REPORT NUMBER: NCAP-KAR-11-007

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

FORD MOTOR CO.

2012 FORD MUSTANG 2-DOOR COUPE

NHTSA NUMBER: MC0210

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

OCTOBER 26, 2011

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SAFETY PERFORMANCE STANDARDS

OFFICE OF CRASHWORTHINESS STANDARDS

1200 NEW JERSEY AVE, SE

ROOM W43-410

WASHINGTON, DC 20590

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

Prepared By: _____

Mr. Denver J. Schaffarzick, Project Engineer
KARCO Engineering, LLC.

Reviewed By: _____

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

Approved By: _____

Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC.

Approval Date: October 26, 2011

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

_____

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

Date: _____

TECHNICAL REPORT DOCUMENTATON PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NCAP-KAR-11-007		

4. Title and Subtitle
Final Report of New Car Assessment Program Testing of a
2012 Ford Mustang 2 Door Coupe
NHTSA No. MC0210

5. Report Date
October 26, 2011

6. Performing Organization Code
KAR

7. Authors
Mr. Denver J. Schaffarzick, Project Engineer, KARCO
Mr. Frank Richardson, Program Manager, KARCO

8. Performing Organization Report No.
TR-P30001-22-NC

9. Performing Organization Name and Address
KARCO Engineering, LLC.
9270 Holly Rd.
Adelanto, CA, 92301

10. Work Unit No.

11. Contract or Grant No.
DTNH22-06-D-00027

12. Sponsoring Agency Name and Address
U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
1200 New Jersey Ave., SE, Room W43-410
Washington, D.C 20590

13. Type of Report and Period Covered
Final Test Report, October 12, 2011 - October 26, 2011

14. Sponsoring Agency Code
NVS-111

15. Supplementary Notes

16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2012 Ford Mustang 2-door coupe in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on October 12, 2011.

The impact velocity of the vehicle was 56.40 km/h and the ambient temperature at the barrier face at the time of impact was 27.2 deg. C. The target vehicle's post-test maximum crush was 513 mm at the vehicle's centerline. The test vehicle's performance is as follows:

Measurement Description	Units	Driver ATD		Passenger ATD	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC_{15})	N/A	700.0	335.0	700.0	243.2
Maximum Chest Compression	mm	63	-30	52	-18
Nij	N/A	1	0.23	1	0.32
Neck Tension	N	4170	1047.9	2620	856.3
Neck Compression	N	4000	-379.1	2520	-291.9
Left Femur Force	N	10008	-1804.6	6805	-1424.0
Right Femur Force	N	10008	-2474.1	6805	-1050.9

17. Key Words
35 mph Frontal Barrier Impact Test
New Car Assessment Program (NCAP)

18. Distribution Statement
Copies of this report are available from:
National Highway Traffic Safety Admin.
Technical Reference Division
1200 New Jersey Ave., SE
Washington, DC 20590

19. Security Classification of this report	20. Security Classification of this page	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	135	

TABLE OF CONTENTS

SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-D-00027. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure, dated August, 2011.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2012 Ford Mustang 2-door coupe at a velocity of 56.40 km/h. The test was performed at KARCO Engineering, LLC. on October 12, 2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

Three (3) real-time cameras and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and the passenger's lap belt to measure the dummy pelvic section loading. The driver (position 1) ATD (Serial No. 034) and the right-front passenger (position 2) ATD (Serial No. 635) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 136 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

There was 100% windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the test vehicle was 513 mm located at the vehicle's centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD's head contacted the airbag and the head restraint. The upper torso contacted the airbag. The left knee contacted the knee bolster and the steering column. The right knee contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger ATD's head contacted the airbag and the head restraint. The upper torso contacted the airbag. Both the left and right knees contacted the glovebox.

The occupant data is summarized below:

ATD Position	HIC_{15}	T^1	T^2	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	335.0	55.6	70.6	-30	0.23	1047.9	-379.1	-1804.6	-2474.1
Passenger (5th)	243.2	54.0	69.0	-18	0.32	856.3	-291.9	-1424.0	-1050.9

SECTION 2

DATA SHEETS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

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	Fluid Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in^2	kPa	7.0
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 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC0210
Model Year	2012
Make	Ford
Model	Mustang
Body Style	2-Door Coupe
VIN	1ZVBP8AMXC5251570
Body Color	Grabber Blue
Odometer Reading (km / mi)	195 / 121
Engine Displacement (L)	3.7
Type / No. of Cylinders	V6
Engine Placement	Longitudinal
Transmission Type	Manual
Transmission Speeds	6
Overdrive	Yes
Final Drive	Rear
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
All Wheel Drive (AWD)	No
Traction Control System (TCS)	Yes

Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	None
Driver Front Airbag	Yes
Driver Curtain Airbag	No
Driver Head/Torso Airbag	Yes
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Curtain Airbag	No
Pass. Head/Torso Airbag	Yes
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	No
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	None

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	Aug-11

GVWR (kg)	2041
GAWR Front (kg)	993
GAWR Rear (kg)	1066

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

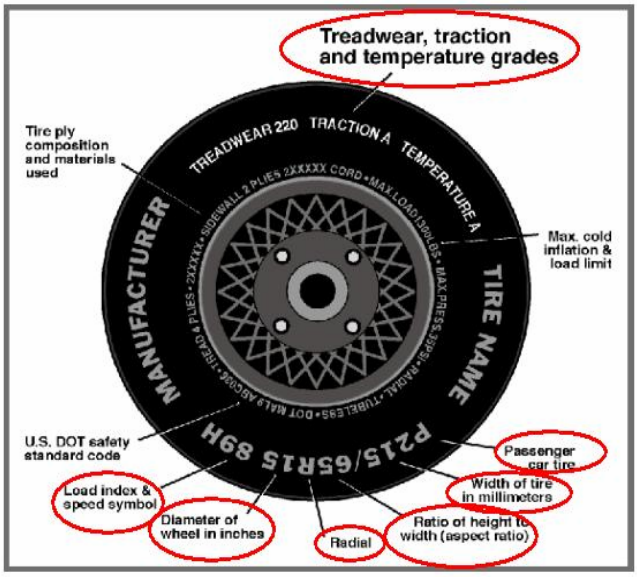
Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Contoured Bench			
Designated Seating Capacity	2	2		4	
Capacity Weight (VCW) (kg)				317.0	*A*
DSC x 68.04 (kg)				272.2	*B*
Cargo Weight (RCLW) (kg)				44.8	*A-B*

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	P235/50R18	P235/50R18
Tire Size on Vehicle	P235/50R18	P235/50R18
Tire Manufacturer	Pirelli	Pirelli
Tire Model	PZero Nero	PZero Nero
Treadwear	400	400
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	97W	97W
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	N94W H367 2811	N94W H367 2811
DOT Safety Code Right	N94W H367 2811	N94W H367 2811

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	437.5	369.0		460.5	447.5	
Right	kg	422.5	367.0		429.0	439.0	
Ratio	%	53.9%	46.1%	100.0%	50.1%	49.9%	100.0%
Total	kg	860.0	736.0	1596.0	889.5	886.5	1776.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1596.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1781.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	736	734	759	756	1256
As Tested	mm	729	724	733	732	1359
Post-Test	mm	805	760	736	669	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2723
Total Vehicle Length at Left Side	mm	4113
Total Vehicle Length at Centerline	mm	4770
Total Vehicle Length at Right Side	mm	4110
Weight of Ballast in Cargo Area	kg	89.0
Weight of Vehicle Components Removed	kg	43.5
Amount of Stoddard Solvent in Fuel Tank	L	56.32

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Rear Seats (12.5 kg), Tire kit and trunk lining (9.0 kg), Rear speakers and package tray (3.0 kg), Outboard mirrors (2.5 kg), Tail lights and side trunk liner (5.5 kg), Rear bumper fascia (5.5 kg), Rear bumper beam (5.5 kg)

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4770	4257	-513
2	Total Width	1854	2076	222
3	Bumper Top Height	552	580	28
4	Bumper Bottom Height	420	440	20
5	Longitudinal Member Top Height	510	590	80
6	Distance Between Longitudinal Members	890	836	-54
7	Longitudinal Member Width	75	63	-12
8	Engine Top Height	912	967	55
9	Engine Bottom Height	191	208	17
10	Engine and Gearbox Width	625	625	0
11	Front Bumper to Engine Distance	695	330	-365
12	Front Shock Absorber Fixing Height	890	933	43
13	Bonnet Leading Edge Height	745	773	28
14	Front Shock Absorber Fixing Width	1105	1070	-35
15	Front Bumper to Front Axle Distance	923	460	-463
16	Front Axle to A-Pillar Distance	765	683	-82
17	A-Pillar to B-Pillar Distance	1208	1206	-2
18	B-Pillar to Rear Axle Distance	745	743	-2
19	B-Pillar to C-Pillar Distance	720	720	0
20	Roof Sill Bottom Height	1242	1285	43
21	Roof Sill Top Height	1355	1390	35
22	Floor Sill Bottom Height	156	196	40
23	Floor Sill Top Height	387	425	38

All measurements in millimeters.

DATA SHEET NO. 2

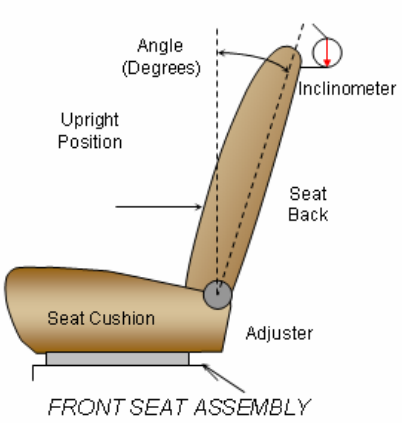
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at 0° ± 0.5°. Seat back angle is measured at the head restraint post using a digital inclinometer.

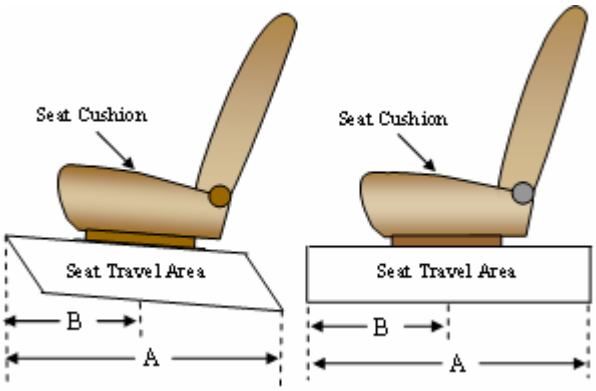


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	13.6
Passenger Seat Back Angle	11.0

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rear most possible position. The driver's seat is set to the middle of the fore-aft travel. The passenger's seat is set to the forward most position where the ATD will not contact any interior panels.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	290 mm	145 mm
Passenger Seat	239 mm	10 mm

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position zero (0) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

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

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

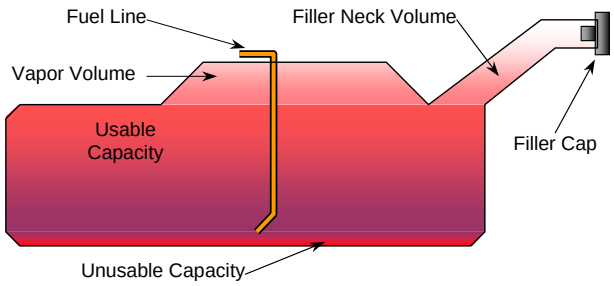
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	60.56
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	55.72 to 56.93
Actual Amount of Stoddard Solvent Used	56.32
1/3 of Usable Capacity	20.19

FUEL PUMP

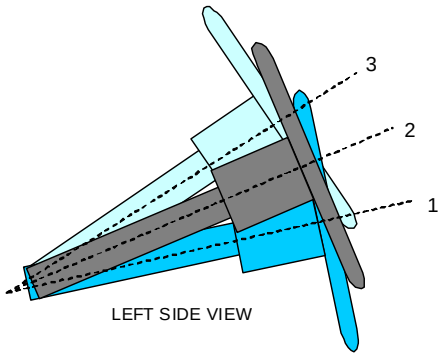
The vehicle is equipped with an electric fuel pump. The fuel pump will begin to pump fuel when the ignition key is turned to the “on” position. If the key is not turned to the ignition position, the pump will power down and stop pumping fuel after 2 seconds. If the key is turned to the ignition position, the pump will continue to pump fuel until the key is turned to the “off” position, the restraints module is activated, or power to the pump is otherwise interrupted.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements. The telescoping steering wheel travel is fixed.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

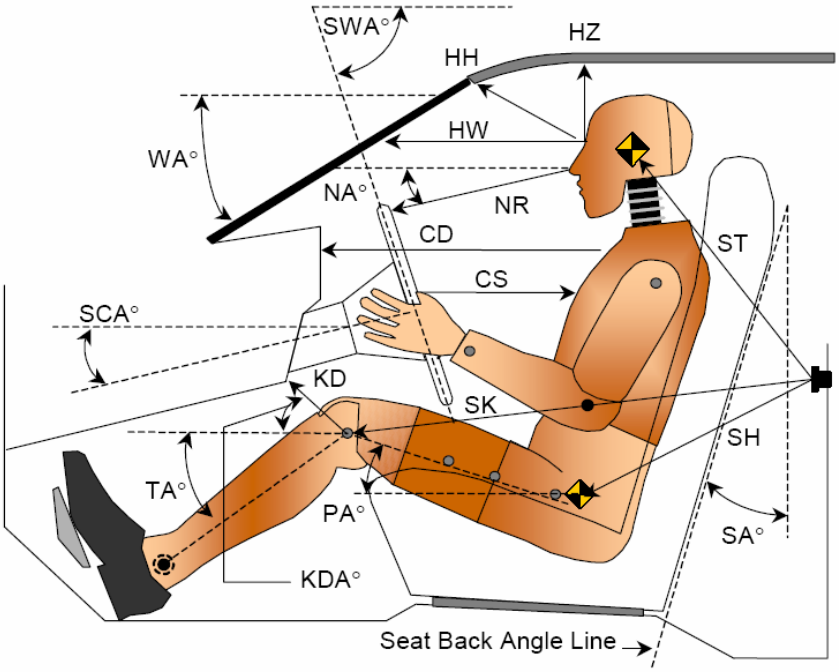
	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	19.2	
Geometric Center Position, No. 2	21.0	
Uppermost Position, No. 3	22.8	
Telescoping Steering Wheel Travel		0
Test Position	21.0	

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



LEFT SIDE VIEW

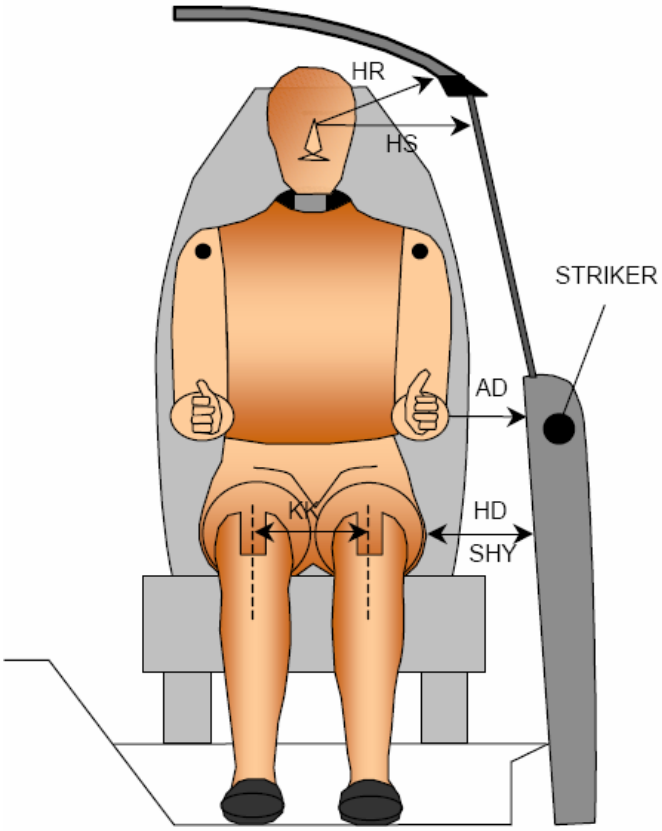
Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		26.4		
SWA°	Steering Wheel Angle		21.8		
SCA°	Steering Column Angle		68.2		
SA°	Seat Back Angle (On Headrest Post)		13.6		11.0
HZ	Head to Roof	211	90.0	204	90.0
HH	Head to Header	321	24.3	260	45.1
HW	Head to Windshield	608	0.0	562	0.0
NR	Nose to Rim	381	7.0	413	5.7
CD	Chest to Dash	535	17.2	375	14.6
CS	Chest to Steering Hub	304	0.0		
RA	Rim to Abdomen	194	0.0		
KDL	Left Knee to Dash	149	49.5	91	38.7
KDR	Right Knee to Dash	114	36.3	87	42.8
PA°	Pelvic Angle		24.8		21.2
TA°	Tibia Angle		37.5		41.2
SK	Striker to Knee	850	6.7	930	6.7
ST	Striker to Head	548	49.9	596	32.5
SH	Striker to H-Point	528	24.9	640	19.2

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



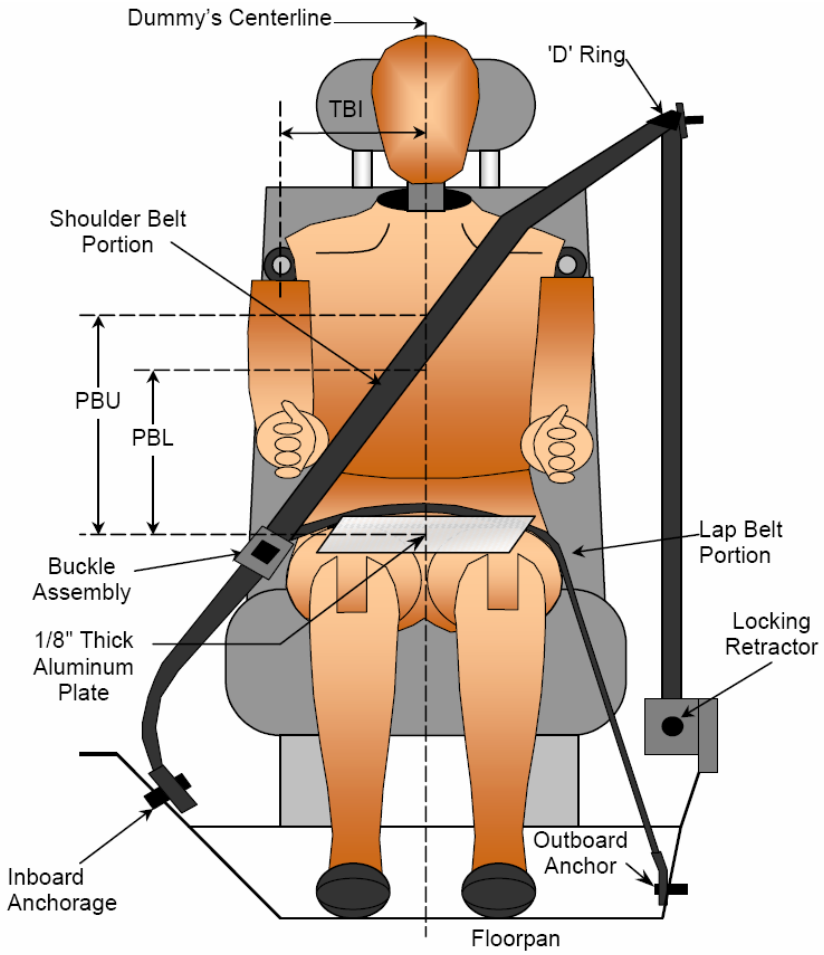
Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	124	71
HD	H-Point to Door	119	158
HR	Head to Side Header	245	247
HS	Head to Side Window	336	350
KK	Knee to Knee	321	232
SHY	Striker to H-Point (Y-Direction)	249	275
AA	Ankle to Ankle	350	165

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	396	289
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	304	209

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	1101	1132
Lap Belt Length as Measured on ATD	mm	830	873
Remainder of Belt on Reel	mm	830	644
Total Belt Length for Continuous Webbing Systems	mm	2761	2649

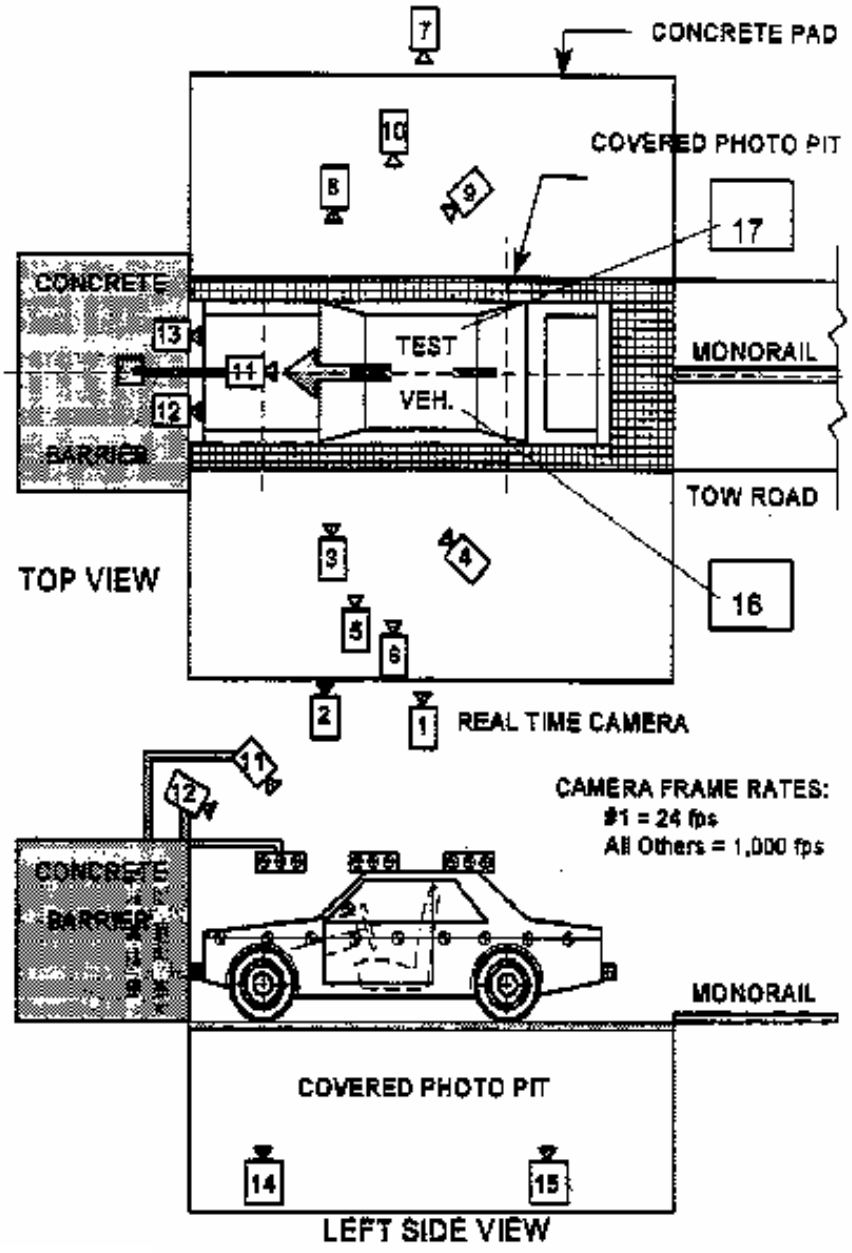
DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 … (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

CAMERA LOCATIONS

No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	24	1000
3	Left Front Half	-1701	-6197	-1701	50	1000
4	Left Angle	-6696	-10308	-3211	ZOOM	1000
5	Steering Column - Top	-1966	-10412	-3688	50	1000
6	Steering Column - Bottom	-1972	-10412	-3379	50	1000
7	Right Overall	-2336	7569	-1012	24	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	ZOOM	1000
10	Right Angle	-6217	9516	-4830	ZOOM	1000
11	Windshield	-354	0	-5749	12	1000
12	Driver Windshield	297	-366	-2460	12	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	12	1000
15	Pit Rear	-3398	0	1495	8	1000
16	Onboard Driver Airbag (Optional)	-3810	310	-1040	12	1000
17	Onboard Passenger Airbag (Optional)	-3810	-310	-1040	12	1000
18	Real-Time Left View of Impact					
19	Real-Time Right View of Impact					

Coordinates: +X = forward impact plane

+Y = right of monorail center

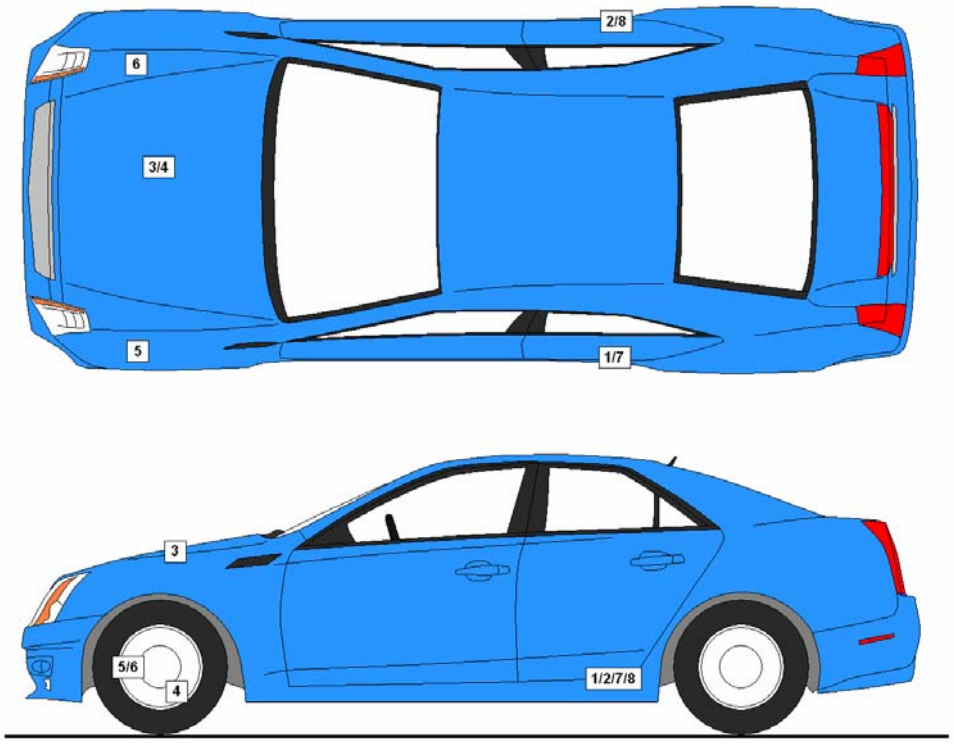
+Z = into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	2130	-700	-360
2	Right Rear Accelerometer X-Direction	2130	700	-360
3	Engine Top X	845	140	-912
4	Engine Bottom X	1020	210	-191
5	Left Brake Caliper X	800	-690	-340
6	Right Brake Caliper X	800	690	-340
7	Left Rear Accelerometer Z-Direction	2130	-700	-360
8	Right Rear Accelerometer Z-Direction	2130	700	-360

Reference Points: X – Rear Surface of Vehicle (+ forward)

Y – Vehicle Centerline (+ to right)

Z – Ground Plane (+ down)

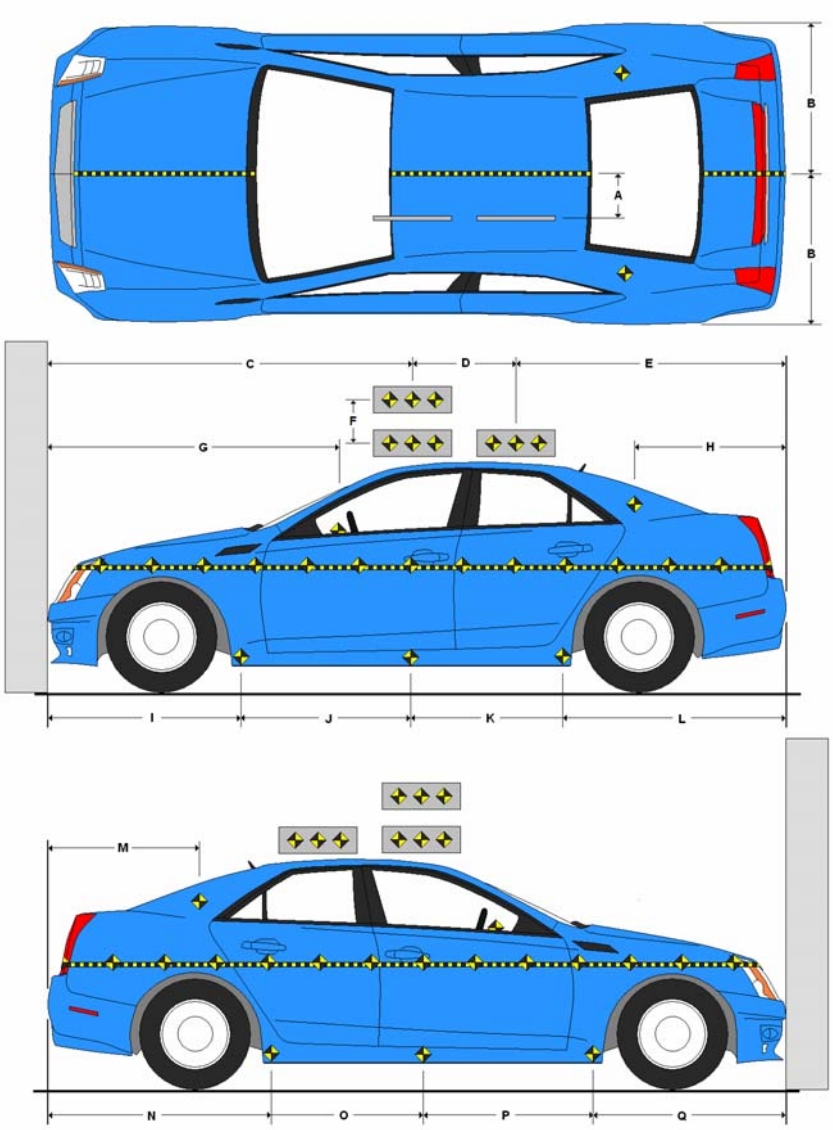
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

Item	Value
A	390
B	927
C	2386
D	610
E	1786
F	305
G	2000
H	1015
I	1402
J	890
K	890
L	1580
M	1004
N	1575
O	888
P	888
Q	1410



All measurements in millimeters.

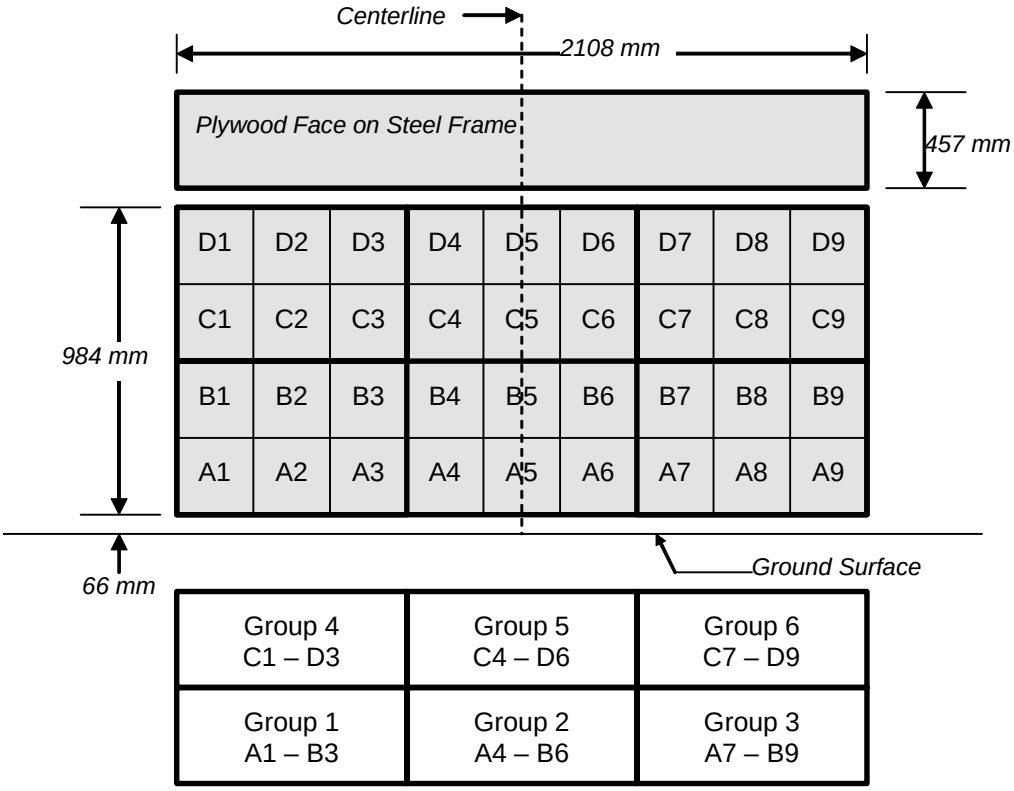
DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

36 Load Cell Rigid Barrier (NHTSA Standard)
Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

INSTRUMENTATION

Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Total	136

CAMERA COVERAGE

High-Speed Vehicle On Board	2
High-Speed Off board	14
Real Time	3
Total	19

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 034	P572O 5th Percentile Female ATD / 141
Head Contact	Airbag, Head Restraint	Airbag, Head Restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster, Steering Column	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening		
Seat Track Shift (mm)	11	9
Seat Back Failure	None	None
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracked
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	714
Center	mm	720
Right Side	mm	811
Average	mm	748

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

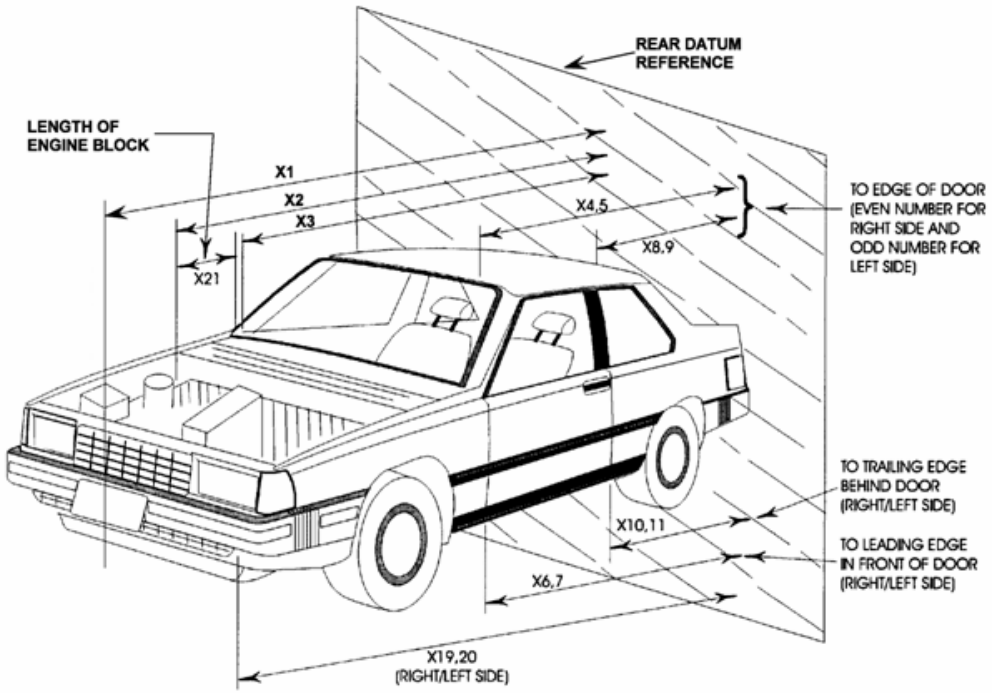
Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Head/Torso Airbag	Yes	No	Yes	No
Knee Airbag	No		No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

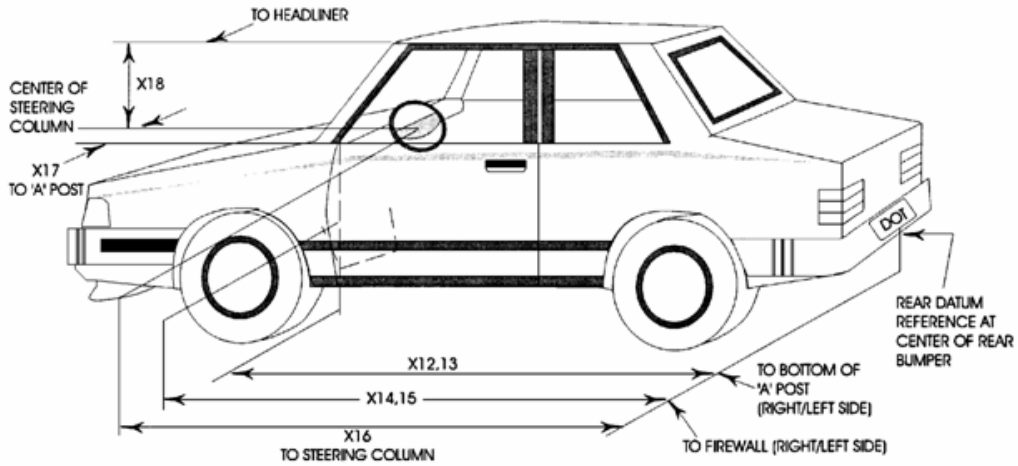
DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11





DATA SHEET NO. 12 … (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4770	4257	-513
2	Rear Surface of Vehicle to Front of Engine	4075	3927	-148
3	RSOV to Firewall	3466	1347	-2119
4	RSOV to Upper Leading Edge of Right Door	3110	3121	11
5	RSOV to Upper Leading Edge of Left Door	3110	3119	9
6	RSOV to Lower Leading Edge of Right Door	3085	3040	-45
7	RSOV to Lower Leading Edge of Left Door	3085	3032	-53
8	RSOV to Upper Trailing Edge of Right Door	1762	1781	19
9	RSOV to Upper Trailing Edge of Left Door	1766	1774	8
10	RSOV to Lower Trailing Edge of Right Door	1856	1927	71
11	RSOV to Lower Trailing Edge of Left Door	1845	1917	72
12	RSOV to Bottom of A-Pillar, Right Side	3021	2426	-595
13	RSOV to Bottom of A-Pillar, Left Side	2726	3026	300
14	RSOV to Firewall, Right Side	3445	3370	-75
15	RSOV to Firewall, Left Side	3102	3430	328
16	RSOV to Steering Column	2618	2620	2
17	Center of Steering Column to A-Pillar	430	440	10
18	Center of Steering Column to Headliner	385	352	-33
19	RSOV to Right Side of Front Bumper	4110	3937	-173
20	RSOV to Left Side of Front Bumper	4113	4008	-105
21	Length of Engine Block	520	520	0
RD	RSOV to Right Side of Dash Panel	2785	2810	25
CD	RSOV to Center of Dash Panel	2765	2780	15
LD	RSOV to Left Side of Dash Panel	2810	2800	-10

All measurements in millimeters.

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

VEHICLE INFORMATION

VIN: 1ZVBP8AMXC5251570 Wheelbase (mm): 2723

Vehicle Size Category: 2-Door Coupe Test Weight (kg): 1776.0

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember

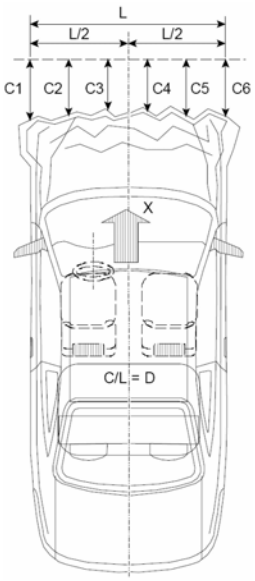
Cal. Procedure/Interval: Drop Test / 6 months

Integration Algorithm: NHTSA Standard Linearity: Good

Impact Velocity (km/h): 56.40

Velocity Change (km/h): 65.6

Time of Separation (msec): 74.7



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2

Midpoint of Damage: Vehicle Centerline

Damage Region Length (mm): 1393

Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	205	520	315
C2	Crush Zone 2 at Left Side	mm	65	530	465
C3	Crush Zone 3 at Left Side	mm	15	511	496
C4	Crush Zone 4 at Right Side	mm	15	524	509
C5	Crush Zone 5 at Right Side	mm	65	572	507
C6	Crush Zone 6 at Right Side	mm	205	615	410
L	C1 to C6	mm	1393		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

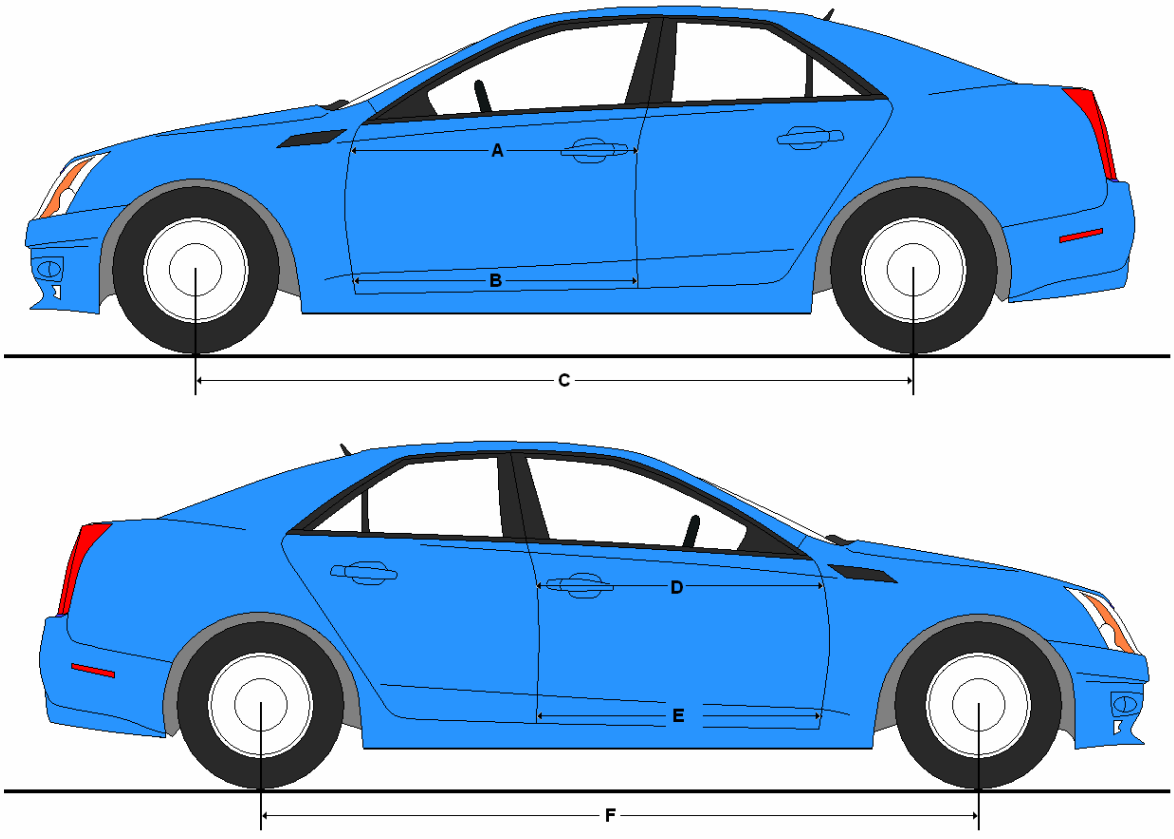
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1206	1206	0
B	Left Side Lower	mm	1047	1050	-3
D	Right Side Upper	mm	1207	1206	1
E	Right Side Lower	mm	1037	1036	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2723	2620	103
F	Right Side Wheelbase	mm	2723	2604	119



DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

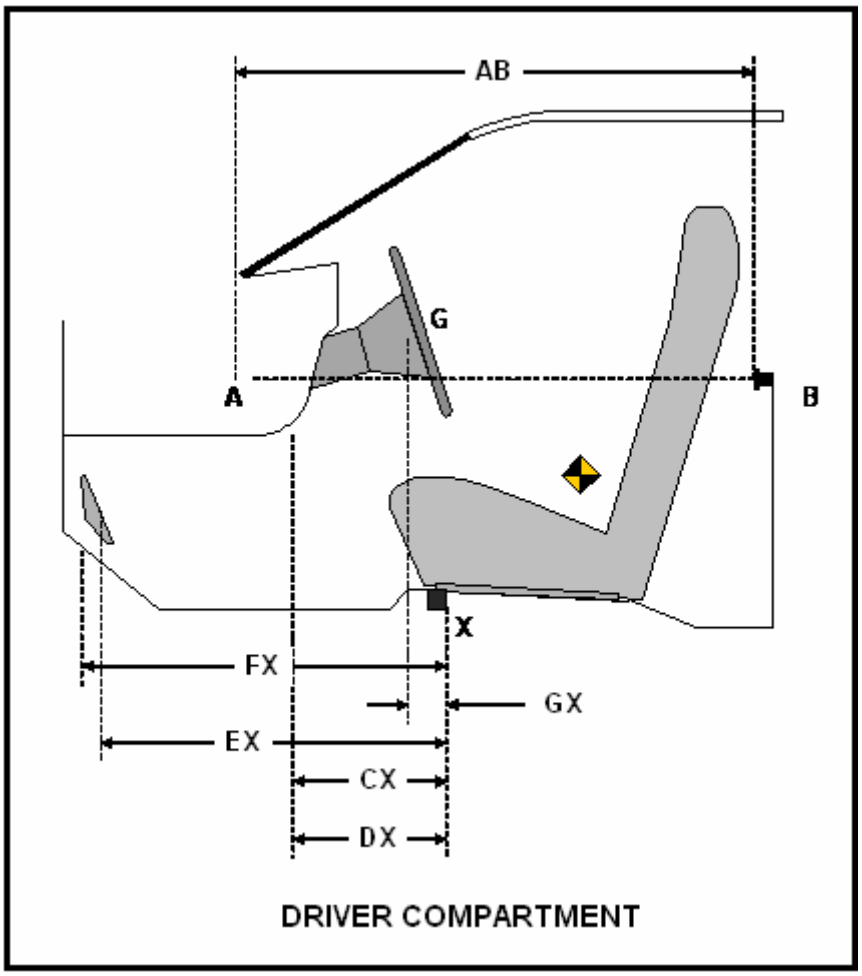
Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	1208	1066	142
CX	Left Knee Bolster to X	mm	245	220	25
DX	Right Knee Bolster to X	mm	240	180	60
EX	Brake Pedal to X	mm	572	540	32
FX	Foot Rest to X	mm	630	630	0
GX	Center of Steering Wheel Hub to X	mm	36	30	6

X = Front of Seat Track (Stationary)

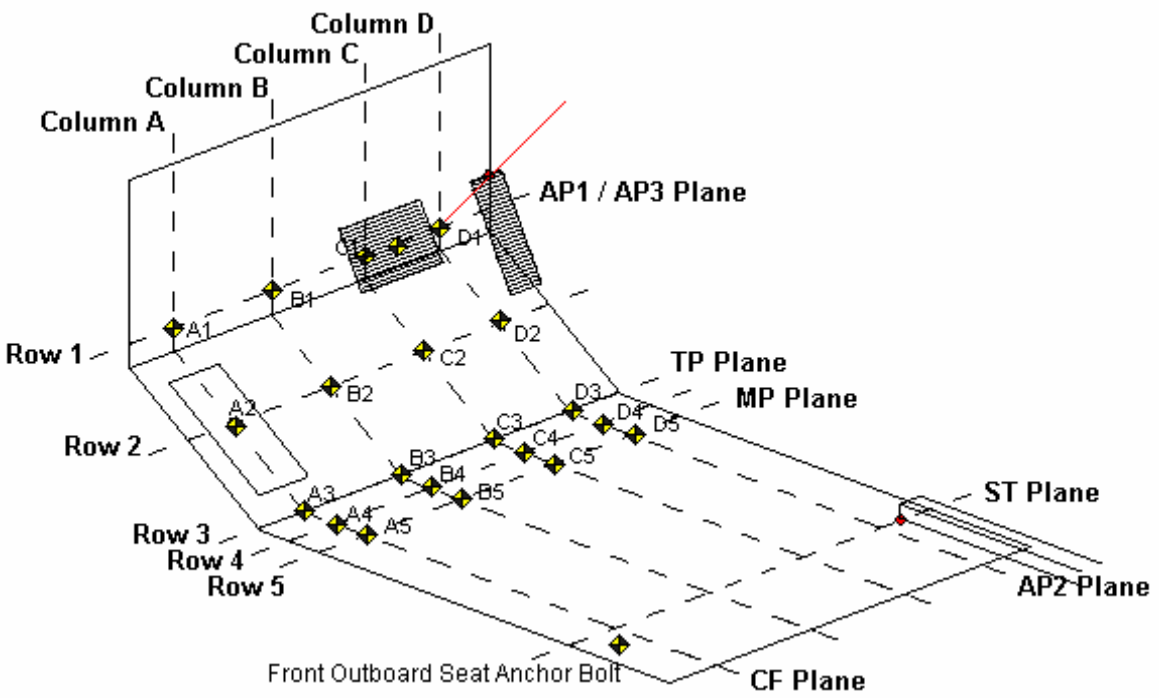


DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

MP: Y-Z plane, halfway between the ST plane and AP1 plane

CF Plane: X-Z plane passes through center of footrest.

BP Plane: X-Z plane passes through center of brake pedal

TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	762	767	767	763	707	676	683	727	55	91	84	36
2	698	696	694	691	648	632	622	666	50	64	72	25
3	605	604	602	603	594	572	566	590	11	32	36	13
4	465	463	461	462	466	461	459	458	-1	2	2	4
5	324	319	318	315	323	319	319	317	1	0	-1	-2

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-15	-119	-228	-345	-3	-103	-211	-317	-12	-16	-17	-28
2	-13	-118	-222	-351	0	-104	-206	-323	-13	-14	-16	-28
3	-14	-115	-220	-351	-18	-101	-206	-331	4	-14	-14	-20
4	-15	-115	-219	-345	-9	-103	-207	-313	-6	-12	-12	-32
5	-18	-115	-219	-341	-12	-104	-206	-320	-6	-11	-13	-21

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	135	128	120	121	176	182	167	142	-41	-54	-47	-21
2	45	40	37	35	87	71	74	49	-42	-31	-37	-14
3	-25	-26	-29	-27	-12	-25	-25	-27	-13	-1	-4	0
4	-43	-42	-43	-37	-59	-89	-91	-38	16	47	48	1
5	-49	-50	-51	-38	-60	-96	-104	-56	11	46	53	18

All measurements in millimeters

*Floor pan measurements not taken per NHTSA's instruction.

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	754	756	758	761	708	664	659	681	46	92	99	80
2	694	701	702	697	650	614	616	626	44	87	86	71
3	604	598	597	601	579	567	568	546	25	31	29	55
4	467	466	461	465	459	464	458	465	8	2	3	0
5	324	322	320	320	326	321	321	321	-2	1	-1	-1

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	367	249	143	52	321	209	108	21	46	40	35	31
2	377	255	142	51	342	222	111	19	35	33	31	32
3	386	261	145	48	346	237	126	30	40	24	19	18
4	384	258	151	49	318	232	138	44	66	26	13	5
5	385	262	152	47	340	237	140	44	45	25	12	3

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	141	139	142	143	174	189	194	192	-33	-50	-52	-49
2	59	51	51	44	97	101	93	83	-38	-50	-42	-39
3	-1	-19	-18	-22	32	-9	-19	-14	-33	-10	1	-8
4	-28	-36	-39	-40	11	-77	-94	-70	-39	41	55	30
5	-28	-43	-45	-44	-10	-87	-108	-67	-18	44	63	23

All measurements in millimeters

*Floor pan measurements not taken per NHTSA's instruction

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

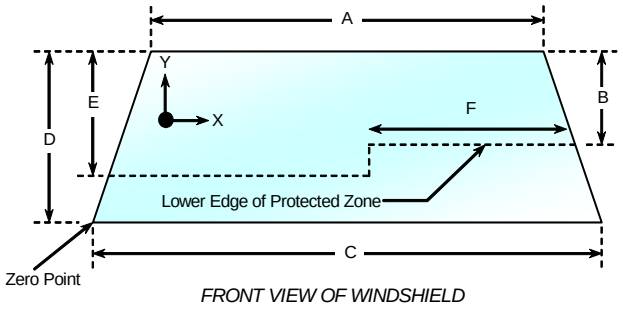
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic and rubber molding sealed with rubber cement.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.1° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2121	2121	100.0%
Right Side	2121	2121	100.0%
Total	4242	4242	100.0%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1252
B	mm	350
C	mm	1550
D	mm	720
E	mm	345
F	mm	570

AREAS OF PROTECTED ZONE FAILURES

A. Provide Coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y

DATA SHEET NO. 15 … (CONTINUED)

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 27.2° C Test Time: 1:00 PM

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: N/A oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: N/A oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: N/A oz.
(Maximum allowable = 1 oz./minute)

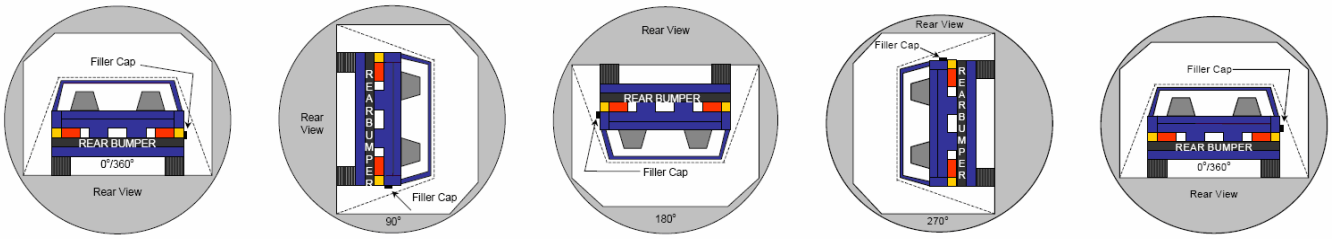
D. Spillage: There was no Stoddard solvent spillage.

DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



0° TO 90° 90° TO 180° 180° TO 270° 270° TO 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard solvent spillage: N/A

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	84	309	393
90° To 180°	82	300	382
180° To 270°	84	300	384
270° To 360°	76	300	376

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

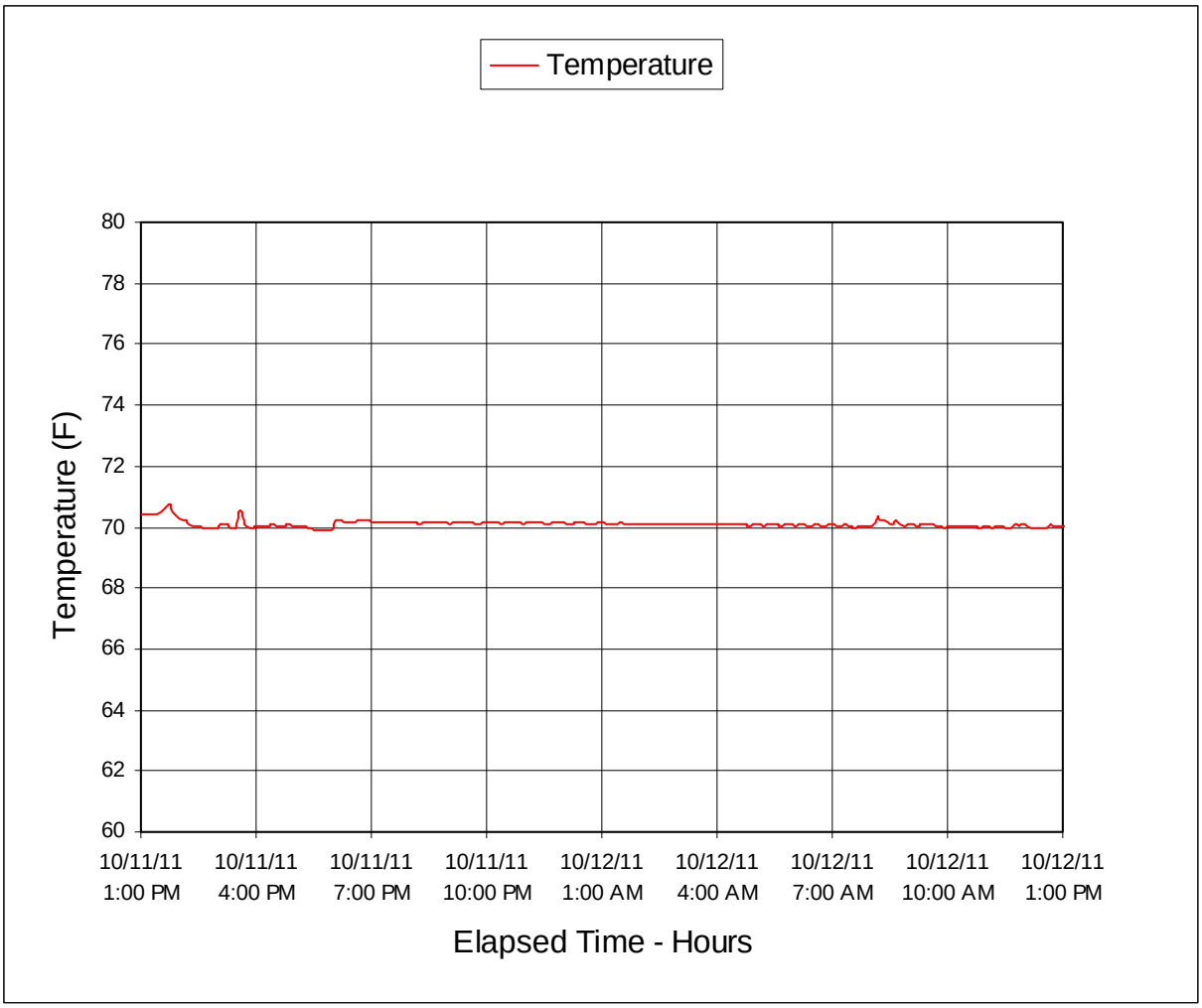
Test Phase	Spillage Location
0° To 90°	N/A
90° To 180°	N/A
180° To 270°	N/A
270° To 360°	N/A

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2012 Ford Mustang 2-Door Coupe NHTSA No.: MC0210

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/12/11



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

FIGURE 1. Load Cell Location

FIGURE 2. Load Cell Wall

FIGURE 3. Manufacturer's Label

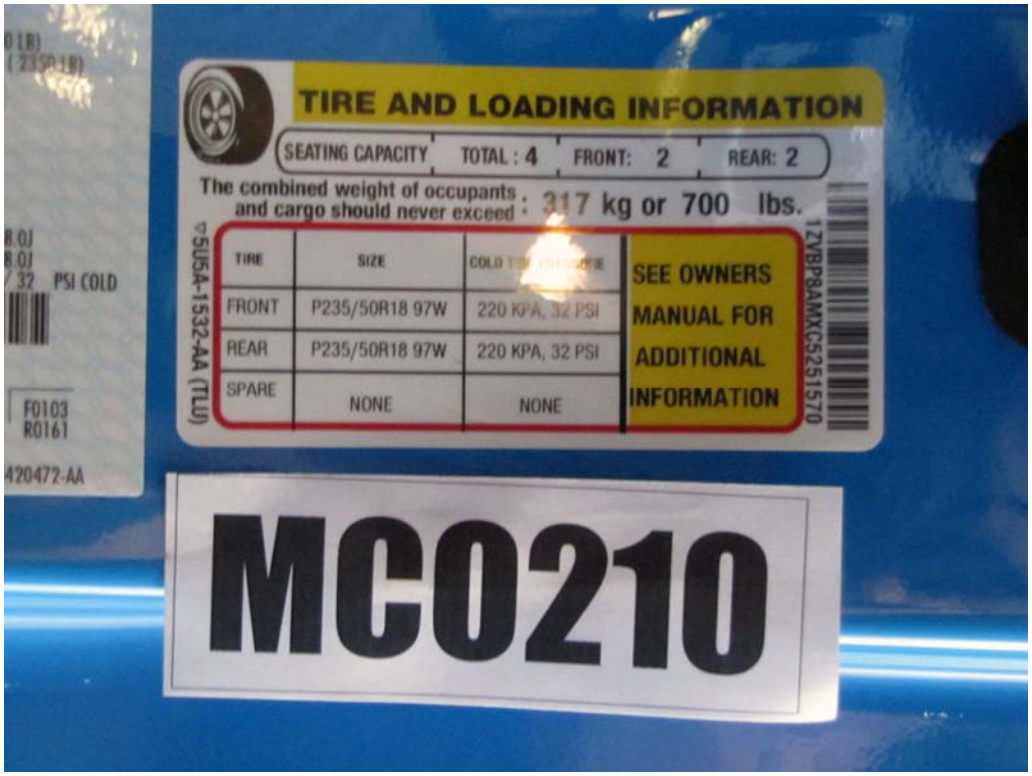


FIGURE 4. Tire Placard

FIGURE 5. Right Front ¾ View, As Delivered

FIGURE 6. Left Rear ¾ View, As Delivered

FIGURE 7. Pre-Test Front View of Test Vehicle

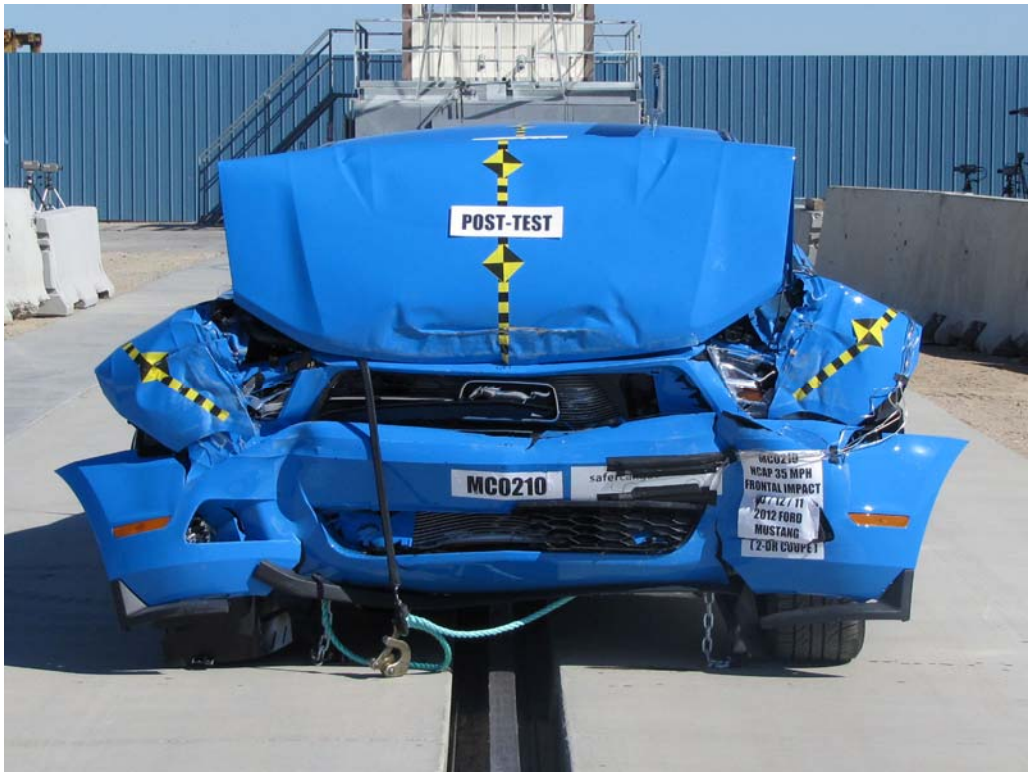


FIGURE 8. Post-Test Front View of Test Vehicle

FIGURE 9. Pre-Test Left View of Test Vehicle

FIGURE 10. Post-Test Left View of Test Vehicle

FIGURE 11. Pre-Test Right View of Test Vehicle

FIGURE 12. Post-Test Right View of Test Vehicle

FIGURE 13. Pre-Test Right Front ¾ View

FIGURE 14. Post-Test Right Front ¾ View

FIGURE 15. Pre-Test Left Rear ¾ View

FIGURE 16. Post-Test Left Rear ¾ View

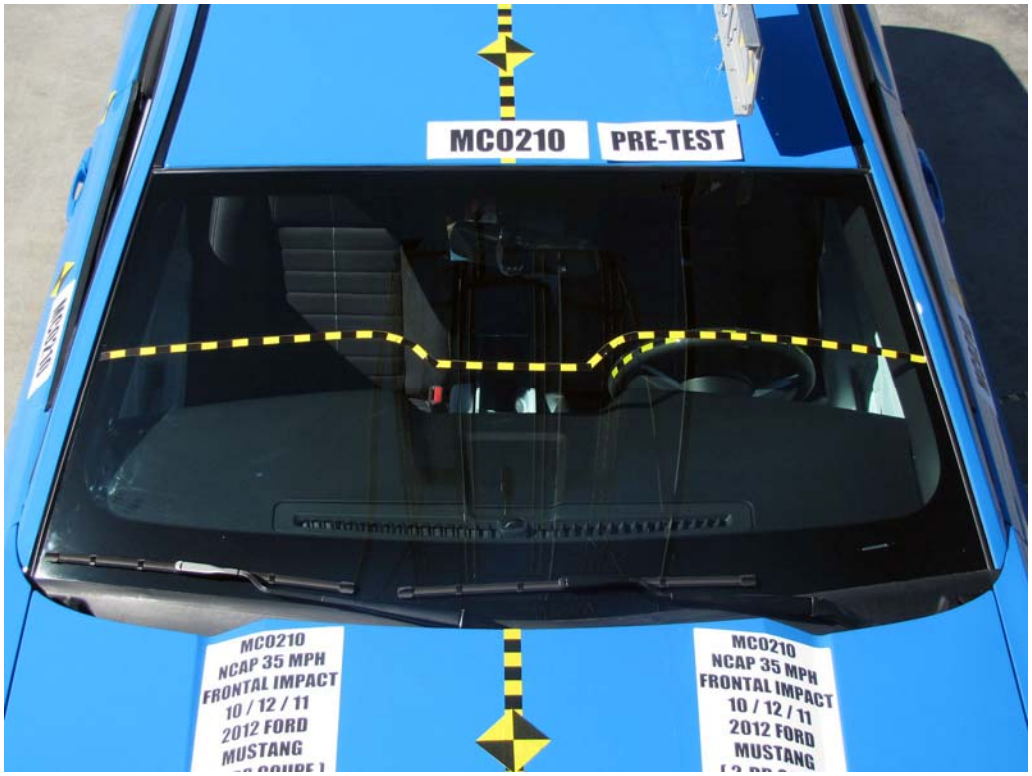


FIGURE 17. Pre-Test Windshield View

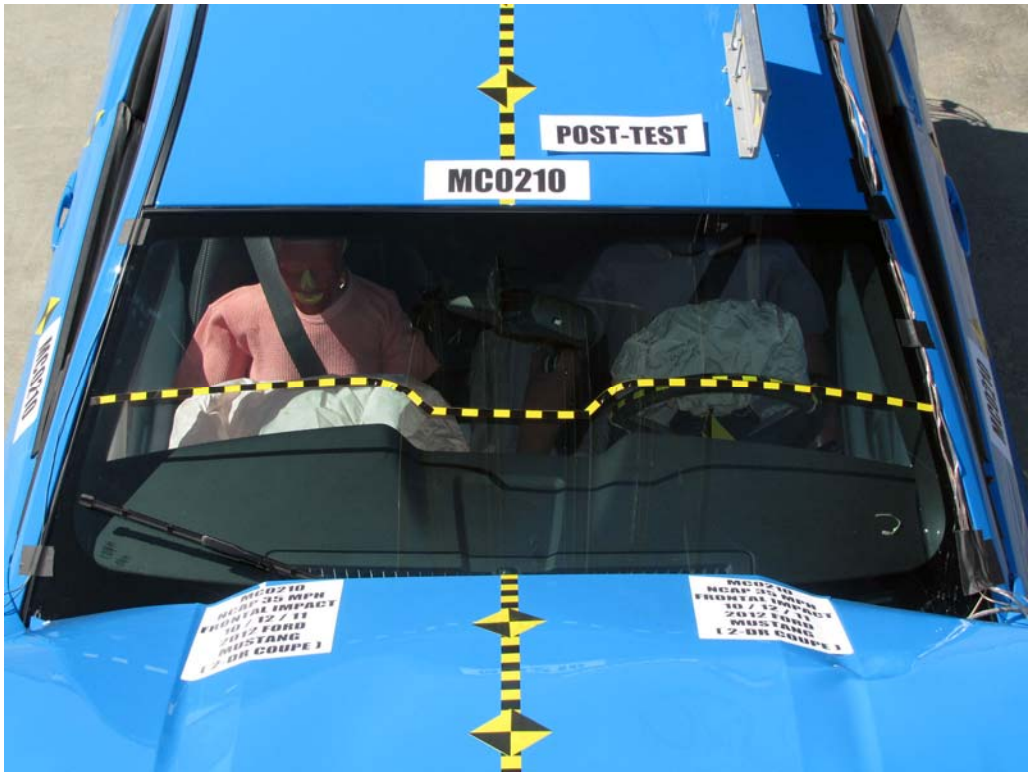


FIGURE 18. Post-Test Windshield View

FIGURE 19. Pre-Test Engine Compartment View

FIGURE 20. Post-Test Engine Compartment View

FIGURE 21. Pre-Test Fuel Filler Cap View

FIGURE 22. Post-Test Fuel Filler Cap View

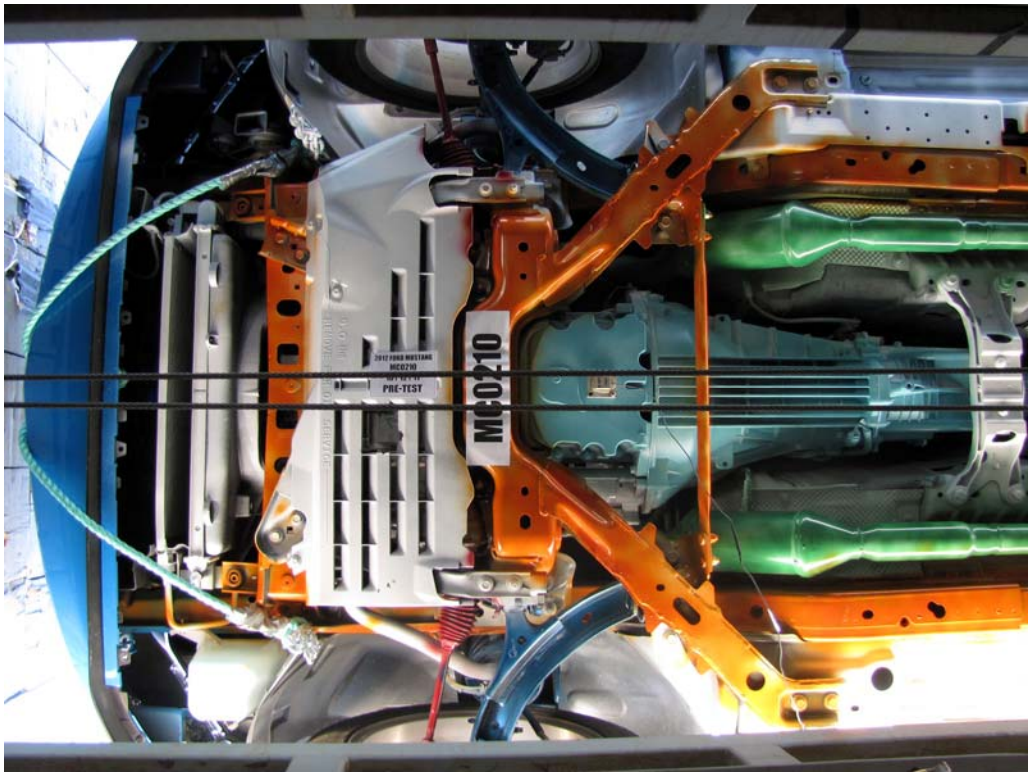


FIGURE 23. Pre-Test Front Underbody View

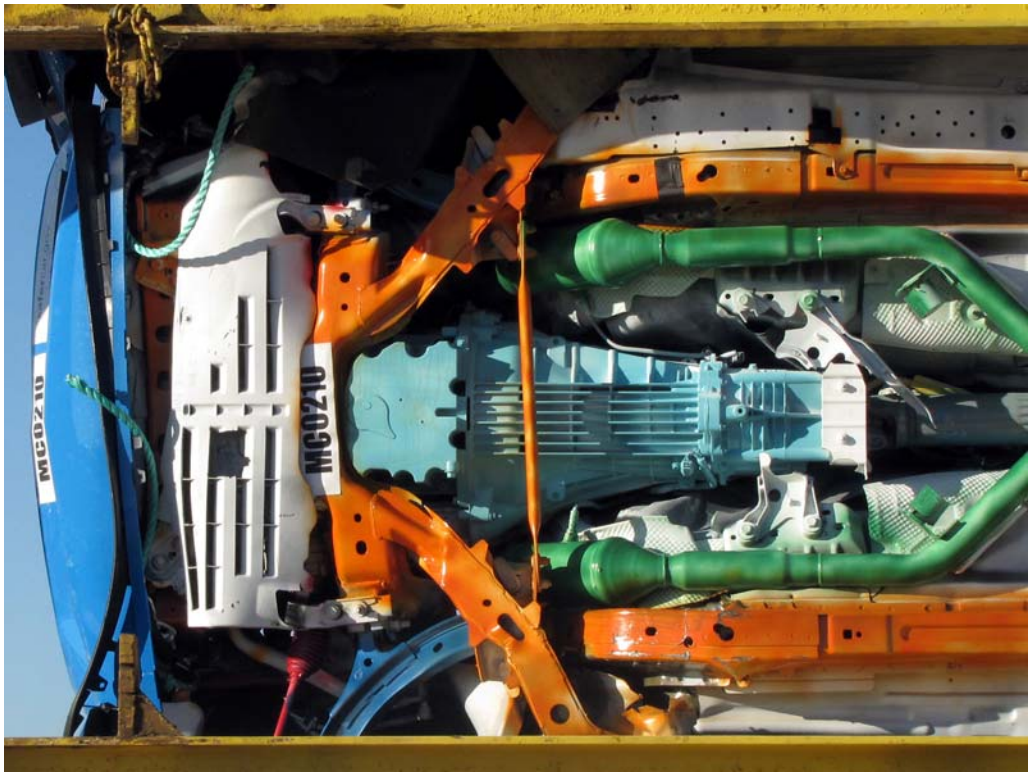


FIGURE 24. Post-Test Front Underbody View

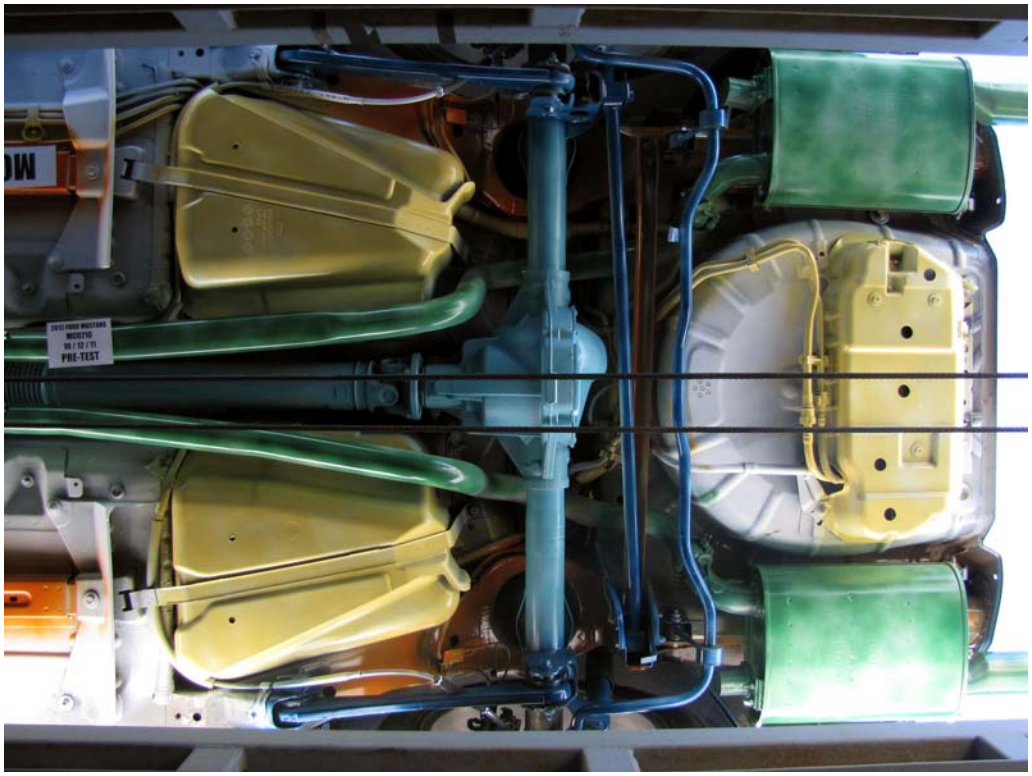


FIGURE 25. Pre-Test Rear Underbody View

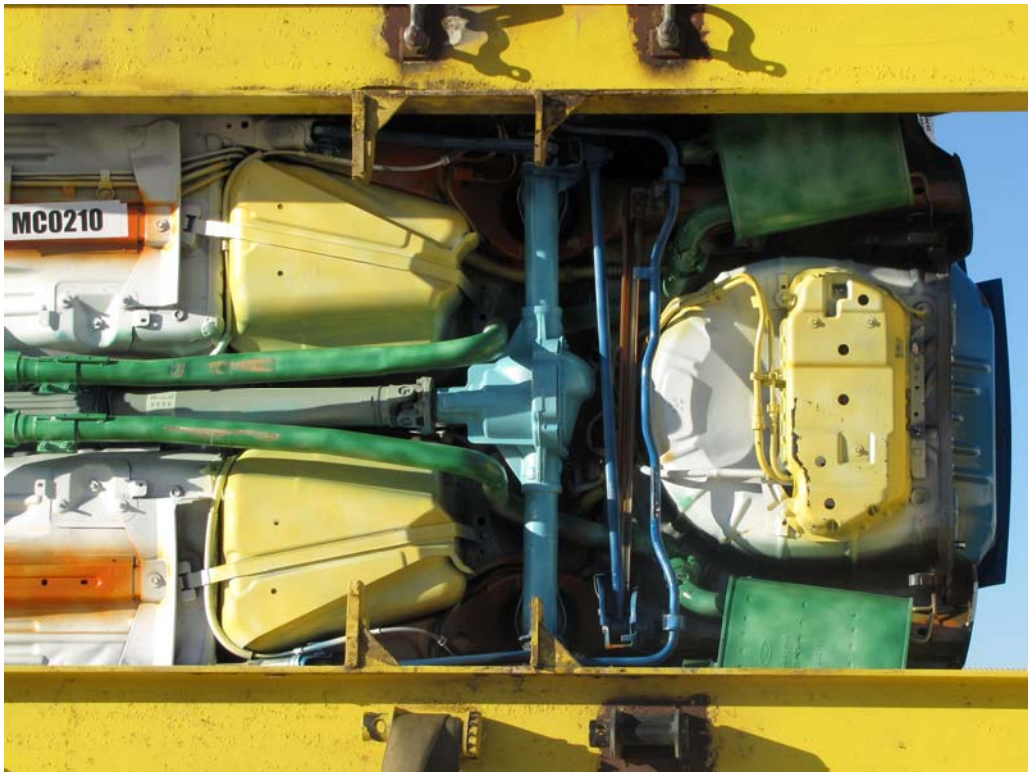


FIGURE 26. Post-Test Rear Underbody View

FIGURE 27. Pre-Test Dummy Cable Routing

FIGURE 28. Post-Test Dummy Cable Routing

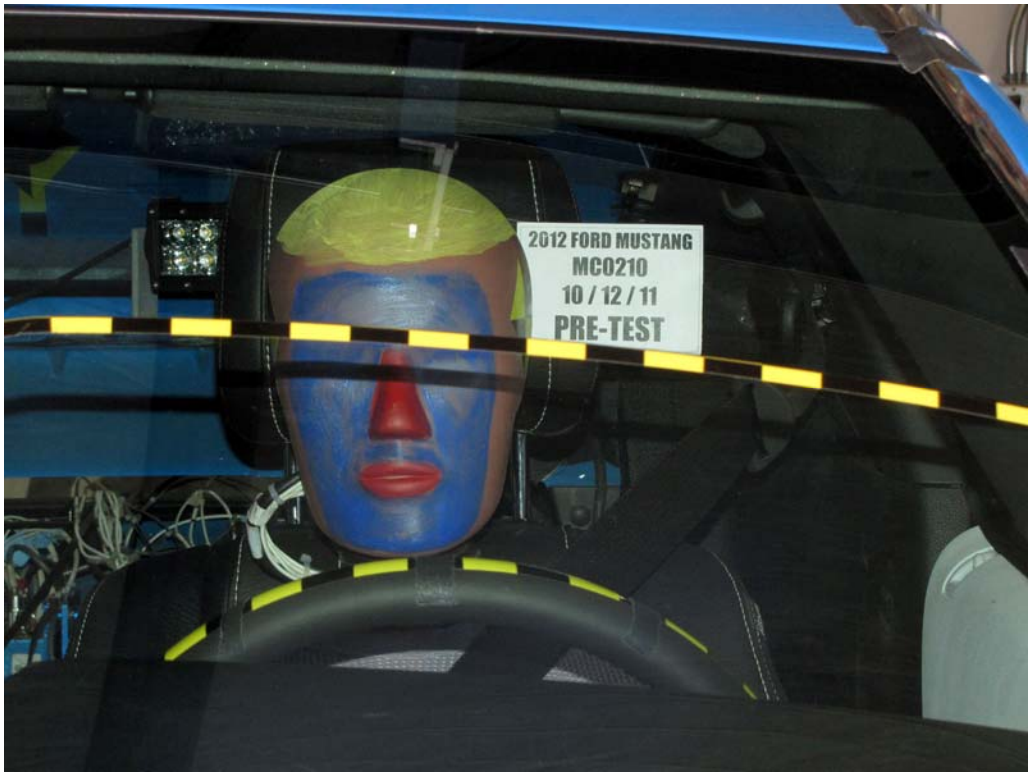


FIGURE 29. Pre-Test Driver Dummy Front View

FIGURE 30. Post-Test Driver Dummy Front View

FIGURE 31. Pre-Test Driver Dummy Window View

FIGURE 32. Post-Test Driver Dummy Window View

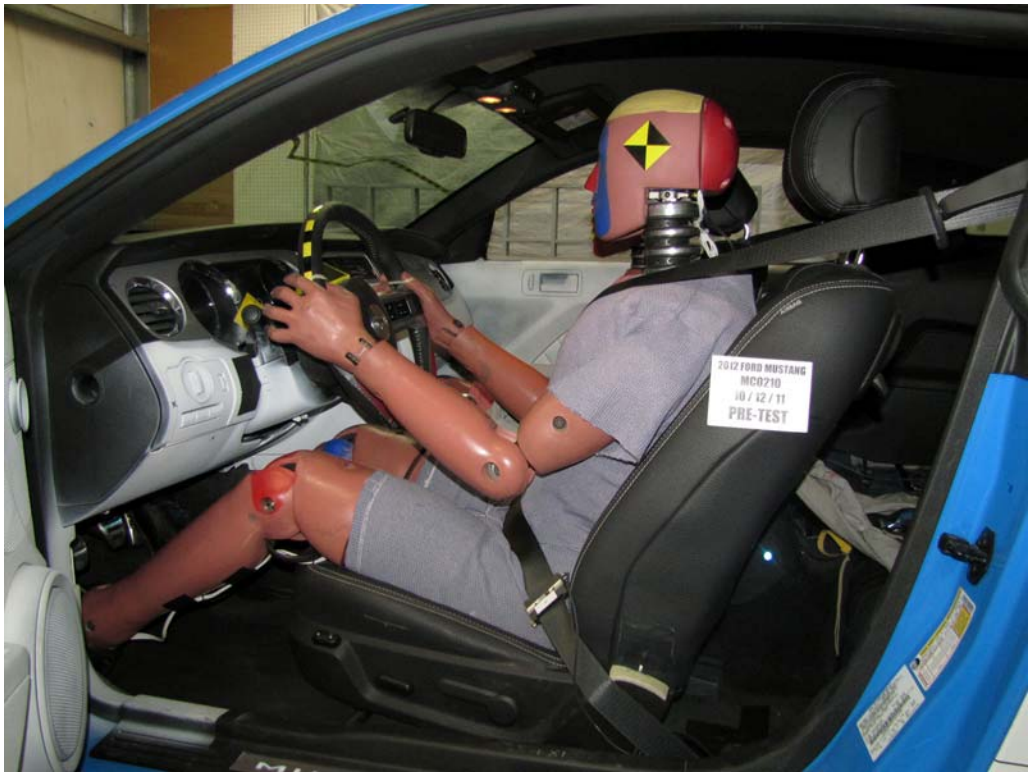


FIGURE 33. Pre-Test Driver Dummy and Vehicle Interior View

FIGURE 34. Post-Test Driver Dummy and Vehicle Interior View

FIGURE 35. Pre-Test Driver's Seat Fore-Aft Markings

FIGURE 36. Post-Test Driver's Seat Fore-Aft Markings

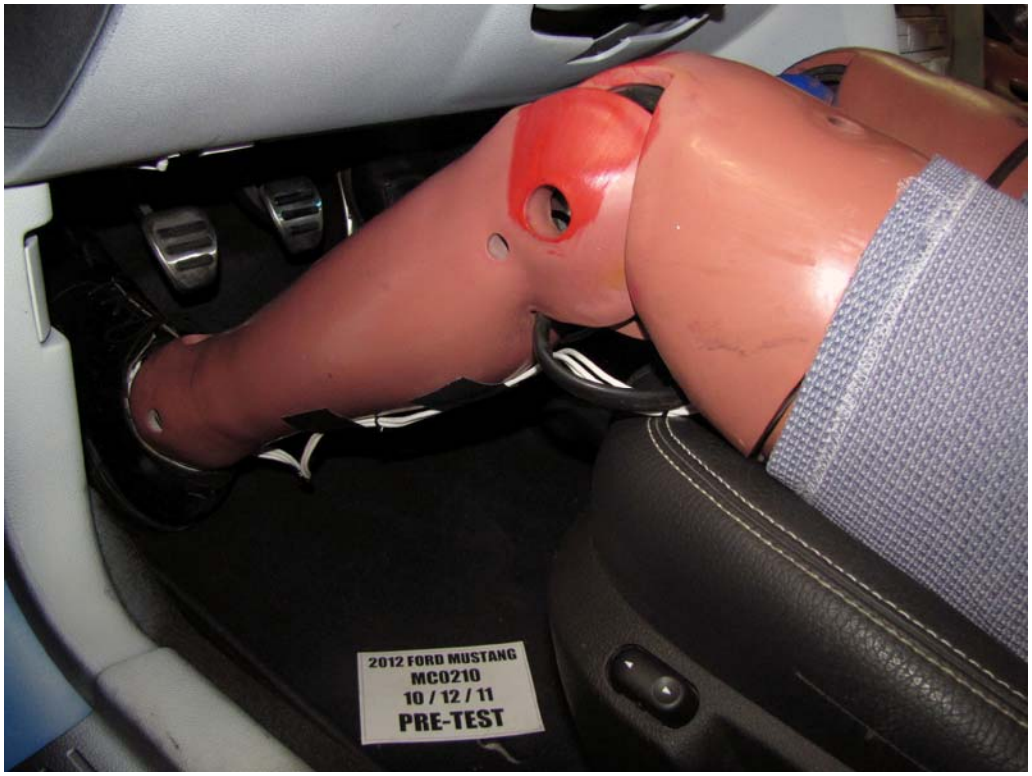


FIGURE 37. Pre-Test Driver Dummy Feet

FIGURE 38. Post-Test Driver Dummy Feet

FIGURE 39. Pre-Test Driver's Side Knee Bolster

FIGURE 40. Post-Test Driver's Side Knee Bolster

FIGURE 41. Pre-Test Driver's Side Floorpan

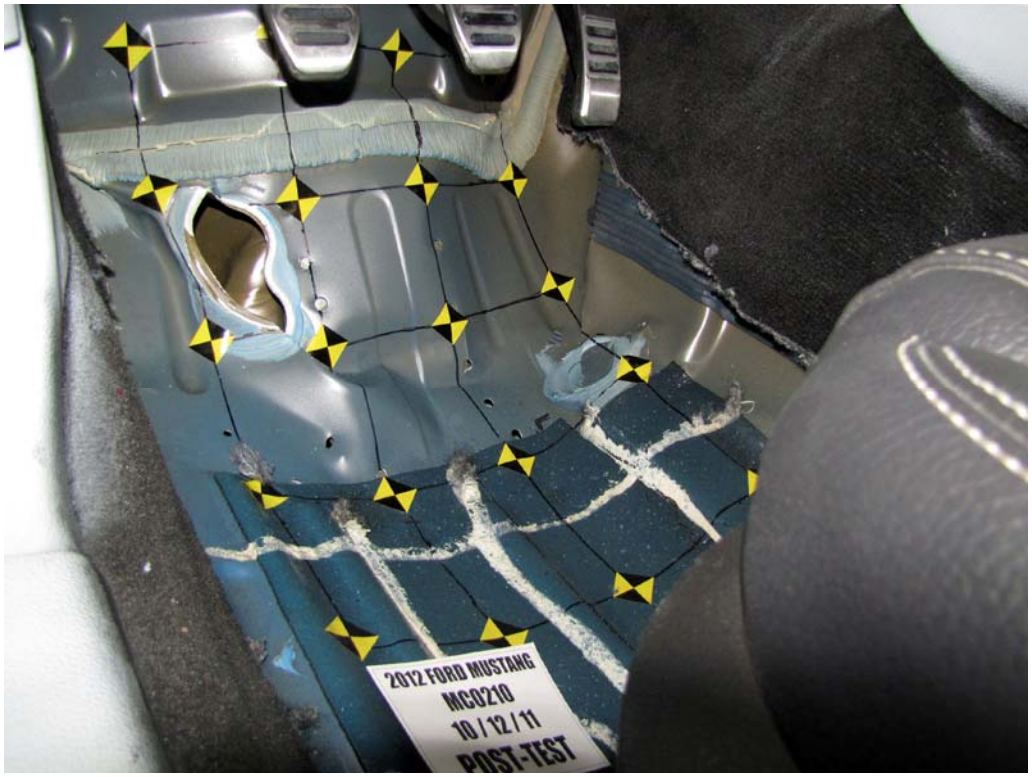


FIGURE 42. Post-Test Driver's Side Floorpan

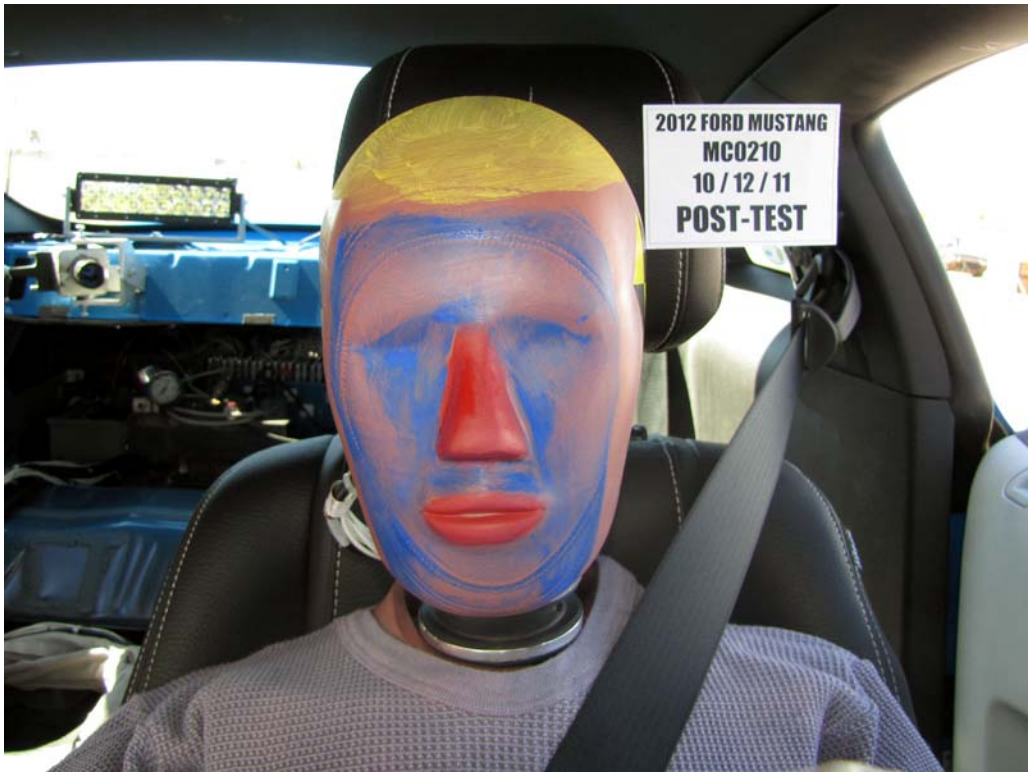


FIGURE 43. Post-Test Driver Dummy Face

FIGURE 44. Post-Test Driver Dummy Contact With Airbag

FIGURE 45. Post-Test Driver Dummy Contact With Head Rest

FIGURE 45a. Post-Test Driver Dummy Contact With Knee Bolster

FIGURE 45b. Post-Test Driver Dummy Contact With Steering Column

FIGURE 46. Pre-Test View Of Steering Wheel

FIGURE 47. Post-Test View Of Steering Wheel

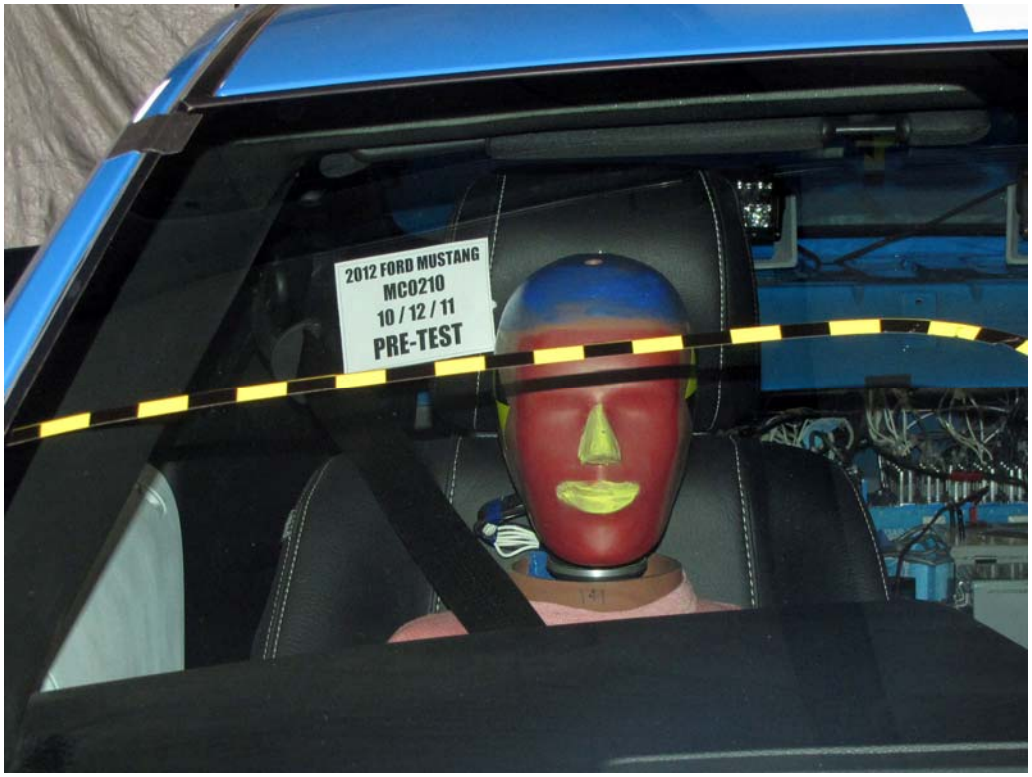


FIGURE 48. Pre-Test Passenger Dummy Front View

FIGURE 49. Post-Test Passenger Dummy Front View

FIGURE 50. Pre-Test Passenger Dummy Window View

FIGURE 51. Post-Test Passenger Dummy Window View

FIGURE 52. Pre-Test Passenger Dummy and Vehicle Interior View

FIGURE 53. Post-Test Passenger Dummy and Vehicle Interior View

FIGURE 54. Pre-Test Passenger's Seat Fore-Aft Markings

FIGURE 55. Post-Test Passenger's Seat Fore-Aft Markings

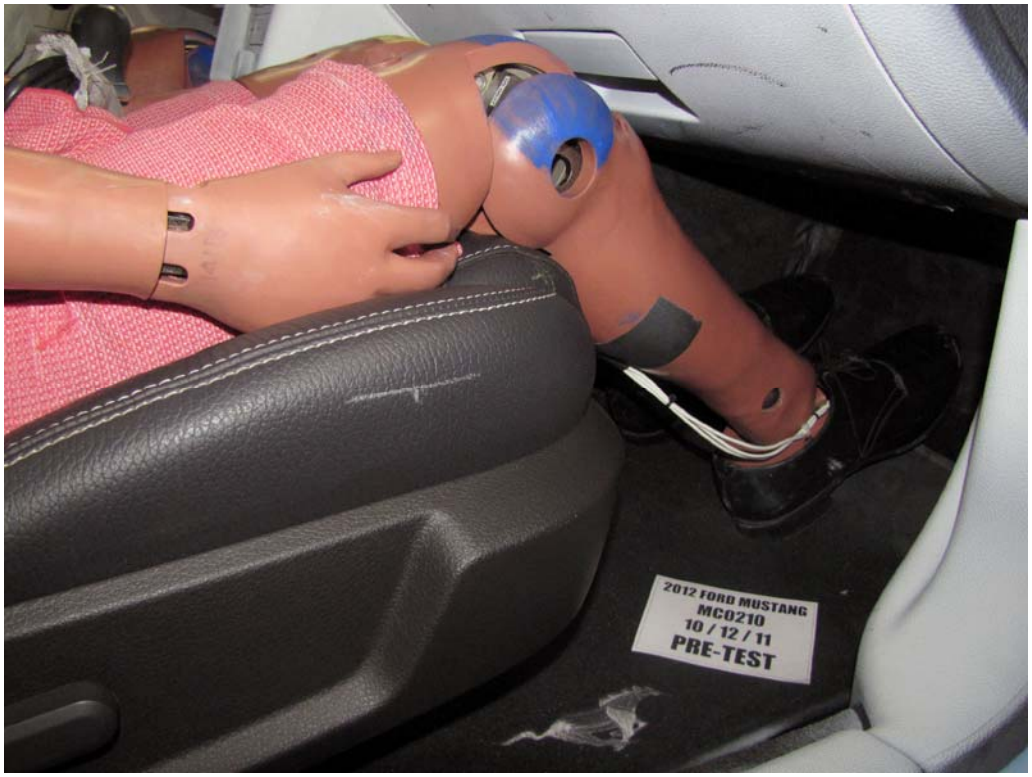


FIGURE 56. Pre-Test Passenger Dummy Feet

FIGURE 57. Post-Test Passenger Dummy Feet

FIGURE 58. Pre-Test Passenger's Side Knee Bolster

FIGURE 59. Post-Test Passenger's Side Knee Bolster

FIGURE 60. Pre-Test Passenger's Side Floorpan

FIGURE 61. Post-Test Passenger's Side Floorpan

FIGURE 62. Post-Test Passenger Dummy Contact With Airbag

FIGURE 62a. Post-Test Passenger Dummy Contact With Head Restraint

FIGURE 62b. Post-Test Passenger Dummy Contact With Knee Bolster

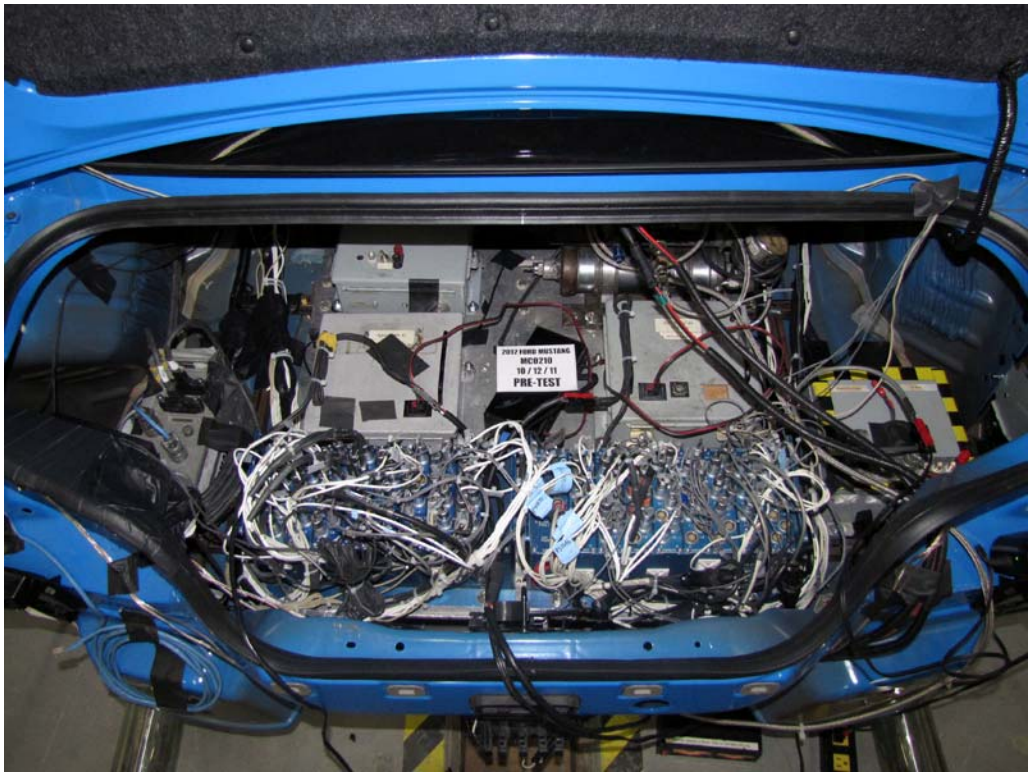


FIGURE 63. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable
No Stoddard
Solvent Spillage

FIGURE 64. Post-Test Stoddard Solvent Spillage Location

FIGURE 65. Post-Test Speed Trap Read Out

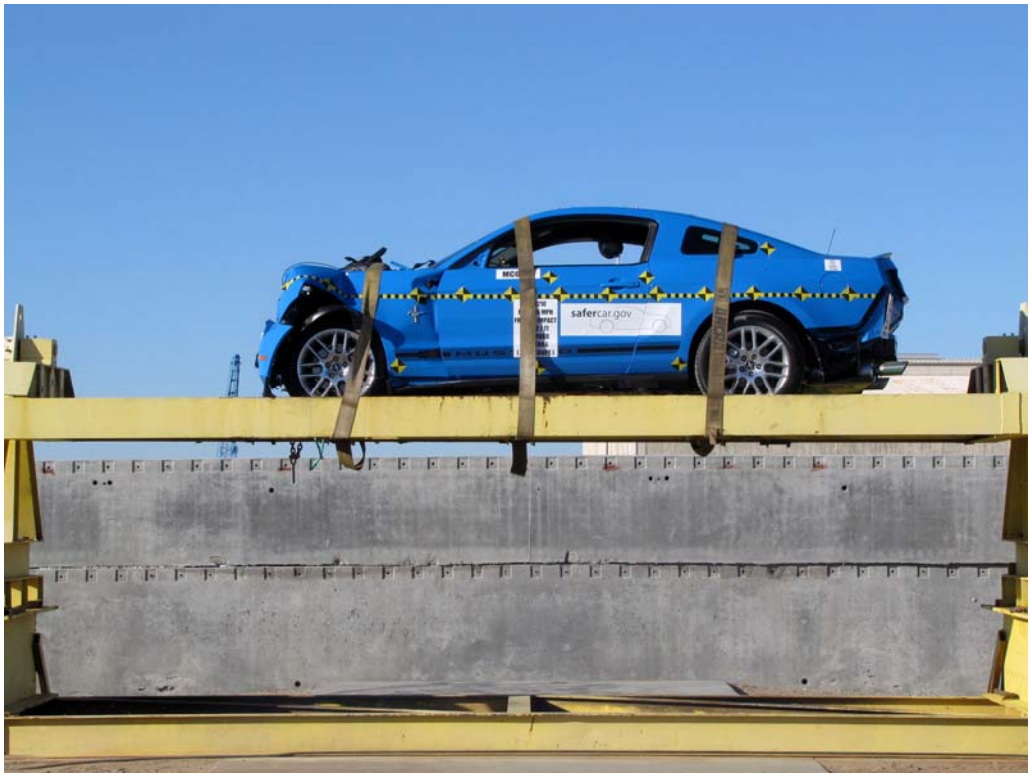


FIGURE 66. Vehicle at 0°on Static Rollover Device

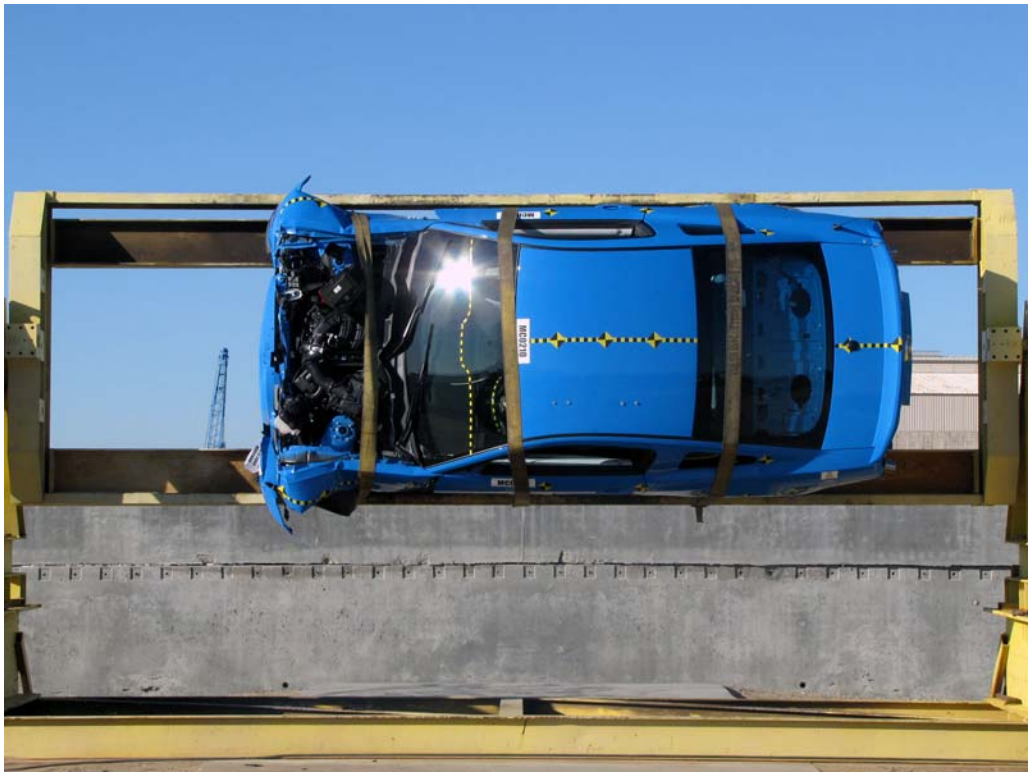


FIGURE 67. Vehicle at 90°on Static Rollover Device

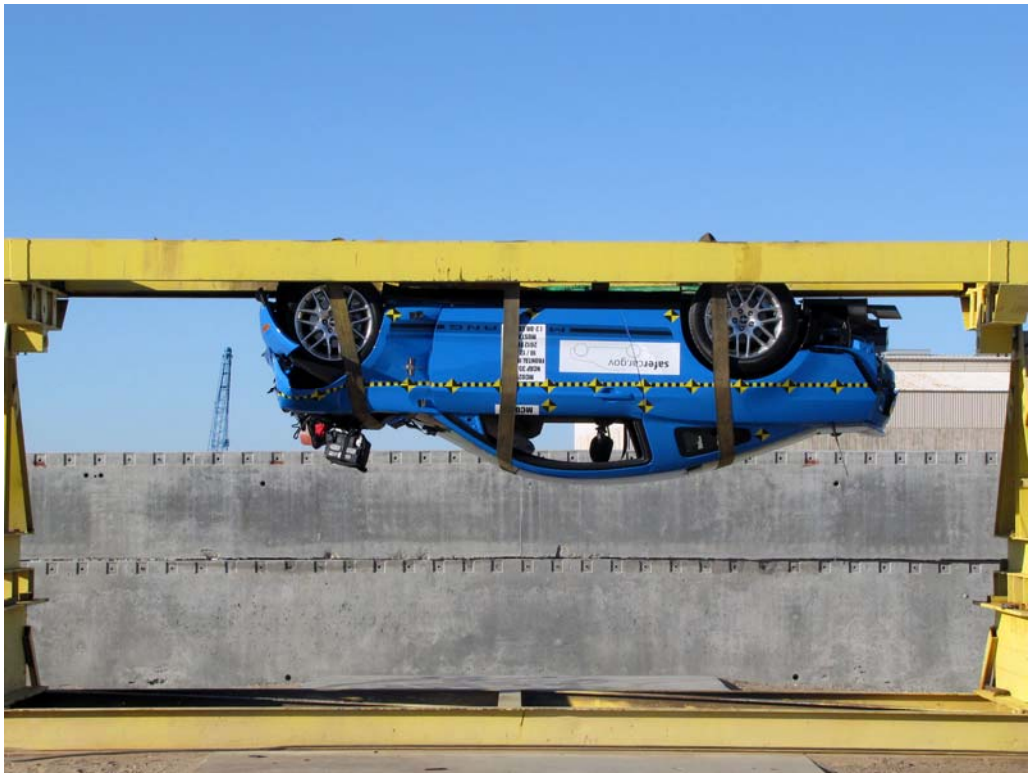


FIGURE 68. Vehicle at 180°on Static Rollover Device

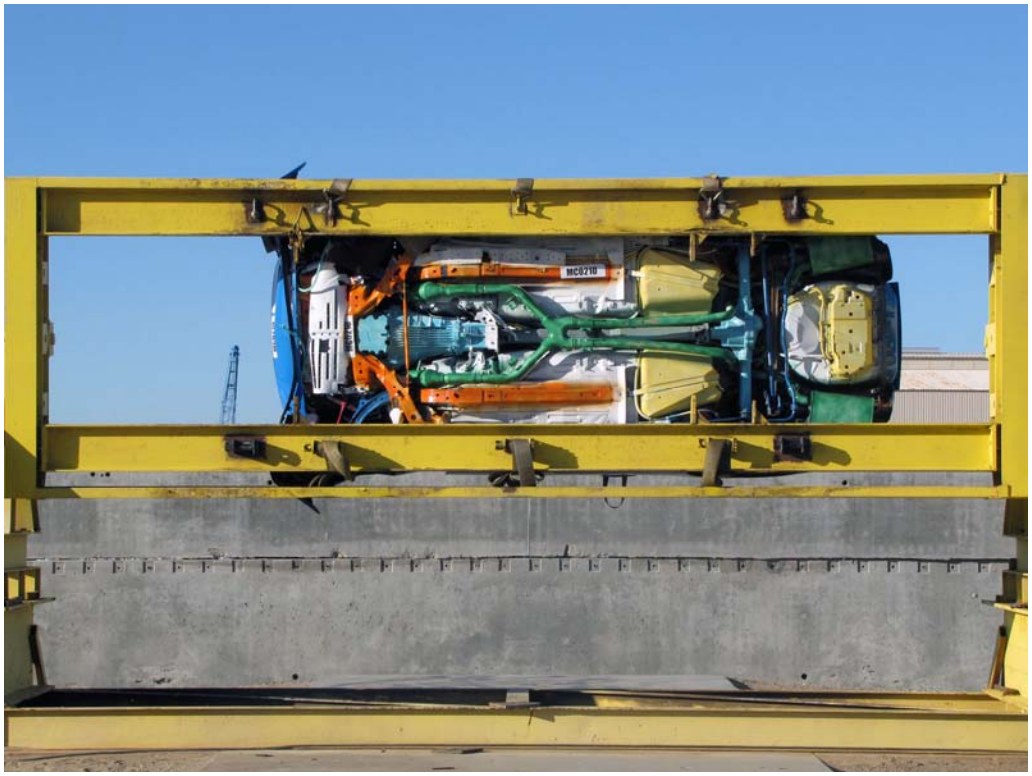


FIGURE 69. Vehicle at 270°on Static Rollover Device

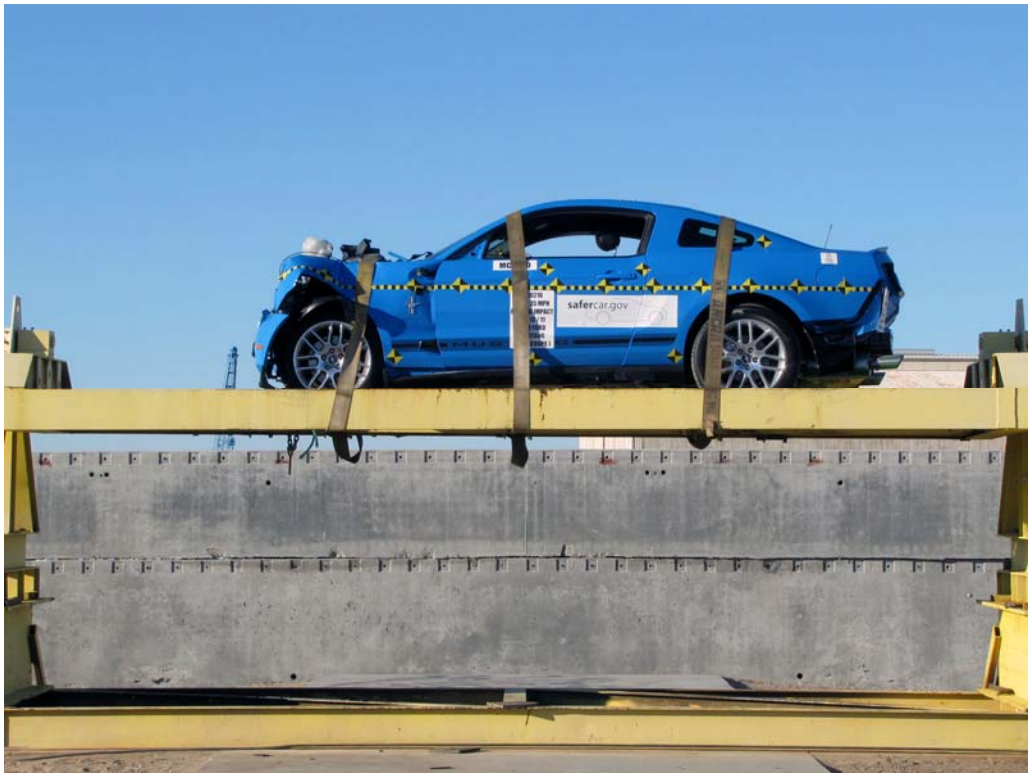


FIGURE 70. Vehicle at 360°on Static Rollover Device

FIGURE 71. Impact Event

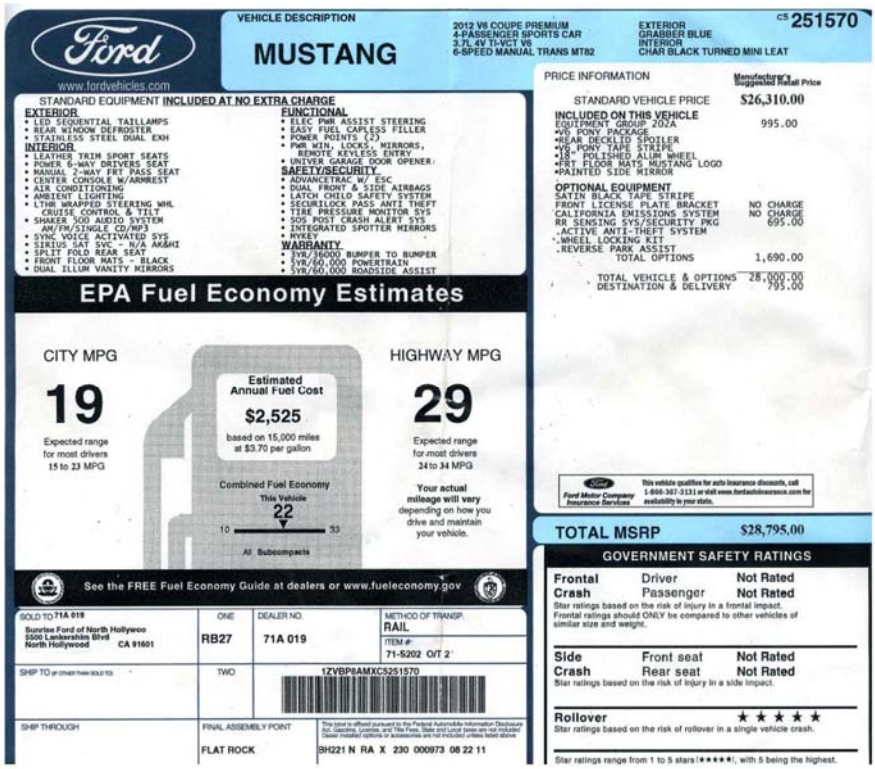


FIGURE 72. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Left Femur Force Z Redundant
Driver Right Femur Force Z Redundant
Driver Shoulder Belt Force
Driver Lap Belt Force
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Right Foot Fore Z
Driver Right Foot Aft X

Driver Right Foot Aft Z
Passenger Head X Acceleration Redundant
Passenger Head Y Acceleration Redundant
Passenger Head Z Acceleration Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Z
Passenger Upper Neck Moment Y
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left Femur Force Z Redundant
Passenger Right Femur Force Z Redundant
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat Crossmember X

Left Rear Seat Crossmember Z

Right Rear Seat Crossmember X

Right Rear Seat Crossmember Z

Vehicle Engine Top X

Vehicle Engine Bottom X

Vehicle Left Brake Caliper X

Vehicle Right Brake Caliper X

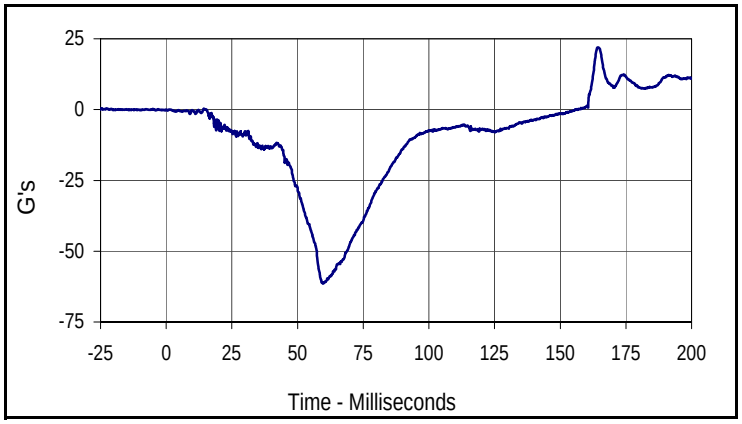
Load Cell Barrier A1-A9

Load Cell Barrier B1-B9

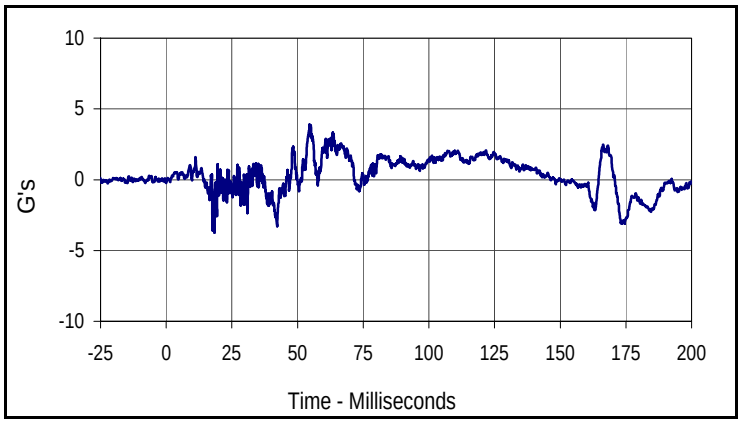
Load Cell Barrier C1-C9

Load Cell Barrier D1-D9

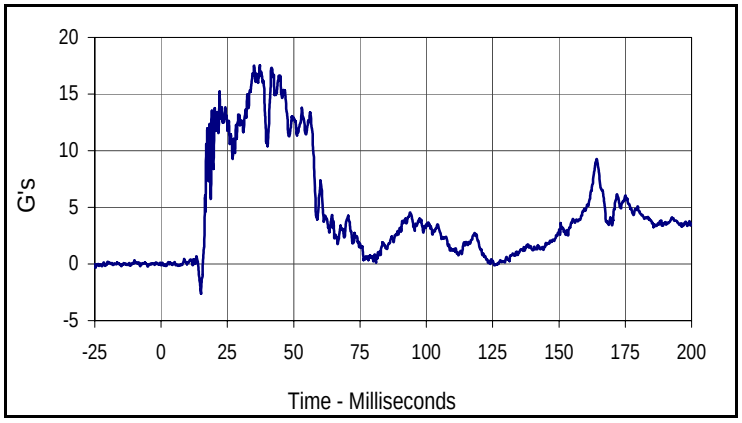
Test Vehicle:	2012 Ford Mustang 2-Door Coupe	Test Date:	10/12/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MC0210



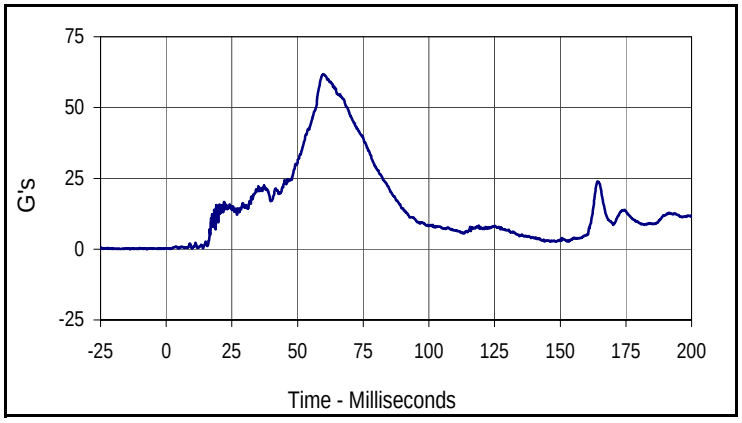
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
22.0	164.3	-61.5	59.8



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.9	54.6	-3.7	18.4

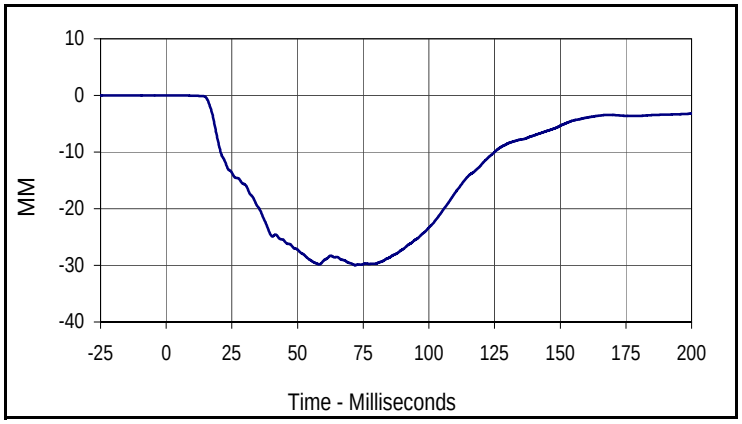


Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.5	37.2	-2.6	15.0

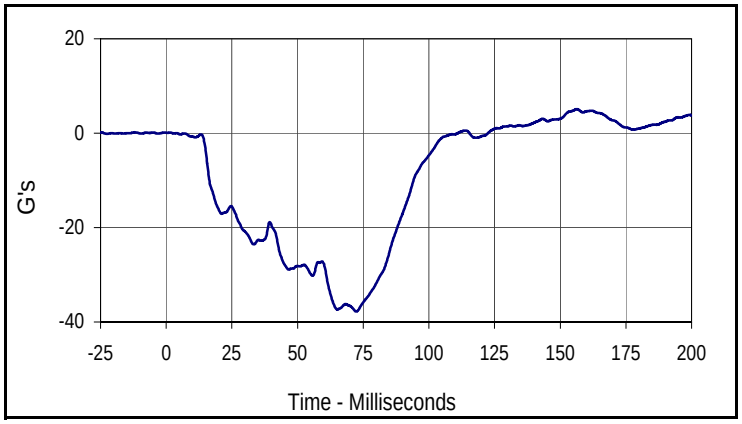


Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
61.8	59.8	0.1	1.2

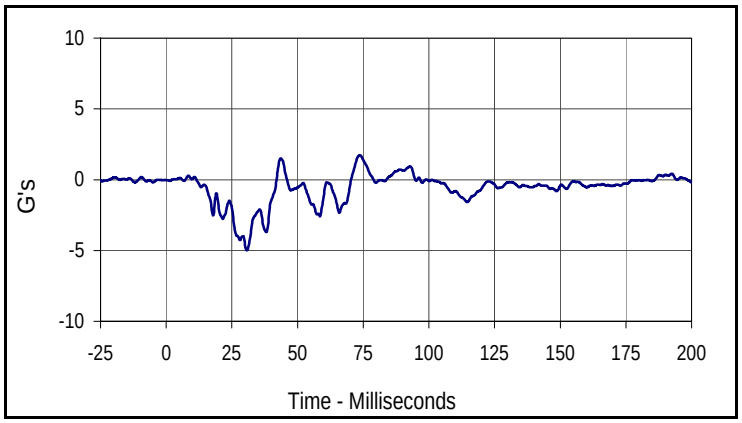
Test Vehicle:	2012 Ford Mustang 2-Door Coupe	Test Date:	10/12/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MC0210



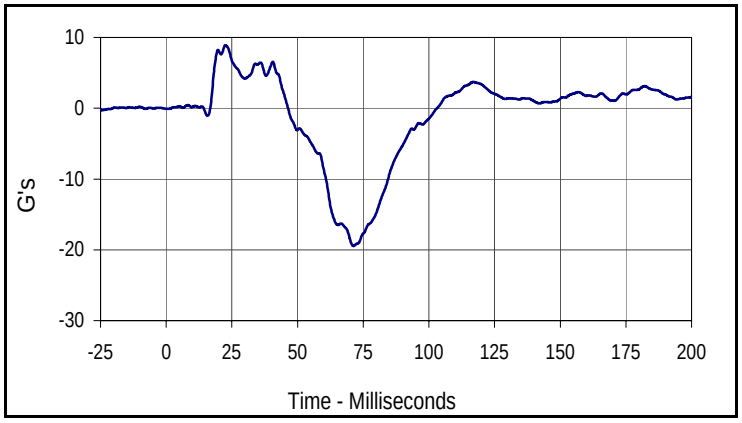
Curve Description			
Driver Chest Deflection			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
0.0	4.0	-30.0	72.0



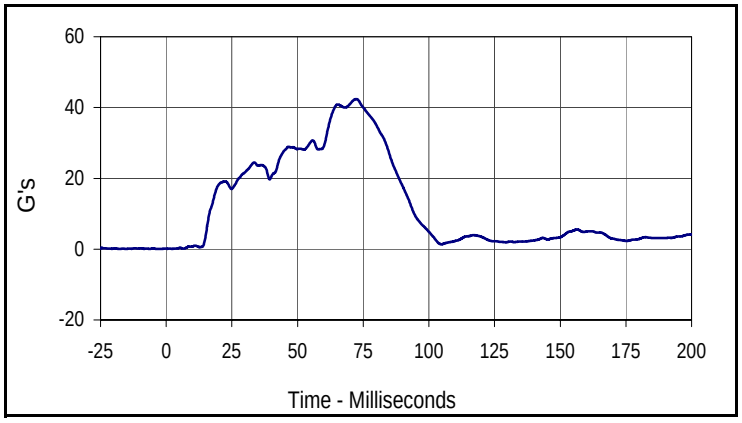
Curve Description			
Driver Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
5.1	156.3	-37.8	72.4



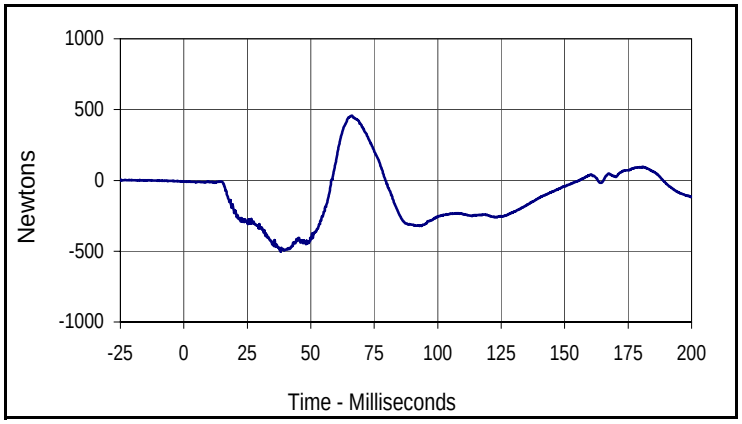
Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
1.7	73.7	-5.0	30.7



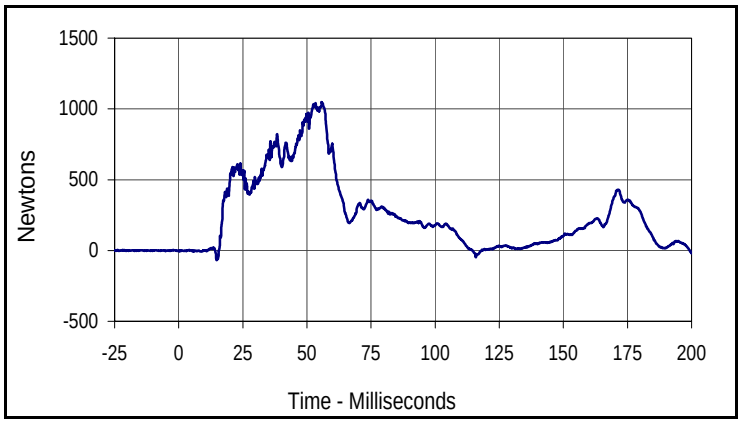
Curve Description			
Driver Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
008	FIL	180	G's
Max	Time	Min	Time
8.9	22.5	-19.5	71.3



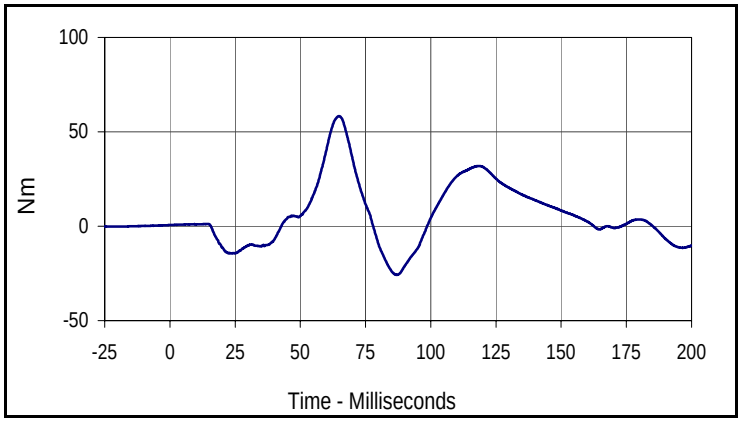
Curve Description			
Driver Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
009	RES	180	G's
Max	Time	Min	Time
42.4	72.3	0.1	2.2



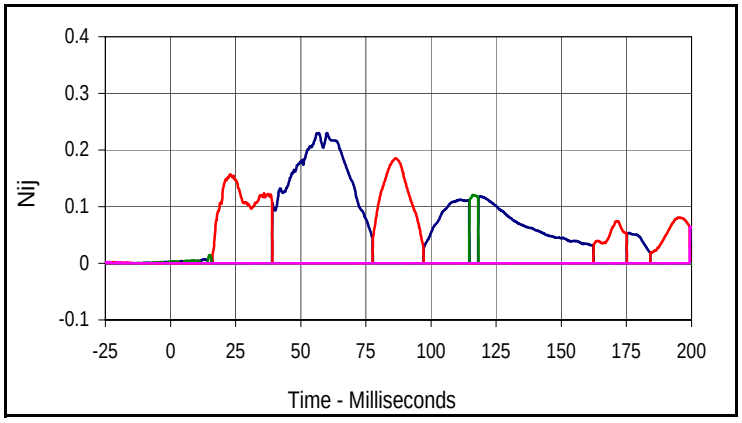
Curve Description			
Driver Upper Neck Force X			
Plot No.	Type	SAE Class	Units
010	FIL	1000	Newtons
Max	Time	Min	Time
456.7	66.3	-502.0	38.1



Curve Description			
Driver Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
011	FIL	1000	Newtons
Max	Time	Min	Time
1047.9	55.8	-67.2	14.8

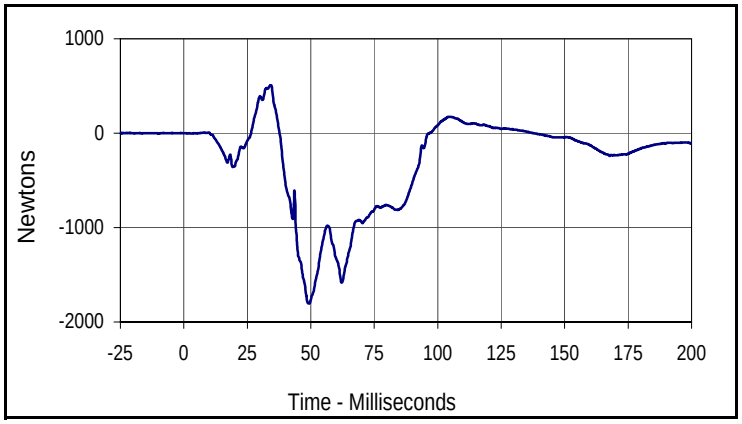


Curve Description			
Driver Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
012	FIL	600	Nm
Max	Time	Min	Time
58.4	64.8	-25.8	87.1

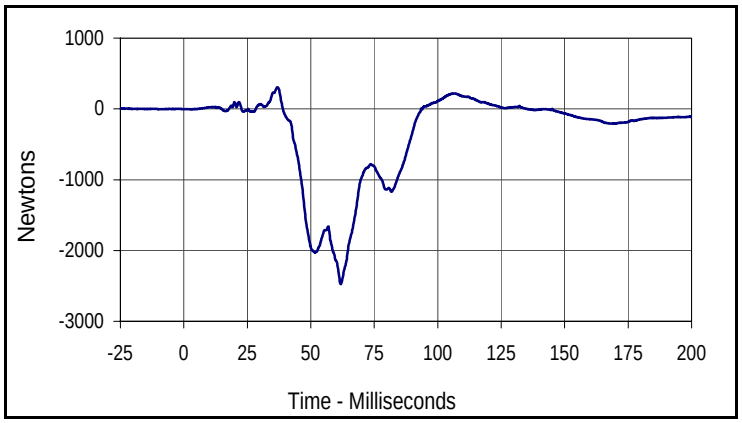


Curve Description			
Driver Nij			
Units	Type	Max	Time
Ntf	FIL	0.23	60.0
Units	Type	Max	Time
Nte	FIL	0.19	86.4
Units	Type	Max	Time
Ncf	FIL	0.12	116.0
Units	Type	Max	Time
Nce	FIL	0.12	218.4

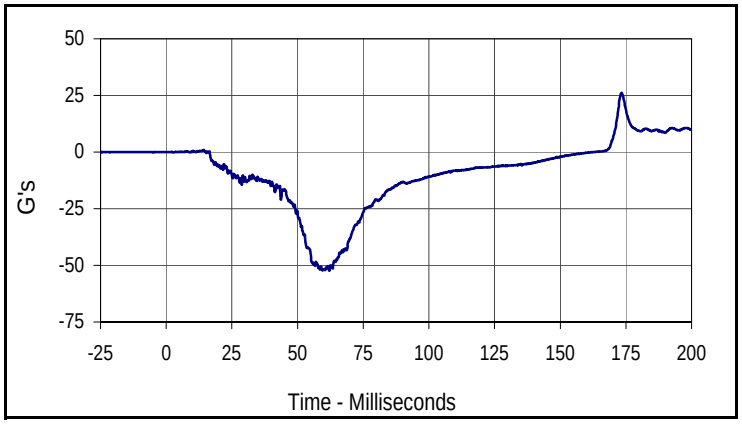
Test Vehicle:	2012 Ford Mustang 2-Door Coupe	Test Date:	10/12/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MC0210



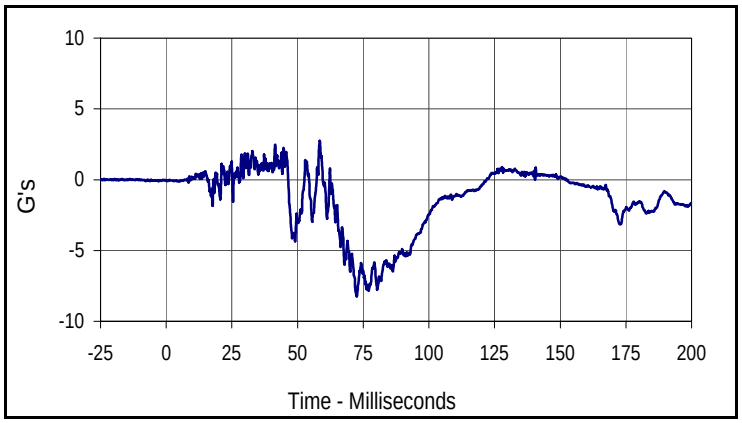
Curve Description			
Driver Left Femur Force Z			
Plot No.	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
507.6	34.3	-1804.6	49.2



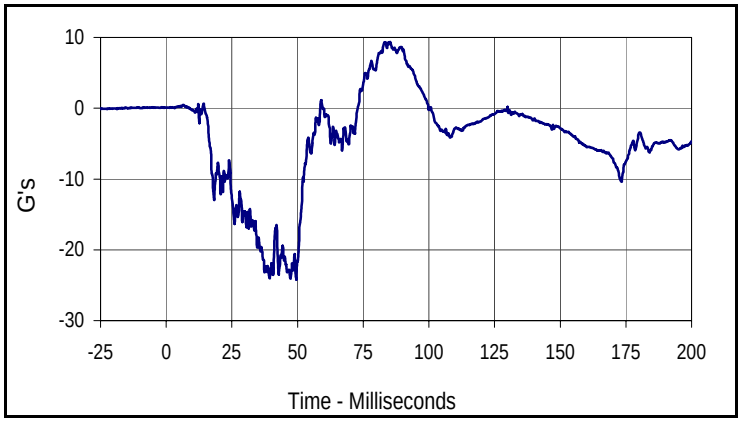
Curve Description			
Driver Right Femur Force Z			
Plot No.	Type	SAE Class	Units
014	FIL	600	Newtons
Max	Time	Min	Time
302.7	36.9	-2474.1	61.8



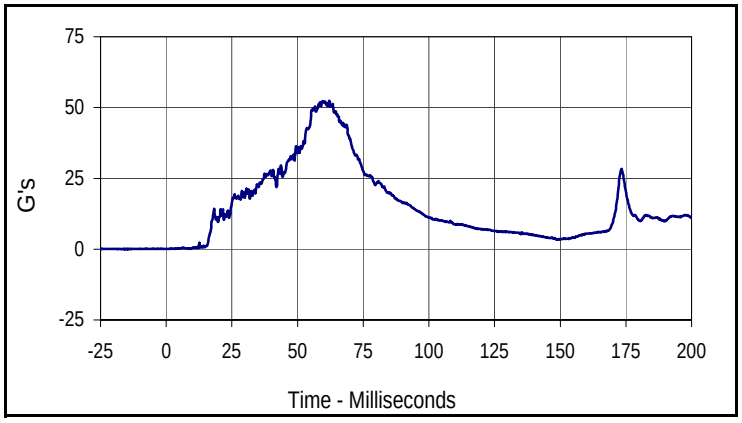
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
26.2	173.3	-52.4	62.1



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
2.8	58.5	-8.3	72.6

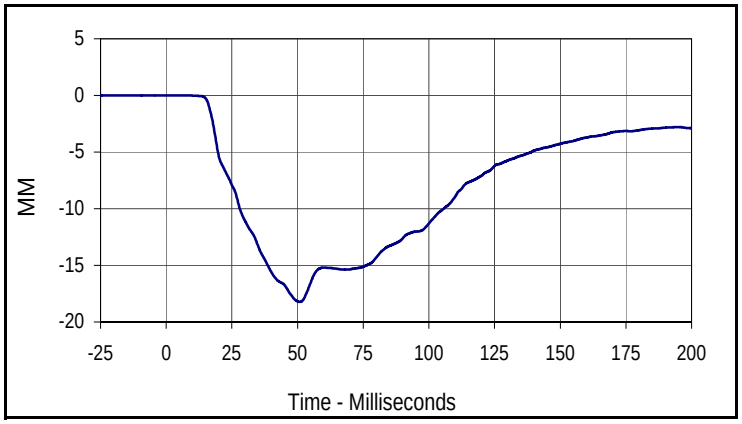


Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
9.4	85.3	-24.2	49.5

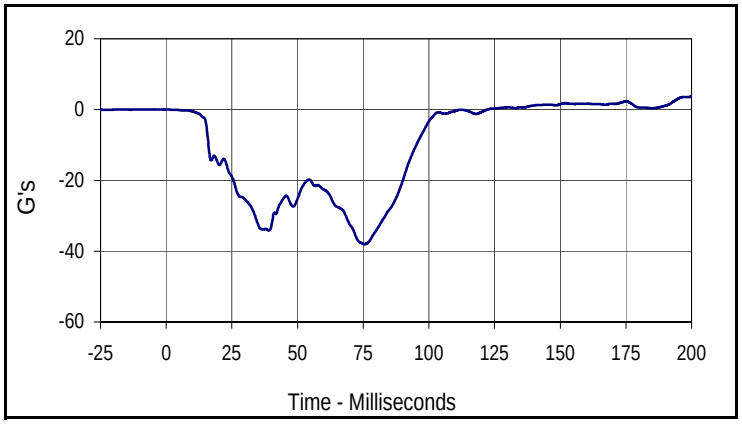


Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
018	RES	1000	G's
Max	Time	Min	Time
52.4	62.1	0.0	1.3

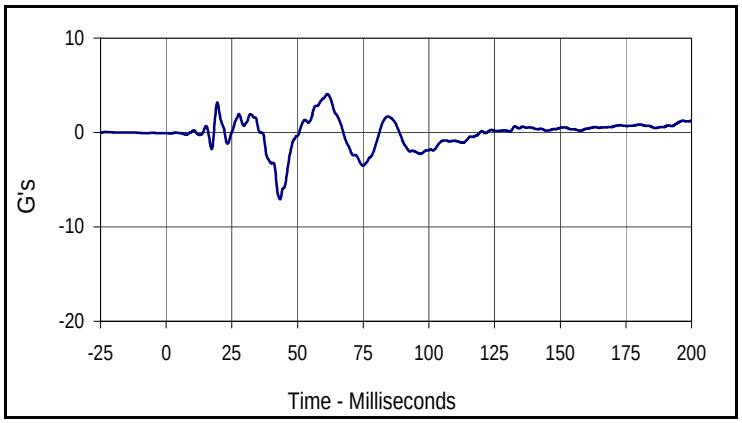
Test Vehicle:	2012 Ford Mustang 2-Door Coupe	Test Date:	10/12/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MC0210



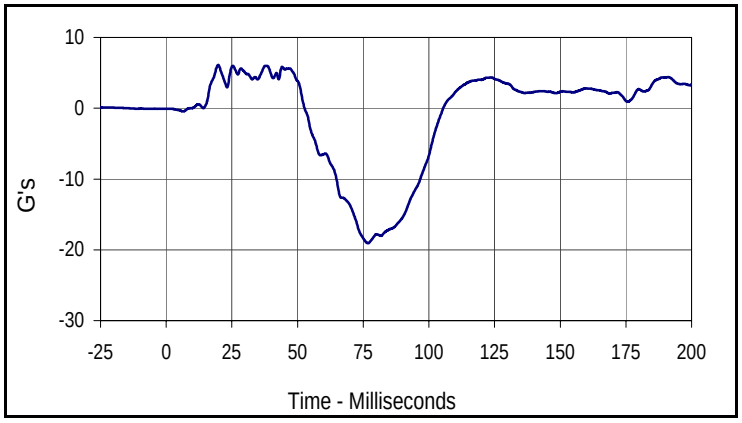
Curve Description			
Passenger Chest Deflection			
Plot No.	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
0.0	1.9	-18.2	50.7



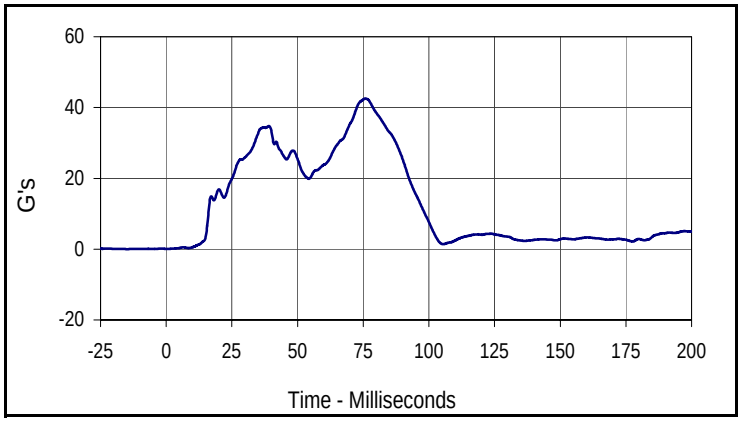
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
3.6	200.0	-38.0	75.5



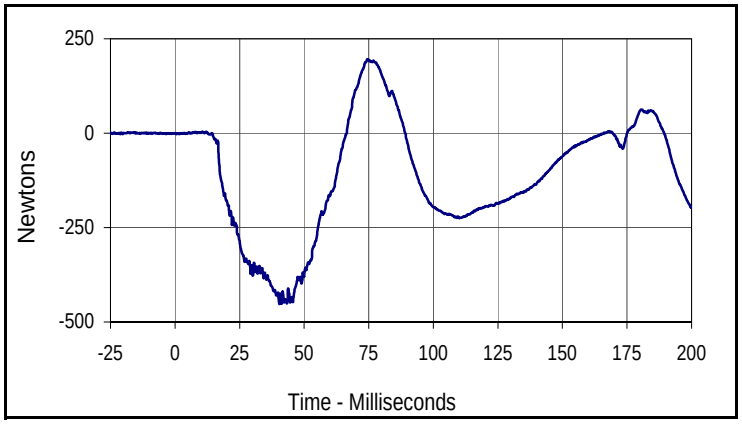
Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
4.1	61.3	-7.1	43.3



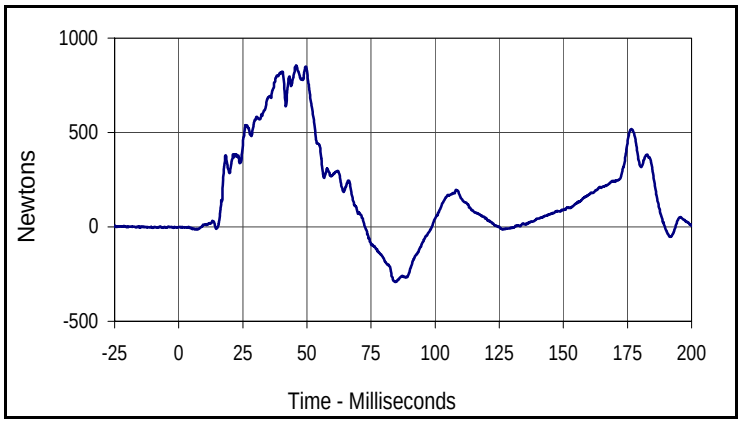
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
022	FIL	180	G's
Max	Time	Min	Time
6.1	19.8	-19.1	76.8



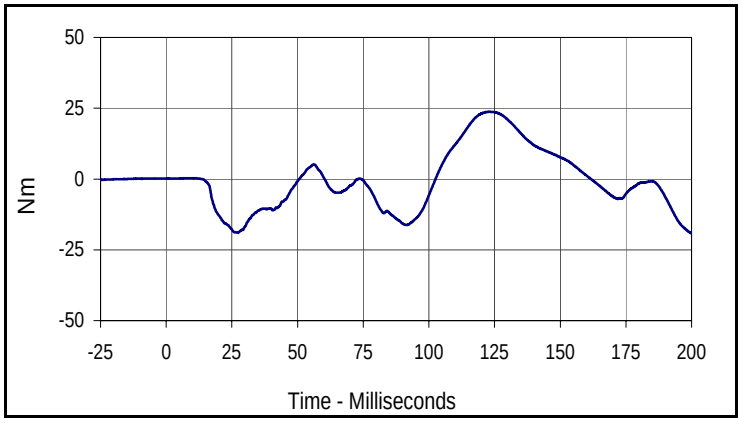
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
023	RES	180	G's
Max	Time	Min	Time
42.5	75.8	0.1	0.1



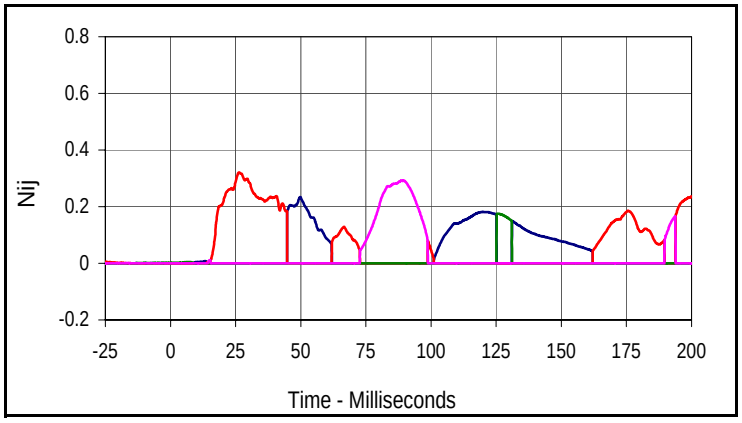
Curve Description			
Passenger Upper Neck Force X			
Plot No.	Type	SAE Class	Units
024	FIL	1000	Newtons
Max	Time	Min	Time
196.0	74.5	-452.8	40.4



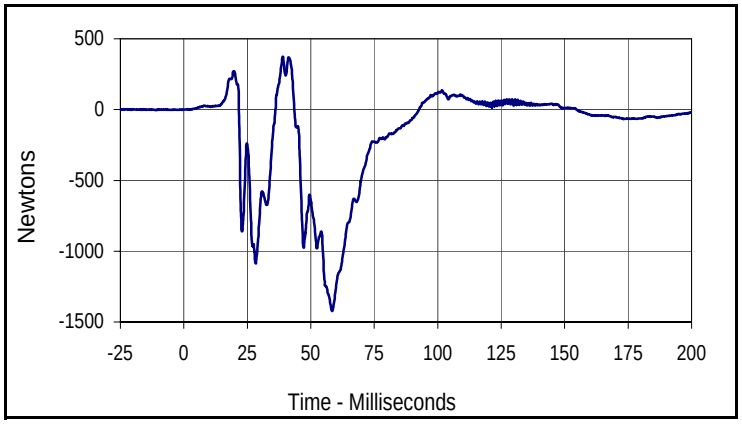
Curve Description			
Passenger Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
025	FIL	1000	Newtons
Max	Time	Min	Time
856.3	45.8	-291.9	84.4



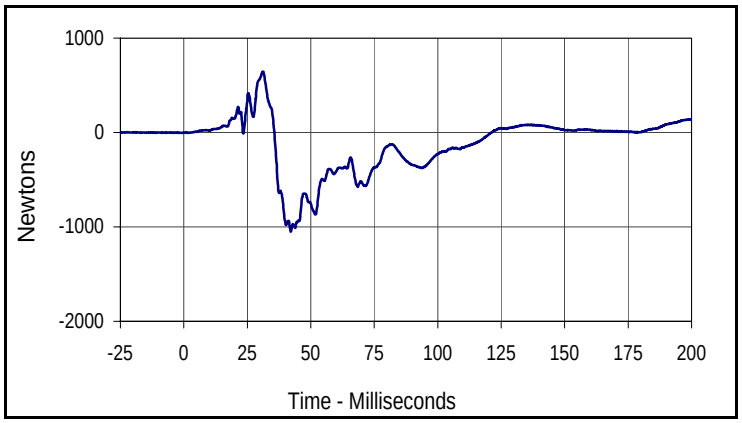
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
026	FIL	600	Nm
Max	Time	Min	Time
23.8	123.0	-19.2	200.0



Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.23	49.8
Units	Type	Max	Time
Nte	FIL	0.32	26.2
Units	Type	Max	Time
Ncf	FIL	0.17	125.8
Units	Type	Max	Time
Nce	FIL	0.29	89.5



Curve Description			
Passenger Left Femur Force Z			
Plot No.	Type	SAE Class	Units
027	FIL	600	Newtons
Max	Time	Min	Time
373.2	39.0	-1424.0	58.4



Curve Description			
Passenger Right Femur Force Z			
Plot No.	Type	SAE Class	Units
028	FIL	600	Newtons
Max	Time	Min	Time
643.7	31.2	-1050.9	42.1

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

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

Test Program: Hybrid III 50th Percentile Male Dummy Damage Checklist Test Date: 10/6/11

ATD Serial No.: 034 Test I.D.: N/A

Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

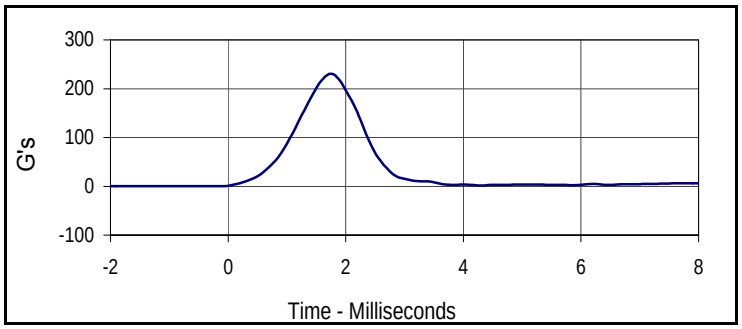
Test Program: Hybrid III 50th Percentile Male External Measurements Test Date: 10/6/11

ATD Serial No.: 034 Test I.D.: N/A

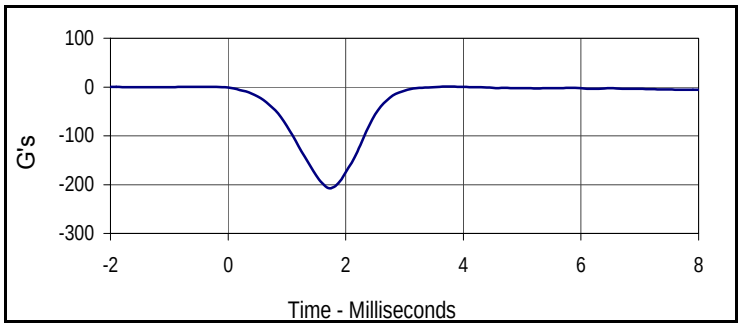
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.08	Pass
Laboratory Relative Humidity	%	10 to 70	29.0	Pass
A - Total sitting height	mm	879 to 889	883	Pass
B - Shoulder pivot height	mm	505 to 521	517	Pass
C - H point height	mm	84 to 89	86	Pass
D - H point location from backline	mm	135 to 140	137	Pass
E - Shoulder pivot from backline	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	149	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	298	Pass
H - Head back to backline	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	334	Pass
J - Elbow rest height	mm	190 to 211	207	Pass
K - Buttock to knee length	mm	579 to 604	589	Pass
L - Popliteal length	mm	429 to 455	437	Pass
M - Knee pivot height	mm	485 to 500	486	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	226	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	435	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference (with chest jacket)	mm	970 to 1001	986	Pass
Z - Waist circumference	mm	836 to 866	864	Pass
AA - Location for chest circumference	mm	429 to 434	432	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 50th Percentile Male Head Drop Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034HD019

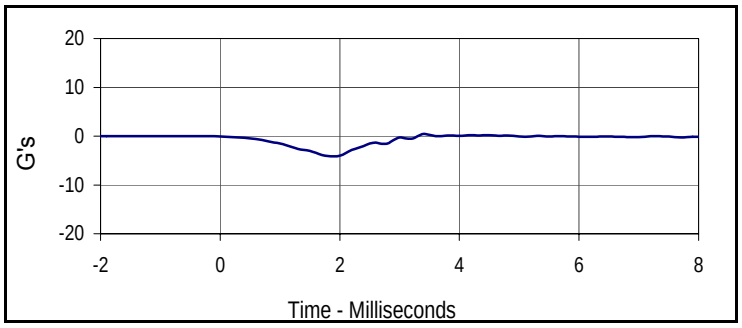
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	245	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.8	Pass
Peak Resultant Acceleration		G's	225.0 to 275.0	229.4	Pass
Peak Lateral Acceleration		G's	≤15.0	4.1	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	2.8	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
			Overall Test Results		Pass



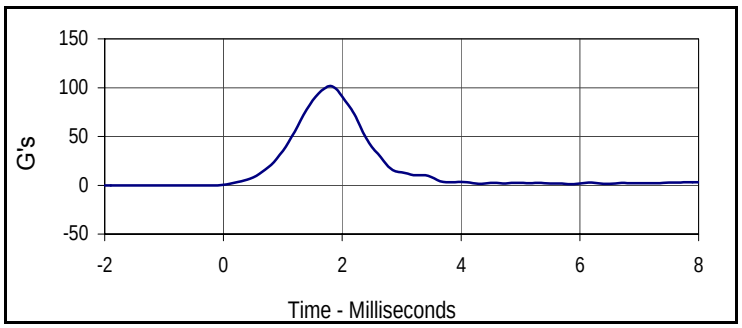
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
229.4	1.7	0.0	-0.5



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.9	3.7	-206.8	1.7



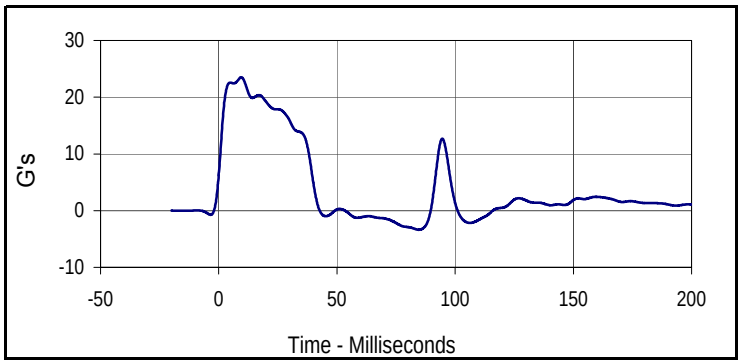
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.4	3.4	-4.1	1.9



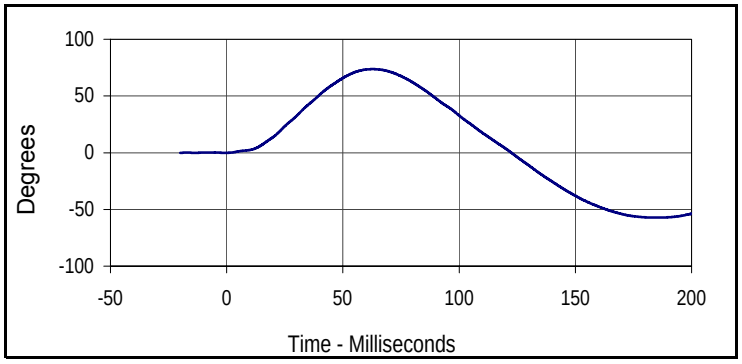
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
101.7	1.8	-0.1	-0.2

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034NF019

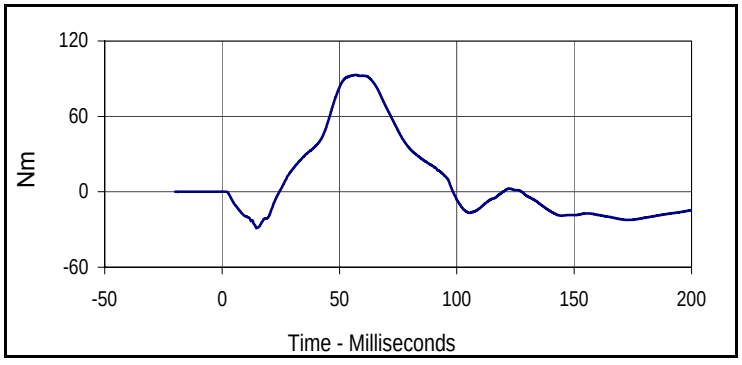
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	330	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.6	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.88	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.4	Pass
	20 Msec.	G's	17.6 to 22.6	19.2	Pass
	30 Msec.	G's	12.5 to 18.5	15.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	15.9	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	40	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	73.7	Pass
	Time	Msec.	57.0 to 64.0	62.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	122.5	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	93.0	Pass
	Time	Msec.	47.0 to 58.0	57.2	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.5	9.5	-3.4	84.6

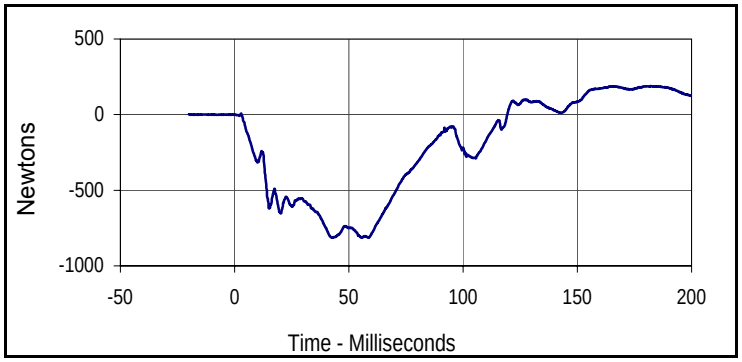


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
73.7	62.9	-57.3	185.1

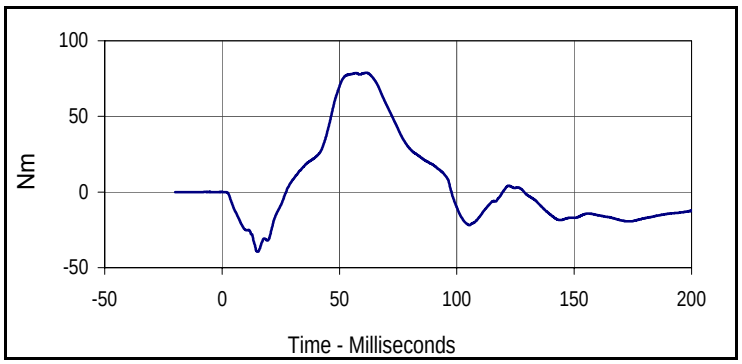


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
93.0	57.2	-28.9	14.6

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034NF019



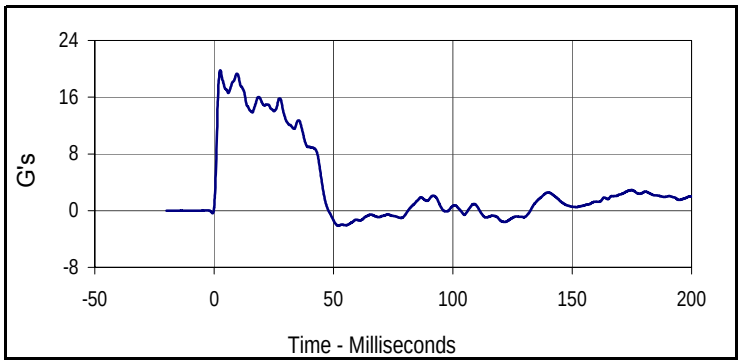
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
188.5	182.2	-814.3	55.8



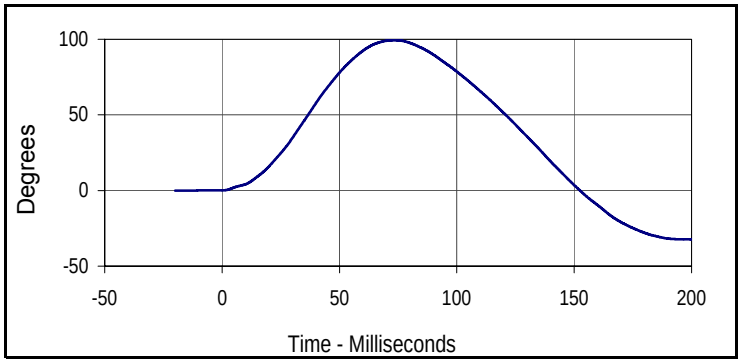
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
78.9	61.5	-39.5	15.2

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034NE019

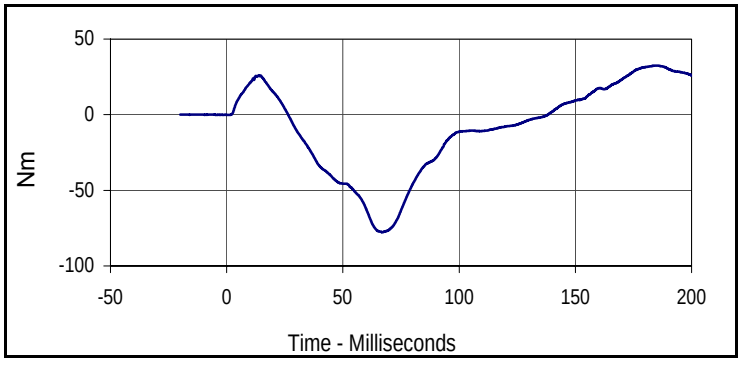
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	285	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.1	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.08	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.2	Pass
	20 Msec.	G's	14.0 to 19.0	15.3	Pass
	30 Msec.	G's	11.0 to 16.0	12.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	12.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	44.8	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	99.5	Pass
	Time	Msec.	72.0 to 82.0	73.3	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	152.5	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-77.7	Pass
	Time	Msec.	65.0 to 79.0	66.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	138.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
19.8	2.6	-2.1	52.0

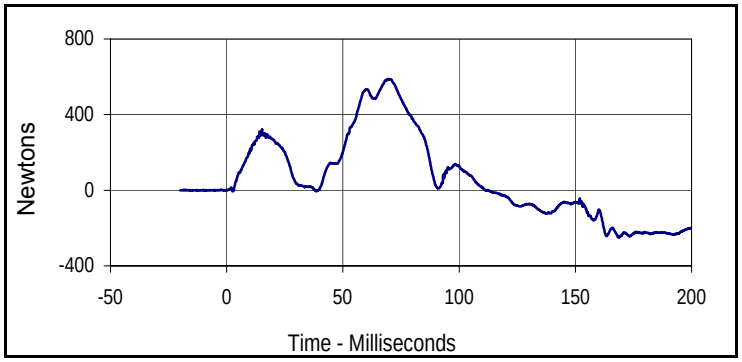


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
99.5	73.3	-32.3	196.5

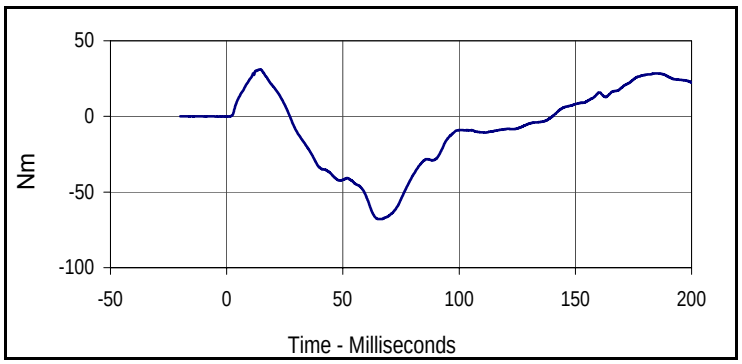


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
32.5	184.8	-77.7	66.9

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034NE019



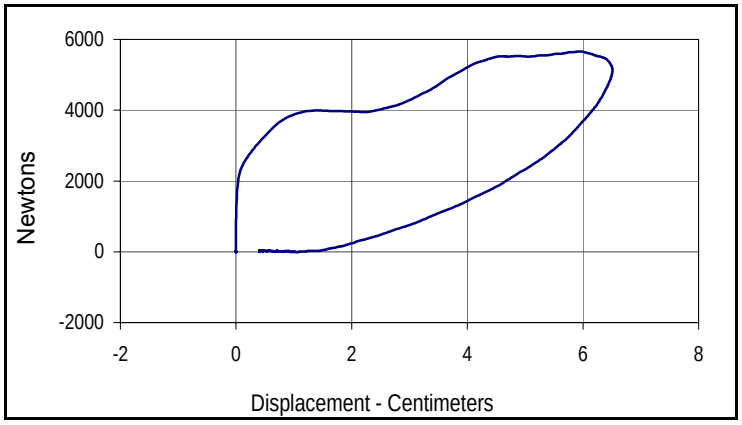
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
588.9	69.9	-250.3	168.6



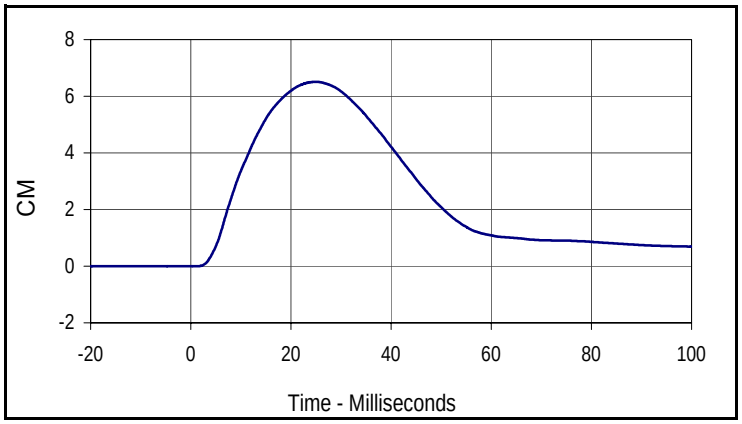
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
31.1	14.6	-67.9	66.7

Test Program:	Hybrid III 50th Percentile Male Thorax Impact Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034CH019

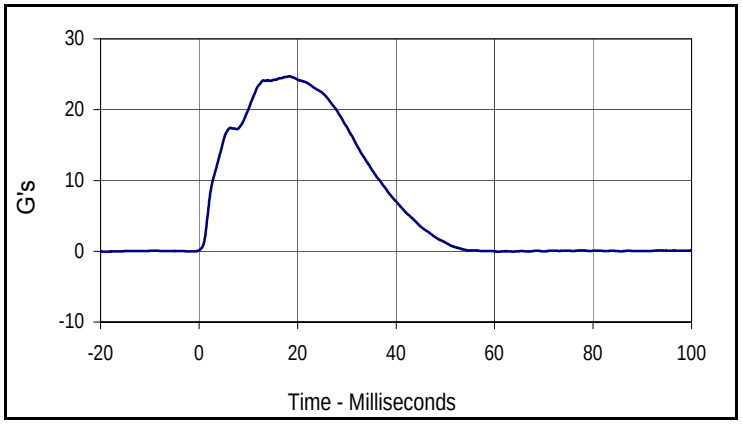
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	440	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.7	Pass
Probe Velocity		m/s	6.58 to 6.82	6.61	Pass
Peak Probe Force		Newtons	5159 to 5893	5659	Pass
Peak Sternum Deflection		CM	6.35 to 7.26	6.51	Pass
Internal Hysterysis		%	69 to 85	71.0	Pass
			Overall Test Results		Pass



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysterysis
001	FIL	180	71.0
Peak Probe Force		Peak Chest Deflection	
5659		6.51	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.5	25.0	0.0	1.1



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.7	18.4	-0.1	-19.0

Test Program:	Hybrid III 50th Percentile Male Knee Impact Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034LK019 , M034RK019

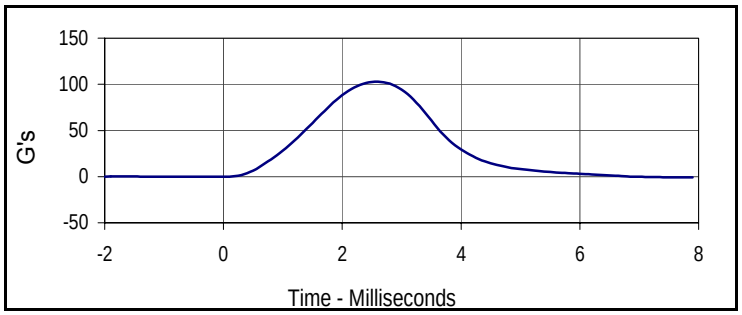
Left Knee

Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	385	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.3	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	4715 to 5782	5038	Pass
			Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5038	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5037.6	2.6	-39.0	7.8



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
103.0	2.6	-0.8	7.8

Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5037.9	2.3	-33.9	7.6

Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
103.0	2.3	-0.7	7.6

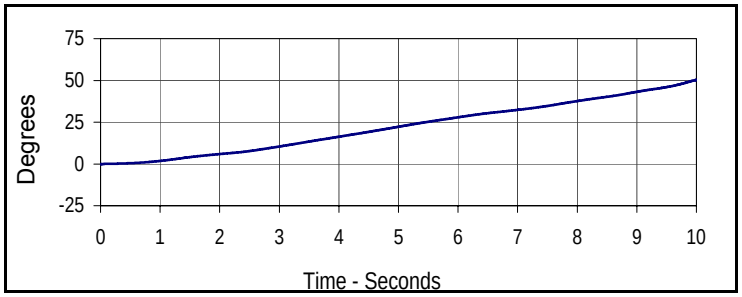
Test Program:	Hybrid III 50th Percentile Male Hip Joint-Femur Flexion Test	Test Date:	10/6/11
ATD Serial No.:	034	Test I.D.:	M034LF019 , M034RF019

Left Hip Joint-Femur Results

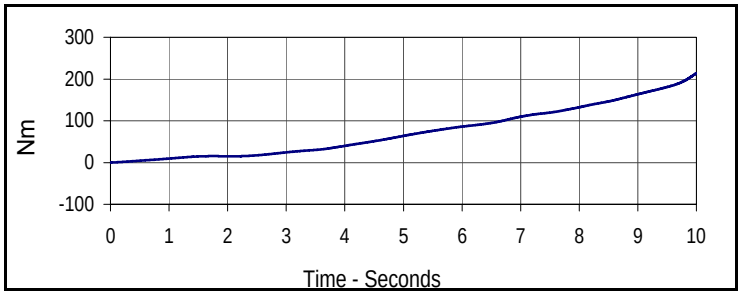
Tested Parameter		Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time		Minutes	≥240	395	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.4	Pass
Rotation Rate		deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°		Nm	≤ 95	92.7	Pass
Rotation at 203 Nm		Degrees	40.0 to 50.0	49.3	Pass
			Overall Test Results		Pass

Right Hip Joint-Femur Results

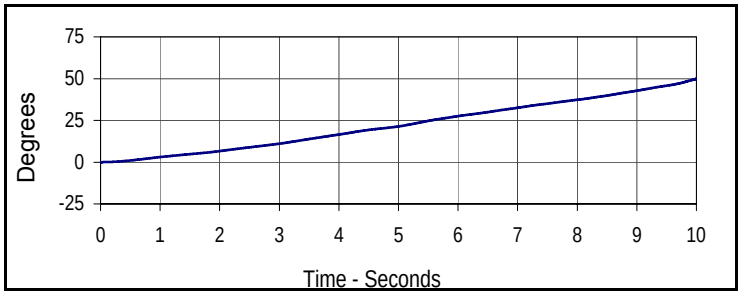
Rotation Rate	deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°	Nm	≤ 95	94.7	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.1	Pass
		Overall Test Results		Pass



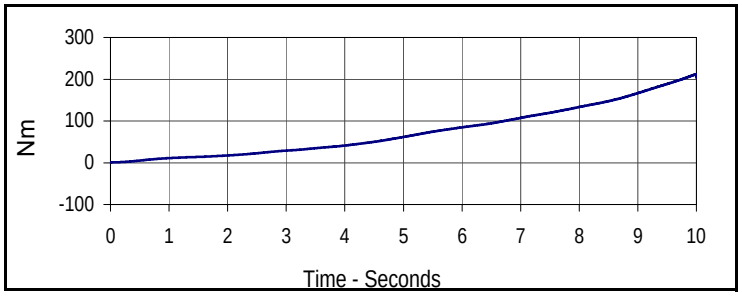
Curve Description			
Left Hip-Femur Rotation			
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
50.3	10.0	0.0	0.0



Curve Description			
Left Femur Torque			
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
213.7	10.0	0.2	0.0



Curve Description			
Right Hip-Femur Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.3	10.0	0.0	0.0



Curve Description			
Right Femur Torque			
Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
212.2	10.0	1.0	0.0

Test Program: Hybrid III 5th Percentile Female Dummy Damage Checklist Test Date: 10/11/11

ATD Serial No.: 141 Test I.D.: N/A

Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

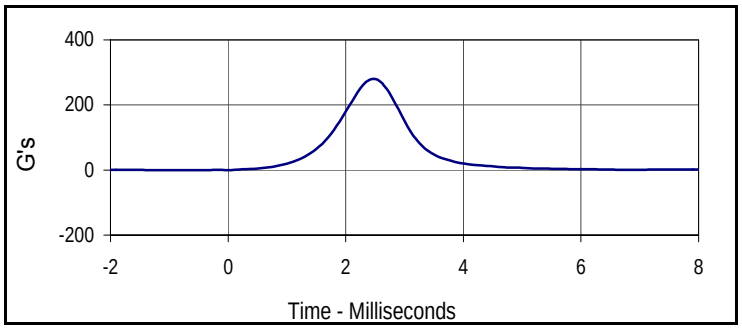
Test Program: Hybrid III 5th Percentile Female External Measurements Test Date: 10/11/11

ATD Serial No.: 141 Test I.D.: N/A

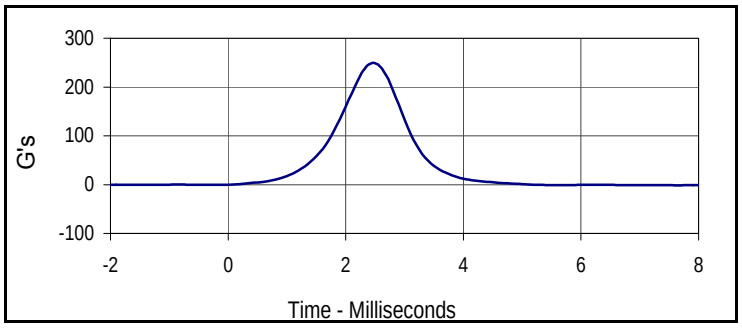
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.64	Pass
Laboratory Relative Humidity	%	10 to 70	29.9	Pass
A - Total sitting height	mm	774.7 to 800.1	775	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	450	Pass
C - H point height	mm	81.3 to 86.3	85	Pass
D - H point location from backline	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	126	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	43	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	286	Pass
J - Elbow rest height	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	531	Pass
L - Popliteal length	mm	355.6 to 376.0	375	Pass
M - Knee pivot height	mm	393.7 to 419.1	401	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	185	Pass
P - Foot length	mm	218.5 to 233.7	220	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	476	Pass
S - Head Breadth	mm	137.1 to 147.3	145	Pass
T - Head Depth	mm	177.8 to 188.0	180	Pass
U - Hip Breadth	mm	299.7 to 314.9	301	Pass
V - Shoulder breadth	mm	350.5 to 365.7	361	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	541	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	862	Pass
Z - Waist circumference	mm	759.5 to 789.9	765	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	165	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female Head Drop Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141HD020

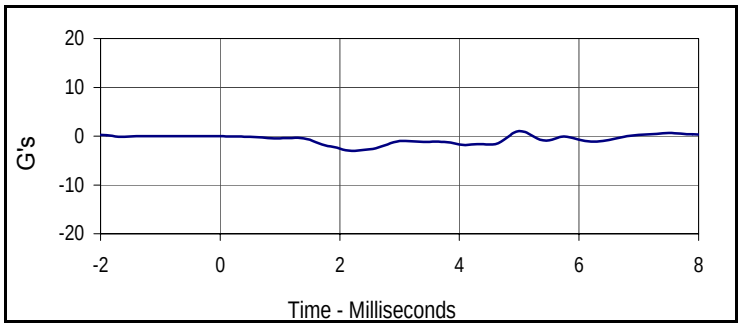
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	275	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Peak Resultant Acceleration		G's	250.0 to 300.0	279.9	Pass
Peak Lateral Acceleration		G's	≤15.0	3.0	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	0.9	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
			Overall Test Results		Pass



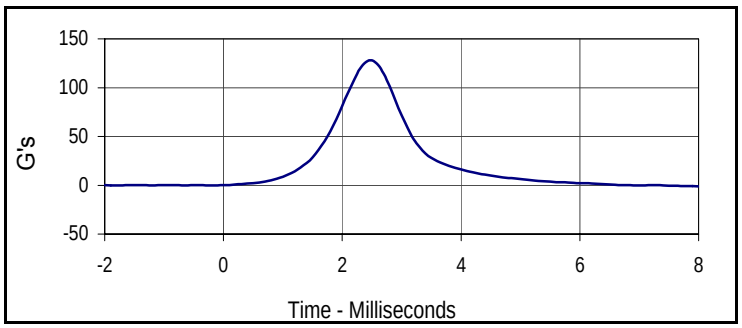
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
279.9	2.5	0.0	-1.3



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
249.0	2.5	-1.1	5.5



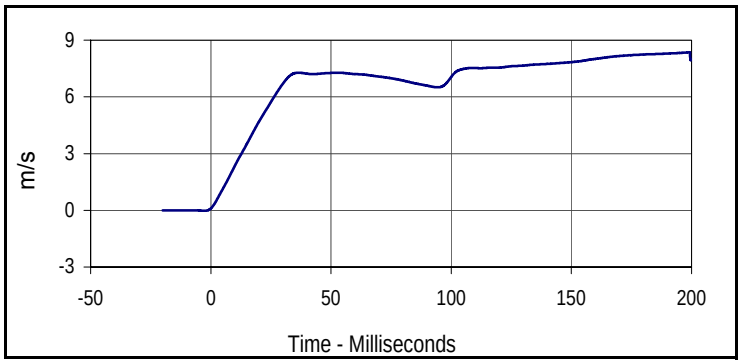
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
1.1	5.0	-3.0	2.2



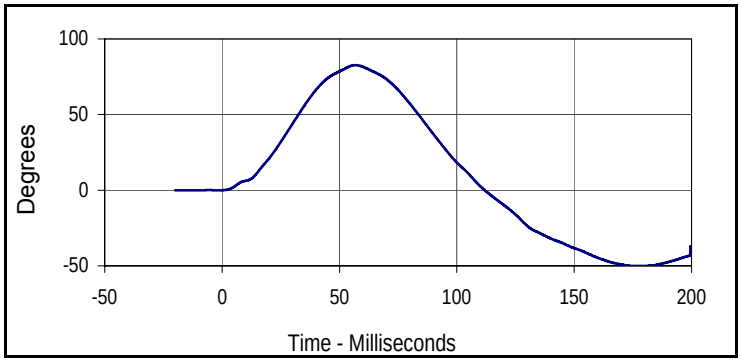
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
127.9	2.5	-0.1	-0.2

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141NF020

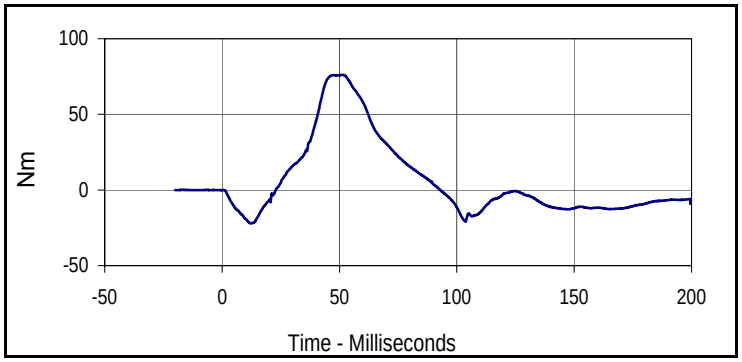
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	320	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.4	Pass
	20 Msec.	m/s	4.0 to 5.0	4.7	Pass
	30 Msec.	m/s	5.8 to 7.0	6.7	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	82.7	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	76.2	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	84.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
8.4	199.4	0.0	-2.7

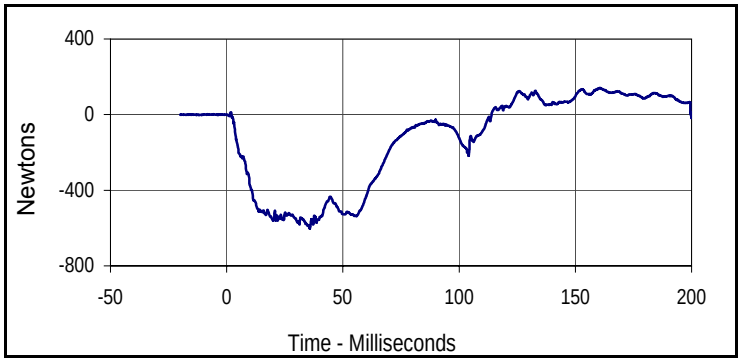


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
82.7	56.7	-50.3	176.2

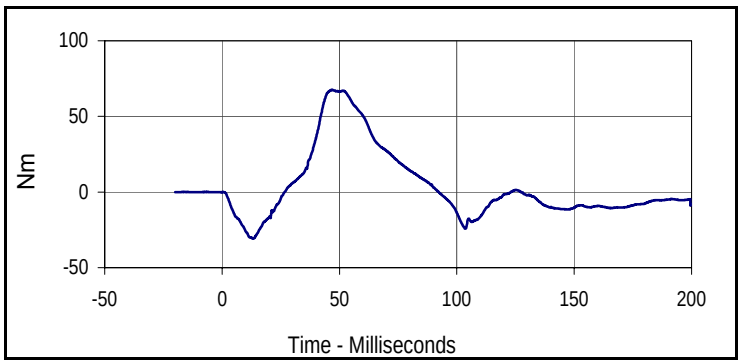


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
76.2	51.3	-22.0	12.3

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141NF020



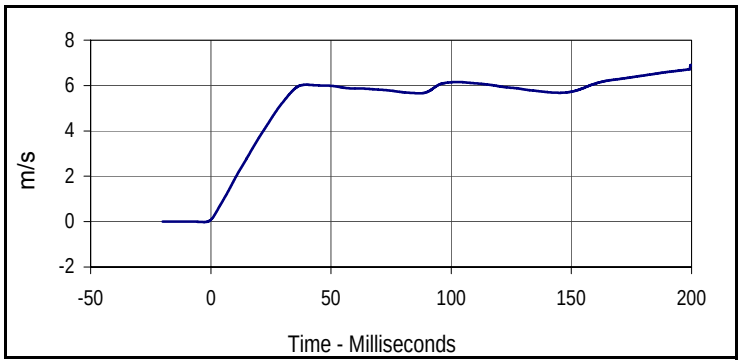
Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
141.6	160.4	-603.7	35.7



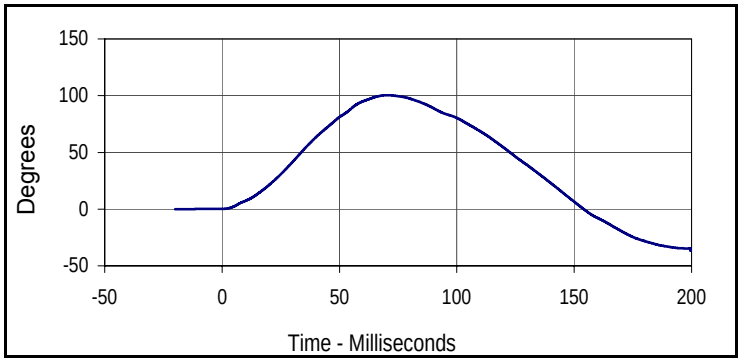
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
67.6	46.8	-30.7	13.1

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141NE020

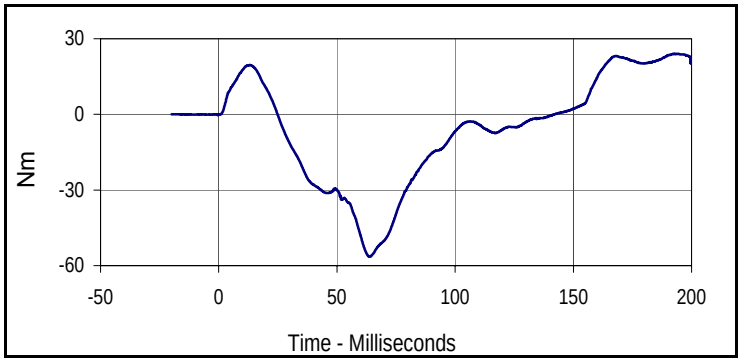
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.9	Pass
	20 Msec.	m/s	3.1 to 3.9	3.7	Pass
	30 Msec.	m/s	4.6 to 5.6	5.3	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	100.5	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-54.9	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	97.5	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.9	200.0	0.0	-2.8

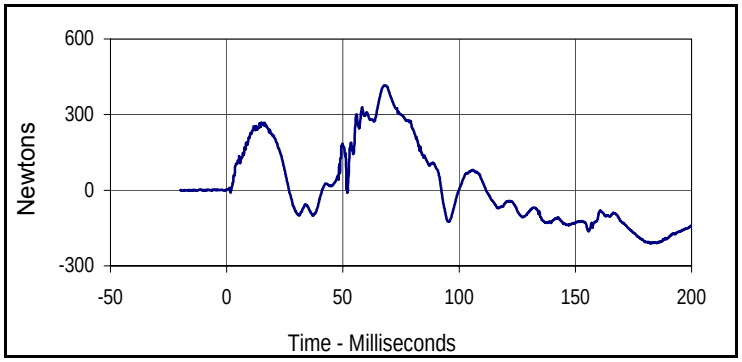


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
100.5	70.5	-36.6	199.5

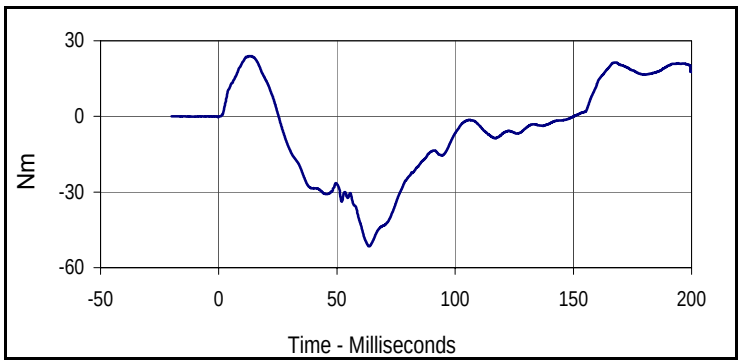


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
24.0	193.1	-56.4	63.9

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141NE020



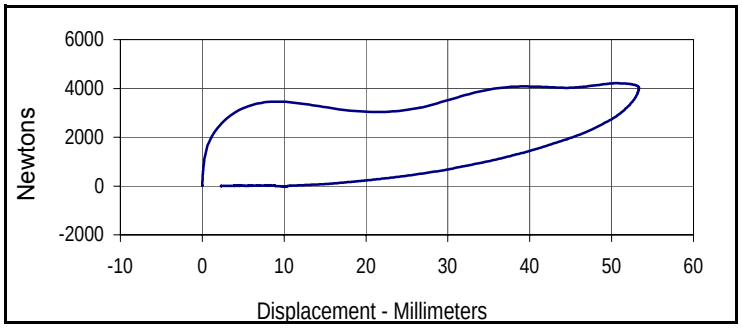
Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
416.4	68.1	-213.0	182.3



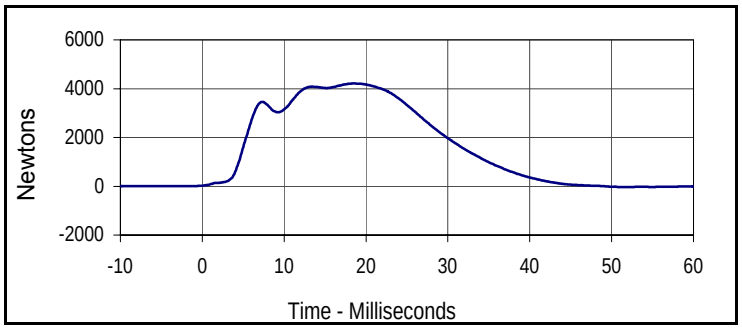
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
24.0	14.1	-51.5	63.5

Test Program:	Hybrid III 5th Percentile Female Thorax Impact Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141CH020

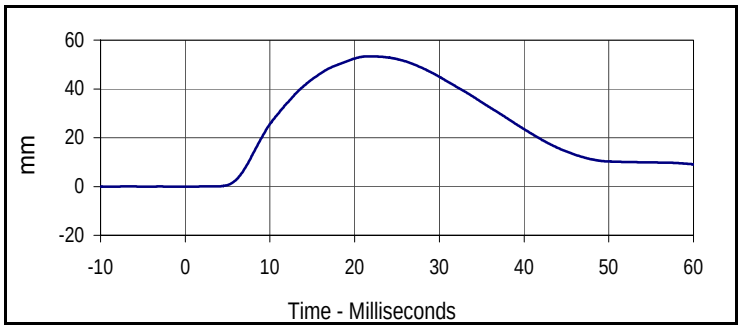
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	420	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Probe Velocity		m/s	6.59 to 6.83	6.64	Pass
Peak Chest Deflection		mm	50.0 to 58.0	53.4	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4205	Pass
Peak Force Between 18 and 50 MM		Newtons	≥4600	4211	Pass
Internal Hysterysis		%	69 to 85	75.1	Pass
			Overall Test Results		Pass



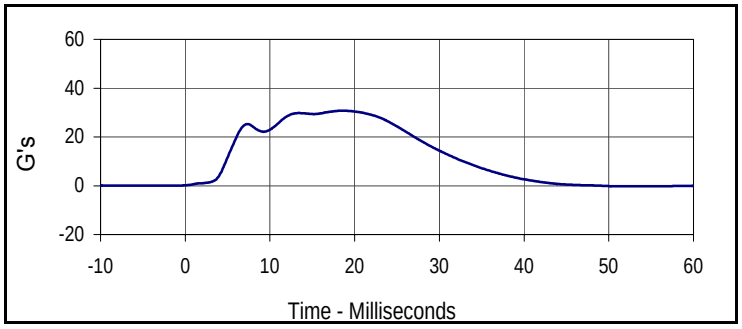
Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysterysis
001	FIL	180	75.1
Peak Probe Force		Peak Chest Deflection	
4210.8		53.4	



Curve Description			
Probe Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4210.8	18.5	-32.4	51.7



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
53.4	21.7	0.0	-1.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.7	18.5	-0.2	51.7

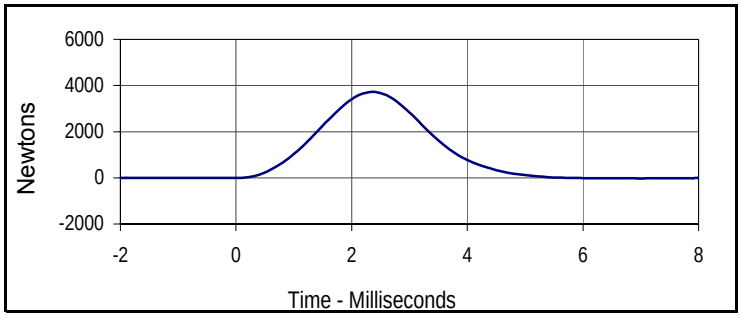
Test Program:	Hybrid III 5th Percentile Female Knee Impact Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141LK020 , F141LK020

Left Knee

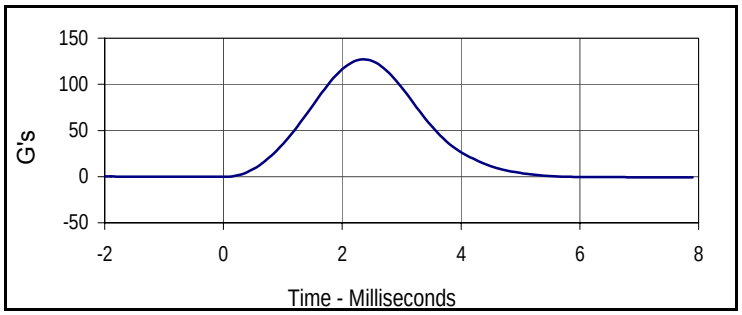
Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	450	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	3450 to 4060	3719	Pass
			Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.076	Pass
Peak Probe Force	Newtons	3450 to 4060	3680	Pass
		Overall Test Results		Pass

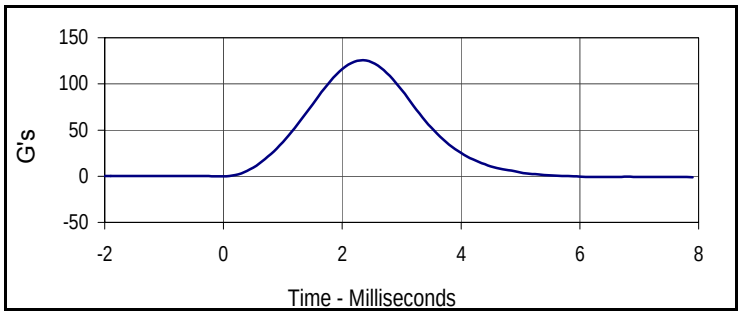


Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3719.5	2.4	-24.4	7.0



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
126.9	2.4	-0.8	7.0

Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3679.8	2.3	-29.4	7.9



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
125.5	2.3	-1.0	7.9

Test Program:	Hybrid III 5th Percentile Female Torso Flexion Test	Test Date:	10/11/11
ATD Serial No.:	141	Test I.D.:	F141TF020

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	485	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Initial Reference Plane Angle		Degrees	≤ 20	8.6	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	337.4	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	0.7	Pass
Final Reference Plane Angle		Degrees	+/-8	4.5	Pass
			Overall Test Results		Pass

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

Test Program: Hybrid III 50th Percentile Male Dummy Damage Checklist Test Date: 10/14/11

ATD Serial No.: 034 Test I.D.: N/A

Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

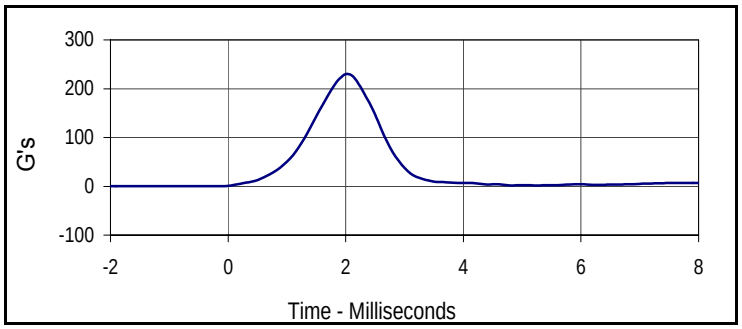
Test Program: Hybrid III 50th Percentile Male External Measurements Test Date: 10/14/11

ATD Serial No.: 034 Test I.D.: N/A

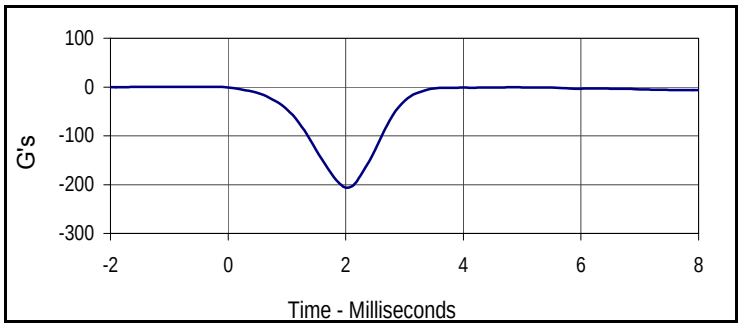
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.24	Pass
Laboratory Relative Humidity	%	10 to 70	29.9	Pass
A - Total sitting height	mm	879 to 889	883	Pass
B - Shoulder pivot height	mm	505 to 521	516	Pass
C - H point height	mm	84 to 89	86	Pass
D - H point location from backline	mm	135 to 140	136	Pass
E - Shoulder pivot from backline	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	149	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	299	Pass
H - Head back to backline	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	334	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	589	Pass
L - Popliteal length	mm	429 to 455	437	Pass
M - Knee pivot height	mm	485 to 500	486	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	226	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	434	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference (with chest jacket)	mm	970 to 1001	985	Pass
Z - Waist circumference	mm	836 to 866	864	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 50th Percentile Male Head Drop Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034HD020

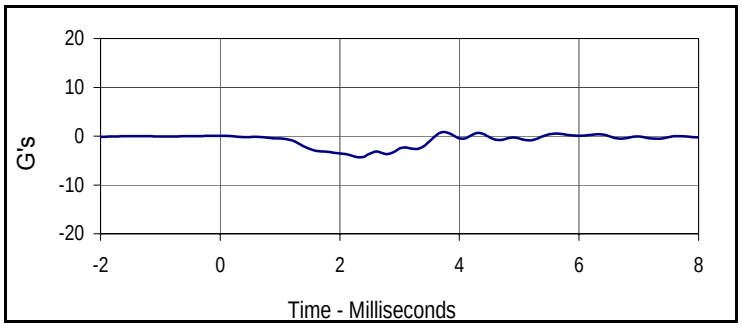
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	245	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Peak Resultant Acceleration		G's	225.0 to 275.0	229.7	Pass
Peak Lateral Acceleration		G's	≤15.0	4.3	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	3.1	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
			Overall Test Results		Pass



Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
229.7	2.0	0.1	-1.6



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	-0.2	-206.0	2.0

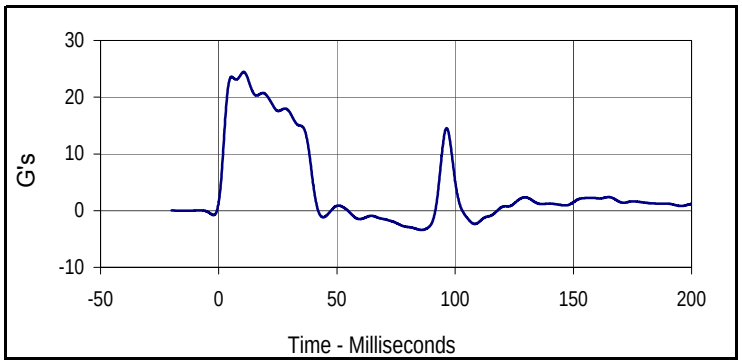


Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.8	3.7	-4.3	2.3

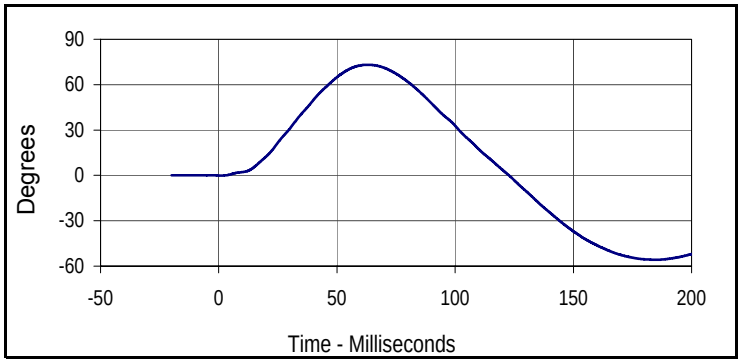
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
101.6	2.0	-0.1	-0.2

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034NF020

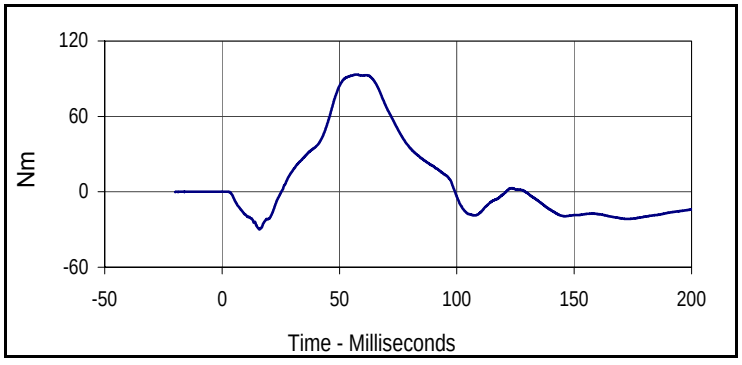
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	335	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.7	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.89	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	24.3	Pass
	20 Msec.	G's	17.6 to 22.6	20.4	Pass
	30 Msec.	G's	12.5 to 18.5	17.3	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.3	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	39.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	73.1	Pass
	Time	Msec.	57.0 to 64.0	62.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	122.8	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	93.4	Pass
	Time	Msec.	47.0 to 58.0	56.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	99.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.4	10.5	-3.4	85.7

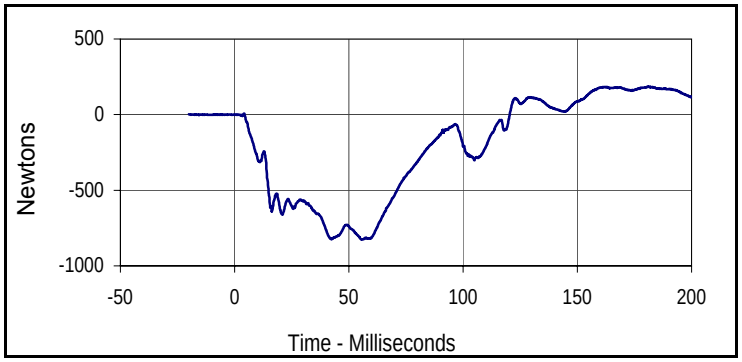


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
73.1	62.9	-55.7	185.0

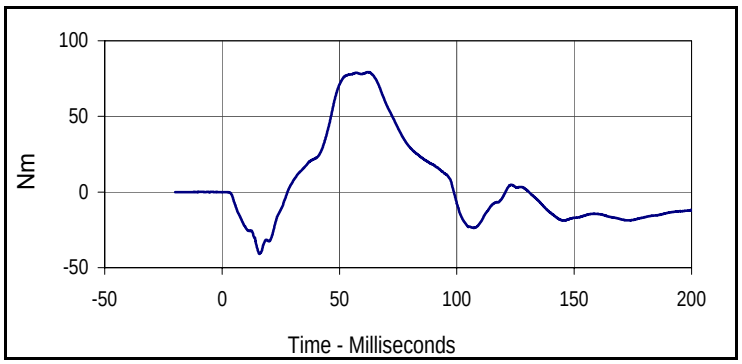


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
93.4	56.9	-30.1	15.9

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034NF020



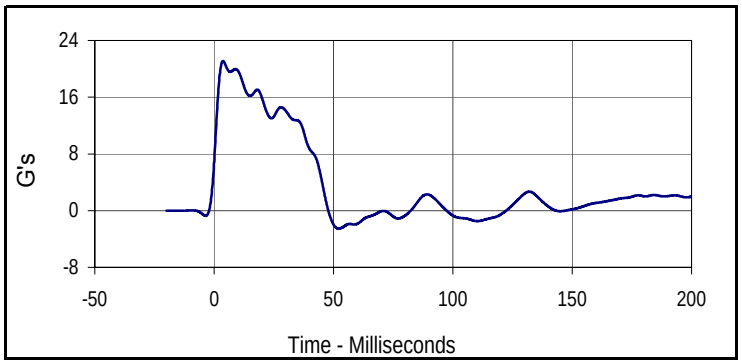
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
185.4	181.3	-826.0	55.5



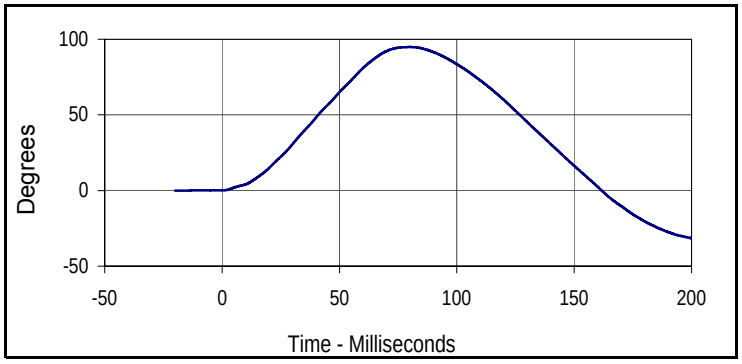
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
79.3	62.0	-40.9	15.9

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034NE020

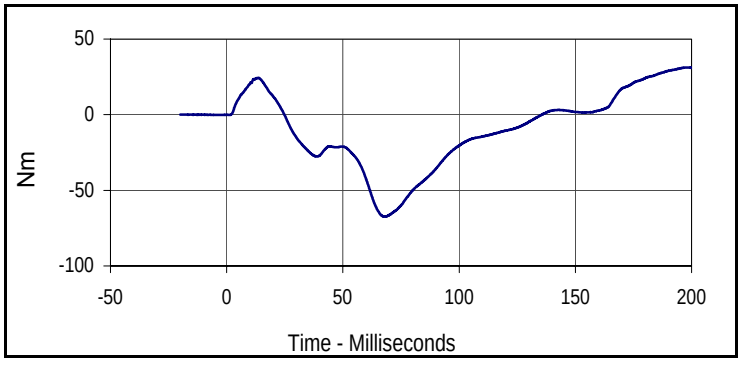
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	295	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.4	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.7	Pass
	20 Msec.	G's	14.0 to 19.0	15.9	Pass
	30 Msec.	G's	11.0 to 16.0	14.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	44.7	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	94.8	Pass
	Time	Msec.	72.0 to 82.0	80.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	161.8	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-67.4	Pass
	Time	Msec.	65.0 to 79.0	68.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	135.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
21.1	3.7	-2.5	52.2

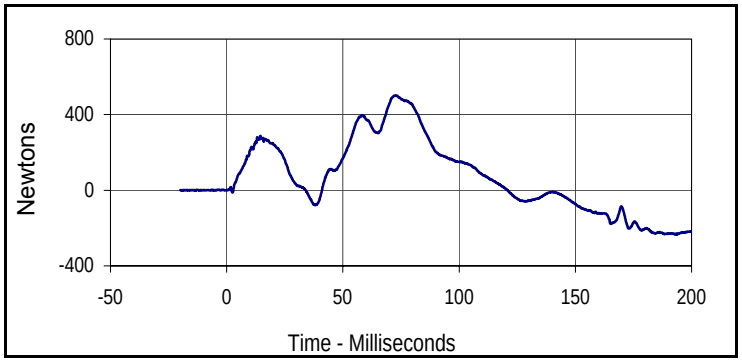


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
94.8	80.0	-31.5	200.0

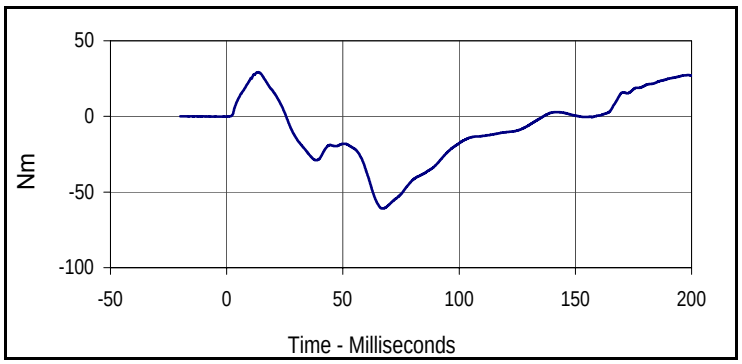


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
31.2	198.3	-67.4	68.1

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034NE020



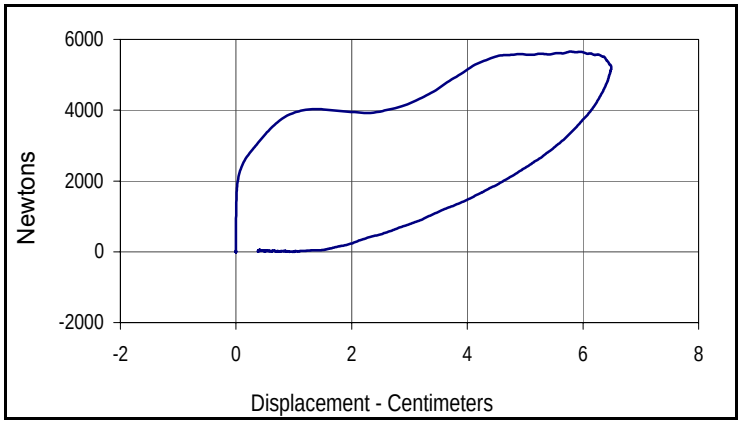
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
501.2	72.1	-234.1	192.8



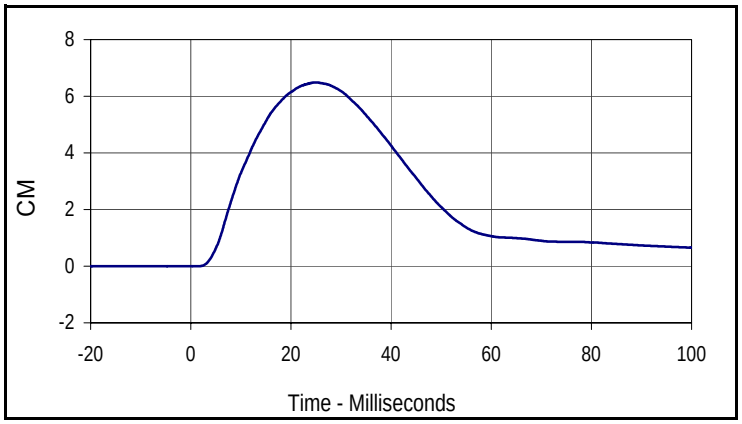
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
29.2	13.5	-60.8	67.4

Test Program:	Hybrid III 50th Percentile Male Thorax Impact Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034CH020

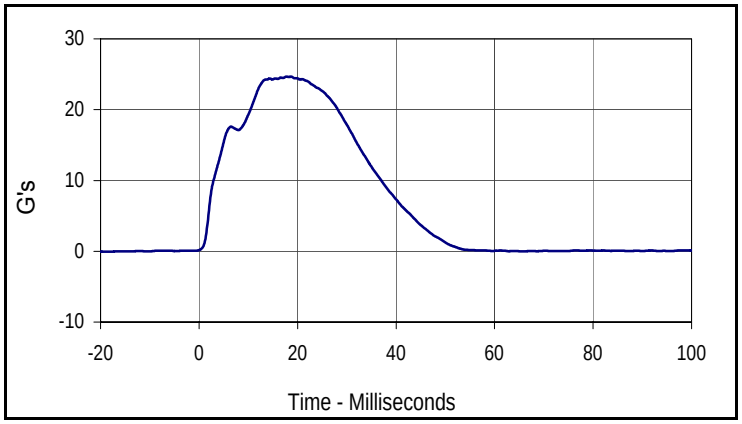
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	450	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.2	Pass
Probe Velocity		m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force		Newtons	5159 to 5893	5653	Pass
Peak Sternum Deflection		CM	6.35 to 7.26	6.49	Pass
Internal Hysterysis		%	69 to 85	70.6	Pass
			Overall Test Results		Pass



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysterysis
001	FIL	180	70.6
Peak Probe Force		Peak Chest Deflection	
5653		6.49	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.5	24.9	0.0	1.4



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.7	17.7	-0.1	-20.0

Test Program:	Hybrid III 50th Percentile Male Knee Impact Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034LK020 , M034RK020

Left Knee

Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	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	29.6	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force		Newtons	4715 to 5782	5027	Pass
			Overall Test Results		Pass

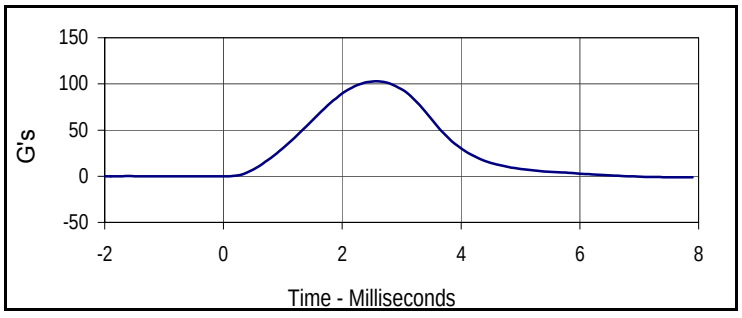
Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5031	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5027.3	2.5	-50.9	7.9

Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
102.7	2.5	-1.0	7.9

Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5030.6	2.6	-49.8	7.6



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
102.8	2.6	-1.0	7.6

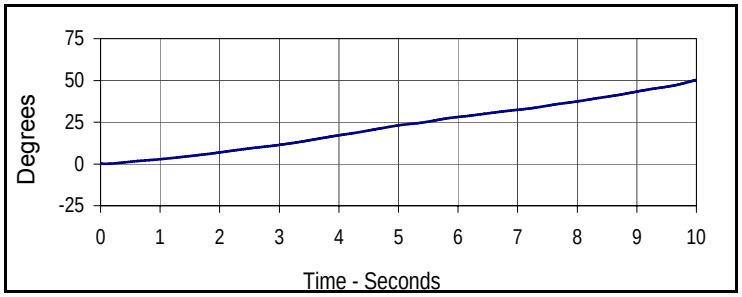
Test Program:	Hybrid III 50th Percentile Male Hip Joint-Femur Flexion Test	Test Date:	10/14/11
ATD Serial No.:	034	Test I.D.:	M034LF020 , M034RF020

Left Hip Joint-Femur Results

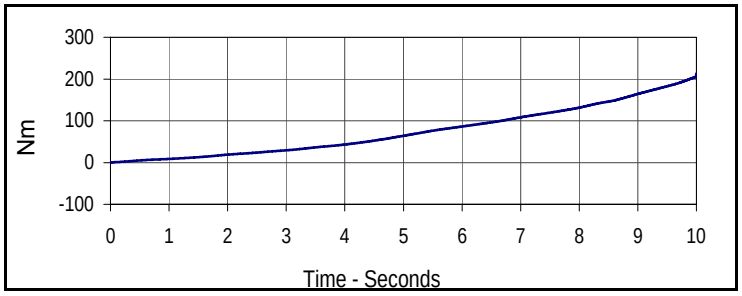
Tested Parameter		Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time		Minutes	≥240	405	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.6	Pass
Rotation Rate		deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°		Nm	≤ 95	95.0	Pass
Rotation at 203 Nm		Degrees	40.0 to 50.0	49.8	Pass
			Overall Test Results		Pass

Right Hip Joint-Femur Results

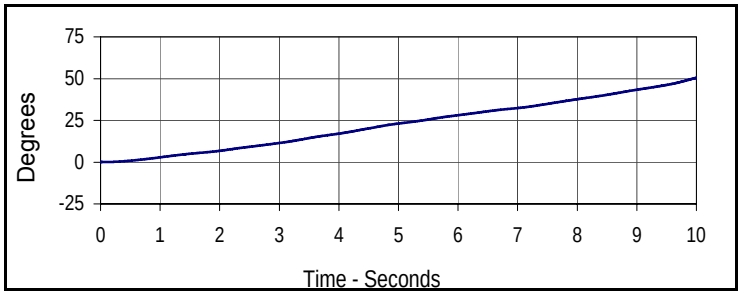
Rotation Rate	deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°	Nm	≤ 95	91.9	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	49.9	Pass
		Overall Test Results		Pass



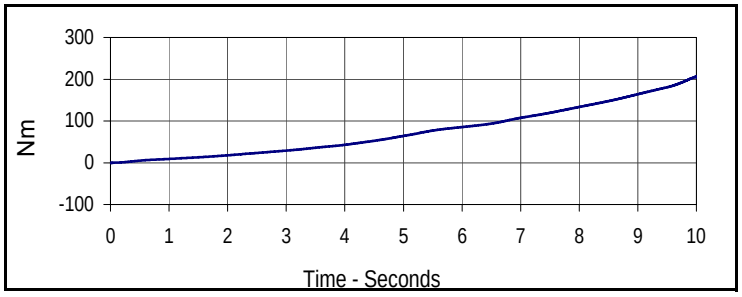
Curve Description			
Hip Rotation			
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
50.3	10.0	0.0	0.0



Curve Description			
Right Femur Force Z			
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
213.7	10.0	0.4	0.0



Curve Description			
Hip Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.4	10.0	0.0	0.0



Curve Description			
Right Femur Force Z			
Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
206.5	10.0	-0.1	0.0

Test Program: Hybrid III 5th Percentile Female Dummy Damage Checklist Test Date: 10/13/11

ATD Serial No.: 141 Test I.D.: N/A

Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

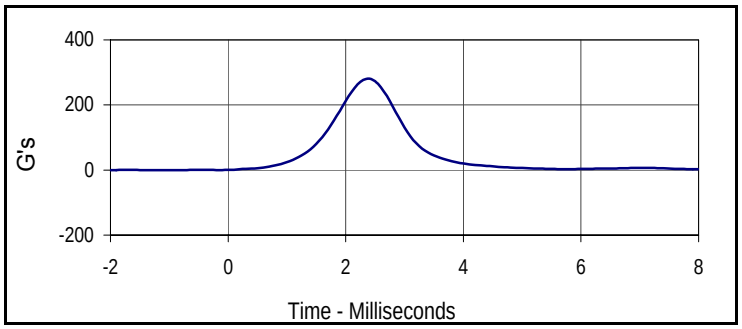
Test Program: Hybrid III 5th Percentile Female External Measurements Test Date: 10/13/11

ATD Serial No.: 141 Test I.D.: N/A

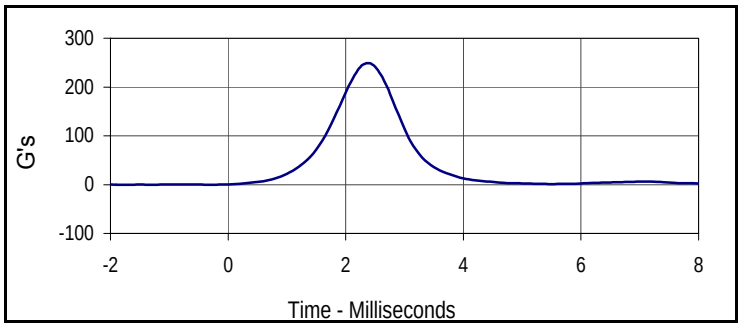
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.67	Pass
Laboratory Relative Humidity	%	10 to 70	29.9	Pass
A - Total sitting height	mm	774.7 to 800.1	775	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	450	Pass
C - H point height	mm	81.3 to 86.3	85	Pass
D - H point location from backline	mm	144.8 to 149.8	145	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	125	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	44	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	530	Pass
L - Popliteal length	mm	355.6 to 376.0	375	Pass
M - Knee pivot height	mm	393.7 to 419.1	400	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	185	Pass
P - Foot length	mm	218.5 to 233.7	220	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	Pass
S - Head Breadth	mm	137.1 to 147.3	145	Pass
T - Head Depth	mm	177.8 to 188.0	180	Pass
U - Hip Breadth	mm	299.7 to 314.9	300	Pass
V - Shoulder breadth	mm	350.5 to 365.7	360	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	540	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	860	Pass
Z - Waist circumference	mm	759.5 to 789.9	765	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	165	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female Head Drop Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141HD022

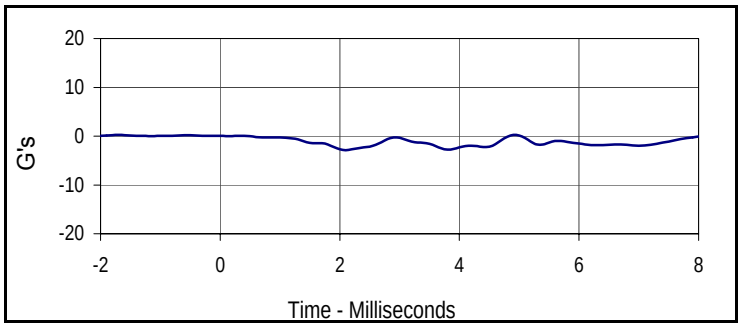
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	260	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Peak Resultant Acceleration		G's	250.0 to 300.0	280.7	Pass
Peak Lateral Acceleration		G's	≤15.0	2.9	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	2.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
			Overall Test Results		Pass



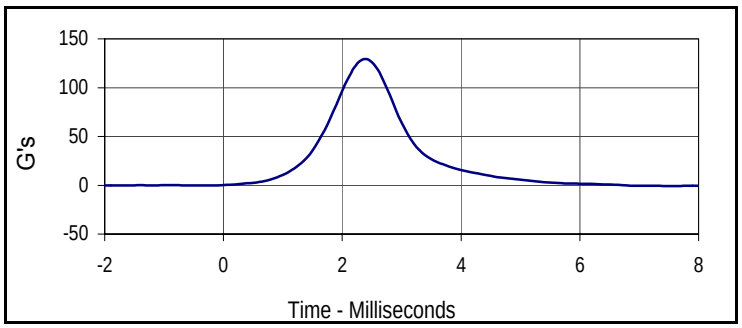
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
280.7	2.4	0.1	-1.1



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
249.0	2.4	-0.1	-0.3



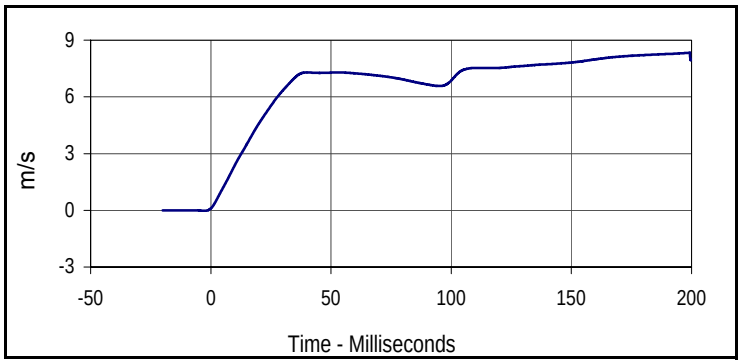
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.2	-1.7	-2.9	2.1



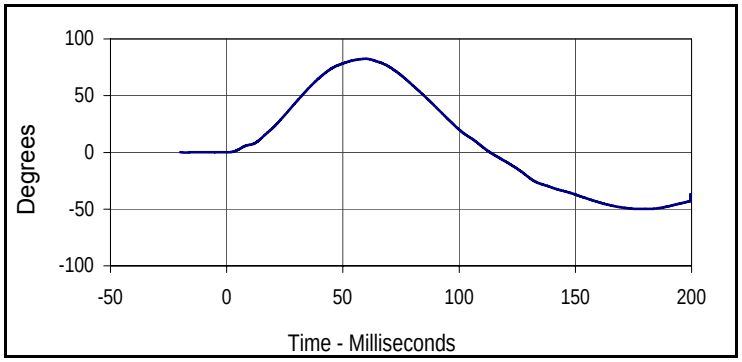
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
129.4	2.4	-0.1	-1.7

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141NF022

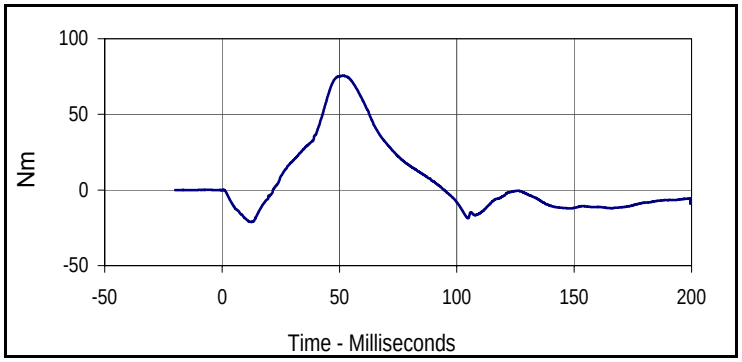
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	420	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	27.5	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.4	Pass
	20 Msec.	m/s	4.0 to 5.0	4.6	Pass
	30 Msec.	m/s	5.8 to 7.0	6.3	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	82.5	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	75.7	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	84.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
8.3	199.4	0.0	-2.7



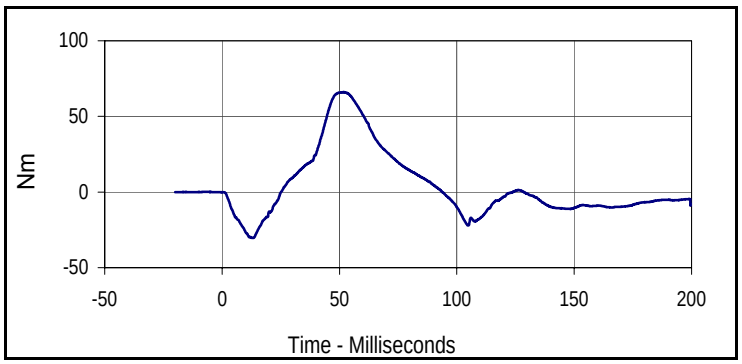
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
82.5	59.7	-49.9	178.9



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
75.7	51.8	-21.2	12.5

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141NF022

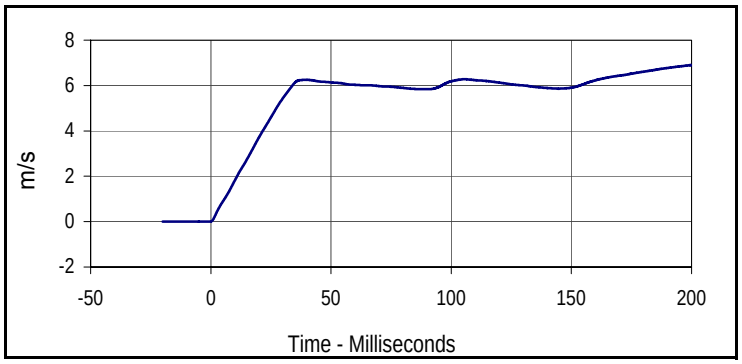
Curve Description			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
126.8	160.7	-682.6	39.7



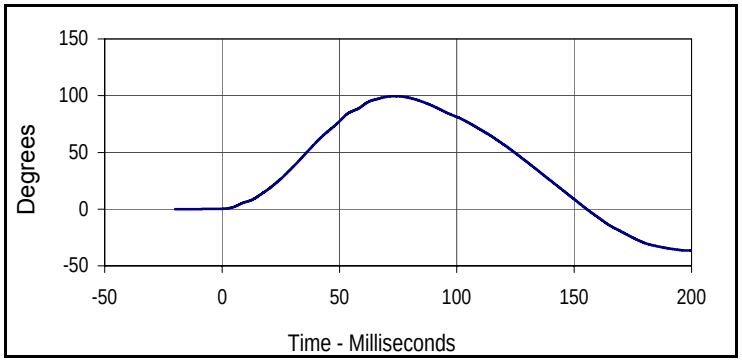
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
66.2	51.7	-30.4	13.1

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141NE022

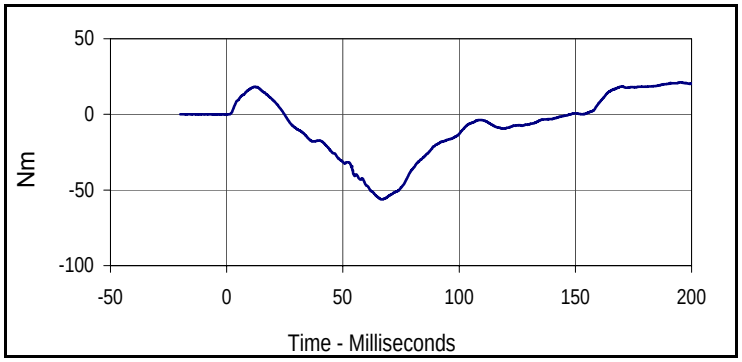
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	450	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.4	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.14	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.7	Pass
	30 Msec.	m/s	4.6 to 5.6	5.4	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	99.5	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-53.7	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	101.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.9	200.0	0.0	-0.6

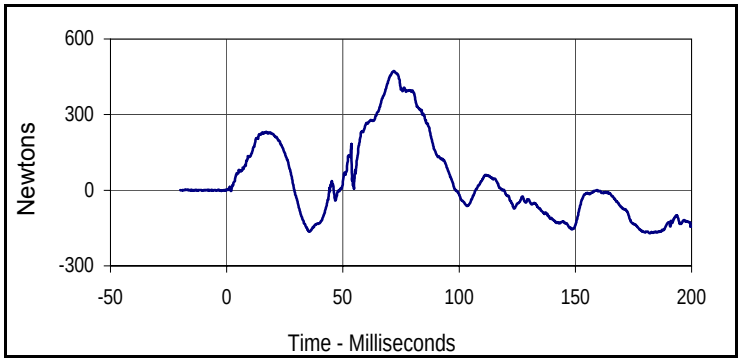


Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
99.5	73.6	-36.6	199.5

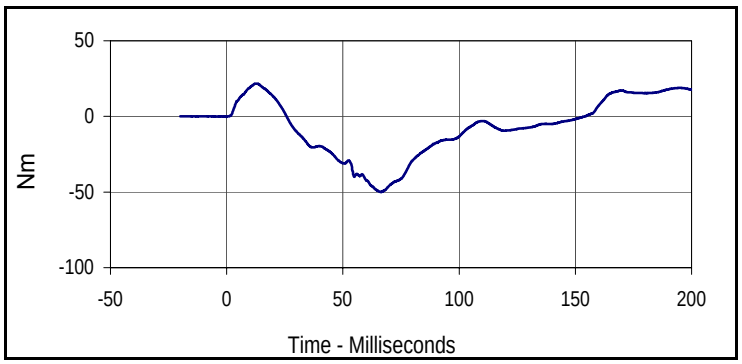


Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
21.2	194.9	-56.3	66.7

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141NE022



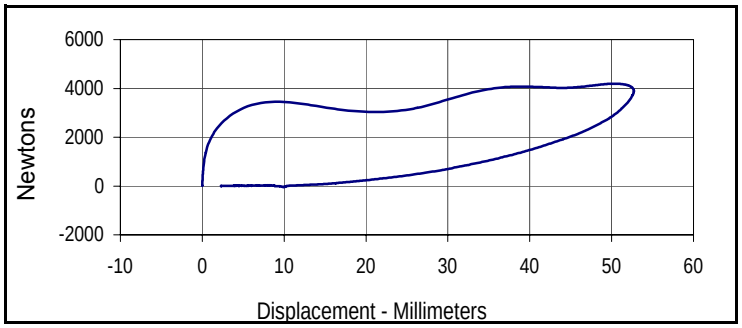
Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
472.6	72.0	-170.9	182.0



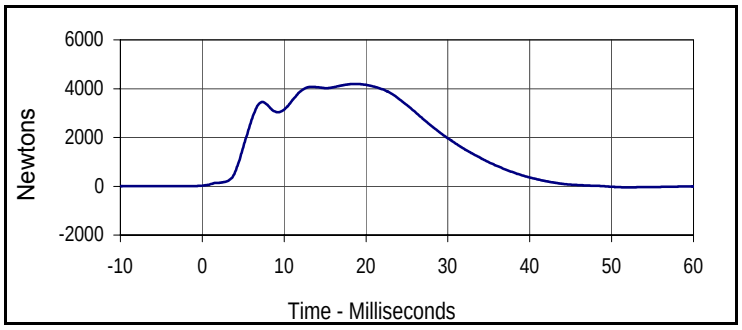
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
21.7	13.0	-50.0	66.4

Test Program:	Hybrid III 5th Percentile Female Thorax Impact Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141CH022

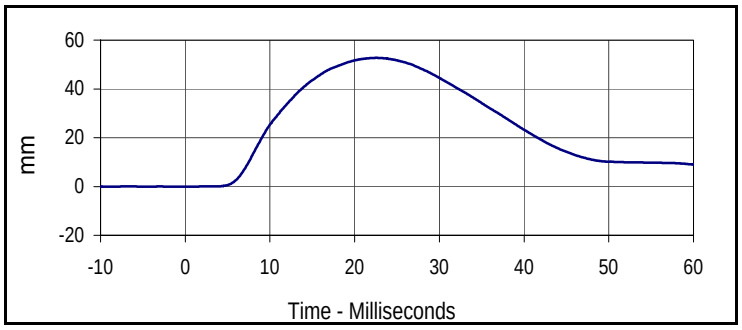
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.4	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Probe Velocity		m/s	6.59 to 6.83	6.64	Pass
Peak Chest Deflection		mm	50.0 to 58.0	52.7	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4194	Pass
Peak Force Between 18 and 50 MM		Newtons	≥4600	4194	Pass
Internal Hysterysis		%	69 to 85	75.2	Pass
			Overall Test Results		Pass



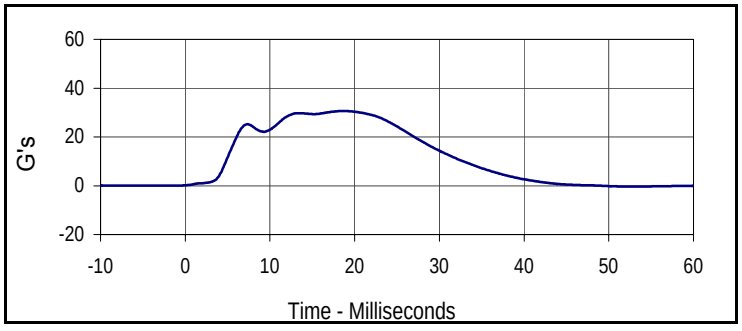
Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysterysis
001	FIL	180	75.2
Peak Probe Force		Peak Chest Deflection	
4194.5		52.7	



Curve Description			
Probe Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4194.5	18.6	-46.3	52.1



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
52.7	22.6	0.0	-1.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.6	18.6	-0.3	52.1

Test Program:	Hybrid III 5th Percentile Female Knee Impact Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141LK022 , F141LK022

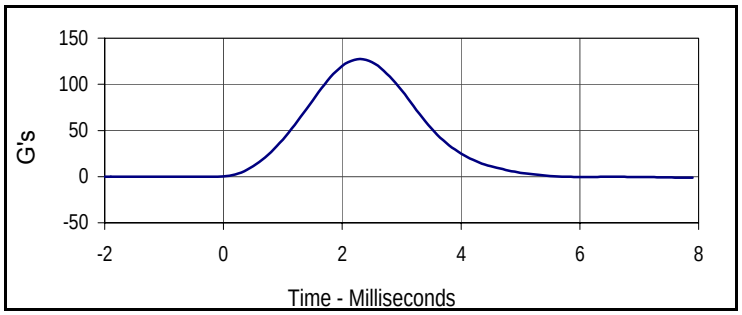
Left Knee

Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	425	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.4	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force		Newtons	3450 to 4060	3735	Pass
			Overall Test Results		Pass

Right Knee

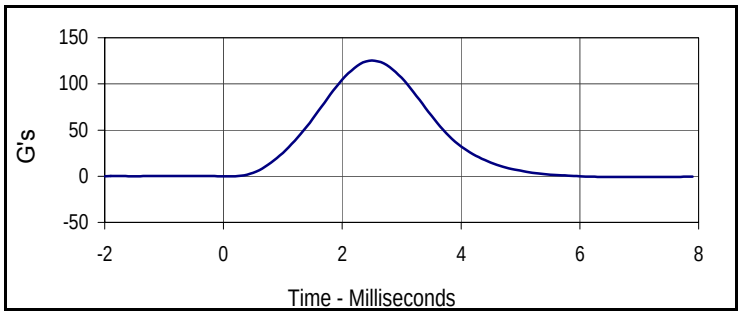
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.078	Pass
Peak Probe Force	Newtons	3450 to 4060	3671	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3734.8	2.3	-36.2	7.9



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
127.4	2.3	-1.2	7.9

Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3671.0	2.5	-27.2	7.1



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
125.2	2.5	-0.9	7.1

Test Program:	Hybrid III 5th Percentile Female Torso Flexion Test	Test Date:	10/13/11
ATD Serial No.:	141	Test I.D.:	F141TF022

Left Hip Joint-Femur Results

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	460	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	26.8	Pass
Initial Reference Plane Angle		Degrees	≤ 20	9.5	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	335.0	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	0.7	Pass
Final Reference Plane Angle		Degrees	+/-8	4.8	Pass
			Overall Test Results		Pass