

REPORT NUMBER: SPNCAP-KAR-15-019

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

**BAYERISCHE MOTOREN WERKE AG
2015 BMW X3 XDRIVE28I 5-DOOR MPV**

NHTSA No: M20154105

**PREPARED BY:
KARCO ENGINEERING, LLC.
9270 HOLLY ROAD
ADELANTO, CA 92301**



DECEMBER 22, 2014

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**

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SPNCAP-KAR-15-019	2. Government Accession No.	3. Recipient's Catalog No.																												
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105		5. Report Date December 22, 2014																												
		6. Performing Organization Code KAR																												
7. Authors Mr. Matthew S. Hubbard, Test Engineer, KARCO Mr. Frank Richardson, Program Manager, KARCO		8. Performing Organization Report No. TR-P34004-08-NC																												
9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301		10. Work Unit No.																												
		11. Contract or Grant No. DTNH22-09-D-00122																												
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, D.C. 20590		13. Type of Report and Period Covered Final Test Report, Dec. 9 - 22, 2014																												
		14. Sponsoring Agency Code NVS-111																												
15. Supplementary Notes																														
16. Abstract A 32.2 km/h (20 mph) 75° oblique impact Side NCAP Test was conducted on the subject 2015 BMW X3 xDrive28i 5-door MPV 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. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on December 9, 2014. The impact velocity was 31.68 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 18.3° C. The target vehicle's maximum post-test static crush was 404 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>185.3</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>33</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetabular and Iliac Forces)</td> <td>N</td> <td>5525</td> <td>1581</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>22</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45</td> <td>18</td> </tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches. The opposite doors did not open during the side impact event.				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	185.3	Resultant Lower Spine Acceleration	g	82	33	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	1581	Maximum Thoracic Rib Deflection	mm	38	22	Maximum Abdominal Rib Deflection	mm	45	18
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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 Admin. 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. No. of Pages 104	22. Price																											

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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2015 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2015 BMW X3 xDrive28i 5-door MPV. 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 rigid pole side impact test was conducted on a 2015 BMW X3 xDrive28i 5-door MPV. The subject vehicle was towed into the rigid pole at an angle of 75.4° and a velocity of 31.68 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California on December 9, 2014. Pre- and post-test photographs of the test vehicle and 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 September 2013. Camera locations and other pertinent camera information are included in this report.

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

- Primary and Redundant Head CG tri-axial accelerometers
- Thorax upper, middle and lower rib displacement potentiometers
- Abdomen upper and lower rib displacement potentiometers
- Lower spine (12) tri-axial 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	Units	Passenger ATD (SID-IIs)	
		IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	185.3
Lower Spine (T12) Resultant Acceleration	g	82	33
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1581
Maximum Thoracic Rib Deflection	mm	38*	22
Maximum Abdominal Rib Deflection	mm	45*	18

*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	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other	No		No	

GENERAL COMMENTS

The doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. The doors on the non-struck side remained closed and latched. There was no ATD injury value that exceeded its limit.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20154105
Model Year	2015
Make	BMW
Model	X3 xDrive28i
Body Style	5-Door MPV
VIN	5UXWX9C5XF0D52689
Body Color	Deep Sea Blue Metallic
Odometer Reading (km / mi)	100 / 62
Engine Displacement (L)	2.0
Type / No. of Cylinders	Inline 4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	AWD
Roof Rack	Yes
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	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. 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	Bayerische Motoren Werke AG
Date of Manufacture	Oct-14
Vehicle Type	MPV

GVWR (kg)	2304
GAWR Front (kg)	1089
GAWR Rear (kg)	1279

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				410.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				69.8	A-B

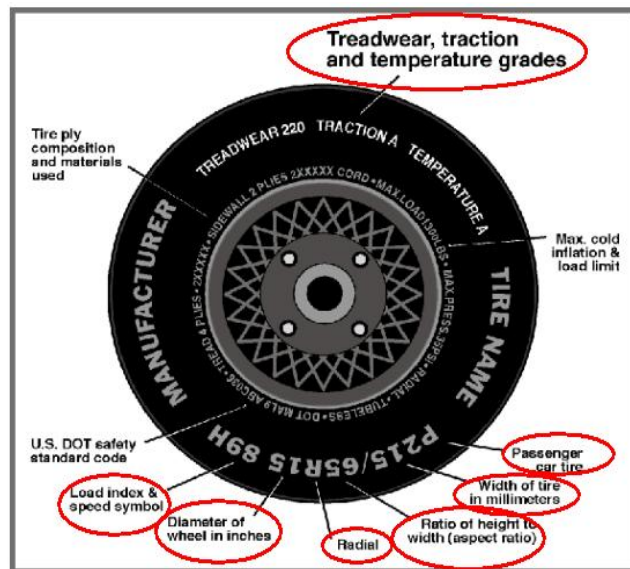
VEHICLE SEAT TYPE

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

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kPa)	220	240
Recommended Tire Size	P245/50R18	P245/50R18
Tire Size on Vehicle	P245/50R18	P245/50R18
Tire Manufacturer	Pirelli	Pirelli
Tire Model	Cinturato P7	Cinturato P7
Treadware	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Rayon	2 Rayon
Tire Plies Body	2 Rayon, 2 Steel, 1 Polyamide	2 Rayon, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	100V	100V
Tire Material	Rayon, Steel, Polyamide	Rayon, Steel, Polyamide
DOT Safety Code Left	93V2 N371 1514	93V2 N371 1514
DOT Safety Code Right	93V2 N371 1514	93V2 N371 1514

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	225	225	225	220
Tire Placard	kPa	220	220	240	240
Owner's Manual	kPa	220	220	240	240
As Tested	kPa	220	220	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	458.5	474.5		471.0	499.5		467.0	533.5	
Right	kg	453.0	456.5		484.0	500.5		455.0	506.0	
Ratio	%	49.5%	50.5%	100.0%	48.8%	51.2%	100.0%	47.0%	53.0%	100.0%
Total	kg	911.5	931.0	1842.5	955.0	1000.0	1955.0	922.0	1039.5	1961.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1842.5	A
Actual Weight of 1 P572 O ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	69.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1961.3	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 -9.0 kg)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	0.0	0.4	0.6	Yes
Front Passenger Sill Angle (front-to-rear)*	°	-0.3	-0.1	-0.1	Yes
Front Bumper-Line Angle (left-to-right)**	°	-0.2	-0.1	-0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.0	0.1	0.3	Yes
Vehicle CG (Aft of Front Axle)	mm	1418	1435	1487	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	10	-6	16	

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

***The "As Tested" vehicle attitude angle measurements must be within "As Delivered" and the "Fully Loaded" vehicle attitude measurements at each location. Indicate "Yes" or "No" for "Meets Requirement"

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105

Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Trim	16.0
Muffler	17.0
Ballast / Equipment Added	124.0

Test Height Adjustable Setting (If Applicable)	
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DATA SHEET NO. 2**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA**

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and 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 seat should be set to the rear most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	12.2	0.0	6.1
Front Passenger Seat	11.9	0.0	5.9
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle	As Tested SCRP Height	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	6.1	709	Max	722	731	739
			Mid	692	701	709
			Min	662	671	679
Front Passenger Seat	5.9	664	Max	678	685	693
			Mid	650	656	664
			Min	622	626	634
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

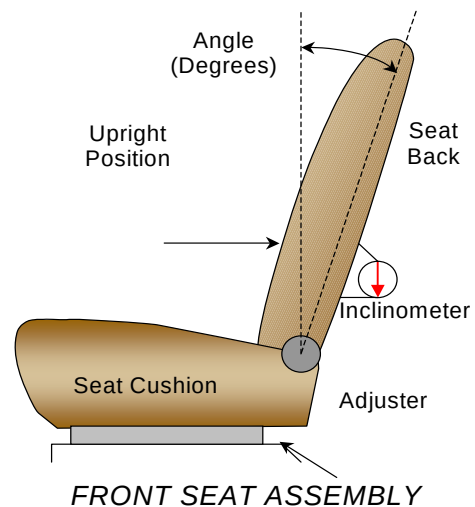
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	250		0	
Front Passenger Seat	250		0	
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

*Detent zero (0) is the forward most detent

SEAT BACK 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 to the driver's seat. The struck side rear passenger seat back is positioned in accordance with the information provided by the manufacturer in Form 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 back angle is measured at the seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	50.0		10.9	
Front Passenger Seat	51.7		10.9	
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

*Detent zero (0) is the forward most detent

DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. The positions are marked H, M1, ..., L from top to bottom.

	Total No. of Positions	Placed in Position
Driver Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total No. of Positions	Placed in Position
Driver Seat	5	Full Down

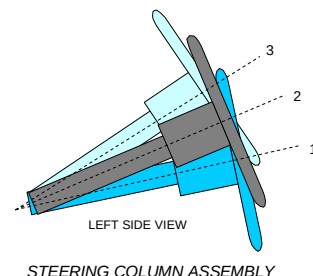
DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

STEERING COLUMN ADJUSTMENT

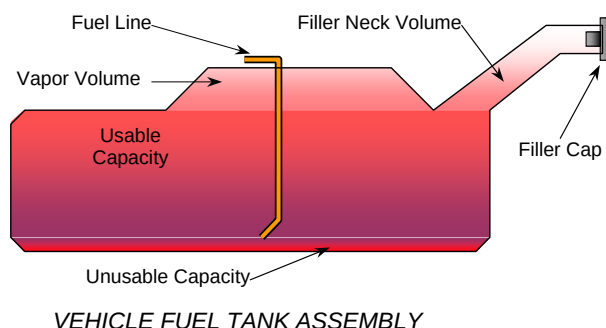
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of the geometric locus it describes when it moves through its full range of motion.



	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	22.5	58
Geometric Center - Position 2	24.1	88
Uppermost - Position 3	25.7	118
Telescoping Steering Wheel Travel		60
Test Position	24.1	88

FUEL PUMP

The vehicle is equipped with an electric fuel pump. The fuel pump operates for 5 seconds after the ignition is switched to the "ON" position. After pressure has been built up the pump switches to sleep mode until the engine is started or the pressure decreases.



FUEL TANK CAPACITY

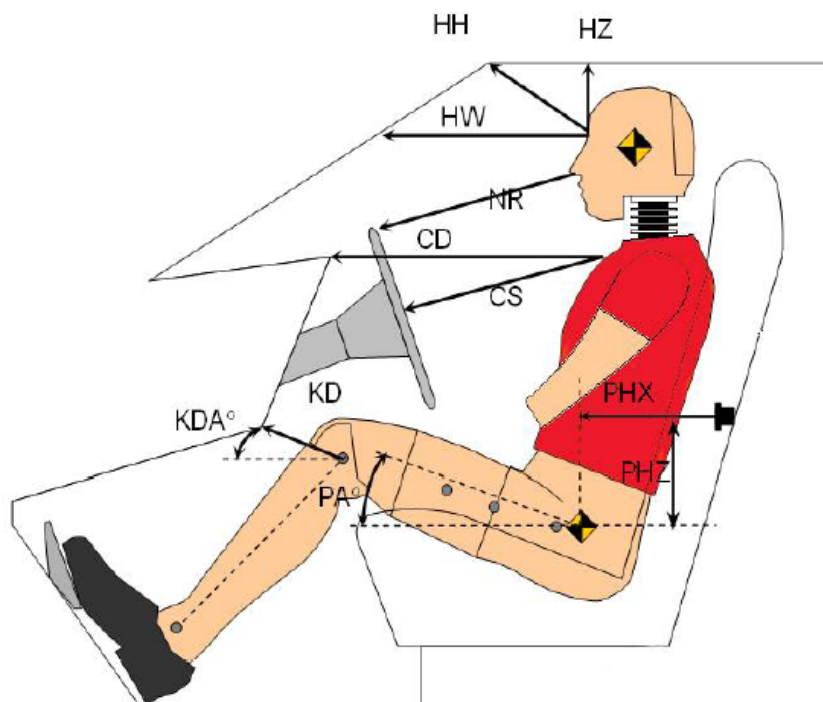
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	66.99
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	62.30
Actual amount of Solvent Used in Test	62.30
1/3 of Usable Capacity	22.33

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

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

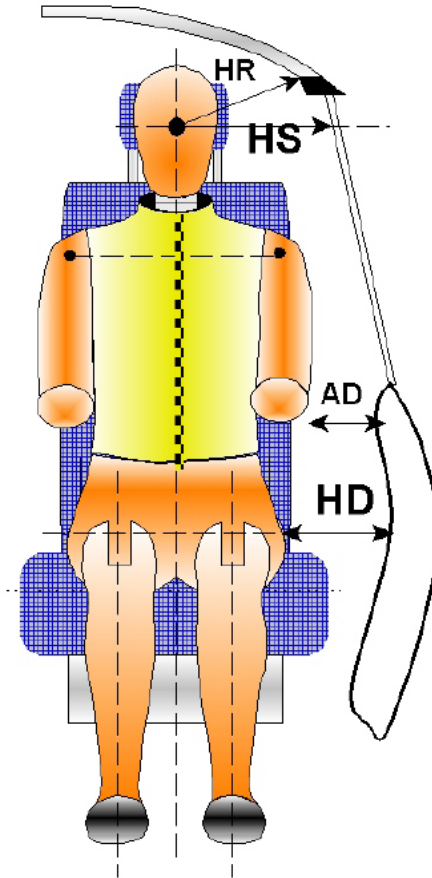


Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	309	
HW	Head to Windshield	619	
HZ	Head to Roof	205	
NR	Nose to Rim	230	
CD	Chest to Dash	386	
CS	Chest to Steering Wheel	158	
KD(L)/KDA(L)°	Left Knee to Dash	104	43.7
KD(R)/KDA(R)°	Right Knee to Dash	96	49.8
PAX°	Pelvic Tilt Angle (x-axis)		20.3
PAY°	Pelvic Tilt Angle (y-axis)		0.4
PHX	Hip Point to Striker (x-axis)	301	
PHZ	Hip Point to Striker (z-axis)	172	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

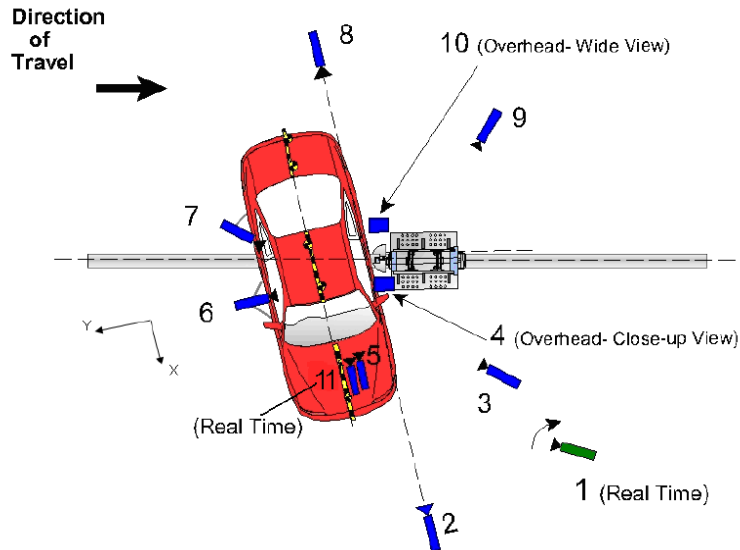


Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	254
HS	Head to Side Window	mm	355
AD	Arm to Door	mm	165
HD	Hip Point to Door	mm	245

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



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 (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.48	0.61	-1.36	35	1000
6	On-Board - Dummy Side View	0.02	1.77	-1.18	14	1000
7	On-Board - Dummy Rear Oblique View	-0.79	1.75	-1.19	20	1000
8	Rear Ground Level - Impact View	-6.12	-6.23	-0.96	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	1.56	0.62	-1.41		30

*All measurements accurate to ± 6 mm

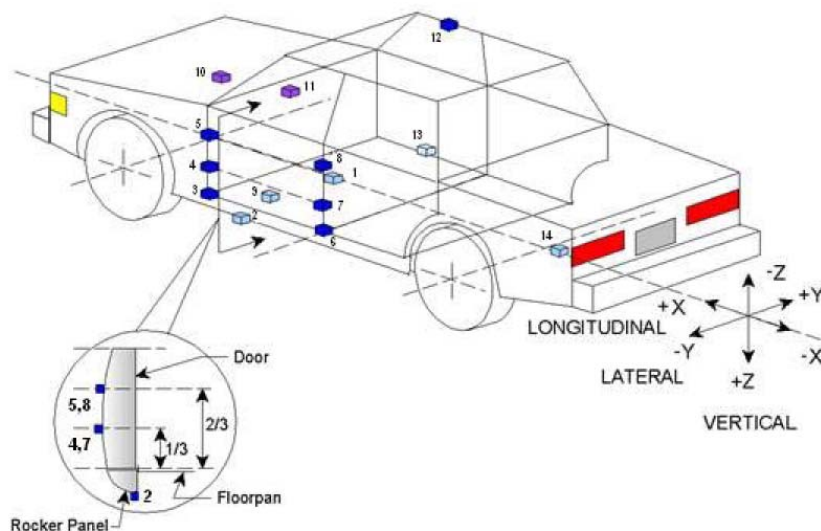
INSTRUMENTATION

Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1985	68	-550
2	Left Floor Sill	2752	-775	-243
3	A-Pillar Sill	3128	-820	-460
4	A-Pillar Low	3128	-820	-650
5	A-Pillar Mid	3128	-815	-865
6	B-Pillar Sill	1890	-740	-445
7	B-Pillar Low	1910	-760	-690
8	B-Pillar Mid	1910	-750	-820
9	Driver Seat Track	2215	-575	-488
10	Engine Top	3925	-115	-906
11	Firewall	3320	205	-875
12	Right Roof	2091	460	-1639
13	Right Floor Sill	1900	740	-440
14	Rear Floorpan	942	0	-629

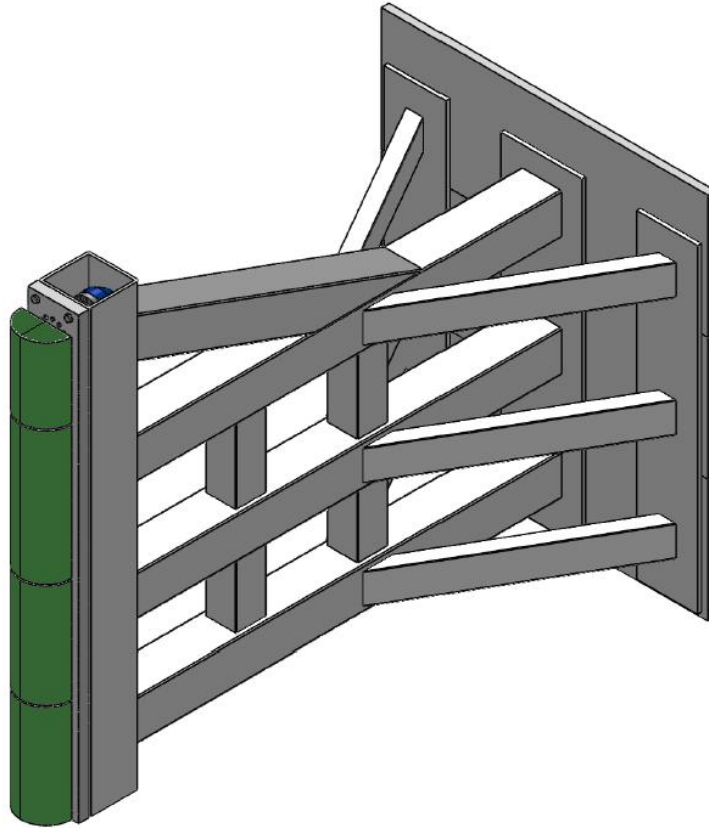
Reference: X – Rear surface of vehicle (+ forward)
 Y – Vehicle centerline (+ to right)
 Z – Ground plane (+ down)

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105

Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



ID	Units	Height From Ground
1	mm	87
2	mm	468
3	mm	648
4	mm	978
5	mm	1168
6	mm	1651
7	mm	1816
8	mm	2057

DATA SHEET NO. 8**POST-TEST OBSERVATIONS**Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14**TEST DUMMY INFORMATION AND CONTACT POINTS**

Dummy Body Part	Driver SID-IIs Dummy
Face	None
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Seat, Torso Airbag
Upper Torso	Seat, Torso Airbag
Lower Torso	Seat, Torso Airbag
Left Hip	Seat, Torso Airbag
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 System 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	No separation occurred
Sill Separation	No separation occurred
Windshield Damage	Broken
Side Window Damage	Left front window broken
Other Notable Effects	None

DATA SHEET NO. 8 ... (CONTINUED)**POST-TEST OBSERVATIONS**

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other	No		No	

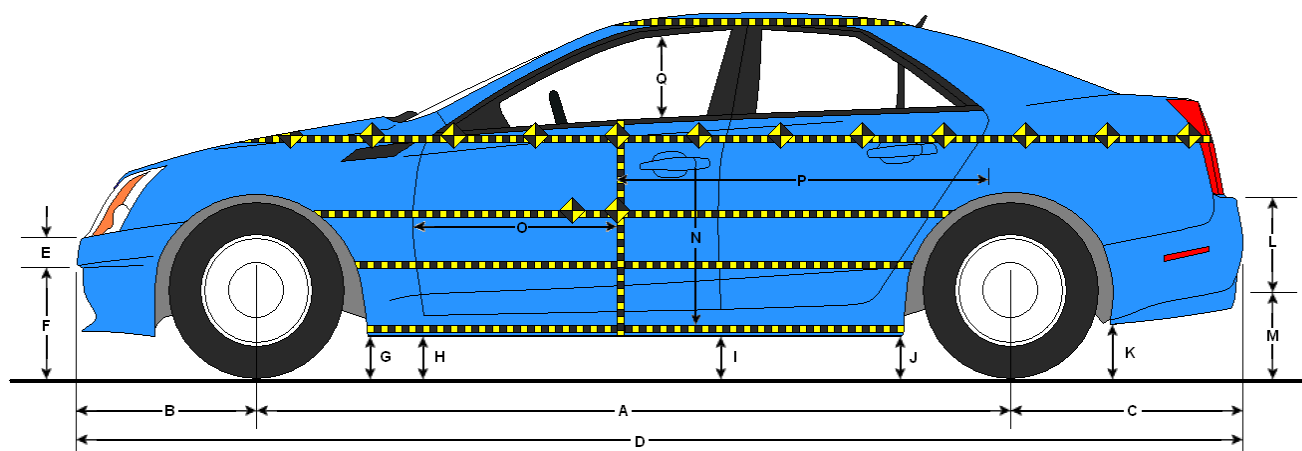
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1283
Actual Impact Point (Aft of Front Axle)	mm		1306
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	-23
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	75.4
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.68
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.66

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



LEFT SIDE VIEW

All measurements in mm with tolerance of ± 3 mm

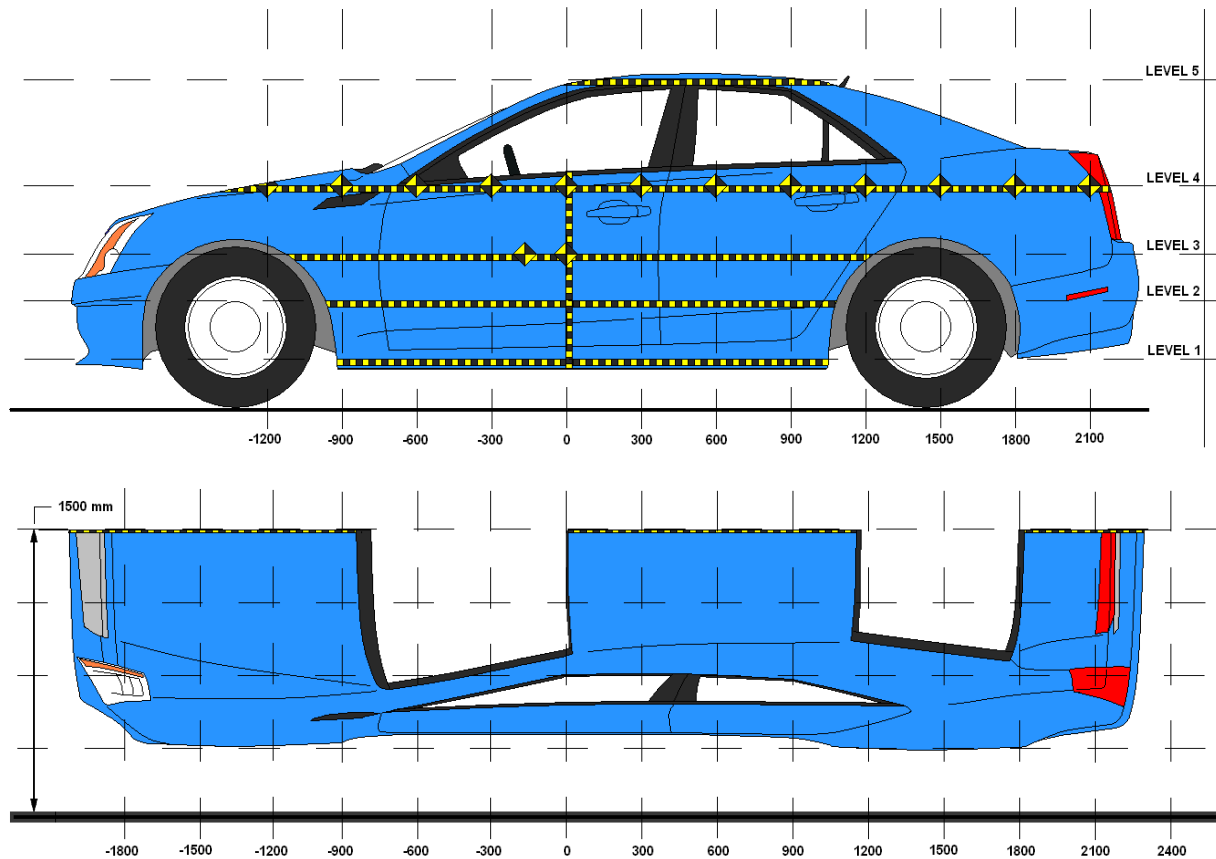
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2806	2728	-78
B	Front Axle to FSOV	844	856	12
C	Rear Axle to RSOV	985	1014	29
D	Total Length at Centerline	4635	4598	-37
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	441	486	45
G	Sill Height at Front Wheel Well	271	274	3
H	Sill Height at Front Door Leading Edge	297	306	9
I	Sill Height at B-Pillar	309	314	5
J1	Sill Height at Rear Wheel Well	296	314	18
J2	Pinch Weld Height at Rear Wheel Well	235	247	12
K	Sill Height Aft of Rear Wheel Well	330	337	7
L	Rear Bumper Thickness	135	133	-2
M	Rear Bumper Bottom to Ground	515	514	-1
N	Sill Height to Bottom of Front Window Sill	750	705	-45
O	Front Door Leading Edge to Impact CL	684	602	-82
P	Rear Door Trailing Edge to Impact CL	1421	1305	-116
Q	Front Window Opening	475	489	14
R	Right Side Length	3365	3380	15
S	Left Side Length	3364	3253	-111
T	Vehicle Width at B-Pillar	1843	1718	-125

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



NOTE: All measurements in mm with tolerance of $\pm 3\text{mm}$

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	435	392	0
2	Occupant H-Point	707	402	150
3	Mid-Door	733	404	150
4	Window Sill	1064	356	150
5	Window Top	1616	209	150

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900		574	576	680			637	639	726			63	63	46	
-750	603	590	591	671		676	658	659	727		73	68	68	56	
-600	599	594	595	667		696	686	686	734		97	92	91	67	
-450	593	592	592	669		745	744	746	784		152	152	154	115	
-300	586	588	588	666		804	815	815	834		218	227	227	168	
-150	583	585	584	662		882	900	898	904		299	315	314	242	
0	580	583	582	656	884	972	983	983	997	1049	392	400	401	341	165
150	578	581	581	652	885	960	983	985	1008	1094	382	402	404	356	209
300	578	582	581	644	883	839	862	864	901	1043	261	280	283	257	160
450	579	584	584	641	883	742	750	749	808	1013	163	166	165	167	130
600	582	588	587	637	885	713	720	719	772	985	131	132	132	135	100
750	587	593	592	635	887	684	691	690	746	966	97	98	98	111	79
900	592	595	594	632	888	656	664	661	718	955	64	69	67	86	67
1050	590	583	584	631	889	623	636	634	692	948	33	53	50	61	59
1200		568	569	619	893		608	601	657	944		40	32	38	51
1350				624	898				643	942				19	44
1500				651	905				687	944				36	39
1650				662	909				692	942				30	33
1800				672	922				698	951				26	29
1950				687	935				707	968				20	33
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

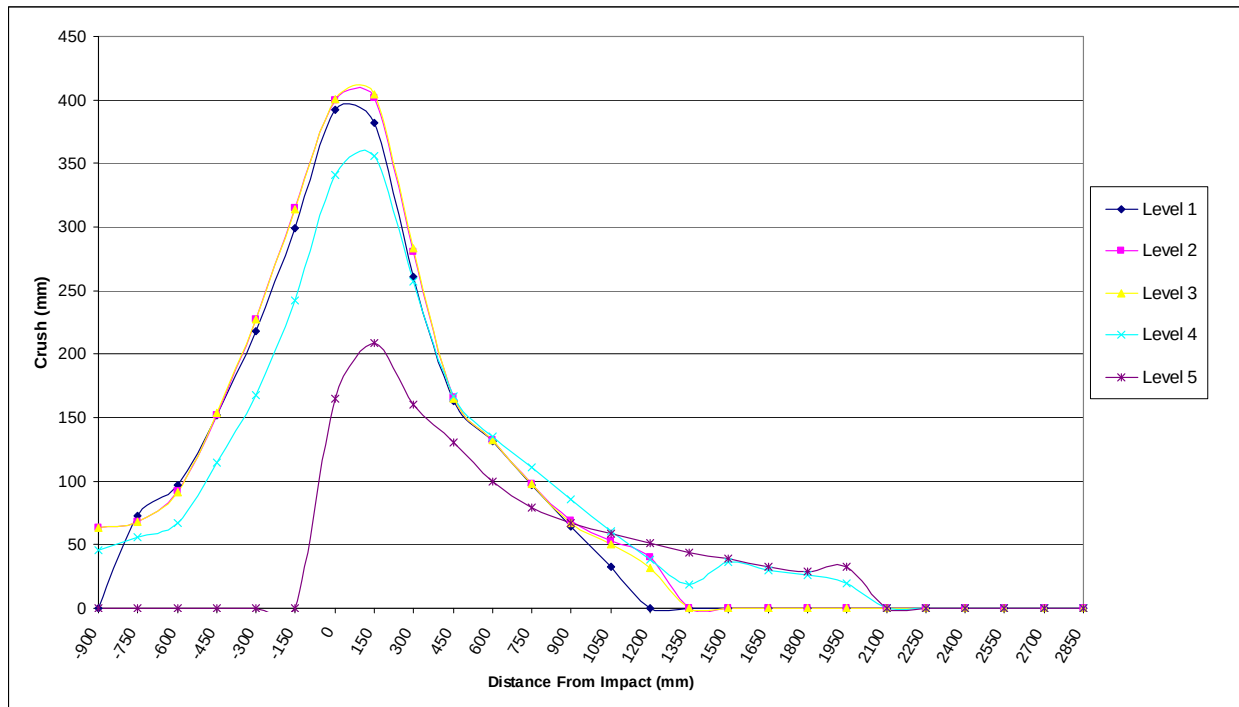
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV

NHTSA No. M20154105

Test Program: NCAP Side Pole Impact Test

Test Date: 12/09/14

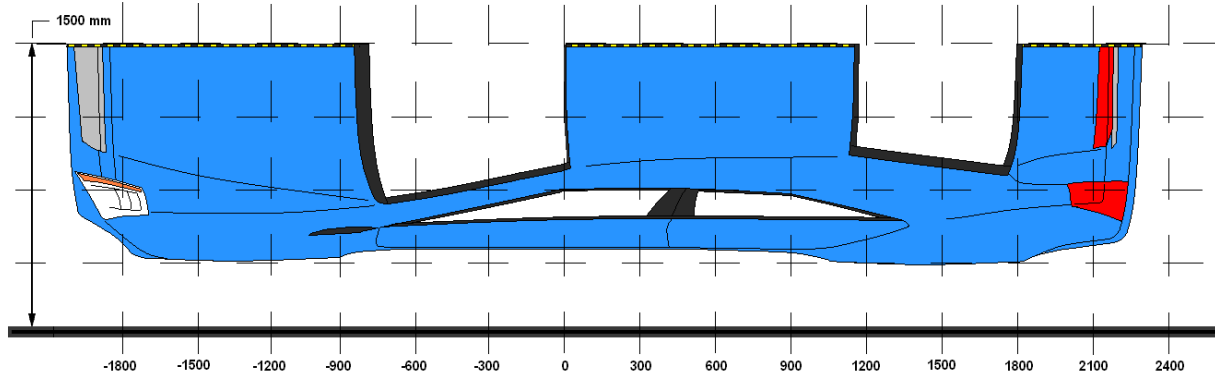


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105

Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



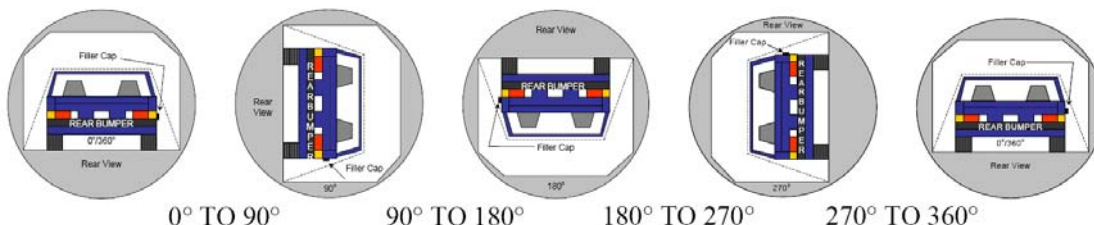
DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	1950	5	935	968	33
2	1350	5	898	942	44
3	750	4	635	746	111
4	300	3	581	864	283
5	-300	3	588	815	227
6	-900	3	576	639	63

DATA SHEET NO. 12

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
 Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14
 Temperature at Time of Impact: 18.3° C Test Time: 11:05 AM

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
 (Maximum allowable = 1 oz./minute)
- D. Spillage Details: There was no Stoddard solvent spillage.



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	86	300	386
90° To 180°	83	300	383
180° To 270°	78	300	378
270° To 360°	76	300	376

FMVSS 301 SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	0			
90° To 180°	0			
180° To 270°	0			
270° To 360°	0			

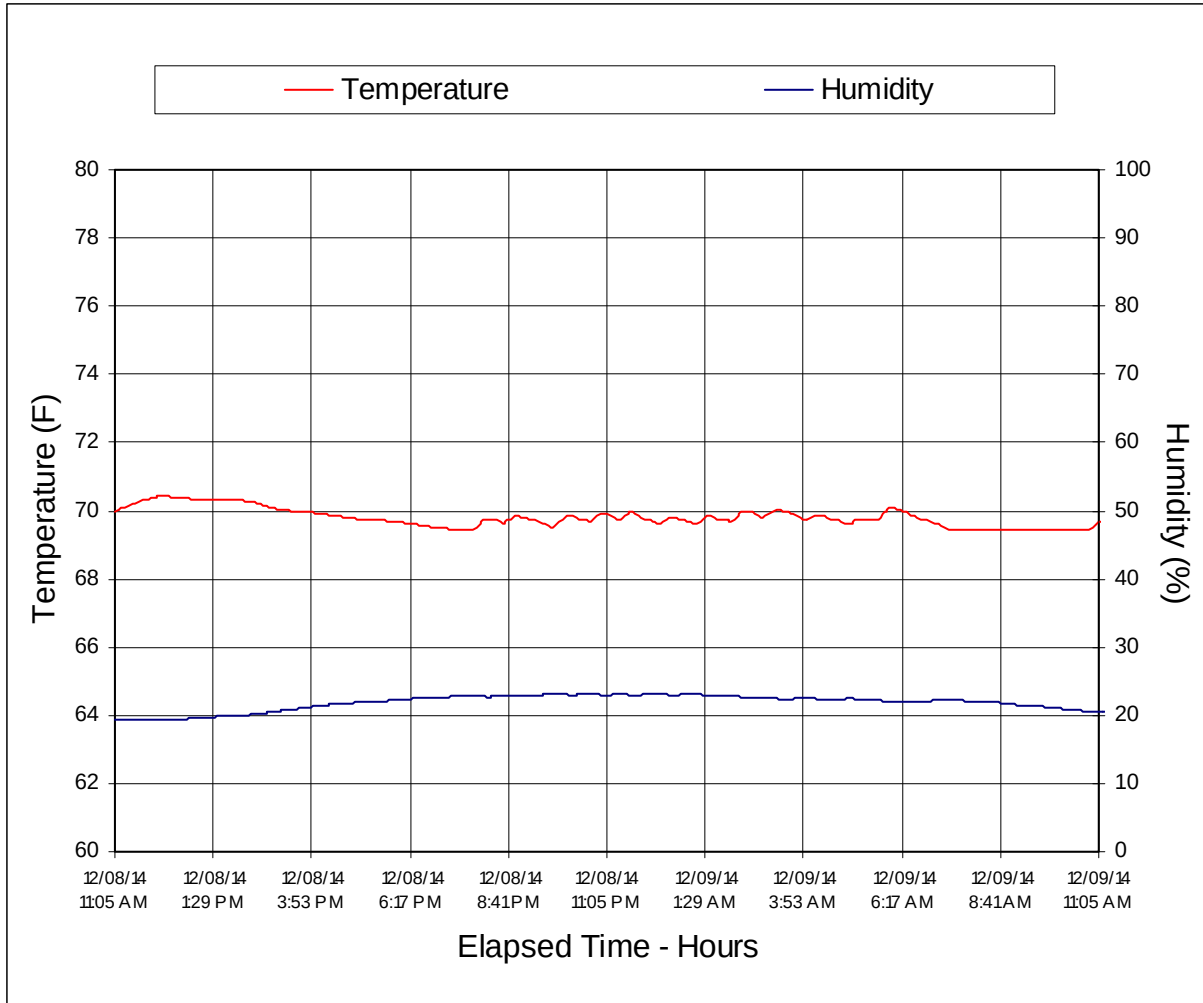
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV NHTSA No. M20154105
Test Program: NCAP Side Pole Impact Test Test Date: 12/09/14



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 2. As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 3. Pre-Test Frontal View of Test Vehicle



FIGURE 4. Post-Test Frontal View of Test Vehicle



FIGURE 5. Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle

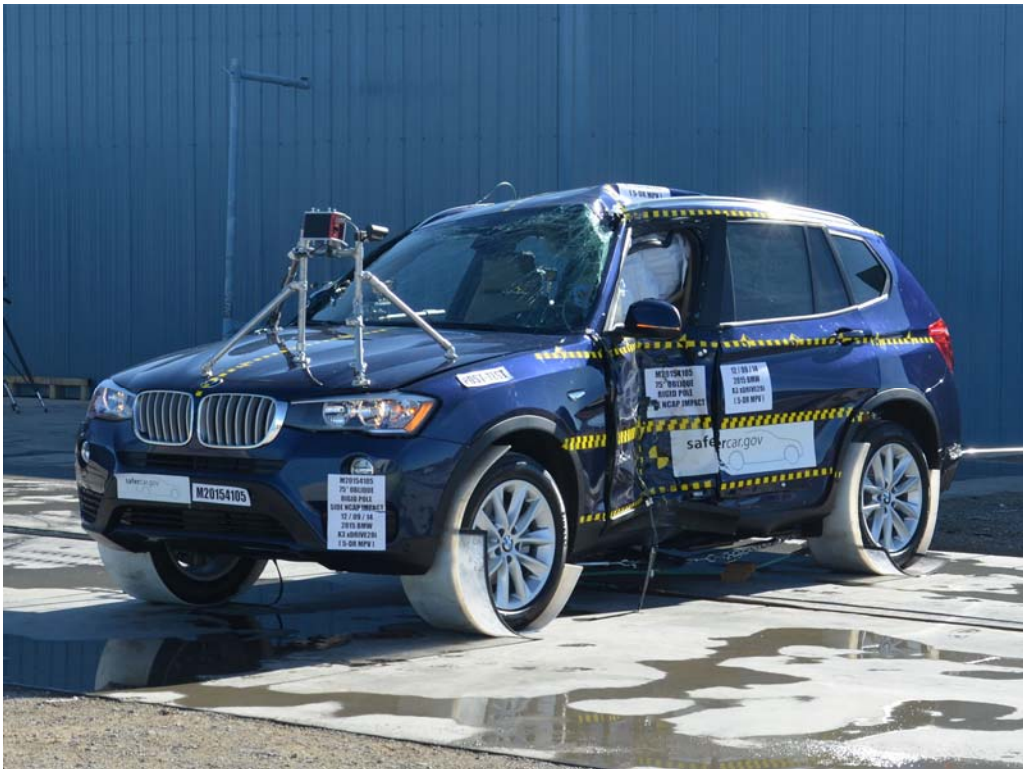


FIGURE 6. Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 7. Pre-Test Left Side View of Test Vehicle

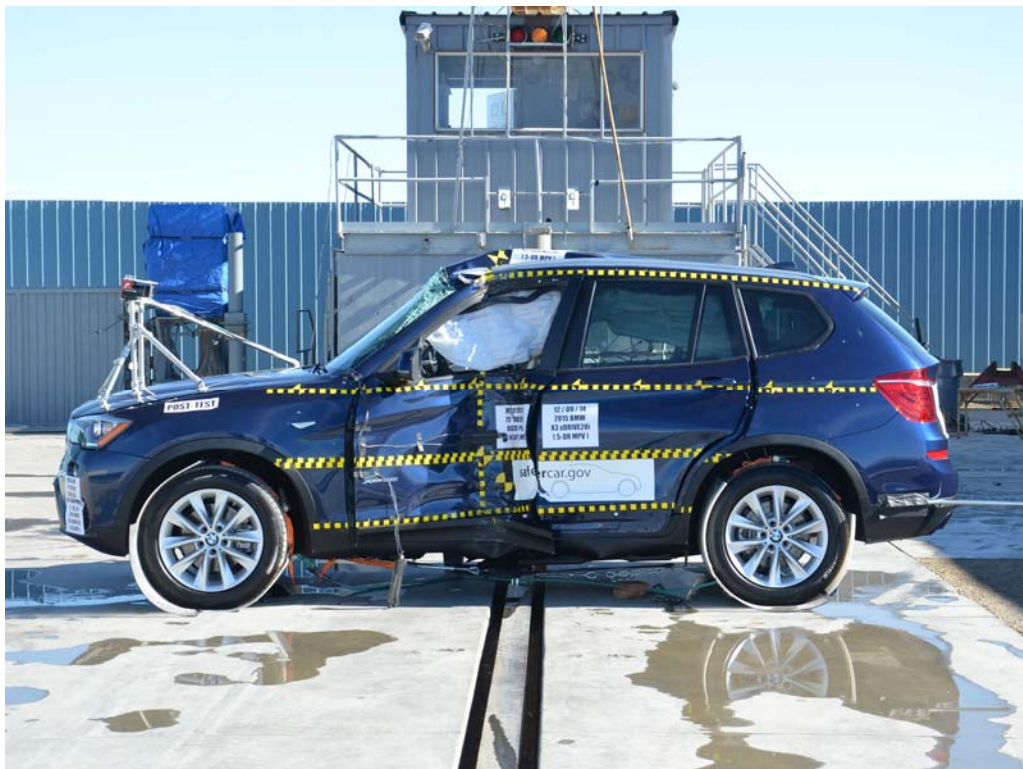


FIGURE 8. Post-Test Left Side View of Test Vehicle



FIGURE 9. Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle

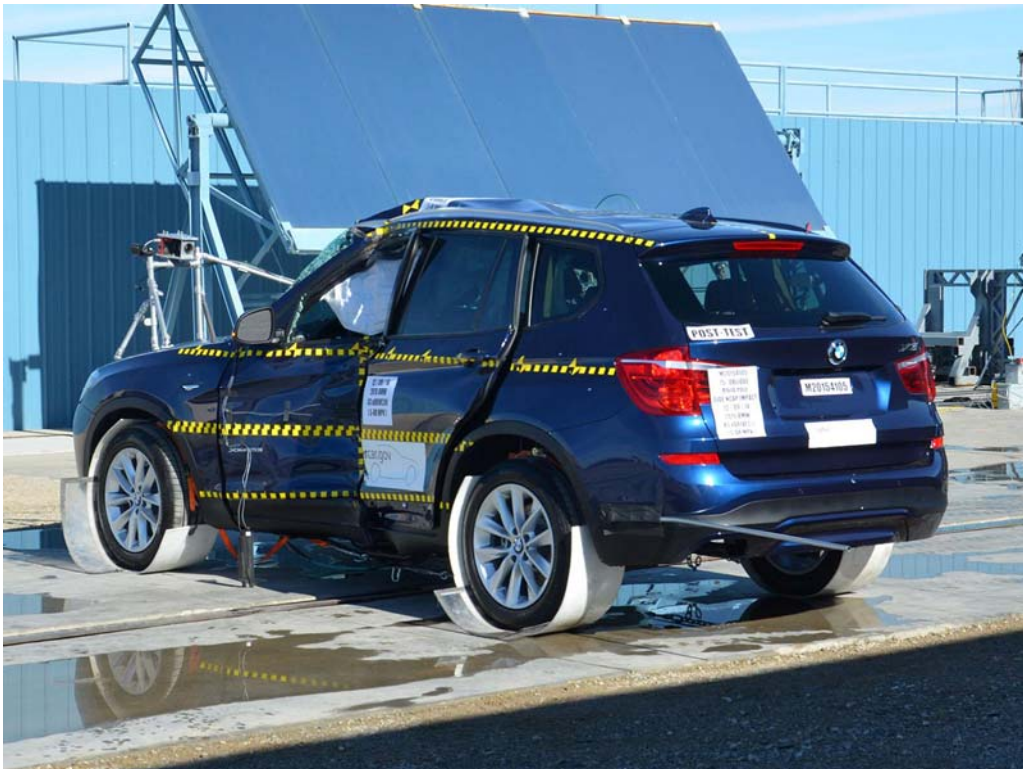


FIGURE 10. Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 11. Pre-Test Rear View of Test Vehicle

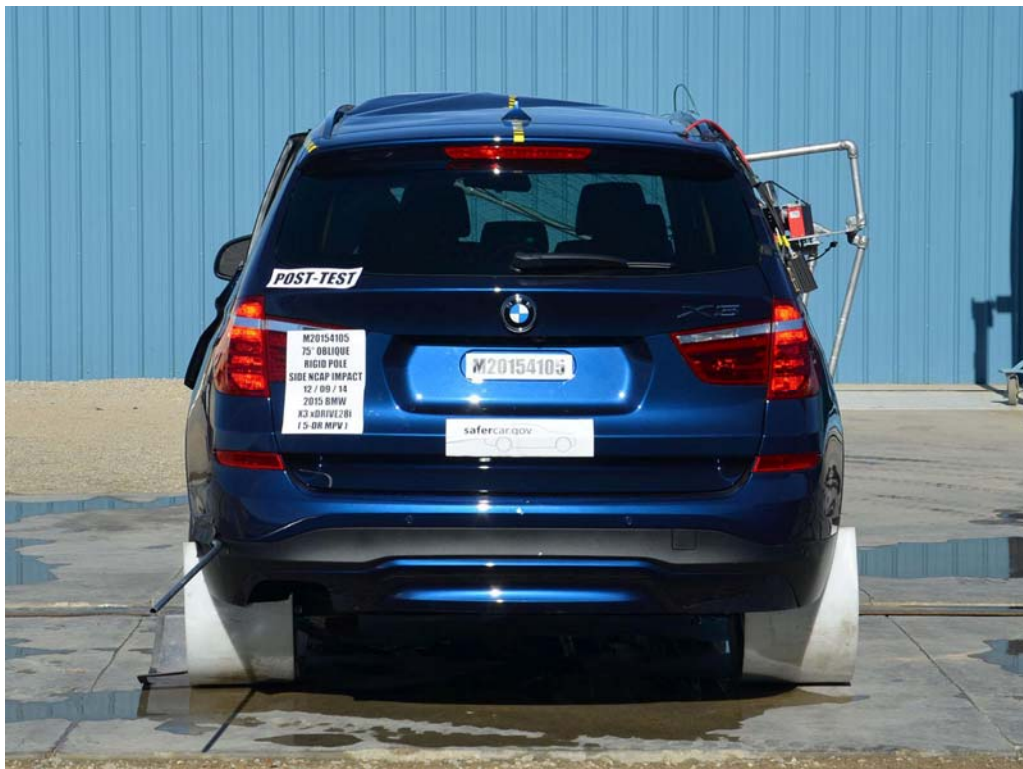


FIGURE 12. Post-Test Rear View of Test Vehicle



FIGURE 13. Pre-Test Right Side View of Test Vehicle

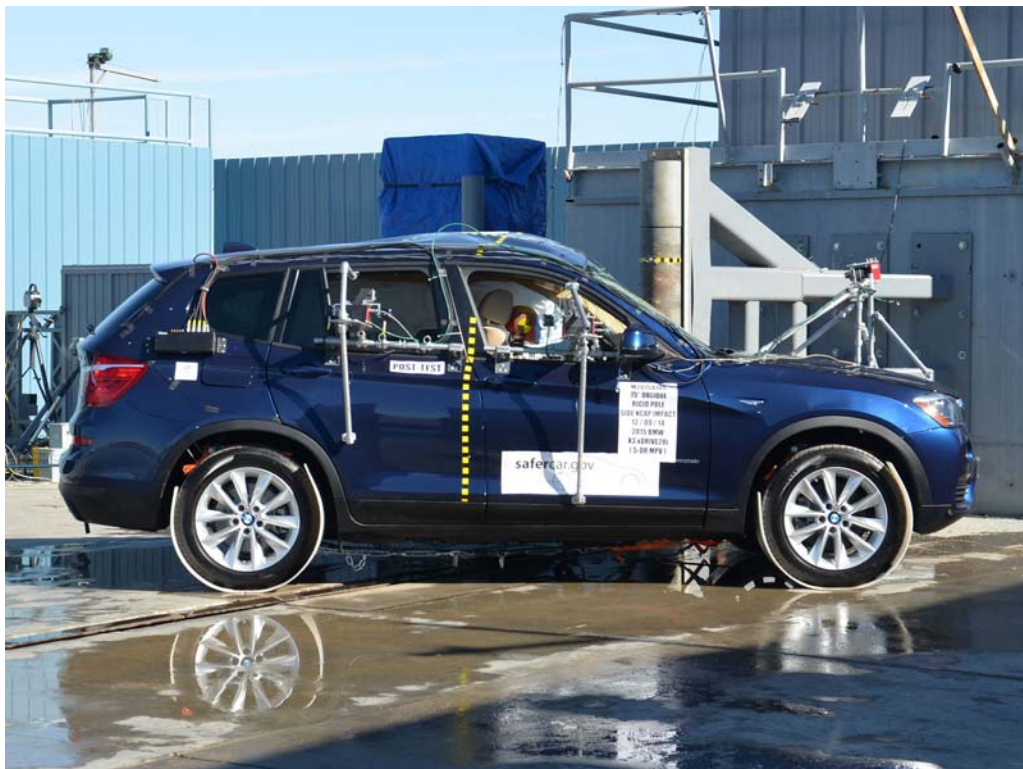


FIGURE 14. Post-Test Right Side View of Test Vehicle



FIGURE 15. Pre-Test Overhead View of Test Area

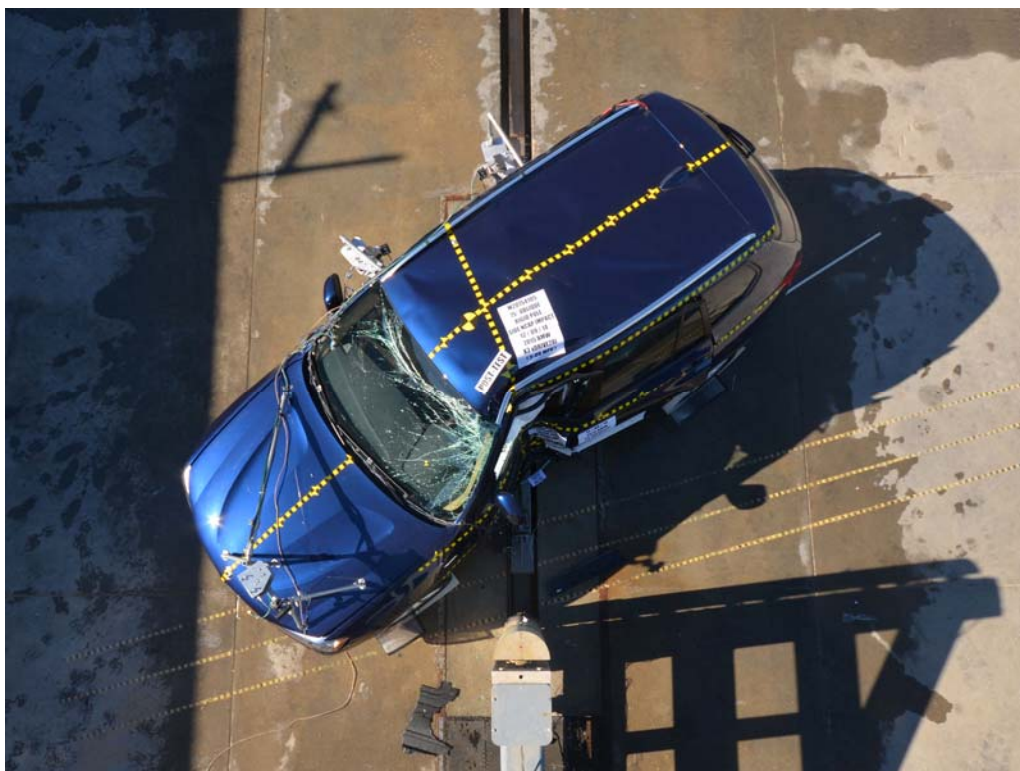


FIGURE 16. Post-Test Overhead View of Test Area



FIGURE 17. Pre-Test Left Side View of Pole
Positioned Against Side of Vehicle



FIGURE 18. Pre-Test Right Side View of Pole
Positioned Against Side of Vehicle

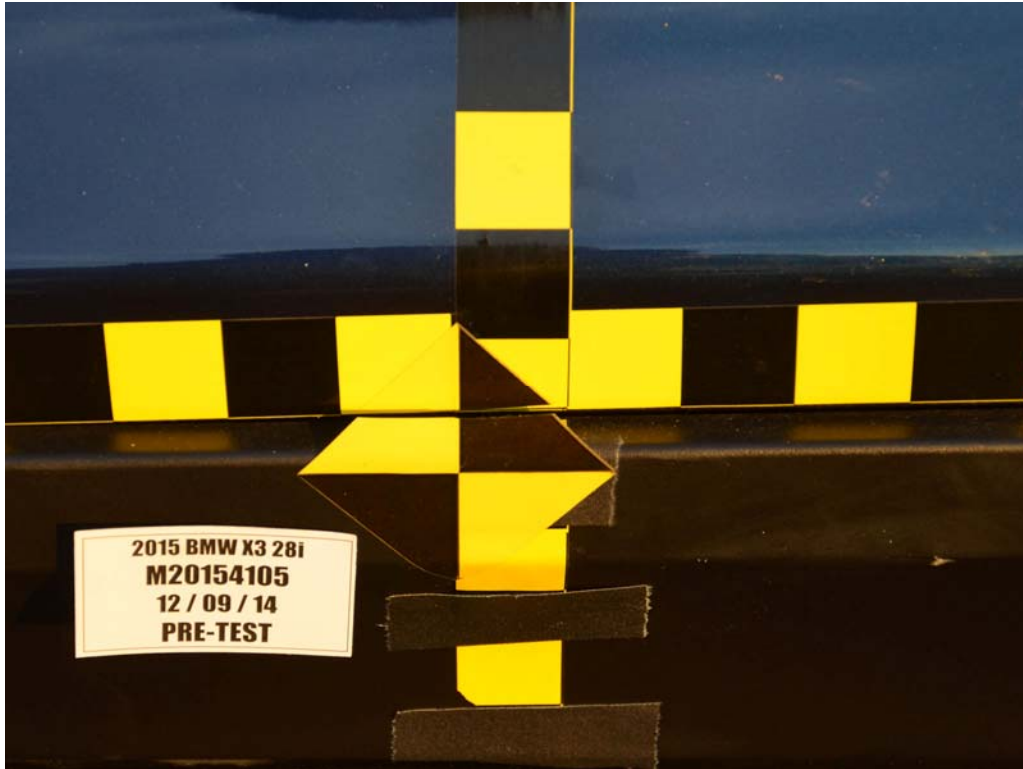


FIGURE 19. Pre-Test Close-Up View of Impact Point Target



FIGURE 20. Post-Test Close-Up View of Impact Point Target
Showing Impact Location



FIGURE 21. Pre-Test Front Close-Up View of Dummy Head and Chest

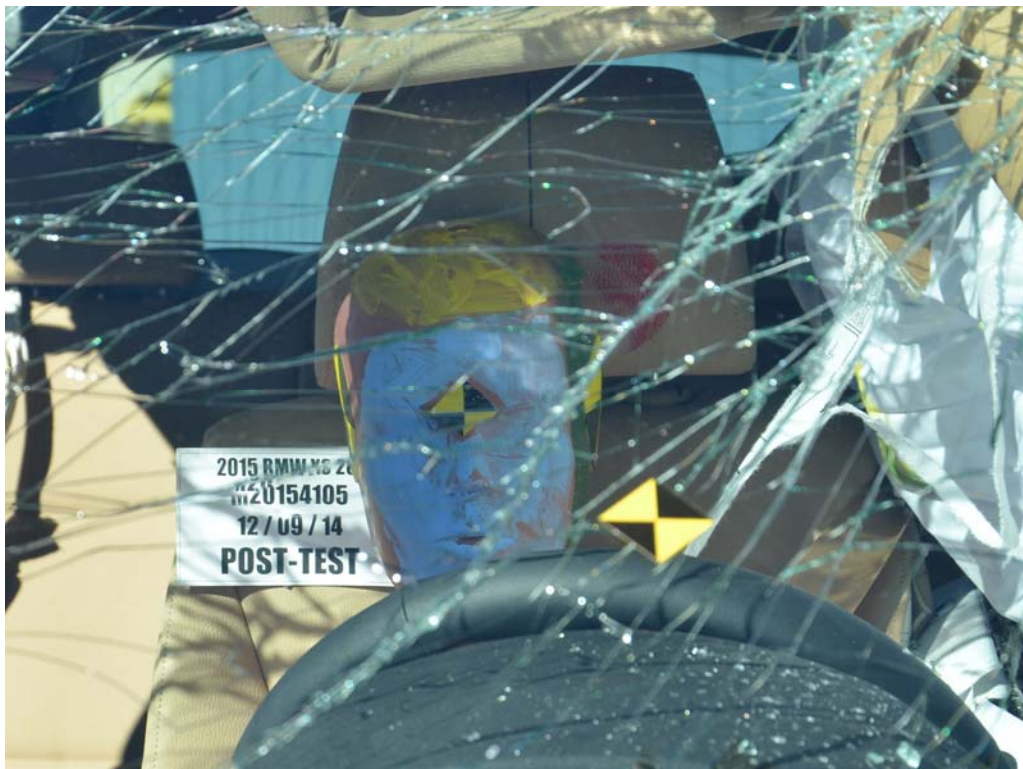


FIGURE 22. Post-Test Front Close-Up View of Dummy



FIGURE 23. Pre-Test Left Side View of Dummy
Showing Belt and Chalking

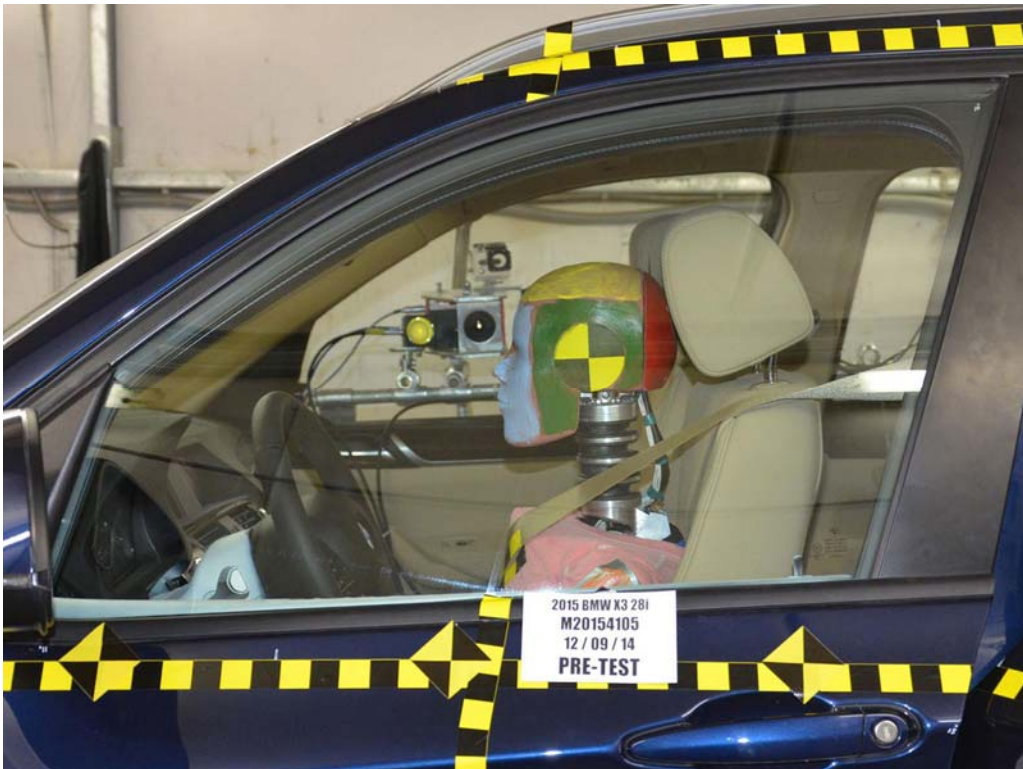


FIGURE 24. Pre-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 25. Post-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



FIGURE 27. Pre-Test Frontal Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 28. Pre-Test Overhead View of Seat Pan Prior to Dummy Positioning



FIGURE 29. Pre-Test Overhead View of Dummy Thighs on Seat Pan



FIGURE 30. Pre-Test Left Side View of Dummy's Neck
Showing Position of Adjustable Neck Bracket



FIGURE 31. Pre-Test Left Side View of Dummy's Head Showing Head is Level



FIGURE 32. Pre-Test Placement of Dummy's Feet



FIGURE 33. Pre-Test View of Belt Anchorage for Dummy

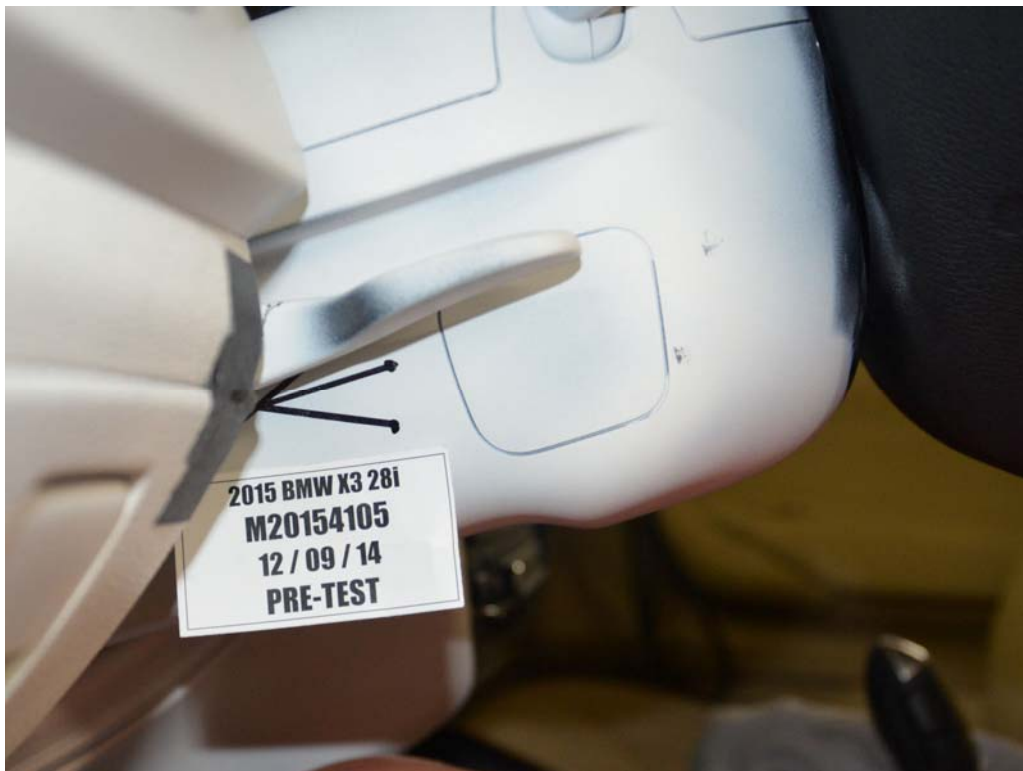


FIGURE 34. Pre-Test Left Side View of Steering Wheel



FIGURE 35. View of Disengaged Parking Brake



FIGURE 36. Pre-Test View of Parking Brake



FIGURE 37. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 38. Pre-Test Close-Up Left Side View of Driver Seat Back



FIGURE 39. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 40. Pre-Test Dummy and Door Clearance View



FIGURE 41. Post-Test Dummy and Door Clearance View



FIGURE 42. Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



FIGURE 43. Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



FIGURE 44. Pre-Test Inner Door Panel View



FIGURE 45. Post-Test Inner Door Panel View
Showing Dummy Contact Locations



FIGURE 46. Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



FIGURE 47. Post-Test Dummy Close-Up Head Contact With Side Airbag View



FIGURE 48. Post-Test Dummy Close-Up Torso Contact With Vehicle Interior View



FIGURE 49. Post-Test Dummy Close-Up Torso Contact With Side Airbag View

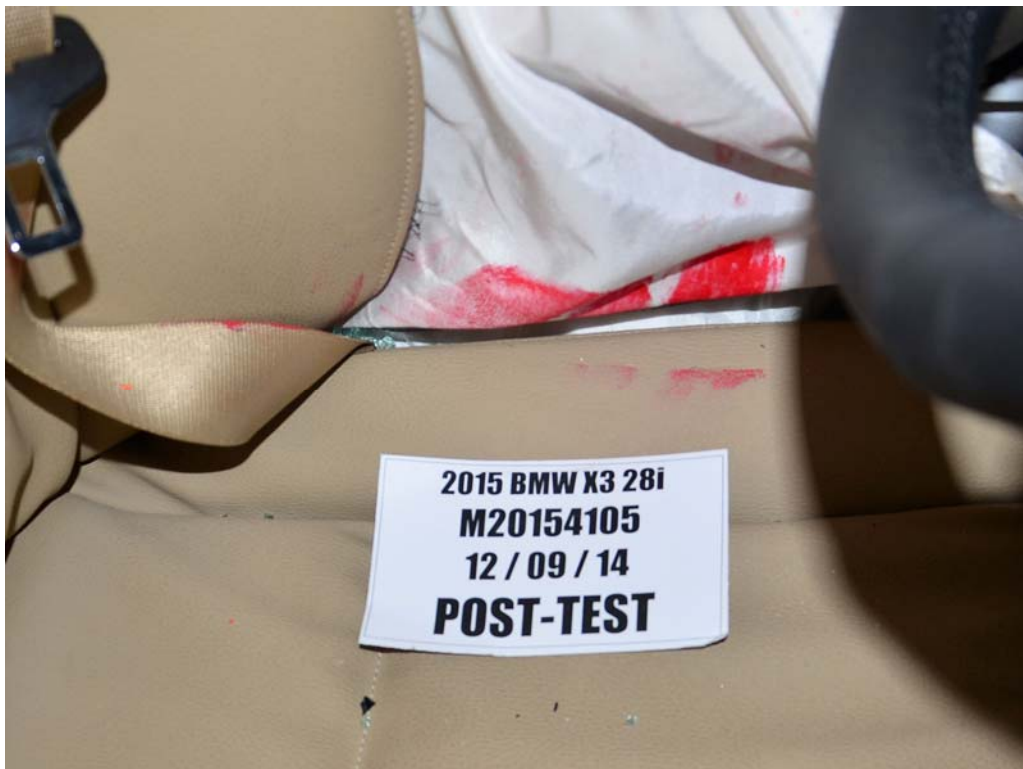


FIGURE 50. Post-Test Dummy Close-Up Pelvis Contact With Vehicle Interior View

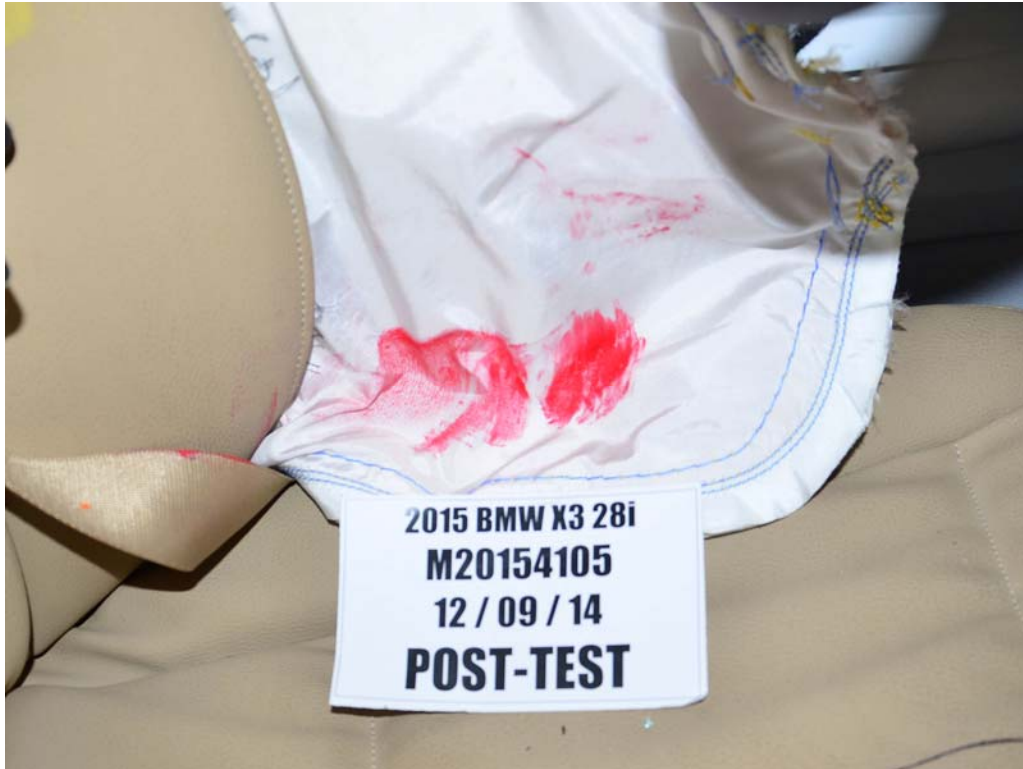


FIGURE 51. Post-Test Dummy Close-Up Pelvis Contact With Side Airbag View



FIGURE 52. Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



FIGURE 53. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 54. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 55. Close-Up View of Vehicle's Certification Label

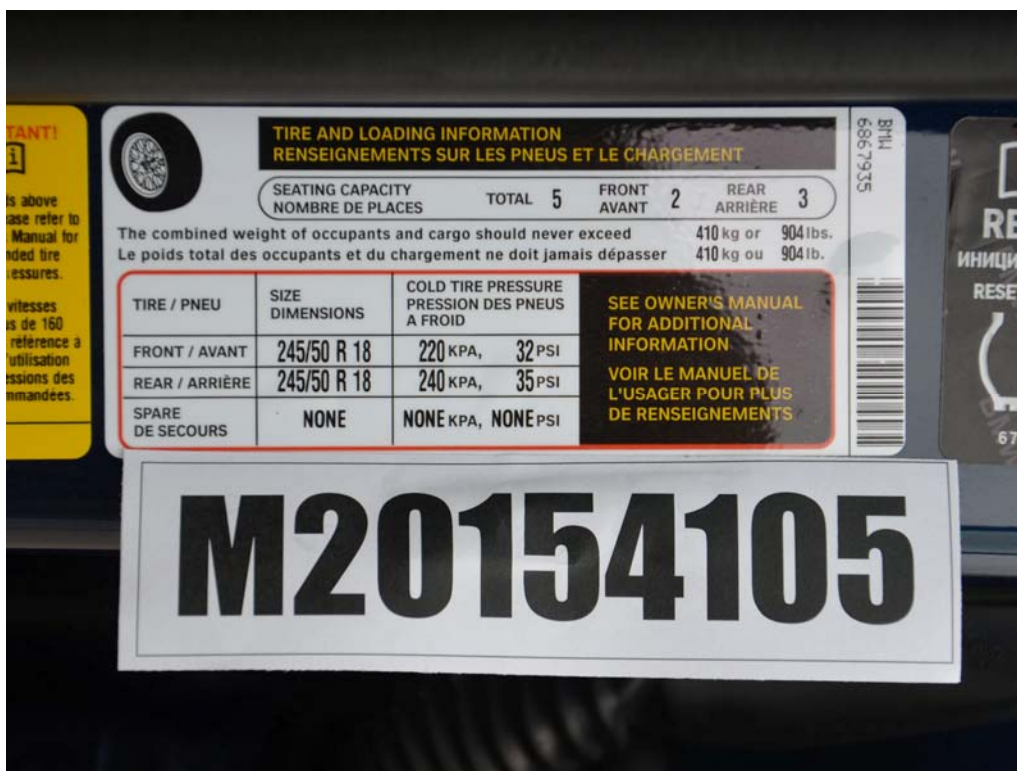


FIGURE 56. Close-Up View of Vehicle's Tire Information Placard or Label



FIGURE 57. Pre-Test Pole Barrier Front View



FIGURE 58. Post-Test Pole Barrier Front View



FIGURE 59. Pre-Test Pole Barrier Side View



FIGURE 60. Post-Test Pole Barrier Side View



FIGURE 61. Pre-Test Ballast View



FIGURE 62. Post-Test Primary and Redundant Speed Trap Read-Out

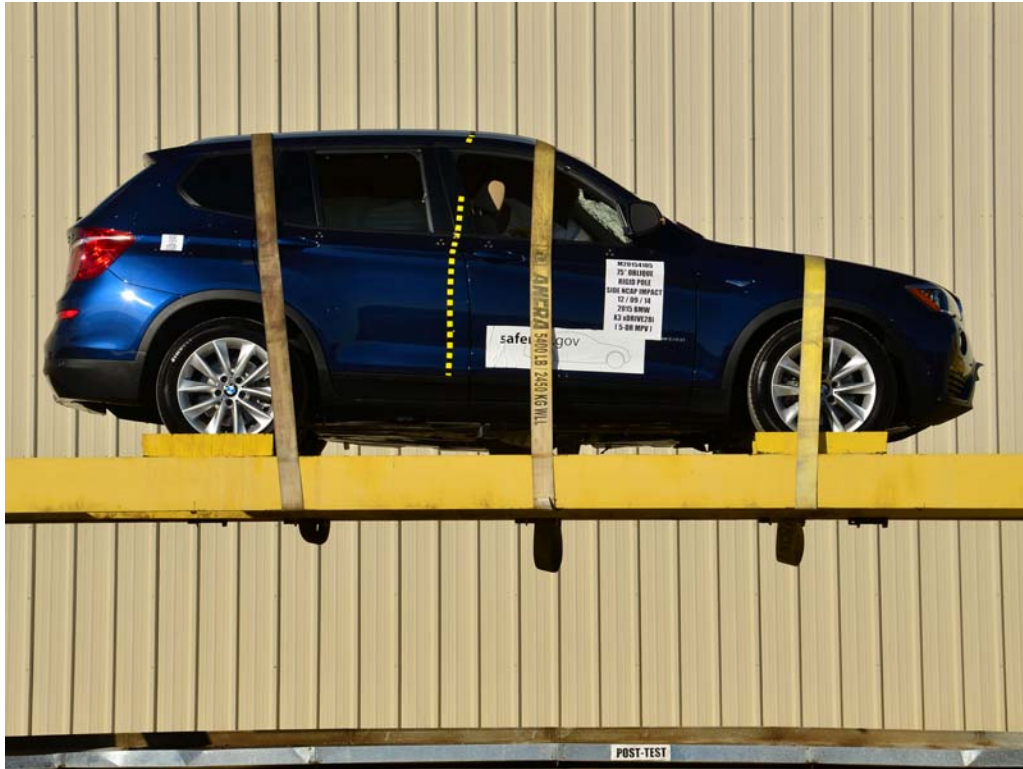


FIGURE 63. FMVSS No. 301 Static Rollover 0 Degrees



FIGURE 64. FMVSS No. 301 Static Rollover 90 Degrees



FIGURE 65. FMVSS No. 301 Static Rollover 180 Degrees



FIGURE 66. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 67. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 68. Impact Event

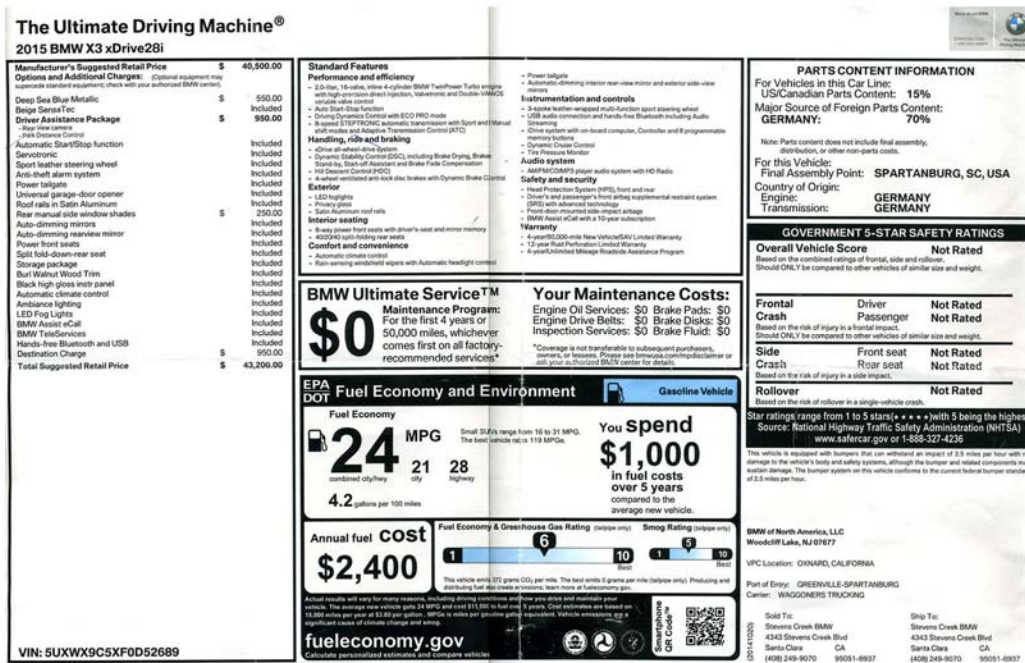


FIGURE 69. Monroney Label

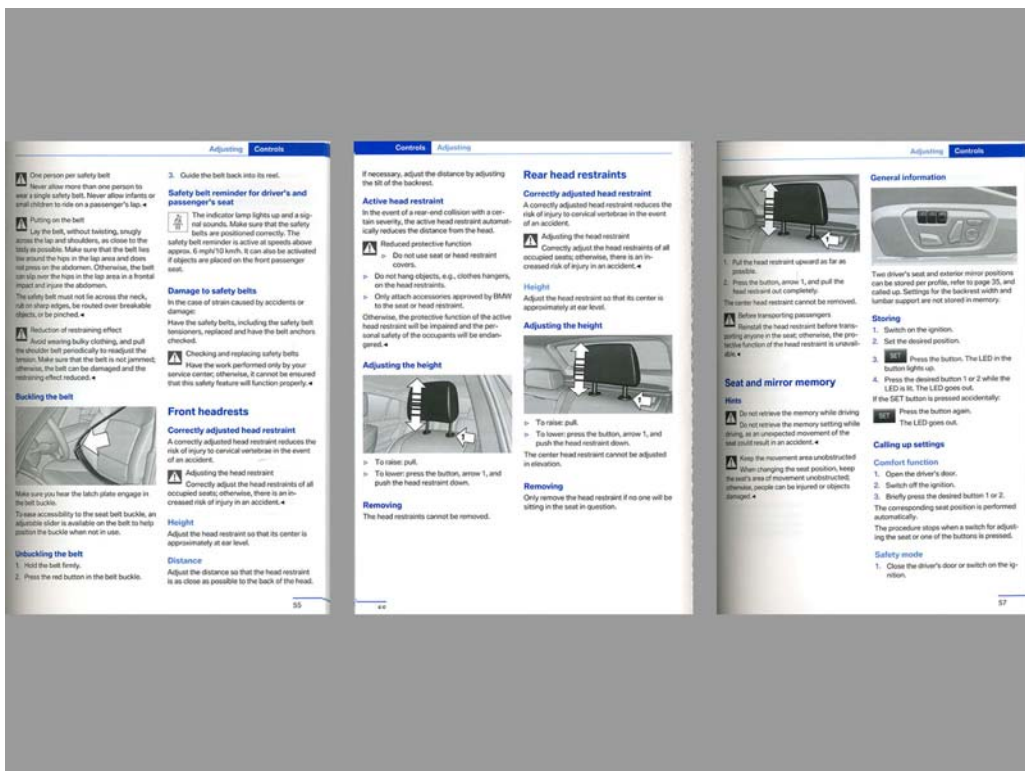


FIGURE 70. Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

Plot		Page
1	Driver Head Acceleration (X) Primary vs. Time	B-1
2	Driver Head Acceleration (Y) Primary vs. Time	B-1
3	Driver Head Acceleration (Z) Primary vs. Time	B-1
4	Driver Head Resultant Acceleration Primary vs. Time	B-1
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-2
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-2
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-2
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

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 Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
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)

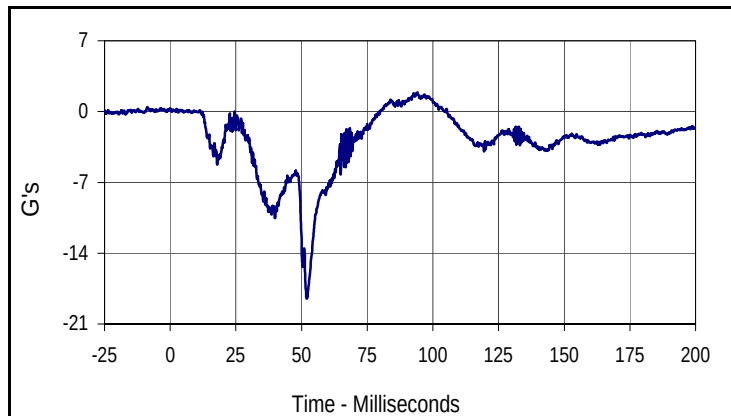
Left B-Pillar Sill Acceleration
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (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

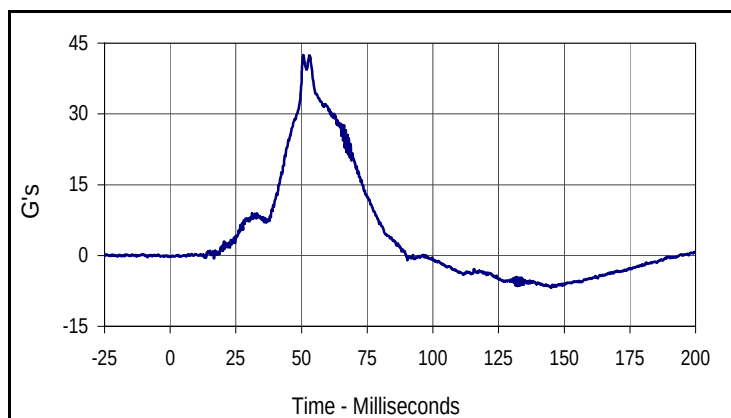
Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV
 Test Program: NCAP Side Pole Impact Test

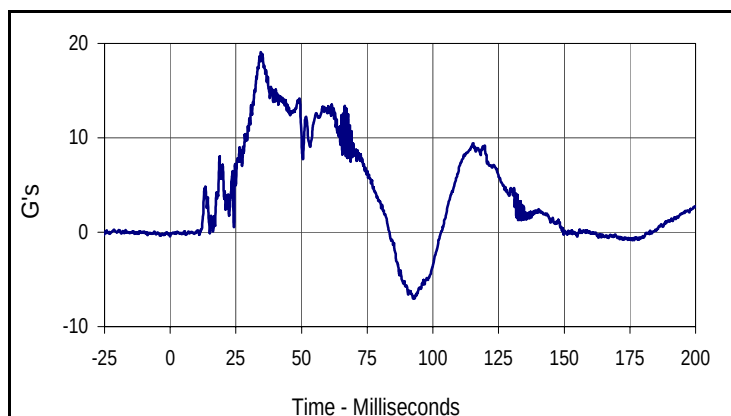
Test Date: 12/9/14
 NHTSA No.: M20154105



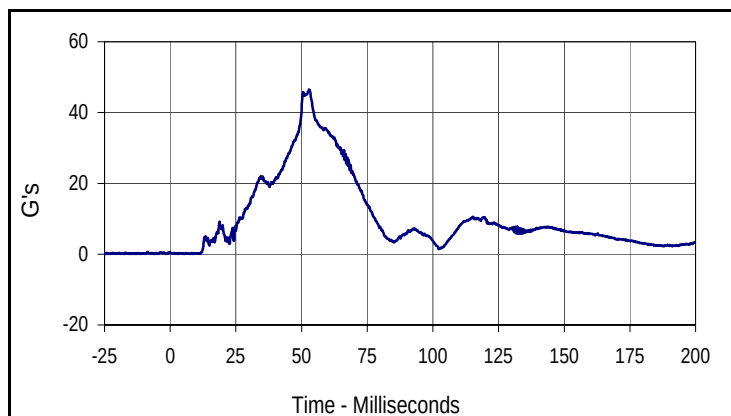
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
1.9	94.1	-18.5	52.0



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
42.5	50.7	-6.8	145.1



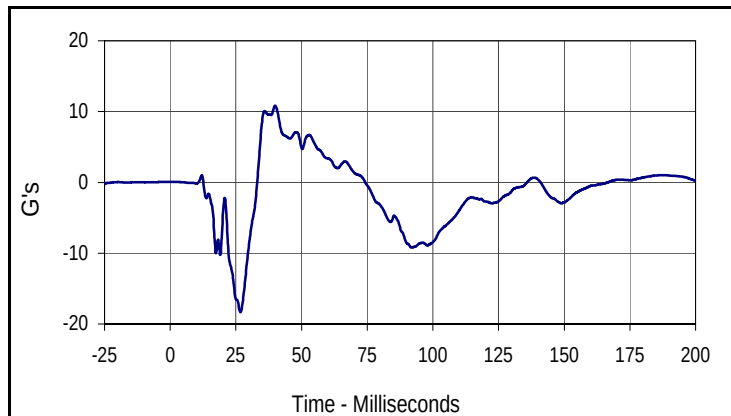
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
19.1	34.5	-7.1	92.5



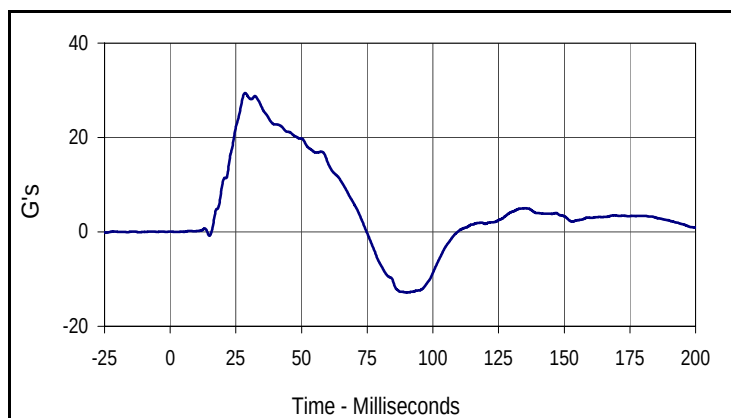
Curve Description			
Driver Head Acceleration Primary Res.			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
46.5	52.9	0.0	3.2

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV
 Test Program: NCAP Side Pole Impact Test

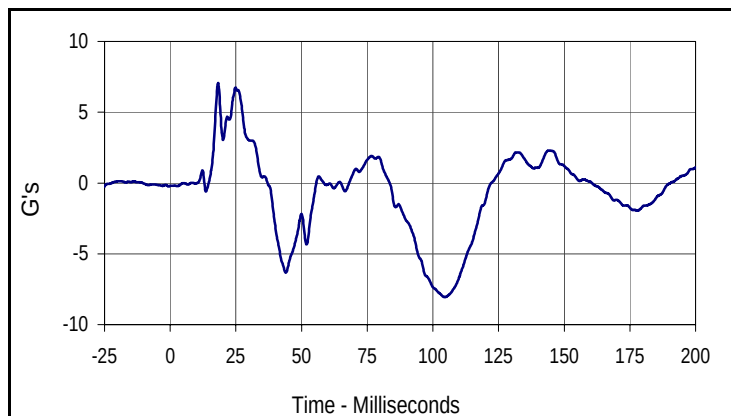
Test Date: 12/9/14
 NHTSA No.: M20154105



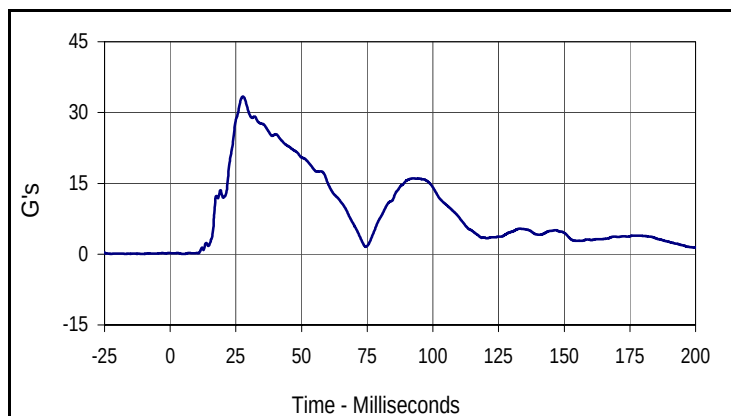
Curve Description			
Driver Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.8	39.9	-18.3	26.7



Curve Description			
Driver Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
29.4	28.5	-12.8	90.6



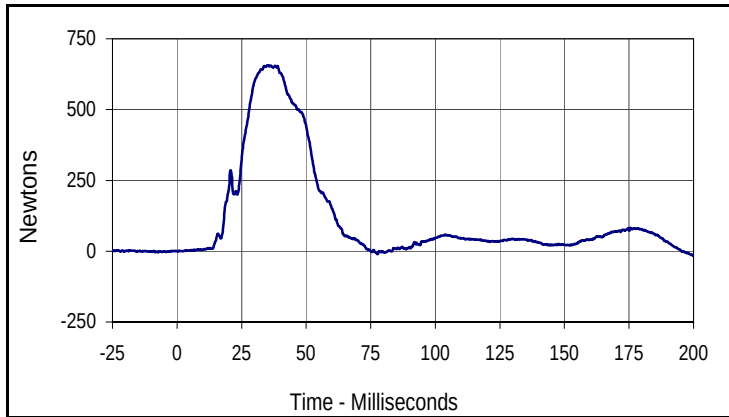
Curve Description			
Driver Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
7.1	18.2	-8.1	104.7



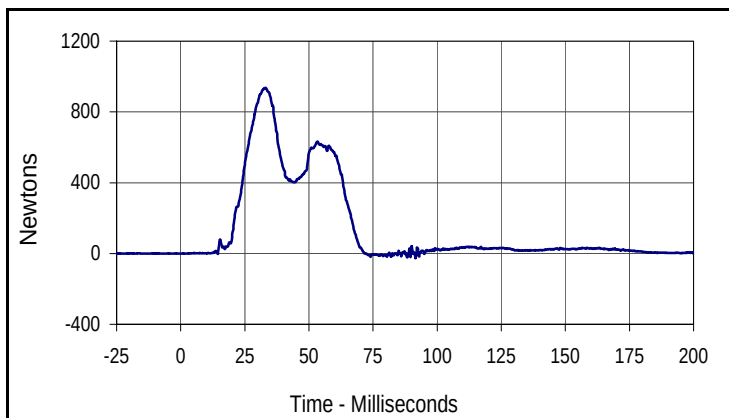
Curve Description			
Driver Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
008	RES	180	G's
Max	Time	Min	Time
33.4	27.7	0.0	5.4

Test Vehicle: 2015 BMW X3 xDrive28i 5-Door MPV
 Test Program: NCAP Side Pole Impact Test

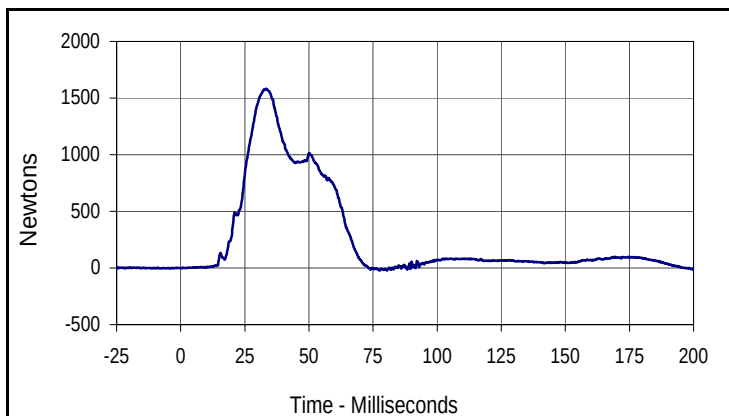
Test Date: 12/9/14
 NHTSA No.: M20154105



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
656.2	35.2	-15.0	200.0



Curve Description			
Driver Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Newtons
Max	Time	Min	Time
936.8	33.1	-25.9	91.6



Curve Description			
Driver Total Pelvic Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
011	SUM	600	Newtons
Max	Time	Min	Time
1581.3	33.4	-21.8	80.4

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
PRE-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: SID IIs External Measurements
 ATD Serial No.: 299

Test Date: 11/24/14
 Test I.D.: N/A



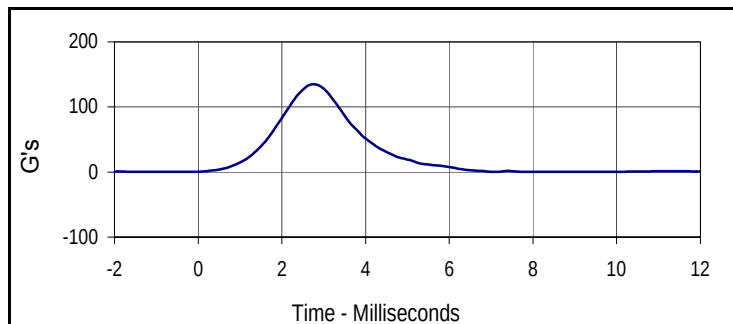
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
A	Sitting Height	mm	772 - 788	780	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	145	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	125	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	44	Pass
I	Head Depth	mm	178 - 188	184	Pass
J	Head Circumference	mm	541 - 551	545	Pass
K	Buttock to Knee Length	mm	514 - 540	527	Pass
L	Popliteal Height	mm	343 - 369	352	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	401	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	202	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	315	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	481	Pass
V	Shoulder Width	mm	341 - 357	352	Pass
W	Foot Width	mm	78 - 94	86	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	872	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
Overall Test Results					Pass

Test Program: SID IIs Head Drop Test
 ATD Serial No.: 299

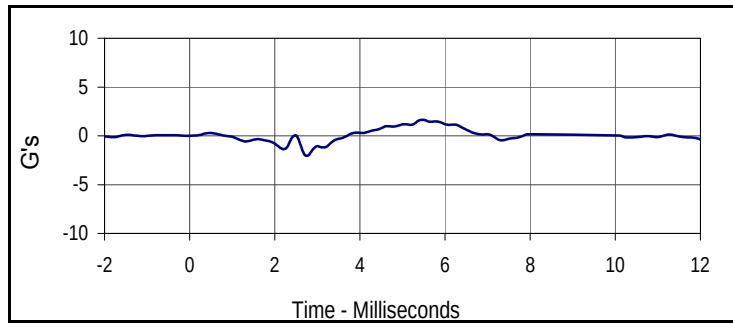
Test Date: 11/24/14
 Test I.D.: 299HD080



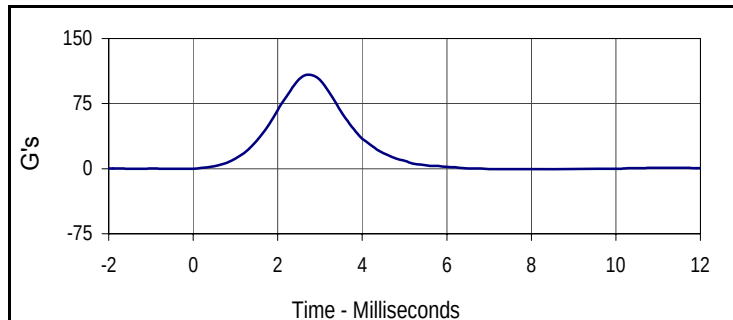
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	300	Pass
Temperature During Soak	Max	18.9 to 25.6	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	20.5	Pass
	Min		20.2	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	20.2	Pass
Peak Head Resultant Acceleration	G's	115 to 137	134.5	Pass
Peak Head X Acceleration	G's	<15	2.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.2	Pass
Overall Test Results				Pass



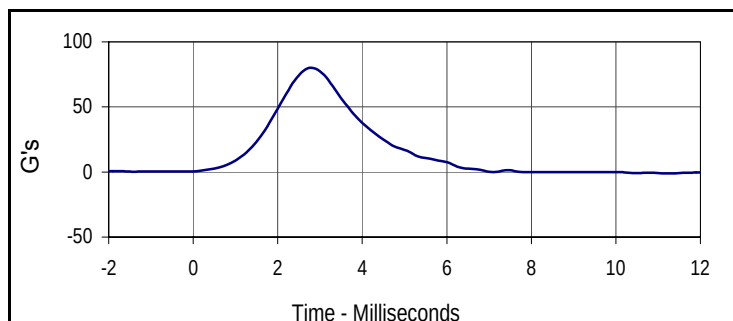
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
134.5	2.7	0.3	-1.4



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.6	5.5	-2.0	2.8



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
108.3	2.7	-0.5	7.9



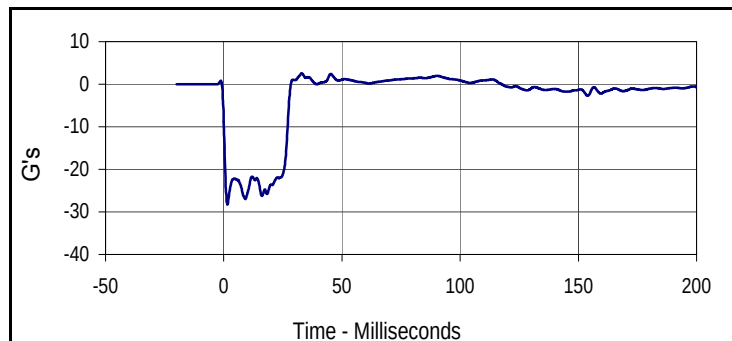
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
80.2	2.8	-1.2	11.3

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 299

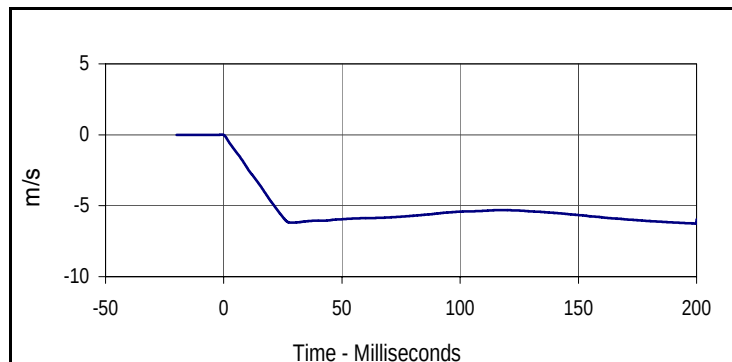
Test Date: 11/24/14
 Test I.D.: 299NB080



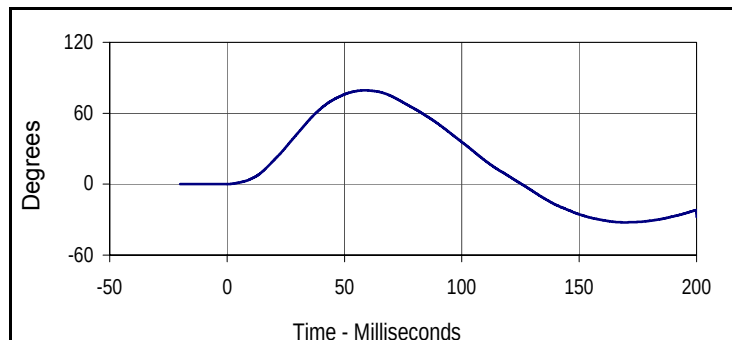
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	345	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	20.5	Pass
	Min		20.2	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	20.4	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.60	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.36	Pass
	15 msec	-3.30 to -4.10	-3.47	Pass
	20 msec	-4.40 to -5.40	-4.70	Pass
	25 msec	-5.40 to -6.10	-5.80	Pass
	25-100 msec	-5.50 to -6.20	-6.20	Pass
D-Plane Rotation	Max	71 to 81	79.4	Pass
	Time	50 to 70	58.6	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-40.9	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	105.3	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
2.5	0.0	-28.3	0.0



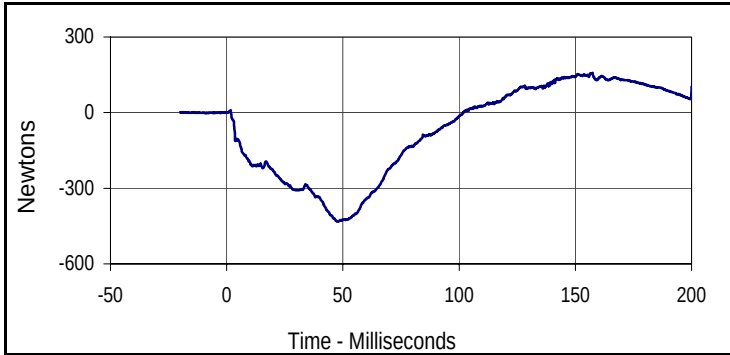
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.8	-6.3	199.9



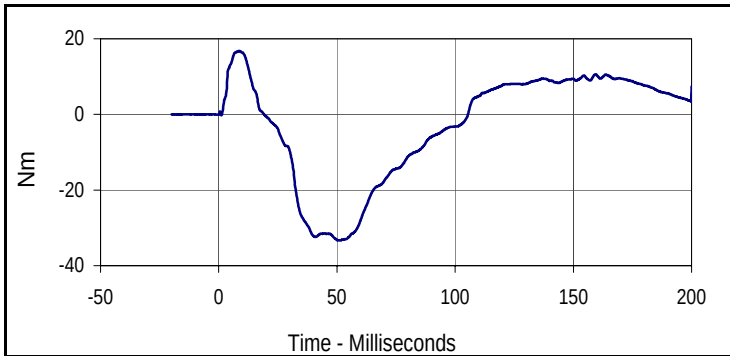
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
79.4	58.6	-32.3	169.2

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 299

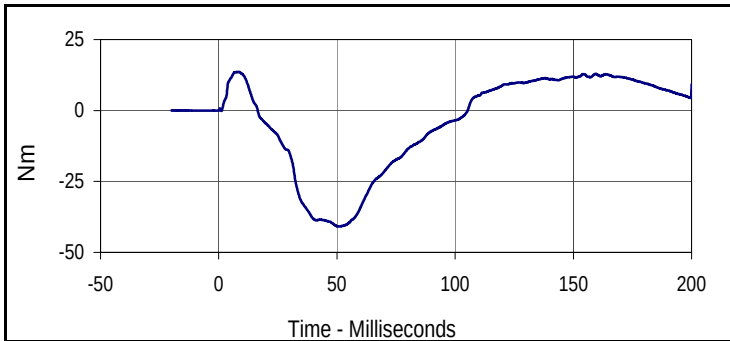
Test Date: 11/24/14
 Test I.D.: 299NB080



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
157.2	157.4	-432.6	47.6



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
16.8	8.8	-33.3	50.5



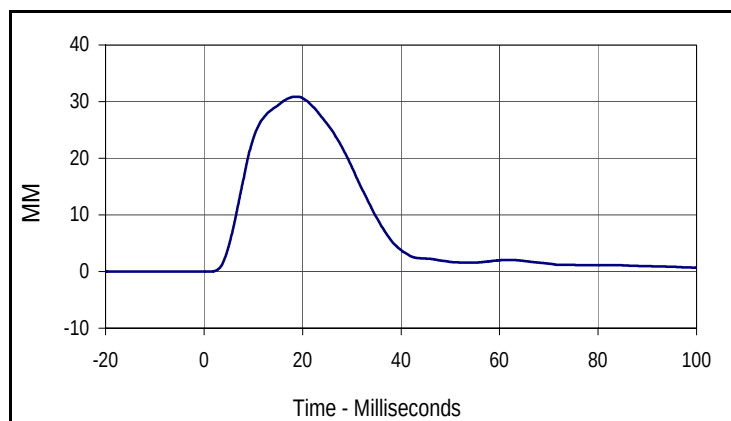
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
13.6	8.3	-40.9	50.6

Test Program: SID IIs Shoulder Impact Test
 ATD Serial No.: 299

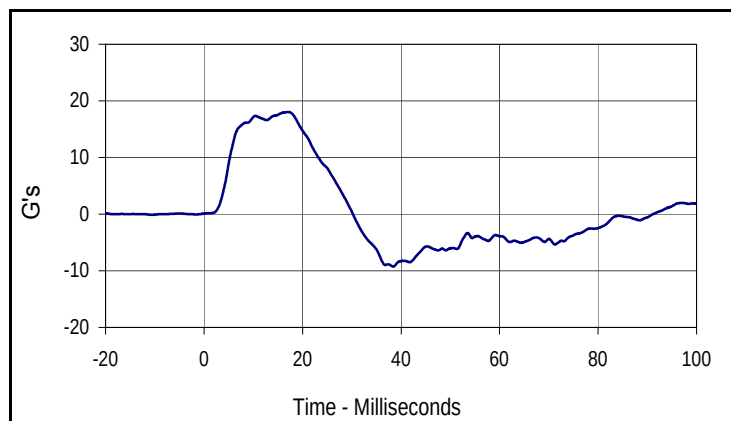
Test Date: 11/24/14
 Test I.D.: 299SH080



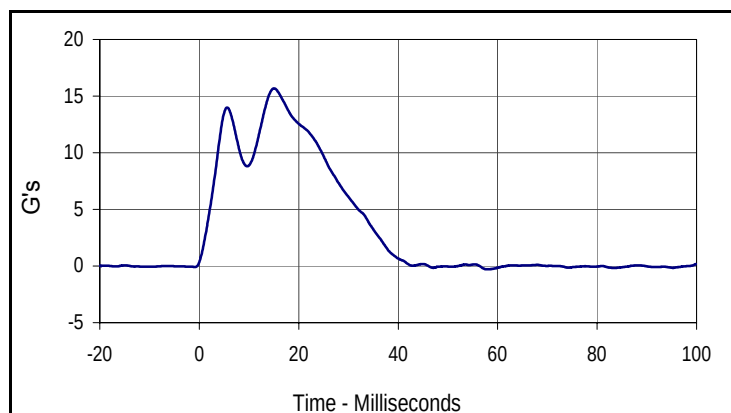
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	390	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.6	Pass
	Min	°C		21.3	Pass
Humidity During Soak	Max	%	10.0 to 70.0	20.5	Pass
	Min	%		20.2	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	20.4	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.33	Pass
Peak Shoulder Deflection		mm	28 to 37	30.9	Pass
Peak Lateral Spine Acceleration Y		G's	17 to 22	18.0	Pass
Peak Impactor Acceleration		G's	13 to 18	15.7	Pass
Overall Test Results				Pass	



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.9	18.6	0.0	-9.0



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.0	17.1	-9.2	38.4



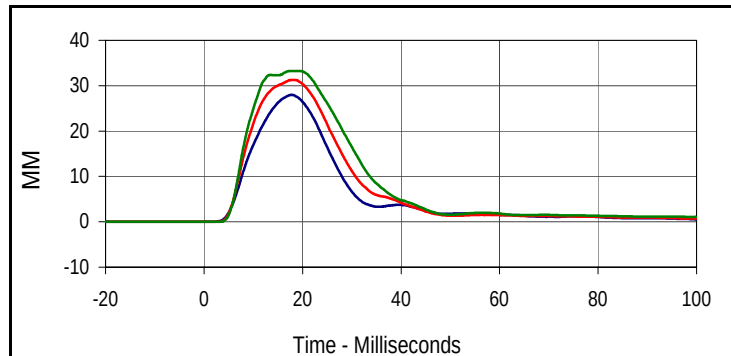
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.7	15.0	-0.3	57.8

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 299

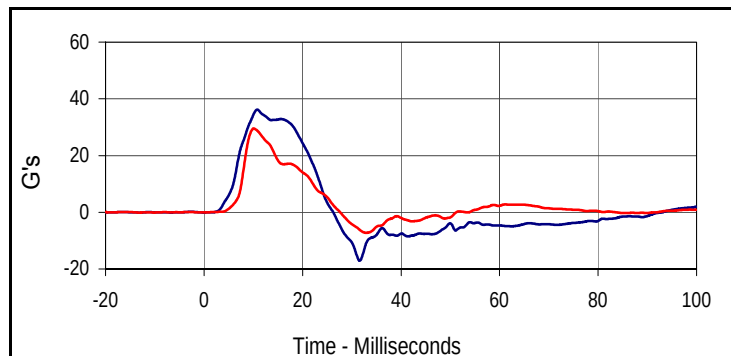
Test Date: 11/24/14
 Test I.D.: 299TWA080



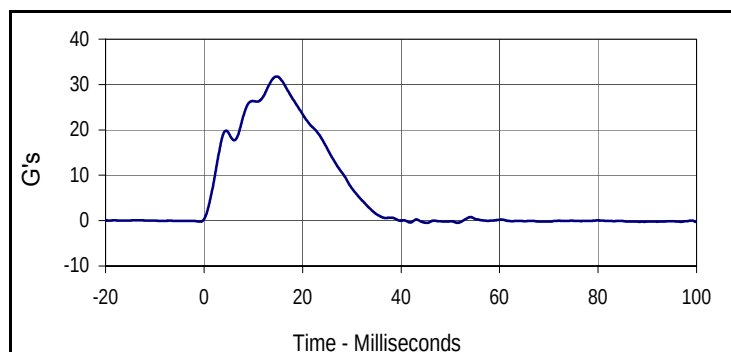
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	435	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	20.5	Pass
	Min		20.2	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	20.4	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.61	Pass
Peak Shoulder Deflection	mm	31 to 40	33.8	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	28.0	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	31.3	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	33.2	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	36.2	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	29.5	Pass
Peak Impactor Acceleration	G's	30 to 36	31.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.0	17.8	0.0	-2.2
Middle Thorax Deflection			
Max	Time	Min	Time
31.3	18.2	0.0	-6.0
Lower Thorax Deflection			
Max	Time	Min	Time
33.2	18.5	0.0	-1.2



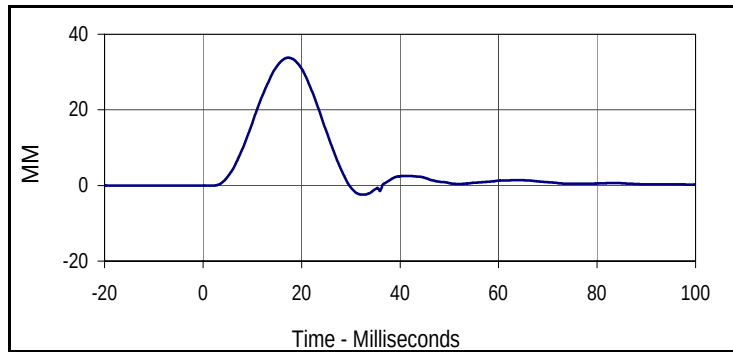
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
36.2	10.8	-17.0	31.6
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
29.5	10.1	-7.2	32.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
31.8	14.7	-0.5	45.2

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 299

Test Date: 11/24/14
 Test I.D.: 299TWA080



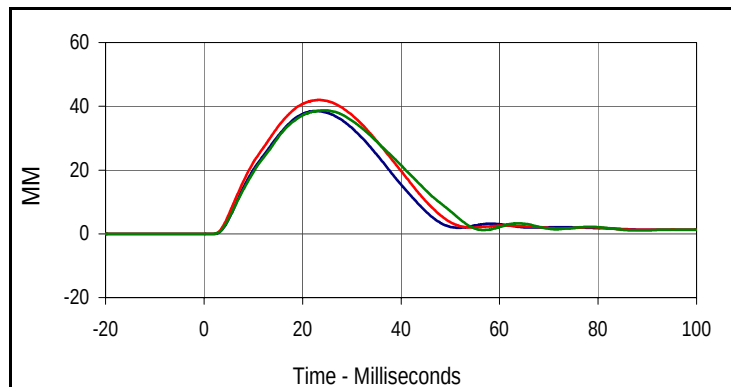
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
33.8	17.3	-2.4	32.8

Test Program: SID IIs Thorax without Arm Impact Test
 ATD Serial No.: 299

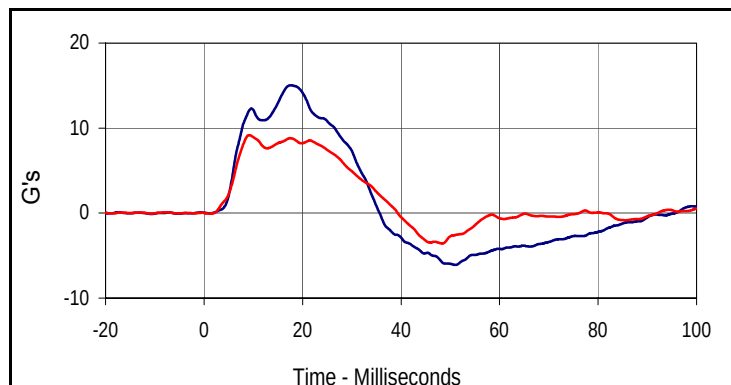
Test Date: 11/24/14
 Test I.D.: 299TWOA080



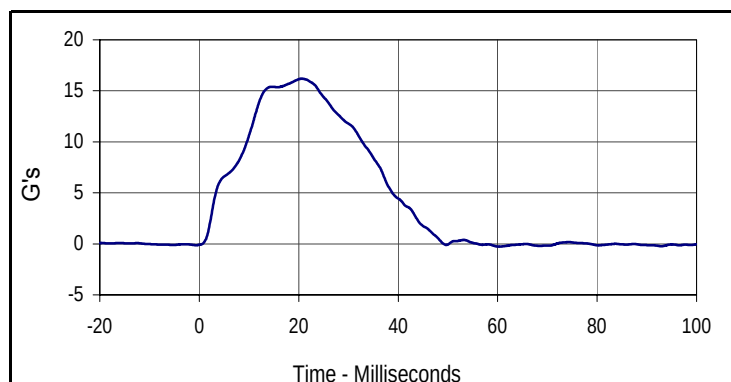
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	480	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.6	Pass
	Min	°C		21.3	Pass
Humidity During Soak	Max	%	10.0 to 70.0	20.5	Pass
	Min	%		20.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	20.5	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.32	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	38.5	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	42.0	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	38.8	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.0	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.2	Pass
Peak Impactor Acceleration		G's	14 to 18	16.2	Pass
Overall Test Results				Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
38.5	22.6	0.0	-5.5
Middle Thorax Deflection			
Max	Time	Min	Time
42.0	23.4	0.0	-0.2
Lower Thorax Deflection			
Max	Time	Min	Time
38.8	24.4	0.0	-0.5



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.0	17.6	-6.1	51.0
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.2	9.2	-3.6	48.4



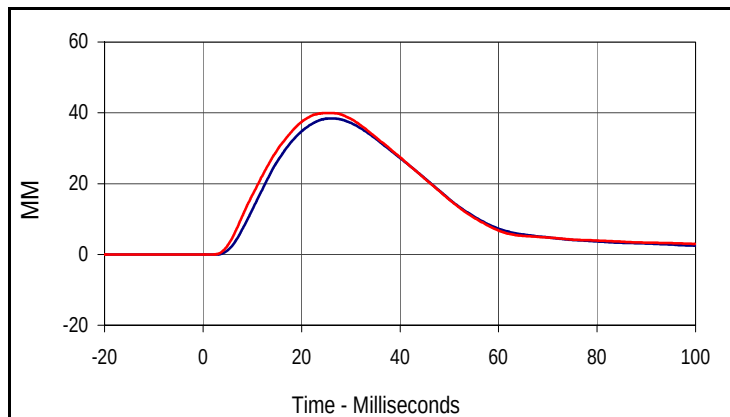
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.2	20.6	-0.3	60.3

Test Program: SID IIs Abdomen Impact Test
 ATD Serial No.: 299

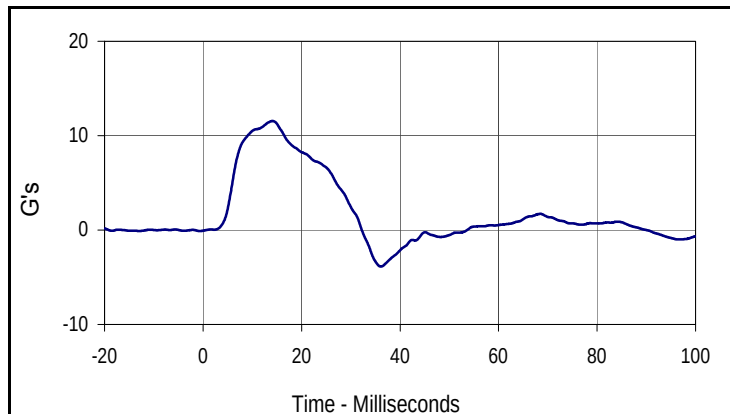
Test Date: 11/24/14
 Test I.D.: 299ABD080



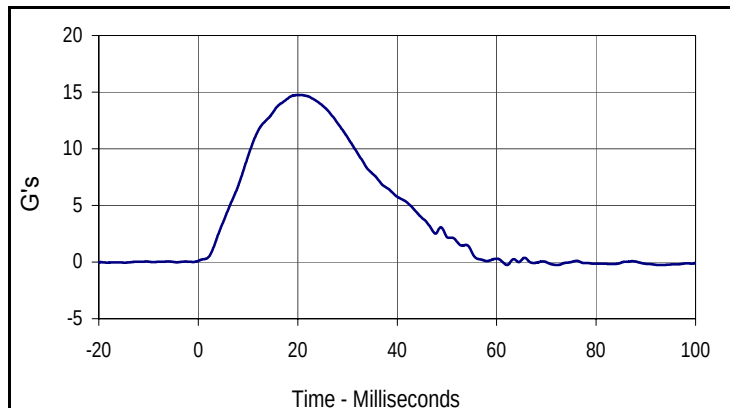
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	525	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	20.5	Pass
	Min		20.2	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	20.5	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.34	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	38.4	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	39.9	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	11.5	Pass
Peak Impactor Acceleration	G's	12 to 16	14.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
38.4	25.8	0.0	1.7
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
39.9	25.1	0.0	-16.4

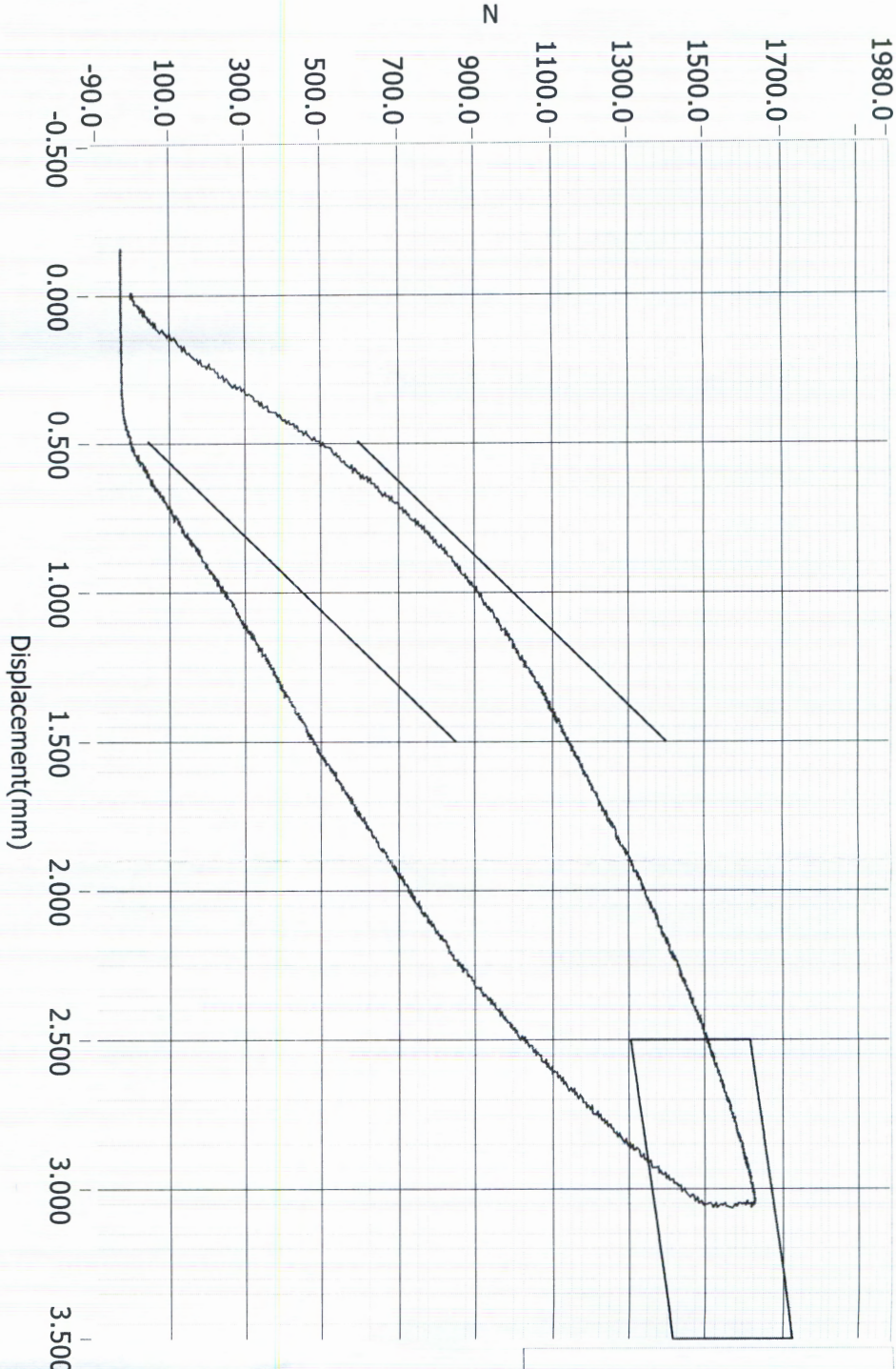


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.5	14.1	-3.9	36.1



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.8	20.1	-0.3	92.6

Resultant Data - SIDIIs Plug Compression



- Loading Curve
- Boundary Limit Upper
- Boundary Limit Lower
- Peak Load Upper
- Peak Load Lower
- Peak Defl Upper
- Peak Defl Lower

1624N

ATD Calibration Lab

M20154105 Pre Test

Test ID	Part Serial Number	Test Date	Test Time
	70994	12/13/2013	11:01 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

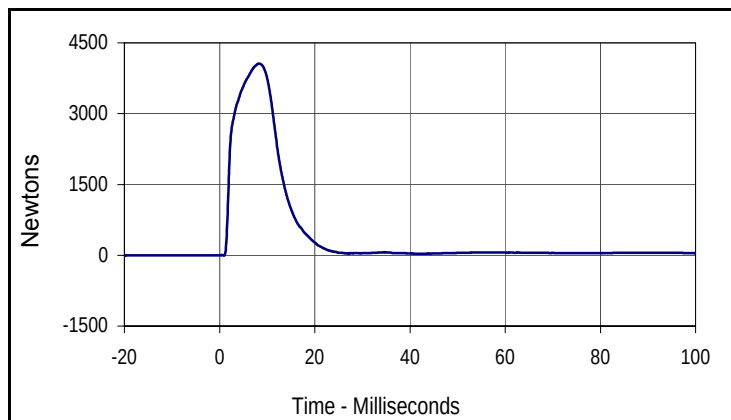
Current Date : 12/13/2013 Current Time : 23:02:13

Test Program: SID IIs Pelvis Acetabulum Impact Test
 ATD Serial No.: 299

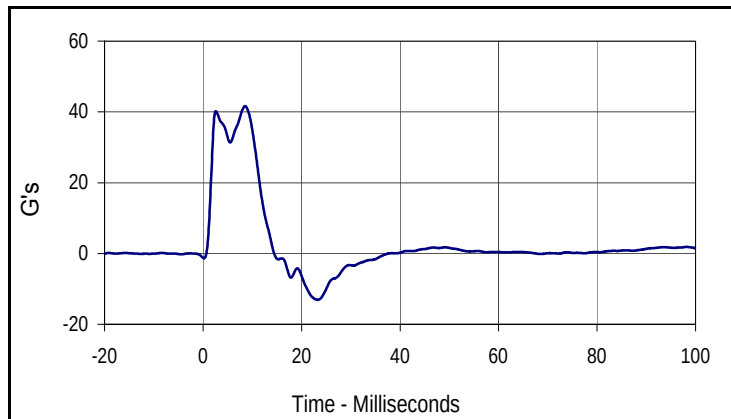
Test Date: 11/24/14
 Test I.D.: 299ACET080



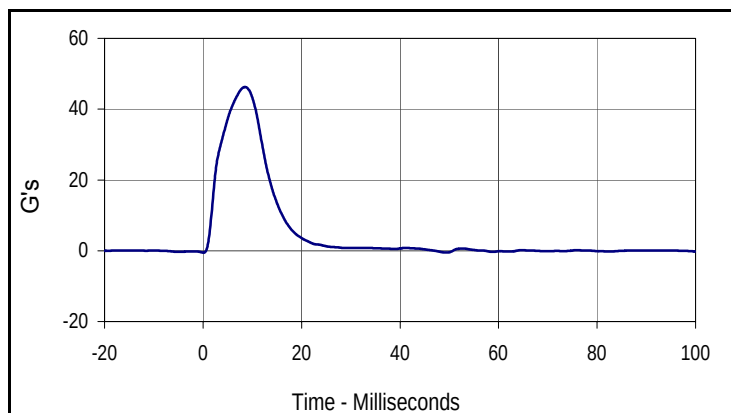
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	570	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	20.5	Pass
	Min		20.2	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	20.4	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.67	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	4059.5	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	41.6	Pass
Peak Impactor Acceleration	G's	38 to 47	46.3	Pass
Overall Test Results				Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4059.5	8.3	-6.5	1.0



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.6	8.5	-13.1	23.3



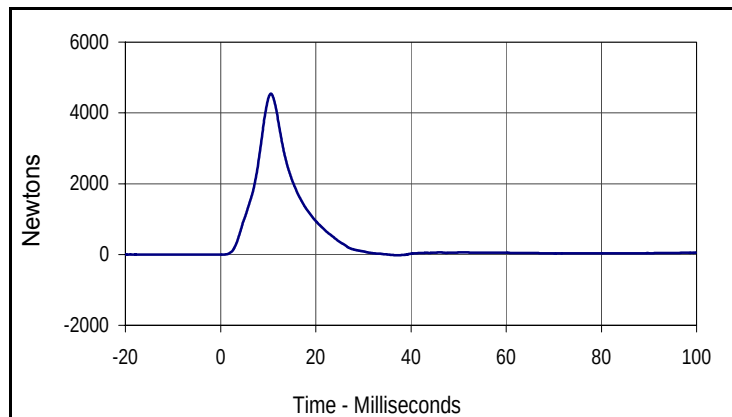
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.3	8.5	-0.5	0.1

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 299

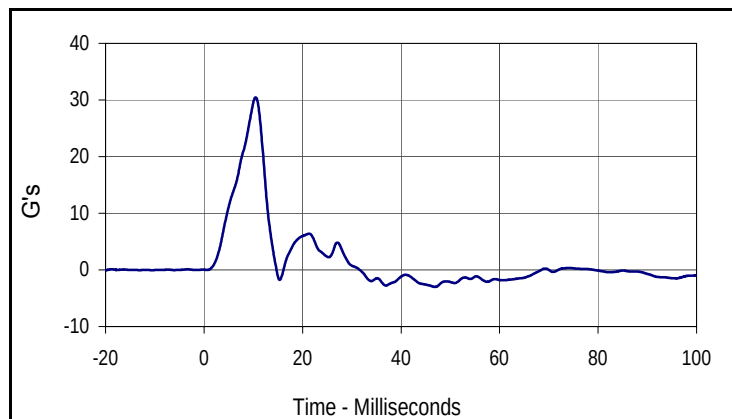
Test Date: 11/24/14
 Test I.D.: 299PL080



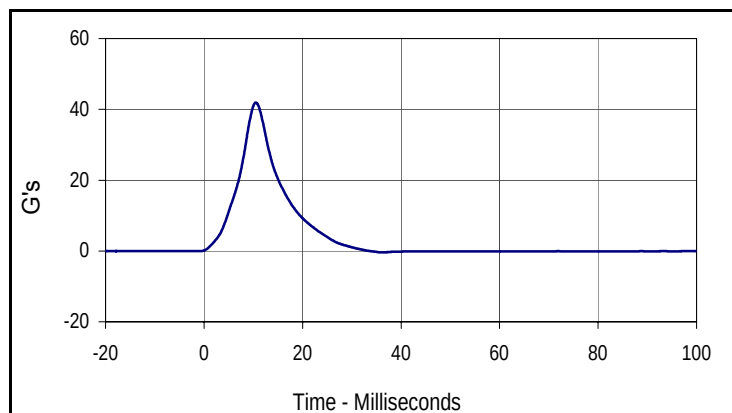
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	615	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	20.5	Pass
	Min		20.2	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	20.5	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.33	Pass
Peak Iliac Force	Newtons	4100 to 5100	4540.7	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	30.5	Pass
Peak Impactor Acceleration	G's	36 to 45	41.9	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4540.7	10.6	-22.7	37.3



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
30.5	10.5	-3.0	46.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
41.9	10.5	-0.4	36.2

APPENDIX C
POST-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: SID IIs External Measurements
 ATD Serial No.: 299

Test Date: 12/10/14
 Test I.D.: N/A



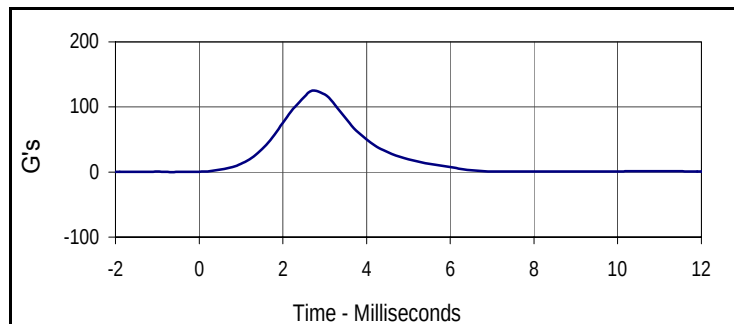
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	31	Pass
A	Sitting Height	mm	772 - 788	780	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	145	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	125	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	44	Pass
I	Head Depth	mm	178 - 188	184	Pass
J	Head Circumference	mm	541 - 551	545	Pass
K	Buttock to Knee Length	mm	514 - 540	527	Pass
L	Popliteal Height	mm	343 - 369	352	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	401	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	202	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	315	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	481	Pass
V	Shoulder Width	mm	341 - 357	352	Pass
W	Foot Width	mm	78 - 94	86	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	872	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
Overall Test Results					Pass

Test Program: SID IIs Head Drop Test
 ATD Serial No.: 299

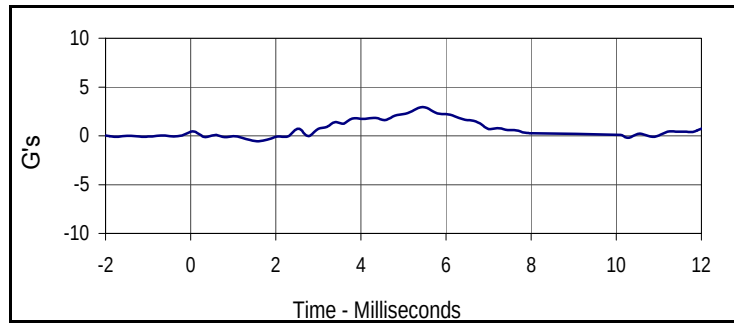
Test Date: 12/10/14
 Test I.D.: 299HD081



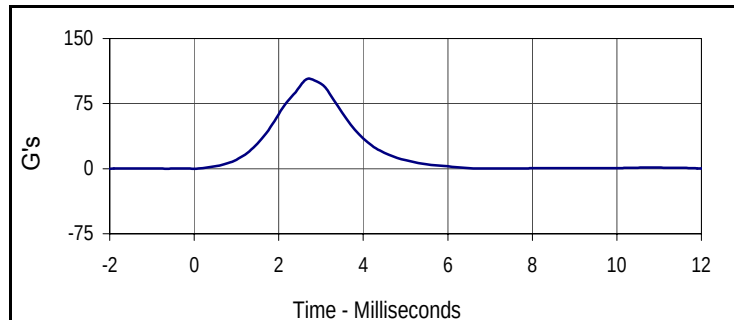
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	344	Pass
Temperature During Soak	Max	18.9 to 25.6	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.9	Pass
Peak Head Resultant Acceleration	G's	115 to 137	125.0	Pass
Peak Head X Acceleration	G's	<15	2.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.2	Pass
Overall Test Results				Pass



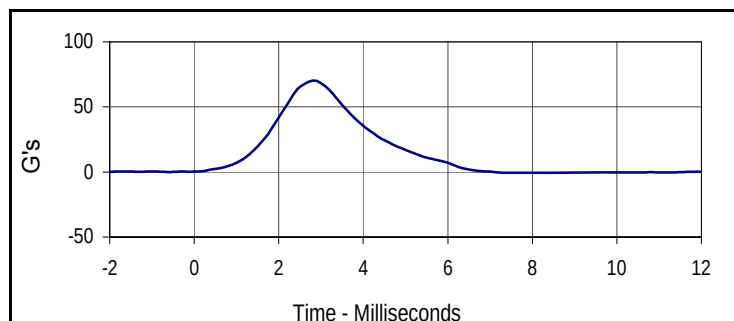
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
125.0	2.7	0.0	-0.6



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.9	5.5	-0.6	1.6



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
104.1	2.7	0.0	-0.6



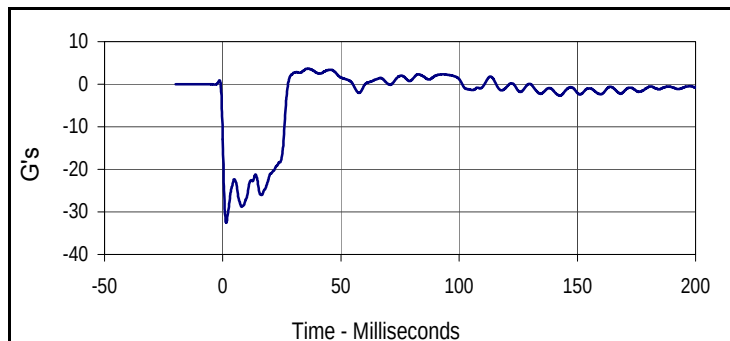
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
70.3	2.8	-0.6	8.0

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 299

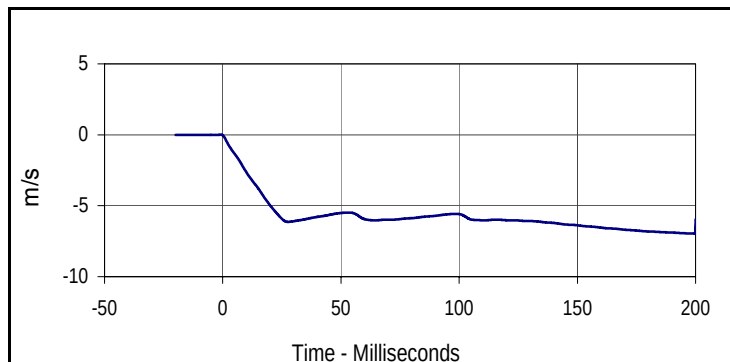
Test Date: 12/10/14
 Test I.D.: 299NB081



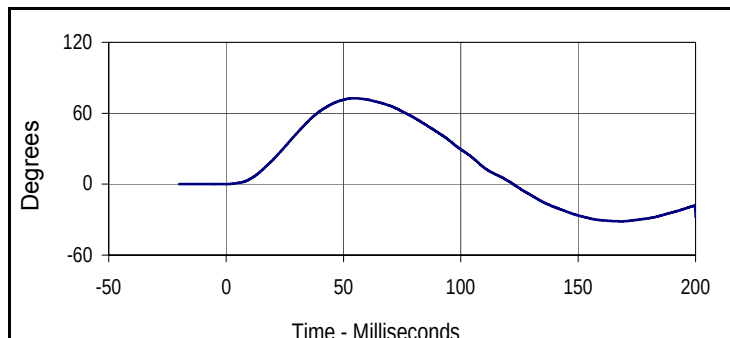
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	389	Pass
Temperature During Soak	Max	20.6 to 22.2	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	22.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.0	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.51	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.64	Pass
	15 msec	-3.30 to -4.10	-3.77	Pass
	20 msec	-4.40 to -5.40	-4.97	Pass
	25 msec	-5.40 to -6.10	-5.92	Pass
	25-100 msec	-5.50 to -6.20	-6.14	Pass
D-Plane Rotation	Max	71 to 81	72.8	Pass
	Time	50 to 70	54.5	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-42.1	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	115.3	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
3.7	0.0	-32.6	0.0



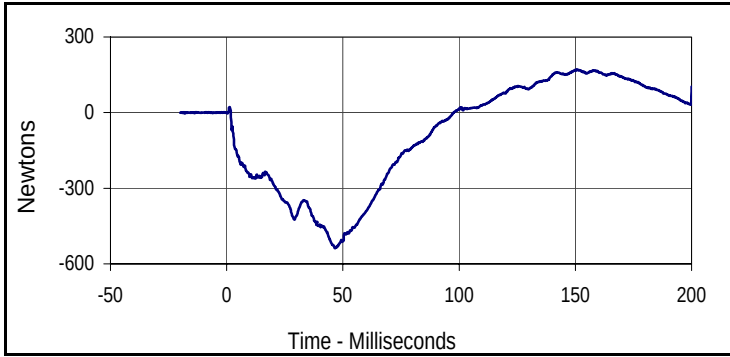
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.9	-7.0	199.9



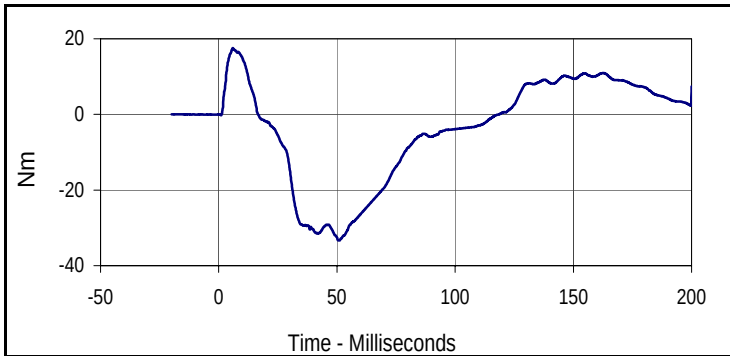
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
72.8	54.5	-31.5	168.3

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 299

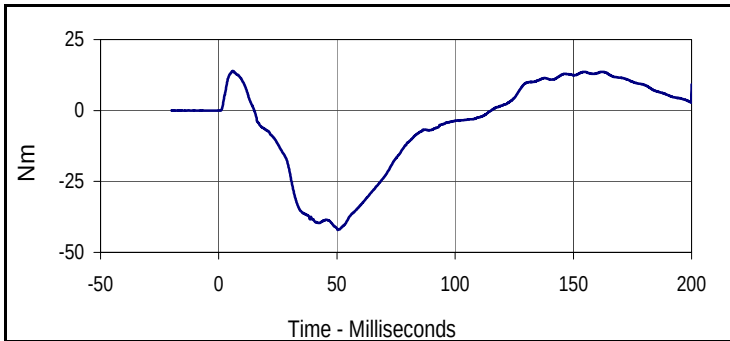
Test Date: 12/10/14
 Test I.D.: 299NB081



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
171.3	150.6	-537.3	46.5



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
17.5	6.0	-33.3	50.7



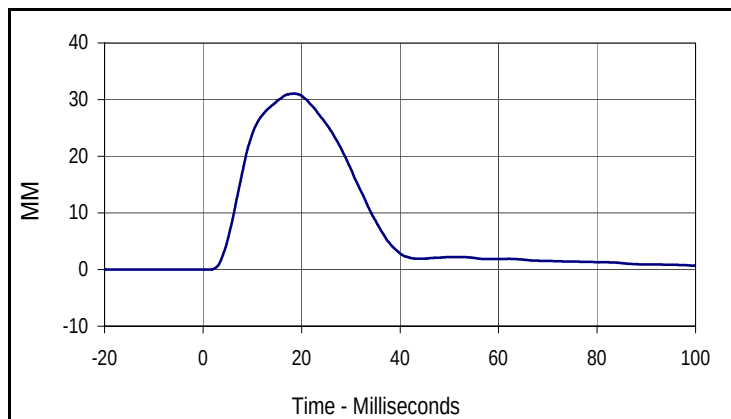
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
14.0	5.8	-42.1	50.3

Test Program: SID IIs Shoulder Impact Test
 ATD Serial No.: 299

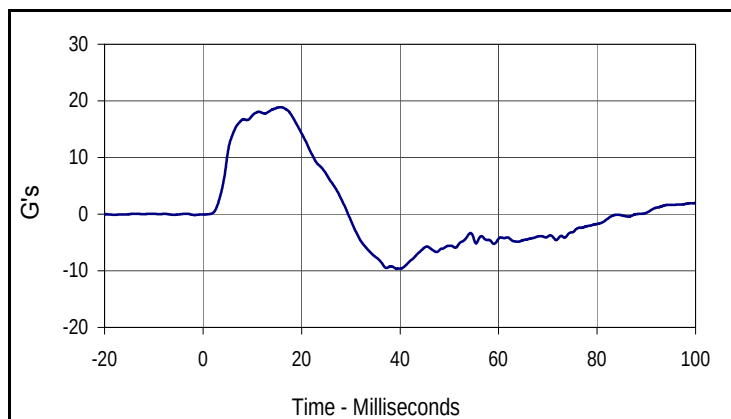
Test Date: 12/10/14
 Test I.D.: 299SH081



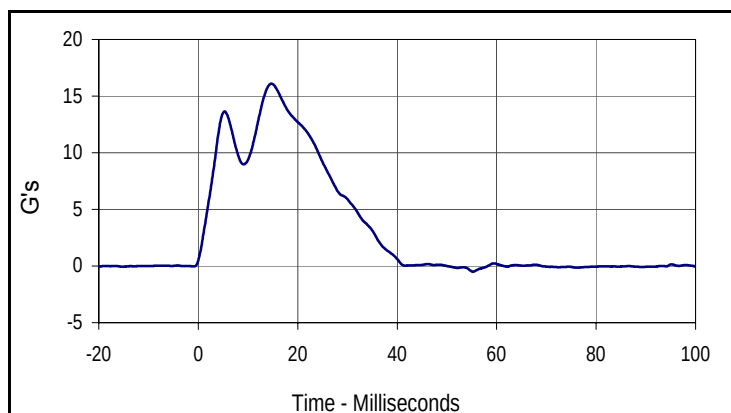
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	434	Pass
Temperature During Soak	Max °C	20.6 to 22.2	22.1	Pass
	Min °C		21.7	Pass
Humidity During Soak	Max %	10.0 to 70.0	31.2	Pass
	Min %		30.8	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	22.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.0	Pass
Impactor Velocity	m/s	4.20 to 4.40	4.33	Pass
Peak Shoulder Deflection	mm	28 to 37	31.0	Pass
Peak Lateral Spine Acceleration Y	G's	17 to 22	18.9	Pass
Peak Impactor Acceleration	G's	13 to 18	16.1	Pass
Overall Test Results				Pass



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
31.0	18.3	0.0	-20.0



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.9	15.7	-9.6	39.4



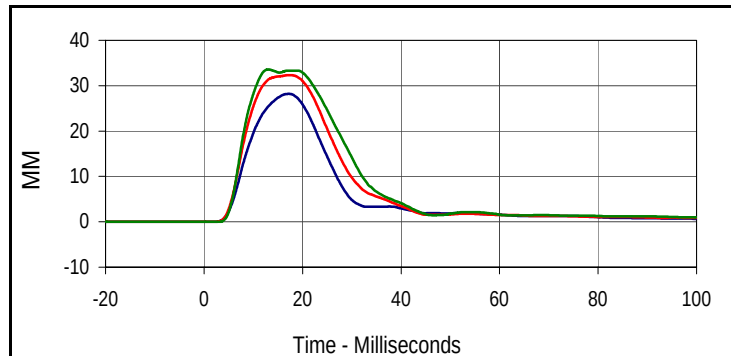
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.1	14.7	-0.5	55.2

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 299

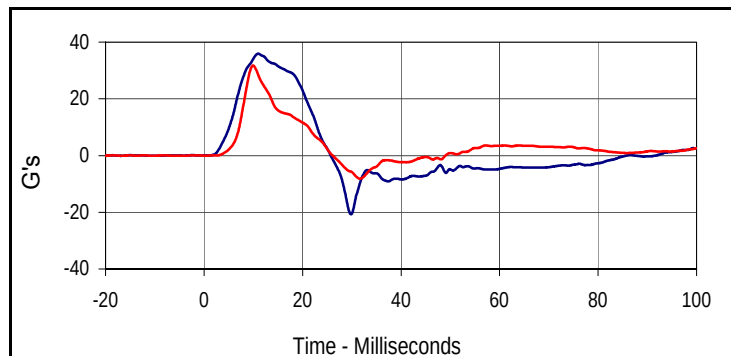
Test Date: 12/10/14
 Test I.D.: 299TWA081



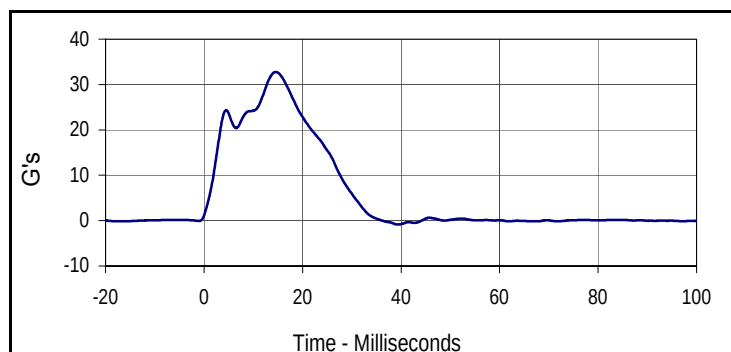
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	479	Pass
Temperature During Soak	Max	20.6 to 22.2	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	22.0	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.0	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.71	Pass
Peak Shoulder Deflection	mm	31 to 40	36.5	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	28.2	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	32.3	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	33.6	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	35.9	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	31.7	Pass
Peak Impactor Acceleration	G's	30 to 36	32.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.2	17.2	0.0	-14.9
Middle Thorax Deflection			
Max	Time	Min	Time
32.3	17.3	0.0	-17.6
Lower Thorax Deflection			
Max	Time	Min	Time
33.6	13.0	0.0	-15.6



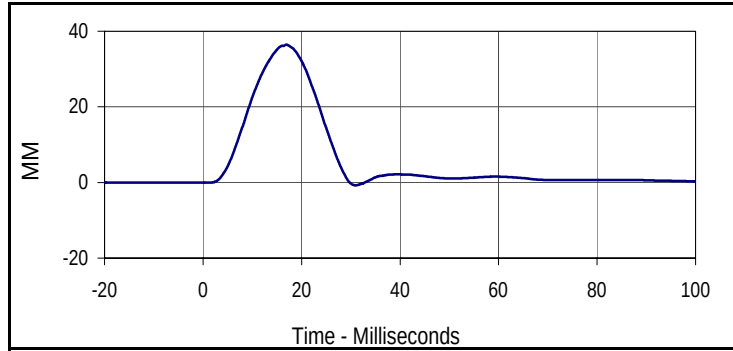
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
35.9	11.0	-20.7	29.8
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.7	9.9	-8.2	31.6



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
32.8	14.6	-0.9	39.2

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 299

Test Date: 12/10/14
 Test I.D.: 299TWA081



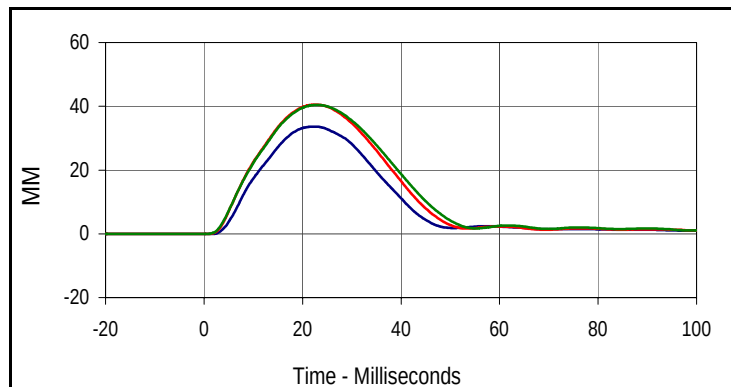
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
36.5	16.9	-0.7	30.9

Test Program: SID IIs Thorax without Arm Impact Test
 ATD Serial No.: 299

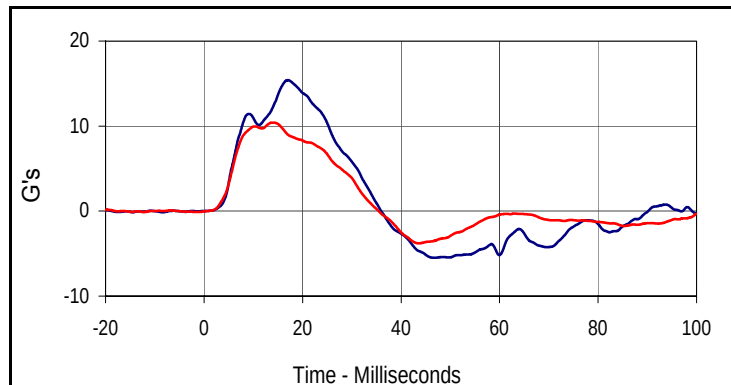
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 Test I.D.: 299TWOA081



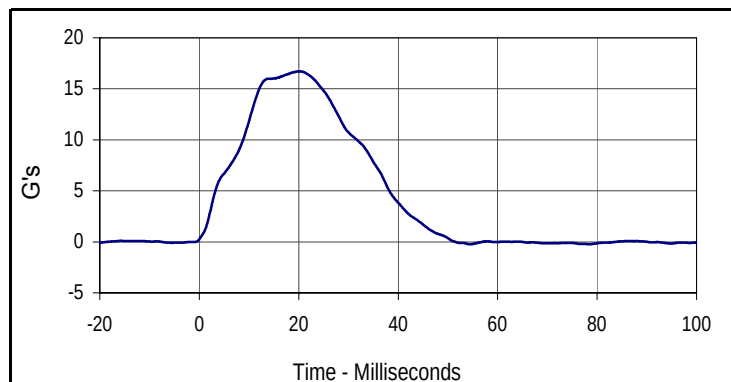
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	524	Pass
Temperature During Soak	Max	18.9 to 25.6	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	22.0	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.1	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.33	Pass
Peak Upper Thorax Rib Deflection	mm	32 to 40	33.6	Pass
Peak Middle Thorax Rib Deflection	mm	39 to 45	40.5	Pass
Peak Lower Thorax Rib Deflection	mm	35 to 43	40.4	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	15.4	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	10.4	Pass
Peak Impactor Acceleration	G's	14 to 18	16.7	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
33.6	22.0	0.0	-4.9
Middle Thorax Deflection			
Max	Time	Min	Time
40.5	22.8	0.0	-5.1
Lower Thorax Deflection			
Max	Time	Min	Time
40.4	22.9	0.0	-1.1



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.4	17.0	-5.5	46.9
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.4	14.0	-3.8	43.6



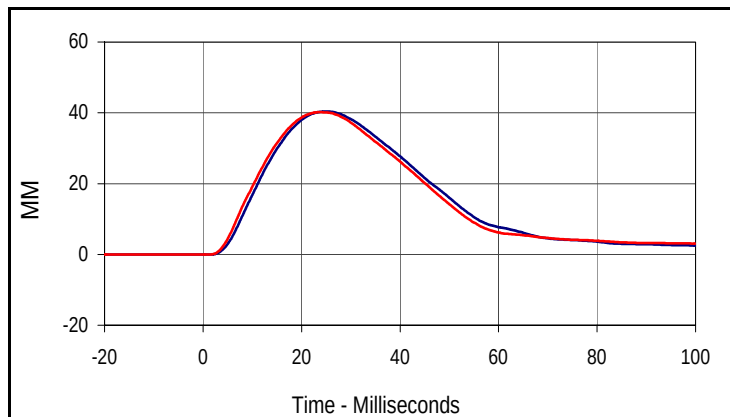
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.7	20.1	-0.2	54.4

Test Program: SID IIs Abdomen Impact Test
 ATD Serial No.: 299

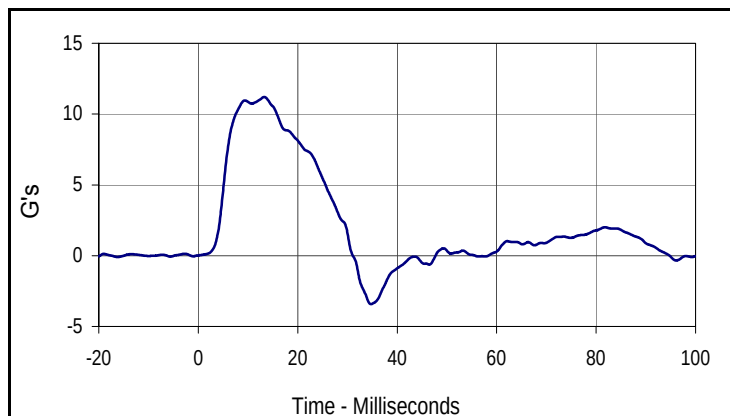
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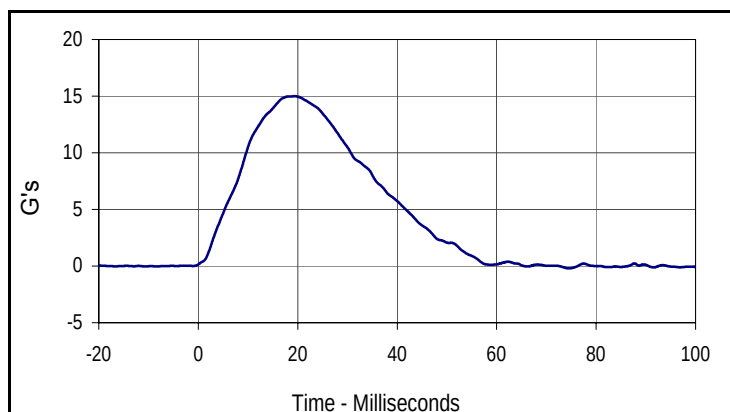
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	569	Pass
Temperature During Soak	Max	20.6 to 22.2	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.9	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.2	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.34	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	40.4	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	40.2	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	11.2	Pass
Peak Impactor Acceleration	G's	12 to 16	15.0	Pass
Overall Test Results			Pass	



Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
40.4	25.2	0.0	-2.5
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
40.2	24.0	0.0	-6.5

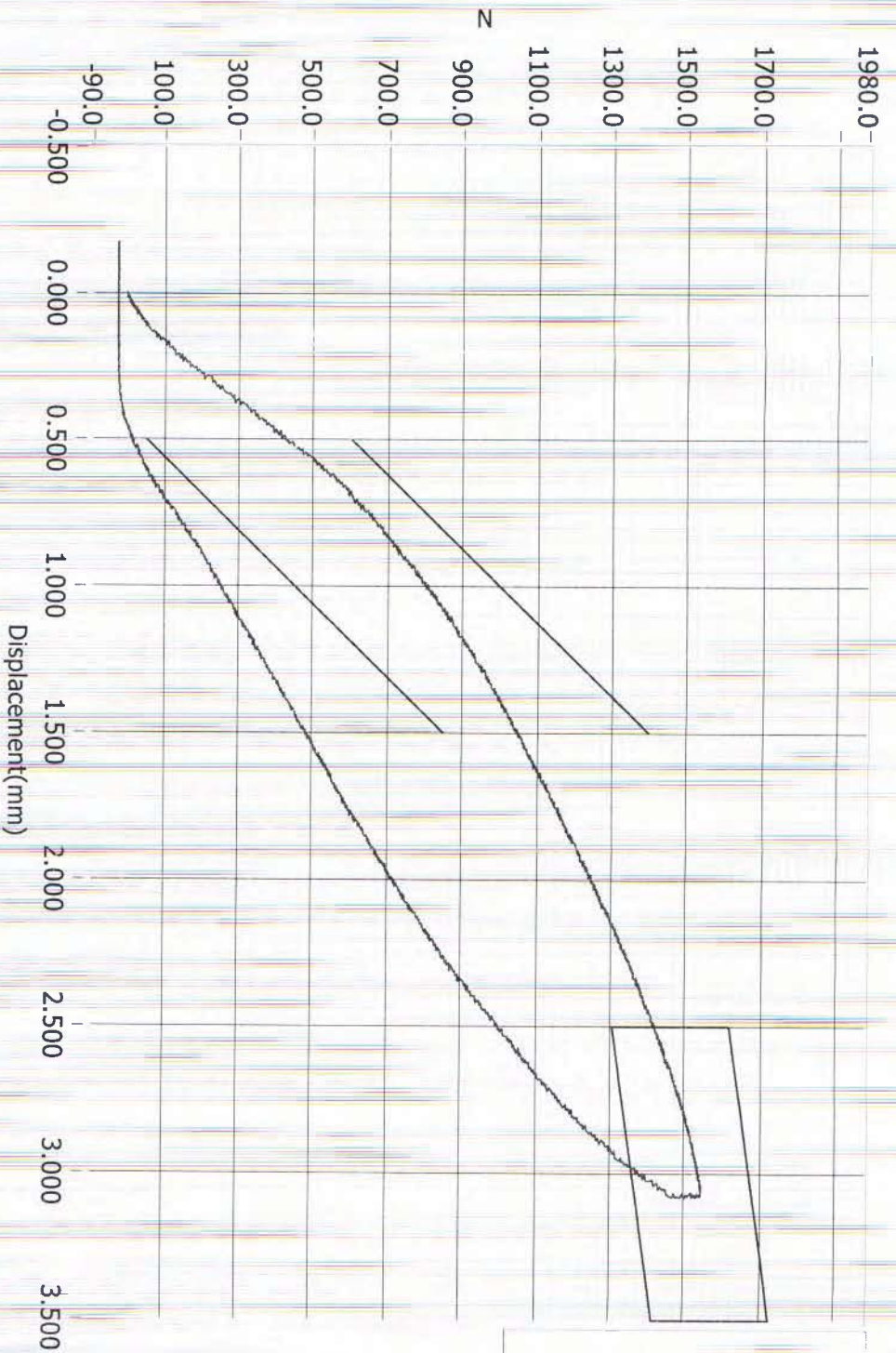


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.2	13.3	-3.4	34.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.0	19.3	-0.2	74.6

Resultant Data - SIDIIs Plug Compression



Loading Curve
 Boundary Limit Upper
 Boundary Limit Lower
 Peak Load Upper
 Peak Load Lower
 Peak Defl Upper
 Peak Defl Lower

1538N

ATD Calibration Lab

M20154105 Post Test

Test ID	Part Serial Number	Test Date	Test Time
70623	70623	12/12/2013	8:09 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/12/2013

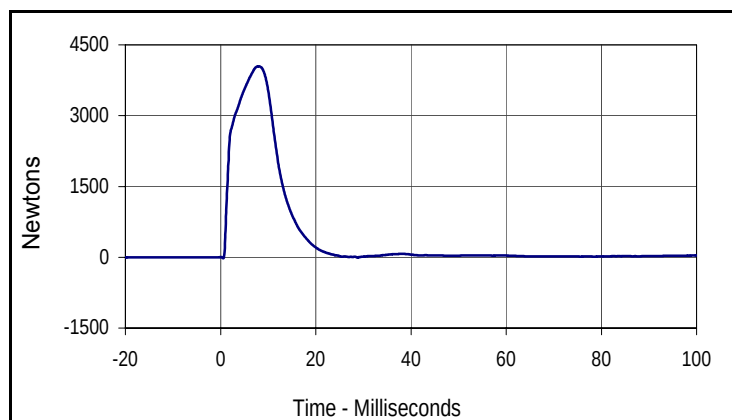
Current Time : 20:09:43

Test Program: SID IIs Pelvis Acetabulum Impact Test
 ATD Serial No.: 299

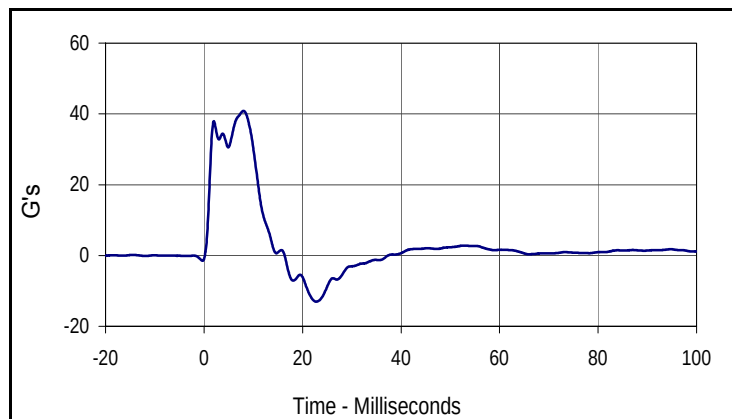
Test Date: 12/10/14
 Test I.D.: 299ACET081



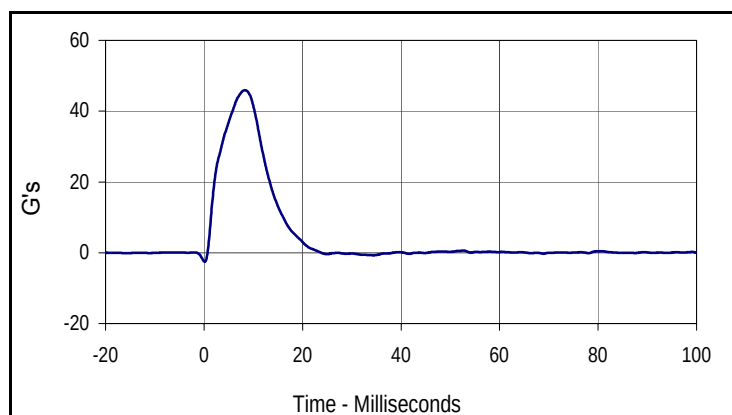
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	614	Pass
Temperature During Soak	Max	20.6 to 22.2	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.9	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.2	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.69	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	4045.9	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	40.9	Pass
Peak Impactor Acceleration	G's	38 to 47	45.9	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4045.9	8.1	-25.3	0.6



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
40.9	8.0	-13.0	22.8



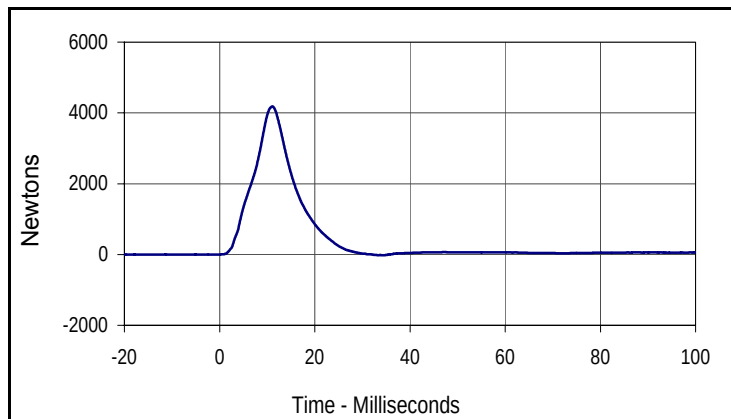
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.9	8.3	-2.6	0.1

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 299

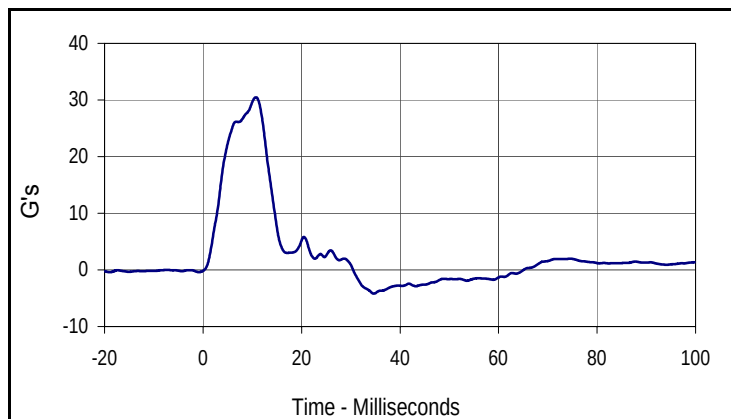
Test Date: 12/10/14
 Test I.D.: 299PL081



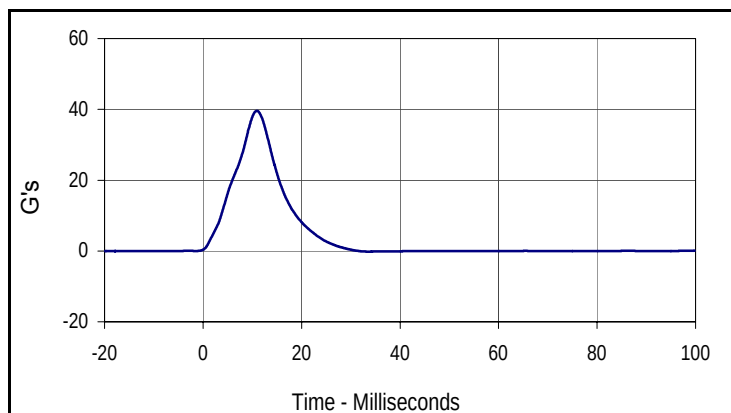
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	659	Pass
Temperature During Soak	Max	20.6 to 22.2	22.1	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.2	Pass
	Min		30.8	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.2	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.33	Pass
Peak Iliac Force	Newtons	4100 to 5100	4185.9	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	30.5	Pass
Peak Impactor Acceleration	G's	36 to 45	39.6	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4185.9	11.1	-22.2	34.3



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
30.5	10.7	-4.2	34.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.6	10.9	-0.2	33.5

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 299		
				Serial Number	Manufacturer	Calibration
Head Accelerometers	Primary		X	P58736	Endevco	10/6/14
			Y	P51929	Endevco	10/6/14
			Z	P51934	Endevco	10/6/14
	Redundant		X	P68604	Endevco	10/6/14
			Y	P51931	Endevco	10/6/14
			Z	P51939	Endevco	10/6/14
Displacement Potentiometers	Thoracic Rib	Upper	Y	1143	FTSS	10/7/14
		Middle	Y	1160	FTSS	10/7/14
		Lower	Y	1213	FTSS	10/7/14
	Abdominal Rib	Upper	Y	1218	FTSS	10/7/14
		Lower	Y	1234	FTSS	10/7/14
Lower Spine Accelerometers (T12)			X	04I20-Z04	Endevco	10/7/14
			Y	06A07-R08	Endevco	10/7/14
			Z	P58795	Endevco	10/7/14
Acetabulum Load Cell			Y	272	Denton	5/1/14
Iliac Wing Load Cell			Y	284	Denton	5/1/14
Pelvis Plug (Struck Side)				70800	FTSS	12/13/13
Pelvis Plug (Non-Struck Side)				70940	FTSS	12/13/13

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A147468	MSI	9/11/14
Vehicle Center of Gravity	Y	A147432	MSI	9/11/14
Vehicle Center of Gravity	Z	A147476	MSI	9/11/14
Left Floor Sill	Y	A147477	MSI	9/11/14
A-Pillar Sill	Y	A147469	MSI	9/11/14
A-Pillar Low	Y	A145471	MSI	8/16/14
A-Pillar Mid	Y	A147450	MSI	9/11/14
B-Pillar Sill	Y	A147475	MSI	9/11/14
B-Pillar Low	Y	A147438	MSI	9/11/14
B-Pillar Mid	Y	A147435	MSI	9/11/14
Driver Seat	Y	A147442	MSI	9/11/14
Engine Top	X	A147478	MSI	9/11/14
Engine Top	Y	A147458	MSI	9/11/14
Firewall	Y	A147459	MSI	9/11/14
Right Roof	Y	A147461	MSI	9/11/14
Right Floor Sill	Y	A147473	MSI	9/11/14
Rear Floorpan	X	A147441	MSI	9/11/14
Rear Floorpan	Y	A147463	MSI	9/11/14

TABLE 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	131822A	Interface	5/20/14
Load Cell 2	132304A	Interface	5/20/14
Load Cell 3	19477	Interface	5/20/14
Load Cell 4	19325	Interface	5/20/14
Load Cell 5	131827A	Interface	5/20/14
Load Cell 6	132302A	Interface	5/21/14
Load Cell 7	19267	Interface	5/21/14
Load Cell 8	19321	Interface	5/21/14