

FINAL REPORT NUMBER: SINCAP-TRC-18-002

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

**FORD MOTOR CO.
2018 Ford F-150 SuperCab
NHTSA NUMBER: M20180211**

**PREPARED BY:
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Report Date: February 22, 2018

FINAL REPORT

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

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Report Prepared By: ILO Project Operations Group

Report Approved By: 

John Shultz

Approval Date: February 22, 2018

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

1. Report No. SINCAP-TRC-18-002	2. Government Accession No.	3. Recipient's Catalog No.																																																									
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2018 Ford F-150 SuperCab, NHTSA No.: M20180211		5. Report Date February 22, 2018																																																									
		6. Performing Organization Code TRC Inc.																																																									
7. Author(s) John Shultz, Project Manager		8. Performing Organization Report Number 171116																																																									
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.																																																									
		11. Contract or Grant No. DTNH22-14-D-00354																																																									
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report November 16, 2017 – February 22, 2018																																																									
		14. Sponsoring Agency Code NRM-110																																																									
15. Supplemental Notes																																																											
16. Abstract This 55 / 28 km/h 90° Moving Deformable Barrier SINCAP Side Impact Test was conducted on the subject 2018 Ford F-150 SuperCab, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on November 16, 2017. The impact velocity of the Moving Deformable Barrier (MDB) was 62.48 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21.3° C. The target vehicle post-test maximum crush was 252 mm at Level 1. 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>30</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>44</td><td>19.4</td></tr> <tr> <td>Total Abdominal Force</td><td>N</td><td>2500</td><td>358.6</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>6000</td><td>-539.4</td></tr> <tr> <td>Lower Spine Acceleration</td><td>G</td><td>82*</td><td>20.5</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>50</td></tr> <tr> <td>Lower Spine Resultant Acceleration</td><td>g's</td><td>82</td><td>25.8</td></tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>1327.1</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>5.8</td></tr> <tr> <td>Maximum Abdominal Rib Deflection</td><td>mm</td><td>45*</td><td>15.3</td></tr> </tbody> </table> * Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Driver ATD (ES-2re)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	30	Maximum Thoracic Rib Deflection	mm	44	19.4	Total Abdominal Force	N	2500	358.6	Pubic Symphysis Force	N	6000	-539.4	Lower Spine Acceleration	G	82*	20.5	Passenger ATD (SID-IIs)				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	50	Lower Spine Resultant Acceleration	g's	82	25.8	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1327.1	Maximum Thoracic Rib Deflection	mm	38*	5.8	Maximum Abdominal Rib Deflection	mm	45*	15.3
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19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 215	22. Price																																																								

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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2018 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00354. The purpose of this test is to generate comparative side impact performance in a 2018 Ford F-150 SuperCab. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2018 Ford F-150 SuperCab 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 62.48 km/h (38.82 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on November 16, 2017. 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	30
Maximum Thoracic Rib Deflection	mm	44	19.4
Combined Abdominal Force	N	2500	358.6
Pubic Symphysis Force	N	6000	-539.4
Lower Spine (T12) Resultant Acceleration	G	82*	20.5

* Proposed IARV

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	50
Lower Spine (T12) Resultant Acceleration	G	82	25.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1327.1
Maximum Thoracic Rib Deflection	mm	38*	5.8
Maximum Abdominal Rib Deflection	mm	45*	15.3

* 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	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Unknown	Yes	Unknown
Other Safety Restraint	No	N/A	No	N/A

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact or the static rollover test which followed. Injury values for both ATDs were within the established performance thresholds.

Left Rear Sill Y; Channel failed at 39ms

Left Lower A-Post Y; Questionable data after 22ms

Left Lower B-Post Y; Questionable data throughout

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20180211
Model Year	2018
Make	Ford
Model	F-150 SuperCab
Body Style	Truck
VIN	1FTEX1CB4JFA28239
Body Color	Lightning Blue
Odometer Reading (km/mi)	42.5 mi
Engine Displacement (L)	3.3
Type/No. Cylinders	V/6
Engine Placement	Front Longitudinal
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
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	Yes
Other Safety Restraint	No

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	FORD MOTOR CO.
Date of Manufacture	08/17
Vehicle Type	Truck

GVWR (kg)	2858
GAWR Front (kg)	1429
GAWR Rear (kg)	1520

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	3	3	N/A	6
Capacity Weight (VCW) (kg)				829
DSC x 68.04 (kg)				408.24
Cargo Weight (RCLW) (kg)				420.76

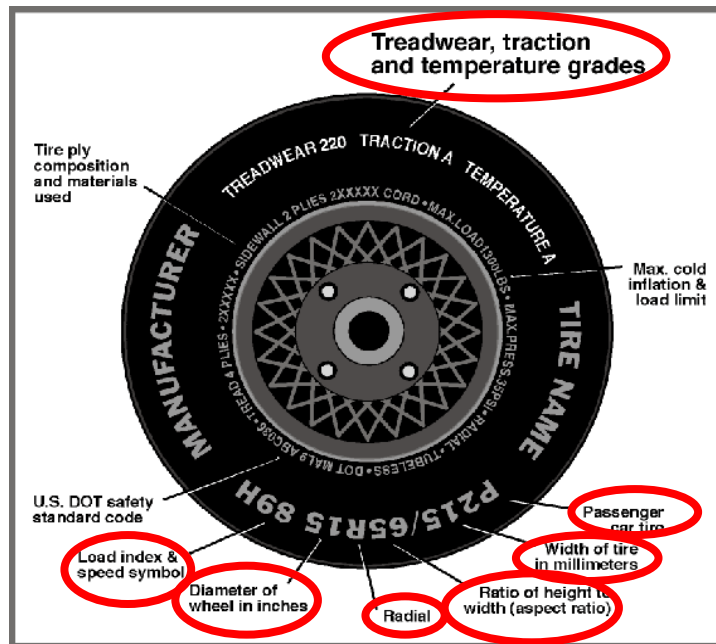
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	245/70R17	245/70R17
Tire Size on Vehicle	245/70R17	245/70R17
Tire Manufacturer	Michelin	Michelin
Tire Model	LTX M/S ²	LTX M/S ²
Treadwear	720	720
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	110T	110T
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	M3X6 00AX 2217	M3X6 00AX 2217
DOT Safety Code Right	M3X6 00AX 2217	M3X6 00AX 2217

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

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	234	227	234	227
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	250	250	250	250

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	577.2	440.4		645.2	522.4		650.0	555.8	
Right	kg	609.8	410.8		623.2	502.6		597.0	496.4	
Ratio	%	58.2	41.8		55.3	44.7		54.2	45.8	
Totals	kg	1187	851.2	2038.2	1268.4	1025.0	2293.4	1247.0	1052.2	2299.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2038.2	(A)
Actual Weight of 1 P572V ATD (SID-ILs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW) ¹	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2299.2	(A+B+C)

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

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement
LF	mm	904	899	Yes
RF	mm	912	910	Yes
RR	mm	958	960	Yes
LR	mm	941	941	Yes
Vehicle CG (Aft of Front Axle)	mm	1684	1645	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+42	+16	

***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: Steel plate mounted in cargo area	58.8
Removed: None	0.0

¹ Rated cargo and luggage weight limited to 136.0 kg or 300.0 lbs.

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

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

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	N/A	N/A	17.3
Front Passenger Seat	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	N/A
Non-Struck Side Rear Seat	N/A	N/A	N/A
Rear Center Seat*	N/A	N/A	N/A

* 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	17.3	320	Max	N/A	N/A	N/A
			Mid	314	320	332
			Min	N/A	N/A	N/A
Front Passenger 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
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	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
Non-Struck Side Rear 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
Rear 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

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2018 Ford F-150 SuperCab

NHTSA No.: M20180211

Test Program: SINCAP Side Impact

Test Date: 11/16/2017

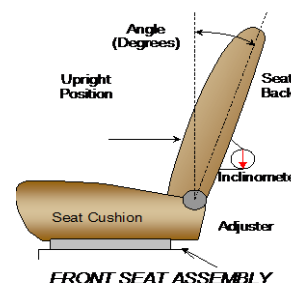
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	254	38	123	18
Front Passenger Seat	254	38	123	18
Front Center Seat*	Fixed	Fixed	Fixed	Fixed
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	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	51.3	27	3.0	10
Front Passenger Seat	52.1	27	3.0	10
Front Center Seat*	Fixed	Fixed	14.7	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	Fixed	19.8	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	21.2	Fixed
Rear Center Seat*	Fixed	Fixed	20.2	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	4, Numbered from 0 to 3	0, Lowermost
Rear Seat	1, Fixed	1, Fixed

HEAD RESTRAINT ADJUSTMENT

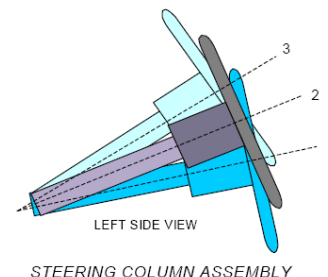
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3, Numbered from 0 to 2	2, Uppermost
Rear Seat	2, Numbered from 0 to 1	1, Uppermost

DATA SHEET NO. 2 (CONTINUED)**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**Test Vehicle: 2018 Ford F-150 SuperCabNHTSA No.: M20180211Test Program: SINCAP Side ImpactTest Date: 11/16/2017**STEERING COLUMN ADJUSTMENT**

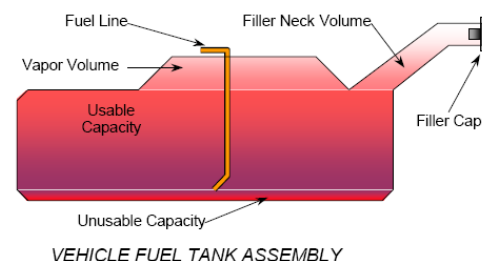
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	22.2	127
Geometric Center, Position No. 2	24.2	147
Uppermost, Position No. 3	26.2	168
Telescoping Steering Wheel Travel		41
Test Position	24.2	147

**FUEL PUMP**

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

The electric fuel pump operates for 3 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 3 seconds following ignition actuation the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump deactivates. In addition, a fuel pump shut-off switch is provided, designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.

**FUEL TANK CAPACITY**

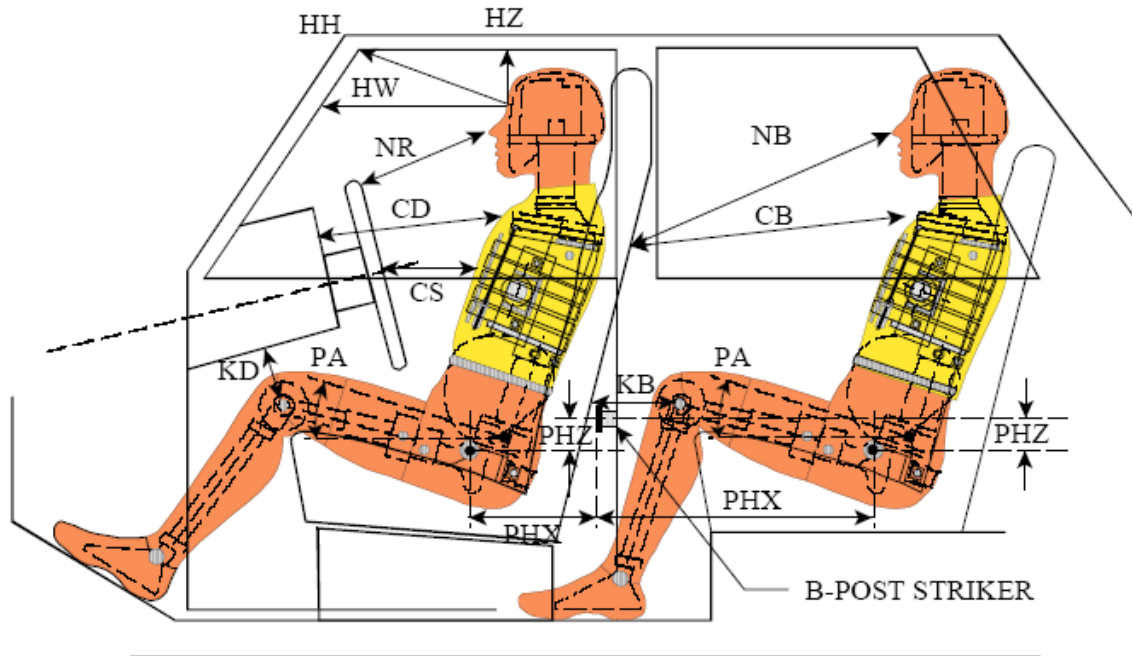
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	90.8
Usable Capacity of "Optional Tank" (see Form No. 1)	136.3
Usable Capacity of Standard Tank (see Owner's Manual)	87.1
Usable Capacity of Optional Tank (see Owner's Manual)	136.3
93% of Usable Capacity	84.5
Actual Amount of Solvent Used in Test	85.5
1/3 of Usable Capacity	30.3

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



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

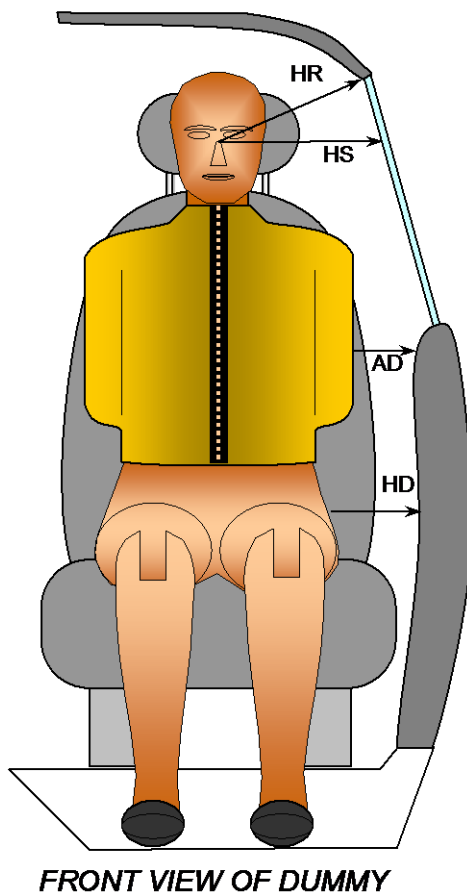
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	476			
HW		Header to Windshield	673			
HZ	HZ	Head to Roof Liner	200		320	
NR	NB	Nose to Rim/Seat Back	454		495	
CD	CB	Chest to Dash/Seat Back	631		462	
CS		Chest to Steering Wheel	394			
KD(L)/KDA(L) [°]	KB(L)/KBA(L) [°]	Left Knee to Dash/Seat Back	161	23.7	180	12.9
KD(R)/KDA(R) [°]	KB(R)/KBA(R) [°]	Right Knee to Dash/Seat Back	159	24.1	184	12.8
PAX [°]	PAX [°]	Pelvic Tilt Angle X		N/A		0.2
	PAY [°]	Pelvic Tilt Angle Y				18.1
PHX	PHX	Hip Point to Striker (X-Axis)	289		514	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	59		28	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

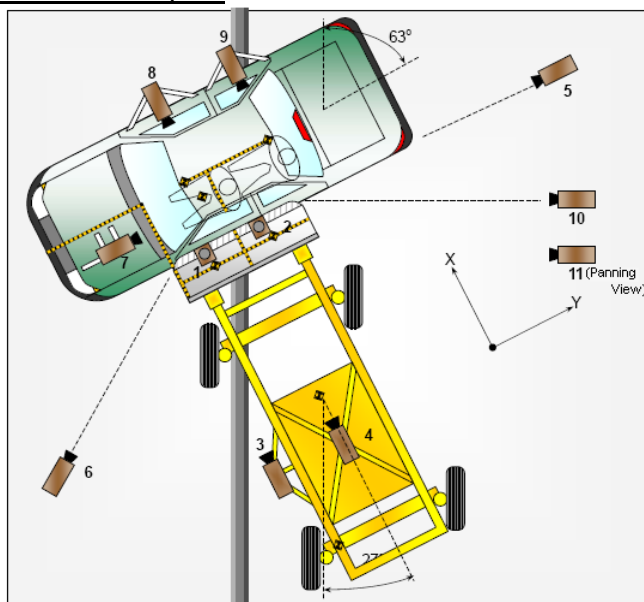


Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	202	286
HS	Head to Side Window	mm	341	381
AD	Arm to Door	mm	125	177
HD	H-Point to Door	mm	170	214

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	-256	4872	8.5	1000
2	Overhead Close-up	0	256	4872	25	1000
3	Left Impact Point (MDB)	1621	937	954	25	1000
4	Side Overall (MDB)	2448	0	1561	12.5	1000
5	Rear	0	8712	1384	20	1000
6	Left Front	2217	-4493	1489	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

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

*All measurements accurate to ± 6 mm.

If applicable, explain why camera(s) did not operate as intended: Camera 3 and 4 triggered early.

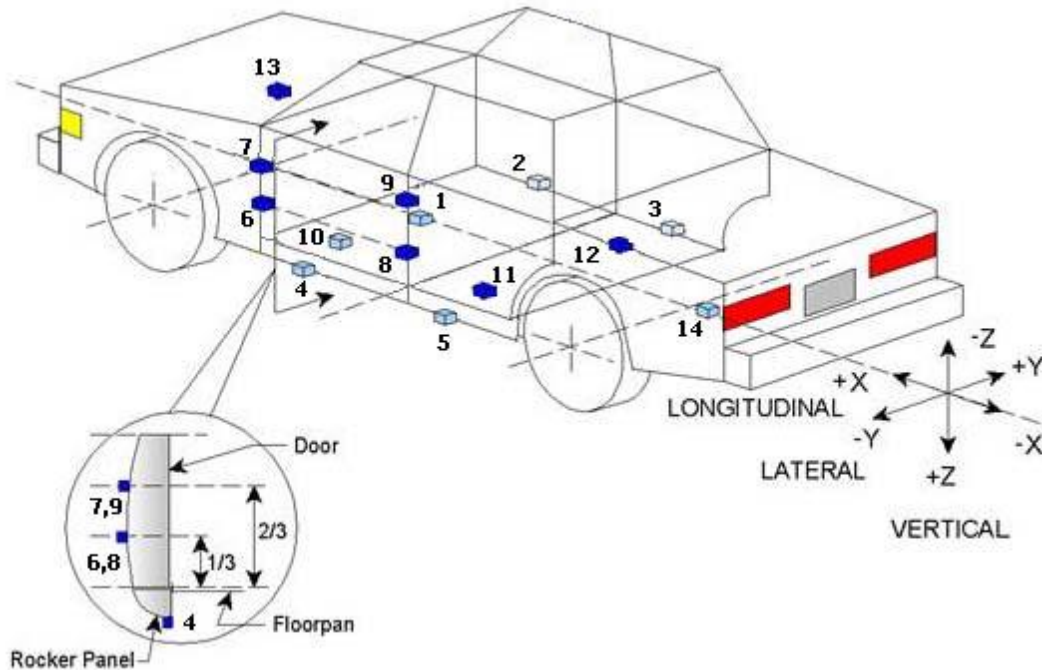
INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



TEST VEHICLE ACCELEROMETER LOCATIONS

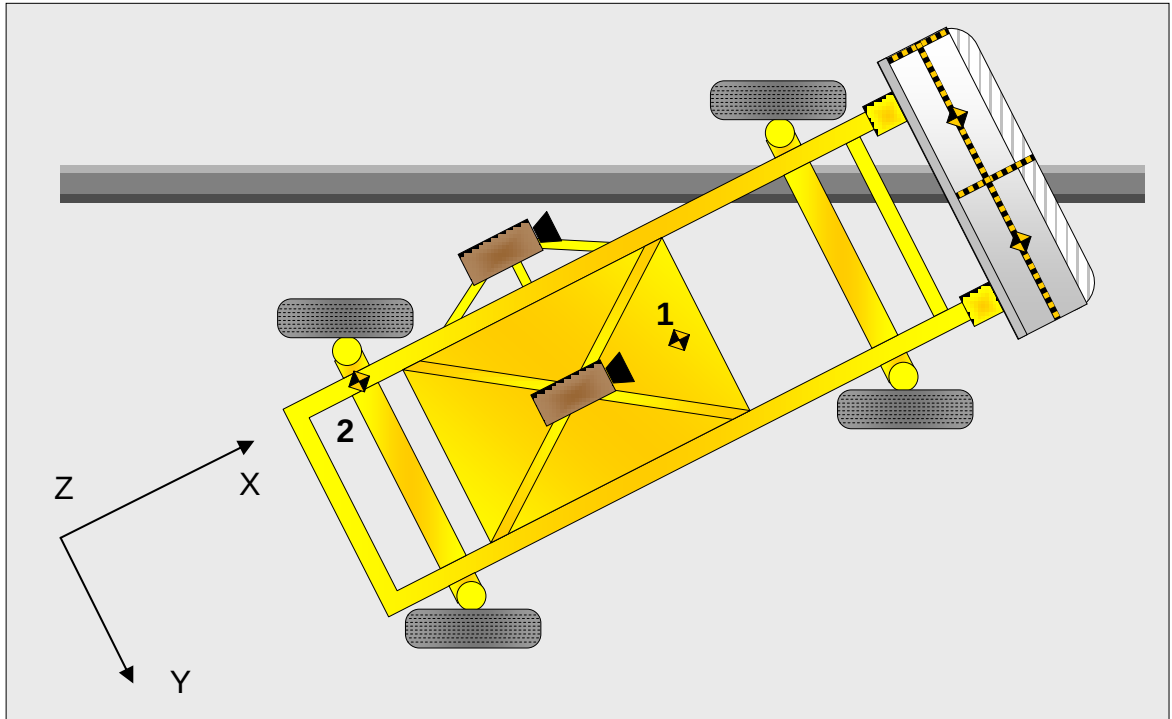
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3840	0	-713
2	Right Sill at Front Seat	3722	735	-555
3	Right Sill at Rear Seat	2655	750	-597
4	Left Sill at Front Door	3713	-765	-550
5	Left Sill at Rear Door	2640	-735	-602
6	A-Post Lower	4250	-922	-607
7	A-Post Middle	4240	-930	-1128
8	B-Post Lower	3155	-845	-1082
9	B-Post Middle	3145	-842	-835
10	Front Seat Track	3382	-662	-661
11	Rear Seat Structure	2625	-500	-684
12	Right Rear Occ. Compartment	2630	540	-675
13	Engine Block	4753	-70	-978
14	Rear Above Axle	1055	0	-794

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



MDB ACCELEROMETER LOCATIONS

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

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

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2018 Ford F-150 SuperCab
Test Program: SINCAP Side Impact

NHTSA No.: M20180211
Test Date: 11/16/2017

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES2-re)	Rear Seat Dummy (SID-IIs)
Face	Head liner, SCAB	SCAB
Top of Head	Head liner	C-pillar trim, SCAB
Left Side of Head	Head liner, SCAB	C-pillar trim, SCAB
Back of Head	Head liner, head rest	C-pillar trim
Left Shoulder	SCAB	SCAB, door panel
Upper Torso	Seat back bolster, SAB	Door panel
Lower Torso	Seat back bolster	Door panel
Left Hip	Seat cushion bolster, SAB, door panel	Seat cushion bolster
Left Knee	Door panel	Door panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	Driver door window broken but intact
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	N/A		
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	Yes	Unknown
Other	No	N/A	No	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3680
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		509
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-1
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-1

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2018 Ford F-150 SuperCab
Test Program: SINCAP Side Impact

NHTSA No.: M20180211
Test Date: 11/16/2017

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	1102

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	389.0	289.2	678.2
Right	kg	394.6	290.4	685.0
Ratio	%	57.5	42.5	100.0
Totals	kg	783.6	579.6	1363.2

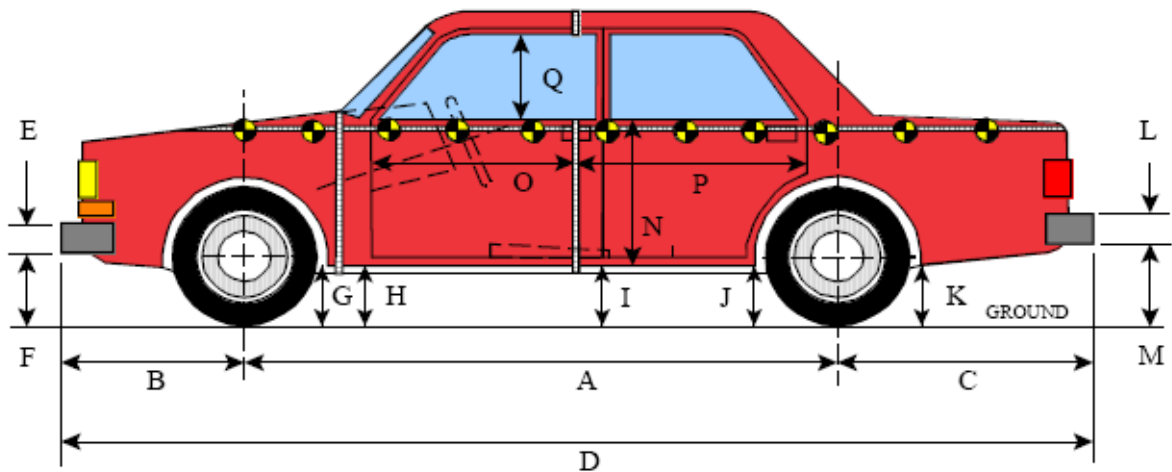
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.48
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.45
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



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	3680	3660	20
B	Front Axle to Front Surface of Vehicle	974	982	-8
C	Rear Axle to Rear Surface of Vehicle	1246	1238	8
D	Total Length at Centerline	5900	5880	20
E	Front Bumper Thickness	180	180	0
F	Front Bumper Bottom to Ground	435	475	-40
G	Sill Height at Front Wheel Well	402	413	-11
H	Sill Height at Front Door Leading Edge	399	417	-18
I	Sill Height at B-Pillar	411	430	-19
J1	Sill Height at Rear Wheel Well	410	437	-27
J2	Pinch Weld Height at Rear Wheel Well	375	382	-7
K	Sill Height Aft of Rear Wheel Well	396	487	-91
L	Rear Bumper Thickness	146	146	0
M	Rear Bumper Bottom to Ground	506	477	29
N	Sill Height to Window Bottom Sill	885	863	22
O	Front Door Leading Edge to Impact CL	727	731	-4
P	Rear Door Trailing Edge to Impact CL	1206	1152	54
Q	Front Window Opening	493	481	12
R	Right Side Length	5705	5720	-15
S	Left Side Length	5702	5717	-15
T	Vehicle Width	2028	2040	-12

DATA SHEET NO. 11

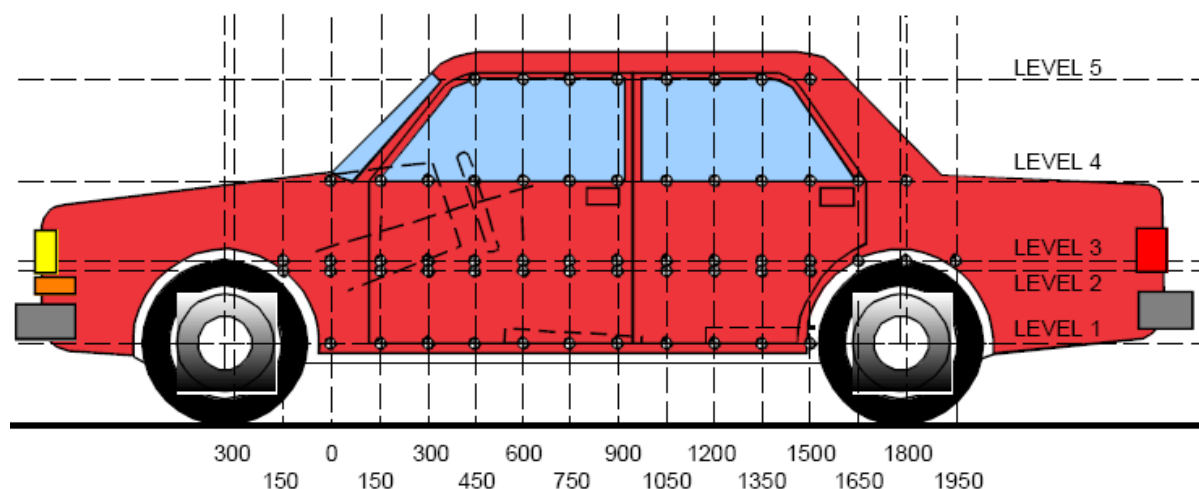
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Ford F-150 SuperCab

NHTSA No.: M20180211

Test Program: SINCAP Side Impact

Test Date: 11/16/2017



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top ¹	487	252	1650
2	Driver Hip Point	923	188	1800
3	Mid-Door	839	213	1650
4	Window Sill	1168	111	1500
				1650
5	Window Top	1838	34	1950

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

¹ The sill top level 2100 missing post-test.

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

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

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
-450	0	0	0	973	0	0	0	0	965	0	0	0	0	8	0
-300	0	1028	0	981	0	0	1004	0	963	0	0	24	0	18	0
-150	0	1022	1027	987	0	0	996	990	965	0	0	26	37	22	0
0	1007	1016	1015	992	0	932	982	972	971	0	75	34	43	21	0
150	993	1016	1013	993	0	875	953	929	975	0	118	63	84	18	0
300	993	1018	1015	995	0	836	922	893	965	0	157	96	122	30	0
450	993	1019	1016	999	0	826	902	863	975	0	167	117	153	24	0
600	993	1020	1016	1003	0	819	895	856	982	0	174	125	160	21	0
750	994	1020	1017	1005	0	821	889	848	979	0	173	131	169	26	0
900	994	1020	1017	1007	717	816	883	840	968	704	178	137	177	39	13
1050	994	1021	1017	1008	733	825	880	832	955	715	169	141	185	53	18
1200	994	1022	1018	1009	739	815	878	829	943	719	179	144	189	66	20
1350	993	1020	1017	1008	741	793	868	816	912	718	200	152	201	96	23
1500	991	1017	1013	1007	742	774	848	819	896	717	217	169	194	111	25
1650	989	1015	1012	1006	744	737	833	799	895	714	252	182	213	111	30
1800	987	1013	1010	1004	743	782	825	810	894	711	205	188	200	110	32
1950	986	1011	1008	1002	740	822	908	897	941	706	164	103	111	61	34
2100	976	1006	1002	993	0	N/A	938	930	936	0	N/A	68	72	57	0
2250	975	999	996	991	0	956	990	984	983	0	19	9	12	8	0
2400	974	998	995	989	0	957	994	989	983	0	17	4	6	6	0
2550	974	996	993	986	0	958	998	993	982	0	16	-2	0	4	0
2700	0	995	1002	984	0	0	1002	1003	981	0	0	-7	-1	3	0
2850	0	1010	0	981	0	0	1010	0	979	0	0	0	0	2	0
3000	0	0	0	977	0	0	0	0	978	0	0	0	0	-1	0

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

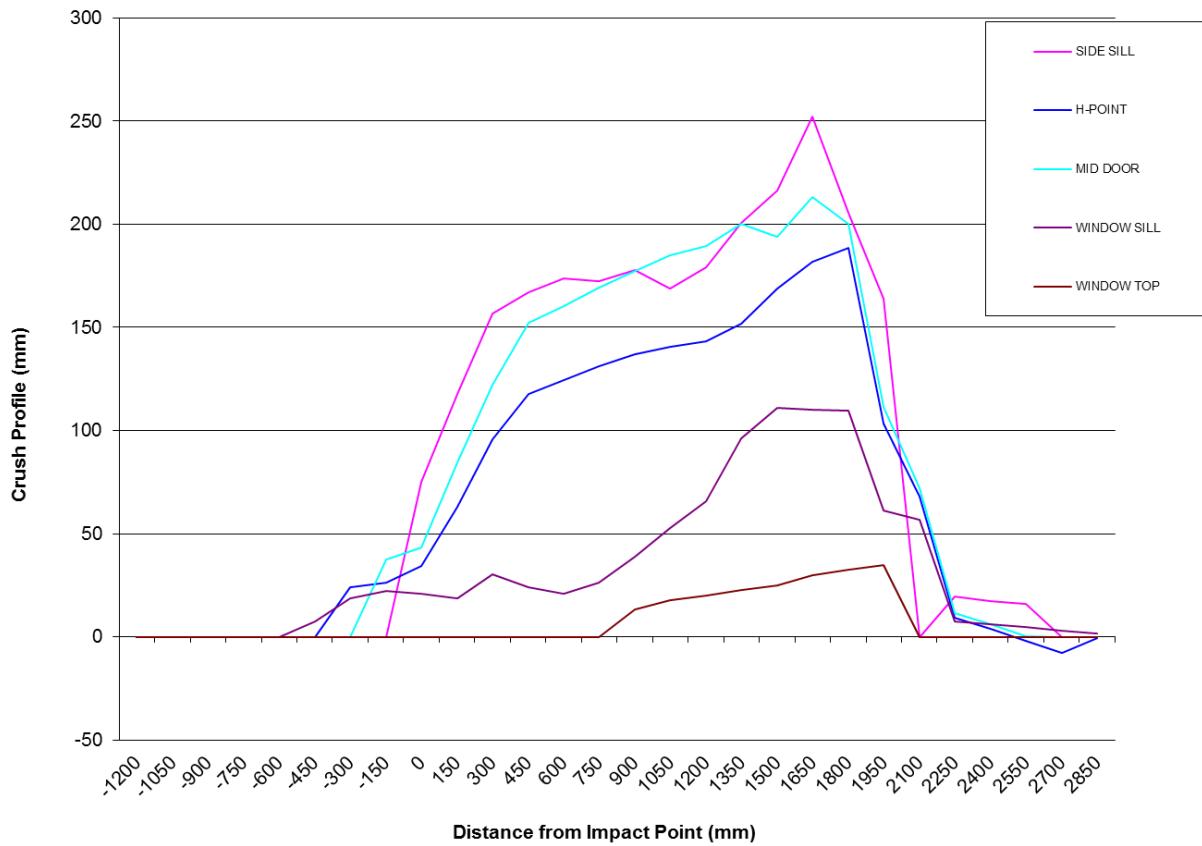
¹ The sill top level 2100 missing post-test.

DATA SHEET NO. 11 (CONTINUED)¹

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Ford F-150 SuperCab
Test Program: SINCAP Side Impact

NHTSA No.: M20180211
Test Date: 11/16/2017

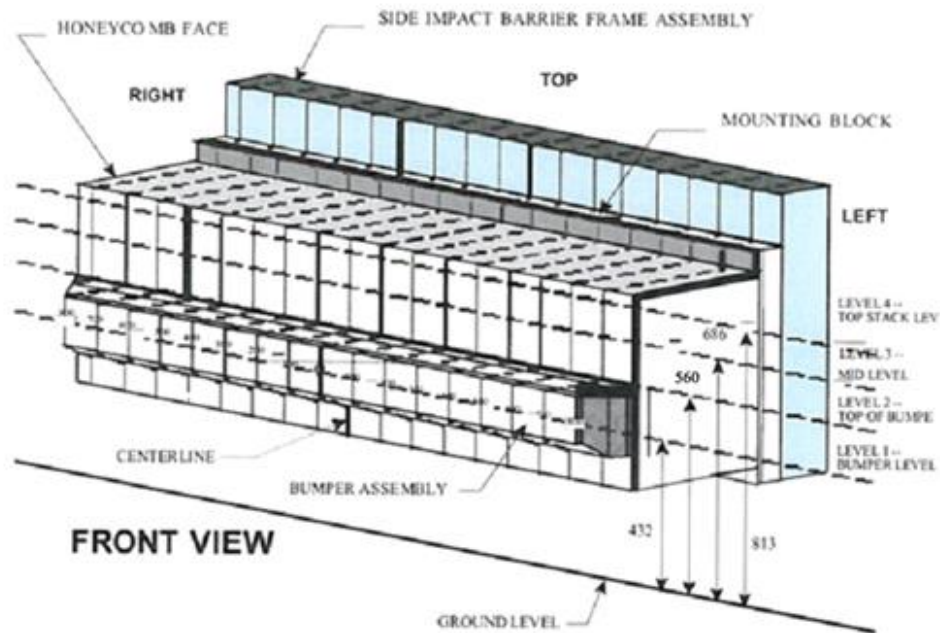


¹ The sill top level 2100 missing post-test.

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



NOTE: Dimensions are shown in millimeters, mm

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	155
B	Top of Bumper	560	800	Right	150
C	Mid-Level	686	800	Left	145
D	Top of Stack	813	800	Left	161

DEFORMABLE BARRIER STATIC CRUSH

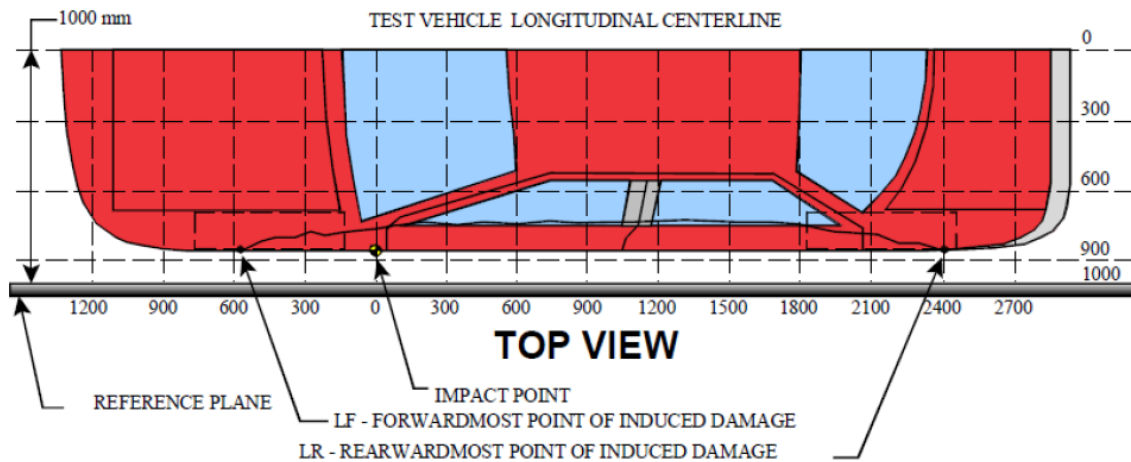
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	61	57	61	68	76	86	96	101	100	93	100	107	114	122	132	151	155
2	150	76	75	82	89	97	97	93	N/A ¹	98	104	111	118	125	133	140	147
3	128	93	47	44	52	68	60	60	45	34	31	30	37	47	64	93	145
4	145	97	N/A ¹	57	47	76	71	66	56	53	49	53	58	68	82	112	161

¹ Missing MDB points 3 and 43 post-test

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1 ¹	2850	4	979	981	0
2	2250	1	956	975	19
3	1500	1	774	991	217
4	900	1	816	994	178
5	150	1	875	993	118
6	-450	4	965	973	8

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	4	223	384	161
2	500 mm Left of Center	2	259	384	125
3	200 mm Left of Center	2	280	384	104
4	200 mm Right of Center	2	287	384	97
5	500 mm Right of Center	2	302	384	82
6	800 mm Right of Center	4	233	383	150

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

² Missing MDB points 3 and 43 post-test.

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

Test Vehicle: 2018 Ford F-150 SuperCab
 Test Program: SINCAP Side Impact

NHTSA No.: M20180211
 Test Date: 11/16/2017

Test Time: 15:46 **Temperature:** 21.3°C

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

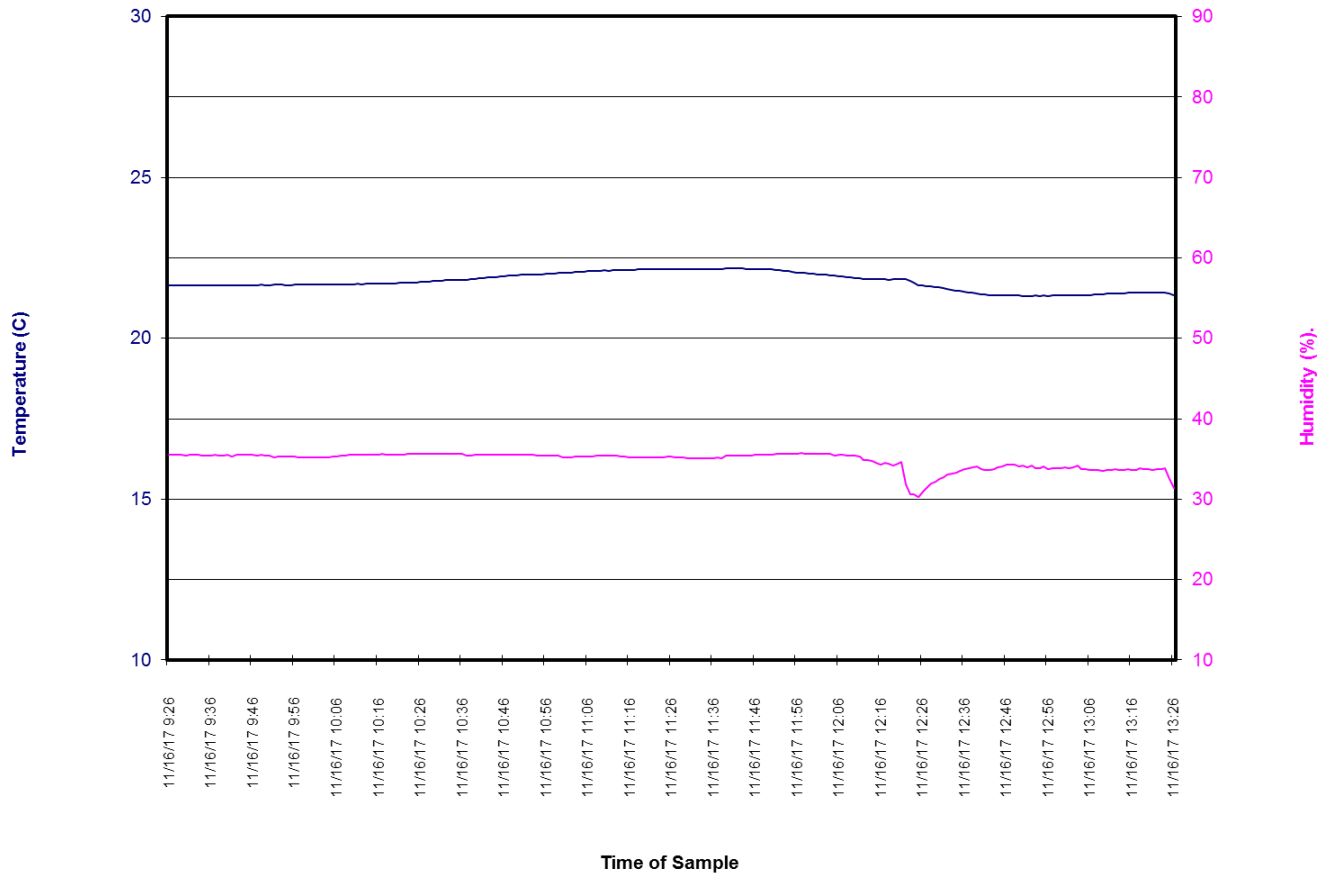
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

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

Test Vehicle: <u>2018 Ford F-150 SuperCab</u>	NHTSA No.: <u>M20180211</u>
Test Program: <u>SINCAP Side Impact</u>	Test Date: <u>11/16/2017</u>

M20180211 2018 Ford F-150 SuperCab Left MDB Impact 171116: Test Time 13:26



APPENDIX A
PHOTOGRAPHS

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



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



003 Pre-Test Frontal View of Test Vehicle



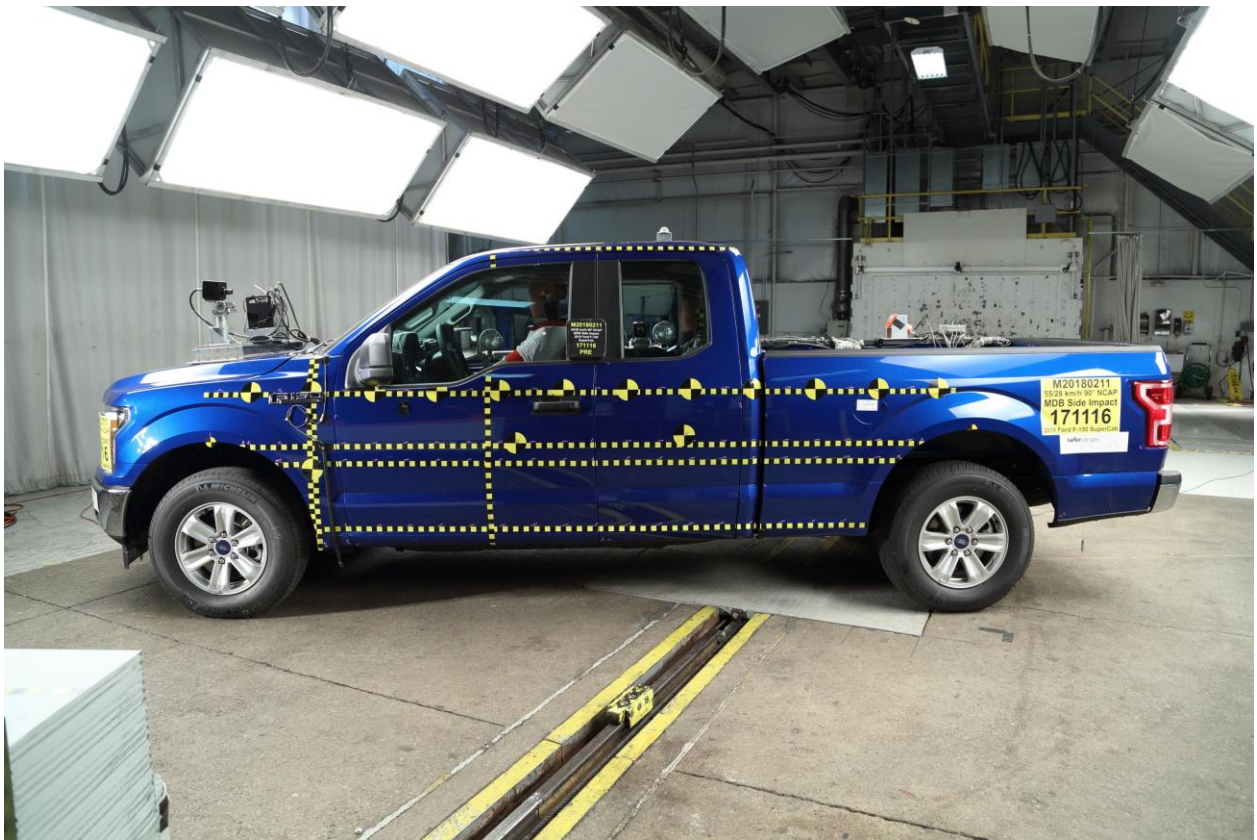
004 Post-Test Frontal View of Test Vehicle



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



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



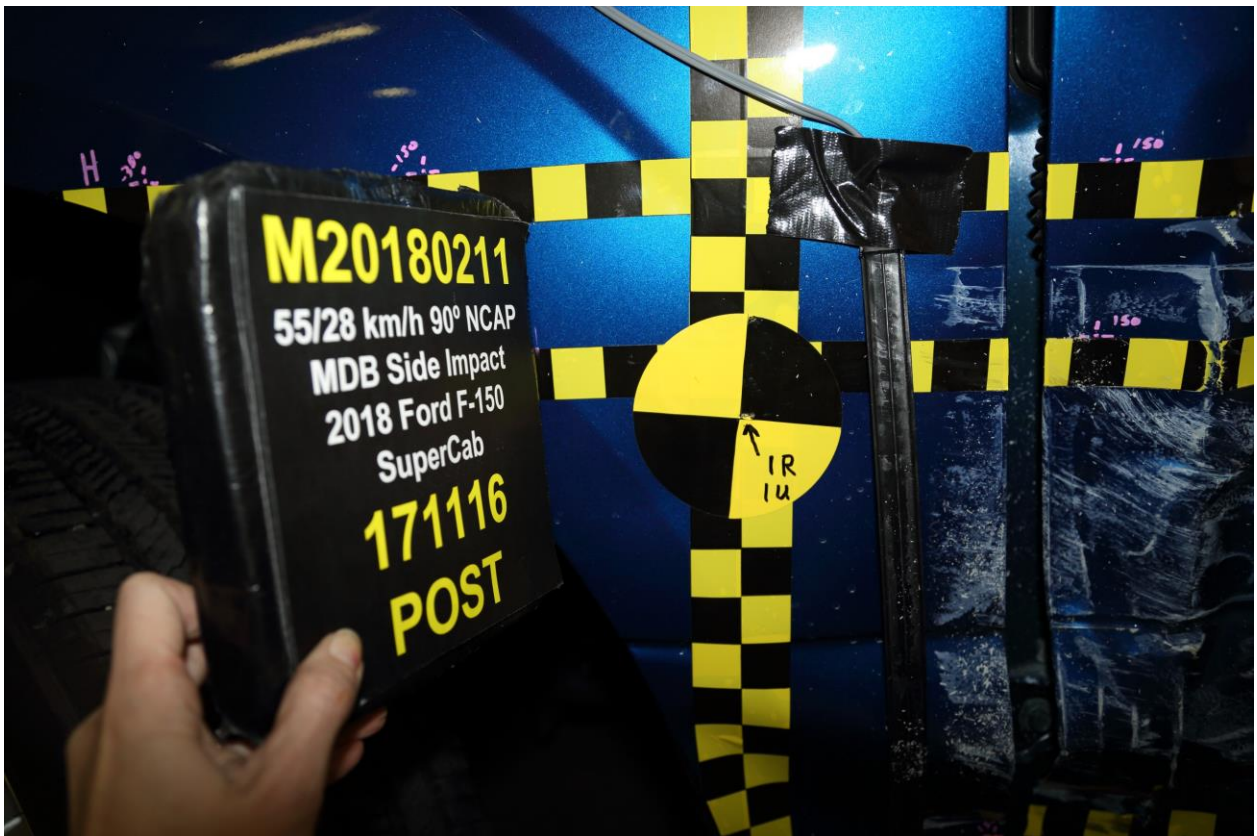
017 Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



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



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



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



021 Pre-Test Left Front Door Latch Close-Up



022 Post-Test Left Front Door Latch Close-Up

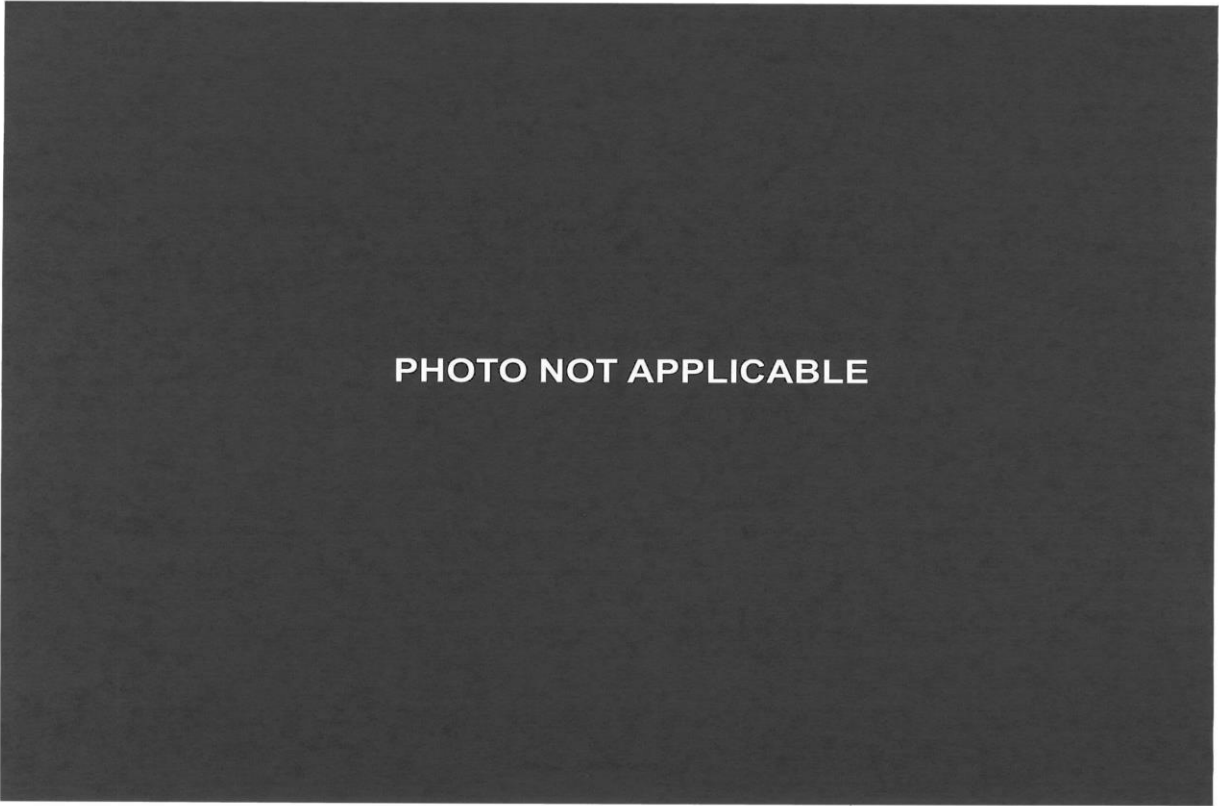


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023 Pre-Test Left Rear Door Latch Close-Up

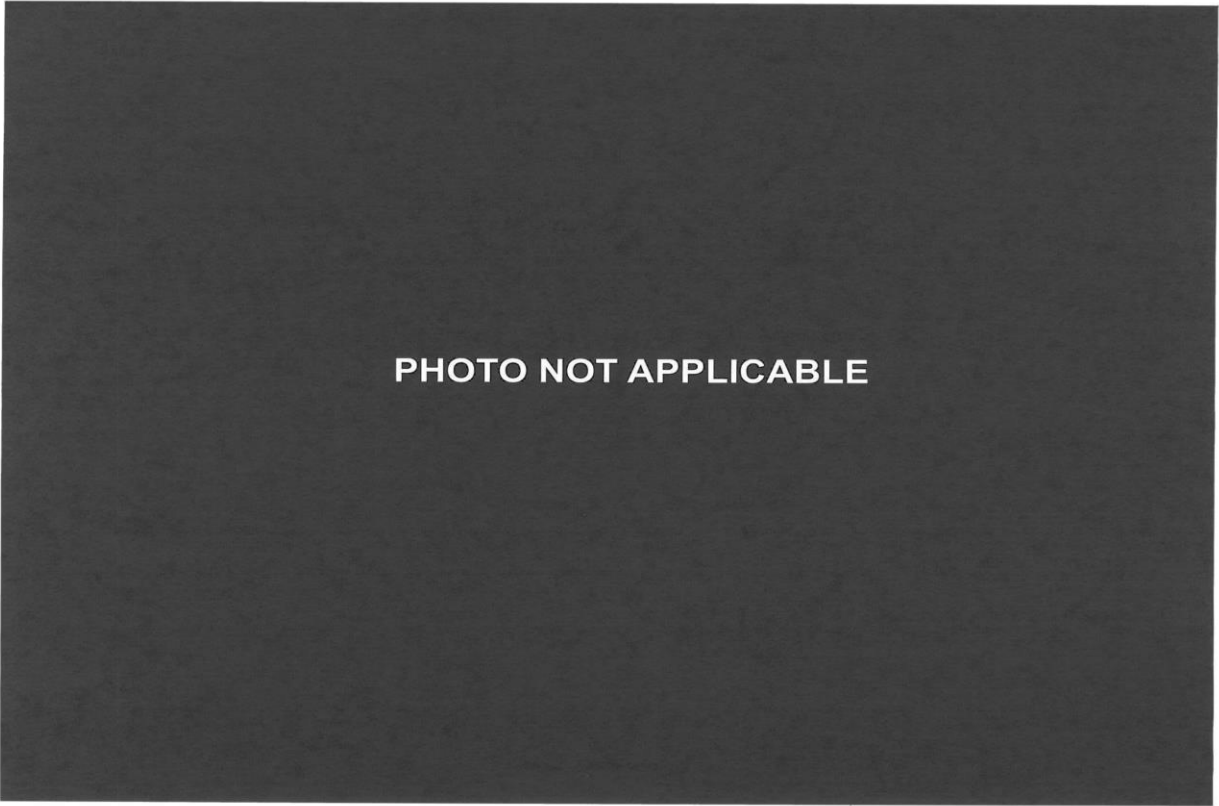


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024 Post-Test Left Rear Door Latch Close-Up



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



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



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

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



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



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



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



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



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



034 Pre-Test Placement of Driver Dummy's 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



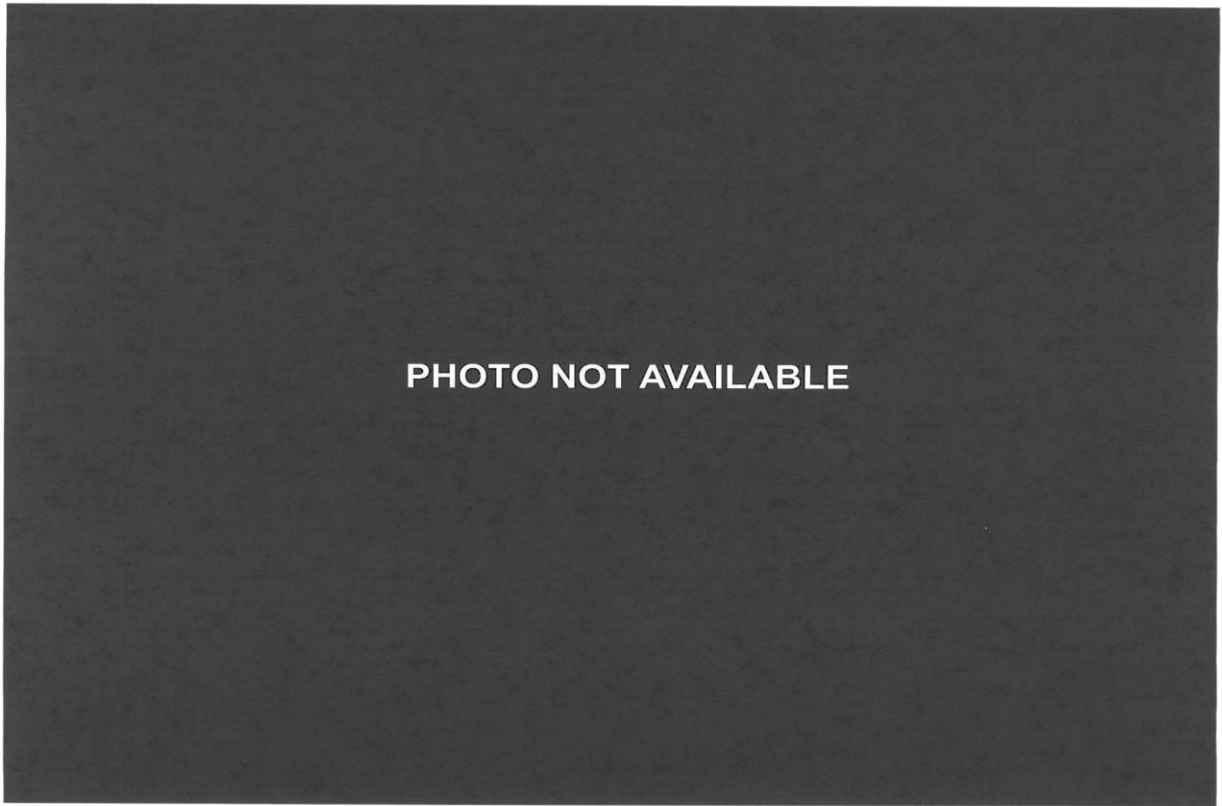
039 Pre-Test Close-Up Left Side View of Driver Seat Track



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



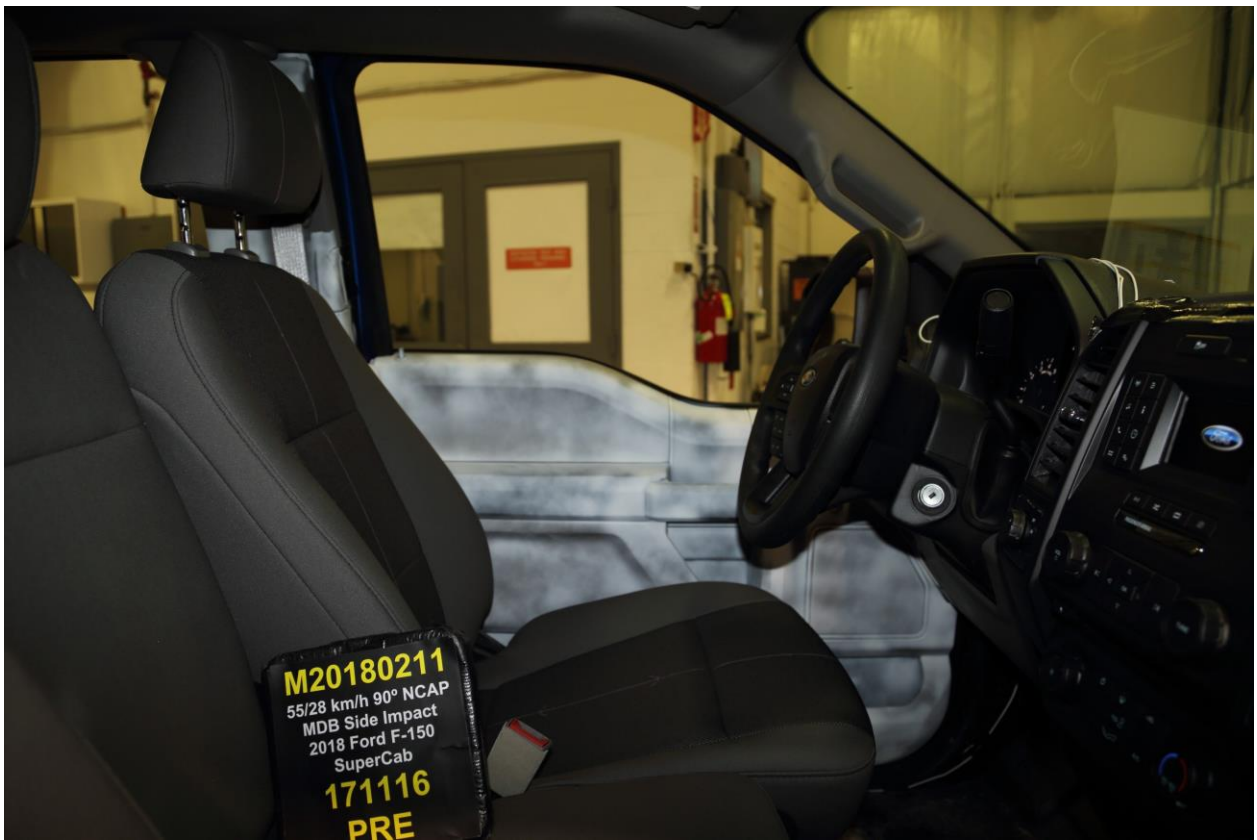
043 Post-Test Driver Dummy and Door Clearance View



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



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



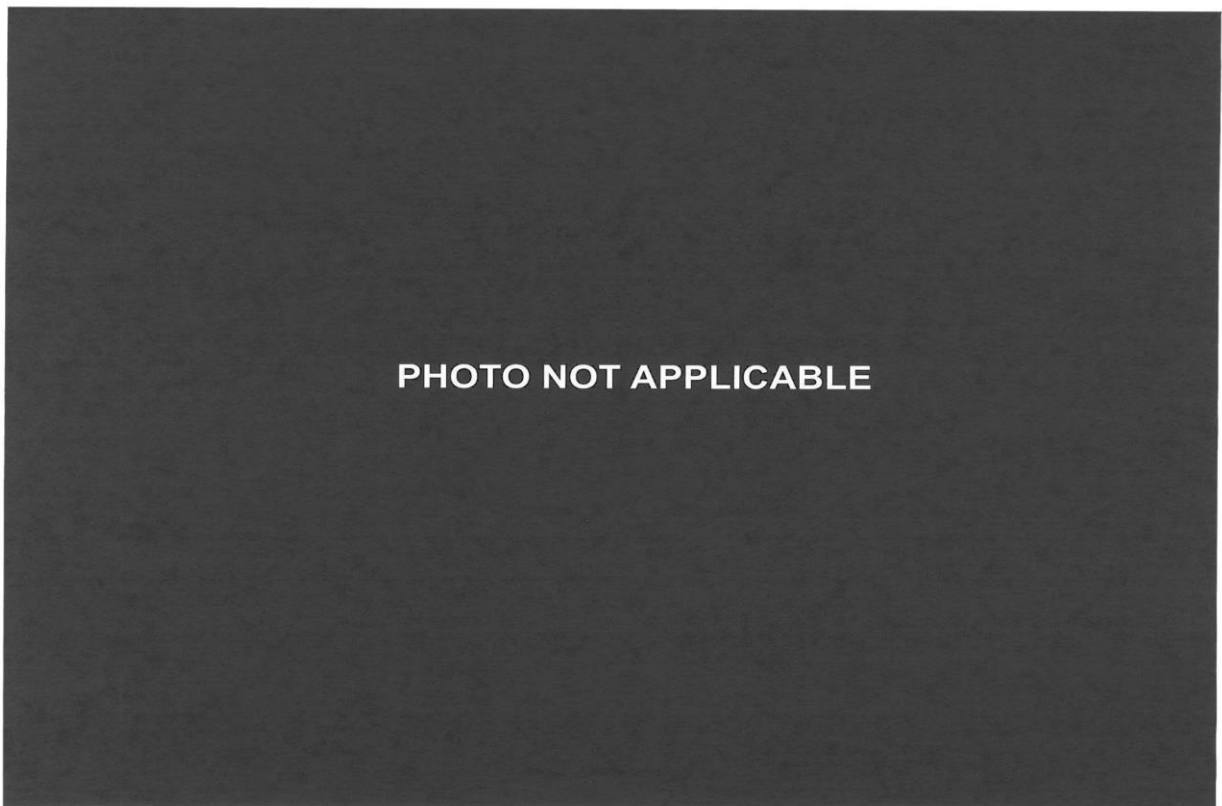
050 Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



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



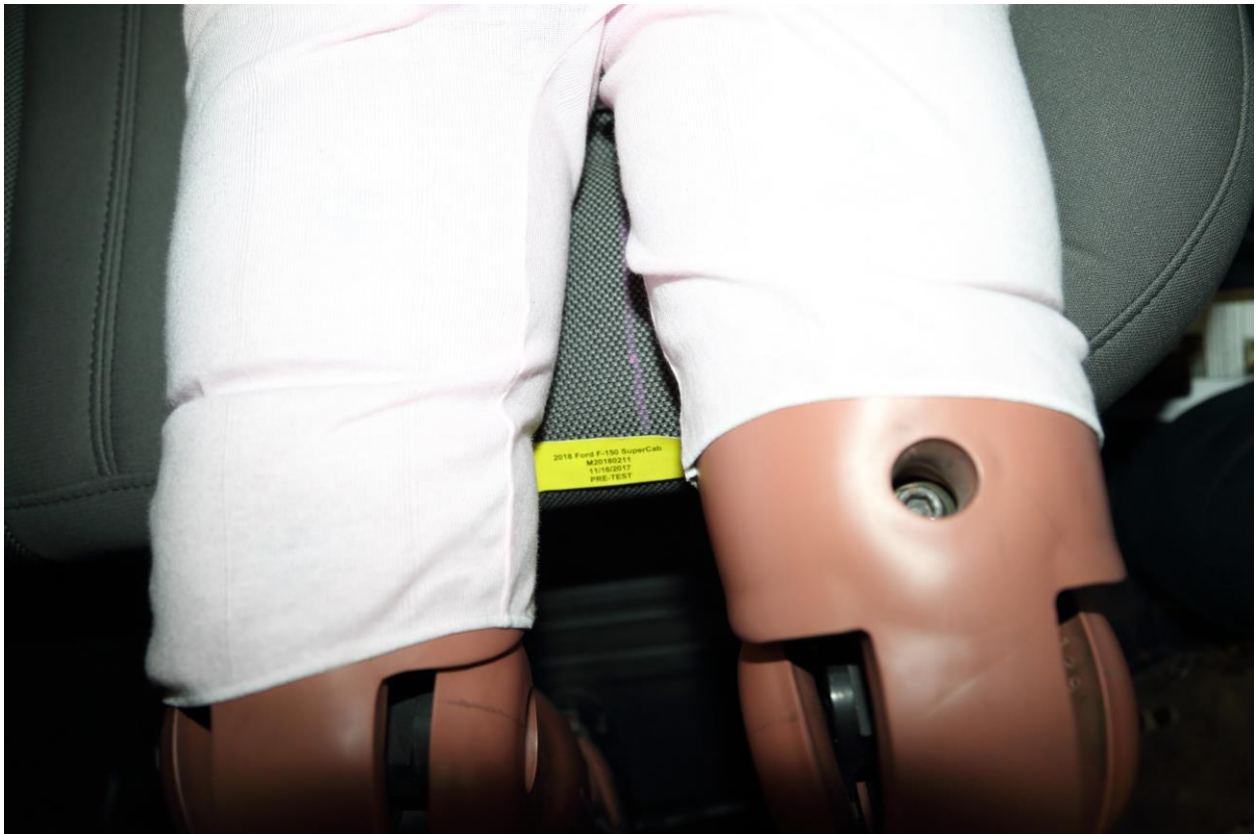
058 Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



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



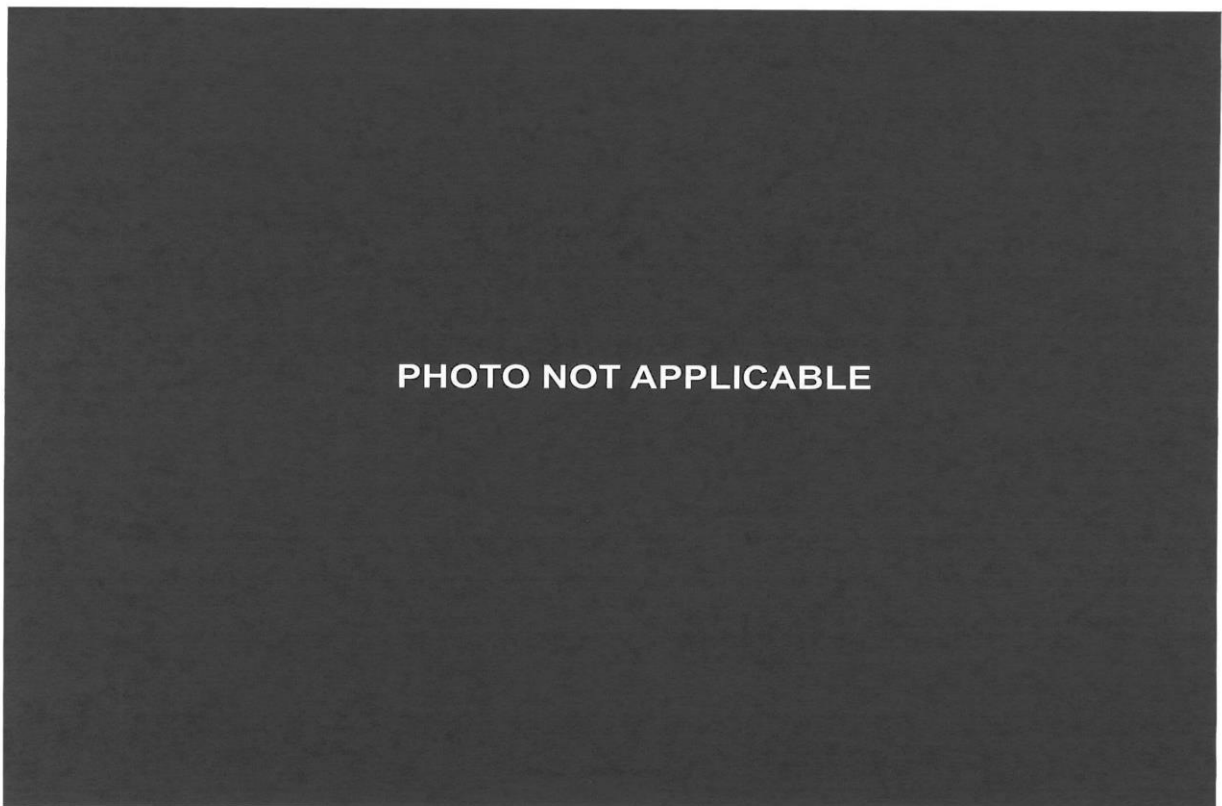
064 Pre-Test Placement of Rear Passenger Dummy's Feet



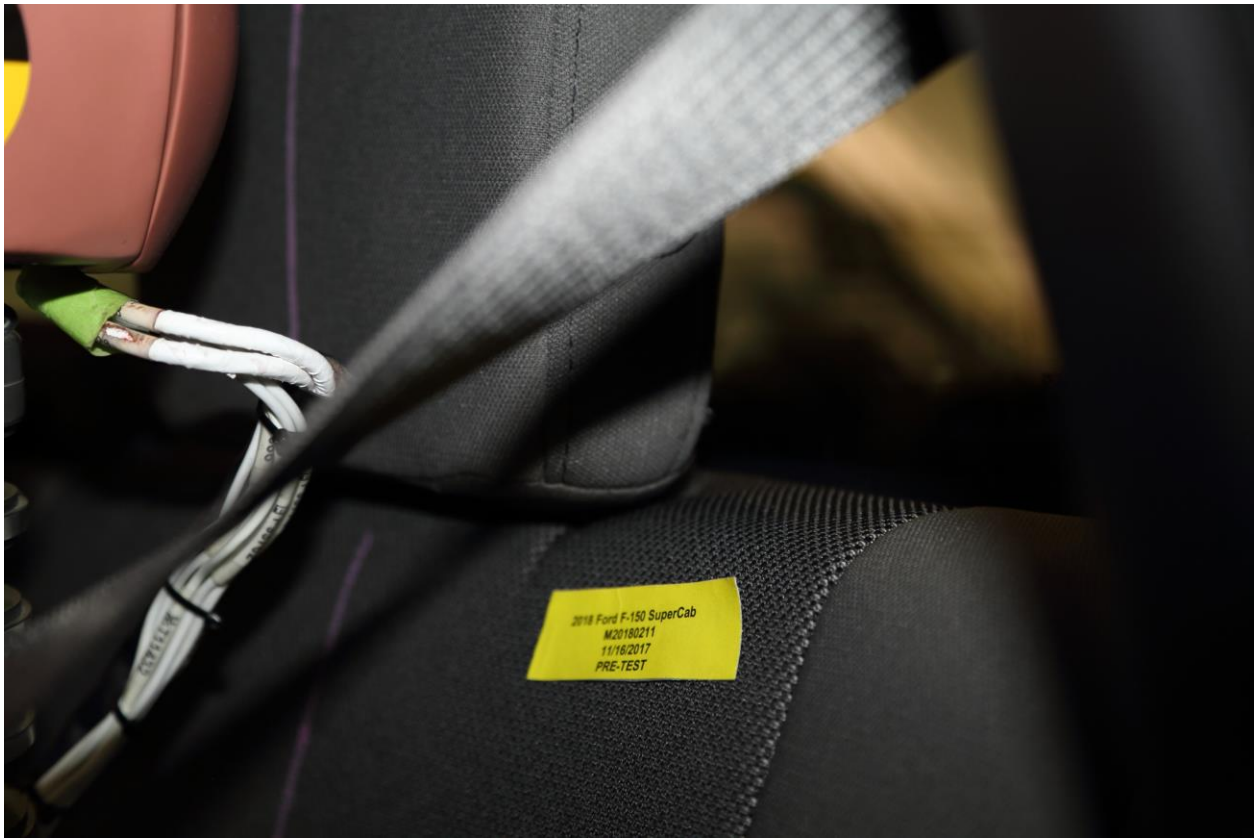
065 Pre-Test View of Belt Anchorage for Rear Passenger Dummy



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



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



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

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069 Pre-Test Passenger Dummy and Door Clearance View



070 Post-Test Passenger Dummy and Door Clearance View



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



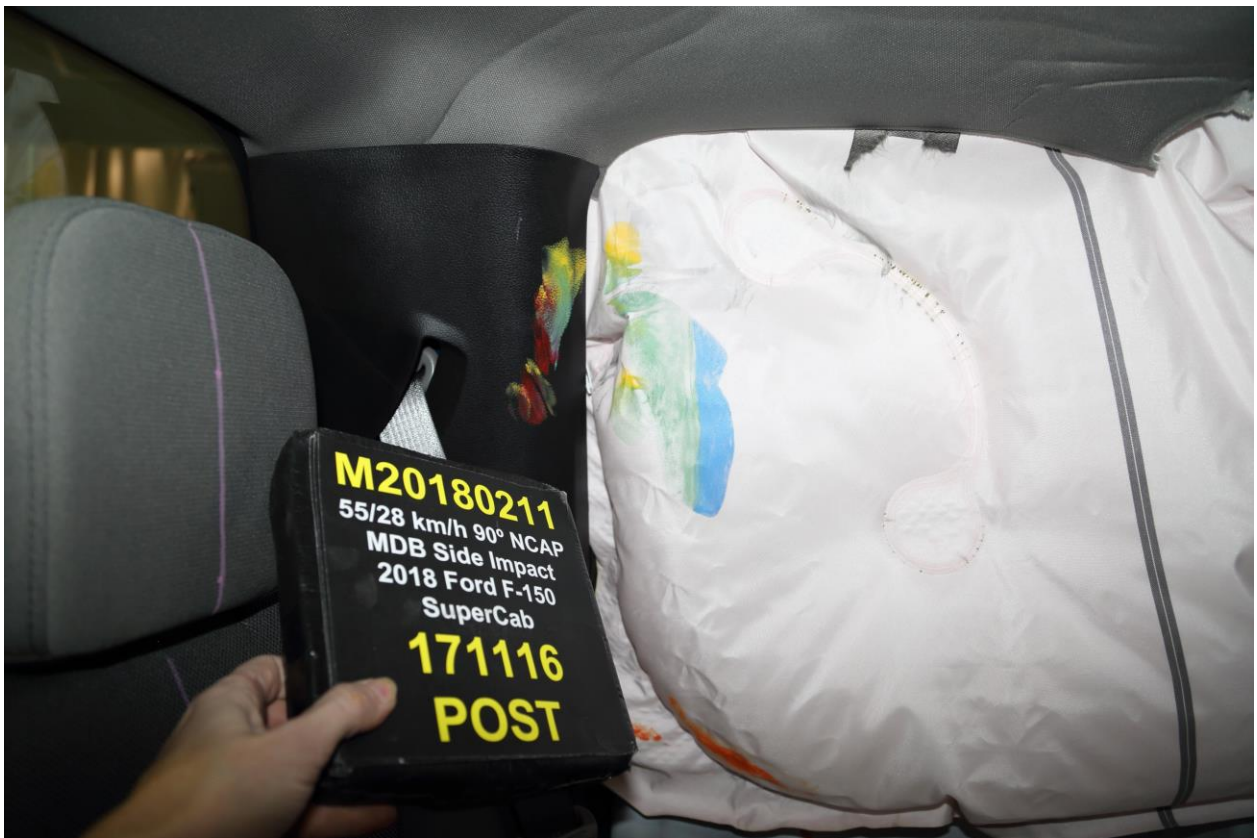
072 Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



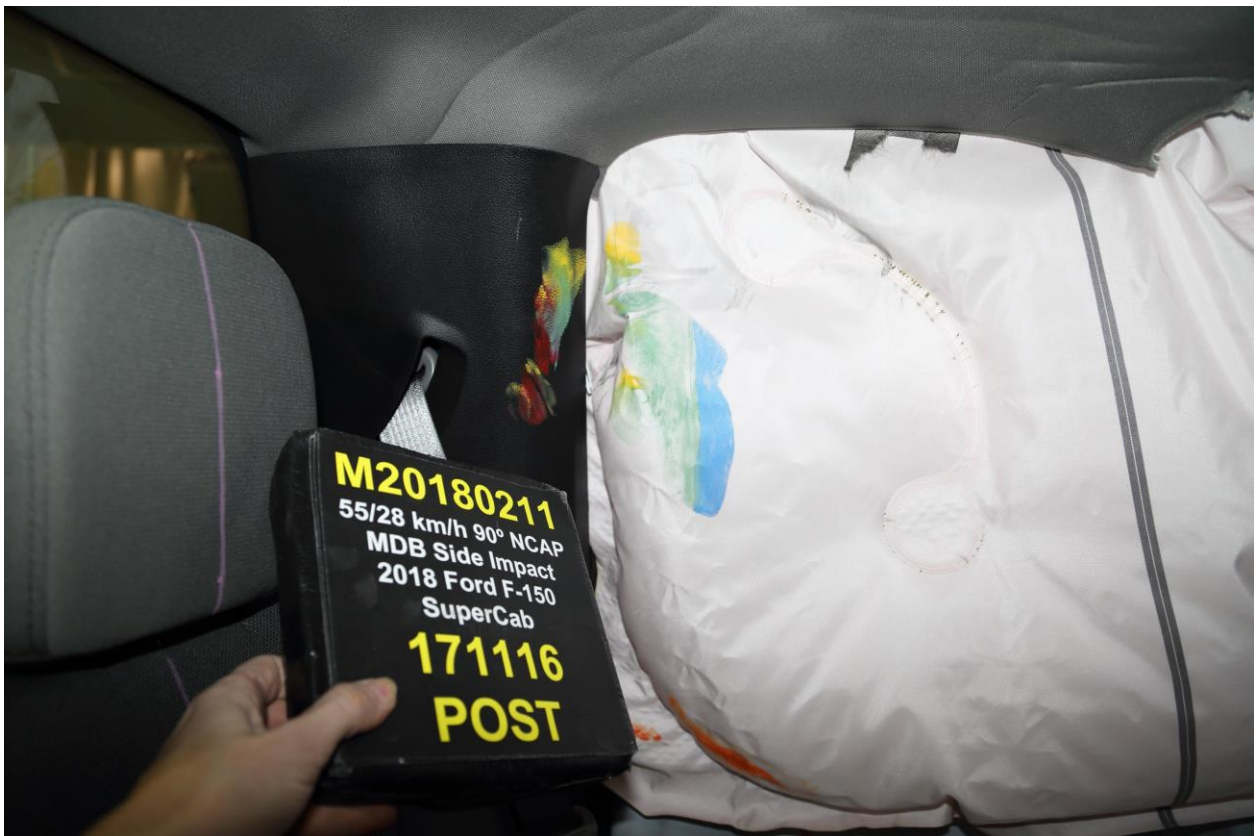
073 Pre-Test Rear Passenger Inner Door Panel View



074 Post-Test Rear Passenger Inner Door Panel View



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



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



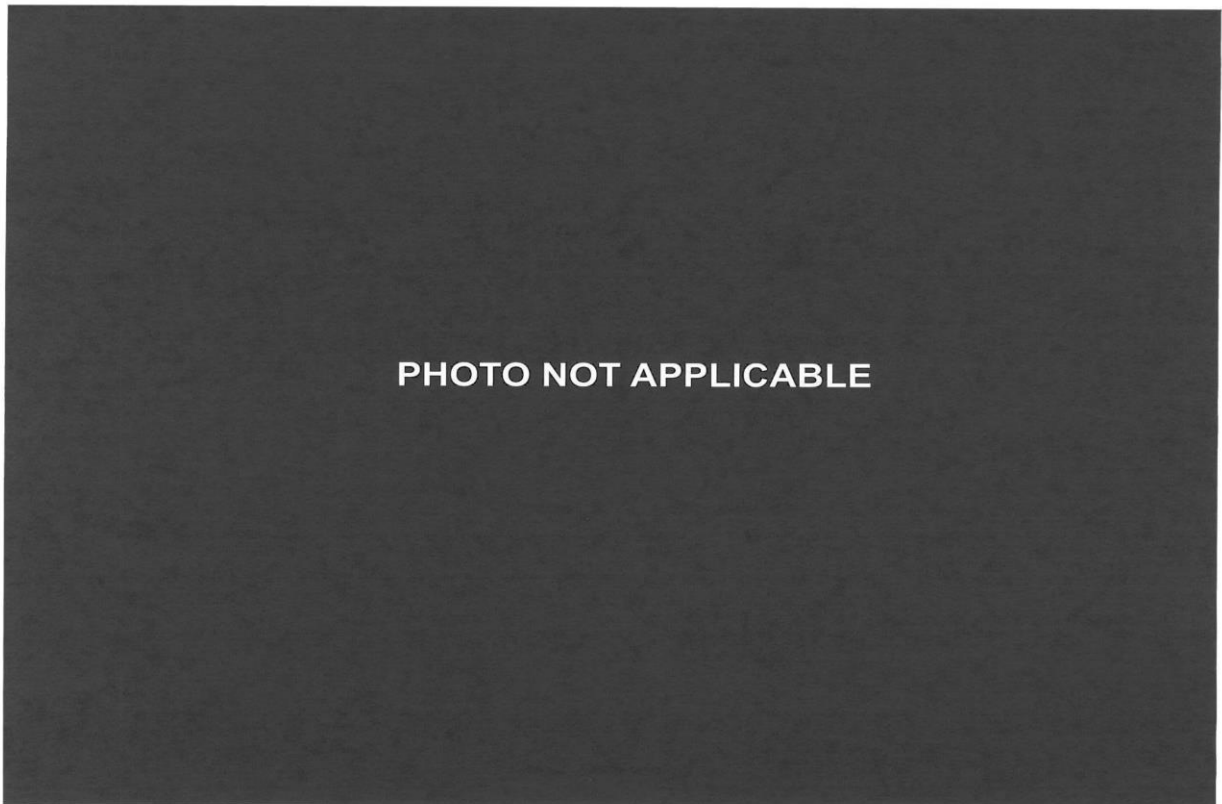
077 Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View



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



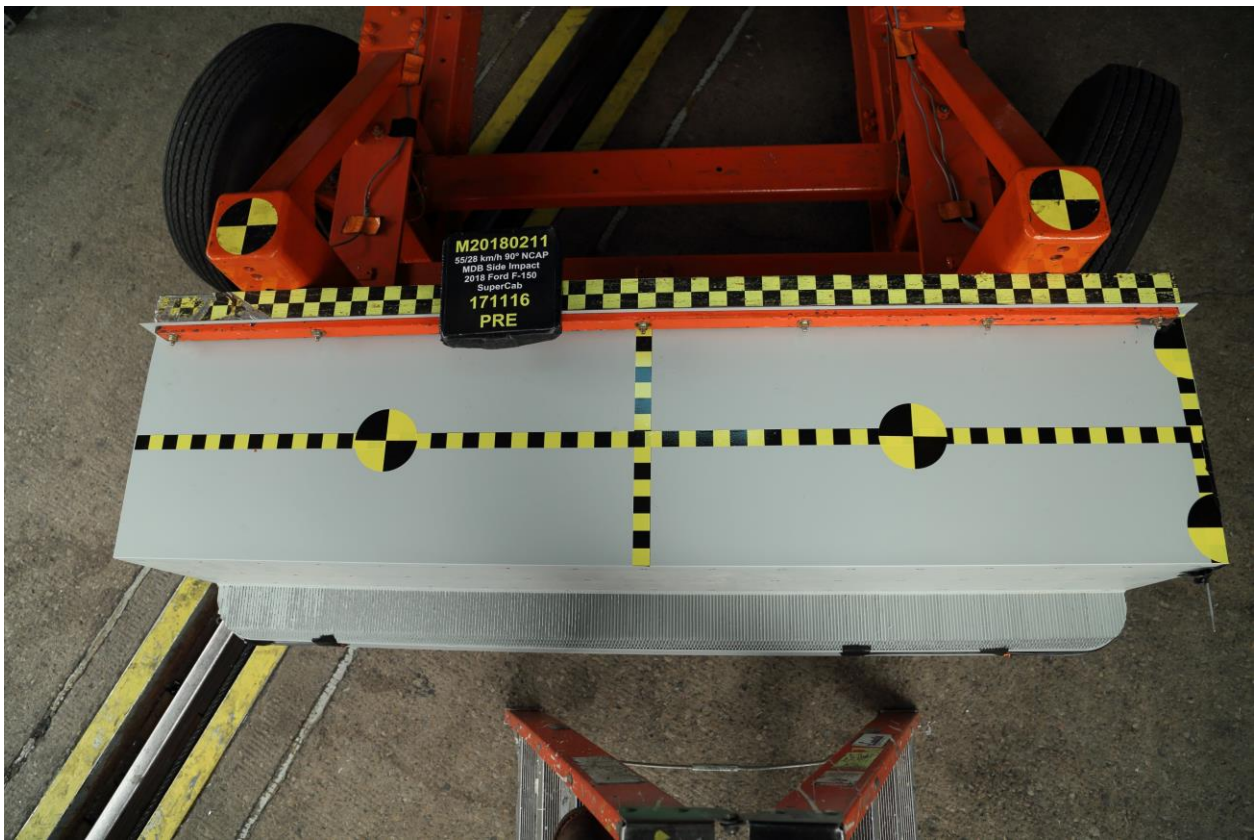
083 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



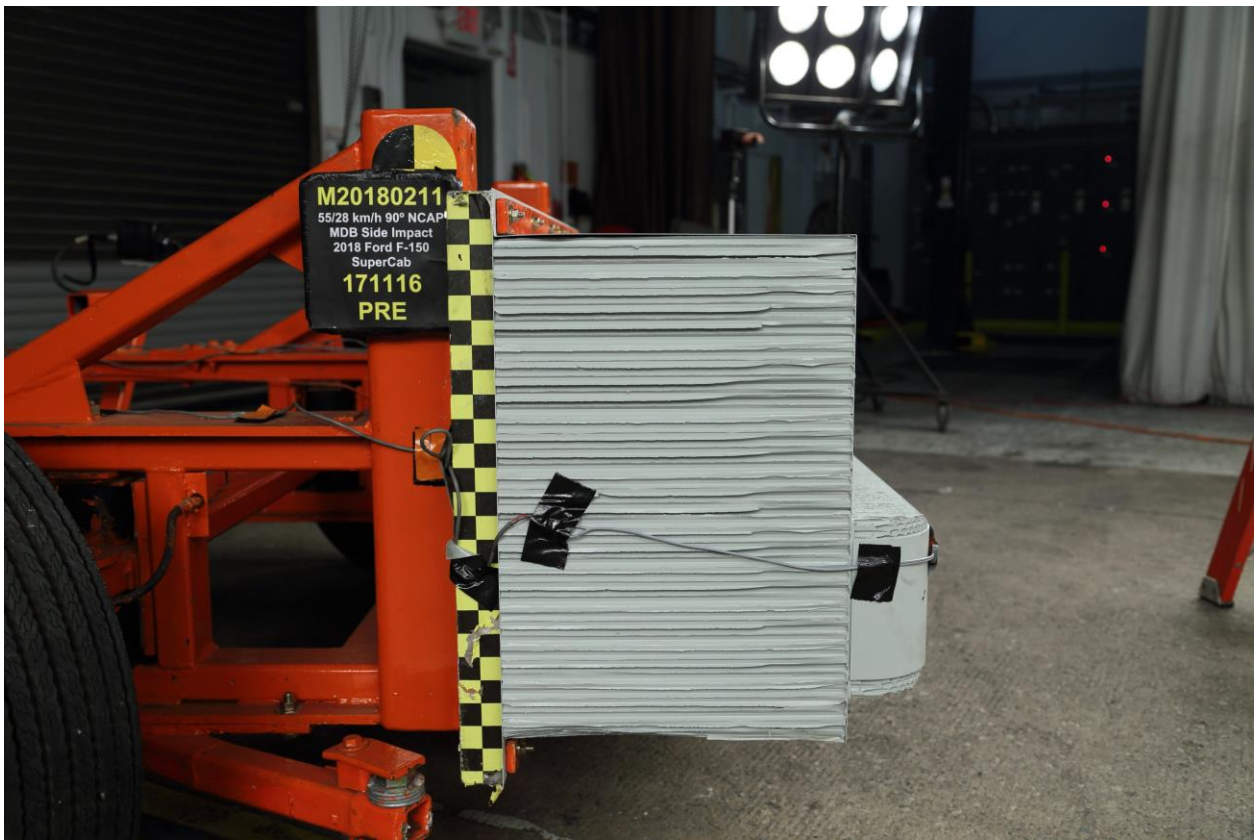
087 Post-Test Top View of MDB Impactor Face



088 Pre-Test Left Side View of MDB Impactor Face



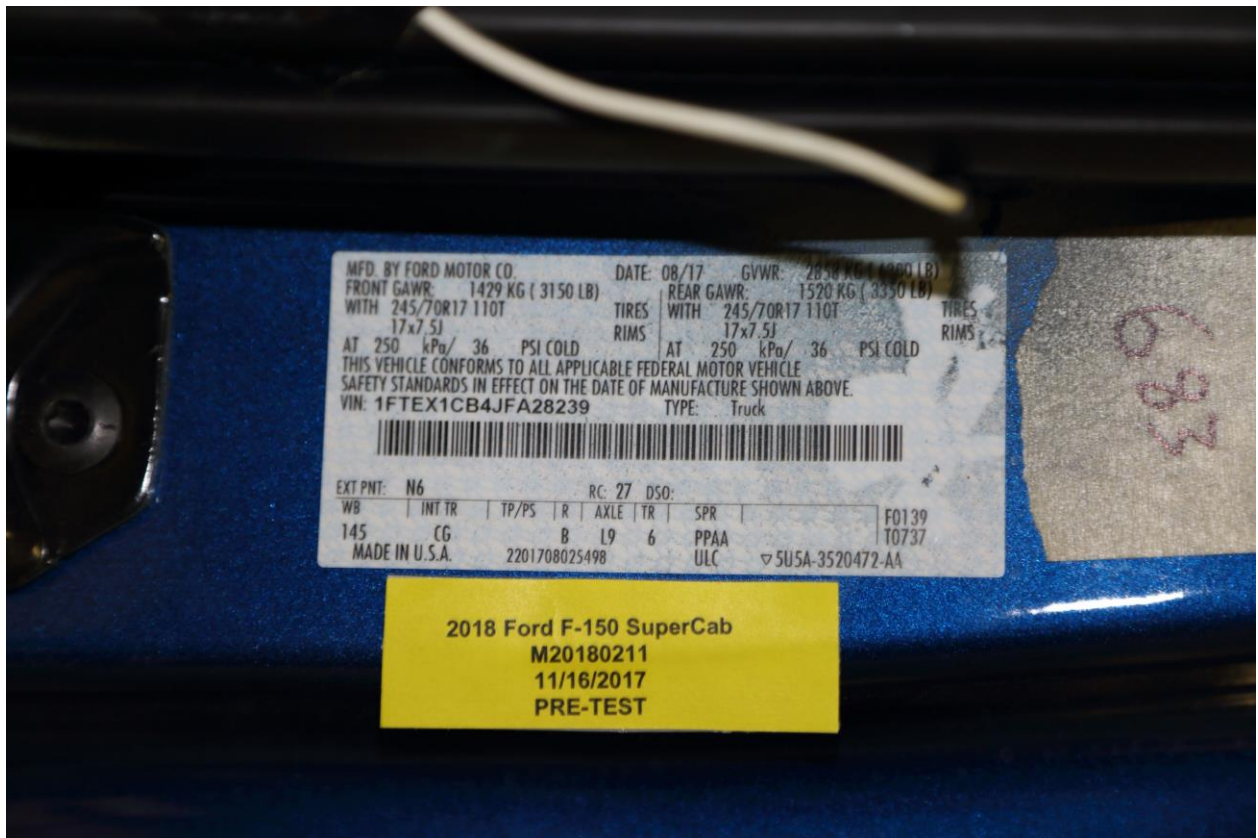
089 Post-Test Left Side View of MDB Impactor Face



090 Pre-Test Right Side View of MDB Impactor Face



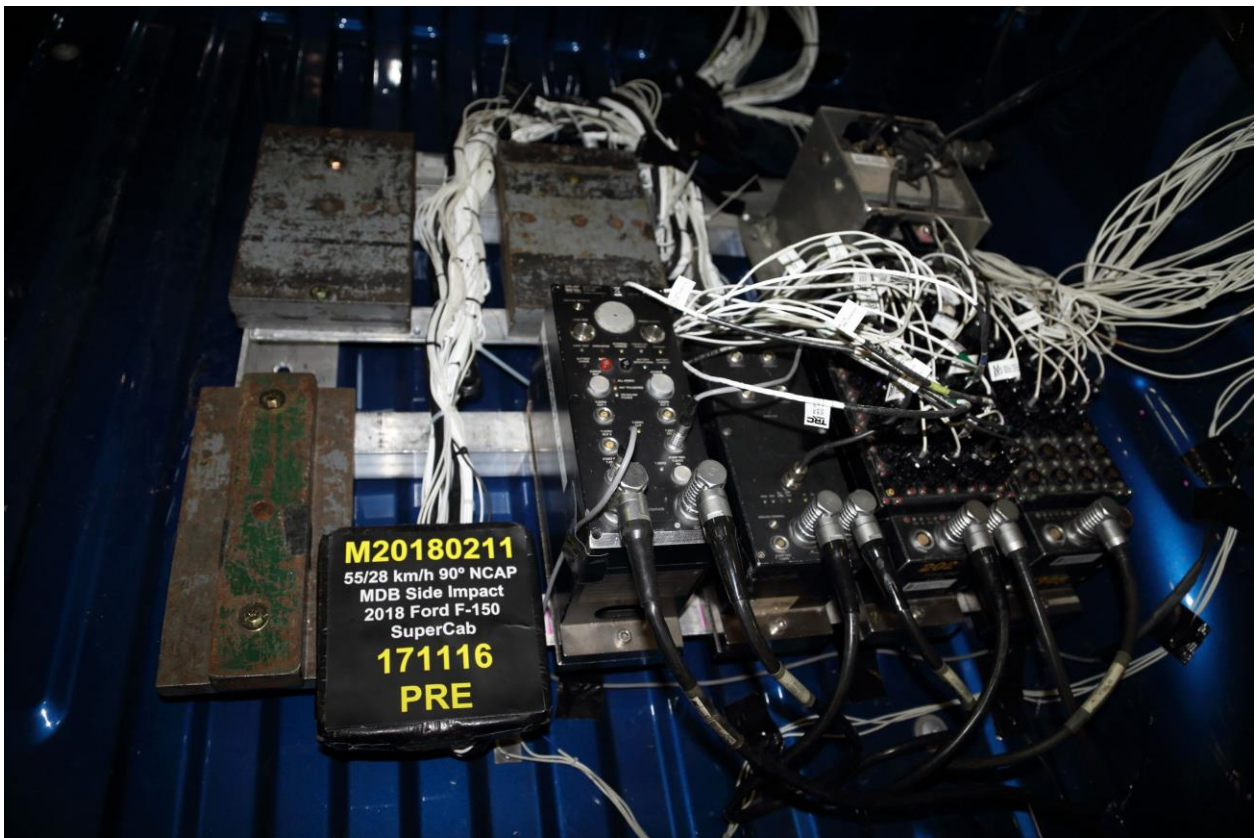
091 Post-Test Right Side View of MDB Impactor Face



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 Post-Test Primary and Redundant Speed Trap Read-Out



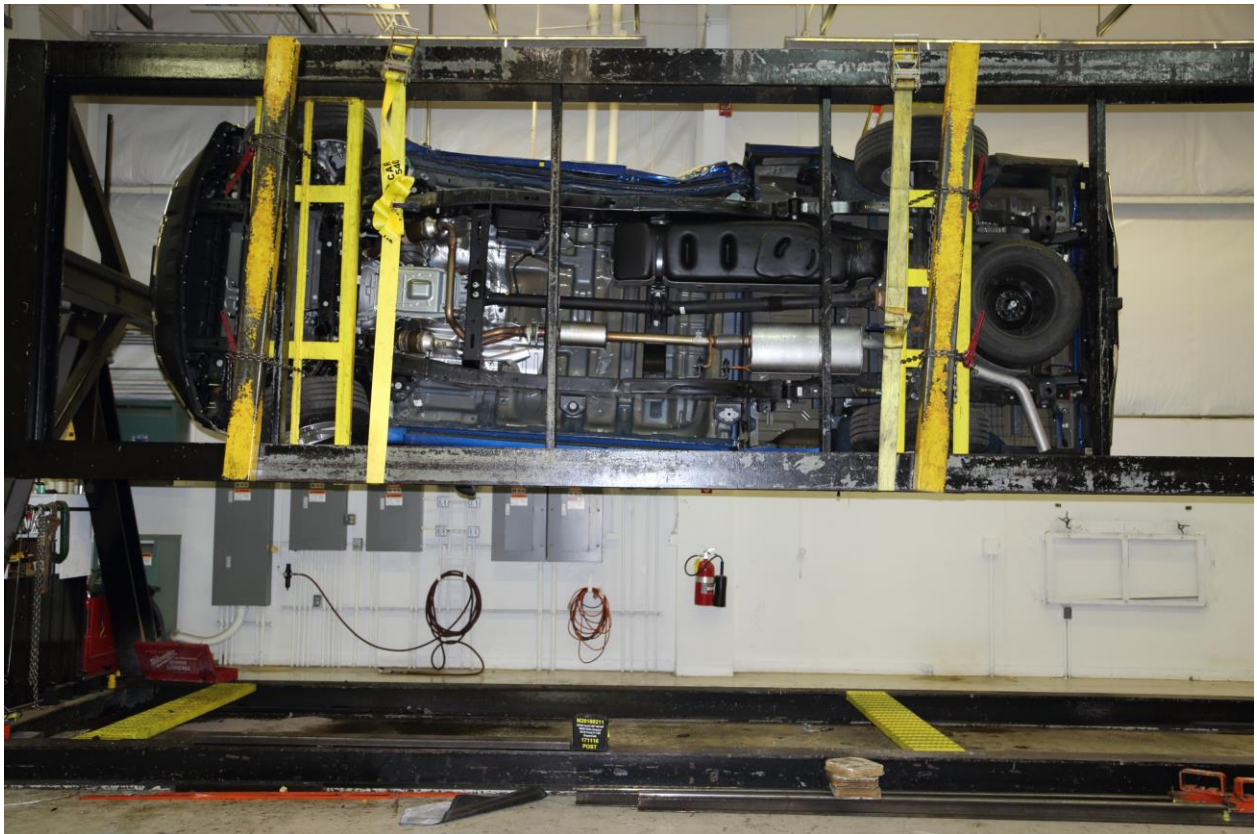
096 FMVSS No. 301 Static Rollover 0 Degrees



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

Go Further
ford.com

VEHICLE DESCRIPTION

F-150

2016 F-150 4X2 SUPERCAB
145" WHEELBASE
3.3L V6 FFDI
ELEC 6-SPEED AUTO W/TOW MOD

EXTERIOR
LIGHTNING BLUE

INTERIOR
DARK GRAY CLOTH 40/20/40

JF A28239

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR

- DAYTIME RUNNING LIGHTS
- EASY FUEL CAPLESS FILLER
- FULLY BOXED STEEL FRAME
- HALOGEN HEADLAMPS
- HEADLAMPS - AUTO LAMP (ON/OFF)
- LOCKING REMOVABLE TAILGATE
- PICKUP BOX TIE DOWN HOOKS
- REAR, 175-DEGREE DOOR
- TRAILER SWAY CONTROL
- WIPERS - INTERMITTENT

INTERIOR

- 60/40 FOLD-UP REAR BENCH SEAT
- A/C W/MANUAL CLIMATE CONTROL, SINGLE ZONE
- DUAL SUNVISORS
- ILLUMINATED ENTRY
- OUTSIDE TEMP DISPLAY
- POWERPOINTS
- TILT/TELESCOPE STR COLUMN

FUNCTIONAL

- 4-WHEEL DISC BRAKES W/ABS
- AUTO START STOP TECH
- CURVE CONTROL
- DYNAMIC HITCH ASSIST
- ELECTRIC-ASSIST PARK BRAKE
- FADE-TO-OFF INTERIOR LIGHT
- FAL-SAFE COOLING SYSTEM
- GAS-CHARGED SHOCKS
- HILL START ASSIST
- MANUAL FOLD MIRRORS
- OUTBOARD MNTD REAR SHOCKS
- PWR RACK AND PINION STEER
- REAR VIEW CAMERA
- SELECTSHIFT TRANSMISSION

SAFETY/SECURITY

- ADVANCETRAC WITH RSC
- AIRBAGS - FRONT SEAT MOUNTED SIDE IMPACT
- AIRBAGS - SAFETY CANOPY SIDE CURTAIN
- CTR HIGH MOUNT STOP LAMP
- 50S POST CRASH ALERT SYS
- TIRE PRESSURE MONITOR SYS

WARRANTY

- 5YR/50,000 BUMPER TO BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST

INCLUDED ON THIS VEHICLE (MSRP)

EQUIPMENT GROUP 101A
XL SERIES
XL POWER EQUIPMENT GROUP
CRUISE CONTROL

2,295.00

OPTIONAL EQUIPMENT/OTHER

245/70R17 BSW ALL-SEASON
3.55 ELECTRONIC LOCK REAR AXLE
6300W GVWR PACKAGE
FRONT LICENSE PLATE BRACKET
CALIFORNIA EMISSIONS SYSTEM SYNC
CLASS V TRAILER HITCH
AM/FM SINGLE CD
XL CHROME APPEARANCE PACKAGE
CHROME FRONT/REAR BUMPERS
FOG LAMPS
17" SILVER PAINTED ALUMINUM

470.00
NO CHARGE
NO CHARGE
95.00
775.00

PRICE INFORMATION

BASE PRICE
TOTAL OPTIONS/OTHER

\$31,465.00
3,465.00

TOTAL VEHICLE A OPTION/OTHER DESTINATION & DELIVERY
25,000.00
1,295.00

TOTAL BEFORE DISCOUNTS
XL MID DISCOUNT
XL DISCT CHROME APP

\$5,355.00
- 750.00
- 500.00

TOTAL SAVINGS
- 1,250.00

TOTAL MSRP
\$35,105.00

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash
Driver Passenger Not Rated Not Rated

Side Crash
Front seat Rear seat Not Rated Not Rated

Rollover
★★★★

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

Fuel Economy and Environment

Fuel Economy

22 MPG
combined city

19 MPG
city

25 MPG
highway

4.5 gallons per 100 miles

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

Annual fuel cost \$1,650

Fuel Economy & Greenhouse Gas Rating
1 4 10 15 20 Best

This vehicle emits 410 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and contributing fuel also create emissions. Learn more at fuelconomy.gov

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash
Driver Passenger Not Rated Not Rated

Side Crash
Front seat Rear seat Not Rated Not Rated

Rollover
★★★★

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

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27D 414

RAMP ONE
CA03

DEALER NO.
27D 414

RAMP TWO
FINAL ASSEMBLY PLANT

DEARBORN

ITEM #
27-9000 Q/T 2

METHOD OF TRANS.
CONVOY

HG261 N RB 2X 815 003646 07 26 17

102 Monroney Label

SEATS

WARNINGS

Install the head restraint properly to help minimize the risk of neck injury in the event of a crash.

Note: Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.

Front Seat Head Restraint

Rear Seat Head Restraint

The head restraints consist of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and release button.
- D Guide sleeve unlock and remove button.
- E Fold button (rear seat outboard only).

Adjusting the Head Restraint

Raising the Head Restraint
Pull the head restraint up.

Lowering the Head Restraint

- Press and hold button C.
- Push the head restraint down.

Removing the Head Restraint

- Pull up the head restraint until it reaches the highest adjustment position.
- Press and hold buttons C and D.
- Pull up the head restraint.

SEATS

Note: For rear seat outboard seats, you can fold the head restraint forward for easier removal.

Installing the Head Restraint
Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Folding the Head Restraint

Note: The rear seat outboard head restraints may fold forward for improved visibility.

- Press and hold button E.
- Pull it back up to reset.

Front Seat Center Head Restraint
Your vehicle may be equipped with a front row center head restraint that you cannot adjust or remove.

Tilting Head Restraints (If Equipped)
The front head restraints tilt for extra comfort. To tilt the head restraint, do the following:

- Adjust the seatback to an upright driving or riding position.

2. Pivot the head restraint forward toward your head to the desired position.

After the head restraint reaches the forward-most tilt position, pivot it forward again to release it to the rearward, untilted position.

Note: Do not attempt to force the head restraint backward after it is tilted. Instead, continue tilting it forward until the head restraint releases to the upright position.

MANUAL SEATS (If Equipped)

WARNING

Do not adjust the driver's seat or seatback when your vehicle is moving.

Moving the Seat Backward and Forward

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

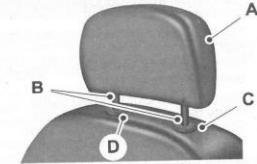
Seats

WARNINGS

 Install the head restraint properly to help minimize the risk of neck injury in the event of a crash.

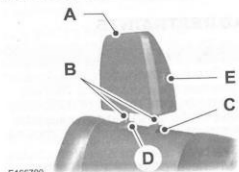
Note: Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.

Front Seat Head Restraint



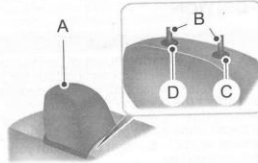
E138642

Rear Seat Outboard Head Restraints



E166700

Rear Seat Center Head Restraint



E166701

The head restraints consist of:

- A An energy absorbing head restraint.
- B Two steel stems.
- C Guide sleeve adjust and release button.
- D Guide sleeve unlock and remove button.
- E Fold button (rear seat outboard only).

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull up the head restraint until it reaches the highest adjustment position.
2. Press and hold buttons C and D.
3. Pull up the head restraint.

146

Seats

Note: For rear seat outboard seats, you can fold the head restraint forward for easier removal.

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Folding the Head Restraint

Note: The rear seat outboard head restraints may fold forward for improved visibility.

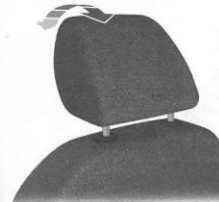
1. Press and hold button E.
2. Pull it back up to reset.

Front Seat Center Head Restraint

Your vehicle may be equipped with a front row center head restraint that you cannot adjust or remove.

Tilting Head Restraints (If Equipped)

The front head restraints tilt for extra comfort. To tilt the head restraint, do the following:



E144727

1. Adjust the seatback to an upright driving or riding position.

2. Pivot the head restraint forward toward your head to the desired position.

After the head restraint reaches the forward-most tilt position, pivot it forward again to release it to the rearward, untilted position.

Note: Do not attempt to force the head restraint backward after it is tilted. Instead, continue tilting it forward until the head restraint releases to the upright position.

MANUAL SEATS (If Equipped)

WARNING

 Do not adjust the driver's seat or seatback when your vehicle is moving.

Moving the Seat Backward and Forward



E175314

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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

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

Additional Driver & Passenger Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

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

NHTSA

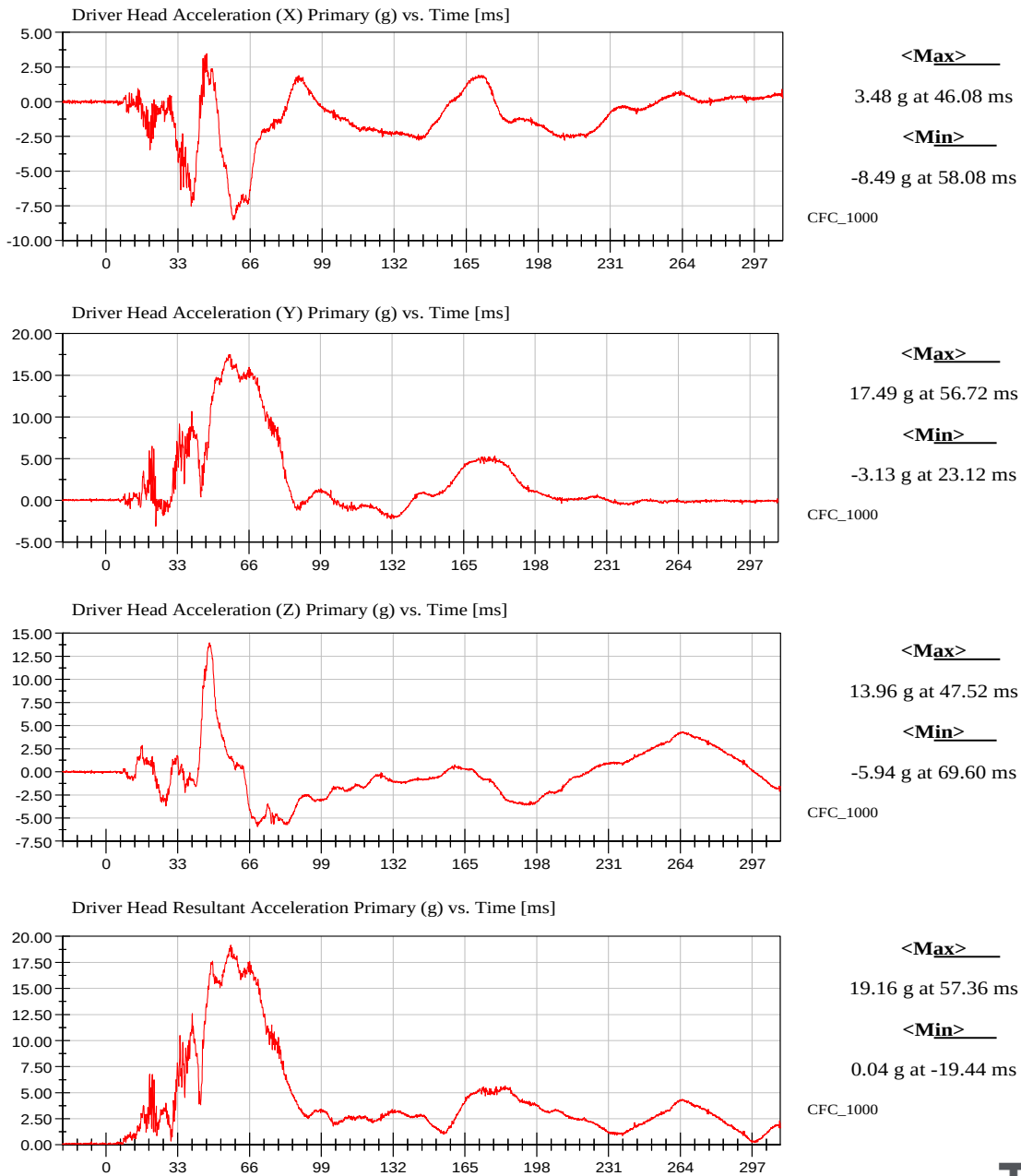
Test Lab: CTF

Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)



NHTSA

Test Lab: CTF

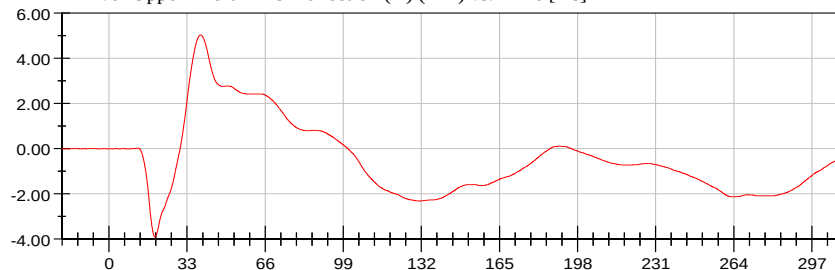
Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)

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



<Max>

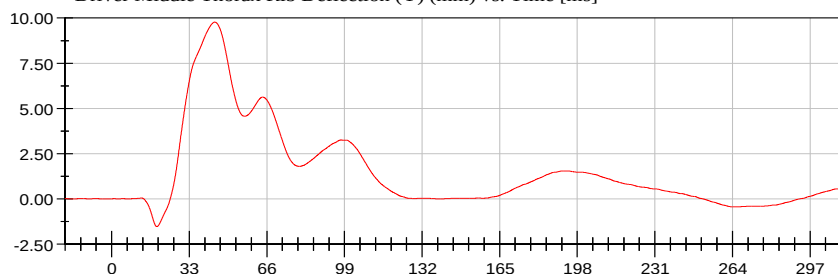
5.04 mm at 38.72 ms

<Min>

-3.90 mm at 19.44 ms

CFC_180

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



<Max>

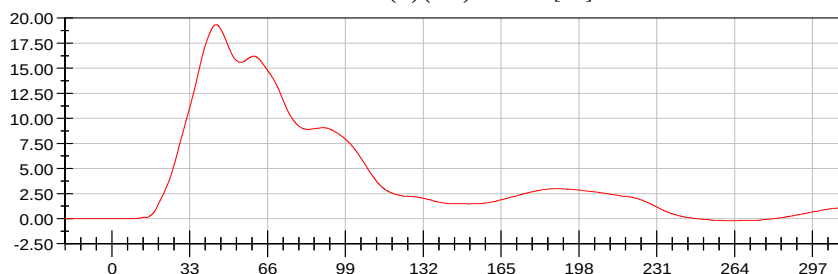
9.77 mm at 43.84 ms

<Min>

-1.54 mm at 19.20 ms

CFC_180

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



<Max>

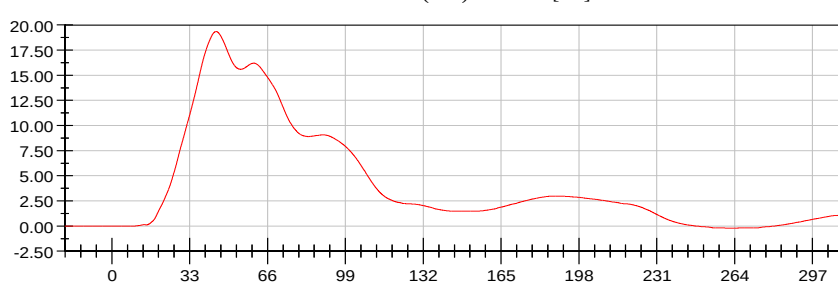
19.35 mm at 44.16 ms

<Min>

-0.21 mm at 262.48 ms

CFC_180

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



<Max>

19.35 mm at 44.16 ms

<Min>

-0.21 mm at 262.48 ms

CFC_180

TRC

NHTSA

Test Lab: CTF

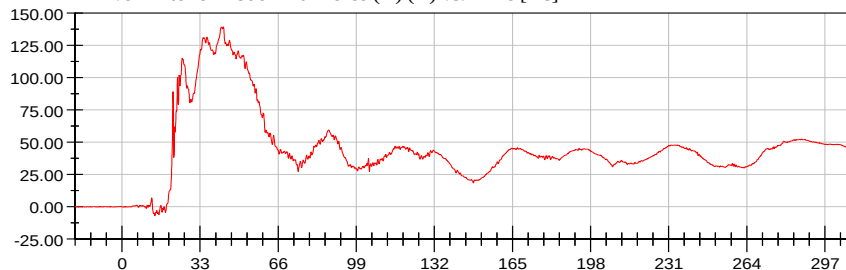
Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)

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



<Max>

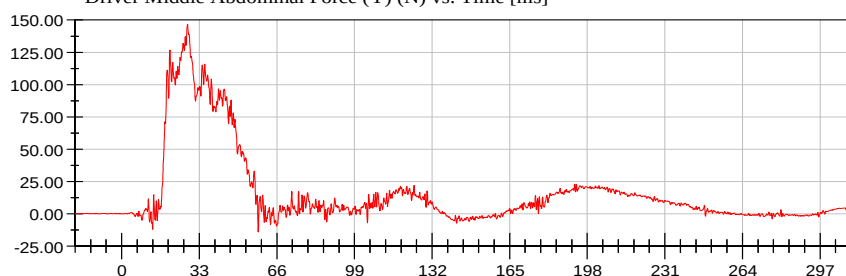
139.47 N at 42.88 ms

<Min>

-6.99 N at 13.92 ms

CFC_600

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



<Max>

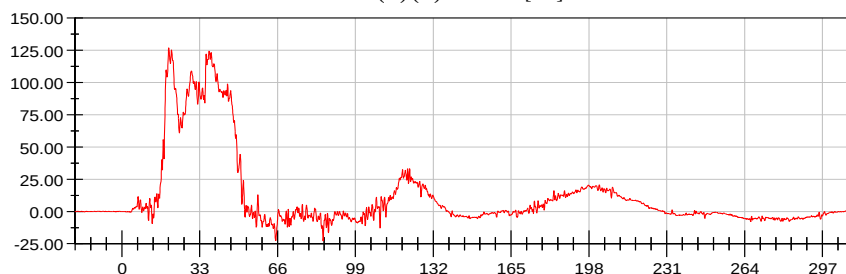
146.88 N at 28.00 ms

<Min>

-14.17 N at 58.08 ms

CFC_600

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



<Max>

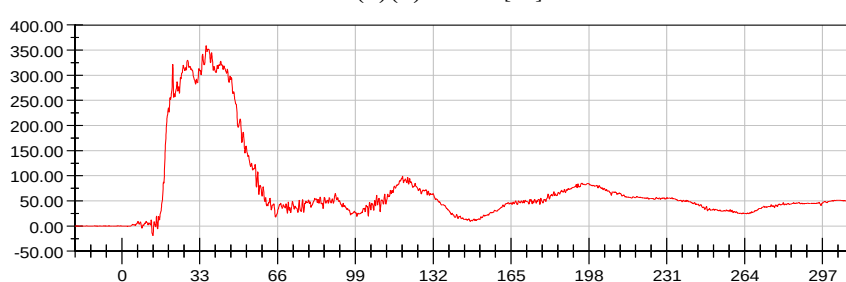
126.92 N at 19.84 ms

<Min>

-22.84 N at 85.36 ms

CFC_600

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



<Max>

358.63 N at 35.76 ms

<Min>

-18.74 N at 13.20 ms

CFC_600



NHTSA

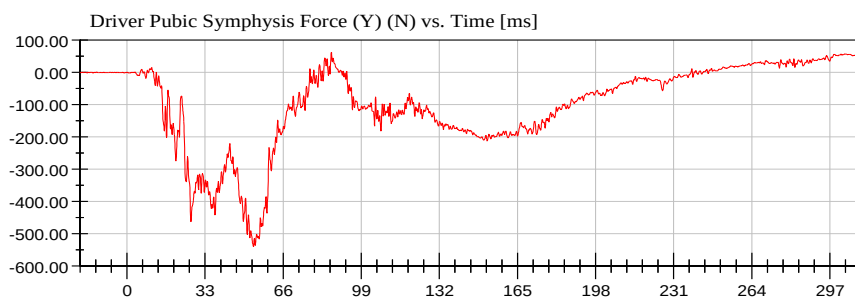
Test Lab: CTF

Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)



<Max>

62.21 N at 86.32 ms

<Min>

-539.40 N at 53.44 ms

CFC_600

TRC

NHTSA

Test Lab: CTF

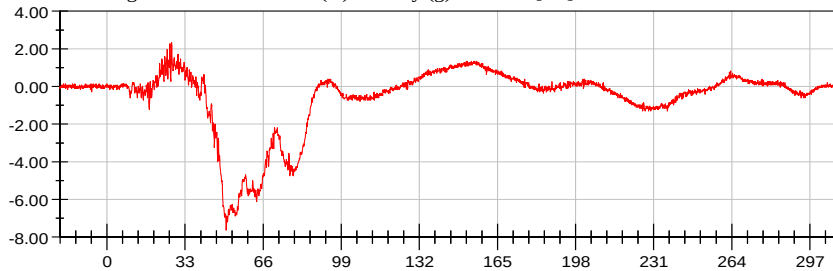
Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)

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



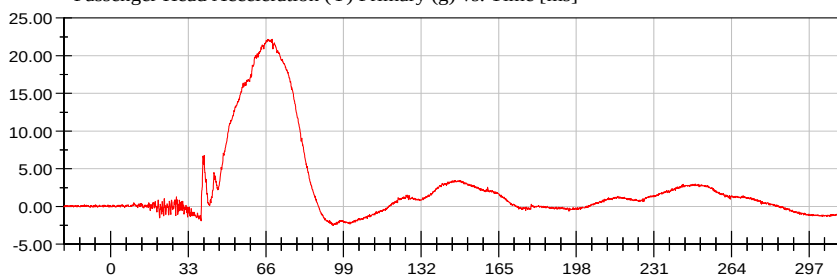
<Max>

2.34 g at 27.28 ms

<Min>

-7.64 g at 50.40 ms

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



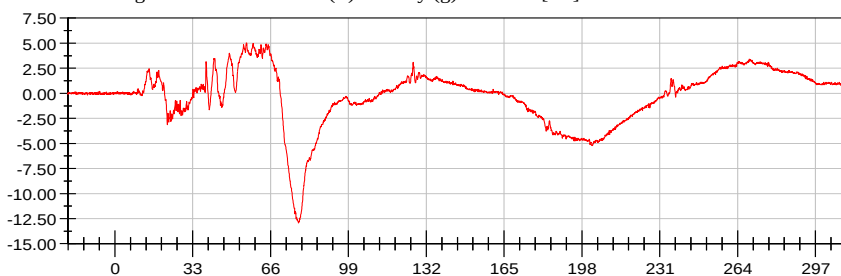
<Max>

22.16 g at 66.88 ms

<Min>

-2.55 g at 94.64 ms

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



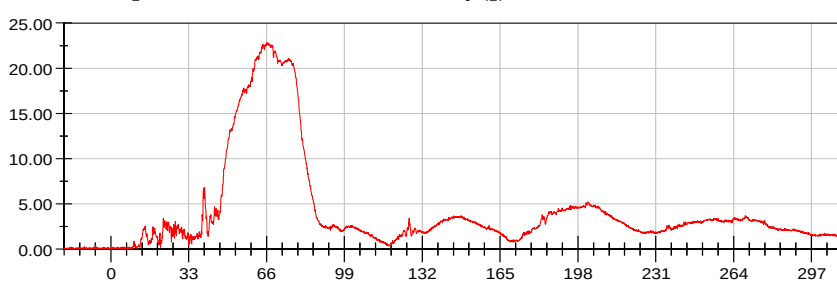
<Max>

5.04 g at 55.76 ms

<Min>

-12.92 g at 77.84 ms

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



<Max>

22.84 g at 66.16 ms

<Min>

0.03 g at -19.60 ms



NHTSA

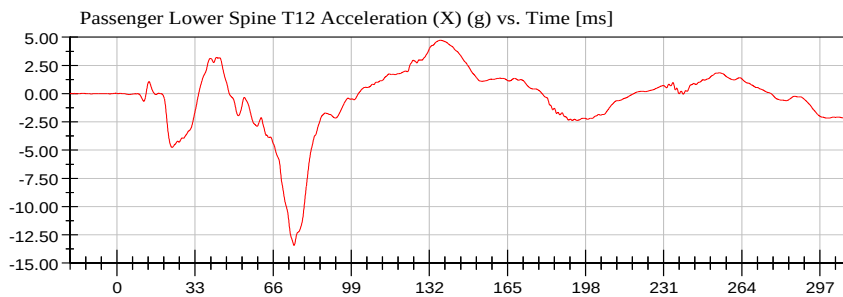
Test Lab: CTF

Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)



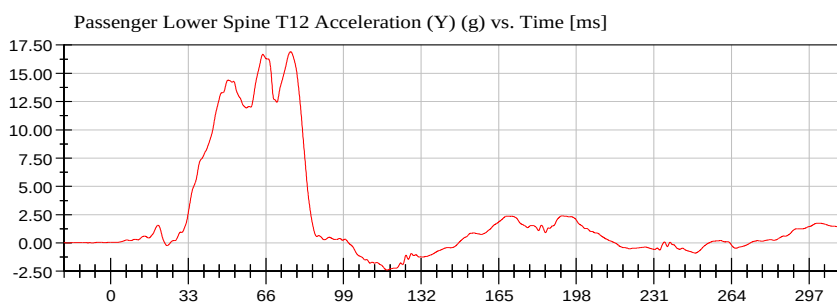
<Max>

4.72 g at 136.48 ms

<Min>

-13.43 g at 74.80 ms

CFC_180



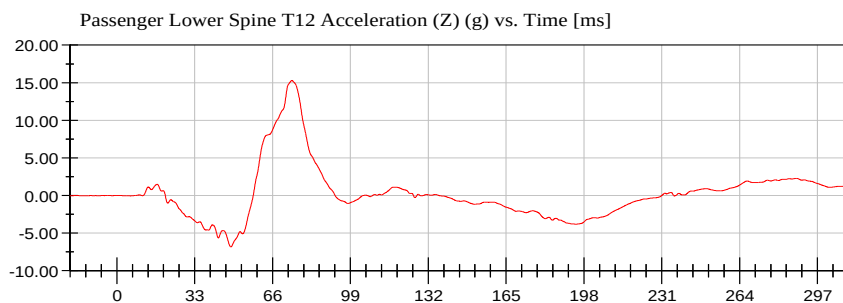
<Max>

16.91 g at 76.56 ms

<Min>

-2.41 g at 117.44 ms

CFC_180



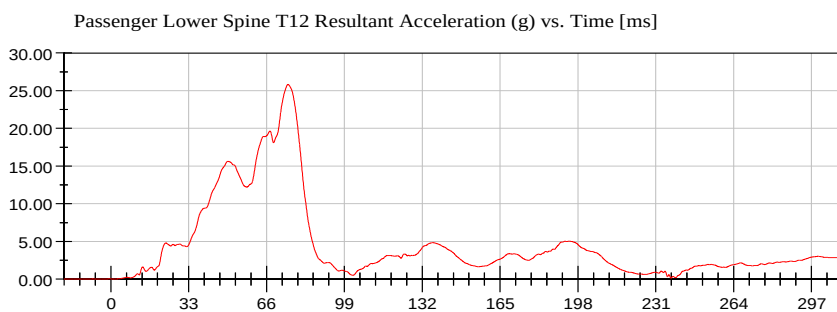
<Max>

15.29 g at 74.16 ms

<Min>

-6.84 g at 48.32 ms

CFC_180



<Max>

25.83 g at 75.12 ms

<Min>

0.00 g at -16.56 ms

CFC_180



NHTSA

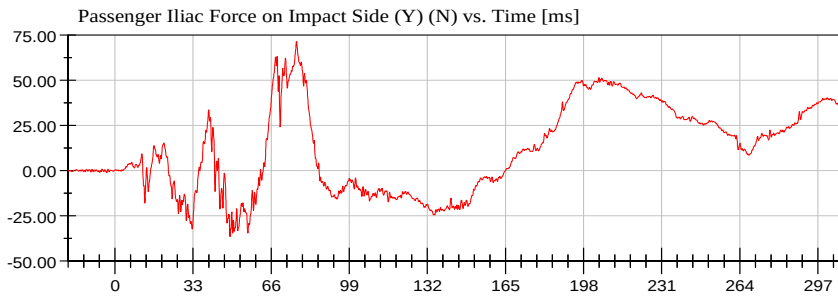
Test Lab: CTF

Test Number: 171116 (M20180211)

Test Date: 11/16/2017

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

Position #4 SID IIs Dummy (305)



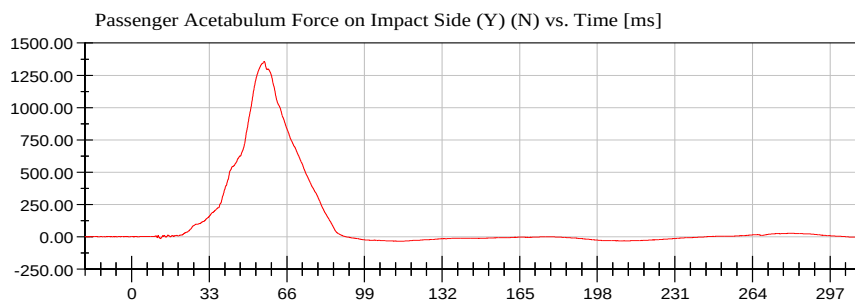
<Max>

71.59 N at 76.72 ms

<Min>

-36.44 N at 48.56 ms

CFC_600



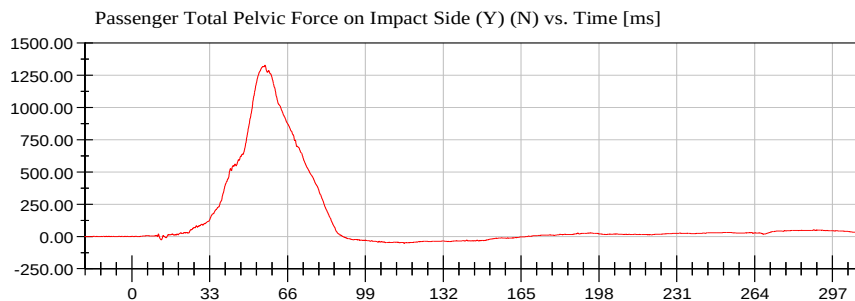
<Max>

1,357.68 N at 56.40 ms

<Min>

-35.65 N at 113.60 ms

CFC_600



<Max>

1,327.08 N at 56.40 ms

<Min>

-52.12 N at 115.52 ms

CFC_600

TRC

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. 50

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	910	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	559	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	350	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	445	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	263	Yes
13	Abdomen Depth	194.0 - 204.0	201	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Peak Resultant Acceleration	125 - 155 g	154.9 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	11.3 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Skull S/N: N/A

Head Skin S/N: DP6812

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

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10.08.2017 12:02:23 364

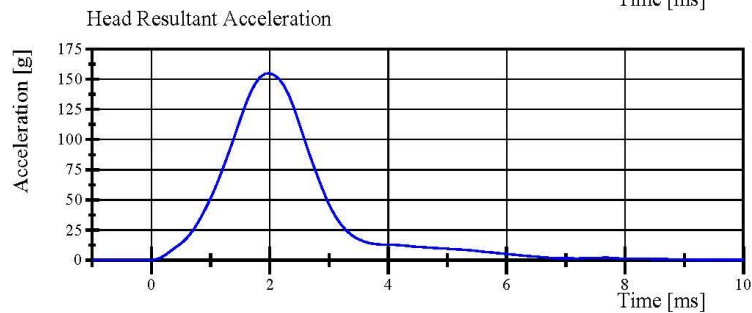
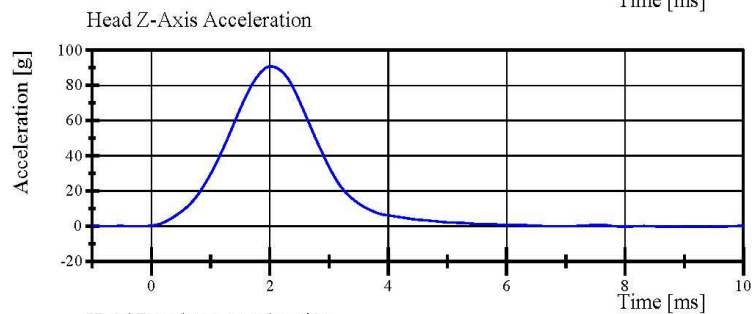
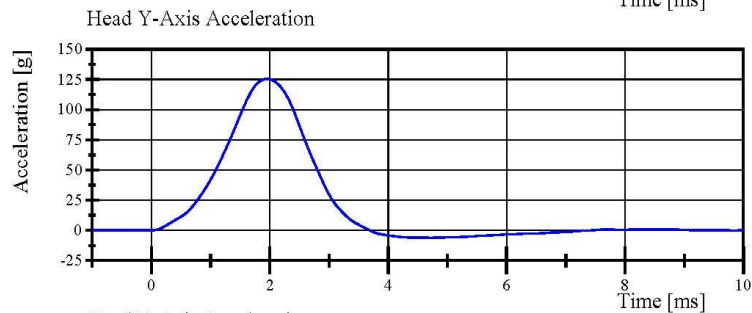
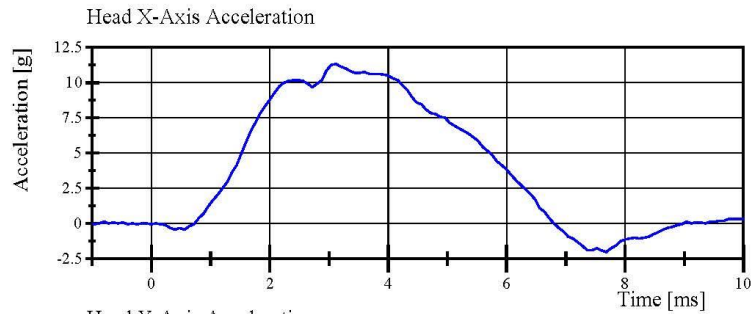


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017



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

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10.08.2017 12:03:37 364



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/8/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.38 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-51.4 deg	Yes
Time of Peak	54 - 66 ms	58.2 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	63.9 ms	Yes

Test meets specifications.

Condition: Used

Comments:

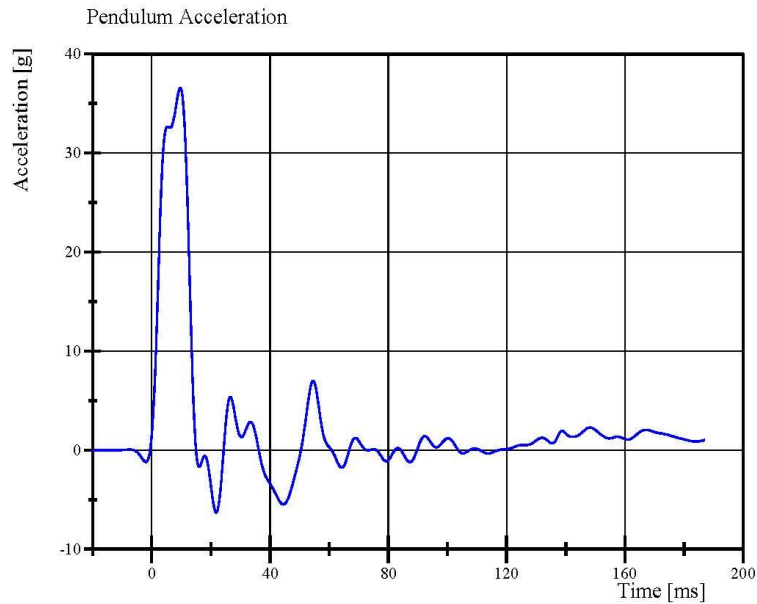
Neck S/N: DI5031

Transportation Research Center Inc.

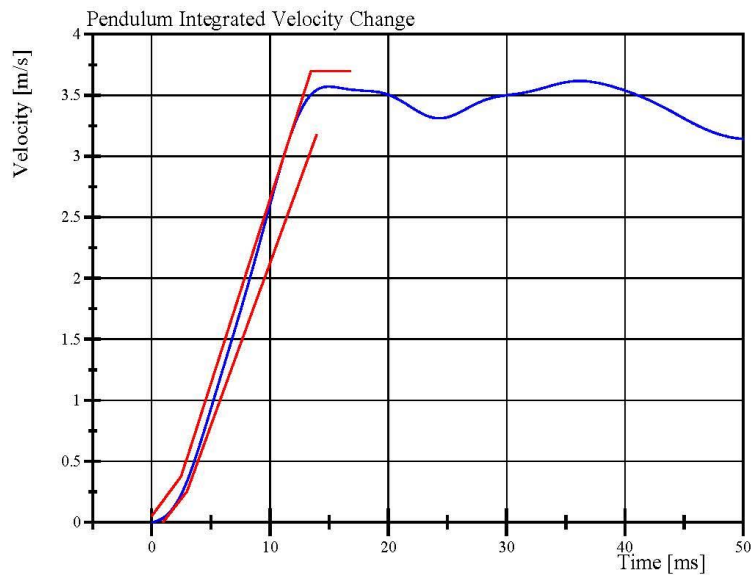
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/8/2017



Filter Class: CFC_60
Max: 36.6 g at 9.7 ms
Min: -6.3 g at 21.8 ms



Filter Class: CFC_60
Max: 3.6 m/s at 36.2 ms
Min: 0.0 m/s at 0.0 ms

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

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10.08.2017 12:07:16 1487

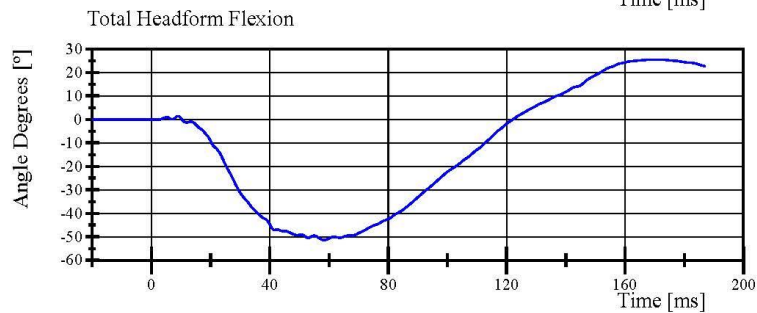
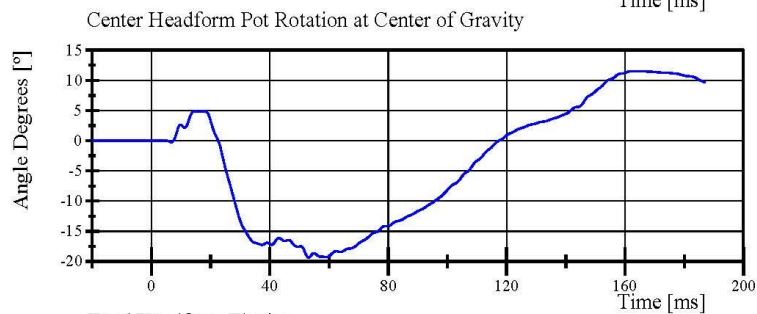
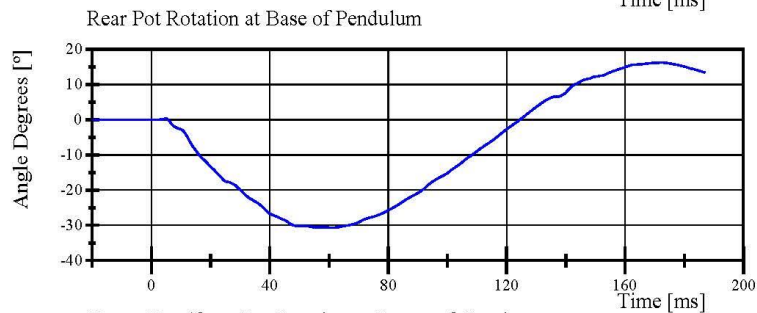
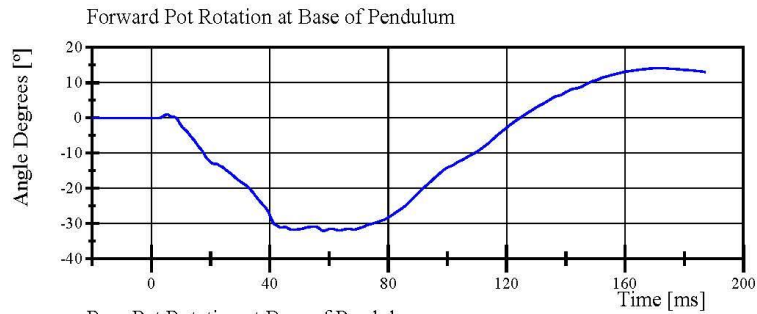


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/8/2017



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

10.08.2017 12:07:17 1487



Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.42 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: 175-3501-07014

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

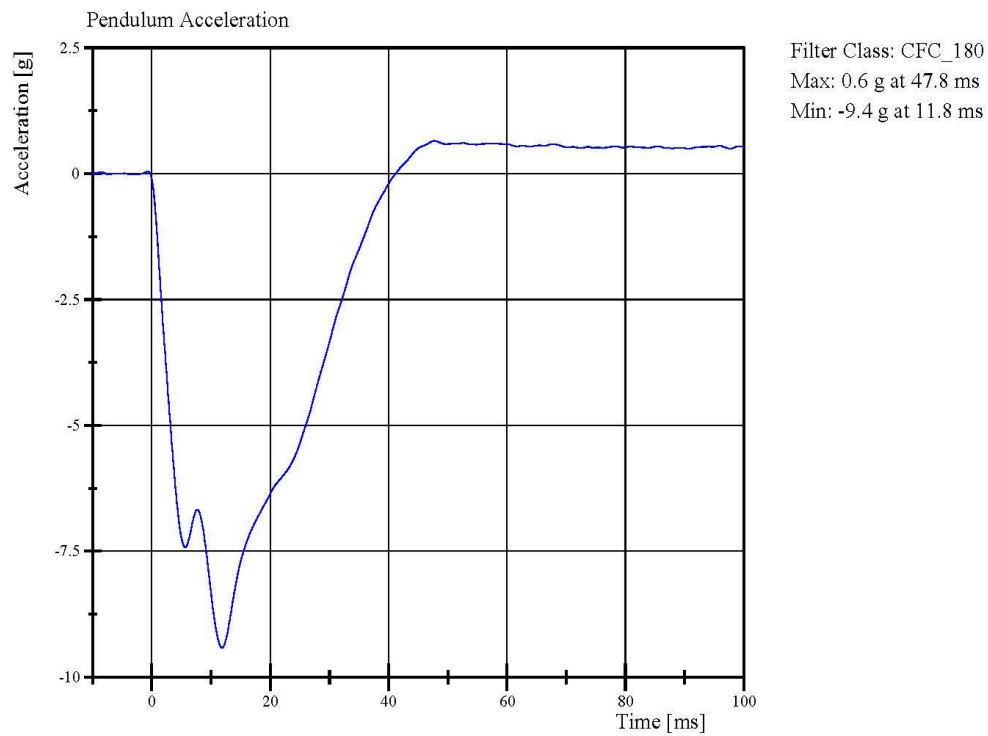
Page 8 of 33

10.06.2017 15:15:00 559



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



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

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10.06.2017 15:15:08 559



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816

Rib Module:175-4008-A

Rib Foam: 07229

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

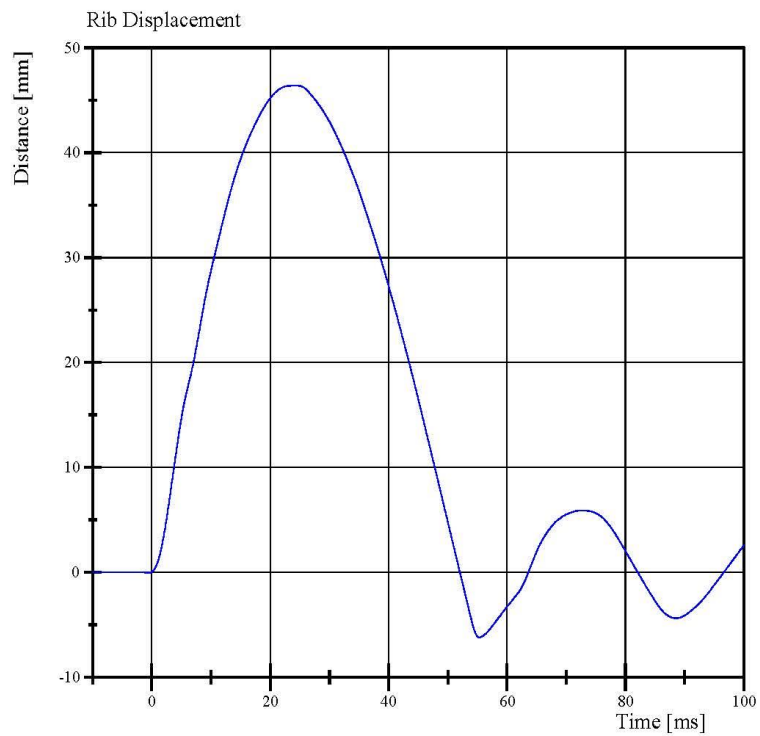
Page 10 of 33

10.06.2017 11:44:11 498



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 46.4 mm at 24.5 ms
Min: -6.2 mm at 55.4 ms

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

10.06.2017 11:45:13 498



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	36.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462

Rib Module: 175-4008-A

Rib Foam: 175-4003-07229

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

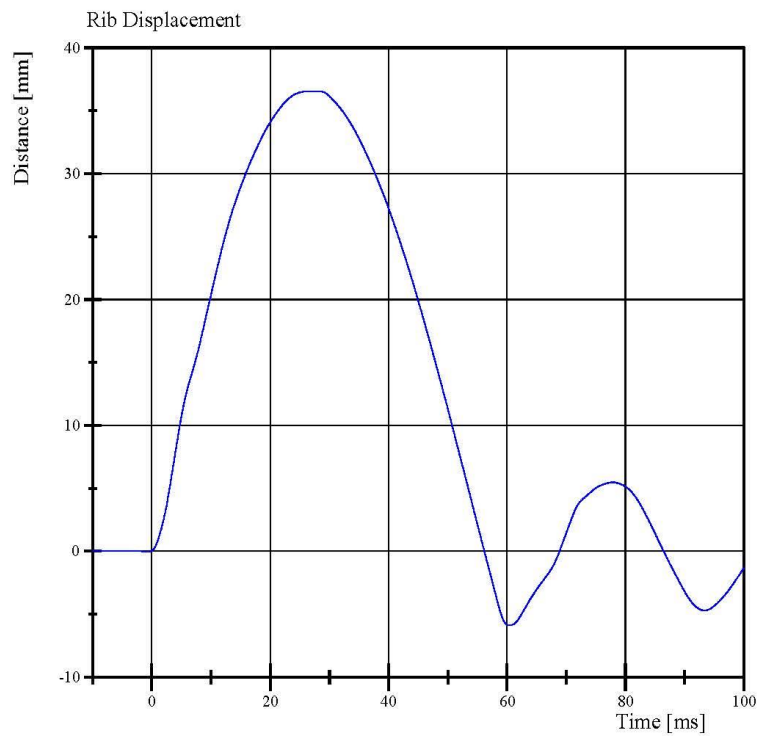
Page 12 of 33

10.06.2017 11:05:38 597



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 36.5 mm at 28.0 ms
Min: -5.9 mm at 60.4 ms

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

10.06.2017 11:08:41 597



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

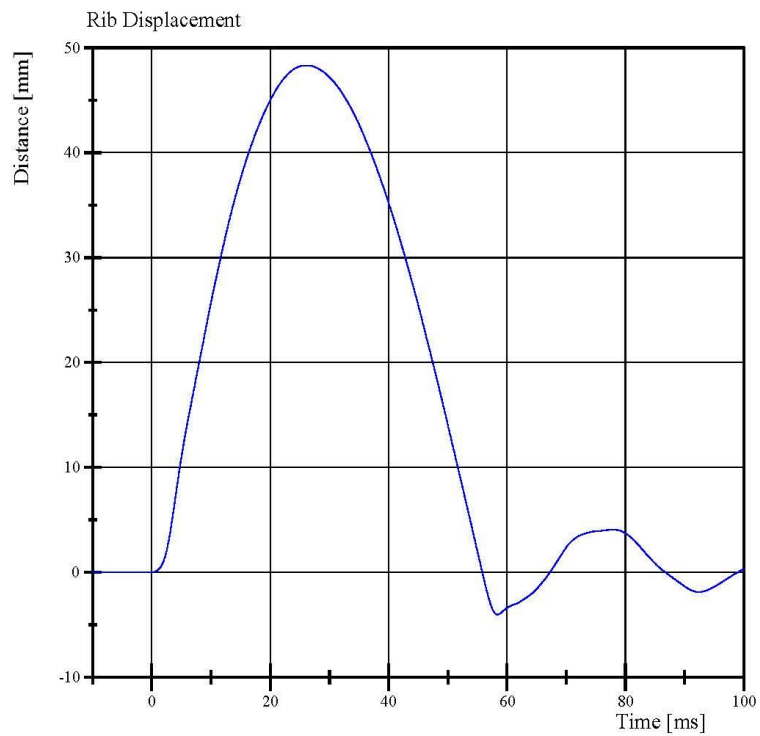
Page 14 of 33

10.06.2017 11:33:16 491



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 48.3 mm at 26.2 ms
Min: -4.0 mm at 58.4 ms

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

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10.06.2017 11:34:14 491



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	48 %	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

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

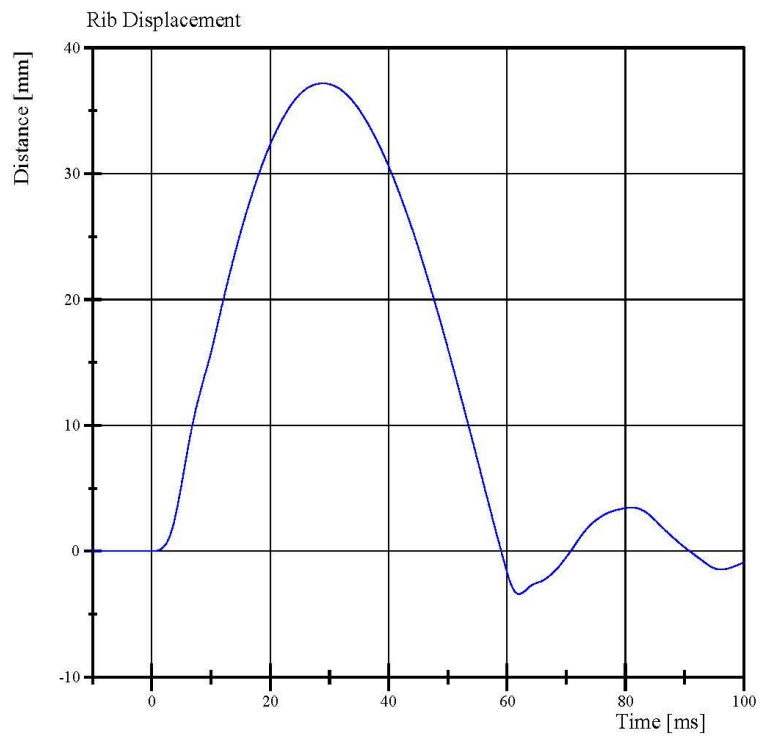
Page 16 of 33

10.06.2017 12:53:22 554



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 37.2 mm at 29.0 ms
Min: -3.4 mm at 62.0 ms

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

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10.06.2017 12:54:43 554



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.8 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816

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

Rib Foam: 175-4003-05125

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

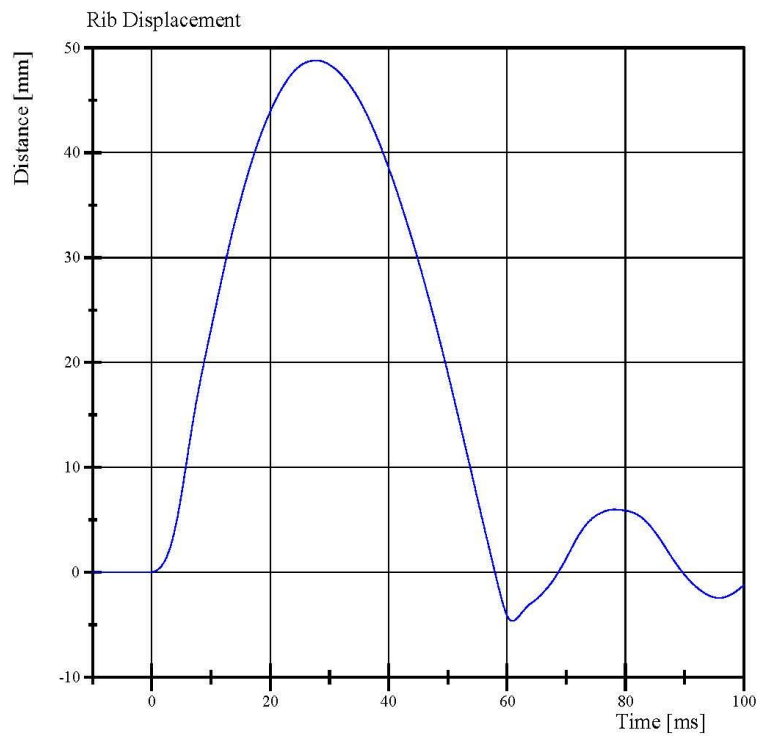
Page 18 of 33

10.06.2017 13:10:07 465



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 48.8 mm at 27.7 ms
Min: -4.6 mm at 60.9 ms

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

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10.06.2017 13:11:31 465



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.0 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462

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

Rib Foam: 175-4003-05125

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

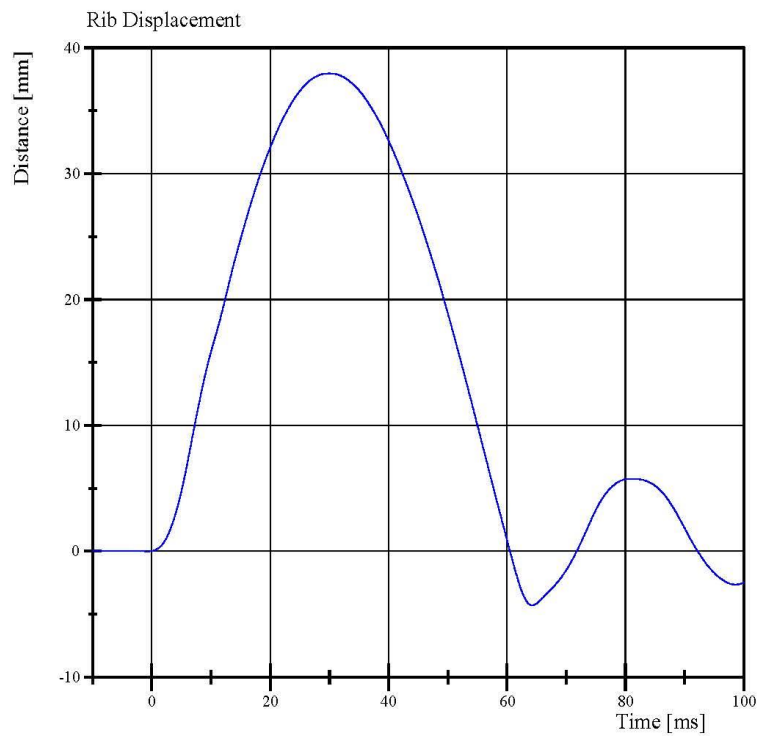
Page 20 of 33

10.06.2017 13:17:15 548



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 38.0 mm at 30.0 ms
Min: -4.3 mm at 64.2 ms

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

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10.06.2017 13:18:34 548



Transportation Research Center Inc.

Left Lower Thorax

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.540 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,286.6 N	Yes
Upper Rib Displacement	34 - 41 mm	37.5 mm	Yes
Center Rib Displacement	37 - 45 mm	42.3 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.2 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib

Rib Module: 175-4008-A

Rib Foam: 175-4003-07229

Center Rib

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

Lower Rib

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

Rib Foam: 175-4003-05125

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

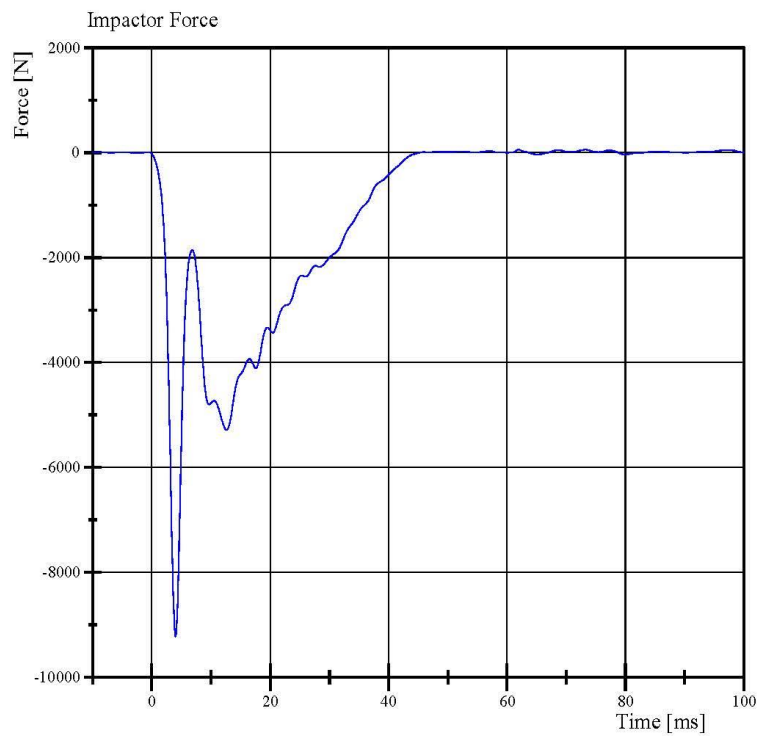
10.06.2017 15:21:18 487



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Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 59.1 N at 61.9 ms
Min: -9,225.4 N at 4.0 ms

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

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10.06.2017 15:21:33 487

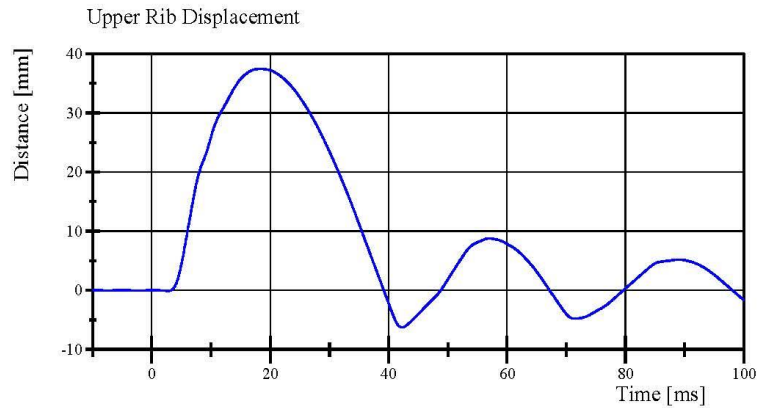


Transportation Research Center Inc.

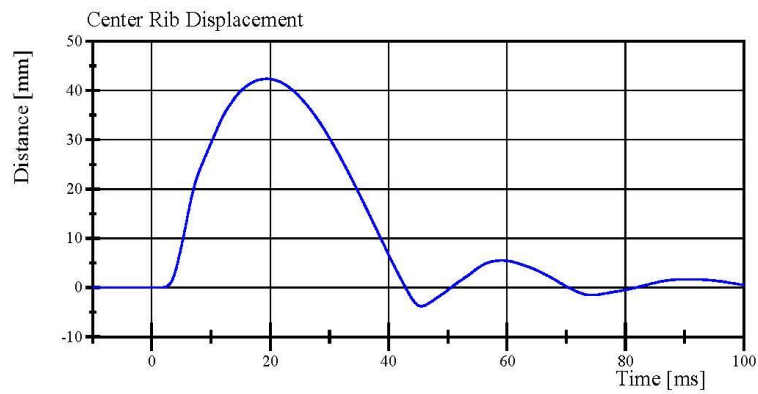
Left Lower Thorax

ES-2re Serial No. F030 Certification No. 50-1

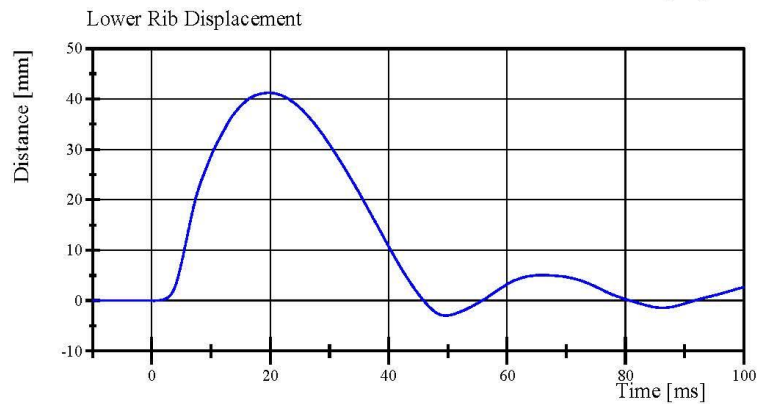
Test Date: 10/6/2017



Filter Class: CFC_180
Max: 37.5 mm at 18.3 ms
Min: -6.3 mm at 42.2 ms



Filter Class: CFC_180
Max: 42.3 mm at 19.4 ms
Min: -3.8 mm at 45.5 ms



Filter Class: CFC_180
Max: 41.2 mm at 19.8 ms
Min: -3.0 mm at 49.6 ms

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

10.06.2017 15:21:33 487



Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.07 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,054.9 N	Yes
Time of Peak	10.6 - 13.0 ms	11.60 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,433.4 N	Yes
Time of Peak	10.0 - 12.3 ms	11.68 ms	Yes

Test meets specifications.

Condition: Used

Comments:

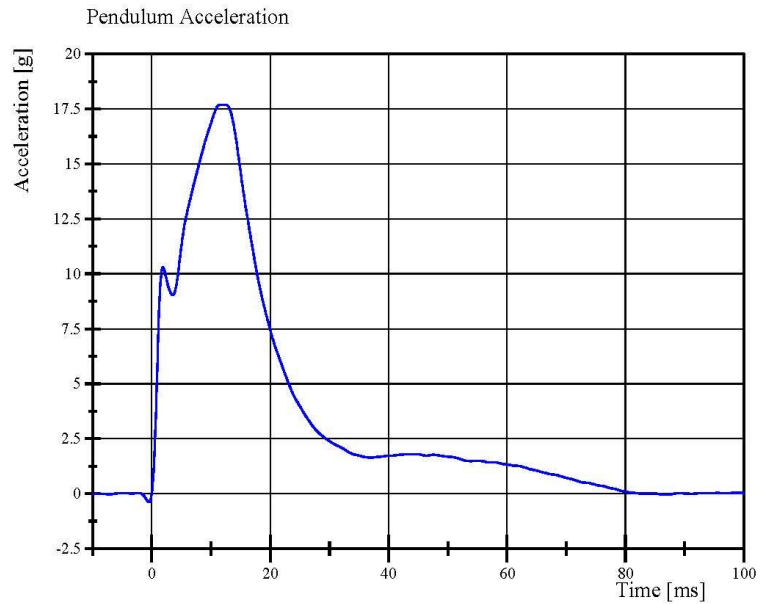
Abdomen S/N: 1066

Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 50-1

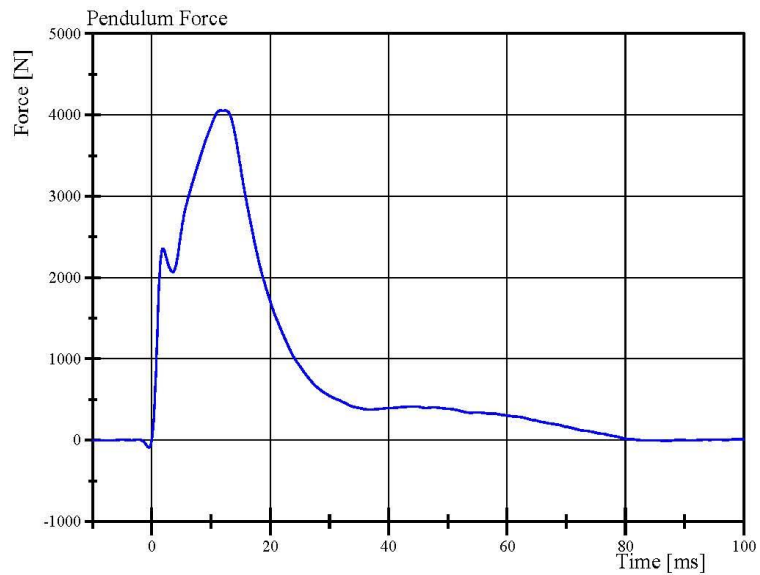
Test Date: 10/6/2017



Filter Class: CFC_180

Max: 17.7 g at 11.6 ms

Min: -0.4 g at -0.5 ms



Filter Class: CFC_180

Max: 4,054.9 N at 11.6 ms

Min: -87.9 N at -0.5 ms

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

10.06.2017 15:28:12 603



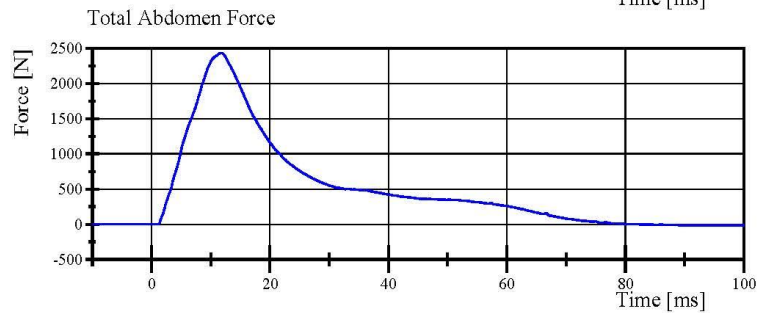
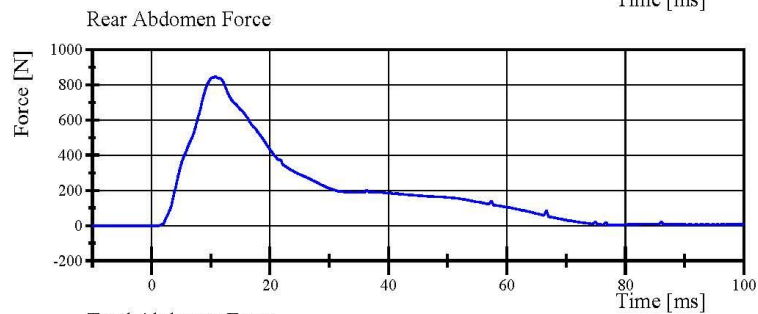
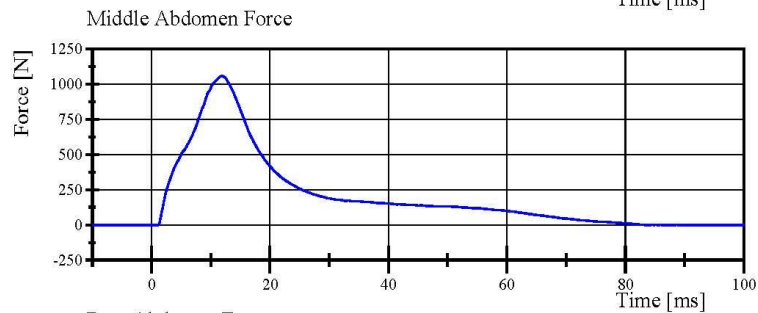
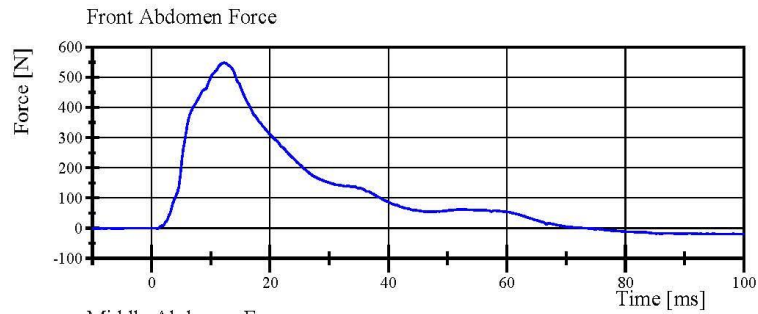
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Transportation Research Center Inc.

Left Lateral Abdomen

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017



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

10.06.2017 15:28:13 603



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/8/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.108 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-47.5 deg	Yes
Time of Peak	39 - 53 ms	43.1 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	37.6 ms	Yes

Test meets specifications.

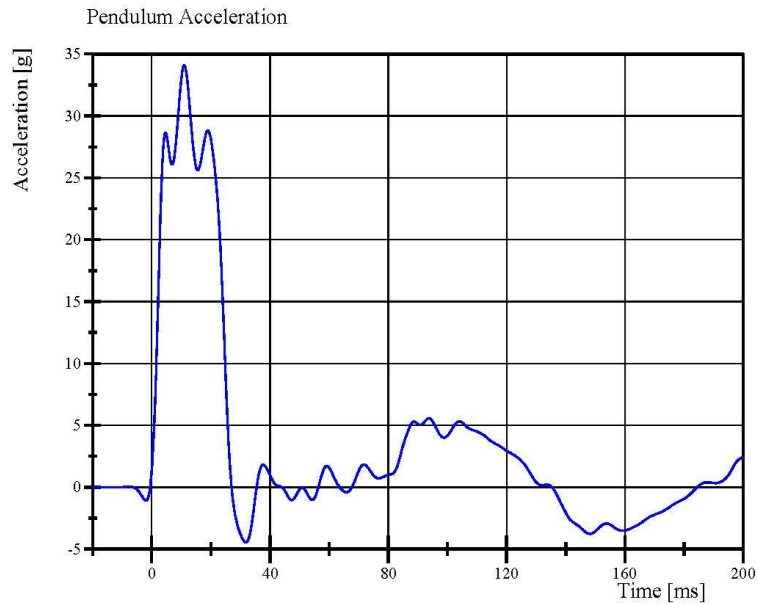
Condition: Used

Comments:

Lumbar S/N: 150375

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/8/2017



Filter Class: CFC_60
Max: 34.1 g at 11.0 ms
Min: -4.5 g at 31.8 ms



Filter Class: CFC_60
Max: 6.2 m/s at 27.0 ms
Min: 0.0 m/s at 0.0 ms

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

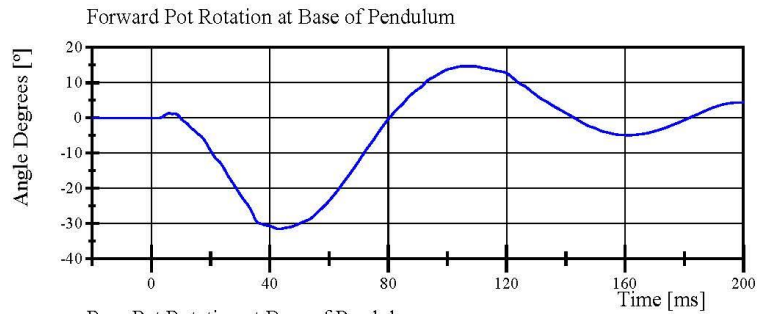
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10.08.2017 12:09:03 670

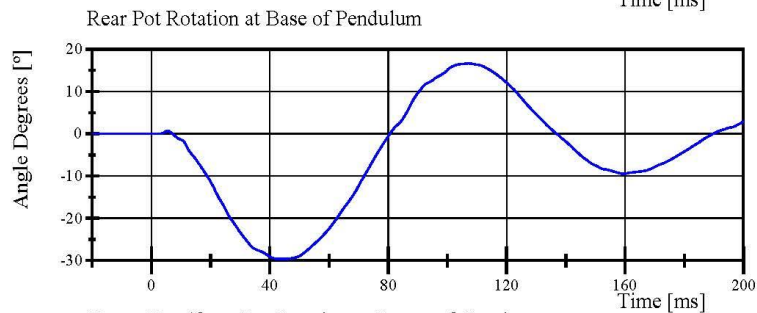


Transportation Research Center Inc.

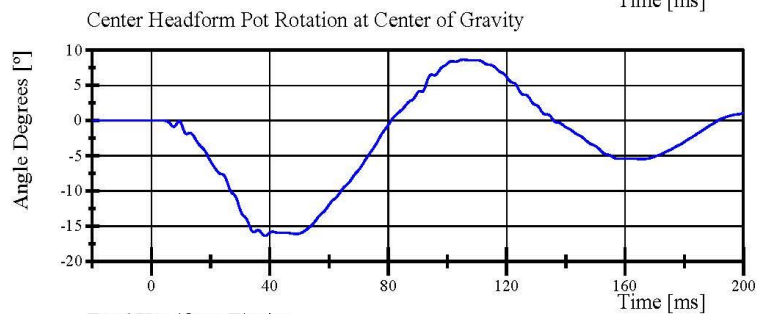
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 50-1
Test Date: 10/8/2017



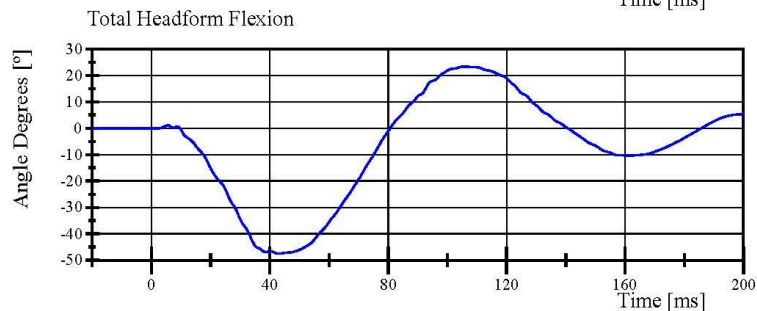
Filter Class: CFC_180
Max: 14.7 ° at 106.2 ms
Min: -31.6 ° at 43.1 ms



Filter Class: CFC_180
Max: 16.7 ° at 107.1 ms
Min: -29.6 ° at 45.5 ms



Filter Class: CFC_180
Max: 8.6 ° at 105.4 ms
Min: -16.4 ° at 38.4 ms



Filter Class: CFC_180
Max: 23.3 ° at 105.6 ms
Min: -47.5 ° at 43.1 ms

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

10.08.2017 12:09:03 670



Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 50-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,251.5 N	Yes
Time of Peak	11.8 - 16.1 ms	13.92 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,331.8 N	Yes
Time of Peak	12.2 - 17.0 ms	14.56 ms	Yes

Test meets specifications.

Condition: Used

Comments:

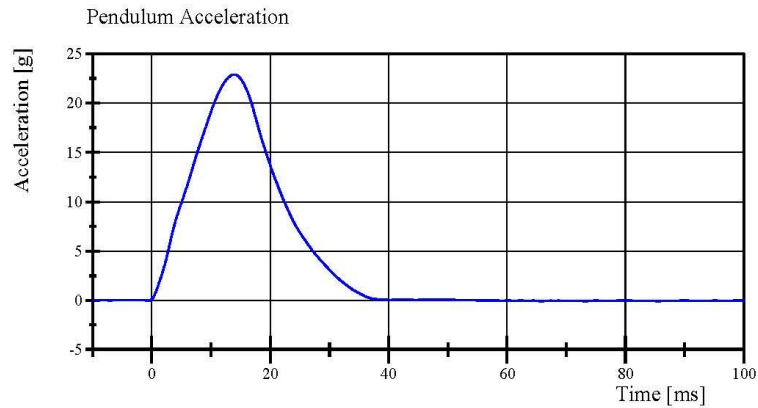
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. F030 Certification No. 50-1

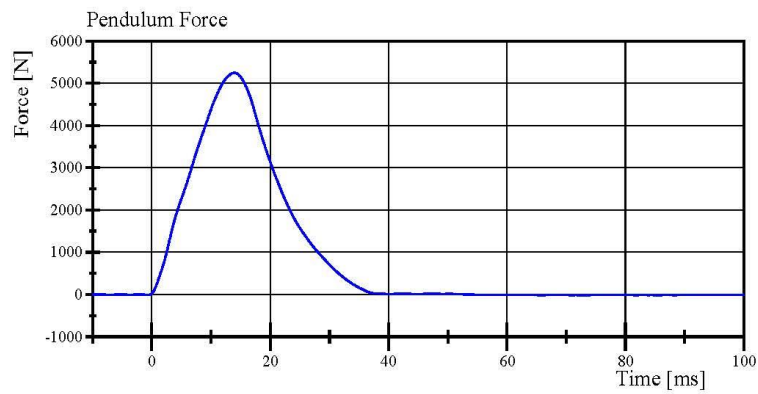
Test Date: 10/6/2017



Filter Class: CFC_180

Max: 22.9 g at 13.9 ms

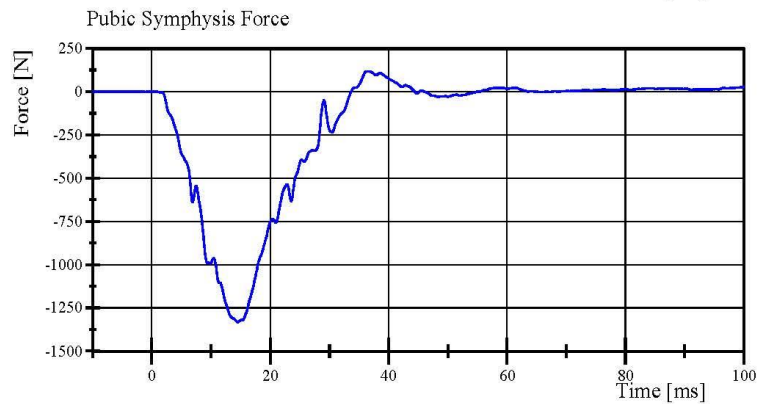
Min: -0.1 g at 65.8 ms



Filter Class: CFC_180

Max: 5,251.5 N at 13.9 ms

Min: -20.1 N at 65.8 ms



Filter Class: CFC_600

Max: 118.1 N at 36.4 ms

Min: -1,331.8 N at 14.6 ms

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

10.06.2017 15:33:17 588



Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 51

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	911	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	560	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	351	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	98	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	445	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	475	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	365	Yes
11	Head Depth	196.0 - 206.0	204	Yes
12	Thorax Depth	262.0 - 272.0	263	Yes
13	Abdomen Depth	194.0 - 204.0	201	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	605	Yes

Baseline 10/07/05



Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Resultant Acceleration	125 - 155 g	136.5 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	9.6 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DP6812

Skull S/N: N/A

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

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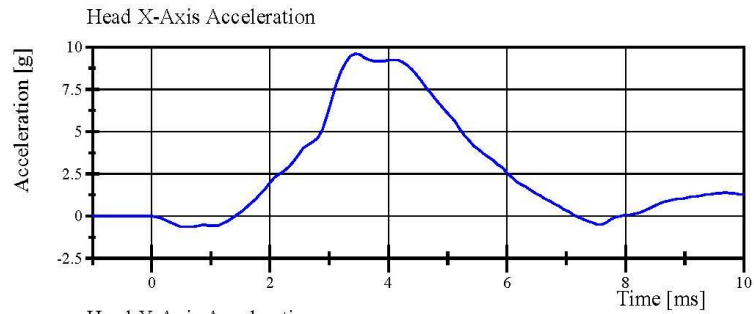


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. F030 Certification No. 51-1

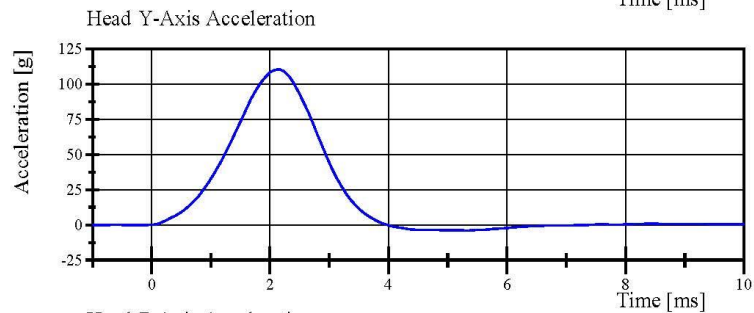
Test Date: 11/17/2017



Filter Class: CFC_1000

Max: 9.6 g at 3.4 ms

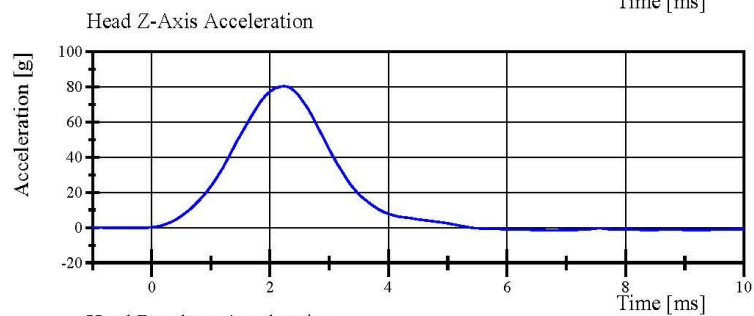
Min: -0.6 g at 0.5 ms



Filter Class: CFC_1000

Max: 110.5 g at 2.2 ms

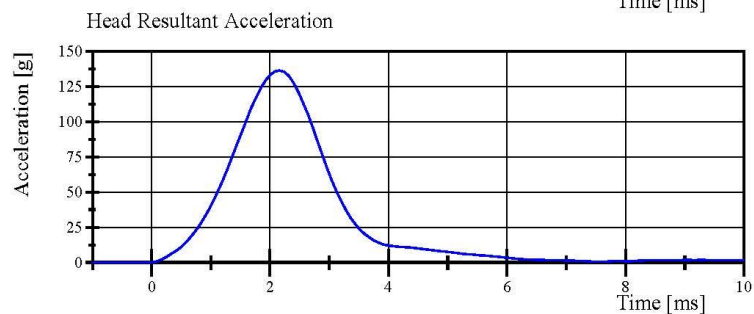
Min: -3.9 g at 5.3 ms



Filter Class: CFC_1000

Max: 80.4 g at 2.2 ms

Min: -1.5 g at 6.7 ms



Filter Class: CFC_1000

Max: 136.5 g at 2.2 ms

Min: 0.0 g at -0.8 ms

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

11.19.2017 12:48:04 327



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 51-2

Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.39 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-52.6 deg	Yes
Time of Peak	54 - 66 ms	56.2 ms	Yes
Headform Flexion Decay			
- Peak to Zero	53 - 88 ms	67.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DI5031

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

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

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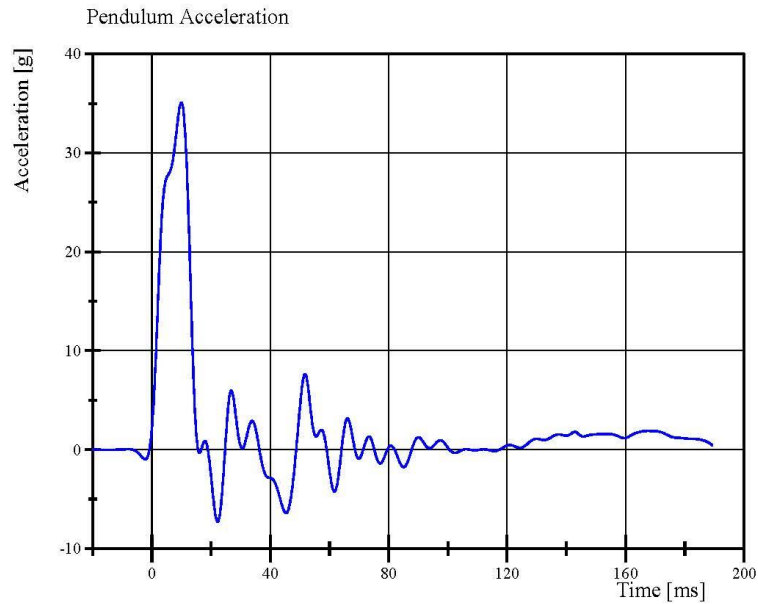


Transportation Research Center Inc.

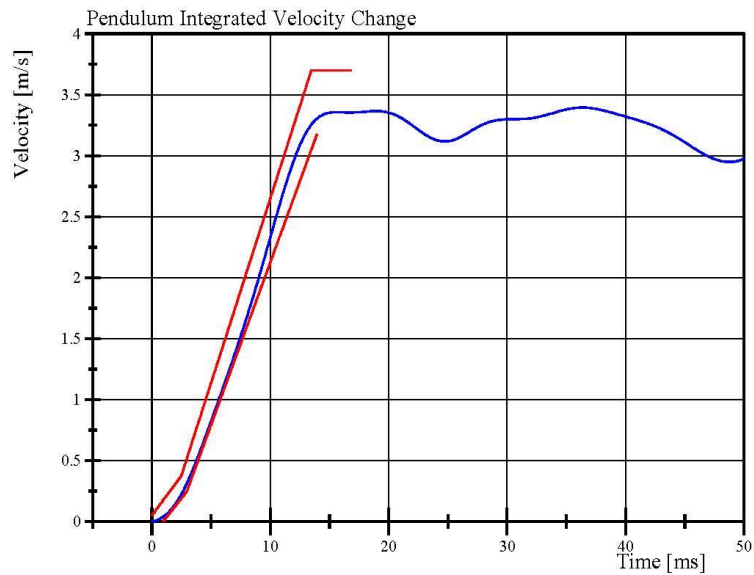
Left Lateral Neck

ES-2re Serial No. F030 Certification No. 51-2

Test Date: 11/17/2017



Filter Class: CFC_60
Max: 35.1 g at 10.0 ms
Min: -7.3 g at 22.2 ms



Filter Class: CFC_60
Max: 3.4 m/s at 36.3 ms
Min: 0.0 m/s at 0.0 ms

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

11.19.2017 12:52:14 1458

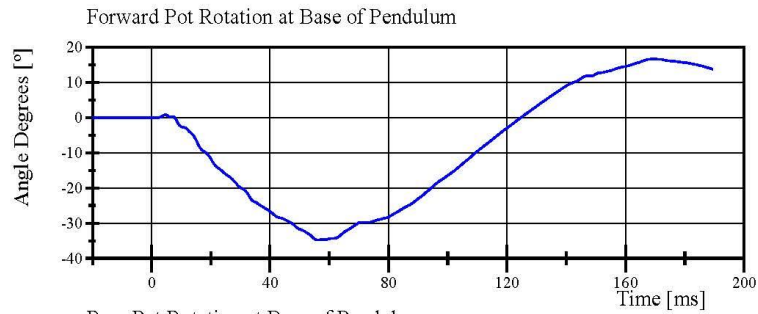


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. F030 Certification No. 51-2

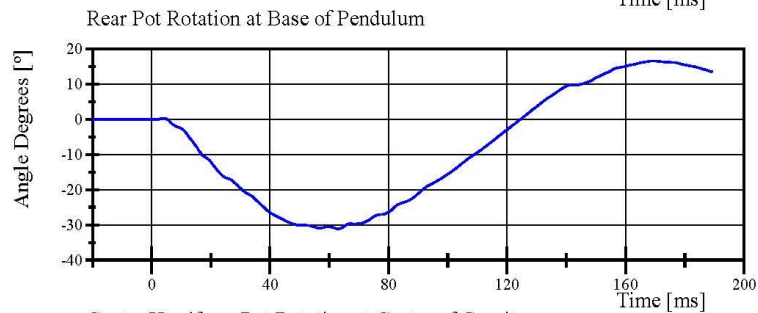
Test Date: 11/17/2017



Filter Class: CFC_180

Max: 16.7 ° at 169.2 ms

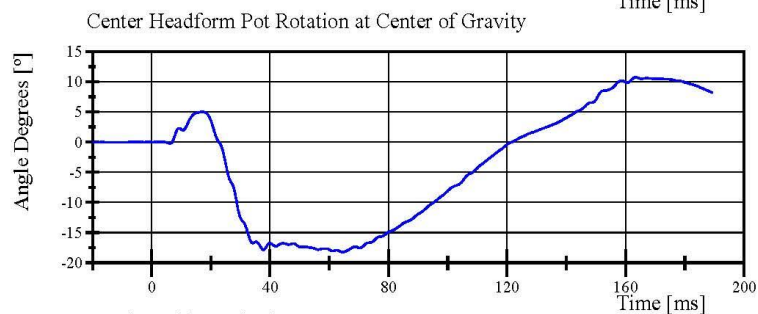
Min: -34.8 ° at 56.1 ms



Filter Class: CFC_180

Max: 16.6 ° at 169.4 ms

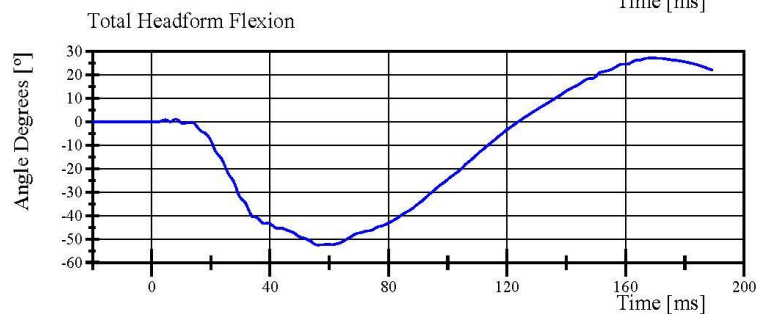
Min: -31.1 ° at 63.0 ms



Filter Class: CFC_180

Max: 10.8 ° at 163.4 ms

Min: -18.2 ° at 64.5 ms



Filter Class: CFC_180

Max: 27.2 ° at 169.0 ms

Min: -52.6 ° at 56.2 ms

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

11.19.2017 12:52:15 1458



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.81 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

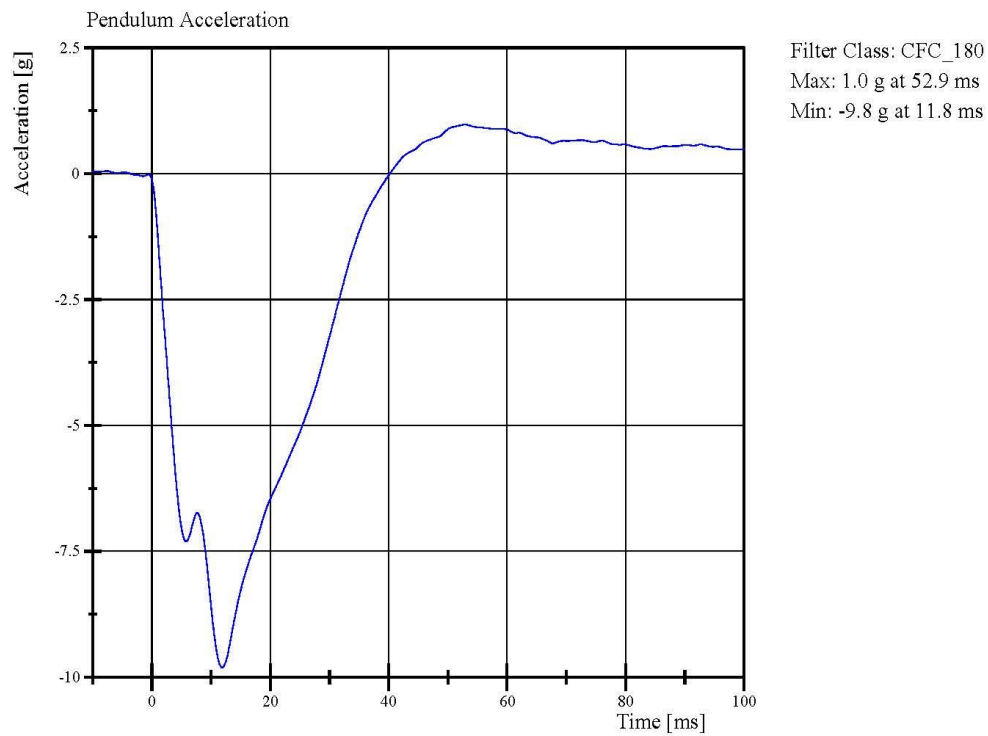
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11.19.2017 15:17:13 542



Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017



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

11.19.2017 15:18:31 542



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 51-2
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	46.4 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

Rib Module: 175-4008-A

Rib Foam: 07229

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

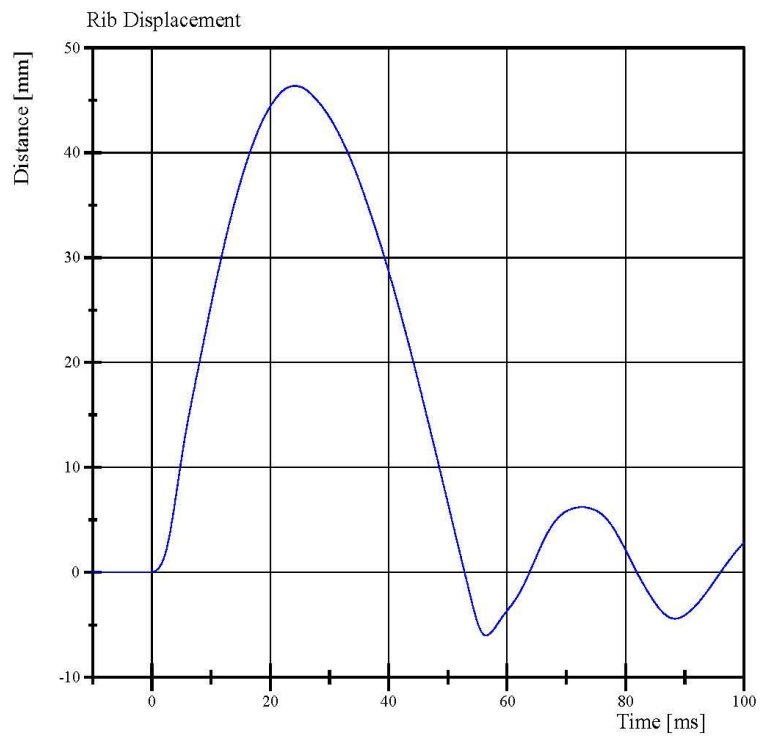
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11.19.2017 12:04:11 452



Transportation Research Center Inc.

4.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 51-2
Test Date: 11/17/2017



Filter Class: CFC_180
Max: 46.4 mm at 24.2 ms
Min: -6.0 mm at 56.4 ms

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

11.19.2017 12:05:14 452



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.0 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462mm

Rib Module:175-4008-A

Rib Foam: 07229

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

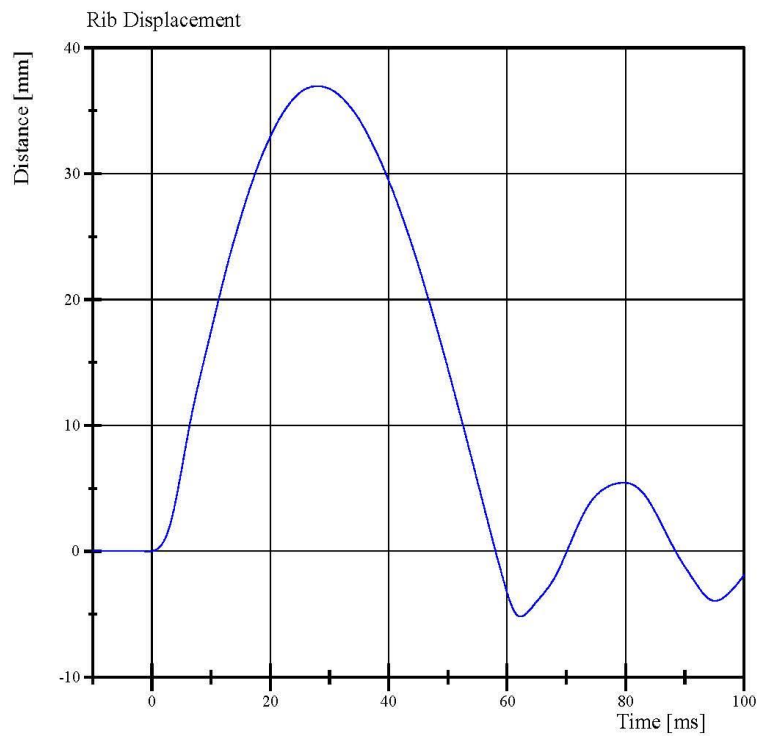
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11.19.2017 12:05:58 529



Transportation Research Center Inc.

3.0 m/s Upper Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017



Filter Class: CFC_180
Max: 37.0 mm at 28.0 ms
Min: -5.2 mm at 62.3 ms

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

11.19.2017 12:06:27 529



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

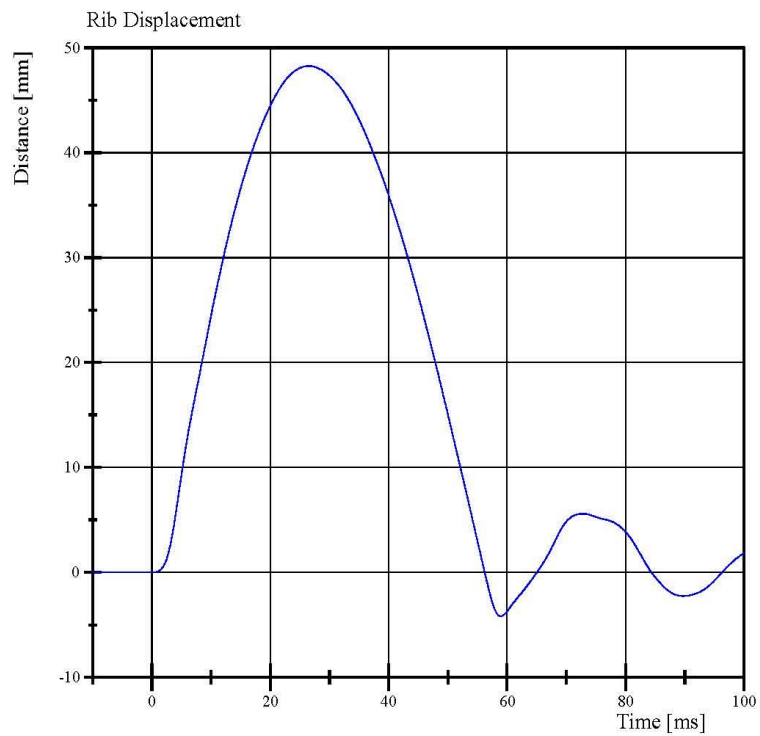
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11.19.2017 12:07:14 442



Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017



Filter Class: CFC_180
Max: 48.3 mm at 26.5 ms
Min: -4.2 mm at 58.9 ms

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

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11.19.2017 12:08:01 442



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.1 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462mm

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

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

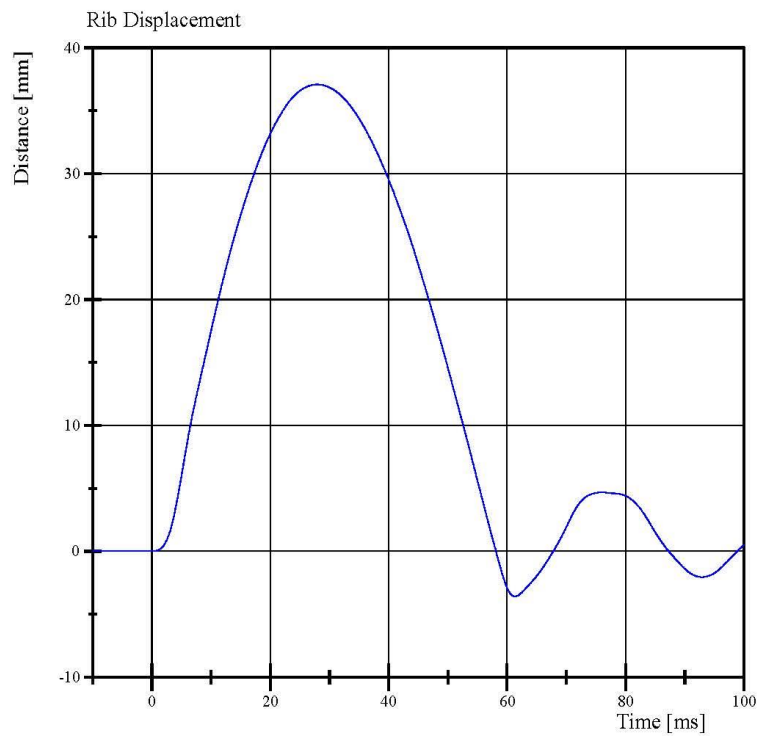
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11.19.2017 12:09:04 519



Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/17/2017



Filter Class: CFC_180
Max: 37.1 mm at 27.9 ms
Min: -3.6 mm at 61.4 ms

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

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11.19.2017 12:09:28 519



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 816mm

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

Rib Foam: 175-4003-05125

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

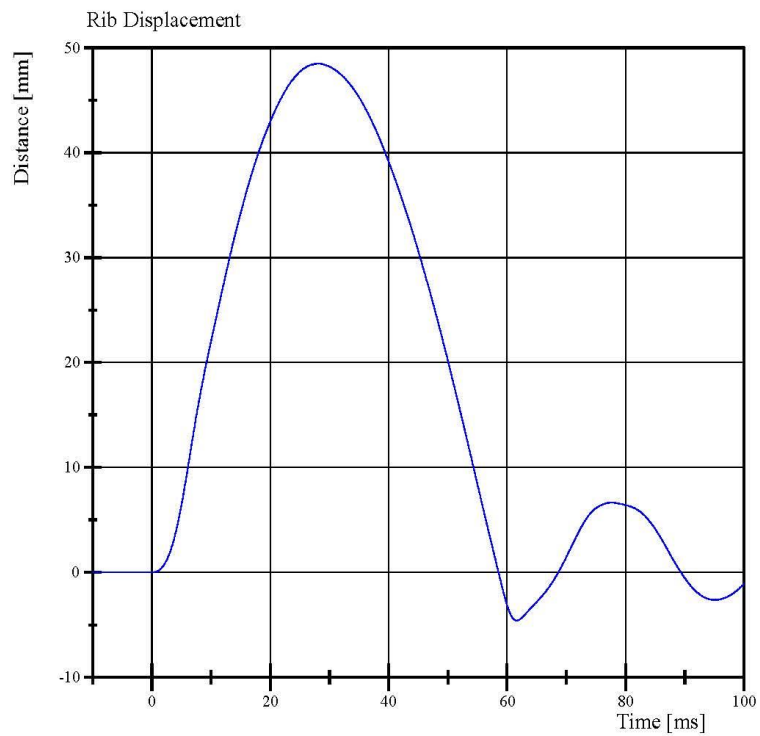
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11.19.2017 12:14:03 418



Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017



Filter Class: CFC_180
Max: 48.5 mm at 28.2 ms
Min: -4.6 mm at 61.6 ms

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

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Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.5 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Drop Height: 462

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

Rib Foam: 175-4003-05125

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

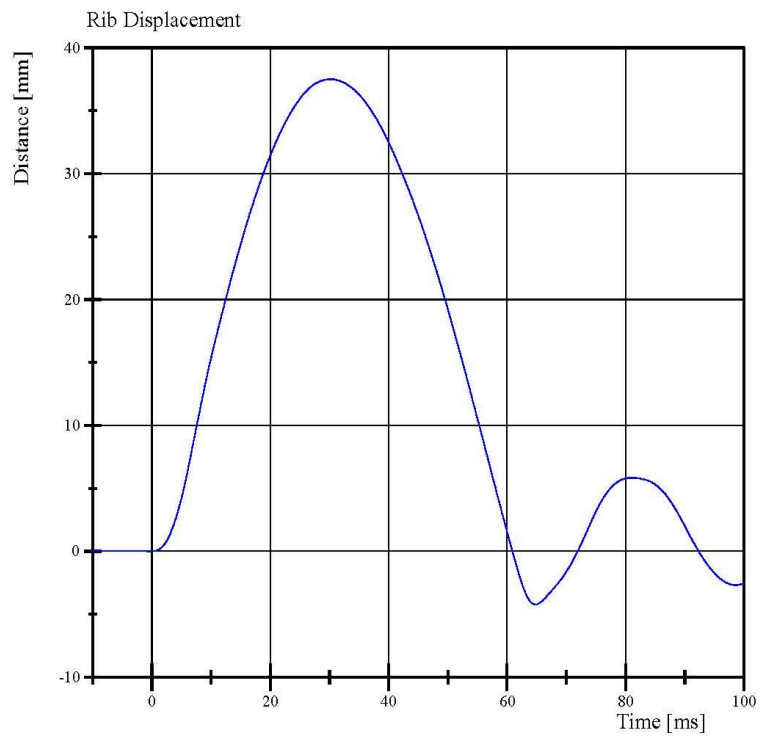
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11.19.2017 12:15:22 502



Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017



Filter Class: CFC_180
Max: 37.5 mm at 30.2 ms
Min: -4.2 mm at 64.8 ms

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

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11.19.2017 12:15:48 502



Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 51-2
Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.534 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,115.3 N	Yes
Upper Rib Displacement	34 - 41 mm	36.9 mm	Yes
Center Rib Displacement	37 - 45 mm	41.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	41.6 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Rib

Rib Module: 175-4008-A

Rib Foam: 175-4003-07229

Center Rib

Rib Module: 175-4008-A

Rib Foam: E2A-DCT-04082

Lower Rib

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

Rib Foam: 175-4003-05125

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

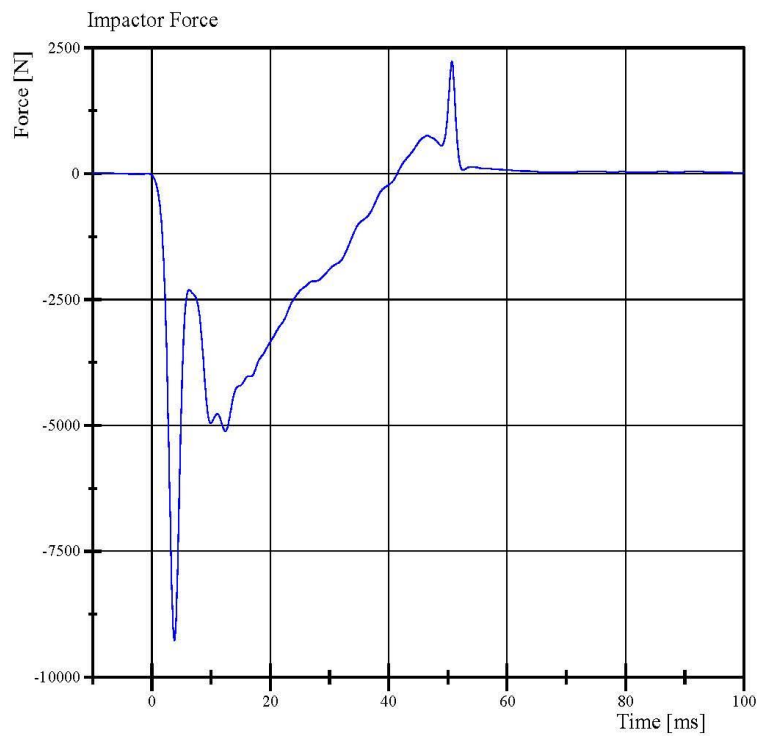
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Transportation Research Center Inc.

Left Lower Thorax
ES-2re Serial No. F030 Certification No. 51-2
Test Date: 11/19/2017



Filter Class: CFC_180
Max: 2,229.8 N at 50.6 ms
Min: -9,273.2 N at 3.8 ms

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

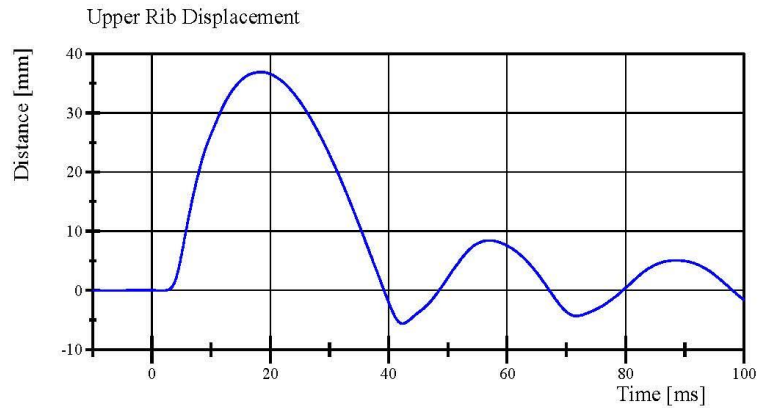
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11.19.2017 16:05:59 395

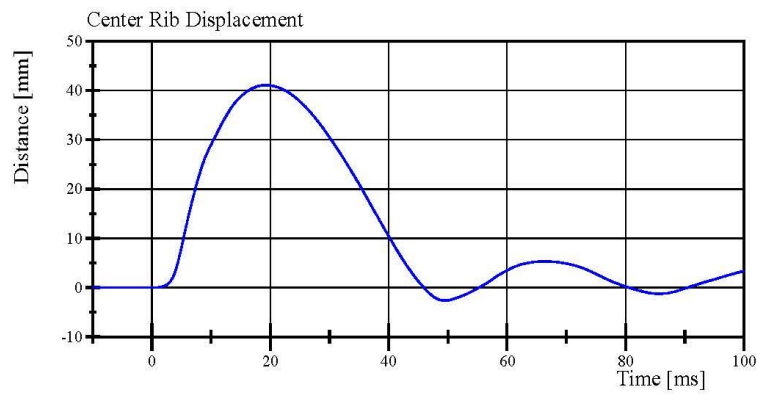


Transportation Research Center Inc.

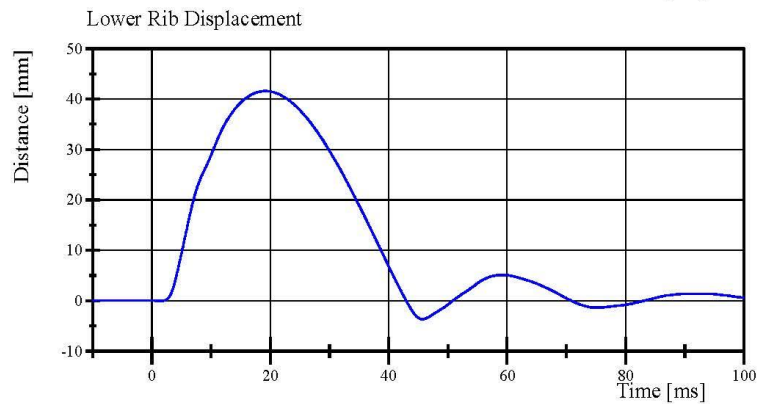
Left Lower Thorax
ES-2re Serial No. F030 Certification No. 51-2
Test Date: 11/19/2017



Filter Class: CFC_180
Max: 36.9 mm at 18.4 ms
Min: -5.6 mm at 42.3 ms



Filter Class: CFC_180
Max: 41.1 mm at 19.3 ms
Min: -2.6 mm at 49.5 ms



Filter Class: CFC_180
Max: 41.6 mm at 19.2 ms
Min: -3.7 mm at 45.7 ms

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

11.19.2017 16:05:59 395



Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.09 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,152.5 N	Yes
Time of Peak	10.6 - 13.0 ms	11.92 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,363.3 N	Yes
Time of Peak	10.0 - 12.3 ms	11.20 ms	Yes

Test meets specifications.

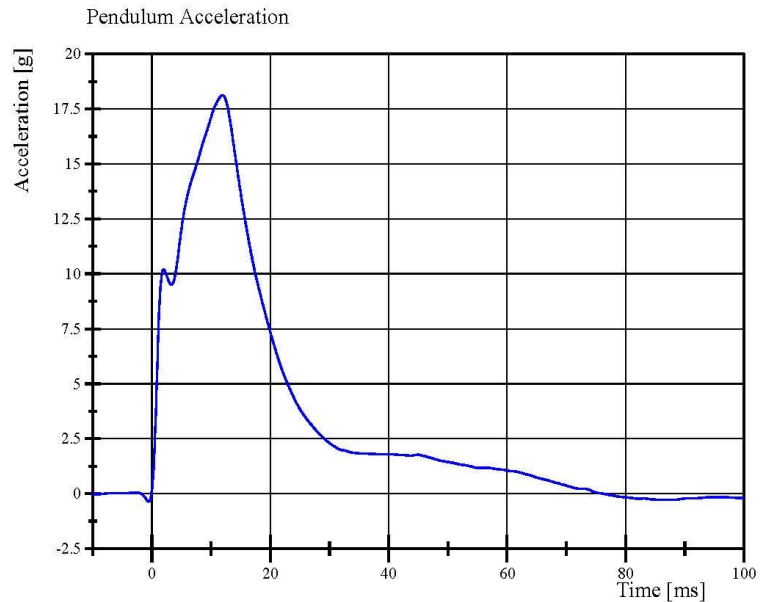
Condition: Used

Comments:

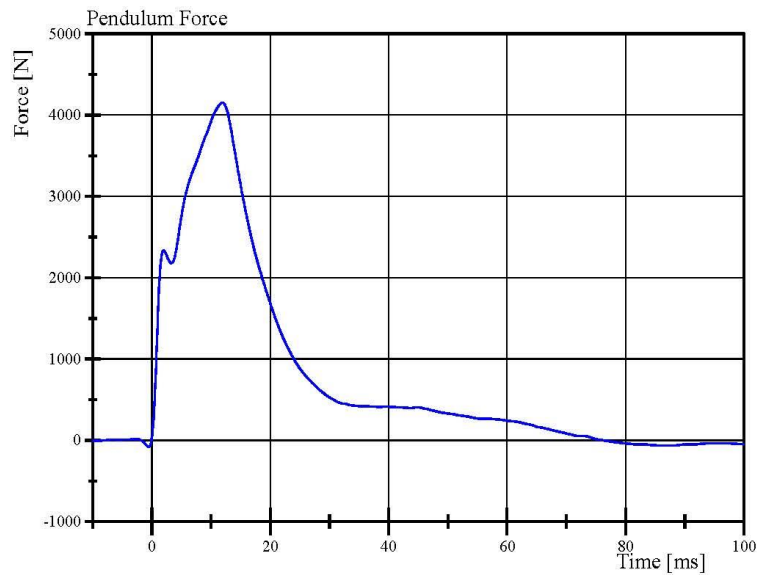
Abdomen S/N: 1066

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017



Filter Class: CFC_180
Max: 18.1 g at 11.9 ms
Min: -0.4 g at -0.6 ms



Filter Class: CFC_180
Max: 4,152.5 N at 11.9 ms
Min: -81.3 N at -0.6 ms

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

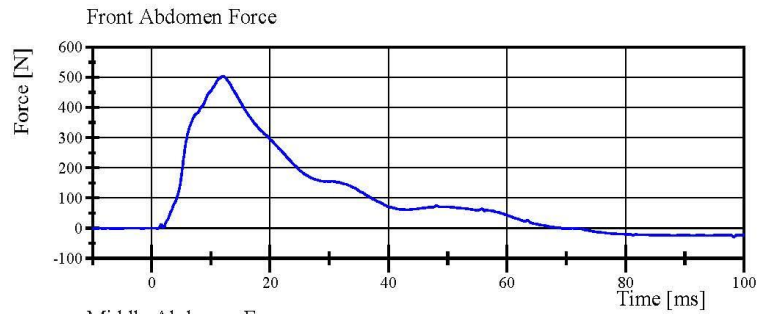
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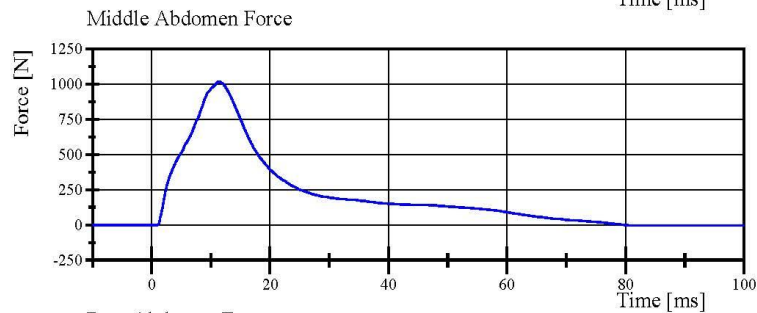


Transportation Research Center Inc.

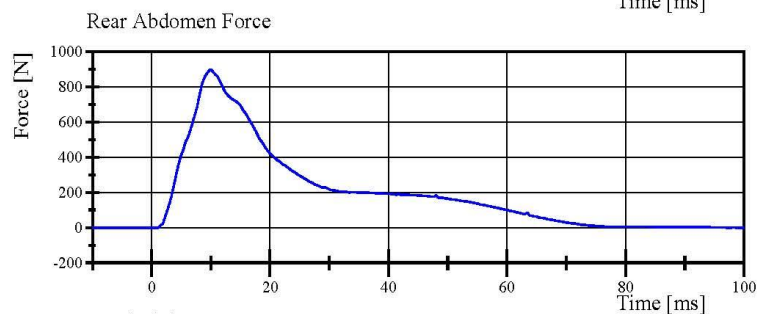
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017



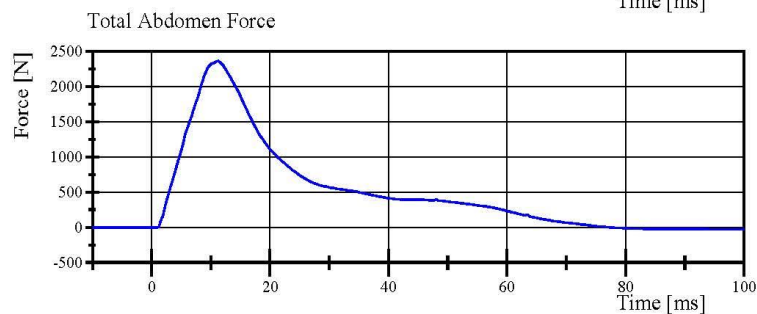
Filter Class: CFC_600
Max: 503.7 N at 12.1 ms
Min: -29.1 N at 98.3 ms



Filter Class: CFC_600
Max: 1,018.0 N at 11.4 ms
Min: -4.4 N at 99.2 ms



Filter Class: CFC_600
Max: 897.7 N at 10.0 ms
Min: -0.5 N at 1.0 ms



Filter Class: CFC_600
Max: 2,363.3 N at 11.2 ms
Min: -31.6 N at 98.3 ms

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

11.19.2017 15:37:25 519



Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. F030 Certification No. 51-3

Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.080 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-51.8 deg	Yes
Time of Peak	39 - 53 ms	43.9 ms	Yes
Headform Flexion Decay			
- Peak to Zero	37 - 57 ms	39.5 ms	Yes

Test meets specifications.

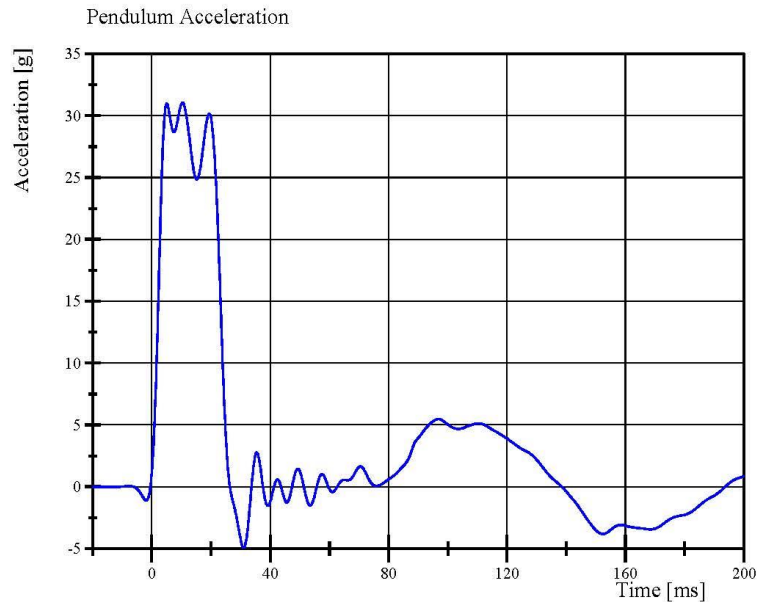
Condition: Used

Comments:

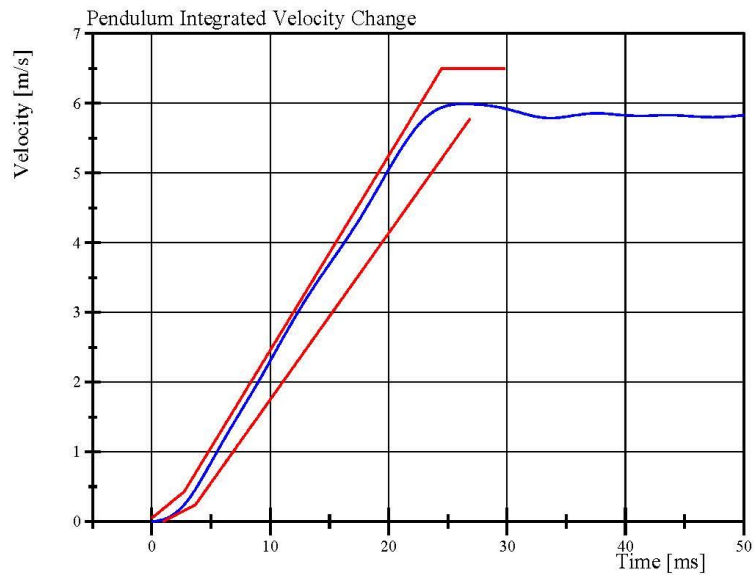
Lumbar S/N: 50375

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 51-3
Test Date: 11/17/2017



Filter Class: CFC_60
Max: 31.1 g at 10.4 ms
Min: -4.9 g at 31.0 ms



Filter Class: CFC_60
Max: 6.0 m/s at 26.4 ms
Min: 0.0 m/s at 0.0 ms

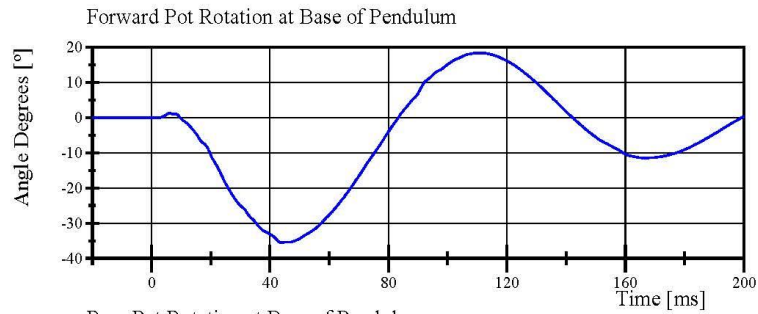
Specification Source: CFR49 Part 572 Subpart U
with Polarity in accordance with J211

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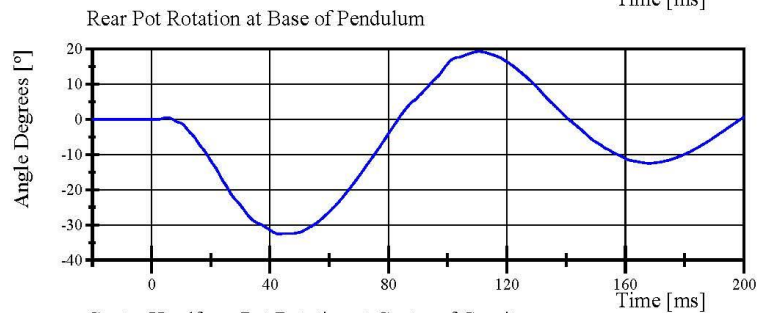


Transportation Research Center Inc.

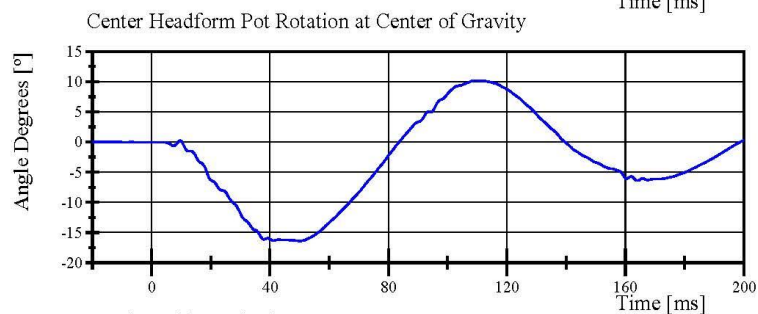
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 51-3
Test Date: 11/17/2017



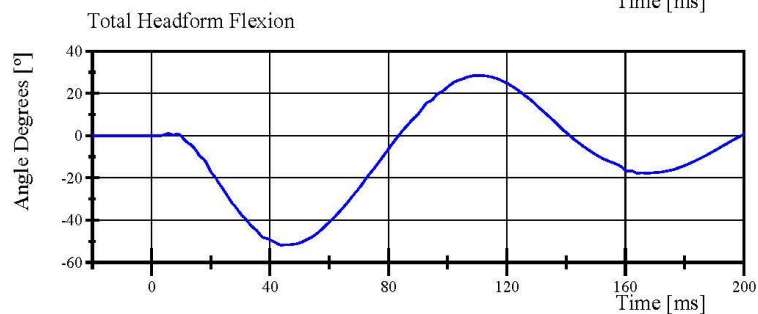
Filter Class: CFC_180
Max: 18.3 ° at 109.7 ms
Min: -35.6 ° at 43.8 ms



Filter Class: CFC_180
Max: 19.3 ° at 110.6 ms
Min: -32.6 ° at 43.0 ms



Filter Class: CFC_180
Max: 10.2 ° at 109.1 ms
Min: -16.4 ° at 50.1 ms



Filter Class: CFC_180
Max: 28.5 ° at 109.4 ms
Min: -51.8 ° at 43.9 ms

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

11.17.2017 12:54:29 639



Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.36 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,211.8 N	Yes
Time of Peak	11.8 - 16.1 ms	13.12 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,310.7 N	Yes
Time of Peak	12.2 - 17.0 ms	13.04 ms	Yes

Test meets specifications.

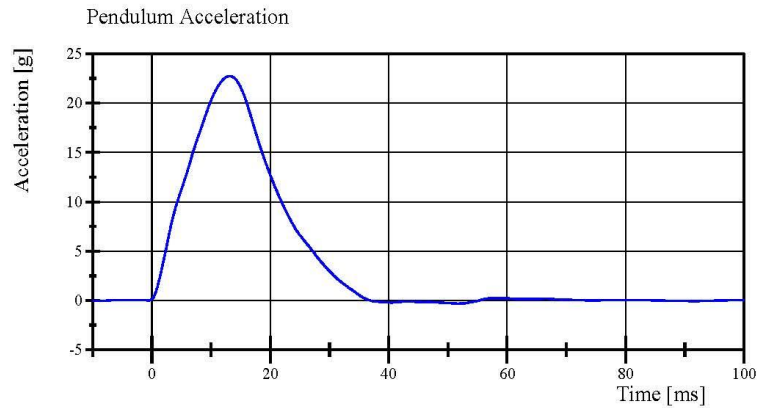
Condition: Used

Comments:

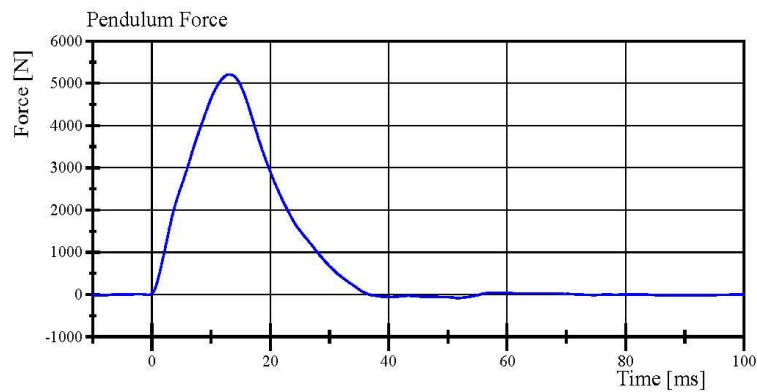
Pelvis Skin S/N: N/A

Transportation Research Center Inc.

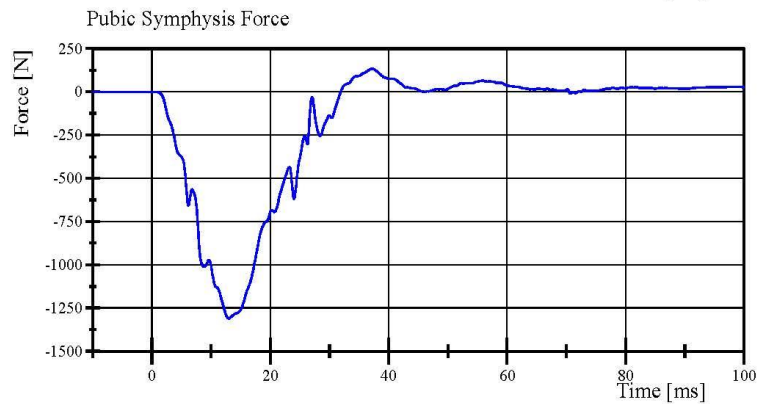
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 51-1
Test Date: 11/19/2017



Filter Class: CFC_180
Max: 22.7 g at 13.1 ms
Min: -0.4 g at 51.7 ms



Filter Class: CFC_180
Max: 5,211.8 N at 13.1 ms
Min: -80.4 N at 51.7 ms



Filter Class: CFC_600
Max: 132.5 N at 37.2 ms
Min: -1,310.7 N at 13.0 ms

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

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Pre-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.58

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	448	Yes
C	H-Point Height	79.0 - 89.0	87	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	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	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	535	Yes
L	Popliteal Height	343.0 - 369.0	348	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	200	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	482	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	873	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIS Serial No. 305 Certification No. 58-1

Test Date: 10/6/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.4 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.3 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Skull: N/A

Skin: 1253

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

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10.06.2017 09:52:33 232

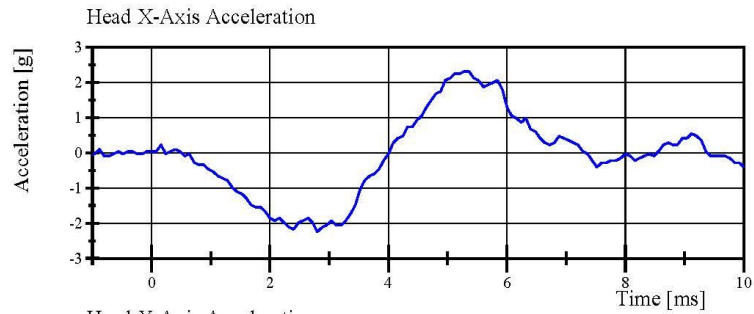


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 58-1

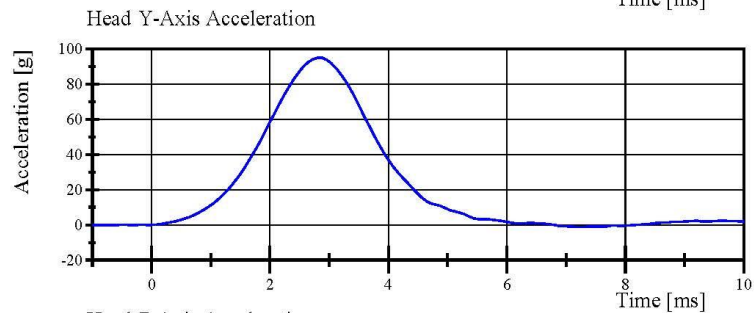
Test Date: 10/6/2017



Filter Class: CFC_1000

Max: 2.3 g at 5.3 ms

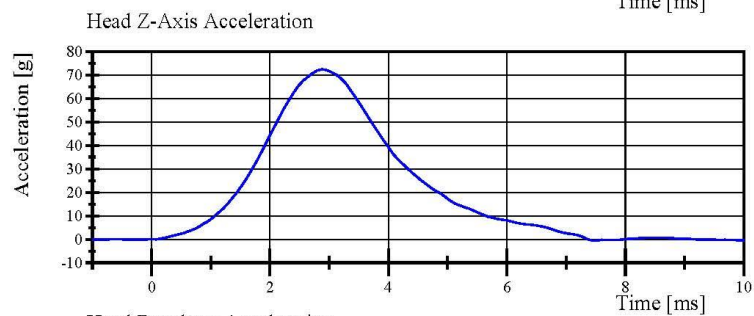
Min: -2.2 g at 2.8 ms



Filter Class: CFC_1000

Max: 95.0 g at 2.8 ms

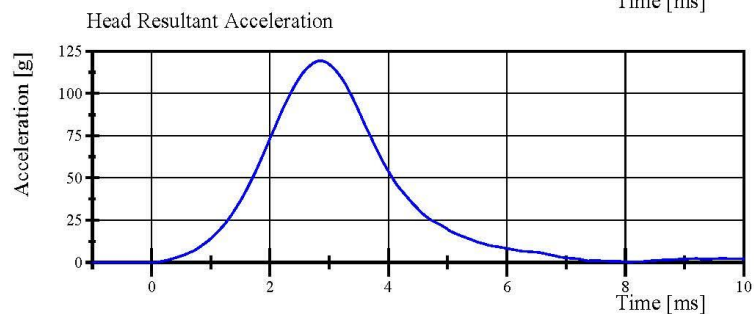
Min: -1.1 g at 7.2 ms



Filter Class: CFC_1000

Max: 72.5 g at 2.9 ms

Min: -0.5 g at 7.4 ms



Filter Class: CFC_1000

Max: 119.4 g at 2.9 ms

Min: 0.1 g at -0.2 ms

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

10.06.2017 09:55:00 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 58-11

Test Date: 11/14/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.620 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.739 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.926 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.249 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.924 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.924 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.9 deg	Yes
Time of Peak	50 - 70 ms	68.2 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	37.8 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	121.0 ms	Yes

Test meets specifications.

Condition: New

Comments:

Neck S/N: 180-2001-606

Neck Cable S/N: N/A

Nodding Blocks:

Front S/N: DN-3094

Rear S/N: 8550-DL6580

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

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11.14.2017 10:10:04 716

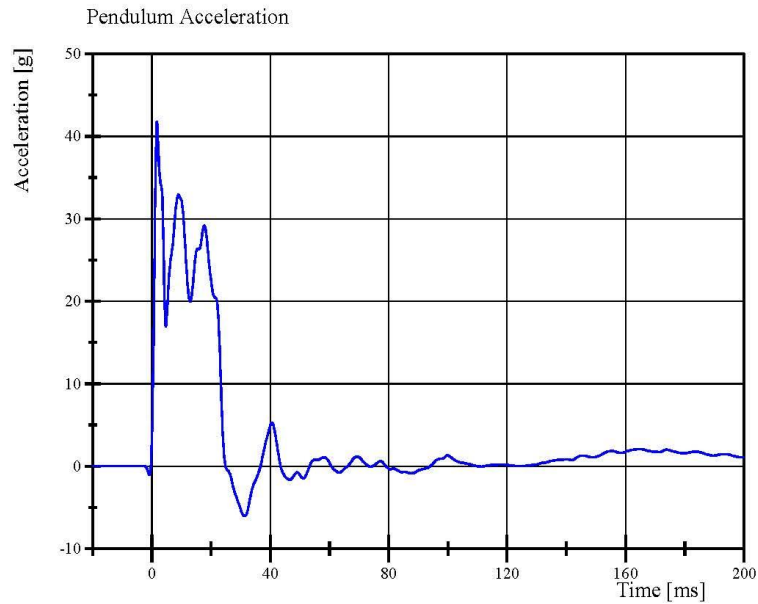


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 58-11

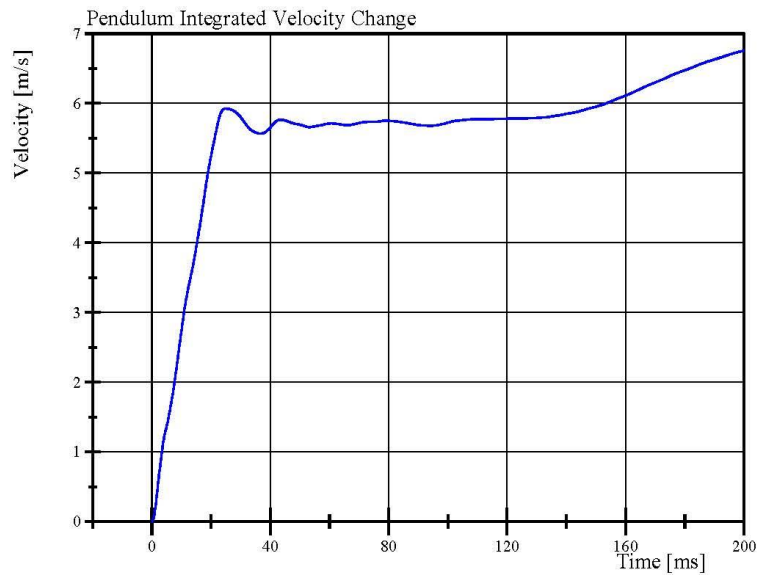
Test Date: 11/14/2017



Filter Class: CFC_180

Max: 41.8 g at 1.7 ms

Min: -6.0 g at 31.4 ms



Filter Class: CFC_180

Max: 6.8 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

11.14.2017 10:12:04 716

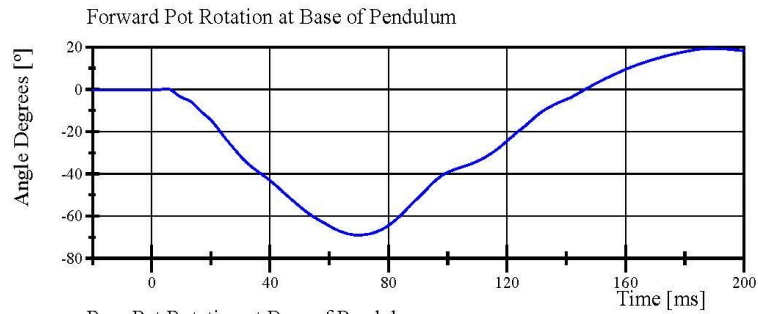


Transportation Research Center Inc.

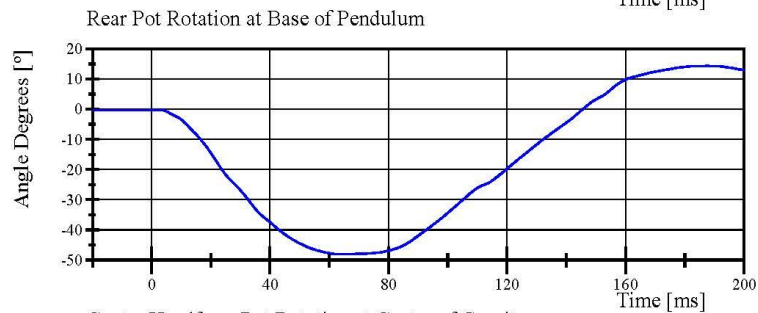
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 58-11

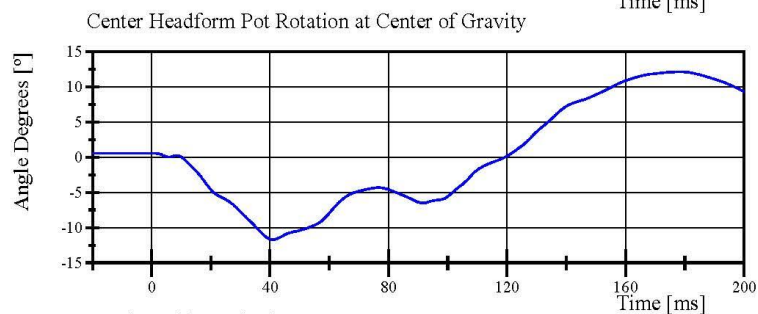
Test Date: 11/14/2017



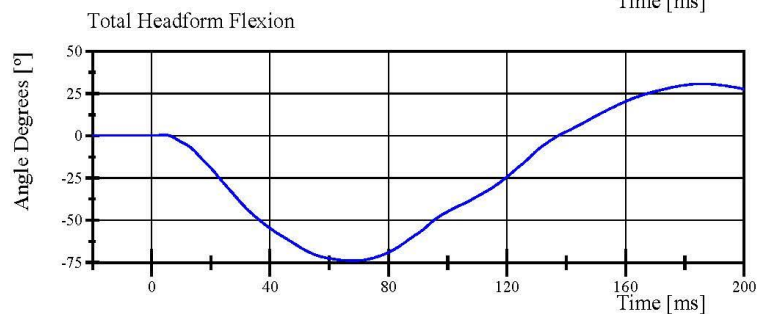
Filter Class: CFC_60
Max: 19.3 ° at 189.0 ms
Min: -68.9 ° at 69.8 ms



Filter Class: CFC_60
Max: 14.4 ° at 187.7 ms
Min: -48.1 ° at 65.0 ms



Filter Class: CFC_60
Max: 12.2 ° at 178.2 ms
Min: -11.7 ° at 40.9 ms



Filter Class: CFC_60
Max: 30.8 ° at 185.8 ms
Min: -73.9 ° at 68.2 ms

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

11.14.2017 10:12:05 716

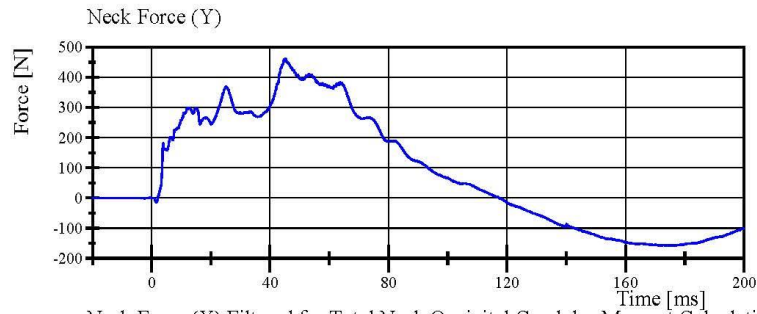


Transportation Research Center Inc.

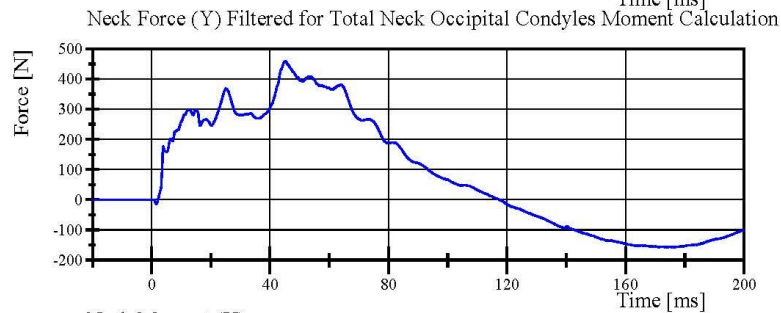
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 58-11

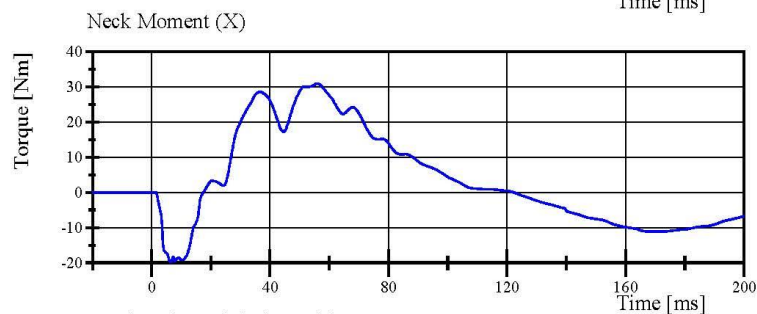
Test Date: 11/14/2017



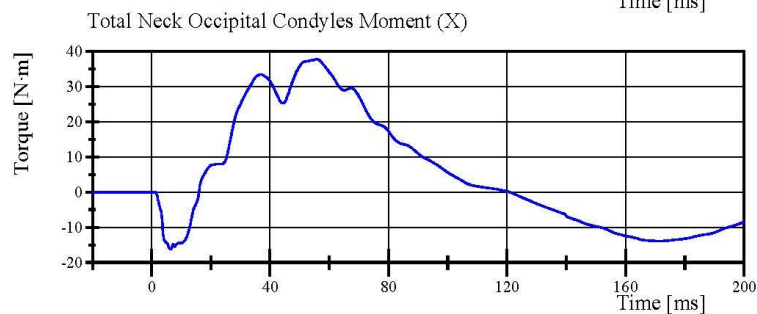
Filter Class: CFC_1000
Max: 461.8 N at 45.2 ms
Min: -157.0 N at 174.0 ms



Filter Class: CFC_600
Max: 459.3 N at 45.2 ms
Min: -156.8 N at 175.7 ms



Filter Class: CFC_600
Max: 31.0 Nm at 55.7 ms
Min: -19.8 Nm at 6.5 ms



Filter Class: Without_(Consta
Max: 37.8 N·m at 55.6 ms
Min: -16.2 N·m at 6.5 ms

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

11.14.2017 10:12:06 716



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIS Serial No. 305 Certification No. 58-1

Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.8 g	Yes
Shoulder Displacement	28 - 37 mm	30.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.9 g	Yes

Test meets specifications.

Condition: Used

Comments:

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

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10.09.2017 10:50:34 887

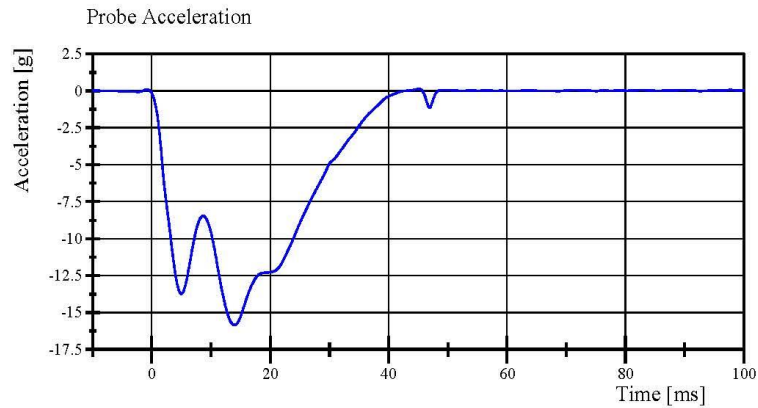


Transportation Research Center Inc.

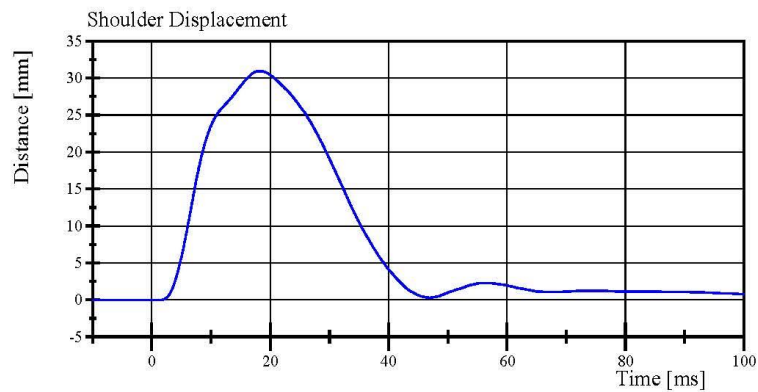
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 58-1

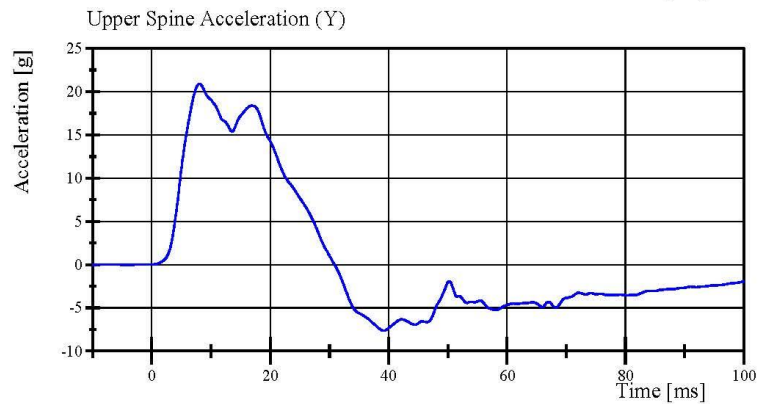
Test Date: 10/9/2017



Filter Class: CFC_180
Max: 0.1 g at 45.1 ms
Min: -15.8 g at 13.9 ms



Filter Class: CFC_600
Max: 30.9 mm at 18.1 ms
Min: -0.0 mm at -3.5 ms



Filter Class: CFC_180
Max: 20.9 g at 8.1 ms
Min: -7.6 g at 39.1 ms

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

10.09.2017 10:50:41 887



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 58-1
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.725 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-31.5 g	Yes
Shoulder Displacement	31 - 40 mm	33.3 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.2 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.8 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.2 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.2 g	Yes

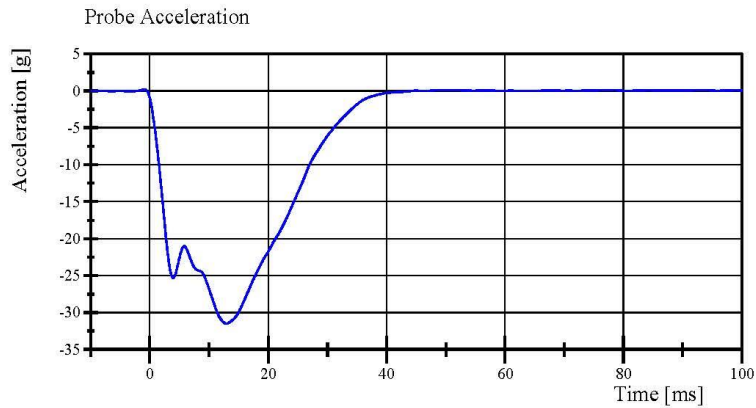
Test meets specifications.

Condition: Used

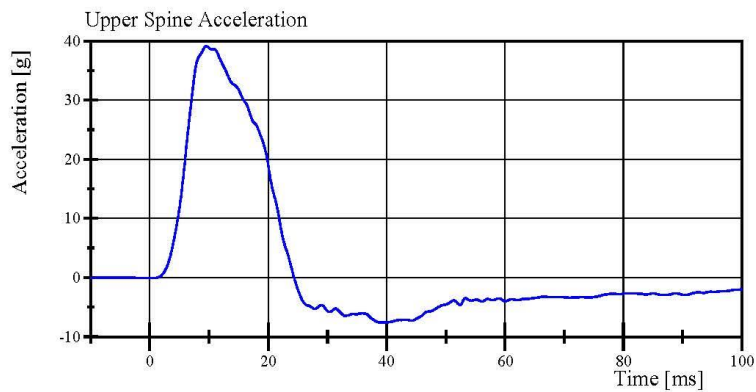
Comments:

Transportation Research Center Inc.

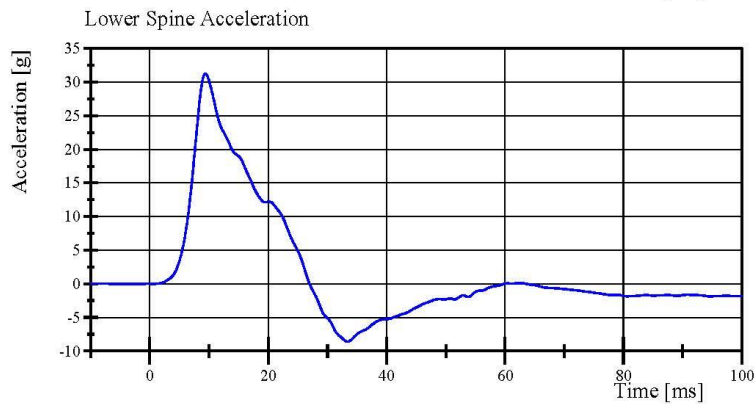
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 58-1
Test Date: 10/9/2017



Filter Class: CFC_180
Max: 0.2 g at -1.0 ms
Min: -31.5 g at 13.0 ms



Filter Class: CFC_180
Max: 39.2 g at 9.5 ms
Min: -7.6 g at 39.0 ms



Filter Class: CFC_180
Max: 31.2 g at 9.4 ms
Min: -8.6 g at 33.4 ms

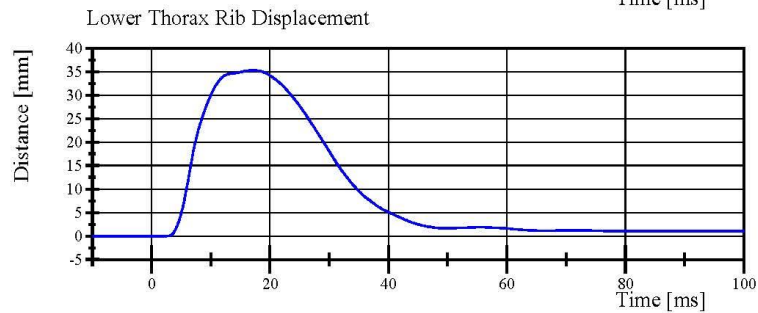
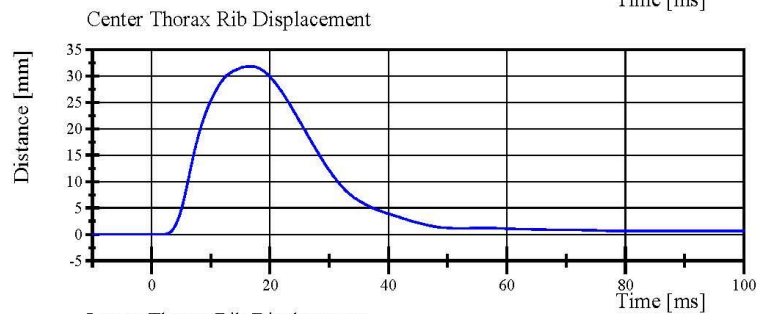
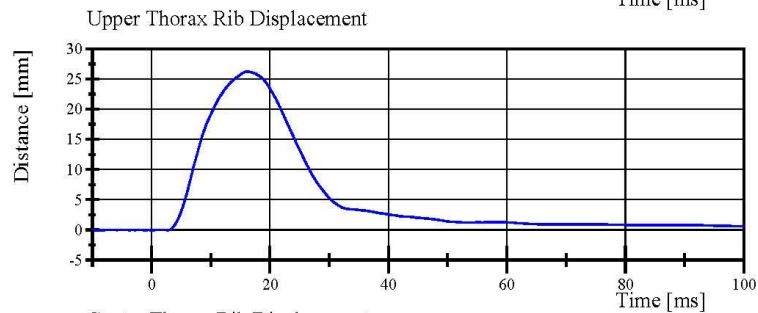
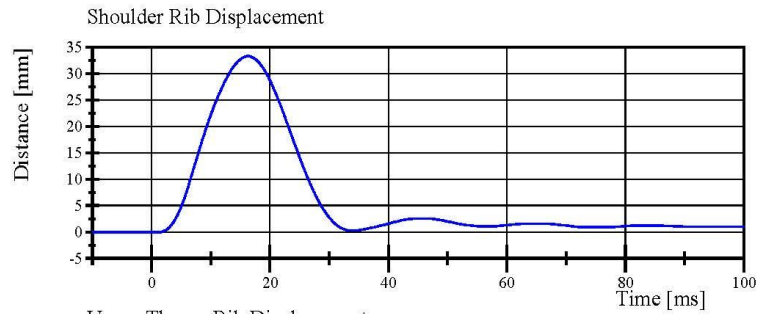
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

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Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 58-1
Test Date: 10/9/2017



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

10.09.2017 09:48:34 618



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 58-3
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.398 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.9 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	37.5 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.9 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.5 g	Yes

Test meets specifications.

Condition: Used

Comments:

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

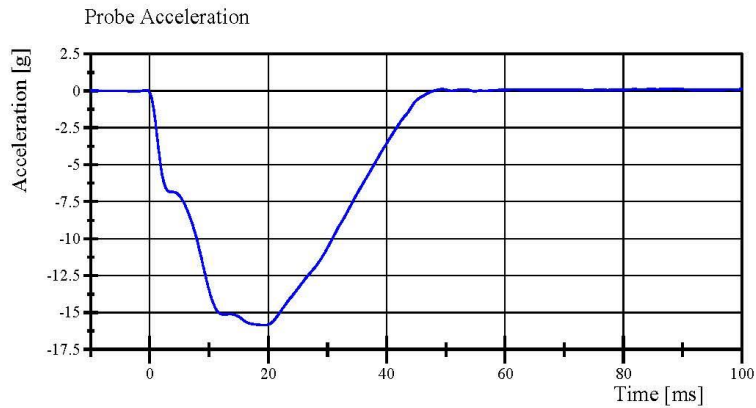
Page 20 of 31

10.09.2017 08:11:14 840

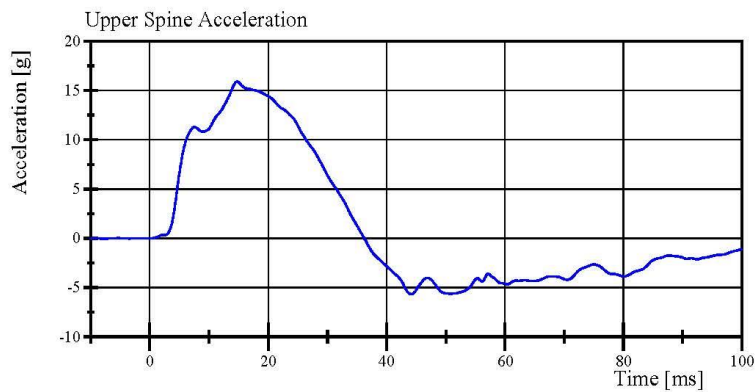


Transportation Research Center Inc.

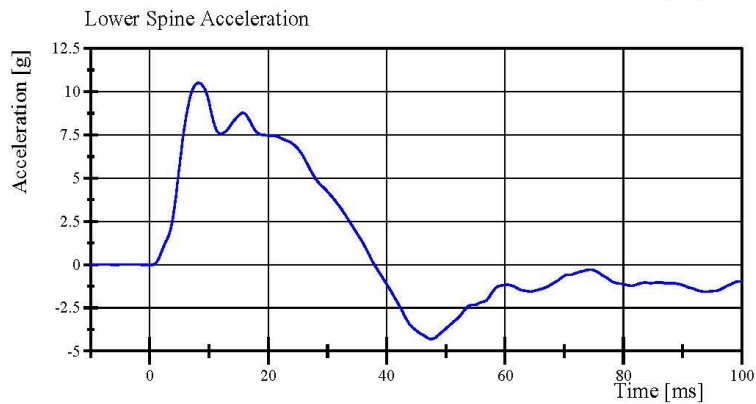
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 58-3
Test Date: 10/9/2017



Filter Class: CFC_180
Max: 0.1 g at 88.8 ms
Min: -15.9 g at 19.4 ms



Filter Class: CFC_180
Max: 15.9 g at 14.7 ms
Min: -5.7 g at 44.2 ms



Filter Class: CFC_180
Max: 10.5 g at 8.2 ms
Min: -4.3 g at 47.5 ms

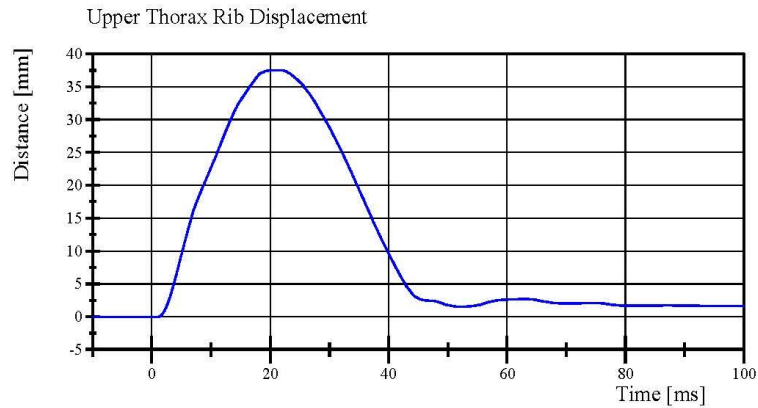
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

10.09.2017 08:12:13 840

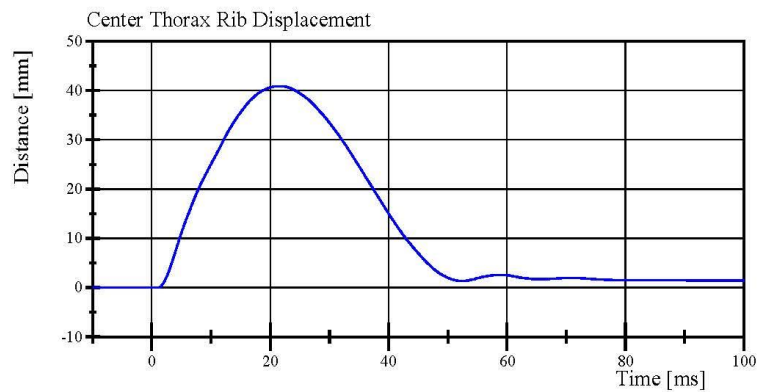


Transportation Research Center Inc.

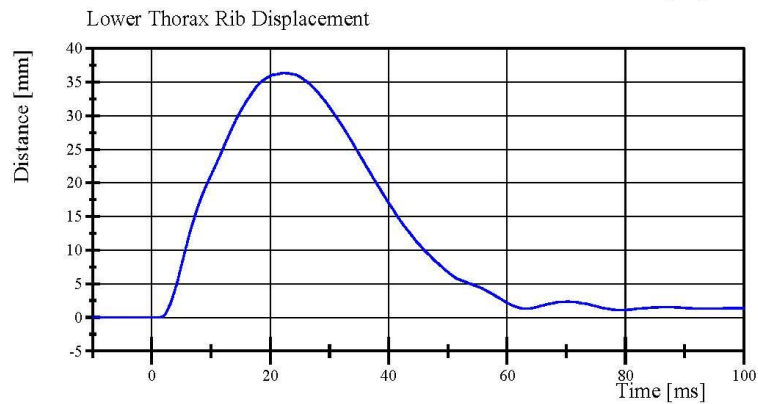
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 58-3
Test Date: 10/9/2017



Filter Class: CFC_600
Max: 37.5 mm at 20.4 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 40.8 mm at 21.6 ms
Min: -0.0 mm at -6.7 ms



Filter Class: CFC_600
Max: 36.3 mm at 22.3 ms
Min: -0.0 mm at -1.5 ms

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

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10.09.2017 08:12:14 840



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 58-1

Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.2 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	42.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.6 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.58 g	Yes

Test meets specifications.

Condition: Used

Comments:

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

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10.09.2017 10:09:34 634

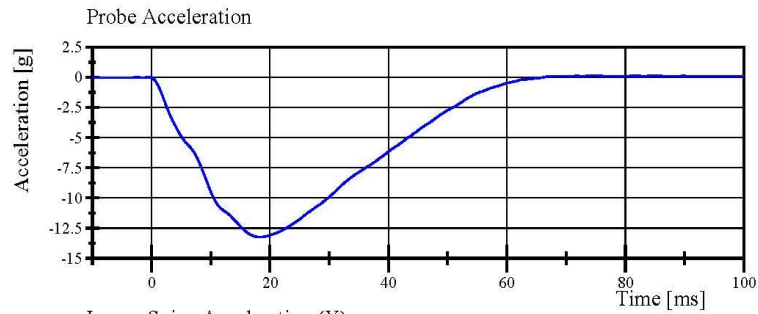


Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 58-1

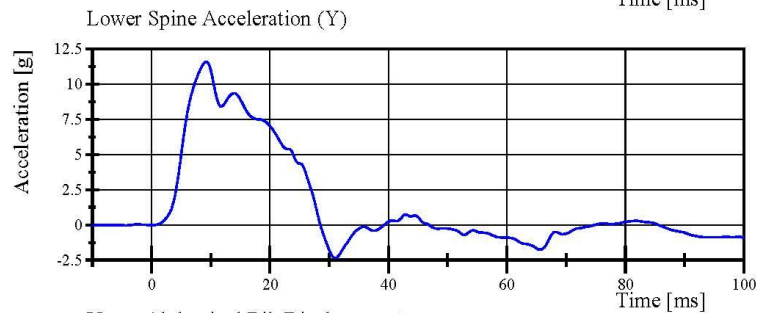
Test Date: 10/9/2017



Filter Class: CFC_180

Max: 0.2 g at 84.9 ms

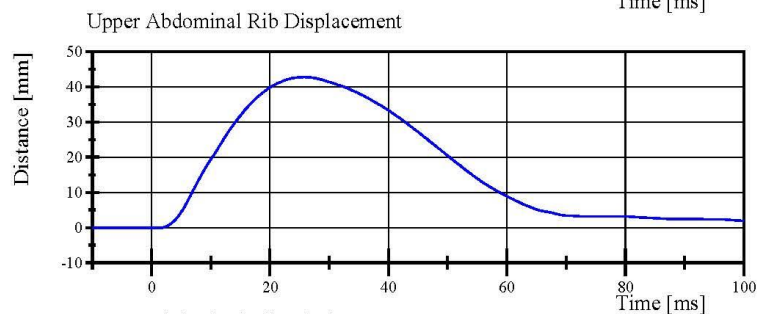
Min: -13.2 g at 18.4 ms



Filter Class: CFC_180

Max: 11.6 g at 9.3 ms

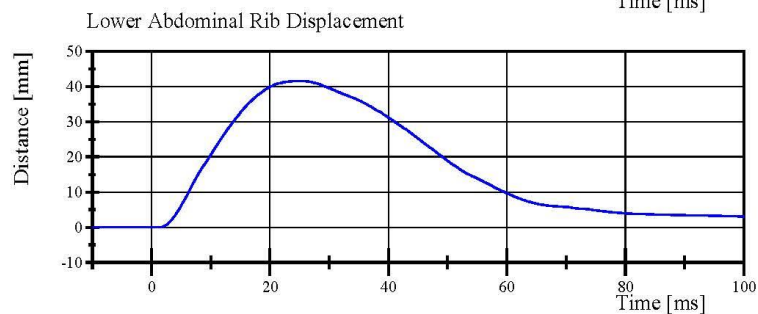
Min: -2.3 g at 31.0 ms



Filter Class: CFC_600

Max: 42.7 mm at 25.8 ms

Min: -0.0 mm at 1.5 ms



Filter Class: CFC_600

Max: 41.6 mm at 24.8 ms

Min: -0.0 mm at 1.3 ms

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

10.09.2017 10:09:42 634



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 58-1

Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-37.3 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.3 g	Yes
Iliac Force	4,100 - 5,100 N	4,258.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

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

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10.09.2017 11:33:47 693

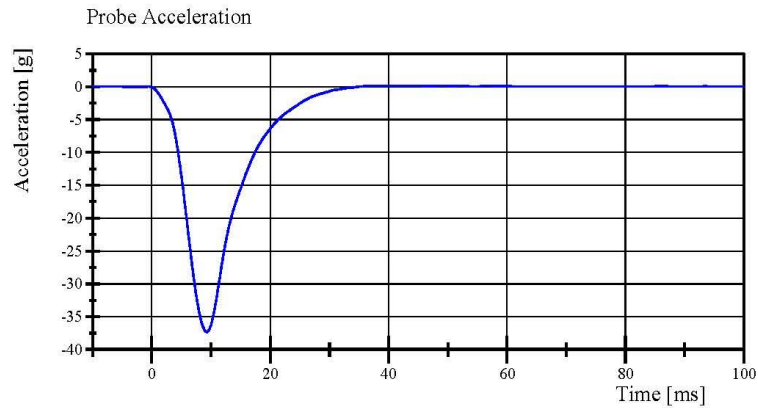


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 58-1

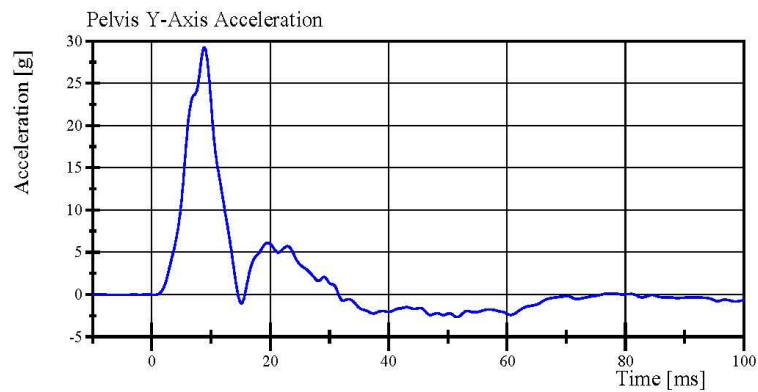
Test Date: 10/9/2017



Filter Class: CFC_180

Max: 0.2 g at 37.4 ms

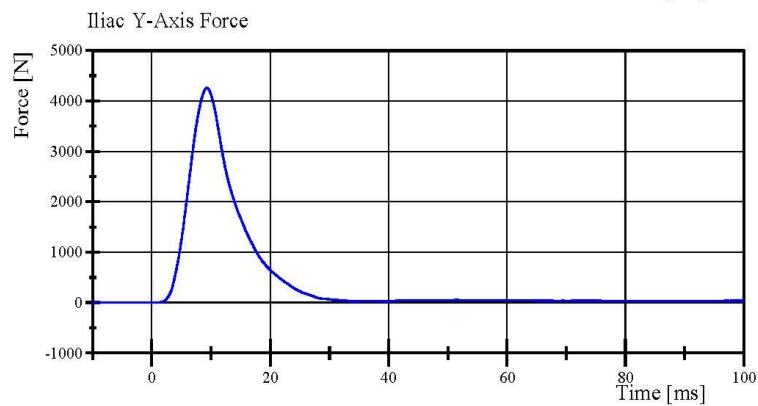
Min: -37.3 g at 9.3 ms



Filter Class: CFC_180

Max: 29.3 g at 8.9 ms

Min: -2.7 g at 51.6 ms



Filter Class: CFC_600

Max: 4,258.8 N at 9.3 ms

Min: -0.7 N at -6.9 ms

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

10.09.2017 11:33:53 693



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 58-2

Test Date: 10/10/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.78 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,224.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

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

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10.10.2017 07:04:20 470

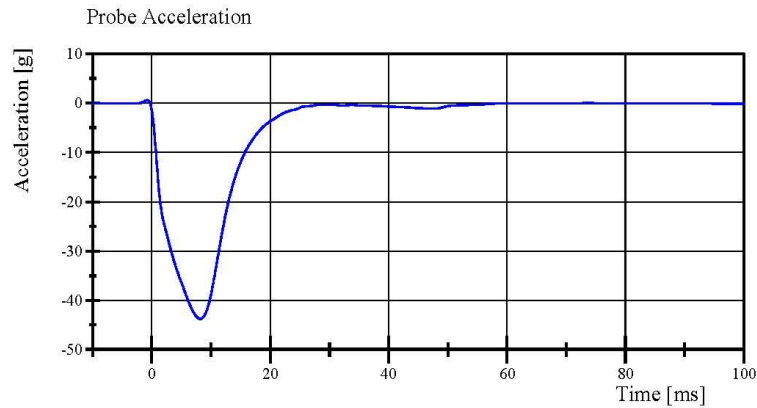


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 58-2

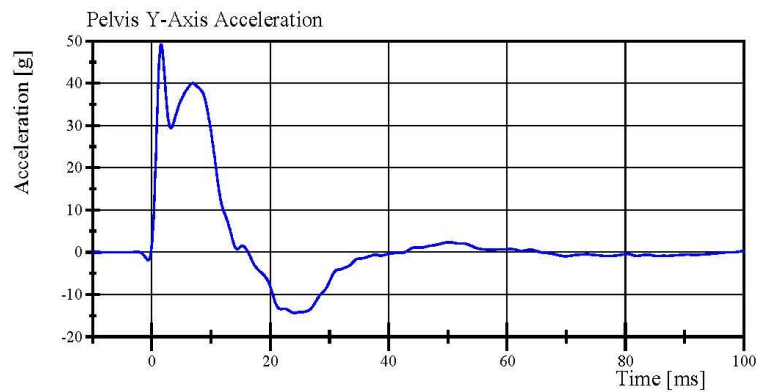
Test Date: 10/10/2017



Filter Class: CFC_180

Max: 0.6 g at -0.8 ms

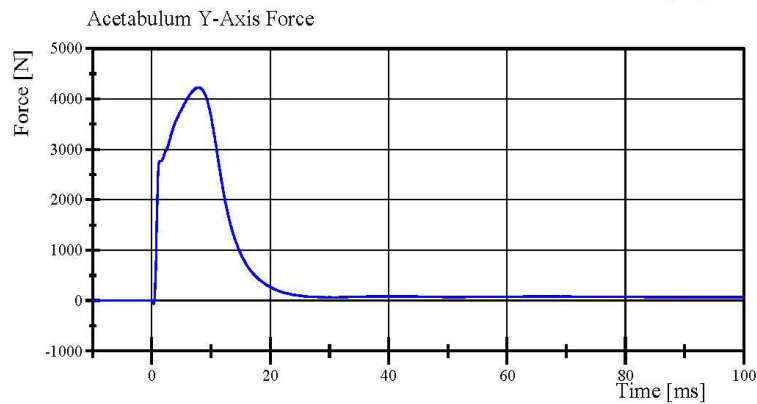
Min: -43.8 g at 8.2 ms



Filter Class: CFC_180

Max: 49.2 g at 1.6 ms

Min: -14.3 g at 24.1 ms



Filter Class: CFC_600

Max: 4,224.8 N at 7.9 ms

Min: -62.4 N at 0.3 ms

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

10.10.2017 07:04:59 470



Post-Test Calibration Sheets
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.59

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	783	Yes
B	Shoulder Pivot Height	437.0 - 453.0	449	Yes
C	H-Point Height	79.0 - 89.0	87	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	131	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	535	Yes
L	Popliteal Height	343.0 - 369.0	348	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	200	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
P	Foot Length (left)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	482	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	873	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 59-2

Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	125.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: 1253

Skull S/N: 180/1001/C

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

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11.19.2017 07:56:53 197

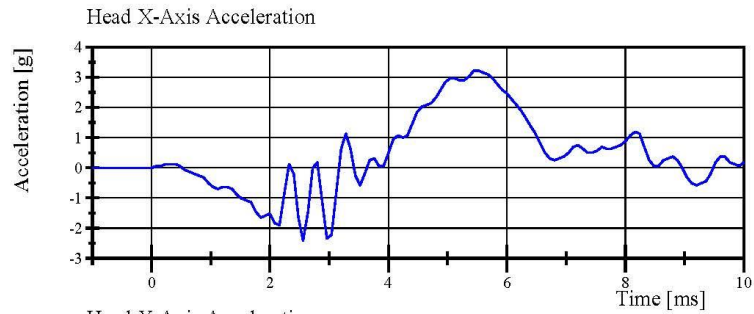


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 59-2

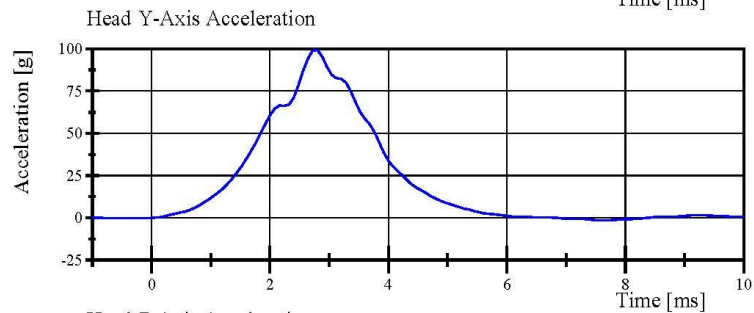
Test Date: 11/19/2017



Filter Class: CFC_1000

Max: 3.2 g at 5.4 ms

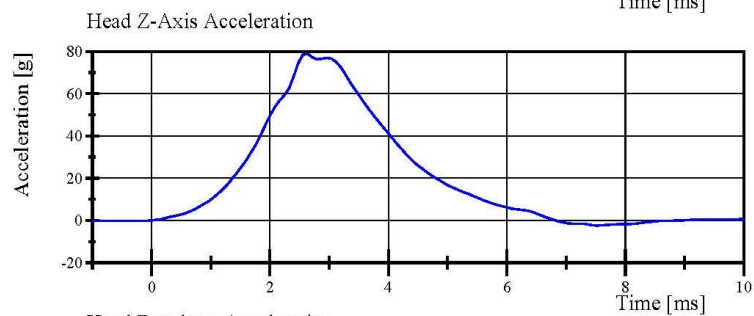
Min: -2.4 g at 2.6 ms



Filter Class: CFC_1000

Max: 99.4 g at 2.8 ms

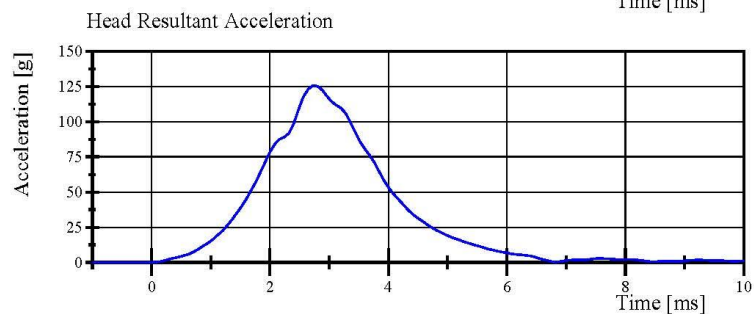
Min: -1.6 g at 7.6 ms



Filter Class: CFC_1000

Max: 78.8 g at 2.6 ms

Min: -2.4 g at 7.5 ms



Filter Class: CFC_1000

Max: 125.6 g at 2.7 ms

Min: 0.0 g at -0.8 ms

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

11.19.2017 07:57:44 197



Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 305 Certification No. 59-1

Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.1 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.615 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.362 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.523 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.806 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.644 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.645 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.8 deg	Yes
Time of Peak	50 - 70 ms	68.3 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	37.9 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	119.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 180-2001-606

Neck Cable S/N: N/A

Nodding Blocks:

Front S/N: DN-3094

Rear S/N: 8550-DL6580

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

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11.17.2017 14:33:08 716

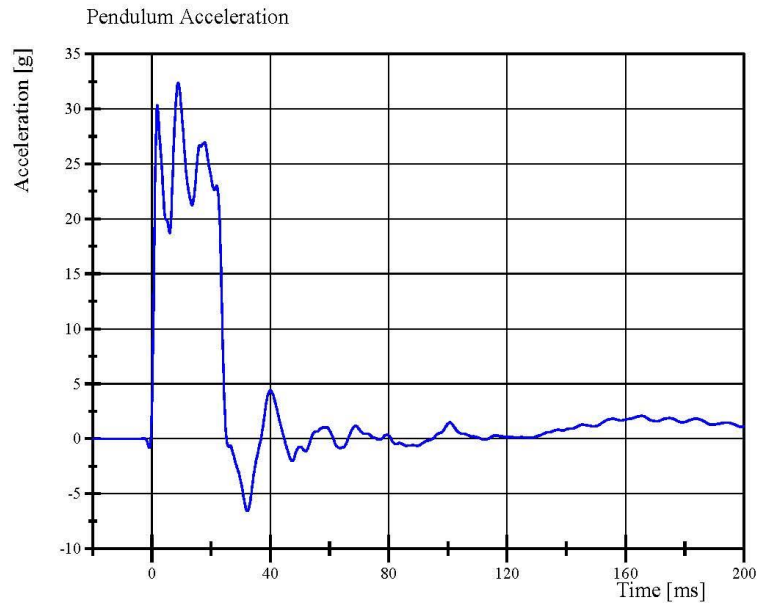


Transportation Research Center Inc.

Left Lateral Neck

SID IIS Serial No. 305 Certification No. 59-1

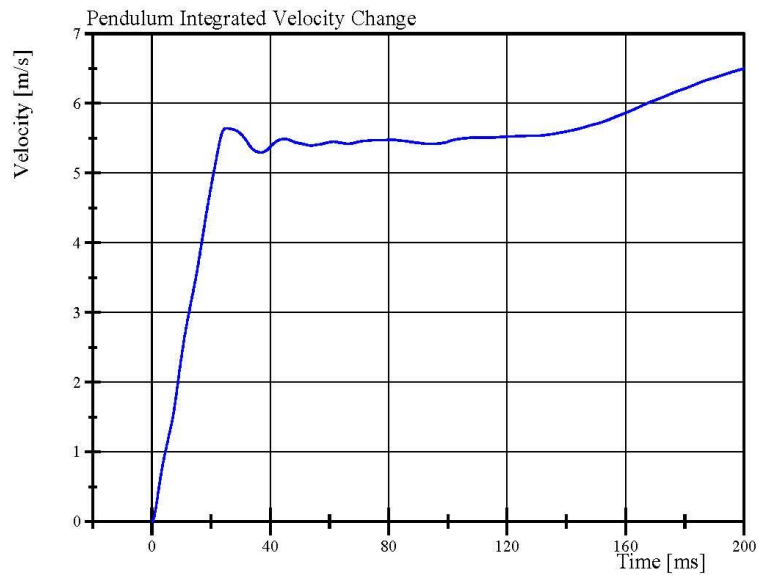
Test Date: 11/17/2017



Filter Class: CFC_180

Max: 32.4 g at 8.9 ms

Min: -6.6 g at 32.2 ms



Filter Class: CFC_180

Max: 6.5 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

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

11.17.2017 14:34:58 716

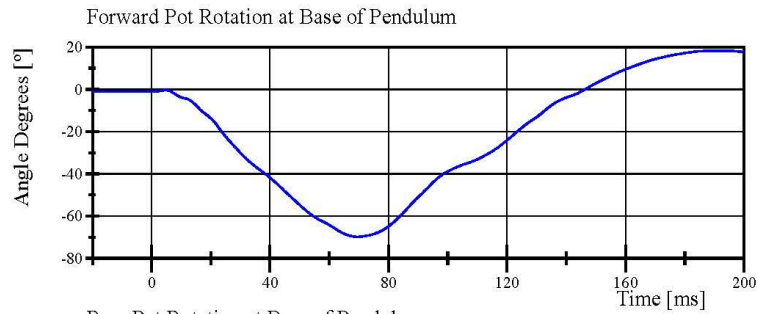


Transportation Research Center Inc.

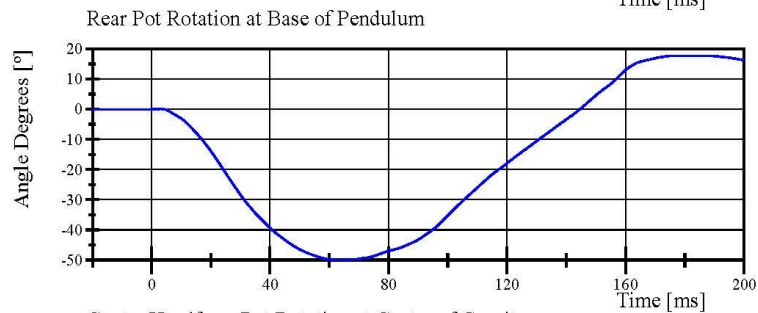
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 59-1

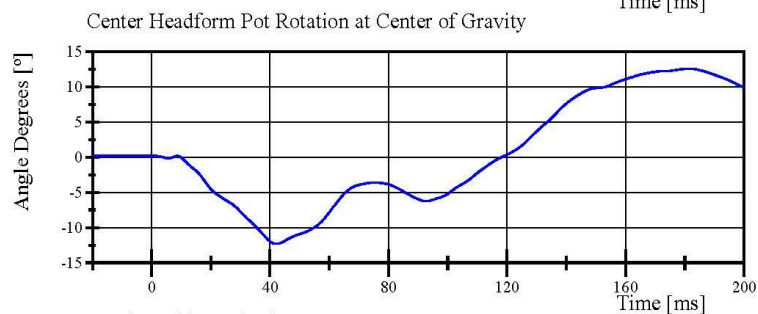
Test Date: 11/17/2017



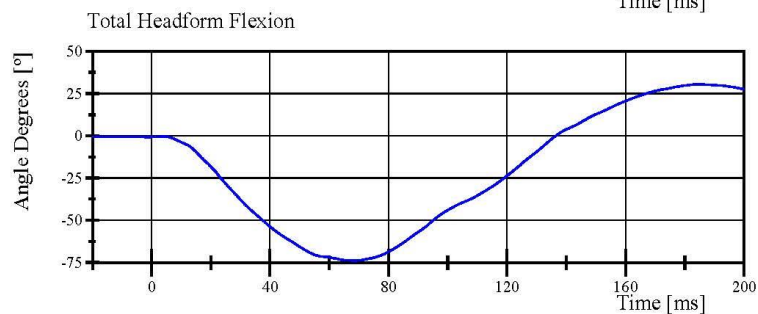
Filter Class: CFC_60
Max: 18.4 ° at 192.2 ms
Min: -69.7 ° at 69.6 ms



Filter Class: CFC_60
Max: 17.7 ° at 184.5 ms
Min: -49.9 ° at 63.9 ms



Filter Class: CFC_60
Max: 12.6 ° at 181.6 ms
Min: -12.3 ° at 42.2 ms



Filter Class: CFC_60
Max: 30.5 ° at 184.5 ms
Min: -73.8 ° at 68.3 ms

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

11.17.2017 14:34:59 716



Transportation Research Center Inc.

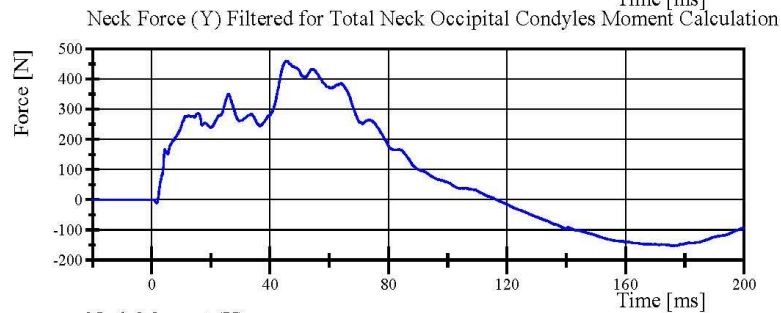
Left Lateral Neck

SID IIS Serial No. 305 Certification No. 59-1

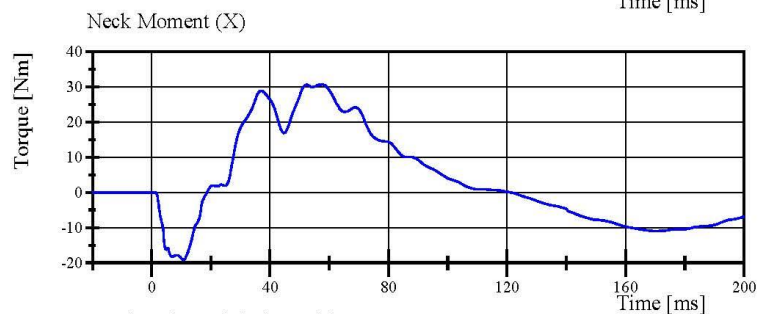
Test Date: 11/17/2017



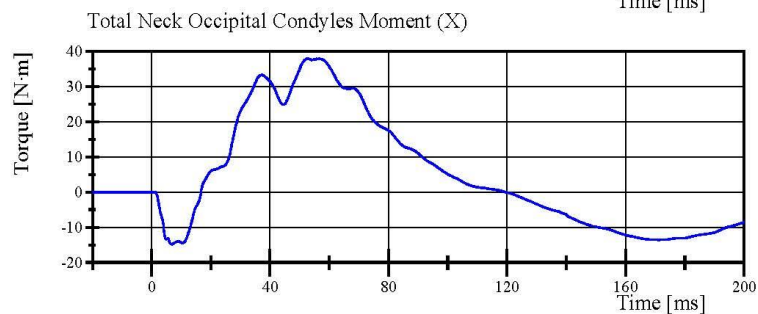
Filter Class: CFC_1000
Max: 460.0 N at 45.3 ms
Min: -151.4 N at 175.2 ms



Filter Class: CFC_600
Max: 459.5 N at 45.4 ms
Min: -151.2 N at 176.0 ms



Filter Class: CFC_600
Max: 30.8 Nm at 57.7 ms
Min: -19.1 Nm at 10.6 ms



Filter Class: Without_(Consta
Max: 37.9 N·m at 52.6 ms
Min: -14.8 N·m at 6.9 ms

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

11.17.2017 14:35:00 716



Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.0 g	Yes
Shoulder Displacement	28 - 37 mm	31.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.3 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Shoulder Rib S/N: 180-3355 169

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

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11.17.2017 09:10:21 825

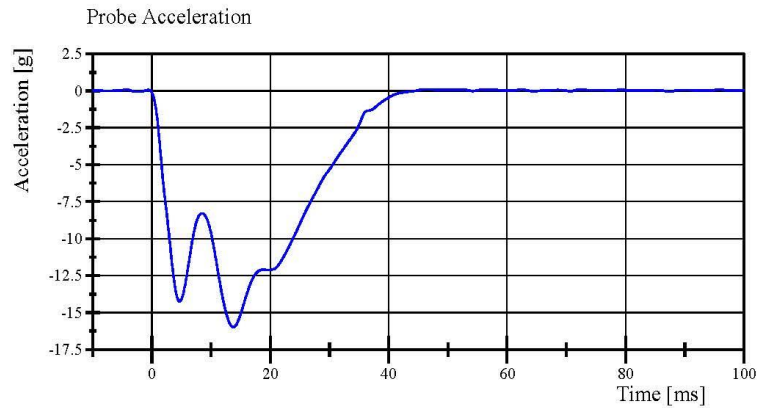


Transportation Research Center Inc.

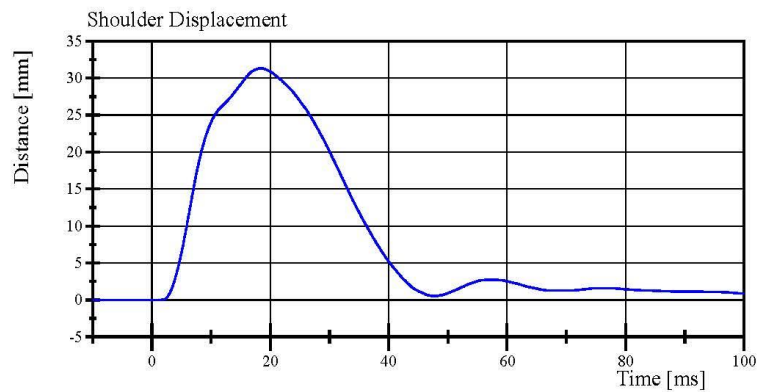
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 59-1

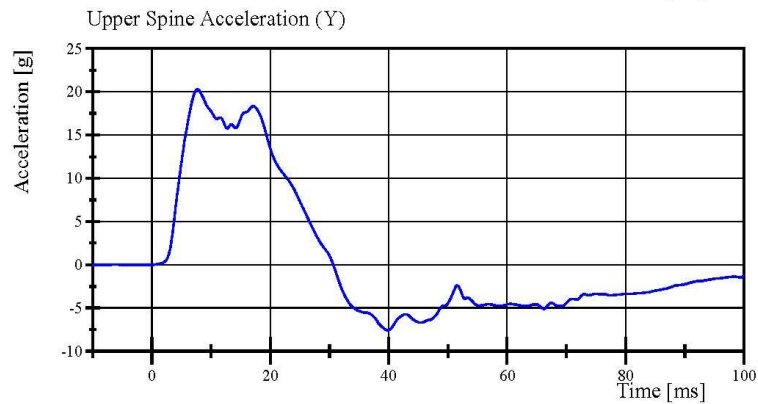
Test Date: 11/17/2017



Filter Class: CFC_180
Max: 0.1 g at 95.8 ms
Min: -16.0 g at 13.8 ms



Filter Class: CFC_600
Max: 31.3 mm at 18.4 ms
Min: -0.0 mm at 0.0 ms



Filter Class: CFC_180
Max: 20.3 g at 7.7 ms
Min: -7.6 g at 39.8 ms

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

11.17.2017 09:11:27 825



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.727 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-31.1 g	Yes
Shoulder Displacement	31 - 40 mm	34.1 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.5 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.1 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.0 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.7 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	31.5 g	Yes

Test meets specifications.

Condition: Used

Comments:

Left Arm S/N: 952

Shoulder Rib S/N: 180-3355 169

Upper Thorax Rib S/N: RS506

Middle Thorax Rib S/N: RS506

Lower Thorax Rib S/N: RS506

Upper Thorax Pad S/N: 180-3451

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

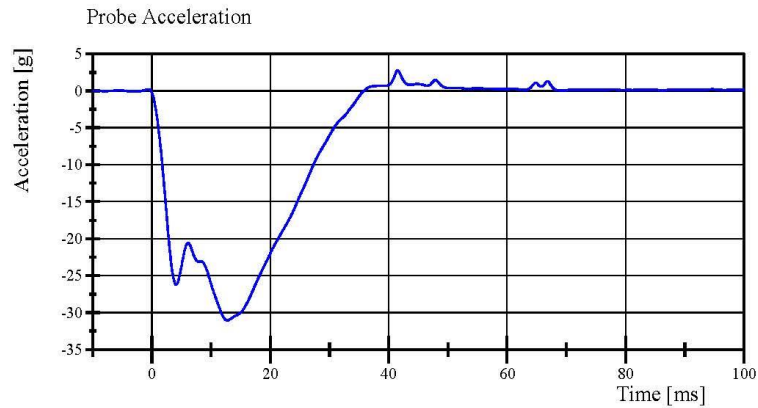
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11.17.2017 10:13:53 597

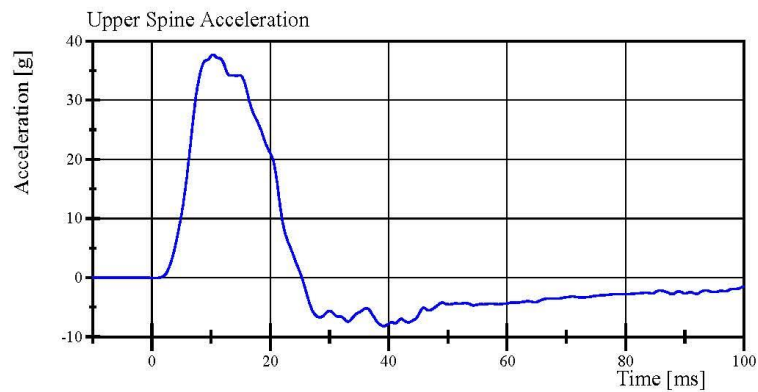


Transportation Research Center Inc.

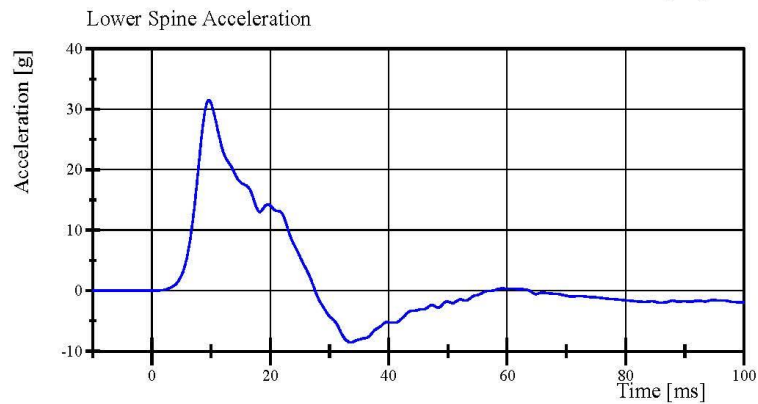
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017



Filter Class: CFC_180
Max: 2.8 g at 41.5 ms
Min: -31.1 g at 12.7 ms



Filter Class: CFC_180
Max: 37.7 g at 10.3 ms
Min: -8.2 g at 39.2 ms



Filter Class: CFC_180
Max: 31.5 g at 9.6 ms
Min: -8.5 g at 33.6 ms

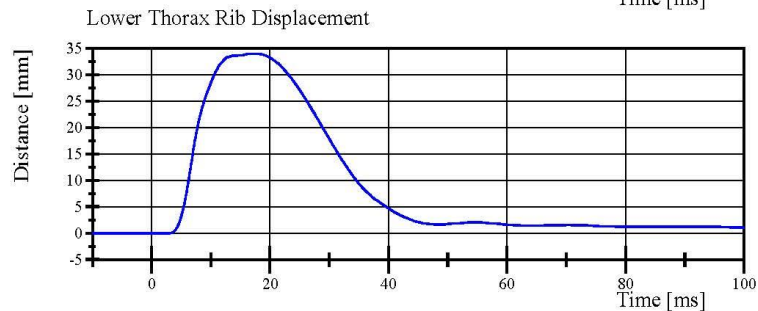
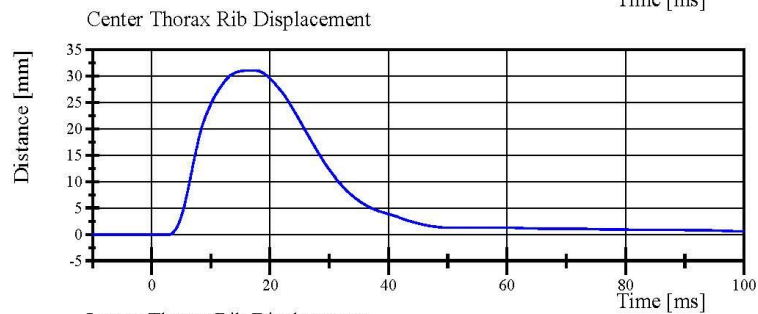
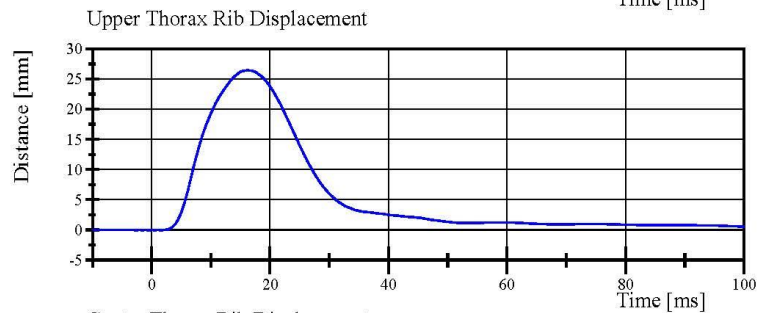
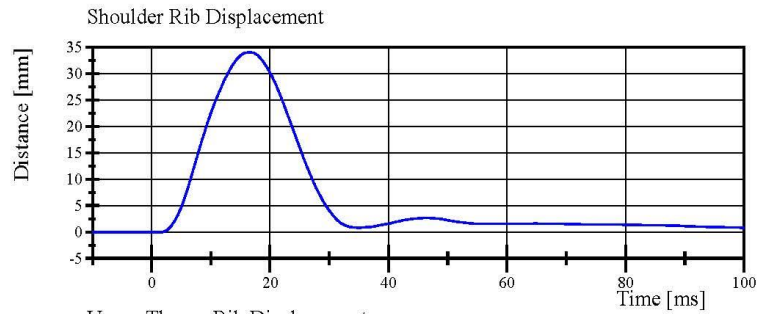
Specification Source: CFR49 Part 572 Subpart V
with Polarity in accordance with J211

11.17.2017 10:15:40 597



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017



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

11.17.2017 10:15:41 597



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.396 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.4 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.9 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.9 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Thorax Rib S/N: RS506

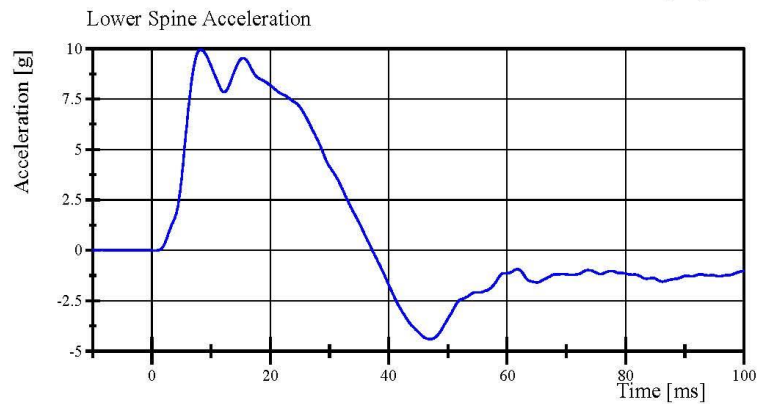
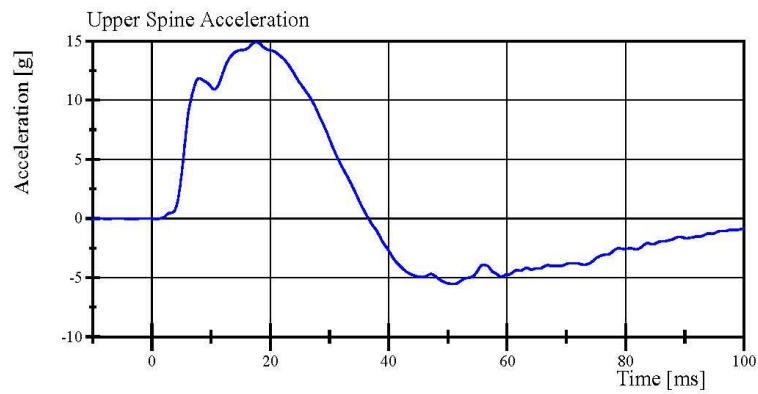
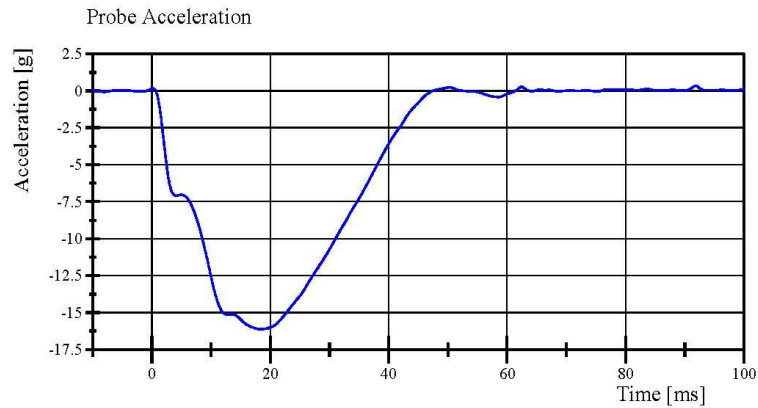
Middle Thorax Rib S/N: RS506

Lower Thorax Rib S/N: RS506

Upper Thorax Pad S/N: 180-3451

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017



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

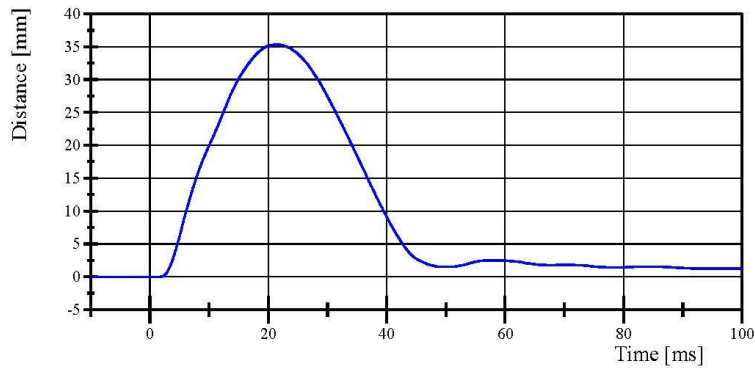
11.17.2017 09:39:36 845



Transportation Research Center Inc.

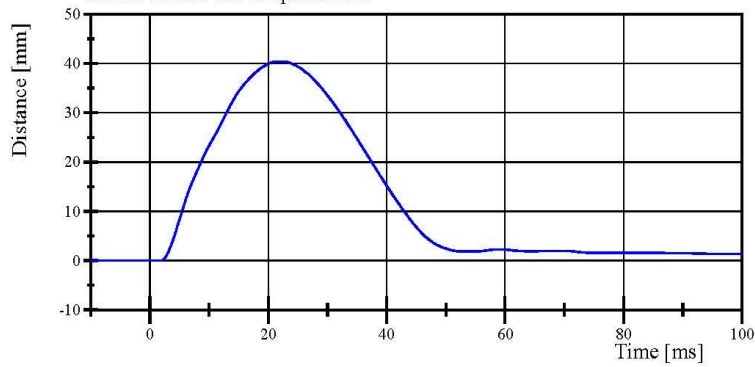
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017

Upper Thorax Rib Displacement



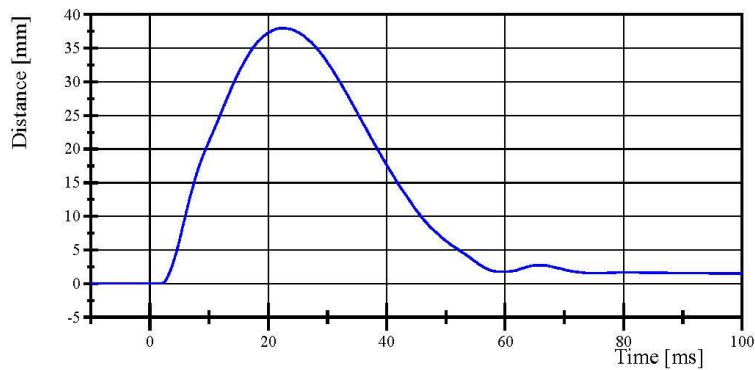
Filter Class: CFC_600
Max: 35.3 mm at 21.4 ms
Min: -0.0 mm at 1.7 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.4 mm at 21.8 ms
Min: -0.0 mm at 1.9 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.0 mm at 22.6 ms
Min: -0.0 mm at 1.6 ms

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

11.17.2017 09:39:37 845



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 59-1
Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.3 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	44.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.9 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.55 g	Yes

Test meets specifications.

Condition: Used

Comments:

Upper Abdominal Rib S/N: RS564

Lower Abdominal Rib S/N: 180-5368 DS1234

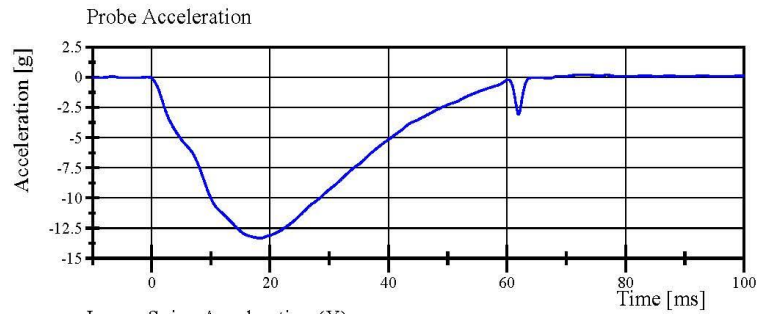
Abdominal Pad S/N: 180-3453

Transportation Research Center Inc.

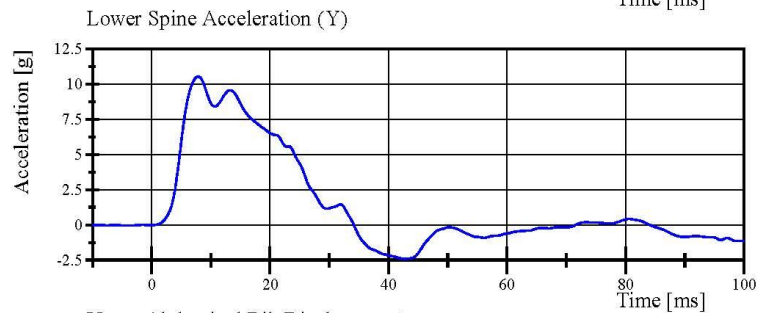
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 59-1

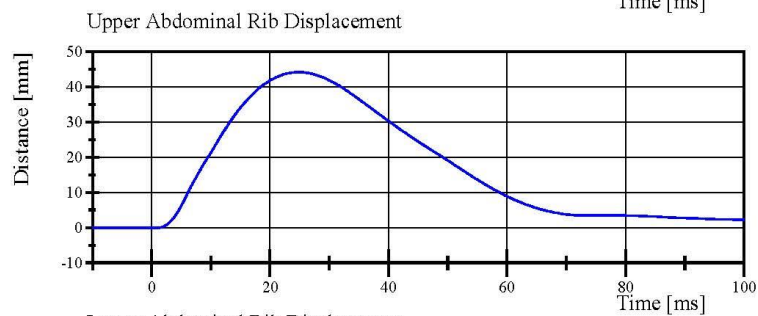
Test Date: 11/17/2017



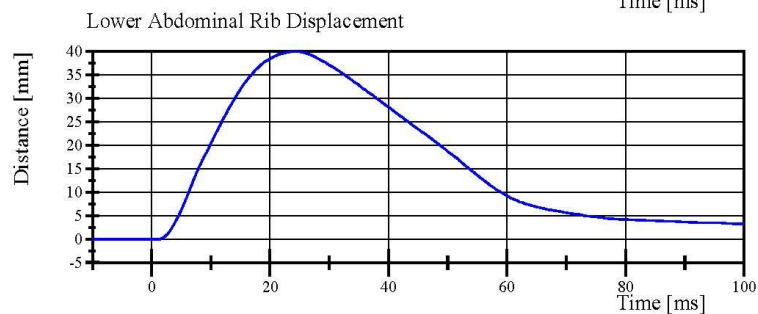
Filter Class: CFC_180
Max: 0.2 g at 72.9 ms
Min: -13.3 g at 18.3 ms



Filter Class: CFC_180
Max: 10.6 g at 7.9 ms
Min: -2.4 g at 42.8 ms



Filter Class: CFC_600
Max: 44.2 mm at 24.9 ms
Min: -0.0 mm at 0.2 ms



Filter Class: CFC_600
Max: 39.9 mm at 24.2 ms
Min: -0.0 mm at 1.2 ms

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

11.17.2017 09:22:52 660



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 59-2

Test Date: 11/19/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.35 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.7 g	Yes
Iliac Force	4,100 - 5,100 N	4,754.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S?N: 884

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

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11.19.2017 08:15:29 659

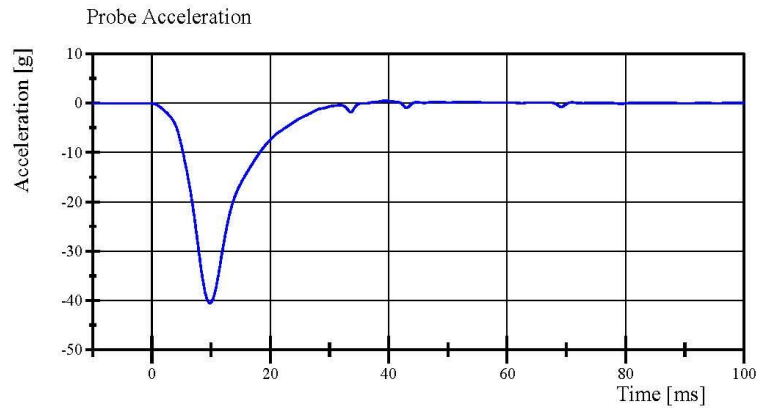


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 59-2

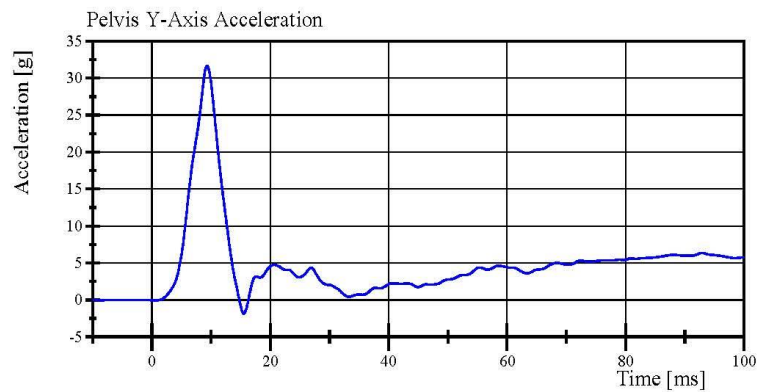
Test Date: 11/19/2017



Filter Class: CFC_180

Max: 0.5 g at 39.4 ms

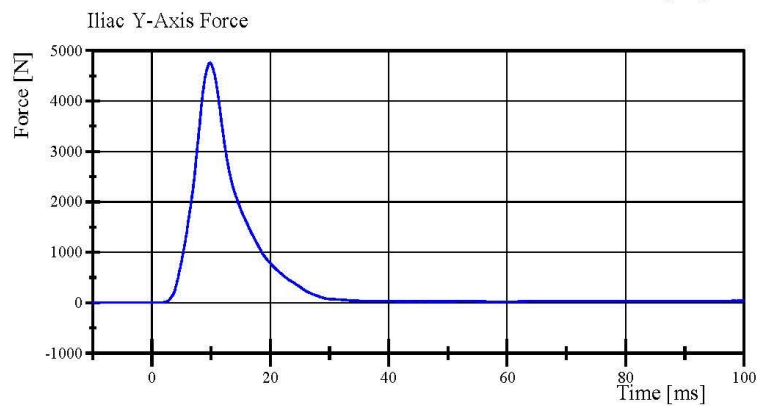
Min: -40.6 g at 9.8 ms



Filter Class: CFC_180

Max: 31.7 g at 9.4 ms

Min: -1.9 g at 15.5 ms



Filter Class: CFC_600

Max: 4,754.8 N at 9.8 ms

Min: -0.6 N at -8.6 ms

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

11.19.2017 08:16:36 659



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 59-1

Test Date: 11/17/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-40.15 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	35.5 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,695.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

Pelvis Skin S/N: 884

Pelvis Plug Info:

Manufacturer: SACO

S/N: 11152

Cal Date: 20160418

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

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11.17.2017 08:39:38 433

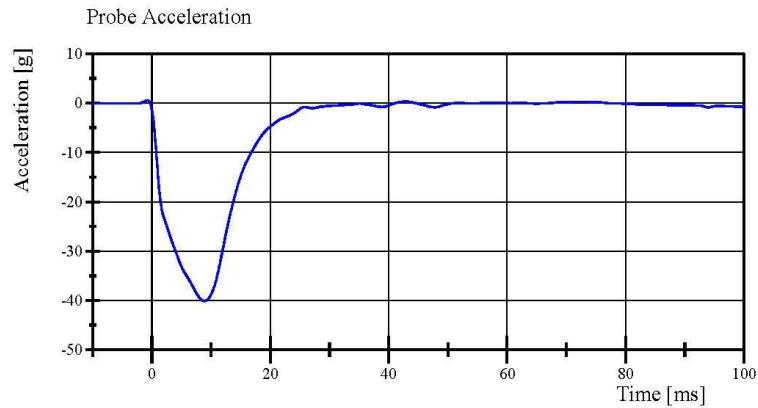


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 59-1

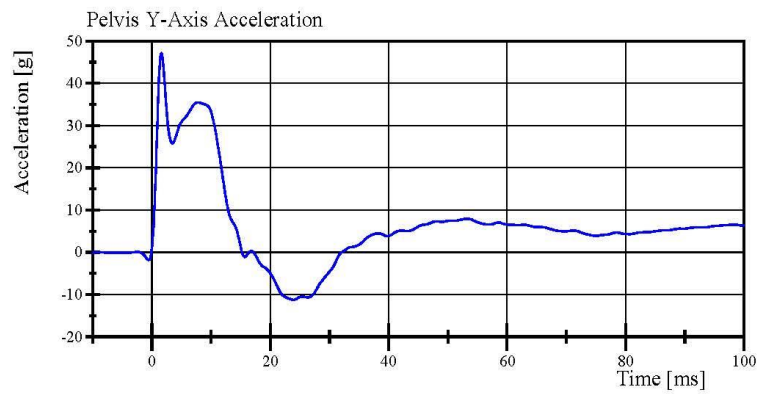
Test Date: 11/17/2017



Filter Class: CFC_180

Max: 0.6 g at -0.7 ms

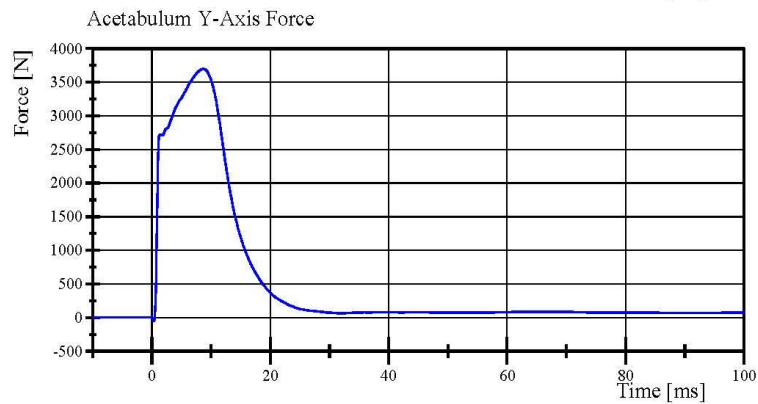
Min: -40.1 g at 8.8 ms



Filter Class: CFC_180

Max: 47.2 g at 1.6 ms

Min: -11.2 g at 23.9 ms



Filter Class: CFC_600

Max: 3,695.8 N at 8.6 ms

Min: -51.8 N at 0.3 ms

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

11.17.2017 08:42:35 433



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	28-Sep-2017
	Y		P66873	Endevco	26-Sep-2017
	Z		P91950	Endevco	26-Sep-2017
Redundant Head Accelerometers	X		P94566	Endevco	26-Sep-2017
	Y		P94429	Endevco	26-Sep-2017
	Z		P94483	Endevco	26-Sep-2017
Thoracic Rib Displacement Potentiometers	Upper	Y	111	Honeywell	26-Sep-2017
	Middle	Y	174	FTSS	26-Sep-2017
	Lower	Y	173	FTSS	26-Sep-2017
Abdomen Load Cells	Front	Y	1441	Denton	15-Mar-2017
	Middle	Y	1436	Denton	15-Mar-2017
	Rear	Y	1437	Denton	15-Mar-2017
Lower Spine Accelerometers (T12)	X		P89126	Endevco	25-Sep-2017
	Y		P87139	Endevco	25-Sep-2017
	Z		P64884	Endevco	25-Sep-2017
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	15-Mar-2017

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	T11432	Endevco	03-Oct-2017
				Y	P93774	Endevco	28-Sep-2017
				Z	P91566	Endevco	28-Sep-2017
Redundant Head Accelerometers				X	P91615	Endevco	28-Sep-2017
				Y	P93762	Endevco	28-Sep-2017
				Z	P93761	Endevco	28-Sep-2017
Displacement Potentiometers	Shoulder			N/A	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	28-Sep-2017	
		Middle	Y	037	Servo	28-Sep-2017	
		Lower	Y	1161	Servo	28-Sep-2017	
	Abdominal Rib	Upper	Y	1295	Servo	28-Sep-2017	
		Lower	Y	1136	Servo	28-Sep-2017	
Lower Spine Accelerometers (T12)				X	P94545	Endevco	28-Sep-2017
				Y	P94647	Endevco	28-Sep-2017
				Z	P94530	Endevco	28-Sep-2017
Acetabulum Load Cell				Y	DK7483S-FY	FTSS	28-Sep-2017
Iliac Wing Load Cell				Y	287-FY	Denton	28-Sep-2017
Pelvis Plug (struck side)					11148	SACO	15-Apr-2016
Pelvis Plug (non-struck side)					32473	FTSS	23-Sep-2010

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T11386	Endevco	3-Oct-2017
	Vehicle Center of Gravity	Y	T10658	Endevco	3-Oct-2017
	Vehicle Center of Gravity	Z	T10341	Endevco	3-Oct-2017
2	Right Sill at Front Seat	X	P87577	Endevco	9-Nov-2017
	Right Sill at Front Seat	Y	P91963	Endevco	9-Nov-2017
	Right Sill at Front Seat	Z	P91171	Endevco	9-Nov-2017
3	Right Sill at Rear Seat	X	P94541	Endevco	9-Nov-2017
	Right Sill at Rear Seat	Y	P91184	Endevco	9-Nov-2017
	Right Sill at Rear Seat	Z	P94424	Endevco	9-Nov-2017
4	Left Sill at Front Door	Y	P97720	Endevco	2-Oct-2017
5	Left Sill at Rear Door	Y	P73578	Endevco	13-Nov-2017
6	Left A-Post Lower	Y	P97877	Endevco	2-Oct-2017
7	Left A-Post Middle	Y	P97888	Endevco	2-Oct-2017
8	Left B-Post Lower	Y	P89124	Endevco	8-Nov-2017
9	B-Post Middle	Y	P94580	Endevco	8-Nov-2017
10	Front Seat Track	Y	P88038	Endevco	7-Aug-2017
11	Rear Seat Track or Structure	Y	P97889	Endevco	2-Oct-2017
12	Right Rear Occupant Compartment	Y	P41055	Endevco	13-Nov-2017
13	Engine Block	X	P94551	Endevco	13-Nov-2017
	Engine Block	Y	P87978	Endevco	13-Nov-2017
14	Rear Floorpan Above Axle	X	P51716	Endevco	27-Sep-2017
	Rear Floorpan Above Axle	Y	P75154	Endevco	14-Sep-2017
	Rear Floorpan Above Axle	Z	P93518	Endevco	2-Oct-2017

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P97718	Endevco	26-Sep-2017
MDB Center of Gravity	Y	P97724	Endevco	26-Sep-2017
MDB Center of Gravity	Z	P97715	Endevco	26-Sep-2017
Left Frame Rail at Rear Axle Centerline	X	P97729	Endevco	26-Sep-2017
Left Frame Rail at Rear Axle Centerline	Y	P97876	Endevco	26-Sep-2017