

FINAL REPORT NUMBER: SINCAP-TRC-20-003

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

**FCA ITALY S.P.A.
2020 Jeep Renegade SUV
NHTSA NUMBER: M20200309**

**PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
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Report Date: March 2, 2020

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: March 2, 2020

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 2020 Jeep Renegade SUV, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on December 10, 2019. The impact velocity of the Moving Deformable Barrier (MDB) was 62.20 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 20.8° C. The target vehicle post-test maximum crush was 232 mm at Level 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>161</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>25.0</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>714.6</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>-1460.0</td> </tr> <tr> <td>Lower Spine Acceleration</td> <td>G</td> <td>82*</td> <td>32.7</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>286</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>g's</td> <td>82</td> <td>72.8</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>5147.1</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>28.8</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>51.5¹</td> </tr> </tbody> </table> * Proposed IARV				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	161	Maximum Thoracic Rib Deflection	mm	44	25.0	Total Abdominal Force	N	2500	714.6	Pubic Symphysis Force	N	6000	-1460.0	Lower Spine Acceleration	G	82*	32.7	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	286	Lower Spine Resultant Acceleration	g's	82	72.8	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	5147.1	Maximum Thoracic Rib Deflection	mm	38*	28.8	Maximum Abdominal Rib Deflection	mm	45*	51.5 ¹
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¹ Exceeded 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.																																																											
17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																									
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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2020 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 2020 Jeep Renegade SUV. 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 2020 Jeep Renegade SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.20 km/h (38.65 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 December 10, 2019. 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	161
Maximum Thoracic Rib Deflection	mm	44	25.0
Combined Abdominal Force	N	2500	714.6
Pubic Symphysis Force	N	6000	-1460.0
Lower Spine (T12) Resultant Acceleration	G	82*	32.7

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	286
Lower Spine (T12) Resultant Acceleration	G	82	72.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	5147.1
Maximum Thoracic Rib Deflection	mm	38*	28.8
Maximum Abdominal Rib Deflection	mm	45*	51.5

* 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 the driver ATD were within the established performance thresholds. The passenger ATD Maximum Abdominal Rib Deflection exceeded established performance thresholds.

Left Lower A-Post Acceleration (Y); Failed after 11.0 ms

Left Middle A-Post Acceleration (Y); Failed after 11.0 ms

Left Lower B-Post Acceleration (Y); Failed after 6.0 ms

Left Middle B-Post Acceleration (Y); Failed after 28.0 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20200309
Model Year	2020
Make	Jeep
Model	Renegade
Body Style	MPV
VIN	ZACNJAB13LPK99039
Body Color	Glacier Metallic
Odometer Reading (km/mi)	175 mi
Engine Displacement (L)	1.3
Type/No. Cylinders	Inline/4
Engine Placement	Front Transverse
Transmission Type	Automatic
Transmission Speeds	9
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Driver Only
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?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	FCA ITALY S.P.A.
Date of Manufacture	09/19
Vehicle Type	MPV

GVWR (kg)	1945
GAWR Front (kg)	1050
GAWR Rear (kg)	960

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				390.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				49.8

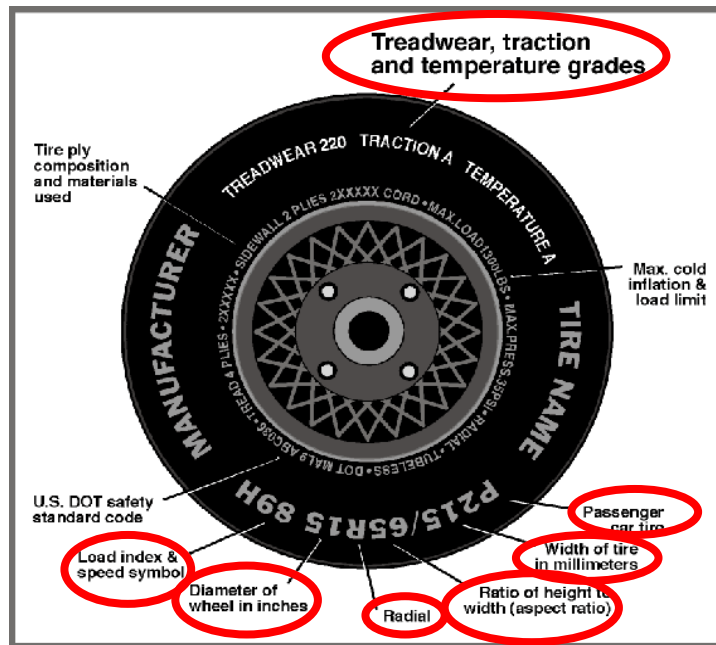
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	215/60R17	215/60R17
Tire Size on Vehicle	215/60R17	215/60R17
Tire Manufacturer	Dunlop	Dunlop
Tire Model	Signature II	Signature II
Treadwear	620	620
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1	1
Tire Plies Body	3	3
Load Index/Speed Symbol	96T	96T
Tire Material	Polyester/Steel	Polyester/Steel
DOT Safety Code Left	M6KT JR1R 4818	M6KT JR1R 4818
DOT Safety Code Right	M6KT JR1R 4218	M6KT JR1R 4218

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

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

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	467.8	282.6		508.0	351.6		511.8	355.6	
Right	kg	435.6	268.6		435.6	327.0		439.0	322.2	
Ratio	%	62.1	37.9		58.2	41.8		58.4	41.6	
Totals	kg	903.4	551.2	1454.6	943.6	678.6	1622.2	950.8	677.8	1628.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1454.6	(A)
Actual Weight of 1 P572V ATD (SID-ILs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW) ¹	kg	49.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1629.4	(A+B+C)

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

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	758	752	Yes
RF	mm	763	763	Yes
RR	mm	762	755	Yes
LR	mm	740	741	Yes
Vehicle CG (Aft of Front Axle)	mm	1072	1077	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+36	+33	

***The "As Tested" vehicle attitude measurements must be equal to or within ± 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirement".

Test height adjustable suspension setting, if applicable:

N/A

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: None	0.0
Removed: Front fascia, grill, head lights, tail lights, right rear door window motor & speaker.	23.2

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

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

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	23.1	13.1	18.1
Front Passenger Seat	N/A	N/A	16.5
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	9.5
Non-Struck Side Rear Seat	N/A	N/A	9.5
Rear Center Seat*	N/A	N/A	8.9

* 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	18.1	176	Max	228	232	236
			Mid	200	204	208
			Min	172	176	180
Front Passenger Seat	16.5	190	Max	N/A	N/A	N/A
			Mid	184	190	196
			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	9.5	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	9.5	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	8.9	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

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

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

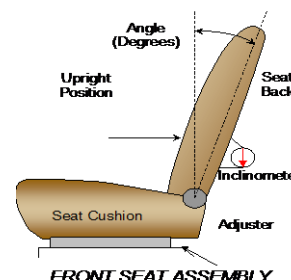
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	225	N/A	113	N/A
Front Passenger Seat	250	26	130	13
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	N/A	Fixed
Non-Struck Side Rear Seat	Fixed	N/A	N/A	Fixed
Rear Center Seat*	Fixed	N/A	N/A	Fixed

* 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	84.1	N/A	1.0	N/A
Front Passenger Seat	81.5	57	1.3	1
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	0	N/A	23.2	Fixed
Non-Struck Side Rear Seat	0	N/A	23.2	Fixed
Rear Center Seat*	0	N/A	19.7	Fixed

* 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	5	1 (25 mm from full up)
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4	4 (Uppermost)
Rear Seat	2	1 (Lowermost)

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

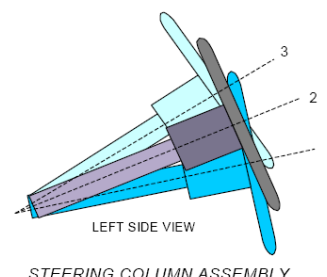
Test Vehicle: 2020 Jeep Renegade SUV
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STEERING COLUMN ADJUSTMENT

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.

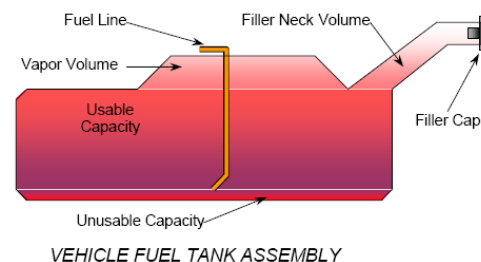
	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	24.3	0
Geometric Center, Position No. 2	26.7	25
Uppermost, Position No. 3	29.1	50
Telescoping Steering Wheel Travel		50
Test Position	26.7	25



FUEL PUMP

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

The fuel pump starts pumping fuel when the key is in "key on"



FUEL TANK CAPACITY

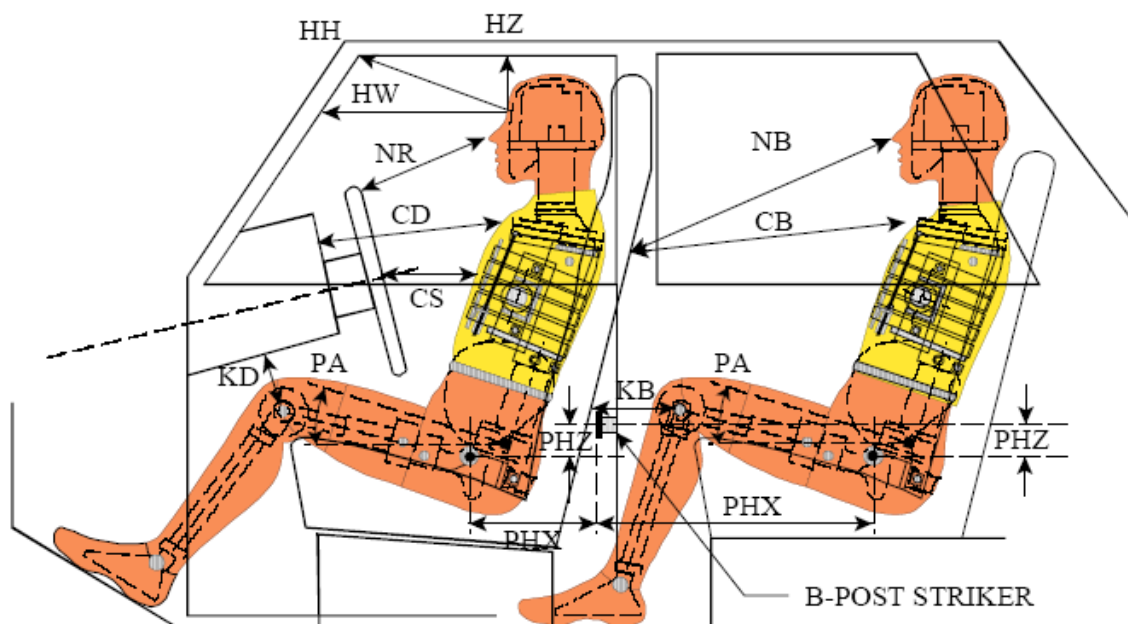
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	48.1
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	48.1
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	44.7
Actual Amount of Solvent Used in Test	44.7
1/3 of Usable Capacity	16.0

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: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



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

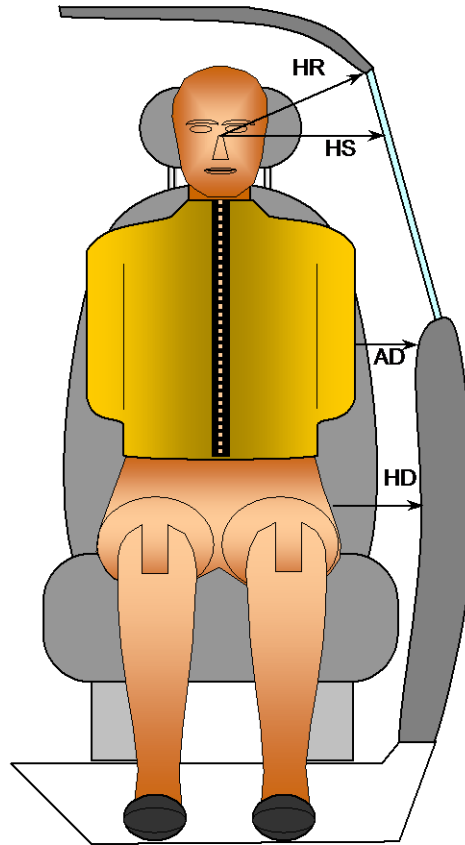
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	601			
HW		Header to Windshield	820			
HZ	HZ	Head to Roof Liner	269		331	
NR	NB	Nose to Rim/Seat Back	447		533	
CD	CB	Chest to Dash/Seat Back	623		485	
CS		Chest to Steering Wheel	391			
KD(L)/KDA(L) ⁰	KB(L)/KBA(L) ⁰	Left Knee to Dash/Seat Back	210	23.4	209	0.0
KD(R)/KDA(R) ⁰	KB(R)/KBA(R) ⁰	Right Knee to Dash/Seat Back	205	17.2	197	0.0
PAX ⁰	PAX ⁰	Pelvic Tilt Angle X		0.3		0.0
	PAY ⁰	Pelvic Tilt Angle Y				19.6
PHX	PHX	Hip Point to Striker (X-Axis)	112		202	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	137		206	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



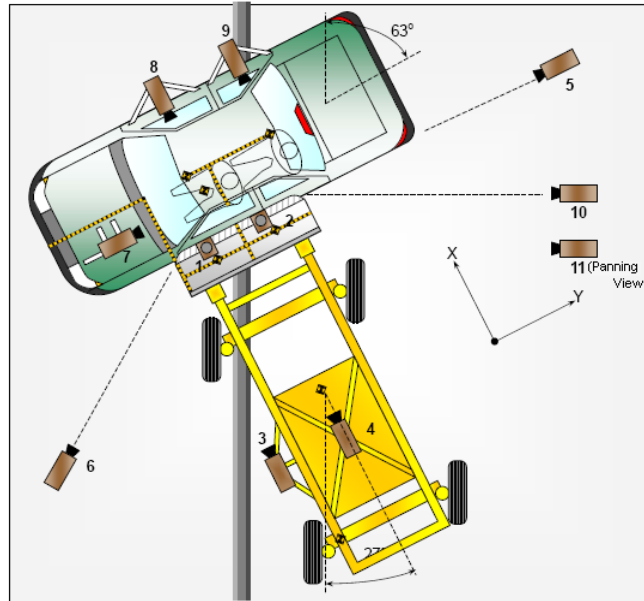
FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	271	313
HS	Head to Side Window	mm	398	409
AD	Arm to Door	mm	111	167
HD	H-Point to Door	mm	161	158

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	-160	1150	-5692	12.5	1000
2	Overhead Close-up	0	770	-5692	28	1000
3	Left Impact Point (MDB)	-1811	890	-860	25	1000
4	Side Overall (MDB)	-2420	0	-1471	12.5	1000
5	Rear	0	5910	-1533	20	1000
6	Left Front	-2090	-5270	-1730	20	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				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

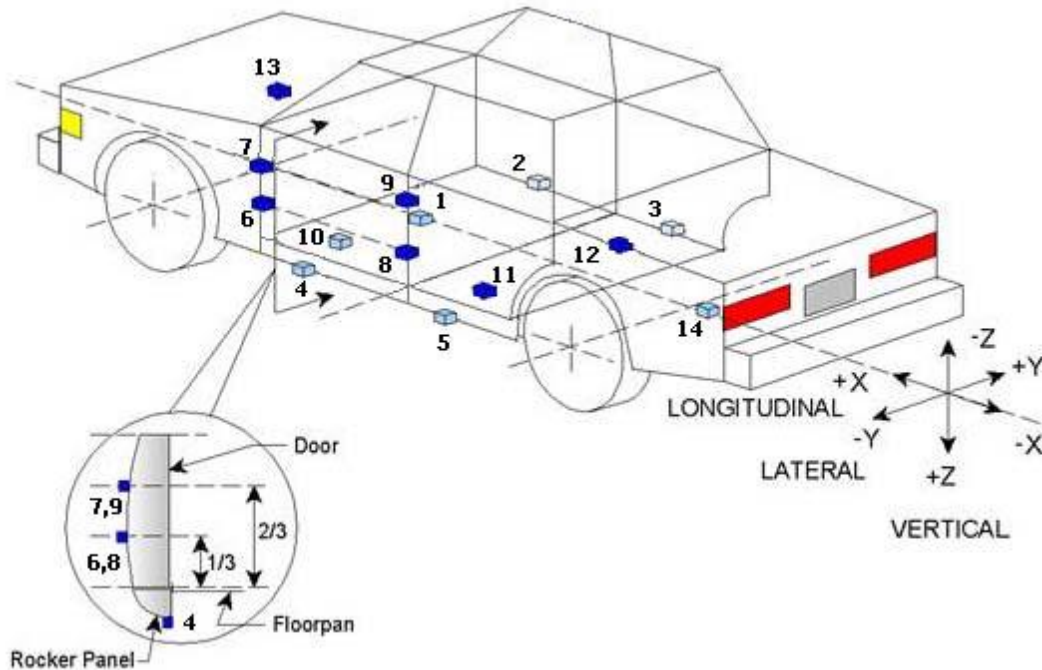
INSTRUMENTATION

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: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



TEST VEHICLE ACCELEROMETER LOCATIONS

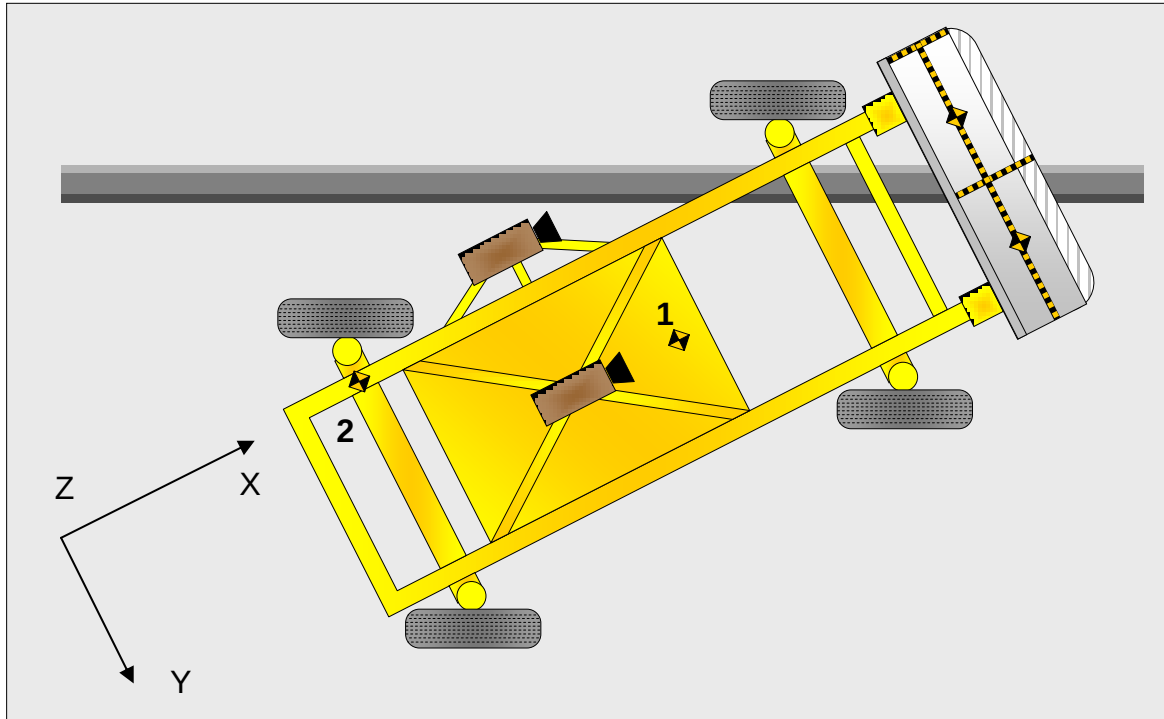
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2517	92	-395
2	Right Sill at Front Seat	2505	710	-400
3	Right Sill at Rear Seat	1695	700	-400
4	Left Sill at Front Door	2495	-710	-397
5	Left Sill at Rear Door	1585	-700	-385
6	A-Post Lower	2840	-822	-555
7	A-Post Middle	2860	-837	-898
8	B-Post Lower	1850	-800	-264
9	B-Post Middle	1814	-795	-989
10	Front Seat Track	2100	-525	-385
11	Rear Seat Structure	1198	-650	-490
12	Right Rear Occ. Compartment	1210	650	-478
13	Engine Block	3692	0	-700
14	Rear Above Axle	642	0	-375

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: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



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: 2020 Jeep Renegade SUV
Test Program: SINCAP Side Impact

NHTSA No.: M20200309
Test Date: 12/10/2019

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	SAB	Door panel
Upper Torso	Seatback bolster, SAB	Door panel
Lower Torso	Seatback bolster, SAB	Door panel
Left Hip	SAB	Seat cushion bolster, door panel
Left Knee	Door panel	Door panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	Rear passenger window broken out
Other Notable Effects	Left front tire flat

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

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		2575
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		348
Actual Impact Point (Aft of Front Axle)	mm		349
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-1
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-3

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2020 Jeep Renegade SUV
Test Program: SINCAP Side Impact

NHTSA No.: M20200309
Test Date: 12/10/2019

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	1101

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	392.8	284.2	677.0
Right	kg	390.8	294.4	685.2
Ratio	%	57.5	42.5	100.0
Totals	kg	783.6	578.6	1362.2

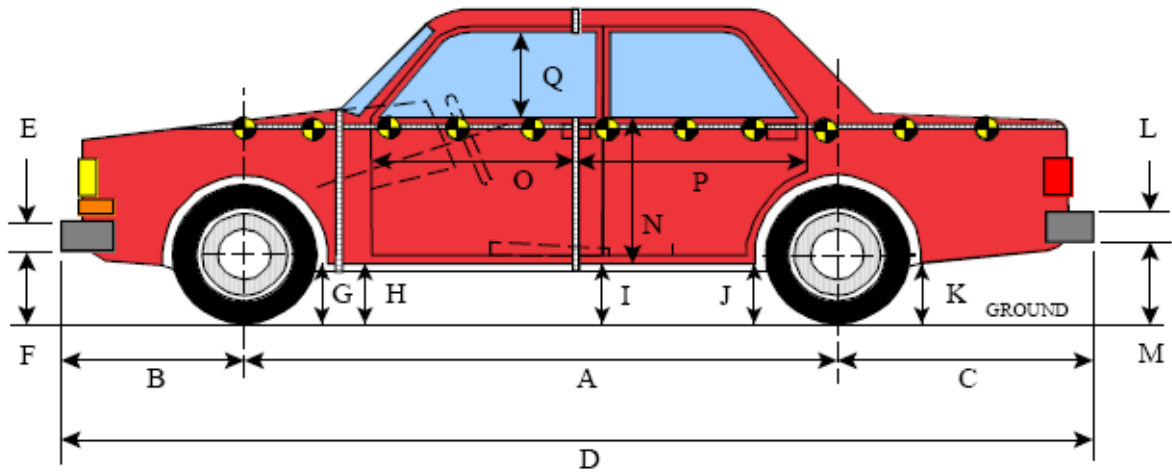
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.20
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.24
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: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



LEFT SIDE VIEW

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

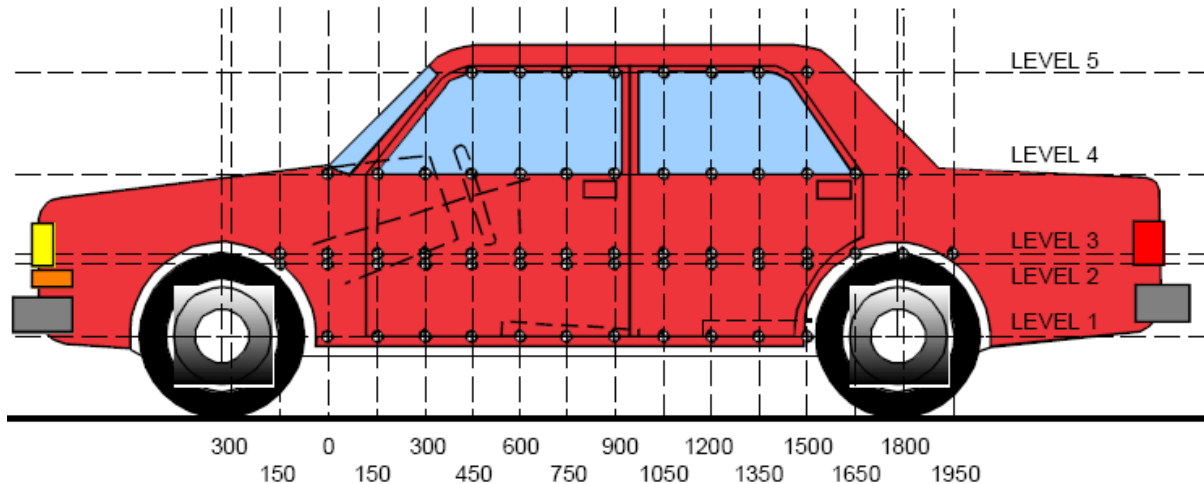
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2575	2570	5
B	Front Axle to Front Surface of Vehicle	865	865	0
C	Rear Axle to Rear Surface of Vehicle	790	790	0
D	Total Length at Centerline	4230	4256	-26
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	450	410	40
G	Sill Height at Front Wheel Well	420	390	30
H	Sill Height at Front Door Leading Edge	418	410	8
I	Sill Height at B-Pillar	472	460	12
J1	Sill Height at Rear Wheel Well	435	480	-45
J2	Pinch Weld Height at Rear Wheel Well	235	220	15
K	Sill Height Aft of Rear Wheel Well	400	402	-2
L	Rear Bumper Thickness	77	77	0
M	Rear Bumper Bottom to Ground	515	545	-30
N	Sill Height to Window Bottom Sill	800	720	80
O	Front Door Leading Edge to Impact CL	706	685	21
P	Rear Door Trailing Edge to Impact CL	1258	1170	88
Q	Front Window Opening	425	425	0
R	Right Side Length	3890	3905	-15
S	Left Side Length	3890	3905	-15
T	Vehicle Width	1805	1795	10

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	401	121	1200
2	Driver Hip Point	628	227	1650
3	Mid-Door	702	232	1650
4	Window Sill	1067	69	1200
5	Window Top	1573	9	1800
				1950

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: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

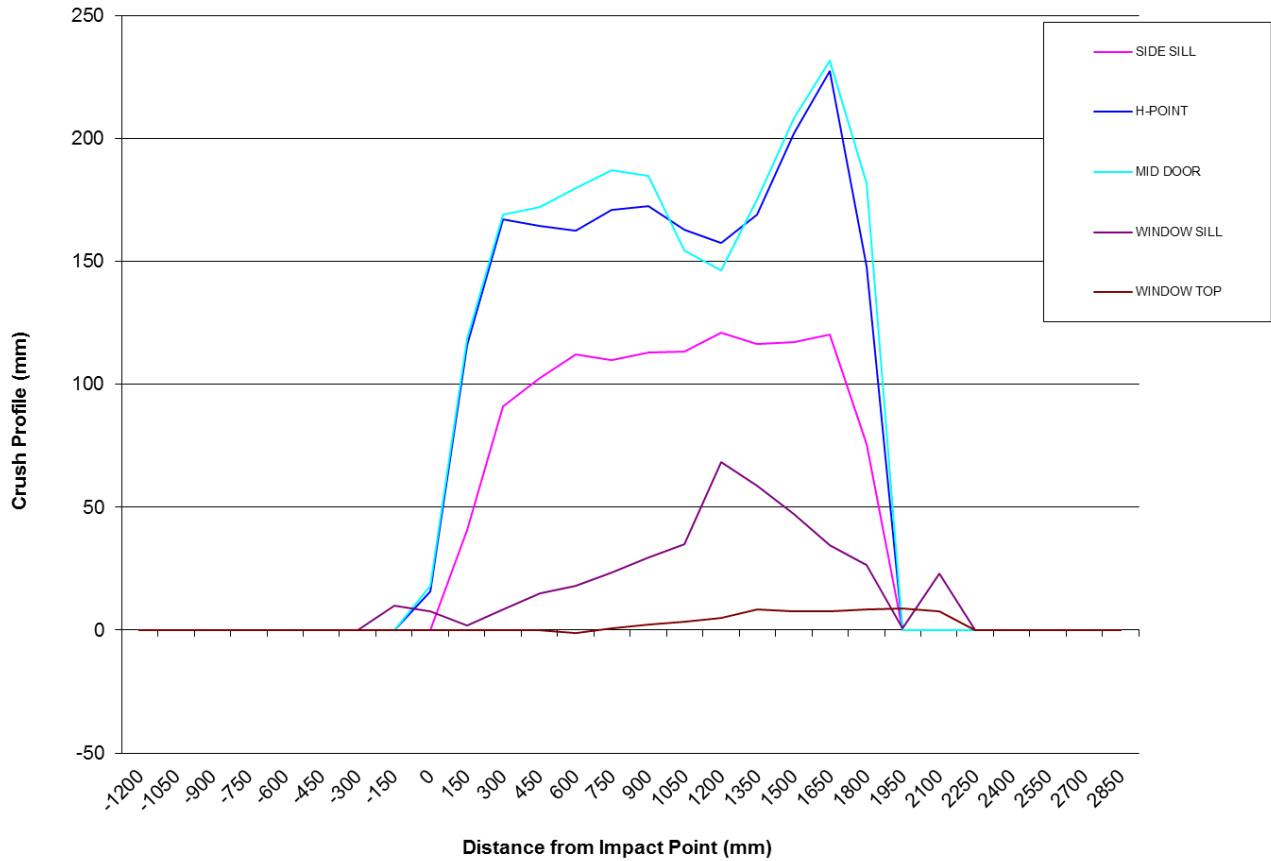
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-150	0	0	0	767	0	0	0	0	757	0	0	0	0	10	0
0	0	895	897	796	0	0	880	879	788	0	0	15	18	8	0
150	865	882	882	807	0	825	766	763	805	0	40	116	119	2	0
300	858	870	873	806	0	767	703	704	798	0	91	167	169	8	0
450	856	869	873	800	0	753	705	700	786	0	103	164	173	14	0
600	857	871	875	807	624	745	709	695	789	625	112	162	180	18	-1
750	859	873	876	814	647	749	702	689	790	646	110	171	187	24	1
900	860	874	877	821	657	747	701	692	791	655	113	173	185	30	2
1050	861	874	878	825	662	747	711	723	790	658	114	163	155	35	4
1200	859	872	876	829	665	738	715	730	760	660	121	157	146	69	5
1350	857	871	875	833	666	741	702	699	774	658	116	169	176	59	8
1500	860	872	875	833	666	743	670	667	786	659	117	202	208	47	7
1650	875	880	881	833	665	755	653	649	798	657	120	227	232	35	8
1800	869	891	890	831	664	793	743	708	805	655	76	148	182	26	9
1950	0	0	0	830	660	0	0	0	829	651	0	0	0	1	9
2100	0	0	0	827	654	0	0	0	804	647	0	0	0	23	7

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: 2020 Jeep Renegade SUV
Test Program: SINCAP Side Impact

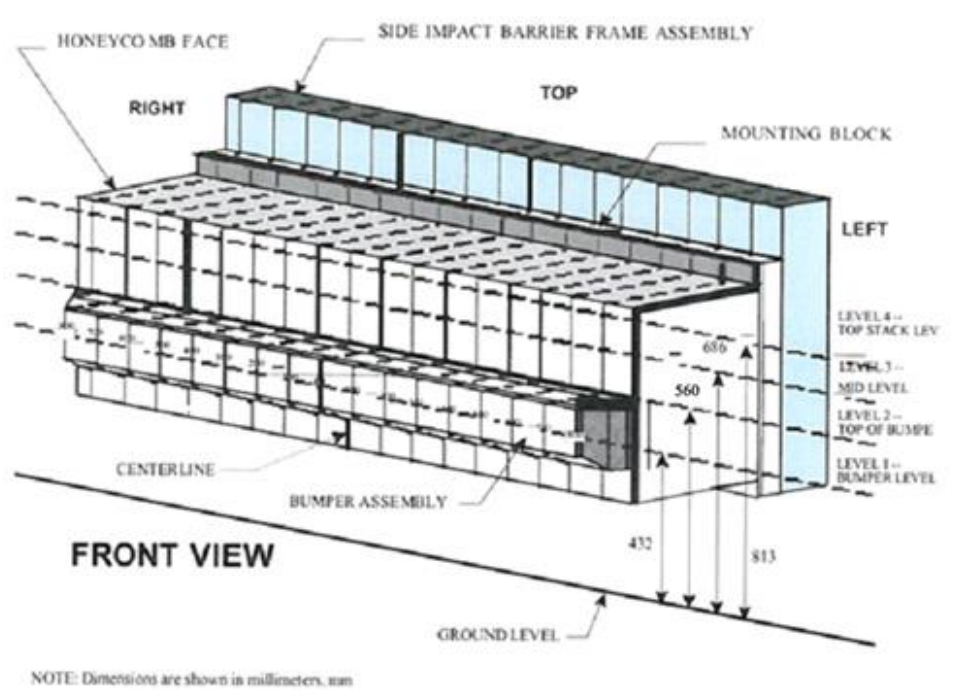
NHTSA No.: M20200309
Test Date: 12/10/2019



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	199
B	Top of Bumper	560	800	Left	127
C	Mid-Level	686	800	Left	121
D	Top of Stack	813	800	Left	160

DEFORMABLE BARRIER STATIC CRUSH

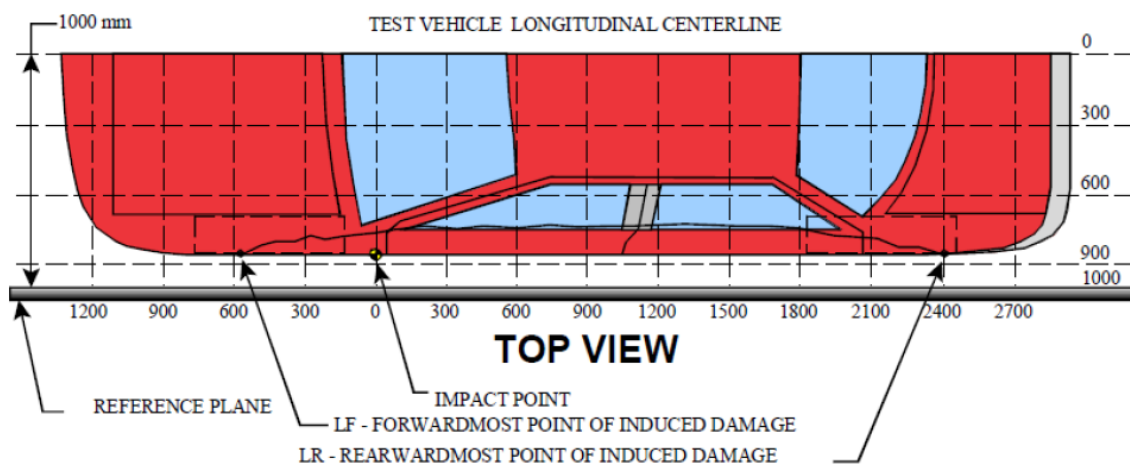
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	193	183	173	171	170	169	168	167	166	165	165	164	163	164	172	190	199
2	81	80	79	78	---	---	---	72	71	71	69	68	68	68	78	101	127
3	31	23	26	35	54	77	91	78	51	32	28	28	31	36	47	77	121
4	54	45	40	45	60	91	101	82	53	52	56	64	70	75	74	101	160

¹ Missing barrier points post test.

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	2100	4	804	827	23
2	1650	3	649	881	232
3	1200	2	715	872	157
4	750	3	689	876	187
5	300	3	704	873	169
6	-150	4	757	767	10

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	272	471	199
2	500 mm Left of Center	1	321	485	164
3	200 mm Left of Center	1	321	486	165
4	200 mm Right of Center	1	318	486	168
5	500 mm Right of Center	1	315	486	171
6	800 mm Right of Center	1	284	477	193

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

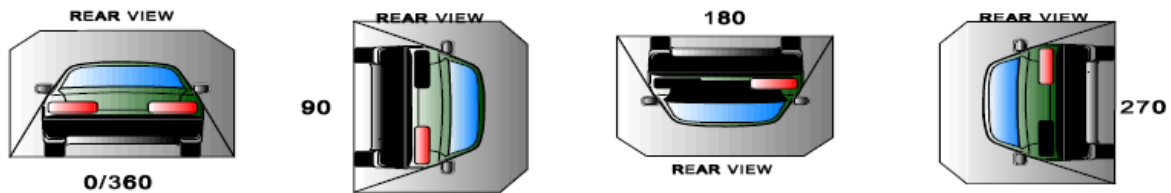
Test Vehicle: 2020 Jeep Renegade SUV
 Test Program: SINCAP Side Impact

NHTSA No.: M20200309
 Test Date: 12/10/2019

Test Time: 17:46 **Temperature:** 21.4°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

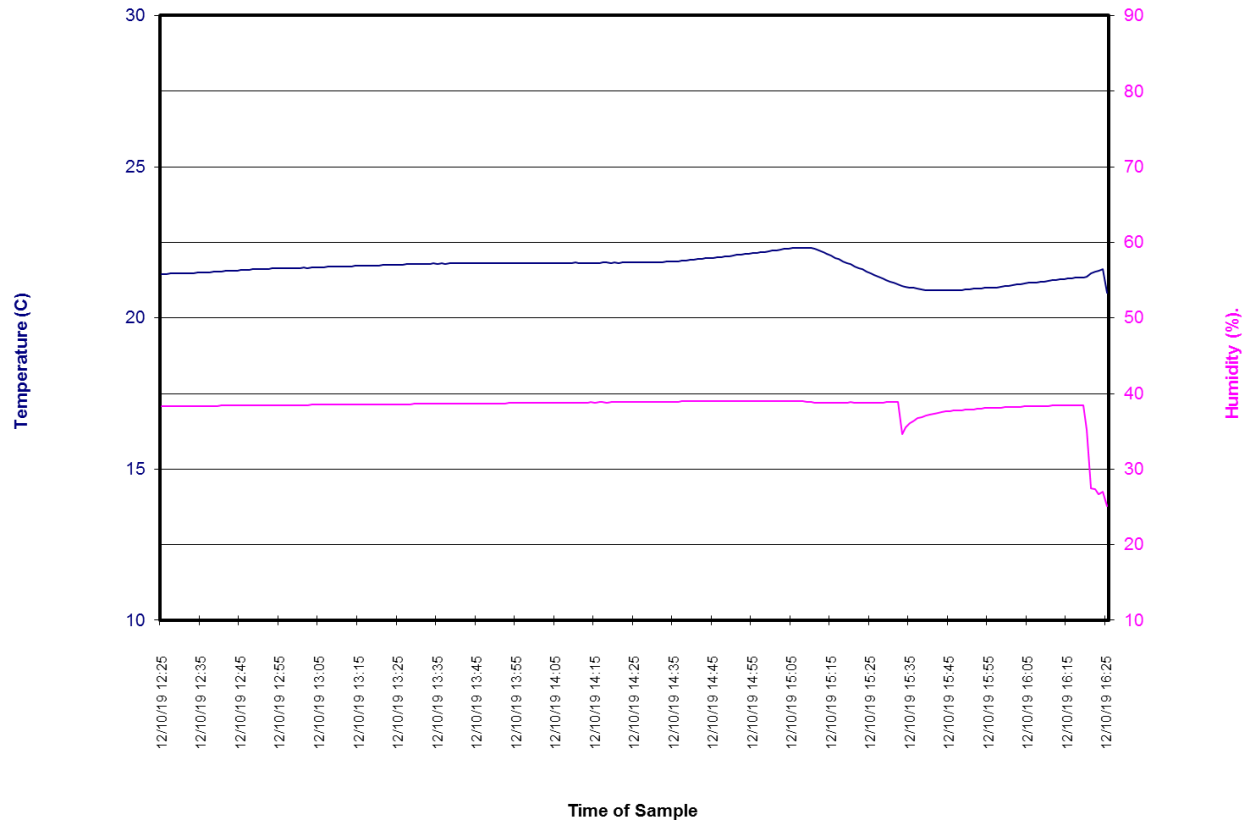
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

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

Test Vehicle: 2020 Jeep Renegade SUV
Test Program: SINCAP Side Impact

NHTSA No.: M20200309
Test Date: 12/10/2019

M20200309 Jeep Renegade SUV Left MDB Impact 191210: Test Time 16:25



APPENDIX A
PHOTOGRAPHS

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



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



003 Pre-Test Frontal View of Test Vehicle



004 Post-Test Frontal View of Test Vehicle



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



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



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



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



021 Pre-Test Left Front Door Latch Close-Up



022 Post-Test Left Front Door Latch Close-Up



023 Pre-Test Left Rear Door Latch Close-Up



024 Post-Test Left Rear Door Latch Close-Up



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



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



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

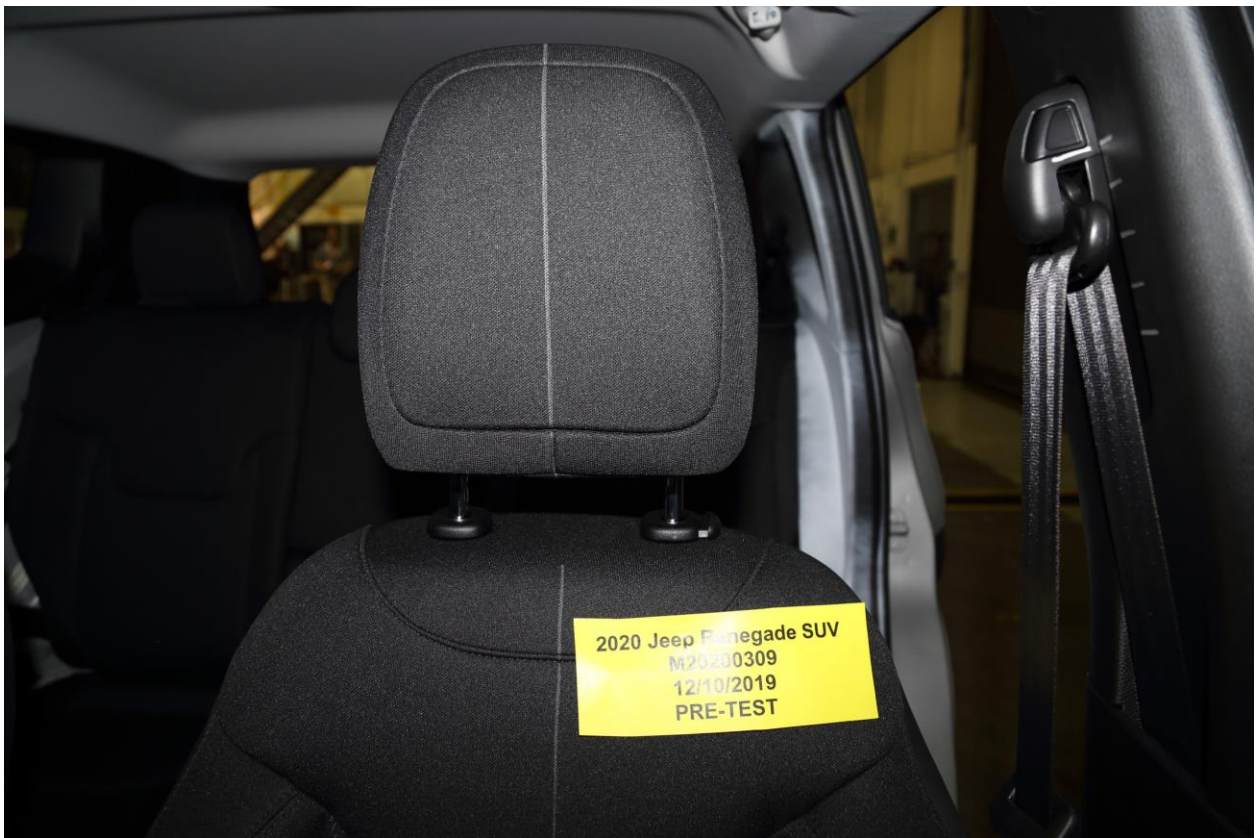
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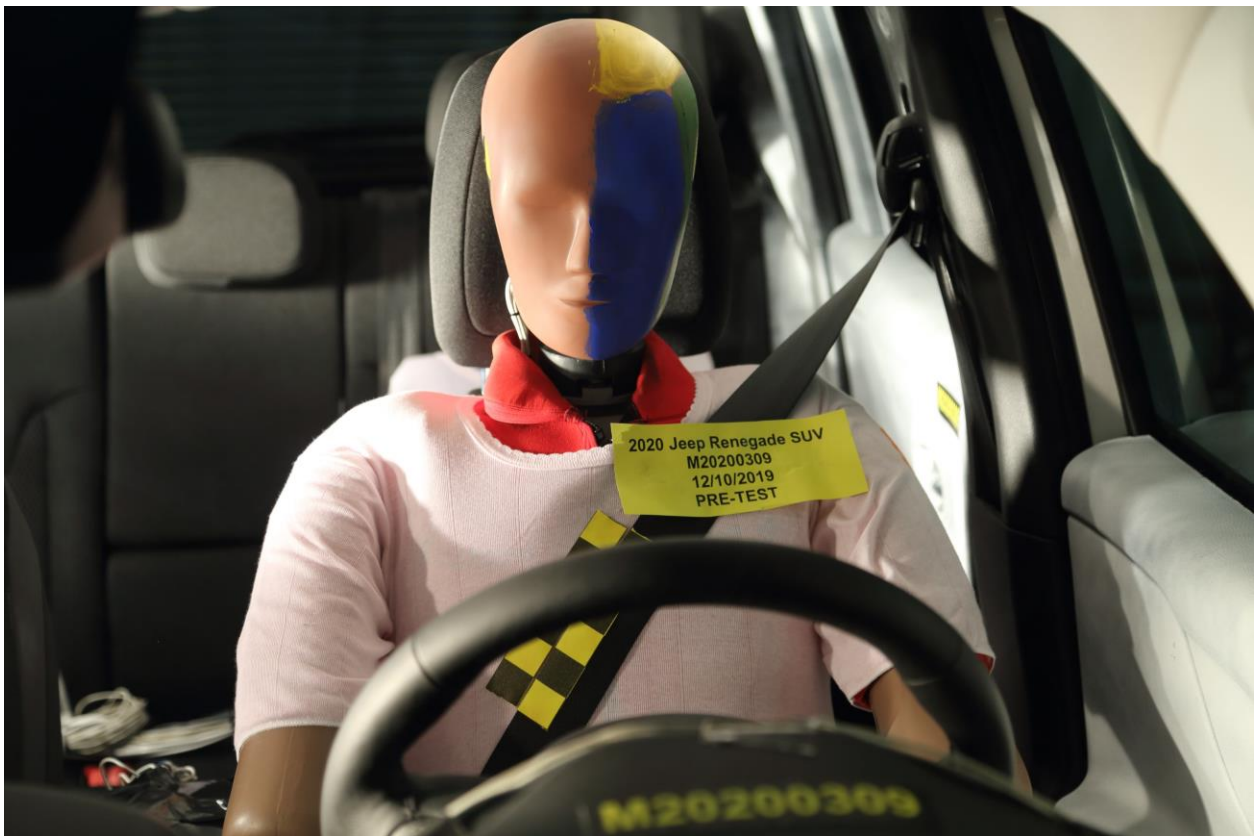
028 Pre-Test Left Side View of Driver Dummy Shoulder and Door Top



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



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



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



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



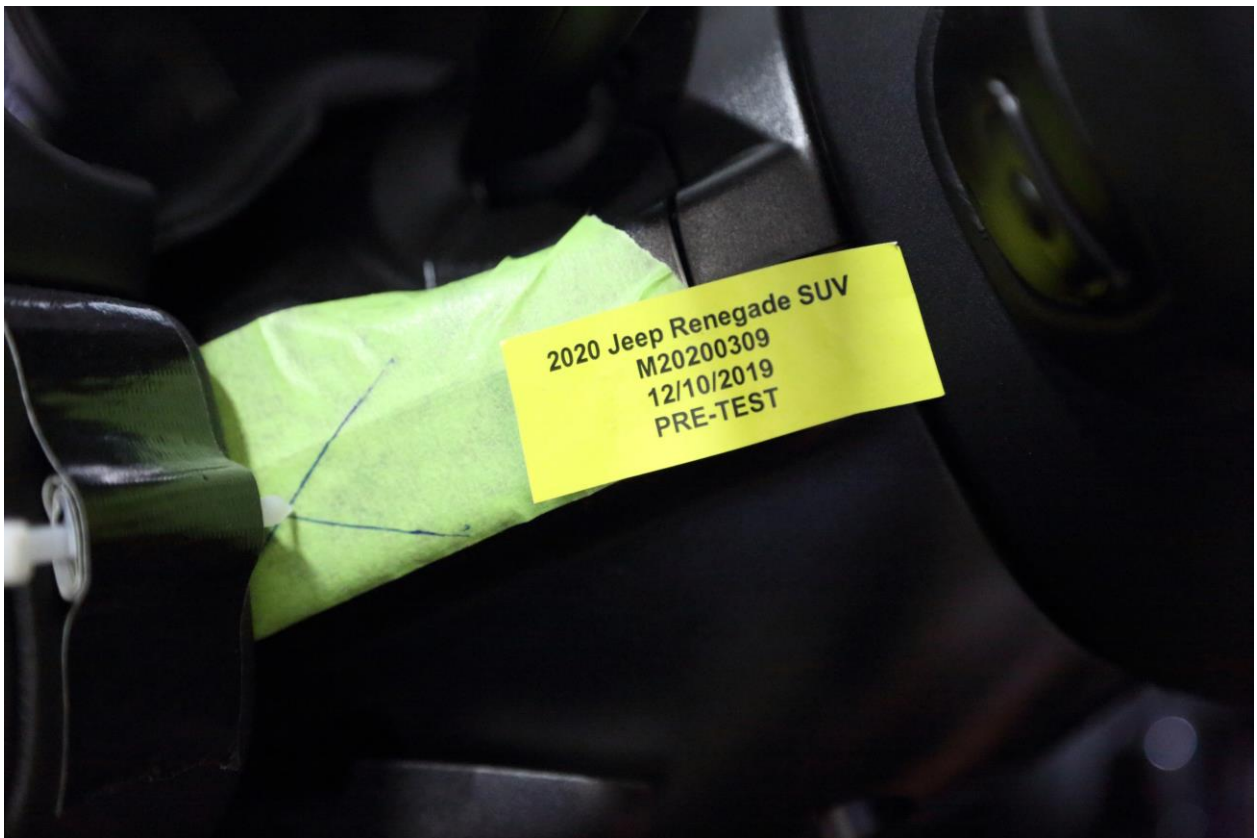
033 Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



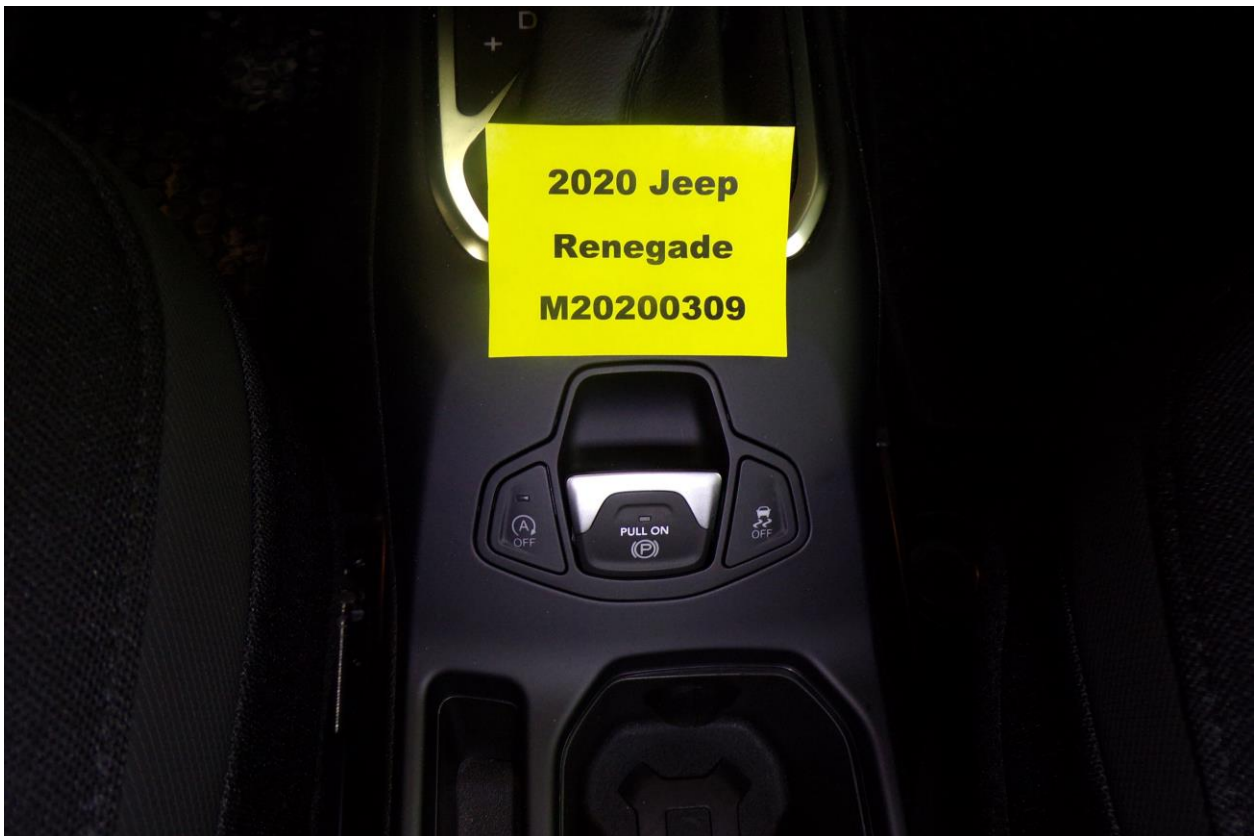
034 Pre-Test Placement of Driver's Dummy Feet



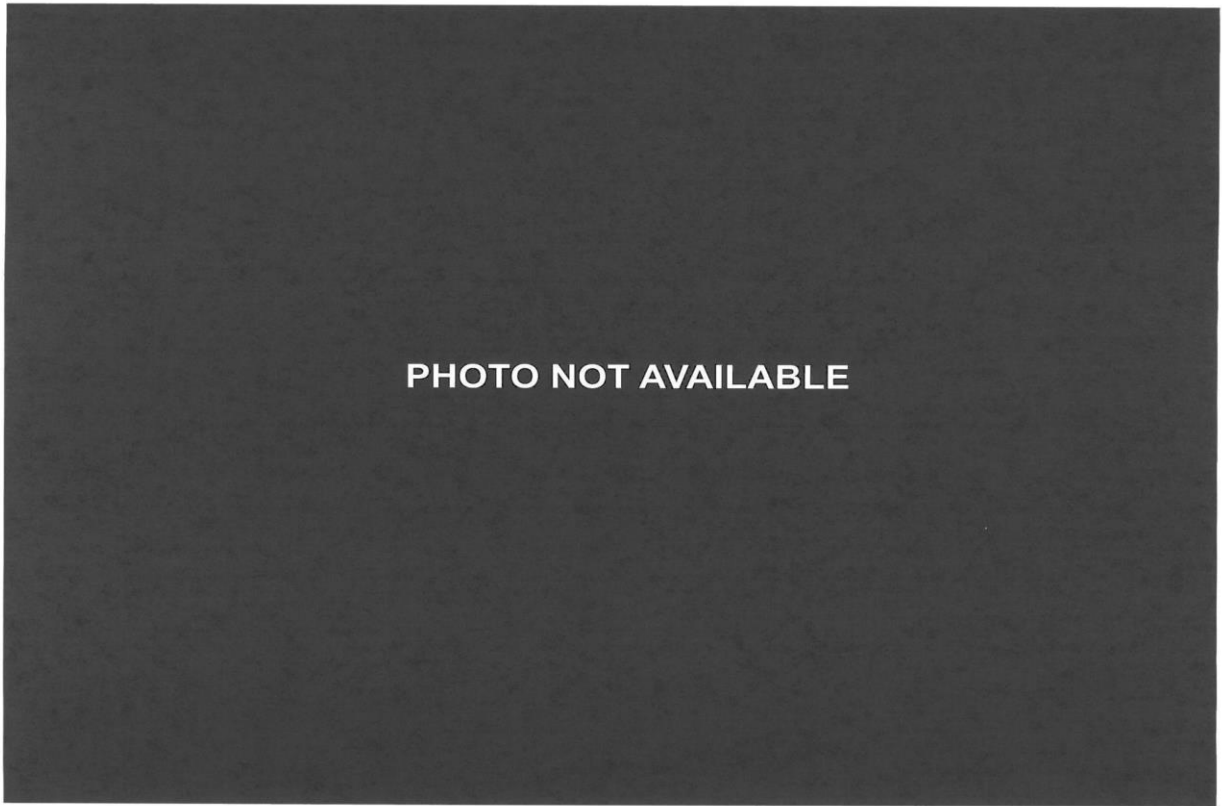
035 Pre-Test View of Belt Anchorage for Driver Dummy



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

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



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



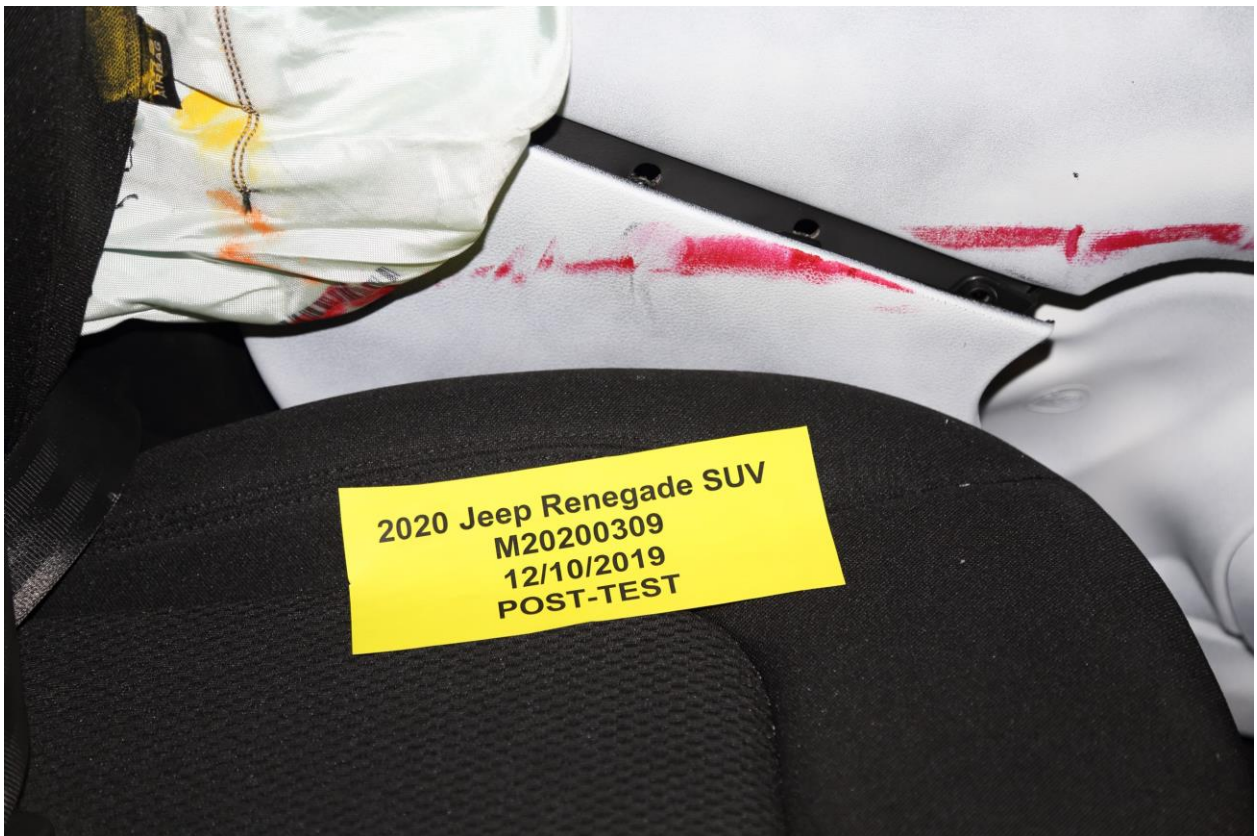
050 Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



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



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



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



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



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



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



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



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



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



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



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



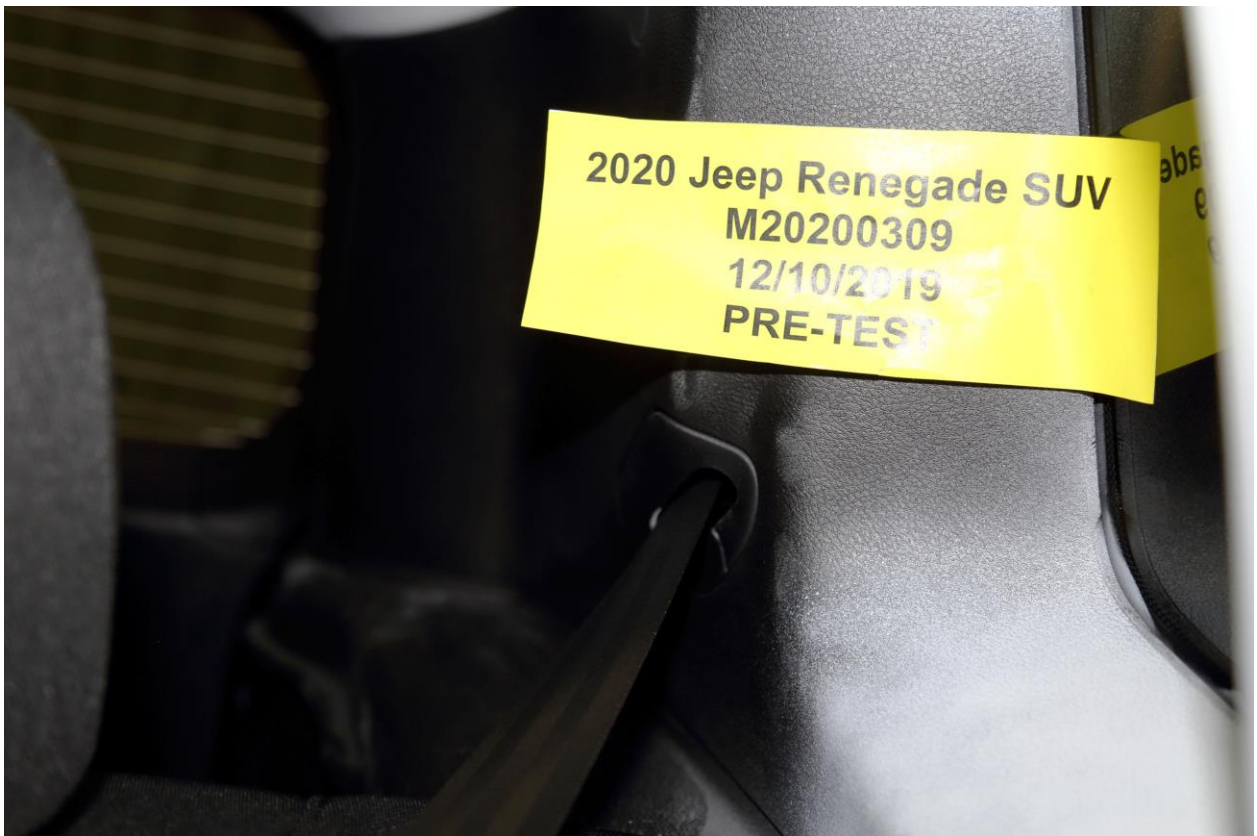
062 Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



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

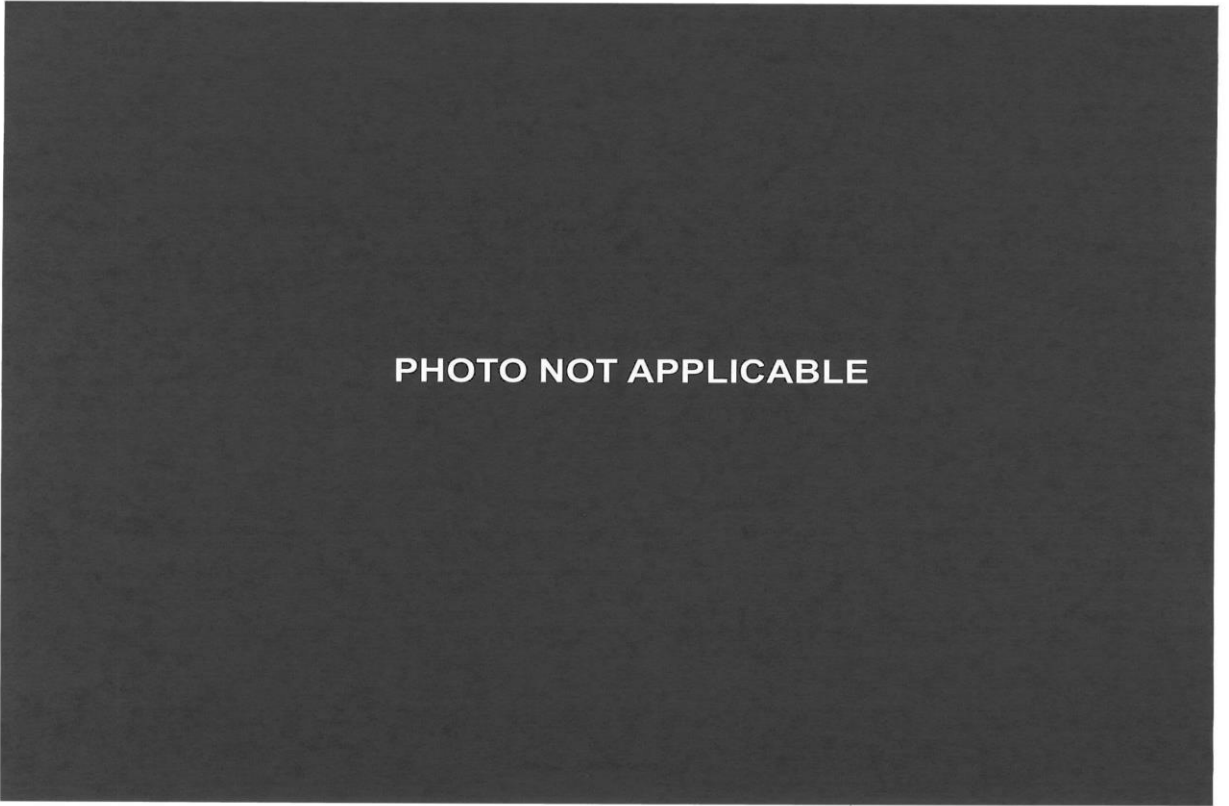


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066 Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

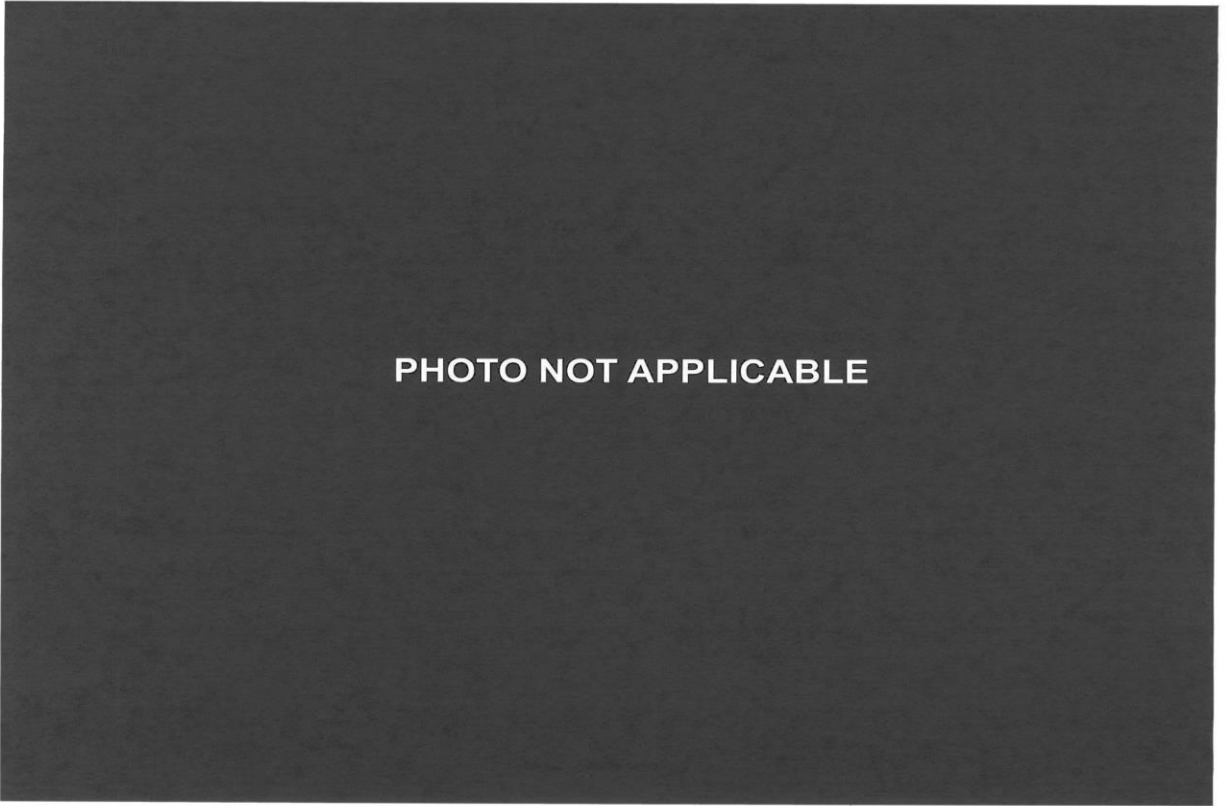


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067 Pre-test Close-Up Left Side View of Rear Passenger Seat Back

PHOTO NOT APPLICABLE

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



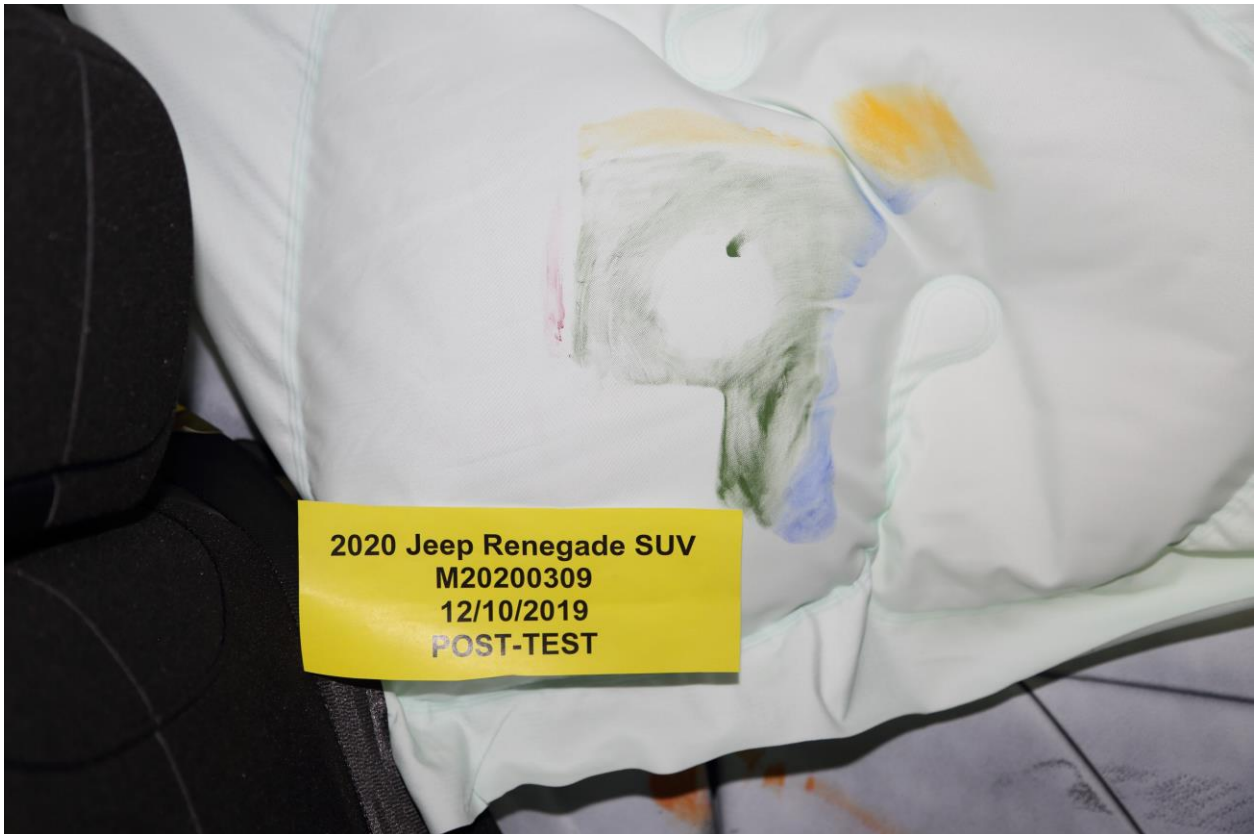
073 Pre-Test Rear Passenger Inner Door Panel View



074 Post-Test Rear Passenger Inner Door Panel View

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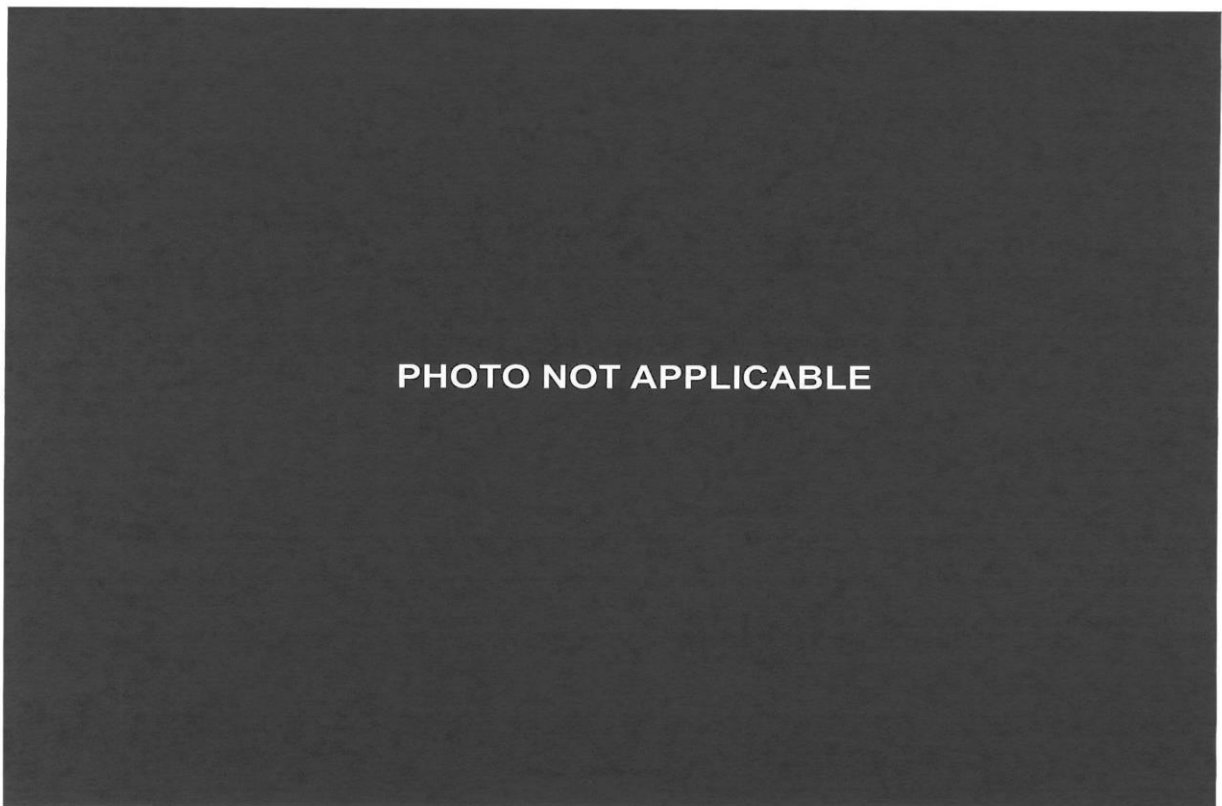
075 Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



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



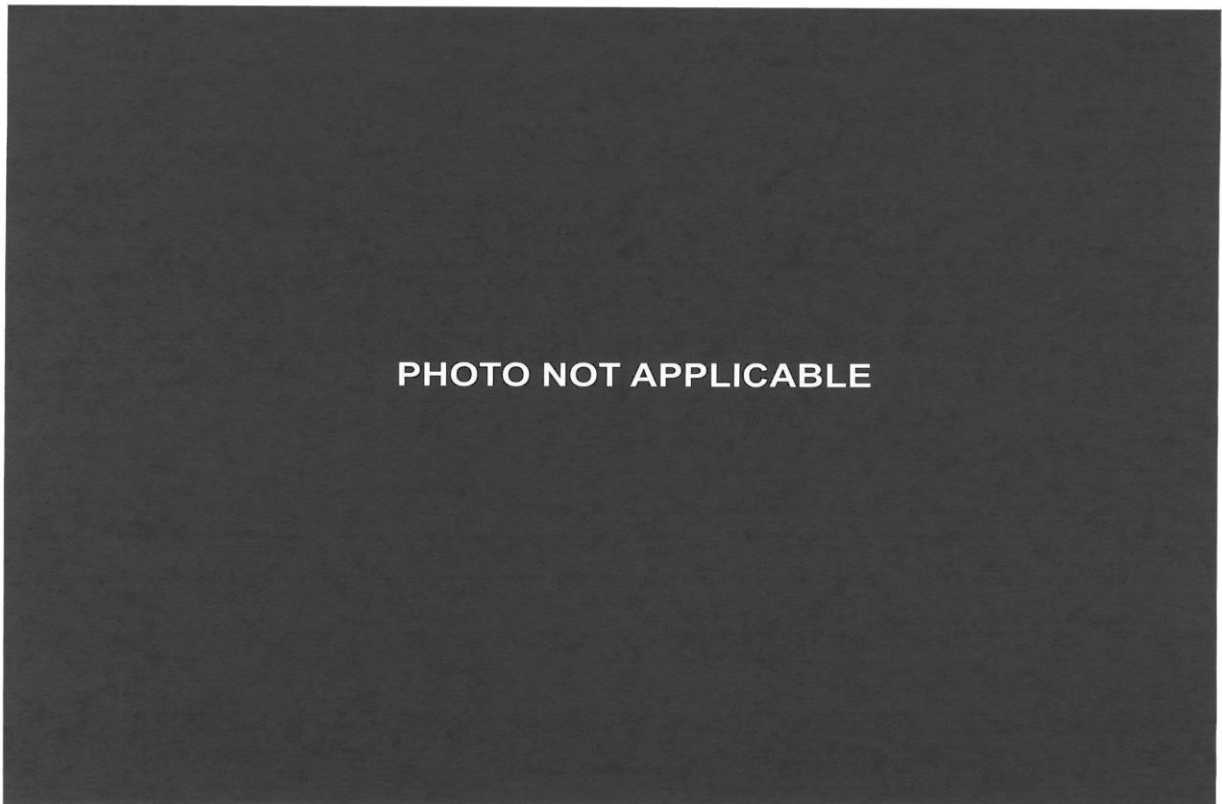
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



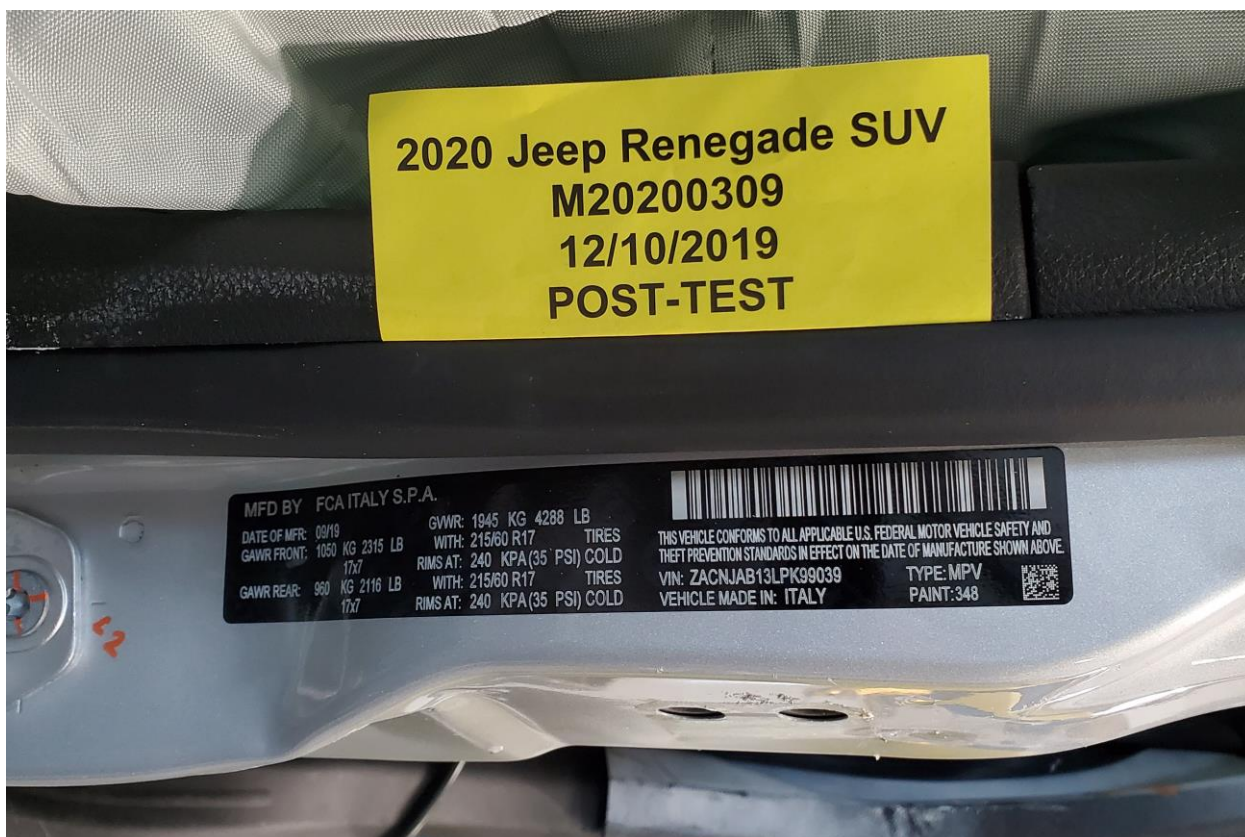
089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



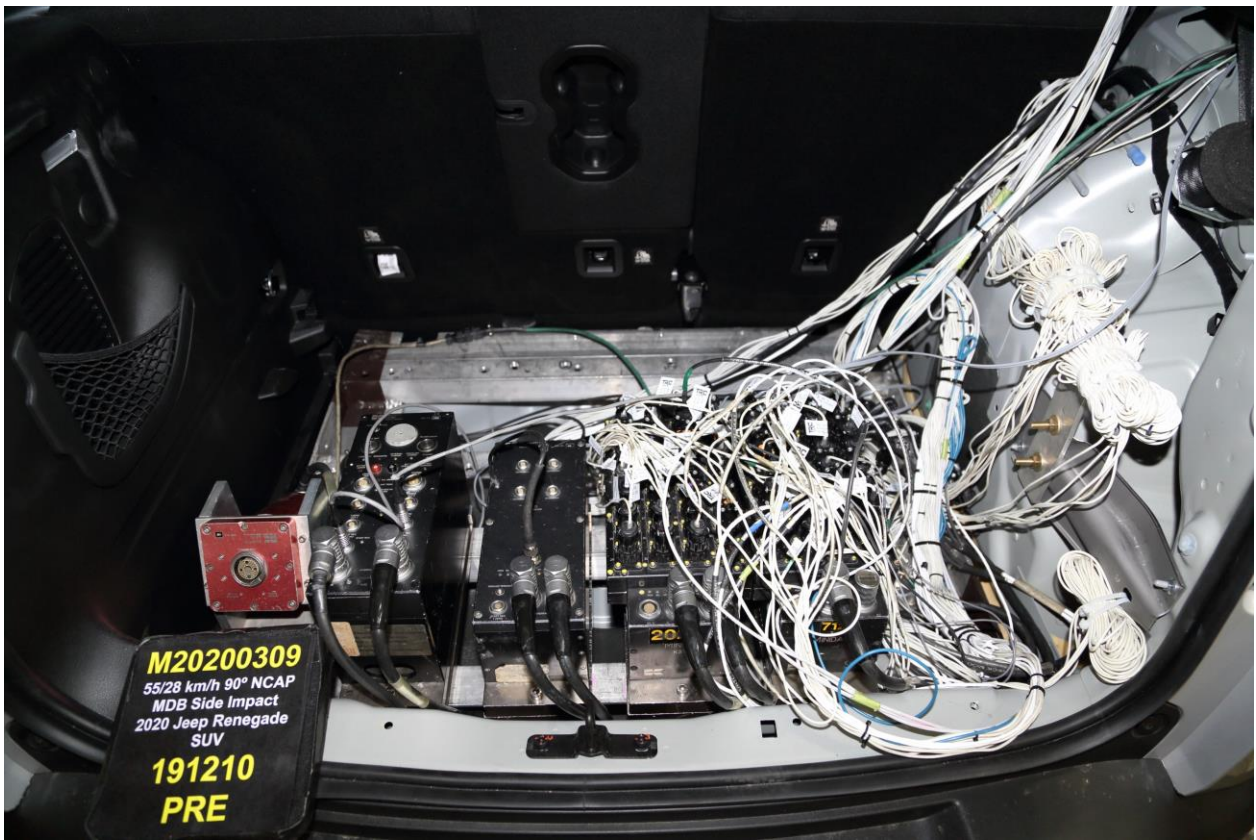
091 Post-Test Right Side View of MDB Impactor Face



092 Close-Up View of Vehicle's Certification Label



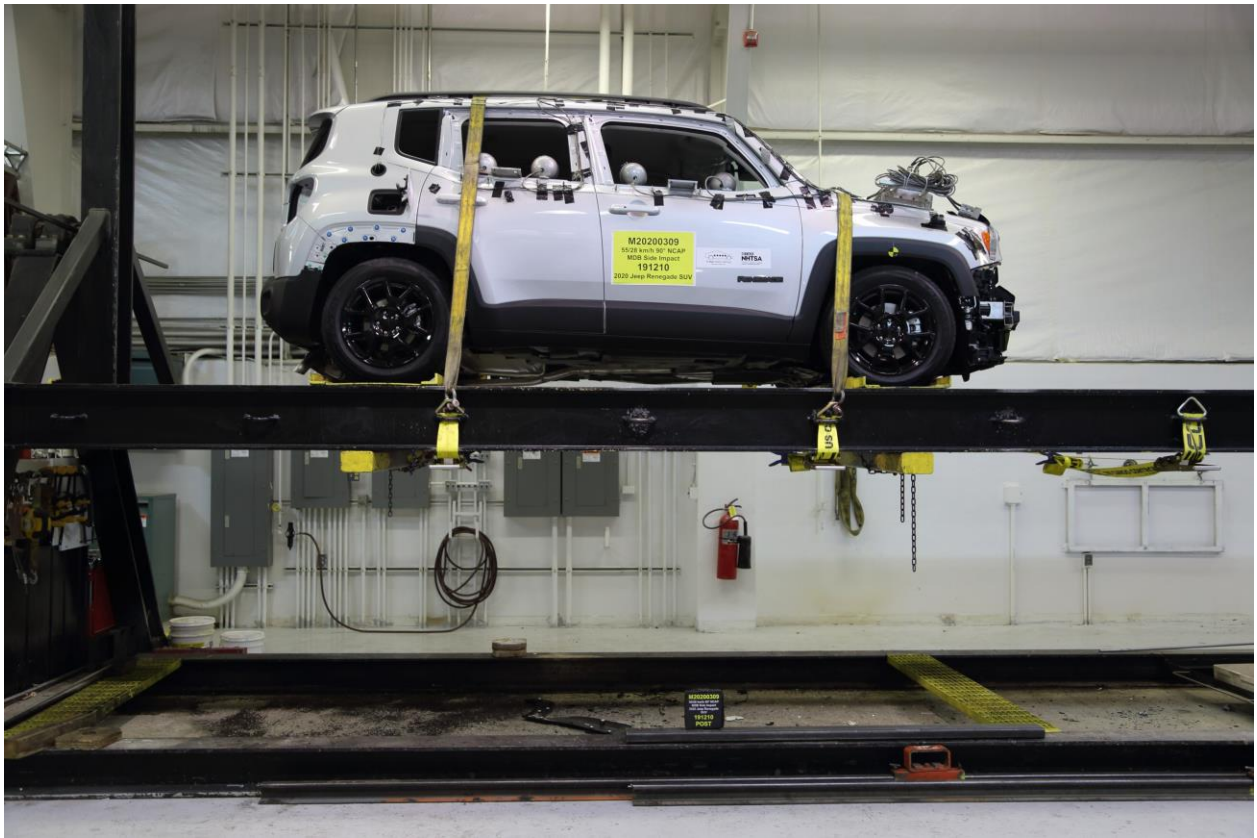
093 Close-Up View of Vehicle's Tire Information Placard or Label



094 Pre-Test Ballast View



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



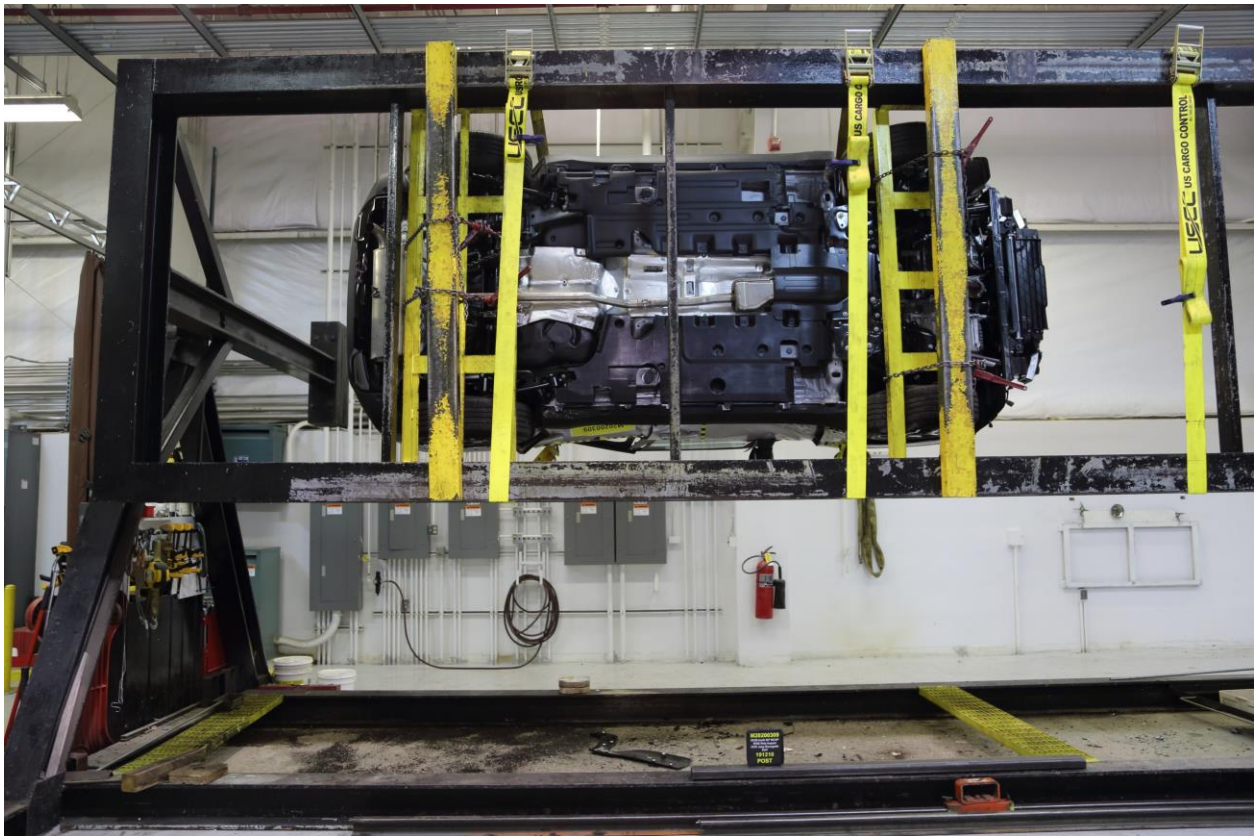
096 FMVSS No. 301 Static Rollover 0 Degrees



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

Jeep 2020 MODEL YEAR RENEGADE LATITUDE FWD

For more information visit: www.jeep.com
or call 1-877-IAM-JEEP

FCA US LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: \$24,125

JEOP® RENEGADE LATITUDE 4X2
Exterior Color: Glacier Metallic Clear-Coat Exterior Paint
Interior Color: Black Interior Color
Interior: Deluxe Cloth High-Back Bucket Seats
Engine: 1.3L I4 Turbo M4i DI Engine w/ESS
Transmission: 9-Speed 948TE Automatic Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES
Advanced Multistage Front Air Bags
Supplemental Side-Curtain Front and Rear Air Bags
Supplemental Front Side Air Bags
Driver Inflatable Knee-Bolster Air Bag
ParkView® Rear Back-Up Camera
Anti-Lock 4-Wheel Disc Brakes
Electric Park Brake
Electronic Stability Control
Electronic Roll Mitigation
All-Speed Traction Control
Speed Control
Push-Button Start
Electric Power Steering
Capless Fuel-Fill
Daytime Running Lamp System
Hill Start Assist
Tire Pressure Monitoring Display
Rear Window Wiper/Washer
Variable Intermittent Windshield Wipers

INTERIOR FEATURES
Uconnect® 4 with 7-inch Display
SiriusXM® with 1-Year Radio Subscription
Apple CarPlay®
Google Android Auto™
Media Hub (USB, Aux)
Integrated Voice Command with Bluetooth®
6-Speakers
A/C Auto Temperature Control w/Dual-Zone Control
Premium-Wrapped Steering Wheel
Steering Wheel Mounted Audio Controls
Tilt / Telescope Steering Column
Rear 60 / 40 Folding Seat
Sun Visions with Illuminated Vanity Mirrors
Height Adjust Load Floor
Power Windows w/Front One-Touch-Down & Up Feature
Carpeted Floor Mats

EXTERIOR FEATURES
17-inch x 7.5-inch Aluminum Wheels
Power-Heated Mirrors
The Service Kit
Automatic Headlamps
Haloed Headlamps

Cornering Front Fog Lamps

OPTIONAL EQUIPMENT (May Replace Standard Equipment)

Glacier Metallic Clear-Coat Exterior Paint \$195
Customer Preferred Package 22M \$995
Deluxe Cloth High-Back Bucket Seats
Altitude Package
Vinyl Door Trim Panel
Black Accent Stitching
Exterior Mirrors with Supplemental Signals
Gloss Black Exterior Accents
Leather-Wrapped Steering Wheel
17-inch x 7.5-inch Gloss Black Wheels \$795
Cold Weather Group
All-Season Floor Mats
Rain-Sensitive Windshield Wipers
Heated Front Seats
Windshield Wiper De-Icer
Heated Steering Wheel
Popular Equipment Group \$695
40 / 20 / 40 Rear Seat with Trunk Pass-Thru
Rear View Automatic Dimming Mirror
115-Volt Auxiliary Power Outlet
4-Way Power Lumbar Adjustable Driver Seat
8-Way Power Adjustable Driver Seat
1.3L I4 Turbo M4i DI Engine w/ESS \$1,495
180-Amp Alternator
Keyless Entry with Panic Alarm
Active Grille Shutters
Remote Start System
Stop-Start Multiple VSM System
Gloss Black Steering Wheel Bezel

DESTINATION CHARGE \$1,495

TOTAL PRICE: *\$29,795

WARRANTY COVERAGE

5-year or 60,000-mile Powertrain Limited Warranty.
3-year or 36,000-mile Basic Limited Warranty.
Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5-YEAR/60,000-MILE
POWERTRAIN WARRANTY**

Assembly Plant/Port of Entry: BALTIMORE, MARYLAND, U.S.A.

VIN: ZAC-NJAB13L-P-K90039 LA-VIN: 4994

IMPORTED BY: STERLING MOTOR SALES INC.

8000 W 108TH ST

MINNETONKA, MN 55345-1220

TEL: 763-847-1220

FAX: 763-847-1220

DEALER: STERLING MOTOR SALES INC.

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8000 W 108TH ST

EPA DOT Fuel Economy and Environment

Gasoline Vehicle

Fuel Economy These estimates reflect new EPA methods beginning with 2017 models.
Small SUV 2WD range from 18 to 120 MPG.
The best vehicle rates 120 MPG.
27 MPG
combined city/hwy
3.7 gallons per 100 miles

24 city
32 highway

You save \$0
in fuel costs
over 5 years
compared to the
average new vehicle.

Annual fuel Cost \$1,500

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Best 10 Worst
This vehicle emits 328 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Purchasing and distributing fuel also creates emissions. Learn more at fuelconomy.gov

Smog Rating (tailpipe only)

Best 10 Worst
This vehicle emits 328 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Purchasing and distributing fuel also creates emissions. Learn more at fuelconomy.gov

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle rates 27 MPG and cost \$2,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.70 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated

Based on the combined ratings of frontal, side, and rollover.

Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash Driver Passenger ★★★★★

Based on the risk of injury in a frontal impact.

Should ONLY be compared to other vehicles of similar size and weight.

Side Crash Front seat Rear seat Not Rated Not Rated

Based on the risk of injury in a side impact.

Rollover ★★★★★

Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 star (★) to 5 stars (★★★★★) with 5 being the highest.

Source: National Highway Traffic Safety Administration (NHTSA)

www.safercar.gov or 1-888-327-4236

The safety ratings above are based on Federal Government tests of particular vehicles equipped with certain features and options. The performance of this vehicle may differ.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS COUNTRY: U.S./CANADIAN PARTS CONTENT: 14%

MAJOR SOURCES OF FOREIGN PARTS CONTENT:

ITALY: 63%

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

FOR THIS VEHICLE: FINAL ASSEMBLY POINT: MELFI, ITALY

COUNTRY OF ORIGIN: ENGINE: POLAND

TRANSMISSION: UNITED STATES

TRANSMISSION: UNITED STATES

TRANSMISSION: UNITED STATES

TRANSMISSION: UNITED STATES

TRANSMISSION: UNITED STATES

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102 Monroney Label

Auto Comfort Systems — If Equipped

In vehicles equipped with Auto On Comfort, when turning on the vehicle the driver's heated seat will automatically turn on when temperatures are below 40°F (4.4°C).

Auto Comfort Systems can be enabled or disabled. Refer to "Uconnect Settings" in "Multimedia" in the Owner's Manual for further information.

WARNING!

Persons who are unable to feel pain to the skin because of advanced age, chronic illness, diabetes, spinal cord injury, medication, alcohol use, exhaustion or other physical condition must exercise care when using the seat heater. It may cause burns even at low temperatures, especially if used for long periods of time.

Do not place anything on the seat or seatback that insulates against heat, such as a blanket or cushion. This may cause the seat heater to overheat. Sitting in a seat that has been overheated could cause serious burns due to the increased surface temperature of the seat.

Unfolding The Rear Armrest 40/20/40

Tilt the head restraint forward and pull the rear armrest tab to release it from the seat and pull forward.

The center part of the rear seat can also be used as rear armrest with cupholders.

WARNING!

Be certain that the seatback is securely locked into position. If the seatback is not securely locked into position the seat will not provide the proper stability for child seats and/or passengers. An improperly latched seat could cause serious injury.

HEAD RESTRAINTS

Head restraints are designed to reduce the risk of injury by restricting head movement in the event of a rear impact. Head restraints should be adjusted so that the top of the head restraint is located above the top of your ear.

WARNING!

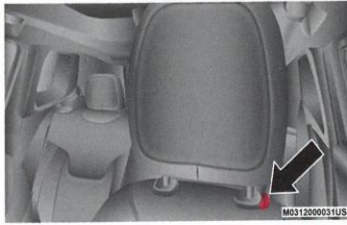
- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.
- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

Front Head Restraints

Your vehicle is equipped with front driver and passenger head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward on the head restraint.





Head Restraint Adjustment Button

NOTE:

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



WARNING!

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.

(Continued)



WARNING! (Continued)

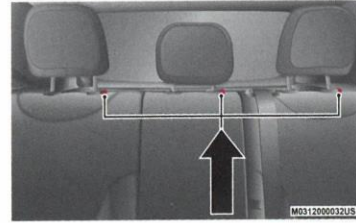
- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

Rear Head Restraints

Your vehicle is equipped with two outboard head restraints and one center head restraint for its rear passengers. The rear head restraints can be raised or lowered. When the center seat is being occupied, the head restraint should be in the raised position. When there are no occupants in the center seat, the head restraint can be lowered for maximum visibility for the driver.

To raise the head restraint, pull upward on the head restraint.

To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward on the head restraint.



Adjustment Button Locations

NOTE:

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

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 (www.nhtsa.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)
Passenger Head Angular Velocity (X)
Passenger Head Angular Velocity (Y)
Passenger Head Angular Velocity (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

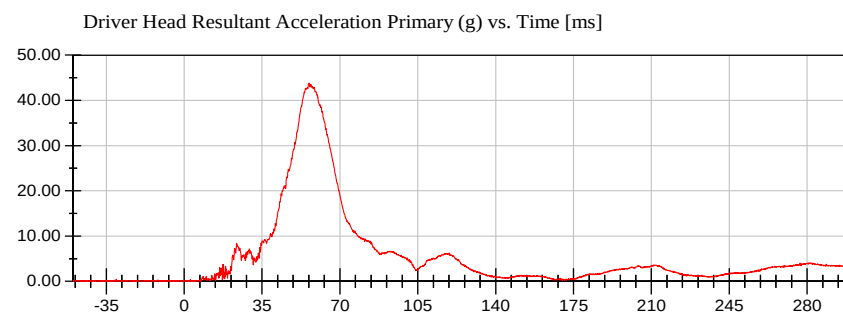
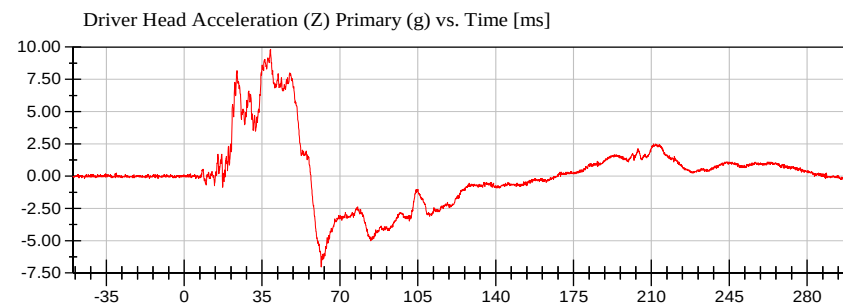
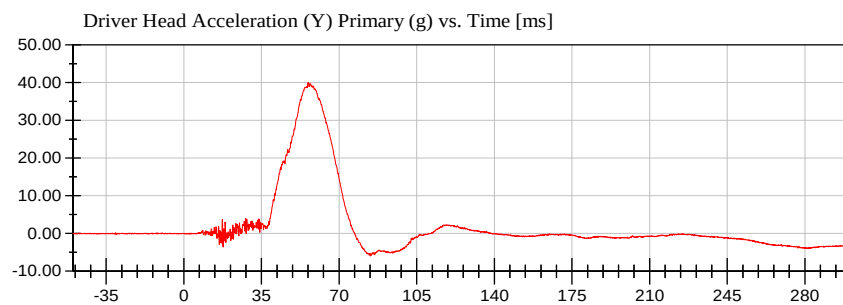
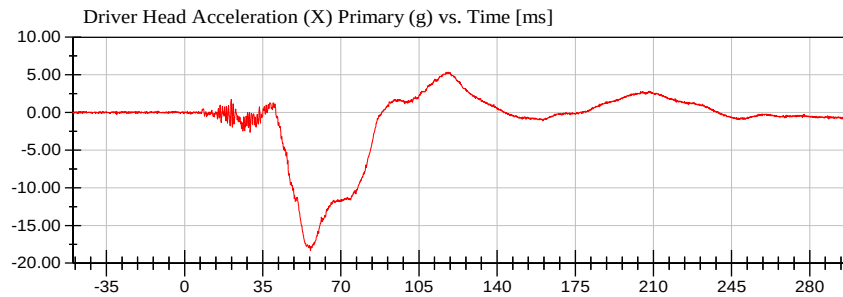
Test Lab: CTF

Test Number: 191210 (M20200309)

Test Date: 12/10/2019

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

Position #4 SID IIs Dummy (305)



NHTSA

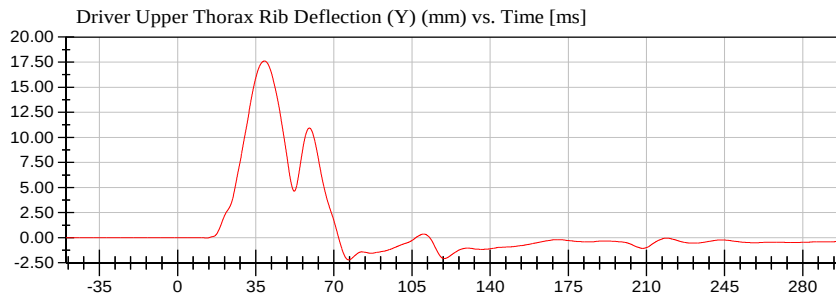
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Test Date: 12/10/2019

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

Position #4 SID IIs Dummy (305)



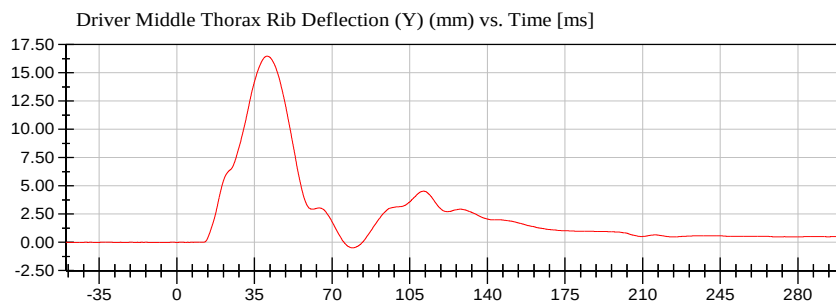
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17.61 mm at 38.96 ms

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-2.21 mm at 76.64 ms

CFC_180



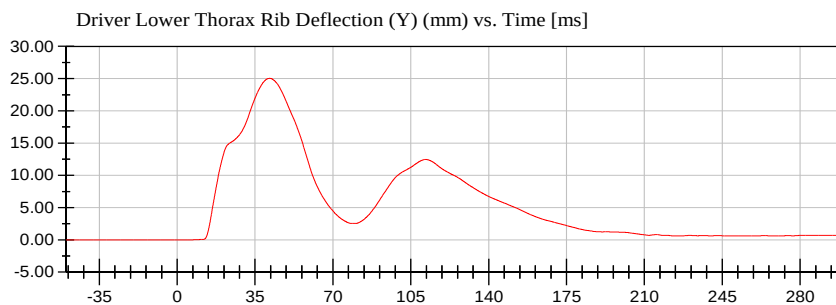
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16.47 mm at 40.72 ms

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-0.49 mm at 79.28 ms

CFC_180



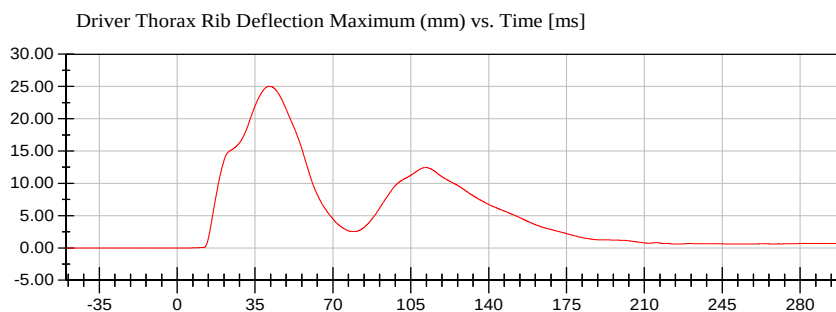
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25.03 mm at 41.52 ms

<Min>

0.00 mm at -6.32 ms

CFC_180



<Max>

25.03 mm at 41.52 ms

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0.00 mm at -6.32 ms

CFC_180



NHTSA

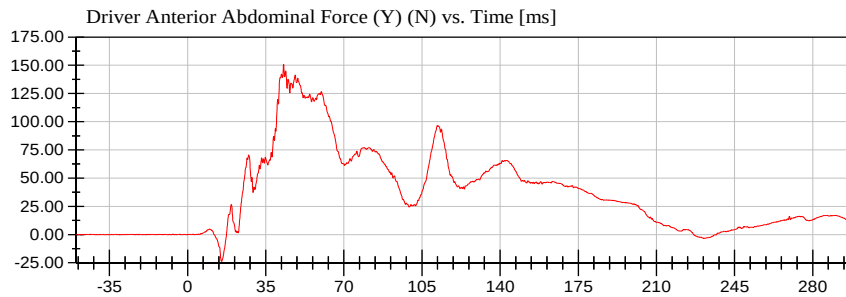
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Test Date: 12/10/2019

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

Position #4 SID IIs Dummy (305)



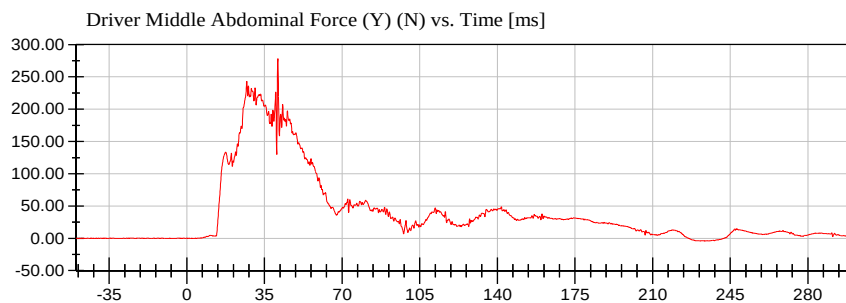
<Max>

150.77 N at 43.04 ms

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-23.81 N at 15.28 ms

CFC_600



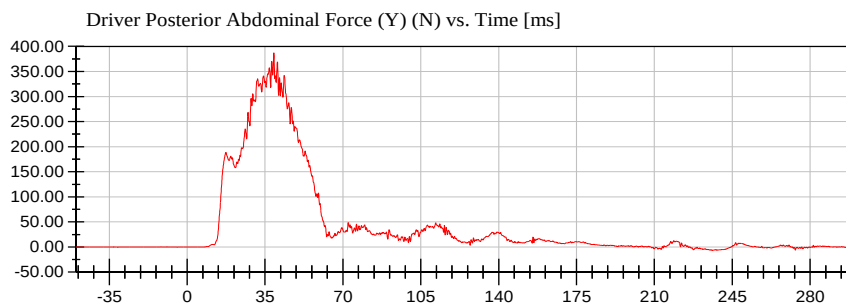
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278.08 N at 41.04 ms

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-4.34 N at 231.36 ms

CFC_600



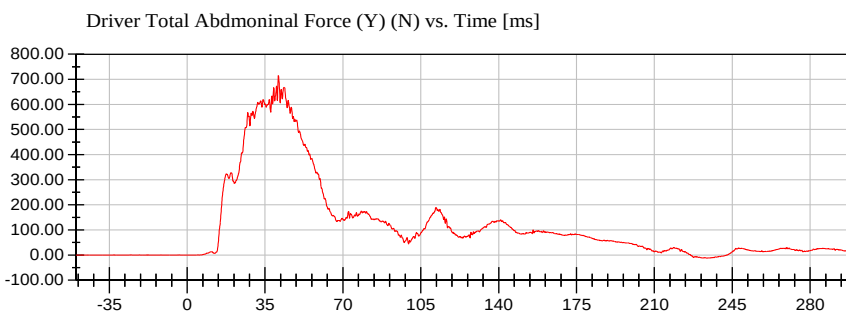
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386.82 N at 38.96 ms

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-6.46 N at 236.00 ms

CFC_600



<Max>

714.60 N at 40.96 ms

<Min>

-12.02 N at 233.60 ms

CFC_600



NHTSA

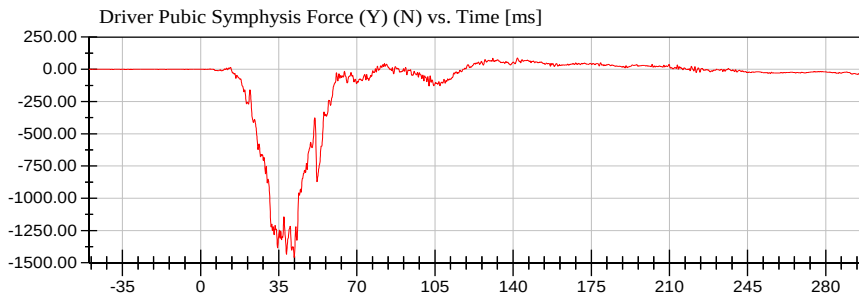
Test Lab: CTF

Test Number: 191210 (M20200309)

Test Date: 12/10/2019

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

Position #4 SID IIs Dummy (305)



<Max>

87.16 N at 141.92 ms

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-1,459.97 N at 41.92 ms

CFC_600



NHTSA

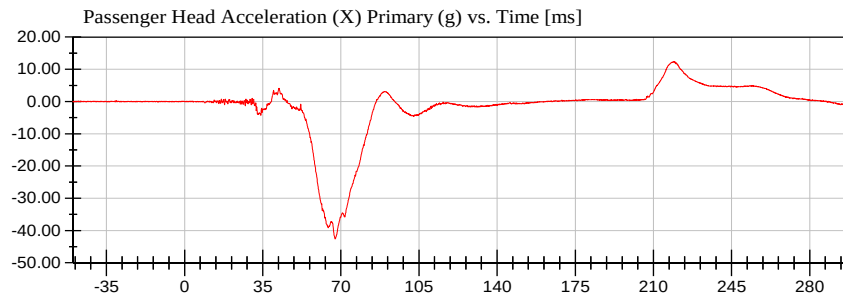
Test Lab: CTF

Test Number: 191210 (M20200309)

Test Date: 12/10/2019

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

Position #4 SID IIs Dummy (305)



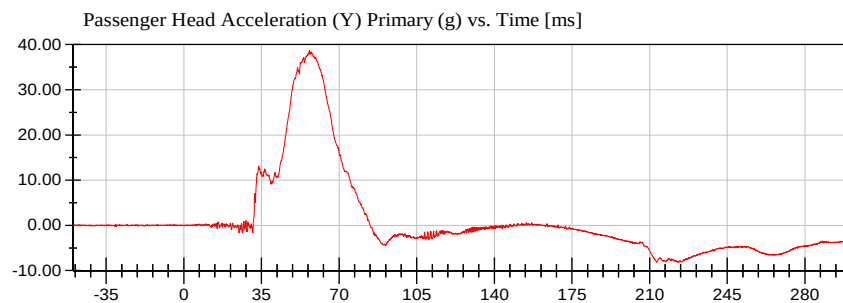
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12.38 g at 219.36 ms

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-42.64 g at 67.44 ms

CFC_1000



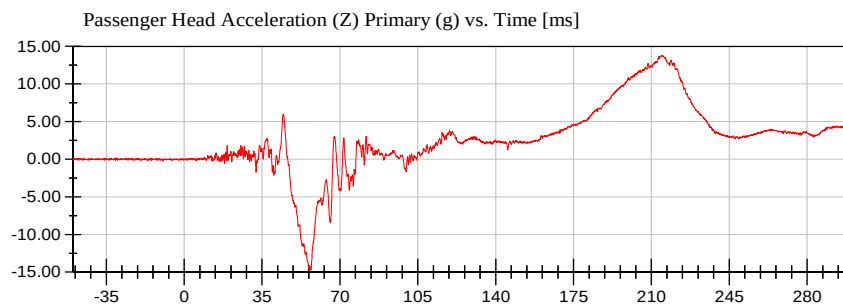
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38.67 g at 56.64 ms

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-8.18 g at 213.20 ms

CFC_1000



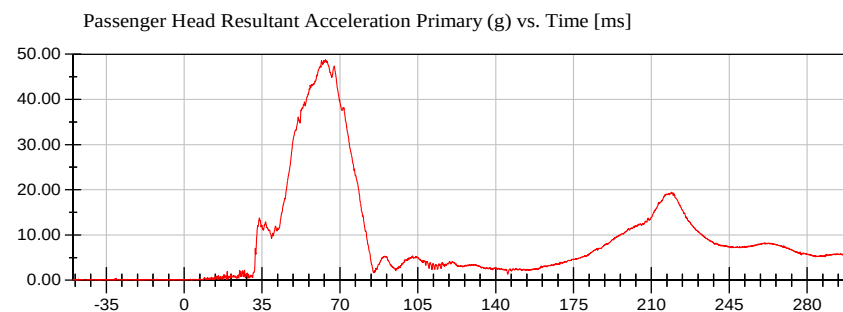
<Max>

13.79 g at 214.56 ms

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-14.74 g at 56.96 ms

CFC_1000



<Max>

48.75 g at 63.44 ms

<Min>

0.01 g at -48.96 ms

CFC_1000



NHTSA

Test Lab: CTF

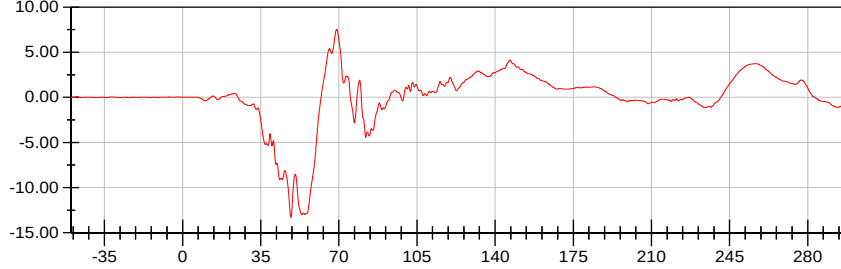
Test Number: 191210 (M20200309)

Test Date: 12/10/2019

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>

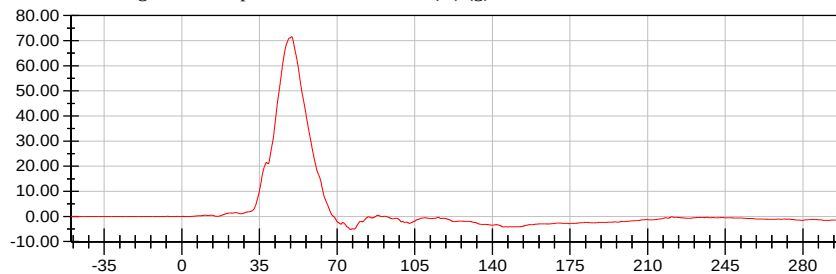
7.55 g at 69.04 ms

<Min>

-13.31 g at 48.48 ms

CFC_180

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



<Max>

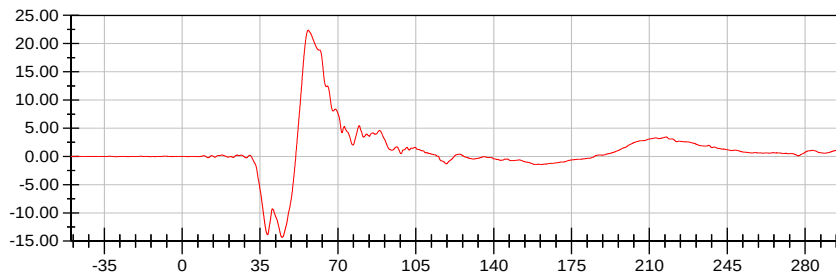
71.56 g at 49.52 ms

<Min>

-5.16 g at 76.00 ms

CFC_180

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



<Max>

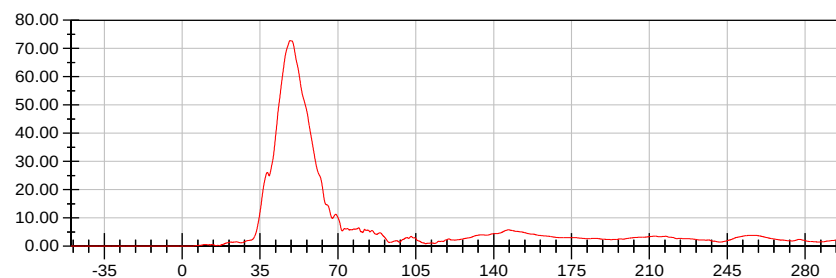
22.38 g at 56.64 ms

<Min>

-14.32 g at 44.88 ms

CFC_180

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



<Max>

72.78 g at 48.48 ms

<Min>

0.00 g at -15.36 ms

CFC_180



NHTSA

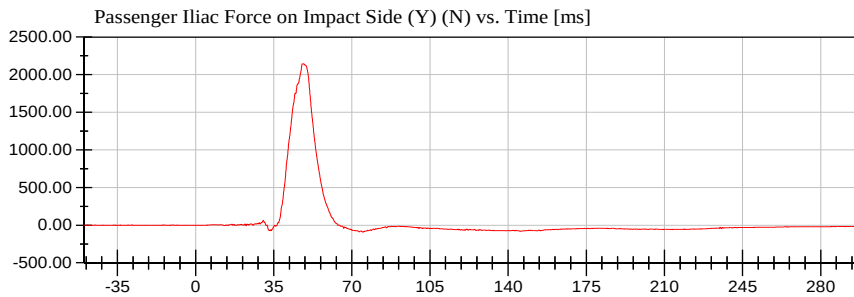
Test Lab: CTF

Test Number: 191210 (M20200309)

Test Date: 12/10/2019

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

Position #4 SID IIs Dummy (305)



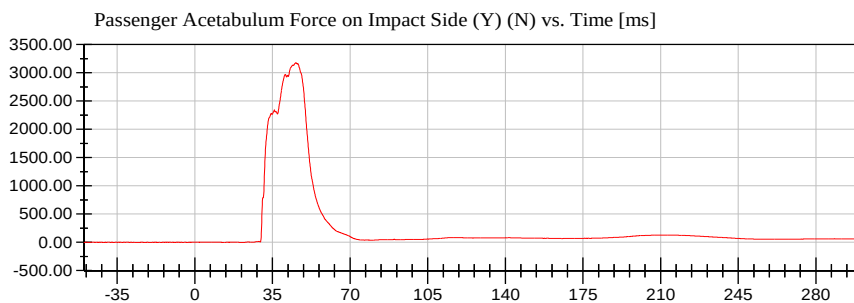
<Max>

2,144.55 N at 48.40 ms

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-92.21 N at 74.88 ms

CFC_600



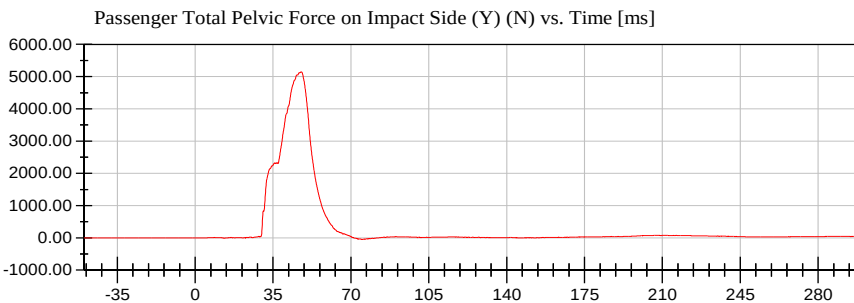
<Max>

3,176.86 N at 45.60 ms

<Min>

-3.87 N at 22.08 ms

CFC_600



<Max>

5,147.06 N at 47.68 ms

<Min>

-48.91 N at 75.04 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. 69

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	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	328	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	201	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. 69-2
Test Date: 12/6/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Resultant Acceleration	125 - 155 g	132.7 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.3 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	4.68 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DP6812

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

12.06.2019 12:54:10 326

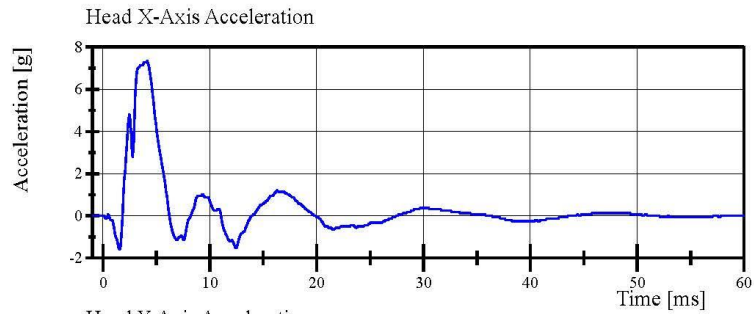


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 69-2

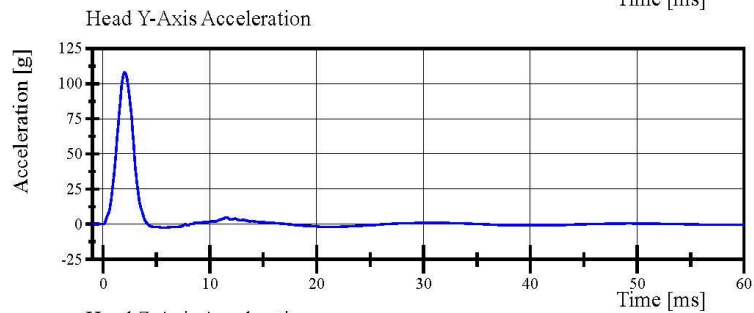
Test Date: 12/6/2019



Filter Class: CFC_1000

Max: 7.3 g at 4.2 ms

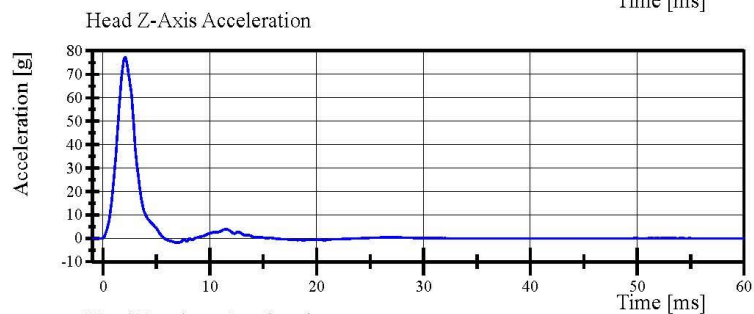
Min: -1.6 g at 1.5 ms



Filter Class: CFC_1000

Max: 107.9 g at 2.0 ms

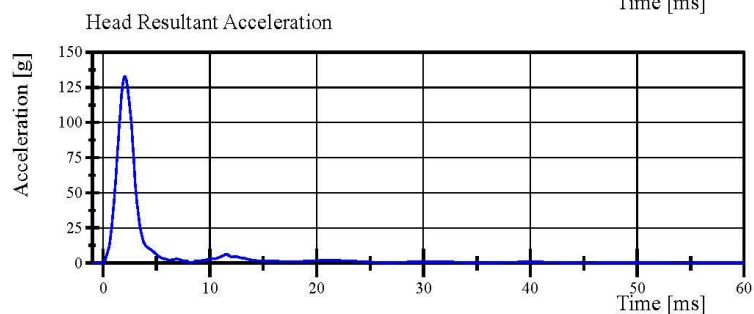
Min: -2.5 g at 5.8 ms



Filter Class: CFC_1000

Max: 77.3 g at 2.1 ms

Min: -1.9 g at 6.9 ms



Filter Class: CFC_1000

Max: 132.7 g at 2.1 ms

Min: 0.0 g at -1.0 ms

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

12.06.2019 12:56:53 326



Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	41 %	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	-49.1 deg	Yes
Time of Peak	54 - 66 ms	55.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	58.5 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 05053

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

12.05.2019 19:35:00 1462

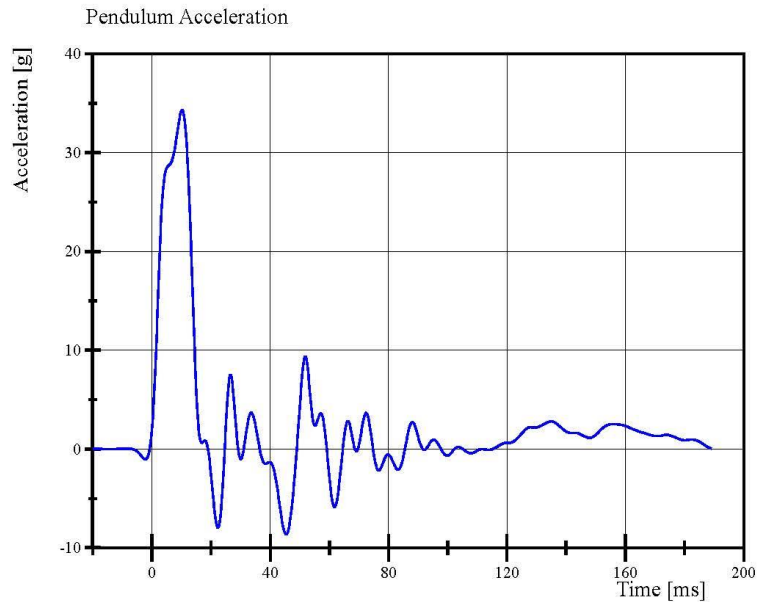


Transportation Research Center Inc.

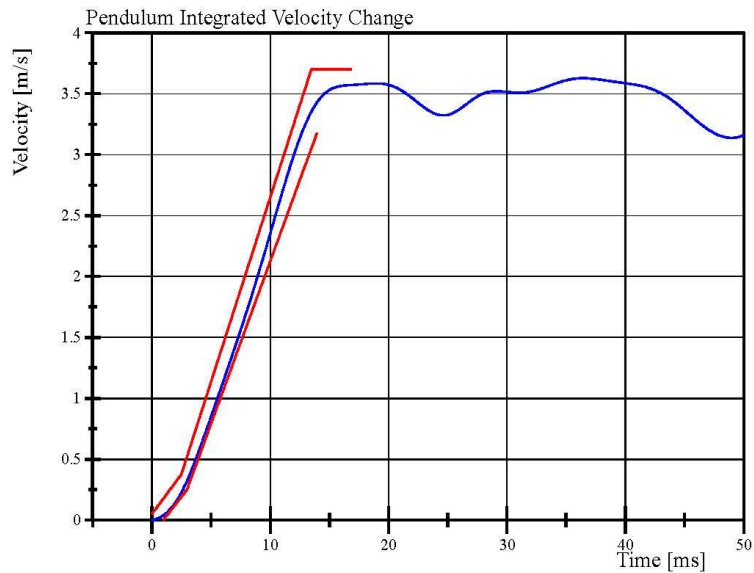
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 69-1

Test Date: 12/5/2019



Filter Class: CFC_60
Max: 34.3 g at 10.2 ms
Min: -8.6 g at 45.4 ms



Filter Class: CFC_60
Max: 3.6 m/s at 36.4 ms
Min: 0.0 m/s at 0.0 ms

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

12.05.2019 19:36:01 1462

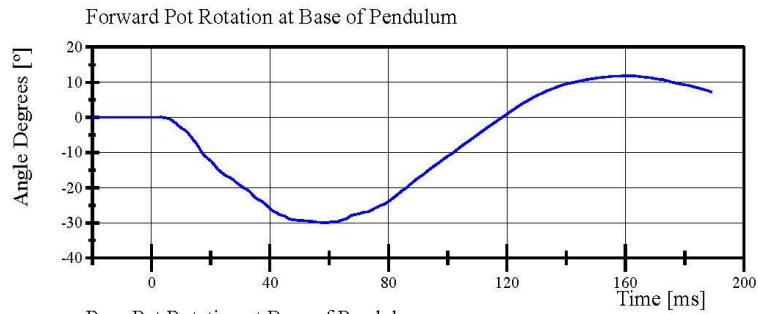


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 69-1

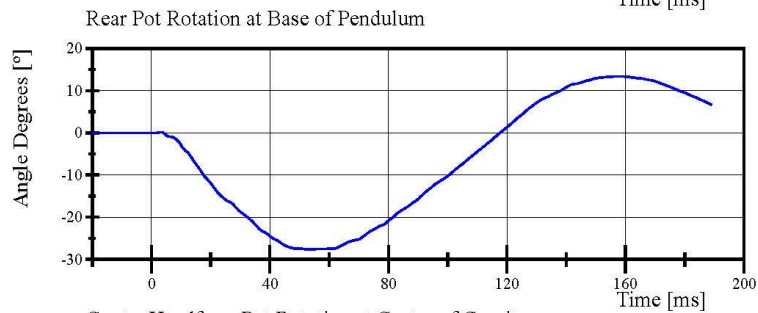
Test Date: 12/5/2019



Filter Class: CFC_180

Max: 11.9 ° at 161.8 ms

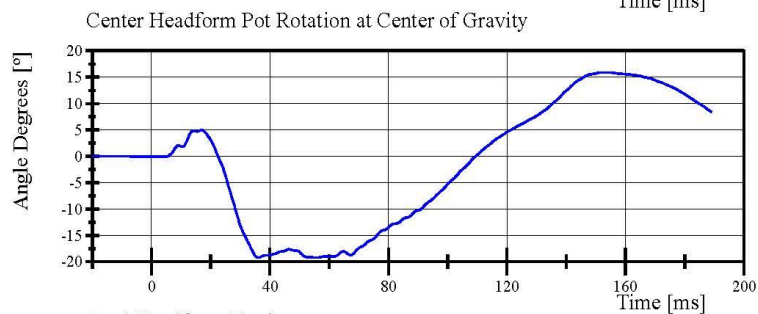
Min: -30.0 ° at 58.4 ms



Filter Class: CFC_180

Max: 13.4 ° at 157.1 ms

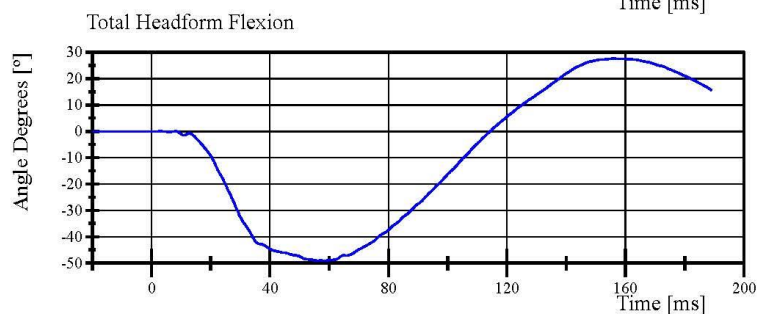
Min: -27.7 ° at 53.8 ms



Filter Class: CFC_180

Max: 15.9 ° at 152.2 ms

Min: -19.3 ° at 36.1 ms



Filter Class: CFC_180

Max: 27.5 ° at 156.0 ms

Min: -49.1 ° at 55.9 ms

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

12.05.2019 19:36:02 1462



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.71 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: 175-3501-07014

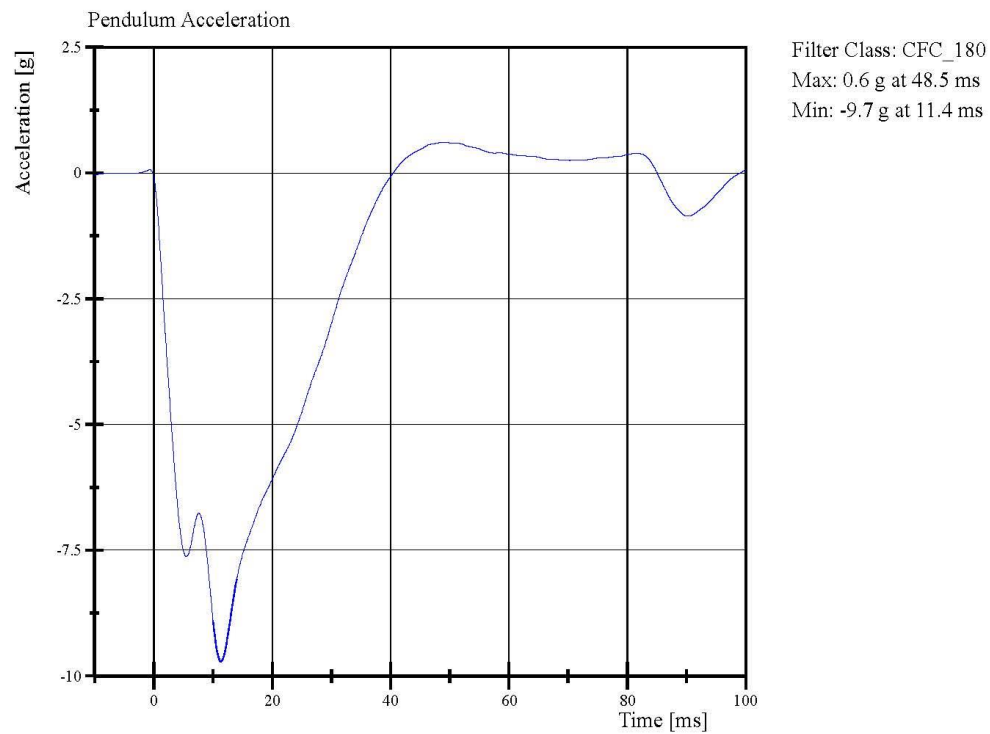
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.06.2019 10:48:20 547



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019



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

12.06.2019 10:48:58 547



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	38 %	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

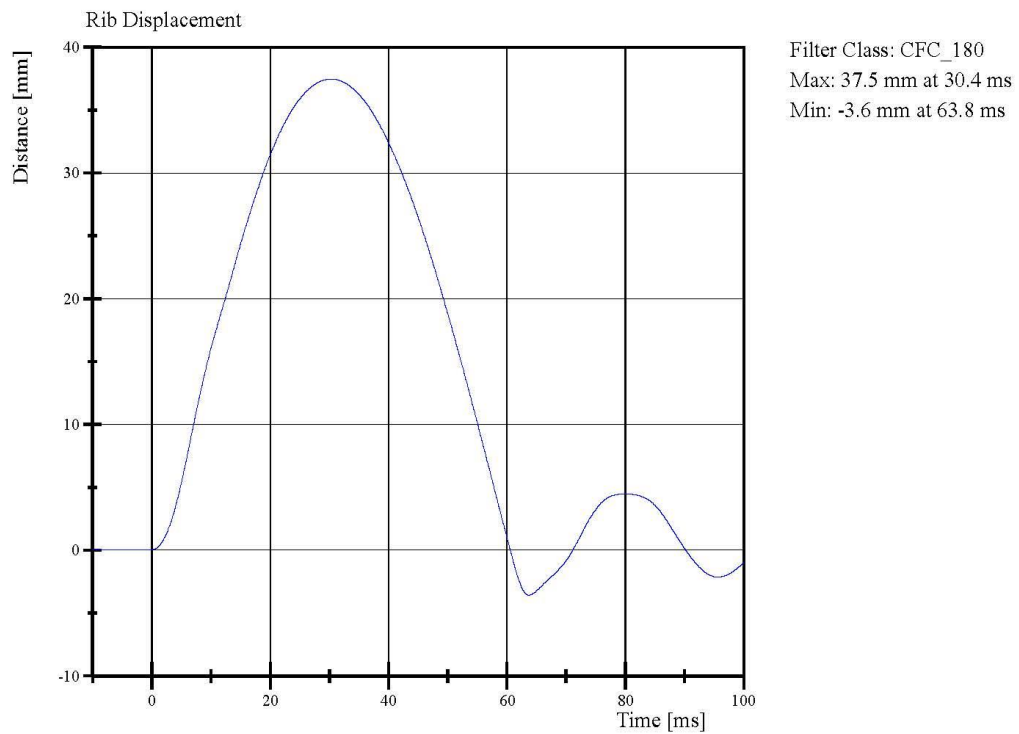
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 07:57:26 503



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



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

12.05.2019 07:57:52 503



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

Rib Module: 175-4008-A

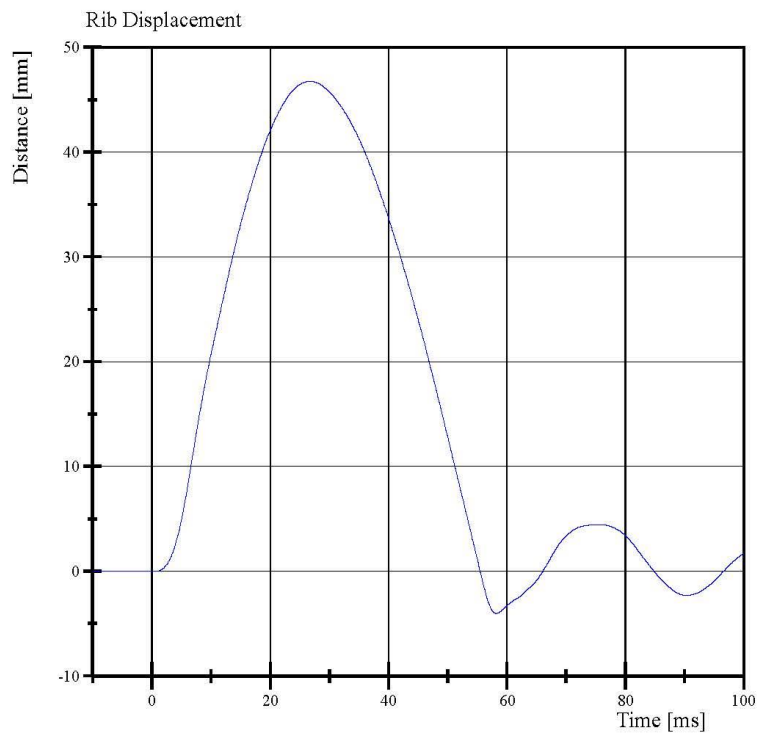
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 07:52:41 392



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 46.7 mm at 26.7 ms
Min: -4.0 mm at 58.2 ms

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

12.05.2019 07:53:21 392



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Module: 175-4008-A

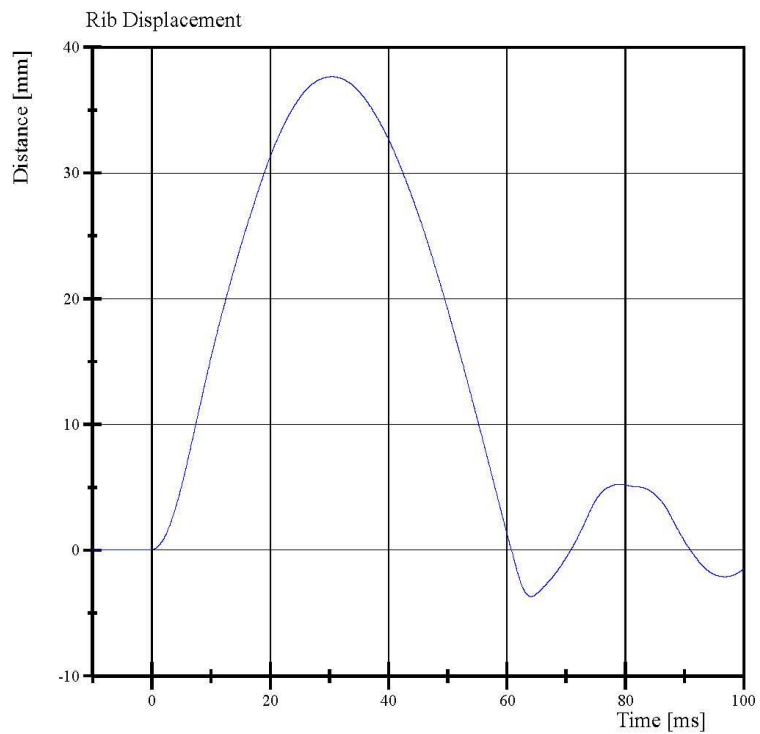
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 08:26:19 490



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 37.7 mm at 30.4 ms
Min: -3.7 mm at 64.1 ms

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

12.05.2019 08:27:09 490



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.0 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Module: 175-4008-A

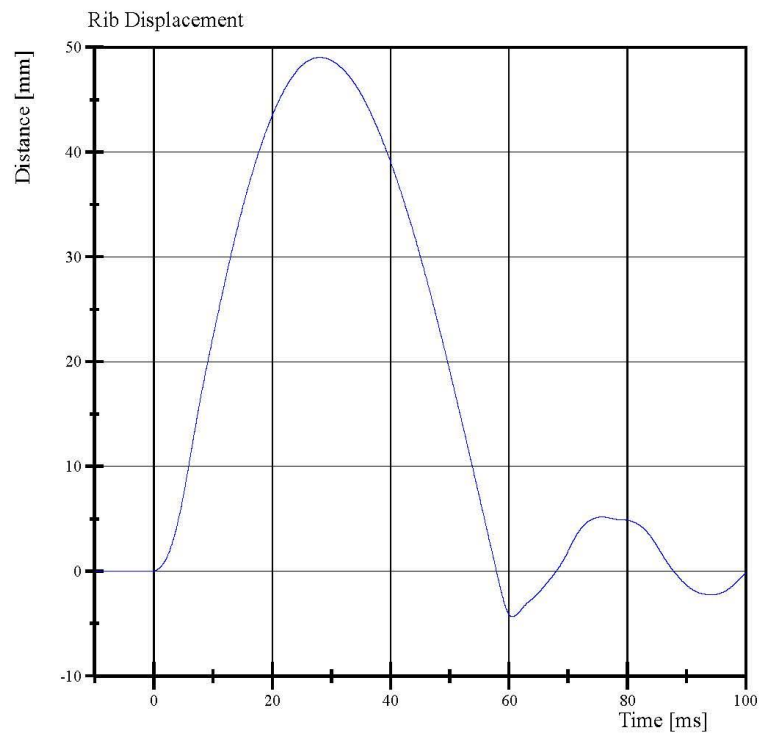
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 08:15:56 411



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 49.0 mm at 28.1 ms
Min: -4.4 mm at 60.6 ms

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

12.05.2019 08:16:31 411



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.2 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

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

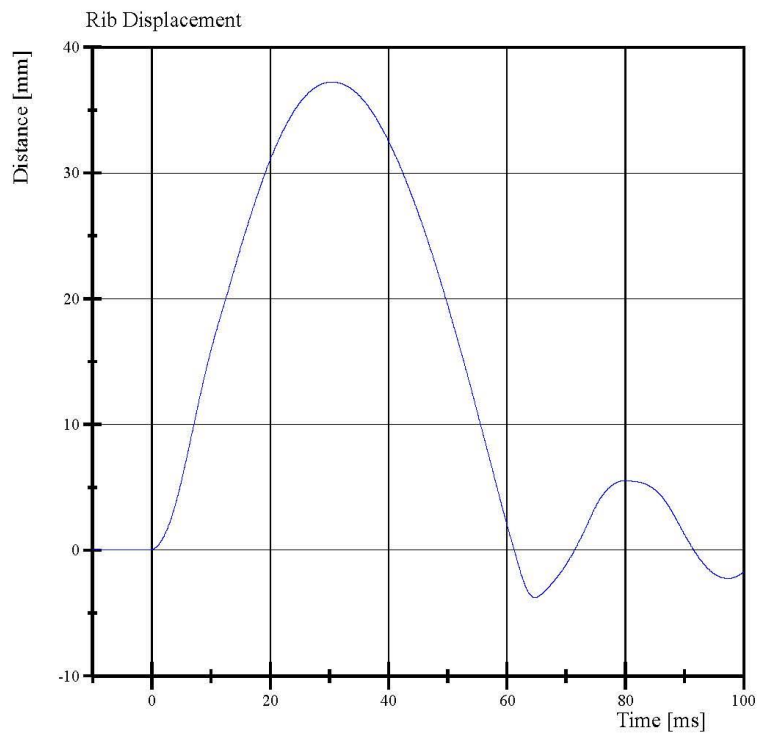
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 08:41:46 468



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 37.2 mm at 30.5 ms
Min: -3.8 mm at 64.7 ms

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

12.05.2019 08:42:22 468



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

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	48.7 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

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

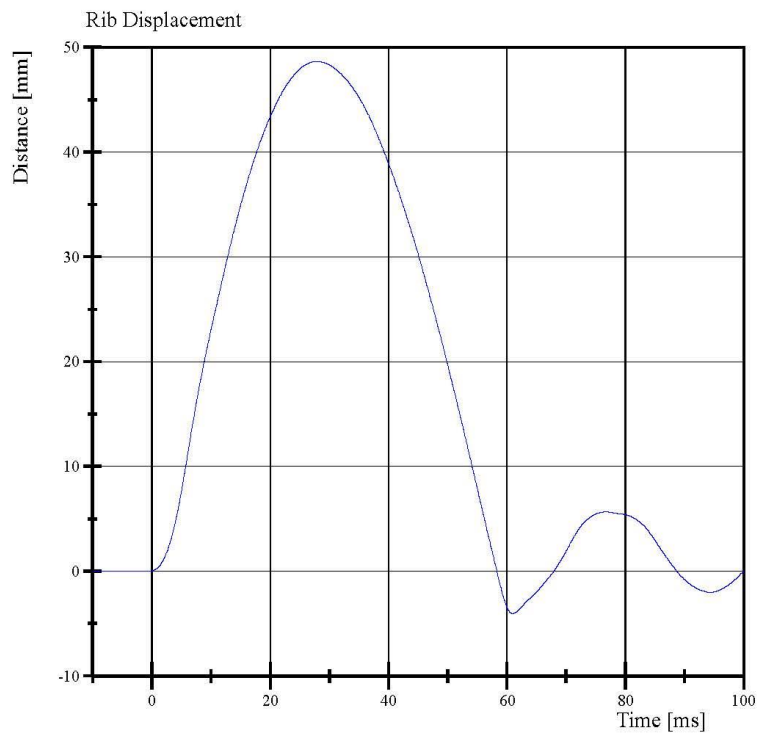
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 08:31:42 416



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 48.7 mm at 27.9 ms
Min: -4.1 mm at 61.0 ms

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

12.05.2019 08:32:21 416



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.462 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,683.1 N	Yes
Upper Rib Displacement	34 - 41 mm	38.9 mm	Yes
Center Rib Displacement	37 - 45 mm	41.2 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib Module S/N: 175-4008-A

Upper Rib Foam S/N: 175-4003-EK6973

Middle Rib Module S/N: 175-4008-A

Middle Rib Foam S/N: 175-4003-EK6970

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

Lower Rib Foam S/N: 175-4008-EK6971

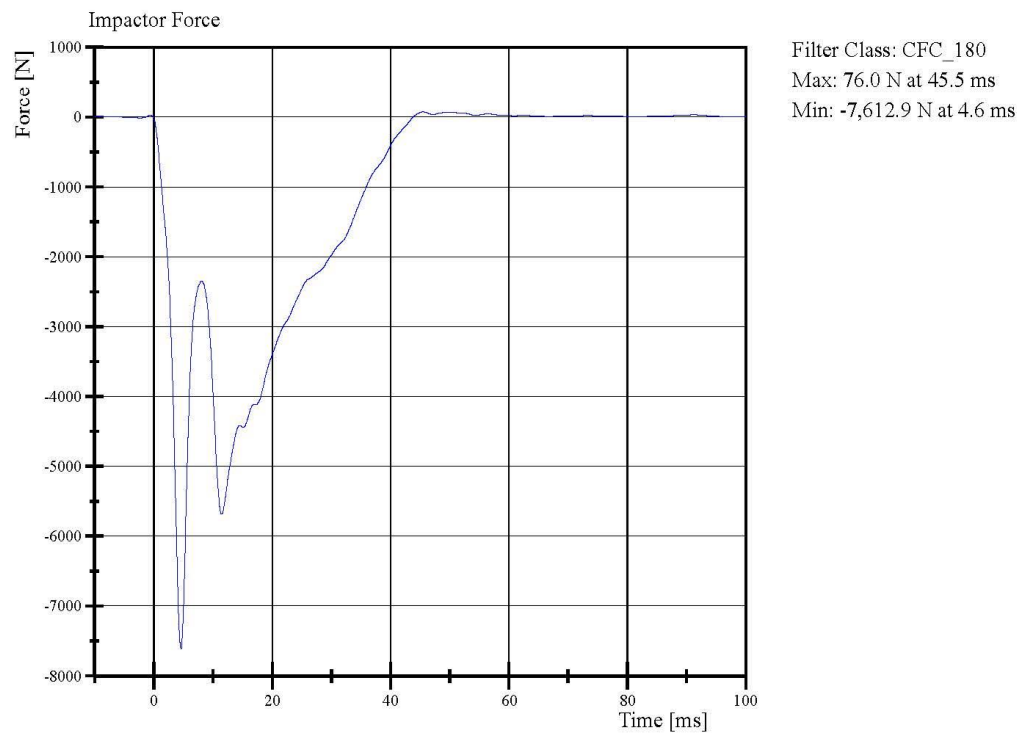
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.06.2019 11:04:42 437



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019



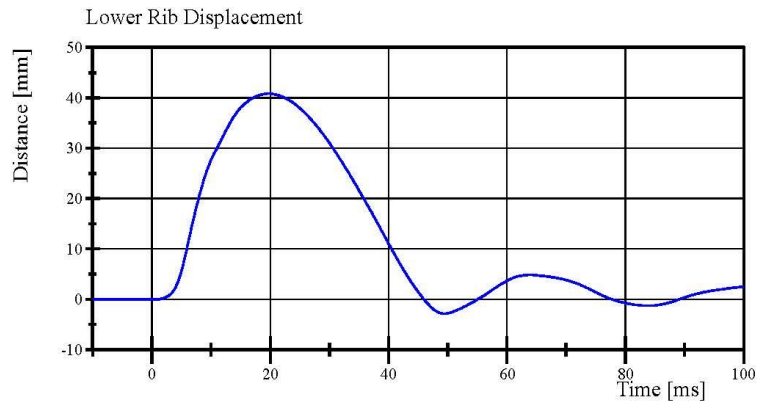
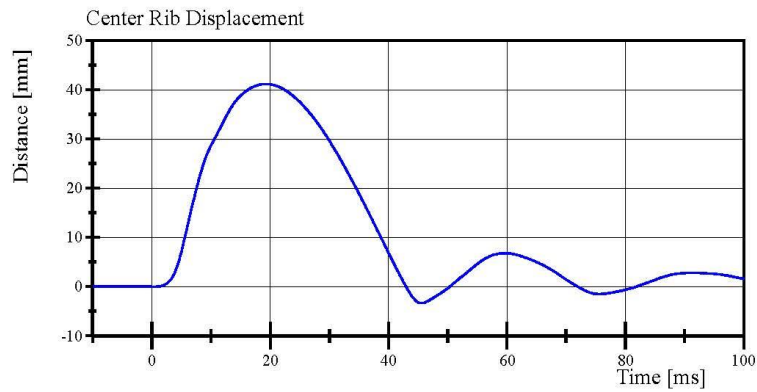
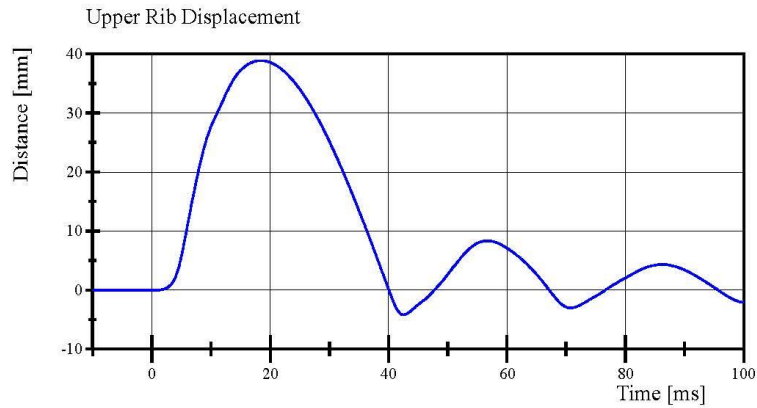
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.06.2019 11:07:45 437



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019



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

12.06.2019 11:07:45 437



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.119 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-48.9 deg	Yes
Time of Peak	39 - 53 ms	44.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	38.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Lumbar S/N: 150365

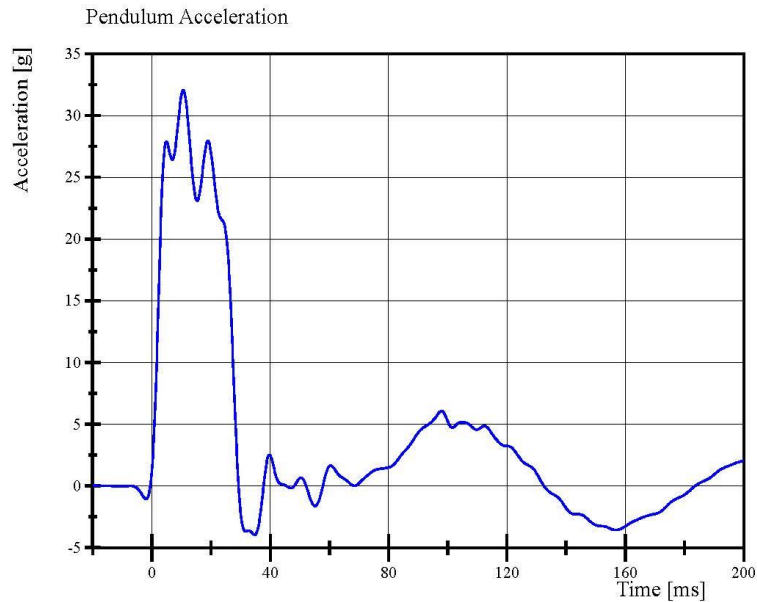
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.05.2019 19:05:39 635

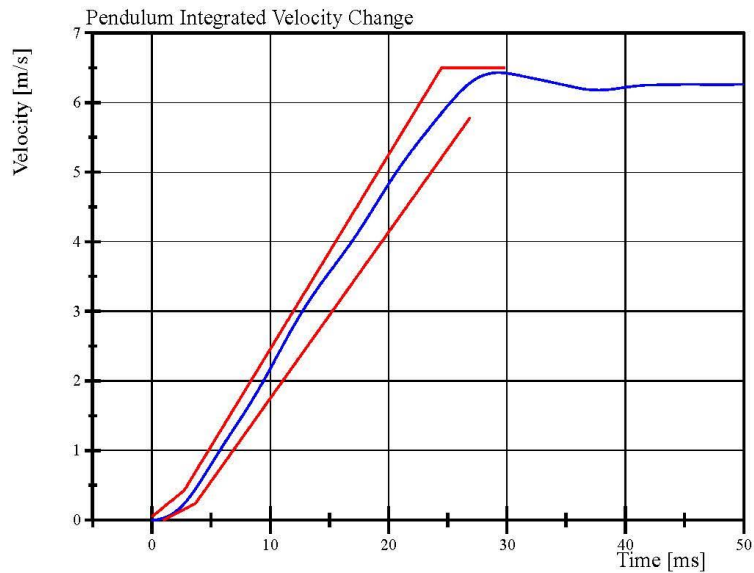


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/5/2019



Filter Class: CFC_60
Max: 32.1 g at 10.6 ms
Min: -3.9 g at 34.7 ms



Filter Class: CFC_60
Max: 6.4 m/s at 29.3 ms
Min: 0.0 m/s at 0.0 ms

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

12.05.2019 19:06:32 635

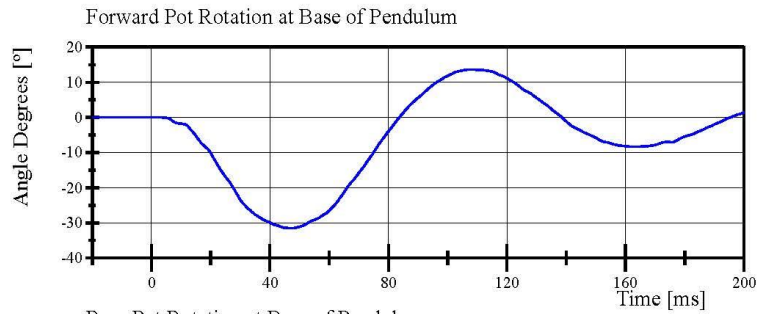


Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 69-1

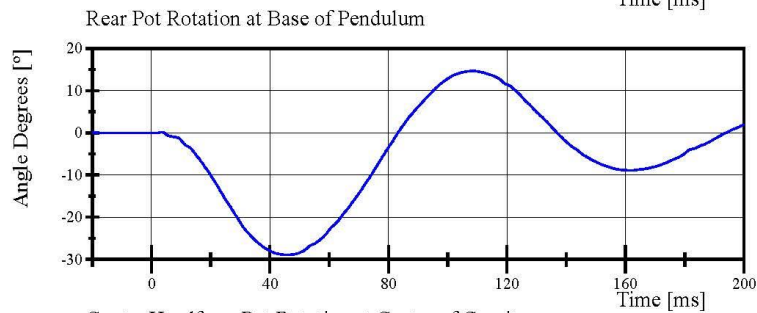
Test Date: 12/5/2019



Filter Class: CFC_180

Max: 13.6 ° at 108.1 ms

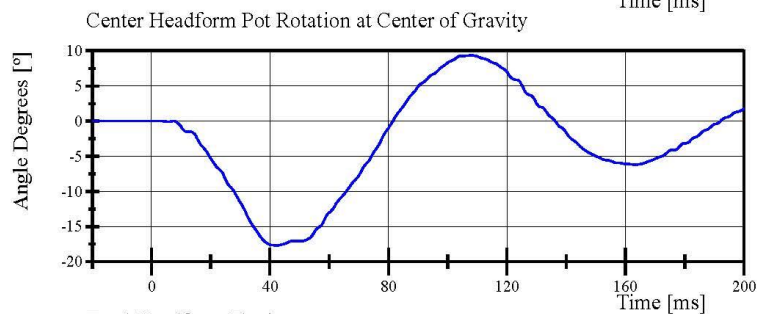
Min: -31.5 ° at 47.4 ms



Filter Class: CFC_180

Max: 14.6 ° at 108.4 ms

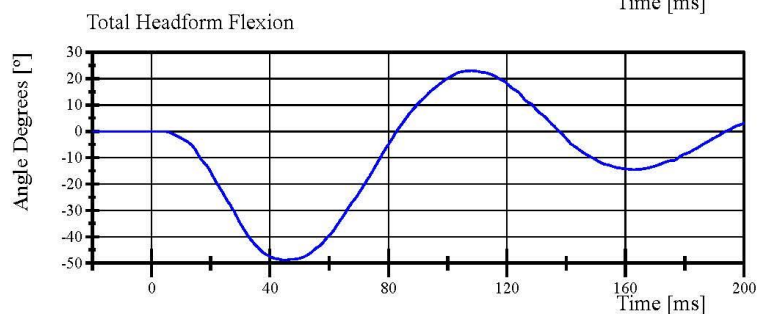
Min: -29.0 ° at 45.7 ms



Filter Class: CFC_180

Max: 9.3 ° at 108.1 ms

Min: -17.7 ° at 42.2 ms



Filter Class: CFC_180

Max: 23.0 ° at 108.1 ms

Min: -48.9 ° at 44.8 ms

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

12.05.2019 19:06:33 635



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.06 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,157.2 N	Yes
Time of Peak	10.6 - 13.0 ms	10.64 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,487.5 N	Yes
Time of Peak	10.0 - 12.3 ms	10.72 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

12.06.2019 11:16:19 567

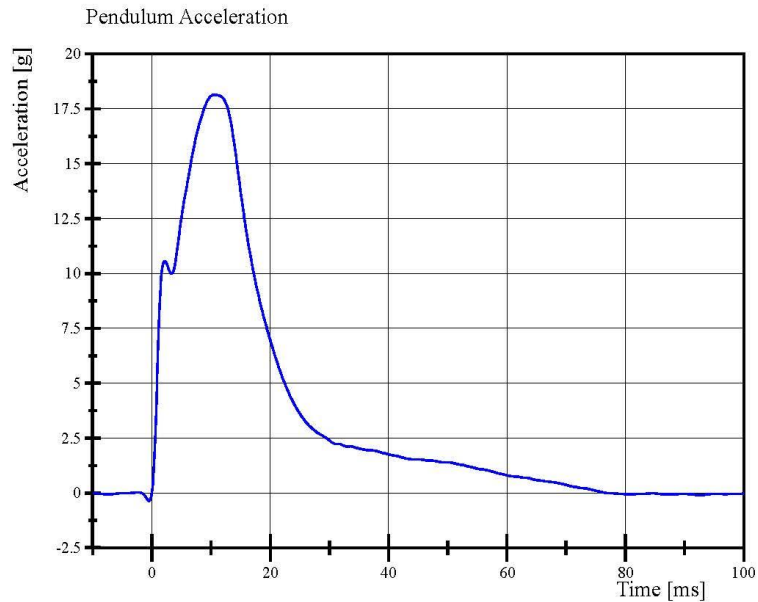


Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 69-1

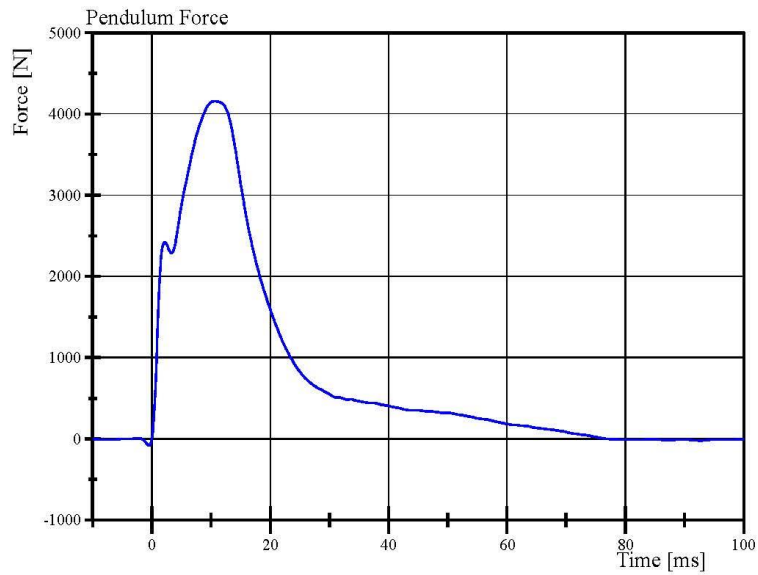
Test Date: 12/6/2019



Filter Class: CFC_180

Max: 18.1 g at 10.6 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,157.2 N at 10.6 ms

Min: -81.4 N at -0.5 ms

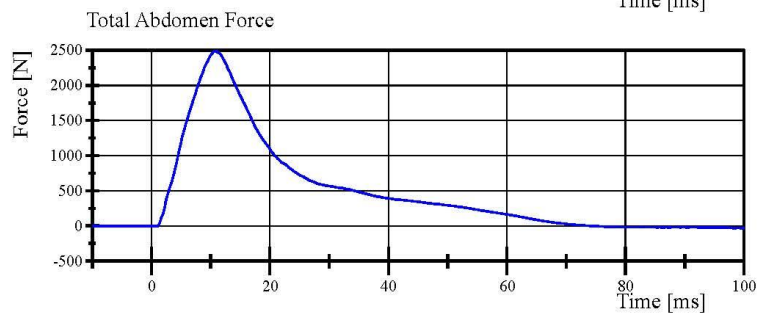
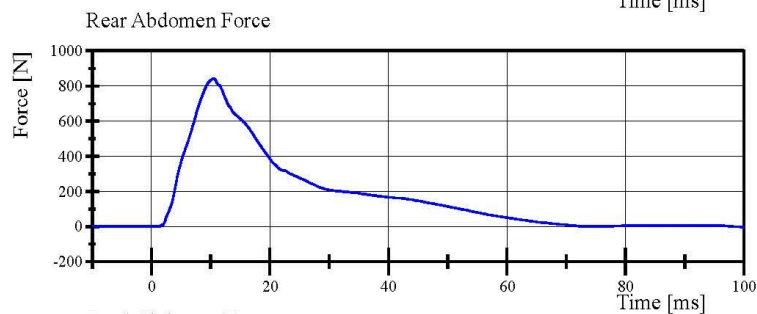
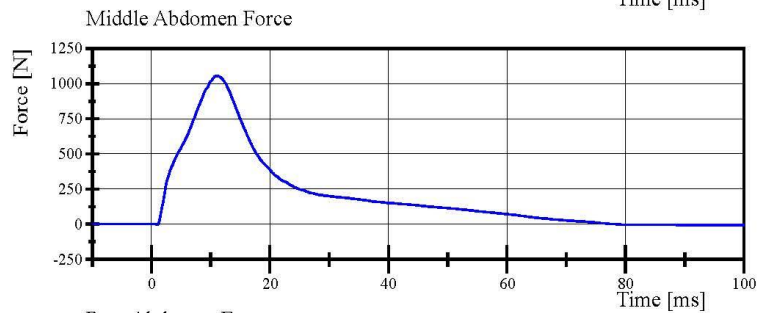
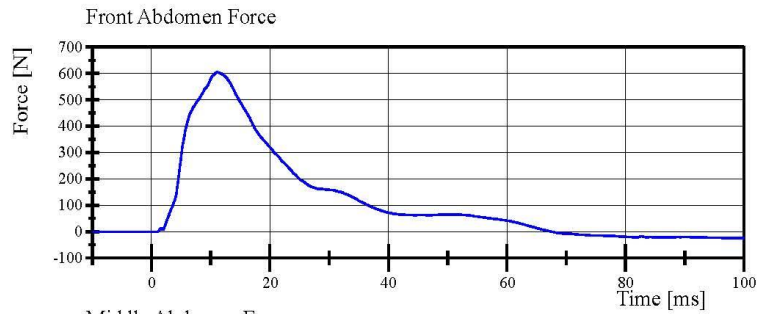
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.06.2019 11:17:24 567



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019



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

12.06.2019 11:17:24 567



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,164.0 N	Yes
Time of Peak	11.8 - 16.1 ms	12.64 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,289.7 N	Yes
Time of Peak	12.2 - 17.0 ms	12.80 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: N/A

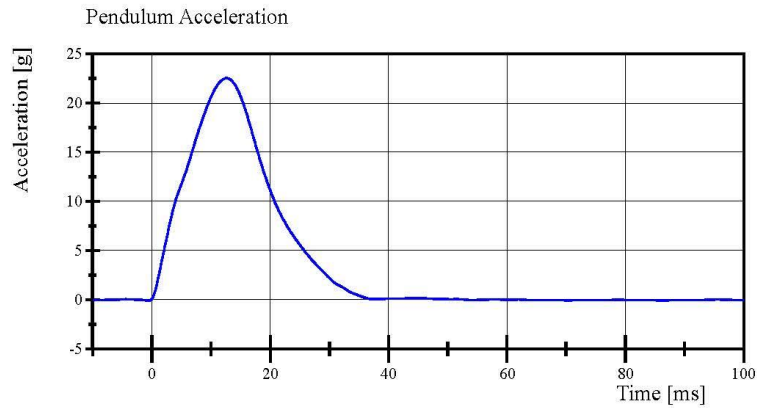
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.06.2019 11:23:32 538

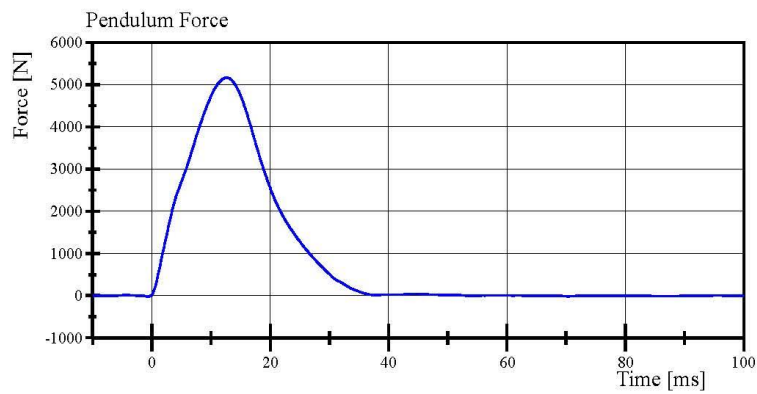


Transportation Research Center Inc.

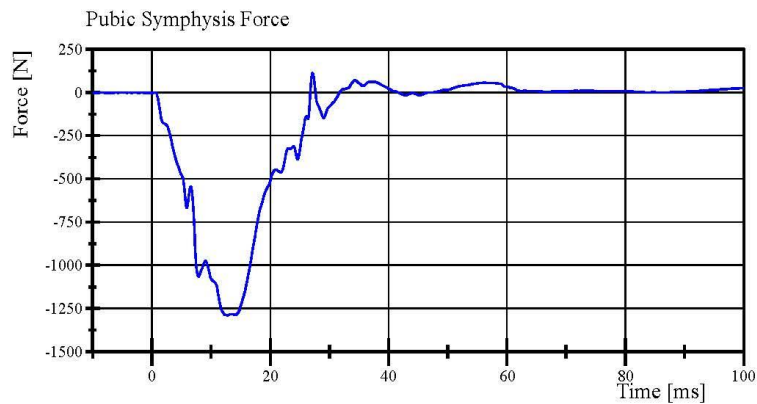
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 69-1
Test Date: 12/6/2019



Filter Class: CFC_180
Max: 22.5 g at 12.6 ms
Min: -0.1 g at -0.6 ms



Filter Class: CFC_180
Max: 5,164.0 N at 12.6 ms
Min: -20.5 N at -0.6 ms



Filter Class: CFC_600
Max: 113.0 N at 27.1 ms
Min: -1,289.7 N at 12.8 ms

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

12.06.2019 11:23:58 538



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 70

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	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	444	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	328	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	201	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. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Resultant Acceleration	125 - 155 g	142.8 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	8.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	< 15 %	3.51 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DP6812

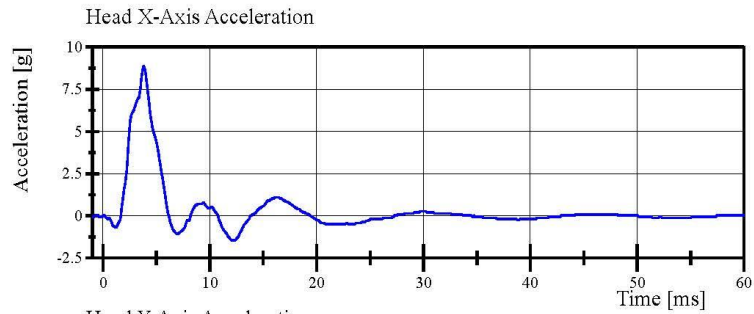
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 11:13:41 326

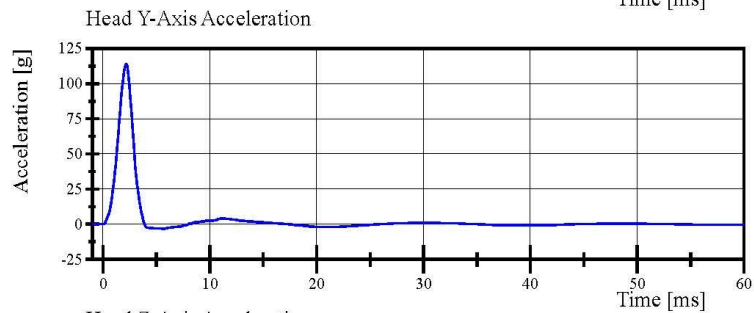


Transportation Research Center Inc.

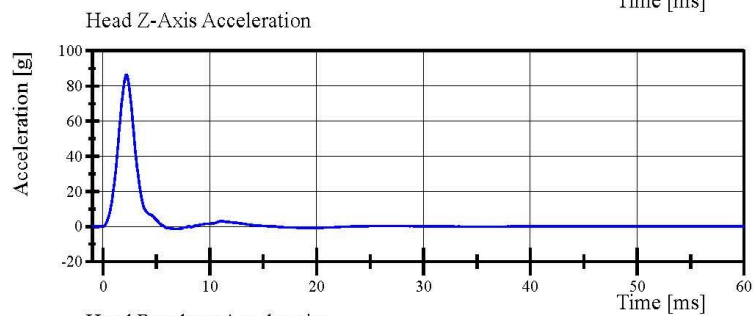
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



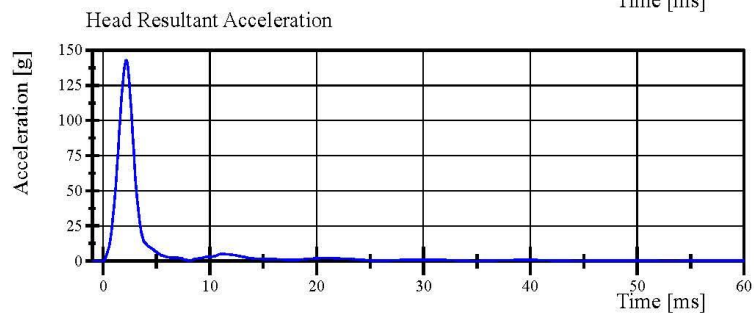
Filter Class: CFC_1000
Max: 8.9 g at 3.8 ms
Min: -1.4 g at 12.0 ms



Filter Class: CFC_1000
Max: 113.9 g at 2.2 ms
Min: -3.1 g at 5.7 ms



Filter Class: CFC_1000
Max: 86.4 g at 2.2 ms
Min: -1.4 g at 6.7 ms



Filter Class: CFC_1000
Max: 142.8 g at 2.2 ms
Min: 0.0 g at -0.7 ms

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

12.11.2019 11:14:07 326



Transportation Research Center Inc.

Left Lateral Neck
ES-2re Serial No. F030 Certification No. 70-2
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-51.6 deg	Yes
Time of Peak	54 - 66 ms	55.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	57.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 05053

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

12.11.2019 12:36:36 1468

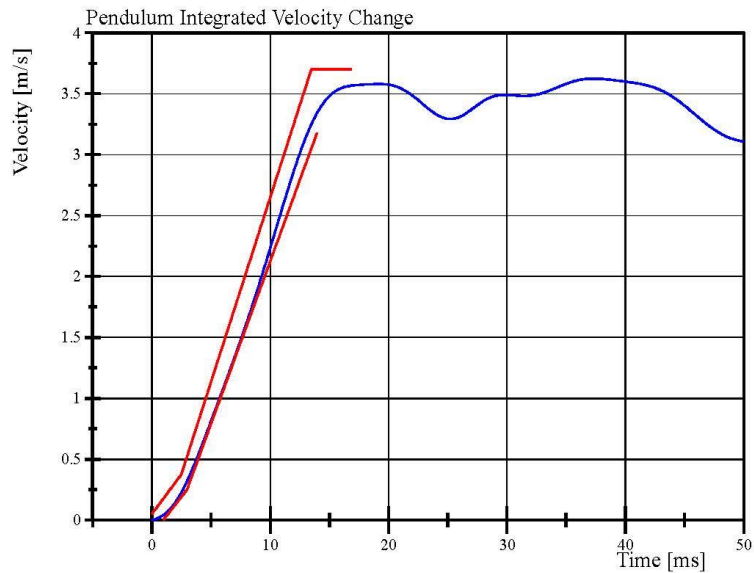
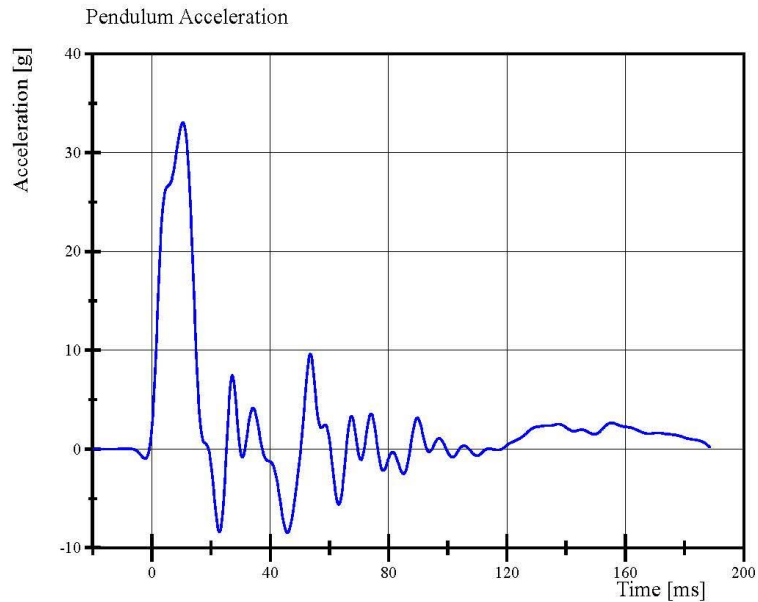


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 70-2

Test Date: 12/11/2019



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

12.11.2019 12:37:17 1468

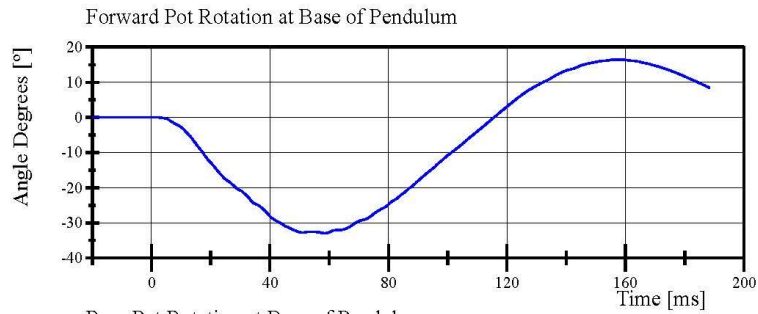


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 70-2

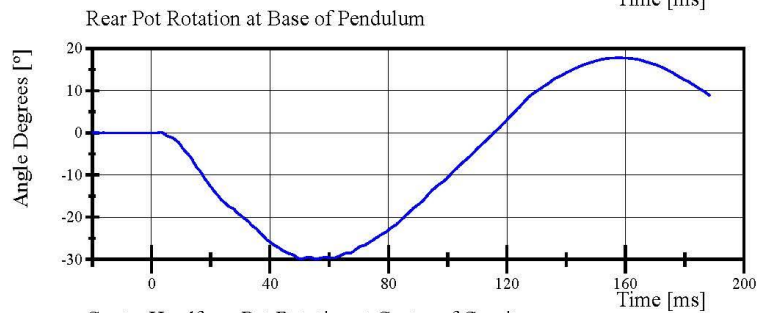
Test Date: 12/11/2019



Filter Class: CFC_180

Max: 16.4 ° at 156.6 ms

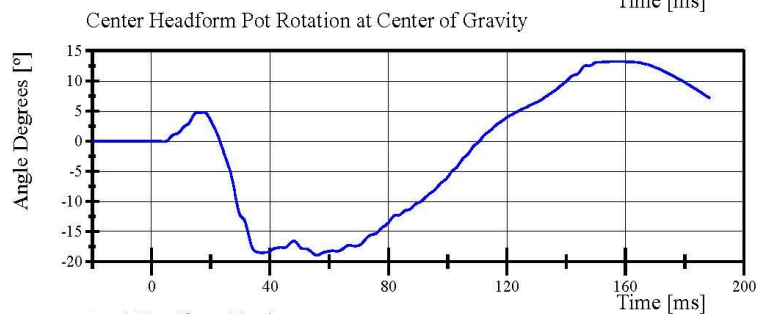
Min: -32.9 ° at 58.4 ms



Filter Class: CFC_180

Max: 17.8 ° at 157.5 ms

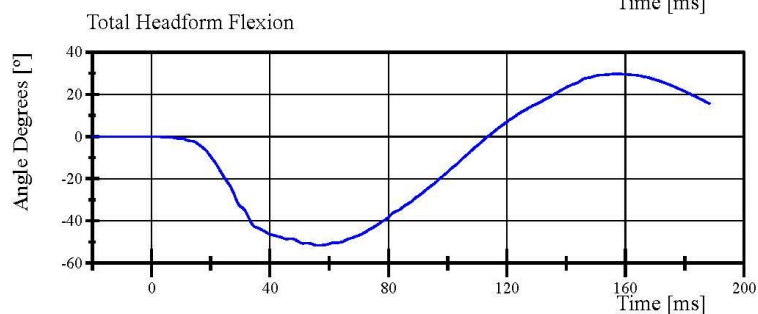
Min: -29.9 ° at 50.4 ms



Filter Class: CFC_180

Max: 13.2 ° at 159.4 ms

Min: -19.0 ° at 55.8 ms



Filter Class: CFC_180

Max: 29.6 ° at 156.6 ms

Min: -51.6 ° at 55.9 ms

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

12.11.2019 12:37:17 1468



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-8.79 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: 175-3501-07014

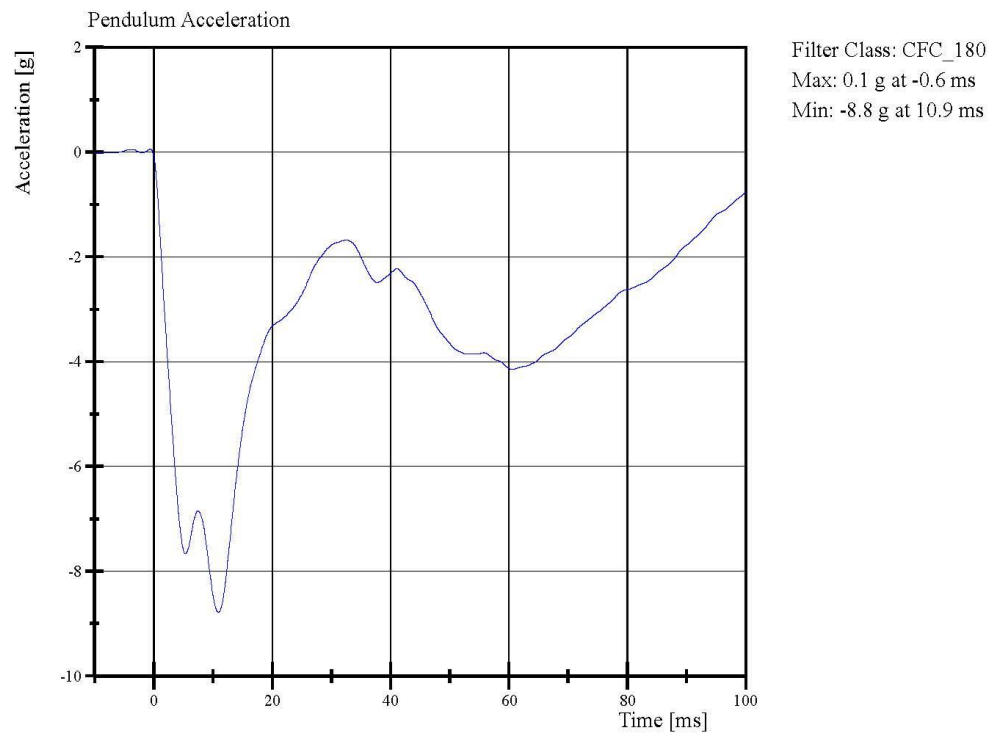
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 13:37:21 537



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



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

12.11.2019 13:37:50 537



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462mm

Rib Module: 175-4008-A

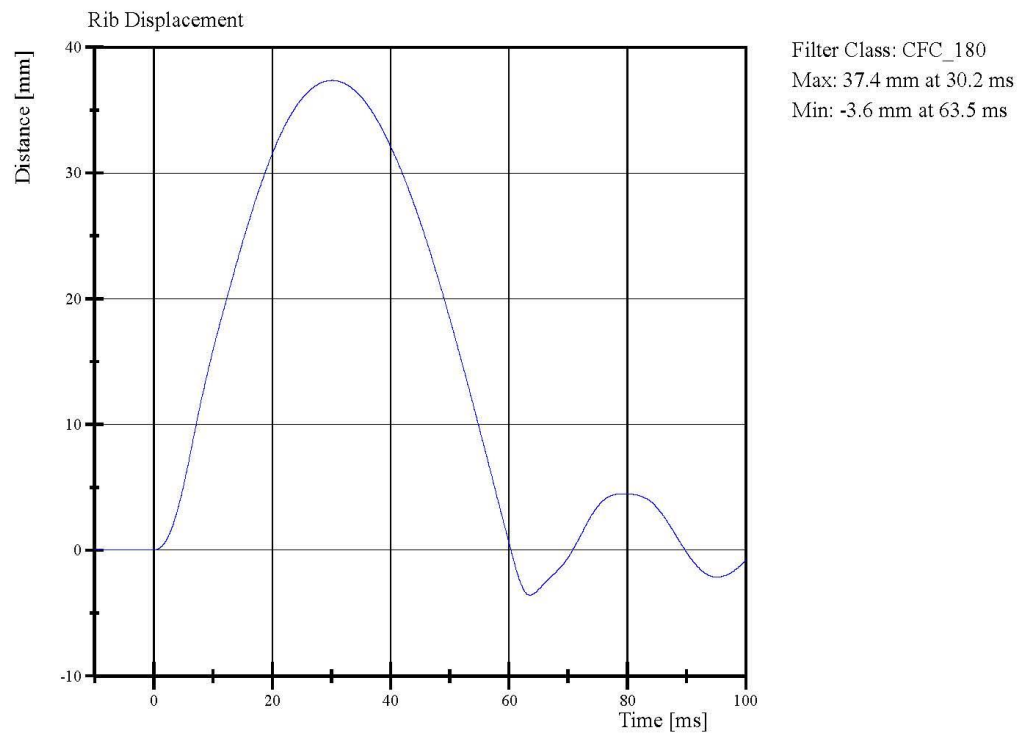
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 09:44:17 474



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



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

12.11.2019 09:44:51 474



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

Rib Module: 175-4008-A

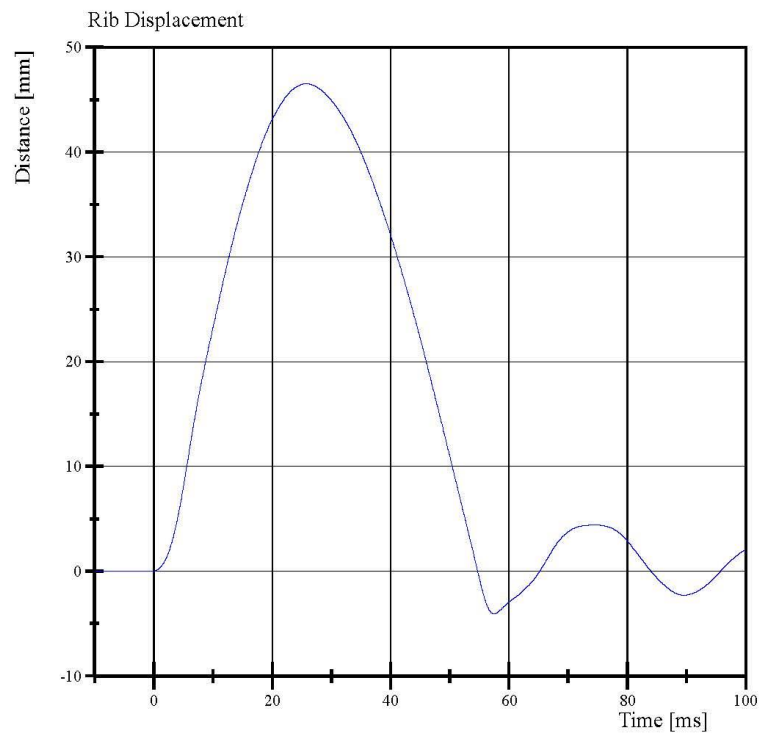
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 09:34:06 426



Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 46.5 mm at 25.8 ms
Min: -4.1 mm at 57.4 ms

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

12.11.2019 09:34:43 426



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

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

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

Rib Module: 175-4008-A

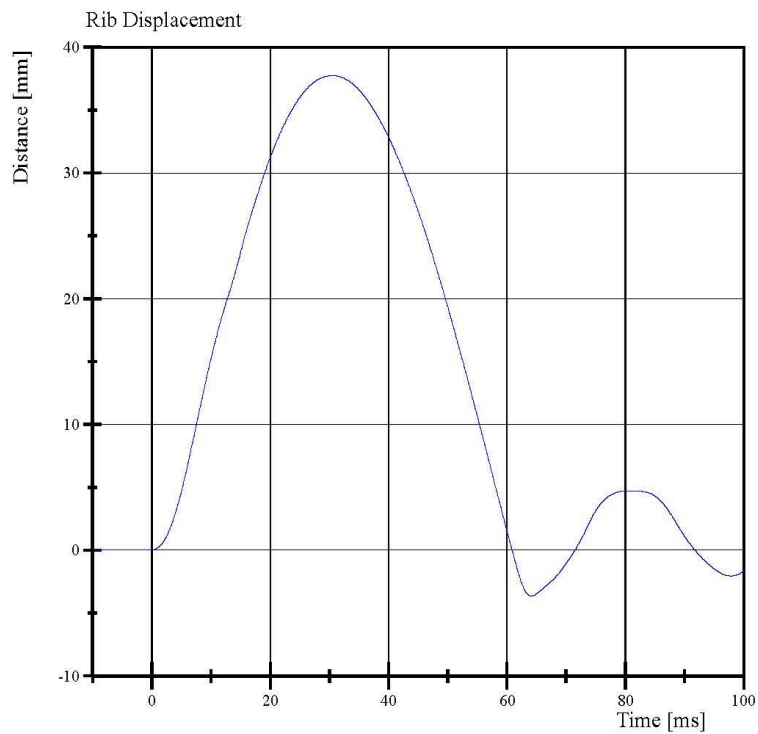
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 09:56:08 475



Transportation Research Center Inc.

3.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 37.7 mm at 30.5 ms
Min: -3.6 mm at 64.2 ms

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

12.11.2019 09:56:53 475



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	49.3 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816 mm

Rib Module: 175-4008-A

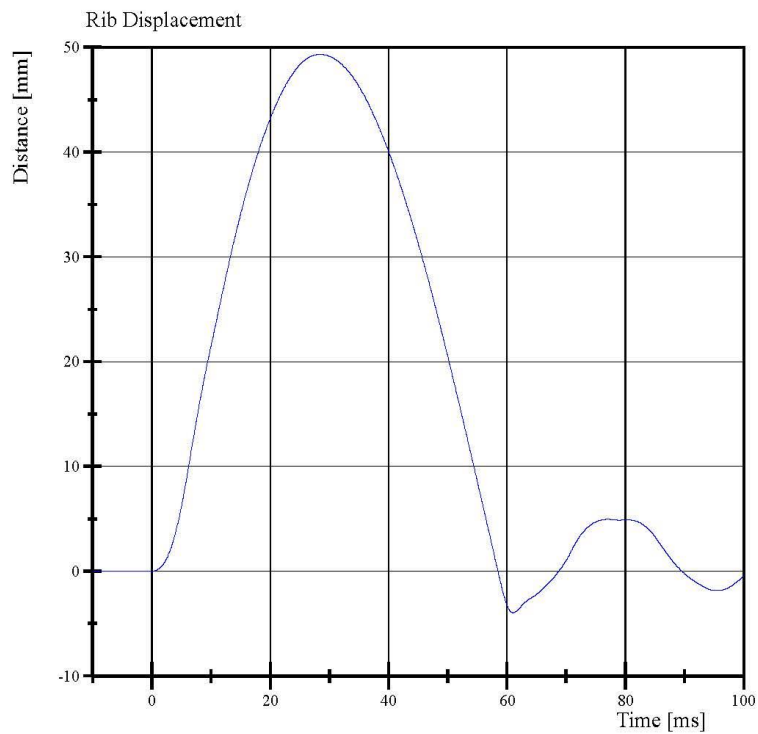
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 09:50:22 418



Transportation Research Center Inc.

4.0 m/s Middle Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 49.3 mm at 28.5 ms
Min: -4.0 mm at 61.0 ms

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

12.11.2019 09:50:55 418



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462 mm

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

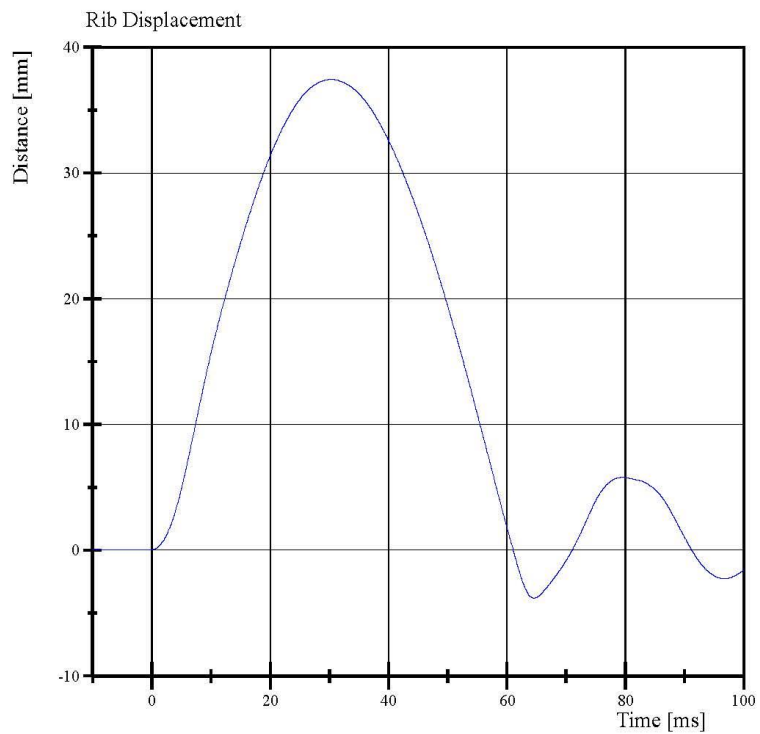
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 10:10:43 499



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 37.4 mm at 30.3 ms
Min: -3.8 mm at 64.6 ms

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

12.11.2019 10:11:29 499



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	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-06-017

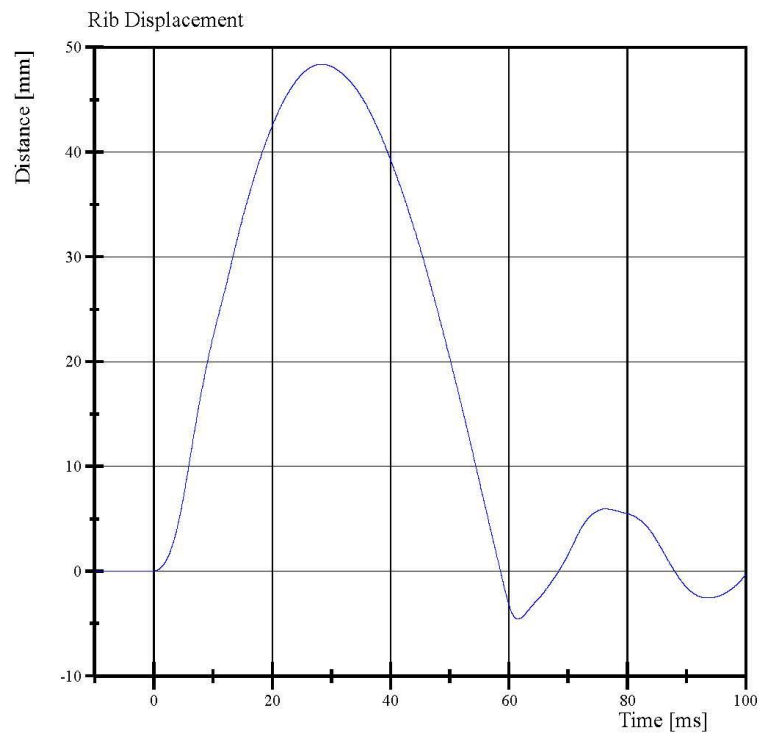
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 10:02:42 409



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 48.4 mm at 28.4 ms
Min: -4.6 mm at 61.5 ms

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

12.11.2019 10:03:20 409



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.472 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,597.3 N	Yes
Upper Rib Displacement	34 - 41 mm	38.4 mm	Yes
Center Rib Displacement	37 - 45 mm	40.9 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.6 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib Module S/N: 175-4008-A

Upper Rib Foam S/N: 175-4003-EK6973

Middle Rib Module S/N: 175-4008-A

Middle Rib Foam S/N: 175-4003-EK6970

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

Lower Rib Foam S/N: 175-4008-EK6971

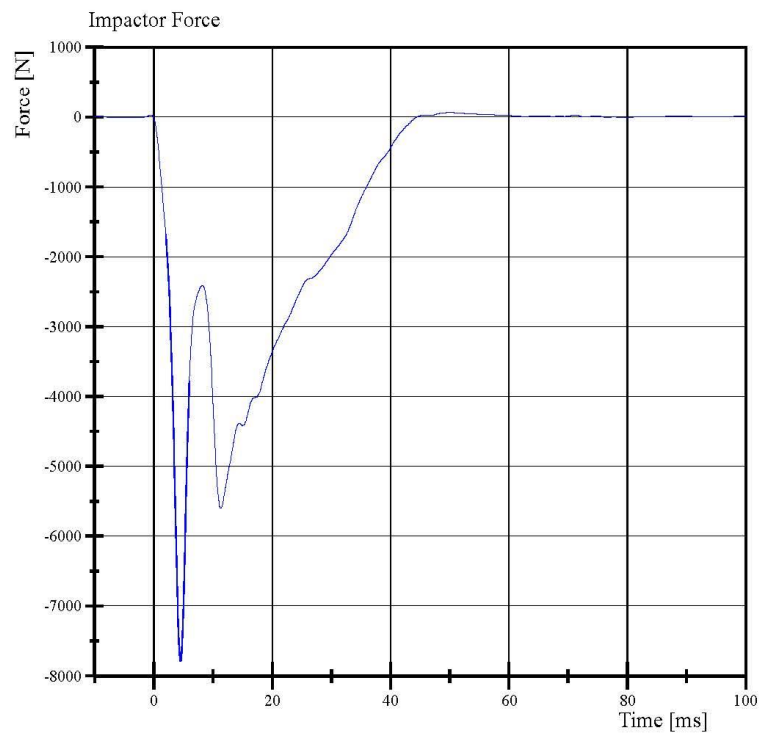
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 13:46:52 400



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 66.9 N at 50.1 ms
Min: -7,788.1 N at 4.5 ms

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

12.11.2019 13:47:55 400

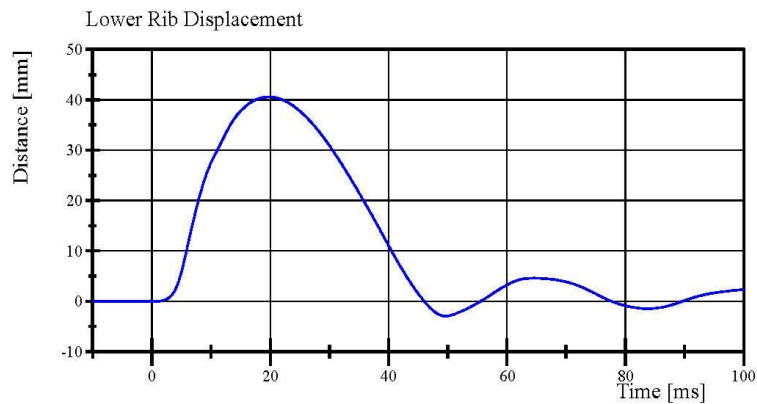
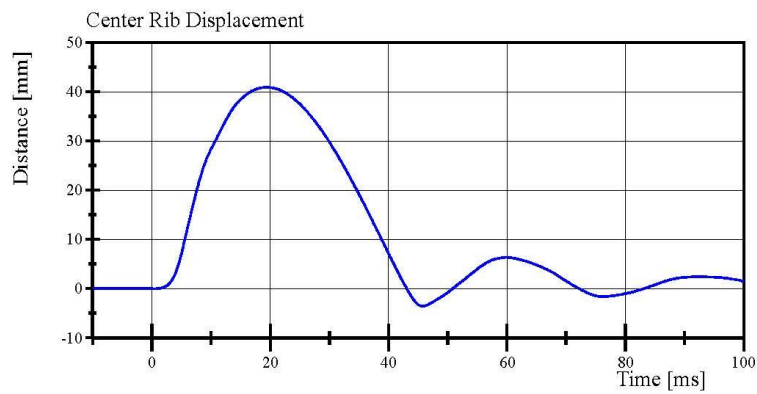
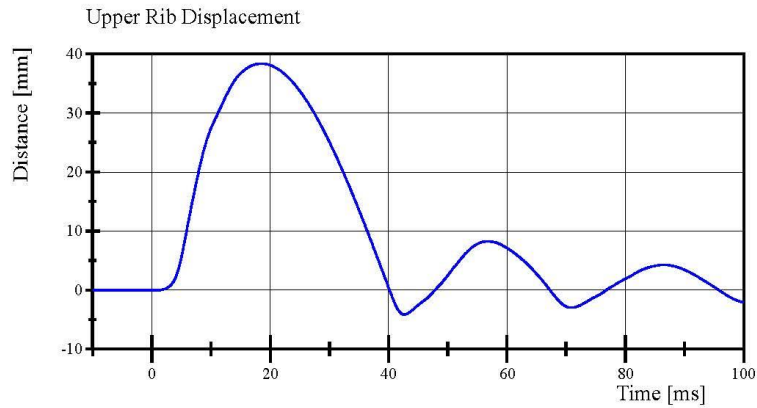


Transportation Research Center Inc.

Left Lower Thorax

ES-2re Serial No. F030 Certification No. 70-1

Test Date: 12/11/2019



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

12.11.2019 13:47:55 400



Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 70-3
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.117 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-50.4 deg	Yes
Time of Peak	39 - 53 ms	45.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Lumbar S/N: 150365

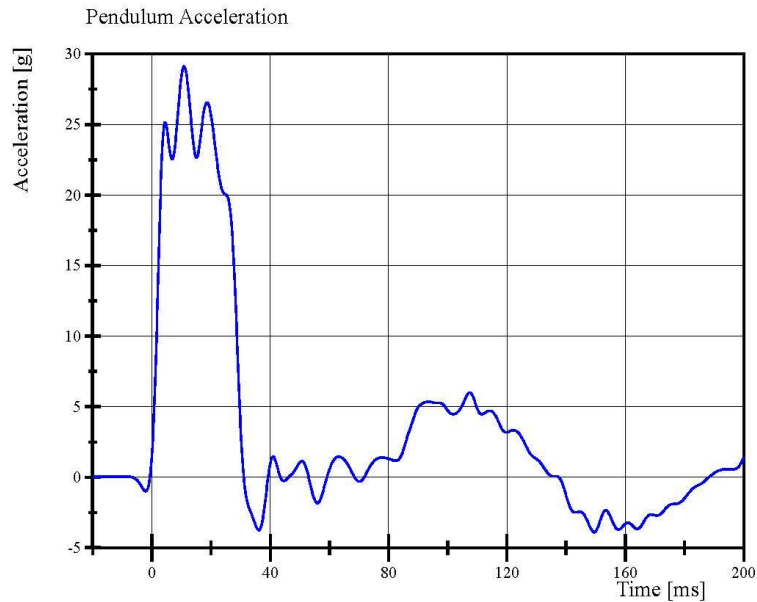
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 12:56:06 638

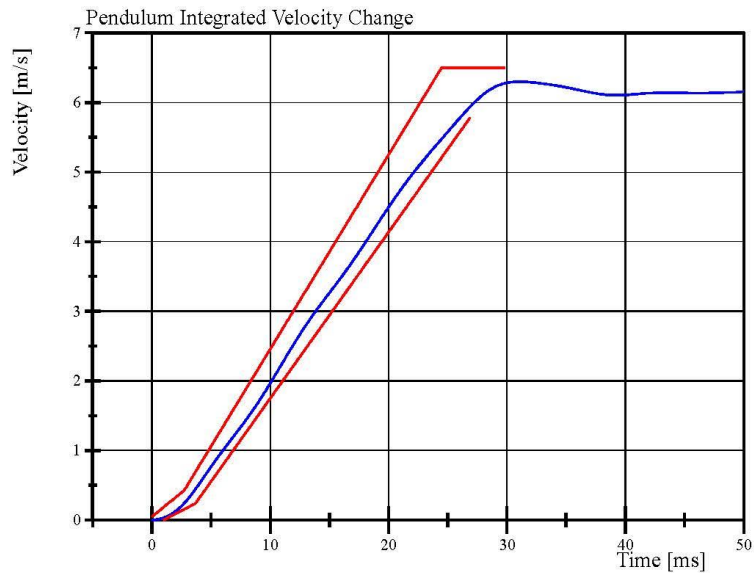


Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 70-3
Test Date: 12/11/2019



Filter Class: CFC_60
Max: 29.1 g at 10.9 ms
Min: -3.9 g at 149.5 ms



Filter Class: CFC_60
Max: 6.3 m/s at 31.0 ms
Min: 0.0 m/s at 0.0 ms

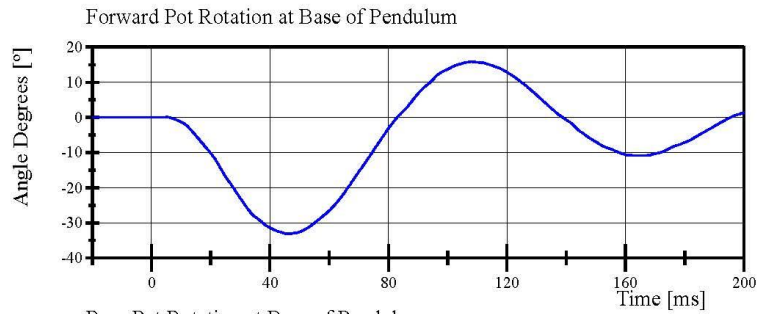
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 12:56:46 638

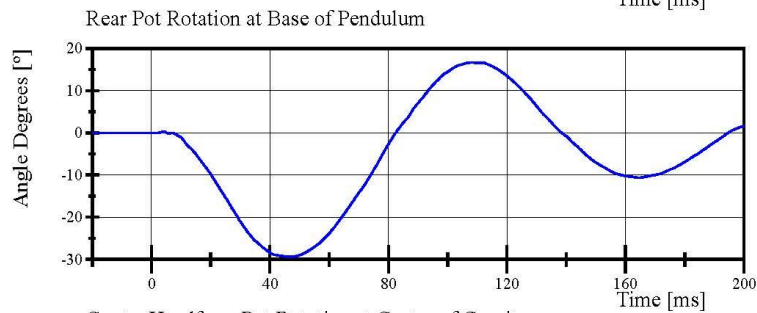


Transportation Research Center Inc.

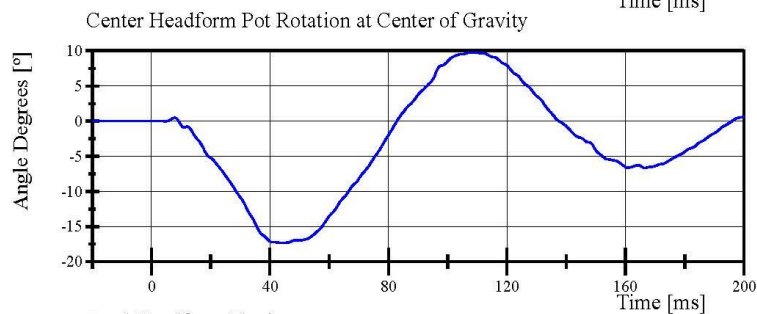
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 70-3
Test Date: 12/11/2019



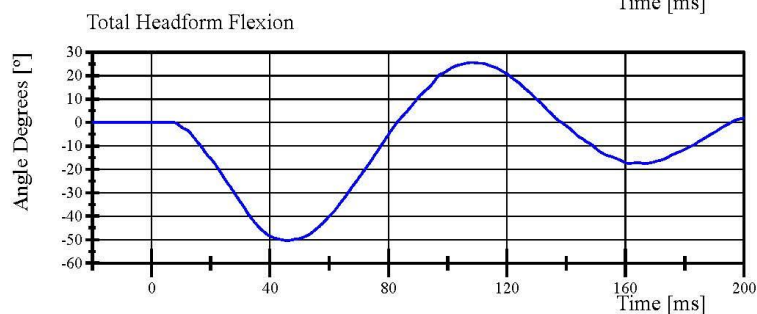
Filter Class: CFC_180
Max: 15.8 ° at 108.0 ms
Min: -33.1 ° at 46.1 ms



Filter Class: CFC_180
Max: 16.7 ° at 108.1 ms
Min: -29.4 ° at 46.4 ms



Filter Class: CFC_180
Max: 9.8 ° at 108.2 ms
Min: -17.3 ° at 43.8 ms



Filter Class: CFC_180
Max: 25.6 ° at 108.1 ms
Min: -50.4 ° at 45.9 ms

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

12.11.2019 12:56:47 638



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.05 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,283.1 N	Yes
Time of Peak	10.6 - 13.0 ms	11.28 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,353.0 N	Yes
Time of Peak	10.0 - 12.3 ms	10.64 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen S/N: 1066

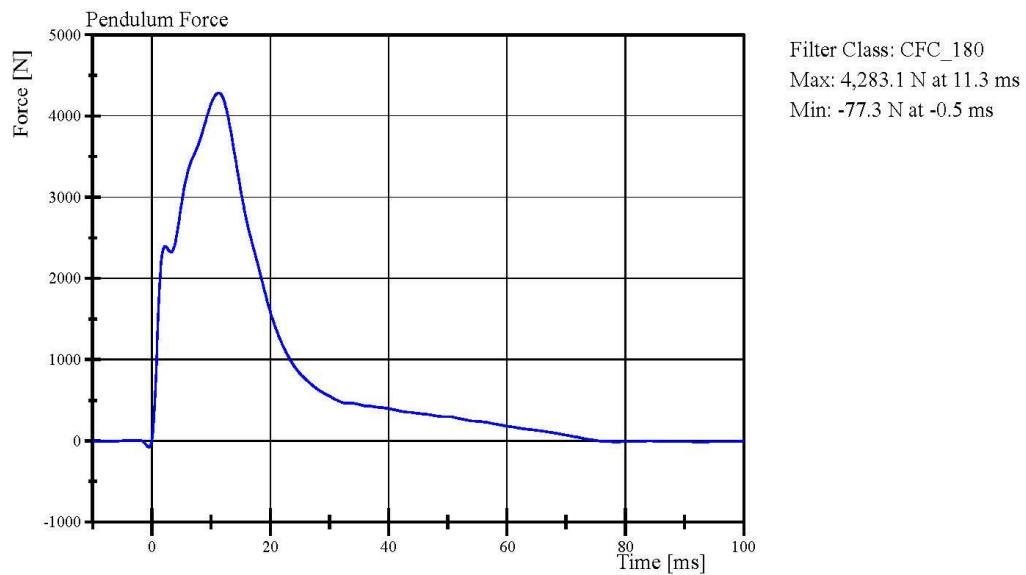
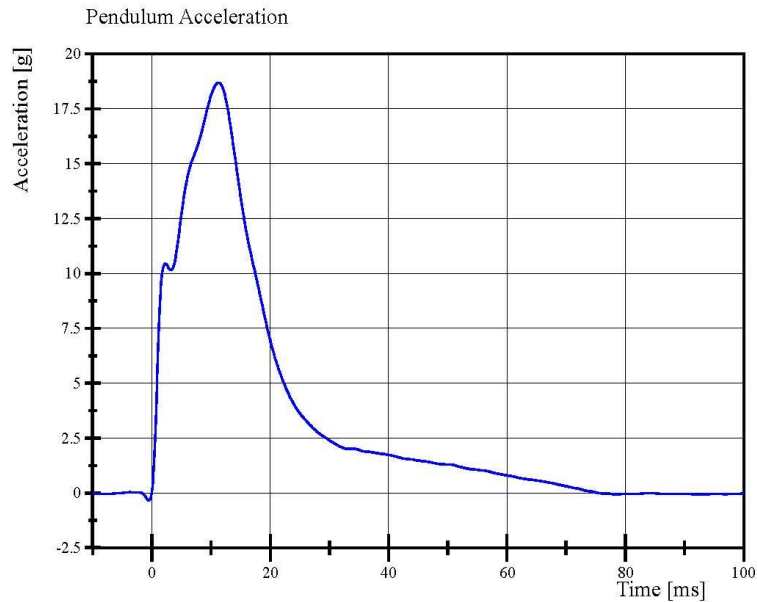
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 14:12:57 525



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



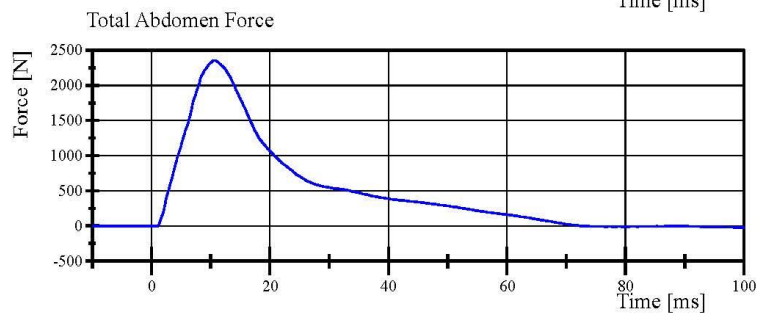
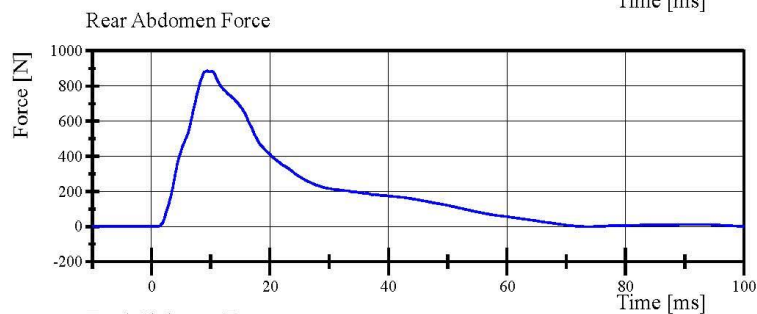
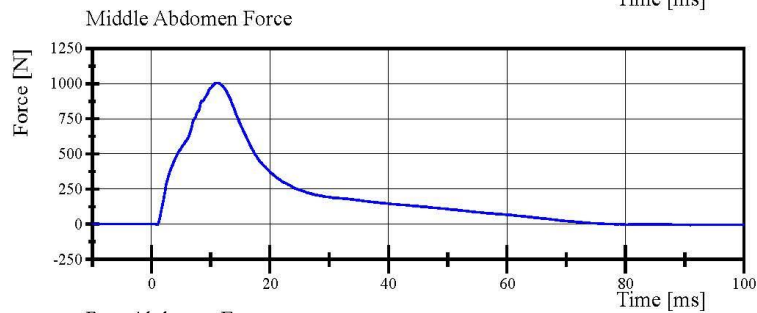
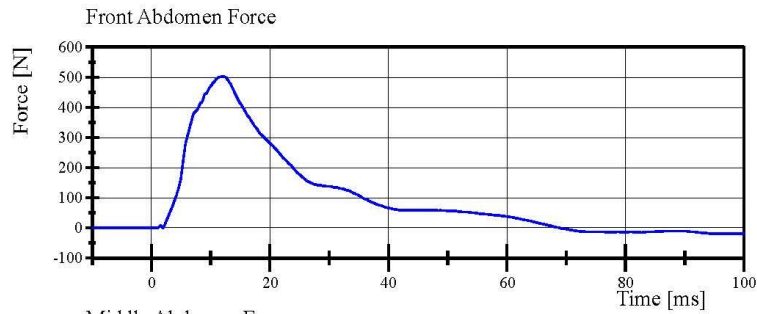
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 14:13:23 525



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



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

12.11.2019 14:13:24 525



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,189.7 N	Yes
Time of Peak	11.8 - 16.1 ms	12.64 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,318.2 N	Yes
Time of Peak	12.2 - 17.0 ms	12.72 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: N/A

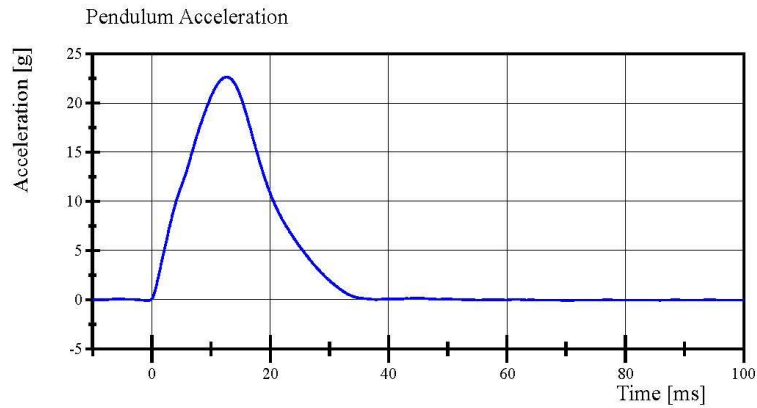
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

12.11.2019 14:22:28 509

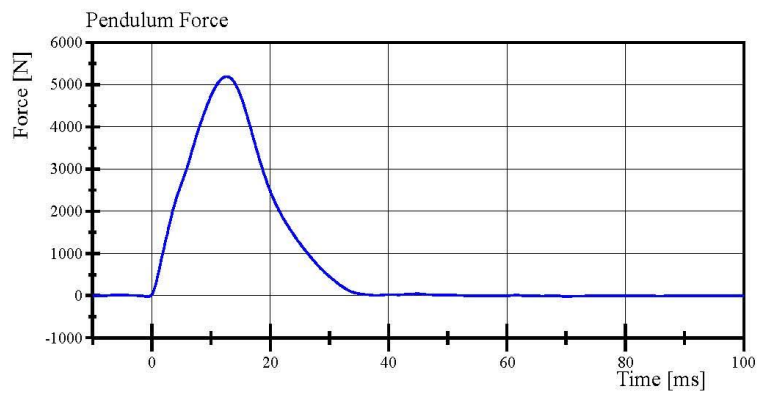


Transportation Research Center Inc.

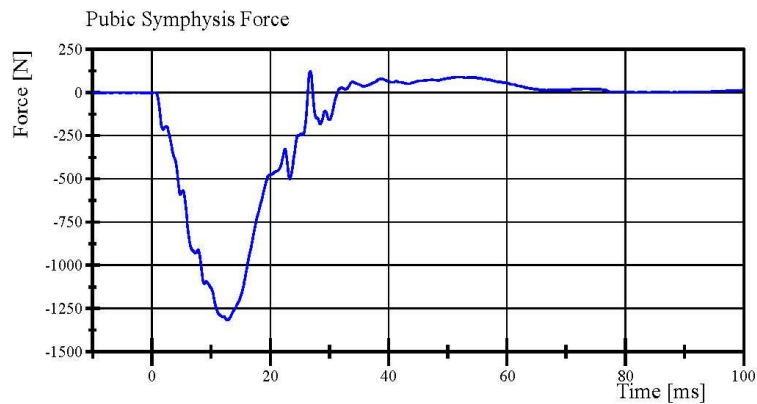
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 70-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 22.6 g at 12.6 ms
Min: -0.1 g at -0.7 ms



Filter Class: CFC_180
Max: 5,189.7 N at 12.6 ms
Min: -22.6 N at -0.7 ms



Filter Class: CFC_600
Max: 122.9 N at 26.8 ms
Min: -1,318.2 N at 12.7 ms

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

12.11.2019 14:22:52 509



Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No. 77

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	145	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	532	Yes
L	Popliteal Height	343.0 - 369.0	349	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	197	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	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	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	878	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 77-1

Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-4.1 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	1.35 %	Yes

Test meets specifications.

Condition: Used

Comments:

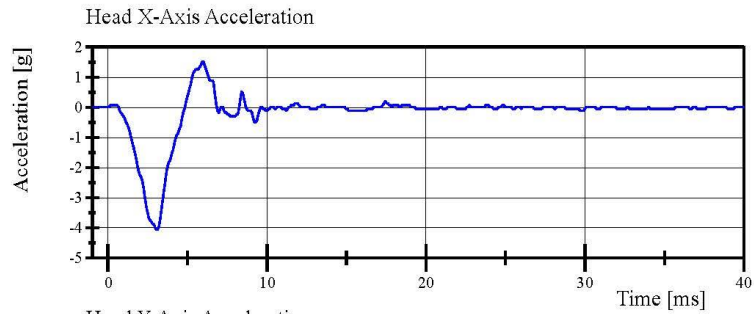
Head Skin S/N: 1253

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 77-1

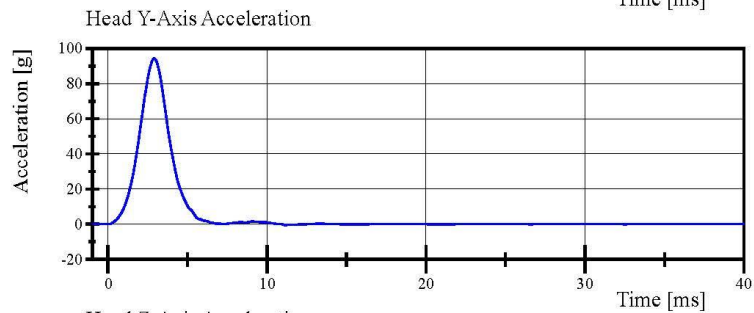
Test Date: 12/5/2019



Filter Class: CFC_1000

Max: 1.5 g at 5.9 ms

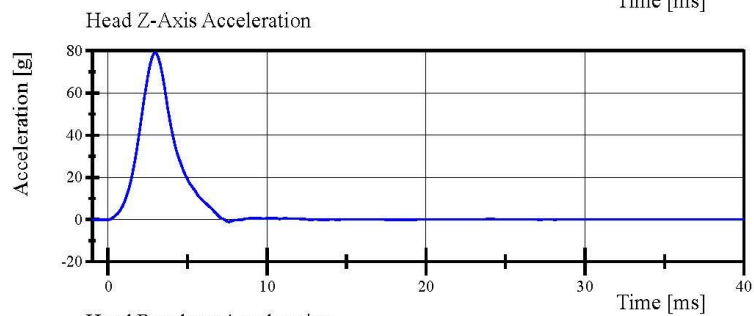
Min: -4.1 g at 3.0 ms



Filter Class: CFC_1000

Max: 94.4 g at 2.9 ms

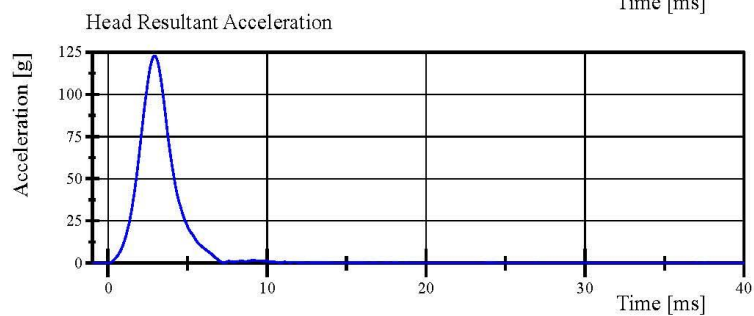
Min: -0.4 g at 11.1 ms



Filter Class: CFC_1000

Max: 79.1 g at 3.0 ms

Min: -1.1 g at 7.6 ms



Filter Class: CFC_1000

Max: 123.0 g at 2.9 ms

Min: 0.0 g at -1.0 ms

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

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Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 77-1

Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.599 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.547 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.750 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.031 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.888 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.907 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.6 deg	Yes
Time of Peak	50 - 70 ms	60.6 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.3 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	119.4 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 180-2001-606

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

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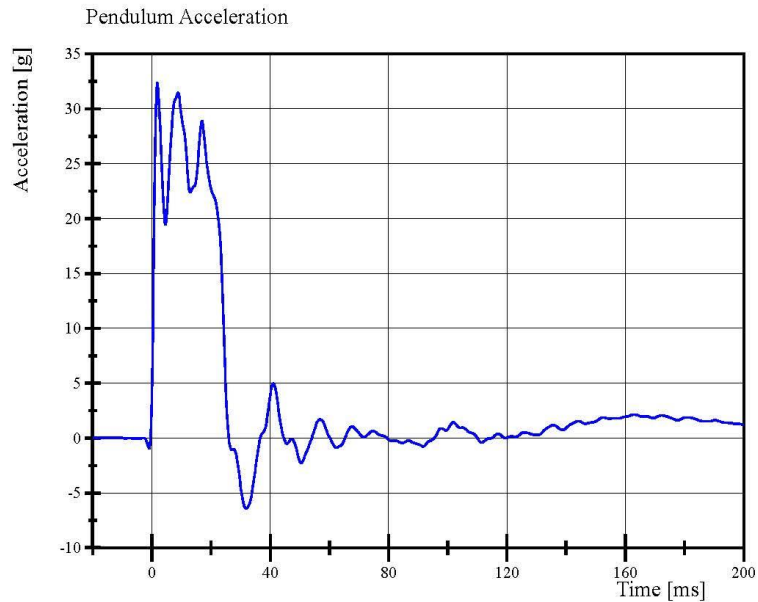


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 77-1

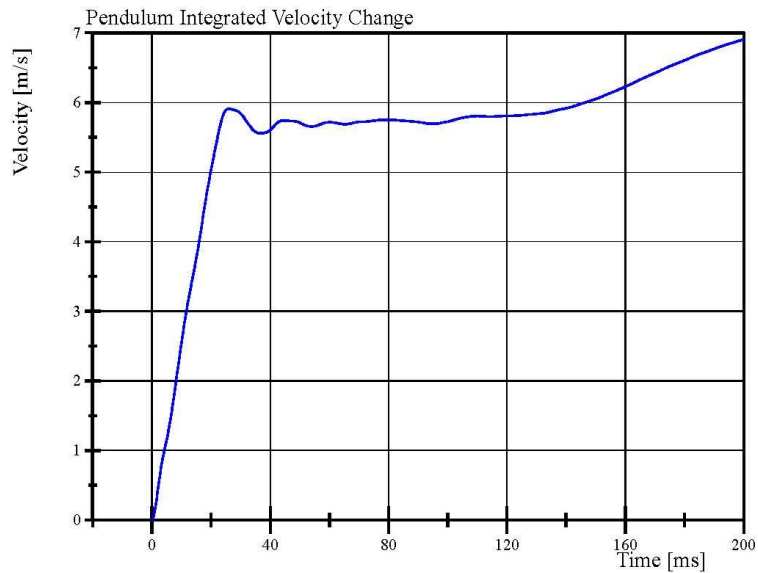
Test Date: 12/5/2019



Filter Class: CFC_180

Max: 32.4 g at 1.8 ms

Min: -6.4 g at 31.8 ms



Filter Class: CFC_180

Max: 6.9 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

12.05.2019 13:49:23 718

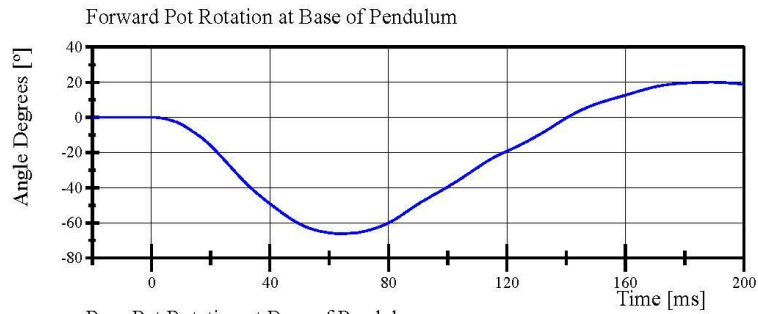


Transportation Research Center Inc.

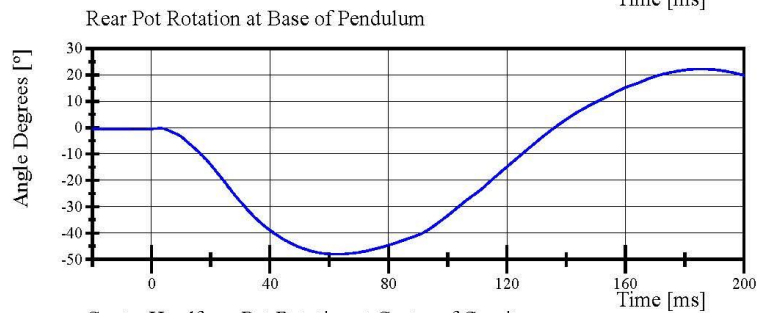
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 77-1

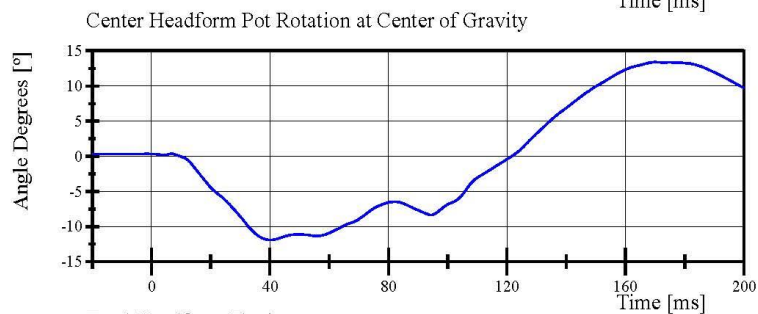
Test Date: 12/5/2019



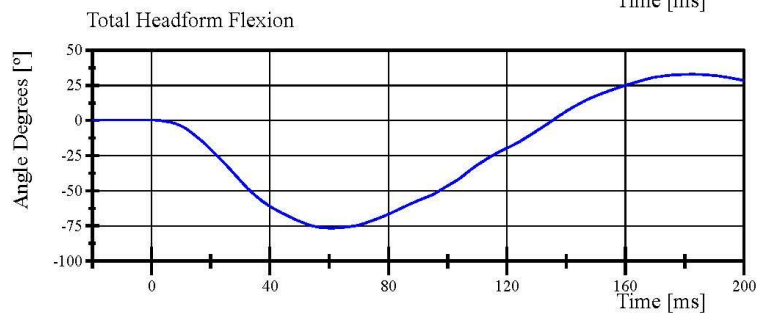
Filter Class: CFC_60
Max: 20.1 ° at 189.1 ms
Min: -66.1 ° at 63.9 ms



Filter Class: CFC_60
Max: 22.2 ° at 185.3 ms
Min: -48.1 ° at 62.5 ms



Filter Class: CFC_60
Max: 13.4 ° at 170.0 ms
Min: -11.9 ° at 40.2 ms



Filter Class: CFC_60
Max: 32.9 ° at 182.6 ms
Min: -76.6 ° at 60.6 ms

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

12.05.2019 13:49:23 718

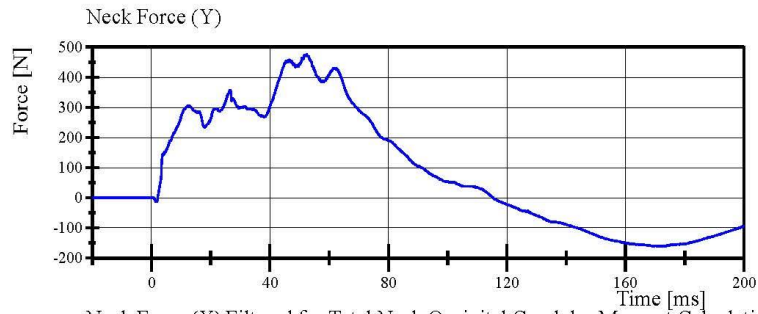


Transportation Research Center Inc.

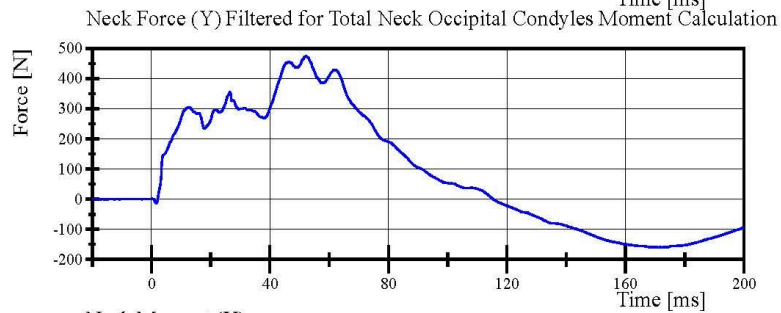
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 77-1

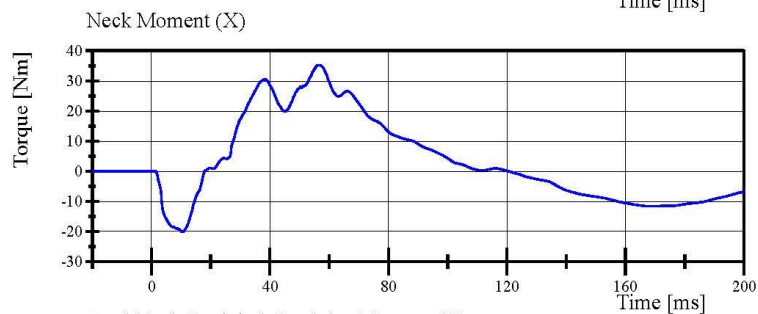
Test Date: 12/5/2019



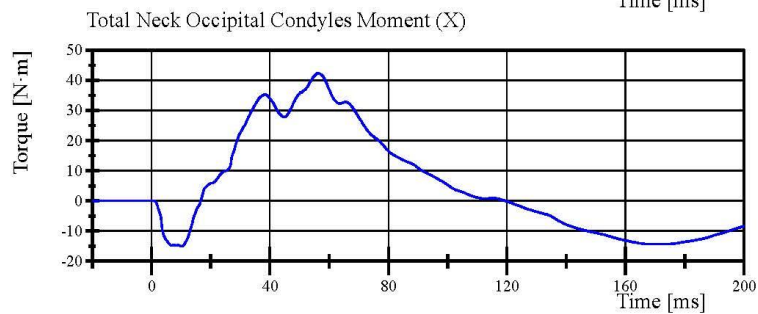
Filter Class: CFC_1000
Max: 476.0 N at 52.3 ms
Min: -161.0 N at 172.2 ms



Filter Class: CFC_600
Max: 474.4 N at 52.2 ms
Min: -160.7 N at 172.3 ms



Filter Class: CFC_600
Max: 35.2 Nm at 56.6 ms
Min: -20.1 Nm at 10.4 ms



Filter Class: Without_(Constar
Max: 42.3 N·m at 56.2 ms
Min: -15.1 N·m at 10.2 ms

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

12.05.2019 13:49:23 718



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.9 g	Yes
Shoulder Displacement	28 - 37 mm	33.0 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	17.5 g	Yes

Test meets specifications.

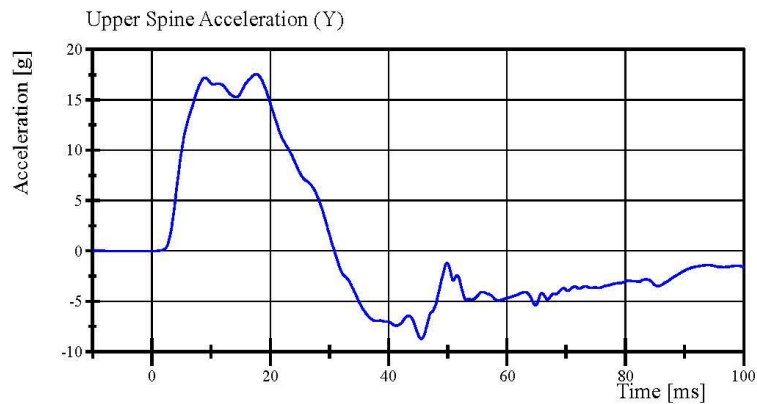
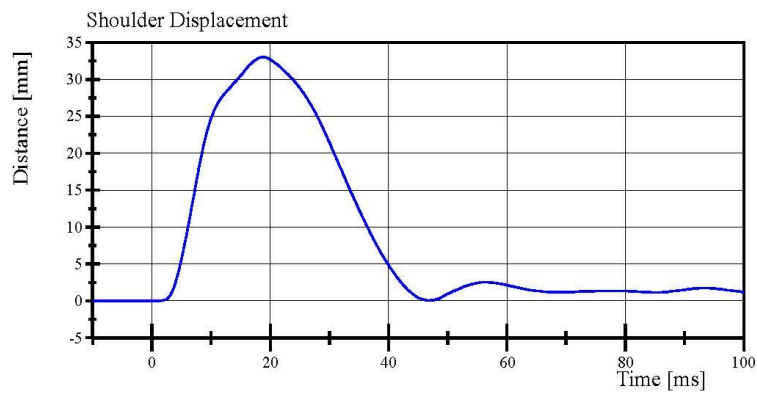
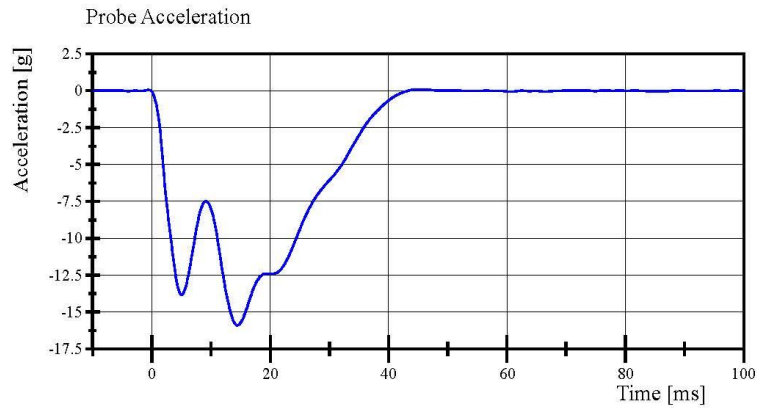
Condition: Used

Comments:

Left Arm S/N: 952

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019



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

12.05.2019 08:36:00 842



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.742 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-31.8 g	Yes
Shoulder Displacement	31 - 40 mm	35.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.2 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.6 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	36.0 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.2 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Shoulder Rib S/N: DM4450

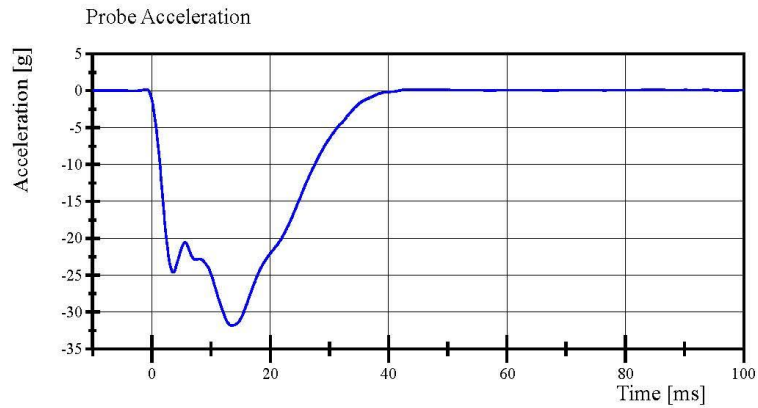
Upper Thorax Rib S/N: 2135

Middle Thorax Rib S/N: 2136

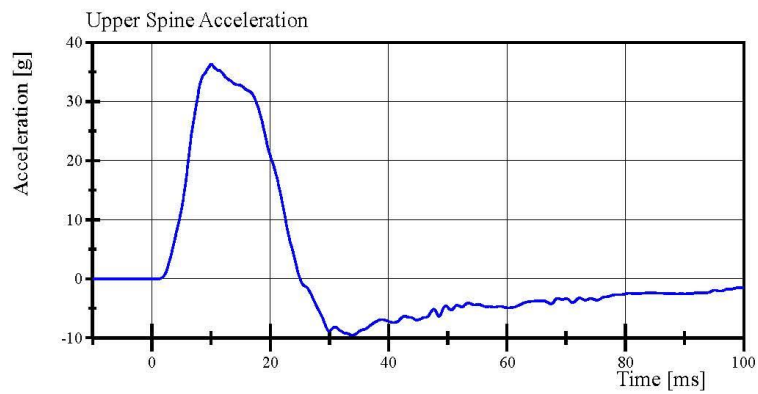
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

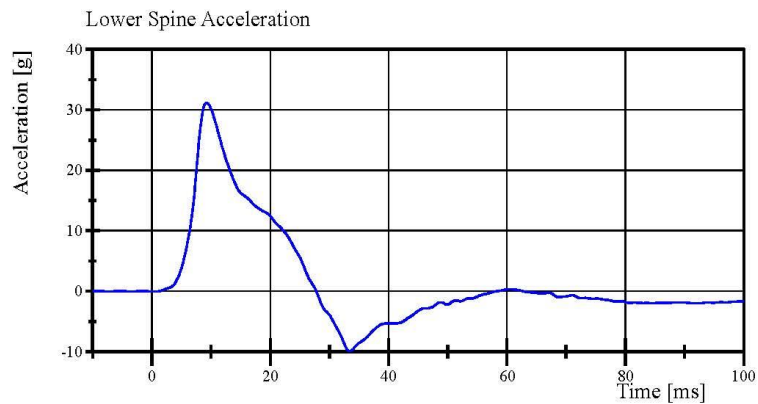
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 0.2 g at -1.0 ms
Min: -31.8 g at 13.5 ms



Filter Class: CFC_180
Max: 36.3 g at 10.1 ms
Min: -9.5 g at 33.9 ms



Filter Class: CFC_180
Max: 31.2 g at 9.3 ms
Min: -9.9 g at 33.4 ms

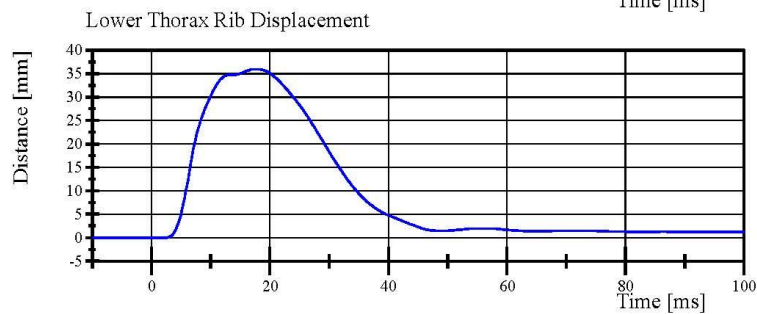
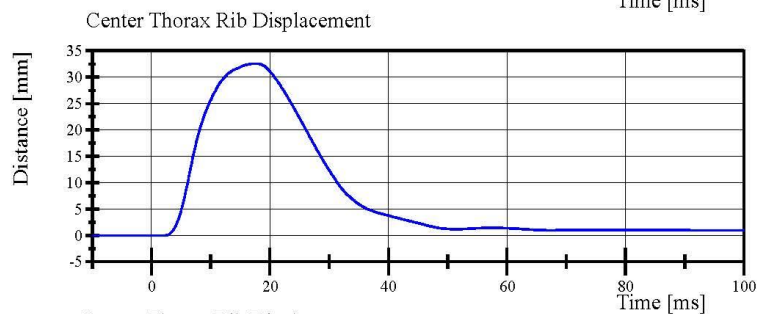
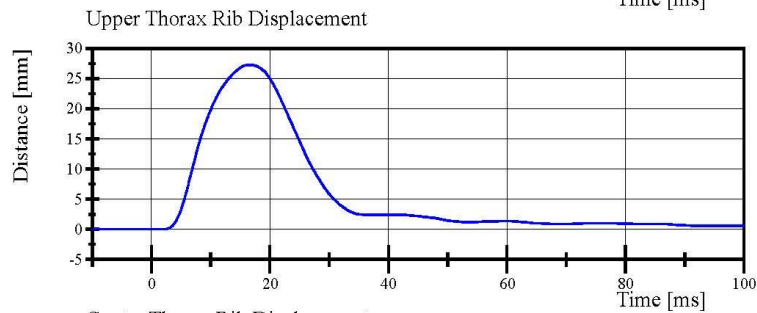
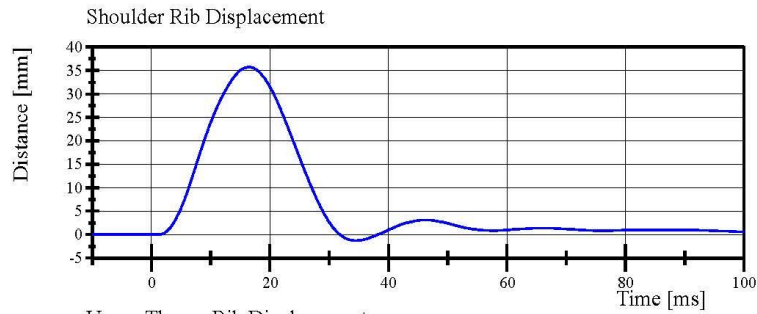
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.05.2019 10:11:14 610



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019



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

12.05.2019 10:11:15 610



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIS Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.272 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.8 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.2 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.5 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	39.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.9 g	Yes

Test meets specifications.

Condition: Used

Comments:

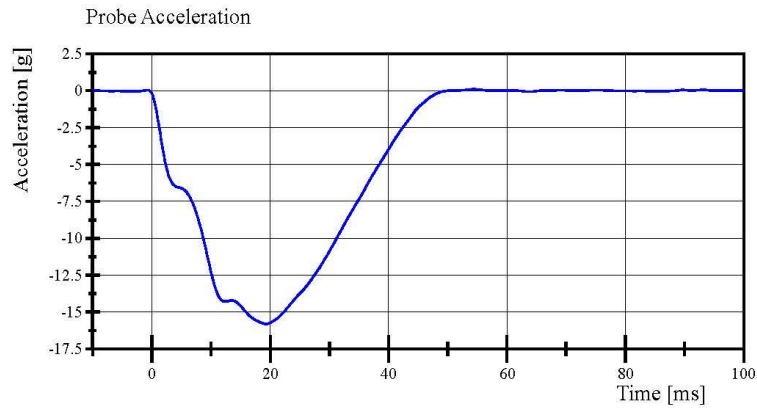
Upper Thorax Rib S/N: 2135

Middle Thorax Rib S/N: 2136

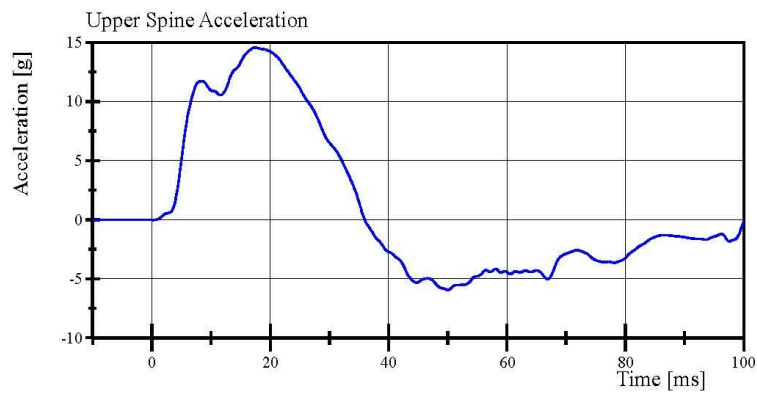
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

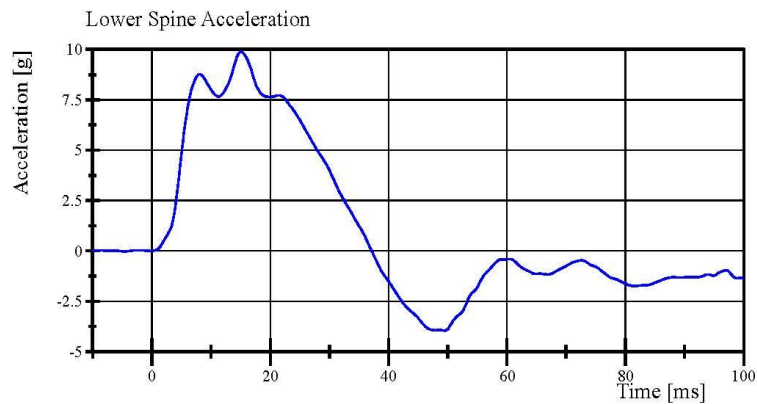
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019



Filter Class: CFC_180
Max: 0.1 g at 54.5 ms
Min: -15.8 g at 19.3 ms



Filter Class: CFC_180
Max: 14.6 g at 17.4 ms
Min: -5.9 g at 50.0 ms



Filter Class: CFC_180
Max: 9.9 g at 15.0 ms
Min: -4.0 g at 49.4 ms

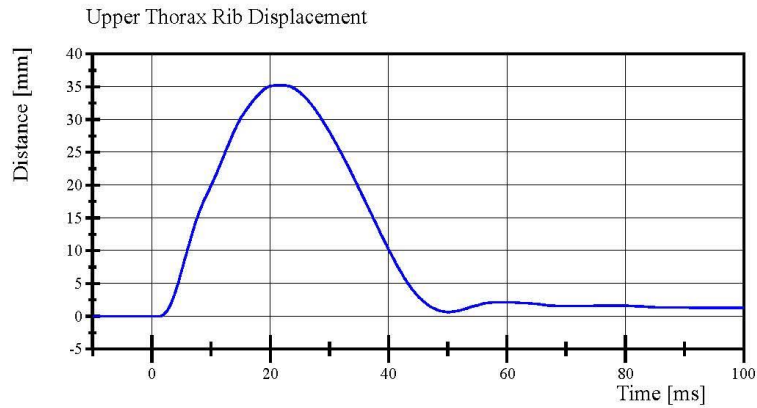
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.05.2019 09:27:50 860

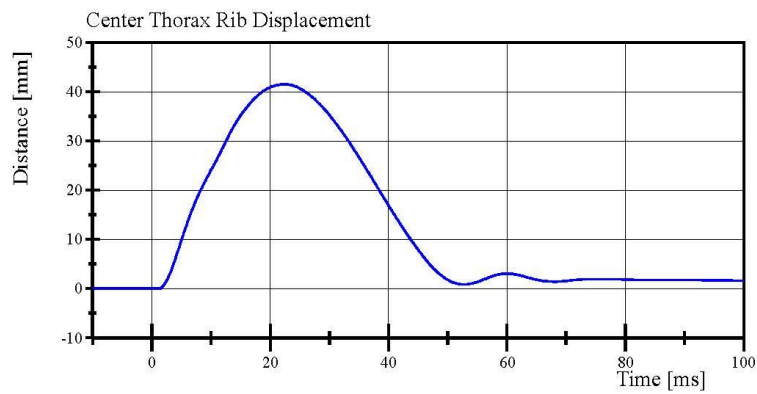


Transportation Research Center Inc.

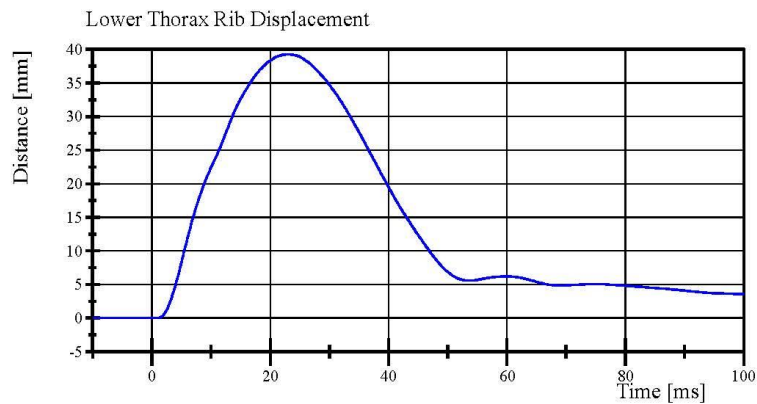
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019



Filter Class: CFC_600
Max: 35.2 mm at 21.2 ms
Min: -0.0 mm at 1.3 ms



Filter Class: CFC_600
Max: 41.5 mm at 22.3 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_600
Max: 39.3 mm at 23.0 ms
Min: -0.0 mm at 0.8 ms

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

12.05.2019 09:27:50 860



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.3 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	44.9 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.8 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.19 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: 1997

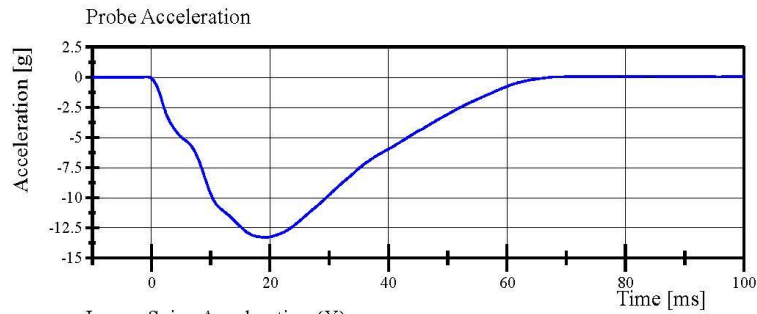
Lower Abdominal Rib S/N: DS1234

Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 77-1

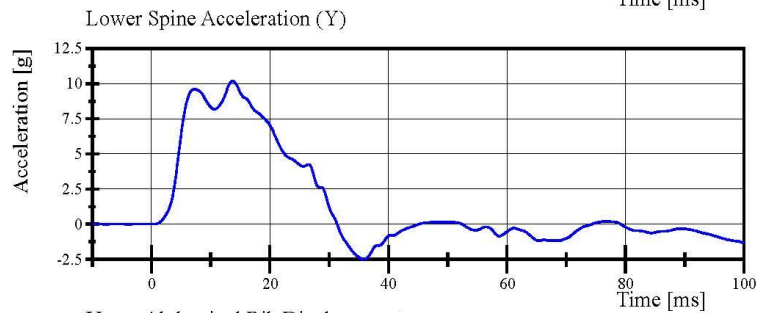
Test Date: 12/5/2019



Filter Class: CFC_180

Max: 0.1 g at 79.1 ms

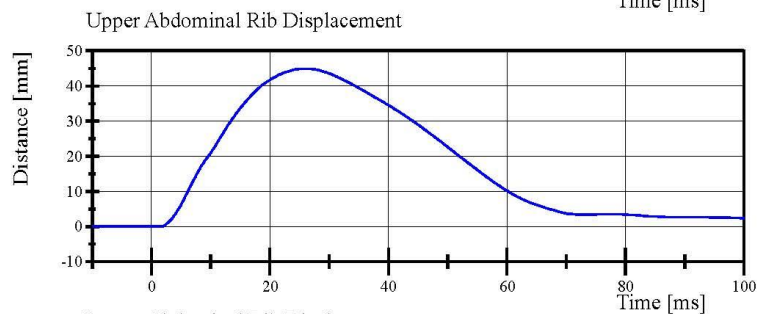
Min: -13.3 g at 19.2 ms



Filter Class: CFC_180

Max: 10.2 g at 13.7 ms

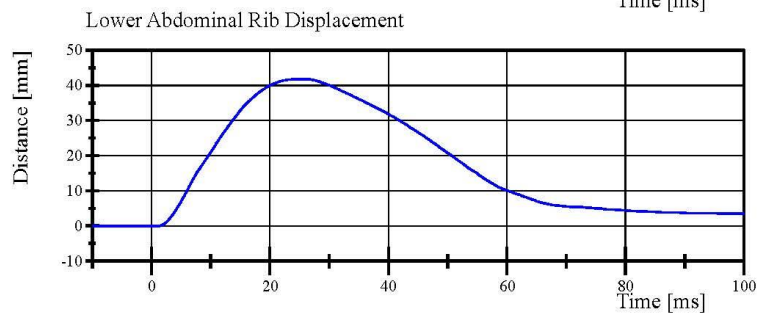
Min: -2.5 g at 35.8 ms



Filter Class: CFC_600

Max: 44.9 mm at 25.7 ms

Min: -0.0 mm at 1.5 ms



Filter Class: CFC_600

Max: 41.8 mm at 25.7 ms

Min: -0.0 mm at 1.0 ms

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

12.05.2019 08:59:32 687



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIS Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.63 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.39 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.2 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,174.3 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 884

Pelvis Plug Info:

Manufacturer: SACO

S/N: 12554

Cal Date: 20181003

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

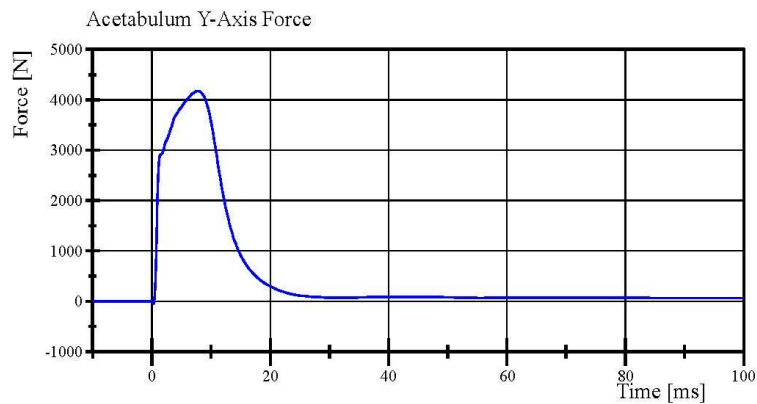
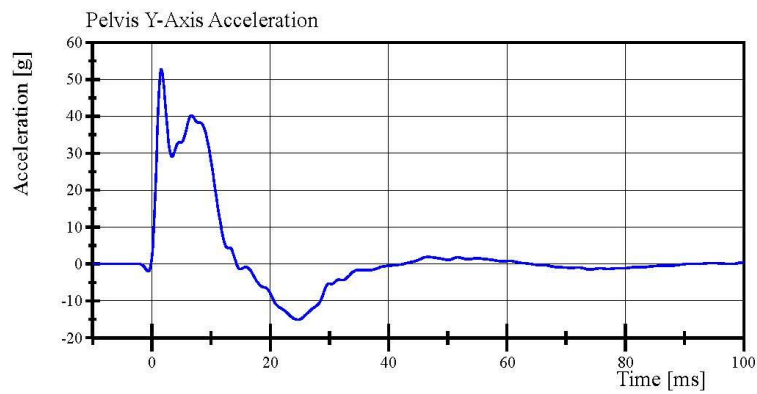
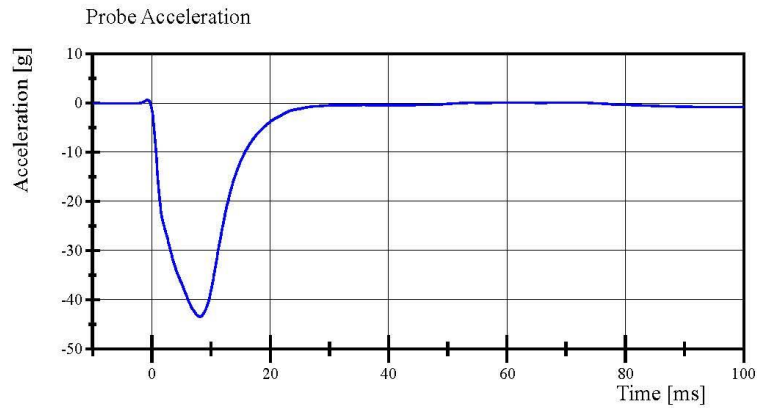
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Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 77-1
Test Date: 12/5/2019



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

12.05.2019 10:38:23 445



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 77-1

Test Date: 12/5/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-37.1 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.8 g	Yes
Iliac Force	4,100 - 5,100 N	4,313.3 N	Yes

Test meets specifications.

Condition: Used

Comments:

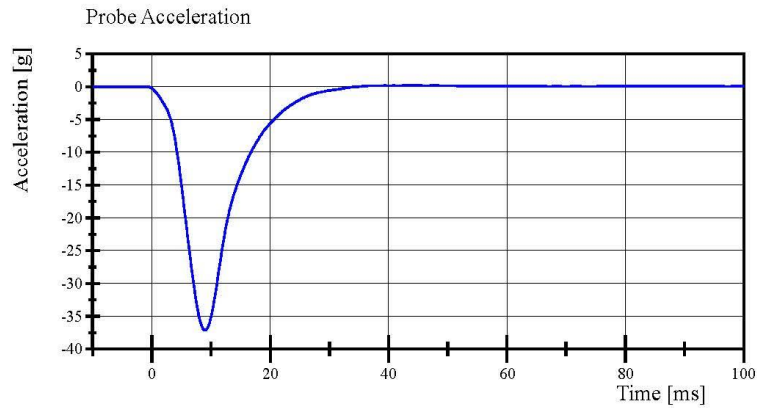
Pelvis Skin S/N: 884

Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 77-1

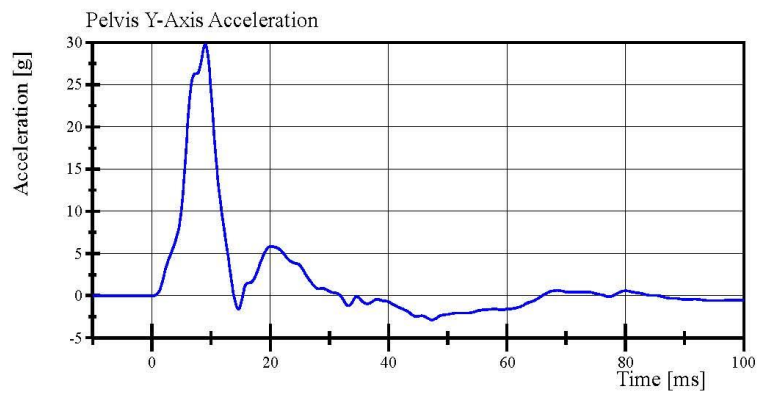
Test Date: 12/5/2019



Filter Class: CFC_180

Max: 0.2 g at 44.7 ms

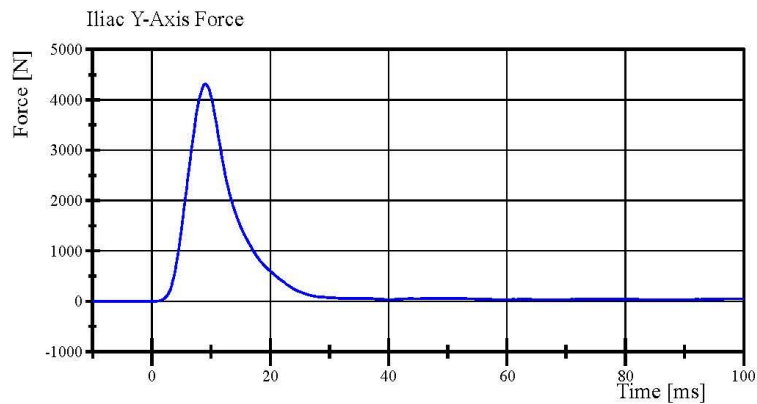
Min: -37.1 g at 9.0 ms



Filter Class: CFC_180

Max: 29.8 g at 9.0 ms

Min: -2.9 g at 47.4 ms



Filter Class: CFC_600

Max: 4,313.3 N at 9.0 ms

Min: -0.8 N at 0.0 ms

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

12.05.2019 08:21:15 696



Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No. 78

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	145	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	532	Yes
L	Popliteal Height	343.0 - 369.0	349	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	197	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	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	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	878	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 78-1

Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.5 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	1.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	< 15 %	0.94 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: 1253

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

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12.11.2019 11:57:11 196

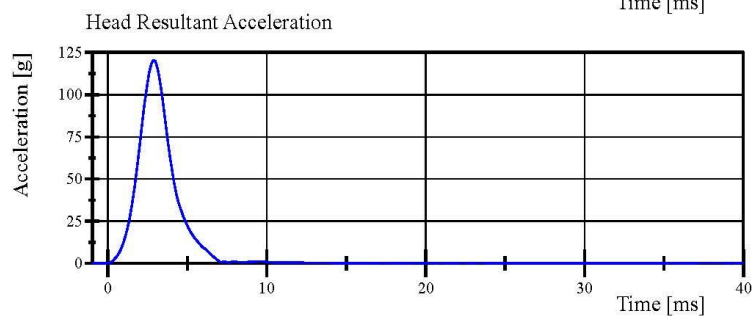
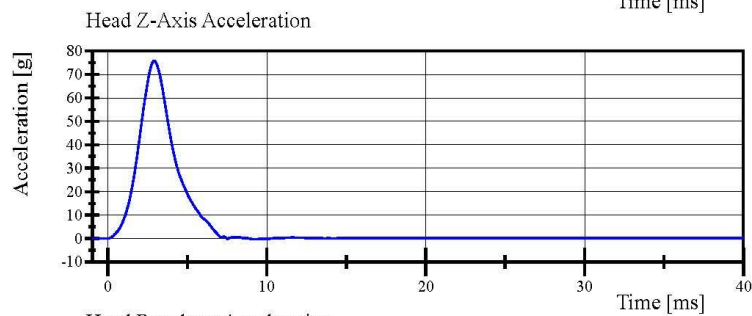
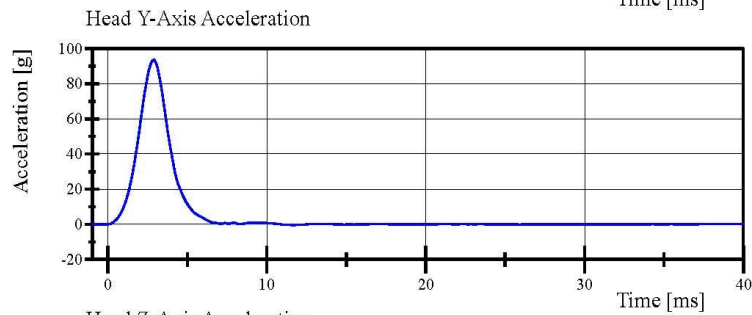
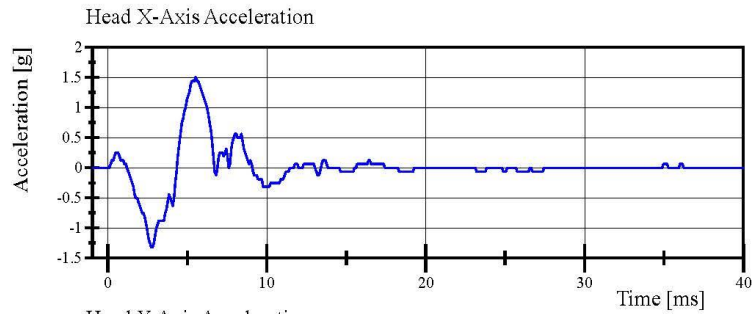


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 78-1

Test Date: 12/11/2019



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

12.11.2019 11:57:41 196



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 78-1

Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.602 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.638 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.849 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.230 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.907 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.908 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-76.3 deg	Yes
Time of Peak	50 - 70 ms	59.5 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	118.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 180-2001-606

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

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12.11.2019 16:01:55 719

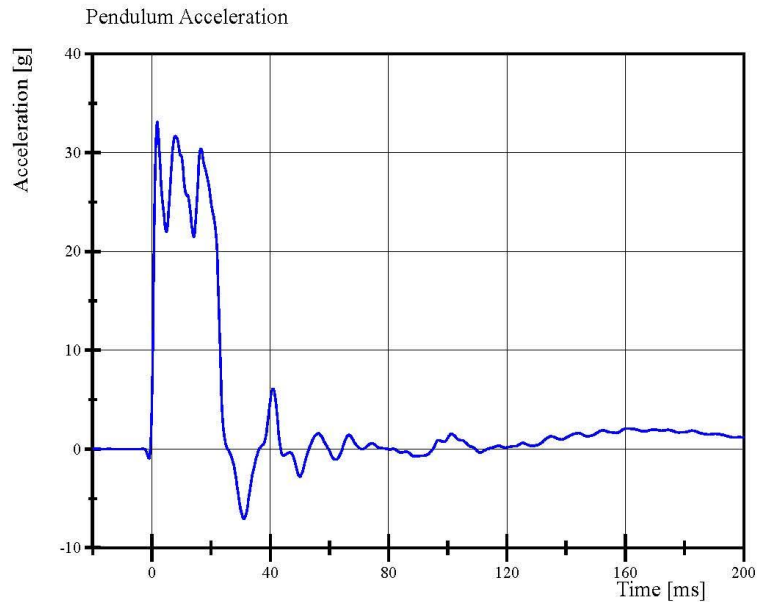


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 78-1

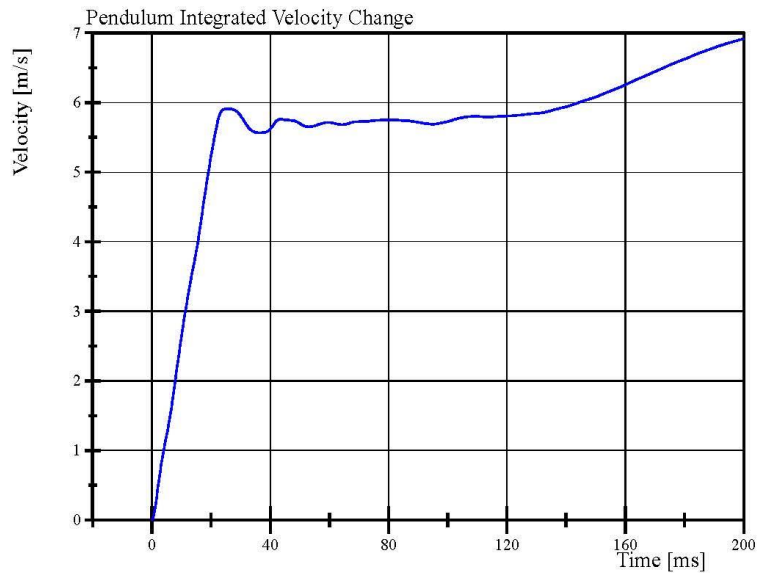
Test Date: 12/11/2019



Filter Class: CFC_180

Max: 33.1 g at 1.8 ms

Min: -7.1 g at 31.0 ms



Filter Class: CFC_180

Max: 6.9 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

12.11.2019 16:02:35 719

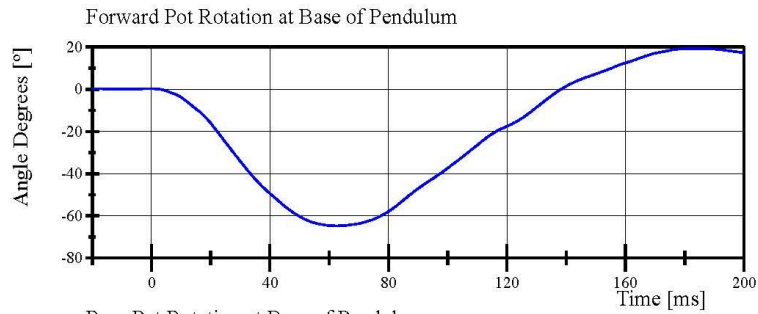


Transportation Research Center Inc.

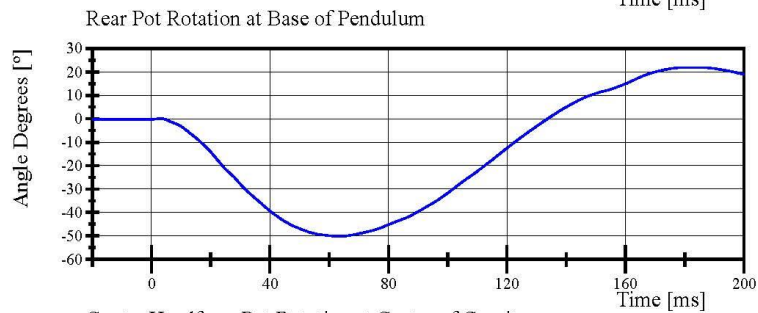
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 78-1

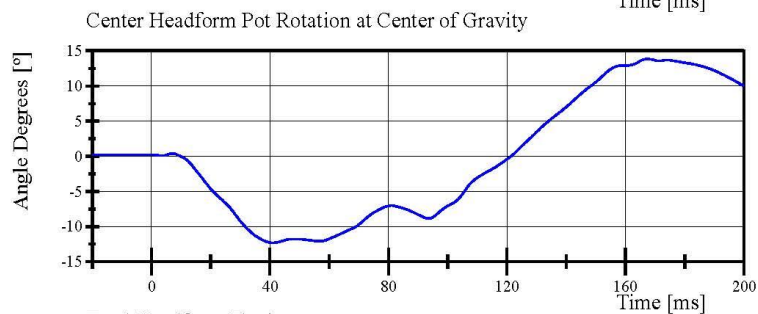
Test Date: 12/11/2019



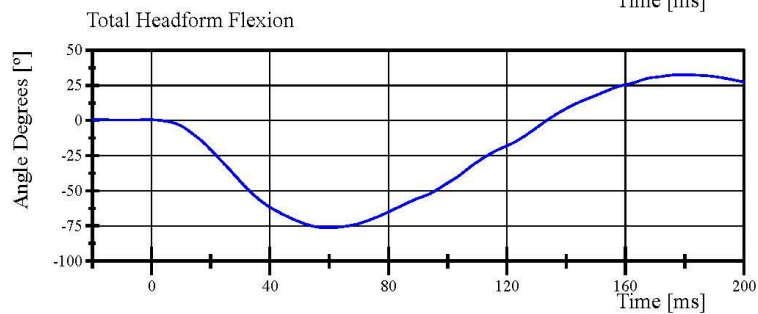
Filter Class: CFC_60
Max: 19.3 ° at 181.7 ms
Min: -64.8 ° at 62.4 ms



Filter Class: CFC_60
Max: 22.0 ° at 182.7 ms
Min: -50.1 ° at 63.9 ms



Filter Class: CFC_60
Max: 13.9 ° at 167.4 ms
Min: -12.3 ° at 41.0 ms



Filter Class: CFC_60
Max: 32.6 ° at 179.4 ms
Min: -76.3 ° at 59.5 ms

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

12.11.2019 16:02:35 719

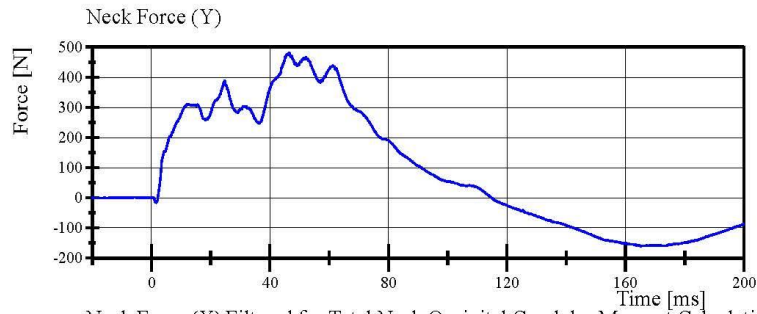


Transportation Research Center Inc.

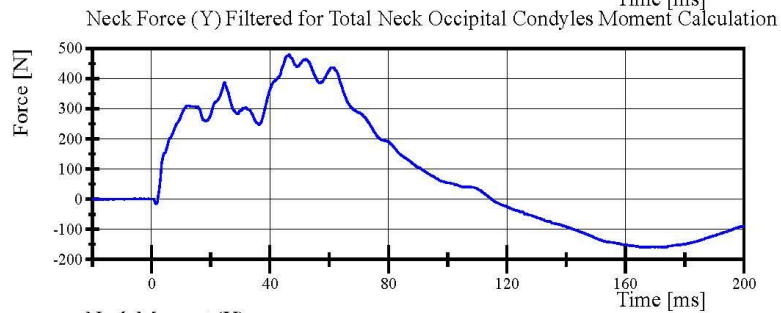
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 78-1

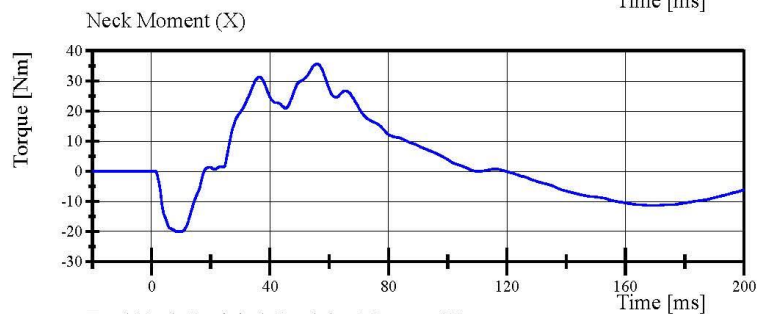
Test Date: 12/11/2019



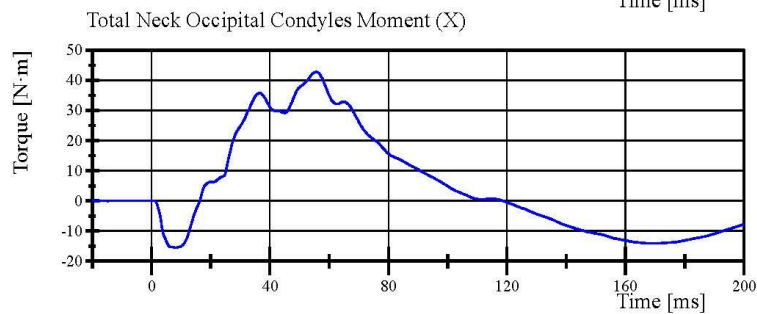
Filter Class: CFC_1000
Max: 481.3 N at 46.6 ms
Min: -160.5 N at 165.1 ms



Filter Class: CFC_600
Max: 479.3 N at 46.5 ms
Min: -159.8 N at 166.4 ms



Filter Class: CFC_600
Max: 35.7 Nm at 55.8 ms
Min: -20.0 Nm at 8.5 ms



Filter Class: Without_(Constar
Max: 42.8 N·m at 55.7 ms
Min: -15.6 N·m at 8.3 ms

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

12.11.2019 16:02:35 719



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.2 g	Yes
Shoulder Displacement	28 - 37 mm	31.4 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.0 g	Yes

Test meets specifications.

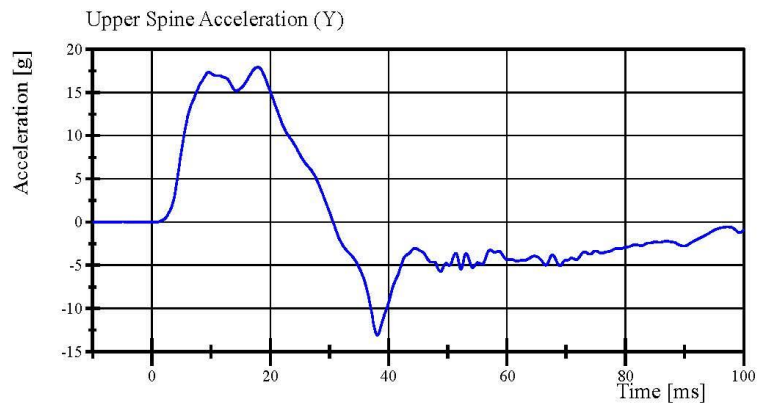
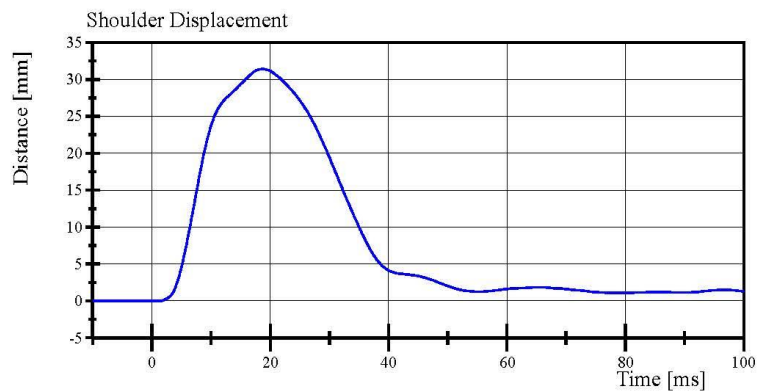
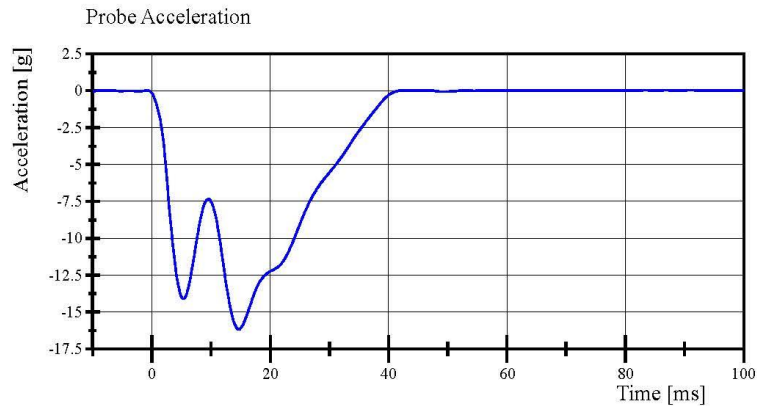
Condition: Used

Comments:

Left Arm S/N: 952

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019



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

12.11.2019 08:35:03 814



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.745 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.3 g	Yes
Shoulder Displacement	31 - 40 mm	34.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	27.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.8 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	36.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.6 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Shoulder Rib S/N: DM4450

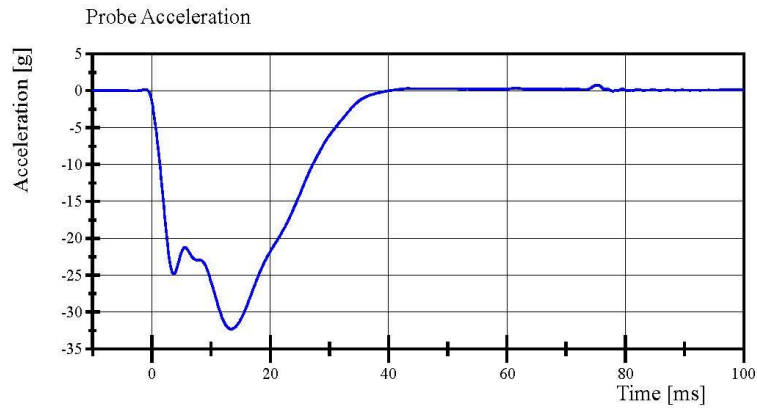
Upper Thorax Rib S/N: 2135

Middle Thorax Rib S/N: 2136

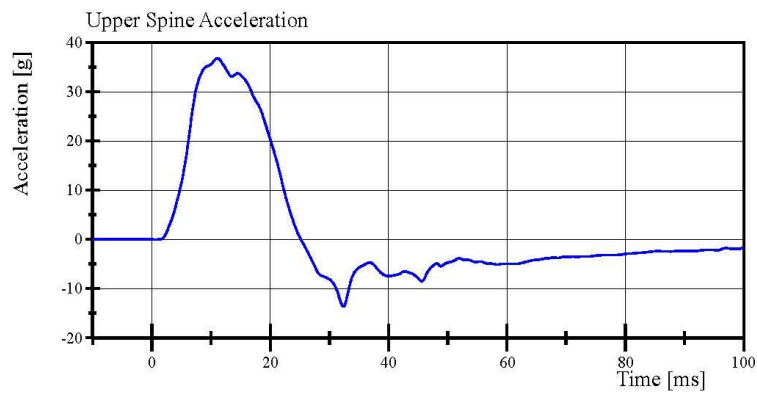
Lower Thorax Rib S/N: 2137

Transportation Research Center Inc.

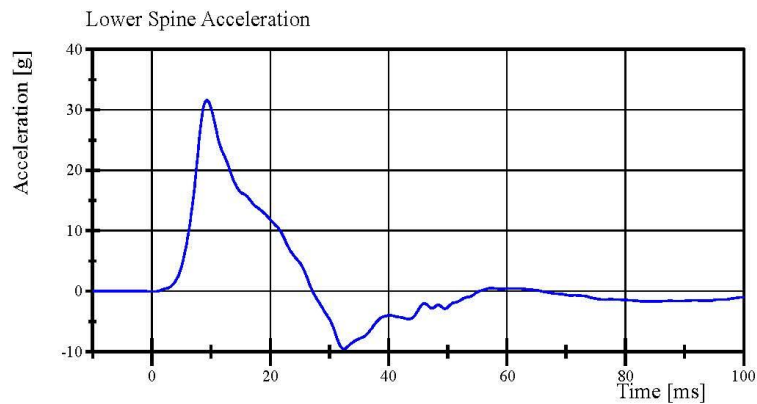
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 0.8 g at 75.0 ms
Min: -32.3 g at 13.4 ms



Filter Class: CFC_180
Max: 36.8 g at 11.1 ms
Min: -13.7 g at 32.3 ms



Filter Class: CFC_180
Max: 31.6 g at 9.3 ms
Min: -9.5 g at 32.4 ms

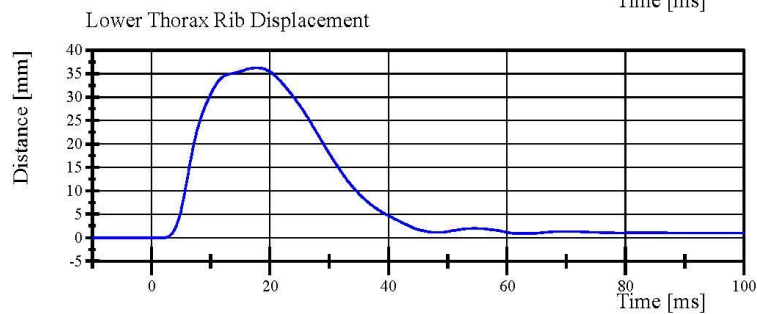
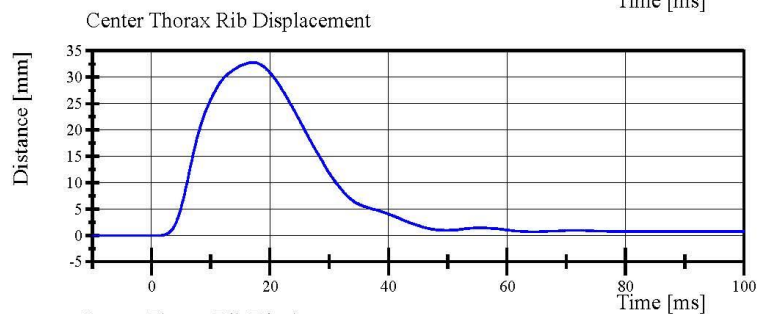
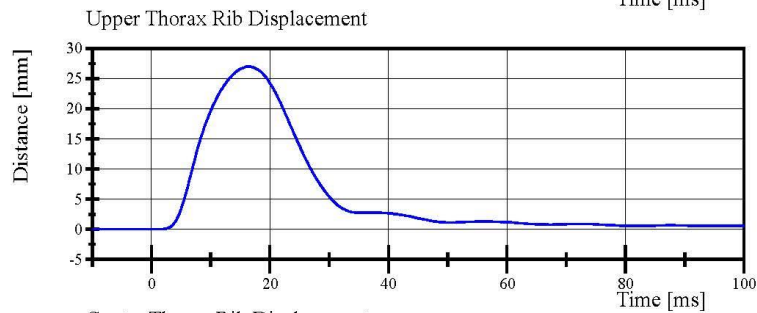
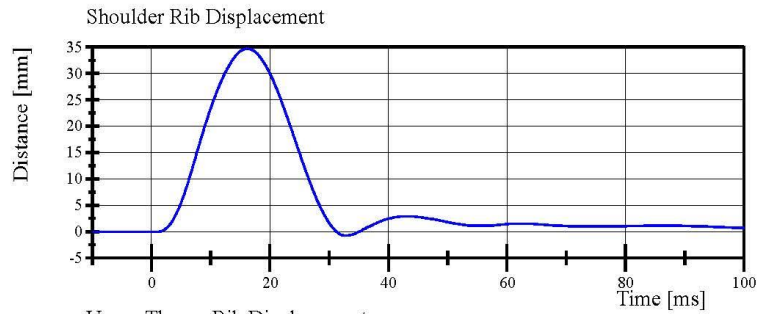
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.11.2019 09:39:56 594



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019



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

12.11.2019 09:39:56 594



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.279 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.7 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.5 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.3 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.1 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Thorax Rib S/N: 2135

Middle Thorax Rib S/N: 2136

Lower Thorax Rib S/N: 2137

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

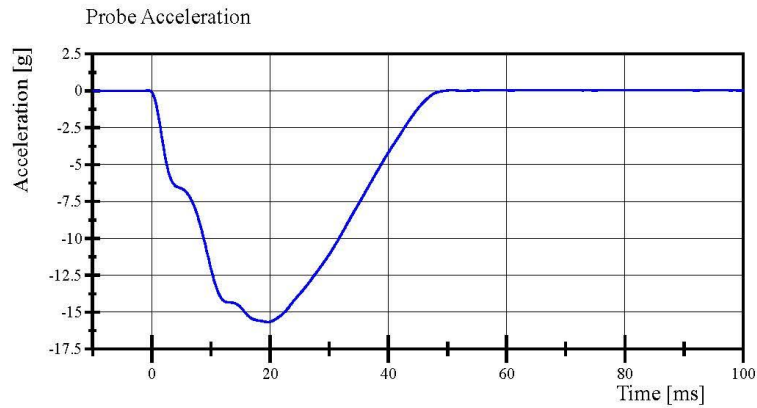
Page 20 of 31

12.11.2019 09:05:42 822

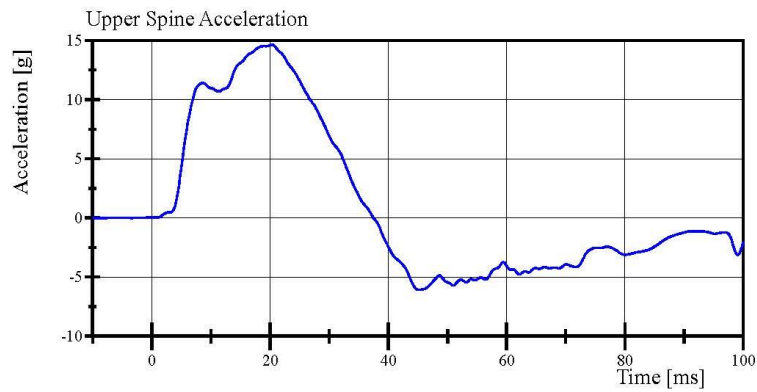


Transportation Research Center Inc.

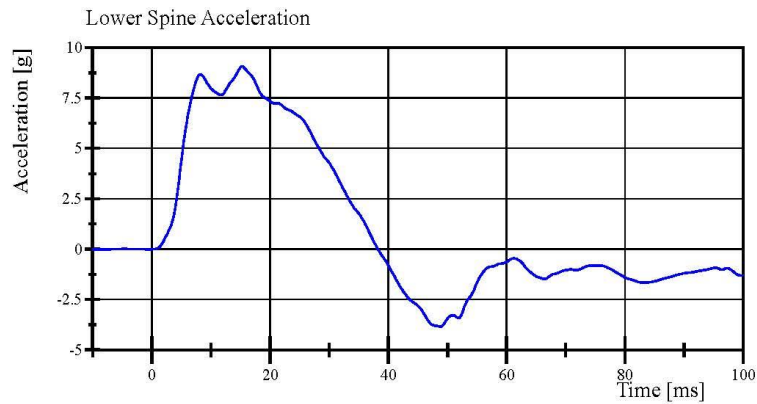
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019



Filter Class: CFC_180
Max: 0.1 g at 58.5 ms
Min: -15.7 g at 19.7 ms



Filter Class: CFC_180
Max: 14.6 g at 20.3 ms
Min: -6.1 g at 45.1 ms



Filter Class: CFC_180
Max: 9.1 g at 15.3 ms
Min: -3.8 g at 48.8 ms

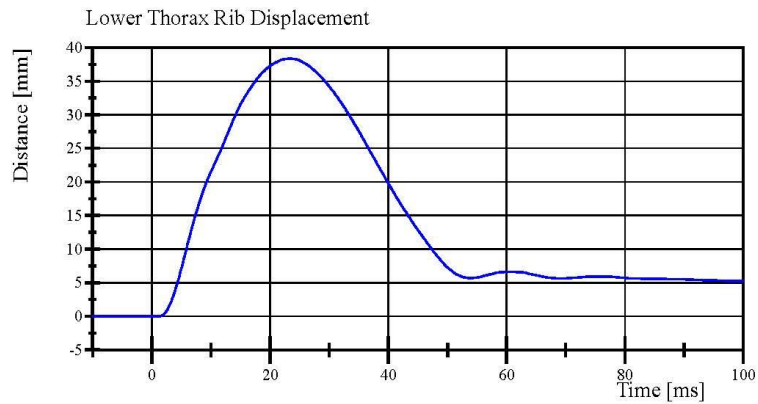
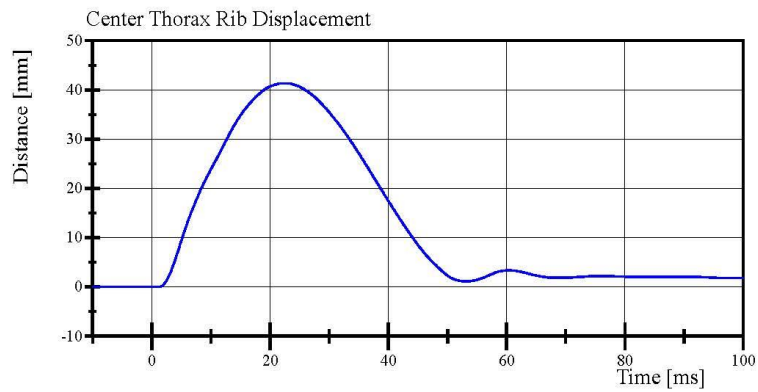
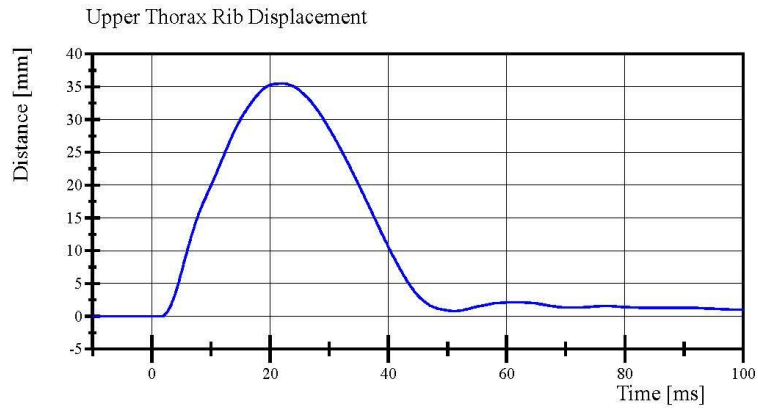
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

12.11.2019 09:06:39 822



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019



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

12.11.2019 09:06:39 822



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	46.3 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.1 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	9.97 g	Yes

Test meets specifications.

Condition: Used

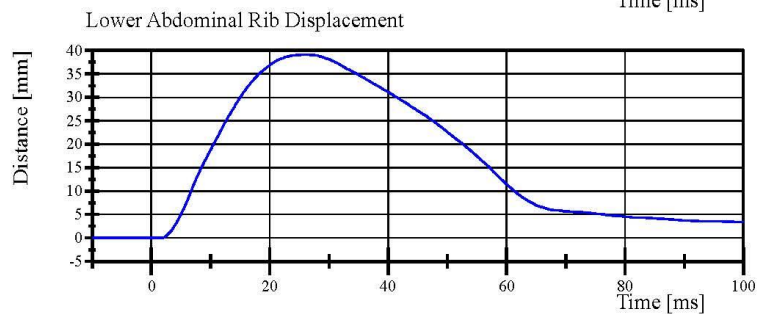
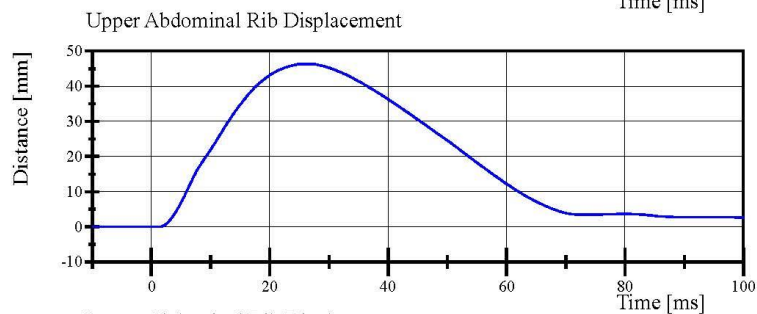
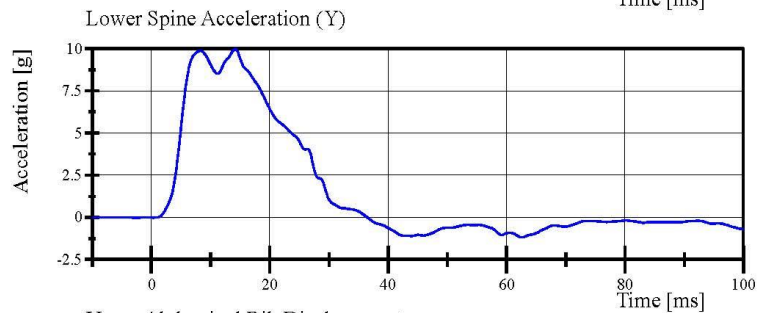
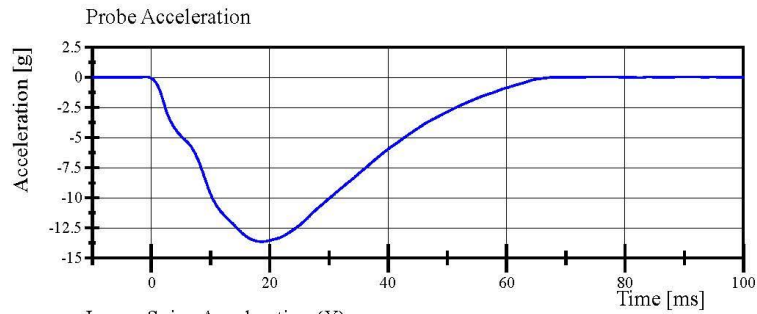
Comments:

Upper Abdominal Rib S/N: 1997

Lower Abdominal Rib S/N: DS1234

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 78-1
Test Date: 12/11/2019



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

12.11.2019 08:51:05 661



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 78-2
Test Date: 12/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.73 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	41.6 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,353.3 N	No

Test does not meet specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 884

Pelvis Plug Info:

Manufacturer: SACO

S/N: 12583

Cal Date: 20181003

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

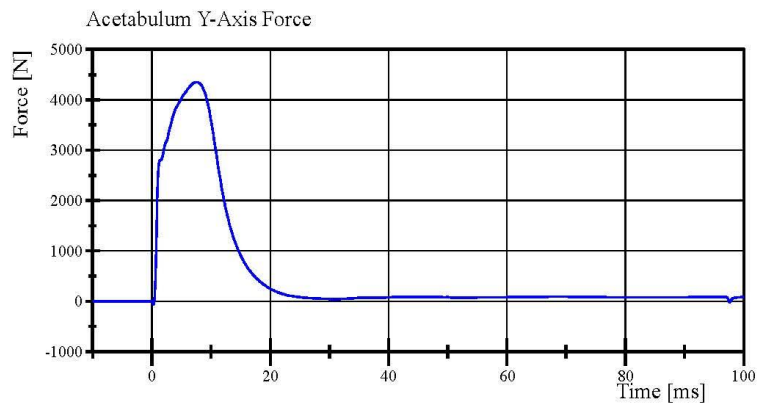
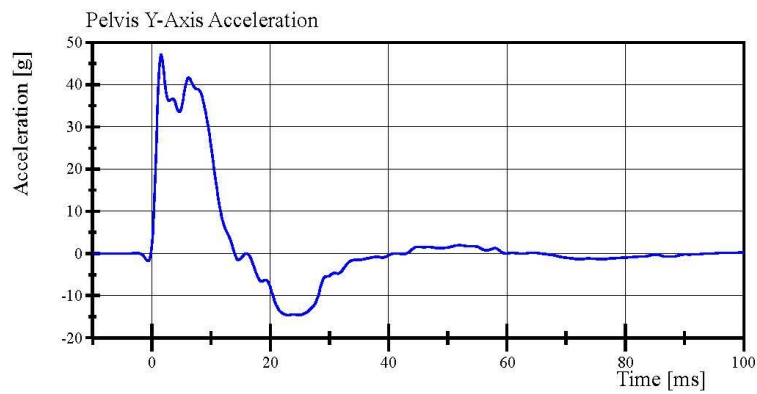
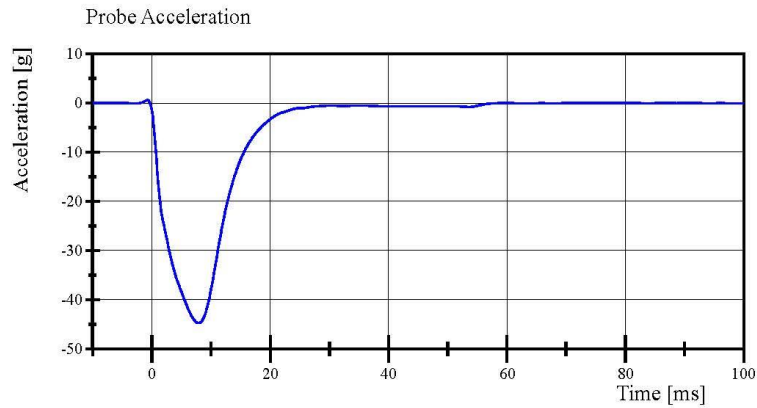
Page 27 of 31

12.12.2019 15:43:40 433



Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 78-2
Test Date: 12/12/2019



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

12.12.2019 15:44:40.433



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 78-1

Test Date: 12/11/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-39.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.5 g	Yes
Iliac Force	4,100 - 5,100 N	4,729.2 N	Yes

Test meets specifications.

Condition: Used

Comments:

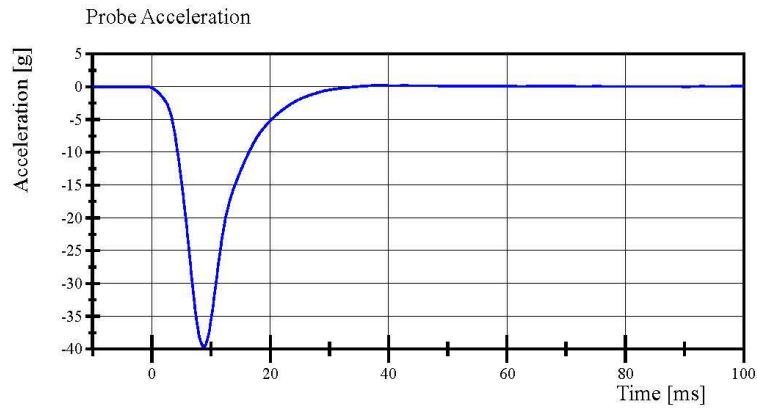
Pelvis Skin S/N: 884

Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 78-1

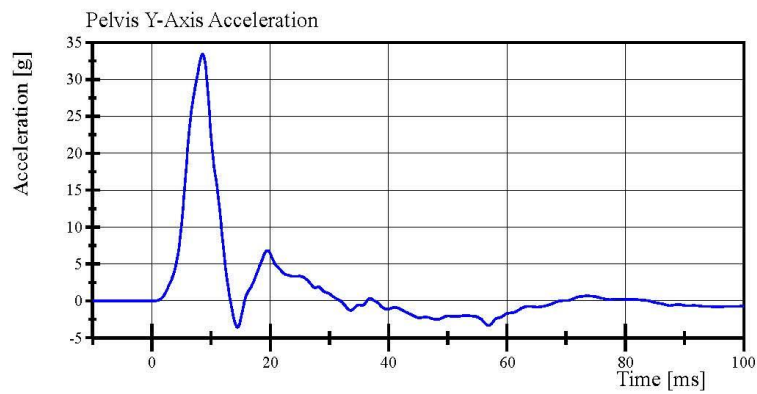
Test Date: 12/11/2019



Filter Class: CFC_180

Max: 0.2 g at 38.2 ms

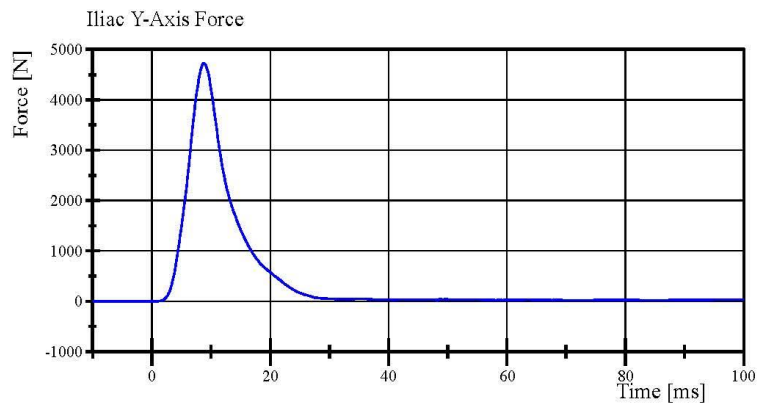
Min: -39.6 g at 8.8 ms



Filter Class: CFC_180

Max: 33.5 g at 8.6 ms

Min: -3.6 g at 14.5 ms



Filter Class: CFC_600

Max: 4,729.2 N at 8.7 ms

Min: -1.1 N at -4.6 ms

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

12.11.2019 08:16:36 658



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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	9-Oct-2019
	Y		T10352	Endevco	9-Oct-2019
	Z		P91950	Endevco	9-Oct-2019
Redundant Head Accelerometers	X		T11817	Endevco	9-Oct-2019
	Y		P83368	Endevco	9-Oct-2019
	Z		P94483	Endevco	9-Oct-2019
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	16-Apr-2019
	Middle	Y	174	FTSS	16-Apr-2019
	Lower	Y	173	FTSS	16-Apr-2019
Abdomen Load Cells	Front	Y	1441	Denton	16-Apr-2019
	Middle	Y	1436	Denton	16-Apr-2019
	Rear	Y	1437	Denton	16-Apr-2019
Lower Spine Accelerometers (T12)	X		T11866	Endevco	9-Oct-2019
	Y		P87139	Endevco	9-Oct-2019
	Z		P64884	Endevco	9-Oct-2019
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	16-Apr-2019

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	T11432	Endevco	14-Oct-2019
				Y	P93774	Endevco	14-Oct-2019
				Z	P91566	Endevco	14-Oct-2019
Redundant Head Accelerometers				X	P91615	Endevco	14-Oct-2019
				Y	P93762	Endevco	14-Oct-2019
				Z	P93761	Endevco	14-Oct-2019
Displacement Potentiometers	Shoulder			N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	18-Apr-2019	
		Middle	Y	037	Servo	18-Apr-2019	
		Lower	Y	036	Servo	23-May-2019	
	Abdominal Rib	Upper	Y	1295	Servo	18-Apr-2019	
		Lower	Y	1136	Servo	18-Apr-2019	
Lower Spine Accelerometers (T12)				X	P94545	Endevco	14-Oct-2019
				Y	P94647	Endevco	14-Oct-2019
				Z	P94530	Endevco	14-Oct-2019
Acetabulum Load Cell				Y	DK7483S-FY	FTSS	18-Apr-2019
Iliac Wing Load Cell				Y	287-FY	Denton	18-Apr-2019
Pelvis Plug (struck side)					12785	SACO	17-Jan-2019
Pelvis Plug (non-struck side)					12544	SACO	2-Oct-2018

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T11453	Endevco	4-Sep-2019
	Vehicle Center of Gravity	Y	T11861	Endevco	4-Sep-2019
	Vehicle Center of Gravity	Z	T11846	Endevco	4-Sep-2019
2	Right Sill at Front Seat	X	T11818	Endevco	10-Sep-2019
	Right Sill at Front Seat	Y	P57961	Endevco	1-Nov-2019
	Right Sill at Front Seat	Z	T11829	Endevco	1-Nov-2019
3	Right Sill at Rear Seat	X	P58549	Endevco	26-Nov-2019
	Right Sill at Rear Seat	Y	P77747	Endevco	26-Nov-2019
	Right Sill at Rear Seat	Z	P58551	Endevco	26-Nov-2019
4	Left Sill at Front Door	Y	T11445	Endevco	5-Sep-2019
5	Left Sill at Rear Door	Y	P94743	Endevco	26-Nov-2019
6	Left A-Post Lower	Y	P88038	Endevco	21-Oct-2019
7	Left A-Post Middle	Y	P57946	Endevco	21-Oct-2019
8	Left B-Post Lower	Y	P57192	Endevco	16-Jul-2019
9	B-Post Middle	Y	T11850	Endevco	22-Oct-2019
10	Front Seat Track	Y	P50398	Endevco	26-Nov-2019
11	Rear Seat Track or Structure	Y	P58586	Endevco	26-Nov-2019
12	Right Rear Occupant Compartment	Y	P58472	Endevco	26-Nov-2019
13	Engine Block	X	P73587	Endevco	11-Oct-2019
	Engine Block	Y	T11816	Endevco	5-Sep-2019
14	Rear Floorpan Above Axle	X	P74456	Endevco	26-Nov-2019
	Rear Floorpan Above Axle	Y	P58494	Endevco	26-Nov-2019
	Rear Floorpan Above Axle	Z	P58537	Endevco	26-Nov-2019

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P75713	Endevco	10-Sep-2019
MDB Center of Gravity	Y	P76171	Endevco	10-Sep-2019
MDB Center of Gravity	Z	P76114	Endevco	10-Sep-2019
Left Frame Rail at Rear Axle Centerline	X	P75115	Endevco	10-Sep-2019
Left Frame Rail at Rear Axle Centerline	Y	P94567	Endevco	10-Sep-2019