

FINAL REPORT NUMBER: SPNCAP-TRC-16-005

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**General Motors LLC
2016 Chevrolet Malibu
NHTSA NUMBER: M20160107**

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



Report Date: March 23, 2016

FINAL REPORT

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

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Melinda Lackey, Project Manager

Approval Date: March 23, 2016

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

Technical Report Documentation Page

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16. Abstract A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject vehicle, a 2016 Chevrolet Malibu, in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on February 11, 2016. The impact velocity was 31.82 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 20° C. The test vehicle's post-test maximum crush was 317 mm at Level 3. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th><th>Unit</th><th>Threshold</th><th>Front SID-IIs</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆):</td><td>NA</td><td>1000</td><td>235</td></tr> <tr> <td>Resultant Lower Spine Acceleration:</td><td>g's</td><td>82</td><td>28.8</td></tr> <tr> <td>Total Pelvic Force:</td><td>N</td><td>5525</td><td>2169.4</td></tr> <tr> <td>(sum of acetabular and iliac forces)</td><td></td><td></td><td></td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38*</td><td>16.5</td></tr> <tr> <td>Maximum Abdomen Rib Deflection</td><td>mm</td><td>45*</td><td>15.0</td></tr> </tbody> </table> * Proposed IARV The two doors on the struck side did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					Unit	Threshold	Front SID-IIs	Head Injury Criteria (HIC ₃₆):	NA	1000	235	Resultant Lower Spine Acceleration:	g's	82	28.8	Total Pelvic Force:	N	5525	2169.4	(sum of acetabular and iliac forces)				Maximum Thoracic Rib Deflection	mm	38*	16.5	Maximum Abdomen Rib Deflection	mm	45*	15.0
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V 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 Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																													
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SECTION 1

TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 16 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 Chevrolet Malibu manufactured by General Motors LLC. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a model year 2016 Chevrolet Malibu. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.82 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on February 11, 2016. Pre-test and post-test photographs of the test vehicle and the side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Primary and Redundant Head CG Triaxial Accelerometers
- Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
- Abdomen Upper and Lower Rib Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Iliac Load Cell
- Acetabulum Load Cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	NA	1000	235
Lower Spine Acceleration Resultant	G	82	28.8
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2169.4
Maximum Thoracic Rib Deflection	mm	38*	16.5
Maximum Abdominal Rib Deflection	mm	45*	15.0

* 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	Yes		
Knee Airbag	Yes	Yes		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other	No	N/A	No	N/A

GENERAL COMMENTS

None

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2016 Chevrolet Malibu
Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
Test Date: 2/11/16

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20160107	Traction Control System (TCS)	Yes
Model Year	2016	Auto-Leveling System	No
Make	Chevrolet	Automatic Door Locks (ADL)	Yes
Model	Malibu	Power Window Auto-Reverse	No
Body Style	Passenger Car	Other Optional Feature	No
VIN	1G1ZB5ST1GF182197	Driver Front Airbag	Yes
Body Color	Blue Velvet Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	8	Driver Head/Torso Airbag	No
Engine Displacement (L)	1.5	Driver Torso Airbag	No
Type/No. Cylinders	Straight/4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Front/Transverse	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	Yes
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	No

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	1835
Date of Manufacturer	12/15	GAWR Front (kg)	952
Vehicle Type	Passenger Car	GAWR Rear (kg)	883

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Vehicle Capacity Weight (VCW) (kg)				408
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				67.8

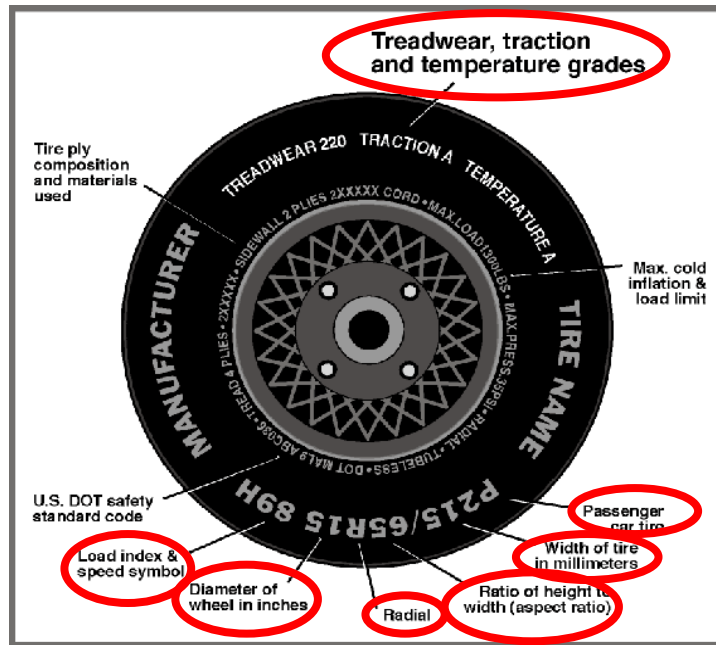
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P205/65R16	P205/65R16
Tire Size on Vehicle	P205/65R16	P205/65R16
Tire Manufacturer	Firestone	Firestone
Tire Model	FT140	FT140
Treadwear	560	560
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	94H	94H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	8X84 FT0 4215	8X84 FT0 4215
DOT Safety Code Right	8X84 FT0 4215	8X84 FT0 4215

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

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	234	221	227	221
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	240	240	240	240

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	438.4	291.0		455.0	325.0		449.6	338.6	
Right	kg	409.2	261.6		420.8	309.4		418.0	311.0	
Ratio	%	60.5	39.5		58.0	42.0		57.2	42.8	
Totals	kg	847.6	552.6	1400.2	875.8	634.4	1510.2	867.6	649.6	1517.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total As Delivered Weight (UVW)	kg	1400.2
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	49.0
Rated Cargo/Luggage Weight (RCLW)	kg	67.8
Calculated Vehicle Target Weight (TVTW)	kg	1517.0

(A)
 (B)
 (C)
 (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

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.3	0.0	0.0	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	0.0	+0.1	+0.4	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	+0.1	0.0	-0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	+0.5	-0.3	-0.3	Yes
Vehicle CG (Aft of Front Axle)	mm	1116	1188	1211	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+33	+26	+31	

*ND=Nose Down (-), NU=Nose Up (+) **LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for "Meets Requirements".

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Plate weight on rear rack	10.6
Components removed: Rear fascia, right rear speaker, and tail lights	11.4

Test height adjustable suspension setting, if applicable:

N/A

DATA SHEET NO. 2

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

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16

SEAT POSITIONING

The driver seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, 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	18.7	14.1	16.4
Front Passenger Seat	19.6	15.1	17.4
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	16.4	162	Max	N/A	N/A	N/A
			Mid	143	153	162
			Min	N/A	N/A	N/A
Front Passenger Seat	17.4	163	Max	N/A	N/A	N/A
			Mid	144	153	163
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	14.8	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	14.7	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*	10.4	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 SYSTEMS DATA

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16

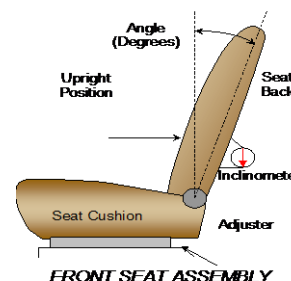
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	259	53	0	1
Front Passenger Seat	240	49	0	1
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* If applicable.

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. 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 passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1. For the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match 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	64.9	31	23.0	6
Front Passenger Seat	64.6	31	23.0	6
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted with the information provided by the manufacturer on Form No. 1

	Total # of Positions	Placed in Position #
Driver Seat	1, Fixed	1, Fixed

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	8, numbered from 0 to 7	0, Lowermost

DATA SHEET NO. 2 (CONTINUED)

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

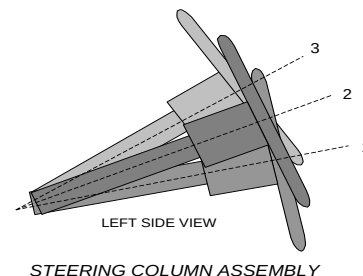
Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

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 Test Date: 2/11/16

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

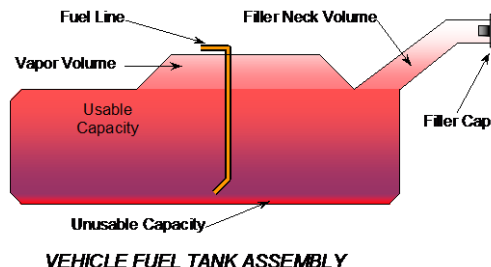
	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	68.9	0
Geometric Center, Position No. 2	66.7	30
Uppermost, Position No. 3	64.4	60
Telescoping Steering Wheel Travel		60
Test Position	66.7	30



FUEL PUMP

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

Pump will run for about 3 seconds when the key is turned on and then will not run unless the engine is cranking or running



FUEL TANK CAPACITY

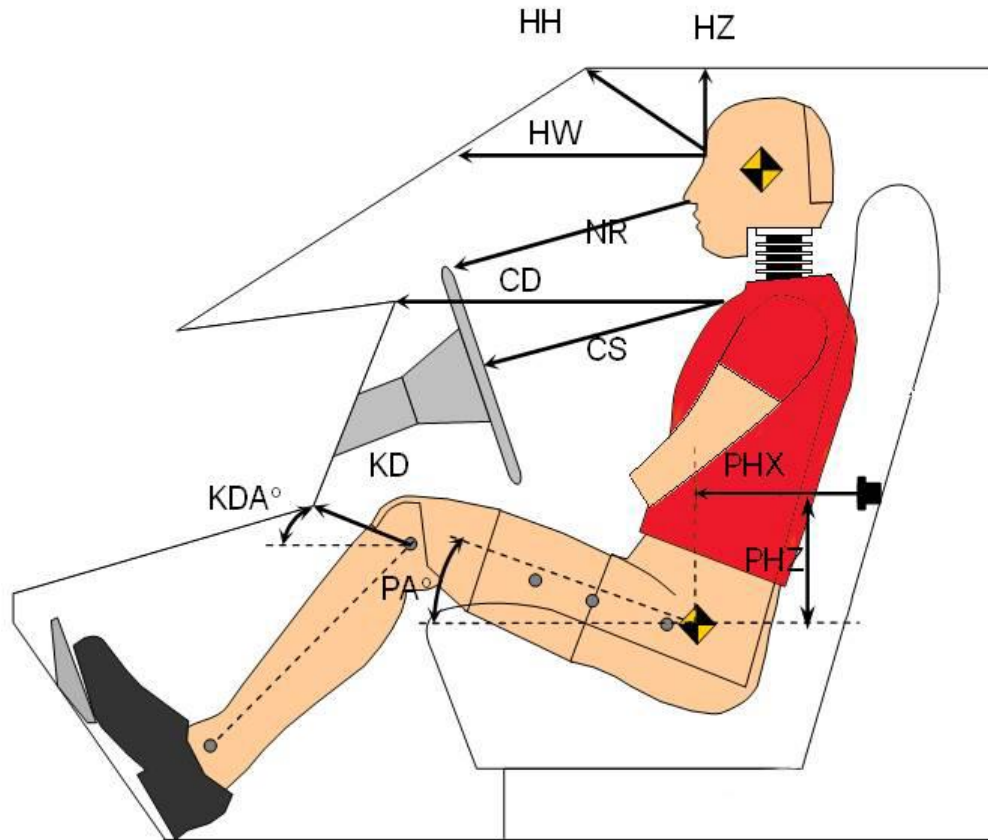
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	49.2
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	49.2
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	45.8
Actual Amount of Solvent Used in Test	45.8
1/3 of Usable Capacity	16.4

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16

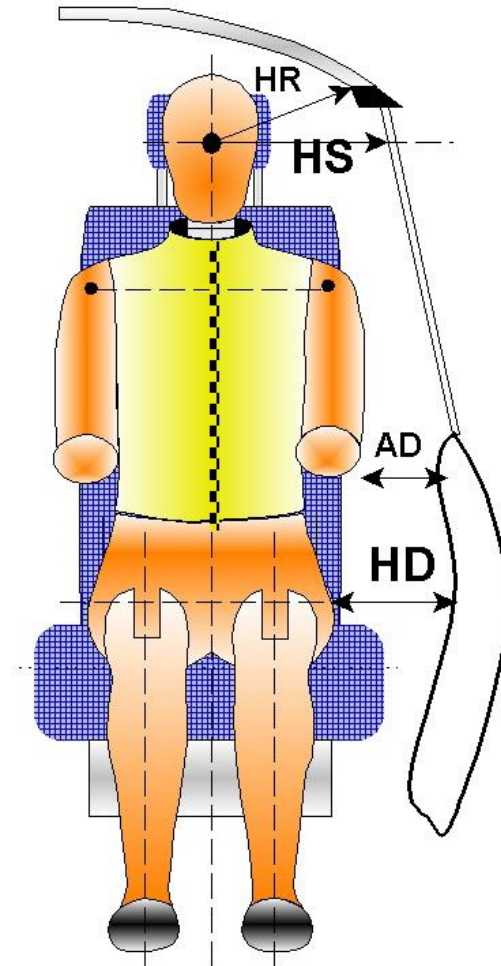


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	313	
HW	Head to Windshield	677	
HZ	Head to Visor	199	
NR	Nose to Rim	299	
CD	Chest to Dashboard	446	
CS	Chest to Steering Wheel	230	
KDL/KDLA°	Left Knee to Dash	159	34.5
KDR/KDRA°	Right Knee to Dash	155	38.5
PAX°	Pelvic Tilt Angle (X-axis)		0.1
PAY°	Pelvic Tilt Angle (Y-axis)		21.0
PHX	Hip Point to Striker (X-Axis)	309	
PHZ	Hip Point to Striker (Z-Axis)	152	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Chevrolet Malibu
Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
Test Date: 2/11/16

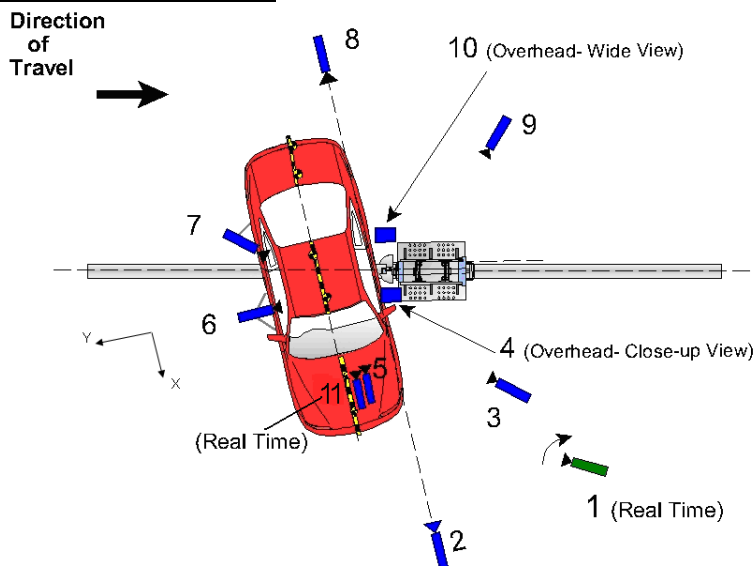


Code	Measurement Description	Length (mm)
HR	Head to Side Header	256
HS	Head to Side Window	396
AD	Arm to Door	197
HD	Hip Point to Door	159

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16



REFERENCE: (from point of impact for X and Y; from ground for Z)
 + X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real time (24-30 fps) pan view of impact				Zoom	30
2	Front ground level – impact view	4938	320	-1232	20	1000
3	Impact side 45° – forward pole view	3325	-895	-1217	20	1000
4	Overhead Close-up view of impact	45	50	-5341	50	1000
5	Onboard – dummy front view				25	1000
6	Onboard – dummy side view				12.5	1000
7	Onboard – dummy rear oblique view				12.5	1000
8	Rear ground level – impact view	-5502	0	-1185	20	1000
9	Impact side 45° – rearward pole view	-3860	-2551	-1265	28	1000
10	Overhead wide view of impact	-45	440	-5366	12.5	1000
11	Real time dummy front view				Zoom	30

All measurements accurate to +/- 6 mm.

NOTE: Vehicle was at a 75° angle to the rigid pole.

If applicable, explain why camera(s) did not run: Not Applicable

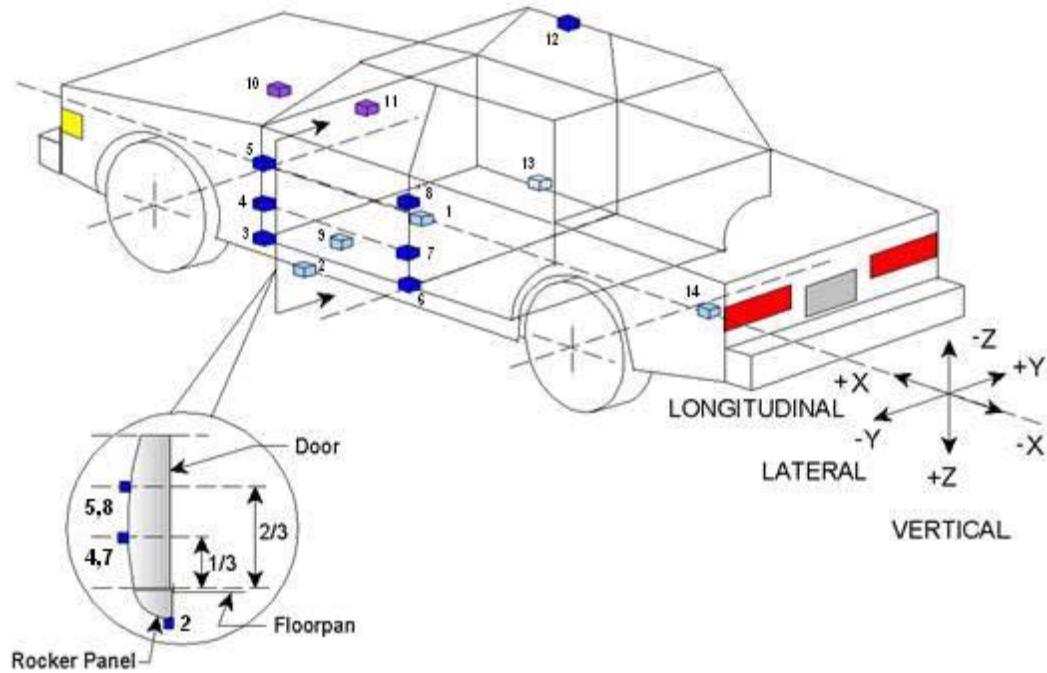
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
TOTAL	42

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16



Accelerometer/Sensor Location				
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3130	100	-270
2	Left Floor Sill	2995	-740	-323
3	A-Pillar Sill	3370	-710	-395
4	A-Pillar Low	3443	-840	-450
5	A-Pillar Mid	3455	-840	-840
6	B-Pillar Sill	2255	-730	-265
7	B-Pillar Low	2290	-850	-545
8	B-Pillar Mid	2265	-845	-875
9	Driver Seat Track	2583	-580	-370
10	Engine Top	4260	101	-778
11	Firewall	3787	90	-795
12	Right Roof	2220	650	-1395
13	Right Floor Sill	3005	740	-320
14	Rear Floorpan	1068	0	-520

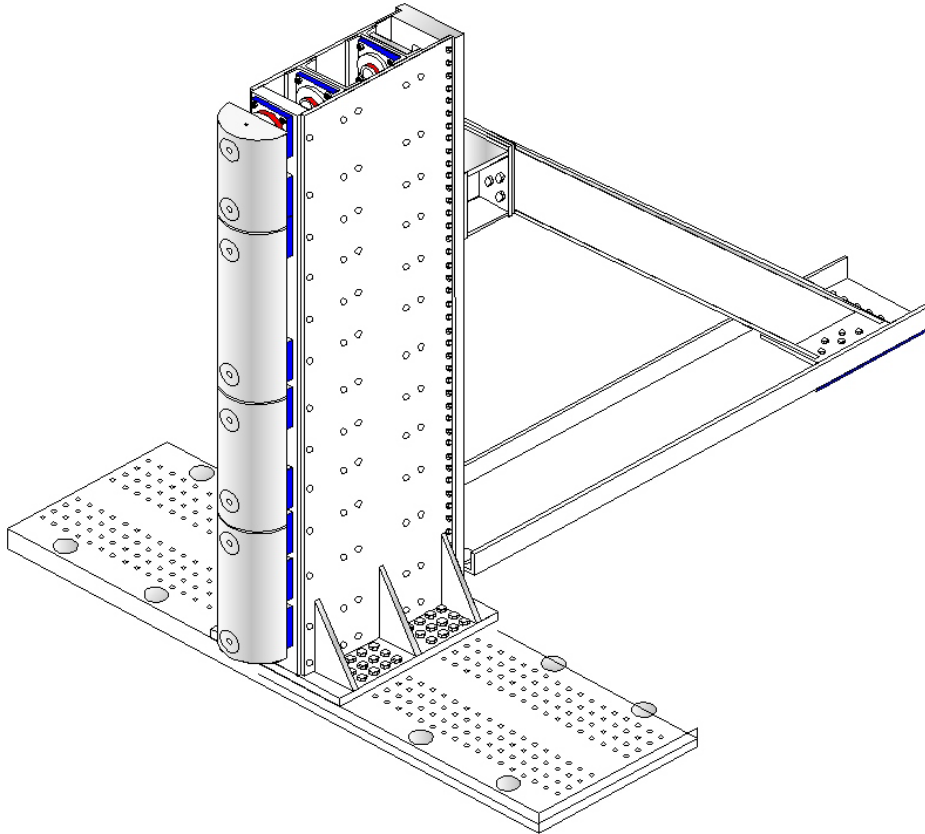
Reference: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2016 Chevrolet Malibu
Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
Test Date: 2/11/16

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Top of Carrier (mm)
1	87
2	468
3	648
4	978
5	1168
6	1651
7	1816
8	2057

DATA SHEET NO. 8
POST TEST OBSERVATIONS

Test Vehicle: 2016 Chevrolet Malibu
Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
Test Date: 2/11/16

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	SCAB/Frontal Airbag
Top of Head	SCAB
Left Side of Head	SCAB
Back of Head	Not Applicable
Left Shoulder	Torso/Pelvis Airbag/Seat Bolster
Upper Torso	Torso/Pelvis Airbag/Seat Bolster
Lower Torso	Seat Bolster
Left Hip	Torso/Pelvis Airbag/Seat Bolster
Left Knee	Door Panel

POST TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	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

* Indicate "Yes", "No", or "NA".

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

* Indicate "Yes", "No", or "NA".

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Minor deformation
Sill Separation	None visible
Windshield Damage	Broken and partially detached
Side Window Damage	Left front window shattered
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side (Driver)		Struck Side (Rear Passenger)	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	Yes		
Knee Airbag	Yes	Yes		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other	No	N/A	No	N/A

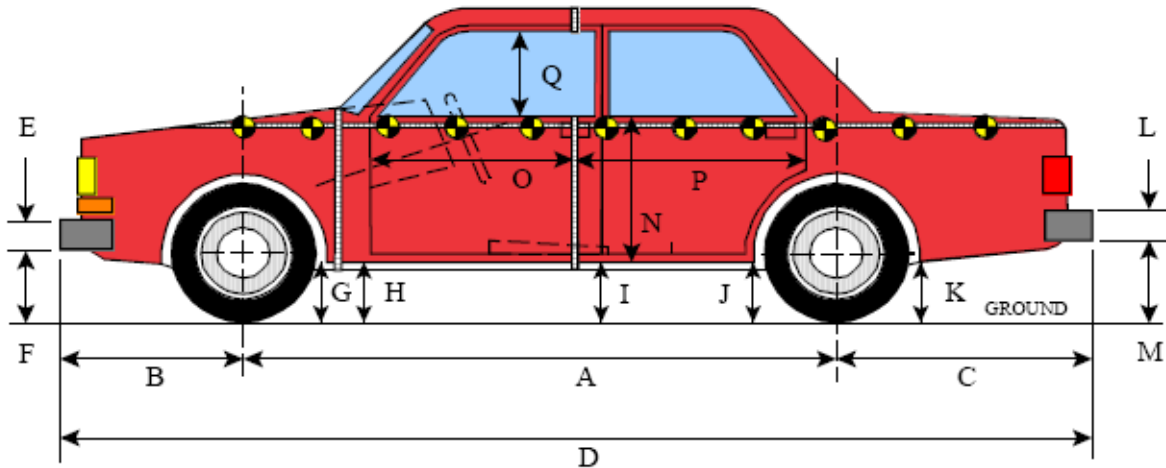
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1236
Actual Impact Point (Aft of Front Axle)	mm		1239
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	-3
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.82
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.83

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16



LEFT SIDE VIEW

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

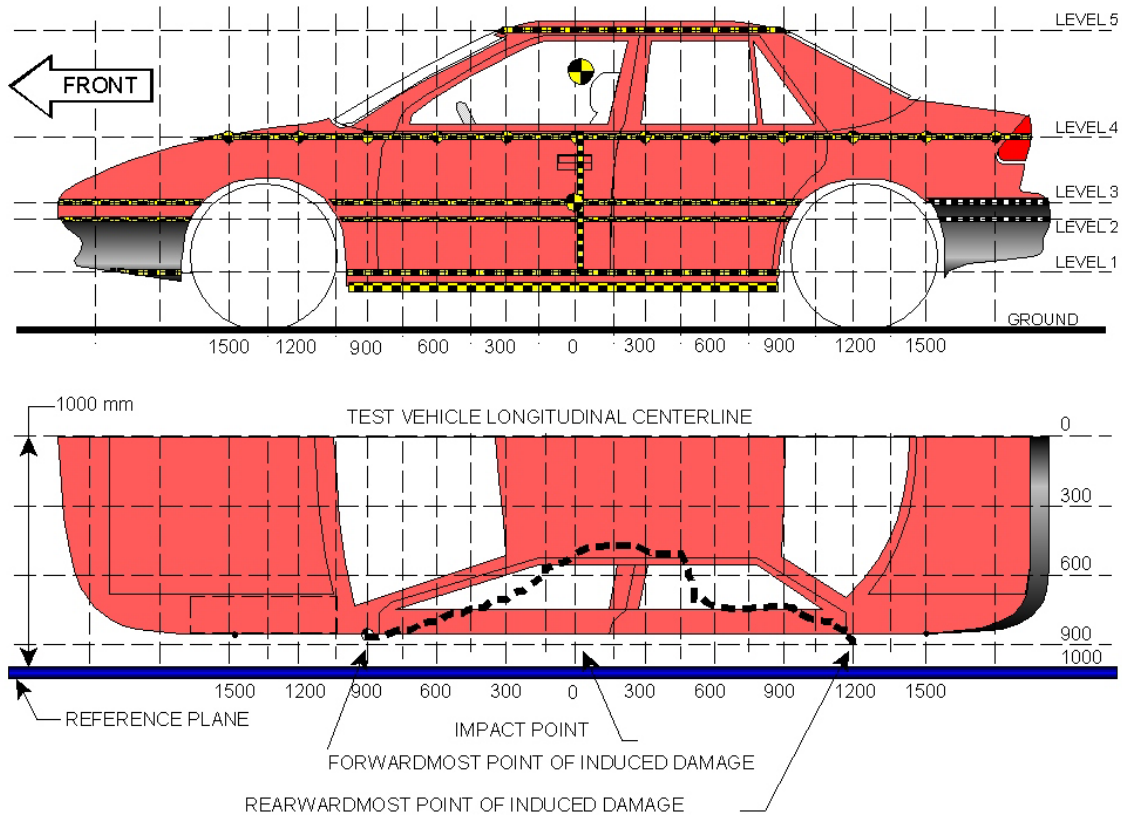
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2828	2783	45
B	Front Axle to Front Surface of Vehicle	942	963	-21
C	Rear Axle to Rear Surface of Vehicle	1137	1139	-2
D	Total Length at Centerline	4907	4885	22
E	Front Bumper Thickness	110	110	0
F	Front Bumper Bottom to Ground	434	448	-14
G	Sill Height at Front Wheel Well	285	290	-5
H	Sill Height at Front Door Leading Edge	293	302	-9
I	Sill Height at B-Pillar	324	363	-39
J1	Sill Height at Rear Wheel Well	374	422	-48
J2	Pinch Weld Height at Rear Wheel Well	164	201	-37
K	Sill Height Aft of Rear Wheel Well	375	416	-41
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	452	475	-23
N	Sill Height to Bottom of Front Window Sill	700	774	-74
O	Front Door Leading Edge to Impact CL	761	753	8
P	Rear Door Trailing Edge to Impact CL	1497	1460	37
Q	Front Window Opening	374	364	10
R	Right Side Length	4600	4580	20
S	Left Side Length	4600	4500	100
T	Vehicle Width at "B" Pillars	1830	1745	85

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16



NOTE: All measurements are in millimeters (mm)

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	318	280	0
2	Occupant H-Point	522	302	0
3	Mid-Door	626	317	0
4	Window Sill	909	299	0
5	Window Top	1379	110	150

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

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16

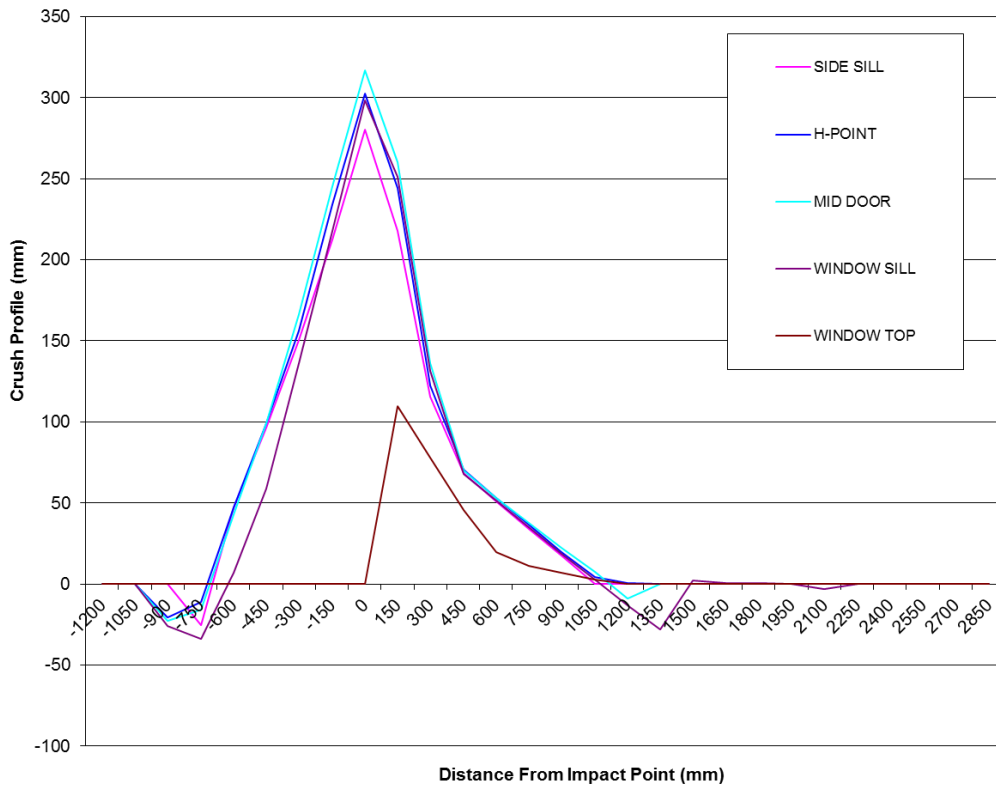
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	909	911	811	0	0	929	933	837	0	0	-20	-22	-26	0
-750	884	902	905	827	0	909	913	921	861	0	-25	-11	-16	-34	0
-600	881	898	903	837	0	833	851	860	830	0	48	47	43	7	0
-450	882	896	901	846	0	786	797	802	787	0	96	99	99	59	0
-300	884	895	901	854	0	734	739	735	718	0	150	156	166	136	0
-150	886	895	901	860	0	674	660	656	642	0	212	235	245	218	0
0	888	894	901	863	0	608	592	584	564	0	280	302	317	299	0
150	890	894	901	863	626	673	650	640	612	516	217	244	261	251	110
300	890	893	901	861	630	774	771	764	730	552	116	122	137	131	78
450	889	893	900	858	629	820	822	830	790	583	69	71	70	68	46
600	885	892	898	856	626	834	839	845	804	607	51	53	53	52	19
750	881	893	898	853	623	847	856	860	818	612	34	37	38	35	11
900	877	894	899	851	613	860	874	876	832	606	17	20	23	19	7
1050	877	896	901	850	592	877	892	894	847	589	0	4	7	3	3
1200	0	901	904	839	0	0	900	913	852	0	0	1	-9	-13	0
1350	0	0	0	847	0	0	0	0	875	0	0	0	0	-28	0
1500	0	0	0	846	0	0	0	0	843	0	0	0	0	3	0
1650	0	0	0	842	0	0	0	0	841	0	0	0	0	1	0
1800	0	0	0	833	0	0	0	0	832	0	0	0	0	1	0
1950	0	0	0	820	0	0	0	0	820	0	0	0	0	0	0
2100	0	0	0	803	0	0	0	0	807	0	0	0	0	-4	0
2250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2016 Chevrolet Malibu
Test Program: SPNCAP Side Impact

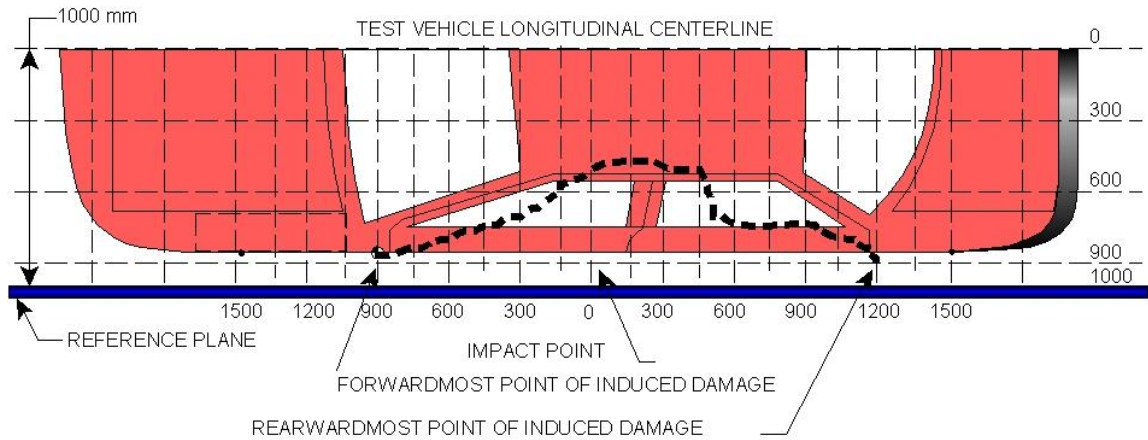
NHTSA No.: M20160107
Test Date: 2/11/16



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2016 Chevrolet Malibu
 Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
 Test Date: 2/11/16



VEHICLE DAMAGE PROFILE DISTANCES¹

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	1800	4	832	833	0
2	1350	4	875	847	-28
3	900	3	876	899	23
4	300	3	764	901	137
5	-150	3	656	901	245
6	-600	1	833	881	0

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

DATA SHEET NO. 12

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2016 Chevrolet Malibu

NHTSA No.: M20160107

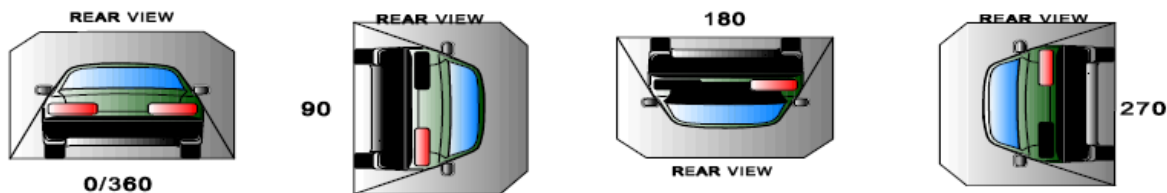
Test Program: SPNCAP Side Impact

Test Date: 2/11/16

Test Time: 12:27 Temperature: 21.7°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
(Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0
(Maximum allowable is 1 ounce/minute)
- D. Spillage Data1LS: 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

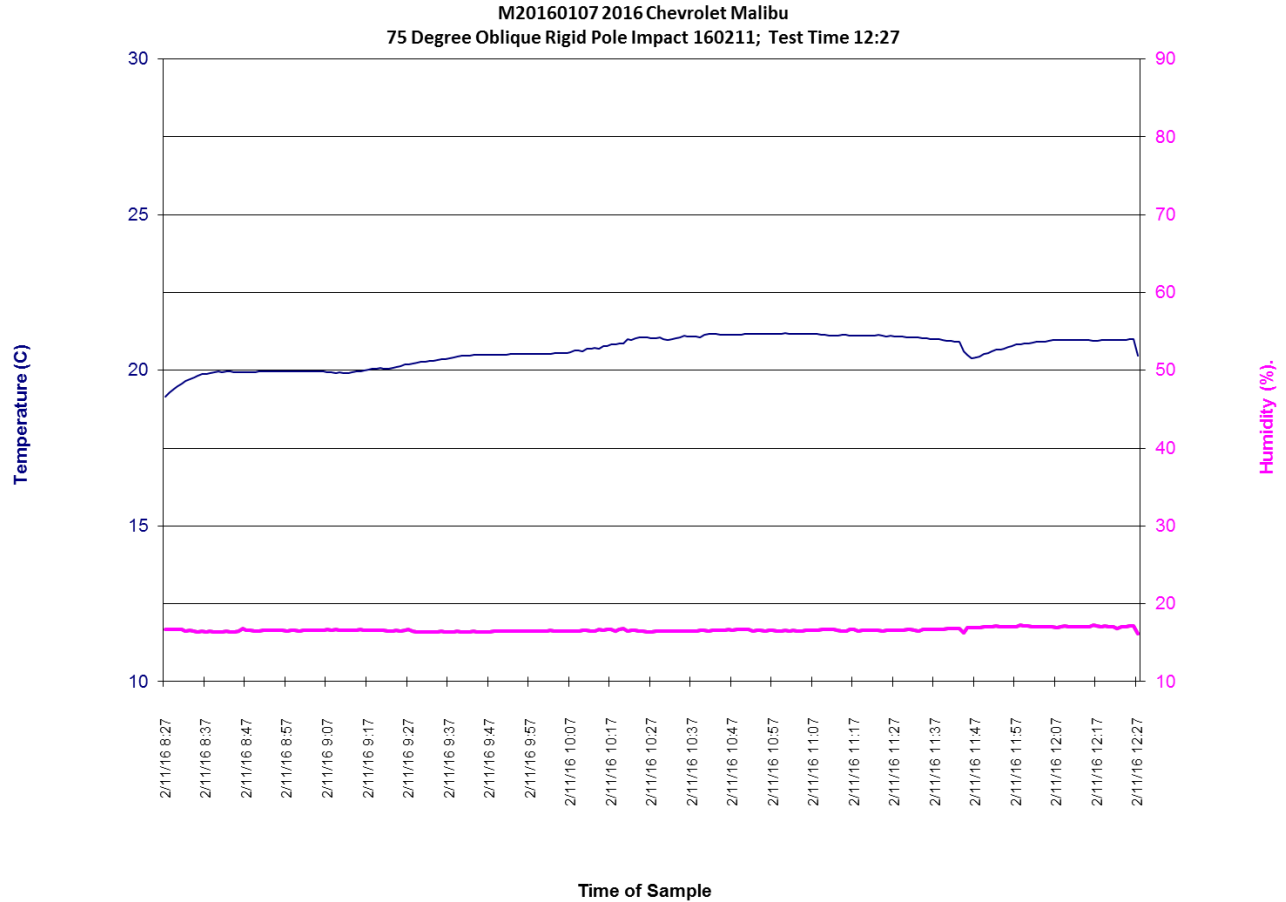
Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2016 Chevrolet Malibu
Test Program: SPNCAP Side Impact

NHTSA No.: M20160107
Test Date: 2/11/16



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

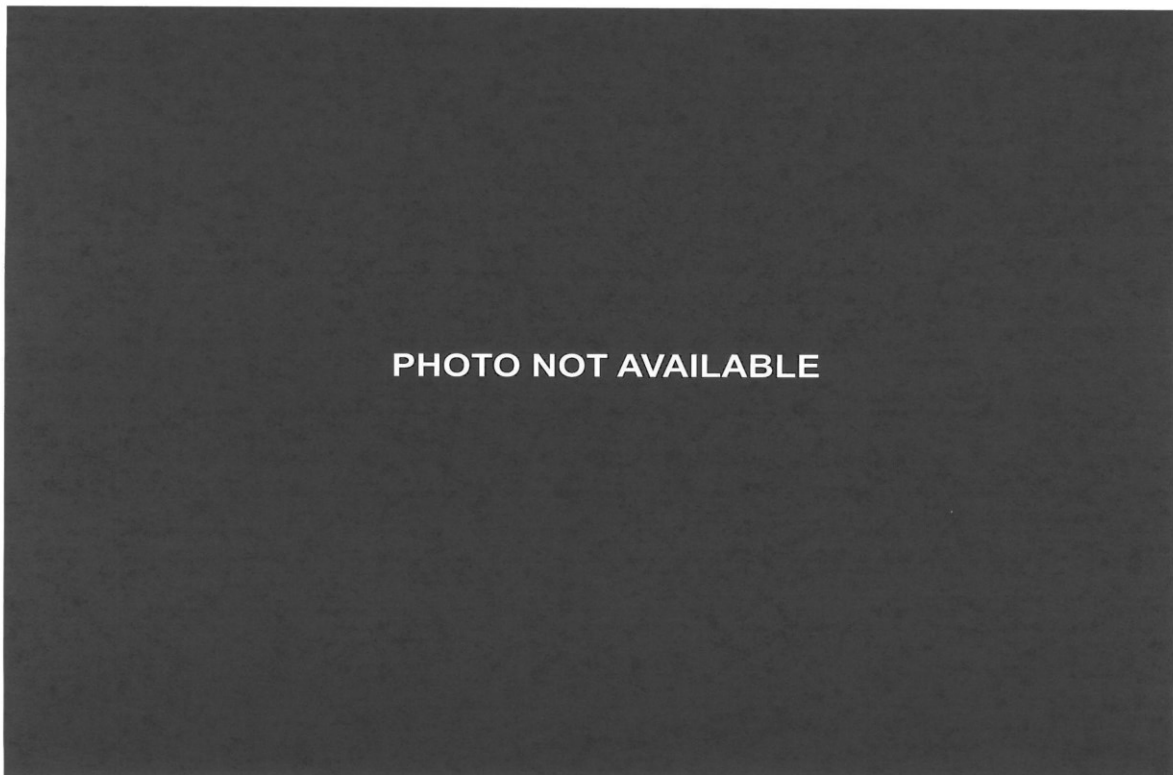
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2	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-4
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4	Post-Test Frontal View of Test Vehicle	A-5
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11	Pre-Test Rear View of Test Vehicle	A-9
12	Post-Test Rear View of Test Vehicle	A-9
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34	Pre-Test Left Side View of Steering Wheel	A-20

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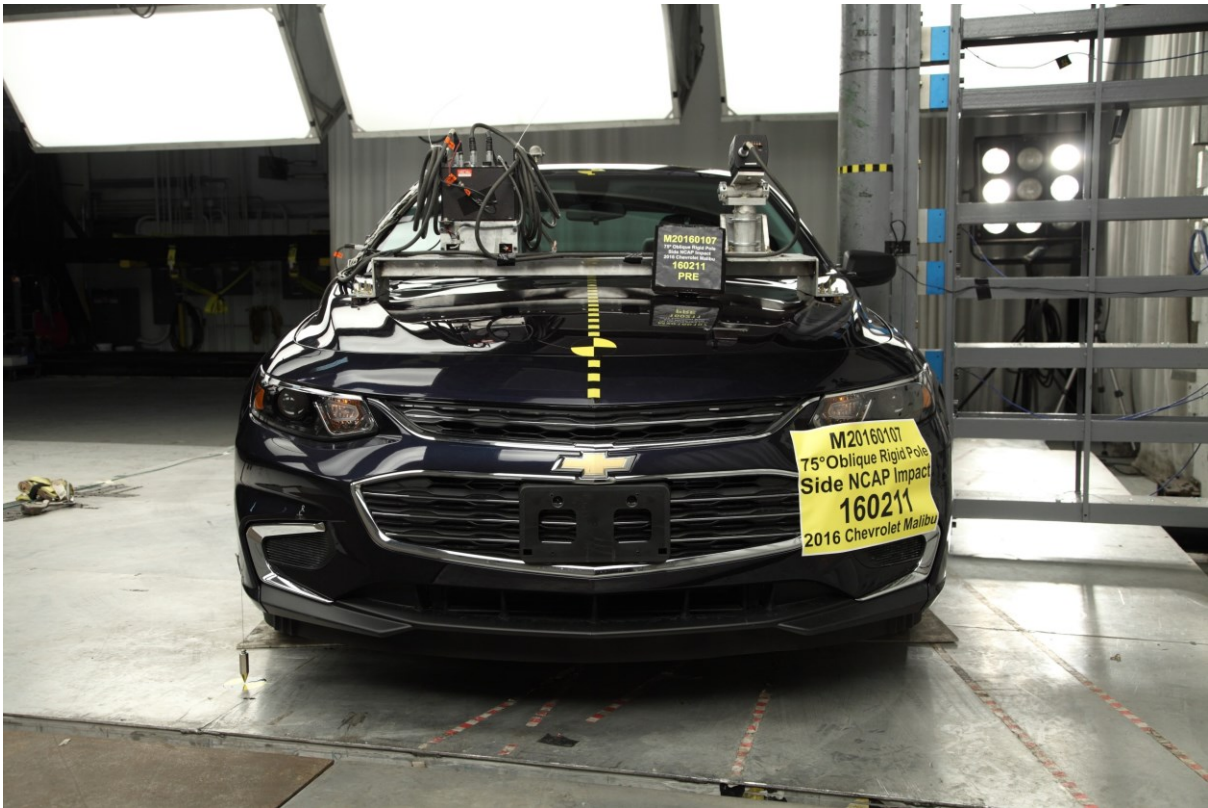
No.	Description	Page
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001 As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



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



003 Pre-Test Frontal View of Test Vehicle



004 Post-Test Frontal View of Test Vehicle



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



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



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



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



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



011 Pre-Test Rear View of Test Vehicle



012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



014 Post-Test Right Side View of Test Vehicle



015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



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



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



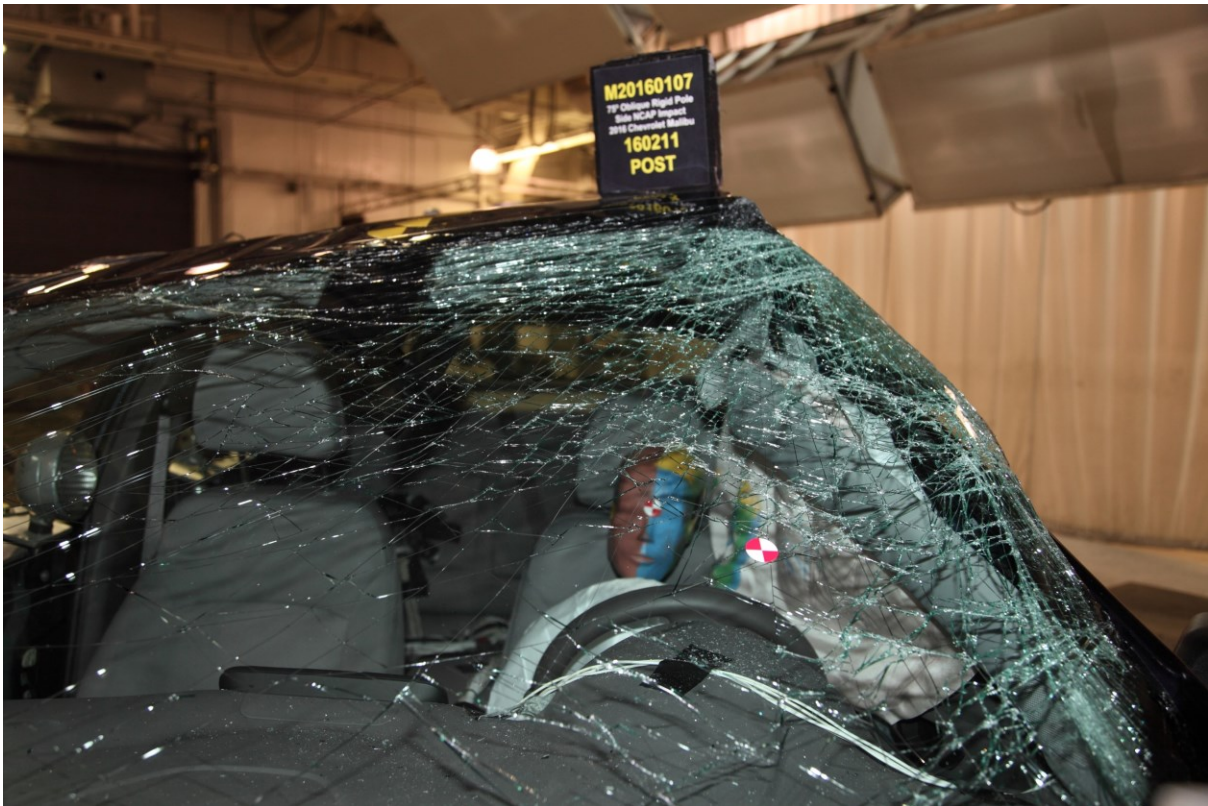
019 Pre-Test Close-Up View of Impact Point Target



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



021 Pre-Test Front Close-Up View of Dummy Head and Chest



022 Post-Test Front Close-Up View of Dummy



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



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



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



026 Pre-Test Front View of Seat Back Prior to Dummy Positioning



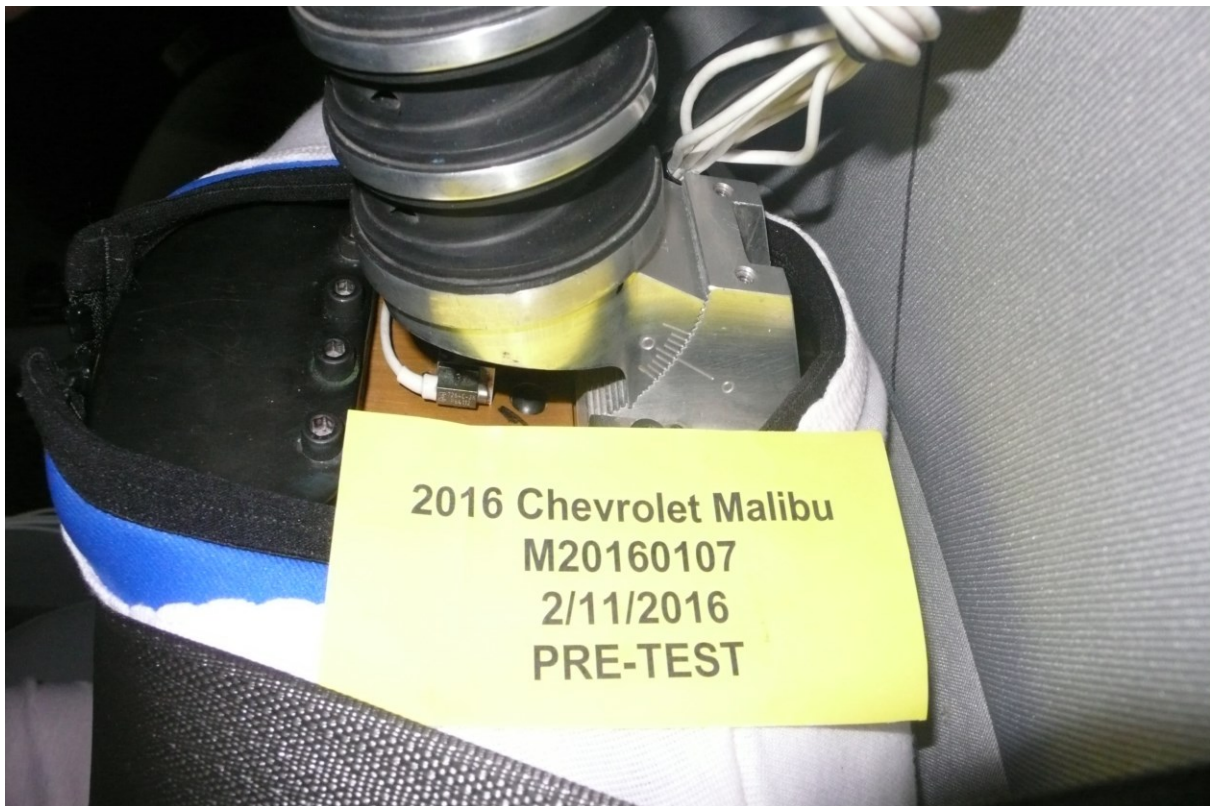
027 Pre-Test Front View of Dummy Head and Shoulders in Relation to Head Restraint



028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning



029 Pre-Test Overhead View of Dummy Thighs on Seat Pan



030 Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket



031 Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level



032 Pre-Test Placement of Dummy Feet



033 Pre-Test View of Belt Anchorage for Dummy



034 Pre-Test Left Side View of Steering Wheel



035 Pre-Test View of Disengaged Parking Brake



036 Pre-Test View of Parking Brake



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



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



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



040 Pre-Test Dummy and Door Clearance View



041 Post-Test Dummy and Door Clearance View



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



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



044 Pre-Test Inner Driver Door Panel View



045 Post-Test Inner Driver Door Panel View Showing Dummy Contact Location



046 Post-Test Dummy Close-Up Head Contact with Vehicle View



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



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



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



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



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



052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



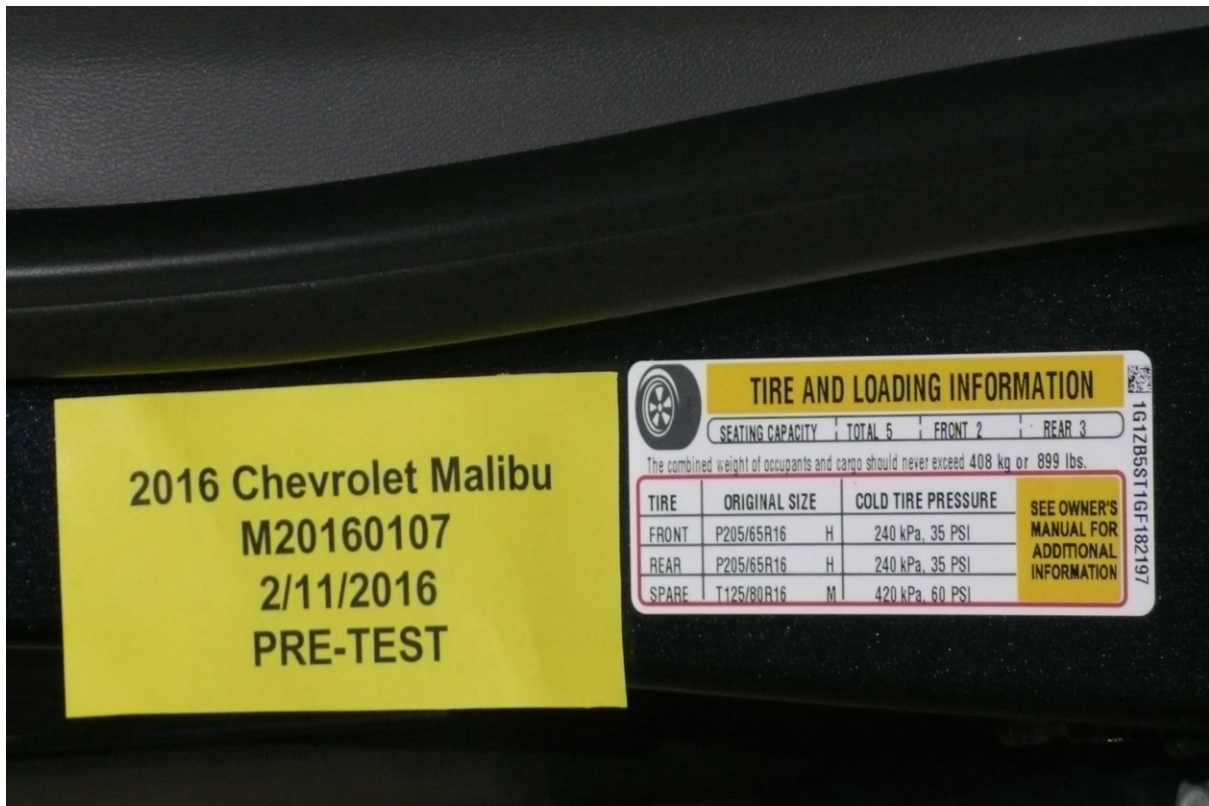
053 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



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



055 Close-Up View of Vehicle's Certification Label



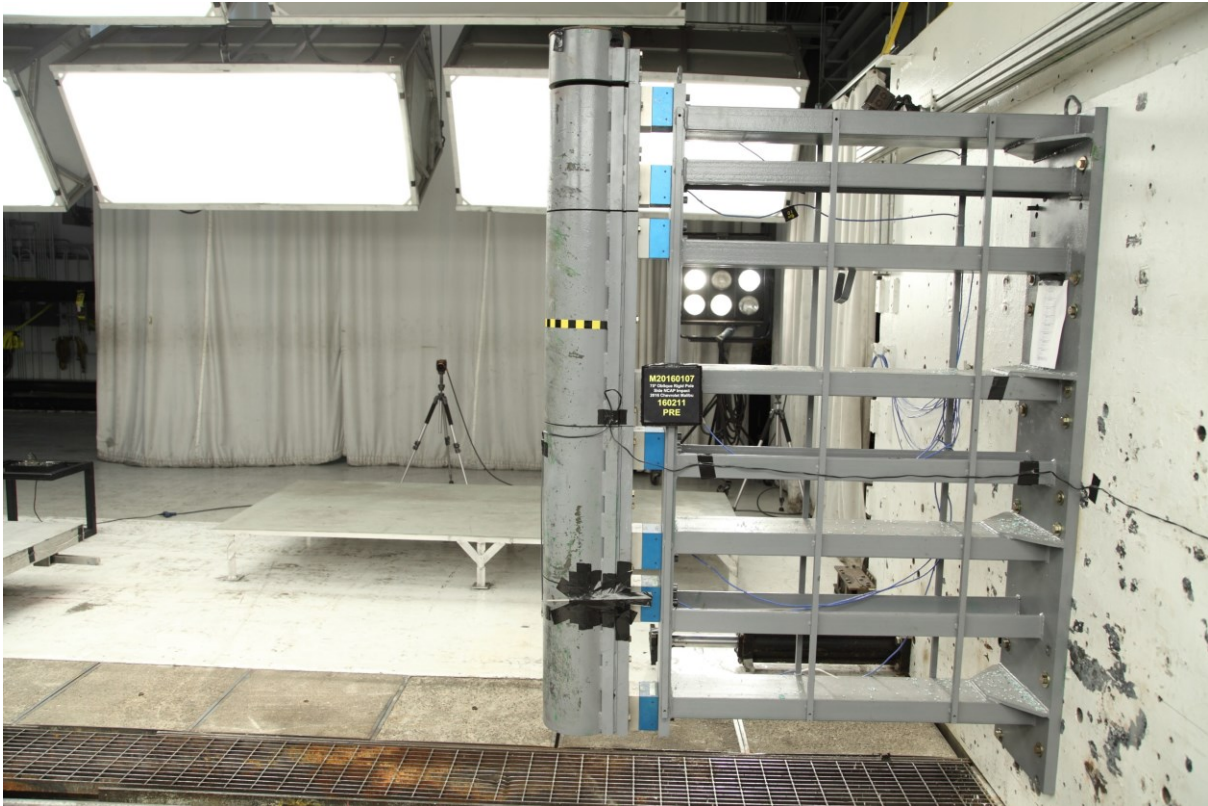
056 Close-Up View of Vehicle's Tire Information Placard or Label



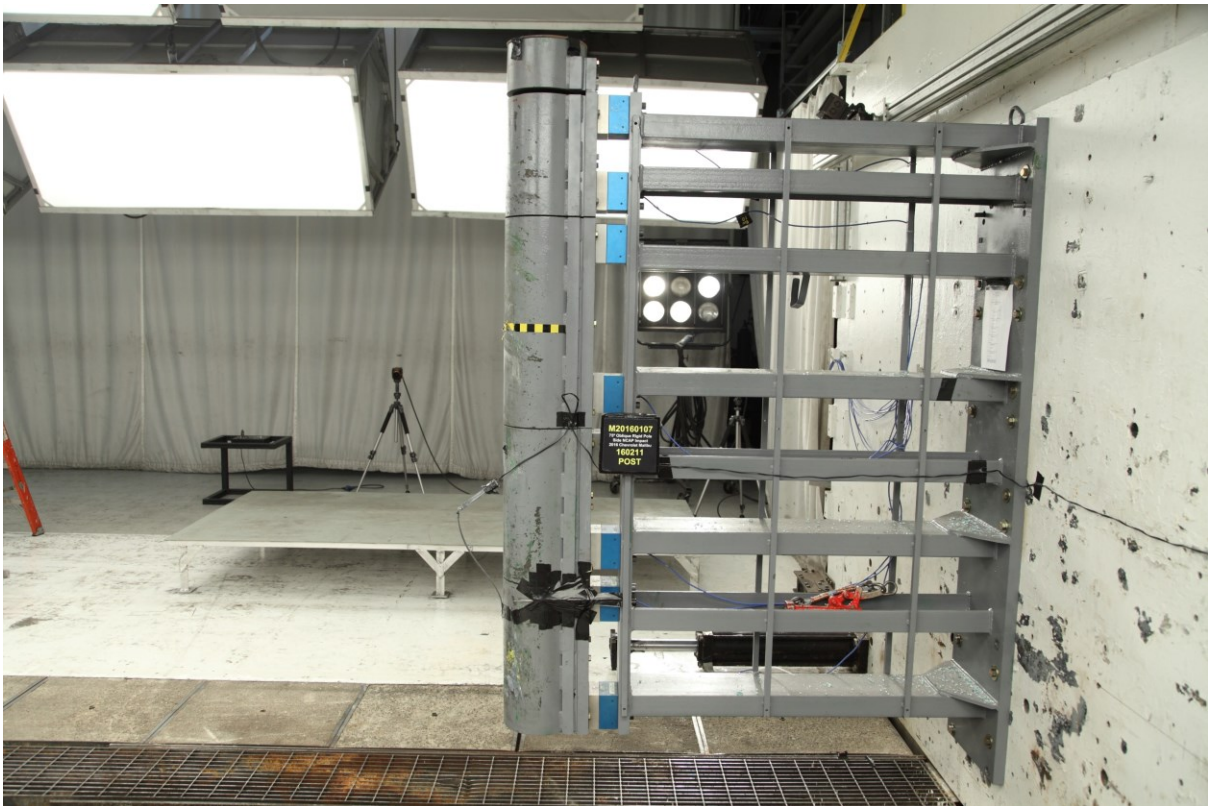
057 Pre-Test Pole Barrier Front View



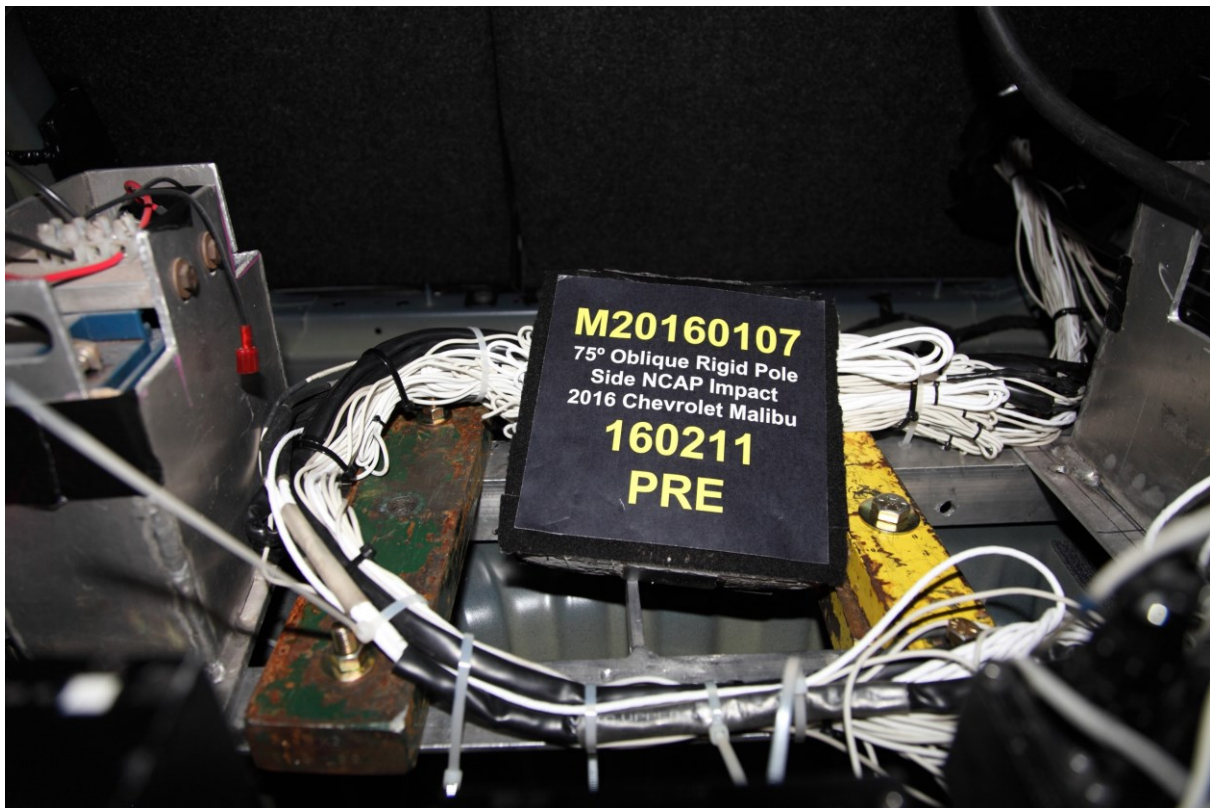
058 Post-Test Pole Barrier Front View



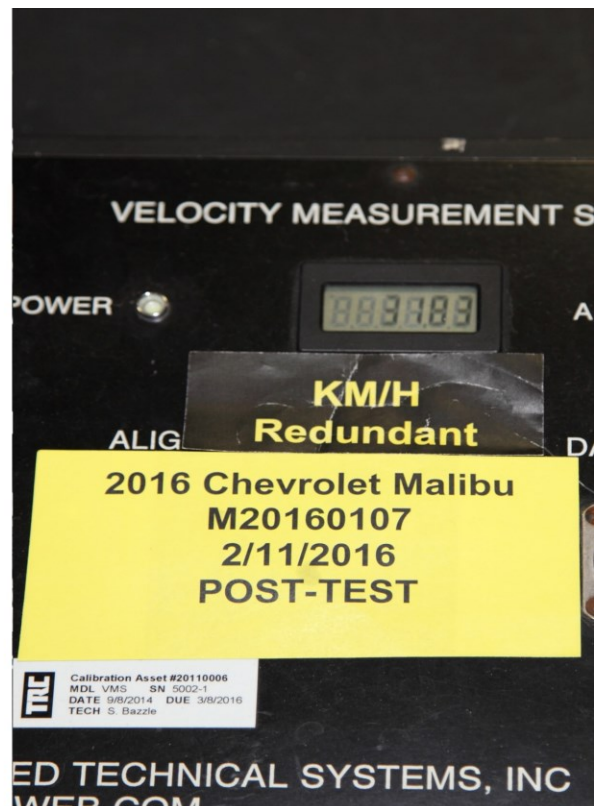
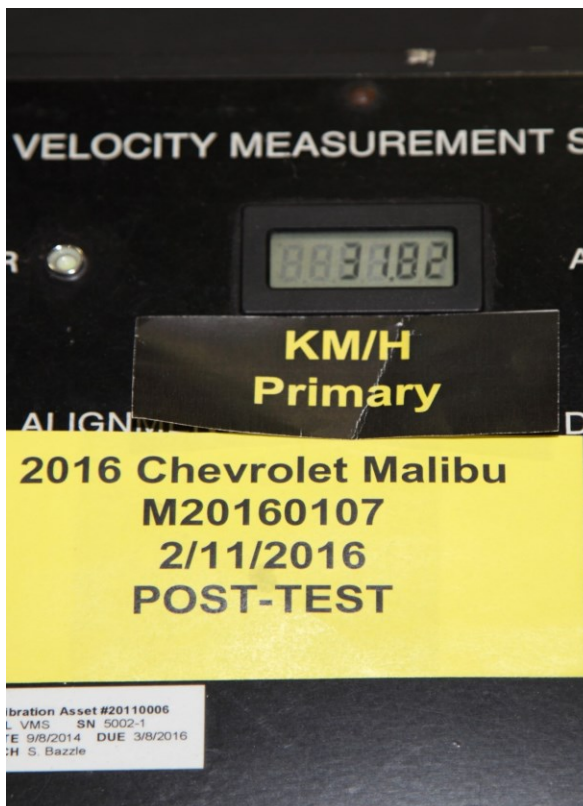
059 Pre-Test Pole Barrier Side View



060 Post-Test Pole Barrier Side View



061 Pre-Test Ballast View



062 Post-Test Primary and Redundant Speed Trap Read-Out



063 FMVSS No. 301 Static Rollover 0 Degrees



064 FMVSS No. 301 Static Rollover 90 Degrees



065 FMVSS No. 301 Static Rollover 180 Degrees



066 FMVSS No. 301 Static Rollover 270 Degrees



067 FMVSS No. 301 Static Rollover 360 Degrees



068 Impact Event

PHOTO NOT APPLICABLE

071 Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

No.	Description	Page
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2	Driver Head Acceleration (Y) vs. Time	B-4
3	Driver Head Acceleration (Z) vs. Time	B-4
4	Driver Head Acceleration Resultant vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Acceleration Resultant vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at:

www.nhtsa.dot.gov.

Additional Driver Dummy Instrumentation Data

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

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (X)
Load Cell Pole Barrier #2 Force (X)
Load Cell Pole Barrier #3 Force (X)
Load Cell Pole Barrier #4 Force (X)
Load Cell Pole Barrier #5 Force (X)
Load Cell Pole Barrier #6 Force (X)
Load Cell Pole Barrier #7 Force (X)
Load Cell Pole Barrier #8 Force (X)

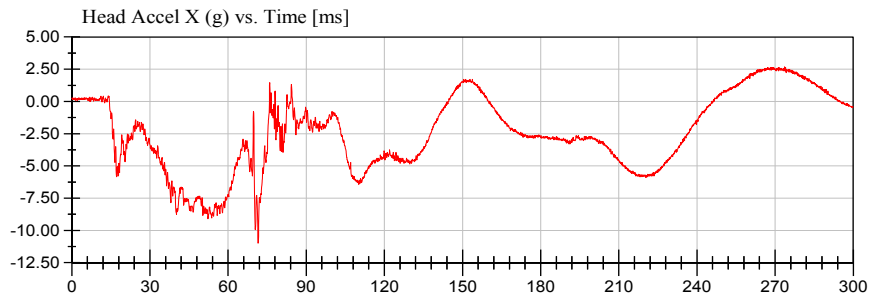
NHTSA

Test Lab: CTF

Test Number: 160211 (M20160107)

Position #1 SID IIs Dummy (305)

Test Date: 02/11/2016

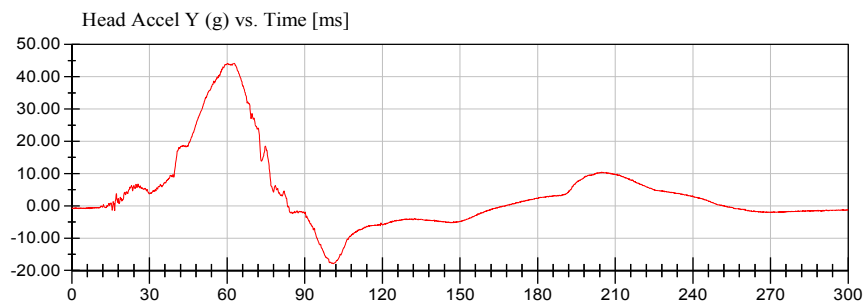


<Max>

2.69 g at 273.68 ms

<Min>

-10.98 g at 71.52 ms

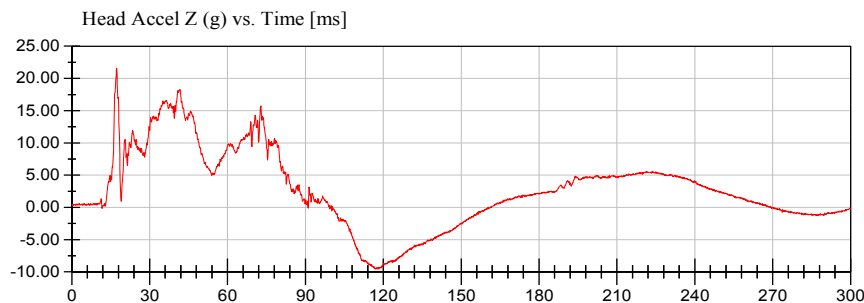


<Max>

44.17 g at 62.64 ms

<Min>

-17.91 g at 100.96 ms

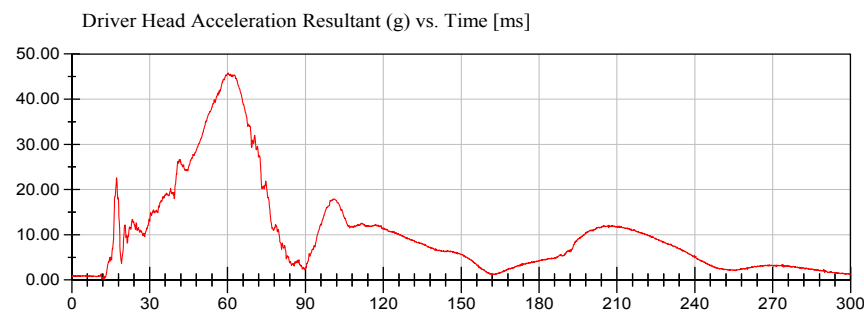


<Max>

21.58 g at 17.28 ms

<Min>

-9.58 g at 117.12 ms



<Max>

45.79 g at 60.24 ms

<Min>

0.21 g at 11.68 ms



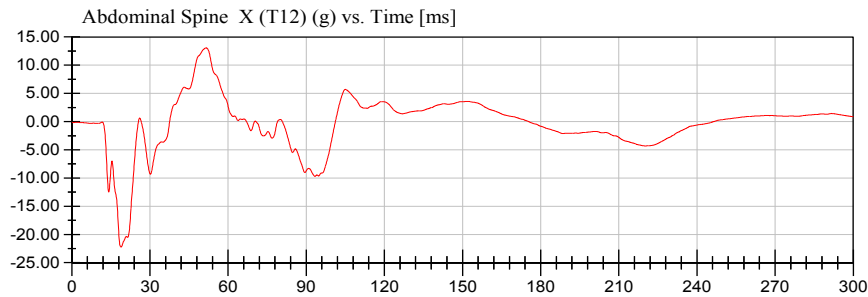
NHTSA

Test Lab: CTF

Test Number: 160211 (M20160107)

Position #1 SID IIs Dummy (305)

Test Date: 02/11/2016

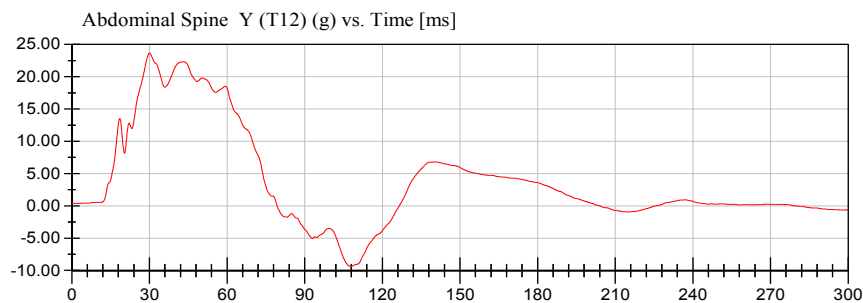


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13.06 g at 51.60 ms

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-22.22 g at 18.88 ms

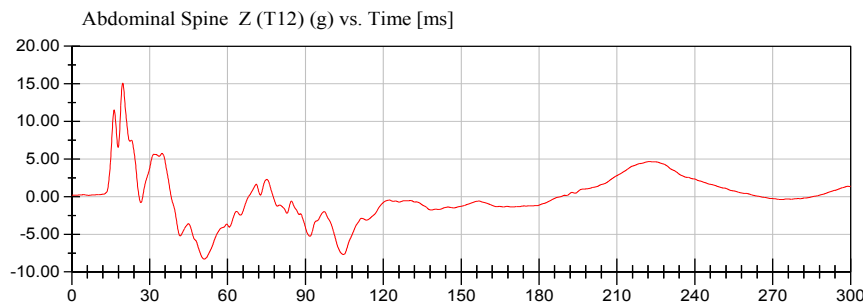


<Max>

23.65 g at 30.08 ms

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-9.40 g at 107.76 ms

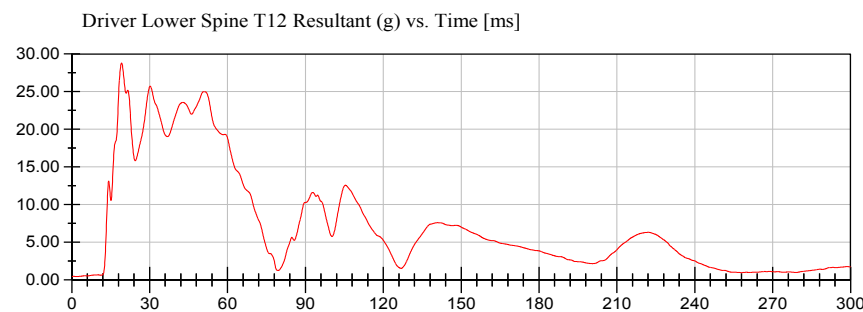


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15.10 g at 19.60 ms

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-8.29 g at 51.04 ms



<Max>

28.82 g at 19.20 ms

<Min>

0.46 g at 0.00 ms



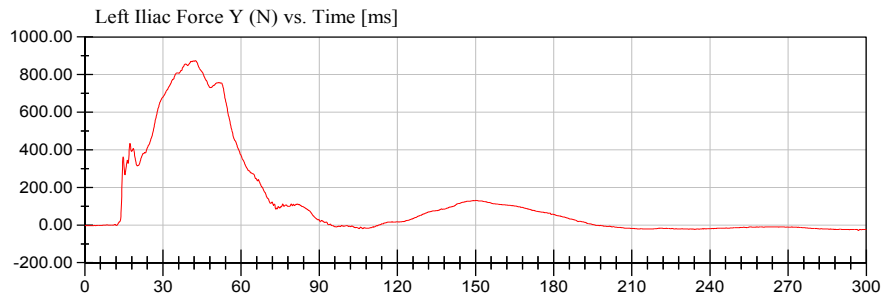
NHTSA

Test Lab: CTF

Test Number: 160211 (M20160107)

Position #1 SID IIs Dummy (305)

Test Date: 02/11/2016



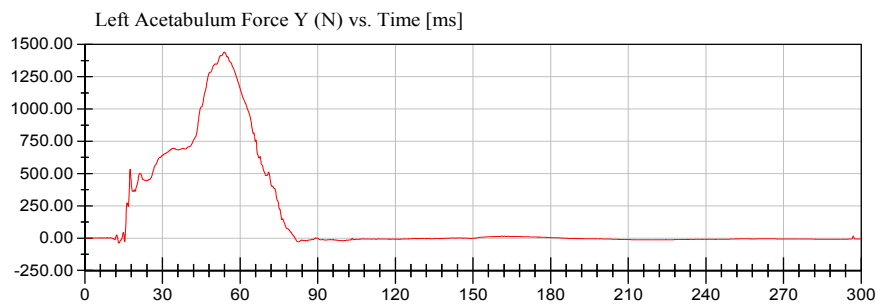
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874.00 N at 42.48 ms

<Min>

-29.22 N at 296.96 ms

CFC_600



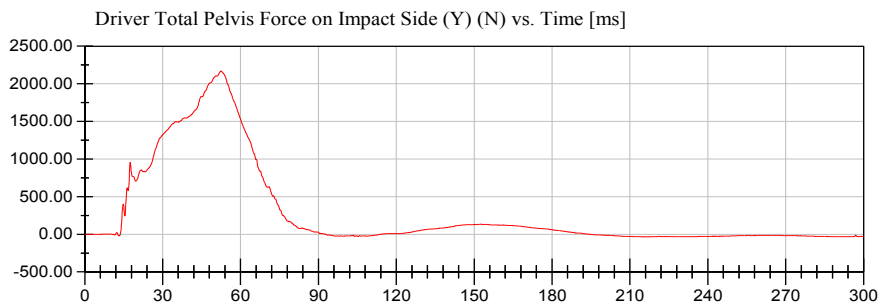
<Max>

1,440.52 N at 53.92 ms

<Min>

-38.97 N at 13.20 ms

CFC_600



<Max>

2,169.42 N at 52.48 ms

<Min>

-34.34 N at 218.00 ms

CFC_600



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS
SID-IIs (Driver) Dummy
Description

Table 1. External Measurements

Table 2. Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)
Head (X) Acceleration (G's) vs. Time (ms)
Head (Y) Acceleration (G's) vs. Time (ms)
Head (Z) Acceleration (G's) vs. Time (ms)

Table 3. Lateral Neck Pendulum Test

Pendulum Velocity (m/s) vs. Time (ms)
Flexion Angle (°) vs. Time (ms)
Moment About Occipital Condyle (Nm) vs. Time (ms)

Table 4. Shoulder Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Shoulder Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)

Table 5. Thorax (With Arm) Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Shoulder Displacement (mm) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 6. Thorax (Without Arm) Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 7. Abdomen Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Upper Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 8. Pelvis Plug Quasi-Static Test (Optional*)

Table 9. Pelvis Acetabulum Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Acetabulum Force (N) vs. Time (ms)

Table 10. Pelvis Iliac Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Iliac Force (N) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N 305

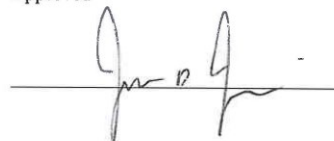
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.38

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	783	Yes
B	Shoulder Pivot Height	437.0 - 453.0	446	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	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	200	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



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 38-2

Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	126.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.3 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

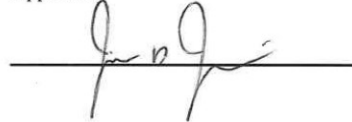
Test meets specifications.

Comments:

Technician



Approved



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

02.05.2016 10:09:52 233

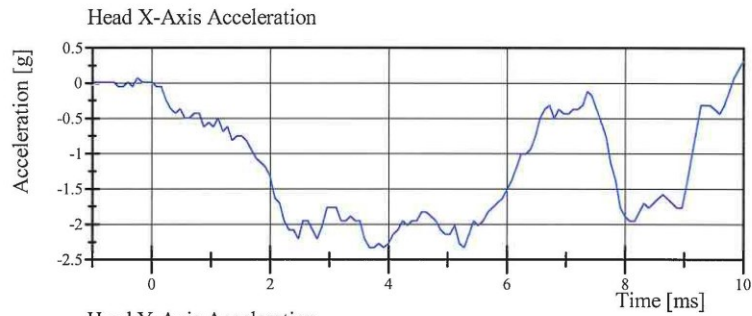


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 38-2

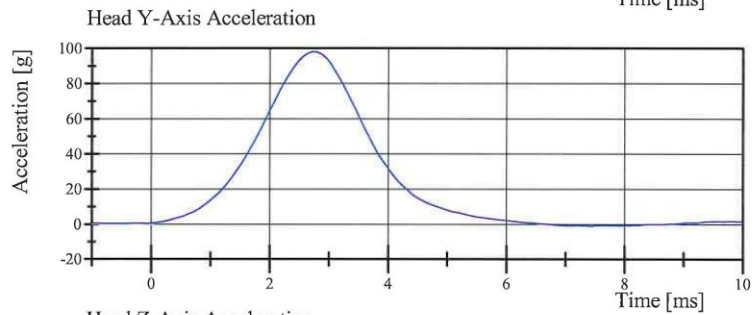
Test Date: 2/5/2016



Filter Class: CFC_1000

Max: 0.3 g at 10.0 ms

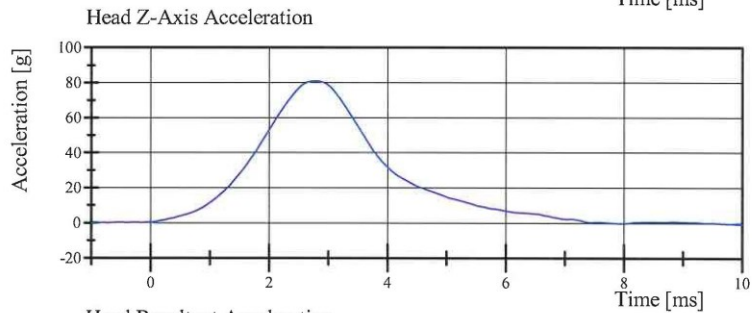
Min: -2.3 g at 3.7 ms



Filter Class: CFC_1000

Max: 97.8 g at 2.7 ms

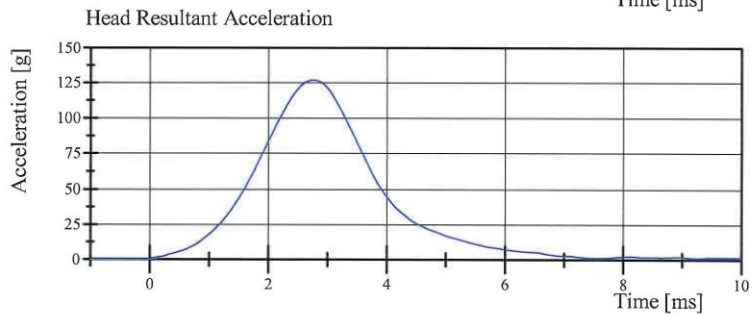
Min: -1.1 g at 7.4 ms



Filter Class: CFC_1000

Max: 80.7 g at 2.8 ms

Min: -0.6 g at 9.9 ms



Filter Class: CFC_1000

Max: 126.8 g at 2.7 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.

02.05.2016 10:10:02 233



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 38-3

Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.604 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.556 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.661 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.004 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.497 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.500 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-80.7 deg	Yes
Time of Peak	50 - 70 ms	66.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.1 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



Approved



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

02.05.2016 10:32:03 640

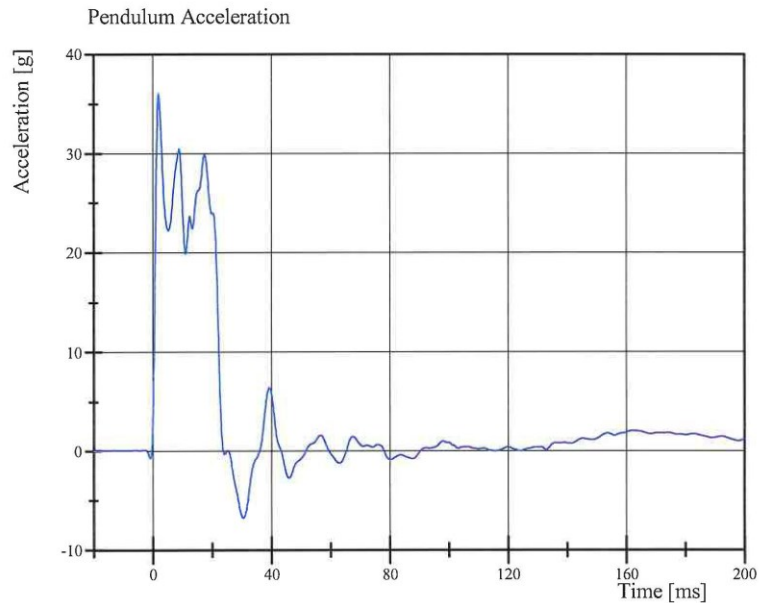


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 38-3

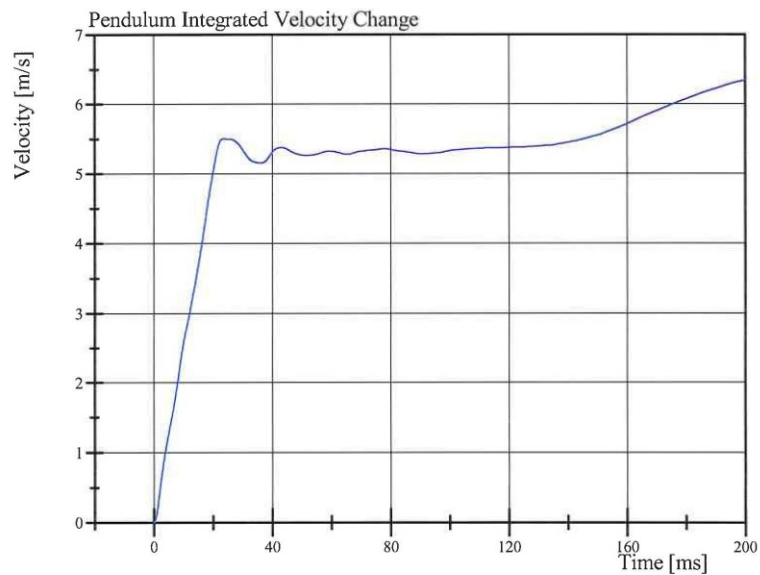
Test Date: 2/5/2016



Filter Class: CFC_180

Max: 36.0 g at 2.0 ms

Min: -6.8 g at 30.4 ms



Filter Class: CFC_180

Max: 6.3 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.

02.05.2016 10:32:19 640

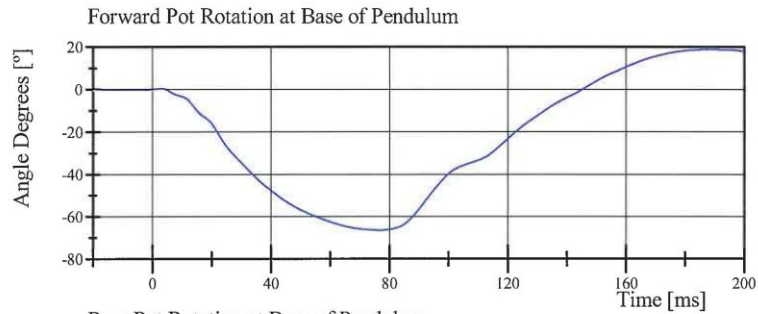


Transportation Research Center Inc.

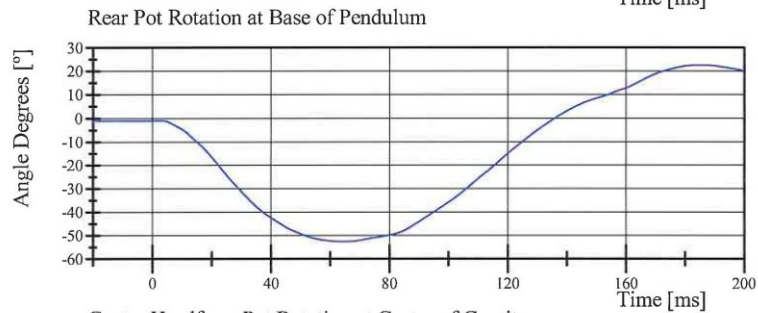
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 38-3

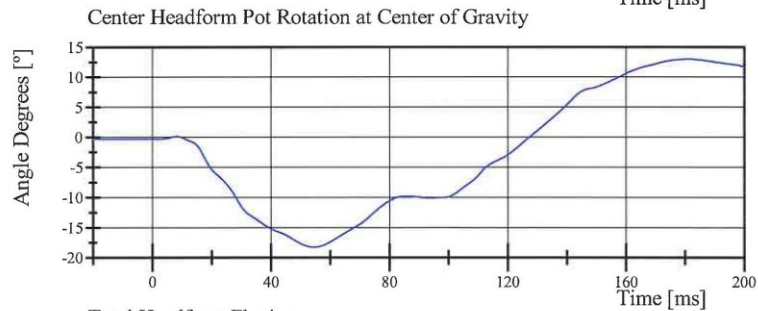
Test Date: 2/5/2016



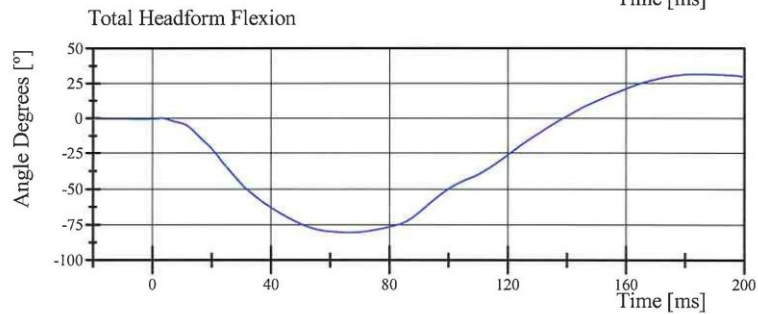
Filter Class: CFC_60
Max: 18.8 ° at 187.2 ms
Min: -66.6 ° at 77.0 ms



Filter Class: CFC_60
Max: 22.7 ° at 185.3 ms
Min: -52.7 ° at 64.5 ms



Filter Class: CFC_60
Max: 13.0 ° at 181.1 ms
Min: -18.3 ° at 54.5 ms



Filter Class: CFC_60
Max: 31.6 ° at 184.6 ms
Min: -80.7 ° at 66.4 ms

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

02.05.2016 10:32:19 640

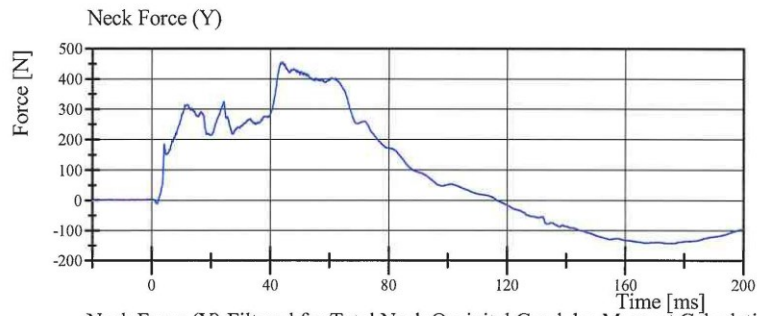


Transportation Research Center Inc.

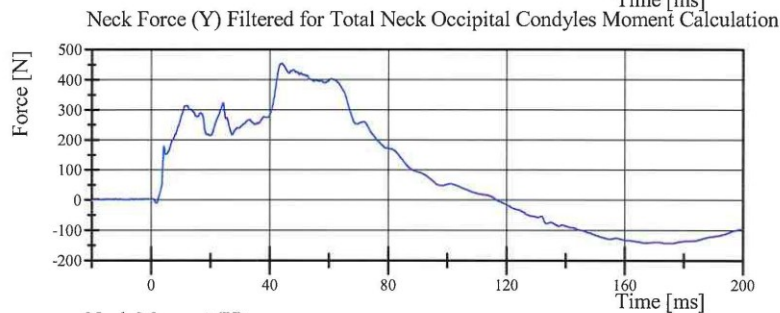
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 38-3

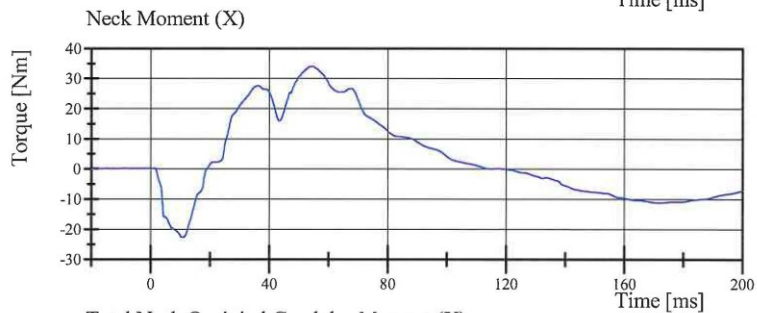
Test Date: 2/5/2016



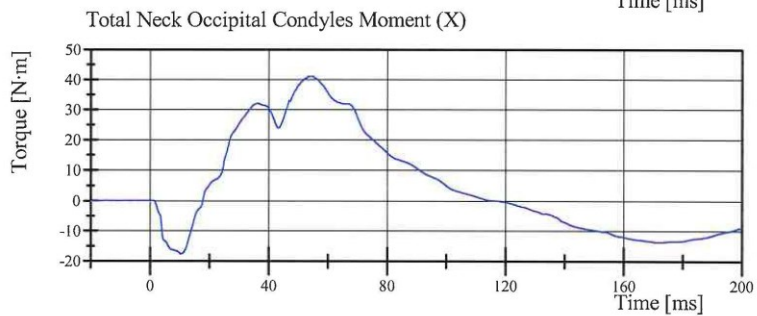
Filter Class: CFC_1000
Max: 455.0 N at 44.2 ms
Min: -143.1 N at 174.7 ms



Filter Class: CFC_600
Max: 453.1 N at 44.2 ms
Min: -142.9 N at 174.9 ms



Filter Class: CFC_600
Max: 34.1 Nm at 54.8 ms
Min: -22.8 Nm at 11.1 ms



Filter Class: Without (Consta
Max: 41.1 N·m at 54.2 ms
Min: -17.7 N·m at 10.5 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J2111.

02.05.2016 10:32:20 640



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 38-1

Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.2 g	Yes
Shoulder Displacement	28 - 37 mm	31.7 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.8 g	Yes

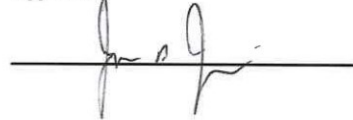
Test meets specifications.

Comments:

Technician



Approved



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

02.05.2016 07:35:59 849

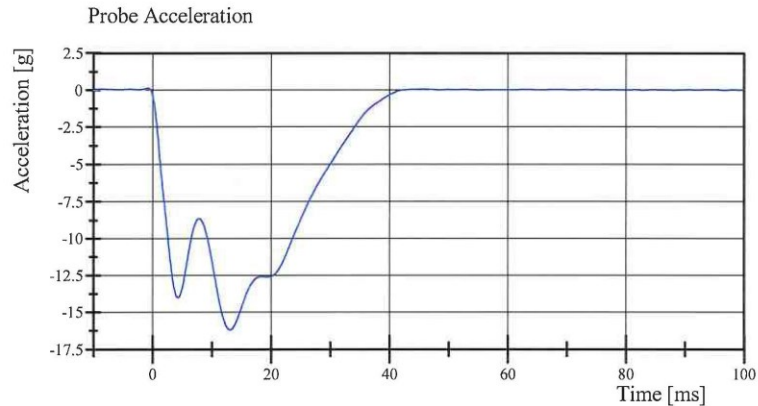


Transportation Research Center Inc.

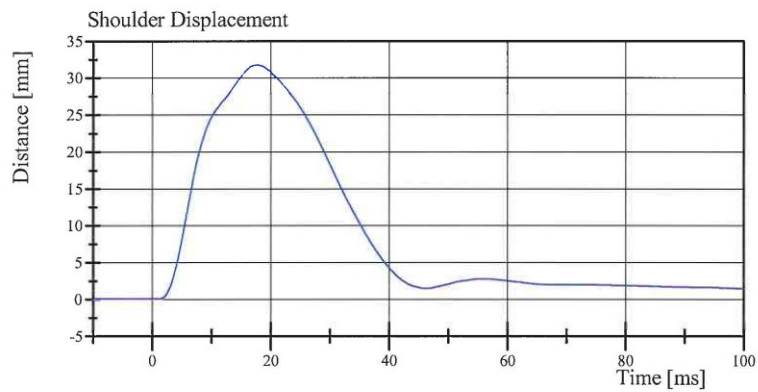
Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 38-1

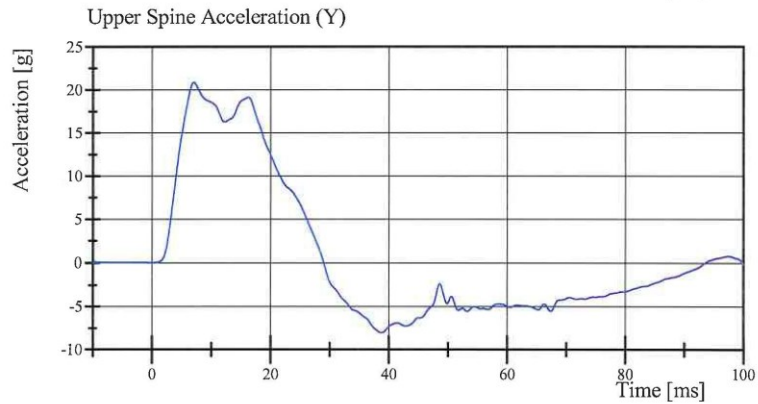
Test Date: 2/5/2016



Filter Class: CFC_180
Max: 0.1 g at -0.8 ms
Min: -16.2 g at 13.1 ms



Filter Class: CFC_600
Max: 31.7 mm at 17.6 ms
Min: -0.0 mm at -1.7 ms



Filter Class: CFC_180
Max: 20.8 g at 7.0 ms
Min: -8.1 g at 38.8 ms

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

02.05.2016 07:36:07 849



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 38-1
Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.737 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-32.9 g	Yes
Shoulder Displacement	31 - 40 mm	33.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	25.4 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.2 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.1 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	39.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.7 g	Yes

Test meets specifications.

Comments:

Technician



Approved



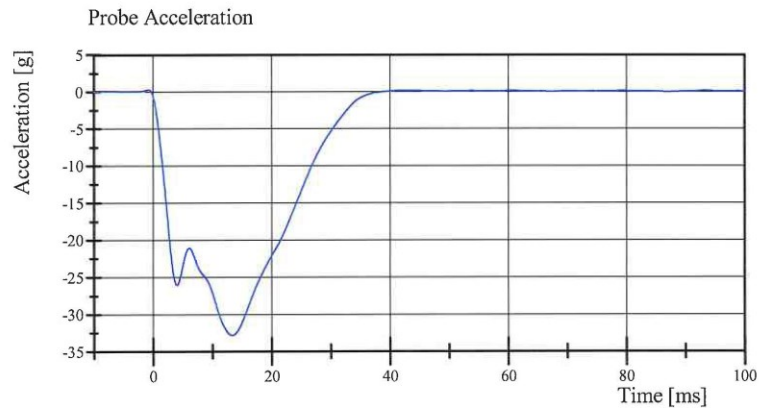
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.05.2016 08:08:24 610

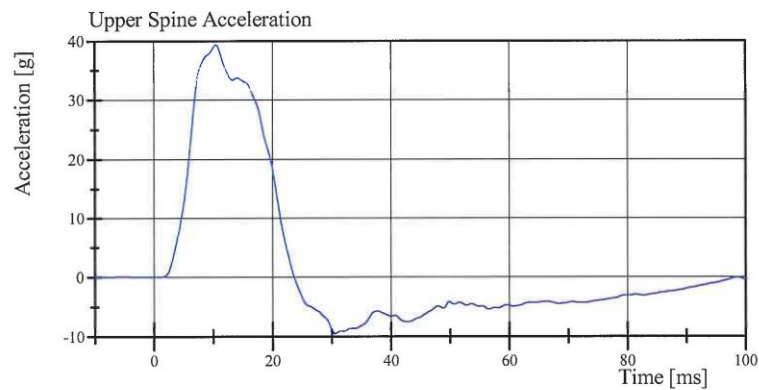


Transportation Research Center Inc.

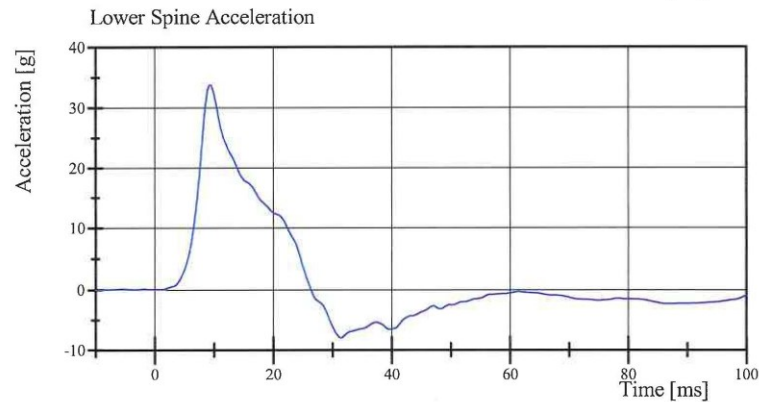
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 38-1
Test Date: 2/5/2016



Filter Class: CFC_180
Max: 0.2 g at -0.8 ms
Min: -32.9 g at 13.4 ms



Filter Class: CFC_180
Max: 39.3 g at 10.5 ms
Min: -9.6 g at 30.6 ms



Filter Class: CFC_180
Max: 33.7 g at 9.4 ms
Min: -8.0 g at 31.4 ms

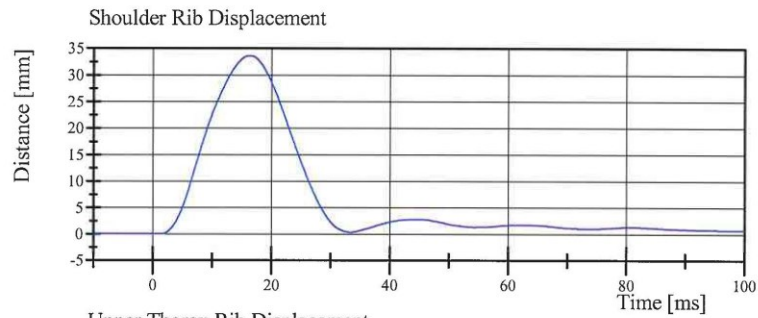
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.05.2016 08:08:49 610

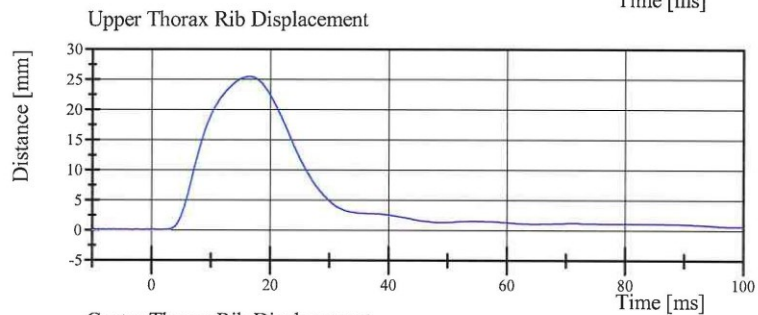


Transportation Research Center Inc.

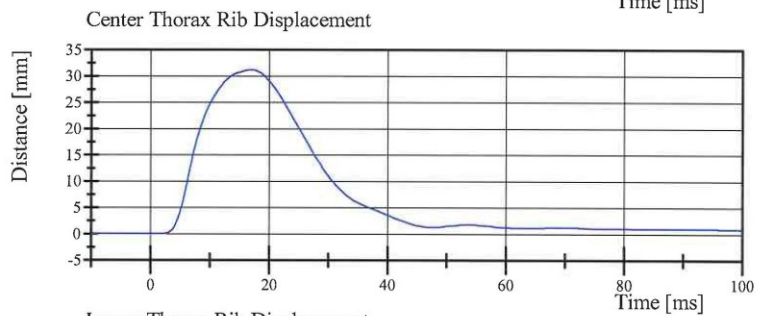
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 38-1
Test Date: 2/5/2016



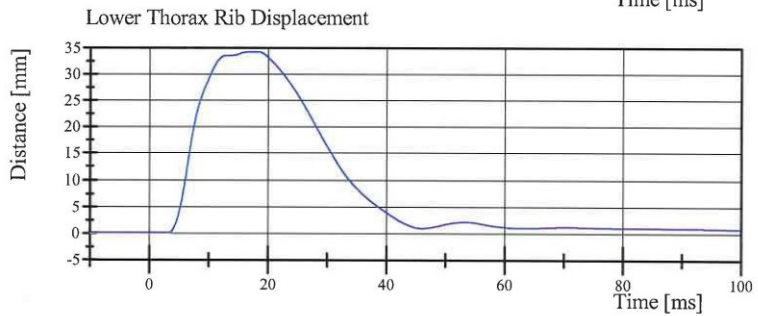
Filter Class: CFC_600
Max: 33.5 mm at 16.2 ms
Min: -0.0 mm at 1.5 ms



Filter Class: CFC_600
Max: 25.4 mm at 16.4 ms
Min: -0.0 mm at -3.8 ms



Filter Class: CFC_600
Max: 31.2 mm at 17.0 ms
Min: -0.0 mm at -7.3 ms



Filter Class: CFC_600
Max: 34.1 mm at 18.2 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.

02.05.2016 08:08:50 610



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 38-1
Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.351 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.9 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	35.8 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.9 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.2 g	Yes

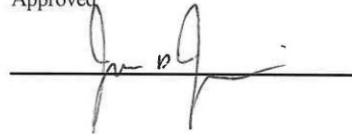
Test meets specifications.

Comments:

Technician



Approved



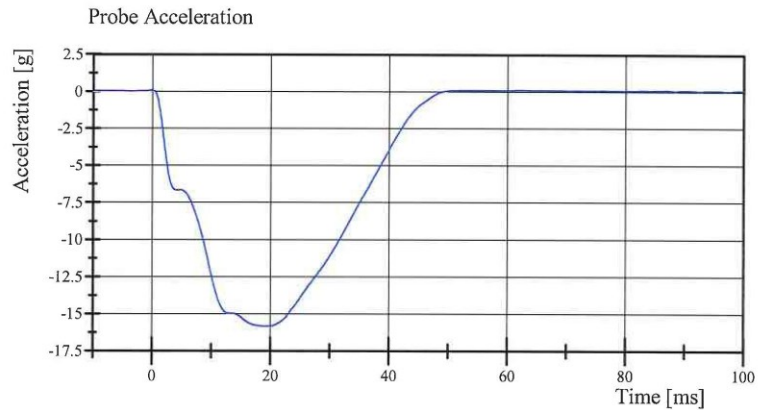
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.05.2016 08:44:26 795

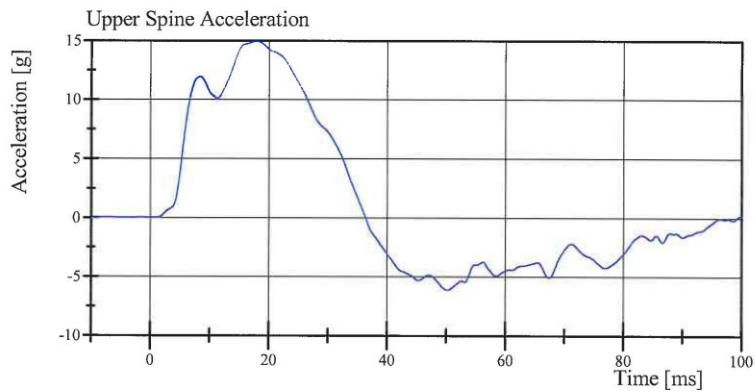


Transportation Research Center Inc.

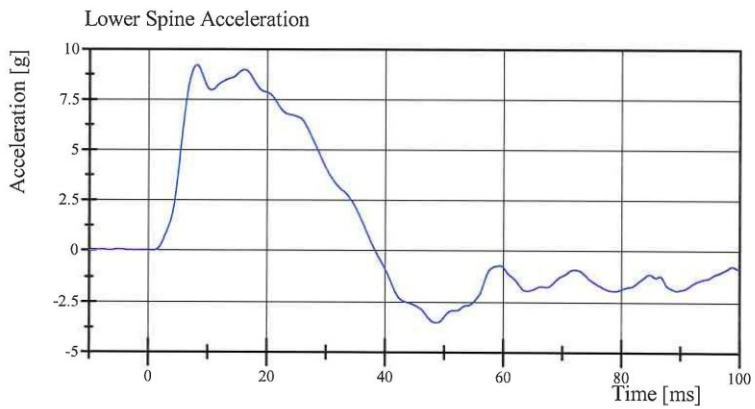
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 38-1
Test Date: 2/5/2016



Filter Class: CFC_180
Max: 0.1 g at 61.9 ms
Min: -15.9 g at 19.6 ms



Filter Class: CFC_180
Max: 14.9 g at 17.9 ms
Min: -6.1 g at 50.2 ms



Filter Class: CFC_180
Max: 9.2 g at 8.1 ms
Min: -3.5 g at 48.6 ms

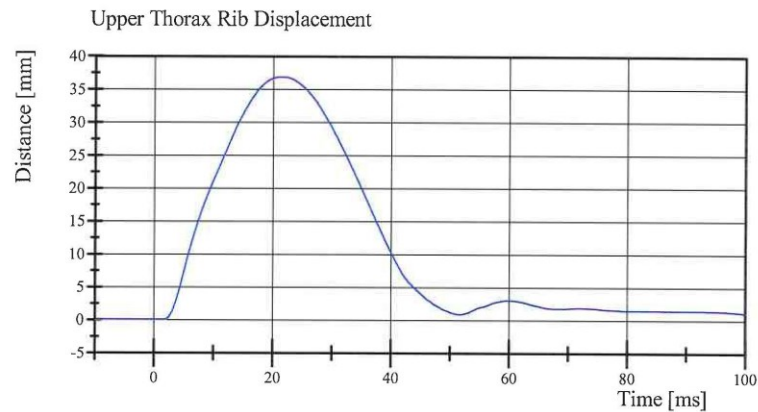
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.05.2016 08:44:41 795

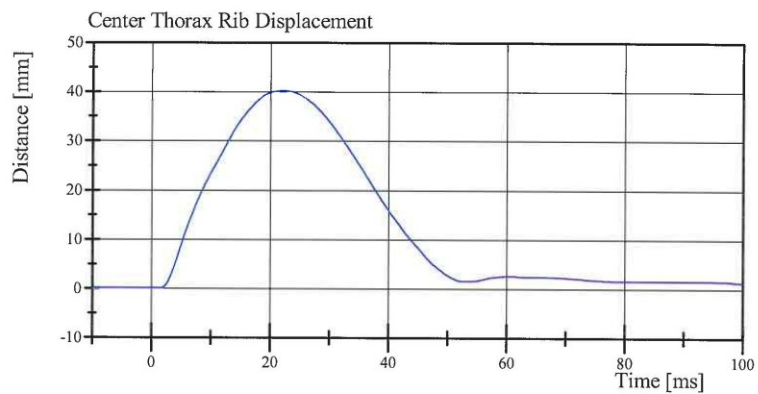


Transportation Research Center Inc.

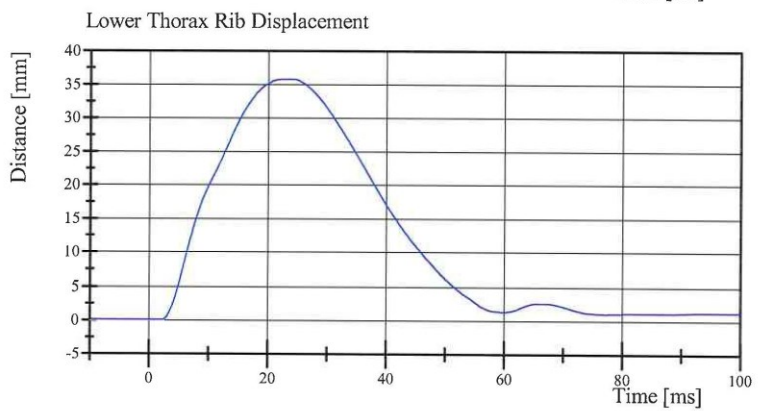
Left Lateral Thorax without Arm
SID II's Serial No. 305 Certification No. 38-1
Test Date: 2/5/2016



Filter Class: CFC_600
Max: 36.8 mm at 21.4 ms
Min: -0.0 mm at -3.0 ms



Filter Class: CFC_600
Max: 40.1 mm at 22.0 ms
Min: -0.0 mm at -3.0 ms



Filter Class: CFC_600
Max: 35.8 mm at 23.0 ms
Min: -0.0 mm at 1.4 ms

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

02.05.2016 08:44:41 795



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 38-2

Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.4 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.6 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.35 g	Yes

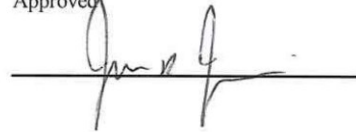
Test meets specifications.

Comments:

Technician



Approved



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

02.05.2016 08:28:20 657

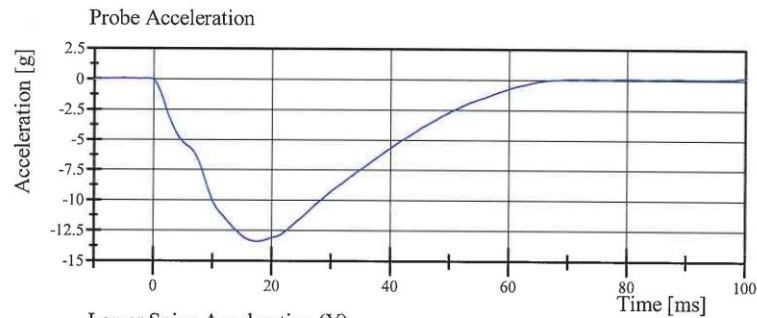


Transportation Research Center Inc.

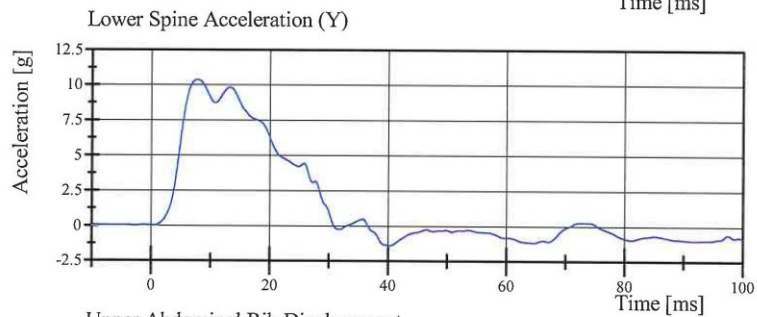
Left Lateral Abdomen

SID II_s Serial No. 305 Certification No. 38-2

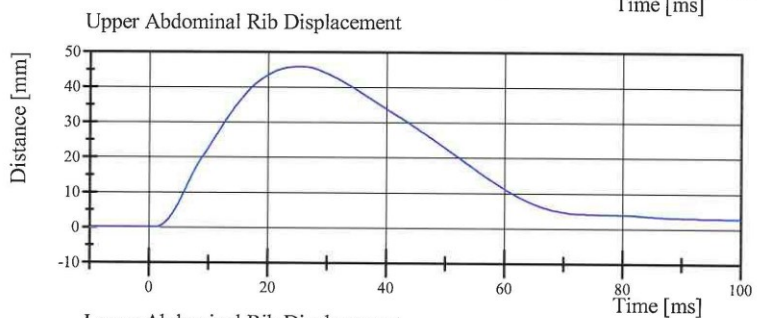
Test Date: 2/5/2016



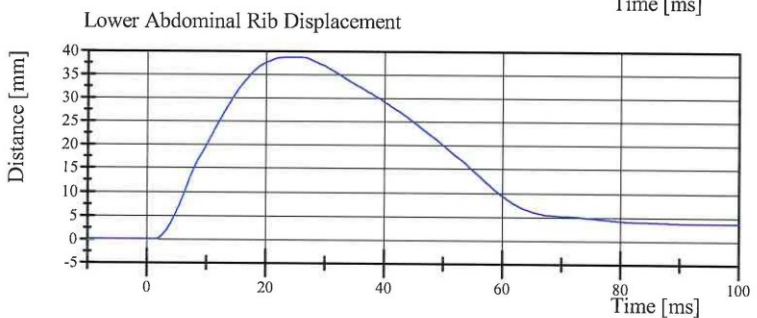
Filter Class: CFC_180
Max: 0.2 g at 99.4 ms
Min: -13.4 g at 17.5 ms



Filter Class: CFC_180
Max: 10.3 g at 7.8 ms
Min: -1.4 g at 40.3 ms



Filter Class: CFC_600
Max: 45.7 mm at 25.2 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_600
Max: 38.6 mm at 25.4 ms
Min: -0.0 mm at 1.4 ms

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

02.05.2016 08:28:35 657



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 38-3

Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.79 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	38.8 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,166.5 N	Yes

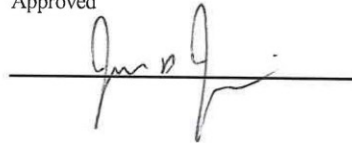
Test meets specifications.

Comments:

Technician



Approved



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

02.05.2016 15:37:13 427

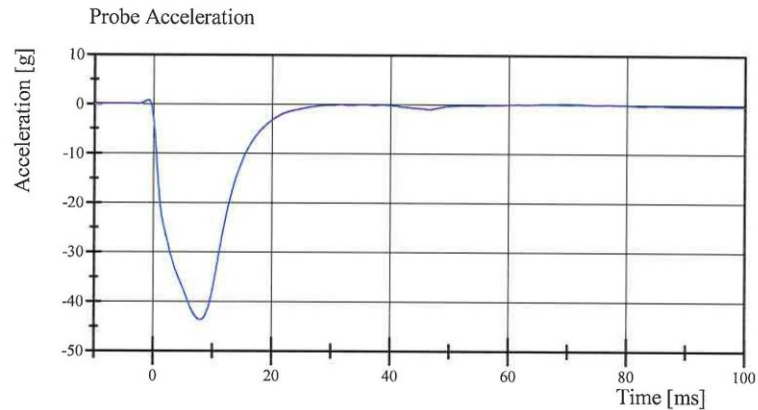


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 38-3

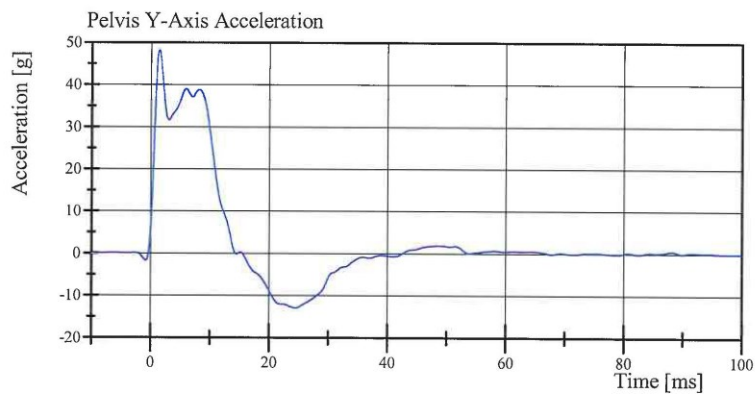
Test Date: 2/5/2016



Filter Class: CFC_180

Max: 0.6 g at -1.0 ms

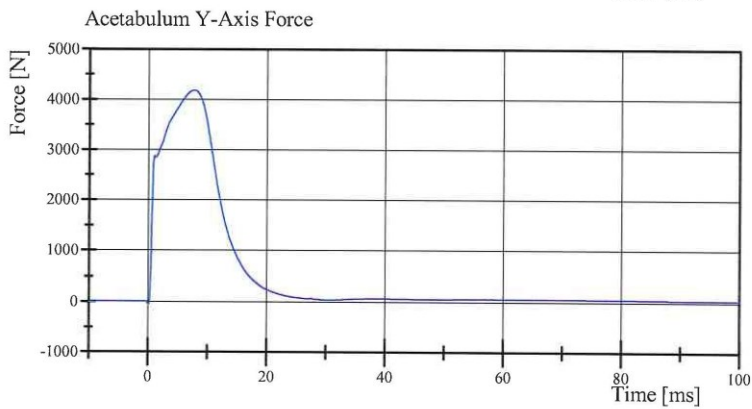
Min: -43.8 g at 8.0 ms



Filter Class: CFC_180

Max: 48.3 g at 1.4 ms

Min: -13.0 g at 24.5 ms



Filter Class: CFC_600

Max: 4,166.5 N at 7.7 ms

Min: -61.2 N at 0.1 ms

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

02.05.2016 15:37:50 427



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 38-2

Test Date: 2/5/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.26 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.0 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.6 g	Yes
Iliac Force	4,100 - 5,100 N	5,069.7 N	Yes

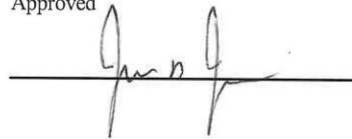
Test meets specifications.

Comments:

Technician



Approved



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

02.05.2016 09:14:27 681

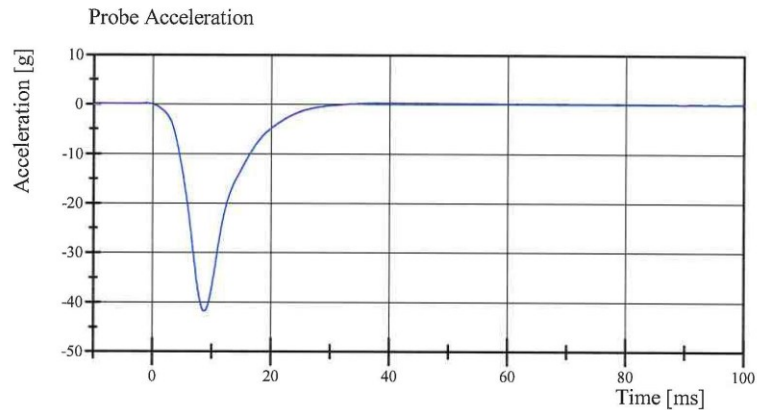


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 38-2

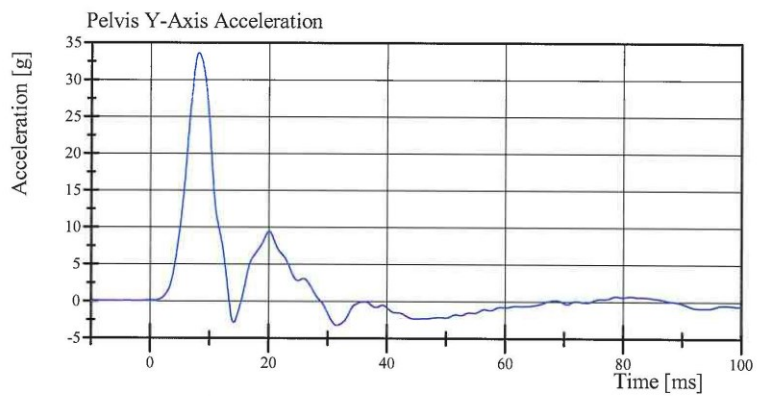
Test Date: 2/5/2016



Filter Class: CFC_180

Max: 0.2 g at 37.8 ms

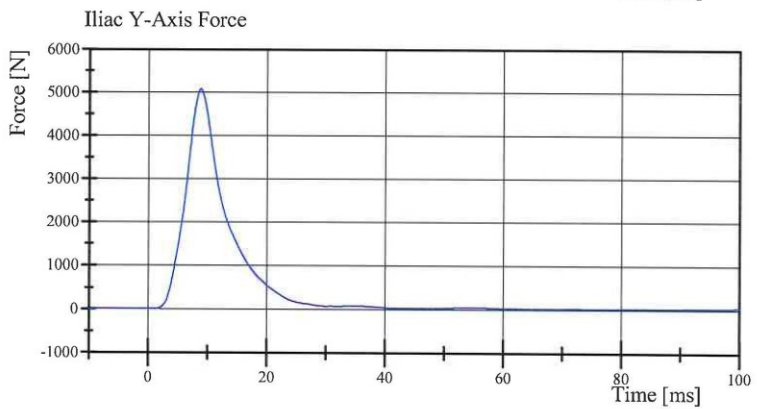
Min: -42.0 g at 8.8 ms



Filter Class: CFC_180

Max: 33.6 g at 8.2 ms

Min: -3.3 g at 31.5 ms



Filter Class: CFC_600

Max: 5,069.7 N at 8.8 ms

Min: -1.1 N at -5.4 ms

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

02.05.2016 09:14:54 681



Post-Test Calibration Sheets
Driver S/N 305

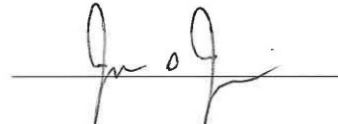
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 305 Calibration No.39

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	783	Yes
B	Shoulder Pivot Height	437.0 - 453.0	446	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	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	200	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



Approved




Revised 9/29/2005

Transportation Research Center Inc.

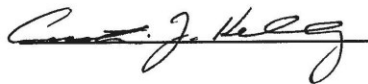
Left Lateral Head Drop
SID IIs Serial No. 305 Certification No. 39-4
Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	120.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.0 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



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

02.12.2016 13:27:23 232

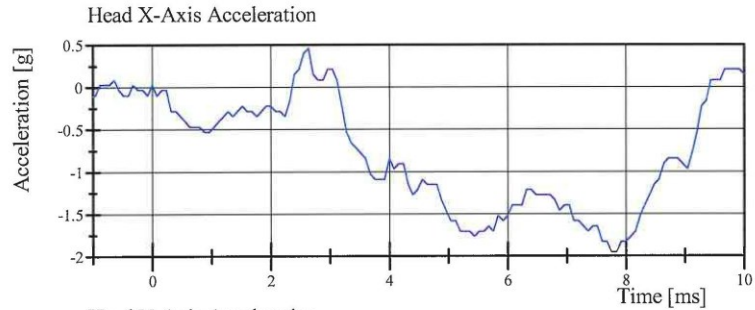


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 305 Certification No. 39-4

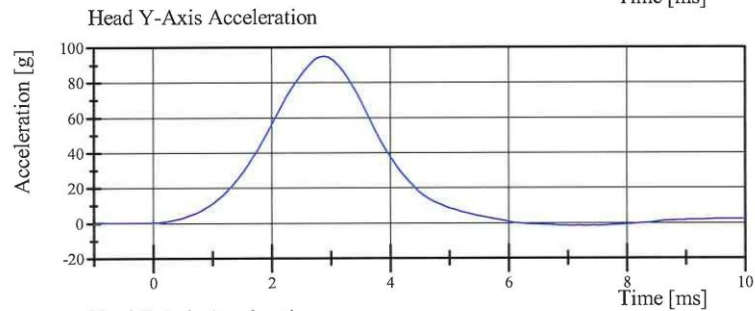
Test Date: 2/12/2016



Filter Class: CFC_1000

Max: 0.5 g at 2.6 ms

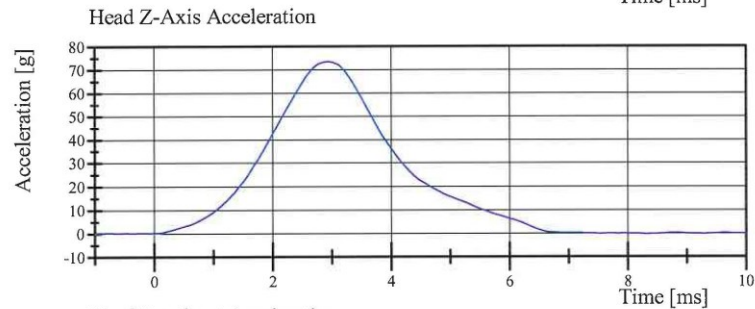
Min: -2.0 g at 7.8 ms



Filter Class: CFC_1000

Max: 94.9 g at 2.9 ms

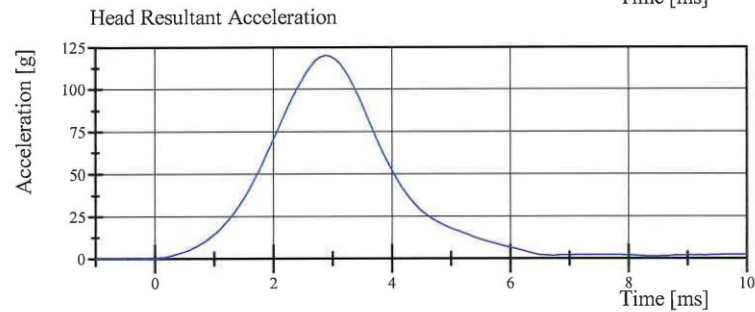
Min: -1.6 g at 7.0 ms



Filter Class: CFC_1000

Max: 73.5 g at 3.0 ms

Min: -0.3 g at 8.3 ms



Filter Class: CFC_1000

Max: 120.0 g at 2.9 ms

Min: 0.0 g at -0.3 ms

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

02.12.2016 13:27:33 232



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 39-1

Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.616 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.602 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.883 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.164 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.842 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.842 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-79.9 deg	Yes
Time of Peak	50 - 70 ms	65.4 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.0 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	118.4 ms	Yes

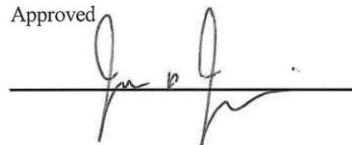
Test meets specifications.

Comments:

Technician



Approved



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

02.12.2016 08:16:15 636

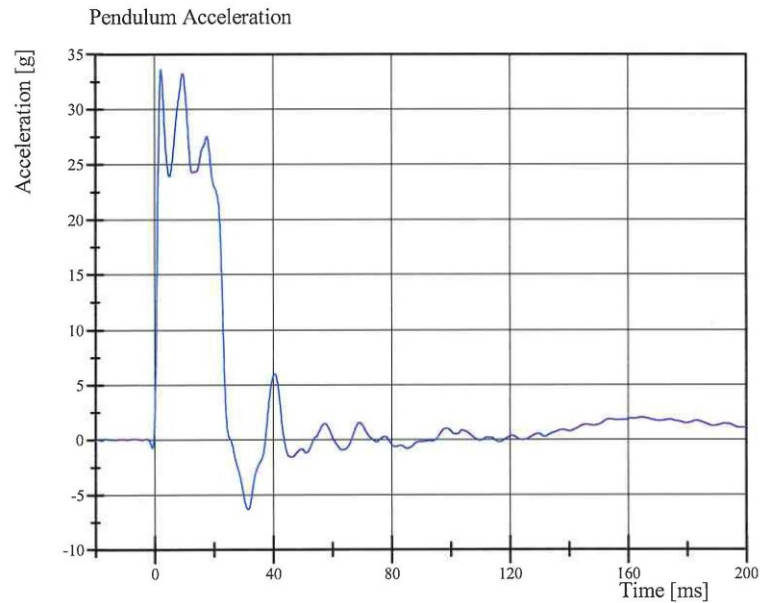


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 39-1

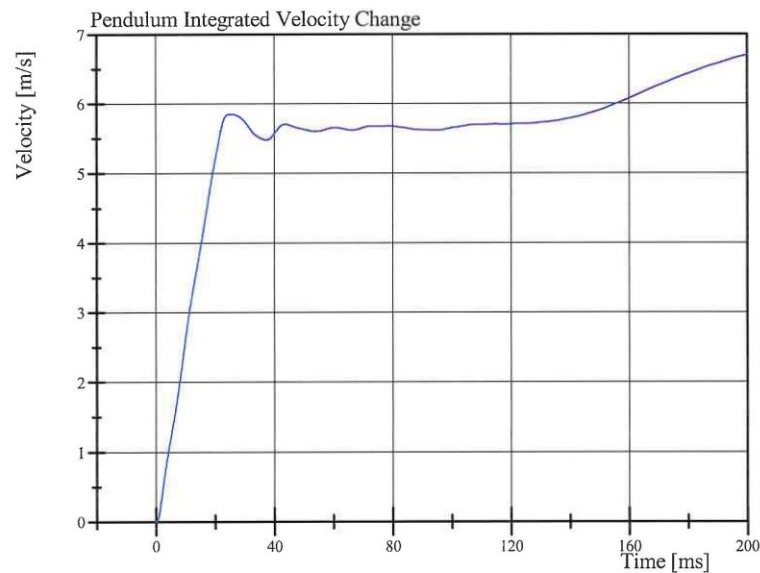
Test Date: 2/12/2016



Filter Class: CFC_180

Max: 33.5 g at 2.2 ms

Min: -6.4 g at 31.6 ms



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.

02.12.2016 08:16:30 636

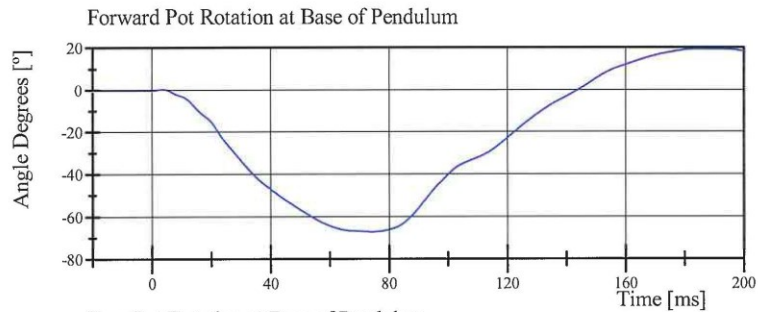


Transportation Research Center Inc.

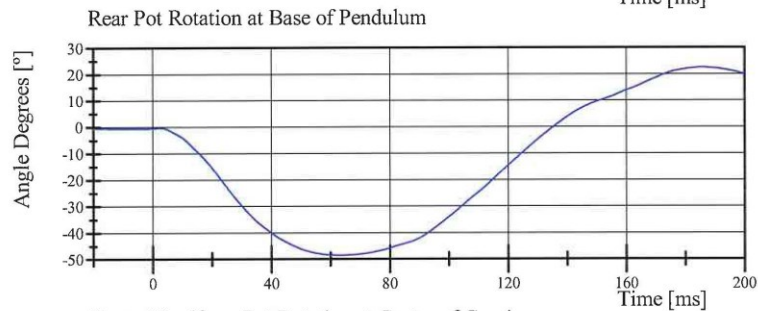
Left Lateral Neck

SID IIs Serial No. 305 Certification No. 39-1

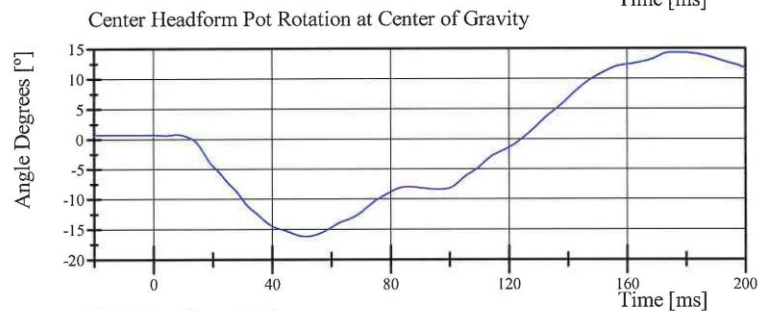
Test Date: 2/12/2016



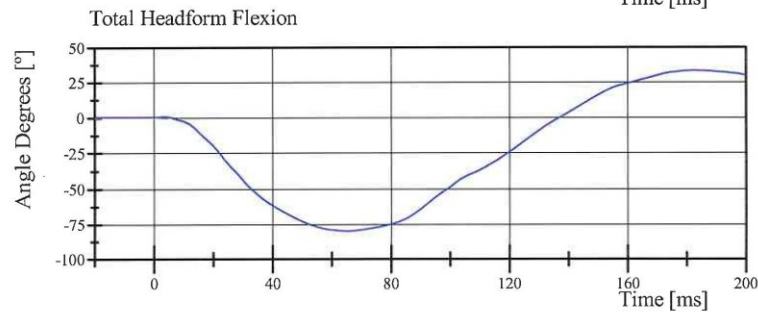
Filter Class: CFC_60
Max: 19.3 ° at 189.0 ms
Min: -67.2 ° at 74.2 ms



Filter Class: CFC_60
Max: 22.5 ° at 185.7 ms
Min: -48.7 ° at 63.4 ms



Filter Class: CFC_60
Max: 14.3 ° at 177.8 ms
Min: -16.2 ° at 51.4 ms



Filter Class: CFC_60
Max: 33.3 ° at 182.6 ms
Min: -79.9 ° at 65.4 ms

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

02.12.2016 08:16:31 636

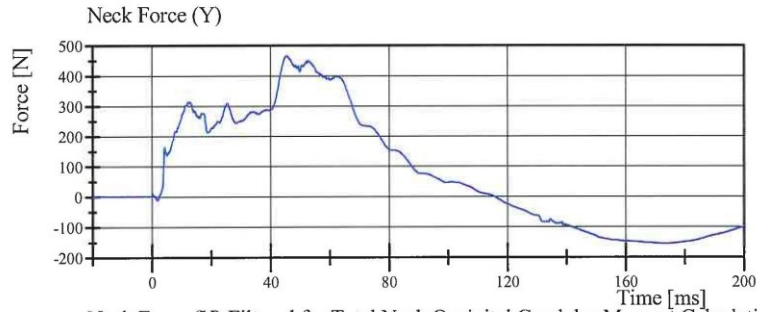


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 305 Certification No. 39-1

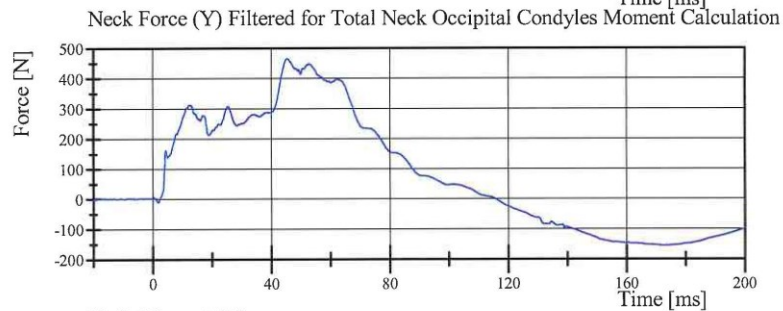
Test Date: 2/12/2016



Filter Class: CFC_1000

Max: 465.5 N at 45.5 ms

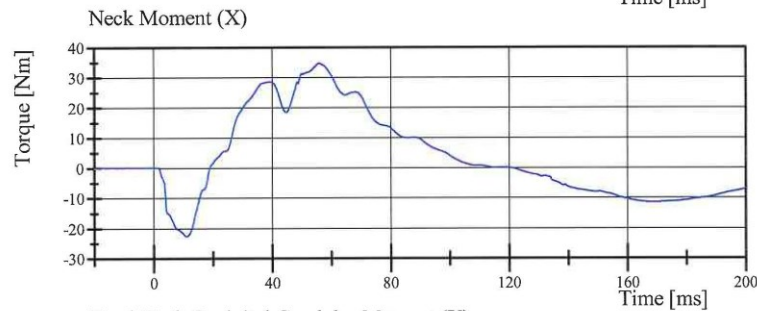
Min: -154.9 N at 172.5 ms



Filter Class: CFC_600

Max: 464.9 N at 45.4 ms

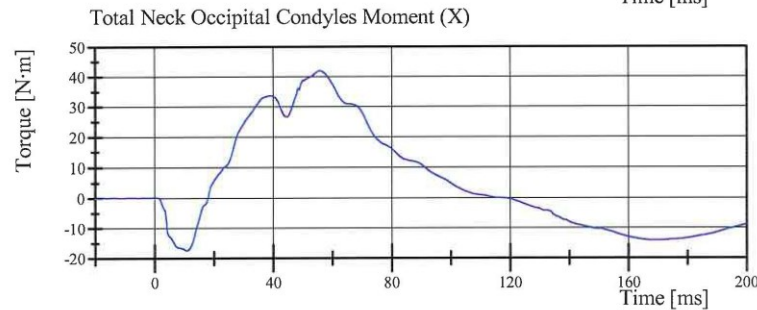
Min: -154.5 N at 172.5 ms



Filter Class: CFC_600

Max: 34.6 Nm at 56.0 ms

Min: -22.8 Nm at 11.3 ms



Filter Class: Without_(Consta

Max: 42.0 N·m at 55.5 ms

Min: -17.6 N·m at 10.8 ms

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

02.12.2016 08:16:32 636



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 39-1

Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.0 g	Yes
Shoulder Displacement	28 - 37 mm	29.7 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	21.9 g	Yes

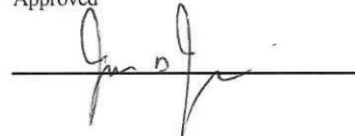
Test meets specifications.

Comments:

Technician



Approved



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

02.12.2016 10:02:23 904

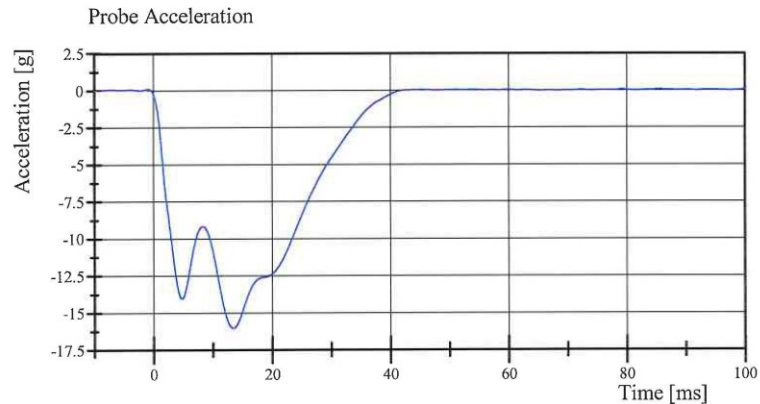


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 305 Certification No. 39-1

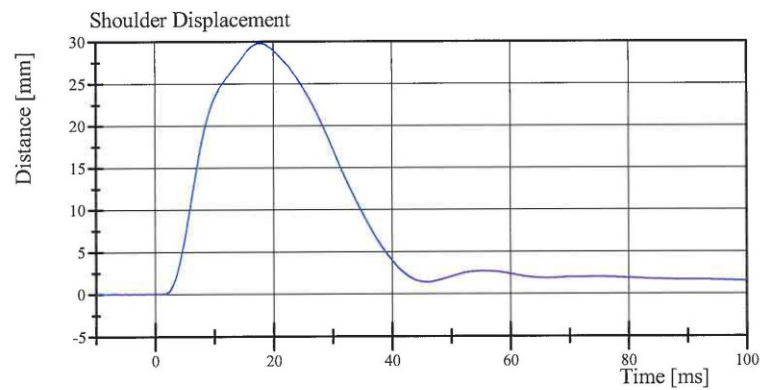
Test Date: 2/12/2016



Filter Class: CFC_180

Max: 0.1 g at 100.0 ms

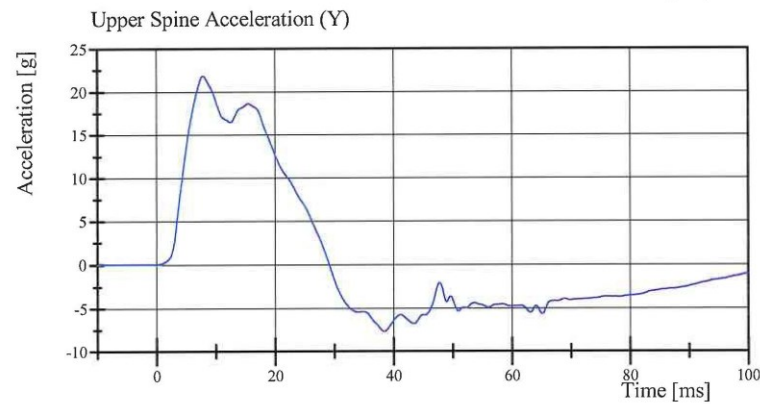
Min: -16.0 g at 13.4 ms



Filter Class: CFC_600

Max: 29.7 mm at 17.8 ms

Min: -0.0 mm at -3.0 ms



Filter Class: CFC_180

Max: 21.9 g at 7.9 ms

Min: -7.7 g at 38.4 ms

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

02.12.2016 10:02:31 904



Transportation Research Center Inc.

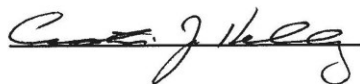
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 39-1
Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.751 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.9 g	Yes
Shoulder Displacement	31 - 40 mm	33.3 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	25.2 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.8 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	40.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.9 g	Yes

Test meets specifications.

Comments:

Technician



Approved



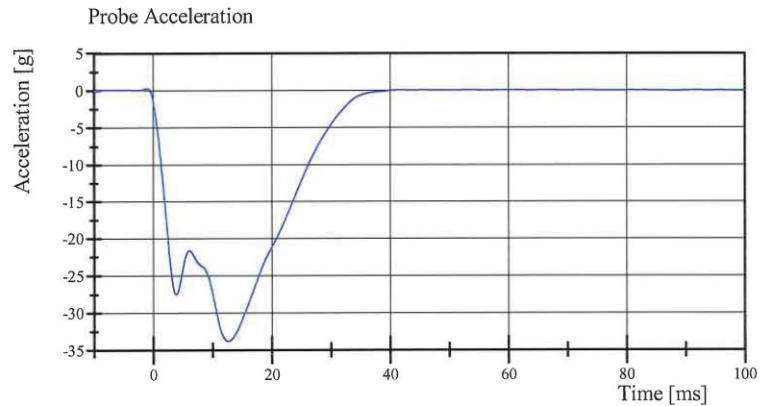
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.12.2016 10:36:39 659

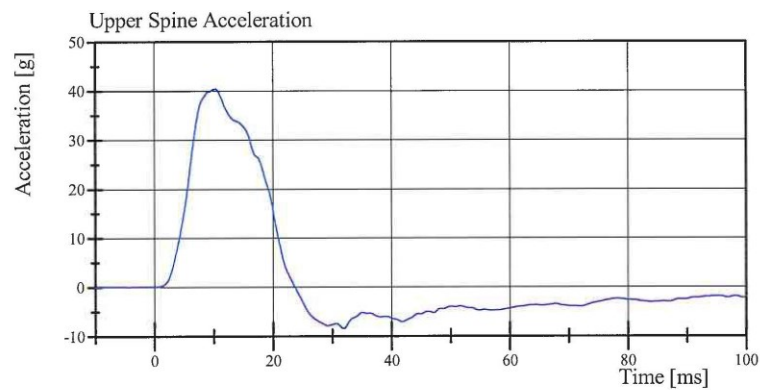


Transportation Research Center Inc.

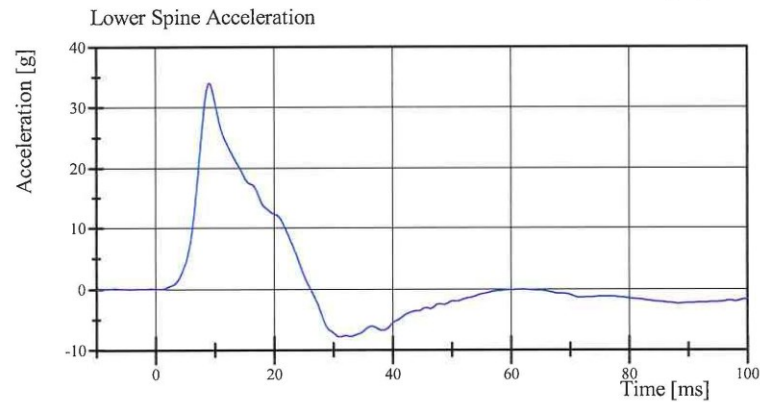
Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 39-1
Test Date: 2/12/2016



Filter Class: CFC_180
Max: 0.2 g at -1.0 ms
Min: -33.9 g at 12.6 ms



Filter Class: CFC_180
Max: 40.3 g at 10.3 ms
Min: -8.5 g at 31.9 ms



Filter Class: CFC_180
Max: 33.9 g at 9.1 ms
Min: -7.9 g at 31.1 ms

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

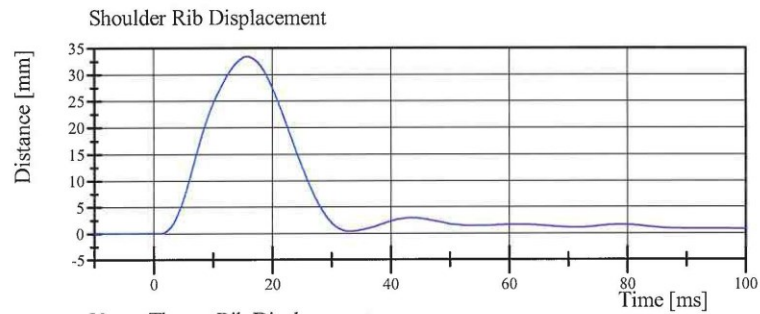
02.12.2016 10:36:49 659



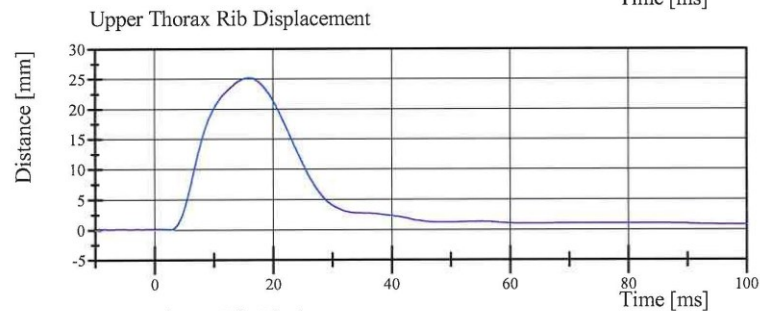
Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 305 Certification No. 39-1

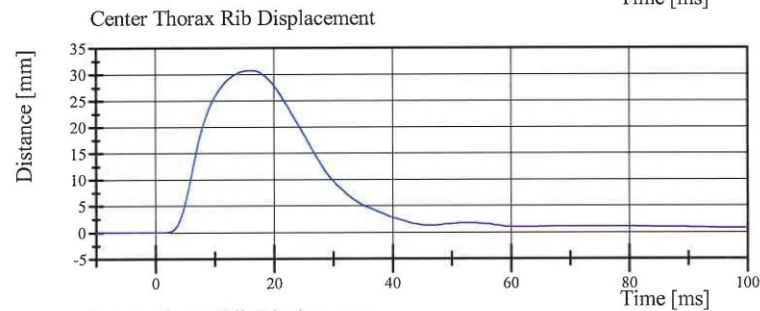
Test Date: 2/12/2016



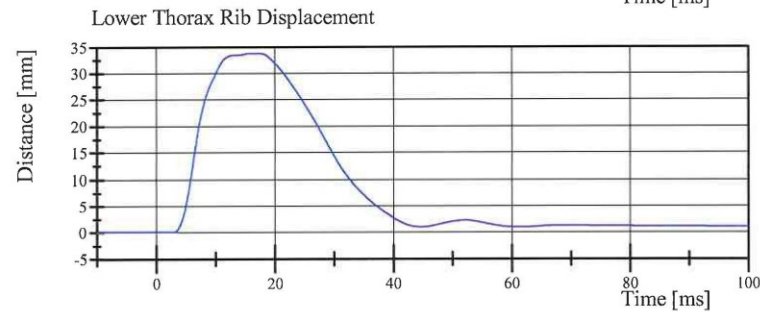
Filter Class: CFC_600
Max: 33.3 mm at 15.7 ms
Min: -0.0 mm at -3.8 ms



Filter Class: CFC_600
Max: 25.2 mm at 16.0 ms
Min: -0.0 mm at 2.7 ms



Filter Class: CFC_600
Max: 30.7 mm at 16.2 ms
Min: -0.0 mm at -1.4 ms



Filter Class: CFC_600
Max: 33.8 mm at 15.8 ms
Min: -0.0 mm at 2.9 ms

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

02.12.2016 10:36:50 659



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 39-1
Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.339 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.6 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.2 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.6 g	Yes

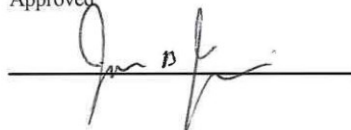
Test meets specifications.

Comments:

Technician



Approved



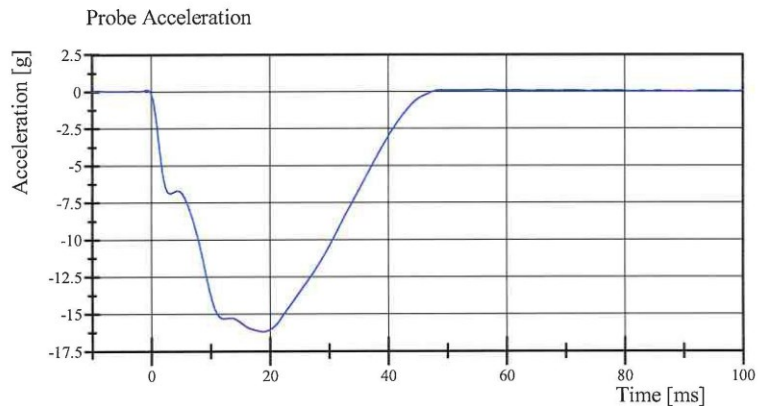
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.12.2016 11:25:37 897

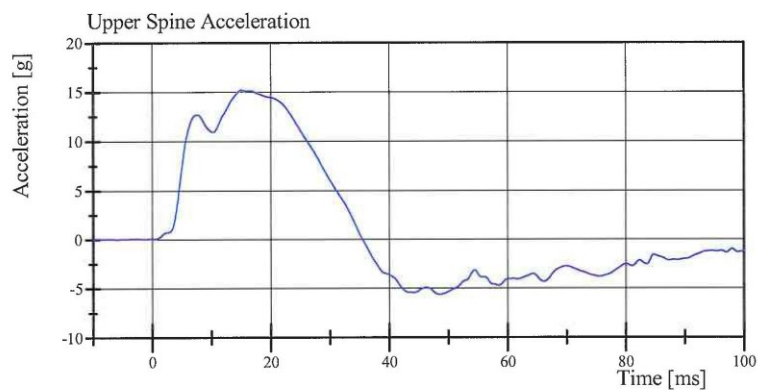


Transportation Research Center Inc.

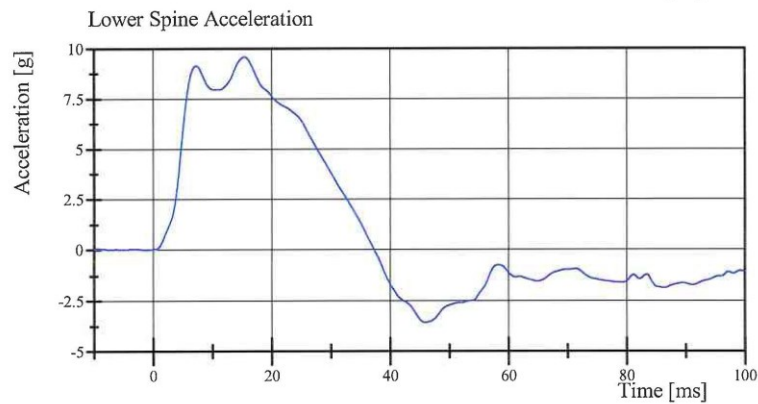
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 39-1
Test Date: 2/12/2016



Filter Class: CFC_180
Max: 0.1 g at 57.4 ms
Min: -16.2 g at 18.8 ms



Filter Class: CFC_180
Max: 15.2 g at 15.1 ms
Min: -5.6 g at 48.5 ms



Filter Class: CFC_180
Max: 9.6 g at 15.4 ms
Min: -3.6 g at 45.9 ms

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

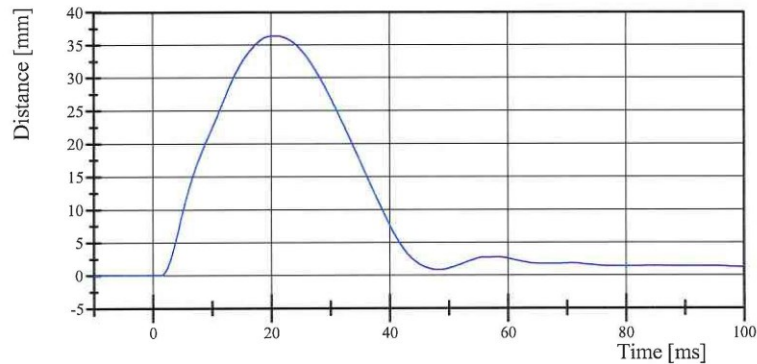
02.12.2016 11:25:46 897



Transportation Research Center Inc.

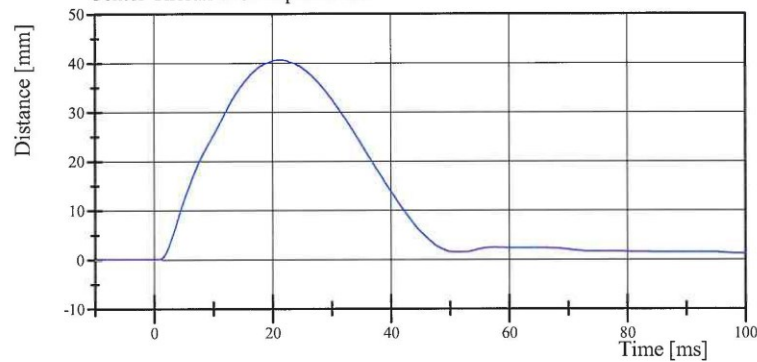
Left Lateral Thorax without Arm
SID IIs Serial No. 305 Certification No. 39-1
Test Date: 2/12/2016

Upper Thorax Rib Displacement



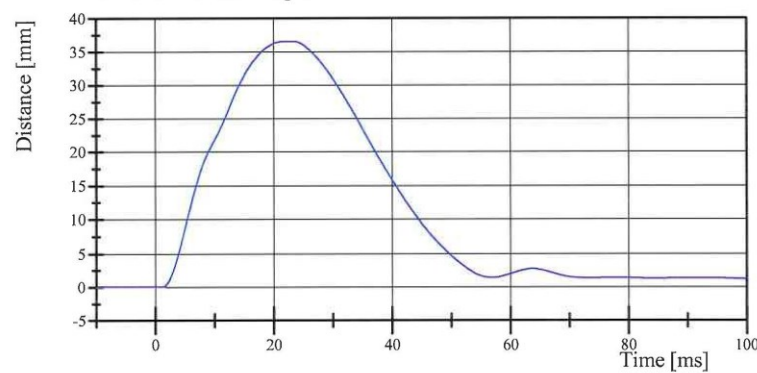
Filter Class: CFC_600
Max: 36.3 mm at 20.4 ms
Min: -0.0 mm at 1.4 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.6 mm at 21.2 ms
Min: -0.0 mm at -6.8 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.5 mm at 22.3 ms
Min: -0.0 mm at 1.1 ms

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

02.12.2016 11:25:46 897



Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 305 Certification No. 39-2
Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-12.6 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	45.7 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.8 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.11 g	Yes

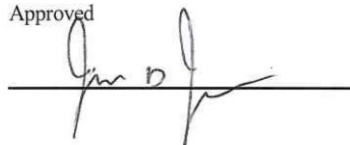
Test meets specifications.

Comments:

Technician



Approved



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

02.12.2016 10:59:06 725

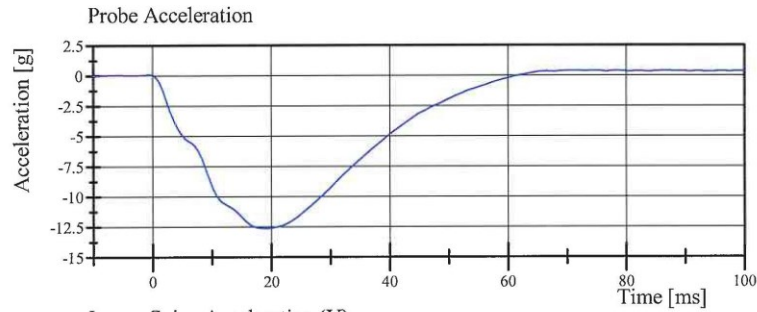


Transportation Research Center Inc.

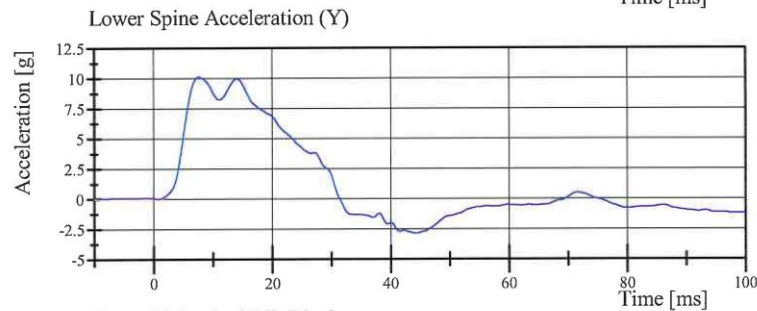
Left Lateral Abdomen

SID IIs Serial No. 305 Certification No. 39-2

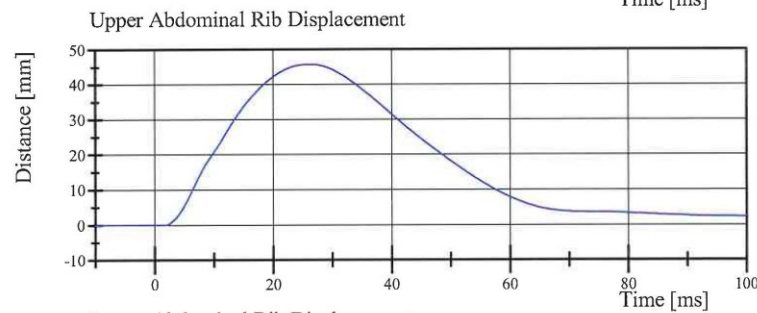
Test Date: 2/12/2016



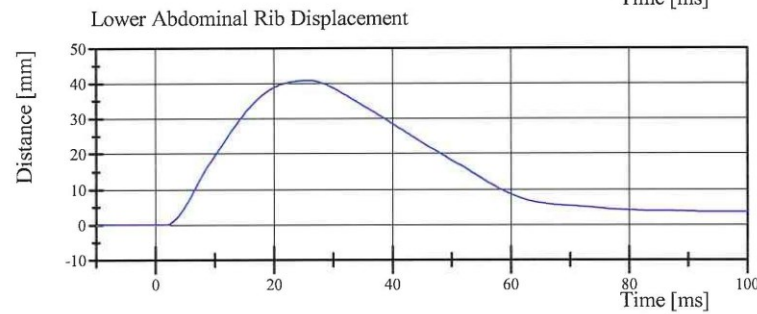
Filter Class: CFC_180
Max: 0.4 g at 86.9 ms
Min: -12.6 g at 19.3 ms



Filter Class: CFC_180
Max: 10.1 g at 7.7 ms
Min: -2.9 g at 44.2 ms



Filter Class: CFC_600
Max: 45.7 mm at 25.9 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_600
Max: 40.8 mm at 25.3 ms
Min: -0.0 mm at 1.9 ms

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

02.12.2016 10:59:14 725



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 305 Certification No. 39-3

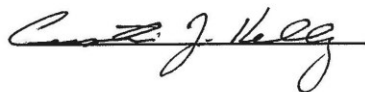
Test Date: 2/15/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.05 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.3 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,268.6 N	Yes

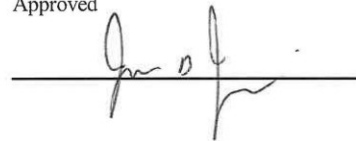
Test meets specifications.

Comments:

Technician



Approved



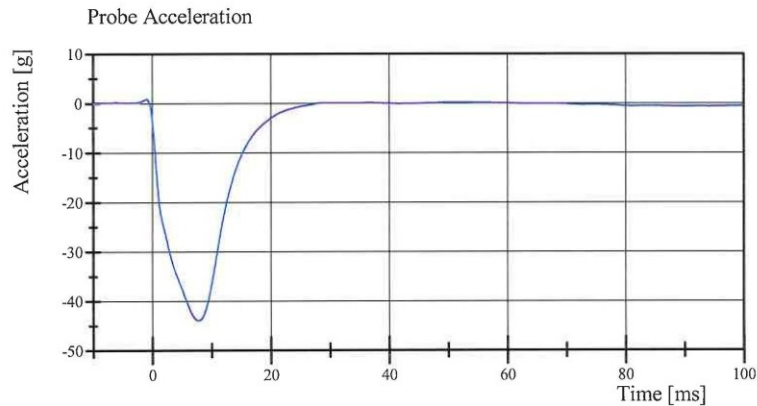
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.15.2016 07:57:22 439

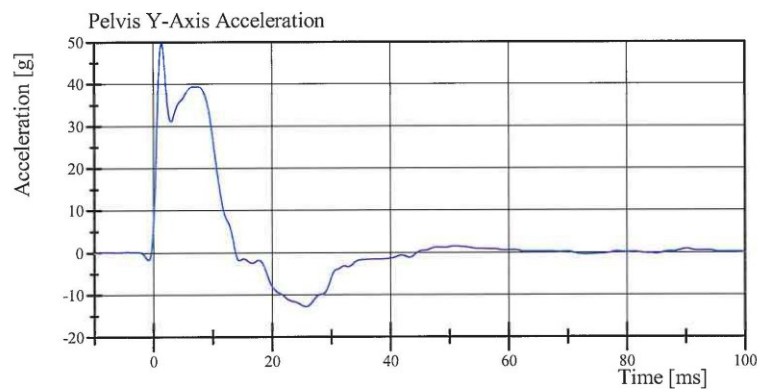


Transportation Research Center Inc.

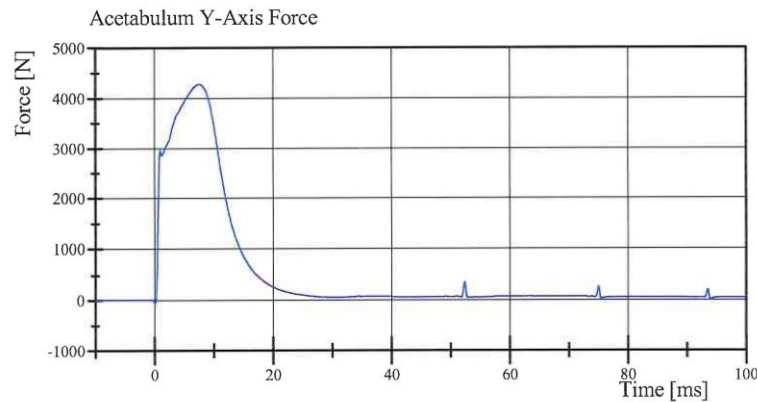
Left Lateral Pelvis
SID IIs Serial No. 305 Certification No. 39-3
Test Date: 2/15/2016



Filter Class: CFC_180
Max: 0.7 g at -1.0 ms
Min: -44.0 g at 7.8 ms



Filter Class: CFC_180
Max: 49.6 g at 1.4 ms
Min: -12.8 g at 25.7 ms



Filter Class: CFC_600
Max: 4,268.6 N at 7.6 ms
Min: -67.7 N at 0.2 ms

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

02.15.2016 07:57:33 439



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 39-2

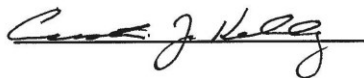
Test Date: 2/12/2016

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.3 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	34.3 g	Yes
Iliac Force	4,100 - 5,100 N	4,978.2 N	Yes

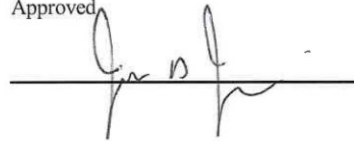
Test meets specifications.

Comments:

Technician



Approved



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

02.12.2016 12:08:03 691

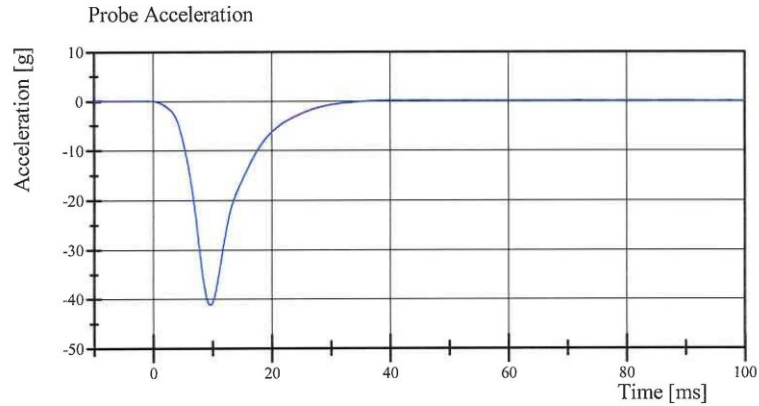


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 305 Certification No. 39-2

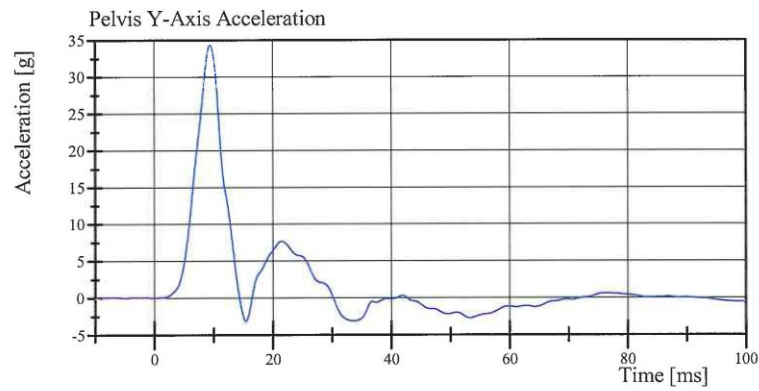
Test Date: 2/12/2016



Filter Class: CFC_180

Max: 0.2 g at 45.8 ms

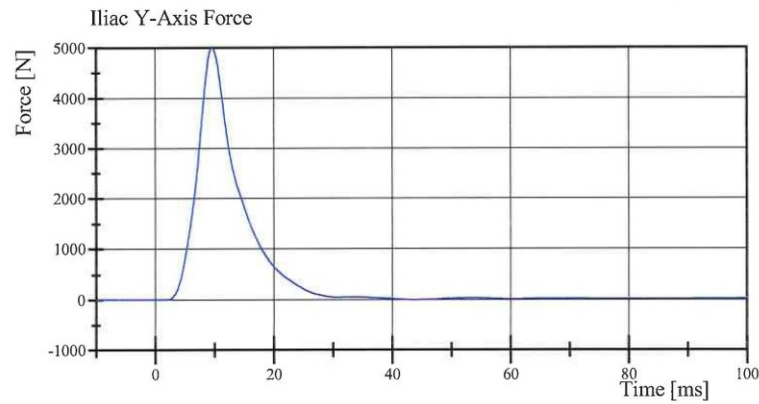
Min: -41.3 g at 9.6 ms



Filter Class: CFC_180

Max: 34.3 g at 9.4 ms

Min: -3.2 g at 15.4 ms



Filter Class: CFC_600

Max: 4,978.2 N at 9.6 ms

Min: -0.8 N at -7.8 ms

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

02.12.2016 12:08:19 691



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 305			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	P51719	Endevco	1-Oct-2015
				Y	P51272	Endevco	1-Oct-2015
				Z	P58862	Endevco	1-Oct-2015
Displacement Potentiometers	Shoulder			Y	N/A	N/A	N/A
	Thoracic Rib	Upper	Y	007	Servo	1-Oct-2015	
		Middle	Y	1161	Servo	1-Oct-2015	
		Lower	Y	037	Servo	1-Oct-2015	
	Abdominal Rib	Upper	Y	1295	Servo	1-Oct-2015	
		Lower	Y	1136	Servo	1-Oct-2015	
Lower Spine Accelerometers (T12)				X	P50068	Endevco	1-Oct-2015
				Y	P52051	Endevco	1-Oct-2015
				Z	P51710	Endevco	1-Oct-2015
Acetabulum Load Cell				Y	DI4283-FY	FTSS	1-Oct-2015
Iliac Wing Load Cell				Y	287-FY	Denton	1-Oct-2015
Pelvis Plug (struck side)					63511	Humanetics	13-Feb-2013
Pelvis Plug (non-struck side)					36473	Humanetics	23-Sep-2010

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P87121	Endevco	3-Sep-2015
Vehicle Center of Gravity	Y	P61718	Endevco	2-Sep-2015
Vehicle Center of Gravity	Z	P74102	Endevco	2-Sep-2015
Left Floor Sill	Y	P63151	Endevco	14-Jan-2016
A-Pillar Sill	Y	P75533	Endevco	1-Feb-2016
A-Pillar Low	Y	P25061	Endevco	29-Jan-2016
A-Pillar Mid	Y	P91089	Endevco	29-Jan-2016
B-Pillar Sill	Y	P25067	Endevco	14-Jan-2016
B-Pillar Low	Y	J26885	Endevco	2-Nov-2015
B-Pillar Mid	Y	J27950	Endevco	2-Nov-2015
Driver Seat	Y	P34103	Endevco	7-Dec-2015
Engine Top	X	P90868	Endevco	29-Jan-2016
Engine Top	Y	P90867	Endevco	29-Jan-2016
Firewall	Y	P58527	Endevco	1-Feb-2016
Right Roof	Y	P88038	Endevco	29-Jan-2016
Right Floor Sill	Y	P46078	Endevco	3-Feb-2016
Rear Floor Pan	X	P61350	Endevco	1-Feb-2016
Rear Floor Pan	Y	P88543	Endevco	1-Feb-2016

TABLE 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	88-FX	Denton	13-Nov-2015
Load Cell 2	77-FX	Denton	13-Nov-2015
Load Cell 3	103-FX	Denton	13-Nov-2015
Load Cell 4	101-FX	Denton	13-Nov-2015
Load Cell 5	92-FX	Denton	13-Nov-2015
Load Cell 6	84-FX	Denton	13-Nov-2015
Load Cell 7	97-FX	Denton	13-Nov-2015
Load Cell 8	87-FX	Denton	13-Nov-2015