

FINAL REPORT NUMBER: SINCAP-TRC-16-008

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

**General Motors LLC
2016 Chevrolet Cruze
NHTSA NUMBER: O20160104**

**PREPARED BY:
Transportation Research Center Inc.
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Report Date: January 2, 2017

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE, Room W43-410
Washington, D.C. 20590**

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Report Approved By: 

John Shultz

Approval Date: January 2, 2017

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

1. Report No. SINCAP-TRC-16-008	2. Government Accession No.	3. Recipient's Catalog No.																																																									
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2016 Chevrolet Cruze, NHTSA No.: O20160104		5. Report Date January 2, 2017																																																									
		6. Performing Organization Code TRC Inc.																																																									
7. Author(s) John Shultz, Project Manager		8. Performing Organization Report Number 160825																																																									
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.																																																									
		11. Contract or Grant No. DTNH22-14-D-00354																																																									
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report August 25, 2016 – January 2, 2017																																																									
		14. Sponsoring Agency Code NRM-110																																																									
15. Supplemental Notes																																																											
16. Abstract This 55 / 28 km/h 90° Moving Deformable Barrier SINCAP Side Impact Test was conducted on the subject 2016 Chevrolet Cruze, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on August 25, 2016. The impact velocity of the Moving Deformable Barrier (MDB) was 61.68 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.8° C. The target vehicle post-test maximum crush was 224 mm at Level 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>248</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>28.8</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>976</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-1025.3</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>35.8</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>521</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>67.4</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>4375.6</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>29.7</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>27.7</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	248	Maximum Thoracic Rib Deflection	mm	44	28.8	Total Abdominal Force	N	2500	976	Pubic Symphysis Force	N	6000	-1025.3	Lower Spine Acceleration	G	82*	35.8	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	521	Lower Spine Resultant Acceleration	g's	82	67.4	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4375.6	Maximum Thoracic Rib Deflection	mm	38*	29.7	Maximum Abdominal Rib Deflection	mm	45*	27.7
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19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 213	22. Price																																																								

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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2016 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00354. The purpose of this test is to generate comparative side impact performance in a 2016 Chevrolet Cruze. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2016 Chevrolet Cruze was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.68 km/h (38.33 mph). 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 Transportation Research Center Inc. in East Liberty, Ohio, on August 25, 2016. Pre-test and post-test photographs of the test vehicle and the MDB and the dummies (ES-2-re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated October 2015. The side impact event was documented by 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 (T12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG triaxial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

APPENDIX B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in APPENDIX C of this report. APPENDIX D of this report contains the test equipment and instrumentation calibration data.

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (ES-2-re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	248
Maximum Thoracic Rib Deflection	mm	44	28.8
Combined Abdominal Force	N	2500	976.0
Pubic Symphysis Force	N	6000	-1025.3
Lower Spine (T12) Resultant Acceleration	G	82*	35.8

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	521
Lower Spine (T12) Resultant Acceleration	G	82	67.4
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4375.6
Maximum Thoracic Rib Deflection	mm	38*	29.7
Maximum Abdominal Rib Deflection	mm	45*	27.7

* Proposed IARV

Supplemental Restraint Information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Side Pelvis Airbag	No	N/A	No	N/A
Knee Airbag	Yes	No	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other	N/A	N/A	N/A	N/A

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact or the static rollover test which followed. Injury values for both ATDs were within the established performance thresholds. The restraint system performed as expected. Head level was left on the rear passenger dummy during the impact.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20160104
Model Year	2016
Make	Chevrolet
Model	Cruze
Body Style	Passenger Car
VIN	1G1BC5SM5G7307753
Body Color	Silver Ice Metallic
Odometer Reading (km/mi)	46 mi.
Engine Displacement (L)	1.4
Type/No. Cylinders	Straight/4
Engine Placement	Front/Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	07/16
Vehicle Type	Passenger Car

GVWR (kg)	1710
GAWR Front (kg)	912
GAWR Rear (kg)	798

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				395
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				54.8

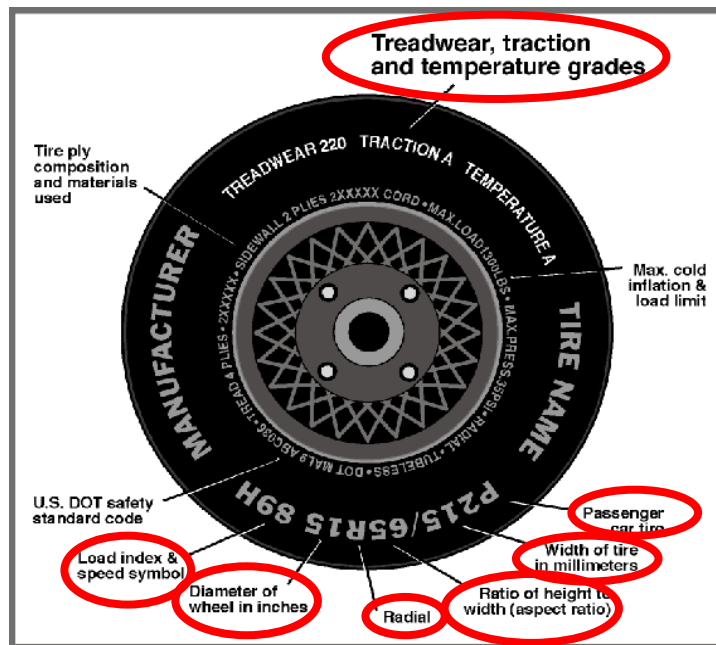
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes	N/A	N/A		N/A	Yes	N/A
Rear or Second Row Seat	N/A	N/A	Yes	Yes	Yes	N/A	N/A
Third Row Seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	195/65R15	195/65R15
Tire Size on Vehicle	195/65R15	195/65R15
Tire Manufacturer	Continental	Continental
Tire Model	ProContact tx	ProContact tx
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	91H	91H
Tire Material	Polyester, steel & polyamide	Polyester, steel & polyamide
DOT Safety Code Left	P5AE WBNU 1616	P5AE WBNU 1616
DOT Safety Code Right	P5AE WBNU 1616	P5AE WBNU 1616

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

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	262	283	255	262
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	240	240	240	240

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE 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	401.2	251.6		455.4	311.4		452.2	334.2	
Right	kg	396.8	237.8		408.4	287.0		392.4	288.6	
Ratio	%	62.0	38.0		59.1	40.9		57.6	42.4	
Totals	kg	798.0	489.4	1287.4	863.8	598.4	1462.2	844.6	622.8	1467.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1287.4	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	54.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1467.2	(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 ☐ NO

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	662	660	Yes
RF	mm	677	671	Yes
RR	mm	670	670	Yes
LR	mm	654	656	Yes
Vehicle CG (Aft of Front Axle)	mm	1146	1105	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+56	+38	

***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. Indicate "Yes" or "No" for "Meets Requirement".

Test height adjustable suspension setting, if applicable:

N/A

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: None	0.0
Removed: Rear fascia, windshield wipers, right side wheel covers, trunk liner and seal, right front and right rear inner door seals and right tail light	12.2

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

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	17.8	13.4	15.6
Front Passenger Seat	N/A	N/A	15.1
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	16.6
Non-Struck Side Rear Seat	N/A	N/A	16.4
Rear Center Seat*	N/A	N/A	11.2

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	15.6	133	Max	N/A	N/A	N/A
			Mid	124	133	143
			Min	N/A	N/A	N/A
Front Passenger Seat	15.1	150	Max	N/A	N/A	N/A
			Mid	141	150	159
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	16.6	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	16.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	11.2	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

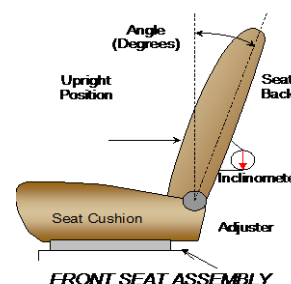
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	240	25	120	13
Front Passenger Seat	220	23	110	12
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* If applicable

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents	Degrees	Detent
Driver Seat w/ Seated Dummy	66.3	N/A	13.0	7
Front Passenger Seat	66.1	N/A	12.8	7
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	N/A	N/A
Non-Struck Side Rear Seat	Fixed	N/A	N/A	N/A
Rear Center Seat*	Fixed	N/A	N/A	N/A

* If applicable

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	1, Fixed	1
Rear Seat	1, Fixed	1

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	5, Numbered from 0 to 4	0, Uppermost
Rear Seat	3, Numbered from 0 to 2	2, Lowermost

DATA SHEET NO. 2 (CONTINUED)

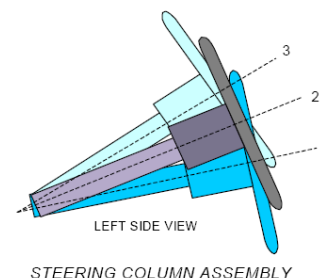
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

STEERING COLUMN ADJUSTMENT

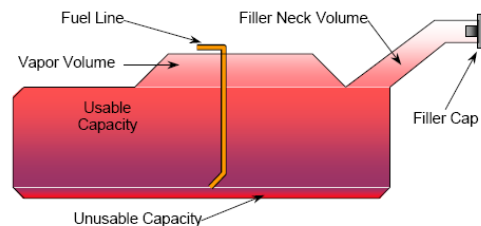
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.



	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	69.6	300
Geometric Center, Position No. 2	67.6	328.5
Uppermost, Position No. 3	65.6	357
Telescoping Steering Wheel Travel		57
Test Position	67.6	328.5

FUEL PUMP

The electric fuel pump is activated when the ignition is turned on.



FUEL TANK CAPACITY

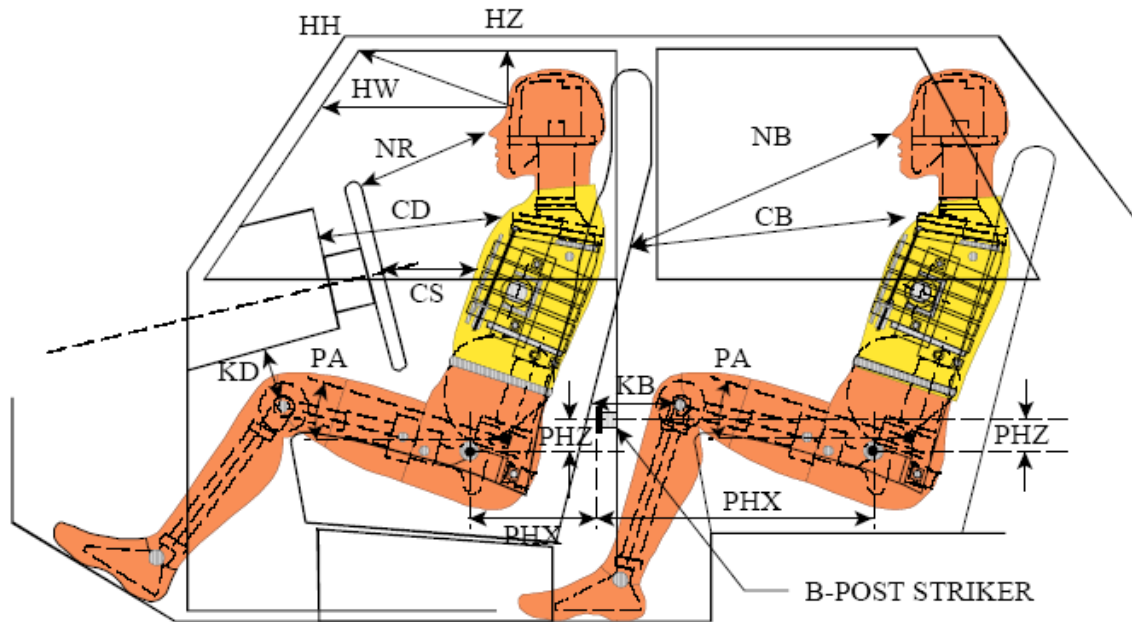
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	50.3
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	51.7
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	46.8
Actual Amount of Solvent Used in Test	46.8
1/3 of Usable Capacity	16.8

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



LEFT SIDE VIEW

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

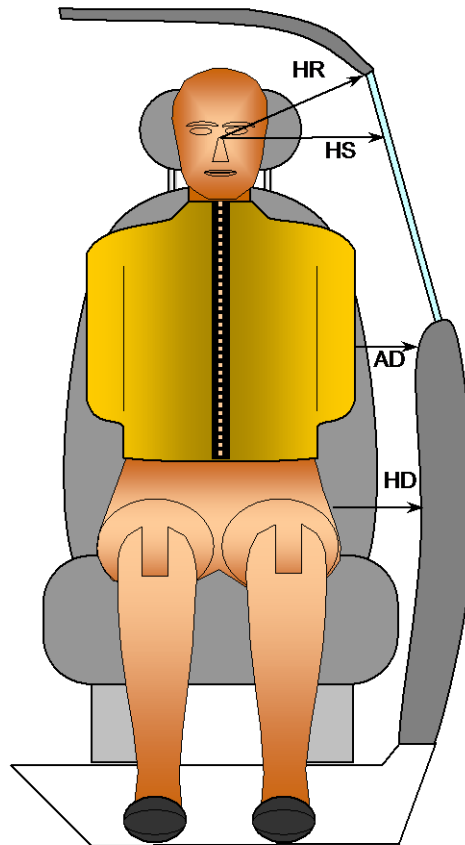
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	466			
HW		Header to Windshield	731			
HZ	HZ	Head to Roof Liner	200		242	
NR	NB	Nose to Rim/Seat Back	513		516	
CD	CB	Chest to Dash/Seat Back	624		492	
CS		Chest to Steering Wheel	387			
KD(L)/KDA(L) ⁰	KB(L)/KBA(L) ⁰	Left Knee to Dash/Seat Back	238	31.9	245	25.0
KD(R)/KDA(R) ⁰	KB(R)/KBA(R) ⁰	Right Knee to Dash/Seat Back	230	28.5	240	25.0
PAX ⁰	PAX ⁰	Pelvic Tilt Angle X		0.4		0.7
	PAY ⁰	Pelvic Tilt Angle Y				19.5
PHX	PHX	Hip Point to Striker (X-Axis)	96		204	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	152		220	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



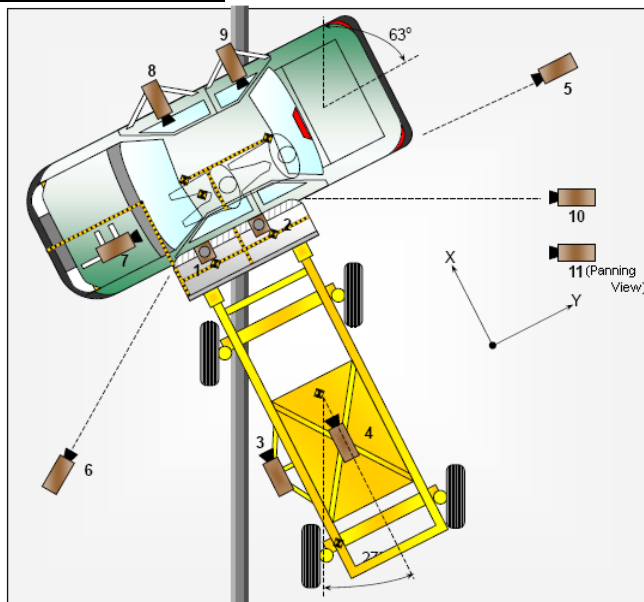
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	181	227
HS	Head to Side Window	mm	335	374
AD	Arm to Door	mm	91	164
HD	H-Point to Door	mm	161	174

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-370	1300	5692	8.5	1000
2	Overhead Close-up	-170	845	5692	16	1000
3	Left Impact Point (MDB)	1730	-900	850	28	1000
4	Side Overall (MDB)	2530	0	1470	12.5	1000
5	Rear	0	7203	1260	20	1000
6	Left Front	2020	3470	1060	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	24
11	Real-time Inrun				Zoom	24

Reference: Impact Point projected to Ground; +X = To Front of MDB +Y = To Right of MDB; +Z = Down

*All measurements accurate to ± 6 mm.

If applicable, explain why camera(s) did not operate as intended: N/A

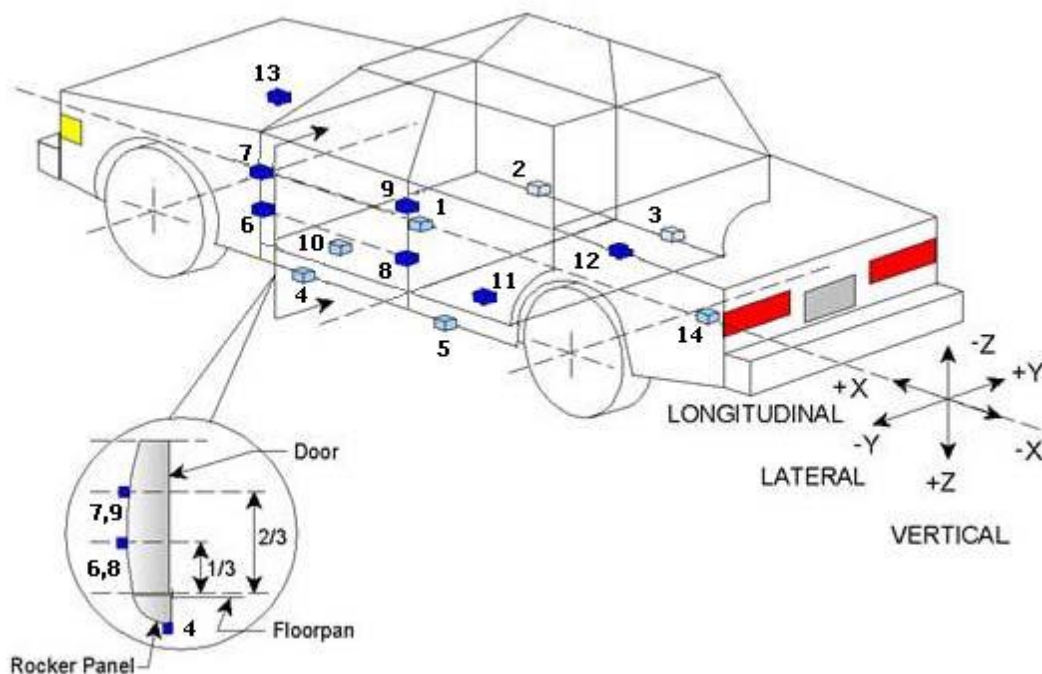
INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MBD Accelerometers	5
TOTAL	60

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



TEST VEHICLE ACCELEROMETER LOCATIONS

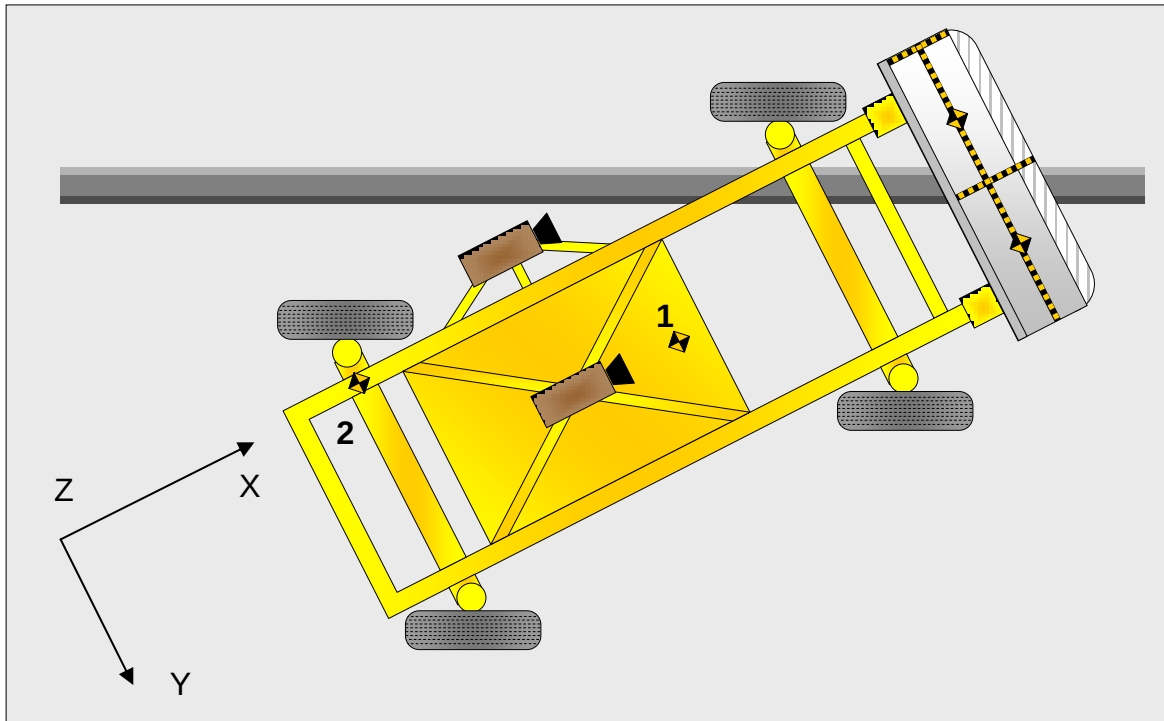
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2915	75	-282
2	Right Sill at Front Seat	2730	710	-331
3	Right Sill at Rear Seat	1916	710	-333
4	Left Sill at Front Door	2765	710	-305
5	Left Sill at Rear Door	1938	710	-317
6	A-Post Lower	3235	800	-468
7	A-Post Middle	3244	805	-828
8	B-Post Lower	2195	785	-545
9	B-Post Middle	2174	803	-885
10	Front Seat Track	2567	554	-295
11	Rear Seat Structure	1792	645	-310
12	Right Rear Occ. Compartment	1764	645	-314
13	Engine Block	4021	52	-750
14	Rear Above Axle	890	0	-407

Reference: X - Rear surface of vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	-2179	0	-505
2	MDB Rear	-3648	-650	-618

Reference : X - Face of MDB (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2016 Chevrolet Cruze
Test Program: SINCAP Side Impact

NHTSA No.: O20160104
Test Date: 8/25/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	SCAB, Headliner	SCAB , Headliner
Top of Head	Headliner	Headliner
Left Side of Head	SCAB, Headliner	SCAB, Headliner
Back of Head	SCAB, Headliner	Headliner, Head Restraint
Left Shoulder	Door Panel	None
Upper Torso	Torso/Pelvis Bag	Torso/Pelvis Bag
Lower Torso	Torso/Pelvis Bag, Seatback	Torso/Pelvis Bag
Left Hip	Door Panel, Torso/Pelvis Bag	Door Panel
Left Knee	Door Panel	Door Panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Major Deformation
Sill Separation	None Visible
Windshield Damage	None
Side Window Damage	Front and rear windows shattered
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Side Pelvis Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other	N/A	N/A	N/A	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2699
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		410
Actual Impact Point (Aft of Front Axle)	mm		404
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+6
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-4

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2016 Chevrolet Cruze
Test Program: SINCAP Side Impact

NHTSA No.: O20160104
Test Date: 8/25/16

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel Base of Framework Carriage	2591
C.G. Location aft of Front Axle	1108

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	408.6	272.8	681.4
Right	kg	371.6	310.2	681.8
Ratio	%	57.2	42.8	100.0
Totals	kg	780.2	583.0	1363.2

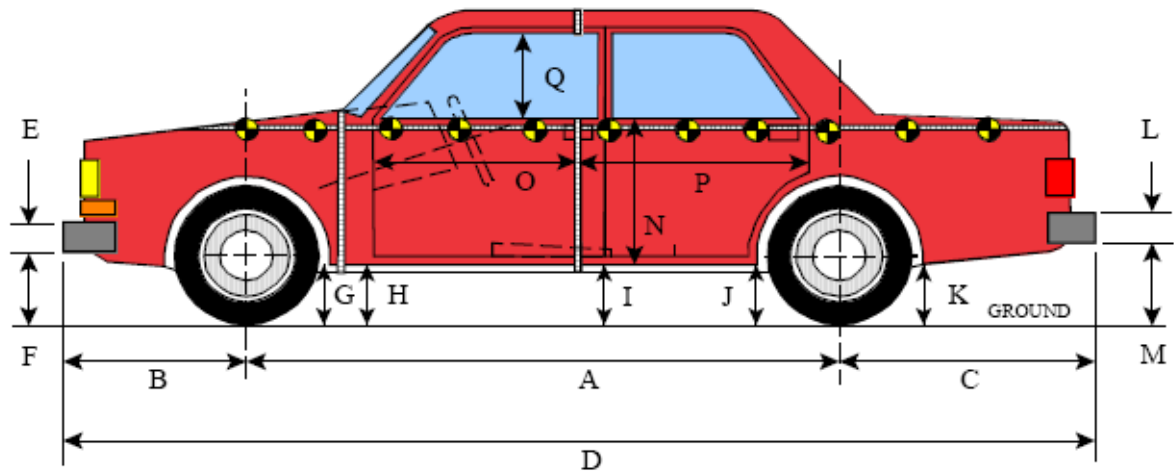
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.68
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.69
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



LEFT SIDE VIEW

ALL MEASUREMENTS IN (mm) WITH TOLERANCE OF $\pm 3\text{mm}$

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

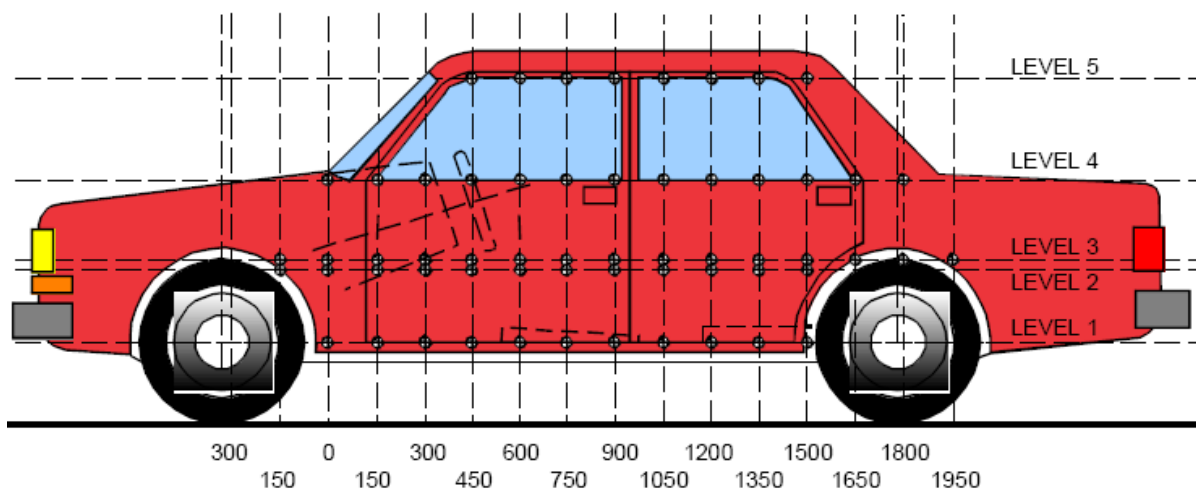
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2699	2700	-1
B	Front Axle to Front Surface of Vehicle	980	950	30
C	Rear Axle to Rear Surface of Vehicle	990	985	5
D	Total Length at Centerline	4670	4652	18
E	Front Bumper Thickness	210	210	0
F	Front Bumper Bottom to Ground	373	370	3
G	Sill Height at Front Wheel Well	265	1285	-1020
H	Sill Height at Front Door Leading Edge	273	370	-97
I	Sill Height at B-Pillar	310	391	-81
J1	Sill Height at Rear Wheel Well	227	264	-37
J2	Pinch Weld Height at Rear Wheel Well	152	184	-32
K	Sill Height Aft of Rear Wheel Well	335	375	-40
L	Rear Bumper Thickness	230	230	0
M	Rear Bumper Bottom to Ground	402	439	-37
N	Sill Height to Window Bottom Sill	730	656	74
O	Front Door Leading Edge to Impact CL	810	750	60
P	Rear Door Trailing Edge to Impact CL	1315	1253	62
Q	Front Window Opening	397	392	5
R	Right Side Length	4475	4530	-55
S	Left Side Length	4475	4530	-55
T	Vehicle Width	1800	1798	2

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	330	106	300, 450
2	Driver Hip Point	508	213	450
3	Mid-Door	599	224	600
4	Window Sill	888	171	1650
5	Window Top	1375	5	1350

NOTE: The above measurements were taken along the vertical impact reference line.
 Vehicle measurements forward of the vertical impact reference line are negative.

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

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

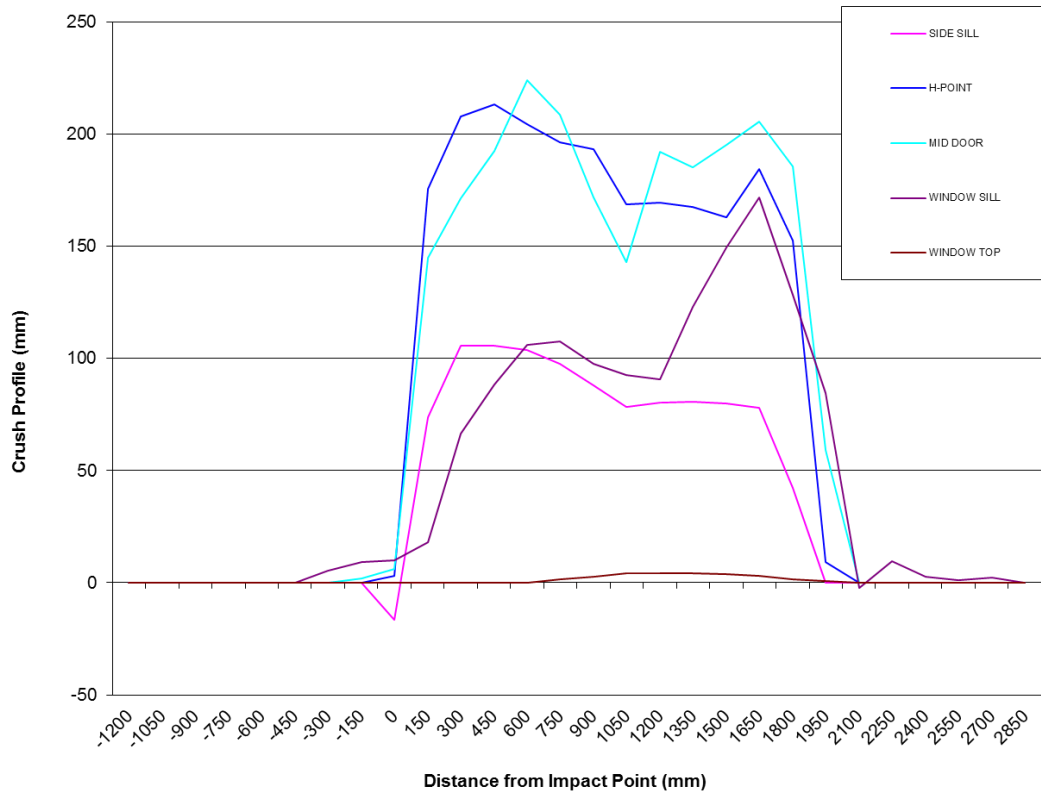
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	0	0	800	0	0	0	0	795	0	0	0	0	5	0
-150	0	0	896	812	0	0	0	895	803	0	0	0	1	9	0
0	875	892	892	810	0	892	889	886	800	0	-17	3	6	10	0
150	870	890	892	817	0	797	714	747	799	0	73	176	145	18	0
300	870	890	893	826	0	764	682	722	759	0	106	208	171	67	0
450	875	890	895	833	0	769	677	702	745	0	106	213	193	88	0
600	879	890	896	839	0	776	686	672	733	0	103	204	224	106	0
750	883	890	897	843	591	786	693	688	735	589	97	197	209	108	2
900	887	889	897	846	602	799	696	725	749	599	88	193	172	97	3
1050	891	888	896	851	603	812	720	753	759	599	79	168	143	92	4
1200	894	887	894	858	600	814	717	702	768	596	80	170	192	90	4
1350	889	885	893	867	599	808	718	707	744	594	81	167	186	123	5
1500	882	884	891	871	598	802	721	696	721	594	80	163	195	150	4
1650	878	884	890	867	595	800	700	684	696	592	78	184	206	171	3
1800	880	890	893	864	582	838	737	707	736	580	42	153	186	128	2
1950	0	899	899	859	547	0	890	840	775	546	0	9	59	84	1
2100	0	0	0	855	0	0	0	0	857	0	0	0	0	-2	0
2250	0	0	0	850	0	0	0	0	840	0	0	0	0	0	0
2400	0	0	0	842	0	0	0	0	839	0	0	0	0	3	0
2550	0	0	0	830	0	0	0	0	829	0	0	0	0	1	0
2700	0	0	0	814	0	0	0	0	812	0	0	0	0	2	0
2850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Test Vehicle: 2016 Chevrolet Cruze
Test Program: SINCAP Side Impact

NHTSA No.: O20160104
Test Date: 8/25/16

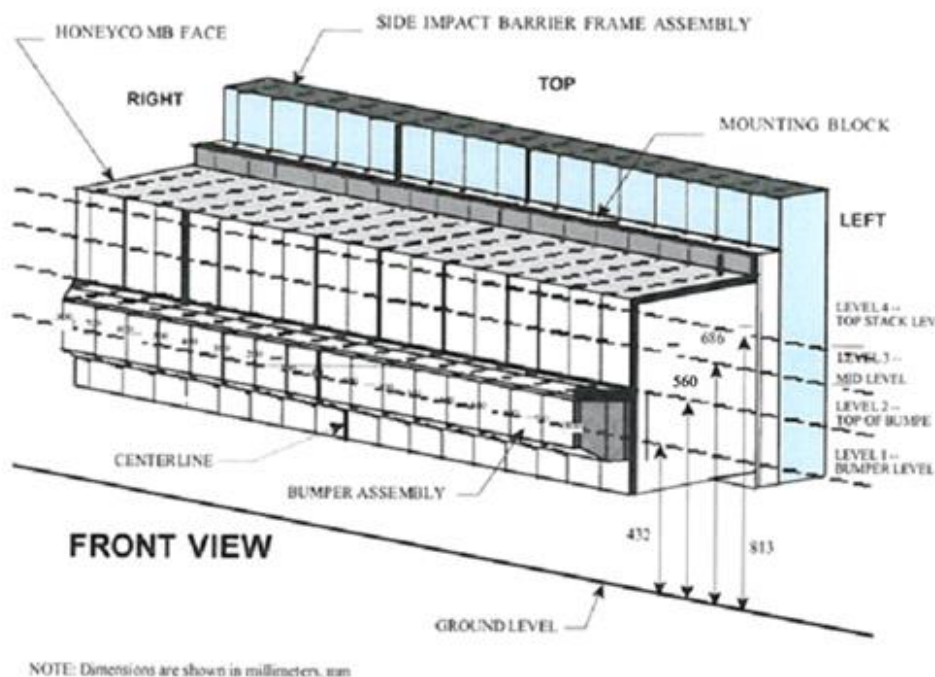


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	195
B	Top of Bumper	560	800	Right	92
C	Mid-Level	686	800	Left	119
D	Top of Stack	813	800	Left	154

DEFORMABLE BARRIER STATIC CRUSH

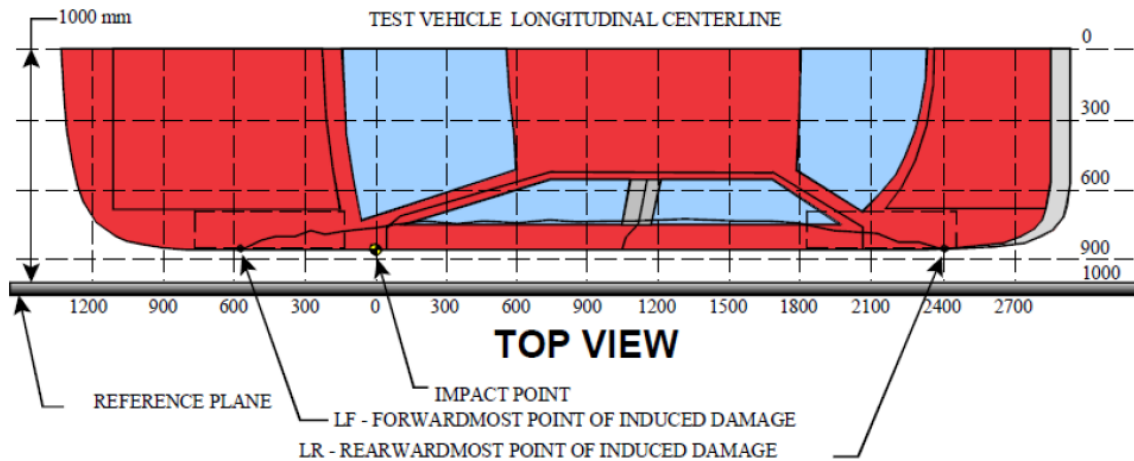
Stack Level	Distance Right of Center									C/L	Distance Left of Center								
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800		
1	195	186	182	180	178	178	178	171	167	160	154	150	146	142	140	146	164		
2	92	90	88	86	85	N/A ¹	N/A ¹	N/A ¹	N/A ¹	74	70	66	63	62	62	63	91		
3	29	11	15	18	22	30	53	77	58	31	30	43	40	34	46	82	119		
4	32	1	-2	7	22	43	81	81	85	78	49	55	58	68	83	105	154		

¹ The points for 300 mm right of center to 0 mm were missing post-test.

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2700	4	812	814	0
2	2100	4	857	855	-2
3	1500	3	696	891	195
4	900	2	696	889	193
5	300	2	682	890	208
6	-300	4	795	800	0

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm Left of Center	1	308	472	164
2	500 mm Left of Center	1	342	484	142
3	200 mm Left of Center	1	331	485	154
4	200 mm Right of Center	1	307	485	178
5	500 mm Right of Center	1	306	486	180
6	800 mm Right of Center	1	278	473	195

¹ DPD 1 and 6 defined as zero crush since the crush does not extend to the end of the vehicle.

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

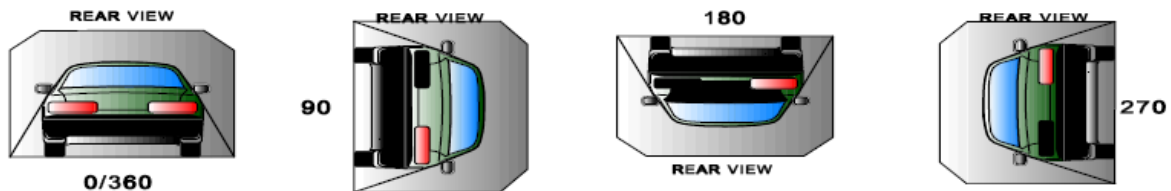
Test Vehicle: 2016 Chevrolet Cruze
 Test Program: SINCAP Side Impact

NHTSA No.: O20160104
 Test Date: 8/25/16

Test Time: 13:25 **Temperature:** 21.8°C

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum allowable is 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (Maximum allowable is 1 ounce/minute)
- D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	90	330	420
90 to 180	90	330	840
180 to 270	90	330	1260
270 to 360	90	330	1680

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

Test Phase	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

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15

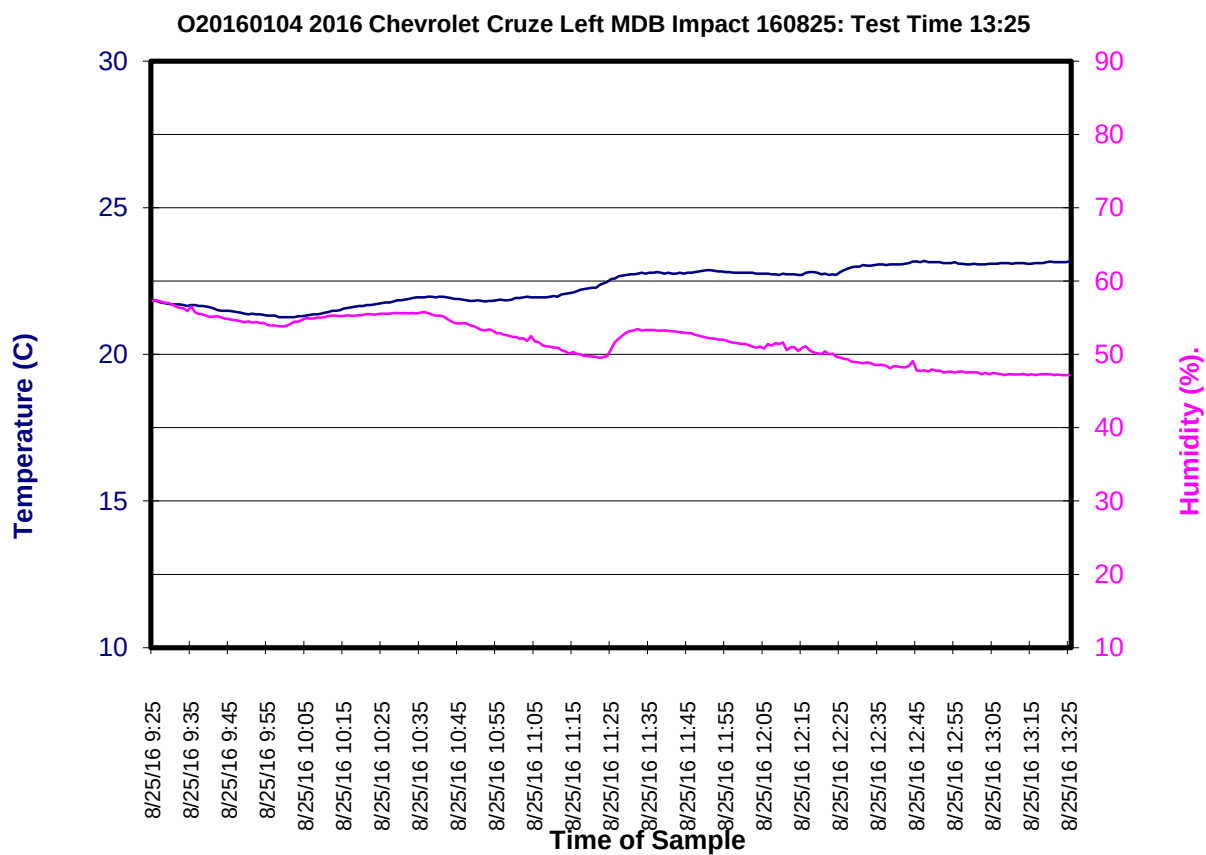
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2016 Chevrolet Cruze

NHTSA No.: O20160104

Test Program: SINCAP Side Impact

Test Date: 8/25/16



APPENDIX A
PHOTOGRAPHS

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001 As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



002 As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



003 Pre-Test Frontal View of Test Vehicle



004 Post-Test Frontal View of Test Vehicle



005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



006 Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



010 Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



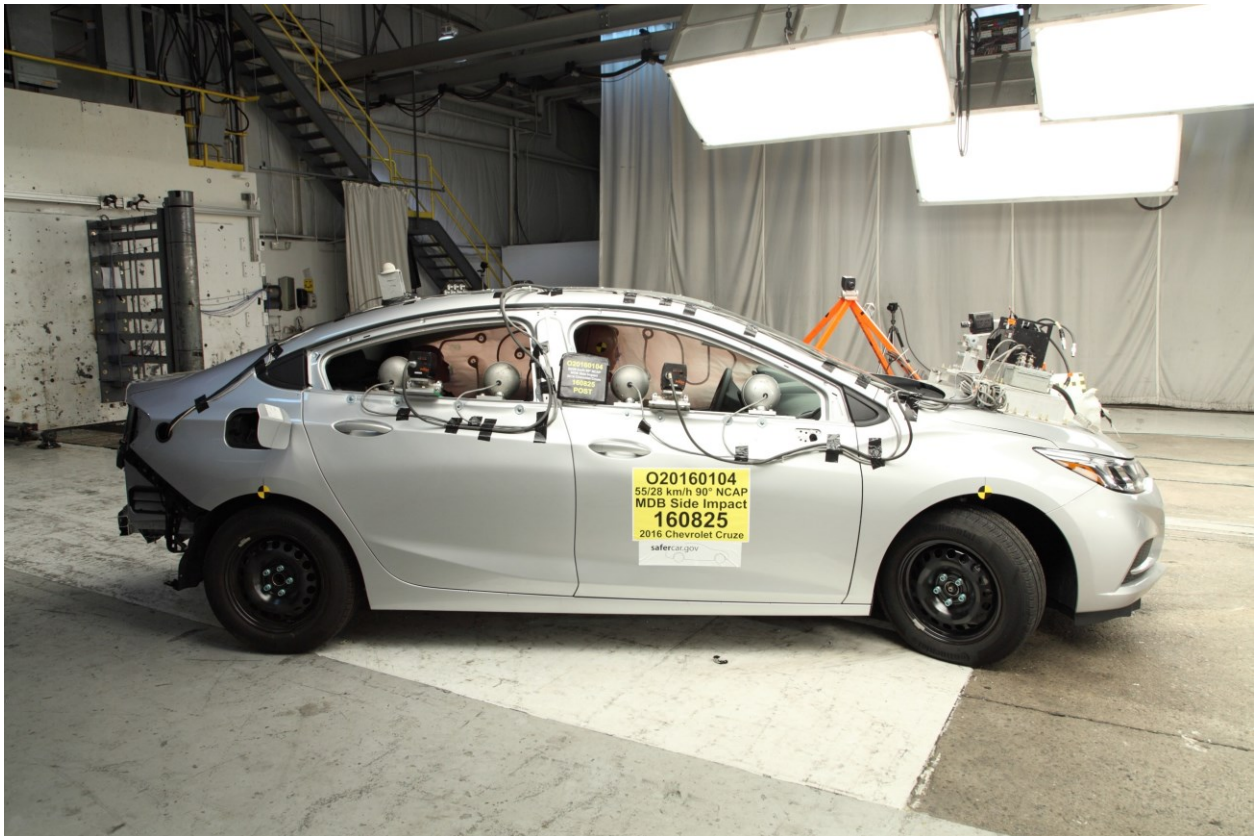
011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



017 Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



018 Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



019 Pre-Test Close-Up View of Impact Point Target



020 Post-Test Close-Up View of Impact Point Target



021 Pre-Test Left Front Door Latch Close-Up



022 Post-Test Left Front Door Latch Close-Up



023 Pre-Test Left Rear Door Latch Close-Up



024 Post-Test Left Rear Door Latch Close-Up



025 Pre-Test Front Close-Up View of Driver Dummy



026 Post-Test Front Close-Up View of Driver Dummy



027 Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



029 Post-Test Left Side View of Driver Dummy Shoulder and Door Top



030 Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



031 Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



032 Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



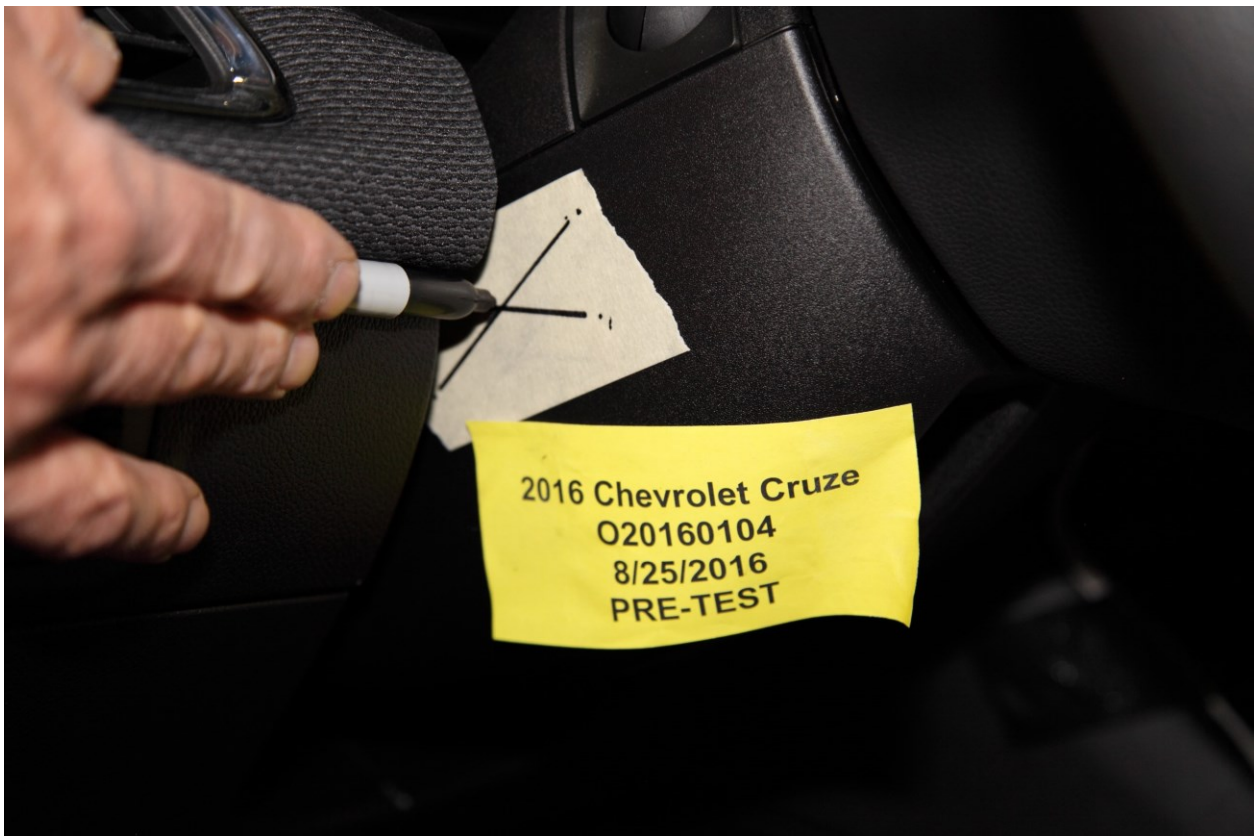
033 Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



034 Pre-Test Placement of Driver Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



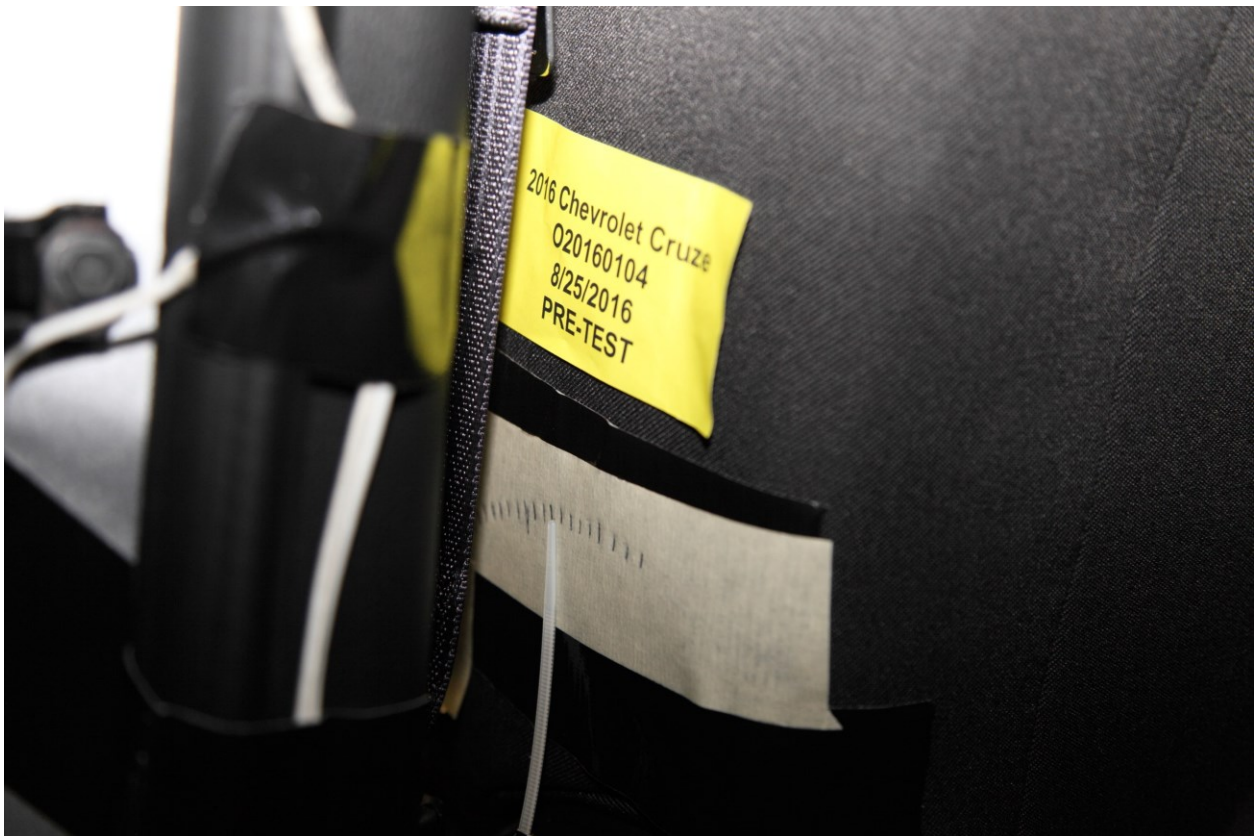
037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



039 Pre-Test Close-Up Left Side View of Driver Seat Track



040 Pre-Test Close-Up Left Side View of Driver Seat Back



041 Pre-Test Close-Up View of Driver Seat Back or Head Restraint



042 Pre-Test Driver Dummy and Door Clearance View



043 Post-Test Driver Dummy and Door Clearance View



044 Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



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046 Pre-Test Driver Inner Door Panel View



047 Post-Test Driver Inner Door Panel View



048 Post-Test Driver Dummy Close-Up Head Contact with Vehicle View



049 Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



050 Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



051 Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



052 Post-Test Driver Dummy Close-Up Pelvis Contact View



053 Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



054 Post-Test Driver Dummy Close-Up Knee Contact View



055 Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking



056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



057 Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View



058 Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



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



060 Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



061 Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



062 Pre-Test View of Rear Passenger Dummy Neck Showing Position of Adjustable Neck Bracket



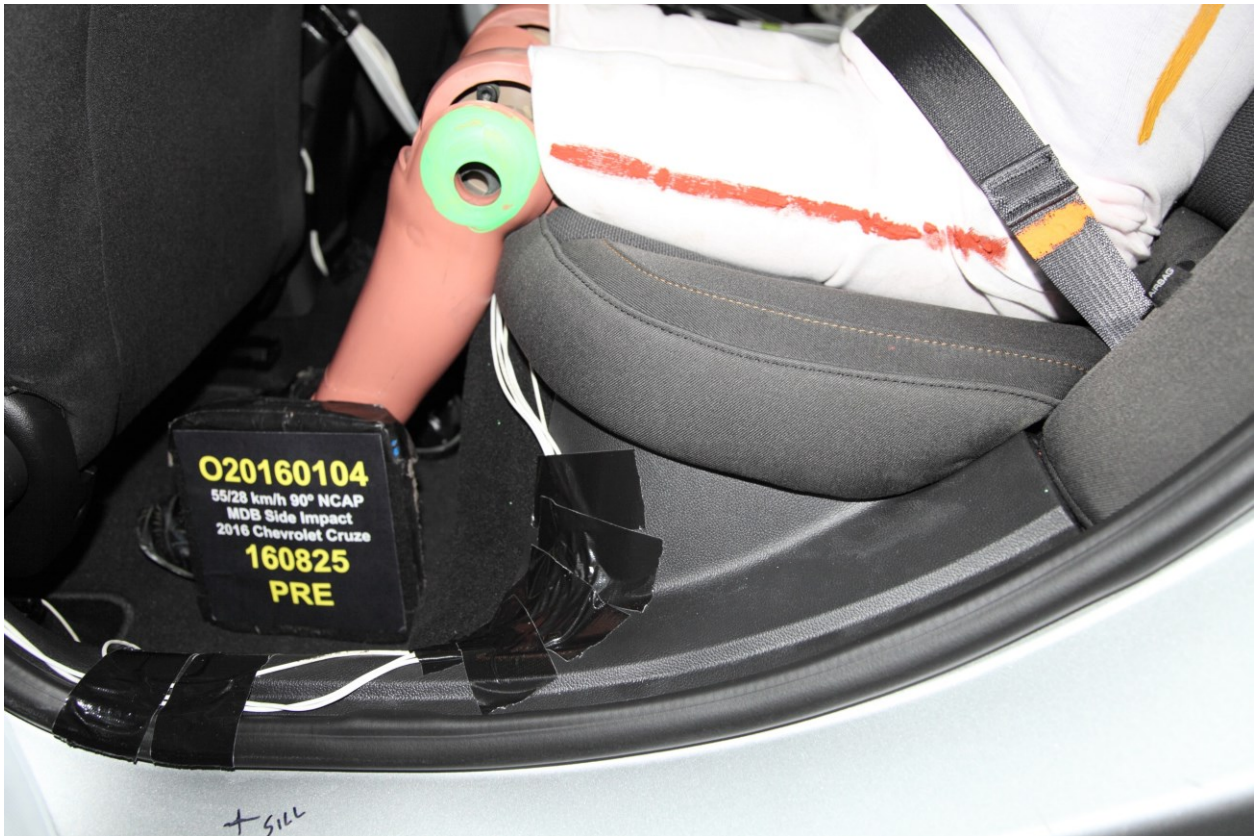
063 Pre-Test View of Rear Passenger Dummy Head Showing Dummy's Head is Level



064 Pre-Test Placement of Rear Passenger Dummy Feet



065 Pre-Test View of Belt Anchorage for Rear Passenger Dummy



066 Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

PHOTO NOT APPLICABLE

067 Pre-test Close-Up Left Side View of Rear Passenger Seat Back



068 Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



069 Pre-Test Passenger Dummy and Door Clearance View



070 Post-Test Passenger Dummy and Door Clearance View



071 Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



072 Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



073 Pre-Test Passenger Inner Door Panel View



074 Post-Test Passenger Inner Door Panel View



075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



076 Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

PHOTO NOT APPLICABLE

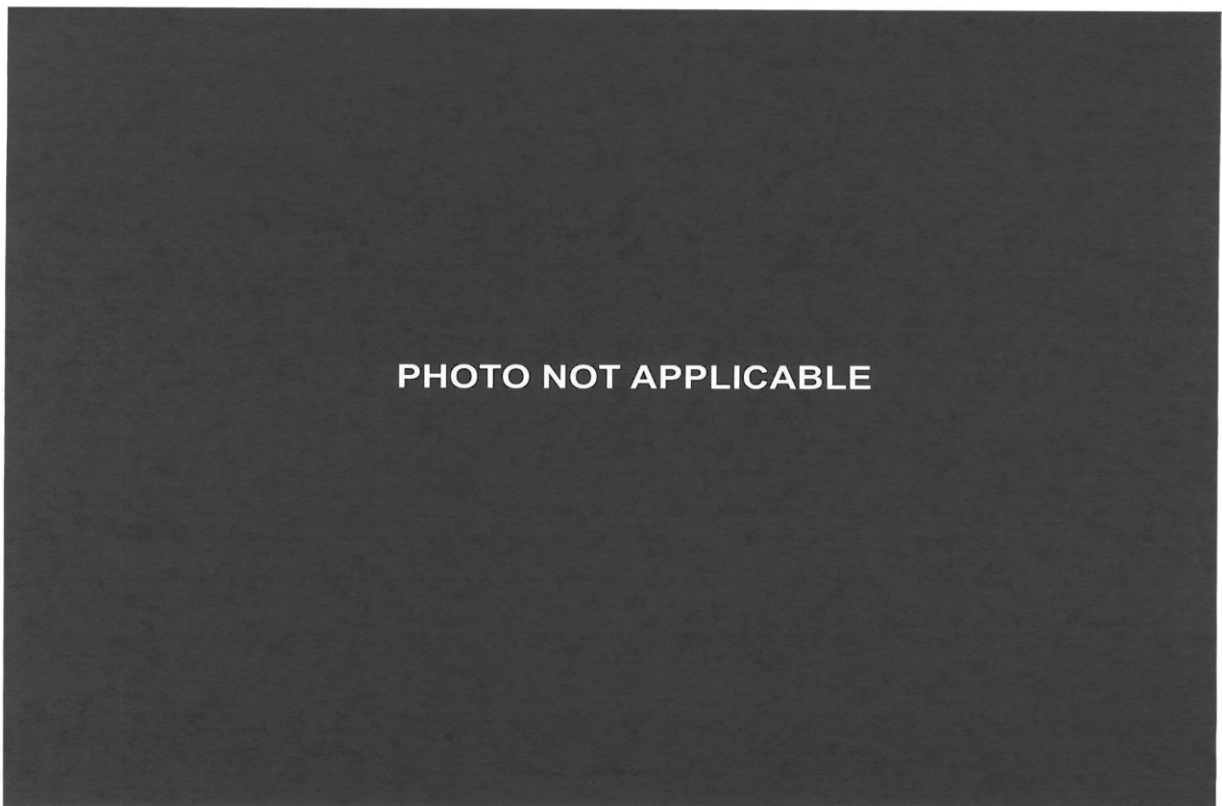
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



078 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View



079 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View



080 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View



081 Post-Test Rear Passenger Dummy Close-Up Knee Contact View

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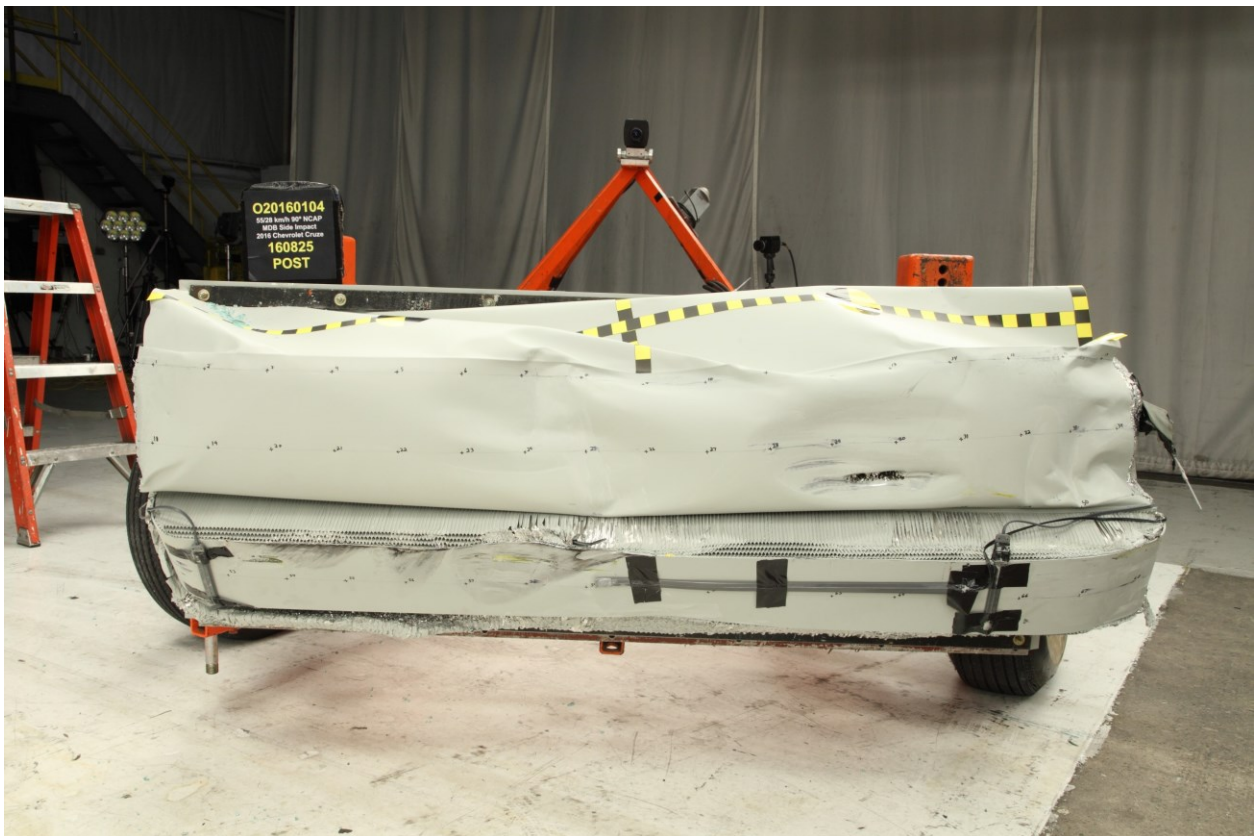
082 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



086 Pre-Test Top View of MDB Impactor Face



087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



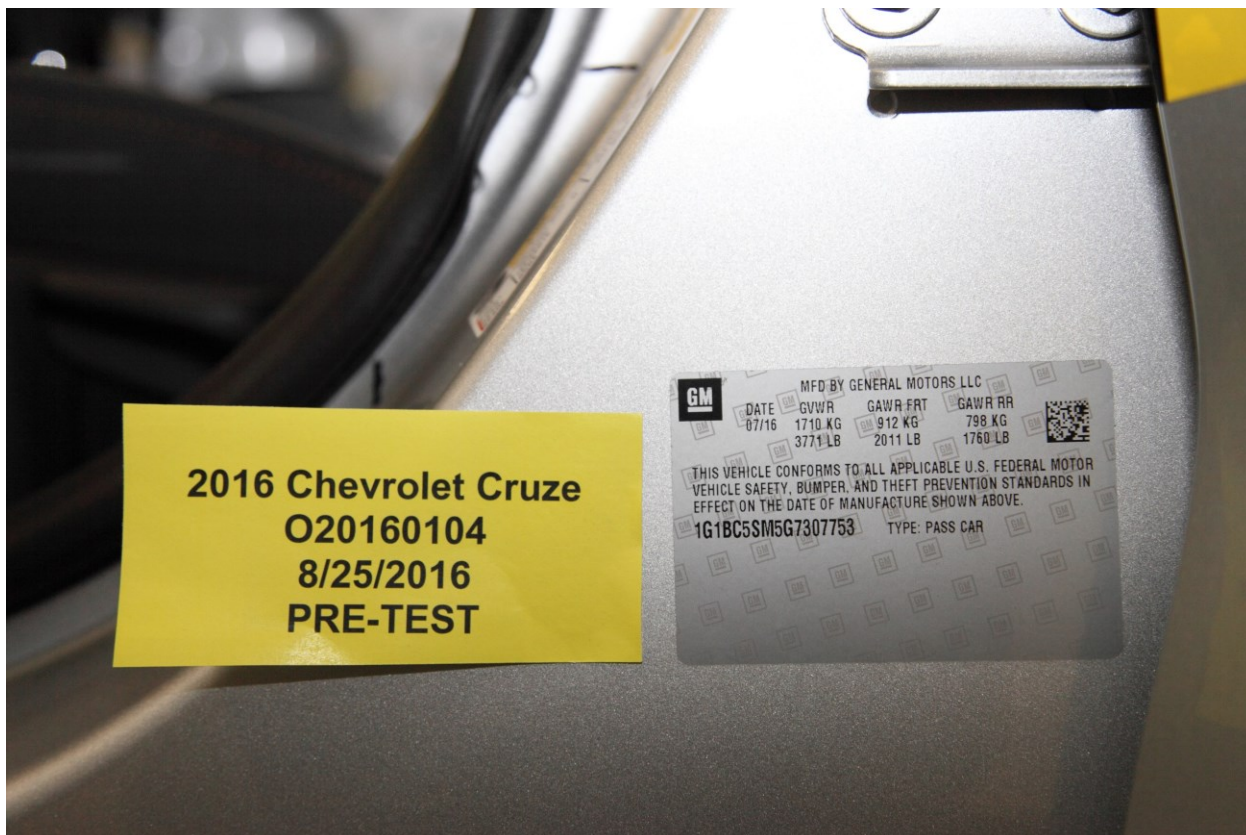
089 Post-Test Left Side View of MDB Impactor Face



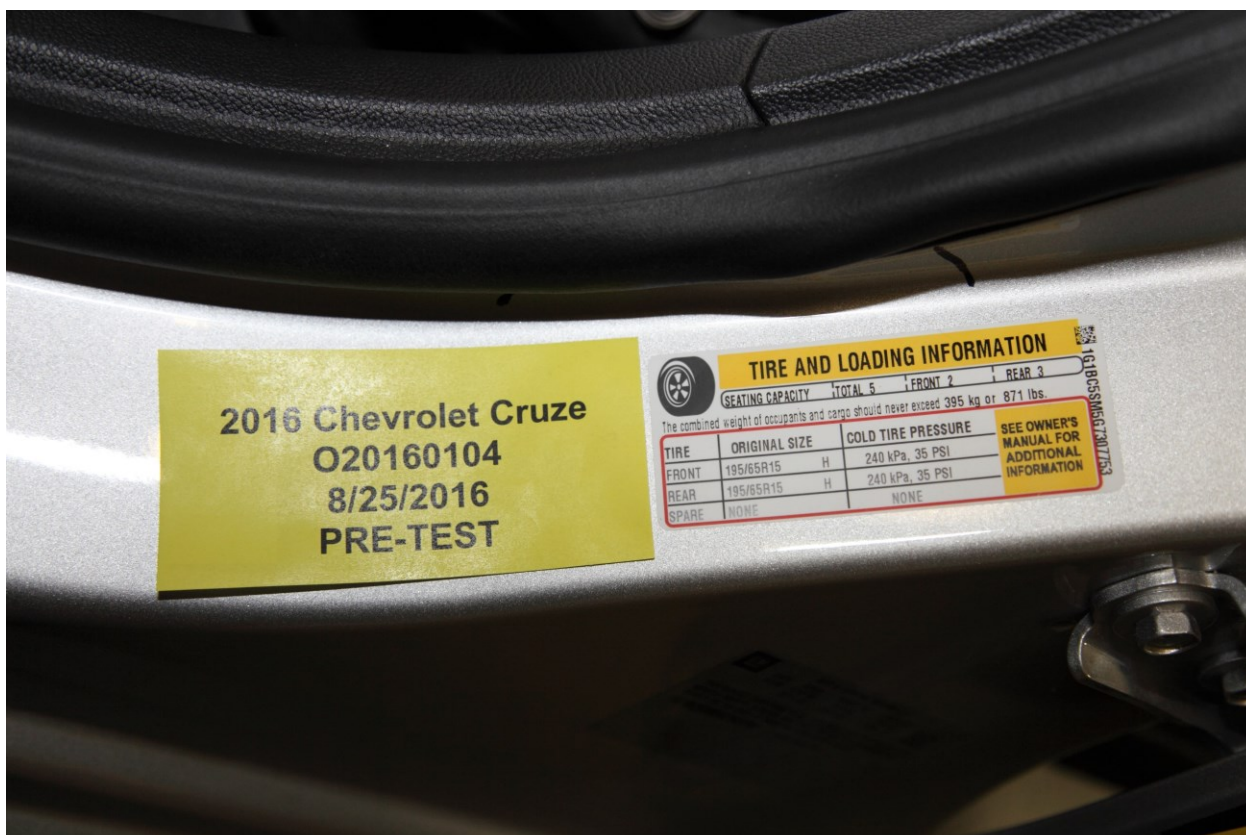
090 Pre-Test Right Side View of MDB Impactor Face



091 Post-Test Right Side View of MDB Impactor Face



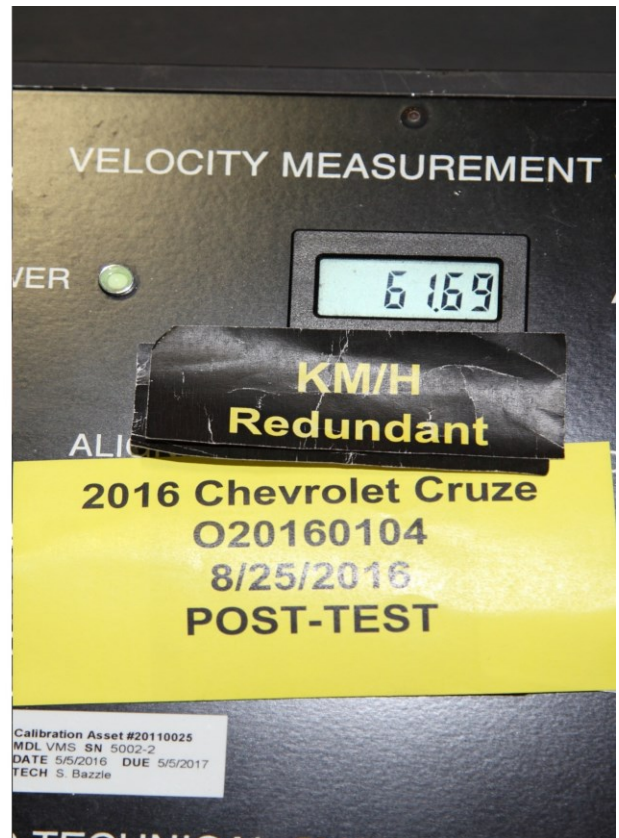
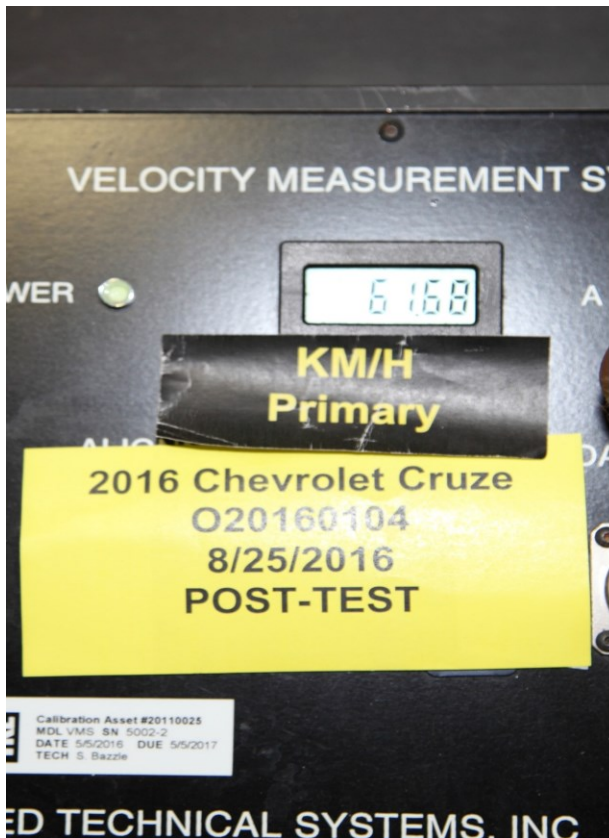
092 Close-Up View of Vehicle Certification Label



093 Close-Up View of Vehicle Tire Information Placard or Label



094 Pre-Test Ballast View



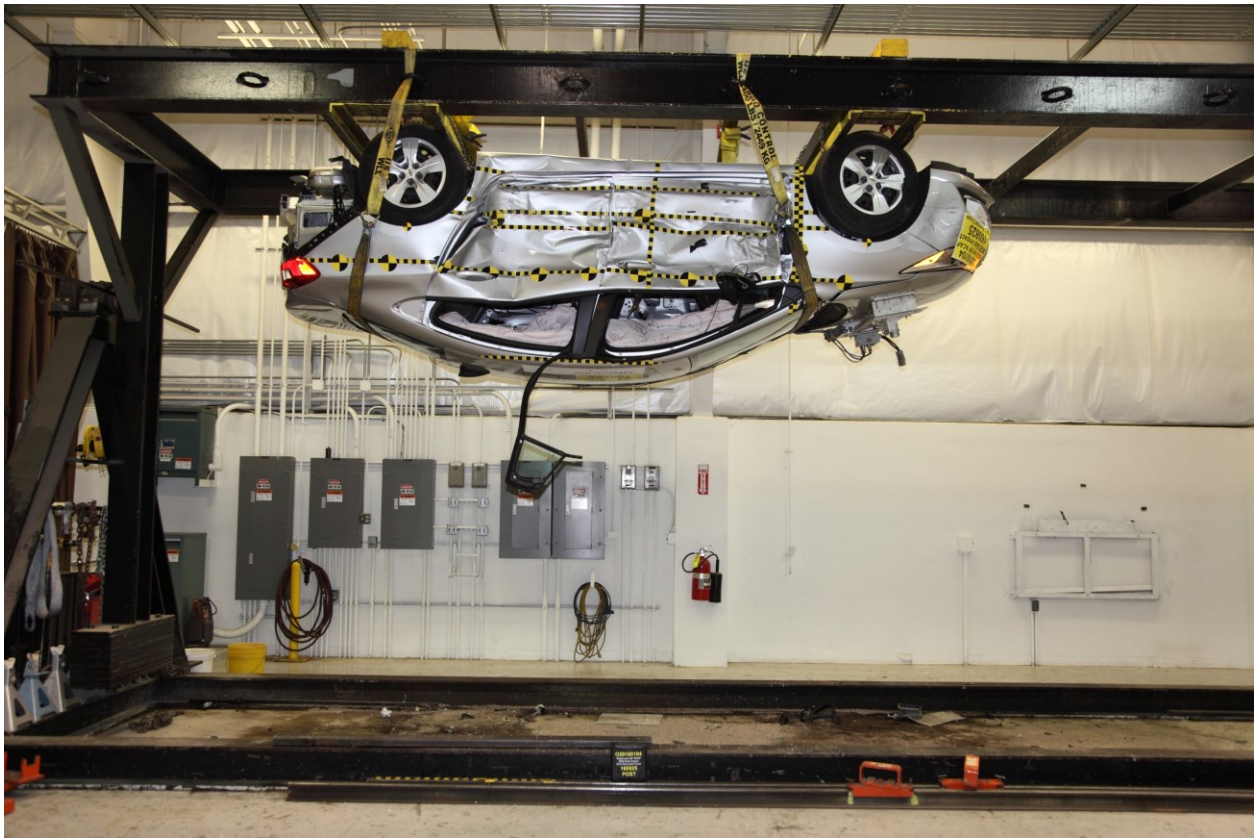
095 Post-Test Primary Speed Trap Read-Out



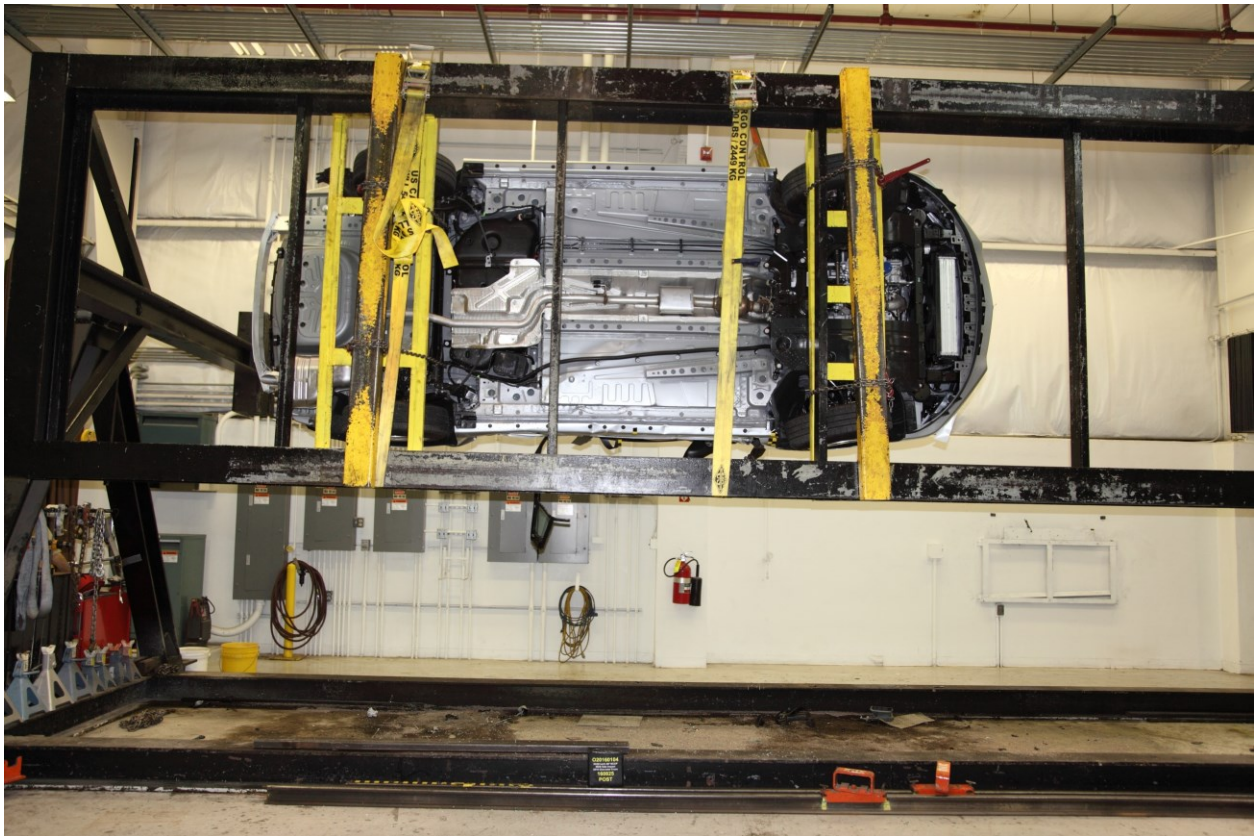
096 FMVSS No. 301 Static Rollover 0 Degrees



097 FMVSS No. 301 Static Rollover 90 Degrees



098 FMVSS No. 301 Static Rollover 180 Degrees



099 FMVSS No. 301 Static Rollover 270 Degrees



100 FMVSS No. 301 Static Rollover 360 Degrees



101 Impact Event



CHEVROLET

2016 CRUZE 4-DOOR SEDAN LS AUTOMATIC



EXTERIOR: SILVER ICE METALLIC
INTERIOR: JET BLACK

ENGINE: TURBO 1.4L VARIABLE
TRANSMISSION: 6-SPD AUTOMATIC

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IN PLACE OF SPARE TIRE

SAFETY & SECURITY

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- PASSENGER FRONTAL KNEE SIDE IMPACT & HEAD CURTAIN, REAR OUTBOARD PASSENGERS SIDE IMPACT & HEAD CURTAIN (10)
- REMOTE PANIC ALARM
- STABILITRAK STABILITY CONTROL SYSTEM W/ TRACTION CONTROL
- TIRE PRESSURE MONITOR
- REAR VISION CAMERA

EXTERIOR

- POWER DOOR LOCKS
- MIRRORS, OUTSIDE POWER-ADJUST
- MANUAL FOLDING
- WHEELS, 18" STEEL
- HEADLAMPS, AUTOMATIC

INTERIOR

- FRONT BUCKET SEATS
- POWER WINDOWS, FRONT & REAR

EXPRESS DOWN

- SEAT ADJUSTER, DRIVER, 6-WAY MANUAL
- REAR SEAT, FOLDING
- FLOOR MATS
- AIR CONDITIONING
- CONSOLE, FLOOR, WITH ARMREST
- CD/USB, DRIVER FRT PASSENGER W/ VANITY MIRRORS
- STEERING COLUMN, TILT & TELESCOPIC
- AUDIO SYSTEM, 4-SPEAKER
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MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE \$19,120.00

OPTIONAL EQUIPMENT INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT) \$0.00

TOTAL OPTIONS \$0.00

TOTAL VEHICLE & OPTIONS \$19,120.00

DESTINATION CHARGE \$75.00

TOTAL VEHICLE PRICE* \$19,995.00



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Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 25 MPG and costs \$8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.00 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

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



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FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 60%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 26%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
LORDSTOWN, OH U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

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JACK MCHEWNEY CHEVROLET, INC.
PO BOX 1054
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1GA2749928

102 Monroney Label

56 Seats and Restraints

Head Restraints

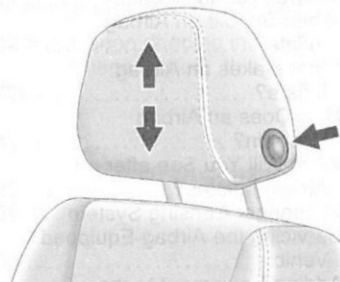
The vehicle's front and rear seats have adjustable head restraints in the outboard seating positions.

Warning

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



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



The height of the head restraint can be adjusted. To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

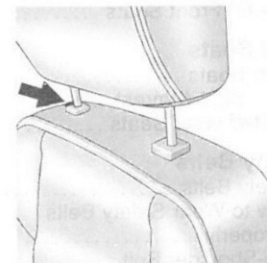
The front seat outboard head restraints are not removable.

Rear Seats

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

The height of the head restraint can be adjusted.

Pull the head restraint up to raise it. Try to move the head restraint to make sure it is locked in place.



To lower the head restraint, press the button located on the top of the seatback and push the head restraint down. Try to move the head restraint after the button is released to make sure it is locked in place.

103 Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Head Restraints

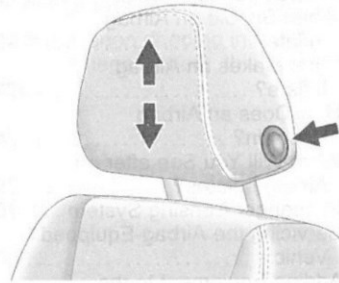
The vehicle's front and rear seats have adjustable head restraints in the outboard seating positions.

Warning

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



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



The height of the head restraint can be adjusted. To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

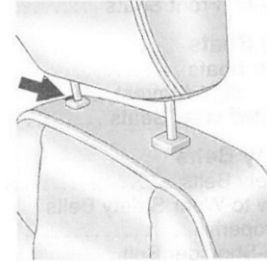
The front seat outboard head restraints are not removable.

Rear Seats

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

The height of the head restraint can be adjusted.

Pull the head restraint up to raise it. Try to move the head restraint to make sure it is locked in place.



To lower the head restraint, press the button located on the top of the seatback and push the head restraint down. Try to move the head restraint after the button is released to make sure it is locked in place.

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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2	Driver Head Acceleration (Y) Primary vs. Time	B-5
3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
8	Driver Thorax Rib Deflection Maximum vs. Time	B-6
9	Driver Anterior Abdominal Force (Y) vs. Time	B-7
10	Driver Middle Abdominal Force (Y) vs. Time	B-7
11	Driver Posterior Abdominal Force (Y) vs. Time	B-7
12	Driver Total Abdominal Force (Y) vs. Time	B-7
13	Driver Pubic Symphysis Force (Y) vs. Time	B-8
14	Passenger Head Acceleration (X) Primary vs. Time	B-8
15	Passenger Head Acceleration (Y) Primary vs. Time	B-8
16	Passenger Head Acceleration (Z) Primary vs. Time	B-8
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-9
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

The following additional data can be obtained from the Research and Development section of the NHTSA website (<http://www.nhtsa.dot.gov>)

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

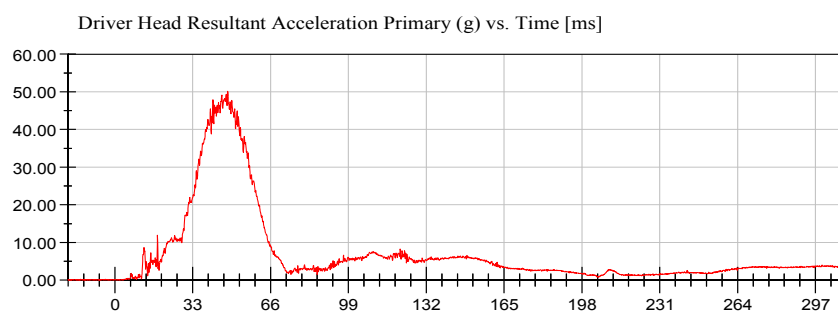
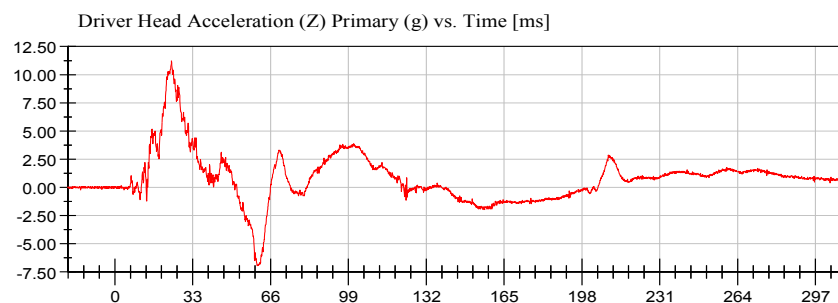
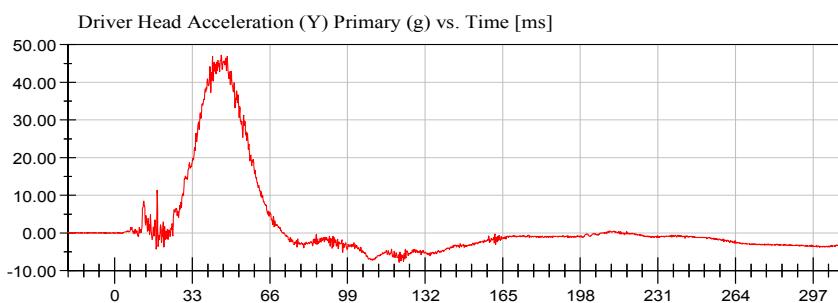
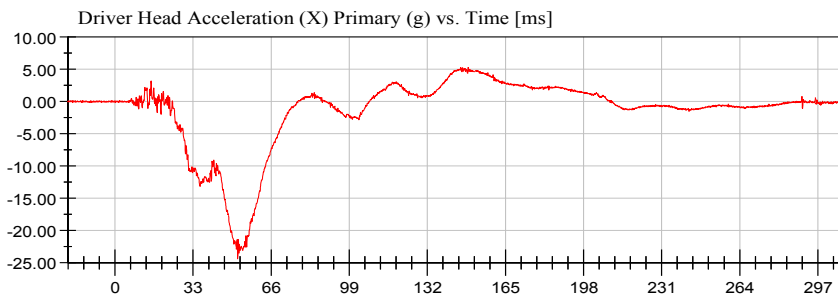
NHTSA

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Date: 08/25/2016

Test Lab: Transportation Research Center, Inc. Position #4 SID IIs Dummy (305)

Test Number: 160825 (O20160104)



NHTSA

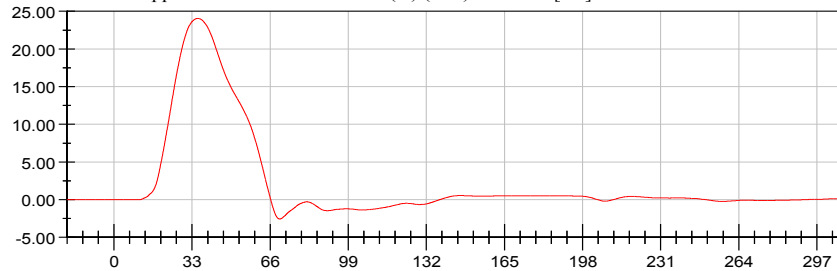
Test Date: 08/25/2016

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Lab: Transportation Research Center, Inc. Position #4 SID II's Dummy (305)

Test Number: 160825 (O20160104)

Driver Upper Thorax Rib Deflection (Y) (mm) vs. Time [ms]



<Max>

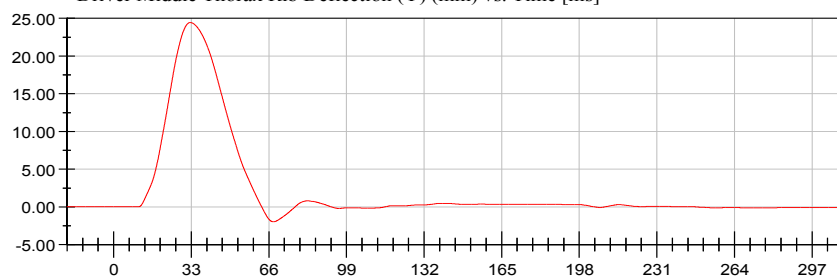
24.06 mm at 35.44 ms

<Min>

-2.56 mm at 70.00 ms

CFC_180

Driver Middle Thorax Rib Deflection (Y) (mm) vs. Time [ms]



<Max>

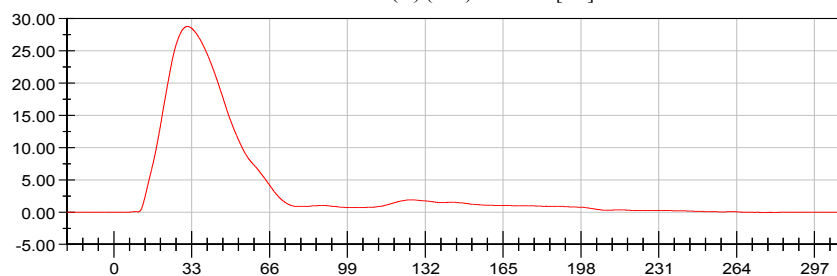
24.44 mm at 32.56 ms

<Min>

-1.98 mm at 67.92 ms

CFC_180

Driver Lower Thorax Rib Deflection (Y) (mm) vs. Time [ms]



<Max>

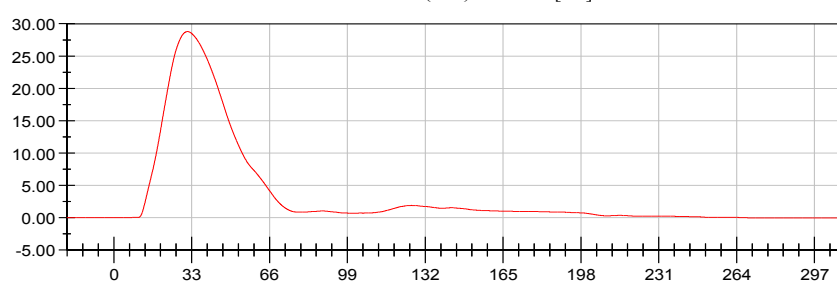
28.78 mm at 31.28 ms

<Min>

-0.05 mm at 275.92 ms

CFC_180

Driver Thorax Rib Deflection Maximum (mm) vs. Time [ms]



<Max>

28.78 mm at 31.28 ms

<Min>

-0.05 mm at 275.92 ms

CFC_180



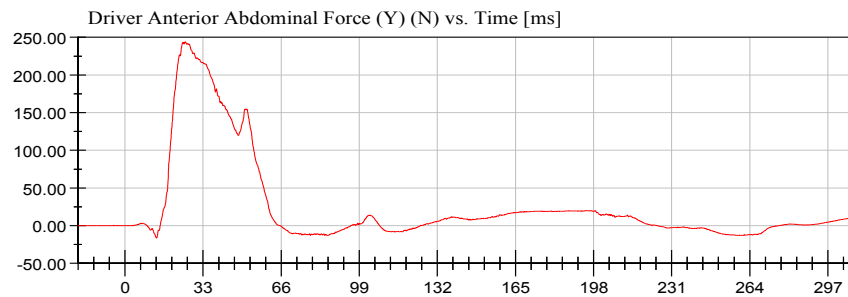
NHTSA

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Date: 08/25/2016

Test Lab: Transportation Research Center, Inc. Position #4 SID IIs Dummy (305)

Test Number: 160825 (O20160104)



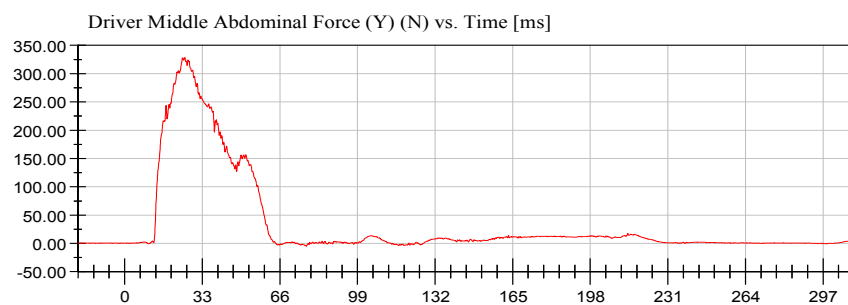
<Max>

244.10 N at 25.44 ms

<Min>

-16.27 N at 13.28 ms

CFC_600



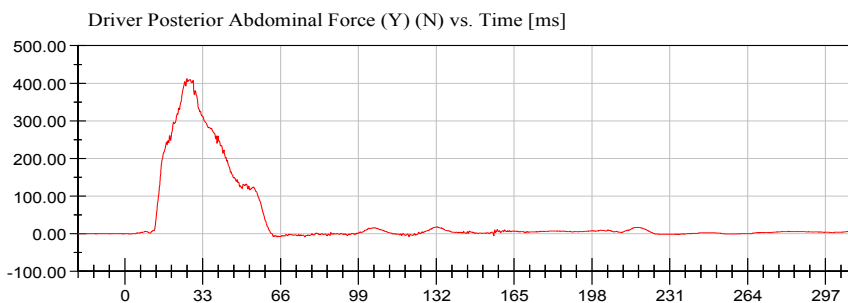
<Max>

328.35 N at 25.60 ms

<Min>

-5.49 N at 77.28 ms

CFC_600



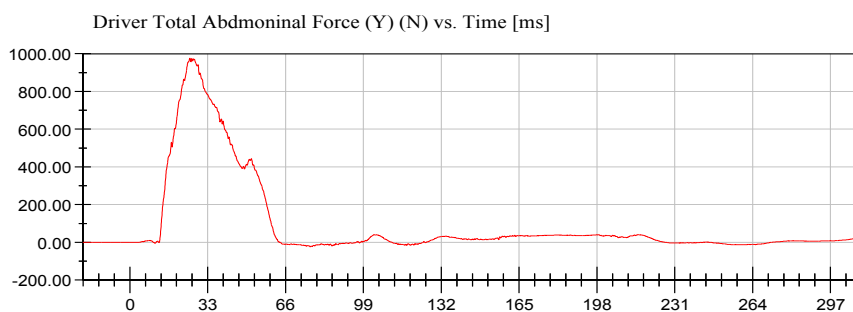
<Max>

412.09 N at 26.32 ms

<Min>

-8.43 N at 64.56 ms

CFC_600



<Max>

976.00 N at 25.44 ms

<Min>

-23.68 N at 76.48 ms

CFC_600



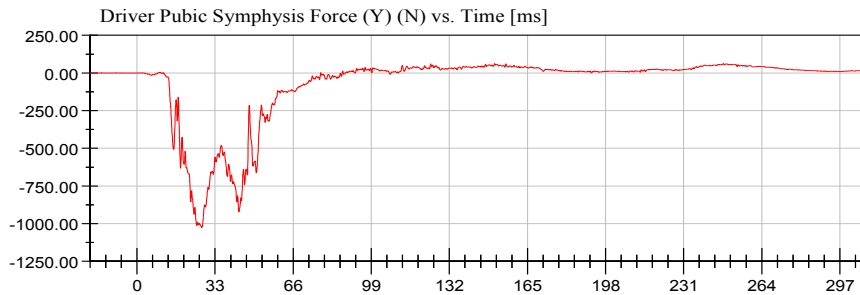
NHTSA

Test Date: 08/25/2016

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Lab: Transportation Research Center, Inc. Position #4 SID IIs Dummy (305)

Test Number: 160825 (O20160104)



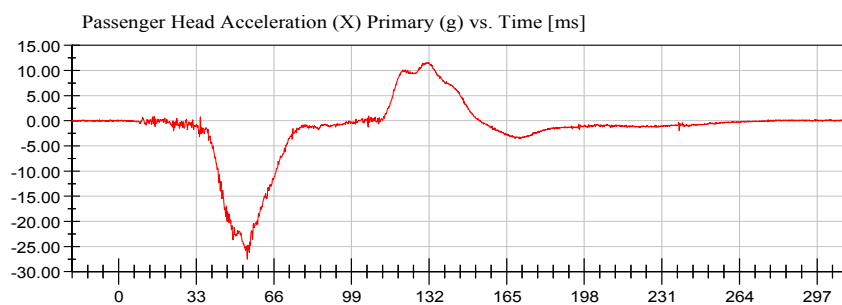
<Max>

61.18 N at 247.92 ms

<Min>

-1,025.32 N at 27.28 ms

CFC_600



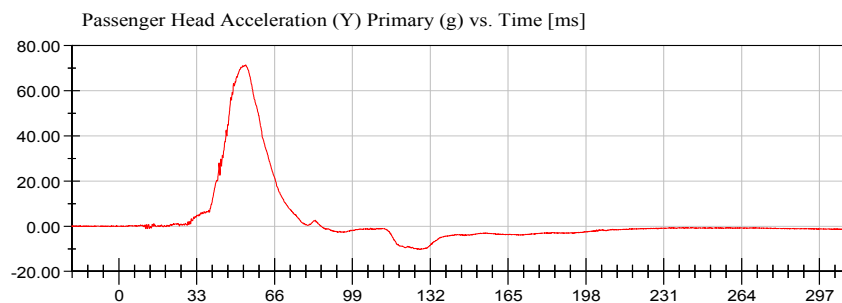
<Max>

11.62 g at 131.76 ms

<Min>

-27.56 g at 54.64 ms

CFC_1000



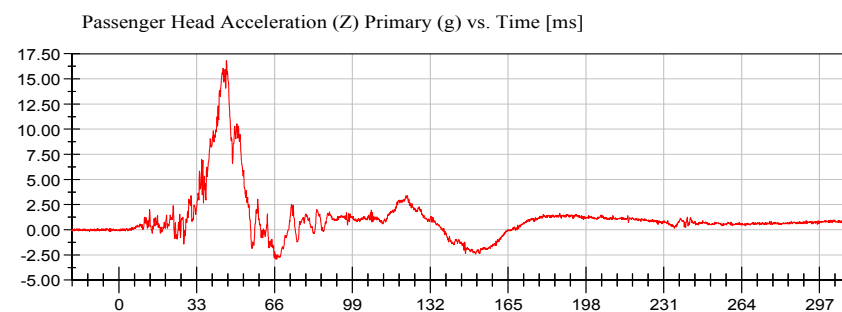
<Max>

71.50 g at 53.68 ms

<Min>

-10.35 g at 127.84 ms

CFC_1000



<Max>

16.82 g at 45.60 ms

<Min>

-2.93 g at 66.40 ms

CFC_1000



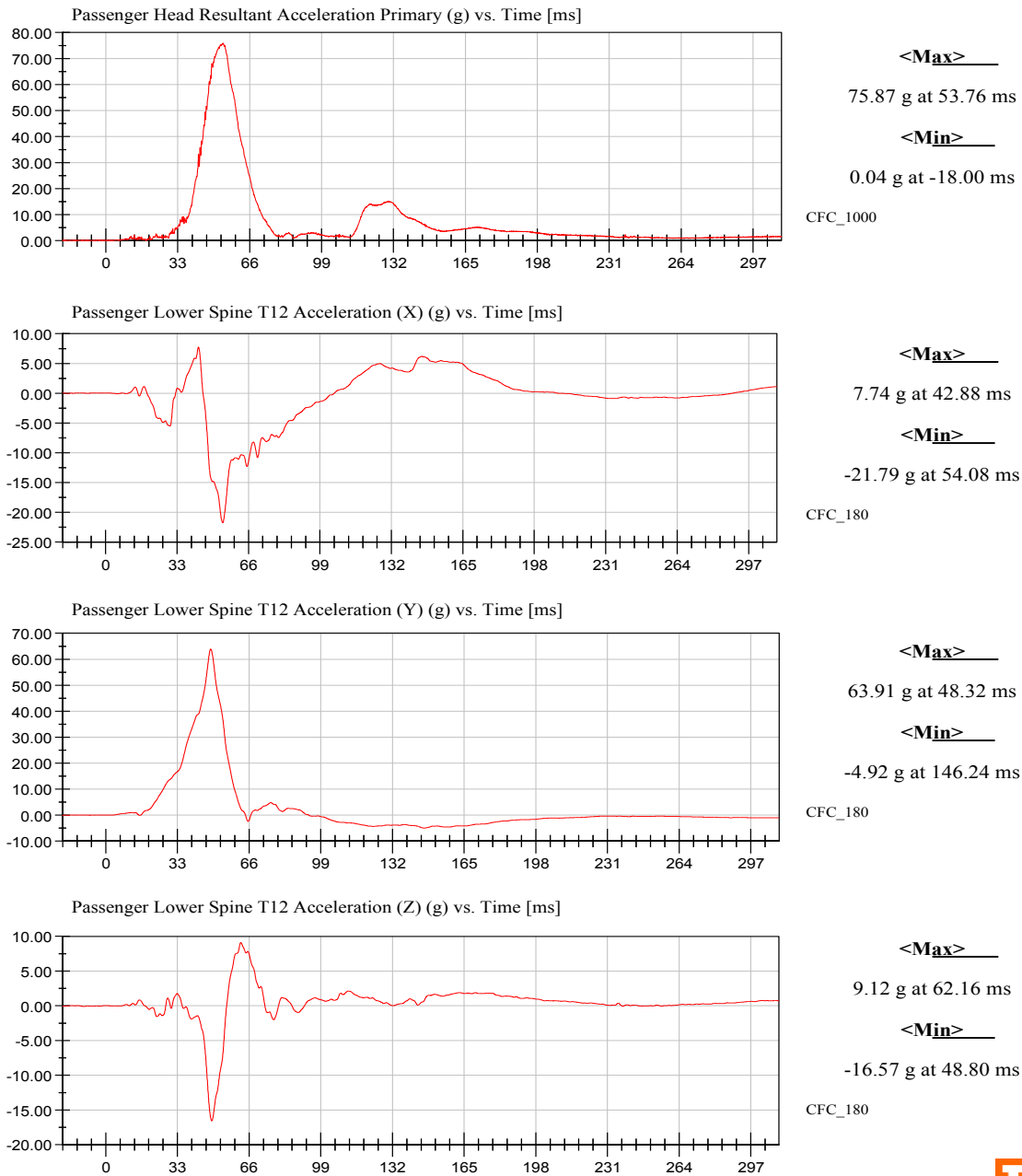
NHTSA

Position #1 ES-2 Dummy with Rib Extension (F030)

Test Date: 08/25/2016

Test Lab: Transportation Research Center, Inc. Position #4 SID IIs Dummy (305)

Test Number: 160825 (O20160104)



NHTSA

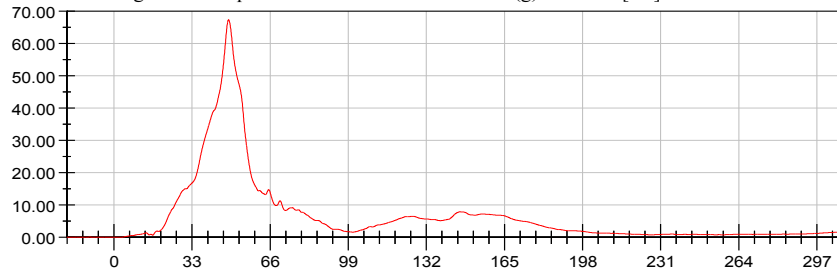
Position #1 ES-2 Dummy with Rib Extension (F030)

Test Date: 08/25/2016

Test Lab: Transportation Research Center, Inc. Position #4 SID IIs Dummy (305)

Test Number: 160825 (O20160104)

Passenger Lower Spine T12 Resultant Acceleration (g) vs. Time [ms]



<Max>

67.38 g at 48.40 ms

<Min>

0.01 g at -14.08 ms

CFC_180

Passenger Iliac Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

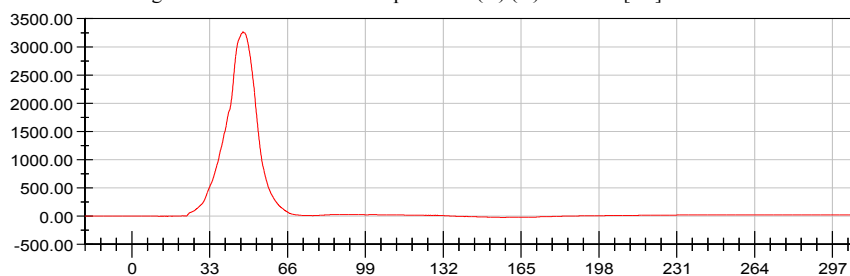
1,158.23 N at 48.40 ms

<Min>

-7.92 N at 212.96 ms

CFC_600

Passenger Acetabulum Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

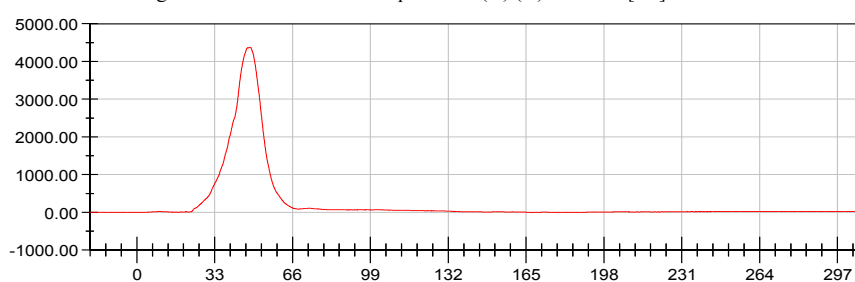
3,266.92 N at 47.12 ms

<Min>

-22.87 N at 158.00 ms

CFC_600

Passenger Total Pelvic Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

4,375.59 N at 47.92 ms

<Min>

-4.20 N at 167.68 ms

CFC_600



APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

Head (X) Acceleration (G's) vs. Time (ms)
Head (Y) Acceleration (G's) vs. Time (ms)
Head (Z) Acceleration (G's) vs. Time (ms)
Resultant Head Acceleration (G's) vs. Time (ms)

Table 3 Neck Pendulum Test

Pendulum Velocity (m/s) vs. Time (ms)
Flexion Angle (°) vs. Time (ms)
Potentiometer A (°) vs. Time (ms)
Potentiometer B (°) vs. Time (ms)
Potentiometer C (°) vs. Time (ms)

Table 4. Shoulder Impact Test

Impactor Acceleration (G's) vs. Time (ms)

Table 5. Thorax – Upper Rib Drop Test

Upper Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
Upper Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 6. Thorax – Middle Rib Drop Test

Middle Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
Middle Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 7. Thorax – Lower Rib Drop Test

Lower Rib Displacement @ 459 mm Drop Height (mm) vs. Time (ms)
Lower Rib Displacement @ 815 mm Drop Height (mm) vs. Time (ms)

Table 8. Thorax – Full Body Impact Test

Pendulum Acceleration (G's) vs. Time (ms)
Impactor Force (kN) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)

Table 9. Abdomen Impact Test

Impactor Force (kN) vs. Time (ms)
Front Abdomen Force (kN) vs. Time (ms)
Middle Abdomen Force (kN) vs. Time (ms)
Rear Abdomen Force (kN) vs. Time (ms)
Total Abdomen Force (kN) vs. Time (ms)

Table 10. Lumbar Spine Flexion Test

Pendulum Velocity (m/s) vs. Time (ms)
Spine Flexion Angle (°) vs. Time (ms)
Potentiometer A (°) vs. Time (ms)
Potentiometer B (°) vs. Time (ms)
Potentiometer C (°) vs. Time (ms)

Table 11. Pelvis Impact Test

Pendulum Acceleration (G's) vs. Time (ms)
Impactor Force (kN) vs. Time (ms)
Pubic Symphysis (Y) Force (kN) vs. Time (ms)

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Table 1. External Measurements

Table 2. Head Drop Test

- Head (X) Acceleration (G's) vs. Time (ms)
- Head (Y) Acceleration (G's) vs. Time (ms)
- Head (Z) Acceleration (G's) vs. Time (ms)
- Resultant Head Acceleration (G's) vs. Time (ms)

Table 3. Lateral Neck Pendulum Test

- Pendulum Velocity (m/s) vs. Time (ms)
- Flexion Angle (°) vs. Time (ms)
- Moment About Occipital Condyle (Nm) vs. Time (ms)

Table 4. Shoulder Impact Test

- Impactor Acceleration (G's) vs. Time (ms)
- Shoulder Displacement (mm) vs. Time (ms)
- Upper Spine Acceleration (G's) vs. Time (ms)

Table 5. Thorax (With Arm) Impact Test

- Impactor Acceleration (G's) vs. Time (ms)
- Shoulder Displacement (mm) vs. Time (ms)
- Upper Rib Displacement (mm) vs. Time (ms)
- Middle Rib Displacement (mm) vs. Time (ms)
- Lower Rib Displacement (mm) vs. Time (ms)
- Upper Spine Acceleration (G's) vs. Time (ms)
- Lower Spine Acceleration (G's) vs. Time (ms)

Table 6. Thorax (Without Arm) Impact Test

- Impactor Acceleration (G's) vs. Time (ms)
- Upper Rib Displacement (mm) vs. Time (ms)
- Middle Rib Displacement (mm) vs. Time (ms)
- Lower Rib Displacement (mm) vs. Time (ms)
- Upper Spine Acceleration (G's) vs. Time (ms)
- Lower Spine Acceleration (G's) vs. Time (ms)

Table 7. Abdomen Impact Test

- Impactor Acceleration (G's) vs. Time (ms)
- Upper Abdominal Rib Displacement (mm) vs. Time (ms)
- Lower Abdominal Rib Displacement (mm) vs. Time (ms)
- Lower Spine Acceleration (G's) vs. Time (ms)

Table 8. Pelvis Plug Quasi-Static Test (Optional*)

Table 9. Pelvis Acetabulum Impact Test

- Impactor Acceleration (G's) vs. Time (ms)
- Pelvis (Y) Acceleration (G's) vs. Time (ms)
- Acetabulum Force (N) vs. Time (ms)

Table 10. Pelvis Iliac Impact Test

- Impactor Acceleration (G's) vs. Time (ms)
- Pelvis (Y) Acceleration (G's) vs. Time (ms)
- Iliac Force (N) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 38
08/17/16

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	558	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	445	Yes
6	Head Width	152.0 - 158.0	156	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	205	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 38-3

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Peak Resultant Acceleration	125 - 155 g	142.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	-9.7 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 13:16:07 361

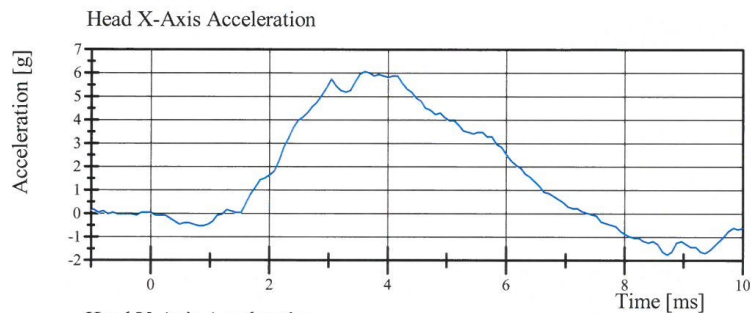


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 38-3

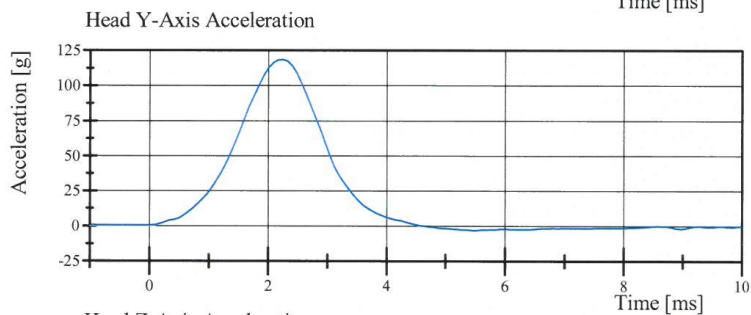
Test Date: 8/17/2016



Filter Class: CFC_1000

Max: 6.0 g at 3.6 ms

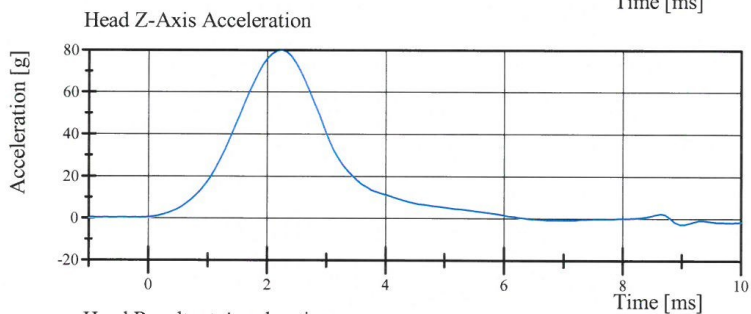
Min: -1.8 g at 8.7 ms



Filter Class: CFC_1000

Max: 118.3 g at 2.2 ms

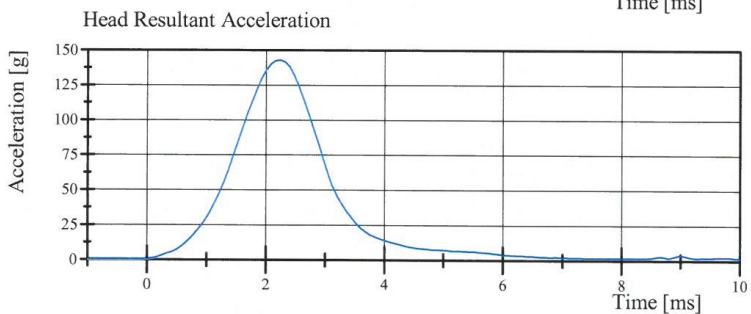
Min: -3.2 g at 5.5 ms



Filter Class: CFC_1000

Max: 79.7 g at 2.2 ms

Min: -2.8 g at 9.0 ms



Filter Class: CFC_1000

Max: 142.7 g at 2.2 ms

Min: 0.0 g at -0.9 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 13:16:13 361



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 38-5

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-51.3 deg	Yes
Time of Peak	54 - 66 ms	59.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	65.0 ms	Yes

Test meets specifications.

Comments:

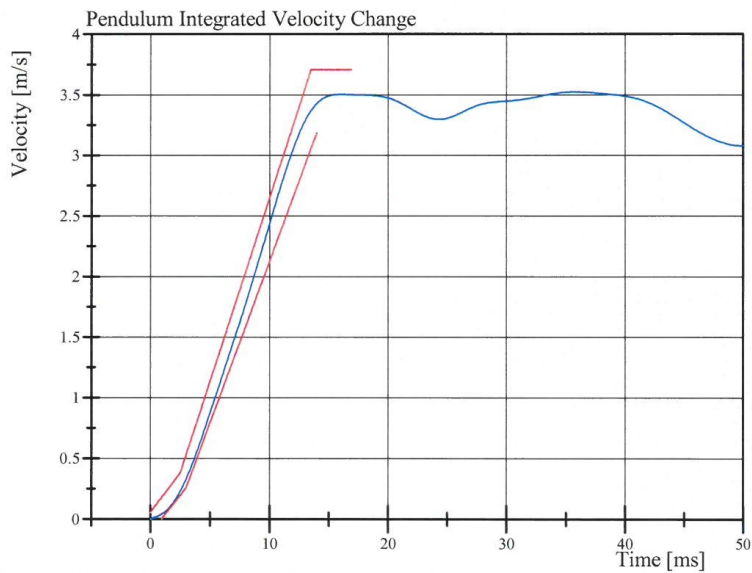
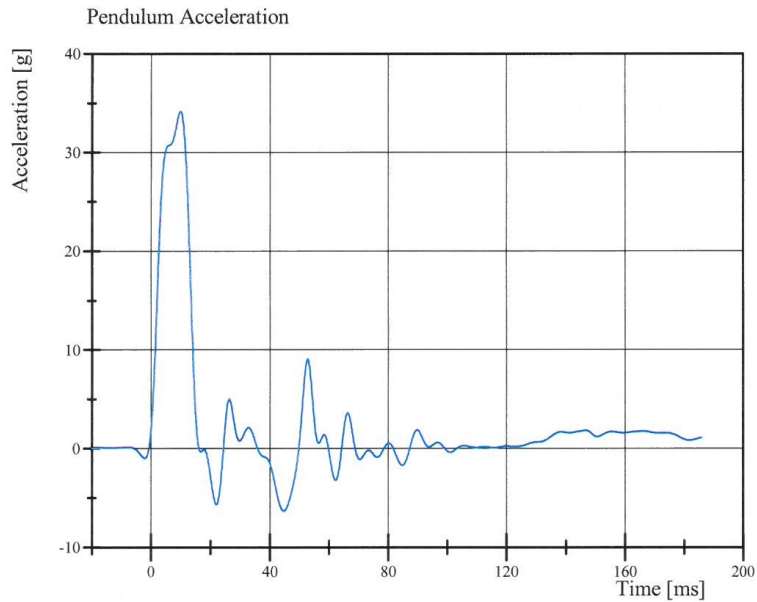
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 07:11:12 1503



Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 38-5
Test Date: 8/17/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 07:11:20 1503

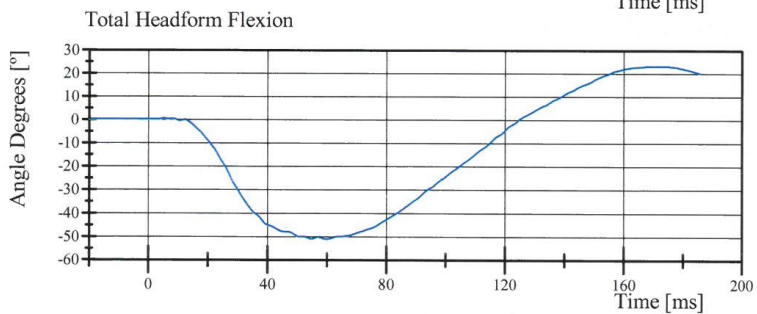
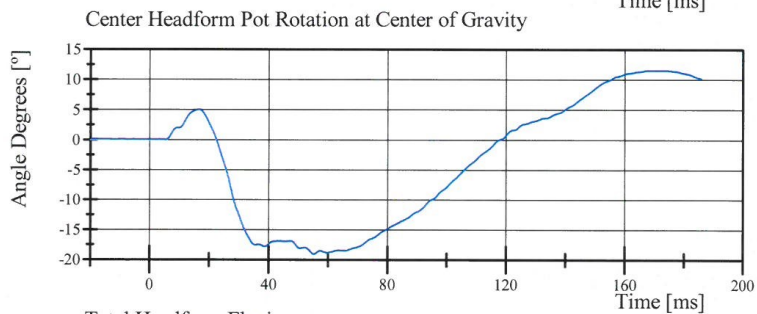
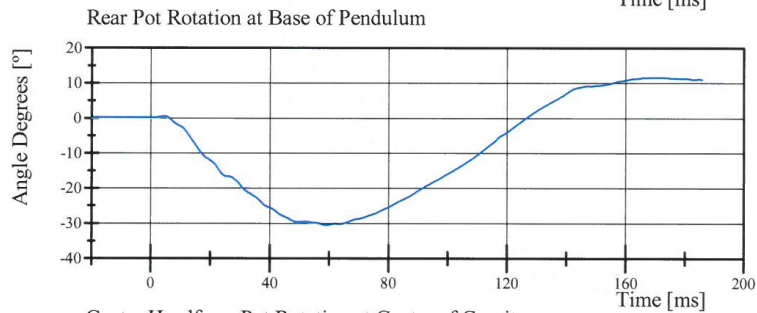
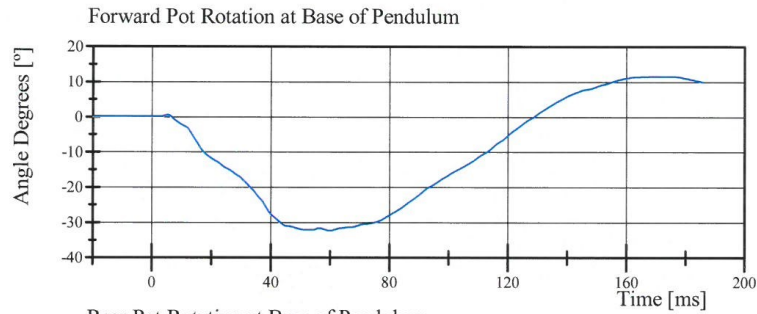


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 38-5

Test Date: 8/17/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 07:11:20 1503



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.41 g	Yes

Test meets specifications.

Comments:

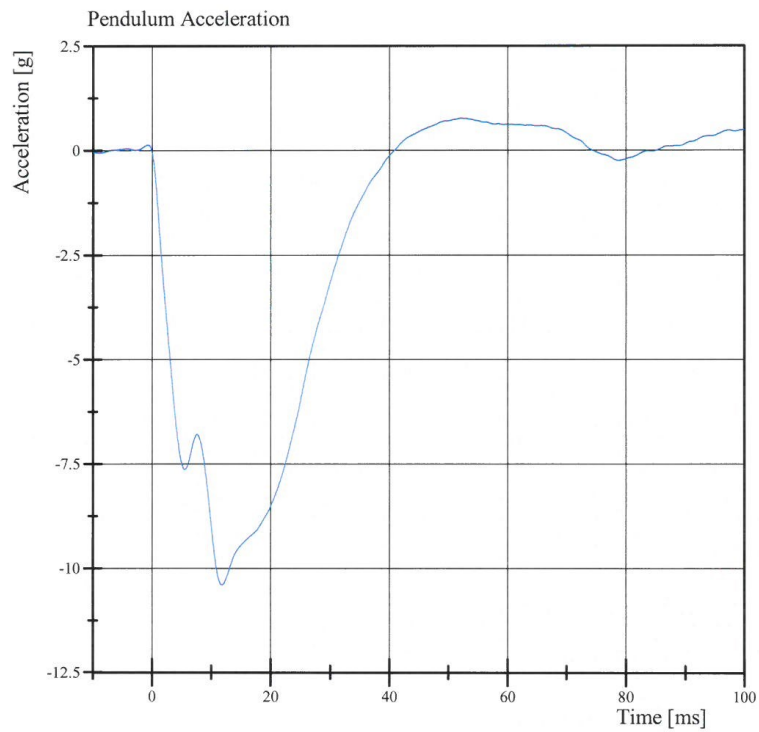
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:30:56 592



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/17/2016



Filter Class: CFC_180
Max: 0.8 g at 52.1 ms
Min: -10.4 g at 11.8 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:31:01 592



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

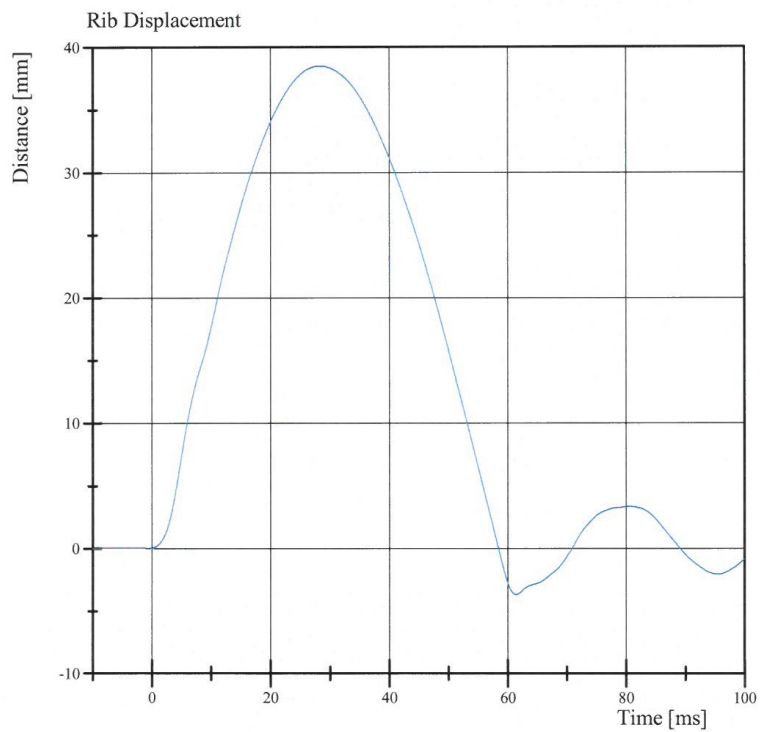
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:38:50 874



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016



Filter Class: CFC_180
Max: 38.5 mm at 28.3 ms
Min: -3.7 mm at 61.4 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:38:57 874



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

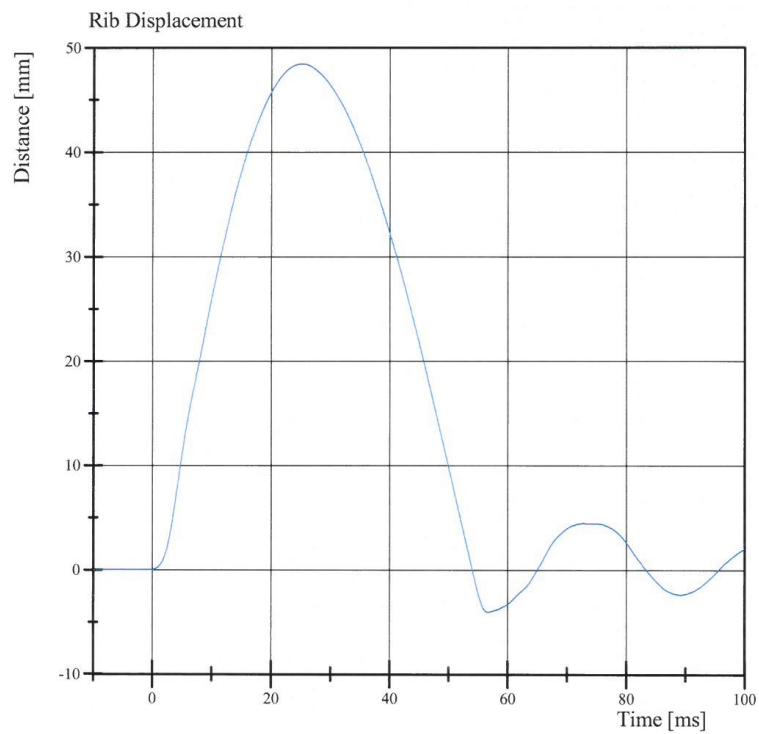
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:31:46 700



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016



Filter Class: CFC_180
Max: 48.4 mm at 25.1 ms
Min: -4.1 mm at 56.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:31:55 700



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

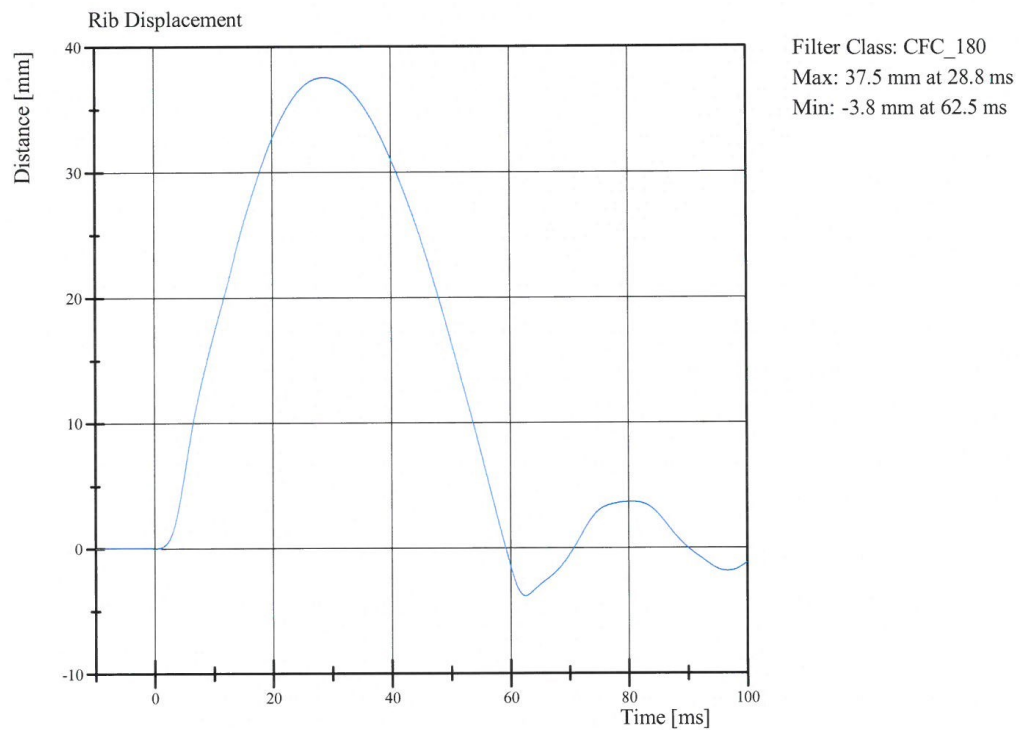
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:51:03 894



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:51:11 894



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

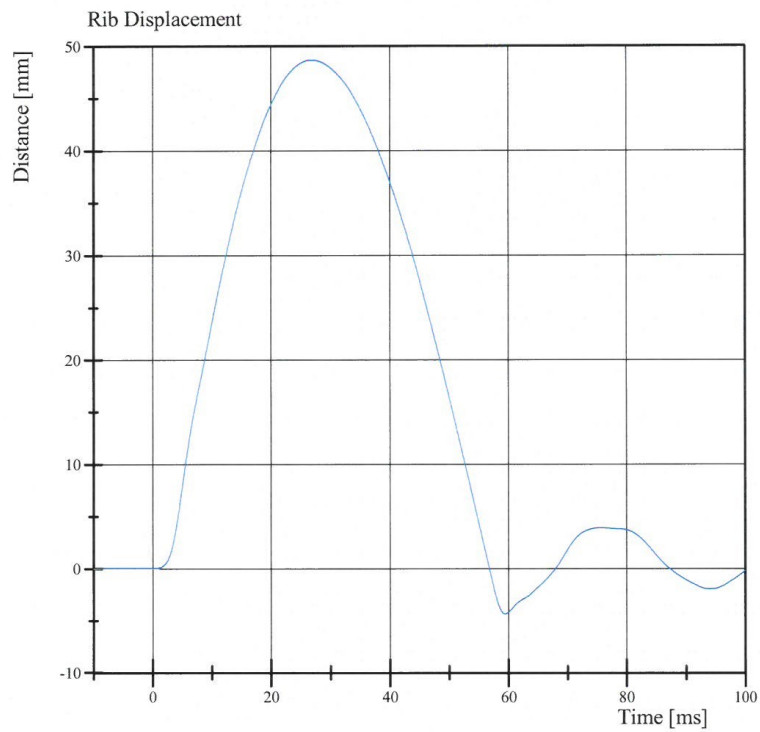
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:44:49 715



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016



Filter Class: CFC_180
Max: 48.6 mm at 26.9 ms
Min: -4.4 mm at 59.4 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:45:00 715



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

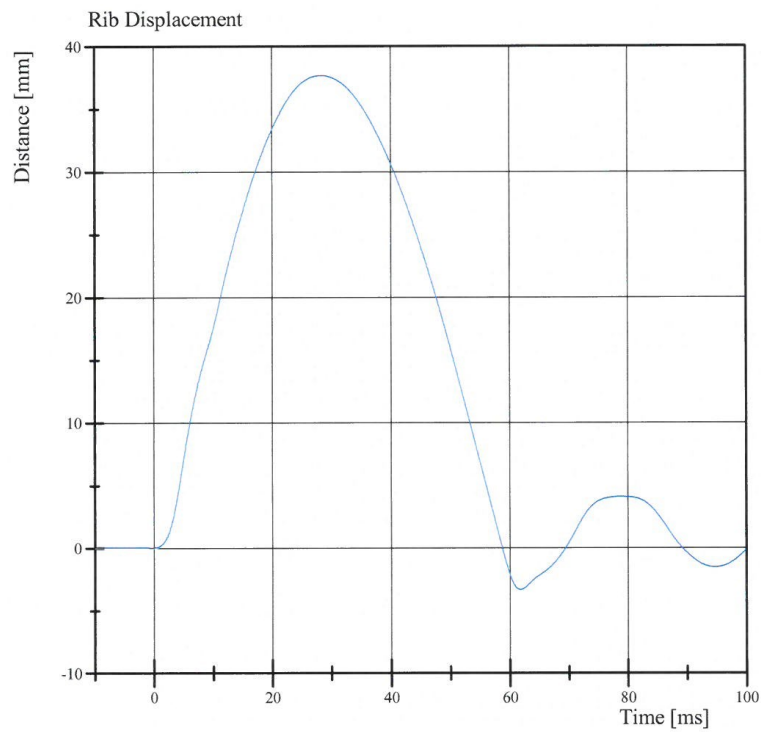
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 13:03:43 898



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016



Filter Class: CFC_180
Max: 37.6 mm at 28.3 ms
Min: -3.3 mm at 61.8 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 13:03:52 898



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

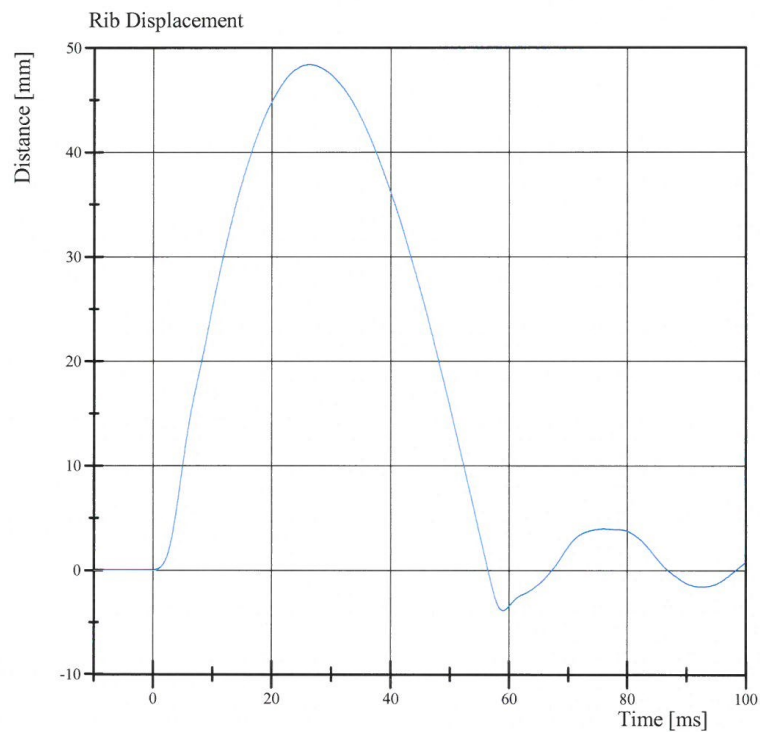
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:57:02 702



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/16/2016



Filter Class: CFC_180
Max: 48.3 mm at 26.3 ms
Min: -3.9 mm at 59.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 12:57:09 702



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.510 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,516.5 N	Yes
Upper Rib Displacement	34 - 41 mm	38.5 mm	Yes
Center Rib Displacement	37 - 45 mm	41.4 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.2 mm	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:44:19 460

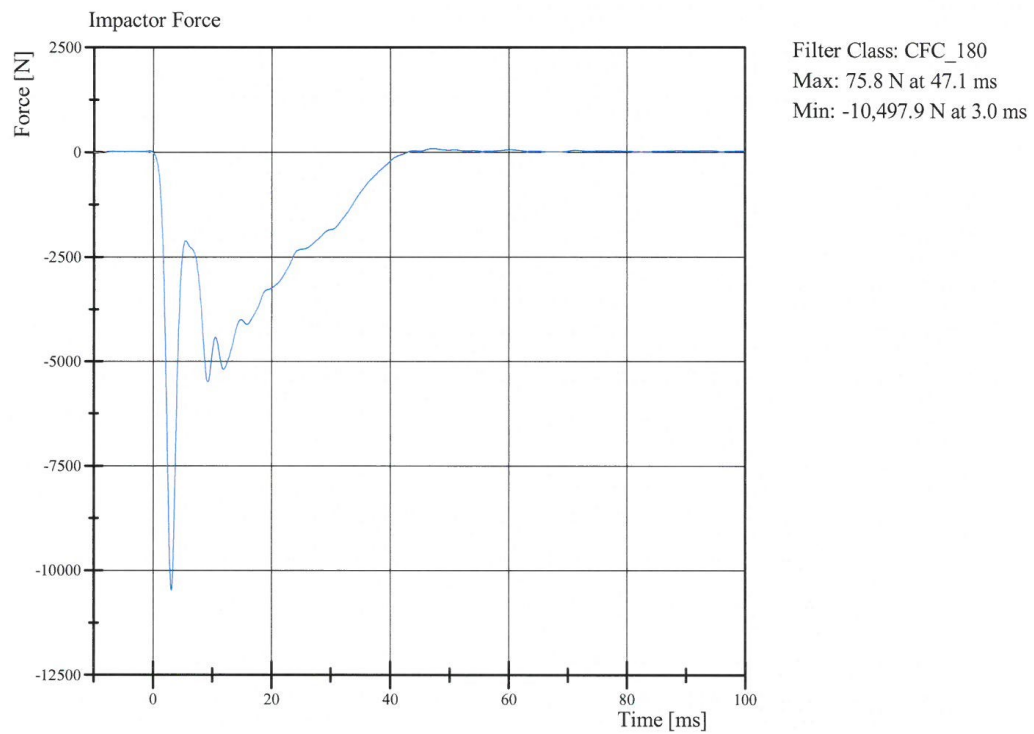


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/17/2016



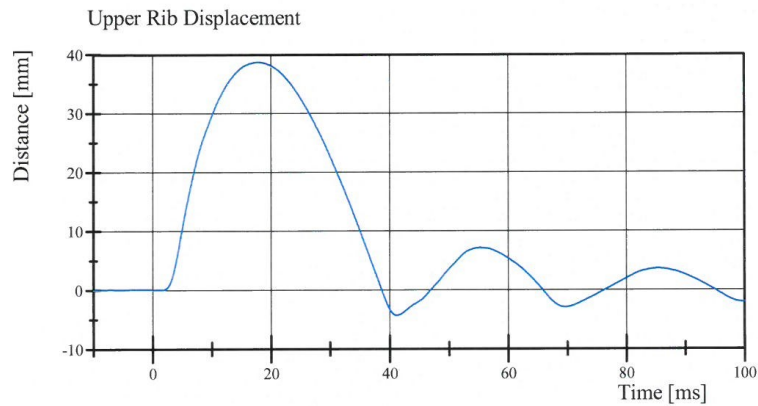
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:44:25 460

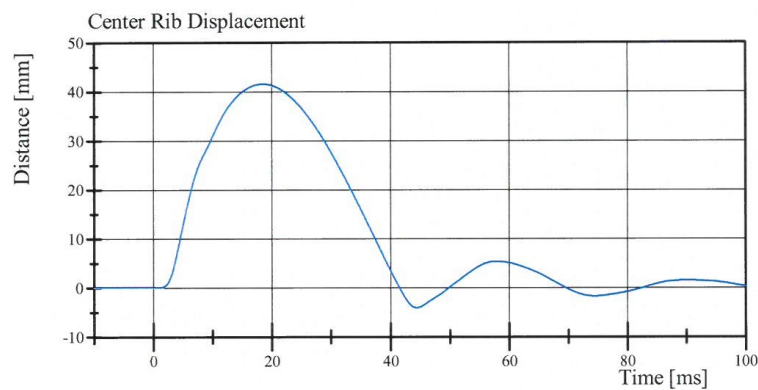


Transportation Research Center Inc.

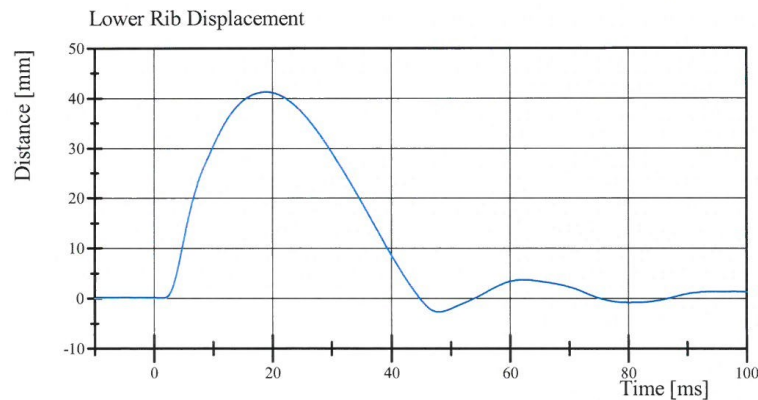
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 38-1
Test Date: 8/17/2016



Filter Class: CFC_180
Max: 38.5 mm at 17.8 ms
Min: -4.3 mm at 41.1 ms



Filter Class: CFC_180
Max: 41.4 mm at 18.5 ms
Min: -4.1 mm at 44.3 ms



Filter Class: CFC_180
Max: 41.2 mm at 18.8 ms
Min: -2.8 mm at 47.9 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:44:26 460



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 38-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.03 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,066.5 N	Yes
Time of Peak	10.6 - 13.0 ms	12.32 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,472.1 N	Yes
Time of Peak	10.0 - 12.3 ms	12.24 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:52:25 615

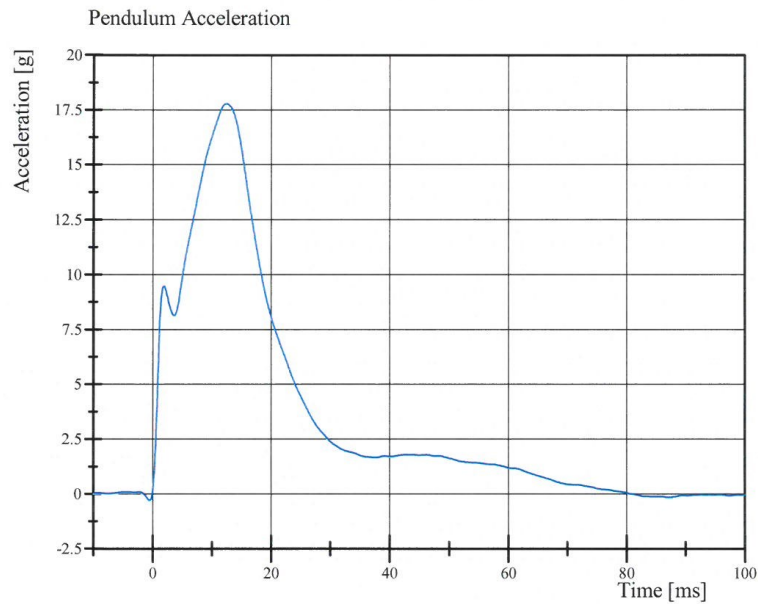


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 38-1

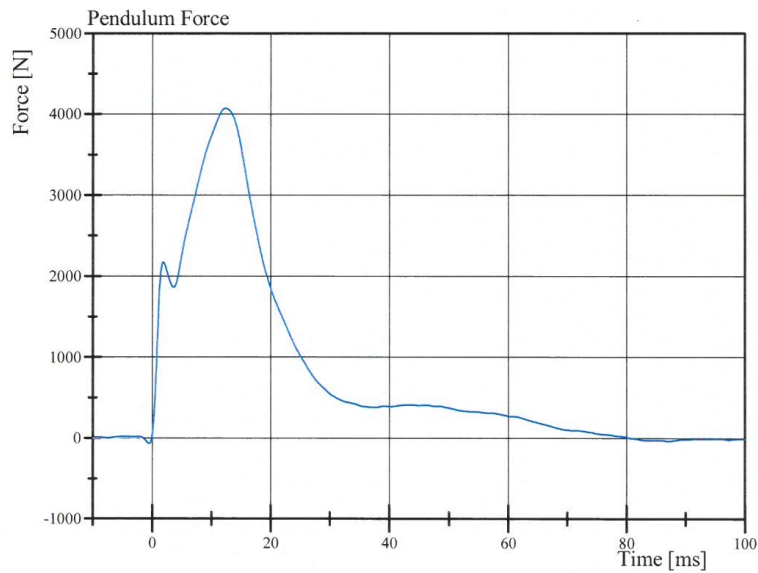
Test Date: 8/17/2016



Filter Class: CFC_180

Max: 17.7 g at 12.3 ms

Min: -0.3 g at -0.6 ms



Filter Class: CFC_180

Max: 4,066.5 N at 12.3 ms

Min: -76.8 N at -0.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:52:30 615

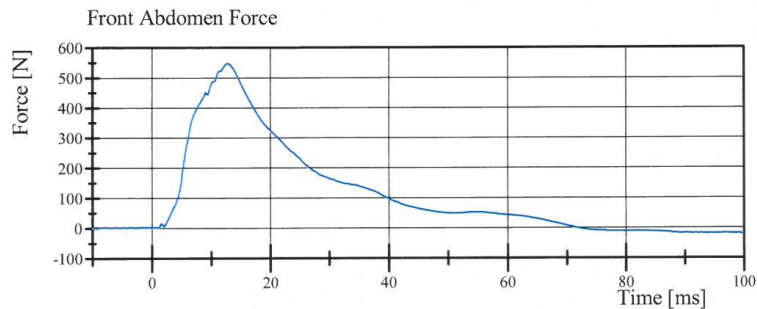


Transportation Research Center Inc.

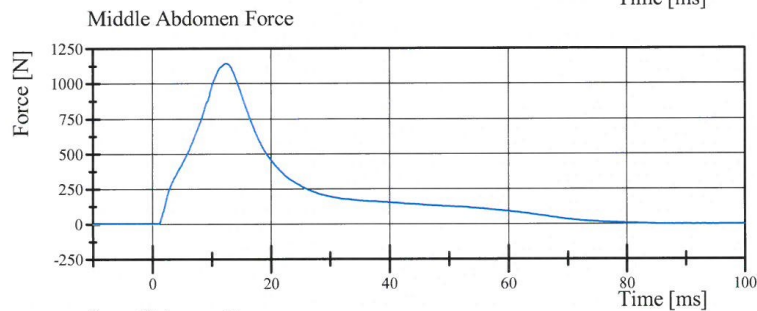
Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 38-1

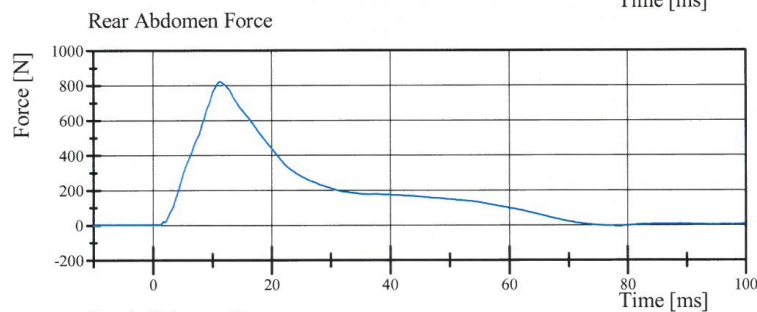
Test Date: 8/17/2016



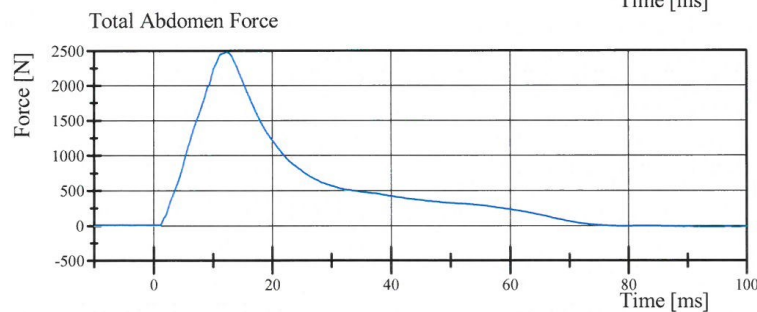
Filter Class: CFC_600
Max: 544.3 N at 12.6 ms
Min: -19.3 N at 99.7 ms



Filter Class: CFC_600
Max: 1,140.2 N at 12.4 ms
Min: -4.4 N at 91.2 ms



Filter Class: CFC_600
Max: 819.4 N at 11.3 ms
Min: -5.1 N at 78.8 ms



Filter Class: CFC_600
Max: 2,472.1 N at 12.2 ms
Min: -19.4 N at 95.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 08:52:31 615



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 38-4

Test Date: 8/16/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.058 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.5 deg	Yes
Time of Peak	39 - 53 ms	44.3 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	39.7 ms	Yes

Test meets specifications.

Comments:

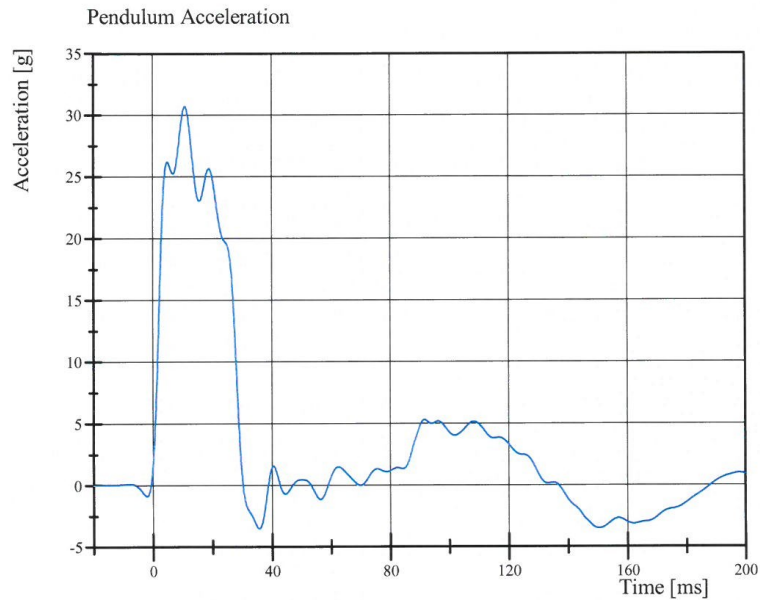
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 14:02:59 678

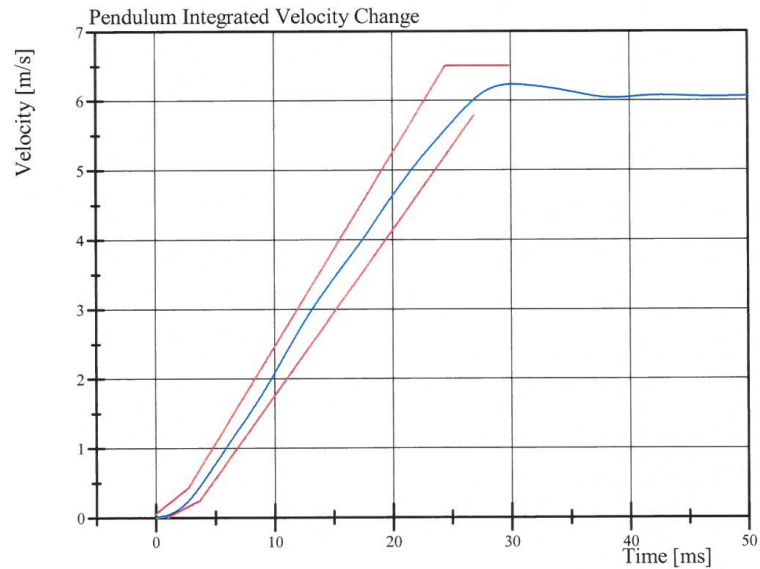


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 38-4
Test Date: 8/16/2016



Filter Class: CFC_60
Max: 30.6 g at 10.8 ms
Min: -3.6 g at 35.7 ms



Filter Class: CFC_60
Max: 6.2 m/s at 30.2 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 14:03:06 678

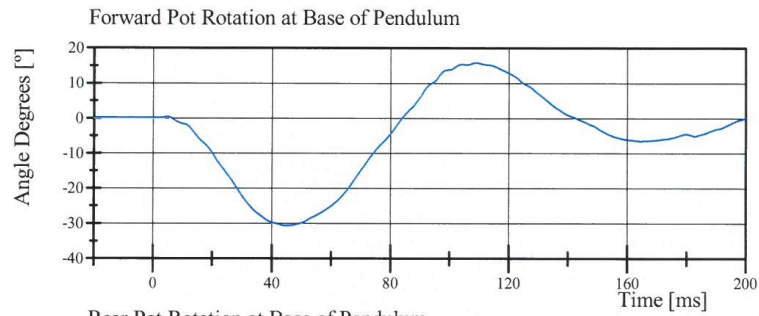


Transportation Research Center Inc.

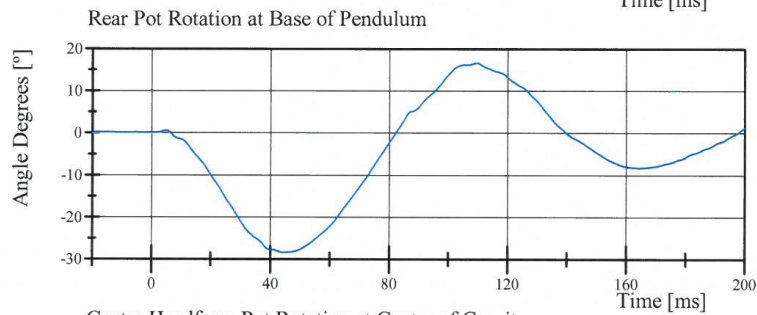
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 38-4

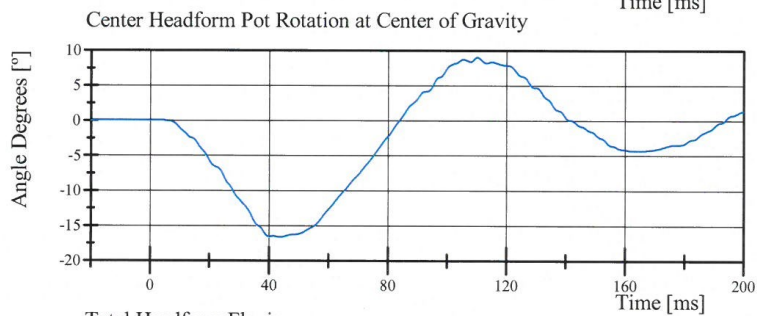
Test Date: 8/16/2016



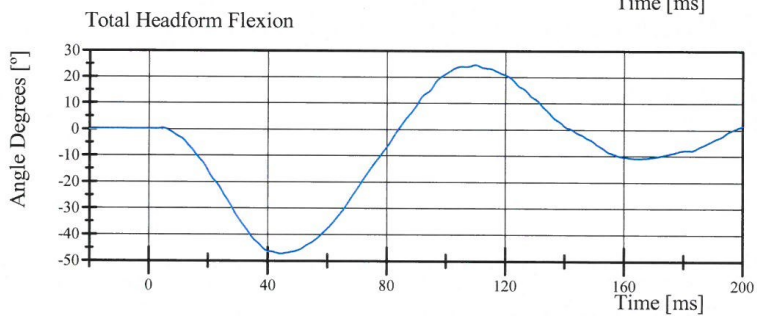
Filter Class: CFC_180
Max: 15.7 ° at 109.0 ms
Min: -30.8 ° at 44.6 ms



Filter Class: CFC_180
Max: 16.6 ° at 109.5 ms
Min: -28.5 ° at 44.3 ms



Filter Class: CFC_180
Max: 9.0 ° at 110.1 ms
Min: -16.7 ° at 43.7 ms



Filter Class: CFC_180
Max: 24.6 ° at 109.8 ms
Min: -47.5 ° at 44.3 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.16.2016 14:03:07 678



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 38-2

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,226.9 N	Yes
Time of Peak	11.8 - 16.1 ms	13.92 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,297.0 N	Yes
Time of Peak	12.2 - 17.0 ms	14.40 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 09:38:38 571

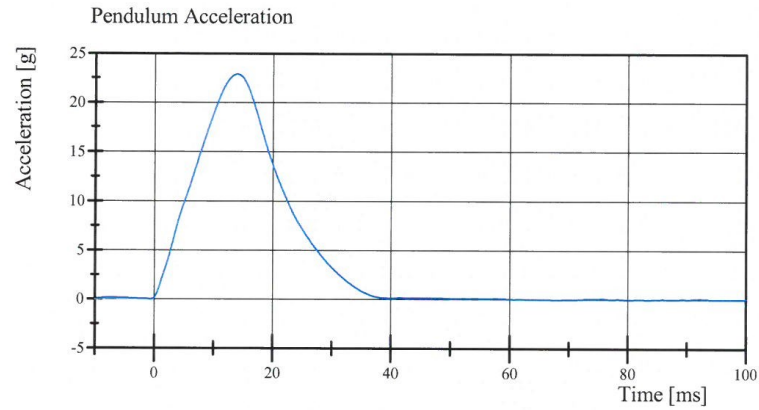


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 38-2

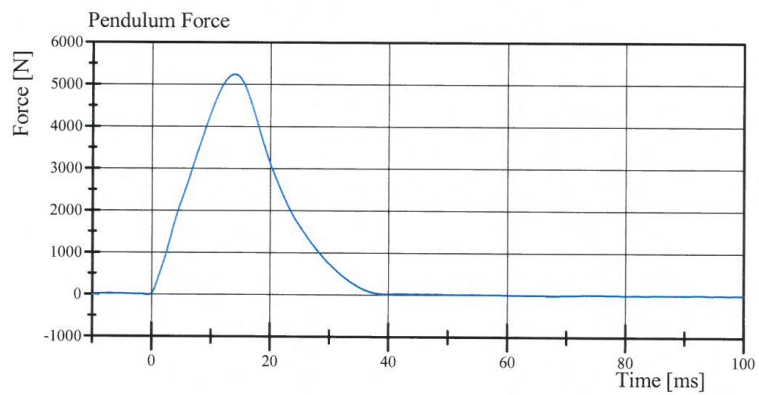
Test Date: 8/17/2016



Filter Class: CFC_180

Max: 22.8 g at 13.9 ms

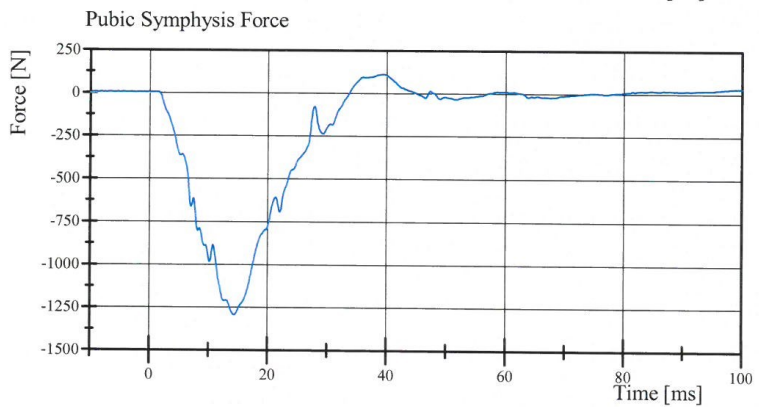
Min: -0.1 g at -0.6 ms



Filter Class: CFC_180

Max: 5,226.9 N at 13.9 ms

Min: -18.6 N at -0.6 ms



Filter Class: CFC_600

Max: 108.4 N at 39.4 ms

Min: -1,297.0 N at 14.4 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.17.2016 09:38:45 571



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 39
08/30/16

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	912	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	558	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	445	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes



Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 39-4

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Peak Resultant Acceleration	125 - 155 g	143.6 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.8 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 17:15:18 362

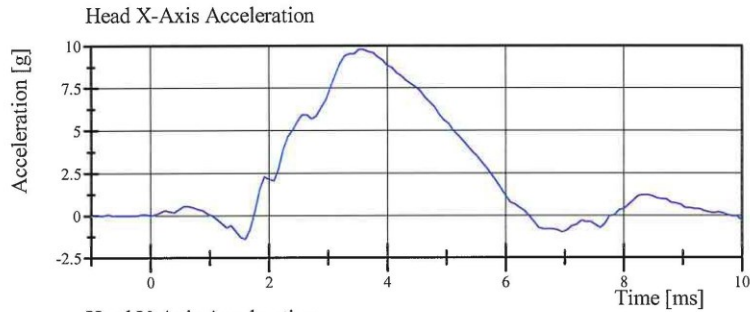


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 39-4

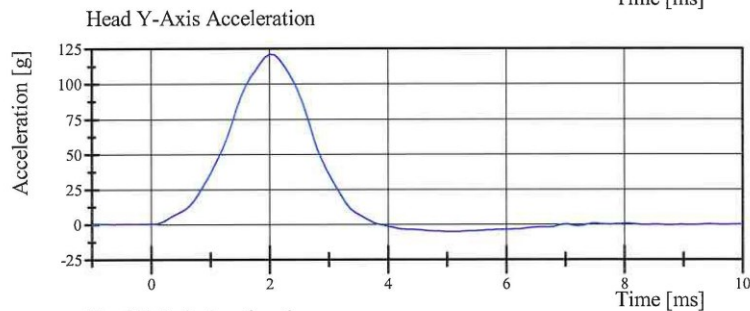
Test Date: 8/29/2016



Filter Class: CFC_1000

Max: 9.8 g at 3.5 ms

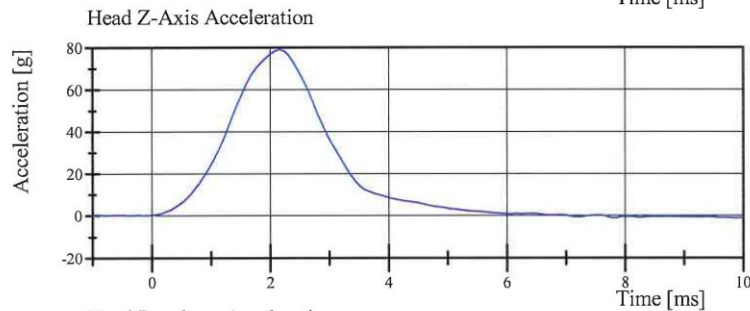
Min: -1.4 g at 1.6 ms



Filter Class: CFC_1000

Max: 120.7 g at 2.0 ms

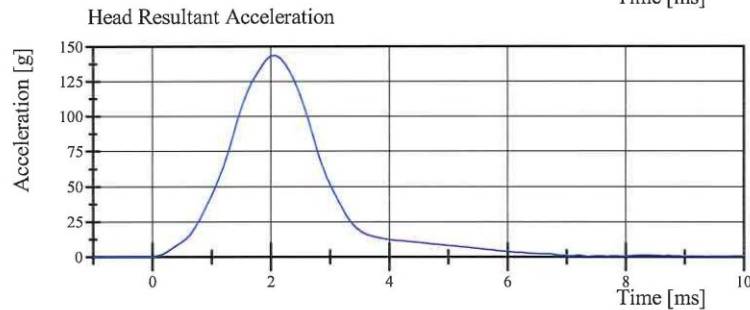
Min: -5.2 g at 5.1 ms



Filter Class: CFC_1000

Max: 79.1 g at 2.2 ms

Min: -1.0 g at 7.8 ms



Filter Class: CFC_1000

Max: 143.6 g at 2.1 ms

Min: 0.0 g at -0.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 17:15:27 362



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.37 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-54.8 deg	Yes
Time of Peak	54 - 66 ms	57.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	65.1 ms	Yes

Test meets specifications.

Comments:

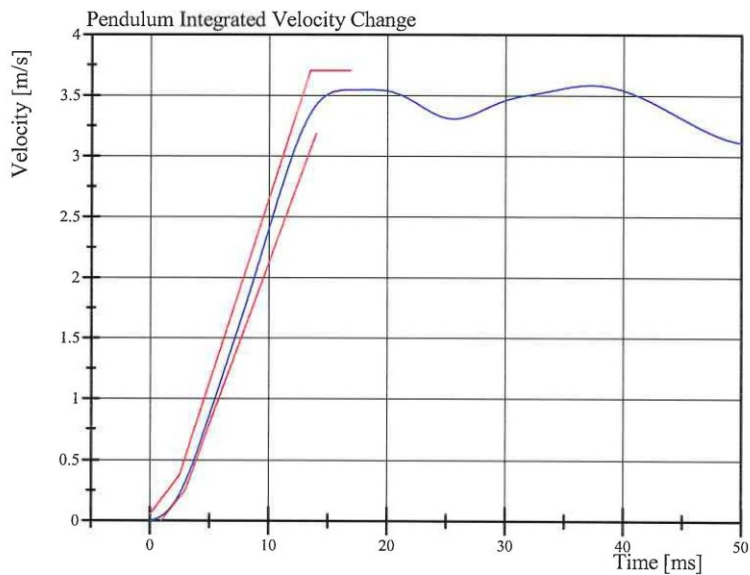
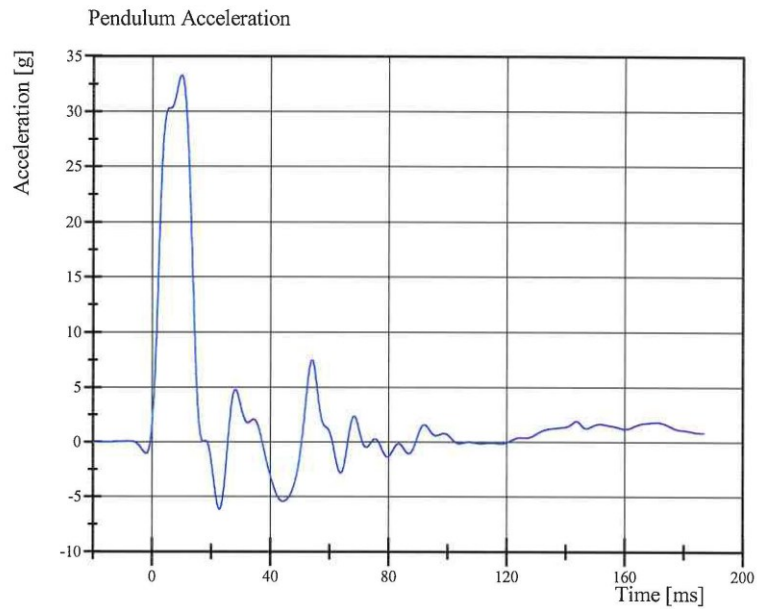
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:44:42 1492



Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:45:30 1492

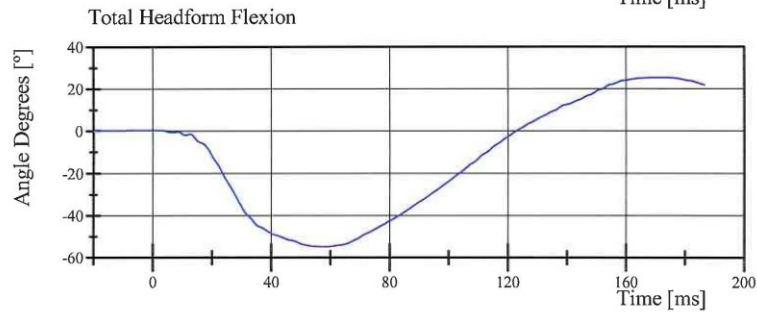
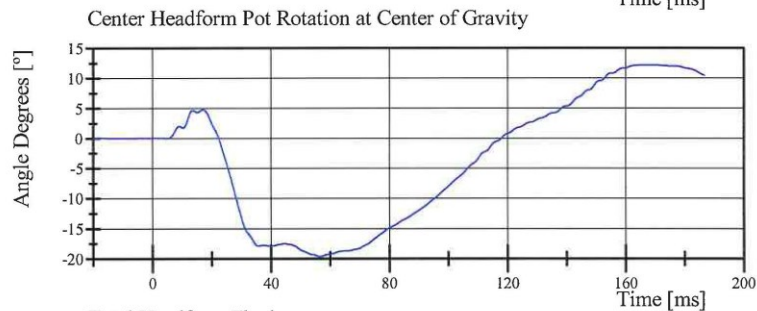
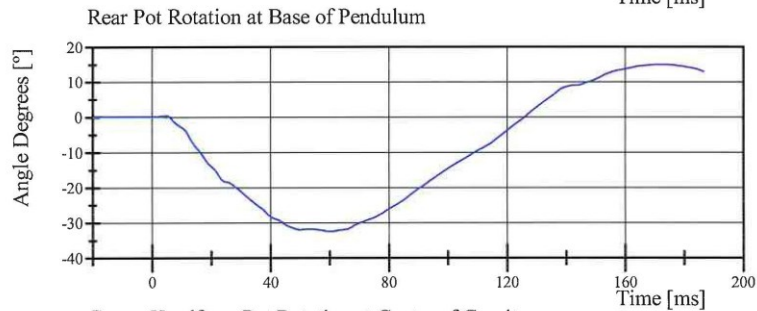
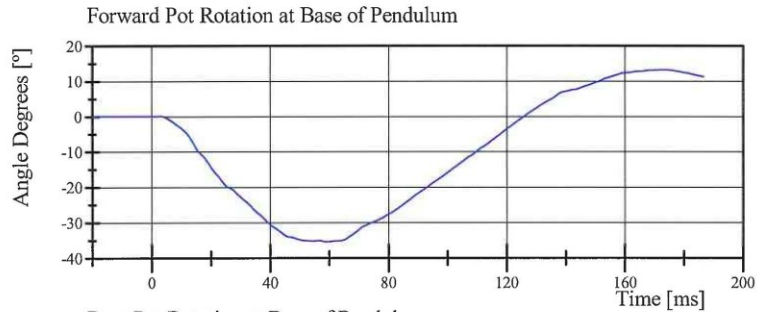


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:45:31 1492



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.33 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 10:47:39 569

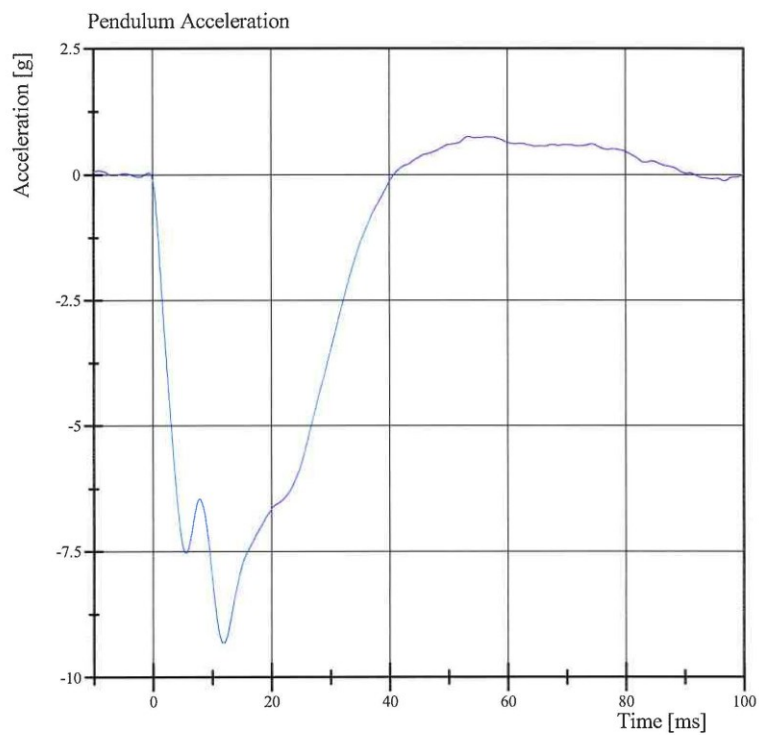


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016



Filter Class: CFC_180

Max: 0.8 g at 53.3 ms

Min: -9.3 g at 11.9 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 10:47:44 569



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

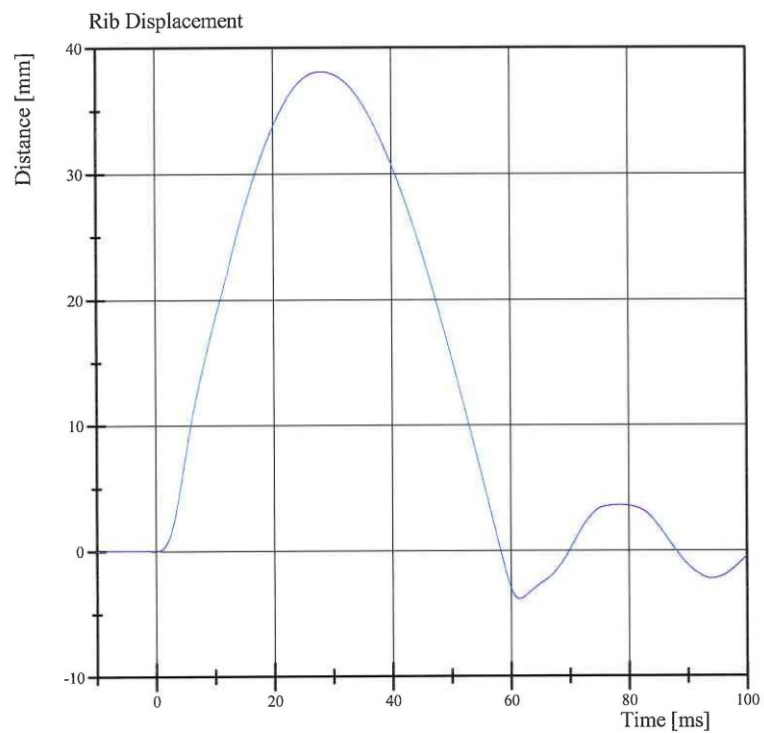
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:44:16 895



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 38.1 mm at 28.1 ms
Min: -3.8 mm at 61.4 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:44:29 895



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

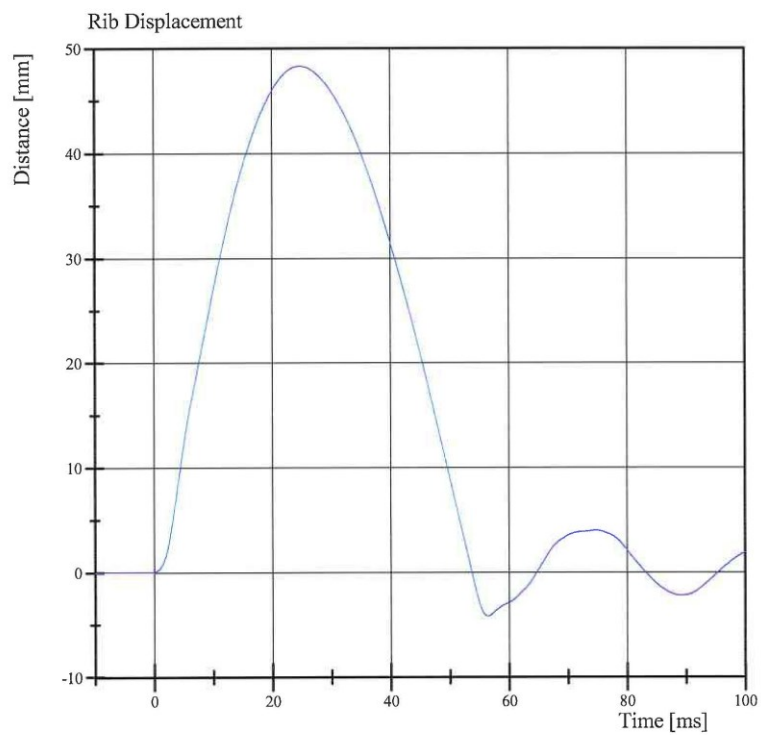
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:40:46 711



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 48.3 mm at 24.8 ms
Min: -4.2 mm at 56.3 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:40:56 711



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

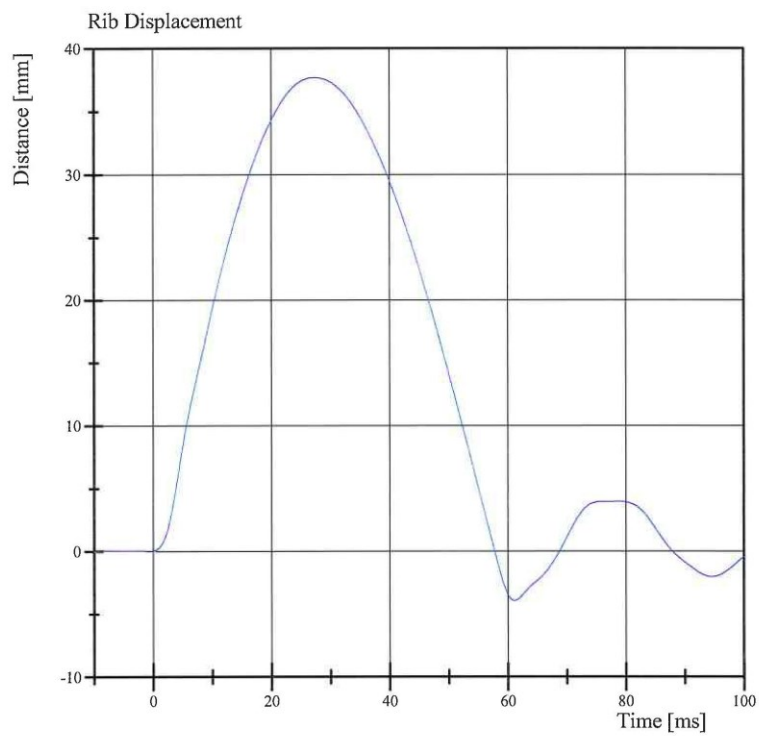
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:53:12 912



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 37.7 mm at 27.4 ms
Min: -4.0 mm at 61.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:53:23 912



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.9 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

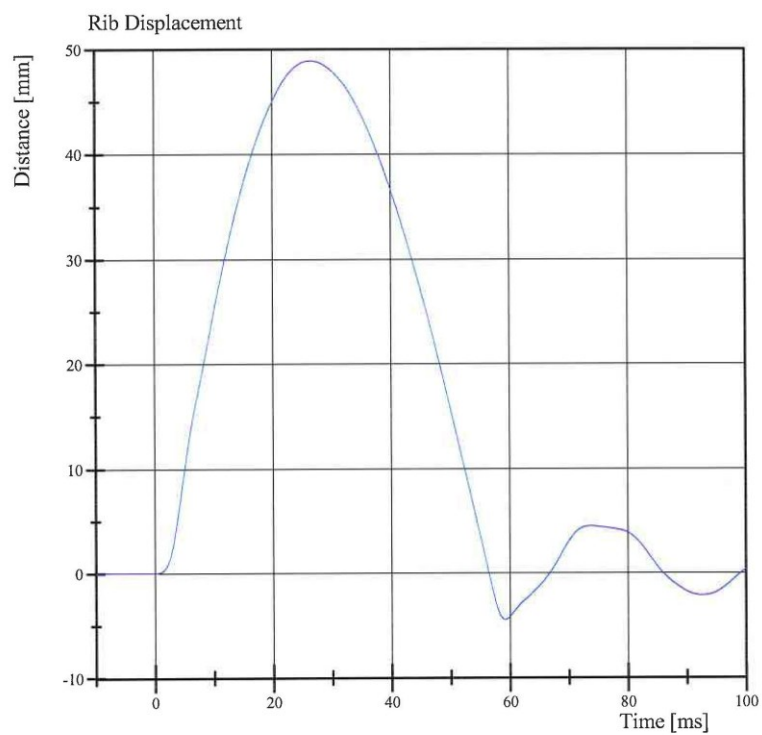
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:47:56 697



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 48.9 mm at 26.5 ms
Min: -4.5 mm at 59.1 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:48:06 697



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

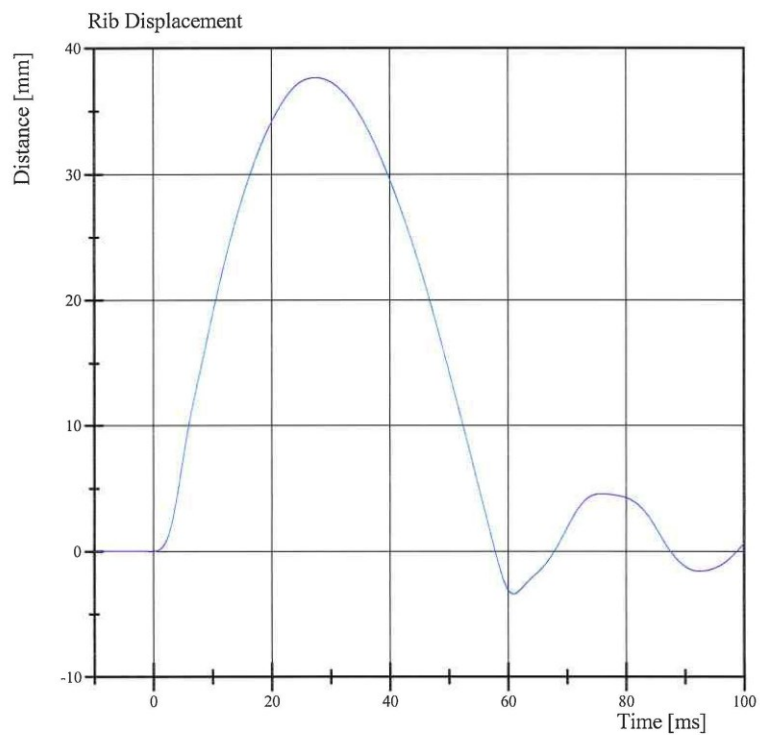
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:02:44 882



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 37.6 mm at 27.4 ms
Min: -3.4 mm at 60.9 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:02:54 882



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

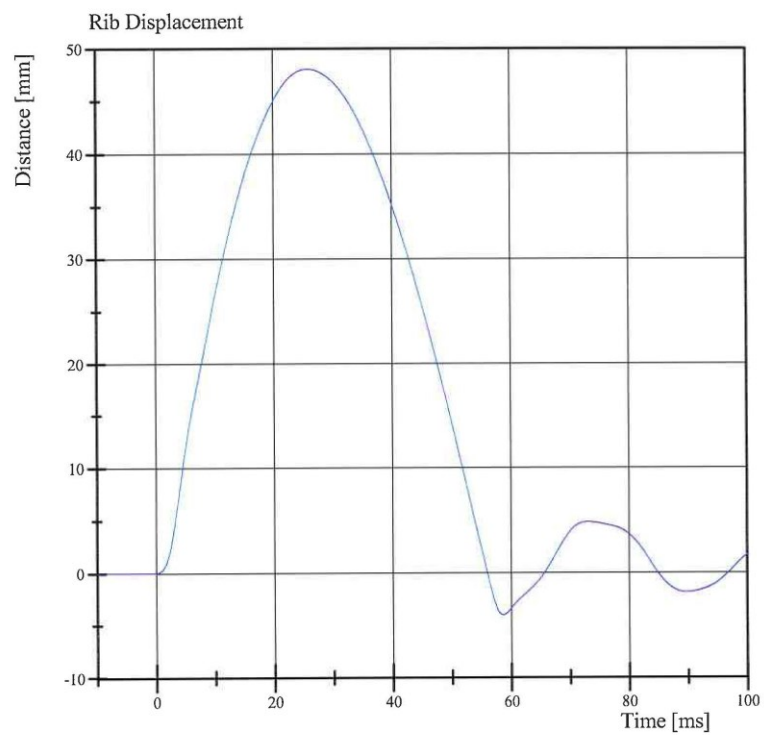
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:56:48 701



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 48.1 mm at 25.8 ms
Min: -4.0 mm at 58.6 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 07:57:04 701



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.558 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,591.5 N	Yes
Upper Rib Displacement	34 - 41 mm	38.6 mm	Yes
Center Rib Displacement	37 - 45 mm	42.3 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.4 mm	Yes

Test meets specifications.

Comments:

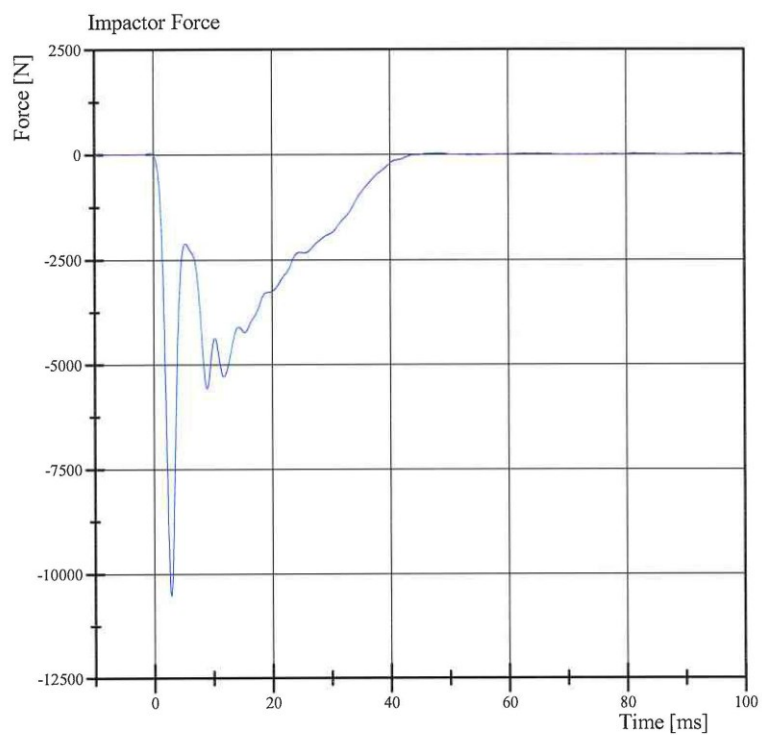
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 10:55:12 463



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 33.2 N at 48.4 ms
Min: -10,534.3 N at 2.9 ms

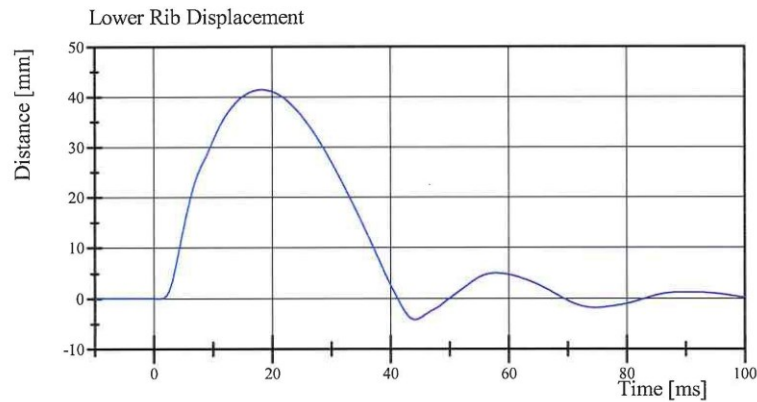
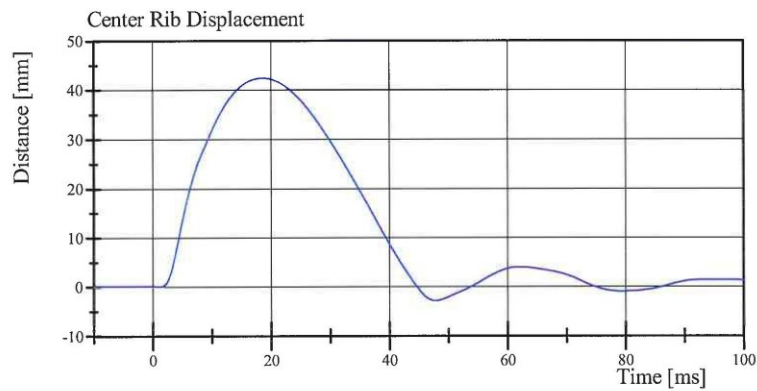
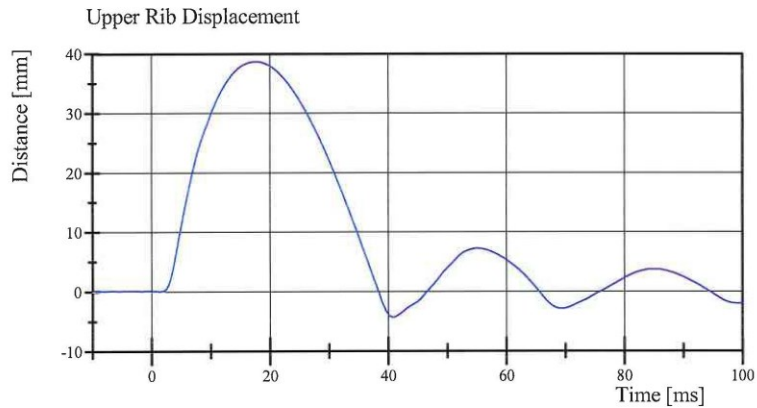
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 10:55:18 463



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 10:55:19 463



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.05 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,065.6 N	Yes
Time of Peak	10.6 - 13.0 ms	12.08 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,443.2 N	Yes
Time of Peak	10.0 - 12.3 ms	11.84 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 11:04:34 560

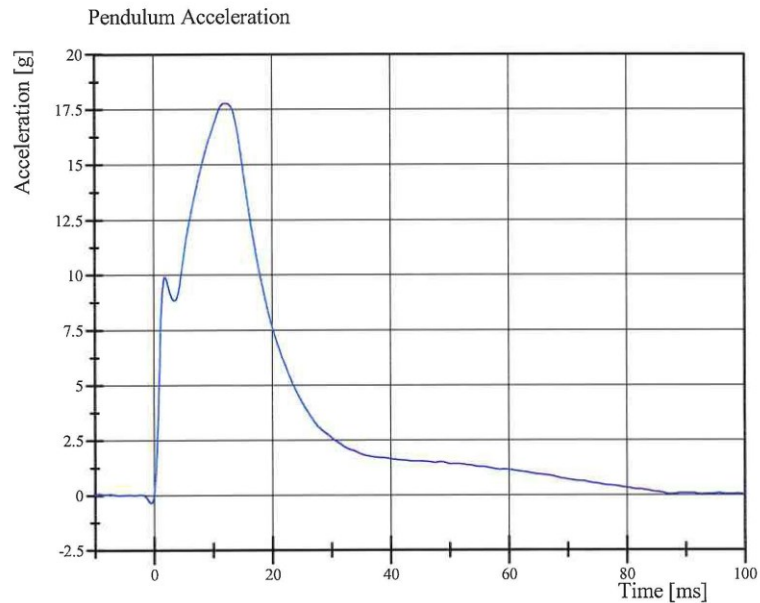


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 39-1

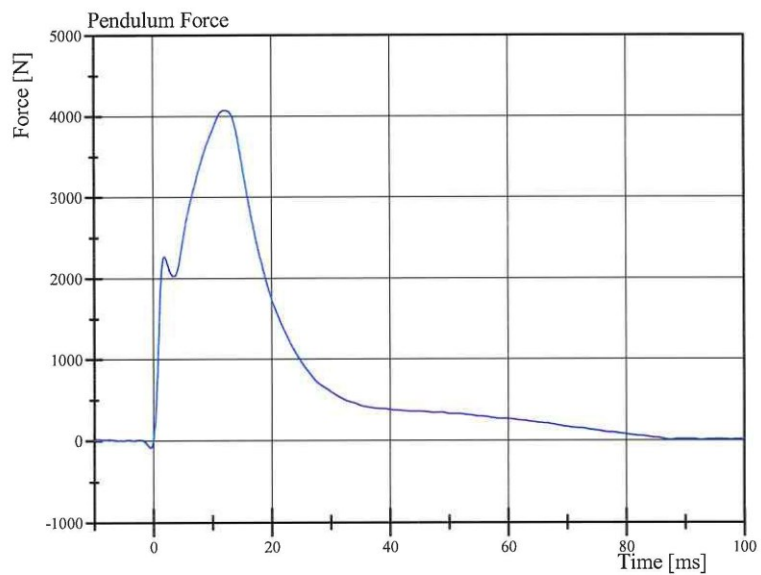
Test Date: 8/29/2016



Filter Class: CFC_180

Max: 17.7 g at 12.1 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,065.6 N at 12.1 ms

Min: -87.3 N at -0.5 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 11:04:44 560

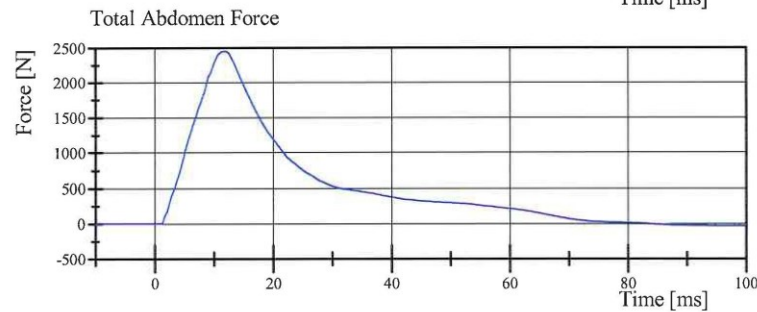
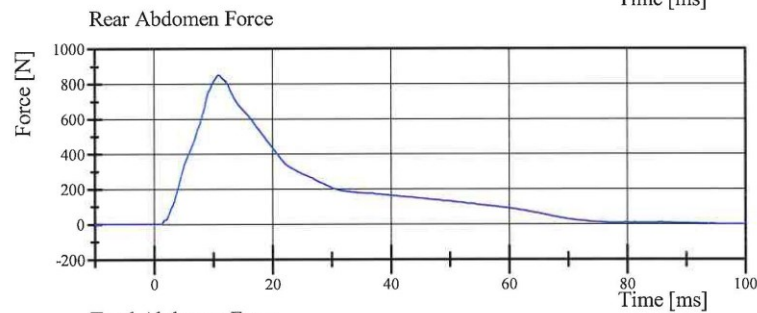
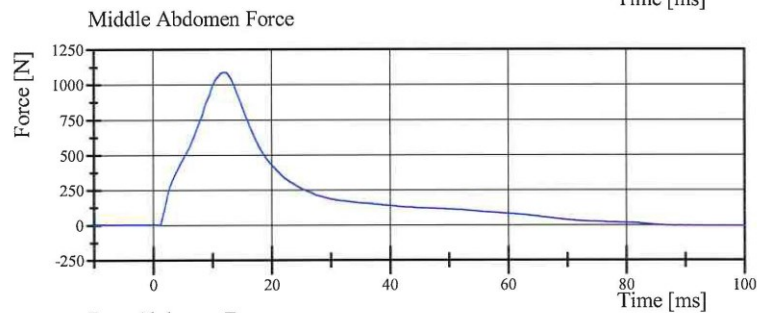
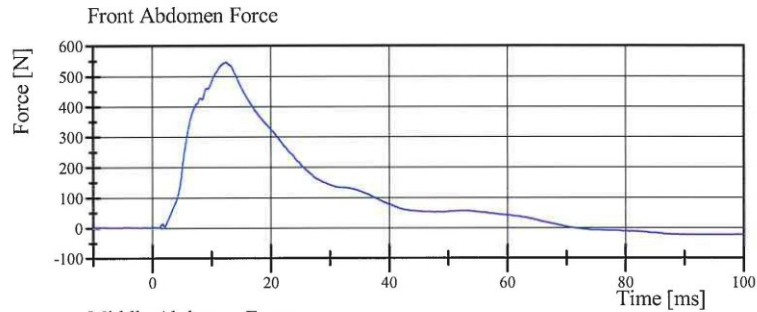


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016



Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 11:04:45 560



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.068 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-50.4 deg	Yes
Time of Peak	39 - 53 ms	45.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.1 ms	Yes

Test meets specifications.

Comments:

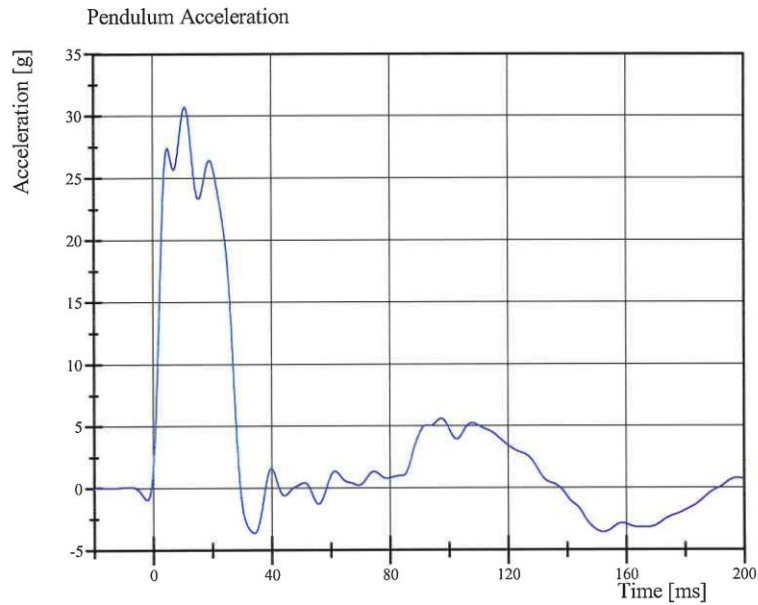
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:31:19 675

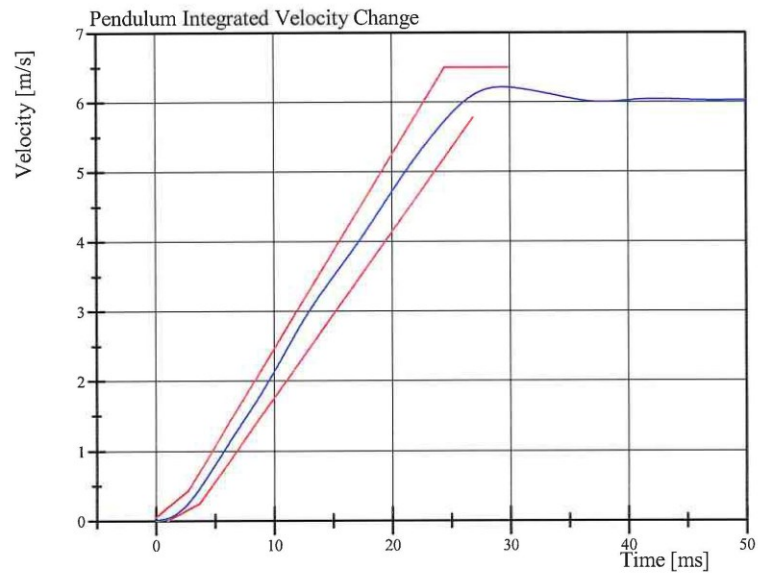


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



Filter Class: CFC_60
Max: 30.7 g at 10.8 ms
Min: -3.7 g at 34.1 ms



Filter Class: CFC_60
Max: 6.2 m/s at 29.4 ms
Min: 0.0 m/s at 0.0 ms

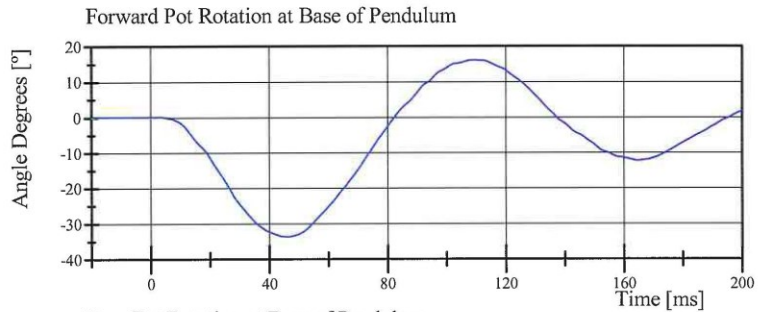
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:31:27 675

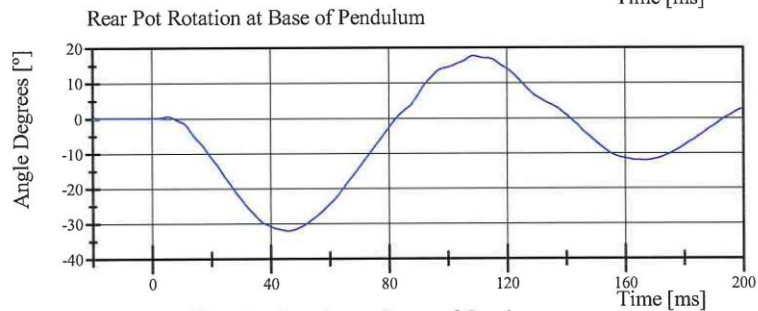


Transportation Research Center Inc.

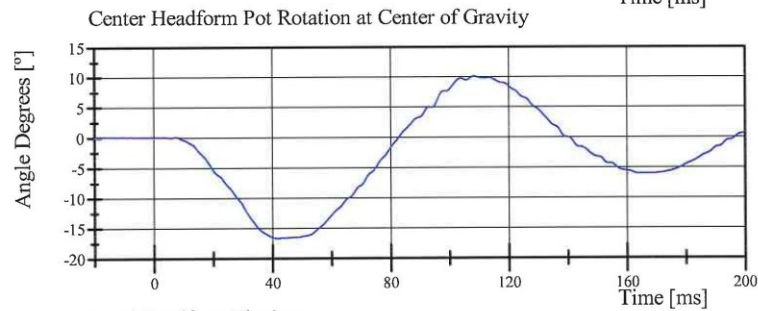
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 39-1
Test Date: 8/29/2016



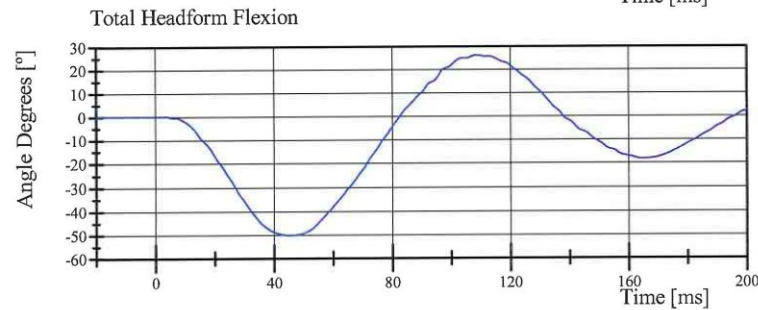
Filter Class: CFC_180
Max: 16.0 ° at 109.1 ms
Min: -33.8 ° at 45.9 ms



Filter Class: CFC_180
Max: 17.7 ° at 108.6 ms
Min: -32.1 ° at 46.0 ms



Filter Class: CFC_180
Max: 10.1 ° at 108.2 ms
Min: -16.7 ° at 41.5 ms



Filter Class: CFC_180
Max: 26.1 ° at 108.4 ms
Min: -50.4 ° at 45.4 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 08:31:29 675



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 39-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,122.9 N	Yes
Time of Peak	11.8 - 16.1 ms	13.92 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,249.0 N	Yes
Time of Peak	12.2 - 17.0 ms	13.20 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 11:10:23 571

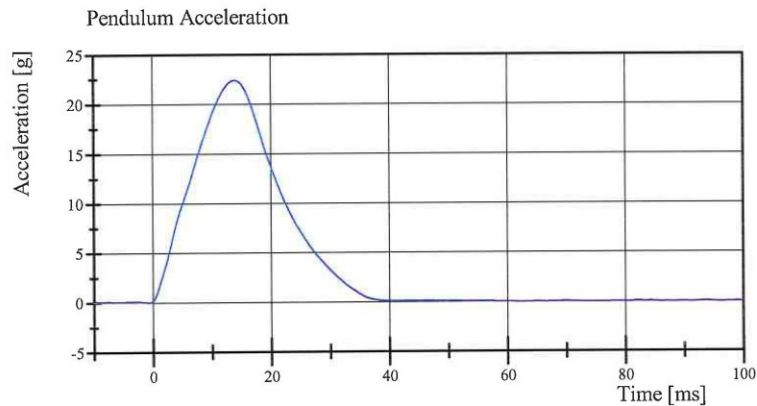


Transportation Research Center Inc.

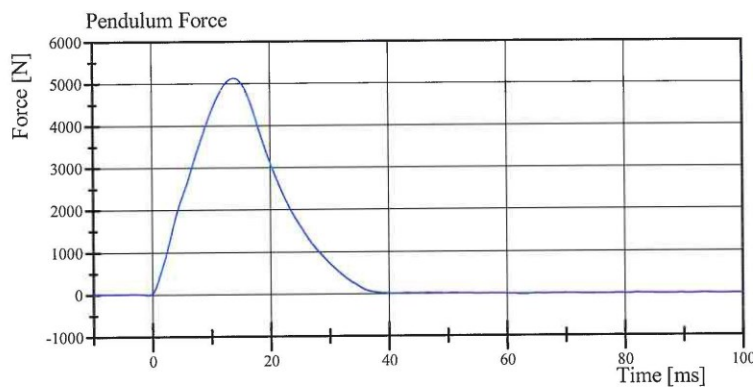
Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 39-1

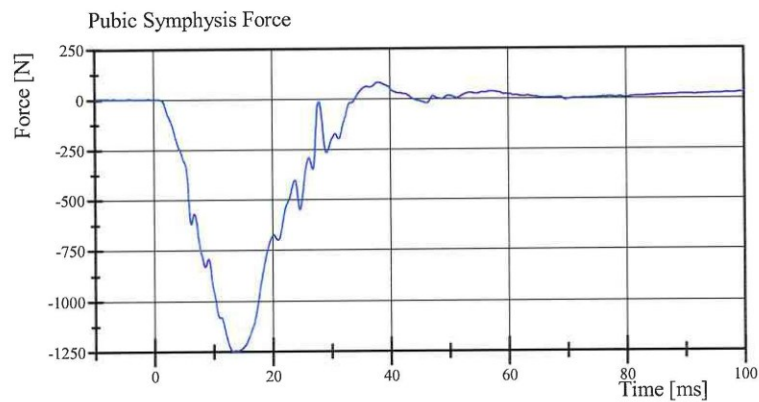
Test Date: 8/29/2016



Filter Class: CFC_180
Max: 22.4 g at 13.9 ms
Min: -0.0 g at 62.2 ms



Filter Class: CFC_180
Max: 5,122.9 N at 13.9 ms
Min: -10.8 N at 62.2 ms



Filter Class: CFC_600
Max: 80.3 N at 37.9 ms
Min: -1,249.0 N at 13.2 ms

Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

08.29.2016 11:10:34 571



Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.44

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	777	Yes
B	Shoulder Pivot Height	437.0 - 453.0	447	Yes
C	H-Point Height	79.0 - 89.0	88	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	125	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	535	Yes
L	Popliteal Height	343.0 - 369.0	345	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	202	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	480	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	873	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 44-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	118.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 09:10:42 231

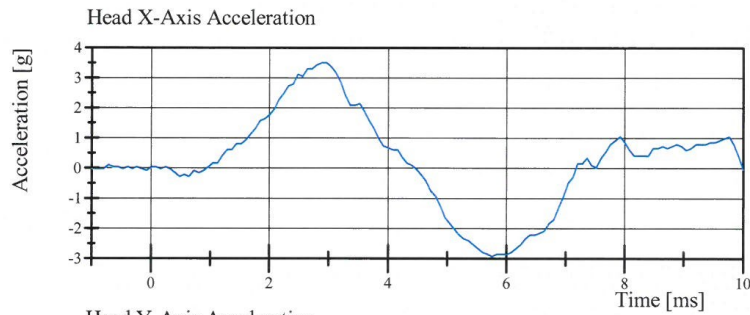


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 44-1

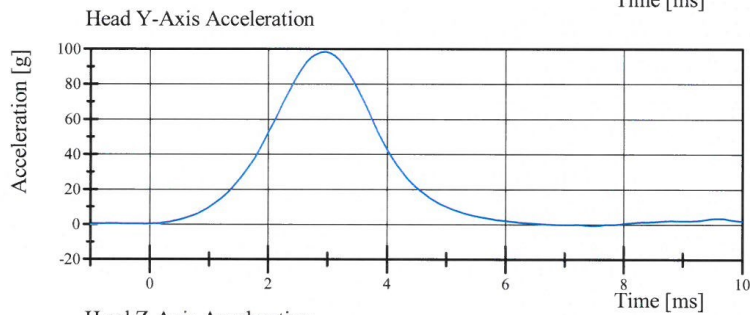
Test Date: 8/17/2016



Filter Class: CFC_1000

Max: 3.5 g at 2.9 ms

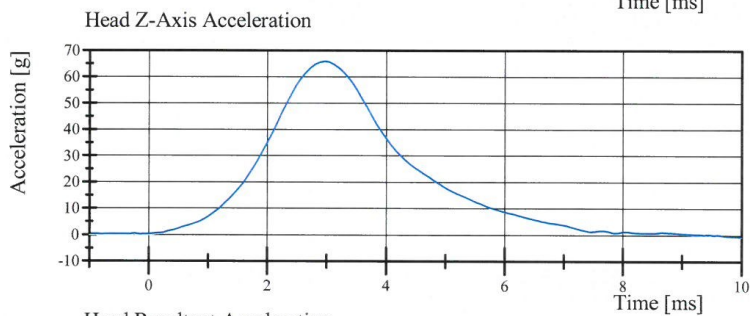
Min: -2.9 g at 5.8 ms



Filter Class: CFC_1000

Max: 98.1 g at 3.0 ms

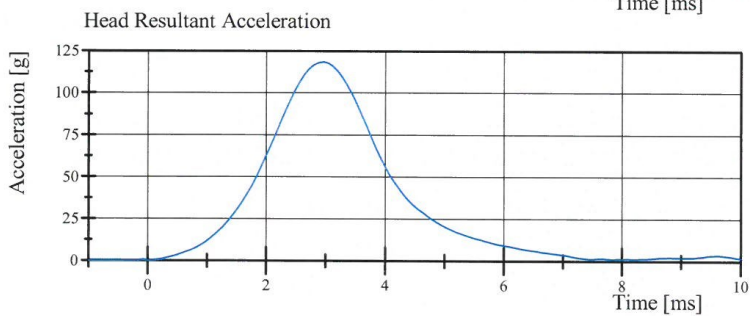
Min: -0.8 g at 7.4 ms



Filter Class: CFC_1000

Max: 65.7 g at 3.0 ms

Min: -0.8 g at 10.0 ms



Filter Class: CFC_1000

Max: 118.1 g at 3.0 ms

Min: 0.1 g at -1.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 09:10:52 231



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 44-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.6 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.615 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.673 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.920 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.202 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.781 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.783 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-75.0 deg	Yes
Time of Peak	50 - 70 ms	58.3 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.8 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	114.8 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 10:32:16 749

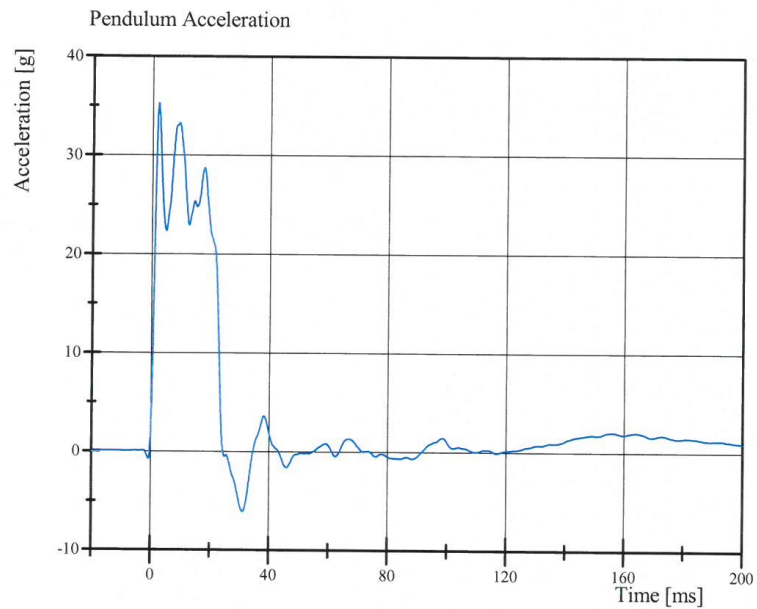


Transportation Research Center Inc.

Left Lateral Neck

SID II_s Serial No. 305 Certification No. 44-1

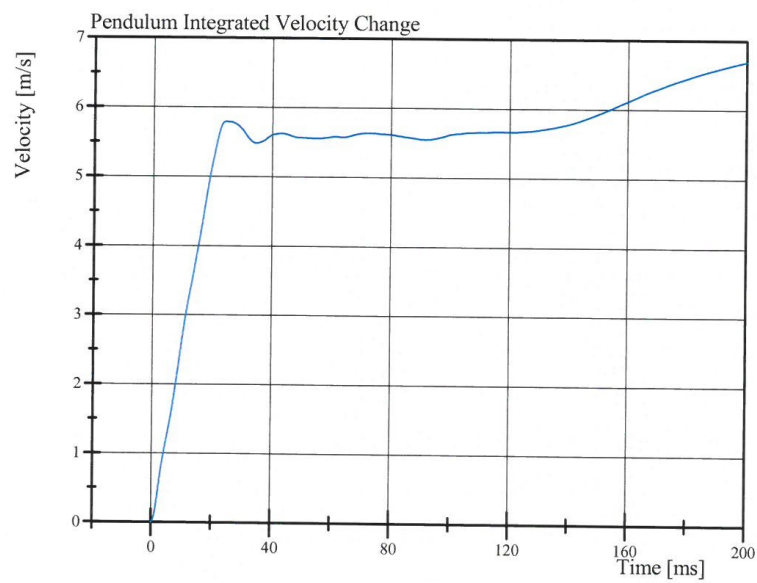
Test Date: 8/17/2016



Filter Class: CFC_180

Max: 35.2 g at 2.0 ms

Min: -6.2 g at 31.1 ms



Filter Class: CFC_180

Max: 6.7 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 10:32:26 749

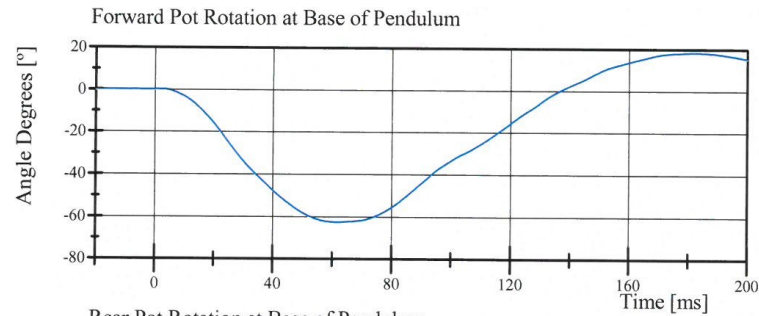


Transportation Research Center Inc.

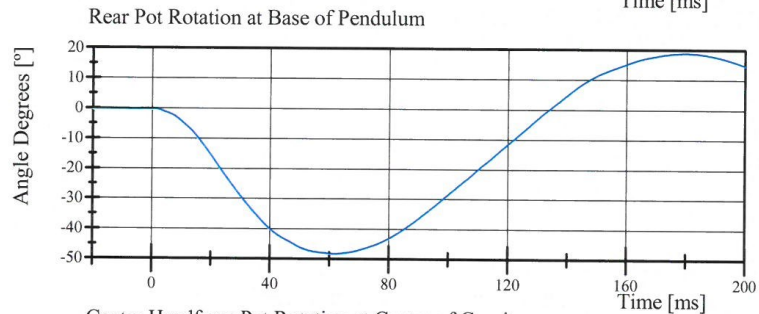
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 44-1

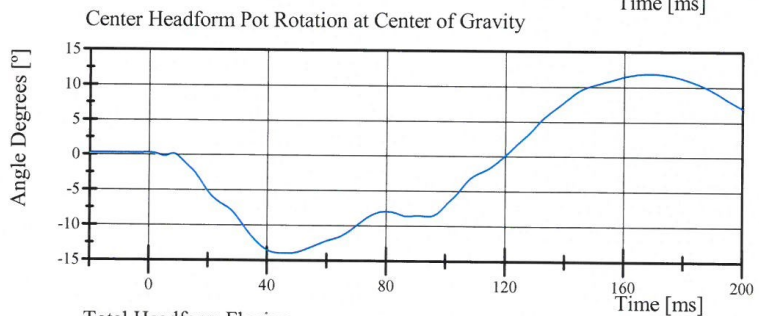
Test Date: 8/17/2016



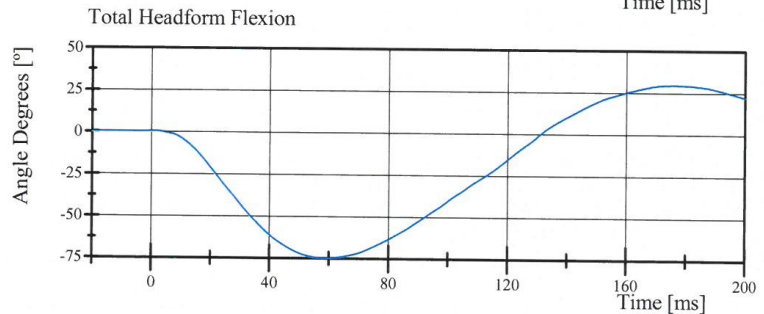
Filter Class: CFC_60
Max: 18.2 ° at 182.2 ms
Min: -62.7 ° at 61.6 ms



Filter Class: CFC_60
Max: 18.8 ° at 179.7 ms
Min: -48.5 ° at 61.7 ms



Filter Class: CFC_60
Max: 11.9 ° at 169.4 ms
Min: -14.0 ° at 46.4 ms



Filter Class: CFC_60
Max: 29.4 ° at 176.0 ms
Min: -75.0 ° at 58.3 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 10:32:27 749

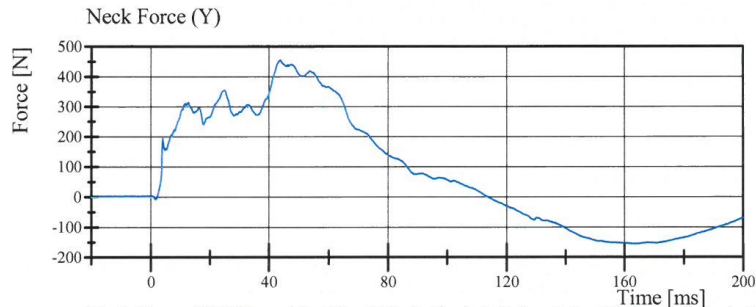


Transportation Research Center Inc.

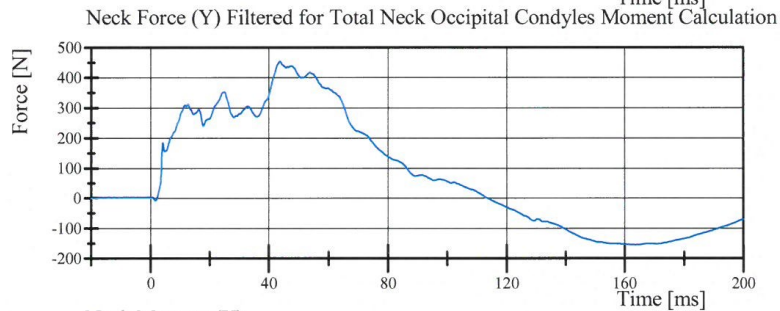
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 44-1

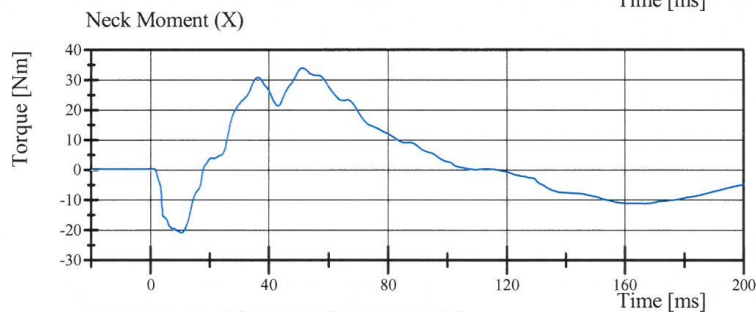
Test Date: 8/17/2016



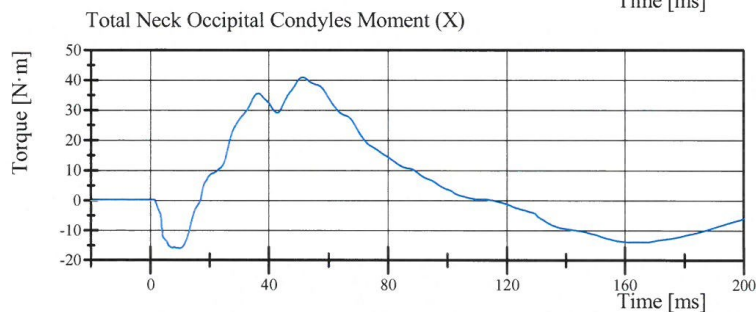
Filter Class: CFC_1000
Max: 453.1 N at 43.8 ms
Min: -156.2 N at 163.4 ms



Filter Class: CFC_600
Max: 452.6 N at 43.7 ms
Min: -155.9 N at 163.6 ms



Filter Class: CFC_600
Max: 33.7 Nm at 51.4 ms
Min: -21.1 Nm at 10.2 ms



Filter Class: Without_(Constar
Max: 40.8 N·m at 51.3 ms
Min: -16.2 N·m at 9.8 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 10:32:27 749



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 44-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	29.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.9 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:25:24 864

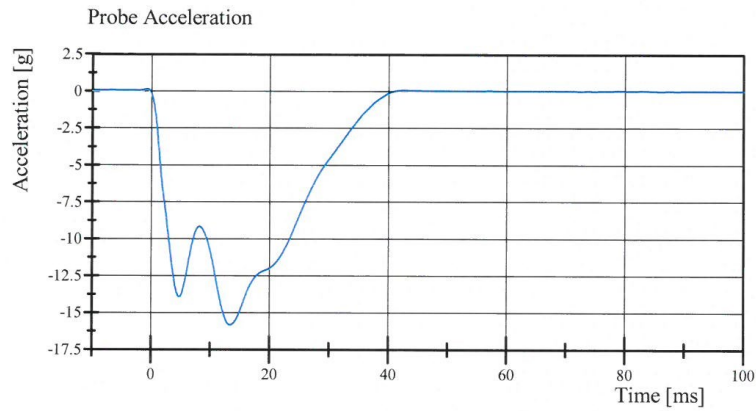


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 44-1

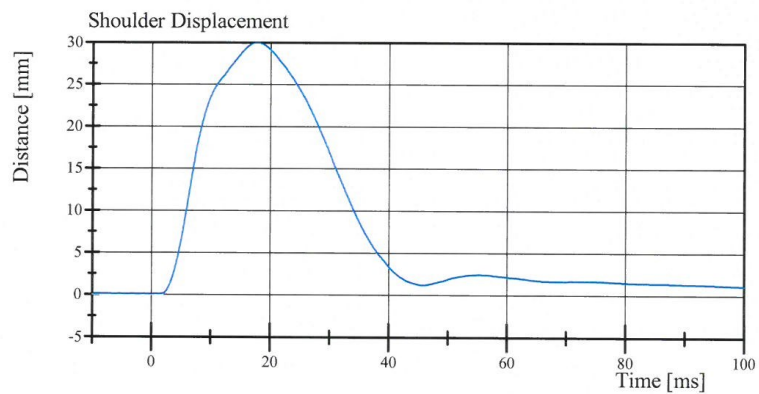
Test Date: 8/17/2016



Filter Class: CFC_180

Max: 0.1 g at -0.8 ms

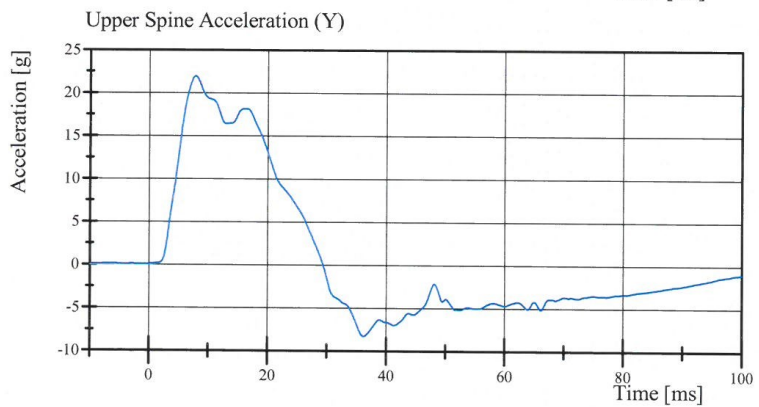
Min: -15.9 g at 13.4 ms



Filter Class: CFC_600

Max: 29.9 mm at 17.5 ms

Min: -0.0 mm at -4.5 ms



Filter Class: CFC_180

Max: 21.9 g at 7.8 ms

Min: -8.3 g at 36.2 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:25:48 864



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 44-1
Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.767 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.1 g	Yes
Shoulder Displacement	31 - 40 mm	33.4 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.6 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	40.1 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.6 g	Yes

Test meets specifications.

Comments:

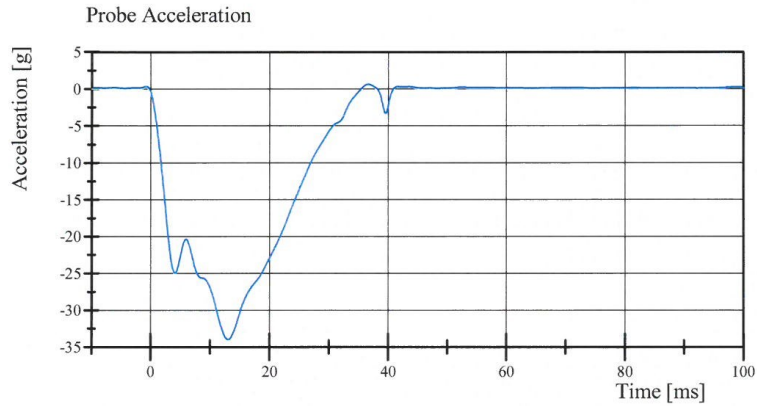
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 13:56:11 627

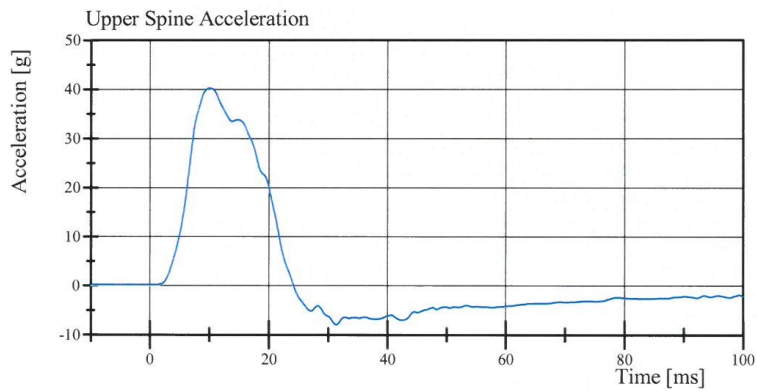


Transportation Research Center Inc.

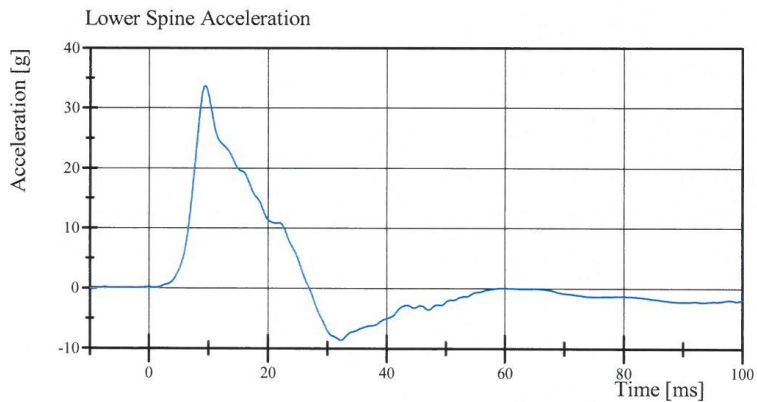
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 44-1
Test Date: 8/17/2016



Filter Class: CFC_180
Max: 0.5 g at 36.6 ms
Min: -34.1 g at 13.0 ms



Filter Class: CFC_180
Max: 40.1 g at 10.0 ms
Min: -8.1 g at 31.4 ms



Filter Class: CFC_180
Max: 33.6 g at 9.4 ms
Min: -8.7 g at 32.2 ms

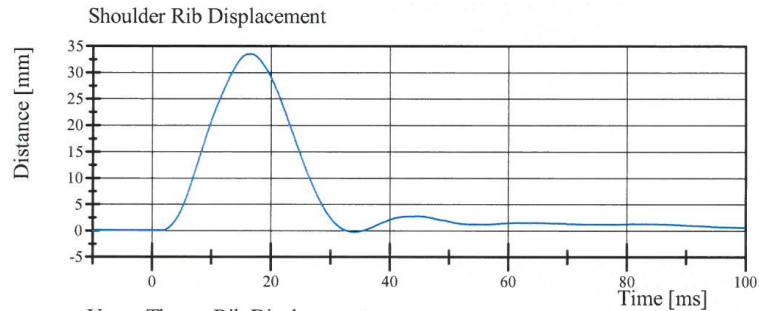
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 13:56:32 627

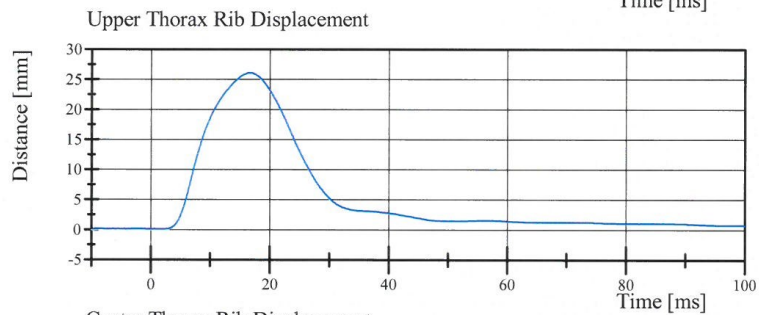


Transportation Research Center Inc.

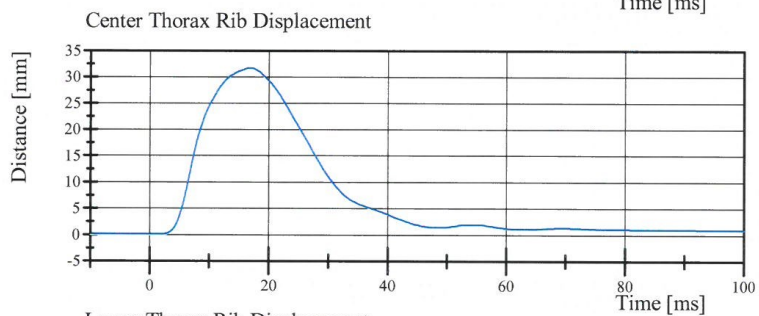
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 44-1
Test Date: 8/17/2016



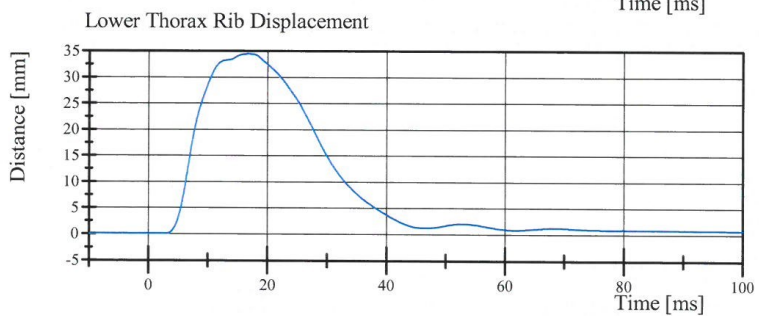
Filter Class: CFC_600
Max: 33.4 mm at 16.6 ms
Min: -0.3 mm at 33.9 ms



Filter Class: CFC_600
Max: 26.0 mm at 16.6 ms
Min: -0.0 mm at 2.2 ms



Filter Class: CFC_600
Max: 31.6 mm at 16.8 ms
Min: -0.0 mm at -8.8 ms



Filter Class: CFC_600
Max: 34.3 mm at 16.7 ms
Min: -0.0 mm at -8.6 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 13:56:33 627



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 44-1
Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.353 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.8 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.7 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.3 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.4 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.5 g	Yes

Test meets specifications.

Comments:

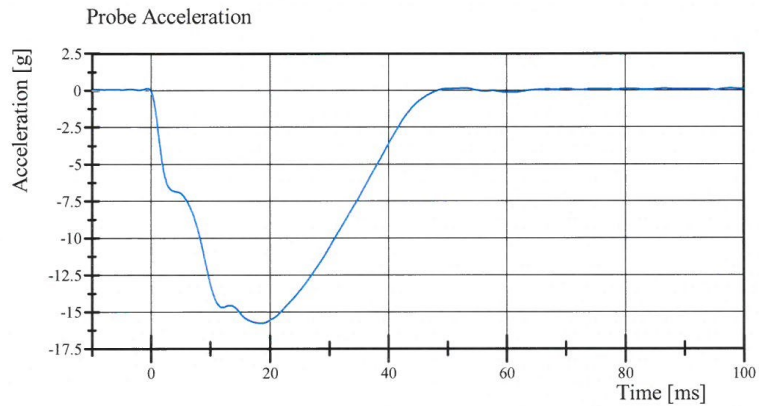
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:55:53 837

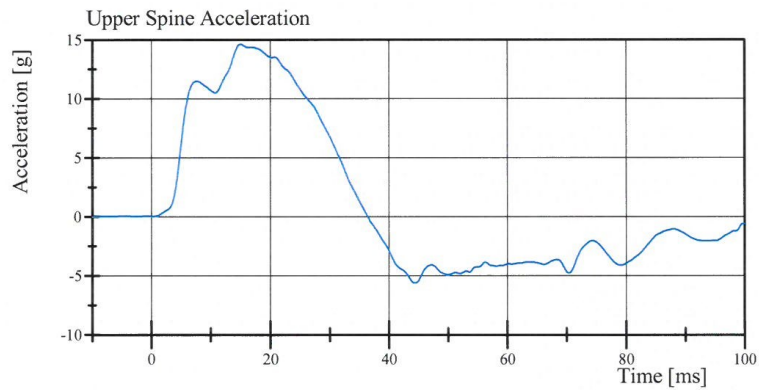


Transportation Research Center Inc.

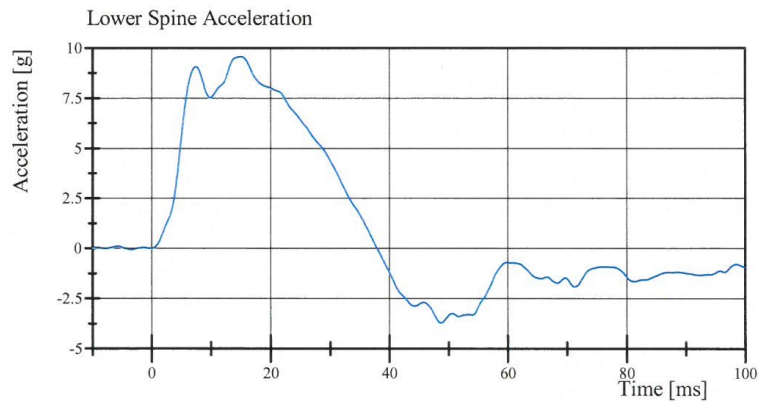
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 44-1
Test Date: 8/17/2016



Filter Class: CFC_180
Max: 0.1 g at 52.9 ms
Min: -15.8 g at 18.5 ms



Filter Class: CFC_180
Max: 14.6 g at 15.0 ms
Min: -5.6 g at 44.3 ms



Filter Class: CFC_180
Max: 9.5 g at 15.0 ms
Min: -3.7 g at 48.7 ms

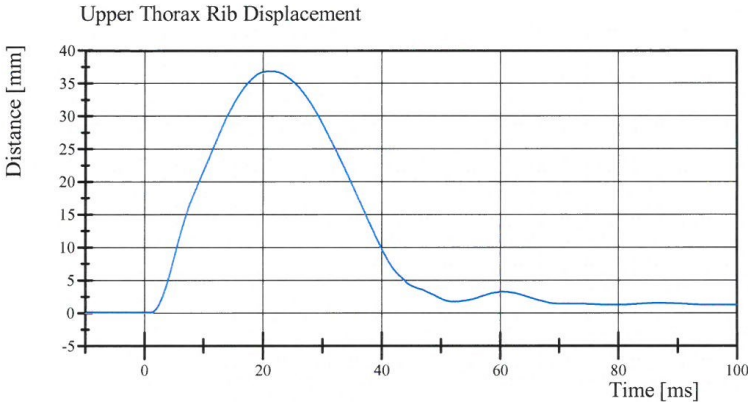
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:56:14 837

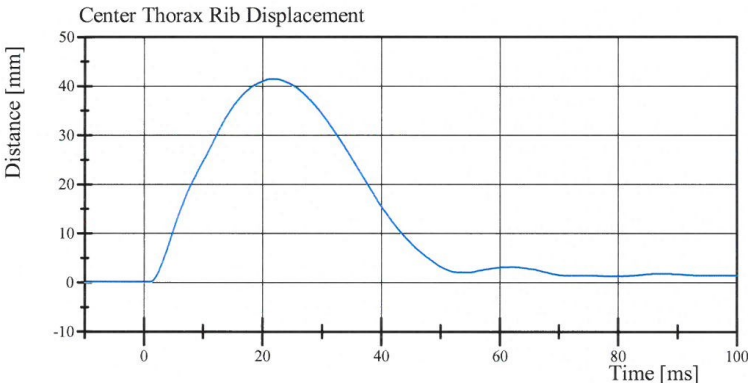


Transportation Research Center Inc.

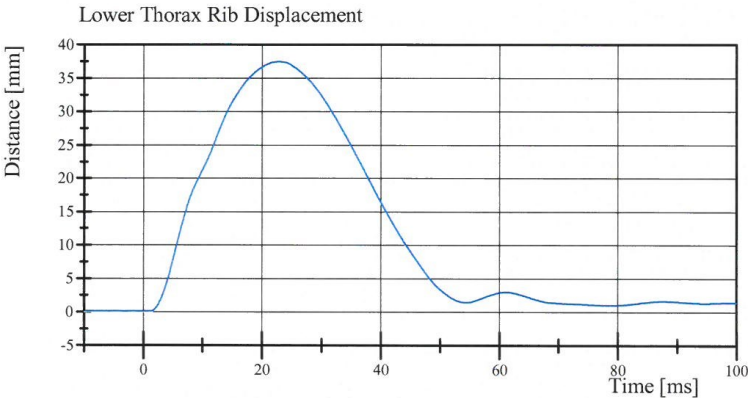
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 44-1
Test Date: 8/17/2016



Filter Class: CFC_600
Max: 36.7 mm at 21.1 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 41.3 mm at 21.8 ms
Min: -0.0 mm at 0.7 ms



Filter Class: CFC_600
Max: 37.4 mm at 22.8 ms
Min: -0.0 mm at -0.4 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:56:14 837



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 44-1

Test Date: 8/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.0 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	44.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.9 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.84 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:36:33 684

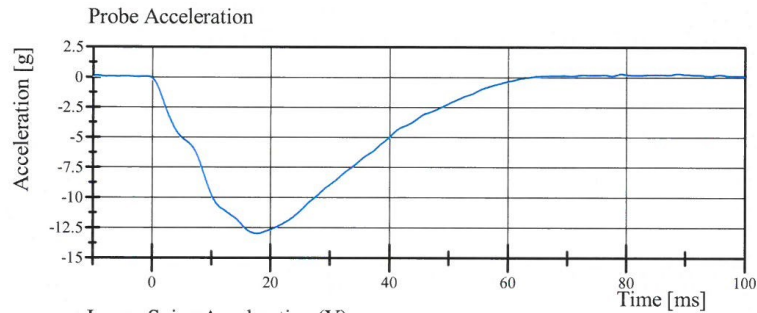


Transportation Research Center Inc.

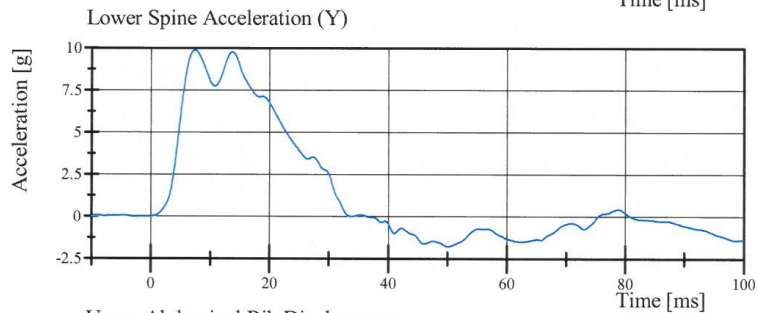
Left Lateral Abdomen

SID IIIs Serial No. 305 Certification No. 44-1

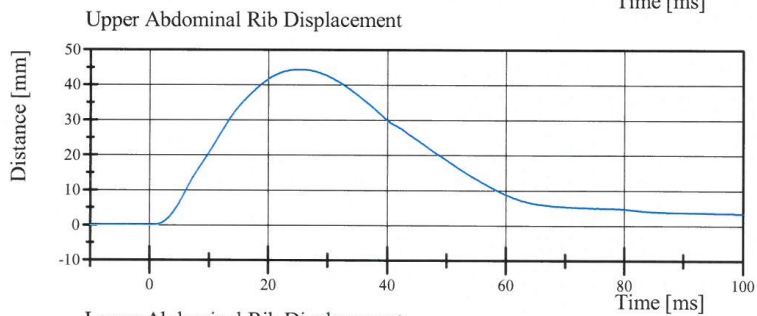
Test Date: 8/17/2016



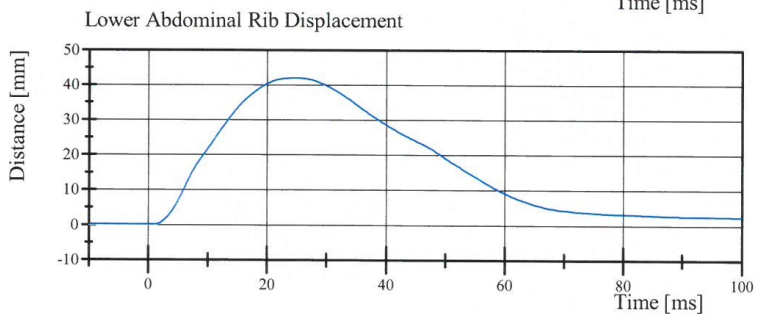
Filter Class: CFC_180
Max: 0.3 g at 88.6 ms
Min: -13.0 g at 17.7 ms



Filter Class: CFC_180
Max: 9.8 g at 7.4 ms
Min: -1.8 g at 50.1 ms



Filter Class: CFC_600
Max: 44.2 mm at 25.1 ms
Min: -0.0 mm at -0.6 ms



Filter Class: CFC_600
Max: 41.9 mm at 24.8 ms
Min: -0.0 mm at 1.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.17.2016 12:36:52 684



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 44-4

Test Date: 8/22/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.17 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,177.7 N	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.22.2016 08:48:55 459

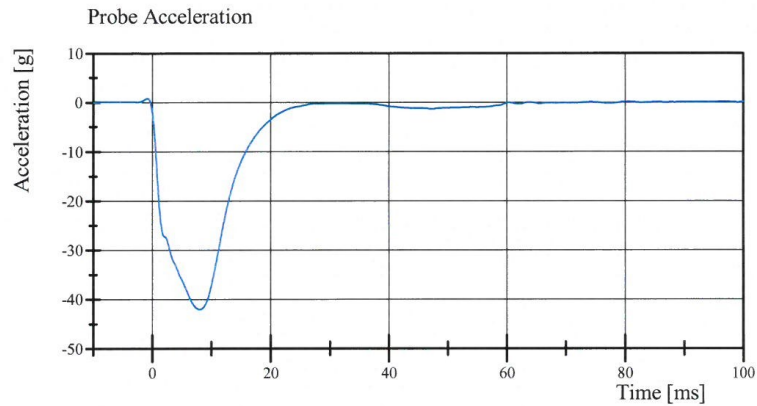


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 44-4

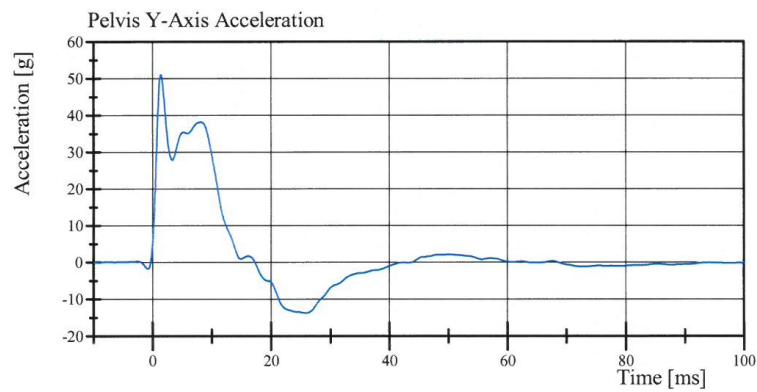
Test Date: 8/22/2016



Filter Class: CFC_180

Max: 0.7 g at -0.8 ms

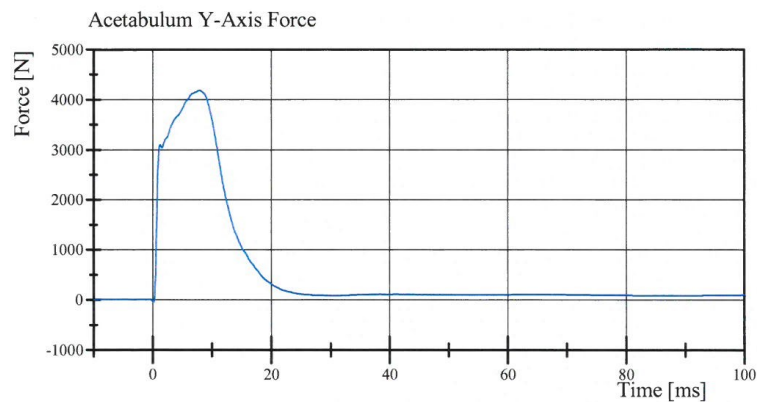
Min: -42.2 g at 8.1 ms



Filter Class: CFC_180

Max: 51.0 g at 1.4 ms

Min: -13.8 g at 25.8 ms



Filter Class: CFC_600

Max: 4,177.7 N at 7.9 ms

Min: -53.6 N at 0.2 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.22.2016 08:49:16 459



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 44-4

Test Date: 8/19/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.39 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.9 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.7 g	Yes
Iliac Force	4,100 - 5,100 N	4,866.0 N	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.19.2016 11:35:10 668

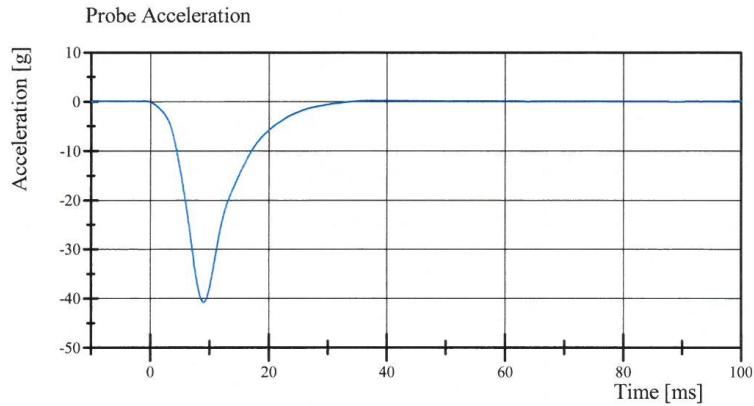


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 44-4

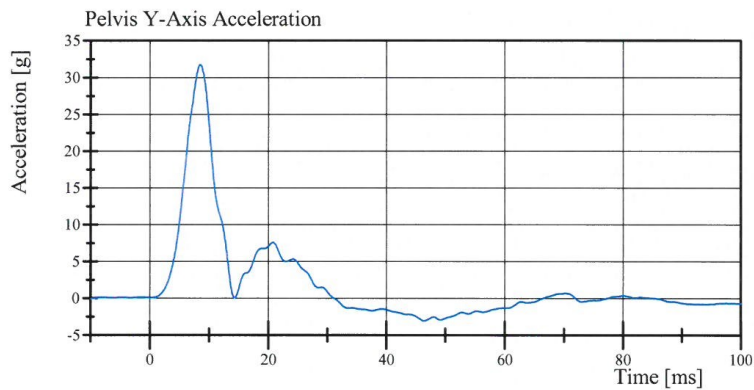
Test Date: 8/19/2016



Filter Class: CFC_180

Max: 0.2 g at 41.1 ms

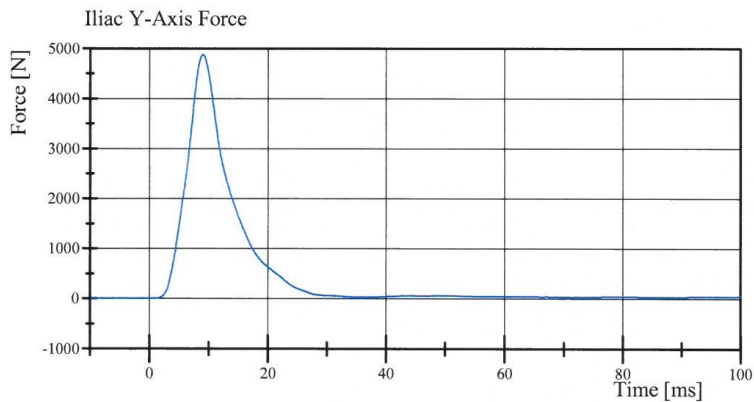
Min: -40.9 g at 9.0 ms



Filter Class: CFC_180

Max: 31.7 g at 8.5 ms

Min: -3.1 g at 46.4 ms



Filter Class: CFC_600

Max: 4,866.0 N at 9.0 ms

Min: -0.9 N at -9.3 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.19.2016 11:35:23 668



Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.45

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	777	Yes
B	Shoulder Pivot Height	437.0 - 453.0	447	Yes
C	H-Point Height	79.0 - 89.0	88	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	125	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	535	Yes
L	Popliteal Height	343.0 - 369.0	345	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	202	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	480	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	873	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.9 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 08:57:27 232

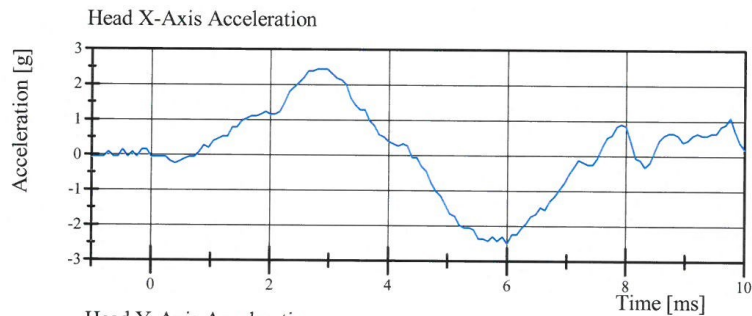


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 45-1

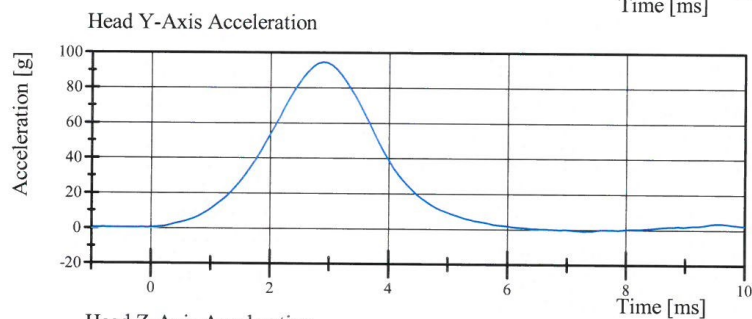
Test Date: 8/30/2016



Filter Class: CFC_1000

Max: 2.4 g at 2.8 ms

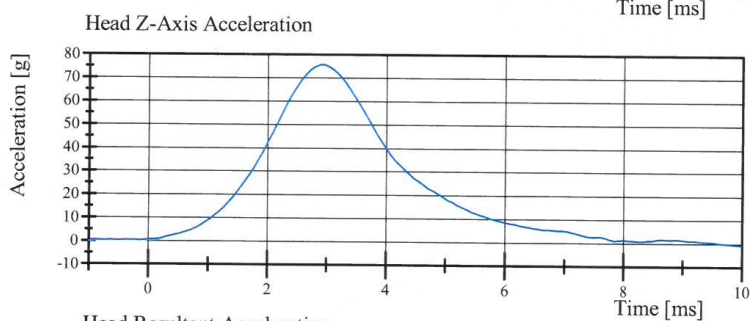
Min: -2.5 g at 6.0 ms



Filter Class: CFC_1000

Max: 94.4 g at 2.9 ms

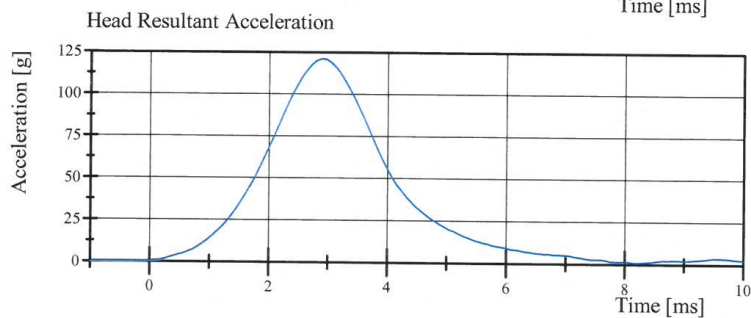
Min: -1.1 g at 7.3 ms



Filter Class: CFC_1000

Max: 75.4 g at 2.9 ms

Min: -0.7 g at 10.0 ms



Filter Class: CFC_1000

Max: 120.9 g at 2.9 ms

Min: 0.1 g at -0.6 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 08:57:41 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 45-1

Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.613 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.304 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.325 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.521 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.464 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.746 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.6 deg	Yes
Time of Peak	50 - 70 ms	60.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.0 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	112.7 ms	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 10:01:38 750

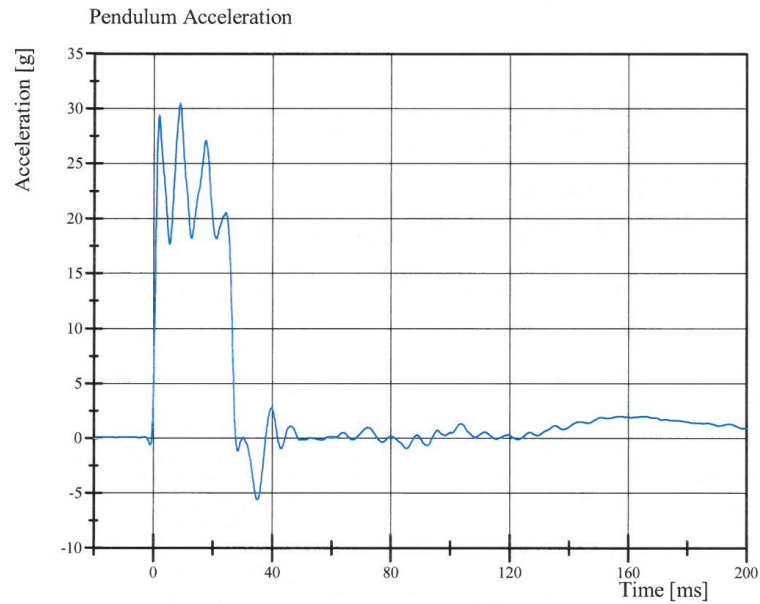


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 45-1

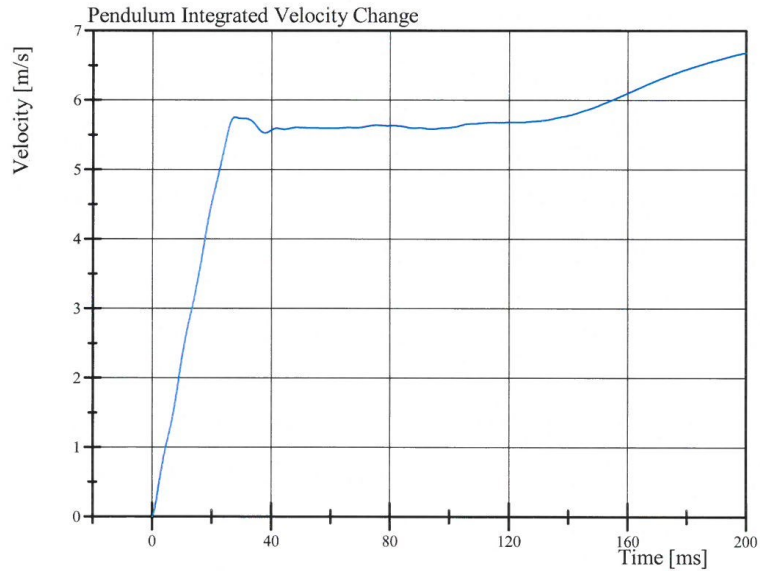
Test Date: 8/30/2016



Filter Class: CFC_180

Max: 30.5 g at 8.8 ms

Min: -5.7 g at 34.9 ms



Filter Class: CFC_180

Max: 6.7 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 10:01:54 750

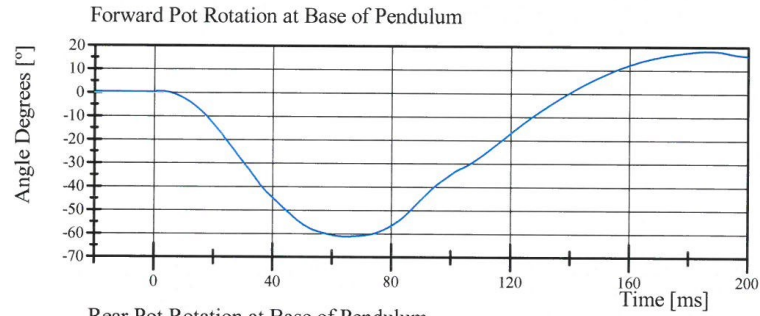


Transportation Research Center Inc.

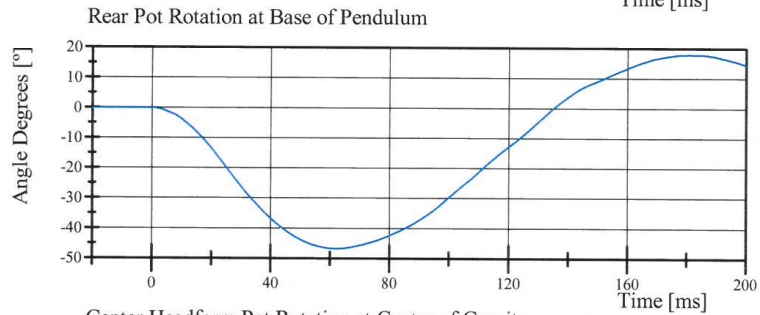
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 45-1

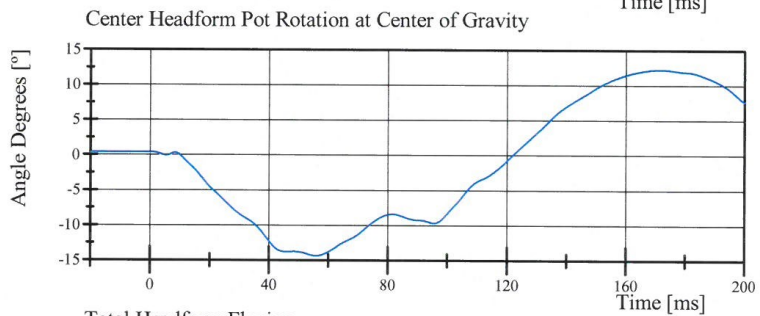
Test Date: 8/30/2016



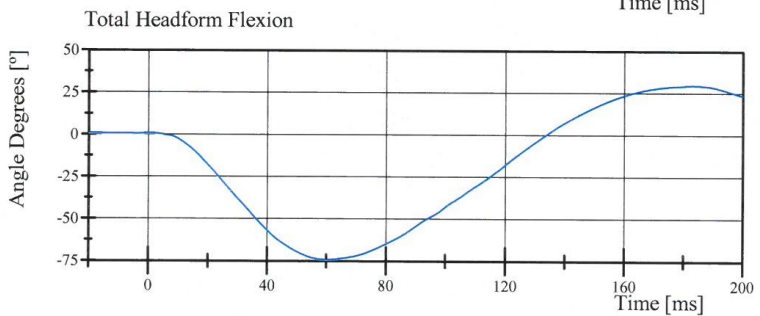
Filter Class: CFC_60
Max: 18.1 ° at 186.7 ms
Min: -61.3 ° at 64.7 ms



Filter Class: CFC_60
Max: 17.9 ° at 180.8 ms
Min: -46.9 ° at 62.2 ms



Filter Class: CFC_60
Max: 12.2 ° at 171.4 ms
Min: -14.4 ° at 56.0 ms



Filter Class: CFC_60
Max: 29.6 ° at 183.0 ms
Min: -74.6 ° at 60.4 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 10:01:54 750

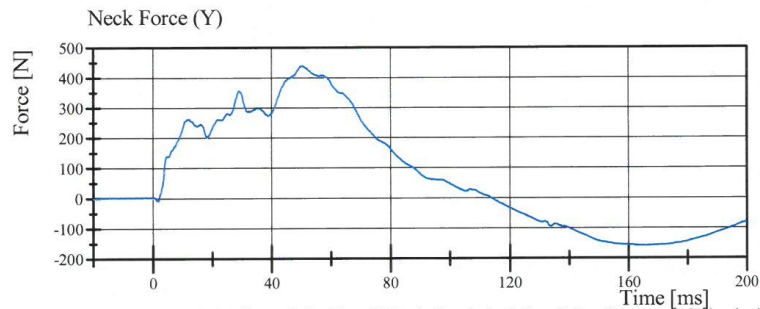


Transportation Research Center Inc.

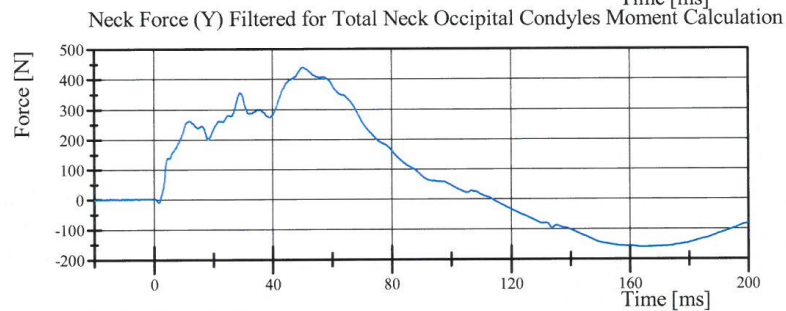
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 45-1

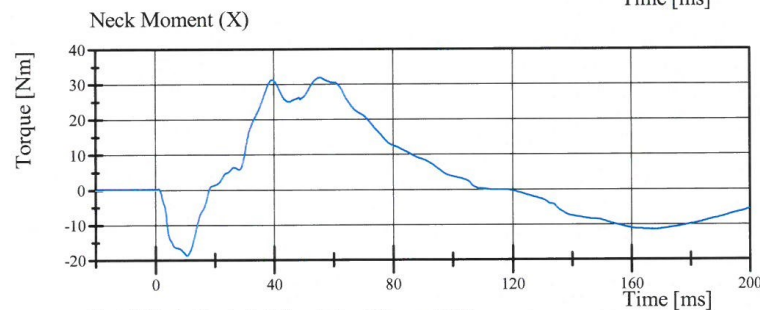
Test Date: 8/30/2016



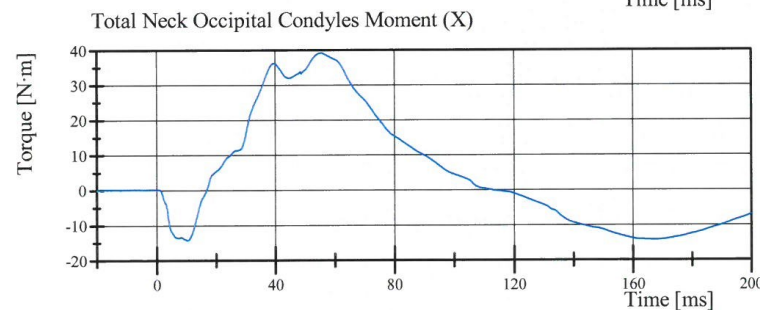
Filter Class: CFC_1000
Max: 438.6 N at 50.2 ms
Min: -160.1 N at 166.2 ms



Filter Class: CFC_600
Max: 437.5 N at 50.2 ms
Min: -159.6 N at 166.1 ms



Filter Class: CFC_600
Max: 31.8 Nm at 55.6 ms
Min: -18.9 Nm at 10.6 ms



Filter Class: Without_(Consta
Max: 39.0 N·m at 55.5 ms
Min: -14.5 N·m at 10.4 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 10:01:55 750



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 45-2

Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.7 g	Yes
Shoulder Displacement	28 - 37 mm	30.0 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.7 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 10:26:20 867

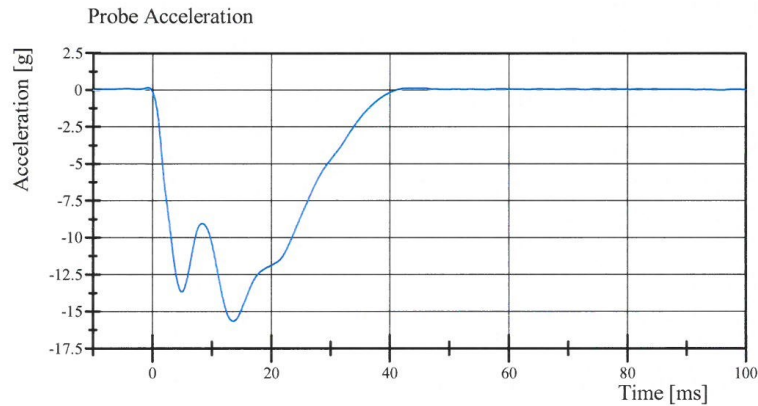


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 45-2

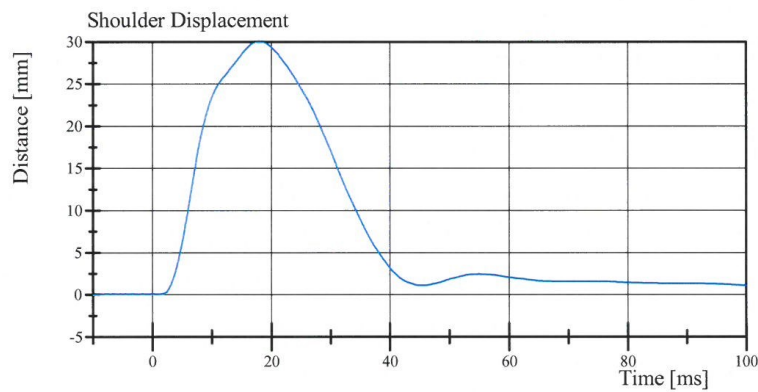
Test Date: 8/30/2016



Filter Class: CFC_180

Max: 0.1 g at -0.8 ms

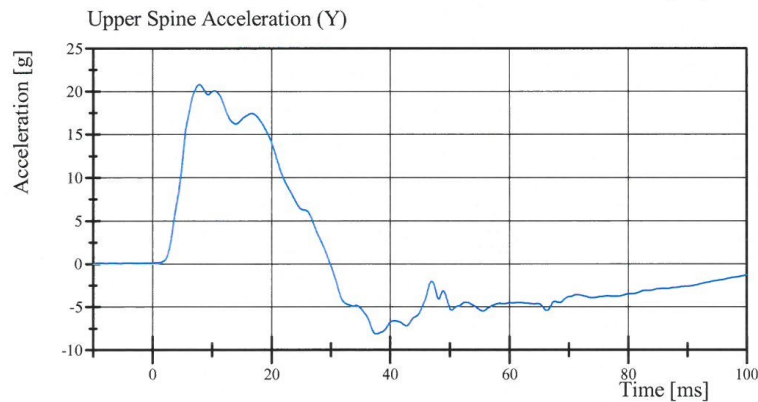
Min: -15.7 g at 13.6 ms



Filter Class: CFC_600

Max: 30.0 mm at 17.8 ms

Min: -0.0 mm at -2.6 ms



Filter Class: CFC_180

Max: 20.7 g at 7.8 ms

Min: -8.2 g at 37.6 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 10:26:31 867



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.786 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.3 g	Yes
Shoulder Displacement	31 - 40 mm	34.9 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.2 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.0 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	32.9 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.2 g	Yes

Test meets specifications.

Comments:

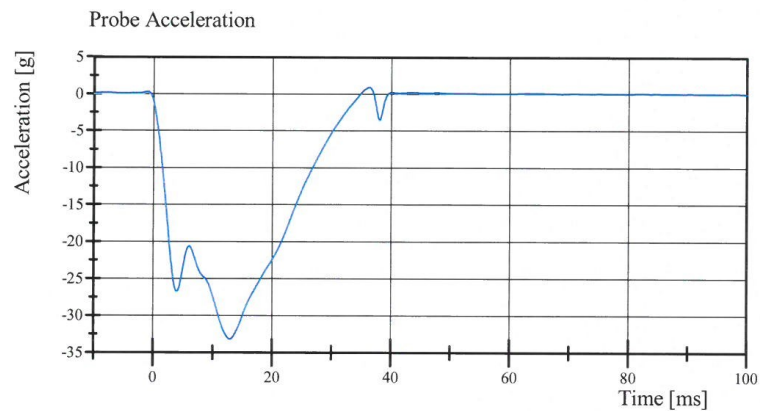
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 09:41:47 628

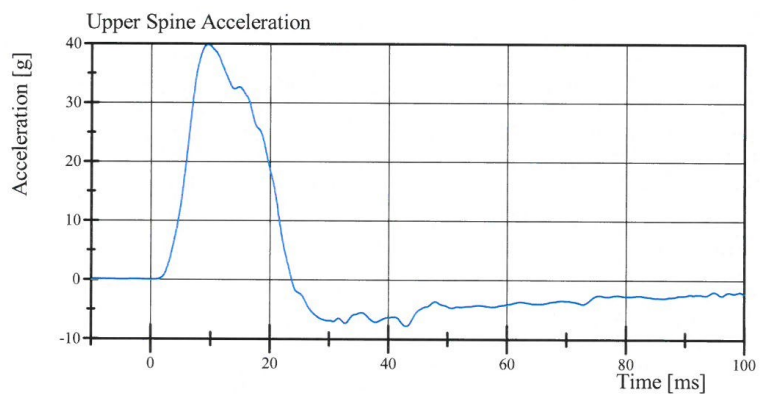


Transportation Research Center Inc.

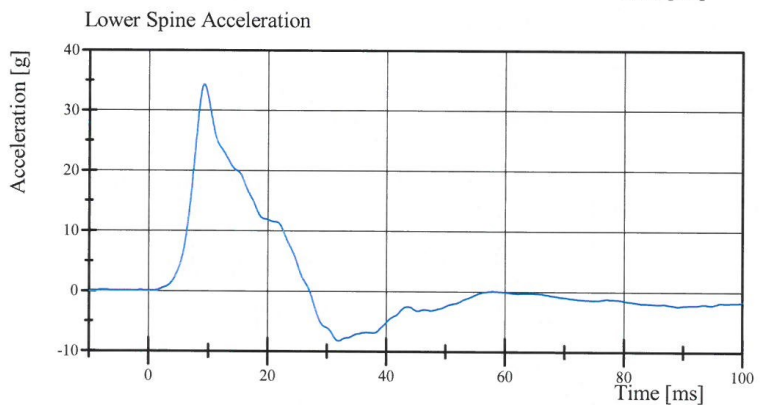
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016



Filter Class: CFC_180
Max: 0.8 g at 36.2 ms
Min: -33.3 g at 13.0 ms



Filter Class: CFC_180
Max: 39.8 g at 9.4 ms
Min: -7.9 g at 43.0 ms



Filter Class: CFC_180
Max: 34.2 g at 9.2 ms
Min: -8.3 g at 32.0 ms

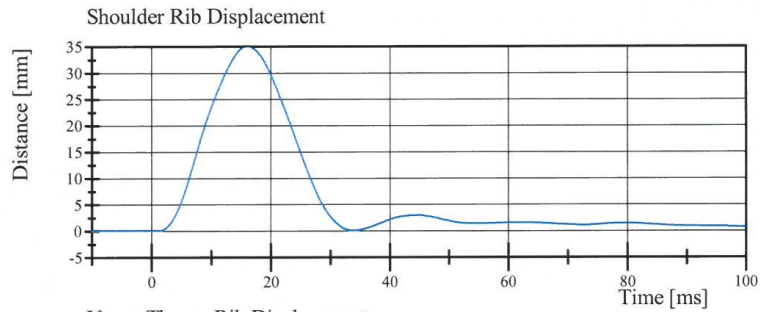
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 09:41:59 628

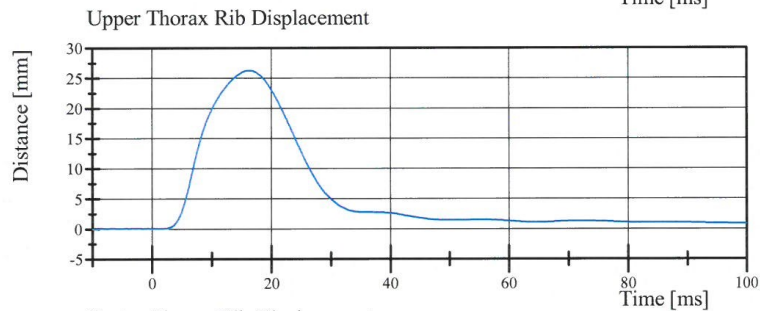


Transportation Research Center Inc.

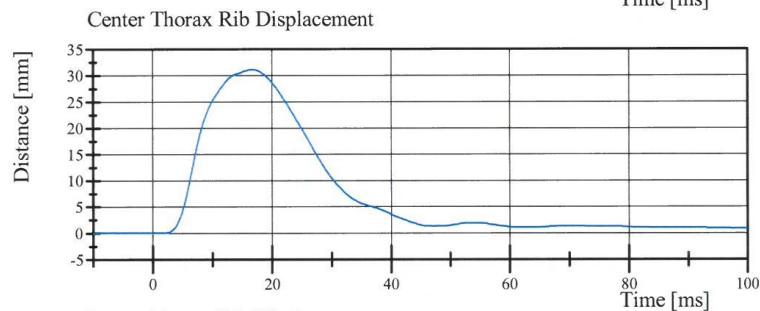
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016



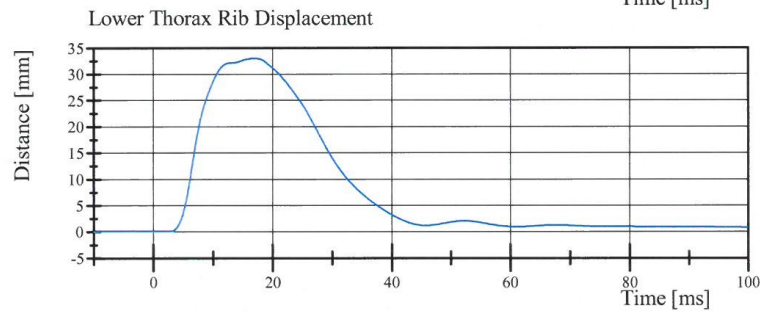
Filter Class: CFC_600
Max: 34.9 mm at 16.1 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_600
Max: 26.2 mm at 16.3 ms
Min: -0.0 mm at 1.9 ms



Filter Class: CFC_600
Max: 31.0 mm at 16.6 ms
Min: -0.0 mm at -5.1 ms



Filter Class: CFC_600
Max: 32.9 mm at 17.0 ms
Min: -0.0 mm at 1.3 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 09:42:00 628



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.352 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.1 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.2 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.6 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.2 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.0 g	Yes

Test meets specifications.

Comments:

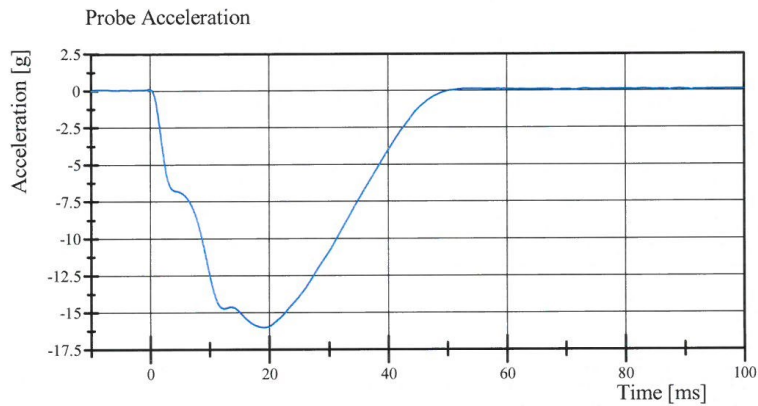
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 09:03:39 877

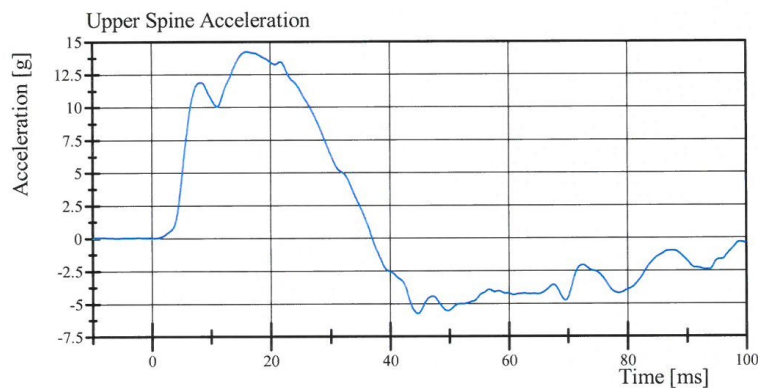


Transportation Research Center Inc.

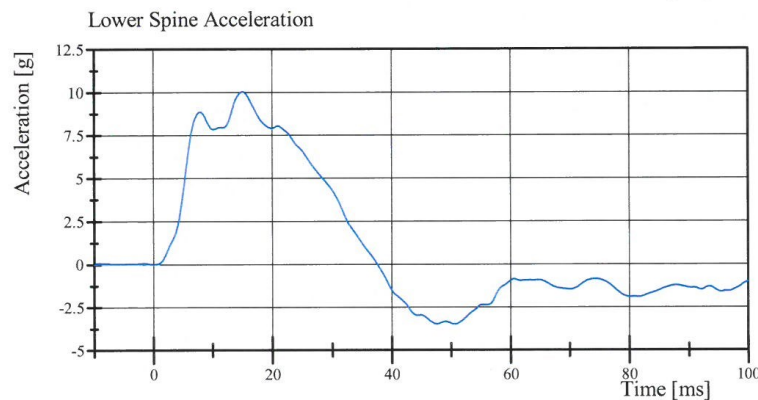
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016



Filter Class: CFC_180
Max: 0.1 g at 53.0 ms
Min: -16.1 g at 19.1 ms



Filter Class: CFC_180
Max: 14.2 g at 16.0 ms
Min: -5.8 g at 44.7 ms



Filter Class: CFC_180
Max: 10.0 g at 15.1 ms
Min: -3.5 g at 50.6 ms

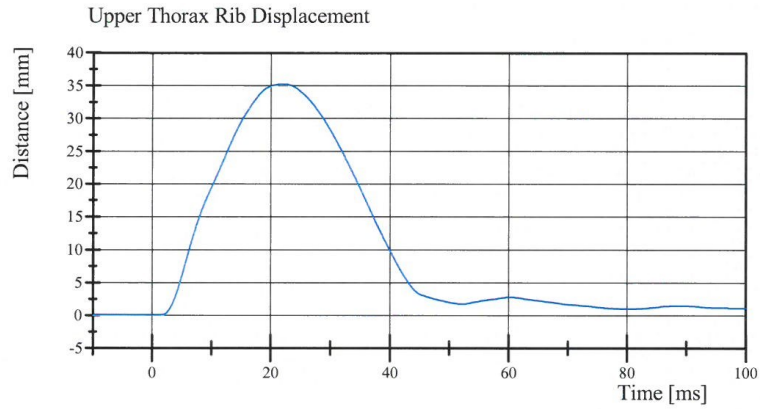
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 09:03:56 877

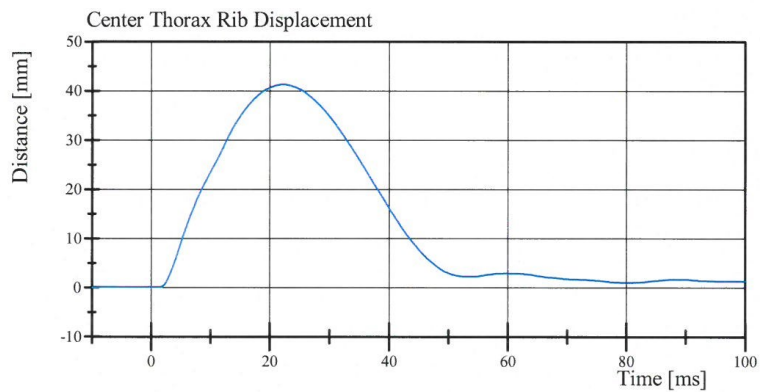


Transportation Research Center Inc.

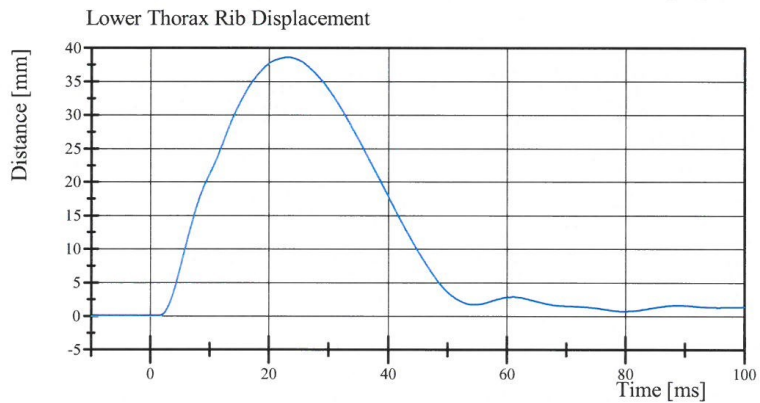
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 45-1
Test Date: 8/30/2016



Filter Class: CFC_600
Max: 35.1 mm at 22.4 ms
Min: -0.0 mm at -6.4 ms



Filter Class: CFC_600
Max: 41.2 mm at 22.2 ms
Min: -0.0 mm at 1.3 ms



Filter Class: CFC_600
Max: 38.6 mm at 23.2 ms
Min: -0.0 mm at 1.3 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 09:03:57 877



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 45-1

Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.1 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.6 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.0 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.82 g	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 08:08:34 701

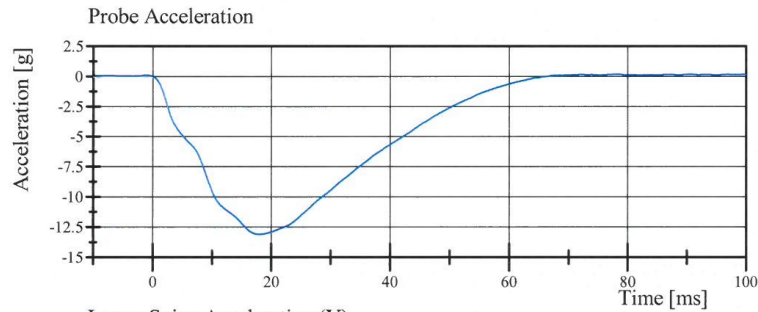


Transportation Research Center Inc.

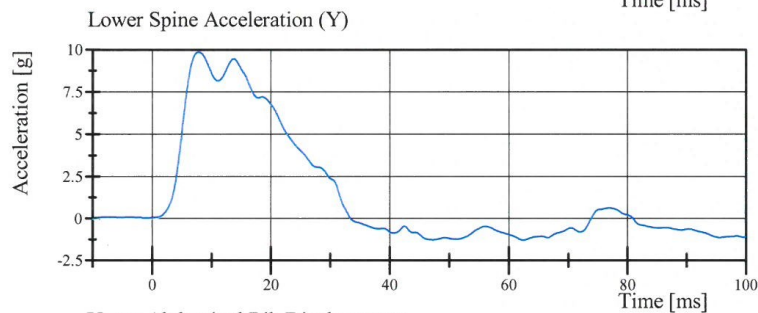
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 45-1

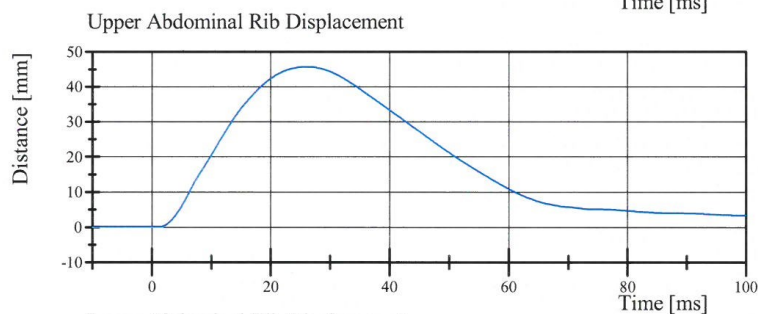
Test Date: 8/30/2016



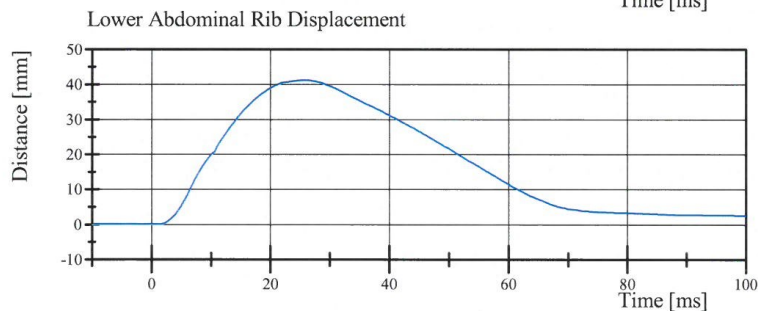
Filter Class: CFC_180
Max: 0.2 g at 78.2 ms
Min: -13.1 g at 17.9 ms



Filter Class: CFC_180
Max: 9.8 g at 7.8 ms
Min: -1.3 g at 62.4 ms



Filter Class: CFC_600
Max: 45.6 mm at 25.9 ms
Min: -0.0 mm at 1.3 ms



Filter Class: CFC_600
Max: 41.0 mm at 25.8 ms
Min: -0.0 mm at 1.3 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 08:08:44 701



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 45-1

Test Date: 8/30/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.75 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.8 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,187.2 N	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 07:37:42 471

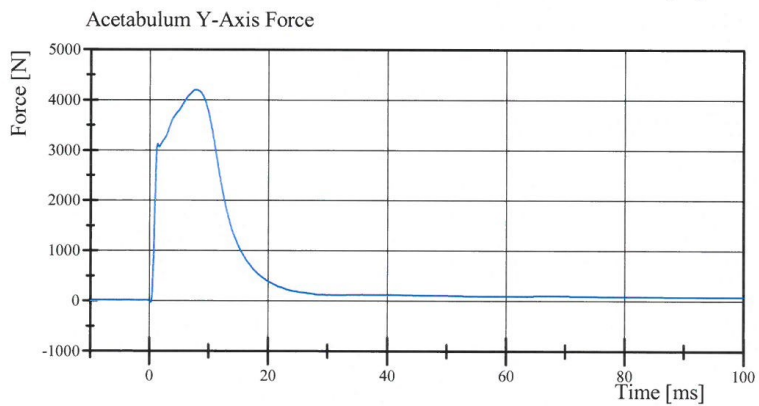
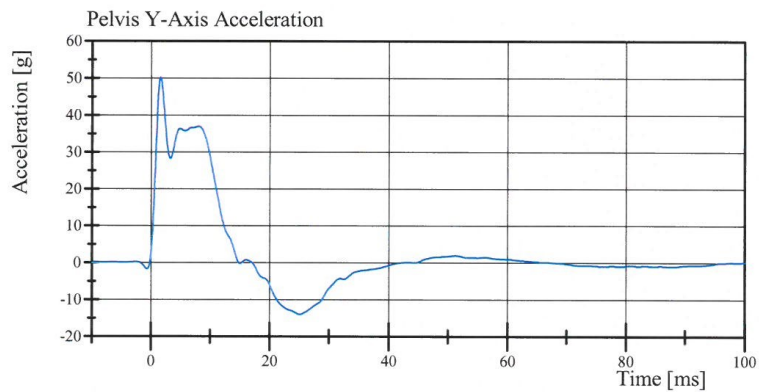
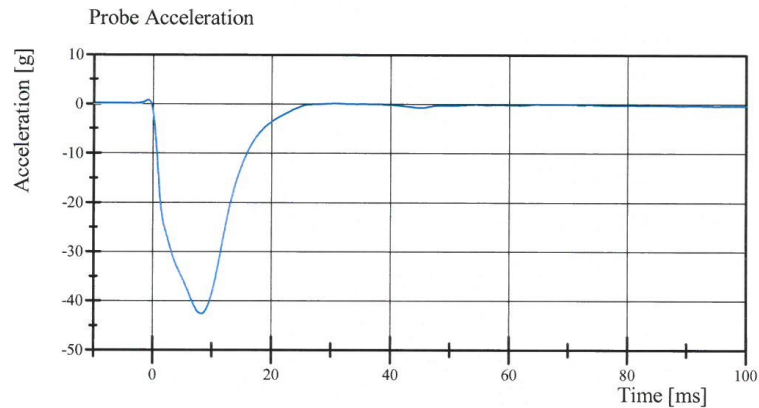


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 45-1

Test Date: 8/30/2016



Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.30.2016 07:37:54 471



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 45-1

Test Date: 8/29/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.39 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	34.0 g	Yes
Iliac Force	4,100 - 5,100 N	4,830.6 N	Yes

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.29.2016 17:23:58 681

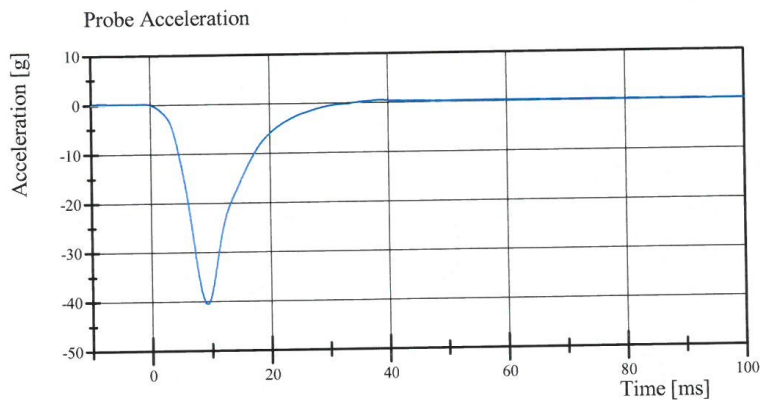


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 45-1

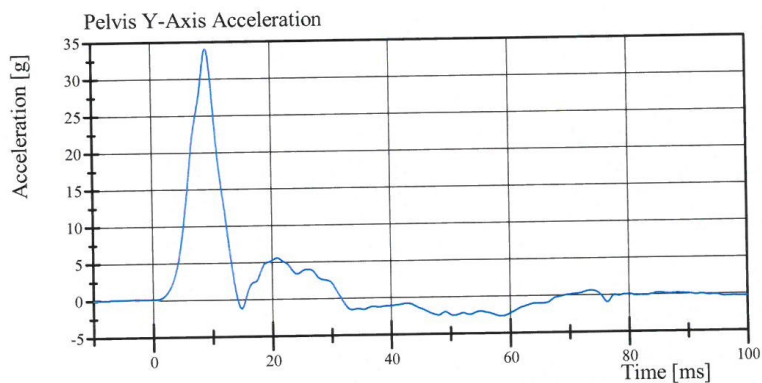
Test Date: 8/29/2016



Filter Class: CFC_180

Max: 0.4 g at 38.7 ms

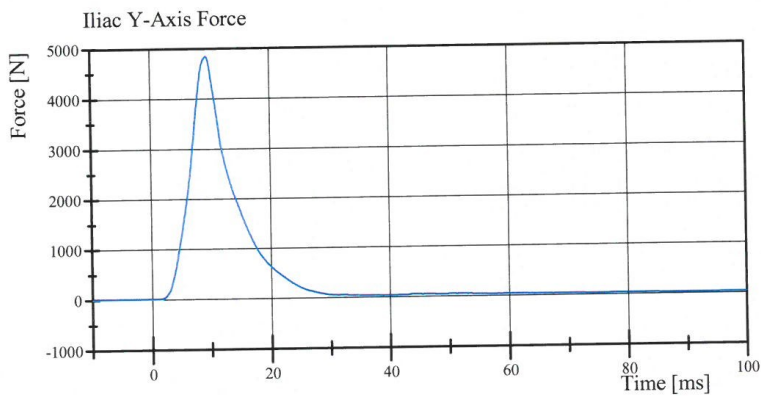
Min: -40.6 g at 9.3 ms



Filter Class: CFC_180

Max: 34.0 g at 9.2 ms

Min: -2.7 g at 58.6 ms



Filter Class: CFC_600

Max: 4,830.6 N at 9.4 ms

Min: -0.6 N at -2.2 ms

Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

08.29.2016 17:25:18 681



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F030		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	X		P58890	Endevco	18-Mar-16
	Y		P51702	Endevco	18-Mar-16
	Z		P52083	Endevco	18-Mar-16
Redundant Head Accelerometers	X		P49190	Endevco	18-Mar-16
	Y		P52044	Endevco	18-Mar-16
	Z		P90849	Endevco	01-Apr-16
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	18-Mar-16
	Middle	Y	174	FTSS	18-Mar-16
	Lower	Y	173	FTSS	18-Mar-16
Abdomen Load Cells	Front	Y	1441	Denton	18-Mar-16
	Middle	Y	1436	Denton	18-Mar-16
	Rear	Y	1437	Denton	18-Mar-16
Lower Spine Accelerometers (T12)	X		P90854	Endevco	18-Mar-16
	Y		P90267	Endevco	18-Mar-16
	Z		P88531	Endevco	18-Mar-16
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	18-Mar-16

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P51719	Endevco	22-Mar-16
			Y	P51272	Endevco	22-Mar-16
			Z	P58862	Endevco	22-Mar-16
Redundant Head Accelerometers			X	P80926	Endevco	22-Mar-16
			Y	P50073	Endevco	22-Mar-16
			Z	P52098	Endevco	22-Mar-16
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	22-Mar-16
		Middle	Y	1161	Servo	22-Mar-16
		Lower	Y	037	Servo	22-Mar-16
	Abdominal Rib	Upper	Y	1295	Servo	22-Mar-16
		Lower	Y	1136	Servo	22-Mar-16
Lower Spine Accelerometers (T12)			X	P50068	Endevco	22-Mar-16
			Y	P52051	Endevco	22-Mar-16
			Z	P51710	Endevco	22-Mar-16
Acetabulum Load Cell			Y	103-FY	FTSS	13-Jun-16
Iliac Wing Load Cell			Y	287-FY	Denton	1-Oct-15
Pelvis Plug (struck side)				88008	Humanetics	22-Jul-15
Pelvis Plug (non-struck side)				36473	FTSS	23-Sep-10

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P91876	Endevco	25-Jul-16
	Vehicle Center of Gravity	Y	P91185	Endevco	30-Mar-16
	Vehicle Center of Gravity	Z	P90843	Endevco	20-Jul-16
2	Right Sill at Front Seat	X	P91671	Endevco	13-Jun-16
	Right Sill at Front Seat	Y	P91631	Endevco	10-May-16
	Right Sill at Front Seat	Z	P93452	Endevco	13-Jun-16
3	Right Sill at Rear Seat	X	P93765	Endevco	27-Jul-16
	Right Sill at Rear Seat	Y	P91474	Endevco	3-May-16
	Right Sill at Rear Seat	Z	P94540	Endevco	27-Jul-16
4	Left Sill at Front Door	Y	P91177	Endevco	15-Aug-16
5	Left Sill at Rear Door	Y	P91186	Endevco	20-Jul-16
6	Left A-Post Lower	Y	P91537	Endevco	20-Jul-16
7	Left A-Post Middle	Y	P91200	Endevco	11-Apr-16
8	Left B-Post Lower	Y	P91608	Endevco	3-May-16
9	B-Post Middle	Y	P91966	Endevco	30-Mar-16
10	Front Seat Track	Y	P58759	Endevco	20-Jul-16
11	Rear Seat Track or Structure	Y	P88548	Endevco	16-May-16
12	Right Rear Occupant Compartment	Y	P25061	Endevco	20-Jul-16
13	Engine Block	X	P33817	Endevco	15-Aug-16
	Engine Block	Y	P29093	Endevco	24-May-16
14	Rear Floorpan Above Axle	X	P91991	Endevco	15-Aug-16
	Rear Floorpan Above Axle	Y	P93538	Endevco	25-Jul-16
	Rear Floorpan Above Axle	Z	P94544	Endevco	26-Jul-16

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P94552	Endevco	26-Jul-16
MDB Center of Gravity	Y	P94553	Endevco	26-Jul-16
MDB Center of Gravity	Z	P94546	Endevco	26-Jul-16
Left Frame Rail at Rear Axle Centerline	X	P93518	Endevco	25-Jul-16
Left Frame Rail at Rear Axle Centerline	Y	P93537	Endevco	25-Jul-16