

FINAL REPORT NUMBER: SINCAP-TRC-17-004

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

**Toyota Motor Manufacturing Canada, Inc.
2017 Toyota Corolla 4DR Sedan
NHTSA NUMBER: M20175106**

**PREPARED BY:
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Report Date: December 20, 2016

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 Prepared By: ILO Project Operations Group

Report Approved By: 

John Shultz

Approval Date: December 20, 2016

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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16. Abstract This 55 / 28 km/h 90° Moving Deformable Barrier SINCAP Side Impact Test was conducted on the subject 2017 Toyota Corolla 4DR Sedan, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on November 16, 2016. The impact velocity of the Moving Deformable Barrier (MDB) was 62.55 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.4° C. The target vehicle post-test maximum crush was 205 mm at Level 2. 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>130</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>18.9</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>577.1</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-1,571.1</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>29.6</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>392</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>73.9</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>3,477.0</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>39.2</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>27.1</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	130	Maximum Thoracic Rib Deflection	mm	44	18.9	Total Abdominal Force	N	2500	577.1	Pubic Symphysis Force	N	6000	-1,571.1	Lower Spine Acceleration	G	82*	29.6	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	392	Lower Spine Resultant Acceleration	g's	82	73.9	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3,477.0	Maximum Thoracic Rib Deflection	mm	38*	39.2	Maximum Abdominal Rib Deflection	mm	45*	27.1
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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 2017 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 2017 Toyota Corolla 4DR Sedan. 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 2017 Toyota Corolla 4DR Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.55 km/h (38.87 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 November 16, 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	130
Maximum Thoracic Rib Deflection	mm	44	18.9
Combined Abdominal Force	N	2500	577.1
Pubic Symphysis Force	N	6000	-1,571.1
Lower Spine (T12) Resultant Acceleration	G	82*	29.6

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	392
Lower Spine (T12) Resultant Acceleration	G	82	73.9
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3,477.0
Maximum Thoracic Rib Deflection	mm	38*	39.2
Maximum Abdominal Rib Deflection	mm	45*	27.1

* 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	No	N/A
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	Unknown	No	N/A
Other	No	N/A	No	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 the Driver ATD (ES-2-re) were within the established performance thresholds. The Passenger ATD (SID-IIs) Upper Thorax Rib Deflection exceeded the threshold value.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20175106
Model Year	2017
Make	Toyota
Model	Corolla LE
Body Style	4 Door
VIN	2T1BURHEXHC750301
Body Color	Slate Metallic
Odometer Reading (km/mi)	9
Engine Displacement (L)	1.8
Type/No. Cylinders	Inline/4
Engine Placement	FRT/ Transverse
Transmission Type	Automatic CVT
Transmission Speeds	N/A
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	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear 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	Yes

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Manufacturing Canada, Inc.
Date of Manufacture	09/16
Vehicle Type	Passenger Car

GVWR (lb)	3820
GAWR Front (lb)	2070
GAWR Rear (lb)	1850

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)				381
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				40.8

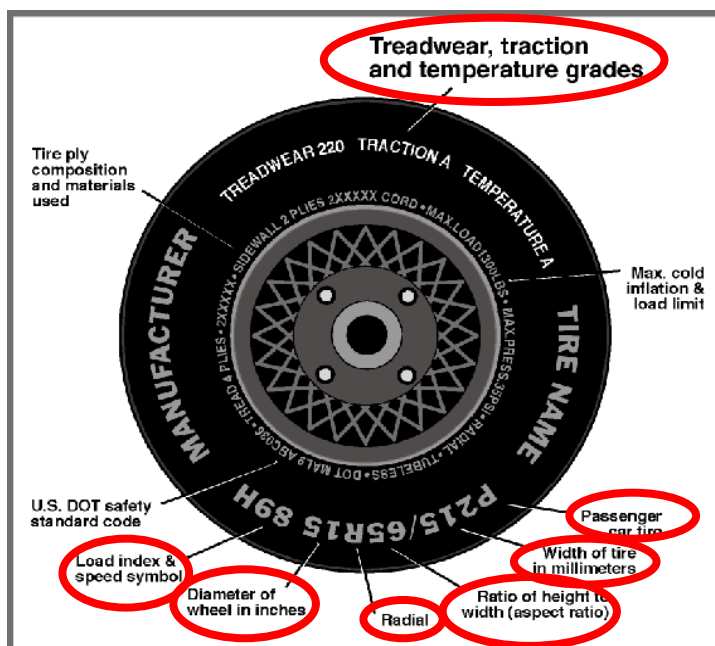
VEHICLE SEAT TYPE

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: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Michelin	Michelin
Tire Model	Primacy MXV4	Primacy MXV4
Treadwear	620	620
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	89H	89HM
Tire Material	Polyester/Polyamide/Steel	Polyester/Polyamide/Steel
DOT Safety Code Left	B3WC 02NX 3216	B3WC 02NX 3216
DOT Safety Code Right	B3WC 02NX 3216	B3WC 02NX 3216

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

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	234	241	262	255
Tire Placard	kPa	220	220	220	220
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	220	220	220	220

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	404.6	267.8		460.0	321.8		451.8	335.4	
Right	kg	395.2	247.0		403.0	289.6		400.8	292.4	
Ratio	%	60.8	39.2		58.5	41.5		57.6	42.4	
Totals	kg	799.8	514.8	1314.6	863.0	611.4	1474.4	852.6	627.6	1480.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1314.6	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	40.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1480.4	(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	700	699	Yes
RF	mm	710	708	Yes
RR	mm	717	718	Yes
LR	mm	703	705	Yes
Vehicle CG (Aft of Front Axle)	mm	1146	1120	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	+49	+46	

***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: Right tail light, rear bumper fascia and trunk liner	5.2

¹ Rated cargo and luggage weight limited to 41 kg or 90 lbs.

DATA SHEET NO. 2

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

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

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	16.0	19.4	17.7
Front Passenger Seat	N/A	N/A	15.7
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	Fixed	17.9
Non-Struck Side Rear Seat	N/A	Fixed	17.1
Rear Center Seat*	N/A	Fixed	15.9

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	17.7	156	Max	N/A	N/A	N/A
			Mid	146	156	165
			Min	N/A	N/A	N/A
Front Passenger Seat	15.7	140	Max	N/A	N/A	N/A
			Mid	130	140	150
			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	17.9	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	17.1	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*	15.9	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: 2017 Toyota Corolla 4DR Sedan

NHTSA No.: M20175106

Test Program: SINCAP Side Impact

Test Date: 11/16/16

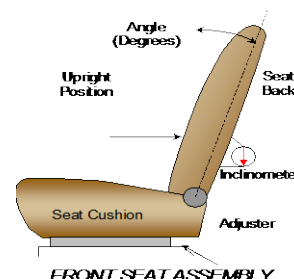
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	240	25	120	12
Front Passenger Seat	240	25	120	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	55.7	29	2.4	3
Front Passenger Seat	55.4	29	2.6	3
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	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 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	4, Numbered from 0 to 3	3, Uppermost
Rear Seat	1, Fixed	1, Fixed

HEAD RESTRAINT ADJUSTMENT

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

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

DATA SHEET NO. 2 (CONTINUED)

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

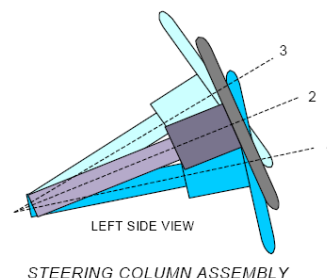
Test Vehicle: 2017 Toyota Corolla 4DR Sedan
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STEERING COLUMN ADJUSTMENT

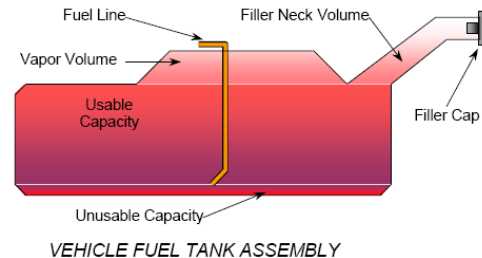
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	20.8	
Geometric Center, Position No. 2	22.5	
Uppermost, Position No. 3	24.2	
Telescoping Steering Wheel Travel		34
Test Position	22.5	17



FUEL PUMP

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



FUEL TANK CAPACITY

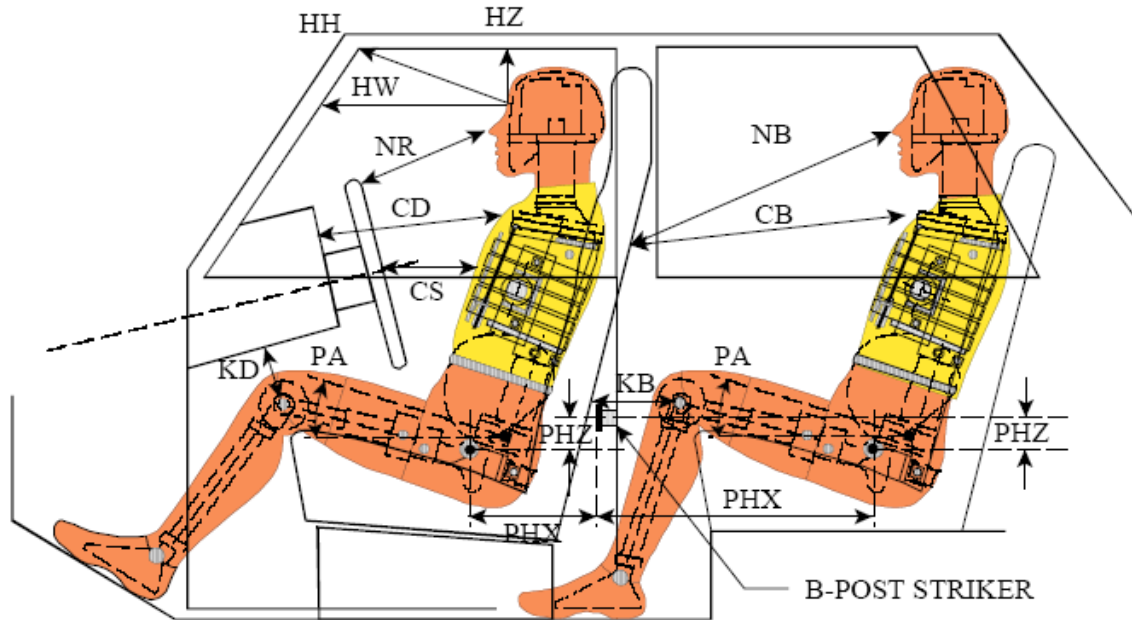
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	48.8
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	50.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	45.4
Actual Amount of Solvent Used in Test	45.4
1/3 of Usable Capacity	16.3

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: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16



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

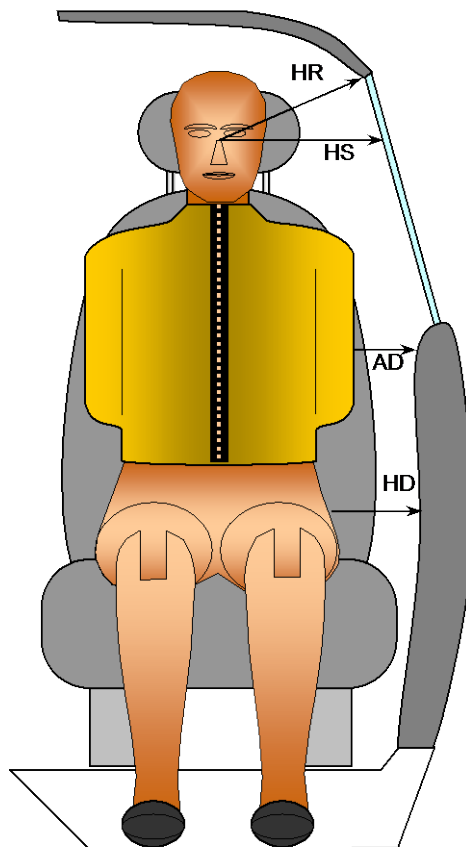
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	344			
HW		Header to Windshield	602			
HZ	HZ	Head to Roof Liner	153		237	
NR	NB	Nose to Rim/Seat Back	415		673	
CD	CB	Chest to Dash/Seat Back	518		626	
CS		Chest to Steering Wheel	292			
KD(L)/KDA(L) ^o	KB(L)/KBA(L) ^o	Left Knee to Dash/Seat Back	120	23.7	335	0.0
KD(R)/KDA(R) ^o	KB(R)/KBA(R) ^o	Right Knee to Dash/Seat Back	117	25.0	337	0.0
PAX ^o	PAX ^o	Pelvic Tilt Angle X		0.1		0.0
	PAY ^o	Pelvic Tilt Angle Y				21.7
PHX	PHX	Hip Point to Striker (X-Axis)	219		333	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	203		342	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16



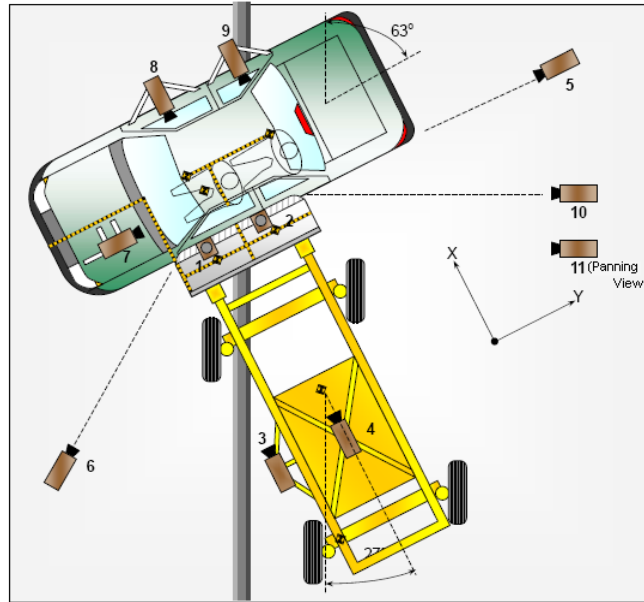
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	117	231
HS	Head to Side Window	mm	200	349
AD	Arm to Door	mm	80	152
HD	H-Point to Door	mm	164	167

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-160	1150	5692	8.5	1000
2	Overhead Close-up	0	770	5692	16	1000
3	Left Impact Point (MDB)	1811	890	860	25	1000
4	Side Overall (MDB)	2625	0	1500	12.5	1000
5	Rear	0	5646	1080	20	1000
6	Left Front	2438	4339	1070	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	30
11	Real-time Inrun				Zoom	30

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

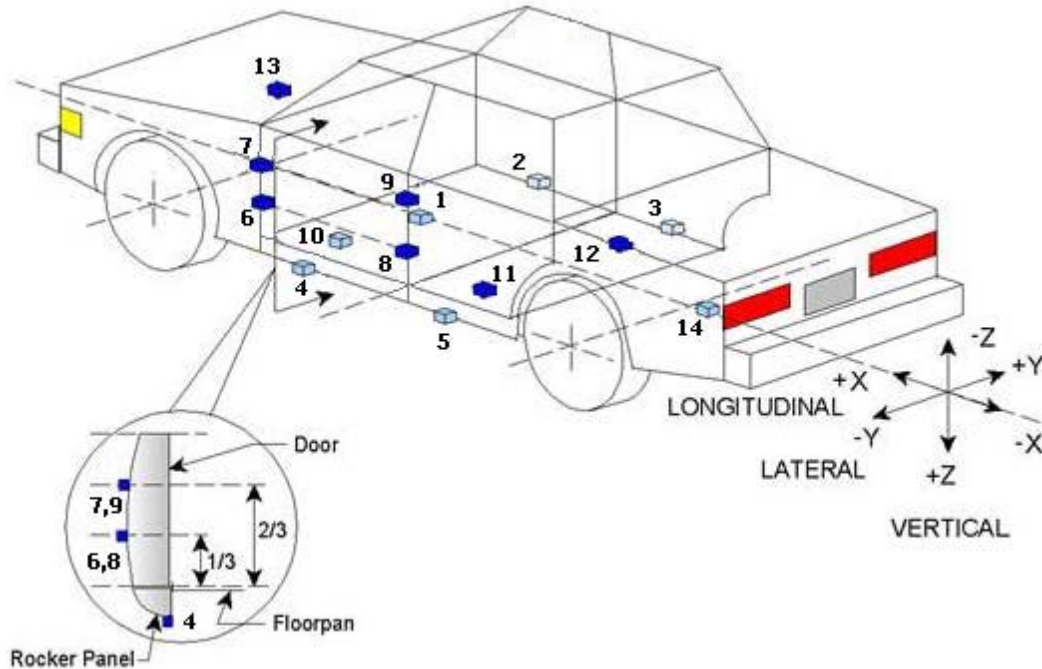
INSTRUMENTATION

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: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16



TEST VEHICLE ACCELEROMETER LOCATIONS

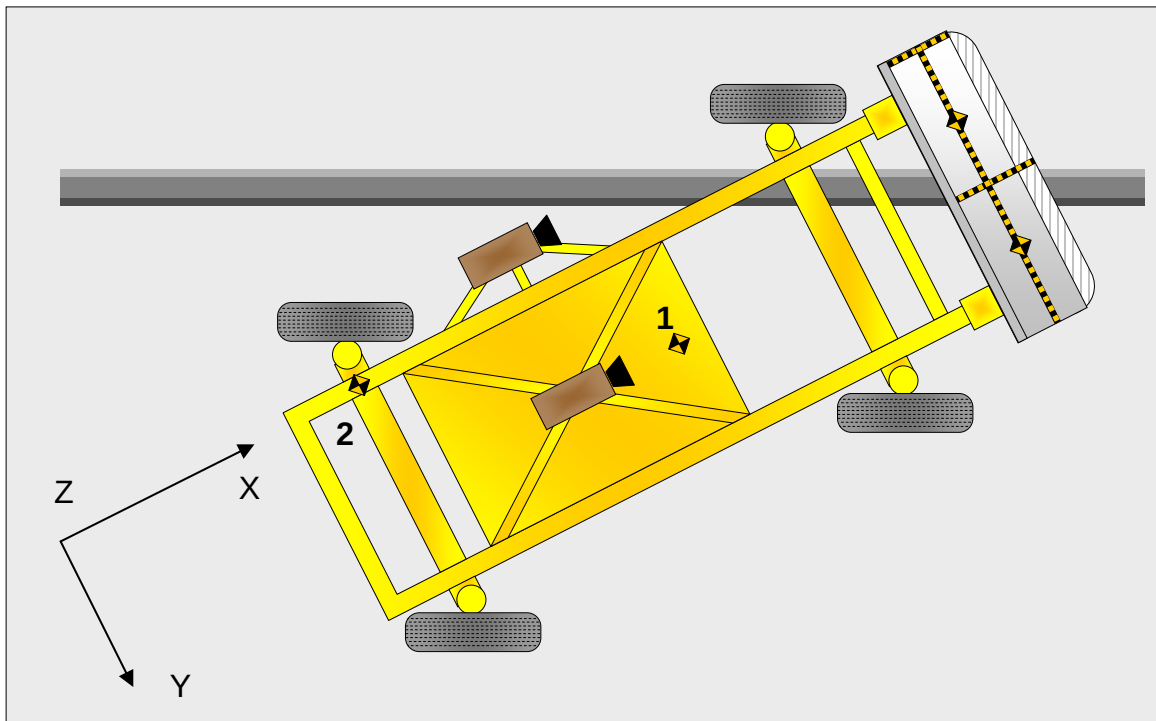
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2842	11	-812
2	Right Sill at Front Seat	2820	705	-306
3	Right Sill at Rear Seat	1955	705	-312
4	Left Sill at Front Door	2758	-700	-305
5	Left Sill at Rear Door	1935	-705	-320
6	A-Post Lower	3220	-815	-485
7	A-Post Middle	3245	-815	-802
8	B-Post Lower	2142	-805	-520
9	B-Post Middle	2105	-795	-880
10	Front Seat Track	2390	-540	-310
11	Rear Seat Structure	1498	-595	-350
12	Right Rear Occ. Compartment	1700	710	-316
13	Engine Block	3880	25	-297
14	Rear Above Axle	1080	0	-482

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: 2017 Toyota Corolla 4DR Sedan
Test Program: SINCAP Side Impact

NHTSA No.: M20175106
Test Date: 11/16/16



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: 2017 Toyota Corolla 4DR Sedan
Test Program: SINCAP Side Impact

NHTSA No.: M20175106
Test Date: 11/16/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	SCAB	SCAB
Top of Head	Assist handle, Head liner	SCAB, Head liner
Left Side of Head	SCAB	SCAB
Back of Head	None	SCAB
Left Shoulder	SCAB, SAB, Door panel	SCAB
Upper Torso	Seat back bolster, SAB	None
Lower Torso	Seat back bolster	Door panel
Left Hip	Seat cushion bolster, Door panel	Seat cushion bolster, 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	N/A	No	N/A
Seat Disengagement from Floor pan	No	N/A	No	N/A
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	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	Driver and passenger window shattered
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

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	No	N/A
Side Pelvis Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Unknown	No	N/A
Other	No	N/A	No	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2703
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		412
Actual Impact Point (Aft of Front Axle)	mm		418
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-6
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-5

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
Test Program: SINCAP Side Impact

NHTSA No.: M20175106
Test Date: 11/16/16

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	1109

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	420.0	256.4	676.4
Right	kg	359.6	327.0	686.6
Ratio	%	57.2	42.8	100.0
Totals	kg	779.6	583.4	1363.0

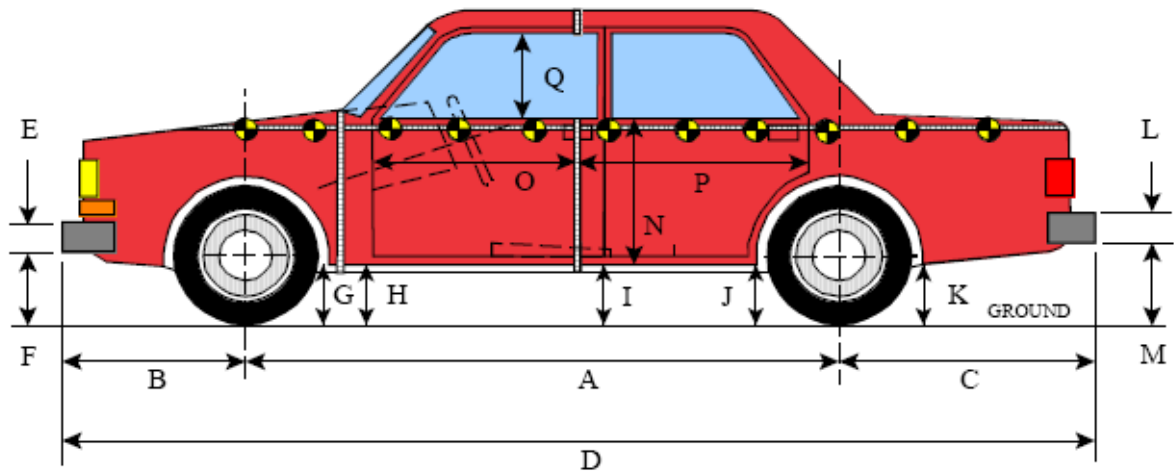
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.55
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.56
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: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

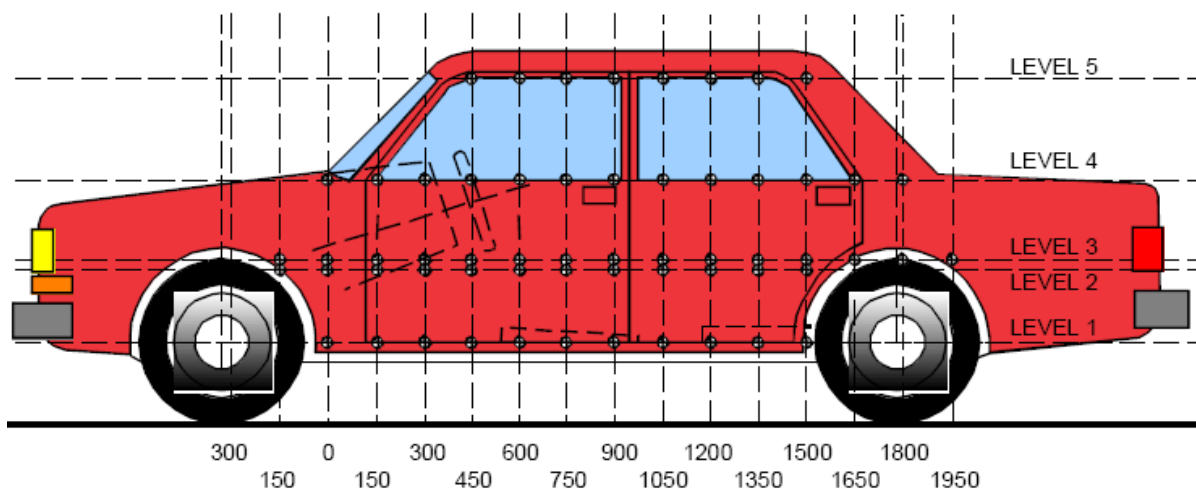


LEFT SIDE VIEW

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	2703	2703	0
B	Front Axle to Front Surface of Vehicle	980	950	30
C	Rear Axle to Rear Surface of Vehicle	970	1002	-32
D	Total Length at Centerline	4650	4655	-5
E	Front Bumper Thickness	102	102	0
F	Front Bumper Bottom to Ground	418	408	10
G	Sill Height at Front Wheel Well	203	240	-37
H	Sill Height at Front Door Leading Edge	201	240	-39
I	Sill Height at B-Pillar	238	240	-2
J1	Sill Height at Rear Wheel Well	218	246	-28
J2	Pinch Weld Height at Rear Wheel Well	156	189	-33
K	Sill Height Aft of Rear Wheel Well	260	310	-50
L	Rear Bumper Thickness	165	165	0
M	Rear Bumper Bottom to Ground	423	472	-49
N	Sill Height to Window Bottom Sill	715	460	255
O	Front Door Leading Edge to Impact CL	831	697	134
P	Rear Door Trailing Edge to Impact CL	1401	1110	291
Q	Front Window Opening	418	380	38
R	Right Side Length	4521	4540	-19
S	Left Side Length	4520	4555	-35
T	Vehicle Width	1768	1765	3

DATA SHEET NO. 11**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**Test Vehicle: 2017 Toyota Corolla 4DR SedanNHTSA No.: M20175106Test Program: SINCAP Side ImpactTest Date: 11/16/16**LEFT SIDE VIEW****MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	265	31	1050
2	Driver Hip Point	538	205	600
3	Mid-Door	610	189	600-750
4	Window Sill	905	160	1650
5	Window Top	1395	9	1350-1500

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: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

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	776	0	0	0	0	772	0	0	0	0	4	0
-150	0	0	876	781	0	0	0	863	782	0	0	0	13	-1	0
0	838	872	870	783	0	823	865	864	787	0	15	7	6	-4	0
150	832	869	870	794	0	820	728	750	774	0	12	141	120	20	0
300	834	870	871	802	0	807	688	710	750	0	27	182	161	52	0
450	836	870	872	810	0	803	673	701	734	0	33	197	171	76	0
600	836	870	873	817	0	811	665	684	734	0	25	205	189	83	0
750	834	870	873	824	534	812	669	684	726	533	22	201	189	98	1
900	833	869	872	830	556	809	676	710	739	553	24	193	162	91	3
1050	832	867	871	835	563	801	688	716	758	558	31	179	155	77	5
1200	834	865	870	838	567	802	687	700	739	559	32	178	170	99	8
1350	836	862	867	841	567	808	703	710	722	558	28	159	157	119	9
1500	836	860	864	842	566	814	718	715	703	557	22	142	149	139	9
1650	835	860	861	840	565	819	736	737	680	559	16	124	124	160	6
1800	833	865	863	837	556	825	755	748	681	555	8	110	115	156	1
1950	0	872	873	824	535	0	859	811	730	534	0	13	62	94	1
2100	0	0	0	822	0	0	0	0	792	0	0	0	0	30	0
2250	0	0	0	822	0	0	0	0	814	0	0	0	0	8	0
2400	0	0	0	811	0	0	0	0	809	0	0	0	0	2	0
2550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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)

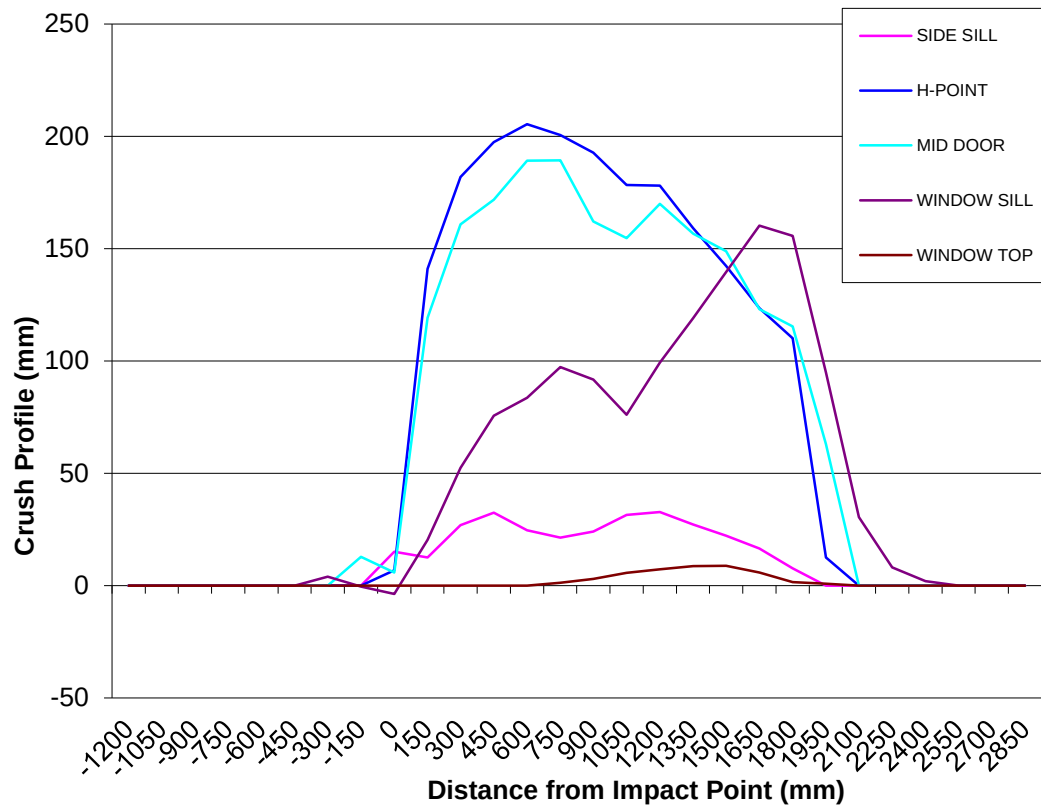
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Toyota Corolla 4DR Sedan

NHTSA No.: M20175106

Test Program: SINCAP Side Impact

Test Date: 11/16/16



DATA SHEET NO. 12

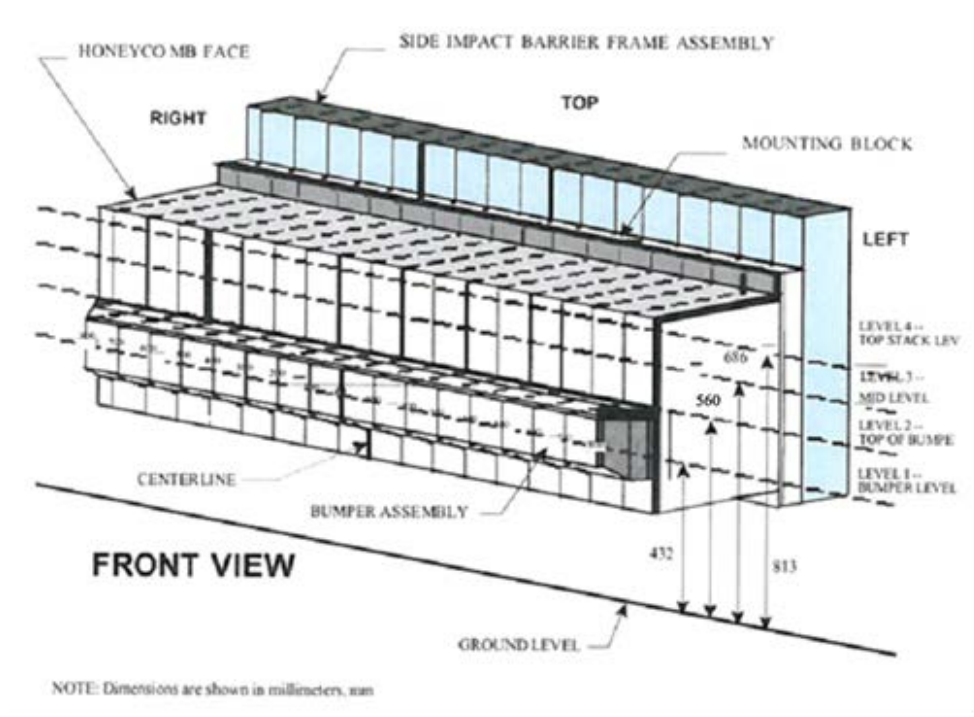
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Toyota Corolla 4DR Sedan

NHTSA No.: M20175106

Test Program: SINCAP Side Impact

Test Date: 11/16/16



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	236
B	Top of Bumper	560	300-300	Right-Left	373
C	Mid-Level	686	800	Left	88
D	Top of Stack	813	100	Right	108

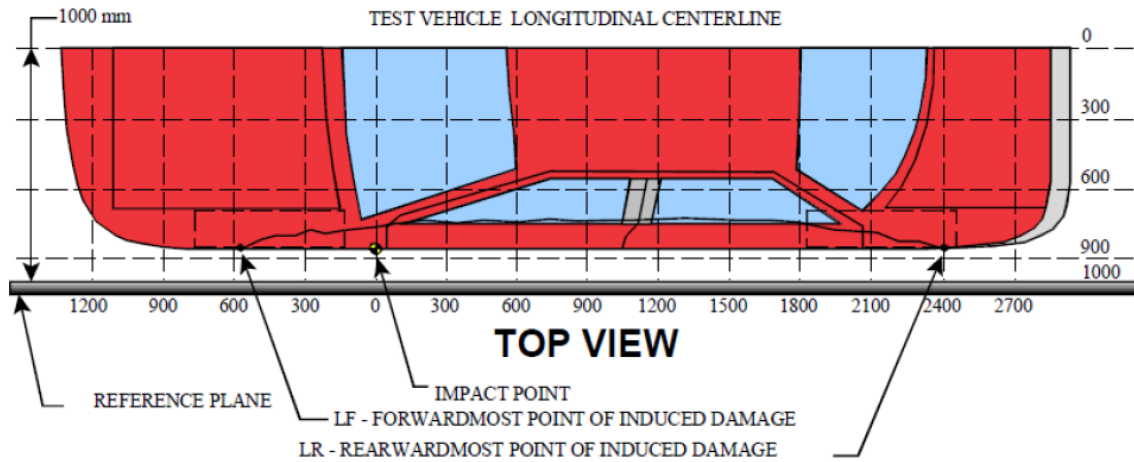
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	236	236	227	212	199	195	191	182	175	165	158	151	145	140	136	138	149
2	147	141	132	126	122	373	373	373	373	373	373	373	79	74	71	72	94
3	66	60	55	53	50	49	56	87	73	45	32	26	29	33	42	57	88
4	30	14	17	26	39	53	91	108	93	81	58	34	43	48	54	71	99

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2400	4	811	809	2
2	1800	4	837	681	156
3	1350	2	862	703	159
4	750	2	870	669	201
5	150	2	869	728	141
6	-300	4	776	772	4

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	327	475	149
2	500 mm Left of Center	1	346	486	140
3	200 mm Left of Center	2	11	384	373
4	200 mm Right of Center	2	11	384	373
5	500 mm Right of Center	1	274	486	212
6	800 mm Right of Center	1	236	472	236

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

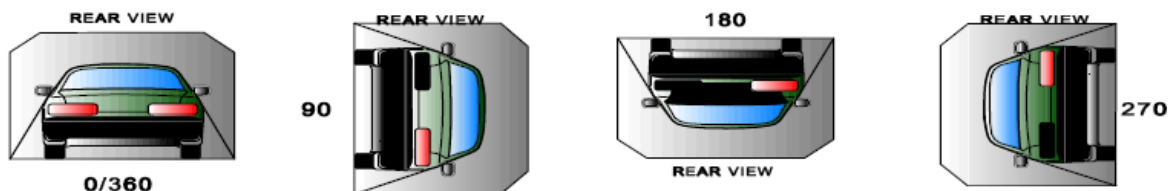
Test Vehicle: 2017 Toyota Corolla 4DR Sedan
 Test Program: SINCAP Side Impact

NHTSA No.: M20175106
 Test Date: 11/16/16

Test Time: 13:41 **Temperature:** 21.3°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

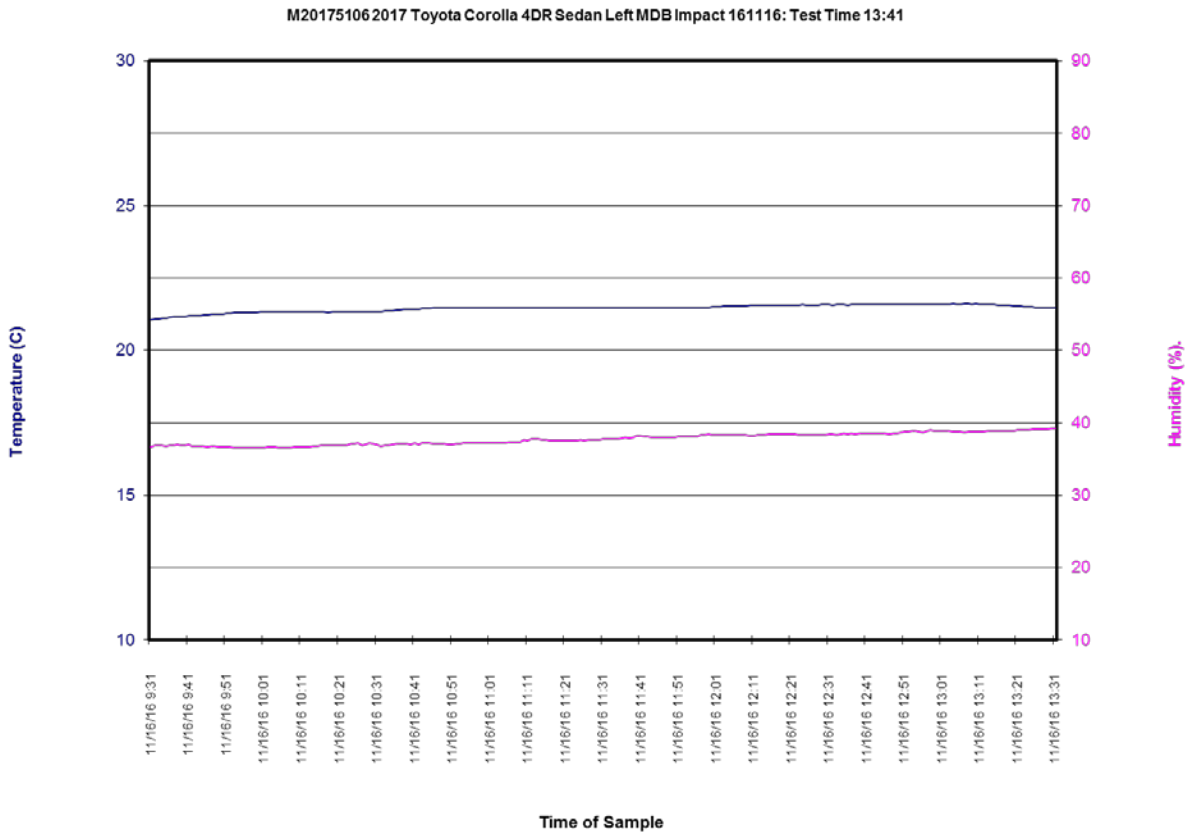
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2017 Toyota Corolla 4DR Sedan

NHTSA No.: M20175106

Test Program: SINCAP Side Impact

Test Date: 11/16/16



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



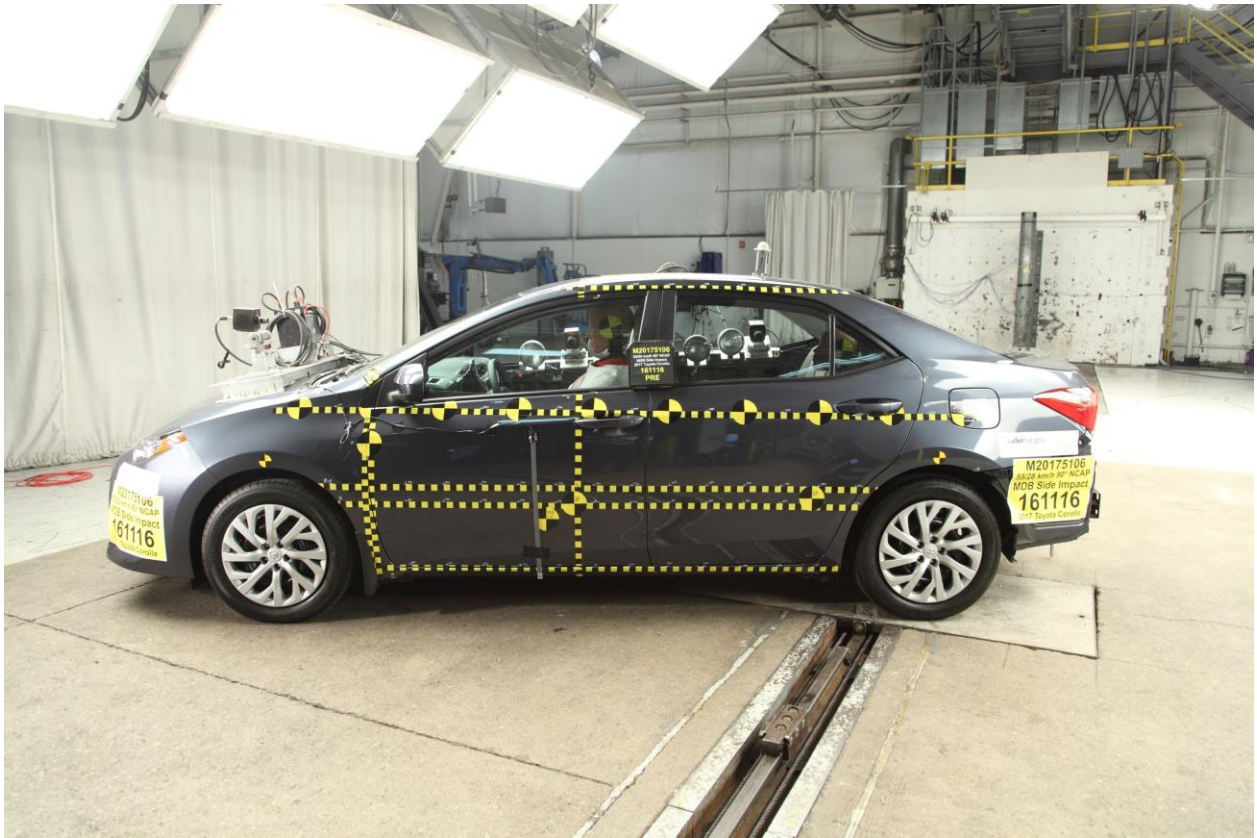
004 Post-Test Frontal View of Test Vehicle



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



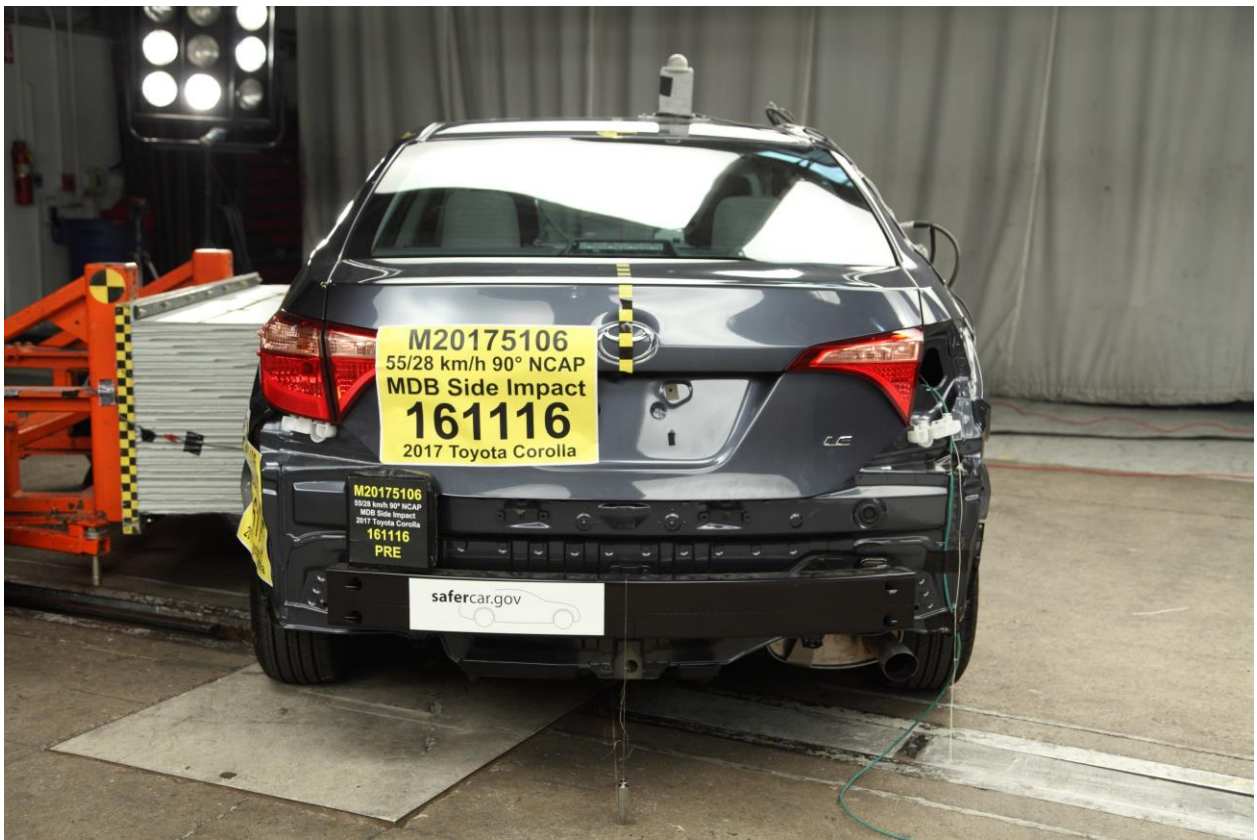
008 Post-Test Left Side View of Test Vehicle



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

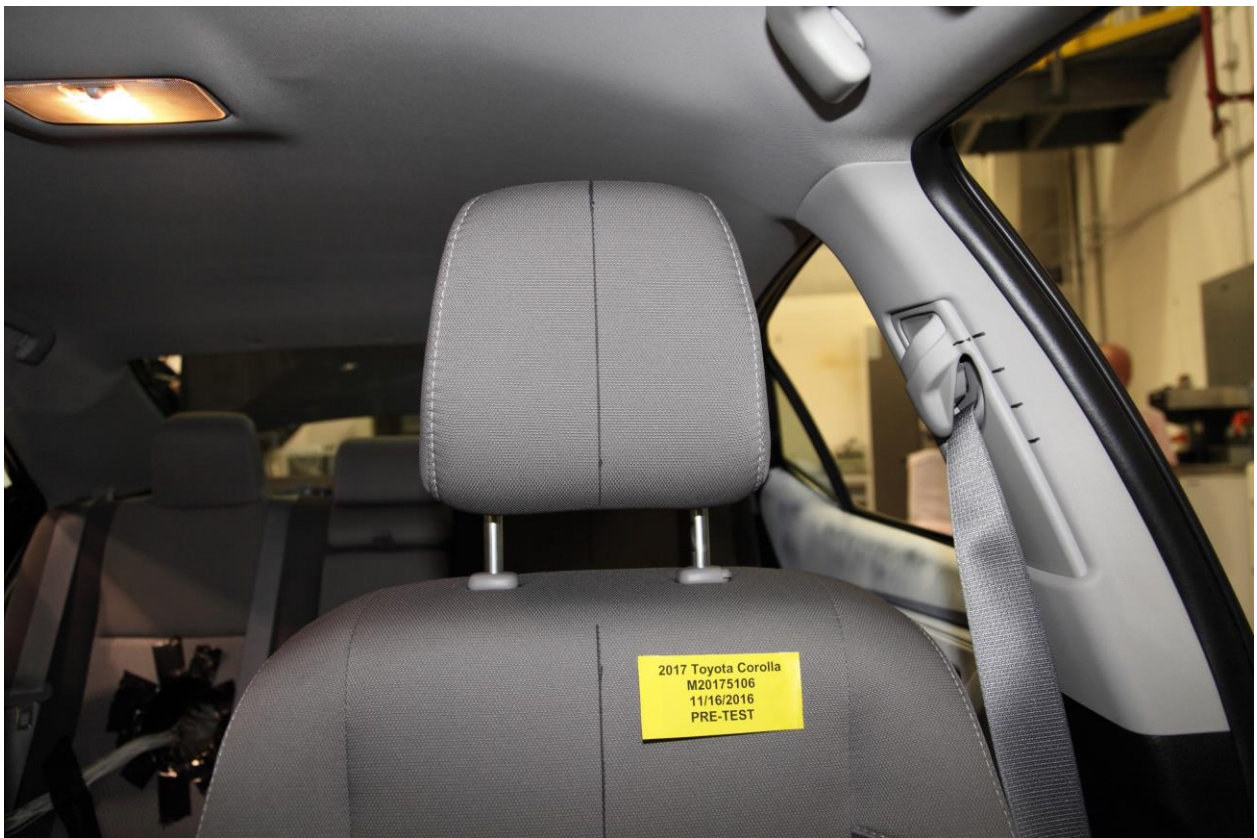
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028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



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

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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

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042 Pre-Test Driver Dummy and Door Clearance View



043 Post-Test Driver Dummy and Door Clearance View



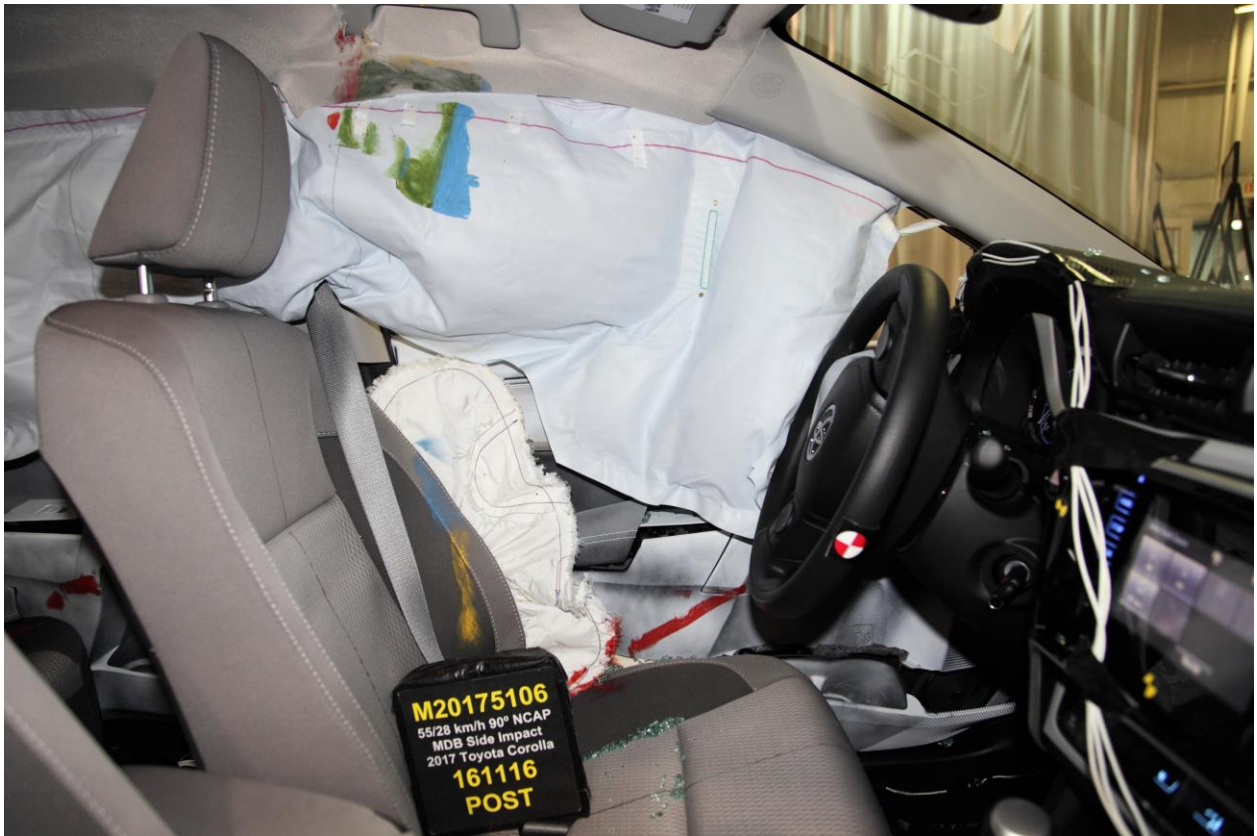
044 Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



045 Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



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



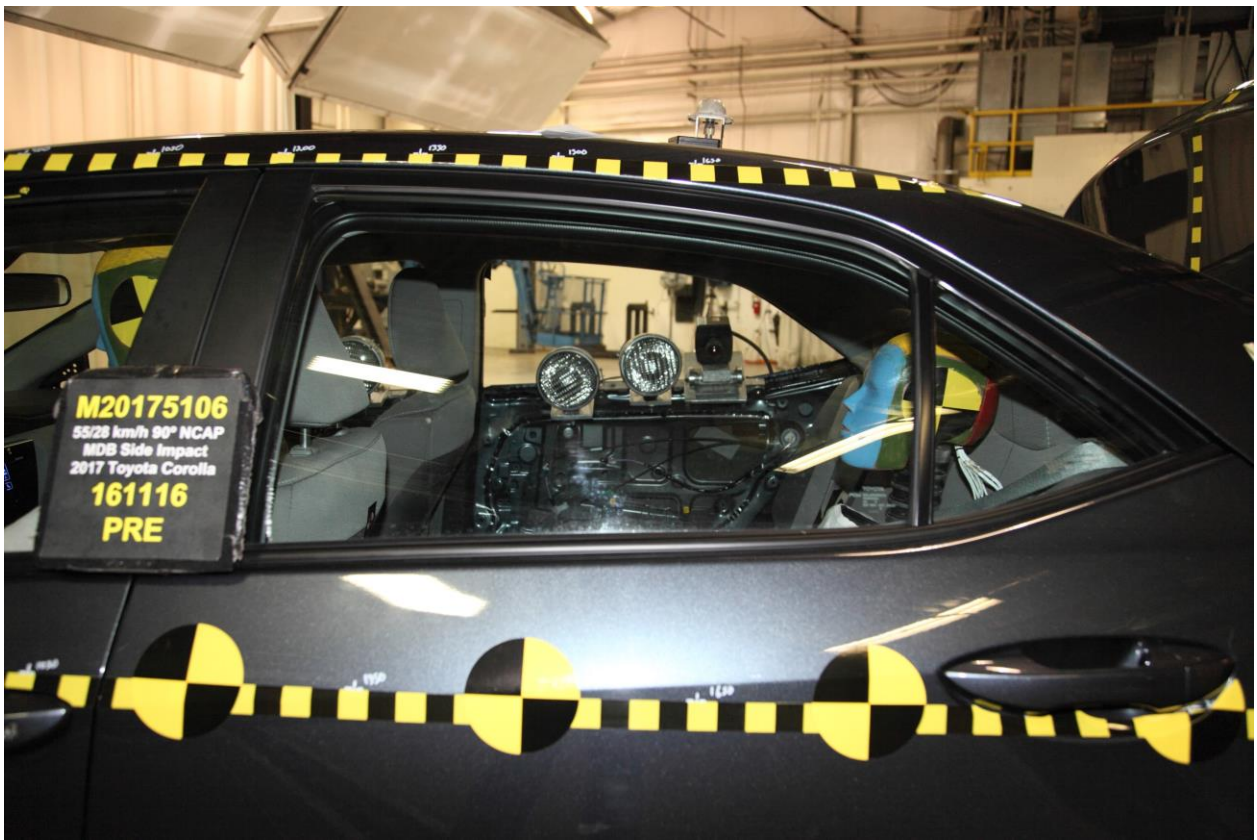
053 Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



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



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



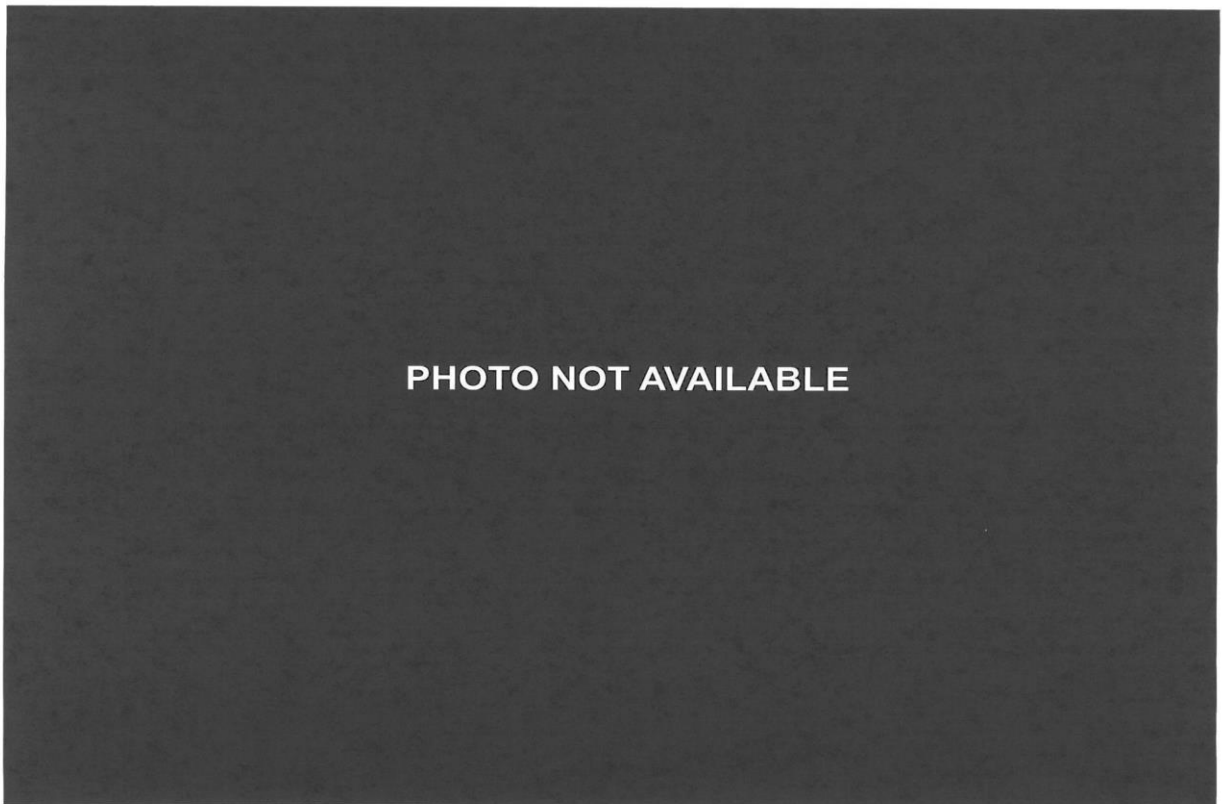
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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 Head is Level



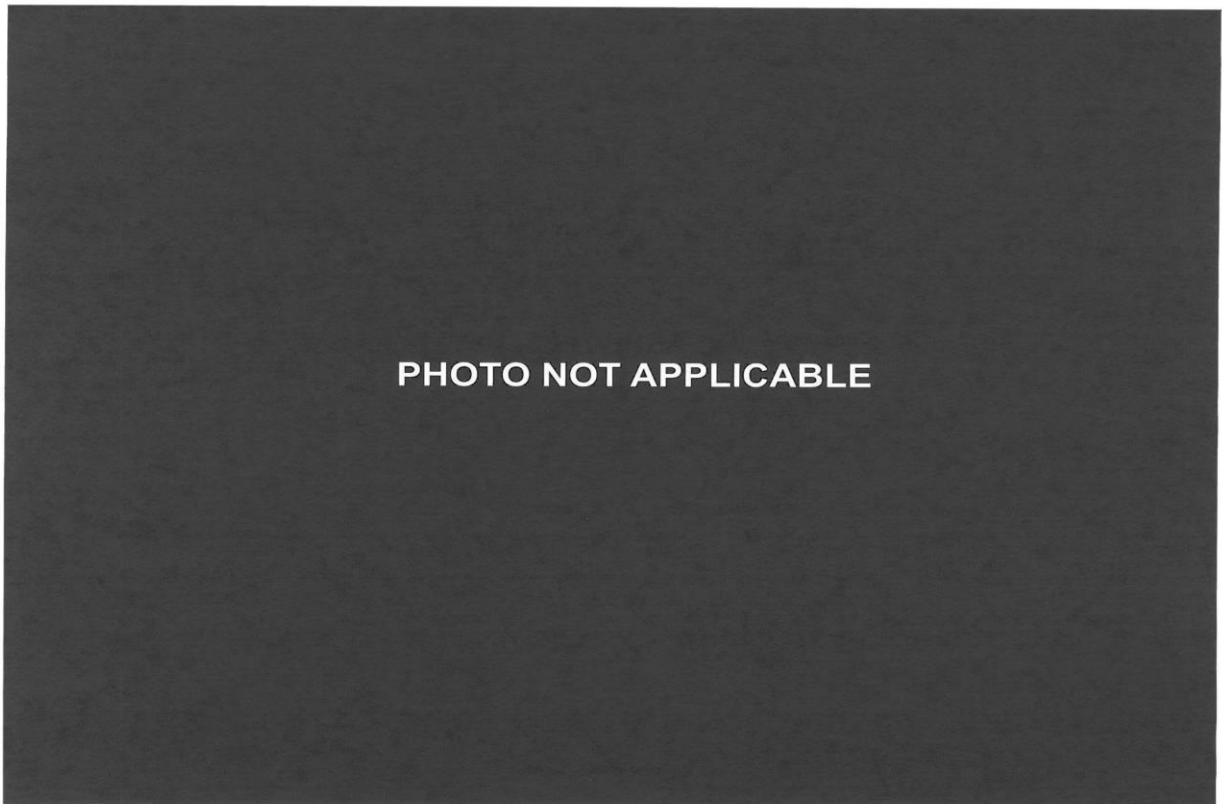
064 Pre-Test Placement of Rear Passenger Dummy Feet



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



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



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

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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

PHOTO NOT APPLICABLE

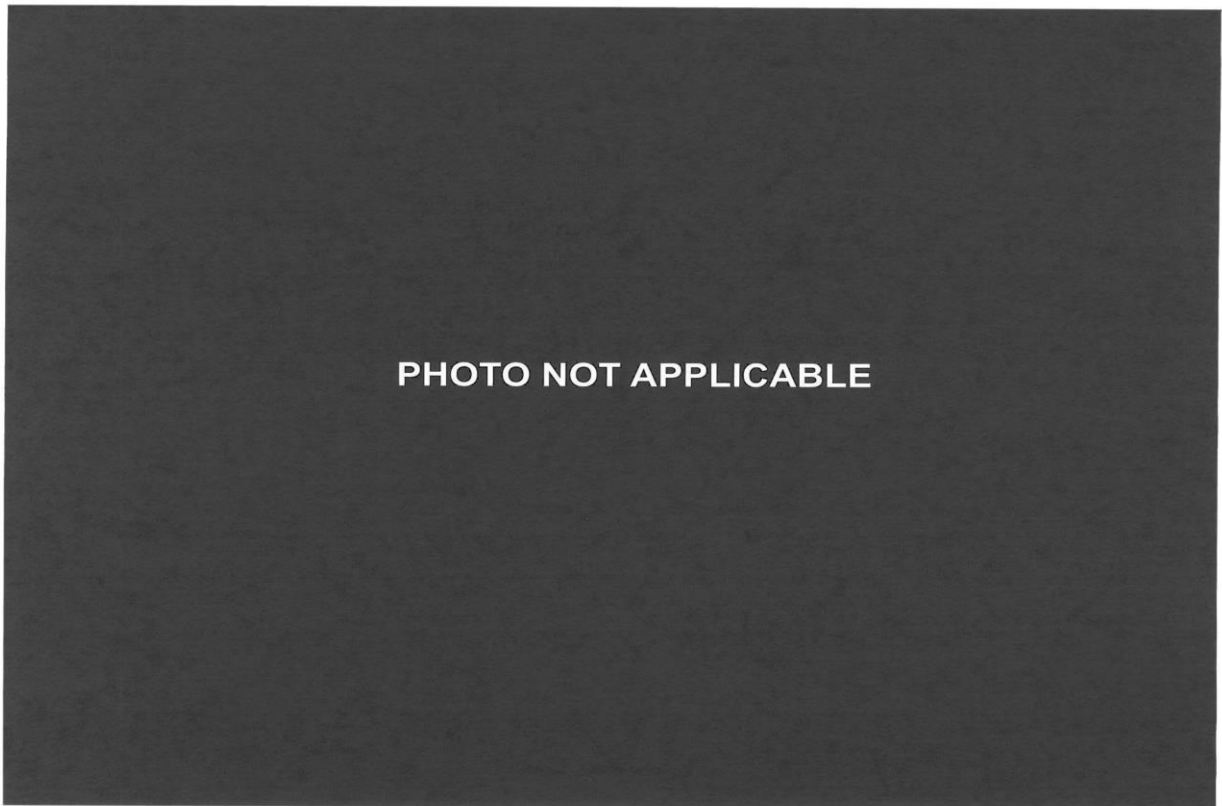
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



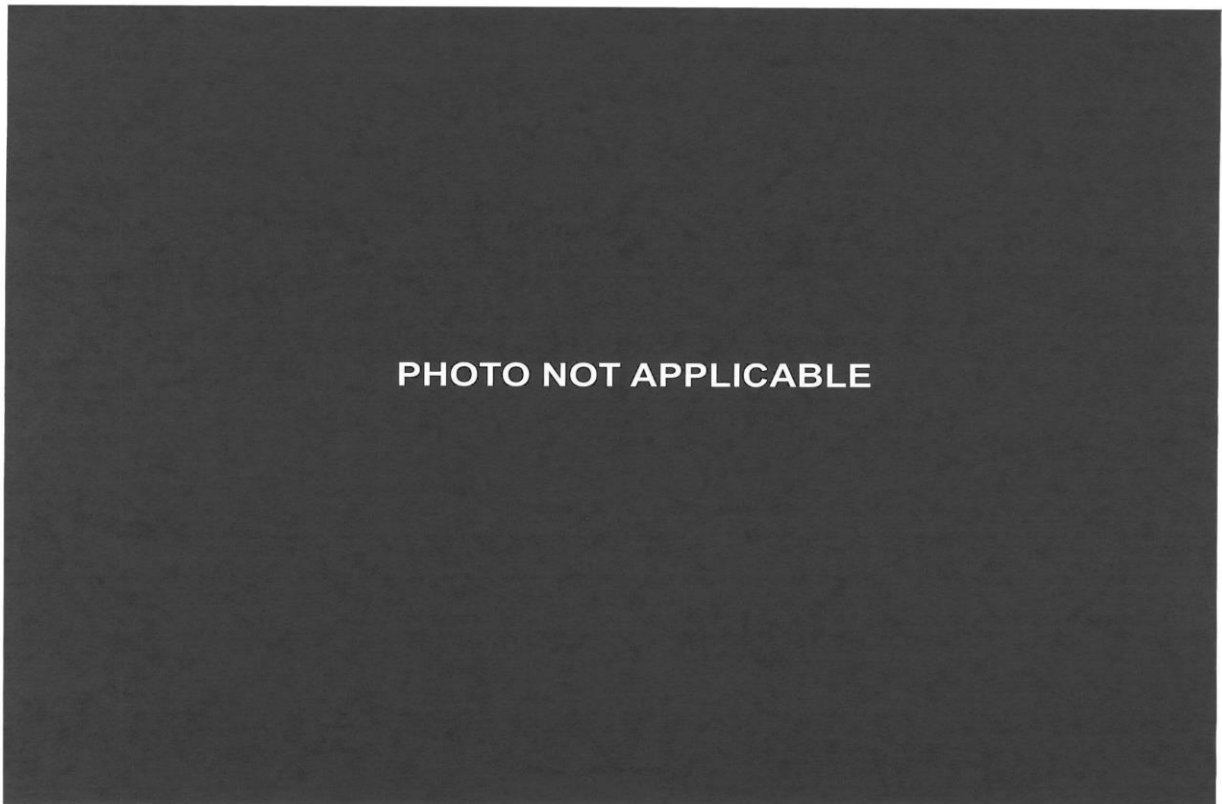
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



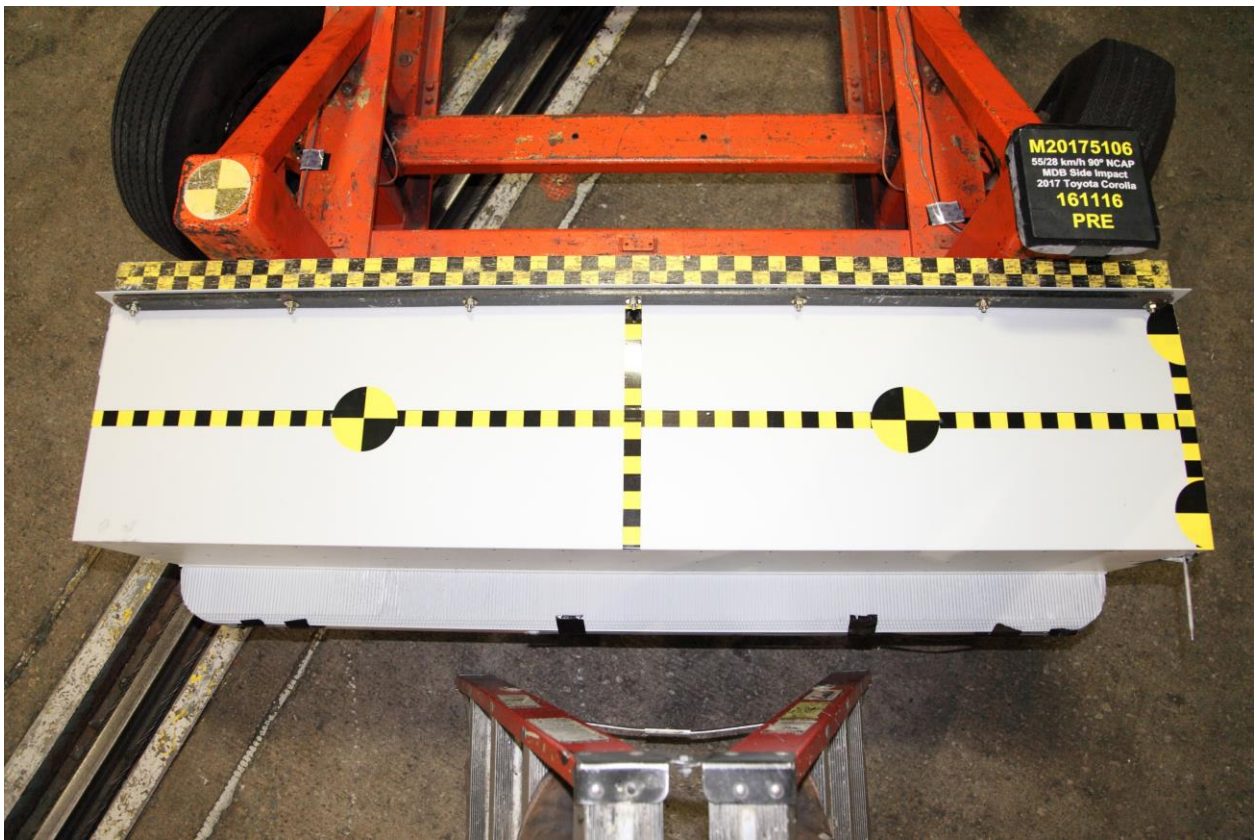
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face



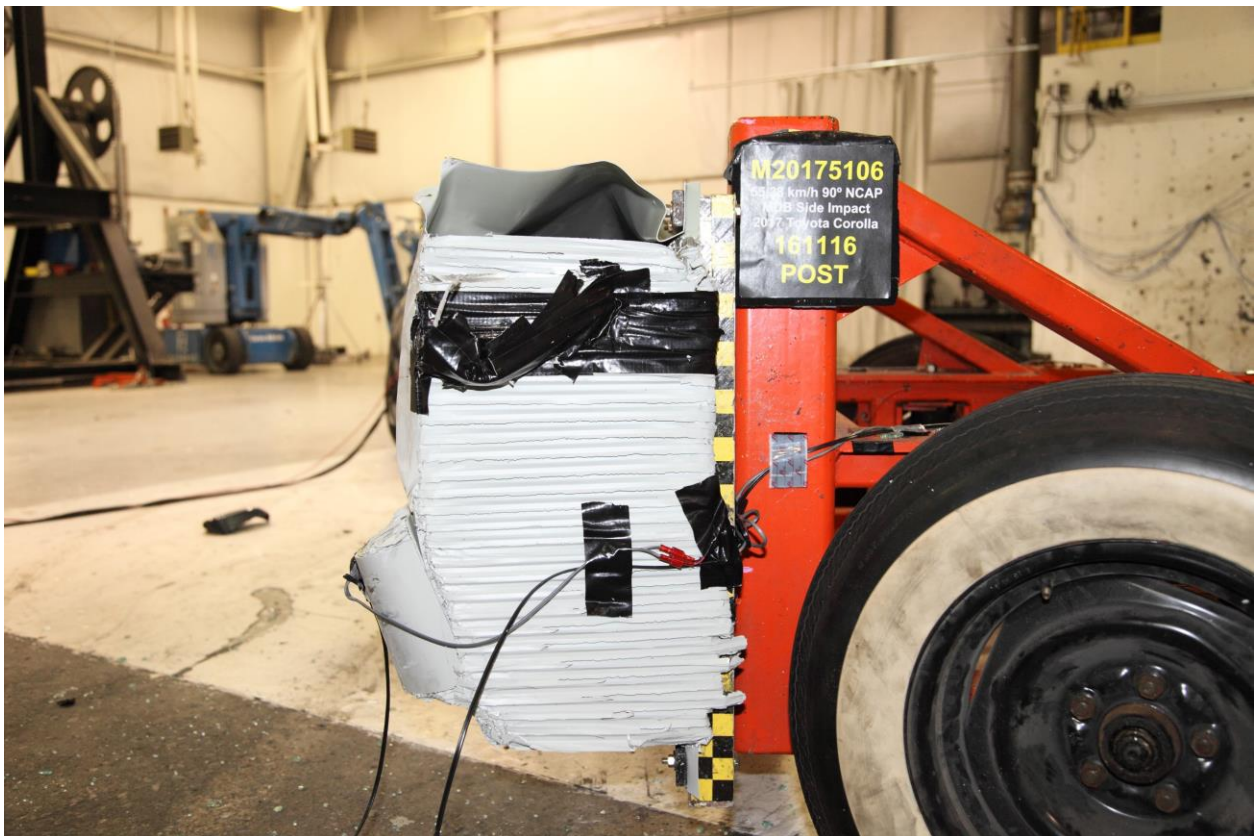
086 Pre-Test Top View of MDB Impactor Face



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



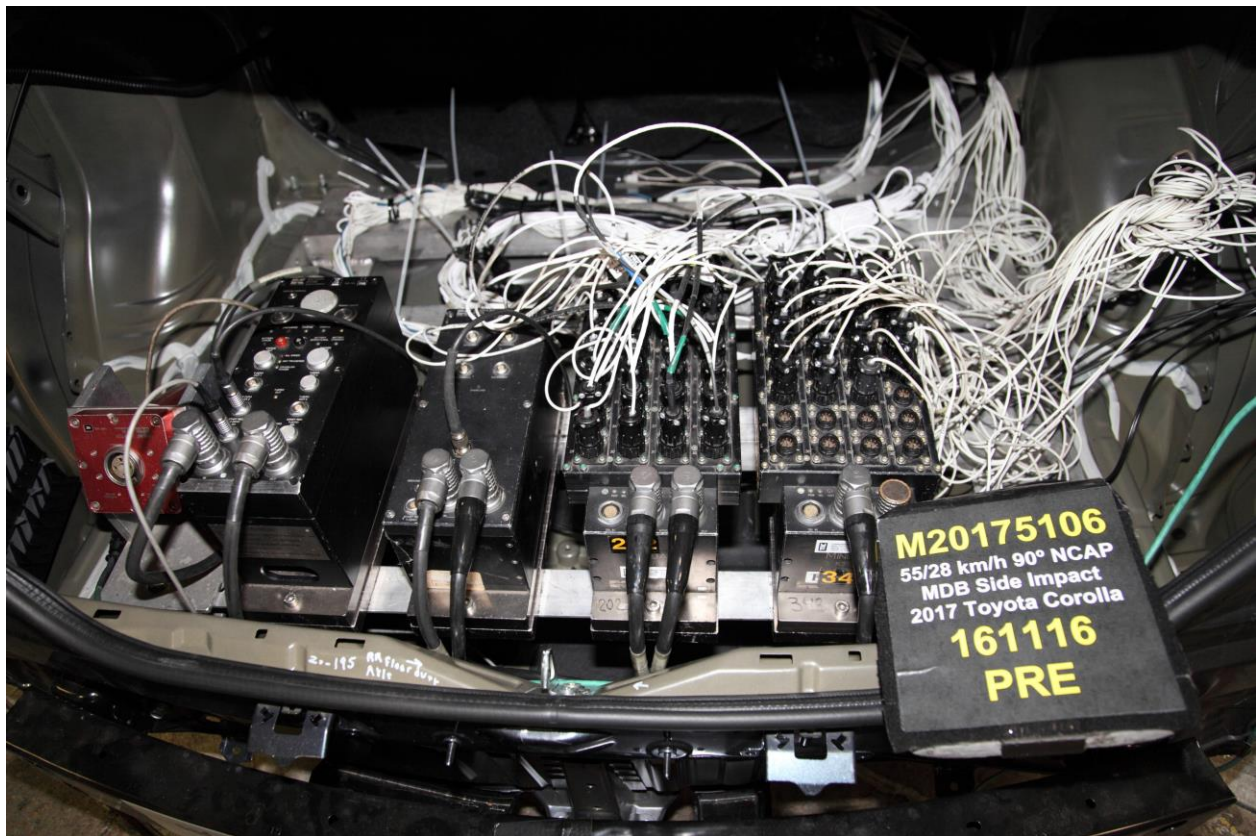
092 Close-Up View of Vehicle Certification Label



092a Close-Up View of Reduced Load Capacity Label



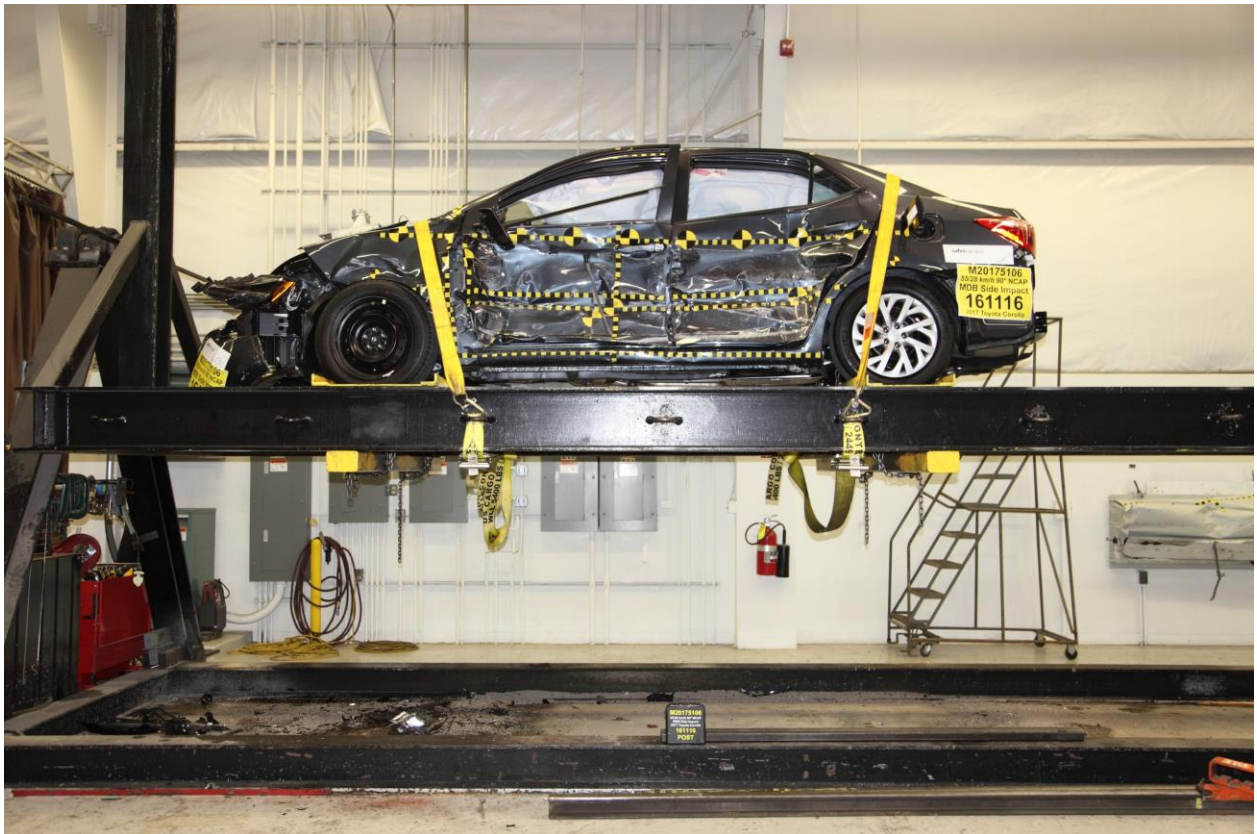
093 Close-Up View of Vehicle Tire Information Placard or Label



094 Pre-Test Ballast View



095 Post-Test Primary Speed Trap Read-Out



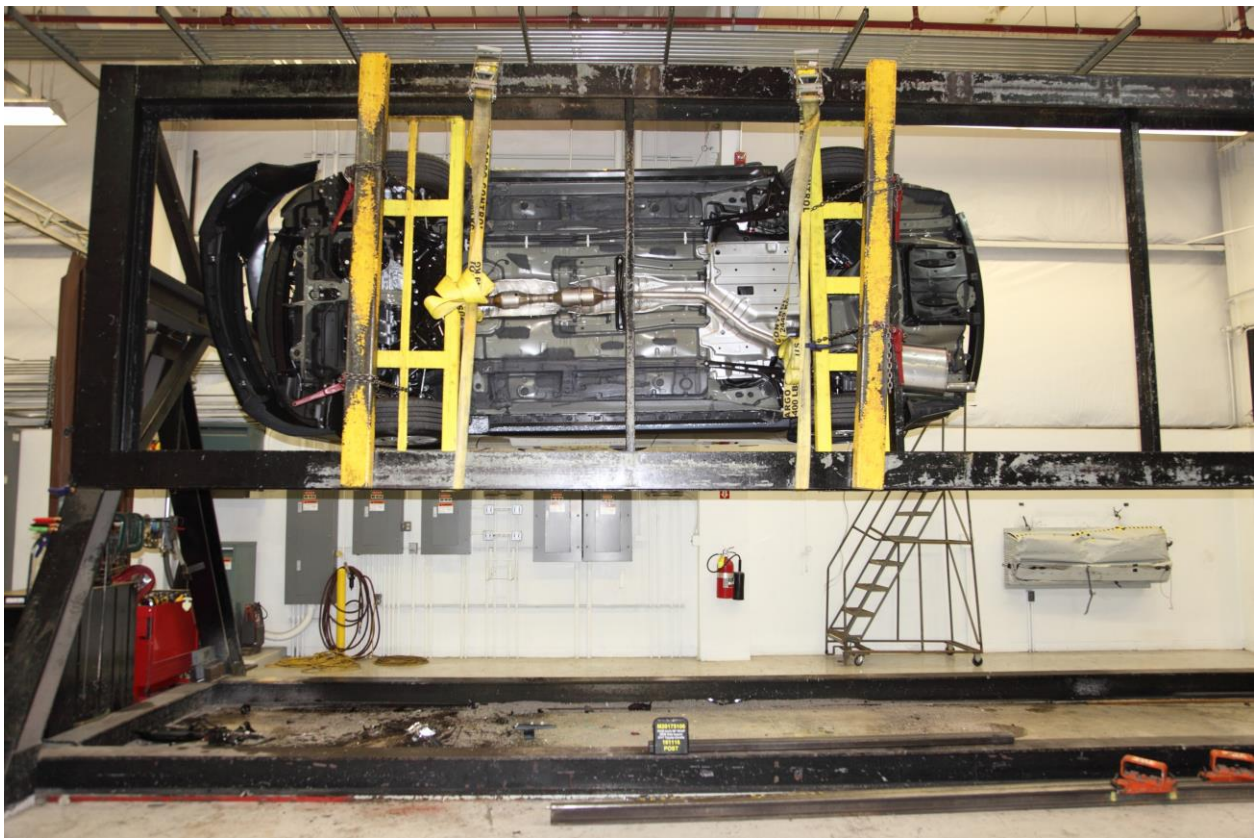
096 FMVSS No. 301 Static Rollover 0 Degrees



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

TOYOTA
Let's Go Places

DESC: **COROLLA** LE
VIN: **2T1BURHEHC750301**
YR/MDL: 2017/1852A
CLR: SLATE METALLIC/FB11 (01F9/11)
FINAL ASSEMBLY POINT: CAMBRIDGE, ONTARIO, CANADA

STANDARD EQUIPMENT

MECHANICAL & PERFORMANCE

- 1.8L 4-cyl DOHC 16-Valve Dual VVT-i
- Continuously Variable Transmission
- 16-in Wide Vent Steel Wheels
- And P205/55R16 Tires

SAFETY & CONVENIENCE

- Toyota Safety Sense-P: Pre-Collision Sys w/Pedestrian Detection, Dynamic Radar Cruise Control, Lane Departure Alert w/Steering Assist, Automatic High Beams
- Safety System Includes: VSC, TRAC, Anti-lock Brake System, EBD, Brake Assist & Smart Stop Technology
- 8 Airbags: Dr & Fr Pass Adv Airbag Sys, Dr & Fr Pass Seat-Mounted Side Airbags, Dr Knee Airbag, Pass Seat Cushion Airbag Front & Rear Side Curtain Airbags
- LATCH (Lwr Anchors/Tethers for Children) for Outboard Rear Seating Positions Only
- Whiplash-Injury Lessening Front Seats

EXTERIOR

- Bi-LED Headlights
- LED Daytime Running Lights in Headlight
- Color-Keyed Heated Power Outside Mirrors

INTERIOR

- Premium Fabric-Trimmed 8-Way Adj Dr Seat
- 4-Way Adj Fr Pass Seat w/Seatback Pocket
- Entune Audio w/1.1-in Touch-screen and Entune Multimedia Bundle (AUX/USB/BT/Adv Voice Recognition), Siri Eyes Free
- 3.5-in Monochrome TFT Multi-Info Display
- Integrated Backup Camera w/Projected Pth Steering Wheel w/Audio & Bluetooth
- Hands-Free Phone Voice Command Controls
- Auto Climate Control w/ Pollen Filter and Push Button Controls
- Remote Keyless Entry System
- Power Door Locks and Windows
- ***Full Tank of Gas***

MANUFACTURER'S SUGGESTED RETAIL PRICE \$18,935.00

OPTIONAL EQUIPMENT

FE	50 State Emissions	249.00
ZT	All Weather Floor Liners/Cargo Tray	129.00
MF	Mudguards	

GOVERNMENT 5-STAR SAFETY RATINGS

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

Frontal Crash	Driver Passenger	Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
Side Crash	Front seat Rear seat	Not Rated
Based on the risk of injury in a side impact.		
Rollover		★★★★
Based on the risk of rollover in a single-vehicle crash.		

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

EPA DOT Fuel Economy and Environment

Fuel Economy

32 MPG
combined city/hwy
3.1 gallons per 100 miles

City 28 MPG
Hwy 36 MPG
Miles per gallon range from 12 to 114 MPG. The best vehicle rates 119 MPG.

You save \$1,250 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$1,150

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Smog Rating (tailpipe only)

7 (Best) **6** (Best)

This vehicle emits 281 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions, learn more at safercar.gov.

Actual results may vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 26 MPG and costs \$7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.45 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Gasoline Vehicle

DELIVERY PROCESSING AND HANDLING FEE 865.00

TOTAL \$20,178.00

The New Vehicle Limited Warranty provides 3-year/50,000-mile basic coverage. 5-year/100,000-mile powertrain coverage, plus 5-year/unlimited-mile corrosion perforation coverage. See Warranty and Maintenance Guide for details. An extended service contract may be available for the vehicle. Ask dealer for details. Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline, license and title fees, applicable federal, state and local taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price.

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

Delivered by Truck to: 31175
WEST HEAR TOWN/VILLAMSVLE
8159 MAIN STREET
WILLIAMSVILLE NY14221

102 Monroney Label

Head restraints

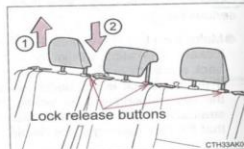
Head restraints are provided for all seats.

Front seats

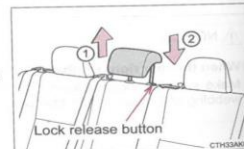
- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.

**Rear seats****► Type A**

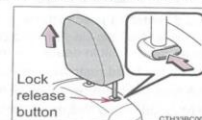
- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.

**► Type B**

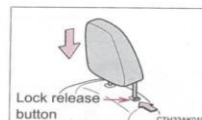
- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.

**■ Removing the head restraints (except for fixed rear head restraints)**

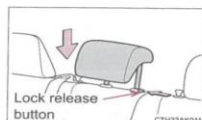
Pull the head restraint up while pressing the lock release button.

**■ Installing the head restraints (except for fixed rear head restraints)****► Front seats and rear outside seats**

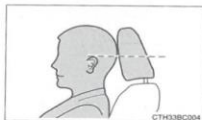
Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button when lowering the head restraint.

**► Rear center seat**

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

**■ Adjusting the height of the head restraints (except for fixed rear head restraints)**

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

**■ Adjusting the rear center seat head restraint**

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

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

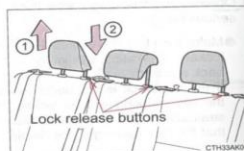
Head restraints are provided for all seats.

Front seats

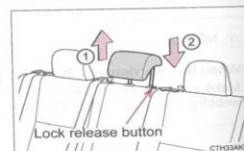
- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.

**Rear seats****► Type A**

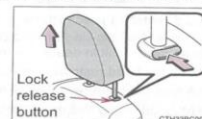
- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.

**► Type B**

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

**■ Removing the head restraints (except for fixed rear head restraints)**

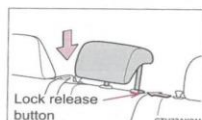
Pull the head restraint up while pressing the lock release button.

**■ Installing the head restraints (except for fixed rear head restraints)****► Front seats and rear outside seats**

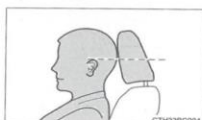
Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button when lowering the head restraint.

**► Rear center seat**

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

**■ Adjusting the height of the head restraints (except for fixed rear head restraints)**

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

**■ Adjusting the rear center seat head restraint**

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

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

No.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-5
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-9
15	Passenger Head Acceleration (Y) Primary vs. Time	B-9
16	Passenger Head Acceleration (Z) Primary vs. Time	B-9
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-10
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-10
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-10
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-11
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-11
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-11

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

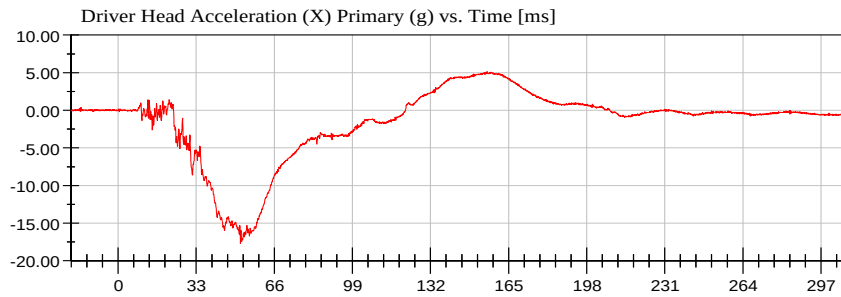
Test Lab: CTF

Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)



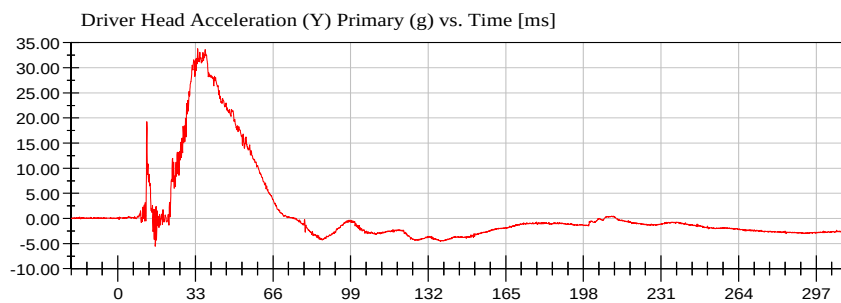
<Max>

5.14 g at 155.92 ms

<Min>

-17.70 g at 51.68 ms

CFC_1000



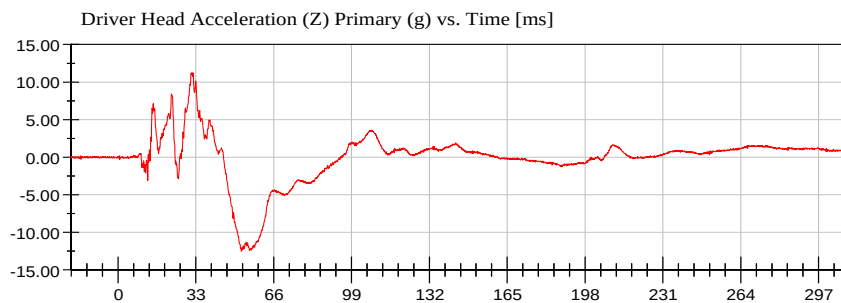
<Max>

33.79 g at 34.00 ms

<Min>

-5.57 g at 15.92 ms

CFC_1000



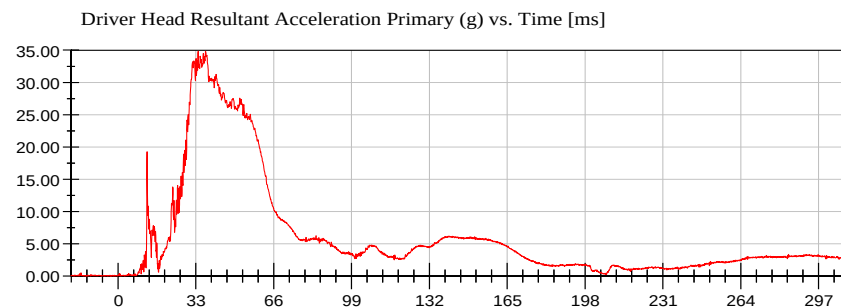
<Max>

11.25 g at 31.36 ms

<Min>

-12.49 g at 52.24 ms

CFC_1000



<Max>

34.86 g at 37.12 ms

<Min>

0.02 g at -18.80 ms

CFC_1000



NHTSA

Test Lab: CTF

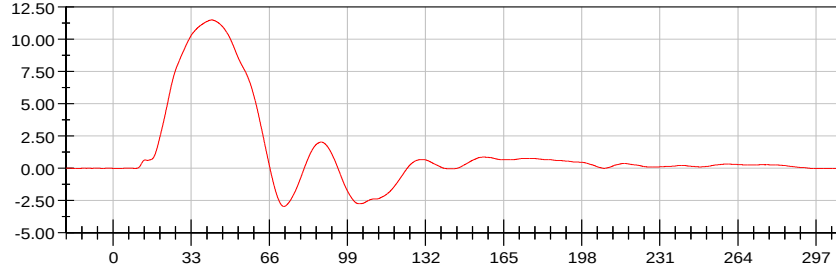
Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

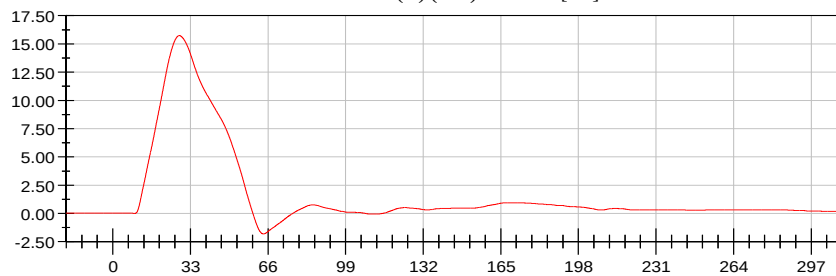
11.50 mm at 41.60 ms

<Min>

-2.96 mm at 72.16 ms

CFC_180

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



<Max>

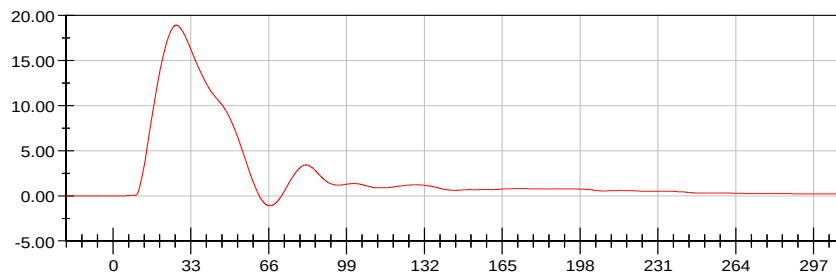
15.74 mm at 28.32 ms

<Min>

-1.83 mm at 64.08 ms

CFC_180

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



<Max>

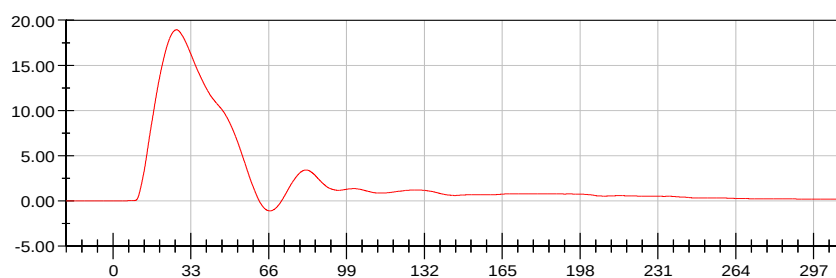
18.94 mm at 26.88 ms

<Min>

-1.09 mm at 66.56 ms

CFC_180

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



<Max>

18.94 mm at 26.88 ms

<Min>

-1.09 mm at 66.56 ms

CFC_180



NHTSA

Test Lab: CTF

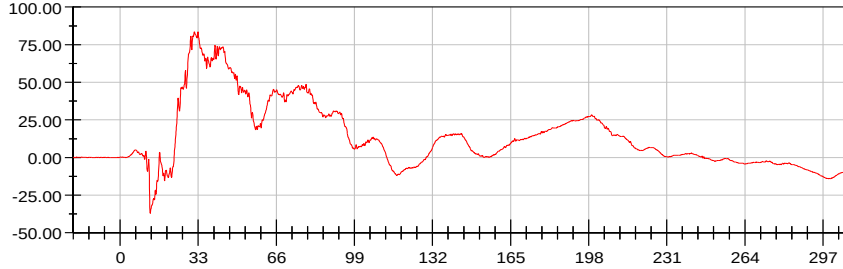
Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)

Driver Anterior Abdominal Force (Y) (N) vs. Time [ms]



<Max>

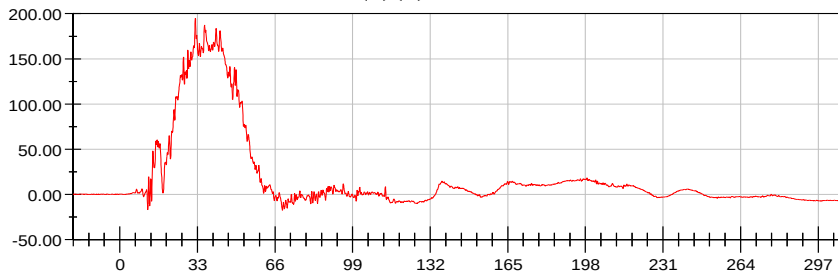
83.61 N at 32.88 ms

<Min>

-36.99 N at 12.72 ms

CFC_600

Driver Middle Abdominal Force (Y) (N) vs. Time [ms]



<Max>

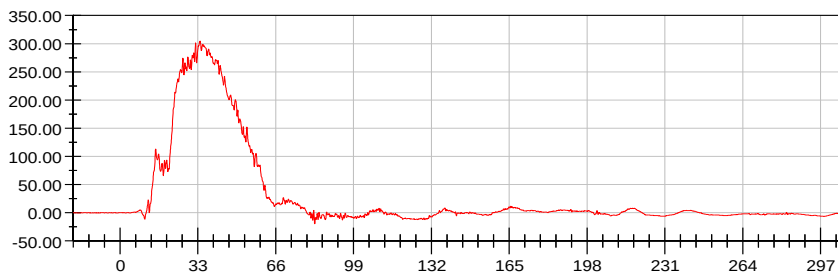
194.75 N at 32.08 ms

<Min>

-17.62 N at 69.12 ms

CFC_600

Driver Posterior Abdominal Force (Y) (N) vs. Time [ms]



<Max>

304.56 N at 33.92 ms

<Min>

-19.35 N at 82.56 ms

CFC_600

Driver Total Abdominal Force (Y) (N) vs. Time [ms]



<Max>

577.05 N at 32.08 ms

<Min>

-38.16 N at 12.64 ms

CFC_600



NHTSA

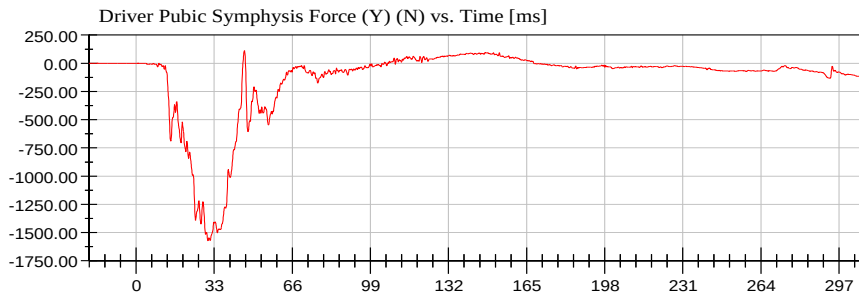
Test Lab: CTF

Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)



<Max>

111.89 N at 45.76 ms

<Min>

-1,571.14 N at 30.32 ms

CFC_600



NHTSA

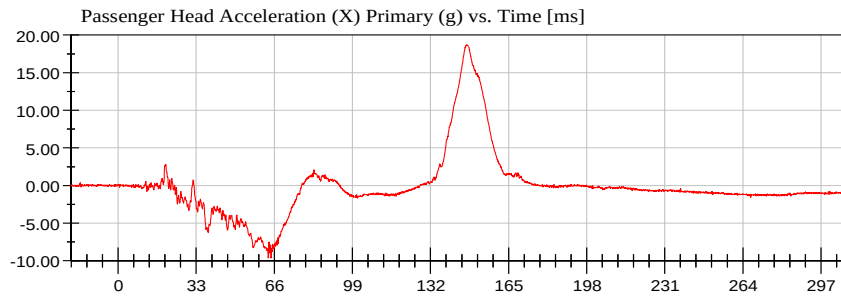
Test Lab: CTF

Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)



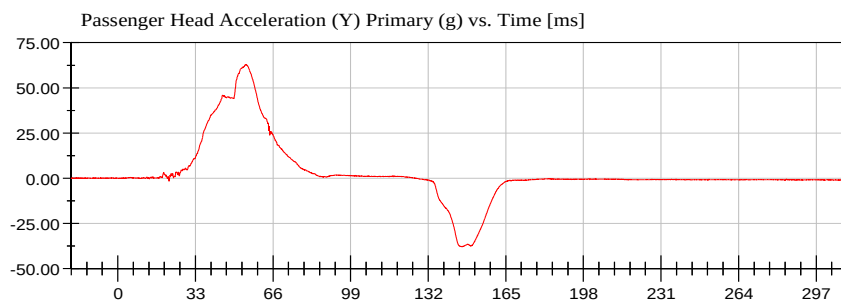
<Max>

18.69 g at 147.12 ms

<Min>

-9.63 g at 63.44 ms

CFC_1000



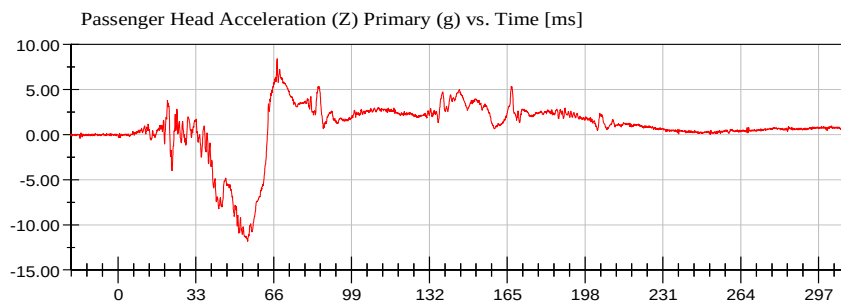
<Max>

62.89 g at 54.56 ms

<Min>

-38.08 g at 146.32 ms

CFC_1000



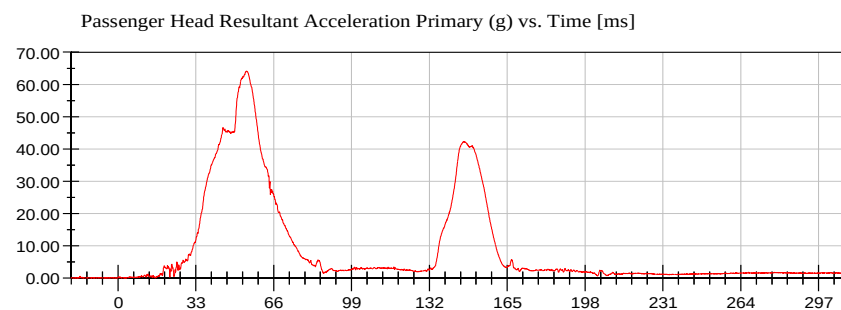
<Max>

8.42 g at 67.44 ms

<Min>

-11.82 g at 54.96 ms

CFC_1000



<Max>

64.18 g at 54.56 ms

<Min>

0.03 g at -19.04 ms

CFC_1000



NHTSA

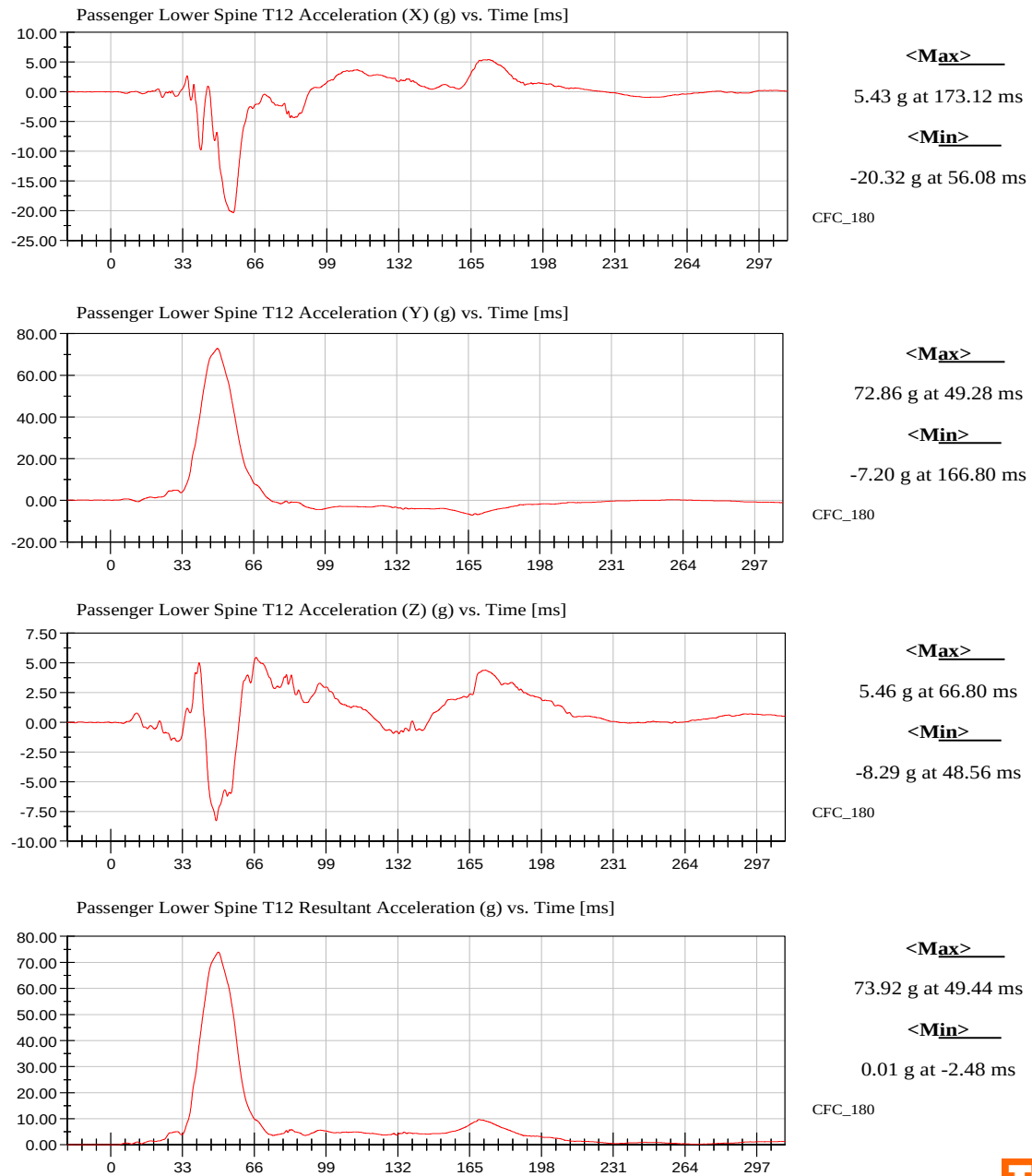
Test Lab: CTF

Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)



NHTSA

Test Lab: CTF

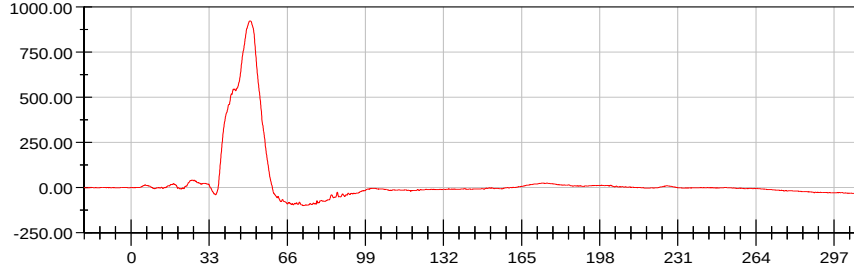
Test Number: 161116 (M20175106)

Test Date: 11/16/2016

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

Position #4 SID IIs Dummy (305)

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



<Max>

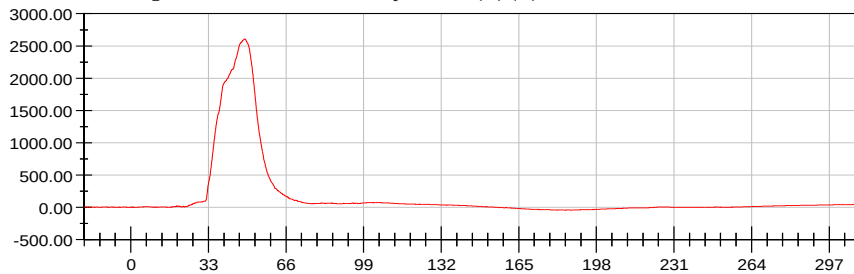
923.00 N at 50.24 ms

<Min>

-99.05 N at 72.72 ms

CFC_600

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



<Max>

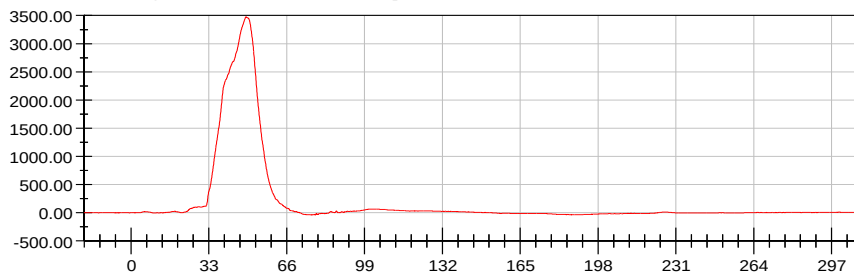
2,607.66 N at 48.48 ms

<Min>

-47.49 N at 184.72 ms

CFC_600

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



<Max>

3,477.02 N at 48.80 ms

<Min>

-38.71 N at 76.56 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. 42

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	559	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	444	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	326	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	263	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. 42-4

Test Date: 11/15/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Peak Resultant Acceleration	125 - 155 g	142.0 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.5 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

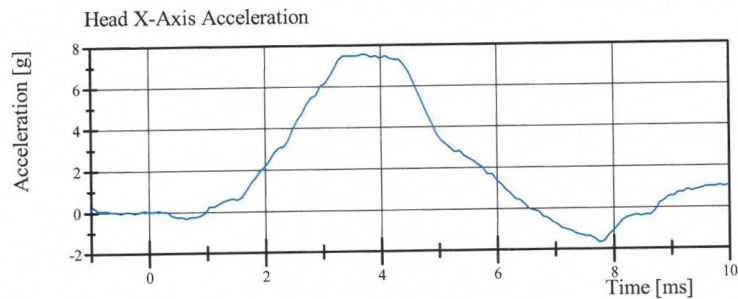
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.15.2016 10:10:09 361

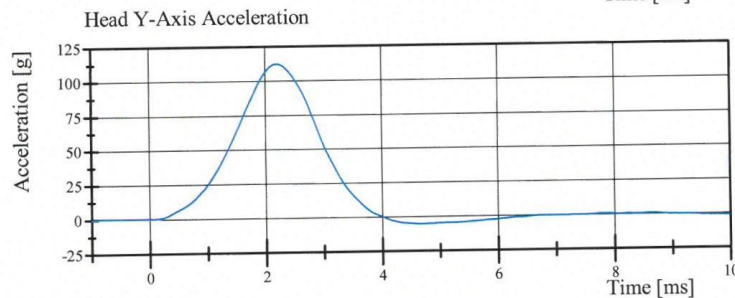


Transportation Research Center Inc.

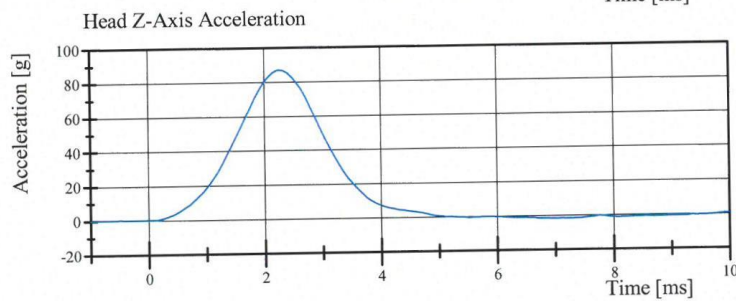
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 42-4
Test Date: 11/15/2016



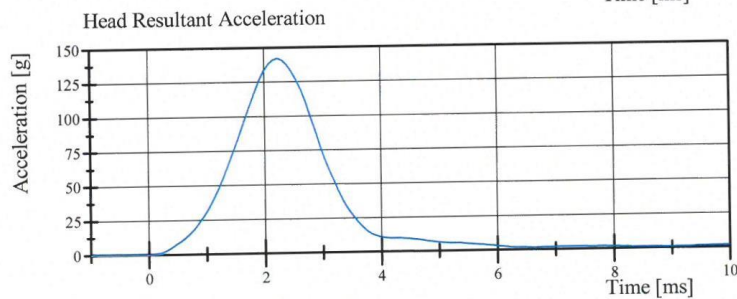
Filter Class: CFC_1000
Max: 7.5 g at 3.7 ms
Min: -1.7 g at 7.8 ms



Filter Class: CFC_1000
Max: 112.3 g at 2.2 ms
Min: -5.4 g at 4.7 ms



Filter Class: CFC_1000
Max: 86.9 g at 2.2 ms
Min: -1.5 g at 7.0 ms



Filter Class: CFC_1000
Max: 142.0 g at 2.2 ms
Min: 0.0 g at -0.6 ms

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

11.15.2016 10:10:18 361



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	23 %	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	-54.1 deg	Yes
Time of Peak	54 - 66 ms	60.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	63.8 ms	Yes

Test meets specifications.

Comments:

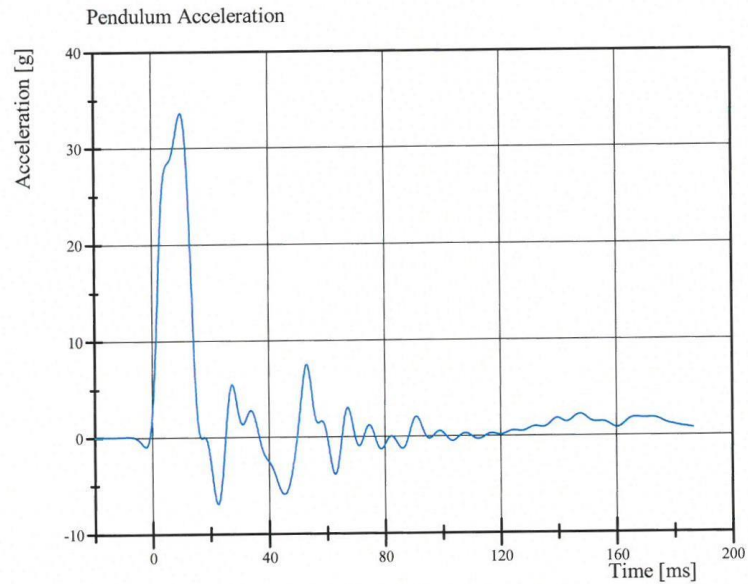
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 14:42:03 1494

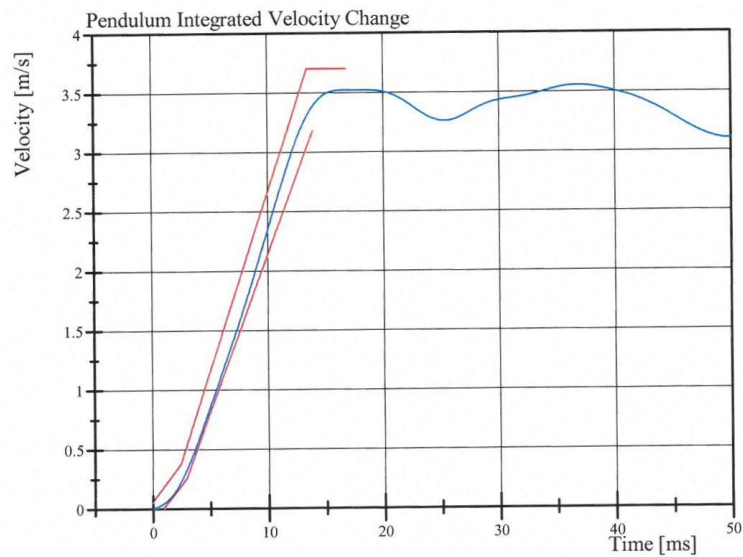


Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_60
Max: 33.6 g at 10.1 ms
Min: -7.0 g at 22.6 ms



Filter Class: CFC_60
Max: 3.6 m/s at 36.8 ms
Min: 0.0 m/s at 0.0 ms

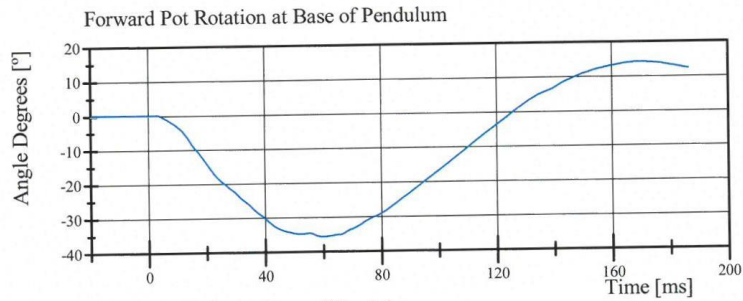
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 14:42:34 1494

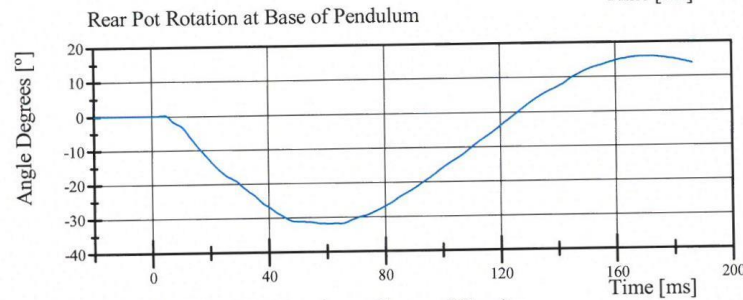


Transportation Research Center Inc.

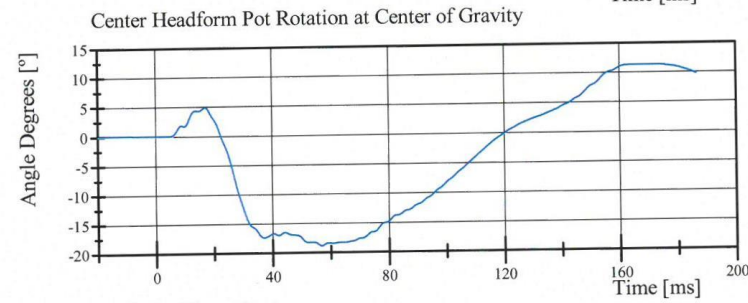
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



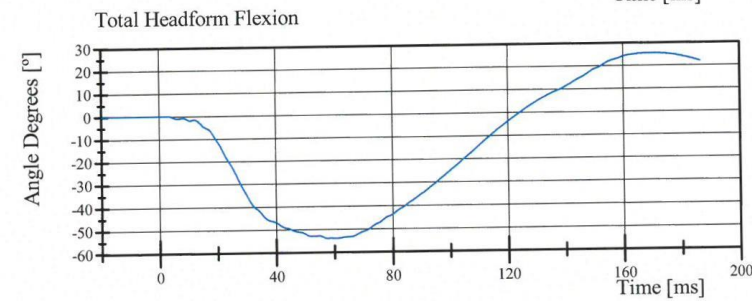
Filter Class: CFC_180
Max: 14.1 ° at 169.0 ms
Min: -35.7 ° at 60.0 ms



Filter Class: CFC_180
Max: 16.0 ° at 170.8 ms
Min: -31.9 ° at 61.0 ms



Filter Class: CFC_180
Max: 11.3 ° at 169.6 ms
Min: -18.9 ° at 56.9 ms



Filter Class: CFC_180
Max: 25.5 ° at 169.1 ms
Min: -54.1 ° at 60.4 ms

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

11.14.2016 14:42:35 1494



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.29 g	Yes

Test meets specifications.

Comments:

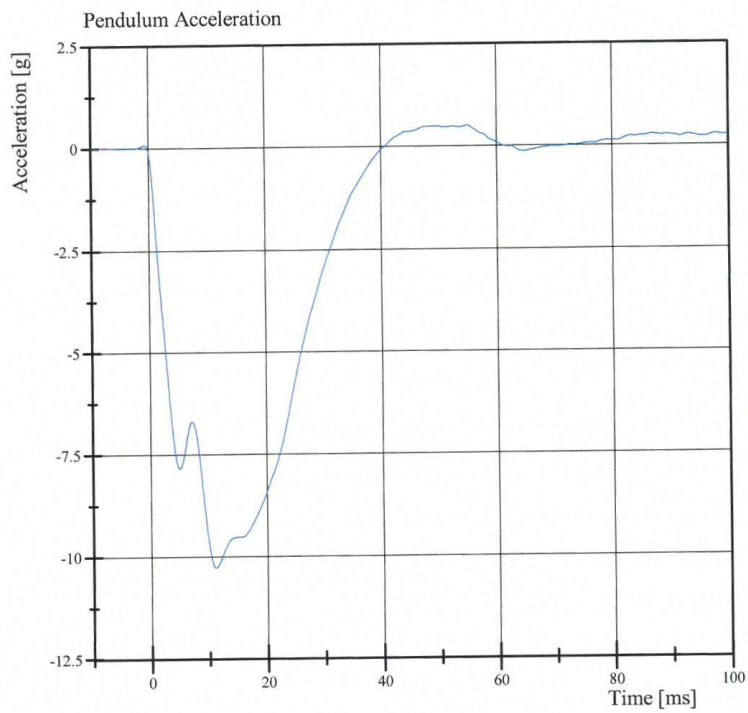
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:38:15 542



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 0.5 g at 55.0 ms
Min: -10.3 g at 11.2 ms

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

11.14.2016 15:38:56 542



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

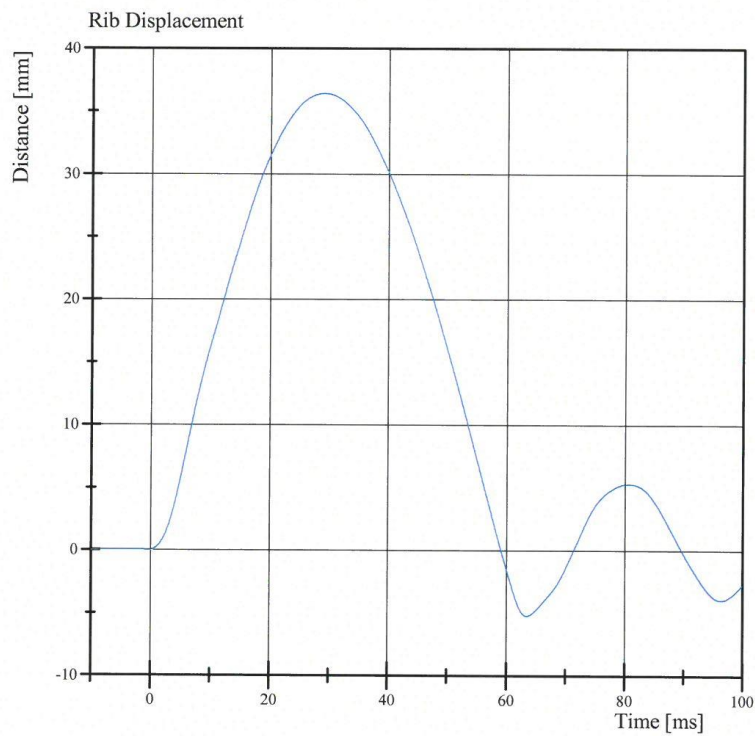
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 12:58:57 859



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.4 mm at 29.0 ms
Min: -5.2 mm at 63.5 ms

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

11.14.2016 12:59:32 859



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

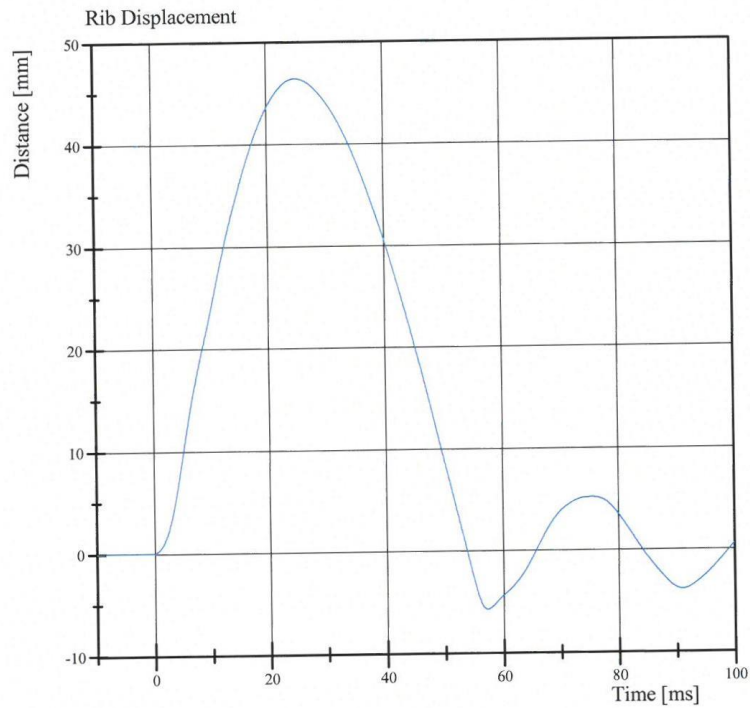
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 12:51:54 703



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 46.4 mm at 25.1 ms
Min: -5.7 mm at 57.3 ms

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

11.14.2016 12:52:32 703



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

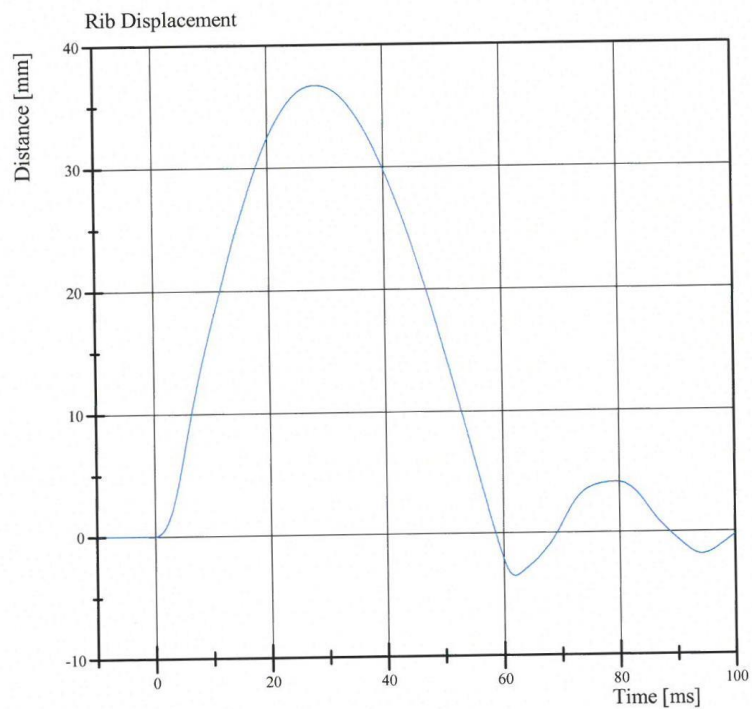
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:16:16 879



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.7 mm at 28.5 ms
Min: -3.5 mm at 62.0 ms

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

11.14.2016 13:16:52 879



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.9 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

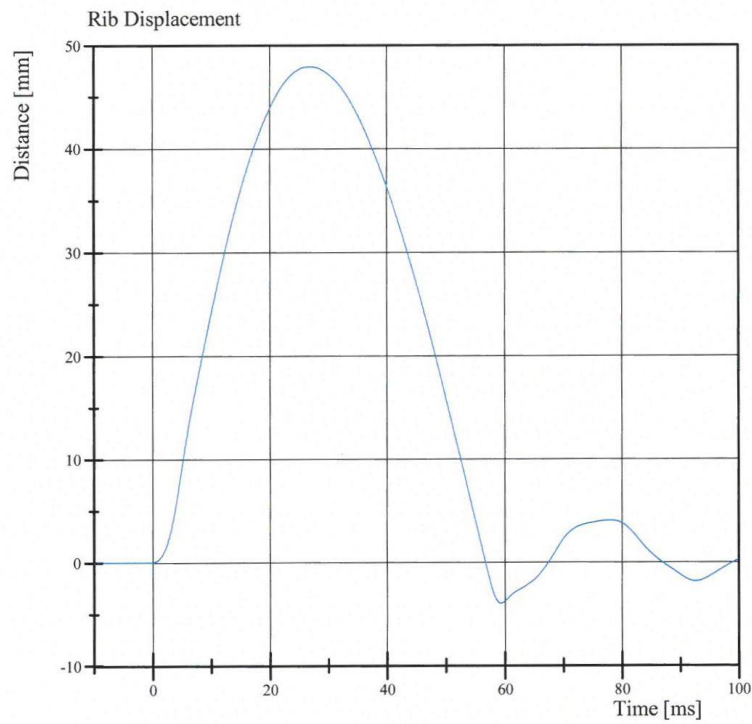
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:08:32 693



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 47.9 mm at 26.9 ms
Min: -3.9 mm at 59.4 ms

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

11.14.2016 13:09:05 693



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

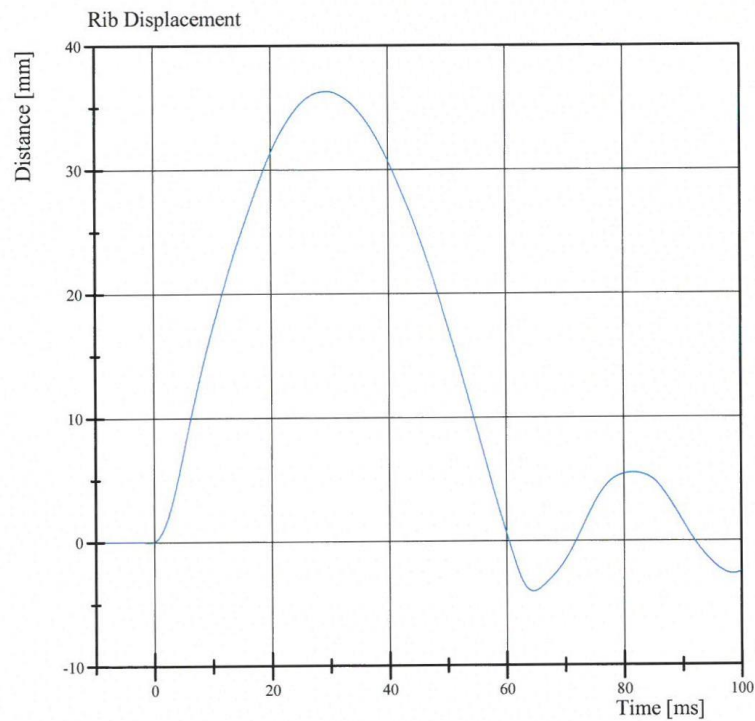
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:32:56 870



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.3 mm at 29.6 ms
Min: -4.0 mm at 64.6 ms

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

11.14.2016 13:33:39 870



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	47.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

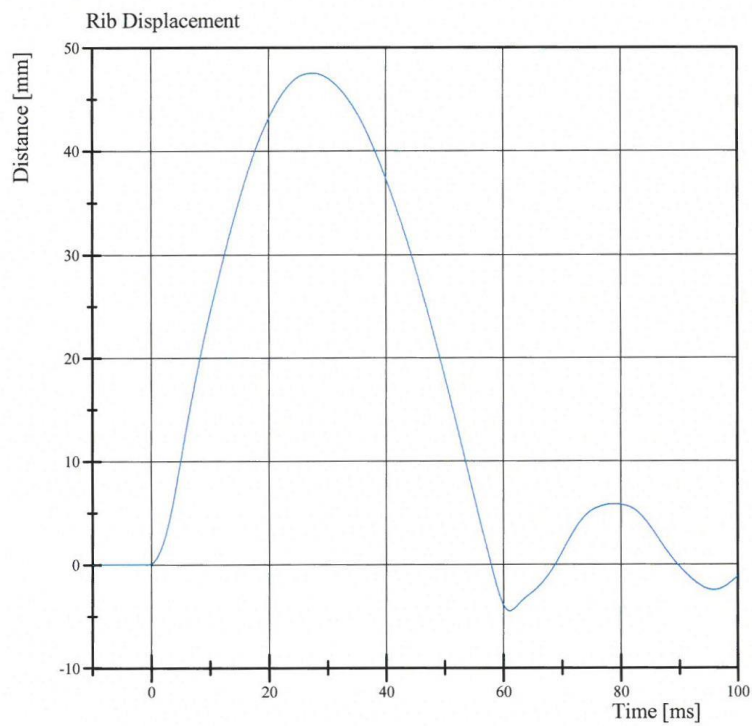
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 13:24:18 679



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 47.5 mm at 27.6 ms
Min: -4.5 mm at 61.1 ms

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

11.14.2016 13:25:14 679



Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.553 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,172.6 N	Yes
Upper Rib Displacement	34 - 41 mm	36.8 mm	Yes
Center Rib Displacement	37 - 45 mm	41.9 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.1 mm	Yes

Test meets specifications.

Comments:

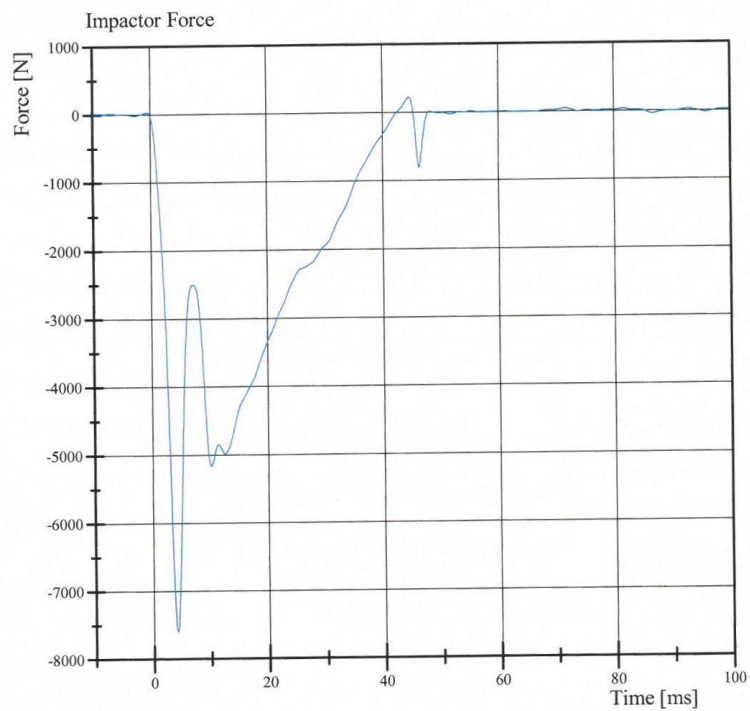
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:47:03 432



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 220.1 N at 44.6 ms
Min: -7,608.6 N at 4.2 ms

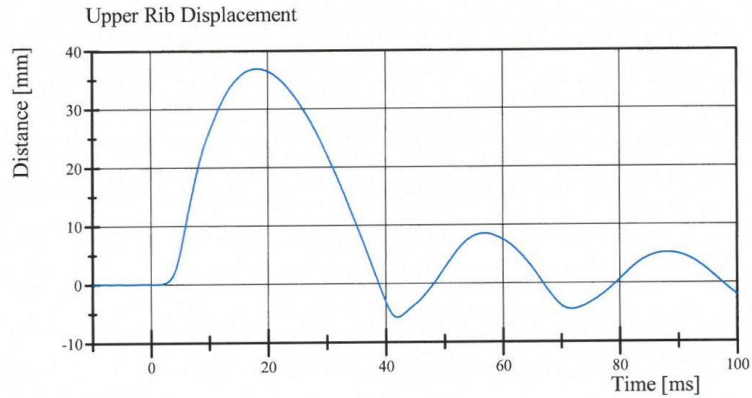
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:47:53 432

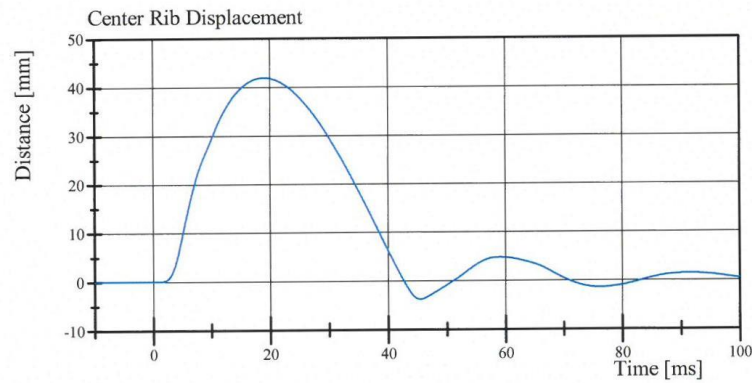


Transportation Research Center Inc.

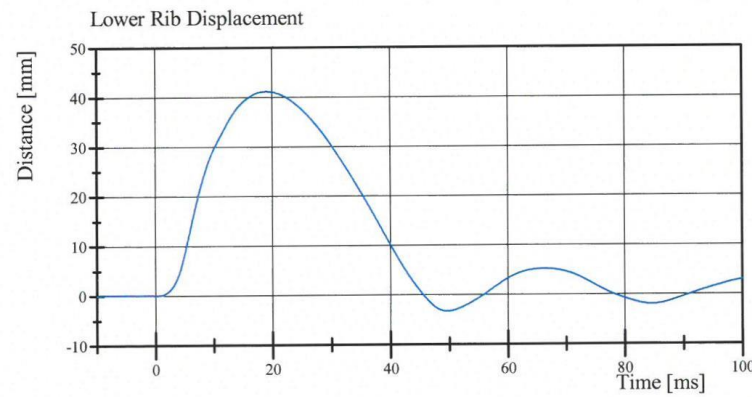
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 36.8 mm at 18.2 ms
Min: -5.8 mm at 42.0 ms



Filter Class: CFC_180
Max: 41.9 mm at 19.0 ms
Min: -3.8 mm at 45.4 ms



Filter Class: CFC_180
Max: 41.1 mm at 19.1 ms
Min: -3.3 mm at 49.7 ms

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

11.14.2016 15:47:55 432



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,010.6 N	Yes
Time of Peak	10.6 - 13.0 ms	11.36 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,382.3 N	Yes
Time of Peak	10.0 - 12.3 ms	11.04 ms	Yes

Test meets specifications.

Comments:

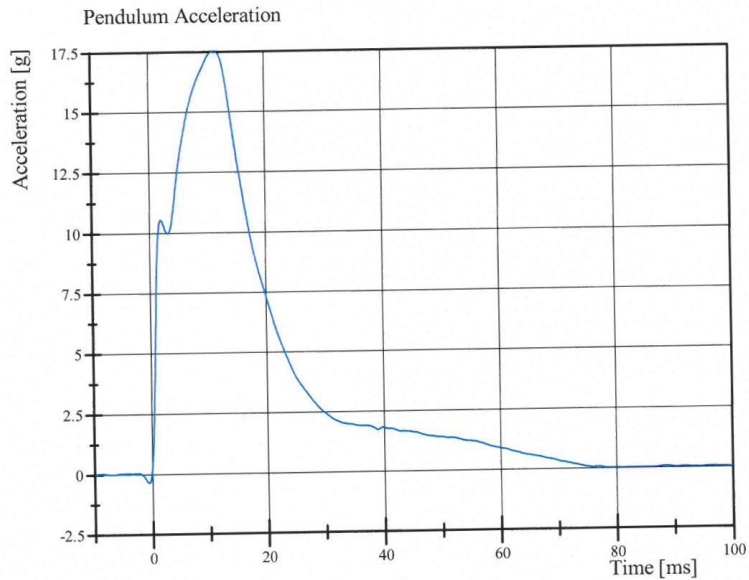
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:56:25 552

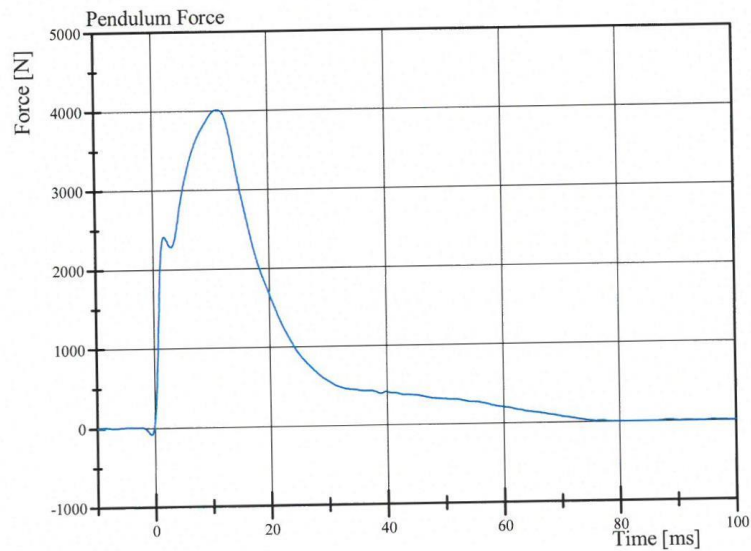


Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



Filter Class: CFC_180
Max: 17.5 g at 11.4 ms
Min: -0.4 g at -0.6 ms



Filter Class: CFC_180
Max: 4,010.6 N at 11.4 ms
Min: -85.7 N at -0.6 ms

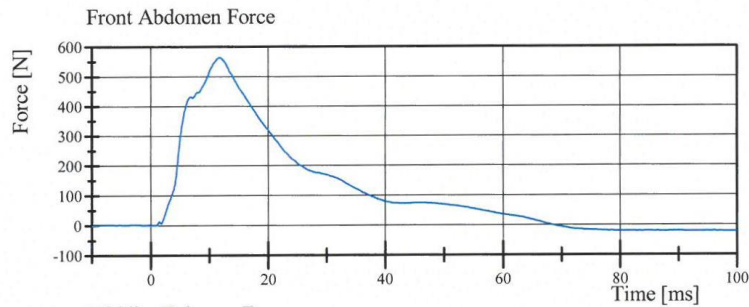
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 15:56:49 552

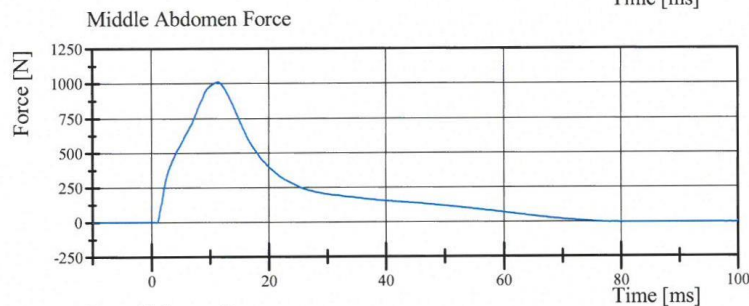


Transportation Research Center Inc.

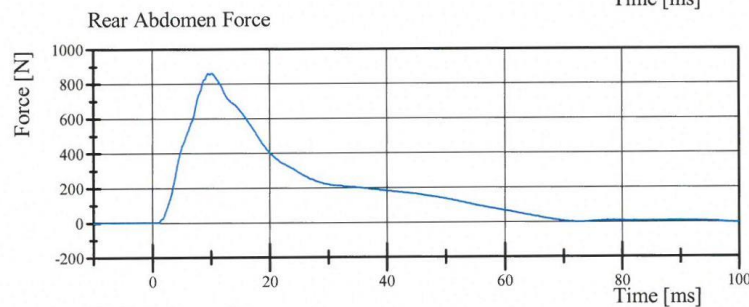
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 42-1
Test Date: 11/14/2016



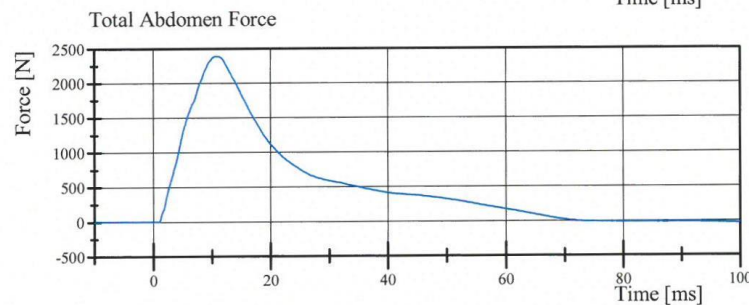
Filter Class: CFC_600
Max: 562.8 N at 11.8 ms
Min: -21.6 N at 98.1 ms



Filter Class: CFC_600
Max: 1,008.7 N at 11.4 ms
Min: -3.8 N at 99.2 ms



Filter Class: CFC_600
Max: 860.4 N at 10.2 ms
Min: -4.2 N at 100.0 ms



Filter Class: CFC_600
Max: 2,382.3 N at 11.0 ms
Min: -29.1 N at 99.6 ms

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

11.14.2016 15:56:51 552



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 42-6

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.114 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-51.2 deg	Yes
Time of Peak	39 - 53 ms	45.5 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.1 ms	Yes

Test meets specifications.

Comments:

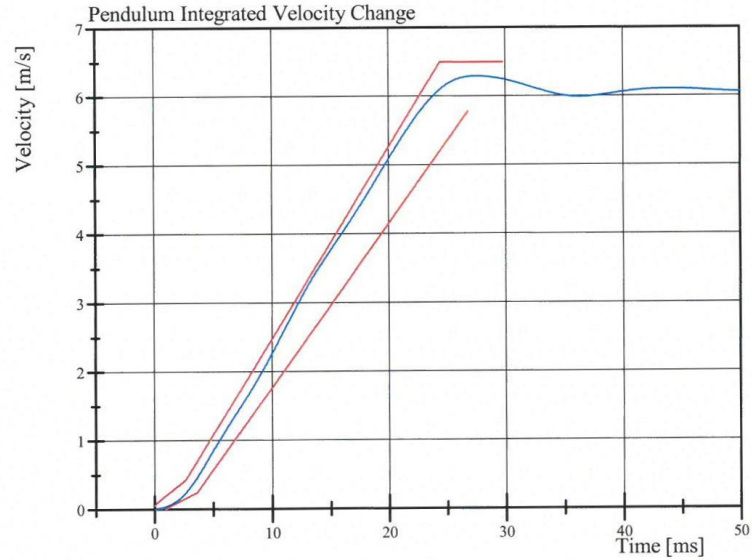
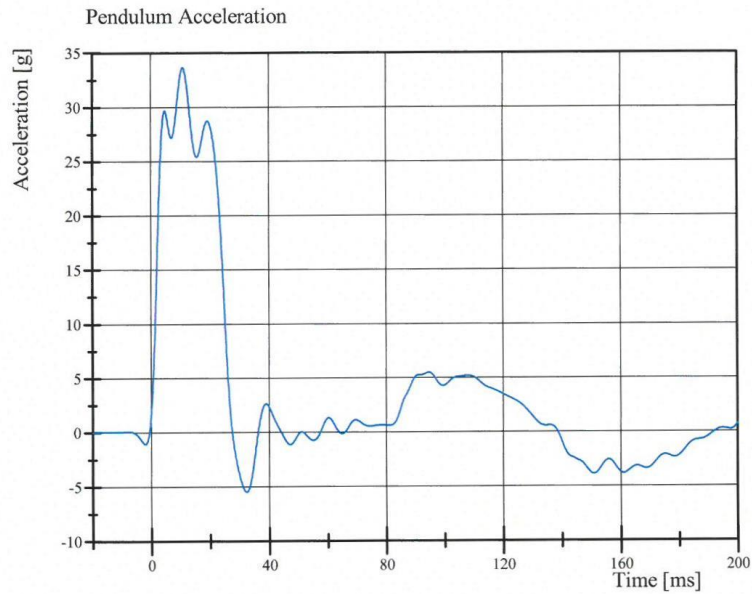
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 14:29:44 668



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 42-6
Test Date: 11/14/2016



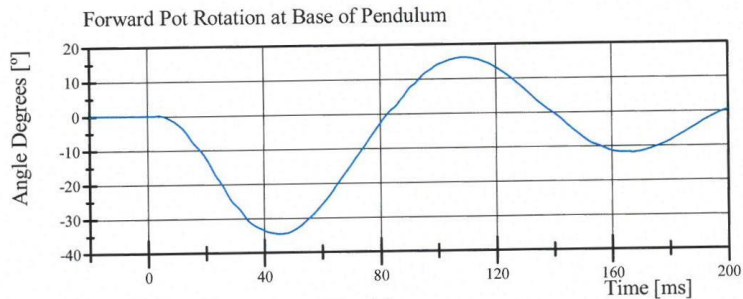
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.14.2016 14:30:14 668

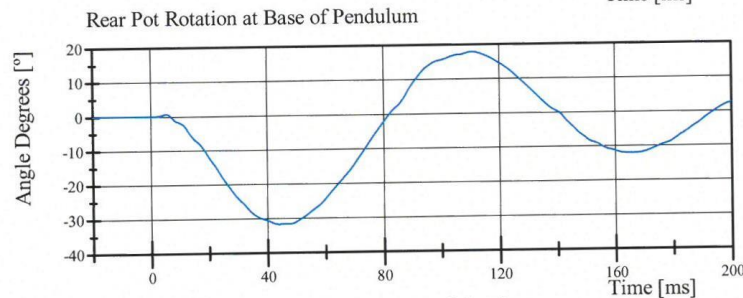


Transportation Research Center Inc.

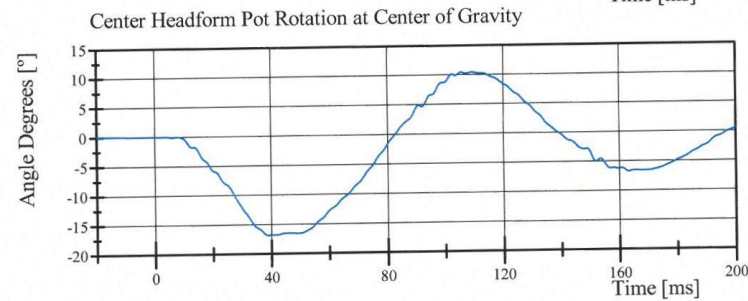
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 42-6
Test Date: 11/14/2016



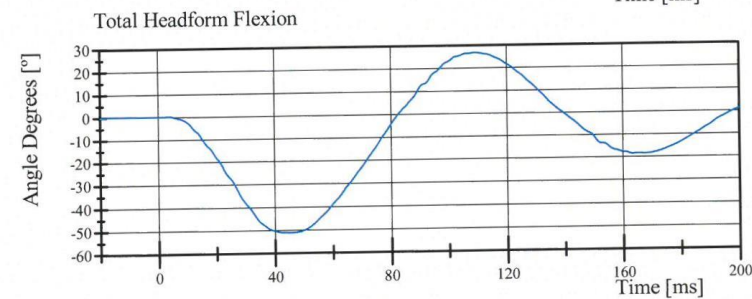
Filter Class: CFC_180
Max: 16.3 ° at 108.9 ms
Min: -34.6 ° at 45.4 ms



Filter Class: CFC_180
Max: 17.9 ° at 110.8 ms
Min: -31.7 ° at 44.0 ms



Filter Class: CFC_180
Max: 10.5 ° at 109.4 ms
Min: -16.9 ° at 39.0 ms



Filter Class: CFC_180
Max: 26.7 ° at 109.2 ms
Min: -51.2 ° at 45.5 ms

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

11.14.2016 14:30:15 668



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 42-1

Test Date: 11/14/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	22 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,118.4 N	Yes
Time of Peak	11.8 - 16.1 ms	12.80 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,297.4 N	Yes
Time of Peak	12.2 - 17.0 ms	13.28 ms	Yes

Test meets specifications.

Comments:

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

11.14.2016 16:01:58 524

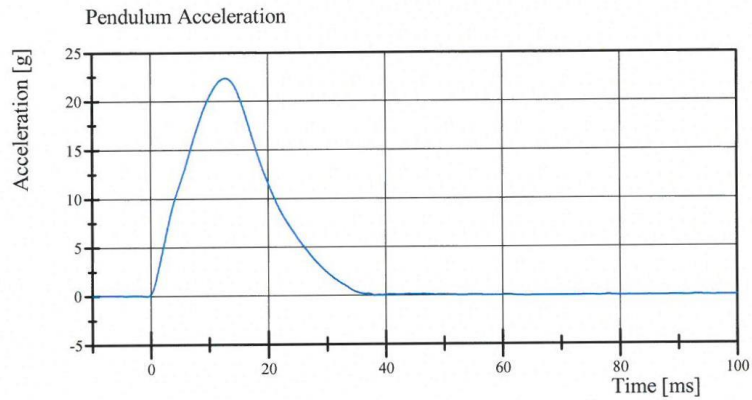


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 42-1

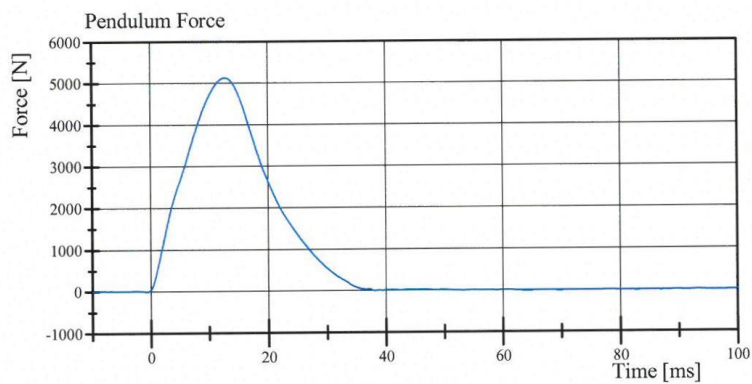
Test Date: 11/14/2016



Filter Class: CFC_180

Max: 22.3 g at 12.8 ms

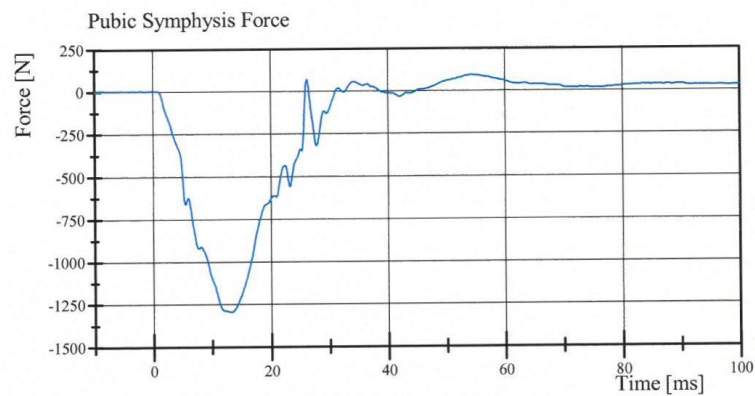
Min: -0.1 g at 64.2 ms



Filter Class: CFC_180

Max: 5,118.4 N at 12.8 ms

Min: -13.0 N at 64.2 ms



Filter Class: CFC_600

Max: 93.0 N at 54.4 ms

Min: -1,297.4 N at 13.3 ms

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

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Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 43

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	559	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	444	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	326	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	263	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. 43-3

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Resultant Acceleration	125 - 155 g	139.4 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.5 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

11.18.2016 10:12:15 362

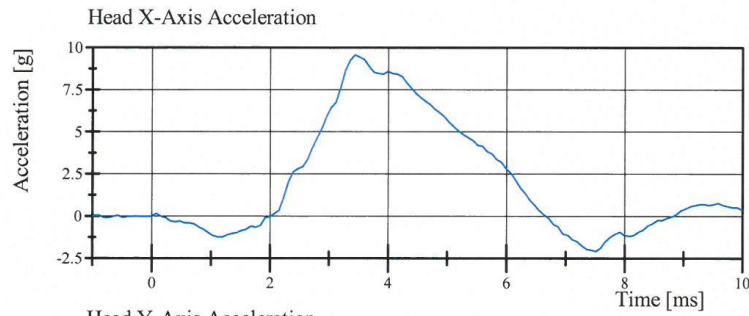


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 43-3

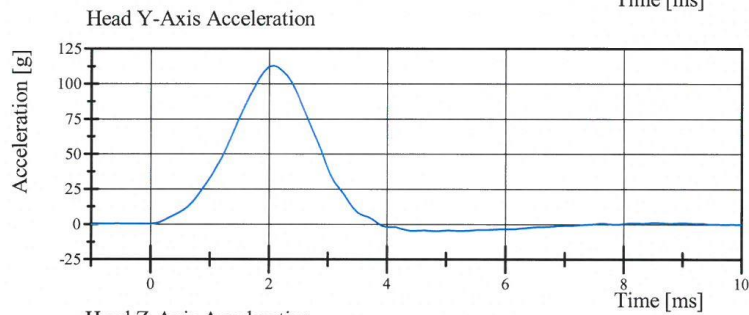
Test Date: 11/18/2016



Filter Class: CFC_1000

Max: 9.5 g at 3.4 ms

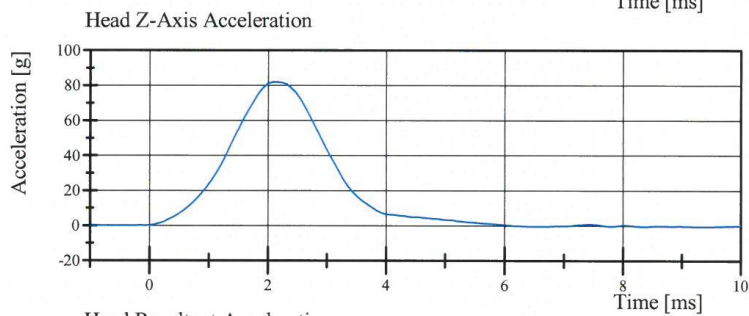
Min: -2.1 g at 7.5 ms



Filter Class: CFC_1000

Max: 112.8 g at 2.1 ms

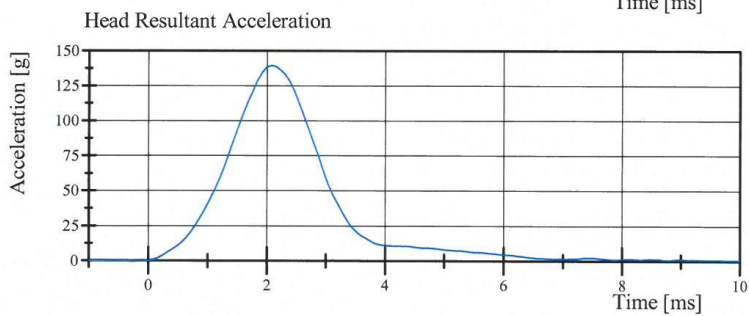
Min: -5.1 g at 4.8 ms



Filter Class: CFC_1000

Max: 81.9 g at 2.1 ms

Min: -0.4 g at 6.6 ms



Filter Class: CFC_1000

Max: 139.4 g at 2.1 ms

Min: 0.0 g at -0.6 ms

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

11.18.2016 10:12:27 362



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	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	-55.9 deg	Yes
Time of Peak	54 - 66 ms	56.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	67.4 ms	Yes

Test meets specifications.

Comments:

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

11.17.2016 14:21:12 1493

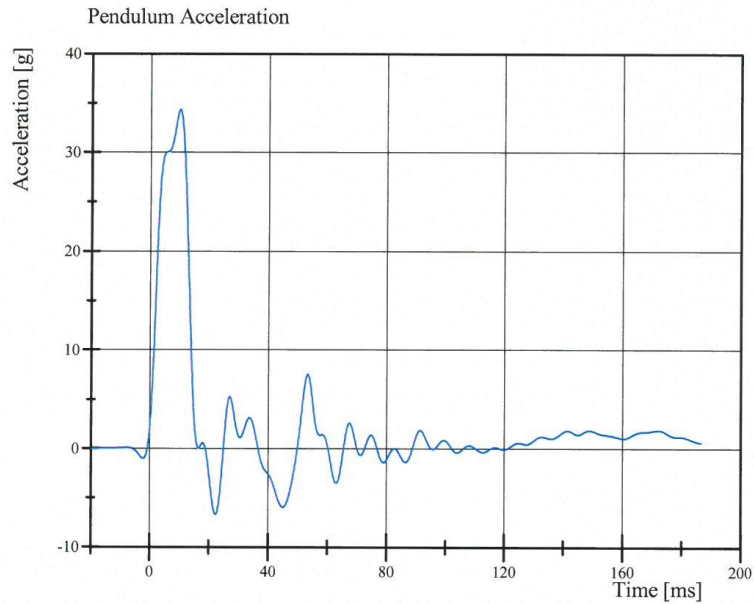


Transportation Research Center Inc.

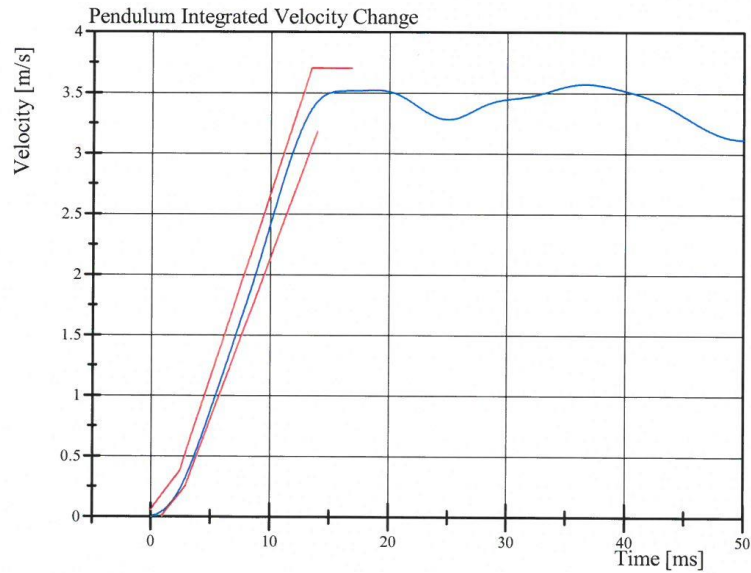
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Filter Class: CFC_60
Max: 34.3 g at 10.1 ms
Min: -6.8 g at 22.4 ms



Filter Class: CFC_60
Max: 3.6 m/s at 36.6 ms
Min: 0.0 m/s at 0.0 ms

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

11.17.2016 14:21:22 1493

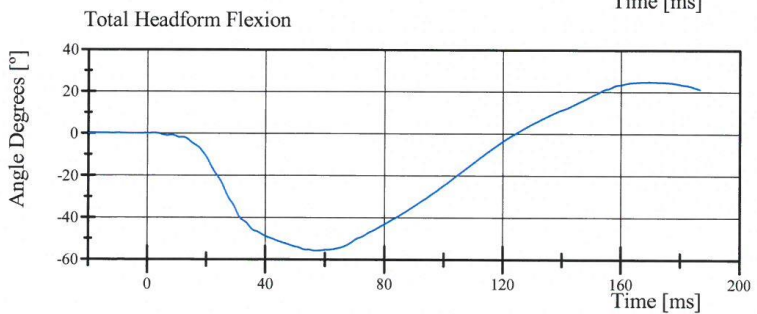
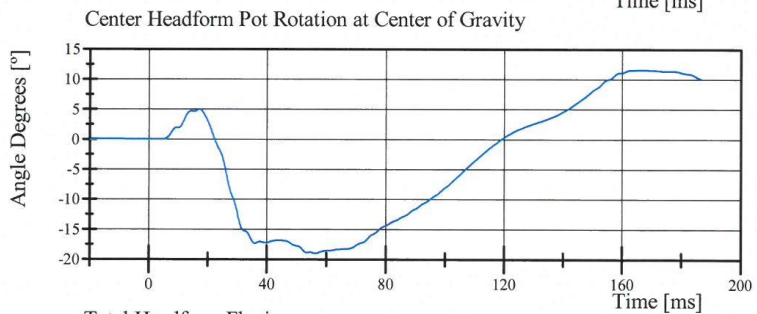
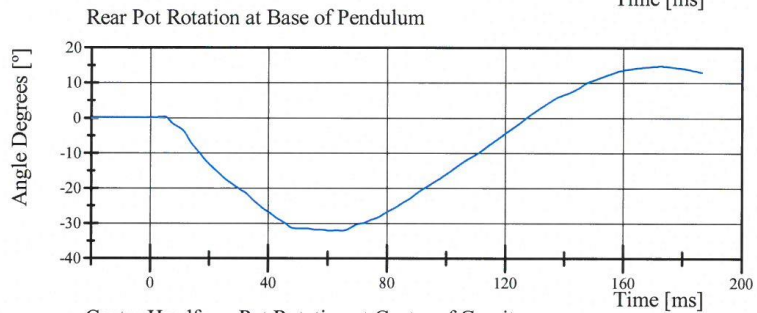
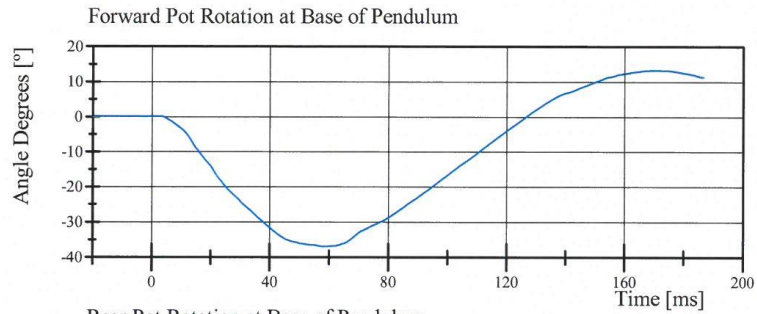


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



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

11.17.2016 14:21:23 1493



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.79 g	Yes

Test meets specifications.

Comments:

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

11.17.2016 15:22:38 541

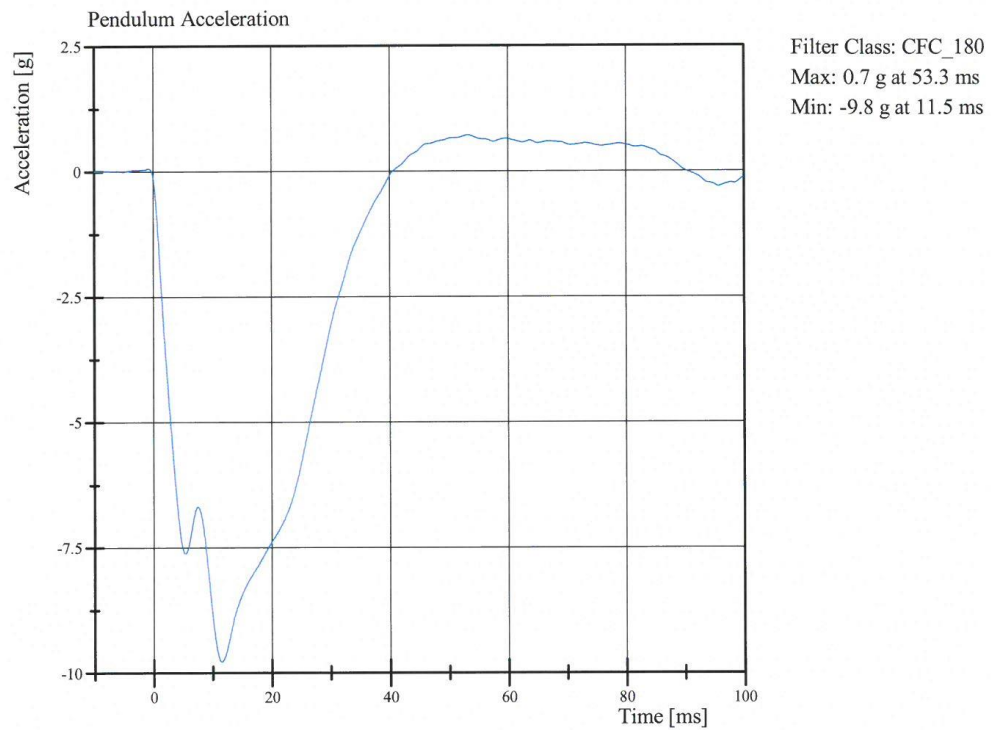


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



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

11.17.2016 15:23:14 541



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

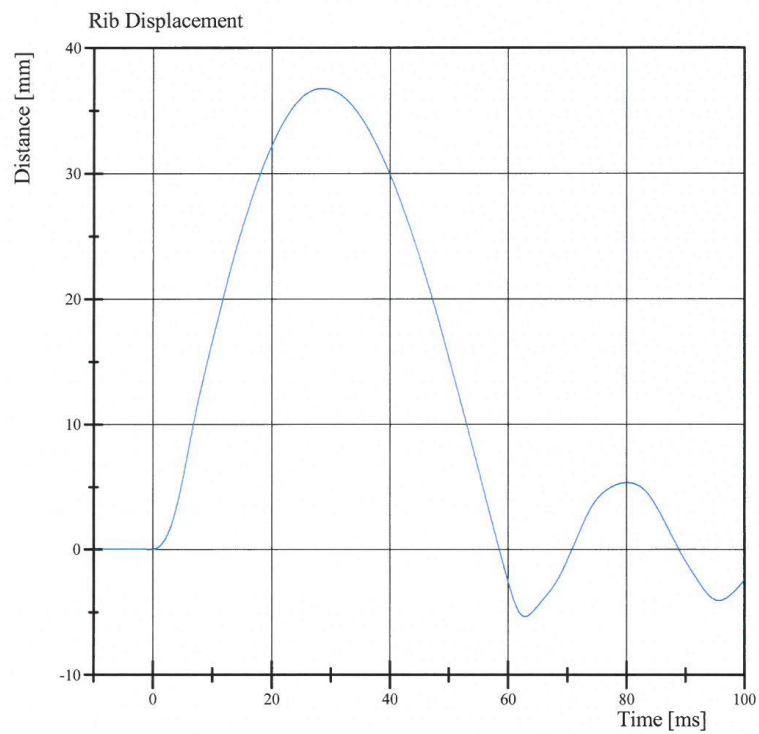
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:45:10 869



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 36.7 mm at 28.6 ms
Min: -5.4 mm at 62.9 ms

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

11.17.2016 13:45:23 869



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module

ES-2re Serial No. F030 Certification No. 43-2

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

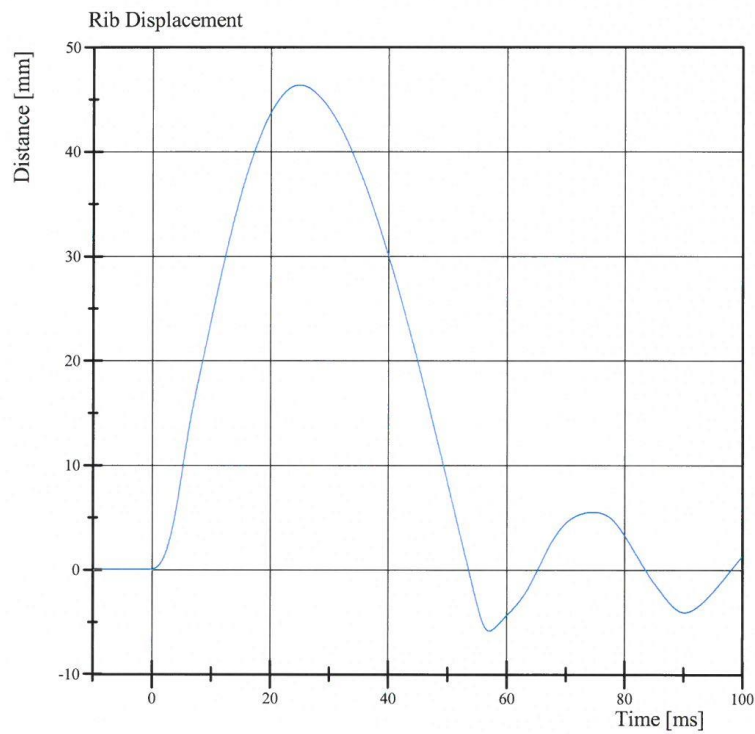
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:35:45 699



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 43-2
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 46.3 mm at 25.0 ms
Min: -5.9 mm at 57.1 ms

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

11.17.2016 13:36:27 699



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

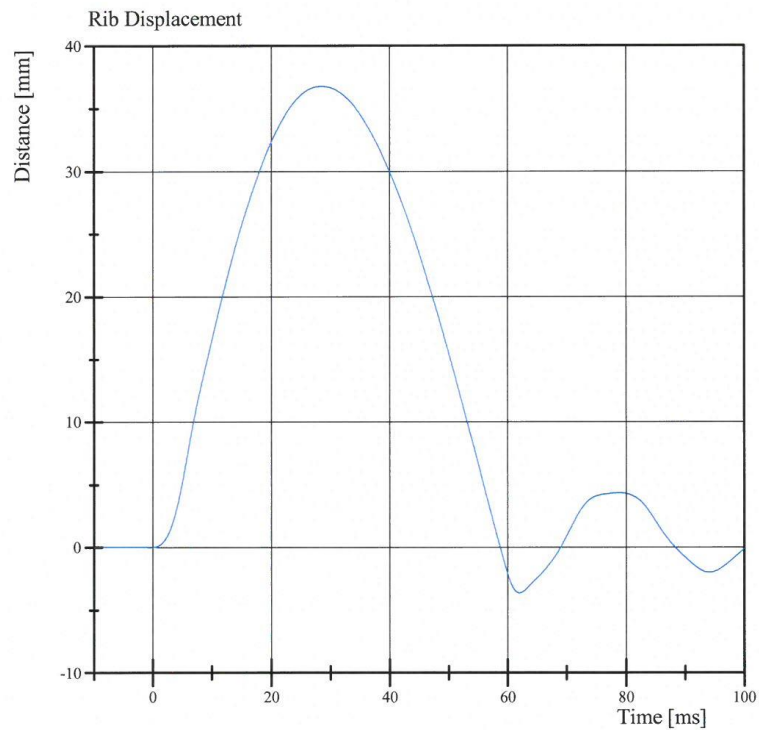
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:57:16 890



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 36.8 mm at 28.5 ms
Min: -3.6 mm at 62.0 ms

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

11.17.2016 13:57:23 890



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.2 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

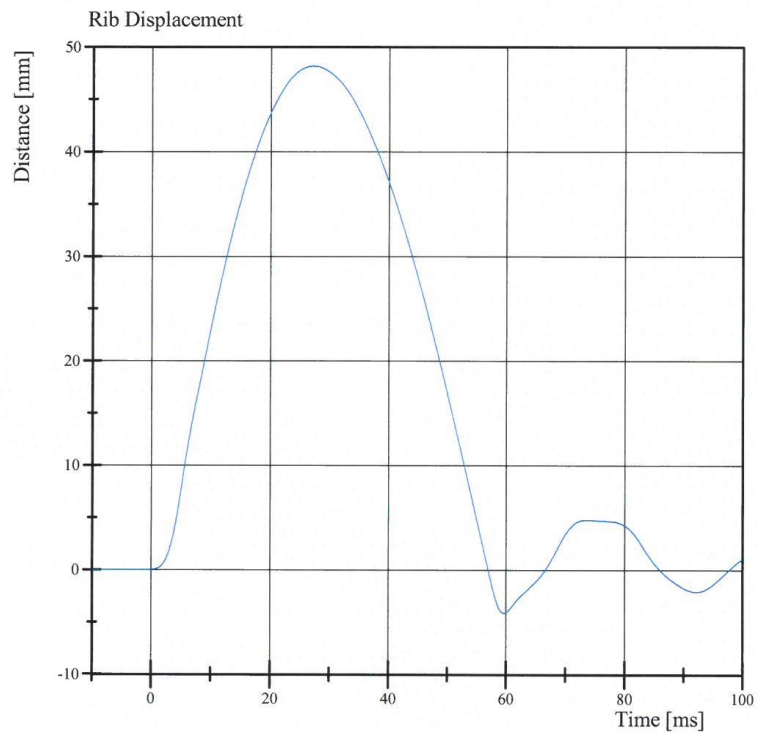
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 13:51:44 702



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 48.2 mm at 27.2 ms
Min: -4.1 mm at 59.7 ms

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

11.17.2016 13:51:53 702



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

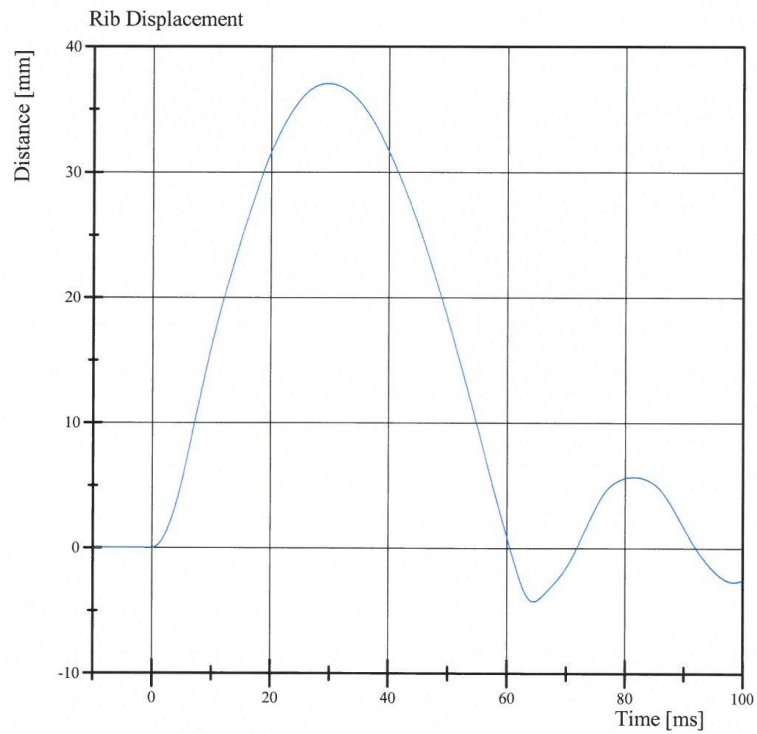
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:11:03 866



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 37.0 mm at 29.6 ms
Min: -4.2 mm at 64.5 ms

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

11.17.2016 14:11:14 866



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

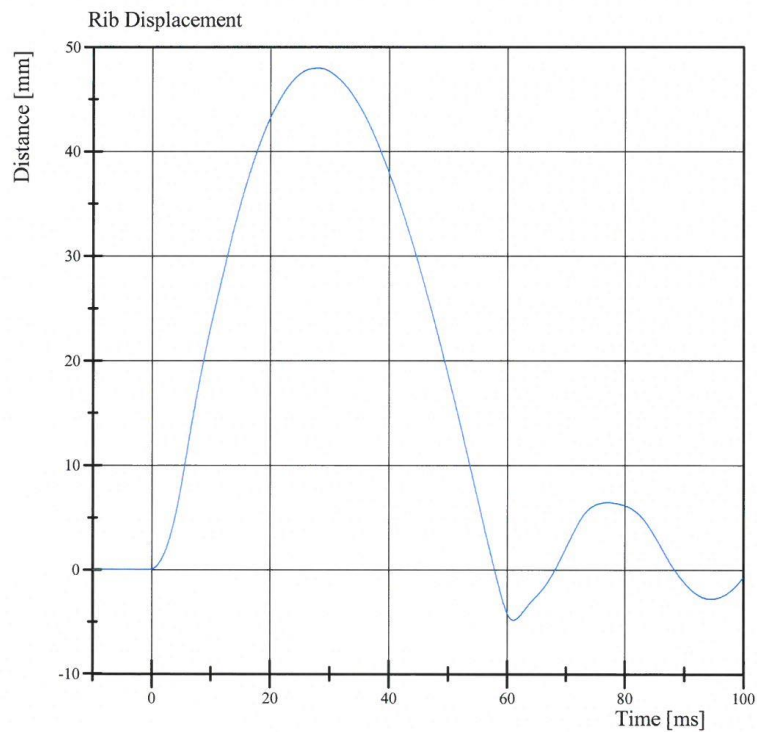
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

11.17.2016 14:03:17 697



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 48.0 mm at 28.0 ms
Min: -4.8 mm at 61.1 ms

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

11.17.2016 14:03:29 697



Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.547 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,172.6 N	Yes
Upper Rib Displacement	34 - 41 mm	37.7 mm	Yes
Center Rib Displacement	37 - 45 mm	42.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.9 mm	Yes

Test meets specifications.

Comments:

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

11.17.2016 15:29:07 445

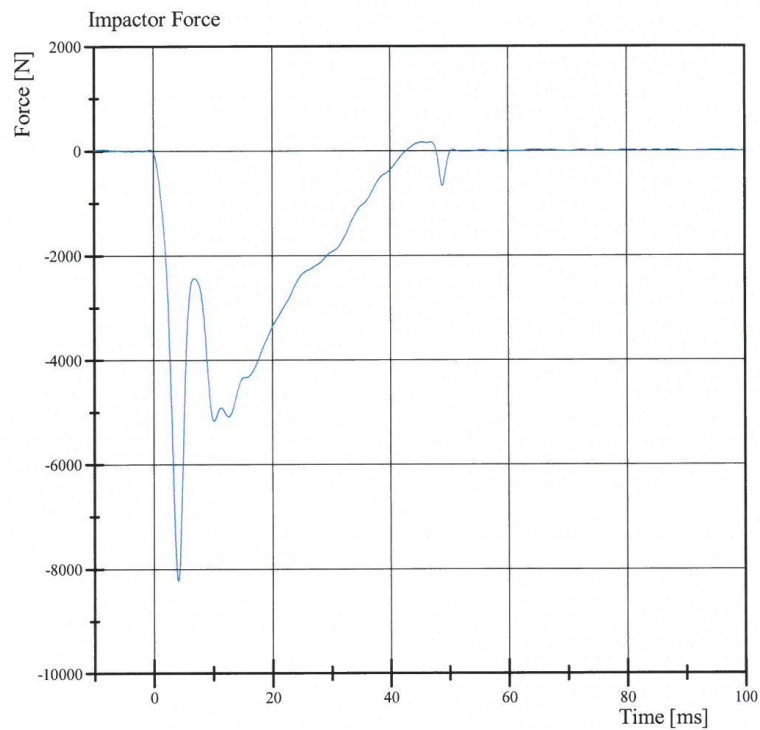


Transportation Research Center Inc.

Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Filter Class: CFC_180
Max: 164.2 N at 46.9 ms
Min: -8,241.4 N at 4.1 ms

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

11.17.2016 15:29:53 445

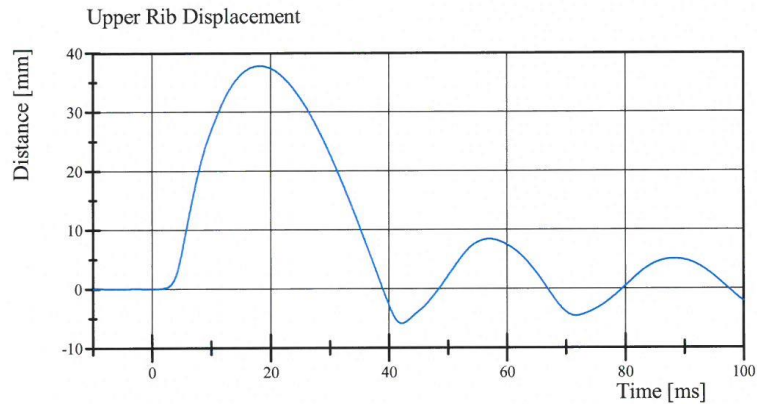


Transportation Research Center Inc.

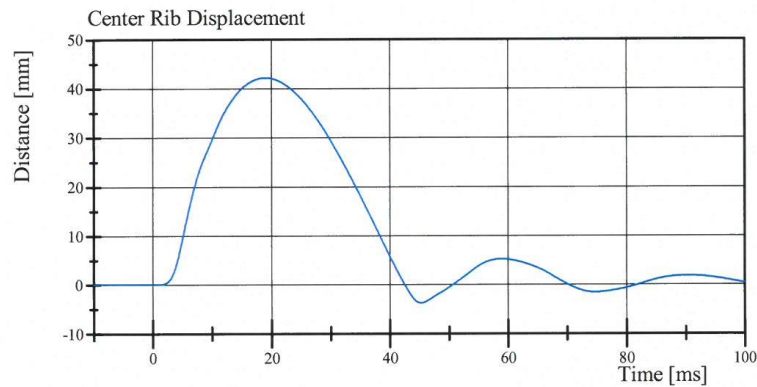
Left Lateral Thorax

ES-2re Serial No. F030 Certification No. 43-1

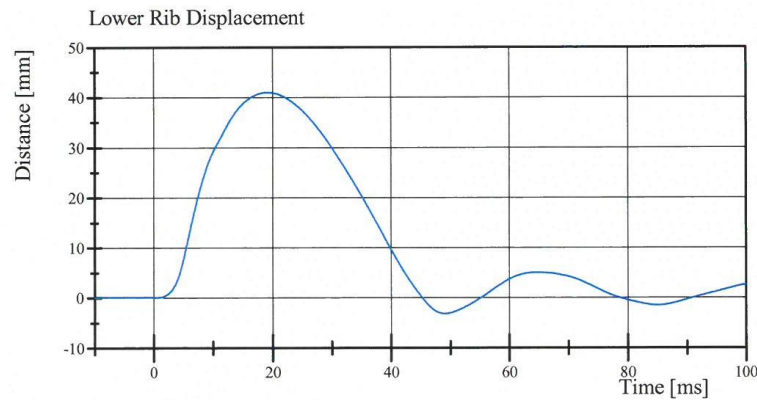
Test Date: 11/17/2016



Filter Class: CFC_180
Max: 37.7 mm at 18.2 ms
Min: -5.9 mm at 42.2 ms



Filter Class: CFC_180
Max: 42.1 mm at 19.0 ms
Min: -3.8 mm at 45.2 ms



Filter Class: CFC_180
Max: 40.9 mm at 19.2 ms
Min: -3.2 mm at 49.1 ms

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

11.17.2016 15:29:54 445



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,006.9 N	Yes
Time of Peak	10.6 - 13.0 ms	12.16 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,418.1 N	Yes
Time of Peak	10.0 - 12.3 ms	10.64 ms	Yes

Test meets specifications.

Comments:

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

11.17.2016 15:36:22 576

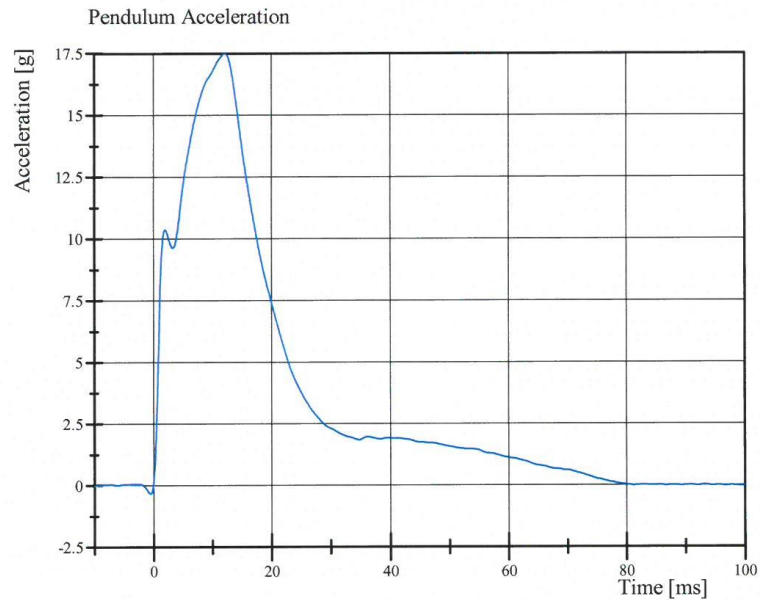


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 43-1

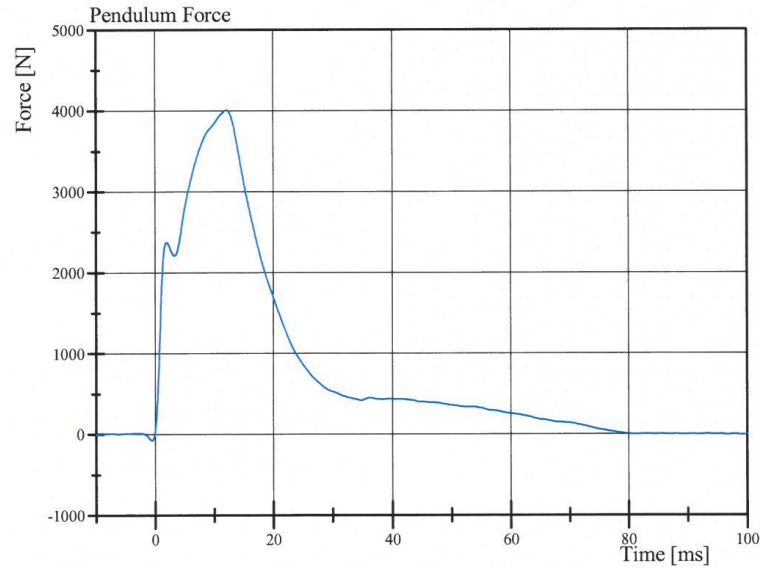
Test Date: 11/17/2016



Filter Class: CFC_180

Max: 17.5 g at 12.2 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,006.9 N at 12.2 ms

Min: -81.5 N at -0.5 ms

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

11.17.2016 15:36:52 576

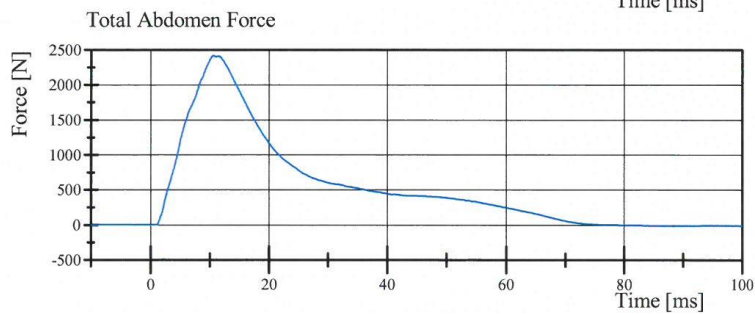
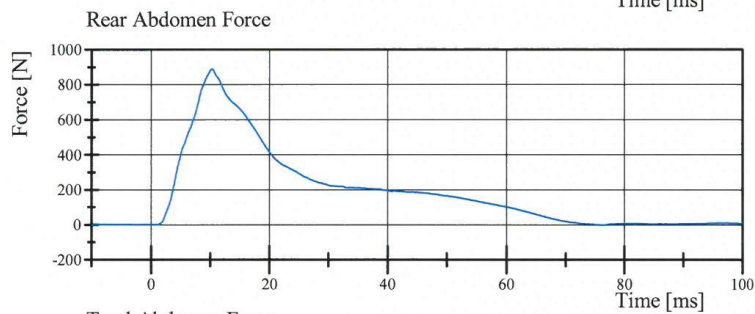
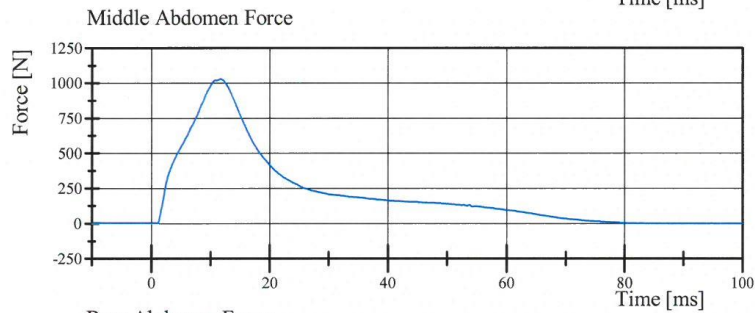
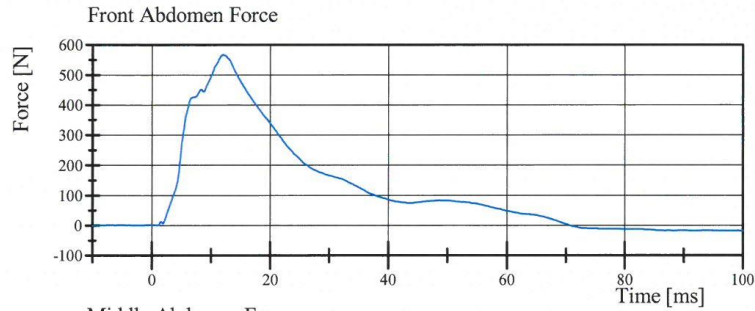


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



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

11.17.2016 15:36:52 576



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.105 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-52.7 deg	Yes
Time of Peak	39 - 53 ms	44.7 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	38.7 ms	Yes

Test meets specifications.

Comments:

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

11.17.2016 13:32:09 669

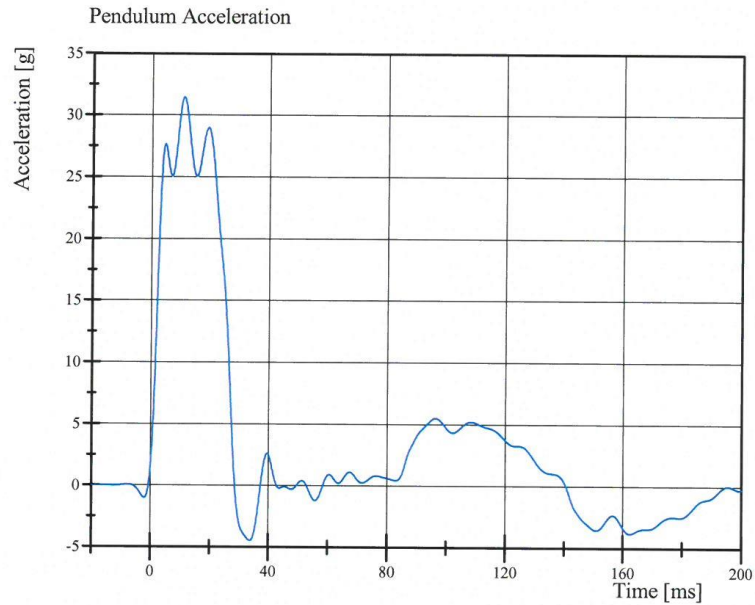


Transportation Research Center Inc.

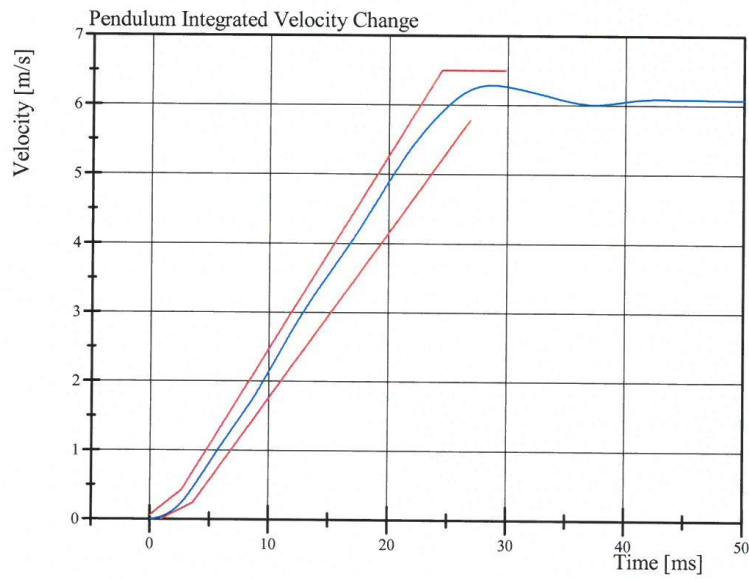
Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



Filter Class: CFC_60
Max: 31.4 g at 10.9 ms
Min: -4.5 g at 33.8 ms



Filter Class: CFC_60
Max: 6.3 m/s at 28.6 ms
Min: 0.0 m/s at 0.0 ms

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

11.17.2016 13:32:24 669

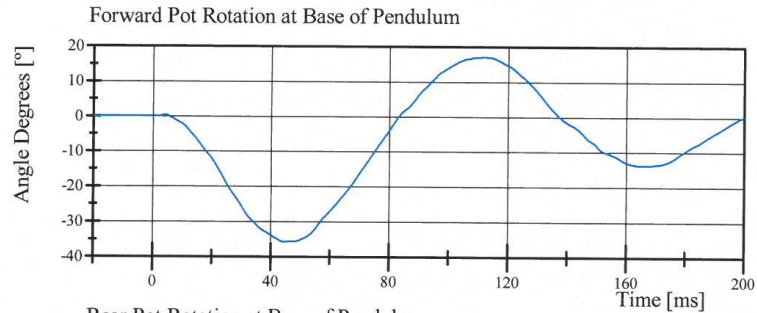


Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 43-1

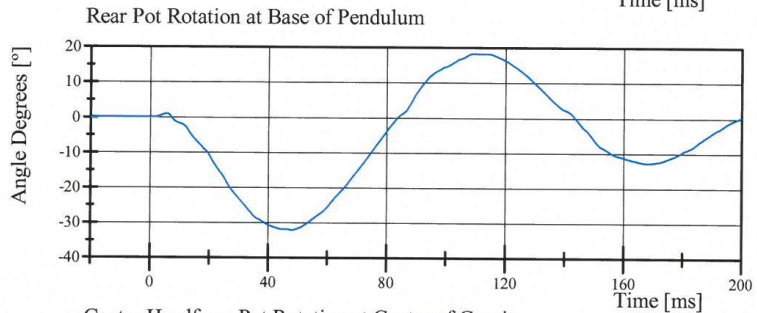
Test Date: 11/17/2016



Filter Class: CFC_180

Max: 17.0 ° at 111.9 ms

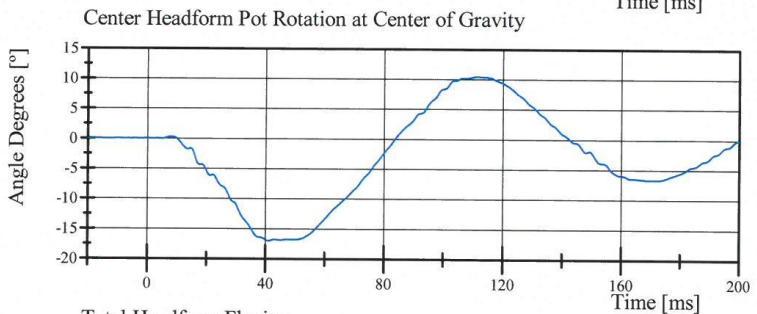
Min: -35.8 ° at 44.6 ms



Filter Class: CFC_180

Max: 18.3 ° at 109.4 ms

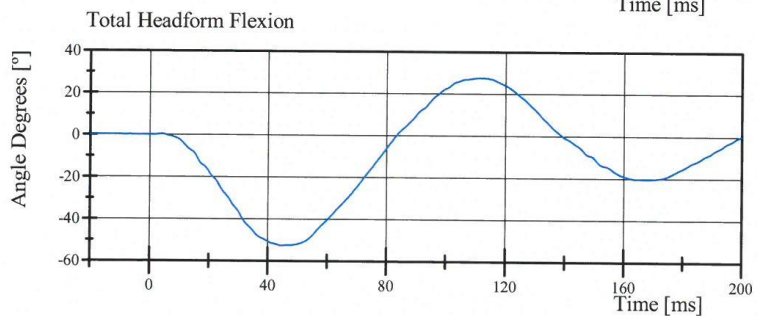
Min: -32.1 ° at 48.2 ms



Filter Class: CFC_180

Max: 10.5 ° at 111.4 ms

Min: -17.0 ° at 41.1 ms



Filter Class: CFC_180

Max: 27.5 ° at 111.6 ms

Min: -52.7 ° at 44.7 ms

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

11.17.2016 13:32:25 669



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 43-1
Test Date: 11/17/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,166.1 N	Yes
Time of Peak	11.8 - 16.1 ms	13.44 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,262.0 N	Yes
Time of Peak	12.2 - 17.0 ms	13.12 ms	Yes

Test meets specifications.

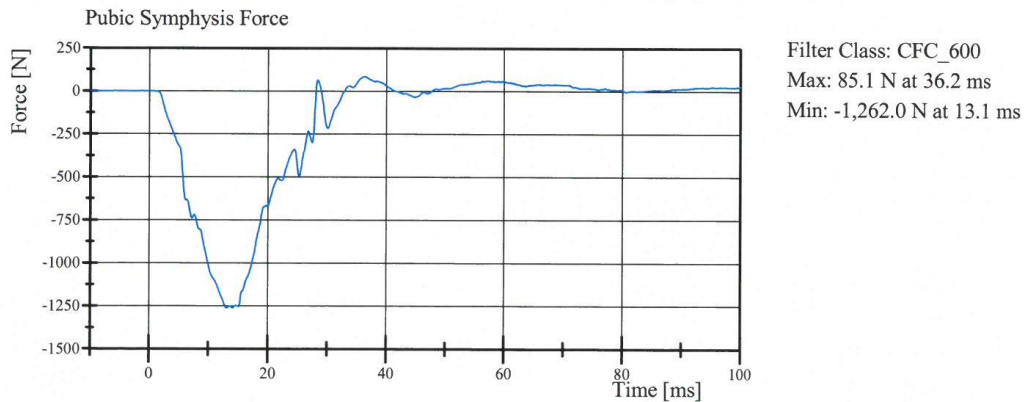
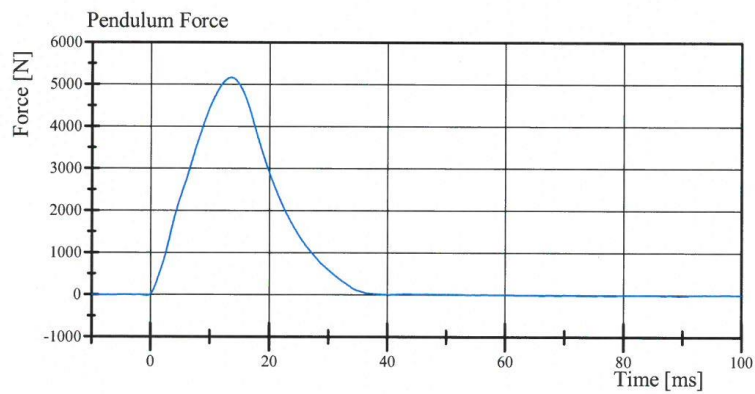
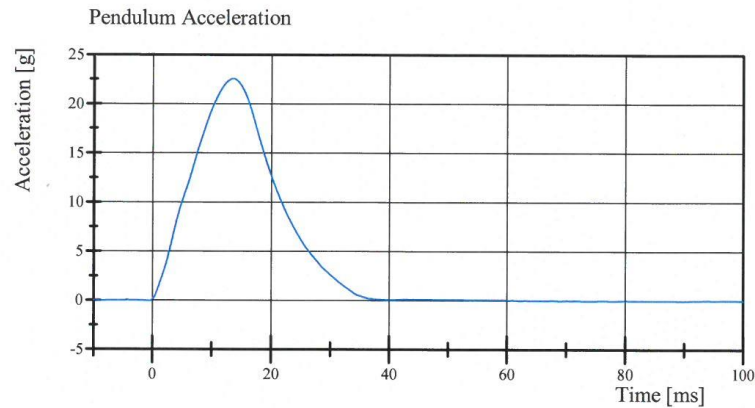
Comments:

Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 43-1

Test Date: 11/17/2016



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

11.17.2016 15:41:44 557



Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.49

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. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	118.6 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:

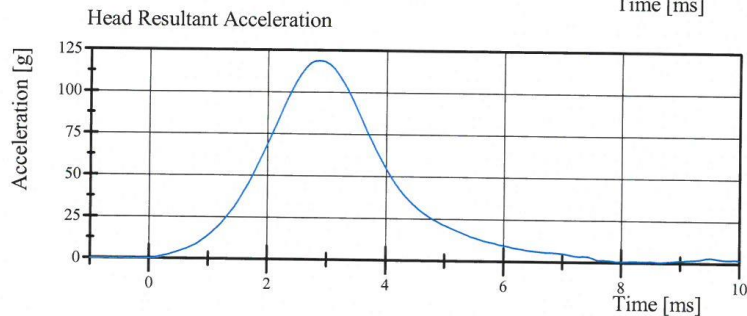
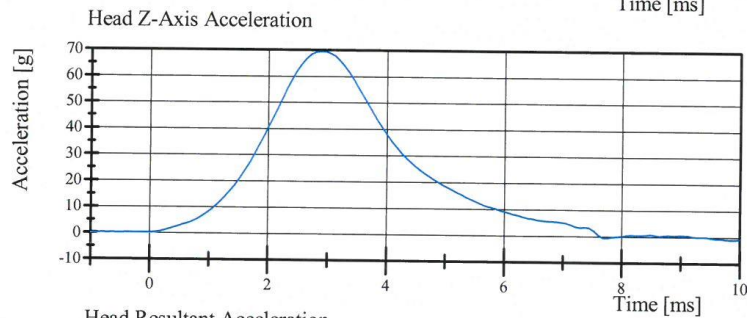
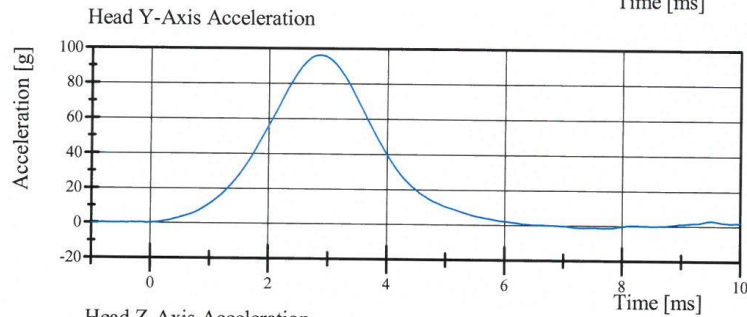
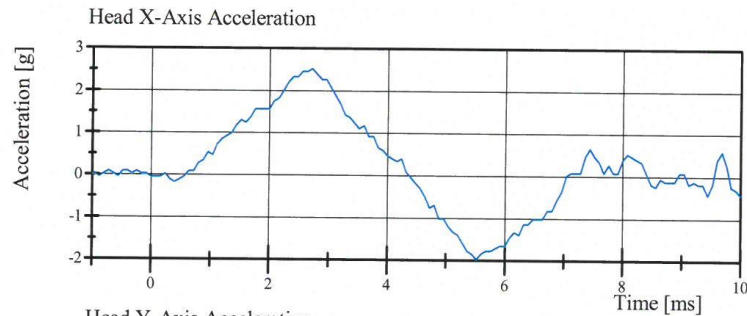
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.11.2016 11:35:52 232



Transportation Research Center Inc.

Left Lateral Head Drop
SID II_s Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



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

11.11.2016 11:36:00 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.610 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.629 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	4.014 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.395 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.788 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.790 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-77.3 deg	Yes
Time of Peak	50 - 70 ms	60.1 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	43.3 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	115.8 ms	Yes

Test meets specifications.

Comments:

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

11.11.2016 12:15:49 739

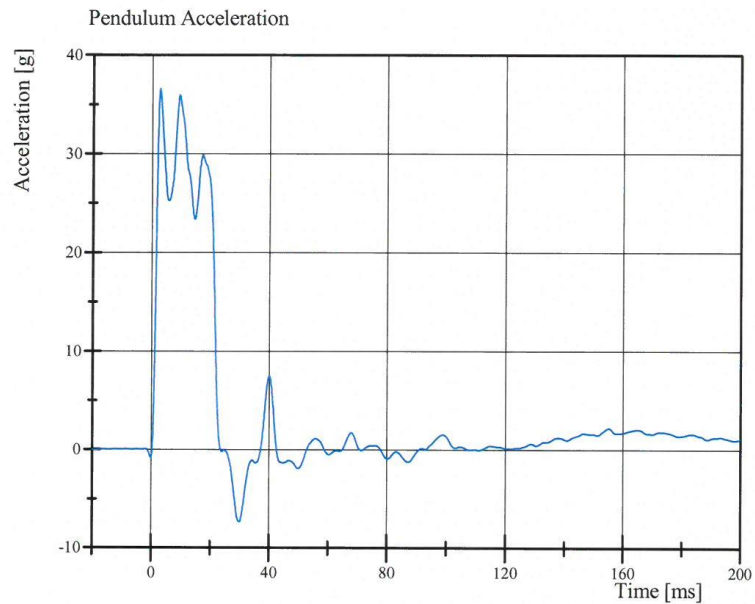


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 49-1

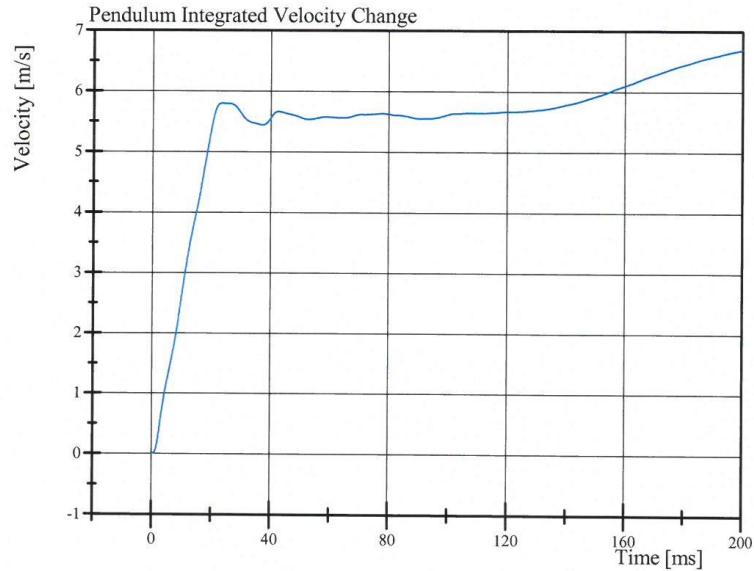
Test Date: 11/11/2016



Filter Class: CFC_180

Max: 36.5 g at 2.7 ms

Min: -7.4 g at 29.9 ms



Filter Class: CFC_180

Max: 6.7 m/s at 200.0 ms

Min: -0.0 m/s at 0.2 ms

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

11.11.2016 12:15:59 739

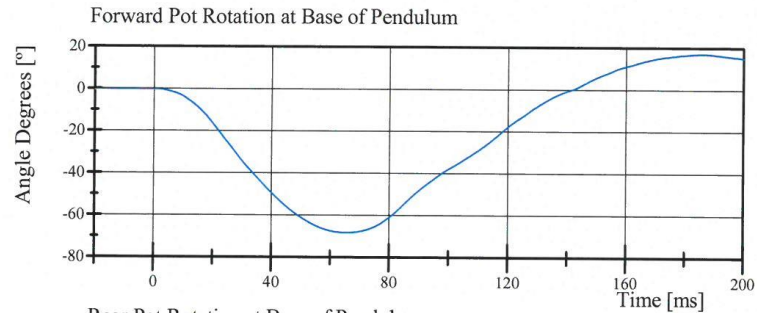


Transportation Research Center Inc.

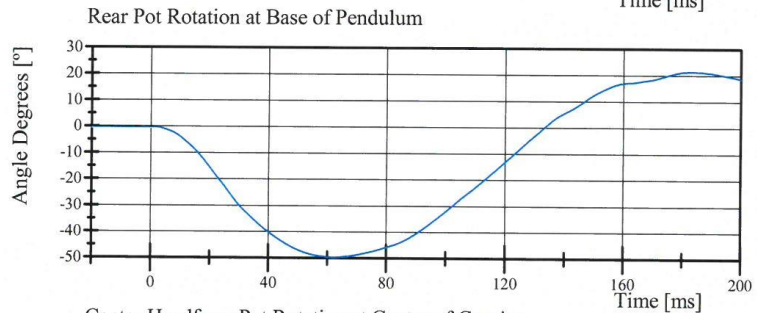
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 49-1

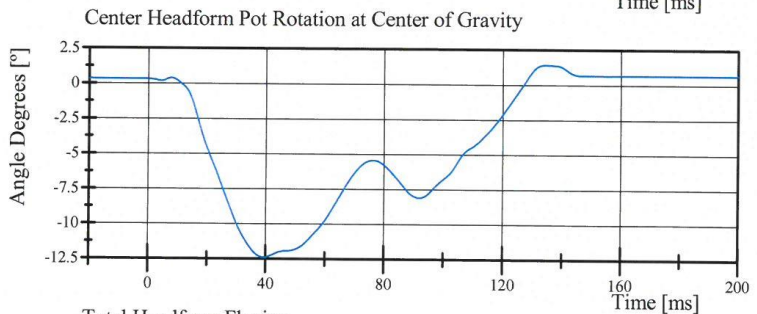
Test Date: 11/11/2016



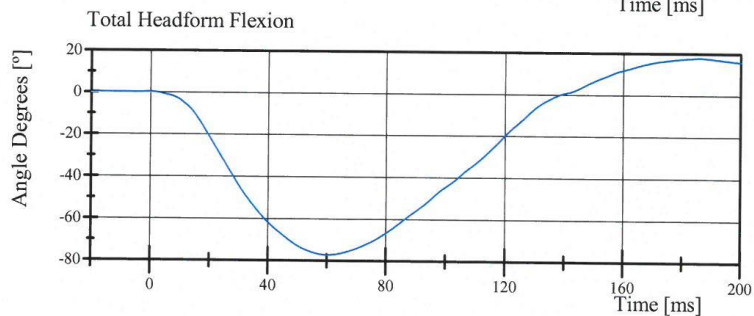
Filter Class: CFC_60
Max: 17.1 ° at 186.0 ms
Min: -68.4 ° at 65.6 ms



Filter Class: CFC_60
Max: 21.4 ° at 183.3 ms
Min: -49.7 ° at 62.0 ms



Filter Class: CFC_60
Max: 1.4 ° at 134.2 ms
Min: -12.4 ° at 39.3 ms



Filter Class: CFC_60
Max: 17.8 ° at 186.0 ms
Min: -77.3 ° at 60.1 ms

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

11.11.2016 12:16:00 739

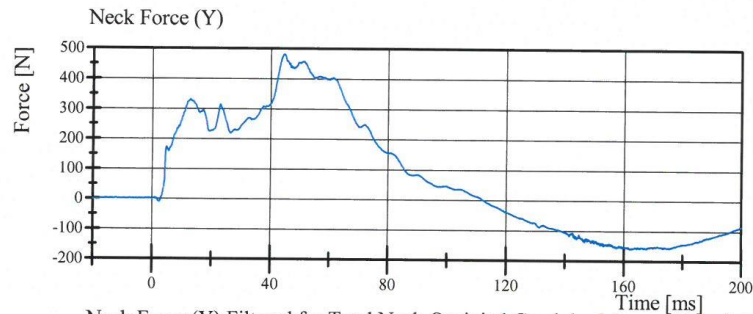


Transportation Research Center Inc.

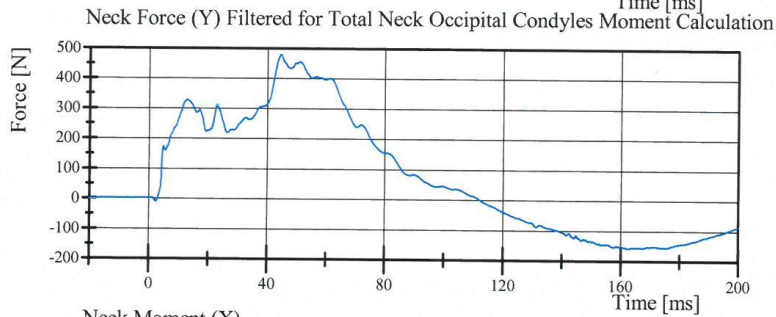
Left Lateral Neck

SID II_s Serial No. 305 Certification No. 49-1

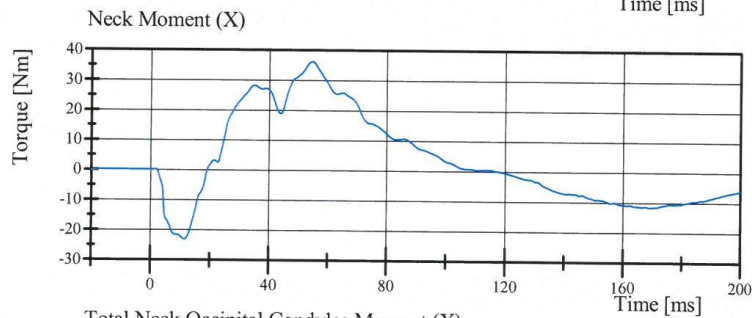
Test Date: 11/11/2016



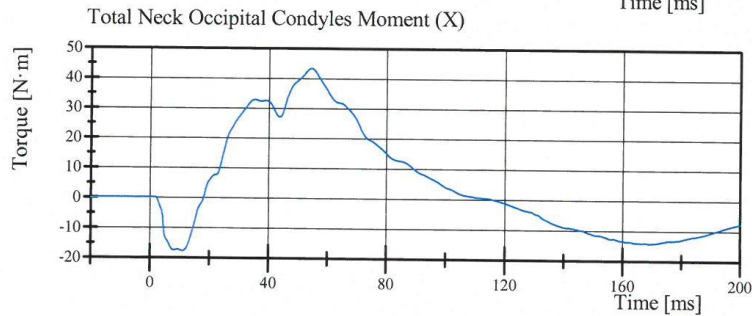
Filter Class: CFC_1000
Max: 479.8 N at 44.5 ms
Min: -160.2 N at 162.3 ms



Filter Class: CFC_600
Max: 479.1 N at 44.5 ms
Min: -158.9 N at 162.2 ms



Filter Class: CFC_600
Max: 36.1 Nm at 54.7 ms
Min: -23.2 Nm at 11.4 ms



Filter Class: Without_(Consta
Max: 43.3 N·m at 54.6 ms
Min: -17.9 N·m at 11.0 ms

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

11.11.2016 12:16:01 739



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.1 g	Yes
Shoulder Displacement	28 - 37 mm	30.6 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.1 g	Yes

Test meets specifications.

Comments:

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

11.11.2016 11:04:15 875

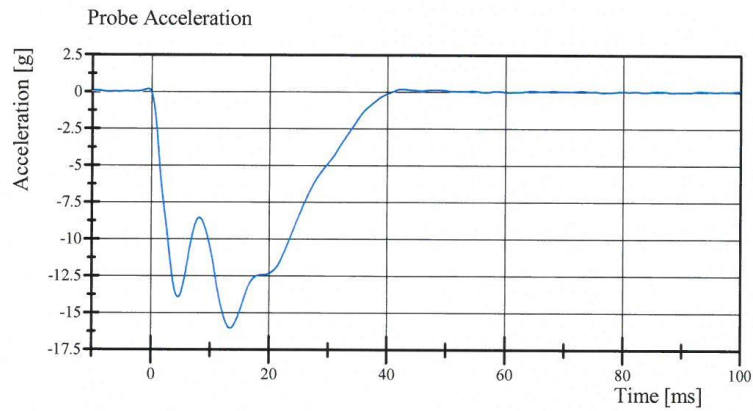


Transportation Research Center Inc.

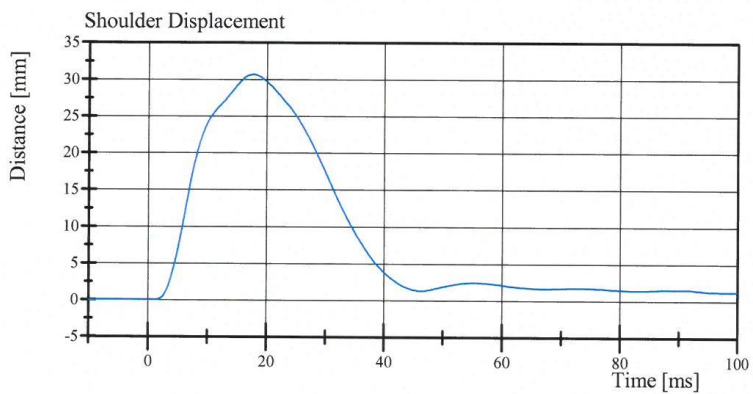
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 49-1

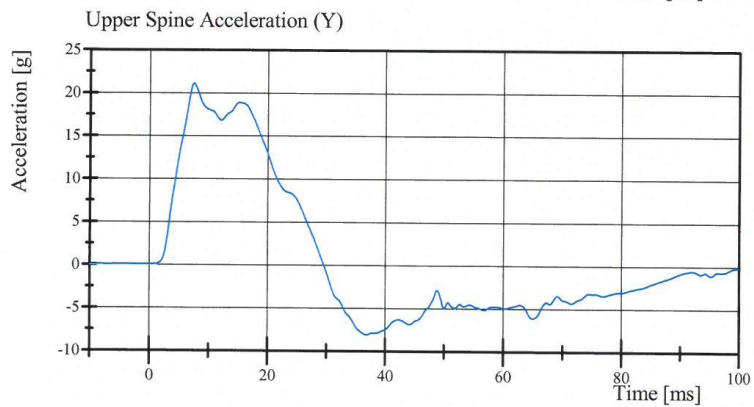
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.2 g at 42.4 ms
Min: -16.1 g at 13.4 ms



Filter Class: CFC_600
Max: 30.6 mm at 17.7 ms
Min: -0.0 mm at -6.9 ms



Filter Class: CFC_180
Max: 21.1 g at 7.4 ms
Min: -8.1 g at 36.8 ms



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

11.11.2016 11:04:24 875

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016

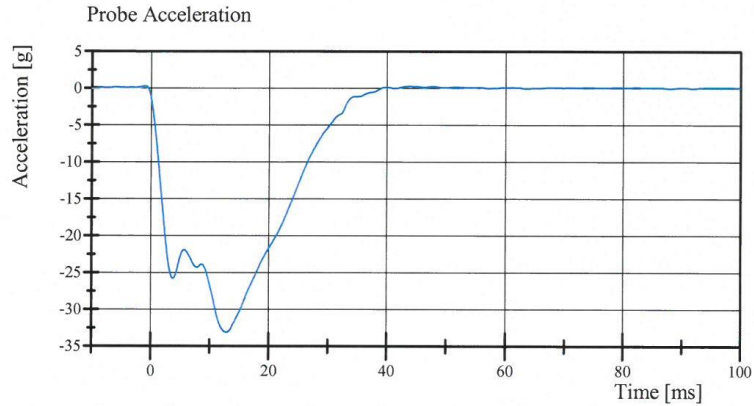
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.793 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.2 g	Yes
Shoulder Displacement	31 - 40 mm	34.0 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.6 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.0 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.8 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	32.8 g	Yes

Test meets specifications.

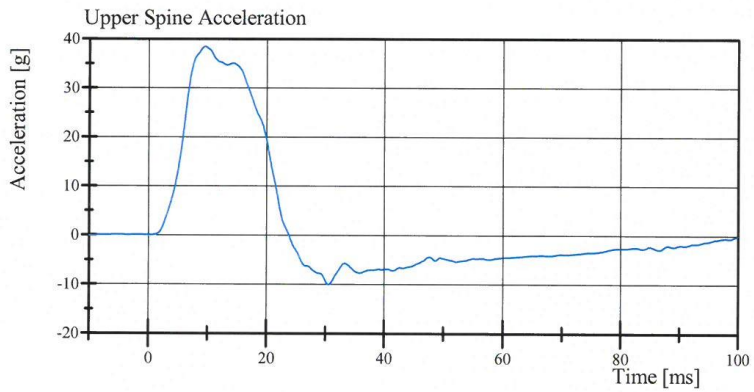
Comments:

Transportation Research Center Inc.

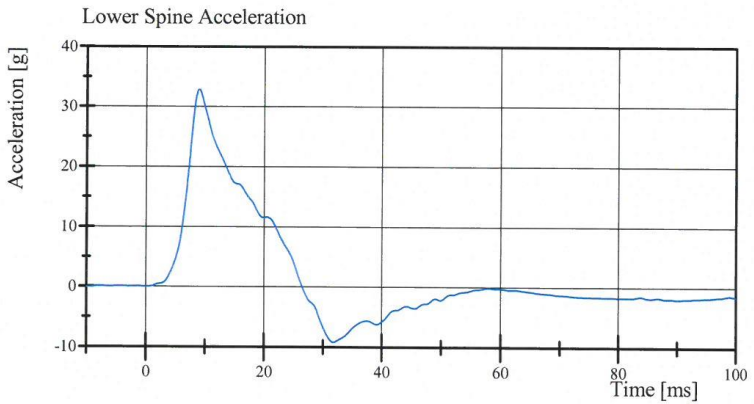
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.2 g at 43.8 ms
Min: -33.2 g at 12.9 ms



Filter Class: CFC_180
Max: 38.3 g at 9.5 ms
Min: -10.1 g at 30.6 ms



Filter Class: CFC_180
Max: 32.8 g at 9.0 ms
Min: -9.3 g at 31.8 ms

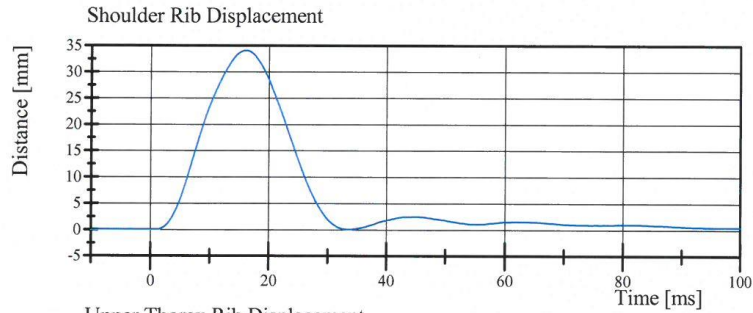


Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

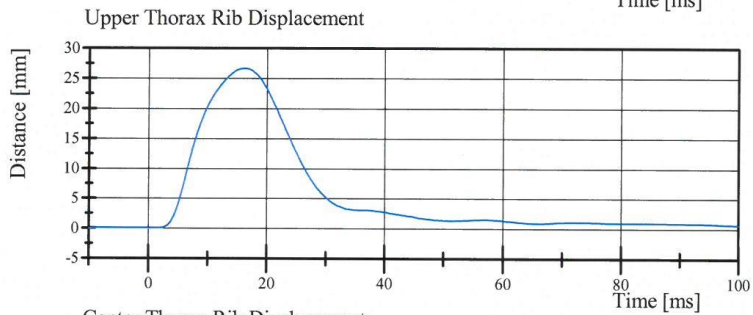
11.11.2016 12:10:40 640

Transportation Research Center Inc.

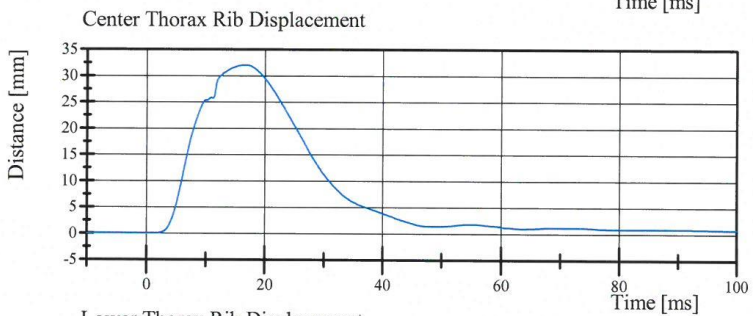
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



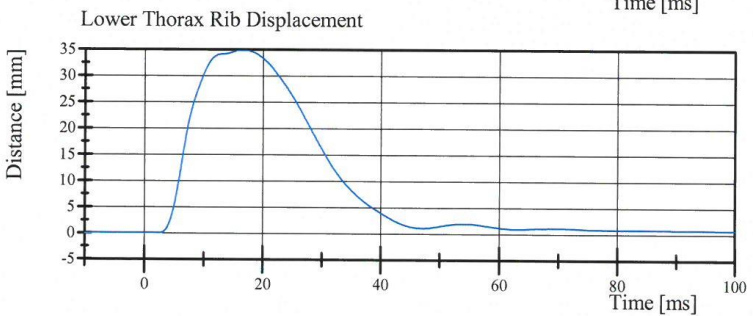
Filter Class: CFC_600
Max: 34.0 mm at 16.0 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_600
Max: 26.6 mm at 16.2 ms
Min: -0.0 mm at -0.9 ms



Filter Class: CFC_600
Max: 32.0 mm at 16.6 ms
Min: -0.0 mm at -10.0 ms



Filter Class: CFC_600
Max: 34.8 mm at 16.1 ms
Min: -0.0 mm at -10.0 ms

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

11.11.2016 12:10:40 640



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.384 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.0 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.6 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.3 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.3 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.7 g	Yes

Test meets specifications.

Comments:

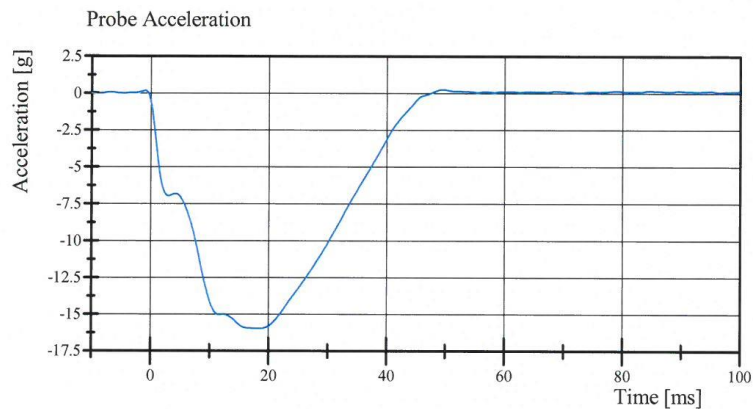
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.11.2016 11:25:49 868

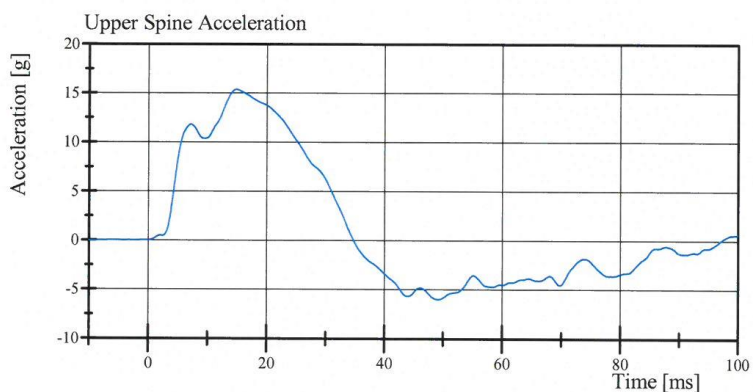


Transportation Research Center Inc.

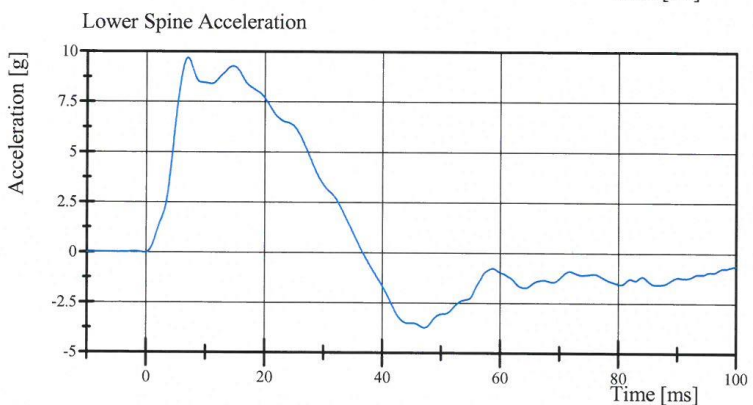
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.2 g at 49.5 ms
Min: -16.0 g at 18.3 ms



Filter Class: CFC_180
Max: 15.3 g at 14.8 ms
Min: -6.0 g at 49.2 ms



Filter Class: CFC_180
Max: 9.7 g at 7.0 ms
Min: -3.8 g at 47.2 ms

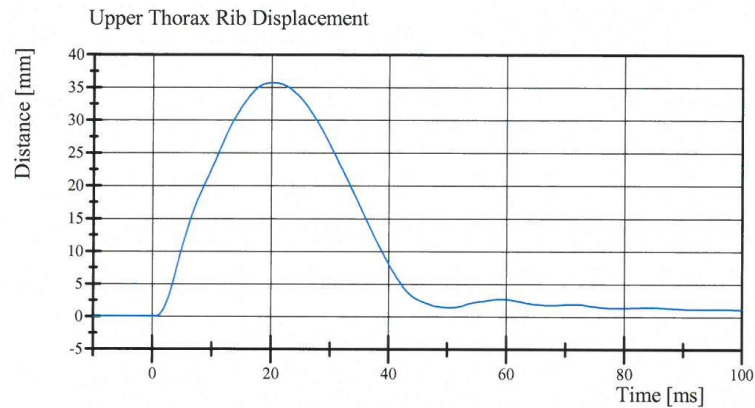


Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

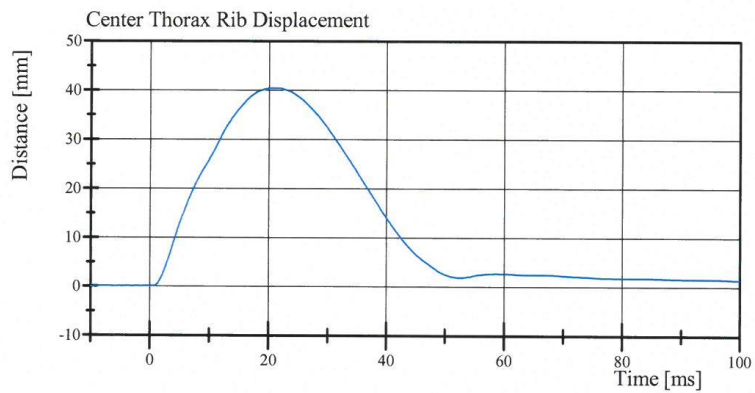
11.11.2016 11:26:00 868

Transportation Research Center Inc.

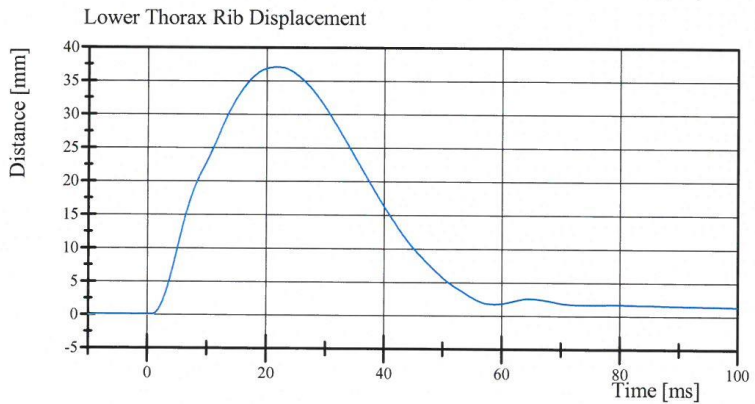
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 49-1
Test Date: 11/11/2016



Filter Class: CFC_600
Max: 35.6 mm at 20.3 ms
Min: -0.0 mm at 0.5 ms



Filter Class: CFC_600
Max: 40.3 mm at 21.0 ms
Min: -0.0 mm at -6.2 ms



Filter Class: CFC_600
Max: 37.0 mm at 21.7 ms
Min: -0.0 mm at -4.6 ms



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

11.11.2016 11:26:00 868

Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.24 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	44.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.34 g	Yes

Test meets specifications.

Comments:

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

11.11.2016 11:15:27 720

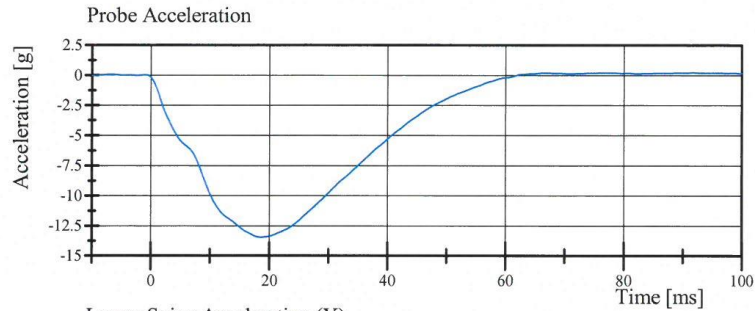


Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 49-1

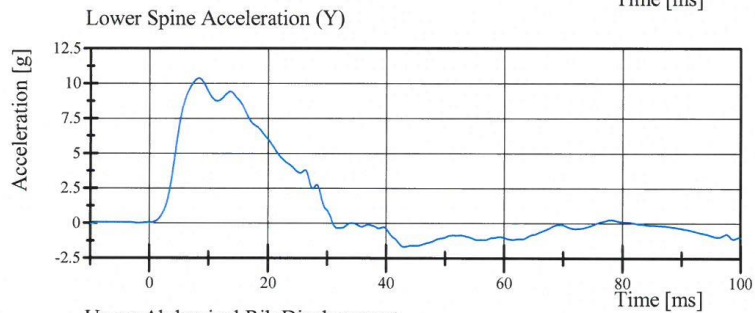
Test Date: 11/11/2016



Filter Class: CFC_180

Max: 0.3 g at 91.6 ms

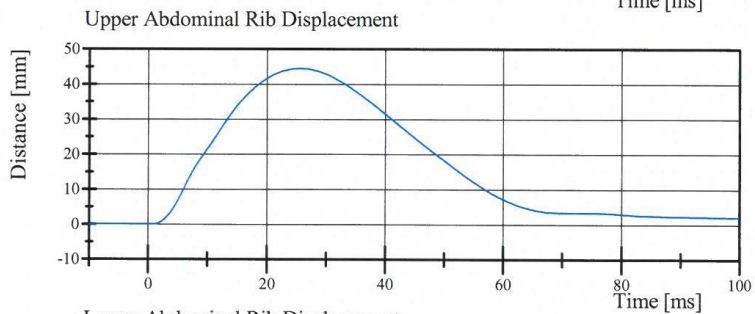
Min: -13.5 g at 18.6 ms



Filter Class: CFC_180

Max: 10.3 g at 8.3 ms

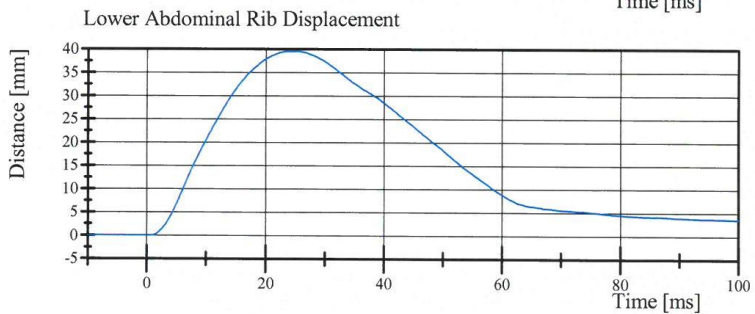
Min: -1.7 g at 43.0 ms



Filter Class: CFC_600

Max: 44.5 mm at 25.5 ms

Min: -0.0 mm at -5.4 ms



Filter Class: CFC_600

Max: 39.5 mm at 24.4 ms

Min: -0.0 mm at 0.8 ms

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

11.11.2016 11:15:42 720



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-46.72 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.2 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,163.3 N	Yes

Test meets specifications.

Comments:

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

11.11.2016 12:51:45 473

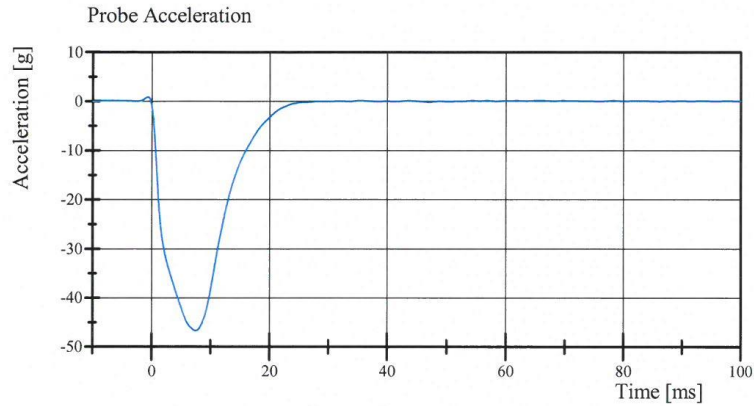


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 49-1

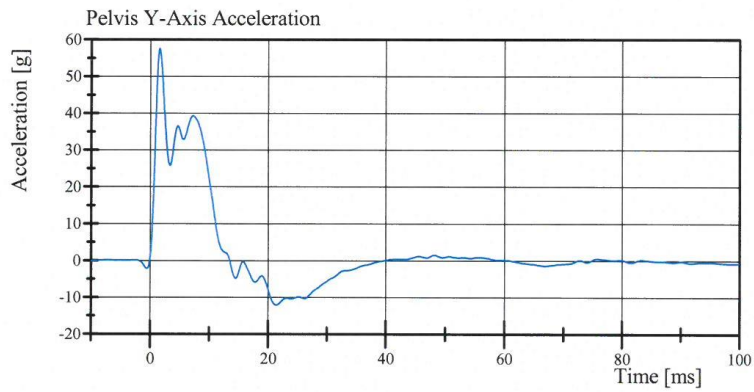
Test Date: 11/11/2016



Filter Class: CFC_180

Max: 0.8 g at -0.7 ms

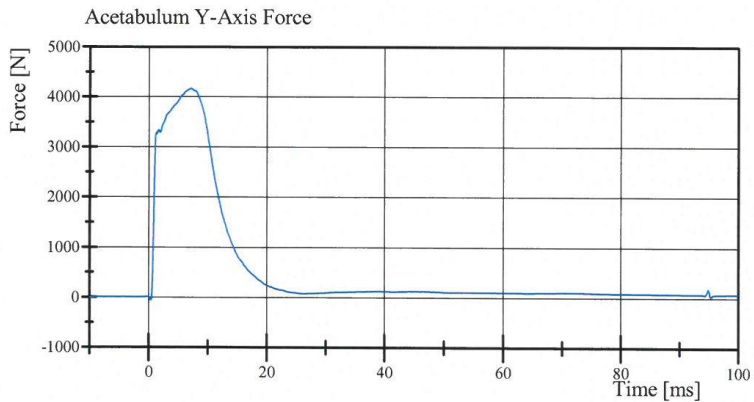
Min: -46.7 g at 7.4 ms



Filter Class: CFC_180

Max: 57.5 g at 1.6 ms

Min: -12.1 g at 21.4 ms



Filter Class: CFC_600

Max: 4,163.3 N at 7.1 ms

Min: -70.8 N at 0.3 ms



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

11.11.2016 12:52:10 473

Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 49-1

Test Date: 11/11/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.36 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.9 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,651.2 N	Yes

Test meets specifications.

Comments:

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

11.11.2016 10:52:49 678

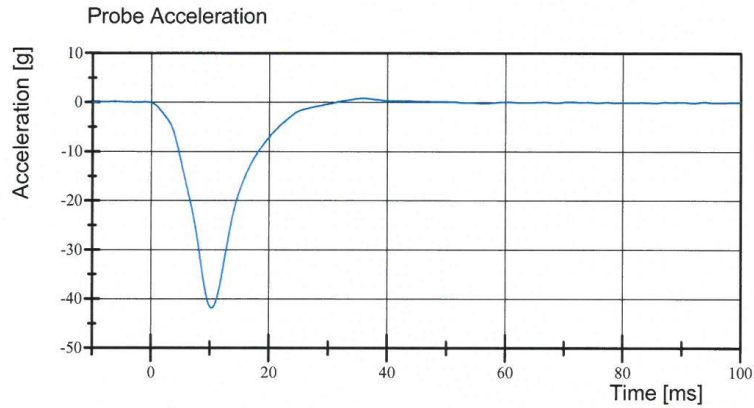


Transportation Research Center Inc.

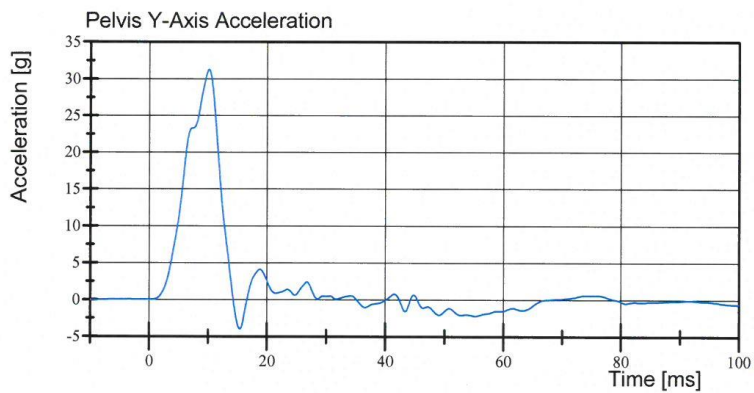
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 49-1

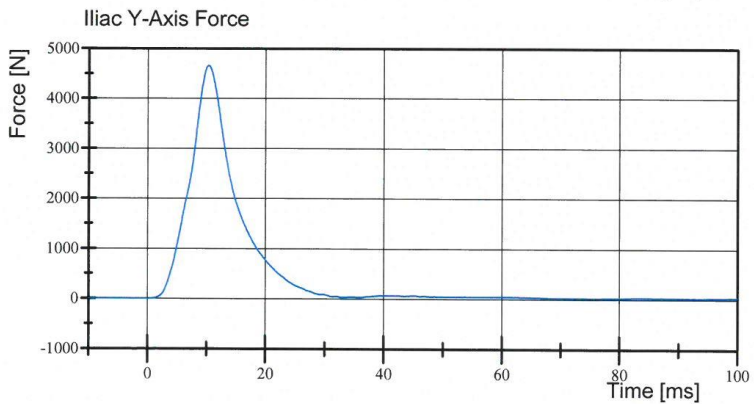
Test Date: 11/11/2016



Filter Class: CFC_180
Max: 0.8 g at 35.9 ms
Min: -41.9 g at 10.3 ms



Filter Class: CFC_180
Max: 31.2 g at 10.1 ms
Min: -4.0 g at 15.4 ms



Filter Class: CFC_600
Max: 4,651.2 N at 10.3 ms
Min: -0.6 N at -3.0 ms



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

11.11.2016 10:52:59 678

Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.50

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. 50-2

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.4 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

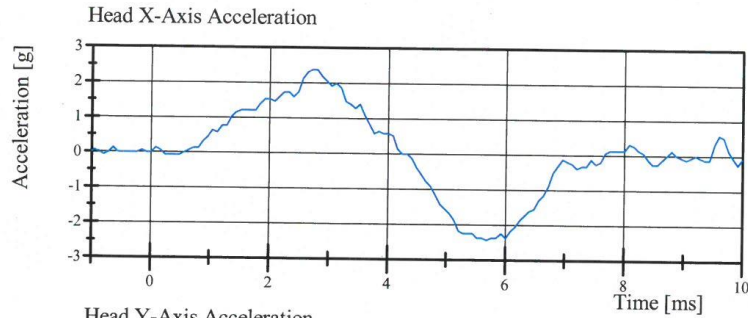
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 13:11:54 232

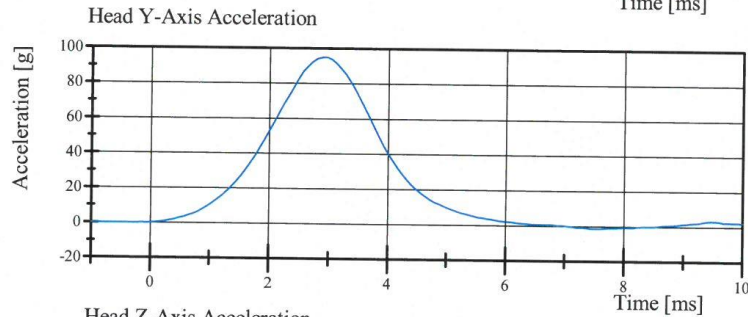


Transportation Research Center Inc.

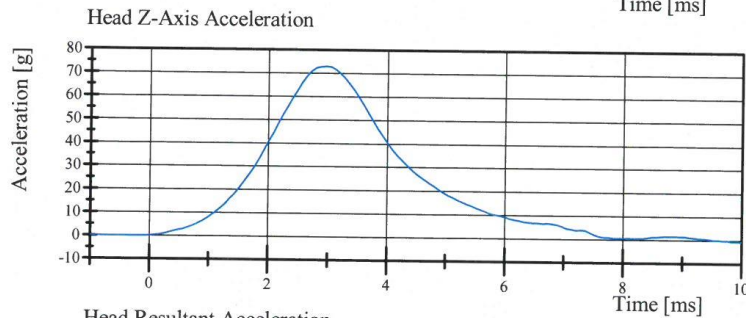
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 50-2
Test Date: 11/18/2016



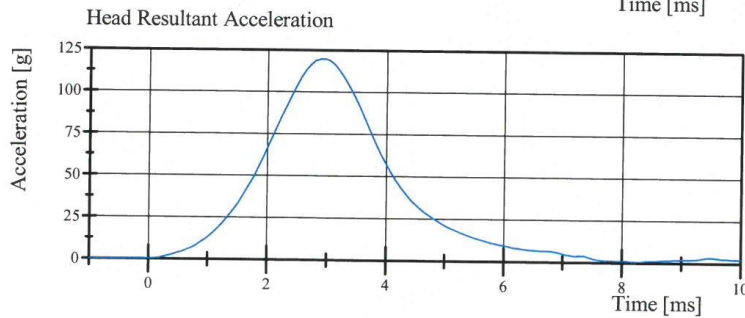
Filter Class: CFC_1000
Max: 2.4 g at 2.7 ms
Min: -2.4 g at 5.7 ms



Filter Class: CFC_1000
Max: 94.9 g at 2.9 ms
Min: -1.2 g at 7.5 ms



Filter Class: CFC_1000
Max: 73.0 g at 3.0 ms
Min: -0.5 g at 10.0 ms



Filter Class: CFC_1000
Max: 119.8 g at 3.0 ms
Min: 0.0 g at -0.5 ms

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

11.18.2016 13:12:00 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.608 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.665 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.967 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.318 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.783 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.784 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.8 deg	Yes
Time of Peak	50 - 70 ms	64.0 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.8 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	122.6 ms	Yes

Test meets specifications.

Comments:

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

11.18.2016 10:47:31 742

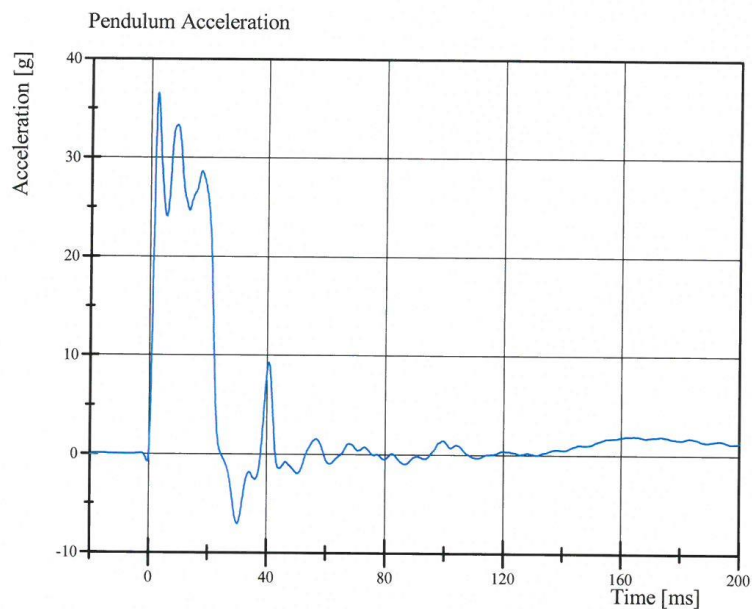


Transportation Research Center Inc.

Left Lateral Neck

SID II_s Serial No. 305 Certification No. 50-1

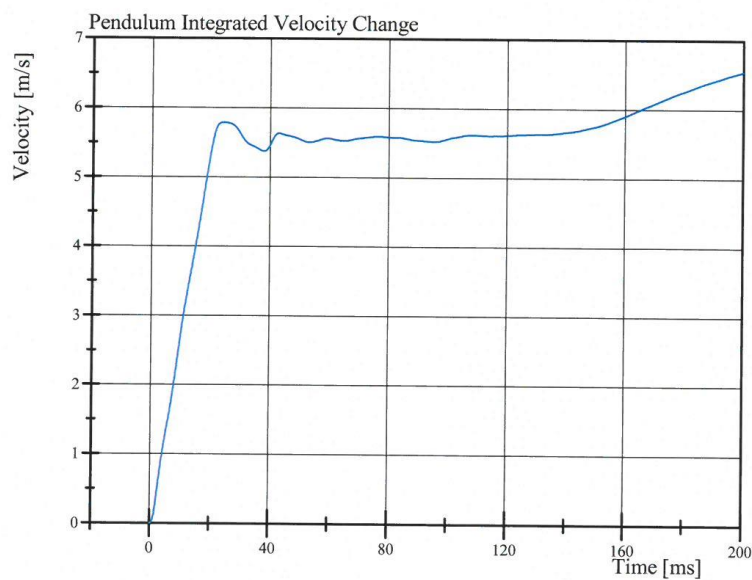
Test Date: 11/18/2016



Filter Class: CFC_180

Max: 36.5 g at 2.5 ms

Min: -7.1 g at 30.2 ms



Filter Class: CFC_180

Max: 6.5 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

11.18.2016 10:47:42 742

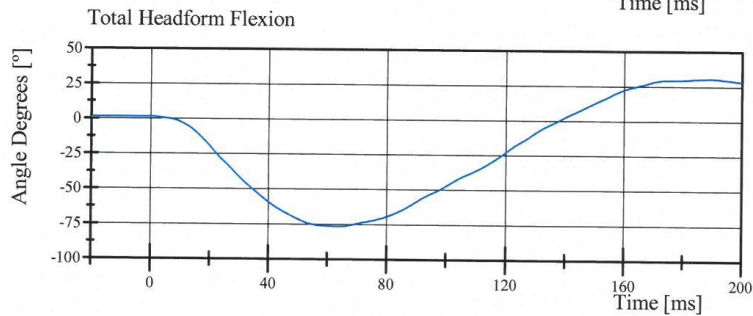
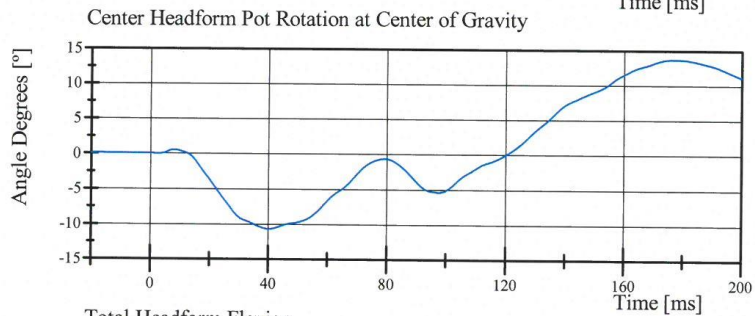
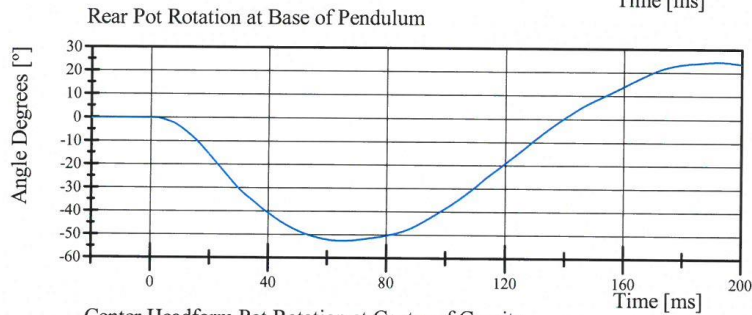
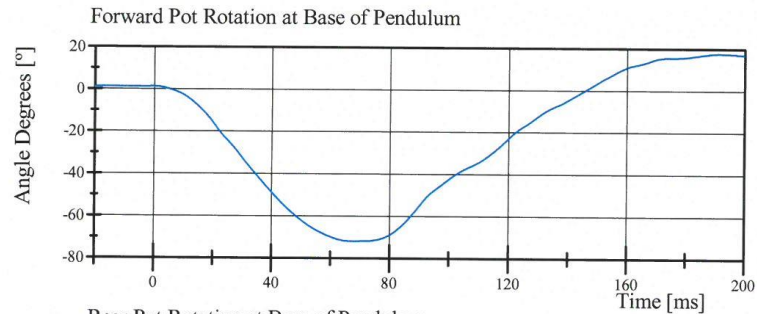


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016



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

11.18.2016 10:47:43 742

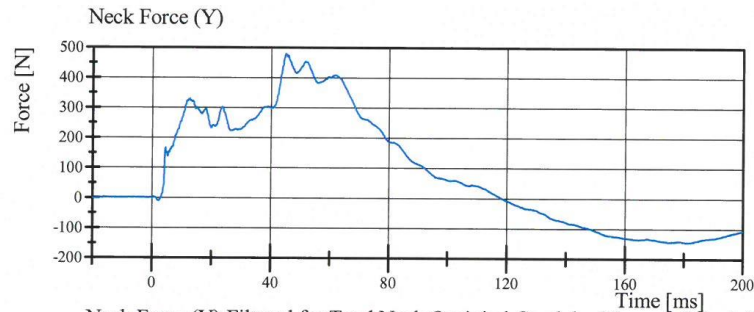


Transportation Research Center Inc.

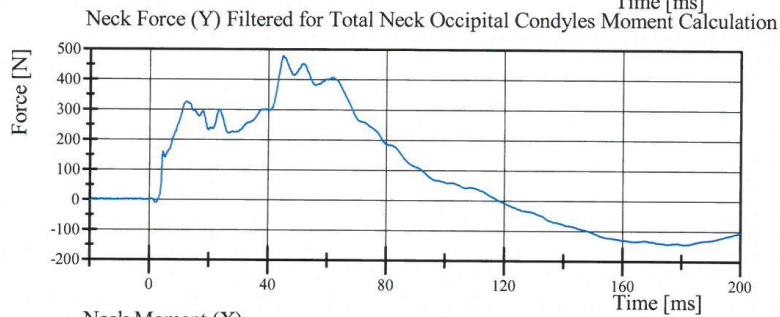
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 50-1

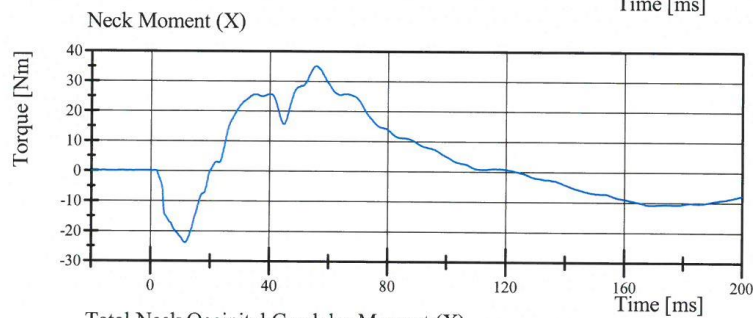
Test Date: 11/18/2016



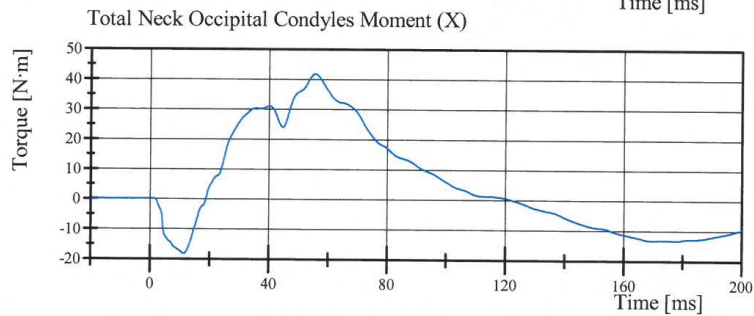
Filter Class: CFC_1000
Max: 478.2 N at 44.9 ms
Min: -143.8 N at 181.3 ms



Filter Class: CFC_600
Max: 477.8 N at 45.0 ms
Min: -143.7 N at 181.4 ms



Filter Class: CFC_600
Max: 35.0 Nm at 55.7 ms
Min: -23.9 Nm at 11.6 ms



Filter Class: Without_(Consta
Max: 41.8 N·m at 55.6 ms
Min: -18.3 N·m at 11.4 ms

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

11.18.2016 10:47:45 742



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.8 g	Yes
Shoulder Displacement	28 - 37 mm	30.6 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.0 g	Yes

Test meets specifications.

Comments:

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

11.18.2016 08:45:43 868

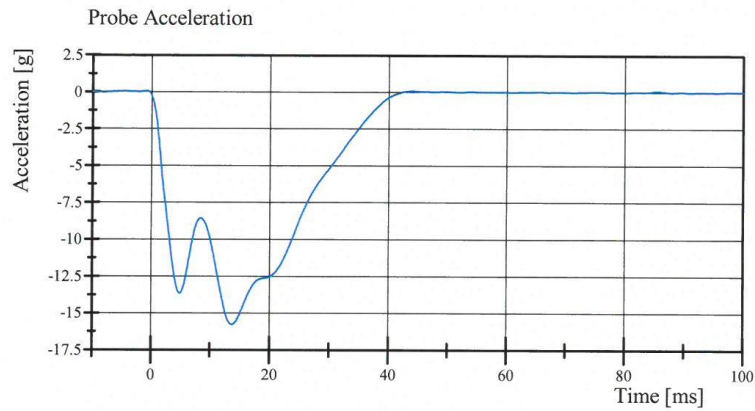


Transportation Research Center Inc.

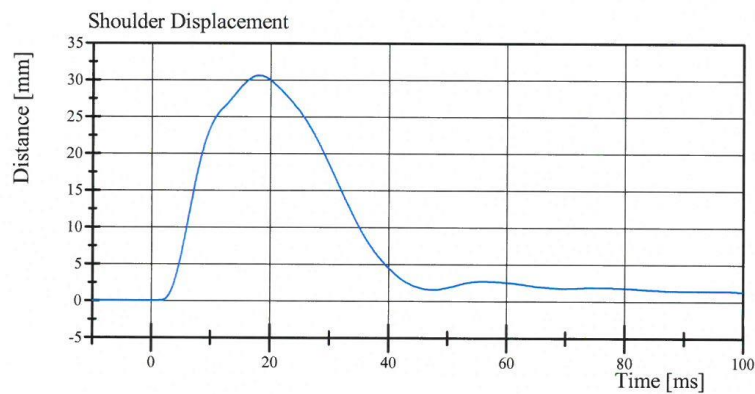
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 50-1

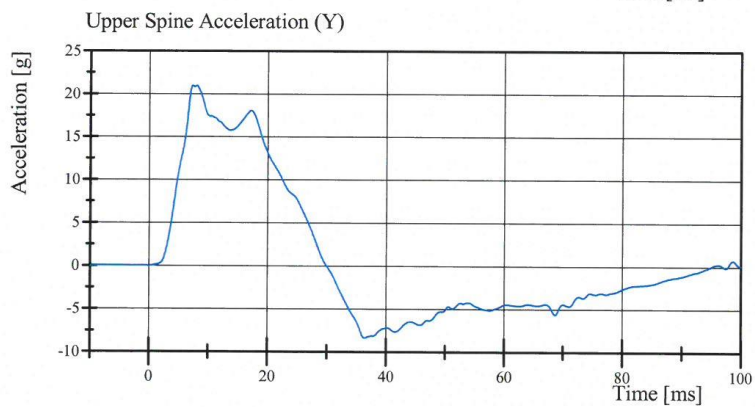
Test Date: 11/18/2016



Filter Class: CFC_180
Max: 0.1 g at 85.3 ms
Min: -15.8 g at 13.7 ms



Filter Class: CFC_600
Max: 30.6 mm at 18.2 ms
Min: -0.0 mm at 0.3 ms



Filter Class: CFC_180
Max: 21.0 g at 7.4 ms
Min: -8.4 g at 36.5 ms

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

11.18.2016 08:45:52 868



Transportation Research Center Inc.

Left Lateral Thorax with Arm

SID IIs Serial No. 305 Certification No. 50-2

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.778 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-31.9 g	Yes
Shoulder Displacement	31 - 40 mm	33.2 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.5 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.5 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.6 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	30.3 g	Yes

Test meets specifications.

Comments:

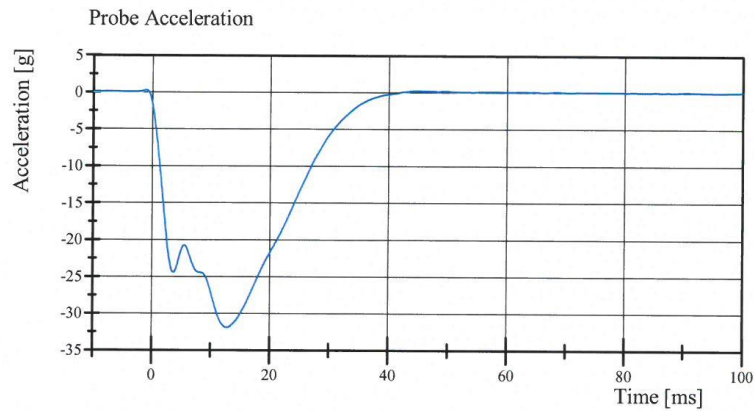
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:35:56 628

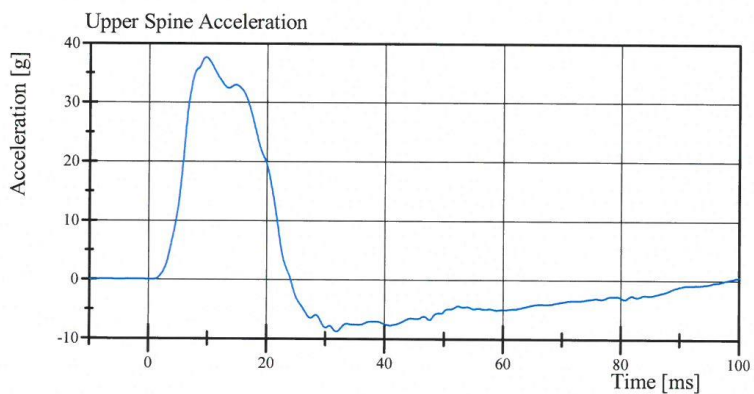


Transportation Research Center Inc.

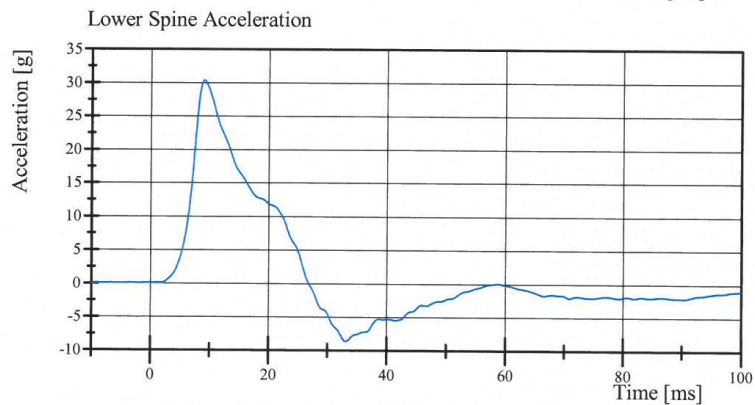
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 50-2
Test Date: 11/18/2016



Filter Class: CFC_180
Max: 0.2 g at -1.0 ms
Min: -31.9 g at 12.8 ms



Filter Class: CFC_180
Max: 37.6 g at 9.7 ms
Min: -8.8 g at 31.9 ms



Filter Class: CFC_180
Max: 30.3 g at 9.0 ms
Min: -8.7 g at 33.1 ms

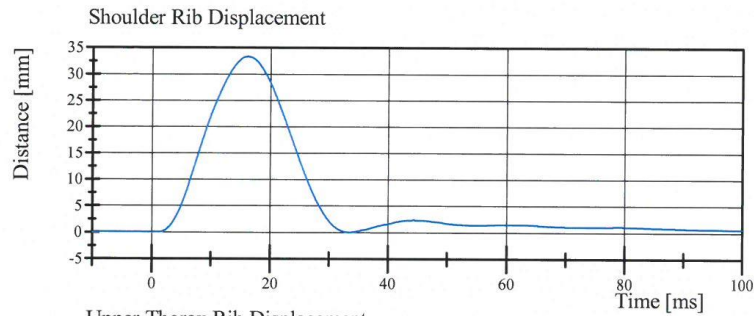
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 10:36:08 628

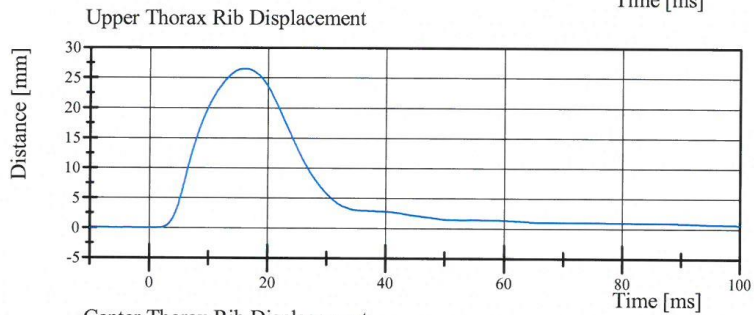


Transportation Research Center Inc.

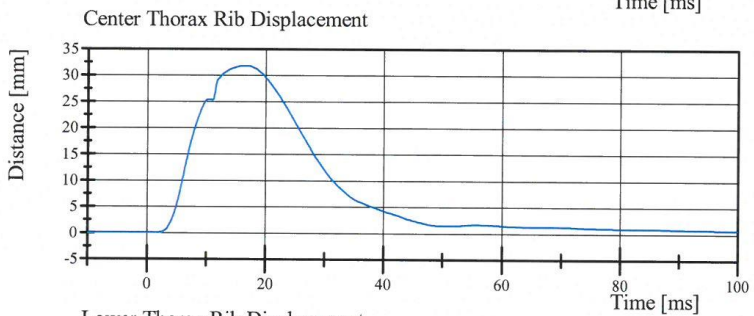
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 50-2
Test Date: 11/18/2016



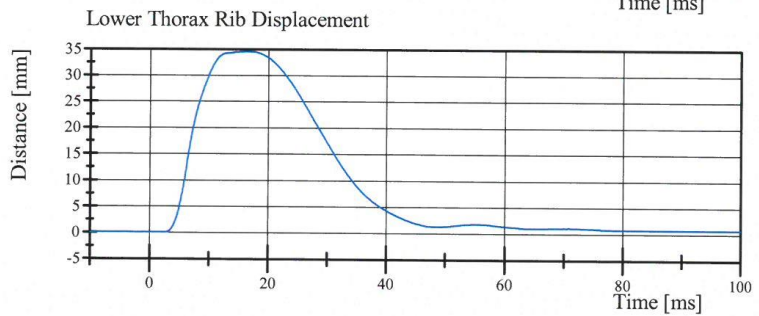
Filter Class: CFC_600
Max: 33.2 mm at 16.2 ms
Min: -0.0 mm at -1.0 ms



Filter Class: CFC_600
Max: 26.5 mm at 16.2 ms
Min: -0.0 mm at -2.0 ms



Filter Class: CFC_600
Max: 31.7 mm at 16.6 ms
Min: -0.0 mm at -6.2 ms



Filter Class: CFC_600
Max: 34.5 mm at 16.0 ms
Min: -0.0 mm at -1.3 ms

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

11.18.2016 10:36:09 628



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 50-1
Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.355 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.5 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.5 g	Yes

Test meets specifications.

Comments:

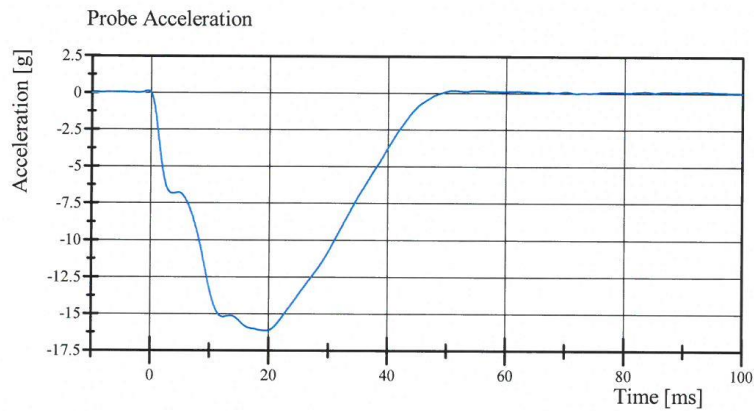
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 09:20:08 840

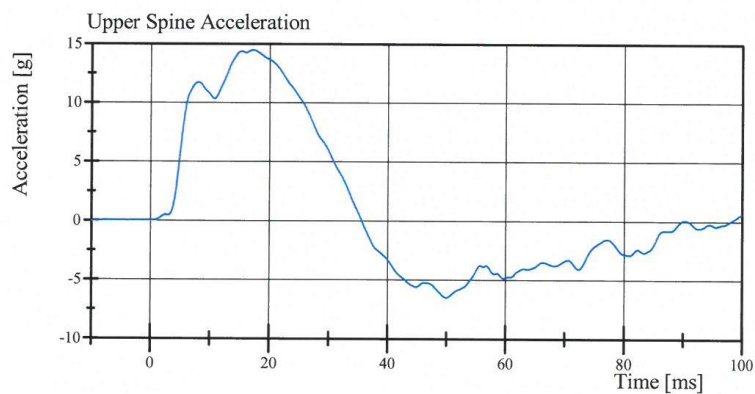


Transportation Research Center Inc.

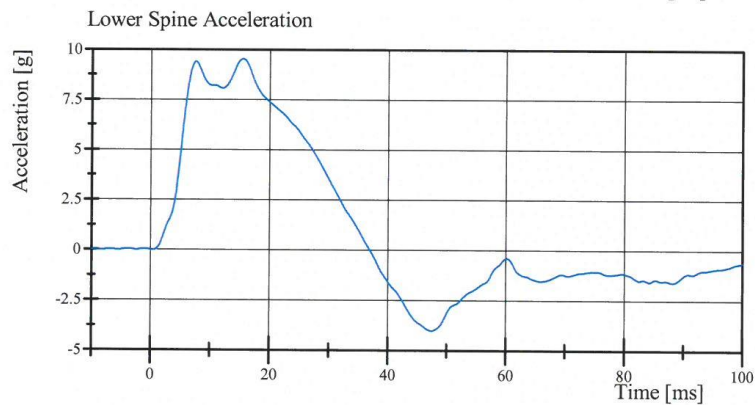
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 50-1
Test Date: 11/18/2016



Filter Class: CFC_180
Max: 0.2 g at 55.8 ms
Min: -16.2 g at 19.4 ms



Filter Class: CFC_180
Max: 14.5 g at 17.2 ms
Min: -6.5 g at 50.0 ms



Filter Class: CFC_180
Max: 9.5 g at 15.5 ms
Min: -4.0 g at 47.4 ms

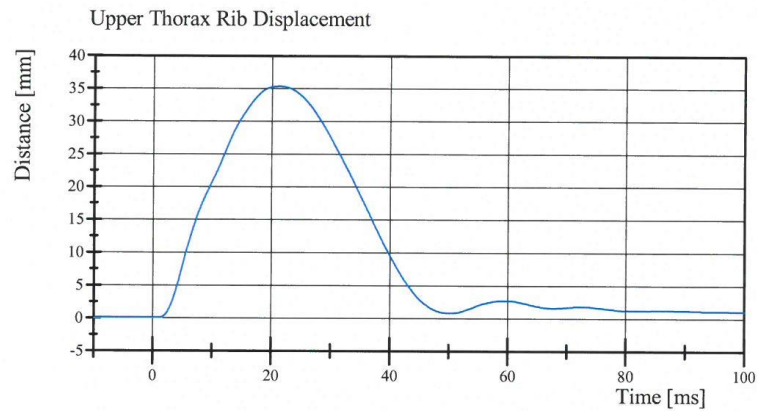
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.18.2016 09:20:20 840

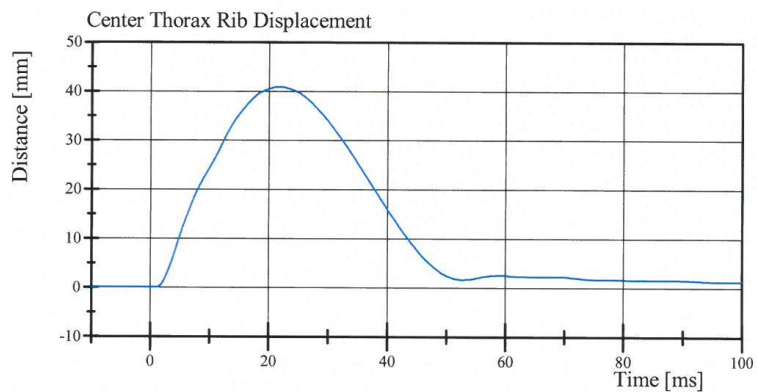


Transportation Research Center Inc.

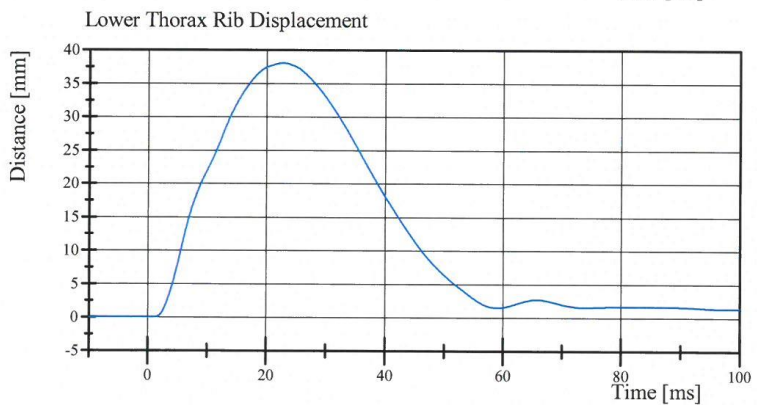
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 50-1
Test Date: 11/18/2016



Filter Class: CFC_600
Max: 35.3 mm at 21.3 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 40.8 mm at 21.7 ms
Min: -0.0 mm at 0.9 ms



Filter Class: CFC_600
Max: 38.0 mm at 22.9 ms
Min: -0.0 mm at -9.7 ms

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

11.18.2016 09:20:21 840



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.7 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.34 g	Yes

Test meets specifications.

Comments:

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

11.18.2016 08:54:59 700

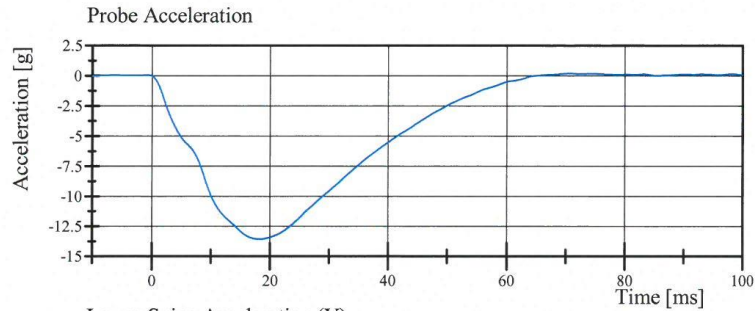


Transportation Research Center Inc.

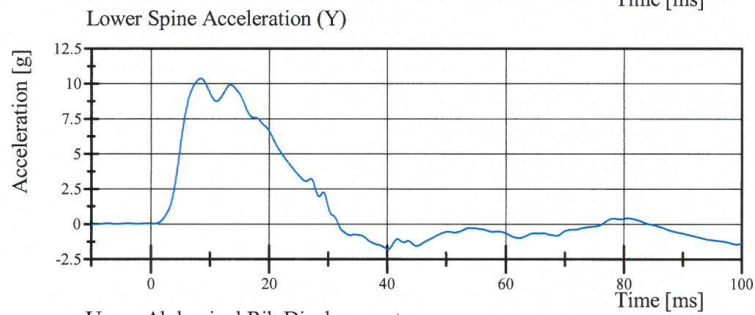
Left Lateral Abdomen

SID IIa Serial No. 305 Certification No. 50-1

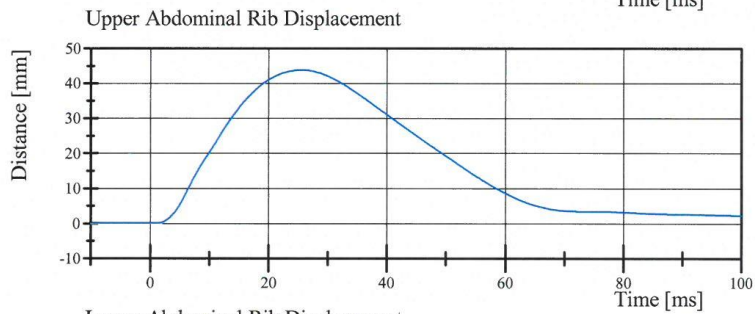
Test Date: 11/18/2016



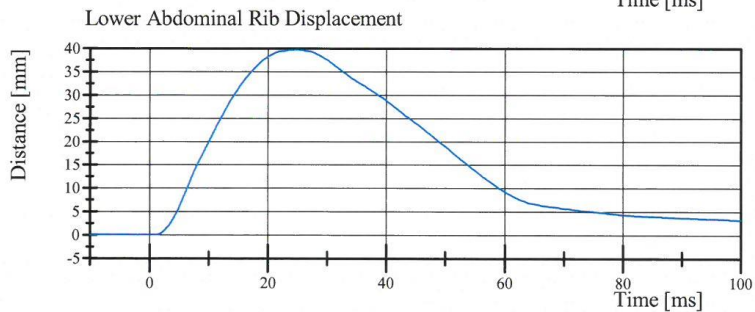
Filter Class: CFC_180
Max: 0.2 g at 70.7 ms
Min: -13.6 g at 18.3 ms



Filter Class: CFC_180
Max: 10.3 g at 8.5 ms
Min: -1.8 g at 40.2 ms



Filter Class: CFC_600
Max: 43.7 mm at 25.5 ms
Min: -0.0 mm at -9.8 ms



Filter Class: CFC_600
Max: 39.7 mm at 25.0 ms
Min: -0.0 mm at -5.5 ms

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

11.18.2016 08:55:09 700



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.15 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,862.0 N	Yes

Test meets specifications.

Comments: Pelvis Pulg#11026

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

11.18.2016 08:28:07 447

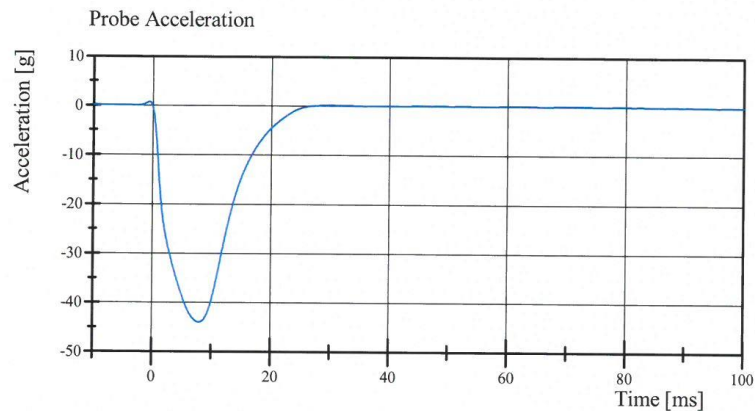


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 50-1

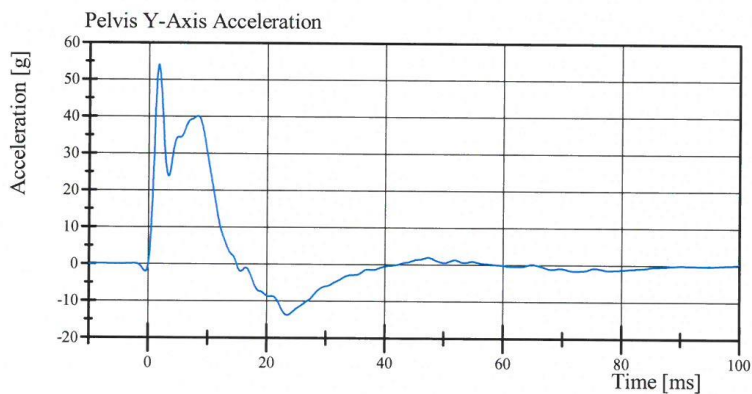
Test Date: 11/18/2016



Filter Class: CFC_180

Max: 0.6 g at -0.6 ms

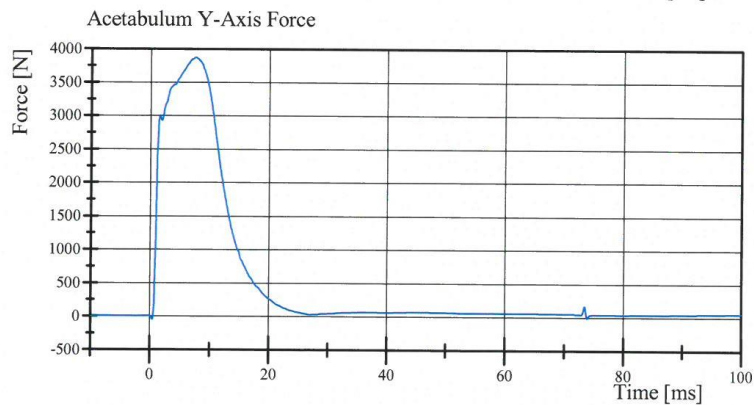
Min: -44.1 g at 8.0 ms



Filter Class: CFC_180

Max: 54.0 g at 1.7 ms

Min: -13.8 g at 23.5 ms



Filter Class: CFC_600

Max: 3,862.0 N at 7.6 ms

Min: -51.4 N at 0.5 ms

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

11.18.2016 08:29:42 447



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 50-1

Test Date: 11/18/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.5 g	Yes
Iliac Force	4,100 - 5,100 N	4,678.6 N	Yes

Test meets specifications.

Comments:

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

11.18.2016 11:03:12 666

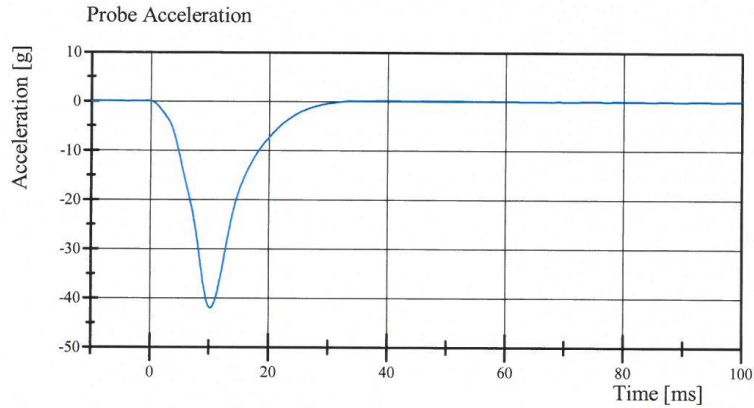


Transportation Research Center Inc.

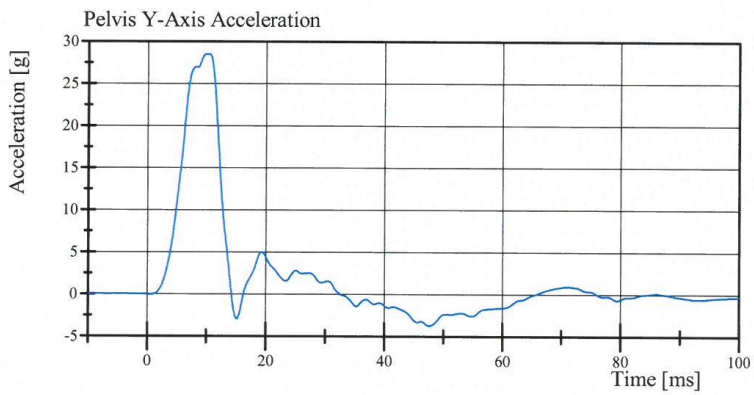
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 50-1

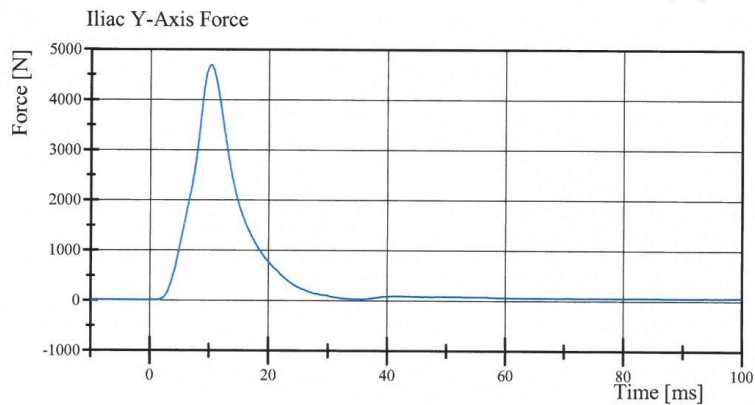
Test Date: 11/18/2016



Filter Class: CFC_180
Max: 0.1 g at 39.7 ms
Min: -42.1 g at 10.2 ms



Filter Class: CFC_180
Max: 28.5 g at 10.5 ms
Min: -3.7 g at 47.6 ms



Filter Class: CFC_600
Max: 4,678.6 N at 10.3 ms
Min: -0.9 N at -10.0 ms

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

11.18.2016 11:03:22 666



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		P87680	Endevco	21-Sep-16
	Y		P66873	Endevco	10-Nov-16
	Z		P91950	Endevco	6-Oct-16
Redundant Head Accelerometers	X		P94566	Endevco	10-Nov-16
	Y		P94429	Endevco	1-Sep-16
	Z		P94483	Endevco	1-Sep-16
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	29-Sep-16
	Middle	Y	174	FTSS	29-Sep-16
	Lower	Y	173	FTSS	29-Sep-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		P89126	Endevco	21-Sep-16
	Y		P87139	Endevco	21-Sep-16
	Z		P64884	Endevco	21-Sep-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	P90267	Endevco	29-Sep-16
			Y	P93774	Endevco	01-Sep-16
			Z	P91566	Endevco	21-Sep-16
Redundant Head Accelerometers			X	P91615	Endevco	21-Sep-16
			Y	P93762	Endevco	01-Sep-16
			Z	P93761	Endevco	01-Sep-16
Displacement Potentiometers	Shoulder		N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	29-Sep-16
		Middle	Y	1161	Servo	29-Sep-16
		Lower	Y	037	Servo	29-Sep-16
	Abdominal Rib	Upper	Y	1295	Servo	29-Sep-16
		Lower	Y	1136	Servo	29-Sep-16
Lower Spine Accelerometers (T12)			X	P94545	Endevco	15-Sep-16
			Y	P94647	Endevco	21-Sep-16
			Z	P94530	Endevco	1-Sep-16
Acetabulum Load Cell			Y	103-FY	FTSS	13-Jun-16
Iliac Wing Load Cell			Y	287-FY	Denton	22-Mar-16
Pelvis Plug (struck side)				81023	Humanetics	03-Dec-14
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	P94489	Endevco	31-Oct-16
	Vehicle Center of Gravity	Y	P94426	Endevco	26-Jul-16
	Vehicle Center of Gravity	Z	P94550	Endevco	26-Jul-16
2	Right Sill at Front Seat	X	P94424	Endevco	31-Oct-16
	Right Sill at Front Seat	Y	P94541	Endevco	26-Jul-16
	Right Sill at Front Seat	Z	P91184	Endevco	10-Nov-16
3	Right Sill at Rear Seat	X	P94524	Endevco	10-Nov-16
	Right Sill at Rear Seat	Y	P94570	Endevco	10-Nov-16
	Right Sill at Rear Seat	Z	P94488	Endevco	10-Nov-16
4	Left Sill at Front Door	Y	P50430	Endevco	12-Oct-16
5	Left Sill at Rear Door	Y	P93452	Endevco	10-Nov-16
6	Left A-Post Lower	Y	P94562	Endevco	2-Nov-16
7	Left A-Post Middle	Y	P94559	Endevco	2-Nov-16
8	Left B-Post Lower	Y	P63151	Endevco	25-Jul-16
9	B-Post Middle	Y	P88468	Endevco	25-Jul-16
10	Front Seat Track	Y	P94504	Endevco	27-Oct-16
11	Rear Seat Track or Structure	Y	P91492	Endevco	27-Oct-16
12	Right Rear Occupant Compartment	Y	P94521	Endevco	27-Oct-16
13	Engine Block	X	P66749	Endevco	28-Sep-16
	Engine Block	Y	P94512	Endevco	2-Nov-16
14	Rear Floorpan Above Axle	X	P88004	Endevco	15-Aug-16
	Rear Floorpan Above Axle	Y	P91482	Endevco	28-Sep-16
	Rear Floorpan Above Axle	Z	P93550	Endevco	25-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