

REPORT NUMBER: SINCAP-KAR-15-026

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

**BAYERISCHE MOTOREN WERKE AG
2015 MINI COOPER HARDTOP 3-DOOR HATCHBACK**

NHTSA No: M20154108

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



JANUARY 28, 2015

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE, SE, ROOM W43-410
WASHINGTON, D.C. 20590**

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: 
Mr. Steven D. Matsusaka, Engineering Dept. Supervisor
KARCO Engineering, LLC.

Reviewed By: 
Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC.

Approved By: 
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC.

Approval Date: January 28, 2015

FINAL REPORT ACCEPTANCE BY OCWS:


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

Date: 


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

Date: 

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SINCAP-KAR-15-026	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108		5. Report Date January 28, 2015
		6. Performing Organization Code KAR
7. Authors Mr. Steven D. Matsusaka, Engineering Department Supervisor, KARCO Mr. Frank Richardson, Program Manager, KARCO		8. Performing Organization Report No. TR-P34003-12-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, January 14 - 28, 2015
		14. Sponsoring Agency Code NVS-111
15. Supplementary Notes		

16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2015 Mini Cooper Hardtop 3-door hatchback in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on January 14, 2015.

The impact velocity of the Moving Deformable Barrier was 61.55 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 19.4° C. The target vehicle's maximum post-test static crush was 137 mm located at level 2. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	305.8
Maximum Thoracic Rib Deflection	mm	44	19
Total Abdominal Force	N	2500	850
Pubic Symphysis Force	N	6000	1617

Measurement Description	Passenger ATD (SID-II's)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	731.3
Resultant Lower Spine Acceleration	g	82	99
Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	5214
Maximum Thoracic Rib Deflection	mm	38*	36
Maximum Abdominal Rib Deflection	mm	45*	32

The door on the struck side of the vehicle did not separate from the body at the hinges or latches. The opposite side door did not open during the side impact event. The passenger ATD's resultant lower spine acceleration exceeded its allowable limit.

* Proposed IARV

17. Key Words New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave., SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX 202-493-2833	
19. Security Classification of this report UNCLASSIFIED	20. Security Classification of this page UNCLASSIFIED	21. No. of Pages 159	22. Price

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information/Data Sheets	4
<u>Data Sheet</u>		<u>Page</u>
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment, and Fuel System Data	9
3	Dummy Longitudinal Clearance Dimensions	13
4	Dummy Lateral Clearance Dimensions	14
5	Camera and Instrumentation Data	15
6	Test Vehicle Accelerometer Locations	16
7	MDB Accelerometer Locations	17
8	Post-Test Observations	18
9	MDB Summary of Results	21
10	Test Vehicle Profile Measurements	22
11	Test Vehicle Exterior Crush Measurements	23
12	MDB Exterior Static Crush Measurements	26
13	Vehicle and MDB Damage Profile Distances	27
14	FMVSS No. 301 Static Rollover Results	28
15	Dummy/Vehicle Temperature and Humidity Stabilization	29
<u>Appendix</u>		<u>Page</u>
A	Photographs	A
B	Vehicle and Dummy Response Data Plots	B
C	Dummy Configuration and Performance Verification Data	C
D	Test Equipment and Instrumentation Calibration Data	D

SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY2015 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 Mini Cooper Hardtop 3-door hatchback. 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 2015 Mini Cooper Hardtop 3-door hatchback was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.55 km/h (38.25 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by KARCO Engineering, LLC. in Adelanto, California, on January 14, 2015. Pre- and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in Appendix A of this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated September 2013. The side impact event was documented by 11 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummy was instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib and lower rib y-axis displacement potentiometers

Abdomen forward, middle, and rear y-axis load cells

Lower spine (12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	305.8
Maximum Thoracic Rib Deflection	mm	44	19
Combined Abdominal Force	N	2500	850
Pubic Symphysis Force	N	6000	1617

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	731.3
Lower Spine (T12) Resultant Acceleration	g	82	99
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	5214
Maximum Thoracic Rib Deflection	mm	38*	36
Maximum Abdominal Rib Deflection	mm	45*	32

*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 door on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. The door on the non-struck side remained closed and latched. The passenger ATD's lower spine resultant acceleration exceeded its allowable limit.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

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 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20154108
Model Year	2015
Make	Mini
Model	Cooper Hardtop
Body Style	3-Door Hatchback
VIN	WMWXM5C55FT973127
Body Color	Moonwalk Gray Metallic
Odometer Reading (km / mi)	126 / 78
Engine Displacement (L)	1.5
Type / No. of Cylinders	Inline 3
Engine Placement	Transverse
Transmission Type	Manual
Transmission Speeds	6
Overdrive	Yes
Final Drive	Front
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks	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	Jul-14
Vehicle Type	Passenger Car

GVWR (kg)	1567
GAWR Front (kg)	871
GAWR Rear (kg)	755

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity	2	2		4
Capacity Weight (VCW) (kg)				305.0
DSC x 68.04 (kg)				272.2
Cargo Weight (RCLW) (kg)				32.8

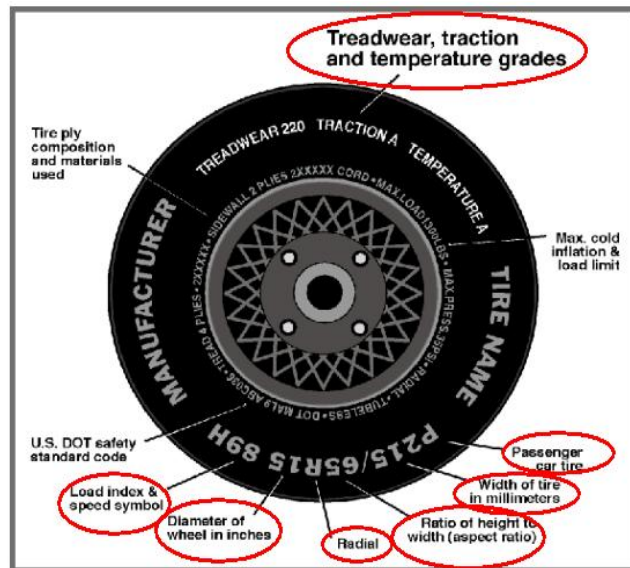
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes					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 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	175/65R15	175/65R15
Tire Size on Vehicle	175/65R15	175/65R15
Tire Manufacturer	Michelin	Michelin
Tire Model	Energy Saver	Energy Saver
Treadware	400	400
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	84H	84H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	FT4E 00FX 2514	FT4E 00FX 2514
DOT Safety Code Right	FT4E 00FX 2514	FT4E 00FX 2514

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	210	210	210	210
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	373.0	233.5		383.5	293.5		405.5	305.5	
Right	kg	358.5	214.5		371.0	283.0		362.0	261.5	
Ratio	%	62.0%	38.0%	100.0%	56.7%	43.3%	100.0%	57.5%	42.5%	100.0%
Total	kg	731.5	448.0	1179.5	754.5	576.5	1331.0	767.5	567.0	1334.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1179.5	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	32.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1337.3	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	Fully Loaded	As Tested	Meets Requirement***
LF	mm	750	757	Yes
RF	mm	750	759	Yes
LR	mm	740	737	Yes
RR	mm	747	741	Yes
Vehicle CG (Aft of Front Axle)	mm	1061	1082	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	49	13	

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

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Front Bumper Beam	5.0
Front Bumper Fascia and Horn	5.0
Headlights	5.0
Windshield Wiper Fluid Bottle	1.0
Air Filter Box	2.0
Spare Tire Tools	3.5
Non-Struck Side Rear Window	2.0
Ballast / Equipment Added	62.0

Test Height Adjustable Setting (If Applicable)	
--	--

DATA SHEET NO. 2

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

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rearmost, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	4.7	0.0	2.4
Front Passenger Seat	4.7	0.0	2.4
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat			
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	2.4	483	Max	473	483	493
			Mid	473	483	493
			Min	473	483	493
Front Passenger Seat	2.4	502	Max	492	502	512
			Mid	492	502	512
			Min	492	502	512
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			Max			
			Mid			
			Min			
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 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15

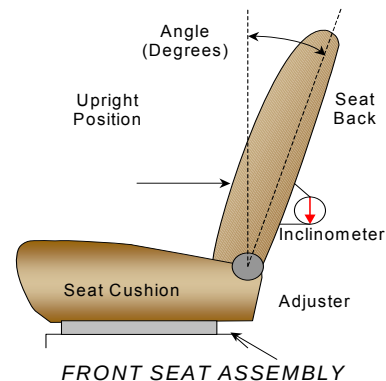
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	250	26	130	13
Front Passenger Seat	250	26	130	13
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat				
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 to the manufacturer's designated design angle. The right front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck side rear seat back. Seat back angle is measured at the seat back.



SEAT BACK POSITION

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	50.7	26	20.0	6
Front Passenger Seat	48.8	26	20.2	6
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat				
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 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

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
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

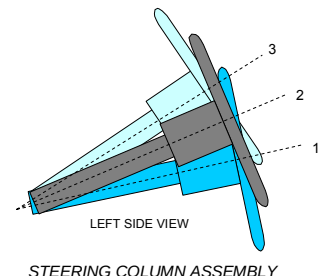
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	4	Full Up
Rear Seat	3	Full Down

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	17.6	204
Geometric Center - Position 2	20.0	235
Uppermost - Position 3	22.5	265
Telescoping Steering Wheel Travel		61
Test Position	20.0	235



DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

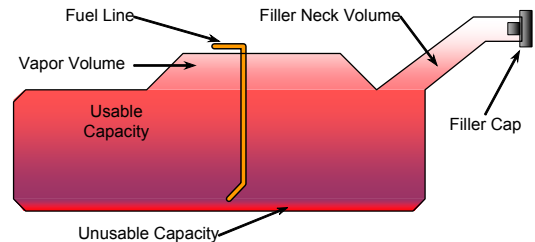
Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15

FUEL PUMP

The vehicle is equipped with an electric fuel pump.

The fuel pump is activated when the ignition is turned on.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	40.12
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	37.31
Actual amount of Solvent Used in Test	37.31
1/3 of Usable Capacity	13.37

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

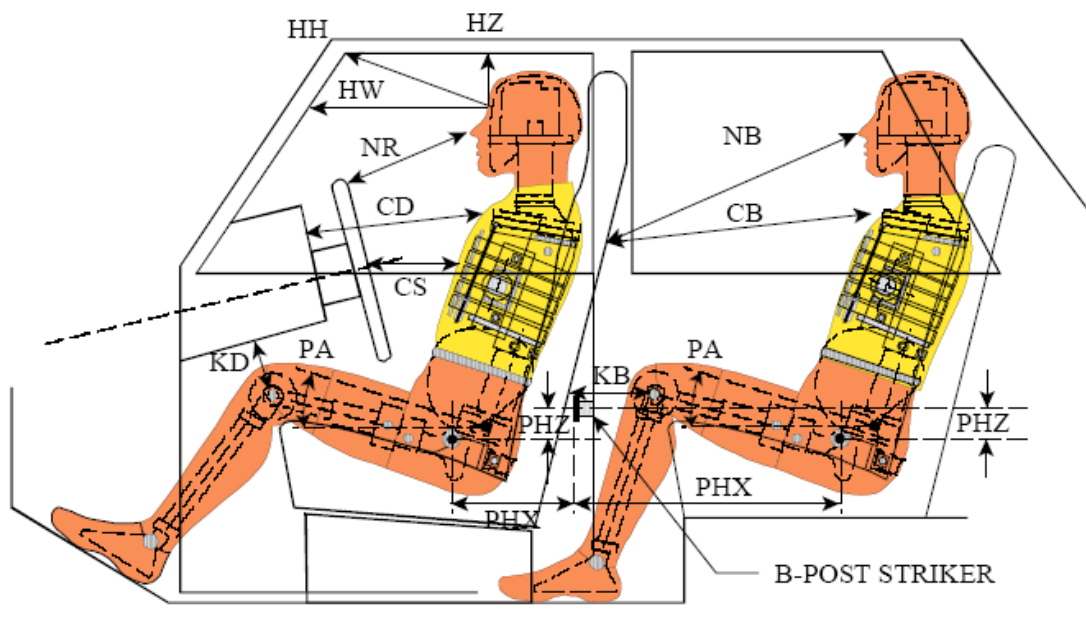
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	638			
HW		Head to Windshield	782			
HZ	HZ	Head to Roof	189		255	
NR	NB	Nose to Rim/Seat Back	465		408	
CD	CB	Chest to Dash/Seat Back	602		392	
CS		Chest to Steering Wheel	320			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	236	29.7	127	20.4
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	178	31.8	118	19.9
PAX°	PAX°	Pelvic Tilt Angle X		19.6		24.0
	PAY°	Pelvic Tilt Angle Y		0.3		0.2
PHX	PHX	Hip Point to Striker (x-axis)	324		428	
PHZ	PHZ	Hip Point to Striker (z-axis)	199		190	

DATA SHEET NO. 4

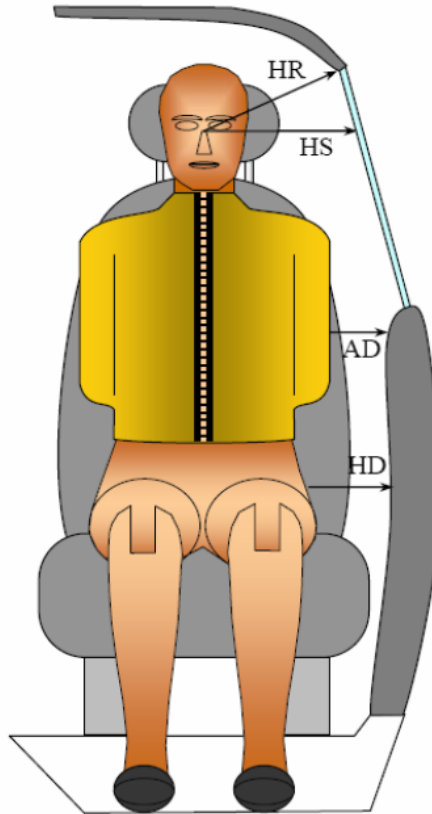
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15



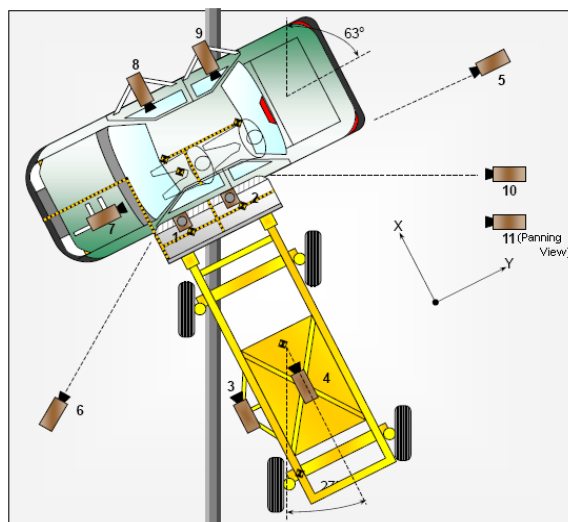
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	188	243
HS	Head to Side Window	mm	308	381
AD	Arm to Door	mm	97	136
HD	H-Point to Door	mm	146	102

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15



CAMERA LOCATIONS AND DATA

No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	1220	2287	-5486	14	1000
2	Overhead Close-Up	609	2287	-5102	35	1000
3	Left Impact Point (MDB)	-2134	0	-1143	25	1000
4	Side Overall (MDB)	-3912	838	-1829	12.5	1000
5	Rear	-64	2485	-1348	85	1000
6	Left Front	-2266	-3564	-1475	24	1000
7	Driver Front (On-Board)	531	-588	-774	24	1000
8	Driver Side (On-Board)	1599	930	-359	12	1000
9	Passenger Side (On-Board)	1608	1835	-357	12	1000
10	Real Time Overall				Zoom	30
11	Real Time Inrun				Zoom	30

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

*All measurements accurate to ± 6 mm

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	17
MDB Accelerometers	5
Total	54

DATA SHEET NO. 6

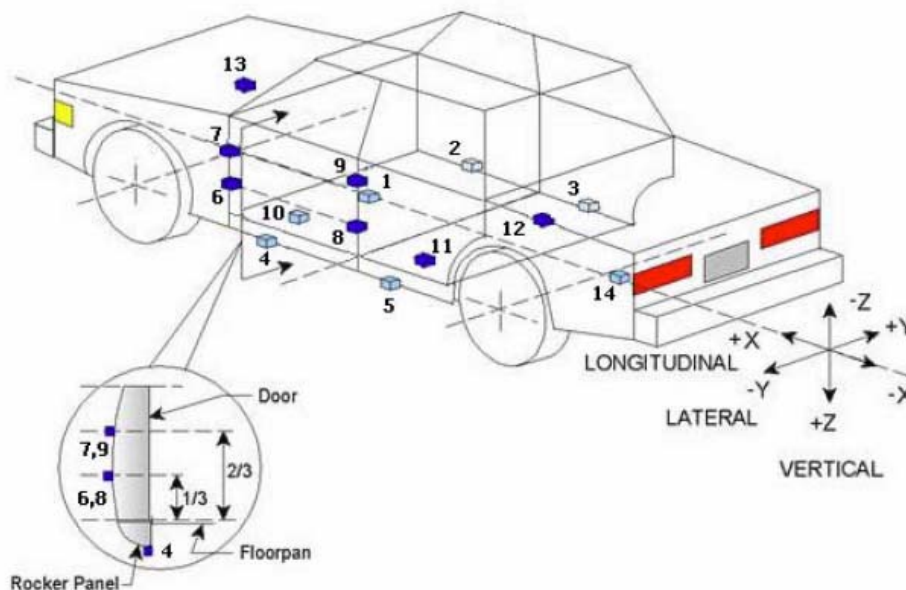
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1470	76	-222
2	Right Sill at Front Seat	2155	650	-331
3	Right Sill at Rear Seat			
4	Left Sill at Front Door	1793	-725	-181
5	Left Sill at Rear Door	1112	-725	-181
6	A-Pillar Lower	2537	-778	-477
7	A-Pillar Middle	2537	-778	-821
8	B-Pillar Lower			
9	B-Pillar Middle			
10	Front Seat Track	1714	-157	-243
11	Rear Seat Structure			
12	Right Rear Occupant Compartment	1549	342	-185
13	Engine Block	3351	194	-766
14	Rear Floorpan Above Axle	591	0	-517

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

DATA SHEET NO. 7

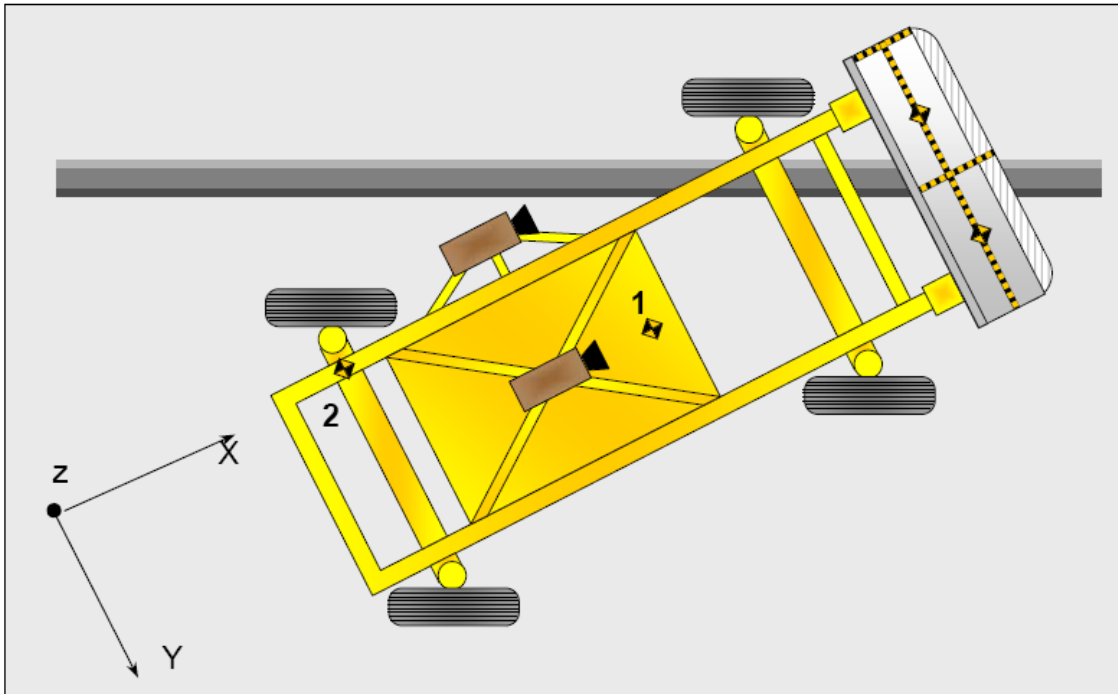
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurement		
		X	Y	Z
1	MDB CG	-1195	0	-430
2	MDB Rear	-2642	-593	-608

Reference: X – Face of MDB (+ forward)
Y – MDB centerline (+ to right)
Z – Ground plane (+ down)

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

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag, Side Header	Curtain Airbag
Top of Head	Side Header	Curtain Airbag, Side Header, Right Side Headrest and Seat Back
Left Side of Head	Curtain Airbag, Side Header	Curtain Airbag, Side Header
Back of Head	Side Header, Headrest	Curtain Airbag, Headrest, Right Side Seat Back
Left Shoulder	Curtain Airbag, Door Panel	Seat, Door Panel
Upper Torso	Seat, Torso Airbag	None
Lower Torso	Seat, Torso Airbag	Seat, Door Panel
Left Hip	Torso Airbag, Door Panel	Seat, Door Panel
Left Knee	Door Panel, Right Knee	Door Panel, Right Knee

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/Other
	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

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

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

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
Sill Separation	No separation
Windshield Damage	None
Side Window Damage	Left front window broken
Other Notable Effects	None

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

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

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
Vehicle Wheel Base	mm		2497
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		305
Actual Impact Point (Aft of Front Axle)	mm		305
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	12

DATA SHEET NO. 9**MDB SUMMARY OF RESULTS**

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length including Honeycomb Face	4023
Wheel Base of Framework Carriage	2595
CG location aft of Front Axle	1118

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	401.8	298.0	699.8
Right	kg	376.9	291.6	668.5
Ratio	%	56.9%	43.1%	100.0%
Totals	kg	778.7	589.6	1368.3

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.55
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.57
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.2
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	26.6

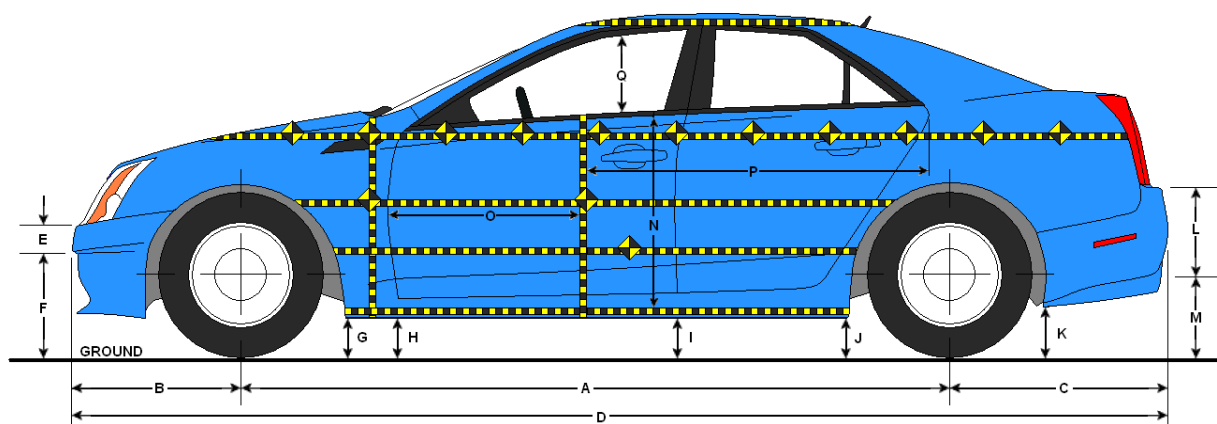
MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	600	Right	254
B	Top of Bumper	533	700	Right	202
C	Mid Level	686	700	Left	182
D	Top of Stack	813	700	Left	185

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2497	2493	-4
B	Front Axle to FSOV	737	741	4
C	Rear Axle to RSOV	568	568	0
D	Total Length at Centerline	3802	3802	0
E	Front Bumper Thickness	78	78	0
F	Front Bumper Bottom to Ground	460	465	5
G	Sill Height at Front Wheel Well	165	174	9
H	Sill Height at Front Door Leading Edge	179	189	10
I	Sill Height at B-Pillar	261	273	12
J1	Sill Height at Rear Wheel Well	188	196	8
J2	Pinch Weld Height at Rear Wheel Well	157	163	6
K	Sill Height Aft of Rear Wheel Well	286	293	7
L	Rear Bumper Thickness	194	196	2
M	Rear Bumper Bottom to Ground	374	377	3
N	Sill Height to Bottom of Front Window Sill	636	631	-5
O	Front Door Leading Edge to Impact CL	616	611	-5
P	Rear Door Trailing Edge to Impact CL	2135	1619	-516
Q	Front Window Opening	373	361	-12
R	Right Side Length	3078	3080	2
S	Left Side Length	3076	3067	-9
T	Vehicle Width at B-Pillar	1692	1642	-50

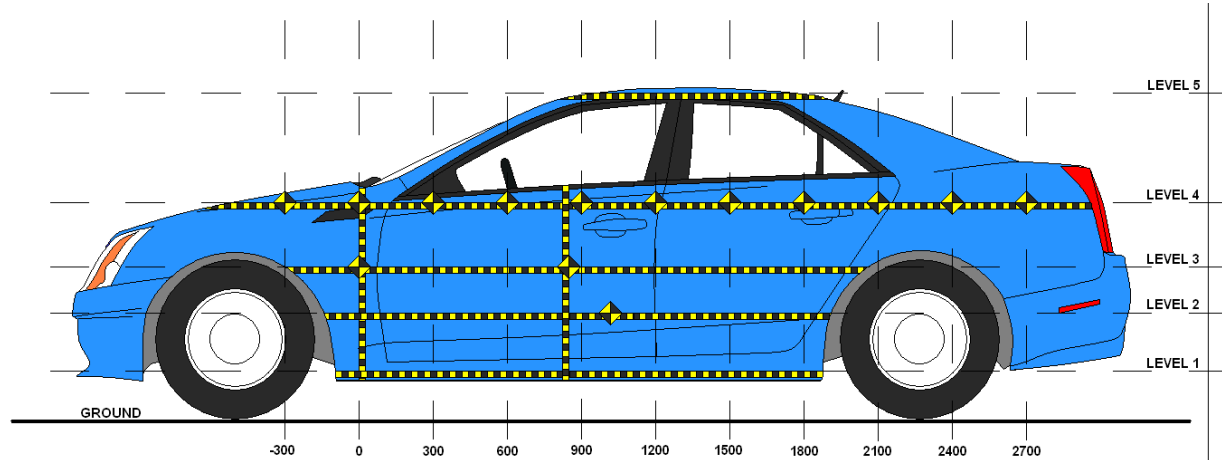
All measurements in mm with tolerance of ± 3 mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	301	114	1050
2	Occupant H-Point	489	137	1050
3	Mid-Door	632	129	1050
4	Window Sill	866	54	1650
5	Window Top	1345	9	900

DATA SHEET NO. 11 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15

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															
-750															
-600															
-450															
-300				770					764					-6	
-150			645	750				647	747				2	-3	
0		655	653	736			667	684	734			12	31	-2	
150	681	662	657	725		715	761	715	738		34	99	58	13	
300	682	668	658	715		741	771	724	734		59	103	66	19	
450	678	668	656	685		761	796	752	708		83	128	96	23	
600	674	667	655	704		766	797	766	728		92	130	111	24	
750	671	666	654	701	953	778	790	782	728	958	107	124	128	27	5
900	669	665	653	696	947	782	796	774	726	956	113	131	121	30	9
1050	668	665	653	695	944	782	802	782	727	951	114	137	129	32	7
1200	666	665	653	693	944	765	792	763	719	949	99	127	110	26	5
1350	667	666	653	693	945	718	759	728	713	950	51	93	75	20	5
1500	670	666	654	694	945	709	719	716	743	949	39	53	62	49	4
1650	672	662	654	696	946	707	739	746	750	953	35	77	92	54	7
1800	669	655	652	699	955	671	679	731	722	959	2	24	79	23	4
1950			647	706	964			664	717	969			17	11	5
2100			645	712	985			649	721	989			4	9	4
2250				725					732					7	
2400															
2550															
2700															
2850															

DATA SHEET NO. 11 ... (CONTINUED)

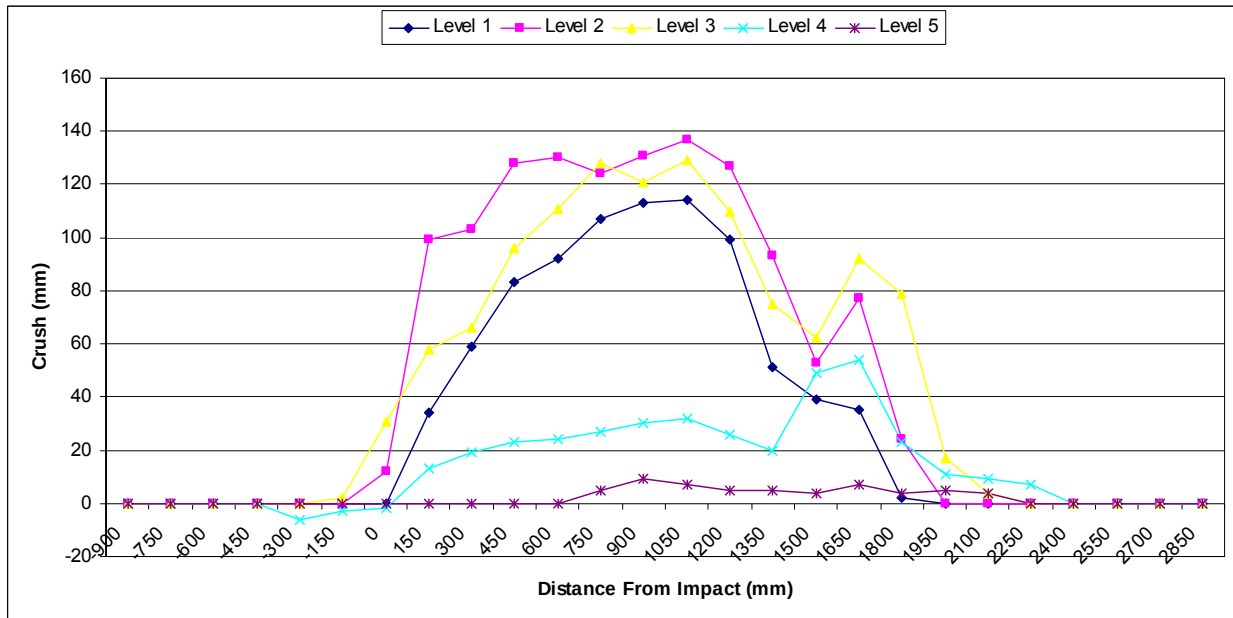
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

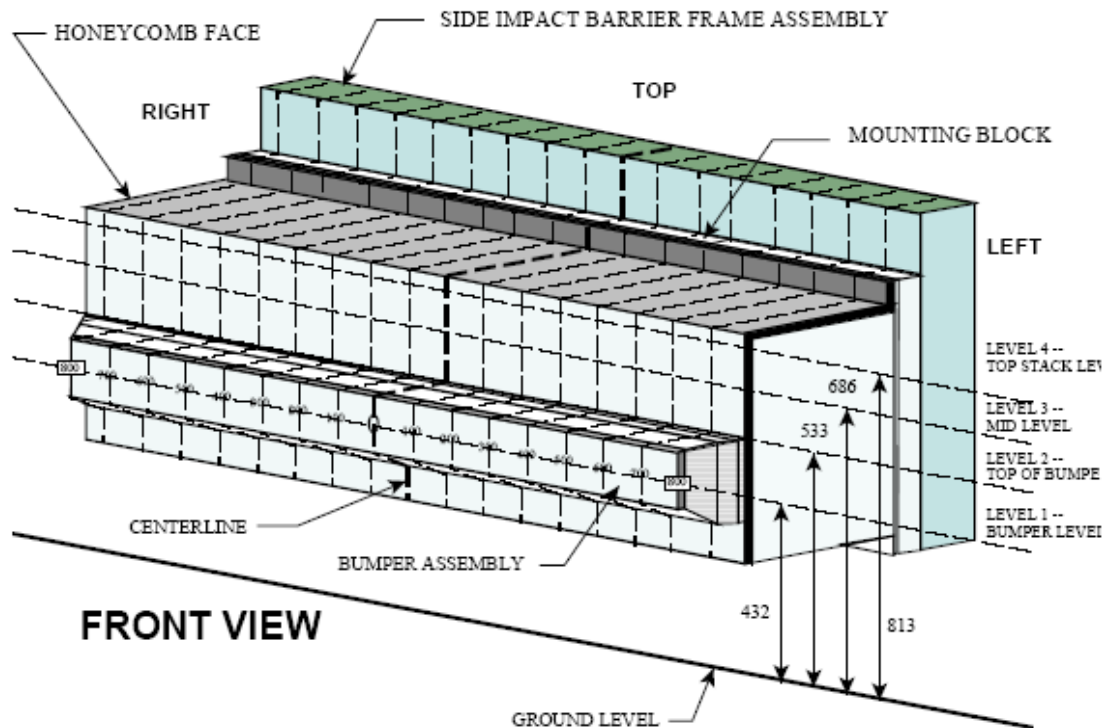
Test Date: 01/14/15



DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

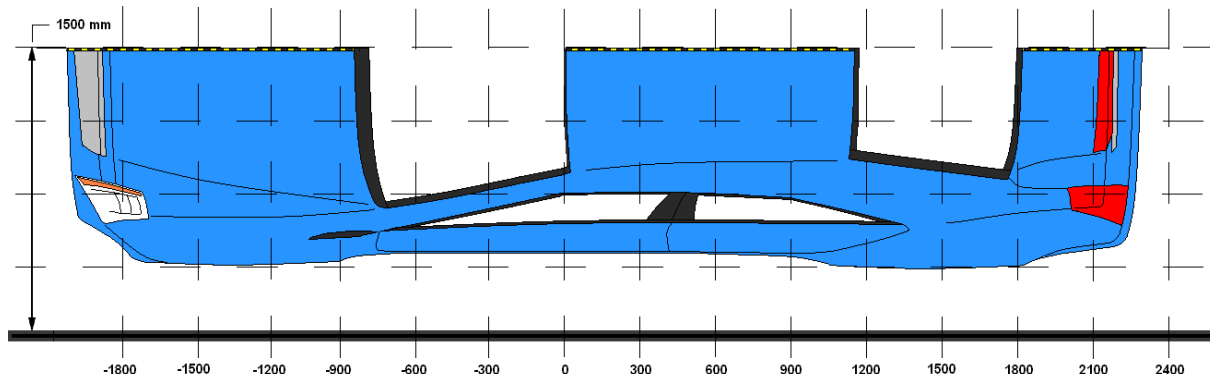
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	249	247	254	254	199	166	149	144	144	151	154	159	167	183	211	219	231
2	196	202	200	176	122	102	98	100	107	117	127	133	142	150	166	184	197
3	107	120	141	134	105	76	60	51	49	52	59	73	93	118	152	182	177
4	107	107	129	136	112	89	47	48	50	62	65	91	112	139	166	185	184

All dimensions in millimeters.

DATA SHEET NO. 13

VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	2250	4	725	732	7
2	1800	3	652	731	79
3	1200	2	665	792	127
4	750	3	654	782	128
5	150	2	662	761	99
6	-300	4	770	764	-6

MDB DAMAGE PROFILE DISTANCES

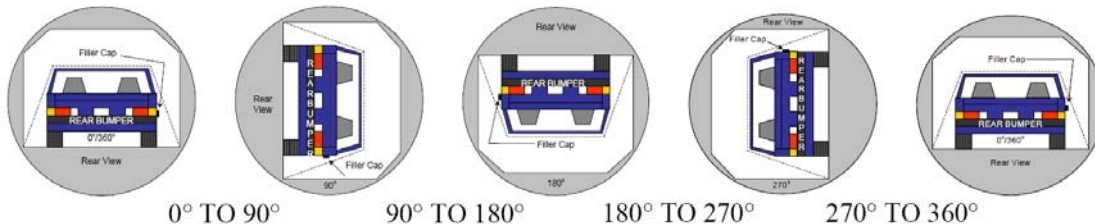
DPD	From MDB Centerline		Level	Crush (mm)
	Distance (mm)	Direction		
1	800	Left	1	231
2	500	Left	1	183
3	200	Left	1	154
4	200	Right	1	149
5	500	Right	1	254
6	800	Right	1	249

DATA SHEET NO. 14

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback NHTSA No. M20154108
 Test Program: NCAP MDB Side Impact Test Test Date: 01/14/15
 Temperature at Time of Impact: 19.4° C Test Time: 11:21 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°	83	300	383
90° To 180°	82	300	382
180° To 270°	79	300	379
270° To 360°	84	300	384

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. 15

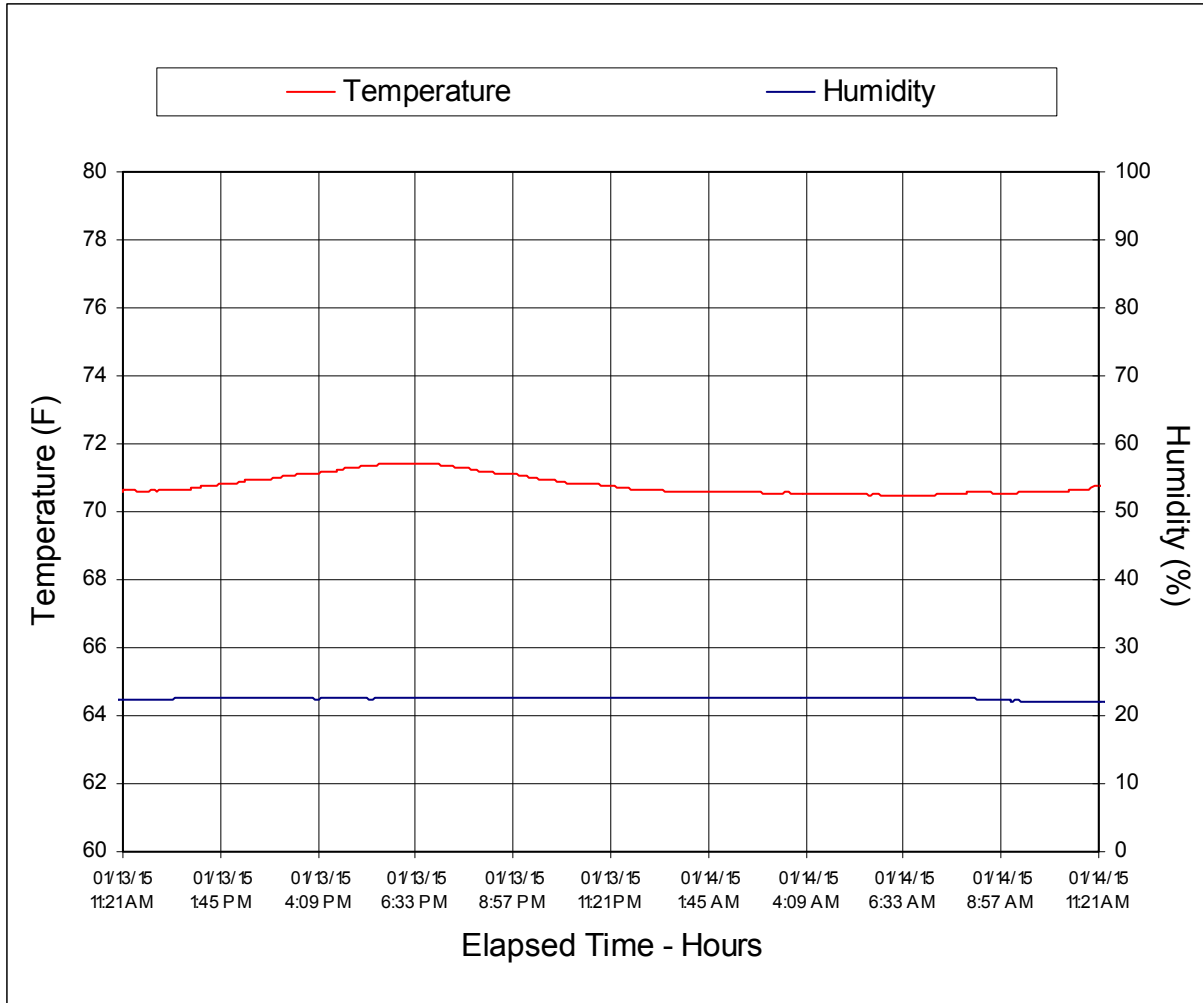
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback

NHTSA No. M20154108

Test Program: NCAP MDB Side Impact Test

Test Date: 01/14/15



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure		Page
1	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-1
2	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-1
3	Pre-Test Frontal View of Test Vehicle	A-2
4	Post-Test Frontal View of Test Vehicle	A-2
5	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
6	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
7	Pre-Test Left Side View of Test Vehicle	A-4
8	Post-Test Left Side View of Test Vehicle	A-4
9	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
10	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
11	Pre-Test Rear View of Test Vehicle	A-6
12	Post-Test Rear View of Test Vehicle	A-6
13	Pre-Test Right Side View of Test Vehicle	A-7
14	Post-Test Right Side View of Test Vehicle	A-7
15	Pre-Test Overhead View of Test Area	A-8
16	Post-Test Overhead View of Test Area	A-8
17	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-9
18	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-9
19	Pre-Test Close-Up View of Impact Point Target	A-10
20	Post-Test Close-Up View of Impact Point Target	A-10
21	Pre-Test Left Front Door Latch Close-Up	A-11
22	Post-Test Left Front Door Latch Close-Up	A-11
23	Pre-Test Left Rear Door Latch Close-Up	A-12
24	Post-Test Left Rear Door Latch Close-Up	A-12
25	Pre-Test Front Close-Up View of Driver Dummy	A-13
26	Post-Test Front Close-Up View of Driver Dummy	A-13
27	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-14
28	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-14
29	Post-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-15
30	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-15
31	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-16
32	Pre-Test Overhead View of Driver Seat Pan Prior to Dummy Positioning	A-16
33	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-17
34	Pre-Test Placement of Driver Dummy's Feet	A-17
35	Pre-Test View of Belt Anchorage for Driver Dummy	A-18

TABLE OF PHOTOGRAPHS ... (CONTINUED)

Figure		Page
36	Pre-Test Left Side View of Steering Wheel	A-18
37	View of Disengaged Parking Brake	A-19
38	Pre-Test View of Parking Brake	A-19
39	Pre-Test Close-Up Left Side View of Driver Seat Track	A-20
40	Pre-Test Close-Up Left Side View of Driver Seat Back	A-20
41	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-21
42	Pre-Test Driver Dummy and Door Clearance View	A-21
43	Post-Test Driver Dummy and Door Clearance View	A-22
44	Pre-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment	A-22
45	Post-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment	A-23
46	Pre-Test Driver Inner Door Panel View	A-23
47	Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations	A-24
48	Post-Test Driver Dummy Close-Up Head Contact with Vehicle Interior View	A-24
49	Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View	A-25
50	Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View	A-25
51	Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View	A-26
52	Post-Test Driver Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-26
53	Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View	A-27
54	Post-Test Driver Dummy Close-Up Knee Contact View	A-27
55	Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking	A-28
56	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-28
57	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
58	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-29
59	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-30
60	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-30
61	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-31
62	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-31
63	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-32
64	Pre-Test Placement of Rear Passenger Dummy's Feet	A-32
65	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-33
66	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-33
67	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-34
68	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-34
69	Pre-Test Rear Passenger Dummy and Door Clearance View	A-35
70	Post-Test Rear Passenger Dummy and Door Clearance View	A-35

TABLE OF PHOTOGRAPHS ... (CONTINUED)

Figure		Page
71	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-36
72	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-36
73	Pre-Test Rear Passenger Inner Door Panel View	A-37
74	Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations	A-37
75	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle Interior View	A-38
76	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View	A-38
77	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-39
78	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	A-39
79	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-40
80	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	A-40
81	Post-Test Rear Passenger Dummy Close-Up Knee Contact View	A-41
82	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-41
83	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
84	Pre-Test Front View of MDB Impactor Face	A-42
85	Post-Test Front View of MDB Impactor Face	A-43
86	Pre-Test Top View of MDB Impactor Face	A-43
87	Post-Test Top View of MDB Impactor Face	A-44
88	Pre-Test Left Side View of MDB Impactor Face	A-44
89	Post-Test Left Side View of MDB Impactor Face	A-45
90	Pre-Test Right Side View of MDB Impactor Face	A-45
91	Post-Test Right Side View of MDB Impactor Face	A-46
92	Close-Up View of Vehicle's Certification Label	A-46
93	Close-Up View of Vehicle's Tire Information Placard or Label	A-47
94	Pre-Test Ballast View	A-47
95	Post-Test Primary and Redundant Speed Trap Read-Out	A-48
96	FMVSS No. 301 Static Rollover 0 Degrees	A-48
97	FMVSS No. 301 Static Rollover 90 Degrees	A-49
98	FMVSS No. 301 Static Rollover 180 Degrees	A-49
99	FMVSS No. 301 Static Rollover 270 Degrees	A-50
100	FMVSS No. 301 Static Rollover 360 Degrees	A-50
101	Impact Event	A-51
102	Monroney Label	A-51
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-52
104	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-52



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

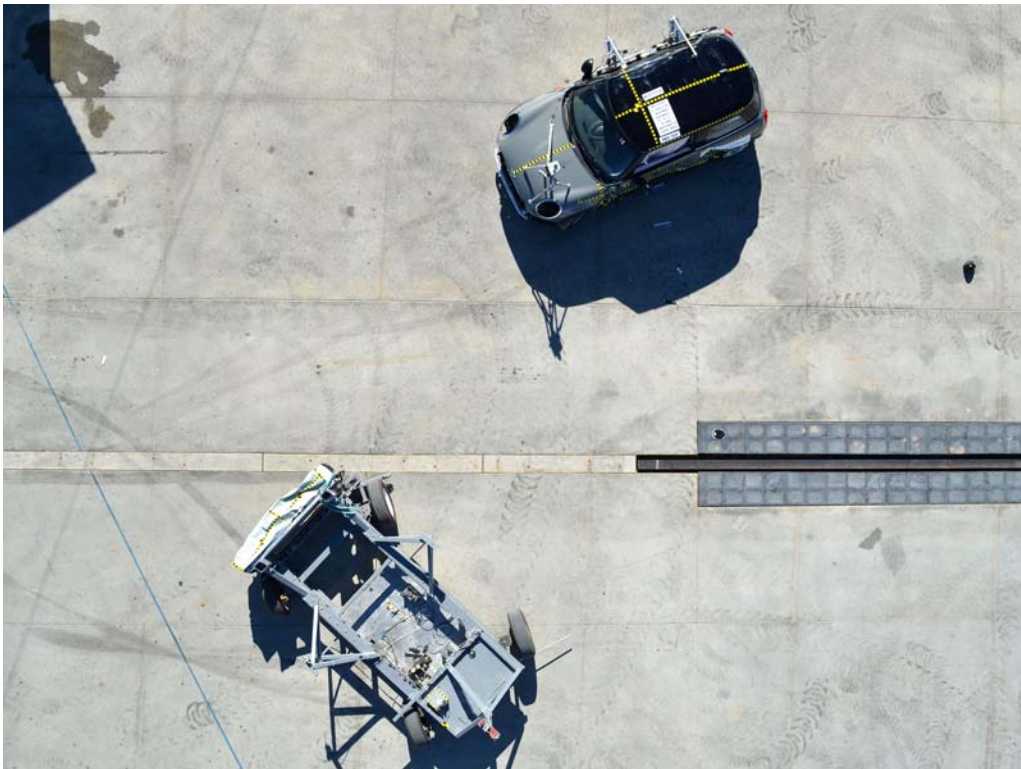


FIGURE 16. Post-Test Overhead View of Test Area



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



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



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



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



FIGURE 21. Pre-Test Left Front Door Latch Close-Up



FIGURE 22. Post-Test Left Front Door Latch Close-Up

Photograph Not Applicable

Vehicle Not Equipped with
Rear Doors

FIGURE 23. Pre-Test Left Rear Door Latch Close-Up

Photograph Not Applicable

Vehicle Not Equipped with
Rear Doors

FIGURE 24. Post-Test Left Rear Door Latch Close-Up



FIGURE 25. Pre-Test Front Close-Up View of Driver Dummy



FIGURE 26. Post-Test Front Close-Up View of Driver Dummy



FIGURE 27. Pre-Test Left Side View of Driver Dummy
Showing Belt and Chalking



FIGURE 28. Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 29. Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 30. Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



FIGURE 31. Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 32. Pre-Test Overhead View of Driver Seat Pan Prior to Dummy Positioning



FIGURE 33. Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



FIGURE 34. Pre-Test Placement of Driver Dummy's Feet

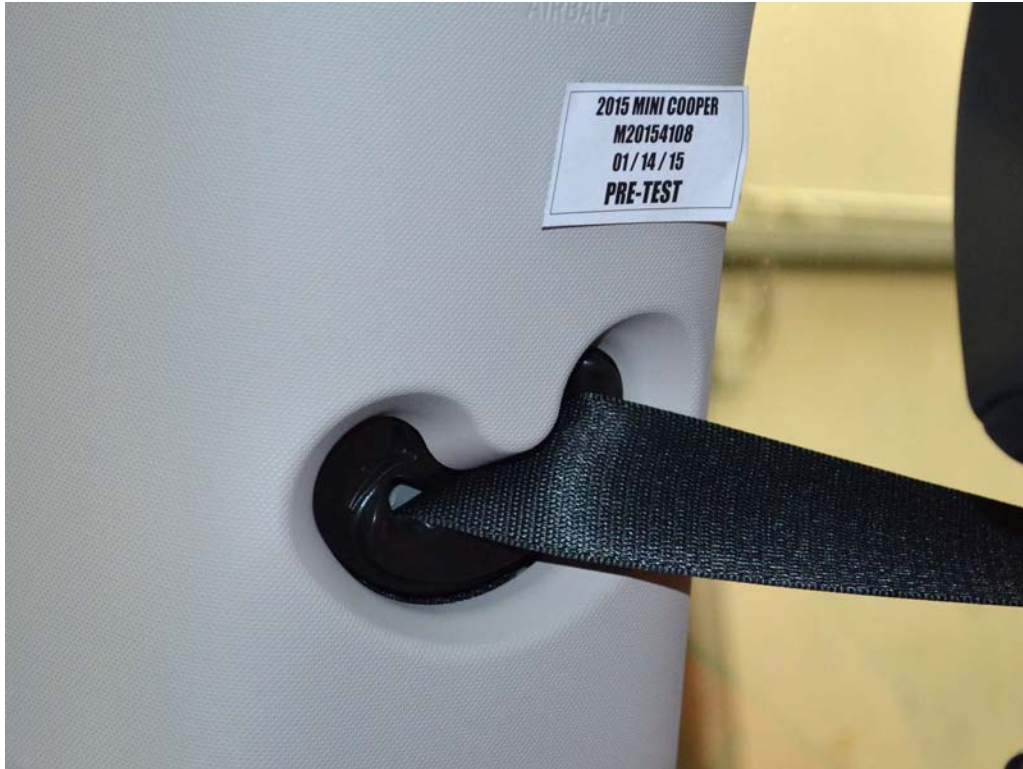


FIGURE 35. Pre-Test View of Belt Anchorage for Driver Dummy



FIGURE 36. Pre-Test Left Side View of Steering Wheel



FIGURE 37. View of Disengaged Parking Brake



FIGURE 38. Pre-Test View of Parking Brake



FIGURE 39. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 40. Pre-Test Close-Up Left Side View of Driver Seat Back



FIGURE 41. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 42. Pre-Test Driver Dummy and Door Clearance View



FIGURE 43. Post-Test Driver Dummy and Door Clearance View



FIGURE 44. Pre-Test Right Side View of Driver Dummy
and Front Seat Occupant Compartment



FIGURE 45. Post-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment



FIGURE 46. Pre-Test Driver Inner Door Panel View



FIGURE 47. Post-Test Driver Inner Door Panel View
Showing Driver Dummy Contact Locations



FIGURE 48. Post-Test Driver Dummy Close-Up Head Contact
with Vehicle Interior View



FIGURE 49. Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



FIGURE 51. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



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



FIGURE 53. Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



FIGURE 54. Post-Test Driver Dummy Close-Up Knee Contact View



FIGURE 55. Pre-Test Left Side View of Rear Passenger Dummy
Showing Belt and Chalking



FIGURE 56. Pre-Test Left Side View of Rear Passenger Dummy
Shoulder and Door Top View



FIGURE 57. Post-Test Left Side View of Rear Passenger Dummy
Shoulder and Door Top View



FIGURE 58. Pre-Test Frontal View of Rear Passenger Seat Back
Prior to Dummy Positioning



FIGURE 59. Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 60. Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



FIGURE 61. Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



FIGURE 62. Pre-Test View of Rear Passenger Dummy's Neck
Showing Position of Adjustable Neck Bracket



FIGURE 63. Pre-Test View of Rear Passenger Dummy's Head
Showing Dummy's Head is Level

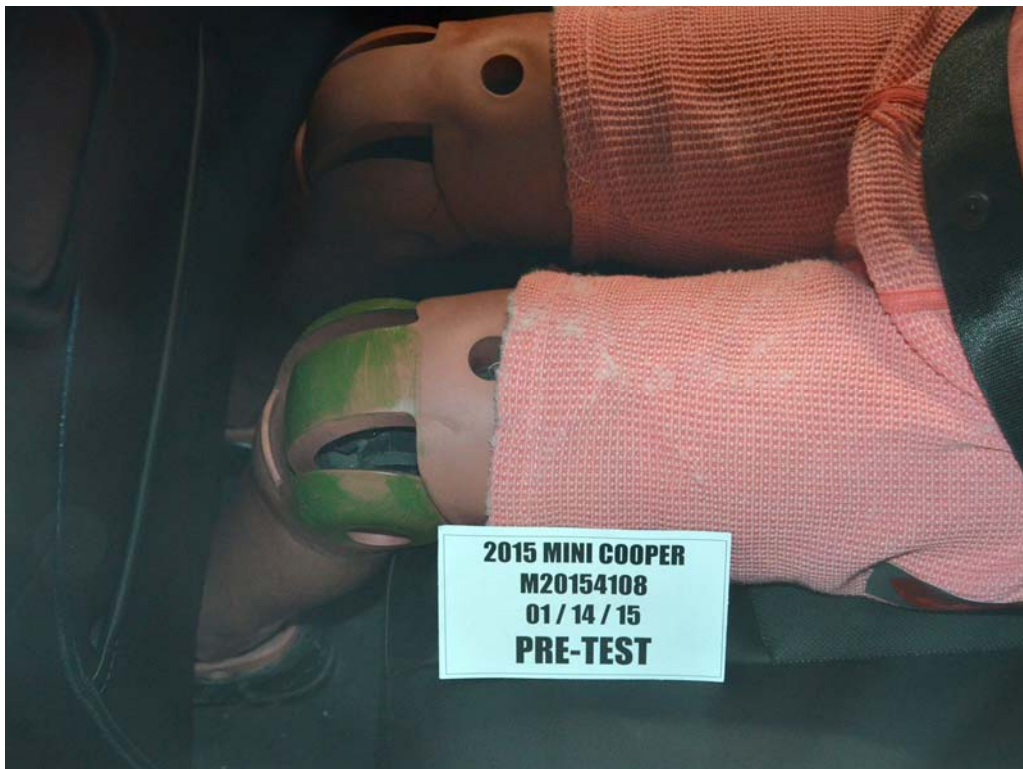


FIGURE 64. Pre-Test Placement of Rear Passenger Dummy's Feet



FIGURE 65. Pre-Test View of Belt Anchorage for Rear Passenger Dummy



FIGURE 66. Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



FIGURE 67. Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



FIGURE 68. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



FIGURE 69. Pre-Test Rear Passenger Dummy and Door Clearance View



FIGURE 70. Post-Test Rear Passenger Dummy and Door Clearance View



FIGURE 71. Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 72. Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 73. Pre-Test Rear Passenger Inner Door Panel View



FIGURE 74. Post-Test Rear Passenger Inner Door Panel View
Showing Rear Passenger Dummy Contact Locations



FIGURE 75. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Vehicle Interior View



FIGURE 76. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Side Airbag View



FIGURE 77. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Vehicle Interior View

Photograph Not Applicable

Vehicle Not Equipped with Rear Passenger Side Airbag

FIGURE 78. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Side Airbag View



FIGURE 79. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Vehicle Interior View

Photograph Not Applicable

Vehicle Not Equipped with Rear Passenger Side Airbag

FIGURE 80. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Side Airbag View



FIGURE 81. Post-Test Rear Passenger Dummy Close-Up Knee Contact View



FIGURE 82. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 83. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 84. Pre-Test Front View of MDB Impactor Face



FIGURE 85. Post-Test Front View of MDB Impactor Face

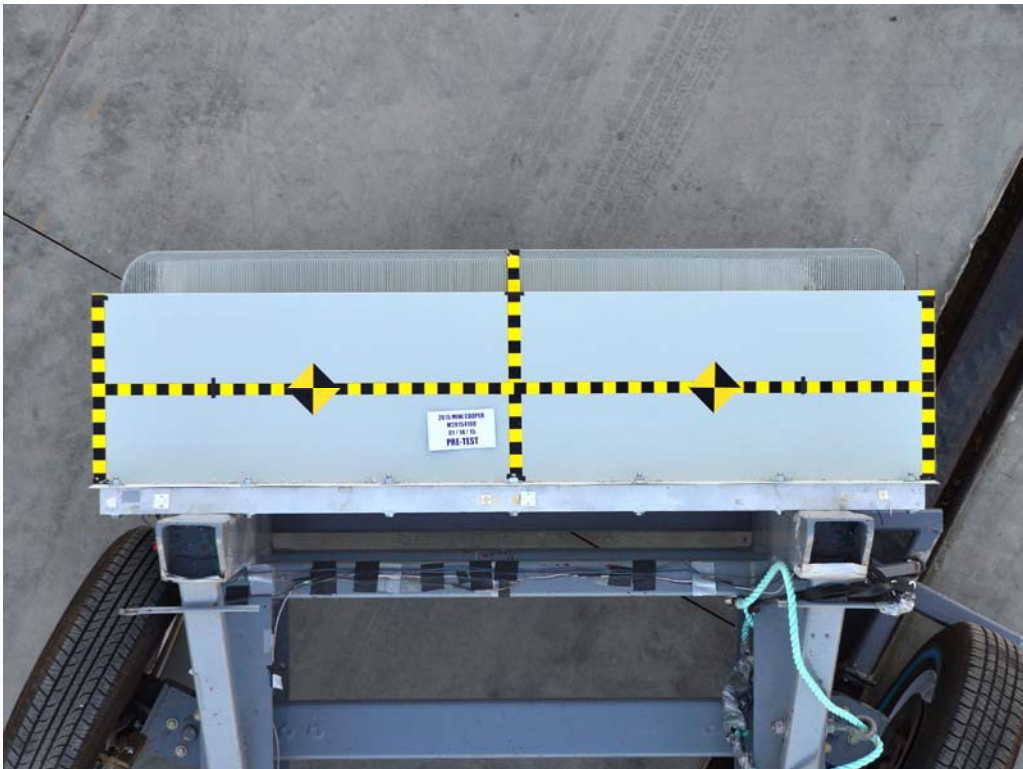


FIGURE 86. Pre-Test Top View of MDB Impactor Face



FIGURE 87. Post-Test Top View of MDB Impactor Face



FIGURE 88. Pre-Test Left Side View of MDB Impactor Face



FIGURE 89. Post-Test Left Side View of MDB Impactor Face



FIGURE 90. Pre-Test Right Side View of MDB Impactor Face



FIGURE 91. Post-Test Right Side View of MDB Impactor Face



FIGURE 92. Close-Up View of Vehicle's Certification Label



FIGURE 93. Close-Up View of Vehicle's Tire Information Placard or Label



FIGURE 94. Pre-Test Ballast View



FIGURE 95. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees



FIGURE 97. FMVSS No. 301 Static Rollover 90 Degrees



FIGURE 98. FMVSS No. 301 Static Rollover 180 Degrees



FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees

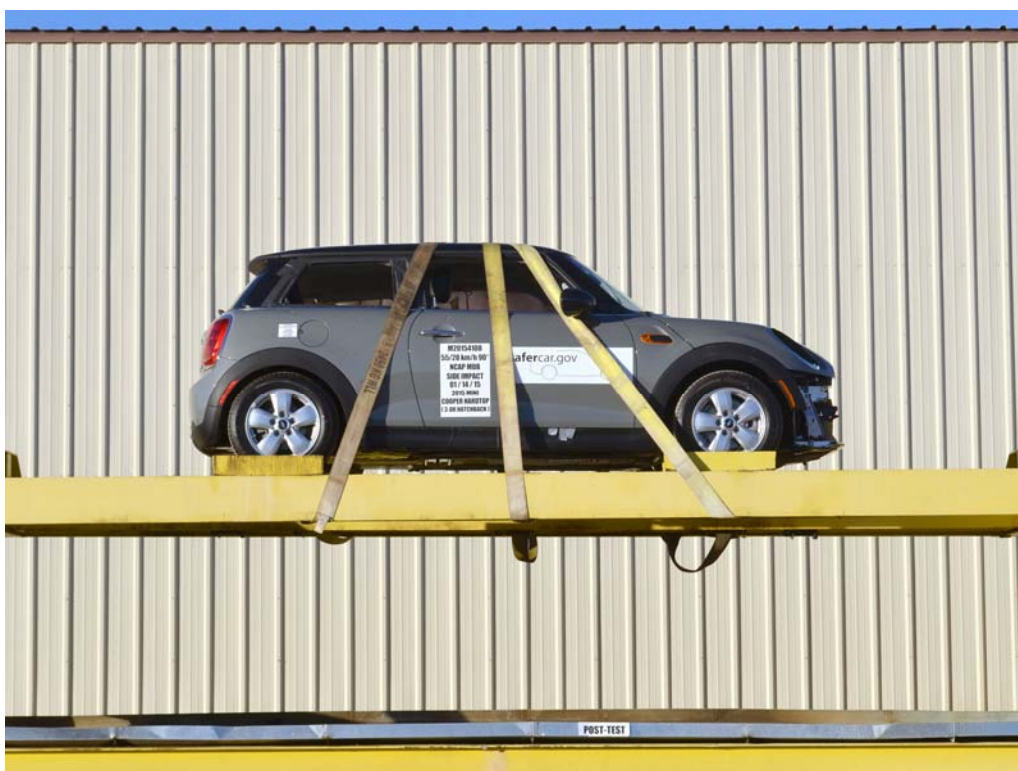


FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 101. Impact Event

LET'S MOTOR.®

2015 MINI Cooper Hardtop 2 door

Manufacturer's Suggested Retail Price \$ 20,700.00

Options and Additional Charges: (Optional equipment not included. See dealer for details.)

- Moontalk, Gray metallic \$ 500.00
- Leatherette Carbon Black \$ 250.00
- Black and mirror caps in black \$ 150.00
- Center armrest \$ 250.00
- MINI Equipment Package \$ 250.00
- MINI Driving Modes \$ 250.00
- Automatic climate control \$ 150.00
- Bluetooth and USB connection \$ 150.00
- Destination Charge \$ 850.00
- Total Suggested Retail Price** \$ 22,900.00

STANDARD FEATURES

Performance and Mileage

- 1.5 liter MINI hardtop Turbo 3-cylinder engine
- 14 hp and 141 km/h
- 6-Speed Getway manual transmission with wet clutching
- Mini Driving Modes: Sport, Mild, Green
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Go-kart handling, braking

- Power-assisted front-wheel-drive rear suspension
- 17" alloy wheels
- 16" alloy wheels
- Electronic Brakeforce Distribution (EBD)
- Anti-lock Braking System (ABS)
- Corner Brake Control (CBC)

Interior comfort

- Automatic dual zone climate control
- Electric power window, weather steering wheel
- Floor mats
- Infotainment display
- Interior LED mood lighting

Interior technology

- Bluetooth and USB connection
- Interactive LED Ring

Standard Features

- Audio system with AM/FM HD Radio, 4 speakers, premium, and auxiliary input
- 8 Airbags including side curtain and knee airbags
- ISOFIX/LATCH Child Seat Installation
- On-the-Road Monitor
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Warranty

- 3 Year/50,000 mile Limited Warranty
- 1 Year/Unlimited Mile Powertrain Warranty
- 3 Year/Unlimited Mile Basic Maintenance Program

PARTS CONTENT INFORMATION

For Vehicles in this Car Line: **5%**

US/Canadian Parts Content: **5%**

Major Source of Foreign Parts Content:

- GERMANY: 35%
- UNITED KINGDOM: 25%

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

Final Assembly Point: **OXFORD, UNITED KINGDOM**

Country of Origin:

- Engine: **GERMANY**
- Transmission: **GERMANY**

STANDARD FEATURES

Performance and Mileage

- 1.5 liter MINI hardtop Turbo 3-cylinder engine
- 14 hp and 141 km/h
- 6-Speed Getway manual transmission with wet clutching
- Mini Driving Modes: Sport, Mild, Green
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Go-kart handling, braking

- Power-assisted front-wheel-drive rear suspension
- 17" alloy wheels
- 16" alloy wheels
- Electronic Brakeforce Distribution (EBD)
- Anti-lock Braking System (ABS)
- Corner Brake Control (CBC)

Interior comfort

- Automatic dual zone climate control
- Electric power window, weather steering wheel
- Floor mats
- Infotainment display
- Interior LED mood lighting

Interior technology

- Bluetooth and USB connection
- Interactive LED Ring

Standard Features

- Audio system with AM/FM HD Radio, 4 speakers, premium, and auxiliary input
- 8 Airbags including side curtain and knee airbags
- ISOFIX/LATCH Child Seat Installation
- On-the-Road Monitor
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Warranty

- 3 Year/50,000 mile Limited Warranty
- 1 Year/Unlimited Mile Powertrain Warranty
- 3 Year/Unlimited Mile Basic Maintenance Program

STANDARD FEATURES

Performance and Mileage

- 1.5 liter MINI hardtop Turbo 3-cylinder engine
- 14 hp and 141 km/h
- 6-Speed Getway manual transmission with wet clutching
- Mini Driving Modes: Sport, Mild, Green
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Go-kart handling, braking

- Power-assisted front-wheel-drive rear suspension
- 17" alloy wheels
- 16" alloy wheels
- Electronic Brakeforce Distribution (EBD)
- Anti-lock Braking System (ABS)
- Corner Brake Control (CBC)

Interior comfort

- Automatic dual zone climate control
- Electric power window, weather steering wheel
- Floor mats
- Infotainment display
- Interior LED mood lighting

Interior technology

- Bluetooth and USB connection
- Interactive LED Ring

Standard Features

- Audio system with AM/FM HD Radio, 4 speakers, premium, and auxiliary input
- 8 Airbags including side curtain and knee airbags
- ISOFIX/LATCH Child Seat Installation
- On-the-Road Monitor
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Warranty

- 3 Year/50,000 mile Limited Warranty
- 1 Year/Unlimited Mile Powertrain Warranty
- 3 Year/Unlimited Mile Basic Maintenance Program

VEHICLE SAFETY RATINGS

Overall Vehicle Score **Not Rated**

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

Crash

Frontal	Driver	Not Rated
Based on the risk of injury in a frontal impact.	Passenger	Not Rated

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

Side

Front seat	Not Rated
Based on the risk of injury in a side impact.	Not Rated

Rollover **Not Rated**

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

STANDARD FEATURES

Performance and Mileage

- 1.5 liter MINI hardtop Turbo 3-cylinder engine
- 14 hp and 141 km/h
- 6-Speed Getway manual transmission with wet clutching
- Mini Driving Modes: Sport, Mild, Green
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Go-kart handling, braking

- Power-assisted front-wheel-drive rear suspension
- 17" alloy wheels
- 16" alloy wheels
- Electronic Brakeforce Distribution (EBD)
- Anti-lock Braking System (ABS)
- Corner Brake Control (CBC)

Interior comfort

- Automatic dual zone climate control
- Electric power window, weather steering wheel
- Floor mats
- Infotainment display
- Interior LED mood lighting

Interior technology

- Bluetooth and USB connection
- Interactive LED Ring

Standard Features

- Audio system with AM/FM HD Radio, 4 speakers, premium, and auxiliary input
- 8 Airbags including side curtain and knee airbags
- ISOFIX/LATCH Child Seat Installation
- On-the-Road Monitor
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Warranty

- 3 Year/50,000 mile Limited Warranty
- 1 Year/Unlimited Mile Powertrain Warranty
- 3 Year/Unlimited Mile Basic Maintenance Program

STANDARD FEATURES

Performance and Mileage

- 1.5 liter MINI hardtop Turbo 3-cylinder engine
- 14 hp and 141 km/h
- 6-Speed Getway manual transmission with wet clutching
- Mini Driving Modes: Sport, Mild, Green
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Go-kart handling, braking

- Power-assisted front-wheel-drive rear suspension
- 17" alloy wheels
- 16" alloy wheels
- Electronic Brakeforce Distribution (EBD)
- Anti-lock Braking System (ABS)
- Corner Brake Control (CBC)

Interior comfort

- Automatic dual zone climate control
- Electric power window, weather steering wheel
- Floor mats
- Infotainment display
- Interior LED mood lighting

Interior technology

- Bluetooth and USB connection
- Interactive LED Ring

Standard Features

- Audio system with AM/FM HD Radio, 4 speakers, premium, and auxiliary input
- 8 Airbags including side curtain and knee airbags
- ISOFIX/LATCH Child Seat Installation
- On-the-Road Monitor
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control
- Dynamic Stability Control (DSC) incl. ESP, DTC
- Dynamic Corner Control

Warranty

- 3 Year/50,000 mile Limited Warranty
- 1 Year/Unlimited Mile Powertrain Warranty
- 3 Year/Unlimited Mile Basic Maintenance Program

VEHICLE SAFETY RATINGS

Overall Vehicle Score **Not Rated**

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

Crash

Frontal	Driver	Not Rated
Based on the risk of injury in a frontal impact.	Passenger	Not Rated

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

Side

Front seat	Not Rated</
------------	-------------

FIGURE 102. Monroney Label

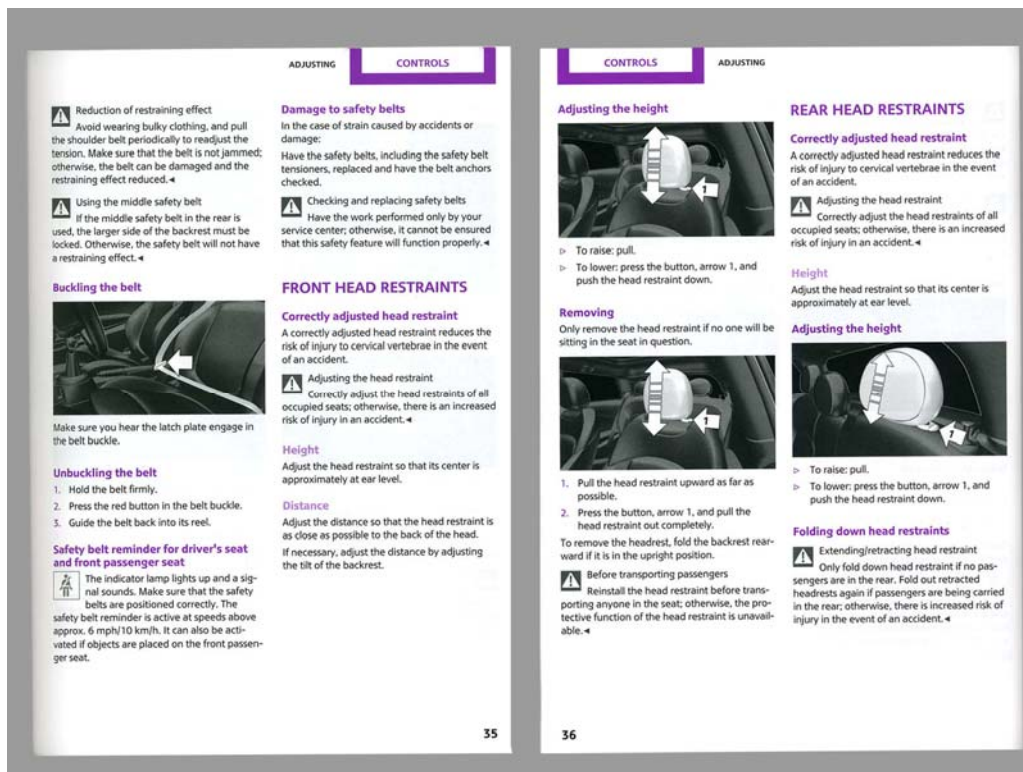


FIGURE 103. Driver Head Restraint Use and Adjustment Information
from Vehicle Owner's Manual

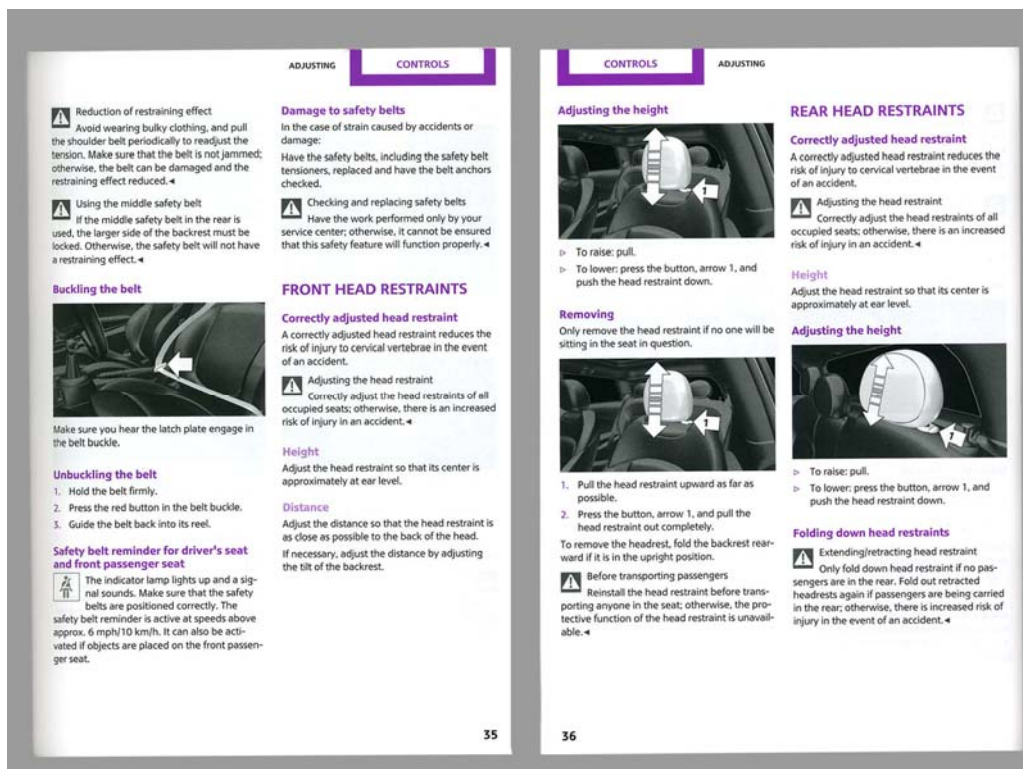


FIGURE 104. Left Rear Passenger Head Restraint Use and Adjustment Information
from Vehicle Owner's Manual

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

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website (www.NHTSA.dot.gov)

Additional Driver & Passenger Dummy Instrumentation Data

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

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

MDB Rear Acceleration (X)

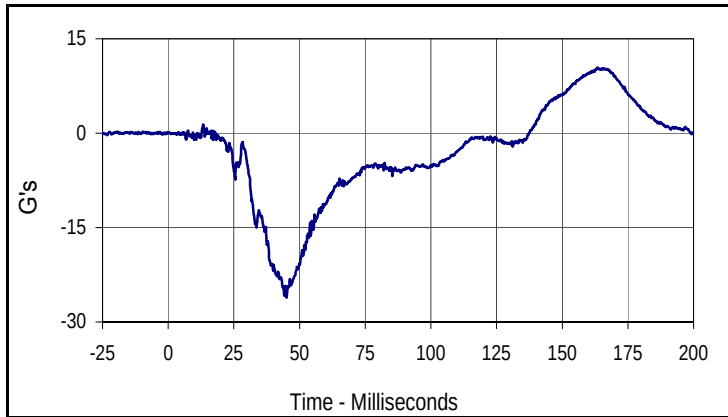
MDB Rear Acceleration (Y)

Left MDB Contact Switch

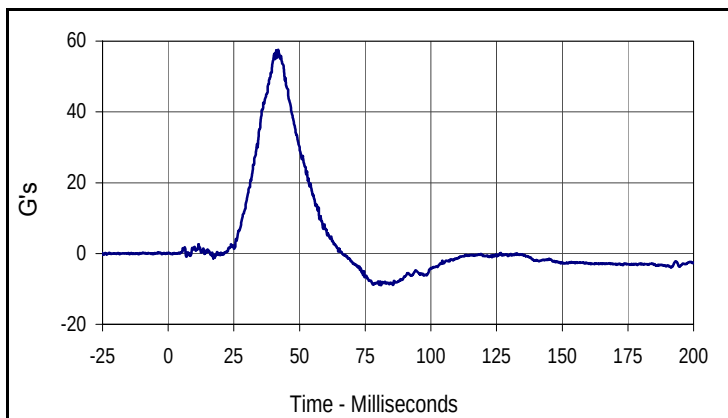
Right MDB Contact Switch

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
 Test Program: NCAP MDB Side Impact Test

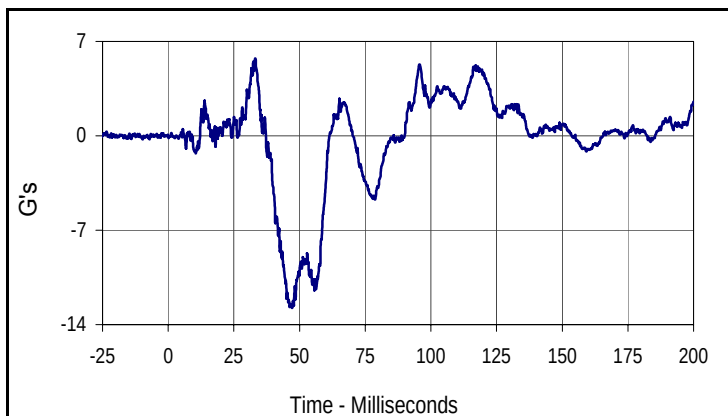
NHTSA No.: M20154108
 Test Date: 1/14/15



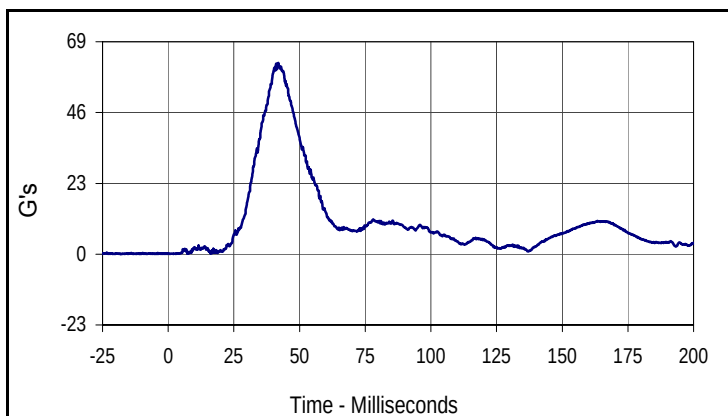
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
10.4	163.3	-26.1	45.1



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
57.6	41.9	-9.0	81.0



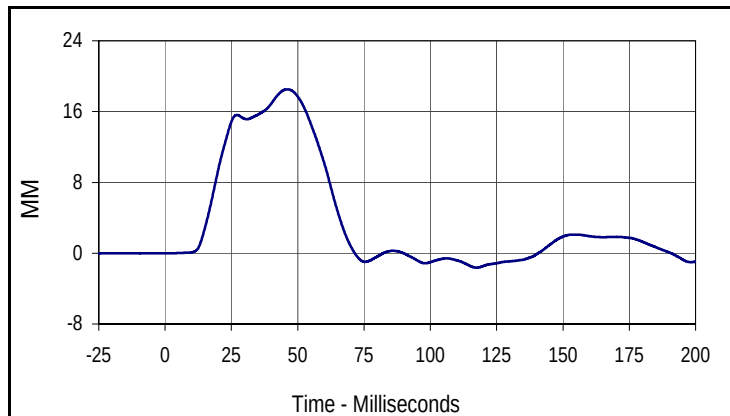
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
5.8	33.1	-12.8	47.1



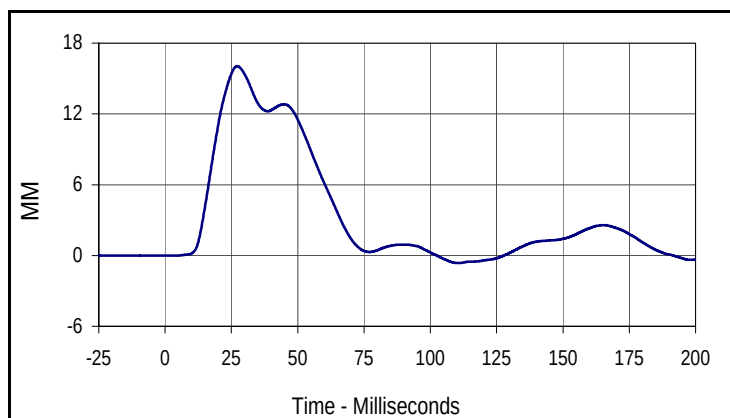
Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
62.1	41.9	0.1	3.0

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
 Test Program: NCAP MDB Side Impact Test

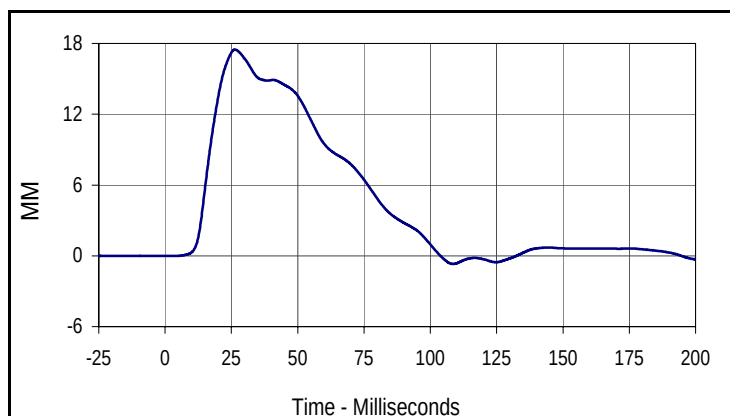
NHTSA No.: M20154108
 Test Date: 1/14/15



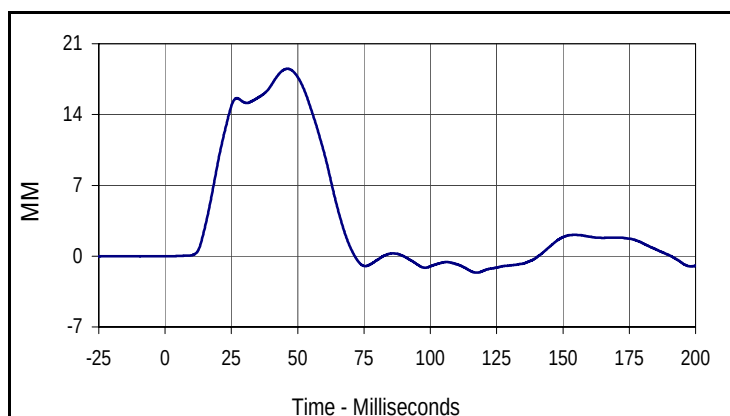
Curve Description			
Driver Upper Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
18.5	46.1	-1.6	117.4



Curve Description			
Driver Middle Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	MM
Max	Time	Min	Time
16.0	27.2	-0.6	110.5



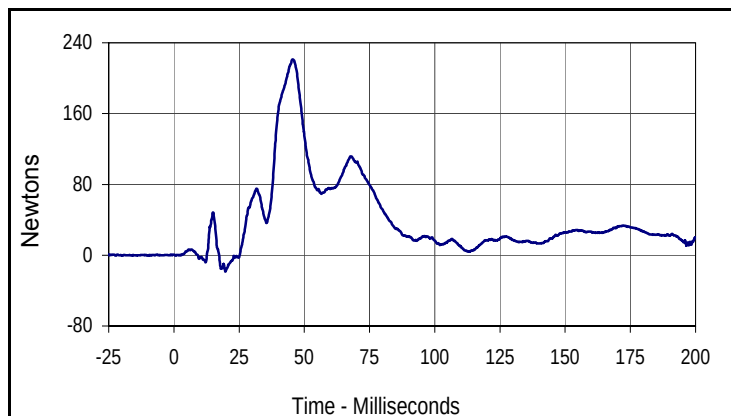
Curve Description			
Driver Lower Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
17.5	26.4	-0.7	108.5



Curve Description			
Driver Thorax Rib Deflection Maximum			
Plot No.	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
18.5	46.1	-1.6	117.4

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
 Test Program: NCAP MDB Side Impact Test

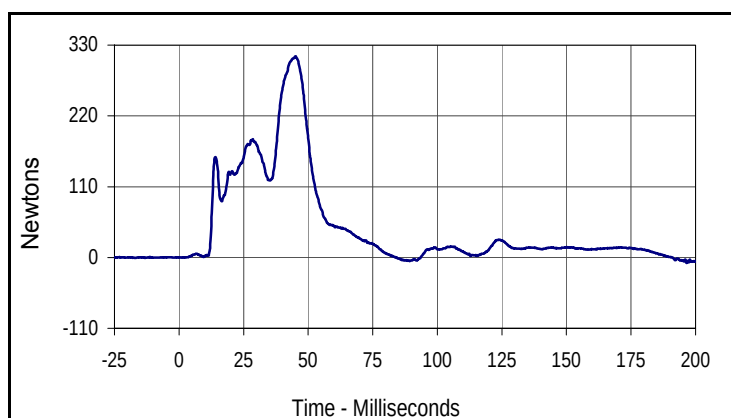
NHTSA No.: M20154108
 Test Date: 1/14/15



Curve Description

Driver Anterior Abdominal Force Y

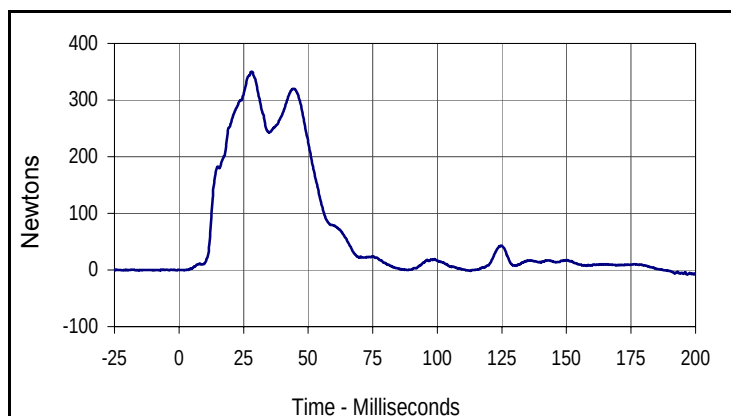
Plot No.	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
221.2	45.5	-18.6	19.7



Curve Description

Driver Middle Abdominal Force Y

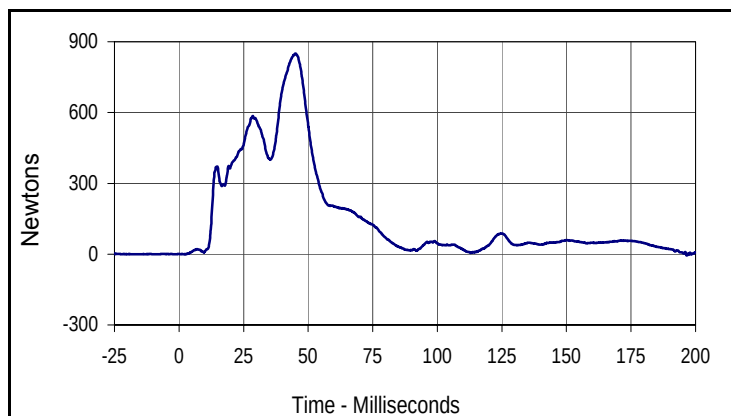
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
312.8	45.1	-8.5	196.5



Curve Description

Driver Posterior Abdominal Force Y

Plot No.	Type	SAE Class	Units
011	FIL	600	Newtons
Max	Time	Min	Time
349.9	27.9	-8.0	196.6



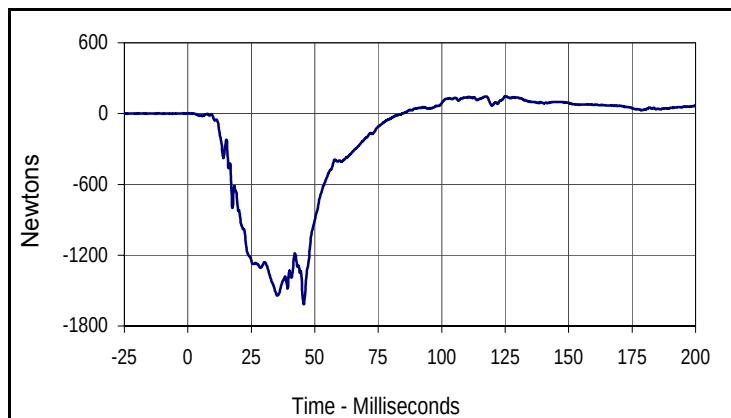
Curve Description

Driver Total Abdominal Force

Plot No.	Type	SAE Class	Units
012	SUM	600	Newtons
Max	Time	Min	Time
849.8	45.2	-5.3	196.5

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
Test Program: NCAP MDB Side Impact Test

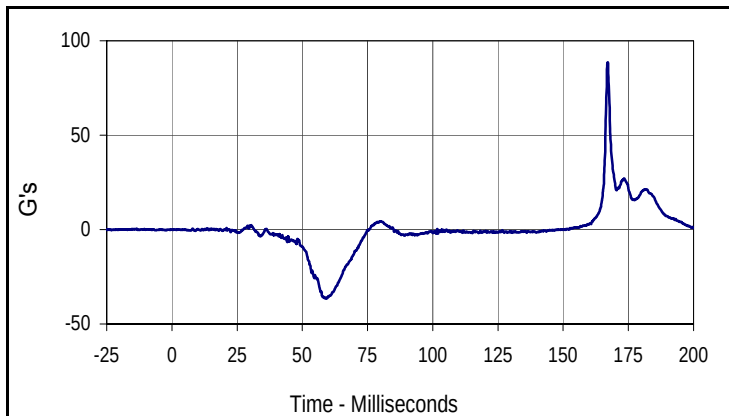
NHTSA No.: M20154108
Test Date: 1/14/15



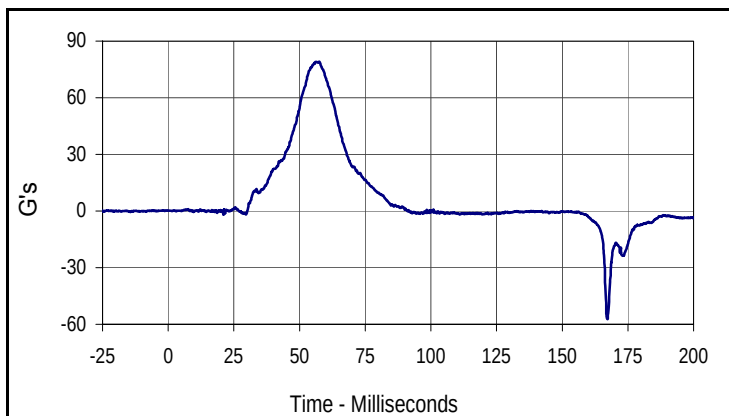
Curve Description			
Driver Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
146.8	125.1	-1616.7	45.6

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
 Test Program: NCAP MDB Side Impact Test

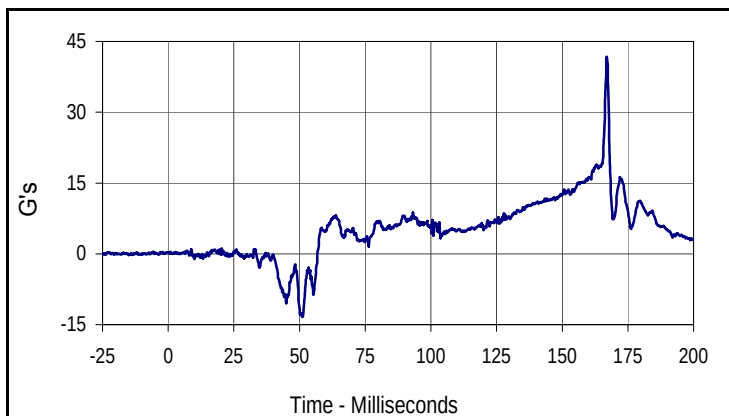
NHTSA No.: M20154108
 Test Date: 1/14/15



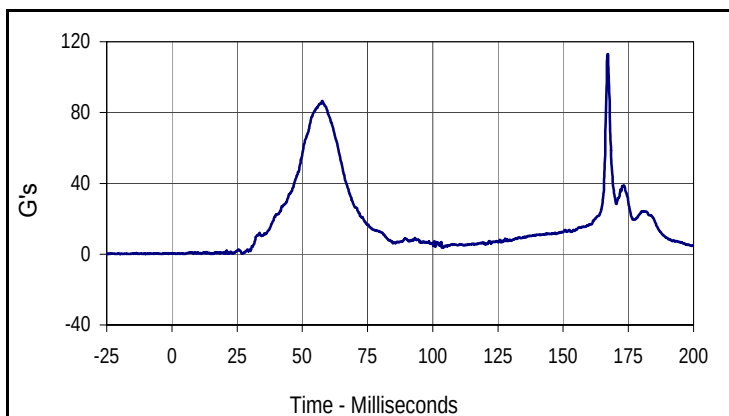
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
88.6	167.1	-36.5	59.0



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
79.1	57.5	-57.2	167.2



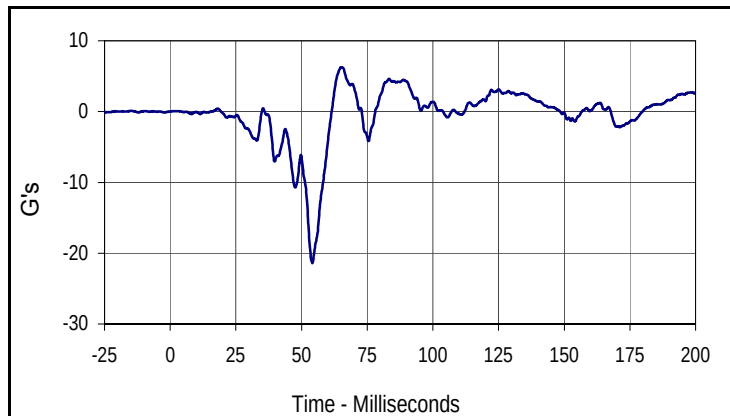
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
41.8	167.0	-13.3	51.0



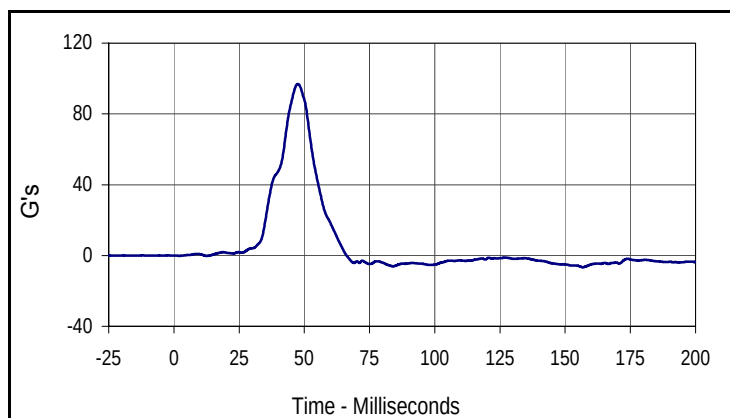
Curve Description			
Passenger Head Acceleration Resultant Primary			
Plot No.	Type	SAE Class	Units
017	RES	1000	G's
Max	Time	Min	Time
113.1	167.1	0.1	1.2

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
 Test Program: NCAP MDB Side Impact Test

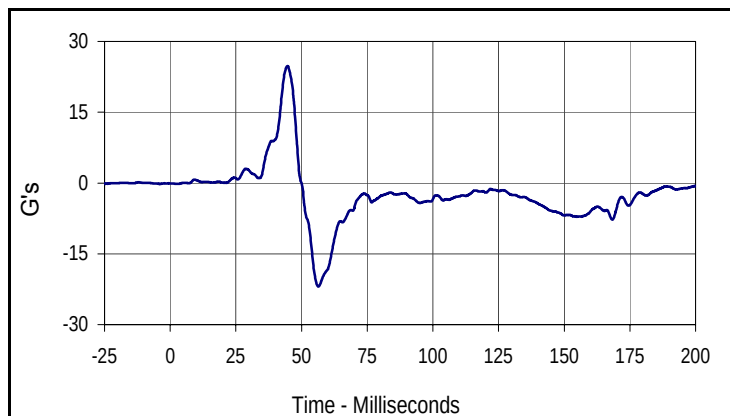
NHTSA No.: M20154108
 Test Date: 1/14/15



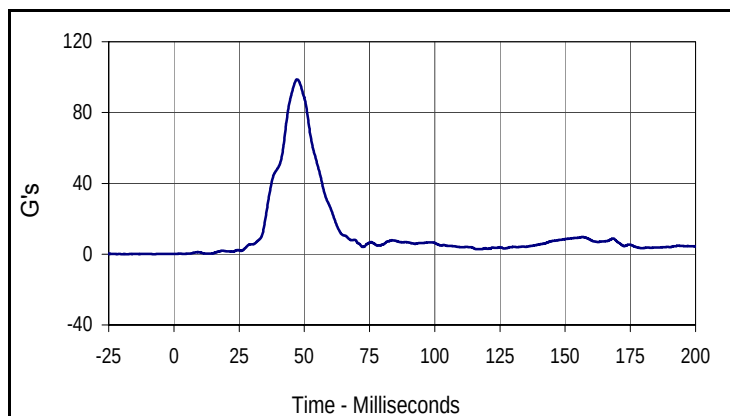
Curve Description			
Passenger Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
6.3	65.2	-21.4	54.1



Curve Description			
Passenger Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
96.9	47.5	-6.7	156.8



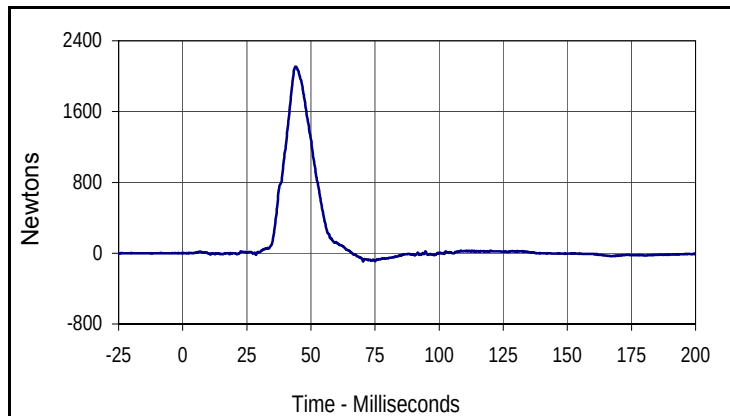
Curve Description			
Passenger Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
24.8	44.6	-21.9	56.4



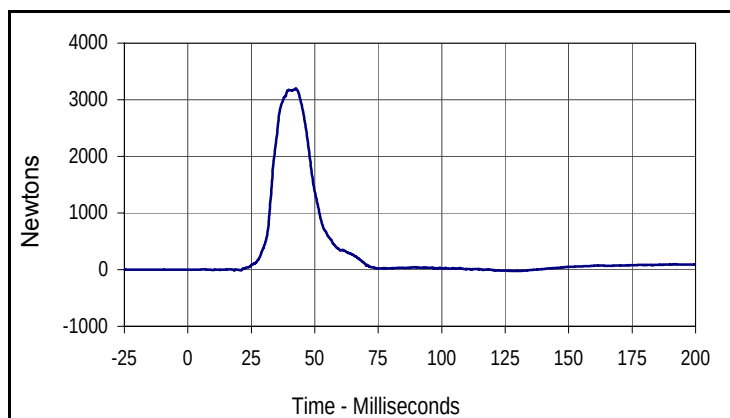
Curve Description			
Passenger Lower Spine T12 Acceleration Resultant			
Plot No.	Type	SAE Class	Units
022	RES	180	G's
Max	Time	Min	Time
98.7	47.3	0.1	4.0

Test Vehicle: 2015 Mini Cooper Hardtop 3-Door Hatchback
 Test Program: NCAP MDB Side Impact Test

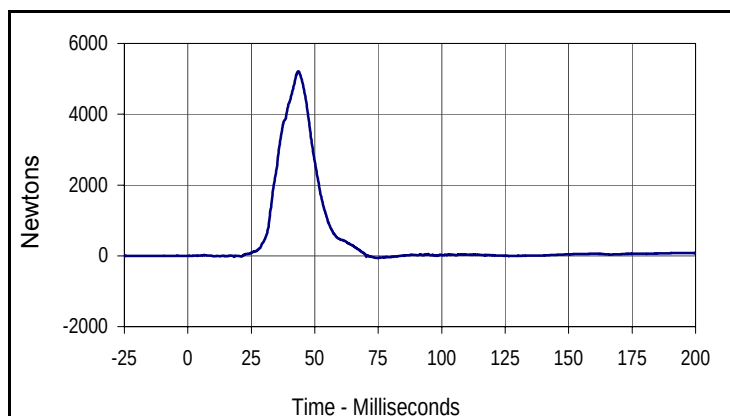
NHTSA No.: M20154108
 Test Date: 1/14/15



Curve Description			
Passenger Iliac Wing Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
2107.3	44.1	-91.7	70.3



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
3204.1	42.5	-23.6	128.4



Curve Description			
Passenger Total Pelvic Force			
Plot No.	Type	SAE Class	Units
018	SUM	600	Newtons
Max	Time	Min	Time
5213.9	43.5	-66.7	74.9

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Test Program: ES2re External Measurements
 ATD Serial No.: F037

Test Date: 1/8/15
 Test I.D.: N/A



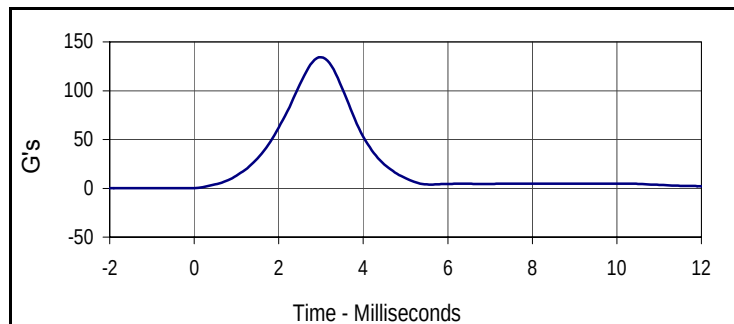
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30.0	Pass
1	Sitting Height	mm	900 - 918	909	Pass
2	Seat to Shoulder Joint	mm	558 - 572	564	Pass
3	Seat to Lower Face of Thoracic Spine Box	mm	346 - 356	350	Pass
4	Seat to Hip Joint (Center of Bolt)	mm	97 - 103	99	Pass
5	Sole to Seat, Sitting	mm	333 - 451	395	Pass
6	Head Width	mm	152 - 158	156	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	326	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	363	Pass
11	Head Depth	mm	196 - 206	201	Pass
12	Thorax Depth	mm	262 - 272	270	Pass
13	Abdomen Width	mm	194 - 204	199	Pass
14	Pelvis Depth	mm	235 - 245	240	Pass
15	Back of Buttocks to Hip Joint (Center of Bolt)	mm	150 - 160	155	Pass
16	Back of Buttocks to Front Knee	mm	597 - 615	608	Pass
Overall Test Results					Pass

Test Program: ES2re Head Drop Test
 ATD Serial No.: F037

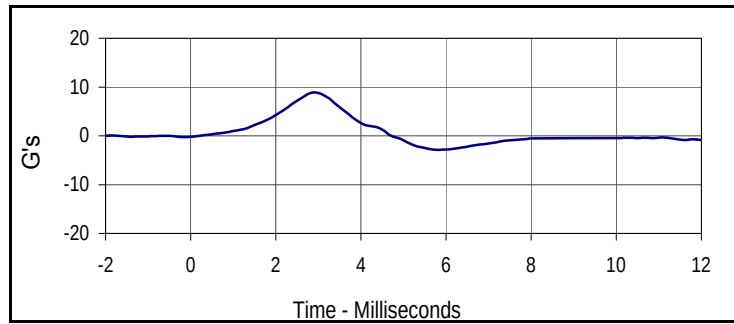
Test Date: 1/8/15
 Test I.D.: F037HD069



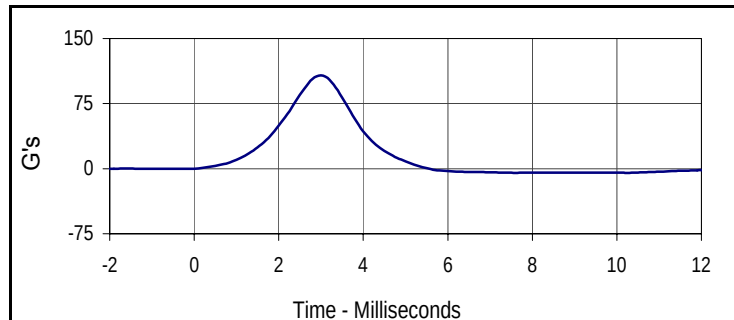
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	362	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	42.4	Pass
Peak Head Resultant Acceleration	G's	125 to 155	134.3	Pass
Peak Head X Acceleration	G's	≤15	8.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	7.8	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
134.3	3.0	0.0	-0.5



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
8.9	2.9	-2.9	5.8



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
107.5	3.0	-4.8	10.2



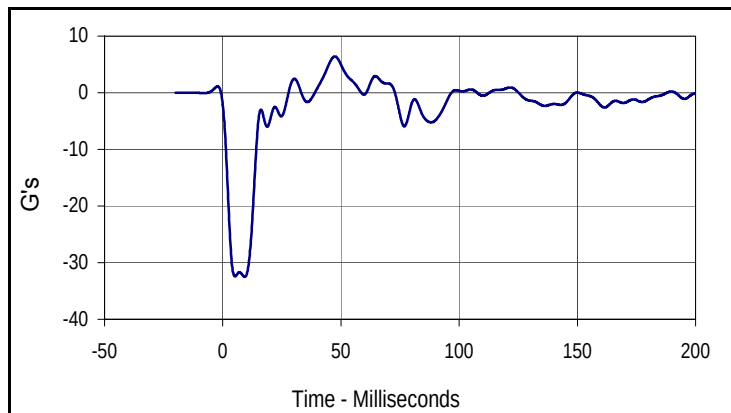
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
79.9	3.0	-0.2	-0.7

Test Program: ES2re Neck Flexion Test
 ATD Serial No.: F037

Test Date: 1/8/15
 Test I.D.: F037NB069



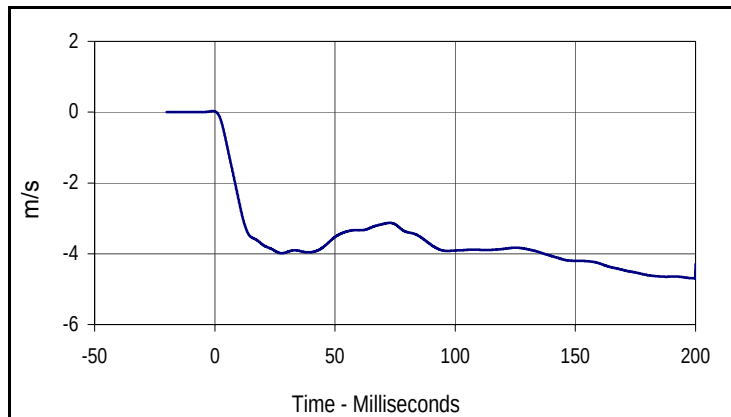
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	397	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	42.7	Pass
Pendulum Velocity	m/s	3.3 to 3.5	3.41	Pass
Headform Flexion	Max	49 to 59	53.5	Pass
	Time	54 to 66	56.4	Pass
Headform Flexion Decay (Peak to Zero)	msec	53 to 88	64.5	Pass
Overall Test Results				Pass



Curve Description

Pendulum Deceleration

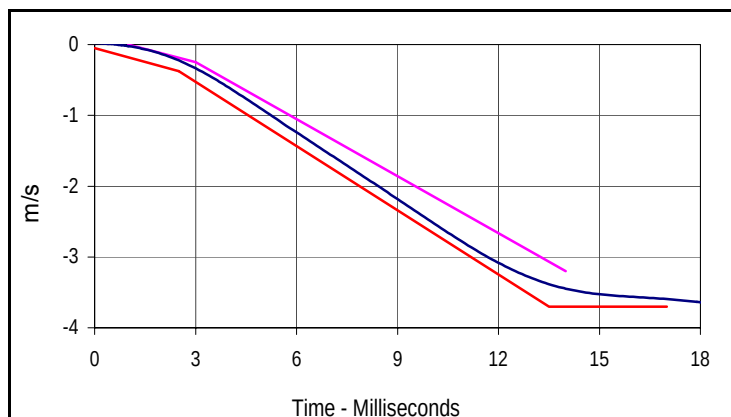
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
6.4	47.4	-32.5	9.3



Curve Description

Pendulum Velocity

Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-0.7	-4.7	199.9



Curve Description

Pendulum Velocity

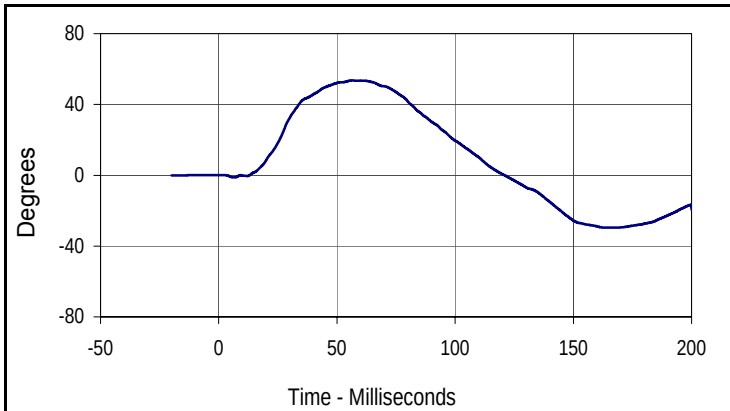
Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-0.7	-4.7	199.9

Velocity Corridors

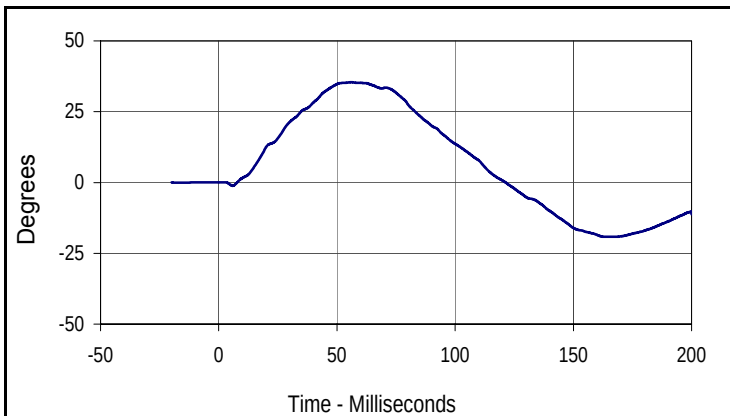
Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.03	2.5	-0.375
14.0	-3.20	13.5	-3.70
		17.0	-3.70

Test Program: ES2re Neck Flexion Test
 ATD Serial No.: F037

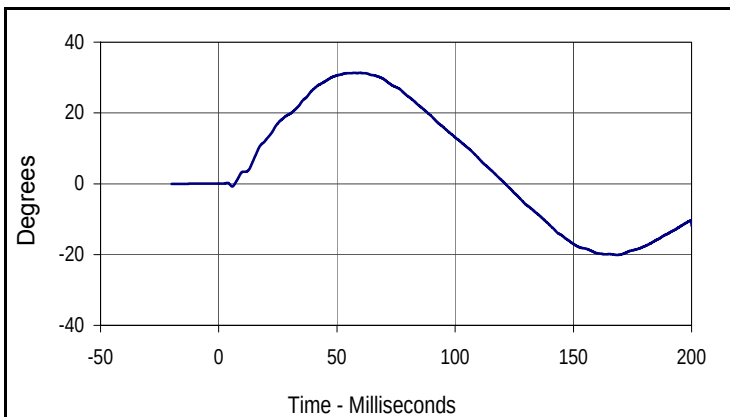
Test Date: 1/8/15
 Test I.D.: F037NB069



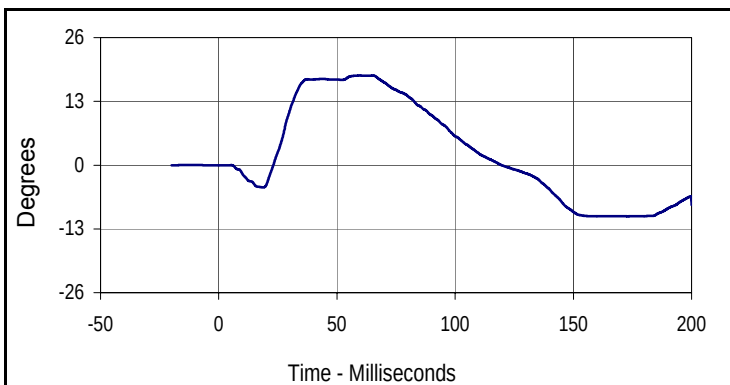
Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
53.5	56.4	-29.6	163.9



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
35.4	56.1	-19.2	164.1



Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
31.3	59.7	-20.1	168.6



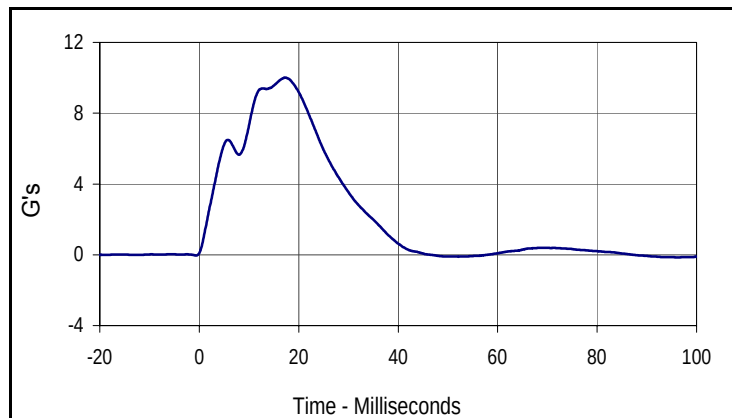
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
006	FIL	180	Degrees
Max	Time	Min	Time
18.3	59.6	-10.4	173.1

Test Program: ES2re Shoulder Impact Test
 ATD Serial No.: F037

Test Date: 1/8/15
 Test I.D.: F037SH069



Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	462	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	42.8	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.32	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	10.0	Pass
Overall Test Results				Pass



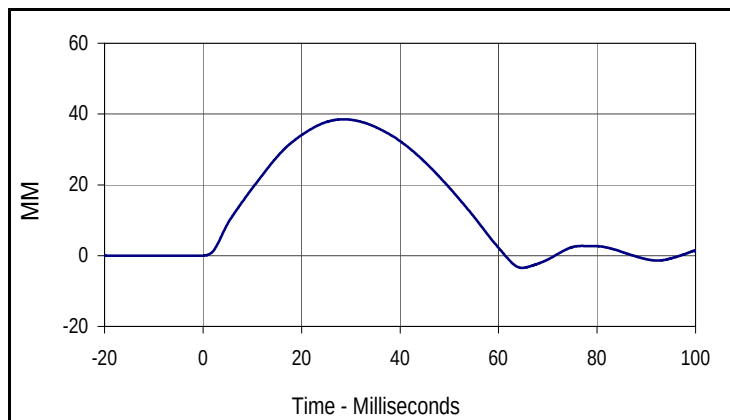
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.0	17.3	-0.1	96.2

Test Program: ES2re Thorax - Rib Drop Test
 ATD Serial No.: F037 Rib # 1

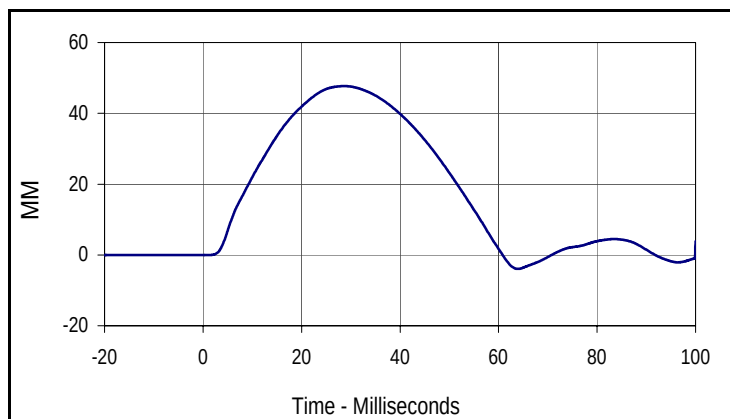
Test Date: 1/8/15
 Test I.D.: F037RB1069



Tested Parameter	Units	Specification	Result	Pass/Fail
Rib Module Soak Time	Minutes	≥240	517	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	43.2	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height	mm	36 to 40	38.5	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height	mm	46 to 51	47.7	Pass
Overall Test Results				Pass



Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.5	28.6	-3.5	64.8



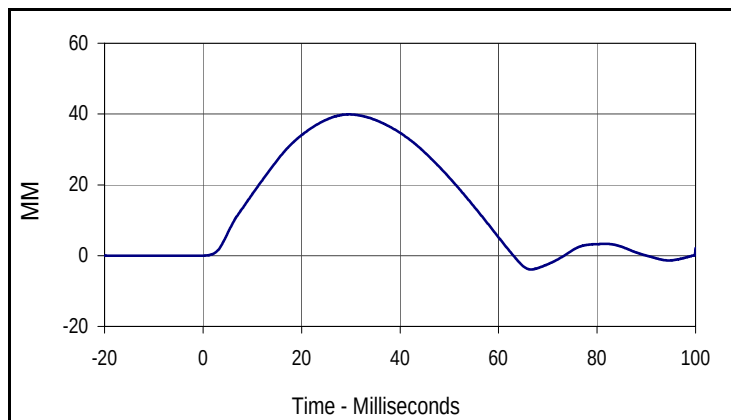
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
47.7	28.6	-3.9	63.9

Test Program: ES2re Thorax - Rib Drop Test
 ATD Serial No.: F037 Rib # 2

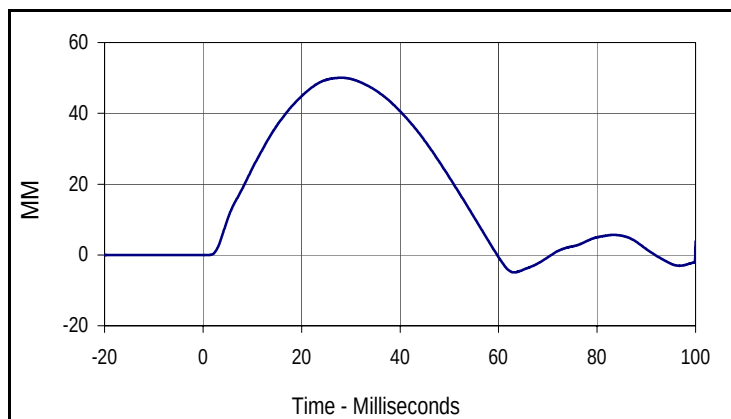
Test Date: 1/8/15
 Test I.D.: F037RB2069



Tested Parameter	Units	Specification	Result	Pass/Fail
Rib Module Soak Time	Minutes	≥240	562	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	43.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height	mm	36 to 40	39.9	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height	mm	46 to 51	50.1	Pass
Overall Test Results				Pass



Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
39.9	29.7	-3.9	66.6



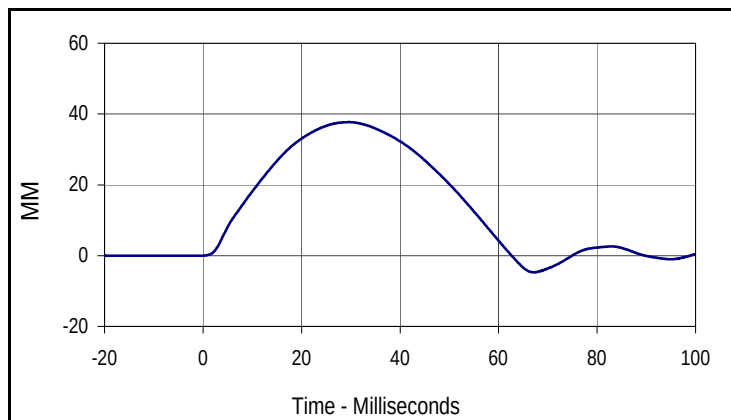
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
50.1	28.1	-4.9	63.2

Test Program: ES2re Thorax - Rib Drop Test
 ATD Serial No.: F037 Rib # 3

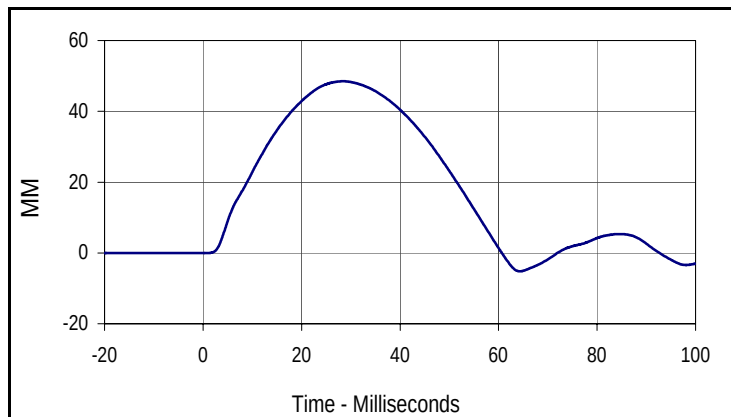
Test Date: 1/8/15
 Test I.D.: F037RB3069



Tested Parameter	Units	Specification	Result	Pass/Fail
Rib Module Soak Time	Minutes	≥240	607	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	43.6	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height	mm	36 to 40	37.7	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height	mm	46 to 51	48.5	Pass
Overall Test Results				Pass



Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.7	29.7	-4.7	67.2



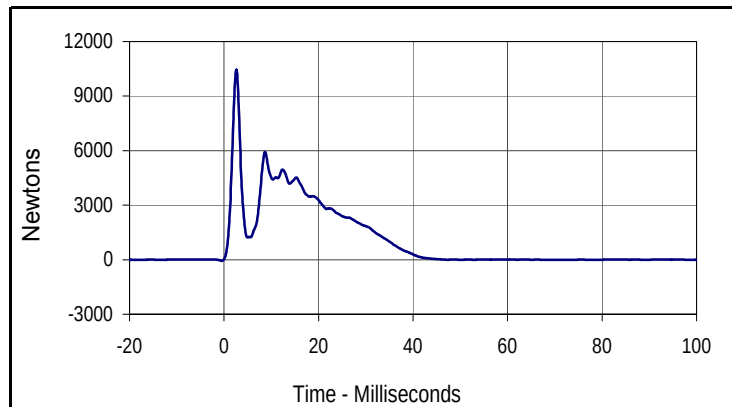
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.5	28.5	-5.2	64.3

Test Program: ES2re Thorax - Full Body Impact Test
 ATD Serial No.: F037

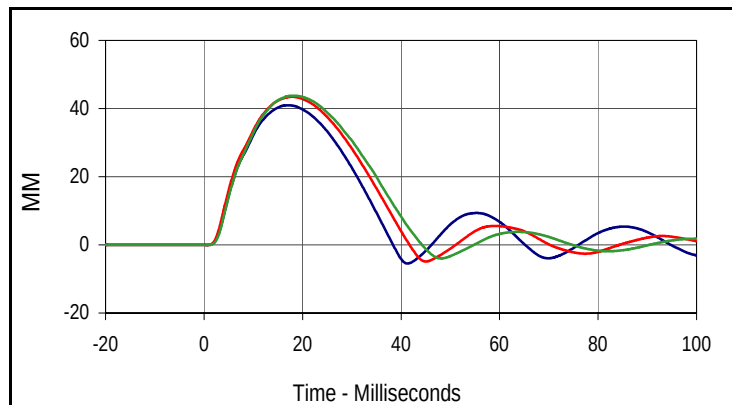
Test Date: 1/8/15
 Test I.D.: F037TH069



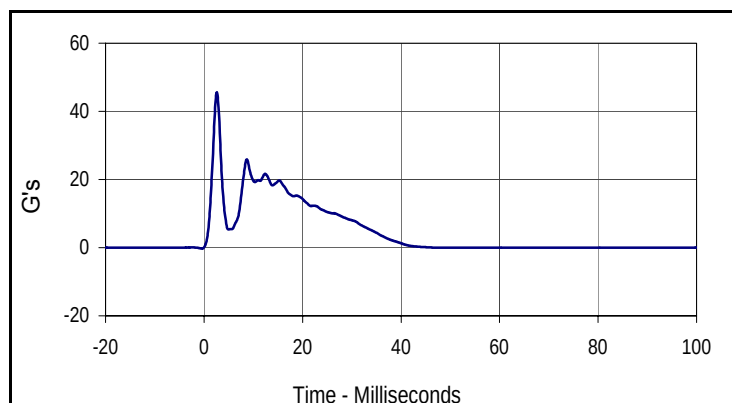
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	652	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	43.8	Pass
Peak Impactor Velocity	m/s	5.4 to 5.6	5.49	Pass
Peak Impactor Force	N	5100 to 6200	5930.1	Pass
	msec	> 6.0 msec	8.7	Pass
Peak Upper Rib Deflection	mm	34 to 41	41.0	Pass
Peak Middle Rib Deflection	mm	37 to 45	43.4	Pass
Peak Lower Rib Deflection	mm	37 to 44	43.8	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
10448.3	2.6	-56.7	-0.5



Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
41.0	17.0	-5.5	41.3
Max (Middle)	Time	Min (Middle)	Time
43.4	17.9	-4.9	45.0
Max (Lower)	Time	Min (Lower)	Time
43.8	18.1	-4.0	48.1



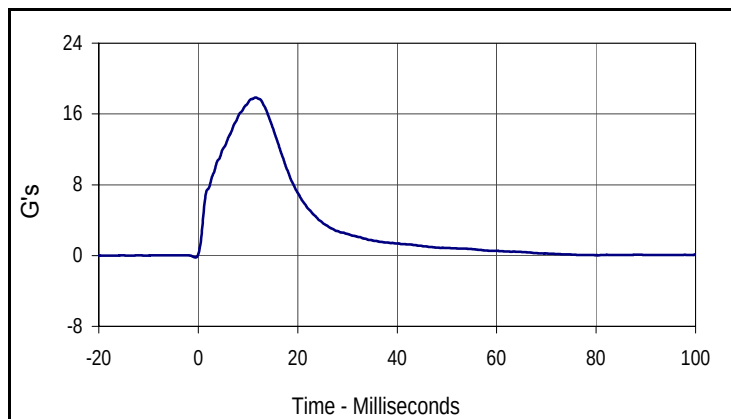
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.6	2.6	-0.2	-0.5

Test Program: ES2re Abdomen Impact Test
 ATD Serial No.: F037

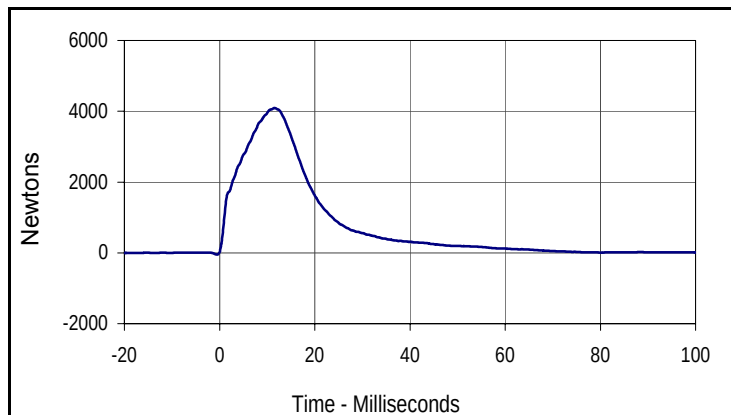
Test Date: 1/8/15
 Test I.D.: F037ABD069



Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	722	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	45.0	Pass
Probe Velocity	m/s	3.9 to 4.1	4.02	Pass
Peak Impactor Force	N	4000 to 4800	4091.9	Pass
	msec	10.6 to 13.0	11.5	Pass
Sum of Abdominal Forces	N	2200 to 2700	2355.8	Pass
	msec	10.0 to 12.3	10.9	Pass
Overall Test Results				Pass



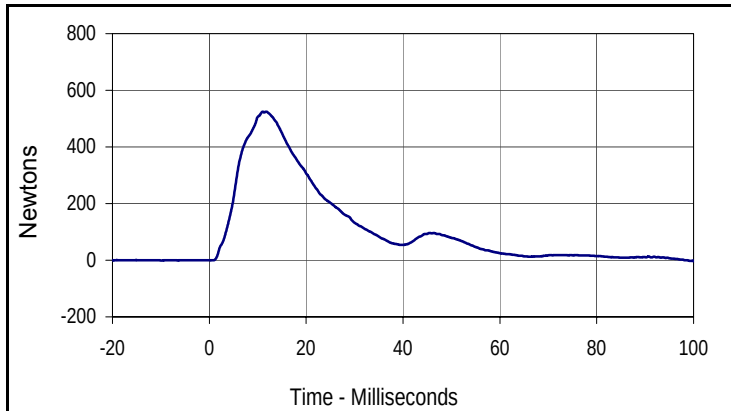
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
17.9	11.5	-0.2	-0.5



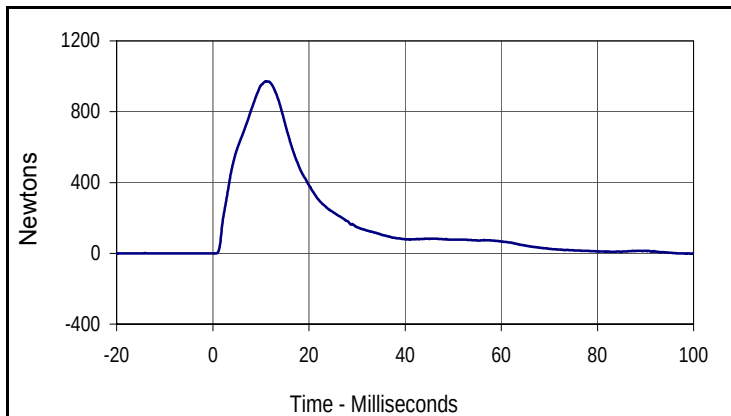
Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4091.9	11.5	-49.7	-0.5

Test Program: ES2re Abdomen Impact Test
 ATD Serial No.: F037

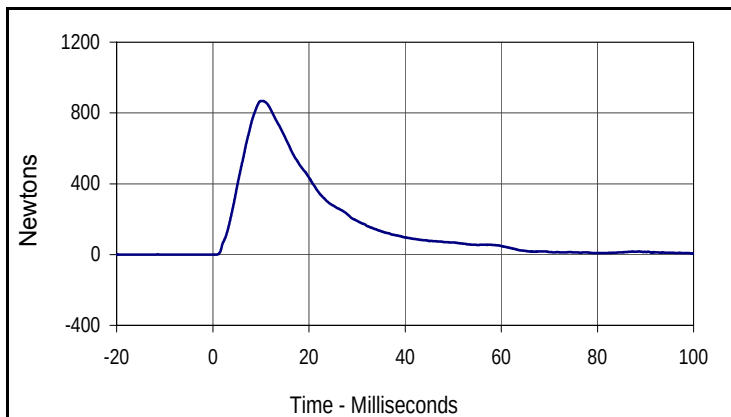
Test Date: 1/8/15
 Test I.D.: F037ABD069



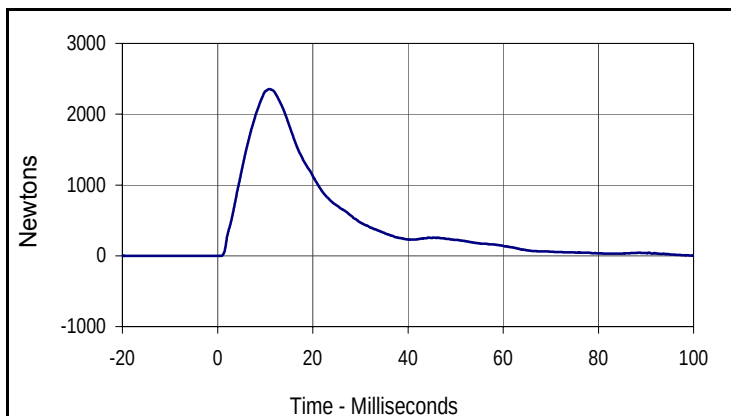
Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtontons
Max	Time	Min	Time
524.6	11.8	-8.2	105.2



Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtontons
Max	Time	Min	Time
971.5	11.2	-3.8	105.2



Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtontons
Max	Time	Min	Time
868.1	10.5	-0.9	121.5



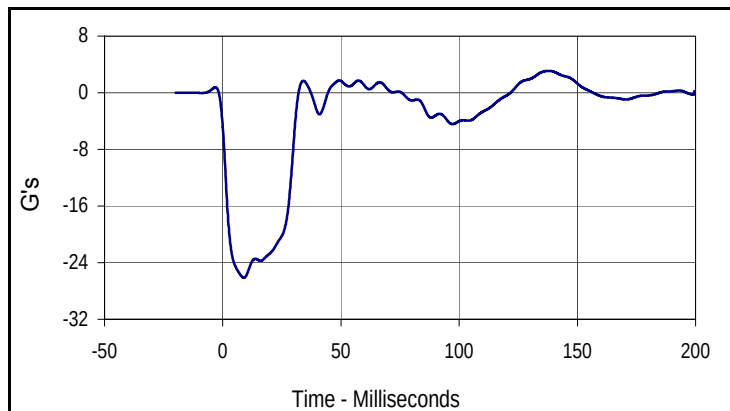
Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
006	RES	600	Newtontons
Max	Time	Min	Time
2355.8	10.9	-1.5	-9.5

Test Program: ES2re Lumbar Flexion Test
 ATD Serial No.: F037

Test Date: 1/8/15
 Test I.D.: F037LB069



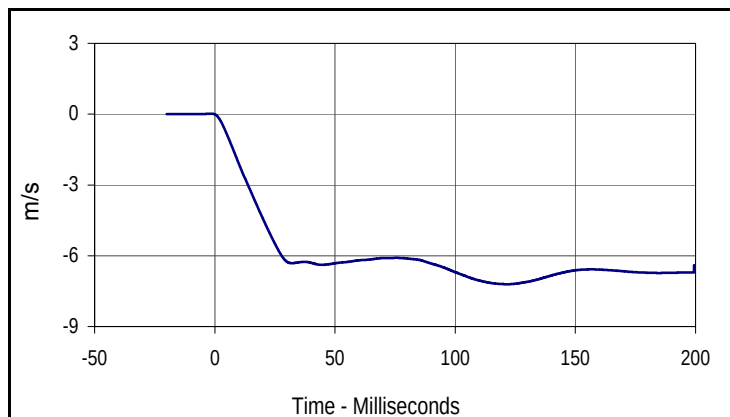
Tested Parameter	Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time	Minutes	≥240	797	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	44.3	Pass
Pendulum Velocity	m/s	5.95 to 6.15	6.03	Pass
Headform Rotation	Max	45 to 55	48.8	Pass
	Time	39 to 53	41.6	Pass
Time of Decay to Zero Angle from Peak	msec	37 to 57	44.7	Pass
Overall Test Results				Pass



Curve Description

Pendulum Deceleration

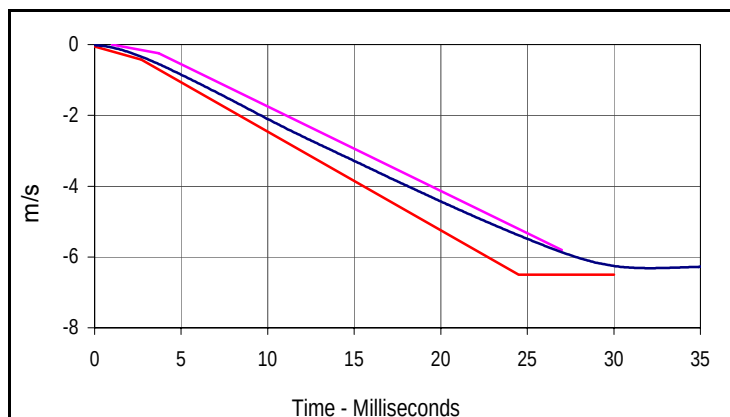
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
3.1	138.6	-26.1	9.5



Curve Description

Pendulum Velocity

Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.2	122.3



Curve Description

Pendulum Velocity

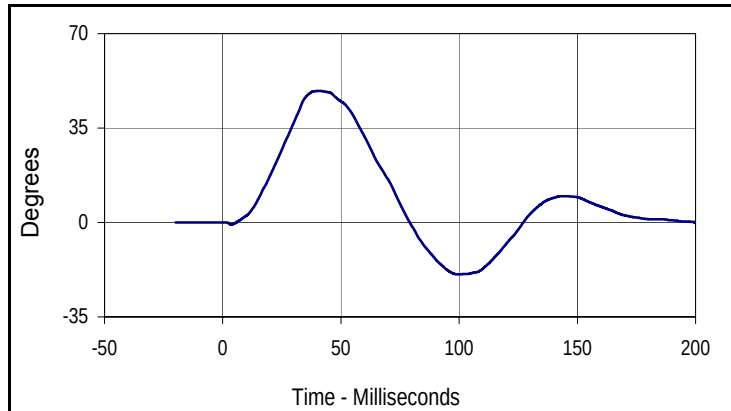
Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.2	122.3

Velocity Corridors

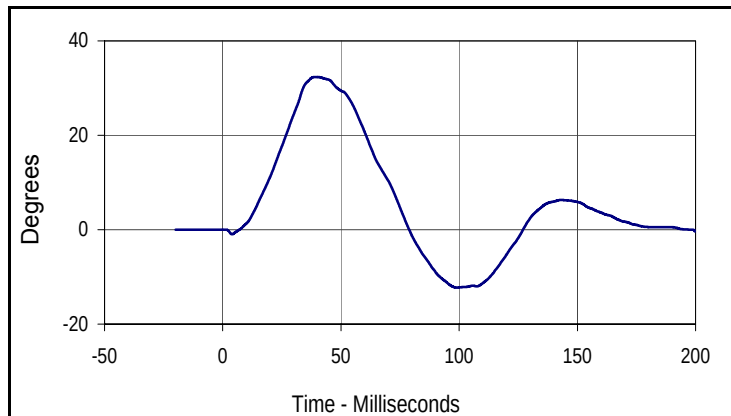
Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.50
		30.0	-6.50

Test Program: ES2re Lumbar Flexion Test
 ATD Serial No.: F037

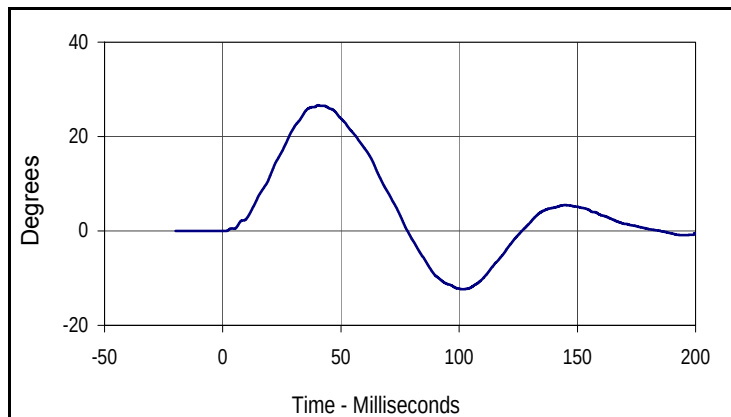
Test Date: 1/8/15
 Test I.D.: F037LB069



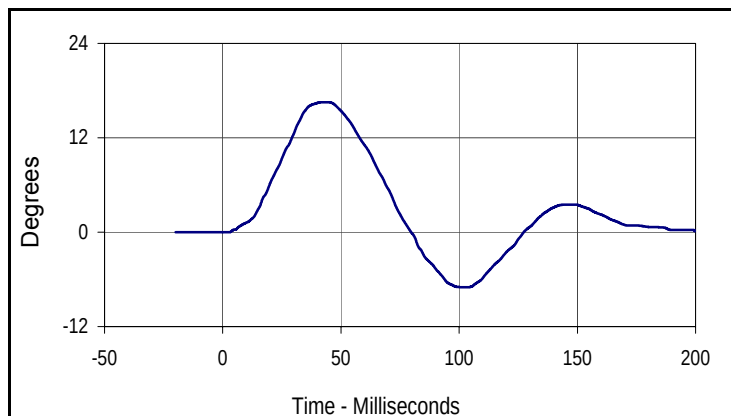
Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
48.8	41.6	-19.2	99.8



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
32.4	39.5	-12.3	99.6



Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
26.6	40.9	-12.4	102.1



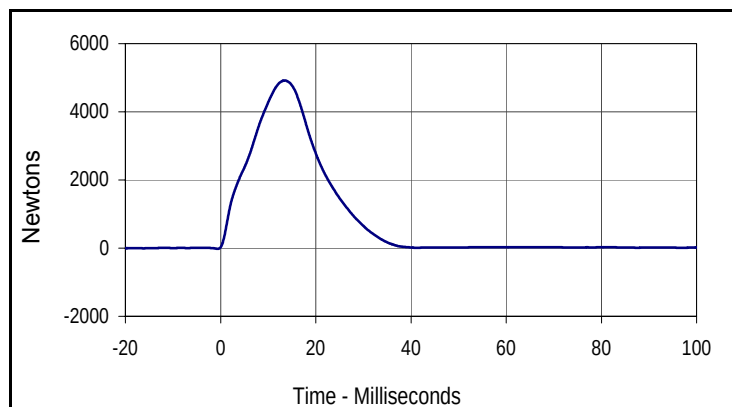
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
006	FIL	180	Degrees
Max	Time	Min	Time
16.5	43.0	-7.0	103.1

Test Program: ES2re Pelvis Impact Test
 ATD Serial No.: F037

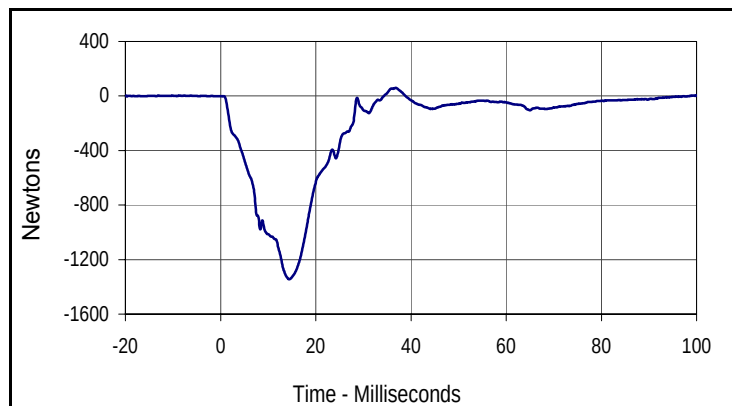
Test Date: 1/8/15
 Test I.D.: F037PL069



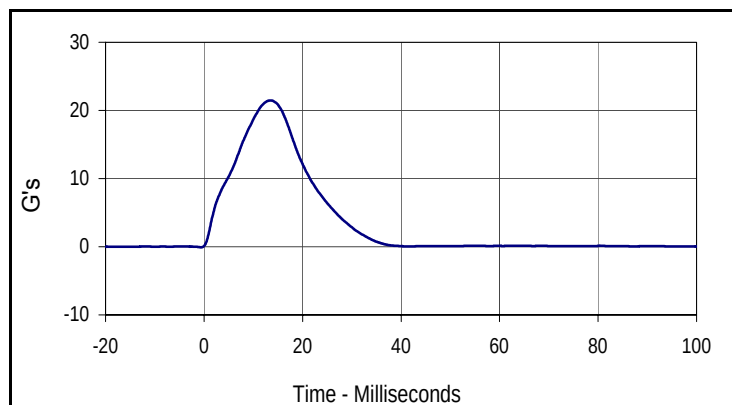
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	852	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.4	Pass
Humidity During Soak	Max	10.0 to 70.0	45.0	Pass
	Min		42.3	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	44.2	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.32	Pass
Peak Impactor Force	N	4700 to 5400	4920.0	Pass
	msec	11.8 to 16.1	13.5	Pass
Peak Pubic Symphysis Load	N	-1230 to -1590	-1344.2	Pass
	msec	12.2 to 17.0	14.4	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4920.0	13.5	-17.7	-0.6



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
60.5	36.8	-1344.2	14.4



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
21.5	13.5	-0.1	-0.6

Test Program: SID IIs External Measurements
 ATD Serial No.: 307

Test Date: 1/9/15
 Test I.D.: N/A



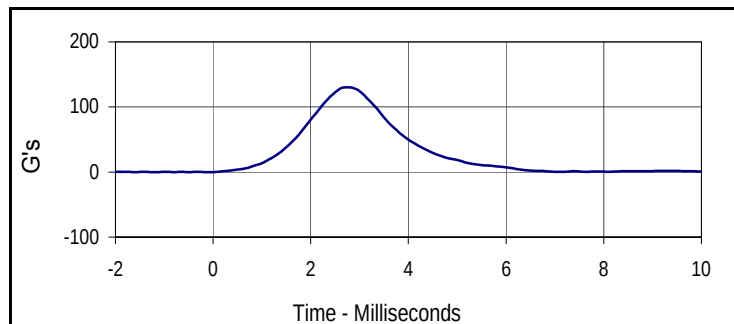
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	144	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	128	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	43	Pass
I	Head Depth	mm	178 - 188	185	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	525	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	223	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	319	Pass
R	Arm Length	mm	249 - 259	254	Pass
S	Knee Joint to Seatback	mm	477 - 493	483	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	89	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.: 307

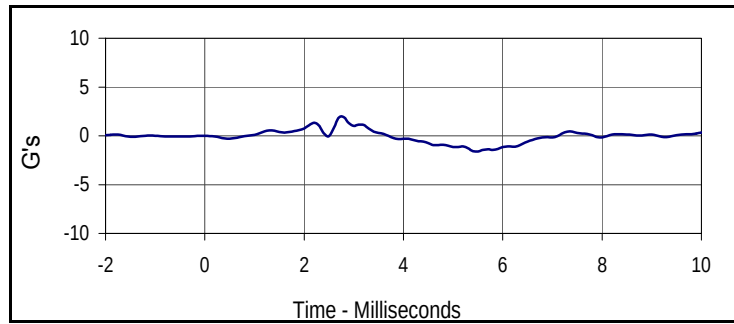
Test Date: 1/9/15
 Test I.D.: 307HD078



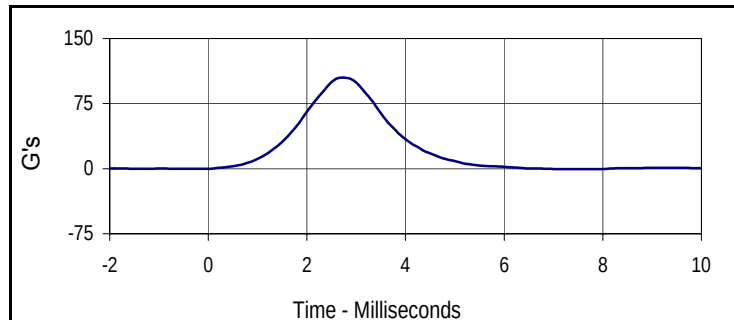
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	286	Pass
Temperature During Soak	Max	18.9 to 25.6	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	45.2	Pass
	Min		44.9	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	44.9	Pass
Peak Head Resultant Acceleration	G's	115 to 137	130.4	Pass
Peak Head X Acceleration	G's	<15	1.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.4	Pass
Overall Test Results				Pass



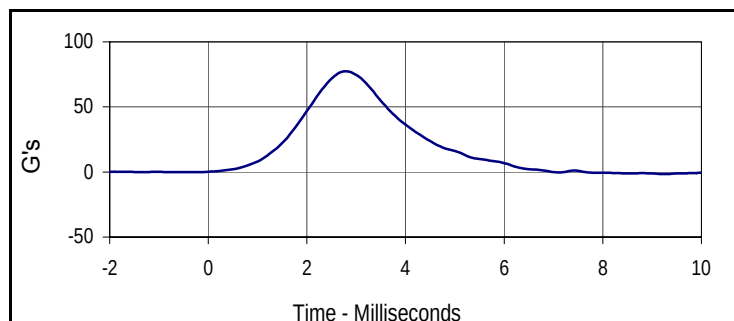
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
130.4	2.7	0.0	-0.1



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.9	2.8	-1.6	5.5



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
105.2	2.7	-0.5	7.9



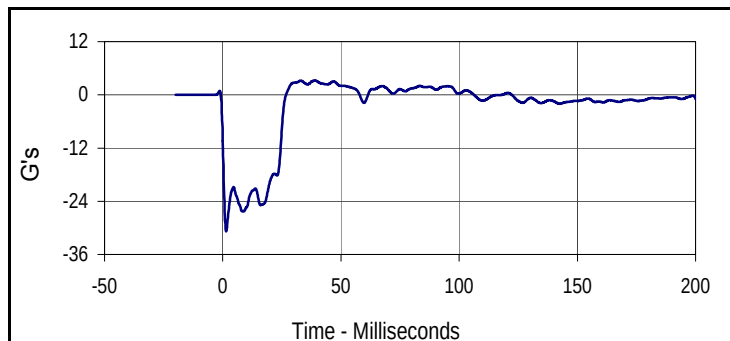
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
77.5	2.8	-1.5	9.3

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 307

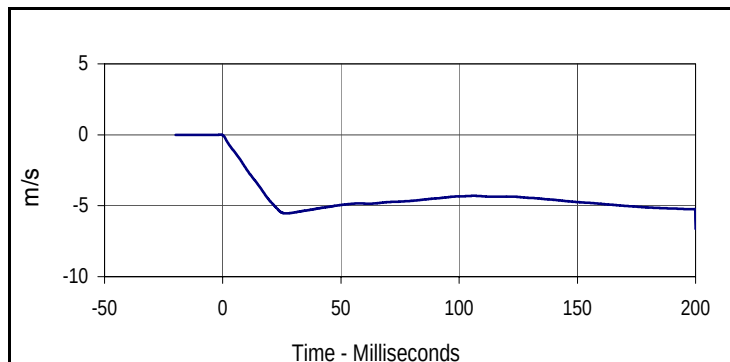
Test Date: 1/9/15
 Test I.D.: 307NB078



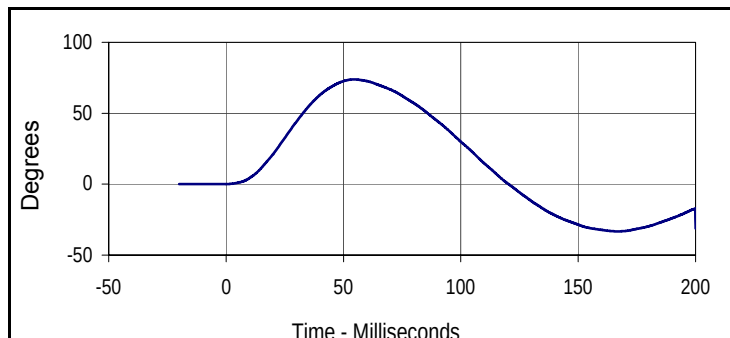
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	331	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	45.2	Pass
	Min		44.9	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	44.9	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.62	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.42	Pass
	15 msec	-3.30 to -4.10	-3.52	Pass
	20 msec	-4.40 to -5.40	-4.67	Pass
	25 msec	-5.40 to -6.10	-5.49	Pass
	25-100 msec	-5.50 to -6.20	-5.54	Pass
D-Plane Rotation	Max	71 to 81	73.8	Pass
	Time	50 to 70	54.5	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-40.8	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	104.2	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
3.3	0.0	-30.8	0.0



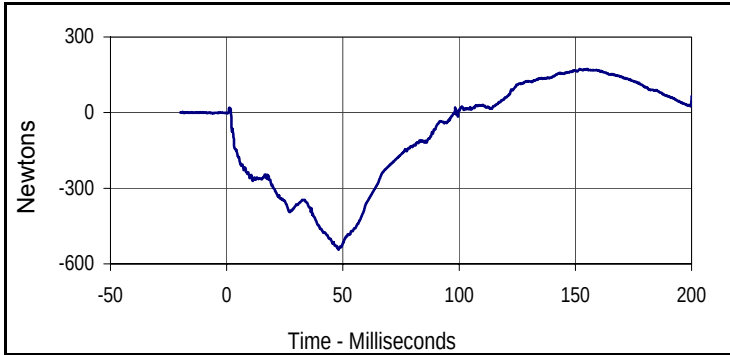
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.8	-6.6	200.0



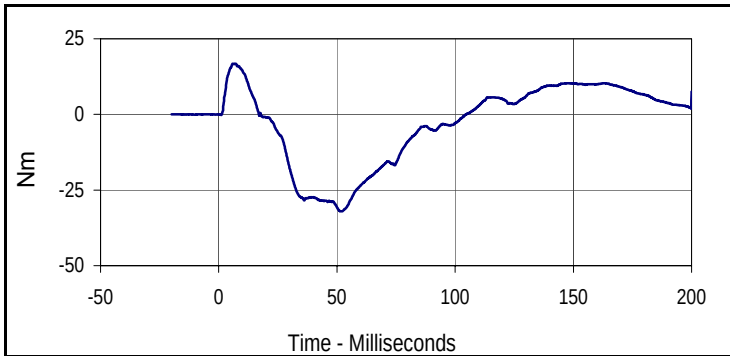
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
73.8	54.5	-33.2	166.9

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 307

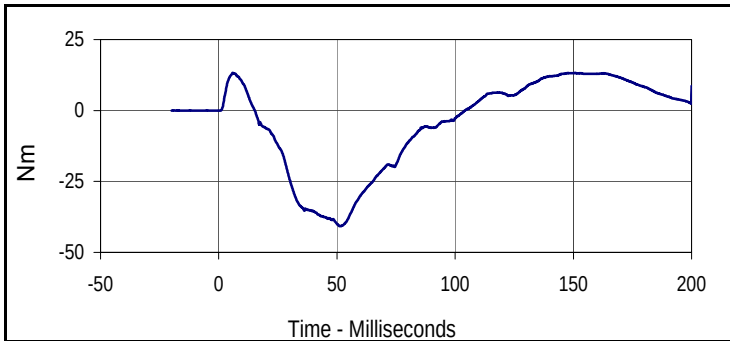
Test Date: 1/9/15
 Test I.D.: 307NB078



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
173.5	151.9	-543.6	48.1



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
16.8	6.0	-32.0	52.0



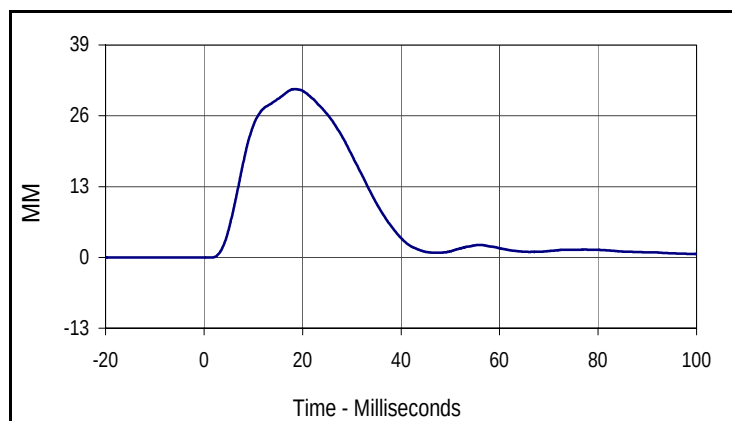
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
13.3	150.5	-40.8	51.5

Test Program: SID IIs Shoulder Impact Test
 ATD Serial No.: 307

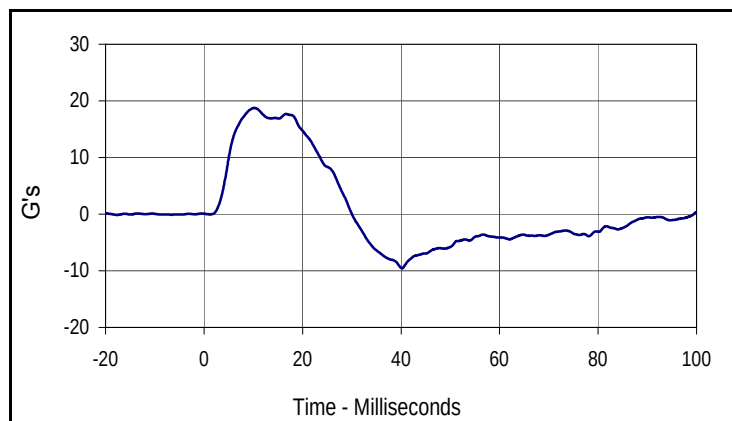
Test Date: 1/9/15
 Test I.D.: 307SH078



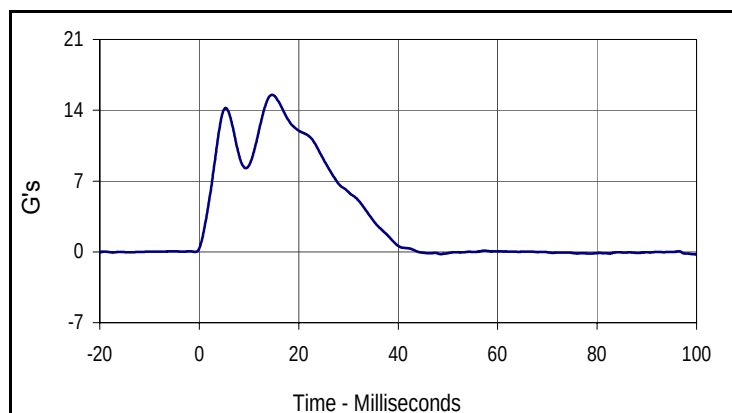
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	386	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.6	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	45.2	Pass
	Min	%		44.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	45.0	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	18.7	Pass
Peak Impactor Acceleration		G's	13 to 18	15.5	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	18.3	0.0	-17.2



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.7	10.2	-9.6	40.2



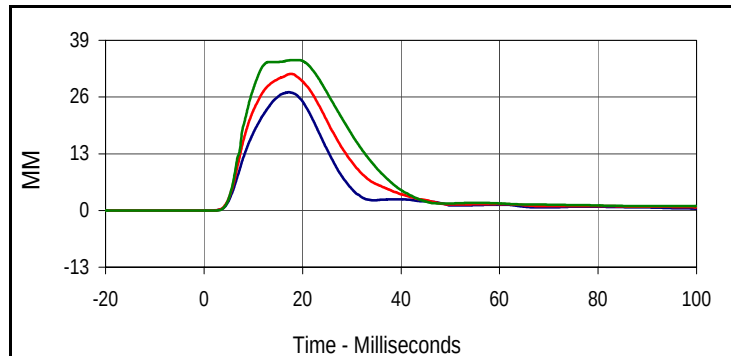
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.5	14.6	-0.3	100.0

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 307

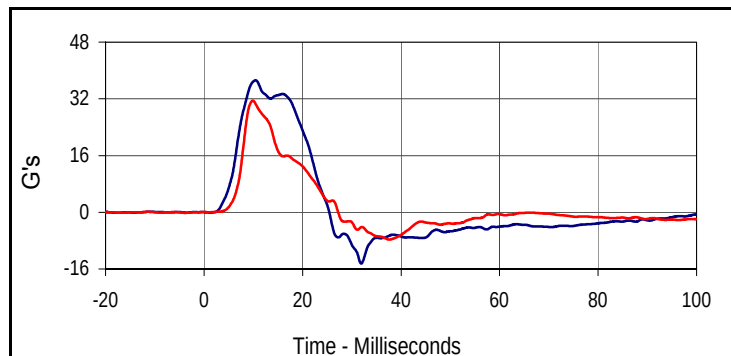
Test Date: 1/9/15
 Test I.D.: 307TWA078



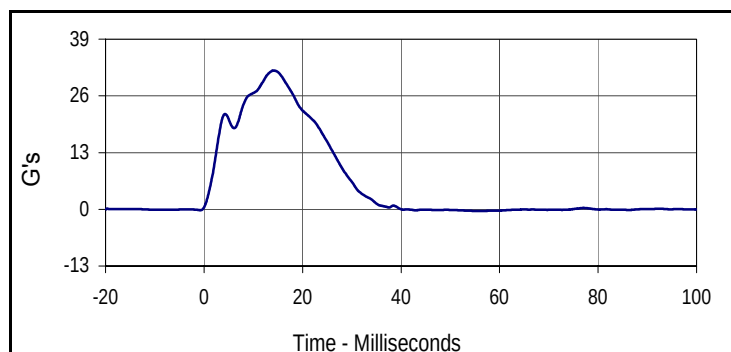
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	431	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	45.2	Pass
	Min		44.9	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	45.2	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.63	Pass
Peak Shoulder Deflection	mm	31 to 40	33.7	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	27.1	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	31.3	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	34.5	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	37.2	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	31.5	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
27.1	17.2	0.0	-0.9
Middle Thorax Deflection			
Max	Time	Min	Time
31.3	17.8	0.0	-2.0
Lower Thorax Deflection			
Max	Time	Min	Time
34.5	18.6	0.0	-16.6



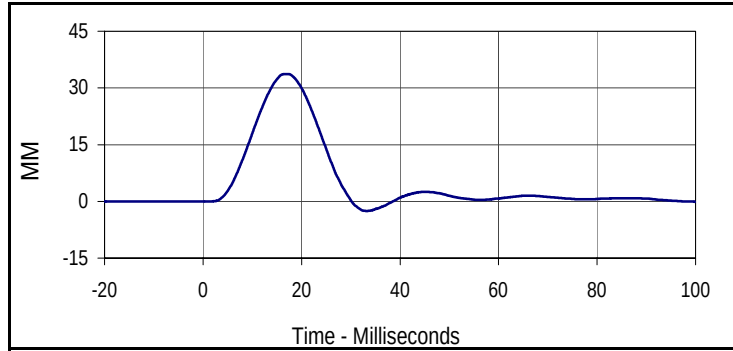
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.2	10.5	-14.5	31.9
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.5	9.9	-7.7	37.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
31.8	14.2	-0.4	56.8

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 307

Test Date: 1/9/15
 Test I.D.: 307TWA078



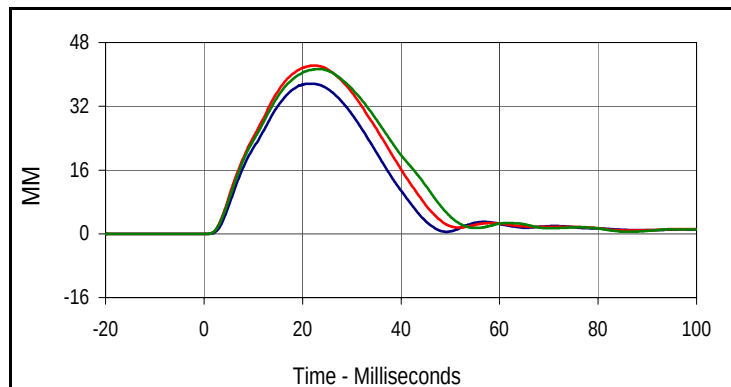
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
33.7	16.9	-2.5	33.3

Test Program: SID IIs Thorax without Arm Impact Test
 ATD Serial No.: 307

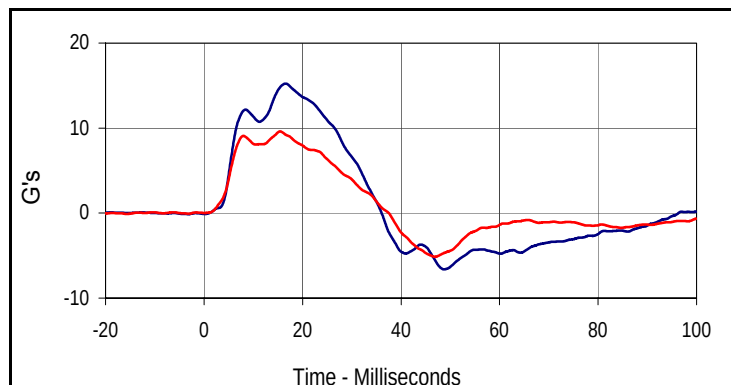
Test Date: 1/9/15
 Test I.D.: 307TWOA078



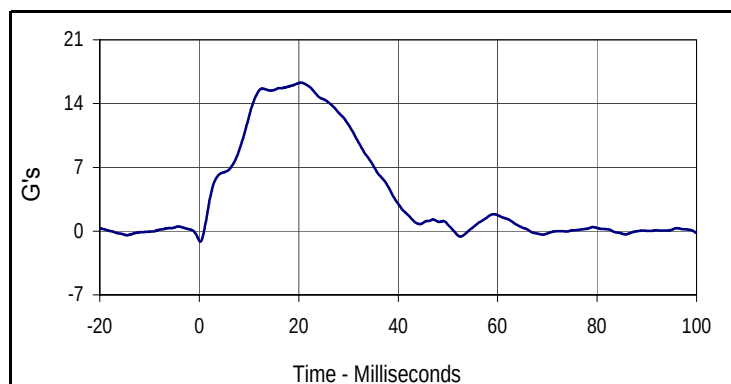
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	486	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.6	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	45.2	Pass
	Min	%		44.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	45.1	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.32	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	37.7	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	42.3	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	41.4	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.2	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.6	Pass
Peak Impactor Acceleration		G's	14 to 18	16.3	Pass
Overall Test Results				Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
37.7	21.8	0.0	-14.7
Middle Thorax Deflection			
Max	Time	Min	Time
42.3	22.4	0.0	-20.0
Lower Thorax Deflection			
Max	Time	Min	Time
41.4	23.5	0.0	-10.9



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.2	16.6	-6.6	48.7
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.6	15.4	-5.1	46.9



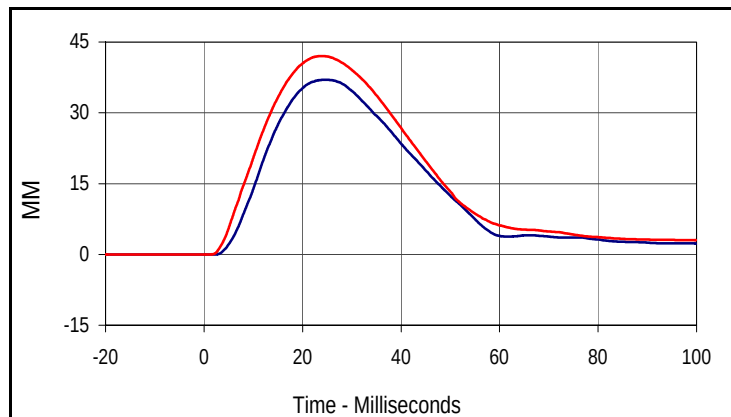
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.3	20.5	-1.2	0.2

Test Program: SID IIs Abdomen Impact Test
 ATD Serial No.: 307

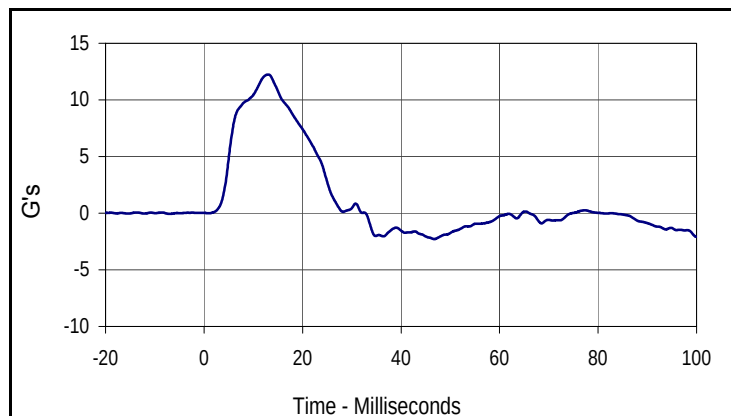
Test Date: 1/9/15
 Test I.D.: 307ABD078



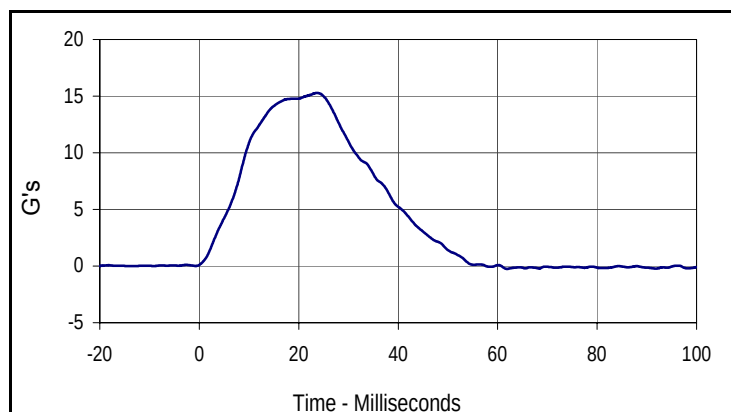
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	541	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.6	Pass
	Min °C		21.1	Pass
Humidity During Soak	Max %	10.0 to 70.0	45.2	Pass
	Min %		44.9	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	45.1	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.37	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	37.0	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	42.0	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.2	Pass
Peak Impactor Acceleration	G's	12 to 16	15.3	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
37.0	24.6	0.0	-13.2
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
42.0	23.8	0.0	-12.5

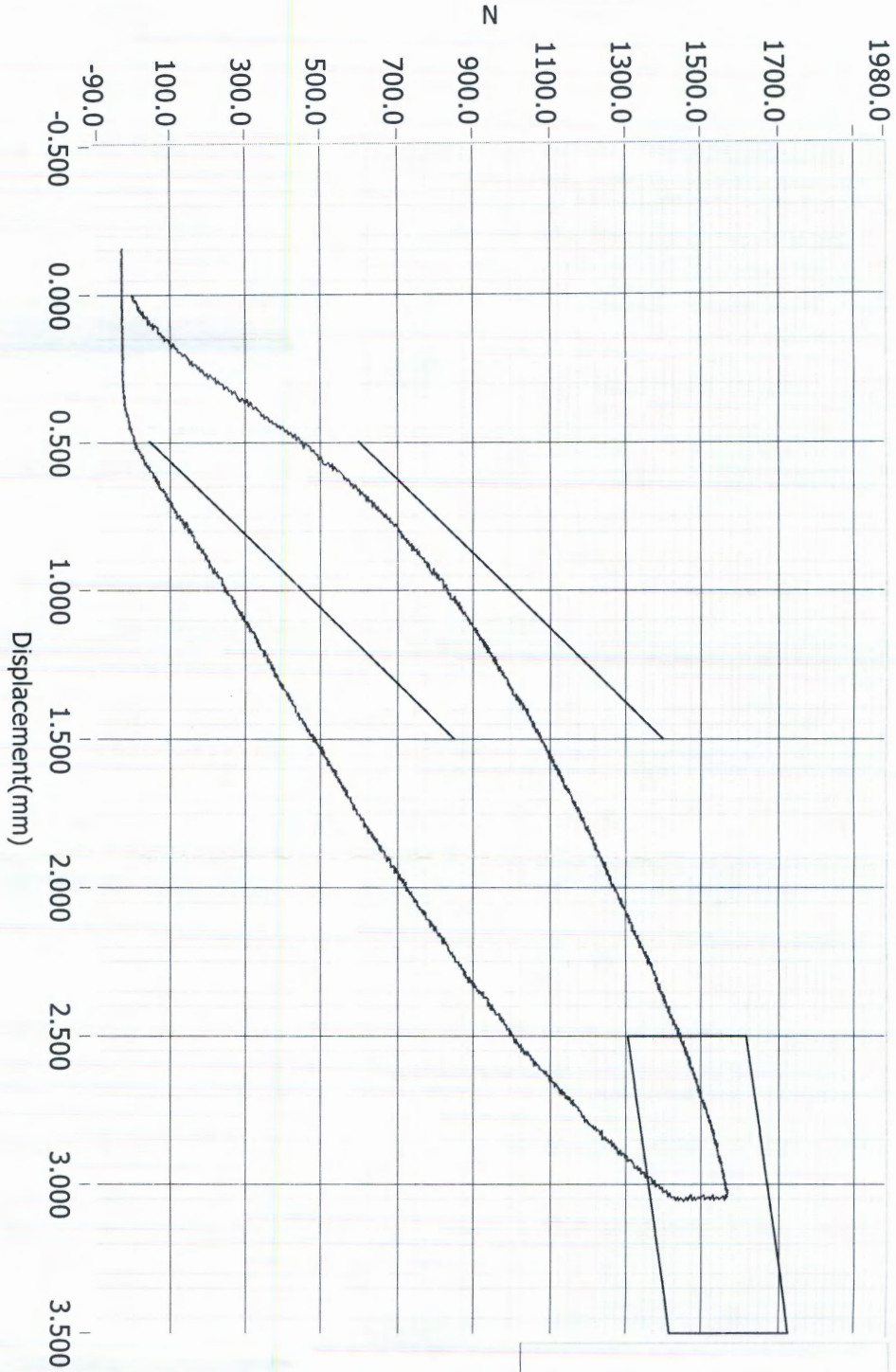


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.2	13.0	-2.3	46.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.3	23.7	-0.3	61.9

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

1562N

ATD Calibration Lab

M20154108 Pre Test

Test ID	Part Serial Number	Test Date	Test Time
	70981	12/13/2013	10:48 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/13/2013

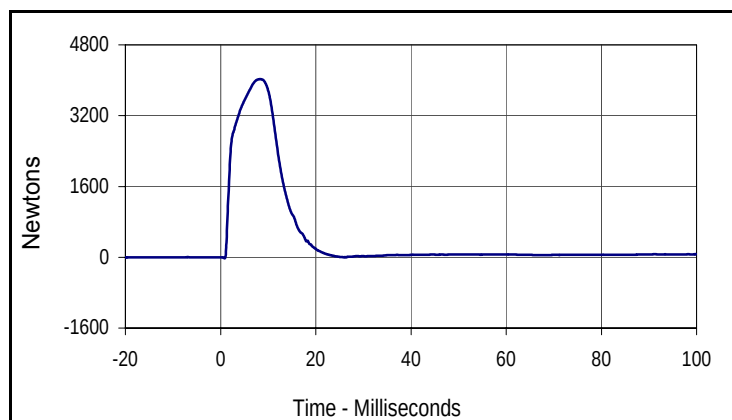
Current Time : 22:48:58

Test Program: SID IIs Pelvis Acetabulum Impact Test
 ATD Serial No.: 307

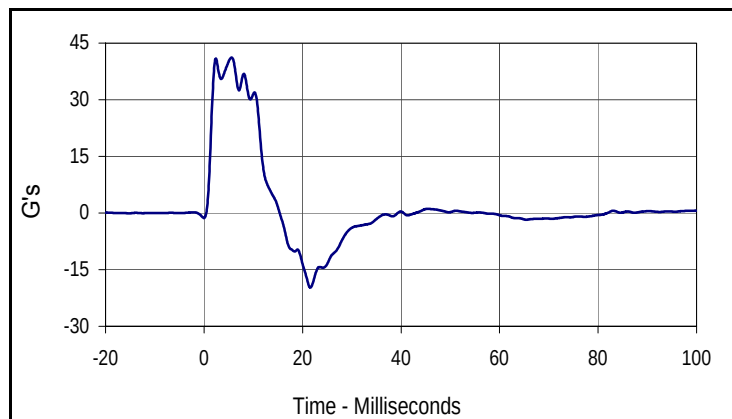
Test Date: 1/9/15
 Test I.D.: 307ACET078



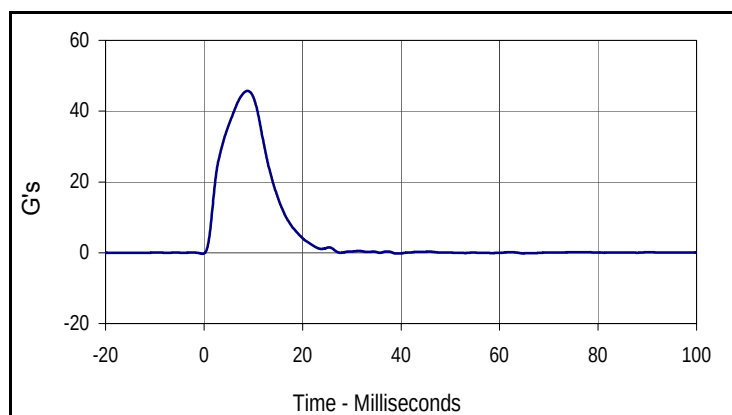
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	591	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	45.2	Pass
	Min		44.9	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	45.0	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.72	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	4025.8	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	40.2	Pass
Peak Impactor Acceleration	G's	38 to 47	45.7	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4025.8	8.3	-26.6	0.9



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.2	5.6	-19.7	21.6



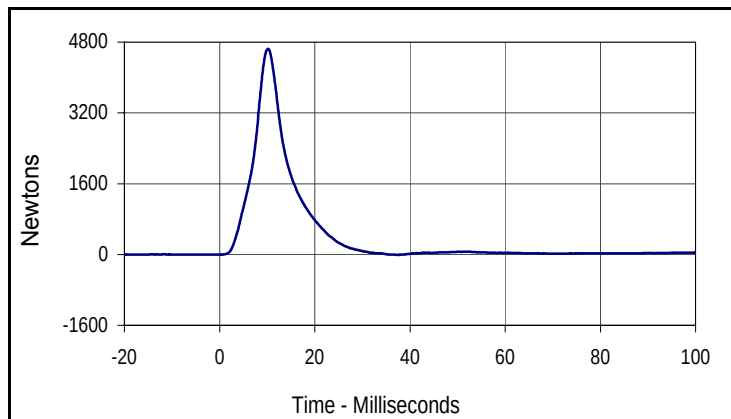
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.7	8.8	-0.3	-0.3

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 307

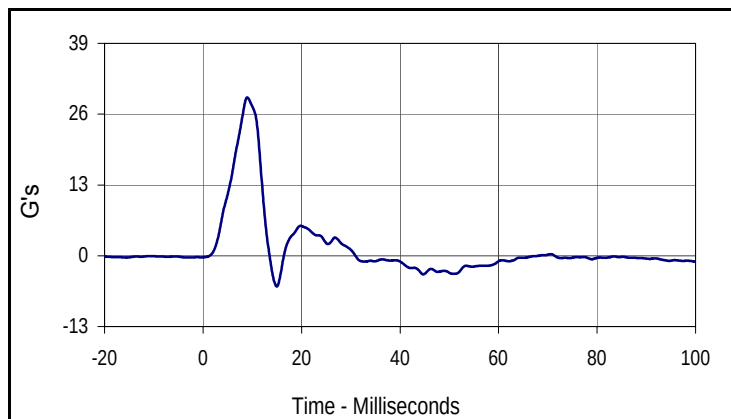
Test Date: 1/9/15
 Test I.D.: 307PL078



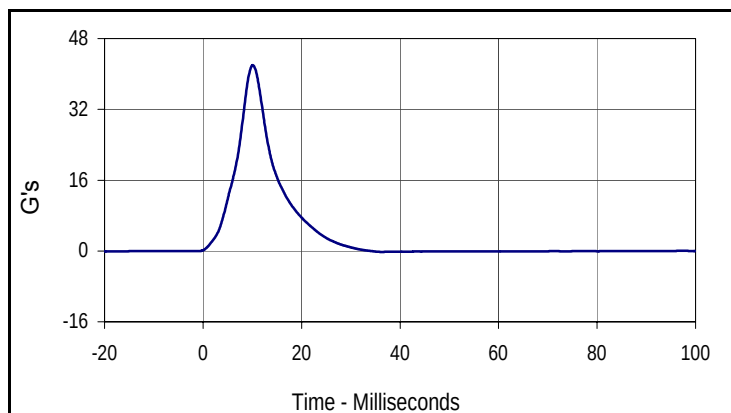
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	646	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	45.2	Pass
	Min		44.9	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	44.9	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.33	Pass
Peak Iliac Force	Newtons	4100 to 5100	4649.9	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	29.1	Pass
Peak Impactor Acceleration	G's	36 to 45	42.0	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4649.9	10.2	-10.8	37.4



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.1	9.0	-5.6	15.0



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
42.0	10.1	-0.2	36.2

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

Test Program: ES2re External Measurements
 ATD Serial No.: F037

Test Date: 1/16/15
 Test I.D.: N/A



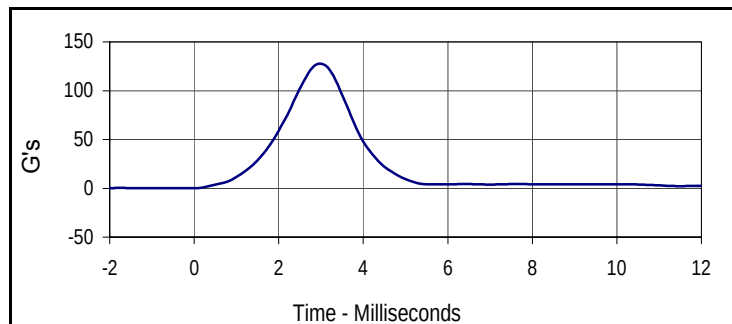
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30.0	Pass
1	Sitting Height	mm	900 - 918	909	Pass
2	Seat to Shoulder Joint	mm	558 - 572	564	Pass
3	Seat to Lower Face of Thoracic Spine Box	mm	346 - 356	350	Pass
4	Seat to Hip Joint (Center of Bolt)	mm	97 - 103	99	Pass
5	Sole to Seat, Sitting	mm	333 - 451	395	Pass
6	Head Width	mm	152 - 158	156	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	326	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	363	Pass
11	Head Depth	mm	196 - 206	201	Pass
12	Thorax Depth	mm	262 - 272	270	Pass
13	Abdomen Width	mm	194 - 204	199	Pass
14	Pelvis Depth	mm	235 - 245	240	Pass
15	Back of Buttocks to Hip Joint (Center of Bolt)	mm	150 - 160	155	Pass
16	Back of Buttocks to Front Knee	mm	597 - 615	608	Pass
Overall Test Results					Pass

Test Program: ES2re Head Drop Test
 ATD Serial No.: F037

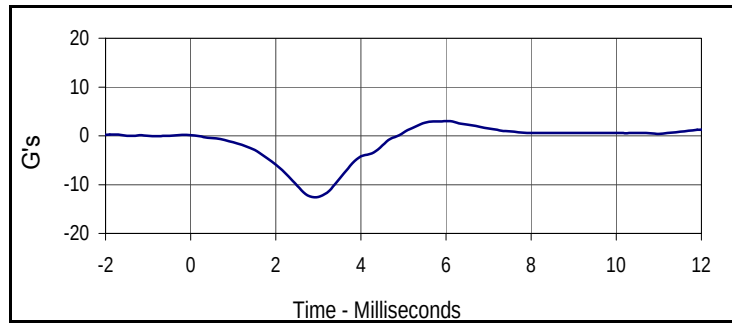
Test Date: 1/16/15
 Test I.D.: F037HD070



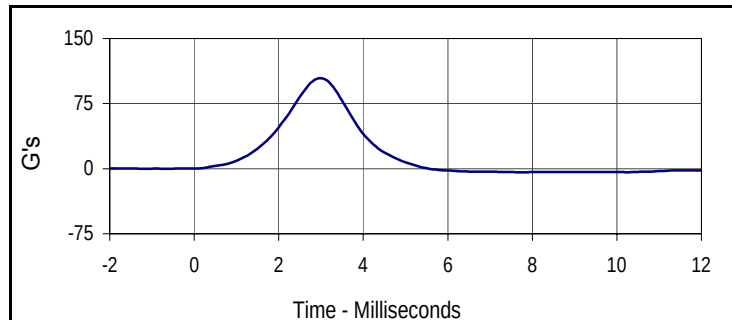
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	300	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	34.0	Pass
Peak Head Resultant Acceleration	G's	125 to 155	127.8	Pass
Peak Head X Acceleration	G's	≤15	12.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	0.2	Pass
Overall Test Results				Pass



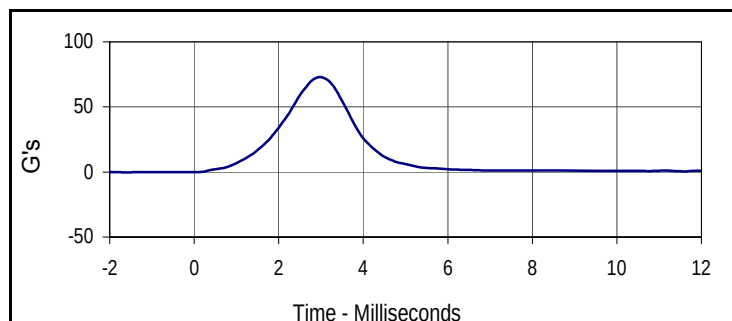
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
127.8	3.0	0.0	-8.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.0	6.0	-12.6	2.9



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
104.3	3.0	-4.1	7.7



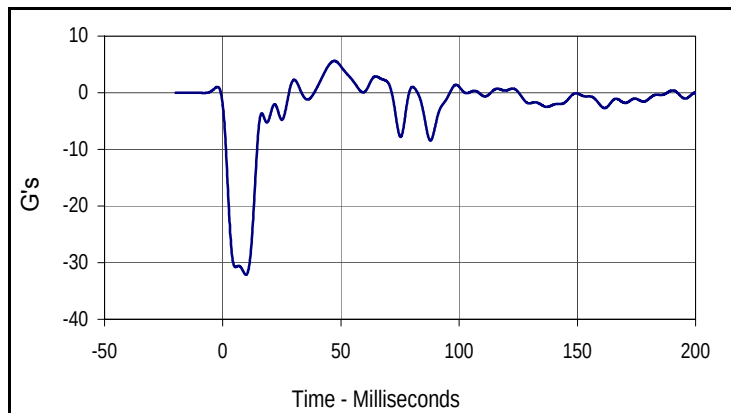
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
72.9	3.0	-0.3	-15.3

Test Program: ES2re Neck Flexion Test
 ATD Serial No.: F037

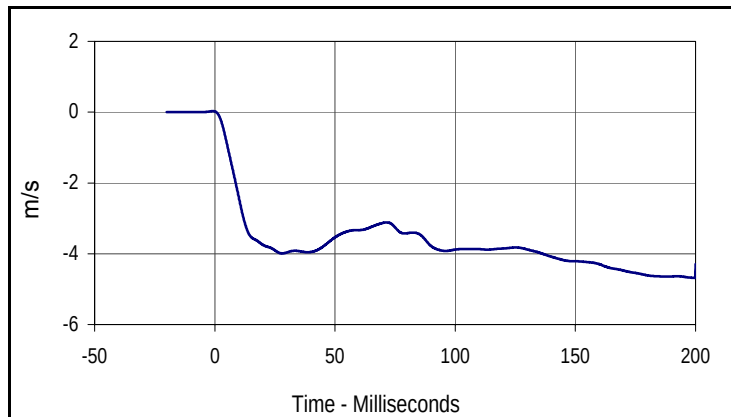
Test Date: 1/16/15
 Test I.D.: F037NB070



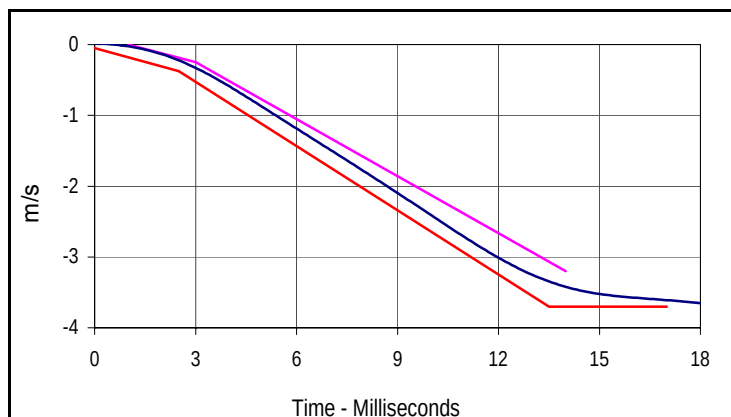
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	335	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.9	Pass
Pendulum Velocity	m/s	3.3 to 3.5	3.37	Pass
Headform Flexion	Max	49 to 59	53.9	Pass
	Time	54 to 66	55.6	Pass
Headform Flexion Decay (Peak to Zero)	msec	53 to 88	63.0	Pass
Overall Test Results				Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
5.6	47.2	-32.1	9.8



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-0.8	-4.7	199.4



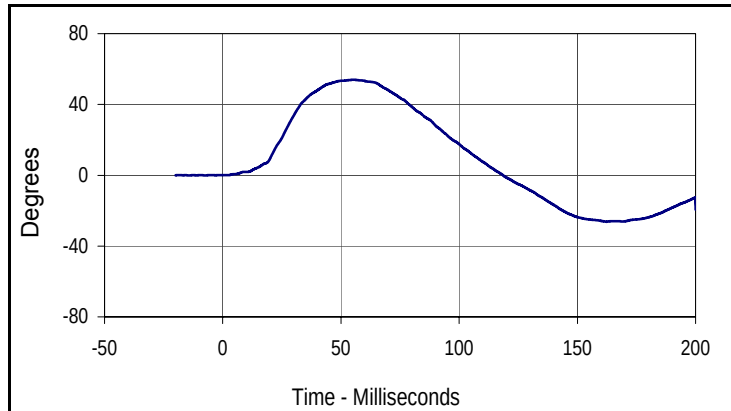
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-0.8	-4.7	199.4

Velocity Corridors

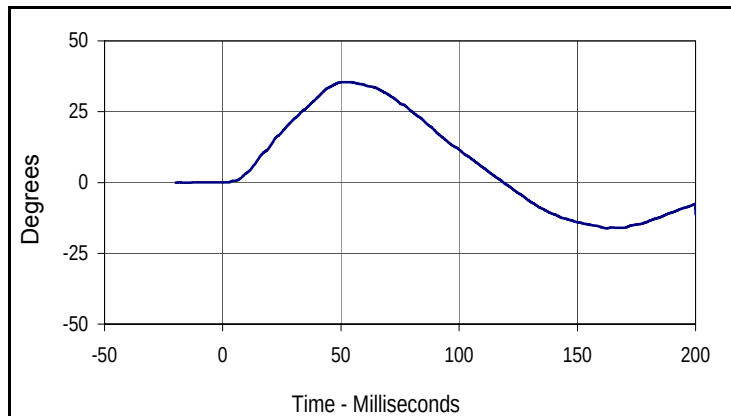
Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.03	2.5	-0.375
14.0	-3.20	13.5	-3.70
		17.0	-3.70

Test Program: ES2re Neck Flexion Test
 ATD Serial No.: F037

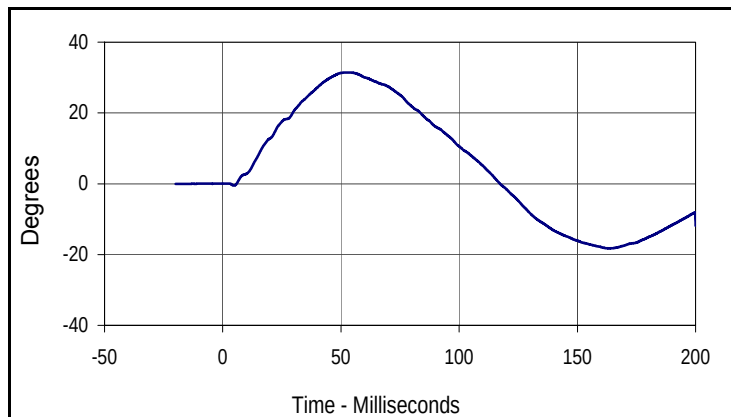
Test Date: 1/16/15
 Test I.D.: F037NB070



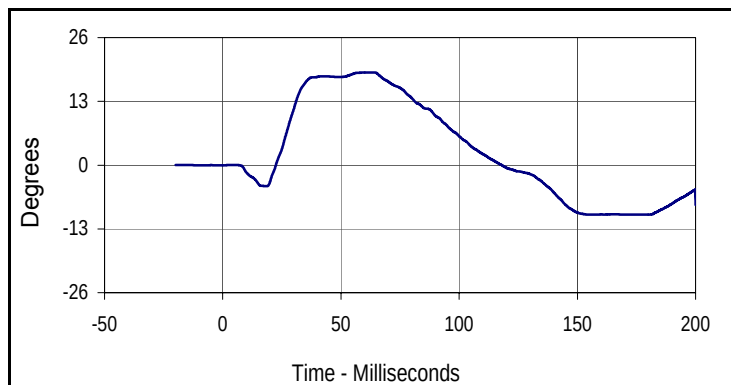
Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
53.9	55.6	-26.2	162.3



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
35.5	52.6	-16.2	162.3



Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
31.4	52.5	-18.3	163.4



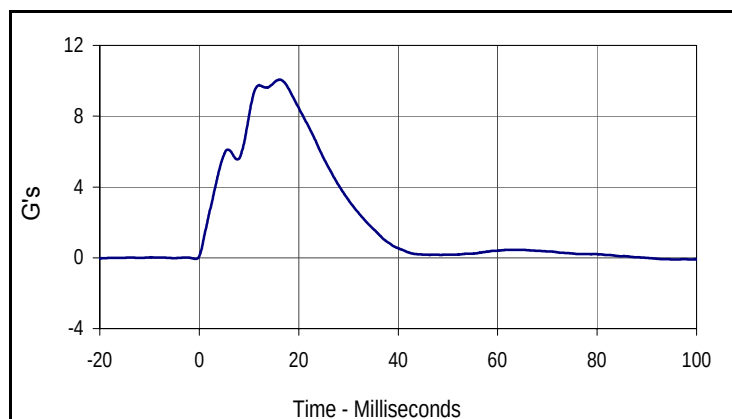
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
006	FIL	180	Degrees
Max	Time	Min	Time
18.9	64.0	-10.1	174.8

Test Program: ES2re Shoulder Impact Test
 ATD Serial No.: F037

Test Date: 1/16/15
 Test I.D.: F037SH070



Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	400	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.8	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.32	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	10.1	Pass
Overall Test Results				Pass



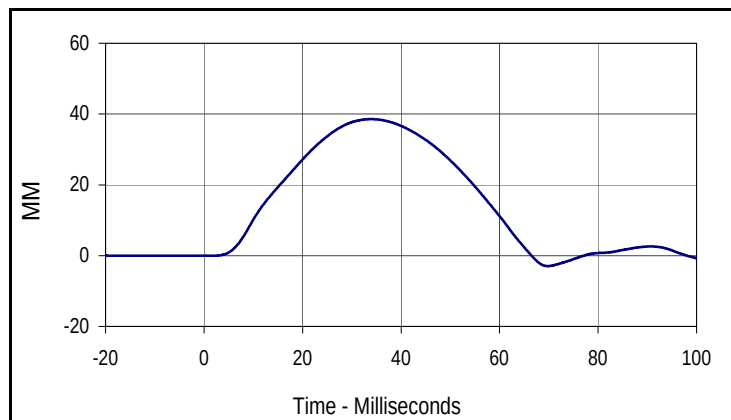
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.1	16.2	-0.1	98.7

Test Program: ES2re Thorax - Rib Drop Test
 ATD Serial No.: F037 Rib # 1

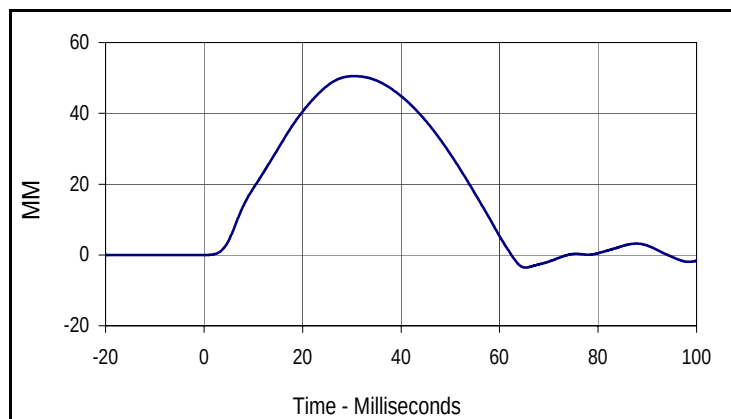
Test Date: 1/16/15
 Test I.D.: F037RB1070



Tested Parameter	Units	Specification	Result	Pass/Fail
Rib Module Soak Time	Minutes	≥240	455	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.6	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height	mm	36 to 40	38.6	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height	mm	46 to 51	50.5	Pass
Overall Test Results				Pass



Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.6	33.9	-3.0	69.8



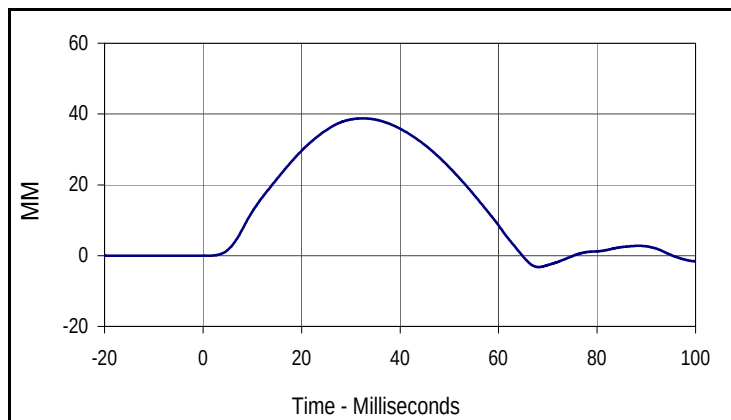
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
50.5	30.5	-3.6	65.3

Test Program: ES2re Thorax - Rib Drop Test
 ATD Serial No.: F037 Rib # 2

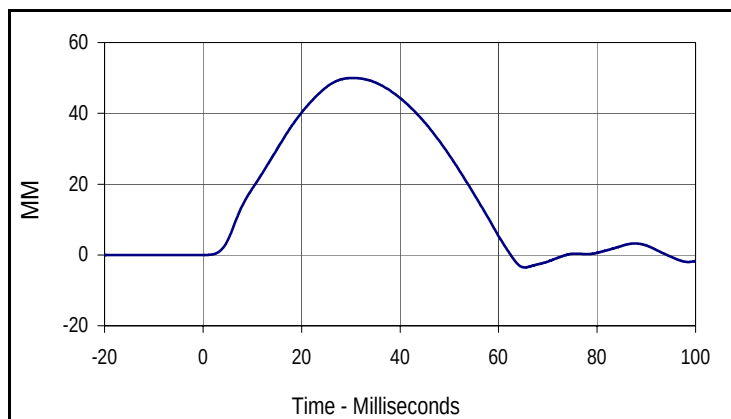
Test Date: 1/16/15
 Test I.D.: F037RB2070



Tested Parameter	Units	Specification	Result	Pass/Fail
Rib Module Soak Time	Minutes	≥240	500	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.6	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height	mm	36 to 40	38.8	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height	mm	46 to 51	50.0	Pass
Overall Test Results			Pass	



Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.8	32.4	-3.2	68.1



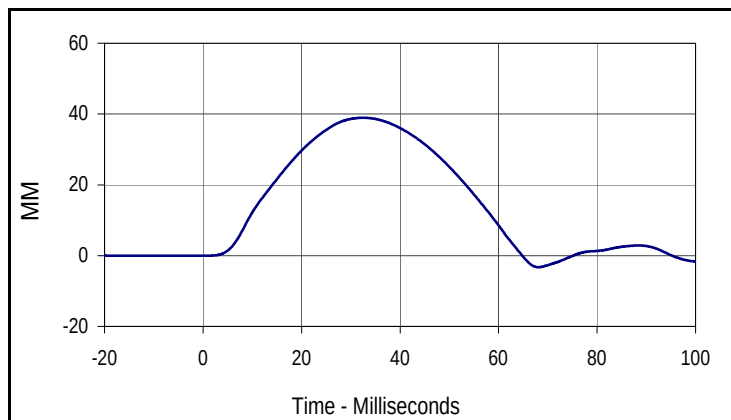
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
50.0	30.3	-3.5	65.3

Test Program: ES2re Thorax - Rib Drop Test
 ATD Serial No.: F037 Rib # 3

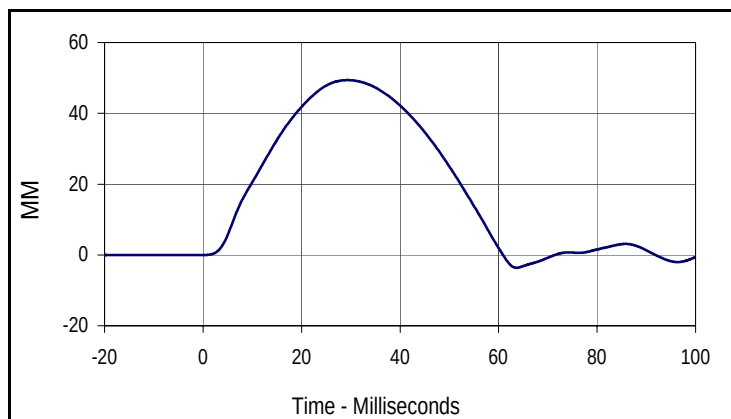
Test Date: 1/16/15
 Test I.D.: F037RB3070



Tested Parameter	Units	Specification	Result	Pass/Fail
Rib Module Soak Time	Minutes	≥240	545	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.7	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height	mm	36 to 40	38.9	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height	mm	46 to 51	49.4	Pass
Overall Test Results				Pass



Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.9	32.5	-3.3	68.1



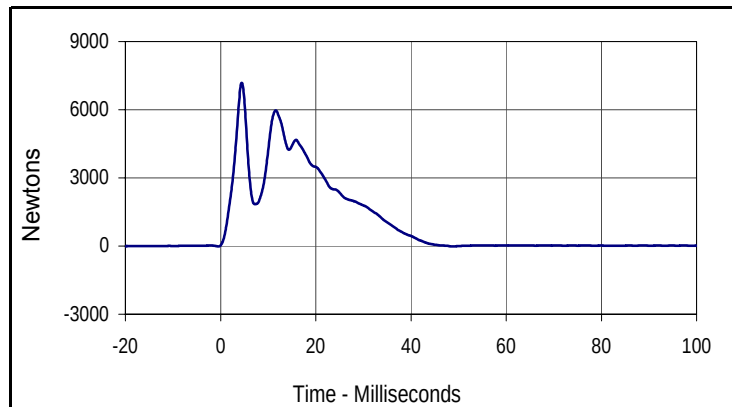
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.4	29.3	-3.6	63.7

Test Program: ES2re Thorax - Full Body Impact Test
 ATD Serial No.: F037

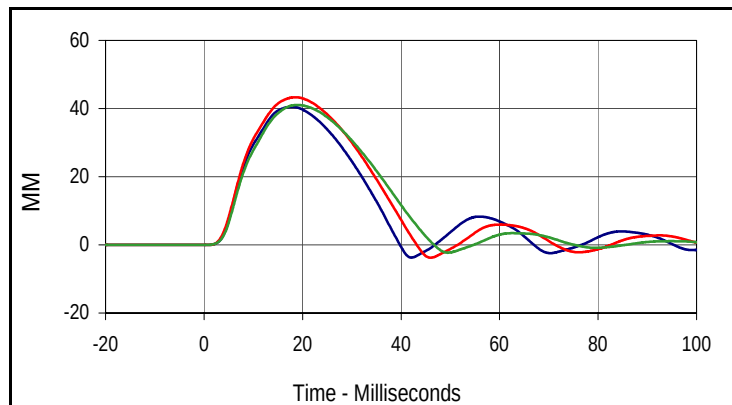
Test Date: 1/16/15
 Test I.D.: F037TH070



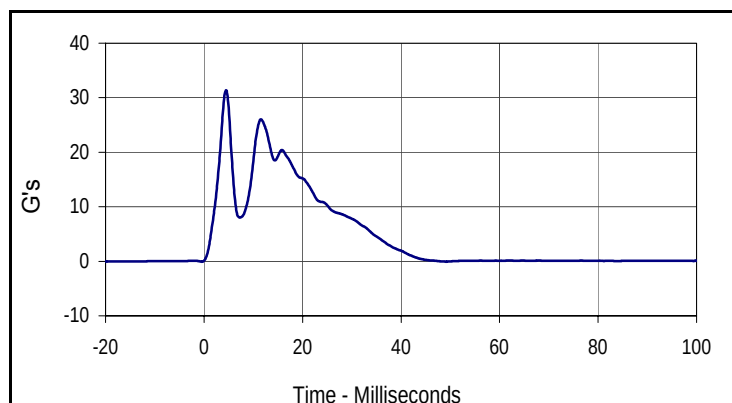
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	590	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.6	Pass
	Min °C		21.1	Pass
Humidity During Soak	Max %	10.0 to 70.0	34.0	Pass
	Min %		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.6	Pass
Peak Impactor Velocity	m/s	5.4 to 5.6	5.56	Pass
Peak Impactor Force	N	5100 to 6200	5967.1	Pass
	msec	> 6.0 msec	11.6	Pass
Peak Upper Rib Deflection	mm	34 to 41	40.5	Pass
Peak Middle Rib Deflection	mm	37 to 45	43.3	Pass
Peak Lower Rib Deflection	mm	37 to 44	41.1	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
7186.3	4.5	-13.9	49.1



Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
40.5	17.8	-3.7	42.1
Max (Middle)	Time	Min (Middle)	Time
43.3	18.5	-3.8	46.0
Max (Lower)	Time	Min (Lower)	Time
41.1	18.9	-2.3	49.5



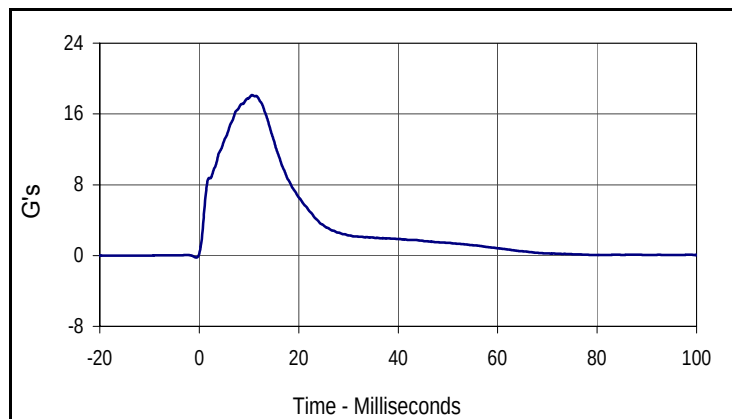
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
31.4	4.5	-0.1	49.1

Test Program: ES2re Abdomen Impact Test
 ATD Serial No.: F037

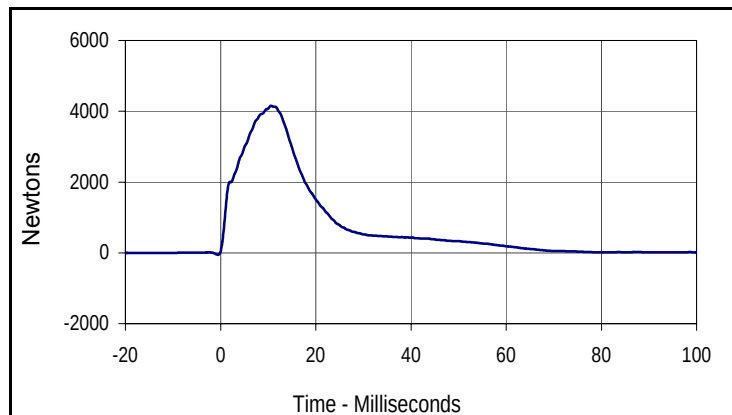
Test Date: 1/16/15
 Test I.D.: F037ABD070



Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	660	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.4	Pass
Probe Velocity	m/s	3.9 to 4.1	4.01	Pass
Peak Impactor Force	N	4000 to 4800	4153.4	Pass
	msec	10.6 to 13.0	10.6	Pass
Sum of Abdominal Forces	N	2200 to 2700	2370.6	Pass
	msec	10.0 to 12.3	10.5	Pass
Overall Test Results				Pass



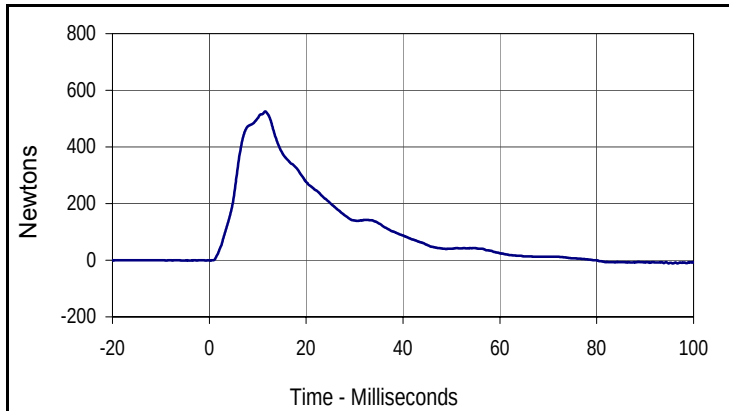
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
18.1	10.6	-0.2	-0.6



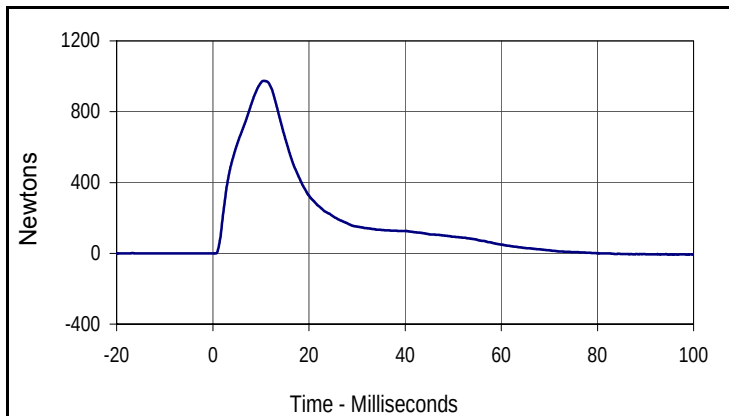
Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4153.4	10.6	-52.9	-0.6

Test Program: ES2re Abdomen Impact Test
 ATD Serial No.: F037

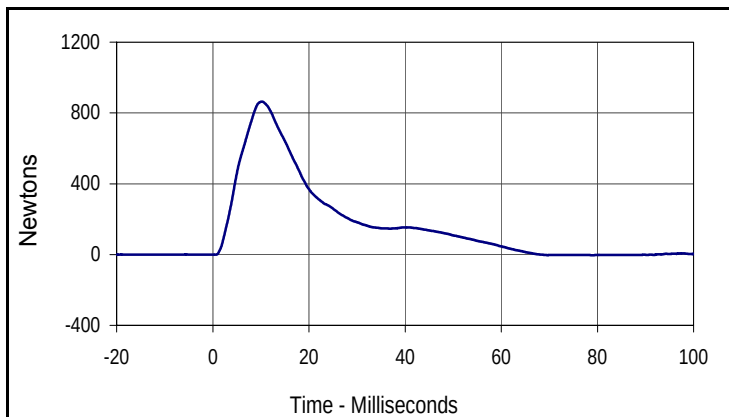
Test Date: 1/16/15
 Test I.D.: F037ABD070



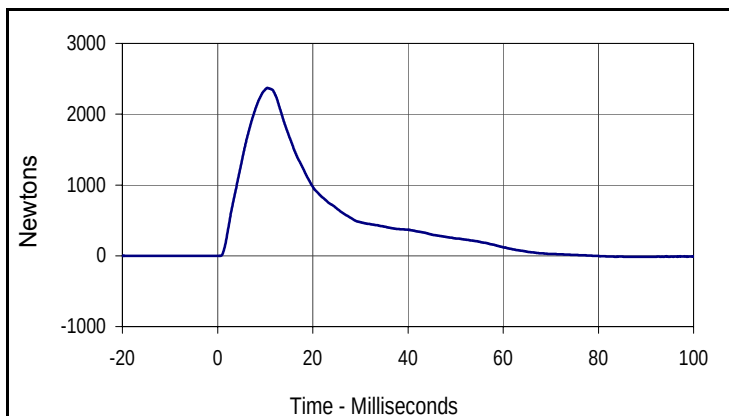
Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
525.5	11.5	-11.4	95.7



Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
974.6	10.6	-8.0	94.8



Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
864.6	10.2	-3.9	111.1



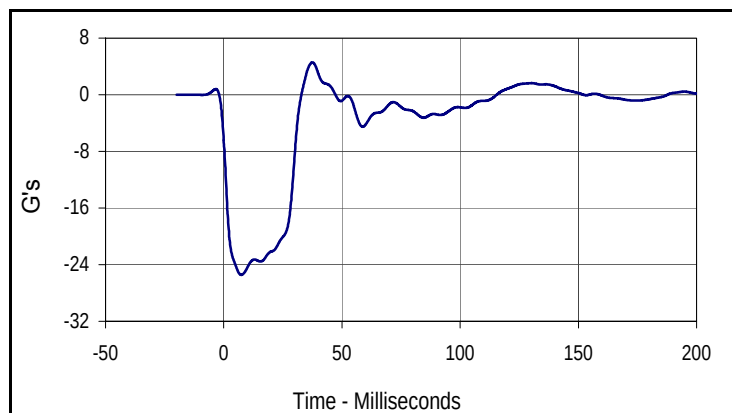
Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
006	RES	600	Newtons
Max	Time	Min	Time
2370.6	10.5	-15.8	92.0

Test Program: ES2re Lumbar Flexion Test
 ATD Serial No.: F037

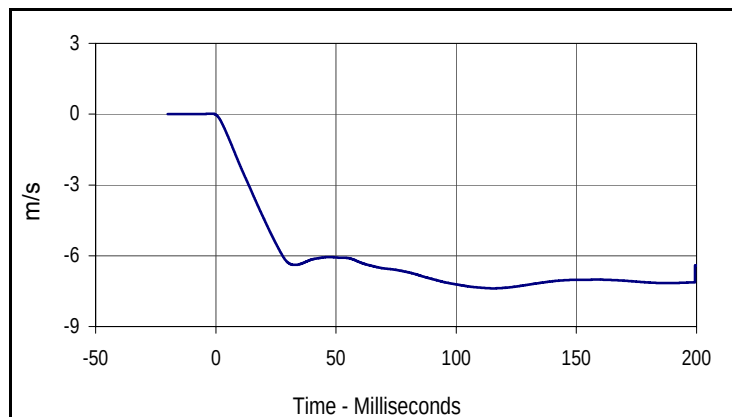
Test Date: 1/16/15
 Test I.D.: F037LB070



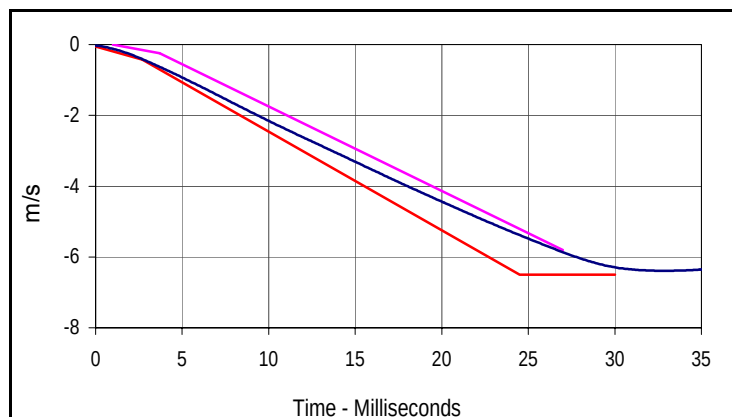
Tested Parameter	Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time	Minutes	≥240	735	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.6	Pass
Pendulum Velocity	m/s	5.95 to 6.15	5.96	Pass
Headform Rotation	Max	45 to 55	48.8	Pass
	Time	39 to 53	42.3	Pass
Time of Decay to Zero Angle from Peak	msec	37 to 57	44.0	Pass
Overall Test Results				Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
4.6	38.1	-25.4	8.0



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.3	-7.4	116.1



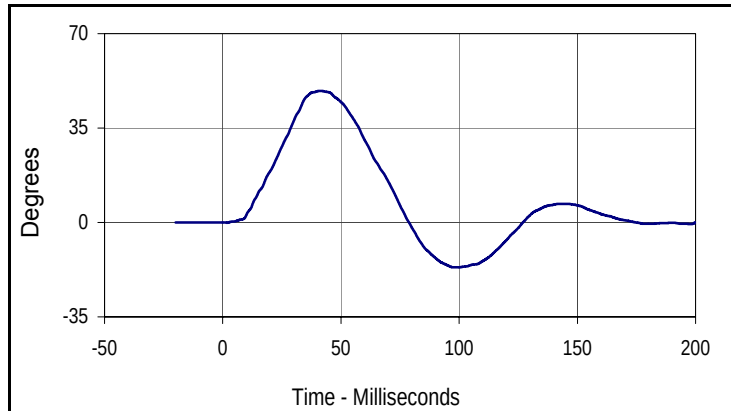
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.3	-7.4	116.1

Velocity Corridors

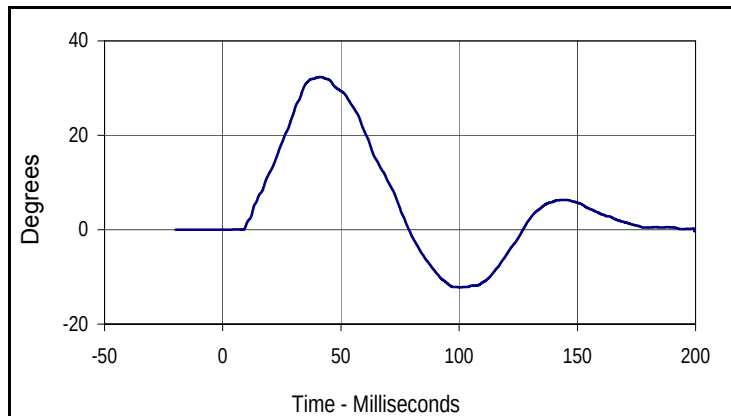
Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.50
		30.0	-6.50

Test Program: ES2re Lumbar Flexion Test
 ATD Serial No.: F037

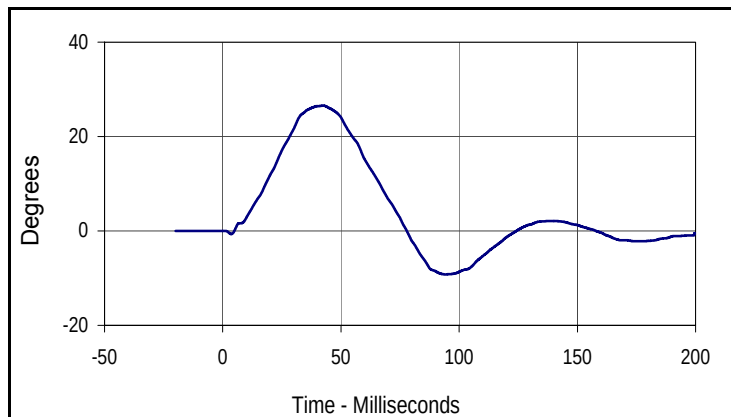
Test Date: 1/16/15
 Test I.D.: F037LB070



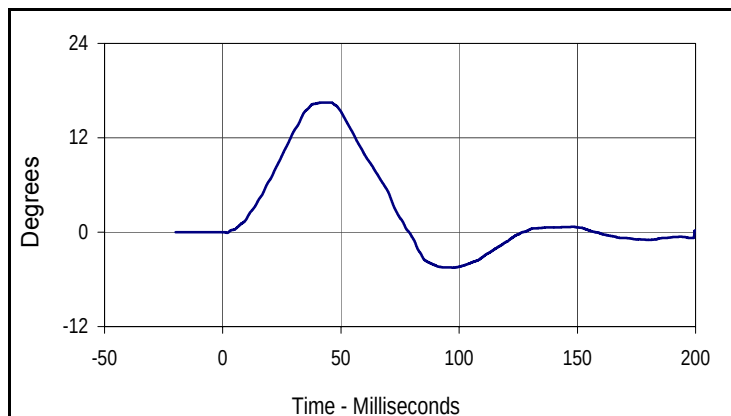
Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
48.8	42.3	-16.6	98.5



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
32.3	42.3	-12.2	101.2



Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
26.6	43.1	-9.2	94.7



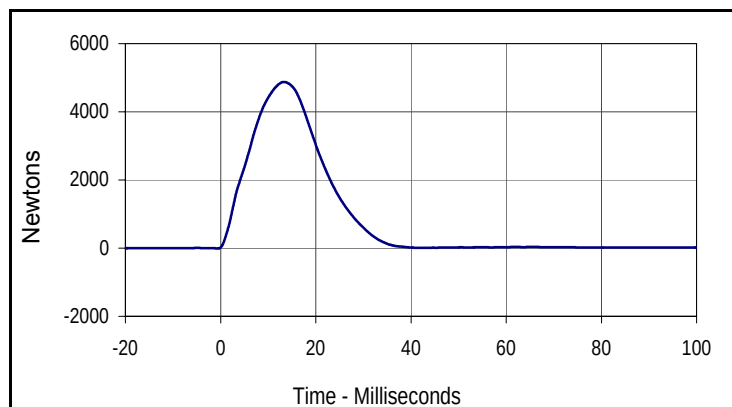
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
006	FIL	180	Degrees
Max	Time	Min	Time
16.5	46.2	-4.5	98.1

Test Program: ES2re Pelvis Impact Test
 ATD Serial No.: F037

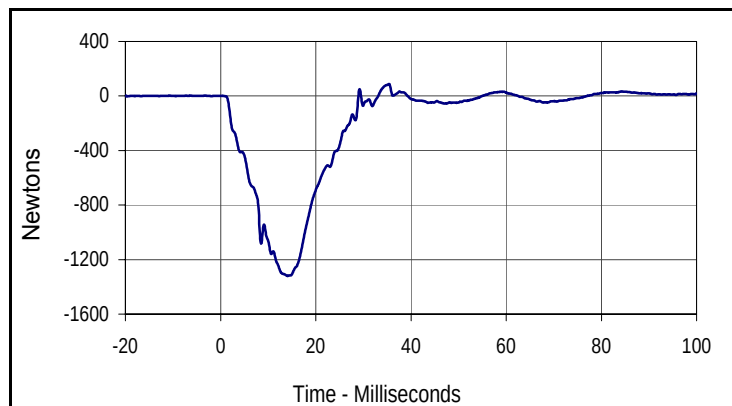
Test Date: 1/16/15
 Test I.D.: F037PL070



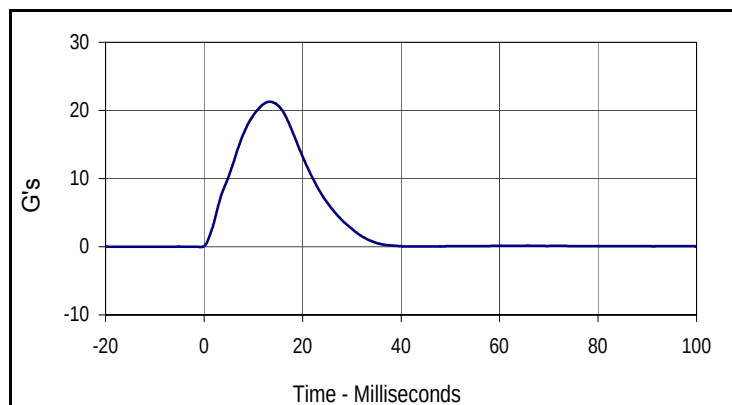
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	790	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		33.4	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.5	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.32	Pass
Peak Impactor Force	N	4700 to 5400	4876.8	Pass
	msec	11.8 to 16.1	13.4	Pass
Peak Pubic Symphysis Load	N	-1230 to -1590	-1319.6	Pass
	msec	12.2 to 17.0	14.1	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4876.8	13.4	-9.6	-0.6



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
87.9	35.4	-1319.6	14.1



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
21.3	13.4	0.0	-0.6

Test Program: SID IIs External Measurements
 ATD Serial No.: 307

Test Date: 1/19/15
 Test I.D.: N/A



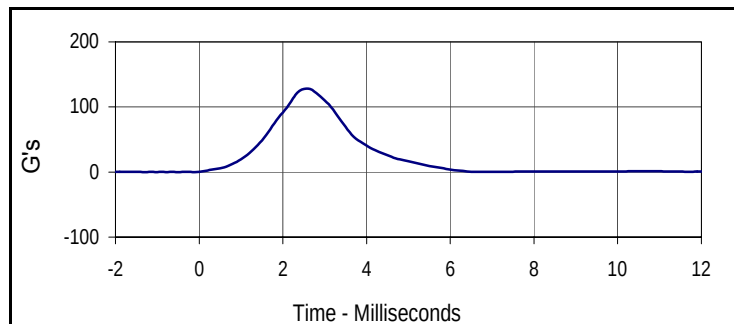
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	144	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	128	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	43	Pass
I	Head Depth	mm	178 - 188	185	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	525	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	223	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	319	Pass
R	Arm Length	mm	249 - 259	254	Pass
S	Knee Joint to Seatback	mm	477 - 493	483	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	89	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.: 307

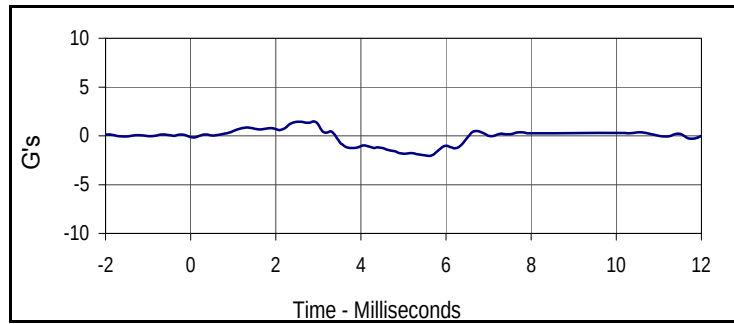
Test Date: 1/19/15
 Test I.D.: 307HD079



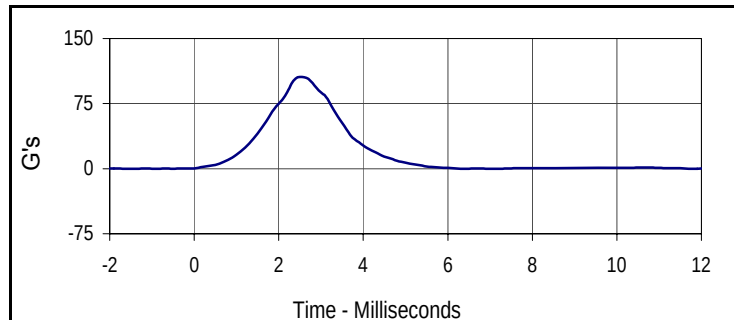
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	345	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.6	Pass
	Min	°C		21.3	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		31.7	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.9	Pass
Peak Head Resultant Acceleration		G's	115 to 137	128.0	Pass
Peak Head X Acceleration		G's	<15	2.1	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	0.6	Pass
Overall Test Results					Pass



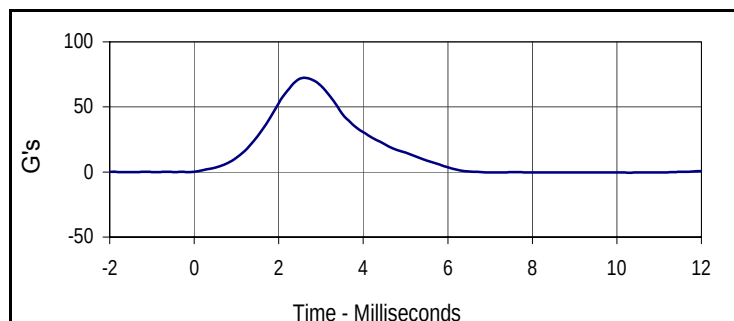
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
128.0	2.6	0.0	-1.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.5	2.9	-2.1	5.6



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
105.6	2.5	-0.4	-7.3



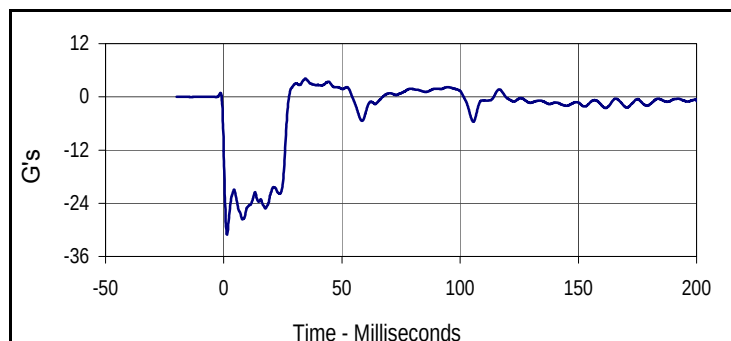
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
72.5	2.6	-0.5	10.3

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 307

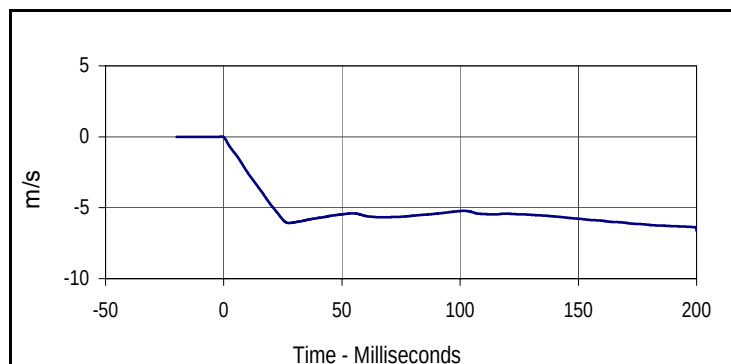
Test Date: 1/19/15
 Test I.D.: 307NB079



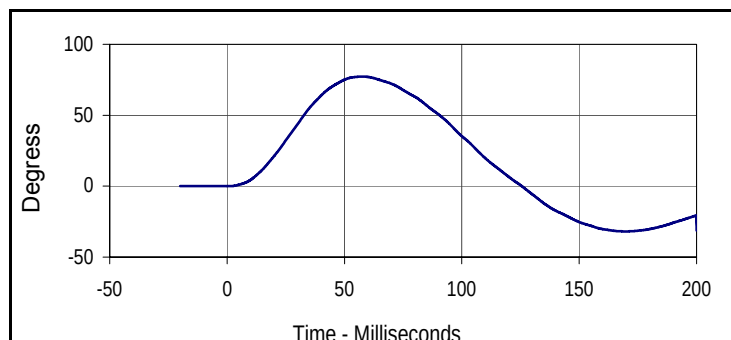
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	390	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	31.9	Pass
	Min		31.7	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.9	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.54	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.49	Pass
	15 msec	-3.30 to -4.10	-3.64	Pass
	20 msec	-4.40 to -5.40	-4.81	Pass
	25 msec	-5.40 to -6.10	-5.84	Pass
	25-100 msec	-5.50 to -6.20	-6.07	Pass
D-Plane Rotation	Max	71 to 81	77.2	Pass
	Time	50 to 70	57.7	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-38.4	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	104.8	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
4.1	0.0	-31.1	0.0



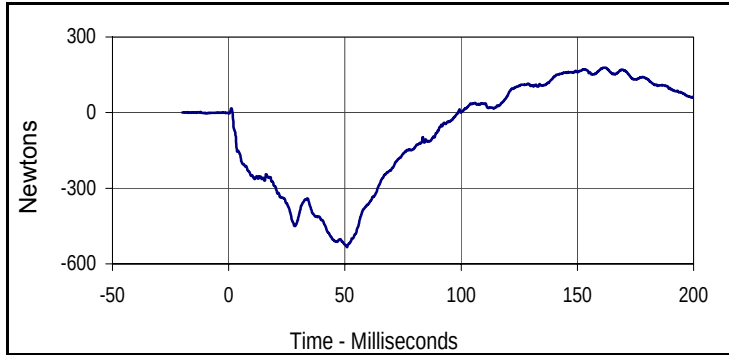
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.9	-6.6	200.0



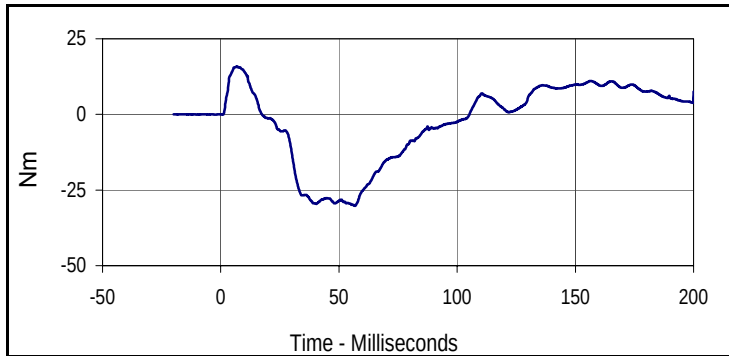
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degress
Max	Time	Min	Time
77.2	57.7	-31.9	169.9

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 307

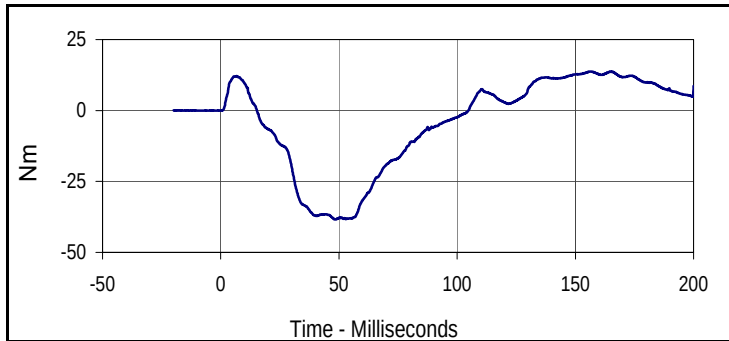
Test Date: 1/19/15
 Test I.D.: 307NB079



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
178.7	161.8	-533.5	50.9



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
15.9	6.9	-30.2	56.8



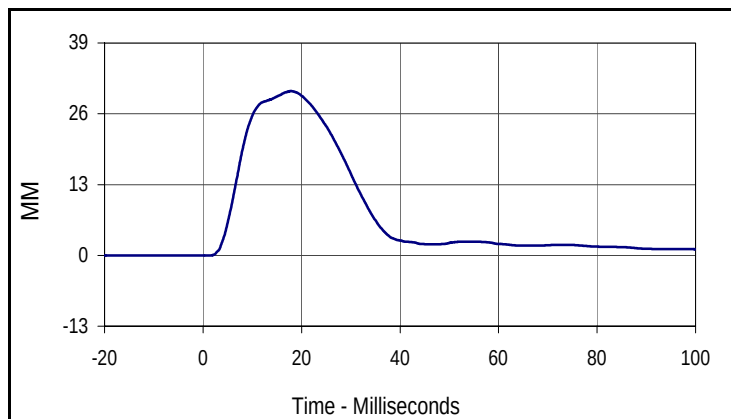
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
13.7	156.5	-38.4	48.4

Test Program: SID IIs Shoulder Impact Test
 ATD Serial No.: 307

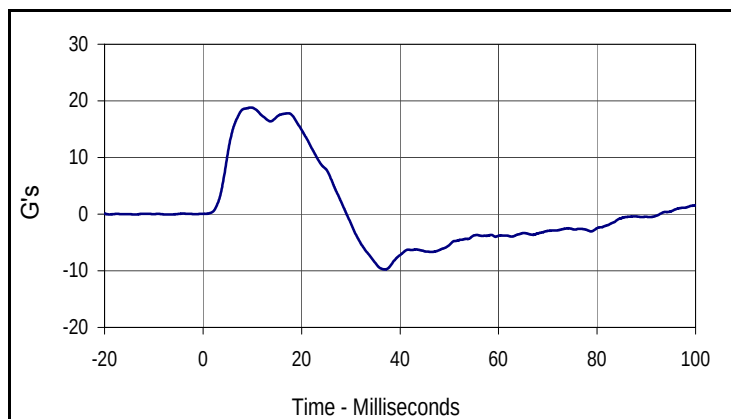
Test Date: 1/19/15
 Test I.D.: 307SH079



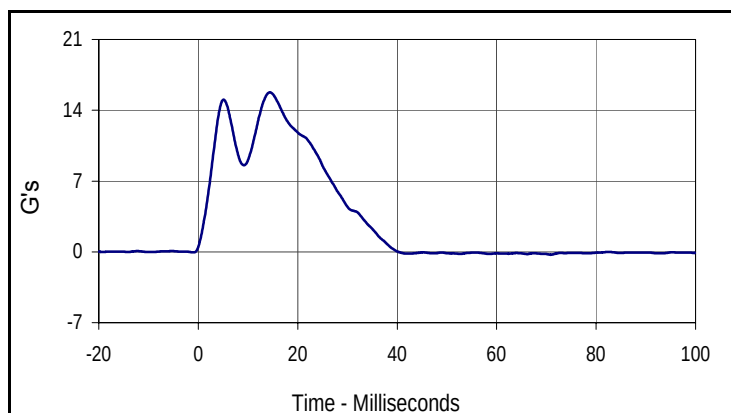
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	445	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.6	Pass
	Min °C		21.3	Pass
Humidity During Soak	Max %	10.0 to 70.0	31.9	Pass
	Min %		31.7	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.8	Pass
Impactor Velocity	m/s	4.20 to 4.40	4.31	Pass
Peak Shoulder Deflection	mm	28 to 37	30.2	Pass
Peak Lateral Spine Acceleration Y	G's	17 to 22	18.8	Pass
Peak Impactor Acceleration	G's	13 to 18	15.8	Pass
Overall Test Results			Pass	



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.2	17.9	0.0	-17.3



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.8	9.7	-9.8	36.9



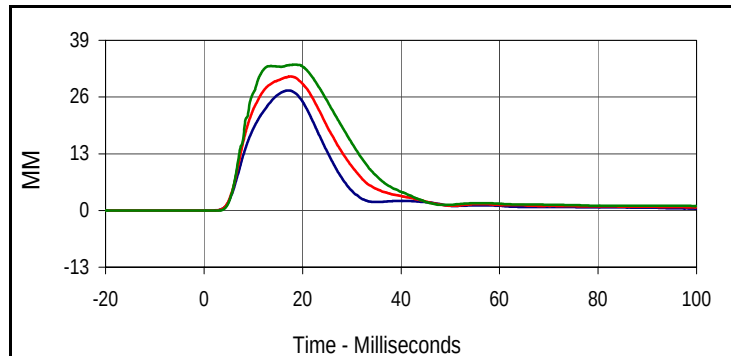
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.8	14.4	-0.3	70.9

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 307

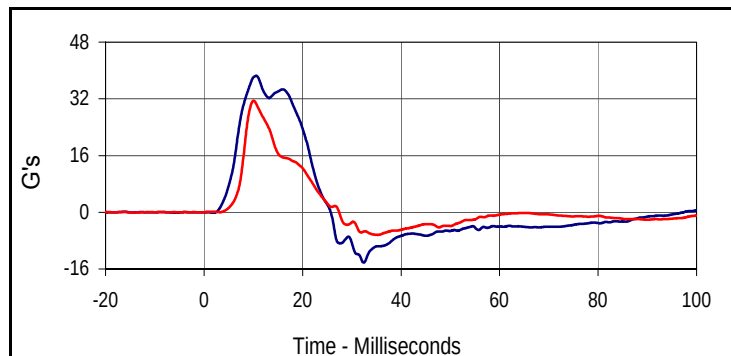
Test Date: 1/19/15
 Test I.D.: 307TWA079



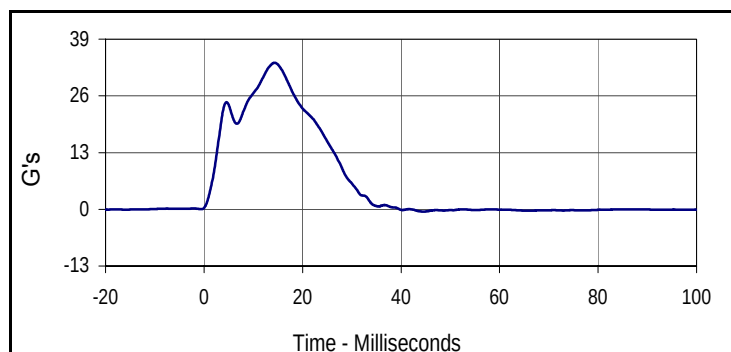
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	490	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	31.9	Pass
	Min		31.7	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.7	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.72	Pass
Peak Shoulder Deflection	mm	31 to 40	34.4	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	27.5	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	30.7	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	33.4	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	38.5	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	31.5	Pass
Peak Impactor Acceleration	G's	30 to 36	33.6	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
27.5	17.2	0.0	-11.6
Middle Thorax Deflection			
Max	Time	Min	Time
30.7	17.6	0.0	-17.9
Lower Thorax Deflection			
Max	Time	Min	Time
33.4	18.4	0.0	-17.4



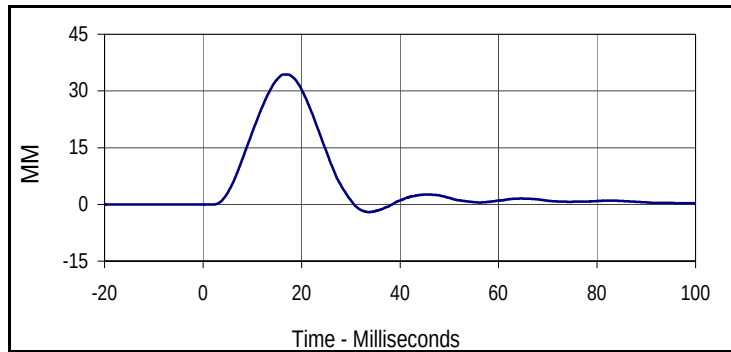
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
38.5	10.6	-14.2	32.4
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.5	10.1	-6.4	35.3



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.6	14.3	-0.5	44.6

Test Program: SID IIs Thorax with Arm Impact Test
 ATD Serial No.: 307

Test Date: 1/19/15
 Test I.D.: 307TWA079



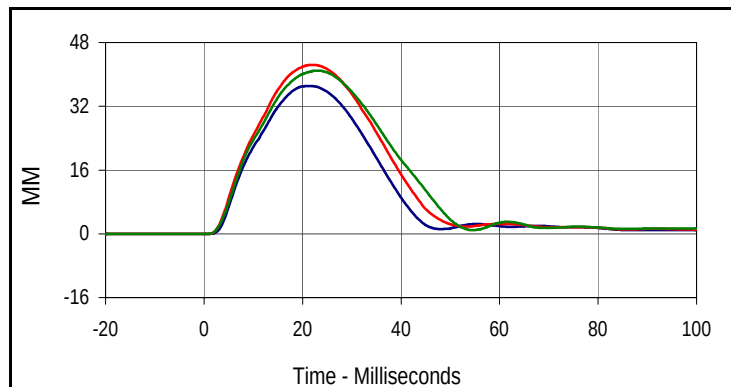
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
34.4	16.8	-2.0	33.7

Test Program: SID IIs Thorax without Arm Impact Test
 ATD Serial No.: 307

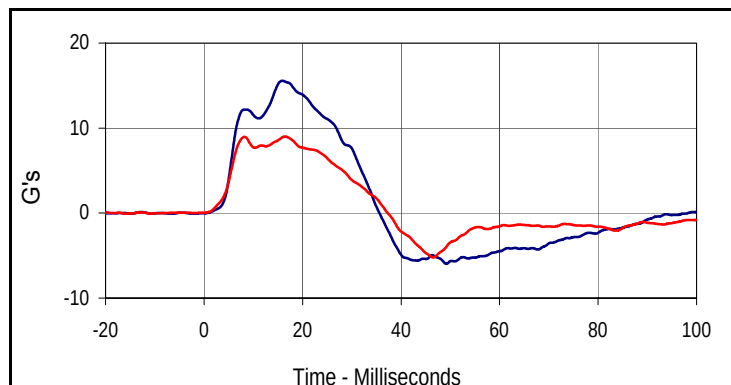
Test Date: 1/19/15
 Test I.D.: 307TWOA079



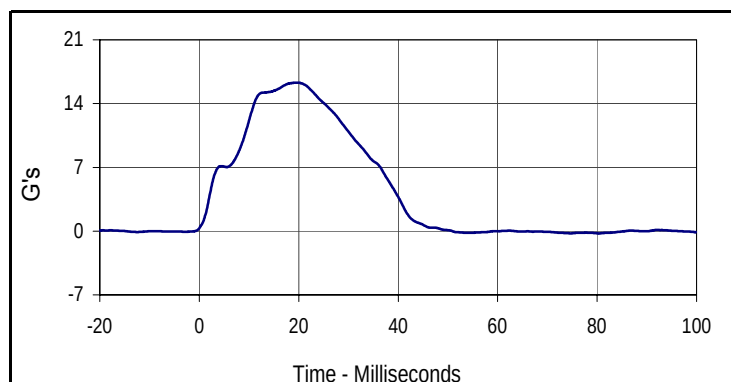
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	545	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.6	Pass
	Min	°C		21.3	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		31.7	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.7	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.37	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	37.1	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	42.4	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	41.0	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.6	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.0	Pass
Peak Impactor Acceleration		G's	14 to 18	16.3	Pass
Overall Test Results				Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
37.1	21.2	0.0	-12.5
Middle Thorax Deflection			
Max	Time	Min	Time
42.4	21.9	0.0	-11.1
Lower Thorax Deflection			
Max	Time	Min	Time
41.0	23.1	0.0	-7.2



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.6	15.9	-6.0	49.2
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.0	16.4	-5.2	46.6



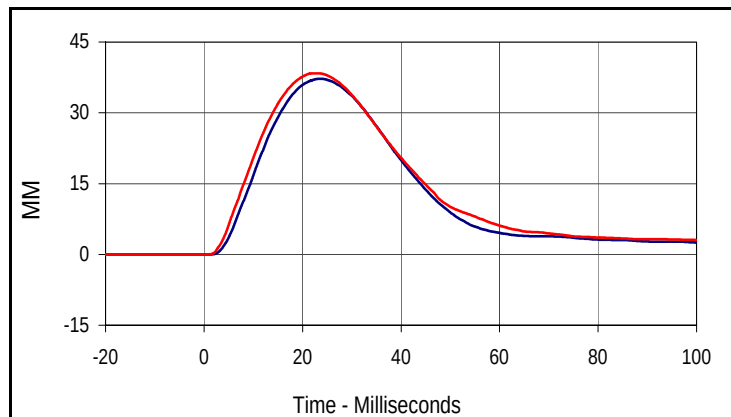
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.3	19.7	-0.2	74.7

Test Program: SID IIs Abdomen Impact Test
 ATD Serial No.: 307

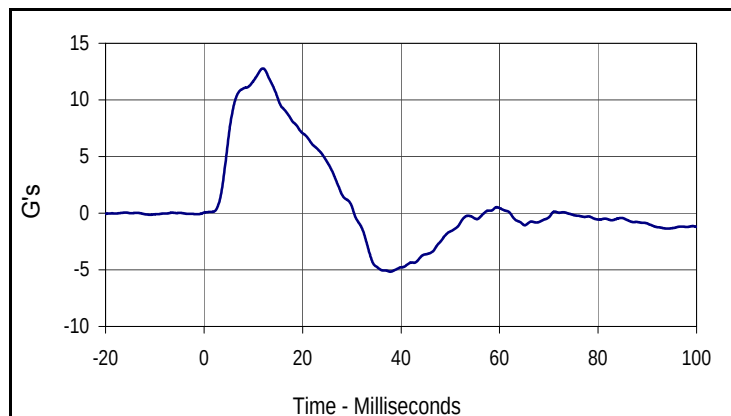
Test Date: 1/19/15
 Test I.D.: 307ABD079



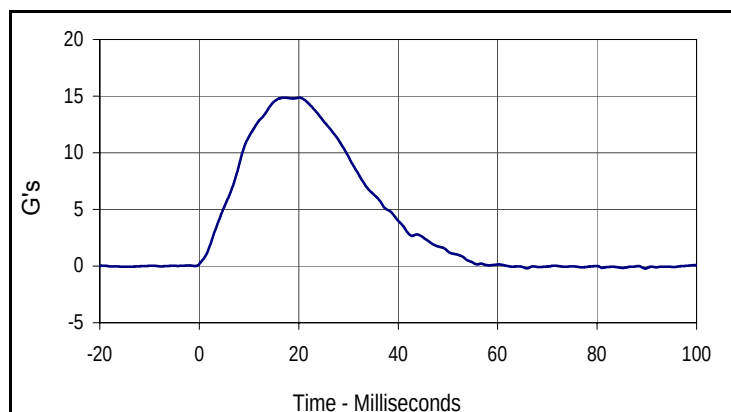
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	600	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	31.9	Pass
	Min		31.7	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.7	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.34	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	37.2	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	38.4	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.8	Pass
Peak Impactor Acceleration	G's	12 to 16	14.9	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
37.2	23.5	0.0	-13.6
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
38.4	22.5	0.0	-16.4

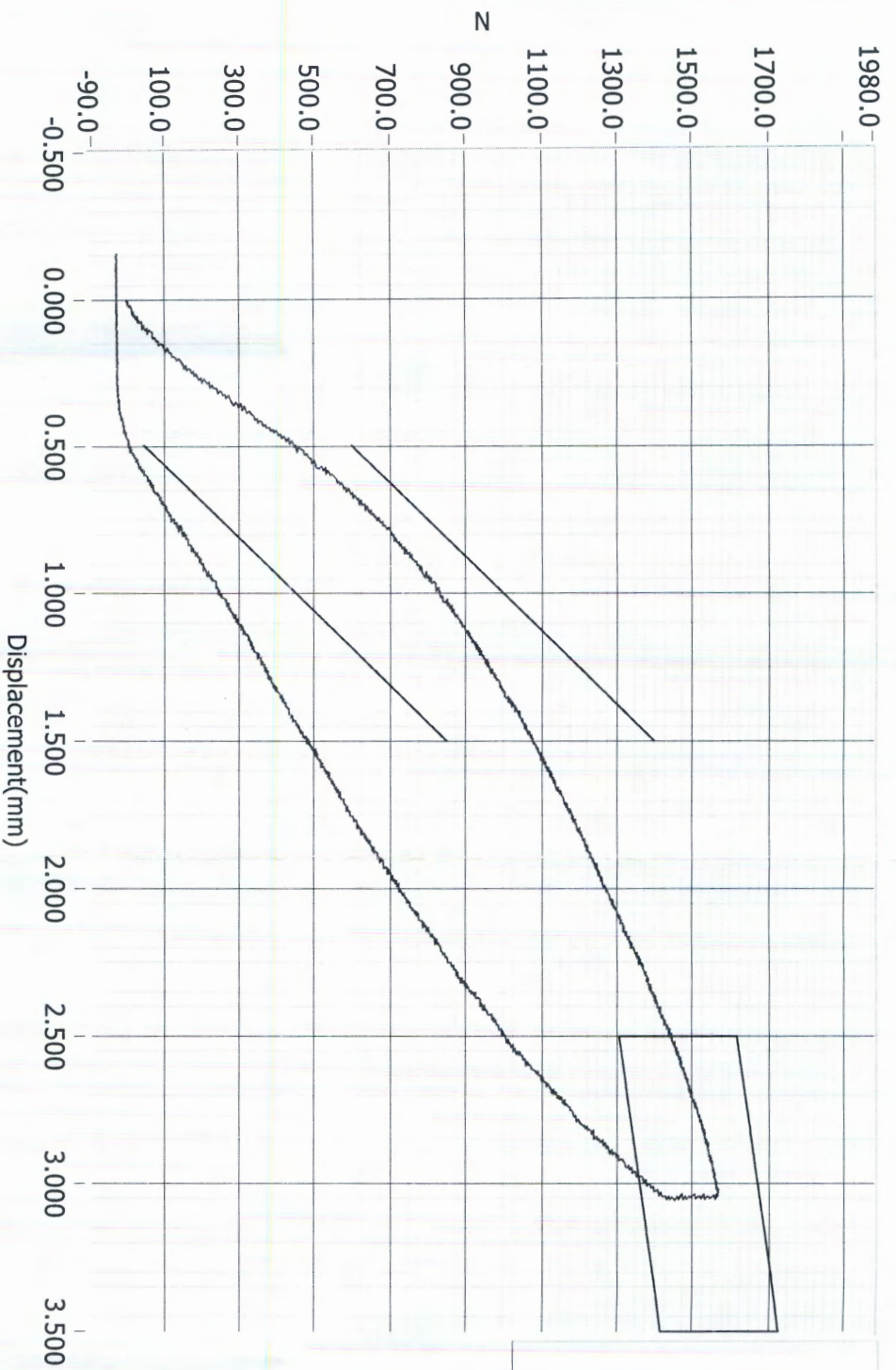


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.8	12.0	-5.2	37.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.9	20.2	-0.2	89.7

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

1562N

ATD Calibration Lab

M20154108 Post Test

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
	70981	12/13/2013	10:48 PM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDIIs	

Current Date : 12/13/2013

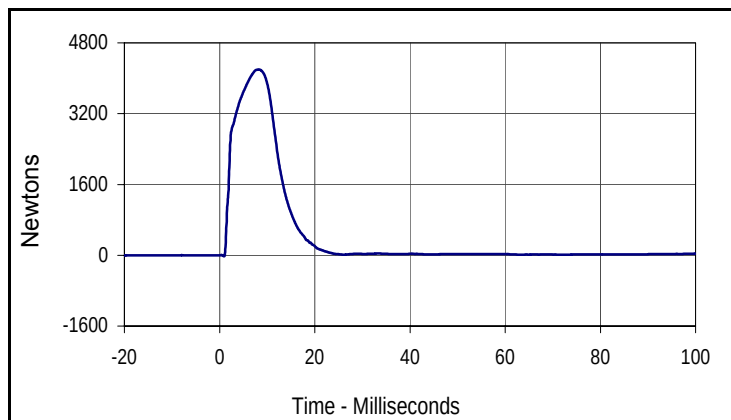
Current Time : 22:48:58

Test Program: SID IIs Pelvis Acetabulum Impact Test
 ATD Serial No.: 307

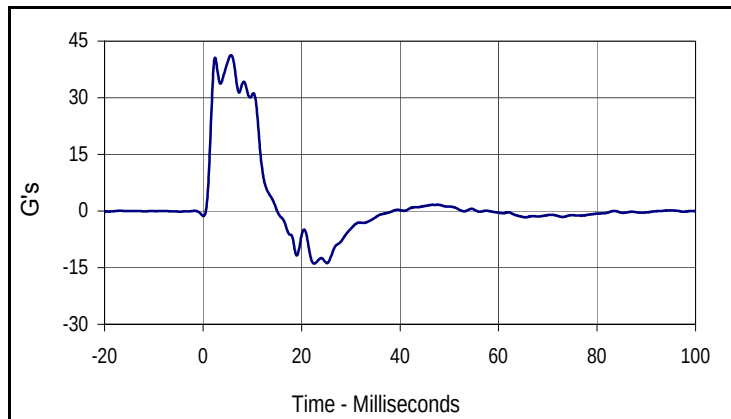
Test Date: 1/19/15
 Test I.D.: 307ACET079



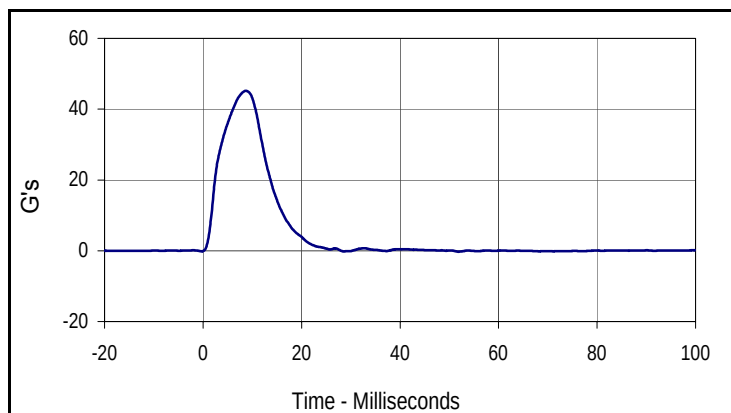
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	650	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	31.9	Pass
	Min		31.7	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.7	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.68	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	4197.0	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	40.7	Pass
Peak Impactor Acceleration	G's	38 to 47	45.2	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4197.0	8.3	-26.5	1.0



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.3	5.7	-13.9	22.6



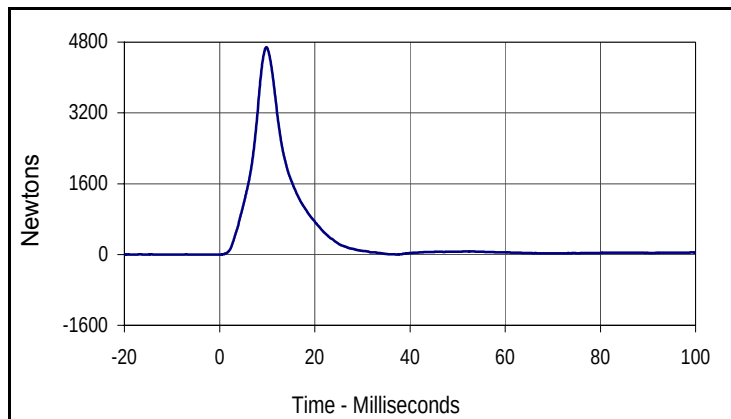
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.2	8.6	-0.3	51.8

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 307

Test Date: 1/19/15
 Test I.D.: 307PL079



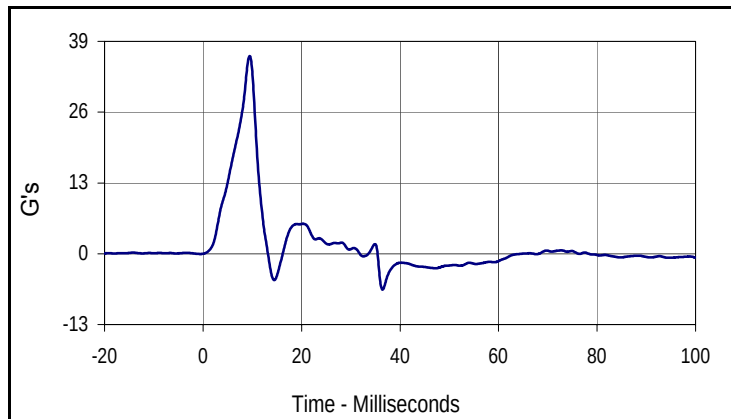
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	705	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		21.3	Pass
Humidity During Soak	Max	10.0 to 70.0	31.9	Pass
	Min		31.7	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.7	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.35	Pass
Peak Iliac Force	Newtons	4100 to 5100	4685.5	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	36.3	Pass
Peak Impactor Acceleration	G's	36 to 45	42.9	Pass
Overall Test Results			Pass	



Curve Description

Pelvis Iliac Force

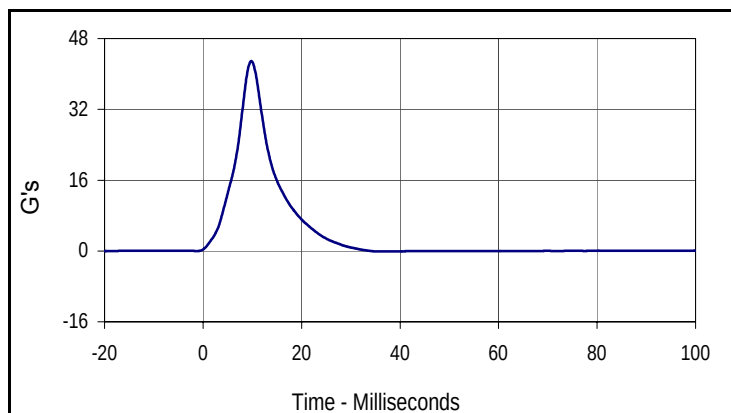
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4685.5	9.8	-2.7	37.3



Curve Description

Pelvis Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
36.3	9.5	-6.6	36.4



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
42.9	9.8	-0.1	35.7

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F037		
			Serial Number	Manufacturer	Calibration
Head Accelerometers	Primary	X	P58858	Endevco	10/11/14
		Y	P58865	Endevco	10/11/14
		Z	P58867	Endevco	10/11/14
	Redundant	X	P58859	Endevco	10/11/14
		Y	P58866	Endevco	10/11/14
		Z	P58873	Endevco	10/11/14
Thorax Rib Displacement Potentiometers	Upper	Y	209	FTSS	10/12/14
	Middle	Y	210	FTSS	10/12/14
	Lower	Y	207	FTSS	10/12/14
Abdomen Load Cells	Forward	Y	1504	Denton	5/1/14
	Middle	Y	1505	Denton	5/1/14
	Rear	Y	1506	Denton	5/1/14
Lower Spine Accelerometers (T12)		X	P16336	Endevco	10/11/14
		Y	P52027	Endevco	10/11/14
		Z	P58877	Endevco	10/11/14
Pubic Symphysis Load Cell		Y	DG6784	Denton	5/15/14

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 307			
				Serial Number	Manufacturer	Calibration	
Head Accelerometers			Primary	X	P58900	Endevco	9/29/14
				Y	P58902	Endevco	9/29/14
				Z	P58983	Endevco	9/29/14
			Redundant	X	P58901	Endevco	9/29/14
				Y	P58906	Endevco	9/29/14
				Z	P58989	Endevco	9/29/14
Displacement Potentiometers	Thoracic Rib	Upper	Y	1249	FTSS	9/30/14	
		Middle	Y	1265	FTSS	9/30/14	
		Lower	Y	1277	FTSS	9/30/14	
	Abdominal Rib	Upper	Y	1286	FTSS	9/30/14	
		Lower	Y	1290	FTSS	9/30/14	
Lower Spine Accelerometers (T12)				X	P59007	Endevco	9/30/14
				Y	P59015	Endevco	9/30/14
				Z	P58995	Endevco	9/30/14
Acetabulum Load Cell				Y	260	Denton	5/8/14
Iliac Wing Load Cell				Y	272	Denton	4/4/14
Pelvis Plug (Struck Side)					70698	FTSS	12/12/13
Pelvis Plug (Non-Struck Side)					72941	FTSS	2/8/14

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A148233	MSI	9/23/14
	Vehicle Center of Gravity	Y	A148270	MSI	9/23/14
	Vehicle Center of Gravity	Z	A147453	MSI	9/11/14
2	Right Sill at Front Seat	X	A148200	MSI	9/18/14
	Right Sill at Front Seat	Y	A148238	MSI	9/23/14
	Right Sill at Front Seat	Z	A148206	MSI	9/18/14
3	Right Sill at Rear Seat	X	N/A	N/A	N/A
	Right Sill at Rear Seat	Y	N/A	N/A	N/A
	Right Sill at Rear Seat	Z	N/A	N/A	N/A
4	Left Sill at Front Door	Y	A145441	MSI	8/11/14
5	Left Sill at Rear Door	Y	A147446	MSI	9/11/14
6	Left A-Post Lower	Y	A147475	MSI	9/11/14
7	Left A-Post Middle	Y	A147442	MSI	9/11/14
8	Left B-Post Lower	Y	N/A	N/A	N/A
9	Left B-Post Middle	Y	N/A	N/A	N/A
10	Front Seat Track	Y	A147466	MSI	9/11/14
11	Rear Seat Structure	Y	N/A	N/A	N/A
12	Right Rear Occ. Compartment	Y	A148194	MSI	9/18/14
13	Engine Block	X	A145454	MSI	8/16/14
	Engine Block	Y	A145439	MSI	8/16/14
14	Rear Floorpan Above Axle	X	A145448	MSI	8/13/14
	Rear Floorpan Above Axle	Y	A145470	MSI	8/16/14
	Rear Floorpan Above Axle	Z	A145479	MSI	8/16/14

TABLE 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	A128040	MSI	10/3/14
MDB Center of Gravity	Y	A124105	MSI	10/3/14
MDB Center of Gravity	Z	A104832	MSI	10/3/14
Left Frame at Rear Axle Centerline	X	A104798	MSI	10/3/14
Left Frame at Rear Axle Centerline	Y	A104808	MSI	10/3/14