REPORT NUMBER: SINCAP-KAR-12-031

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

TOYOTA MOTOR CORPORATION

2012 TOYOTA YARIS LE 5-DOOR HATCHBACK

NHTSA No: MC5107

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

JANUARY 17, 2012

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

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FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

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16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2012 Toyota Yaris LE 5-door hatchback in accordance with the specifications of the Office of Crashworthiness 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 4, 2012.

The impact velocity of the Moving Deformable Barrier was 61.9 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 19.4 deg. C. The target vehicle's maximum post-test static crush was 239 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	157.1
Maximum Thorax Rib Deflection	mm	44	25
Total Abdominal Force	N	2500	1143
Pubic Symphysis Force	N	6000	1957

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	449.9
Resultant Lower Spine Acceleration	g	82	81
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	3664
Maximum Thoracic Rib Deflection	mm	38*	34
Maximum Abdominal Rib Deflection	mm	45*	36

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

** Proposed IARV*

17. Key Words		18. Distribution Statement	
New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		Copies of this report are available from: National Highway Traffic Safety Admin. Technical Information Services Division, NPO-411 1200 New Jersey Ave., SE, Room E12-100 Washington, DC 20590	
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TABLE OF CONTENTS

Section		Page
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4

Data Sheet		Page
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	20
10	Test Vehicle Profile Measurements	21
11	Test Vehicle Exterior Crush Measurements	22
12	MDB Exterior Static Crush Measurements	25
13	FMVSS No. 301 Static Rollover Results	26
14	Dummy/Vehicle Temperature and Humidity Stabilization	27

Appendix		Page
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 MY 2012 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 2012 Toyota Yaris LE 5-door hatchback. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated August 2011.

SECTION 2
SUMMARY OF TEST RESULTS

A 2012 Toyota Yaris LE 5-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 61.9 km/h (38.5 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 4, 2012. 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 August 2011. The side impact event was documented by 11 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (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.

Dummy injury readings were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	157.1
Maximum Thorax Rib Deflection	mm	44	25
Combined Abdominal Force	N	2500	1143
Pubic Symphysis Force	N	6000	1957

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	449.9
Lower Spine (T12) Resultant Acceleration	g	82	81
Total Pelvic Force (sum of acetabular and iliac forces	N	5525	3664
Maximum Thoracic Rib Deflection	mm	38*	34
Maximum Abdominal Rib Deflection	mm	45*	36

**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/Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other (Seat Cushion Airbag)	Yes	No	No	

GENERAL COMMENTS

The doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. The left rear door skin separated from the frame. The doors on the non-struck side remained closed and latched. There were no ATD values that exceeded limits.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

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	^oF	^oC	=(Tf -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: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC5107	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Toyota	Automatic Door Locks	No
Model	Yaris LE	Power Window Auto-Reverse	Yes
Body Style	5-Door Hatchback	Other Optional Feature	None
VIN	JTDKTUD34CD503930	Driver Front Airbag	Yes
Body Color	Waveline Pearl/Gray	Driver Curtain Airbag	Yes
Odometer Reading (km / mi)	105 / 65	Driver Head/Torso Airbag	No
Engine Displacement (L)	1.5	Driver Torso Airbag	No
Type / No. of Cylinders	Inline 4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Transverse	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	4	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Front	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof / T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensione	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
All Wheel Drive (AWD)	No	Other Safety Restraint	Seat Cushion Airbag

Does Owner's Manual provide instructions to turn off automatic door locks?

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation	GVWR (kg)	1660
Date of Manufacture	Sep-11	GAWR Front (kg)	830
Vehicle Type	Passenger Car	GAWR Rear (kg)	830

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				376.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				35.8	*A-B*

VEHICLE SEAT TYPE

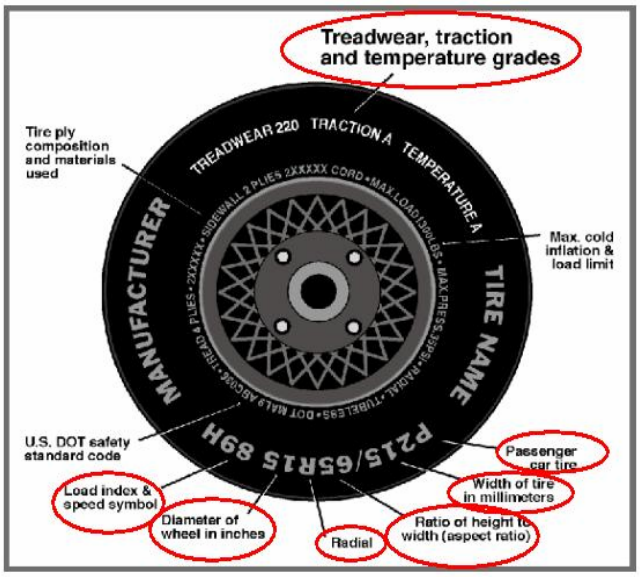
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	230	230
Recommended Tire Size	P175/65R15	P175/65R15

VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Tire Size on Vehicle	P175/65R15	P175/65R15
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Turanza	Turanza
Tire Type	Passenger	Passenger
Tire Width	175	175
Aspect Ratio	65	65
Radial	Yes	Yes
Wheel Diameter	15	15
Load Index/Speed Symbol	84H	84H
Treadware	300	300
Traction Grade	A	A
Temperature Grade	A	A
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	230	230	230
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

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

		As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
	Units	Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	347.0	215.5		337.0	259.5		393.5	283.0	
Right	kg	327.0	203.0		371.5	276.5		330.5	244.5	
Ratio	%	61.7%	38.3%	100.0%	56.9%	43.1%	100.0%	57.9%	42.1%	100.0%
Total	kg	674.0	418.5	1092.5	708.5	536.0	1244.5	724.0	527.5	1251.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1092.5	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	35.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1253.3	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**

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Rear Bumper Cover	2.5
Rear Taillights	3.0
Non-Struck Side Windows	5.0
Speakers	1.0
Outboard Mirror	1.0
Non-Struck Side Door Panels	5.0
Spare Tire	11.0
Spare Tire Tools	4.0
Headlights	5.0
Front Bumper Cover	2.5
Ballast / Equipment Added	128.0

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	633	636	Yes
RF	mm	653	643	Yes
RR	mm	631	621	Yes
LR	mm	637	630	Yes
Vehicle CG (Aft of Front Axle)	mm	1058	1081	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	60	-31	

***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. 2

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

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

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 rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	7.3	0.0	3.6
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle	As Tested SCRP Height	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	3.6	556	Max	546	556	566
			Mid	546	556	566
			Min	546	556	566
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 … (CONTINUED)

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

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

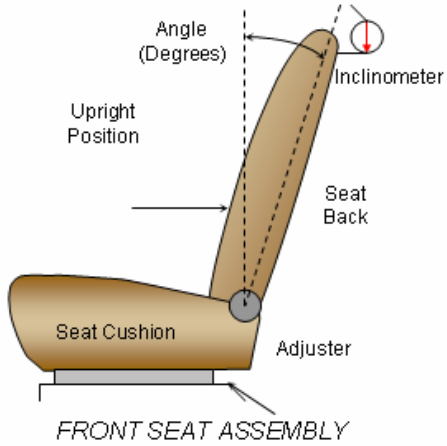
Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	220	23	110	11
Front Passenger Seat	220	23	110	11
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	52.1	27	1.1	3
Front Passenger Seat	51.9	27	1.0	3
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

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

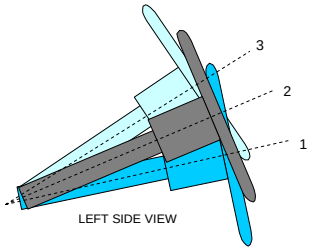
HEAD RESTRAINT ADJUSTMENT

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	3	Full Up
Rear Seat	Fixed	Fixed

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.



STEERING COLUMN ASSEMBLY

	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	23.1	
Geometric Center - Position 2	24.6	
Uppermost - Position 3	26.2	
Telescoping Steering Wheel Travel		
Test Position	24.6	

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

FUEL TANK CAPACITY

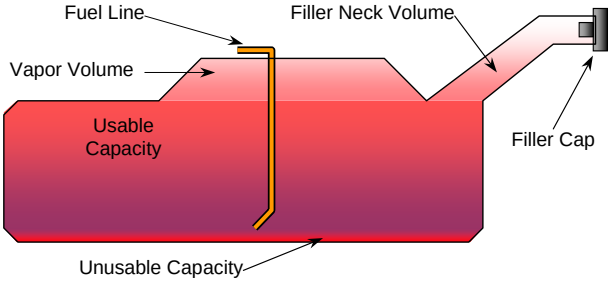
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	42.01
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	39.07
Actual amount of Solvent Used in Test	27.71
1/3 of Usable Capacity	14.00

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

NOTE: Solvent was removed from the fuel tank to achieve test weight.

FUEL PUMP

The vehicle is equipped with an electric fuel pump. The fuel pump is activated when the ignition is turned on.



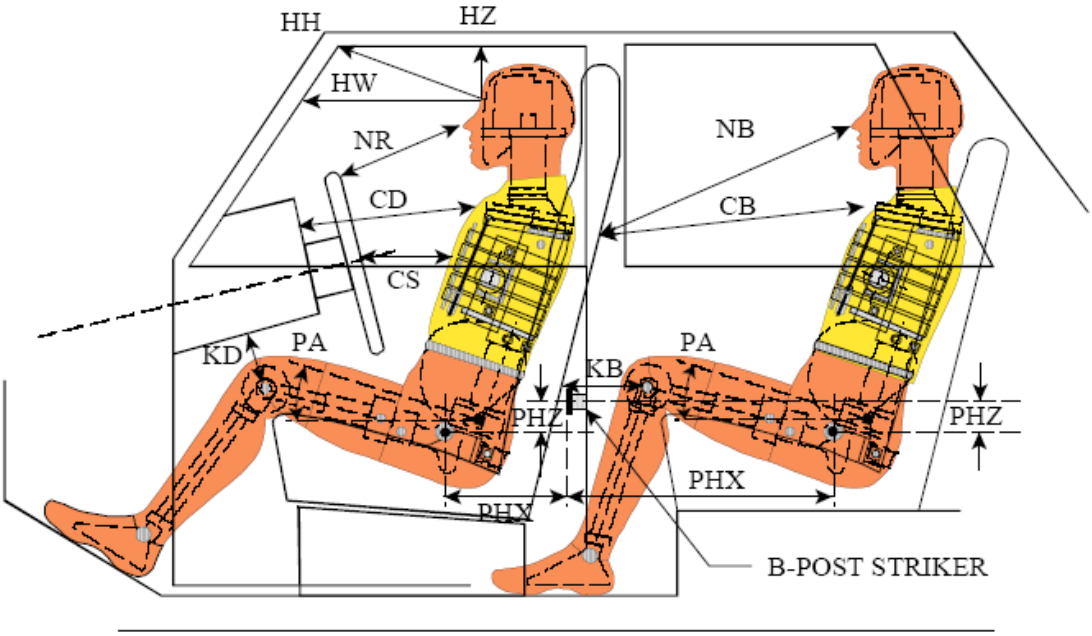
VEHICLE FUEL TANK ASSEMBLY

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



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

LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

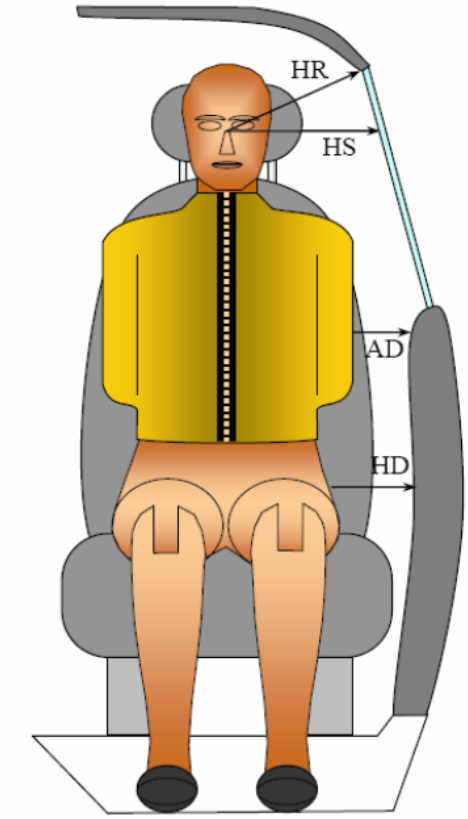
Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (º)	Length (mm)	Angle (º)
HH		Head to Header	311			
HW		Head to Windshield	590			
HZ	HZ	Head to Roof	142		266	
NR	NB	Nose to Rim/Seat Back	440		556	
CD	CB	Chest to Dash/Seat Back	542		539	
CS		Chest to Steering Wheel	280			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	151	32.3	280	14.4
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	124	43.8	268	19.1
PAX°	PAX°	Pelvic Tilt Angle X		11.5		21.7
	PAY°	Pelvic Tilt Angle Y				0.4
PHX	PHX	Hip Point to Striker (x-axis)	190		295	
PHZ	PHZ	Hip Point to Striker (z-axis)	167		340	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

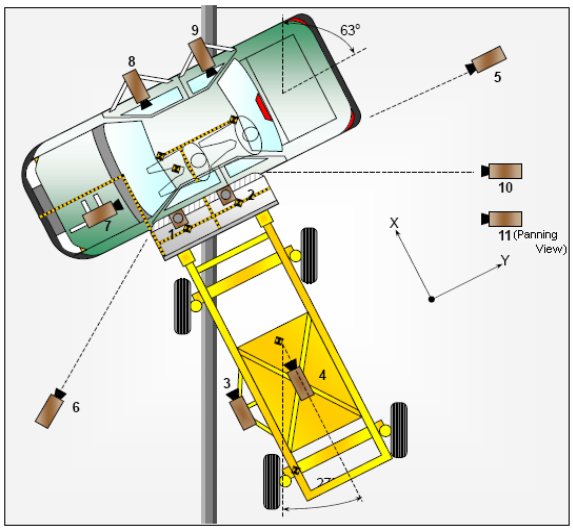
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	198	249
HS	Head to Side Window	mm	296	328
AD	Arm to Door	mm	79	136
HD	H-Point to Door	mm	136	185

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



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)	471	-377	-644	35	1000
8	Driver Side (On-Board)	1452	712	-430	14	1000
9	Passenger Side (On-Board)	1553	1532	-505	14	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

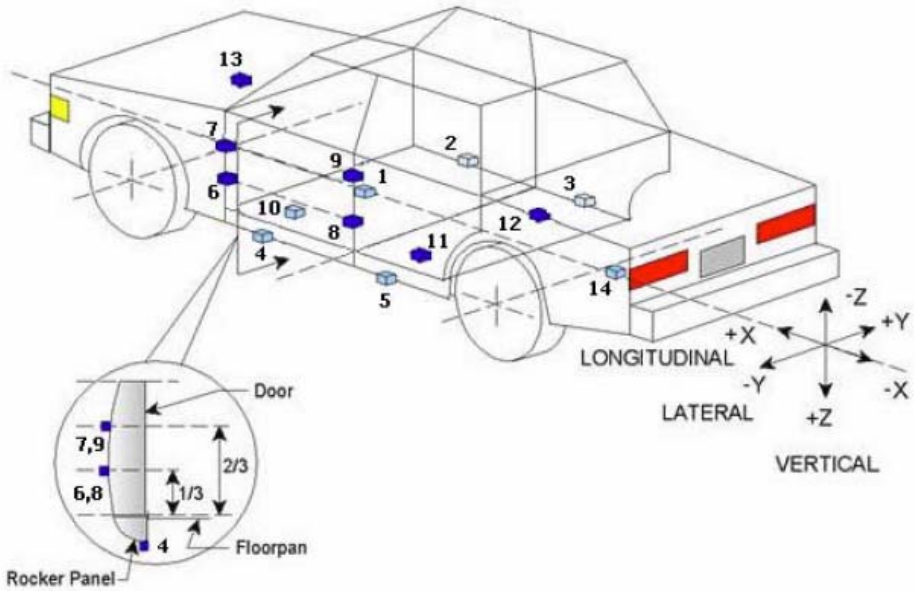
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	5
Total	60

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1415	0	-244
2	Right Sill at Front Seat	2271	652	-336
3	Right Sill at Rear Seat	1395	664	-329
4	Left Sill at Front Door	2442	-475	-144
5	Left Sill at Rear Door	1337	-498	-163
6	A-Pillar Lower	2745	-768	-537
7	A-Pillar Middle	2745	-768	-821
8	B-Pillar Lower	1719	-709	-499
9	B-Pillar Middle	1719	-709	-802
10	Front Seat Track	2008	-547	-324
11	Rear Seat Structure			
12	Right Rear Occupant Compartment	1420	304	-244
13	Engine Block	3221	340	-778
14	Rear Floorpan Above Axle	781	319	-453

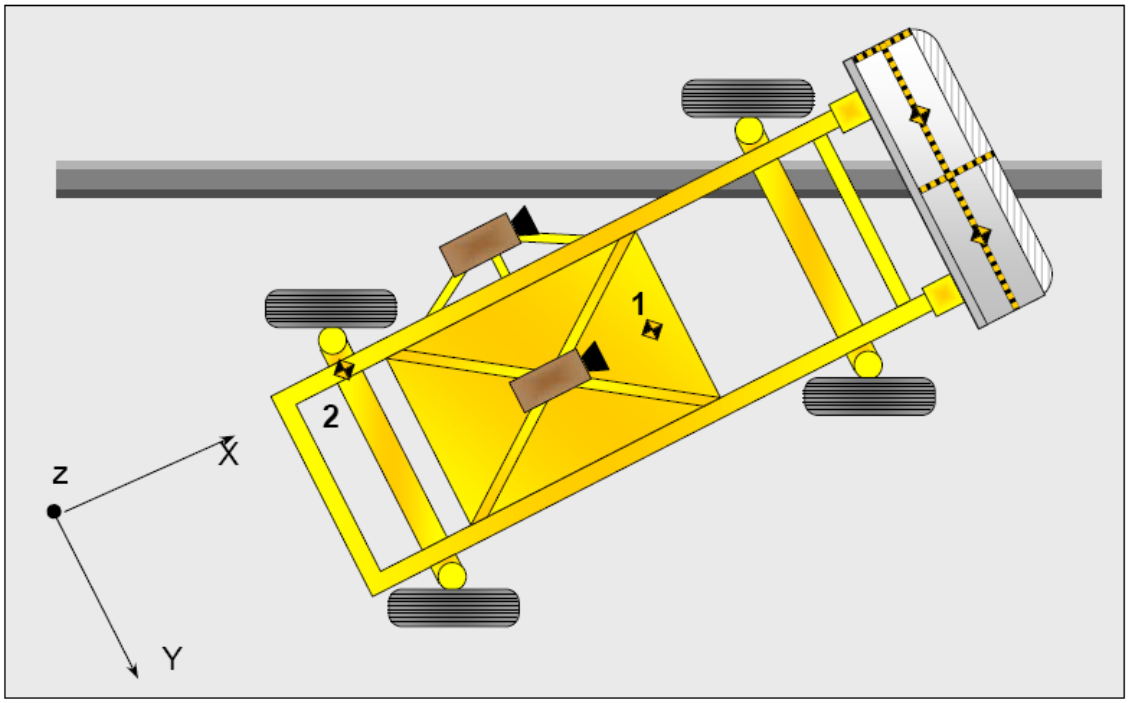
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



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: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Side Header	Curtain Airbag, Center Seat Headrest
Left Side of Head	Side Header, Curtain Airbag	Curtain Airbag
Back of Head	Side Header, Headrest	Curtain Airbag, Center Seat Headrest
Left Shoulder	Curtain Airbag	Door Panel
Upper Torso	Seat, Torso Airbag	Door Panel
Lower Torso	Seat, Torso Airbag	Door Panel
Left Hip	Pelvis 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/Oth
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge System Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	n/a	n/a	n/a	n/a	n/a

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	No Separation
Windshield Damage	None
Side Window Damage	Left Front Window Broken
Other Notable Effects	Left Rear Door Skin Separation

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

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/Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other (Seat Cushion Airbag)	Yes	No	No	

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2511
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		316
Actual Impact Point (Aft of Front Axle)	mm		300
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	16
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	-2

DATA SHEET NO. 9

MDB SUMMARY OF RESULTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

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	402	298	700
Right	kg	377	292	669
Ratio	%	56.9%	43.1%	100.0%
Totals	kg	779	590	1368

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.88
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.80
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.4
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.7
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.9

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

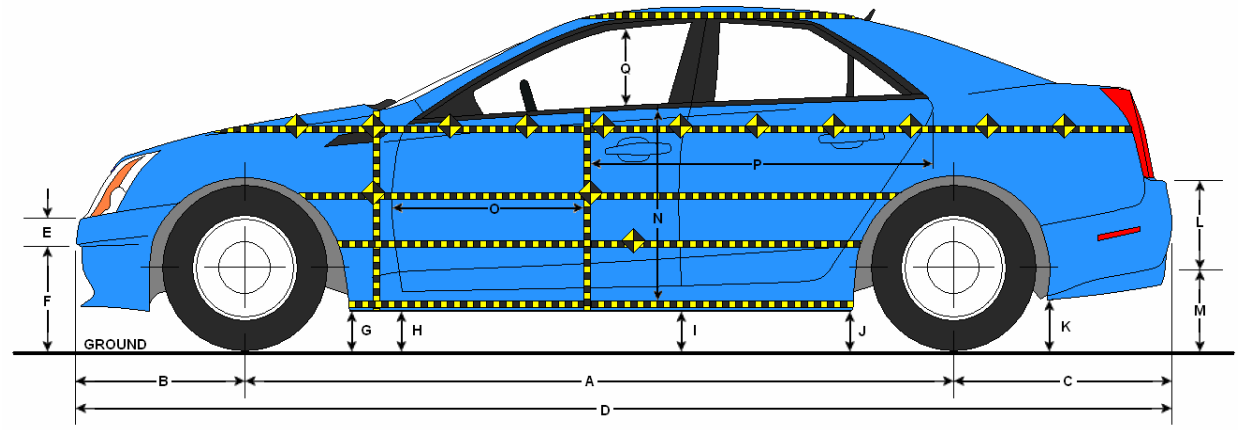
Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	209
B	Top of Bumper	533	800	Right	96
C	Mid Level	686	800	Left	108
D	Top of Stack	813	800	Left	157

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2511	2511	0
B	Front Axle to FSOV	732	734	2
C	Rear Axle to RSOV	572	569	-3
D	Total Length at Centerline	3814	3815	1
E	Front Bumper Thickness	107	108	1
F	Fromt Bumper Bottom to Ground	395	399	4
G	Sill Height at Front Wheel Well	194	193	-1
H	Sill Height at Front Door Leading Edge	191	195	4
I	Sill Height at B-Pillar	194	242	48
J1	Sill Height at Rear Wheel Well	198	210	12
J2	Pinch Weld Height at Rear Wheel Well	176	191	15
K	Sill Height Aft of Rear Wheel Well	409	417	8
L	Rear Bumper Thickness	119	120	1
M	Rear Bumper Bottom to Ground	346	355	9
N	Sill Height to Bottom of Front Window Sill	585	535	-50
O	Front Door Leading Edge to Impact CL	780	749	-31
P	Rear Door Trailing Edge to Impact CL	1288	1268	-20
Q	Front Window Opening	481	504	23
R	Right Side Length	2977	2977	0
S	Left Side Length	2977	2929	-48
T	Vehicle Width at B-Pillar	1692	1532	-160

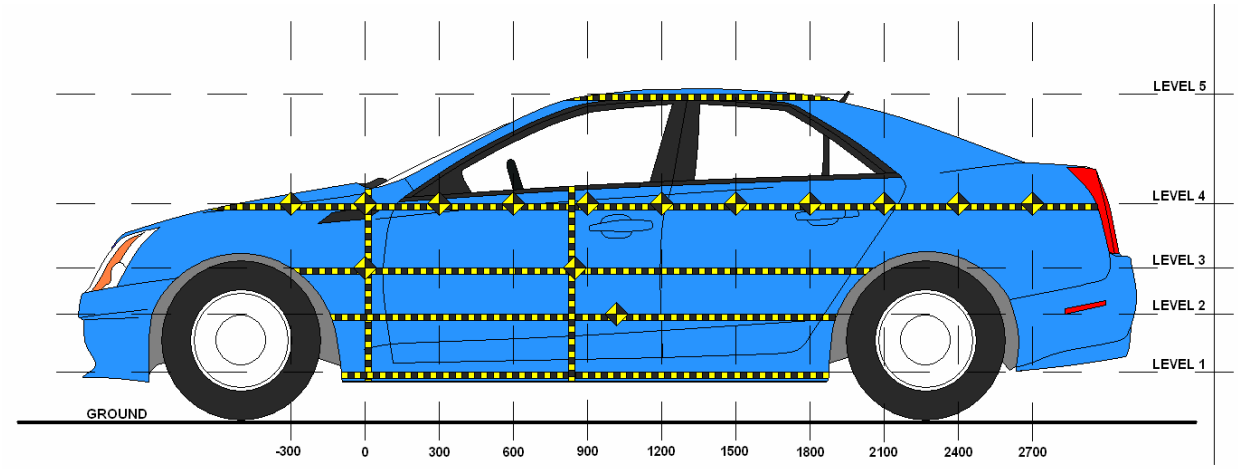
All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	244	43	600
2	Occupant H-Point	570	239	1200
3	Mid-Door	627	238	1200
4	Window Sill	874	201	1350
5	Window Top	1445	16	1350

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

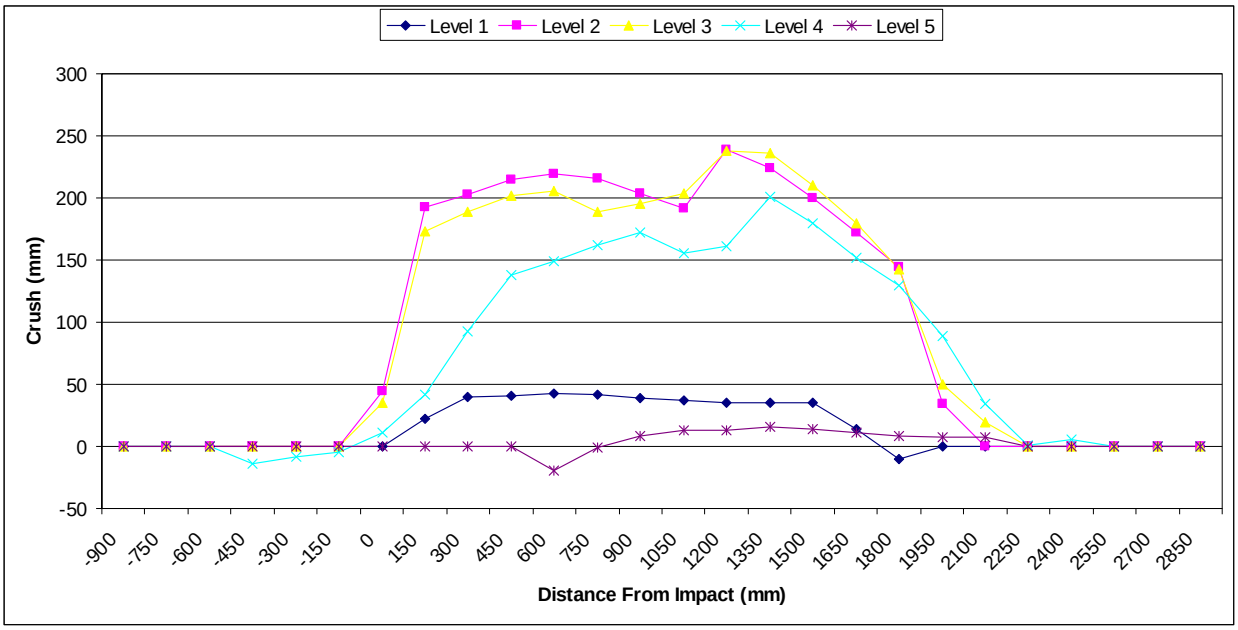
	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450				760					746					-14	
-300				740					732					-8	
-150			655	733				655	728				0	-5	
0		659	662	729			703	697	740			44	35	11	
150	696	664	662	718		718	857	835	760		22	193	173	42	
300	695	663	660	710		735	866	849	803		40	203	189	93	
450	694	662	658	703		735	877	860	841		41	215	202	138	
600	693	661	657	697	960	736	880	863	846	941	43	219	206	149	-19
750	694	660	657	690	967	736	876	846	852	966	42	216	189	162	-1
900	696	660	656	687	969	735	864	851	859	977	39	204	195	172	8
1050	697	660	656	685	972	734	852	860	841	985	37	192	204	156	13
1200	699	662	658	679	972	734	901	896	840	985	35	239	238	161	13
1350	701	664	660	680	971	736	888	896	881	987	35	224	236	201	16
1500	703	666	662	683	969	738	866	872	863	983	35	200	210	180	14
1650	704	669	665	688	969	718	841	845	840	980	14	172	180	152	11
1800	701	666	666	693	970	691	810	809	823	978	-10	144	143	130	8
1950		654	657	701	972		688	707	790	979		34	50	89	7
2100			653	707	976			672	741	983			19	34	7
2250				719					720					1	
2400				739					745					6	
2550															
2700															
2850															

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

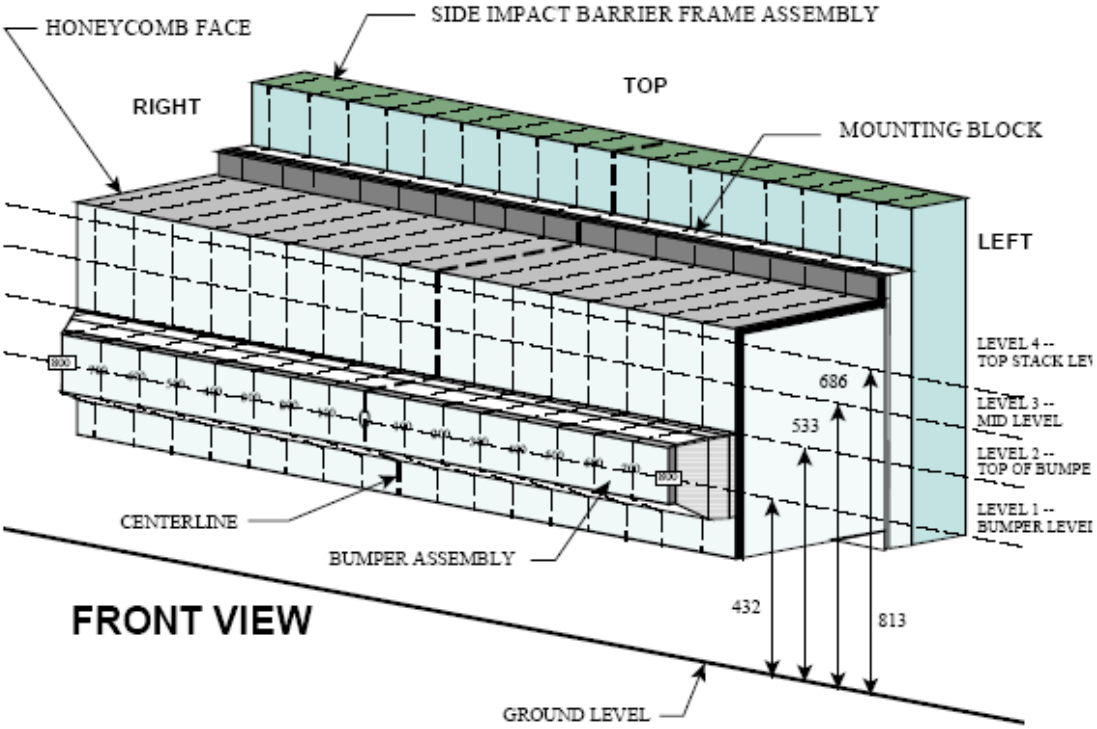


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	209	185	170	160	148	146	139	136	131	128	120	119	116	115	110	121	142
2	96	87	77	65	58	47	45	47	40	42	45	48	49	49	46	48	61
3	92	68	45	36	26	41	54	36	28	21	11	9	10	18	29	55	108
4	66	43	28	14	18	50	77	72	50	28	17	21	26	34	64	111	157

All dimensions in millimeters.

DATA SHEET NO. 13

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12

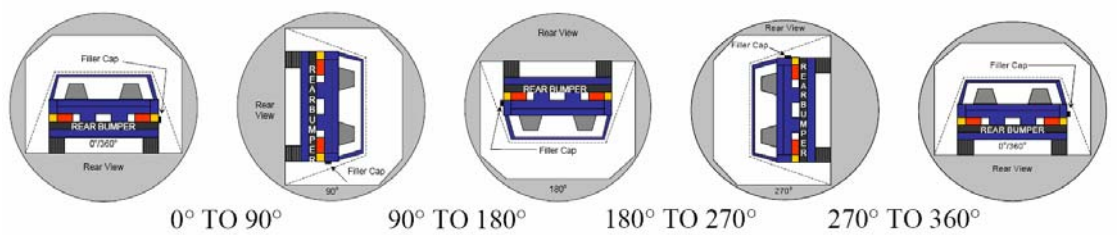
Temperature at Time of Impact: 19.4° C Test Time: 2:12 PM

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: No spillage occurred



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	81	300	381
90° To 180°	80	300	380
180° To 270°	85	300	385
270° To 360°	81	300	381

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

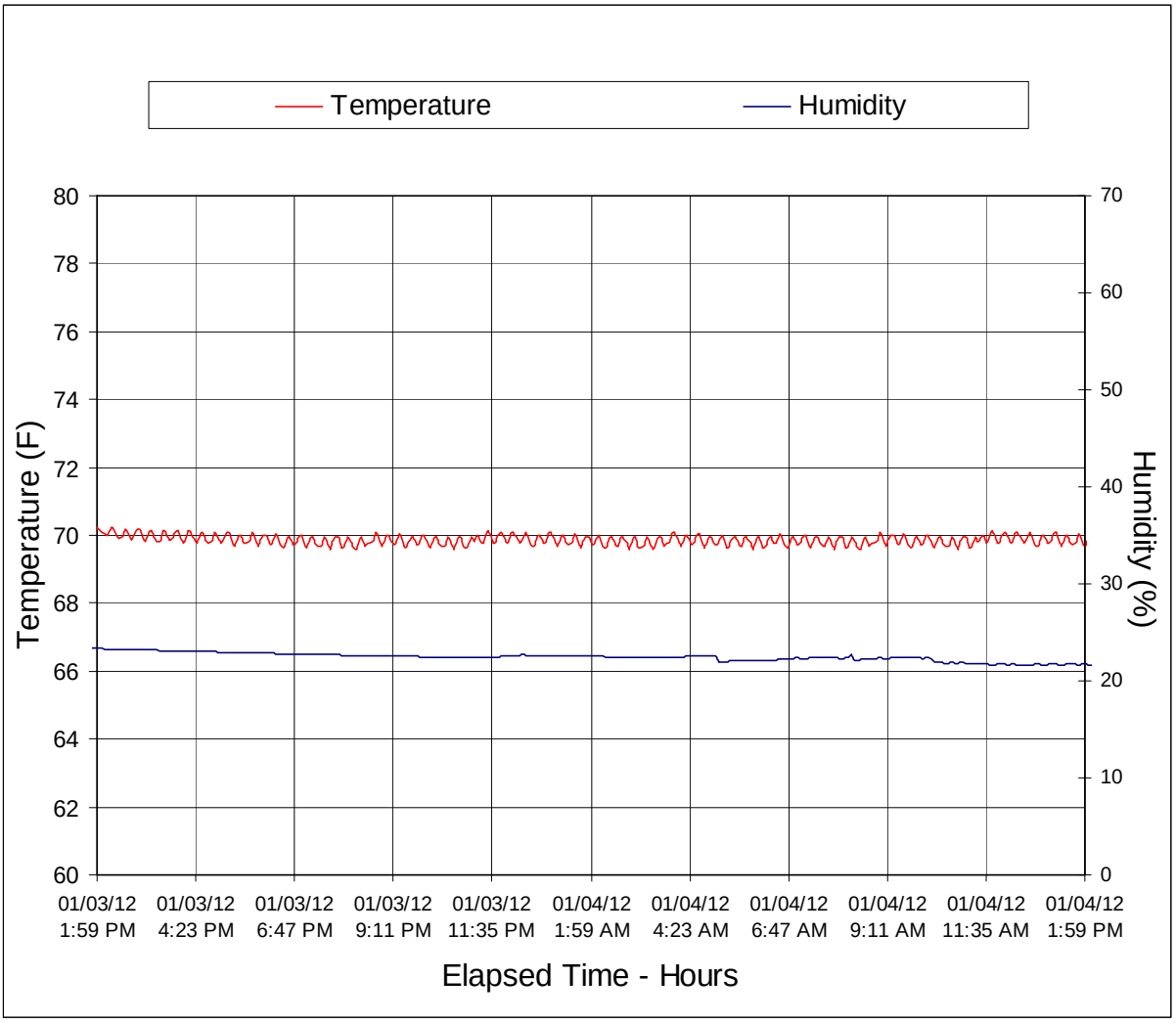
Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2012 Toyota Yaris LE 5-Door Hatchback NHTSA No. MC5107

Test Program: NCAP MDB Side Impact Test Test Date: 1/4/12



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure		Page
1	As Delivered Right Front 3/4 View of Test Vehicle	A-1
2	As Delivered Left Rear 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 3/4 View of Test Vehicle	A-3
6	Post-Test Left Front 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 3/4 View of Test Vehicle	A-5
10	Post-Test Left Rear 3/4 View of Impact Zone	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 Frontal 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 of 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	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	Pre-Test Left Side View of Rear Passenger Dummy Showing Belt, Chalking, and Contact Switches	A-27
55	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-28
56	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-28
57	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-29
58	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-29
59	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-30
60	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-30
61	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-31
62	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-31
63	Pre-Test Placement of Rear Passenger Dummy's Feet	A-32
64	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-32
65	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-33
66	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-33
67	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-34
68	Pre-Test Rear Passenger Dummy and Door Clearance View	A-34
69	Post-Test Rear Passenger Dummy and Door Clearance View	A-35
70	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-35

TABLE OF PHOTOGRAPHS … (CONTINUED)

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

FIGURE 1. As-Delivered Right Front ¾ View of Test Vehicle

FIGURE 2. As-Delivered Left Rear ¾ 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 ¾ View of Test Vehicle

FIGURE 6. Post-Test Left Front ¾ 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 ¾ View of Test Vehicle

FIGURE 10. Post-Test Left Rear ¾ View of Impact Zone

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 at Ideal Impact Point

FIGURE 18. Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle at Ideal Impact Point

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

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

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

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

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

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, Chalking, and Contact Switches

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

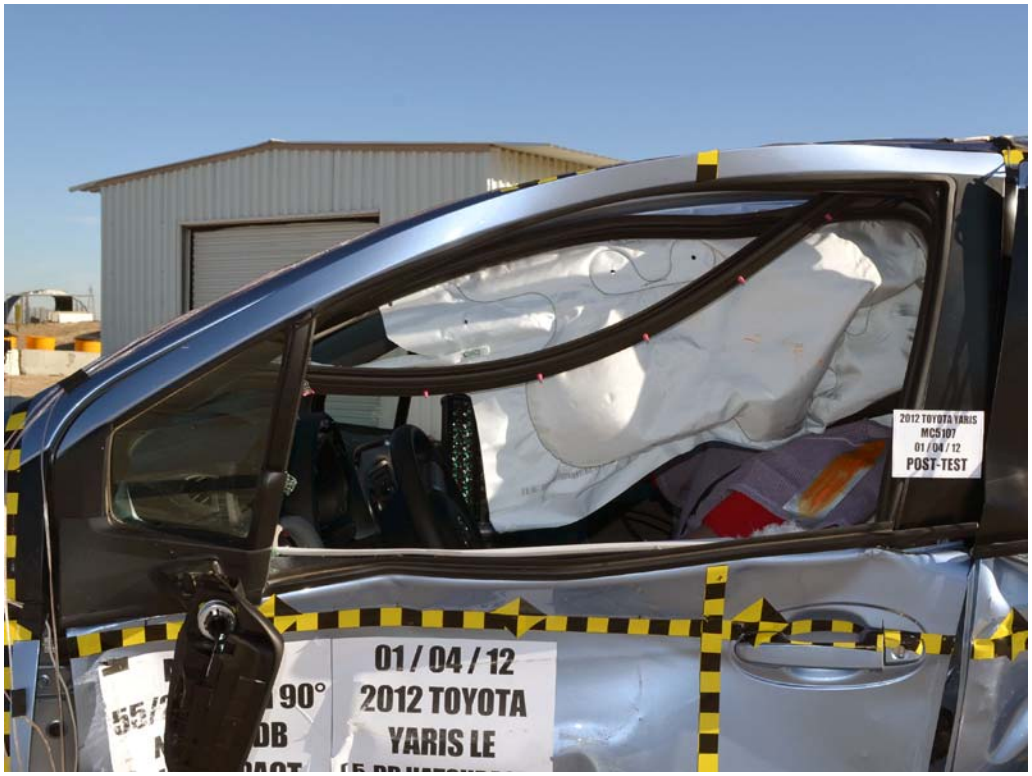


FIGURE 29. Post-Test Left Side View of Driver Dummy Shoulder and Door Top View

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 Frontal View of Driver Seat Pan Prior to Dummy Positioning

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

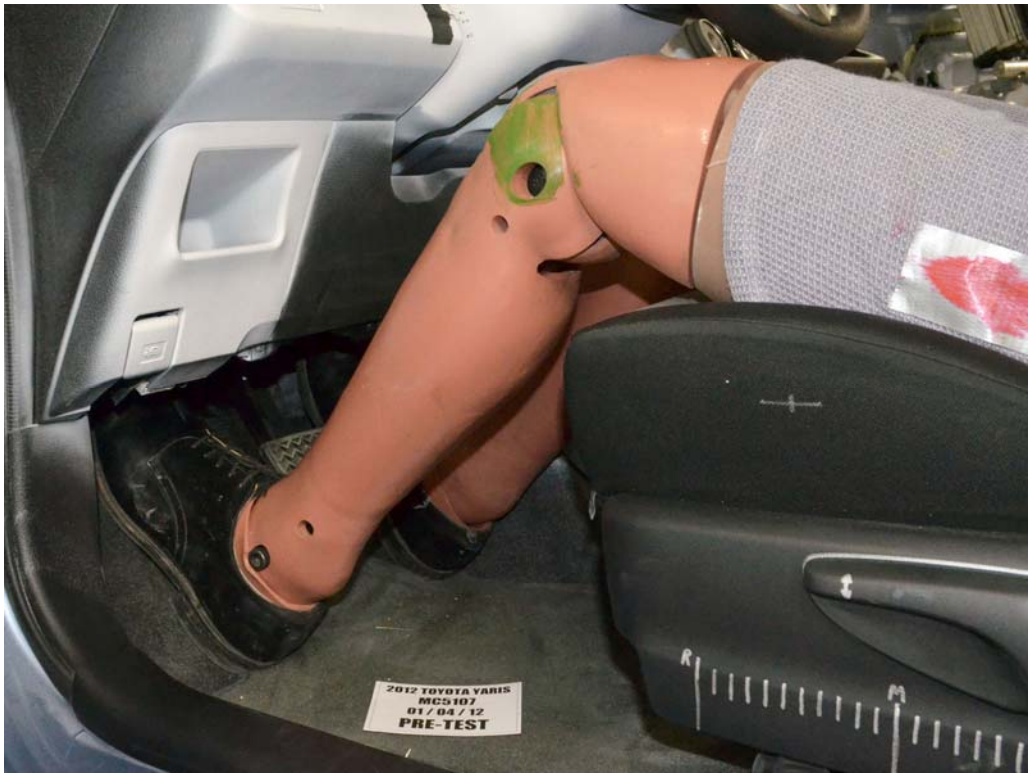


FIGURE 34. Pre-Test Placement of Driver Dummy's Feet

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

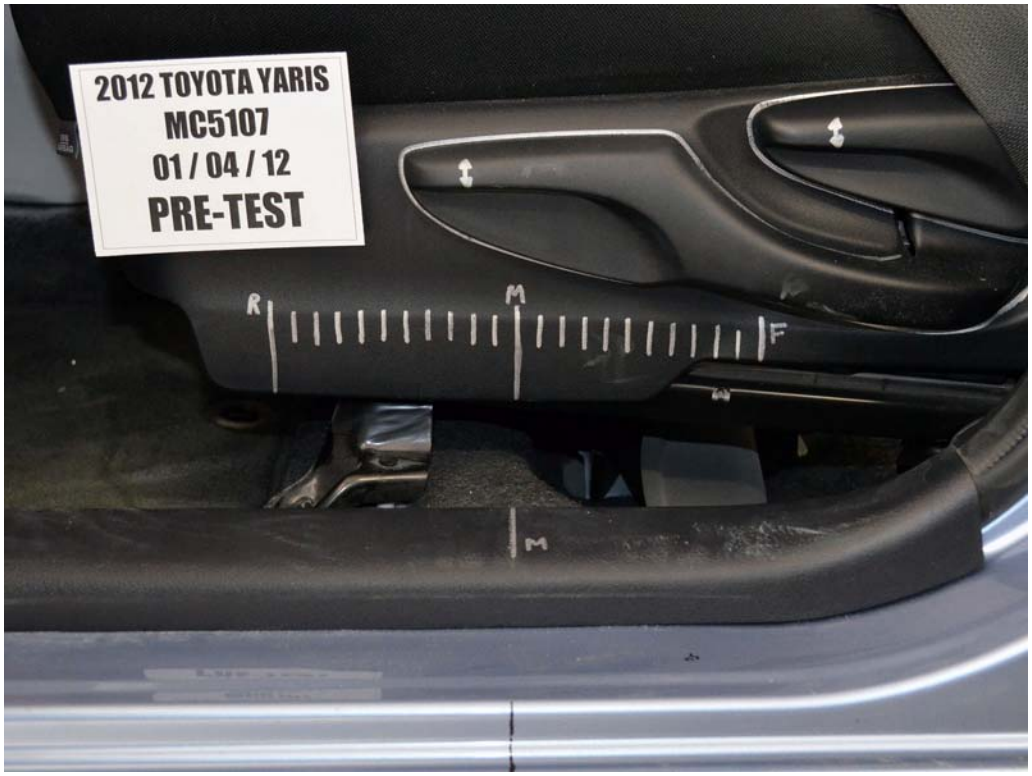


FIGURE 39. Pre-Test Close-Up Left Side View of Driver Seat Track

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

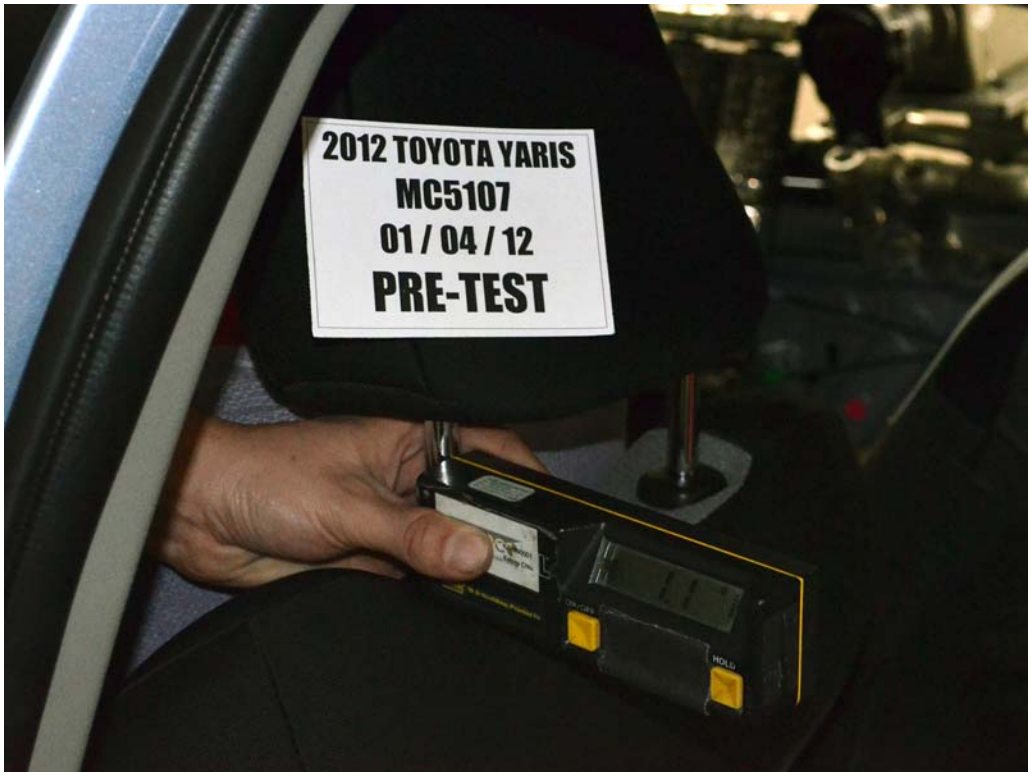


FIGURE 41. Pre-Test Close-Up View of Driver Seat Back or Head Restraint

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

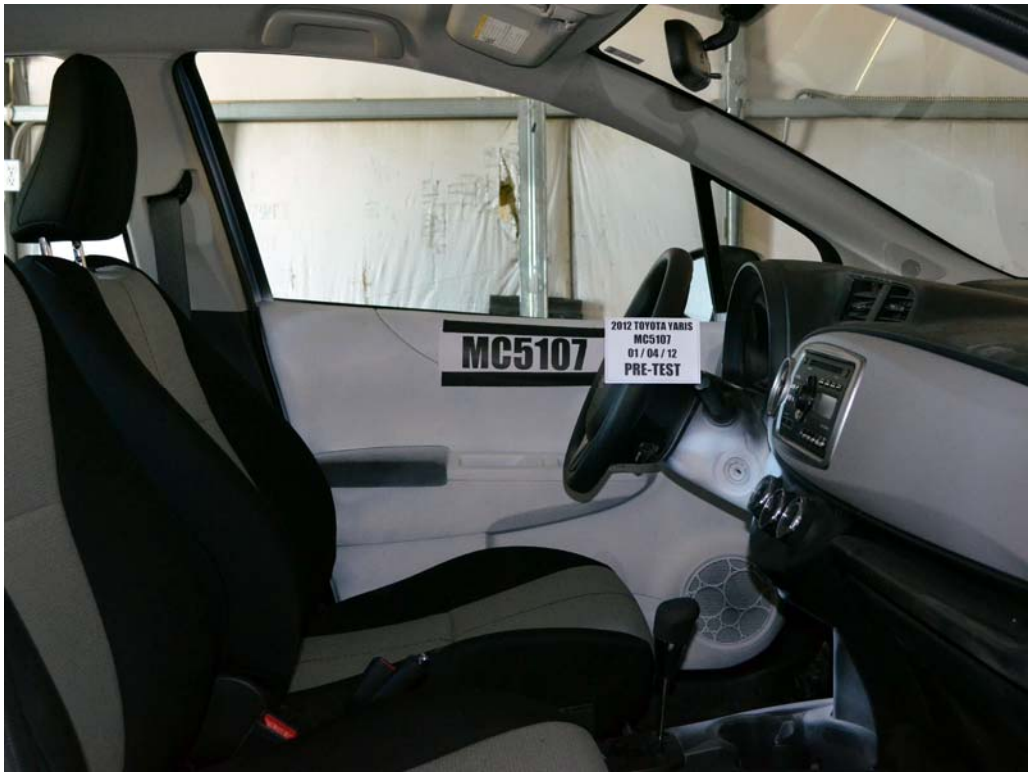


FIGURE 46. Pre-Test Driver Inner Door Panel View

FIGURE 47. Post-Test Driver Inner Door Panel View

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

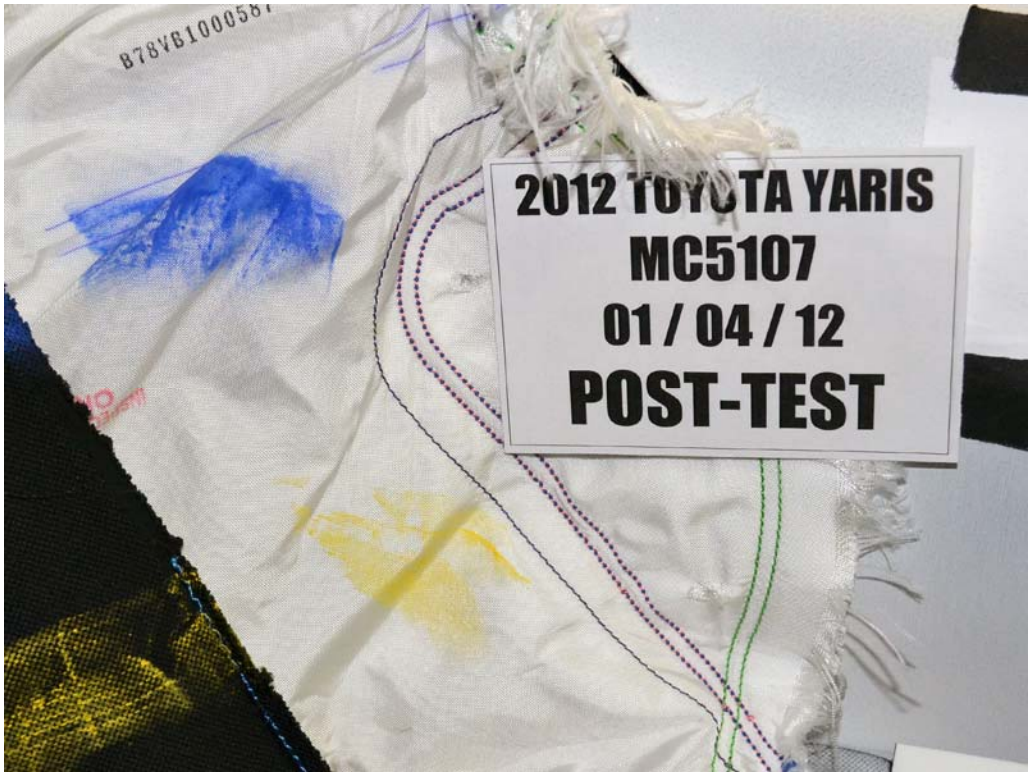


FIGURE 51. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

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. Pre-Test Left Side View of Rear Passenger Dummy
Showing Belt, Chalking, and Contact Switches

FIGURE 55. Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

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

FIGURE 57. Pre-Test Frontal View of Rear Passenger Seat Back
Prior to Dummy Positioning

FIGURE 58. Pre-Test Frontal View of Rear Passenger Dummy
Head and Shoulders in Relation to Head Restraint

FIGURE 59. Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

FIGURE 60. Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

FIGURE 61. Pre-Test View of Rear Passenger Dummy's Neck
Showing Position of Adjustable Neck Bracket

FIGURE 62. Pre-Test View of Rear Passenger Dummy's Head
Showing Dummy's Head is Level

FIGURE 63. Pre-Test Placement of Rear Passenger Dummy's Feet

FIGURE 64. Pre-Test View of Belt Anchorage for Rear Passenger Dummy

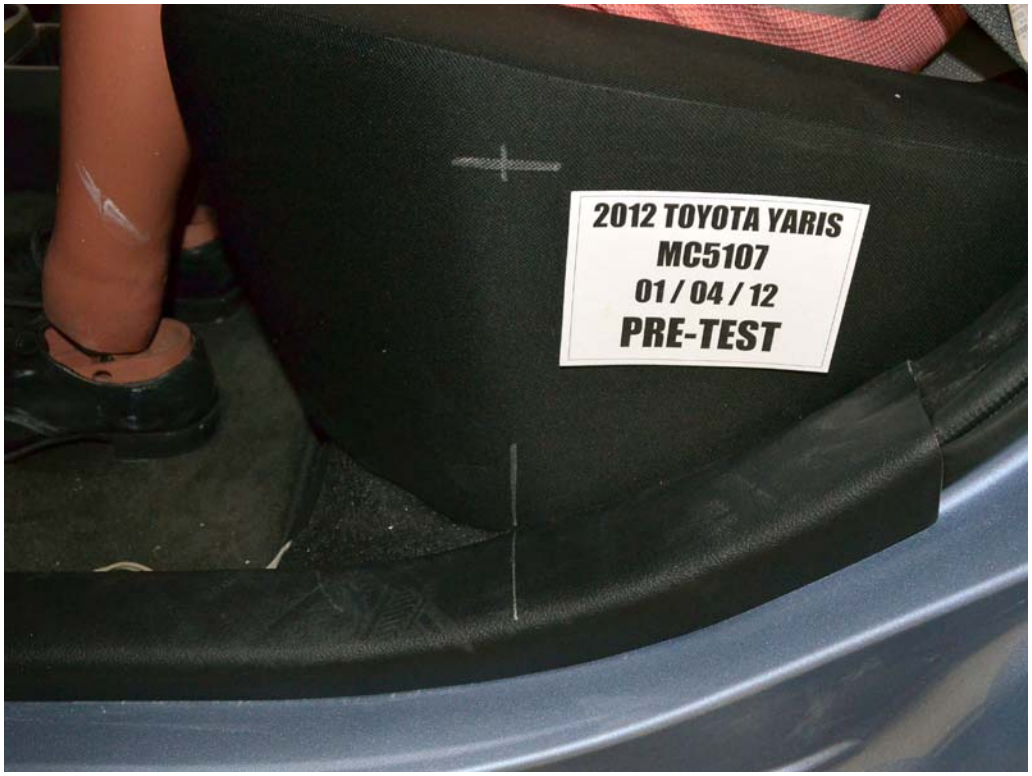


FIGURE 65. Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

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

FIGURE 67. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint

FIGURE 68. Pre-Test Rear Passenger Dummy and Door Clearance View

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

FIGURE 70. Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

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

FIGURE 72. Pre-Test Rear Passenger Inner Door Panel View

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

FIGURE 74. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Vehicle Interior View

FIGURE 75. Post-Test Rear Passenger Dummy Close-Up

Head Contact with Side Airbag View

FIGURE 76. 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 77. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Side Airbag View

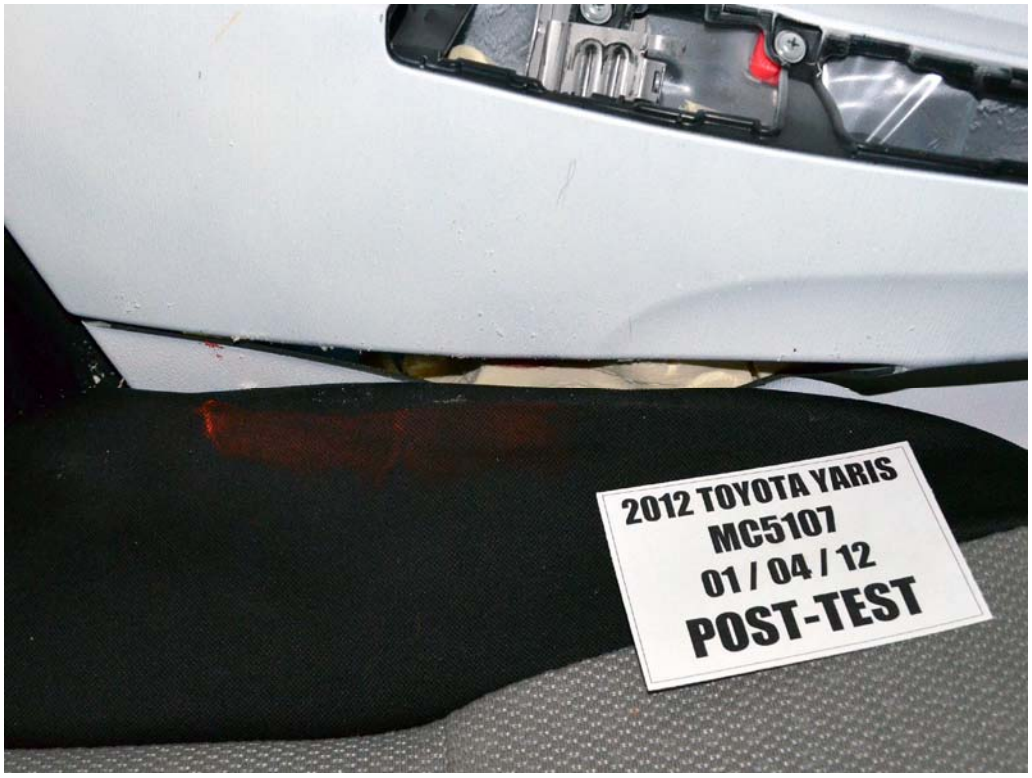


FIGURE 78. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Vehicle Interior View

Photograph Not Applicable

Vehicle Not Equipped With Rear Passenger Side Airbag

FIGURE 79. Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

FIGURE 80. Pre-Test View of Fuel Filler Cap

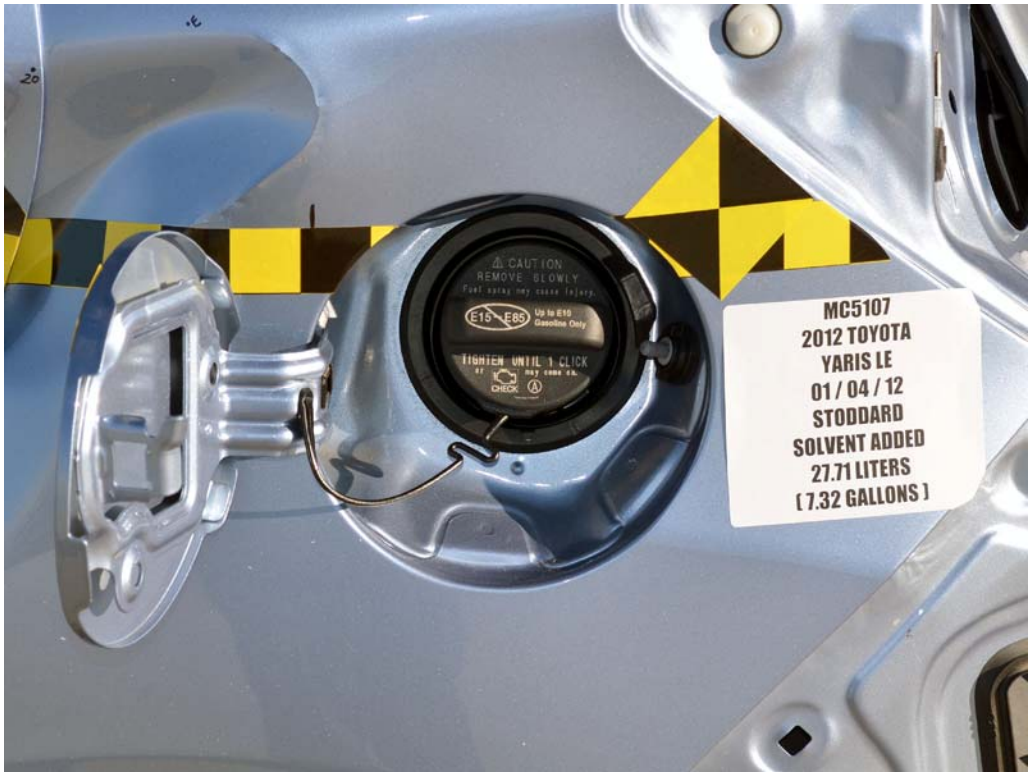


FIGURE 81. Post-Test View of Fuel Filler Cap

FIGURE 82. Pre-Test Front View of MDB Impactor Face

FIGURE 83. Post-Test Front View of MDB Impactor Face

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

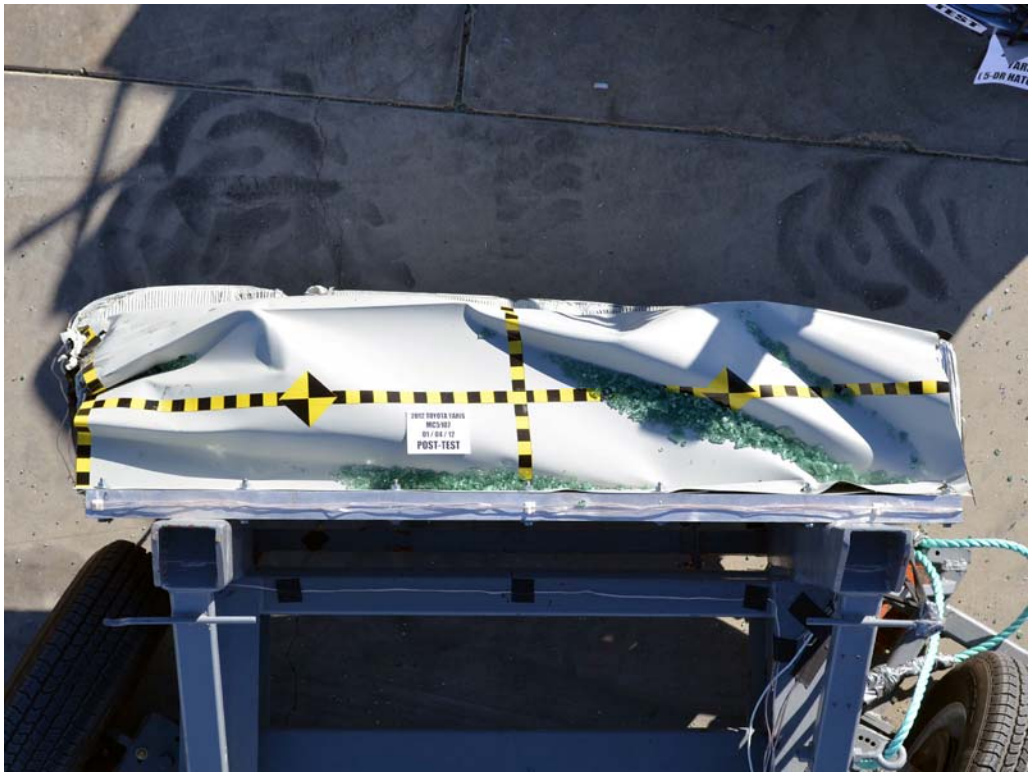


FIGURE 85. Post-Test Top View of MDB Impactor Face

FIGURE 86. Pre-Test Left Side View of MDB Impactor Face

FIGURE 87. Post-Test Left Side View of MDB Impactor Face

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

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

FIGURE 90. Close-Up View of Vehicle's Certification Label

FIGURE 91. Close-Up View of Vehicle's Tire Information Placard

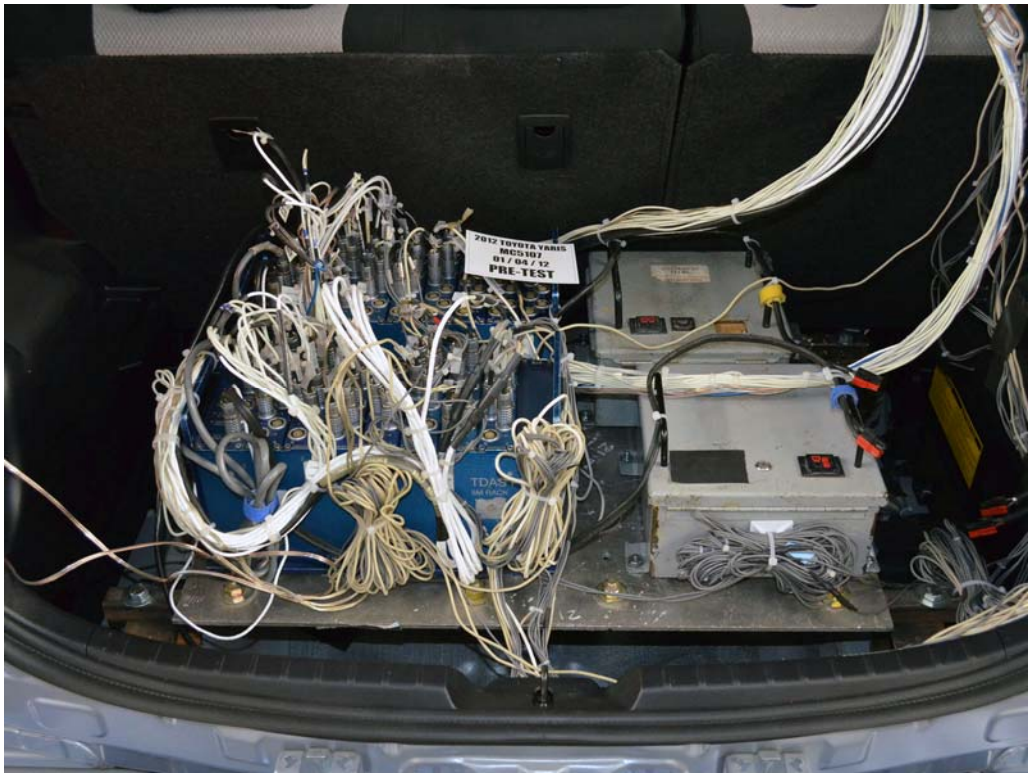


FIGURE 92. Pre-Test Ballast View

FIGURE 93. Post-Test Primary and Redundant Speed Trap Read-Out

FIGURE 94. FMVSS No. 301 Static Rollover 0 Degrees

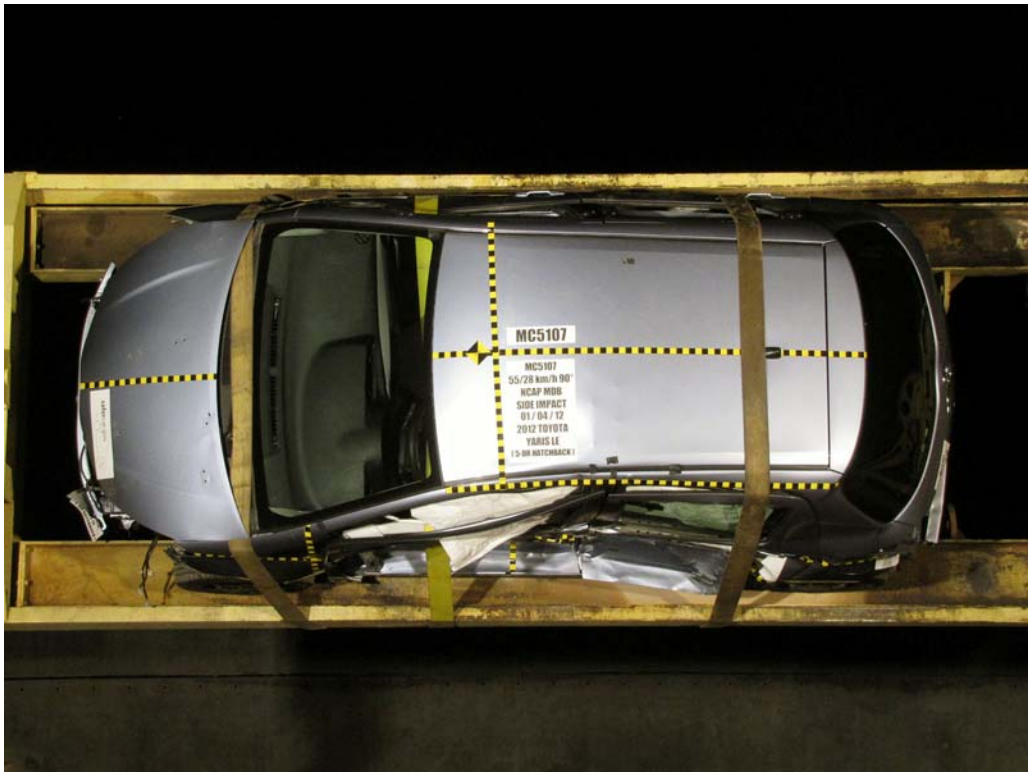


FIGURE 95. FMVSS No. 301 Static Rollover 90 Degrees

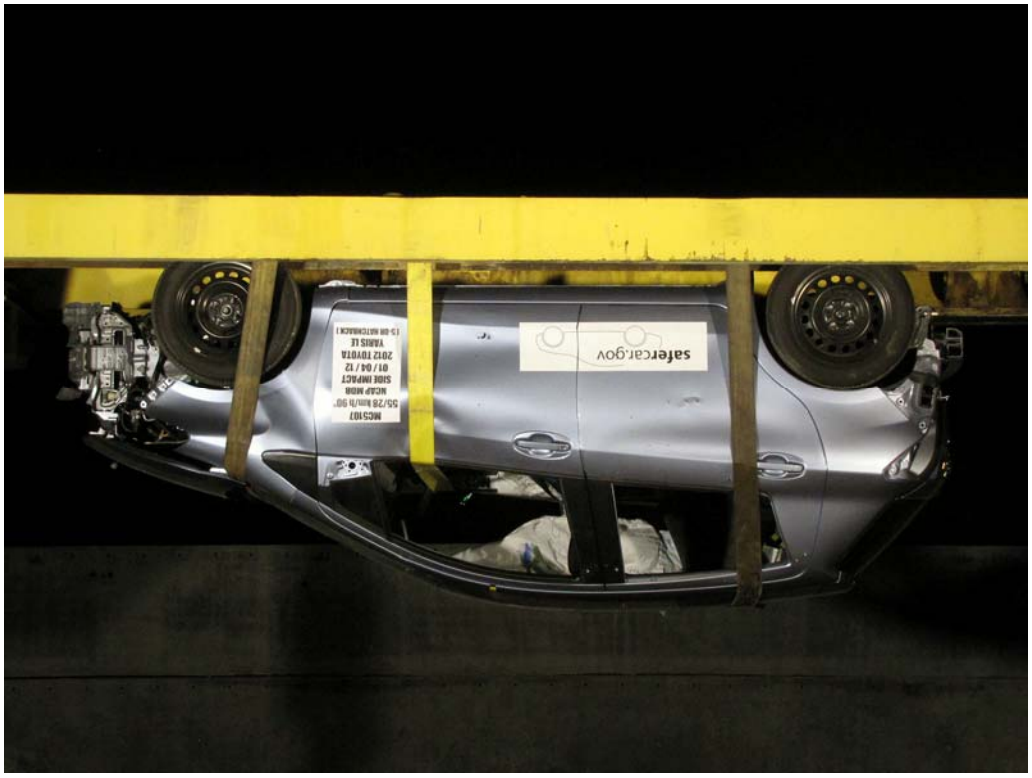


FIGURE 96. FMVSS No. 301 Static Rollover 180 Degrees

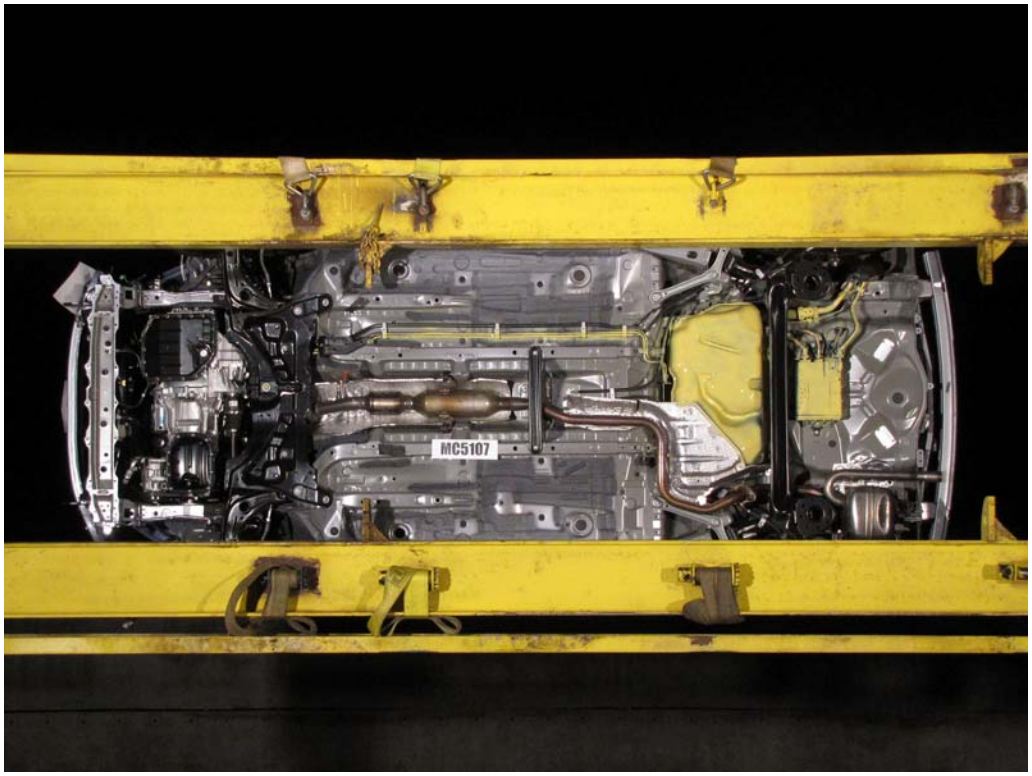


FIGURE 97. FMVSS No. 301 Static Rollover 270 Degrees

FIGURE 98. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 99. Impact Event

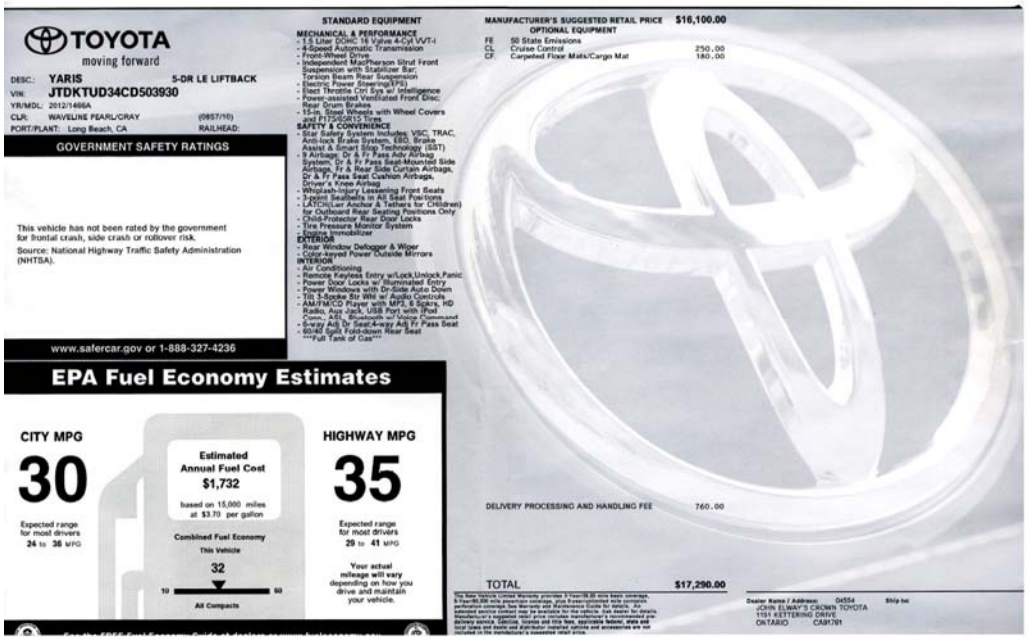
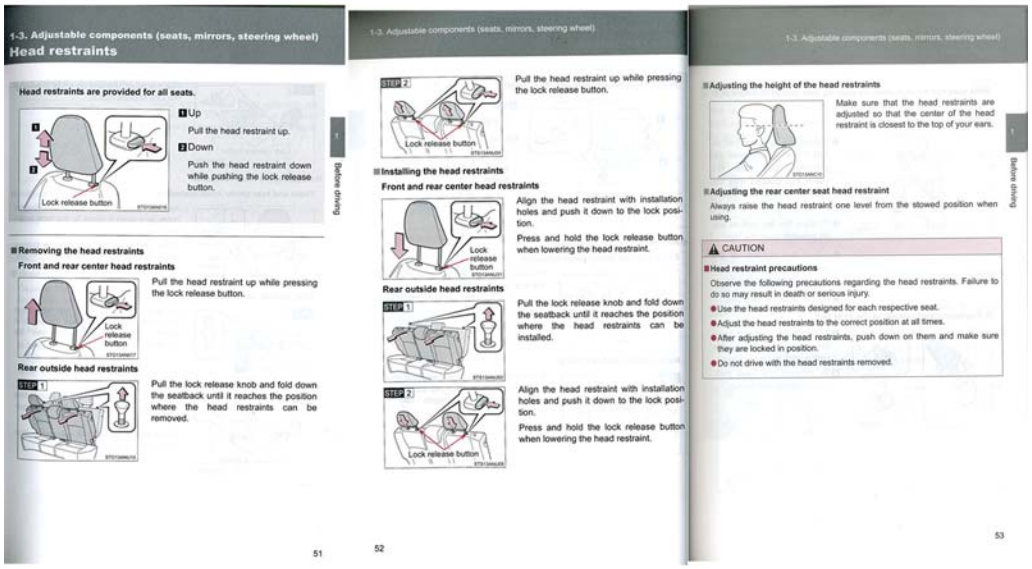


FIGURE 100. Monroney Label



1-3. Adjustable components (seats, mirrors, steering wheel)

Head restraints

Head restraints are provided for all seats.

1 Up

Pull the head restraint up.

2 Down

Push the head restraint down while pushing the lock release button.

Lock release button

■ Removing the head restraints

Front and rear center head restraints

Pull the head restraint up while pressing the lock release button.

Lock release button

Rear outside head restraints

STEP 1

Pull the lock release knob and fold down the seatback until it reaches the position where the head restraints can be removed.

Pull the head restraint up while pressing the lock release button.

Lock release button

■ Installing the head restraints

Front and rear center head restraints

Align the head restraint with installation holes and push it down to the lock position.

Press and hold the lock release button when lowering the head restraint.

Lock release button

Rear outside head restraints

STEP 1

Pull the lock release knob and fold down the seatback until it reaches the position where the head restraints can be installed.

STEP 2

Align the head restraint with installation holes and push it down to the lock position.

Press and hold the lock release button when lowering the head restraint.

Lock release button

■ Adjusting the height of the head restraints

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.

■ Adjusting the rear center seat head restraint

Always raise the head restraint one level from the stowed position when using.

CAUTION

■ Head restraint precautions

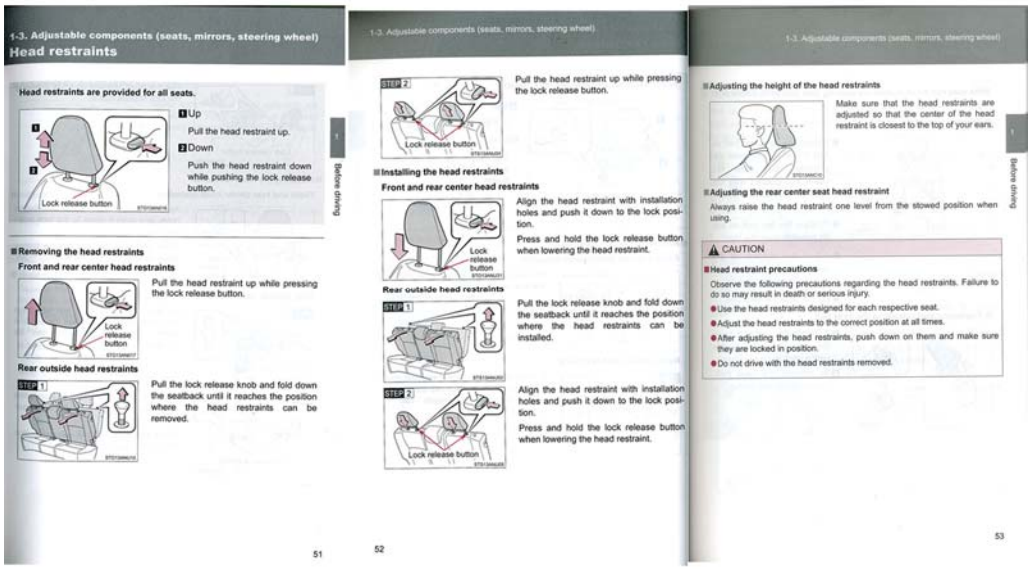
Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.

Before driving

51 52 53

FIGURE 101. Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



1-3. Adjustable components (seats, mirrors, steering wheel)

Head restraints

Head restraints are provided for all seats.

1 Up

Pull the head restraint up.

2 Down

Push the head restraint down while pushing the lock release button.

Lock release button

■ Removing the head restraints

Front and rear center head restraints

Pull the head restraint up while pressing the lock release button.

Lock release button

Rear outside head restraints

STEP 1

Pull the lock release knob and fold down the seatback until it reaches the position where the head restraints can be removed.

Pull the head restraint up while pressing the lock release button.

Lock release button

■ Installing the head restraints

Front and rear center head restraints

Align the head restraint with installation holes and push it down to the lock position.

Press and hold the lock release button when lowering the head restraint.

Lock release button

Rear outside head restraints

STEP 1

Pull the lock release knob and fold down the seatback until it reaches the position where the head restraints can be installed.

STEP 2

Align the head restraint with installation holes and push it down to the lock position.

Press and hold the lock release button when lowering the head restraint.

Lock release button

■ Adjusting the height of the head restraints

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.

■ Adjusting the rear center seat head restraint

Always raise the head restraint one level from the stowed position when using.

CAUTION

■ Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.

Before driving

51 52 53

FIGURE 102. 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)

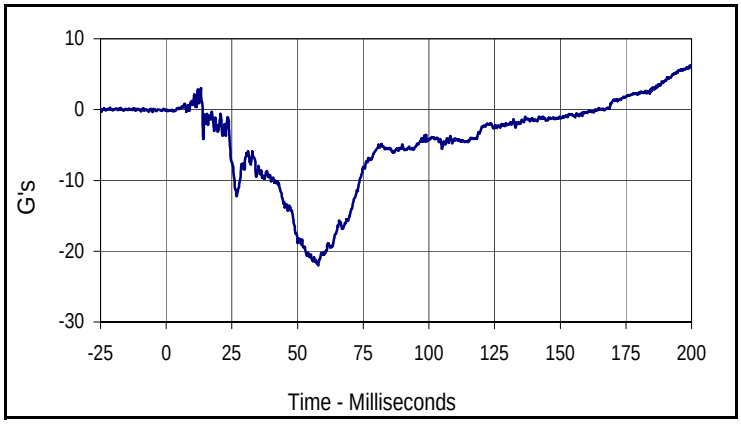
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

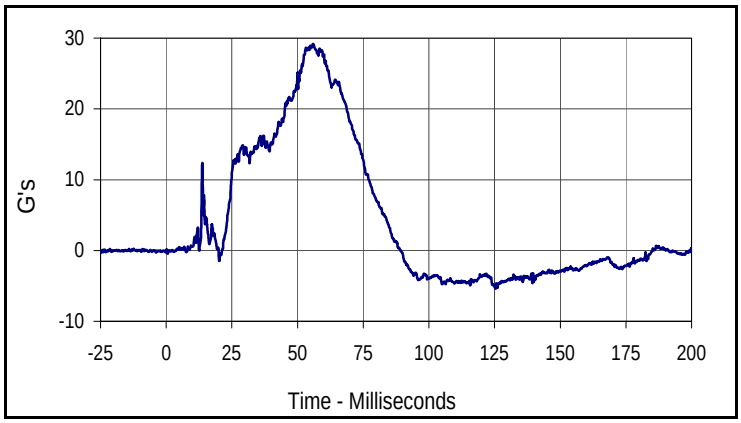
Left MDB Contact Switch

Right MDB Contact Switch

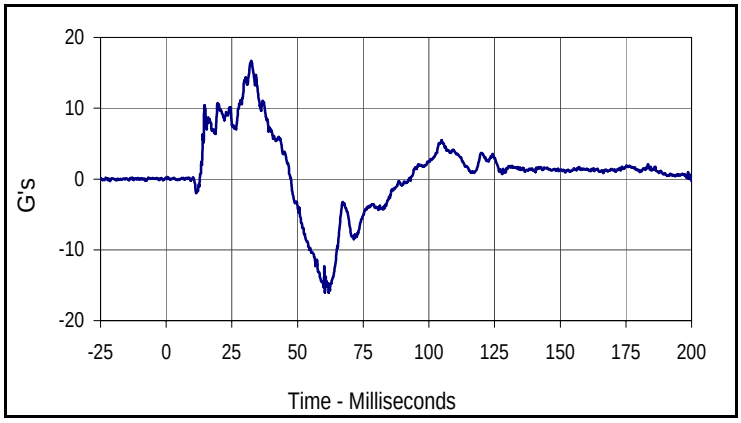
Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12



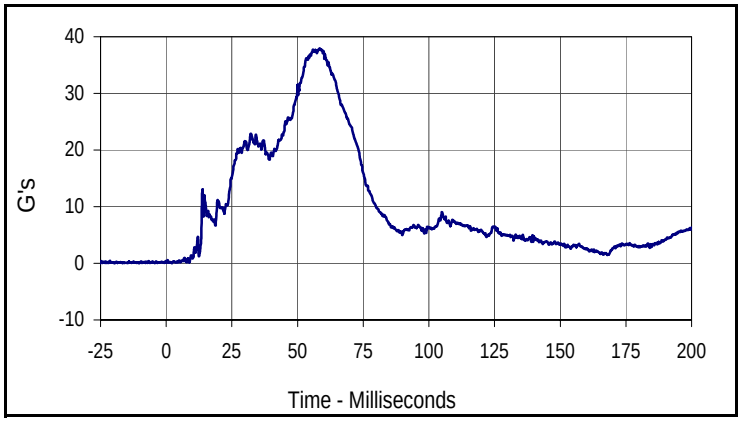
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
6.3	200.0	-22.0	57.9



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
29.2	55.9	-5.4	125.3

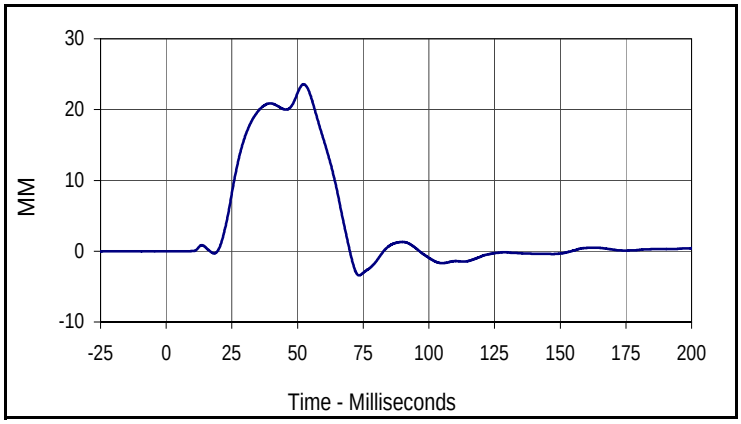


Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
16.7	32.4	-16.1	61.9

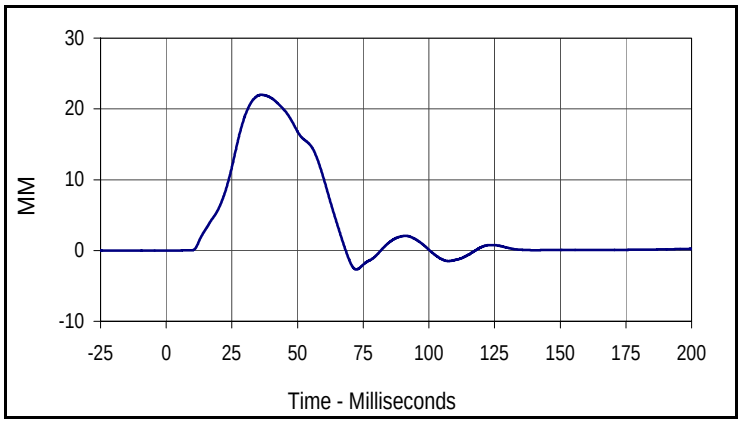


Curve Description			
Driver Head Resultant Accerlation Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
38.0	58.4	0.0	2.2

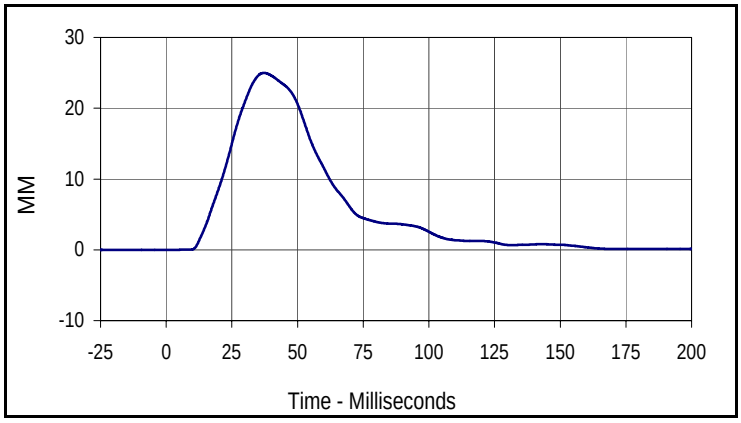
Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12



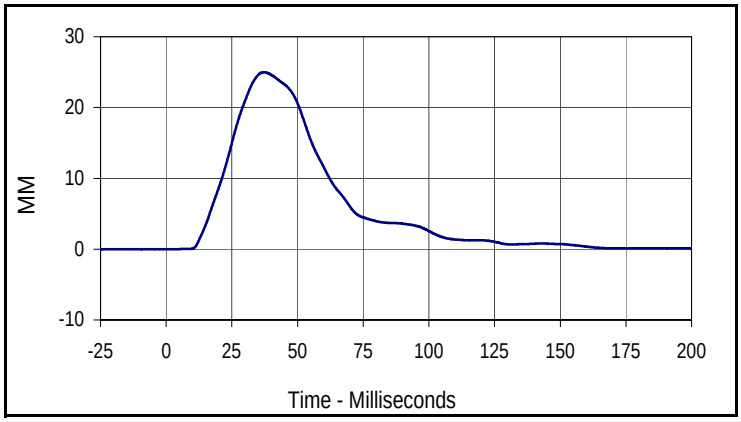
Curve Description			
Driver Upper Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
23.6	52.3	-3.4	73.4



Curve Description			
Driver Middle Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	MM
Max	Time	Min	Time
22.0	36.3	-2.7	72.4

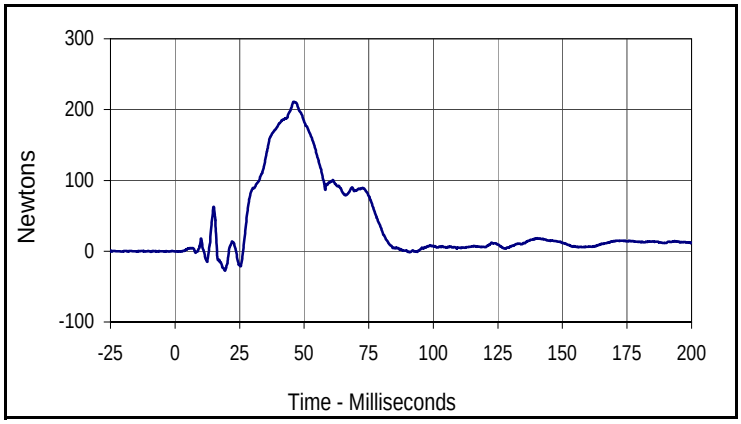


Curve Description			
Driver Lower Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
25.0	37.2	0.0	0.3

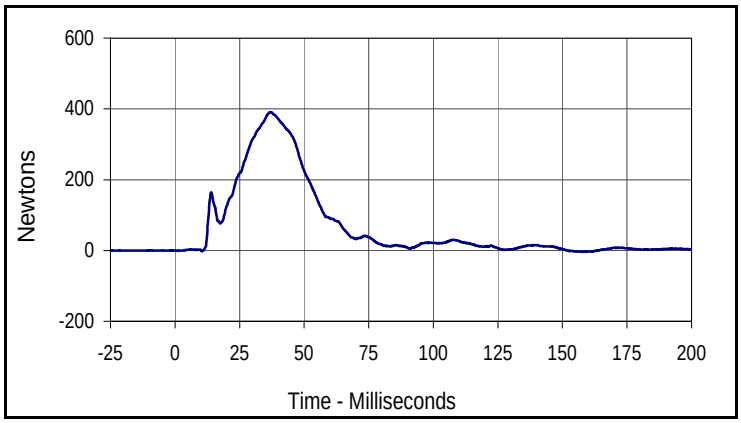


Curve Description			
Driver Thorax Rib Deflection Maximum			
Plot No.	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
25.0	37.2	0.0	0.3

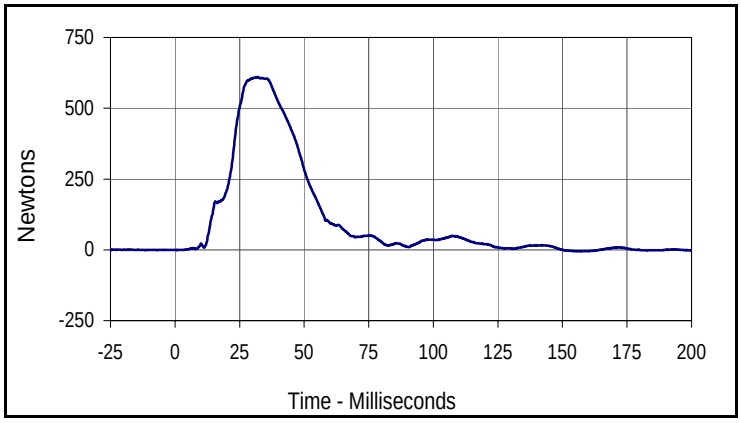
Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12



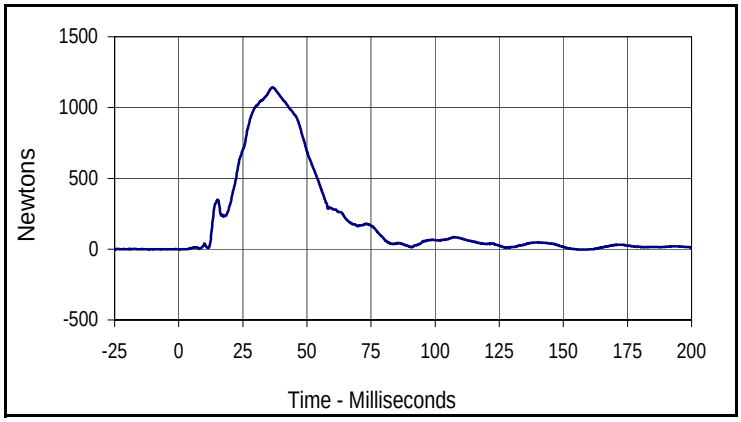
Curve Description			
Driver Anterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
211.0	45.9	-27.9	19.3



Curve Description			
Driver Middle Abdominal Force Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
389.9	36.7	-3.6	158.5

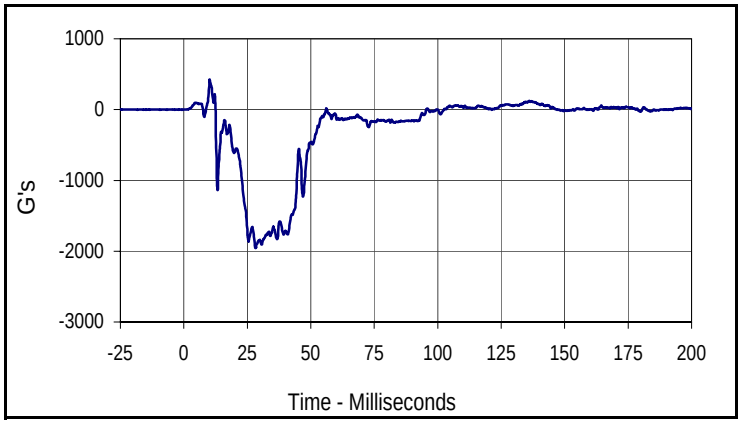


Curve Description			
Driver Posterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
011	FIL	600	Newtons
Max	Time	Min	Time
609.8	31.9	-5.5	157.1



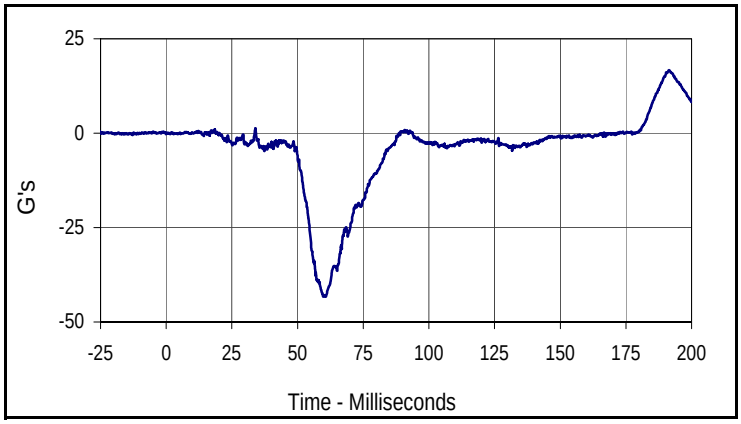
Curve Description			
Driver Total Abdominal Force			
Plot No.	Type	SAE Class	Units
012	SUM	600	Newtons
Max	Time	Min	Time
1143.0	36.6	-3.1	158.0

Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12

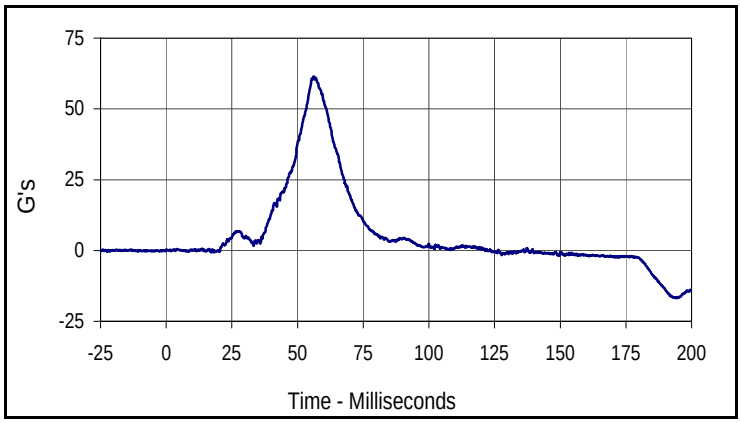


Curve Description			
Driver Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
013	FIL	600	G's
Max	Time	Min	Time
423.8	10.2	-1957.5	28.2

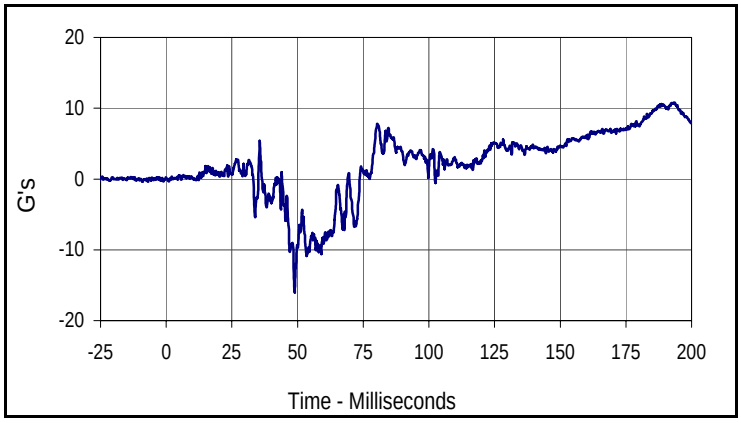
Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12



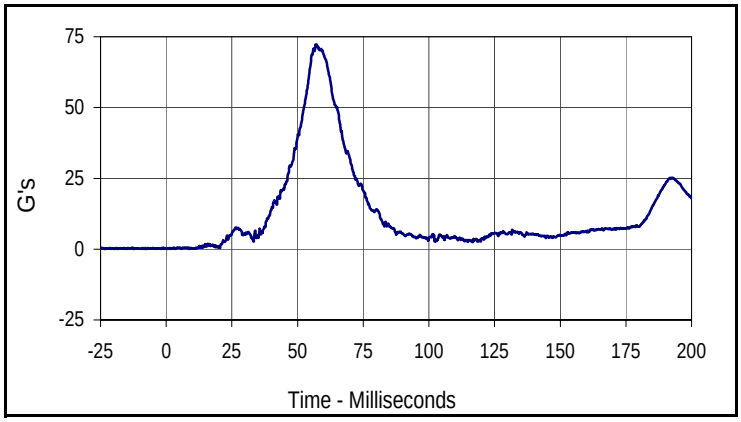
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
16.7	191.4	-43.3	60.5



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
61.5	56.2	-16.9	194.3

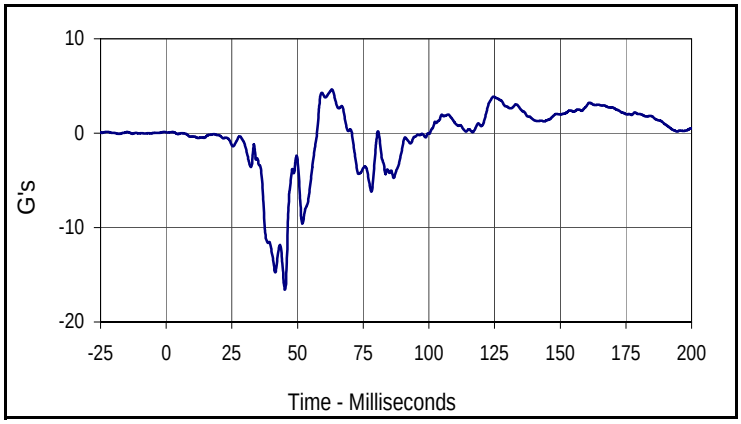


Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
10.8	193.1	-16.0	48.9

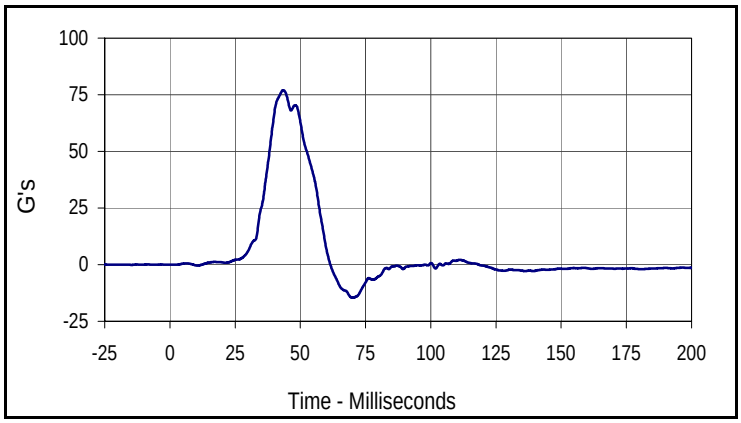


Curve Description			
Passenger Head Acceleration Resultant Primary			
Plot No.	Type	SAE Class	Units
017	RES	1000	G's
Max	Time	Min	Time
72.2	57.2	0.1	3.7

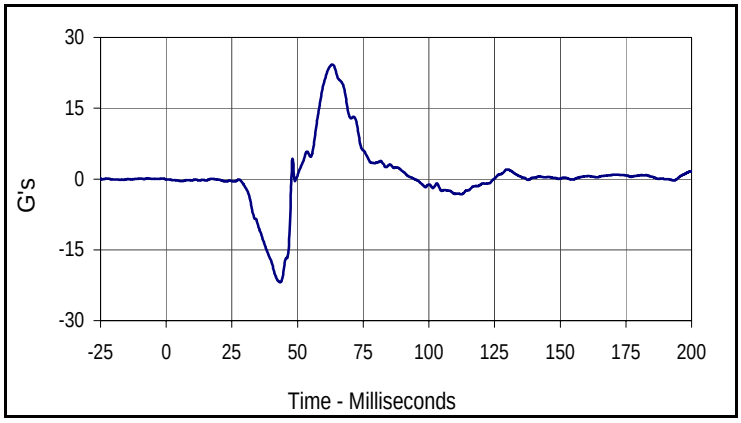
Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12



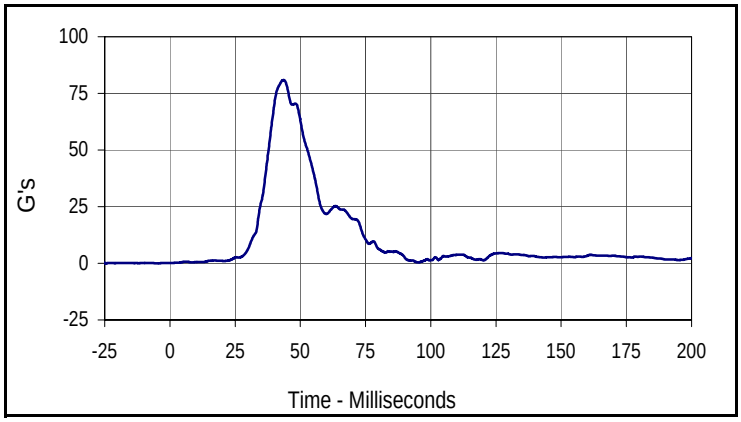
Curve Description			
Passenger Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
4.6	63.1	-16.6	45.2



Curve Description			
Passenger Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
77.0	43.5	-14.6	70.0

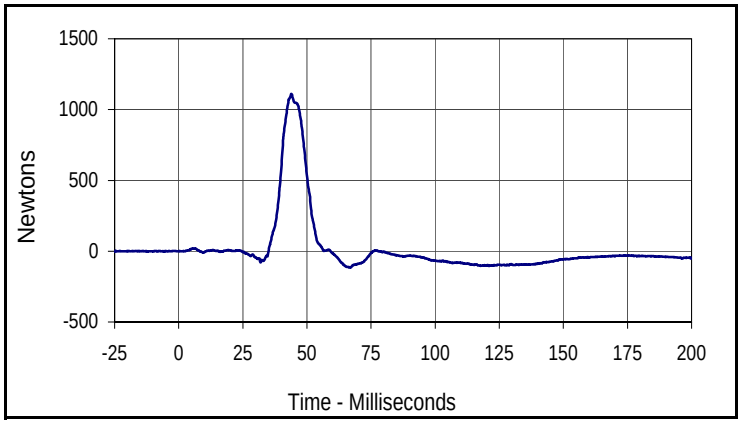


Curve Description			
Passenger Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
24.3	63.3	-21.9	43.3

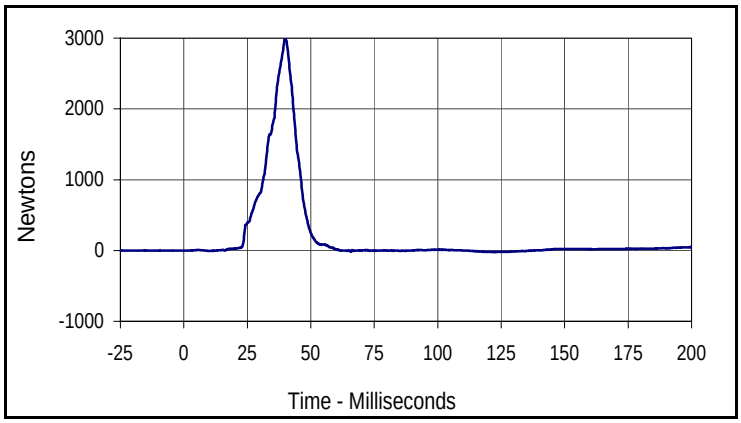


Curve Description			
Passenger Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
022	RES	180	G's
Max	Time	Min	Time
80.9	43.5	0.1	0.0

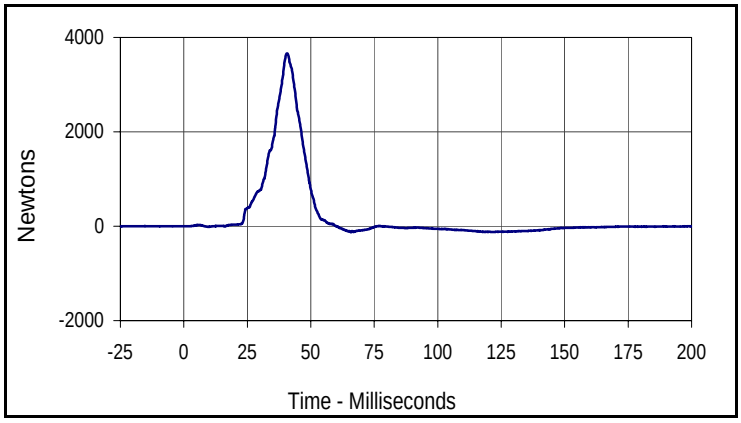
Test Vehicle:	2012 Toyota Yaris LE 5-Door Hatchback	NHTSA No.:	MC5107
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	1/4/12



Curve Description			
Passenger Iliac Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
1110.2	43.9	-116.1	66.7



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
2990.4	40.0	-22.4	121.8



Curve Description			
Passenger Total Pelvic Force			
Plot No.	Type	SAE Class	Units
018	SUM	600	Newtons
Max	Time	Min	Time
3664.3	40.6	-129.8	65.9

APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

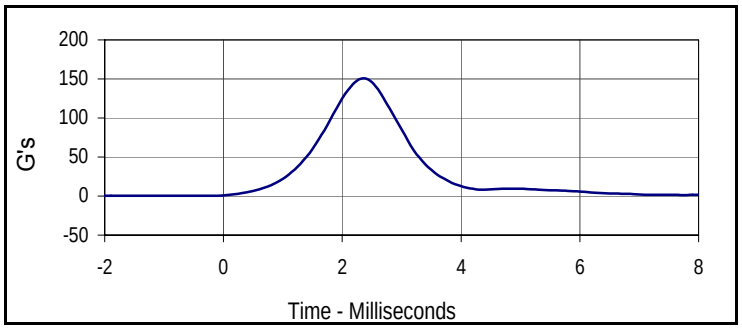
APPENDIX C
PRE-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	ES2re External Measurements	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	N/A

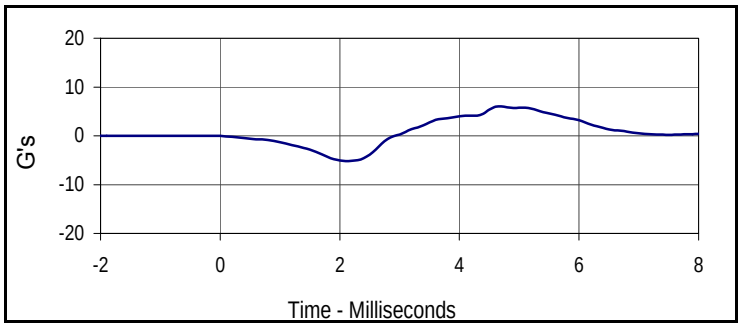
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		^{o}C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	35	Pass
1	Sitting Height	mm	900 - 918	906	Pass
2	Seat to Shoulder Joint	mm	558 - 572	562	Pass
3	Seat to Lower Face of Thoracic Spine Box	mm	346 - 356	350	Pass
4	Seat to Hip Joint (Center of Bolt)	mm	97 - 103	100	Pass
5	Sole to Seat, Sitting	mm	333 - 451	380	Pass
6	Head Width	mm	152 - 158	156	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	329	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	360	Pass
11	Head Depth	mm	196 - 206	201	Pass
12	Thorax Depth	mm	262 - 272	270	Pass
13	Abdomen Width	mm	194 - 204	200	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	610	Pass
			Overall Test Results		Pass

Test Program:	ES2re Head Drop Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037HD016

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	250	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.0	Pass
Peak Head Resultant Acceleration		G's	125 to 155	150.3	Pass
Peak Head X Acceleration		G's	≤15	6.0	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	8.5	Pass
			Overall Test Results		Pass



Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
150.3	2.4	0.2	-2.9



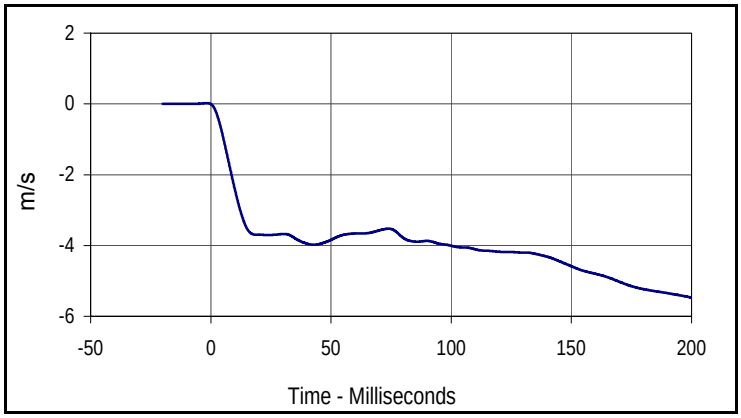
Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.0	4.7	-5.2	2.1

Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
122.0	2.4	-5.1	4.9

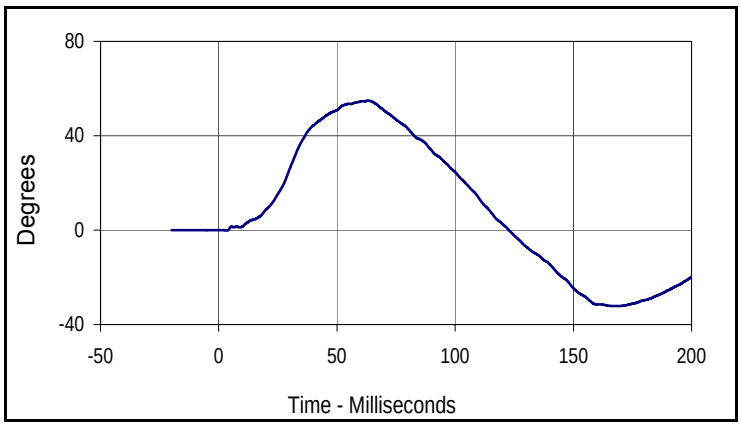
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
87.6	2.4	0.0	-0.8

Test Program:	ES2re Neck Flexion Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037NB016

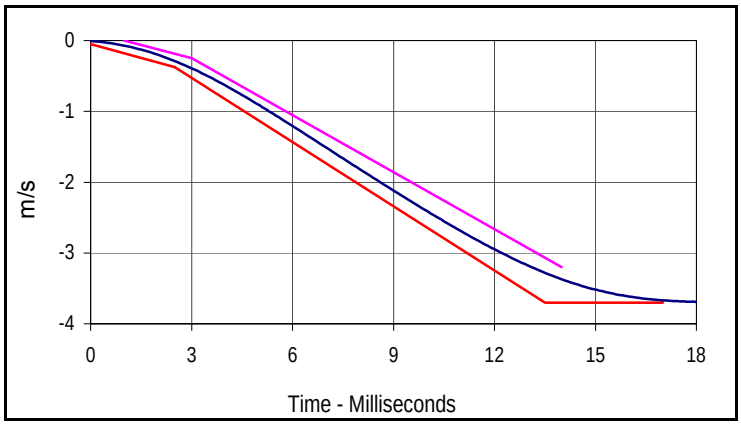
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	280	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.4	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.4	Pass
Headform Flexion	Max	Degrees	49 to 59	54.9	Pass
	Time	msec	54 to 66	63.3	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	59.5	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.6	-5.5	200.0



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
54.9	63.3	-32.2	167.0

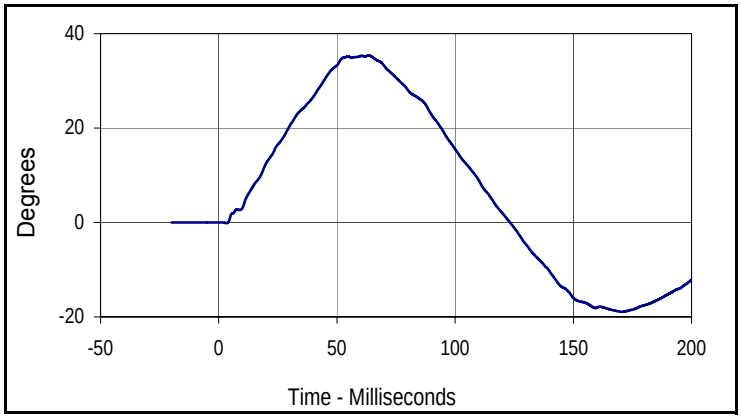


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.6	-5.5	200.0

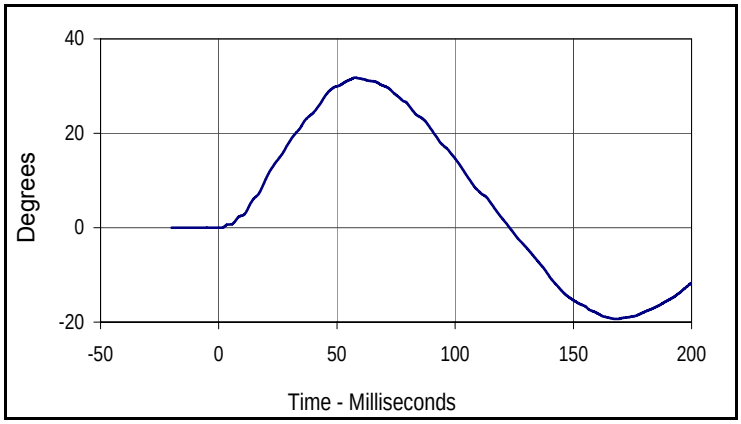
Velocity Corridors

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

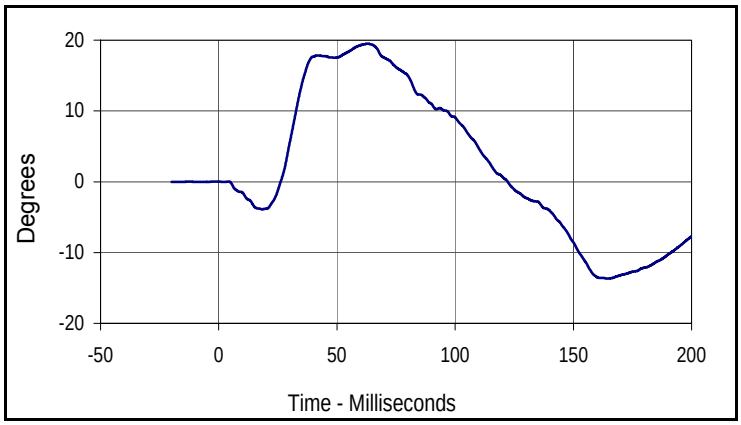
Test Program:	ES2re Neck Flexion Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037NB016



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
35.4	63.4	-18.9	170.7



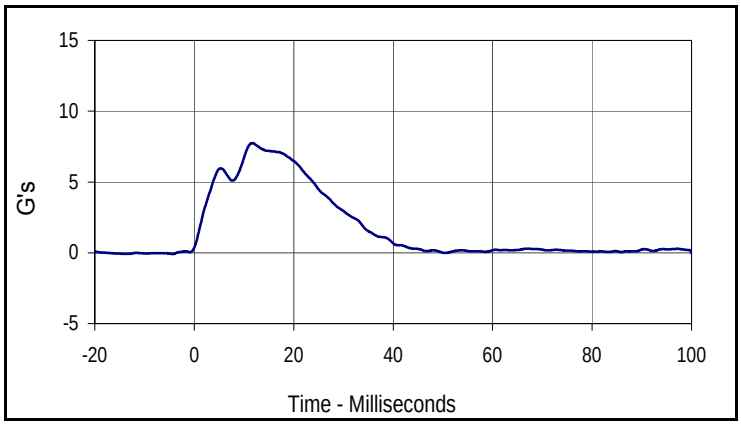
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
31.8	57.7	-19.3	168.7



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
19.5	63.0	-13.7	164.4

Test Program:	ES2re Shoulder Impact Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037SH016

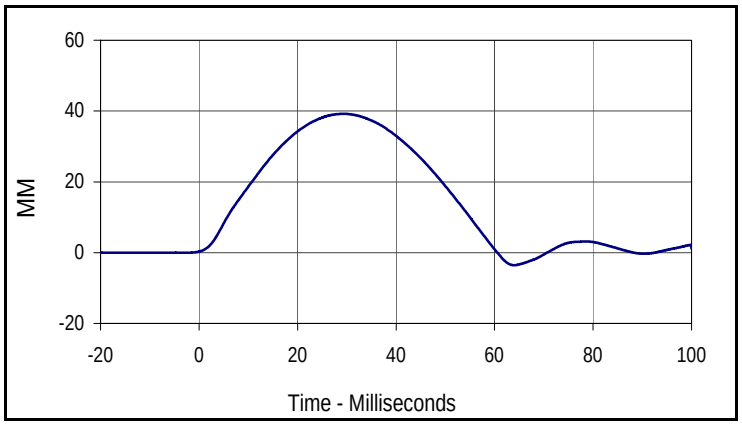
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	320	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.9	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.8	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.3	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	7.7	Pass
			Overall Test Results		Pass



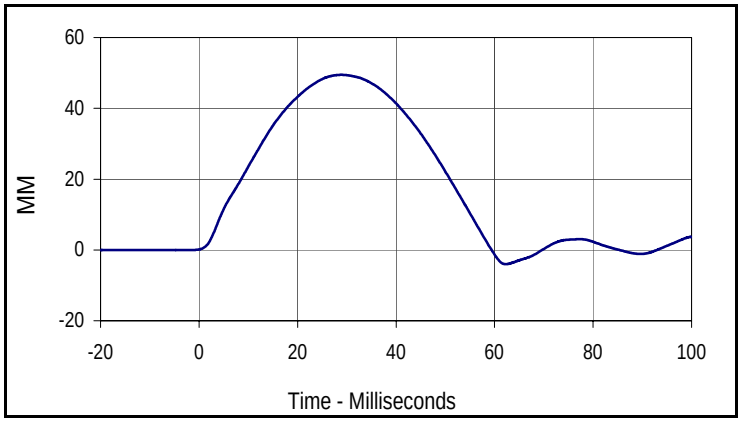
Curve Description			
Probe Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
7.7	11.7	-0.1	-4.3

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/8/11
ATD Serial No.:	F037 Rib #1	Test I.D.:	F037RB1016

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.2	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	39.2	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.5	Pass
			Overall Test Results		Pass



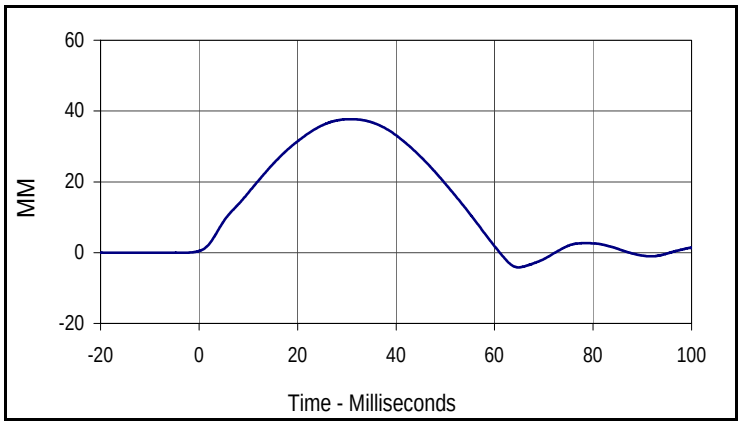
Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
39.2	29.4	-3.5	64.0



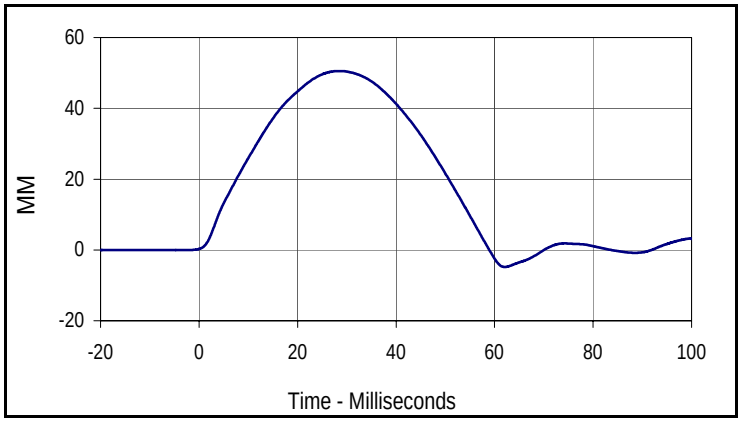
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.5	28.9	-4.0	62.3

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/8/11
ATD Serial No.:	F037 Rib #2	Test I.D.:	F037RB2016

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	380	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.6	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	50.6	Pass
			Overall Test Results		Pass



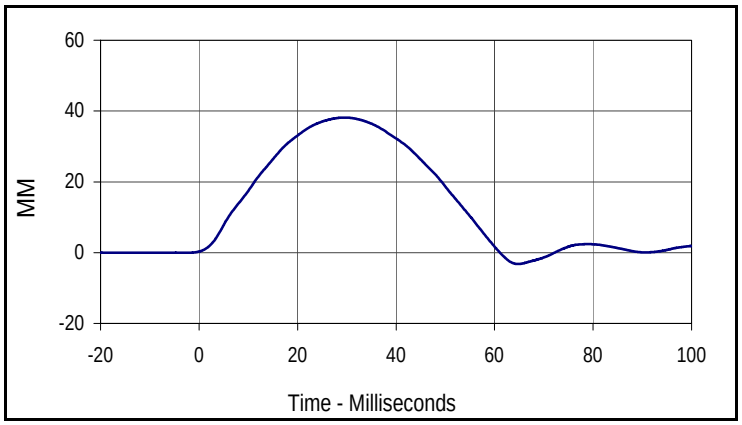
Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.7	30.8	-4.2	64.8



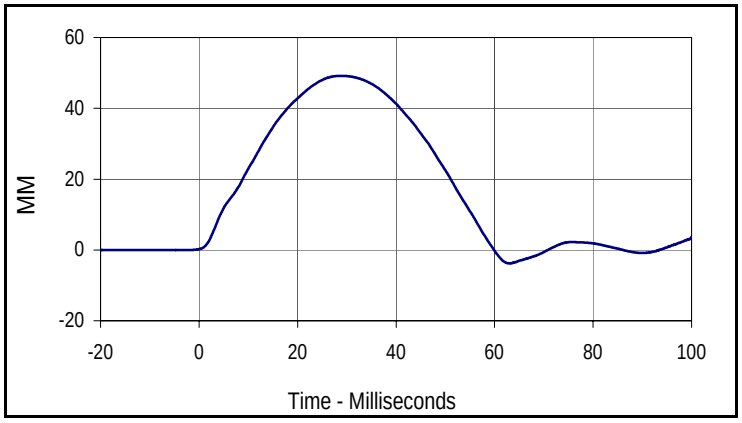
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
50.6	28.5	-4.8	62.1

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/8/11
ATD Serial No.:	F037 Rib # 3	Test I.D.:	F037RB3016

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.1	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.2	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.2	Pass
			Overall Test Results		Pass



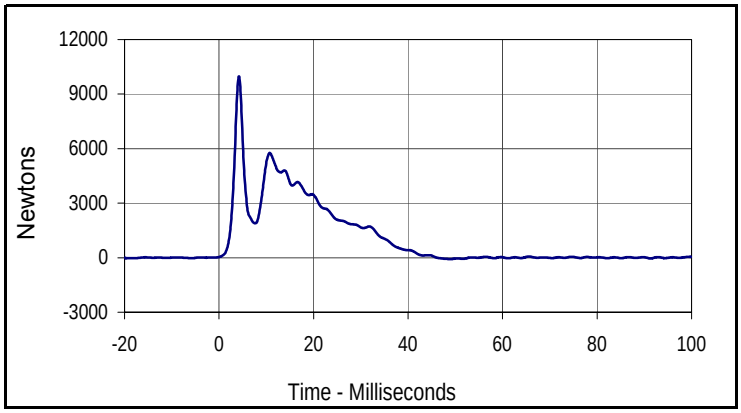
Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.2	29.6	-3.2	64.8



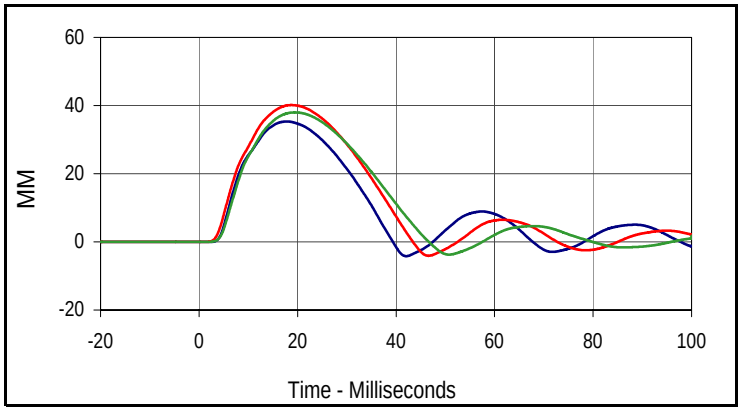
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
49.2	28.8	-3.8	63.0

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037TH016

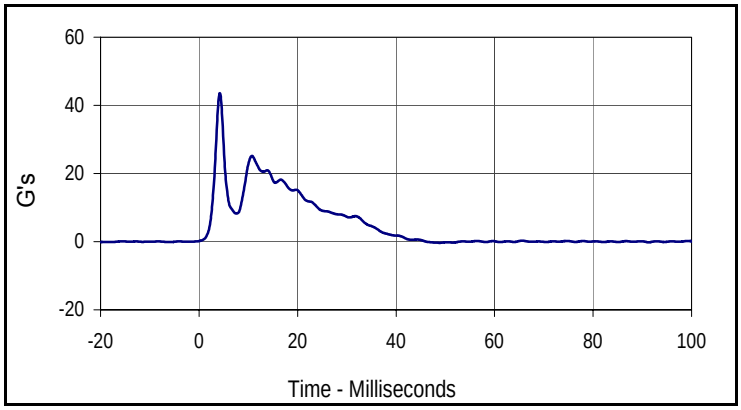
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	440	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.8	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.5	Pass
Peak Impactor Force		N	5100 to 6200	5760.4	Pass
		msec	> 6.0 msec	10.7	Pass
Peak Upper Rib Deflection		mm	34 to 41	35.3	Pass
Peak Middle Rib Deflection		mm	37 to 45	40.1	Pass
Peak Lower Rib Deflection		mm	37 to 44	38.0	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
9972.1	4.2	-76.1	48.8



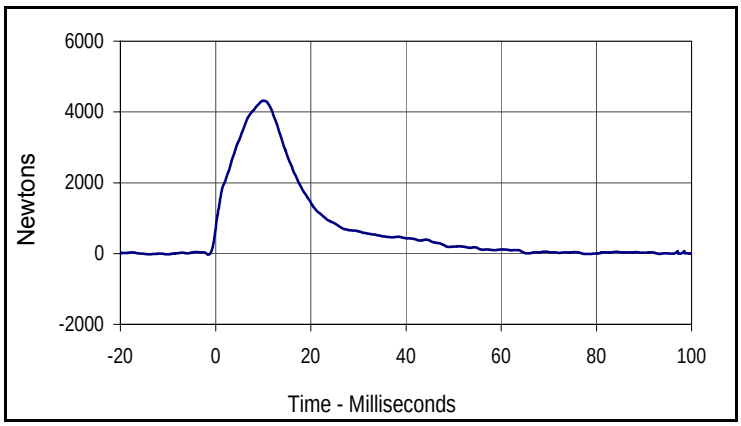
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
35.3	17.8	-4.2	42.0
Max (Middle)	Time	Min (Middle)	Time
40.1	18.8	-4.1	46.6
Max (Lower)	Time	Min (Lower)	Time
38.0	19.5	-3.8	50.7



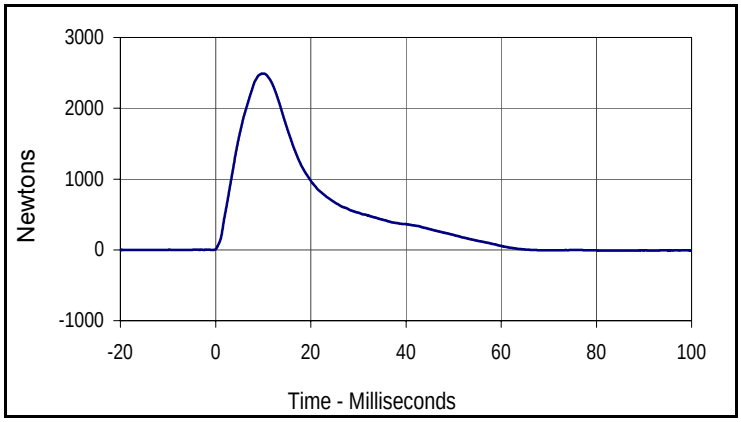
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.5	4.2	-0.3	48.8

Test Program:	ES2re Abdomen Impact Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037ABD016

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	460	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.8	Pass
Probe Velocity		m/s	3.9 to 4.1	4.0	Pass
Peak Impactor Force		N	4000 to 4800	4314.6	Pass
		msec	10.6 to 13.0	11.4	Pass
Sum of Abdominal Forces		N	2200 to 2700	2490.0	Pass
		msec	10.0 to 12.3	11.5	Pass
			Overall Test Results		Pass

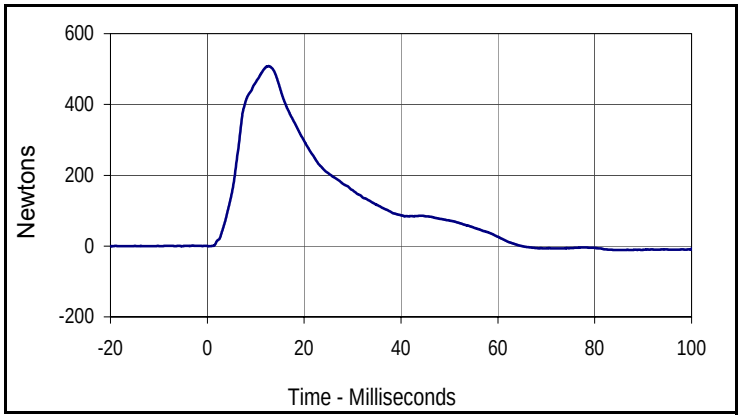


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4314.6	11.4	-25.0	-0.1

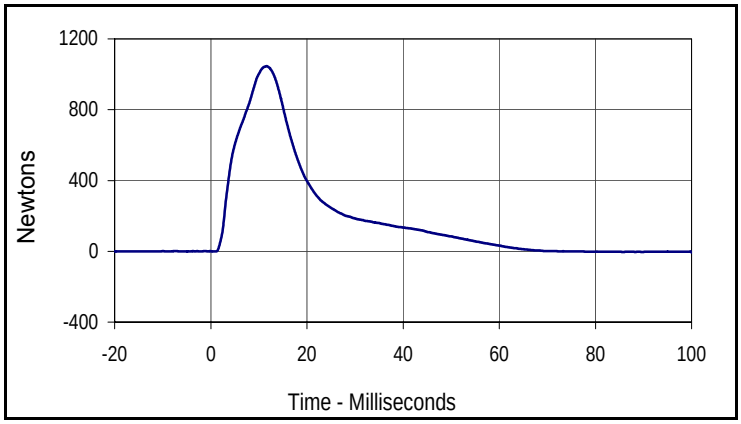


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2490.0	11.5	-11.1	89.7

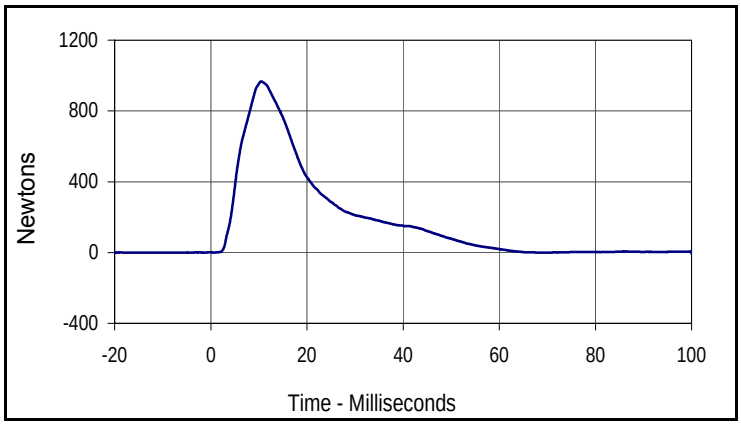
Test Program:	ES2re Abdomen Impact Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037ABD016



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
508.4	12.7	-11.5	86.1



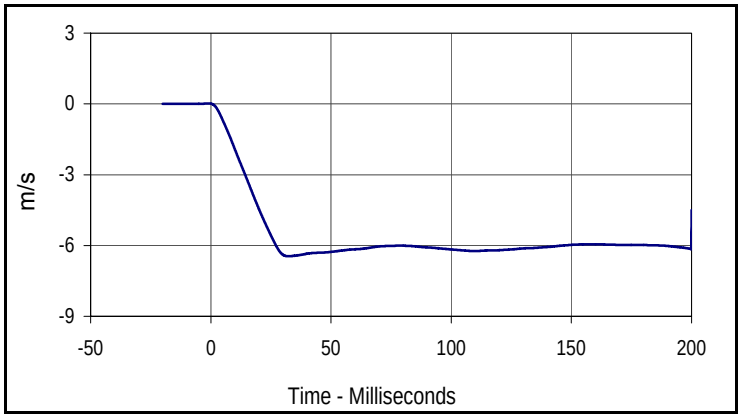
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
1045.7	11.6	-8.5	0.0



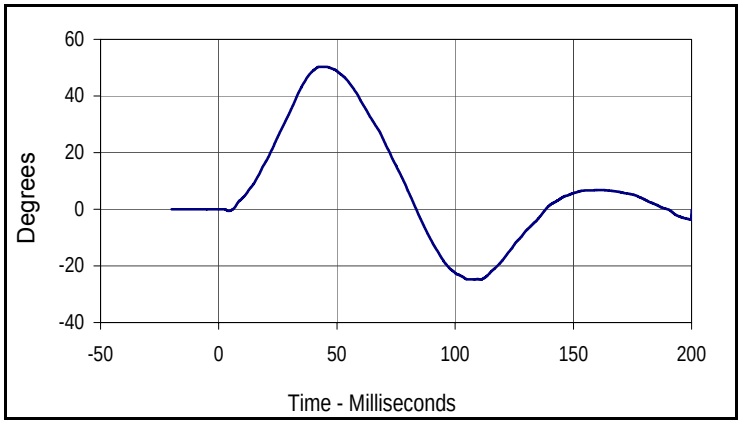
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
967.4	10.5	-8.5	0.0

Test Program:	ES2re Lumbar Flexion Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037LB016

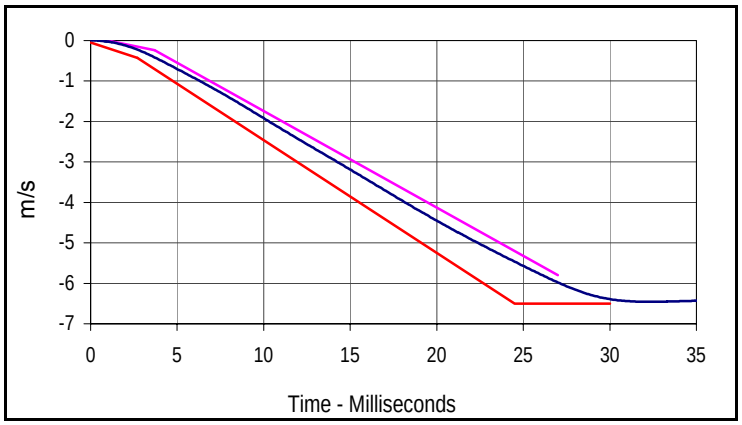
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	370	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.8	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.04	Pass
Headform Rotation	Max	Degrees	45 to 55	50.3	Pass
	Time	msec	39 to 53	44.4	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	39.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-6.5	32.3



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.3	44.4	-24.9	110.8

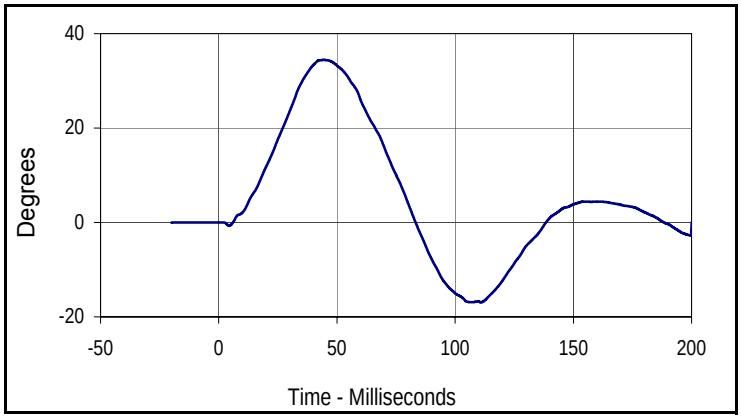


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-6.5	32.3

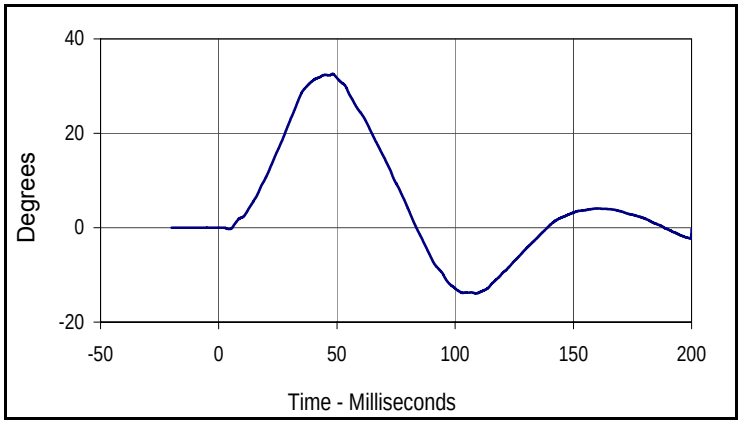
Velocity Corridors

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

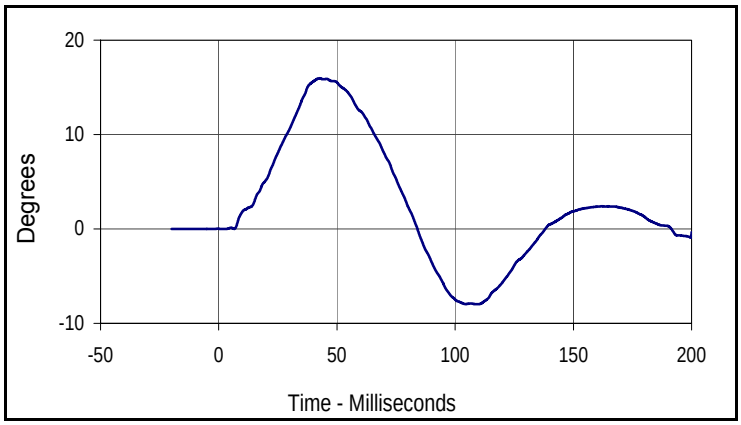
Test Program:	ES2re Lumbar Flexion Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037LB016



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
34.5	44.4	-16.9	110.9



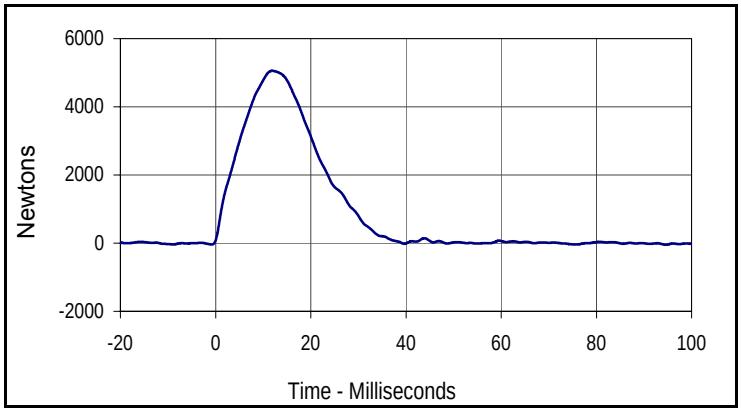
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
32.6	48.2	-13.9	108.8



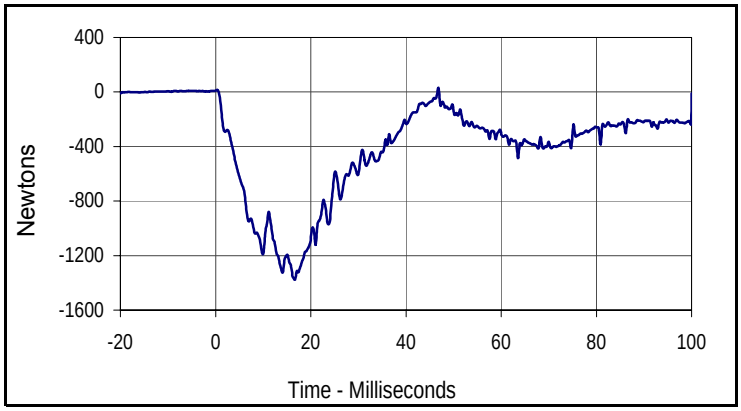
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
16.0	42.5	-8.0	108.4

Test Program:	ES2re Pelvis Impact Test	Test Date:	12/8/11
ATD Serial No.:	F037	Test I.D.:	F037PL016

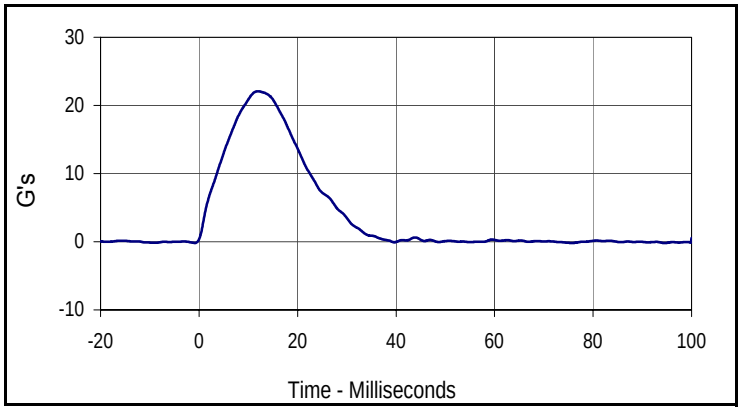
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.8	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Impactor Force		N	4700 to 5400	5057.6	Pass
		msec	11.8 to 16.1	11.9	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1376.7	Pass
		msec	12.2 to 17.0	16.7	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5057.6	11.9	-46.7	94.6



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
30.3	46.8	-1376.7	16.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
22.1	11.9	-0.2	94.6

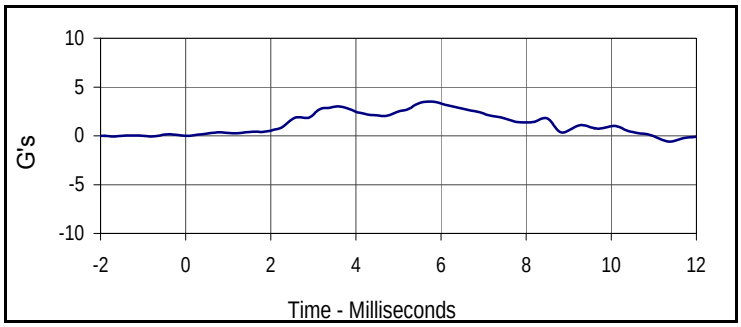
Test Program:	SID IIs External Measurements	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		^{o}C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	777	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	82	Pass
D	H-Point from Seatback	mm	141 - 151	146	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	103	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	182	Pass
J	Head Circumference	mm	541 - 551	547	Pass
K	Buttock to Knee Length	mm	514 - 540	527	Pass
L	Popliteal Height	mm	343 - 369	348	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	430	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	317	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	480	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	875	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
			Overall Test Results		Pass

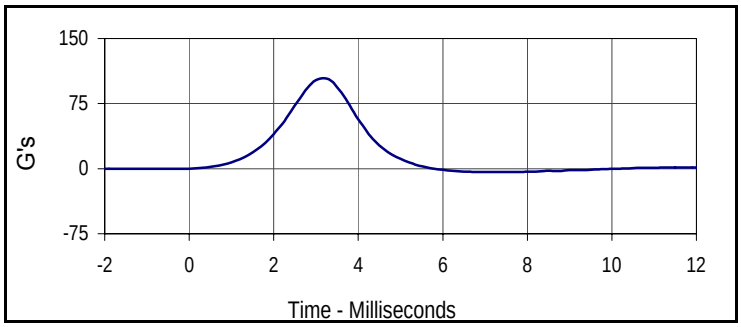
Test Program:	SID IIs Head Drop Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307HD025

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	260	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	22.2	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Peak Head Resultant Acceleration		G's	115 to 137	127.9	Pass
Peak Head X Acceleration		G's	<15	3.5	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	13.1	Pass
			Overall Test Results		Pass

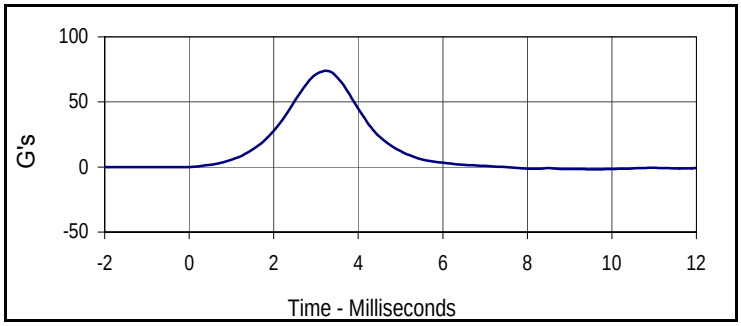
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
127.9	3.2	0.0	-2.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.5	5.8	-0.1	-0.8



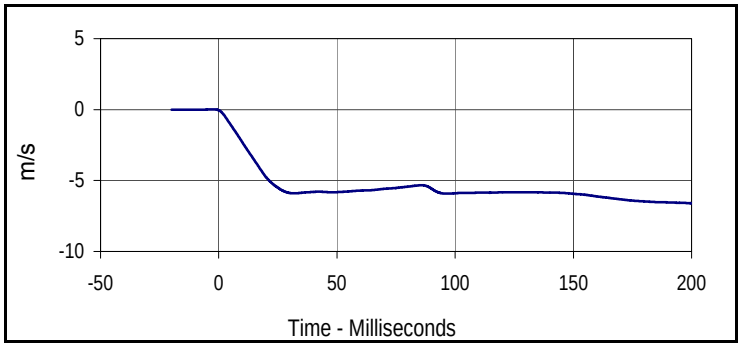
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
104.3	3.2	-4.0	7.4



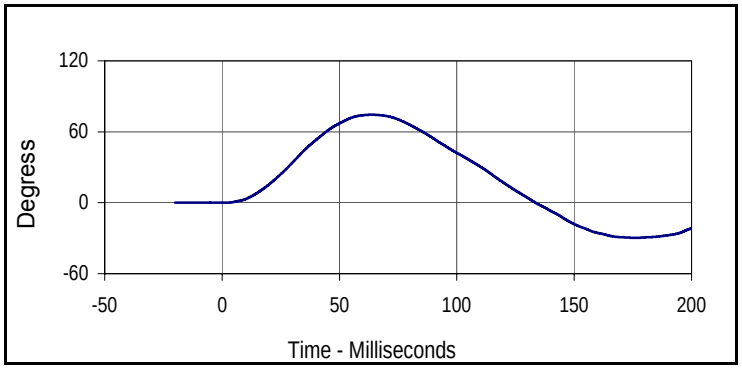
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
73.8	3.2	-1.8	9.6

Test Program:	SID IIs Neck Flexion Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307NB025

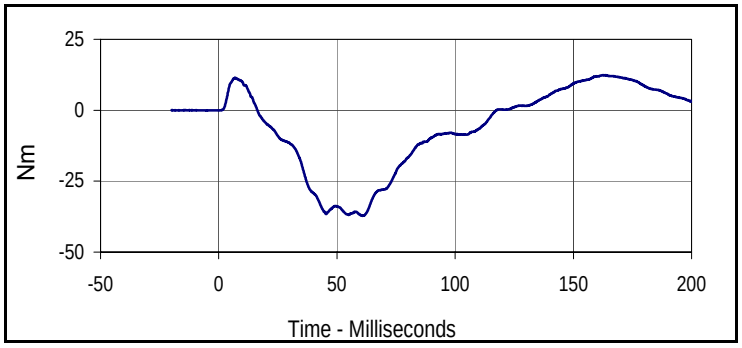
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	330	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.55	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.31	Pass
	15 msec	m/s	-3.30 to -4.10	-3.55	Pass
	20 msec	m/s	-4.40 to -5.40	-4.76	Pass
	25 msec	m/s	-5.40 to -6.10	-5.51	Pass
	25-100 msec	m/s	-5.50 to -6.20	-5.93	Pass
D-Plane Rotation	Max	Degrees	71 to 81	74.5	Pass
	Time	msec	50 to 70	63.8	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-37.2	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	117.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-2.2	-6.6	200.0



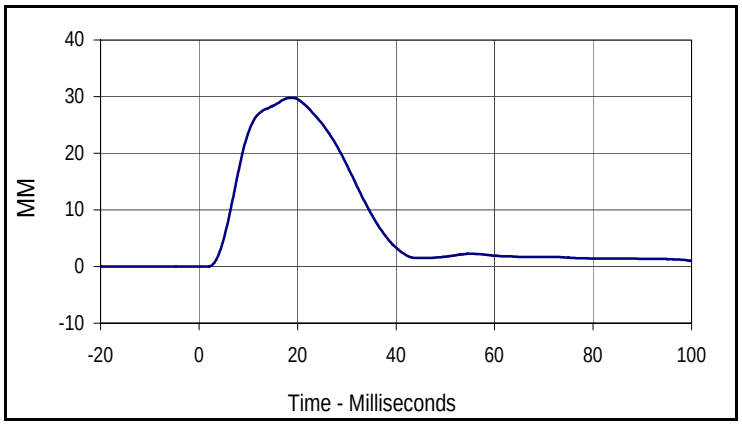
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
74.5	63.8	-29.7	176.1



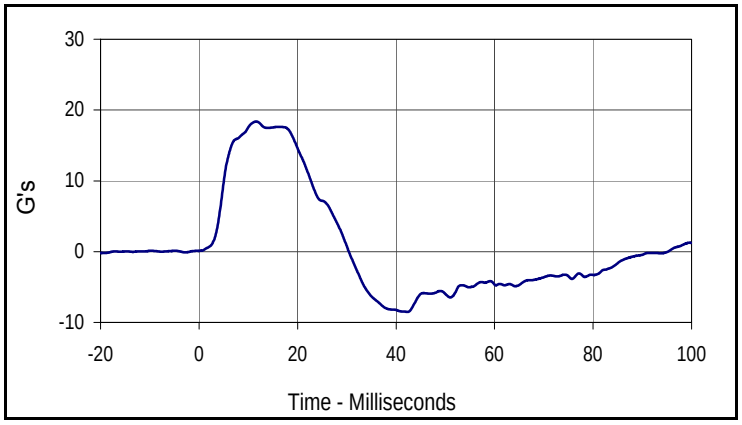
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
12.4	162.7	-37.2	60.8

Test Program:	SID IIs Shoulder Impact Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307SH025

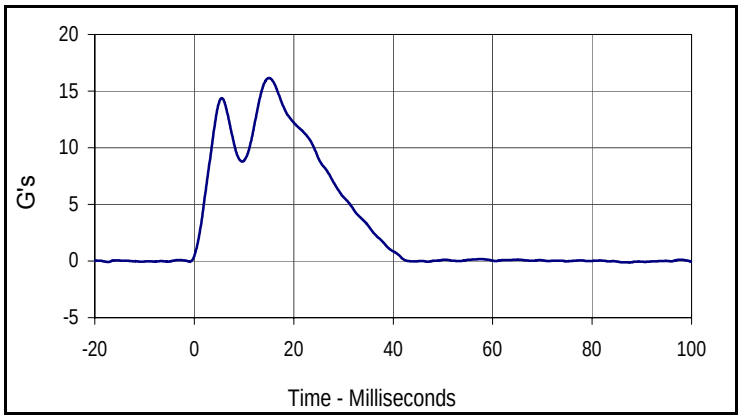
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	350	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	20.3	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.29	Pass
Peak Shoulder Deflection		mm	28 to 37	29.8	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	18.4	Pass
Peak Impactor Acceleration		G's	13 to 18	16.1	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.8	18.6	0.0	-11.5



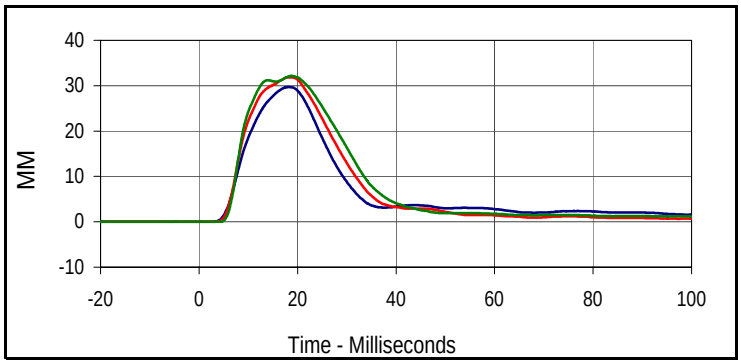
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.4	11.6	-8.5	42.3



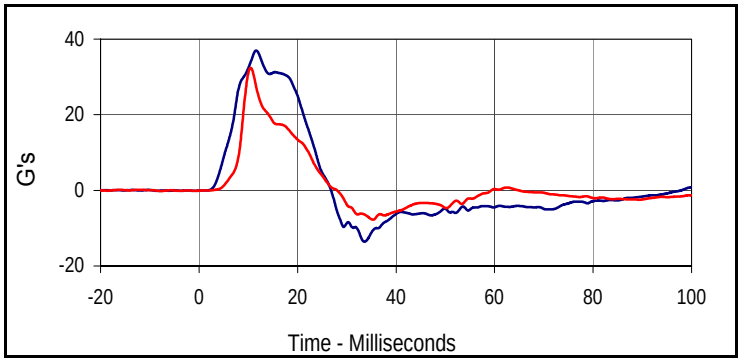
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.1	15.1	-0.1	87.5

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307TWA025

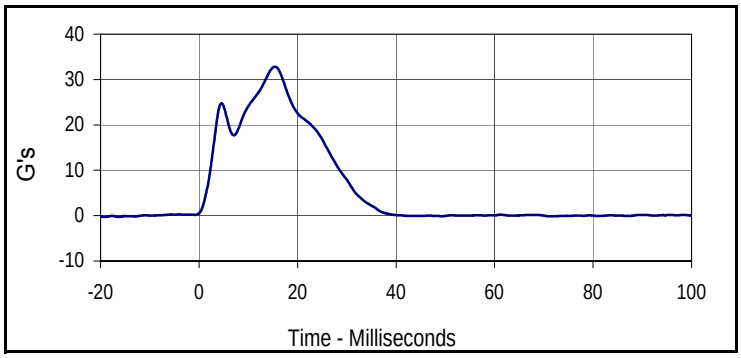
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	370	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.6	Pass
Peak Shoulder Deflection		mm	31 to 40	37.0	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	29.7	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	31.8	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	32.2	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	37.0	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	32.4	Pass
Peak Impactor Acceleration		G's	30 to 36	32.8	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.7	18.3	0.0	-11.2
Middle Thorax Deflection			
Max	Time	Min	Time
31.8	18.2	0.0	-17.8
Lower Thorax Deflection			
Max	Time	Min	Time
32.2	18.8	0.0	-16.1

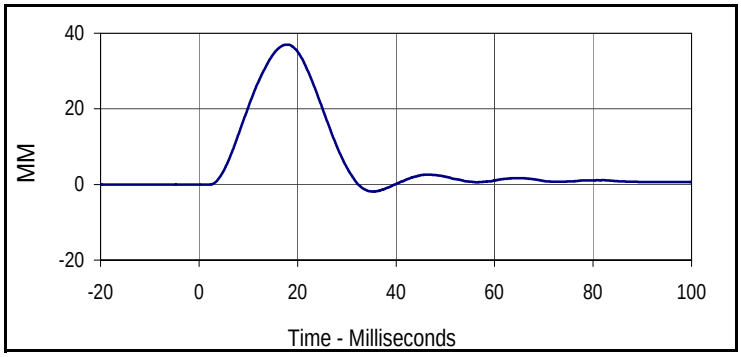


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.0	11.6	-13.6	33.6
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.4	10.5	-7.8	35.3



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
32.8	15.4	-0.3	-16.3

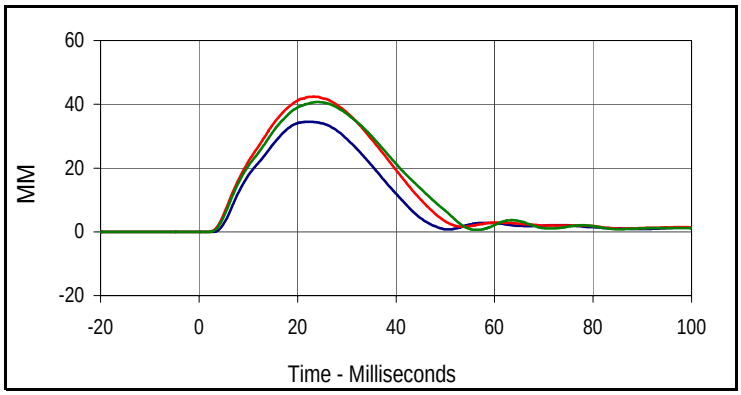
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307TWA025



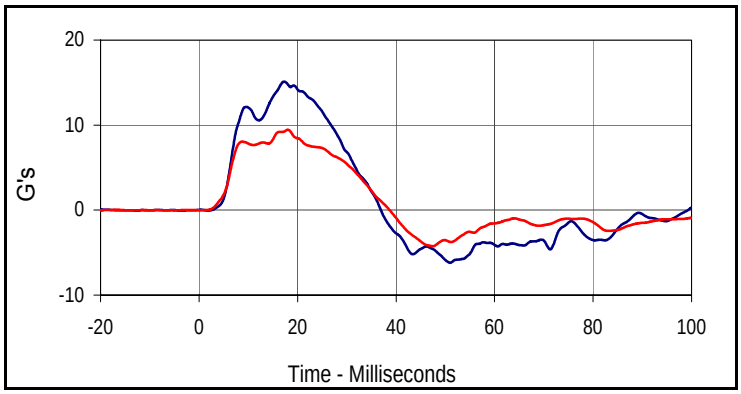
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
37.0	17.9	-1.9	35.3

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307TWOA025

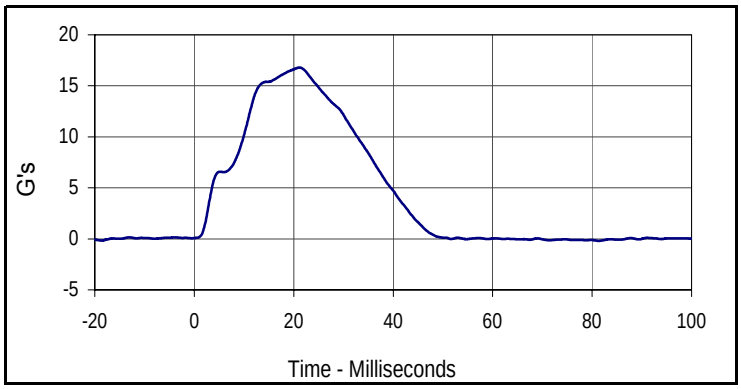
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	390	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.9	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	34.5	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	42.4	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	40.7	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.1	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.4	Pass
Peak Impactor Acceleration		G's	14 to 18	16.8	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
34.5	22.3	0.0	-18.4
Middle Thorax Deflection			
Max	Time	Min	Time
42.4	23.3	0.0	-17.6
Lower Thorax Deflection			
Max	Time	Min	Time
40.7	24.1	0.0	-18.3



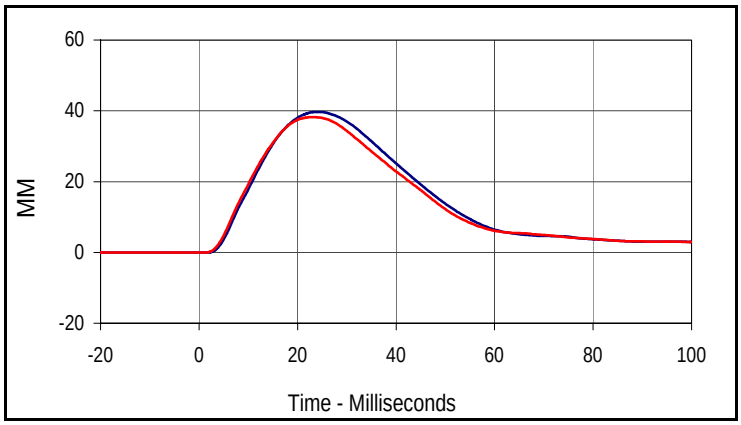
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	17.3	-6.2	51.0
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.4	18.0	-4.3	47.4



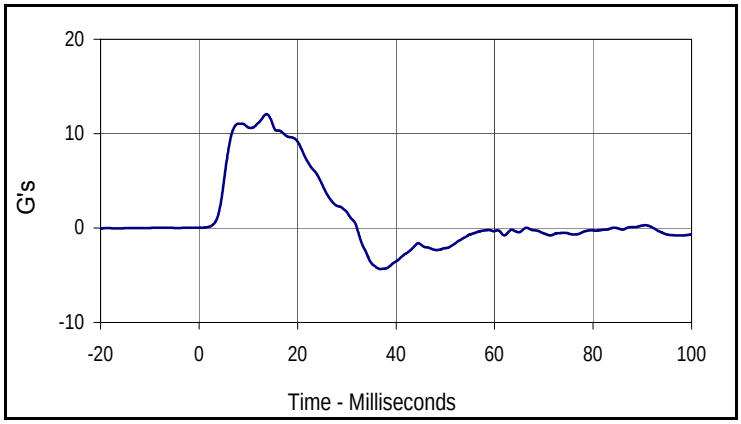
Curve Description			
Impactor Accleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.8	21.1	-0.2	81.3

Test Program:	SID IIs Abdomen Impact Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307ABD025

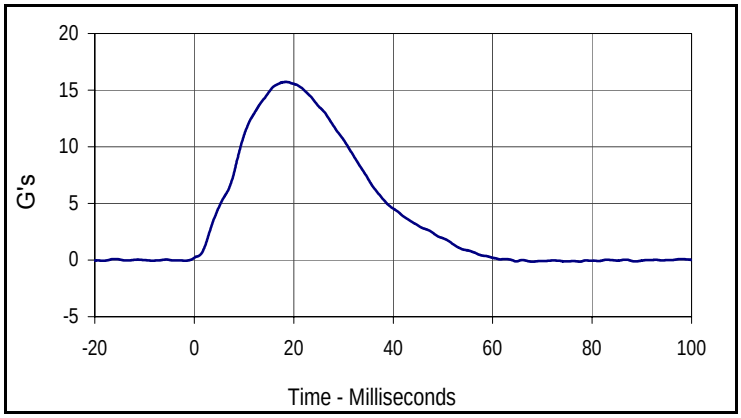
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	450	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.4	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	39.7	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	38.2	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	12.1	Pass
Peak Impactor Acceleration		G's	12 to 16	15.7	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
39.7	23.9	0.0	0.6
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
38.2	22.8	0.0	-3.5



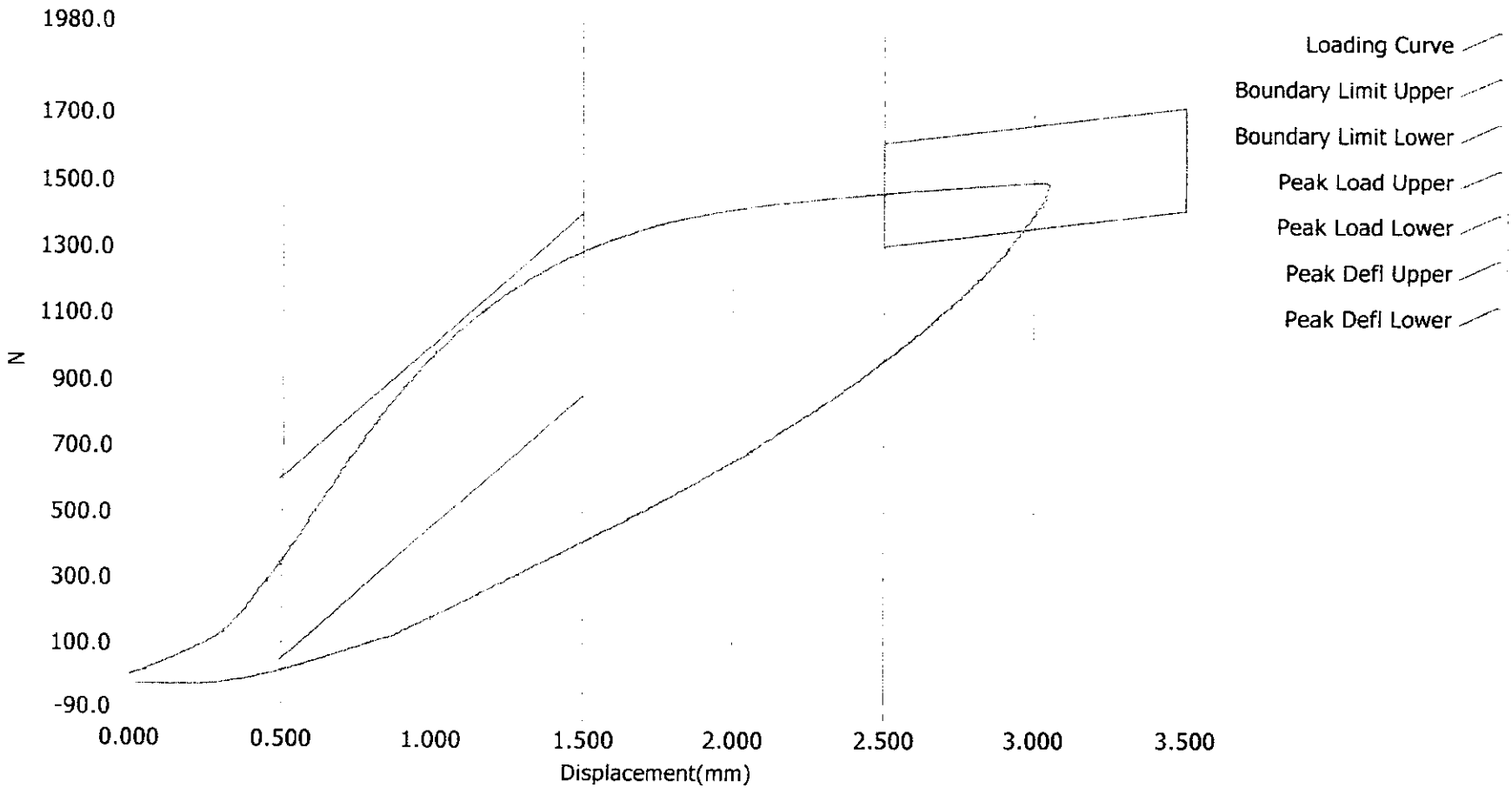
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.1	13.7	-4.3	36.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.7	18.5	-0.1	68.0

MC5107 PRE TEST

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

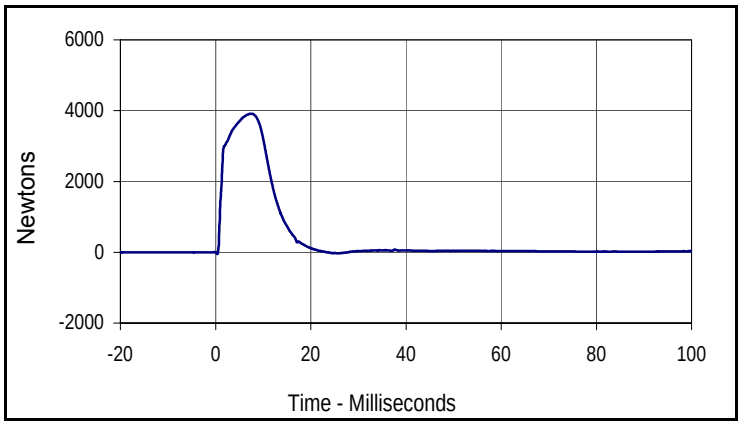
Test ID	Part Serial Number	Test Date	Test Time
		9/23/2010	1:43 AM

Cert ID	ATD Serial Number	ATD Type
	36387	SIDIIs

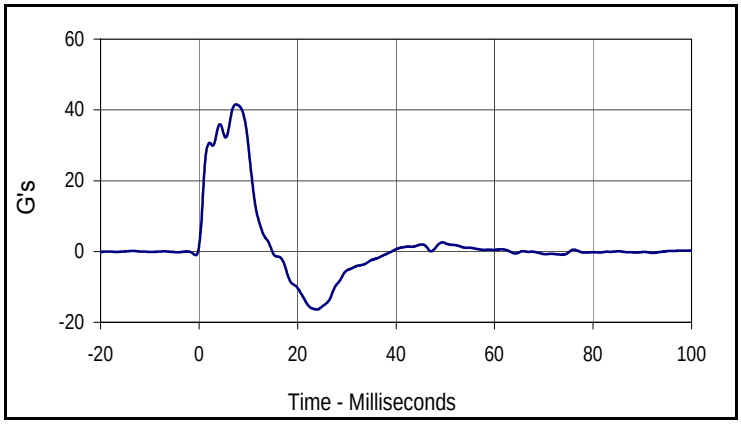
Current Date : 9/23/2010 Current Time : 01:44:50

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307ACET025

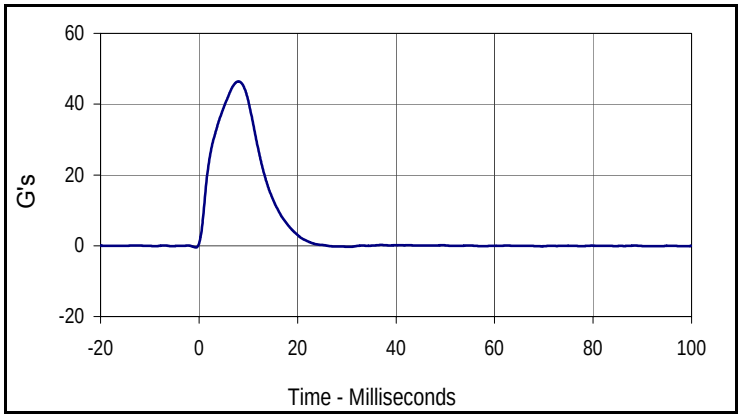
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	525	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.6	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3914.7	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	41.6	Pass
Peak Impactor Acceleration		G's	38 to 47	46.4	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3914.7	7.5	-47.1	0.4



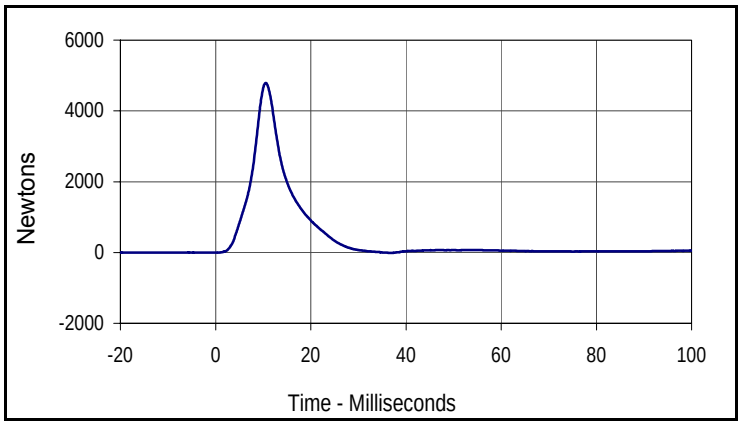
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.6	7.5	-16.4	23.9



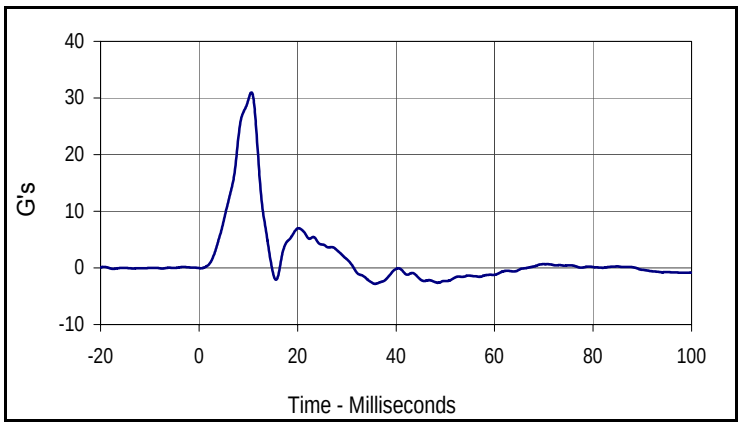
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.4	8.0	-0.5	-0.6

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	12/23/11
ATD Serial No.:	307	Test I.D.:	307PL025

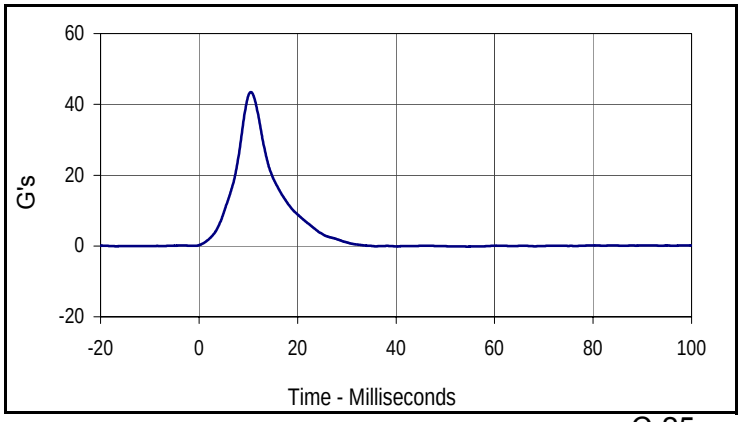
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	575	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.7	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Illiac Force		Newtons	4100 to 5100	4788.2	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	31.0	Pass
Peak Impactor Acceleration		G's	36 to 45	43.5	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4788.2	10.5	-11.2	37.1



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.0	10.6	-2.8	35.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.5	10.5	-0.2	54.5

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

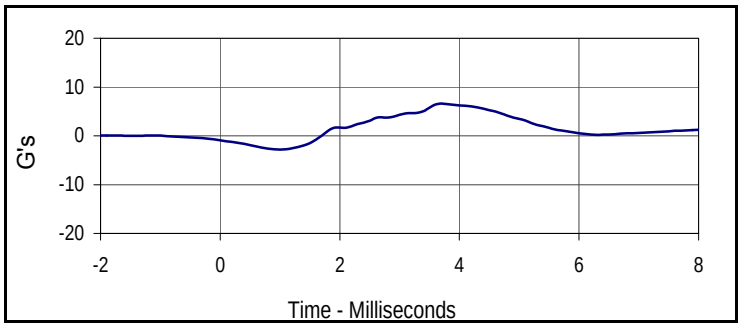
Test Program:	ES2re External Measurements	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		^{o}C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	34	Pass
1	Sitting Height	mm	900 - 918	909	Pass
2	Seat to Shoulder Joint	mm	558 - 572	563	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	100	Pass
5	Sole to Seat, Sitting	mm	333 - 451	383	Pass
6	Head Width	mm	152 - 158	156	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	329	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	360	Pass
11	Head Depth	mm	196 - 206	201	Pass
12	Thorax Depth	mm	262 - 272	270	Pass
13	Abdomen Width	mm	194 - 204	200	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	610	Pass
			Overall Test Results		Pass

Test Program:	ES2re Head Drop Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037HD017

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	250	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	36.1	Pass
Peak Head Resultant Acceleration		G's	125 to 155	149.2	Pass
Peak Head X Acceleration		G's	≤15	6.6	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	6.2	Pass
			Overall Test Results		Pass

Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
149.2	1.4	0.1	-2.7



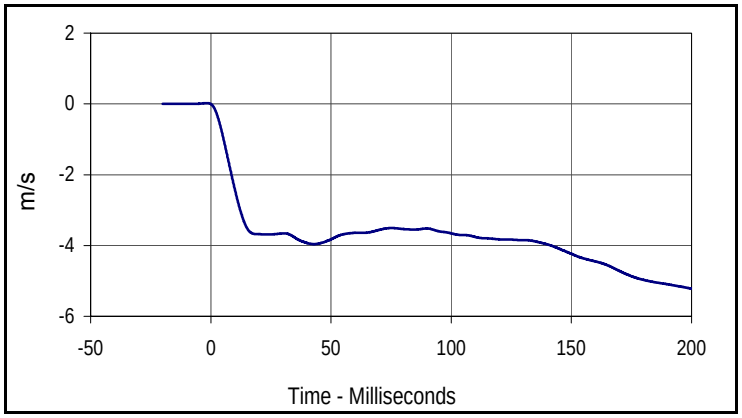
Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.6	3.7	-2.8	1.0

Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
123.0	1.4	-4.6	4.0

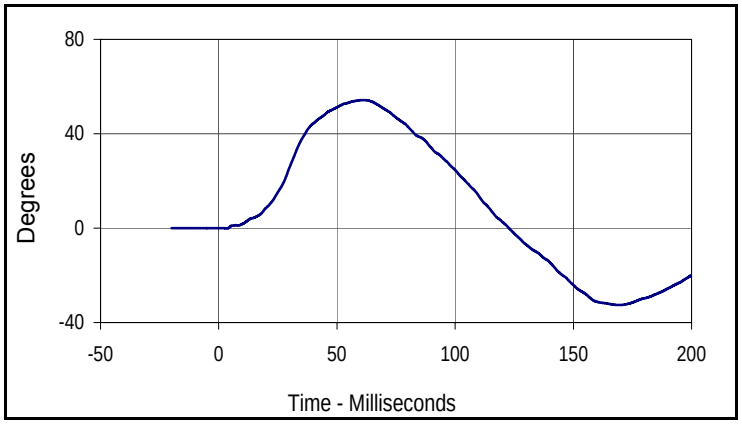
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
84.3	1.4	-0.3	8.9

Test Program:	ES2re Neck Flexion Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037NB017

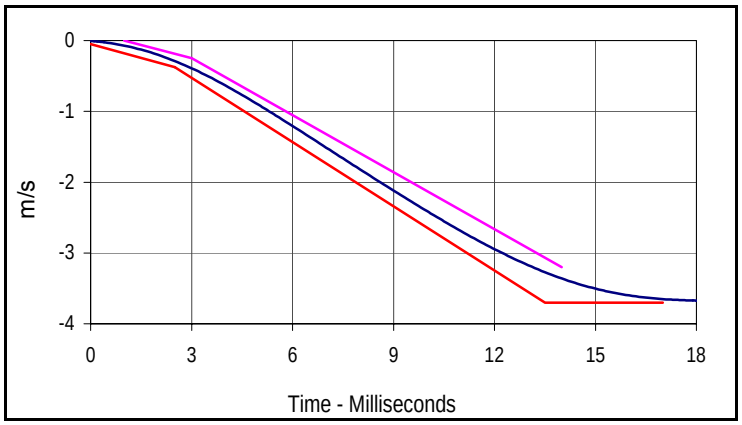
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	270	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	36.2	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.4	Pass
Headform Flexion	Max	Degrees	49 to 59	54.3	Pass
	Time	msec	54 to 66	60.7	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	62.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.6	-5.2	200.0



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
54.3	60.7	-32.5	169.6

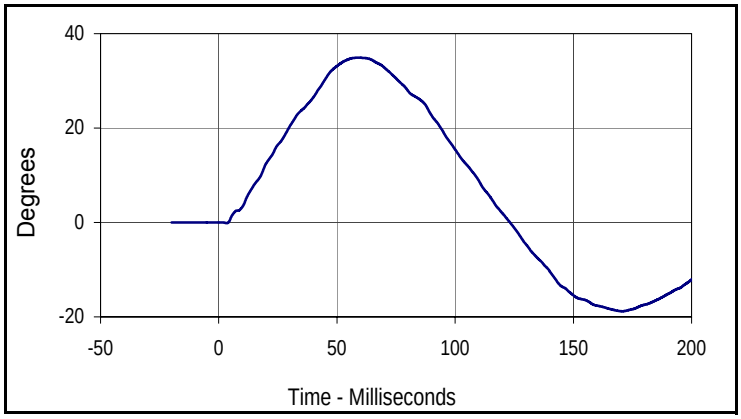


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.6	-5.2	200.0

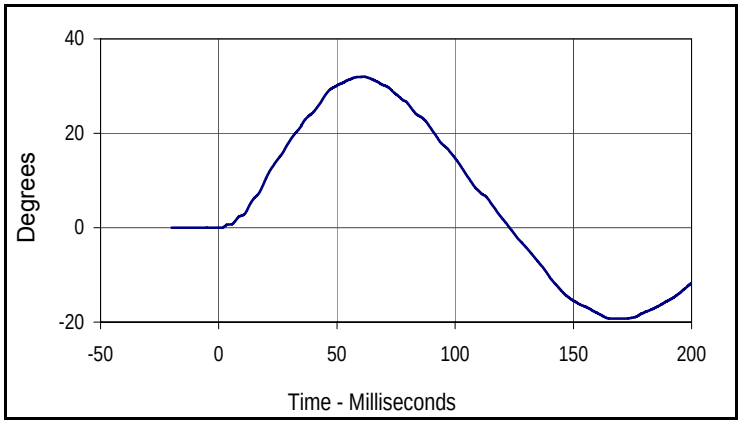
Velocity Corridors

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

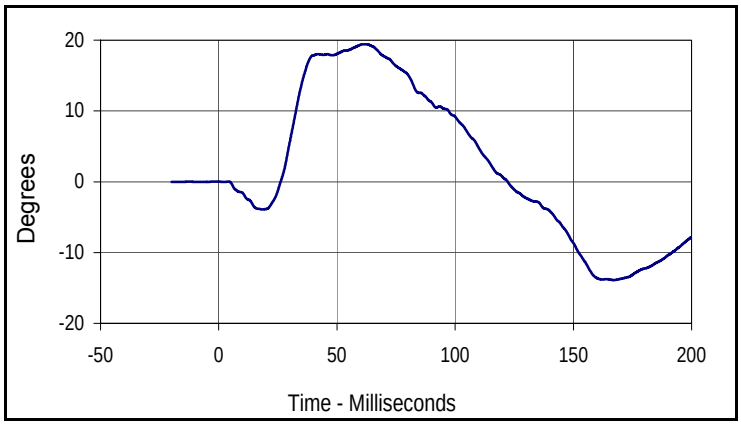
Test Program:	ES2re Neck Flexion Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037NB017



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
34.9	58.3	-18.8	170.7



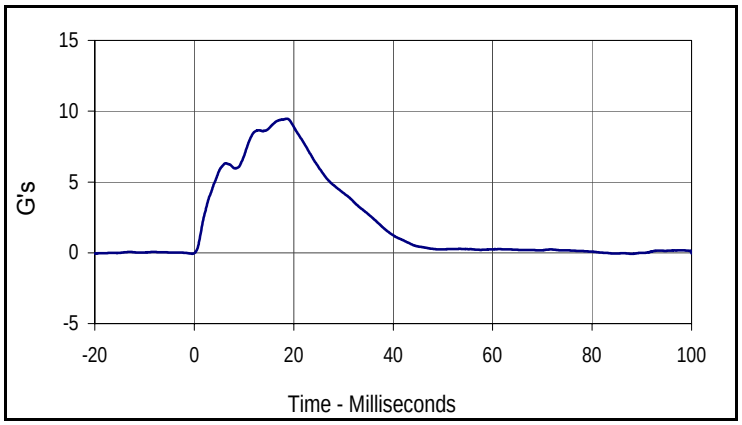
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
32.0	61.4	-19.3	165.8



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
19.4	61.0	-13.9	167.0

Test Program:	ES2re Shoulder Impact Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037SH017

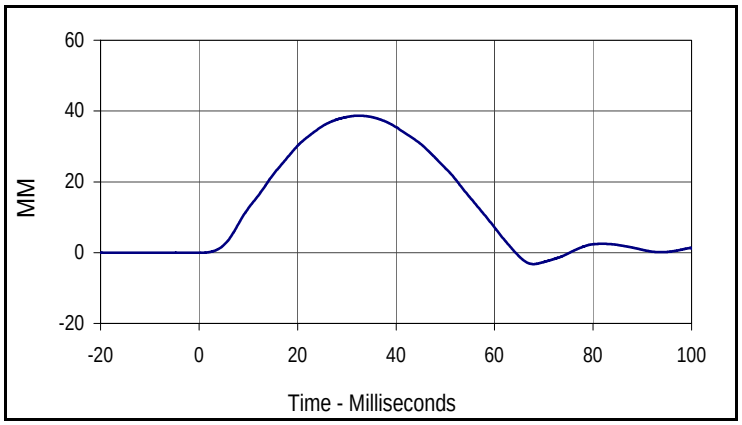
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	310	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	36.1	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.3	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	9.5	Pass
			Overall Test Results		Pass



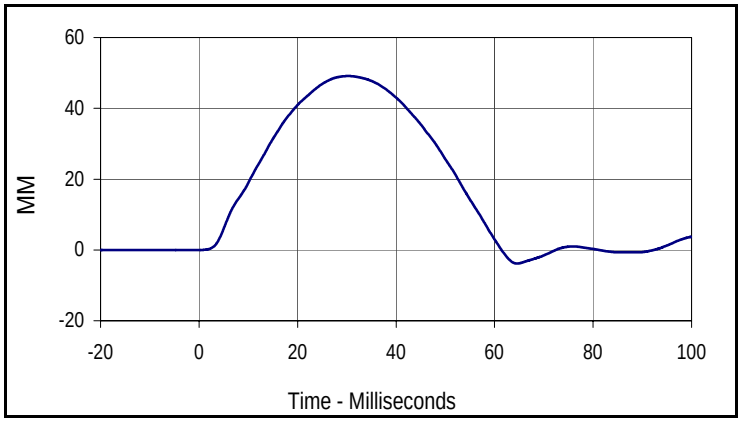
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
9.5	18.6	-0.1	88.0

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	1/6/12
ATD Serial No.:	F037 Rib #1	Test I.D.:	F037RB1017

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	350	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.9	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.7	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.1	Pass
			Overall Test Results		Pass



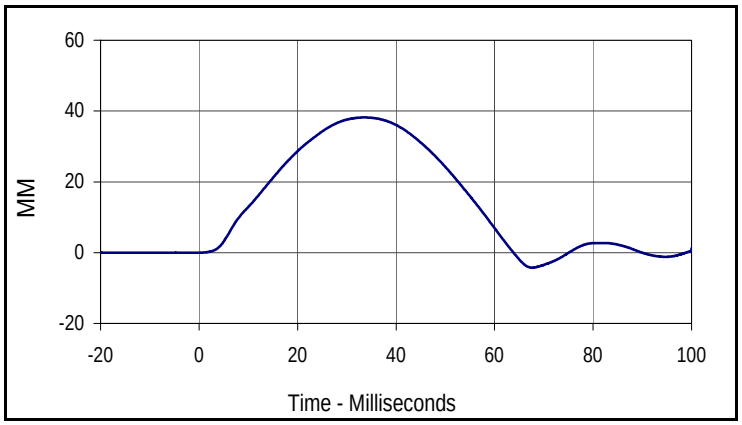
Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.7	32.4	-3.3	67.9



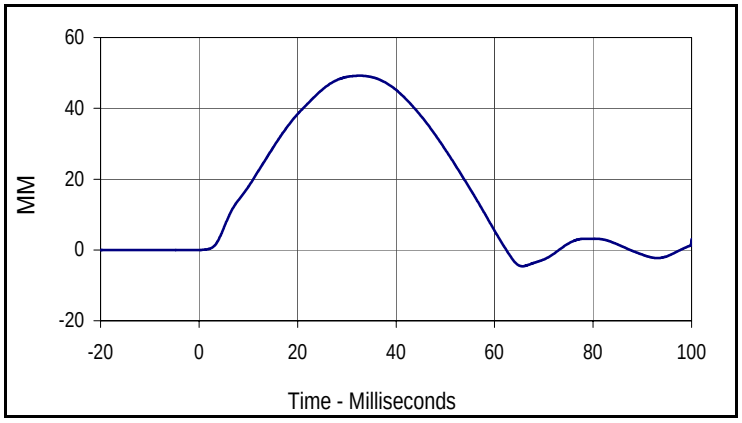
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.1	30.3	-3.8	64.6

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	1/6/12
ATD Serial No.:	F037 Rib #2	Test I.D.:	F037RB2017

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	37.2	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.2	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.2	Pass
			Overall Test Results		Pass



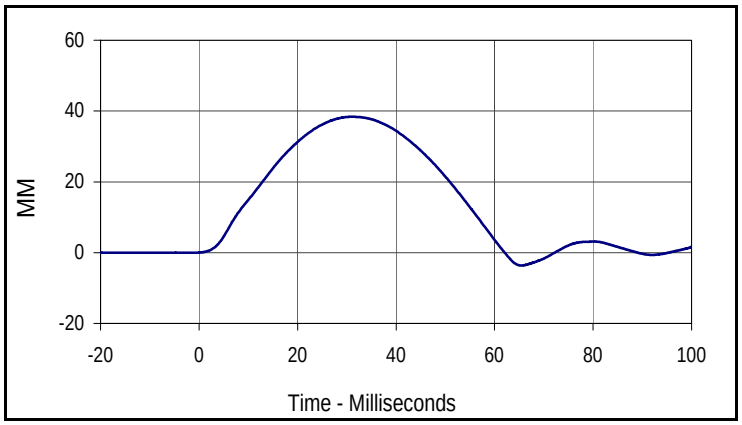
Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.2	33.5	-4.3	67.7



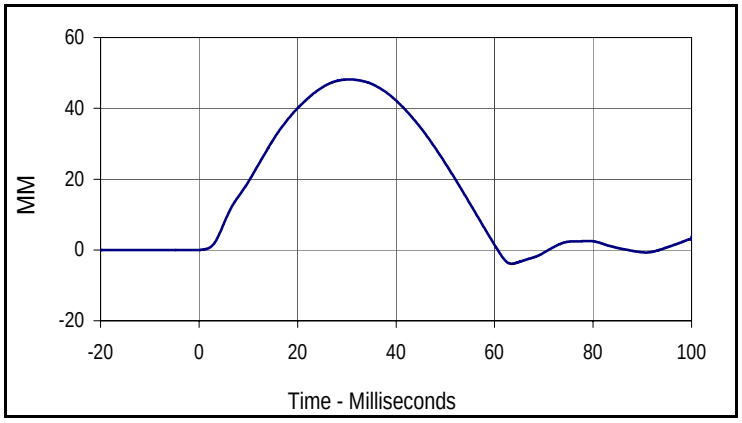
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.2	32.8	-4.6	65.7

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	1/6/12
ATD Serial No.:	F037 Rib # 3	Test I.D.:	F037RB3017

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	390	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.6	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.4	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.2	Pass
			Overall Test Results		Pass



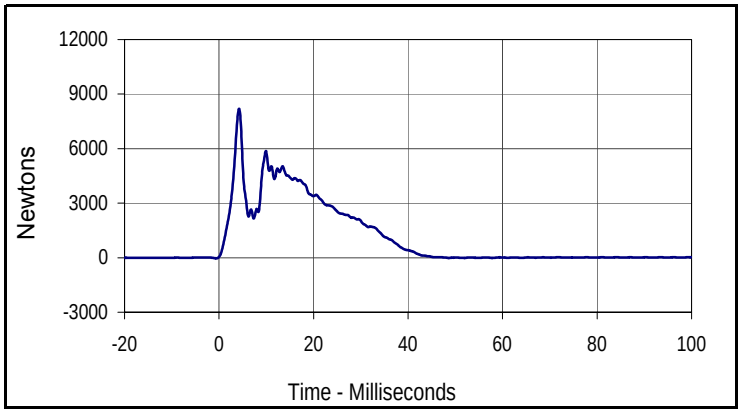
Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.4	31.0	-3.6	65.4



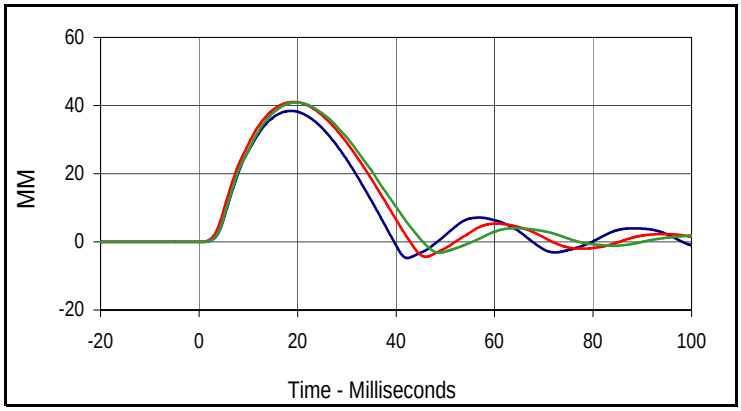
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.2	30.6	-3.9	63.5

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037TH017

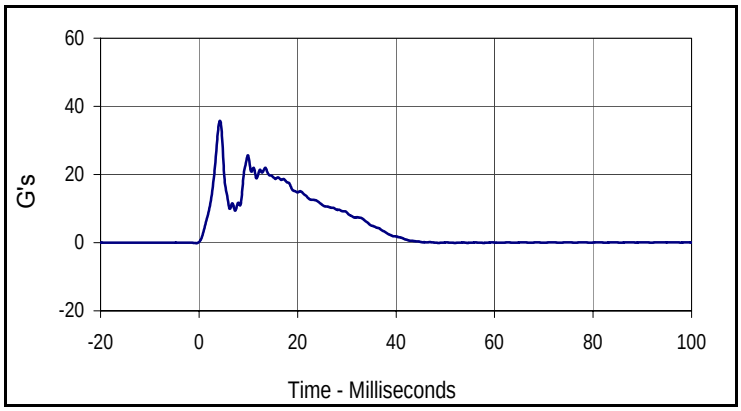
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	420	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	36.4	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.5	Pass
Peak Impactor Force		N	5100 to 6200	5866.8	Pass
		msec	> 6.0 msec	9.9	Pass
Peak Upper Rib Deflection		mm	34 to 41	38.4	Pass
Peak Middle Rib Deflection		mm	37 to 45	41.0	Pass
Peak Lower Rib Deflection		mm	37 to 44	40.9	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
8178.0	4.2	-33.6	-0.6



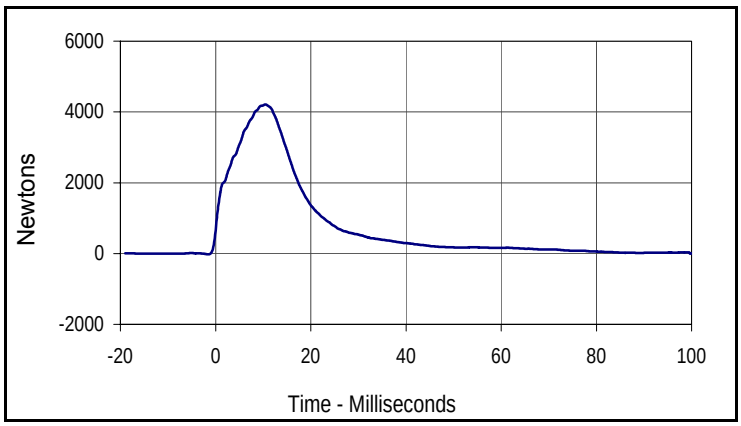
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
38.4	18.7	-4.7	42.3
Max (Middle)	Time	Min (Middle)	Time
41.0	19.3	-4.4	46.0
Max (Lower)	Time	Min (Lower)	Time
40.9	19.7	-3.2	48.8



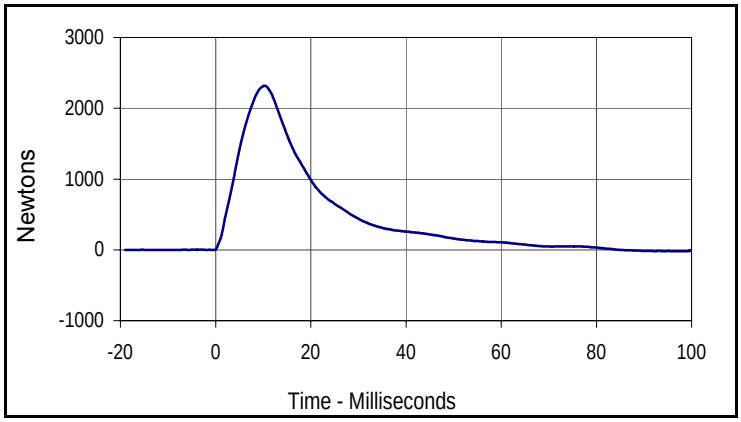
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
35.7	4.2	-0.1	-0.6

Test Program:	ES2re Abdomen Impact Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037ABD017

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	450	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.9	Pass
Probe Velocity		m/s	3.9 to 4.1	4.0	Pass
Peak Impactor Force		N	4000 to 4800	4213.0	Pass
		msec	10.6 to 13.0	11.9	Pass
Sum of Abdominal Forces		N	2200 to 2700	2316.9	Pass
		msec	10.0 to 12.3	11.7	Pass
			Overall Test Results		Pass

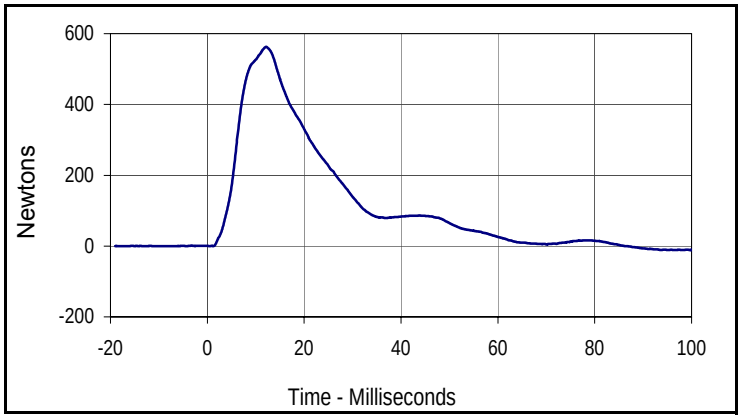


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4213.0	11.9	-23.6	-0.1

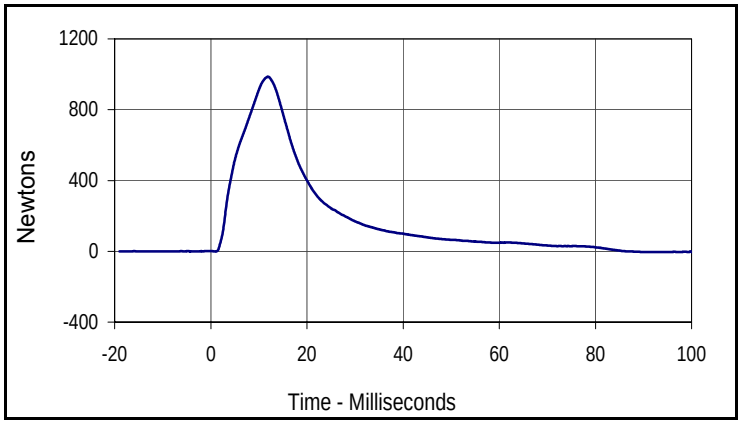


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2316.9	11.7	-19.1	99.6

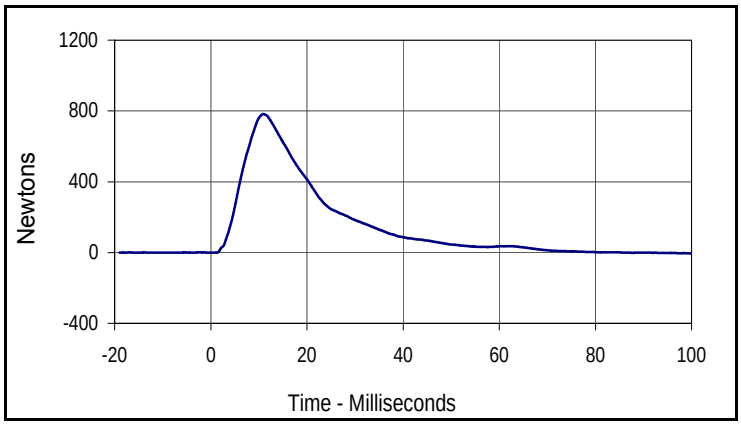
Test Program:	ES2re Abdomen Impact Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037ABD017



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
562.8	12.1	-11.4	98.4



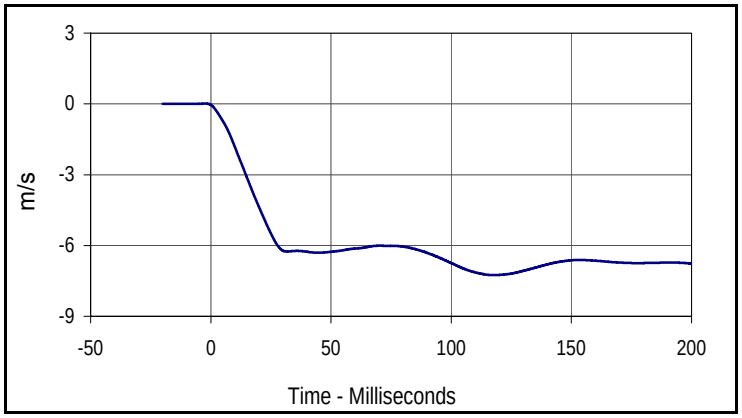
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
985.9	11.9	-8.5	102.2



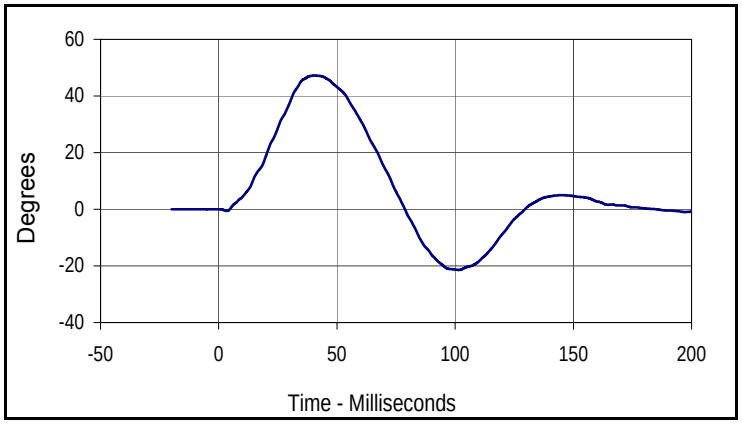
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
782.2	10.9	-8.5	102.2

Test Program:	ES2re Lumbar Flexion Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037LB017

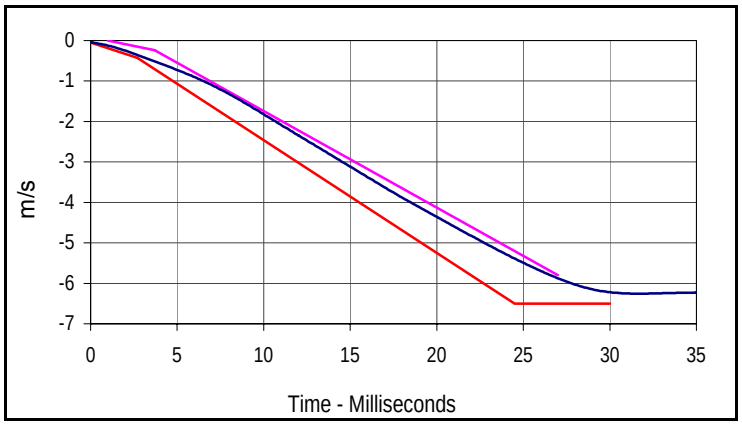
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	36.7	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.00	Pass
Headform Rotation	Max	Degrees	45 to 55	47.2	Pass
	Time	msec	39 to 53	40.5	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	38.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-2.4	-7.3	117.5



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
47.2	40.5	-21.4	101.5

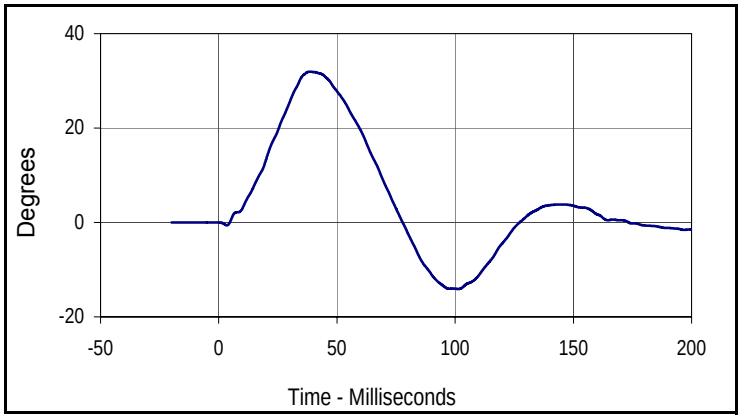


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-2.4	-7.3	117.5

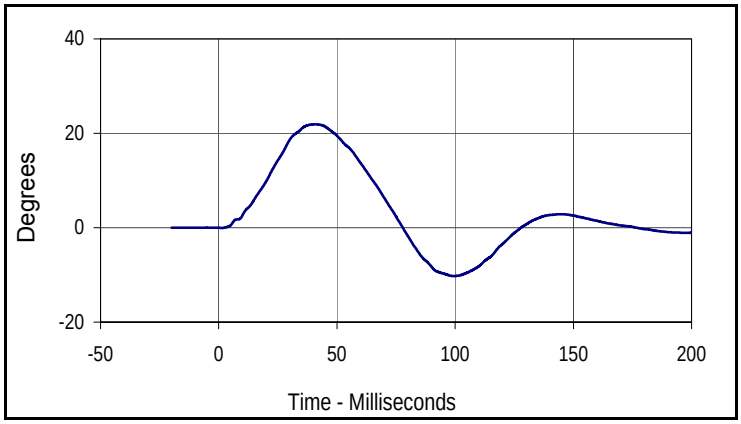
Velocity Corridors

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

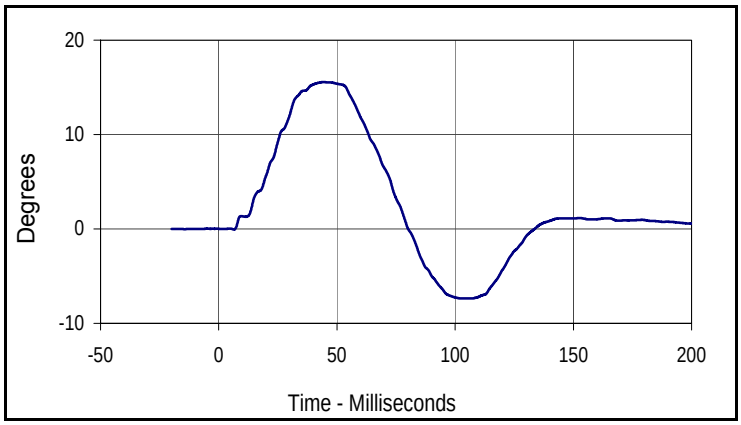
Test Program:	ES2re Lumbar Flexion Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037LB017



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
31.9	38.3	-14.1	101.3



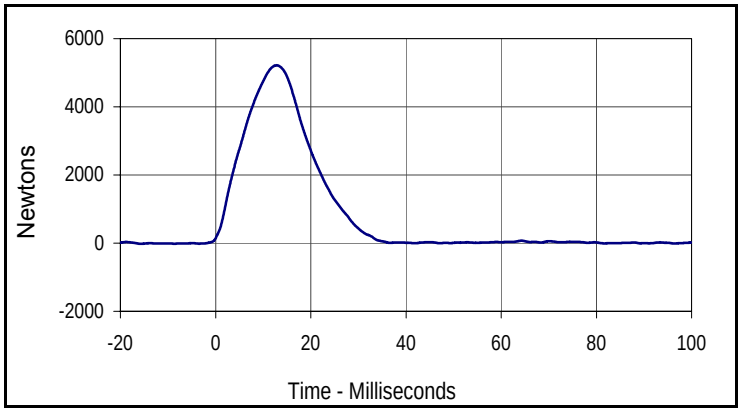
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
21.9	40.4	-10.3	99.6



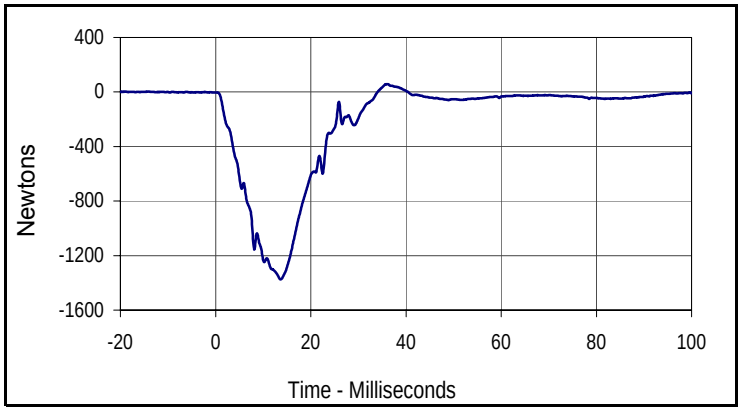
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
15.6	44.3	-7.4	106.6

Test Program:	ES2re Pelvis Impact Test	Test Date:	1/6/12
ATD Serial No.:	F037	Test I.D.:	F037PL017

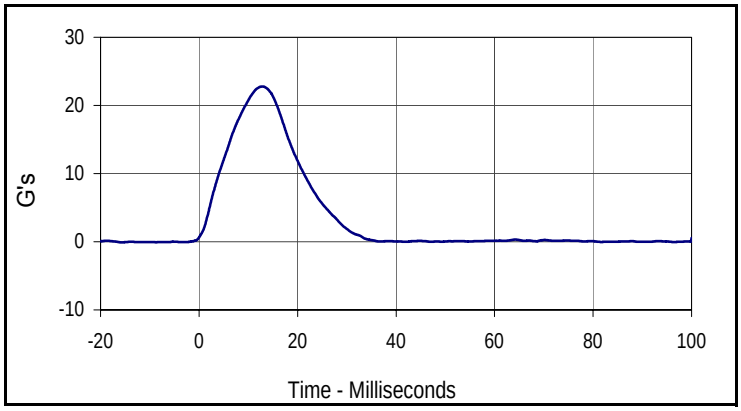
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	490	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	38.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	35.1	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Impactor Force		N	4700 to 5400	5216.4	Pass
		msec	11.8 to 16.1	12.8	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1375.0	Pass
		msec	12.2 to 17.0	13.7	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5216.4	12.8	-19.1	-15.7



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
57.9	36.1	-1375.0	13.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
22.8	12.8	-0.1	-15.7

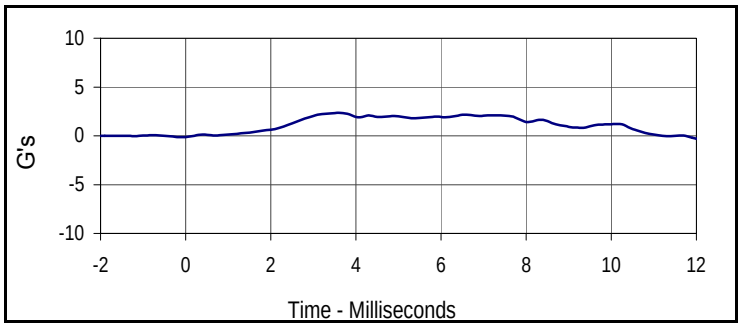
Test Program:	SID IIs External Measurements	Test Date:	1/912
ATD Serial No.:	307	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		^{o}C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	34	Pass
A	Sitting Height	mm	772 - 788	780	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	83	Pass
D	H-Point from Seatback	mm	141 - 151	145	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	103	Pass
F	Thigh Clearance	mm	119 - 135	126	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	182	Pass
J	Head Circumference	mm	541 - 551	547	Pass
K	Buttock to Knee Length	mm	514 - 540	527	Pass
L	Popliteal Height	mm	343 - 369	349	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	430	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	317	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	480	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	875	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
			Overall Test Results		Pass

Test Program:	SID IIs Head Drop Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307HD026

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	270	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Peak Head Resultant Acceleration		G's	115 to 137	123.5	Pass
Peak Head X Acceleration		G's	<15	2.4	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	10.4	Pass
			Overall Test Results		Pass

Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
123.5	3.0	0.2	0.2



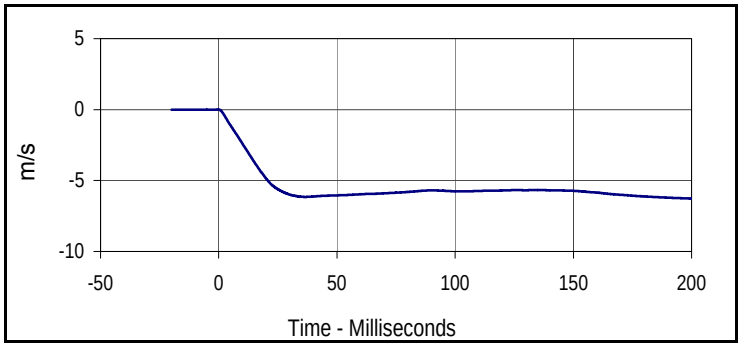
Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.4	3.6	-0.1	-0.1

Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
101.2	3.0	-3.0	6.4

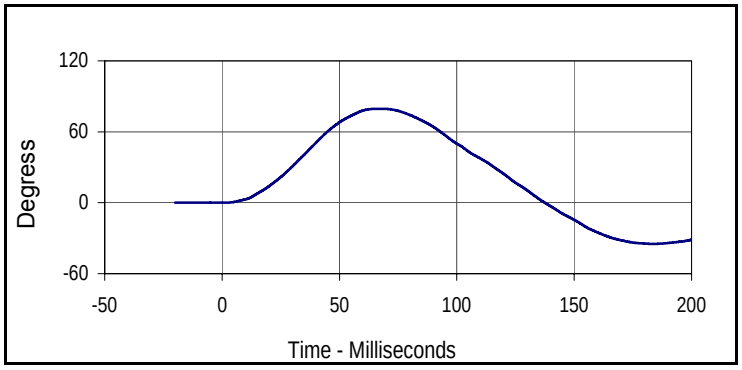
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
70.8	3.1	-1.4	9.9

Test Program:	SID IIs Neck Flexion Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307NB026

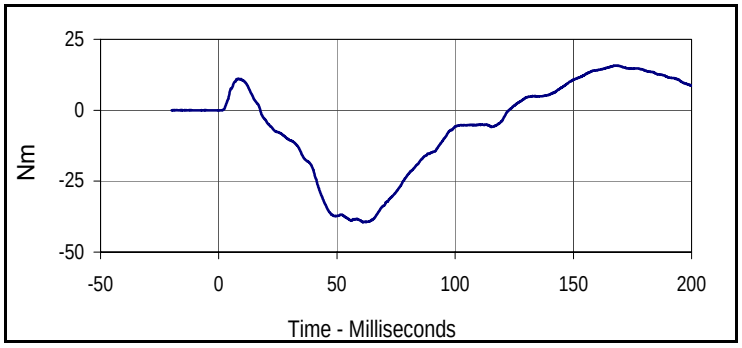
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	340	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.8	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.57	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.40	Pass
	15 msec	m/s	-3.30 to -4.10	-3.69	Pass
	20 msec	m/s	-4.40 to -5.40	-4.85	Pass
	25 msec	m/s	-5.40 to -6.10	-5.61	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.16	Pass
D-Plane Rotation	Max	Degrees	71 to 81	79.5	Pass
	Time	msec	50 to 70	66.7	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-39.5	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	122.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.5	-6.3	200.0



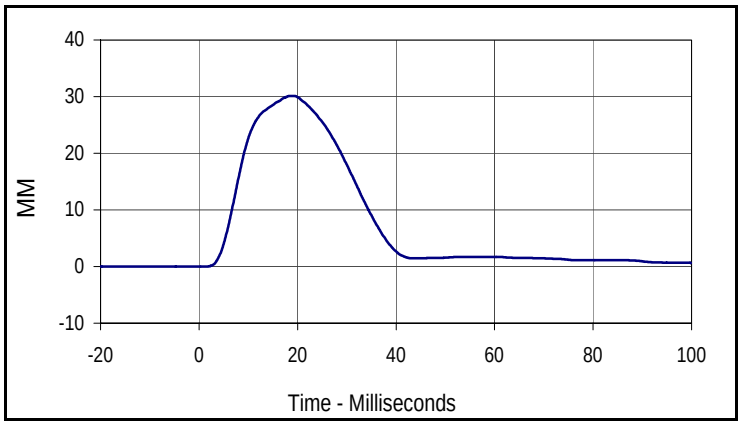
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
79.5	66.7	-34.8	183.4



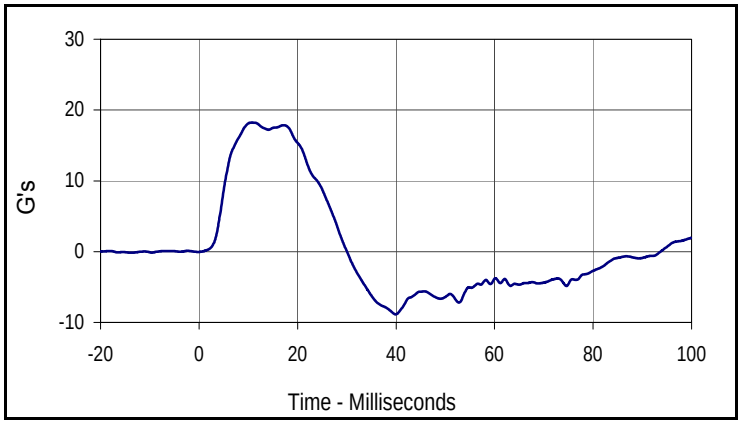
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.8	168.0	-39.5	61.1

Test Program:	SID IIs Shoulder Impact Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307SH026

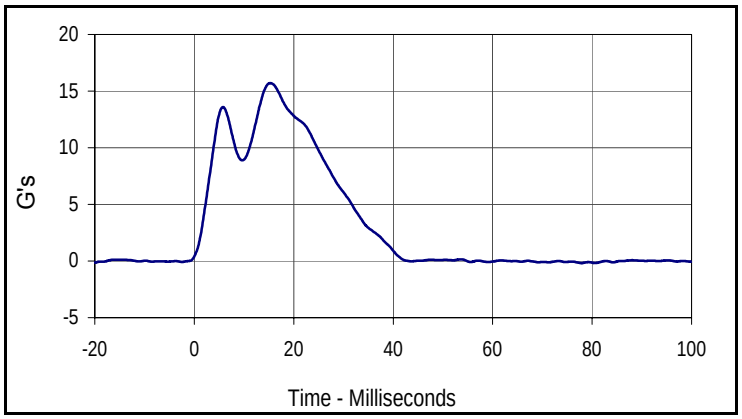
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	350	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.6	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.32	Pass
Peak Shoulder Deflection		mm	28 to 37	30.1	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	18.2	Pass
Peak Impactor Acceleration		G's	13 to 18	15.7	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.1	18.7	0.0	-19.8



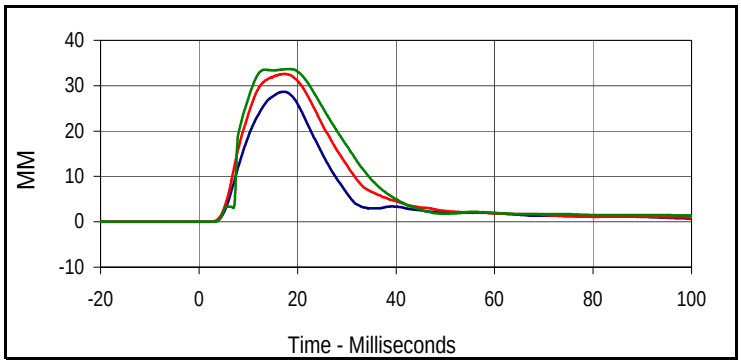
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.2	10.8	-8.8	39.9



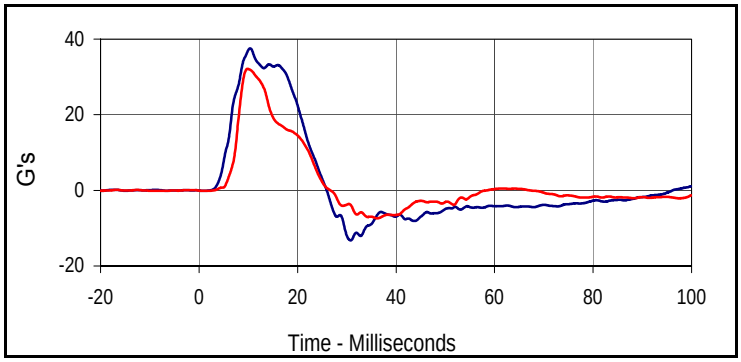
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.7	15.3	-0.2	77.8

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307TWA026

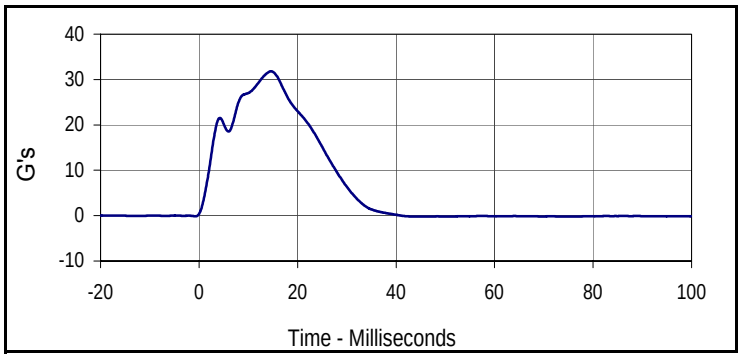
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.9	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.7	Pass
Peak Shoulder Deflection		mm	31 to 40	33.7	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	28.7	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	32.6	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	33.6	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	37.5	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	32.2	Pass
Peak Impactor Acceleration		G's	30 to 36	31.8	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.7	17.2	0.0	-12.8
Middle Thorax Deflection			
Max	Time	Min	Time
32.6	17.4	0.0	-3.0
Lower Thorax Deflection			
Max	Time	Min	Time
33.6	18.4	0.0	-17.7

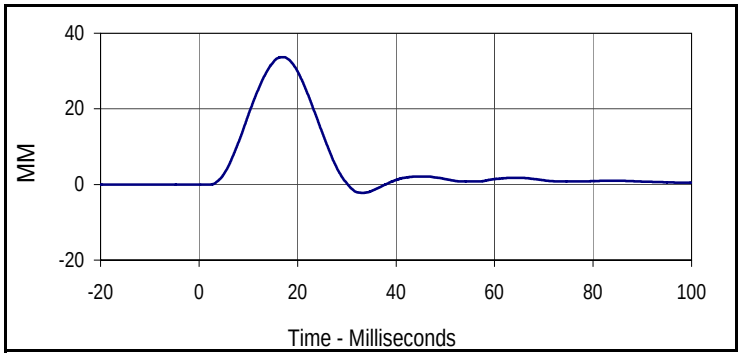


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.5	10.4	-13.2	30.8
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.2	9.9	-7.4	36.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
31.8	14.6	-0.3	0.0

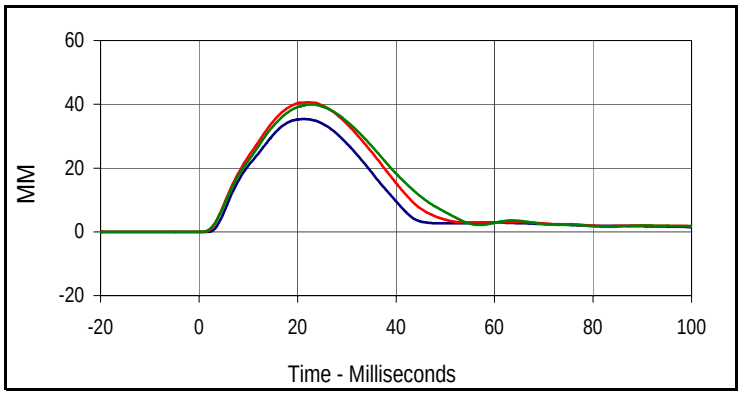
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307TWA026



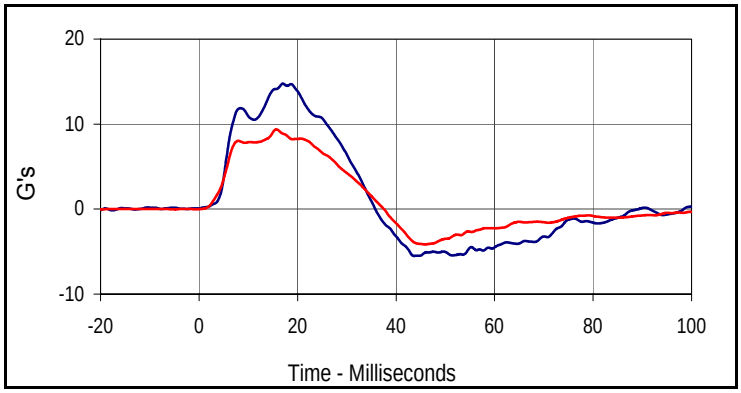
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
33.7	16.9	-2.2	33.2

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307TWOA026

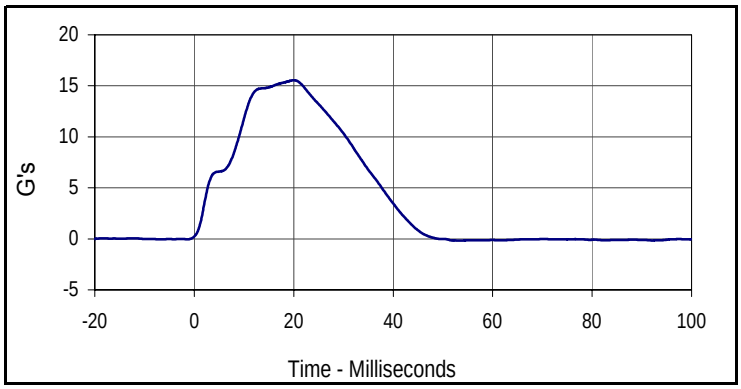
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	380	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.6	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	35.4	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	40.6	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	40.0	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	14.8	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.4	Pass
Peak Impactor Acceleration		G's	14 to 18	15.5	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
35.4	21.3	0.0	1.0
Middle Thorax Deflection			
Max	Time	Min	Time
40.6	22.1	0.0	-3.0
Lower Thorax Deflection			
Max	Time	Min	Time
40.0	22.8	0.0	-4.7



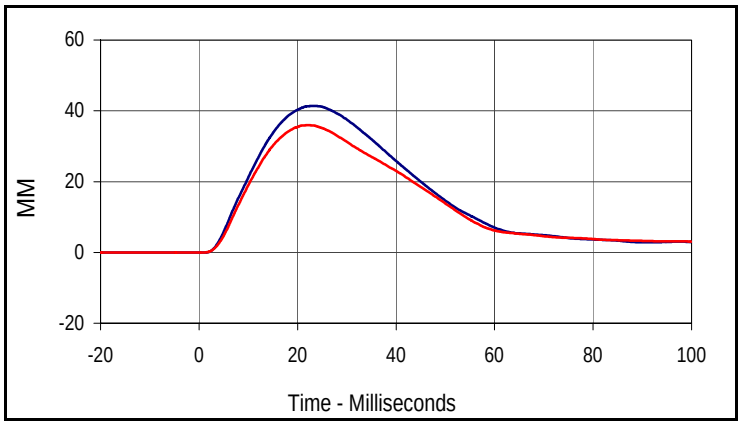
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.8	17.0	-5.5	43.7
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.4	15.7	-4.2	45.8



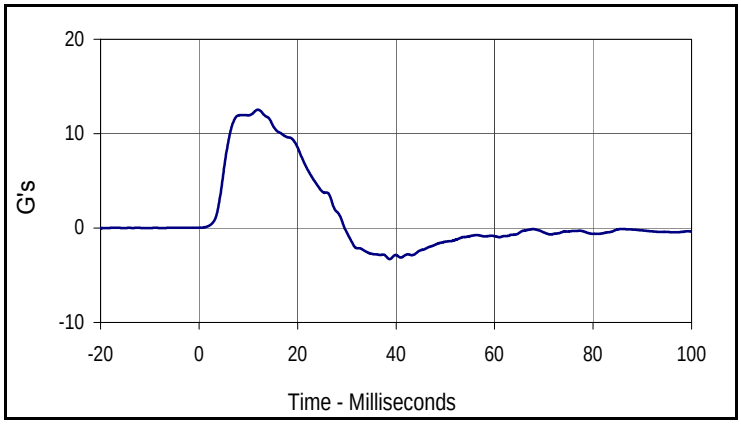
Curve Description			
Impactor Accleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.5	20.0	-0.2	53.5

Test Program:	SID IIs Abdomen Impact Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307ABD026

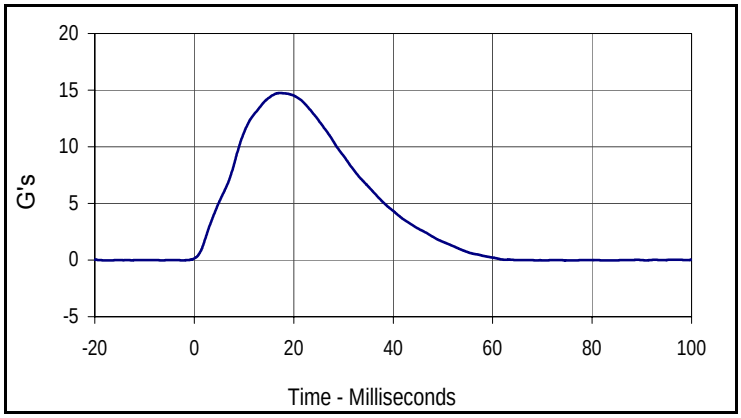
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	450	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.7	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.4	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	41.4	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	35.9	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	12.5	Pass
Peak Impactor Acceleration		G's	12 to 16	14.7	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
41.4	23.2	0.0	-11.2
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
35.9	22.2	0.0	-6.3



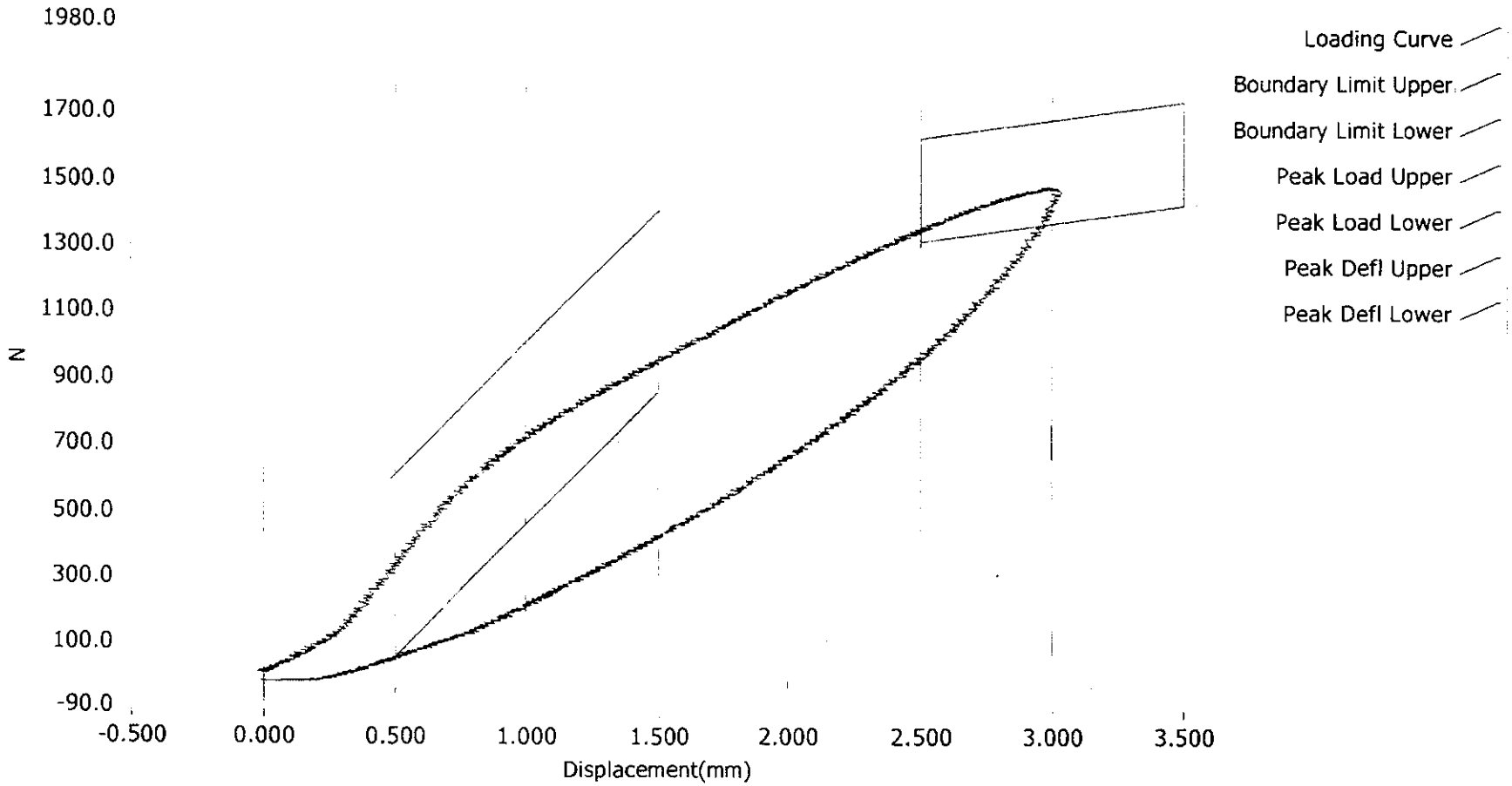
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.5	12.0	-3.3	38.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.7	17.3	0.0	76.2

MC5107 POST TEST

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

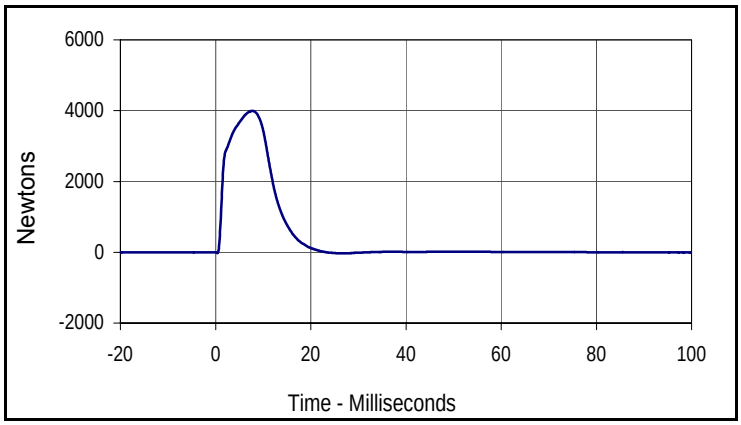
Test ID	Part Serial Number	Test Date	Test Time
		9/27/2010	5:12 PM

Cert ID	ATD Serial Number	ATD Type
	36597	SIDIIs

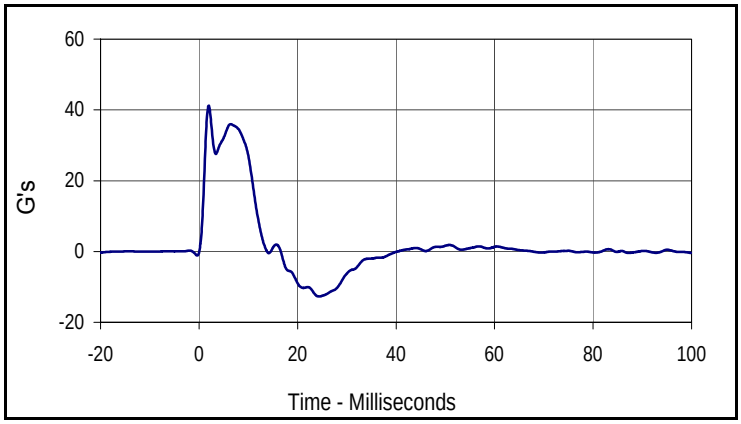
Current Date : 9/27/2010 Current Time : 17:13:39

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307ACET026

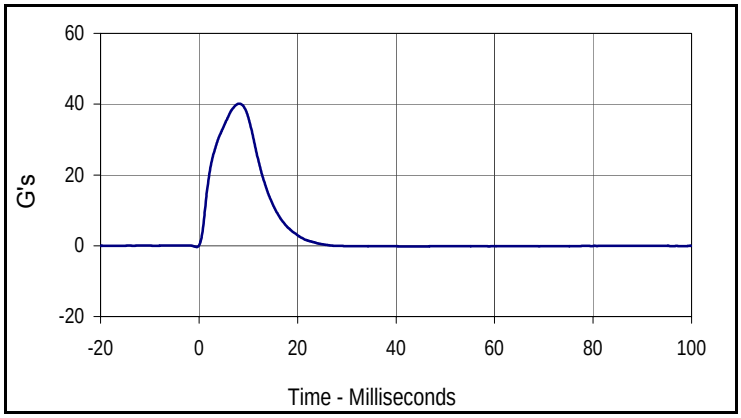
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	530	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.7	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3994.2	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	36.0	Pass
Peak Impactor Acceleration		G's	38 to 47	40.1	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3994.2	7.7	-33.1	27.0



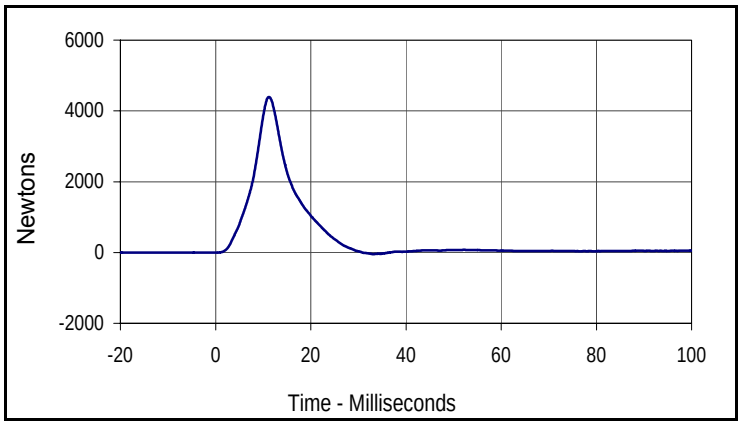
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.2	2.0	-12.7	24.3



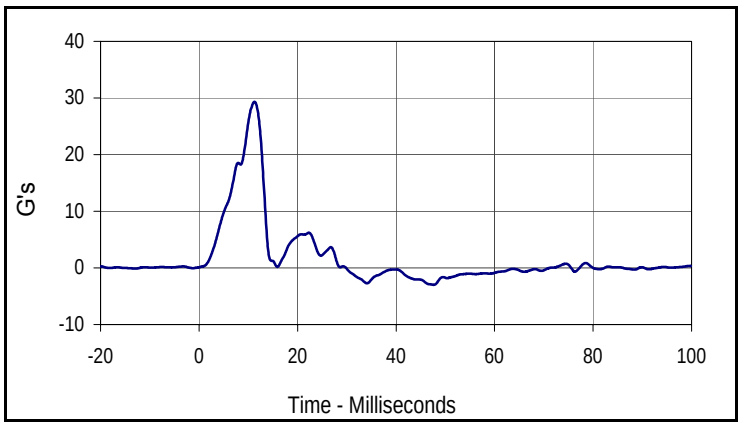
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.1	8.2	-0.3	-0.5

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	1/9/12
ATD Serial No.:	307	Test I.D.:	307PL026

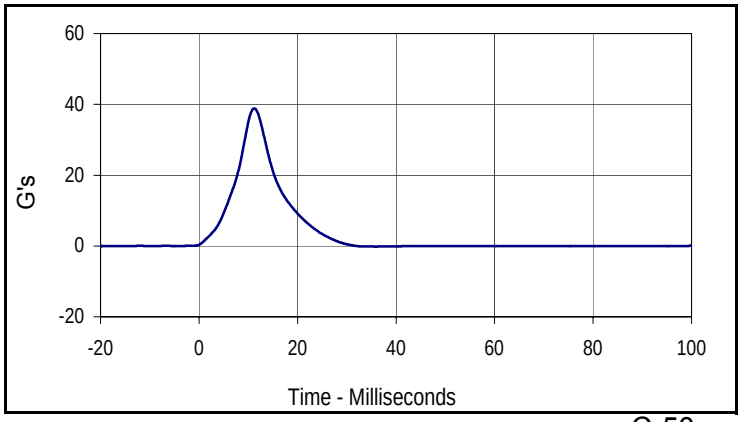
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	580	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Illiac Force		Newtons	4100 to 5100	4394.5	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	29.3	Pass
Peak Impactor Acceleration		G's	36 to 45	38.9	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4394.5	11.2	-48.6	33.2



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.3	11.3	-3.0	47.6



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
38.9	11.2	-0.2	35.9

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		X	P58858	Endevco	5/24/11
		Y	P58865	Endevco	5/24/11
		Z	P58867	Endevco	5/24/11
Thorax Rib Displacement Potentiometers	Upper	Y	209	FTSS	6/2/11
	Middle	Y	210	FTSS	6/2/11
	Lower	Y	207	FTSS	6/2/11
Abdomen Load Cells	Forward	Y	1504	Denton	6/10/11
	Middle	Y	1505	Denton	6/29/11
	Rear	Y	1506	Denton	6/10/11
Lower Spine Accelerometers (T12)		X	04J04107-Z15	Endevco	6/2/11
		Y	P58876	Endevco	6/2/11
		Z	P58877	Endevco	5/31/11
Pubic Symphysis Load Cell		Y	464	Denton	6/9/11

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 307		
				Serial Number	Manufacturer	Calibration
Head Accelerometers			X	P58900	Endevco	7/5/11
			Y	P58902	Endevco	7/5/11
			Z	P58983	Endevco	7/5/11
Displacement Potentiometers	Shoulder		Y	1244	FTSS	7/1/11
	Thoracic Rib	Upper	Y	1249	FTSS	7/1/11
		Middle	Y	1265	FTSS	7/1/11
		Lower	Y	1277	FTSS	7/1/11
	Abdominal Rib	Upper	Y	1286	FTSS	7/1/11
		Lower	Y	1290	FTSS	7/1/11
Lower Spine Accelerometers (T12)			X	P59007	Endevco	7/1/11
			Y	P59015	Endevco	7/1/11
			Z	P59016	Endevco	7/1/11
Acetabulum Load Cell			Y	277	Denton	6/10/11
Iliac Wing Load Cell			Y	289	Denton	6/10/11
Pelvis Plug (Struck Side)				36694	FTSS	9/27/10
Pelvis Plug (Non-Struck Side)				36736	FTSS	10/5/10

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	Ketx5a	ICSensor	6/20/11
	Vehicle Center of Gravity	Y	Ketx5b	ICSensor	6/20/11
	Vehicle Center of Gravity	Z	Ketx5c	ICSensor	6/20/11
2	Right Sill at Front Seat	X	Keva201X	ICSensor	11/28/11
	Right Sill at Front Seat	Y	Keva201Y	ICSensor	11/28/11
	Right Sill at Front Seat	Z	Keva201Z	ICSensor	11/28/11
3	Right Sill at Rear Seat	X	Keva202x	ICSensor	11/30/11
	Right Sill at Rear Seat	Y	Keva202y	ICSensor	11/30/11
	Right Sill at Rear Seat	Z	Keva202z	ICSensor	11/30/11
4	Left Sill at Front Door	Y	AJ4F8	Endevco	11/7/11
5	Left Sill at Rear Door	Y	J21776	Endevco	3/22/11
6	Left A-Post Lower	Y	00L20-A20	Entran	10/28/11
7	Left A-Post Middle	Y	BY98H	Endevco	3/15/11
8	Left B-Post Lower	Y	J24533	Endevco	4/1/11
9	Left B-Post Middle	Y	CY06H	Endevco	3/15/11
10	Front Seat Track	Y	J21907	Endevco	3/30/11
11	Rear Seat Structure	Y	N/A	N/A	N/A
12	Right Rear Occ. Compartment	Y	Keva004	ICSensor	5/8/11
13	Engine Block	X	BI60H	Endevco	7/22/11
	Engine Block	Y	AR17	Endevco	7/22/11
14	Rear Floorpan Above Axle	X	ketx12a	ICSensor	7/20/11
	Rear Floorpan Above Axle	Y	ketx12y	ICSensor	7/21/11
	Rear Floorpan Above Axle	Z	ketx12z	ICSensor	7/21/11

TABLE 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	00L13-F37	Entrans	6/22/11
MDB Center of Gravity	Y	02I10-N16	Entrans	6/22/11
MDB Center of Gravity	Z	03J13_Z09	Entrans	6/22/11
Left Frame at Rear Axle Centerline	X	P58705	Endevco	11/6/11
Left Frame at Rear Axle Centerline	Y	05616-L03	Entrans	6/22/11