FINAL REPORT NUMBER: SINCAP-TRC-16-002

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

Ford Motor Company
2016 Ford F-250 SuperCab Pickup Truck
NHTSA NUMBER: M20160204

PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319

Report Date: December 7, 2015

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave, SE, Room W43-410
Washington, D.C. 20590

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Melinda Lackey, Project Manager

Approval Date: December 7, 2015

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date:

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

Date:

Technical Report Documentation Page

1. Report No. SINCAP-TRC-16-002	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 2016 Ford F-250 SuperCab Pickup Truck, NHTSA No.: M20160204		5. Report Date December 7, 2015 6. Performing Organization Code TRC Inc.
7. Author(s) Melinda Lackey, Project Manager		8. Performing Organization Report Number 151023
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 (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report October 23, 2015 – December 7, 2015 14. Sponsoring Agency Code NRM-110
15. Supplemental Notes		

16. Abstract

This 55 / 28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2016 Ford F-250 SuperCab Pickup Truck, 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 October 23, 2015.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.08 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 20° C. The target vehicle post-test maximum crush was 314 mm at Level 1. The test vehicle's performance was as follows:

Driver ATD (ES-2re)

Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	32
Maximum Thoracic Rib Deflection	mm	44	20.5
Total Abdominal Force	N	2500	254.4
Pubic Symphysis Force	N	6000	868.6

Passenger ATD (SID-IIs)

Measurement Description	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	87
Lower Spine Resultant Acceleration	g's	82	25.3
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	789.3
Maximum Thoracic Rib Deflection	mm	38*	14.1
Maximum Abdominal Rib Deflection	mm	45*	25.3

* Proposed IARV

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 213	22. Price

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TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test was conducted as part of the MY 2016 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00354. The purpose of this test is to generate comparative side impact performance in a 2016 Ford F-250 SuperCab Pickup Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A 2016 Ford F-250 SuperCab Pickup Truck 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 62.08 km/h (38.57 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on October 23, 2015. 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 September 2013. 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.

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	32
Maximum Thoracic Rib Deflection	mm	44	20.5
Combined Abdominal Force	N	2500	254.4
Pubic Symphysis Force	N	6000	868.6

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/A	1000	87
Lower Spine (T12) Resultant Acceleration	G	82	25.3
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	789.3
Maximum Thoracic Rib Deflection	mm	38*	14.1
Maximum Abdominal Rib Deflection	mm	45*	25.3

* 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	N/A	No	N/A
Seat Belt Load Limiter	Yes	N/A	No	N/A
Other	N/A	N/A	N/A	N/A

GENERAL COMMENTS

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

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20160204
Model Year	2016
Make	Ford
Model	F-250
Body Style	Extended Cab Pickup Truck
VIN	1FT7X2A62GEA02841
Body Color	Caribou
Odometer Reading (km/mi)	15.0 mi
Engine Displacement (L)	6.2
Type/No. Cylinders	Gas/8
Engine Placement	Front/Longitudinal
Transmission Type	Automatic
Transmission Speeds	6 Speed
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	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	No
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 Company
Date of Manufacture	05/15
Vehicle Type	Truck

GVWR (kg)	4536
GAWR Front (kg)	1860
GAWR Rear (kg)	2812

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				1576
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)[1]				1235.8

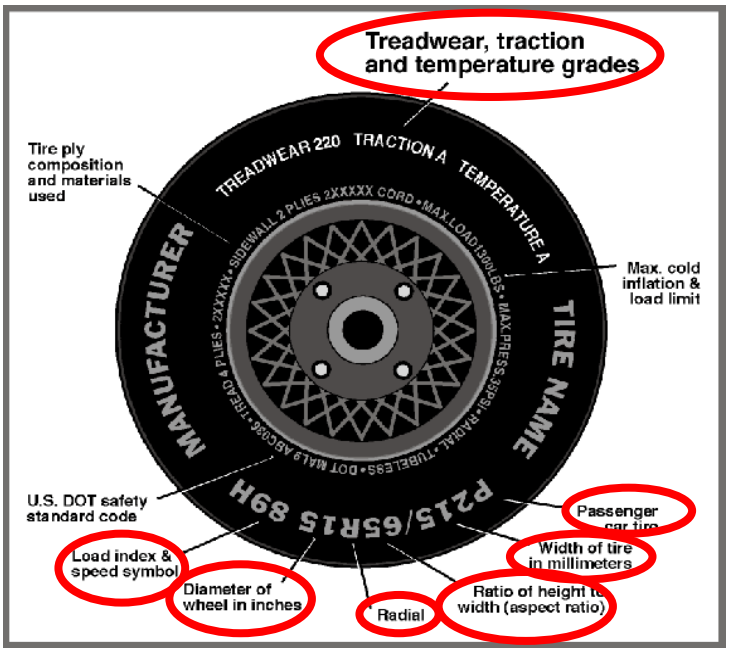
VEHICLE SEAT TYPE

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

[1] Rated cargo and luggage weight is limited to 136.0 kg or 300 lbs.

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

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	550	550
Cold Pressure (kPa)	420	520
Recommended Tire Size	LT275/65R18	LT275/65R18
Tire Size on Vehicle	LT275/65R18	LT275/65R18
Tire Manufacturer	Continental	Continental
Tire Model	Contitrac	Contitrac
Treadwear	N/A	N/A
Traction	N/A	N/A
Temperature Grades	N/A	N/A
Tire Plies Sidewall	2	2
Tire Plies Body	6	6
Load Index/Speed Symbol	123/120 S	123/120 S
Tire Material	Polyester, steel & polyamide	Polyester, steel & polyamide
DOT Safety Code Left	A3B9 HOOR 0615	A3B9 HOOR 0715
DOT Safety Code Right	A3B9 HOOR 0715	A3B9 HOOR 0715

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

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	469	496	469	489
Tire Placard	kPa	420	420	520	520
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	420	420	520	520

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	207	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	804.2	665.2		868.2	770.0		860.4	773.4	
Right	kg	819.6	618.0		810.0	713.0		829.0	705.4	
Ratio	%	55.9	44.1		53.1	46.9		53.3	46.7	
Totals	kg	1623.8	1283.2	2907.0	1678.2	1483.0	3161.2	1689.4	1478.8	3168.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2907.0	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	125.0	(B)
Rated Cargo/Luggage Weight (RCLW) [1]	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	3168.0	(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	937	931	Yes
RF	mm	946	944	Yes
RR	mm	1005	1004	Yes
LR	mm	990	990	Yes
Vehicle CG (Aft of Front Axle)	mm	1690	1698	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	+27	+32	

***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".

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: 82.6 kg steel plate in bed	82.6
Removed: None.	0.0

[1] RCLW is limited to 136.0 kg

DATA SHEET NO. 2

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

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

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	22.0	11.3	16.6
Front Passenger Seat	21.5	10.6	16.0
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	N/A
Non-Struck Side Rear Seat	Fixed	N/A	N/A
Rear Center Seat*	Fixed	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	16.6	366	Max	423	426	430
			Mid	392	396	400
			Min	362	366	370
Front Passenger Seat	16.0	355	Max	411	413	415
			Mid	381	385	388
			Min	352	355	357
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	9.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	9.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	9.3	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

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

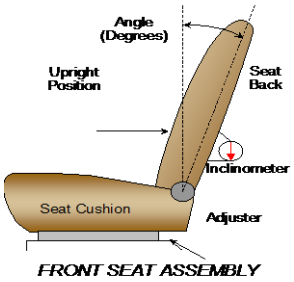
Test Vehicle: 2016 Ford F-250 SuperCrabPickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	215	N/A	107	N/A
Front Passenger Seat	214	N/A	107	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

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	60.5	N/A	27.0	N/A
Front Passenger Seat	61.4	N/A	27.0	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

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, Uppermost
Rear Seat	1, Fixed	1

HEAD RESTRAINT ADJUSTMENT

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

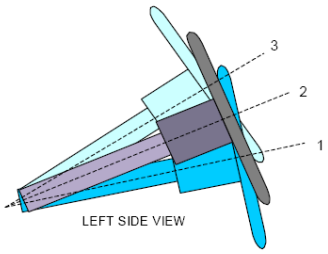
	Total # of Positions	Placed in Position #
Driver Seat	3, Numbered from 0 to 2	0, Uppermost
Rear Seat	1, Fixed	1

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

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

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.

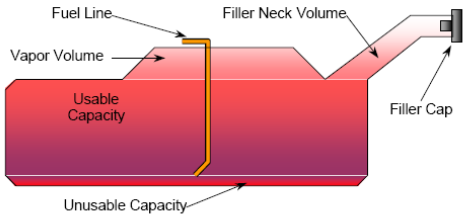


STEERING COLUMN ASSEMBLY

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	62.9	300
Geometric Center, Position No. 2	64.8	300
Uppermost, Position No. 3	66.7	300
Telescoping Steering Wheel Travel		24
Test Position	64.8	312

FUEL PUMP

Pump operates a few seconds after ignition switch is turned ON. After that, pump operates only while engine is running.



VEHICLE FUEL TANK ASSEMBLY

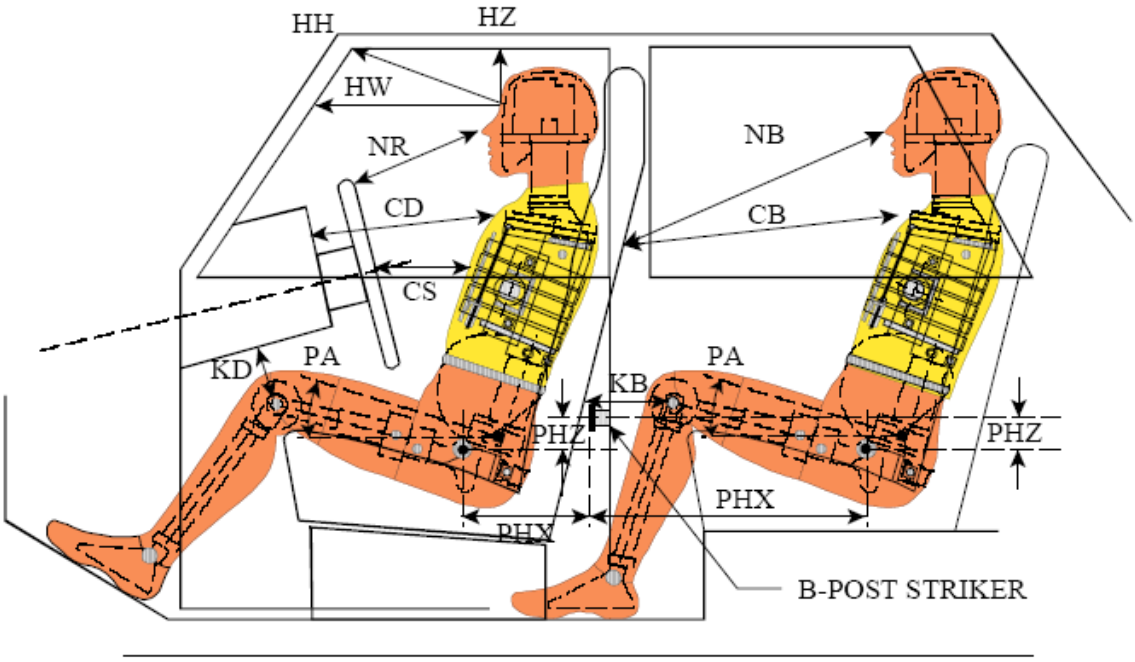
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	132.5
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	132
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	123.2
Actual Amount of Solvent Used in Test	123.2
1/3 of Usable Capacity	41.1

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



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

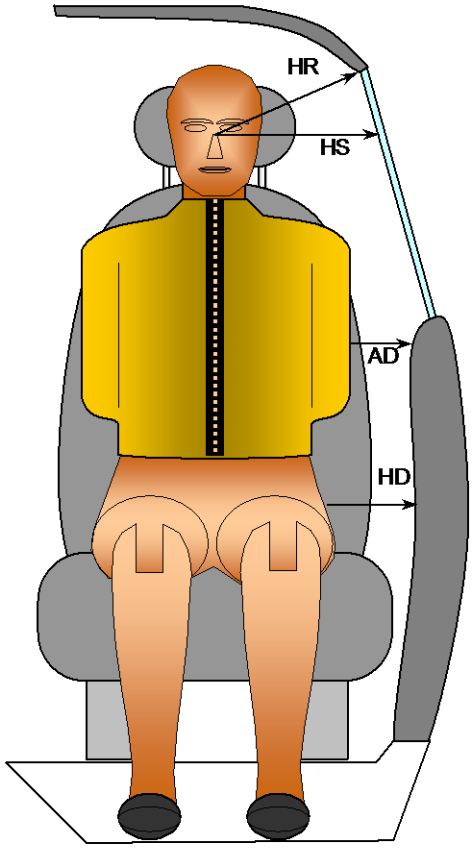
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	495			
HW		Header to Windshield	653			
HZ	HZ	Head to Roof Liner	197		277	
NR	NB	Nose to Rim/Seat Back	453		336	
CD	CB	Chest to Dash/Seat Back	598		330	
CS		Chest to Steering Wheel	381			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	176	27.0	112	18.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	190	22.0	112	18.0
PAX°	PAX°	Pelvic Tilt Angle X		0.5		0.5
	PAY°	Pelvic Tilt Angle Y				14.1
PHX	PHX	Hip Point to Striker (X-Axis)	330		428	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	-24		-34	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

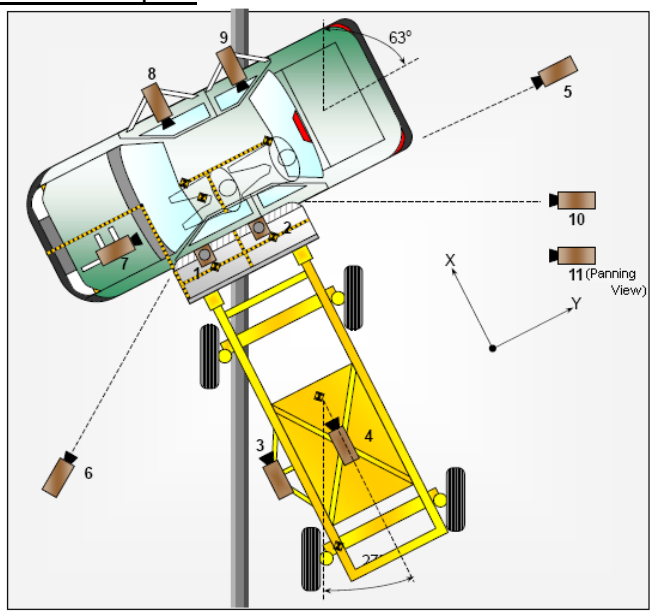


FRONT VIEW OF DUMMY

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	208	230
HS	Head to Side Window	mm	309	247
AD	Arm to Door	mm	138	128
HD	H-Point to Door	mm	233	167

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	110	850	-5741	8.5	1000
2	Overhead Close-up	110	470	-5741	25	1000
3	Left Impact Point (MDB)	-1750	-870	-833	12.5	1000
4	Side Overall (MDB)	-2432	0	-1438	8.5	1000
5	Rear	-95	7982	-1221	20	1000
6	Left Front	-2139	-3571	-1259	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.

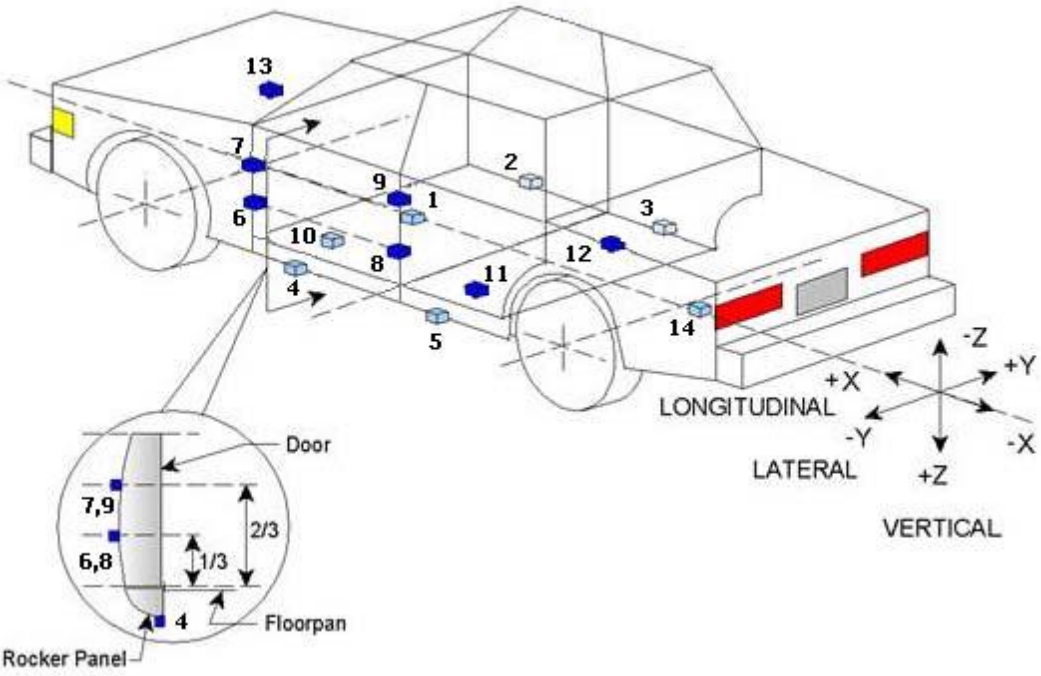
If applicable, explain why camera(s) did not operate as intended:

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MBD Accelerometers	7
TOTAL	62

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



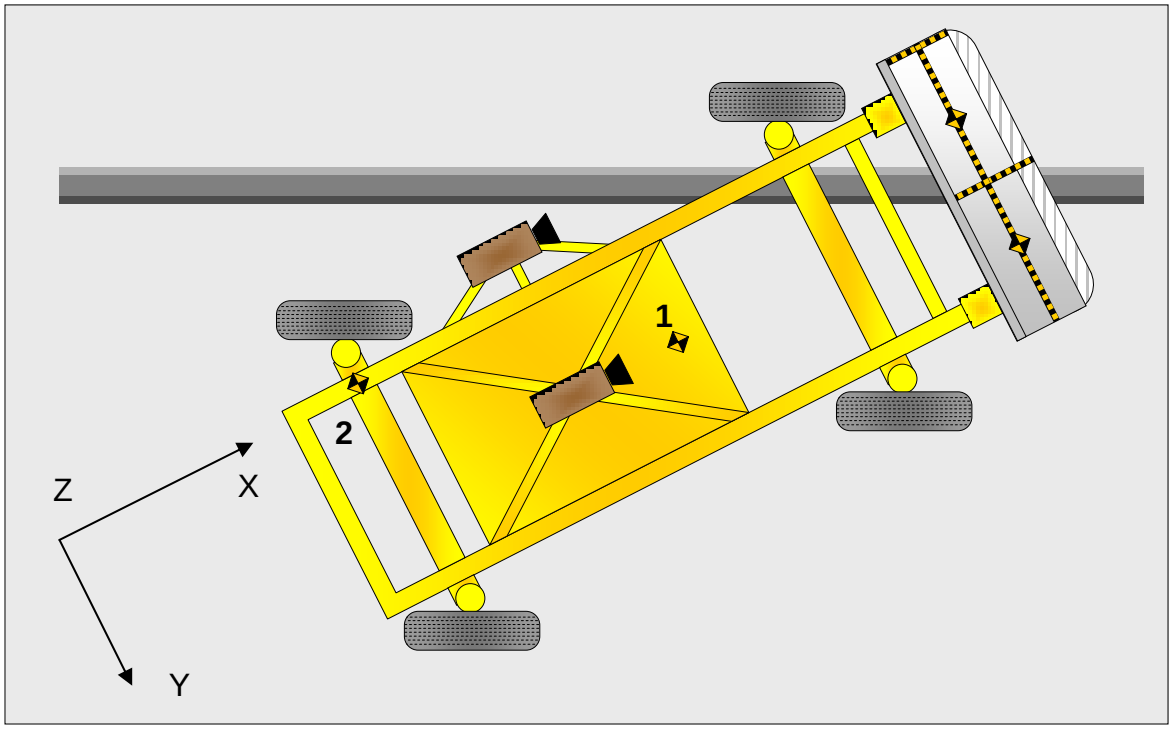
TEST VEHICLE ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3888	196	-719
2	Right Sill at Front Seat	3693	725	-614
3	Right Sill at Rear Seat	2951	725	-618
4	Left Sill at Front Door	3982	-725	-585
5	Left Sill at Rear Door	2941	-725	-618
6	A-Post Lower	4223	-875	-742
7	A-Post Middle	4243	-875	-1115
8	B-Post Lower	3094	-865	-874
9	B-Post Middle	3110	-863	-1155
10	Front Seat Track	3407	-690	-750
11	Rear Seat Structure	2759	-595	-650
12	Right Rear Occ. Compartment	2800	535	-673
13	Engine Block	4108	290	-1068
14	Rear Above Axle	1153	0	-765

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



MDB ACCELEROMETER LOCATIONS

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

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST TEST DOOR PERFORMANCE

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

POST TEST SEAT PERFORMANCE

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	N/A No B-Pillar
Sill Separation	None Visible
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	Parking brake disengaged

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

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	N/A	No	N/A
Seat Belt Load Limiter	Yes	N/A	No	N/A
Other	N/A	N/A	N/A	N/A

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3620
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		530
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact point	-22
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact point	-9

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

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	1096

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	415.0	272.8	687.8
Right	kg	374.0	305.8	679.8
Ratio	%	57.7	42.3	100
Totals	kg	789.0	578.6	1367.6

SPEED AND IMPACT ANGLE DATA

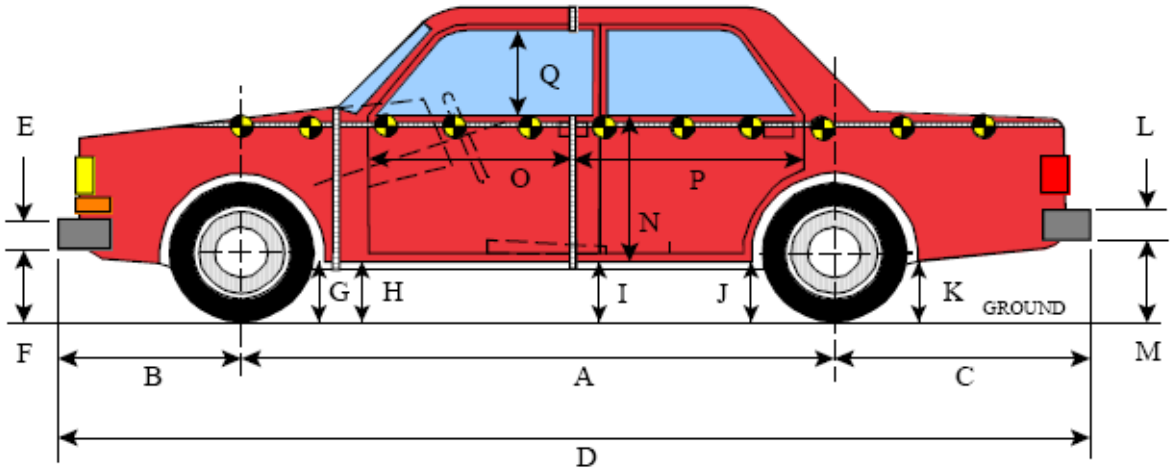
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.08
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.10
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Left	40
B	Top of Bumper	533	800	Right	123
C	Mid-Level	686	700	Right	385
D	Top of Stack	813	800	Right	263

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



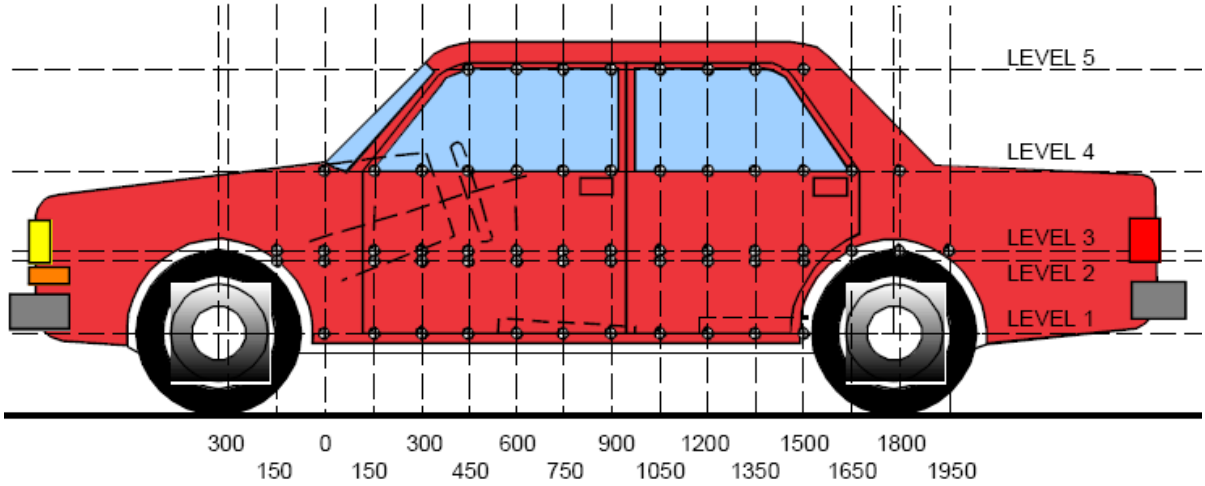
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3620	3590	30
B	Front Axle to Front Surface of Vehicle	995	970	25
C	Rear Axle to Rear Surface of Vehicle	1330	1330	0
D	Total Length at Centerline	5945	5923	22
E	Front Bumper Thickness	215	215	0
F	Front Bumper Bottom to Ground	390	384	6
G	Sill Height at Front Wheel Well	461	491	-30
H	Sill Height at Front Door Leading Edge	464	537	-73
I	Sill Height at B-Pillar	464	513	-49
J1	Sill Height at Rear Wheel Well	530	466	64
J2	Pinch Weld Height at Rear Wheel Well	403	566	-163
K	Sill Height Aft of Rear Wheel Well	592	630	-38
L	Rear Bumper Thickness	200	200	0
M	Rear Bumper Bottom to Ground	507	544	-37
N	Sill Height to Window Bottom Sill	900	888	12
O	Front Door Leading Edge to Impact CL	725	740	-15
P	Rear Door Trailing Edge to Impact CL	1105	1050	55
Q	Front Window Opening	537	537	0
R	Right Side Length	5805	5800	5
S	Left Side Length	5805	5830	-25
T	Vehicle Width	2034	2025	9
	Maximum Vehicle Width at B-Pillars	2034	2025	9

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance From Impact
1	Sill Top	577	314	1200
2	Driver Hip Point	973	160	1650
3[1]	Mid-Door	855	194	1650
4	Window Sill	1193	58	1500
5[2]	Window Top	1861	243	900

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

[1] A maximum exterior static crush of 194 was achieved at three locations; 750, 1050 and 1650.

[2] A maximum exterior static crush of 243 was achieved at two locations; 750 and 900.

DATA SHEET NO. 11 (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

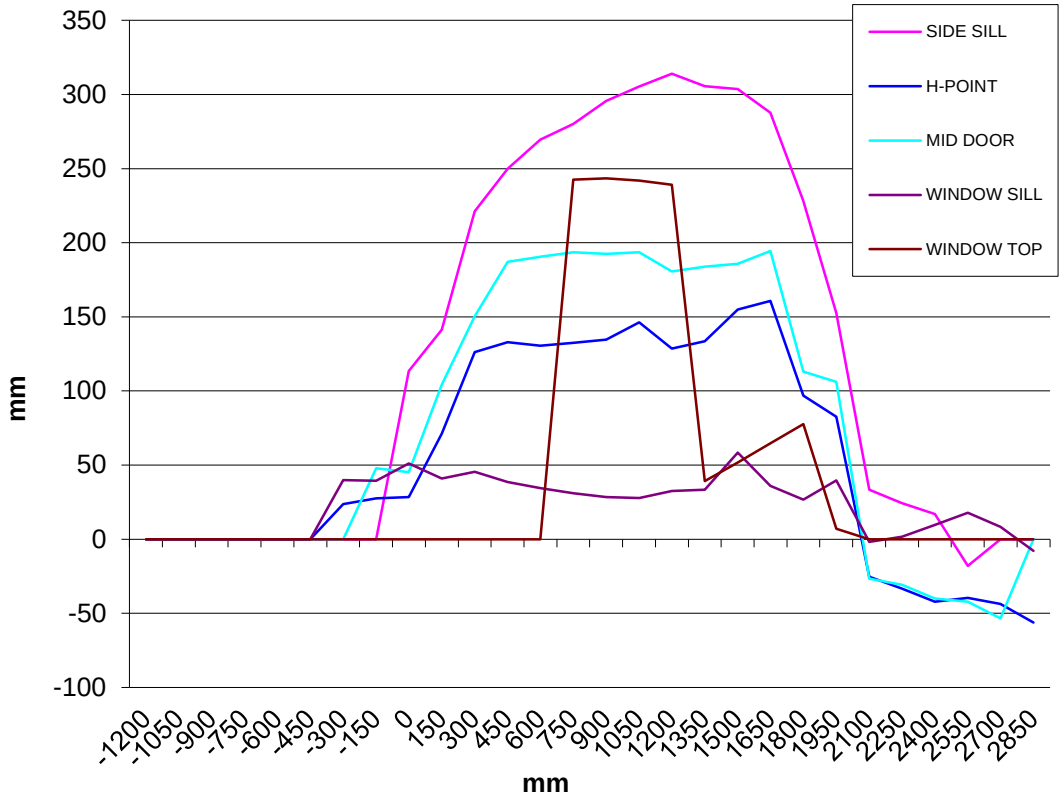
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-300	0	31	0	17	0	0	-4	0	-22	0	0	24	0	39	0
-150	0	24	30	16	0	0	-16	-18	-23	0	0	28	48	39	0
0	-5	13	13	21	0	-119	-58	-32	-30	0	114	29	45	51	0
150	4	13	8	18	0	-137	-110	-96	-23	0	141	71	104	41	0
300	4	16	9	13	0	-217	-116	-142	-32	0	221	126	151	45	0
450	4	17	10	9	0	-246	-113	-177	-29	0	250	133	187	38	0
600	4	18	10	6	0	-265	-115	-180	-28	0	269	131	190	34	0
750	5	18	11	3	255	-275	-117	-183	-28	12	280	133	194	31	243
900	6	18	11	0	250	-289	-129	-182	-29	7	295	135	193	29	243
1050	8	17	11	-3	247	-297	-112	-183	-31	5	305	146	194	28	242
1200	10	17	10	-5	244	-304	-116	-171	-37	5	314	129	181	32	239
1350	11	18	10	-4	241	-294	-137	-174	-38	202	305	134	184	34	39
1500	15	18	10	-4	240	-289	-142	-176	-62	188	304	155	186	58	52
1650	16	18	10	-4	239	-272	-79	-184	-40	174	288	160	194	36	65
1800	17	17	9	-4	238	-211	-70	-104	-31	161	228	96	113	27	77
1950	19	13	6	-1	245	-133	26	-100	-41	238	152	83	106	40	7
2100	32	1	-8	10	0	-1	32	18	12	0	33	-25	-26	-2	0
2250	32	-1	-7	11	0	7	42	23	9	0	25	-33	-30	2	0
2400	32	-1	-8	11	0	15	39	32	2	0	17	-43	-40	9	0
2550	19	-1	-2	13	0	37	58	41	-5	0	-18	-40	-43	18	0
2700	0	14	16	15	0	0	74	70	6	0	0	-44	-54	9	0
2850	0	18	0	16	0	0	-4	0	24	0	0	-56	0	-8	0

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

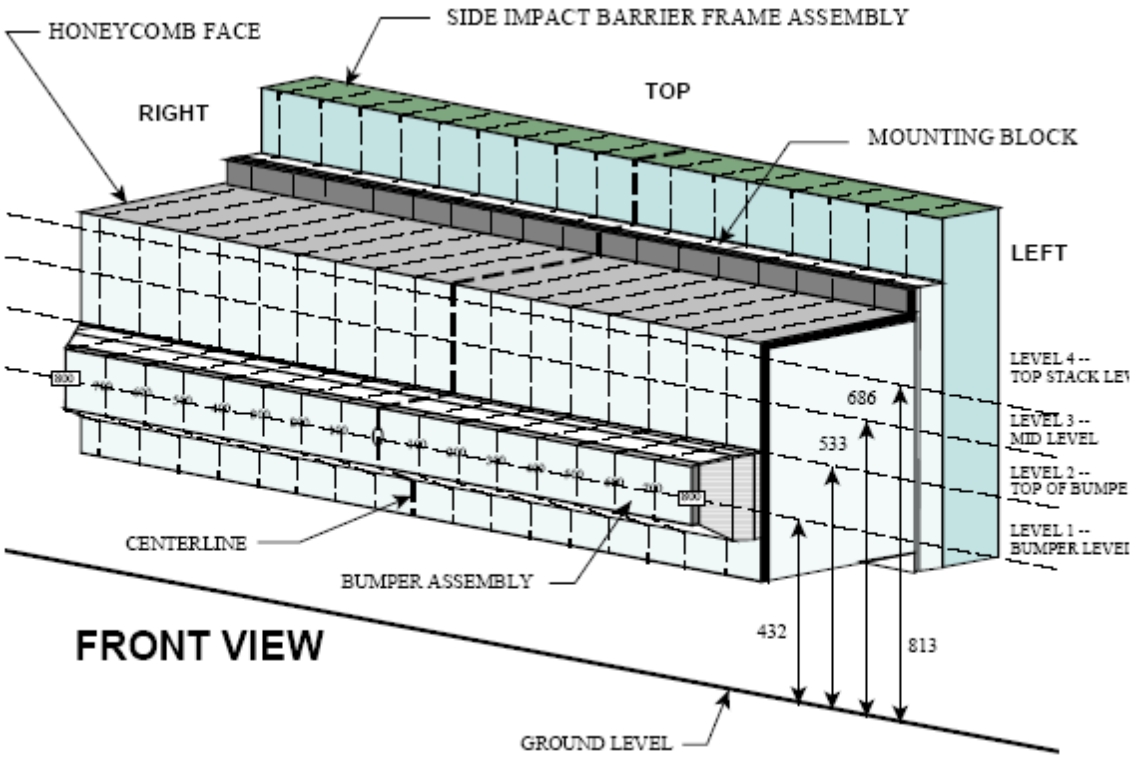
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	263	226	185	160	182	185	161	153	145	137	143	140	149	161	180	202	228
2	123	81	48	39	28	--[1]	--[1]	--[1]	--[1]	25	25	30	34	39	46	61	83
3	385	385	134	105	125	106	78	69	69	75	81	85	93	103	122	139	170
4	263	226	185	160	182	185	161	153	145	137	143	140	149	161	180	202	228

[1] Missing points.

DATA SHEET NO. 13

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204
Test Program: NCAP Side Impact Test Date: 10/23/15

Test Time: 17:09 **Temperature:** 20.7°C

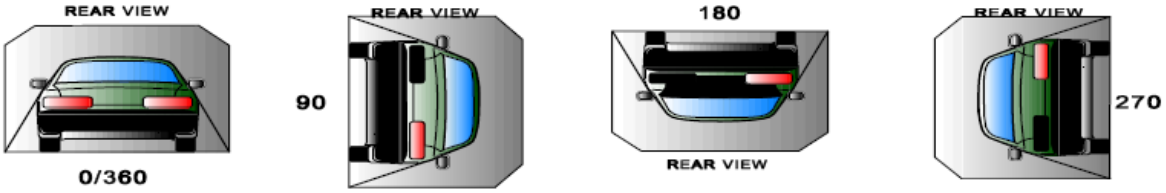
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

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

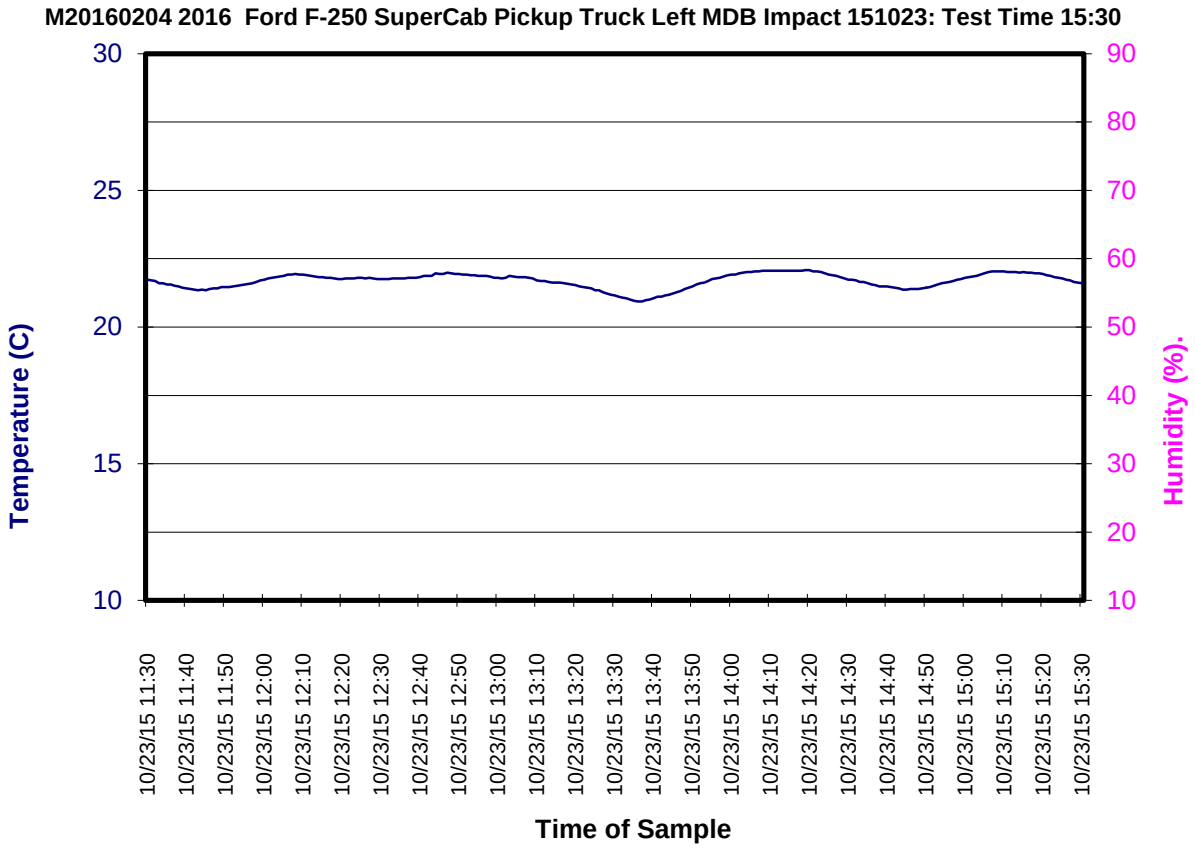
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 14[1]

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2016 Ford F-250 SuperCab Pickup Truck NHTSA No.: M20160204

Test Program: NCAP Side Impact Test Date: 10/23/15



[1] The humidity was not recorded for this test.

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

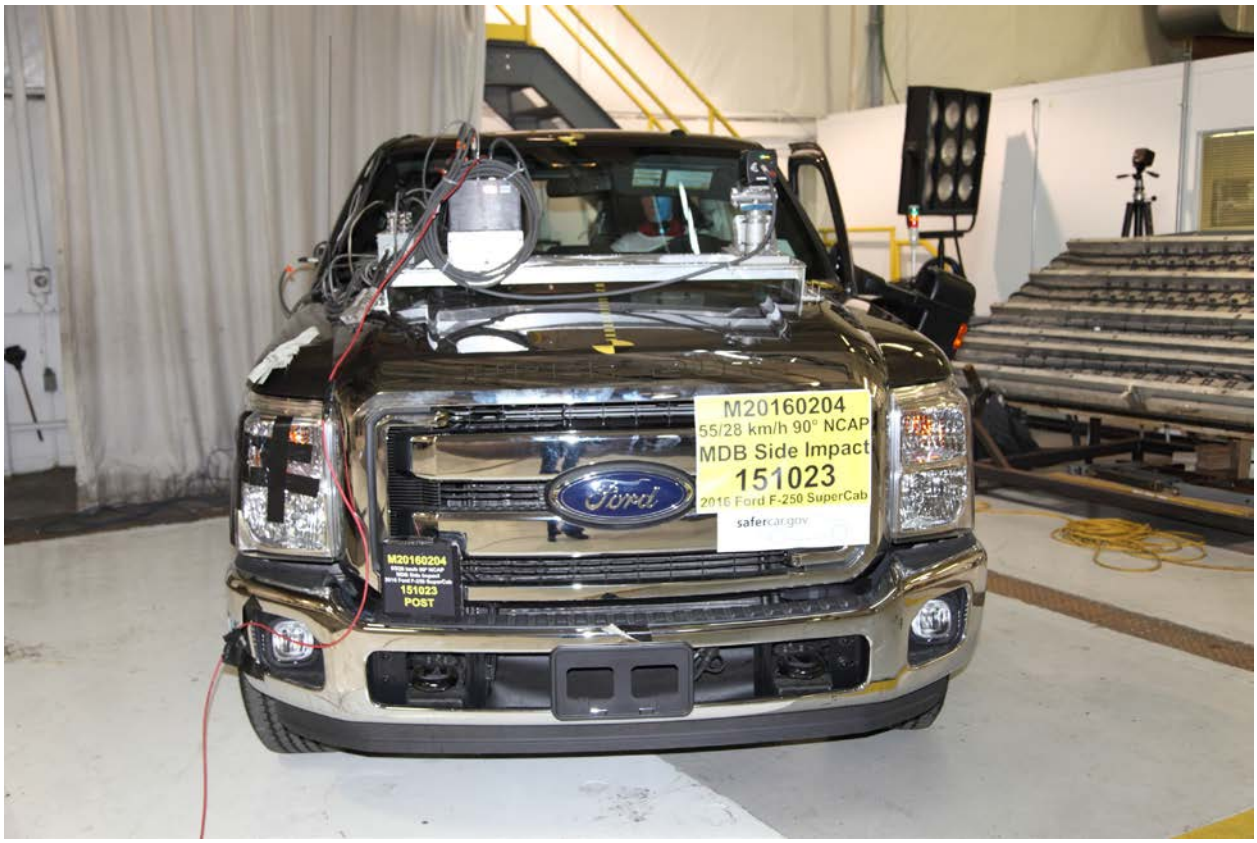
TABLE OF PHOTOGRAPHS (CONTINUED)

TABLE OF PHOTOGRAPHS (CONTINUED)

001 As-Delivered Right Front ¾ View of Test Vehicle

002 As-Delivered Left Rear ¾ View of Test Vehicle

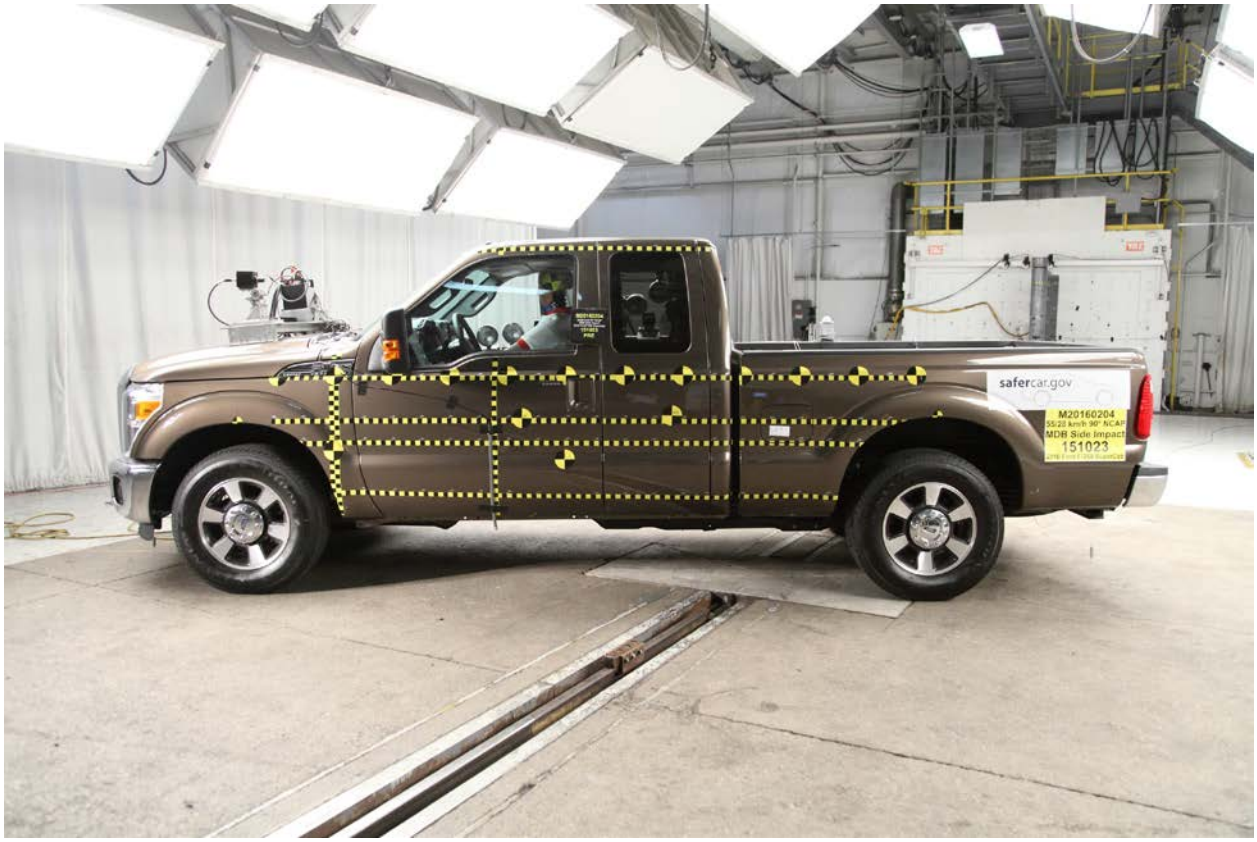
003 Pre-Test Front View of Test Vehicle



004 Post-Test Front View of Test Vehicle

005 Pre-Test Left Front ¾ View of Test Vehicle

006 Post-Test Left Front ¾ 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 ¾ View of Test Vehicle

010 Post-Test Left Rear ¾ View of Test Vehicle

011 Pre-Test Rear View of Test Vehicle

012 Post-Test Rear View of Test Vehicle

013 Pre-Test Right Side View of Test Vehicle

014 Post-Test Right Side View of Test Vehicle

015 Pre-Test Overhead View of Test Area

016 Post-Test Overhead View of Test Area

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

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

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

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

021 Pre-Test Left Front Door Latch Close-up

022 Post-Test Left Front Door Latch Close-up

023 Pre-Test Left Rear Door Latch Close-up

024 Post-Test Left Rear Door Latch Close-up

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

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

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

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

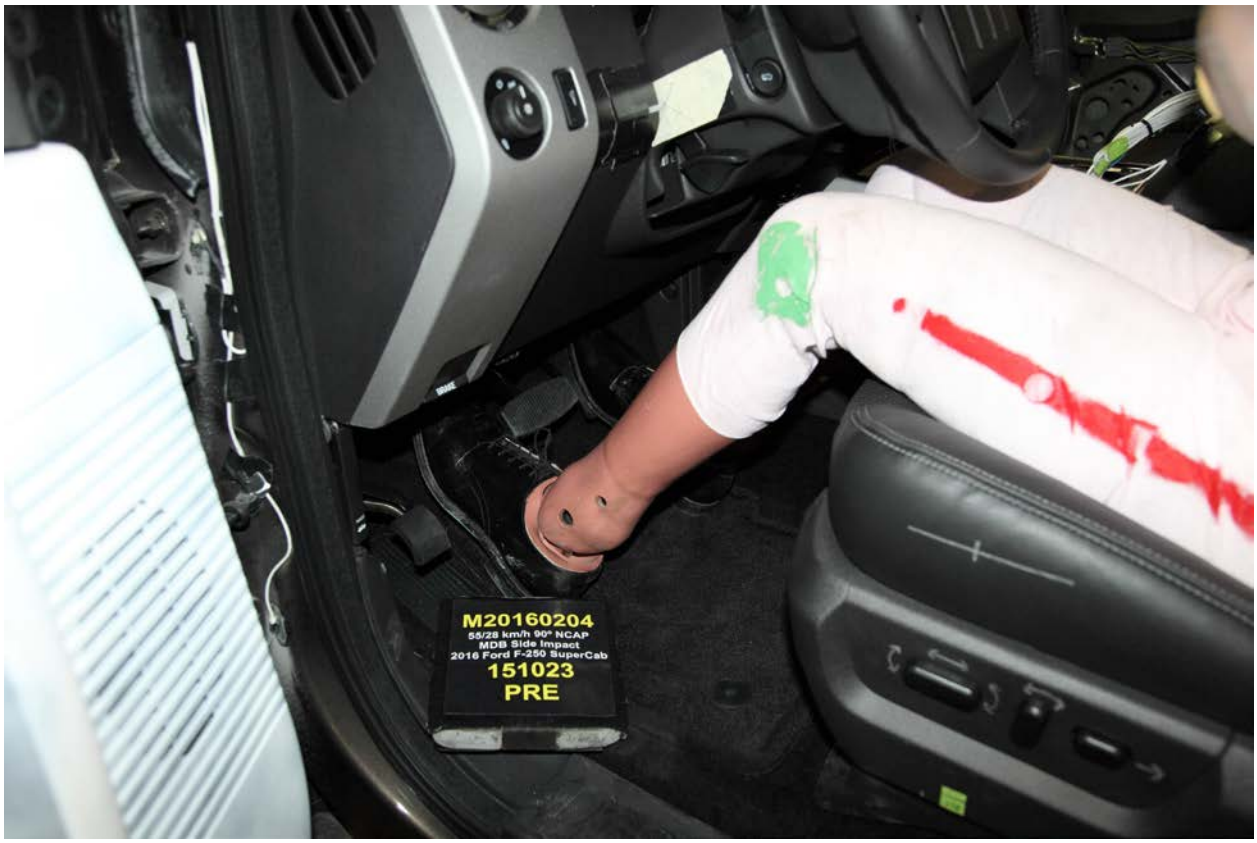
029 Post-Test Left Side View of Driver Dummy Shoulder and Door Top

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

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

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

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



034 Pre-Test Placement of Driver Dummy Feet

035 Pre-Test View of Belt Anchorage for Driver Dummy

036 Pre-Test Left Side View of Steering Wheel

037 View of Disengaged Parking Brake

038 Pre-Test View of Parking Brake

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

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

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

042 Pre-Test Driver Dummy and Door Clearance View

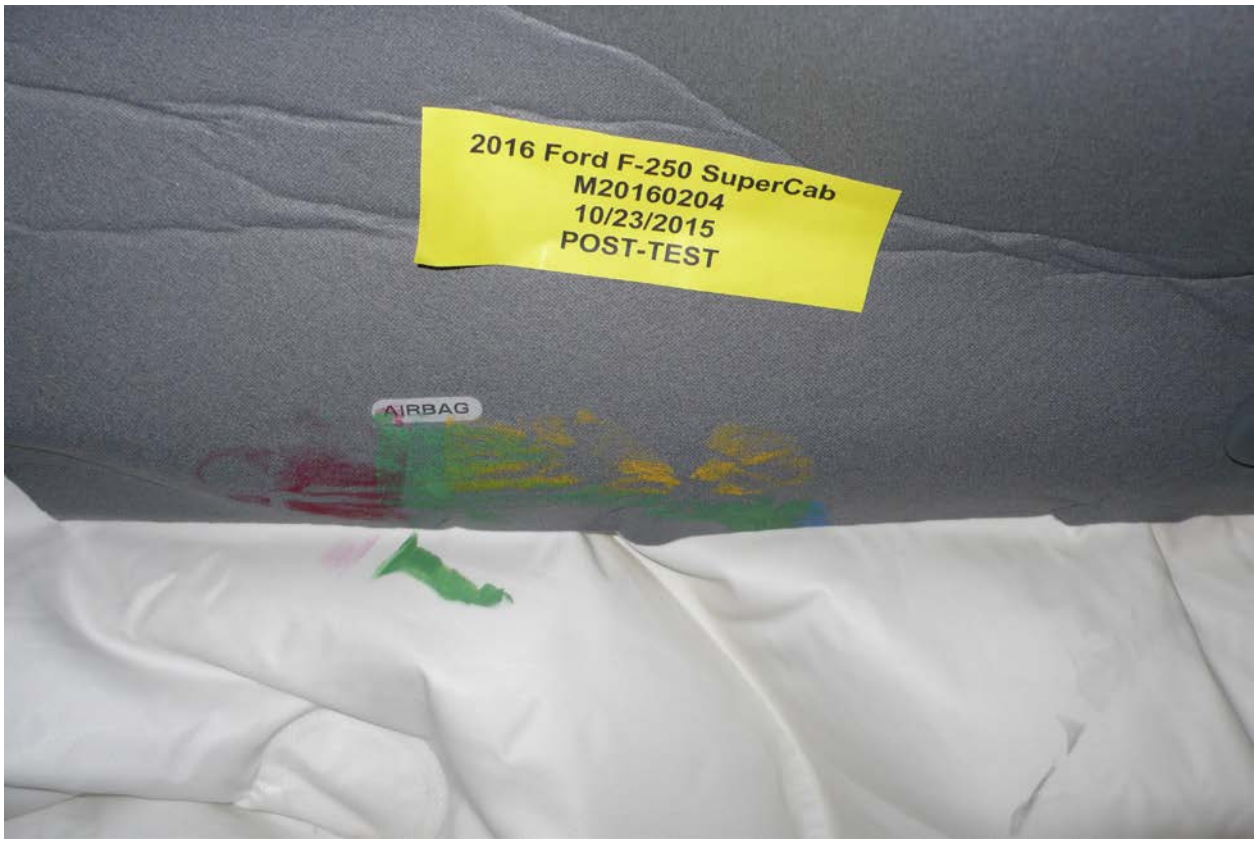
043 Post-Test Driver Dummy and Door Clearance View

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

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



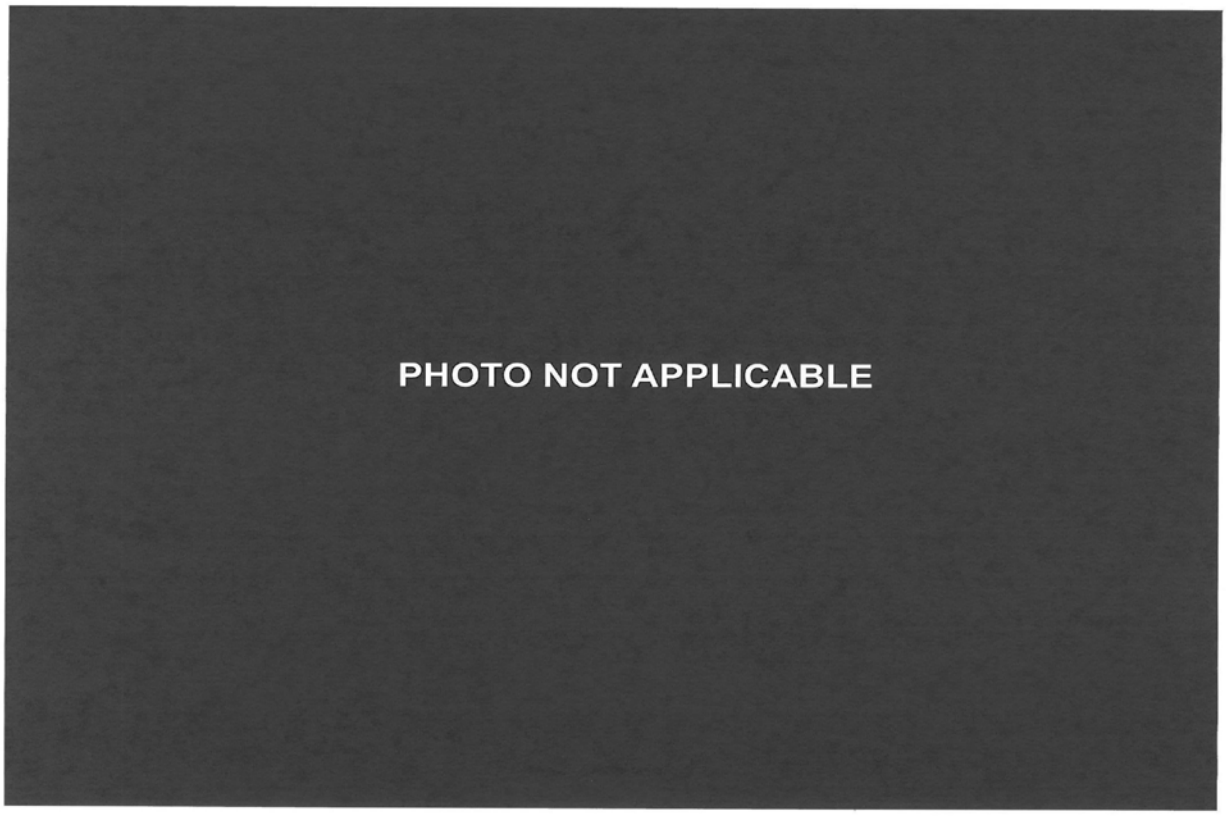
048 Post-Test Driver Dummy Close-Up Head Contact with Vehicle View

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

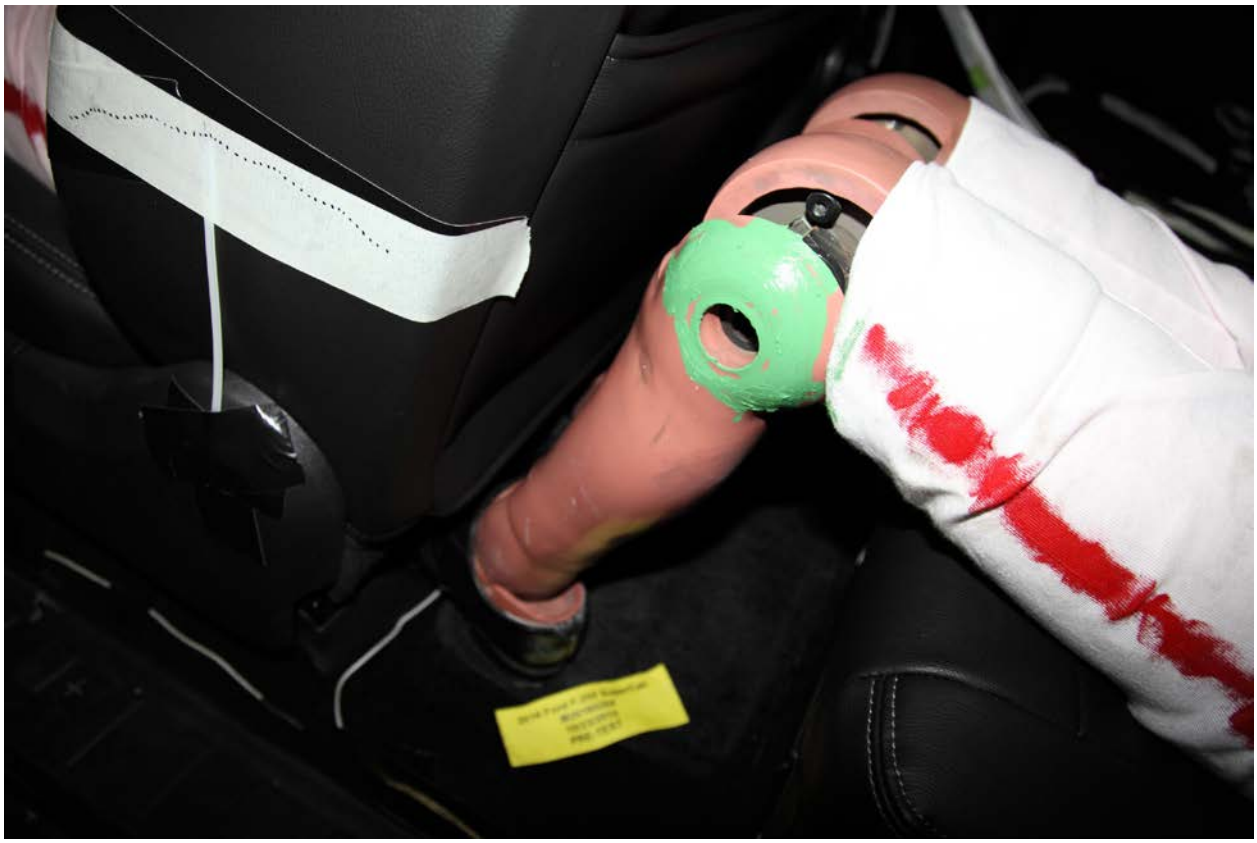
059 Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

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 Neck Showing Position of Adjustable Neck Bracket

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

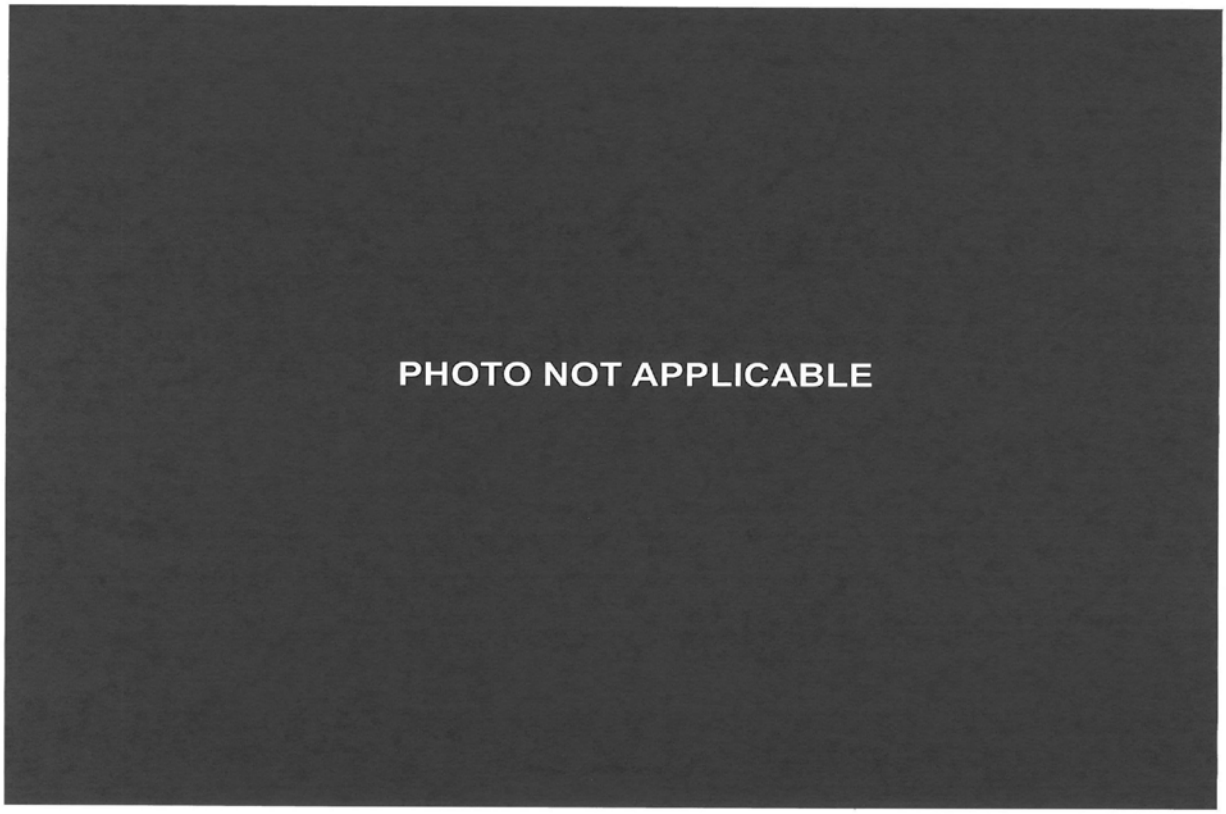


064 Pre-Test Placement of Rear Passenger Dummy Feet

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

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

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



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

069 Pre-Test Passenger Dummy and Door Clearance View

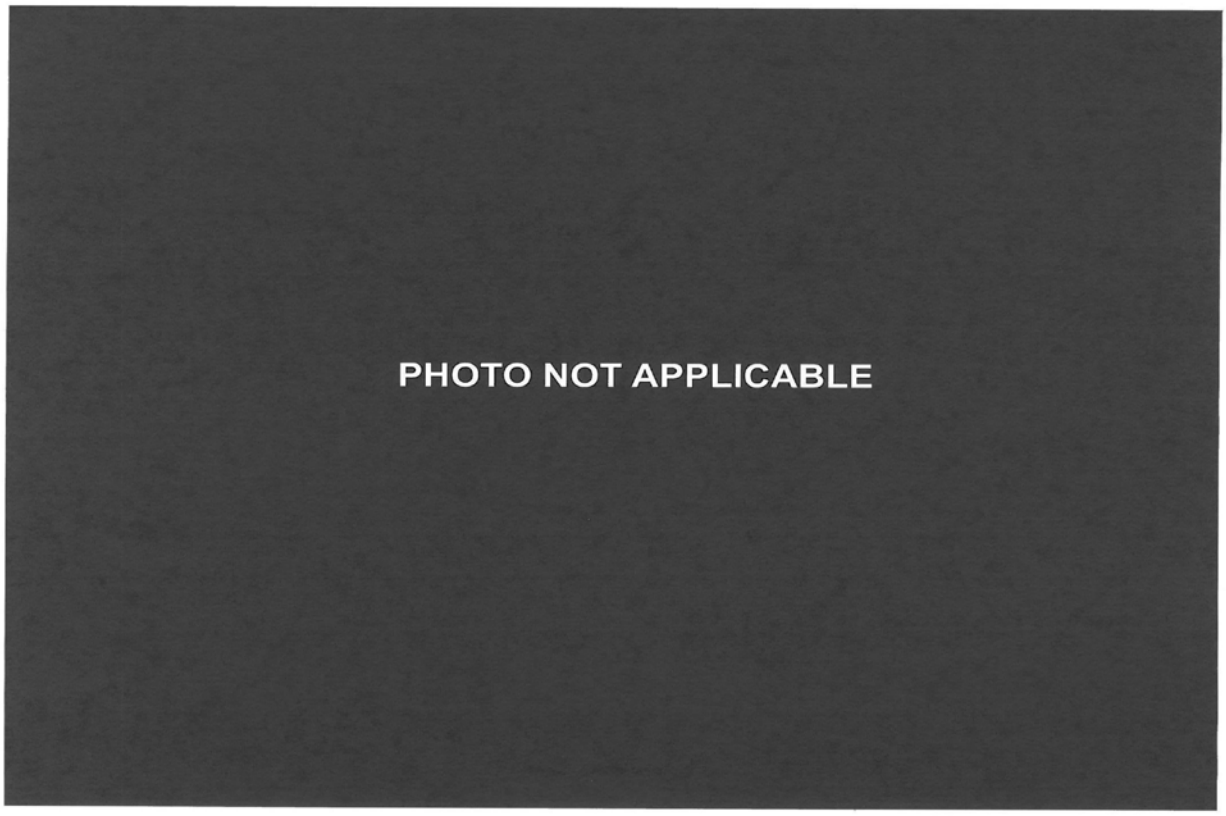
070 Post-Test Passenger Dummy and Door Clearance View

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

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

073 Pre-Test Passenger Inner Door Panel View

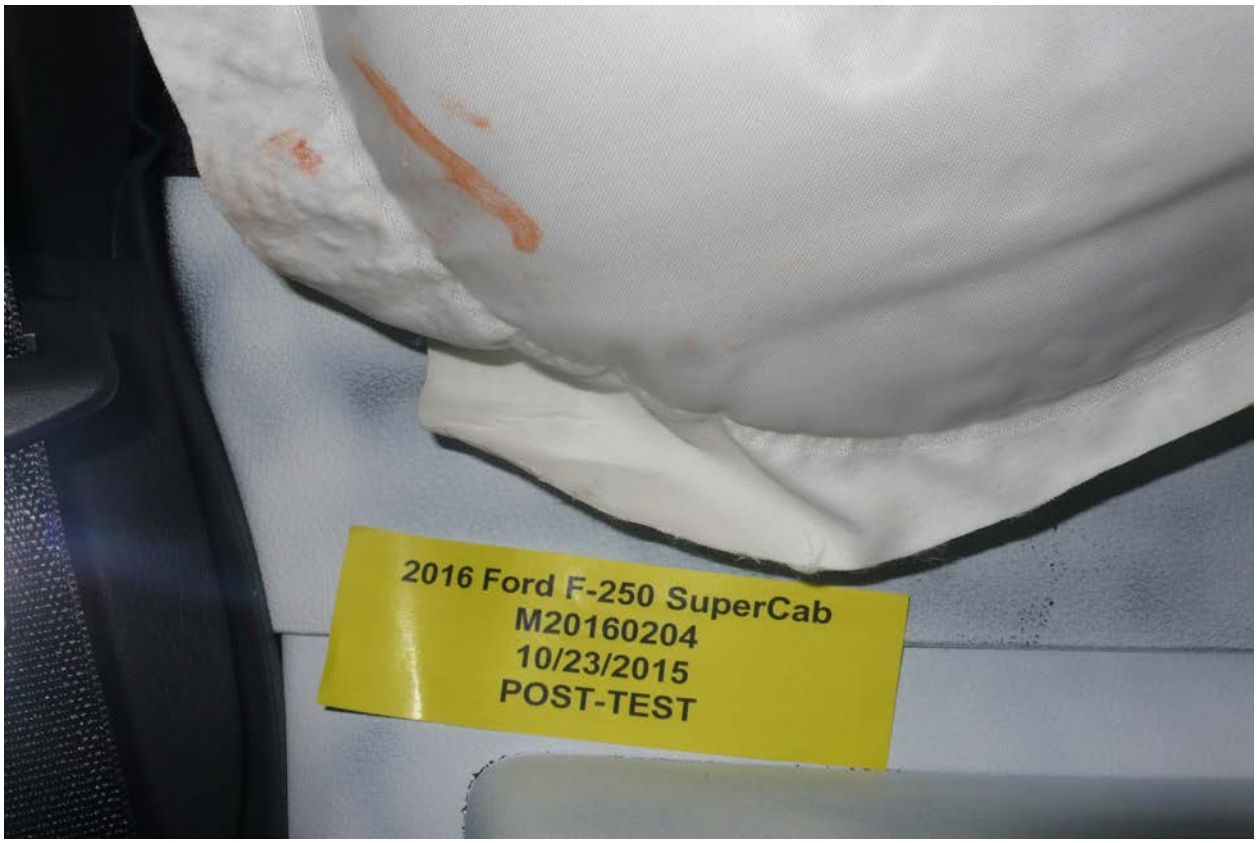
074 Post-Test Passenger Inner Door Panel View Showing



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

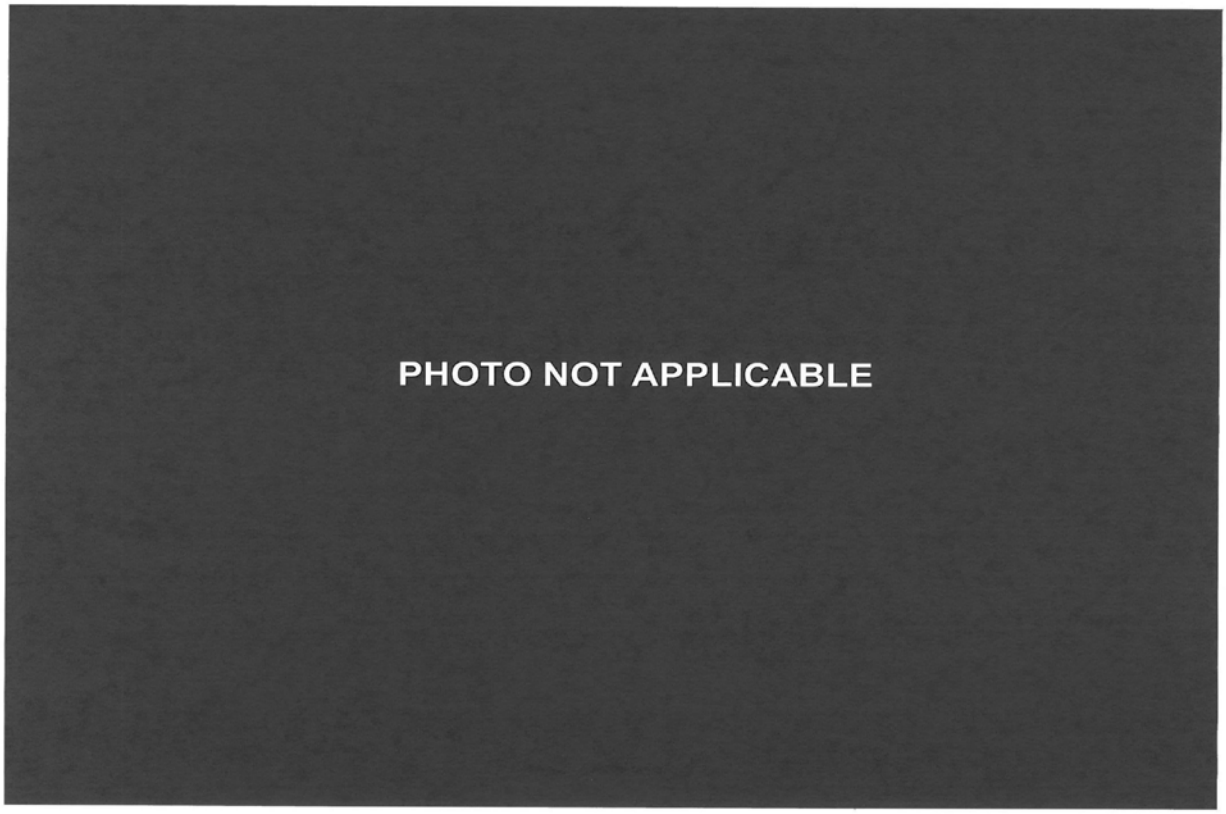
076 Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

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



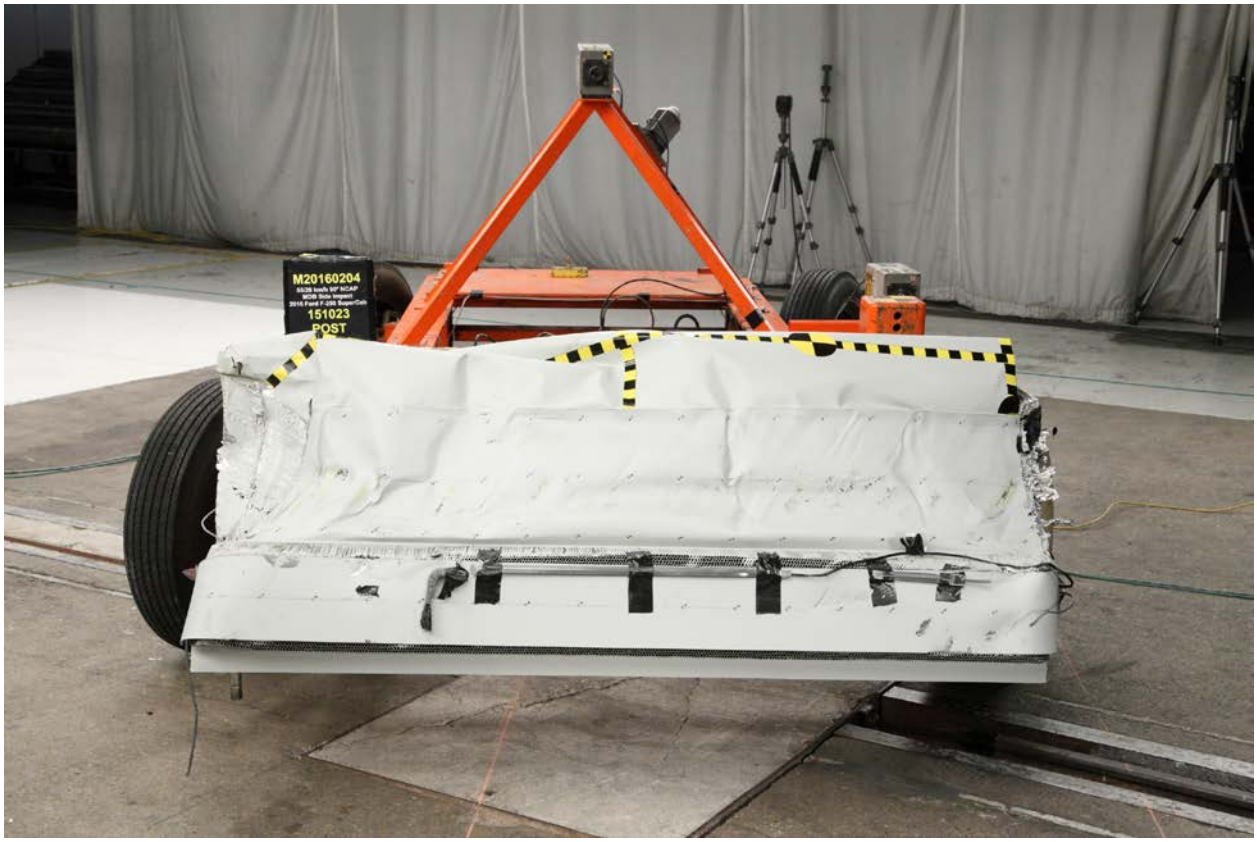
080 Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

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

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

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

084 Pre-Test Front View of MDB Impactor Face



085 Post-Test Front View of MDB Impactor Face

086 Pre-Test Top View of MDB Impactor Face

087 Post-Test Top View of MDB Impactor Face

088 Pre-Test Left Side View of MDB Impactor Face

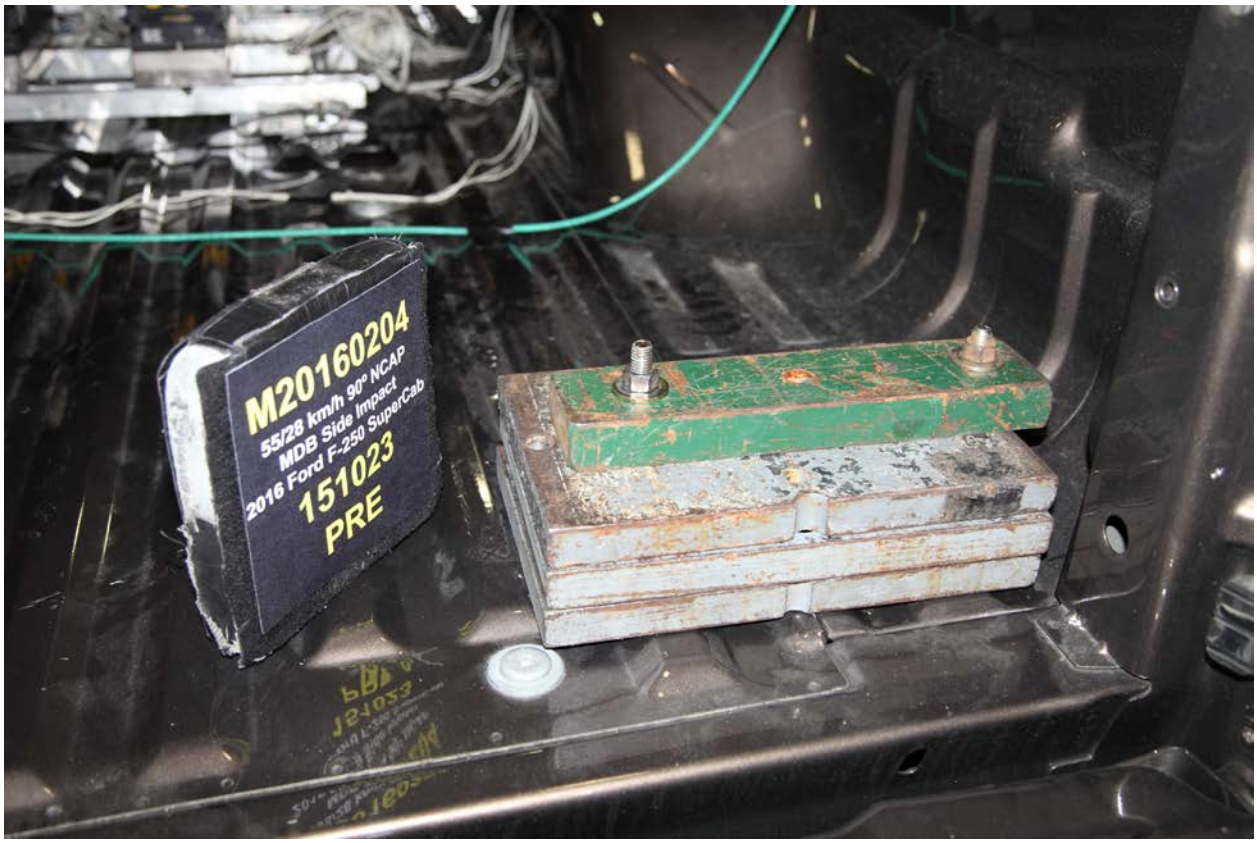
089 Post-Test Left Side View of MDB Impactor Face

090 Pre-Test Right Side View of MDB Impactor Face

091 Post-Test Right Side View of MDB Impactor Face

092 Close-Up View of Vehicle Certification Label

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



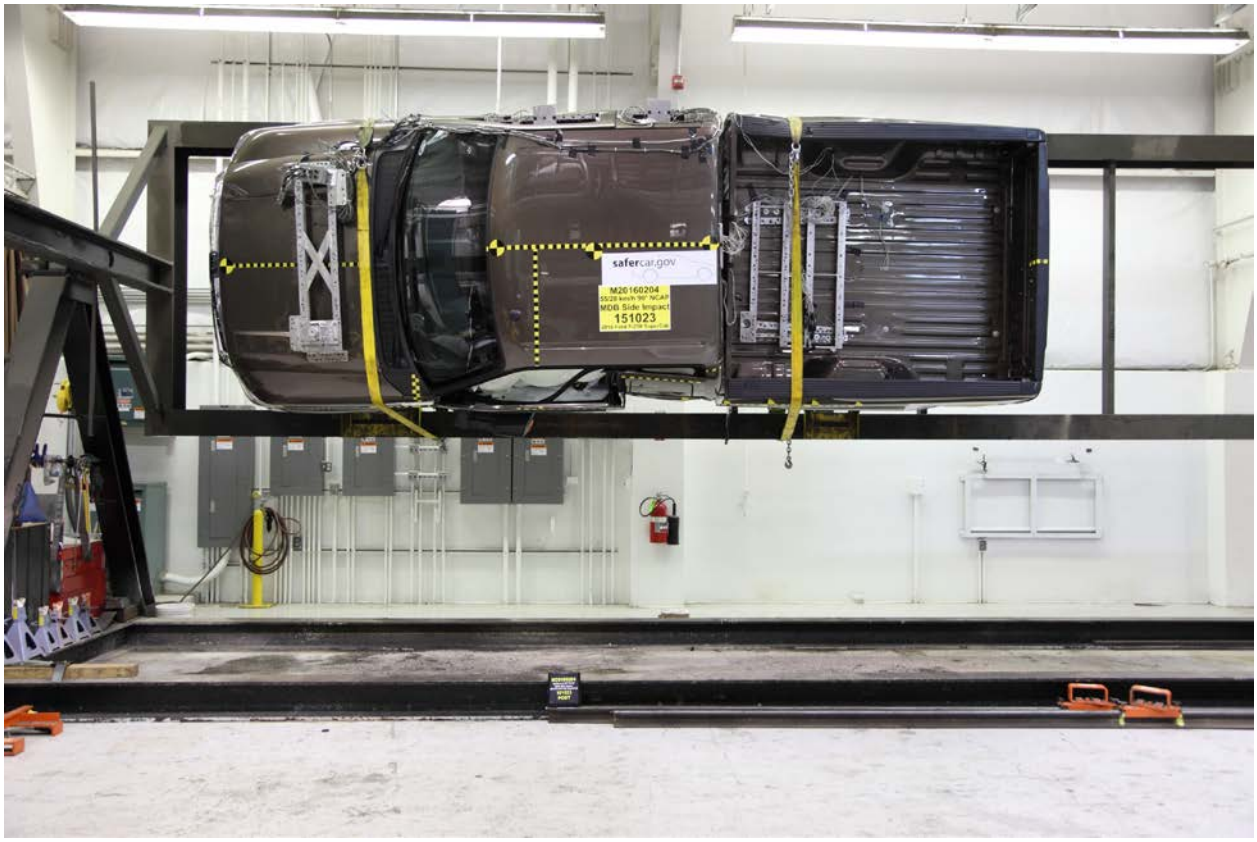
094 Pre-Test Ballast View

094a Pre-Test Ballast View

094b Pre-Test Ballast View

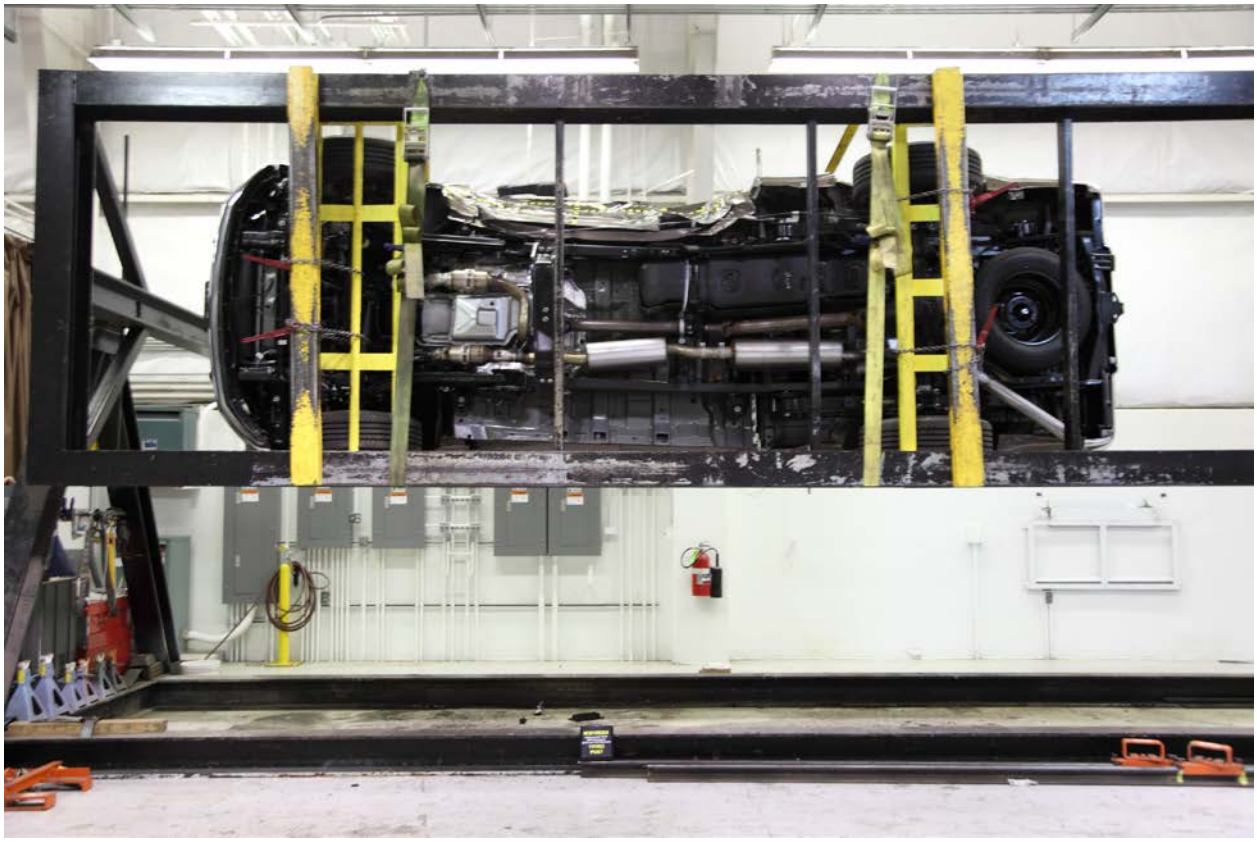
095 Post-Test Primary Speed Trap Read-Out

096 FMVSS No. 301 Static Rollover 0 Degrees

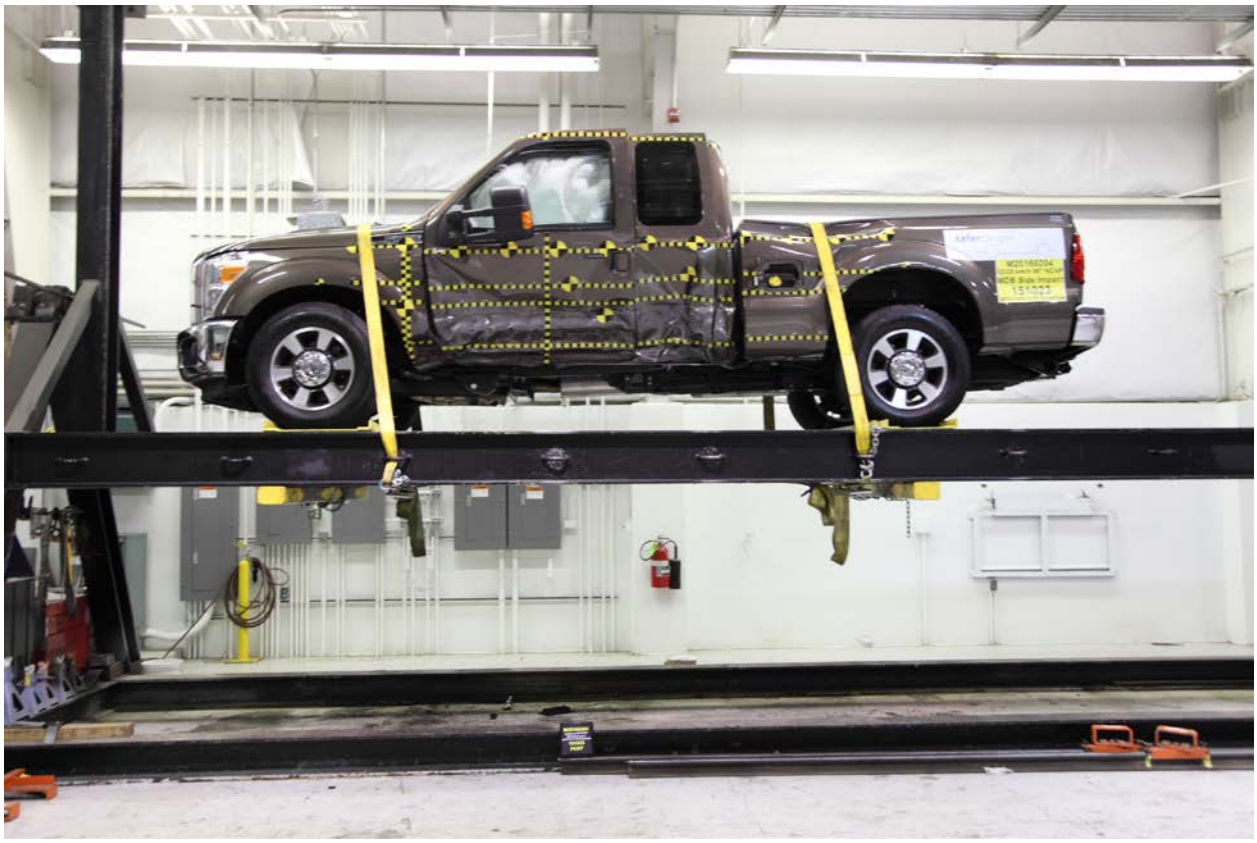


097 FMVSS No. 301 Static Rollover 90 Degrees

098 FMVSS No. 301 Static Rollover 180 Degrees

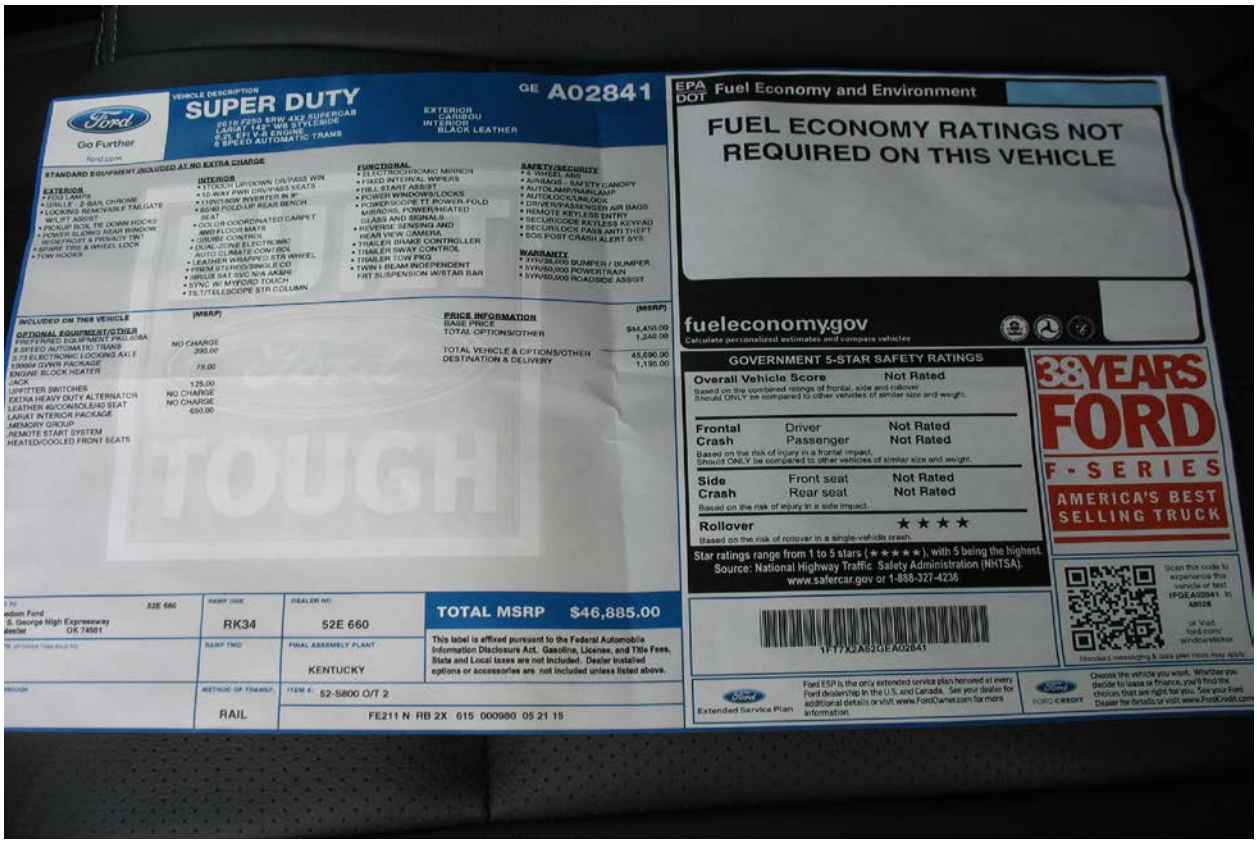


099 FMVSS No. 301 Static Rollover 270 Degrees

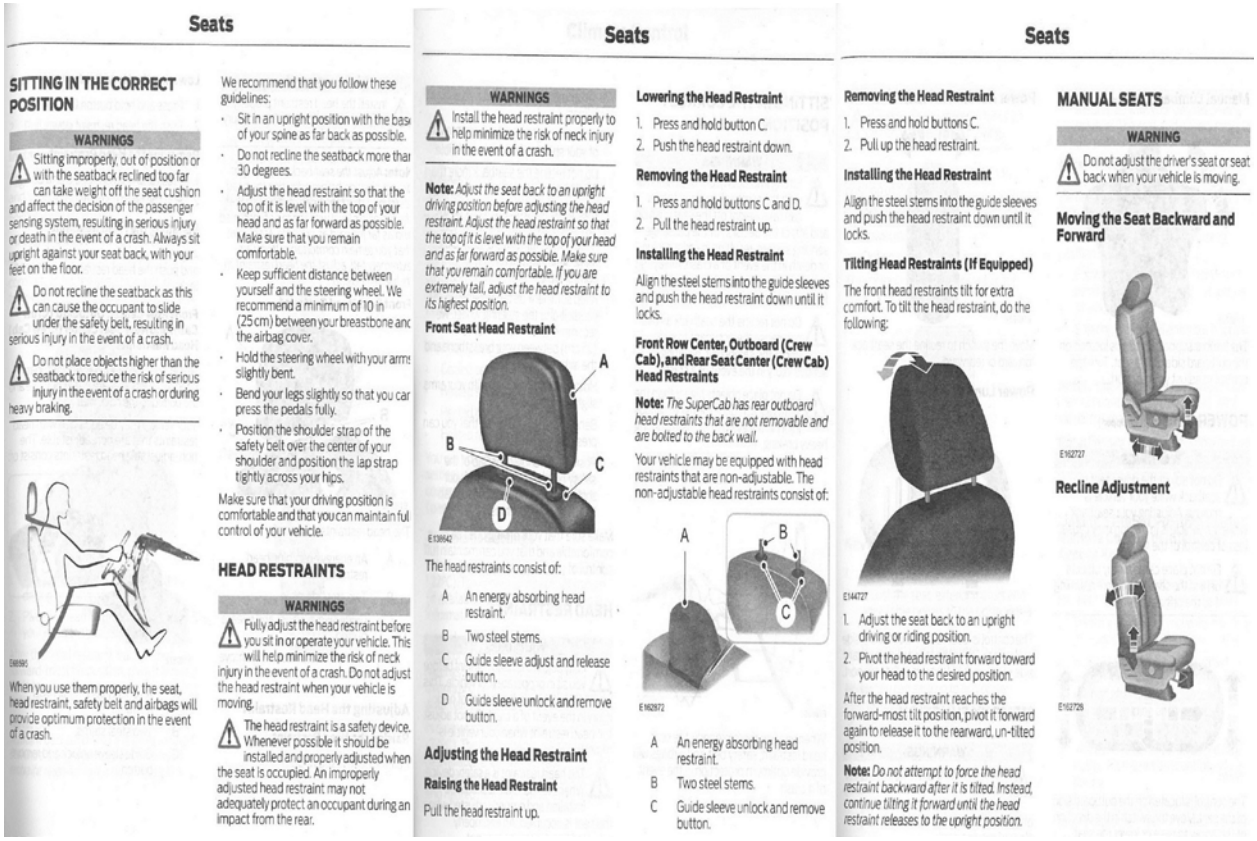


100 FMVSS No. 301 Static Rollover 360 Degrees

101 Impact Event



102 Monroney Label



Seats

SITTING IN THE CORRECT POSITION

WARNINGS

Sitting improperly, out of position or with the seatback reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a crash. Always sit upright against your seat back, with your feet on the floor.

Do not recline the seatback as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a crash.

Do not place objects higher than the seatback to reduce the risk of serious injury in the event of a crash or during heavy braking.

E69592

When you use them properly, the seat, head restraint, safety belt and airbags will provide optimum protection in the event of a crash.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seatback more than 30 degrees.
- 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.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 in (25 cm) between your breastbone and the airbag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraint when your vehicle is moving.

The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. An improperly adjusted head restraint may not adequately protect an occupant during an impact from the rear.

Seats

WARNINGS

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

Note: *Adjust the seat back 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

E138942

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.

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. Press and hold buttons C and D.
2. Pull the head restraint up.

Installing the Head Restraint

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

Front Row Center, Outboard (Crew Cab), and Rear Seat Center (Crew Cab) Head Restraints

Note: *The SuperCab has rear outboard head restraints that are not removable and are bolted to the back wall.*

Your vehicle may be equipped with head restraints that are non-adjustable. The non-adjustable head restraints consist of:

E162872

A An energy absorbing head restraint.

B Two steel stems.

C Guide sleeve unlock and remove button.

Seats

Removing the Head Restraint

1. Press and hold buttons C.
2. Pull up the head restraint.

Installing the Head Restraint

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

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 seat back 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, un-tilted 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

WARNING

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

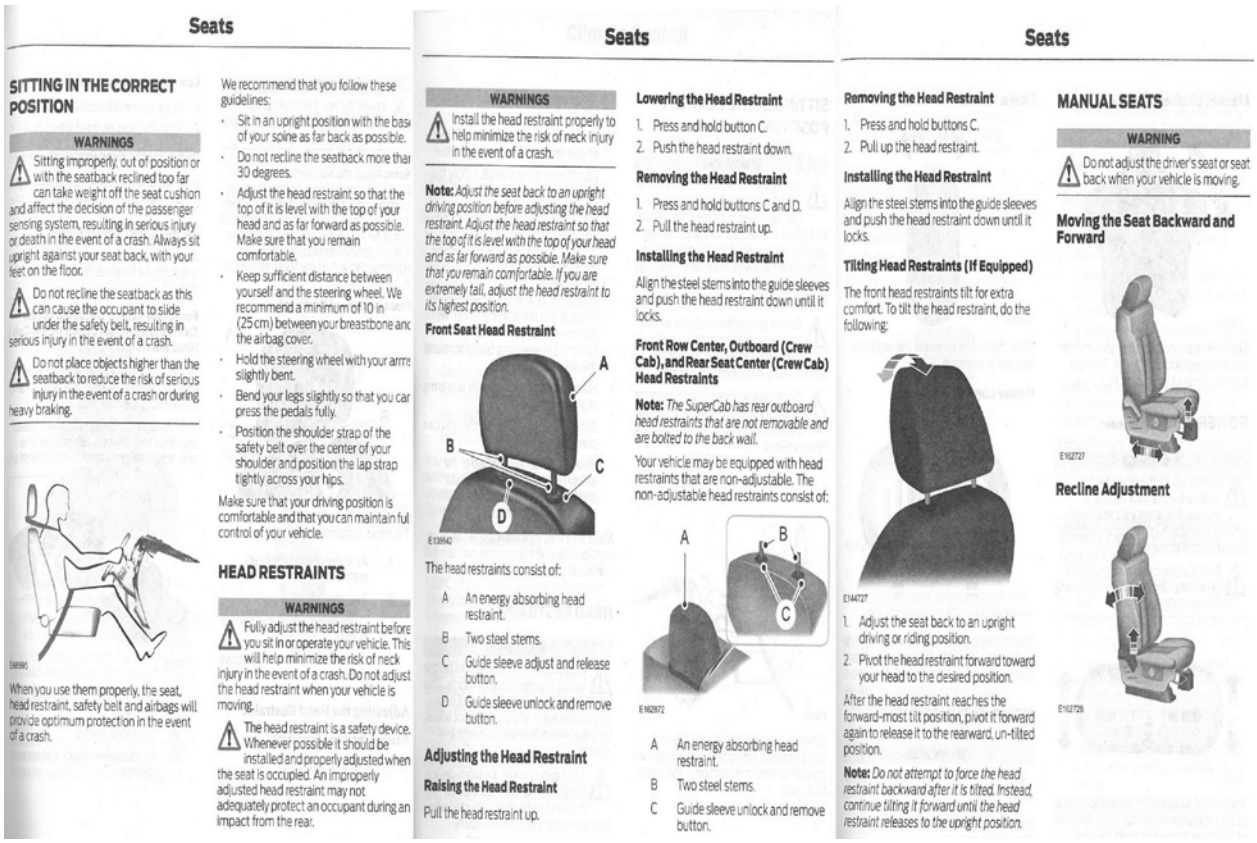
Moving the Seat Backward and Forward

E162727

Recline Adjustment

E162726

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



Seats

SITTING IN THE CORRECT POSITION

WARNINGS

Sitting improperly, out of position or with the seatback reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a crash. Always sit upright against your seat back, with your feet on the floor.

Do not recline the seatback as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a crash.

Do not place objects higher than the seatback to reduce the risk of serious injury in the event of a crash or during heavy braking.

E69592

When you use them properly, the seat, head restraint, safety belt and airbags will provide optimum protection in the event of a crash.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seatback more than 30 degrees.
- 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.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 in (25 cm) between your breastbone and the airbag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraint when your vehicle is moving.

The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. An improperly adjusted head restraint may not adequately protect an occupant during an impact from the rear.

Seats

WARNINGS

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

Note: *Adjust the seat back 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

E138942

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.

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. Press and hold buttons C and D.
2. Pull the head restraint up.

Installing the Head Restraint

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

Front Row Center, Outboard (Crew Cab), and Rear Seat Center (Crew Cab) Head Restraints

Note: *The SuperCab has rear outboard head restraints that are not removable and are bolted to the back wall.*

Your vehicle may be equipped with head restraints that are non-adjustable. The non-adjustable head restraints consist of:

E162872

A An energy absorbing head restraint.

B Two steel stems.

C Guide sleeve unlock and remove button.

Seats

Removing the Head Restraint

1. Press and hold buttons C.
2. Pull up the head restraint.

Installing the Head Restraint

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

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 seat back 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, un-tilted 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

WARNING

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

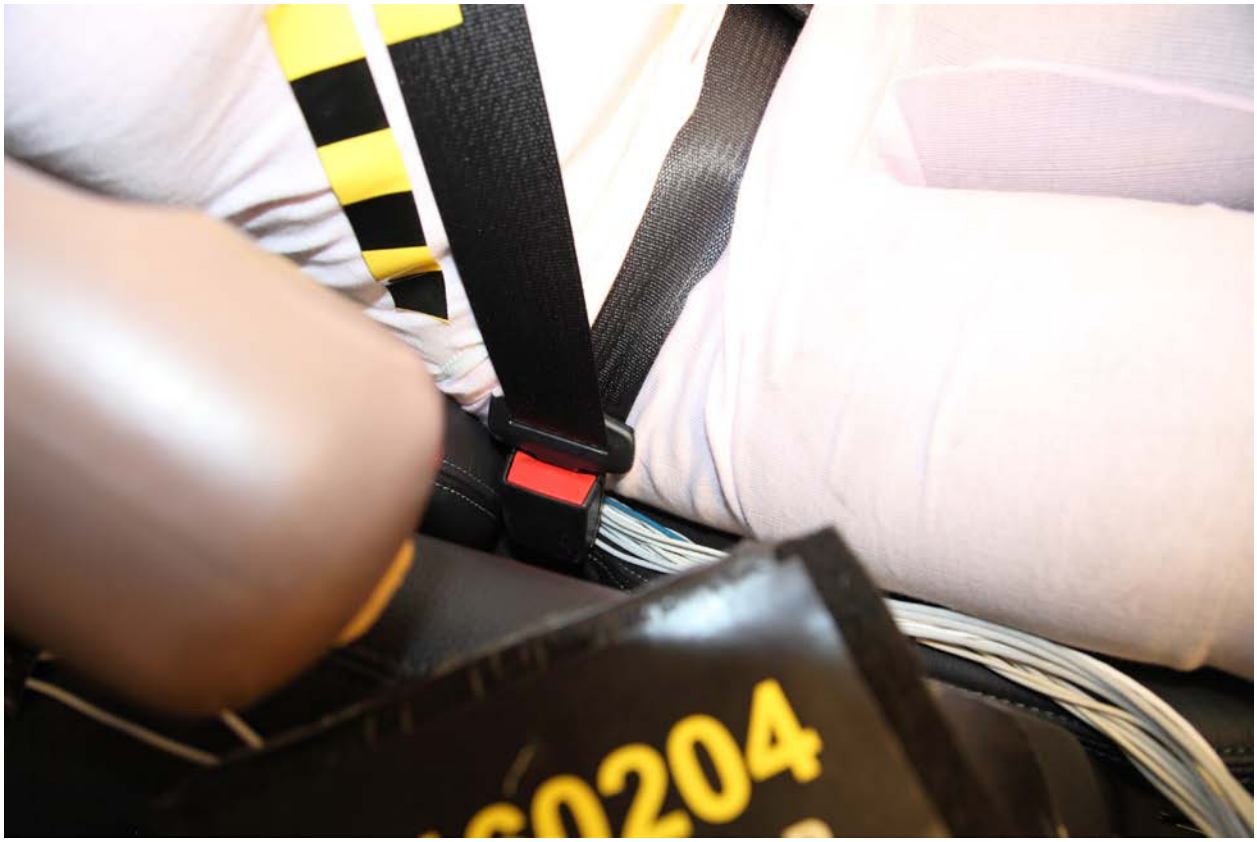
Moving the Seat Backward and Forward

E162727

Recline Adjustment

E162726

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



105 Pre-Test Driver Seat Belt Latch

106 Pre-Test Passenger Seat Belt Latch

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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 Date: 10/23/2015

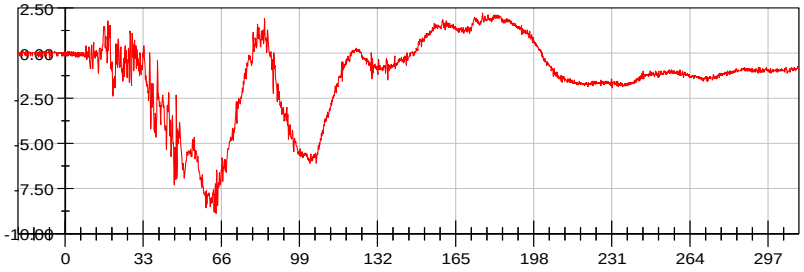
Test Lab: CTF

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

Test Number: 151023 (M20160204)

Position #4 SID IIs Dummy (305)

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



<Max>

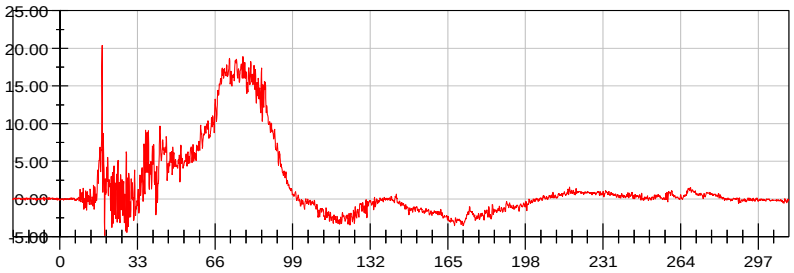
2.24 g at 176.40 ms

<Min>

-8.88 g at 63.76 ms

CFC_1000

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



<Max>

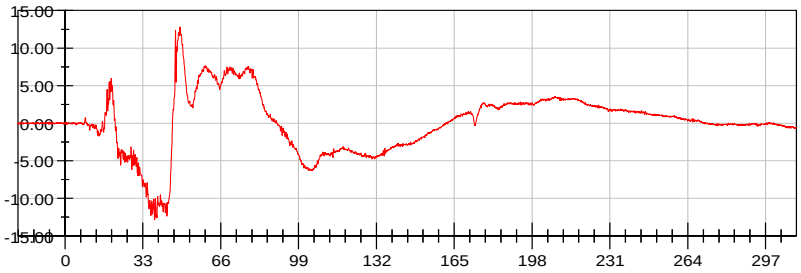
20.40 g at 18.00 ms

<Min>

-4.85 g at 19.04 ms

CFC_1000

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



<Max>

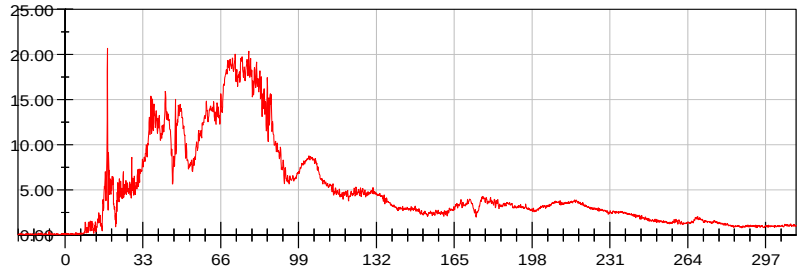
12.80 g at 48.80 ms

<Min>

-12.87 g at 38.00 ms

CFC_1000

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



<Max>

20.68 g at 18.00 ms

<Min>

0.04 g at -19.52 ms

CFC_1000

NHTSA

Test Date: 10/23/2015

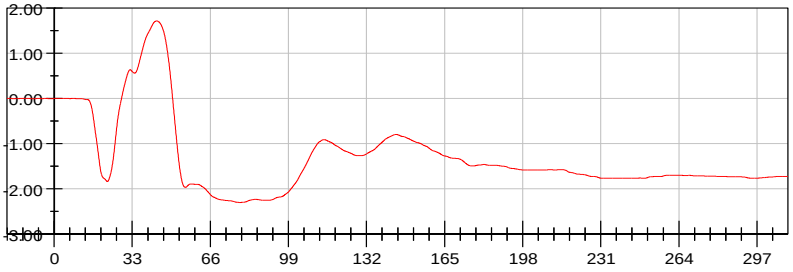
Test Lab: CTF

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

Test Number: 151023 (M20160204)

Position #4 SID IIs Dummy (305)

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



<Max>

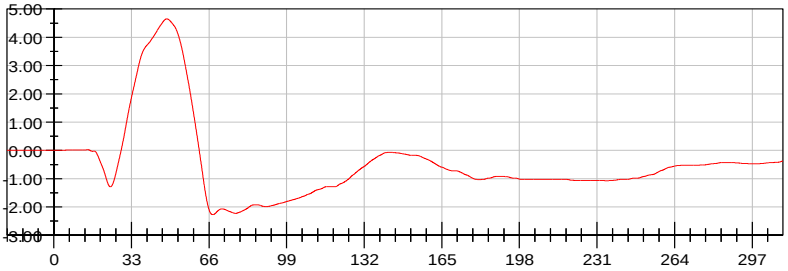
1.72 mm at 43.36 ms

<Min>

-2.30 mm at 78.56 ms

CFC_180

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



<Max>

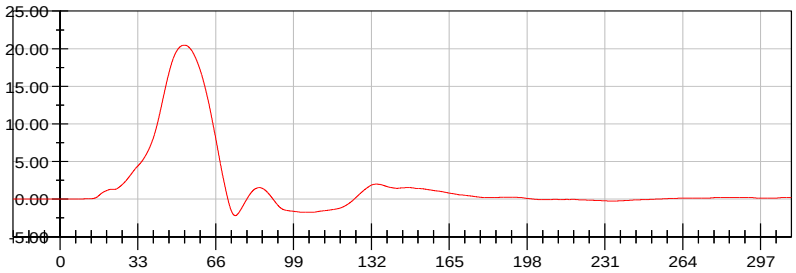
4.65 mm at 48.00 ms

<Min>

-2.28 mm at 67.60 ms

CFC_180

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



<Max>

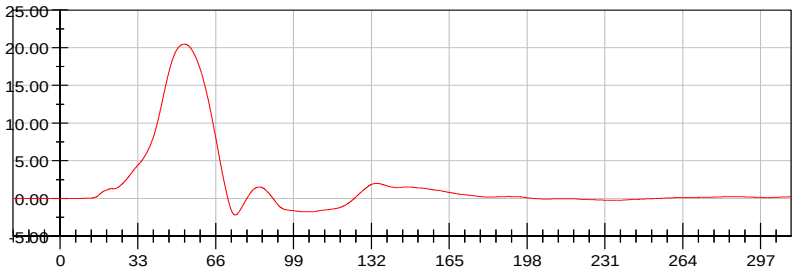
20.47 mm at 52.80 ms

<Min>

-2.19 mm at 74.32 ms

CFC_180

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



<Max>

20.47 mm at 52.80 ms

<Min>

-2.19 mm at 74.32 ms

CFC_180

NHTSA

Test Date: 10/23/2015

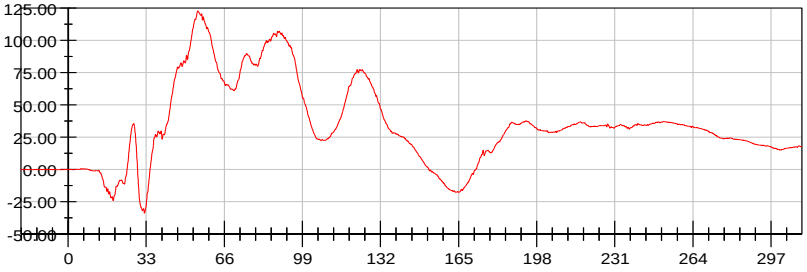
Test Lab: CTF

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

Test Number: 151023 (M20160204)

Position #4 SID IIs Dummy (305)

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



<Max>

122.83 N at 54.80 ms

<Min>

-33.84 N at 32.24 ms

CFC_600

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

<Max>

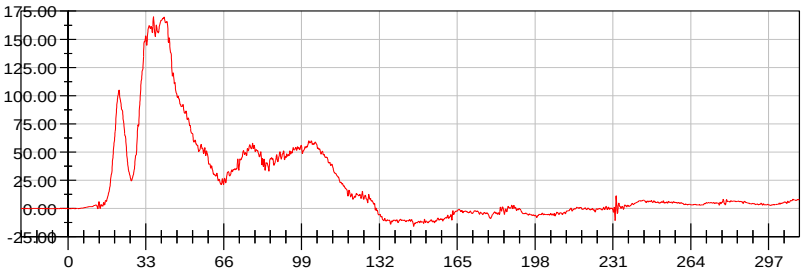
82.82 N at 20.80 ms

<Min>

-6.58 N at 155.04 ms

CFC_600

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



<Max>

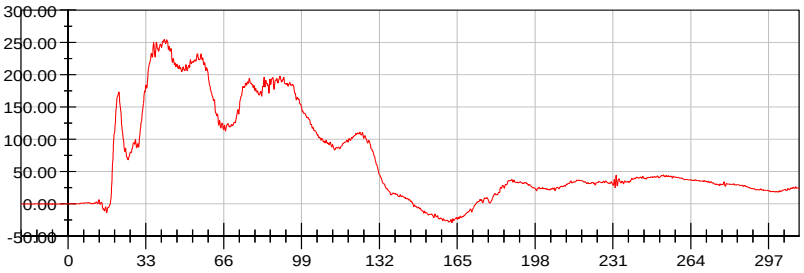
169.88 N at 36.24 ms

<Min>

-15.76 N at 146.56 ms

CFC_600

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



<Max>

254.39 N at 40.80 ms

<Min>

-29.08 N at 162.80 ms

CFC_600

NHTSA

Test Date: 10/23/2015

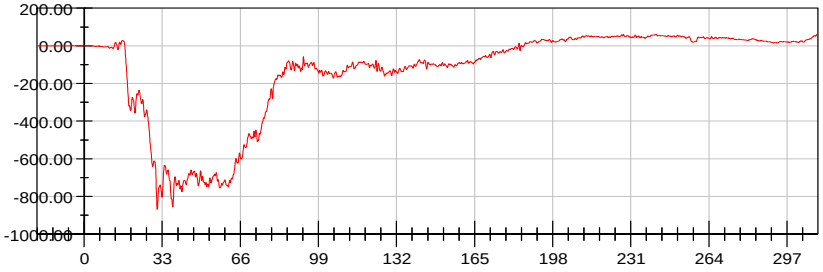
Test Lab: CTF

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

Test Number: 151023 (M20160204)

Position #4 SID IIs Dummy (305)

Driver Pubic Symphysis Force (Y) vs. Time (N) vs. Time [ms]



<Max>

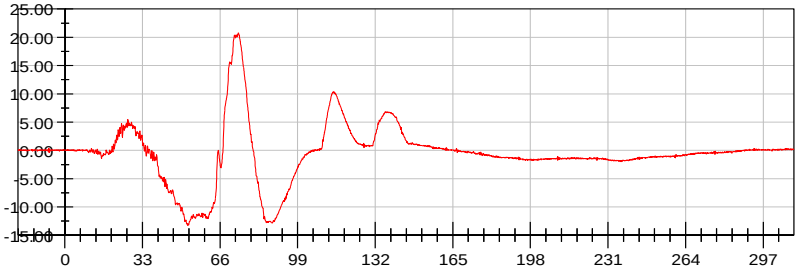
59.93 N at 241.76 ms

<Min>

-868.57 N at 30.88 ms

CFC_600

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



<Max>

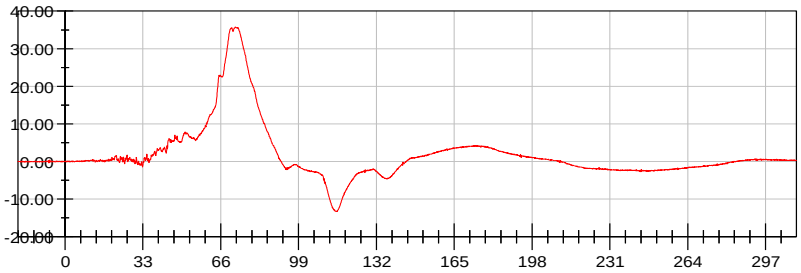
20.74 g at 73.76 ms

<Min>

-13.30 g at 52.24 ms

CFC_1000

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



<Max>

35.76 g at 72.16 ms

<Min>

-13.28 g at 114.64 ms

CFC_1000

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

<Max>

8.89 g at 73.12 ms

<Min>

-10.17 g at 38.56 ms

CFC_1000

NHTSA

Test Date: 10/23/2015

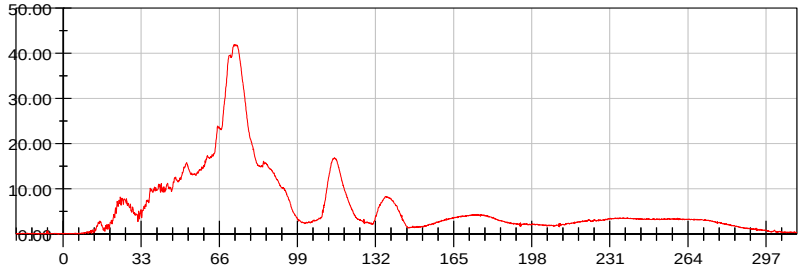
Test Lab: CTF

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

Test Number: 151023 (M20160204)

Position #4 SID IIs Dummy (305)

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



<Max>

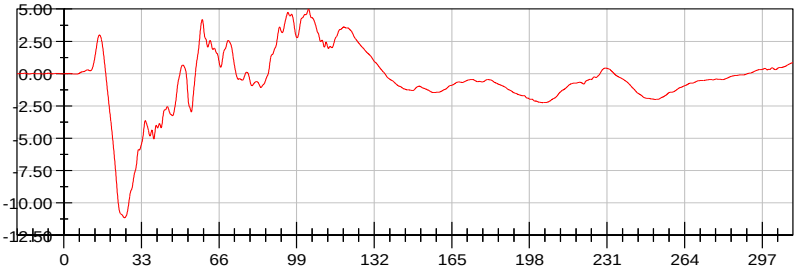
41.96 g at 72.32 ms

<Min>

0.03 g at -19.52 ms

CFC_1000

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



<Max>

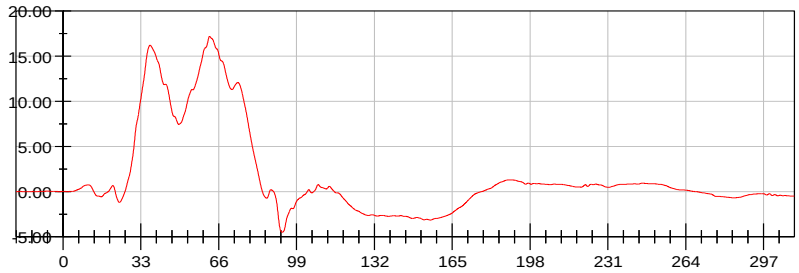
4.99 g at 104.08 ms

<Min>

-11.17 g at 25.76 ms

CFC_180

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



<Max>

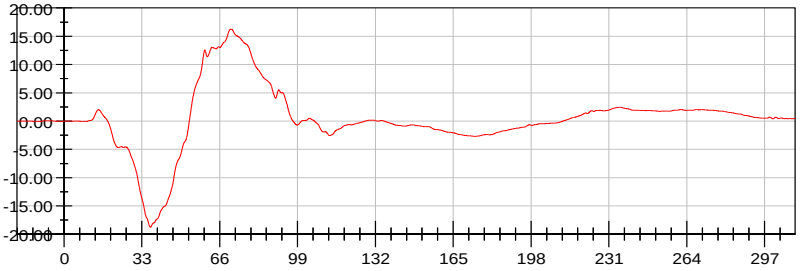
17.19 g at 62.16 ms

<Min>

-4.49 g at 92.80 ms

CFC_180

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



<Max>

16.26 g at 70.88 ms

<Min>

-18.78 g at 36.64 ms

CFC_180

NHTSA

Test Date: 10/23/2015

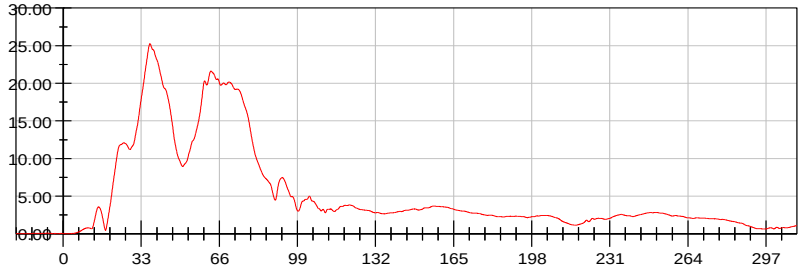
Test Lab: CTF

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

Test Number: 151023 (M20160204)

Position #4 SID IIs Dummy (305)

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



<Max>

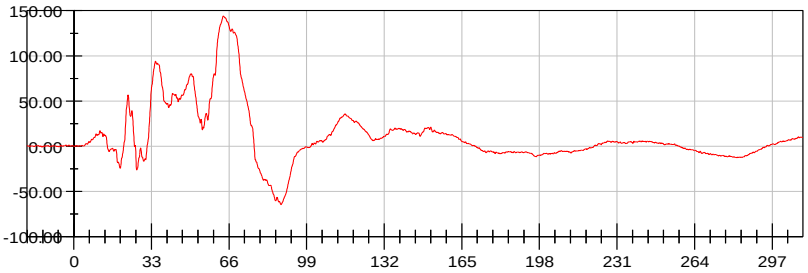
25.26 g at 36.72 ms

<Min>

0.01 g at 1.60 ms

CFC_180

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



<Max>

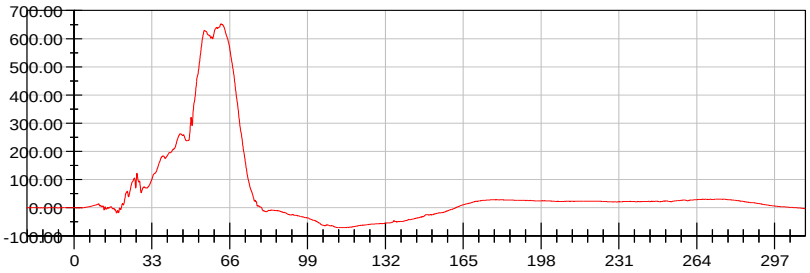
143.95 N at 63.52 ms

<Min>

-64.78 N at 88.08 ms

CFC_600

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



<Max>

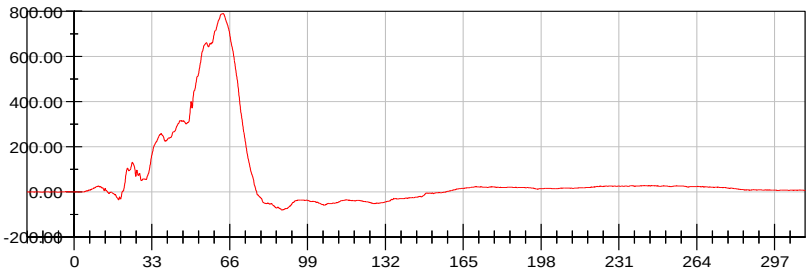
652.20 N at 62.40 ms

<Min>

-70.81 N at 115.04 ms

CFC_600

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



<Max>

789.25 N at 63.20 ms

<Min>

-79.53 N at 88.24 ms

CFC_600

APPENDIX C
DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

ES-2re (Driver) Dummy

Description

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS

SID-IIs (Rear Passenger) Dummy

Description

Pre-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 28
10/20/15

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	560	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	443	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	474	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	279	Yes
10	Pelvis Lap Width	359.0 - 373.0	366	Yes
11	Head Depth	196.0 - 206.0	205	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	606	Yes

Technician

Approved

Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 28-3
Test Date: 10/20/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Resultant Acceleration	125 - 155 g	154.2 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	7.6 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

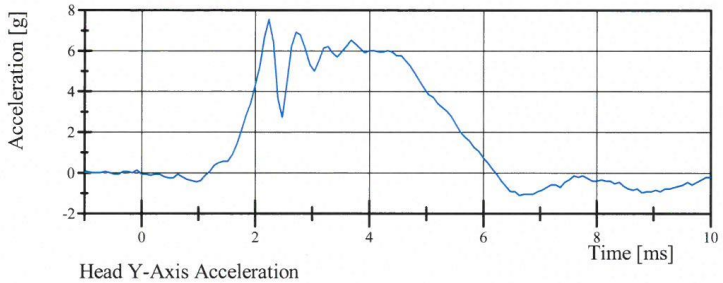
Specification Source: NHTSA Final Rule 8/15/2008

10.20.2015 12:56:13 361

Transportation Research Center Inc.

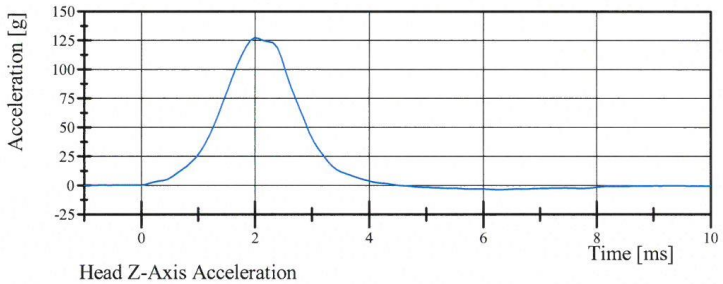
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 28-3
Test Date: 10/20/2015

Head X-Axis Acceleration



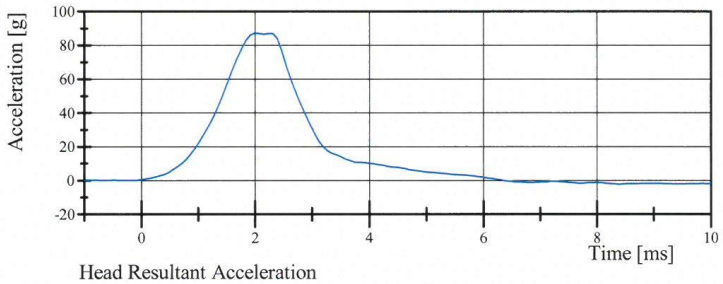
Filter Class: CFC_1000
Max: 7.6 g at 2.2 ms
Min: -1.1 g at 6.6 ms

Head Y-Axis Acceleration



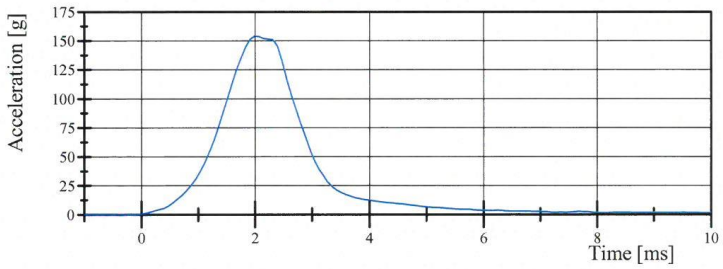
Filter Class: CFC_1000
Max: 127.1 g at 2.0 ms
Min: -3.7 g at 6.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 87.2 g at 2.0 ms
Min: -2.1 g at 8.4 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 154.2 g at 2.0 ms
Min: 0.0 g at -0.7 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.20.2015 12:56:19 361

Transportation Research Center Inc.

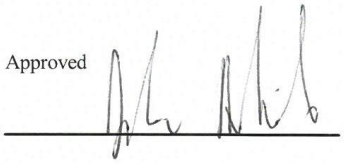
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-52.9 deg	Yes
Time of Peak	54 - 66 ms	59.2 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	64.1 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

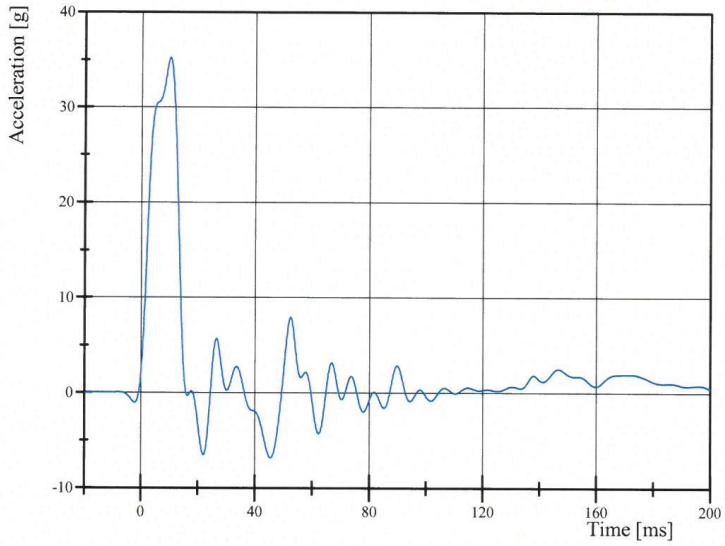
Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 14:49:57 1313

Transportation Research Center Inc.

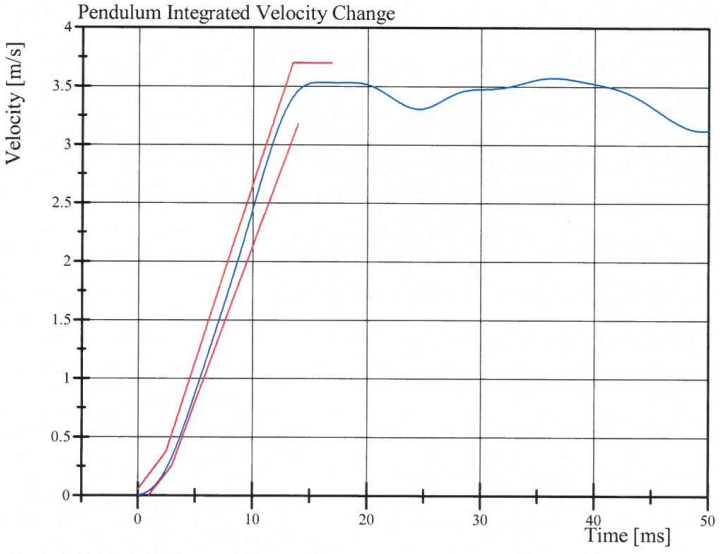
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Pendulum Acceleration



Filter Class: CFC_60
Max: 35.2 g at 10.1 ms
Min: -6.8 g at 45.6 ms

Pendulum Integrated Velocity Change



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

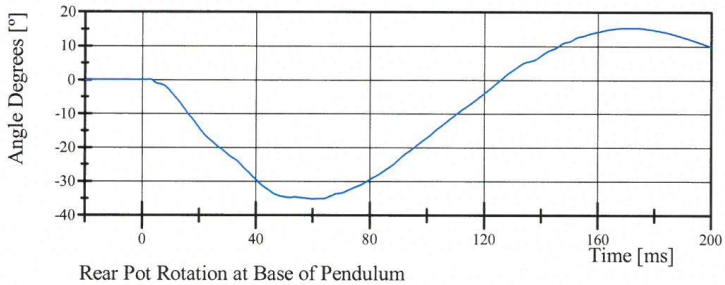
Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 14:50:04 1313

Transportation Research Center Inc.

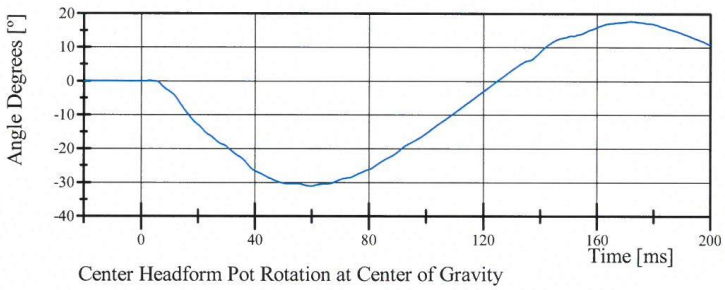
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Forward Pot Rotation at Base of Pendulum



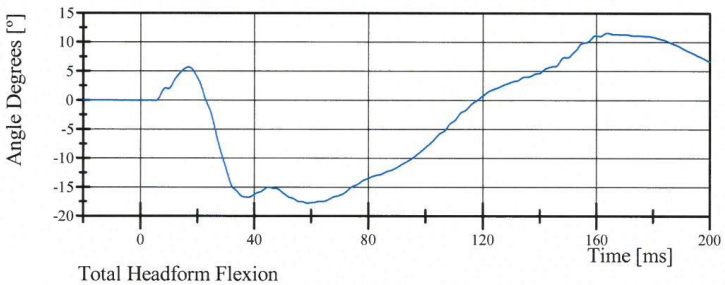
Filter Class: CFC_180
Max: 15.4 ° at 170.1 ms
Min: -35.1 ° at 59.8 ms

Rear Pot Rotation at Base of Pendulum



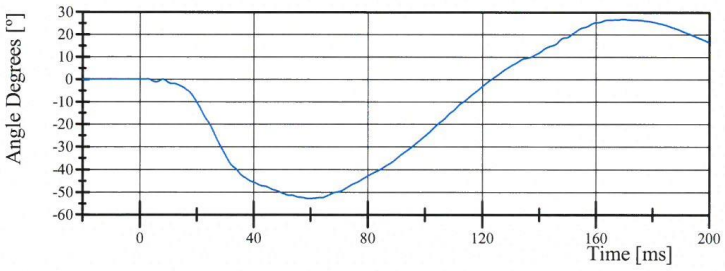
Filter Class: CFC_180
Max: 17.8 ° at 172.0 ms
Min: -31.0 ° at 59.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.6 ° at 163.9 ms
Min: -17.8 ° at 58.8 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 26.8 ° at 169.8 ms
Min: -52.9 ° at 59.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 14:50:04 1313

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/20/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-9.04 g	Yes

Test meets specifications.

Comments:

Technician

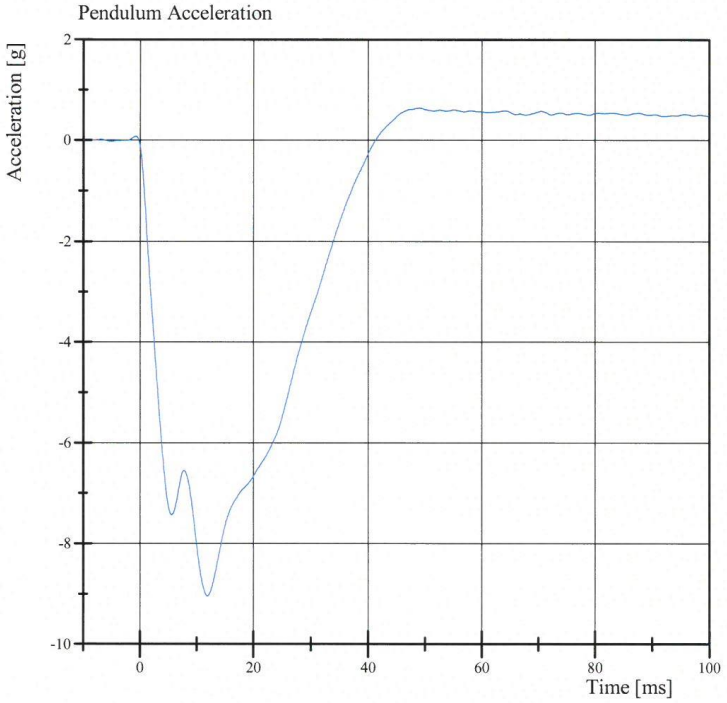
Approved

Specification Source: NHTSA final rule 8/15/2008

10.20.2015 14:24:44 580

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/20/2015



Filter Class: CFC_180
Max: 0.6 g at 49.0 ms
Min: -9.0 g at 11.9 ms

Specification Source: NHTSA final rule 8/15/2008

10.20.2015 14:24:54 580

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

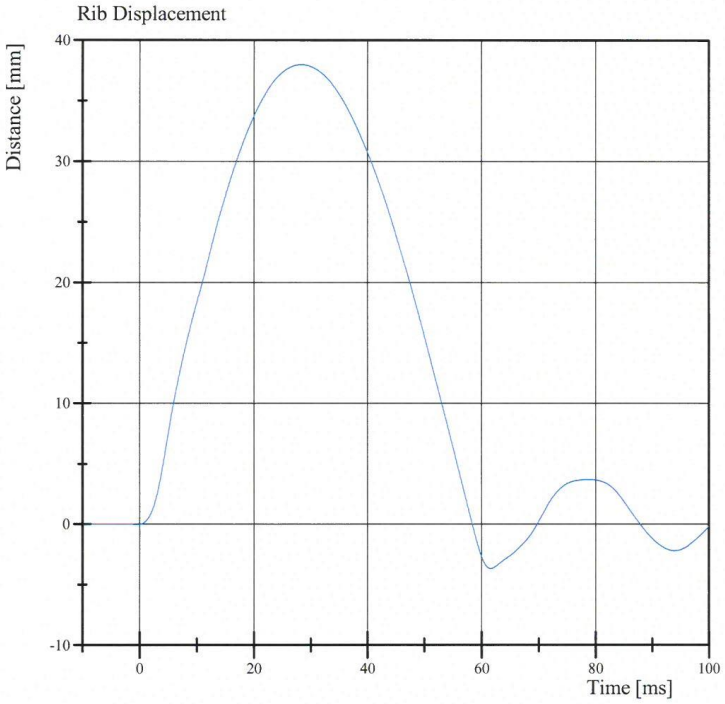
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:45:03 926

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015



Filter Class: CFC_180
Max: 38.0 mm at 28.4 ms
Min: -3.7 mm at 61.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:45:13 926

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.8 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

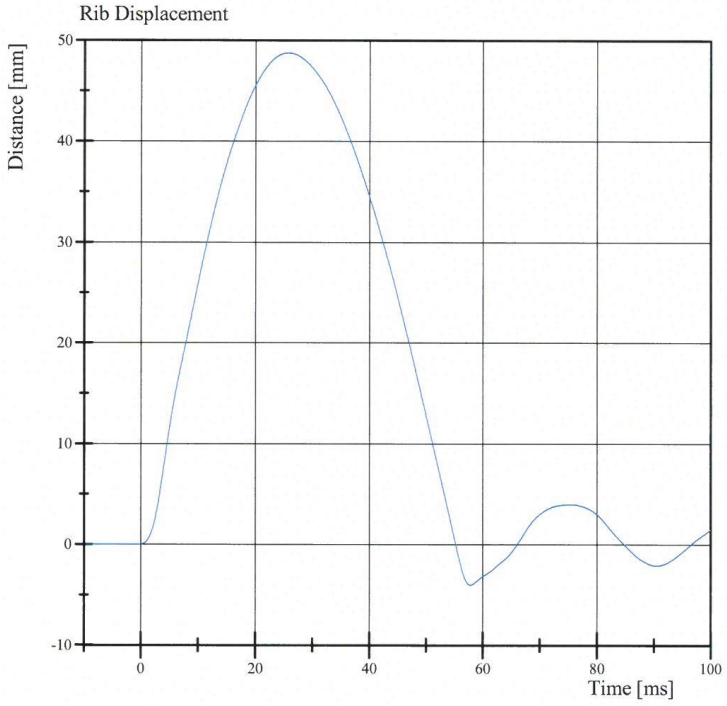
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:39:07 743

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015



Filter Class: CFC_180
Max: 48.8 mm at 25.8 ms
Min: -4.0 mm at 57.8 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:39:14 743

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.5 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

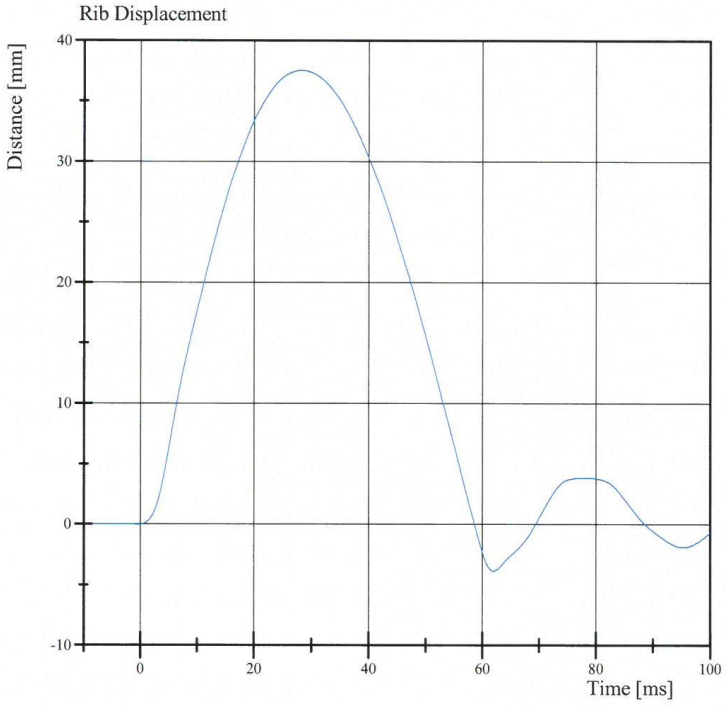
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:55:20 924

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015



Filter Class: CFC_180
Max: 37.5 mm at 28.3 ms
Min: -3.8 mm at 62.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:55:28 924

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

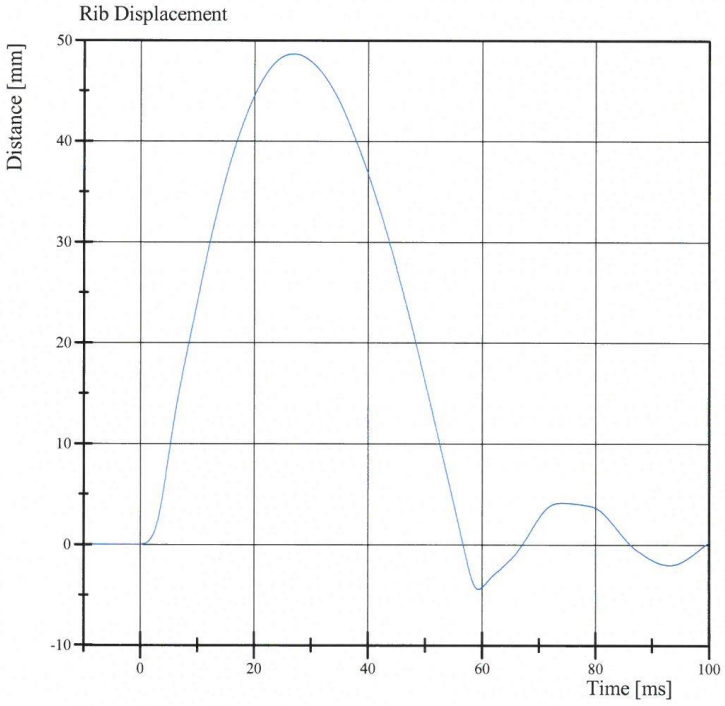
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:49:13 729

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015



Filter Class: CFC_180
Max: 48.7 mm at 26.9 ms
Min: -4.4 mm at 59.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:49:21 729

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.0 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

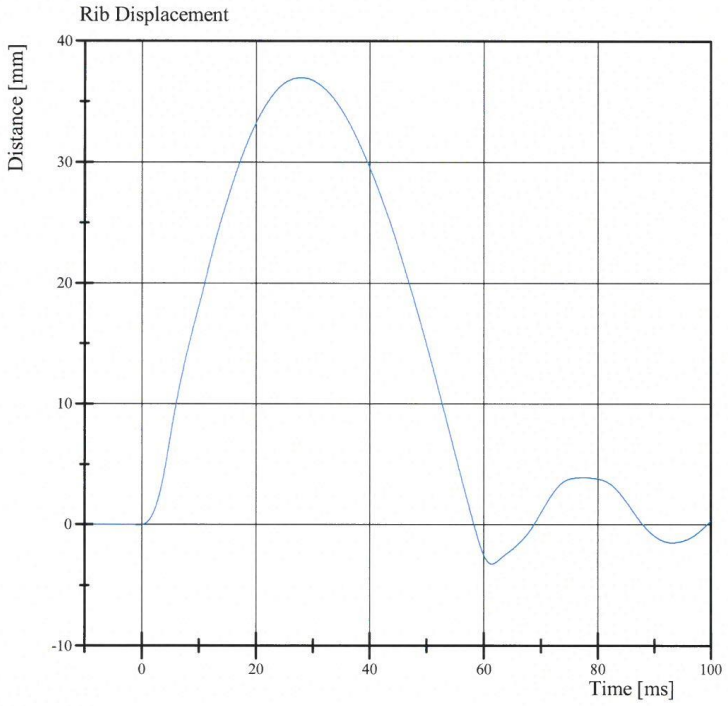
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 10:04:54 943

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015



Filter Class: CFC_180
Max: 37.0 mm at 27.9 ms
Min: -3.2 mm at 61.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 10:05:01 943

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.1 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

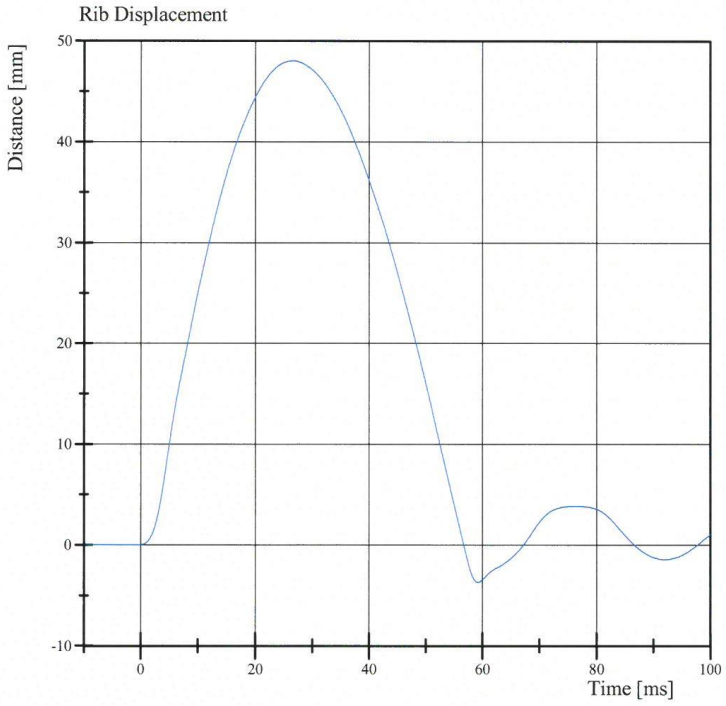
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 09:59:54 735

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 28-1
Test Date: 10/19/2015



Filter Class: CFC_180
Max: 48.1 mm at 26.6 ms
Min: -3.7 mm at 59.3 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 10:00:02 735

Transportation Research Center Inc.

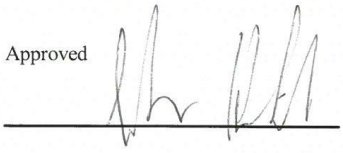
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/20/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	37 %	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	-5,373.4 N	Yes
Upper Rib Displacement	34 - 41 mm	39.1 mm	Yes
Center Rib Displacement	37 - 45 mm	42.1 mm	Yes
Lower Rib Displacement	37 - 44 mm	42.1 mm	Yes

Test meets specifications.

Comments:

Technician 

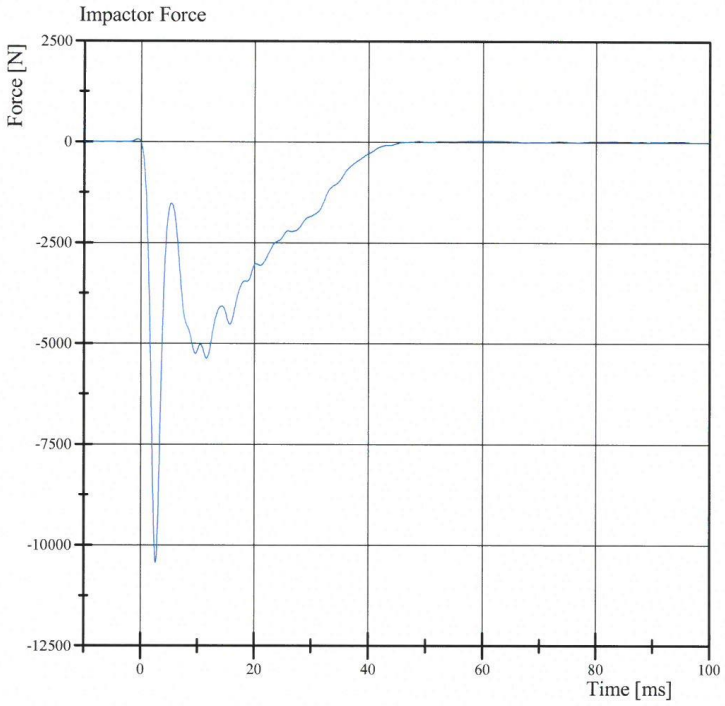
Approved 

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

10.20.2015 14:32:23 470

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/20/2015



Filter Class: CFC_180
Max: 59.1 N at -0.5 ms
Min: -10,437.8 N at 2.6 ms

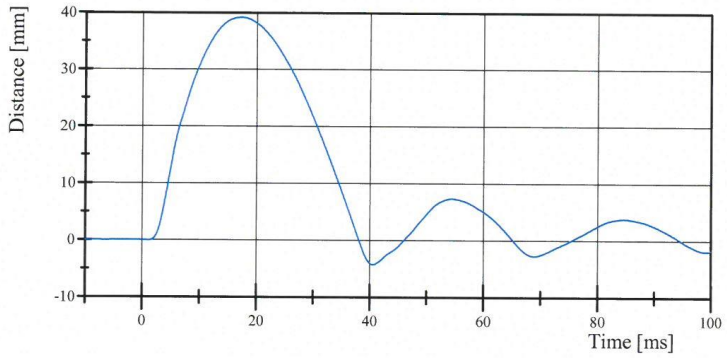
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

10.20.2015 14:34:31 470

Transportation Research Center Inc.

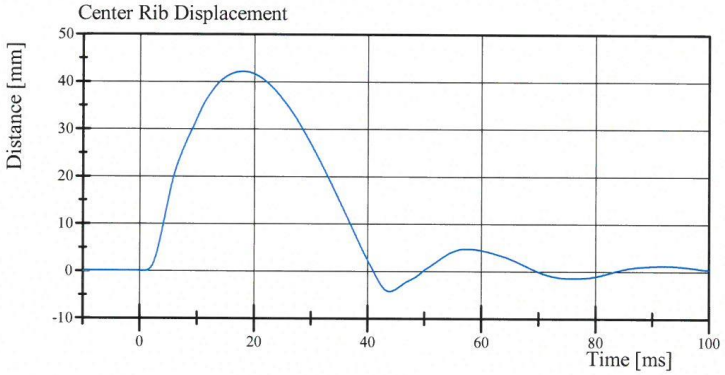
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/20/2015

Upper Rib Displacement



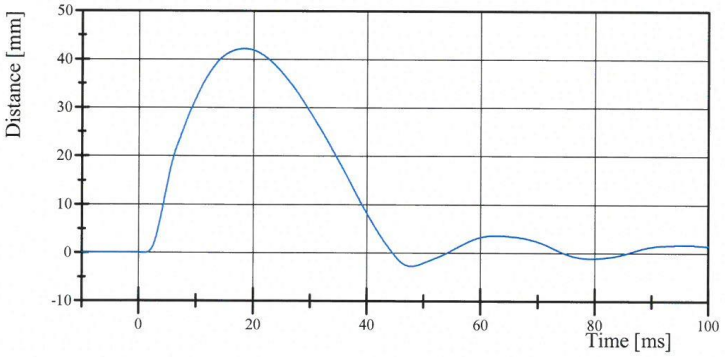
Filter Class: CFC_180
Max: 39.1 mm at 17.3 ms
Min: -4.2 mm at 40.6 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 42.1 mm at 18.0 ms
Min: -4.3 mm at 43.9 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 42.1 mm at 18.4 ms
Min: -2.7 mm at 47.8 ms

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

10.20.2015 14:34:32 470

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 28-7
Test Date: 10/21/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.08 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,240.2 N	Yes
Time of Peak	10.6 - 13.0 ms	10.72 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,679.7 N	Yes
Time of Peak	10.0 - 12.3 ms	10.88 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

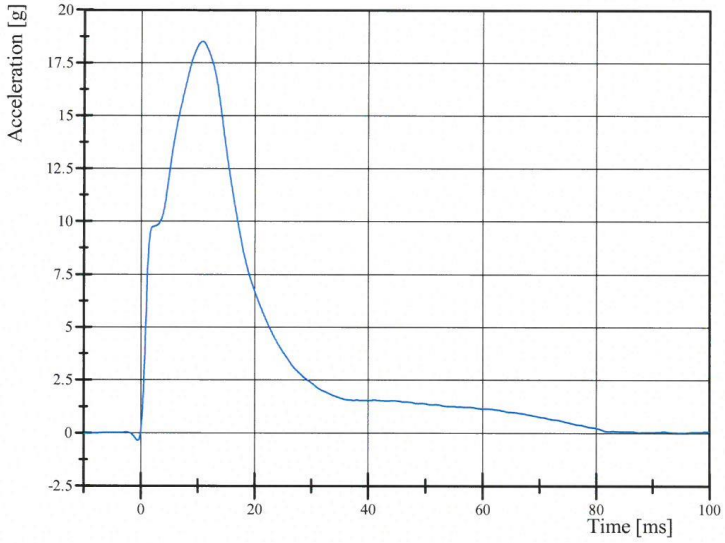
Specification Source: NHTSA Final Rule 8/15/2008

10.21.2015 07:54:19 569

Transportation Research Center Inc.

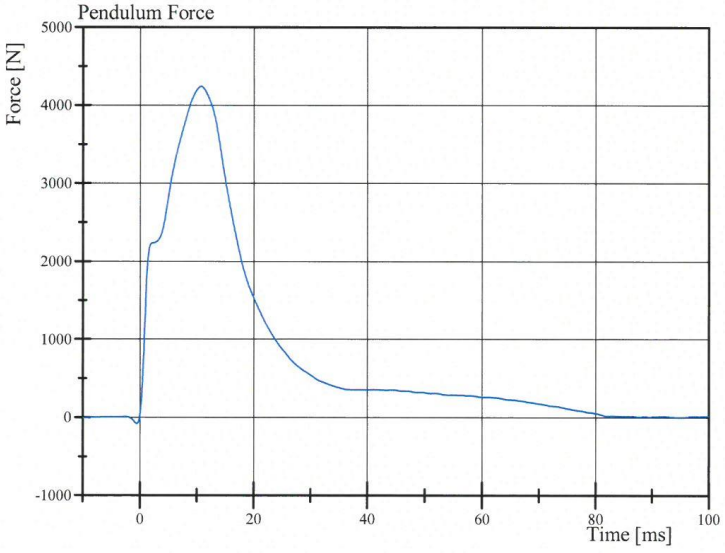
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 28-7
Test Date: 10/21/2015

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.5 g at 10.7 ms
Min: -0.4 g at -0.5 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,240.2 N at 10.7 ms
Min: -81.6 N at -0.5 ms

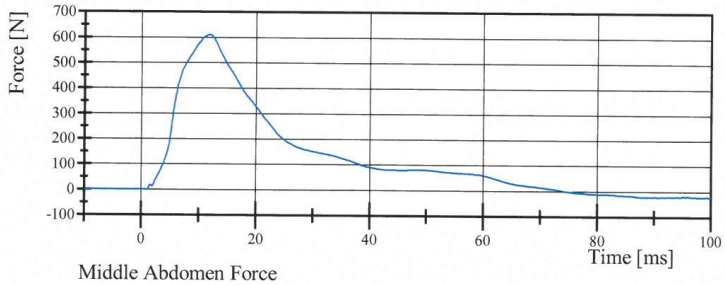
Specification Source: NHTSA Final Rule 8/15/2008

10.21.2015 07:54:30 569

Transportation Research Center Inc.

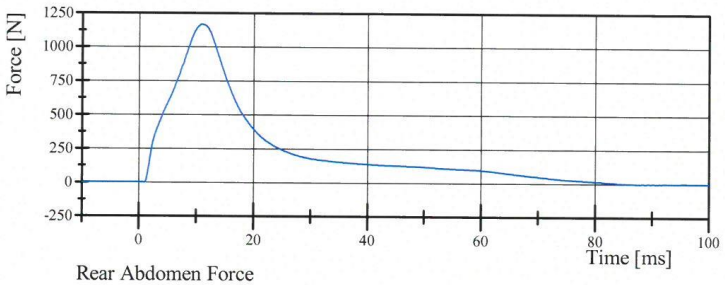
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 28-7
Test Date: 10/21/2015

Front Abdomen Force



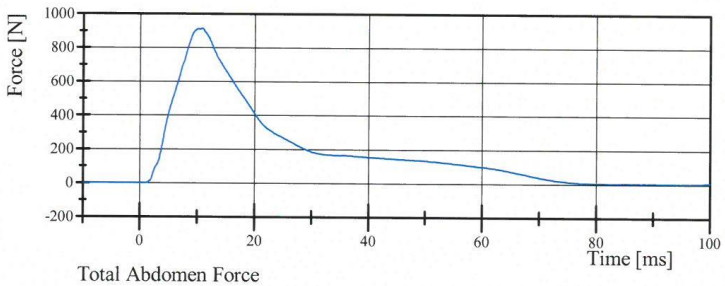
Filter Class: CFC_600
Max: 610.3 N at 11.8 ms
Min: -21.7 N at 98.3 ms

Middle Abdomen Force



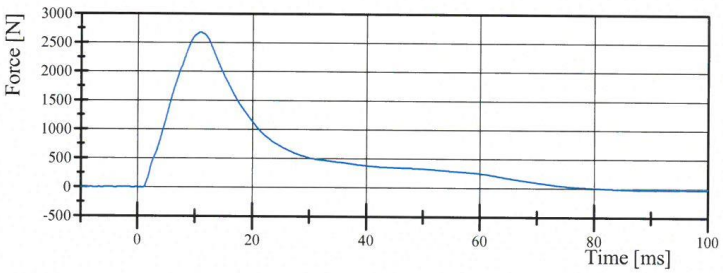
Filter Class: CFC_600
Max: 1,166.2 N at 10.9 ms
Min: -2.0 N at 1.0 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 913.2 N at 10.8 ms
Min: -0.2 N at -7.9 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,679.7 N at 10.9 ms
Min: -15.8 N at 98.3 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.21.2015 07:54:30 569

Transportation Research Center Inc.

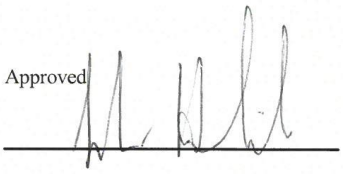
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	20 %	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	-48.4 deg	Yes
Time of Peak	39 - 53 ms	42.4 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	39.7 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

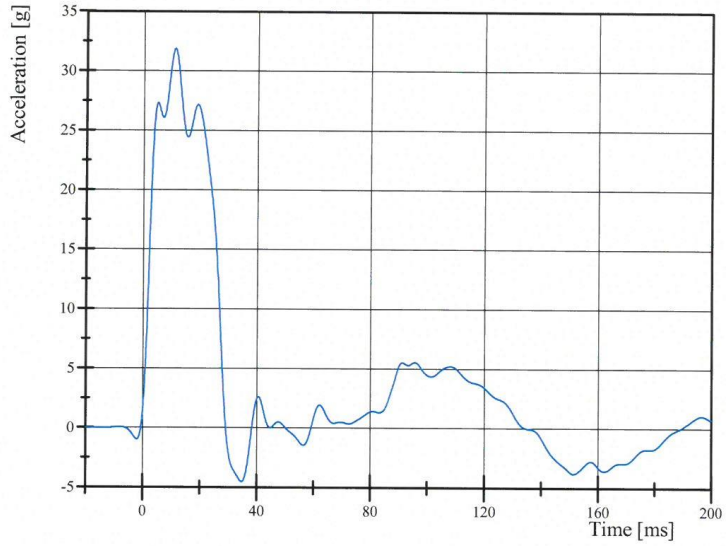
Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 13:50:59 574

Transportation Research Center Inc.

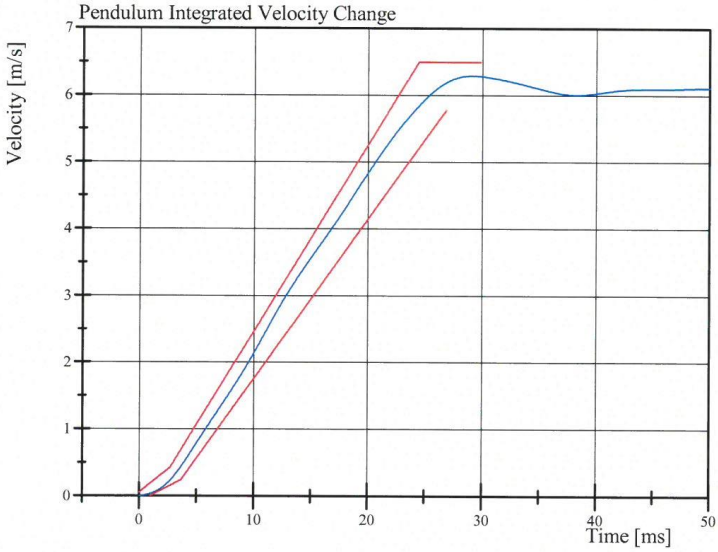
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/19/2015

Pendulum Acceleration



Filter Class: CFC_60
Max: 31.9 g at 11.0 ms
Min: -4.5 g at 34.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.3 m/s at 29.1 ms
Min: 0.0 m/s at 0.0 ms

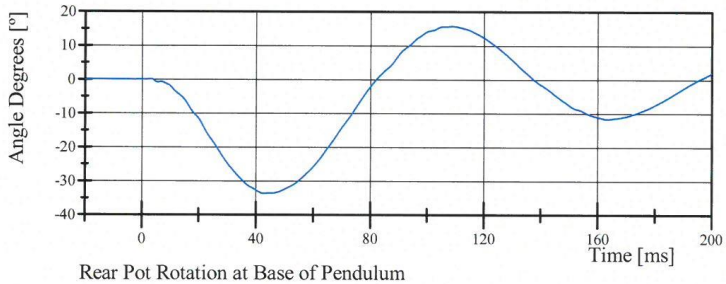
Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 13:51:07 574

Transportation Research Center Inc.

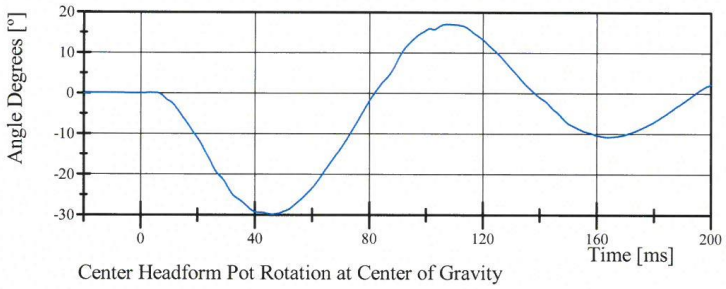
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 28-5
Test Date: 10/19/2015

Forward Pot Rotation at Base of Pendulum



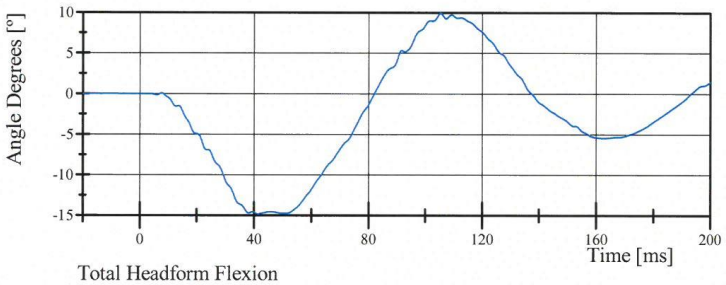
Filter Class: CFC_180
Max: 15.7 ° at 108.8 ms
Min: -33.7 ° at 42.7 ms

Rear Pot Rotation at Base of Pendulum



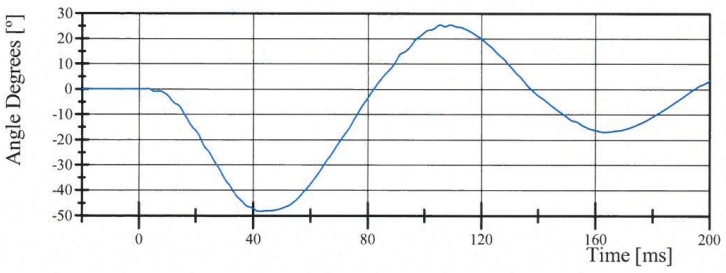
Filter Class: CFC_180
Max: 17.1 ° at 107.7 ms
Min: -29.8 ° at 45.9 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 10.0 ° at 105.4 ms
Min: -14.8 ° at 41.4 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 25.5 ° at 105.4 ms
Min: -48.4 ° at 42.4 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.19.2015 13:51:08 574

Transportation Research Center Inc.

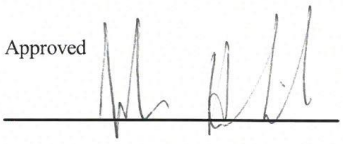
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 28-3
Test Date: 10/20/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.25 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,339.8 N	Yes
Time of Peak	11.8 - 16.1 ms	12.88 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,288.0 N	Yes
Time of Peak	12.2 - 17.0 ms	14.24 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

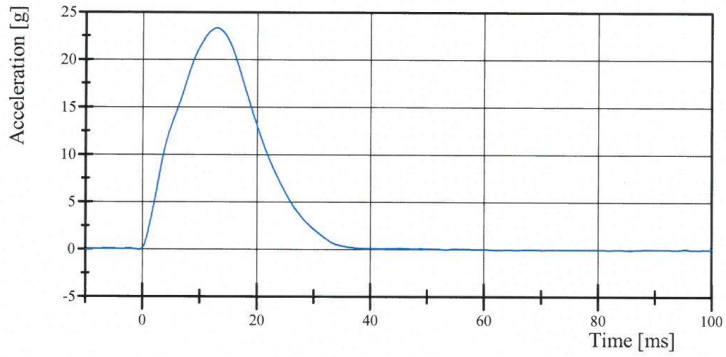
Specification Source: NHTSA Final Rule 8/15/2008

10.20.2015 11:45:21 588

Transportation Research Center Inc.

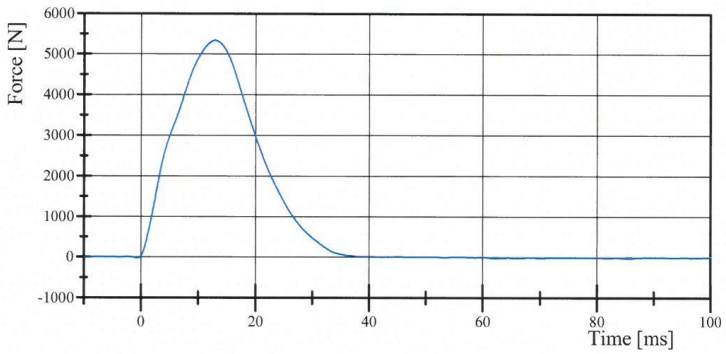
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 28-3
Test Date: 10/20/2015

Pendulum Acceleration



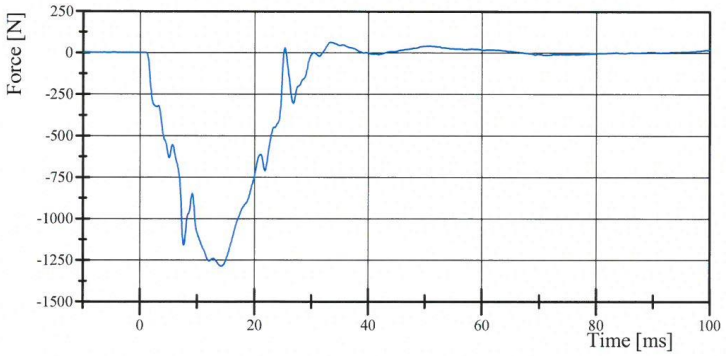
Filter Class: CFC_180
Max: 23.3 g at 12.9 ms
Min: -0.1 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,339.8 N at 12.9 ms
Min: -20.7 N at -0.6 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 65.0 N at 33.4 ms
Min: -1,288.0 N at 14.2 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.20.2015 11:45:27 588

Post-Test Calibration Sheets
Driver S/N F030

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. F030 Calibration No. 29
10/27/15

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	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	443	Yes
6	Head Width	152.0 - 158.0	155	Yes
7	Shoulder/Arm Width	461.0 - 479.0	474	Yes
8	Thorax Width	322.0 - 332.0	325	Yes
9	Abdomen Width	273.0 - 287.0	279	Yes
10	Pelvis Lap Width	359.0 - 373.0	366	Yes
11	Head Depth	196.0 - 206.0	205	Yes
12	Thorax Depth	262.0 - 272.0	262	Yes
13	Abdomen Depth	194.0 - 204.0	200	Yes
14	Pelvis Depth	235.0 - 245.0	240	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	158	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	606	Yes

Technician

Approved

Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Peak Resultant Acceleration	125 - 155 g	139.6 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	6.7 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

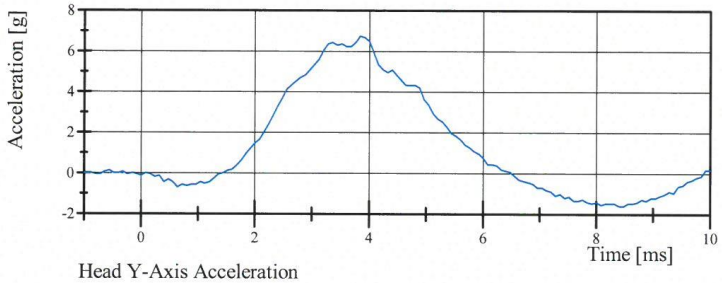
Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:21:00 360

Transportation Research Center Inc.

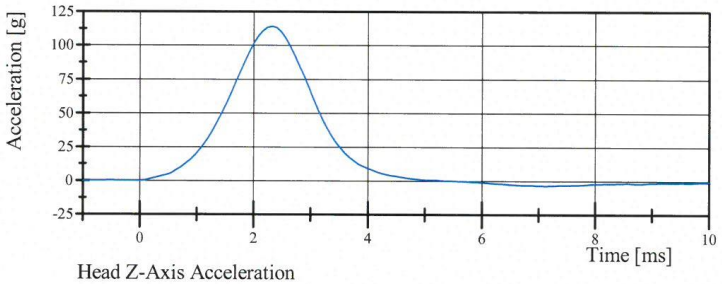
Left Lateral Head Drop
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Head X-Axis Acceleration



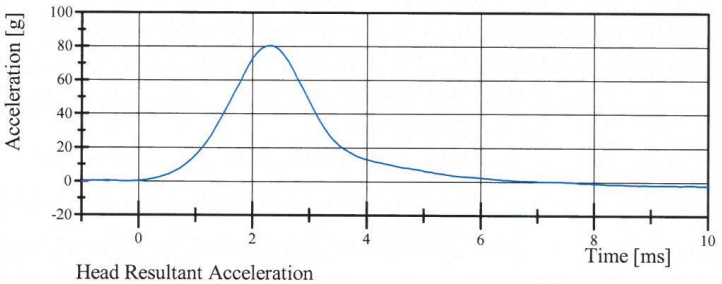
Filter Class: CFC_1000
Max: 6.7 g at 3.8 ms
Min: -1.6 g at 8.4 ms

Head Y-Axis Acceleration



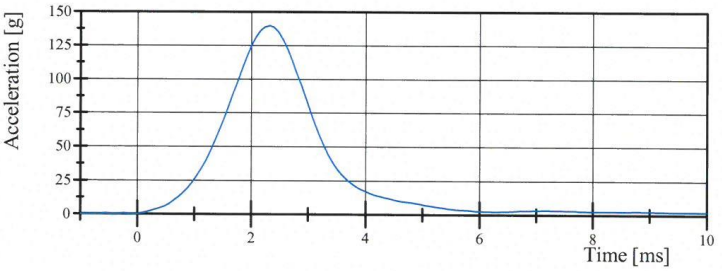
Filter Class: CFC_1000
Max: 114.0 g at 2.3 ms
Min: -3.4 g at 7.1 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 80.4 g at 2.3 ms
Min: -2.0 g at 9.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 139.6 g at 2.3 ms
Min: 0.0 g at -1.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:21:06 360

Transportation Research Center Inc.

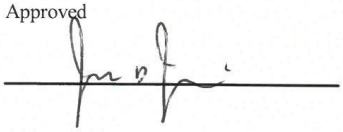
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.36 m/s	Yes
Maximum Headform Flexion			
Peak	(-49) - (-59) deg	-53.1 deg	Yes
Time of Peak	54 - 66 ms	62.1 ms	Yes
Headform Flexion Decay - Peak to Zero	53 - 88 ms	61.8 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

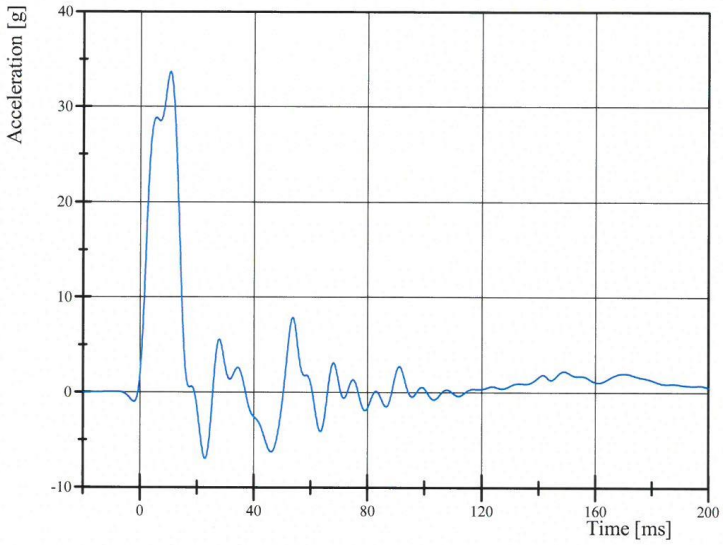
Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:42:08 1314

Transportation Research Center Inc.

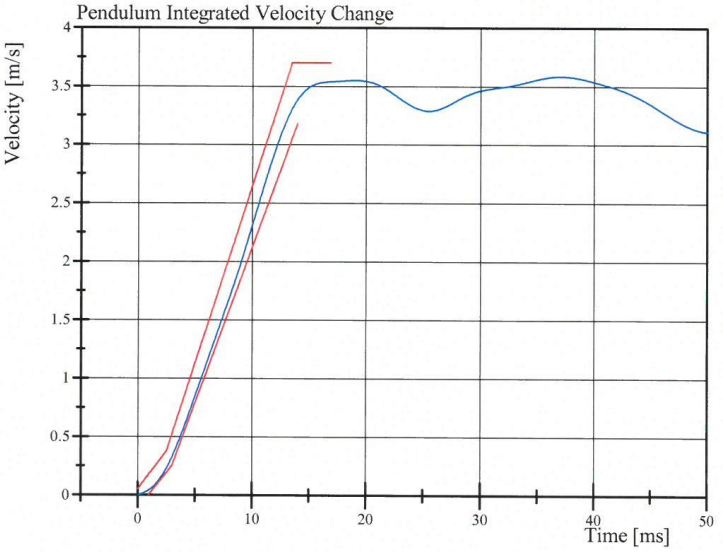
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Pendulum Acceleration



Filter Class: CFC_60
Max: 33.6 g at 10.4 ms
Min: -7.0 g at 22.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 3.6 m/s at 37.0 ms
Min: 0.0 m/s at 0.0 ms

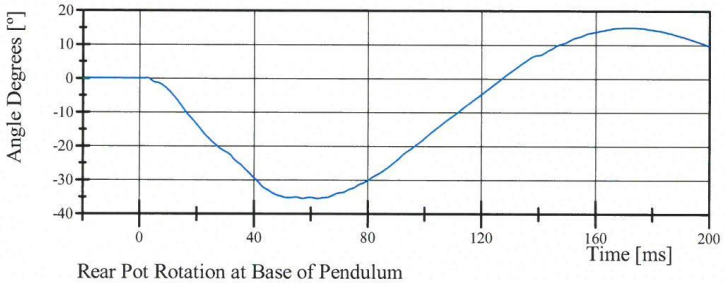
Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:42:15 1314

Transportation Research Center Inc.

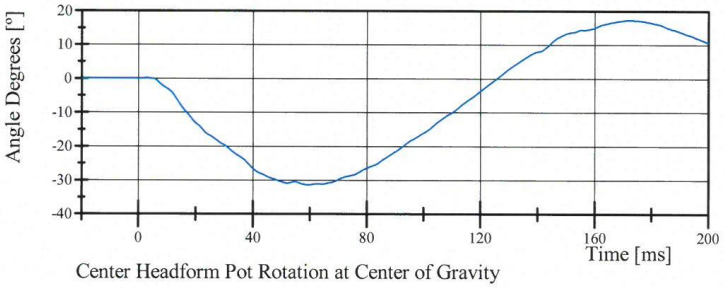
Left Lateral Neck
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Forward Pot Rotation at Base of Pendulum



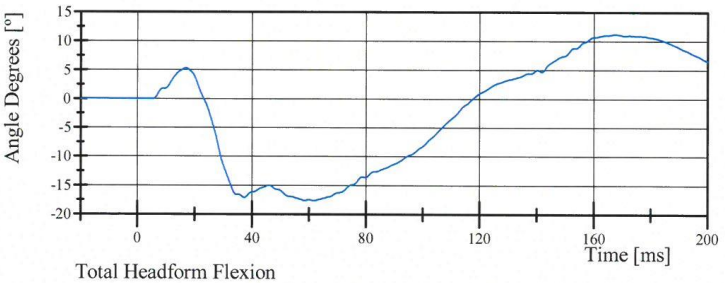
Filter Class: CFC_180
Max: 15.2 ° at 171.6 ms
Min: -35.5 ° at 62.2 ms

Rear Pot Rotation at Base of Pendulum



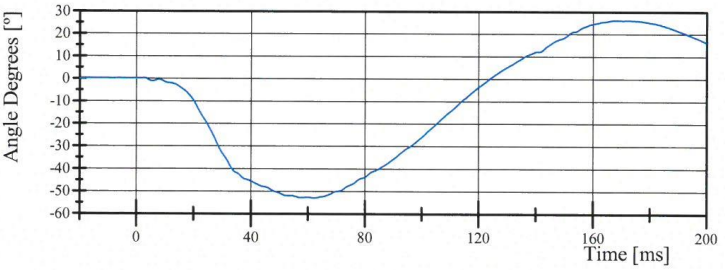
Filter Class: CFC_180
Max: 17.4 ° at 171.9 ms
Min: -31.4 ° at 59.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 11.2 ° at 167.4 ms
Min: -17.6 ° at 61.7 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 26.3 ° at 167.7 ms
Min: -53.1 ° at 62.1 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:42:16 1314

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-10.42 g	Yes

Test meets specifications.

Comments:

Technician

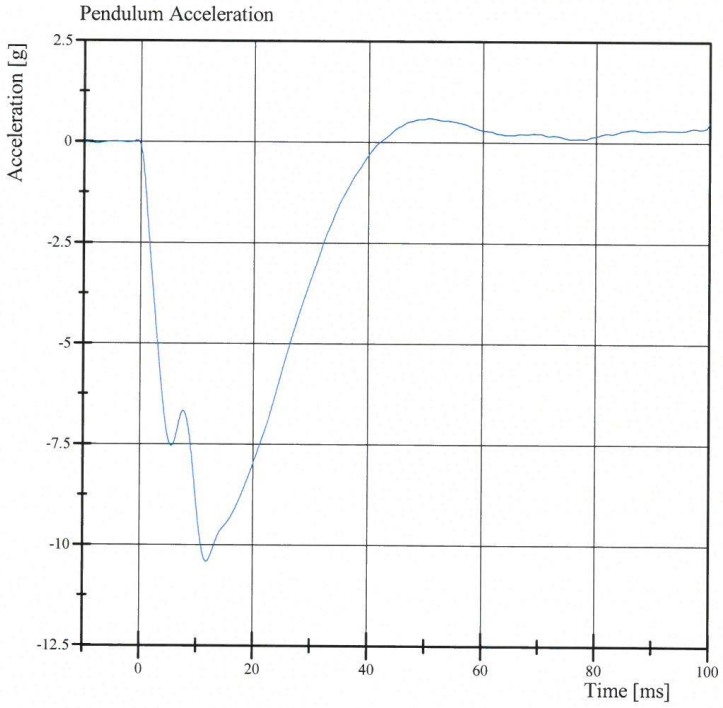
Approved

Specification Source: NHTSA final rule 8/15/2008

10.27.2015 10:28:00 580

Transportation Research Center Inc.

Left Lateral Shoulder
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 0.6 g at 50.6 ms
Min: -10.4 g at 11.8 ms

Specification Source: NHTSA final rule 8/15/2008

10.27.2015 10:28:07 580

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	38.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

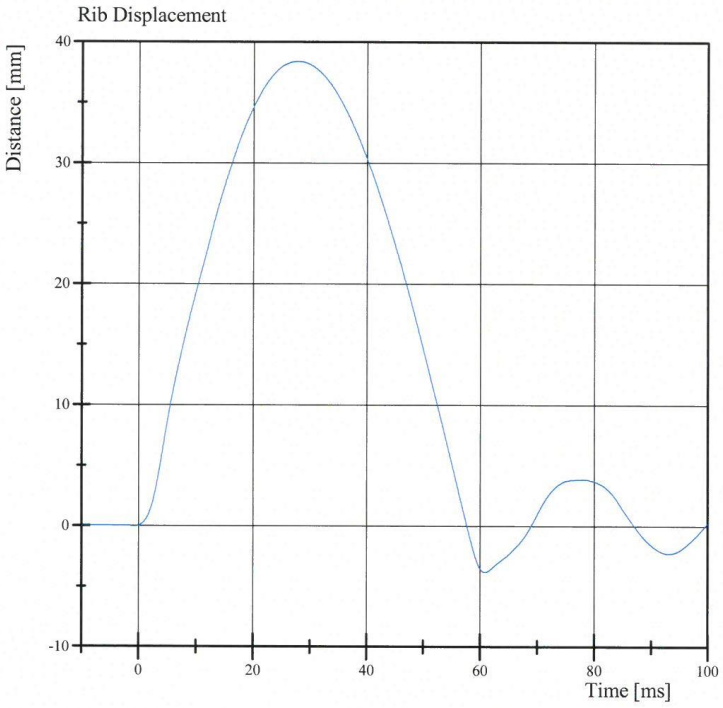
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:45:42 933

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 38.4 mm at 27.8 ms
Min: -3.8 mm at 60.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:45:55 933

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 29-2
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.9 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

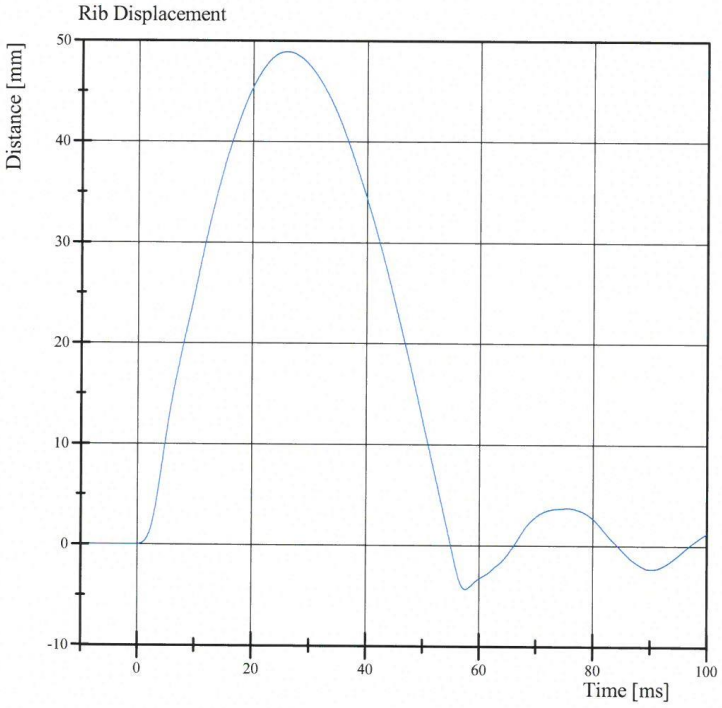
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:40:59 733

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. F030 Certification No. 29-2
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 48.9 mm at 25.8 ms
Min: -4.3 mm at 57.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:41:06 733

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.6 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

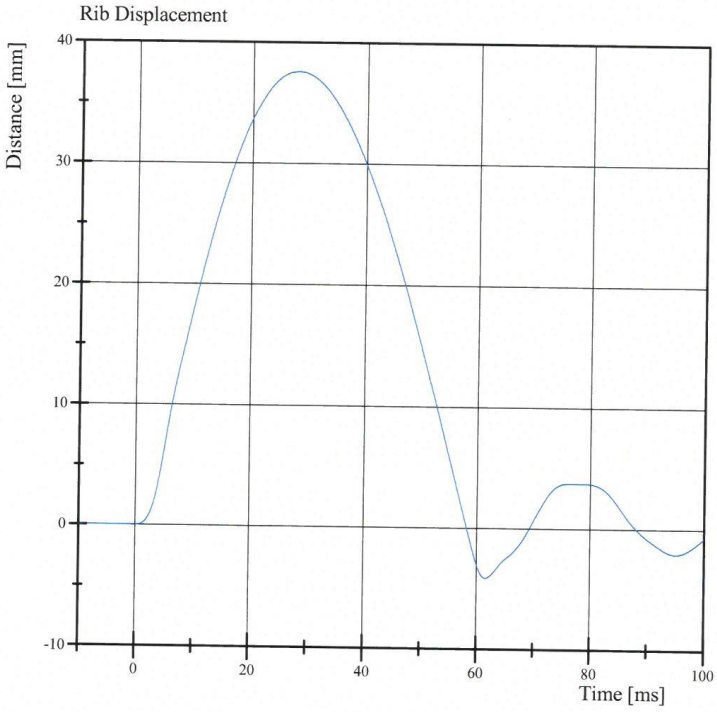
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:57:02 944

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 37.6 mm at 27.9 ms
Min: -4.1 mm at 61.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:57:14 944

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.7 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

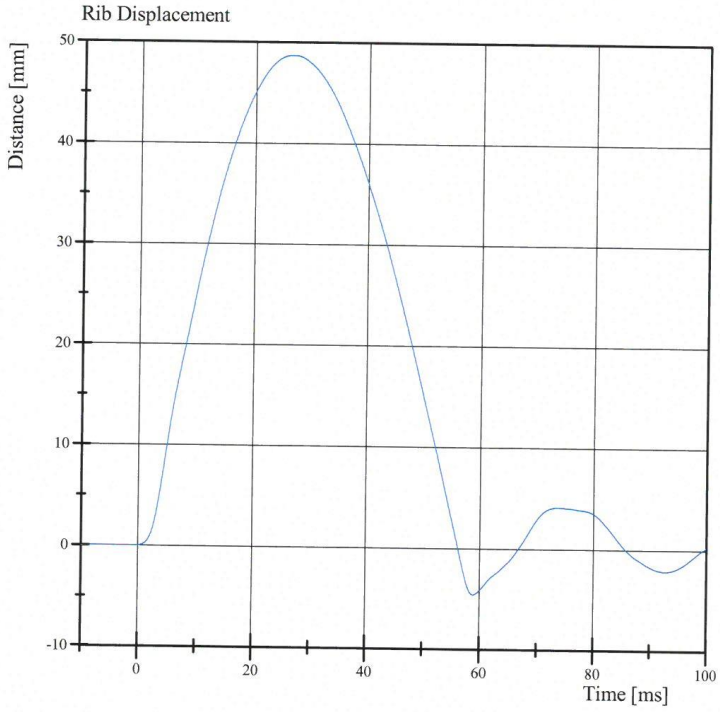
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:50:56 741

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 48.7 mm at 26.6 ms
Min: -4.6 mm at 58.9 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 07:51:04 741

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
3.0 m/s Test Rib Displacement (454 mm to 464 mm)	36 - 40 mm	37.4 mm	Yes

Test meets specifications.

Comments:

Drop Height: 462

Technician

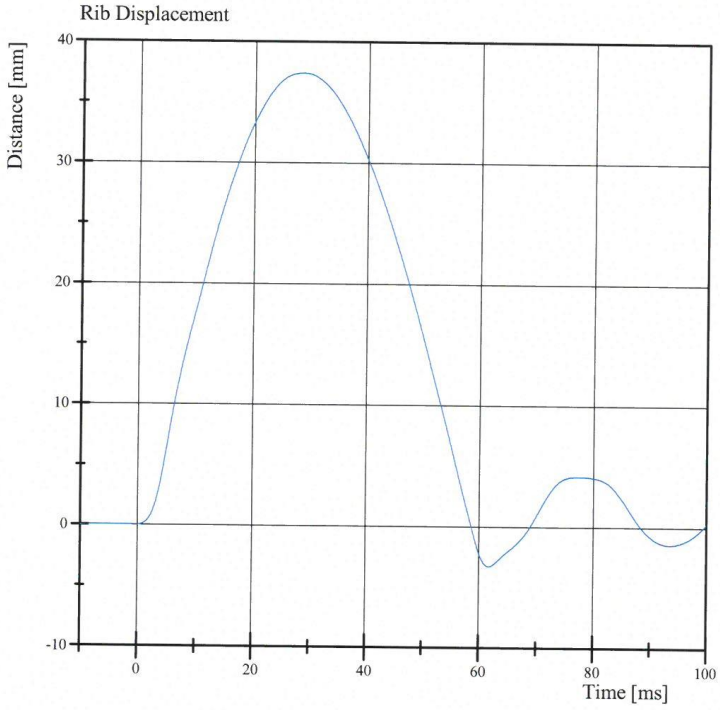
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 08:08:16 937

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 37.4 mm at 28.4 ms
Min: -3.3 mm at 61.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 08:08:29 937

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
4.0 m/s Test Rib Displacement (807 mm to 823 mm)	46 - 51 mm	48.3 mm	Yes

Test meets specifications.

Comments:

Drop Height: 816

Technician

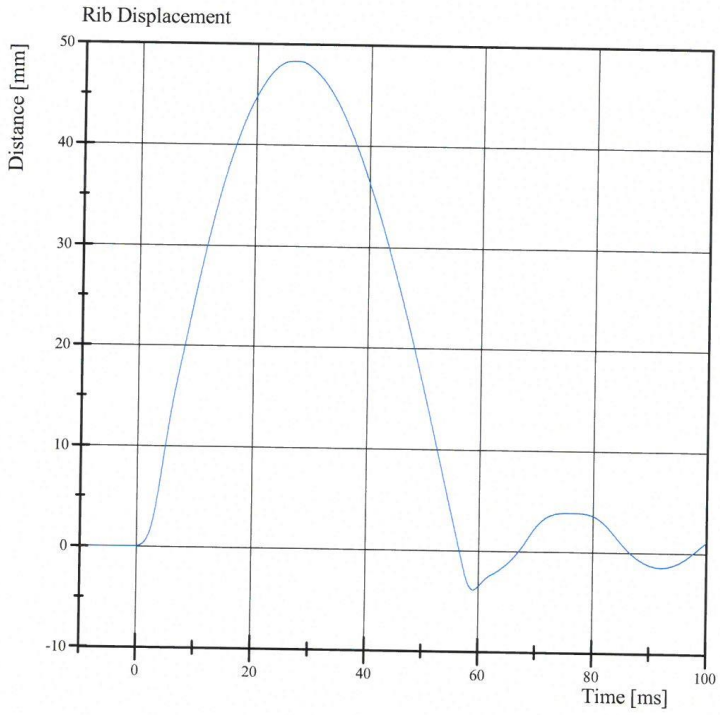
Approved

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 08:00:39 734

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 48.3 mm at 26.7 ms
Min: -3.8 mm at 59.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 08:00:51 734

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	5.4 - 5.60 m/s	5.560 m/s	Yes
Peak Impactor Force after 6 ms	(-5,100) - (-6,200) N	-5,566.2 N	Yes
Upper Rib Displacement	34 - 41 mm	37.9 mm	Yes
Center Rib Displacement	37 - 45 mm	40.8 mm	Yes
Lower Rib Displacement	37 - 44 mm	40.9 mm	Yes

Test meets specifications.

Comments:

Technician

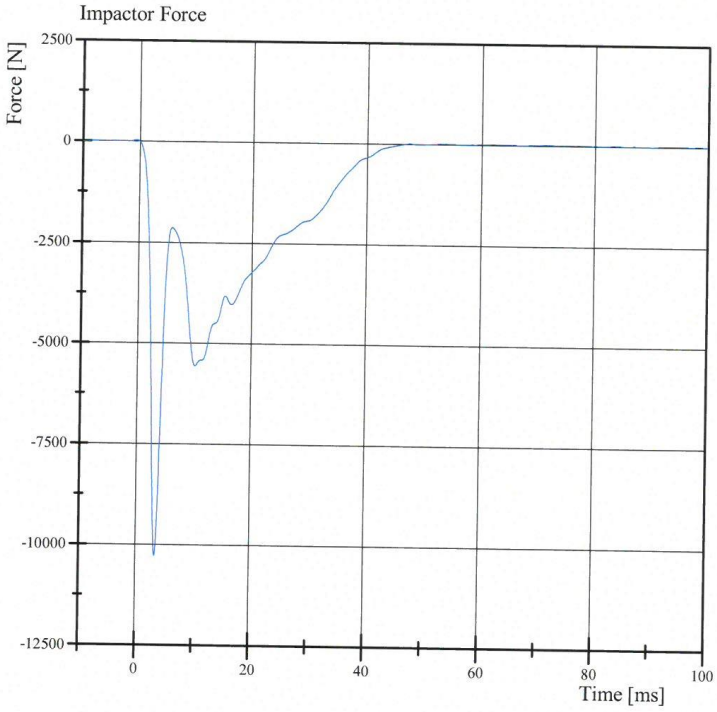
Approved

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

10.27.2015 10:44:16 443

Transportation Research Center Inc.

Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015



Filter Class: CFC_180
Max: 21.7 N at -0.6 ms
Min: -10,297.7 N at 3.4 ms

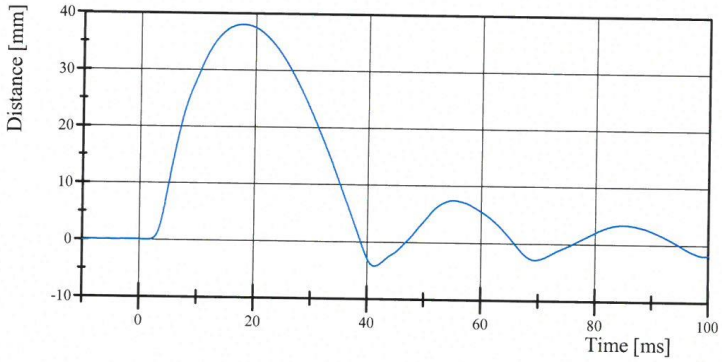
Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

10.27.2015 10:44:24 443

Transportation Research Center Inc.

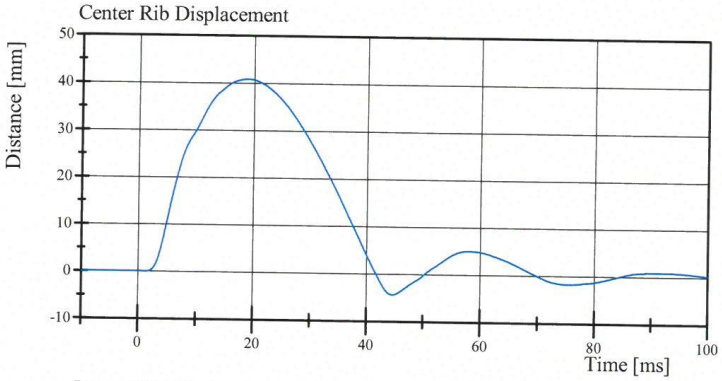
Left Lateral Thorax
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Upper Rib Displacement



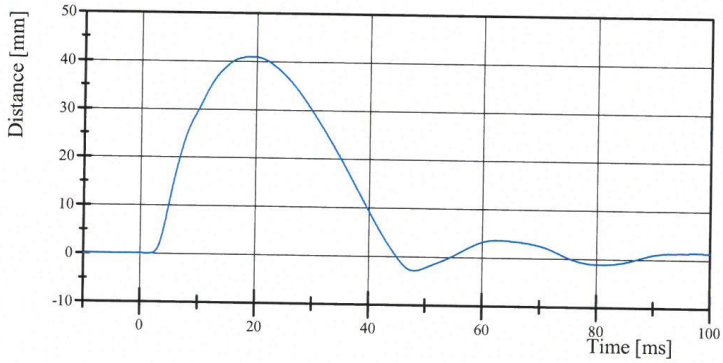
Filter Class: CFC_180
Max: 37.9 mm at 17.7 ms
Min: -4.2 mm at 41.3 ms

Center Rib Displacement



Filter Class: CFC_180
Max: 40.8 mm at 18.7 ms
Min: -4.3 mm at 44.6 ms

Lower Rib Displacement



Filter Class: CFC_180
Max: 40.9 mm at 19.1 ms
Min: -2.8 mm at 48.1 ms

Specification Source: Procedures based on Final Rule dated 8/15/2008.
Polarity in accordance with SAE J211.

10.27.2015 10:44:25 443

Transportation Research Center Inc.

Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 29-3
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	4.08 m/s	Yes
Test Probe Force			
Peak	4,000 - 4,800 N	4,252.8 N	Yes
Time of Peak	10.6 - 13.0 ms	11.12 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,699.3 N	Yes
Time of Peak	10.0 - 12.3 ms	11.12 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

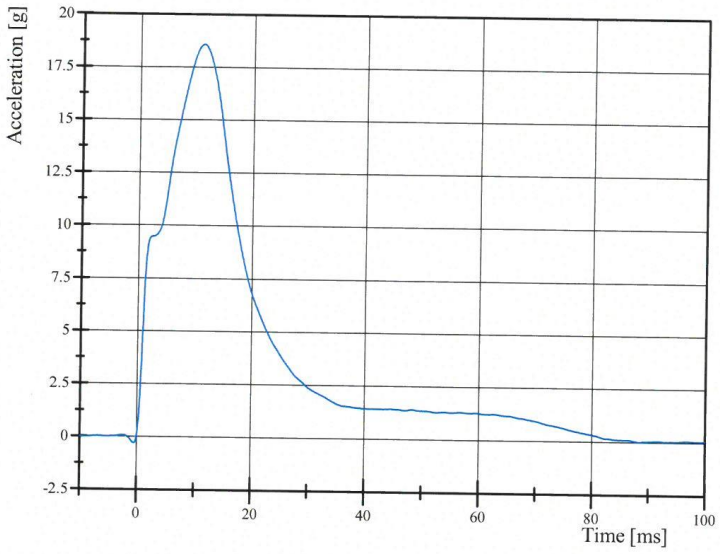
Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 12:43:09 581

Transportation Research Center Inc.

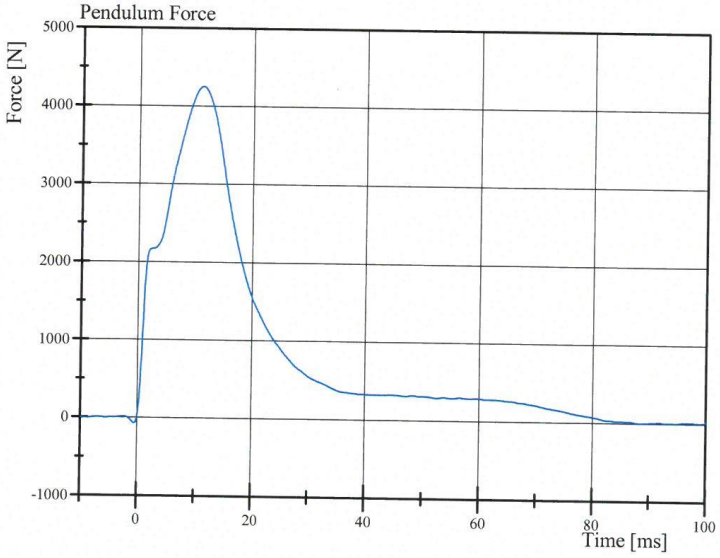
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 29-3
Test Date: 10/27/2015

Pendulum Acceleration



Filter Class: CFC_180
Max: 18.6 g at 11.1 ms
Min: -0.3 g at -0.6 ms

Pendulum Force



Filter Class: CFC_180
Max: 4,252.8 N at 11.1 ms
Min: -74.5 N at -0.6 ms

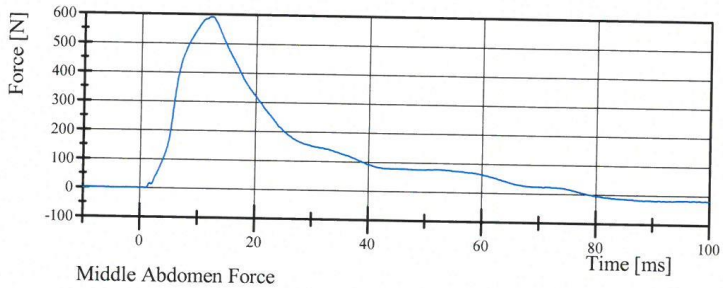
Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 12:43:16 581

Transportation Research Center Inc.

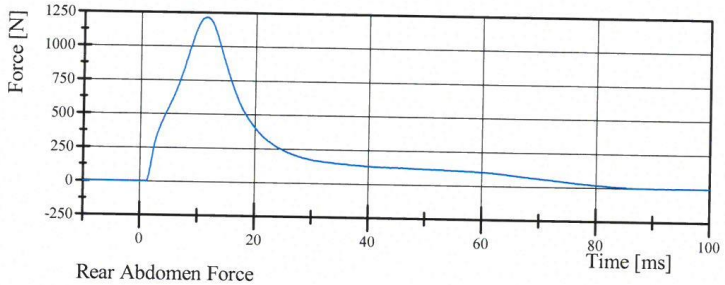
Left Lateral Abdomen
ES-2re Serial No. F030 Certification No. 29-3
Test Date: 10/27/2015

Front Abdomen Force



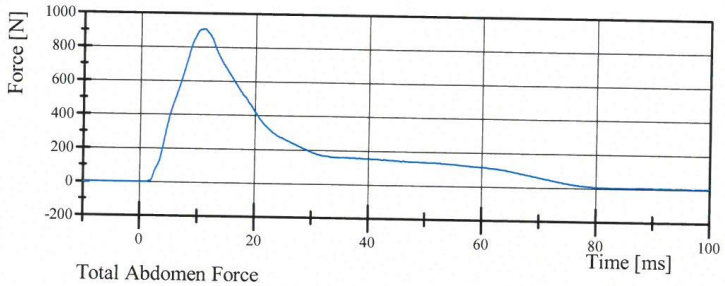
Filter Class: CFC_600
Max: 590.7 N at 11.9 ms
Min: -18.7 N at 90.6 ms

Middle Abdomen Force



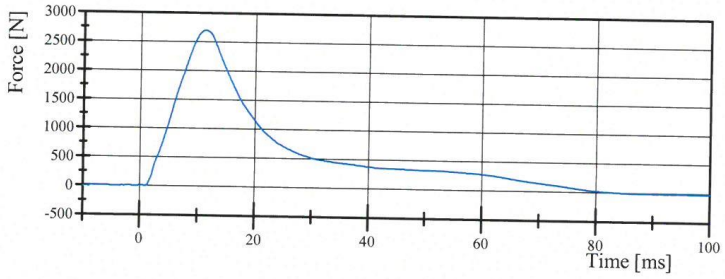
Filter Class: CFC_600
Max: 1,212.5 N at 11.4 ms
Min: -1.7 N at 1.0 ms

Rear Abdomen Force



Filter Class: CFC_600
Max: 906.5 N at 11.0 ms
Min: -0.2 N at -0.6 ms

Total Abdomen Force



Filter Class: CFC_600
Max: 2,699.3 N at 11.1 ms
Min: -14.1 N at 93.5 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 12:43:17 581

Transportation Research Center Inc.

Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Integrated Velocity Change within Corridor	Yes	Yes	Yes
Pendulum Velocity	(-5.95) - (-6.15) m/s	-6.064 m/s	Yes
Maximum Headform Flexion			
Peak	(-45) - (-55) deg	-46.2 deg	Yes
Time of Peak	39 - 53 ms	42.6 ms	Yes
Headform Flexion Decay - Peak to Zero	37 - 57 ms	39.7 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

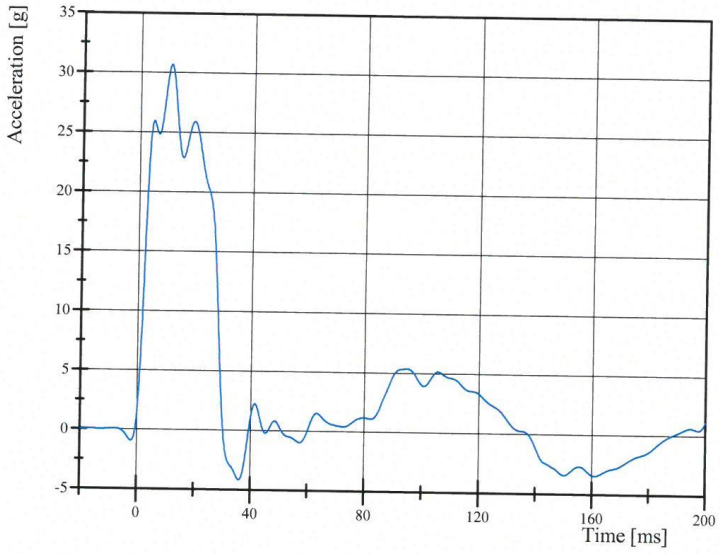
Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:18:22 575

Transportation Research Center Inc.

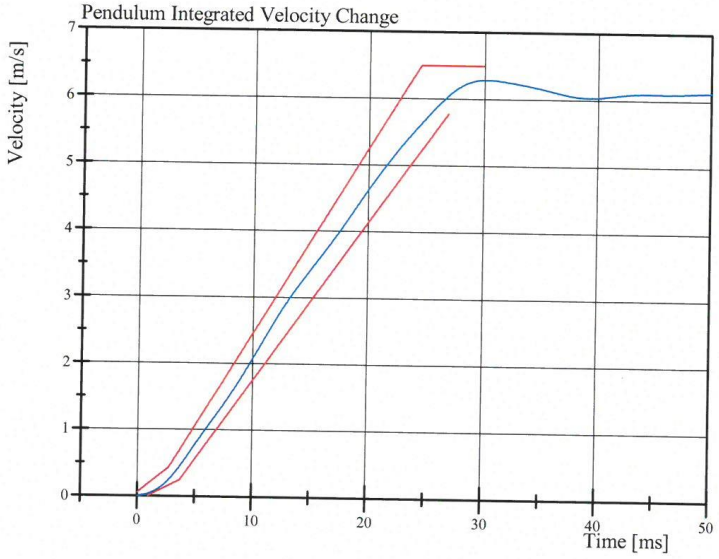
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Pendulum Acceleration



Filter Class: CFC_60
Max: 30.7 g at 10.6 ms
Min: -4.2 g at 36.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_60
Max: 6.3 m/s at 30.2 ms
Min: 0.0 m/s at 0.0 ms

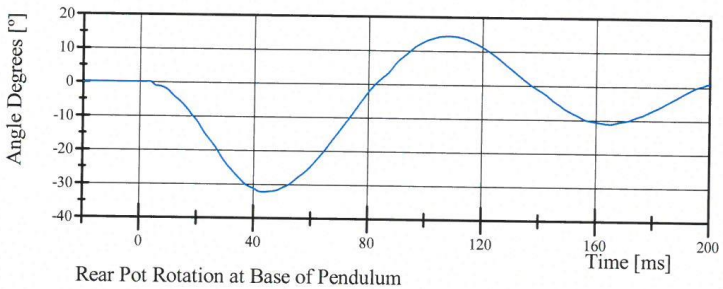
Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:18:29 575

Transportation Research Center Inc.

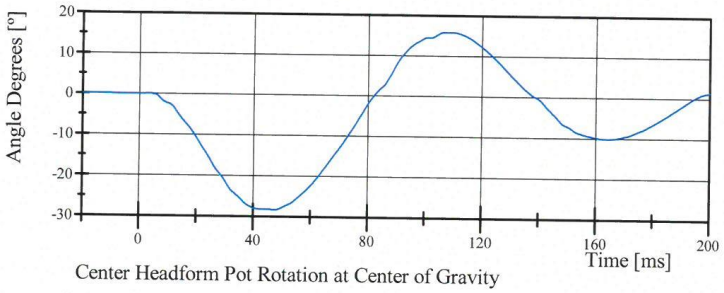
Left Lateral Lumbar
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/26/2015

Forward Pot Rotation at Base of Pendulum



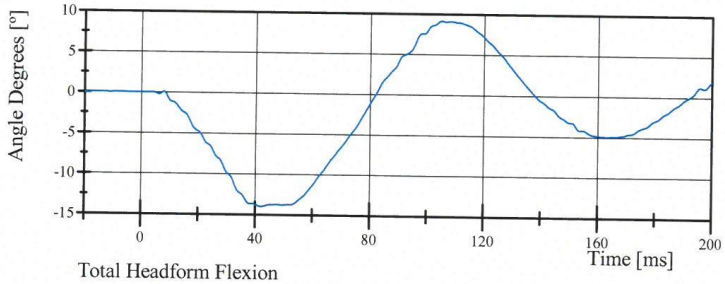
Filter Class: CFC_180
Max: 14.4 ° at 108.2 ms
Min: -32.2 ° at 43.4 ms

Rear Pot Rotation at Base of Pendulum



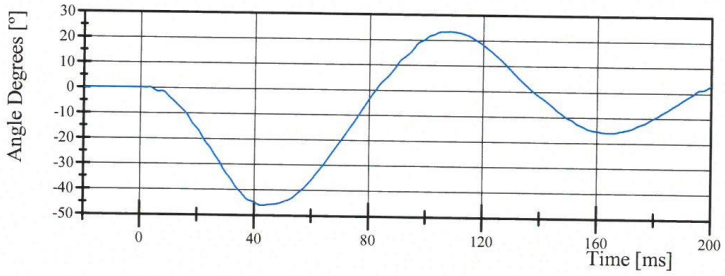
Filter Class: CFC_180
Max: 15.9 ° at 108.1 ms
Min: -28.3 ° at 47.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 9.1 ° at 105.0 ms
Min: -14.0 ° at 42.0 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 23.5 ° at 108.2 ms
Min: -46.2 ° at 42.6 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.26.2015 13:18:30 575

Transportation Research Center Inc.

Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.24 m/s	Yes
Test Probe Force			
Peak	4,700 - 5,400 N	5,061.7 N	Yes
Time of Peak	11.8 - 16.1 ms	12.96 ms	Yes
Pubic Symphysis Force			
Peak	(-1,230) - (-1,590) N	-1,244.3 N	Yes
Time of Peak	12.2 - 17.0 ms	14.00 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

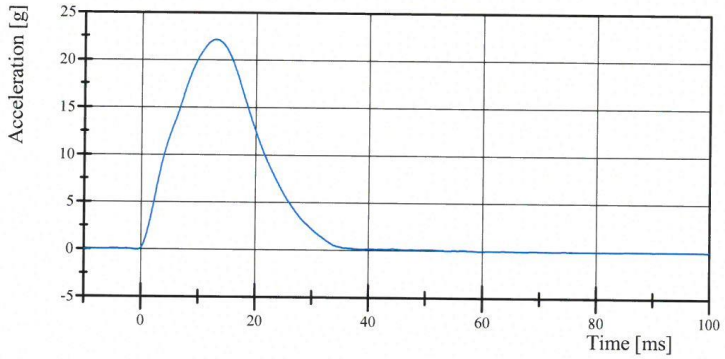
Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 11:15:10 587

Transportation Research Center Inc.

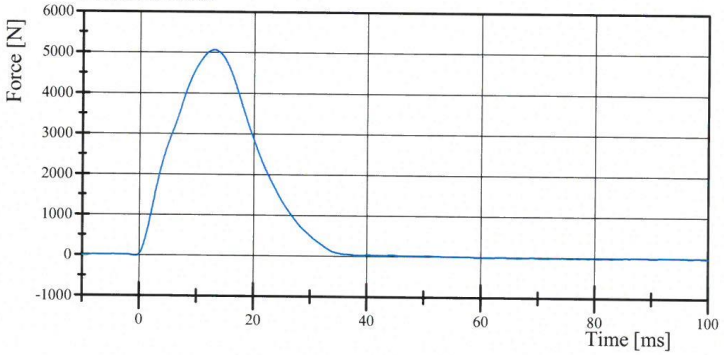
Left Lateral Pelvis
ES-2re Serial No. F030 Certification No. 29-1
Test Date: 10/27/2015

Pendulum Acceleration



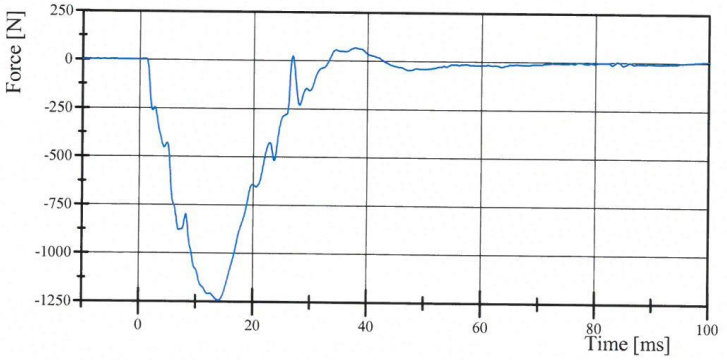
Filter Class: CFC_180
Max: 22.1 g at 13.0 ms
Min: -0.1 g at -0.7 ms

Pendulum Force



Filter Class: CFC_180
Max: 5,061.7 N at 13.0 ms
Min: -20.7 N at -0.7 ms

Pubic Symphysis Force



Filter Class: CFC_600
Max: 65.5 N at 37.8 ms
Min: -1,244.3 N at 14.0 ms

Specification Source: NHTSA Final Rule 8/15/2008

10.27.2015 11:15:17 587

Pre-Test Calibration
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.033

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	445	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	127	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	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	525	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	401	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	318	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician

Melissa Schenker

Approved

Revised 9/29/2005

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	124.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	4.1 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Melissa Schreiber

Approved

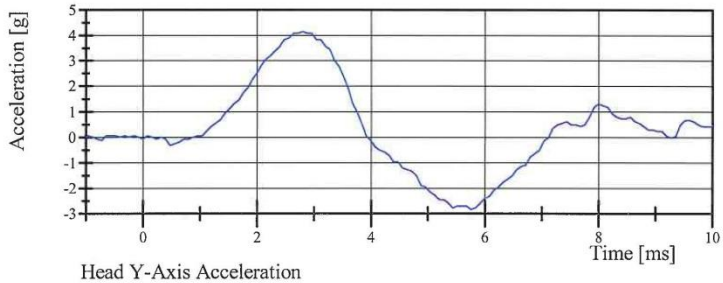
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 14:51:16 232

Transportation Research Center Inc.

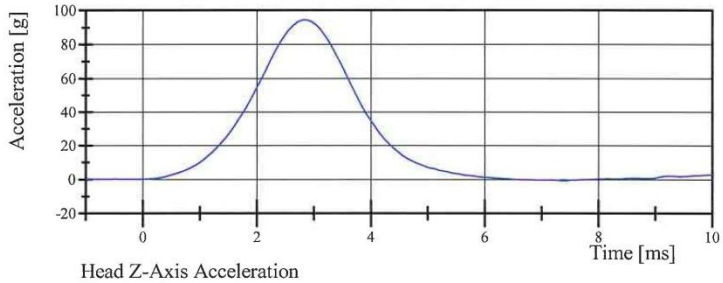
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Head X-Axis Acceleration



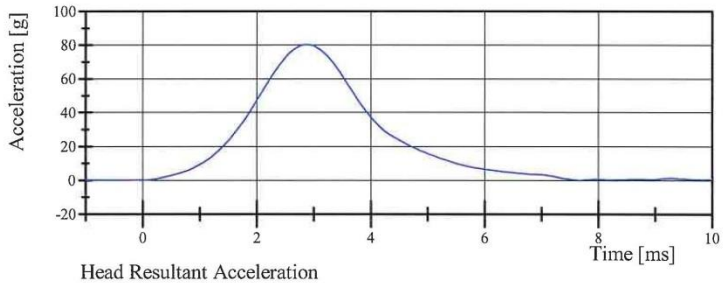
Filter Class: CFC_1000
Max: 4.1 g at 2.8 ms
Min: -2.8 g at 5.8 ms

Head Y-Axis Acceleration



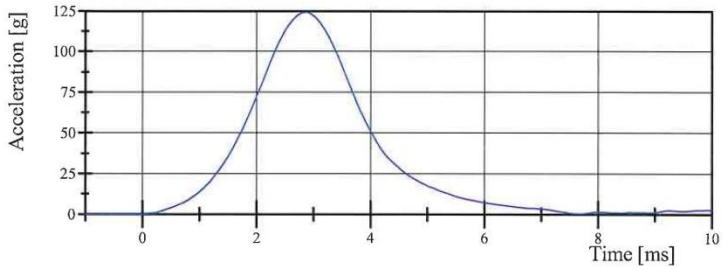
Filter Class: CFC_1000
Max: 94.5 g at 2.9 ms
Min: -0.7 g at 7.4 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 80.4 g at 2.9 ms
Min: -0.0 g at -0.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 124.1 g at 2.9 ms
Min: 0.1 g at -1.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 14:51:23 232

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.599 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.434 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.596 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.867 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.803 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.857 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.5 deg	Yes
Time of Peak	50 - 70 ms	65.8 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	113.3 ms	Yes

Test meets specifications.

Comments:

Technician

Melissa Schintzer

Approved

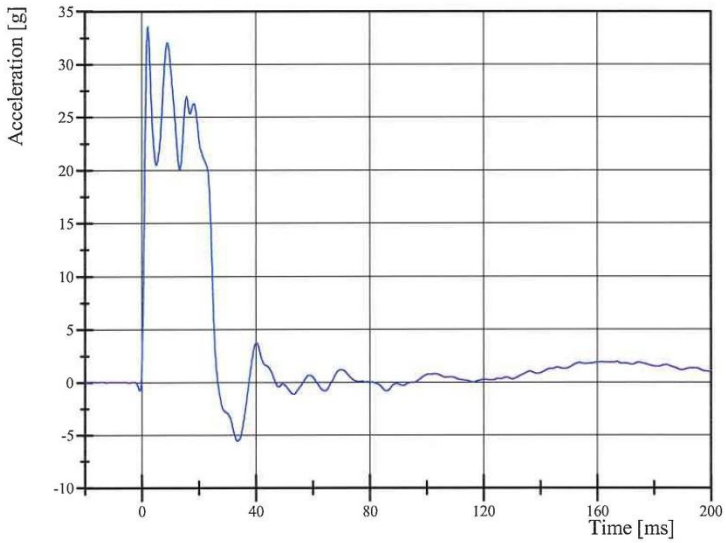
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 09:33:06 639

Transportation Research Center Inc.

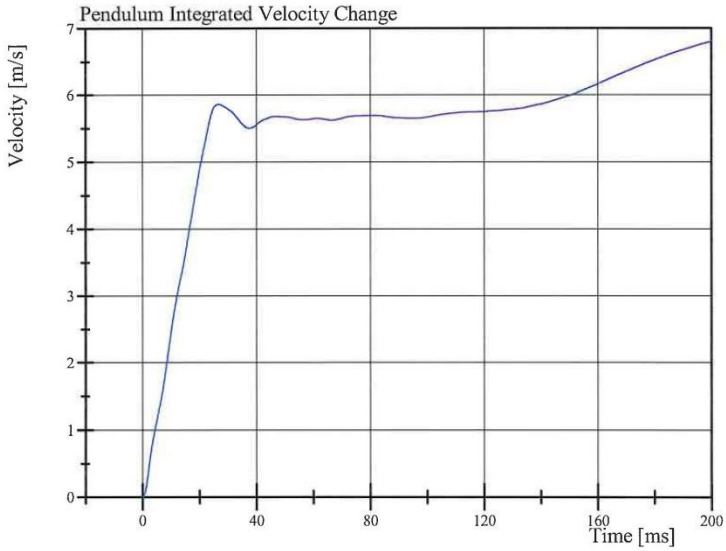
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Pendulum Acceleration



Filter Class: CFC_180
Max: 33.5 g at 2.2 ms
Min: -5.6 g at 33.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.8 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

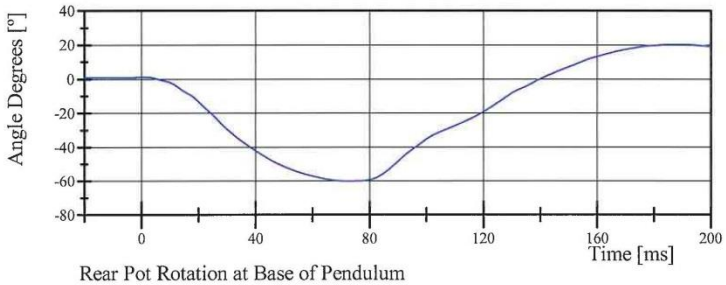
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 09:33:14 639

Transportation Research Center Inc.

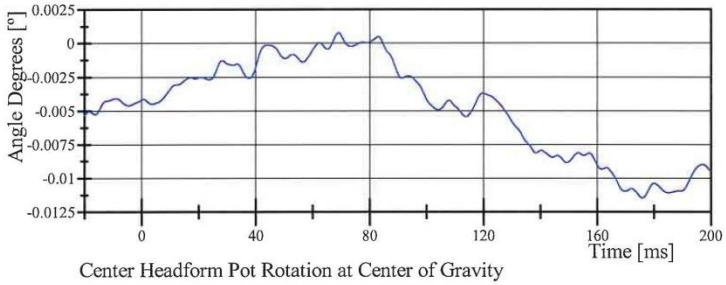
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Forward Pot Rotation at Base of Pendulum



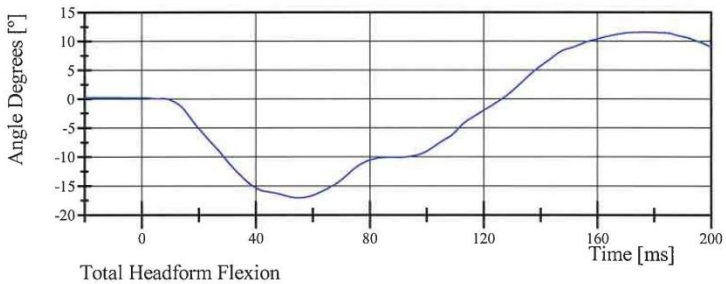
Filter Class: CFC_60
Max: 20.4 ° at 187.2 ms
Min: -60.2 ° at 71.9 ms

Rear Pot Rotation at Base of Pendulum



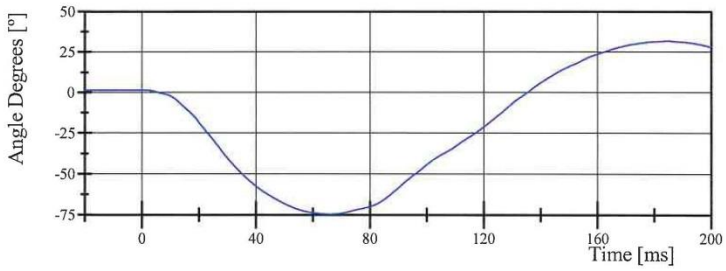
Filter Class: CFC_60
Max: 0.0 ° at 69.1 ms
Min: -0.0 ° at 175.9 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.6 ° at 177.4 ms
Min: -17.1 ° at 55.1 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 31.8 ° at 184.7 ms
Min: -74.5 ° at 65.8 ms

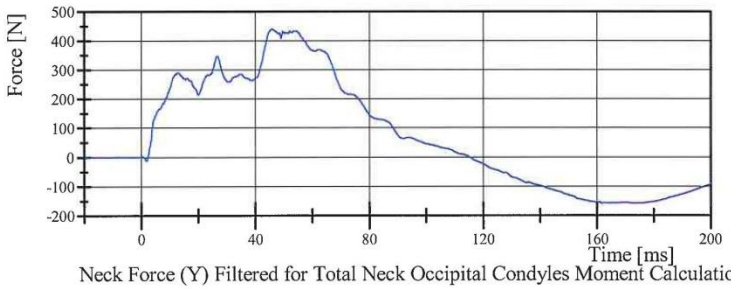
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 09:33:15 639

Transportation Research Center Inc.

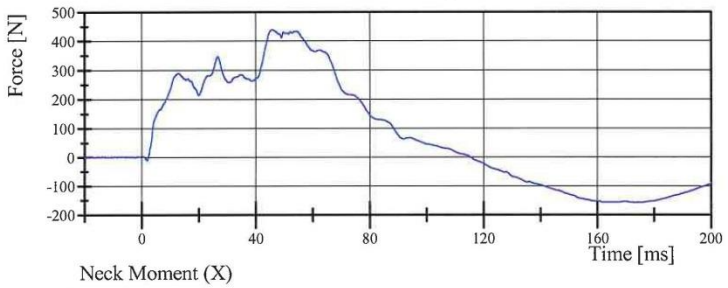
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Neck Force (Y)



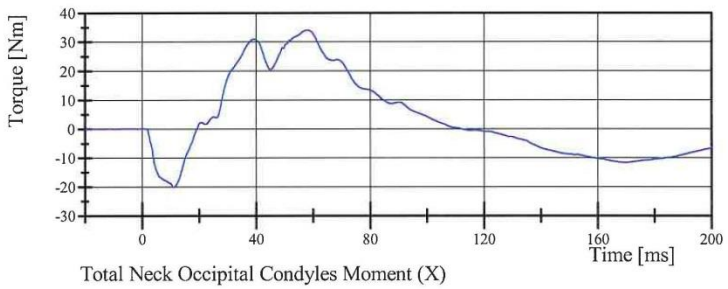
Filter Class: CFC_1000
Max: 440.5 N at 45.9 ms
Min: -156.8 N at 173.4 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



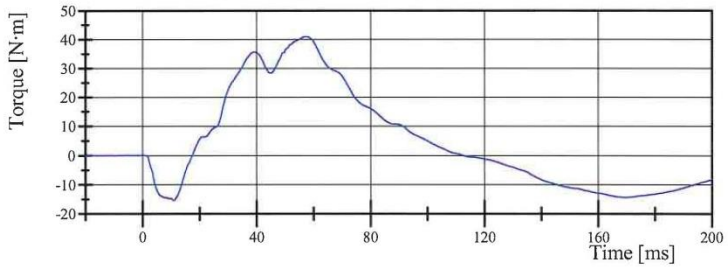
Filter Class: CFC_600
Max: 439.8 N at 45.9 ms
Min: -156.6 N at 173.7 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 34.0 Nm at 58.3 ms
Min: -20.2 Nm at 11.1 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Constai
Max: 41.0 N·m at 57.4 ms
Min: -15.4 N·m at 11.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 09:33:15 639

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 33-2
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.5 g	Yes
Shoulder Displacement	28 - 37 mm	29.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.6 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

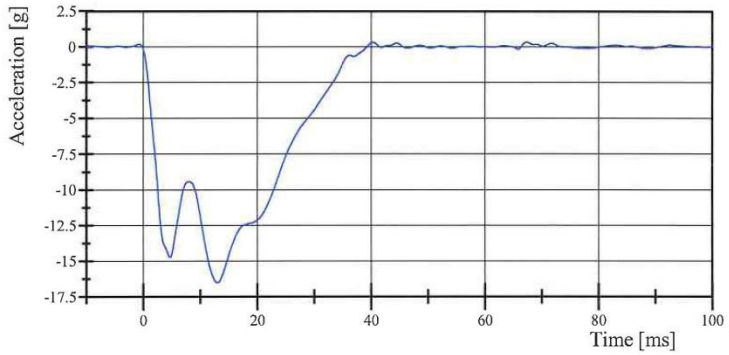
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:07:47 829

Transportation Research Center Inc.

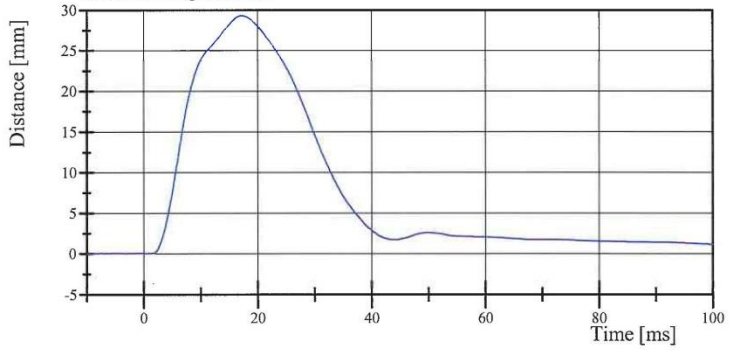
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 33-2
Test Date: 10/19/2015

Probe Acceleration



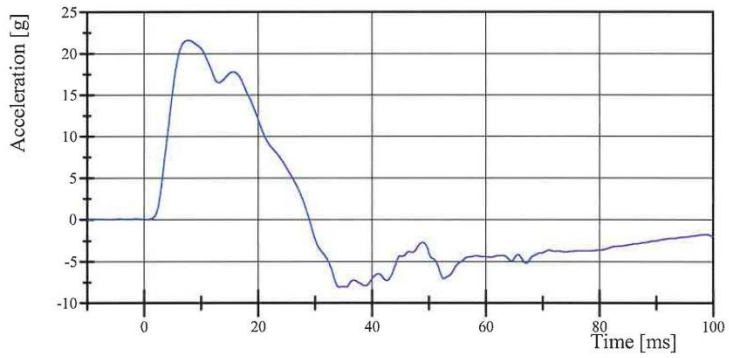
Filter Class: CFC_180
Max: 0.3 g at 67.4 ms
Min: -16.5 g at 13.0 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 29.3 mm at 17.2 ms
Min: -0.0 mm at -6.0 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 21.6 g at 7.8 ms
Min: -8.1 g at 34.3 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:07:58 829

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 33-6
Test Date: 10/20/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.784 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.0 g	Yes
Shoulder Displacement	31 - 40 mm	35.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.1 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	32.5 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	40.4 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.7 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schneider

Approved

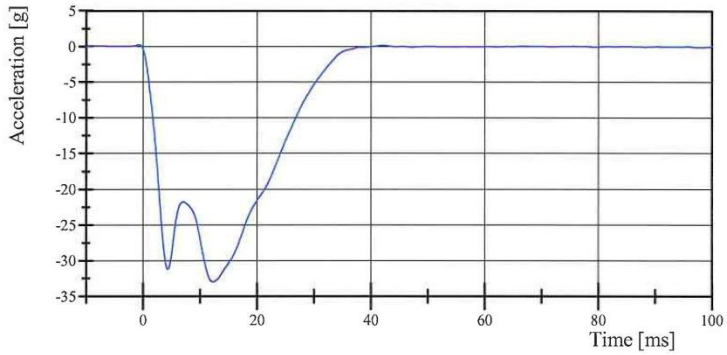
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 11:37:39 629

Transportation Research Center Inc.

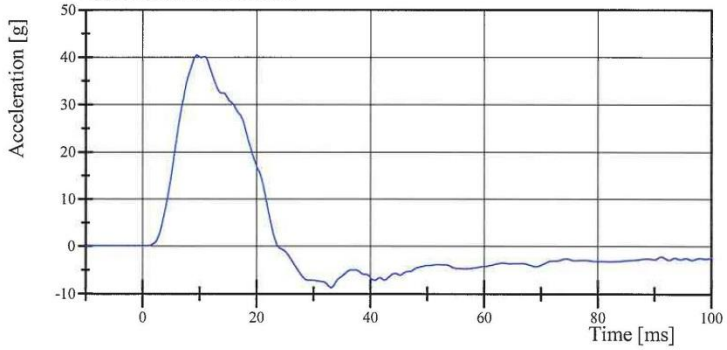
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 33-6
Test Date: 10/20/2015

Probe Acceleration



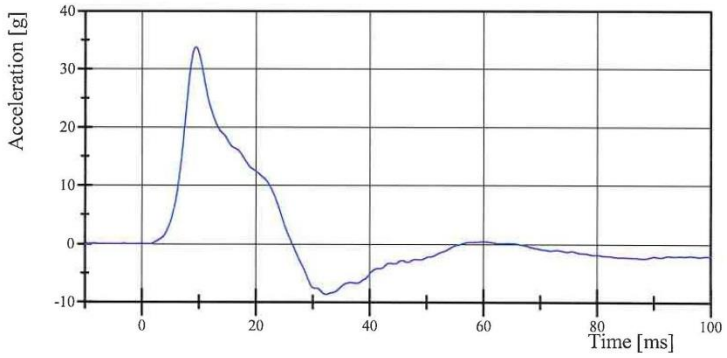
Filter Class: CFC_180
Max: 0.2 g at -0.7 ms
Min: -33.0 g at 12.3 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 40.4 g at 9.5 ms
Min: -8.7 g at 33.1 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 33.7 g at 9.4 ms
Min: -8.7 g at 32.3 ms

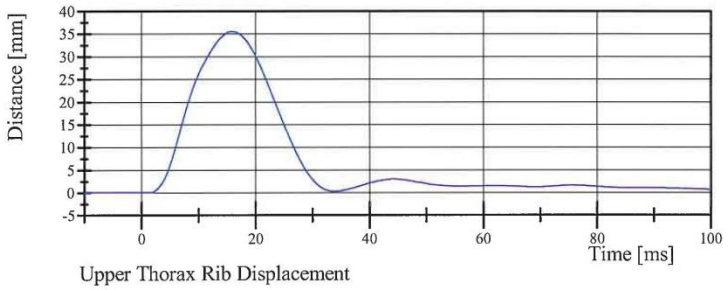
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 11:37:48 629

Transportation Research Center Inc.

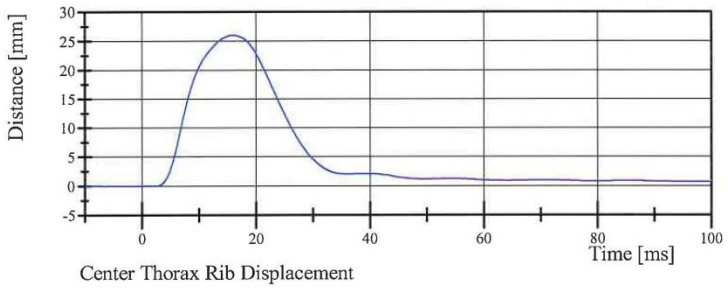
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 33-6
Test Date: 10/20/2015

Shoulder Rib Displacement



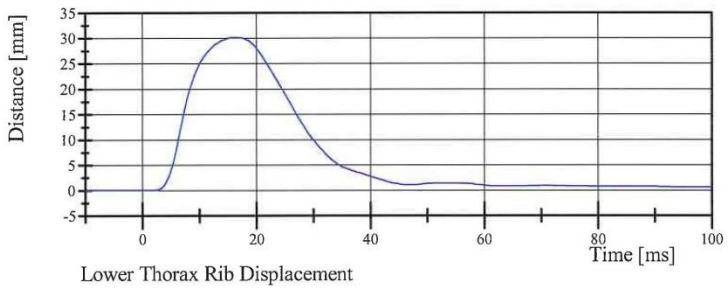
Filter Class: CFC_600
Max: 35.5 mm at 15.8 ms
Min: -0.0 mm at 1.4 ms

Upper Thorax Rib Displacement



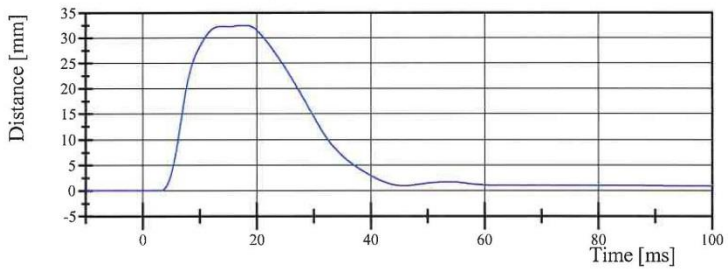
Filter Class: CFC_600
Max: 26.0 mm at 15.9 ms
Min: -0.0 mm at -5.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 30.1 mm at 16.2 ms
Min: -0.0 mm at -1.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.5 mm at 17.8 ms
Min: -0.0 mm at 3.2 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 11:37:48 629

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.342 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.6 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.1 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.9 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.8 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

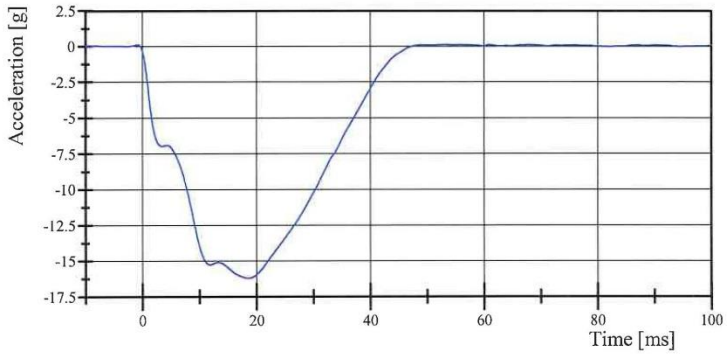
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:46:55 814

Transportation Research Center Inc.

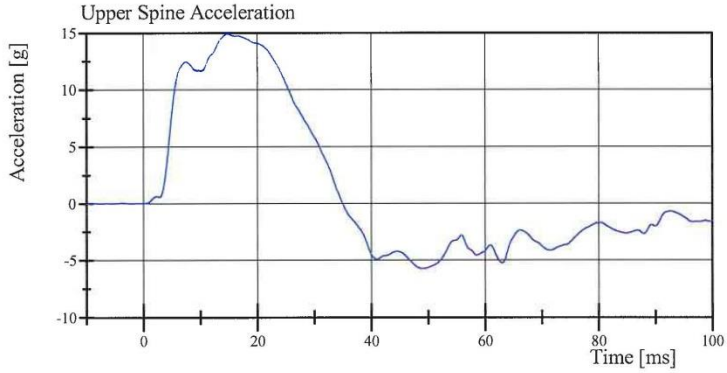
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Probe Acceleration



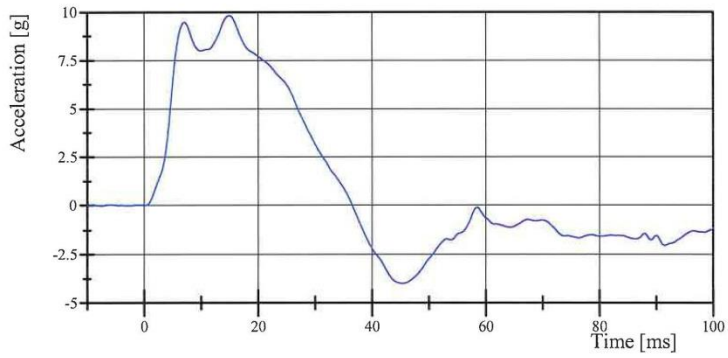
Filter Class: CFC_180
Max: 0.1 g at 53.0 ms
Min: -16.2 g at 18.6 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 14.9 g at 14.8 ms
Min: -5.7 g at 49.0 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.8 g at 15.0 ms
Min: -4.0 g at 45.4 ms

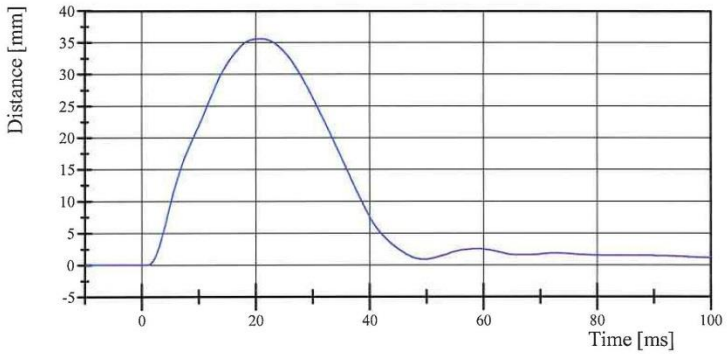
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:47:06 814

Transportation Research Center Inc.

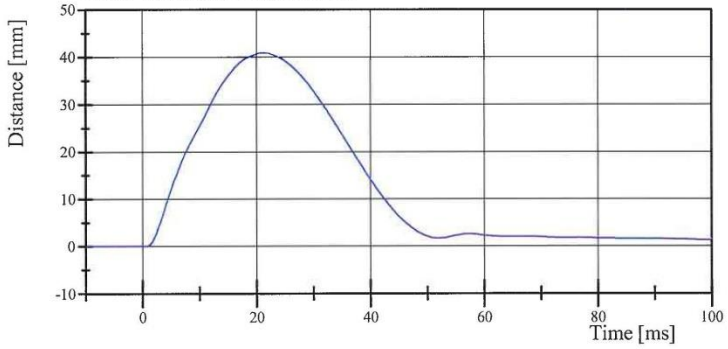
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Upper Thorax Rib Displacement



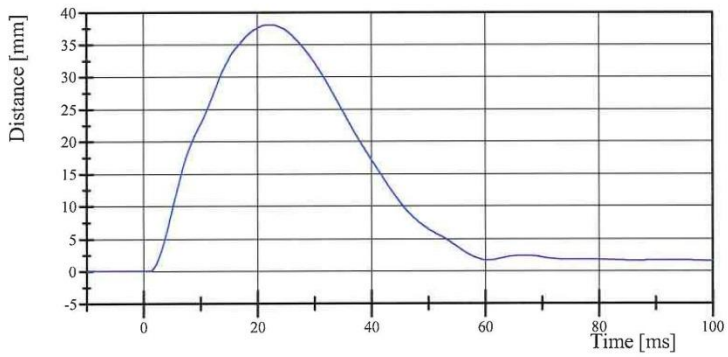
Filter Class: CFC_600
Max: 35.6 mm at 20.6 ms
Min: -0.0 mm at 1.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.8 mm at 21.3 ms
Min: -0.0 mm at -7.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 38.1 mm at 21.9 ms
Min: -0.0 mm at -8.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:47:06 814

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	21 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.2 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.1 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	41.5 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.52 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schenker

Approved

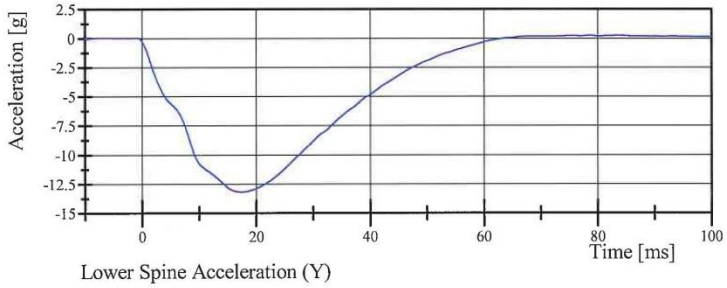
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:24:05 696

Transportation Research Center Inc.

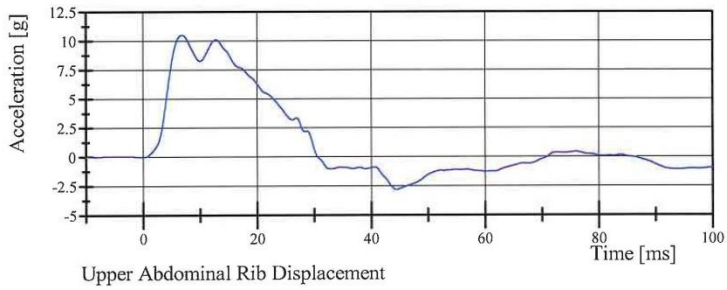
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Probe Acceleration



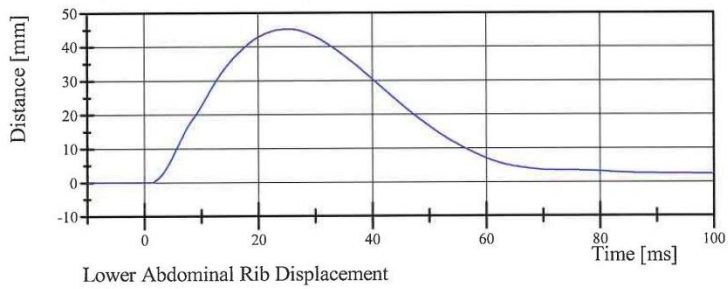
Filter Class: CFC_180
Max: 0.3 g at 84.0 ms
Min: -13.2 g at 17.4 ms

Lower Spine Acceleration (Y)



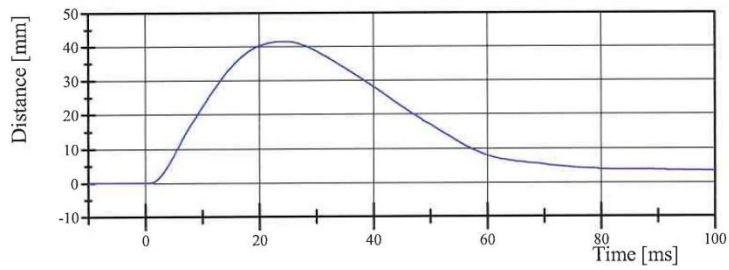
Filter Class: CFC_180
Max: 10.5 g at 6.8 ms
Min: -2.8 g at 44.5 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 45.1 mm at 25.0 ms
Min: -0.0 mm at 1.2 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 41.5 mm at 24.2 ms
Min: -0.0 mm at -2.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 11:24:13 696

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	20 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.41 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.9 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,215.3 N	Yes

Test meets specifications.

Comments:

Technician

Melissa Schreiber

Approved

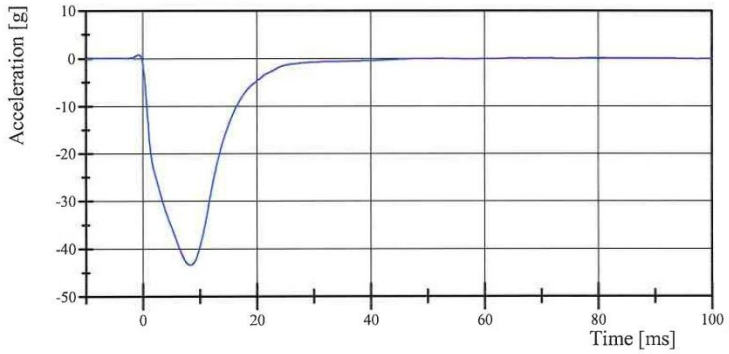
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 13:35:05 466

Transportation Research Center Inc.

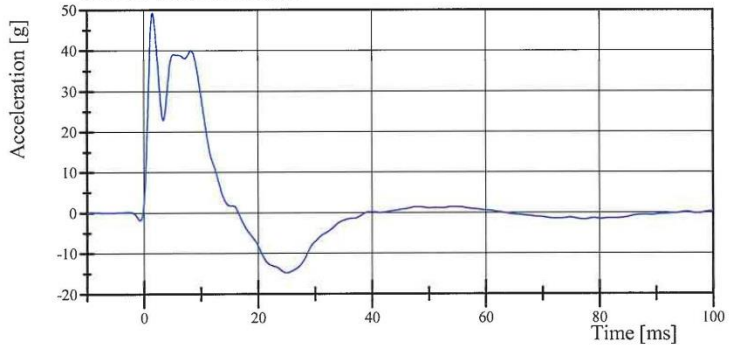
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/19/2015

Probe Acceleration



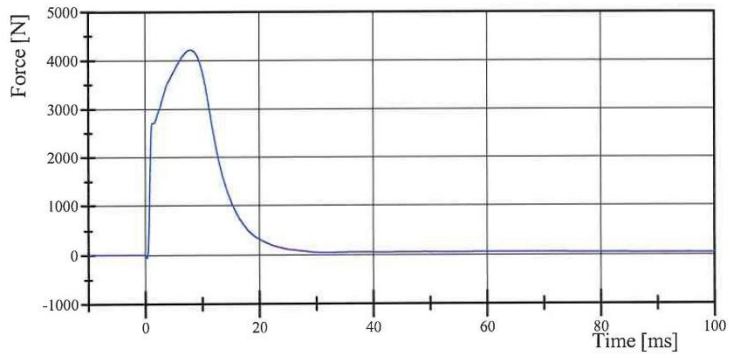
Filter Class: CFC_180
Max: 0.7 g at -0.6 ms
Min: -43.4 g at 8.3 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 49.2 g at 1.5 ms
Min: -14.8 g at 25.0 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,215.3 N at 8.0 ms
Min: -57.6 N at 0.3 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.19.2015 13:35:12 466

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/20/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-39.6 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	29.4 g	Yes
Iliac Force	4,100 - 5,100 N	4,647.2 N	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

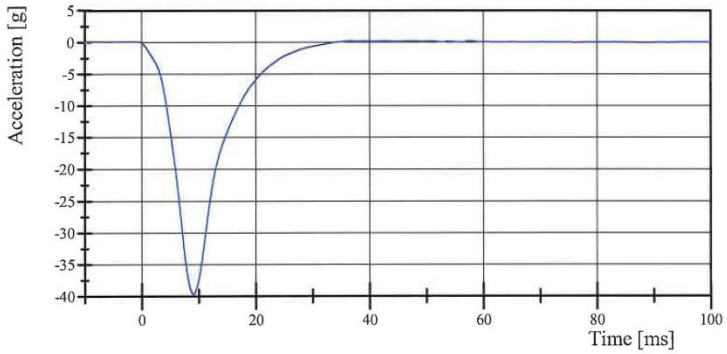
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 13:38:17 681

Transportation Research Center Inc.

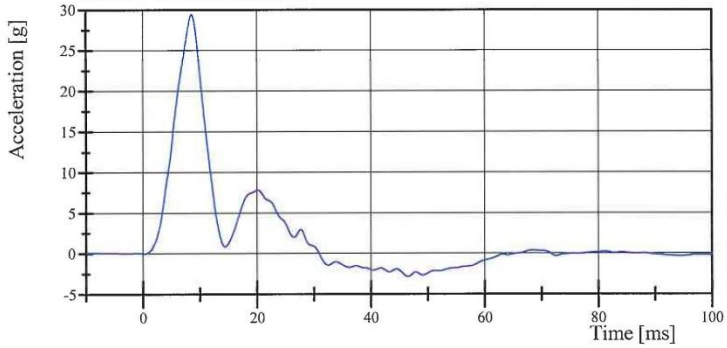
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 33-1
Test Date: 10/20/2015

Probe Acceleration



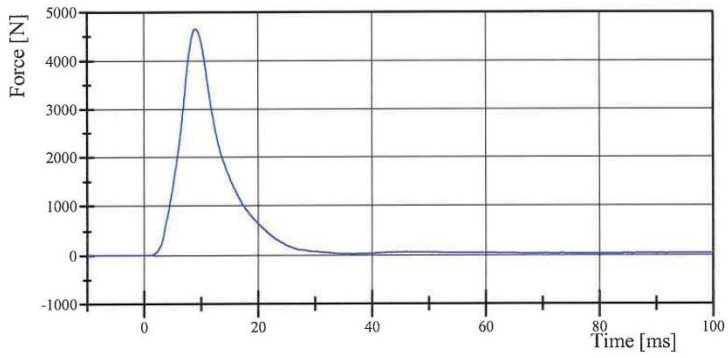
Filter Class: CFC_180
Max: 0.2 g at 57.5 ms
Min: -39.6 g at 9.0 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 29.4 g at 8.6 ms
Min: -2.8 g at 46.5 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,647.2 N at 9.0 ms
Min: -0.7 N at -1.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.20.2015 13:38:27 681

Post-Test Calibration
Passenger S/N 305

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.034

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	445	Yes
C	H-Point Height	79.0 - 89.0	84	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	102	Yes
F	Thigh Clearance	119.0 - 135.0	127	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	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	525	Yes
L	Popliteal Height	343.0 - 369.0	355	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	401	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	318	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	347	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

Technician

Melissa Schinker

Approved

Revised 9/29/2005

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/26/2015

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.6 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Melissa Schimpel

Approved

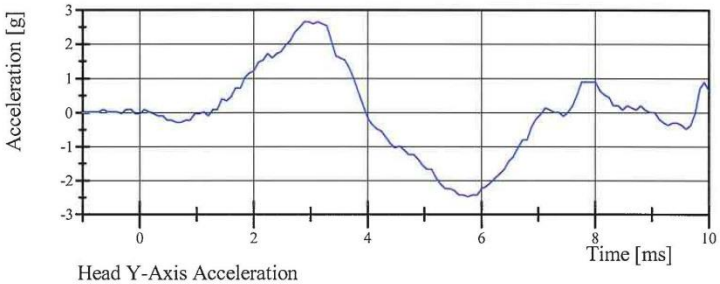
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.26.2015 14:08:00 230

Transportation Research Center Inc.

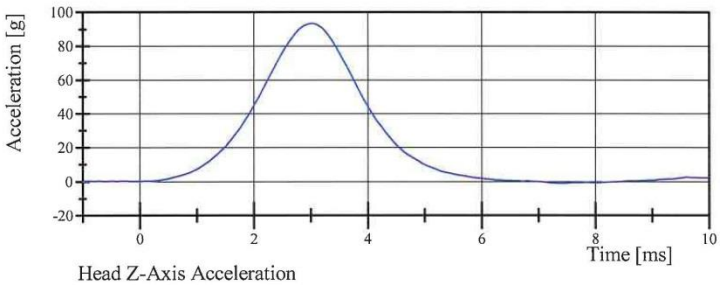
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/26/2015

Head X-Axis Acceleration



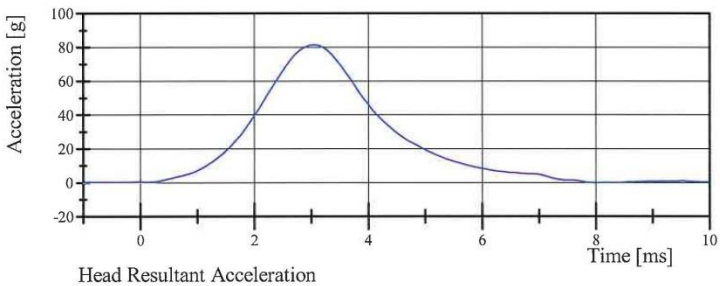
Filter Class: CFC_1000
Max: 2.6 g at 2.9 ms
Min: -2.5 g at 5.8 ms

Head Y-Axis Acceleration



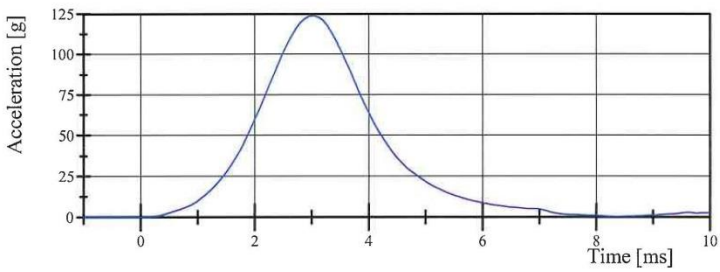
Filter Class: CFC_1000
Max: 93.2 g at 3.0 ms
Min: -1.1 g at 7.4 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 81.3 g at 3.0 ms
Min: -0.2 g at 8.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 123.7 g at 3.0 ms
Min: 0.0 g at -0.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.26.2015 14:08:06 230

Transportation Research Center Inc.

Left Lateral Neck
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/26/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.596 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.363 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.465 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.679 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.659 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.817 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.3 deg	Yes
Time of Peak	50 - 70 ms	67.8 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.1 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	118.0 ms	Yes

Test meets specifications.

Comments:

Technician

Melissa Schuster

Approved

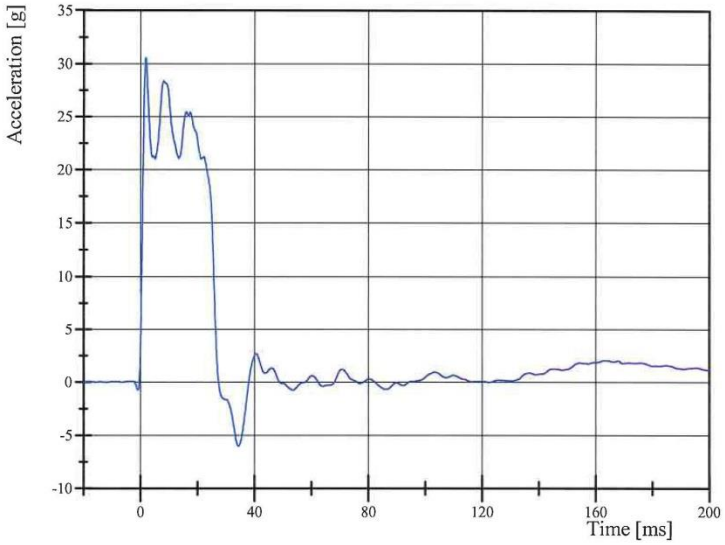
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.26.2015 14:58:09 643

Transportation Research Center Inc.

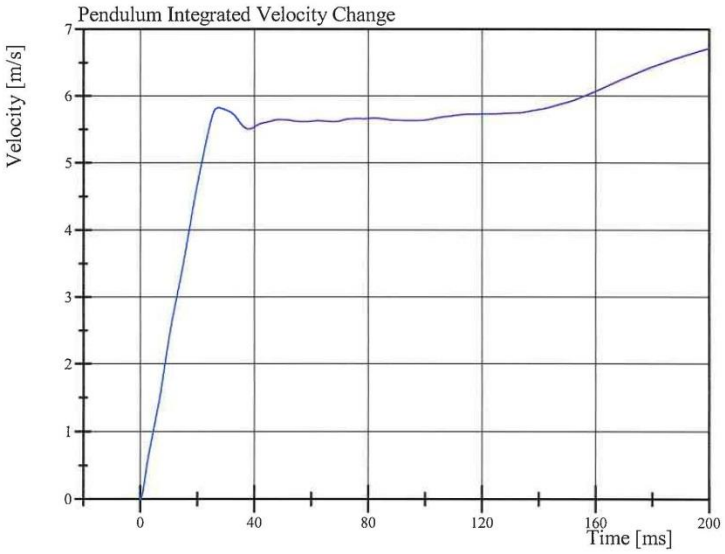
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/26/2015

Pendulum Acceleration



Filter Class: CFC_180
Max: 30.5 g at 1.8 ms
Min: -6.0 g at 34.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.7 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

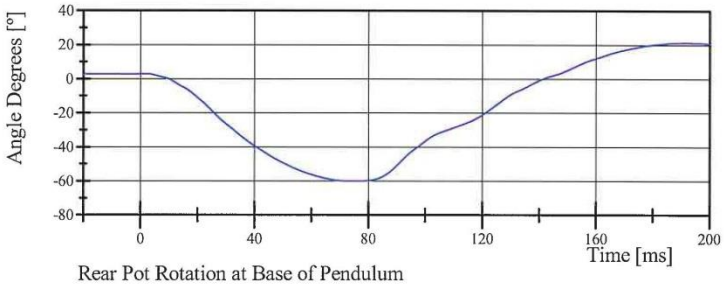
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.26.2015 14:58:15 643

Transportation Research Center Inc.

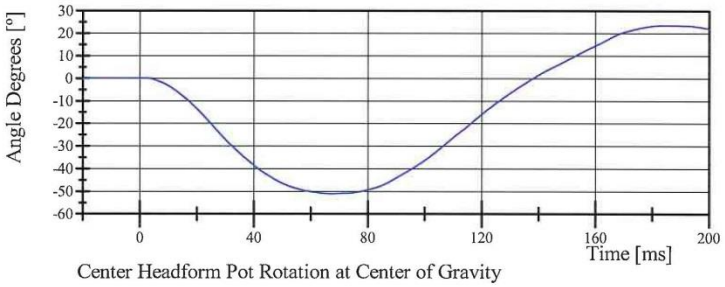
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/26/2015

Forward Pot Rotation at Base of Pendulum



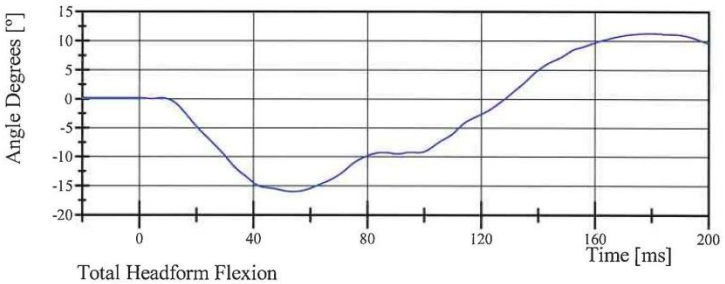
Filter Class: CFC_60
Max: 21.3 ° at 191.7 ms
Min: -60.2 ° at 72.7 ms

Rear Pot Rotation at Base of Pendulum



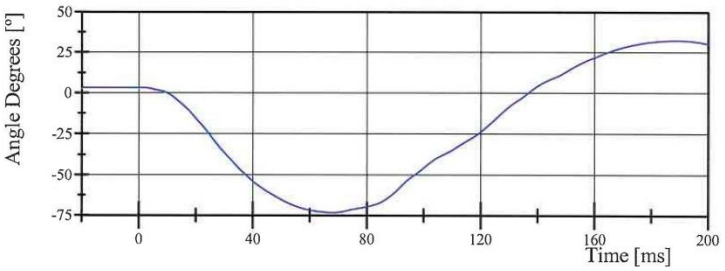
Filter Class: CFC_60
Max: 23.5 ° at 183.4 ms
Min: -51.2 ° at 67.2 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.3 ° at 179.7 ms
Min: -16.0 ° at 53.8 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 32.4 ° at 188.5 ms
Min: -73.3 ° at 67.8 ms

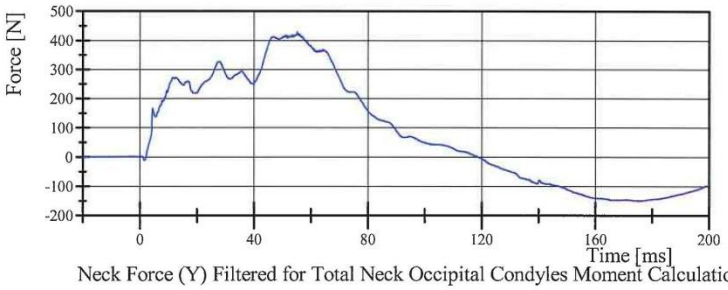
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.26.2015 14:58:16 643

Transportation Research Center Inc.

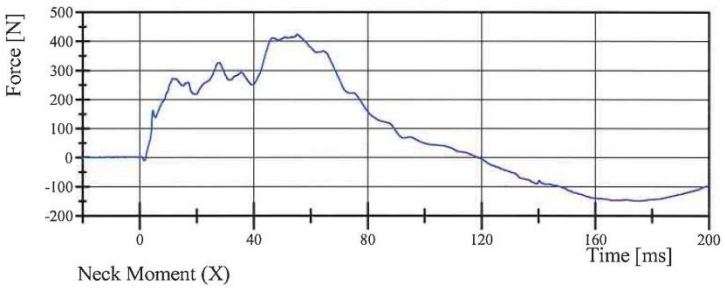
Left Lateral Neck
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/26/2015

Neck Force (Y)



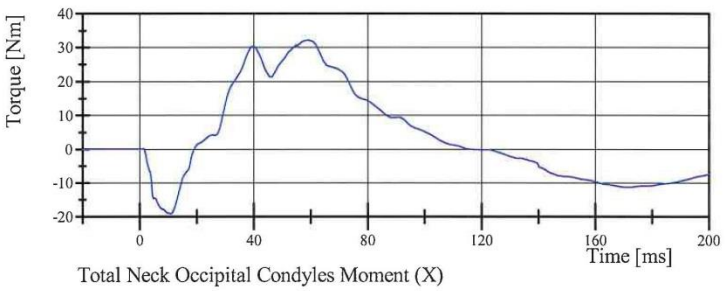
Filter Class: CFC_1000
Max: 428.5 N at 55.0 ms
Min: -149.4 N at 175.4 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



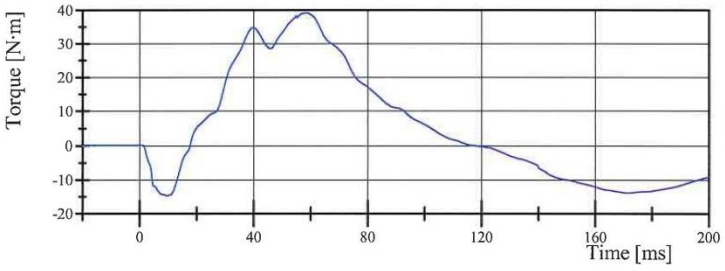
Filter Class: CFC_600
Max: 424.4 N at 55.0 ms
Min: -149.1 N at 175.1 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 32.1 Nm at 59.1 ms
Min: -19.2 Nm at 10.8 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Consta
Max: 39.1 N·m at 57.8 ms
Min: -14.9 N·m at 9.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.26.2015 14:58:17 643

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 34-2
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-15.8 g	Yes
Shoulder Displacement	28 - 37 mm	29.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.2 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schunkel

Approved

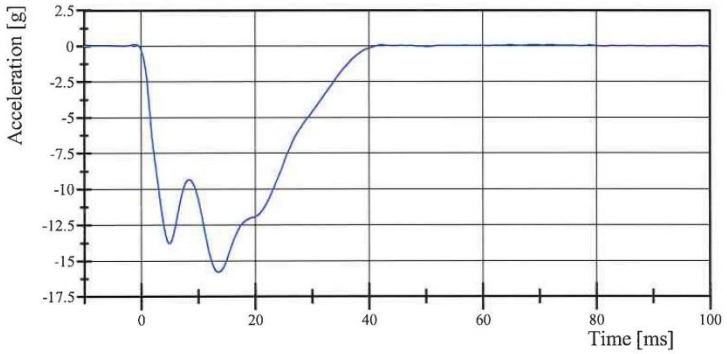
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 10:21:25 853

Transportation Research Center Inc.

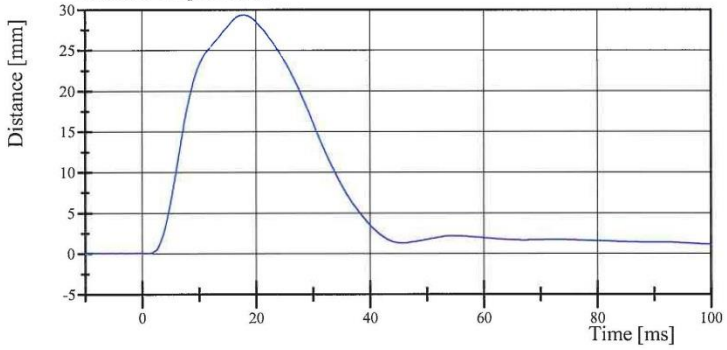
Left Lateral Shoulder
SID IIs Serial No. 305 Certification No. 34-2
Test Date: 10/27/2015

Probe Acceleration



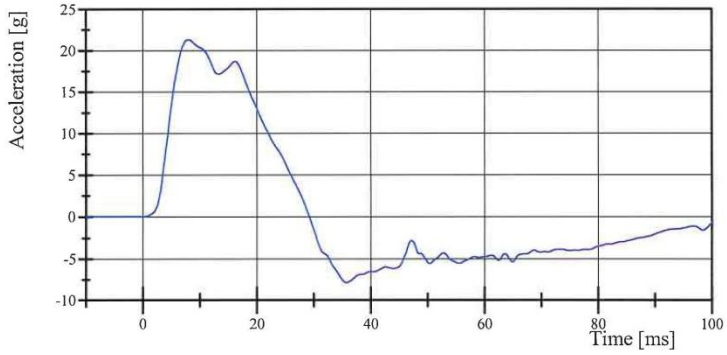
Filter Class: CFC_180
Max: 0.1 g at 69.0 ms
Min: -15.8 g at 13.5 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 29.3 mm at 17.8 ms
Min: -0.0 mm at 1.0 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 21.2 g at 8.0 ms
Min: -7.9 g at 35.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 10:21:33 853

Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.781 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.5 g	Yes
Shoulder Displacement	31 - 40 mm	33.0 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	25.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.9 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.6 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	41.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.4 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

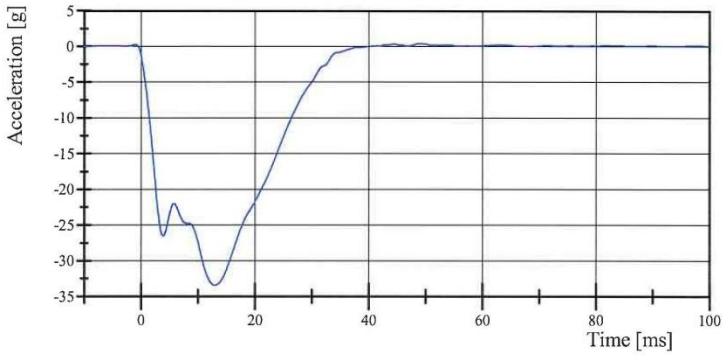
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 11:39:53 576

Transportation Research Center Inc.

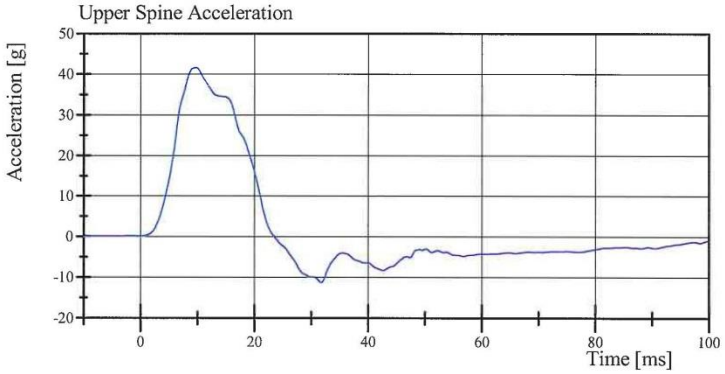
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Probe Acceleration



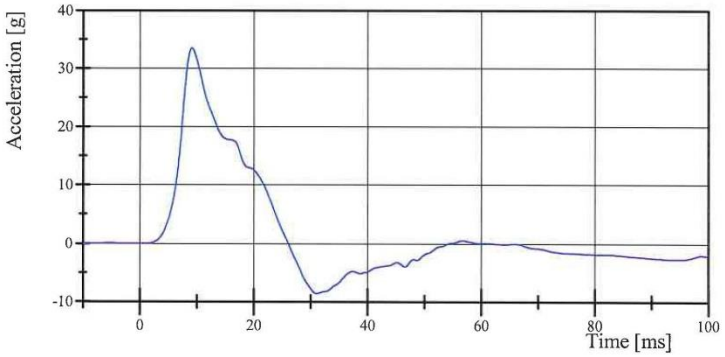
Filter Class: CFC_180
Max: 0.4 g at 48.9 ms
Min: -33.5 g at 13.0 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 41.5 g at 9.8 ms
Min: -11.4 g at 31.8 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 33.4 g at 9.1 ms
Min: -8.6 g at 31.0 ms

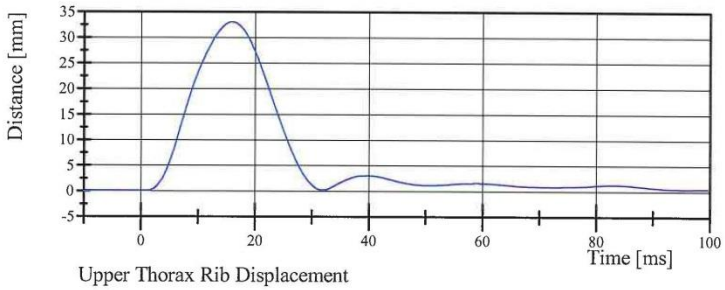
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 11:40:03 576

Transportation Research Center Inc.

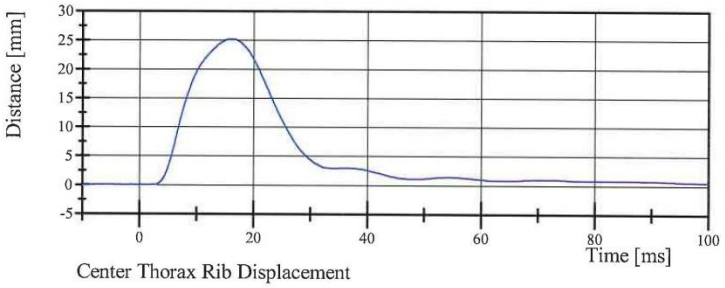
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Shoulder Rib Displacement



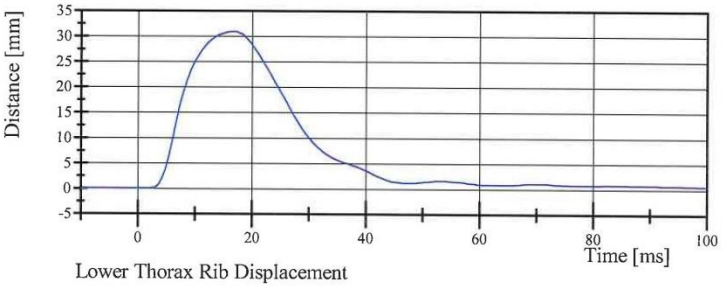
Filter Class: CFC_600
Max: 33.0 mm at 15.8 ms
Min: -0.0 mm at 1.0 ms

Upper Thorax Rib Displacement



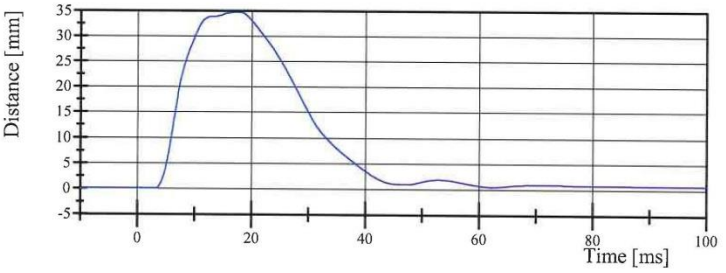
Filter Class: CFC_600
Max: 25.1 mm at 16.1 ms
Min: -0.0 mm at -8.6 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 30.9 mm at 16.6 ms
Min: -0.0 mm at -9.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 34.6 mm at 17.0 ms
Min: -0.0 mm at 3.2 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 11:40:04 576

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.343 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.8 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.3 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.4 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.8 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

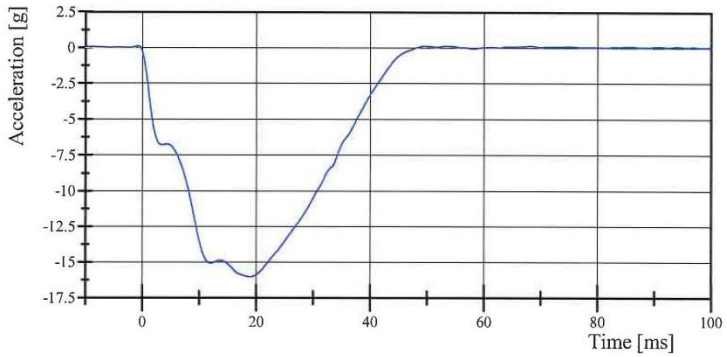
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 09:41:43 845

Transportation Research Center Inc.

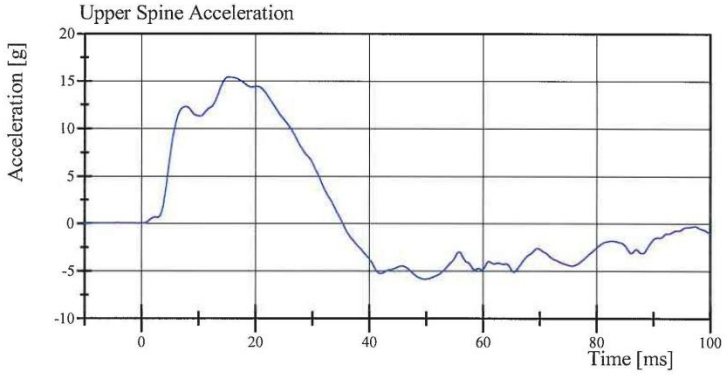
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Probe Acceleration



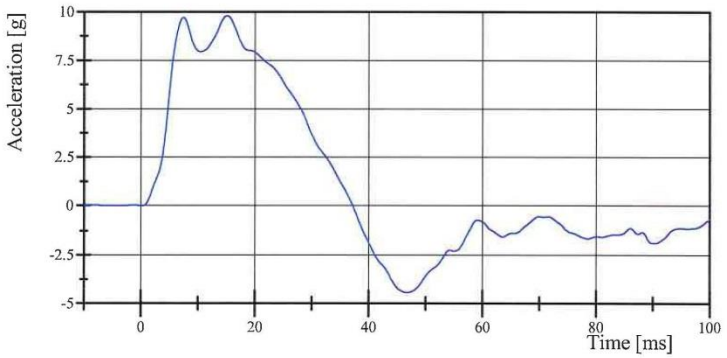
Filter Class: CFC_180
Max: 0.1 g at 68.1 ms
Min: -16.1 g at 18.9 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.4 g at 15.3 ms
Min: -5.9 g at 49.8 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 9.8 g at 15.1 ms
Min: -4.4 g at 46.7 ms

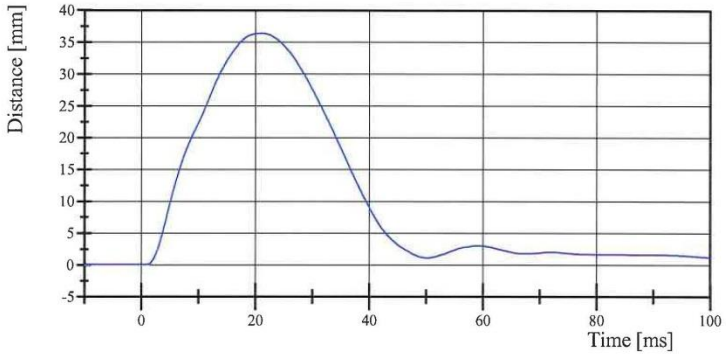
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 09:41:54 845

Transportation Research Center Inc.

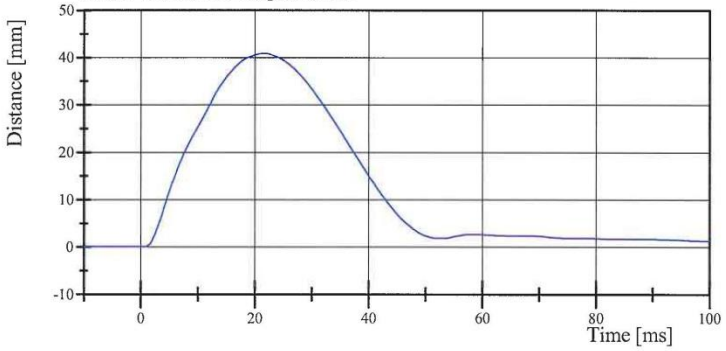
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Upper Thorax Rib Displacement



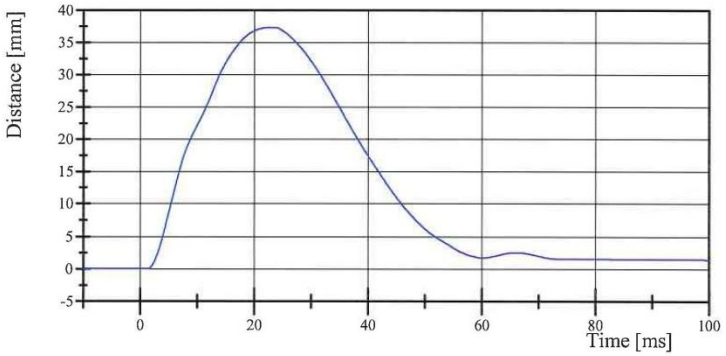
Filter Class: CFC_600
Max: 36.3 mm at 21.1 ms
Min: -0.0 mm at 0.9 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.8 mm at 21.6 ms
Min: -0.0 mm at -3.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.3 mm at 22.6 ms
Min: -0.0 mm at -3.2 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 09:41:54 845

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.5 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.8 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.6 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.20 g	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinkel

Approved

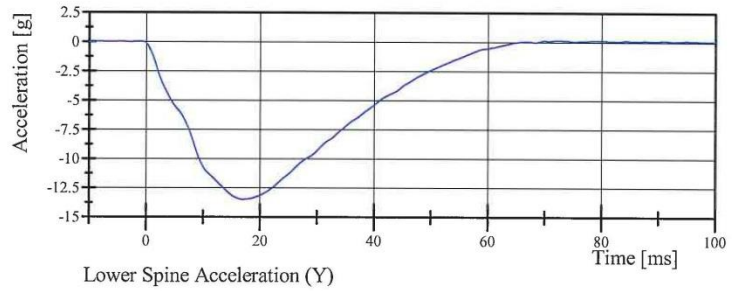
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 09:18:39 692

Transportation Research Center Inc.

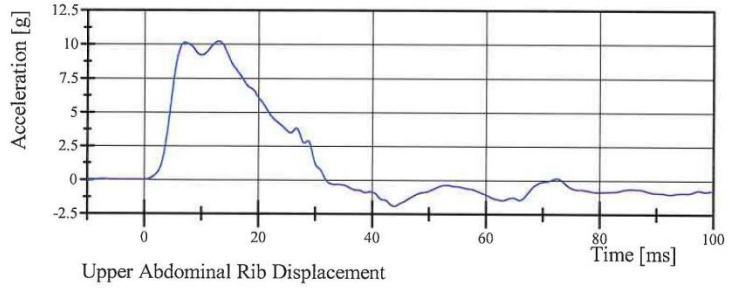
Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Probe Acceleration



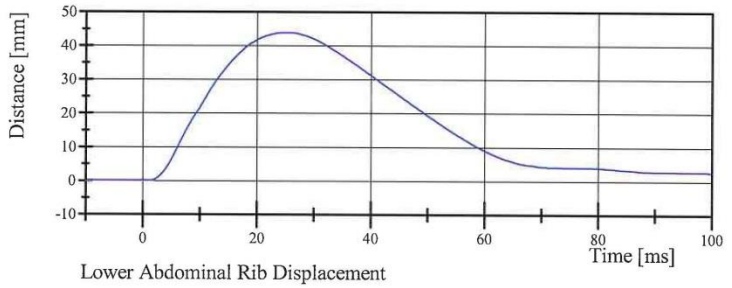
Filter Class: CFC_180
Max: 0.2 g at 72.2 ms
Min: -13.5 g at 17.0 ms

Lower Spine Acceleration (Y)



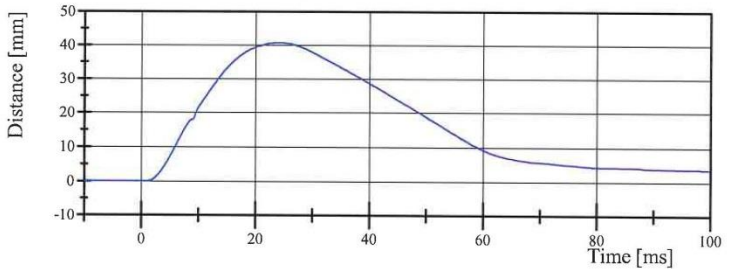
Filter Class: CFC_180
Max: 10.2 g at 13.0 ms
Min: -1.9 g at 43.9 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 43.8 mm at 24.9 ms
Min: -0.0 mm at 1.5 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 40.6 mm at 23.9 ms
Min: -0.0 mm at 0.9 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 09:18:47 692

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.65 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.50 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.8 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,139.6 N	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

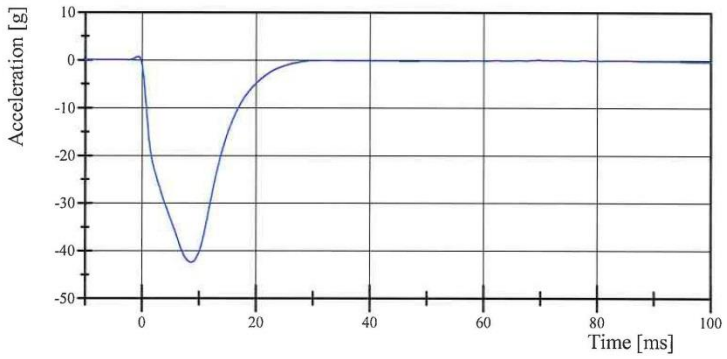
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 12:58:46 466

Transportation Research Center Inc.

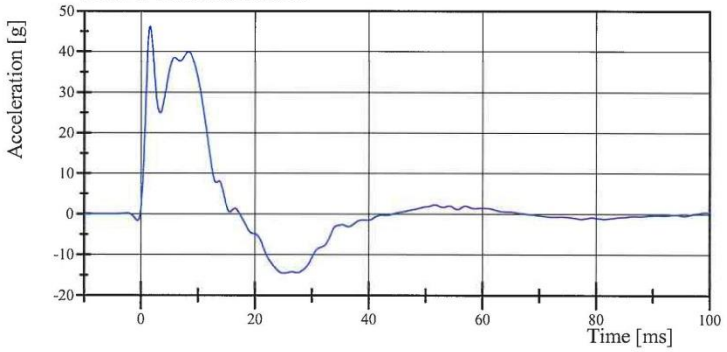
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Probe Acceleration



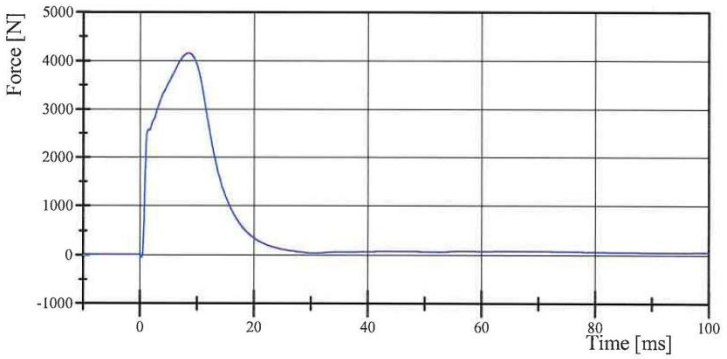
Filter Class: CFC_180
Max: 0.6 g at -0.7 ms
Min: -42.5 g at 8.6 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 46.1 g at 1.5 ms
Min: -14.6 g at 25.0 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,139.6 N at 8.5 ms
Min: -55.9 N at 0.3 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 12:58:55 466

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.2 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	35.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,974.7 N	Yes

Test meets specifications.

Comments:

Technician

Melissa Schinker

Approved

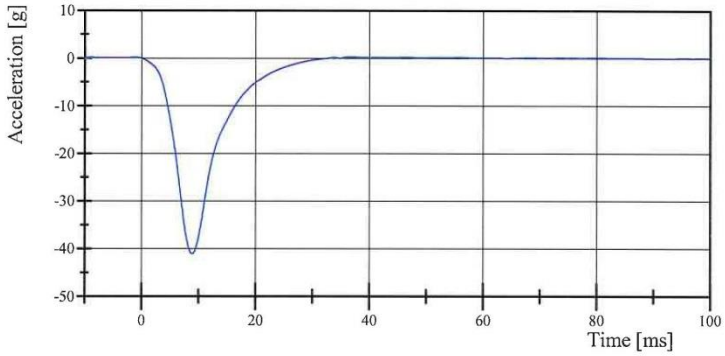
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 08:53:18 696

Transportation Research Center Inc.

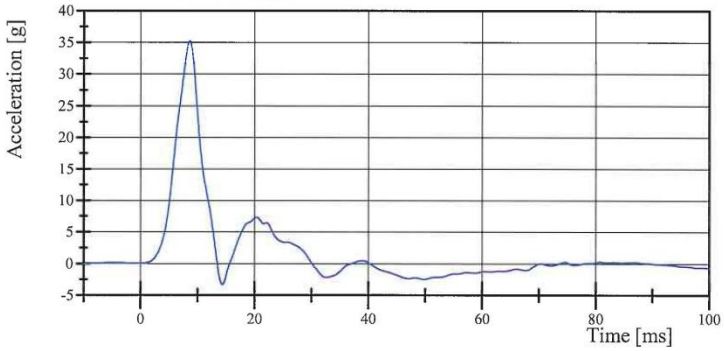
Left Lateral Iliac
SID IIs Serial No. 305 Certification No. 34-1
Test Date: 10/27/2015

Probe Acceleration



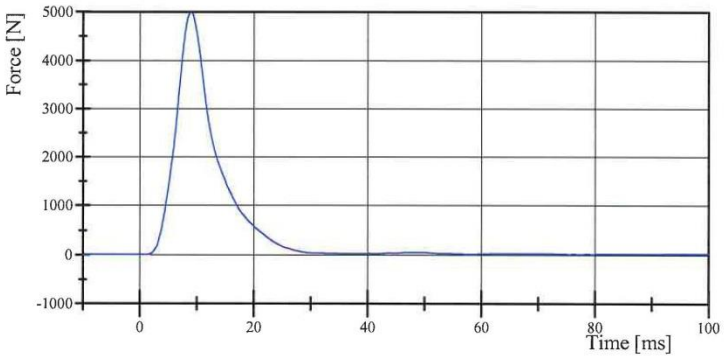
Filter Class: CFC_180
Max: 0.3 g at 36.5 ms
Min: -41.2 g at 8.9 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 35.2 g at 8.6 ms
Min: -3.4 g at 14.4 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,974.7 N at 9.0 ms
Min: -0.7 N at -0.5 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

10.27.2015 08:53:28 696

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F030		
			Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers		X	P58890	Endevco	29-Sep-15
		Y	P51702	Endevco	29-Sep-15
		Z	P52083	Endevco	29-Sep-15
Redundant Head Accelerometers		X	P49190	Endevco	29-Sep-15
		Y	P52044	Endevco	29-Sep-15
		Z	P51717	Endevco	29-Sep-15
Thoracic Rib Displacement Potentiometers	Upper	Y	111	FTSS	29-Sep-15
	Middle	Y	174	FTSS	29-Sep-15
	Lower	Y	173	FTSS	29-Sep-15
Abdomen Load Cells	Front	Y	1441	Denton	7-Apr-15
	Middle	Y	1436	Denton	7-Apr-15
	Rear	Y	1437	Denton	7-Apr-15
Lower Spine Accelerometers (T12)		X	P51295	Endevco	29-Sep-15
		Y	P68599	Endevco	29-Sep-15
		Z	P59005	Endevco	29-Sep-15
Acetabulum Load Cell		Y	N/A	N/A	N/A
Pubic Symphysis Load Cell		Y	457-FY	Denton	7-Apr-15

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P51719	Endevco	1-Oct-15
			Y	P51272	Endevco	1-Oct-15
			Z	P58862	Endevco	1-Oct-15
Redundant Head Accelerometers			X	P80926	Endevco	1-Oct-15
			Y	P50073	Endevco	1-Oct-15
			Z	P52098	Endevco	1-Oct-15
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	1-Oct-15
		Middle	Y	1161	Servo	1-Oct-15
		Lower	Y	037	Servo	1-Oct-15
	Abdominal Rib	Upper	Y	1295	Servo	1-Oct-15
		Lower	Y	1136	Servo	1-Oct-15
Lower Spine Accelerometers (T12)			X	P50068	Endevco	1-Oct-15
			Y	P52051	Endevco	1-Oct-15
			Z	P51710	Endevco	1-Oct-15
Acetabulum Load Cell			Y	D14283-FY	FTSS	1-Oct-15
Iliac Wing Load Cell			Y	287-FY	FTSS	1-Oct-15
Pelvis Plug (struck side)				71125	FTSS	18-Dec-13
Pelvis Plug (non-struck side)				36473	FTSS	23-Sep-10

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P34103	Endevco	25-Aug-15
	Vehicle Center of Gravity	Y	P81534	Endevco	3-Jun-15
	Vehicle Center of Gravity	Z	P81542	Endevco	5-May-15
2	Right Sill at Front Seat	X	P61285	Endevco	3-Sep-15
	Right Sill at Front Seat	Y	P50463	Endevco	13-May-15
	Right Sill at Front Seat	Z	P82047	Endevco	8-Jul-15
3	Right Sill at Rear Seat	X	P41252	Endevco	21-Oct-15
	Right Sill at Rear Seat	Y	P49313	Endevco	21-Oct-15
	Right Sill at Rear Seat	Z	P47512	Endevco	21-Oct-15
4	Left Sill at Front Door	Y	P87103	Endevco	15-May-15
5	Left Sill at Rear Door	Y	P57198	Endevco	14-Oct-15
6	Left A-Post Lower	Y	P90291	Endevco	12-Oct-15
7	Left A-Post Middle	Y	P61772	Endevco	21-Oct-15
8	Left B-Post Lower	Y	P88424	Endevco	21-Oct-15
9	B-Post Middle	Y	P75519	Endevco	21-Oct-15
10	Front Seat Track	Y	P87156	Endevco	18-Jun-15
11	Rear Seat Track or Structure	Y	P82005	Endevco	20-Jul-15
12	Right Rear Occupant Compartment	Y	P50473	Endevco	21-Oct-15
13	Engine Block	X	P88543	Endevco	7-Aug-15
	Engine Block	Y	P61350	Endevco	15-Oct-15
14	Rear Floorpan Above Axle	X	P76405	Endevco	9-Jun-15
	Rear Floorpan Above Axle	Y	P25261	Endevco	5-May-15
	Rear Floorpan Above Axle	Z	P81616	Endevco	10-Jul-15

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P88568	Endevco	17-Jul-15
MDB Center of Gravity	Y	P88423	Endevco	17-Jul-15
MDB Center of Gravity	Z	P84582	Endevco	23-Jul-15
Left Frame Rail at Rear Axle Centerline	X	P87153	Endevco	26-Jun-15
Left Frame Rail at Rear Axle Centerline	Y	P90862	Endevco	12-Oct-15