Medical College of Wisconsin (MCW) facility in Milwaukee, Wisconsin on 20 November 2013.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.07 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 post test maximum static crush was 190 mm at level 3. The test vehicle's performance is as follows:

	Units	IARV	DRIVER ATD (ES-2re)
Head Injury Criteria (HIC_{36})	N/a	1000	85
Maximum Thoracic Rib Deflection	mm	44	33
Total Abdominal Force	N	2500	427
Pubic Symphysis Force	N	6000	1643

	Units	IARV	Pass. ATD (SID-IIs)
Head Injury Criteria (HIC_{36})	N/a	1000	246
Lower Spine Resultant Acceleration	G	82	44
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2583
Maximum Thoracic Rib Deflection	mm	38*	32
Maximum Abdominal Rib Deflection	mm	45*	17

The rear passenger door on the struck side of the vehicle separated from the body at the hinge. The driver's door and the opposite doors did not open during the side impact event.

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Side Impact
MDB
ES-2re
SID-IIs</td><td colspan="2">18. Distribution Statement
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National Highway Traffic Safety Administration
Technical Information Service Division, NPO-411
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Washington, D.C. 20590

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SECTION 1
TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2014 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00123. The purpose of this test is to generate comparative side impact performance in a 2014 Jeep Compass 5-Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2013.

SECTION 2
SUMMARY OF TEST RESULTS

A 2014 Jeep Compass 5-Door 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 62.07 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 Medical College of Wisconsin in Milwaukee, Wisconsin, on November 20, 2014. 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 September 2013. The side impact event was documented by 11 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 (T_{12}) Tri-Axial Accelerometers
- Pubic 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 (T_{12}) 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.

SECTION 2
SUMMARY OF TEST RESULTS (CONTINUED)

Dummy injury values were recorded as follows:

DRIVER DUMMY INJURY VALUES			
Measurement Description	**Driver ATD (ES-2re)**		
	Units	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/a	1000	85
Maximum Thorax Rib Deflection	mm	44	33
Combined Abdominal Force	N	2500	427
Pubic Symphysis Force	N	6000	1643

PASSENGER DUMMY INJURY VALUES			
Measurement Description	**Passenger ATD (SID-IIs)**		
	Units	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/a	1000	246
Lower Spine (T_{12}) Resultant Acceleration	G's	82	44
Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	2583
Maximum Thoracic Rib Deflection	mm	38*	32
Maximum Abdominal Rib Deflection	mm	45*	17

**Proposed IARV*

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION				
Restraint type	**Left Front (Driver) Occupant Location 1**		**Left Rear (Passenger) Occupant Location 4**	
	Mounted	**Deployed**	**Mounted**	**Deployed**
Frontal Airbag	Yes	Did Not Deploy	No	N/a
Knee Airbag	No	N/a	No	N/a
Side Curtain Airbag	Yes	Deployed	Yes	Deployed
Side Torso Airbag	Yes	Deployed	No	N/a
Seat Belt Pretensioner	Yes	Deployed	No	N/a
Seat Belt Load Limiter	Yes	N/a	No	N/a
Other	N/a	N/a	N/a	N/a

GENERAL COMMENTS

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

PRE TEST

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

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POST TEST

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Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

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Data Sheet No. 13 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 14 – Dummy/Vehicle Temperature and Humidity Stabilization Data

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

VEHICLE INFORMATION	
NHTSA No.	M20140306
Model Year	2014
Make	Jeep
Model	Compass
Body Style	SUV
VIN	1C4NJCBA2ED620732
Body Color	True Blue Pearl
Odometer Reading (km/mi)	2 mi
Engine Displacement (L)	2.0
Type/No. of Cylinders	DOHC 16-Valve
Engine Placement	Lateral
Transmission Type	5-Speed Manual
Transmission Speeds	5
Overdrive	Yes
Final Drive	FWD
Roof Rack	Yes
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

VEHICLE OPTIONS	
Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	No
Power Window Auto-Reverse	No
Other Optional Features	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	None Noted

Does owner's manual provide instructions to turn off automatic door locks? No

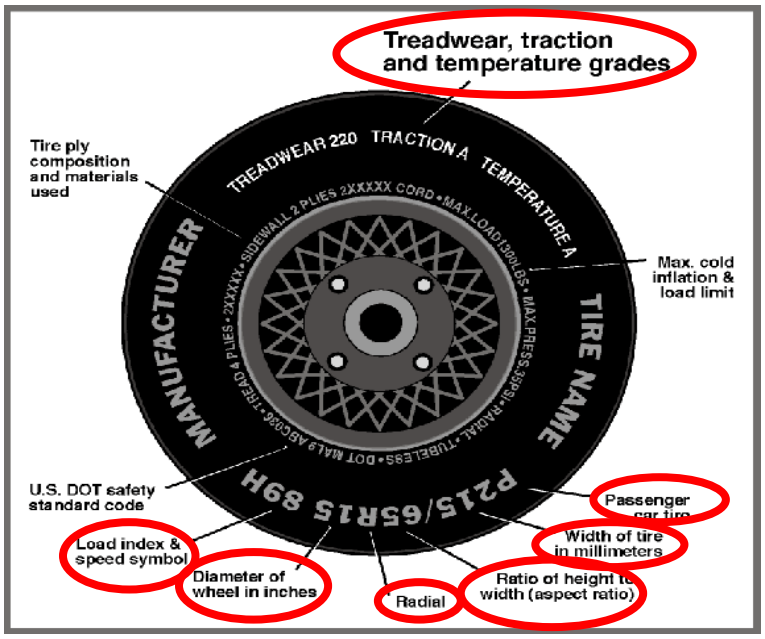
DATA FROM CERTIFICATION LABEL			
Manufactured By	Chrysler Group, LLC	GVWR (kg)	2012
Date of Manufacture	October 2013	GAWR Front(kg)	1080
Vehicle Type	Sport Utility Vehicle	GAWR Rear (kg)	1044

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION					
	Front	**Rear**	**Third**	**Total**	
Designated Seating Capacity (DSC)	2	3	0	5	
Capacity Weight (VCW) (kg)				419.6	(A)
DSC X 68.04 (kg)				340.2	(B)
Cargo Weight (RCLW) (kg)				79.4	(A-B)

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

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	X	N/a	
Third Row Seat							

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



VEHICLE TIRE INFORMATION		
Measured Parameter	**Front**	**Rear**
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	241.3	241.3
Recommended Tire Size	P205/70R16	P205/70R16
Tire Size on Vehicle	P205/70R16	P205/70R16
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Eagle LS	Eagle LS
Treadwear	400	400
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	4	4
Load Index/Speed Symbol	96T	96T
Tire Material	Polyester & Steel	Polyester & Steel
DOT Safety Code Left	M60W CUER 3413	M60W CUER 3413
DOT Safety Code Right	M60W CUER 3413	M60W CUER 3413

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

TIRE PRESSURES					
	Units	**LF**	**RF**	**LR**	**RR**
As Delivered	kPa	241.3	241.3	241.3	241.3
Tire Placard	kPa	241.3	241.3	241.3	241.3
Owner's Manual	kPa	241.3	241.3	241.3	241.3
As Tested	kPa	241.3	241.3	241.3	241.3

MDB TIRE SPECIFICATIONS						
	Units	**Requirement**	**LF**	**RF**	**LR**	**RR**
Tire Size		205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 +/- 21	200	200	200	200

TEST VEHICLE WEIGHTS										
	Units	**As Delivered (UVW)**			**As Tested (ATW)**			**Fully Loaded**		
		Front Axle	**Rear Axle**	**Total**	**Front Axle**	**Rear Axle**	**Total**	**Front Axle**	**Rear Axle**	**Total**
Left	kg	420.9	289.4		453.6	381.9		455.4	386.9	
Right	kg	404.2	299.4		406.9	369.2		415.0	361.2	
Ratio	%	58.4	41.6		53.4	46.6		53.8	46.2	
Totals	kg	825.1	588.8	1413.9	860.5	751.1	1611.6	870.4	748.1	1618.5

TARGET TEST WEIGHT CALCULATION			
	Units		
Total Delivered Weight (UVW)	kg	1413.9	(A)
Sum of Actual Weight of 2 P572 ATDs used	kg	125.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	79.4	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1618.5	(A + B + C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? Yes

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

TEST VEHICLE ATTITUDE AND CG				
Measurement description	**Units**	**Fully Loaded**	**As Tested**	**Meets Requirement*** **
LF	mm	802	807	Yes
RF	mm	811	808	Yes
RR	mm	799	795	Yes
LR	mm	804	803	Yes
Vehicle CG (Aft of Front Axle)	mm	1217.9	1228.1	
Vehicle CG (Left(+))/Right(-) from Longitudinal Centerline)	mm	36.0	32.5	

***The "As Tested" vehicle attitude measurements must be equal to or within +/- 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. "Yes" or "No" is indicated.

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW	
Ballast	**Weight (kg)**
Removed spare tire & floor cover, washer bottle, power steering reservoir, radiator overflow, and jack to achieve calculated "As Tested" weight.	26.3

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

SCRL ANGLE RANGE			
Seat	**SCRL (°)**		
	Max	**Min**	**Mid**
Driver Seat	Fixed	Fixed	Set at 0° for test
Front Passenger Seat	Fixed	Fixed	Set at 0° for test
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*			

*If applicable

SCRL ANGLE RANGE						
Seat	**As Tested SCRL Angle (Mid) (°)**	**As Tested SCRP Height (mm)**	**SCRP Height Position**	**SCRP Height (mm)**		
				Rearmost	**Mid-Fore/Aft**	**Forward-Most**
Driver's Seat	N/a**	N/a**	Max	N/a**	N/a**	N/a**
	0.0	35	Mid	45	35	25
	N/a**	N/a**	Min	N/a**	N/a**	N/a**
Front Passenger Seat	N/a**	N/a**	Max	N/a**	N/a**	N/a**
	0.0	31	Mid	39	31	21
	N/a**	N/a**	Min	N/a**	N/a**	N/a**
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat*			Max			
			Mid			
			Min			

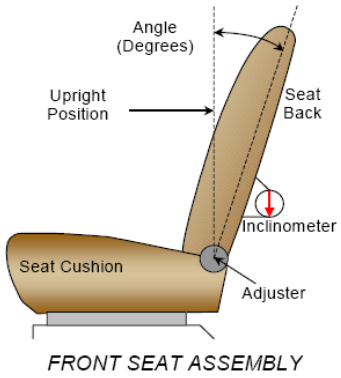
*If applicable

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

SEAT FORE/AFT POSITION				
Seat	**Total Fore/Aft Travel**		**Test Position from Forwardmost Position**	
	mm	**Detent***	**mm**	**Detent***
Driver Seat	260	39	130	19
Front Passenger Seat	260	39	130	19
Front Center Seat*				
Struck Side Rear Seat	Fixed	N/a	Fixed	N/a
Non-Struck Side Rear Seat	Fixed	N/a	Fixed	N/a
Rear Center Seat*				

*If applicable

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



FRONT SEAT ASSEMBLY

SEAT BACK ANGLE ADJUSTMENT				
Seat	**Total Seat Back Angle Range**		**Test Position from Most Upright**	
	Degrees	**Detents***	**Degrees**	**Detents***
Driver Seat w/ Seated Dummy	60.0	41	12.7	5
Front Passenger Seat	60.0	39	12.4	5
Front Center Seat*				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*				

*If applicable

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

Seat Belt Anchorage Adjustment
Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

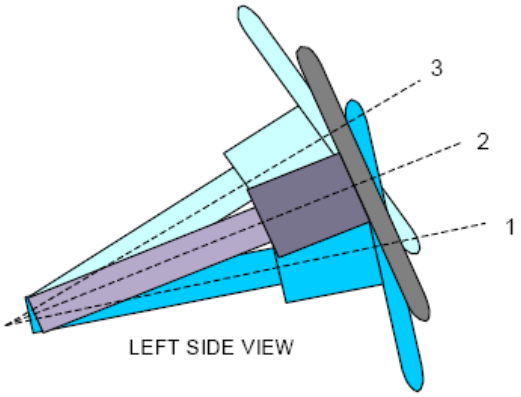
SEAT BELT ANCHORAGE ADJUSTMENT		
	Total # of Positions	**Placed in Position #**
Driver Seat	4	H
Rear Seat	Fixed	As Positioned

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

HEAD RESTRAINT ADJUSTMENT		
	Total # of Positions	**Placed in Position #**
Driver Seat	5	Highest Position
Rear Seat	1	Lowest Detent

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.

STEERING COLUMN ADJUSTMENT			
	Degrees	**Fore/Aft Position (mm)**	
Lowermost, Pos. No. 1	62.0	N/a	
Geometric Center, Pos. No. 2	65.2	N/a	
Uppermost, Pos. No. 3	68.4	N/a	
Telescoping Steering Wheel Travel	Non-telescoping	N/a	
Test Position	65.2	N/a	

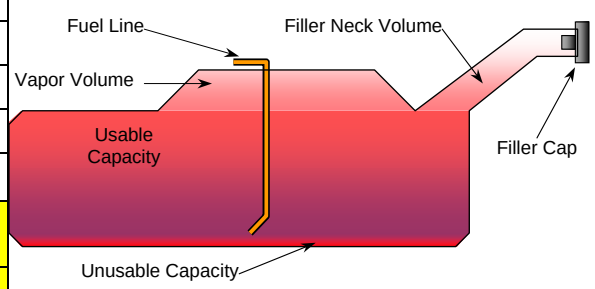


STEERING COLUMN ASSEMBLY

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

FUEL TANK CAPACITY DATA

Description	Units	Value
Usable Capacity of "Standard Tank"	L	51.5
Usable Capacity of "Optional Tank"	L	0.0
Usable Capacity of Standard Tank	L	51.5
Usable Capacity of Optional Tank	L	0.0
93% of Usable Capacity	%	47.9
Actual Amount of Solvent Used in Test	L	47.9
1/3 of Usable Capacity	17.2	



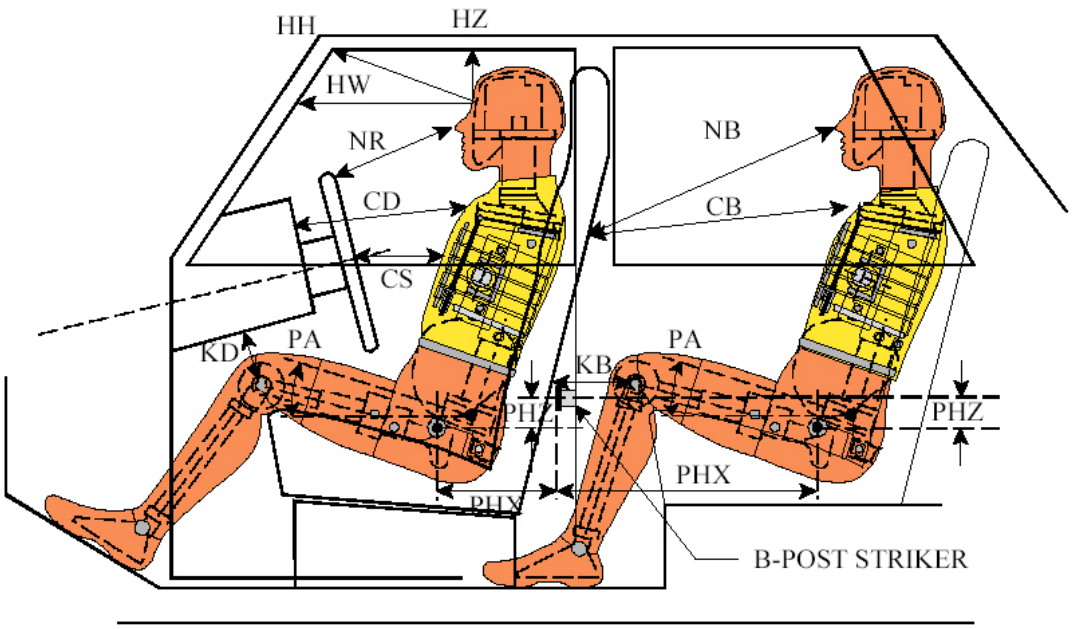
VEHICLE FUEL TANK ASSEMBLY

Fuel Pump
The vehicle is equipped with an electronic fuel pump. Key is "ON" position. The fuel pump is on the left side.

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated in on Form No. 1?

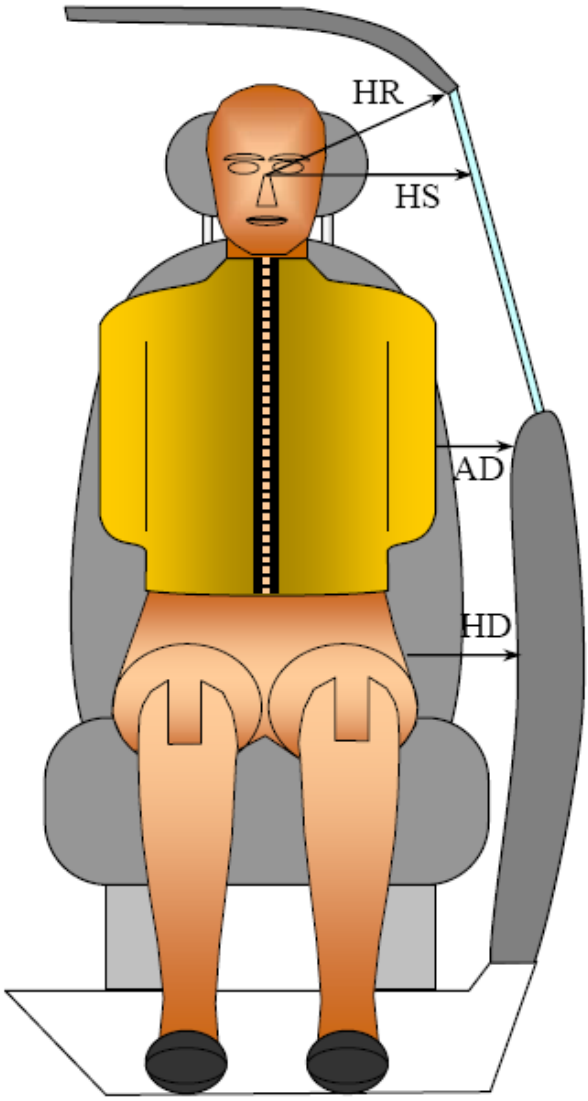
Yes

DATA SHEET NUMBER 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS



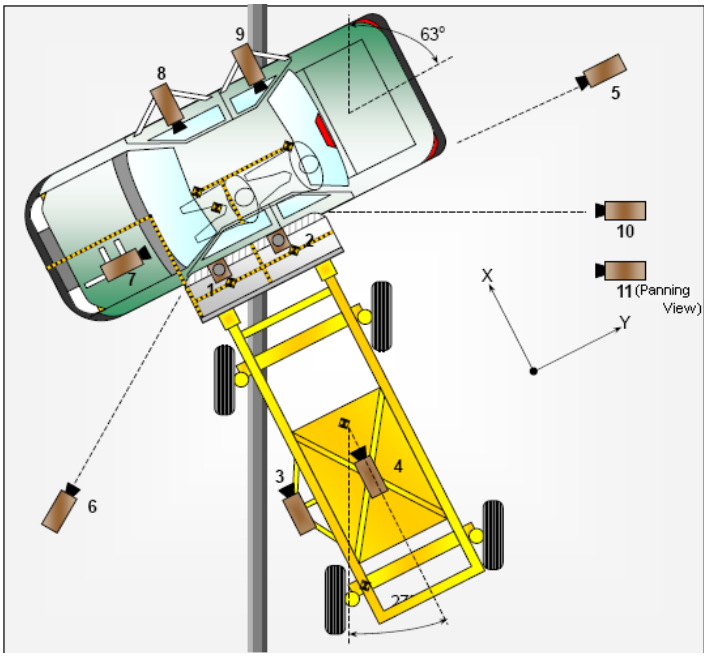
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION						
Driver Code	**Pass. Code**	**Measurement Description**	**Driver**		**Passenger**	
			Length (mm)	**Angle**	**Length (mm)**	**Angle**
HH		Header to Header	430			
HW		Header to Windshield	644			
HZ	HZ	Head to Roof Liner	198		332	
NR	NB	Nose to Rim/Seat Back	410		568	
CD	CB	Chest to Dash/Seat Back	540		554	
CS		Chest to Steering Wheel	325			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	131	31.0	309	11.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	125	20.0	306	10.0
PAX°	PAX°	Pelvic Tilt Angle X		0.0		0.0
	PAY°	Pelvic Tilt Angle Y		19.1		18.3
PHX	PHX	Hip Point to Striker (X-Axis)	206		138	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	126		291	

DATA SHEET NUMBER 4
DUMMY LATERAL CLEARANCE DIMENSIONS



DUMMY LATERAL CLEARANCE DIMENSION INFORMATION				
Code	**Description**	**Units**	**Driver**	**Passenger**
HR	Head to Side Header	mm	192	285
HS	Head to Side Window	mm	330	384
AD	Arm to Door	mm	120	144
HD	Hip Point to Door	mm	158	165

DATA SHEET 5
CAMERA AND INSTRUMENTATION DATA



	View	Coordinates †			Lens Length	Operating Frame Rate
		X	Y	Z		
		mm	mm	mm	mm	fps
1	Overhead Overall	1784	2230	-6023	10	1000
2	Overhead Close-up	979	752	-5983	25	1000
3	Left Impact Point (MDB)	-2264	-159	-792	25	1000
4	Side Overall (MDB)	-2144	919	-1300	12.5	1000
5	Rear	-1340	7711	-1410	35	1000
6	Left Front	-3081	-7571	-1422	25	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				N/a	30
11	Real – Time Inrun				N/a	30

Origin		Orientation	
X	Impact Point	X	+(X) To Front of MDB
Y	Impact Point	Y	+(Y) To Right of MDB
Z	Ground	Z	+(Z) Down

**All measurements accurate to +/- 6 mm*

DATA SHEET 5
CAMERA AND INSTRUMENTATION DATA (CONTINUED)

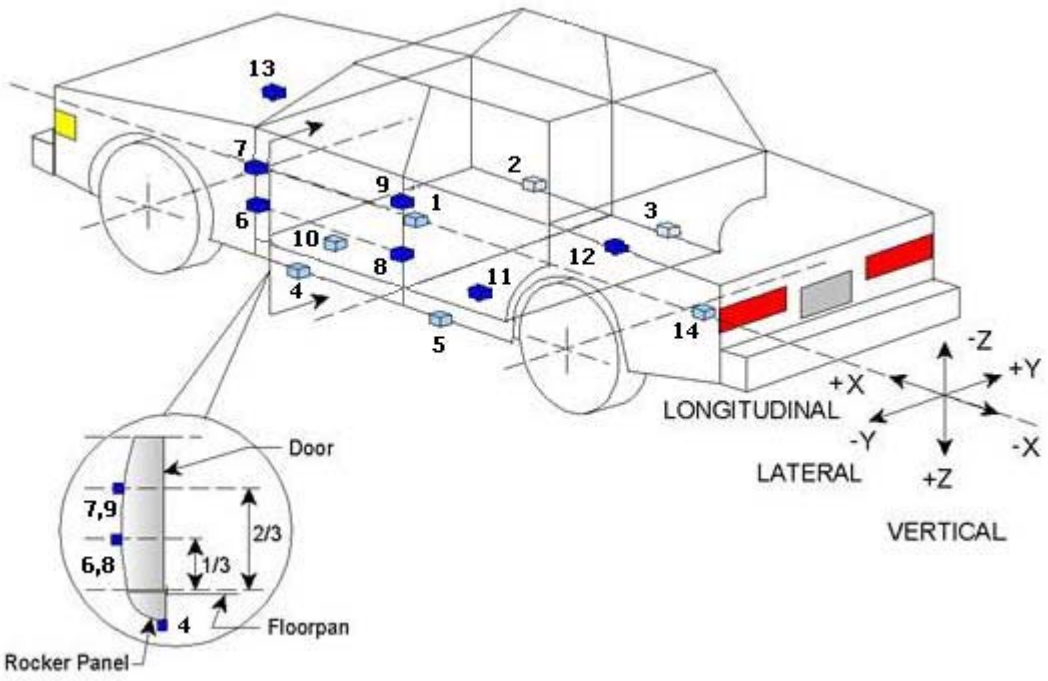
Why did the cameras not operate?

_____

_____

INSTRUMENTATION	
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	5
Total	60

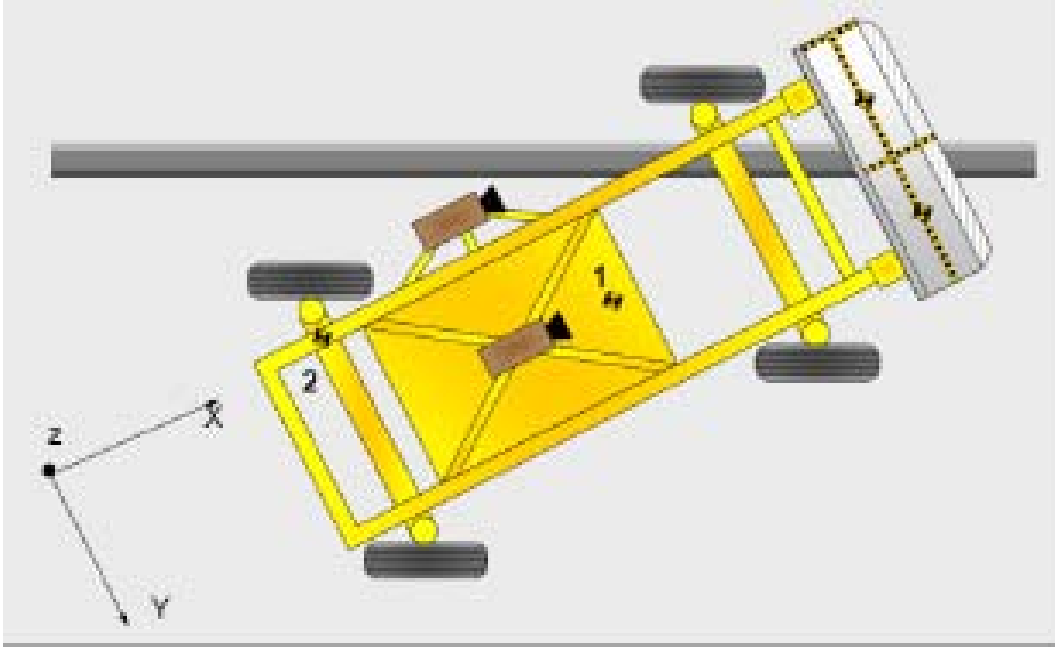
DATA SHEET 6
TEST VEHICLE ACCELEROMETER LOCATIONS



TEST VEHICLE ACCELEROMETER LOCATIONS				
Loc. No.	**Accelerometer Location**	**Measurements (mm)**		
		X	**Y**	**Z**
1	Vehicle CG	2628.2	85.3	191.2
2	Right Sill at Front Seat	2504.1	698.5	432.4
3	Right Sill at Rear Seat	1592.1	704.5	428.0
4	Left Sill at Front Door	2481.5	-708.9	423.8
5	Left Sill at Rear Door	1600.3	-711.4	418.1
6	A-Post Lower	2966.4	-781.4	83.4
7	A-Post Middle	2986.9	-774.5	-163.2
8	B-Post Lower	1965.7	-790.5	22.5
9	B-Post Middle	1949.4	-787.7	-204.9
10	Front Seat Track	2299.1	-540.6	220.6
11	Rear Seat Structure	1114.5	-508.8	56.9
12	Rt. Rear Occ. Compartment	1662.2	359.7	298.4
13	Engine Block	3729.7	176.6	-171.6
14	Rear Above Axle	960.4	7.91	105.8

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

DATA SHEET 7
MDB ACCELEROMETER LOCATIONS



MDB ACCELEROMETER LOCATIONS				
Loc No.	**Accelerometer Locations**	**Coordinates (mm)**		
		X	**Y**	**Z**
1	MDB CG	1113	-1	311
2	MDB Rear	2812	-614	585

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

DATA SHEET NUMBER 8
POST-TEST OBSERVATIONS

TEST DUMMY INFORMATION AND CONTACT POINTS		
Dummy Body Part	**Front Seat Dummy (ES-2re)**	**Rear Seat Dummy (SID-IIs)**
Face	To Side Curtain Airbag	To Side Curtain Airbag
Top of Head	To Side Header	To Side Curtain Airbag
Left Side of Head	To Side Curtain Airbag	To Side Curtain Airbag
Back of Head	Along Head Rest to the Side Curtain Airbag	To Side Curtain Airbag
Left Shoulder	To Side Curtain Airbag and Side Torso Airbag	To Side Curtain Airbag and Interior Door Panel
Upper Torso	To Seat Mounted Side Torso Airbag	To Interior Door Panel
Lower Torso	To Seat Mounted Side Torso Airbag	To Interior Door Panel
Left Hip	To Interior Door Panel	To Interior Door Panel
Left Knee	To Interior Door Panel	To Interior Door Panel

POST-TEST DOOR PERFORMANCE					
Description	**Struck Side**		**Non-Struck Side**		**Rear Hatch/ Other Door**
	Front	**Rear**	**Front**	**Rear**	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges of Latches	No	Yes	No	No	No
Latch of Hinge Systems Pulled Out of Their Anchorages	No	Yes	No	No	No
Disengaged from Latched Position	No	Yes	No	No	No
Latch Separated from Striker	No	Yes	No	No	No
Jammed Shut	Yes	No	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/a	80	N/a	N/a	N/a

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	Yes	No	No	No
Seat Back Collapse	No	No	No	No

DATA SHEET NUMBER 8
POST-TEST OBSERVATIONS (CONTINUED)

POST TEST STRUCTURAL OBSERVATIONS	
Critical Areas of Performance	**Observations/Conclusions**
Pillar Performance	No Damage
Sill Separation	Max Sill Separation of 90 mm at 1200 Line
Windshield Damage	No Damage
Window Damage	No Damage
Other Notable Effects	None Noted

SUPPLEMENTAL RESTRAINT INFORMATION				
Restraint Type	**Struck Side Driver**		**Struck Side Rear Passenger**	
	Mounted	**Deployed**	**Mounted**	**Deployed**
Frontal Airbag	Yes – Steering Wheel	Did Not Deploy		
Knee Airbag	No	N/a		
Side Curtain Airbag	Yes – Side Header	Deployed Properly	Yes – Side Header	Deployed Properly
Side Torso Airbag	Yes – Seat Back	Deployed Properly	No	N/a
Seat Belt Pretensioner	Yes	Deployed Properly	No	N/a
Seat Belt Load Limiter	Yes	N/a	No	N/a
Other	No	N/a	No	N/a

IMPACT POINT LOCATION DATA			
Measured Parameter	**Units**	**Tolerance**	**Value**
Vehicle Wheel Base	mm		2635
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		378
Actual Impact Point (Aft of Front Axle)	mm		344
Horizontal Offset (+ forward / - rear)	mm	+/- 50 of Intended Impact Point	34 Forward
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	11 Below

DATA SHEET NUMBER 9
MDB SUMMARY OF RESULTS

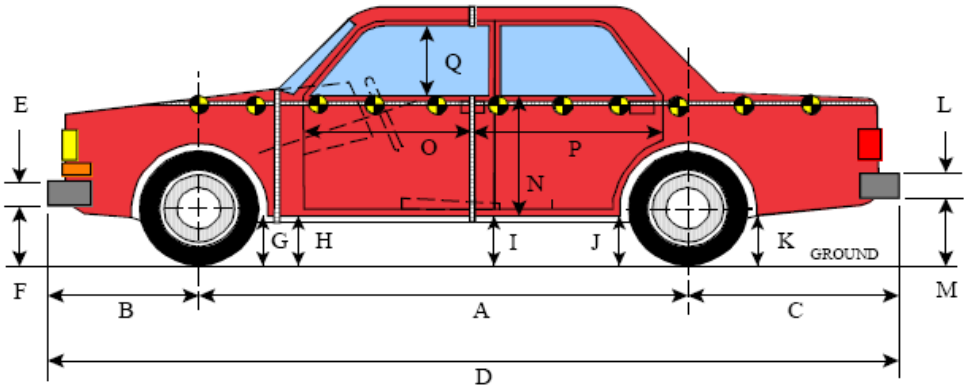
MDB SPECIFICATIONS	
Measurement Description	**Length (mm)**
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Frame	4116
Wheel Base of Framework Carriage	2578
CG Location of Front Axle	1112

MDB WEIGHTS				
	Units	**Front Axle**	**Rear Axle**	**Total**
Left	kg	456.3	228.6	684.9
Right	kg	304.4	372.9	677.3
Ratio	%	55.8	44.2	100.0
Totals	kg	760.7	601.5	1362.2

SPEED AND ANGLE AT IMPACT DATA			
Measured parameter	**Units**	**Requirement**	**Value**
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.07
Trap No. 2 Velocity (Secondary)	km/h	61.1 to 62.7	62.07
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.0

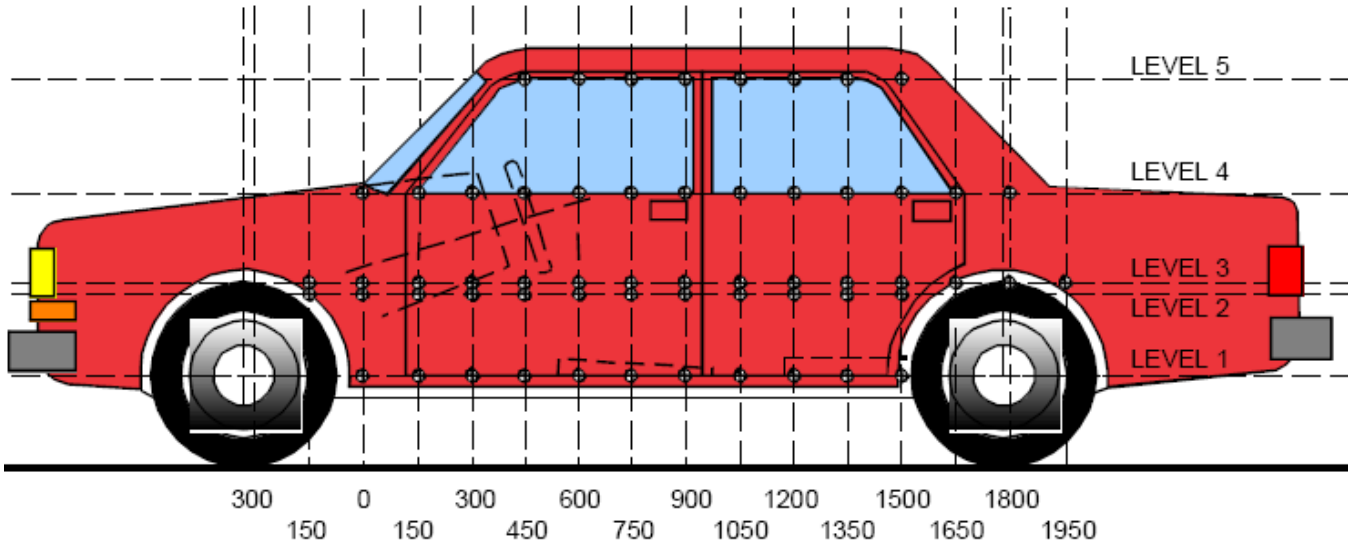
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE					
Vertical Location			**From Centerline**		**Maximum Crush**
Row	**Description**	**Height**	**Distance**	**Direction**	
A	Center of Bumper	431	800	Right	149
B	Top of Bumper	532	800	Right	179
C	Mid-Level	559	700	Left	166
D	Top of Stack	837	700	Left	180

DATA SHEET NUMBER 10
TEST VEHICLE PROFILE MEASUREMENTS



VEHICLE PRE – AND POST – TEST MEASUREMENT INFORMATION				
Code	**Description**	**Pre test**	**Post test**	**Difference**
		mm	**mm**	**mm**
A	Wheelbase	2635	2621	-14
B	Front Axle to FSOV	645	642	-3
C	Rear Axle to RSOV	662	662	0
D	Total Length at Centerline	4446	4445	-1
E	Front Bumper Thickness	196	196	0
F	Front Bumper Bottom to Ground	334	344	10
G	Sill Height at Front Wheel Well	295	275	-20
H	Sill Height at Front Door Leading Edge	293	303	10
I	Sill Height at B-Pillar	302	292	-10
J1	Sill Height at Rear Wheel Well	268	246	-22
J2	Pinch Weld Height at Rear Wheel Well	308	242	-66
K	Sill Height Aft of Rear Wheel Well	435	395	-40
L	Rear Bumper Thickness	190	190	0
M	Rear Bumper Bottom to Ground	505	467	-38
N	Sill Height to Bottom of Front Window Sill	753	742	-11
O	Front Door Leading Edge to Impact C/L	1038	1015	-23
P	Rear Door Trailing Edge to Impact C/L	895	806	-89
Q	Front Window Opening	435	430	-5
R	Right Side Length	3942	3943	1
S	Left Side Length	3942	3925	-17
T	Maximum Vehicle Width	1765	1663	-102

DATA SHEET NUMBER 11
VEHICLE EXTERIOR CRUSH MEASUREMENTS



LEFT SIDE VIEW

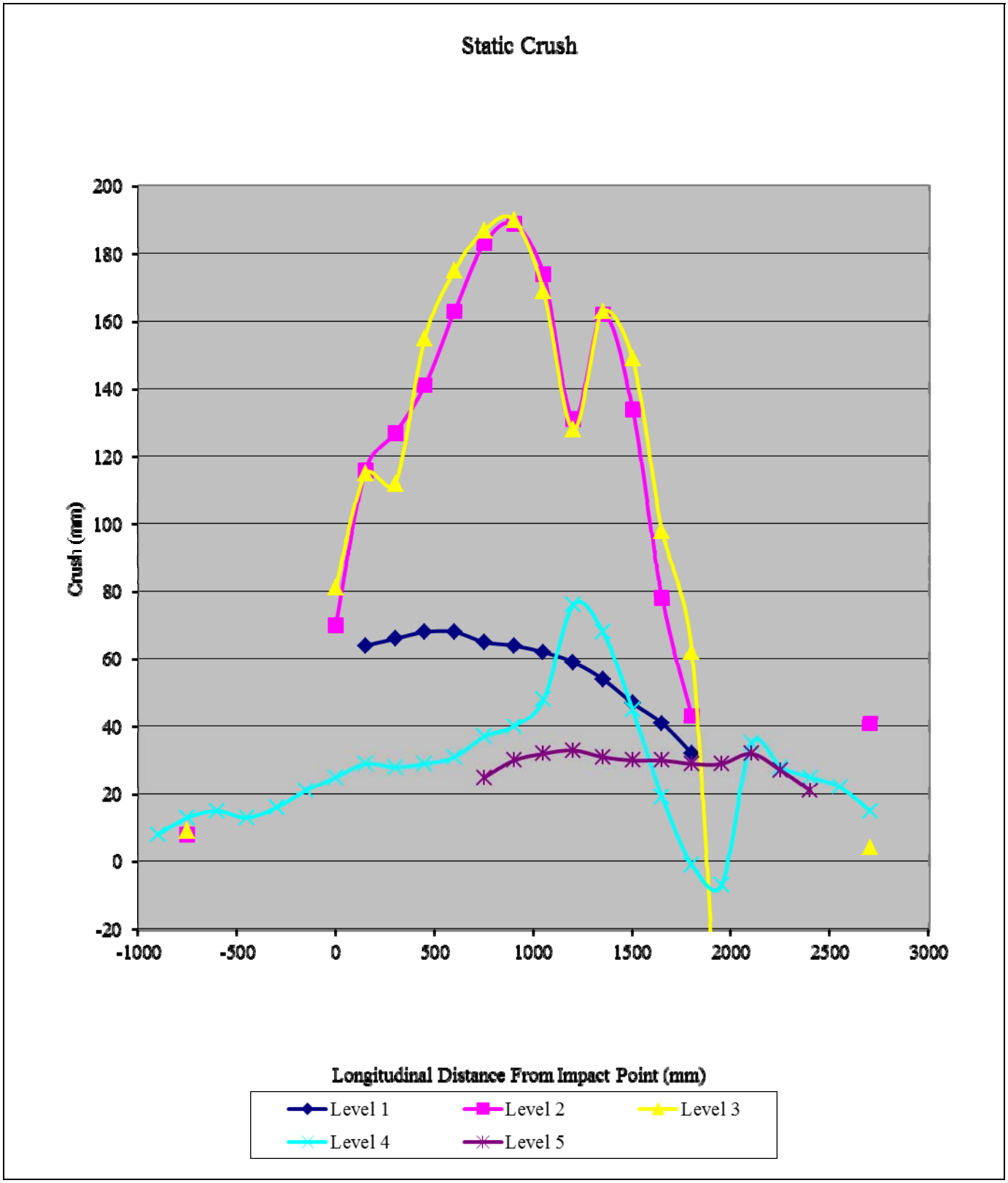
MAXIMUM EXTERIOR CRUSH MEASUREMENTS				
Level	**Measurement Description**	**Height Above Ground**	**Maximum Exterior Static Crush**	**Distance from Impact**
1	Sill Top	317	68	450 & 600
2	Occupant Hip Point	650	189	900
3	Mid-Door	699	190	900
4	Window Sill	1030	76	1200
5	Window Top	1530	33	1200

DATA SHEET NUMBER 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS (CONTINUED)

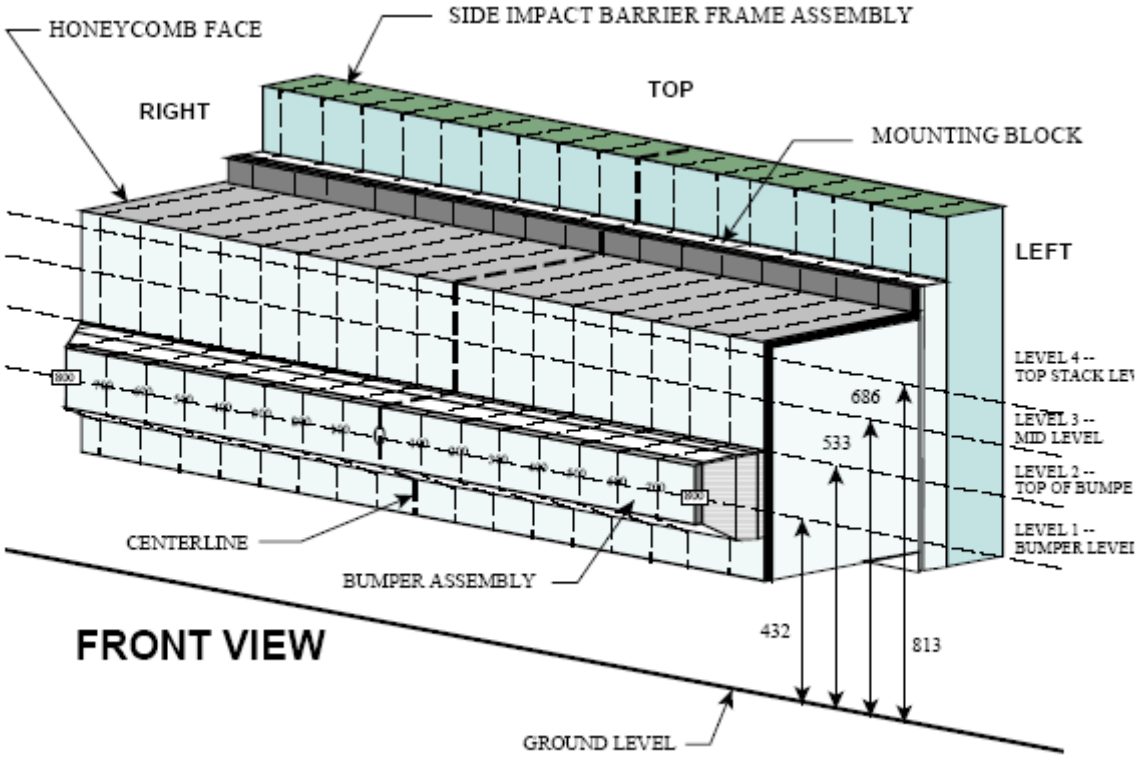
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

Level		1			2			3			4			5		
		Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush
DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT	-1050															
	-900										515	523	8			
	-750				302	310	8	305	314	9	477	490	13			
	-600										450	465	15			
	-450										422	435	13			
	-300										402	418	16			
	-150										385	406	21			
	0				266	336	70	262	343	81	374	399	25			
	150	330	394	64	276	392	116	275	390	115	367	396	29			
	300	328	394	66	281	408	127	280	392	112	360	388	28			
	450	325	393	68	280	421	141	279	434	155	350	379	29			
	600	324	392	68	279	442	163	277	452	175	340	371	31			
	750	323	388	65	277	460	183	276	463	187	329	366	37	330	355	25
	900	323	387	64	276	465	189	275	465	190	322	362	40	326	356	30
	1050	325	387	62	276	450	174	275	444	169	312	360	48	324	356	32
	1200	325	384	59	277	408	131	275	403	128	310	386	76	323	356	33
	1350	326	380	54	278	440	162	275	438	163	310	378	68	325	356	31
	1500	327	374	47	279	413	134	277	426	149	307	352	45	326	356	30
	1650	329	370	41	279	357	78	277	375	98	307	326	19	327	357	30
	1800	331	363	32	269	312	43	262	324	62	295	294	-1	328	357	29
	1950							260	185	-75	290	283	-7	329	358	29
	2100										289	324	35	332	364	32
	2250										291	319	28	339	366	27
	2400										292	317	25	349	370	21
	2550										300	322	22			
	2700				260	301	41	321	325	4	312	327	15			
	2850															
	3000															
	3150															
	3330															

DATA SHEET NUMBER 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS (CONTINUED)



DATA SHEET NUMBER 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS



NOTE: Dimensions are shown in millimeters, mm

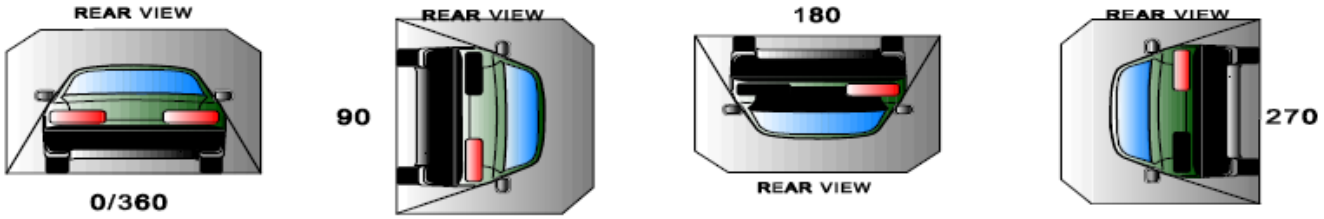
DEFORMABLE BARRIER STATIC CRUSH																	
	Distance Left of Center								C_L	Distance Right of Center							
	800	**700**	**600**	**500**	**400**	**300**	**200**	**100**	**0**	**100**	**200**	**300**	**400**	**500**	**600**	**700**	**800**
1	83	88	85	87	90	87	91	95	90	95	93	97	102	110	124	136	149
2	140	139	134	132	132	131	128	122	113	104	108	115	114	125	144	168	179
3	134	166	108	87	78	68	64	62	69	89	120	140	101	89	88	107	134
4	174	180	135	112	101	88	79	75	85	102	148	158	116	88	80	86	113

DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER RESULTS

Temperature at Time of Impact: 21° C Test Time: 1:45 pm

STODDARD SOLVENT SPILLAGE MEASUREMENTS				
Period	**Description**	**Maximum Allowable Spillage**	**Spillage**	
			Amount	**Location**
A	From Impact Until Vehicle Motion Ceases	1 oz	0	N/a
B	5 Minutes After Vehicle Motion Ceases	5 oz	0	N/a
C	Next 25 Minutes	1 oz/minute	0	N/a
D	Spillage Details:			

FMVSS 301 STATIC ROLLOVER



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS			
Test Phase	**Rotation Time**	**Hold Time**	**Total Time**
0° to 90°	63	300	363
90° to 180°	64	300	364
180° to 270°	64	300	364
270° to 360°	66	300	366

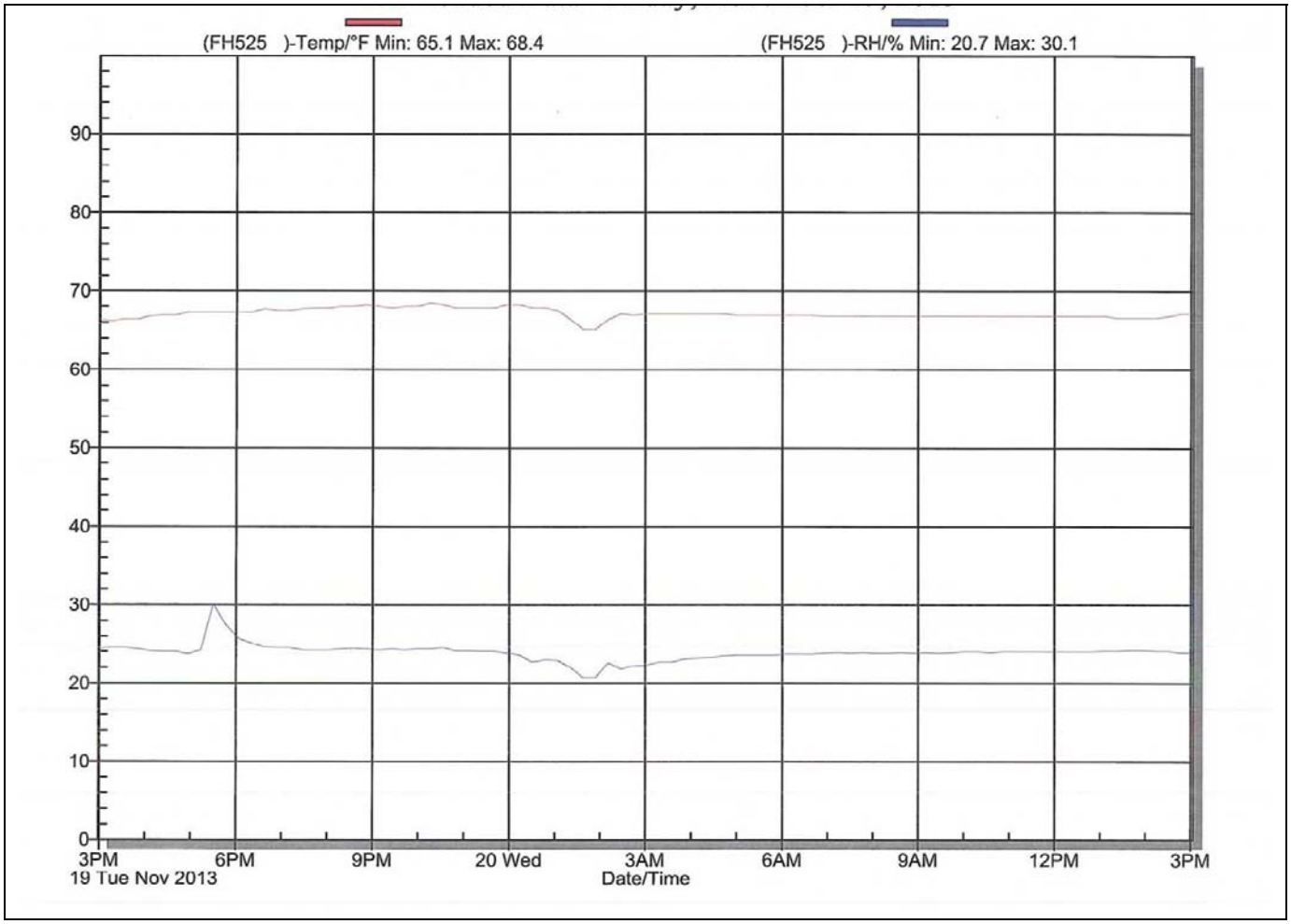
DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER RESULTS (CONTINUED)

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE				
	First 5 Minutes	**Sixth Minute**	**Seventh Minute**	**Eighth Minute**
0° to 90°	0	0	0	N/a
90° to 180°	0	0	0	N/a
180° to 270°	0	0	0	N/a
270° to 360°	0	0	0	N/a

FMVSS NO. 301 STATIC ROLLOVER - SPILLAGE				
	First five minutes (oz)	**Sixth minute (oz)**	**Seventh minute (oz)**	**Eighth minute (oz)**
Max allowable leakage	**5.0**	**1.0**	**1.0**	**1.0**
0° to 90°	0	0	0	N/a
90° to 180°	0	0	0	N/a
180° to 270°	0	0	0	N/a
270° to 360°	0	0	0	N/a

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE	
Test Phase	**Spillage Location**
0° to 90°	N/a
90° to 180°	N/a
180° to 270°	N/a
270° to 360°	N/a

DATA SHEET 14
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA



APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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

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

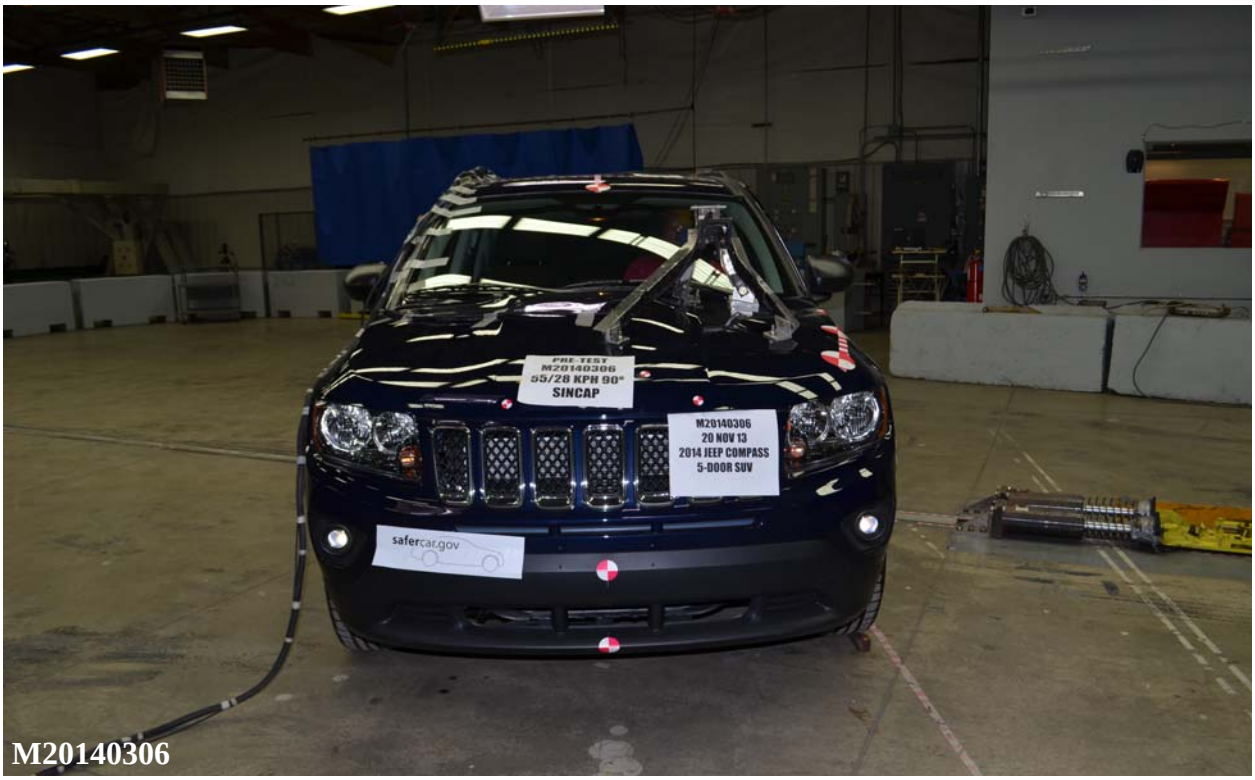


Figure A-3: Pre-Test Frontal View of the Test Vehicle

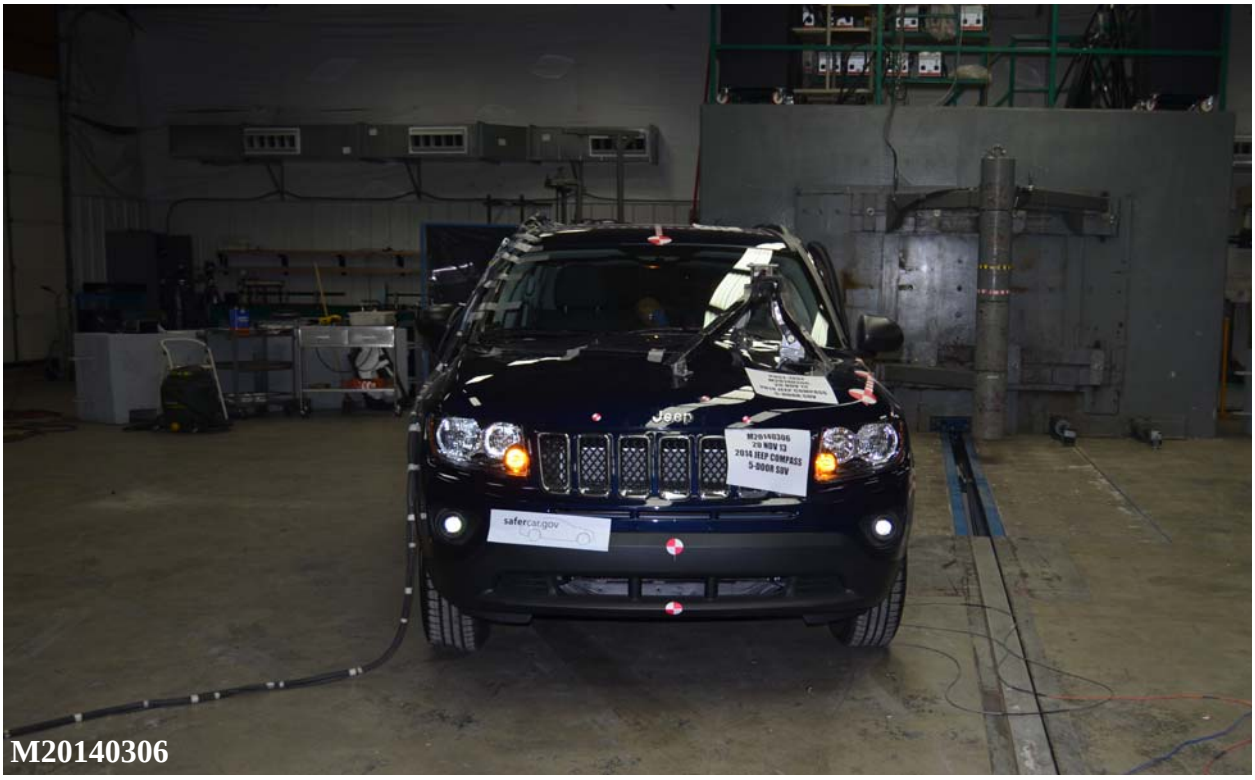


Figure A-4: Post-Test Frontal View of Test Vehicle

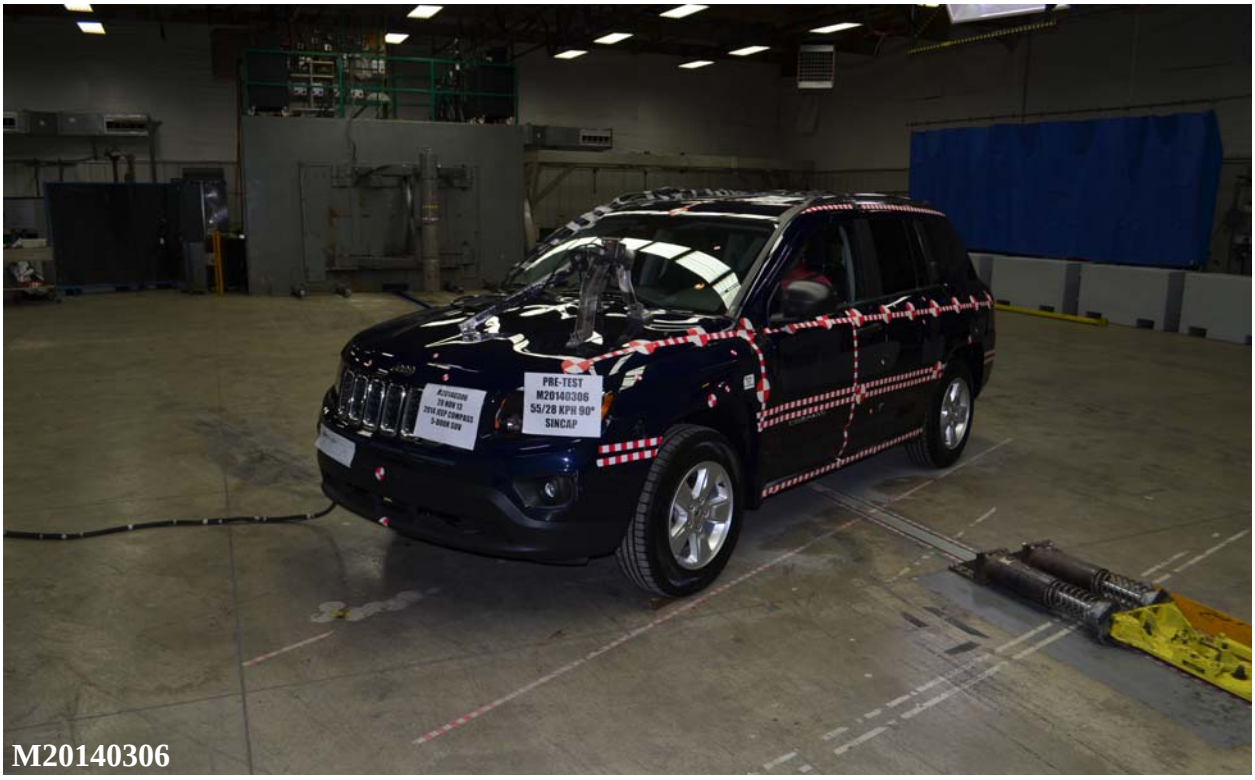


Figure A-5: Pre-Test Left Front 3-4 View of Test Vehicle

Figure A-6: Post-Test Left Front 3-4 View of Test Vehicle

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

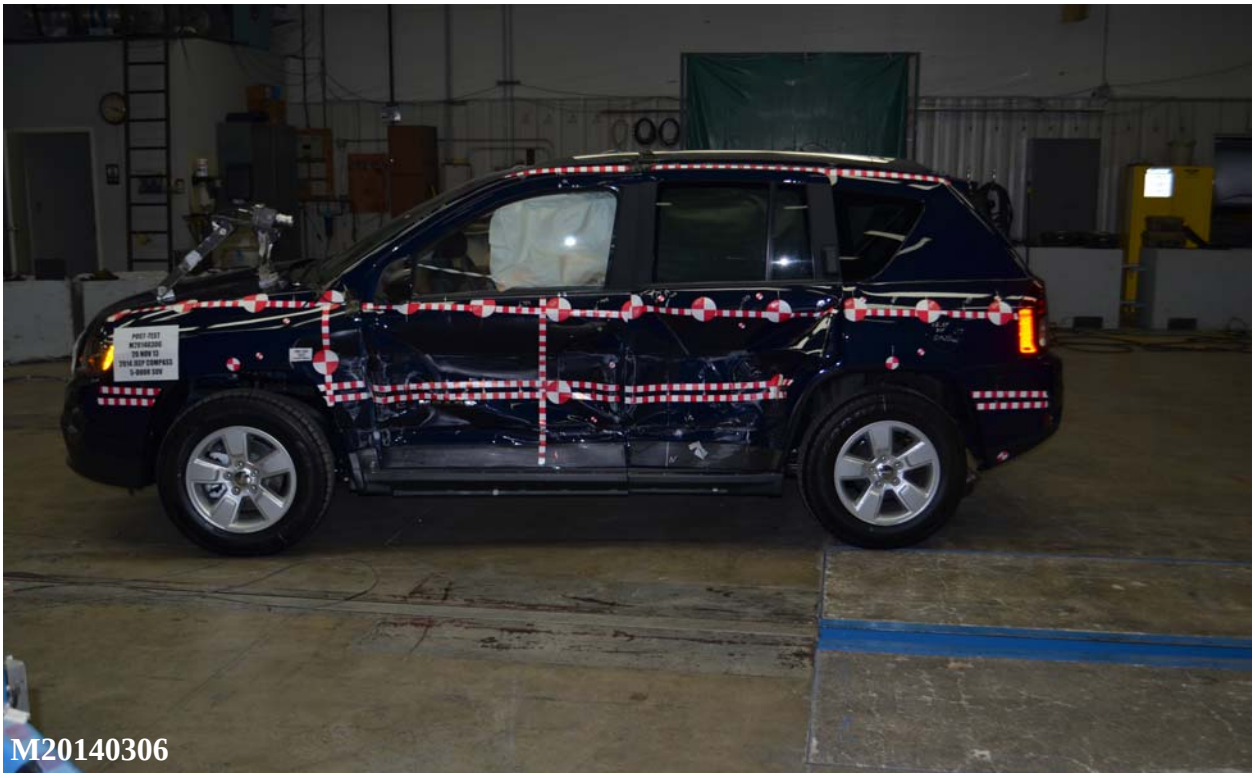


Figure A-8: Post-Test Left Side View of Test Vehicle

Figure A-9: Pre-Test Left Rear 3-4 View of Test Vehicle

Figure A-10: Post-Test Left Rear 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

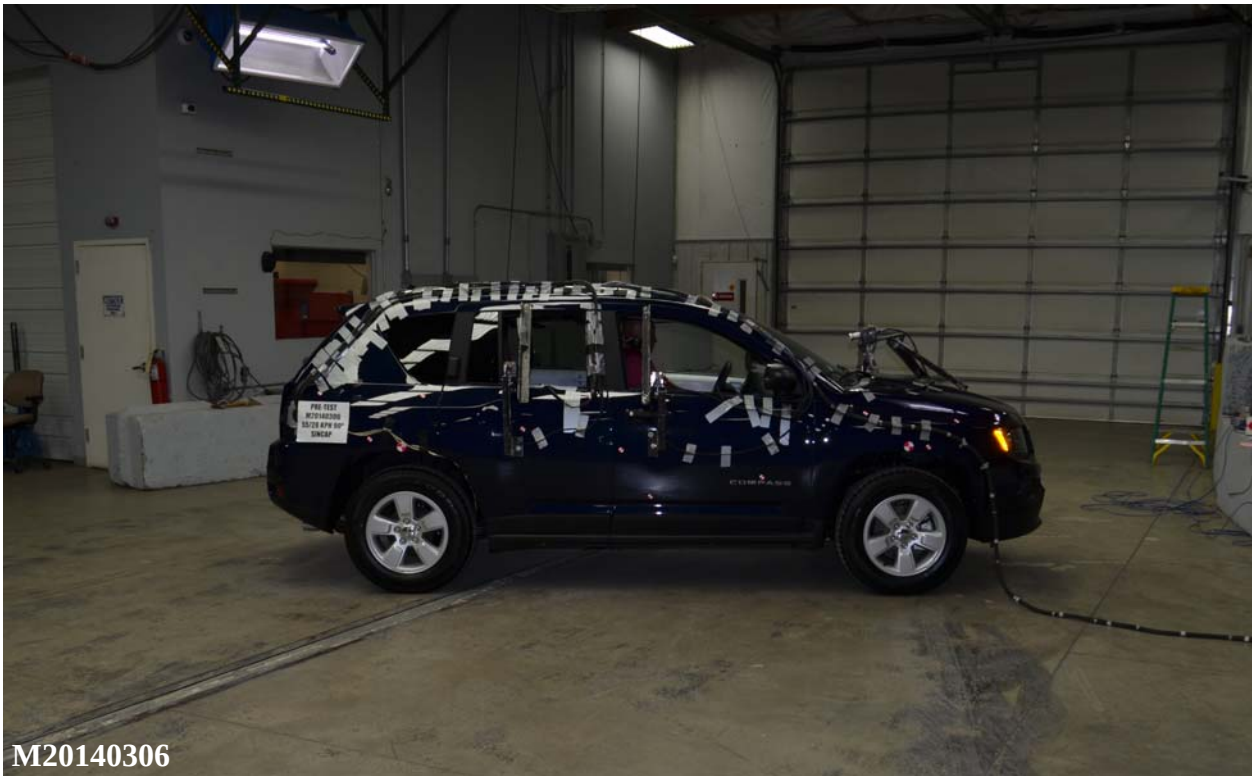


Figure A-13: Pre-Test Right Side View of Test Vehicle

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

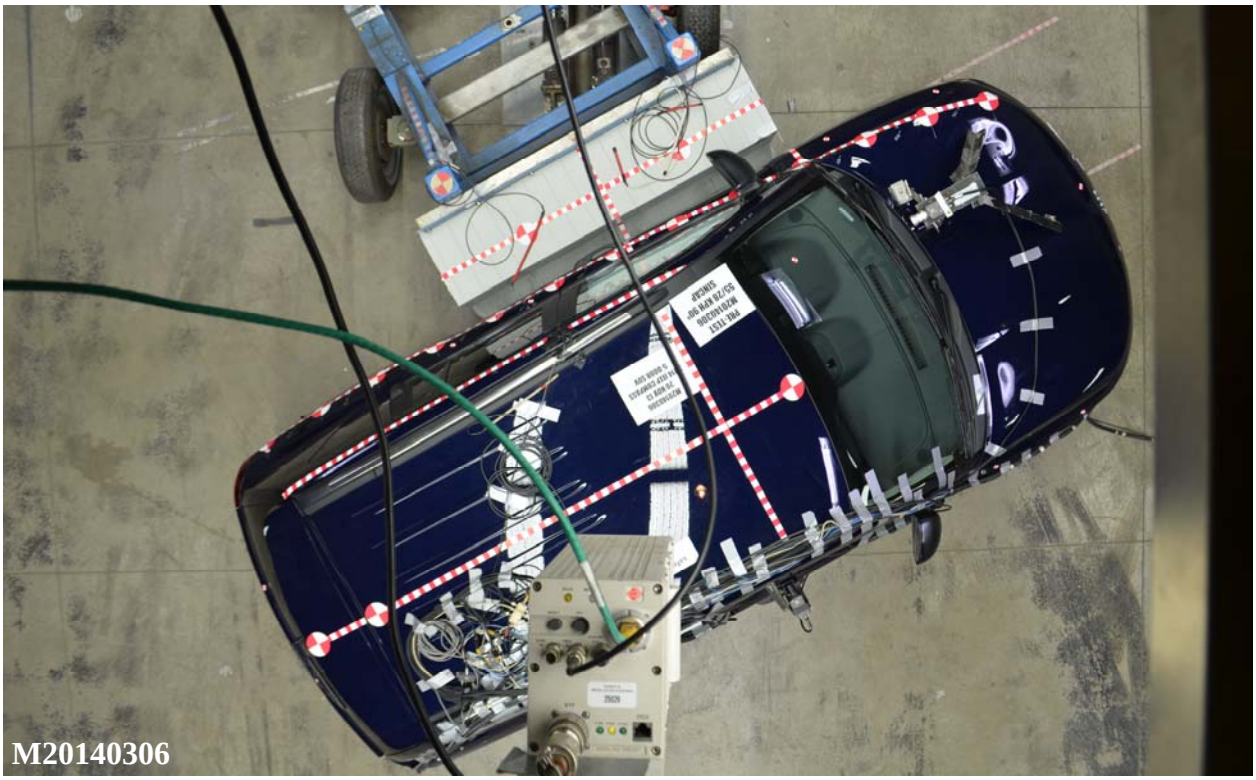


Figure A-15: Pre-Test Overhead View of Test Area

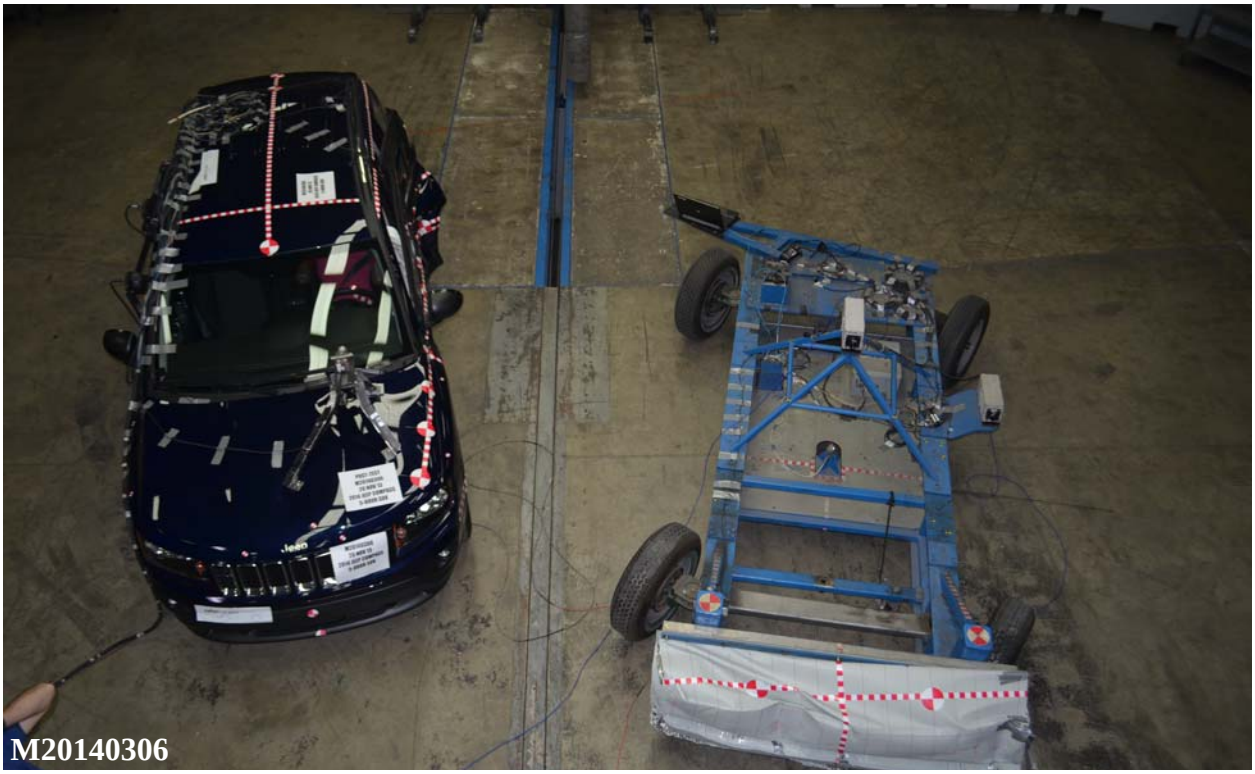


Figure A-16: Post-Test Overhead View of Test Area

Figure A-17: Pre-Test Left Side View of 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

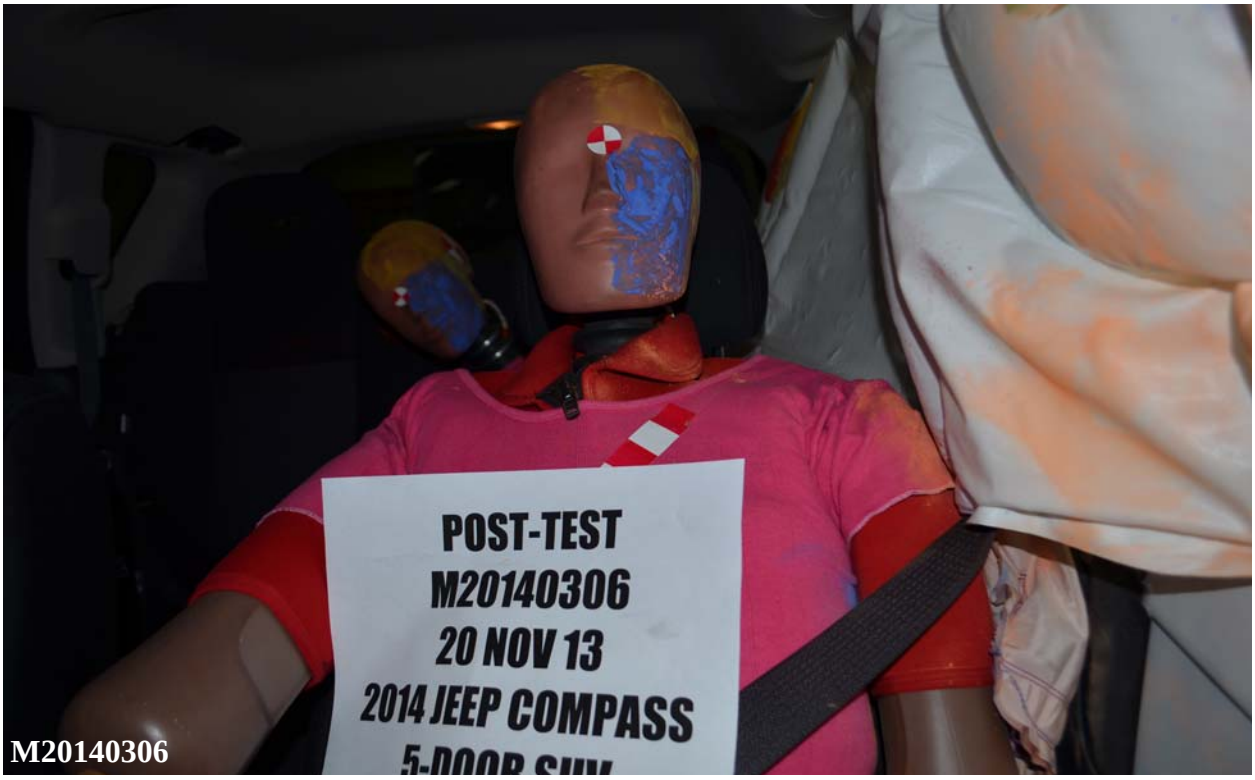


Figure A-26: Post-Test Front Close-Up View of Driver Dummy

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 Occupant Compartment

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

Figure A-47: Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations

Figure A-48: Post-Test Driver Dummy Close-Up Head Contact With Vehicle Interior 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 Air Bag View

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

Not Applicable

M20140306

Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View

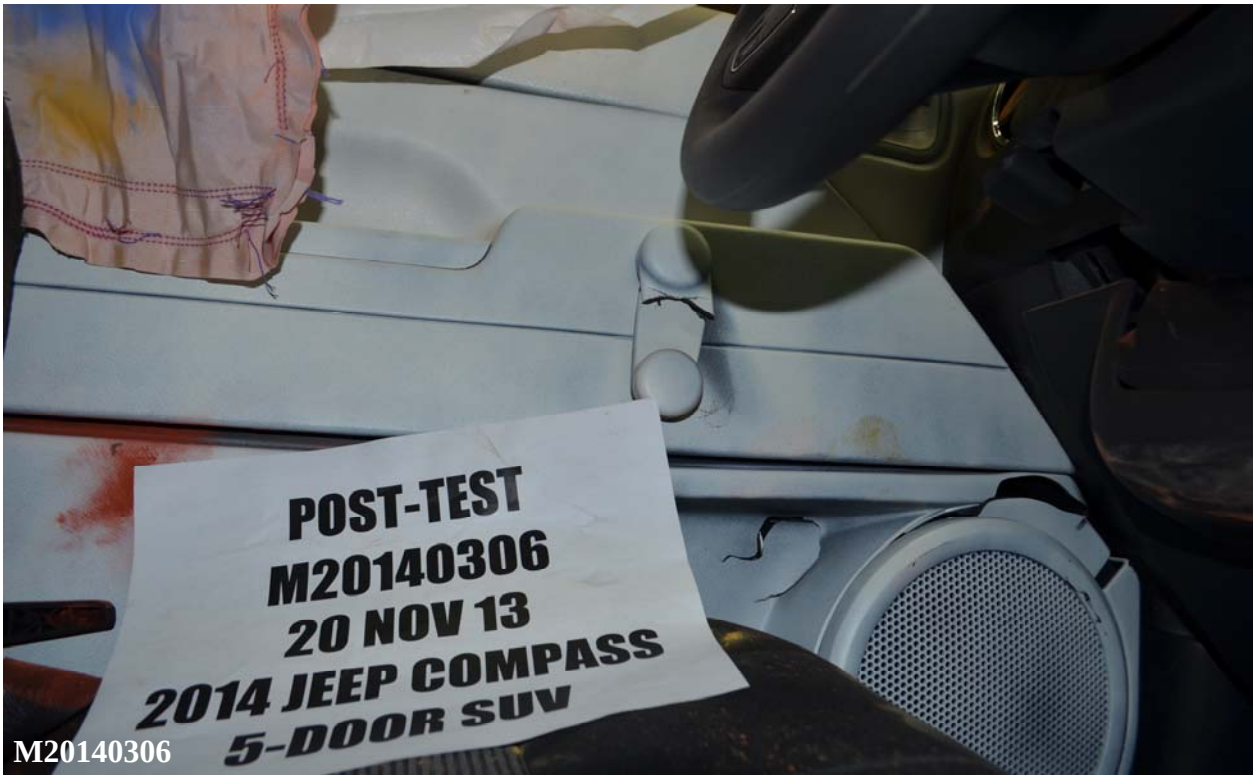


Figure A-54: Post-Test Driver Dummy Close-Up Knee Contact View

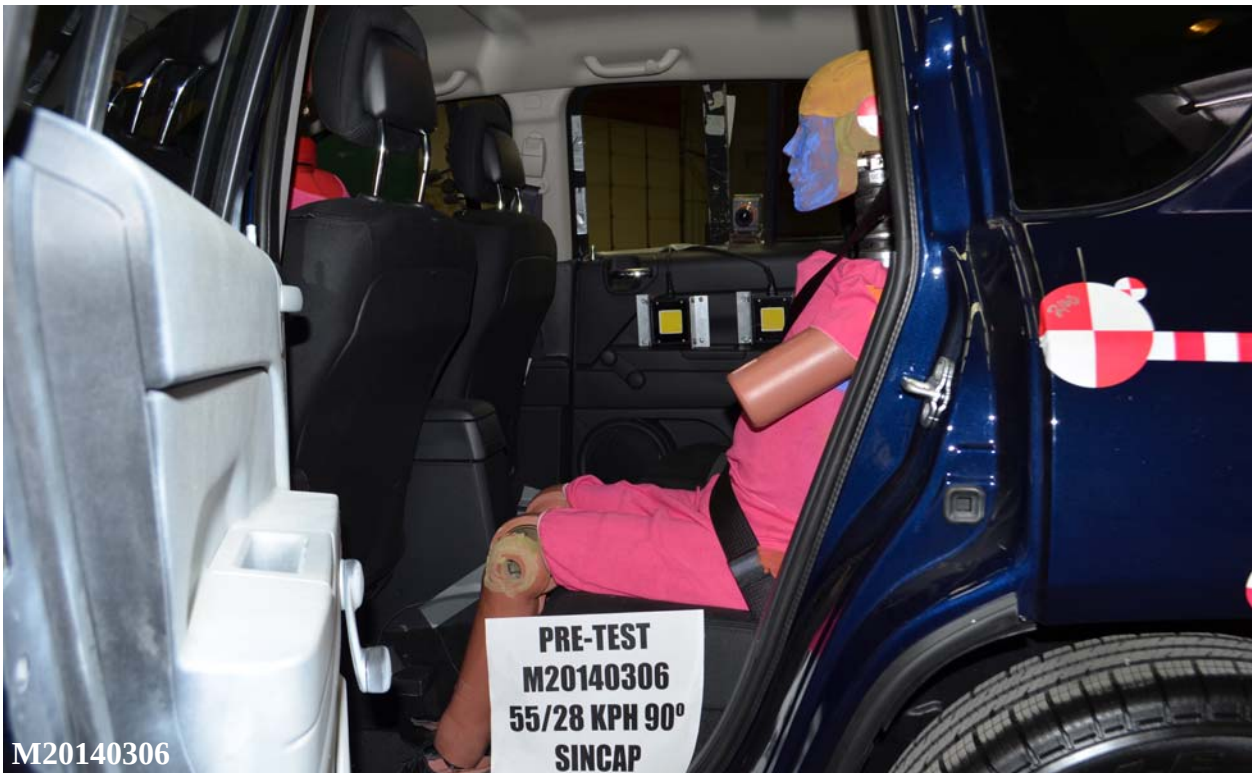


Figure A-55: Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking

Figure A-56: Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

Figure A-57: Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

Figure A-58: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

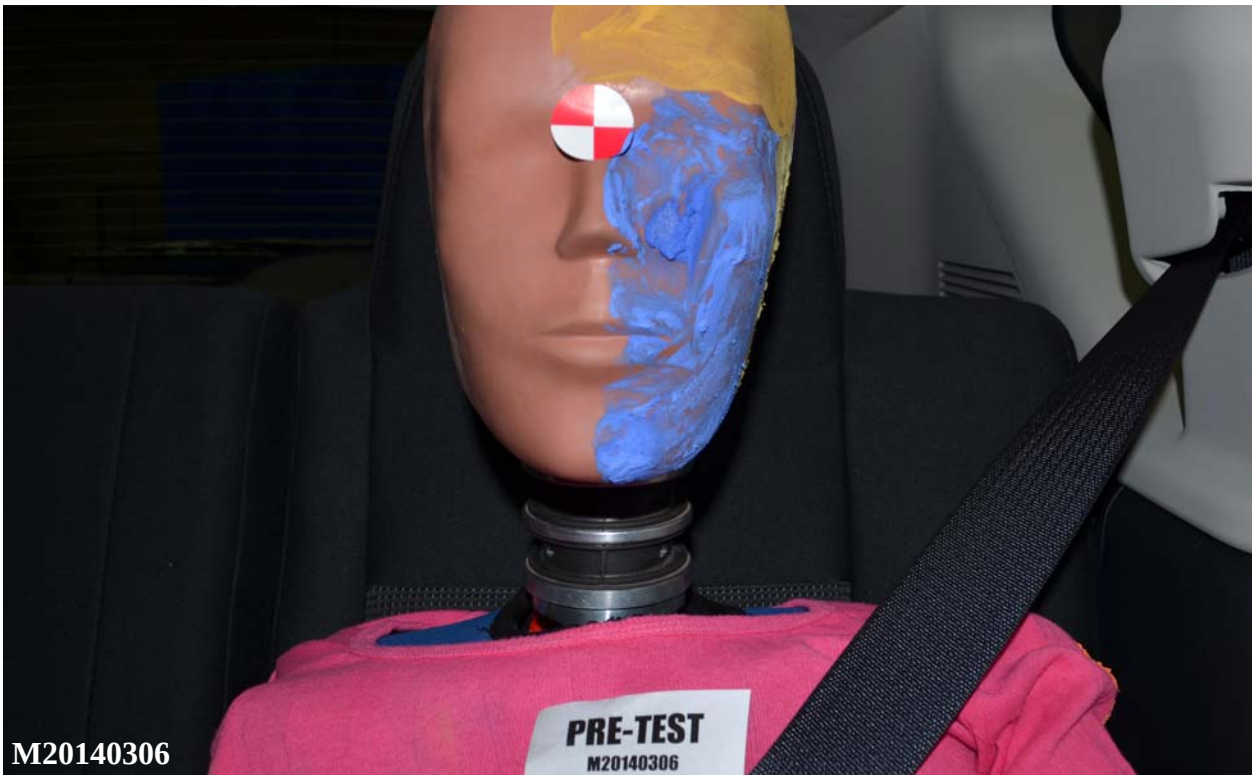


Figure A-59 - Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

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 Rear Passenger Dummy and Door Clearance View

Figure A-70: Post-Test Rear 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 Rear Passenger Inner Door Panel View

Figure A-74: Post-Test Rear Passenger Inner Door Panel View Showing Dummy Contact Locations

Not Applicable

M20140306

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

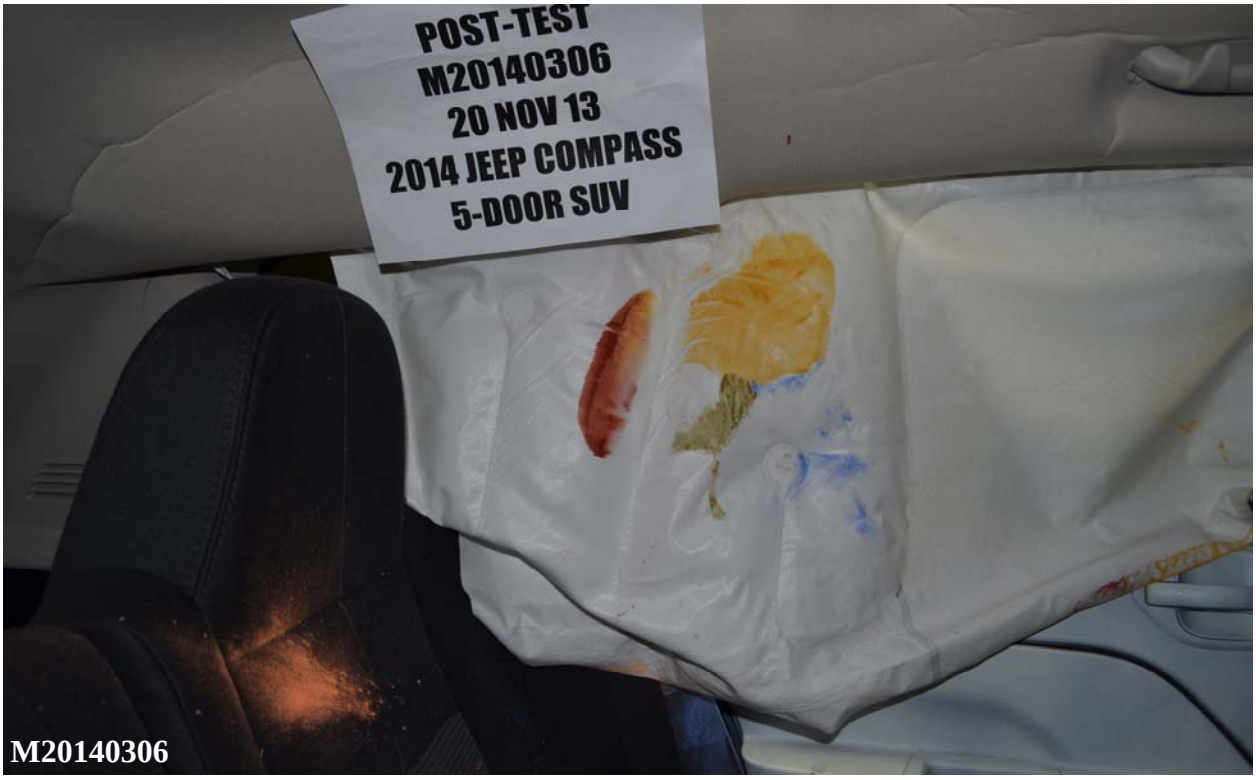


Figure A-76: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

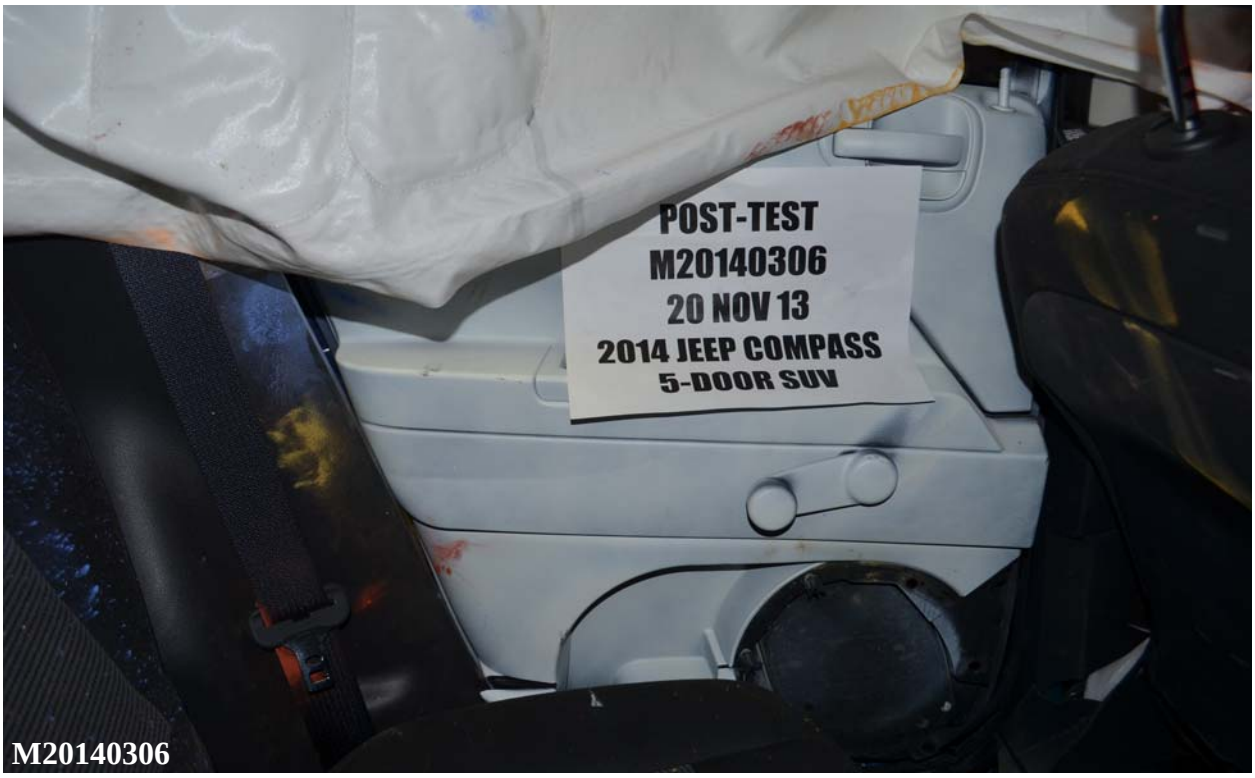


Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

Not Applicable

M20140306

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 with Vehicle Interior View

Not Applicable

M20140306

Figure A-80: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

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

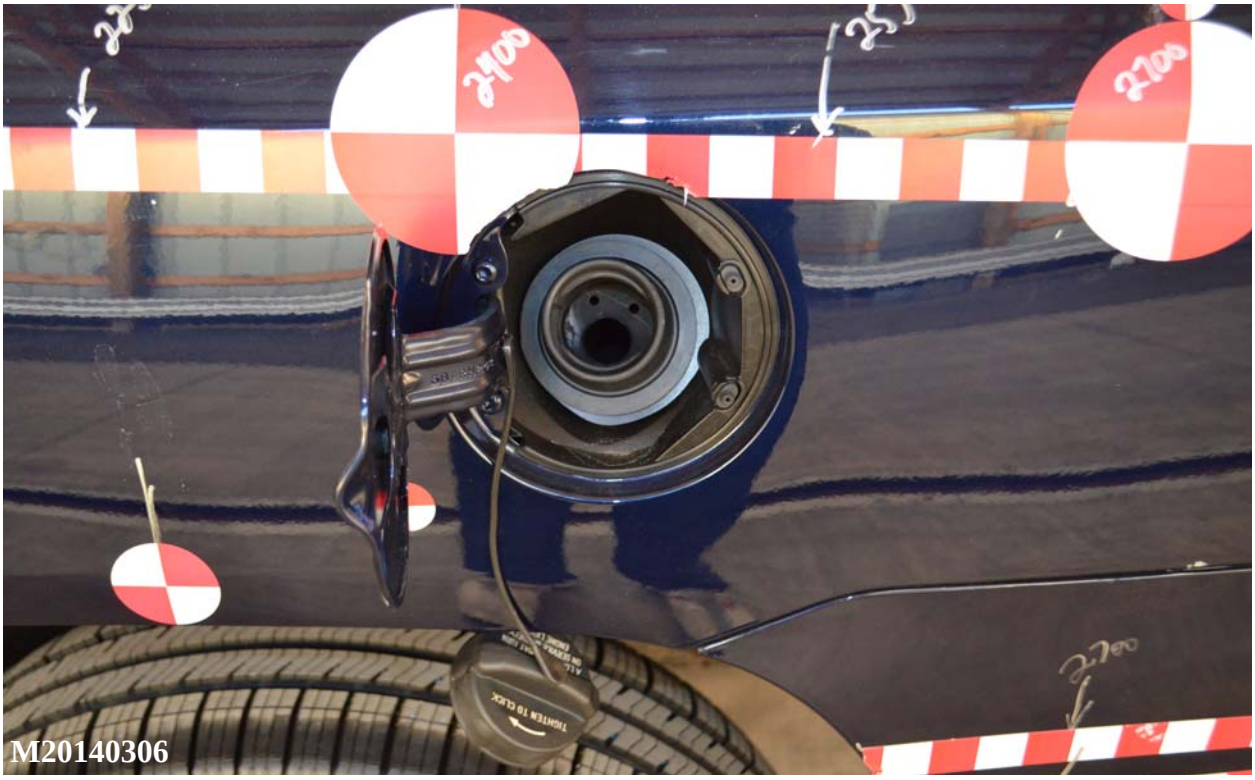


Figure A-82: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

Figure A-83: Post-Test View of Fuel Filler Cap or Fuel Filler Neck

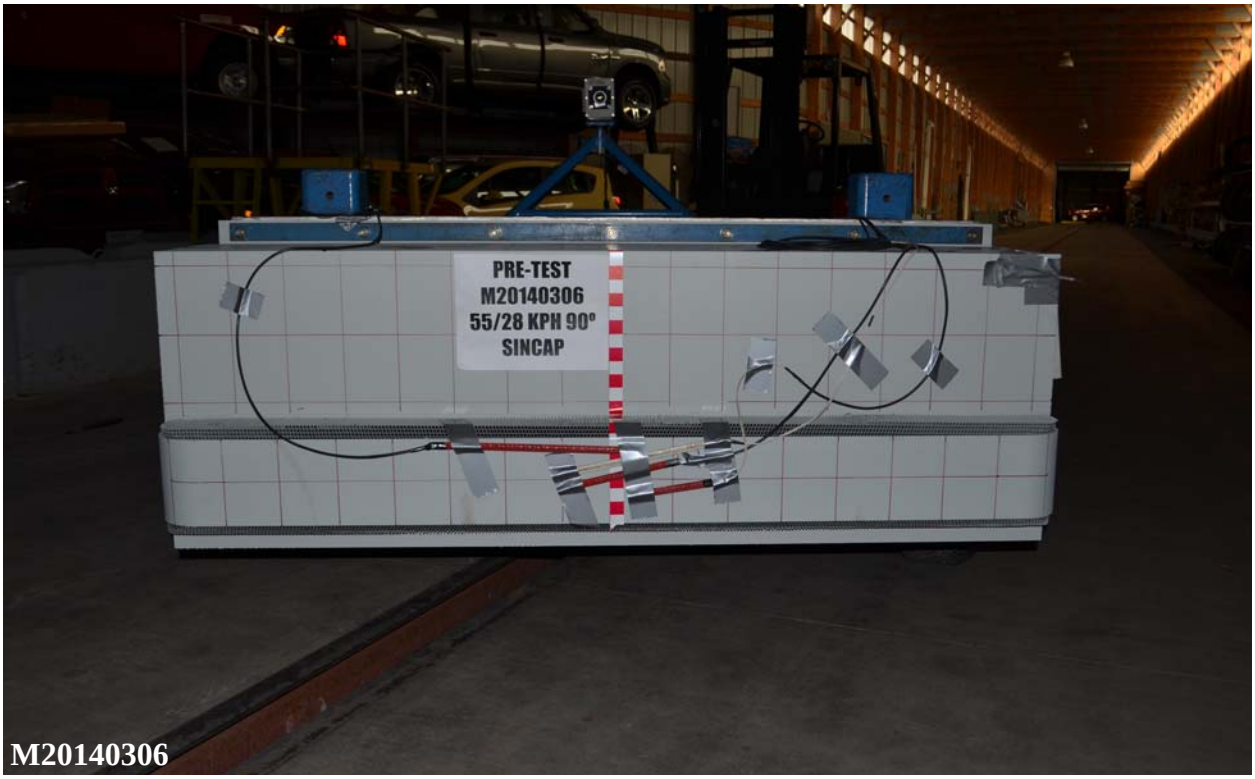


Figure A-84: Pre-Test Front View of MDB Impactor Face

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

Figure A-86: Pre-Test Top View of MDB Impactor Face

Figure A-87: Post-Test Top View of MDB Impactor Face

Figure A-88: Pre-Test Left Side View of MDB Impactor Face

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

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

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

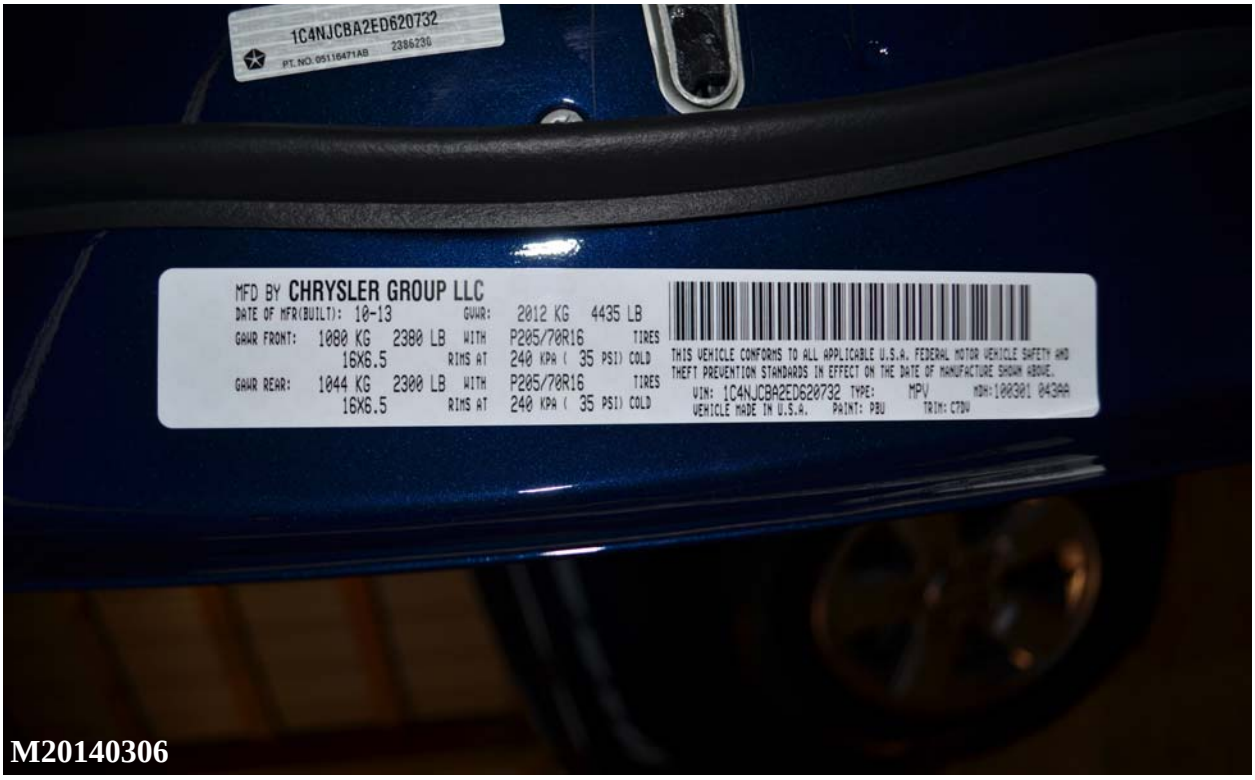


Figure A-92: Close-Up View of Vehicle's Certification Label

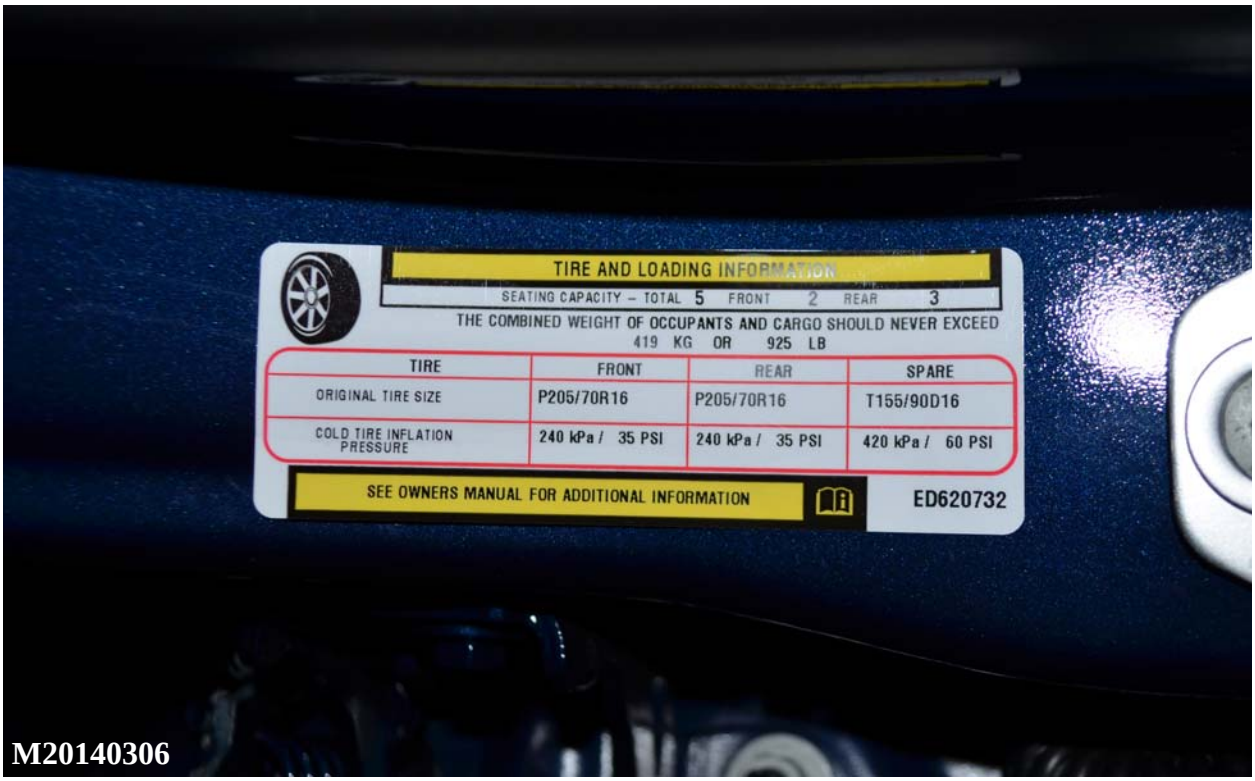


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label

Figure A-94: Pre-Test Ballast View

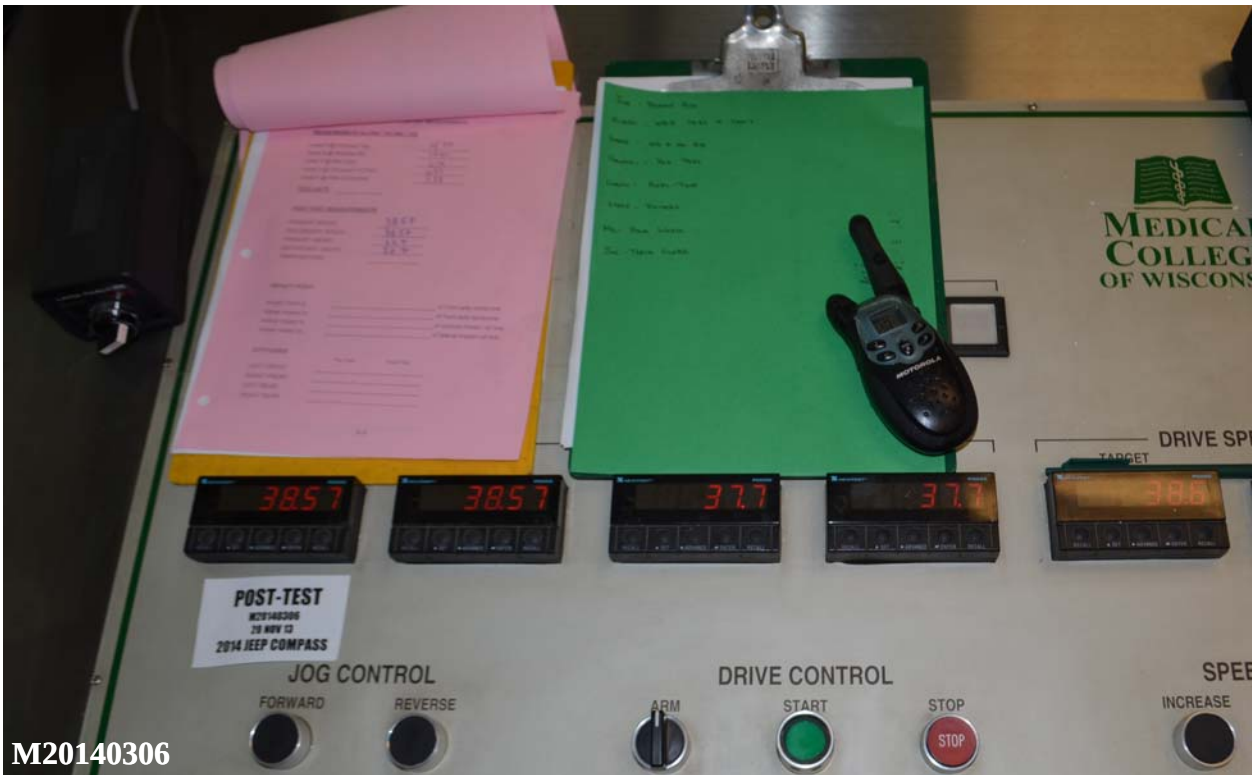


Figure A-95: Post-Test Primary and Redundant Speed Trap Read-Out

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

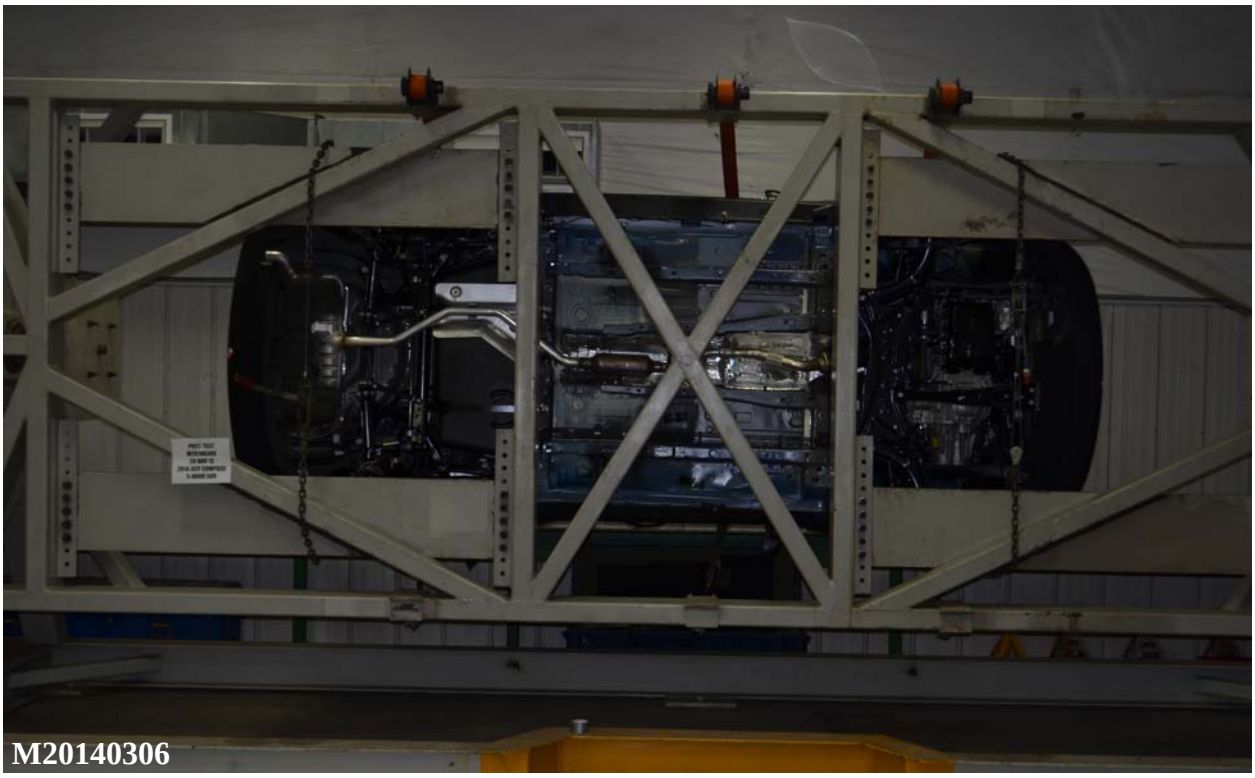


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

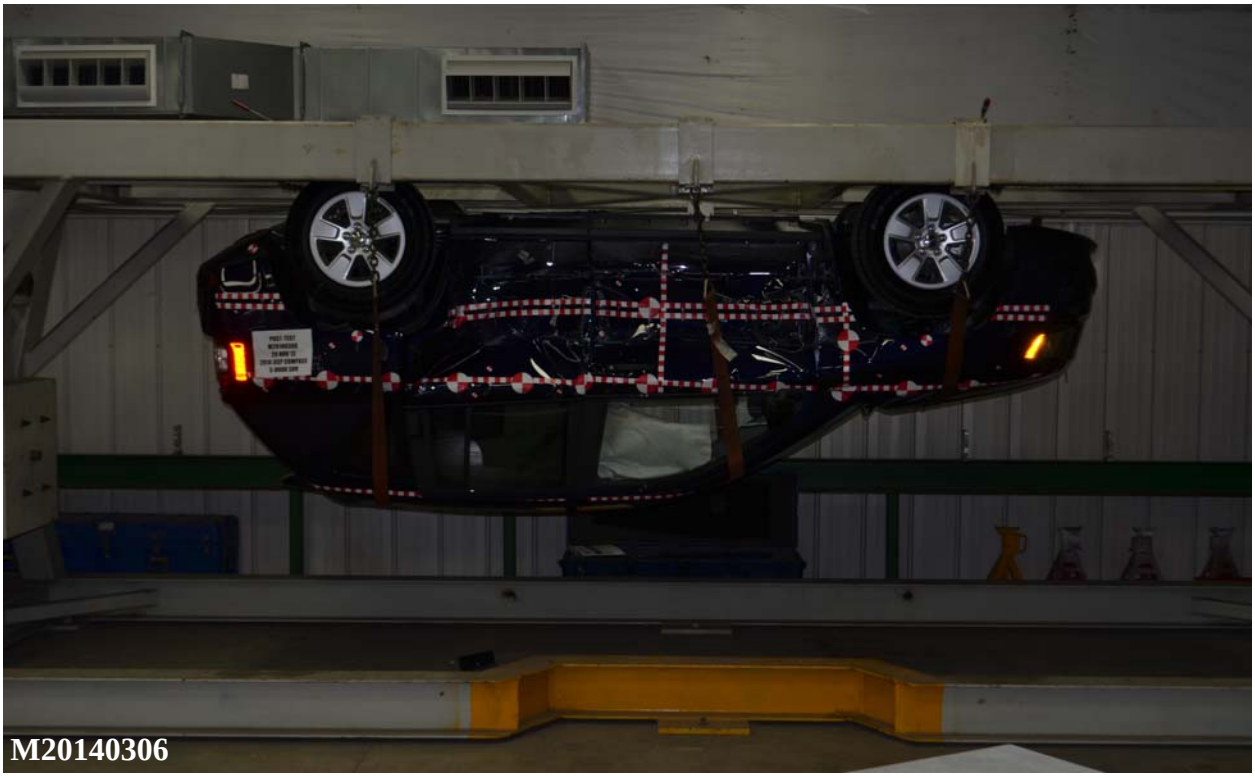


Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees

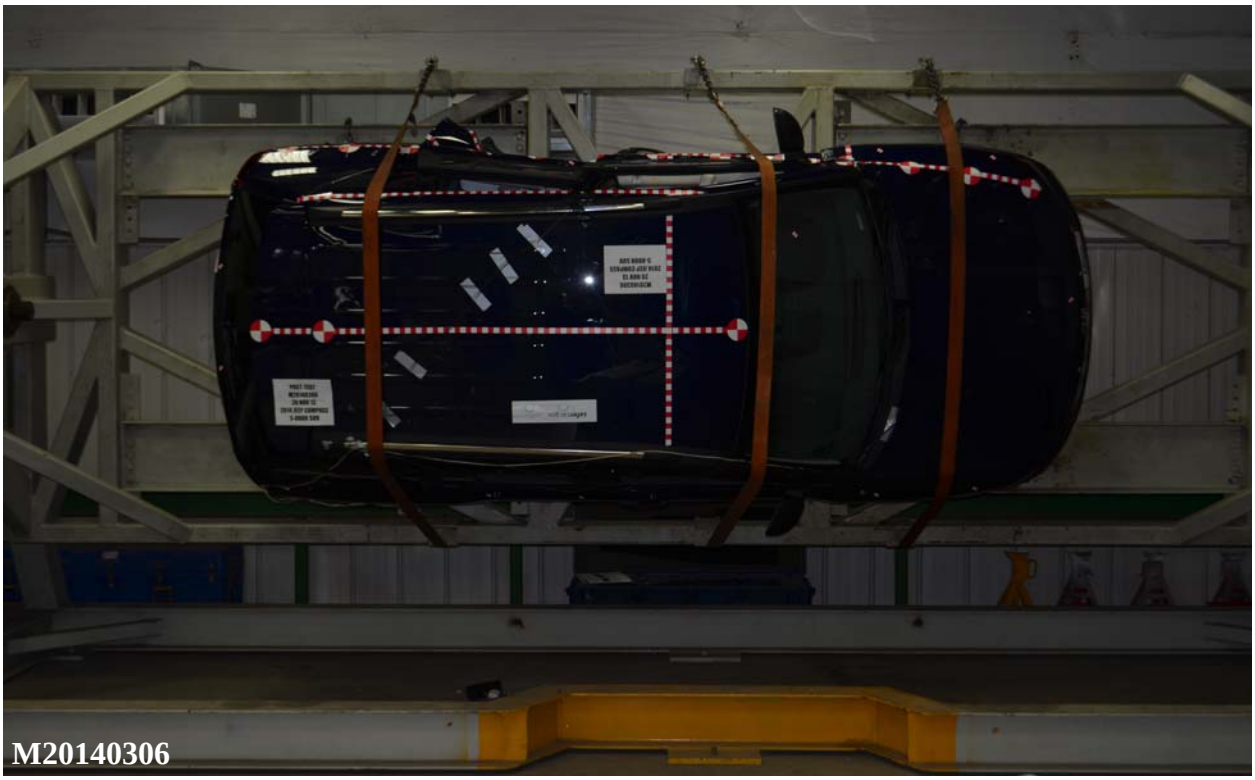


Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees

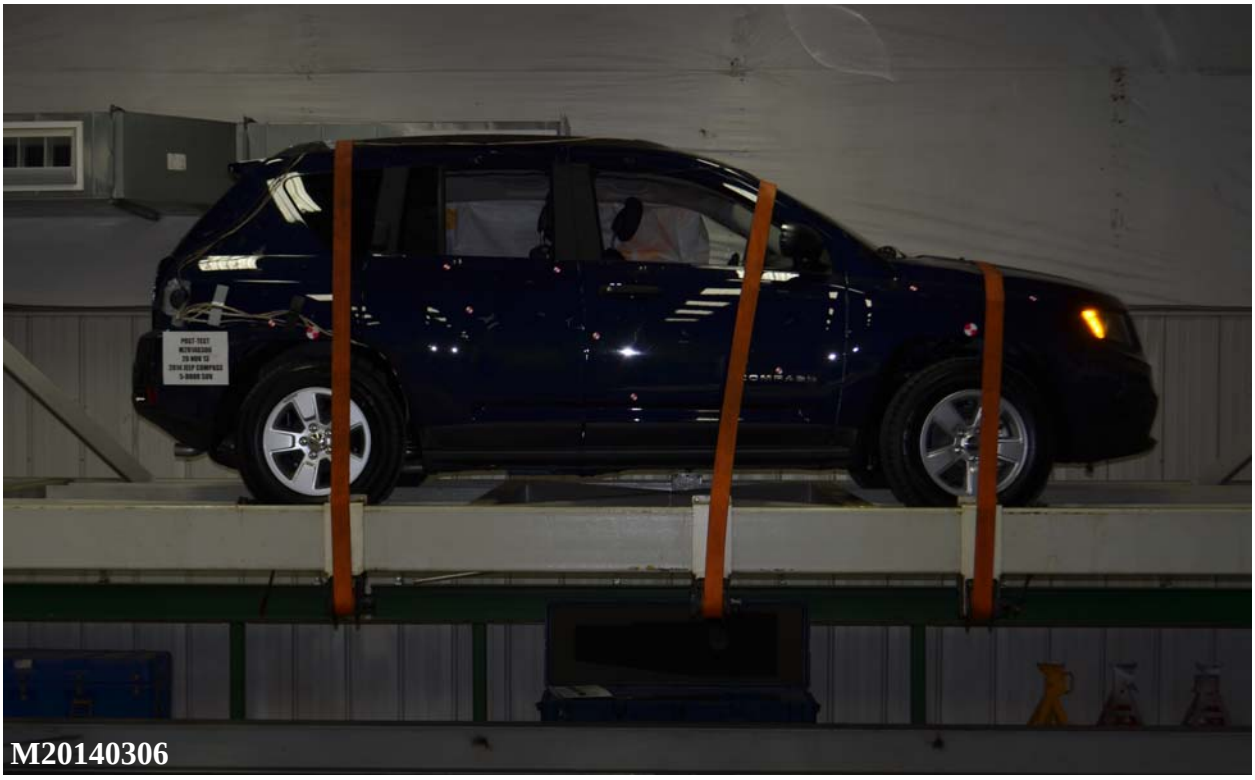


Figure A-100: FMVSS No. 301 Static Rollover 360 Degrees

Figure A-101: Impact Event

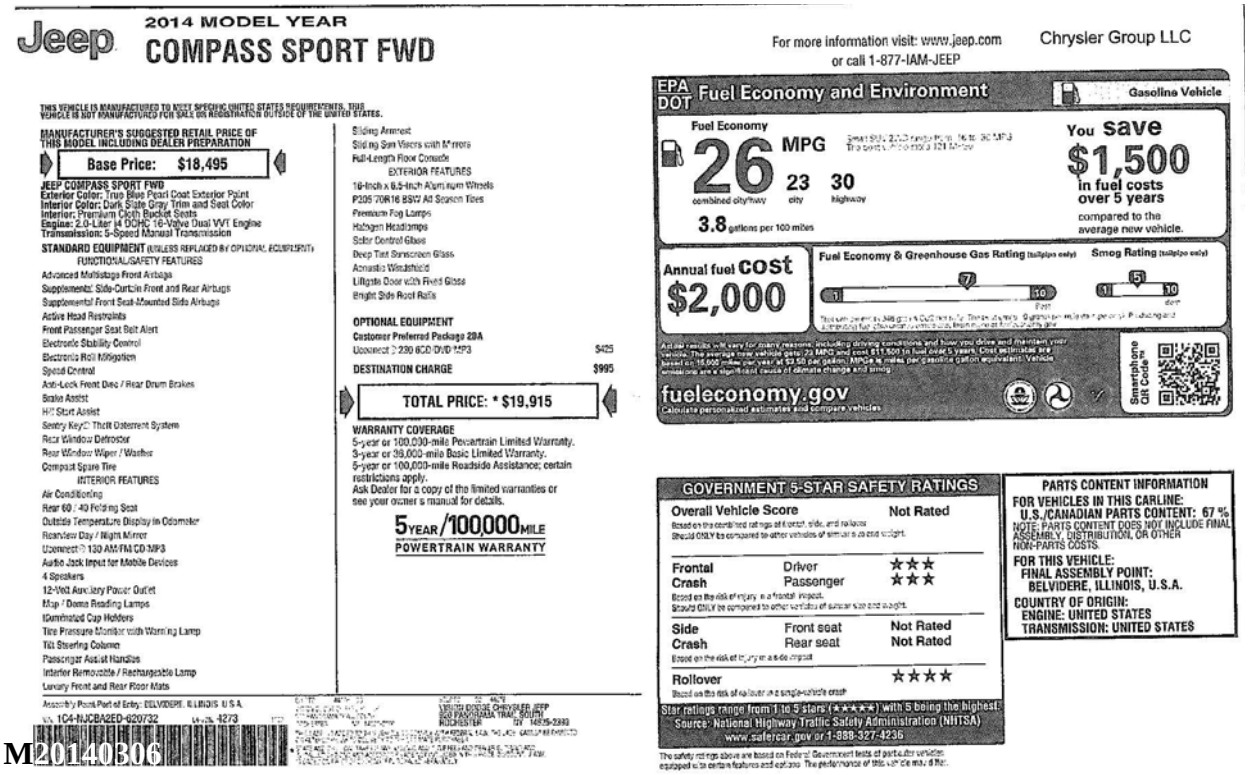
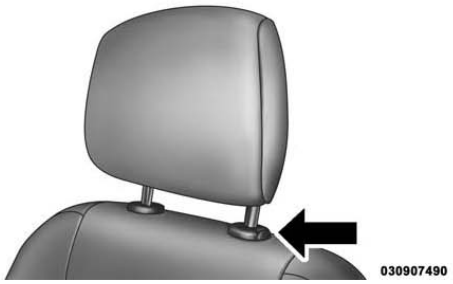


Figure A-102: Monroney Label



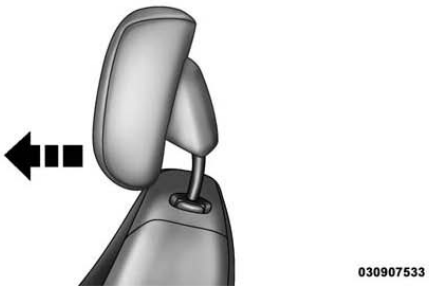
Push Button

For comfort the Active Head Restraints can be tilted forward and backward. To tilt the head restraint closer to the back of your head, pull forward on the bottom of the head restraint. Push rearward on the bottom of the head restraint to move the head restraint away from your head.

Active Head Restraint (Normal Position)

M20140306

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



Active Head Restraint (Tilted Position)

NOTE:

- The head restraints should only be removed by qualified technicians, for service purposes only. If either of the head restraints require removal, see your authorized dealer.

- In the event of deployment of an Active Head Restraint, refer to "Occupant Restraints/Resetting Active Head Restraints (AHR)" in "Things To Know Before Starting Your Vehicle" for further information.

WARNING!

- Do not place items over the top of the Active Head Restraint, such as coats, seat covers or portable DVD players. These items may interfere with the operation of the Active Head Restraint in the event of a collision and could result in serious injury or death.

(Continued)

M20140306

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

APPENDIX B
DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS

The following plots are provided in the test report

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 T_{12} Acceleration (X)
Driver Lower Spine T_{12} Acceleration (Y)
Driver Lower Spine T_{12} 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

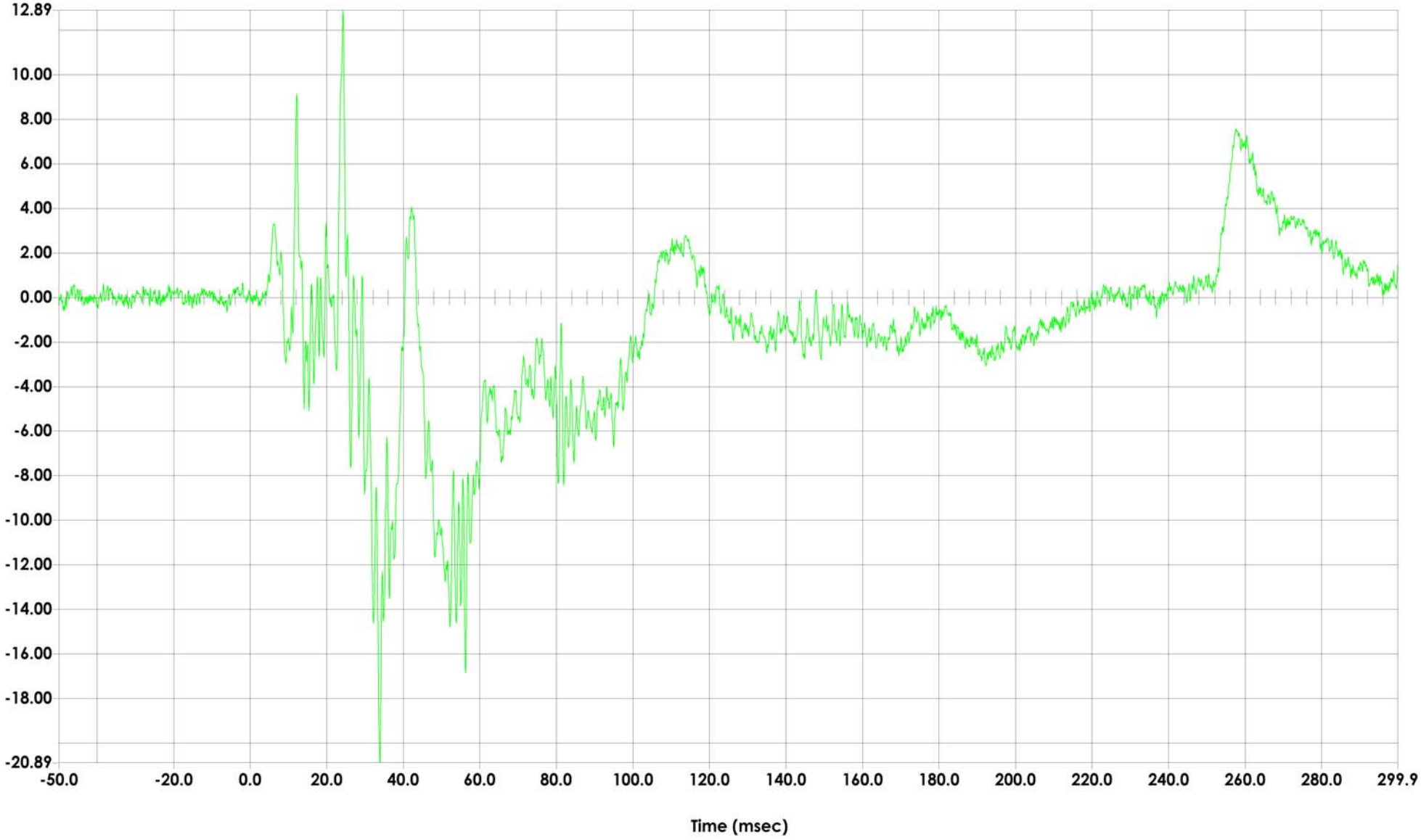
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	001
Units	G'S

Max	12.89	G'S
	24.24	msec
Min	-20.89	G'S
	33.92	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Head Acceleration (X) Primary vs. Time

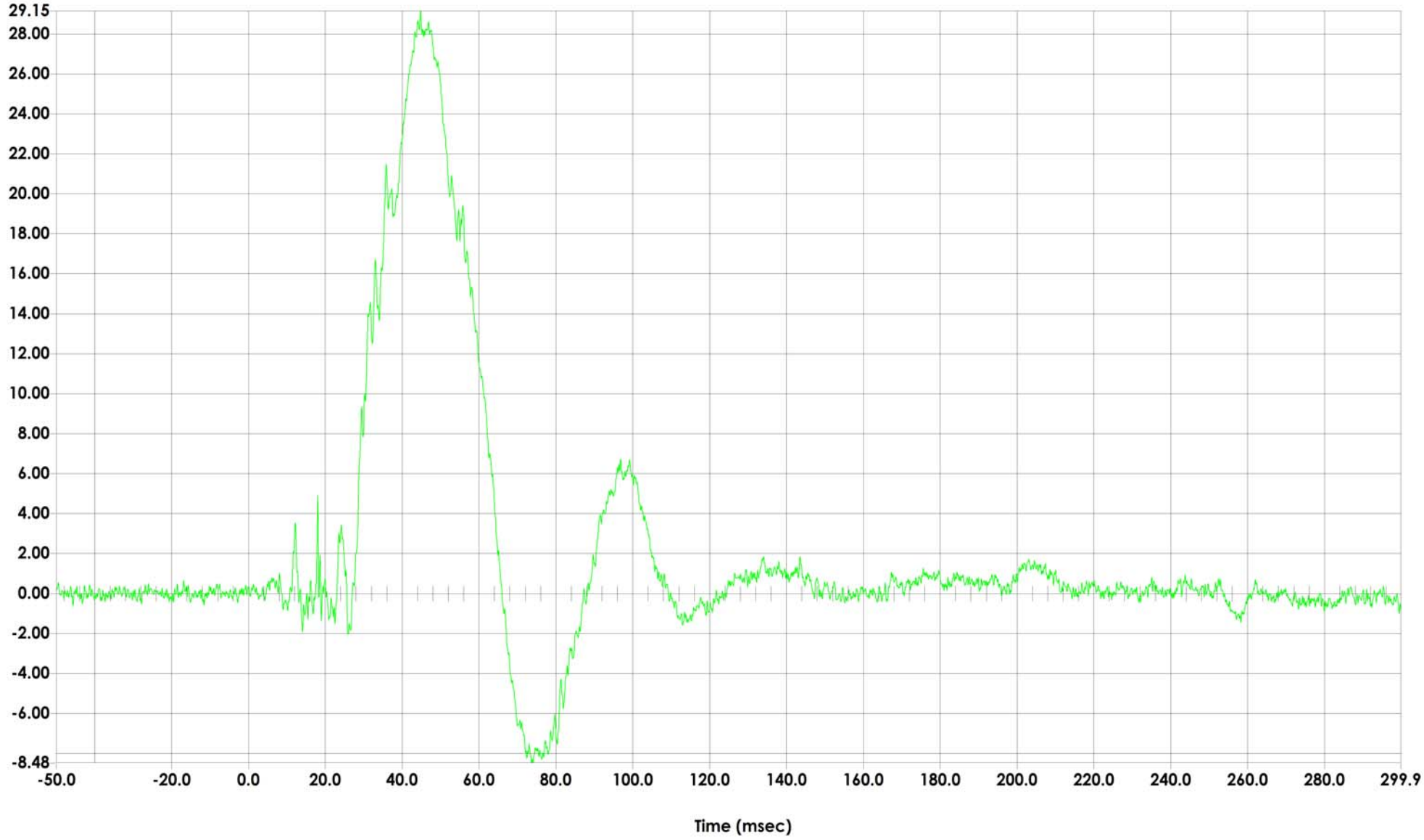


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	002
Units	G'S

Max	29.15	G'S
	44.80	msec
Min	-8.48	G'S
	74.00	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Head Acceleration (Y) Primary vs. Time

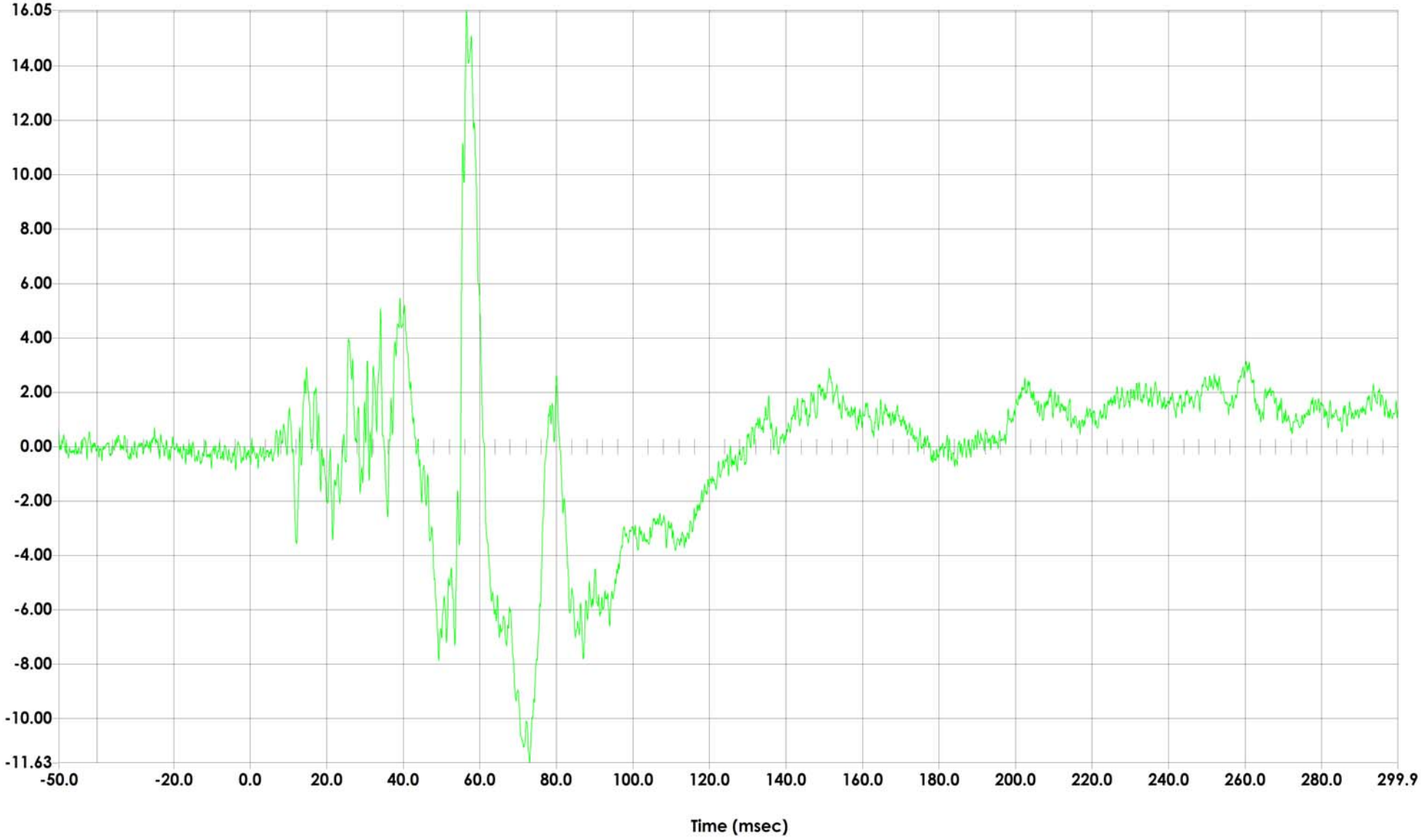


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	003
Units	G'S

Max	16.05	G'S
	56.56	msec
Min	-11.63	G'S
	73.04	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Head Acceleration (Z) Primary vs. Time

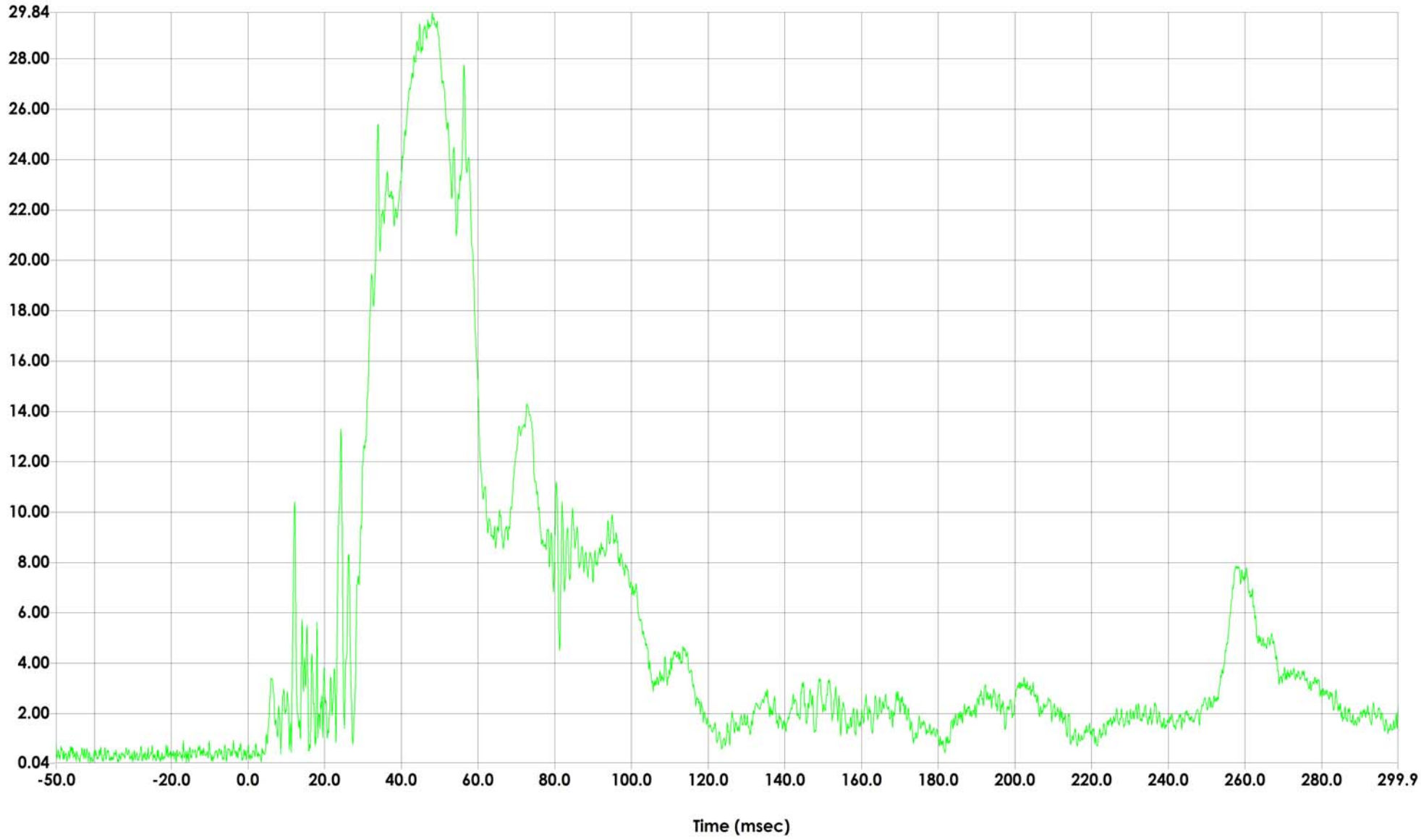


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	056
Units	G'S

Max	29.84	G'S
	48.08	msec
Min	0.04	G'S
	-41.12	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Head Resultant Acceleration Primary vs. Time

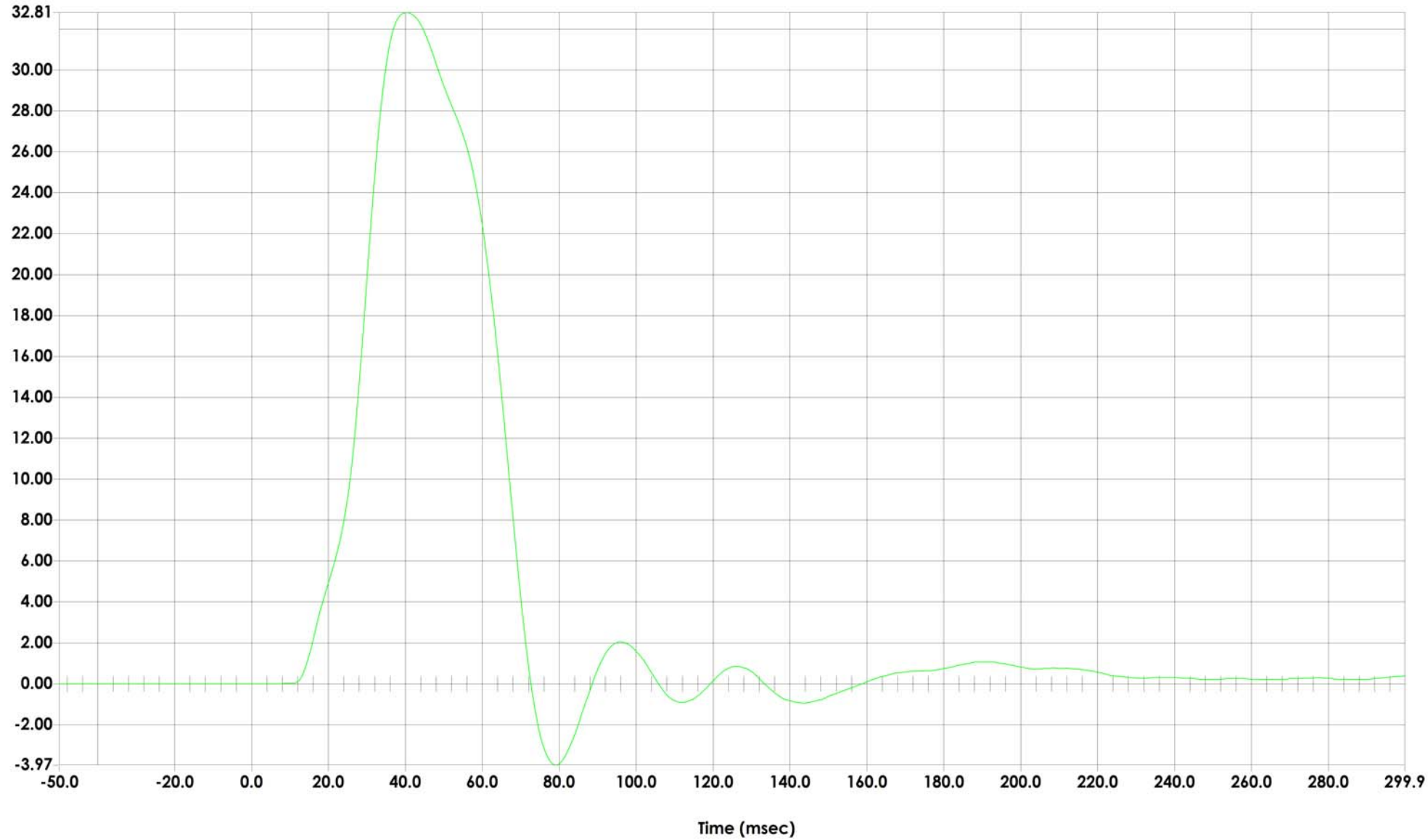


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	007
Units	MM

Max	32.81	MM
	40.32	msec
Min	-3.97	MM
	79.12	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Upper Thorax Rib Deflection (Y) vs. Time

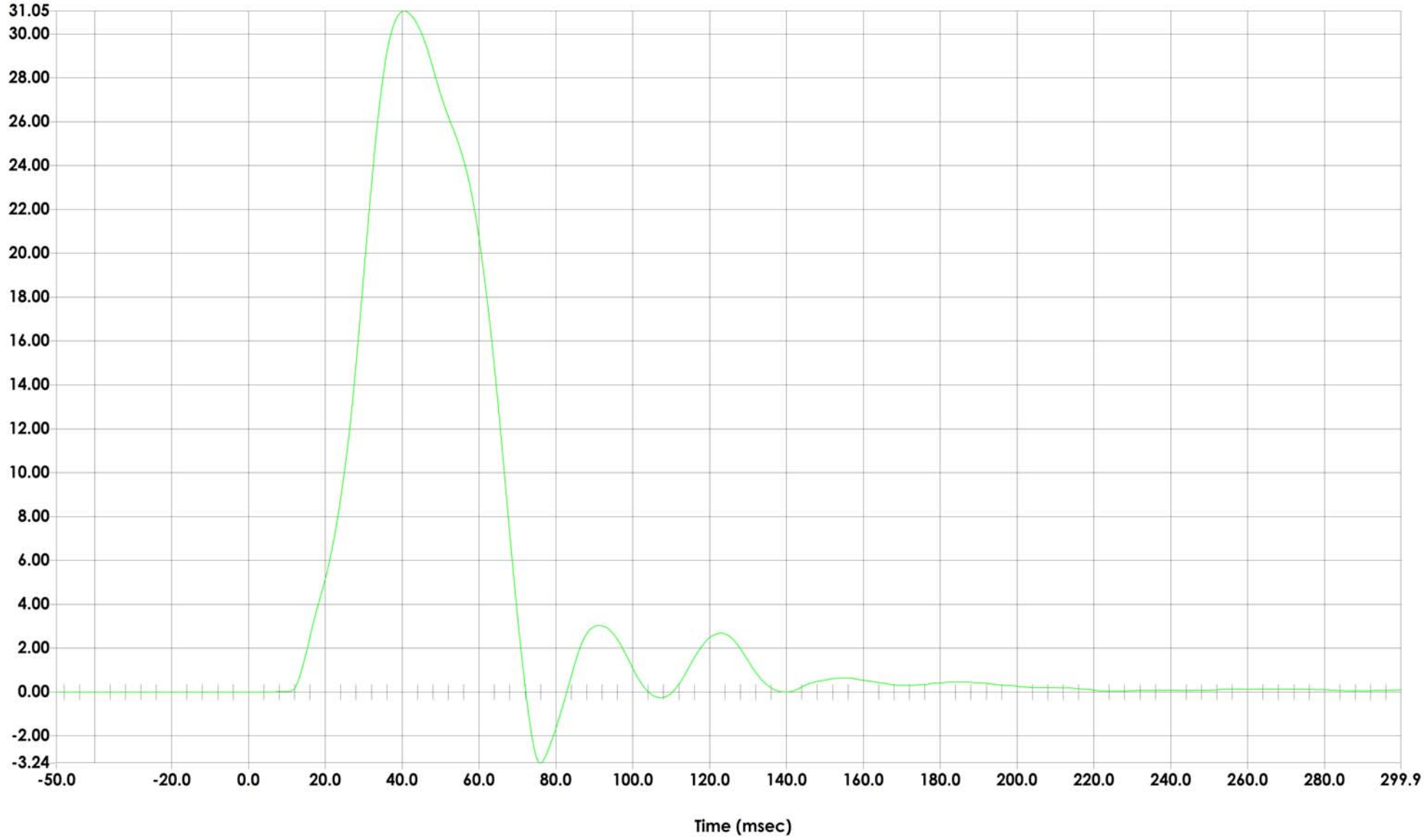


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	008
Units	MM

Max	31.05	MM
	40.48	msec
Min	-3.24	MM
	75.92	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Middle Thorax Rib Deflection (Y) vs. Time

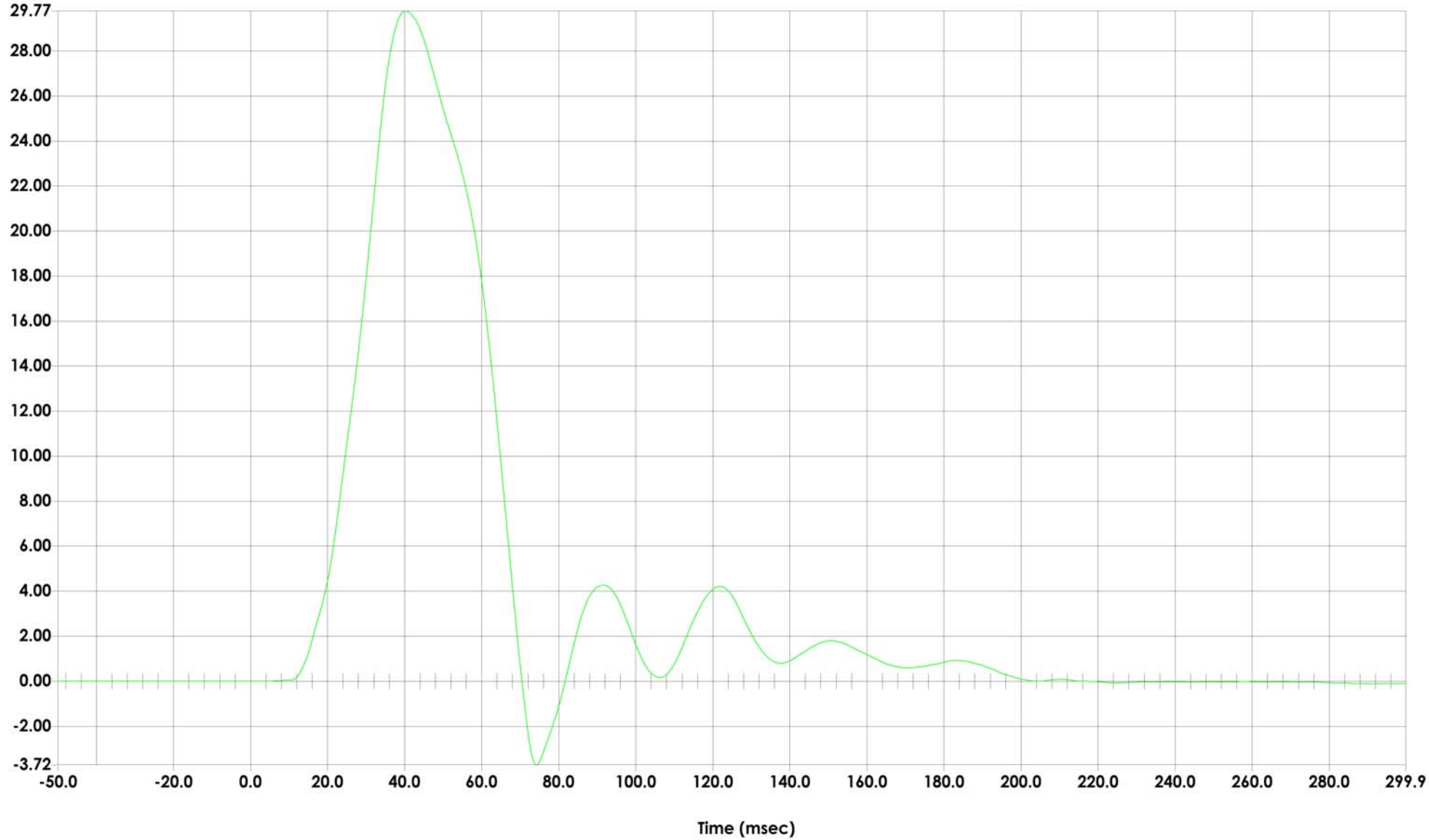


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	009
Units	MM

Max	29.77	MM
	40.24	msec
Min	-3.72	MM
	74.16	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Lower Thorax Rib Deflection (Y) vs. Time

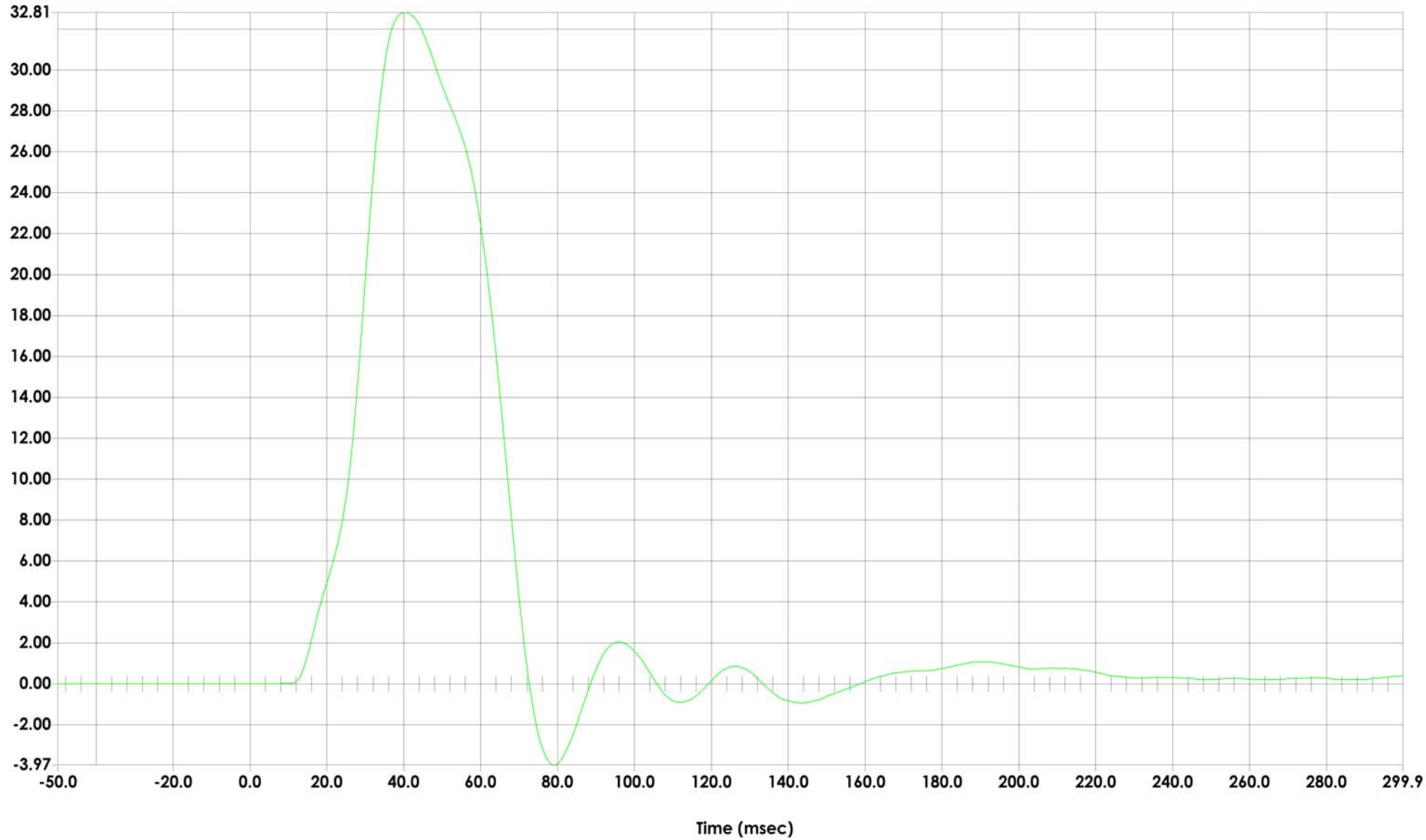


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	007
Units	MM

Max	32.81	MM
	40.32	msec
Min	-3.97	MM
	79.12	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Thorax Rib Deflection Maximum (Y) vs. Time

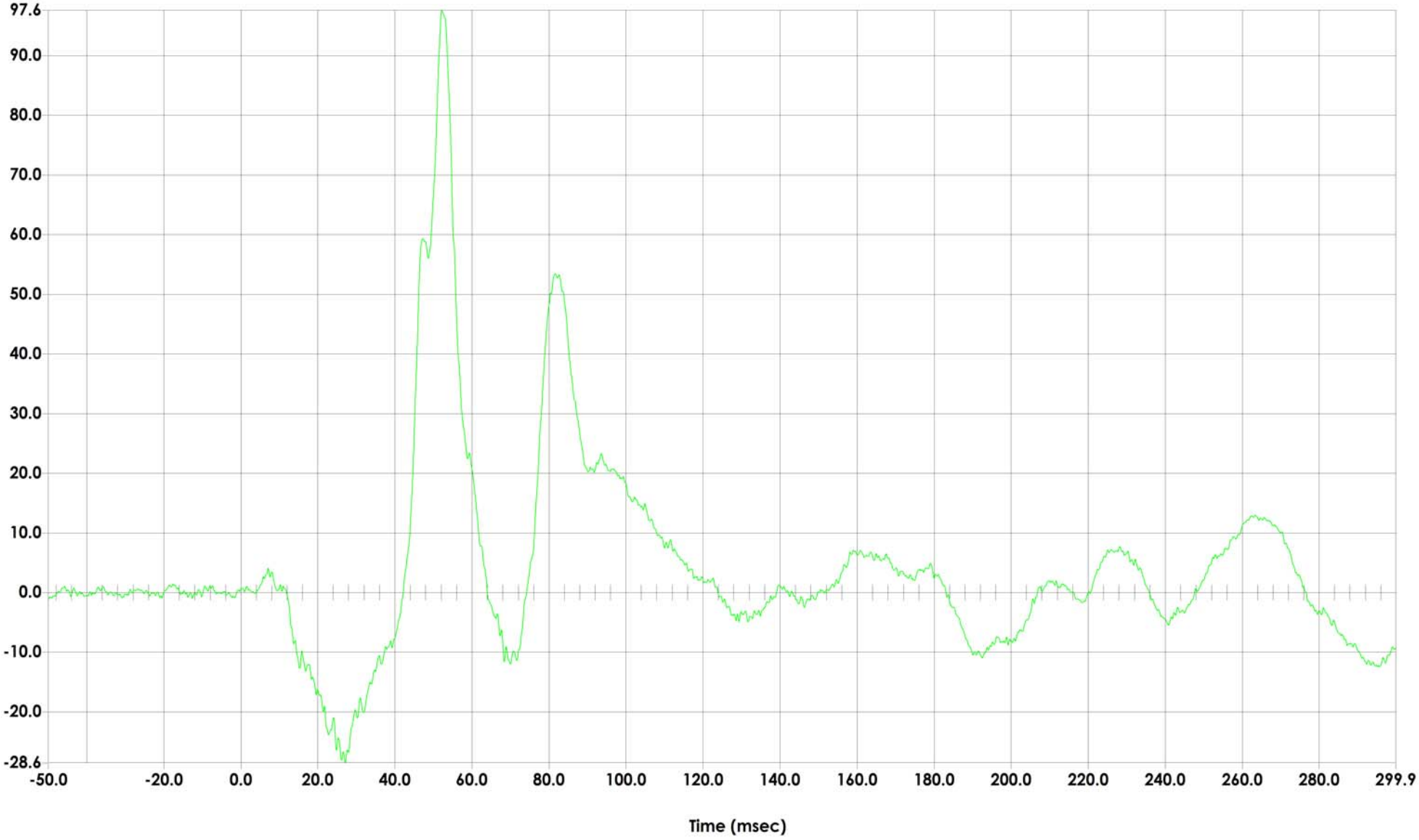


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	010
Units	NWT

Max	97.60	NWT
	52.16	msec
Min	-28.55	NWT
	27.12	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Anterior Abdominal Force (Y) vs. Time

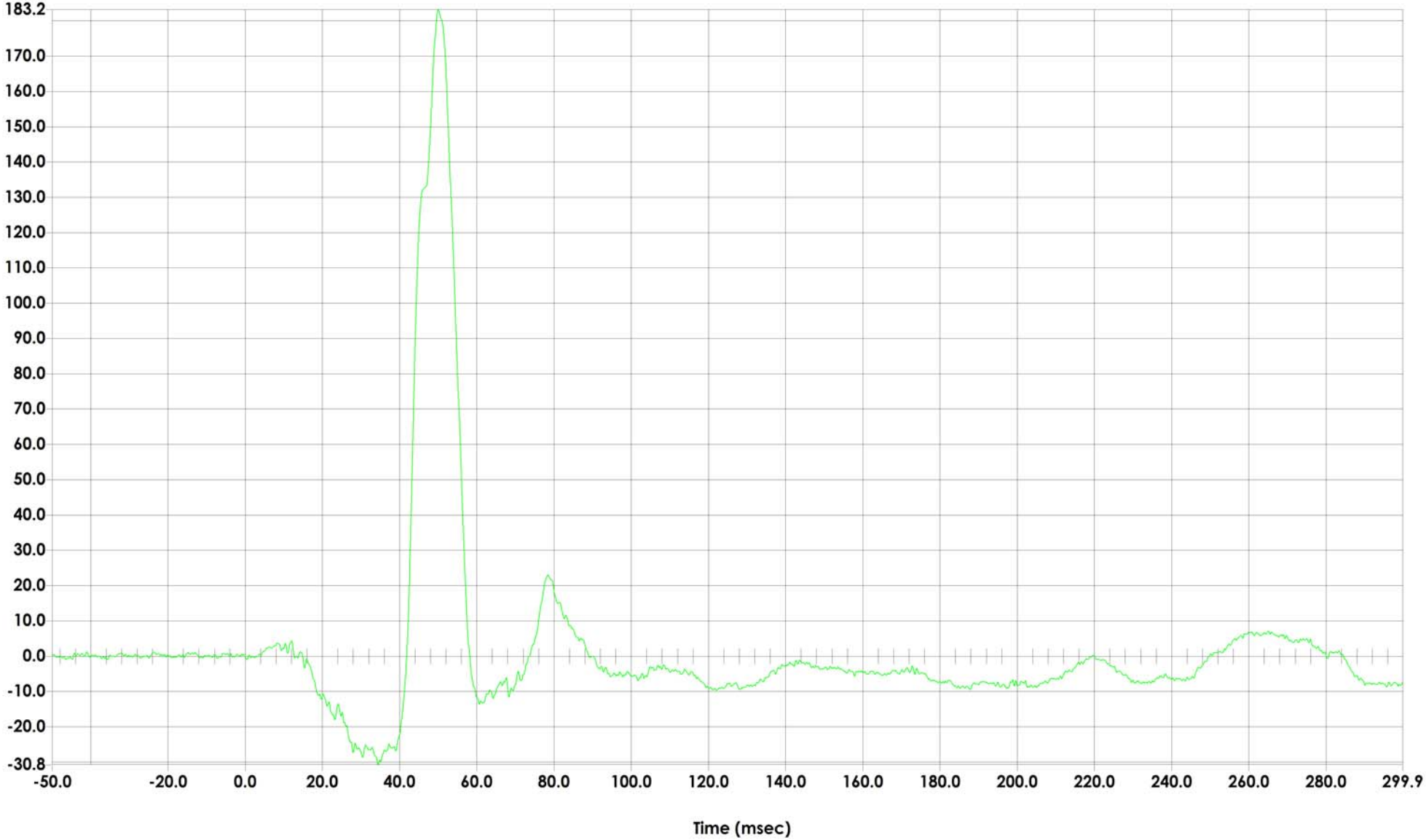


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	011
Units	NWT

Max	183.17	NWT
	49.92	msec
Min	-30.78	NWT
	34.40	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Middle Abdominal Force (Y) vs. Time

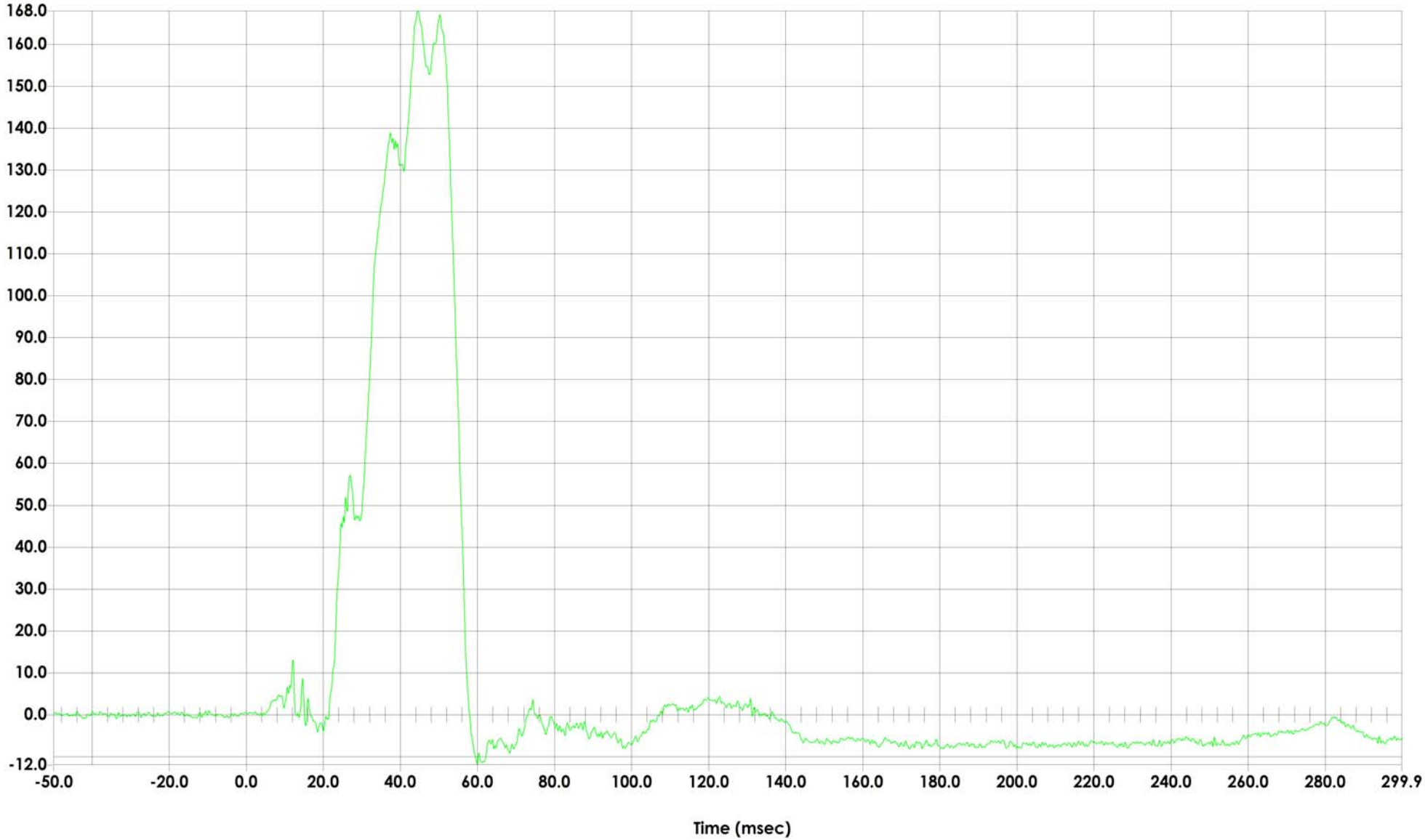


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	012
Units	NWT

Max	167.96	NWT
	44.48	msec
Min	-11.99	NWT
	59.92	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Posterior Abdominal Force (Y) vs. Time

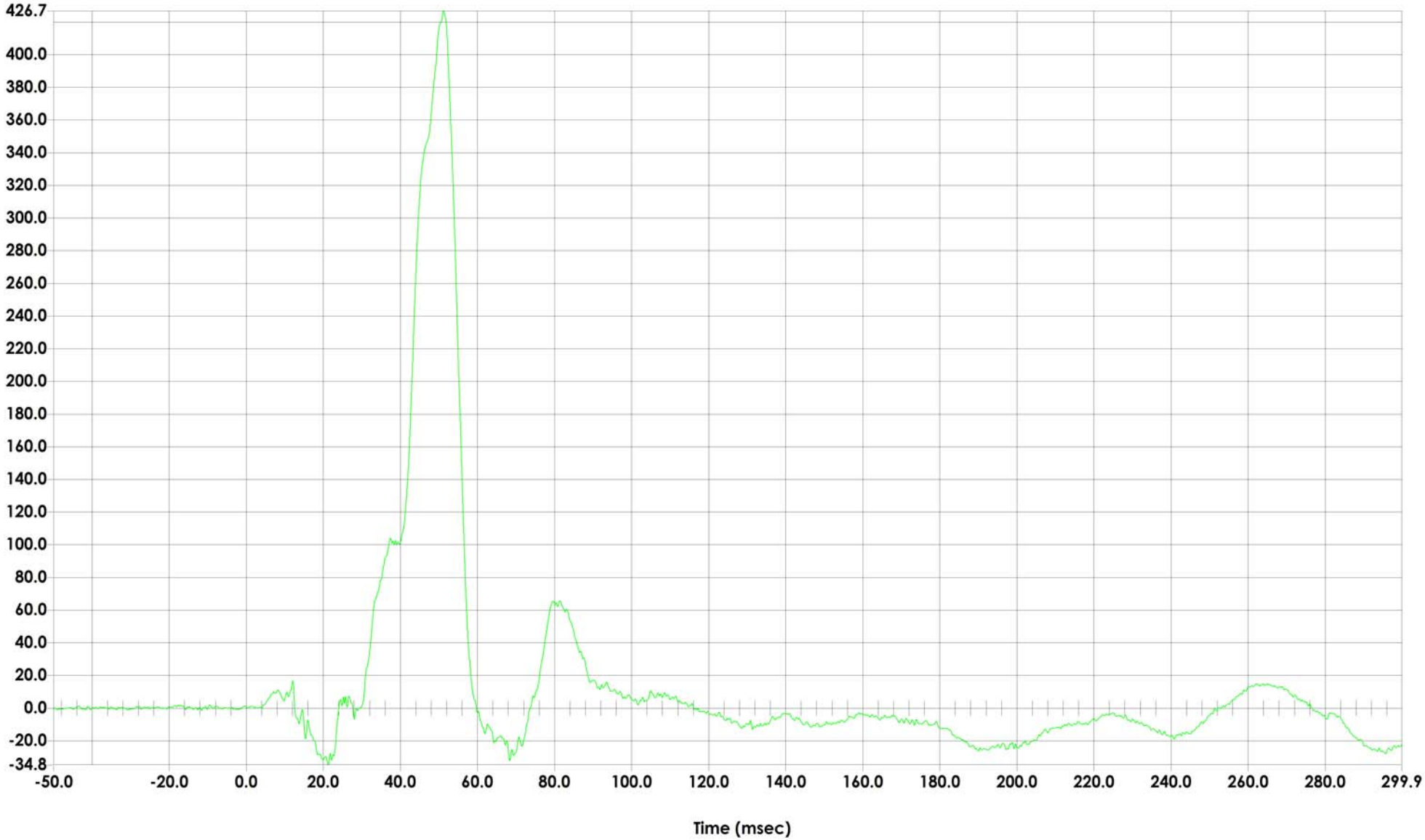


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	058
Units	NWT

Max	426.66	NWT
	51.20	msec
Min	-34.77	NWT
	21.28	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Total Abdominal Force (Y) vs. Time

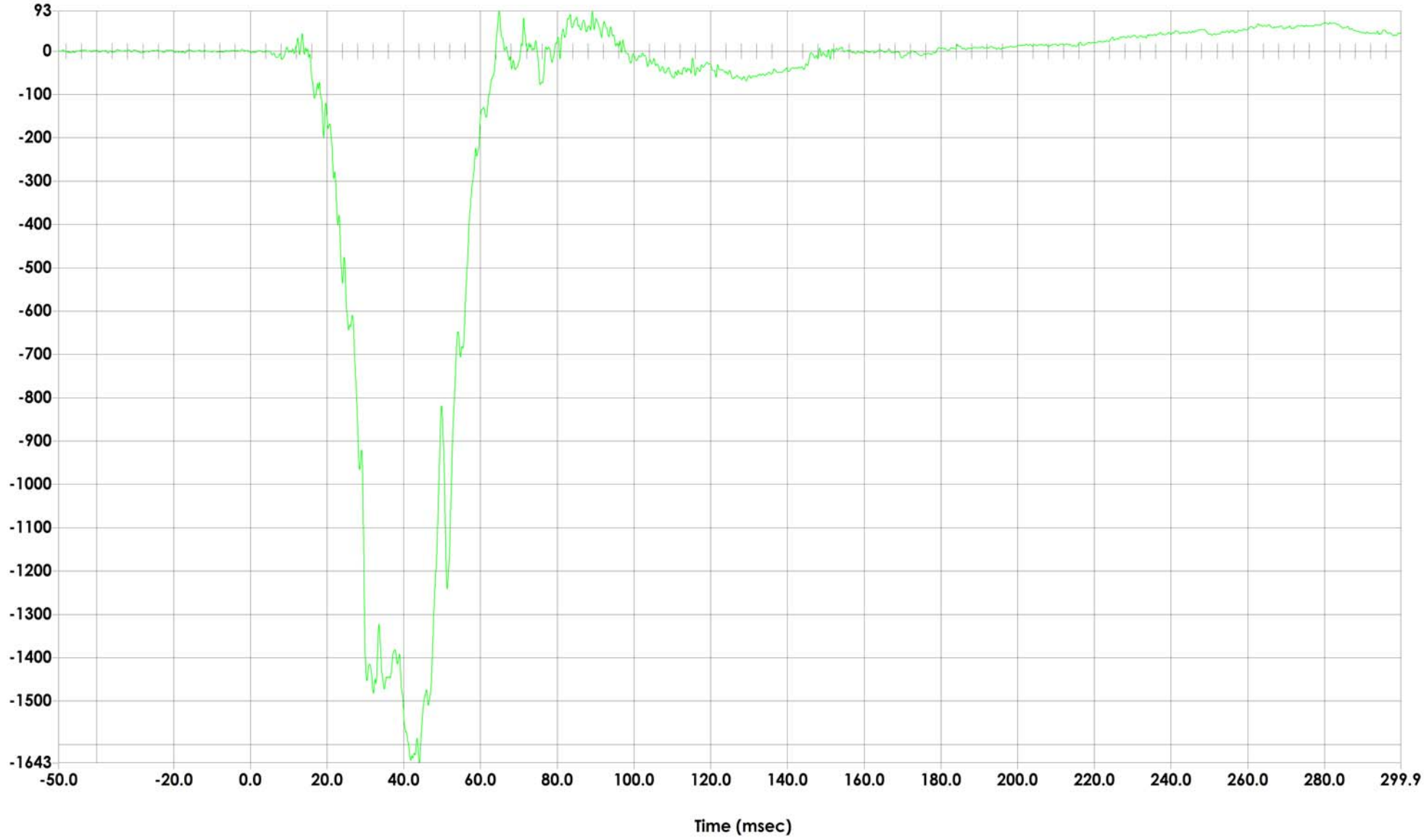


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	016
Units	NWT

Max	92.53	NWT
	64.88	msec
Min	-1642.93	NWT
	44.08	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Pubic Symphysis Force (Y) vs. Time

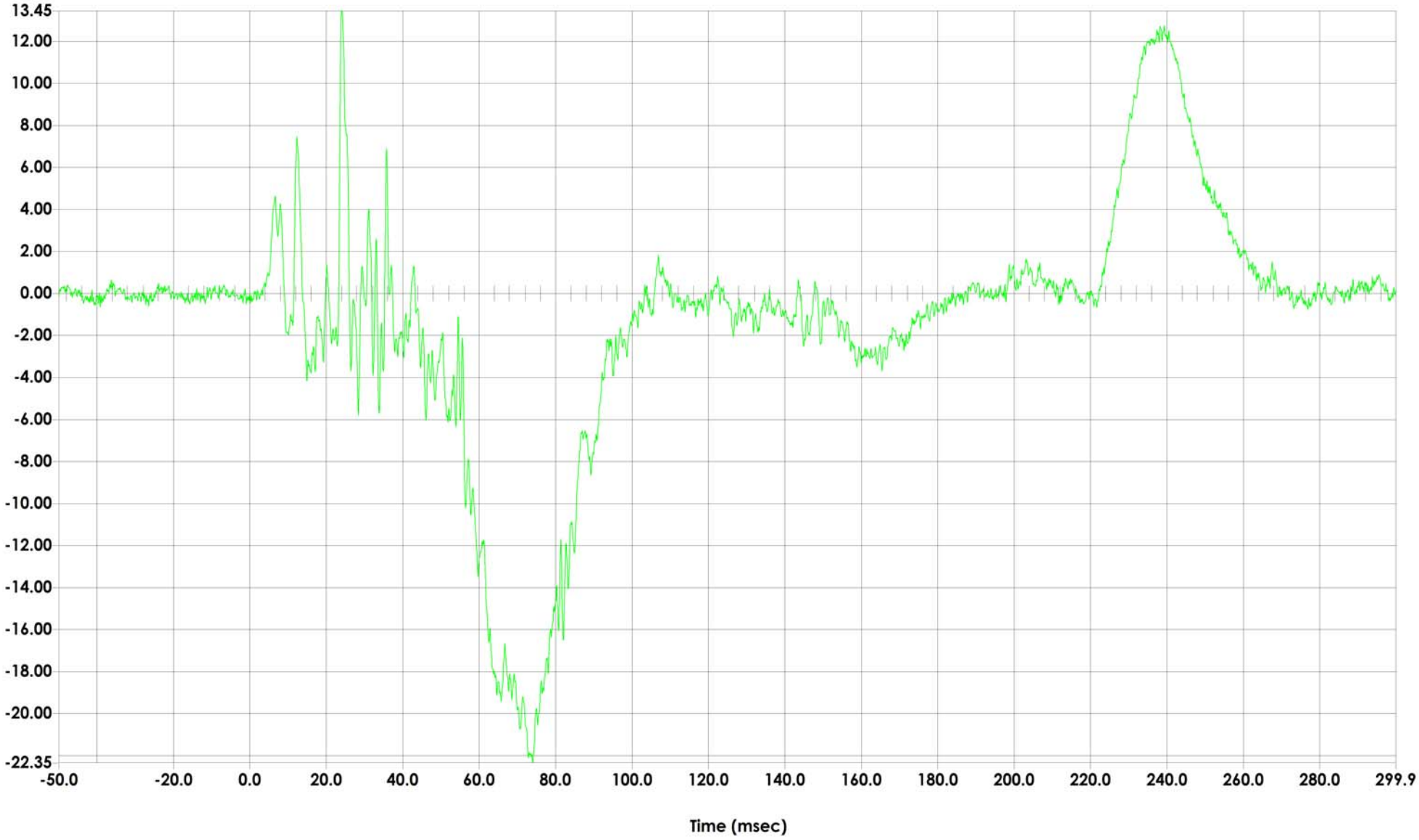


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	017
Units	G'S

Max	13.45	G'S
	23.92	msec
Min	-22.35	G'S
	74.08	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Head Acceleration (X) Primary vs. Time

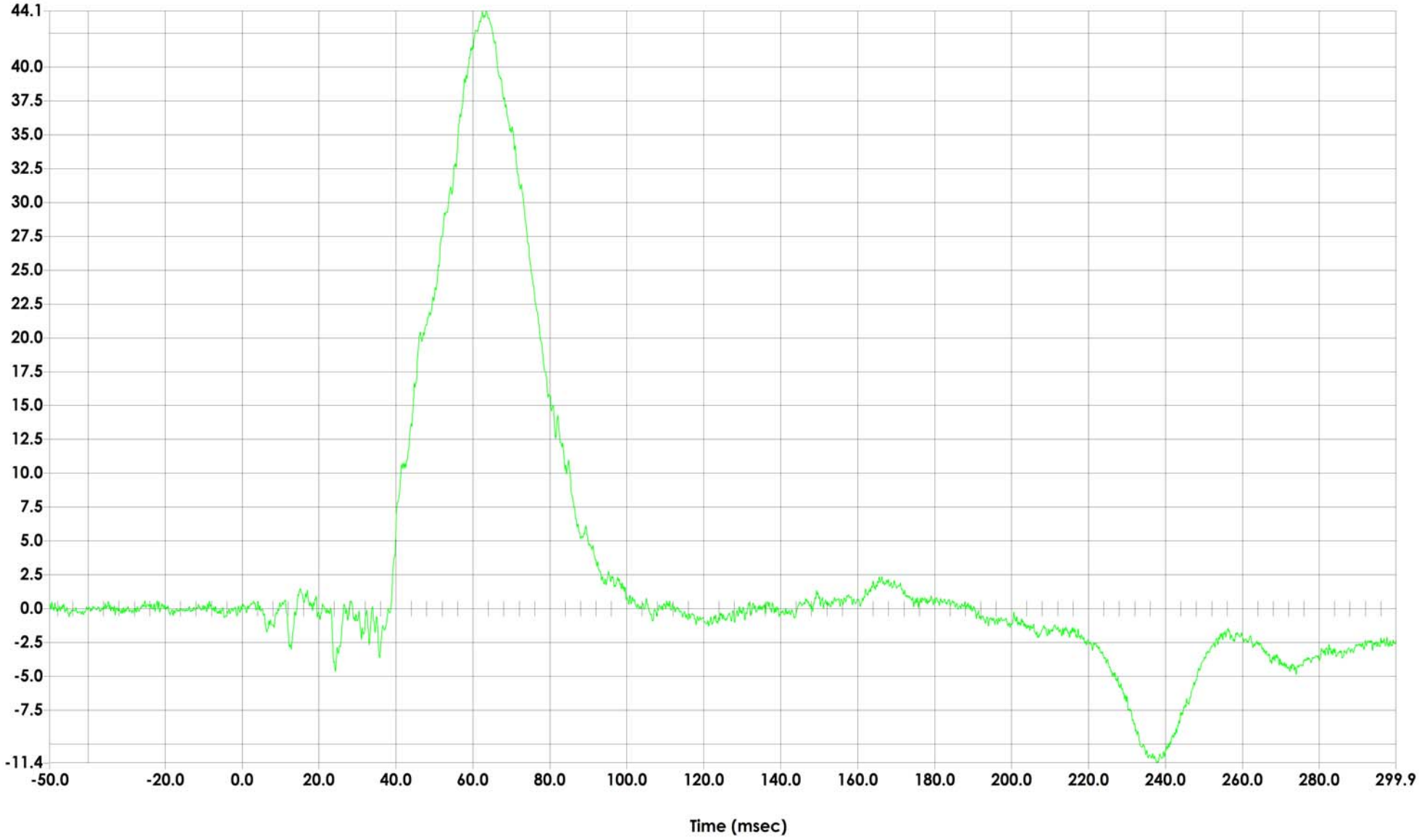


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	018
Units	G'S

Max	44.13	G'S
	63.44	msec
Min	-11.40	G'S
	237.76	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Head Acceleration (Y) Primary vs. Time

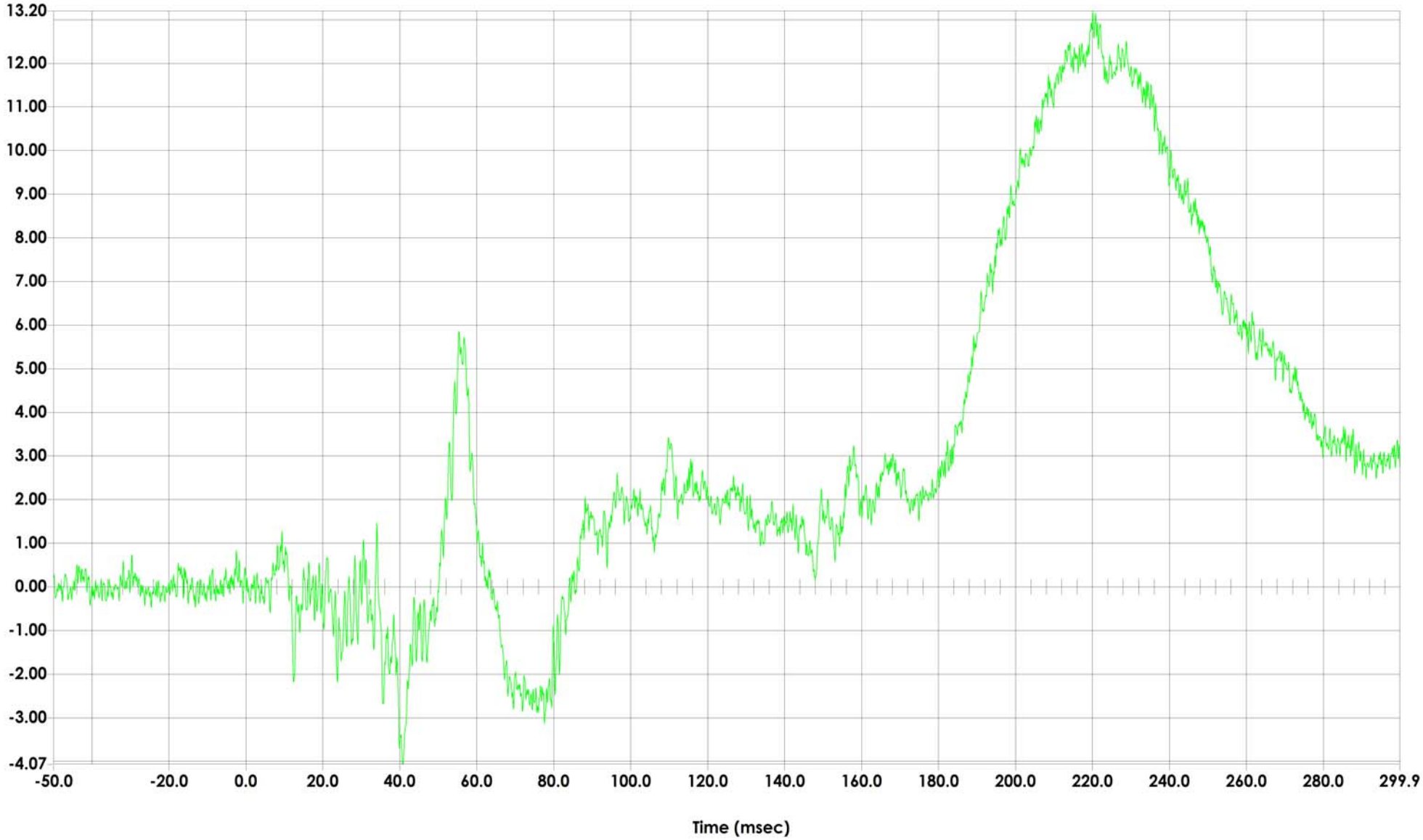


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	019
Units	G'S

Max	13.20	G'S
	220.08	msec
Min	-4.07	G'S
	40.72	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Head Acceleration (Z) Primary vs. Time

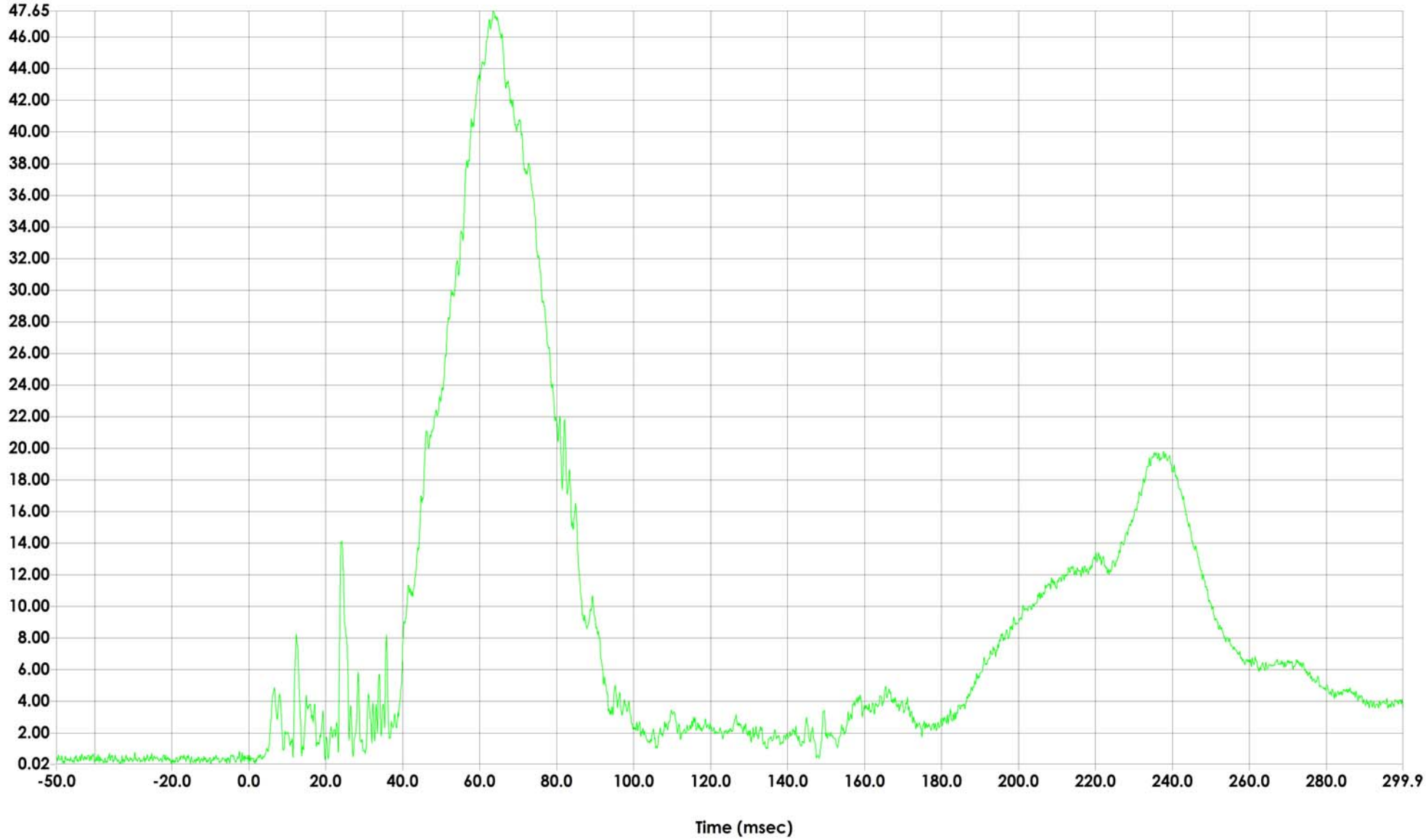


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	059
Units	G'S

Max	47.65	G'S
	63.44	msec
Min	0.02	G'S
	-15.20	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Head Resultant Acceleration Primary vs. Time

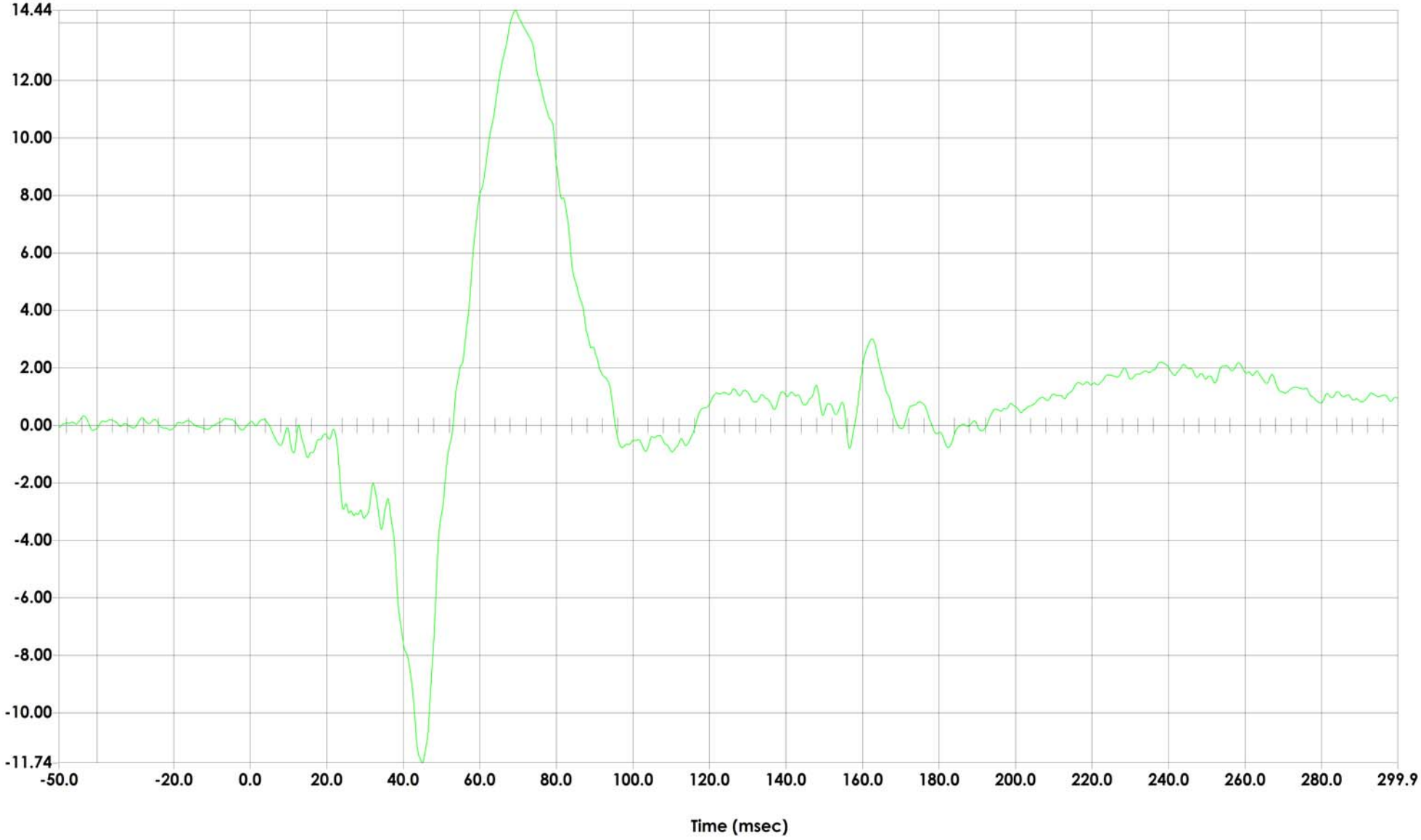


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	028
Units	G'S

Max	14.44	G'S
	69.28	msec
Min	-11.74	G'S
	44.96	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Lower Spine T12 Acceleration (X) vs. Time

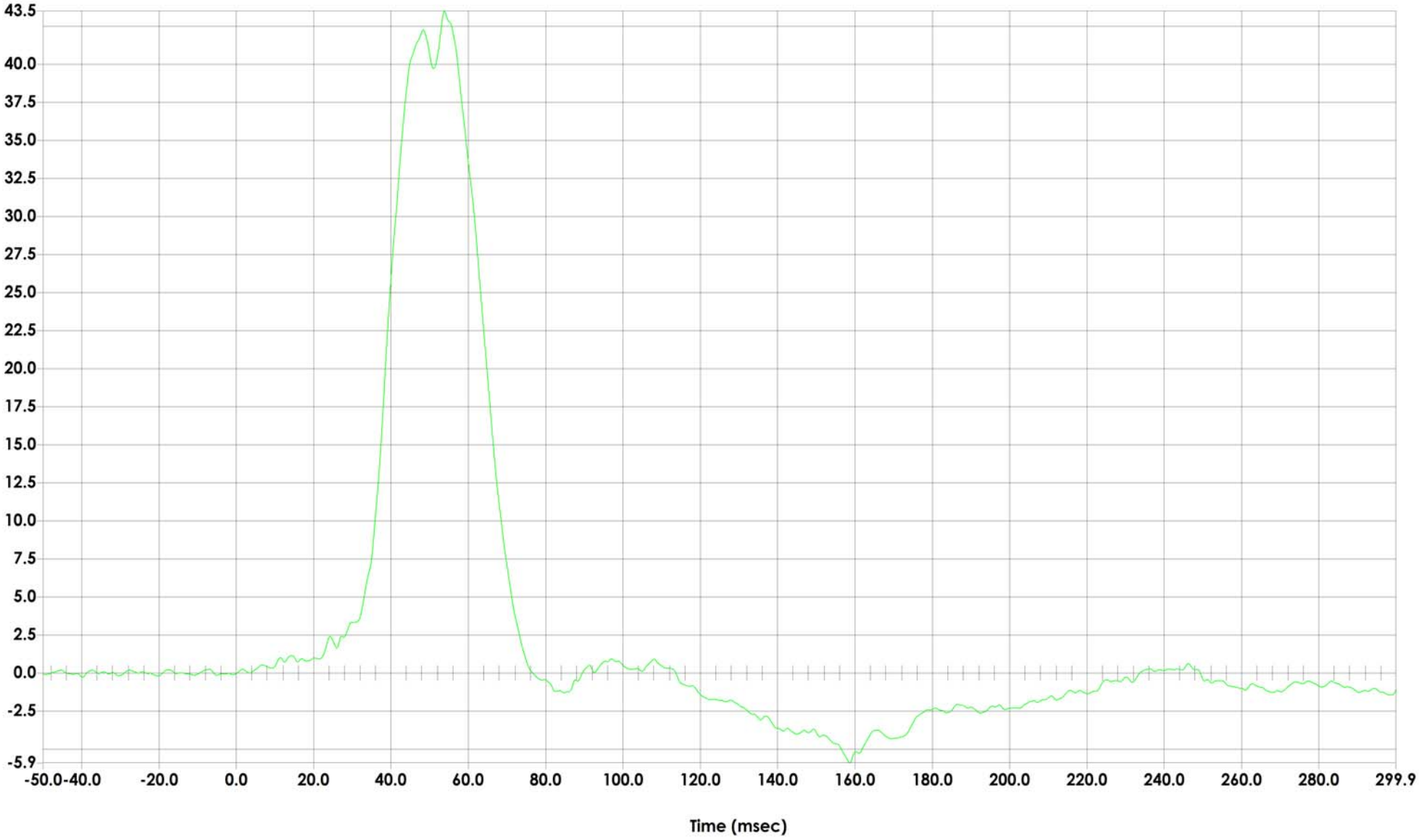


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	029
Units	G'S

Max	43.49	G'S
	53.84	msec
Min	-5.91	G'S
	158.64	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Lower Spine T12 Acceleration (Y) vs. Time

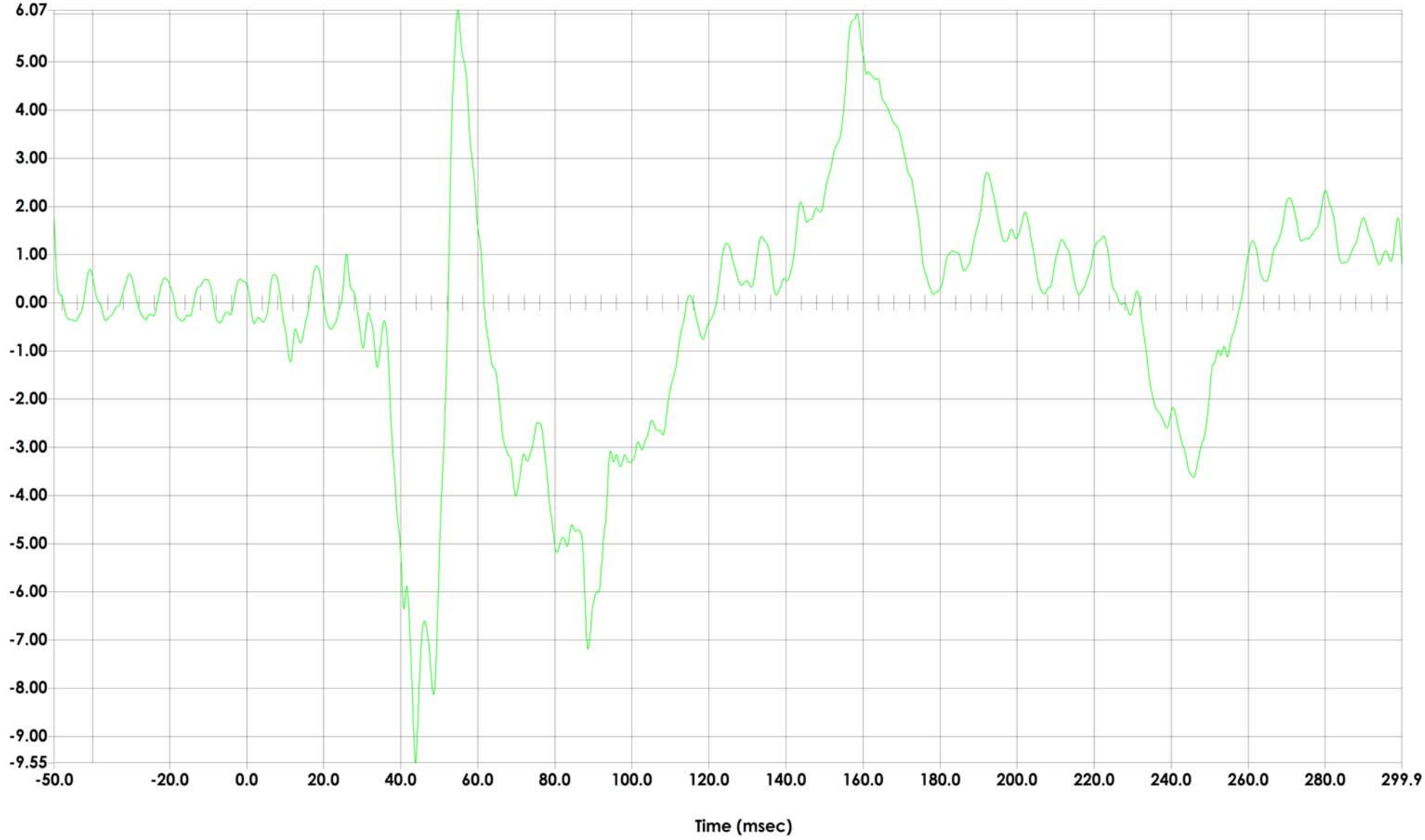


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	030
Units	G'S

Max	6.07	G'S
	54.80	msec
Min	-9.55	G'S
	43.76	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Lower Spine T12 Acceleration (Z) vs. Time

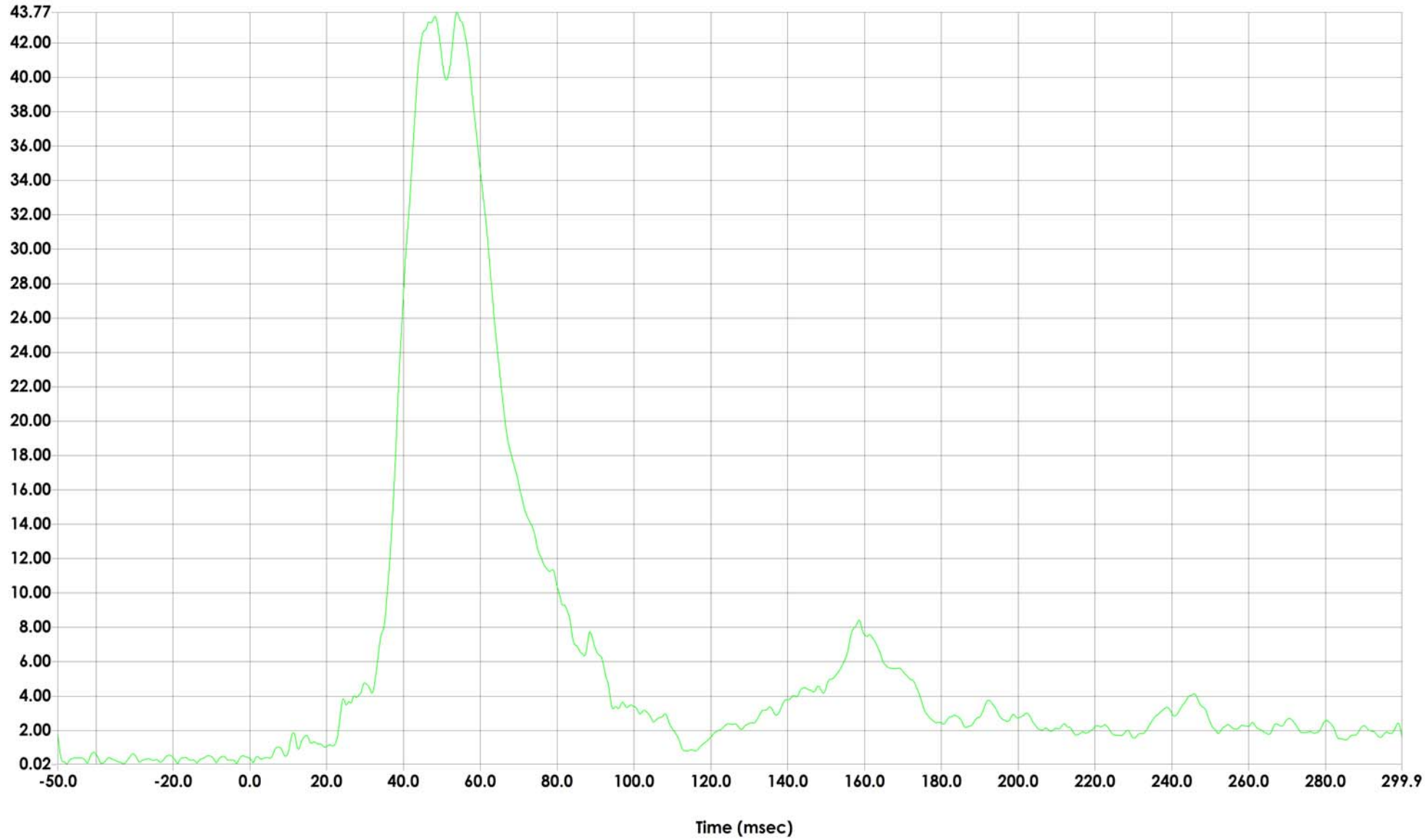


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	060
Units	G'S

Max	43.77	G'S
	53.84	msec
Min	0.02	G'S
	-47.68	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Lower Spine T12 Resultant Acceleration vs. Time

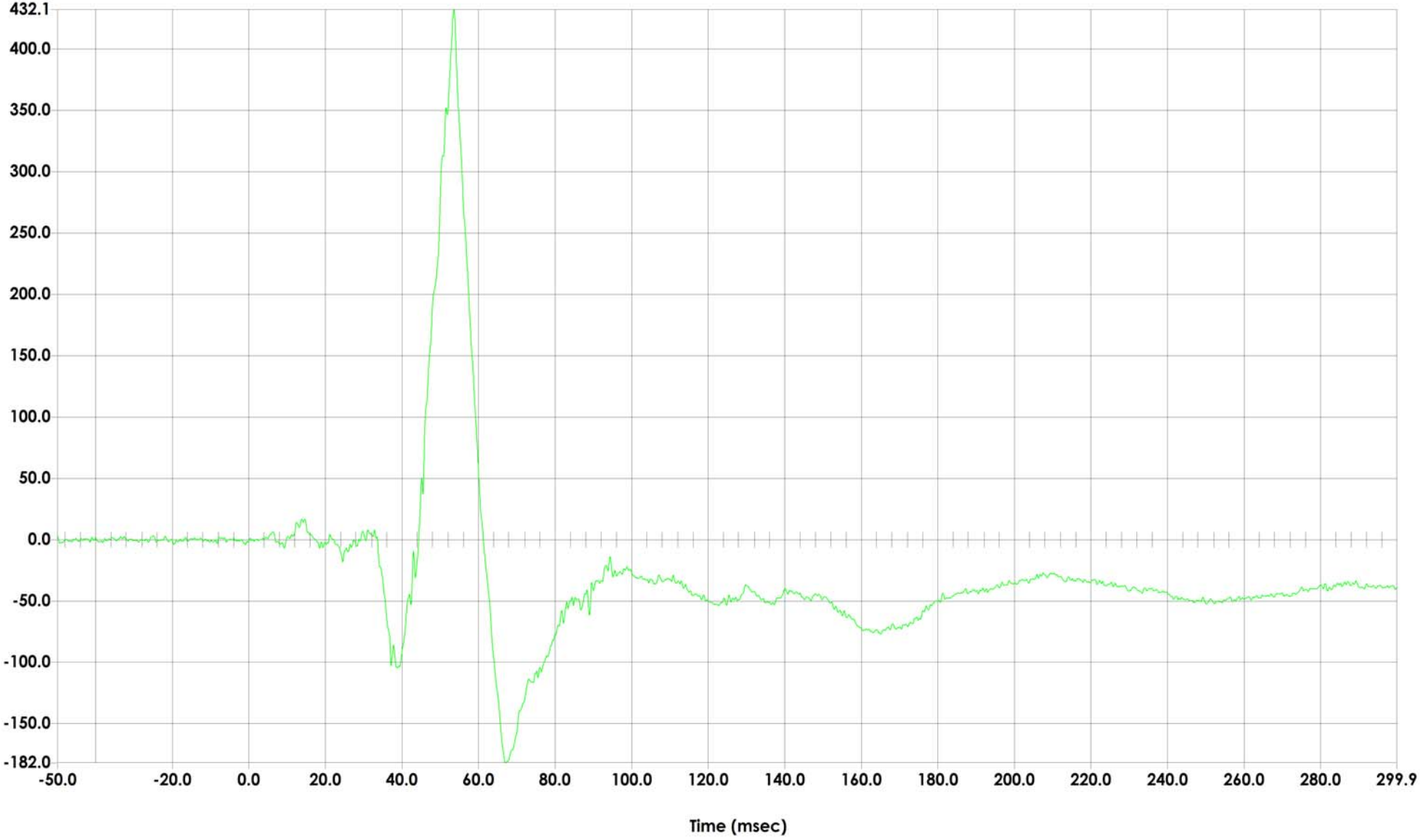


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	031
Units	NWT

Max	432.13	NWT
	53.60	msec
Min	-181.97	NWT
	67.12	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Iliac Wing Force on Impact Side vs. Time

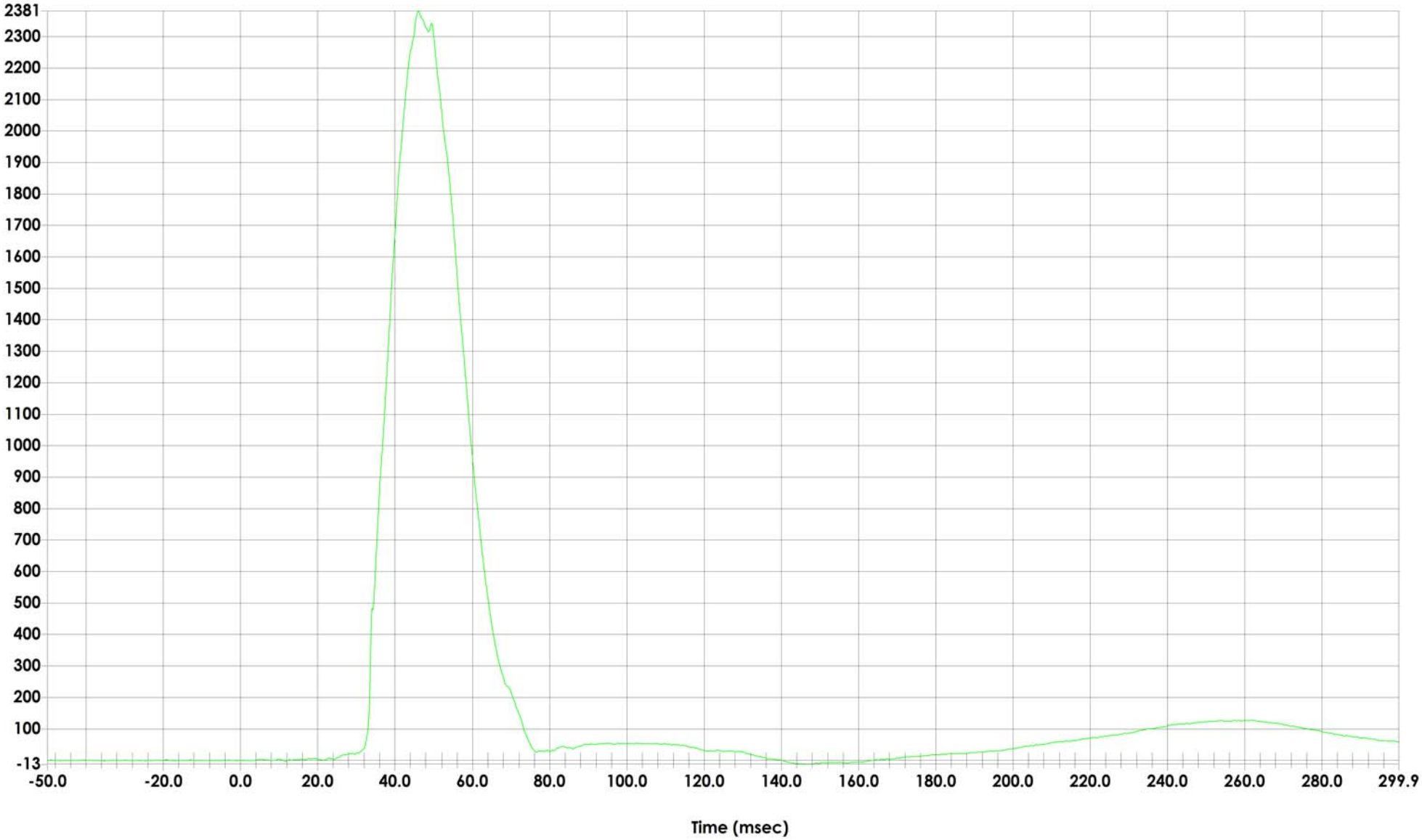


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	032
Units	NWT

Max	2381.25	NWT
	46.08	msec
Min	-12.64	NWT
	146.72	msec

MEDICAL COLLEGE OF WISCONSIN

Passenger Acetabulum Force on Impact Side vs. Time

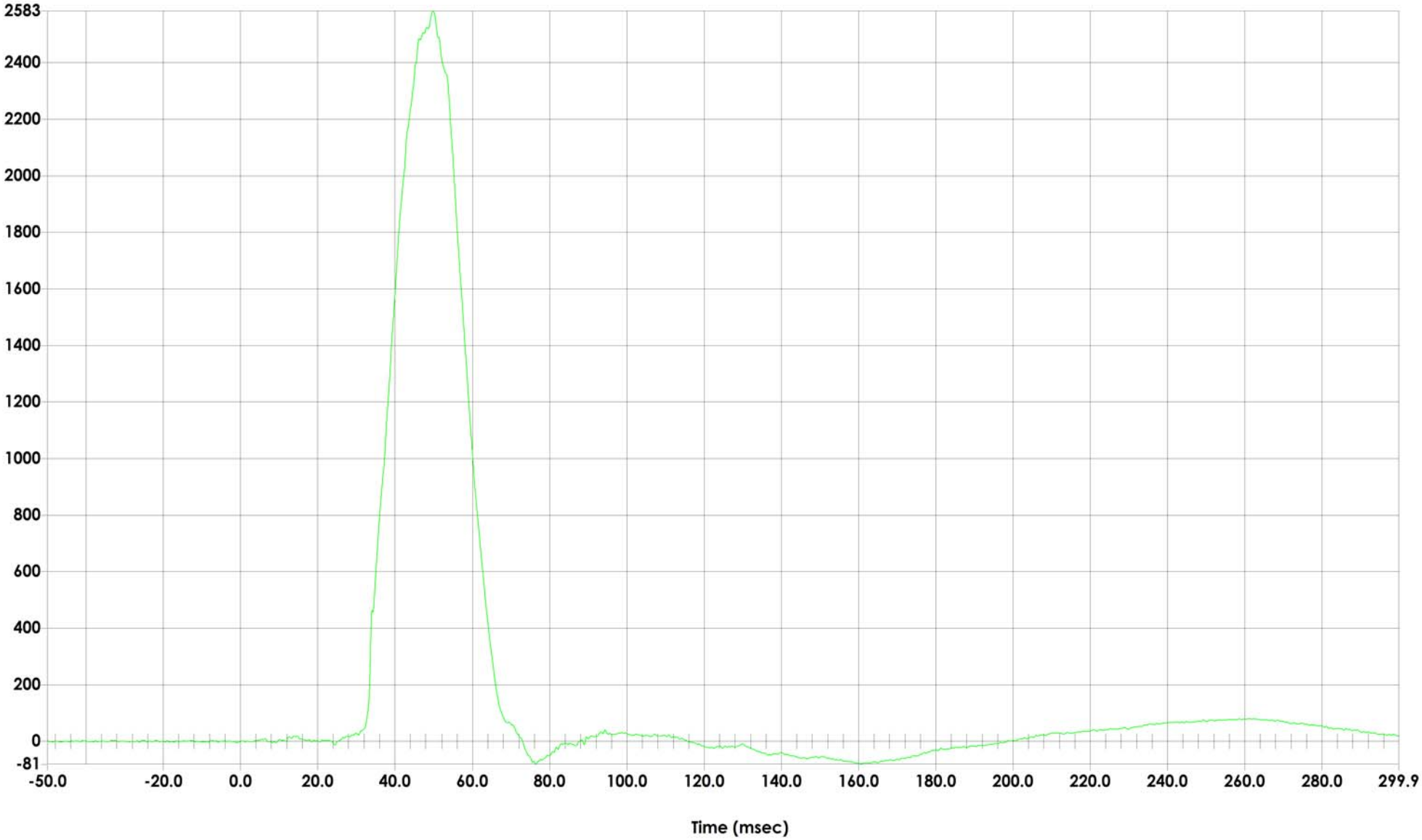


Test ID	M20140306
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	061
Units	NWT

Max	2582.80	NWT
	49.76	msec
Min	-81.35	NWT
	76.48	msec

MEDICAL COLLEGE OF WISCONSIN

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



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE DATA

TABLE 1
EXTERNAL MEASUREMENTS (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER	SPEC.	PRE		POST	
Date	-	11-18-13		11-27-13	
Sequential Test Number	-	2		3	
		Result	**Pass/Fail**	**Result**	**Pass/Fail**
Temperature (°C)	**20.6-22.2**	21.0	Pass	20.8	Pass
Relative Humidity (%)	**10-70**	33.2	Pass	20.4	Pass
Sitting Height	**900 - 918**	912	Pass	907	Pass
Seat to Shoulder Joint	**558 -572**	564	Pass	563	Pass
Seat to Lower Face of Thoracic Spine Box	**346 -356**	355	Pass	354	Pass
Seat to Hip Joint (Center of Bolt)	**97 - 103**	100	Pass	98	Pass
Sole to Seat, Sitting	**433 - 451**	440	Pass	440	Pass
Head Width	**152 -158**	155	Pass	155	Pass
Shoulder/Arm Width	**461 - 479**	476	Pass	478	Pass
Thorax Width	**322 - 332**	323	Pass	323	Pass
Abdomen Width	**273 - 287**	281	Pass	282	Pass
Pelvis/Lap Width	**359 - 373**	364	Pass	367	Pass
Head Depth	**196 - 206**	201	Pass	200	Pass
Thorax Depth	**262 - 272**	270	Pass	270	Pass
Abdomen Depth	**194 - 204**	201	Pass	202	Pass
Pelvis Depth	**235 - 245**	242	Pass	242	Pass
Back of Buttocks to Hip Joint (Center of Bolt)	**150 - 160**	154	Pass	154	Pass
Back of Buttocks to Front Knee	**597 - 615**	610	Pass	610	Pass

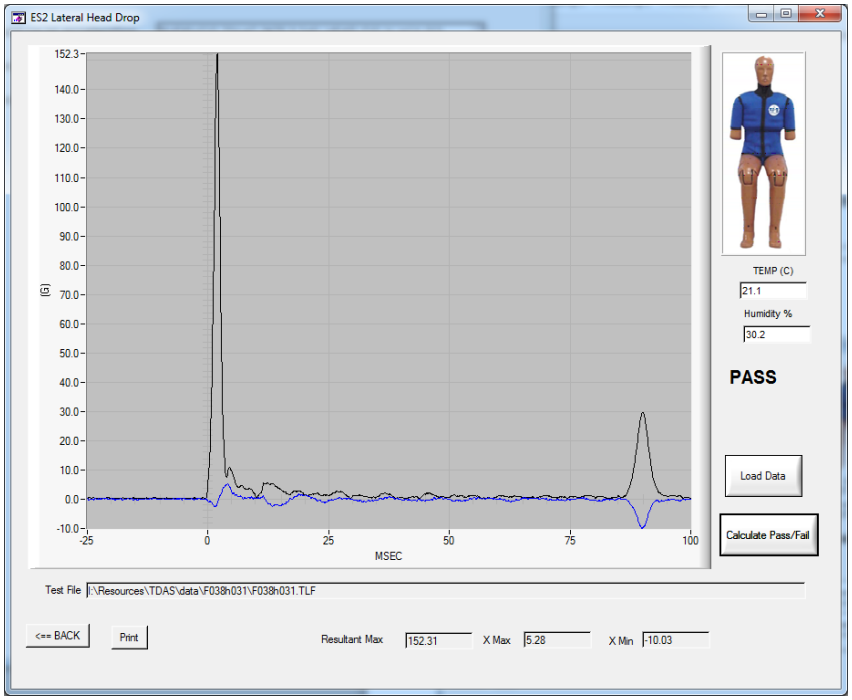
TABLE 2
HEAD DROP TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Head Assembly Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	21.1	Pass	20.7	Pass
	Min		20.7	Pass	20.6	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	30.2	Pass	22.3	Pass
	Min		29.1	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.1	Pass	20.7	Pass
Humidity – During Test (%)		**10-70**	30.2	Pass	22.3	Pass
Peak Head Resultant Acceleration (G)		**125-155**	152.3	Pass	142.1	Pass
Peak Head X Acceleration (G)		**<15**	5.3	Pass	3.7	Pass
Unimodal (Oscillation) (Yes/No)		**<15%**	Yes	Pass	Yes	Pass

TABLE 2
HEAD DROP TEST (ES-IIre) (CONTINUED)

PRE-TEST



POST-TEST

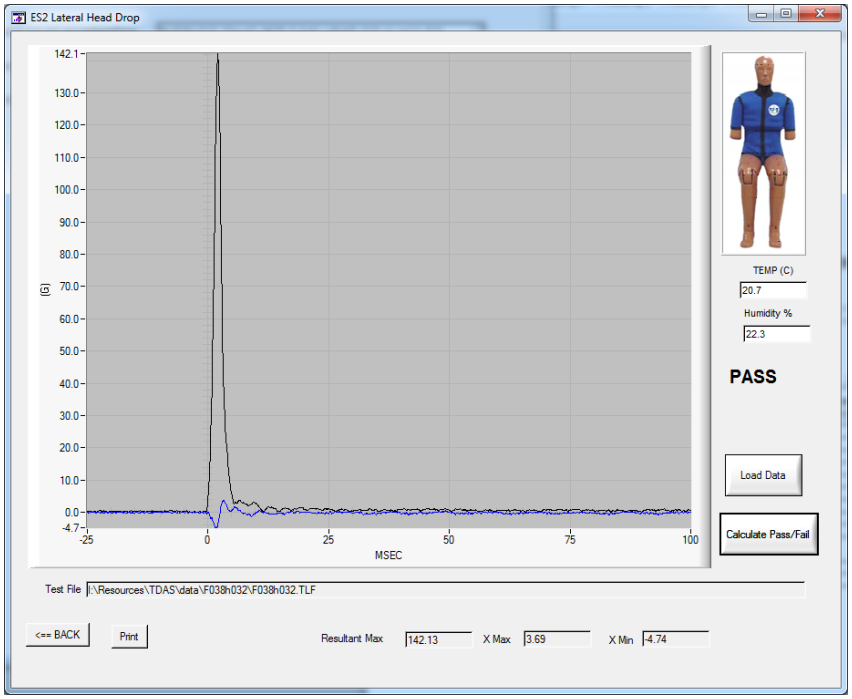


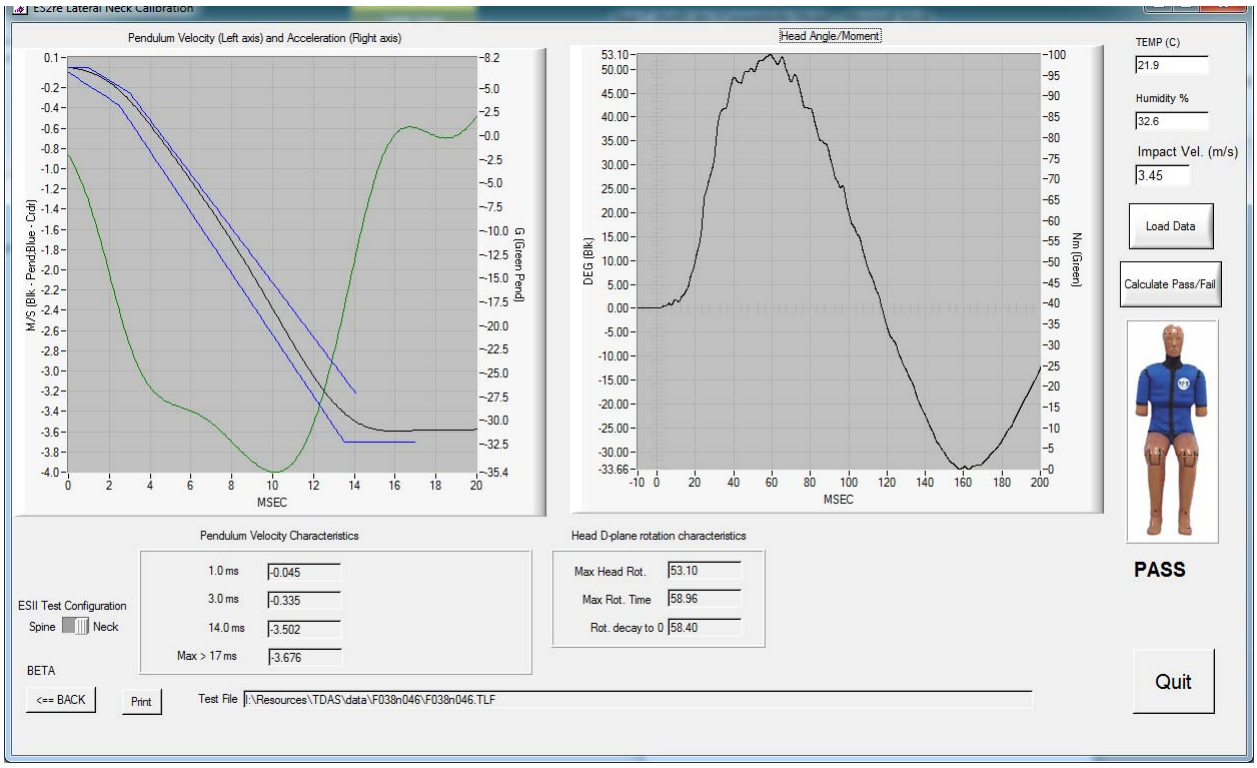
TABLE 3
NECK PENDULUM TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Neck Assembly Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	21.9	Pass	21.9	Pass
	Min		20.8	Pass	20.6	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	32.6	Pass	23.3	Pass
	Min		32.0	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.9	Pass	21.9	Pass
Humidity – During Test (%)		**10-70**	32.6	Pass	23.3	Pass
Pendulum Velocity (m/s)		**3.3-3.5**	3.45	Pass	3.42	Pass
Pendulum Velocity Corridors (m/s)	0-1.0 ms	**(-0.05)-0.00**	-0.05	Pass	-0.04	Pass
	2.5-3.0 ms	**(-0.375) - (-0.25)**	-0.34	Pass	-0.34	Pass
	13.5-14.0 ms	**(-3.7) - (-3.20)**	-3.5	Pass	-3.6	Pass
	Max > 17 ms	**-3.7**	-3.7	Pass	-3.6	Pass
Max D-Plane rotation (deg)		**49-59**	53.1	Pass	53.9	Pass
Time of Max D-Plane Rotation (ms)		**54-66**	59.0	Pass	57.8	Pass
Time of Moment Decay from Peak to 0 Nm (ms)		**53-88**	58.4	Pass	59.0	Pass

TABLE 3
NECK PENDULUM TEST (ES-IIre) (CONTINUED)

PRE-TEST



POST-TEST

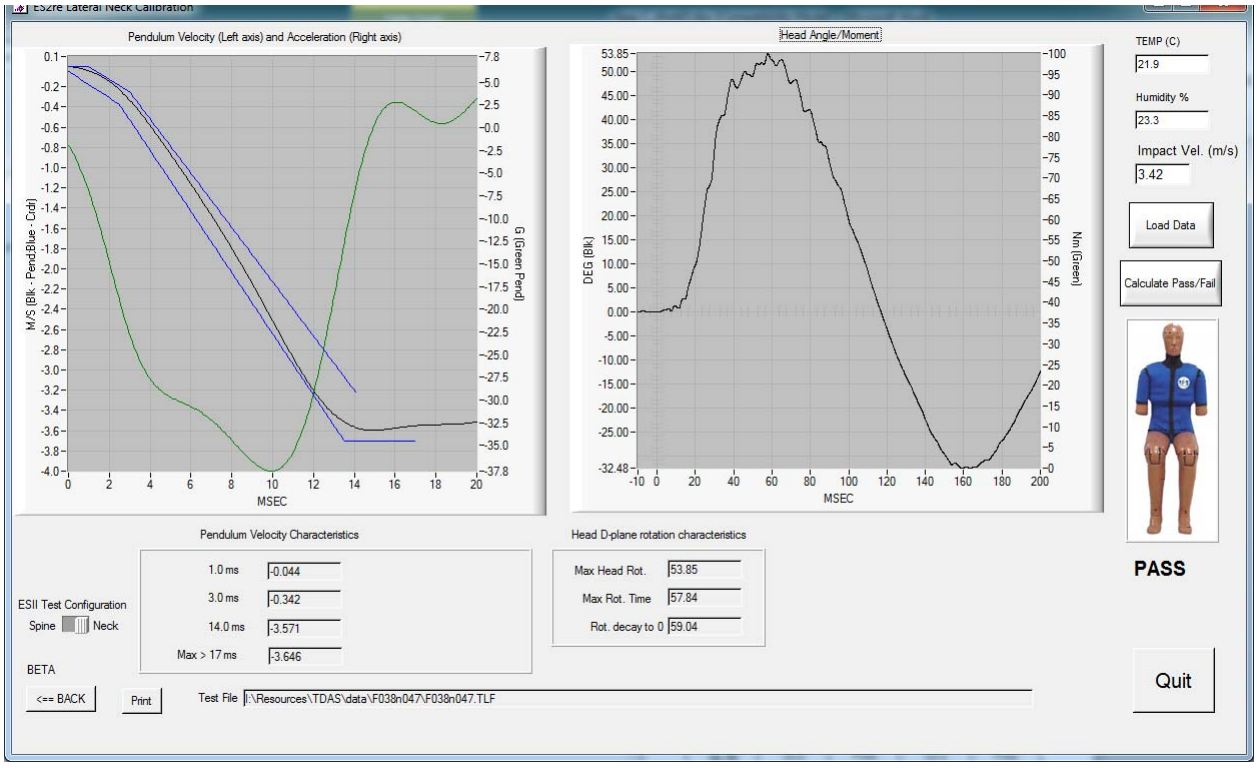


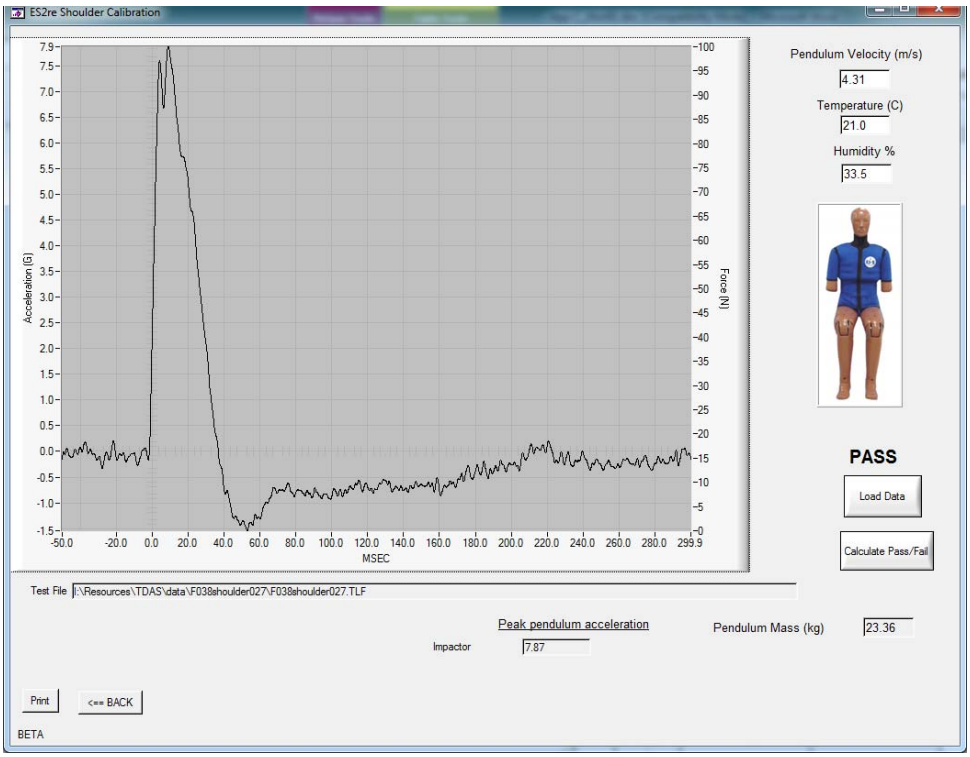
TABLE 4
SHOULDER IMPACT TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-27-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	20.8	Pass
	Min		20.7	Pass	20.7	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	33.5	Pass	20.0	Pass
	Min		29.1	Pass	19.5	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	20.8	Pass
Humidity – During Test (%)		**10-70**	33.5	Pass	20.0	Pass
Pendulum Velocity (m/s)		**4.2-4.4**	4.31	Pass	4.31	Pass
Peak Impactor Acceleration (G)		**7.5-10.5**	7.9	Pass	7.9	Pass

TABLE 4
SHOULDER IMPACT TEST (ES-IIre) (CONTINUED)

PRE-TEST



POST-TEST

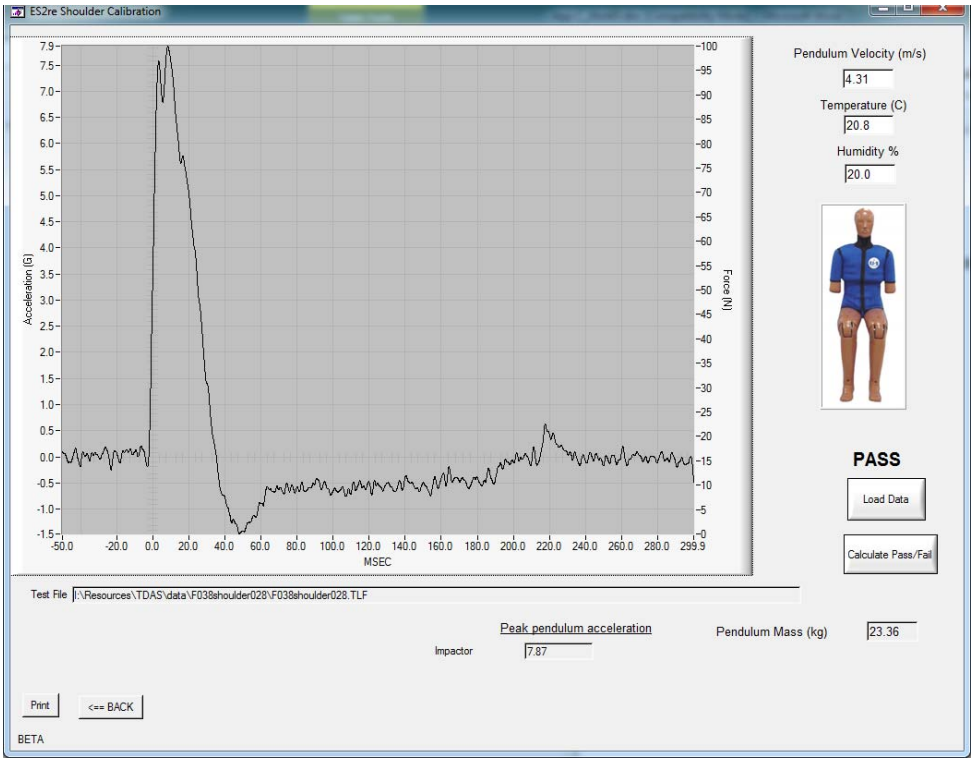


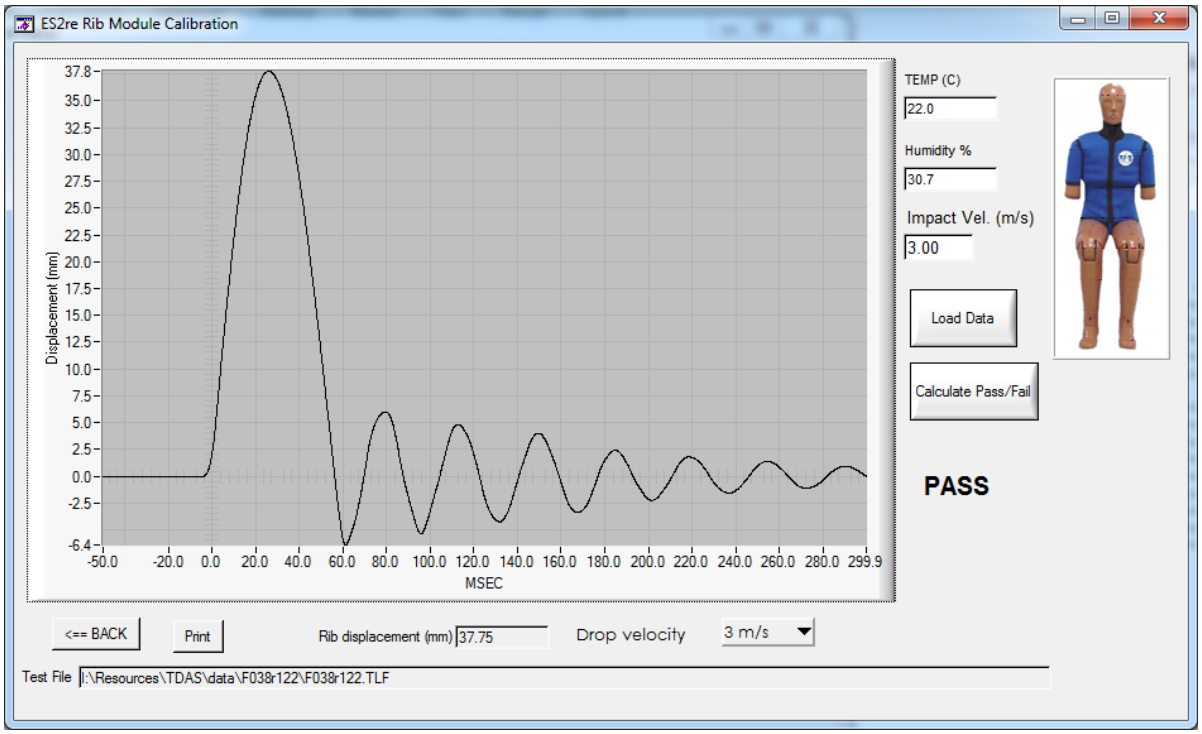
TABLE 5
THORAX – UPPER RIB DROP TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Upper Rib Drop Module Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	22.0	Pass	22.0	Pass
	Min		20.9	Pass	20.6	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	30.7	Pass	22.7	Pass
	Min		28.1	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	22.0	Pass	22.0	Pass
Humidity – During Test (%)		**10-70**	30.7	Pass	22.7	Pass
1st Test - Drop Height 459 ± 5 mm		**36-40**	37.8	Pass	37.6	Pass
2nd Test - Drop Height 815 ± 5 mm		**46-51**	49.2	Pass	49.1	Pass

TABLE 5
THORAX – UPPER RIB DROP TEST (ES-IIre) (CONTINUED)
3.00 m/s

PRE-TEST



POST-TEST

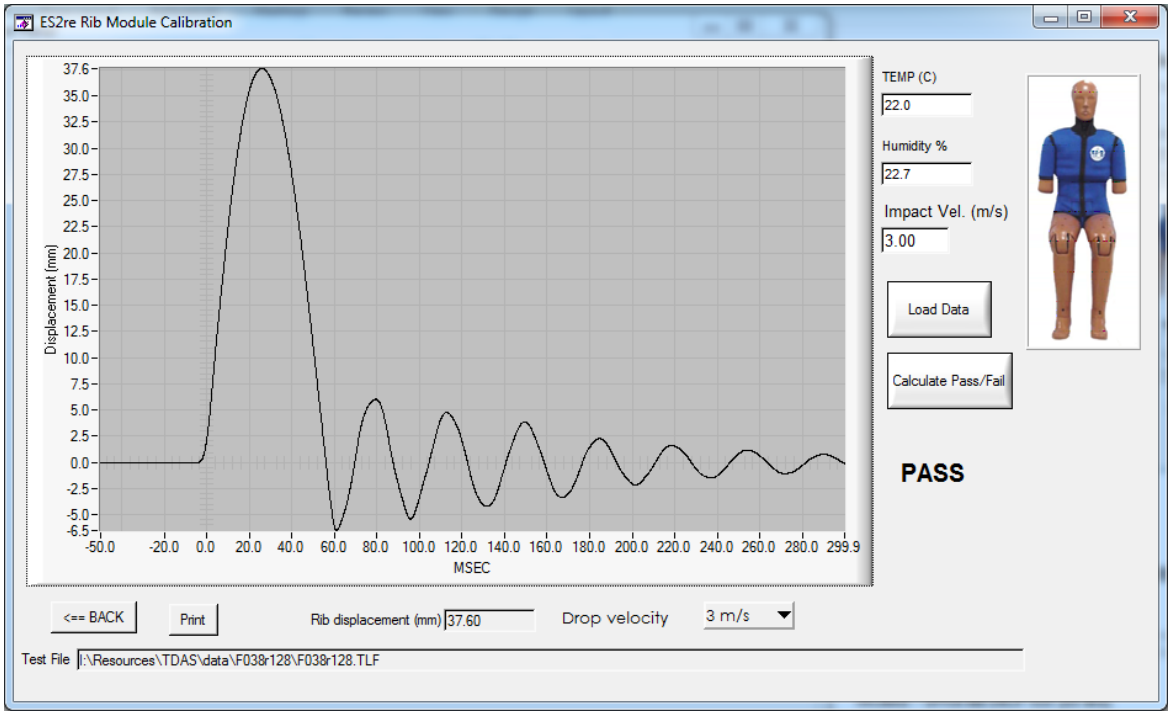
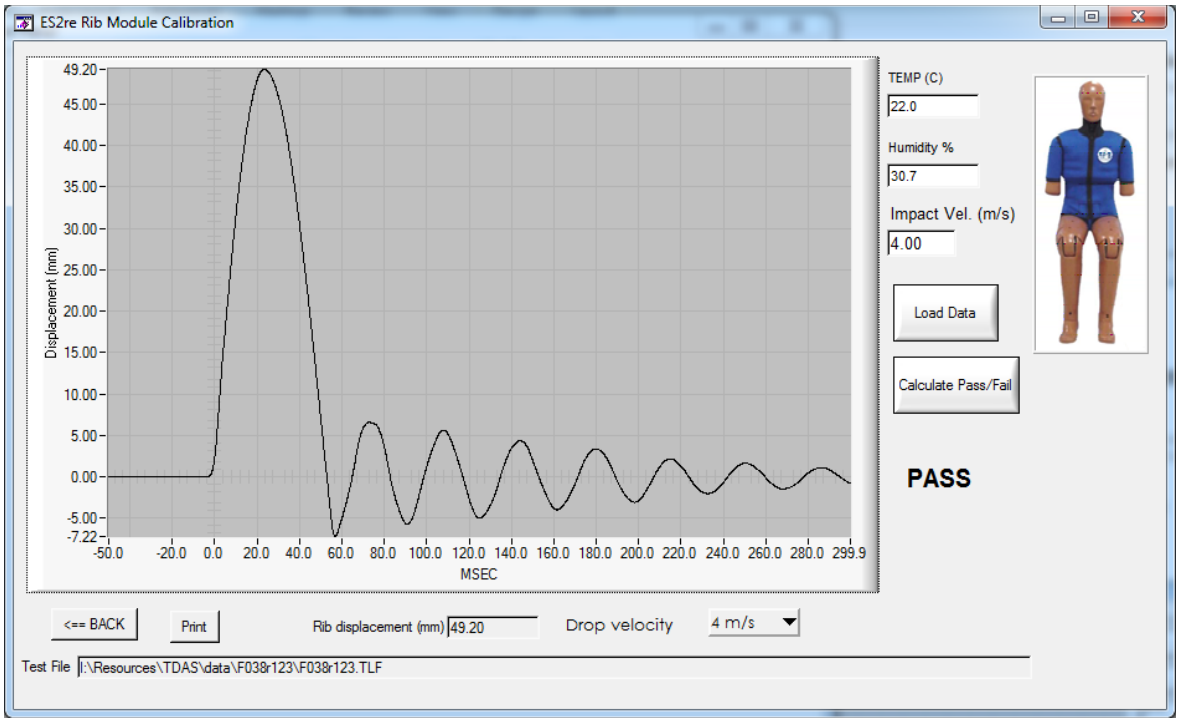


TABLE 5
THORAX – UPPER RIB DROP TEST (ES-IIre) (CONTINUED)
4.00 m/s

PRE-TEST



POST-TEST

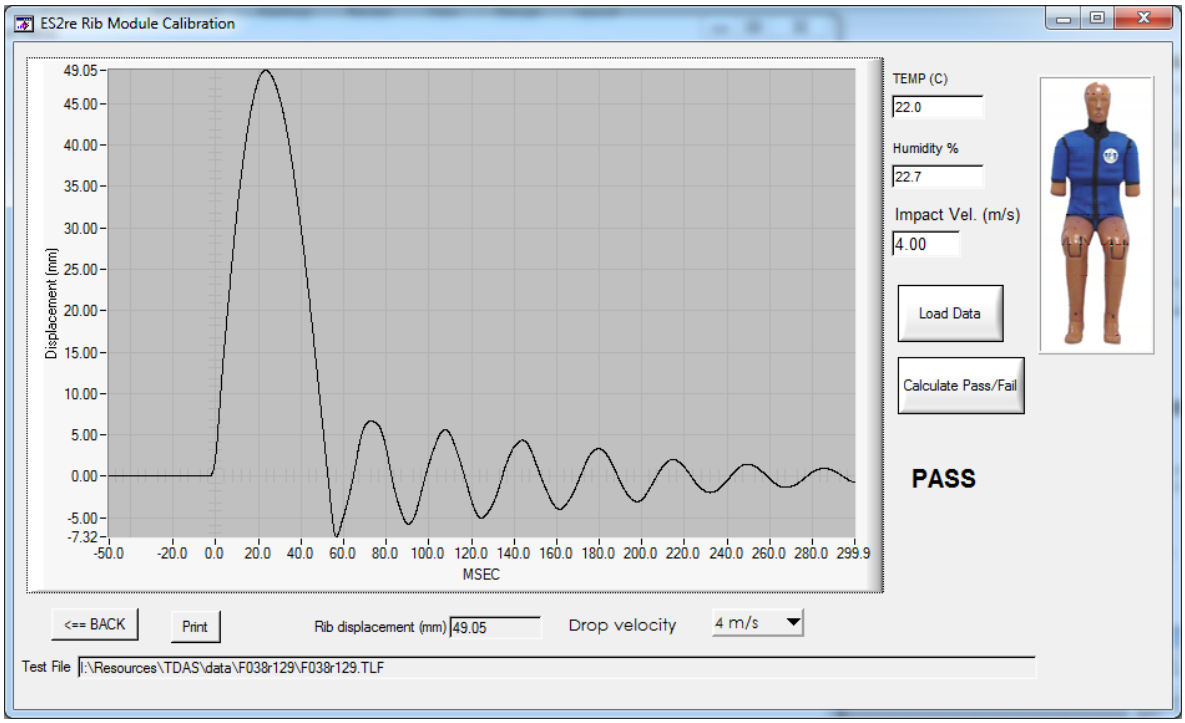


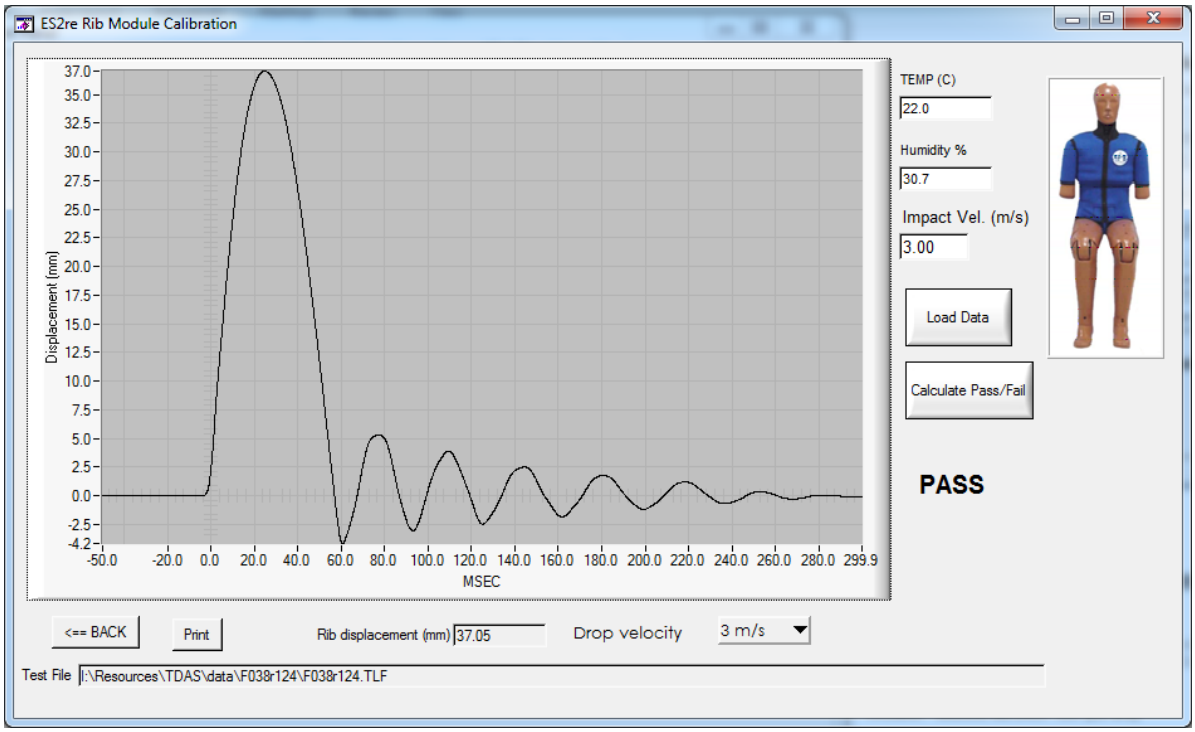
TABLE 6
THORAX – MIDDLE RIB DROP TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Middle Rib Drop Module Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	22.0	Pass	22.0	Pass
	Min		20.9	Pass	20.6	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	30.7	Pass	22.7	Pass
	Min		28.1	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	22.0	Pass	22.0	Pass
Humidity – During Test (%)		**10-70**	30.7	Pass	22.7	Pass
1st Test - Drop Height 459 ± 5 mm		**36-40**	37.1	Pass	37.0	Pass
2nd Test - Drop Height 815 ± 5 mm		**46-51**	48.7	Pass	48.7	Pass

TABLE 6
THORAX – MIDDLE RIB DROP TEST (ES-IIre) (CONTINUED)
3.00 m/s

PRE-TEST



POST-TEST

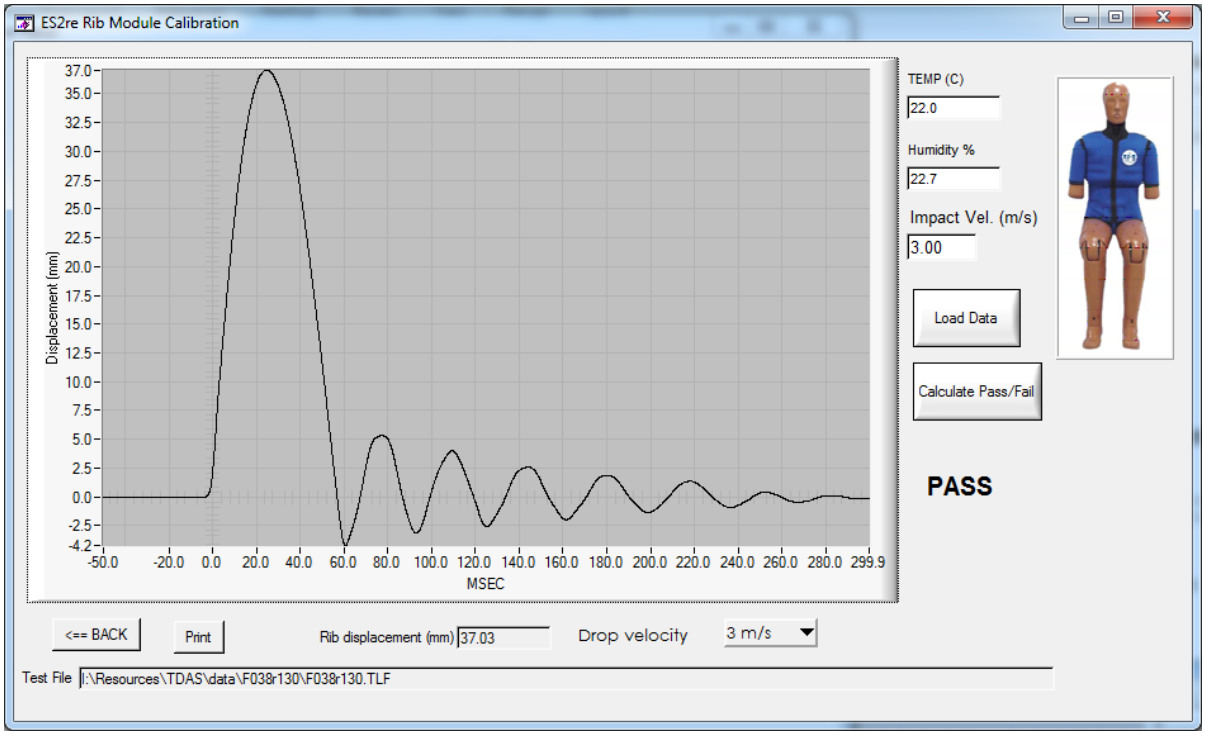
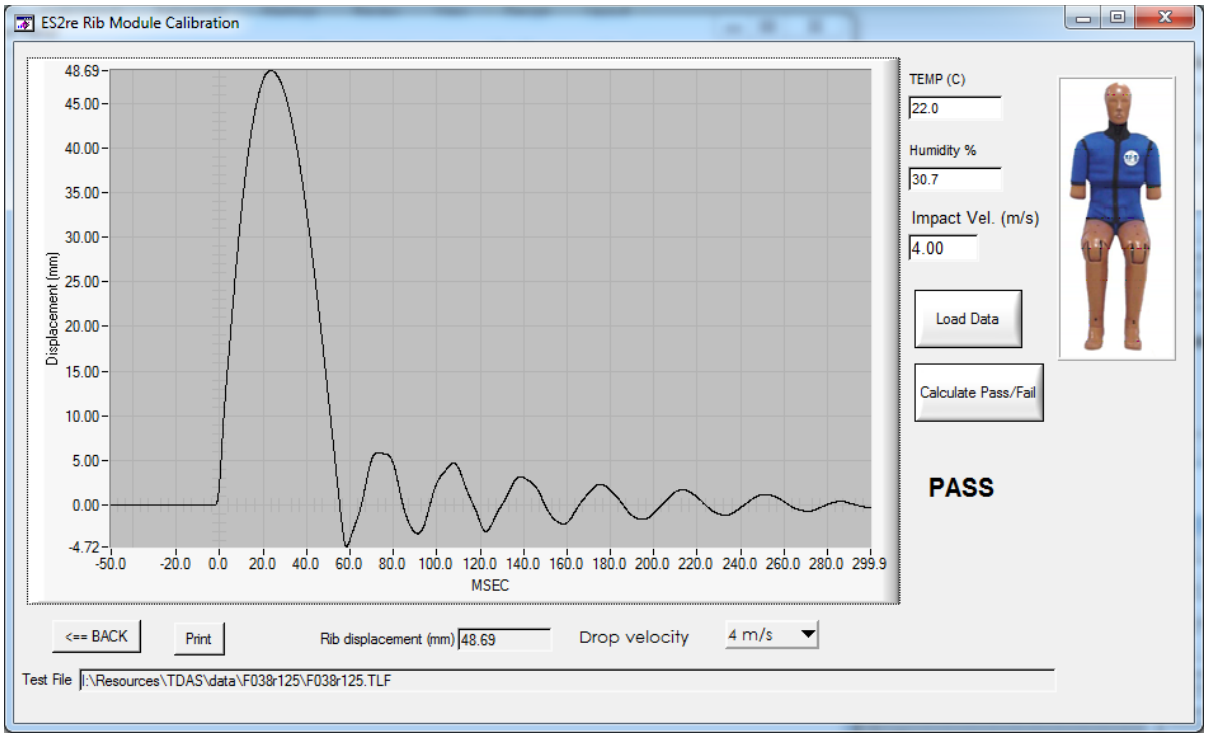


TABLE 6
THORAX – MIDDLE RIB DROP TEST (ES-IIre) (CONTINUED)
4.00 m/s

PRE-TEST



POST-TEST

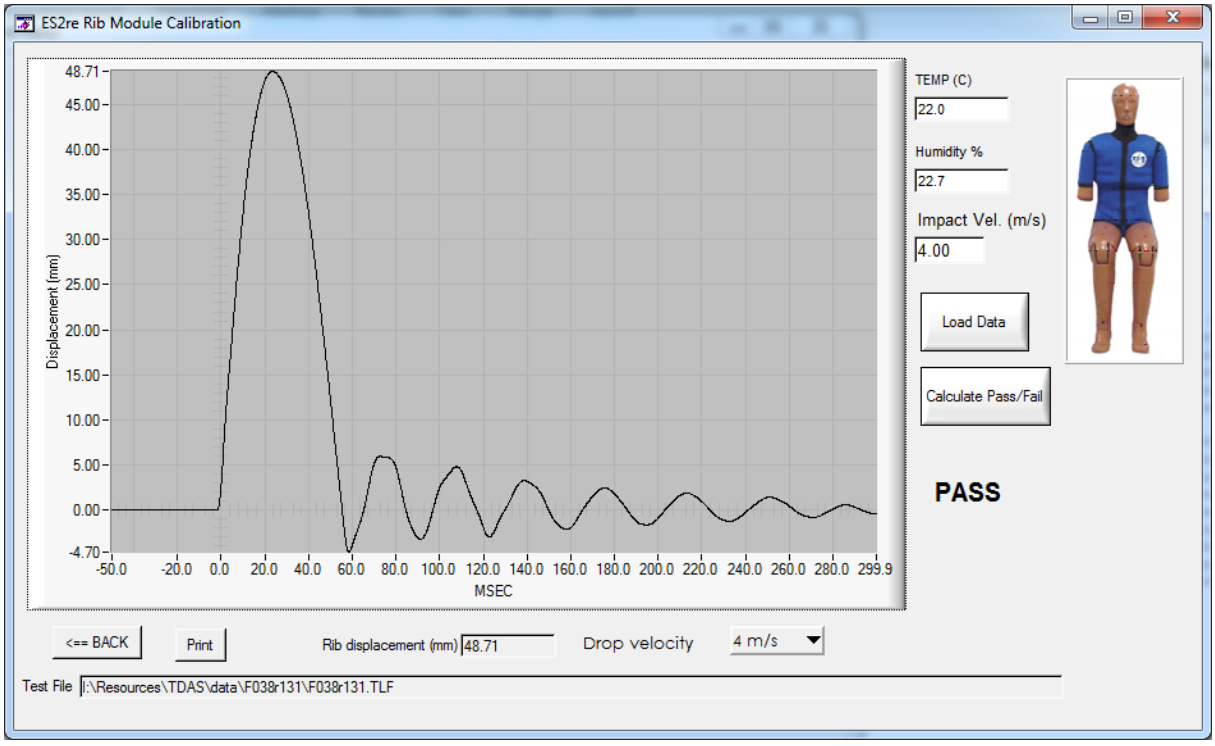


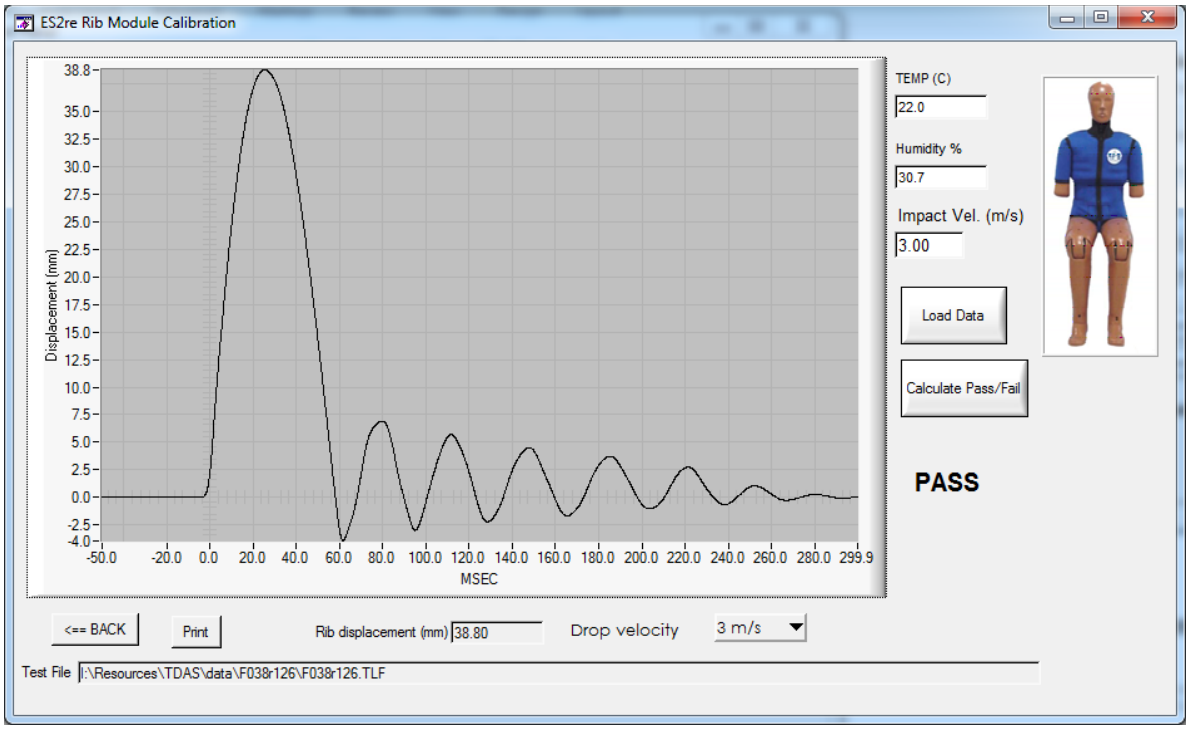
TABLE 7
THORAX – LOWER RIB DROP TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Lower Rib Drop Module Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	22.0	Pass	22.0	Pass
	Min		20.9	Pass	20.6	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	30.7	Pass	22.7	Pass
	Min		28.1	Pass	22.3	Pass
Temperature – During Test (°C)		20.6-22.2	22.0	Pass	22.0	Pass
Humidity – During Test (%)		10-70	30.7	Pass	22.7	Pass
1st Test - Drop Height 459 ± 5 mm		36-40	38.8	Pass	38.5	Pass
2nd Test - Drop Height 815 ± 5 mm		46-51	49.3	Pass	49.4	Pass

TABLE 7
THORAX – LOWER RIB DROP TEST (ES-IIre) (CONTINUED)
3.00 m/s

PRE-TEST



POST-TEST

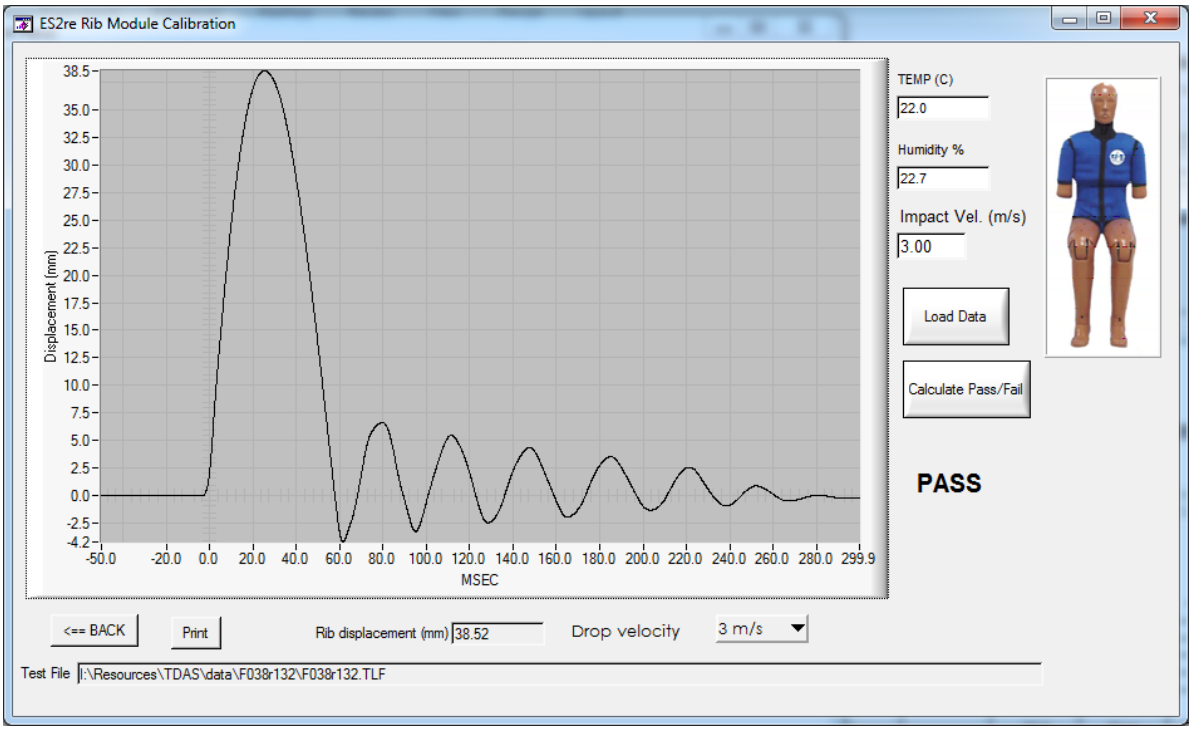
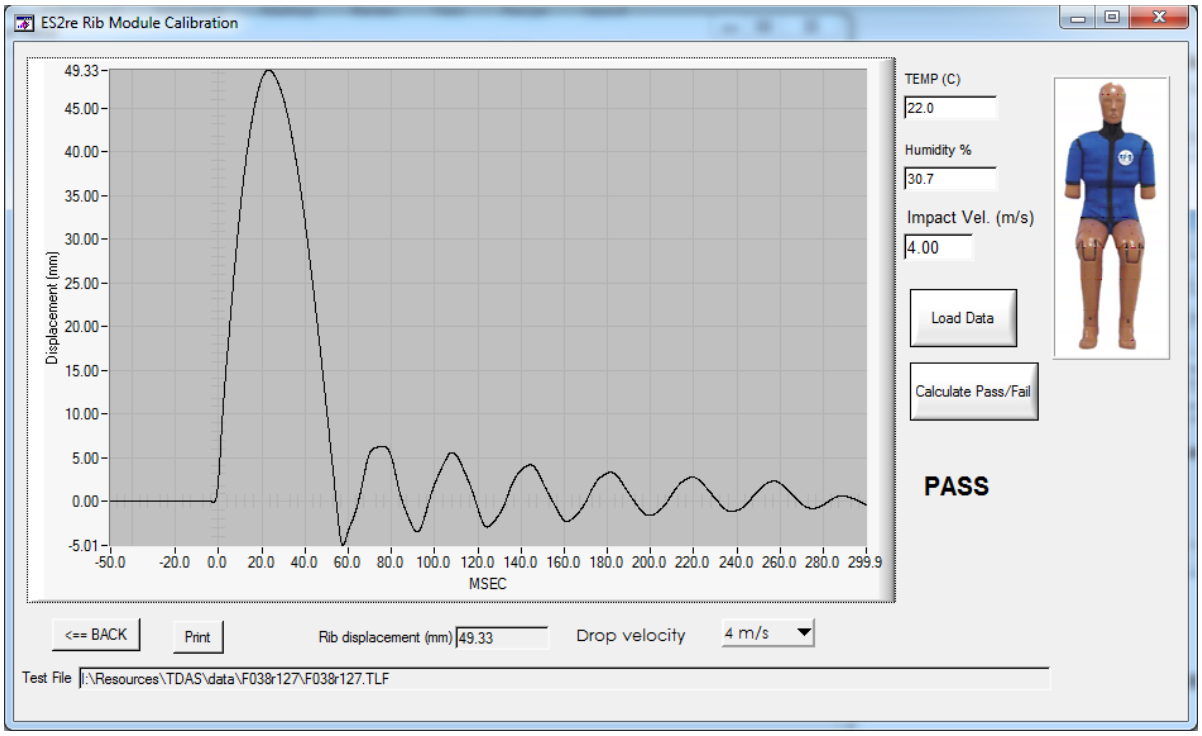


TABLE 7
THORAX – LOWER RIB DROP TEST (ES-IIre) (CONTINUED)
4.00 m/s

PRE-TEST



POST-TEST

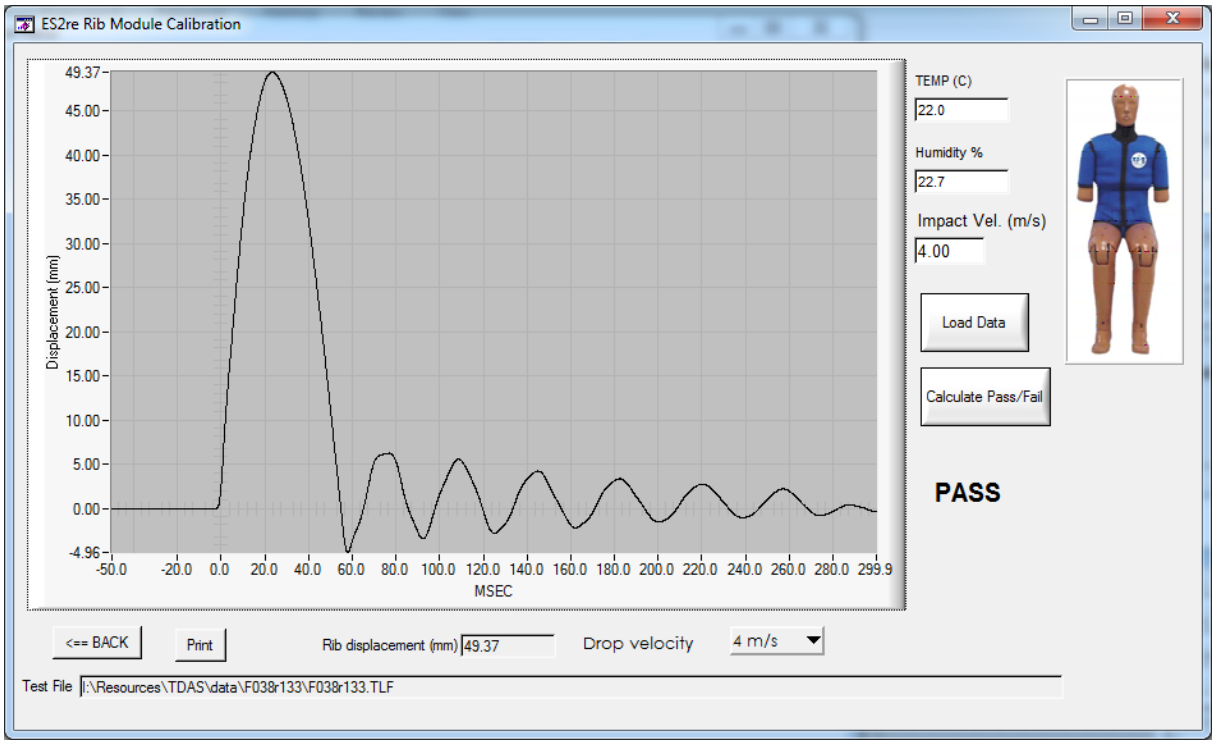


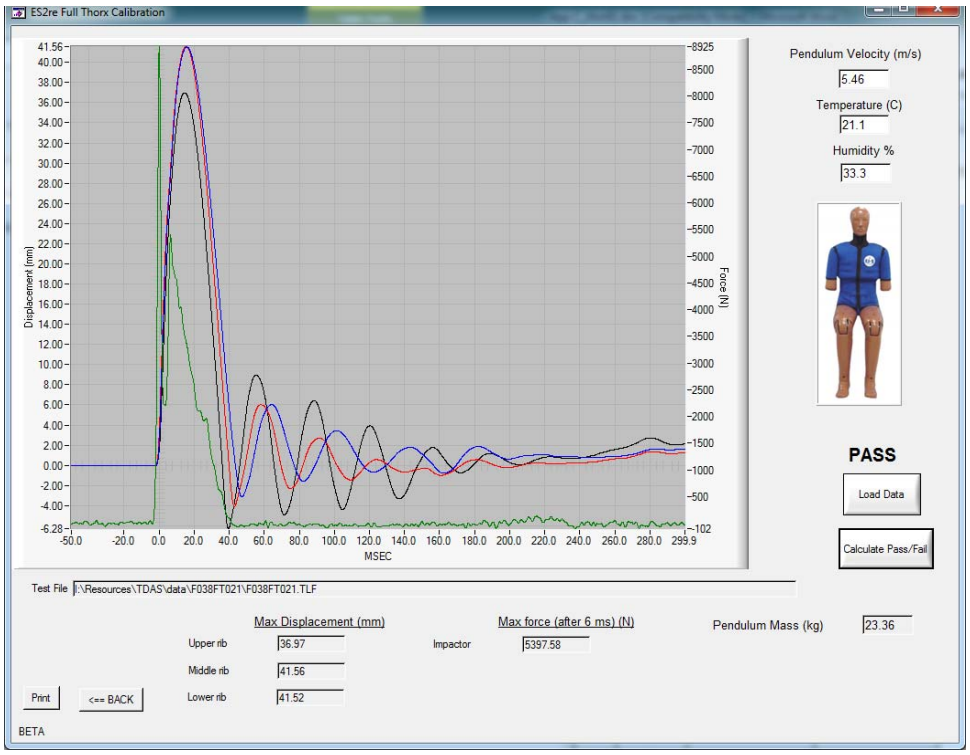
TABLE 8
THORAX – FULL BODY IMPACT TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-27-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	21.1	Pass	20.8	Pass
	Min		20.8	Pass	20.7	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	33.3	Pass	20.0	Pass
	Min		30.6	Pass	19.5	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.1	Pass	20.8	Pass
Humidity – During Test (%)		**10-70**	33.3	Pass	20.0	Pass
Peak Impactor Velocity (m/s)		**5.4-5.6**	5.46	Pass	5.46	Pass
Peak Upper Rib Deflection (mm)		**34-41**	37.0	Pass	37.5	Pass
Peak Middle Rib Deflection (mm)		**37-45**	41.6	Pass	41.5	Pass
Peak Lower Rib Deflection (mm)		**37-44**	41.5	Pass	40.2	Pass
Peak Impactor Force (>6ms) (kN)		**5.1-6.2**	5.4	Pass	5.4	Pass

TABLE 8
THORAX – FULL BODY IMPACT TEST (ES-IIre)

PRE-TEST



POST-TEST

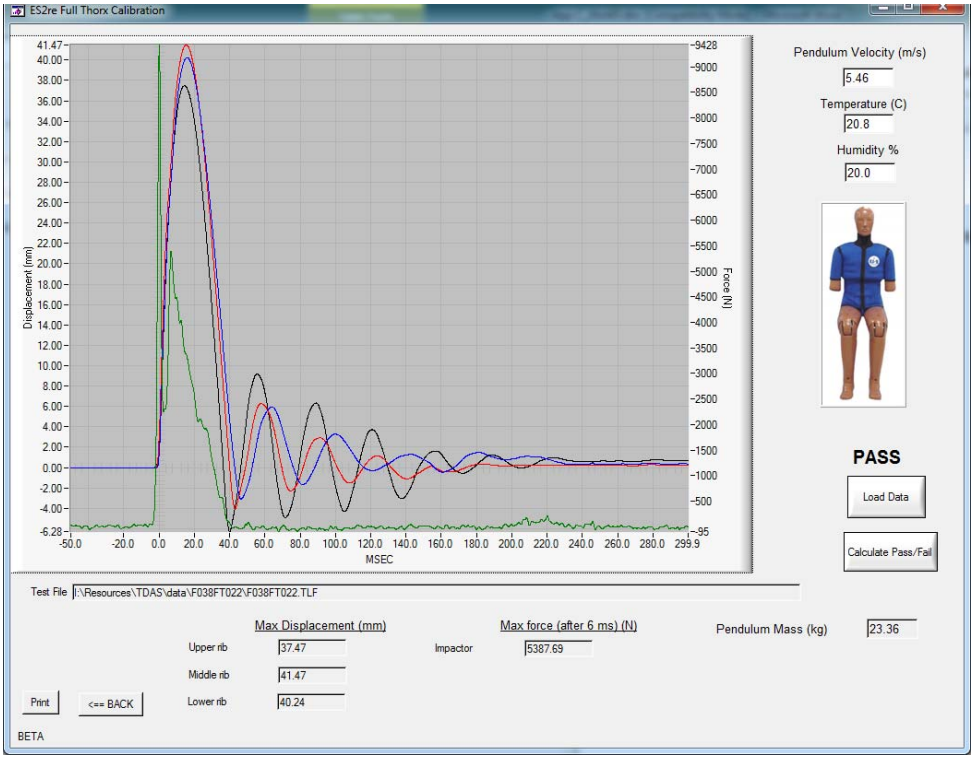


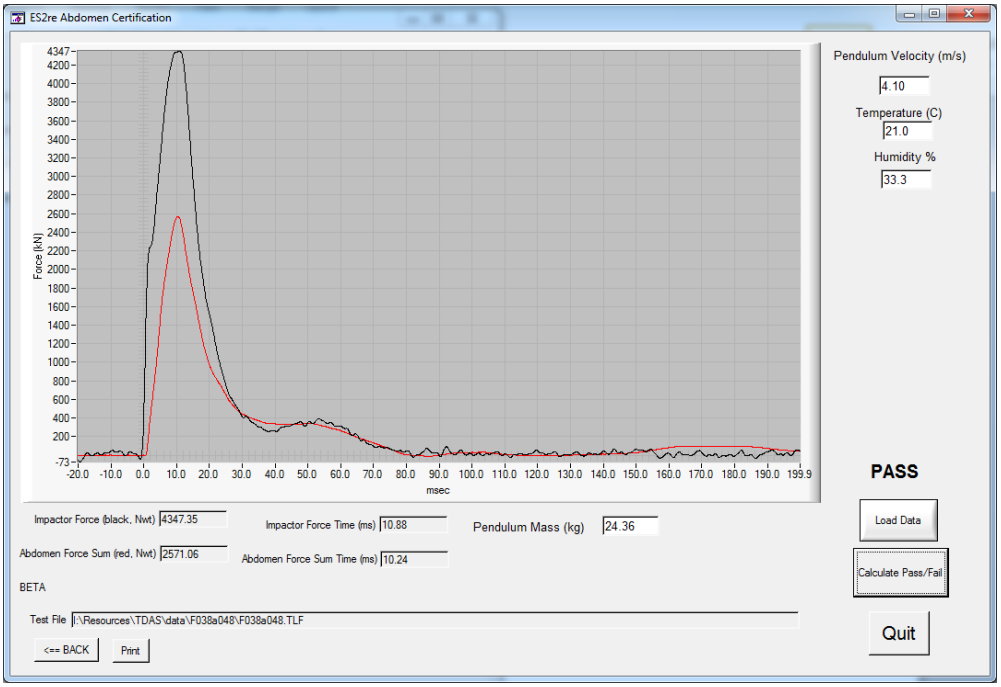
TABLE 9
ABDOMEN IMPACT TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-27-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	20.8	Pass
	Min		20.9	Pass	20.7	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	33.3	Pass	20.1	Pass
	Min		31.2	Pass	19.5	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	20.8	Pass
Humidity – During Test (%)		**10-70**	33.3	Pass	20.1	Pass
Peak Impactor Velocity (m/s)		**3.9-4.1**	4.1	Pass	4.0	Pass
Sum of Abdominal Forces (kN)		**2.2-2.7**	2.6	Pass	2.6	Pass
Time of Abdominal Forces (ms)		**10-12.3**	10.2	Pass	12.2	Pass
Peak Impactor Force (kN)		**4.0-4.8**	4.3	Pass	4.6	Pass
Time of Peak Impactor Force (ms)		**10.6-13.0**	10.9	Pass	12.2	Pass

TABLE 9
ABDOMEN IMPACT TEST (ES-IIre) (CONTINUED)

PRE-TEST



POST-TEST

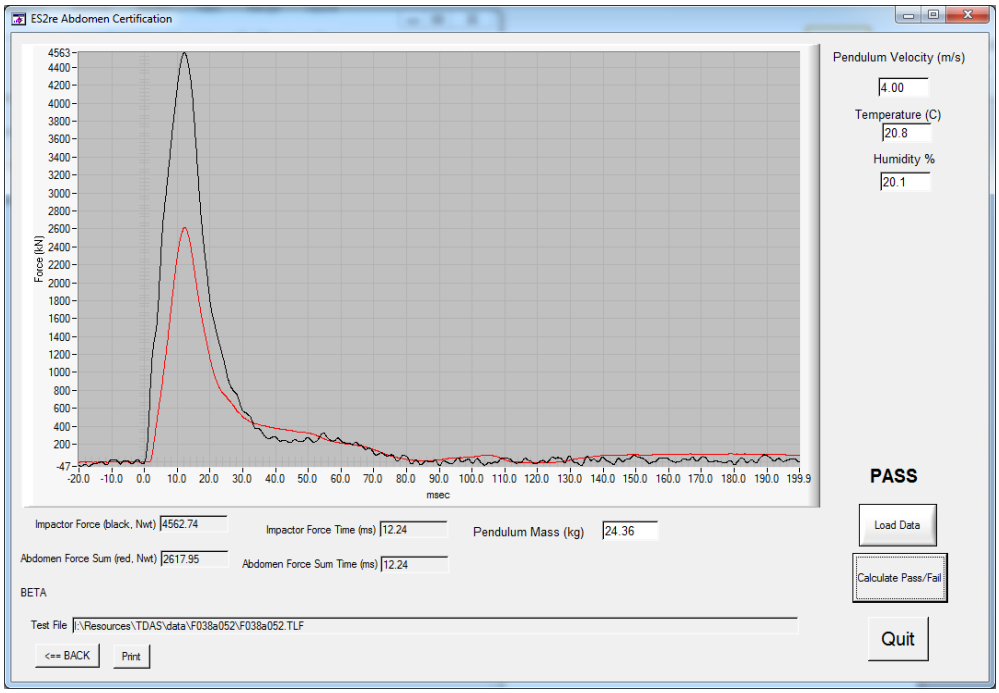


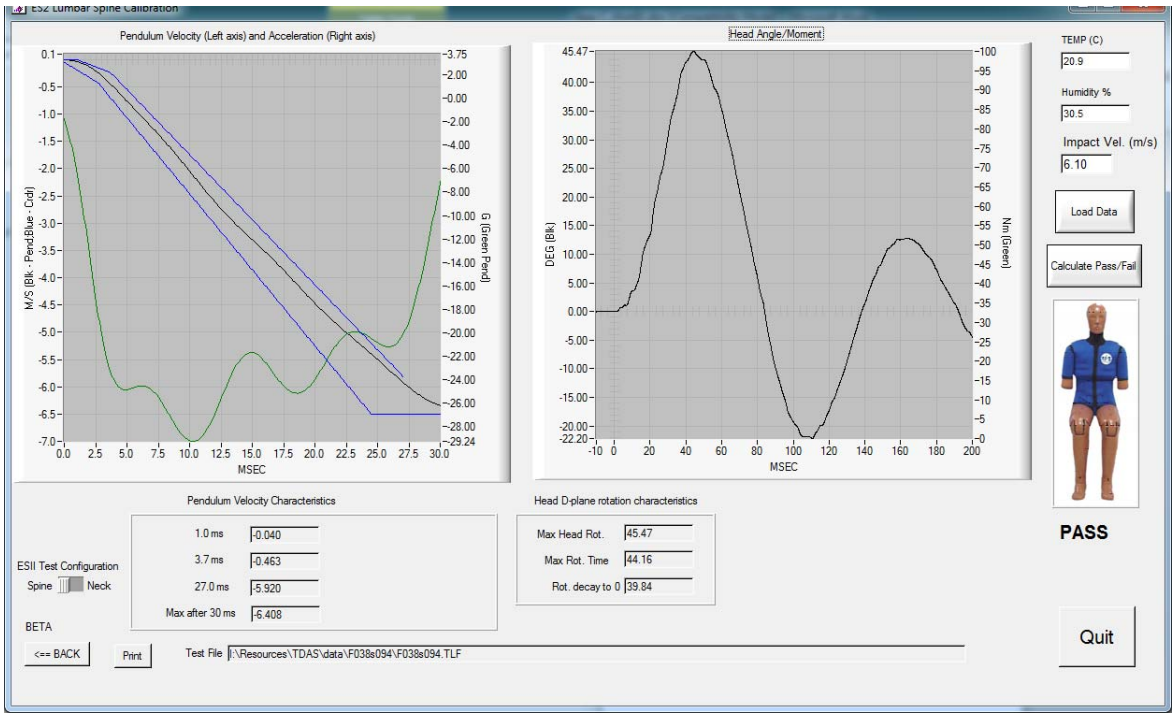
TABLE 10
LUMBAR SPINE FLEXION TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Lumbar Spine Assembly Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	20.9	Pass	21.9	Pass
	Min		20.6	Pass	20.6	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	30.5	Pass	23.2	Pass
	Min		28.7	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	20.9	Pass	21.9	Pass
Humidity – During Test (%)		**10-70**	30.5	Pass	23.2	Pass
Pendulum Velocity (m/s)		**5.95-6.15**	6.1	Pass	6.12	Pass
Pendulum Velocity Corridors (m/s)	0-1.0 ms	**(-0.05)-0.00**	-0.04	Pass	-0.04	Pass
	2.7-3.7 ms	**(-0.425) - (-0.24)**	-0.46	Pass	-0.45	Pass
	24.5-27.0 ms	**(-6.50) - (-5.80)**	-5.9	Pass	-6.1	Pass
	Max after 30 ms	**-6.50**	-6.4	Pass	-6.4	Pass
Maximum Headform Flexion Angle (deg)		**45-55**	45.5	Pass	47.0	Pass
Time at Maximum Flexion Angel (ms)		**39-53**	44.2	Pass	44.0	Pass
Time of Decay to Zero Angle from Peak (ms)		**37-57**	39.8	Pass	39.4	Pass

TABLE 10
LUMBAR SPINE FLEXION TEST (ES-IIre) (CONTINUED)

PRE-TEST



POST-TEST

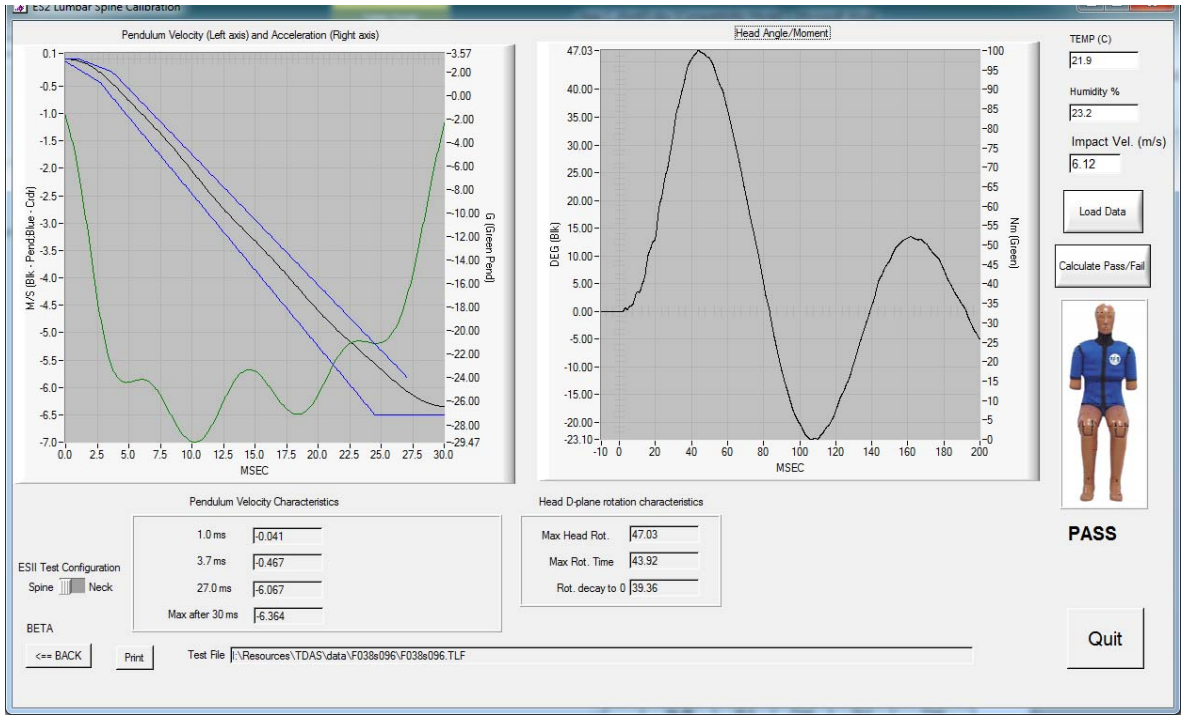


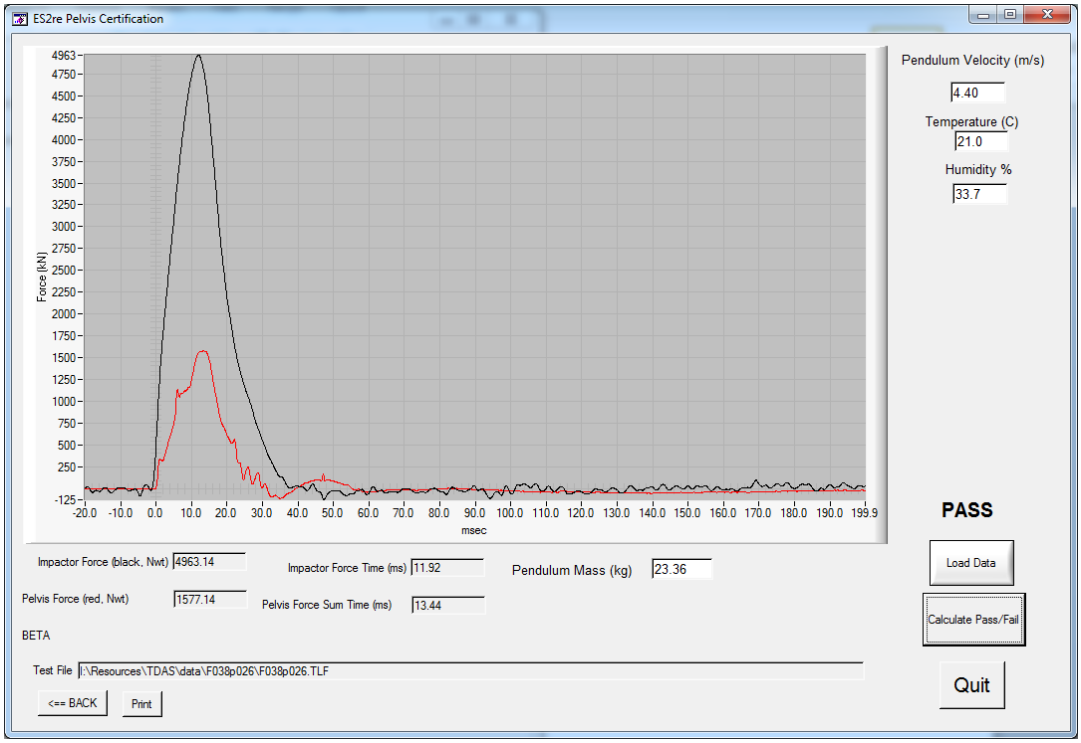
TABLE 11
PELVIS IMPACT TEST (ES-IIre)

ES-IIre Serial Number F038 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-27-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature (°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	20.8	Pass
	Min		20.7	Pass	20.7	Pass
Humidity (%) – During Soak	Max	**10.0-70.0**	33.7	Pass	20.2	Pass
	Min		30.2	Pass	19.5	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	20.8	Pass
Humidity – During Test (%)		**10-70**	33.7	Pass	20.2	Pass
Pendulum Velocity (m/s)		**4.2-4.4**	4.4	Pass	4.4	Pass
Peak Impactor Force (kN)		**4.7 – 5.4**	5.0	Pass	4.9	Pass
Time at Peak Force (ms)		**11.8-16.1**	11.9	Pass	12.6	Pass
Peak Pubic Symphysis Force (kN)		**1.23-1.59**	1.58	Pass	1.52	Pass
Time at Peak Force (ms)		**12.2-17.0**	13.4	Pass	12.6	Pass

TABLE 11
PELVIS IMPACT TEST (ES-IIre) (CONTINUED)

PRE-TEST



POST-TEST

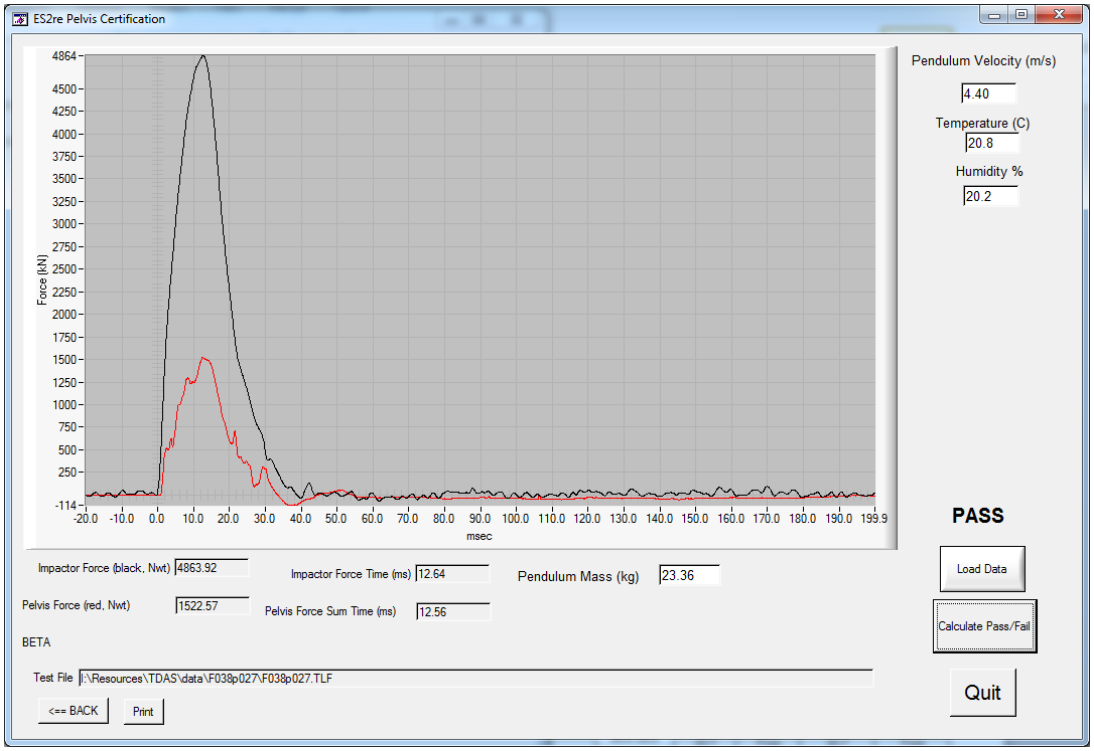


TABLE 1
EXTERNAL MEASUREMENTS (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER	SPEC.	PRE		POST	
Date	-	11-18-13		11-27-13	
Sequential Test Number	-	2		3	
		Result	**Pass/Fail**	**Result**	**Pass/Fail**
Temperature (°C)	**20.6-22.2**	21.1	Pass	20.9	Pass
Relative Humidity (%)	**10-70**	34.1	Pass	19.5	Pass
Sitting Height	**772 – 788**	775	Pass	783	Pass
Shoulder Pivot Height	**437 – 453**	448	Pass	448	Pass
H-Point Height	**79 – 89**	86	Pass	87	Pass
H-Point from Seat Back	**141 – 151**	146	Pass	146	Pass
Shoulder Pivot from Backline	**97 – 107**	102	Pass	101	Pass
Thigh Clearance	**119 – 135**	125	Pass	125	Pass
Head Breadth	**140 – 148**	143	Pass	142	Pass
Head Back from Backline	**40 – 46**	42	Pass	43	Pass
Head Depth	**178 – 188**	182	Pass	181	Pass
Head Circumference	**541 – 551**	542	Pass	543	Pass
Buttock to Knee Length	**514 – 540**	525	Pass	526	Pass
Popliteal Height	**343 – 369**	356	Pass	355	Pass
Knee Pivot to Floor Height	**392 – 409**	405	Pass	405	Pass
Buttock Popliteal Length	**416 – 442**	431	Pass	432	Pass
Chest Depth w/o Jacket	**195 – 211**	207	Pass	205	Pass
Foot Length	**216 – 232**	225	Pass	225	Pass
Hip Breadth	**313 – 323**	318	Pass	320	Pass
Arm Length	**249 – 259**	255	Pass	255	Pass
Knee Joint to Seat Back	**477 – 493**	485	Pass	485	Pass
Shoulder Width	**341 – 357**	351	Pass	350	Pass
Foot Width	**78 – 94**	87	Pass	87	Pass
Chest Circumference w/Jacket	**851 – 881**	874	Pass	876	Pass
Waist Circumference	**761 – 791**	775	Pass	771	Pass

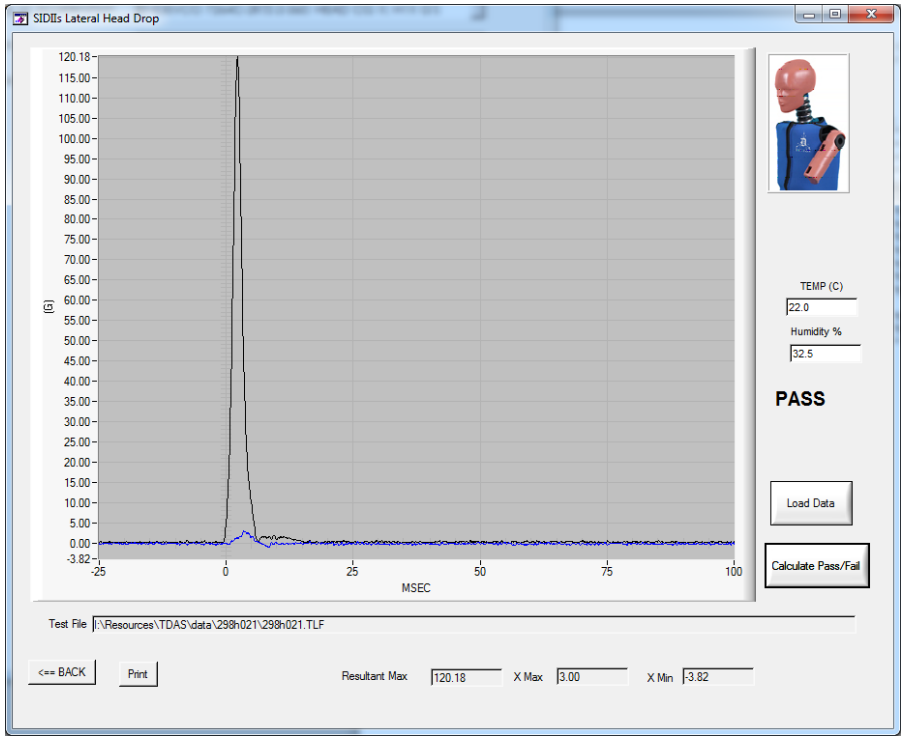
TABLE 2
HEAD DROP TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-16-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Head Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	22.0	Pass	20.7	Pass
	Min		21.3	Pass	20.7	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	32.5	Pass	22.4	Pass
	Min		30.1	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	22.0	Pass	20.7	Pass
Humidity – During Test (%)		**10-70**	32.5	Pass	22.4	Pass
Peak Head Resultant Acceleration (G)		**115-137**	120.2	Pass	124.0	Pass
Peak Head X Acceleration (G)		**<15**	3	Pass	4.3	Pass
Unimodal (Oscillation) (Yes/No)		**<15%**	Yes	Pass	Yes	Pass

TABLE 2
HEAD DROP TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

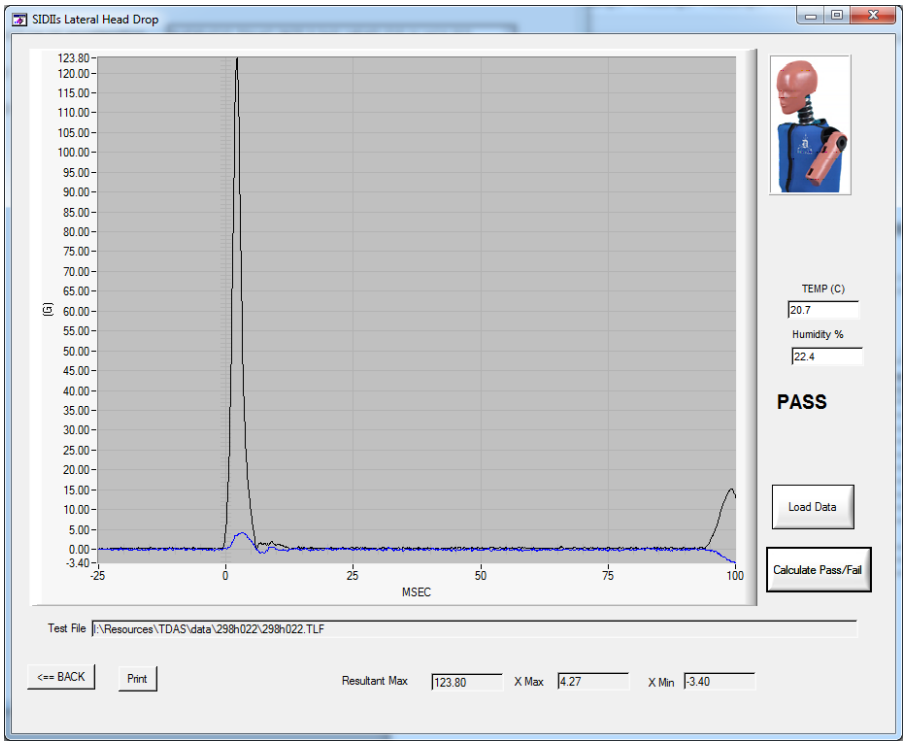


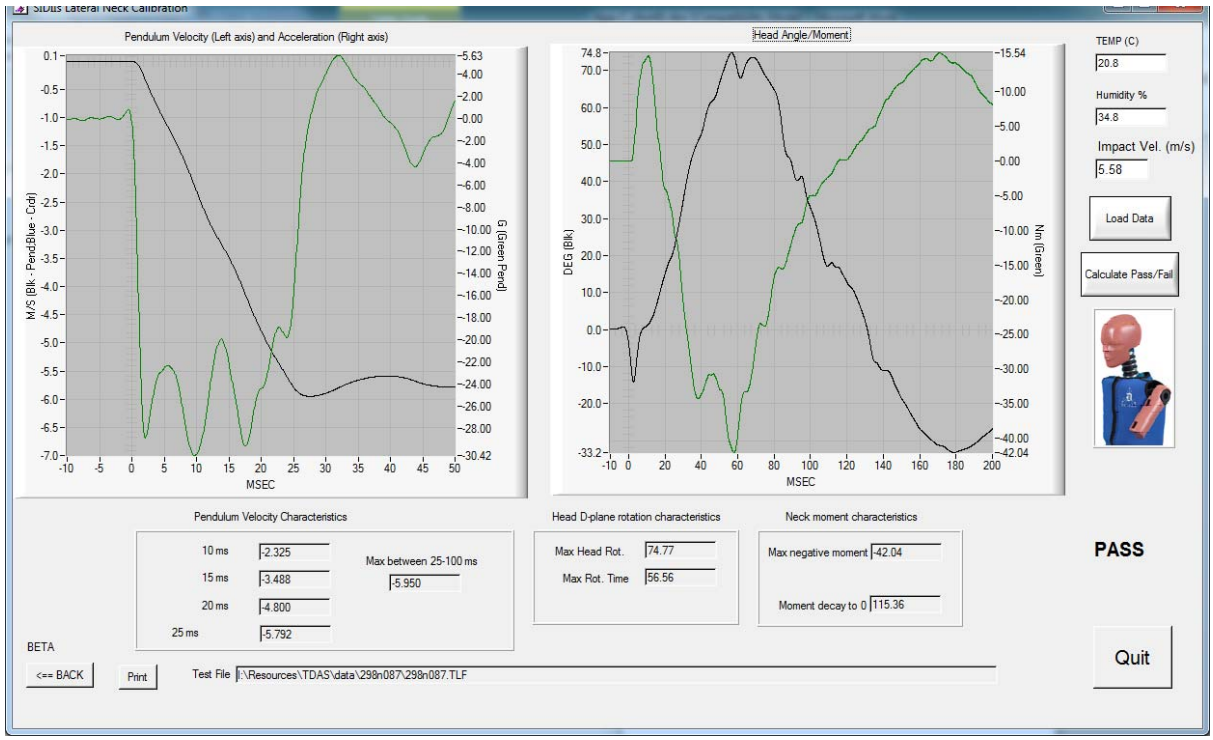
TABLE 3
LATERAL NECK PENDULUM TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Neck Assembly Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	20.8	Pass	22.0	Pass
	Min		20.6	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.8	Pass	23.0	Pass
	Min		31.1	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	20.8	Pass	22.0	Pass
Humidity – During Test (%)		**10-70**	34.8	Pass	23.0	Pass
Pendulum Velocity (m/s)		**5.51-5.63**	5.58	Pass	5.58	Pass
Pendulum Deceleration (G)	10 ms	**2.20-2.80**	2.3	Pass	2.3	Pass
	15 ms	**3.30-4.10**	3.5	Pass	3.4	Pass
	20 ms	**4.40-5.40**	4.8	Pass	4.6	Pass
	25 ms	**5.40-6.10**	5.8	Pass	5.5	Pass
	25-100 ms	**5.50-6.20**	6.0	Pass	5.9	Pass
Maximum D-Plane rotation (deg)		**71-81**	74.8	Pass	74.1	Pass
Time of Maximum D-Plane Rotation (ms)		**50-70**	56.6	Pass	63.0	Pass
Peak Occ. Condyle Moment (Nm)		**36-44**	42.0	Pass	39.0	Pass
Time of Moment Decay (ms)		**102-126**	115.4	Pass	117.0	Pass

TABLE 3
LATERAL NECK PENDULUM TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

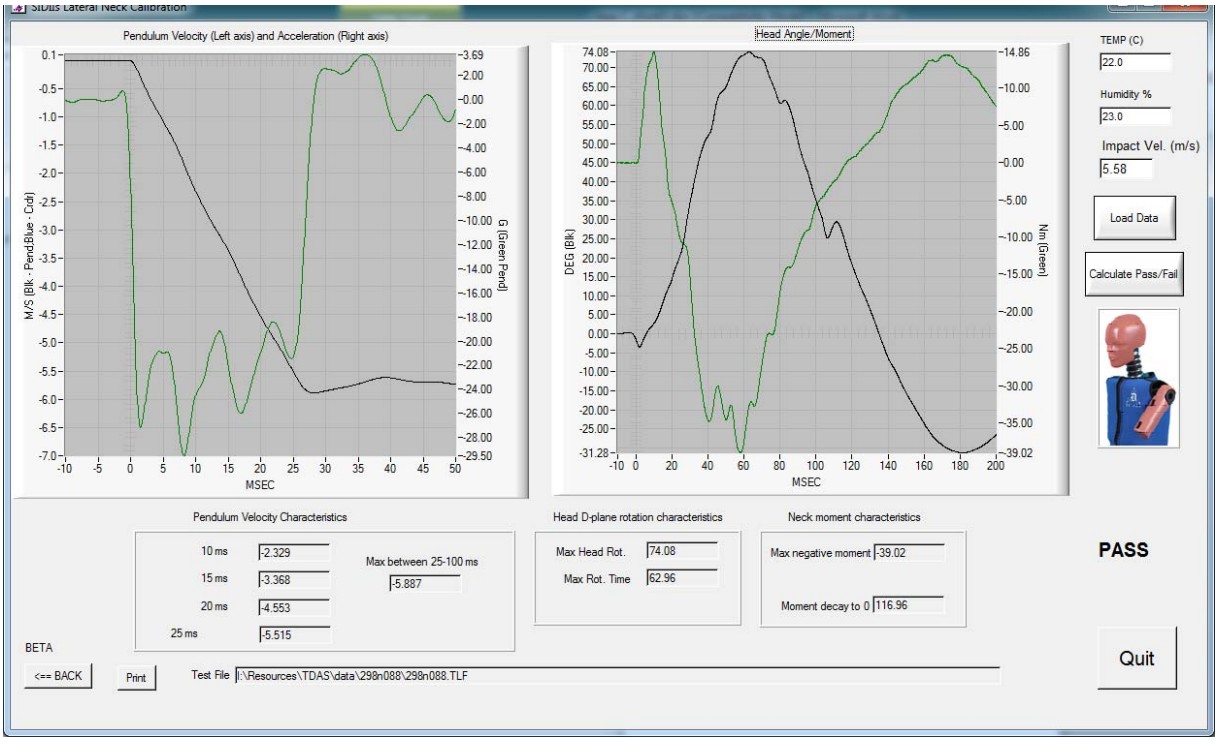


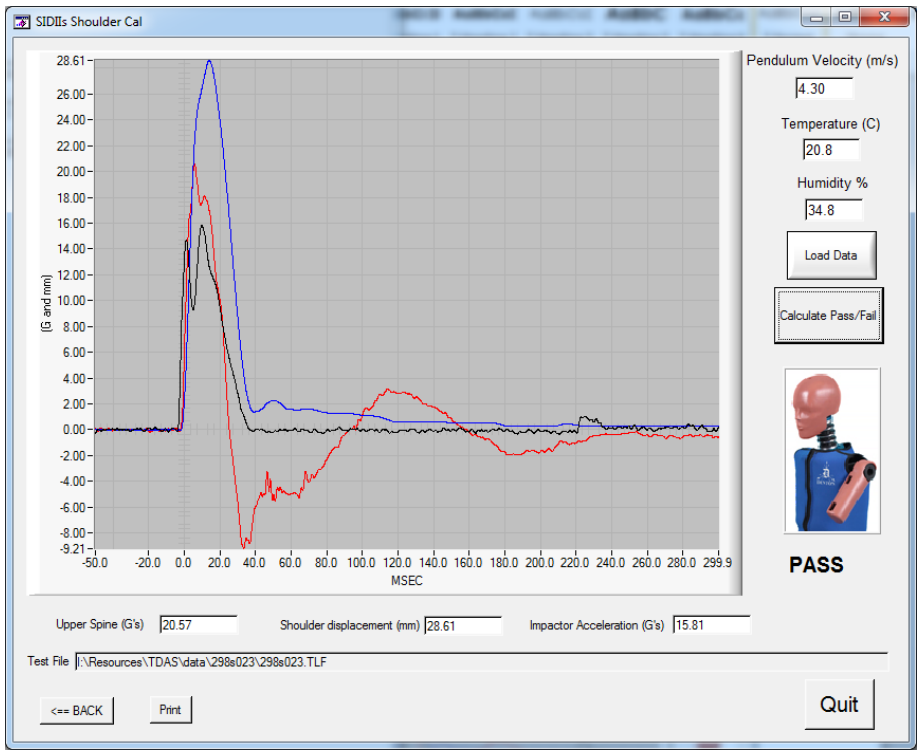
TABLE 4
SHOULDER IMPACT TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	20.8	Pass	21.5	Pass
	Min		20.6	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.8	Pass	22.5	Pass
	Min		31.2	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	20.8	Pass	21.5	Pass
Relative Humidity – During Test (%)		**10-70**	34.8	Pass	22.5	Pass
Impactor Velocity (m/s)		**4.2-4.4**	4.3	Pass	4.3	Pass
Peak Shoulder Deflection (mm)		**28-37**	28.6	Pass	29.9	Pass
Peak Lateral Spine (T1) Acceleration Y (G)		**17-22**	20.6	Pass	20.0	Pass
Peak Impactor Acceleration (G)		**13-18**	15.8	Pass	15.8	Pass

TABLE 4
SHOULDER IMPACT TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

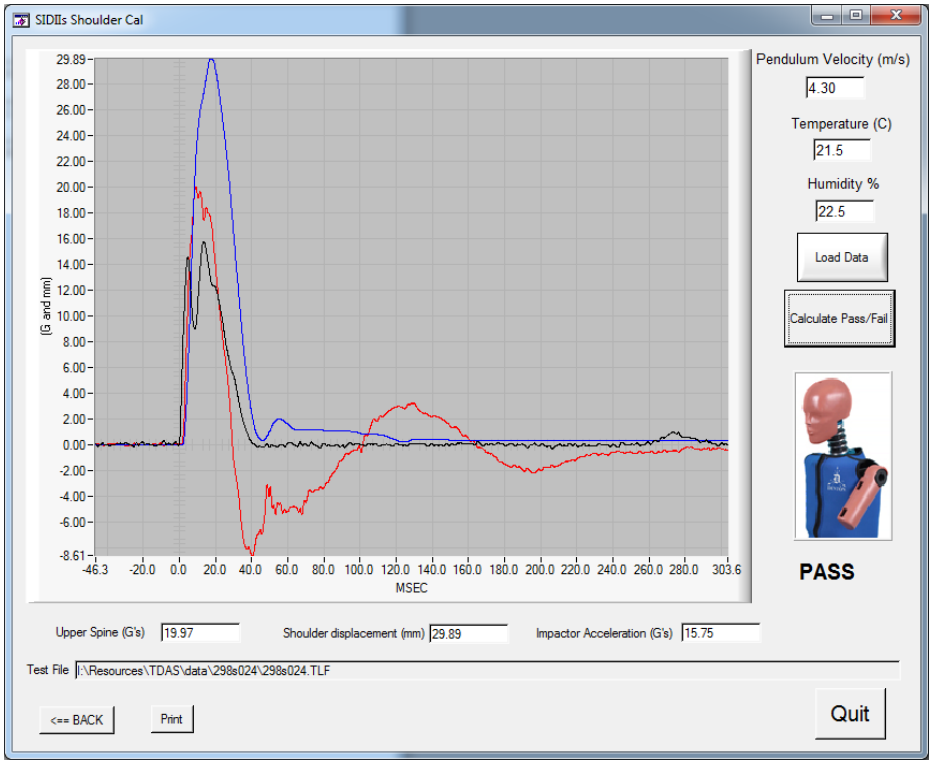


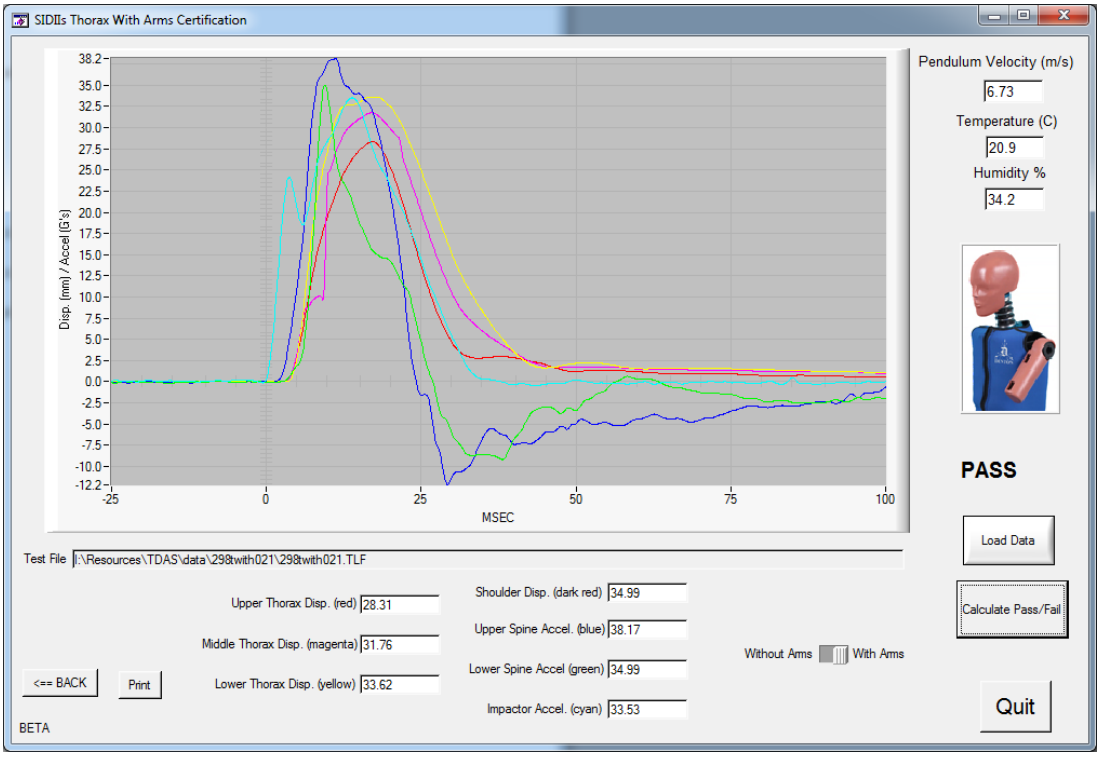
TABLE 5
THORAX (WITH ARM) IMPACT TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	20.9	Pass	21.6	Pass
	Min		20.6	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.2	Pass	22.4	Pass
	Min		33.1	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	20.9	Pass	21.6	Pass
Relative Humidity – During Test (%)		**10-70**	34.2	Pass	22.4	Pass
Impactor Velocity (m/s)		**6.6-6.8**	6.73	Pass	6.73	Pass
Peak Shoulder Deflection (mm)		**31-40**	35.0	Pass	35.1	Pass
Peak Upper Rib Deflection (mm)		**25-32**	28.3	Pass	29.2	Pass
Peak Middle Rib Deflection (mm)		**30-36**	31.8	Pass	32.0	Pass
Peak Lower Rib Deflection (mm)		**32-38**	33.6	Pass	33.5	Pass
Peak Upper Spine (T1) Acceleration Y (G)		**34-43**	38.2	Pass	38.7	Pass
Peak Lower Spine (T12) Acceleration Y (G)		**29-37**	35.0	Pass	35.1	Pass
Peak Impactor Acceleration (G)		**30-36**	33.5	Pass	33.2	Pass

TABLE 5
THORAX (WITH ARM) IMPACT TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

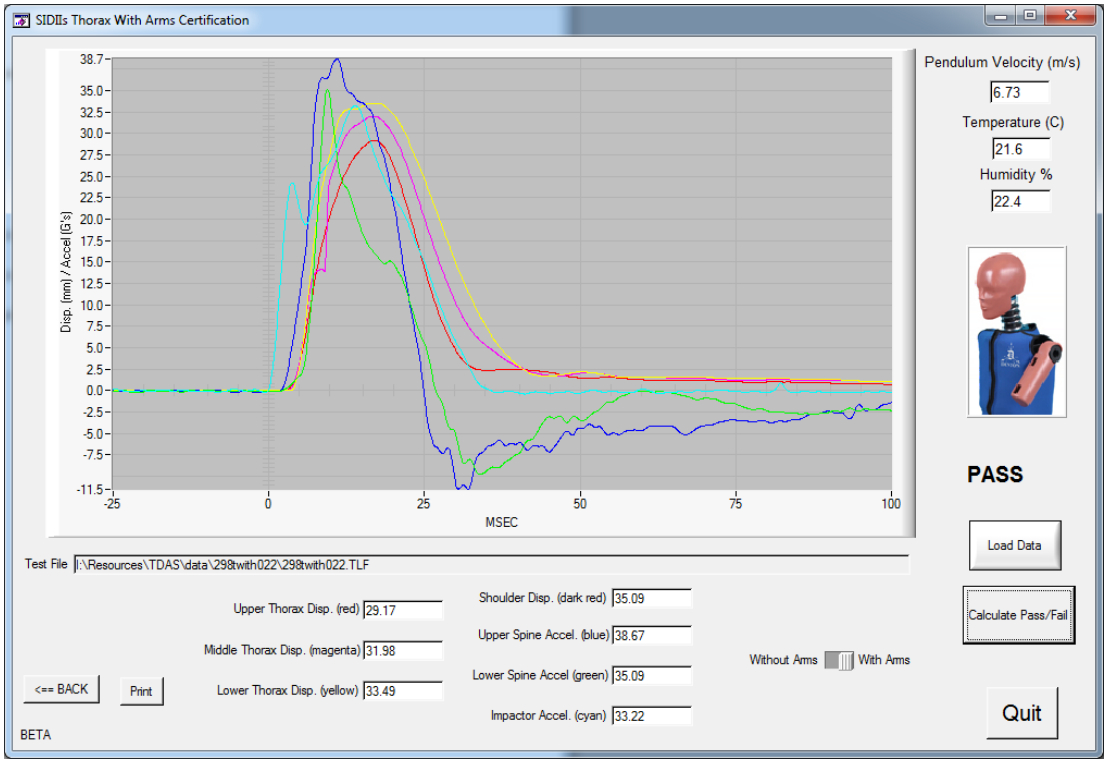


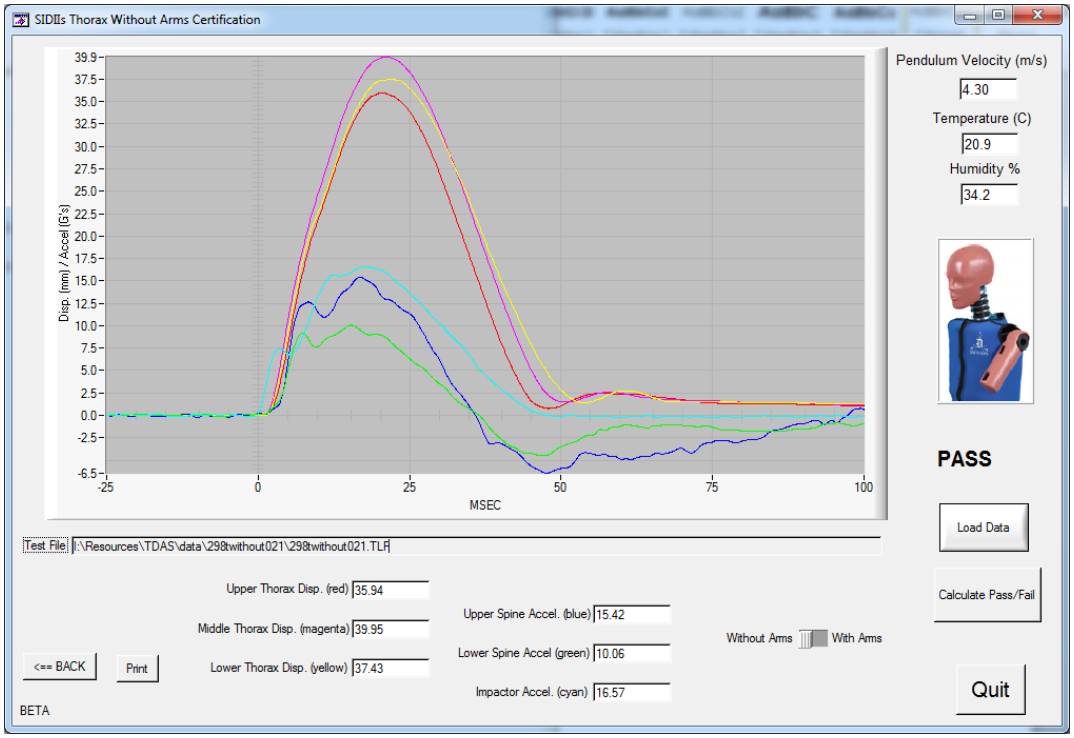
TABLE 6
THORAX (WITHOUT ARM) IMPACT TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	20.9	Pass	21.6	Pass
	Min		20.6	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.2	Pass	22.5	Pass
	Min		31.3	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	20.9	Pass	21.6	Pass
Relative Humidity – During Test (%)		**10-70**	34.2	Pass	22.5	Pass
Impactor Velocity (m/s)		**4.2-4.4**	4.3	Pass	4.3	Pass
Peak Upper Rib Deflection (mm)		**32-40**	36.0	Pass	36.5	Pass
Peak Middle Rib Deflection (mm)		**39-45**	40.0	Pass	40.5	Pass
Peak Lower Rib Deflection (mm)		**35-43**	37.4	Pass	38.2	Pass
Peak Upper Spine (T1) Acceleration Y (G)		**13-17**	15.4	Pass	15.5	Pass
Peak Lower Spine (T12) Acceleration Y (G)		**7-11**	10.1	Pass	9.9	Pass
Peak Impactor Acceleration (G)		**14-18**	16.6	Pass	16.3	Pass

TABLE 6
THORAX (WITHOUT ARM) IMPACT TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

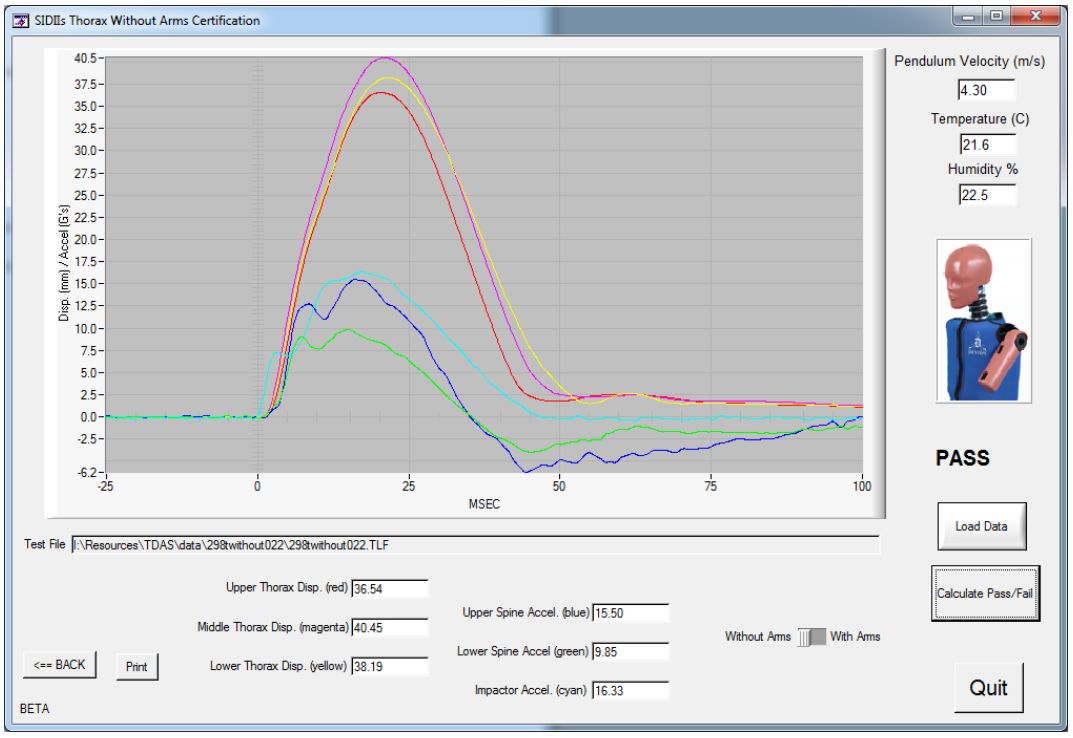


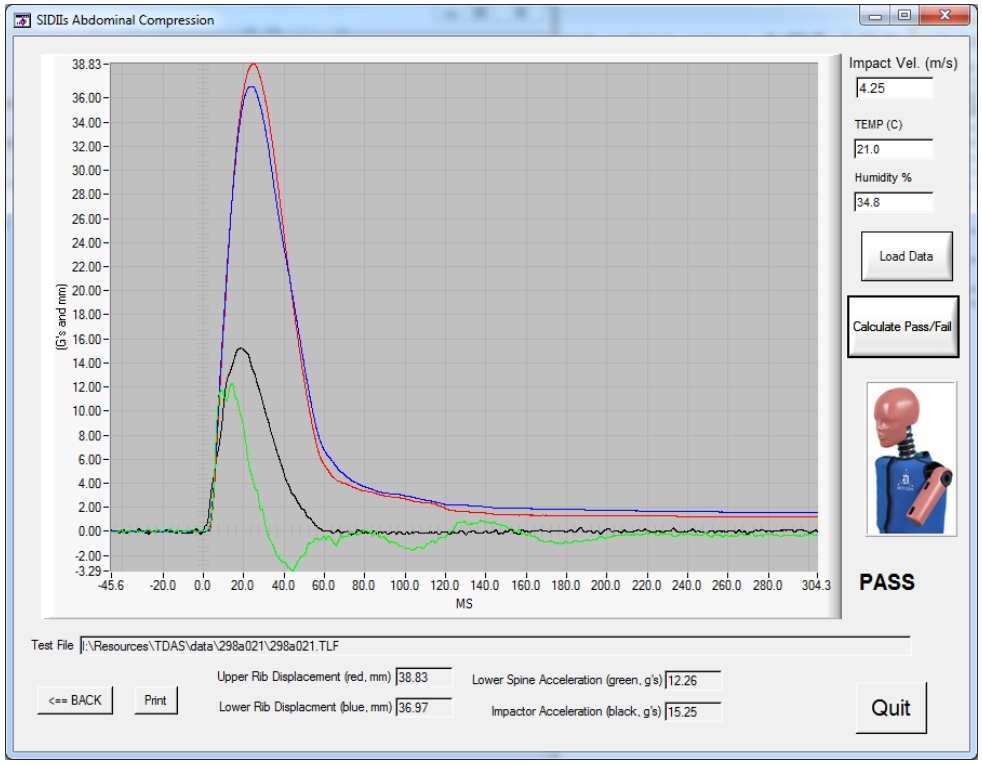
TABLE 7
ABDOMEN IMPACT TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	21.6	Pass
	Min		20.7	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.8	Pass	22.5	Pass
	Min		32.6	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	21.6	Pass
Relative Humidity – During Test (%)		**10-70**	34.8	Pass	22.5	Pass
Impactor Velocity (m/s)		**4.2-4.4**	4.25	Pass	4.25	Pass
Peak Upper Abdominal Rib Deflection (mm)		**36-47**	38.8	Pass	37.3	Pass
Peak Lower Abdominal Rib Deflection (mm)		**33-44**	37.0	Pass	37.4	Pass
Peak Lower Spine (T12) Acceleration Y (G)		**9-14**	12.3	Pass	11.7	Pass
Peak Impactor Acceleration (G)		**12-16**	15.3	Pass	15.0	Pass

TABLE 7
ABDOMEN IMPACT TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

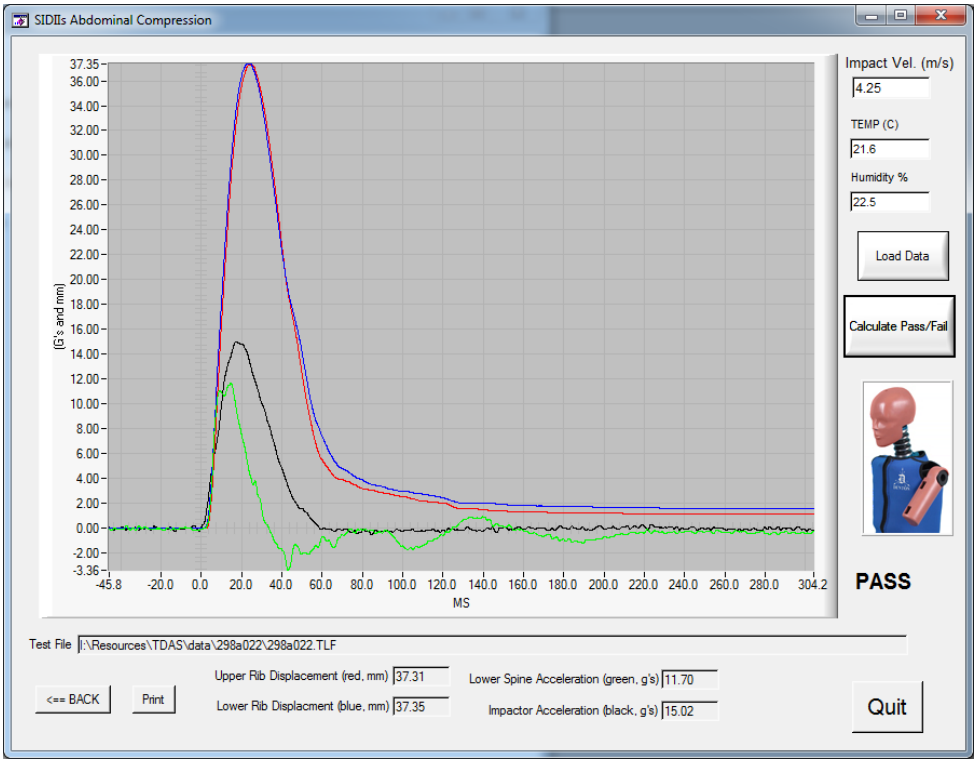
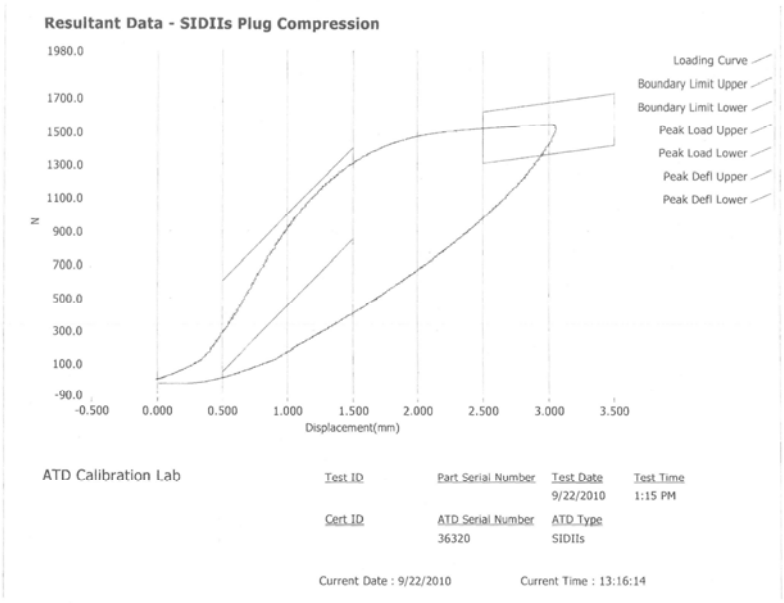


TABLE 8
PELVIS PLUG QUASI-STATIC TEST (SID-IIs)

PRE-Test



POST-TEST

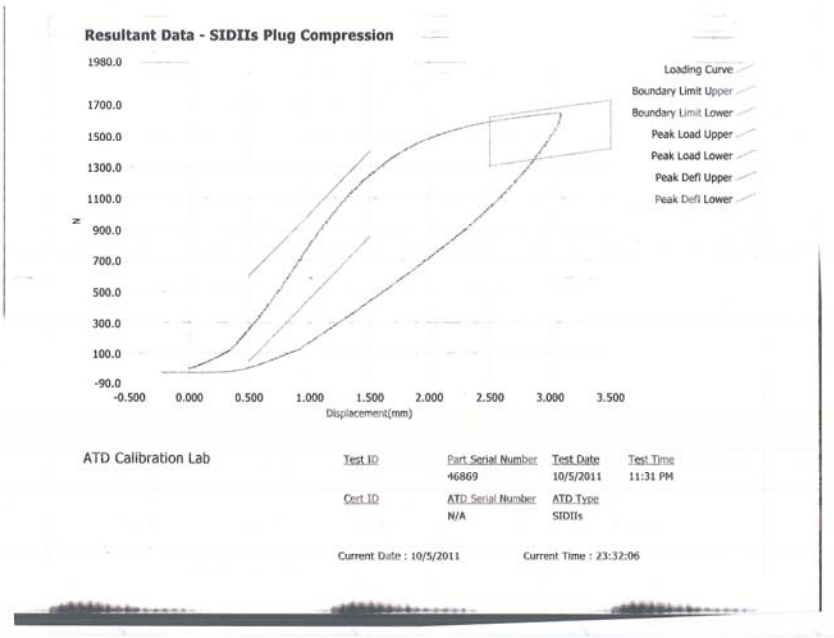


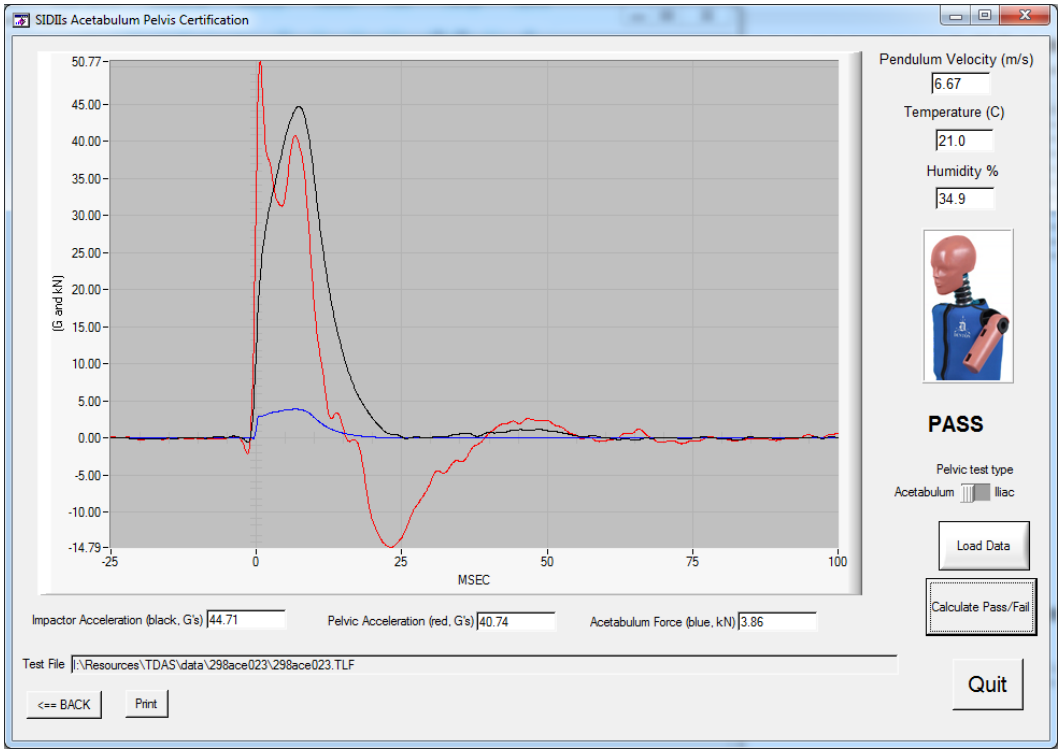
TABLE 9
PELVIS ACETABULUM IMPACT TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Results**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	21.9	Pass
	Min		20.6	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.9	Pass	22.6	Pass
	Min		33.2	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	21.9	Pass
Humidity – During Test (%)		**10-70**	34.9	Pass	22.6	Pass
Impactor Velocity (m/s)		**6.6-6.8**	6.67	Pass	6.61	Pass
Peak Impactor Acceleration (G)		**38-47**	44.7	Pass	44.1	Pass
Pelvis Acceleration Y after 6ms (G)		**34-42**	40.7	Pass	41.0	Pass
Peak Acetabulum Force (kN)		**3.60-4.30**	3.9	Pass	4.0	Pass
Pelvis Plug Serial No. 36320 (Pre) No. 46869 (Post)						

TABLE 9
PELVIS ACETABULUM IMPACT TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST

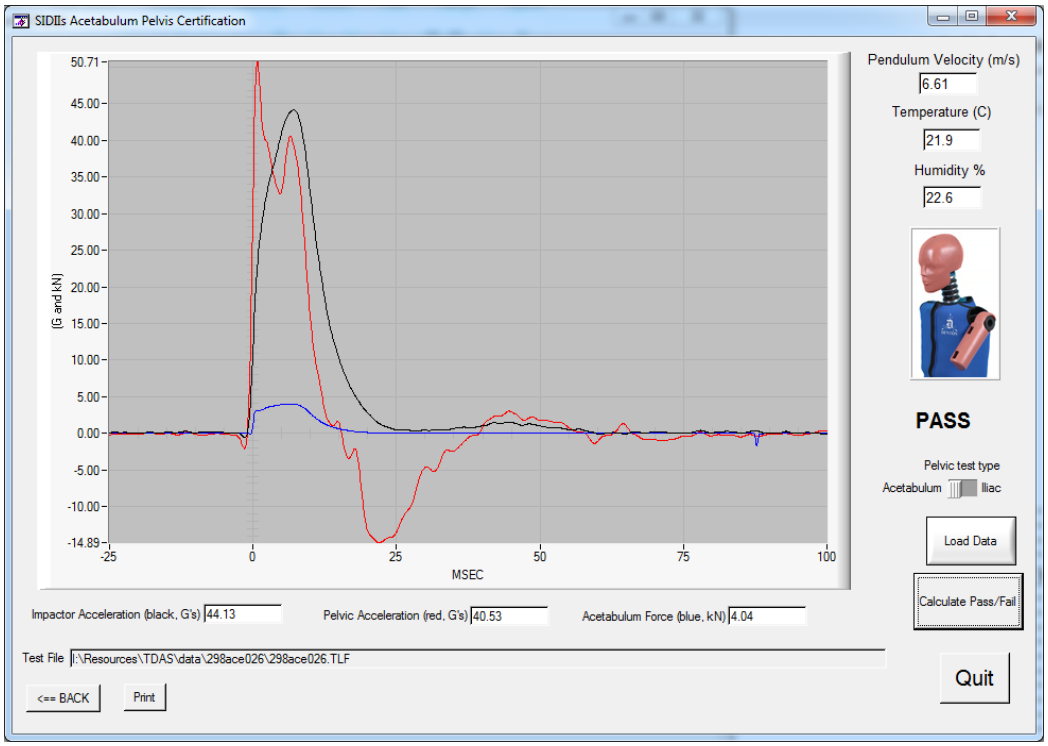


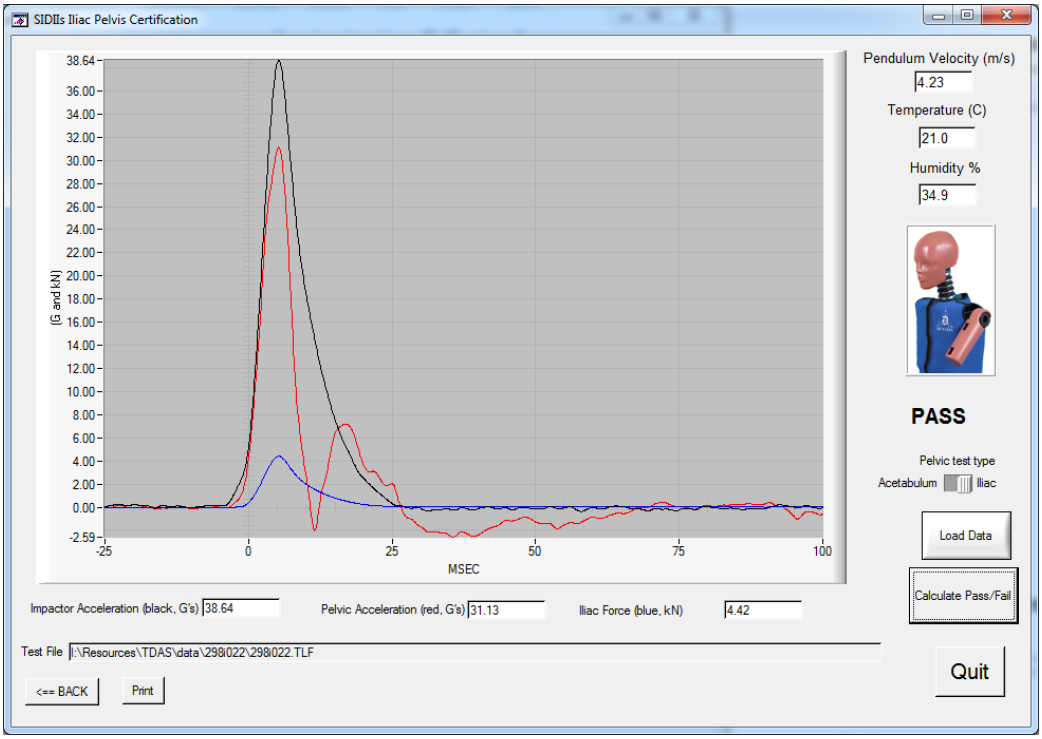
TABLE 10
PELVIS ILIAC IMPACT TEST (SID-IIs)

SIDIIs Serial Number 298 Test Sequences 2 & 3

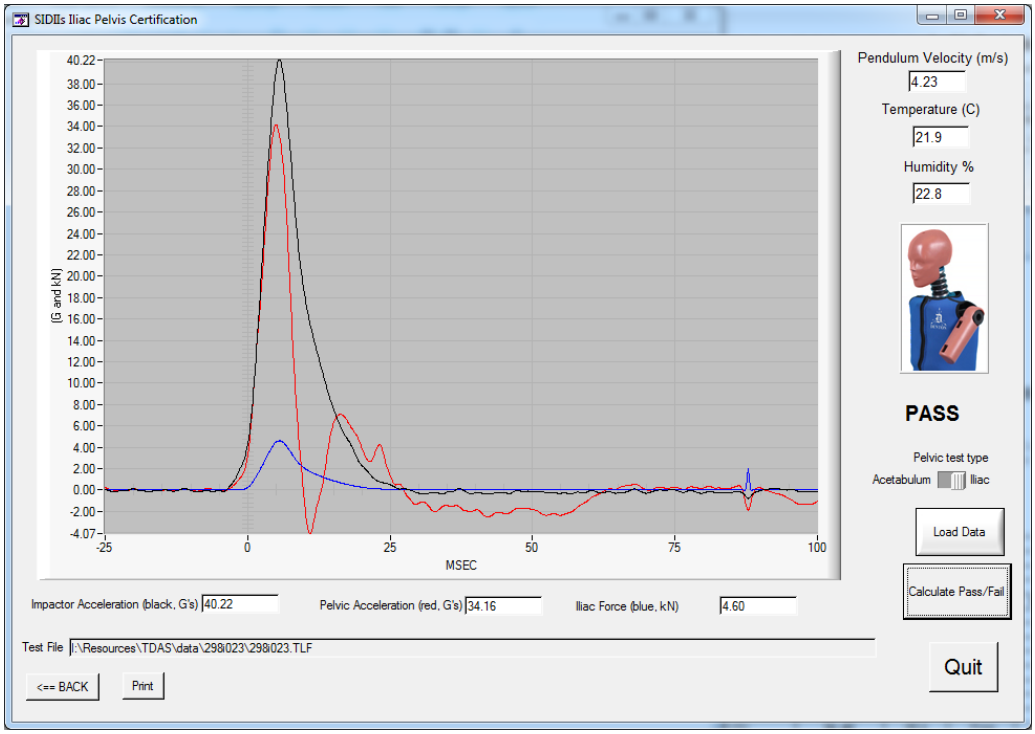
TEST PARAMETER		SPEC.	PRE		POST	
Date		-	11-18-13		11-26-13	
Sequential Test Number		-	2		3	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	21.9	Pass
	Min		20.7	Pass	20.6	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	34.9	Pass	22.8	Pass
	Min		30.9	Pass	22.3	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	21.9	Pass
Humidity – During Test (%)		**10-70**	34.9	Pass	22.8	Pass
Pendulum Velocity (m/s)		**4.2-4.4**	4.23	Pass	4.23	Pass
Peak Impactor Acceleration (G)		**36-45**	38.6	Pass	40.2	Pass
Pelvis Acceleration Y (G)		**28-39**	31.1	Pass	34.2	Pass
Peak Iliac Force Y (N)		**4.10-5.10**	4.4	Pass	4.6	Pass
Pelvis Plug Serial No. 36320 (Pre) No. 46869 (Post)						

TABLE 10
PELVIS ILIAC IMPACT TEST (SID-IIs) (CONTINUED)

PRE-TEST



POST-TEST



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 - DUMMY INSTRUMENTATION – ES-IIRE

			ES-IIre S/N: F038		
			Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers		X	P24165	Endevco	28/Nov/2013
		Y	P25036	Endevco	15/June/2013
		Z	P21704	Endevco	15/June/2013
		X_R	12120	Endevco	15/June/2013
		Y_R	12093	Endevco	06/Aug/2013
		Z_R	12097	Endevco	15/June/2013
Thoracic Rib Displacement Potentiometers	Upper	Y	224	Honeywell	02/May/2013
	Middle	Y	193	Honeywell	02/May/2013
	Lower	Y	191	Honeywell	02/May/2013
Abdomen Load Cells	Forward	Y	1502	Denton	07/May/2013
	Middle	Y	1511	Denton	07/May/2013
	Rear	Y	1537	Denton	07/May/2013
Lower Spine Accelerometers (T_{12})		X	P19287	Endevco	15/June/2013
		Y	P21575	Endevco	25/Aug/2013
		Z	P21732	Endevco	15/June/2013
Pubic Symphosis Load Cell		Y	460	Denton	07/May/2013

TABLE 2 - DUMMY INSTRUMENTATION – SID-IIS

				SID-IIs S/N: 298		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers			X	P59221	Endevco	15/Oct/2013
			Y	P22311	Endevco	25/Aug/2013
			Z	P23582	Endevco	25/Aug/2013
			X_R	12099	Endevco	15/June/2013
			Y_R	12103	Endevco	28/May/2013
			Z_R	12108	Endevco	15/June/2013
Displacement Potentiometers	Shoulder		Y	N/a	N/a	N/a
	Thoracic Rib	Upper	Y	1181	FTSS	02/May/2013
		Middle	Y	1203	FTSS	02/May/2013
		Lower	Y	1215	FTSS	03/May/2013
	Abdominal Rib	Upper	Y	717	FTSS	03/May/2013
		Lower	Y	486	FTSS	03/May/2013
Lower Spine Accelerometers (T_{12})			X	P21586	Endevco	25/Aug/2013
			Y	P21673	Endevco	25/Aug/2013
			Z	P24682	Endevco	25/Aug/2013
Acetabulum Load Cell			Y	114	FTSS	07/May/2013
Iliac Wing Load Cell			Y	283	Denton	22/Aug/2013
Pelvis Plug (Struck-Side)				36320	FTSS	N/a
Pelvis Plug (Non-Struck-Side)				46804	FTSS	N/a

TABLE 3 - VEHICLE INSTRUMENTATION

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A011321	MSI	15/Oct/2013
	Vehicle Center of Gravity	Y	A011331	MSI	15/Oct/2013
	Vehicle Center of Gravity	Z	A011312	MSI	15/Oct/2013
2	Right Sill at Front Seat	X	A011335	MSI	15/Oct/2013
	Right Sill at Front Seat	Y	98F98E11-K07	Entran	15/Oct/2013
	Right Sill at Front Seat	Z	A010890	MSI	15/Oct/2013
3	Right Sill at Rear Seat	X	P21608	Endevco	15/Oct/2013
	Right Sill at Rear Seat	Y	P21605	Endevco	22/Sept/2013
	Right Sill at Rear Seat	Z	P21785	Endevco	15/Oct/2013
4	Left Sill at Front Door	Y	A086967	MSI	22/Sept/2013
5	Left Sill at Rear Door	Y	A119063	MSI	24/Sept/2013
6	Left A-Post Lower	Y	A119065	MSI	24/Sept/2013
7	Left A-Post Middle	Y	A086968	MSI	15/Oct/2013
8	Left B-Post Lower	Y	A086967	MSI	22/Sept/2013
9	Left B-Post Middle	Y	A119063	MSI	24/Sept/2013
10	Front Seat Track	Y	A086969	MSI	15/Oct/2013
11	Rear Seat Track or Structure	Y	J43513	Endevco	15/Oct/2013
12	Right Rear Occ. Compartment	Y	A007267	MSI	15/Oct/2013
13	Engine Block	X	P21820	Endevco	15/Oct/2013
	Engine Block	Y	J43474	Endevco	15/Oct/2013
14	Rear Floorpan Above Axle	X	98G98E11-K02	Entran	15/Oct/2013
	Rear Floorpan Above Axle	Y	98L98H31-Z05	Entran	15/Oct/2013
	Rear Floorpan Above Axle	Z	98G98D22-Z15	Entran	15/Oct/2013

TABLE 4 - MDB INSTRUMENTATION

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	12115	Endevco	22/Oct/2013
MDB Center of Gravity	Y	12149	Endevco	22/Oct/2013
MDB Center of Gravity	Z	P21898	Endevco	22/Oct/2013
Left Frame at Rear Axle Centerline	X	P22339	Endevco	22/Oct/2013
Left Frame at Rear Axle Centerline	Y	P22539	Endevco	22/Oct/2013