

FINAL REPORT NUMBER: SINCAP-TRC-18-008

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

**TOYOTA MOTOR MANUFACTURING, INDIANA, INC.
2018 Toyota Sienna Van
NHTSA NUMBER: M20185109**

**PREPARED BY:
Transportation Research Center Inc.
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P. O. Box B-67
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Report Date: June 8, 2018

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: June 8, 2018

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 2018 Toyota Sienna Van, 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 May 11, 2018. The impact velocity of the Moving Deformable Barrier (MDB) was 62.07 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.8° C. The target vehicle post-test maximum crush was 206 mm at Level 2 and 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th><th>Units</th><th>IARV</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td><td>N/A</td><td>1000</td><td>55</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>14.9</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>741.8</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-1839.3</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>22.6</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>111</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>49.2</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>2479.7</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>10.8</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>2.9</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	55	Maximum Thoracic Rib Deflection	mm	44	14.9	Total Abdominal Force	N	2500	741.8	Pubic Symphysis Force	N	6000	-1839.3	Lower Spine Acceleration	G	82*	22.6	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	111	Lower Spine Resultant Acceleration	g's	82	49.2	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2479.7	Maximum Thoracic Rib Deflection	mm	38*	10.8	Maximum Abdominal Rib Deflection	mm	45*	2.9
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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4
<u>Appendix</u>		
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Performance Calibration Test Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	8
3	Dummy Longitudinal Clearance Dimensions	11
4	Dummy Lateral Clearance Dimensions	12
5	Camera and Instrumentation Data	13
6	Test Vehicle Accelerometer Locations	14
7	MDB Accelerometer Locations	15
8	Post-Test Observations	16
9	MDB Summary of Results	18
10	Test Vehicle Profile Measurements	19
11	Test Vehicle Exterior Crush Measurements	20
12	MDB Exterior Static Crush Measurements	23
13	Vehicle and MDB Damage Distances	24
14	FMVSS No. 301 Static Rollover Results	25
15	Dummy/Vehicle Temperature and Humidity Stabilization	26

SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2018 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 2018 Toyota Sienna Van. 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 2018 Toyota Sienna Van was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.07 km/h (38.57 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 May 11, 2018. 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	55
Maximum Thoracic Rib Deflection	mm	44	14.9
Combined Abdominal Force	N	2500	741.8
Pubic Symphysis Force	N	6000	-1839.3
Lower Spine (T12) Resultant Acceleration	G	82*	22.6

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	111
Lower Spine (T12) Resultant Acceleration	G	82	49.2
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2479.7
Maximum Thoracic Rib Deflection	mm	38*	10.8
Maximum Abdominal Rib Deflection	mm	45*	2.9

* 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 Safety Restraint	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 both ATDs were within the established performance thresholds.

Left Lower A-Post Y; QD after 43.0 ms

Left Lower B-Post Y; QD after 20.0 ms

Left Mid A-Post Y; QD from 24-29 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20185109
Model Year	2018
Make	Toyota
Model	Sienna LE
Body Style	MPV
VIN	5TDKZ3DC3JS902287
Body Color	Silver Sky Metallic
Odometer Reading (km/mi)	3 mi
Engine Displacement (L)	3.5
Type/No. Cylinders	Gas/6
Engine Placement	Front/Transverse
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
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	No

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	TOYOTA MOTOR MANUFACTURING, INDIANA, INC.
Date of Manufacture	11/17
Vehicle Type	MPV

GVWR (kg)	2715
GAWR Front (kg)	1405
GAWR Rear (kg)	1405

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	3	8
Capacity Weight (VCW) (kg)				608
DSC x 68.04 (kg)				544.3
Cargo Weight (RCLW) (kg)				63.7

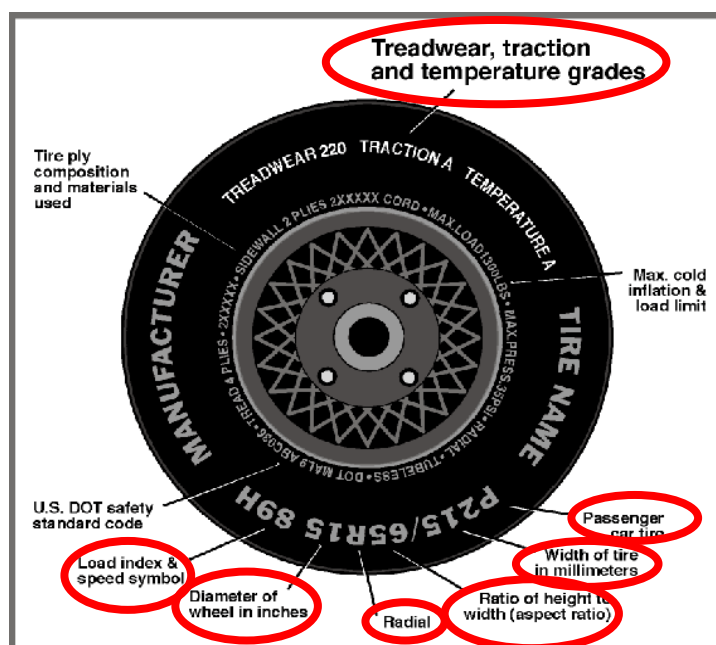
VEHICLE SEAT TYPE

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	Yes	N/A	N/A	Yes	N/A	Yes	N/A
Third Row Seat	N/A	N/A	Yes	N/A	Yes	N/A	N/A

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

Test Vehicle: 2018 Toyota Sienna Van
Test Program: SINCAP Side Impact

NHTSA No.: M20185109
Test Date: 5/11/2018



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P235/60R17	P235/60R17
Tire Size on Vehicle	P235/60R17	P235/60R17
Tire Manufacturer	Firestone	Firestone
Tire Model	FR710	FR710
Treadwear	560	560
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	4	4
Tire Plies Body	2	2
Load Index/Speed Symbol	100T	100T
Tire Material	Polyester/Steel/Nylon	Polyester/Steel/Nylon
DOT Safety Code Left	W20U 712 4117	W20U 712 4117
DOT Safety Code Right	W20U 712 4117	W20U 712 4117

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

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

TIRE PRESSURES

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

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	592.4	449.8		648.4	520.6		641.4	547.4	
Right	kg	586.4	413.2		587.6	465.2		578.6	470.2	
Ratio	%	57.7	42.3		55.6	44.4		54.5	45.5	
Totals	kg	1178.8	863.0	2041.8	1236.0	985.8	2221.8	1220.0	1017.6	2237.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2041.8	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	63.7	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2230.5	(A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e.

Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? ☒ YES ☐ NO

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	750	749	Yes
RF	mm	763	757	Yes
RR	mm	767	772	Yes
LR	mm	750	750	Yes
Vehicle CG (Aft of Front Axle)	mm	1378	1686	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+54	+45	

***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: plate on rear cargo area	54.6
Removed: None	0.0

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

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

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	14.0	11.7	12.8
Front Passenger Seat	N/A	N/A	12.1
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	23.8
Non-Struck Side Rear Seat	N/A	N/A	26.4
Rear Center Seat*	N/A	N/A	18.2

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	12.8	312	Max	348	364	368
			Mid	324	338	341
			Min	301	312	315
Front Passenger Seat	12.1	277	Max	N/A	N/A	N/A
			Mid	N/A	277	N/A
			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	23.8	291	Max	N/A	N/A	N/A
			Mid	N/A	291	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	26.4	282	Max	N/A	N/A	N/A
			Mid	N/A	282	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	18.2	291	Max	N/A	N/A	N/A
			Mid	N/A	291	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: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

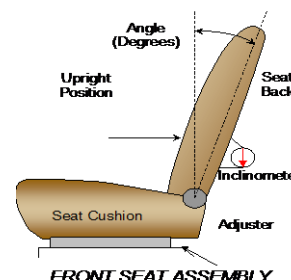
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	240	N/A	120	N/A
Front Passenger Seat	240	24	120	13
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	370	23	370	23
Non-Struck Side Rear Seat	370	23	370	23
Rear Center Seat*	370	23	370	23

* 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	50.8	N/A	3.0	N/A
Front Passenger Seat	50.1	26	3.0	6
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	24.4	13	5.7	0
Non-Struck Side Rear Seat	26.4	14	5.6	0
Rear Center Seat*	N/A	13	6.1	0

* 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	0, Lowermost
Rear Seat	4, Numbered from 0 to 3	3, Uppermost

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	2, Numbered from 0 to 1	0, Lowermost

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

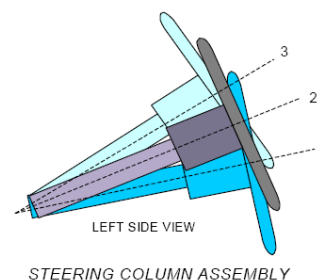
Test Vehicle: 2018 Toyota Sienna Van
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STEERING COLUMN ADJUSTMENT

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.

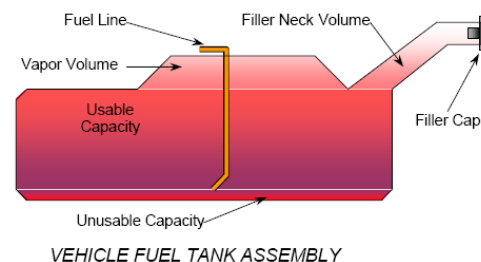
	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	27.4	0
Geometric Center, Position No. 2	29.6	20
Uppermost, Position No. 3	31.8	40
Telescoping Steering Wheel Travel		40
Test Position	29.6	20



FUEL PUMP

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

The fuel pump is activated when the ignition switch is turned to the "ON" position



FUEL TANK CAPACITY

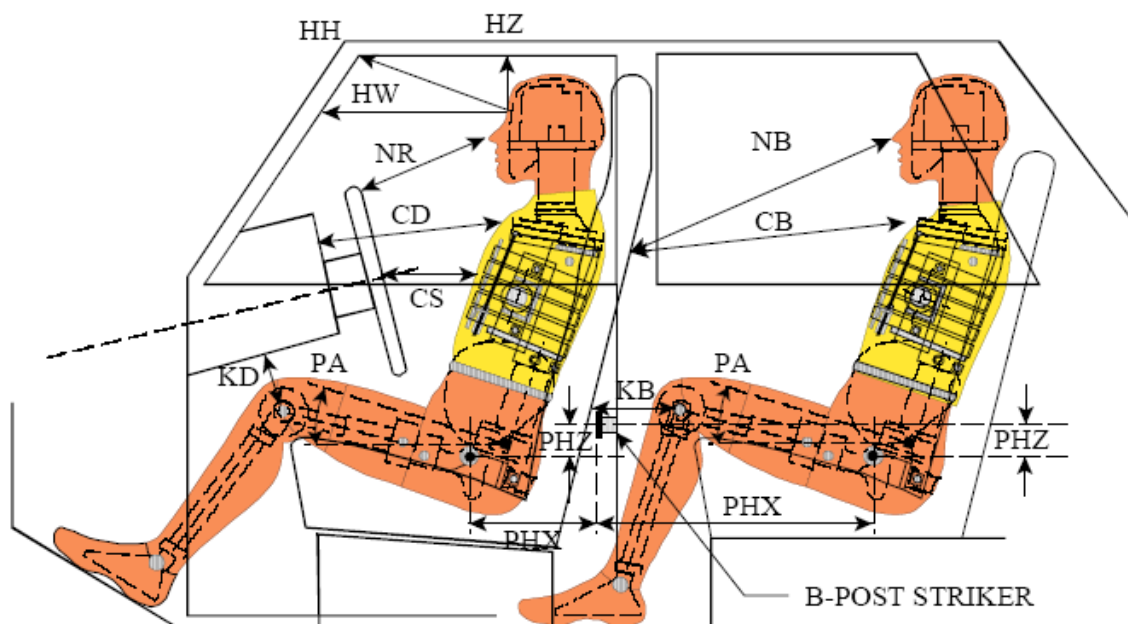
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	77.9
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	77.9
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	72.3
Actual Amount of Solvent Used in Test	72.3
1/3 of Usable Capacity	24.1

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: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



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

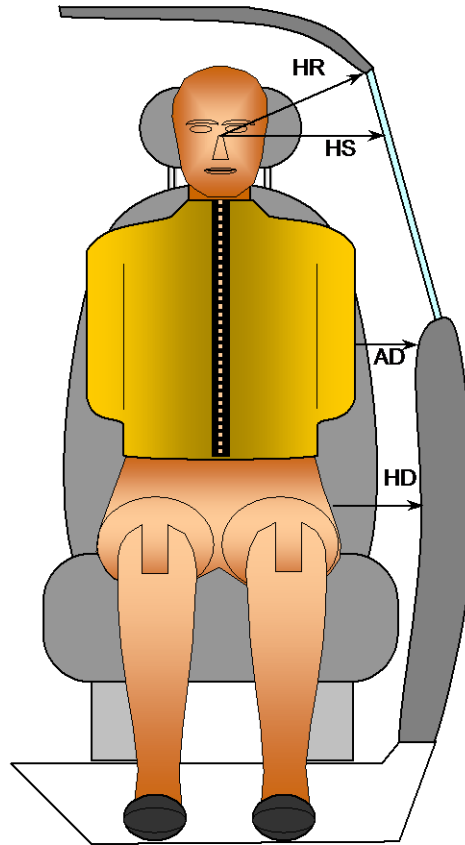
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	477			
HW		Header to Windshield	755			
HZ	HZ	Head to Roof Liner	247		317	
NR	NB	Nose to Rim/Seat Back	472		742	
CD	CB	Chest to Dash/Seat Back	572		727	
CS		Chest to Steering Wheel	348			
KD(L)/KDA(L) ⁰	KB(L)/KBA(L) ⁰	Left Knee to Dash/Seat Back	209	12.7	470	15.8
KD(R)/KDA(R) ⁰	KB(R)/KBA(R) ⁰	Right Knee to Dash/Seat Back	200	22.7	480	16.2
PAX ⁰	PAX ⁰	Pelvic Tilt Angle X		0.2		0.2
	PAY ⁰	Pelvic Tilt Angle Y				21.6
PHX	PHX	Hip Point to Striker (X-Axis)	206		274	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	183		186	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Toyota Sienna Van
Test Program: SINCAP Side Impact

NHTSA No.: M20185109
Test Date: 5/11/2018



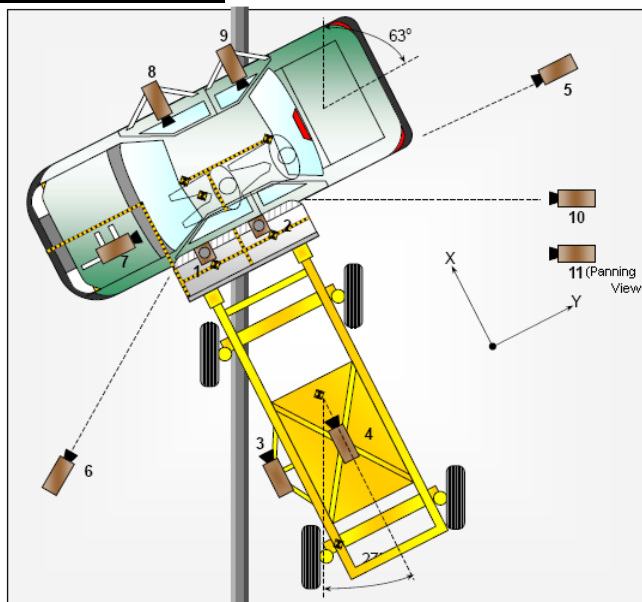
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	264	270
HS	Head to Side Window	mm	387	378
AD	Arm to Door	mm	136	159
HD	H-Point to Door	mm	138	236

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	-443	-5699	8.5	1000
2	Overhead Close-up	0	443	-5699	25	1000
3	Left Impact Point (MDB)	-1425	-978	-862	25	1000
4	Side Overall (MDB)	-2312	0	-1495	12.5	1000
5	Rear	0	8709	-1213	20	1000
6	Left Front	-4345	-2270	-1322	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

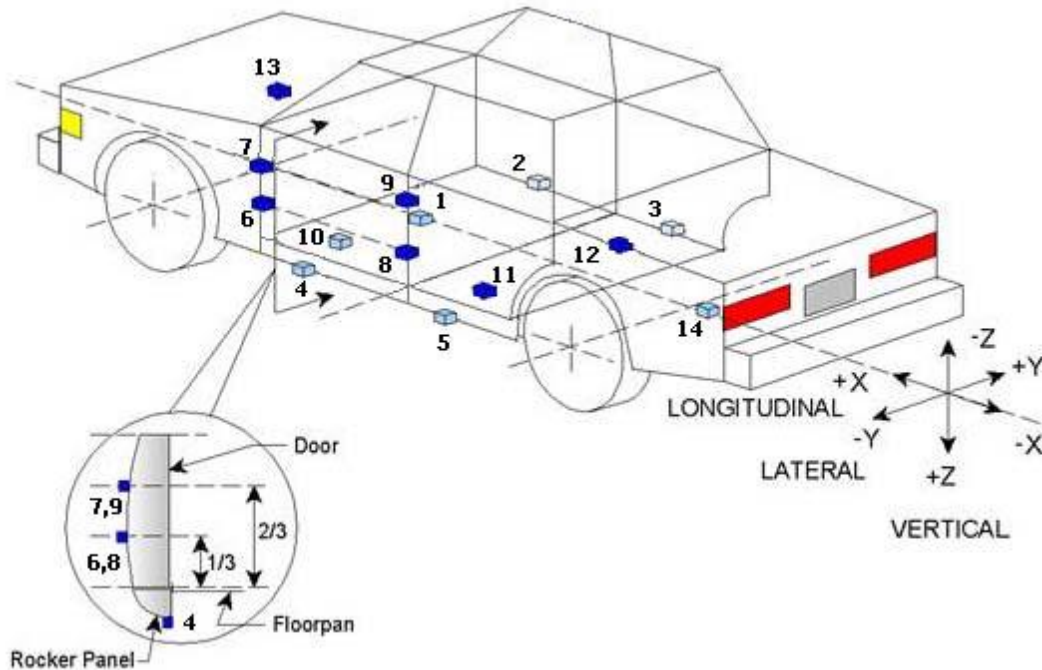
INSTRUMENTATION

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: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



TEST VEHICLE ACCELEROMETER LOCATIONS

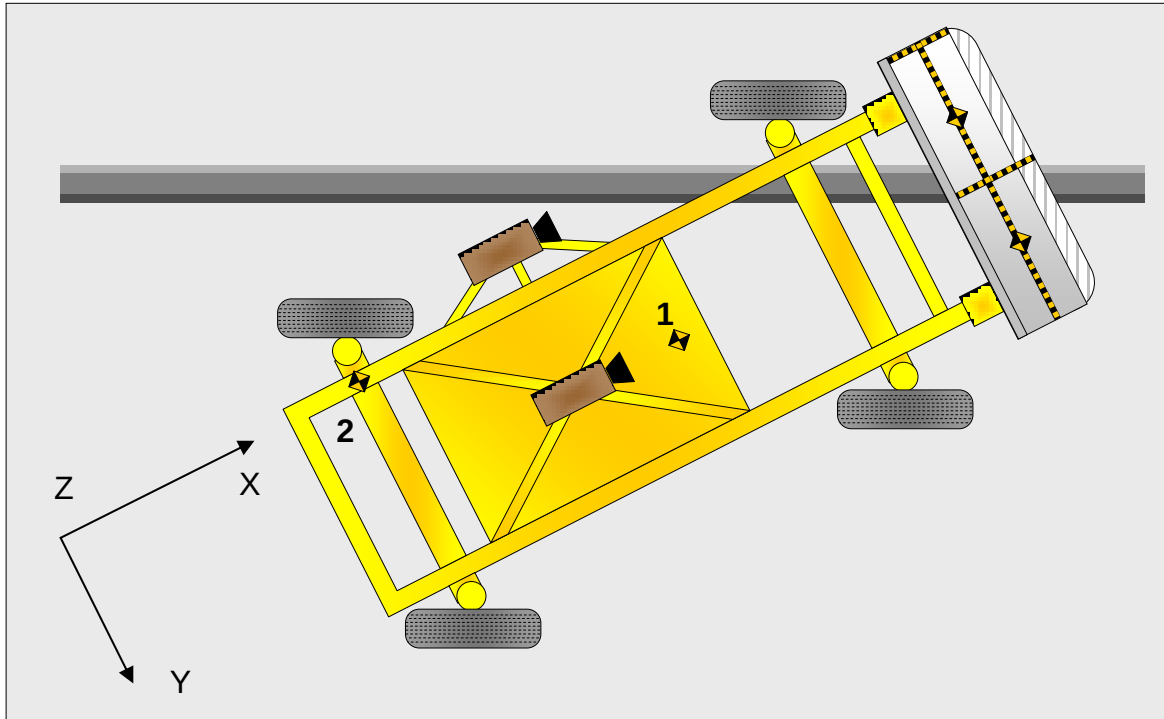
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3310	95	-372
2	Right Sill at Front Seat	3260	795	-378
3	Right Sill at Rear Seat	2299	757	-433
4	Left Sill at Front Door	3339	-795	-378
5	Left Sill at Rear Door	2285	-775	-430
6	A-Post Lower	3695	-923	-650
7	A-Post Middle	3712	-916	-860
8	B-Post Lower	2623	-900	-630
9	B-Post Middle	2600	-922	-1040
10	Front Seat Track	3019	-625	-534
11	Rear Seat Structure	1417	-160	-495
12	Right Rear Occ. Compartment	1452	462	-495
13	Engine Block	4436	90	-493
14	Rear Above Axle	965	-10	-492

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: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



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: 2018 Toyota Sienna Van
Test Program: SINCAP Side Impact

NHTSA No.: M20185109
Test Date: 5/11/2018

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	SCAB	SCAB
Left Side of Head	SCAB	SCAB
Back of Head	SCAB	SCAB
Left Shoulder	SCAB	SCAB, C-Pillar
Upper Torso	SAB	None
Lower Torso	SAB	None
Left Hip	Door panel	Seat Cushion Bolster
Left Knee	None	Door panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Major Deformation
Sill Separation	None
Windshield Damage	None
Side Window Damage	3 rd row left rear shattered
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

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		3030
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		493
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	+15
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-4

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2018 Toyota Sienna Van
Test Program: SINCAP Side Impact

NHTSA No.: M20185109
Test Date: 5/11/2018

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	1104

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	433.0	247.0	680.0
Right	kg	350.6	334.4	685.0
Ratio	%	57.4	42.6	100.0
Totals	kg	783.6	581.4	1365.0

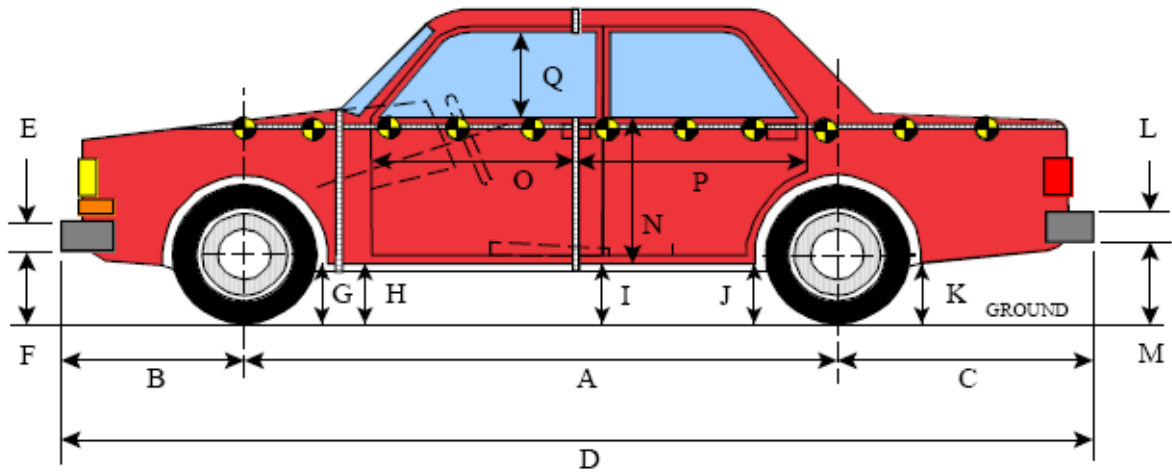
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.07
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.09
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: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



LEFT SIDE VIEW

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

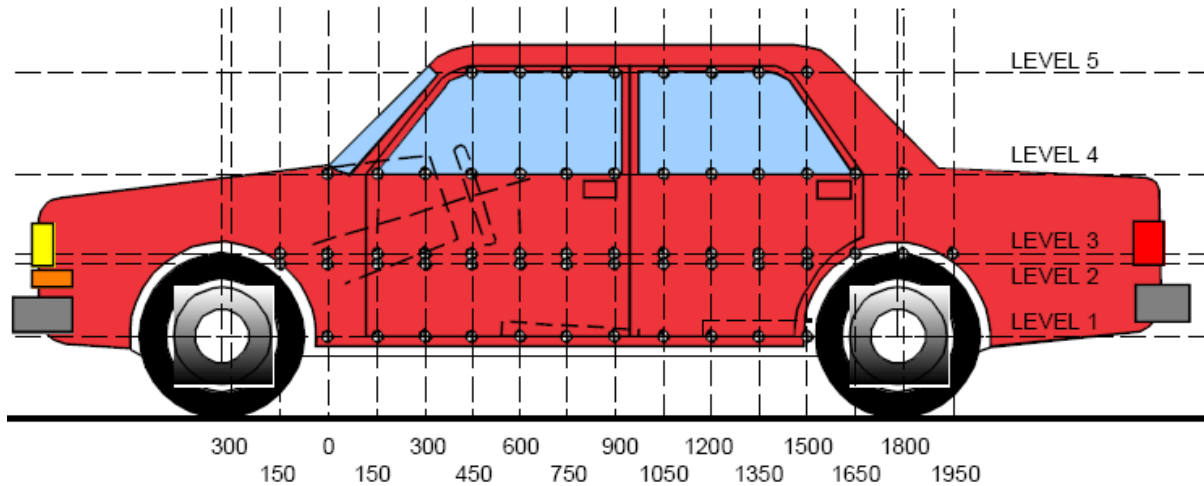
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3030	3020	10
B	Front Axle to Front Surface of Vehicle	965	980	-15
C	Rear Axle to Rear Surface of Vehicle	1097	1078	19
D	Total Length at Centerline	5092	5078	14
E	Front Bumper Thickness	160	160	0
F	Front Bumper Bottom to Ground	400	400	0
G	Sill Height at Front Wheel Well	210	226	-16
H	Sill Height at Front Door Leading Edge	214	231	-17
I	Sill Height at B-Pillar	243	273	-30
J1	Sill Height at Rear Wheel Well	215	255	-40
J2	Pinch Weld Height at Rear Wheel Well	224	259	-35
K	Sill Height Aft of Rear Wheel Well	248	284	-36
L	Rear Bumper Thickness	155	155	0
M	Rear Bumper Bottom to Ground	378	409	-31
N	Sill Height to Window Bottom Sill	840	760	80
O	Front Door Leading Edge to Impact CL	795	901	-106
P	Rear Door Trailing Edge to Impact CL	1433	1407	26
Q	Front Window Opening	538	541	-3
R	Right Side Length	5000	5000	0
S	Left Side Length	5000	5000	0
T	Vehicle Width	1988	1985	3

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	376	71	1200
2	Driver Hip Point	707	206	900
3	Mid-Door	713	206	900
4	Window Sill	1047	116	1350
5	Window Top	1650	5	900

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: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

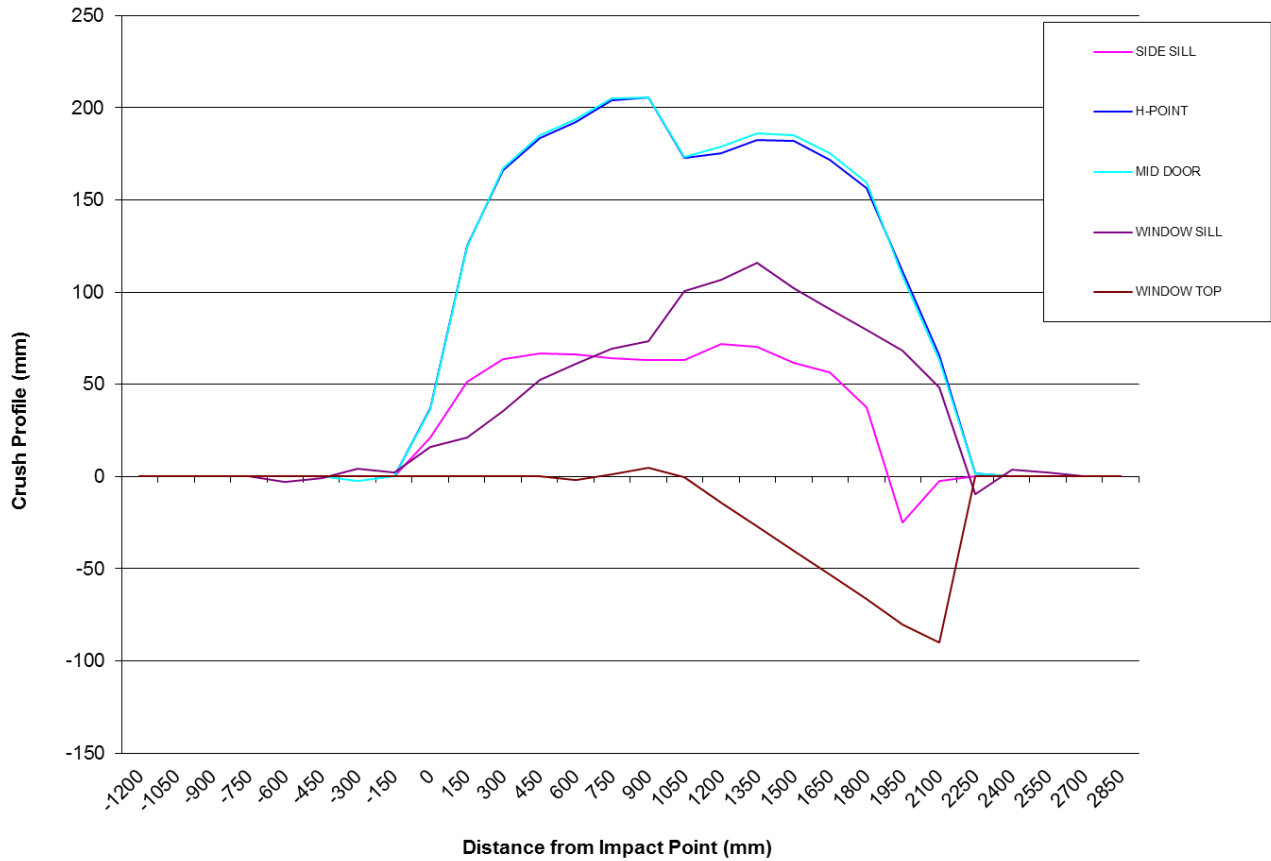
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-600	0	0	0	867	0	0	0	0	870	0	0	0	0	-3	0
-450	0	0	0	894	0	0	0	0	894	0	0	0	0	0	0
-300	0	0	982	903	0	0	0	984	899	0	0	0	-2	4	0
-150	0	979	978	906	0	0	979	978	904	0	0	0	0	2	0
0	960	973	973	910	0	939	936	937	894	0	21	37	36	16	0
150	941	975	975	915	0	890	850	851	894	0	51	125	124	21	0
300	940	977	977	920	0	876	810	810	885	0	64	167	167	35	0
450	942	978	979	926	0	875	795	794	874	0	67	183	185	52	0
600	944	980	980	932	651	877	787	786	871	652	67	193	194	61	-1
750	945	981	981	939	697	881	777	776	870	696	64	204	205	69	1
900	946	982	982	945	707	883	776	776	872	702	63	206	206	73	5
1050	947	982	983	951	713	884	810	809	850	713	63	172	174	101	0
1200	948	983	983	943	716	877	807	804	836	730	71	176	179	107	-14
1350	950	982	982	961	719	880	800	796	845	746	70	182	186	116	-27
1500	951	981	982	963	719	890	800	796	861	760	61	181	186	102	-41
1650	952	981	981	964	718	895	809	806	873	771	57	172	175	91	-53
1800	954	980	980	964	716	917	823	821	884	783	37	157	159	80	-67
1950	963	978	978	964	715	988	867	870	895	795	-25	111	108	69	-80
2100	973	982	982	963	713	976	916	919	914	803	-3	66	63	49	-90
2250	0	990	990	962	0	0	989	988	972	0	0	1	2	-10	0
2400	0	0	0	960	0	0	0	0	956	0	0	0	0	4	0
2550	0	0	0	958	0	0	0	0	956	0	0	0	0	2	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: 2018 Toyota Sienna Van
Test Program: SINCAP Side Impact

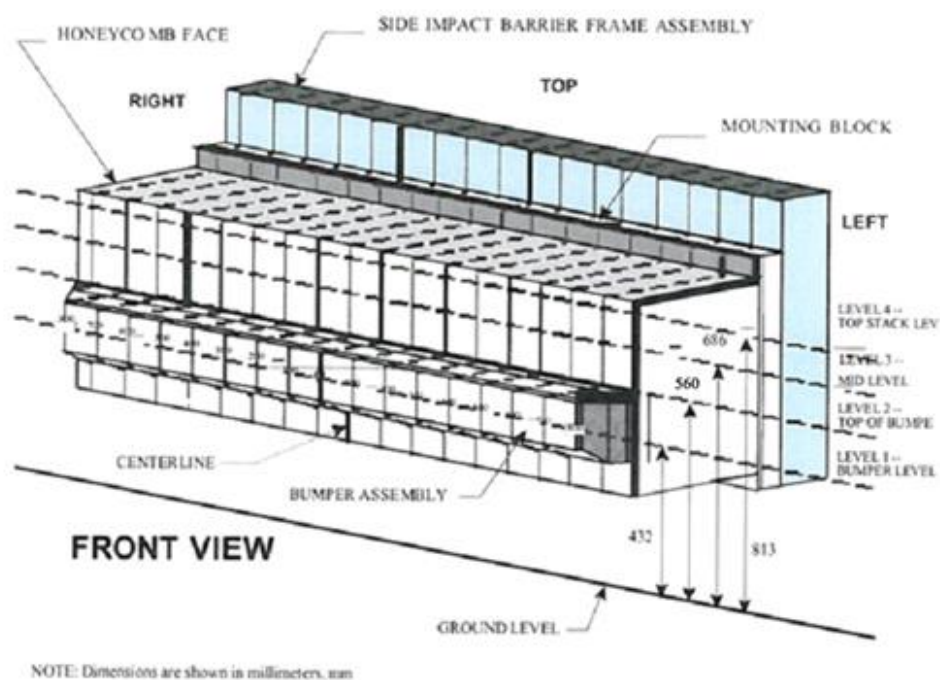
NHTSA No.: M20185109
Test Date: 5/11/2018



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	200	Right	266
B	Top of Bumper	560	800	Right	148
C	Mid-Level	686	800	Left	124
D	Top of Stack	813	800	Left	146

DEFORMABLE BARRIER STATIC CRUSH

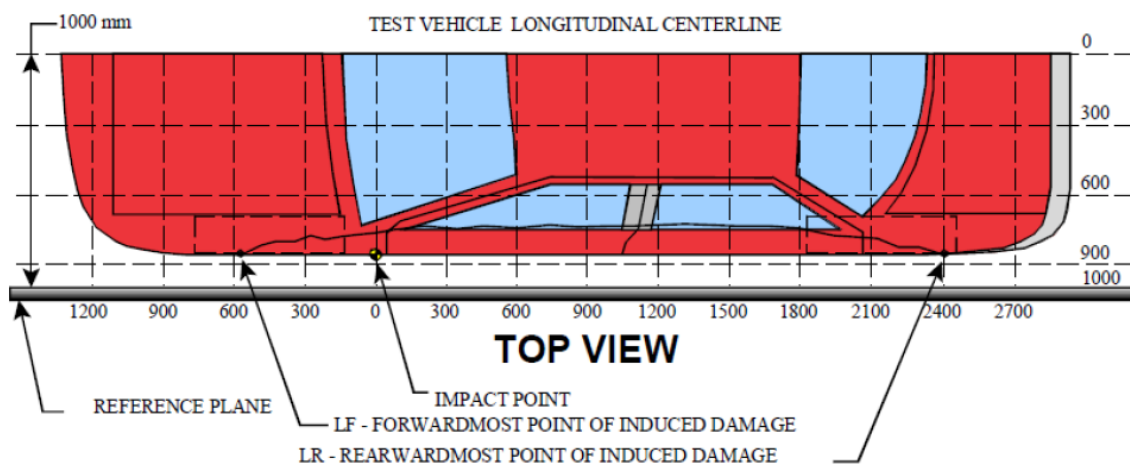
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	262	262	263	262	262	264	266	263	258	254	248	246	244	243	240	238	234
2	148	141	144	142	142	143	143	N/A ¹	140	136	131	128	125	121	119	119	132
3	113	92	72	67	68	80	100	119	97	83	66	69	70	73	82	95	124
4	105	87	71	58	54	61	77	107	124	82	80	80	81	91	104	125	146

¹ Missing point 42

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2250	4	956	958	2
2	1950	2	867	978	111
3	1350	3	796	982	186
4	900	2	776	982	206
		3	776	982	
5	300	2	810	977	167
		3	810	977	
6 ¹	-300	4	899	903	0

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm Left of Center	1	238	472	234
2	500 mm Left of Center	1	243	485	243
3	200 mm Left of Center	1	237	485	248
4	200 mm Right of Center	1	220	486	266
5	500 mm Right of Center	1	224	486	262
6	800 mm Right of Center	1	213	475	262

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

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

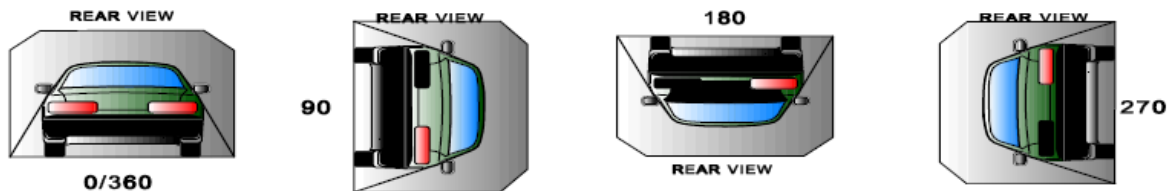
Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

Test Time: 15:46 **Temperature:** 21.8°C

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

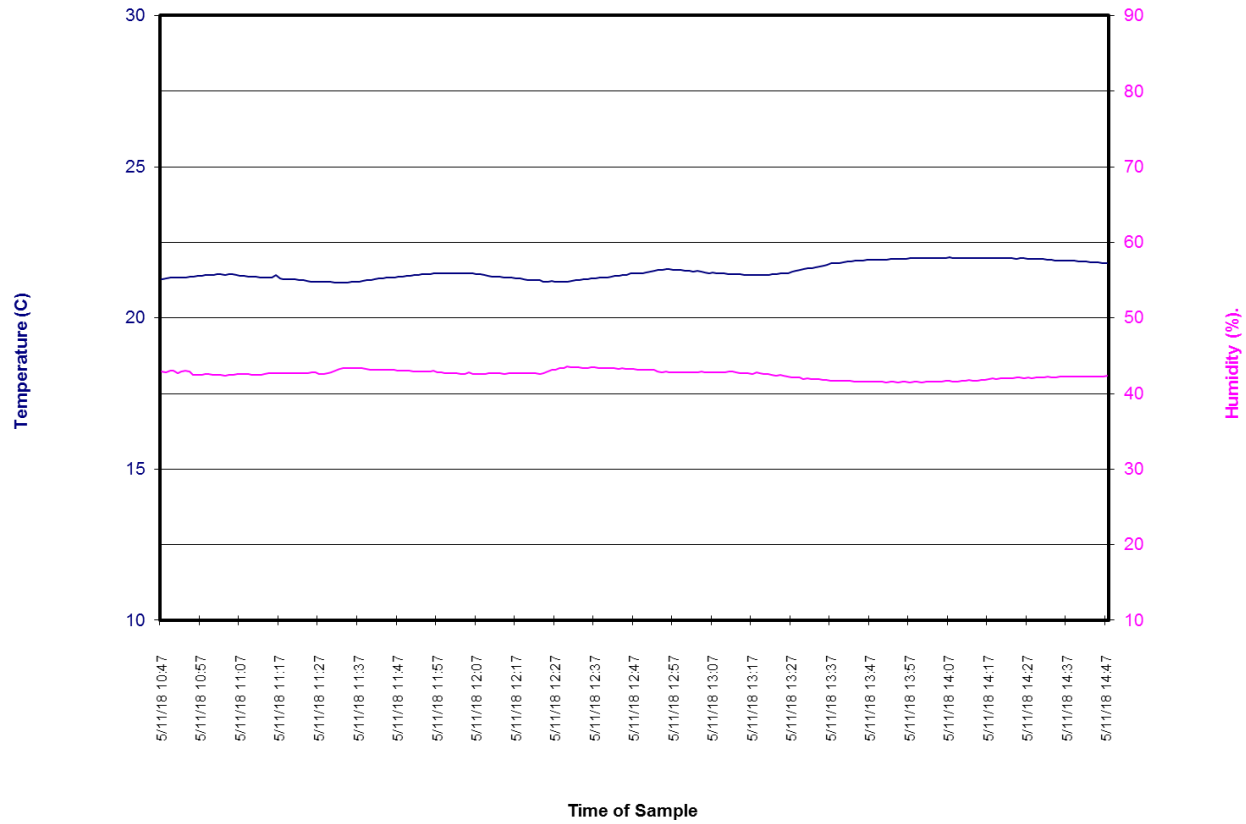
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

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

Test Vehicle: 2018 Toyota Sienna Van
 Test Program: SINCAP Side Impact

NHTSA No.: M20185109
 Test Date: 5/11/2018

M20185109 2018 Toyota Sienna Left MDB Impact 180511: Test Time 14:47



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

No.	Description	Page
001	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-6
002	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-6
003	Pre-Test Frontal View of Test Vehicle	A-7
004	Post-Test Frontal View of Test Vehicle	A-7
005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
006	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-8
007	Pre-Test Left Side View of Test Vehicle	A-9
008	Post-Test Left Side View of Test Vehicle	A-9
009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
010	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-10
011	Pre-Test Rear View of Test Vehicle	A-11
012	Post-Test Rear View of Test Vehicle	A-11
013	Pre-Test Right Side View of Test Vehicle	A-12
014	Post-Test Right Side View of Test Vehicle	A-12
015	Pre-Test Overhead View of Test Area	A-13
016	Post-Test Overhead View of Test Area	A-13
017	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-14
018	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-14
019	Pre-Test Close-Up View of Impact Point Target	A-15
020	Post-Test Close-Up View of Impact Point Target	A-15
021	Pre-Test Left Front Door Latch Close-Up	A-16
022	Post-Test Left Front Door Latch Close-Up	A-16
023	Pre-Test Left Rear Door Latch Close-Up	A-17
024	Post-Test Left Rear Door Latch Close-Up	A-17
025	Pre-Test Front Close-Up View of Driver Dummy	A-18
026	Post-Test Front Close-Up View of Driver Dummy	A-18
027	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-19
028	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
029	Post-Test Left Side View of Driver Dummy Shoulder and Door Top	A-20
030	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-21
031	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-21
032	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-22
033	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-22
034	Pre-Test Placement of Driver Dummy's Feet	A-23
035	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
036	Pre-Test Left Side View of Steering Wheel	A-24

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
037	View of Disengaged Parking Brake	A-24
038	Pre-Test View of Parking Brake	A-25
039	Pre-Test Close-Up Left Side View of Driver Seat Track	A-25
040	Pre-Test Close-Up Left Side View of Driver Seat Back	A-26
041	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-26
042	Pre-Test Driver Dummy and Door Clearance View	A-27
043	Post-Test Driver Dummy and Door Clearance View	A-27
044	Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-28
045	Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-28
046	Pre-Test Driver Inner Door Panel View	A-29
047	Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations	A-29
048	Post-Test Driver Dummy Close-Up Head Contact with Vehicle View	A-30
049	Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View	A-30
050	Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View	A-31
051	Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View	A-31
052	Post-Test Driver Dummy Close-Up Pelvis Contact View	A-32
053	Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View	A-32
054	Post-Test Driver Dummy Close-Up Knee Contact View	A-33
055	Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking	A-33
056	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-34
057	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-34
058	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-35
059	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-35
060	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-36
061	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-36
062	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-37
063	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-37

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
064	Pre-Test Placement of Rear Passenger Dummy's Feet	A-38
065	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-38
066	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-39
067	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-39
068	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-40
069	Pre-Test Rear Passenger Dummy and Door Clearance View	A-41
070	Post-Test Rear Passenger Dummy and Door Clearance View	A-41
071	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-42
072	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-42
073	Pre-Test Rear Passenger Inner Door Panel View	A-43
074	Post-Test Rear Passenger Inner Door Panel View	A-43
075	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	A-44
076	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View	A-44
077	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-45
078	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	A-45
079	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	A-46
080	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	A-46
081	Post-Test Rear Passenger Dummy Close-Up Knee Contact View	A-47
082	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-48
083	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-48
084	Pre-Test Front View of MDB Impactor Face	A-49
085	Post-Test Front View of MDB Impactor Face	A-49
086	Pre-Test Top View of MDB Impactor Face	A-50
087	Post-Test Top View of MDB Impactor Face	A-50
088	Pre-Test Left Side View of MDB Impactor Face	A-51
089	Post-Test Left Side View of MDB Impactor Face	A-51
090	Pre-Test Right Side View of MDB Impactor Face	A-52
091	Post-Test Right Side View of MDB Impactor Face	A-52

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
092	Close-Up View of Vehicle's Certification Label	A-53
093	Close-Up View of Vehicle's Tire Information Placard or Label	A-53
093a	Reduced Load Carrying Capacity Label	A-54
094	Pre-Test Ballast View	A-55
095	Post-Test Primary and Redundant Speed Trap Read-Out	A-55
096	FMVSS No. 301 Static Rollover 0 Degrees	A-56
097	FMVSS No. 301 Static Rollover 90 Degrees	A-56
098	FMVSS No. 301 Static Rollover 180 Degrees	A-57
099	FMVSS No. 301 Static Rollover 270 Degrees	A-57
100	FMVSS No. 301 Static Rollover 360 Degrees	A-58
101	Impact Event	A-58
102	Monroney Label	A-59
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-59
104	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-60



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



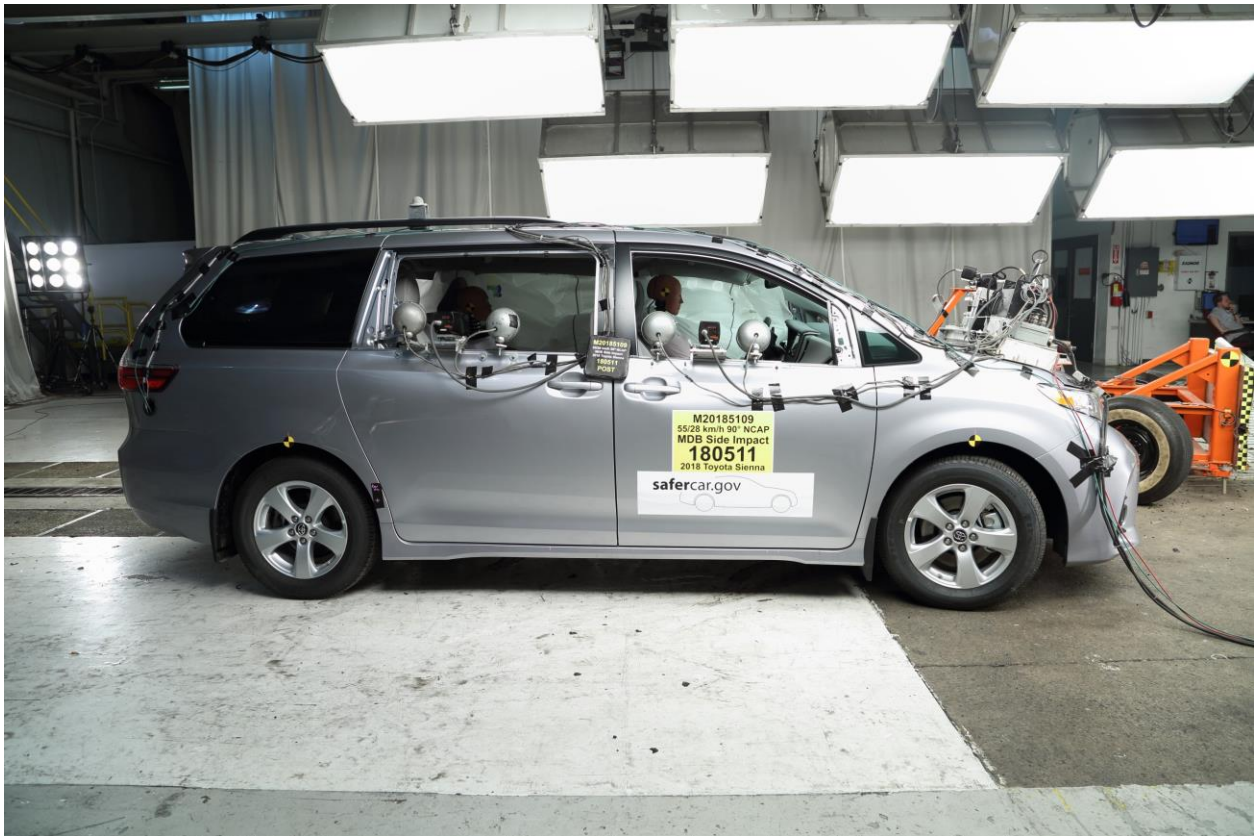
011 Pre-Test Rear View of Test Vehicle



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 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

Intentionally Left Blank



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



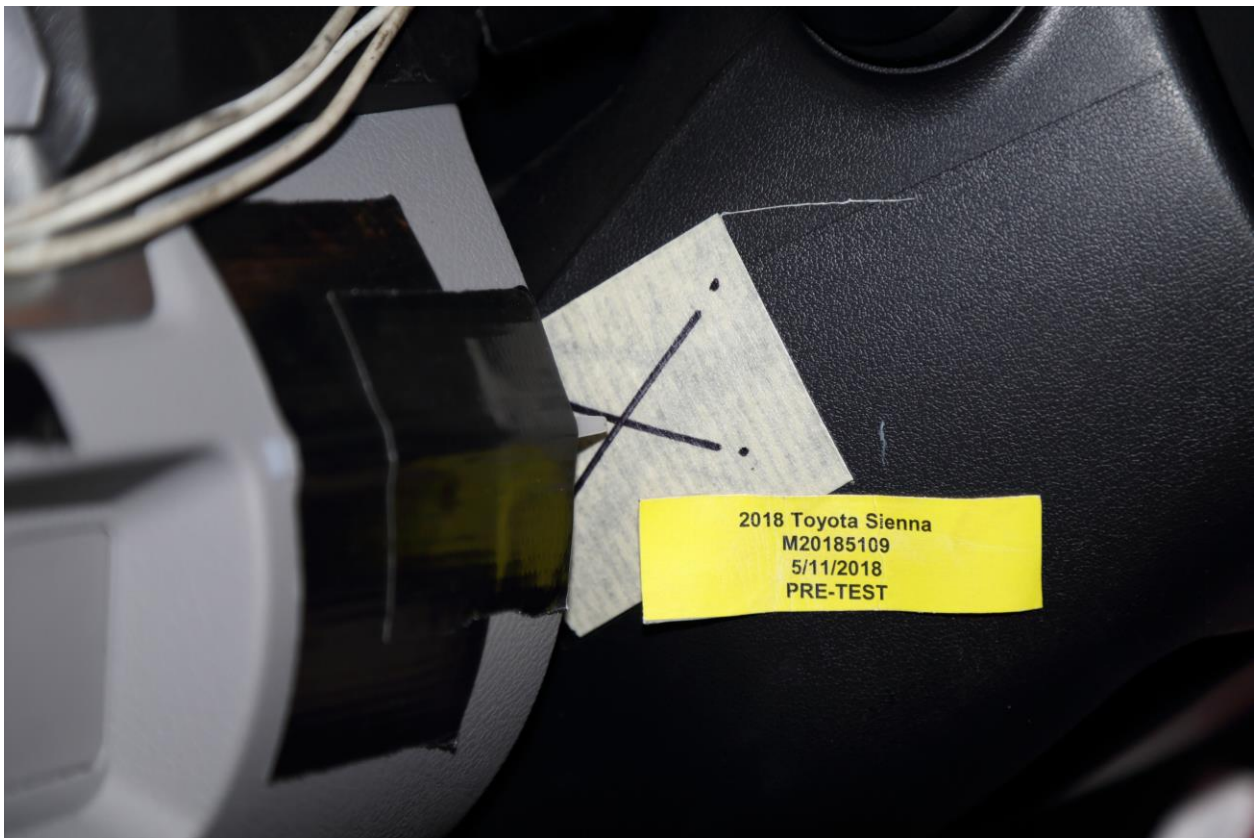
033 Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



034 Pre-Test Placement of Driver's Dummy Feet



035 Pre-Test View of Belt Anchorage for Driver Dummy



036 Pre-Test Left Side View of Steering Wheel



037 View of Disengaged Parking Brake



038 Pre-Test View of Parking Brake



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



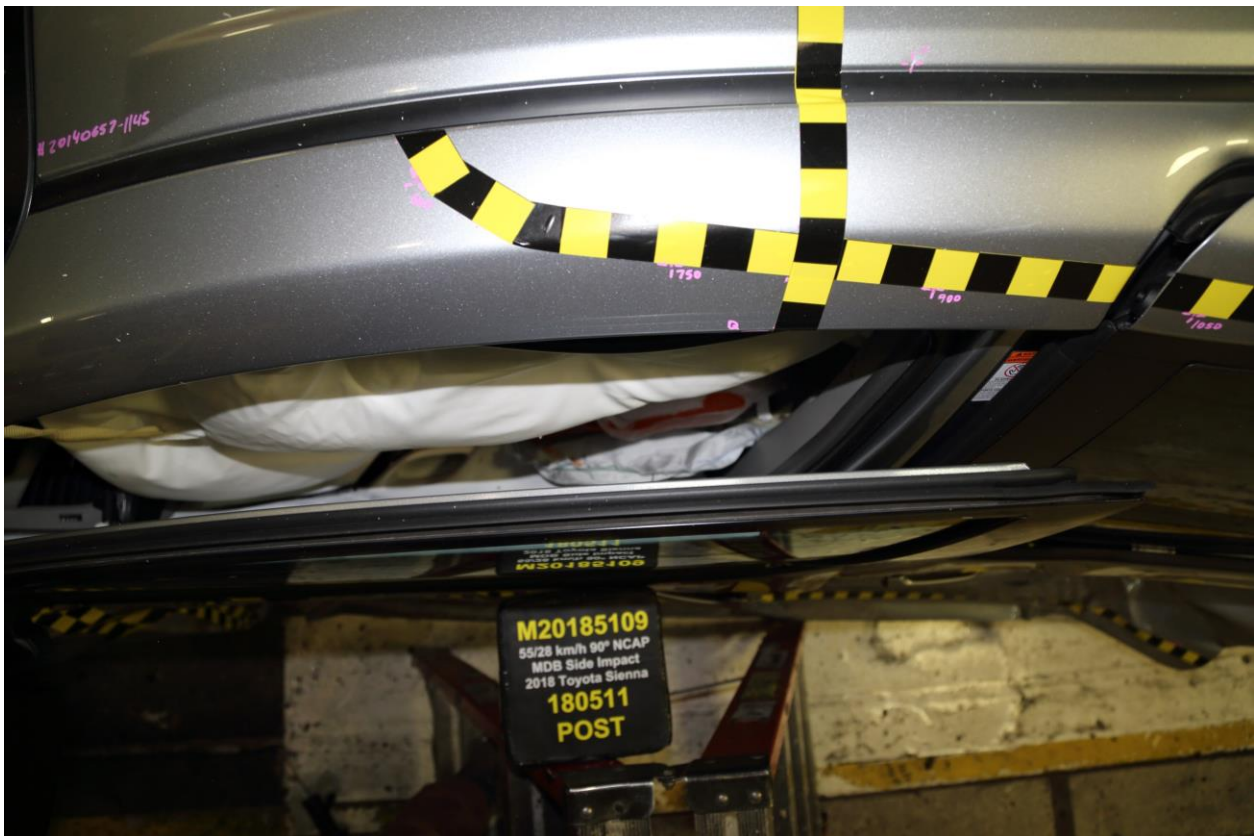
040 Pre-Test Close-Up Left Side View of Driver Seat Back



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



042 Pre-Test Driver Dummy and Door Clearance View



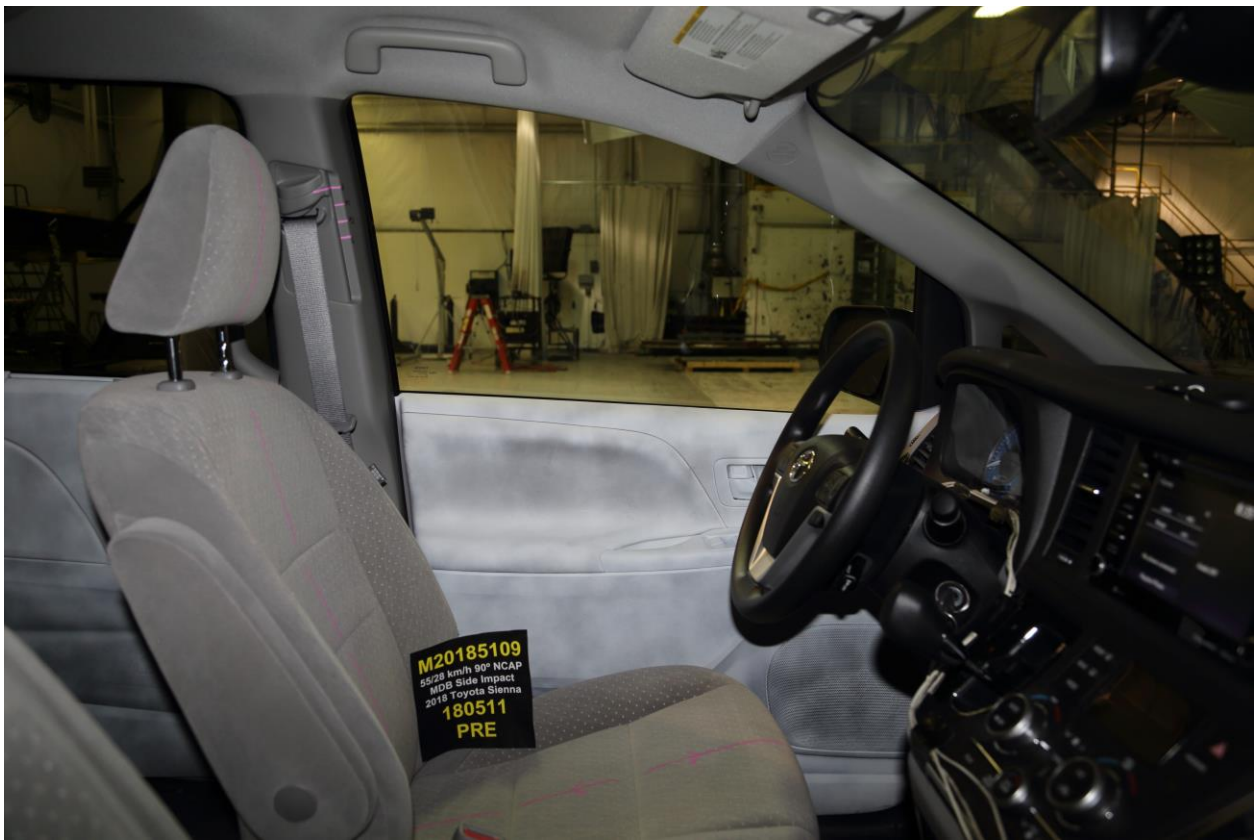
043 Post-Test Driver Dummy and Door Clearance View



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



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 Showing Driver Dummy Contact Locations

PHOTO NOT APPLICABLE

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



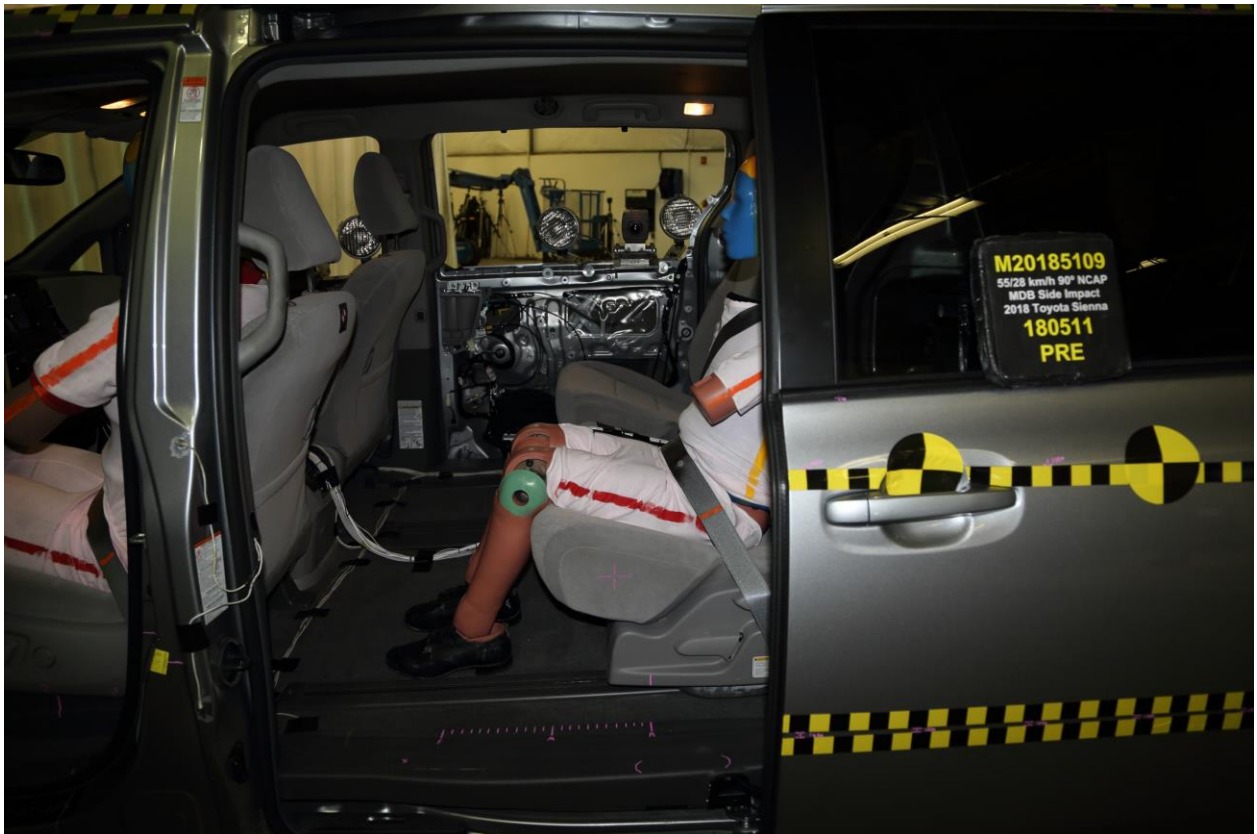
052 Post-Test Driver Dummy Close-Up Pelvis Contact View



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

PHOTO NOT APPLICABLE

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



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



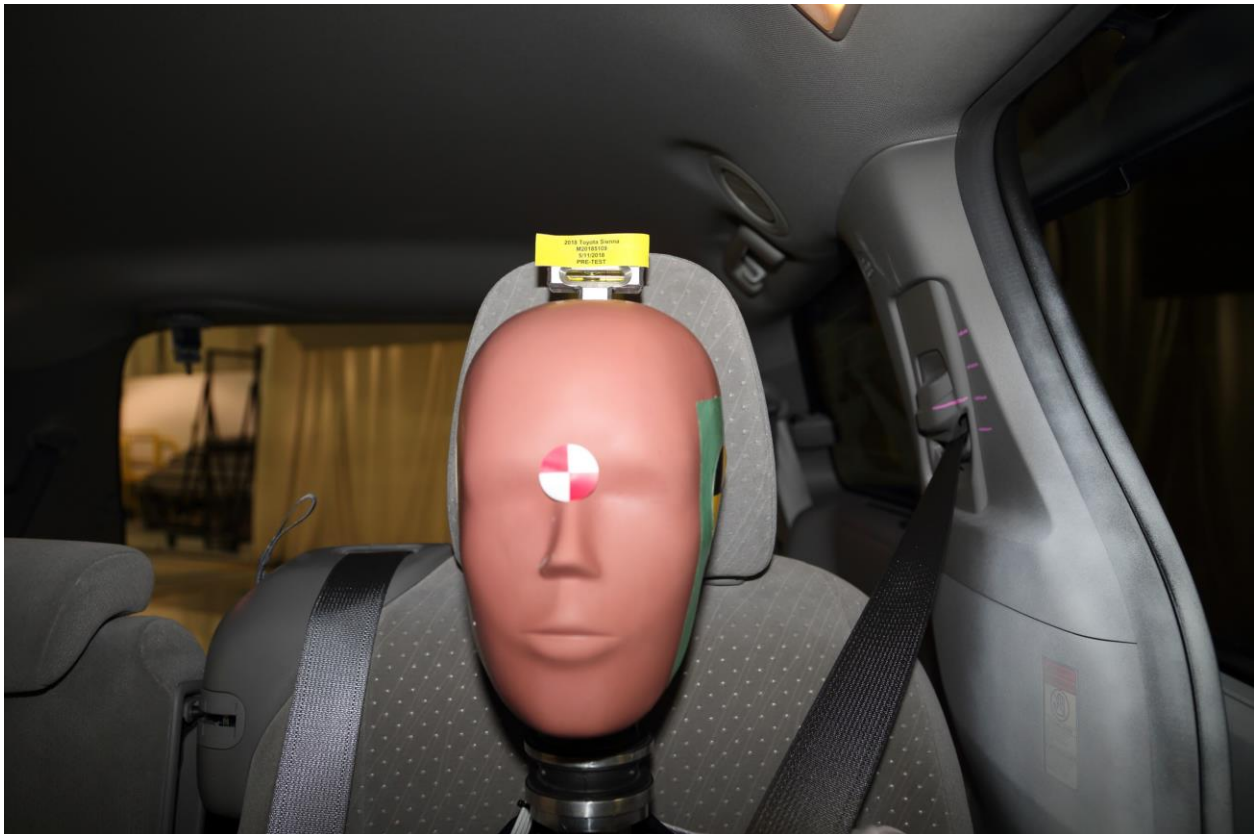
056 Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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's Neck Showing Position of Adjustable Neck Bracket



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



064 Pre-Test Placement of Rear Passenger Dummy's 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

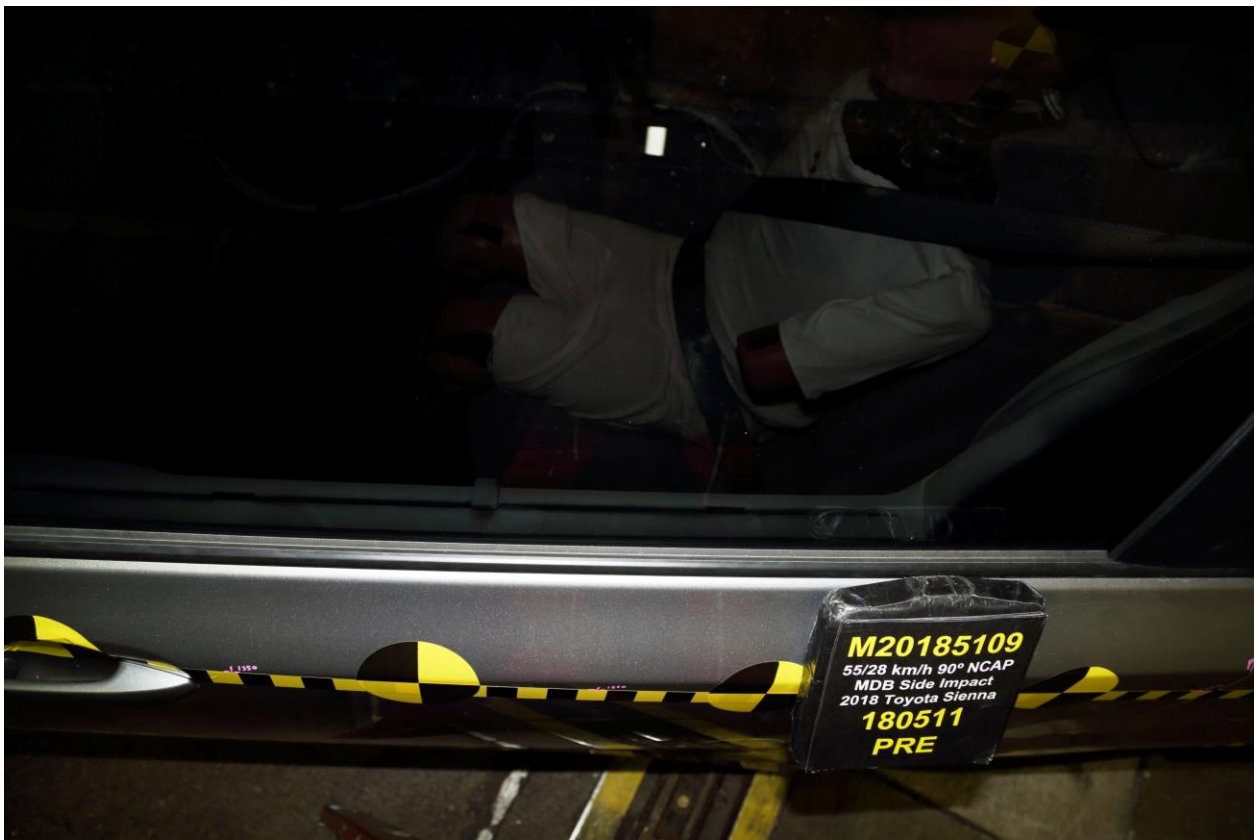


067 Pre-test Close-Up Left Side View of Rear Passenger Seat Back

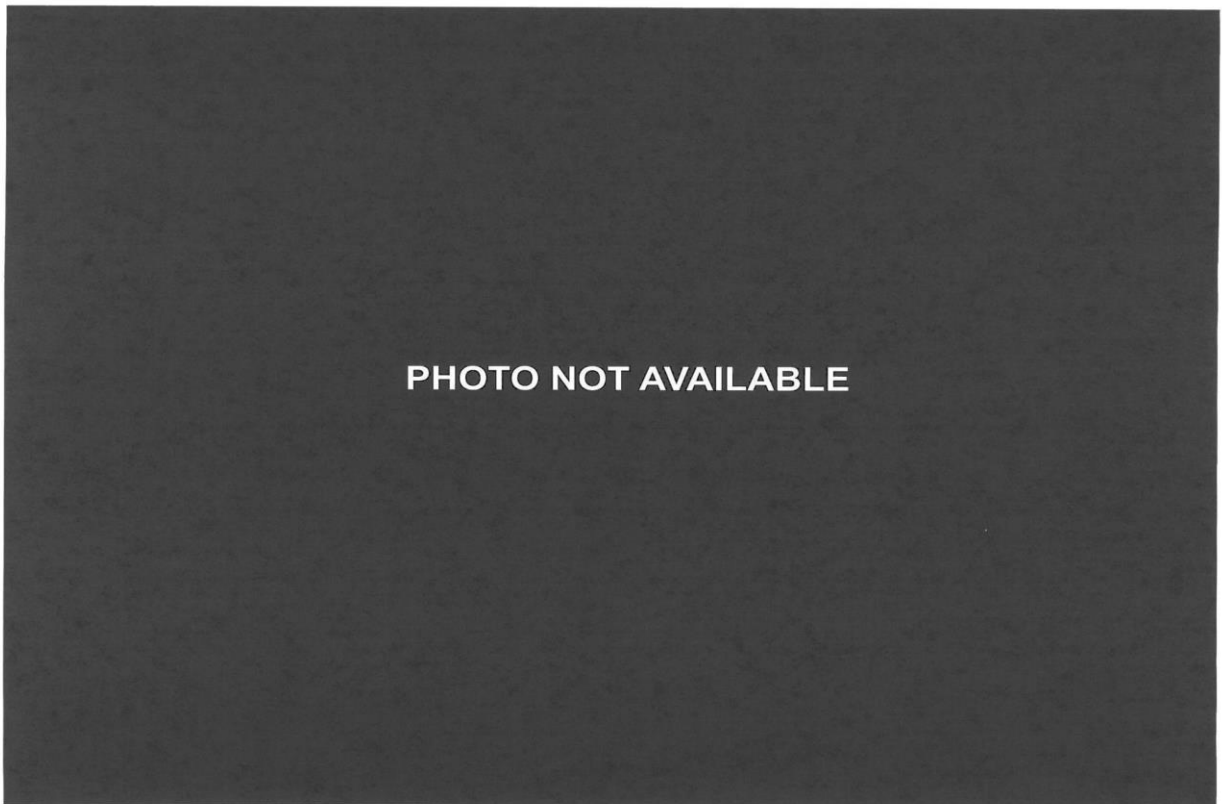


068 Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint

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069 Pre-Test Rear Passenger Dummy and Door Clearance View



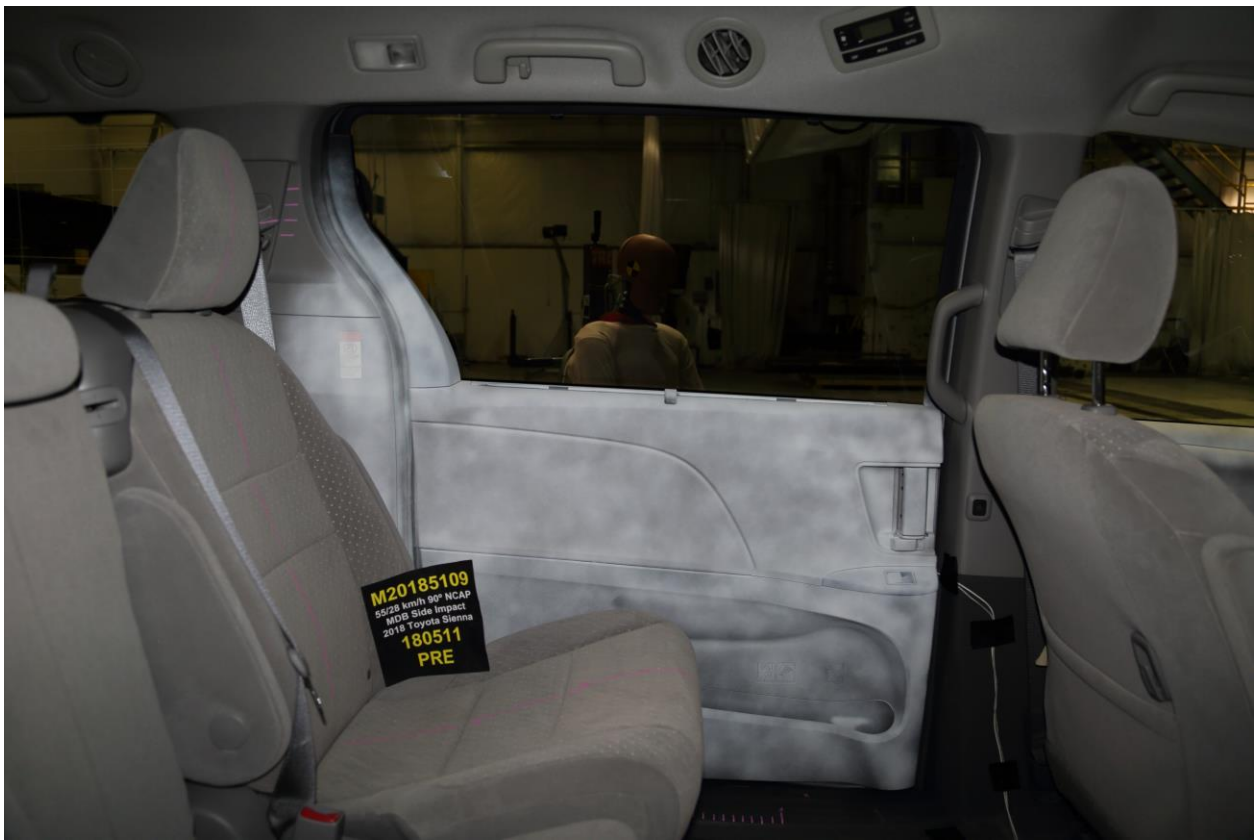
070 Post-Test Rear Passenger Dummy and Door Clearance View



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 Rear Passenger Inner Door Panel View



074 Post-Test Rear Passenger Inner Door Panel View

PHOTO NOT APPLICABLE

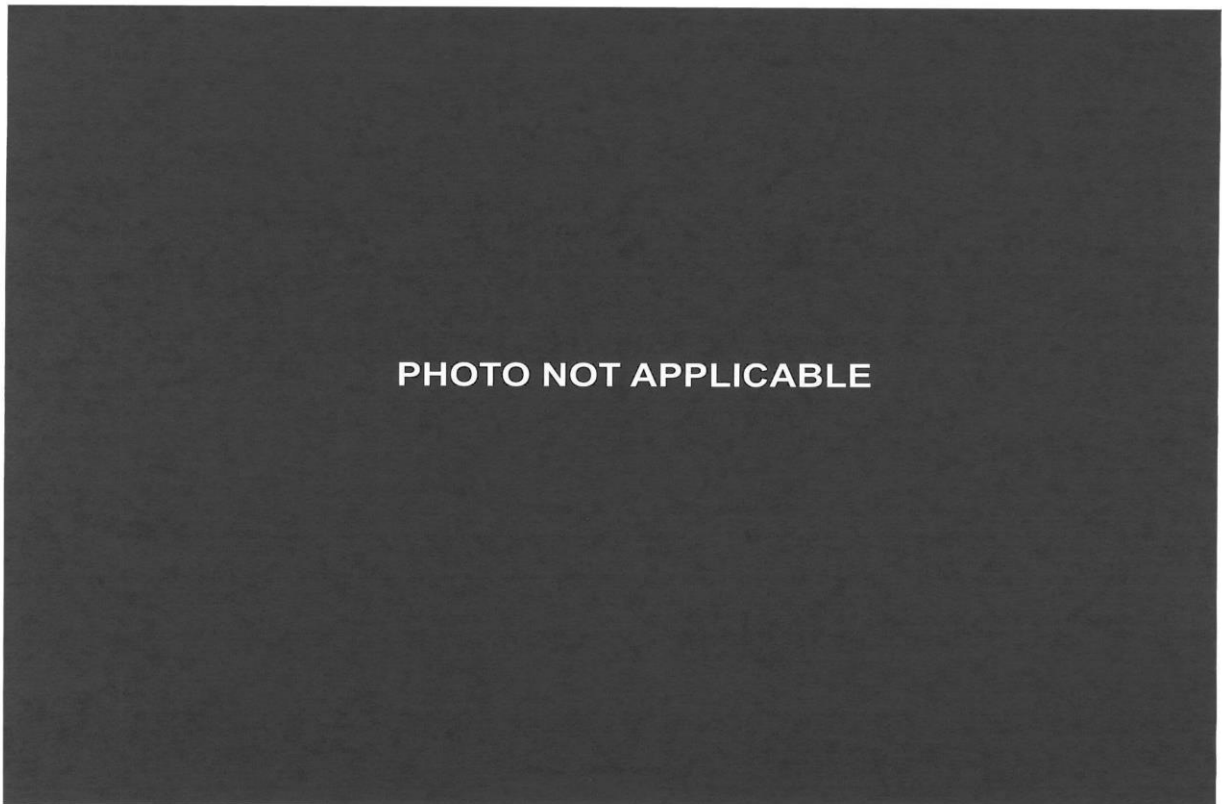
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



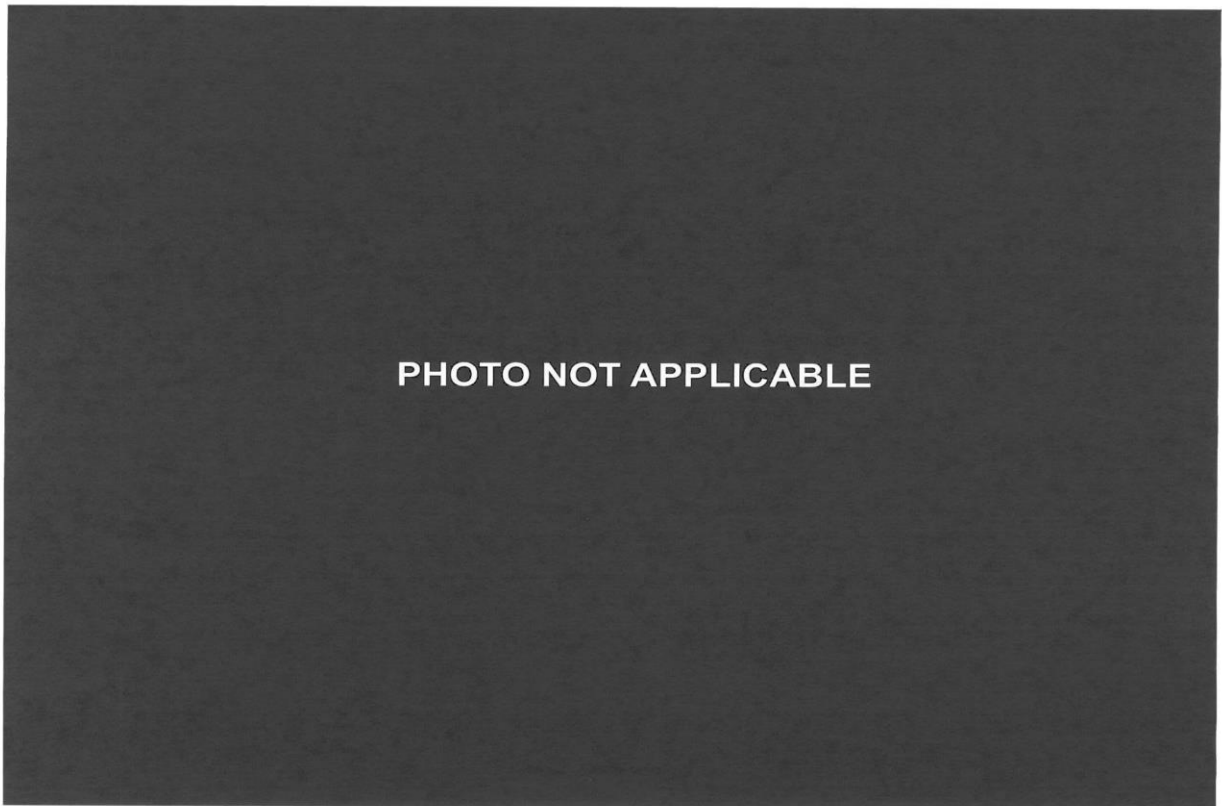
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



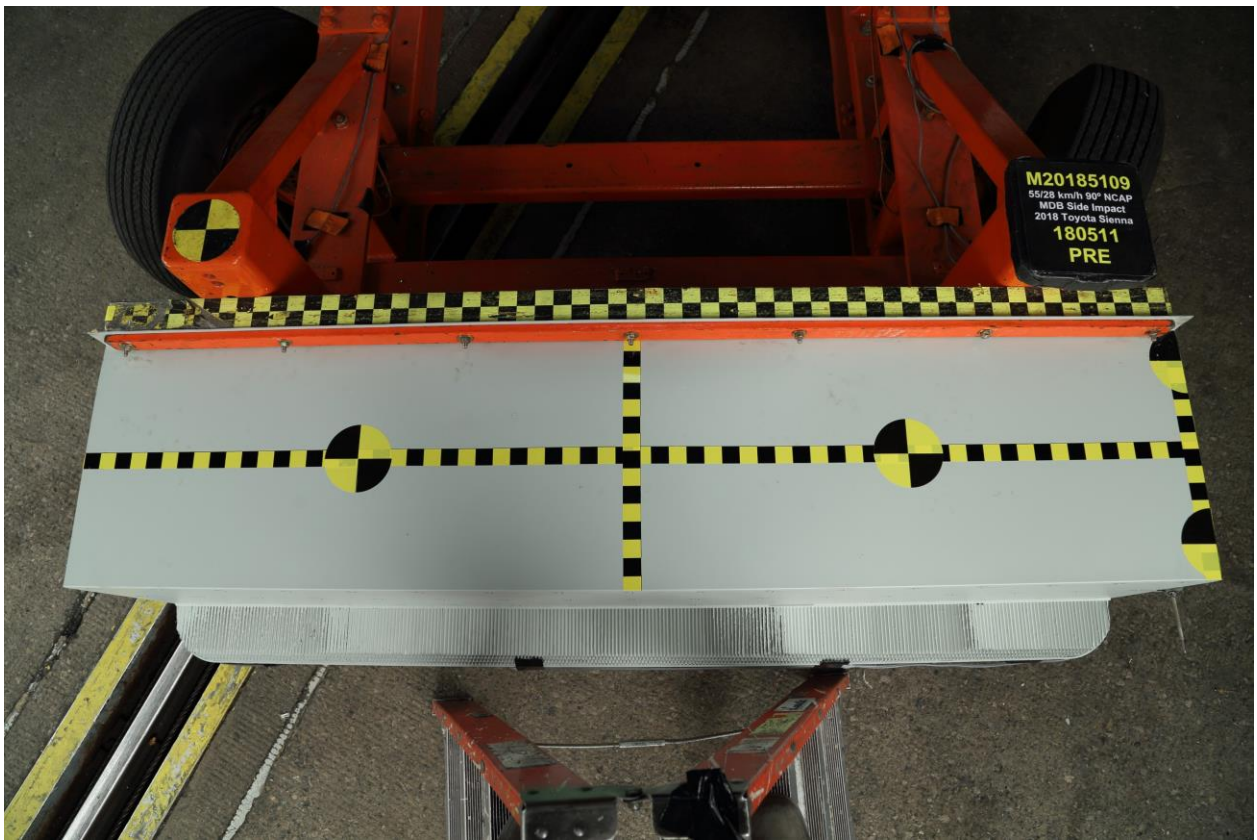
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



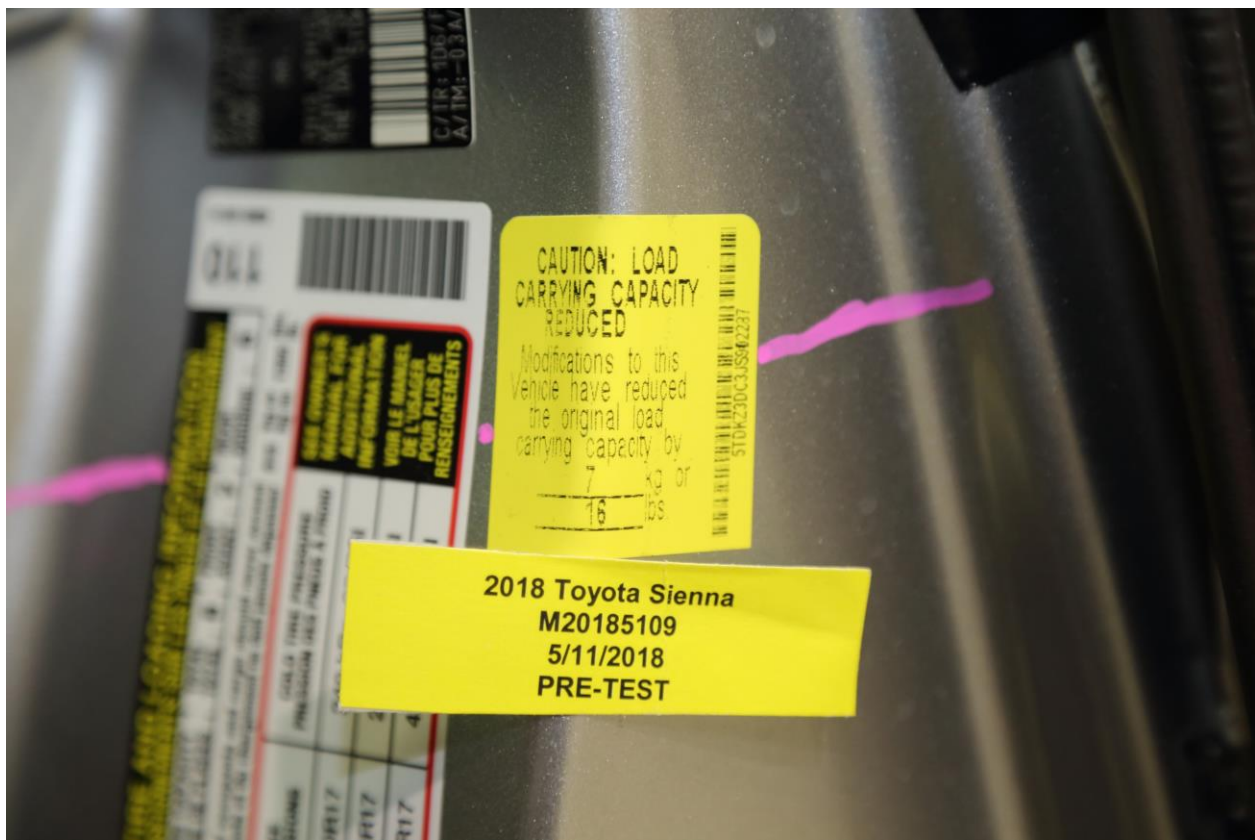
091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle's Certification Label



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



093a Reduced Load Carrying Capacity Label

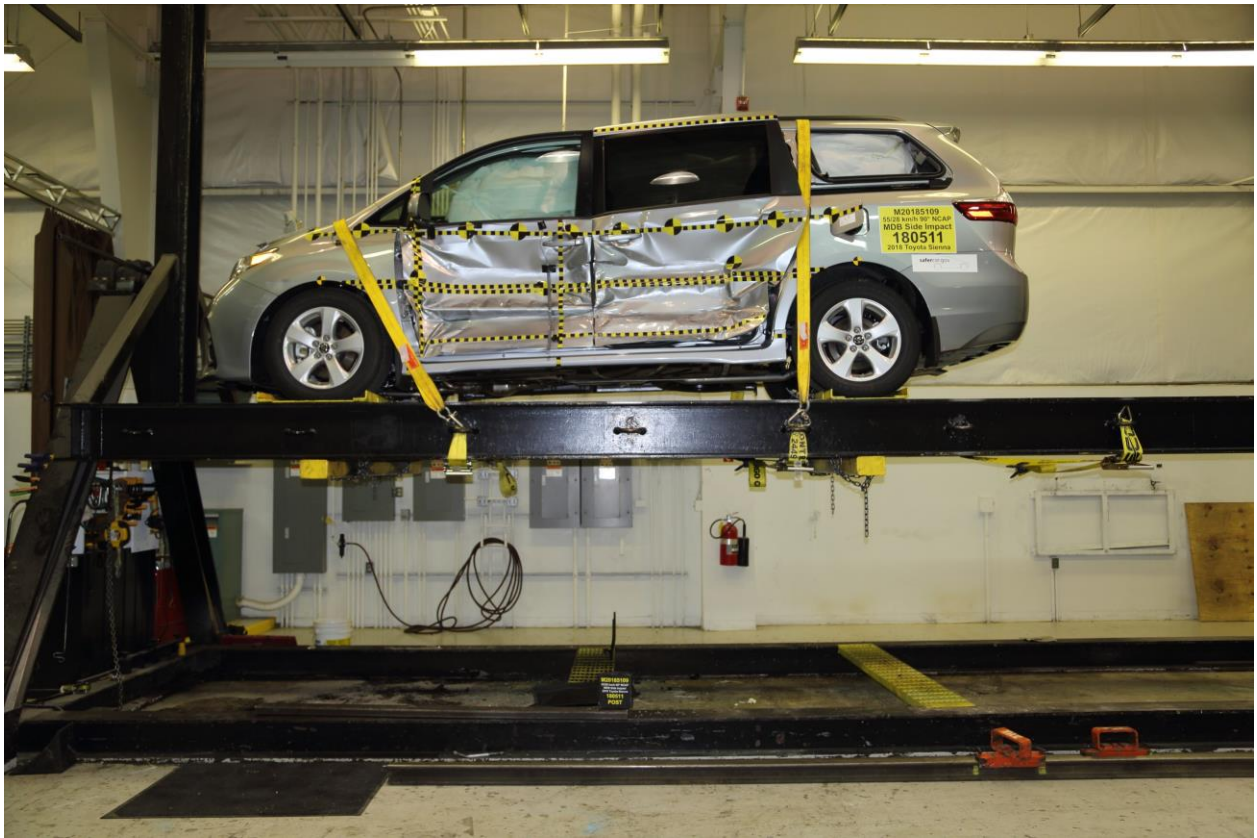
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094 Pre-Test Ballast View



095 No. Post-Test Primary and Redundant Speed Trap Read-Out



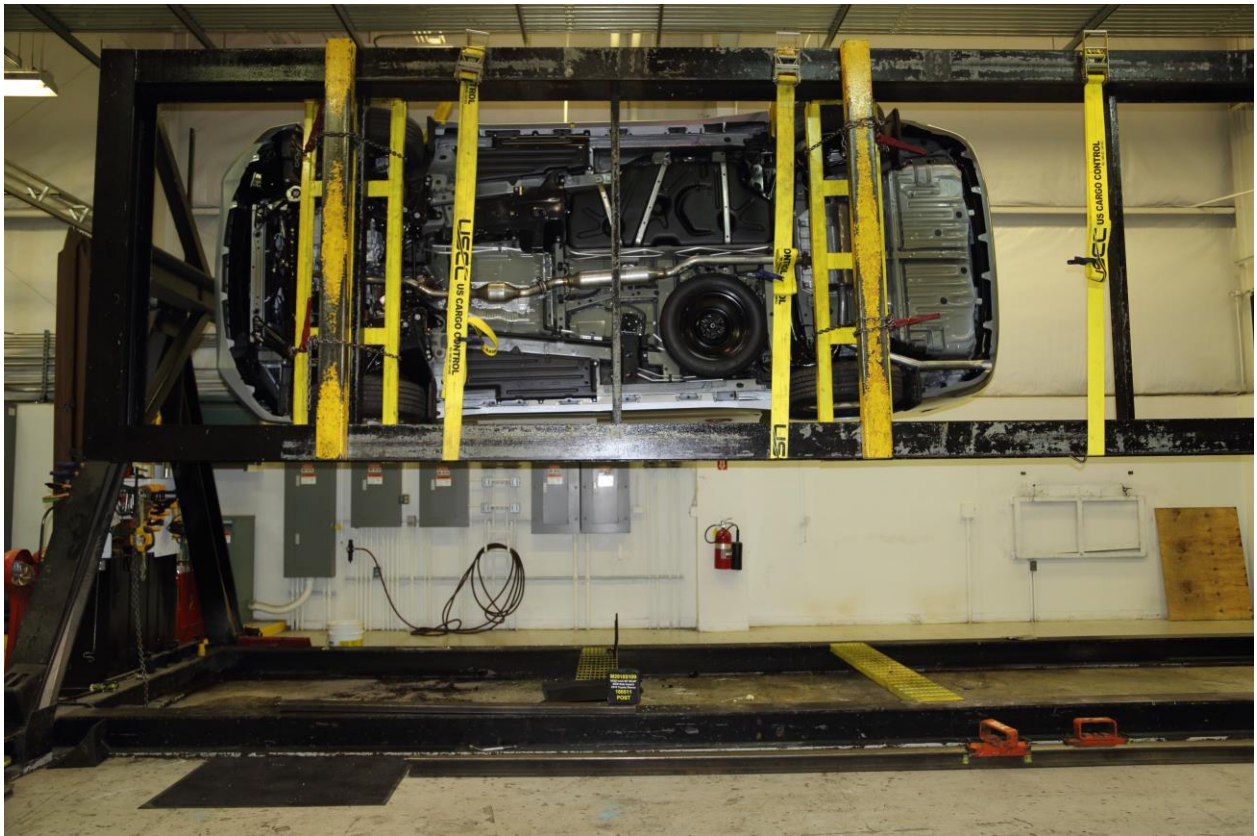
096 FMVSS No. 301 Static Rollover 0 Degrees



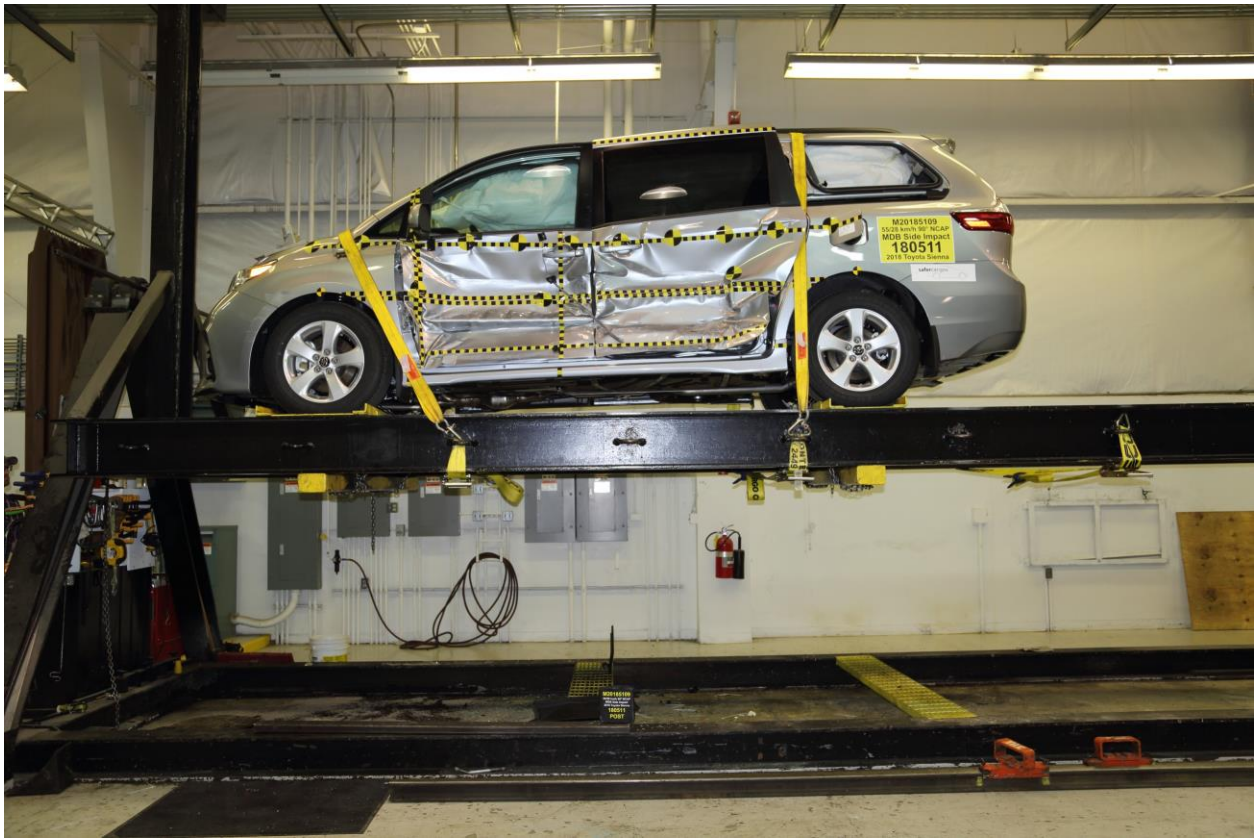
097 FMVSS No. 301 Static Rollover 90 Degrees



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: **SIENNA LE 3.5L FWD 8 PSGR**
VIN: **5TDKZ3DC3JS902287**
YR/MDL: 2018/5338A
CLR: SILVER SKY METALLIC/FC14 (01D6/14)
FINAL ASSEMBLY POINT: PRINCETON, INDIANA, U.S.A.

GOVERNMENT 5-STAR SAFETY RATINGS

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

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

STANDARD EQUIPMENT

MECHANICAL & PERFORMANCE

- 3.5L V6 DOHC 24-valve D-4S injection with Dual VVT-i
- Direct Shift 8-Speed Automatic Transmission with Intelligence (ECT-i)
- 17" Alloy Wheels with P235/60R17 Tires

SAFETY & CONVENIENCE

- Toyota Safety Sense (TSS-P): Pre-Collision System w/Pedestrian Detection (PCS w/PD), Lane Departure Alert (LDA), w/Steering Assist (SA), Auto High Beams (AHB) and Dynamic Radar Cruise Control (DRCC)
- Star Safety System: Enhanced Vehicle Stability Control, Traction Control, Anti-Lock Brake System, Electronic Brake-Force Distribution, Brake Assist & Smart Stop Technology
- 4 LATCH locations: 2 in 2nd row and 2 in 3rd row

EXTERIOR

- Projector Beam Headlights w/Auto On/Off
- Dual Power Sliding Side Doors
- Daytime Running Lights
- Color-Keyed Power Outside Mirrors with Integrated Blind Spot Mirrors

INTERIOR

- Easy Clean Fabric 8-Way Power Driver's Seat with Power Lumbar, 4-Way Front Passenger Seat
- Removable Easy Clean 2nd Row Captain's Chairs with Stowable Center Seat with Tip Up and Long Slide
- 60/40 Split and Stow 3rd Row Seat with One-Motion Stow
- 3-Zone Automatic Climate Control: Driver, Passenger and Rear zones
- Entune 3.0 Audio Plus w/Connected Navigation, iPod, GPS, Link App, 17" Hi-Res Touch-Screen, AM/FM/CD/USB/AUX, Bluetooth, Sirius XM 3-Month Trial, HD Radio & Integrated Backup Camera Display
- **Full Tank of Gas**

MANUFACTURER'S SUGGESTED RETAIL PRICE \$33,660.00

OPTIONAL EQUIPMENT

- FE 50 State Emissions 130.00
- ZT All-Weather Floor Liners/Door Sill Mudguards 149.00

EPA DOT Fuel Economy and Environment

Fuel Economy

22 MPG
combined city/hwy

19 27
city highway

4.5 gallons per 100 miles

You spend \$1,500 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$1,650

Fuel Economy & Greenhouse Gas Rating (EPA est.)

4

Smog Rating (EPA est.)

5

Actual Results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$6.79 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.40 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuel economy.gov
Calculate personalized estimates and compare vehicles

DELIVERY PROCESSING AND HANDLING FEE 995.00

TOTAL \$34,934.00

The New Vehicle Limited Warranty provides 3-year/50,000-mile basic coverage, 5-year/100,000-mile powertrain coverage, plus 3-year/unlimited-mile corrosion perforation coverage. See Warranty and Maintenance Guide for details. An additional 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, tires and the following optional features, along with state taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price.
Tires shown, which cover normal factory scheduled maintenance for new cars or 25,000 miles, will wear at rates that vary. It is included in, and of the same price of the vehicle for qualifying buyers. See participating dealer for availability and coverage details.

Delivered by Truck for 31177
MAQUISE TOYOTA
370 ELMIRA ROAD
ITHACA NY 14850

102 Monroney Label

3-3. Adjusting the seats **173**

Head restraints

Head restraints are provided for all seats.

Front and second outside seats

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

Second center* and third center seats

- 1 Up
Pull the head restraints up.
- 2 Down
Push the head restraint down while pressing the lock release button.
* 8-passenger models only

Third outside seats

- 1 To use
Pull the head restraints up.
- 2 To fold
Press the button.

133SN011

Lock release button

133SN012a

Lock release button

133SN014

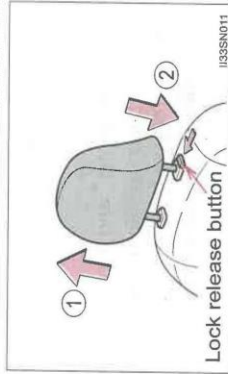
103 Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Head restraints

Head restraints are provided for all seats.

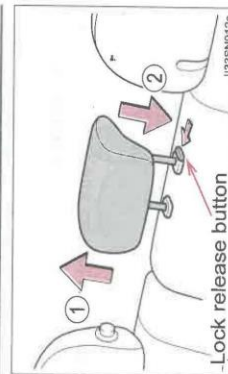
Front and second outside seats

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



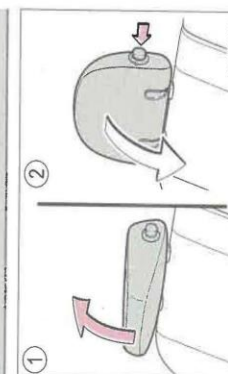
Second center* and third center seats

- ① Up
Pull the head restraints up.
 - ② Down
Push the head restraint down while pressing the lock release button.
- * 8-passenger models only



Third outside seats

- ① To use
Pull the head restraints up.
- ② To fold
Press the button.



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

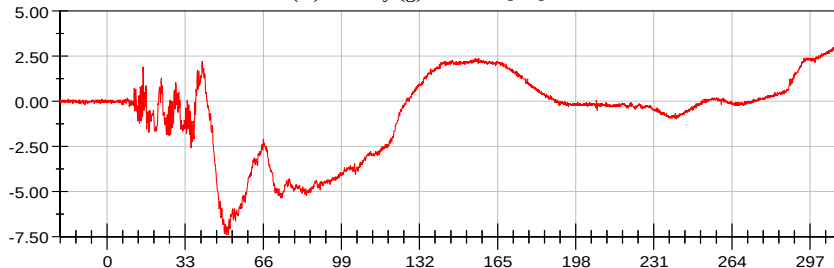
Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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

Position #4 SID IIs Dummy (305)

Driver Head Acceleration (X) Primary (g) vs. Time [ms]



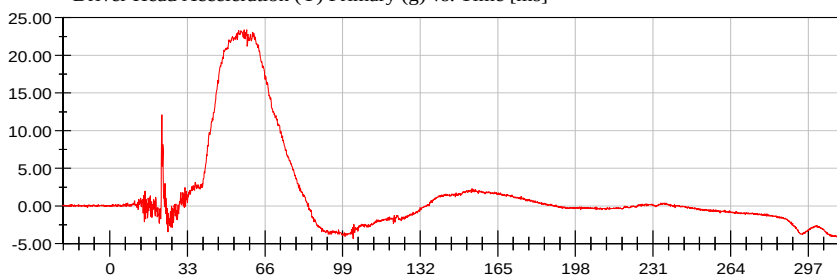
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3.26 g at 309.60 ms

<Min>

-7.37 g at 50.32 ms

Driver Head Acceleration (Y) Primary (g) vs. Time [ms]



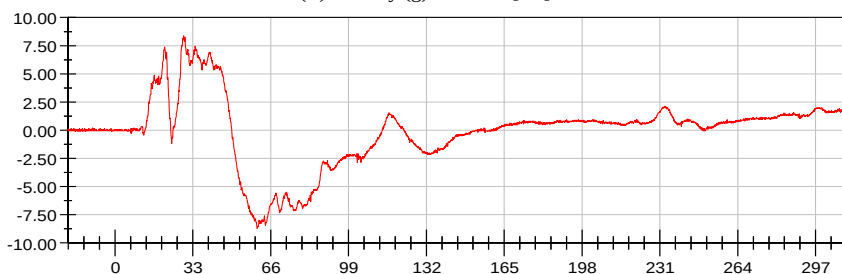
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23.38 g at 57.12 ms

<Min>

-4.35 g at 103.52 ms

Driver Head Acceleration (Z) Primary (g) vs. Time [ms]



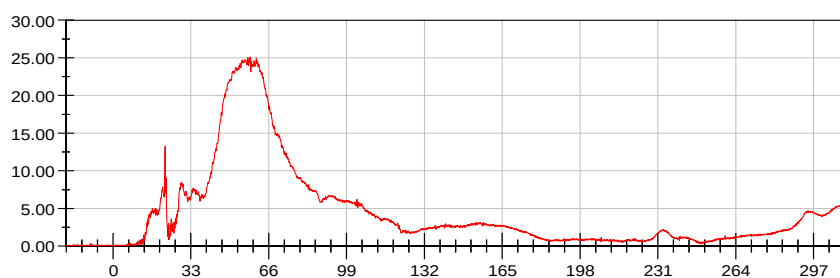
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8.37 g at 29.12 ms

<Min>

-8.72 g at 60.24 ms

Driver Head Resultant Acceleration Primary (g) vs. Time [ms]



<Max>

25.10 g at 58.16 ms

<Min>

0.03 g at -10.56 ms



NHTSA

Test Lab: CTF

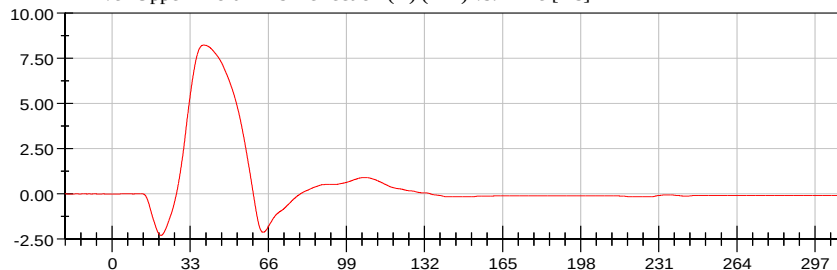
Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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>

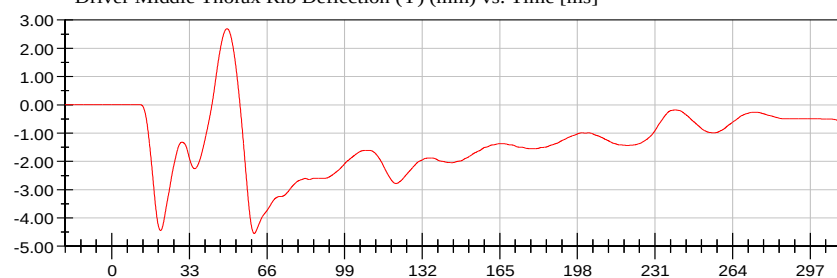
8.23 mm at 38.72 ms

<Min>

-2.29 mm at 20.64 ms

CFC_180

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



<Max>

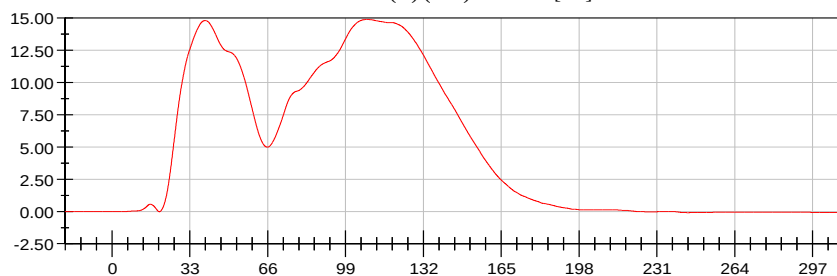
2.69 mm at 48.96 ms

<Min>

-4.56 mm at 60.56 ms

CFC_180

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



<Max>

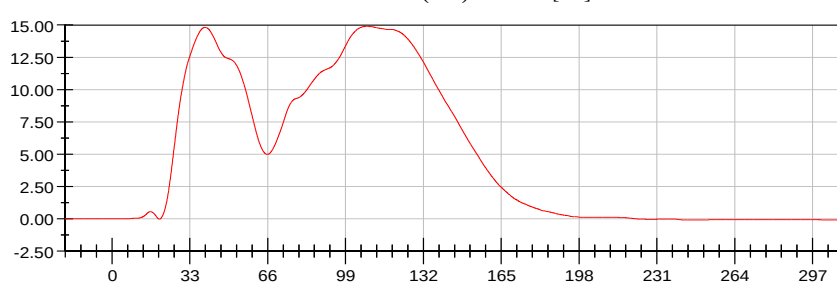
14.89 mm at 108.16 ms

<Min>

-0.09 mm at 244.32 ms

CFC_180

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



<Max>

14.89 mm at 108.16 ms

<Min>

-0.09 mm at 244.32 ms

CFC_180



NHTSA

Test Lab: CTF

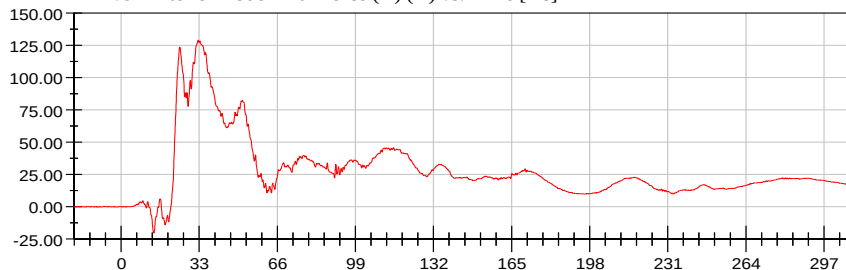
Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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>

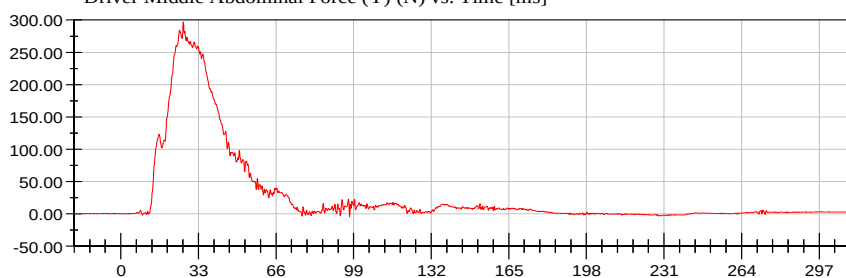
129.09 N at 32.56 ms

<Min>

-20.23 N at 13.84 ms

CFC_600

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



<Max>

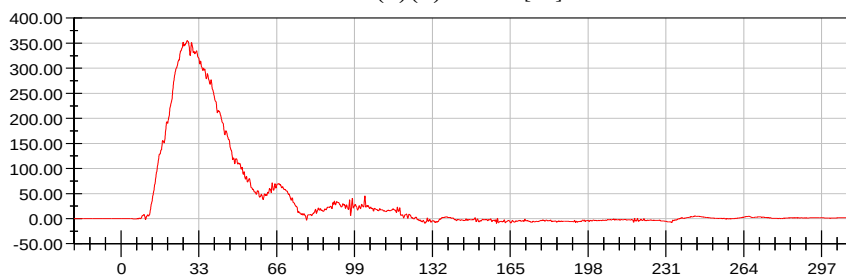
297.18 N at 26.56 ms

<Min>

-4.63 N at 97.28 ms

CFC_600

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



<Max>

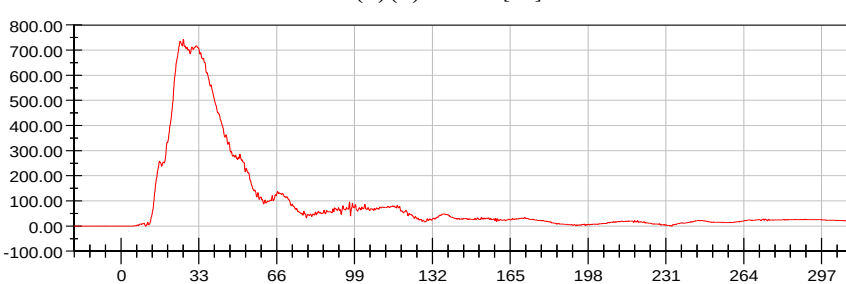
355.35 N at 28.08 ms

<Min>

-9.30 N at 128.80 ms

CFC_600

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



<Max>

741.78 N at 26.40 ms

<Min>

-0.47 N at -10.00 ms

CFC_600



NHTSA

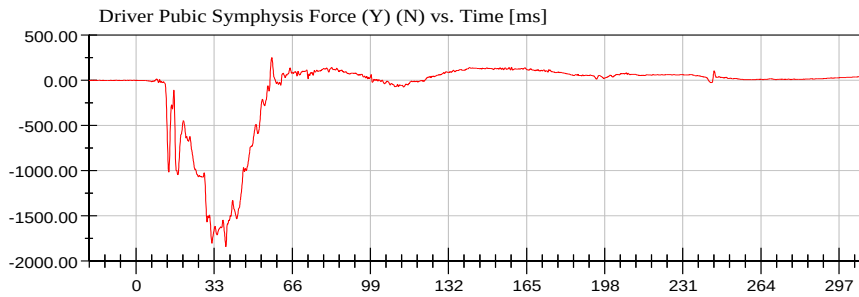
Test Lab: CTF

Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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

Position #4 SID IIs Dummy (305)



<Max>

250.40 N at 57.36 ms

<Min>

-1,839.34 N at 37.92 ms

CFC_600



NHTSA

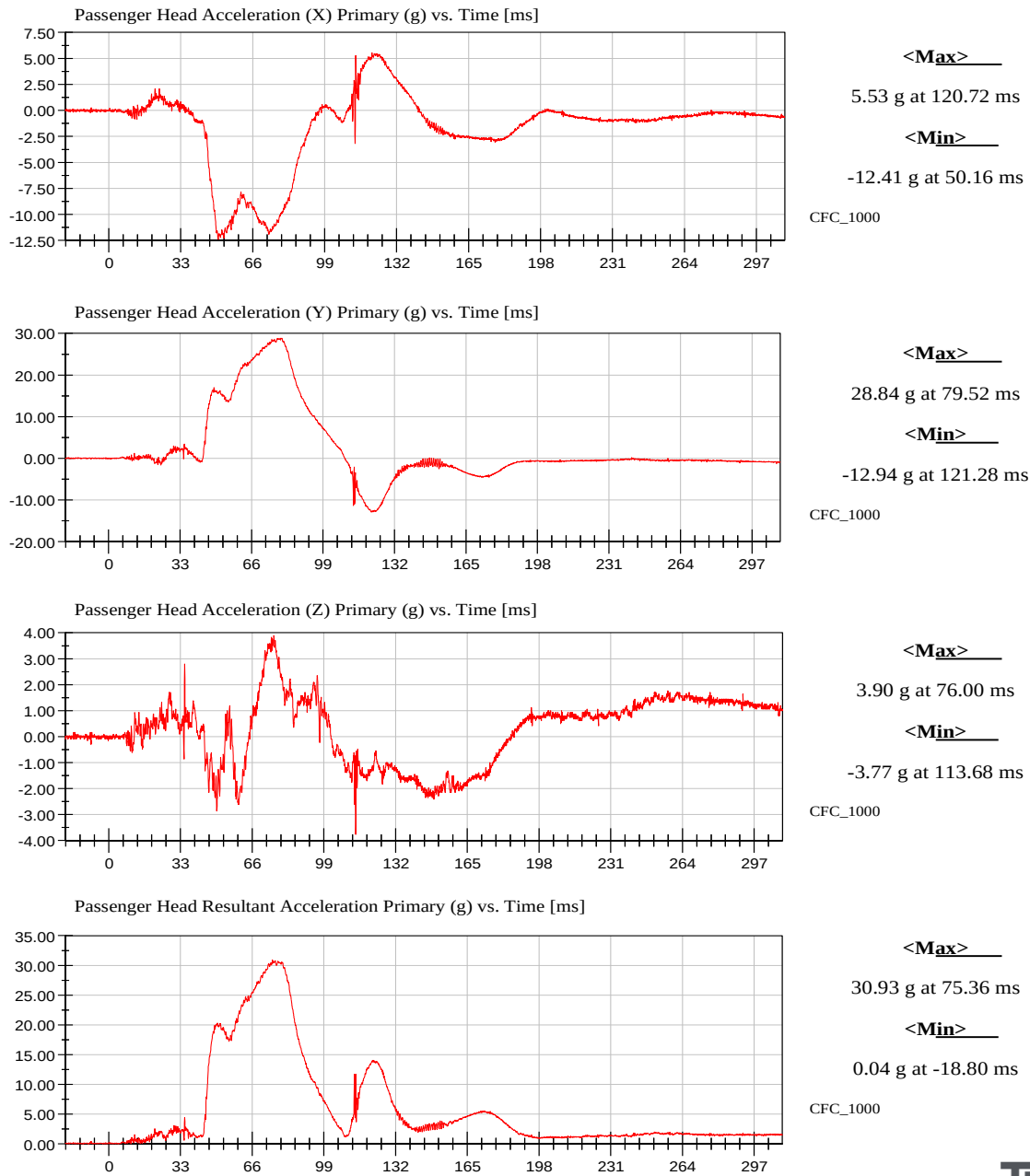
Test Lab: CTF

Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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

Position #4 SID IIs Dummy (305)



NHTSA

Test Lab: CTF

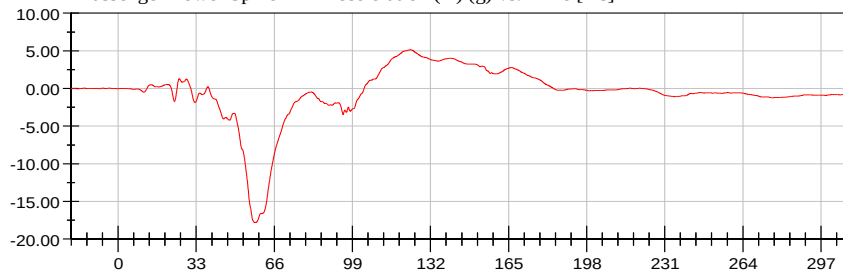
Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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

Position #4 SID IIs Dummy (305)

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



<Max>

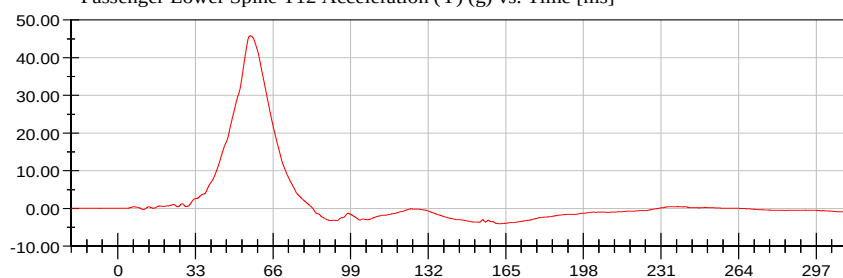
5.13 g at 123.68 ms

<Min>

-17.80 g at 57.76 ms

CFC_180

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



<Max>

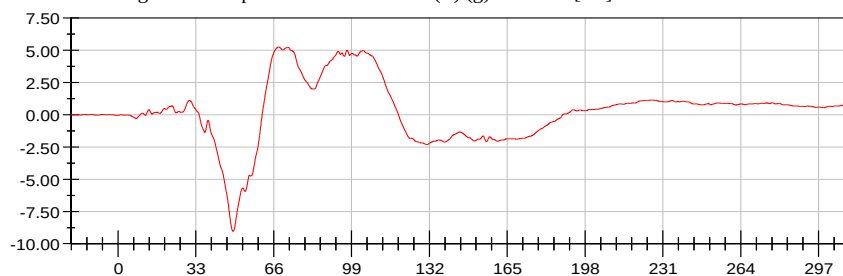
45.79 g at 56.24 ms

<Min>

-4.10 g at 162.56 ms

CFC_180

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



<Max>

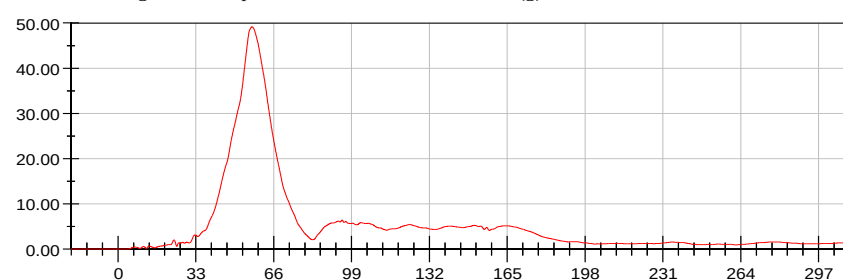
5.26 g at 68.08 ms

<Min>

-9.03 g at 48.80 ms

CFC_180

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



<Max>

49.17 g at 56.80 ms

<Min>

0.01 g at -10.16 ms

CFC_180



NHTSA

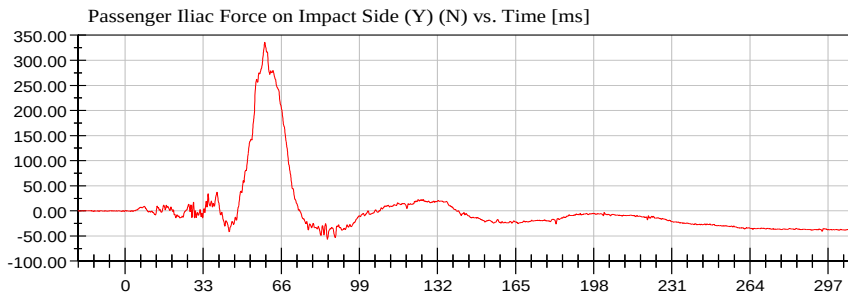
Test Lab: CTF

Test Number: 180511 (M20185109)

Test Date: 05/11/2018

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

Position #4 SID IIs Dummy (305)



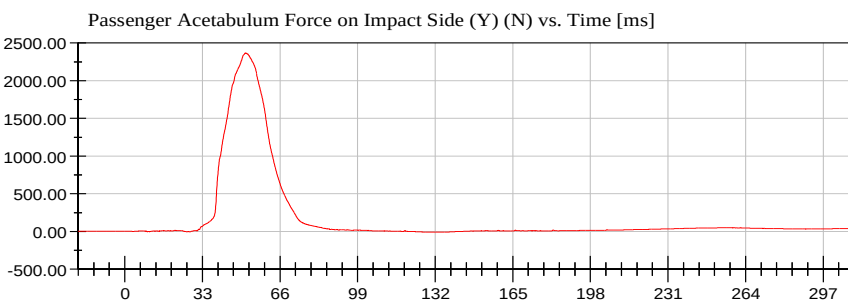
<Max>

335.93 N at 58.96 ms

<Min>

-56.42 N at 85.44 ms

CFC_600



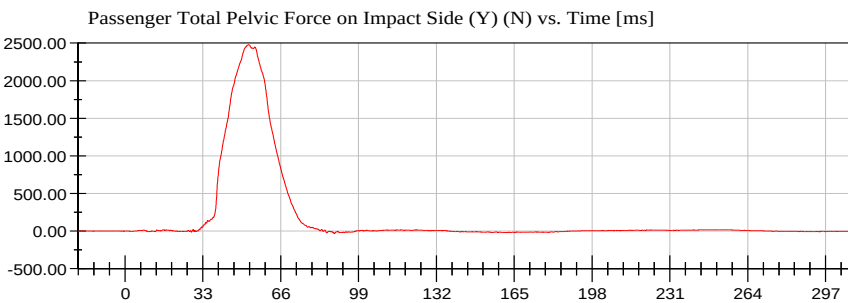
<Max>

2,367.92 N at 51.36 ms

<Min>

-11.12 N at 132.96 ms

CFC_600



<Max>

2,479.73 N at 52.40 ms

<Min>

-29.07 N at 88.80 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. 57

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	561	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	97	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	327	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	202	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	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. 57-1

Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Peak Resultant Acceleration	125 - 155 g	126.3 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.0 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DP6812

Skull S/N: N/A

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

05.07.2018 14:47:23 327



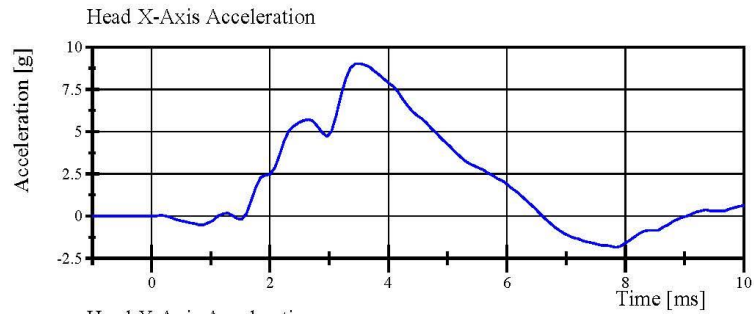
Page10 of 41

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 57-1

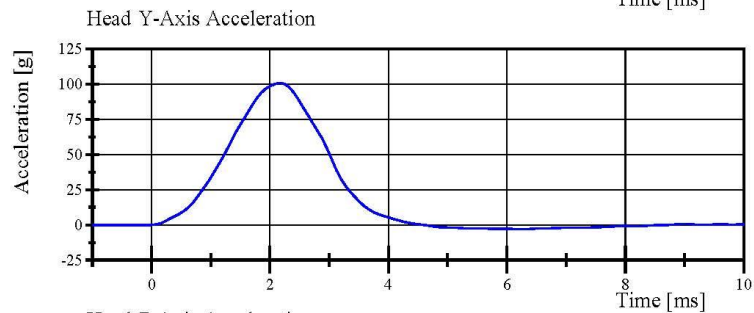
Test Date: 5/7/2018



Filter Class: CFC_1000

Max: 9.0 g at 3.4 ms

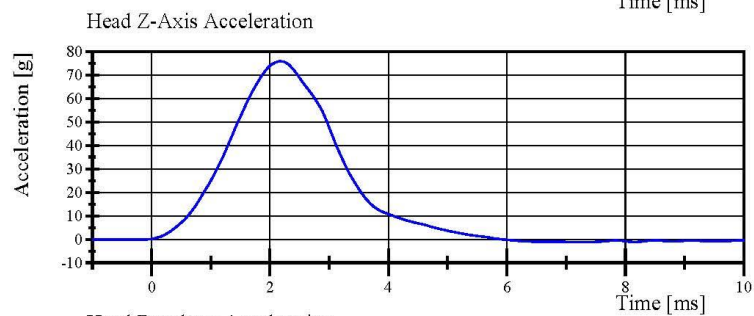
Min: -1.8 g at 7.8 ms



Filter Class: CFC_1000

Max: 100.8 g at 2.2 ms

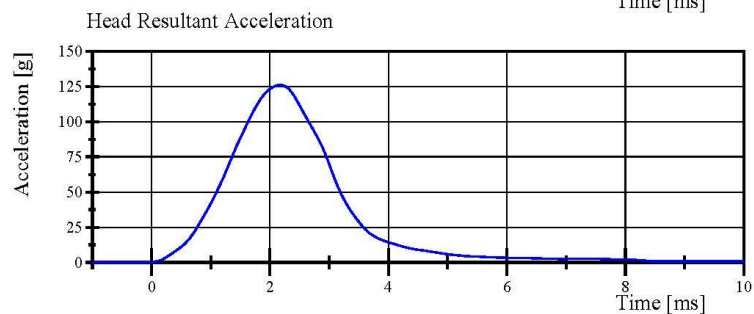
Min: -2.9 g at 6.2 ms



Filter Class: CFC_1000

Max: 76.0 g at 2.2 ms

Min: -1.1 g at 7.0 ms



Filter Class: CFC_1000

Max: 126.3 g at 2.2 ms

Min: 0.0 g at -1.0 ms

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

05.07.2018 14:48:07 327



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 57-1

Test Date: 5/8/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	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	-52.5 deg	Yes
Time of Peak	54 - 66 ms	55.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	67.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DI5031

Neck Buffer Molded(Yellow) S/N: N/A

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

Page12 of 41

05.08.2018 06:50:48 1462

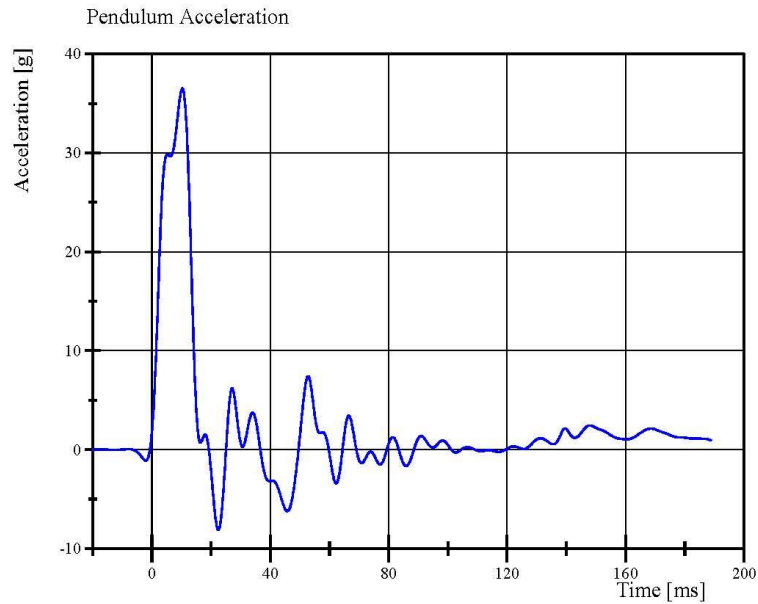


Transportation Research Center Inc.

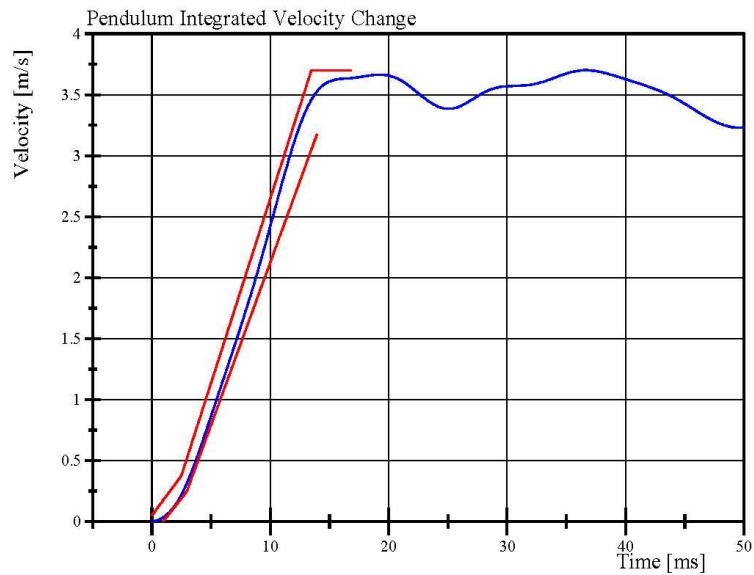
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 57-1

Test Date: 5/8/2018



Filter Class: CFC_60
Max: 36.5 g at 10.3 ms
Min: -8.1 g at 22.5 ms



Filter Class: CFC_60
Max: 3.7 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

Page13 of 41

05.08.2018 06:51:18 1462

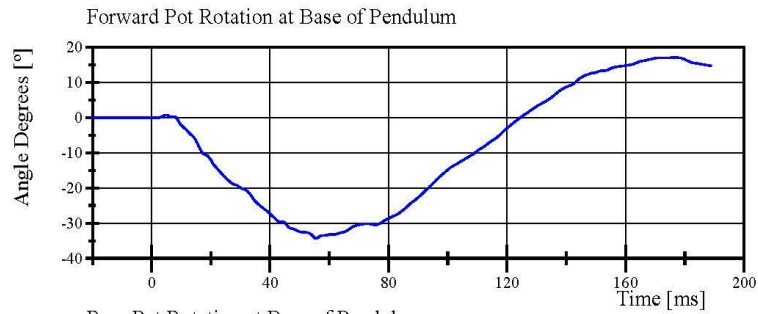


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 57-1

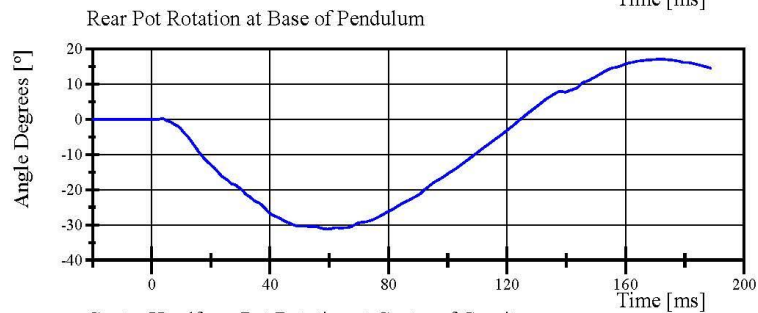
Test Date: 5/8/2018



Filter Class: CFC_180

Max: 17.2 ° at 176.5 ms

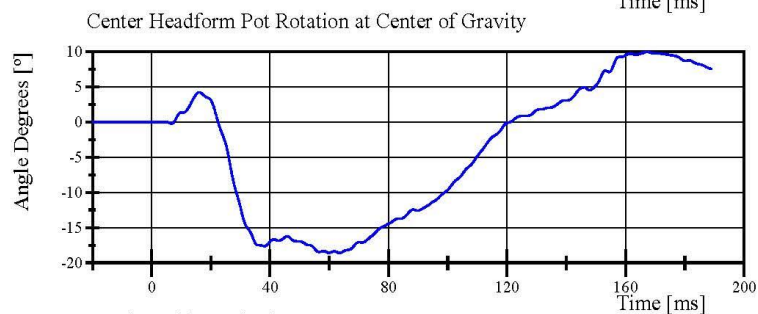
Min: -34.3 ° at 55.5 ms



Filter Class: CFC_180

Max: 17.2 ° at 172.0 ms

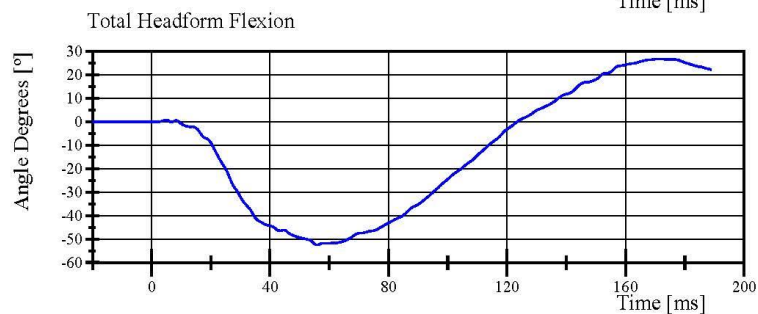
Min: -31.2 ° at 59.4 ms



Filter Class: CFC_180

Max: 10.0 ° at 167.2 ms

Min: -18.6 ° at 59.9 ms



Filter Class: CFC_180

Max: 26.7 ° at 171.0 ms

Min: -52.5 ° at 55.8 ms

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

05.08.2018 06:51:19 1462



Page14 of 41

Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 57-1

Test Date: 5/8/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.64 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: 175-3501-07014

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

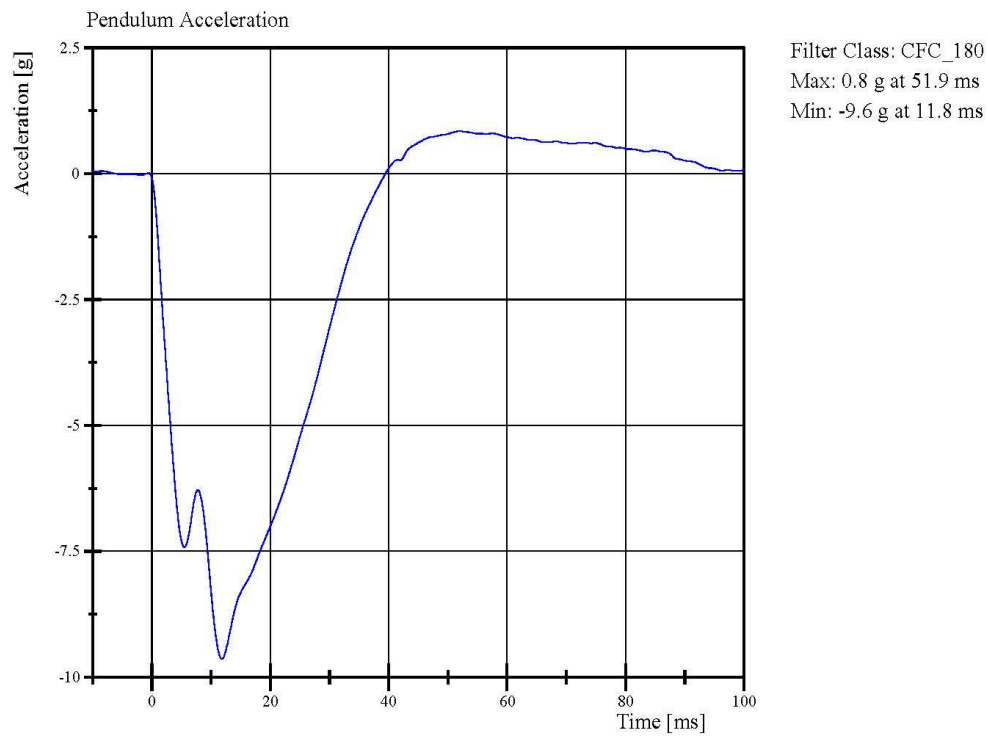
Page15 of 41

05.08.2018 07:38:17 560



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/8/2018



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

Page16 of 41

05.08.2018 07:38:42 560



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height:462mm

Rib Module:175-4008-A

Rib Foam: 07229

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

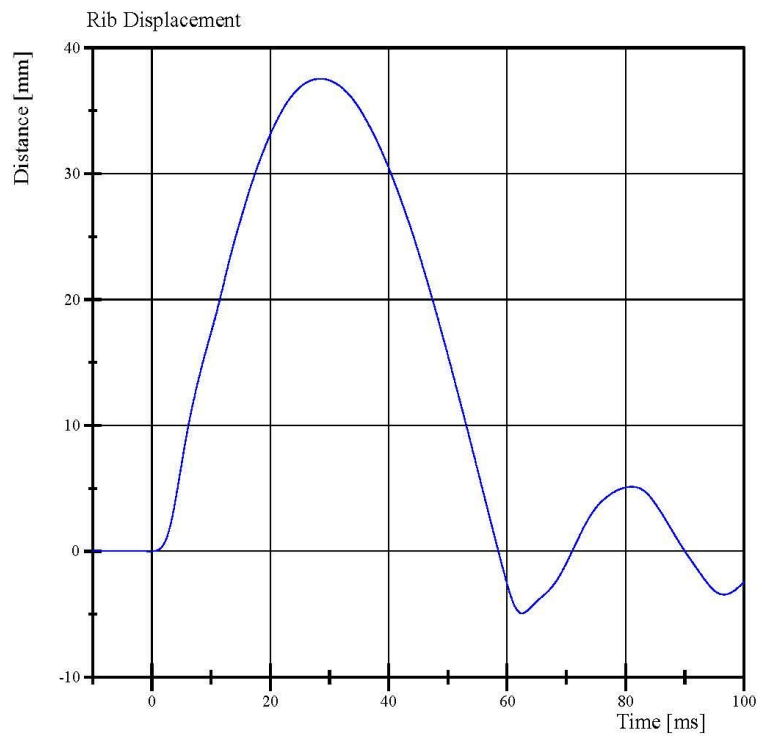
Page17 of 41

05.07.2018 15:15:05 458



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 37.5 mm at 28.5 ms
Min: -4.9 mm at 62.5 ms

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

Page18 of 41

05.07.2018 15:15:42 458



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.6 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

Rib Module:175-4008-A

Rib Foam: 07229

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

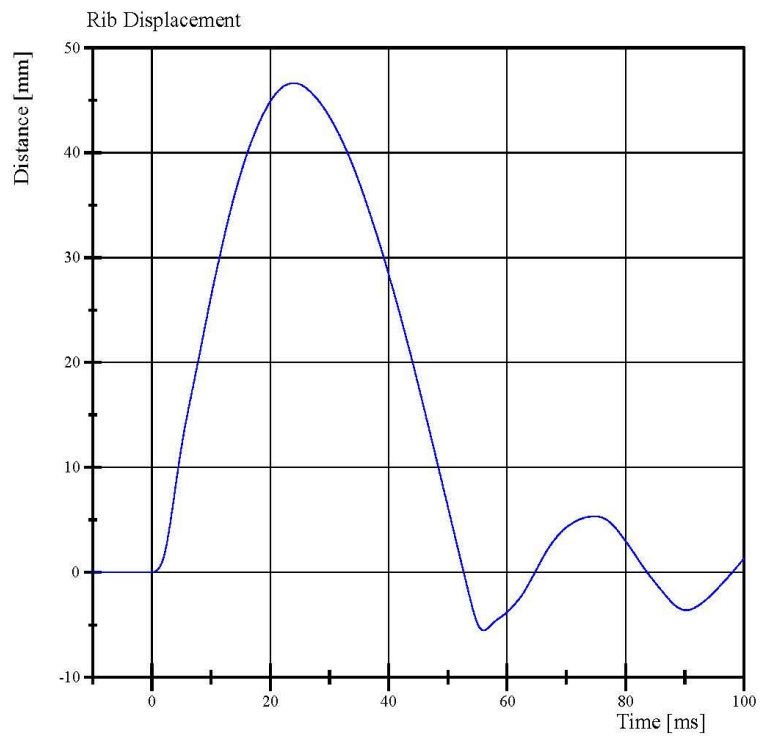
Page19 of 41

05.07.2018 15:08:49 392



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 46.6 mm at 23.9 ms
Min: -5.5 mm at 56.0 ms

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

Page20 of 41

05.07.2018 15:09:30 392



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.3 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

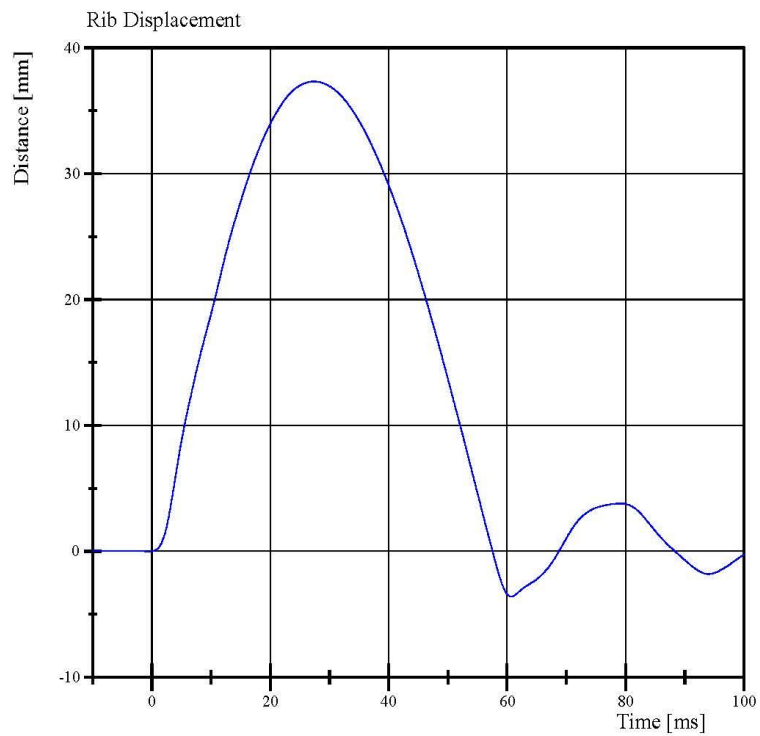
Page21 of 41

05.07.2018 15:27:35 469



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 37.3 mm at 27.4 ms
Min: -3.6 mm at 60.6 ms

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

Page 22 of 41

05.07.2018 15:28:07 469



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.2 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

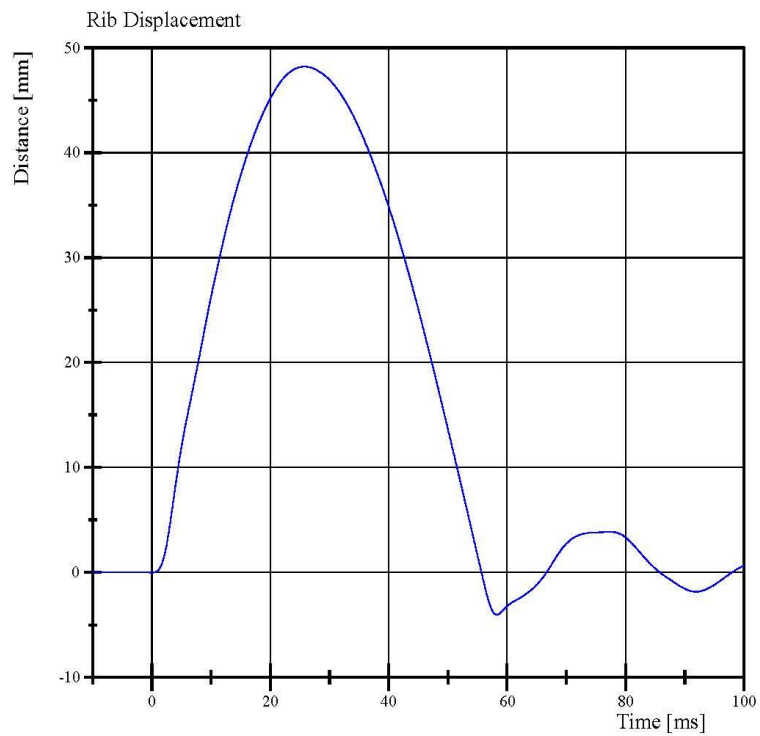
Page23 of 41

05.07.2018 15:19:22 389



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 48.2 mm at 25.8 ms
Min: -4.0 mm at 58.2 ms

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

Page24 of 41

05.07.2018 15:19:57 389



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462mm

Rib Module: 175-4008-A-06-017

Rib Foam: 175-4003-05125

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

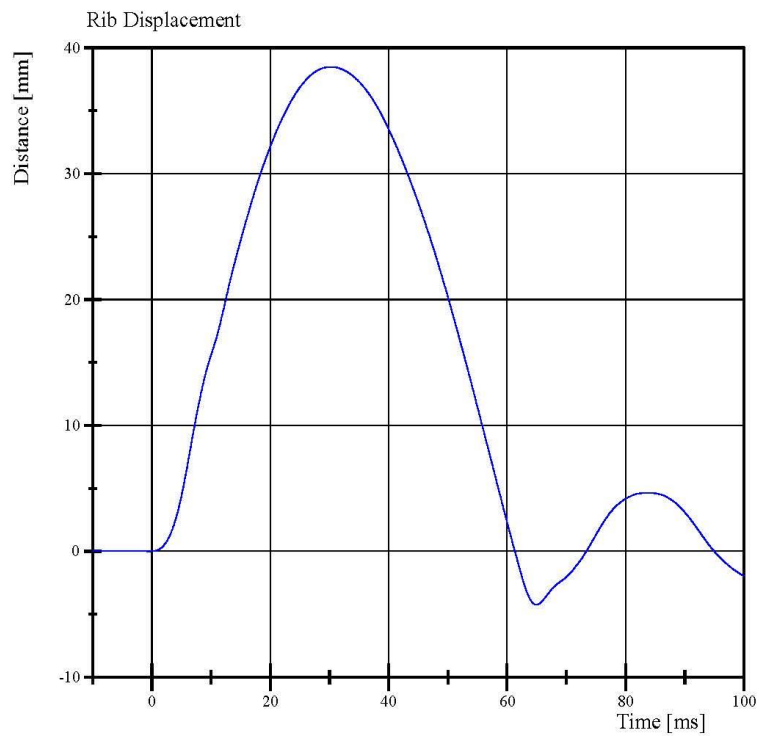
Page25 of 41

05.07.2018 15:42:13 441



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 38.5 mm at 30.3 ms
Min: -4.2 mm at 65.0 ms

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

Page26 of 41

05.07.2018 15:42:41 441



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.1 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Module: 175-4008-A-06-017

Rib Foam: 175-4003-05125

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

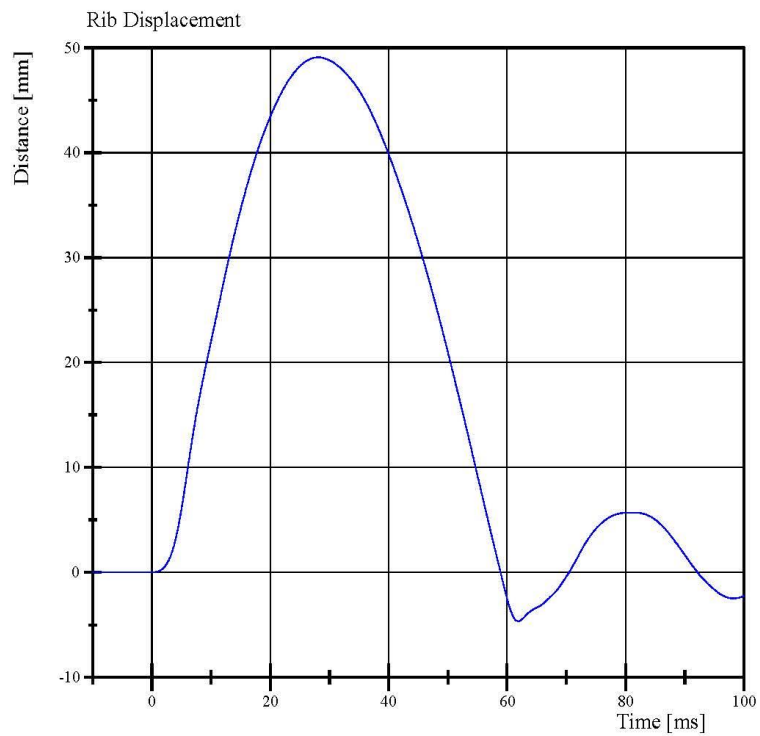
Page 27 of 41

05.07.2018 15:35:36 389



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 49.1 mm at 28.1 ms
Min: -4.7 mm at 61.8 ms

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

Page28 of 41

05.07.2018 15:36:11 389



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/8/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.525 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,368.3 N	Yes
Upper Rib Displacement	34 - 41 mm	38.2 mm	Yes
Center Rib Displacement	37 - 45 mm	42.5 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib:

Rib Module S/N: 175-4008-A

Rib Foam S/N: 175-4003-07229

Center Rib:

Rib Module S/N: 175-4008-A

Rib Foam S/N: E2A-DCT-04082

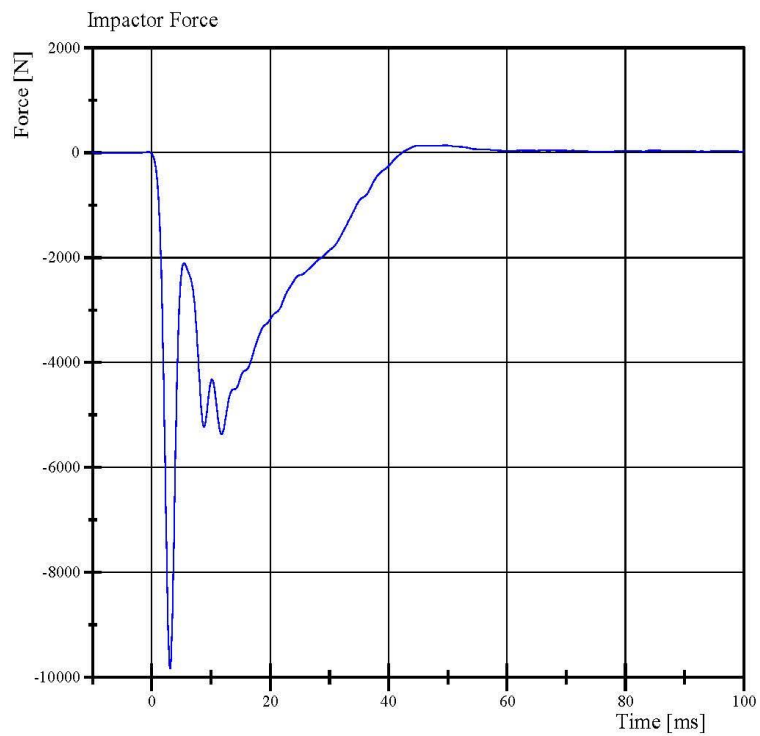
Lower Rib:

Rib Module S/N: 175-4008-A-06-017

Rib Foam S/N: 175-4003-05125

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/8/2018



Filter Class: CFC_180
Max: 138.4 N at 49.6 ms
Min: -9,833.6 N at 3.1 ms

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

Page30 of 41

05.08.2018 07:49:45 423

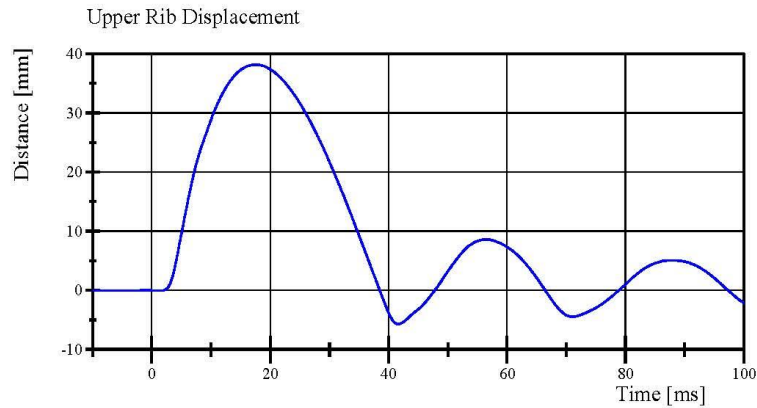


Transportation Research Center Inc.

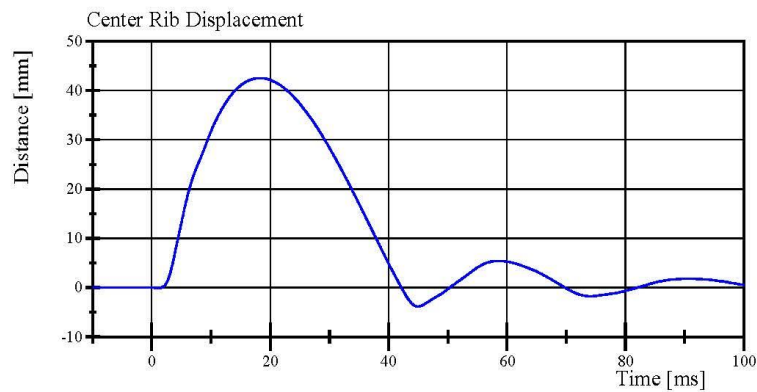
Left Lower Thorax

ES-2re Serial No. F030 Certification No. 57-1

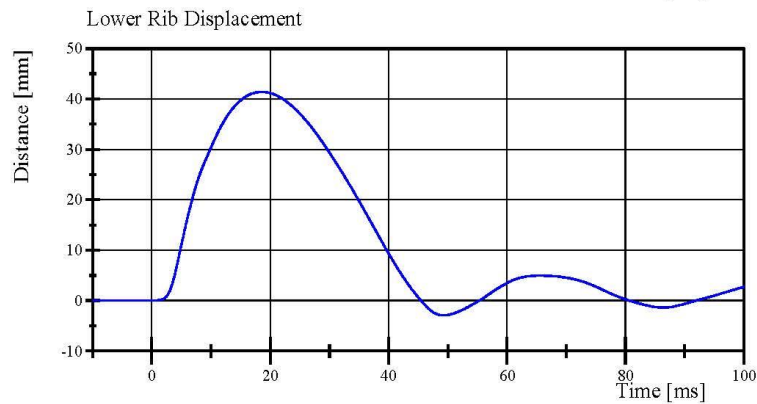
Test Date: 5/8/2018



Filter Class: CFC_180
Max: 38.2 mm at 17.5 ms
Min: -5.7 mm at 41.6 ms



Filter Class: CFC_180
Max: 42.5 mm at 18.3 ms
Min: -3.8 mm at 45.0 ms



Filter Class: CFC_180
Max: 41.4 mm at 18.6 ms
Min: -2.9 mm at 49.3 ms

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

05.08.2018 07:49:45 423



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 57-1
Test Date: 5/8/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.04 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,201.7 N	Yes
Time of Peak	10.6 - 13.0 ms	11.84 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,488.2 N	Yes
Time of Peak	10.0 - 12.3 ms	11.52 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen S/N: 1066

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

Page 37 of 41

05.08.2018 07:57:25 552

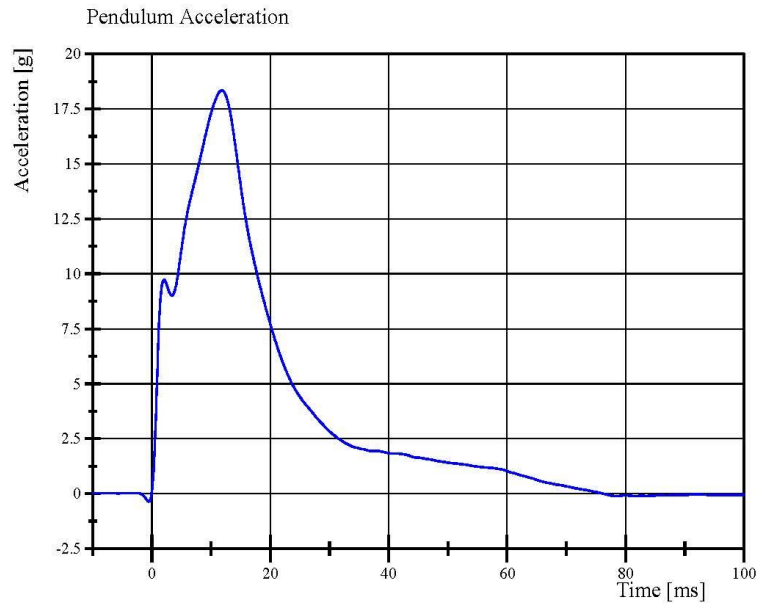


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 57-1

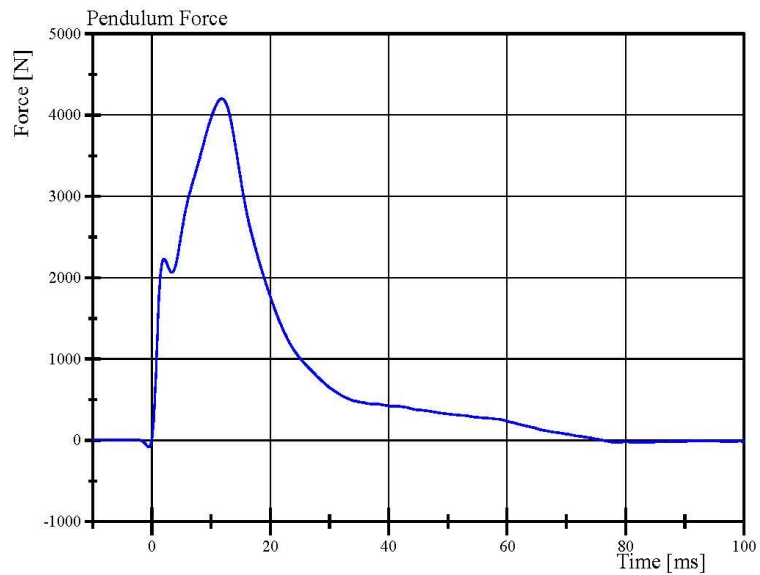
Test Date: 5/8/2018



Filter Class: CFC_180

Max: 18.3 g at 11.8 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,201.7 N at 11.8 ms

Min: -81.4 N at -0.5 ms

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

Page38 of 41

05.08.2018 07:57:50 552

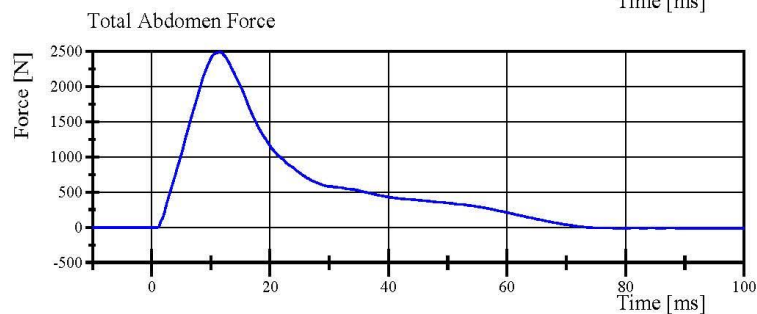
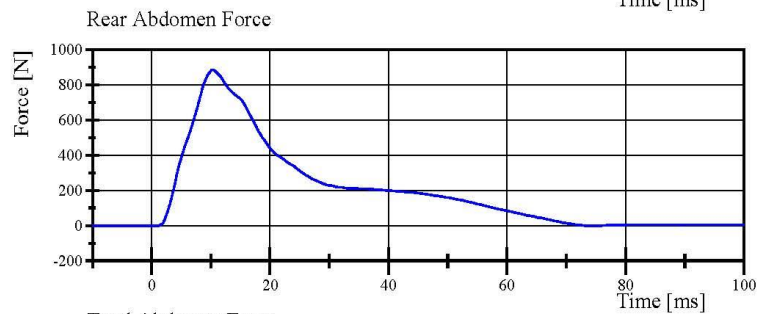
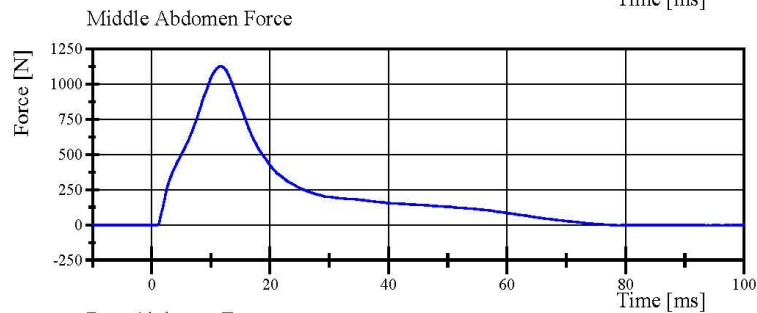
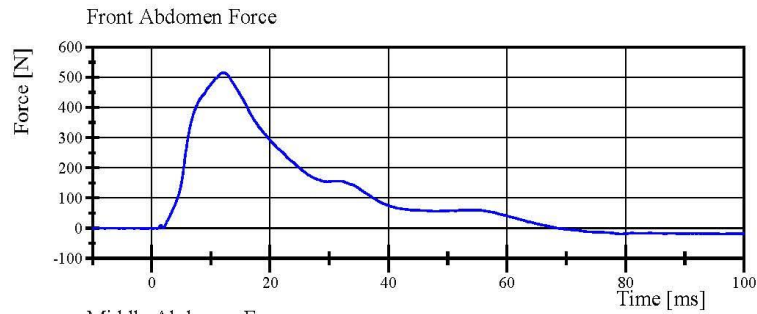


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 57-1

Test Date: 5/8/2018



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

Page39 of 41

05.08.2018 07:57:51 552



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 57-4

Test Date: 5/8/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.078 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-48.1 deg	Yes
Time of Peak	39 - 53 ms	43.4 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	40.6 ms	Yes

Test meets specifications.

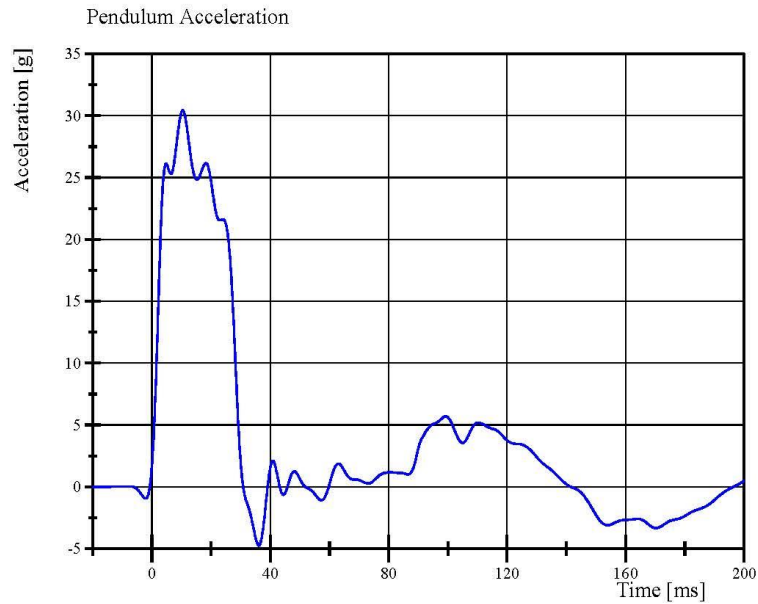
Condition: Used

Comments:

Lumbar S/N: 175-5501 DP0815

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 57-4
Test Date: 5/8/2018



Filter Class: CFC_60
Max: 30.4 g at 10.4 ms
Min: -4.7 g at 36.2 ms



Filter Class: CFC_60
Max: 6.5 m/s at 30.8 ms
Min: 0.0 m/s at 0.0 ms

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

Page 33 of 41

05.08.2018 06:32:28 641

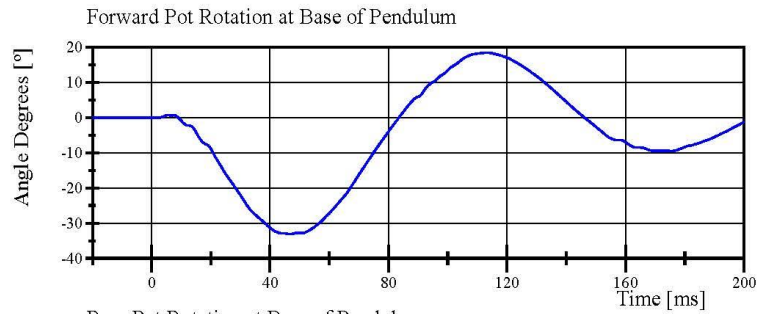


Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 57-4

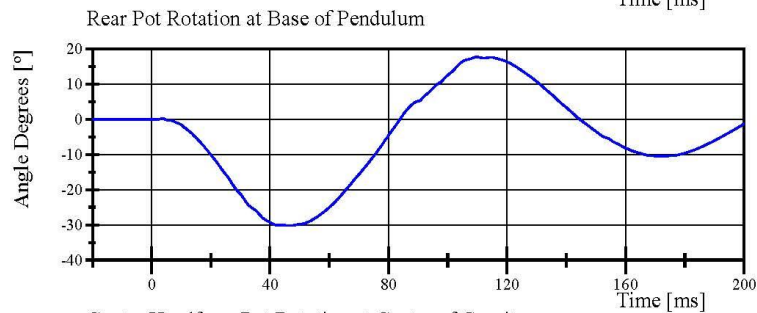
Test Date: 5/8/2018



Filter Class: CFC_180

Max: 18.4 ° at 113.1 ms

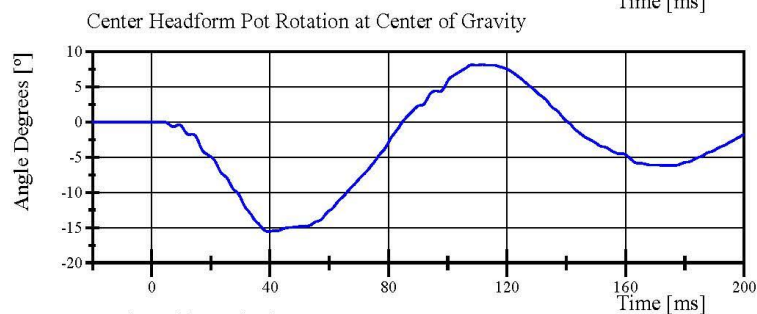
Min: -33.0 ° at 46.7 ms



Filter Class: CFC_180

Max: 17.7 ° at 109.8 ms

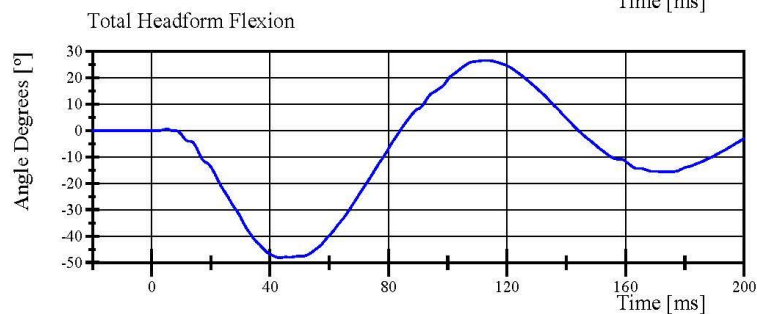
Min: -30.2 ° at 46.7 ms



Filter Class: CFC_180

Max: 8.2 ° at 111.5 ms

Min: -15.6 ° at 39.4 ms



Filter Class: CFC_180

Max: 26.5 ° at 111.9 ms

Min: -48.1 ° at 43.4 ms

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

05.08.2018 06:32:29 641



Page34 of 41

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 57-3
Test Date: 5/8/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.38 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,321.5 N	Yes
Time of Peak	11.8 - 16.1 ms	12.48 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,308.6 N	Yes
Time of Peak	12.2 - 17.0 ms	12.24 ms	Yes

Test meets specifications.

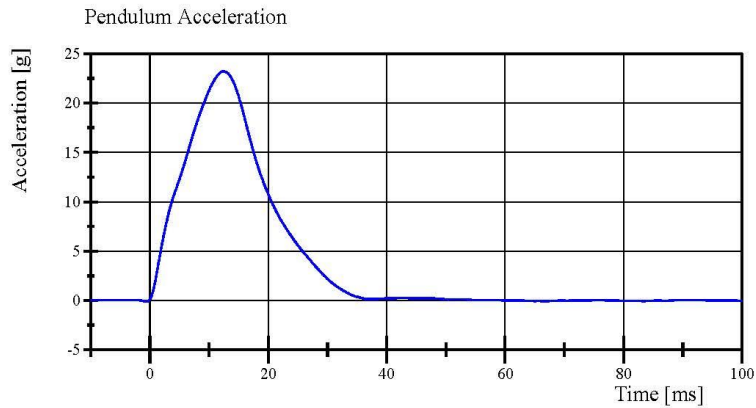
Condition: Used

Comments:

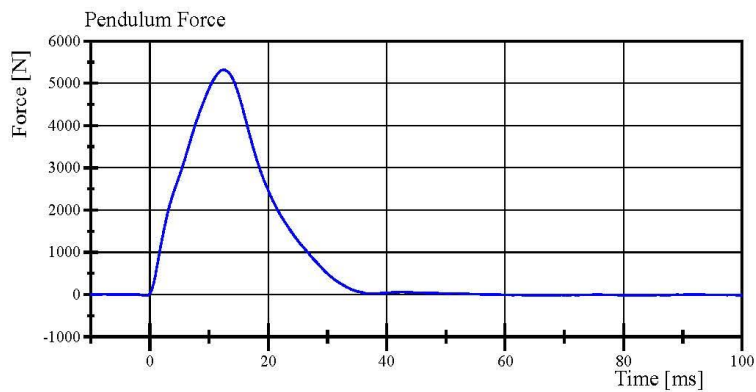
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

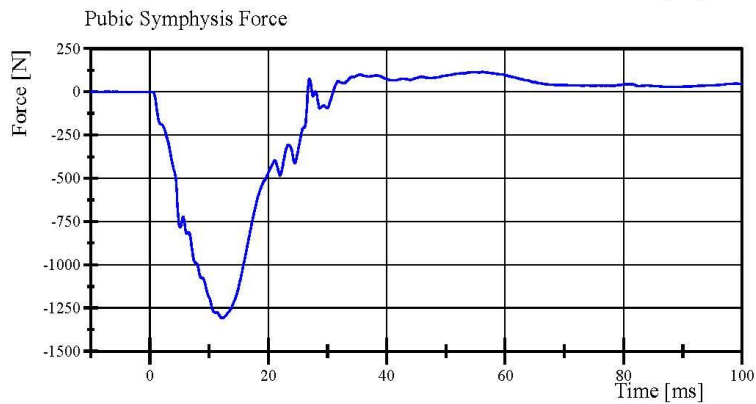
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 57-3
Test Date: 5/8/2018



Filter Class: CFC_180
Max: 23.2 g at 12.5 ms
Min: -0.1 g at -0.6 ms



Filter Class: CFC_180
Max: 5,321.5 N at 12.5 ms
Min: -25.1 N at -0.6 ms



Filter Class: CFC_600
Max: 114.3 N at 56.2 ms
Min: -1,308.6 N at 12.2 ms

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

05.08.2018 09:05:01 569



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 58

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	909	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	347	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	97	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	445	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	327	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	202	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	242	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	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. 58-6

Test Date: 5/15/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Peak Resultant Acceleration	125 - 155 g	131.0 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	6.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DP6812

Skull S/N: N/A

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

Page 10 of 41

05.15.2018 14:04:03 326

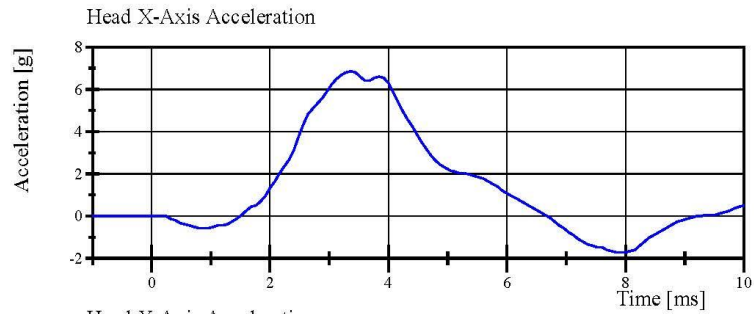


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 58-6

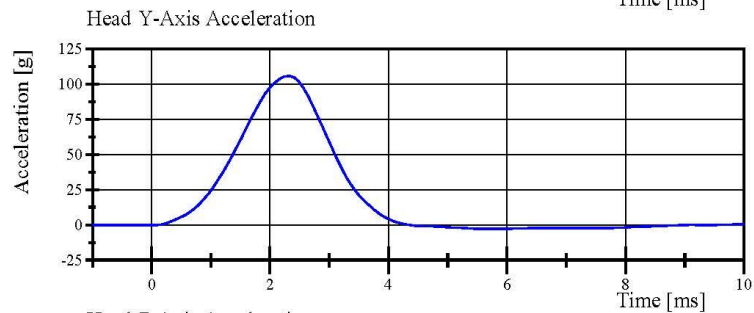
Test Date: 5/15/2018



Filter Class: CFC_1000

Max: 6.9 g at 3.4 ms

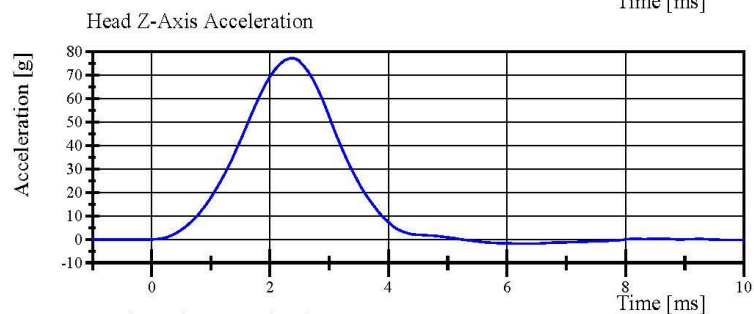
Min: -1.7 g at 7.8 ms



Filter Class: CFC_1000

Max: 105.9 g at 2.3 ms

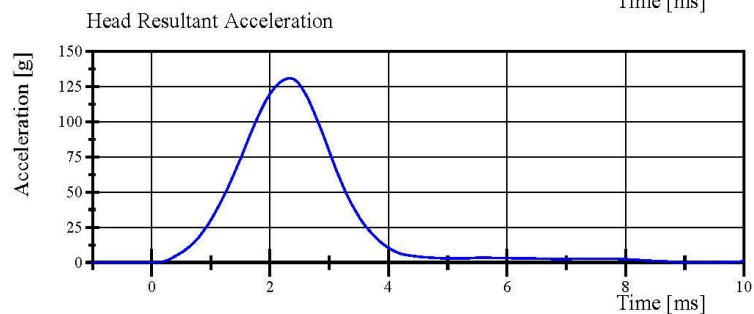
Min: -2.8 g at 5.6 ms



Filter Class: CFC_1000

Max: 77.2 g at 2.4 ms

Min: -1.7 g at 6.2 ms



Filter Class: CFC_1000

Max: 131.0 g at 2.3 ms

Min: 0.0 g at -1.0 ms

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

05.15.2018 14:05:12 326



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 58-1

Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.38 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-52.9 deg	Yes
Time of Peak	54 - 66 ms	58.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	64.5 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DI5031

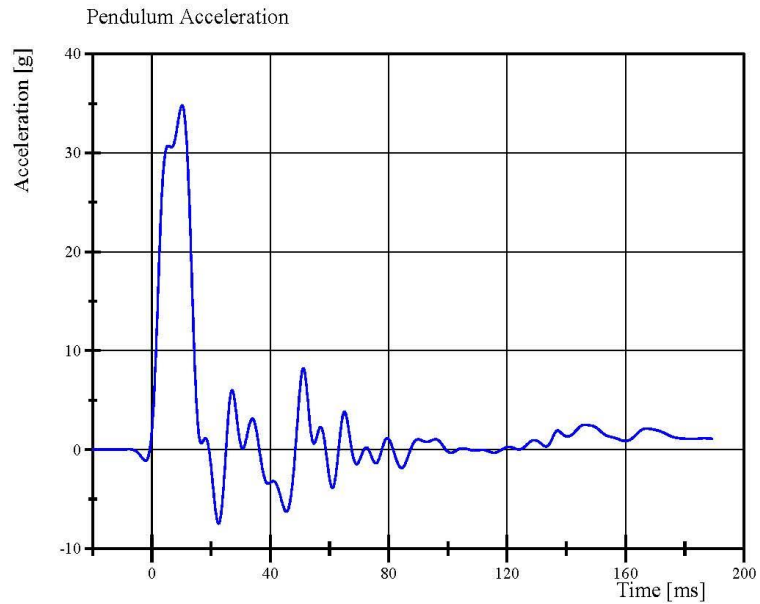
Neck Buffer Molded(Yellow) S/N: N/A

Transportation Research Center Inc.

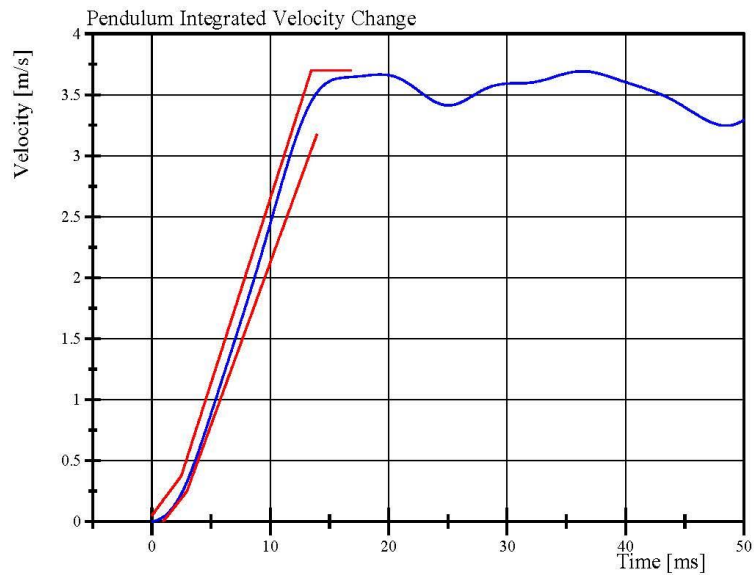
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 58-1

Test Date: 5/14/2018



Filter Class: CFC_60
Max: 34.8 g at 10.2 ms
Min: -7.5 g at 22.6 ms



Filter Class: CFC_60
Max: 3.7 m/s at 36.3 ms
Min: 0.0 m/s at 0.0 ms

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

05.14.2018 13:10:20 1457

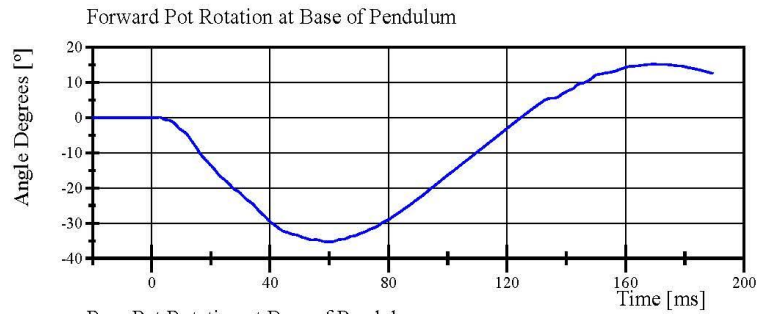


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 58-1

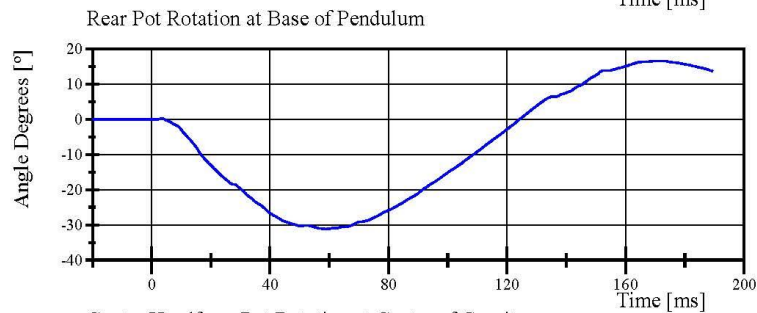
Test Date: 5/14/2018



Filter Class: CFC_180

Max: 15.2 ° at 169.4 ms

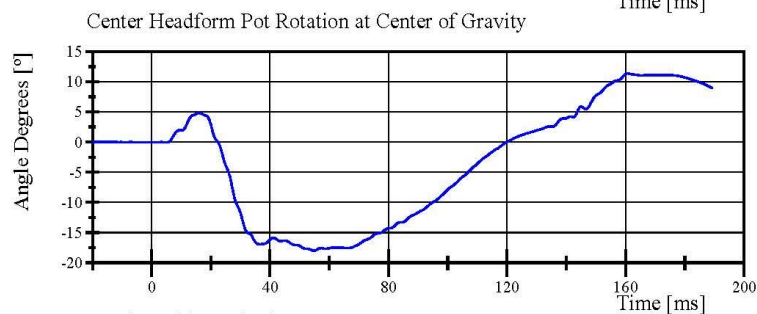
Min: -35.2 ° at 60.6 ms



Filter Class: CFC_180

Max: 16.6 ° at 172.1 ms

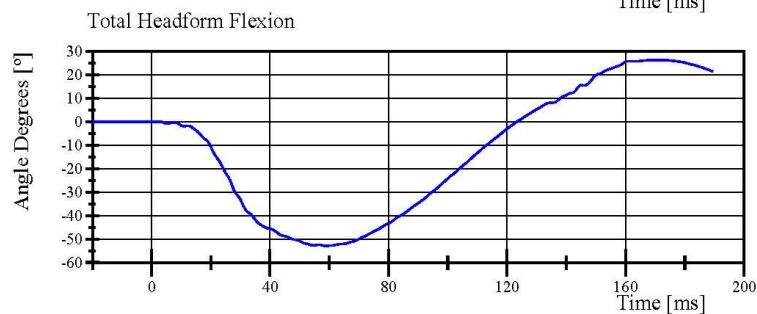
Min: -31.2 ° at 58.8 ms



Filter Class: CFC_180

Max: 11.4 ° at 160.6 ms

Min: -18.0 ° at 54.8 ms



Filter Class: CFC_180

Max: 26.4 ° at 169.4 ms

Min: -52.9 ° at 58.9 ms

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

05.14.2018 13:10:21 1457



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 58-1

Test Date: 5/15/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.65 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: 175-3501-07014

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

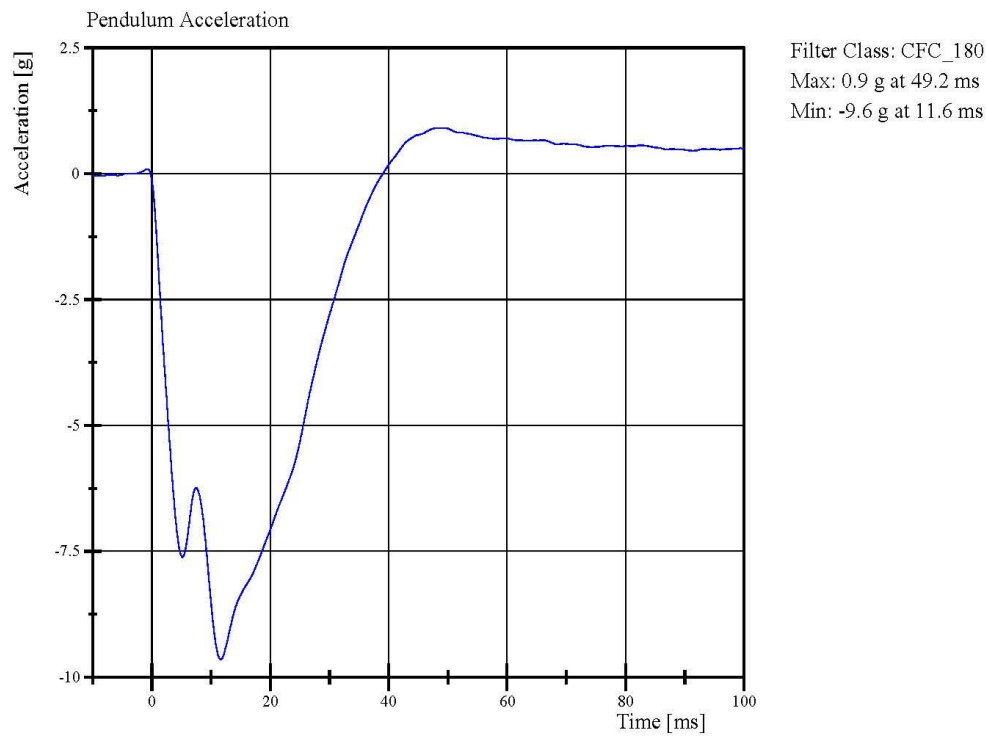
Page 15 of 41

05:15:2018 08:46:14 536



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/15/2018



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

05.15.2018 08:46:54 536



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462mm

Rib Module:175-4008-A

Rib Foam: 07229

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

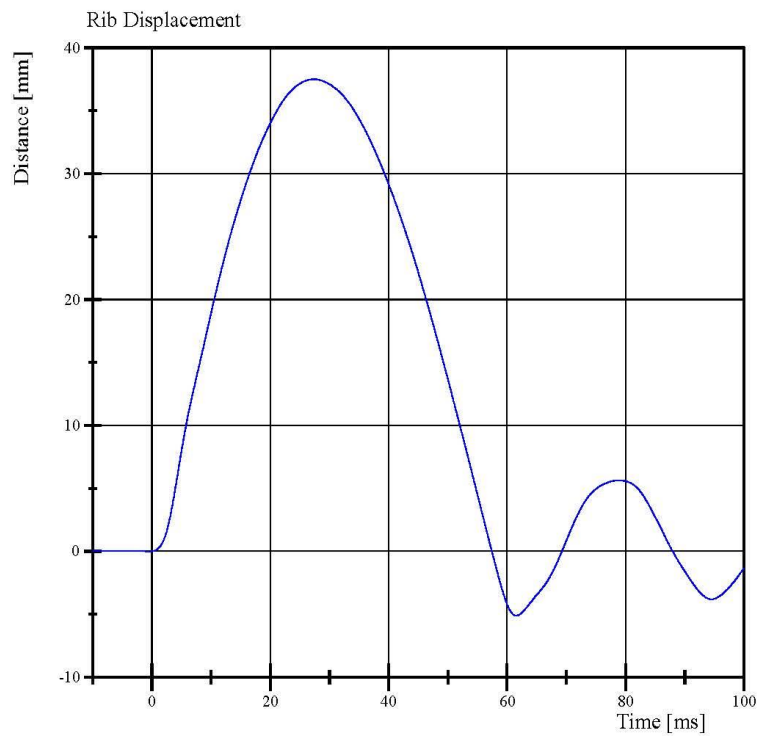
Page 17 of 41

05.14.2018 11:07:18 462



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018



Filter Class: CFC_180
Max: 37.5 mm at 27.4 ms
Min: -5.1 mm at 61.5 ms

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

05.14.2018 11:07:50 462



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

Rib Module:175-4008-A

Rib Foam: 07229

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

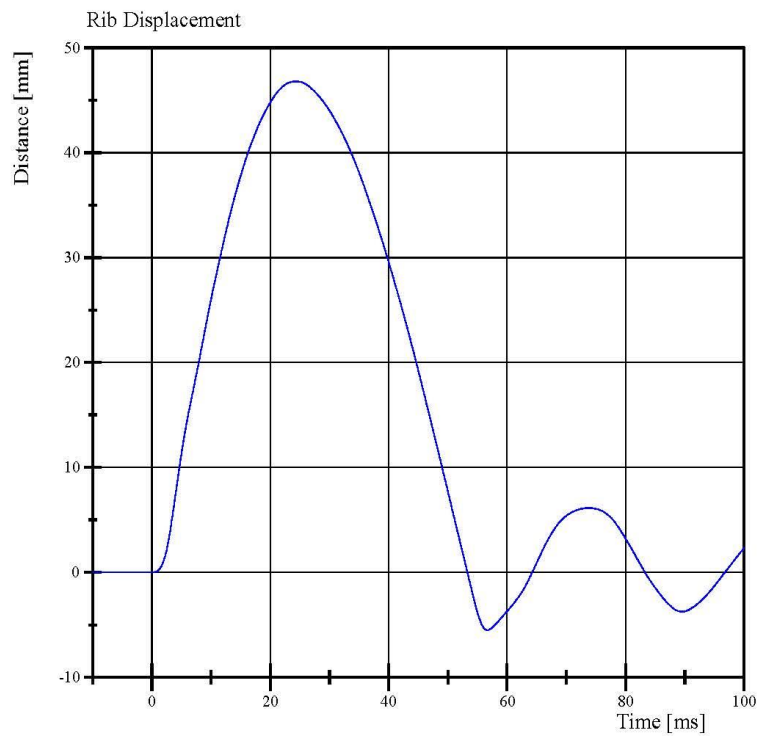
Page 19 of 41

05.14.2018 11:02:25 402



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018



Filter Class: CFC_180
Max: 46.8 mm at 24.4 ms
Min: -5.5 mm at 56.6 ms

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

Page 20 of 41

05.14.2018 11:03:04 402



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

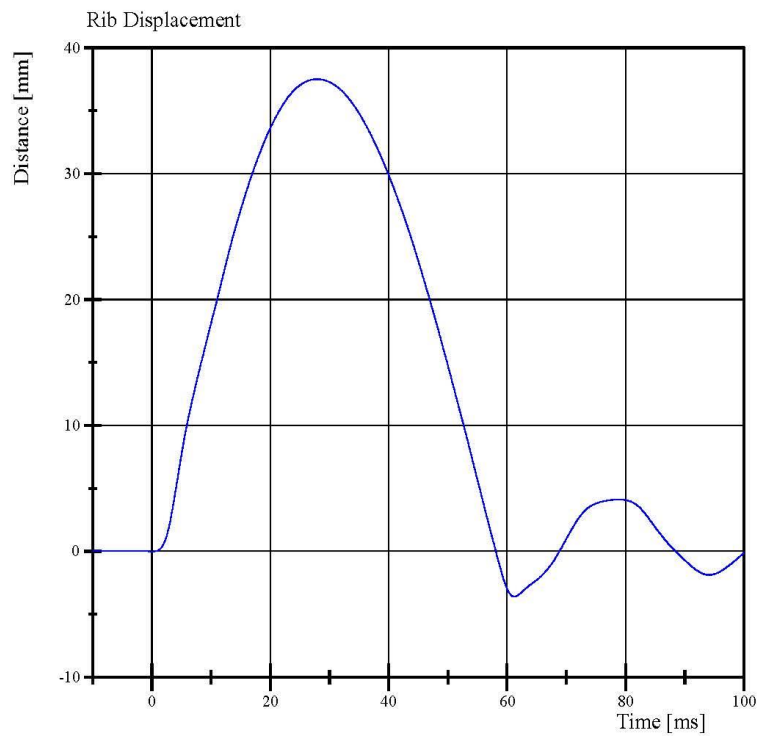
Page 21 of 41

05.14.2018 11:32:49 452



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018



Filter Class: CFC_180
Max: 37.5 mm at 27.9 ms
Min: -3.6 mm at 61.2 ms

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

Page 22 of 41

05.14.2018 11:33:29 452



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

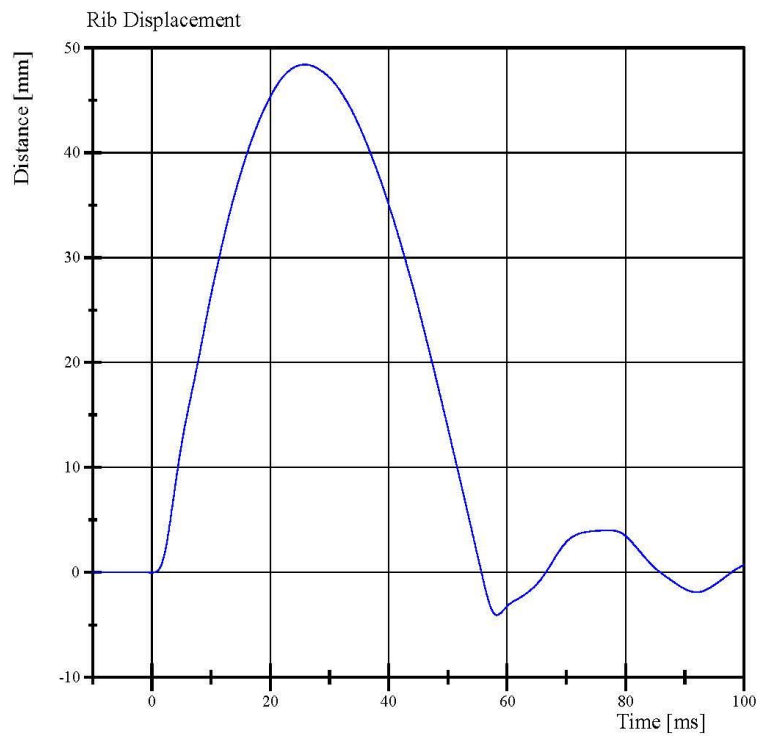
Page 23 of 41

05.14.2018 11:24:57 393



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018



Filter Class: CFC_180
Max: 48.4 mm at 25.8 ms
Min: -4.1 mm at 58.2 ms

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

Page 24 of 41

05.14.2018 11:25:48 393



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462mm

Rib Module: 175-4008-A-06-017

Rib Foam: 175-4003-05125

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

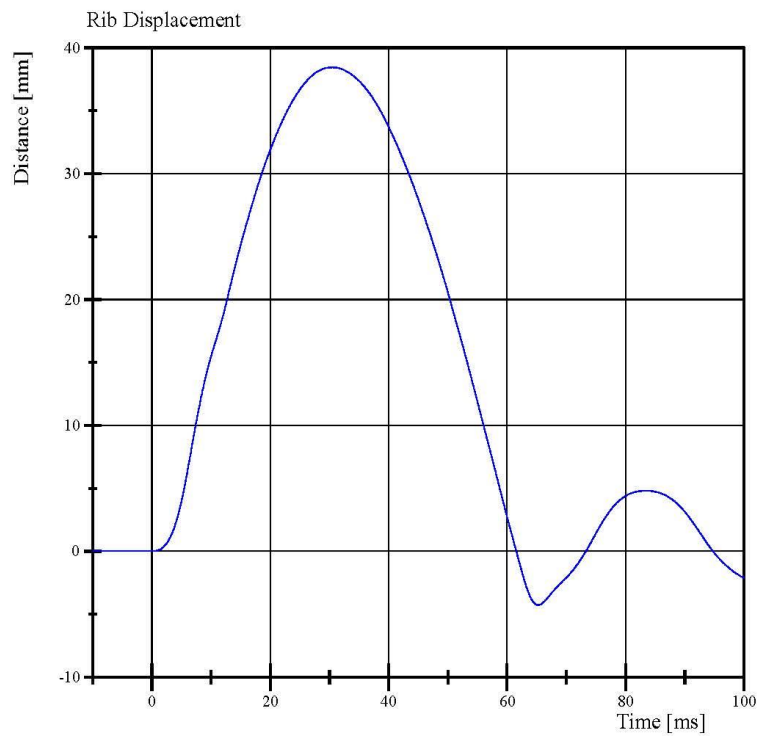
Page 25 of 41

05.14.2018 11:48:46 447



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018



Filter Class: CFC_180
Max: 38.4 mm at 30.5 ms
Min: -4.3 mm at 65.2 ms

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

Page 26 of 41

05.14.2018 11:49:20 447



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Module: 175-4008-A-06-017

Rib Foam: 175-4003-05125

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

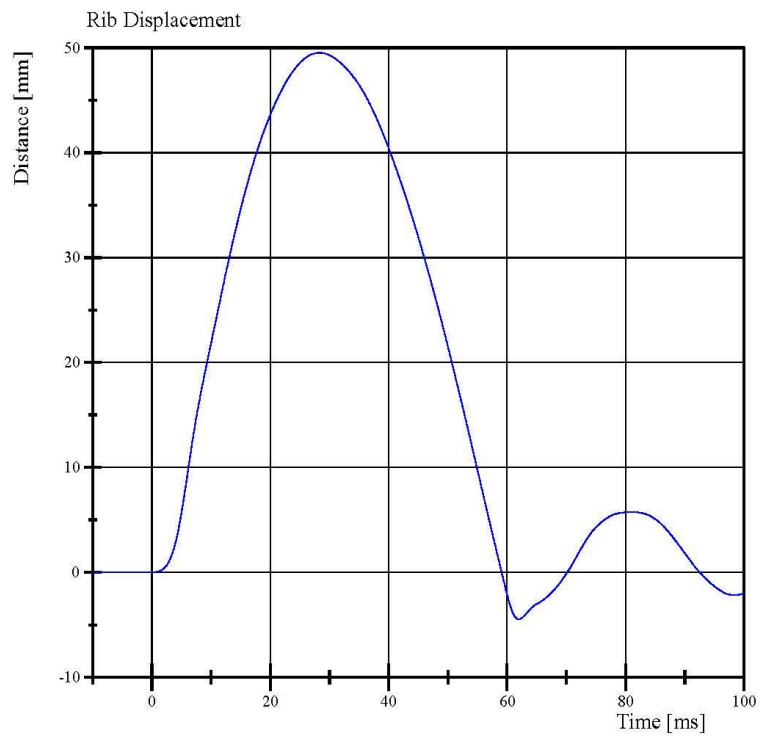
Page 27 of 41

05.14.2018 11:40:56 373



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/14/2018



Filter Class: CFC_180
Max: 49.5 mm at 28.3 ms
Min: -4.5 mm at 62.0 ms

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

Page 28 of 41

05.14.2018 11:41:30 373



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/15/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.526 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,458.0 N	Yes
Upper Rib Displacement	34 - 41 mm	37.8 mm	Yes
Center Rib Displacement	37 - 45 mm	42.3 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.2 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib:

Rib Module S/N: 175-4008-A

Rib Foam S/N: 175-4003-07229

Center Rib:

Rib Module S/N: 175-4008-A

Rib Foam S/N: E2A-DCT-04082

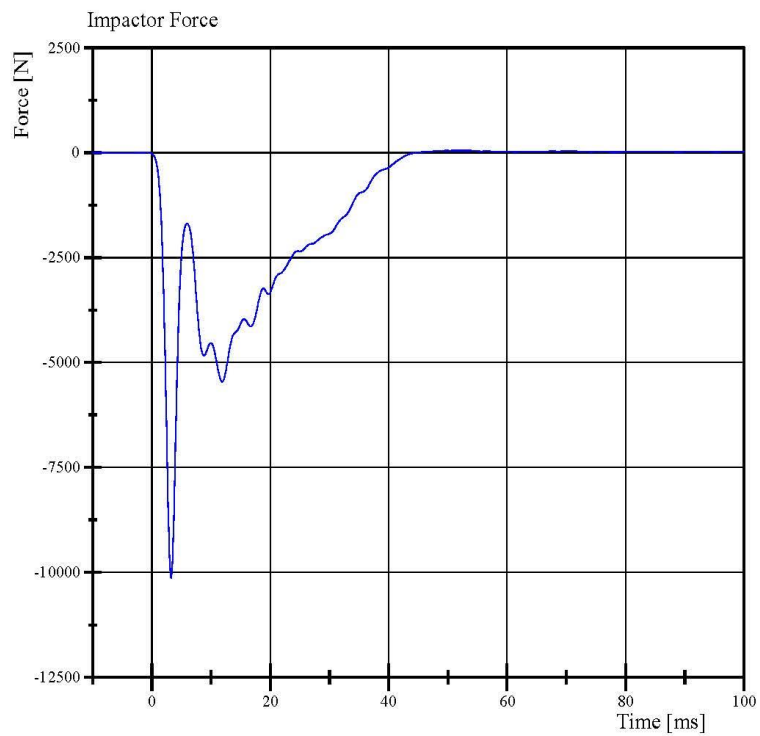
Lower Rib:

Rib Module S/N: 175-4008-A-06-017

Rib Foam S/N: 175-4003-05125

Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/15/2018



Filter Class: CFC_180
Max: 54.1 N at 53.3 ms
Min: -10,134.6 N at 3.3 ms

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

05.15.2018 08:56:14 416



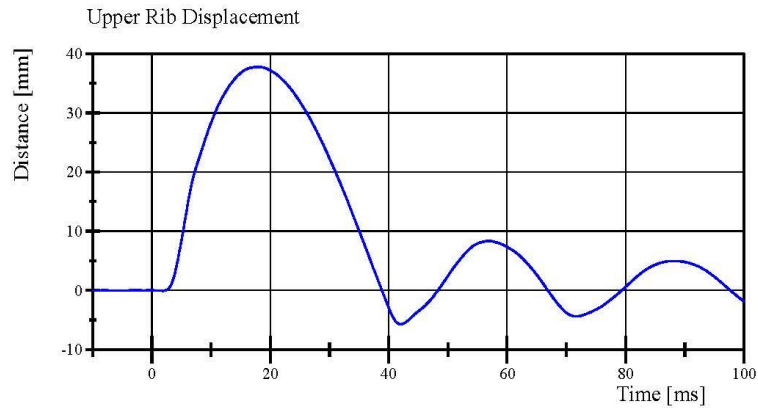
Page 30 of 41

Transportation Research Center Inc.

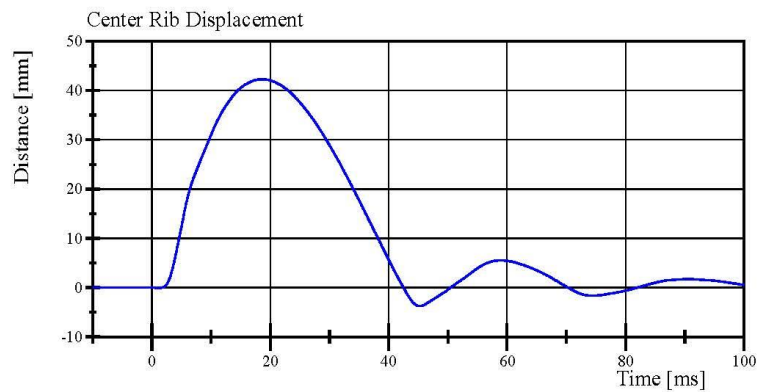
Left Lower Thorax

ES-2re Serial No. F030 Certification No. 58-1

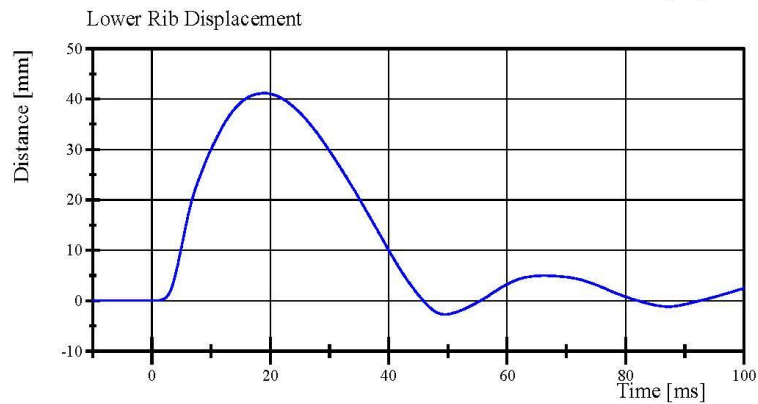
Test Date: 5/15/2018



Filter Class: CFC_180
Max: 37.8 mm at 17.9 ms
Min: -5.7 mm at 42.0 ms



Filter Class: CFC_180
Max: 42.3 mm at 18.6 ms
Min: -3.7 mm at 45.3 ms



Filter Class: CFC_180
Max: 41.2 mm at 19.0 ms
Min: -2.7 mm at 49.5 ms

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

05.15.2018 08:56:15 416



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 58-1

Test Date: 5/15/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.05 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,210.7 N	Yes
Time of Peak	10.6 - 13.0 ms	11.76 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,450.2 N	Yes
Time of Peak	10.0 - 12.3 ms	11.28 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen S/N: 1066

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

Page 37 of 41

05.15.2018 09:07:38 536

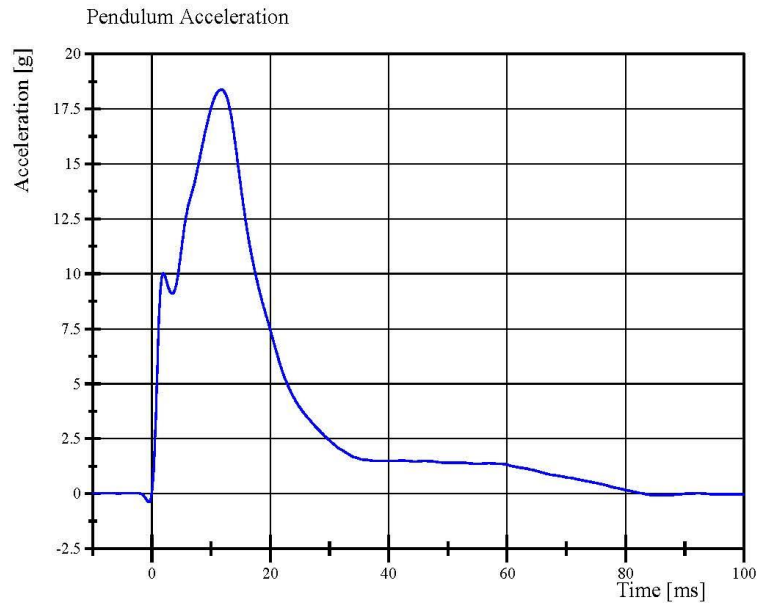


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 58-1

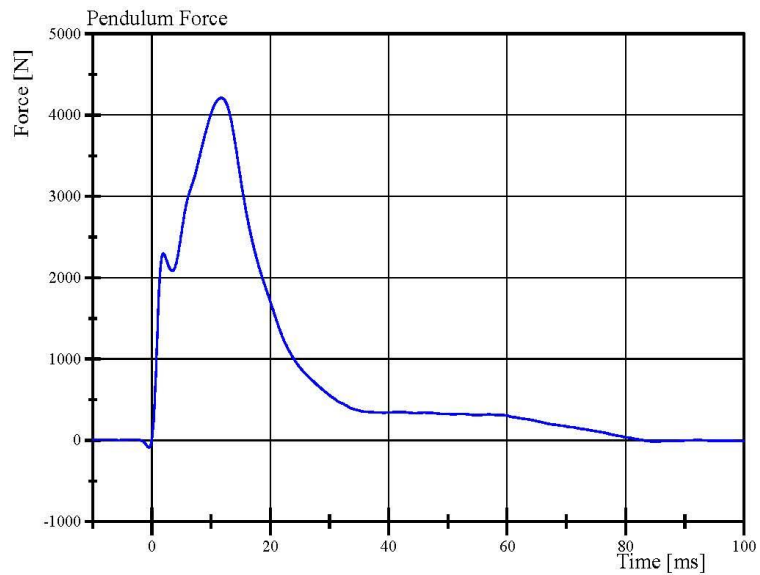
Test Date: 5/15/2018



Filter Class: CFC_180

Max: 18.4 g at 11.8 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,210.7 N at 11.8 ms

Min: -87.3 N at -0.5 ms

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

05.15.2018 09:08:03 536



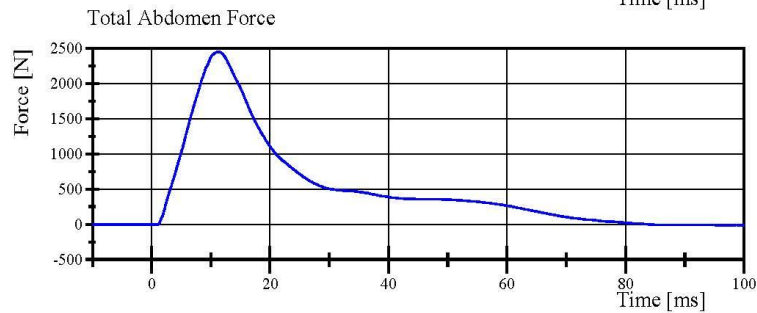
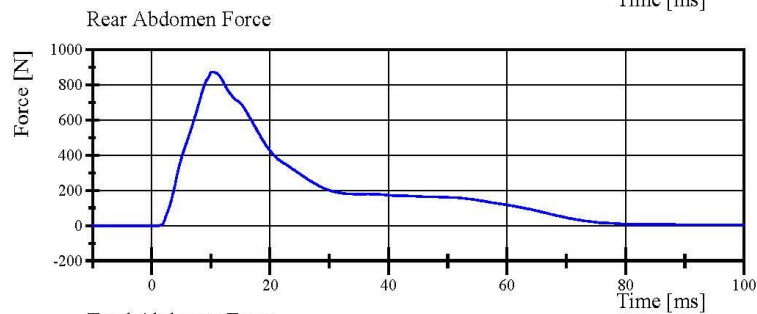
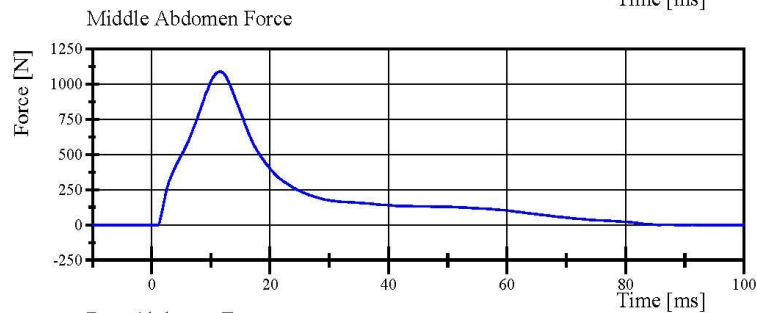
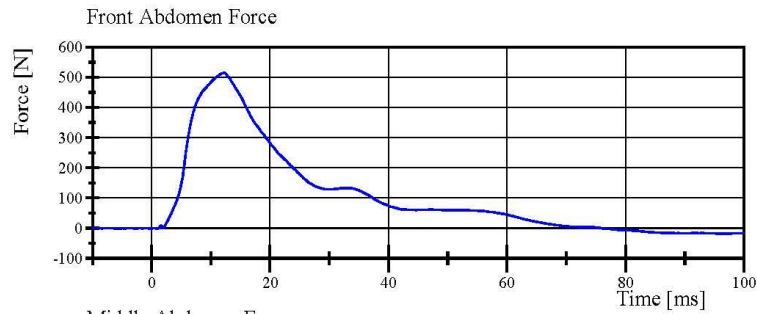
Page 38 of 41

Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 58-1

Test Date: 5/15/2018



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

05.15.2018 09:08:04 536



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 58-16

Test Date: 5/17/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.103 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-48.4 deg	Yes
Time of Peak	39 - 53 ms	43.1 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.4 ms	Yes

Test meets specifications.

Condition: New

Comments:

Lumbar S/N: DM3011

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

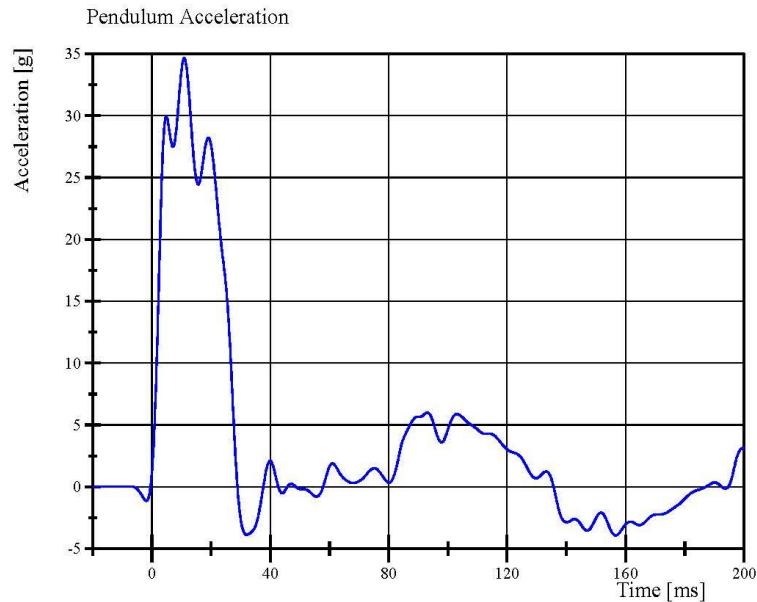
Page 32 of 41

05.17.2018 09:35:18 635

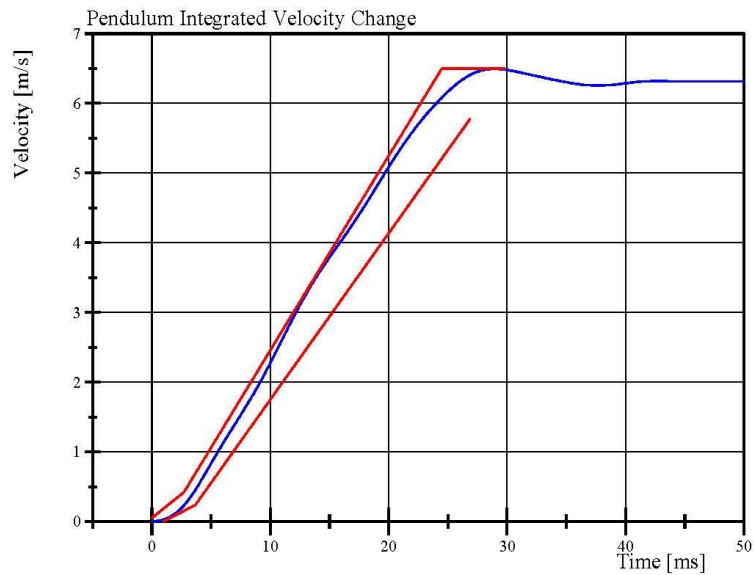


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 58-16
Test Date: 5/17/2018



Filter Class: CFC_60
Max: 34.7 g at 11.0 ms
Min: -3.9 g at 156.6 ms



Filter Class: CFC_60
Max: 6.5 m/s at 28.9 ms
Min: 0.0 m/s at 0.0 ms

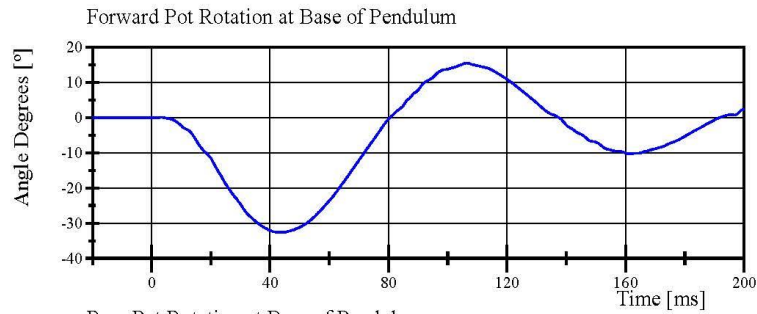
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

05.17.2018 09:35:36 635

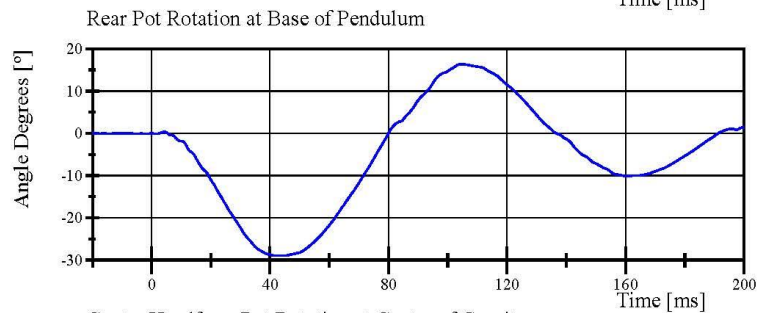


Transportation Research Center Inc.

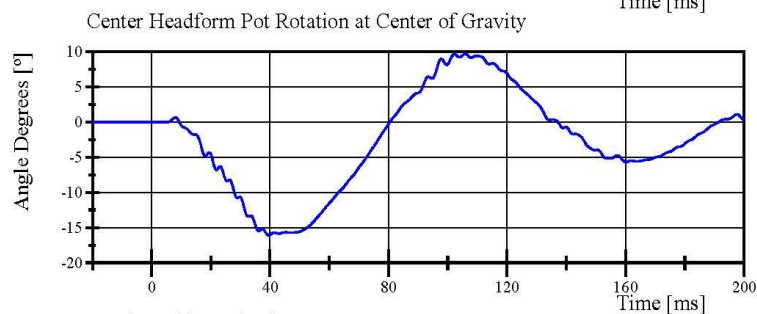
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 58-16
Test Date: 5/17/2018



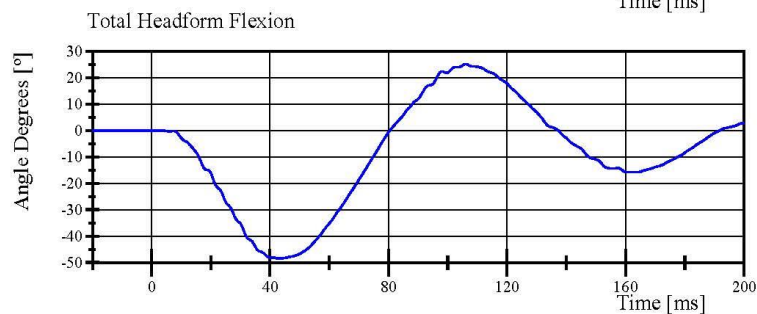
Filter Class: CFC_180
Max: 15.5 ° at 106.4 ms
Min: -32.6 ° at 43.8 ms



Filter Class: CFC_180
Max: 16.4 ° at 104.6 ms
Min: -28.9 ° at 44.7 ms



Filter Class: CFC_180
Max: 9.7 ° at 105.9 ms
Min: -16.1 ° at 39.5 ms



Filter Class: CFC_180
Max: 25.2 ° at 106.1 ms
Min: -48.4 ° at 43.1 ms

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

05.17.2018 09:35:37 635



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/15/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,285.7 N	Yes
Time of Peak	11.8 - 16.1 ms	12.72 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,313.1 N	Yes
Time of Peak	12.2 - 17.0 ms	12.48 ms	Yes

Test meets specifications.

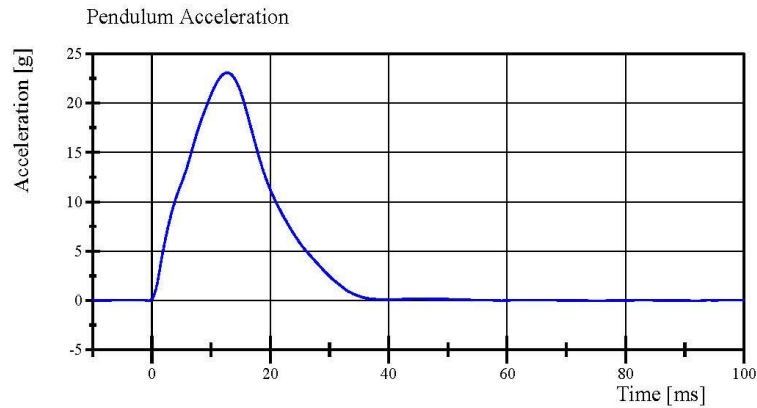
Condition: Used

Comments:

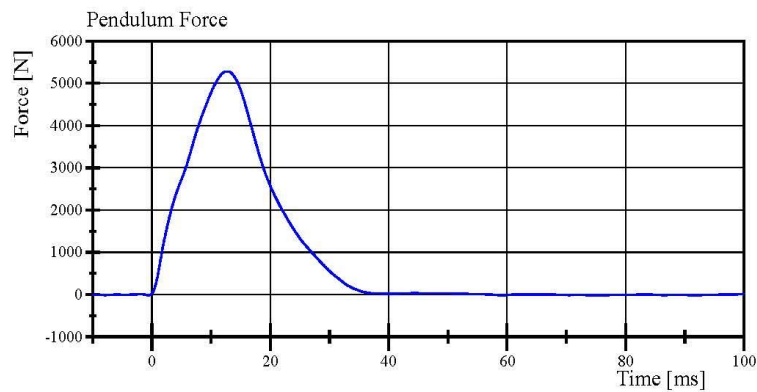
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

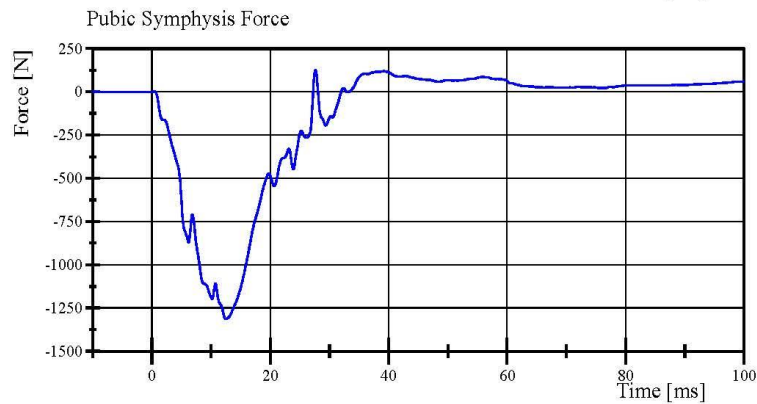
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 58-1
Test Date: 5/15/2018



Filter Class: CFC_180
Max: 23.1 g at 12.7 ms
Min: -0.1 g at 91.9 ms



Filter Class: CFC_180
Max: 5,285.7 N at 12.7 ms
Min: -15.9 N at 91.9 ms



Filter Class: CFC_600
Max: 125.3 N at 27.6 ms
Min: -1,313.1 N at 12.5 ms

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

05.15.2018 09:15:11 510



Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No. 65

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	86	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	131	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	44	Yes
I	Head Depth	178.0 - 188.0	185	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	534	Yes
L	Popliteal Height	343.0 - 369.0	348	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	396	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	198	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	252	Yes
S	Knee Joint to seat Back	478.0 - 493.0	482	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	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	877	Yes
Z	Waist Circumference	761.0 - 791.0	781	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 65-1

Test Date: 5/5/2018

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: 1253

Skull S/N: 180/1001/C

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

Page 9 of 31

05.05.2018 11:04:53 194

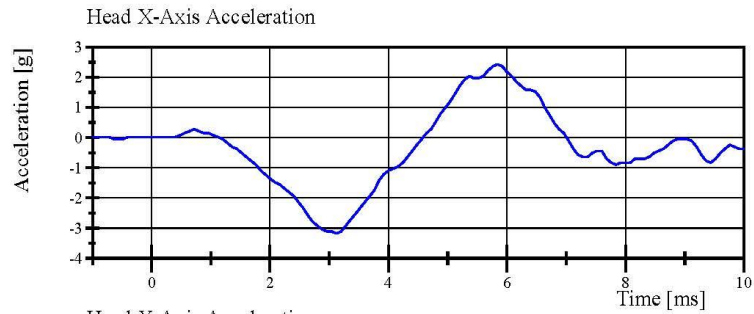


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 65-1

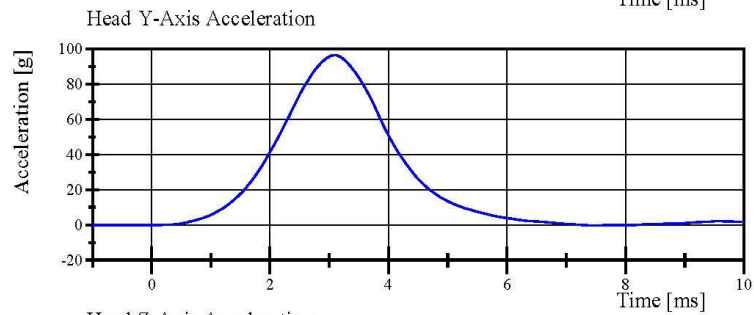
Test Date: 5/5/2018



Filter Class: CFC_1000

Max: 2.4 g at 5.8 ms

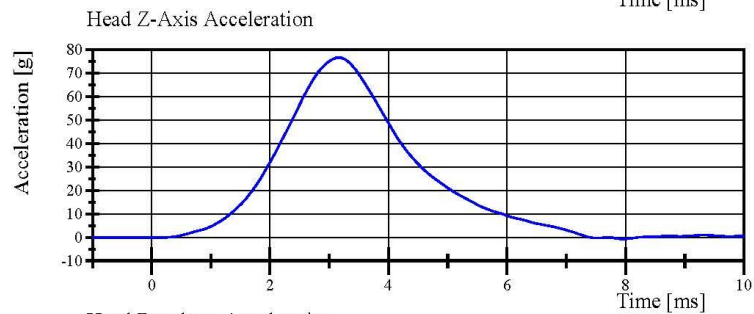
Min: -3.2 g at 3.1 ms



Filter Class: CFC_1000

Max: 96.5 g at 3.1 ms

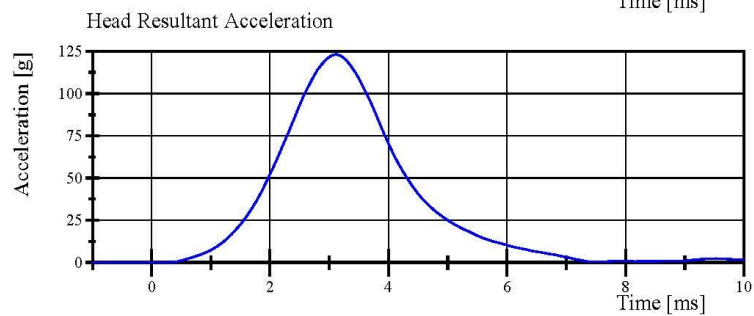
Min: -0.3 g at 7.4 ms



Filter Class: CFC_1000

Max: 76.5 g at 3.1 ms

Min: -0.7 g at 7.9 ms



Filter Class: CFC_1000

Max: 123.2 g at 3.1 ms

Min: 0.0 g at -1.0 ms

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

05.05.2018 11:06:03 194



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 65-1

Test Date: 5/5/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.630 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.535 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.838 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.185 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	6.036 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	6.044 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.2 deg	Yes
Time of Peak	50 - 70 ms	59.6 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.2 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	119.3 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 180-2001-606

Neck Cable S/N: N/A

Nodding Block S/N's:

- Front - DN-3094

- Rear - 8550-DL6580

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

Page 11 of 31

05.05.2018 14:36:48 707

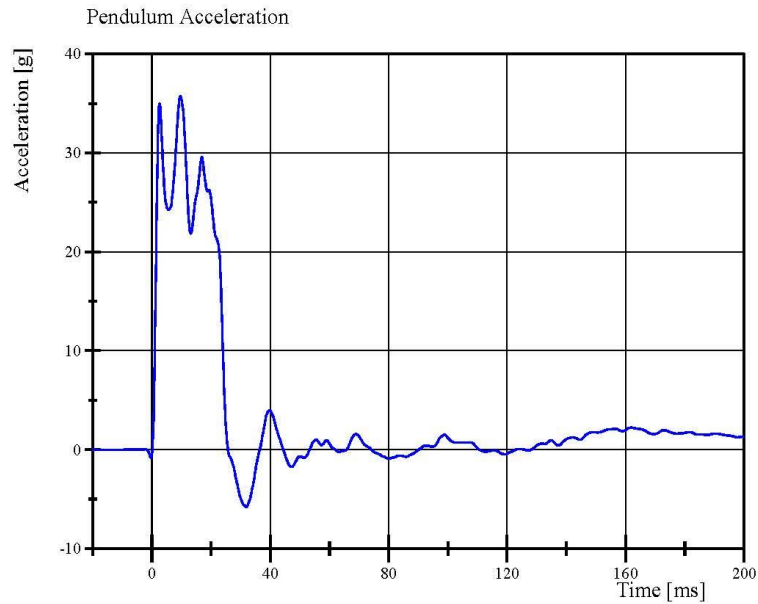


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 305 Certification No. 65-1

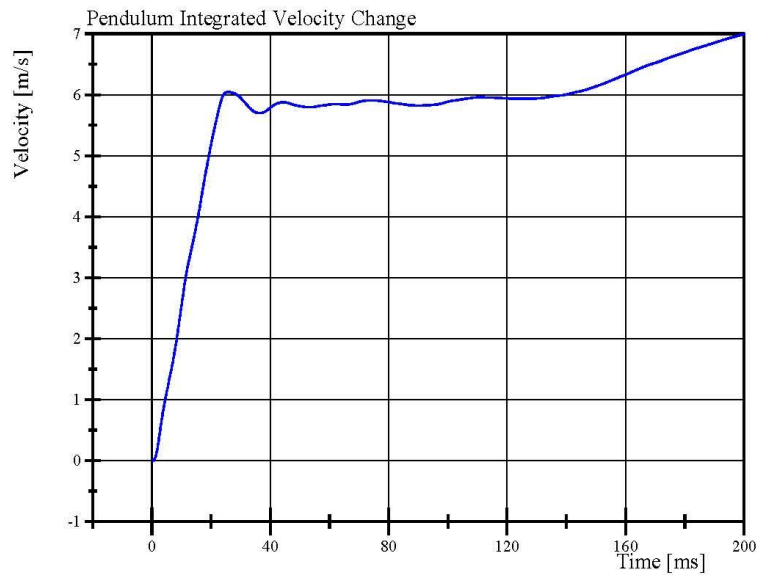
Test Date: 5/5/2018



Filter Class: CFC_180

Max: 35.7 g at 9.6 ms

Min: -5.8 g at 31.9 ms



Filter Class: CFC_180

Max: 7.0 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

05.05.2018 14:38:24 707

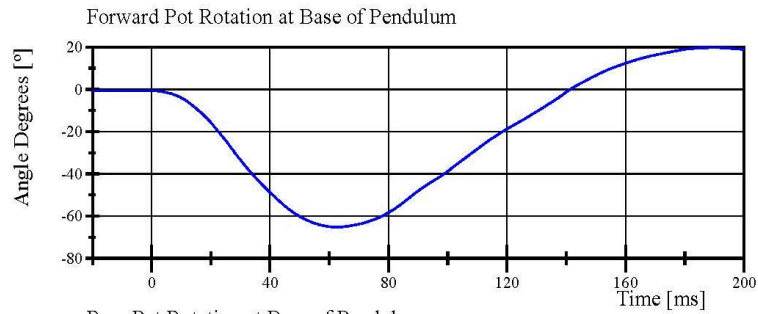


Transportation Research Center Inc.

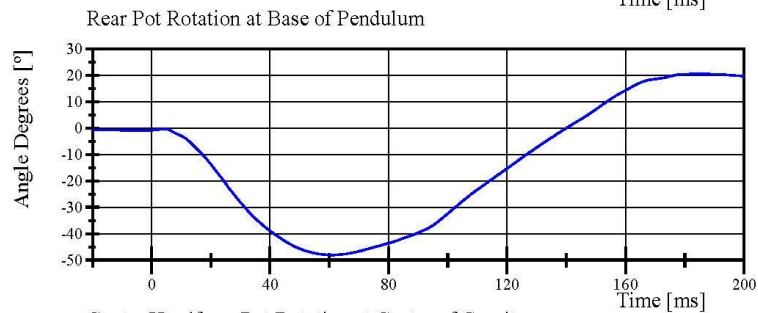
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 65-1

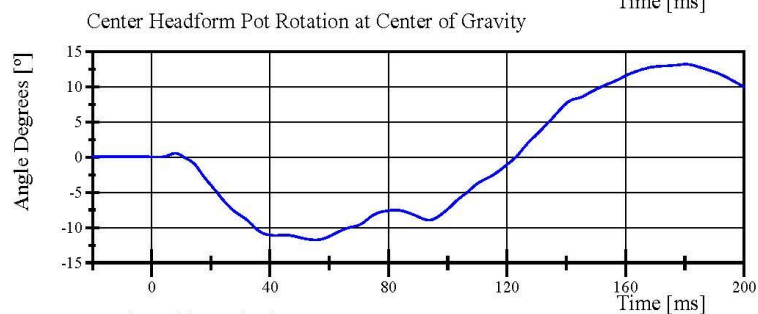
Test Date: 5/5/2018



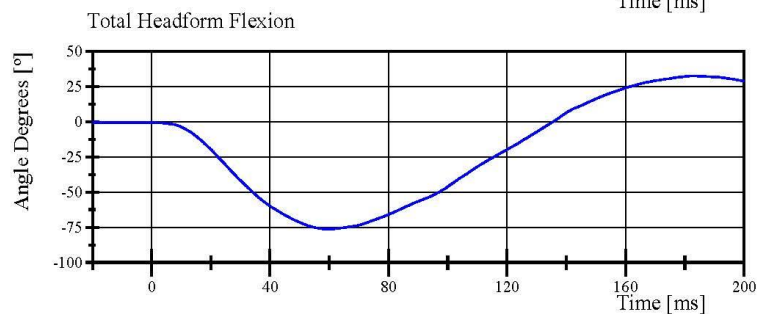
Filter Class: CFC_60
Max: 19.7 ° at 190.0 ms
Min: -65.1 ° at 62.4 ms



Filter Class: CFC_60
Max: 20.6 ° at 185.0 ms
Min: -48.1 ° at 60.9 ms



Filter Class: CFC_60
Max: 13.2 ° at 180.4 ms
Min: -11.7 ° at 55.4 ms



Filter Class: CFC_60
Max: 32.5 ° at 182.8 ms
Min: -76.2 ° at 59.6 ms

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

05.05.2018 14:38:24 707

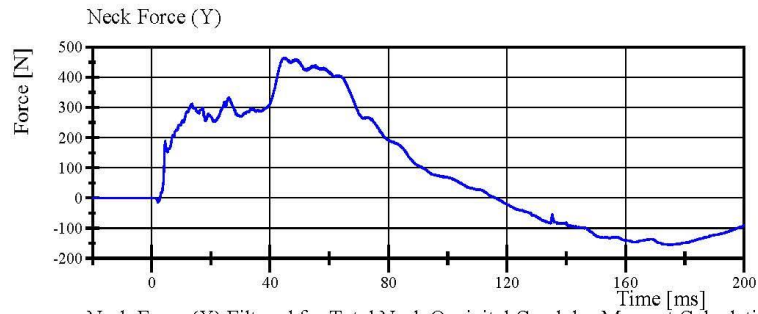


Transportation Research Center Inc.

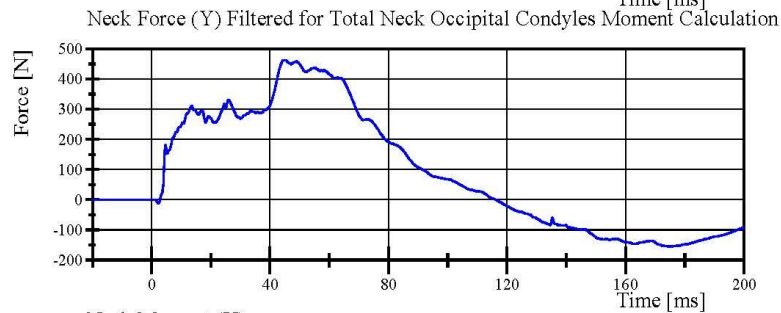
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 65-1

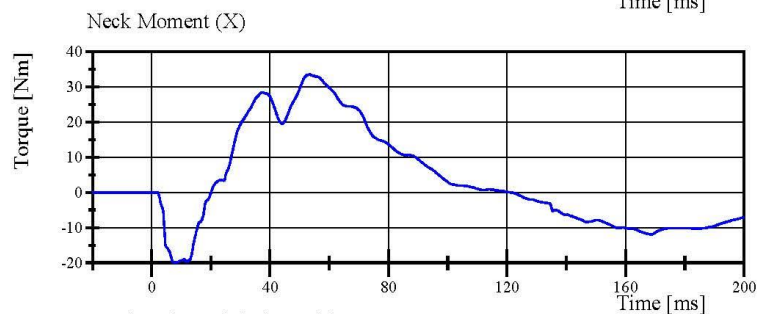
Test Date: 5/5/2018



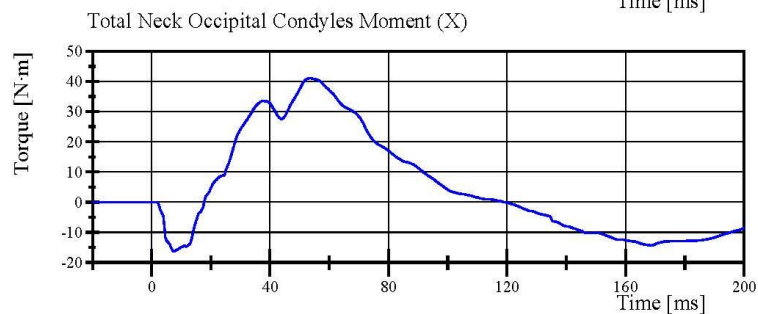
Filter Class: CFC_1000
Max: 464.2 N at 45.3 ms
Min: -154.9 N at 175.3 ms



Filter Class: CFC_600
Max: 462.9 N at 44.7 ms
Min: -154.6 N at 175.4 ms



Filter Class: CFC_600
Max: 33.5 Nm at 53.3 ms
Min: -20.0 Nm at 7.7 ms



Filter Class: Without_(Consta
Max: 41.2 N·m at 53.5 ms
Min: -16.3 N·m at 7.6 ms

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

05.05.2018 14:38:25 707



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.1 g	Yes
Shoulder Displacement	28 - 37 mm	31.0 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.8 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Shoulder Rib S/N: 180-3355 169

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

Page 15 of 31

05.07.2018 07:41:08 878

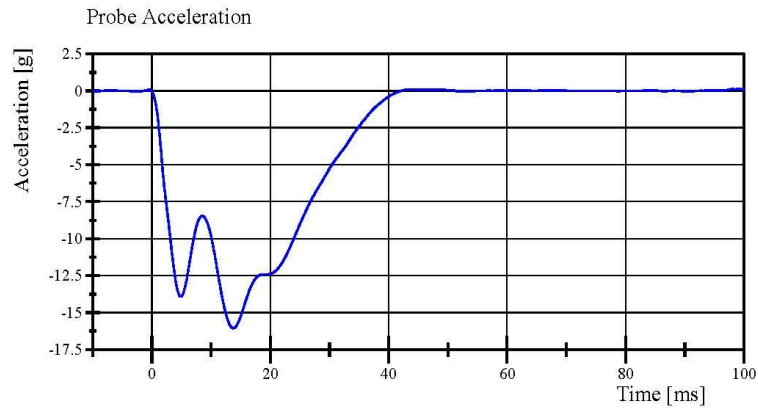


Transportation Research Center Inc.

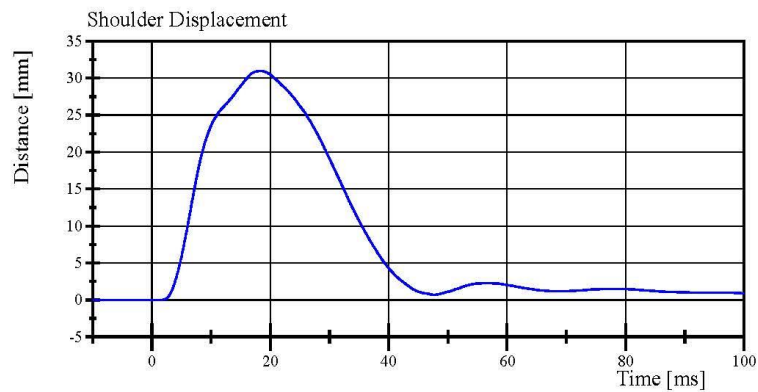
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 65-1

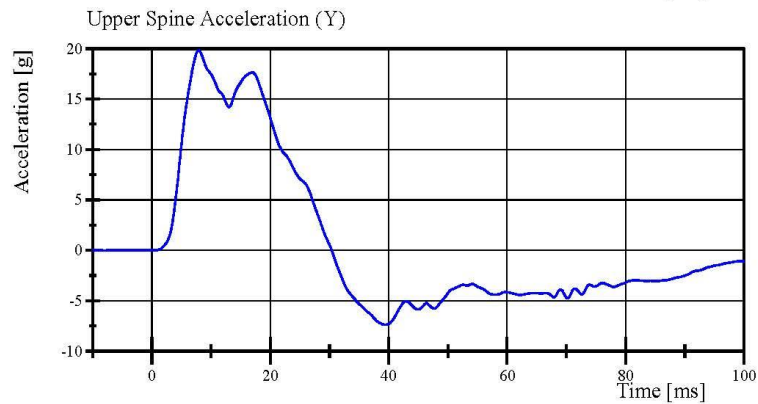
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 0.1 g at 99.0 ms
Min: -16.1 g at 13.8 ms



Filter Class: CFC_600
Max: 31.0 mm at 18.4 ms
Min: -0.0 mm at 1.5 ms



Filter Class: CFC_180
Max: 19.8 g at 7.9 ms
Min: -7.4 g at 39.5 ms

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

05.07.2018 07:41:38 878



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.751 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.5 g	Yes
Shoulder Displacement	31 - 40 mm	32.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.2 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.6 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.1 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.1 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Upper Thorax Rib S/N: RS506

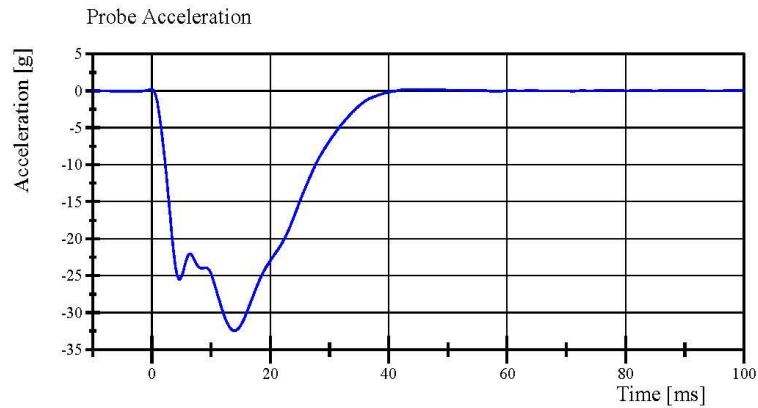
Middle Thorax Rib S/N: RS506

Lower Thorax Rib S/N: RS506

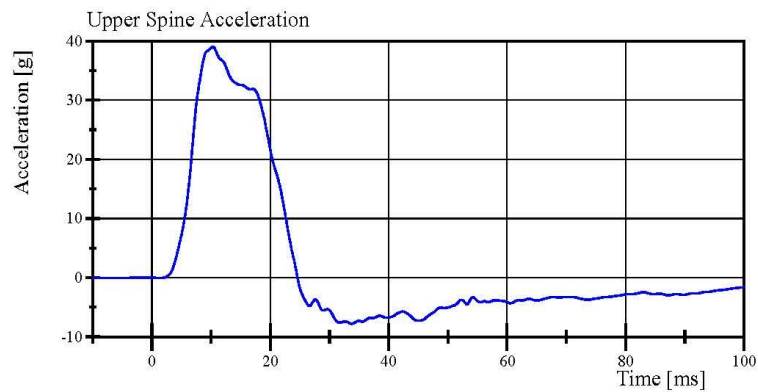
Upper Thorax Pad S/N: 180-3451

Transportation Research Center Inc.

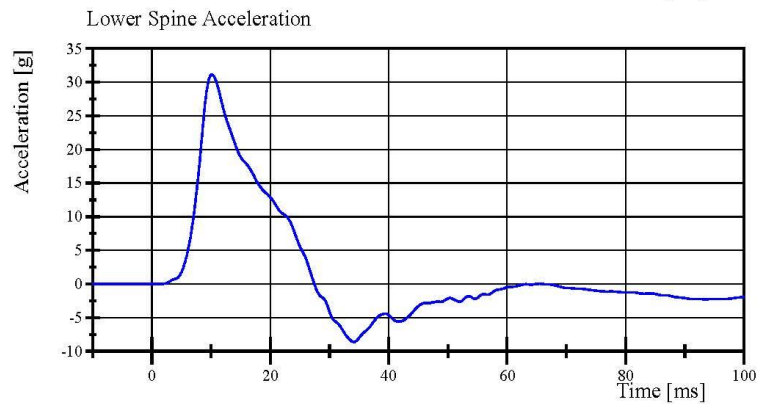
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018



Filter Class: CFC_180
Max: 0.2 g at 43.5 ms
Min: -32.5 g at 13.9 ms



Filter Class: CFC_180
Max: 39.1 g at 10.3 ms
Min: -7.8 g at 33.7 ms



Filter Class: CFC_180
Max: 31.1 g at 10.1 ms
Min: -8.6 g at 34.2 ms

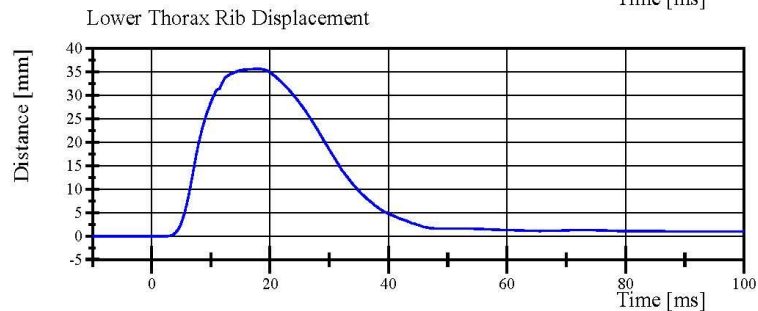
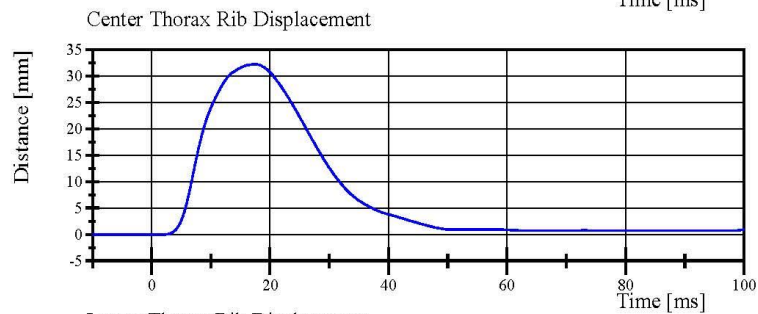
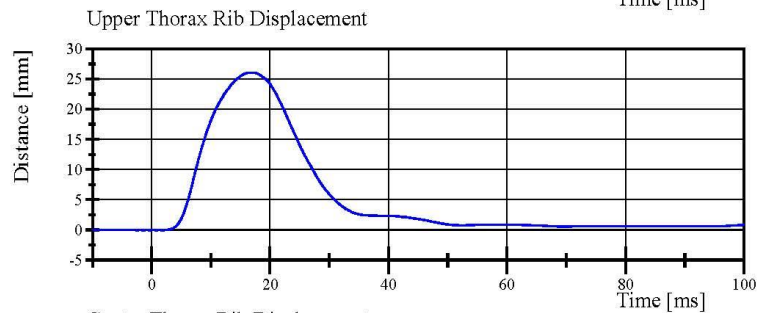
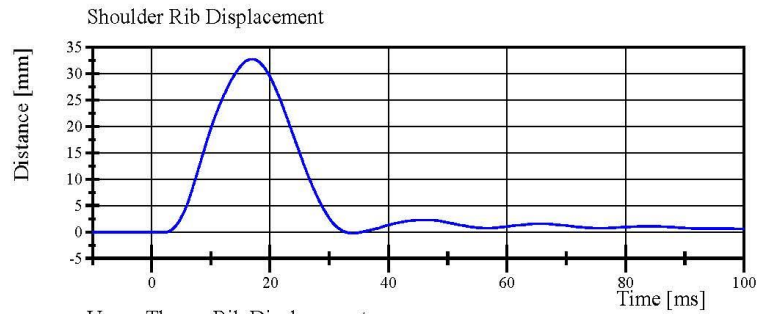
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

05.07.2018 08:43:38 597



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018



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

05.07.2018 08:43:39 597



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.291 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.0 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.9 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.7 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	35.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.7 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.5 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Thorax Rib S/N: RS506

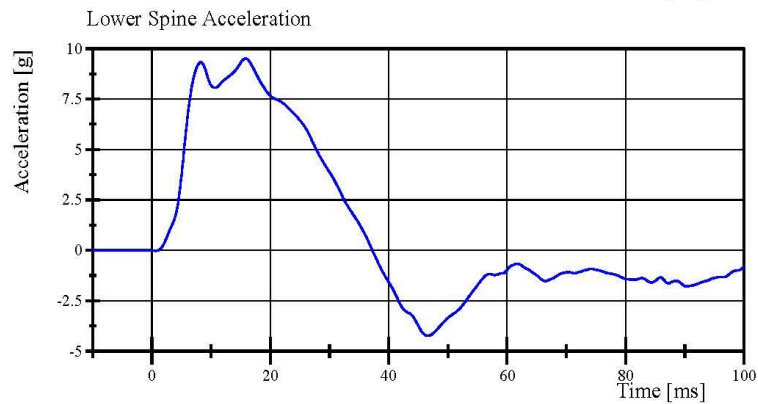
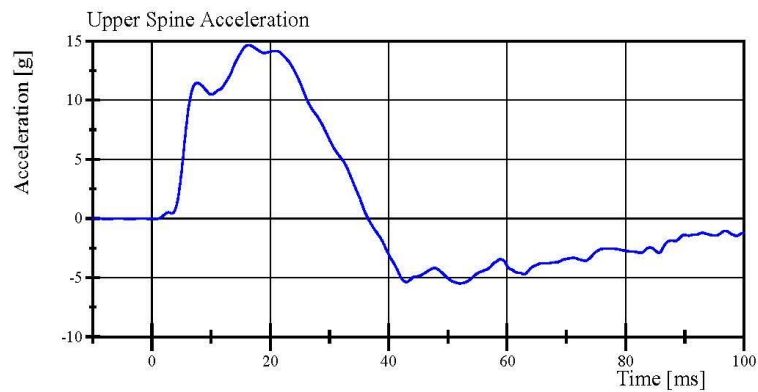
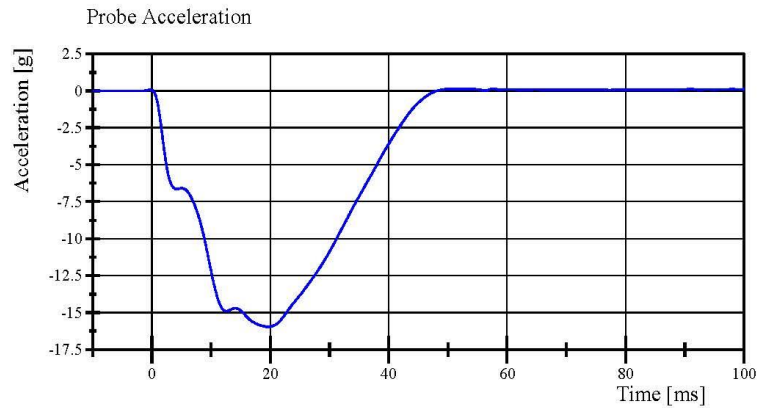
Middle Thorax Rib S/N: RS506

Lower Thorax Rib S/N: RS506

Upper Thorax Pad S/N: 180-3451

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018



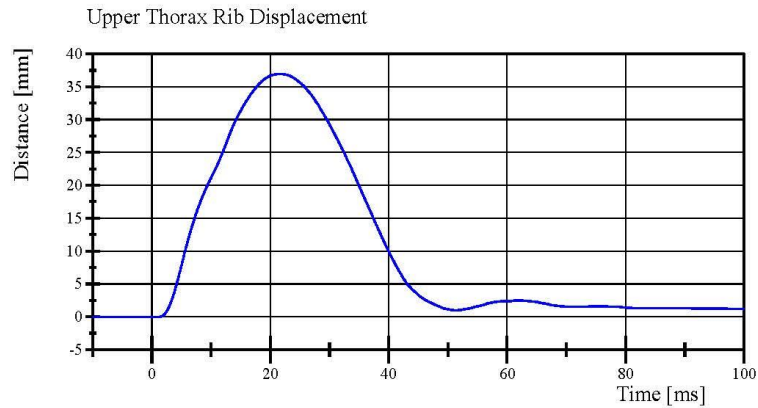
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

05.07.2018 07:57:33 841

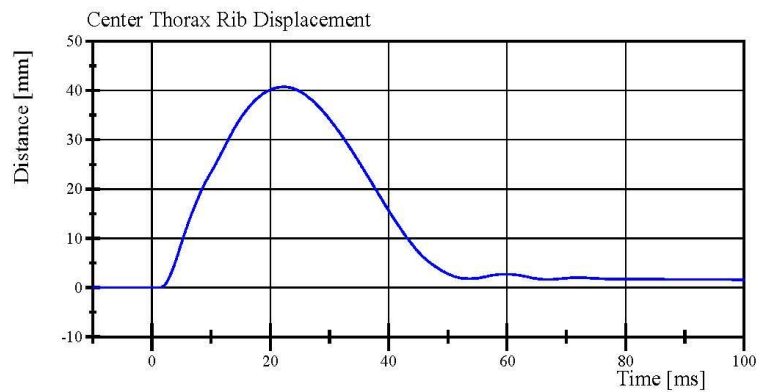


Transportation Research Center Inc.

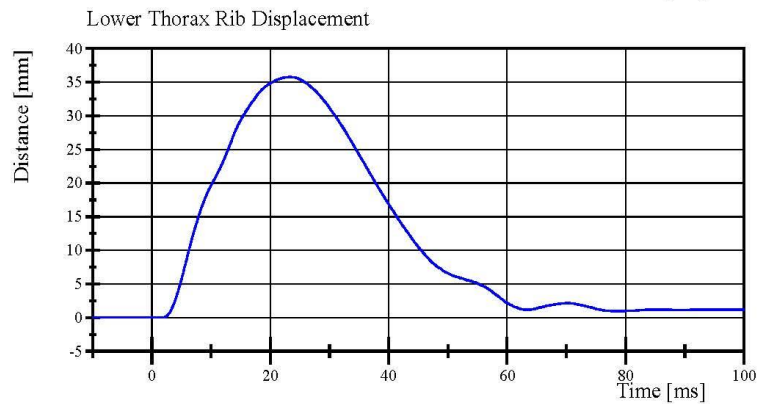
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018



Filter Class: CFC_600
Max: 36.9 mm at 21.6 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 40.7 mm at 22.2 ms
Min: -0.0 mm at -4.2 ms



Filter Class: CFC_600
Max: 35.7 mm at 23.4 ms
Min: -0.0 mm at -5.9 ms

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

05.07.2018 07:57:34 841



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 65-1

Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-12.7 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.0 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.1 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.03 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: RS564

Lower Abdominal Rib S/N: 180-5368 DS1234

Abdominal Pad S/N: 180-3452

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

Page 23 of 31

05.07.2018 07:48:57 724

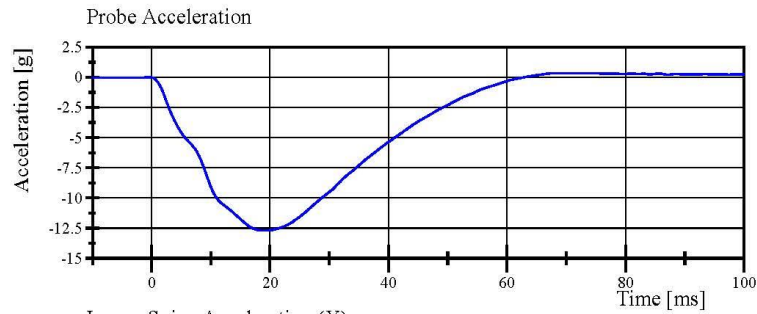


Transportation Research Center Inc.

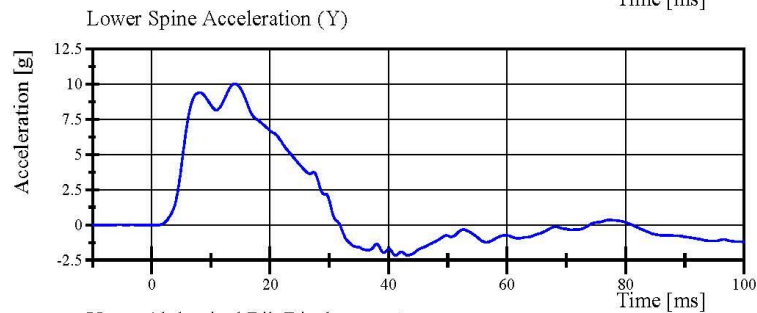
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 65-1

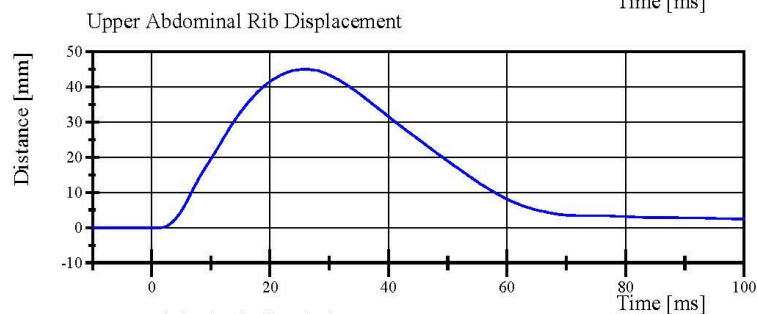
Test Date: 5/7/2018



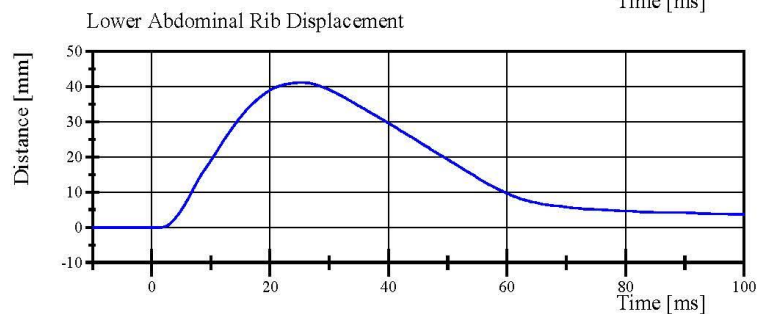
Filter Class: CFC_180
Max: 0.3 g at 68.1 ms
Min: -12.7 g at 19.0 ms



Filter Class: CFC_180
Max: 10.0 g at 14.0 ms
Min: -2.2 g at 41.2 ms



Filter Class: CFC_600
Max: 45.0 mm at 25.9 ms
Min: -0.0 mm at 0.7 ms



Filter Class: CFC_600
Max: 41.1 mm at 25.2 ms
Min: -0.0 mm at 0.5 ms

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

05.07.2018 07:49:41 724



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 65-1
Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-40.72 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	34.4 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,794.6 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 884

Pelvis Plug Info:

Manufacturer: SACO

S/N: 11487

Cal Date: 20160831

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

Page 27 of 31

05.07.2018 09:35:34 408

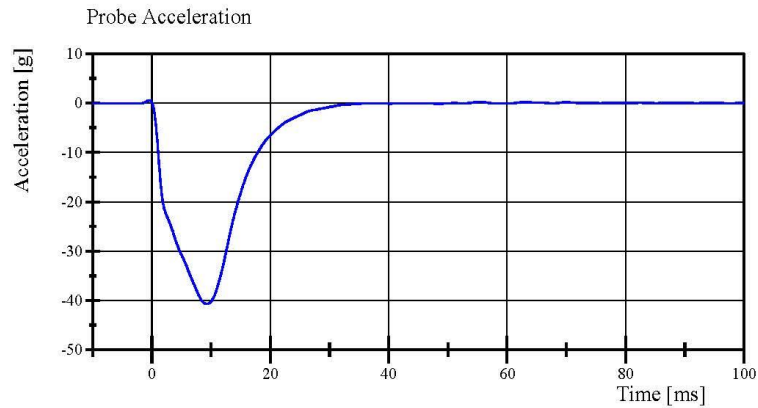


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 65-1

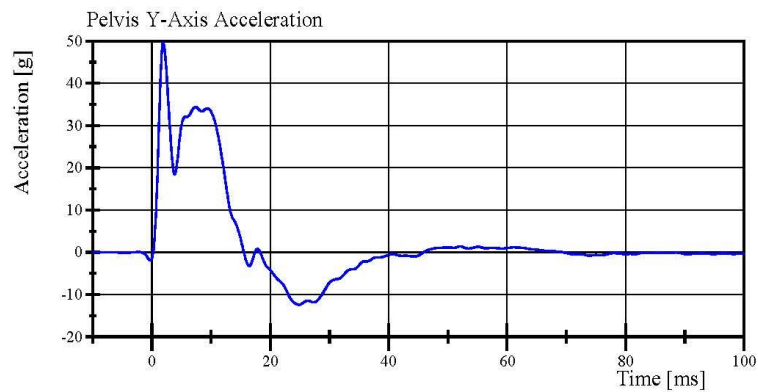
Test Date: 5/7/2018



Filter Class: CFC_180

Max: 0.6 g at -0.4 ms

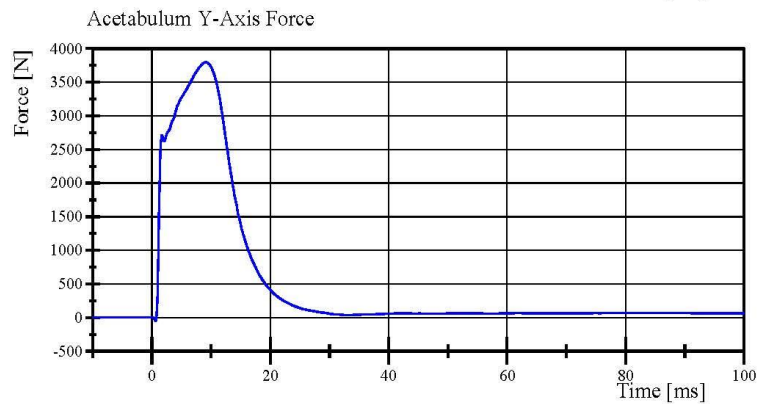
Min: -40.7 g at 9.3 ms



Filter Class: CFC_180

Max: 49.7 g at 1.9 ms

Min: -12.4 g at 24.8 ms



Filter Class: CFC_600

Max: 3,794.6 N at 9.1 ms

Min: -47.7 N at 0.6 ms

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

05.07.2018 09:38:00 408



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 65-1

Test Date: 5/7/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.36 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-37.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.9 g	Yes
Iliac Force	4,100 - 5,100 N	4,404.6 N	Yes

Test meets specifications.

Condition: Used

Comments:

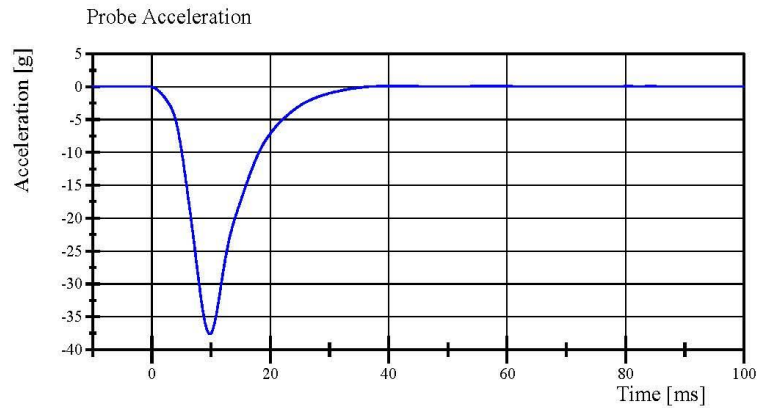
Pelvis Skin S/N: 884

Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 65-1

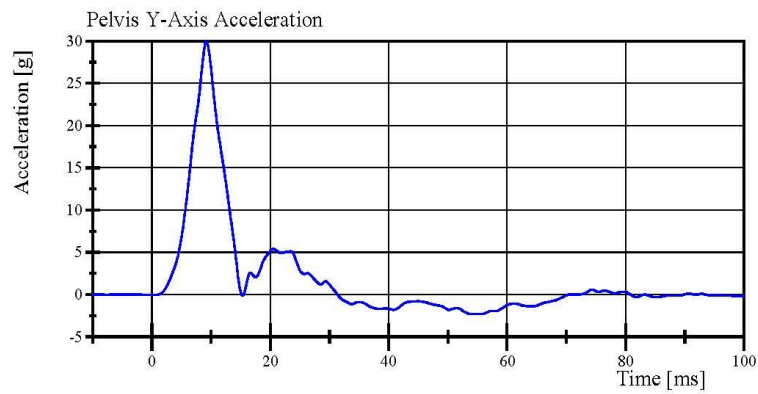
Test Date: 5/7/2018



Filter Class: CFC_180

Max: 0.1 g at 39.4 ms

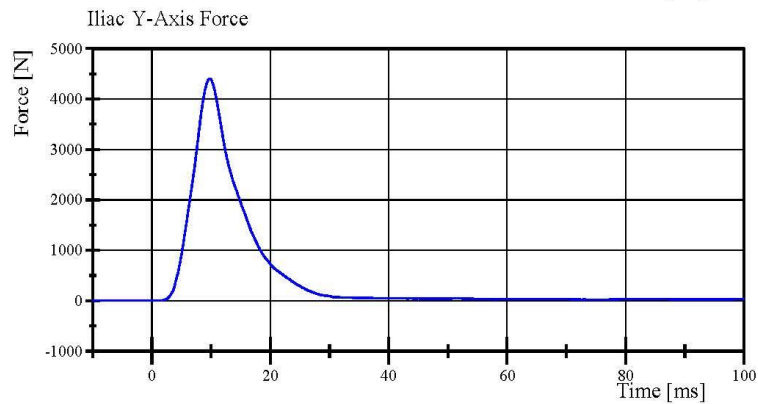
Min: -37.6 g at 9.8 ms



Filter Class: CFC_180

Max: 29.9 g at 9.2 ms

Min: -2.3 g at 55.4 ms



Filter Class: CFC_600

Max: 4,404.6 N at 9.8 ms

Min: -1.0 N at -9.0 ms

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

05.07.2018 07:29:31 726



Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No. 66

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	86	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	44	Yes
I	Head Depth	178.0 - 188.0	185	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	534	Yes
L	Popliteal Height	343.0 - 369.0	348	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	396	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	198	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	252	Yes
S	Knee Joint to seat Back	478.0 - 493.0	482	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	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	876	Yes
Z	Waist Circumference	761.0 - 791.0	781	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. 305 Certification No. 66-1

Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.4 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: 1253

Skull S/N: 180/1001/C

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

Page 9 of 31

05.12.2018 08:32:44 196

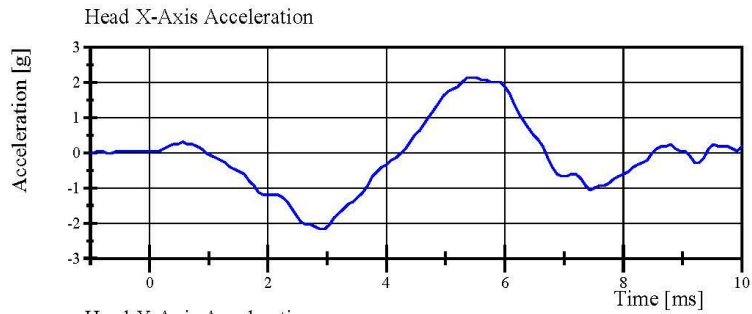


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 66-1

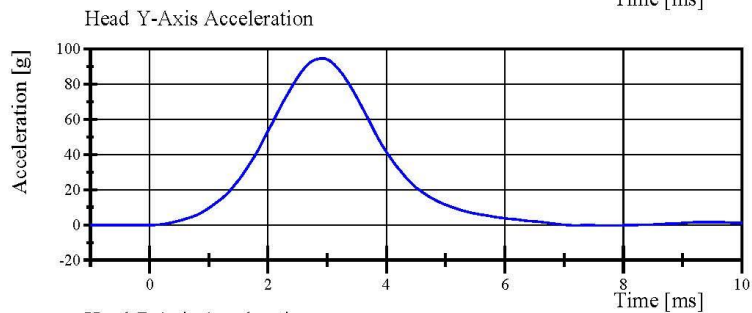
Test Date: 5/12/2018



Filter Class: CFC_1000

Max: 2.1 g at 5.4 ms

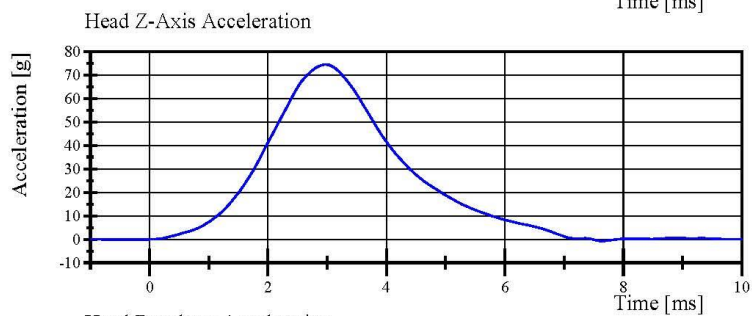
Min: -2.2 g at 2.9 ms



Filter Class: CFC_1000

Max: 94.6 g at 2.9 ms

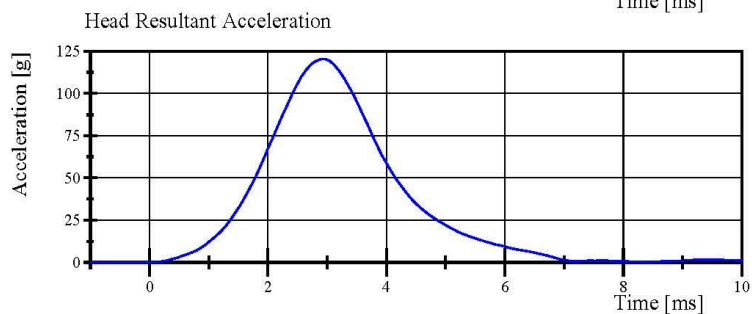
Min: -0.4 g at 7.7 ms



Filter Class: CFC_1000

Max: 74.6 g at 3.0 ms

Min: -0.6 g at 7.6 ms



Filter Class: CFC_1000

Max: 120.4 g at 3.0 ms

Min: 0.0 g at -0.7 ms

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

05.12.2018 08:33:20 196



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 66-1

Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.630 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.493 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.705 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.010 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.974 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	6.037 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.9 deg	Yes
Time of Peak	50 - 70 ms	66.2 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.9 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	121.1 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 180-2001-606

Neck Cable S/N: N/A

Nodding Block S/N's:

- Front - DN-3094

- Rear - 8550-DL6580

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

Page 11 of 31

05.12.2018 09:40:27 712

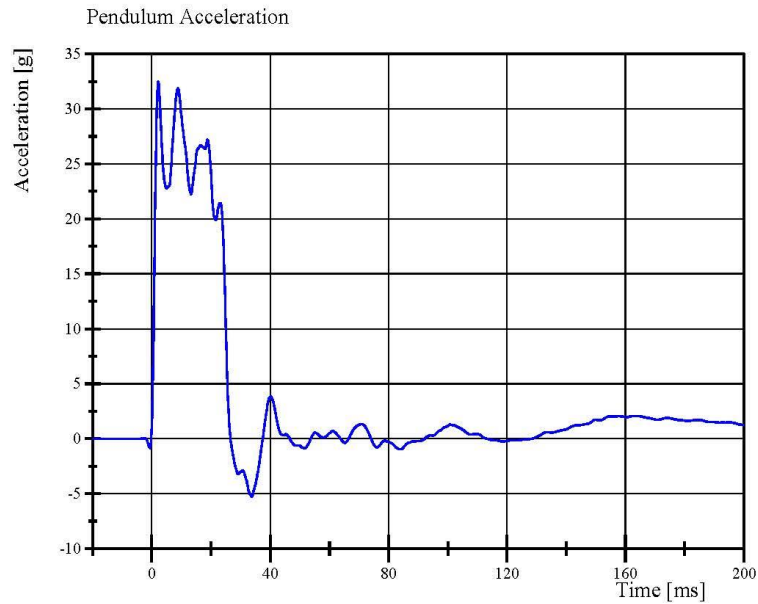


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 305 Certification No. 66-1

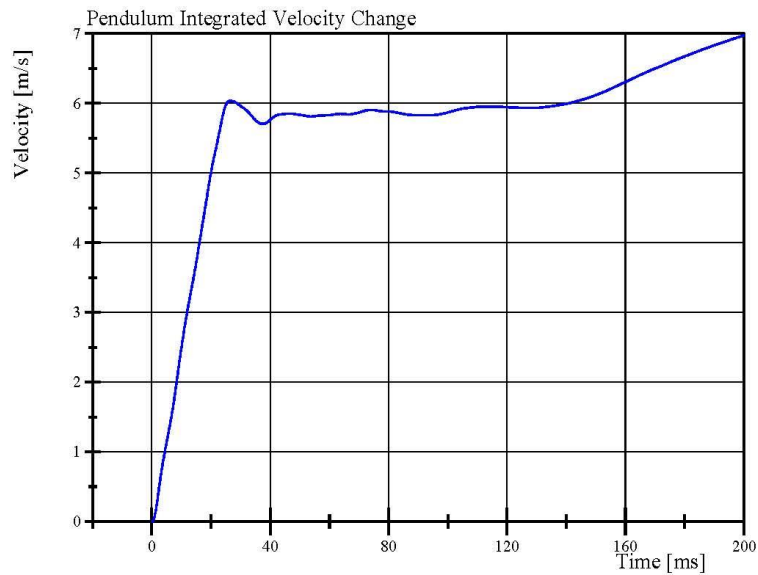
Test Date: 5/12/2018



Filter Class: CFC_180

Max: 32.5 g at 2.2 ms

Min: -5.3 g at 33.8 ms



Filter Class: CFC_180

Max: 7.0 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

05.12.2018 09:43:09 712

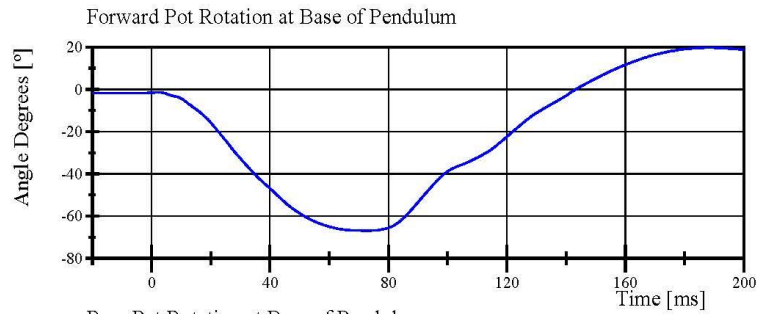


Transportation Research Center Inc.

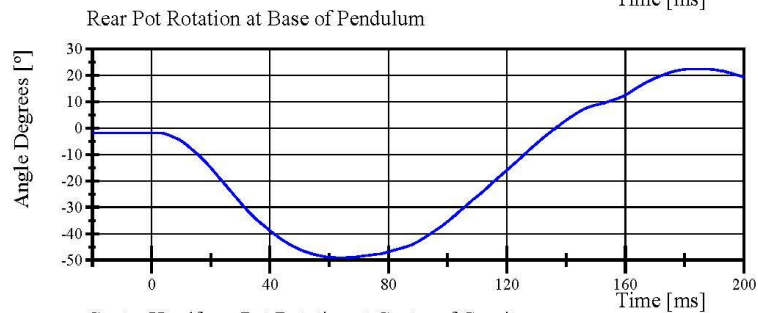
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 66-1

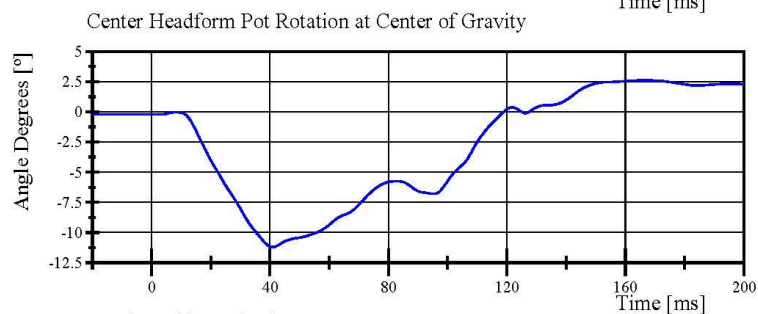
Test Date: 5/12/2018



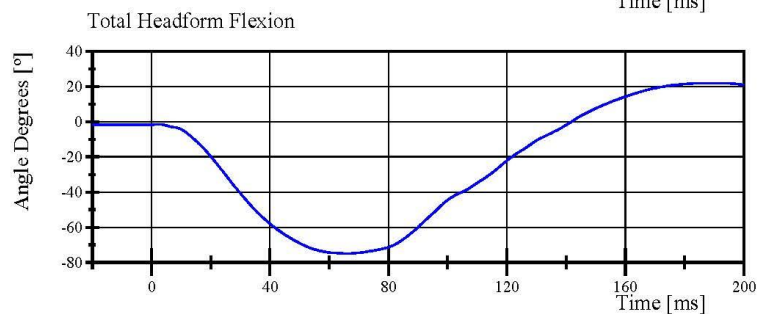
Filter Class: CFC_60
Max: 19.7 ° at 188.0 ms
Min: -66.9 ° at 72.6 ms



Filter Class: CFC_60
Max: 22.5 ° at 184.2 ms
Min: -49.1 ° at 63.9 ms



Filter Class: CFC_60
Max: 2.6 ° at 166.4 ms
Min: -11.2 ° at 40.9 ms



Filter Class: CFC_60
Max: 22.0 ° at 189.2 ms
Min: -74.9 ° at 66.2 ms

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

05.12.2018 09:43:11 712

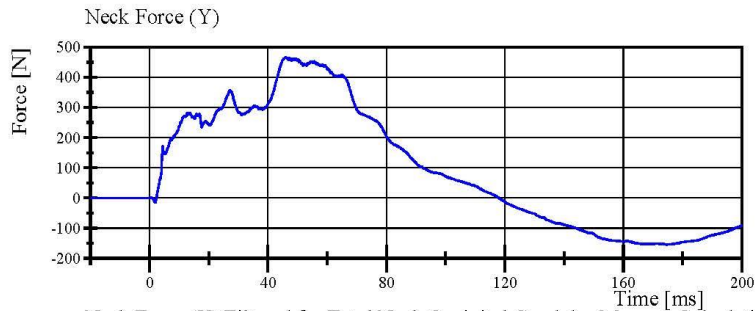


Transportation Research Center Inc.

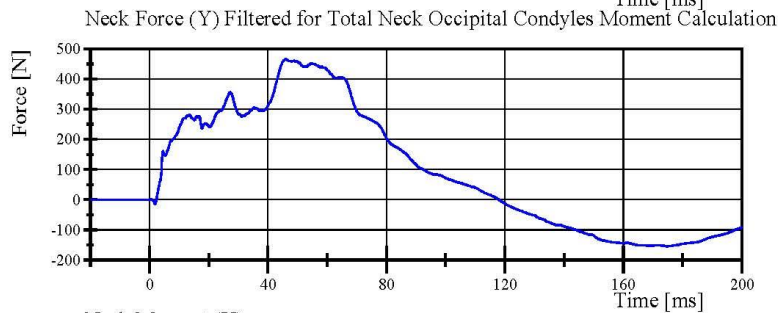
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 66-1

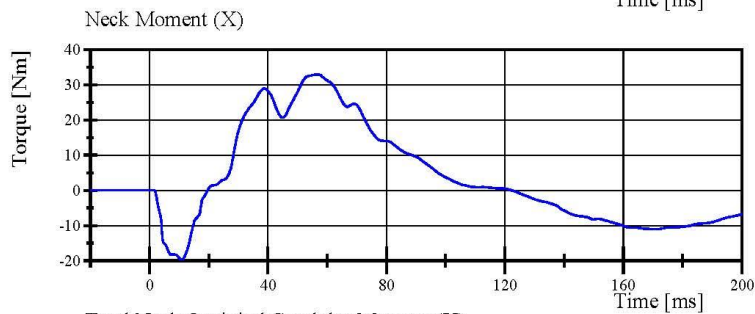
Test Date: 5/12/2018



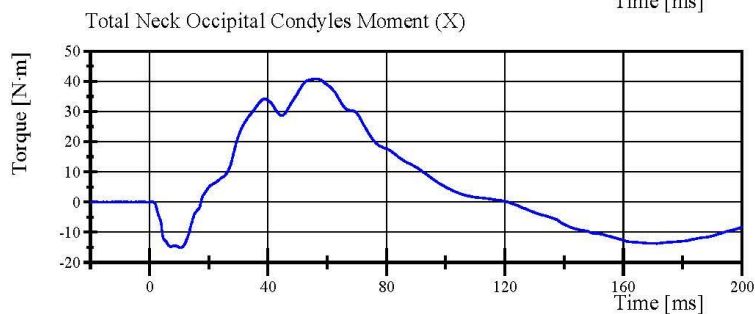
Filter Class: CFC_1000
Max: 467.6 N at 45.9 ms
Min: -154.5 N at 174.6 ms



Filter Class: CFC_600
Max: 466.4 N at 46.0 ms
Min: -154.2 N at 174.7 ms



Filter Class: CFC_600
Max: 33.0 Nm at 56.4 ms
Min: -19.6 Nm at 11.0 ms



Filter Class: Without_(Consta
Max: 40.9 N·m at 56.4 ms
Min: -15.1 N·m at 10.5 ms

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

05.12.2018 09:43:13 712



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 66-1

Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.5 g	Yes
Shoulder Displacement	28 - 37 mm	31.2 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.8 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Shoulder Rib S/N: 180-3355 169

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

Page 15 of 31

05.12.2018 12:05:16 804

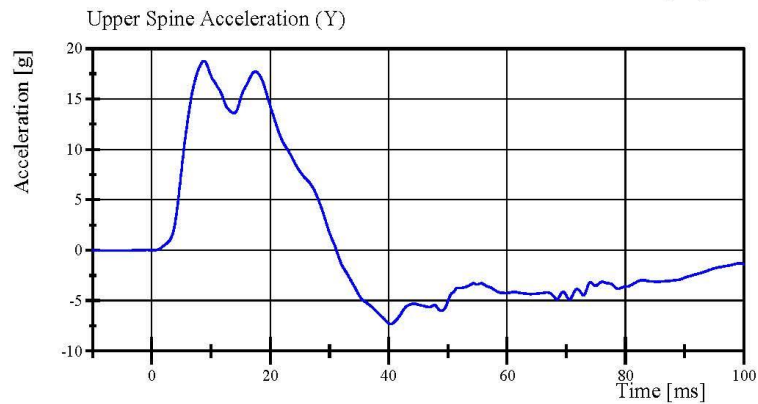
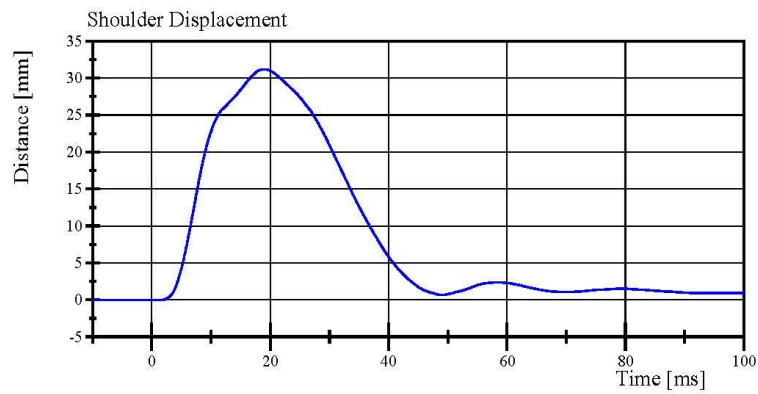
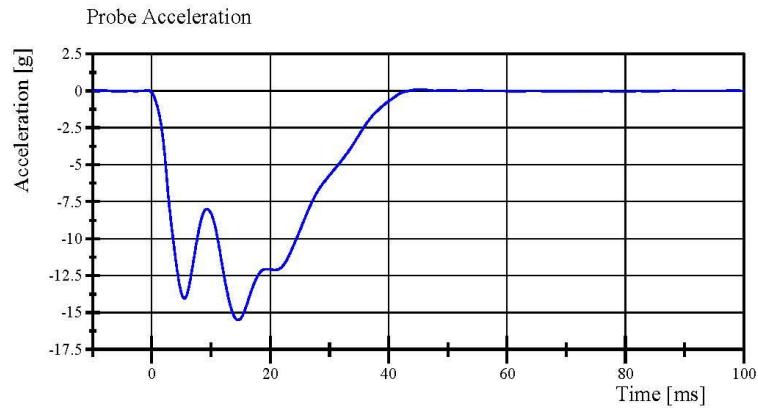


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 66-1

Test Date: 5/12/2018



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

05.12.2018 12:06:02 804



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIS Serial No. 305 Certification No. 66-1
Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.745 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.2 g	Yes
Shoulder Displacement	31 - 40 mm	33.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.9 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	33.1 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	36.5 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.6 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.0 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Upper Thorax Rib S/N: RS506

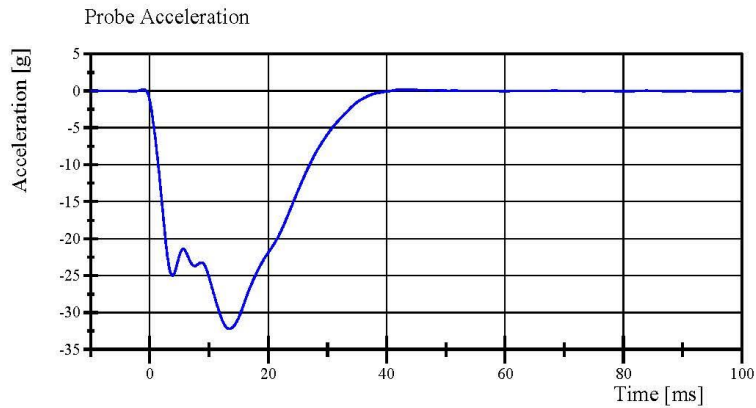
Middle Thorax Rib S/N: RS506

Lower Thorax Rib S/N: RS506

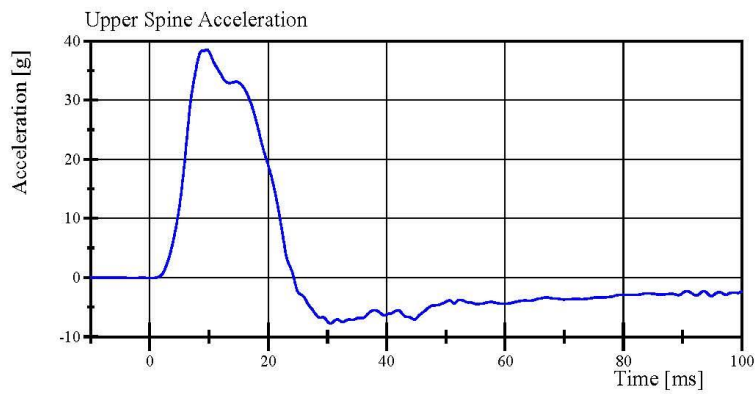
Upper Thorax Pad S/N: 180-3451

Transportation Research Center Inc.

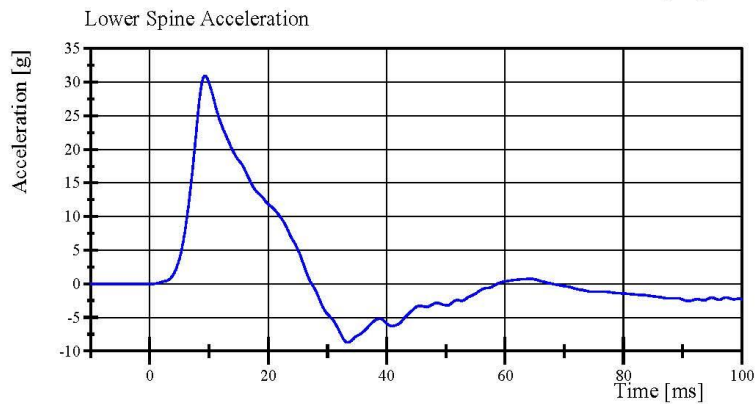
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 66-1
Test Date: 5/12/2018



Filter Class: CFC_180
Max: 0.2 g at -1.0 ms
Min: -32.2 g at 13.4 ms



Filter Class: CFC_180
Max: 38.6 g at 9.7 ms
Min: -7.7 g at 30.5 ms



Filter Class: CFC_180
Max: 31.0 g at 9.3 ms
Min: -8.7 g at 33.4 ms

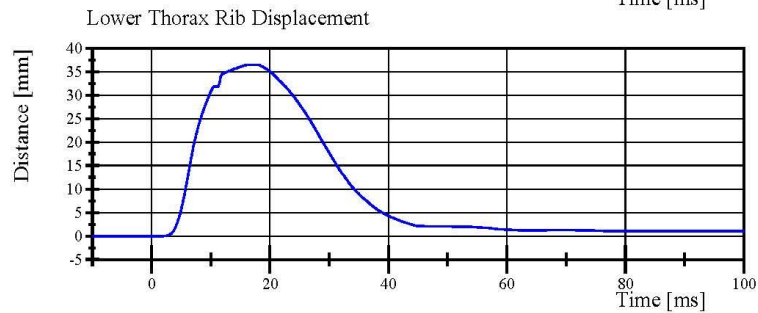
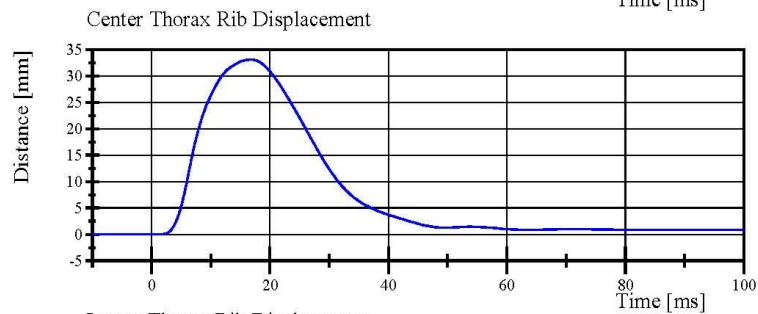
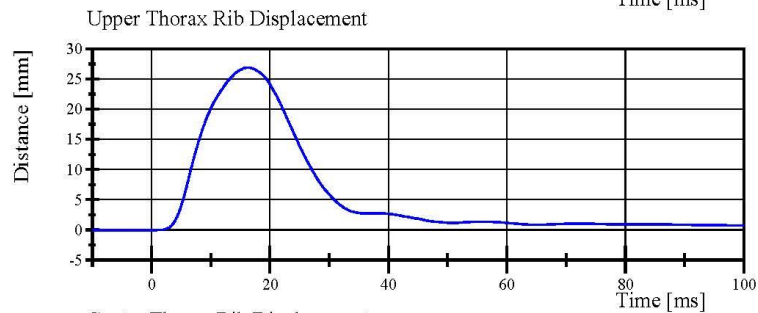
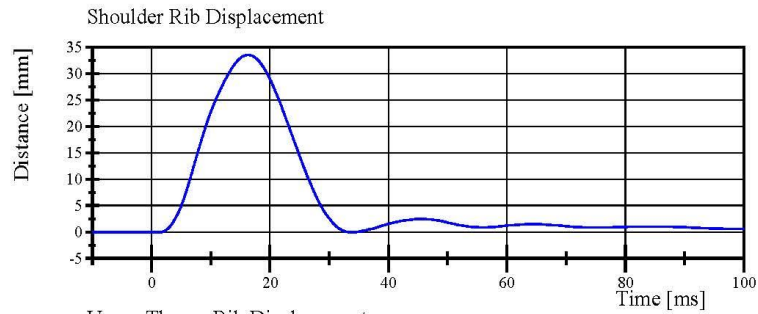
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

05.12.2018 12:48:30 588



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 66-1
Test Date: 5/12/2018



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

05.12.2018 12:48:31 588



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 66-1
Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.350 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.7 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.2 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	39.5 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	35.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.4 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	8.7 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Thorax Rib S/N: RS506

Middle Thorax Rib S/N: RS506

Lower Thorax Rib S/N: RS506

Upper Thorax Pad S/N: 180-3451

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

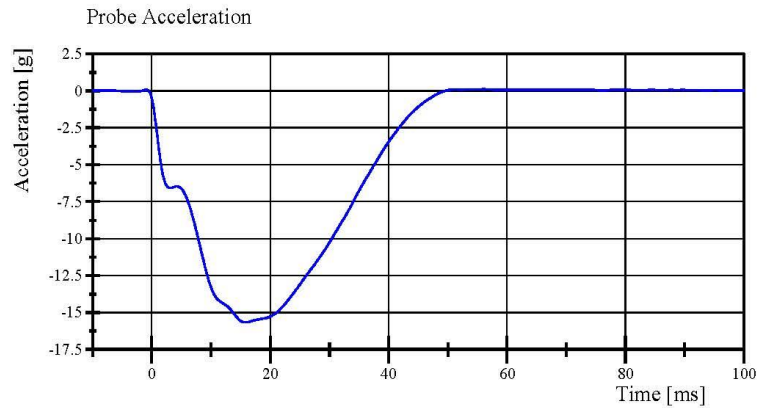
Page 20 of 31

05.12.2018 12:16:13 809

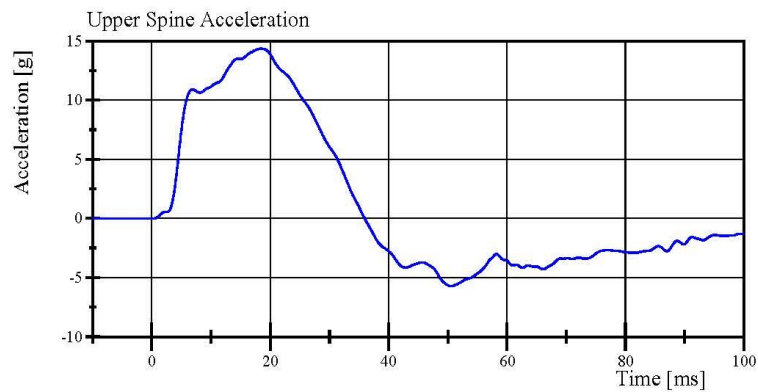


Transportation Research Center Inc.

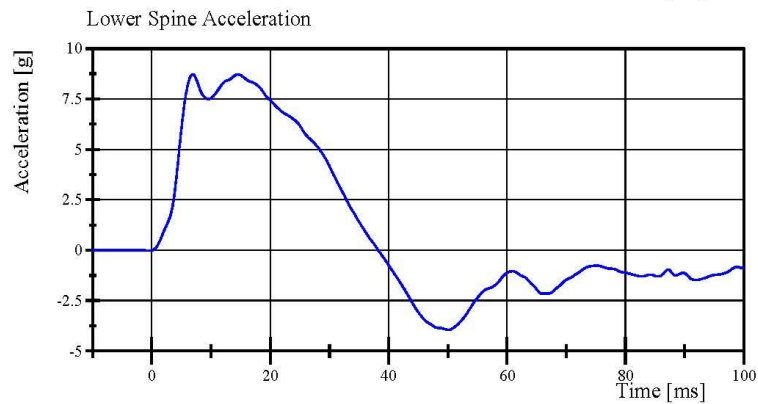
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 66-1
Test Date: 5/12/2018



Filter Class: CFC_180
Max: 0.1 g at 56.1 ms
Min: -15.7 g at 15.8 ms



Filter Class: CFC_180
Max: 14.4 g at 18.4 ms
Min: -5.7 g at 50.5 ms



Filter Class: CFC_180
Max: 8.7 g at 14.6 ms
Min: -3.9 g at 50.1 ms

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

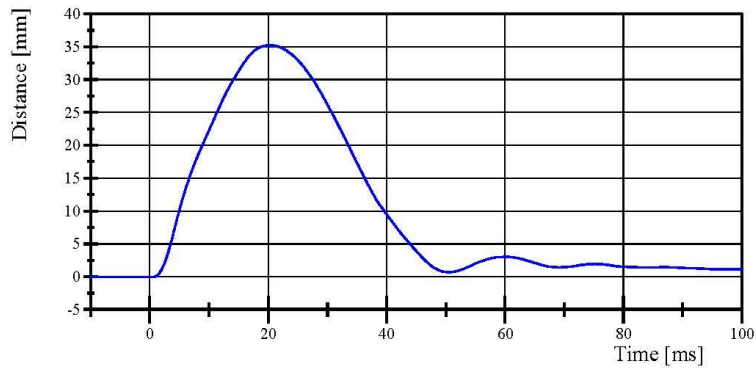
05.12.2018 12:17:18 809



Transportation Research Center Inc.

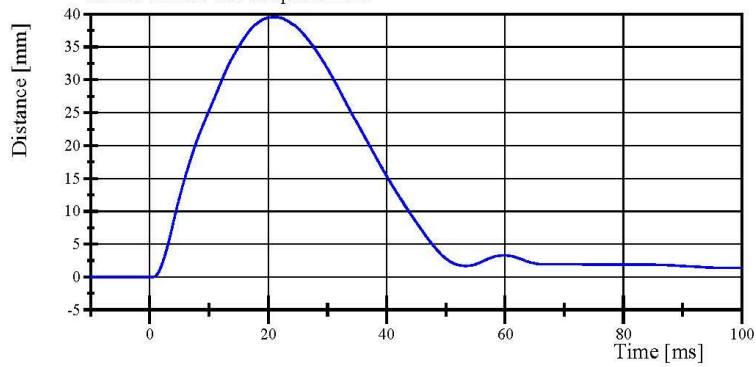
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 66-1
Test Date: 5/12/2018

Upper Thorax Rib Displacement



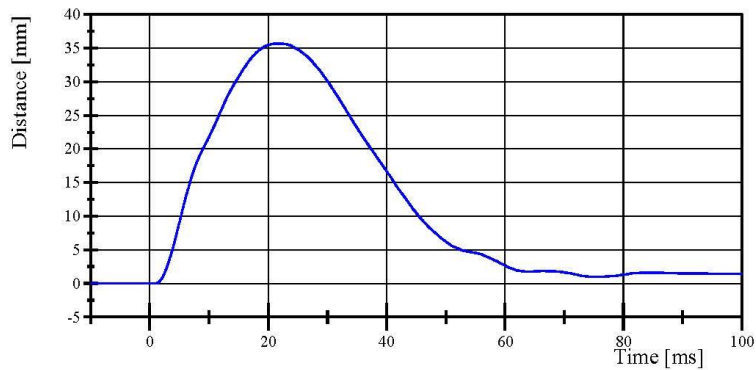
Filter Class: CFC_600
Max: 35.2 mm at 20.2 ms
Min: -0.0 mm at 0.6 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 39.5 mm at 21.0 ms
Min: -0.0 mm at -5.0 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 35.7 mm at 21.9 ms
Min: -0.0 mm at 0.6 ms

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

Page 22 of 31

05.12.2018 12:17:20 809



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 66-1

Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-12.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	42.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	43.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.63 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: RS564

Lower Abdominal Rib S/N: DS1234

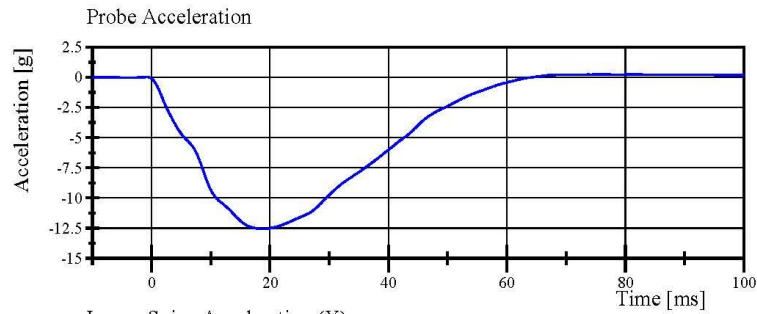
Abdominal Pad S/N: 180-3452

Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 66-1

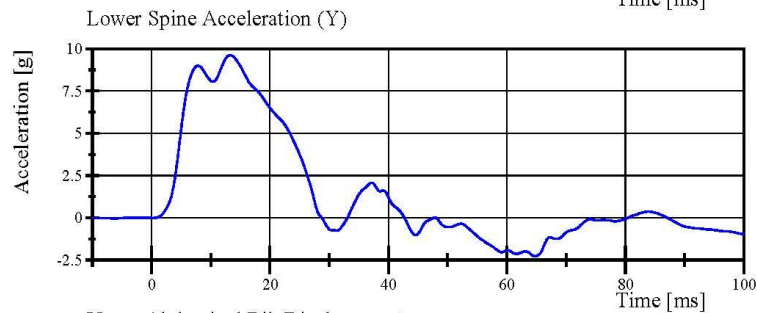
Test Date: 5/12/2018



Filter Class: CFC_180

Max: 0.3 g at 80.8 ms

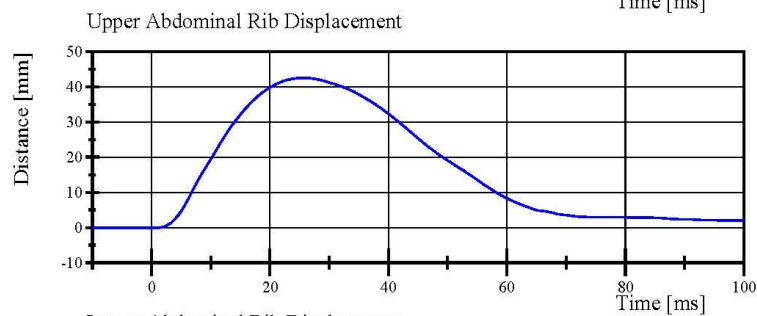
Min: -12.5 g at 19.0 ms



Filter Class: CFC_180

Max: 9.6 g at 13.3 ms

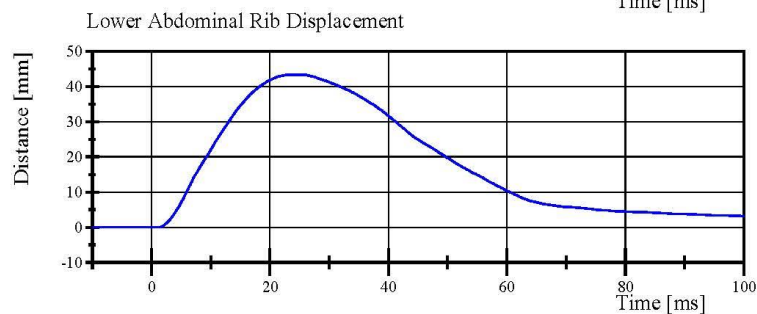
Min: -2.3 g at 64.7 ms



Filter Class: CFC_600

Max: 42.5 mm at 25.6 ms

Min: -0.0 mm at 0.6 ms



Filter Class: CFC_600

Max: 43.4 mm at 24.7 ms

Min: -0.0 mm at 0.9 ms

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

05.12.2018 13:21:26 675



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 66-1

Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-41.10 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	36.6 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,685.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 884

Pelvis Plug Info:

Manufacturer: SACO

S/N: 11421

Cal Date: 20160829

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

Page 27 of 31

05.12.2018 13:33:39 382

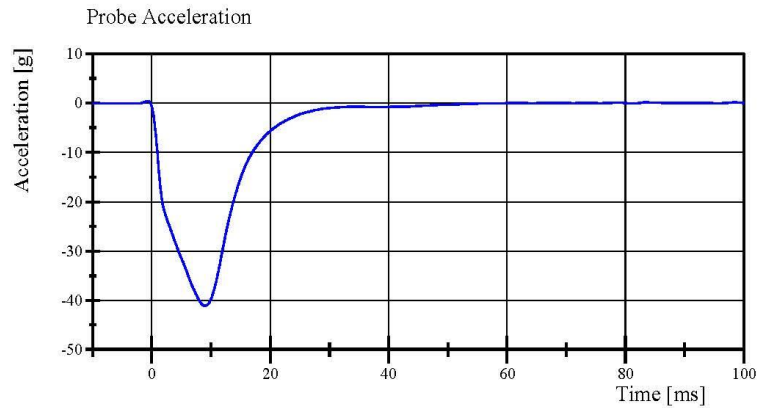


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 66-1

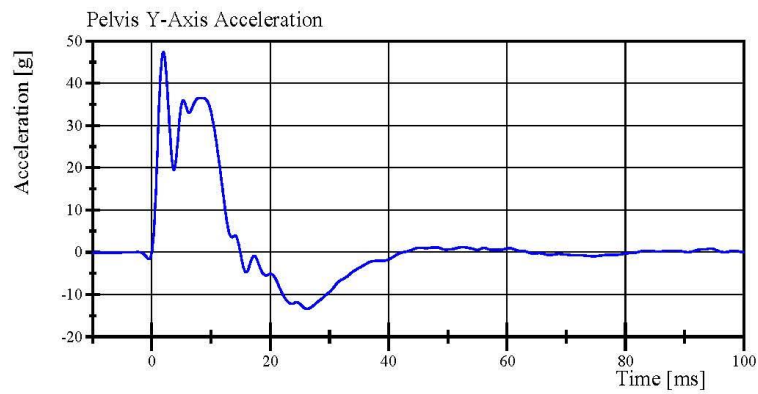
Test Date: 5/12/2018



Filter Class: CFC_180

Max: 0.4 g at -0.7 ms

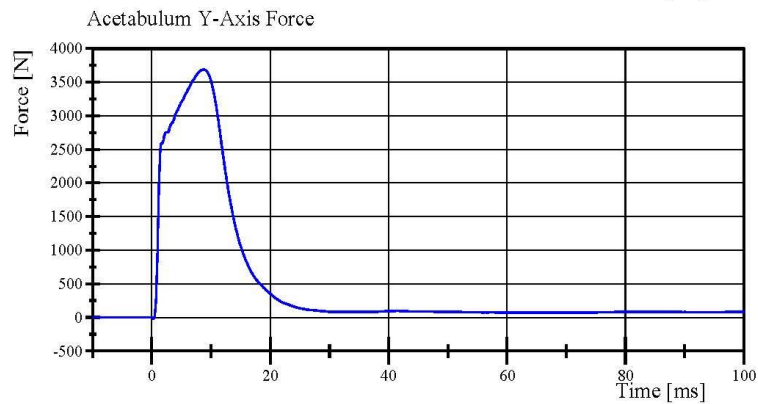
Min: -41.1 g at 9.0 ms



Filter Class: CFC_180

Max: 47.4 g at 2.0 ms

Min: -13.4 g at 26.2 ms



Filter Class: CFC_600

Max: 3,685.8 N at 8.7 ms

Min: -17.6 N at 0.3 ms

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

05.12.2018 13:34:56 382



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 66-2

Test Date: 5/12/2018

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-36.8 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	30.6 g	Yes
Iliac Force	4,100 - 5,100 N	4,397.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

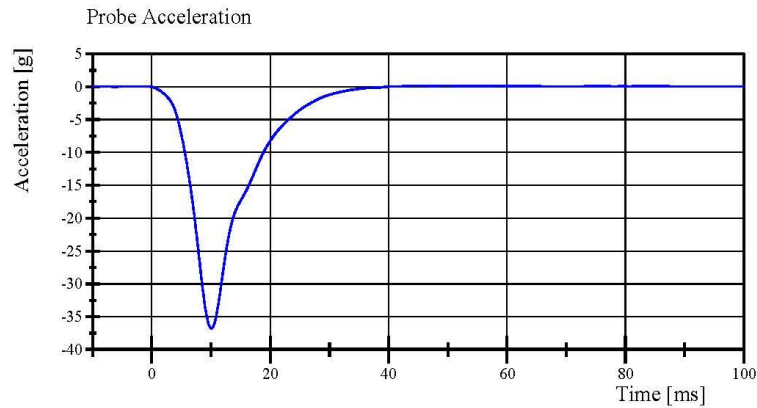
Pelvis Skin S/N: 884

Transportation Research Center Inc.

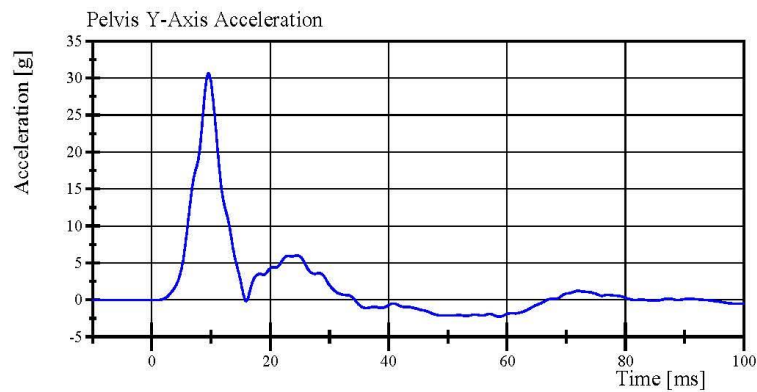
Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 66-2

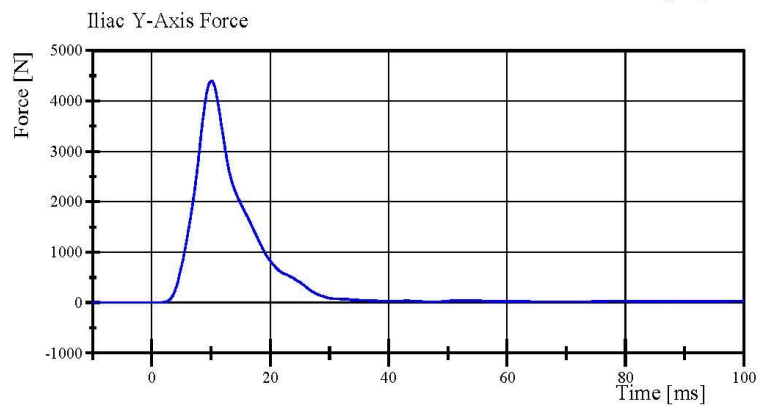
Test Date: 5/12/2018



Filter Class: CFC_180
Max: 0.2 g at 44.4 ms
Min: -36.8 g at 10.1 ms



Filter Class: CFC_180
Max: 30.6 g at 9.6 ms
Min: -2.3 g at 58.6 ms



Filter Class: CFC_600
Max: 4,397.8 N at 10.1 ms
Min: -0.8 N at -0.5 ms

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

05.12.2018 10:32:55 642



Page 26 of 31

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	12-Apr-2018
	Y		P66873	Endevco	12-Apr-2018
	Z		P91950	Endevco	12-Apr-2018
Redundant Head Accelerometers	X		P94566	Endevco	12-Apr-2018
	Y		P83368	Endevco	12-Apr-2018
	Z		P94483	Endevco	12-Apr-2018
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	11-Apr-2018
	Middle	Y	174	FTSS	11-Apr-2018
	Lower	Y	173	FTSS	11-Apr-2018
Abdomen Load Cells	Front	Y	1441	Denton	11-Apr-2018
	Middle	Y	1436	Denton	11-Apr-2018
	Rear	Y	1437	Denton	11-Apr-2018
Lower Spine Accelerometers (T12)	X		P89126	Endevco	12-Apr-2018
	Y		P87139	Endevco	12-Apr-2018
	Z		P64884	Endevco	12-Apr-2018
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	11-Apr-2018

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	T11432	Endevco	17-Apr-2018
				Y	P93774	Endevco	17-Apr-2018
				Z	P91566	Endevco	17-Apr-2018
Redundant Head Accelerometers				X	P91615	Endevco	17-Apr-2018
				Y	P93762	Endevco	17-Apr-2018
				Z	P93761	Endevco	17-Apr-2018
Displacement Potentiometers	Shoulder			N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	17-Apr-2018	
		Middle	Y	037	Servo	17-Apr-2018	
		Lower	Y	1161	Servo	17-Apr-2018	
	Abdominal Rib	Upper	Y	1295	Servo	17-Apr-2018	
		Lower	Y	1136	Servo	17-Apr-2018	
Lower Spine Accelerometers (T12)				X	P94545	Endevco	17-Apr-2018
				Y	P94647	Endevco	17-Apr-2018
				Z	P94530	Endevco	17-Apr-2018
Acetabulum Load Cell				Y	DK7483S-FY	FTSS	16-Apr-2018
Iliac Wing Load Cell				Y	287-FY	Denton	16-Apr-2018
Pelvis Plug (struck side)					11457	SACO	31-Aug-2016
Pelvis Plug (non-struck side)					36473	FTSS	23-Jul-2010

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P94577	Endevco	13-Nov-2017
	Vehicle Center of Gravity	Y	P75115	Endevco	14-Nov-2017
	Vehicle Center of Gravity	Z	P41055	Endevco	13-Nov-2017
2	Right Sill at Front Seat	X	P97719	Endevco	23-Apr-2018
	Right Sill at Front Seat	Y	P94740	Endevco	23-Apr-2018
	Right Sill at Front Seat	Z	P88043	Endevco	23-Apr-2018
3	Right Sill at Rear Seat	X	P76454	Endevco	14-Nov-2017
	Right Sill at Rear Seat	Y	P58611	Endevco	14-Nov-2017
	Right Sill at Rear Seat	Z	P61295	Endevco	14-Nov-2017
4	Left Sill at Front Door	Y	P94567	Endevco	13-Apr-2018
5	Left Sill at Rear Door	Y	P80466	Endevco	13-Mar-2018
6	Left A-Post Lower	Y	P81599	Endevco	13-Nov-2017
7	Left A-Post Middle	Y	P73587	Endevco	13-Apr-2018
8	Left B-Post Lower	Y	P87981	Endevco	13-Apr-2018
9	B-Post Middle	Y	P75506	Endevco	13-Apr-2018
10	Front Seat Track	Y	P94561	Endevco	13-Apr-2018
11	Rear Seat Track or Structure	Y	T10651	Endevco	9-May-2018
12	Right Rear Occupant Compartment	Y	T10655	Endevco	9-May-2018
13	Engine Block	X	T10650	Endevco	9-May-2018
	Engine Block	Y	T10668	Endevco	9-May-2018
14	Rear Floorpan Above Axle	X	P97718	Endevco	11-Apr-2018
	Rear Floorpan Above Axle	Y	P94485	Endevco	13-Nov-2017
	Rear Floorpan Above Axle	Z	P56615	Endevco	13-Apr-2018

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P97724	Endevco	11-Apr-2018
MDB Center of Gravity	Y	P97718	Endevco	11-Apr-2018
MDB Center of Gravity	Z	P97715	Endevco	11-Apr-2018
Left Frame Rail at Rear Axle Centerline	X	P97729	Endevco	11-Apr-2018
Left Frame Rail at Rear Axle Centerline	Y	P97876	Endevco	11-Apr-2018