FINAL REPORT NUMBER 201UI-MGA-10-03

SAFETY COMPLIANCE TESTING FOR FMVSS 201
Occupant Protection In Interior Impact
Upper Interior Head Impact Protection

MAZDA MOTOR CORPORATION
2010 Mazda 3 4-Door Sedan
NHTSA No. CA5401

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: March 31 - April 1, 2010
Report Date: May 7, 2010

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 New Jersey Avenue, SE
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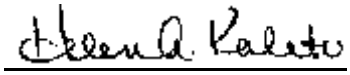
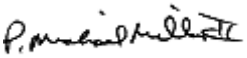
Prepared By: 

Donald J. Whiteside, Project Engineer



Helen A. Kaleto, Project Manager

Approved By: 

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4. Title and Subtitle Final Report of FMVSS 201 Compliance Testing of a 2010 Mazda 3 4-Door Sedan, NHTSA No. CA5401		5. Report Date April 2, 2010 6. Performing Organization Code MGA	
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12. Sponsoring Agency Name and Address U.S. Department Of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance 1200 New Jersey Avenue, SE West Building, 4th Floor Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report 14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test series was conducted on the subject 2010 Mazda 3 4-Door Sedan, NHTSA No. CA5401, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201 compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on March 31 - April 1, 2010. Test failures identified were as follows: None The data recorded indicates that the 2010 Mazda 3 4-Door Sedan tested appears to comply with the upper interior requirements of FMVSS 201.			
17. Key Words Compliance Testing Safety Engineering FMVSS 201UI 2010 Mazda 3 4-Door Sedan		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division, Mail Code: NPO-410 1200 New Jersey Avenue, SE West Building Washington, D.C. 20590	
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2010 Mazda 3 4-Door Sedan, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on March 31 - April 1, 2010 on a 2010 Mazda 3 4-Door Sedan, manufactured by Mazda Motor Corporation.

All tests were conducted in accordance with the U. S. Department of Transportation, National Highway Traffic Safety Administration's Laboratory Test Procedure TP-201U-01 dated April 3, 1998 and the corresponding MGA Research Corporation's FMVSS 201U procedure number MGATP201U_FRAME#2 dated August 21, 2009.

All tests were conducted at MGA Research Corporation in Troy, Michigan and were performed by MGA engineers and technicians. The FMVSS 201U impactor test machine was used to conduct the testing. Target locations were determined by using a Coordinate Measurement Machine in conjunction with the MGA EZ-Target™ program and MGA procedure MGATP201U_Test Series dated November 9, 2009.

2.0 COMPLIANCE TEST DATA SUMMARY

The 2010 Mazda 3 4-Door Sedan was equipped with A, B, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a grab handle located on the side rail above the front passenger door and each rear door.

Upon completion of targeting the test vehicle, twelve (12) targets were chosen to be impacted based upon engineering judgment and certification test data provided by the manufacturer. The twelve (12) targets chosen were:

AP2	BP4	SR1	UR3@BPR
AP3	RP2	SR3-2	UR4@SR3-1
BP2	FH1	UR2@SR2A	UR5@SR3-2

The 2010 Mazda 3 4-Door Sedan tested appears to comply with the upper interior performance criteria for FMVSS 201. The HIC(d) measured using the Part 572L (Free Motion Headform) was below 1000 for each tested component.

TABLE 2-1

SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2010 Mazda 3 4-Door Sedan

VEH. NHTSA NO.: CA5401 VIN: JM1BL1SG8A1232728 COLOR: Silver

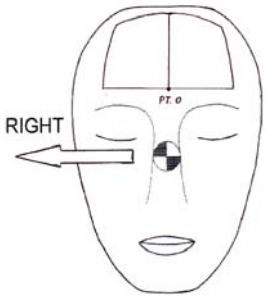
VEH. BUILD DATE: October, 2009 TEST DATES: March 31 - April 1, 2010

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Andrew Gould, Ryan Jones, Helen A. Kaleto, Nathaniel Newth, Donald J. Whiteside

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP2	Left	205	49	19.0	342	233	31	5 Left
AP3	Right	154	47	18.8	333	220	14	4 Right
BP2	Left	270	5	24.1	625	608	12	5 Right
BP4	Right	154	-2	23.7	876	941	10	6 Left
RP2	Left	280	-9	24.1	629	614	14	3 Left
FH1	Left	180	50	23.7	494	434	16	2 Left
SR1	Right	90	26	19.0	295	170	17	6 Left
SR3-2	Right	90	33	18.4	237	93	23	1 Left
UR2@SR2A	Right	90	50	24.1	694	700	26	0
UR3@BPR	Left	270	50	23.5	503	446	36	5 Left
UR4@SR3-1	Right	90	50	24.0	644	633	36	2 Left
UR5@SR3-2	Left	270	50	23.9	637	623	38	5 Left

Above and left/right refers to the position relative to reference pt. 0 where the target made contact with the Free Motion Headform. See the diagram below for details.



POST TEST COMMENTS:

The following description lists any post-test damage or other test observations for each target.

AP2: Trim compression.

BP2: Anchorage compression.

SR1: Grab handle anchor compression and headliner deformation.

SR3-2: Grab handle anchor compression and headliner deformation.

UR2@SR2-A: Grab handle anchor compression and headliner deformation.

UR3@BPR: Headliner deformation.

UR4@SR3-1: Grab handle anchor compression and headliner deformation.

UR5@SR3-2: Slight headliner deformation.

REMARKS:

The targets listed were impacted in the following order:

Left: RP2, UR5@SR3-2, BP2, UR3@BPR, AP2, FH1

Right: SR3-2, UR4@SR3-1, BP4, SR1, UR2@SR2-A, AP3

The 150 mm rule was observed for targets horizontal to each other and the 200 mm rule was observed for vertical components.

RECORDED BY: Donald J. Whiteside DATE: March 31, 2010

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2010 Mazda 3 4-Door Sedan

VEH. NHTSA NO.: CA5401 VIN: JM1BL1SG8A1232728 COLOR: Silver

VEH. BUILD DATE: October, 2009 TEST DATES: March 31 - April 1, 2010

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Andrew Gould, Ryan Jones, Helen A. Kaleto, Nathaniel Newth, Donald J. Whiteside

INTERIOR TRIM INFORMATION: The 2010 Mazda 3 4-Door Sedan was equipped with A, B, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a grab handle located on the side rail above the front passenger door and each rear door.

SUNROOF INFORMATION:

Installed:	_____Yes	_X_ No
Operation:	_____Electric	____ Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed:	_X_Yes	___ No

ROLL-BAR INFORMATION:

Installed:	_____Yes	_X_ No
Padded:	_____Yes	_X_ No
Braces:	_____Yes	_X_ No

GENERAL INFORMATION:

Date Received: January 21, 2010; Odometer Reading 12 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Mazda Motor Corporation

Date of Manufacture: October, 2009; VIN: JM1BL1SG8A1232728

GVWR: 1768 kg; GAWR FRONT: 933 kg;

GAWR REAR: 835 kg;

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 240 kPa REAR: 240 kPa

Recommended Tire Size: P205/55R16

Recommended Cold Tire Pressure:

FRONT: 240 kPa REAR: 240 kPa

Size of Tire on Test Vehicle: P205/55R16

Type of Spare Tire: T115/70D15; Space Saver: X; Standard__

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench__; Bucket X; Split Bench __

Number of Occupants: Front 2; Rear 3; TOTAL 5

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 385 kg

No. of Occupants x 68 kg = 340 kg

Rated Cargo/Luggage Weight (RCLW) = 45 kg (difference)

WEIGHT OF TEST VEHICLE AS DELIVERED AT LABORATORY: (with maximum fluids)

Right Front =	412.5 kg	Right Rear =	240.5 kg
Left Front =	368.5 kg	Left Rear =	283.5 kg
TOTAL FRONT =	781.0 kg	TOTAL REAR =	524.0 kg
% Total Weight =	59.8 %	% Total Weight =	40.2 %

TOTAL DELIVERED WEIGHT = 1305.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1305.0 kg

Max. Test Cargo/Luggage Weight = 45.0 kg

Target Test Weight = 1350.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	401.5 kg	Right Rear =	273.0 kg
Left Front =	376.0 kg	Left Rear =	298.5 kg
TOTAL FRONT =	777.5 kg	TOTAL REAR =	571.5 kg
% Total Weight =	57.6 %	% Total Weight =	42.4 %

TOTAL TEST WEIGHT = 1349.0 kg

Weight of ballast secured in vehicle's cargo area = 44.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 688 mm; Left Front 686 mm;
Right Rear 694 mm; Left Rear 694 mm;
Pitch Angle at Right Door Sill = 0.4 Rear is higher
Pitch Angle at Left Door Sill = 0.2 Rear is higher
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.3 Right is higher

FULLY LOADED: Right Front 846 mm; Left Front 845 mm;
Right Rear 845 mm; Left Rear 848 mm;
Pitch Angle at Right Door Sill = 0.1 Front is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.3 Right is higher
Roll Angle at Rear Bumper = 0.4 Right is higher

AS TARGETED: Right Front 846 mm; Left Front 845 mm;
Right Rear 845 mm; Left Rear 848 mm;
Pitch Angle at Right Door Sill = 0.0
Pitch Angle at Left Door Sill = 0.0
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.3 Right is higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill =	0.0
Pitch Angle at Left Door Sill =	0.1 Front is higher
Roll Angle at Front Bumper =	0.2 Right is higher
Roll Angle at Rear Bumper =	0.3 Right is higher

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill =	0.0
Pitch Angle at Left Door Sill =	0.0
Roll Angle at Front Bumper =	0.3 Right is higher
Roll Angle at Rear Bumper =	0.3 Right is higher

VEHICLE WHEELBASE = 2635 mm

REMARKS: The seat travel distance was measured to be 259 mm for the driver front seat and 259 mm for the passenger front seat.

RECORDED BY: Donald J. Whiteside DATE: March 30, 2010

APPROVED BY: Helen A. Kaleto

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2010 Mazda 3 4-Door Sedan

VEH. NHTSA NO.: CA5401 VIN: JM1BL1SG8A1232728 COLOR: Silver

VEH. BUILD DATE: October, 2009 TEST DATES: March 31 - April 1, 2010

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Andrew Gould, Ryan Jones, Helen A. Kaleto, Nathaniel Newth, Donald J. Whiteside

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195º-255º	L 203.7º	L 254.2º
	R 105º-165º	R 106.8º	R 155.1º
B-PILLAR	L 195º-345º	L 204.7º	L 304.2º
	R 15º-165º	R 55.4º	R 155.1º

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Donald J. Whiteside DATE: March 30, 2010

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2010 Mazda 3 4-Door Sedan

VEH. NHTSA NO.: CA5401 VIN: JM1BL1SG8A1232728 COLOR: Silver

VEH. BUILD DATE: October 2009 TEST DATES: March 31 - April 1, 2010

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Andrew Gould, Ryan Jones, Helen A. Kaleto, Nathaniel Newth, Donald J. Whiteside

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
	FH2	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
SIDE RAIL	SR1	L 0º-50º	L 0º	L 25º
		R 0º-50º	R 0º	R 26º
	SR2A	L 0º-50º	L 0º	L 15º
		R 0º-50º	R 0º	R 26º
	SR2B	L 0º-50º	L 0º	L 17º
		R 0º-50º	R 0º	R 30º
	SR3-1	L 0º-50º	L 0º	L 31º
		R 0º-50º	R 0º	R 32º
	SR3-2	L 0º-50º	L 0º	L 33º
		R 0º-50º	R 0º	R 33º
REAR HEADER	RH	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
A-PILLAR	AP1	L -5º-50º	L -5º	L 30º
		R -5º-50º	R -5º	R 30º
	AP2	L -5º-50º	L -5º	L 49º
		R -5º-50º	R -5º	R 49º
	AP3	L -5º-50º	L -5º	L 47º
		R -5º-50º	R -5º	R 47º
B-PILLAR	BP1	L -10º-50º	L -10º	L 22º
		R -10º-50º	R -10º	R 22º
	BP2*	L 0º-50º	L 0º	L 5º
		R 0º-50º	R 0º	R 5º
	BP3*	L 0º-50º	L 0º	L 3º
		R 0º-50º	R 0º	R 3º
	BP4	L -10º-50º	L -10º	L -2º
		R -10º-50º	R -10º	R -2º
REAR PILLAR	RP1	L -10º-50º	L -10º	L 6º
		R -10º-50º	R -10º	R 6º
	RP2	L -10º-50º	L -10º	L -9º
		R -10º-50º	R -10º	R -9º
UPPER ROOF 1		0º-50º	0º	50º
UPPER ROOF 2		0º-50º	0º	50º
UPPER ROOF 3		0º-50º	0º	50º
UPPER ROOF 4		0º-50º	0º	50º
UPPER ROOF 5		0º-50º	0º	50º
UPPER ROOF 6		0º-50º	0º	50º

As determined using the Procedures specified in S8.13.4.2. *Targets BP2 and BP3 are seat belt anchorage locations.

RECORDED BY: Donald J. Whiteside DATE: March 25, 2010

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2010 Mazda 3 4-Door Sedan

VEH. NHTSA NO.: CA5401 VIN: JM1BL1SG8A1232728 COLOR: Silver

VEH. BUILD DATE: October, 2009 TEST DATES: March 31 - April 1, 2010

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Andrew Gould, Ryan Jones, Helen A. Kaleto, Nathaniel Newth, Donald J. Whiteside

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	259 mm	259 mm
Tº	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	105.8º	--
A1º	360º - Tº	254.2º	--
Wº	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	203.7º	--
A2º	A2º = Wº	203.7º	--
Uº	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	304.2º	--
B1º	B1º = Uº	304.2º	--
Vº	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	204.7º	--
B2º	B2º = Vº	204.7º	--
Wº (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	155.1º
A1º (right)	A1º (right) = Wº (right)	--	155.1º
T º (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	253.2º
A2º (right)	360º-Tº (right)	--	106.8º
V º (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	155.1º
B1º (right)	B1º (right) = Vº (right)	--	155.1º
U º (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	55.4º
B2º (right)	B2º (right) = Uº (right)	--	55.4º
J	A-Pillar {(Plane 3) – (Plane 5)}	295.6 mm	293.4 mm
J/2	J ÷ 2	147.8 mm	146.7 mm
D1	Upper Roof {(Plane A) – (Plane B)}	1546.1 mm	
D1/2	D1 ÷ 2	773.1 mm	

Measurement	Description	Left Side	Right Side
D2	Upper Roof {(Plane C) – (Plane D)}	1182.0 mm	
D2/2	D2 ÷ 2	591.0 mm	
.35D1	.35 x D1	541.1 mm	
.35D2	.35 x D2	413.7 mm	
N	B-Pillar {(BPR) – (lowest point on daylight opening forward of B-Pillar)}	395.1 mm	394.1 mm
N/2	B-Pillar {(BP3) – (lowest point on daylight opening forward of B-Pillar)}	197.6 mm	197.1 mm
N/4	B-Pillar {(BP4) – (lowest point on daylight opening forward of B-Pillar)}	98.8 mm	98.5 mm
D	R-Pillar (Point 7 – Point M)	685.0 mm	685.0 mm
3D/7	3*D / 7	293.6 mm	293.6 mm

As determined using the Procedures specified in S10.1-10.13.

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	3116.9	-355.0	710.2	3116.9	355.0	710.2
Rear	3890.9	-330.0	695.0	3890.9	330.0	695.0

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	3116.9	-355.0	710.2	3116.9	355.0	710.2
Rear	3890.9	-330.0	695.0	3890.9	330.0	695.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	X	y	Z
CGF1	3017.9	-355.0	1370.2	3017.9	355.0	1370.2
CGF2	3276.9	-355.0	1370.2	3276.9	355.0	1370.2
CGR	4050.9	-330.0	1355.0	4050.9	330.0	1355.0

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Front driver door striker front center edge (x, y, z) = 3232.7, -774.7, 846.1

Front row driver seat front outboard anchor (x, y, z) = 2738.9, -577.0, 489.2

Front row passenger seat front outboard anchor (x, y, z) = 2738.9, 577.0, 489.2

REMARKS:

RECORDED BY: Donald J. Whiteside DATE: March 25, 2010

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2010 Mazda 3 4-Door Sedan

VEH. NHTSA NO.: CA5401 VIN: JM1BL1SG8A1232728 COLOR: Silver

VEH. BUILD DATE: October, 2009 TEST DATES: March 31 - April 1, 2010

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Andrew Gould, Ryan Jones, Helen A. Kaleto, Nathaniel Newth, Donald J. Whiteside

SUMMARY OF TARGETING RESULTS								
Target	**Location (mm)**			**Horizontal Angle (deg)**	**Vertical Angle (deg)**	**Relocation (Yes/No)**	**Extension (# of 25 mm Spheres)**	**Impact (Yes/No)**
	x	**y**	**z**					
A-Pillar Left Side								
AP1	2912.1	-539.0	1471.9	--	--	Yes	--	--
REL	2928.4	-543.5	1450.2	253	30	--	1	No
AP2	2791.1	-580.9	1384.8	205	49	No	--	Yes
AP3	2656.4	-606.3	1325.0	205	47	No	--	No
A-Pillar Right Side								
AP1	2914.5	535.7	1470.9	--	--	Yes	--	--
REL	2933.9	535.3	1456.8	108	30	--	1	No
AP2	2795.4	582.4	1383.9	154	49	No	--	No
AP3	2658.9	605.4	1324.7	154	47	No	--	Yes
B-Pillar Left Side								
BP1	3460.4	-475.4	1534.7	--	--	Yes	--	--
REL	3462.3	-488.1	1512.4	270	22	--	1	No
BP2	3413.1	-574.8	1299.2	270	5	No	--	Yes
BP3	3411.7	-565.8	1337.2	280	3	No	--	No
BP4	3459.9	-629.6	1238.5	206	-2	No	--	No

SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
B-Pillar Right Side								
BP1	3459.0	472.2	1535.5	--	--	Yes	--	--
REL	3459.3	486.8	1514.3	90	22	--	1	No
BP2	3415.2	573.4	1301.8	90	5	No	--	No
BP3	3412.4	565.2	1338.3	80	3	No	--	No
BP4	3459.9	623.1	1240.2	154	-2	No	--	Yes
Rear Pillar Left Side								
RP1	4139.8	-495.2	1461.4	--	--	Yes	--	--
REL	4121.4	-503.1	1445.8	280	6	--	1	No
RP2	4232.0	-604.4	1312.1	--	--	Yes	--	--
REL	4221.7	-548.7	1362.3	280	-9	--	2	Yes
Rear Pillar Right Side								
RP1	4135.6	492.7	1458.3	--	--	Yes	--	--
REL	4124.0	498.6	1439.7	80	6	--	1	No
RP2	4236.2	600.2	1308.7	--	--	Yes	--	--
REL	4222.1	547.9	1359.9	80	-9	--	2	No
Front Header Left Side								
FH1	2831.2	-437.1	1501.8	--	--	Yes	--	--
REL	2827.0	-411.3	1501.4	180	50	--	1	Yes
FH2	2802.6	-287.5	1512.2	180	50	No	--	No
Front Header Right Side								
FH1	2828.6	431.6	1500.8	--	--	Yes	--	--
REL	2823.3	407.2	1498.6	180	50	--	1	No
FH2	2801.1	283.7	1511.3	180	50	No	--	No
Side Rail Left Side								
SR1	3061.2	-505.9	1513.6	--	--	Yes	--	--
REL	3067.5	-515.5	1497.7	270	25	--	1	No
SR2A	3211.8	-493.4	1528.6	270	15	No	--	No
SR2B	3159.9	-498.3	1526.2	270	17	No	--	No

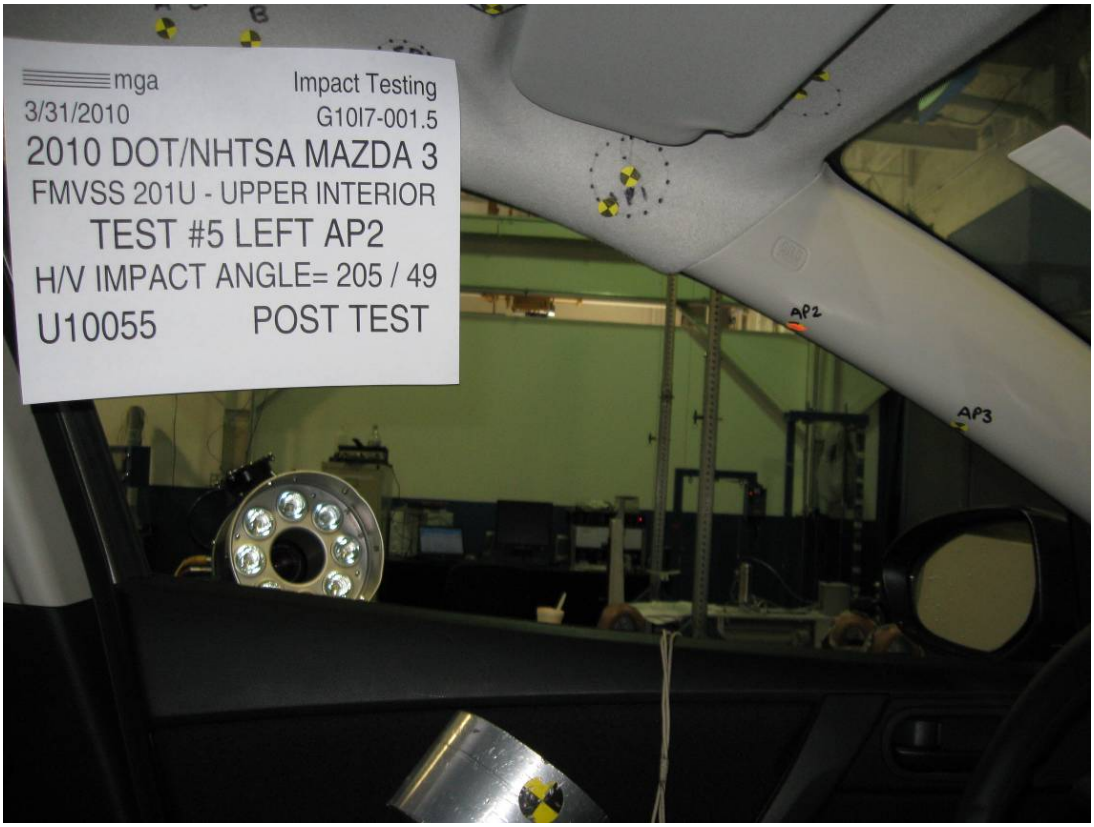
SUMMARY OF TARGETING RESULTS								
Target	**Location (mm)**			**Horizontal Angle (deg)**	**Vertical Angle (deg)**	**Relocation (Yes/No)**	**Extension (# of 25 mm Spheres)**	**Impact (Yes/No)**
	x	**y**	**z**					
SR3-1	3731.7	-491.9	1485.2	270	31	No	--	No
SR3-2	3903.1	-497.1	1462.1	270	33	No	--	No
Side Rail Right Side								
SR1	3064.4	508.6	1523.3	--	--	Yes	--	--
REL	3082.7	507.3	1499.4	90	26	--	1	Yes
SR2A	3213.5	488.0	1522.7	--	--	Yes	--	--
REL	3233.9	482.9	1520.9	90	26	--	1	No
SR2B	3158.6	490.9	1518.5	90	30	No	--	No
SR3-1	3733.4	488.2	1486.0	90	32	No	--	No
SR3-2	3903.9	492.9	1463.2	90	33	No	--	Yes
Rear Header Left Side								
RH	4115.9	-329.9	1512.9	0	50	No	--	No
Rear Header Right Side								
RH	4114.9	329.4	1515.3	0	50	No	--	No
Upper Roof Left Side								
UR1@SR1	3009.8	-405.4	1519.1	270	50	No	--	No
UR3@BPR	3468.5	-358.3	1566.4	270	50	No	--	Yes
UR5@SR3-2	3901.1	-326.0	1561.6	270	50	No	--	Yes
Upper Roof Right Side								
UR2@SR2A	3258.9	355.5	1571.5	90	50	No	--	Yes
UR4@SR3-1	3752.4	329.5	1568.5	90	50	No	--	Yes
UR6@RP	4022.6	332.3	1538.2	90	50	No	--	No

As determined using the Procedures specified in S10.1-10.13.

RECORDED BY: Donald J. Whiteside DATE: March 25, 2010

APPROVED BY: Helen A. Kaleto

3.0 TEST DATA (Including Acceleration and Velocity Plots)


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT AP2
H/V IMPACT ANGLE= 205 / 49
U10055
POST TEST
AP2
AP3


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT AP2
H/V IMPACT ANGLE= 205 / 49
U10055
POST TEST


mga
3/31/2010
2010 DOT/N
FMVSS 201U
TEST
H/V IMPAC
U10055


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT AP2
H/V IMPACT ANGLE= 205 / 49
U10055
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): AP2Left

Temperature:20.9C

MGA Test Reference No.:U10055

Humidity:34.8%

Approach Horizontal Angles:205º

Time of Test:5:05:28 PM

Approach Vertical Angles:49º

FMH Serial No:[037]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
342	233	12	19.0	31	5 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-116.9	1.06	1.06
Y	6	J14103	94.2	0.84	0.84
Z	7	J35800	98.2	0.93	0.93

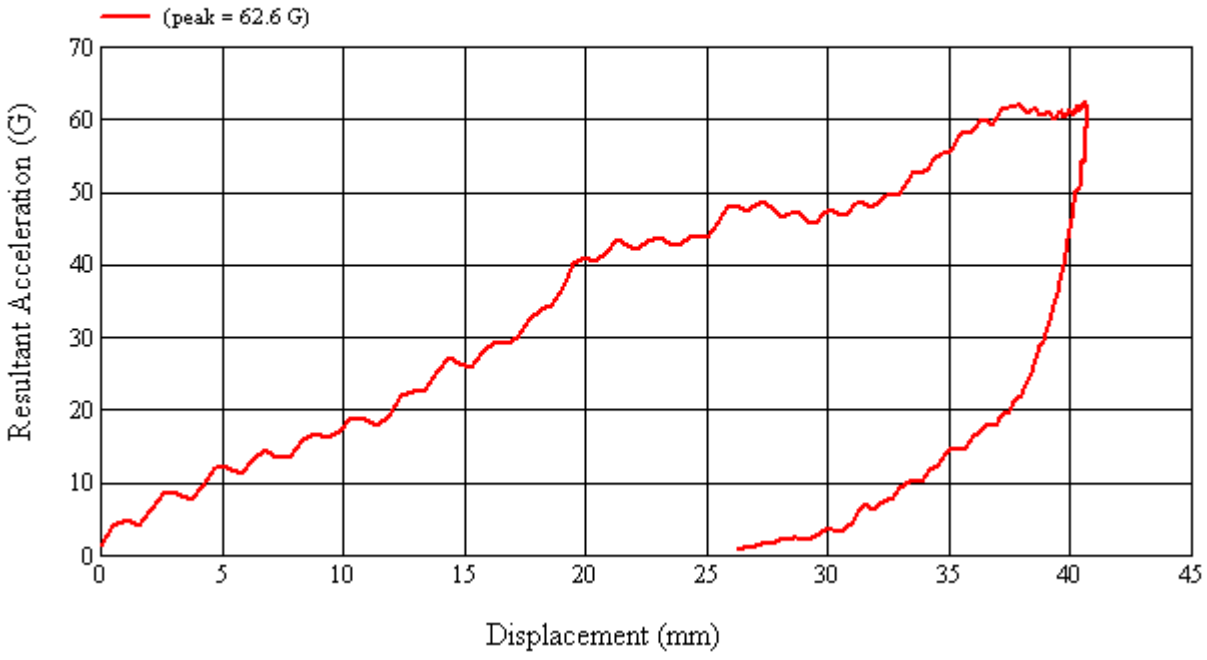
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

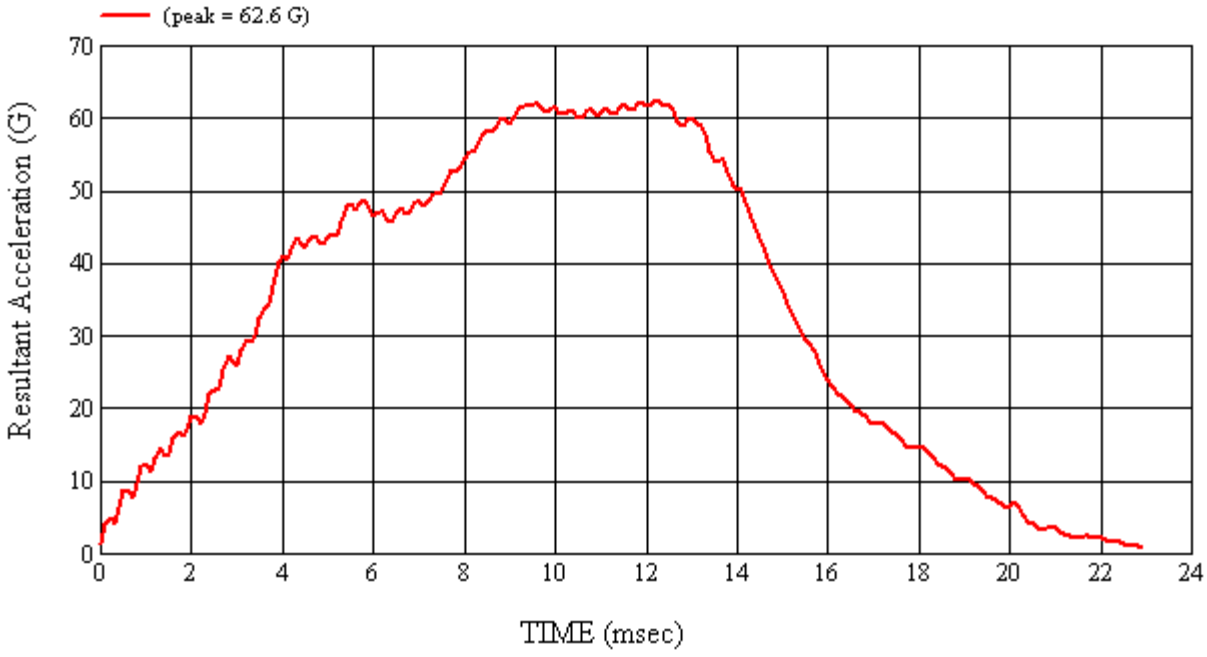
Trim compression

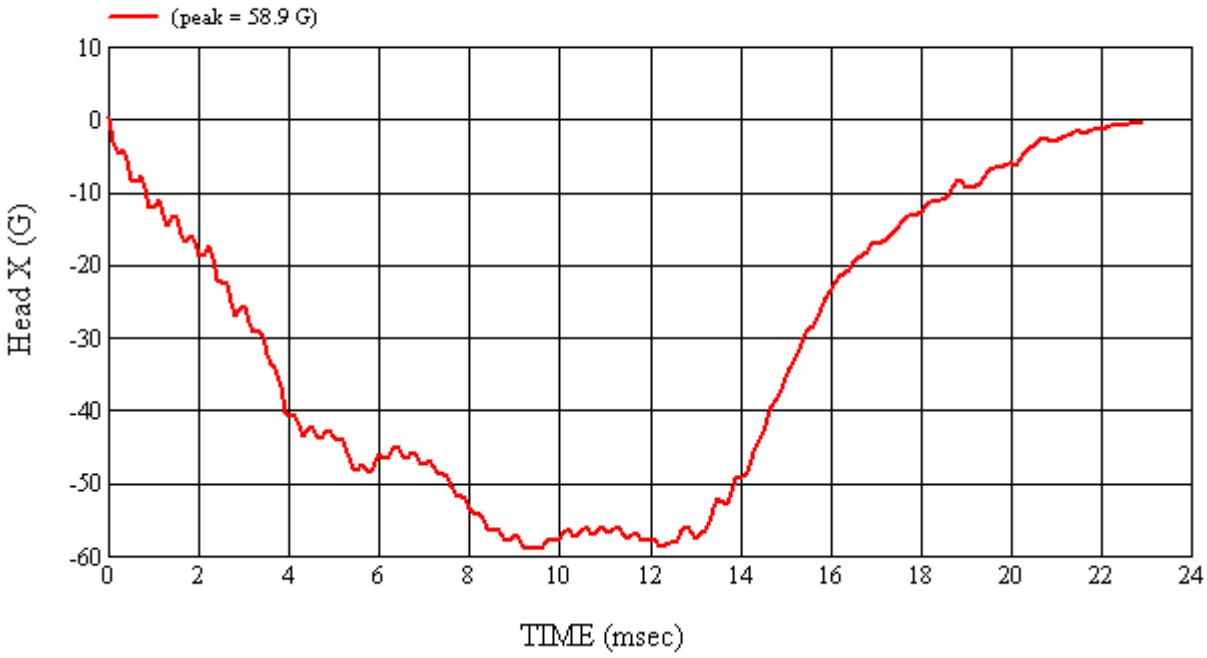
Recorded By: _____ Approved By*: _____ Date: 3/31/2010

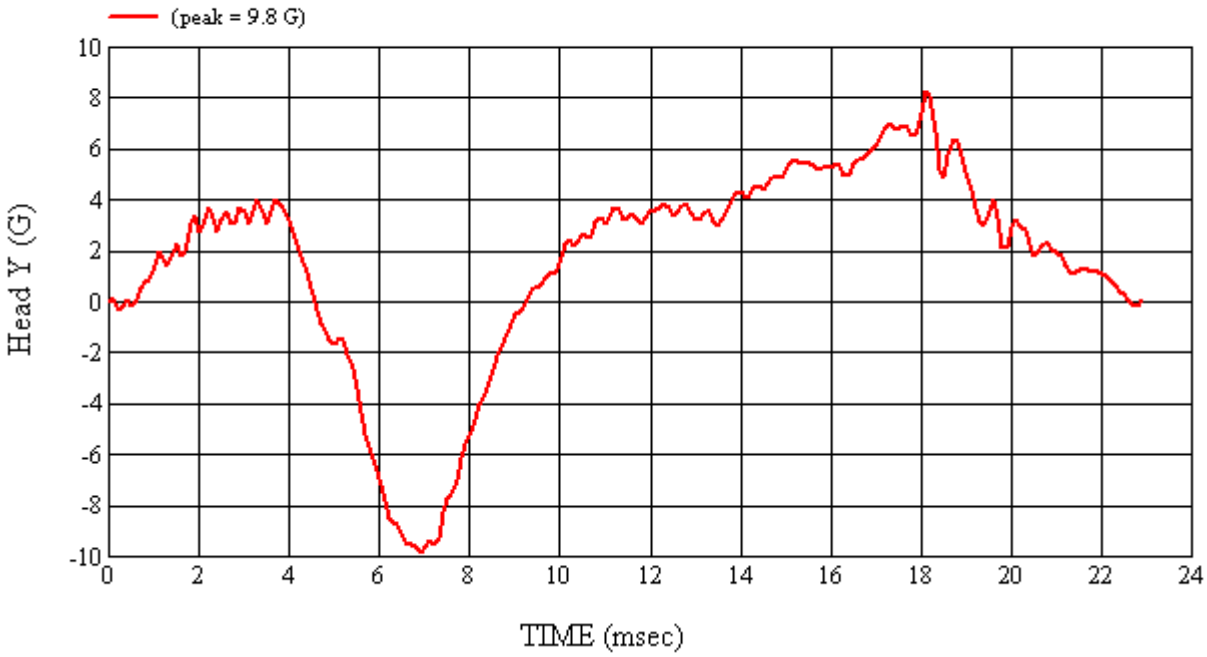
*Only necessary for NHTSA (Government) Compliance testing.

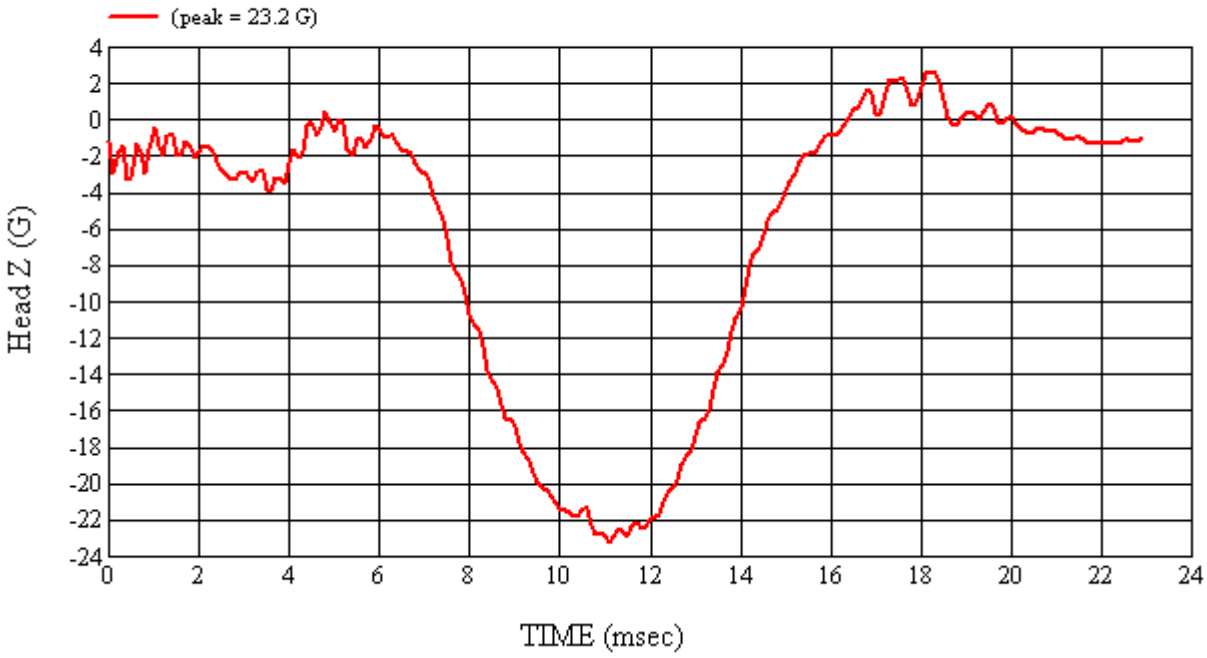
MGA Test #: U10055 Target Location: AP2, Left Side Test Date: 3/31/2010

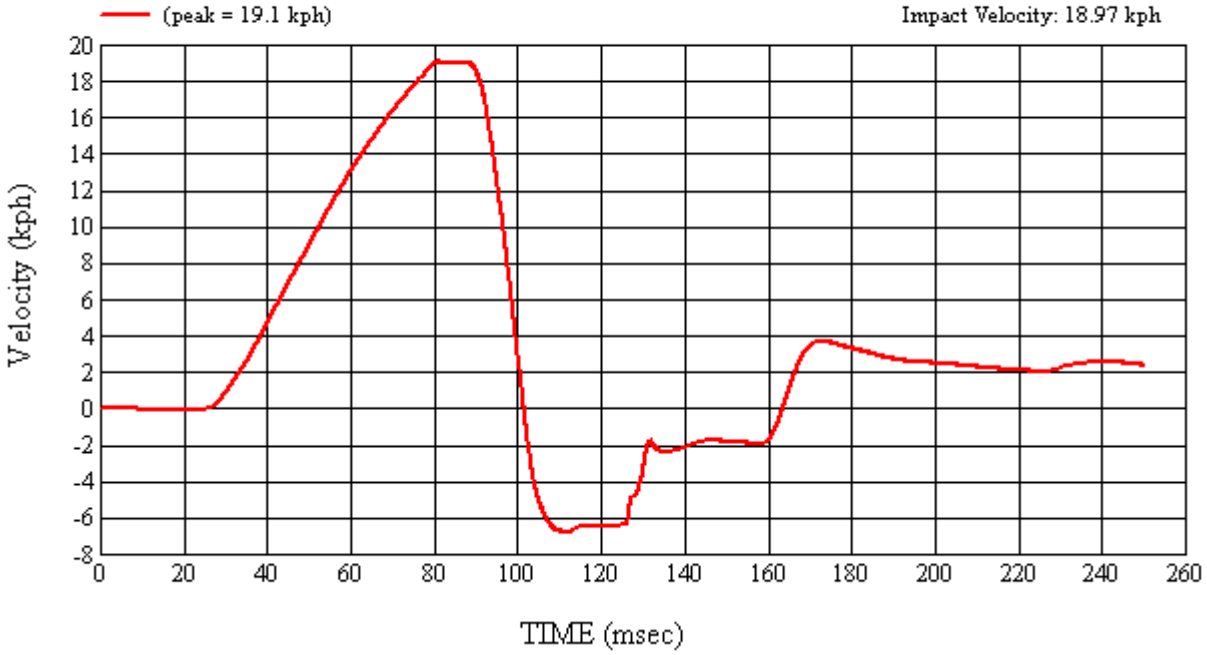


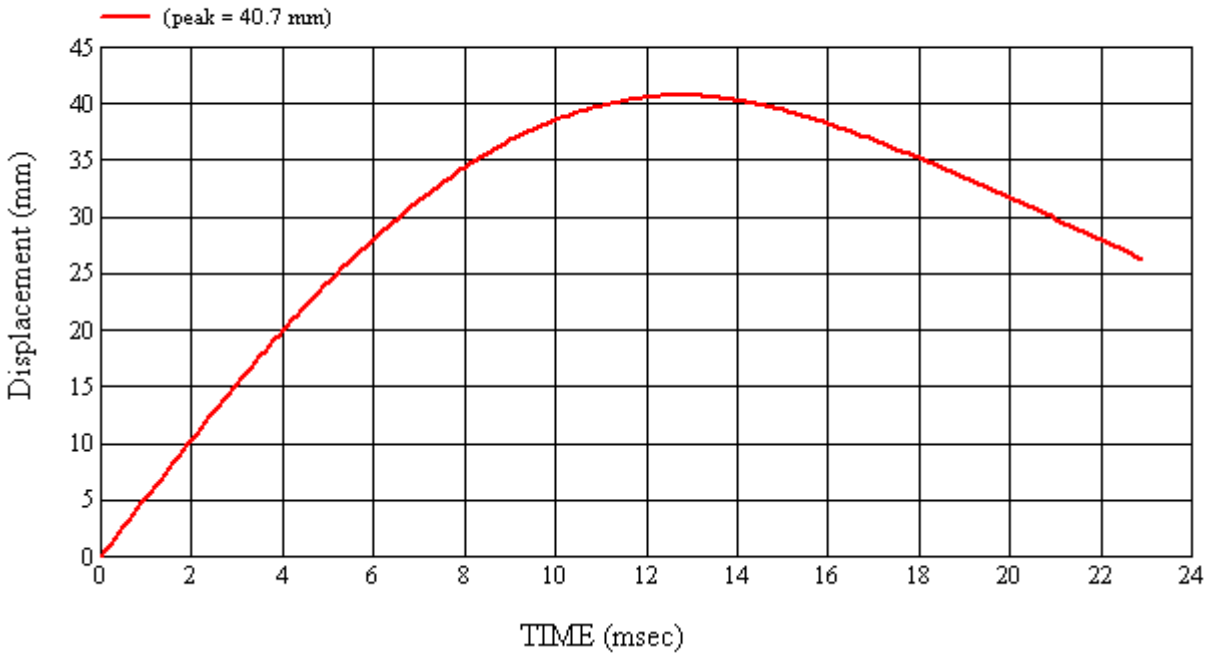


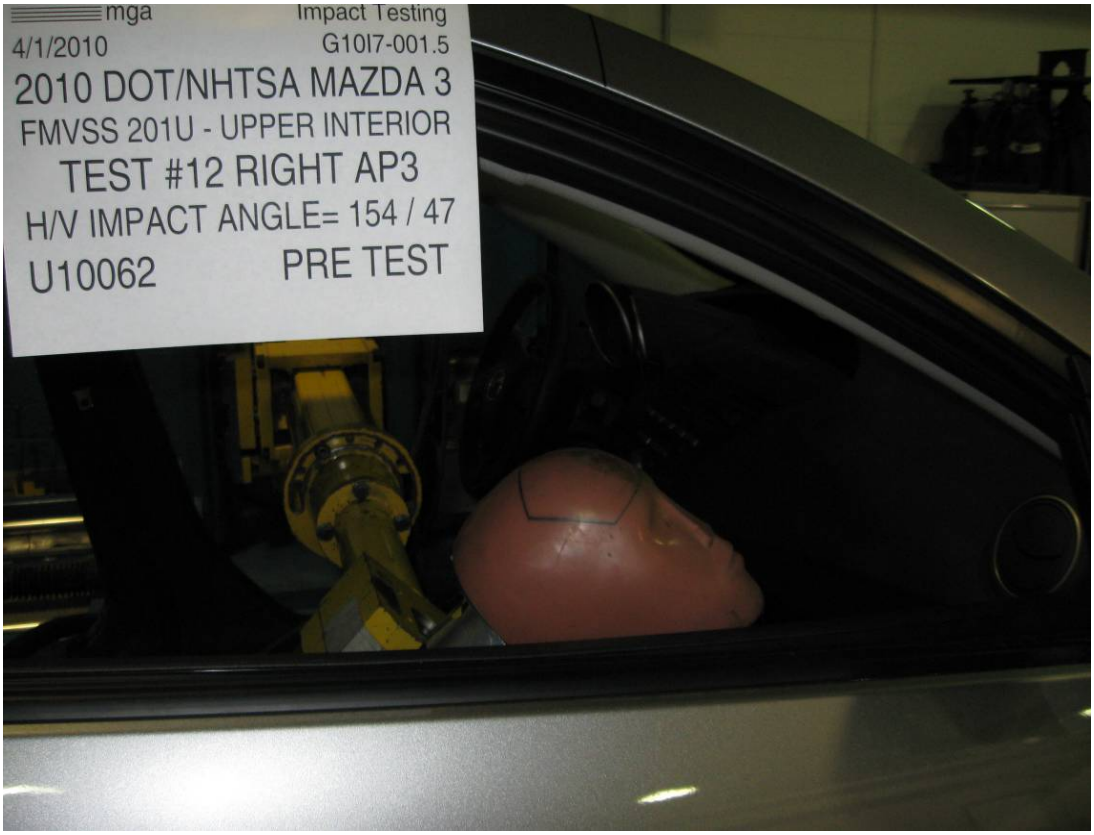

(peak = 58.9 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

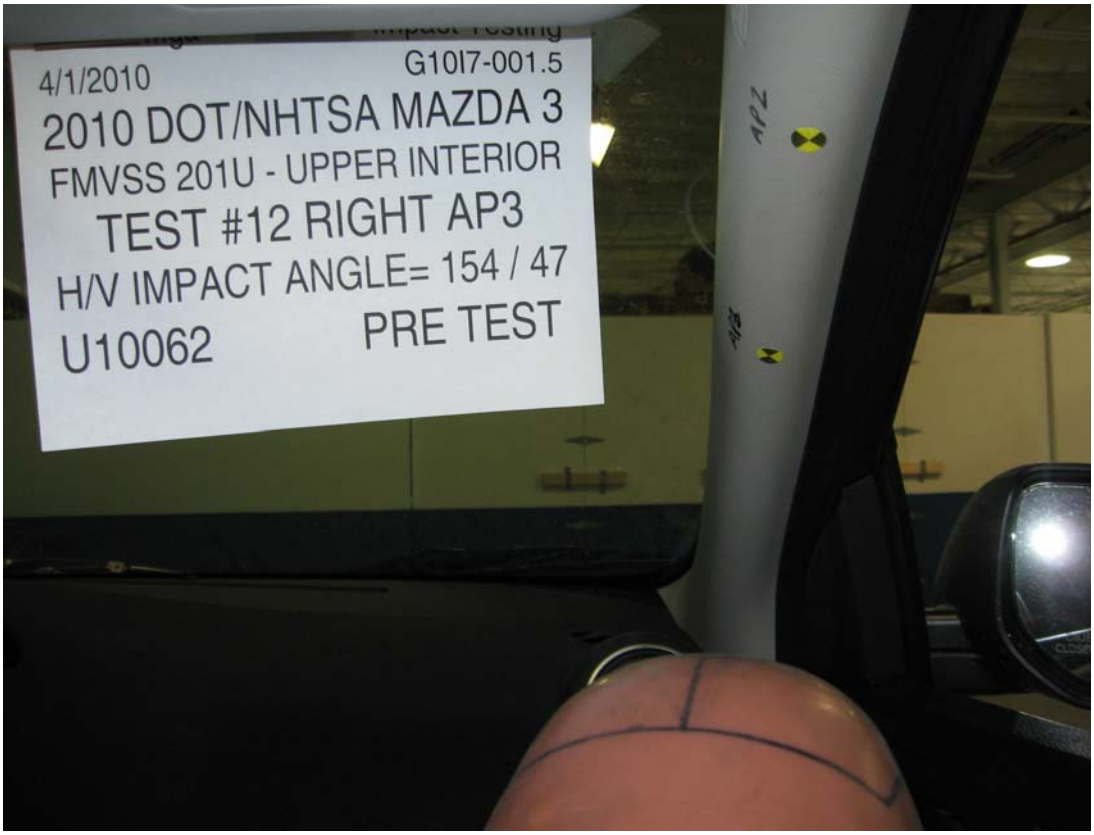

(peak = 9.8 G)
Head Y (G)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

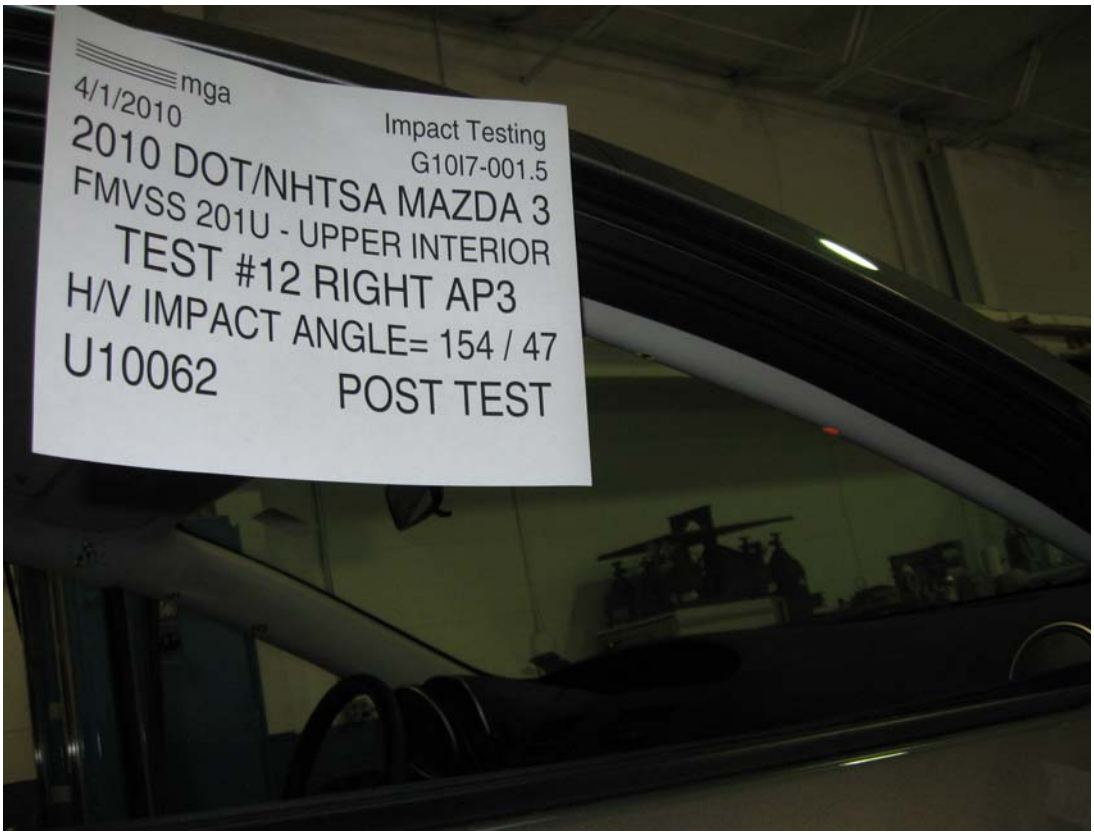

(peak = 23.2 G)
Head Z (G)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

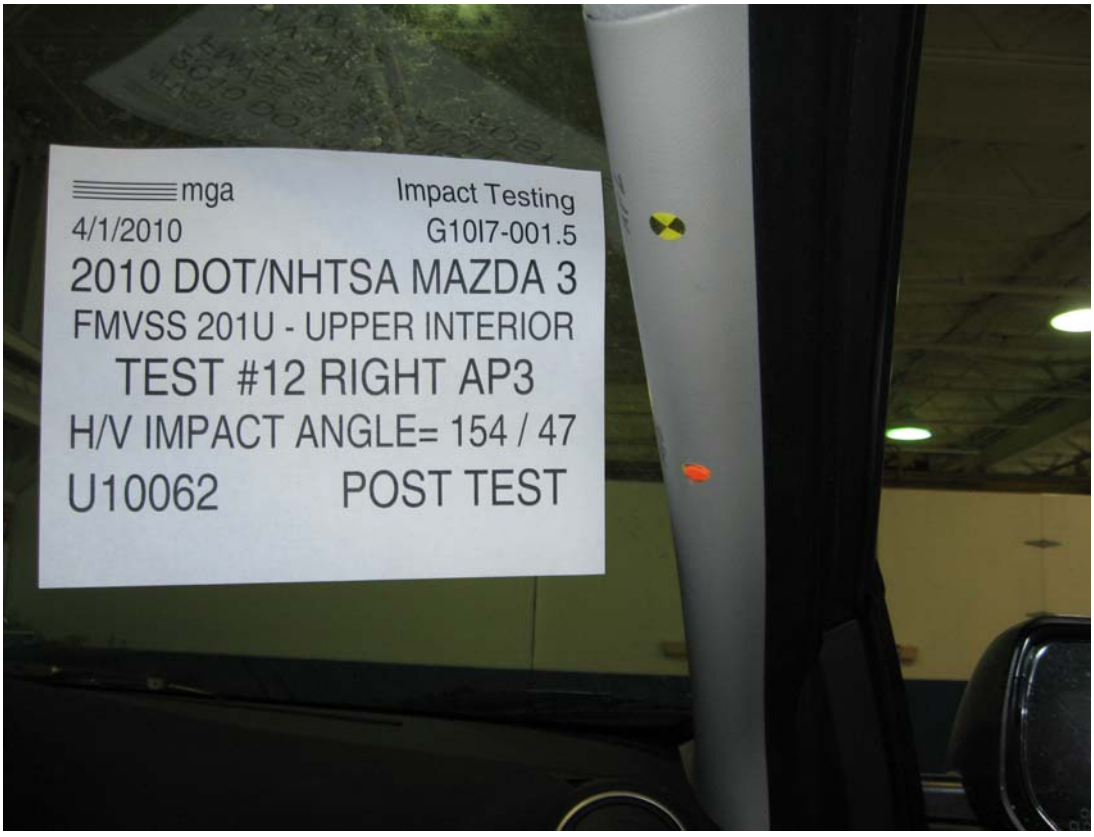

(peak = 19.1 kph)
Impact Velocity: 18.97 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 40.7 mm)
Displacement (mm)
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP3
H/V IMPACT ANGLE= 154 / 47
U10062
PRE TEST


4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP3
H/V IMPACT ANGLE= 154 / 47
U10062
PRE TEST
AP2


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP3
H/V IMPACT ANGLE= 154 / 47
U10062
POST TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP3
H/V IMPACT ANGLE= 154 / 47
U10062
POST TEST


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP3
H/V IMPACT ANGLE= 154 / 47
U10062
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): AP3Right

Temperature:21.4C

MGA Test Reference No.:U10062

Humidity:41.5%

Approach Horizontal Angles:154º

Time of Test:4:12:32 PM

Approach Vertical Angles:47º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
333	220	13.1	18.8	14	4 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.5	1.06	1.06
Y	6	J36197	109.5	0.84	0.84
Z	7	J36353	99.5	0.93	0.93

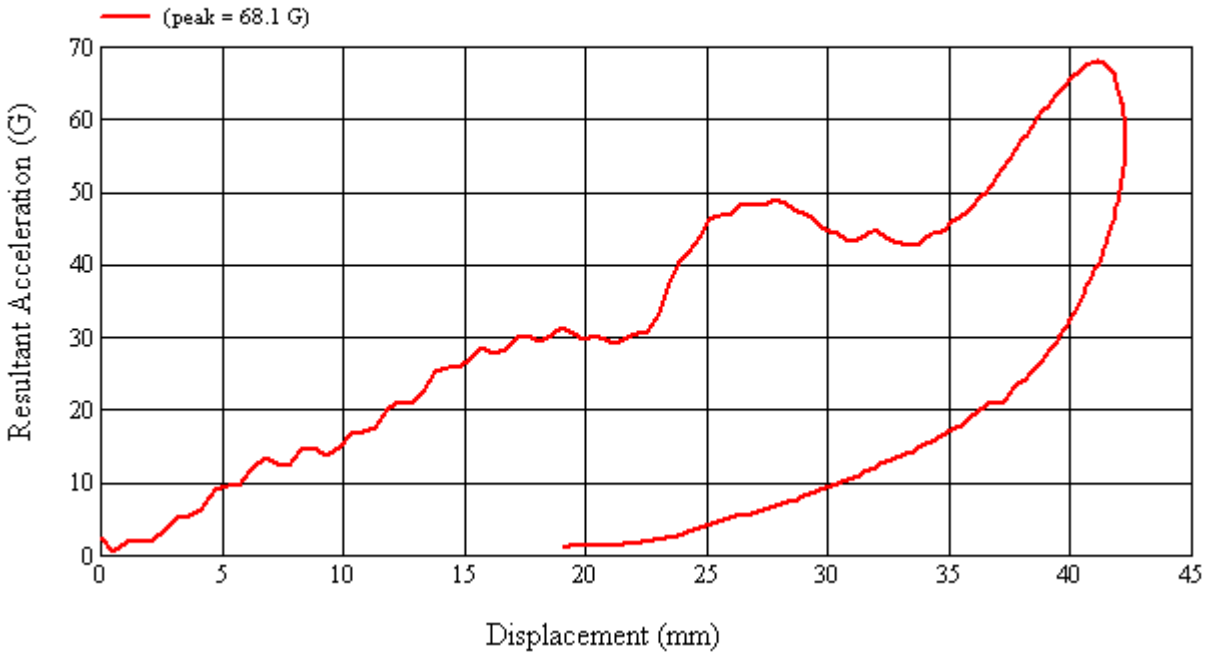
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

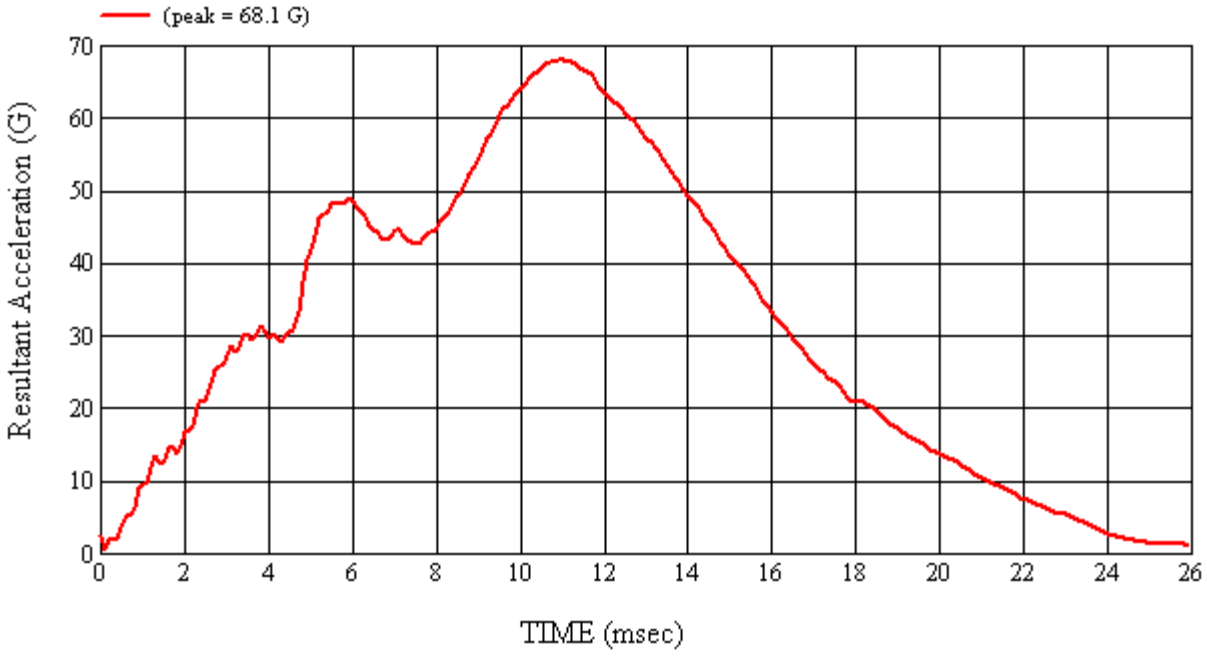
No visible damage

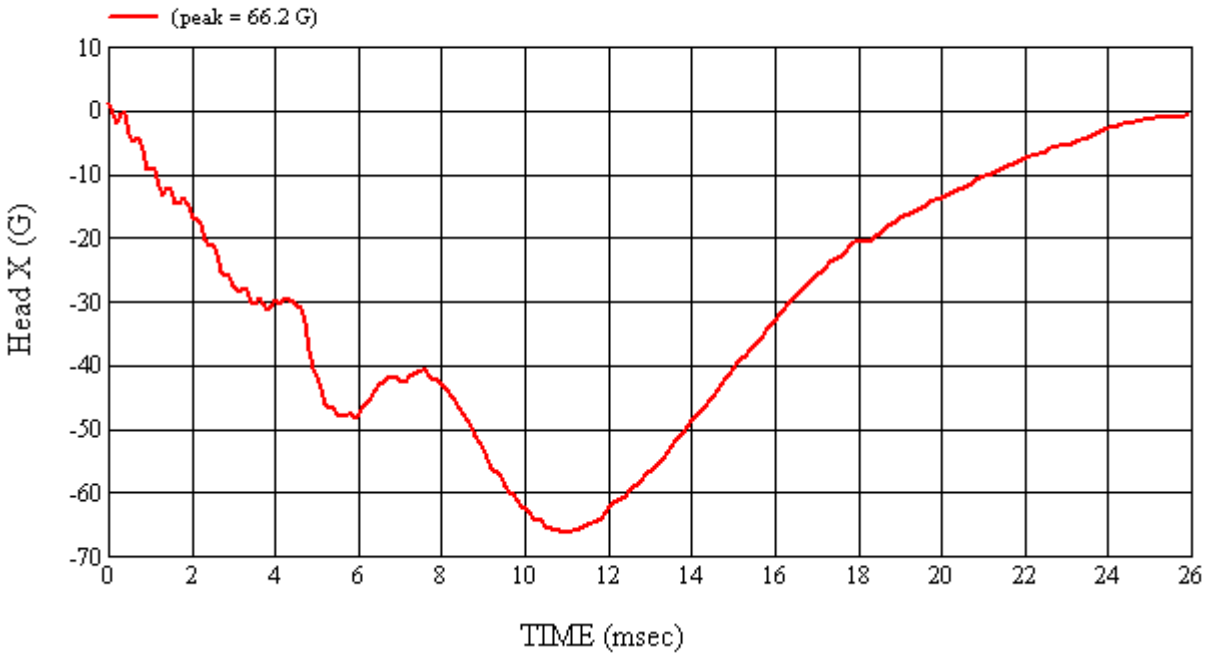
Recorded By: _____ Approved By*: _____ Date: 4/1/2010

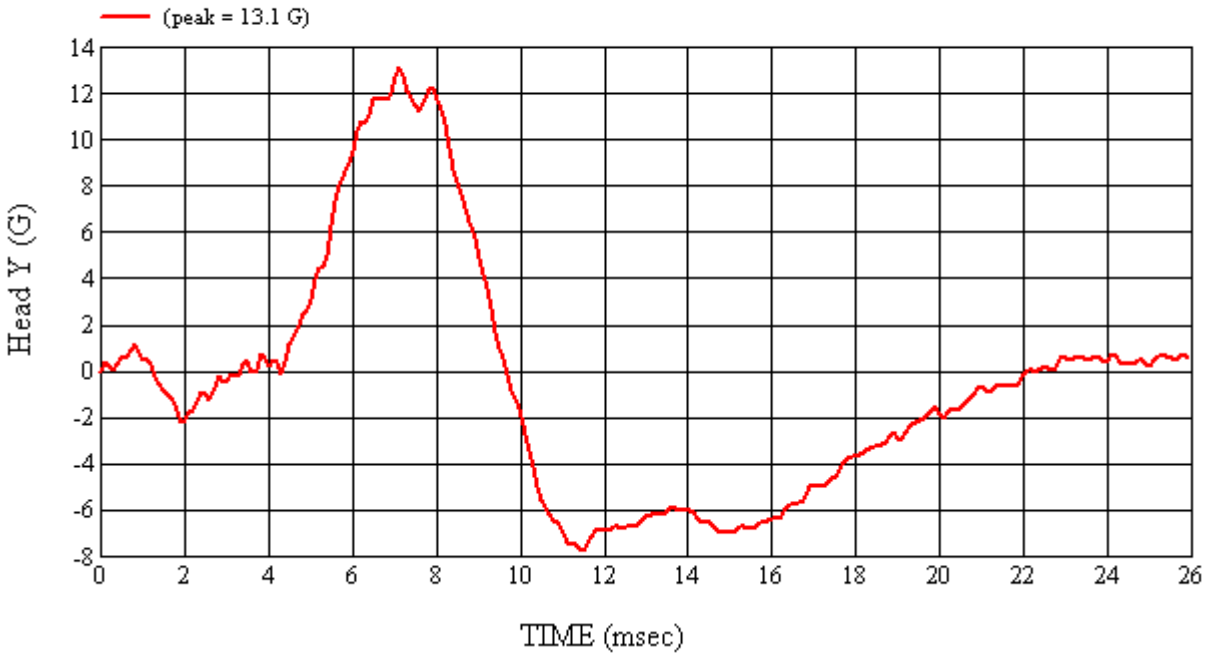
*Only necessary for NHTSA (Government) Compliance testing.

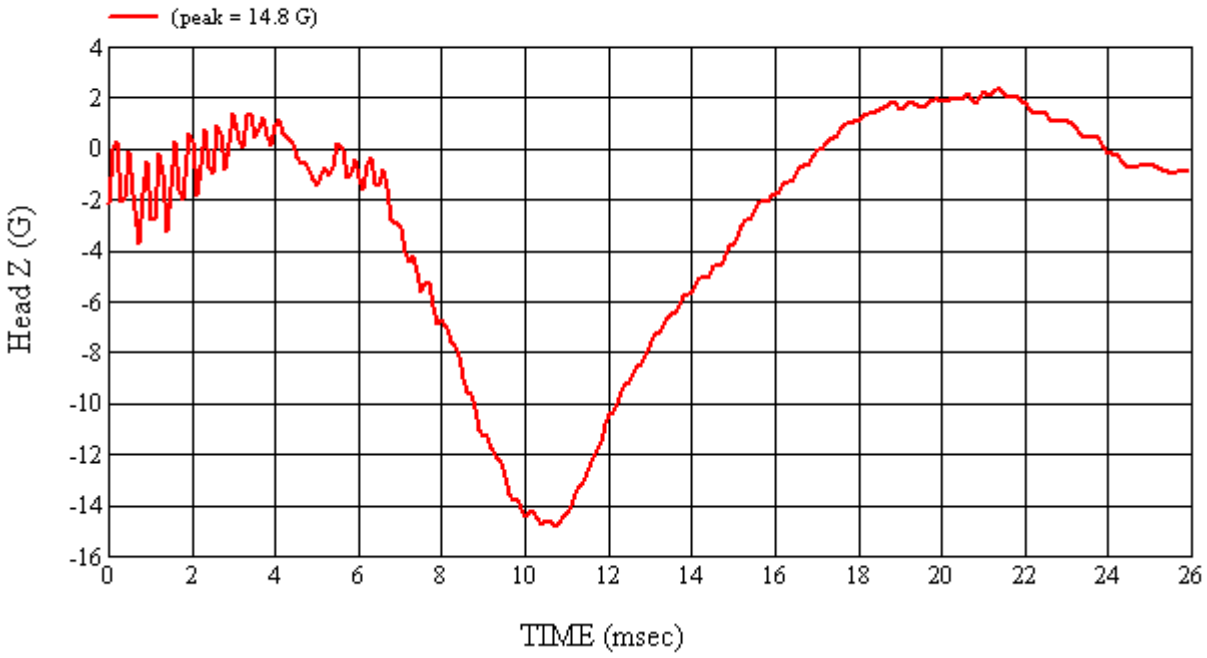
MGA Test #: U10062 Target Location: AP3, Right Side Test Date: 4/1/2010

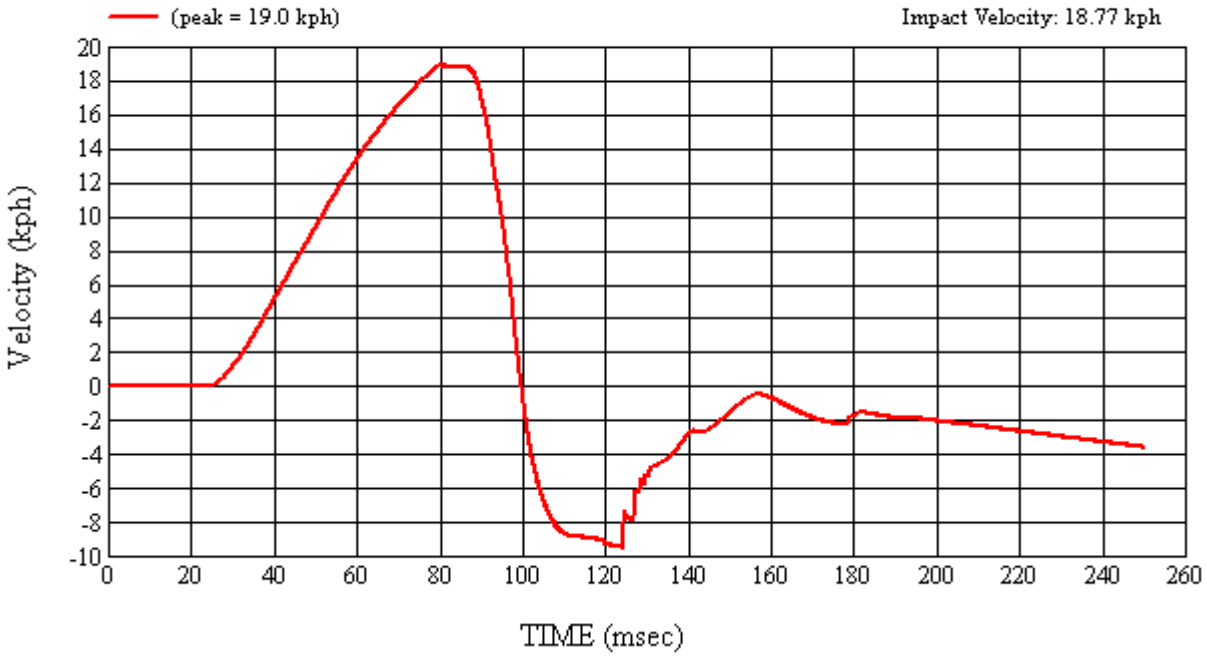


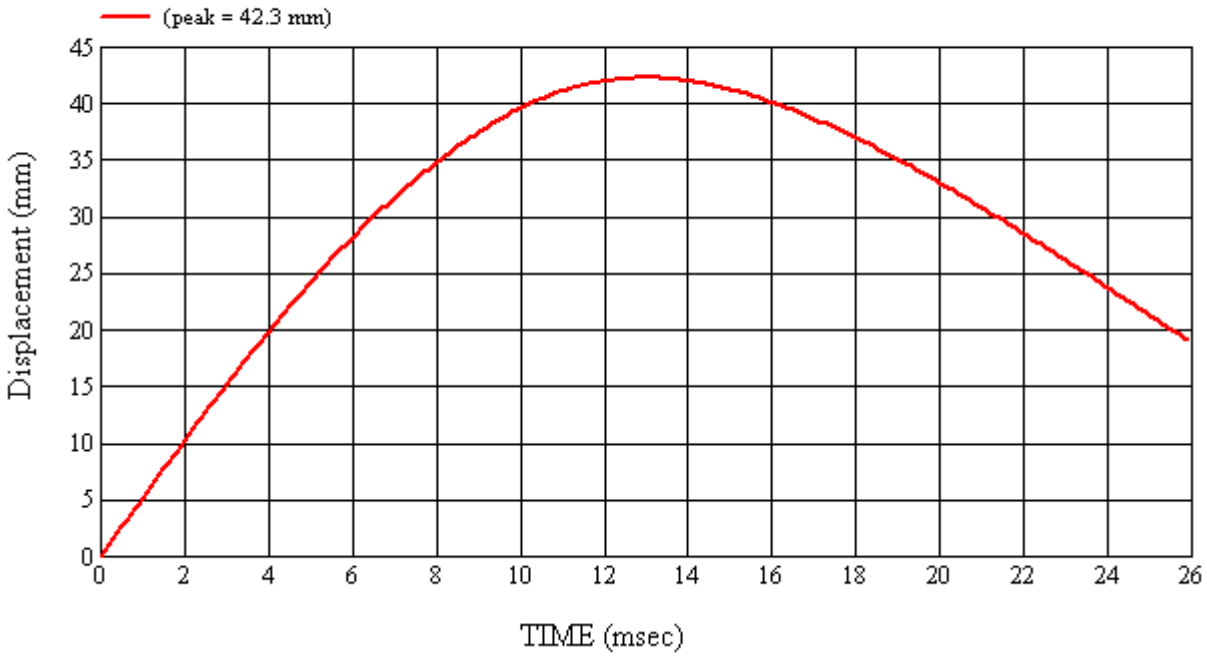


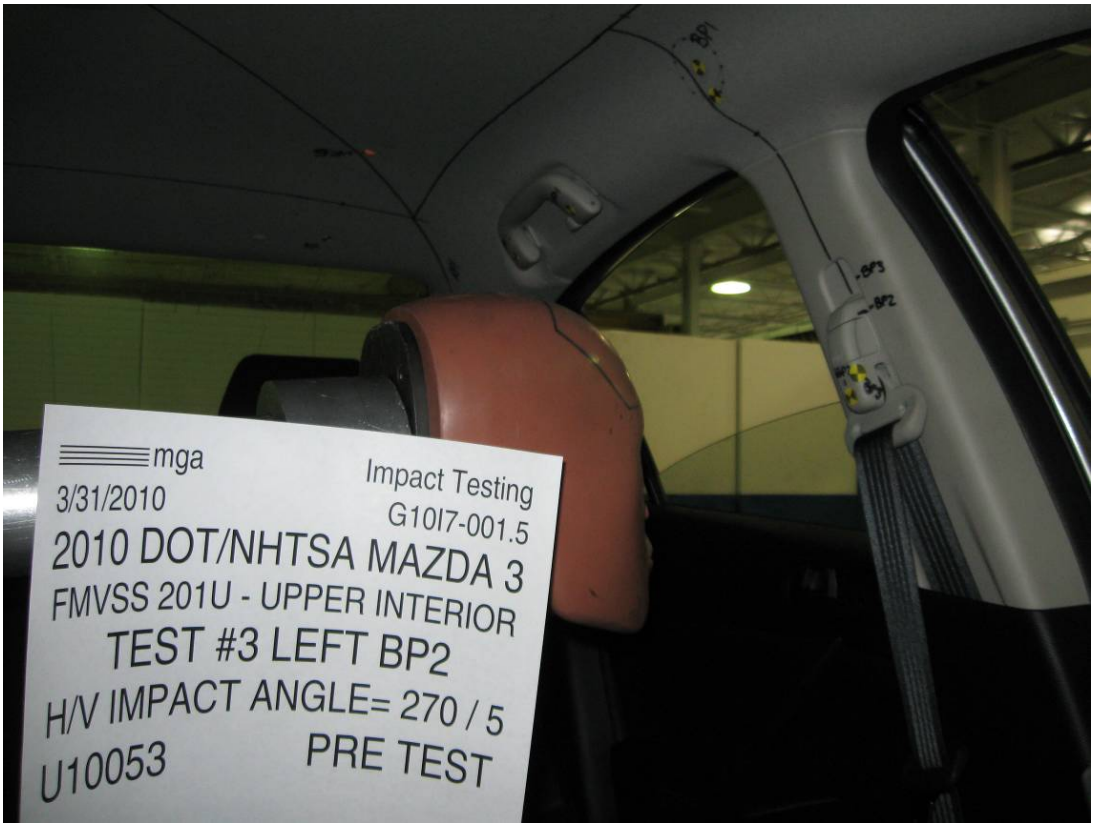

(peak = 66.2 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

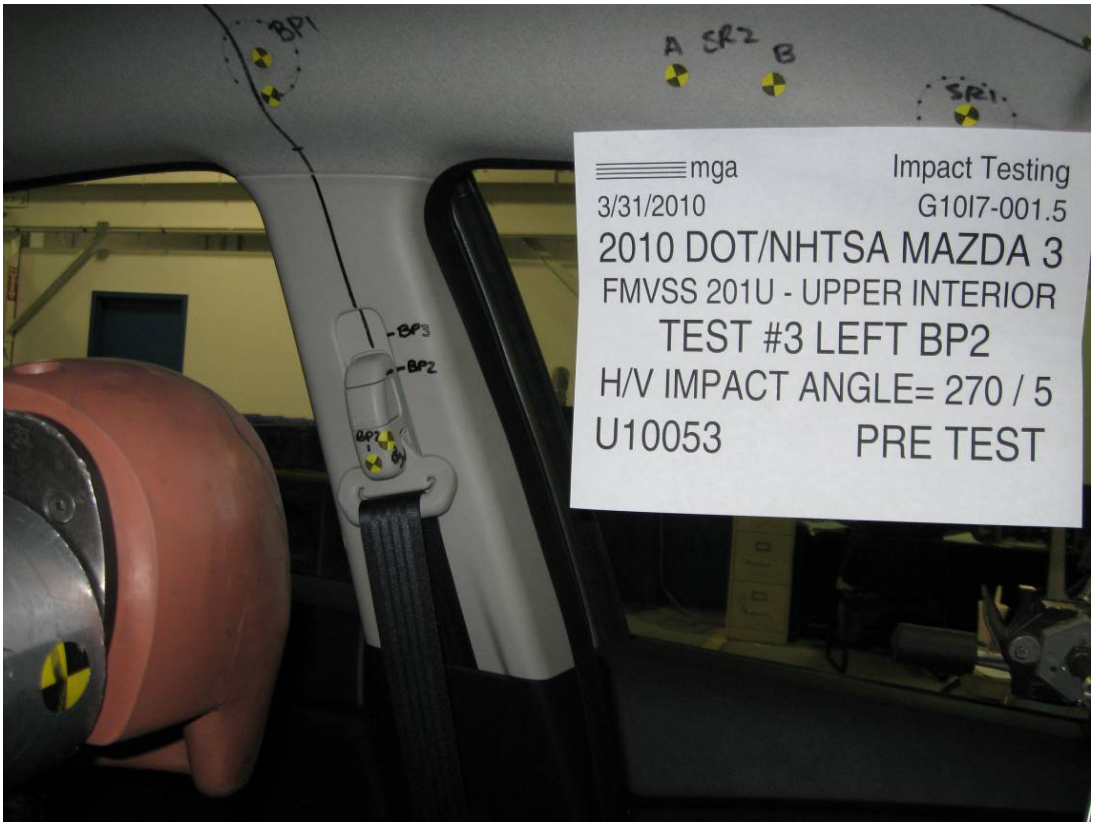

(peak = 13.1 G)
Head Y (G)
14
12
10
8
6
4
2
0
-2
-4
-6
-8
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

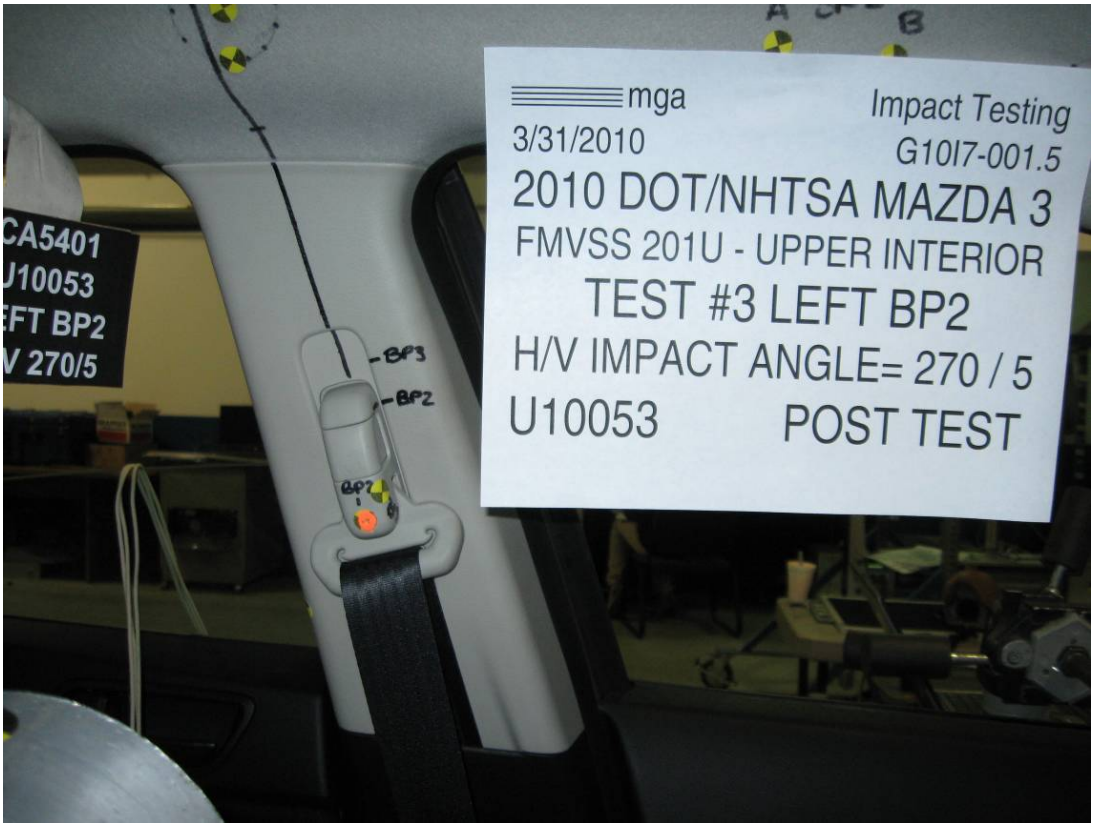

(peak = 14.8 G)
Head Z (G)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 19.0 kph)
Impact Velocity: 18.77 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 42.3 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


BP1
BP3
BP2
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U10053
PRE TEST


BP1
A
SR2
B
SR1
BP3
BP2
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U10053
PRE TEST


CA5401
U10053
FT BP2
V 270/5
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U10053
POST TEST


mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U10053
POST TEST


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U10053
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): BP2Left

Temperature:22.6C

MGA Test Reference No.:U10053

Humidity:30.7%

Approach Horizontal Angles:270º

Time of Test:2:45:02 PM

Approach Vertical Angles:5º

FMH Serial No:[038]

Additional Description: Seatbelt anchorage second from top position

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
625	608	8.4	24.1	12	5 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.5	1.06	1.06
Y	6	J36197	109.5	0.84	0.84
Z	7	J36353	99.5	0.93	0.93

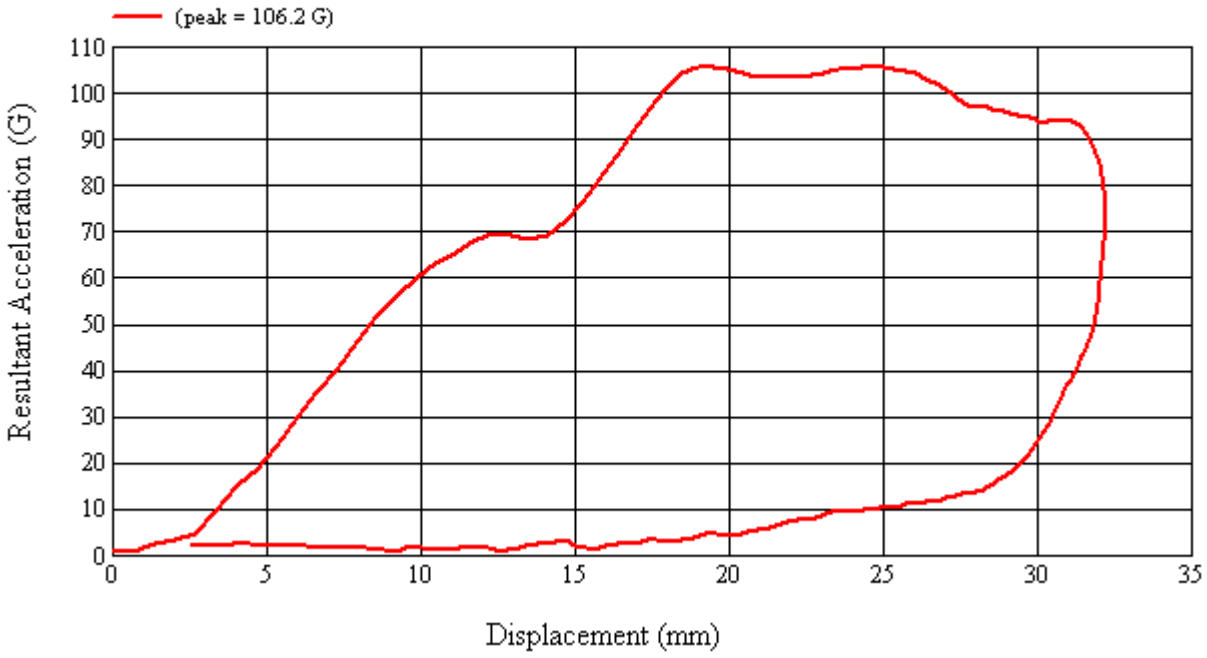
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

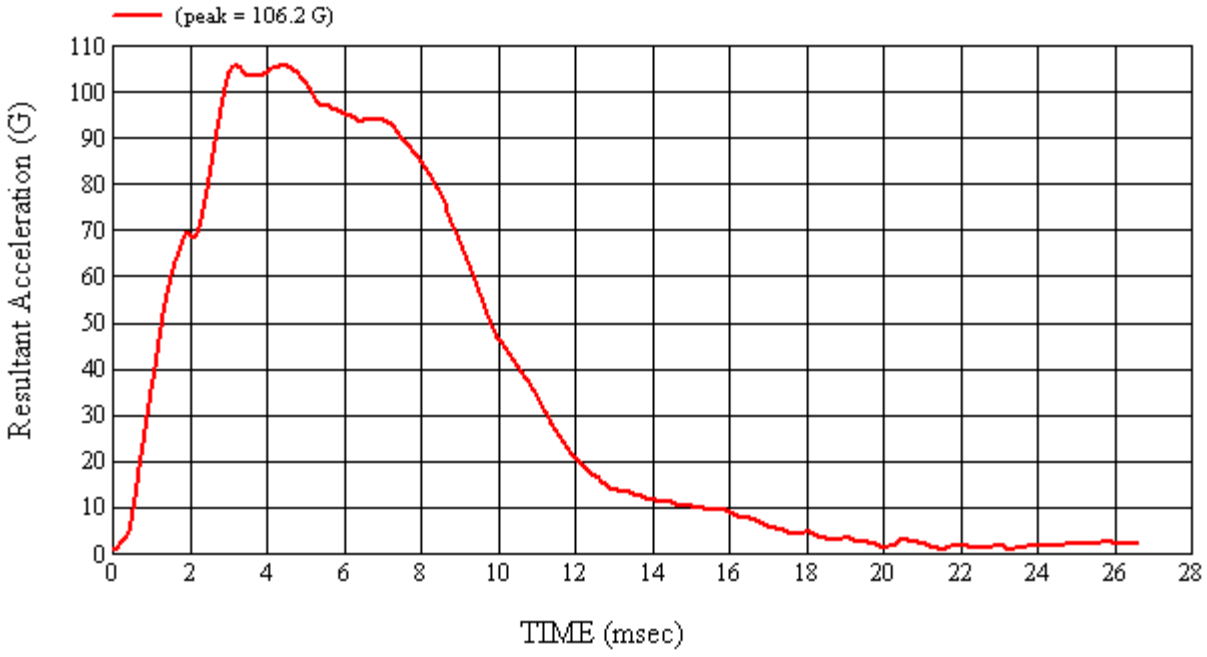
Anchorage compression

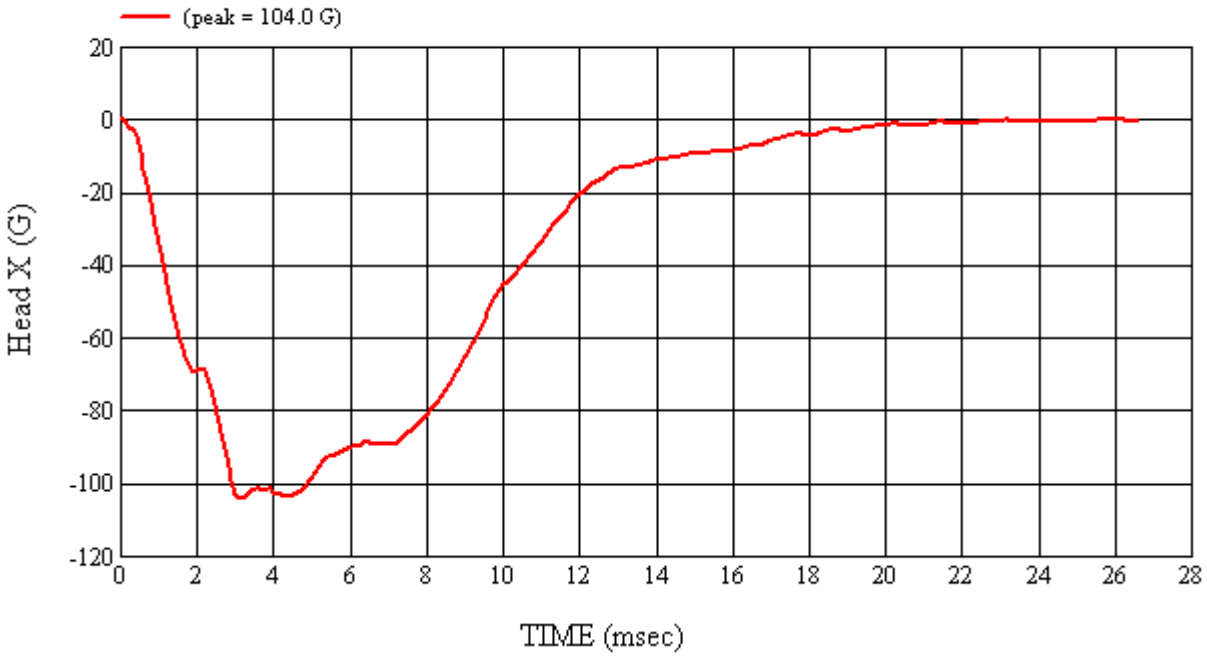
Recorded By: _____ Approved By*: _____ Date: 3/31/2010

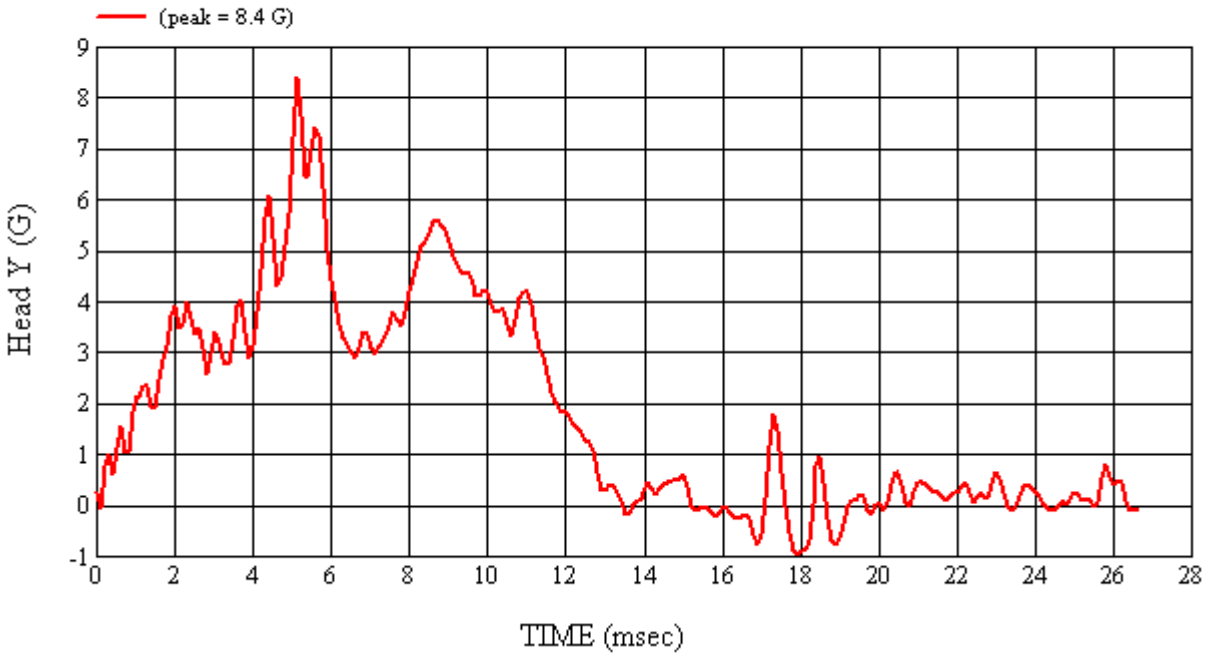
*Only necessary for NHTSA (Government) Compliance testing.

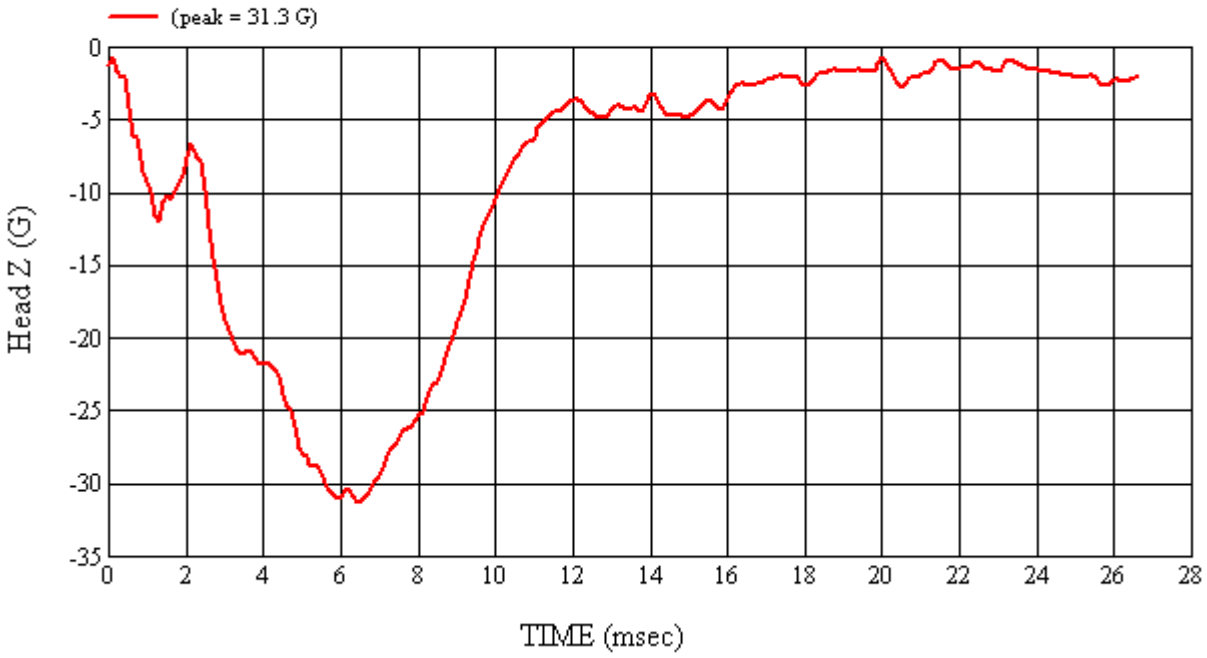
MGA Test #: U10053 Target Location: BP2, Left Side Test Date: 3/31/2010

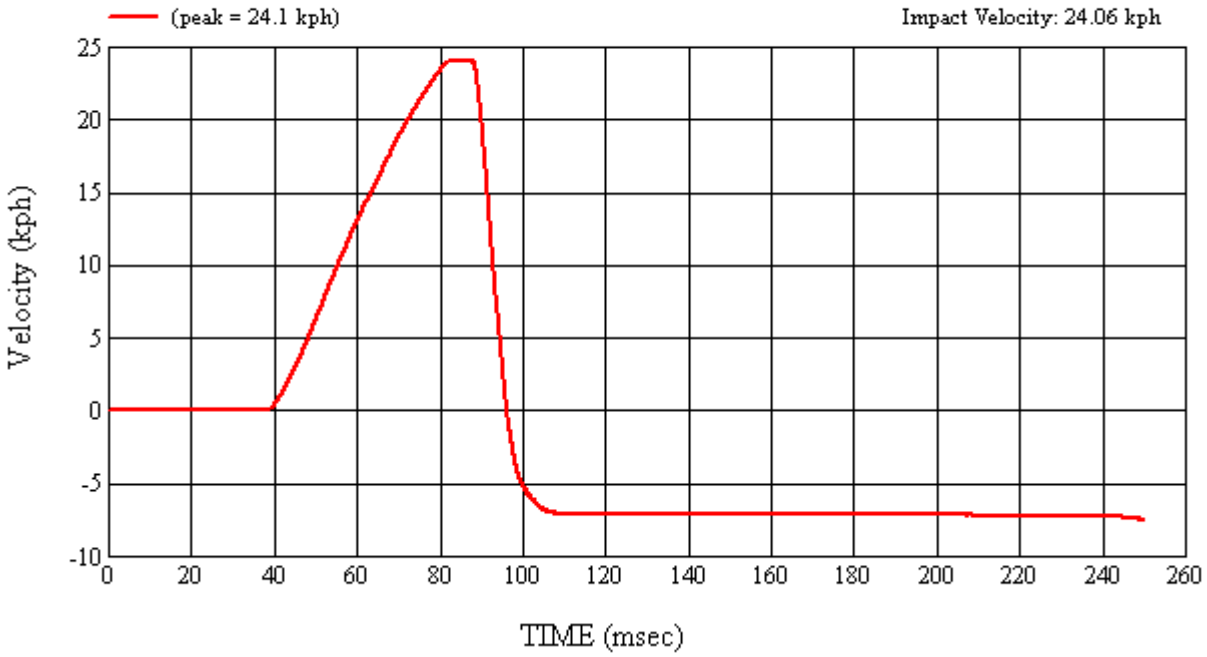


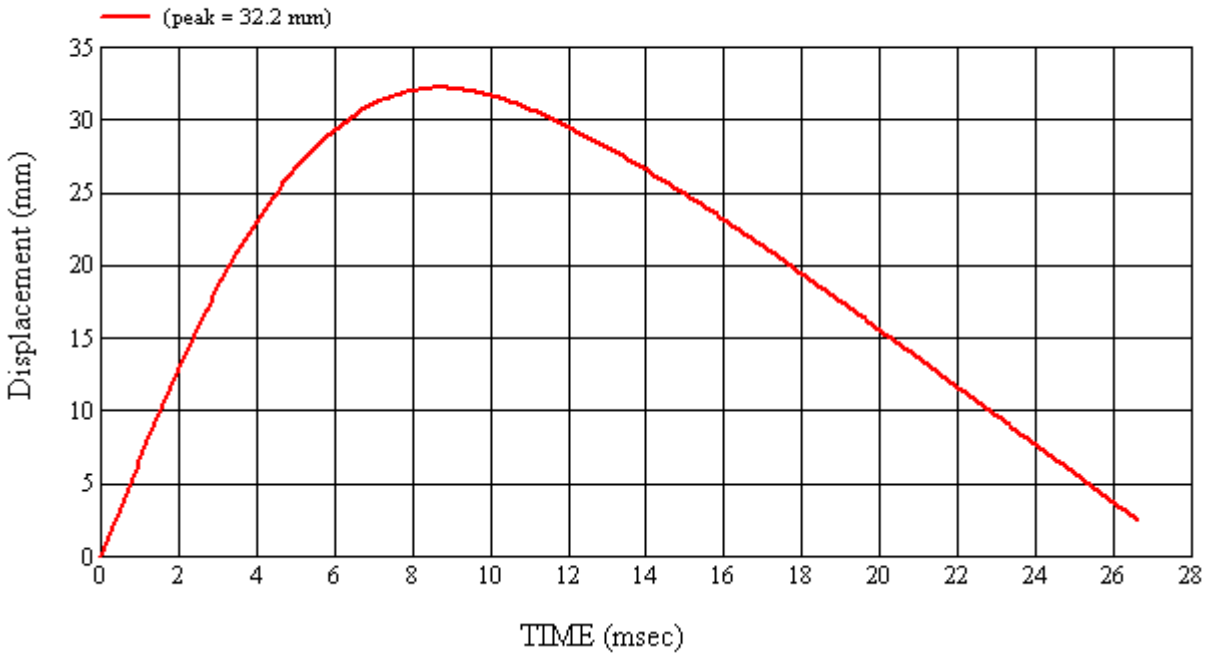



(peak = 104.0 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)

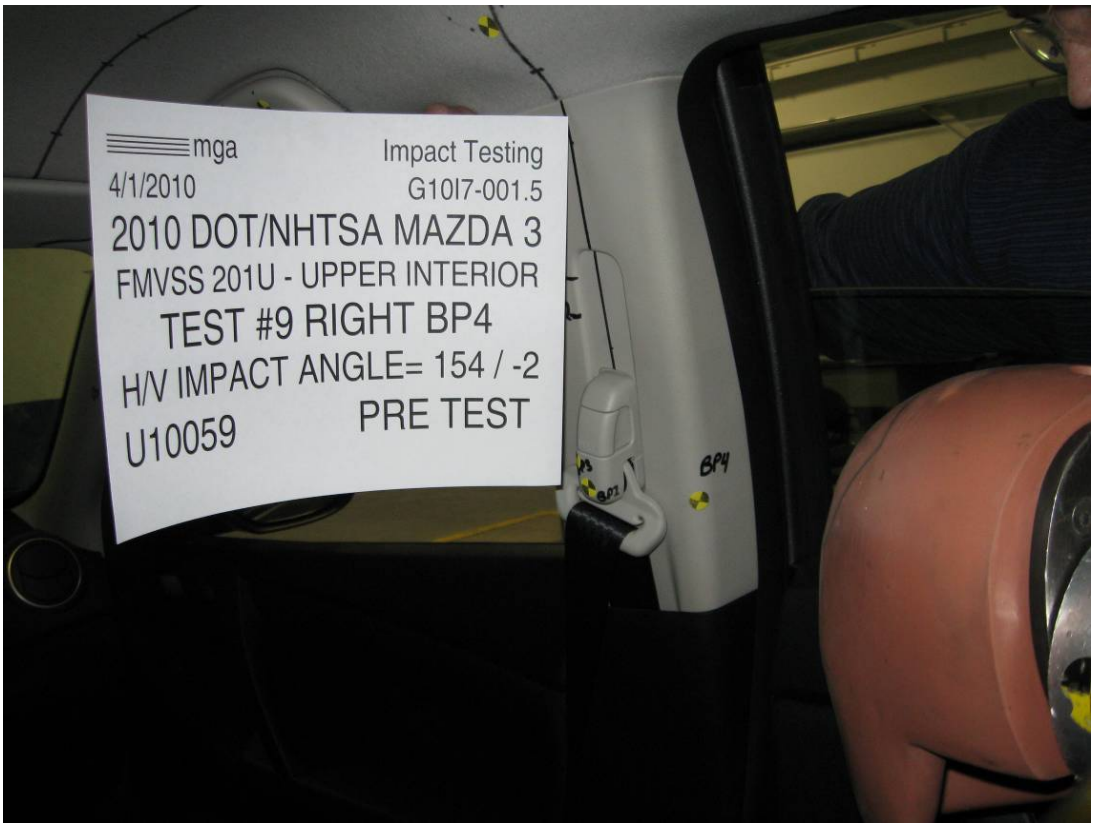

(peak = 8.4 G)
Head Y (G)
9
8
7
6
5
4
3
2
1
0
-1
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)

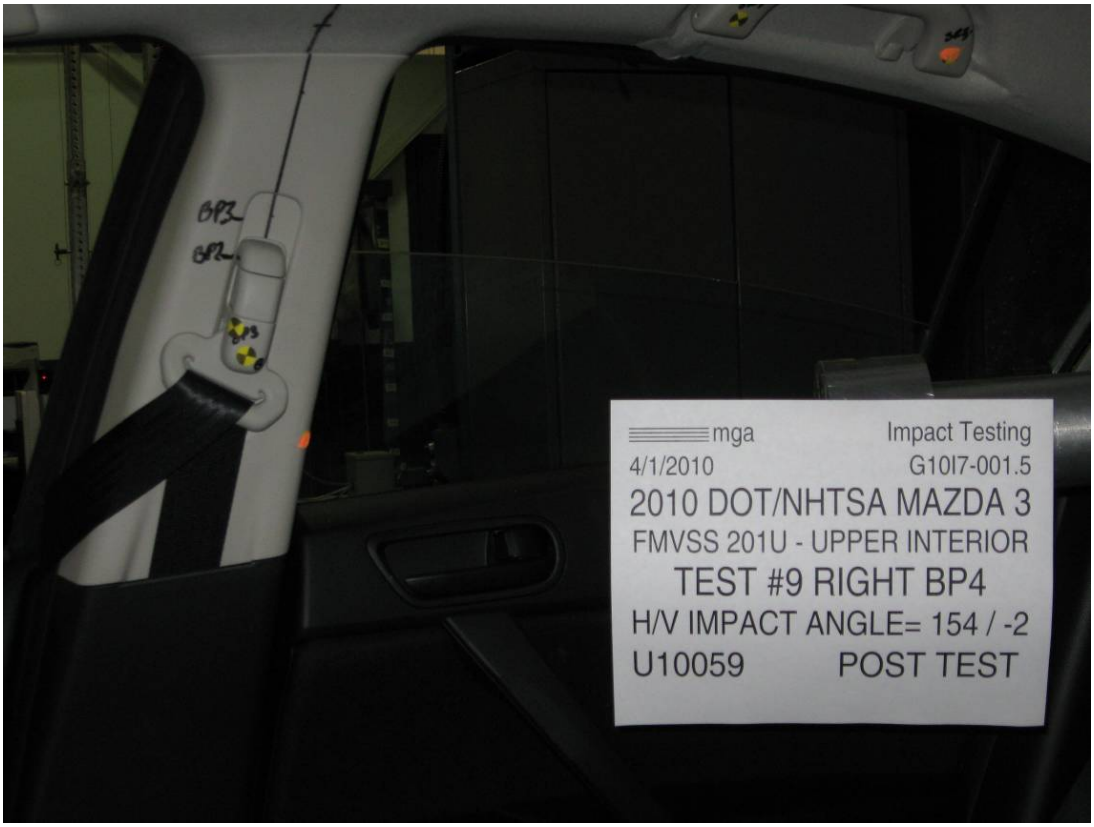

(peak = 31.3 G)
Head Z (G)
0
-5
-10
-15
-20
-25
-30
-35
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


(peak = 24.1 kph)
Impact Velocity: 24.06 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 32.2 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP4
H/V IMPACT ANGLE= 154 / -2
U10059
PRE TEST


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP4
H/V IMPACT ANGLE= 154 / -2
U10059
PRE TEST


BP3
BP2
mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP4
H/V IMPACT ANGLE= 154 / -2
U10059
POST TEST


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP4
H/V IMPACT ANGLE= 154 / -2
U10059
POST TEST
BP4


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP4
H/V IMPACT ANGLE= 154 / -2
U10059
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): BP4Right

Temperature:22.0C

MGA Test Reference No.:U10059

Humidity:36.6%

Approach Horizontal Angles:154º

Time of Test:11:11:22 AM

Approach Vertical Angles:-2º

FMH Serial No:[038]

Additional Description: Seatbelt anchorage full down

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
876	941	6.7	23.7	10	6 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.5	1.06	1.06
Y	6	J36197	109.5	0.84	0.84
Z	7	J36353	99.5	0.93	0.93

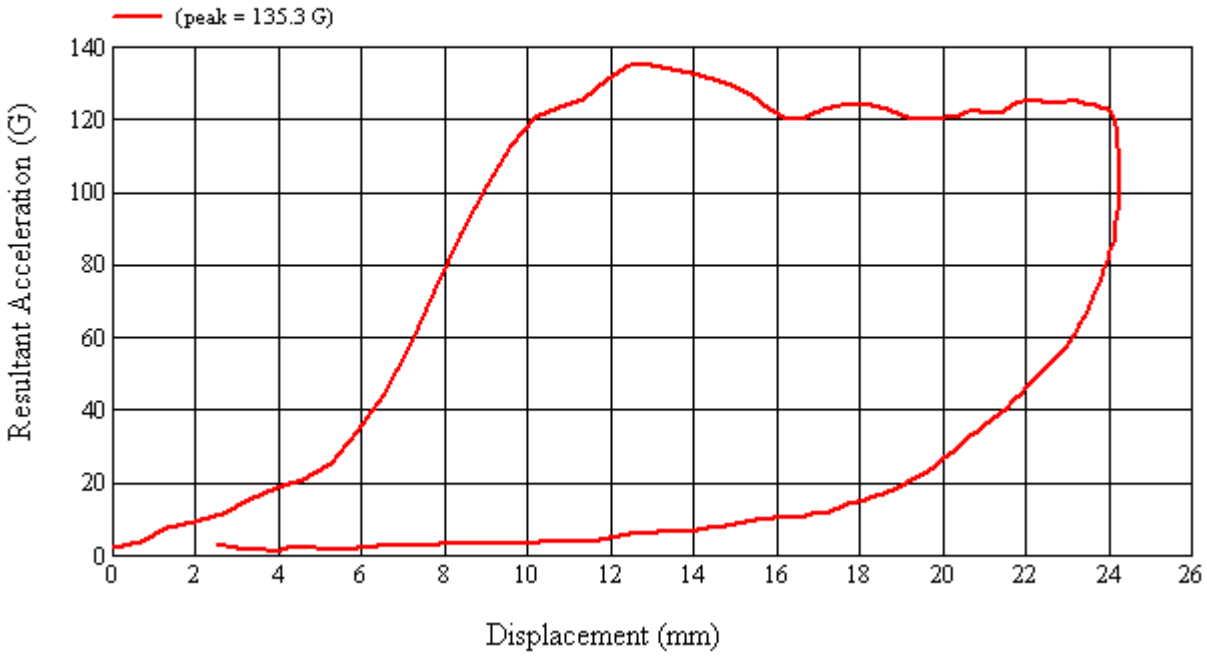
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

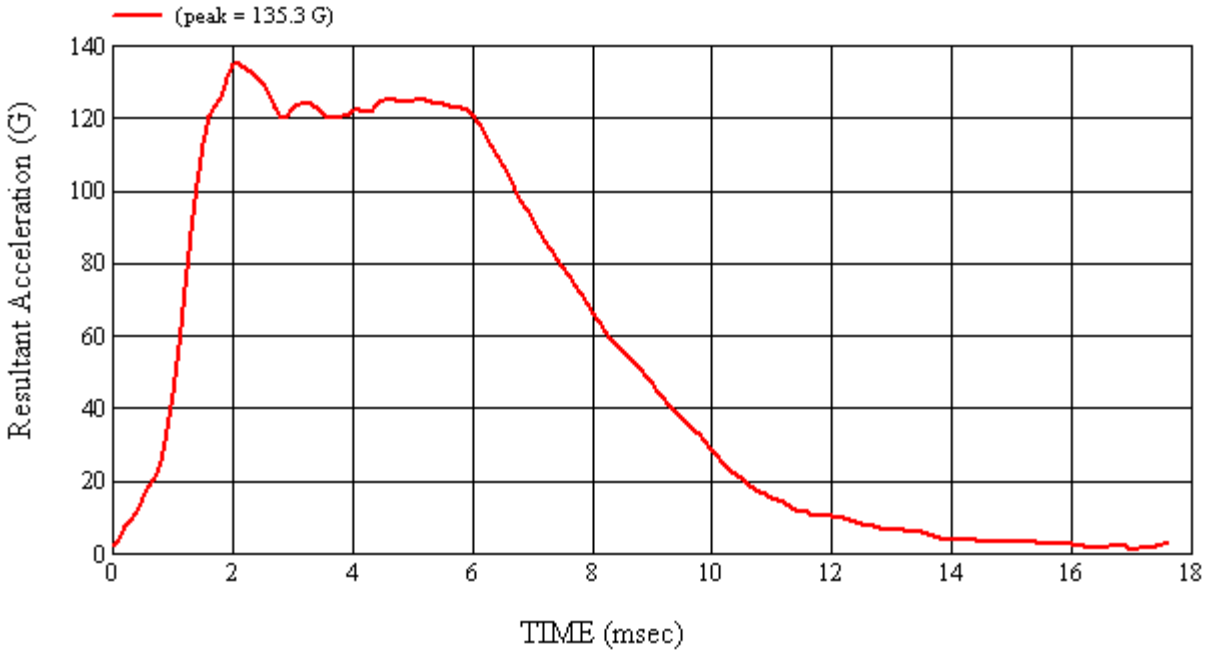
No visible damage

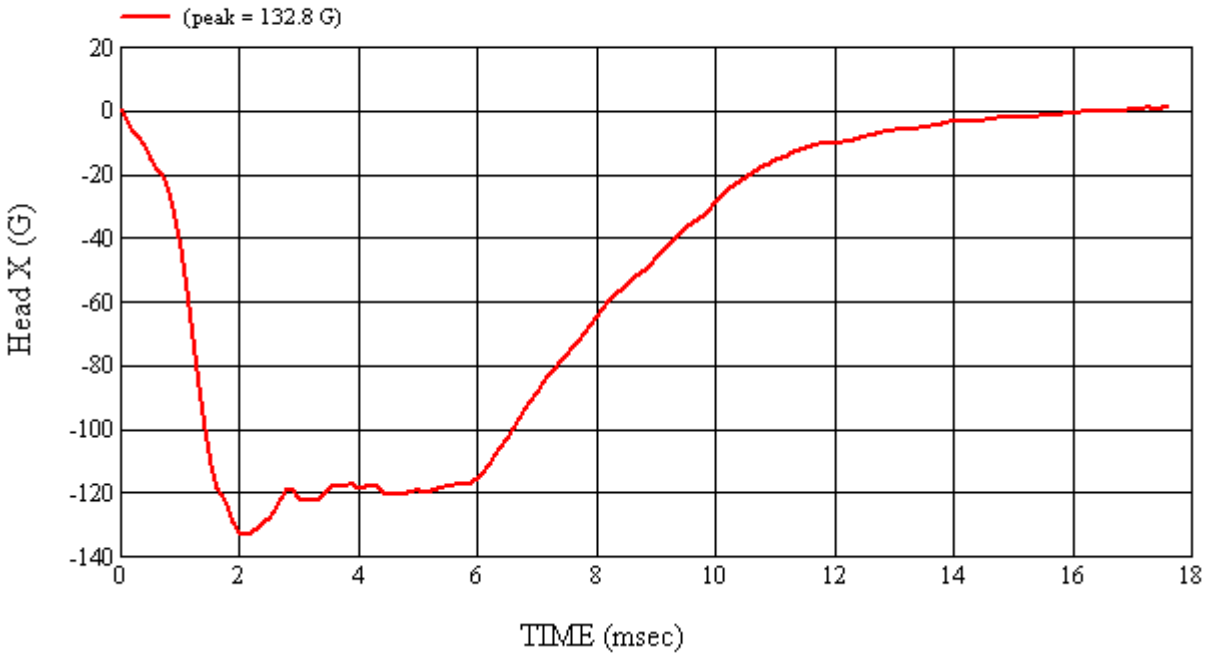
Recorded By: _____ Approved By*: _____ Date: 4/01/2010

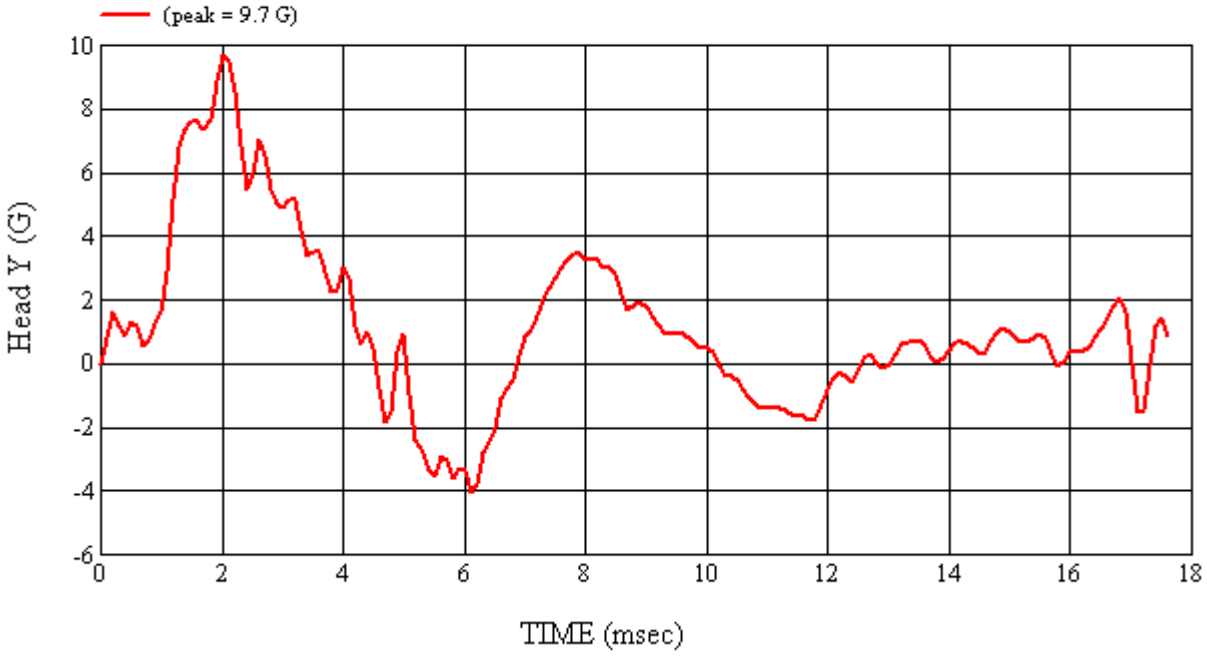
*Only necessary for NHTSA (Government) Compliance testing.

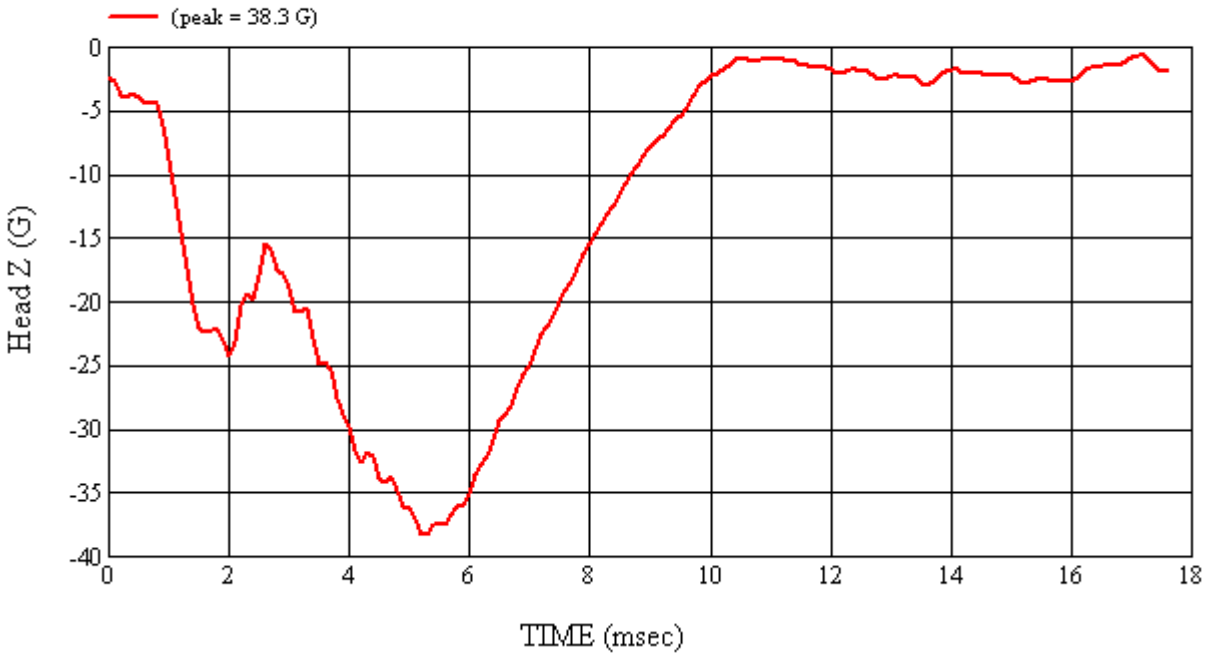
MGA Test #: U10059 Target Location: BP4, Right Side Test Date: 4/1/2010

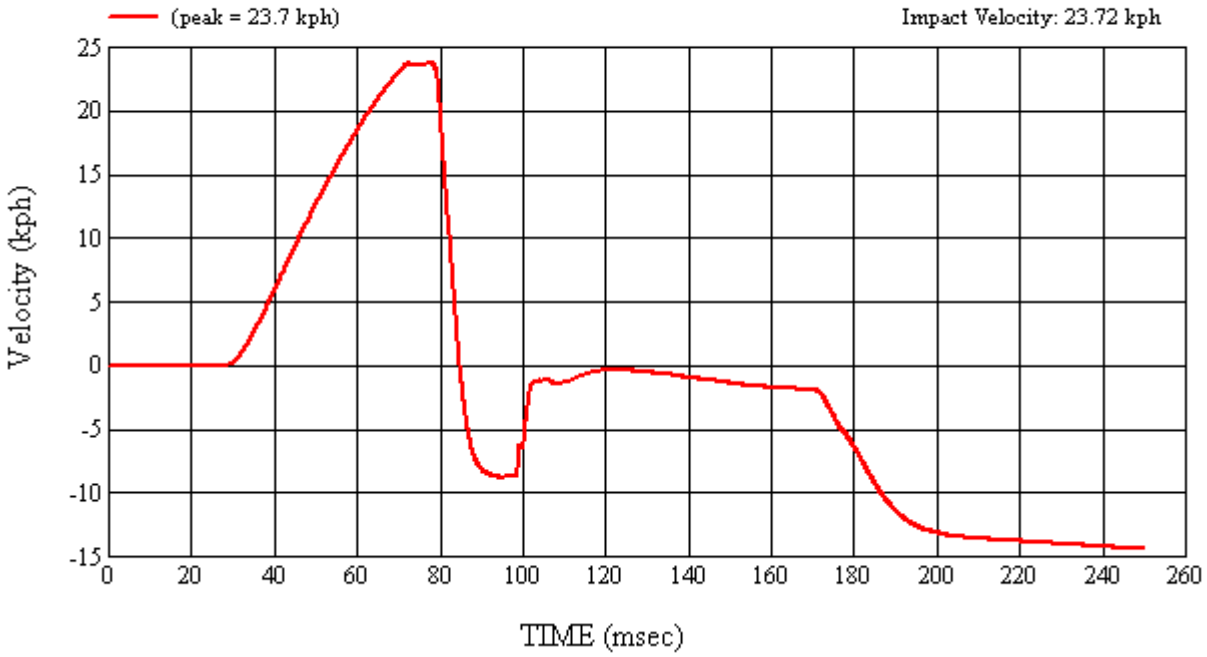


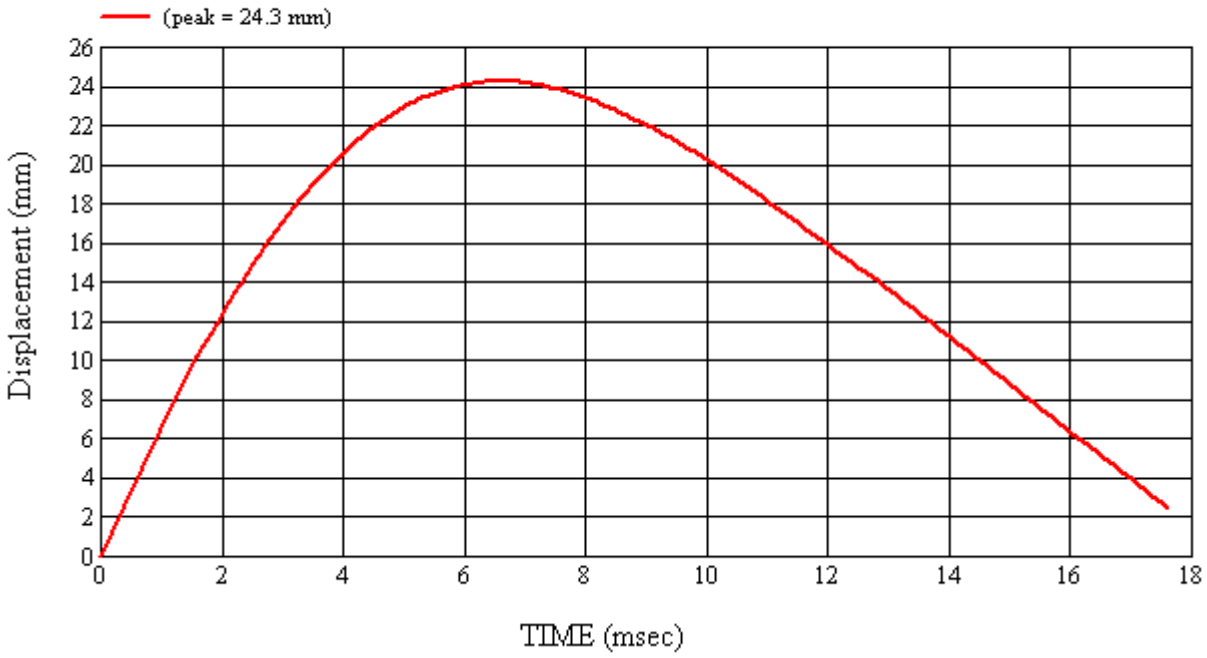


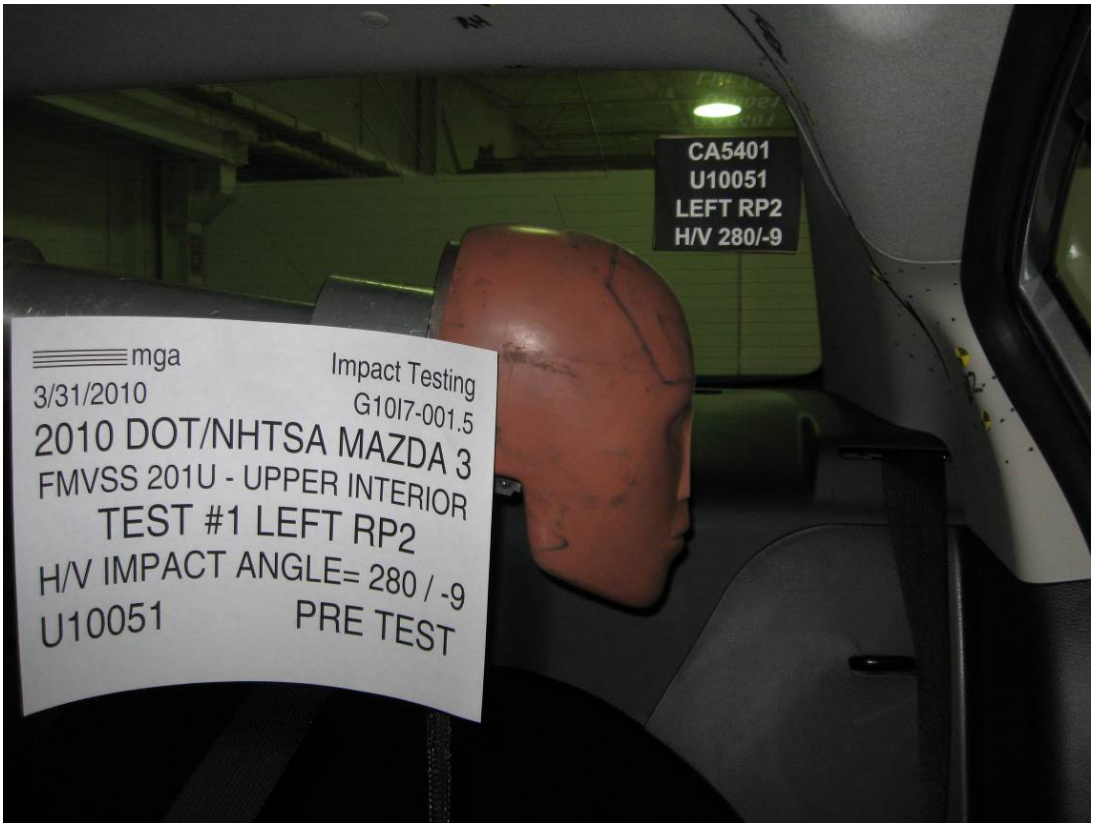

(peak = 132.8 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
TIME (msec)

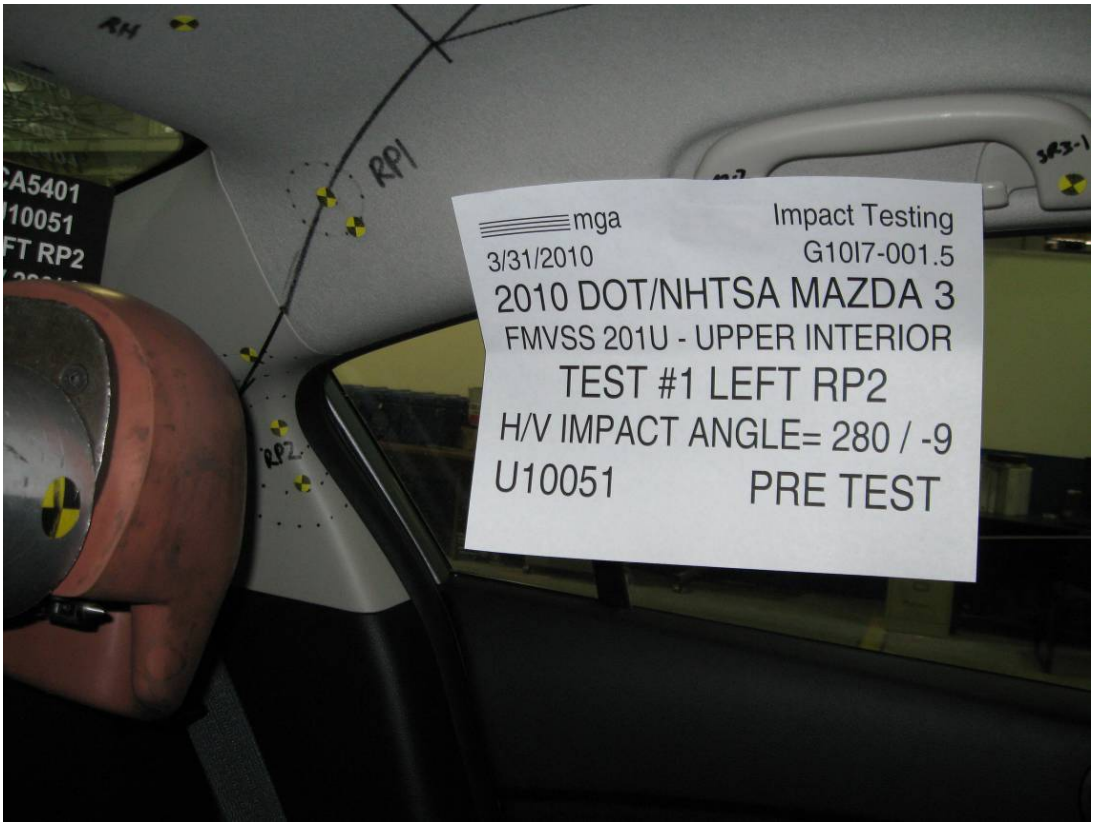

(peak = 9.7 G)
Head Y (G)
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
TIME (msec)

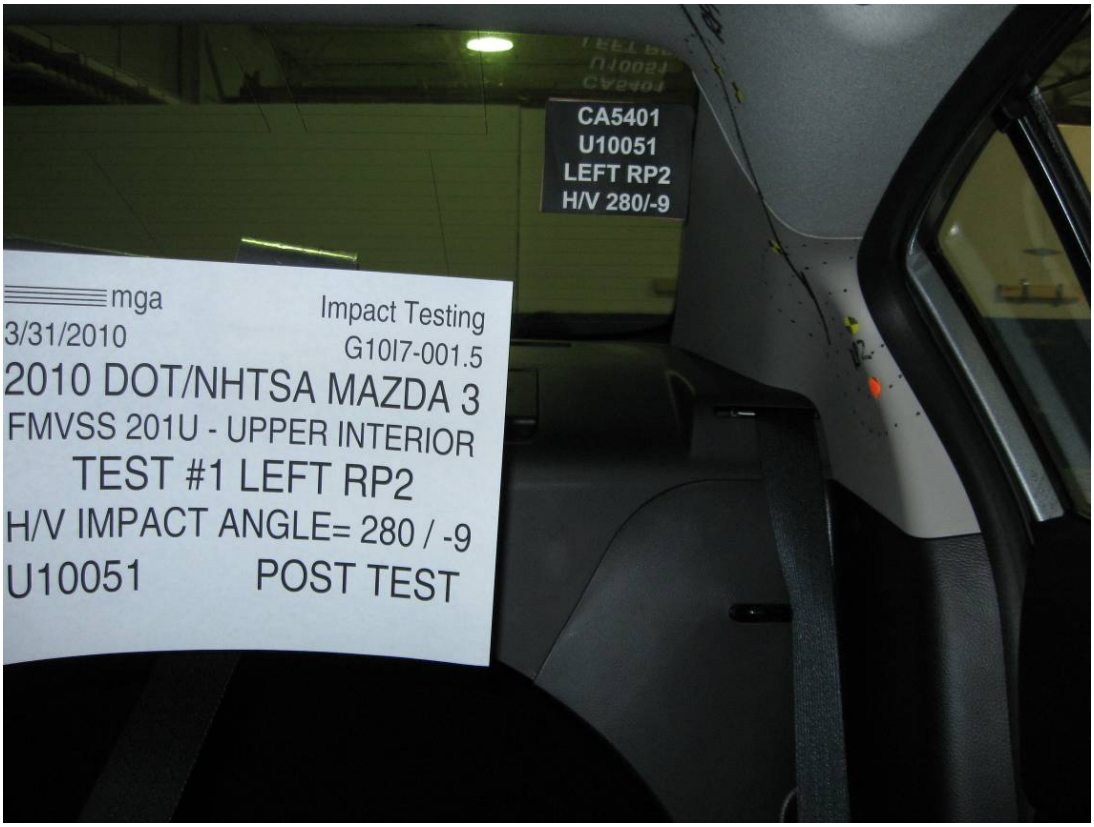

(peak = 38.3 G)
Head Z (G)
0
-5
-10
-15
-20
-25
-30
-35
-40
0
2
4
6
8
10
12
14
16
18
TIME (msec)

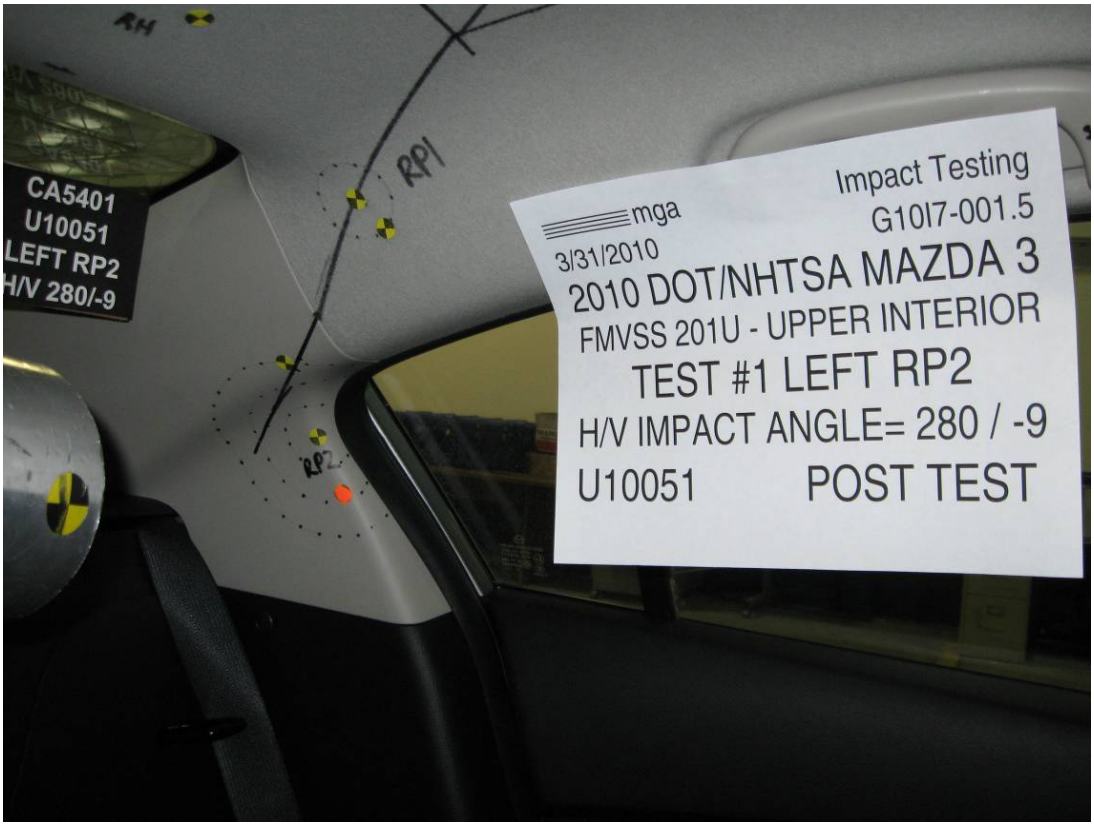

(peak = 23.7 kph)
Impact Velocity: 23.72 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

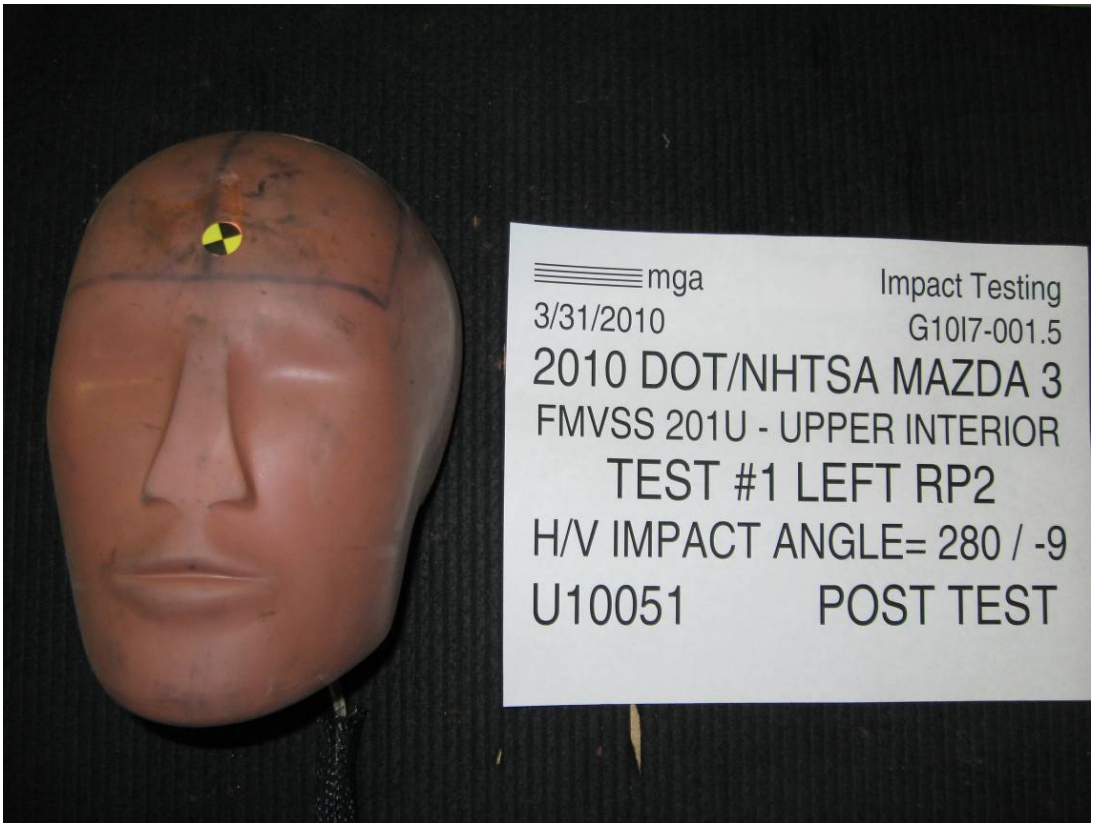

(peak = 24.3 mm)
Displacement (mm)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
0
2
4
6
8
10
12
14
16
18
TIME (msec)


CA5401
U10051
LEFT RP2
H/V 280/-9
mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT RP2
H/V IMPACT ANGLE= 280 / -9
U10051
PRE TEST


RP1
RP2
mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT RP2
H/V IMPACT ANGLE= 280 / -9
U10051
PRE TEST


CA5401
U10051
LEFT RP2
H/V 280/-9
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT RP2
H/V IMPACT ANGLE= 280 / -9
U10051
POST TEST


RH
RP1
RP2
CA5401
U10051
LEFT RP2
H/V 280/-9
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT RP2
H/V IMPACT ANGLE= 280 / -9
U10051
POST TEST


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT RP2
H/V IMPACT ANGLE= 280 / -9
U10051
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): RP2Left

Temperature:20.1C

MGA Test Reference No.:U10051

Humidity:31.6%

Approach Horizontal Angles:280º

Time of Test:12:49:43 PM

Approach Vertical Angles:-9º

FMH Serial No:[035]

Additional Description:2 relocations

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
629	614	9.4	24.1	14	3 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-96.3	1.06	1.06
Y	6	J22664	95.2	0.84	0.84
Z	7	J35924	93.8	0.93	0.93

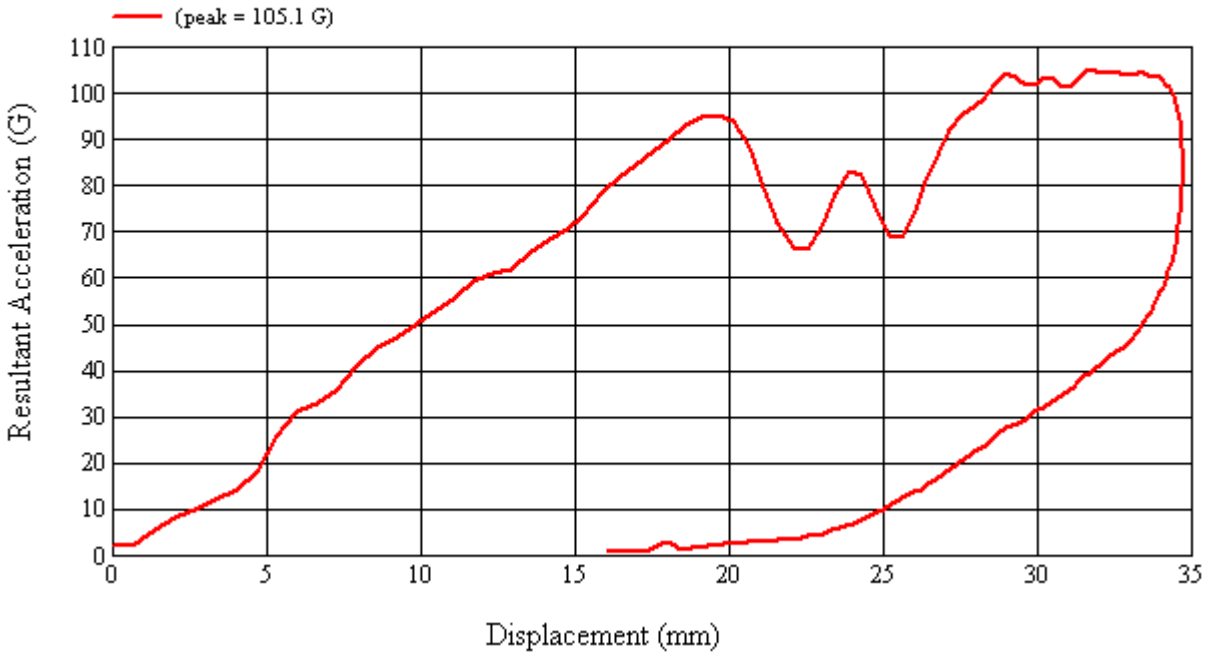
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

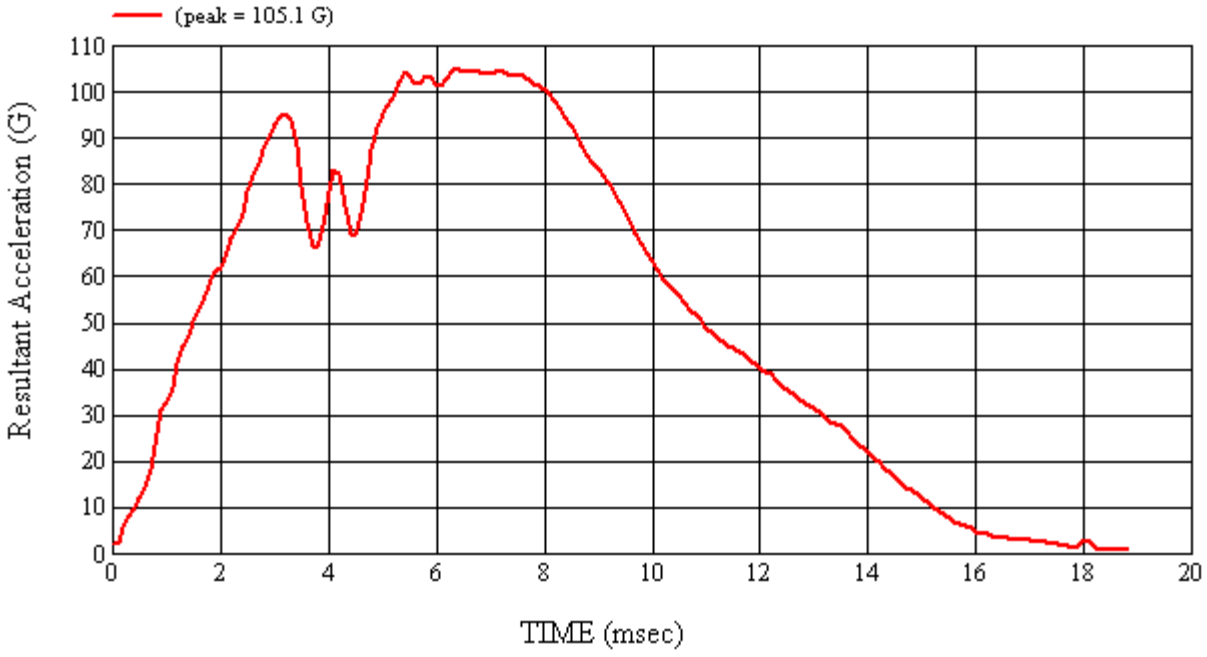
No visible damage

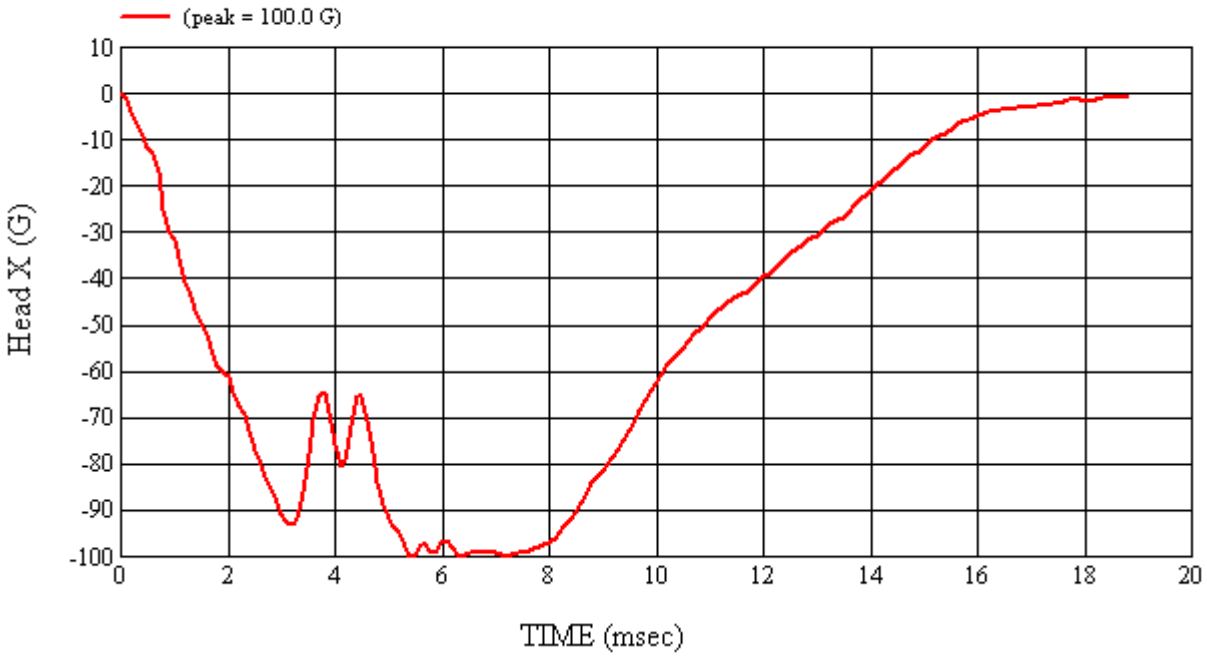
Recorded By: _____ Approved By*: _____ Date: 3/31/2010

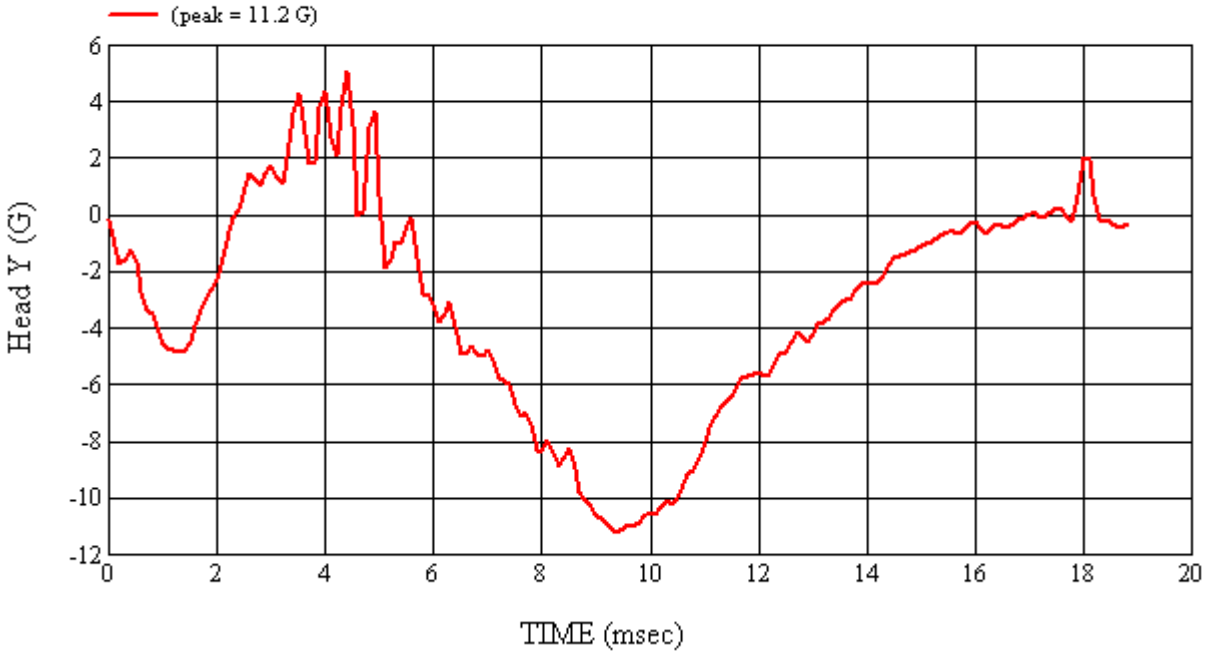
*Only necessary for NHTSA (Government) Compliance testing.

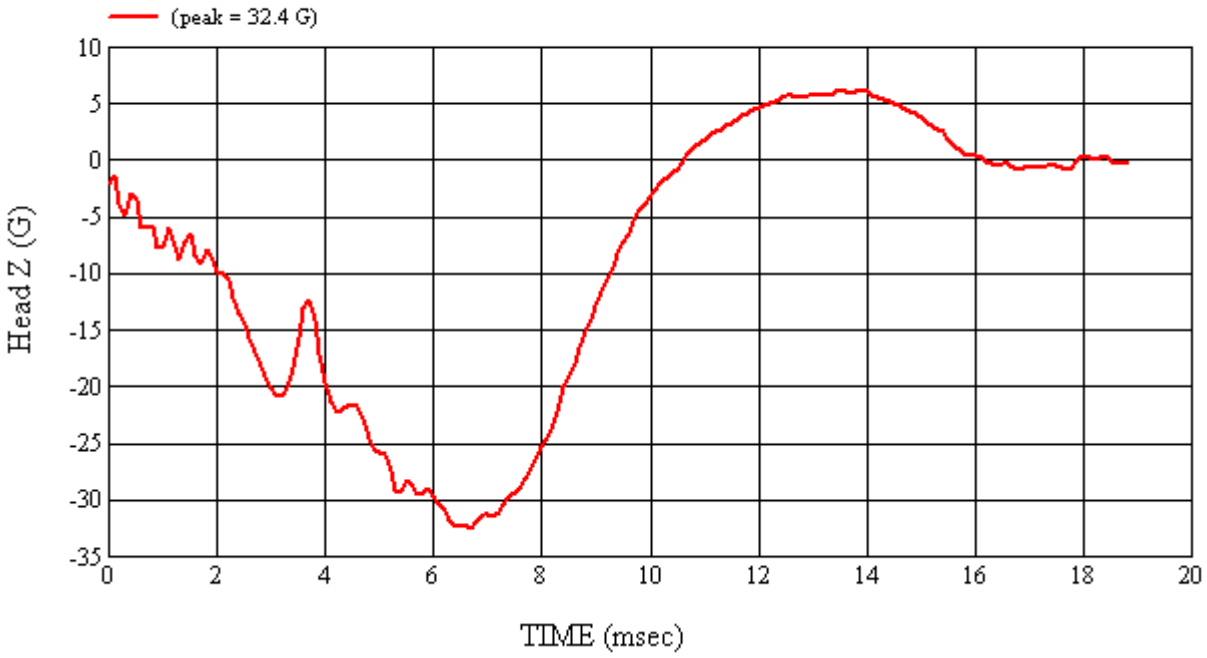
MGA Test #: U10051 Target Location: RP2, Left Side Test Date: 3/31/2010

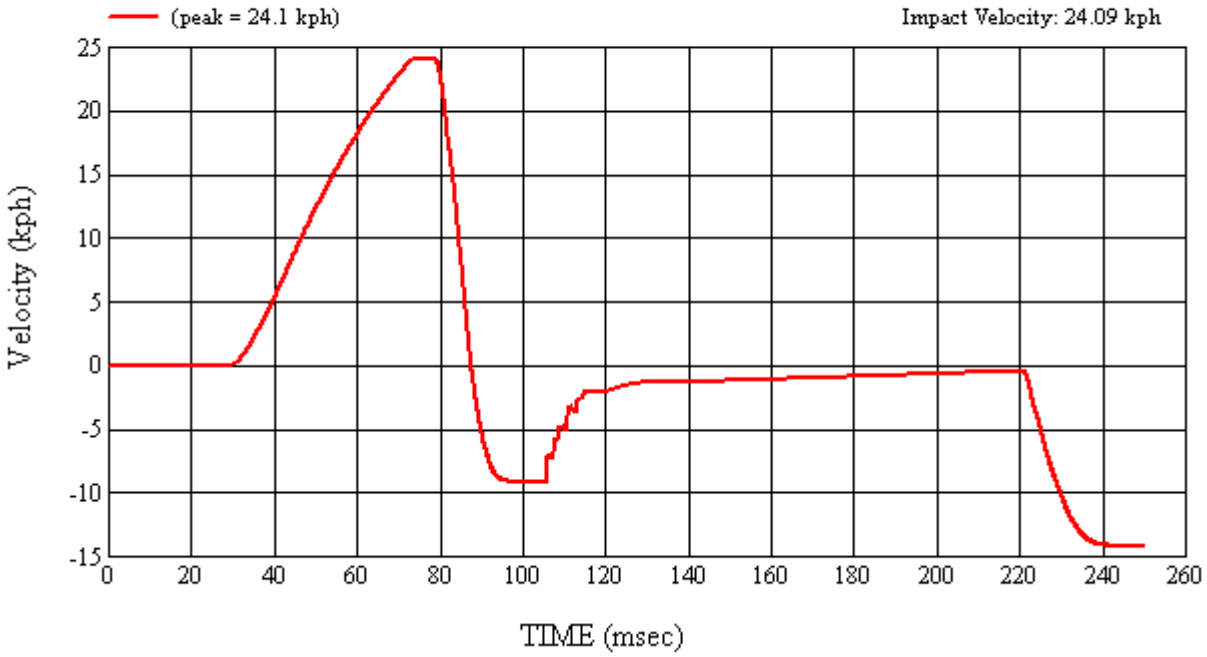


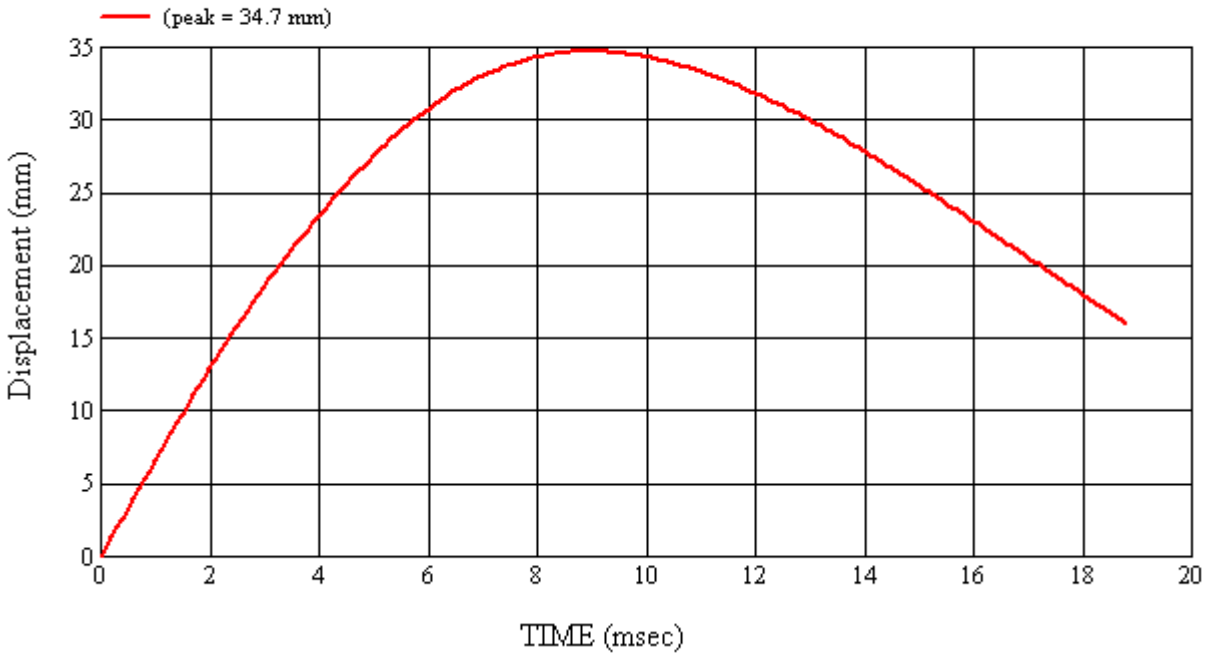


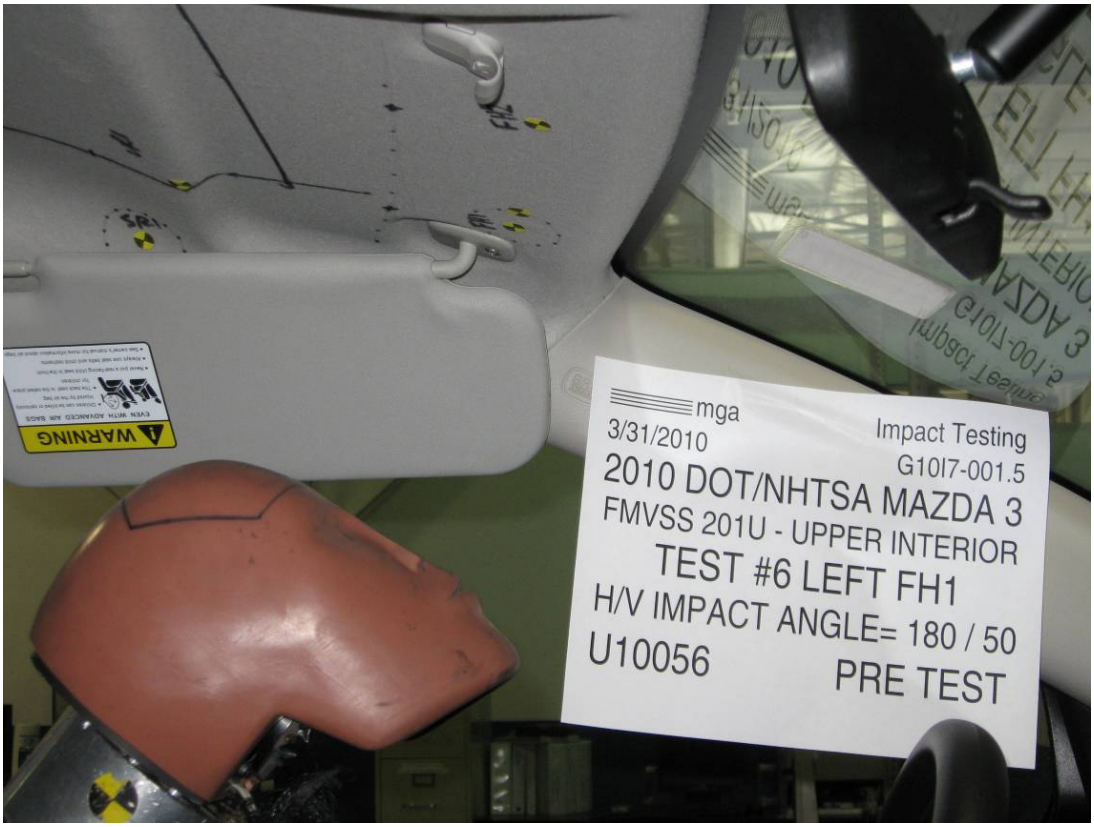

(peak = 100.0 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

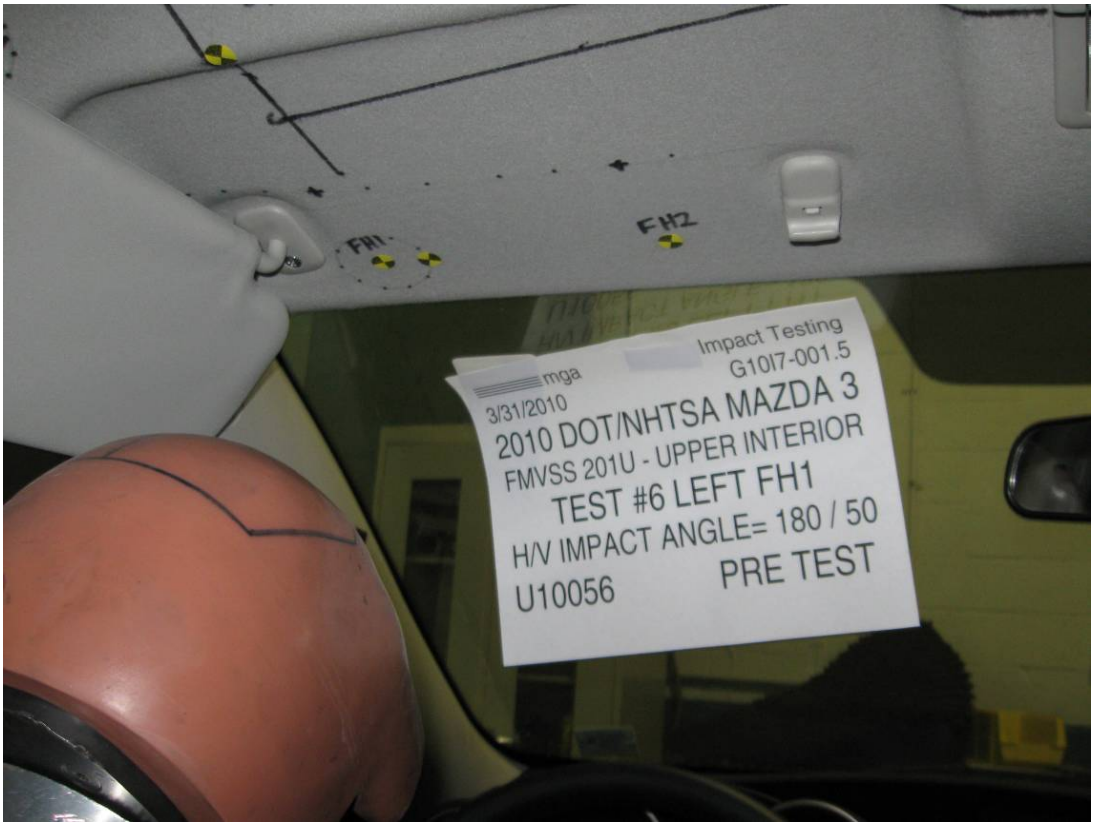

(peak = 11.2 G)
Head Y (G)
6
4
2
0
-2
-4
-6
-8
-10
-12
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

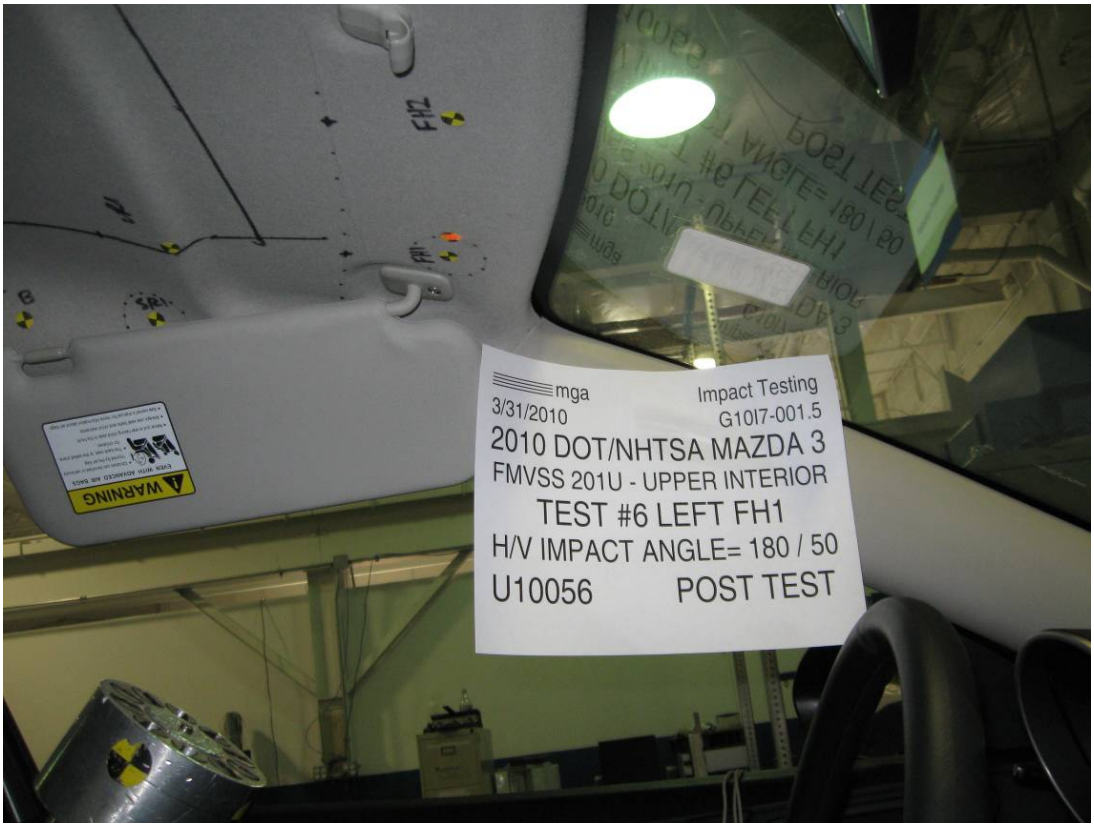

(peak = 32.4 G)
Head Z (G)
10
5
0
-5
-10
-15
-20
-25
-30
-35
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 24.1 kph)
Impact Velocity: 24.09 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 34.7 mm)
Displacement (mm)
TIME (msec)
0
5
10
15
20
25
30
35
0
2
4
6
8
10
12
14
16
18
20


mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
U10056
PRE TEST


FH1
FH2
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
U10056
PRE TEST


FH2
mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
U10056
POST TEST


FH1
FH2
mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
U10056
POST TEST


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
U10056
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): FH1Left

Temperature:20.9C

MGA Test Reference No.:U10056

Humidity:35.2%

Approach Horizontal Angles:180º

Time of Test:5:55:20 PM

Approach Vertical Angles:50º

FMH Serial No:[038]

Additional Description:1 Relocation Sphere

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
494	434	9.9	23.7	16	2 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

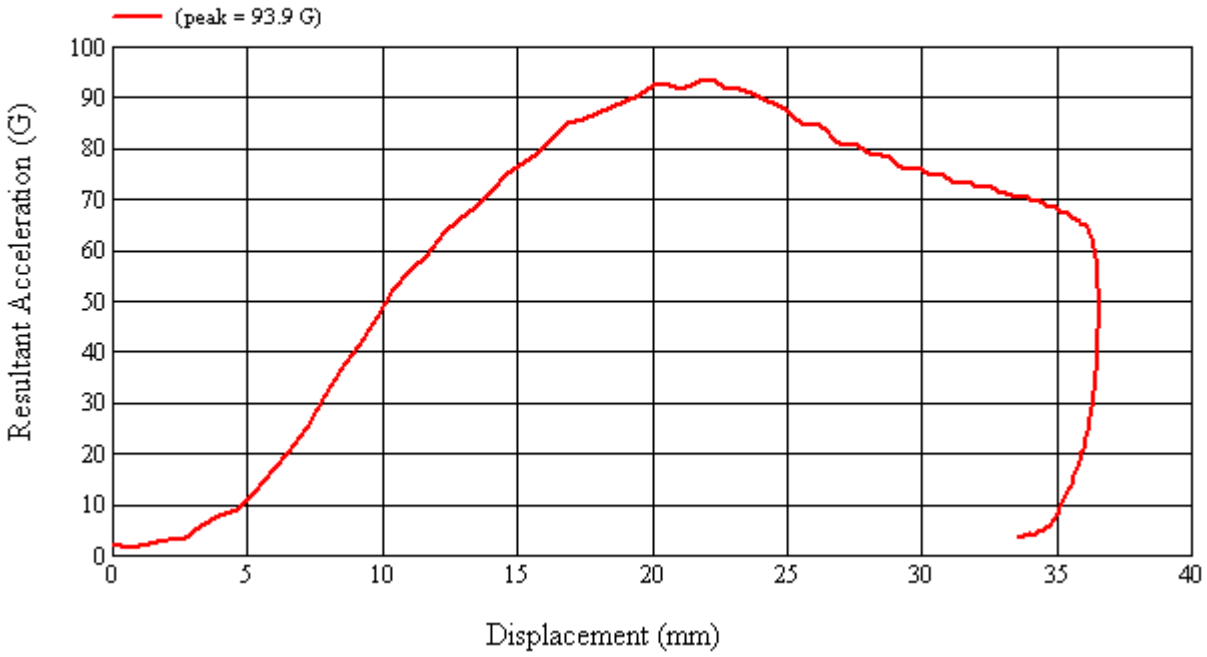
Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.5	1.06	1.06
Y	6	J36197	109.5	0.85	0.85
Z	7	J36353	99.5	0.93	0.93

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: _____ Approved By*: _____ Date: 3/31/2010

*Only necessary for NHTSA (Government) Compliance testing.



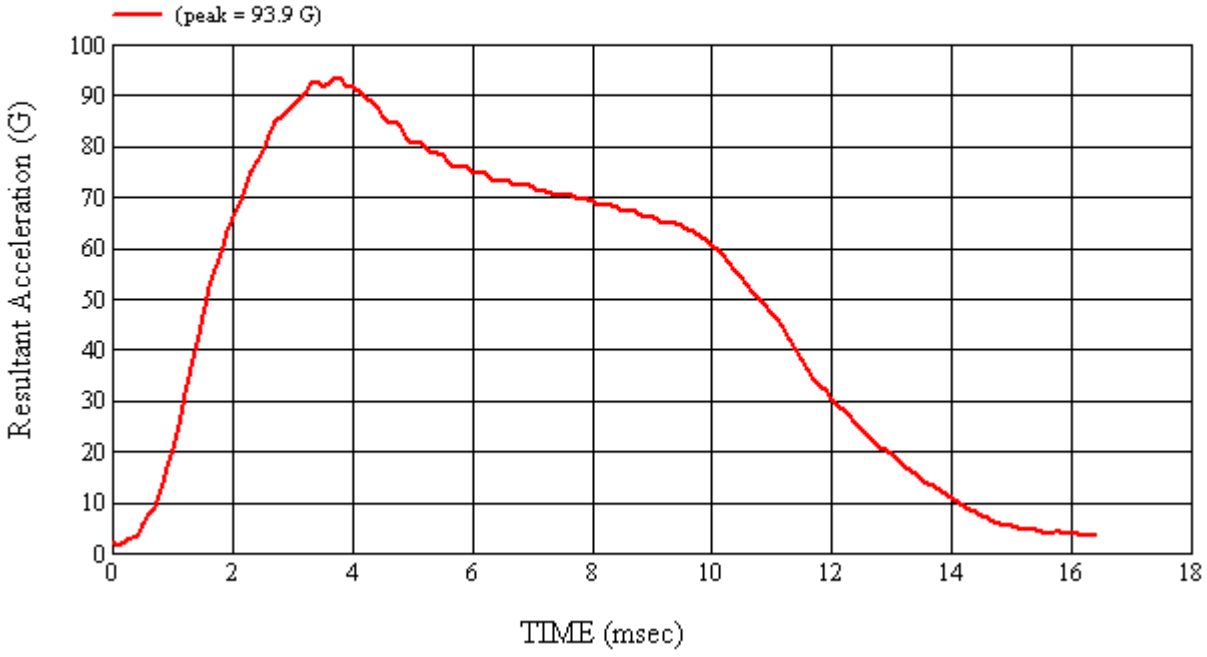
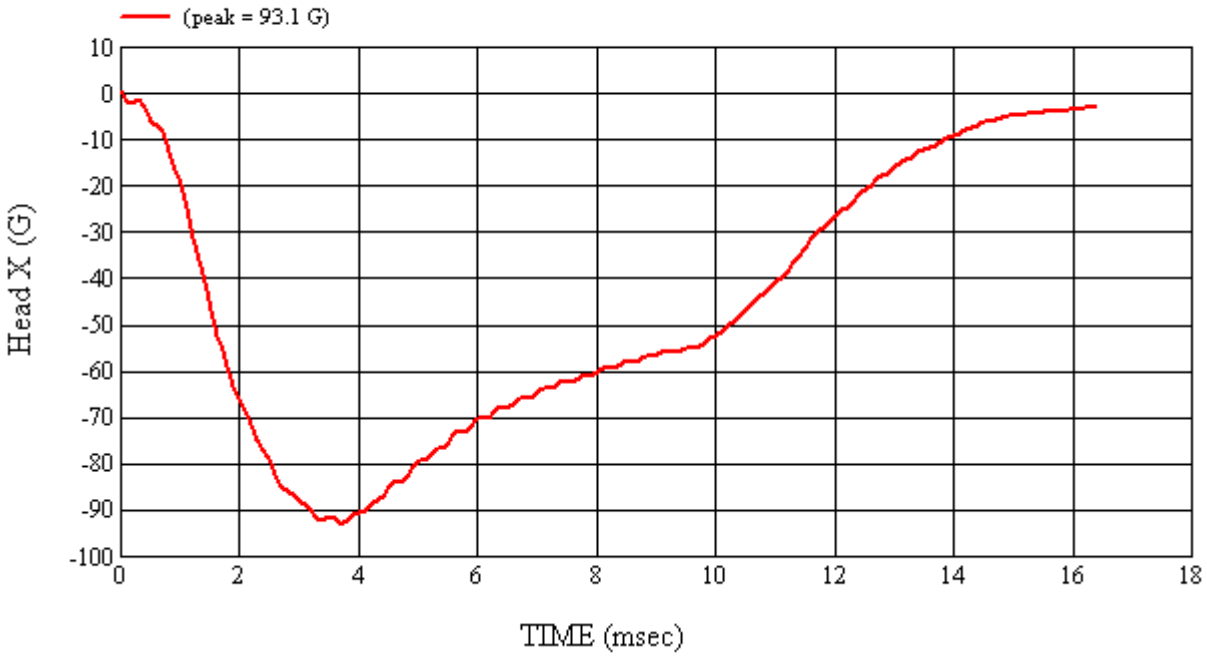
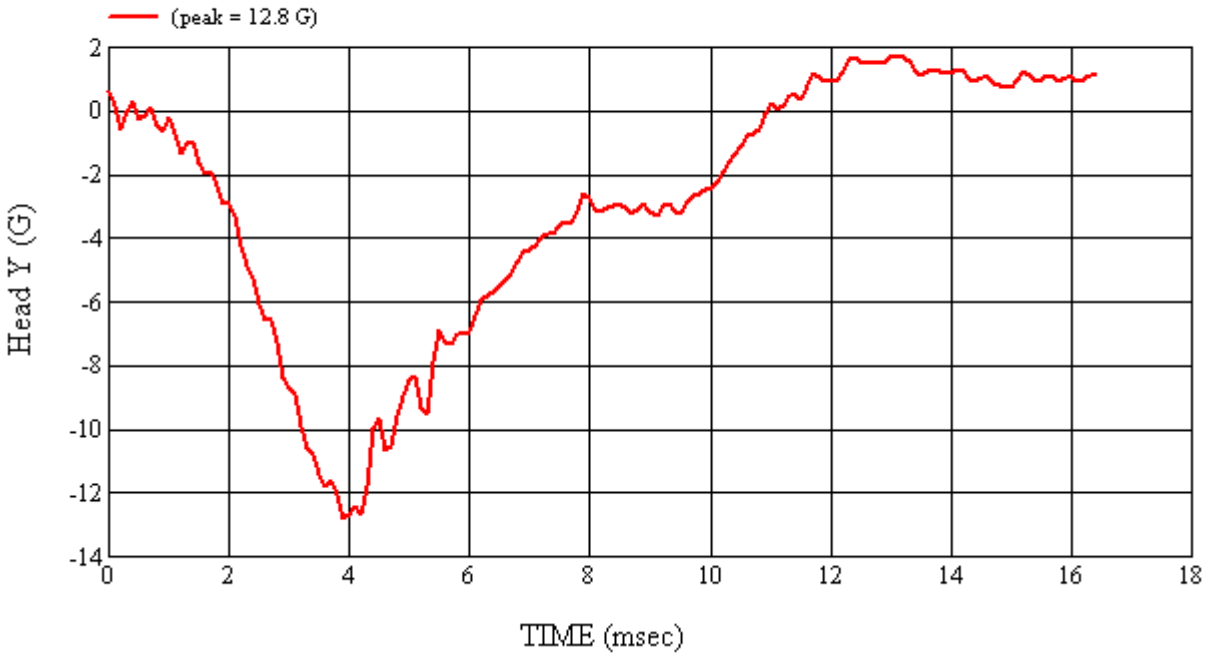
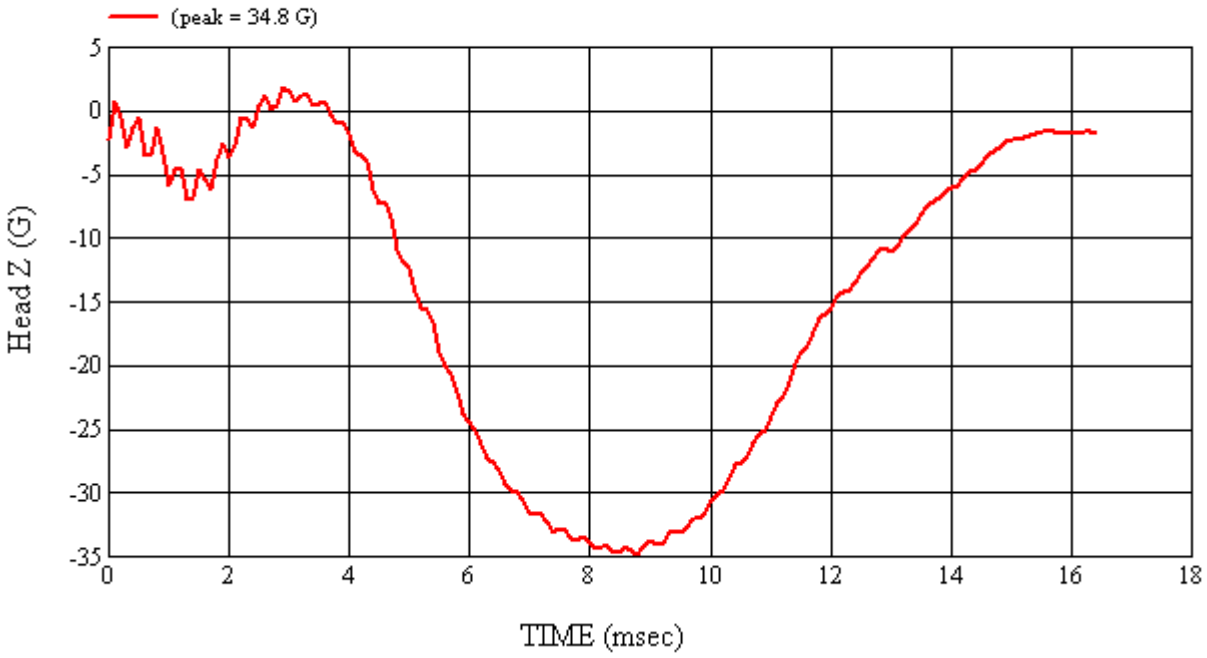
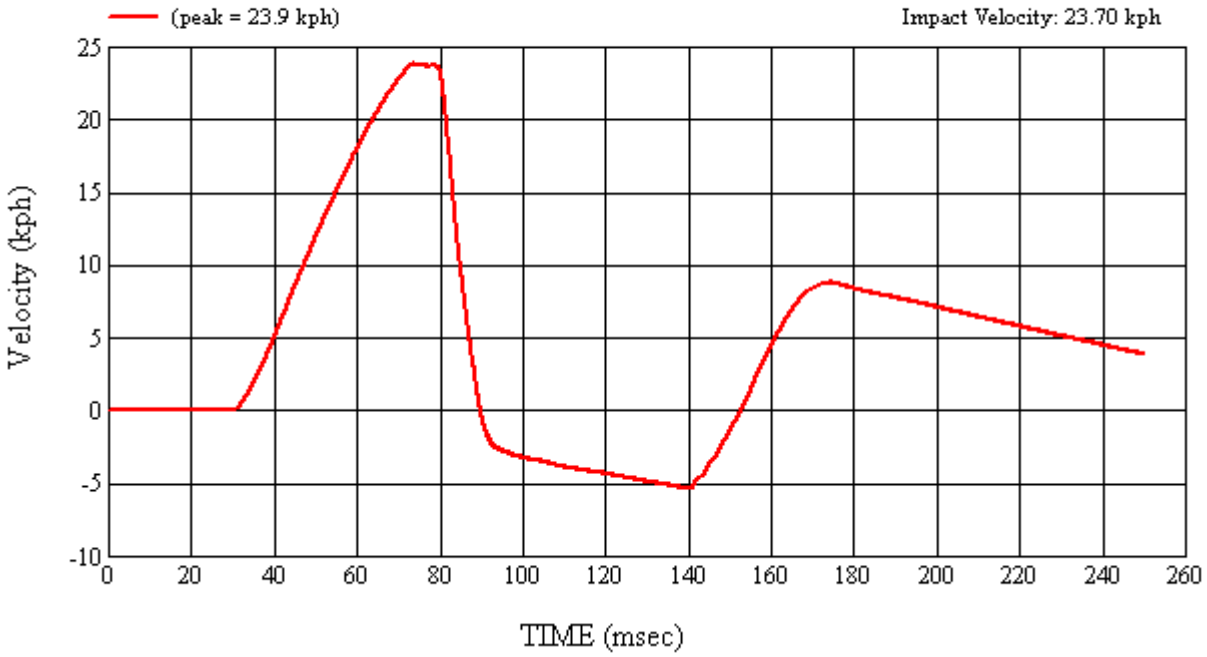


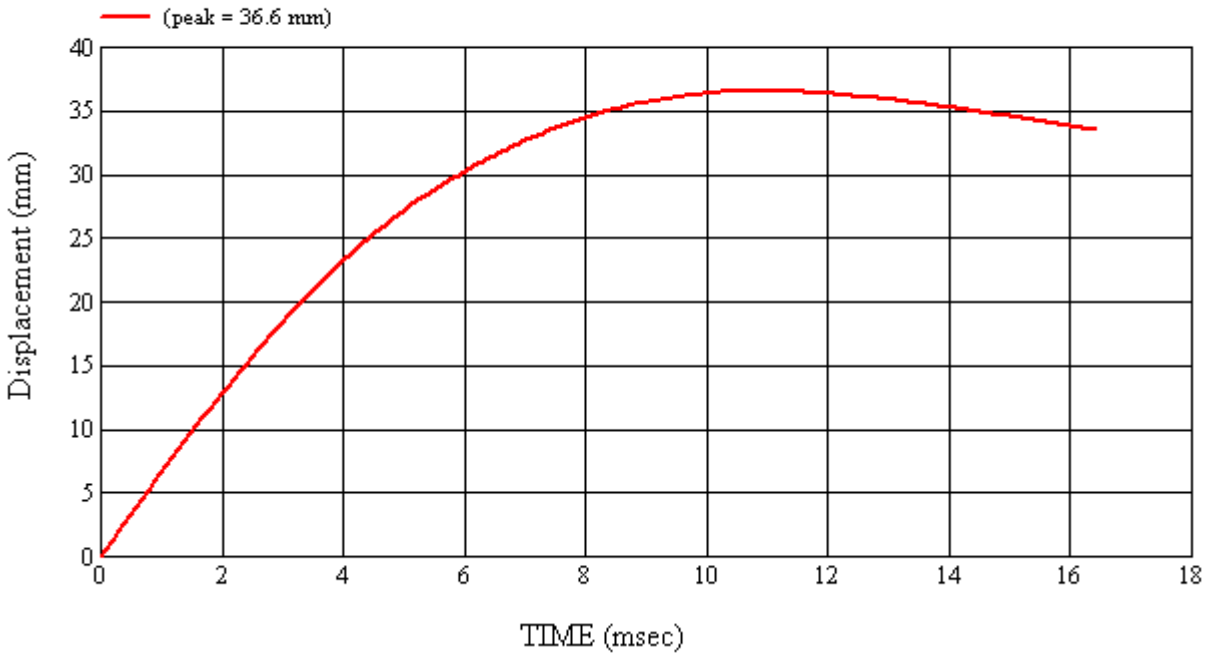
Figure 9 Test #U10056

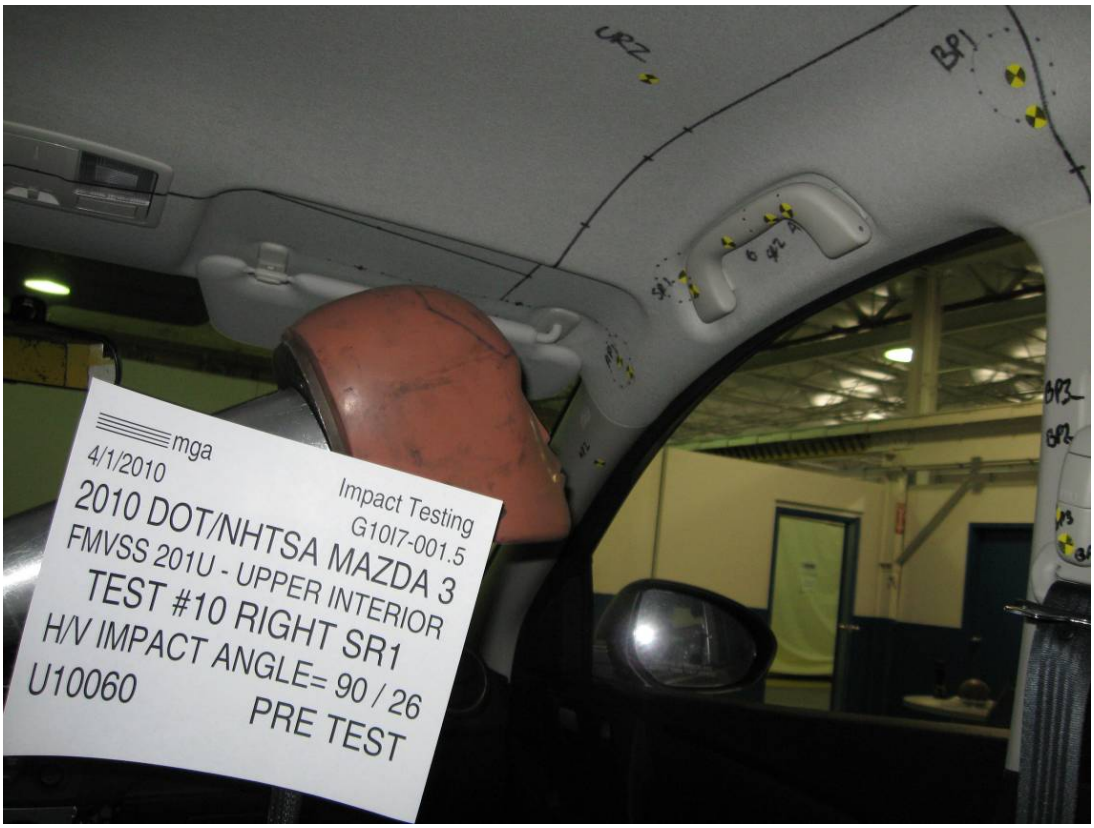

(peak = 93.1 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
TIME (msec)

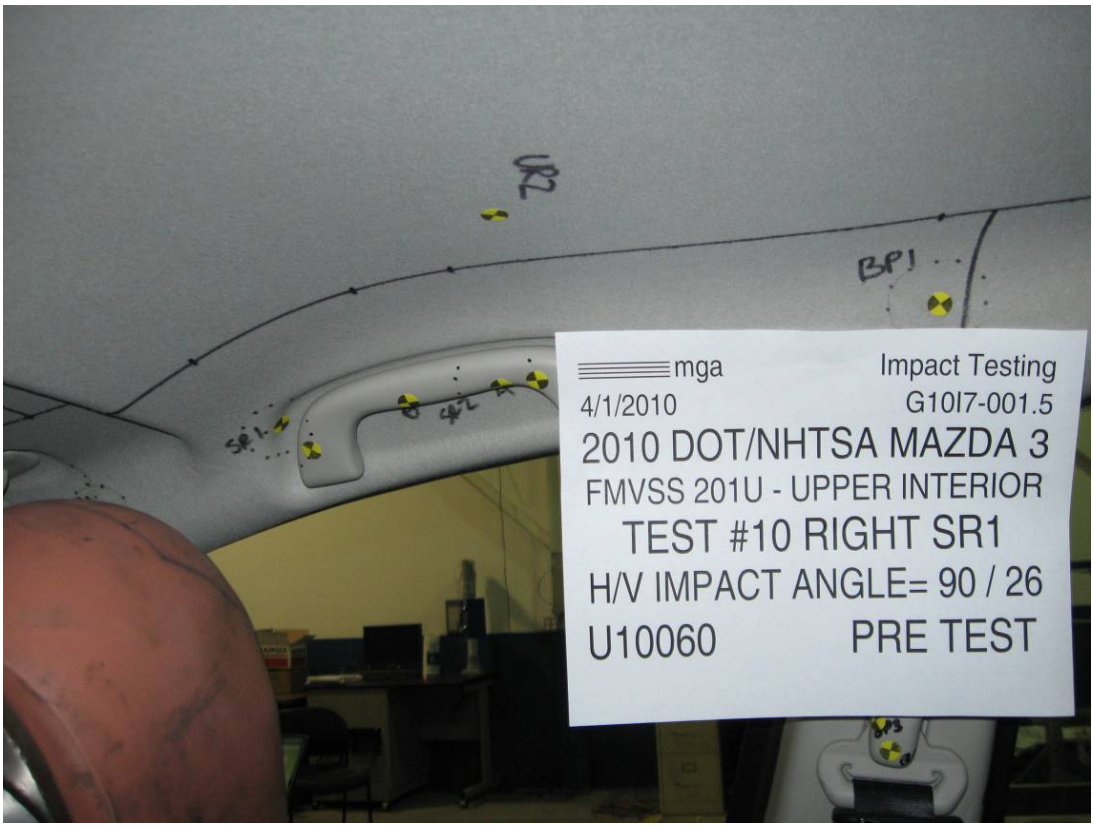

(peak = 12.8 G)
Head Y (G)
2
0
-2
-4
-6
-8
-10
-12
-14
0
2
4
6
8
10
12
14
16
18
TIME (msec)

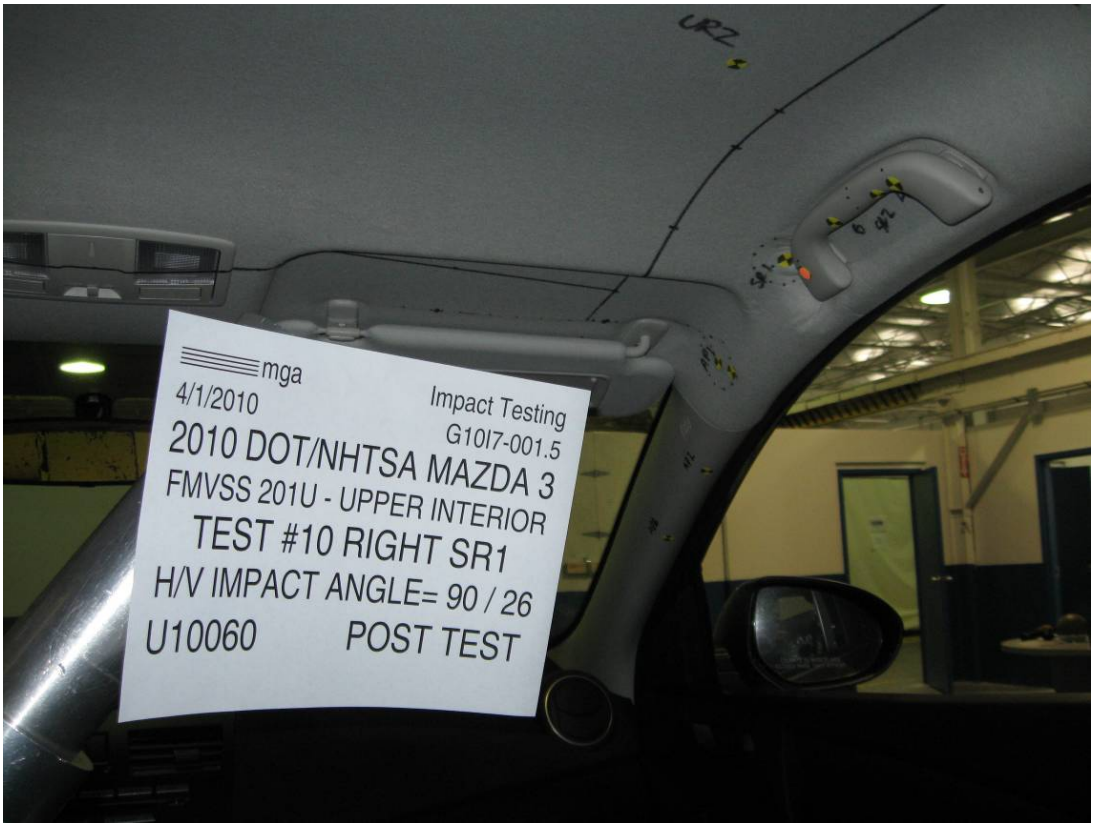

(peak = 34.8 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
-35
0
2
4
6
8
10
12
14
16
18
TIME (msec)

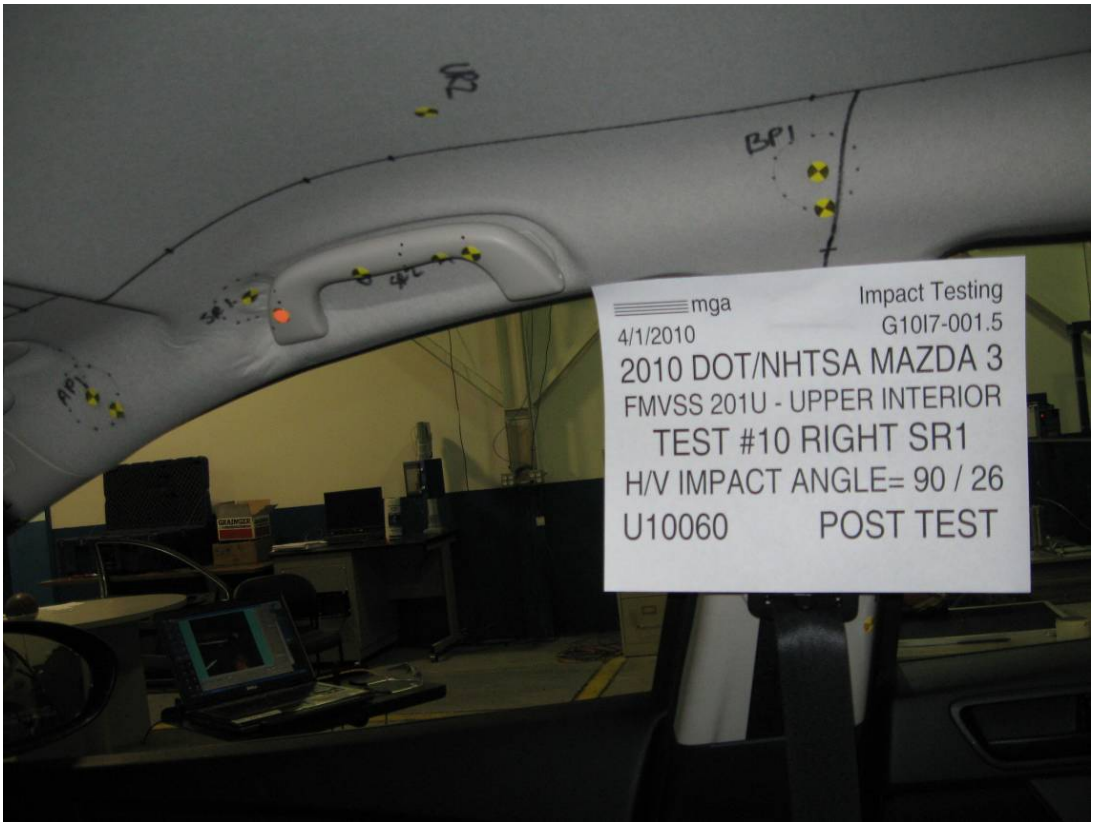

(peak = 23.9 kph)
Impact Velocity: 23.70 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

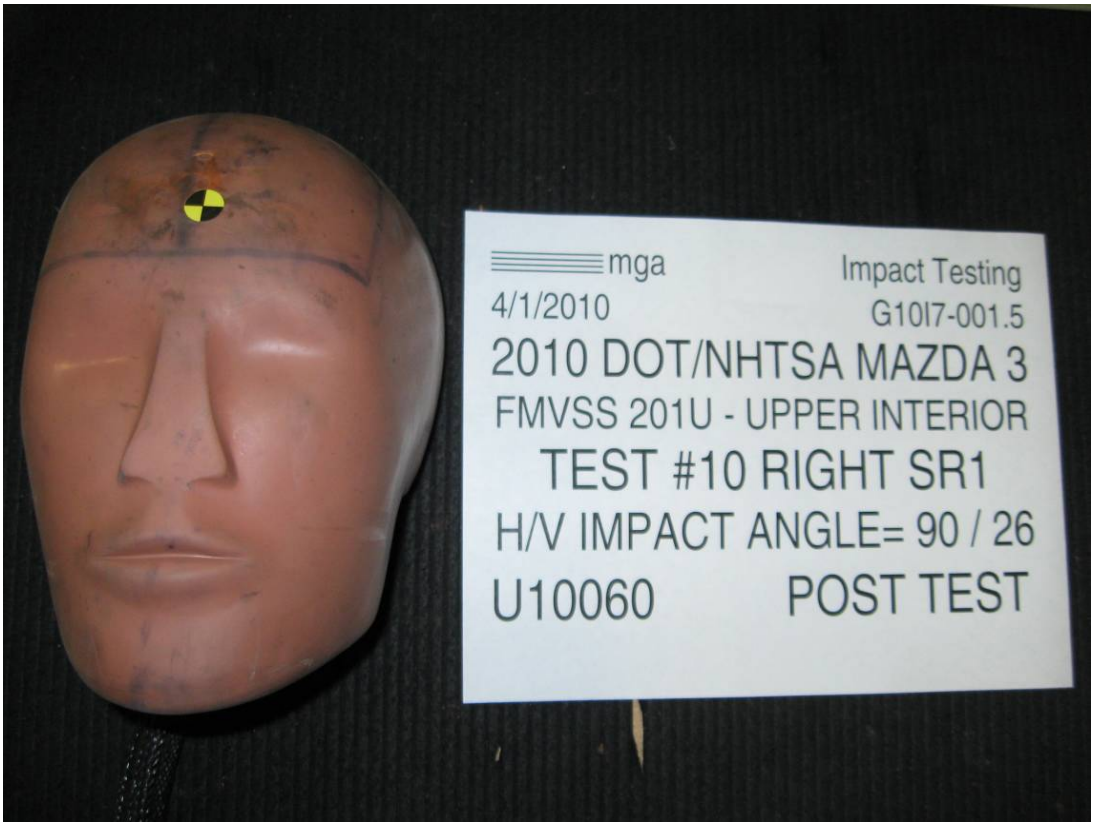

(peak = 36.6 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
18
TIME (msec)


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT SR1
H/V IMPACT ANGLE= 90 / 26
U10060
PRE TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT SR1
H/V IMPACT ANGLE= 90 / 26
U10060
PRE TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT SR1
H/V IMPACT ANGLE= 90 / 26
U10060
POST TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT SR1
H/V IMPACT ANGLE= 90 / 26
U10060
POST TEST


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT SR1
H/V IMPACT ANGLE= 90 / 26
U10060
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Target (Vehicle Side): SR1Right

MGA Test Reference No.:U10060

Approach Horizontal Angles:90º

Approach Vertical Angles:26º

Additional Description:1 Relocation

Test Number:#10

Temperature:20.9C

Humidity:39.8%

Time of Test:1:54:28 PM

FMH Serial No:[035]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
295	170	9.9	19.0	17	6 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-96.3	1.05	1.05
Y	6	J22664	95.2	0.84	0.84
Z	7	J35924	93.8	0.93	0.93

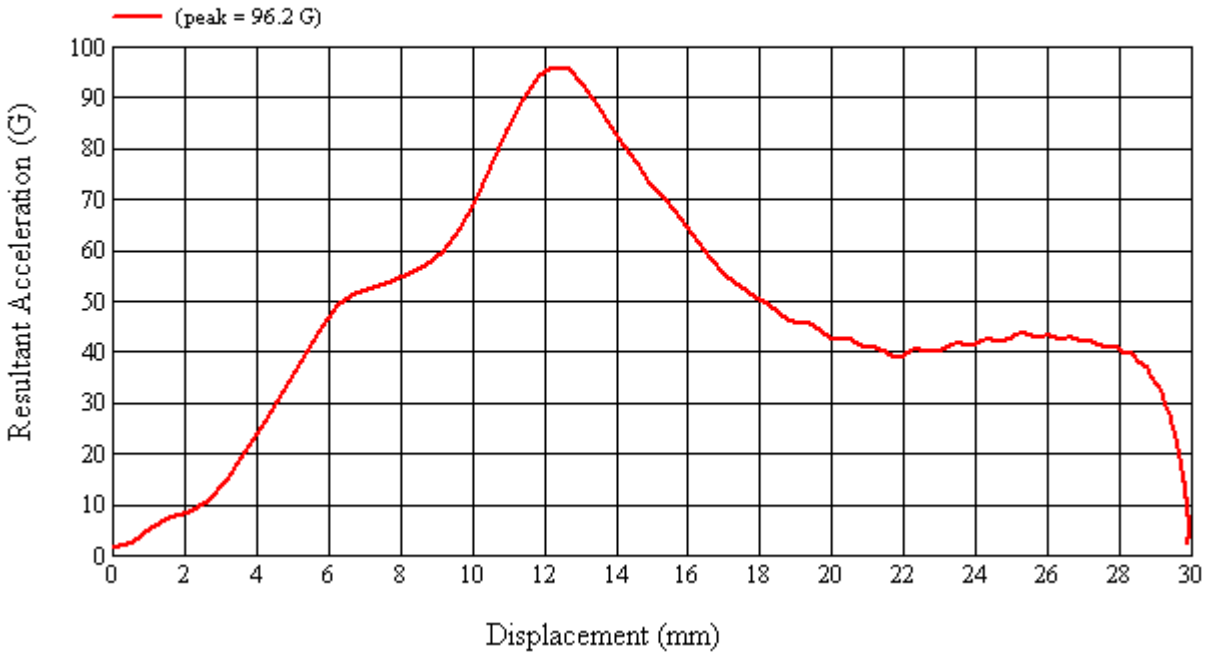
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

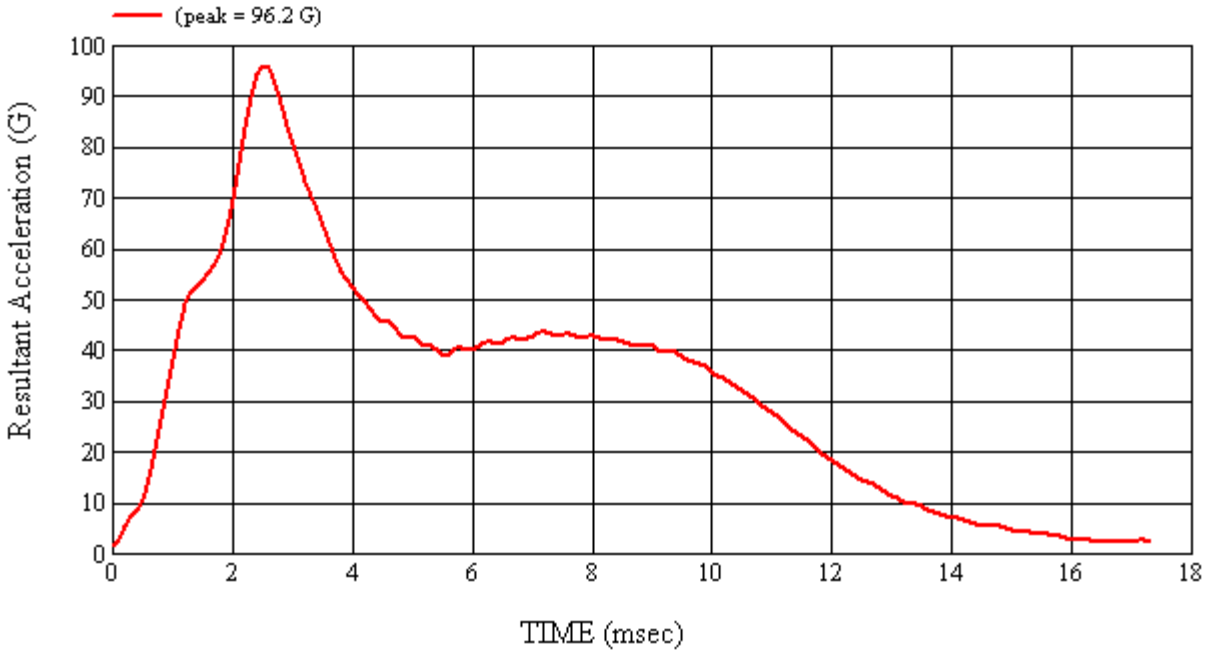
Grab handle anchor compression and headliner deformation

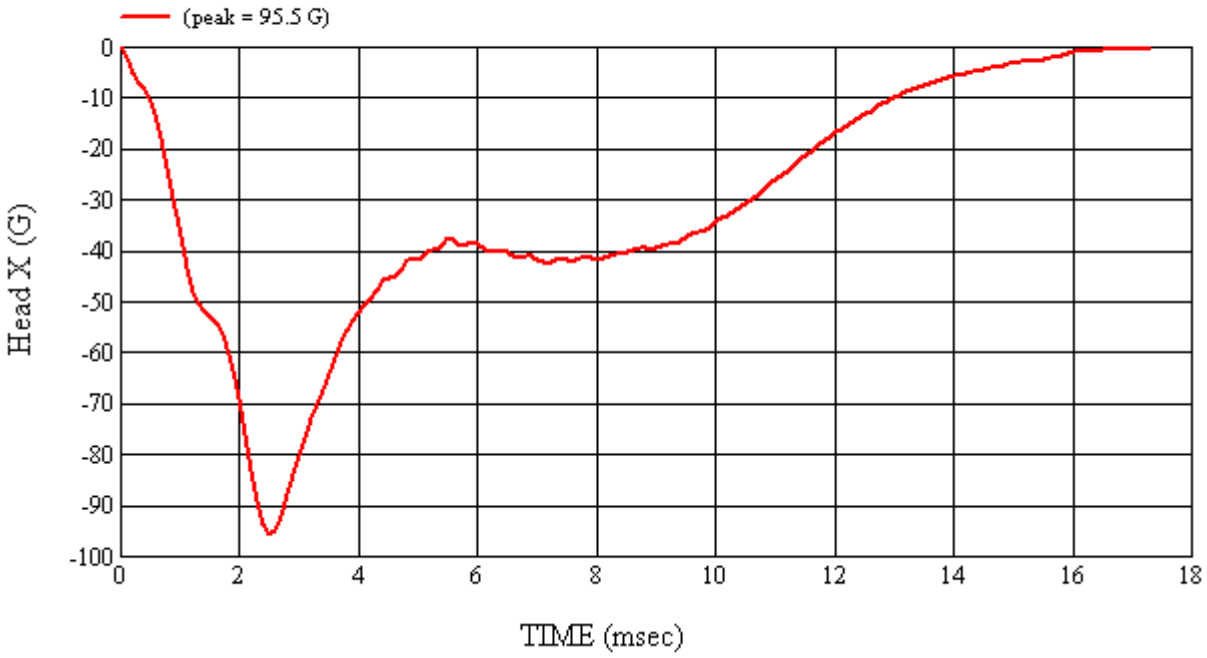
Recorded By: _____ Approved By*: _____ Date: 4/01/2010

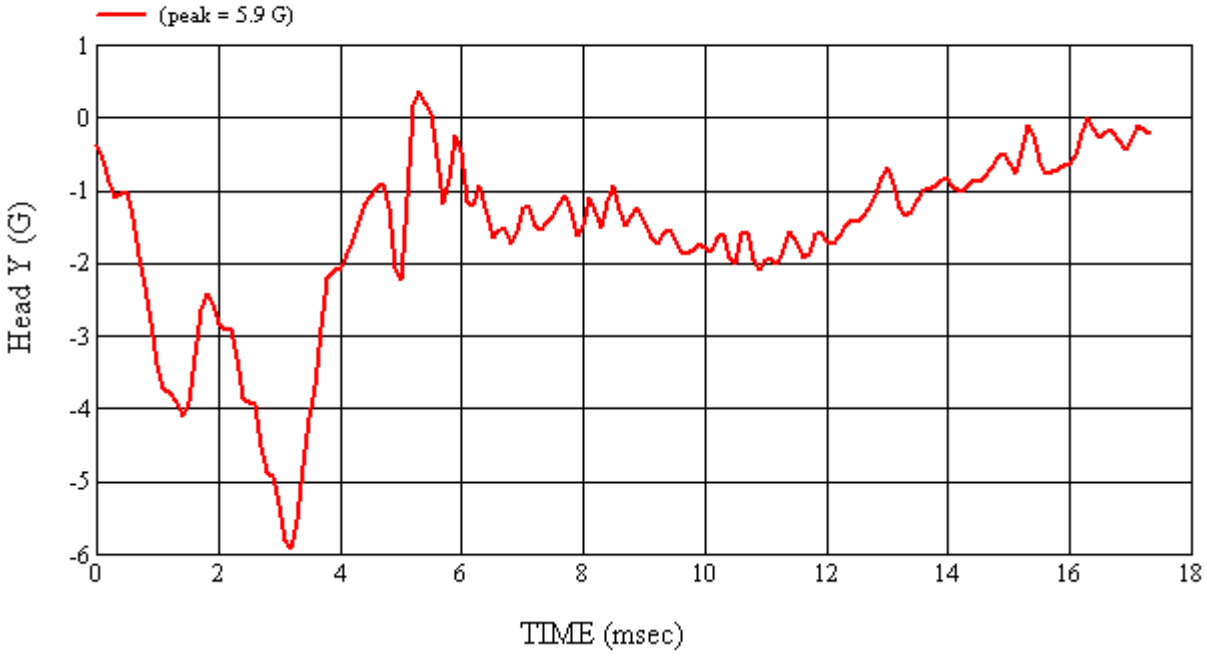
*Only necessary for NHTSA (Government) Compliance testing.

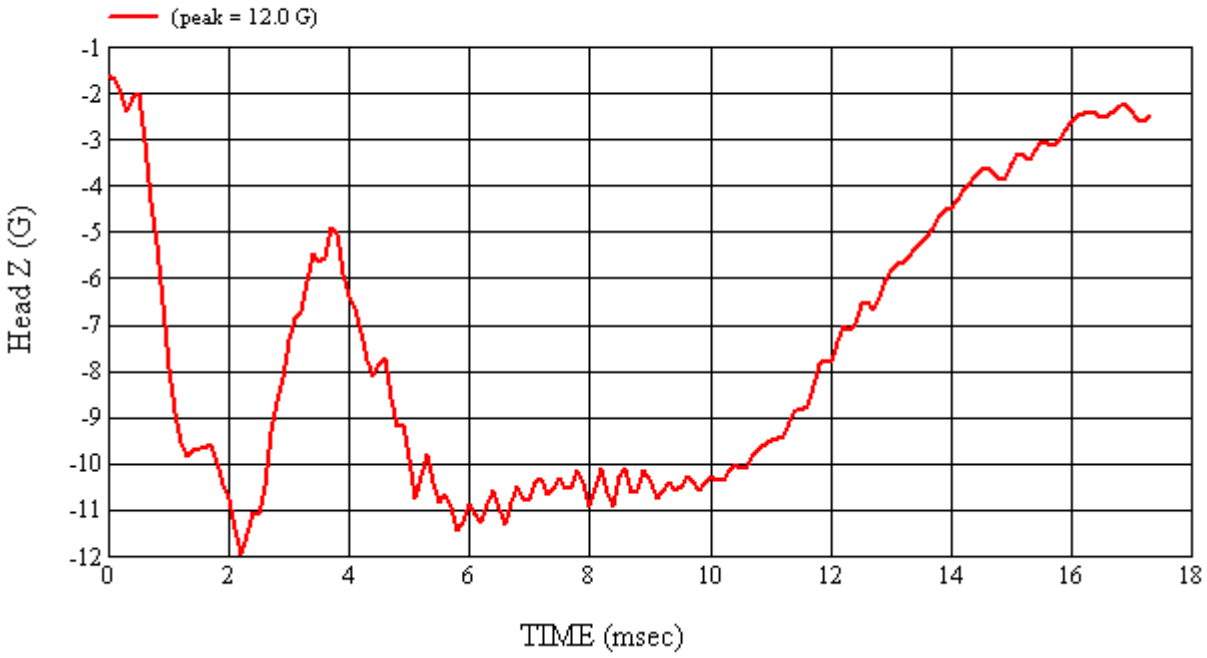
MGA Test #: U10060 Target Location: SR1, Right Side Test Date: 4/1/2010

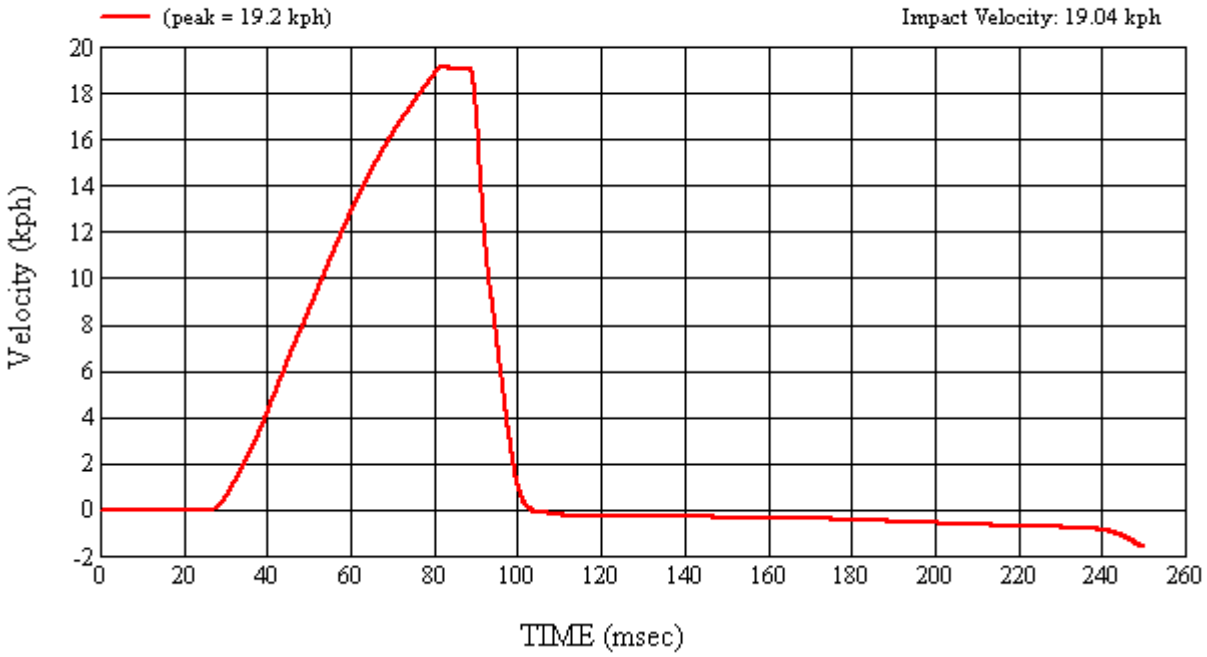


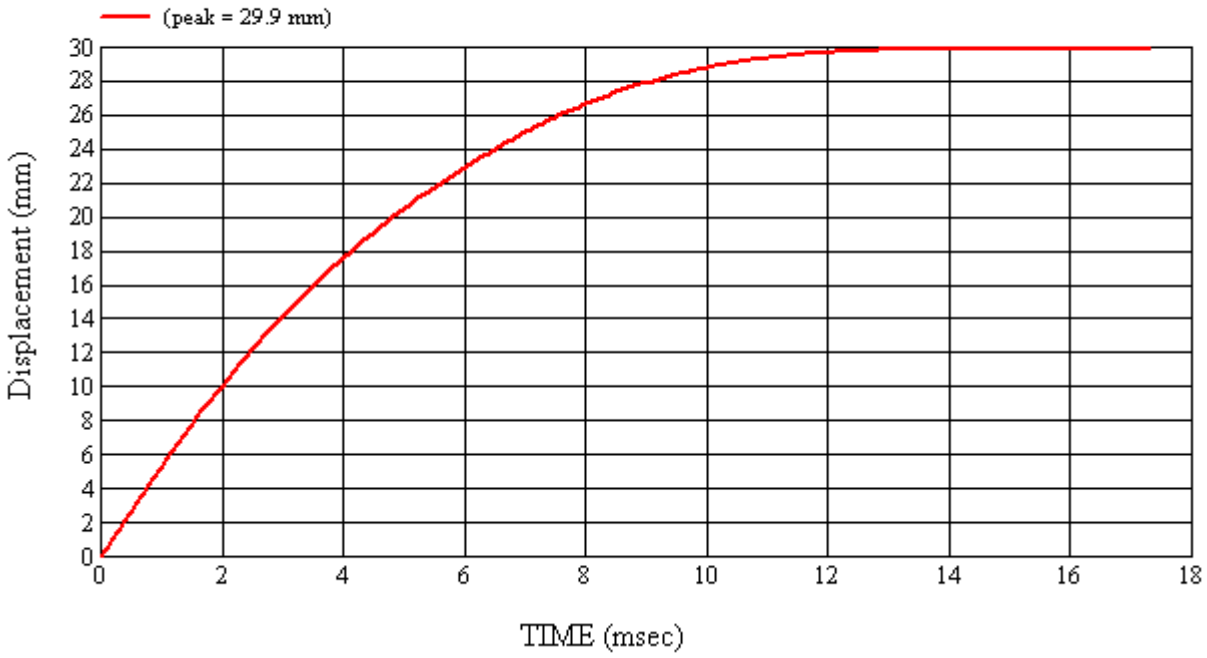


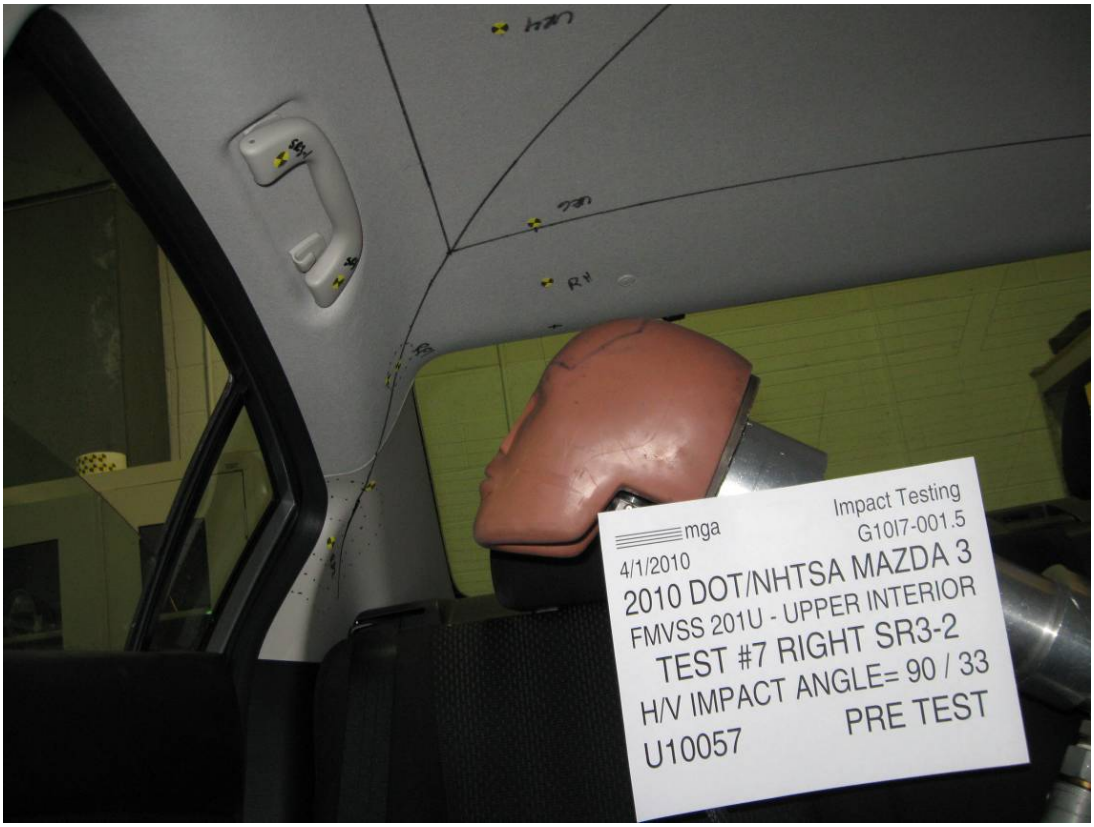

(peak = 95.5 G)
Head X (G)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
TIME (msec)

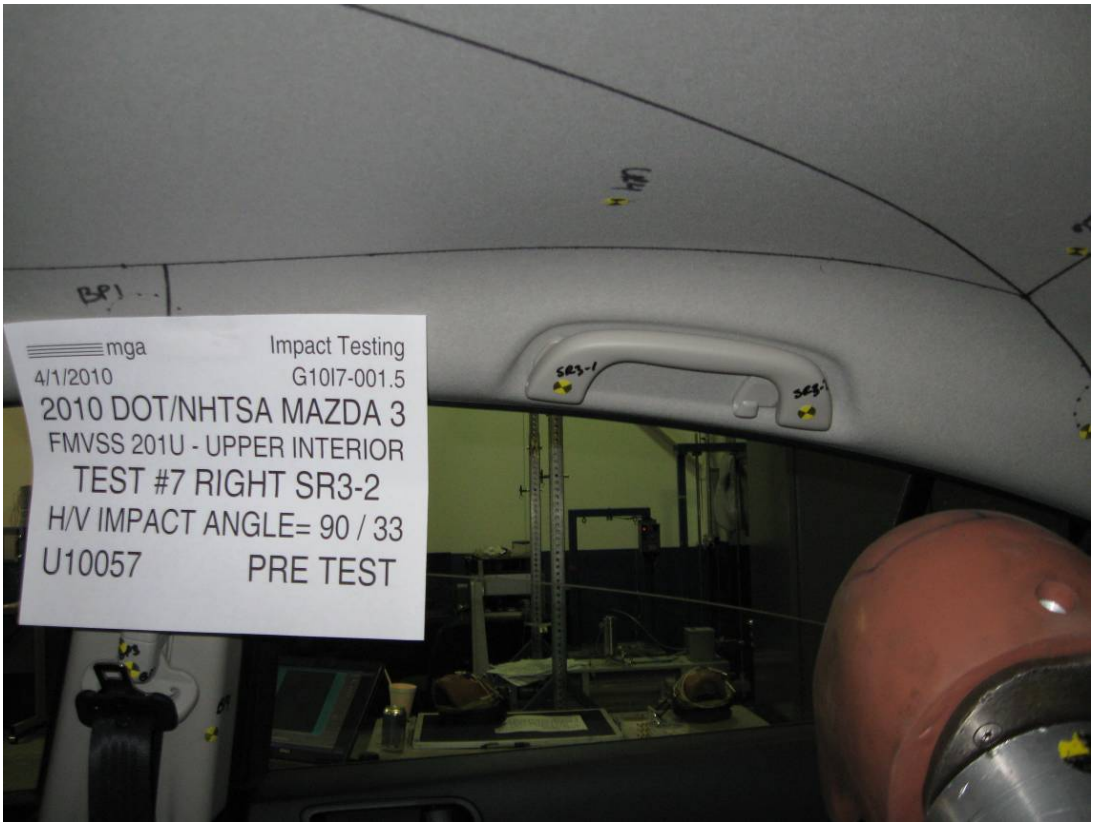

(peak = 5.9 G)
Head Y (G)
1
0
-1
-2
-3
-4
-5
-6
0
2
4
6
8
10
12
14
16
18
TIME (msec)

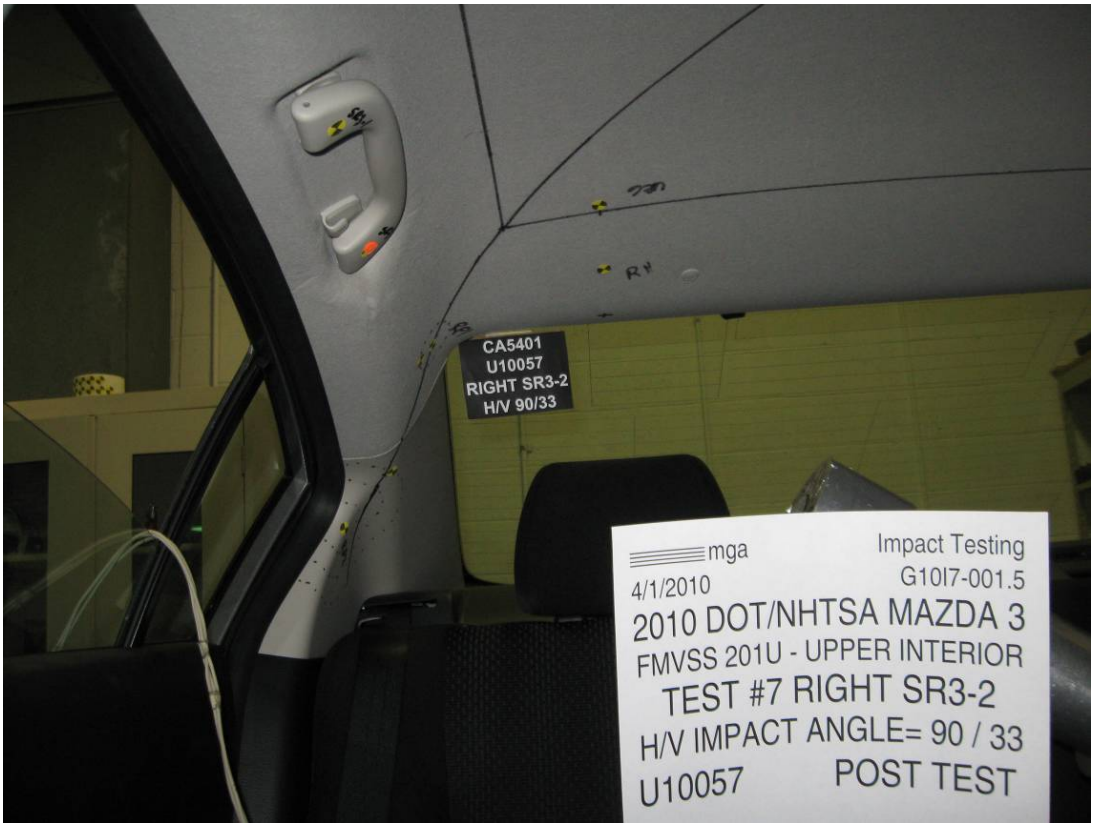

(peak = 12.0 G)
Head Z (G)
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 19.2 kph)
Impact Velocity: 19.04 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 29.9 mm)
Displacement (mm)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
16
18
TIME (msec)


mga
Impact Testing
G10I7-001.5
4/1/2010
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR3-2
H/V IMPACT ANGLE= 90 / 33
U10057
PRE TEST


mga
Impact Testing
G10I7-001.5
4/1/2010
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR3-2
H/V IMPACT ANGLE= 90 / 33
U10057
PRE TEST


CA5401
U10057
RIGHT SR3-2
H/V 90/33
mga
Impact Testing
G10I7-001.5
4/1/2010
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR3-2
H/V IMPACT ANGLE= 90 / 33
U10057
POST TEST


mga
Impact Testing
G10I7-001.5
4/1/2010
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR3-2
H/V IMPACT ANGLE= 90 / 33
U10057
POST TEST


SR3-2


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR3-2
H/V IMPACT ANGLE= 90 / 33
U10057
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): SR3-2Right

Temperature:20.6C

MGA Test Reference No.:U10057

Humidity:37.7%

Approach Horizontal Angles:90º

Time of Test:9:06:03 AM

Approach Vertical Angles:33º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
237	93	11.8	18.4	23	1 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-96.3	1.06	1.06
Y	6	J22664	95.2	0.85	0.85
Z	7	J35924	93.8	0.93	0.94

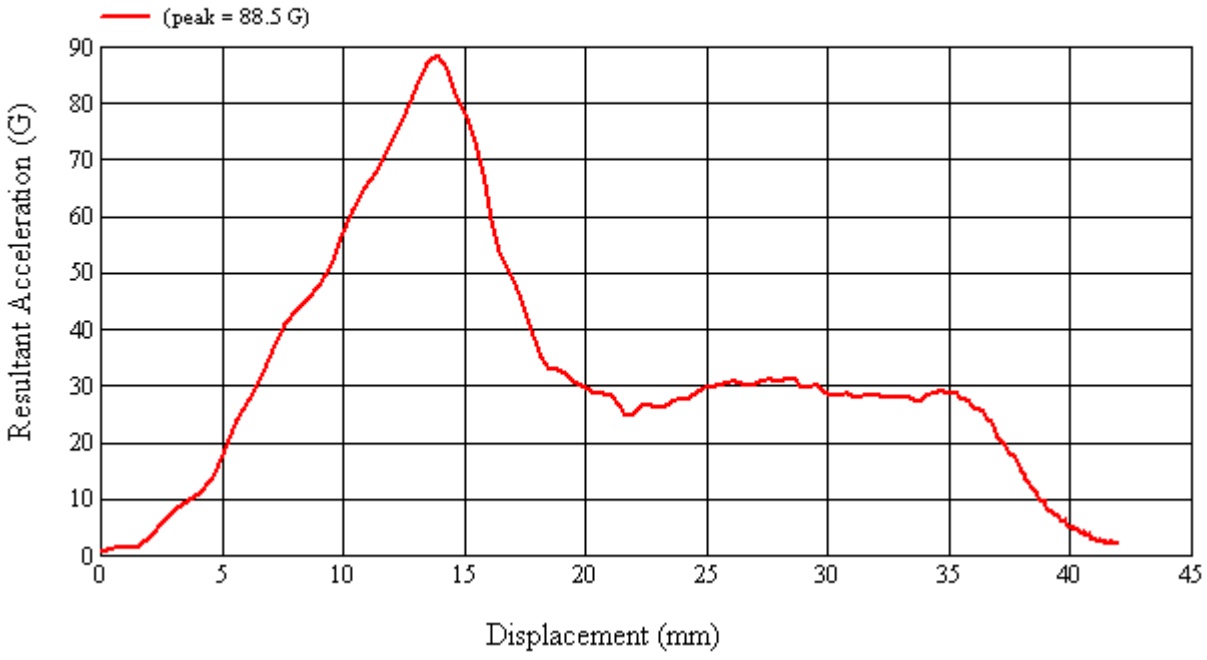
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

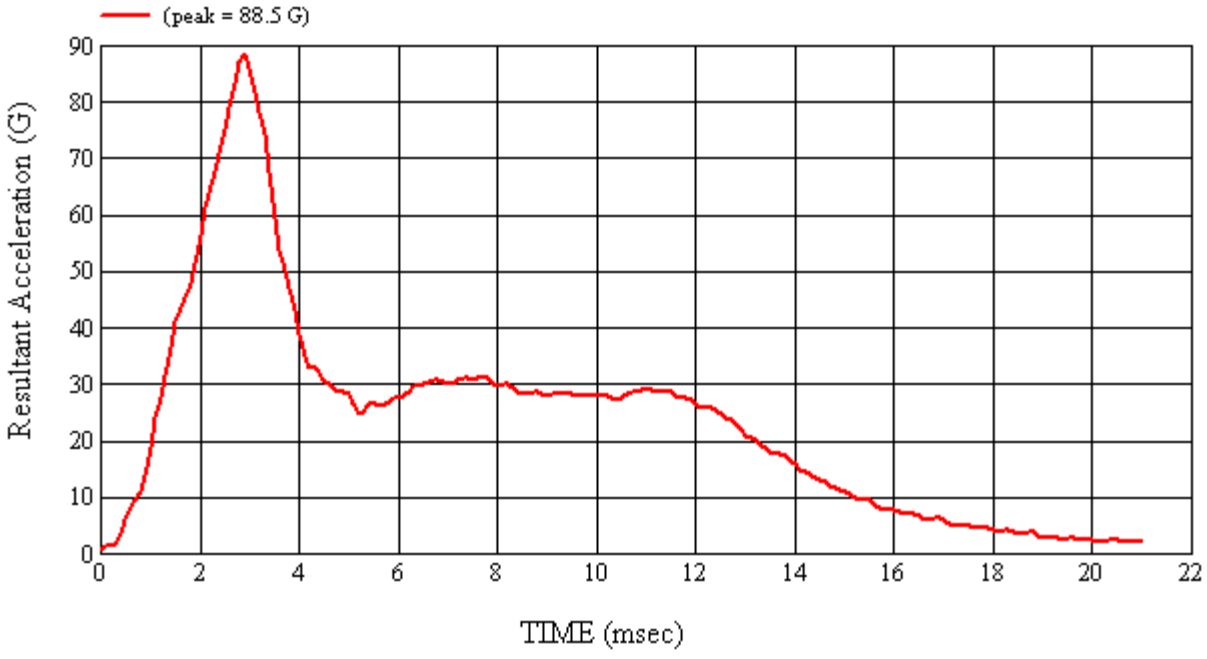
Grab handle anchor compression and headliner deformation

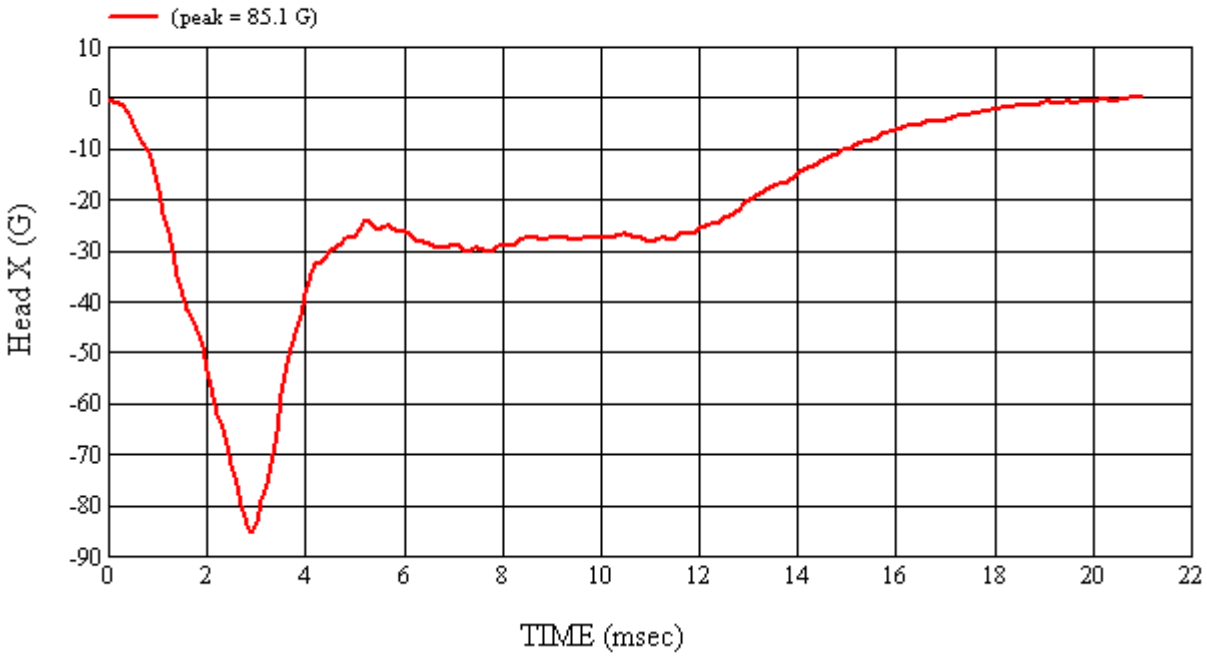
Recorded By: _____ Approved By*: _____ Date: 4/01/2010

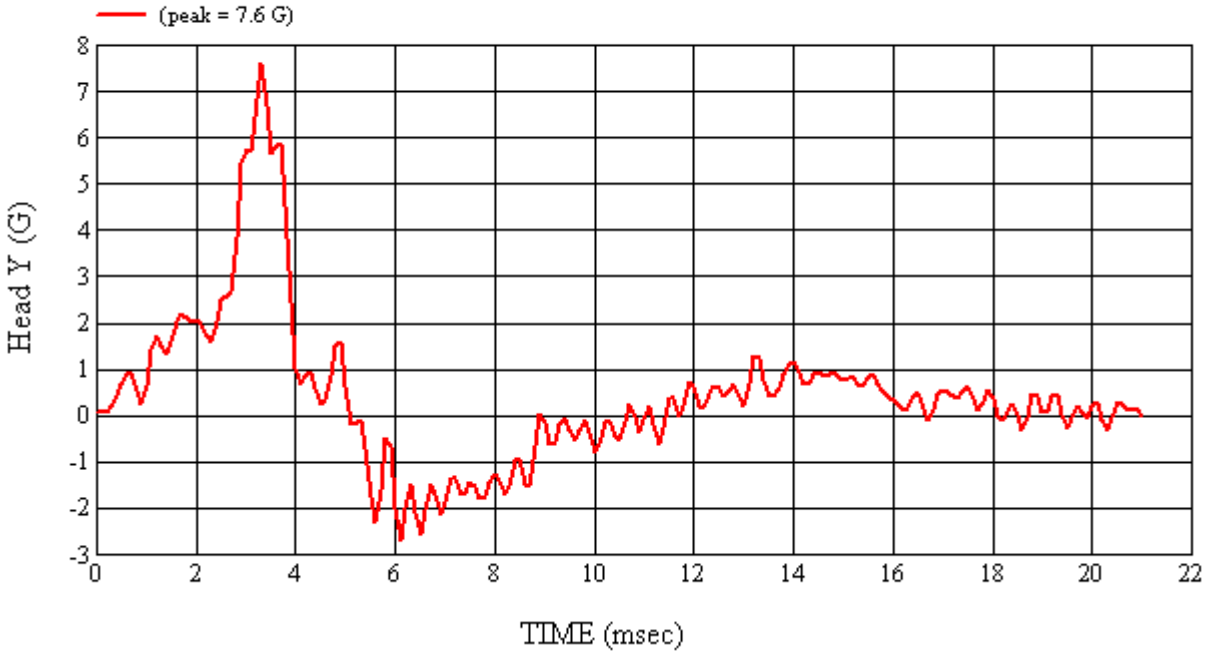
*Only necessary for NHTSA (Government) Compliance testing.

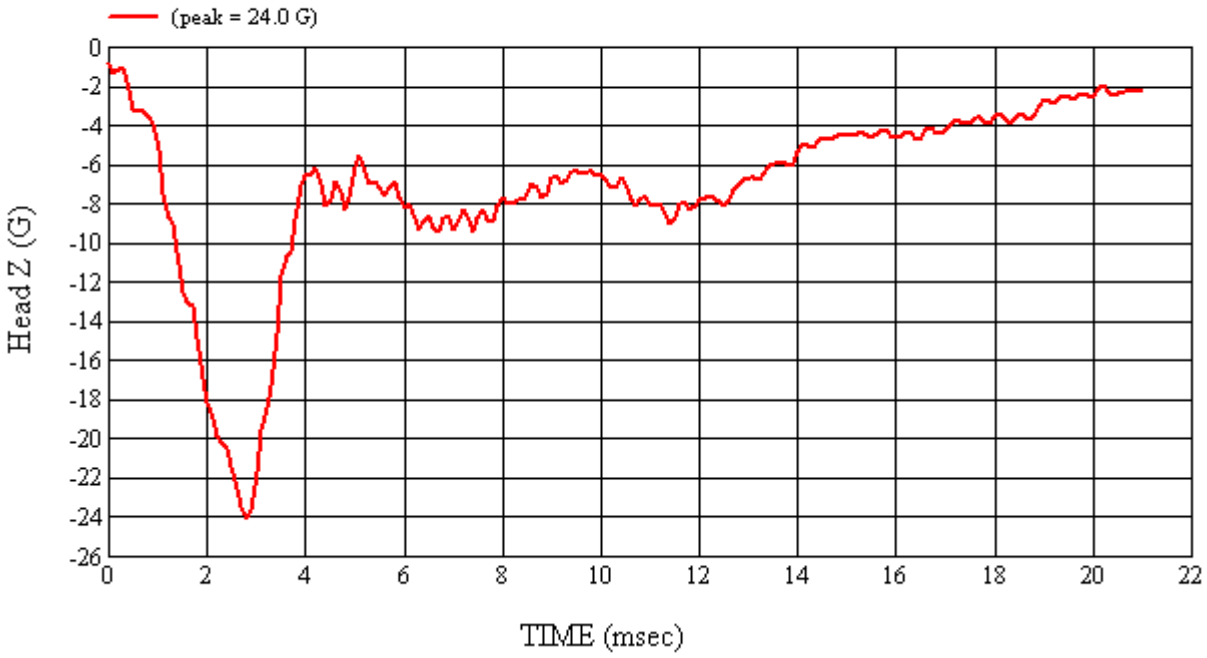
MGA Test #: U10057 Target Location: SR3-2, Right Side Test Date: 4/1/2010

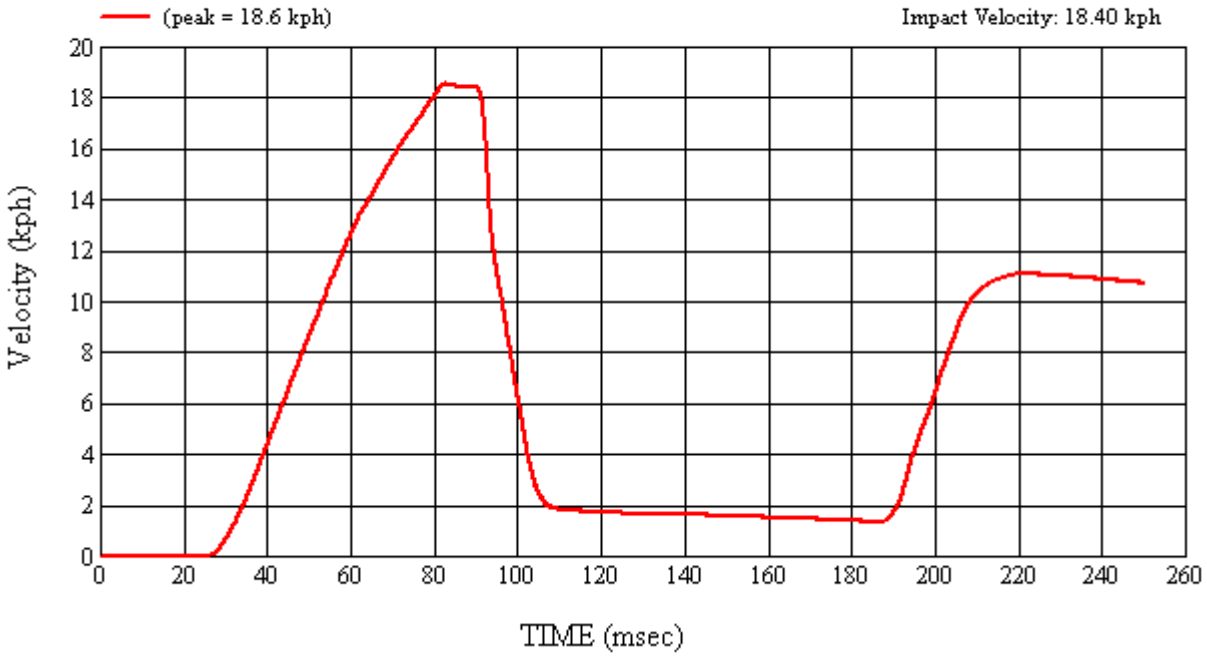


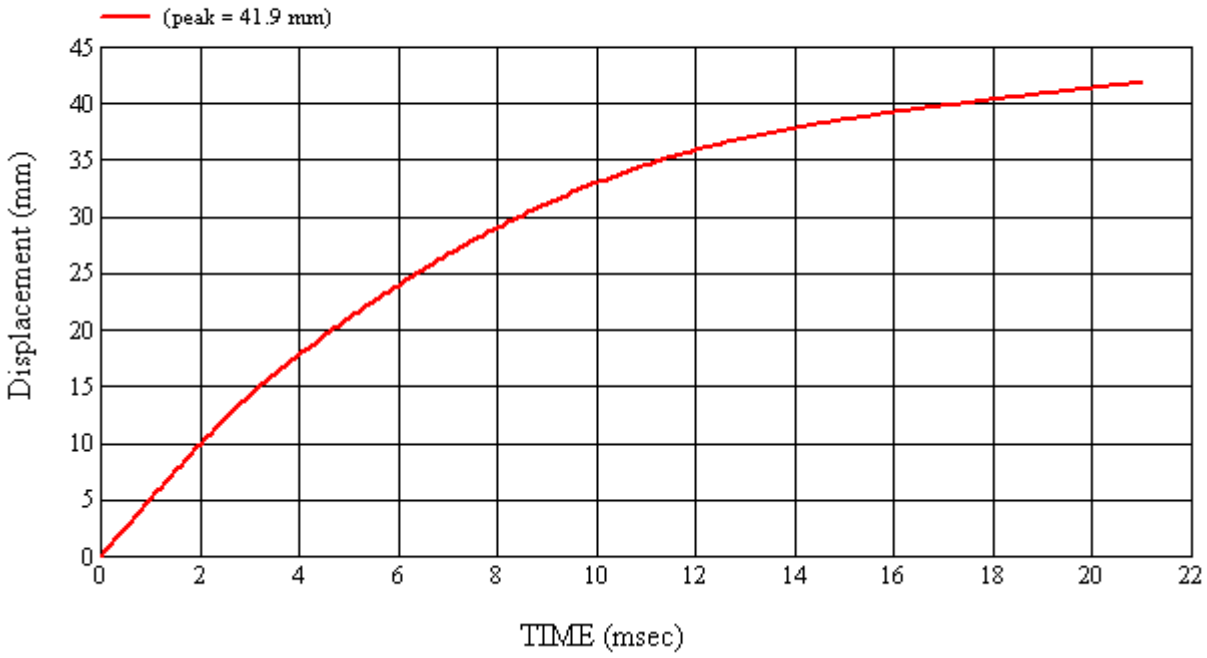


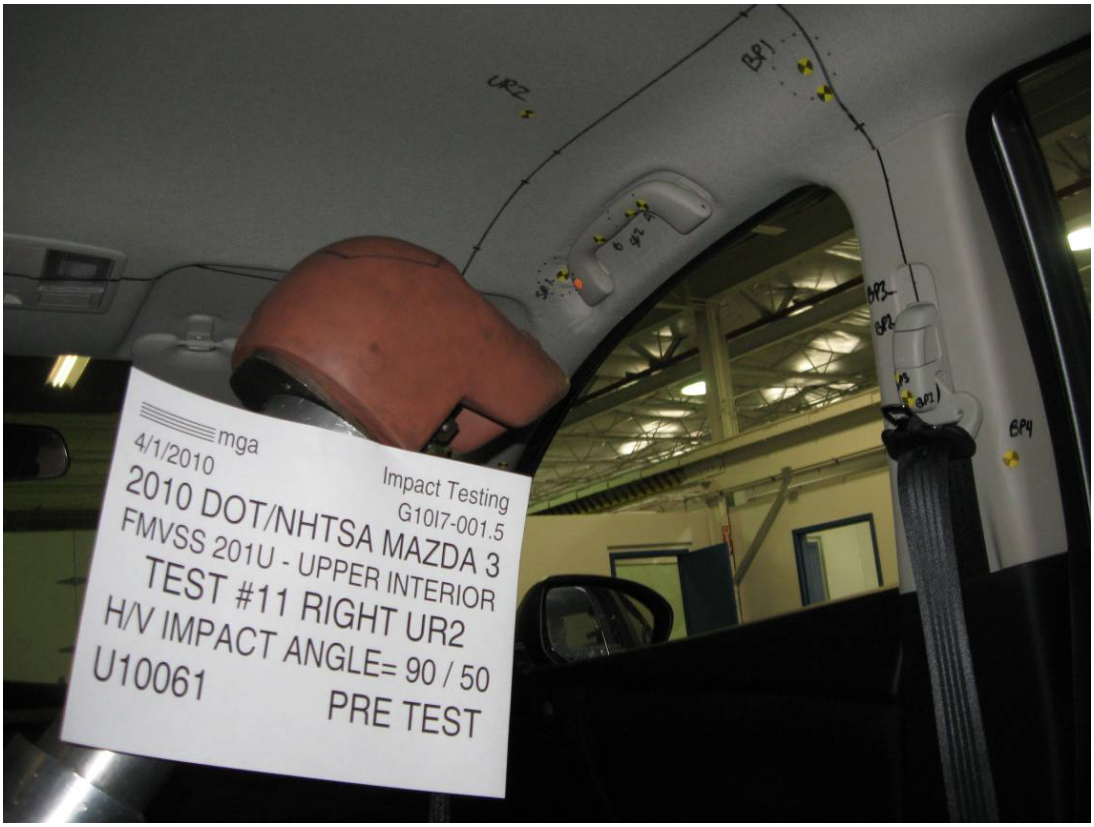

(peak = 85.1 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)

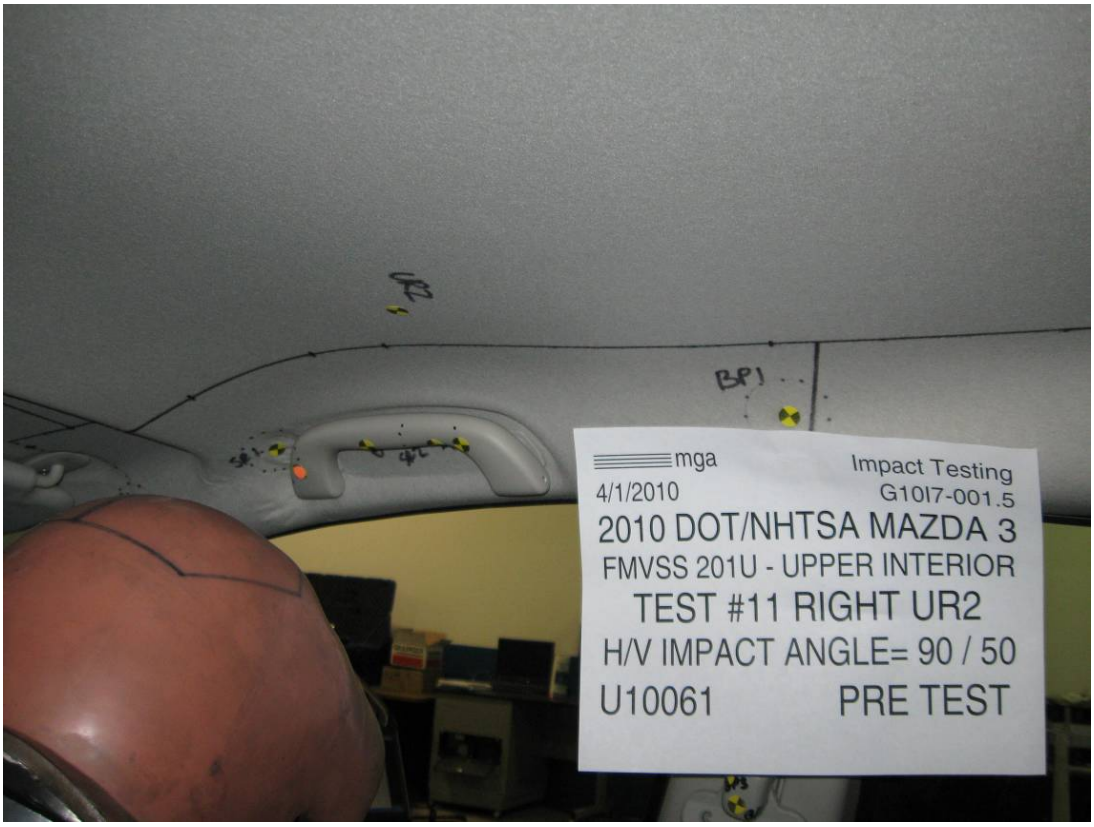

(peak = 7.6 G)
Head Y (G)
8
7
6
5
4
3
2
1
0
-1
-2
-3
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 24.0 G)
Head Z (G)
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 18.6 kph)
Impact Velocity: 18.40 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 41.9 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U10061
PRE TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U10061
PRE TEST


CA5401
U10061
RIGHT UR2
H/V 90/50
mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U10061
POST TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U10061
POST TEST


mga
4/1/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U10061
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): UR2Right

Temperature:21.1C

MGA Test Reference No.:U10061

Humidity:41.0%

Approach Horizontal Angles:90º

Time of Test:3:13:57 PM

Approach Vertical Angles:50º

FMH Serial No:[037]

Additional Description: Above SR2-A

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
694	700	7.2	24.1	26	0

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-116.9	1.06	1.06
Y	6	J14103	94.2	0.85	0.84
Z	7	J35800	98.2	0.93	0.93

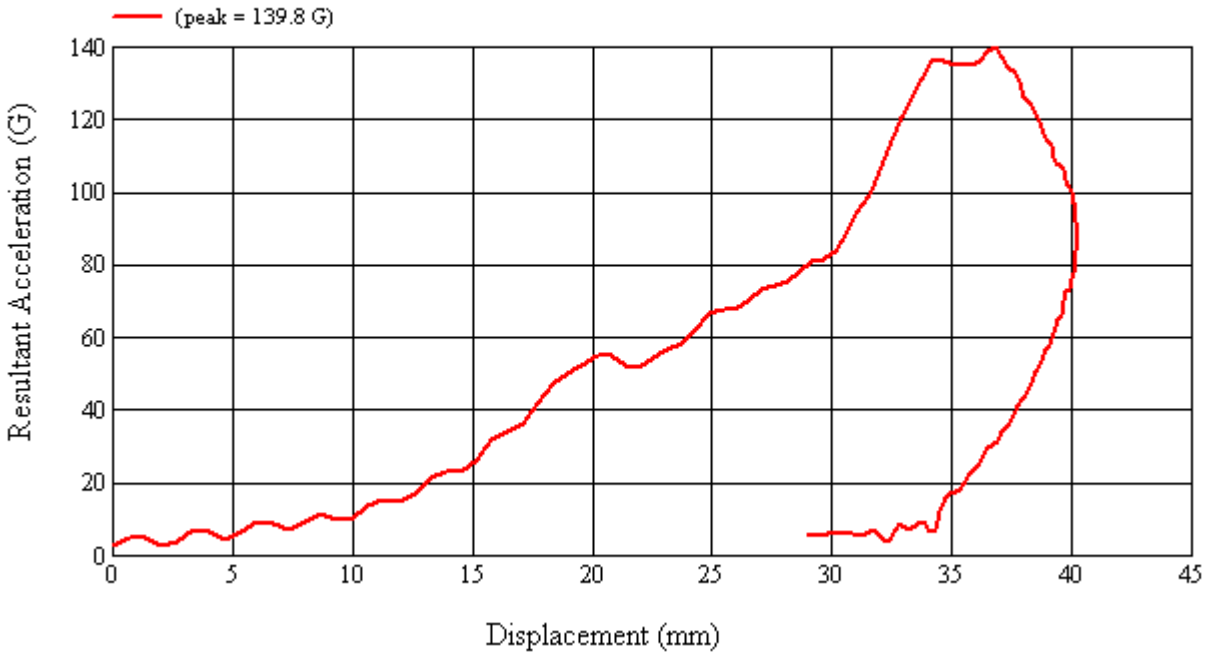
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

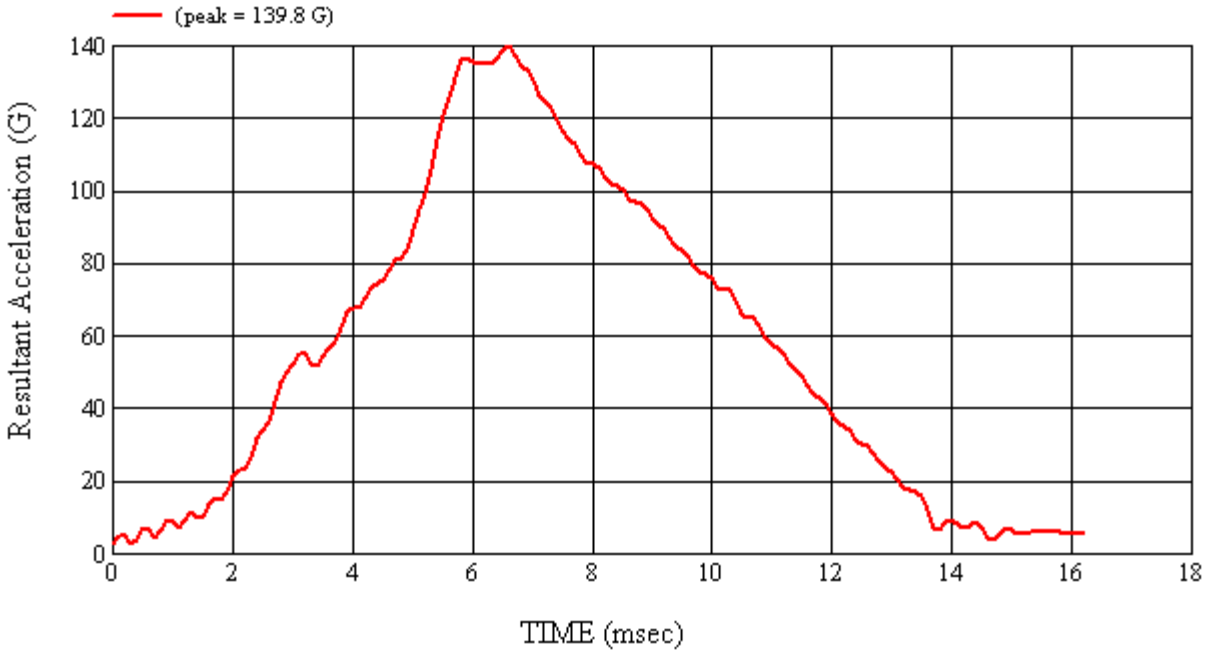
Grab handle anchor compression and headliner deformation

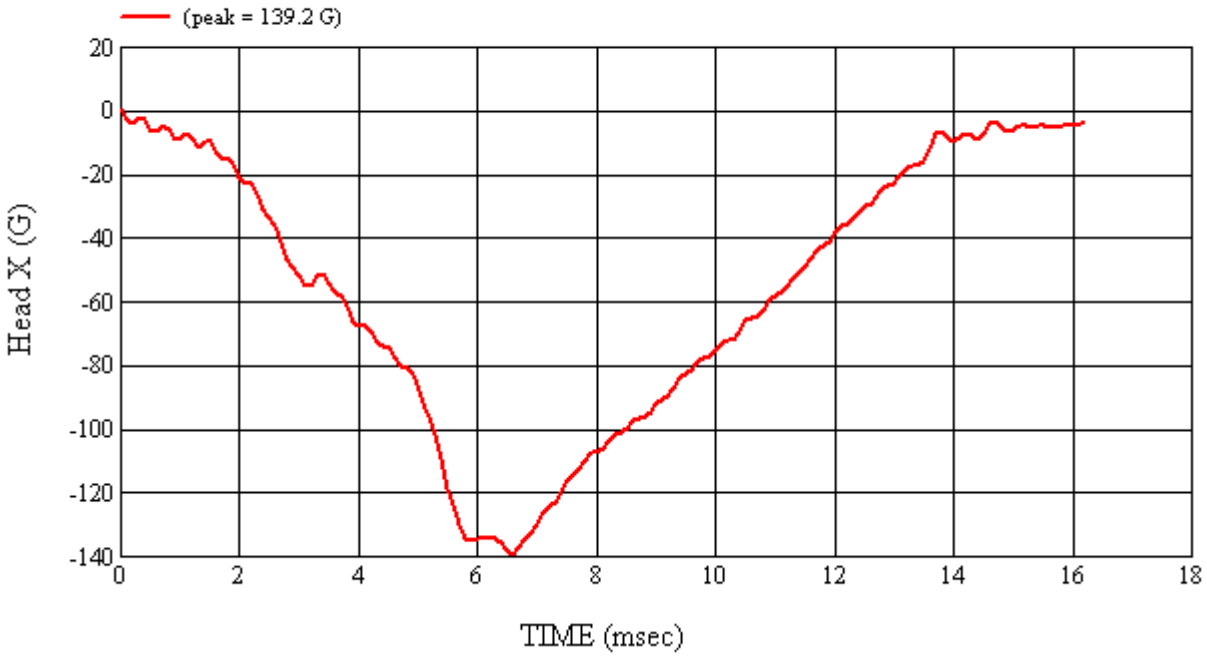

Recorded By: _____ Approved By*: _____ Date: 4/01/2010

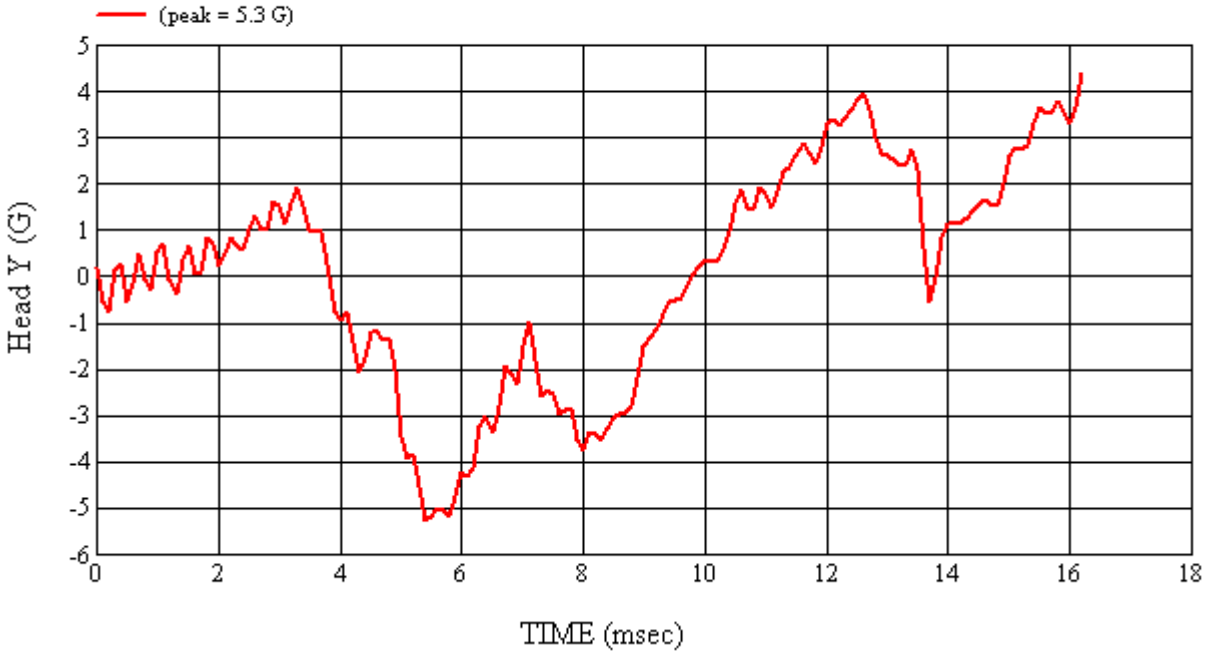
*Only necessary for NHTSA (Government) Compliance testing.

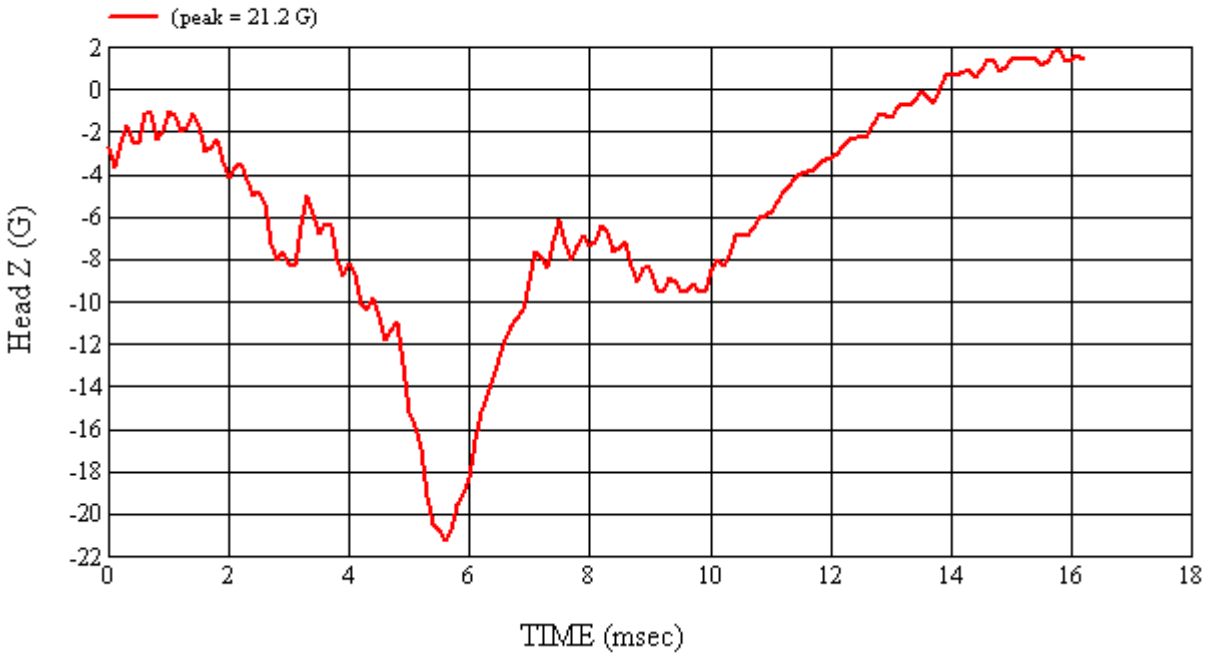
MGA Test #: U10061 Target Location: UR2, Right Side Test Date: 4/1/2010

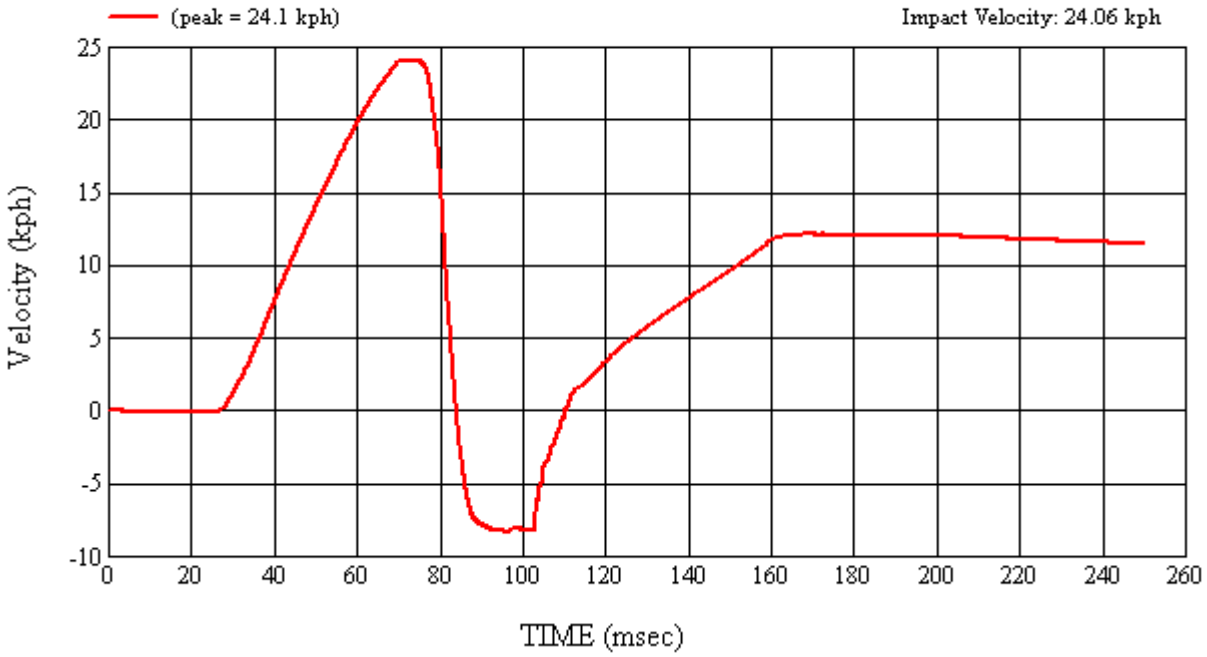


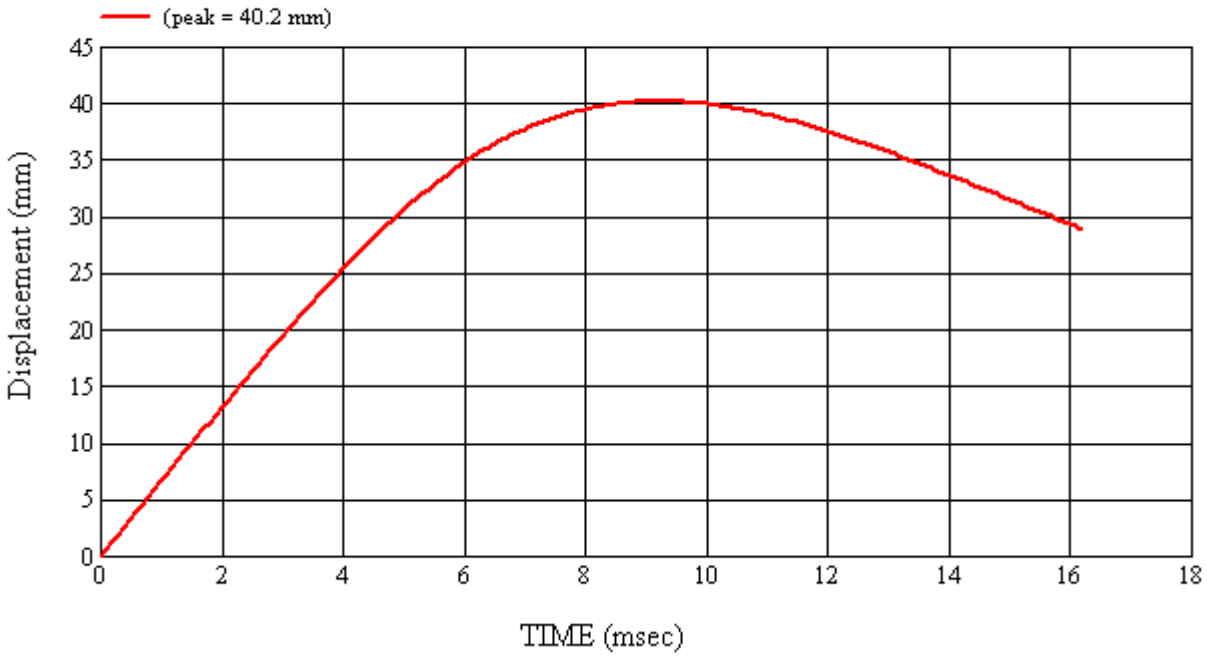


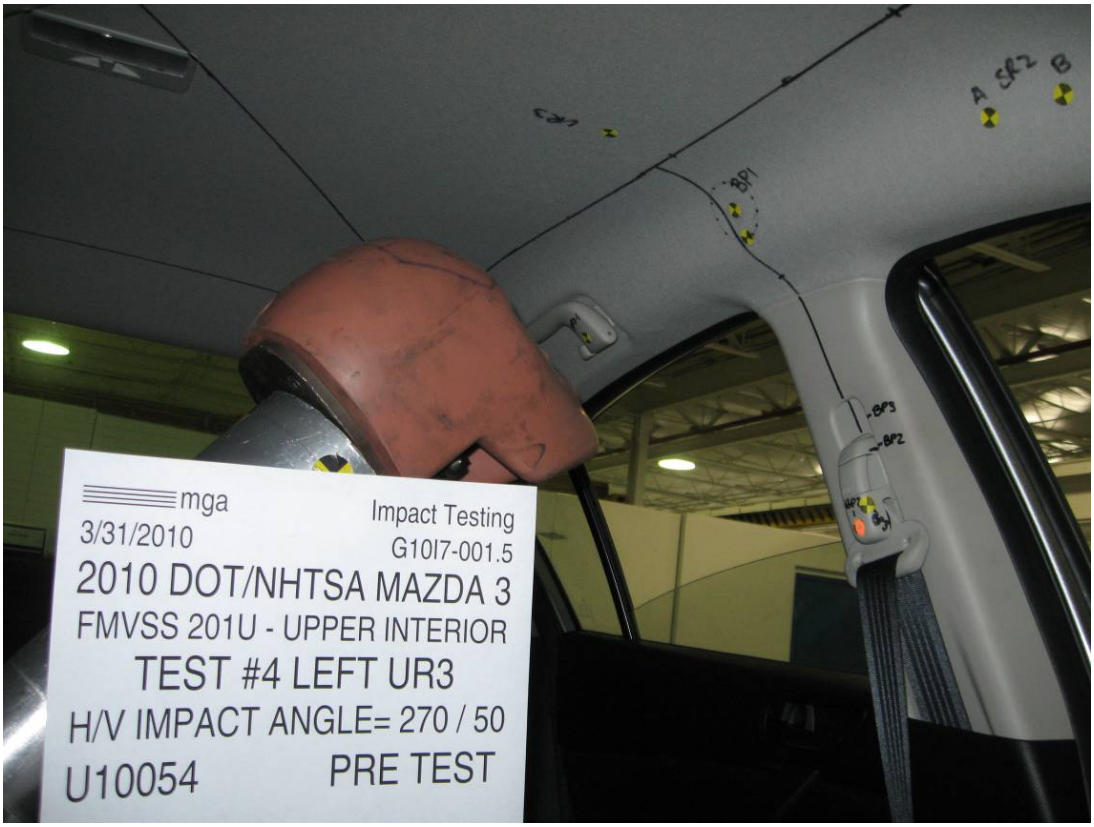

(peak = 139.2 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
TIME (msec)

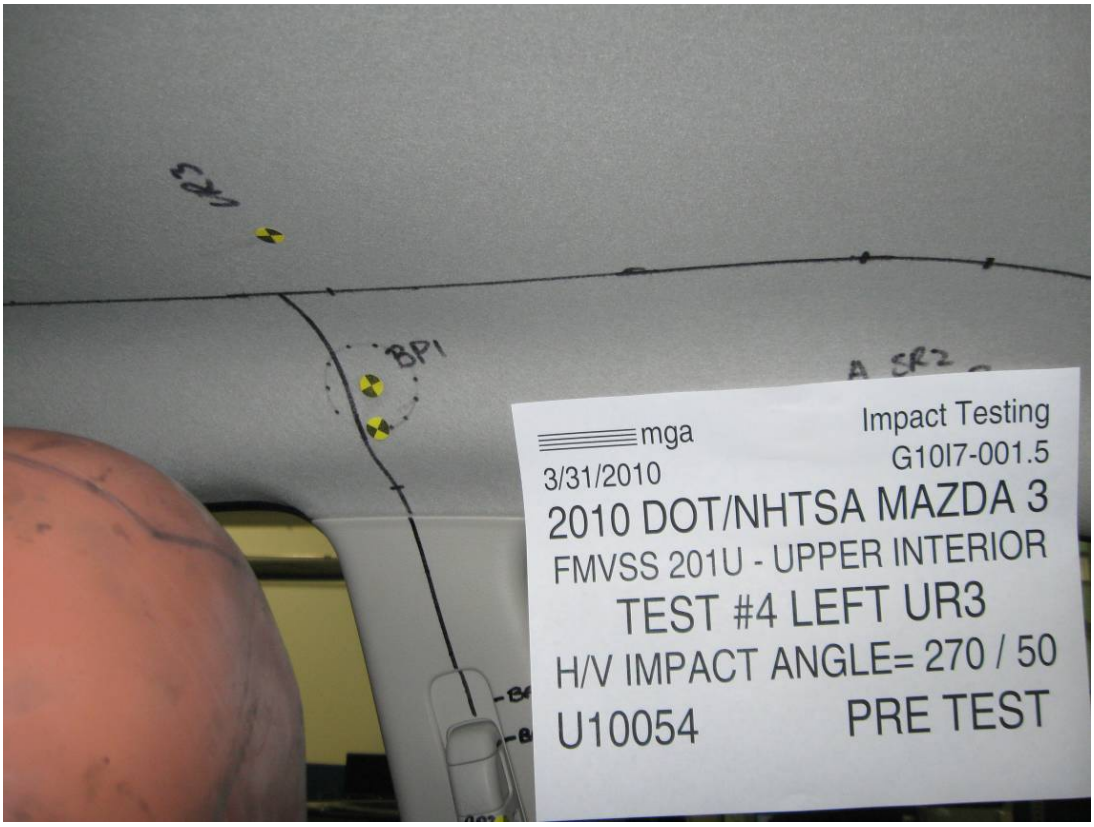

(peak = 5.3 G)
Head Y (G)
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 21.2 G)
Head Z (G)
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
0
2
4
6
8
10
12
14
16
18
TIME (msec)

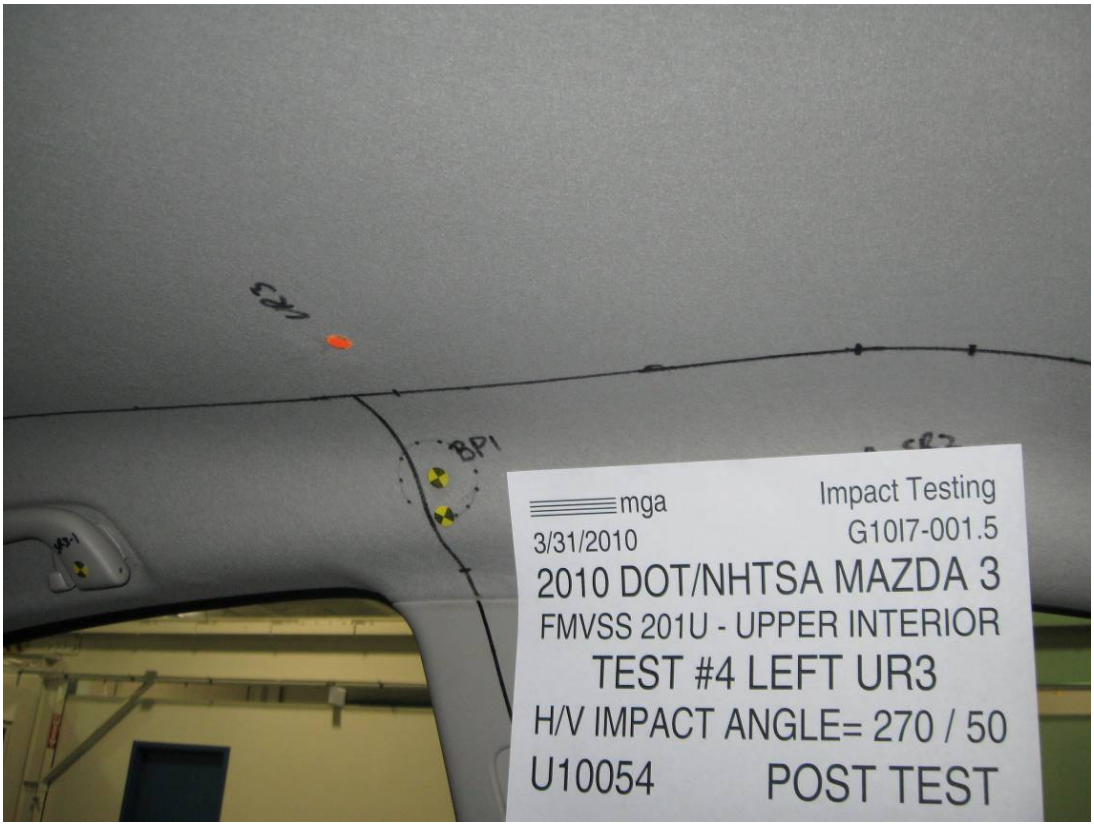

(peak = 24.1 kph)
Impact Velocity: 24.06 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

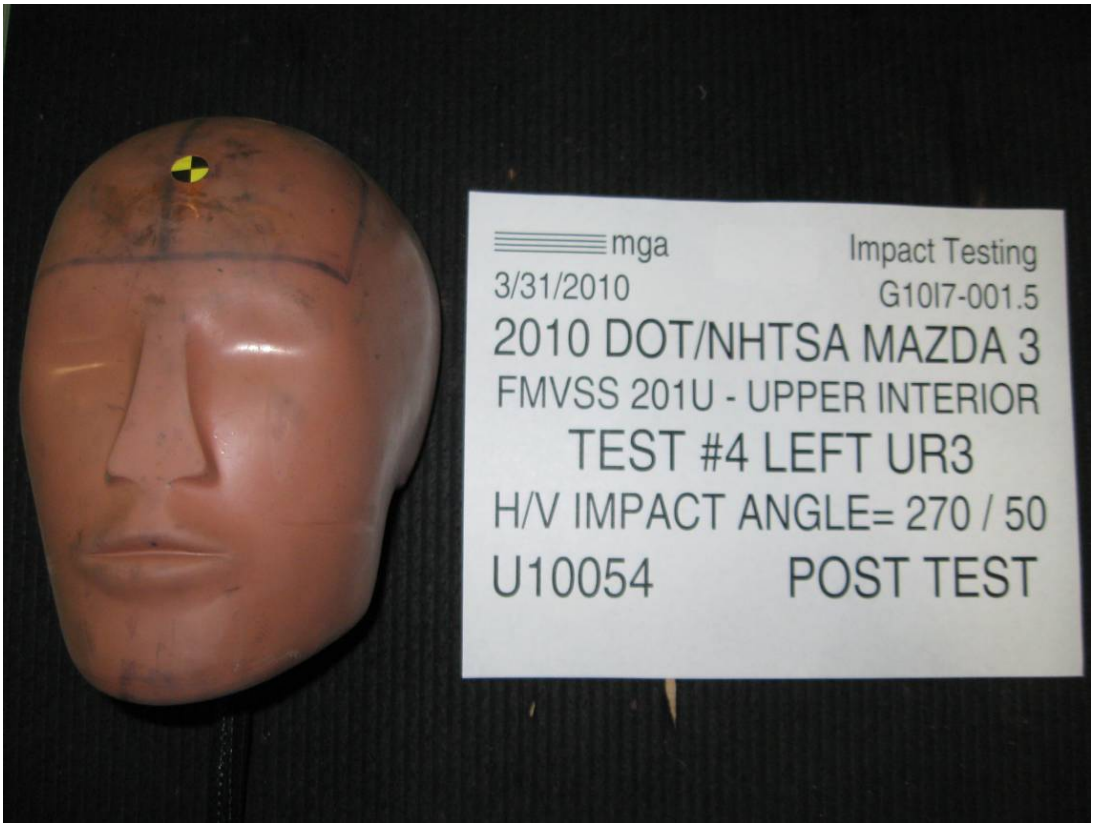

(peak = 40.2 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
TIME (msec)


mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U10054
PRE TEST


mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U10054
PRE TEST


CA5401
U10054
LEFT UR3
H/V 270/50
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U10054
POST TEST


BP1
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U10054
POST TEST


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U10054
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): UR3Left

Temperature:22.4C

MGA Test Reference No.:U10054

Humidity:31.8%

Approach Horizontal Angles:270º

Time of Test:3:52:18 PM

Approach Vertical Angles:50º

FMH Serial No:[035]

Additional Description: At BPR

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
503	446	11	23.5	36	5 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-96.3	1.06	1.06
Y	6	J22664	95.2	0.84	0.85
Z	7	J35924	93.8	0.93	0.93

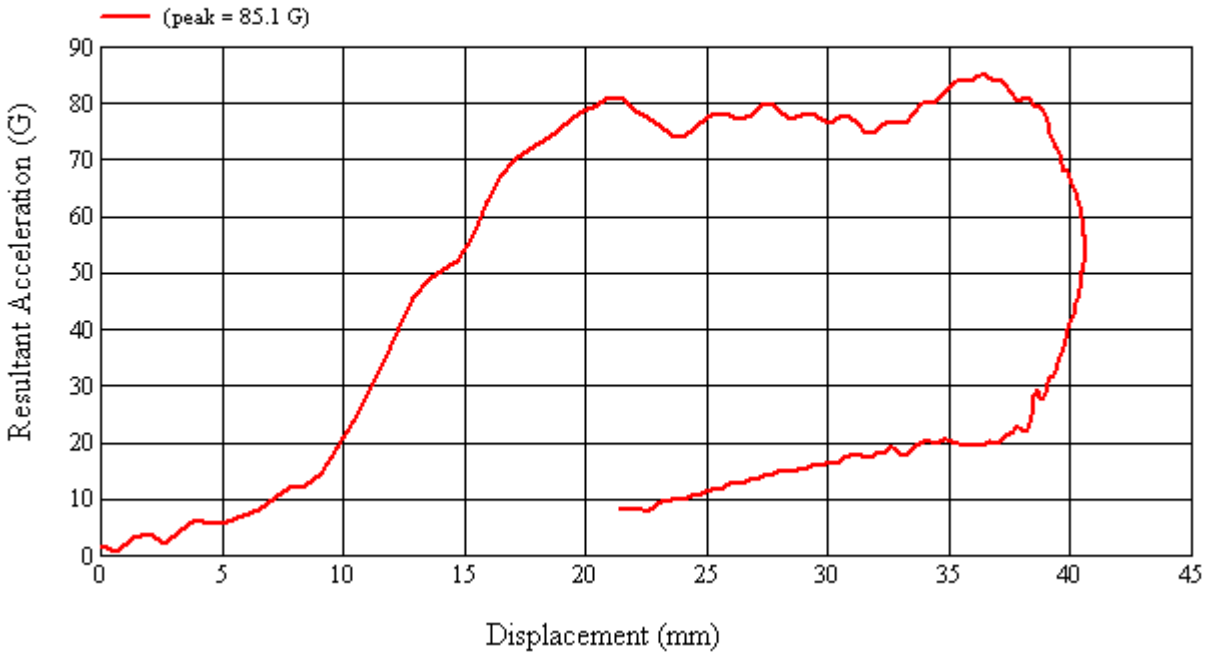
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

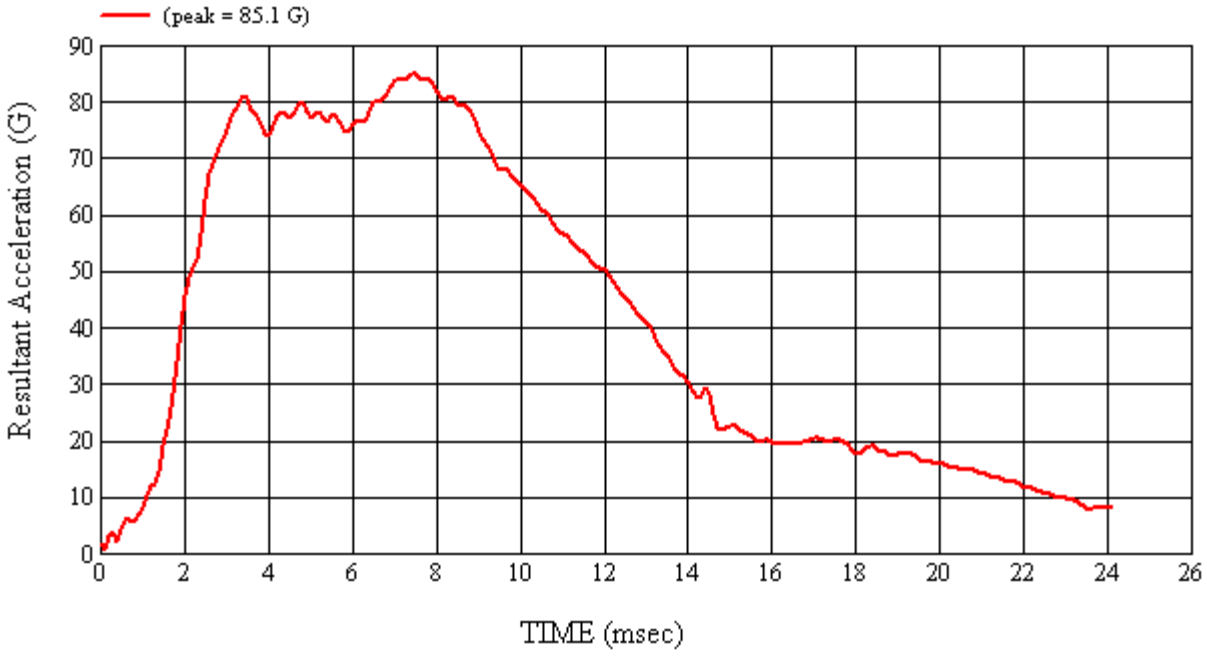
Headliner deformation

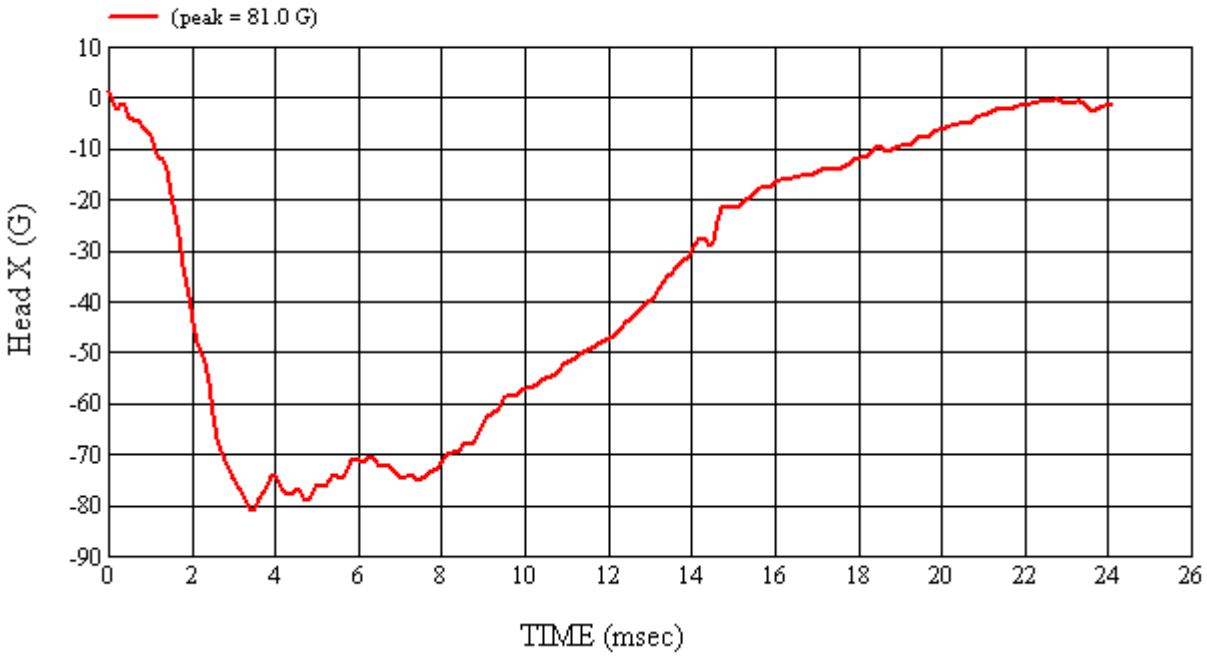
Recorded By: _____ Approved By*: _____ Date: 3/31/2010

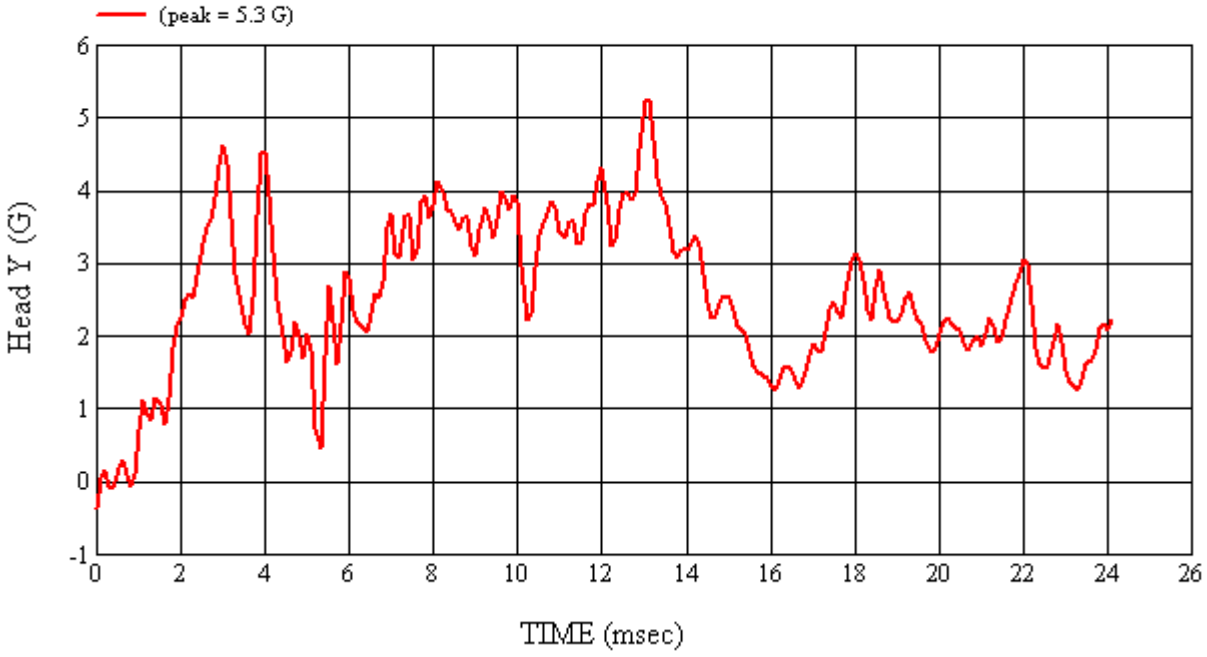
*Only necessary for NHTSA (Government) Compliance testing.

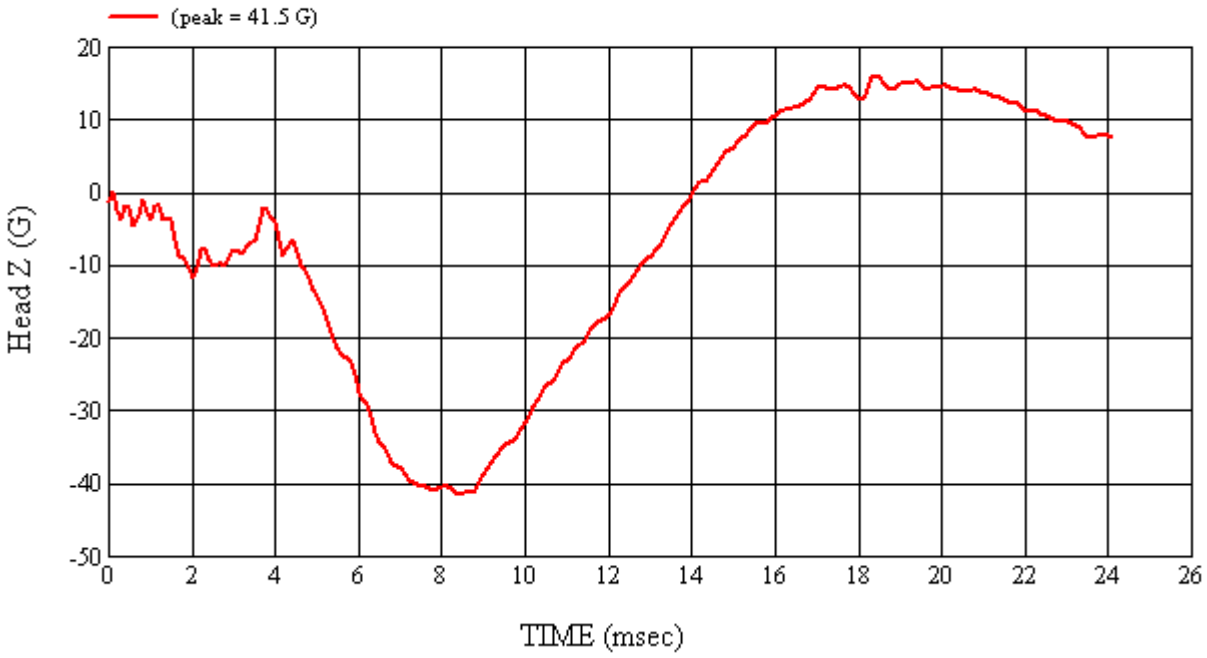
MGA Test #: U10054 Target Location: UR3, Left Side Test Date: 3/31/2010

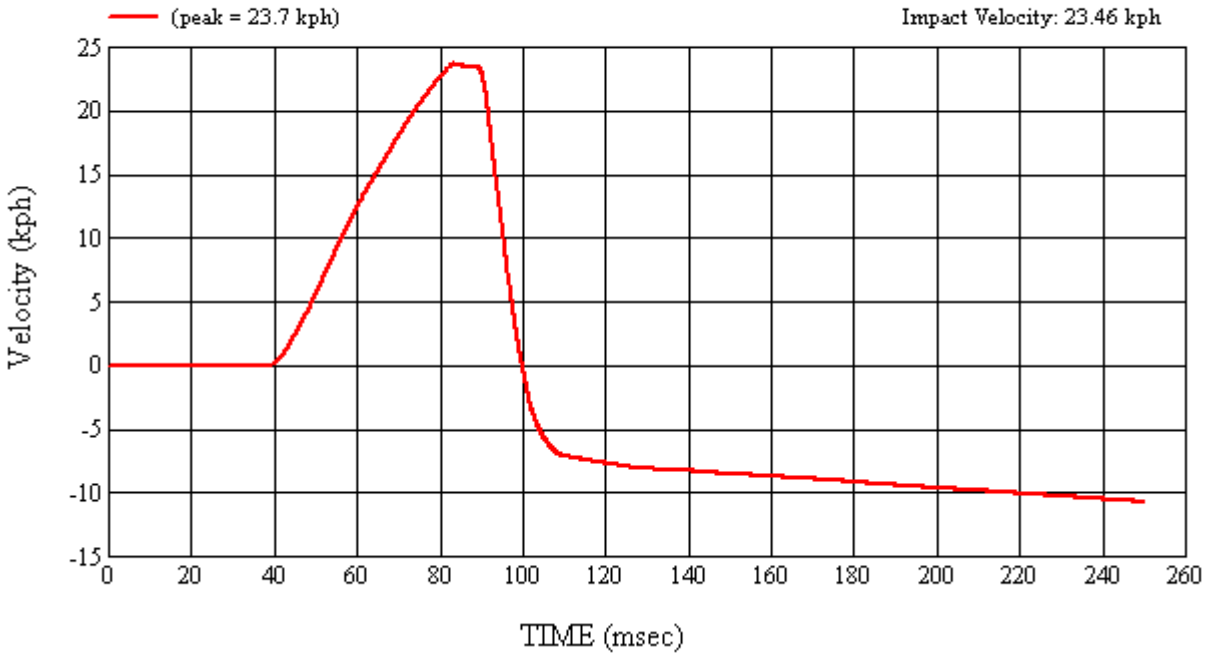


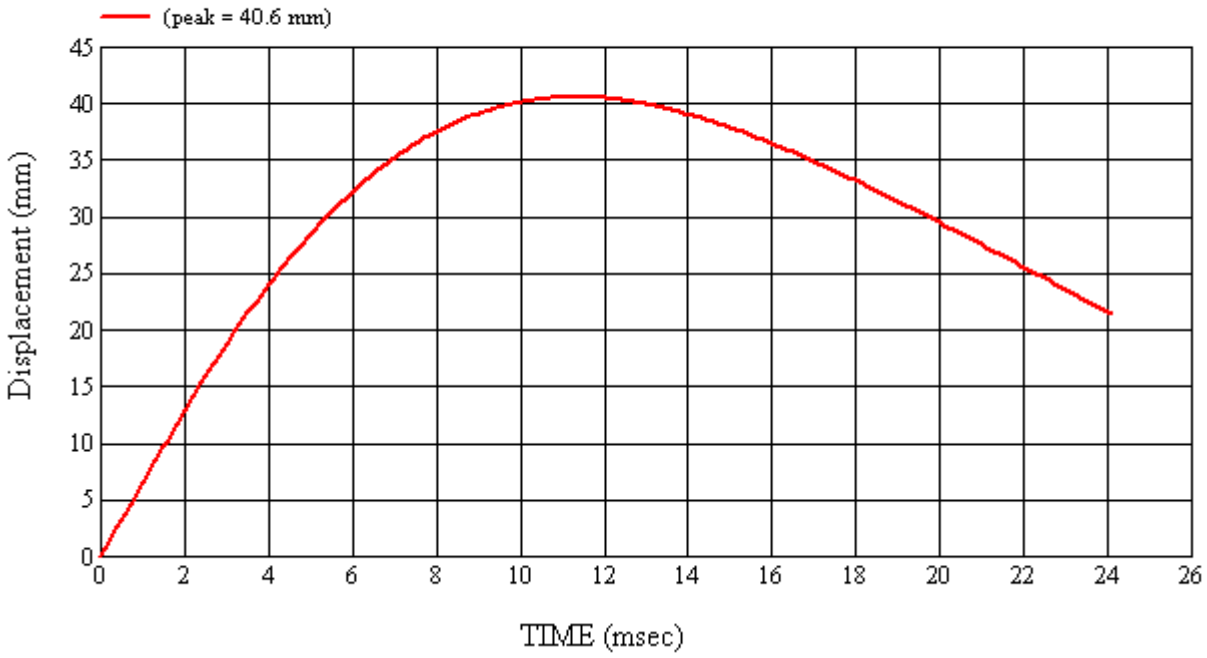


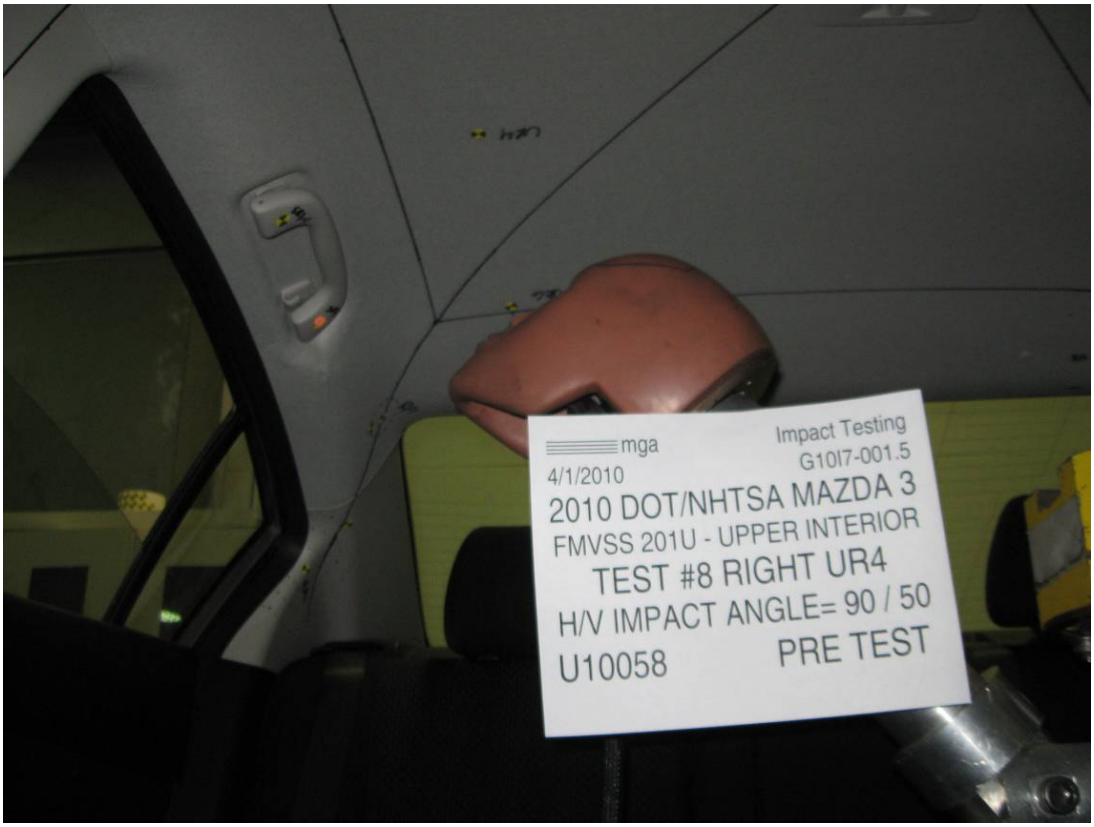

(peak = 81.0 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

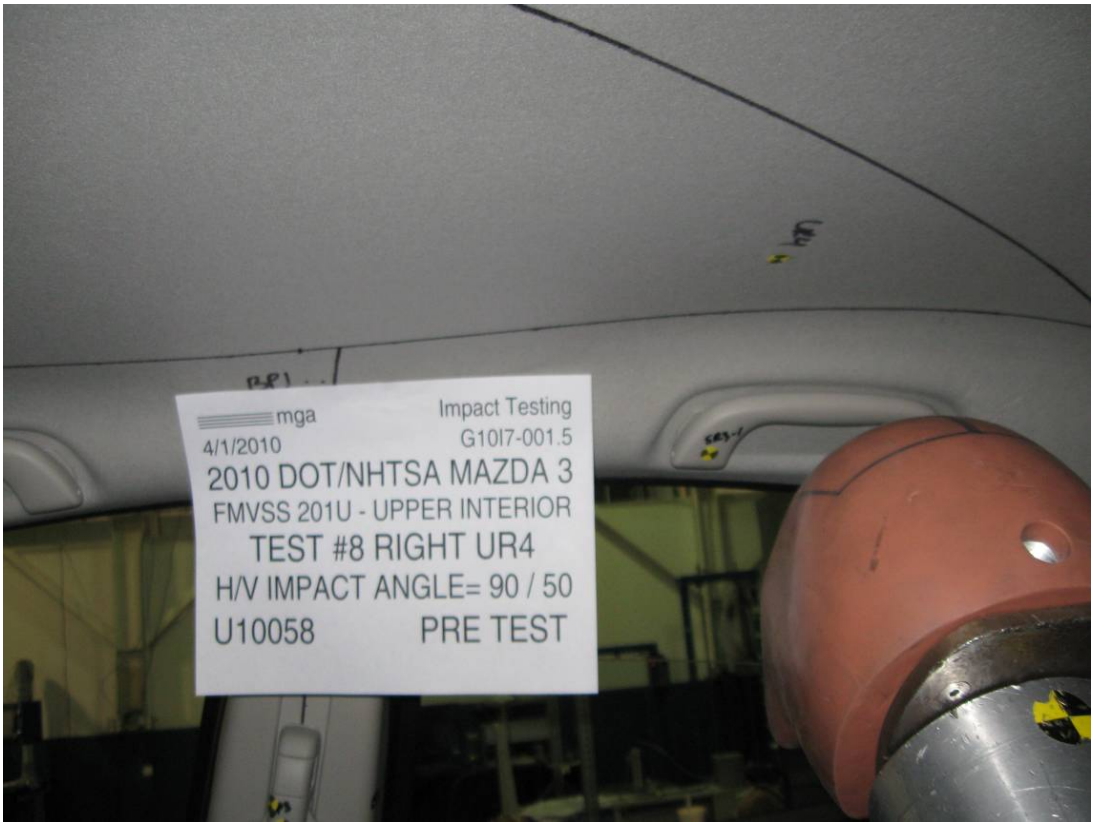

(peak = 5.3 G)
Head Y (G)
6
5
4
3
2
1
0
-1
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 41.5 G)
Head Z (G)
20
10
0
-10
-20
-30
-40
-50
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

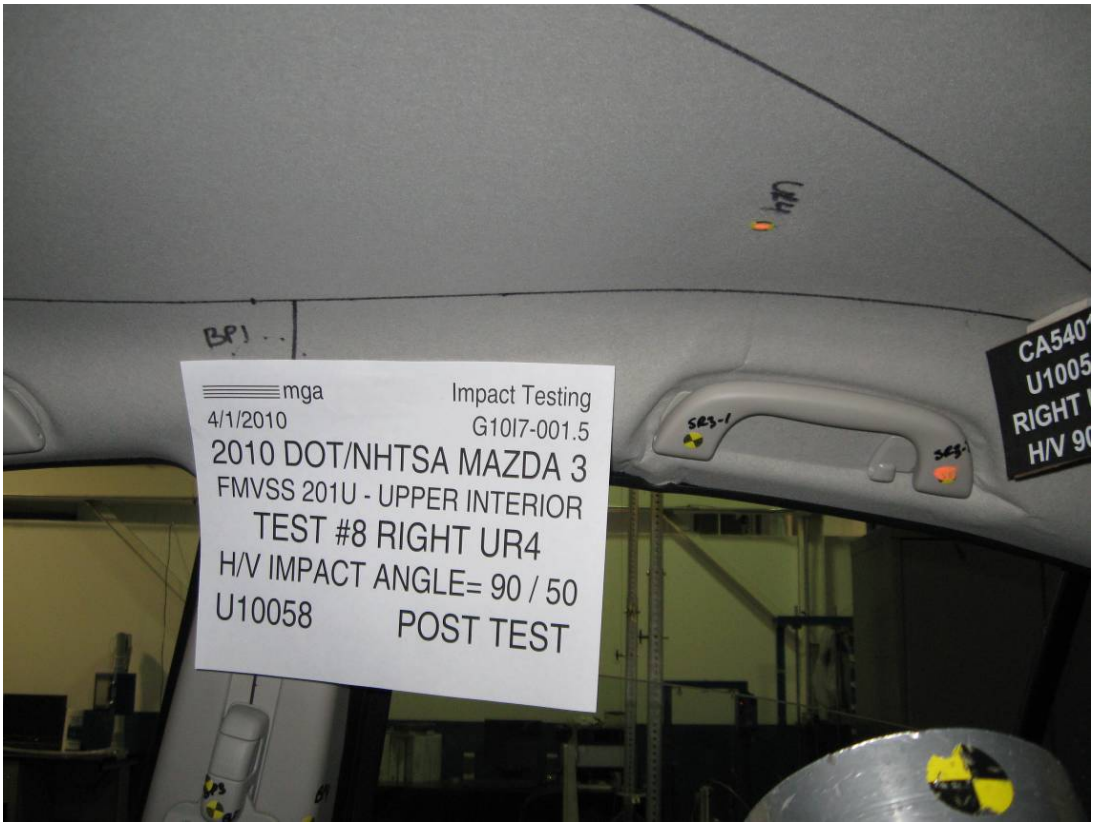

(peak = 23.7 kph)
Impact Velocity: 23.46 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 40.6 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

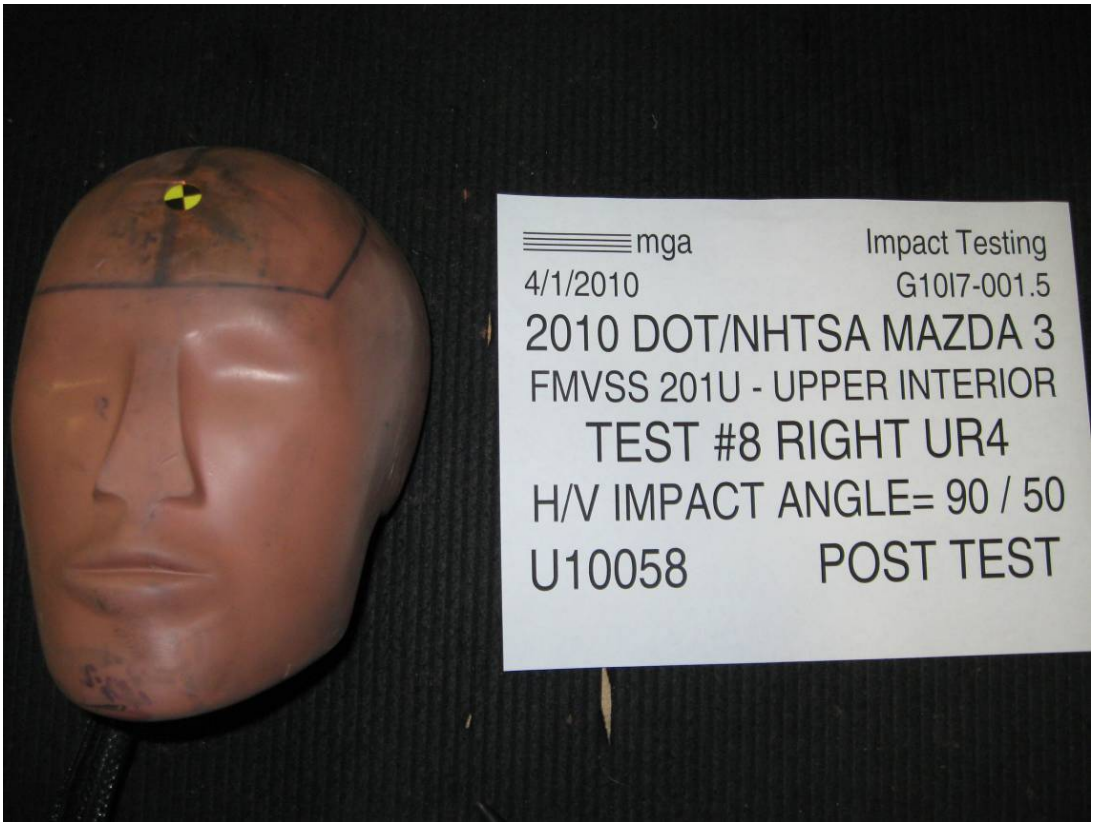

mga
Impact Testing
G10I7-001.5
4/1/2010
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U10058
PRE TEST


mga
Impact Testing
G10I7-001.5
4/1/2010
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U10058
PRE TEST


CA5401
U10058
RIGHT UR4
H/V 90/50
mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U10058
POST TEST


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U10058
POST TEST


SR3-1


mga
Impact Testing
4/1/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U10058
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#8

Target (Vehicle Side): UR4Right

Temperature:20.6C

MGA Test Reference No.:U10058

Humidity:37.8%

Approach Horizontal Angles:90º

Time of Test:10:11:15 AM

Approach Vertical Angles:50º

FMH Serial No:[037]

Additional Description: Above SR3-1

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
644	633	7.9	24.0	36	2 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-116.9	1.06	1.06
Y	6	J14103	94.2	0.85	0.85
Z	7	J35800	98.2	0.93	0.93

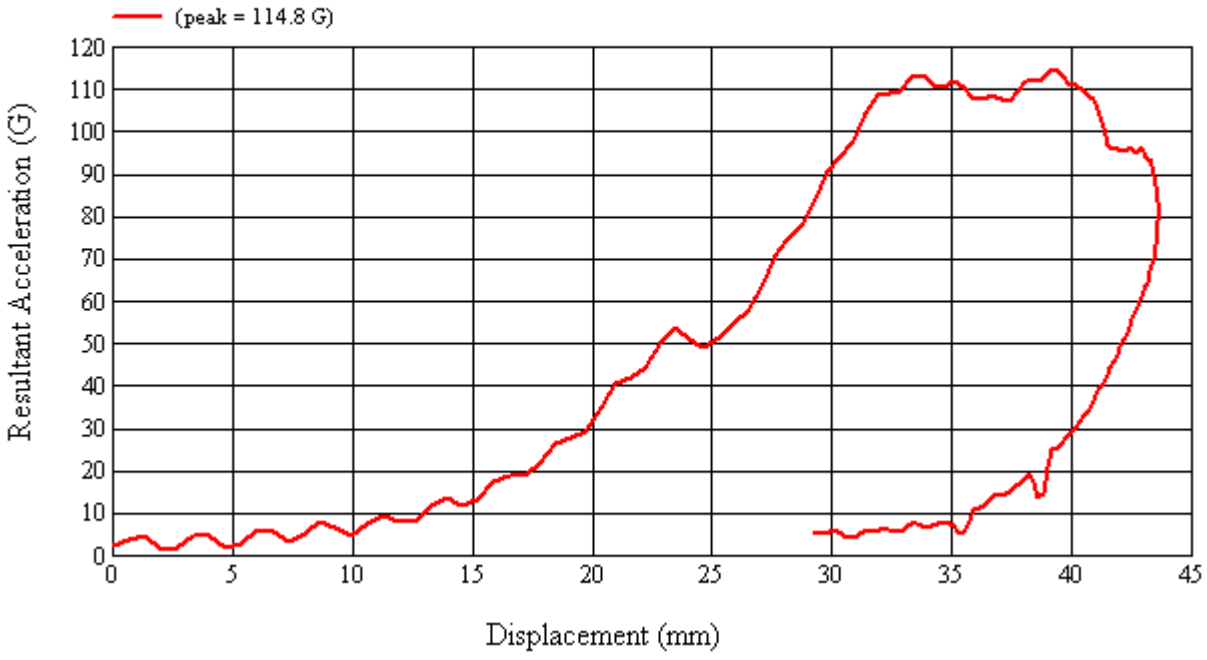
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

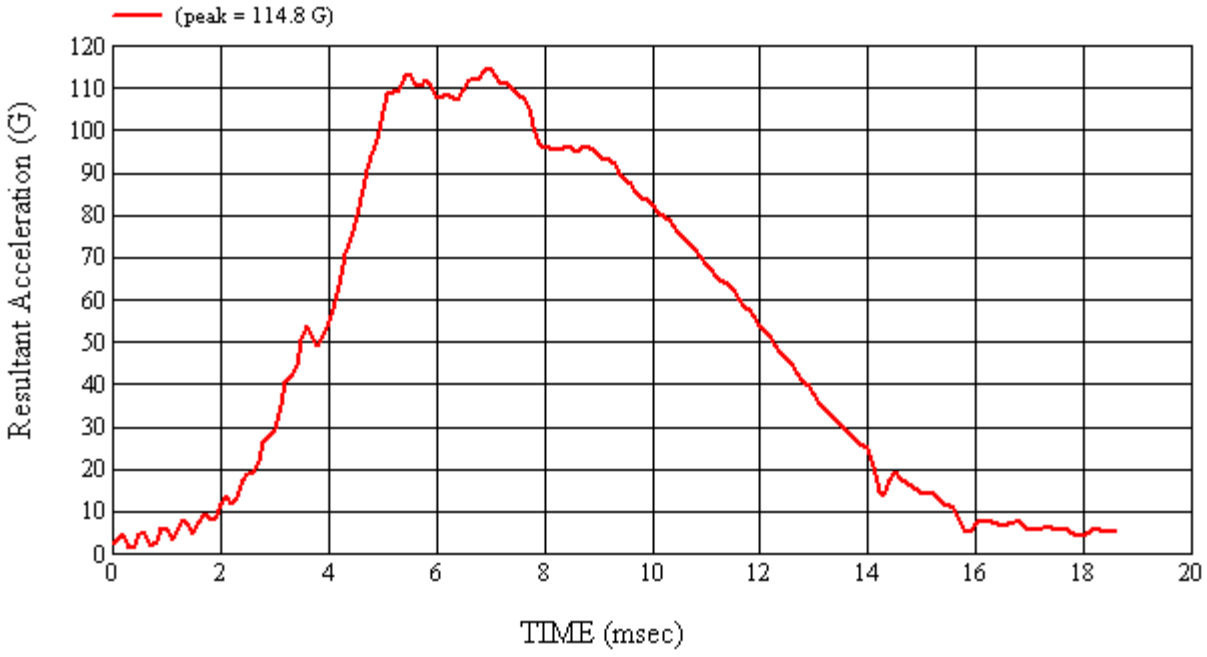
Grab handle anchor compression and headliner deformation

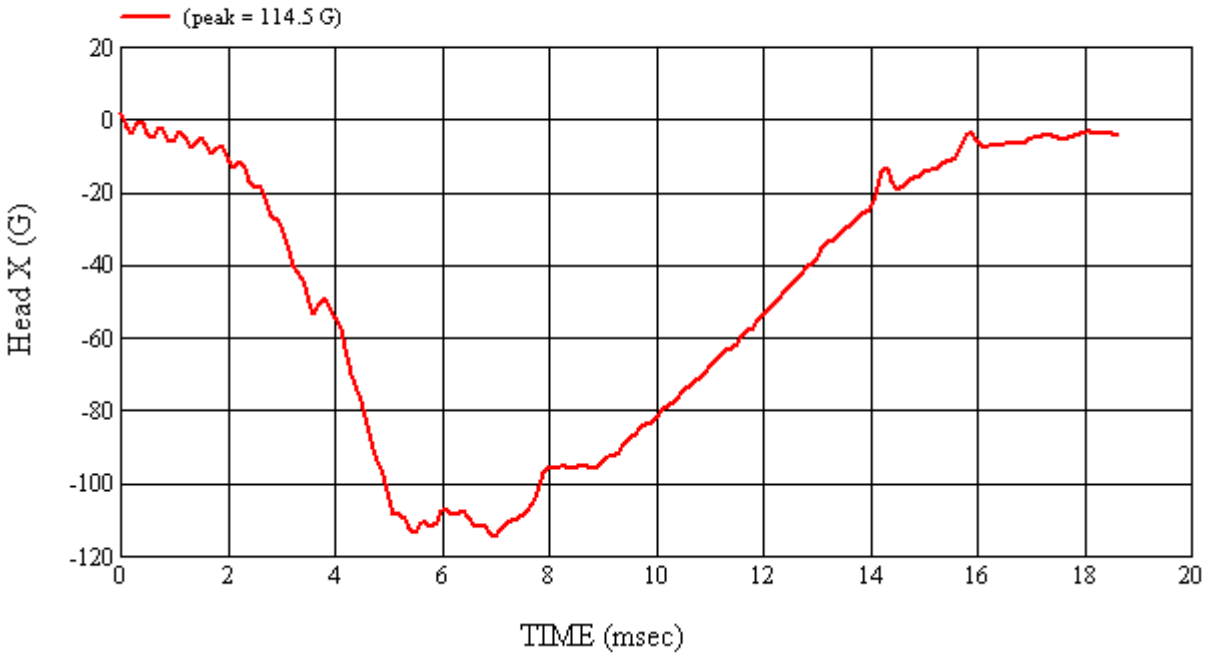
Recorded By: _____ Approved By*: _____ Date: 4/01/2010

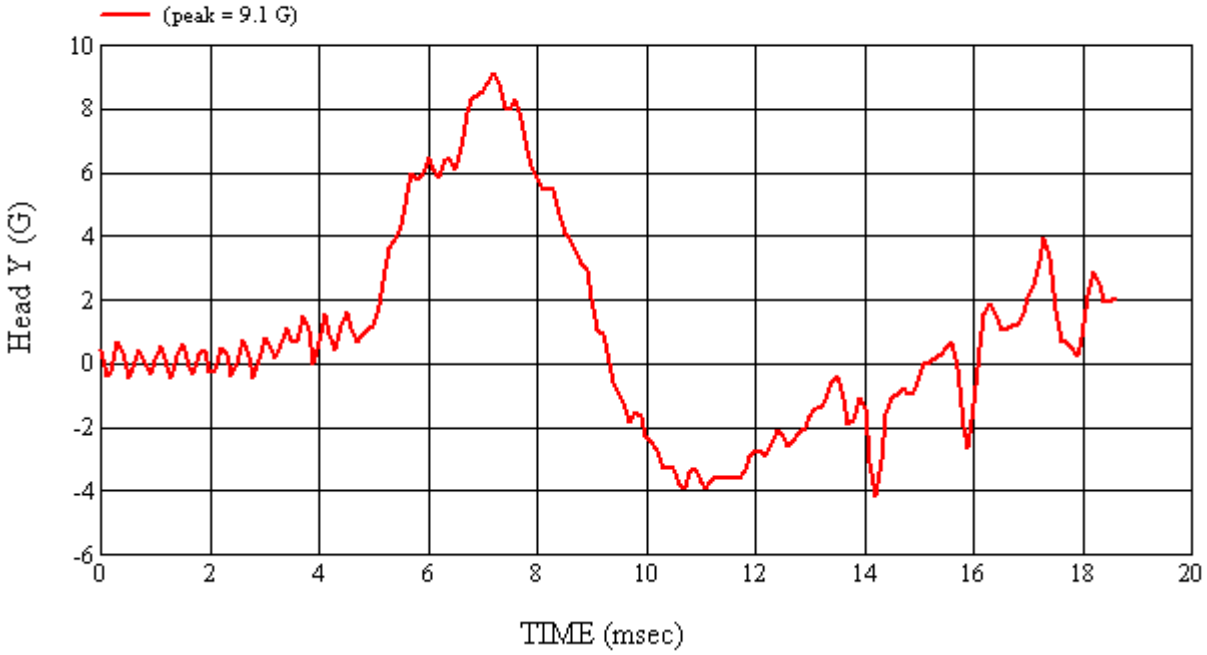
*Only necessary for NHTSA (Government) Compliance testing.

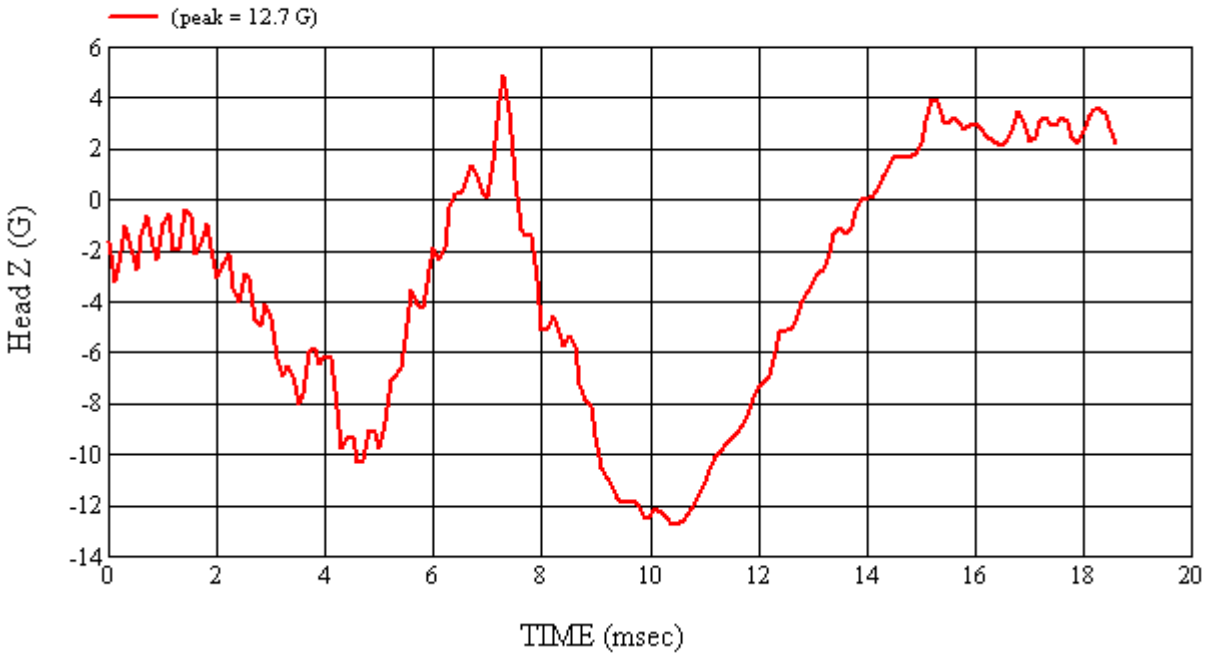
MGA Test #: U10058 Target Location: UR4, Right Side Test Date: 4/1/2010

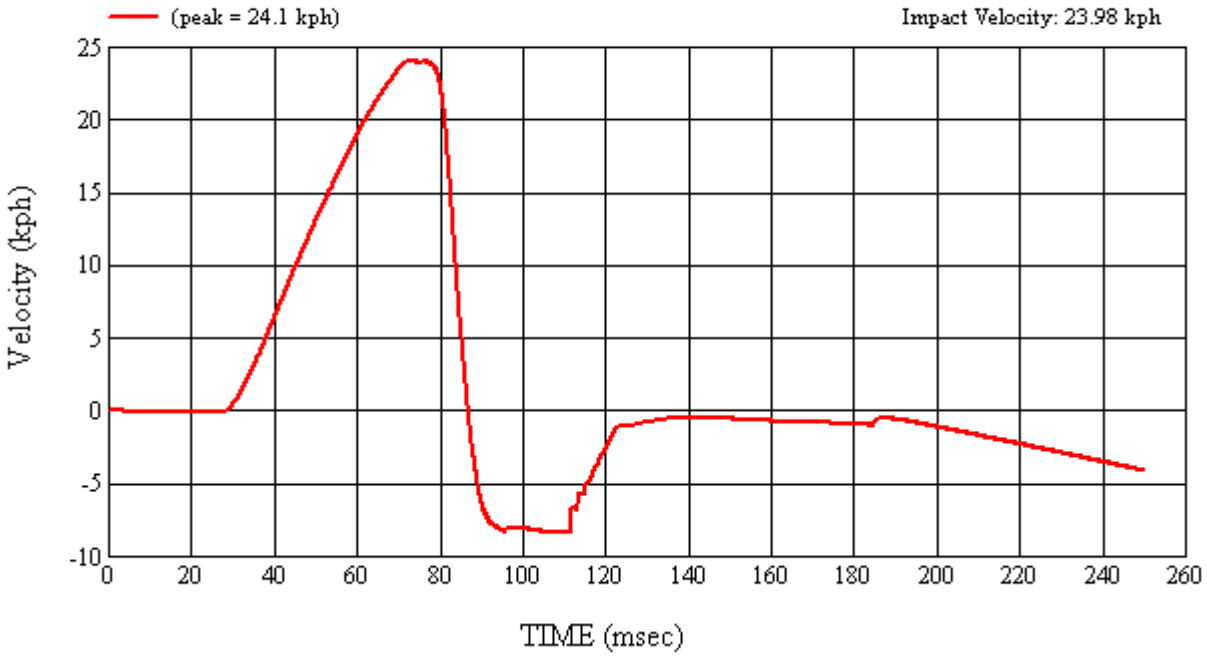


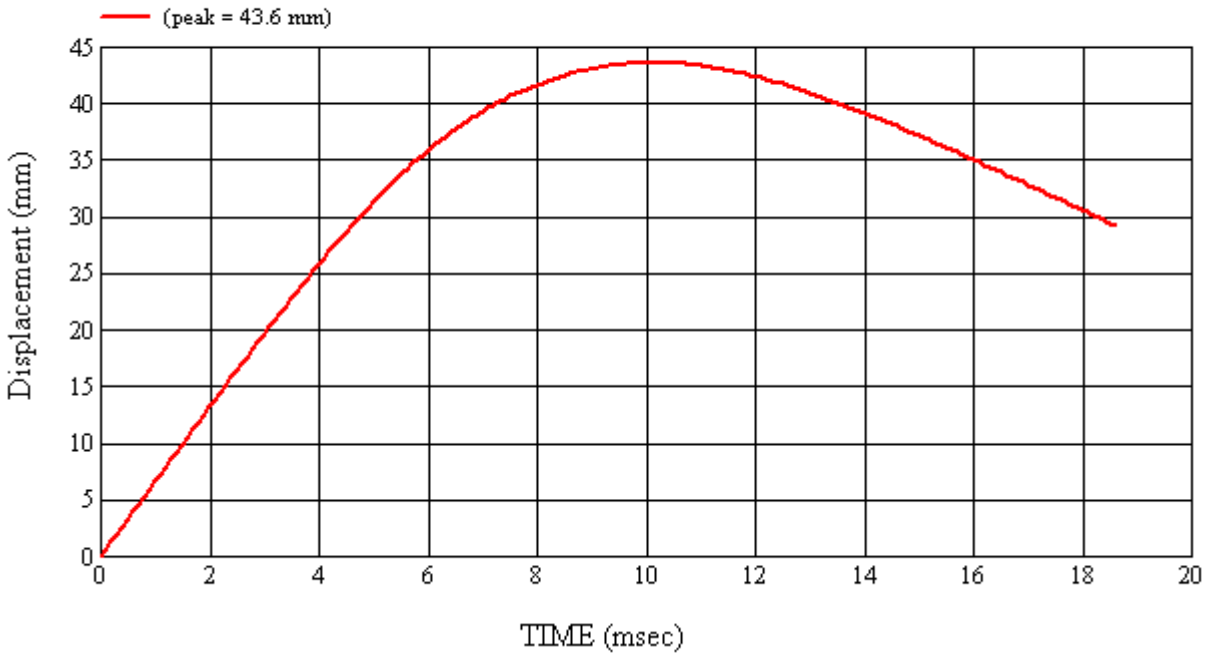


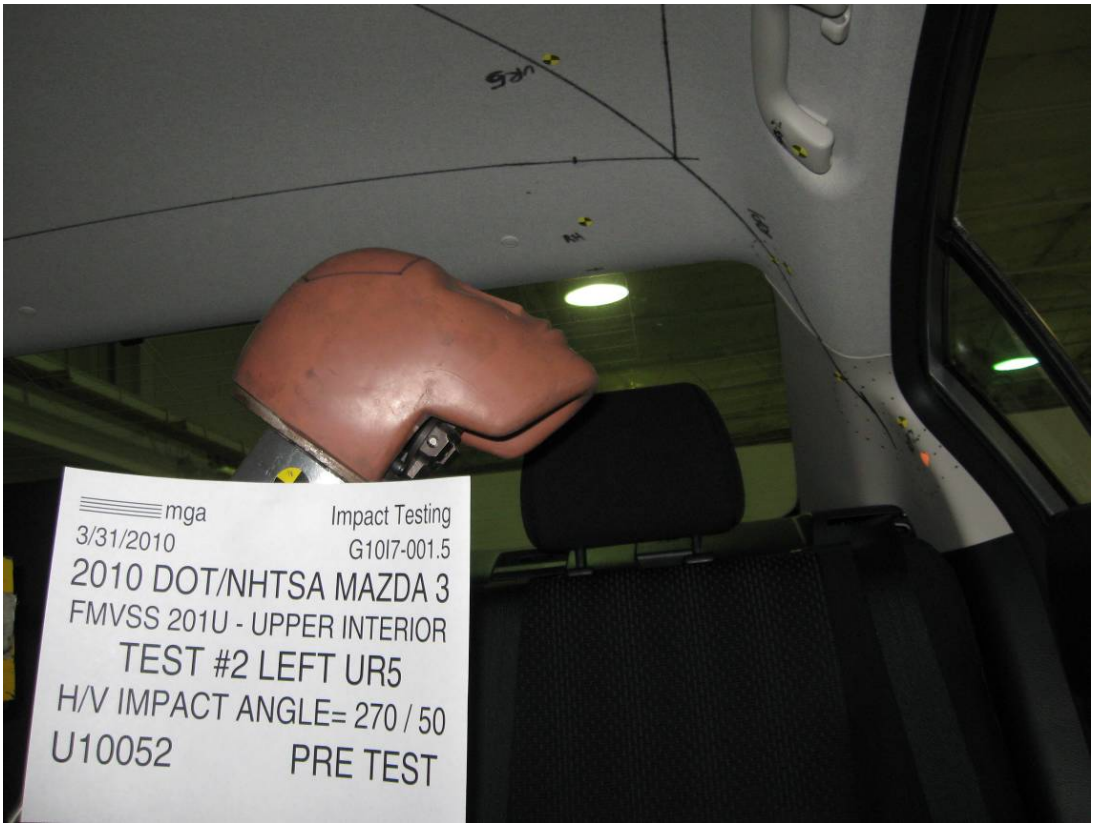

(peak = 114.5 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

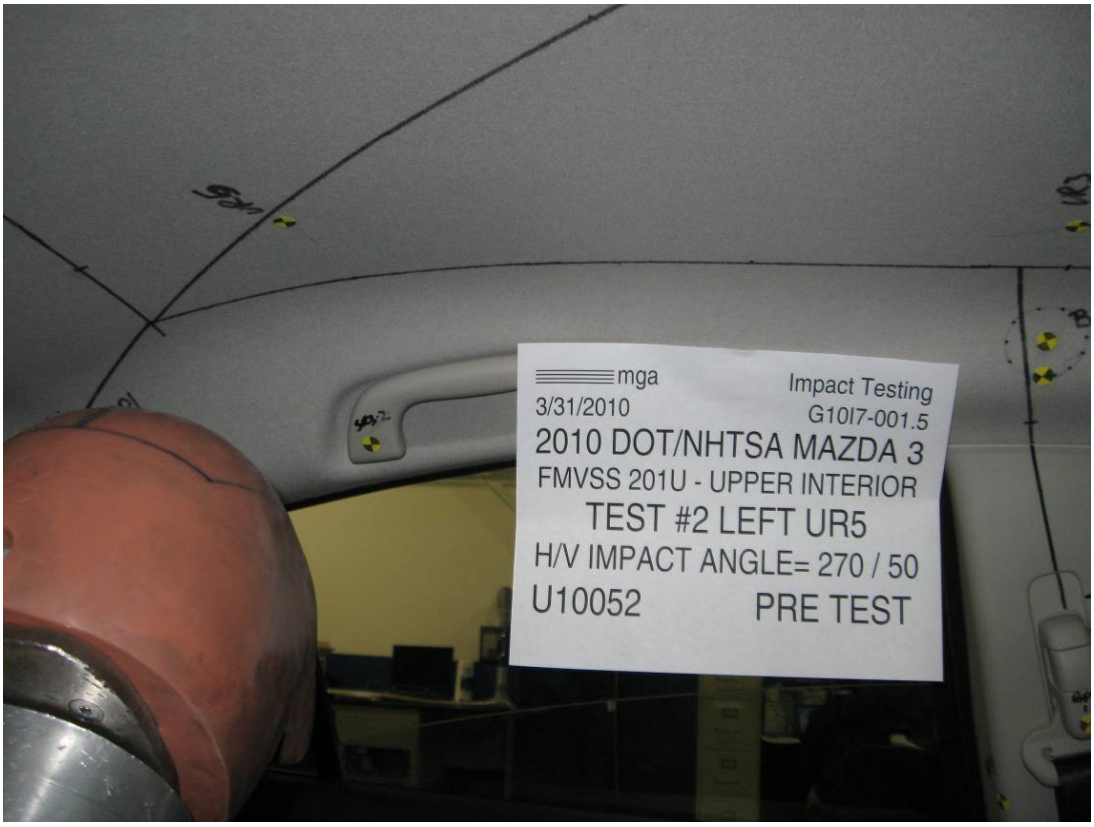

(peak = 9.1 G)
Head Y (G)
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

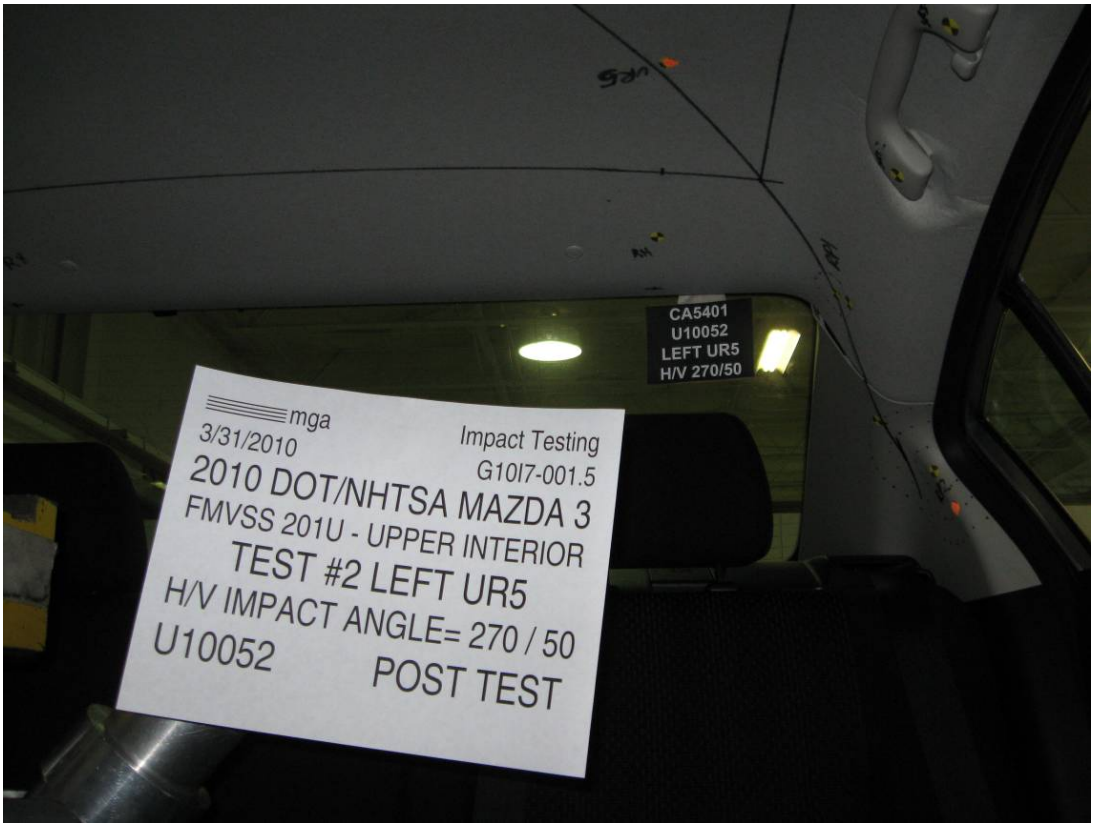

(peak = 12.7 G)
Head Z (G)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 24.1 kph)
Impact Velocity: 23.98 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

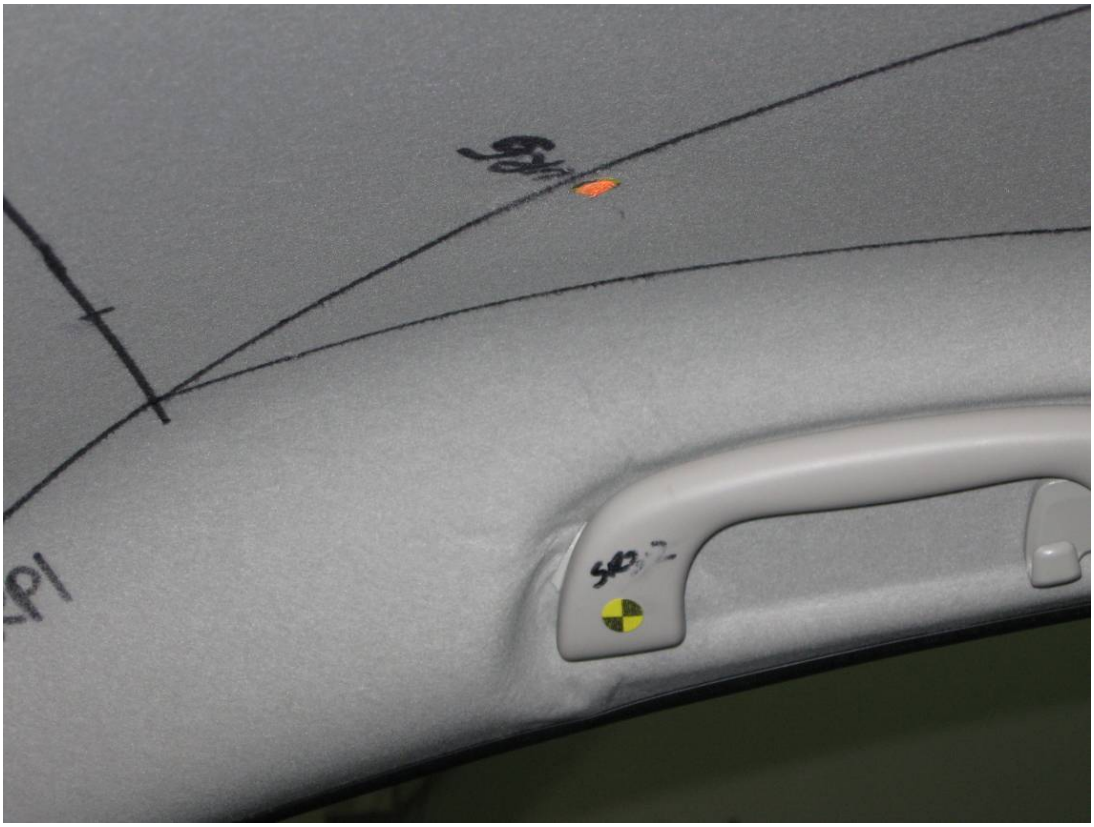

(peak = 43.6 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

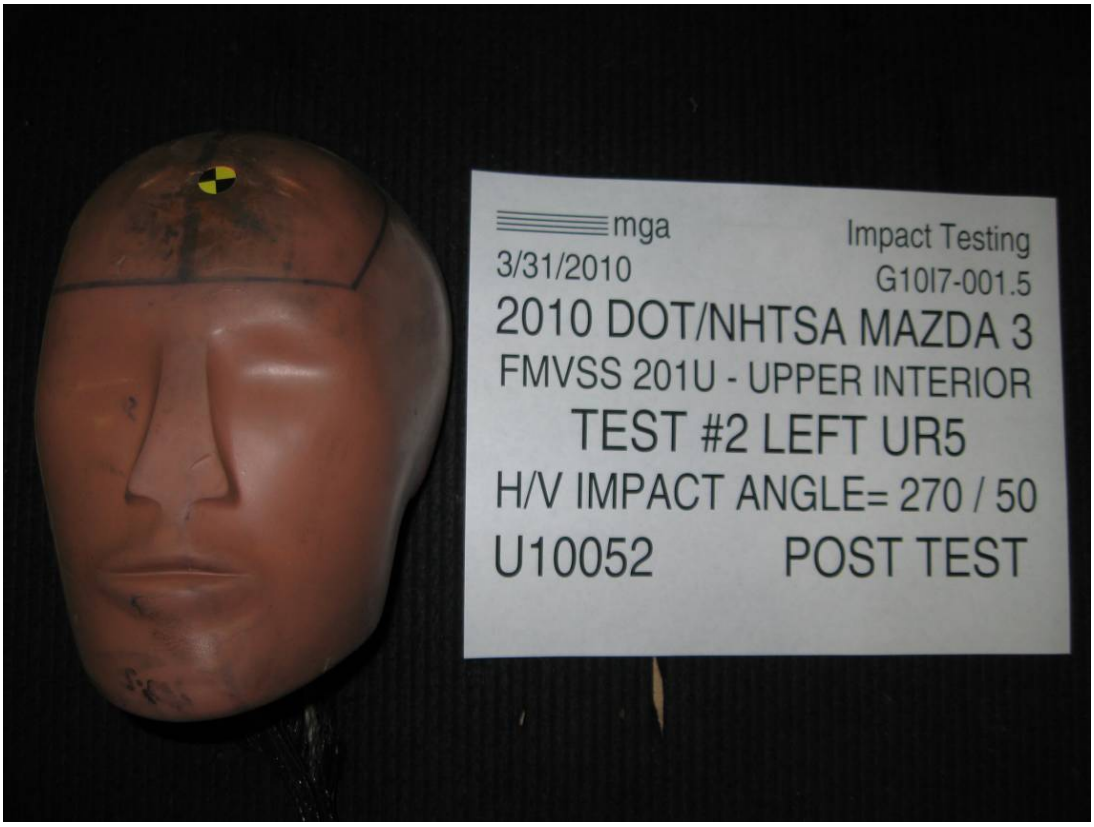

mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U10052
PRE TEST


mga
Impact Testing
3/31/2010
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U10052
PRE TEST


CA5401
U10052
LEFT UR5
H/V 270/50
mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U10052
POST TEST


mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U10052
POST TEST




mga
3/31/2010
Impact Testing
G10I7-001.5
2010 DOT/NHTSA MAZDA 3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U10052
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G10I7-001.5 VEHICLE YR/MAKE/MODEL:2010/DOT/NHTSA/Mazda 3

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): UR5Left

Temperature:20.3C

MGA Test Reference No.:U10052

Humidity:32.7%

Approach Horizontal Angles:270º

Time of Test:1:58:41 PM

Approach Vertical Angles:50º

FMH Serial No:[037]

Additional Description: At SR3-2

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
637	623	7.6	23.9	38	5 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-116.9	1.06	1.06
Y	6	J14103	94.2	0.84	0.84
Z	7	J35800	98.2	0.93	0.93

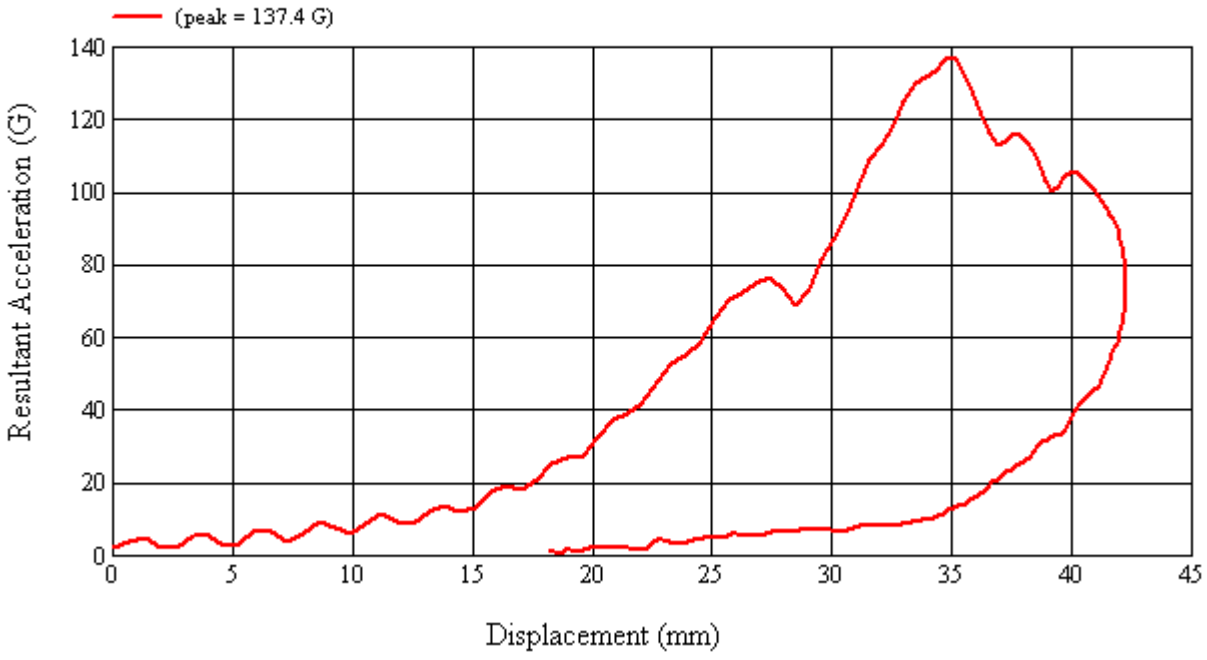
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

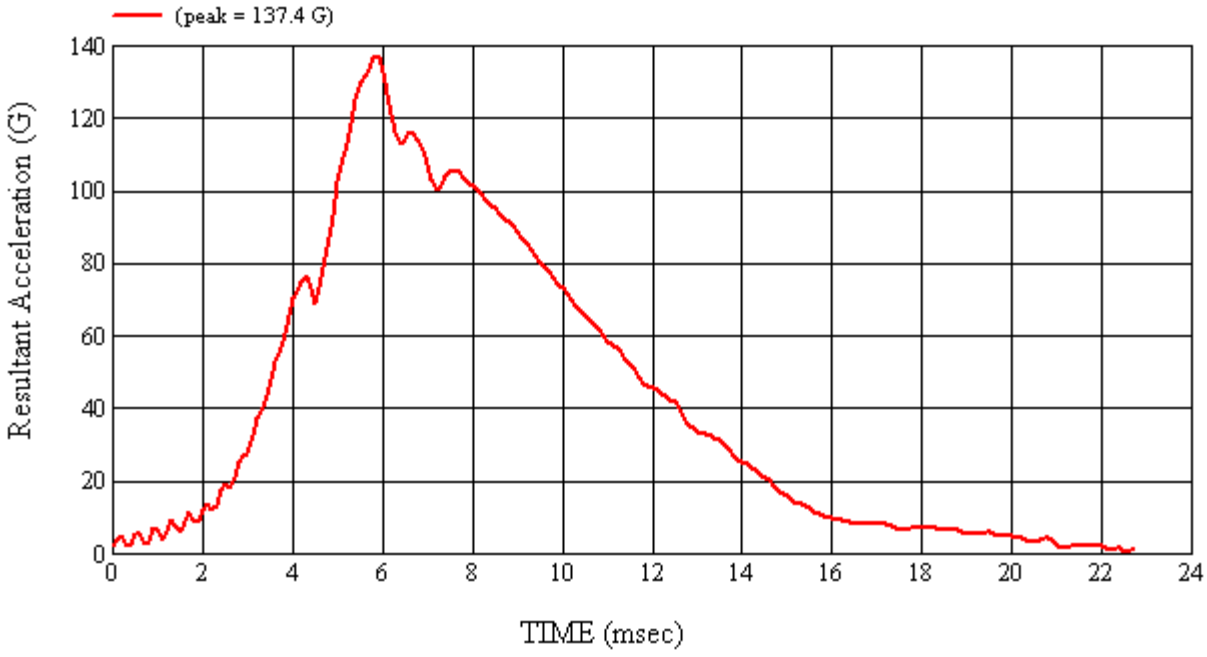
Slight headliner deformation

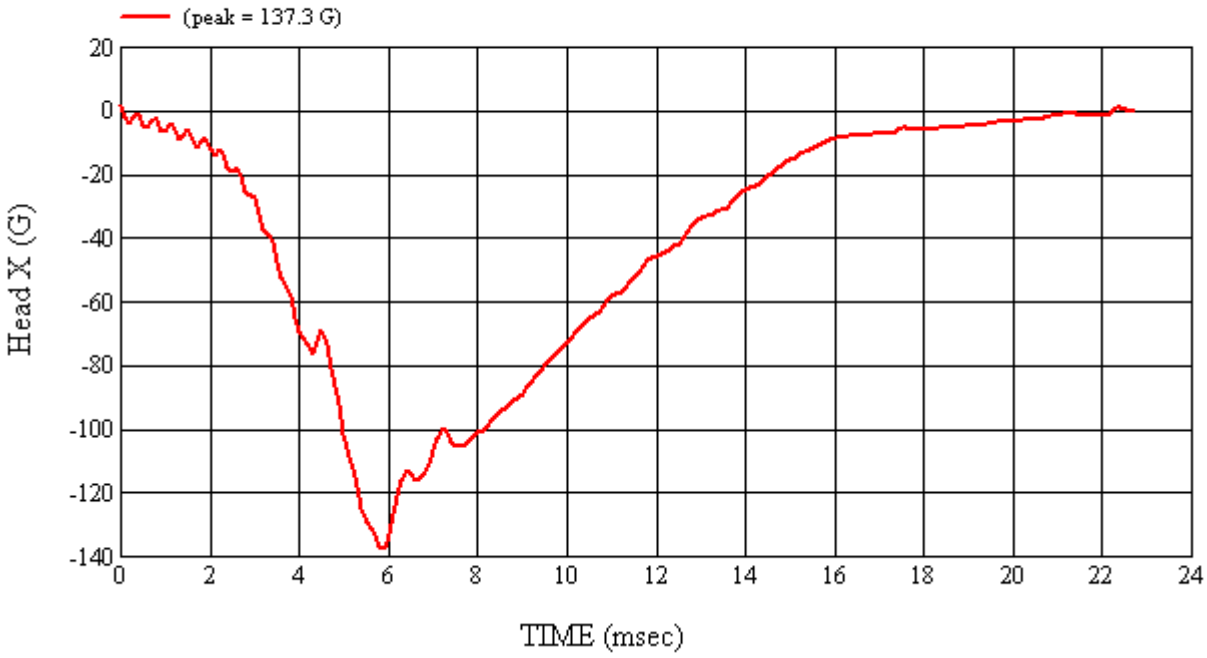
Recorded By: _____ Approved By*: _____ Date: 3/31/2010

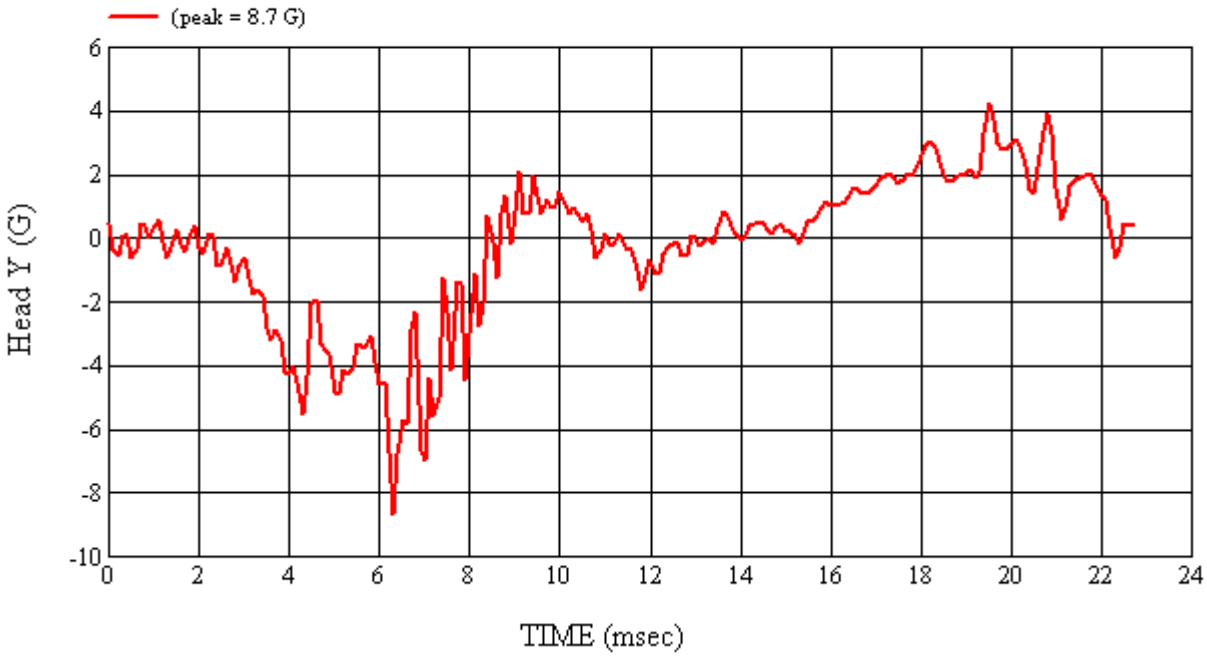
*Only necessary for NHTSA (Government) Compliance testing.

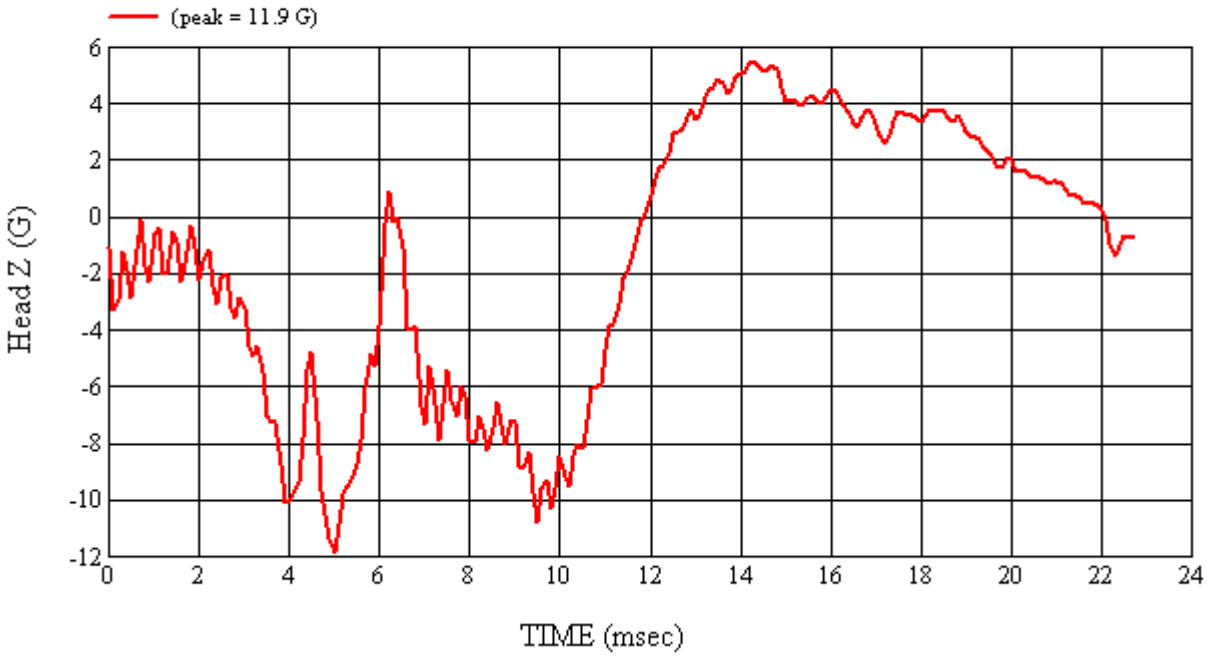
MGA Test #: U10052 Target Location: UR5, Left Side Test Date: 3/31/2010

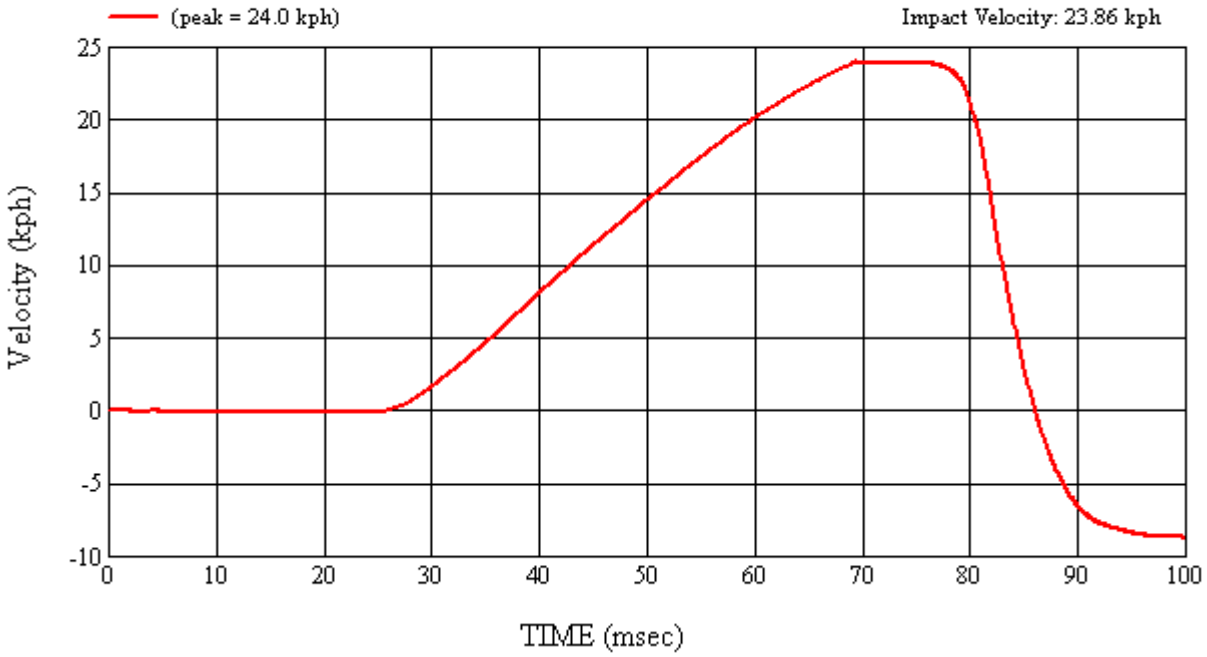


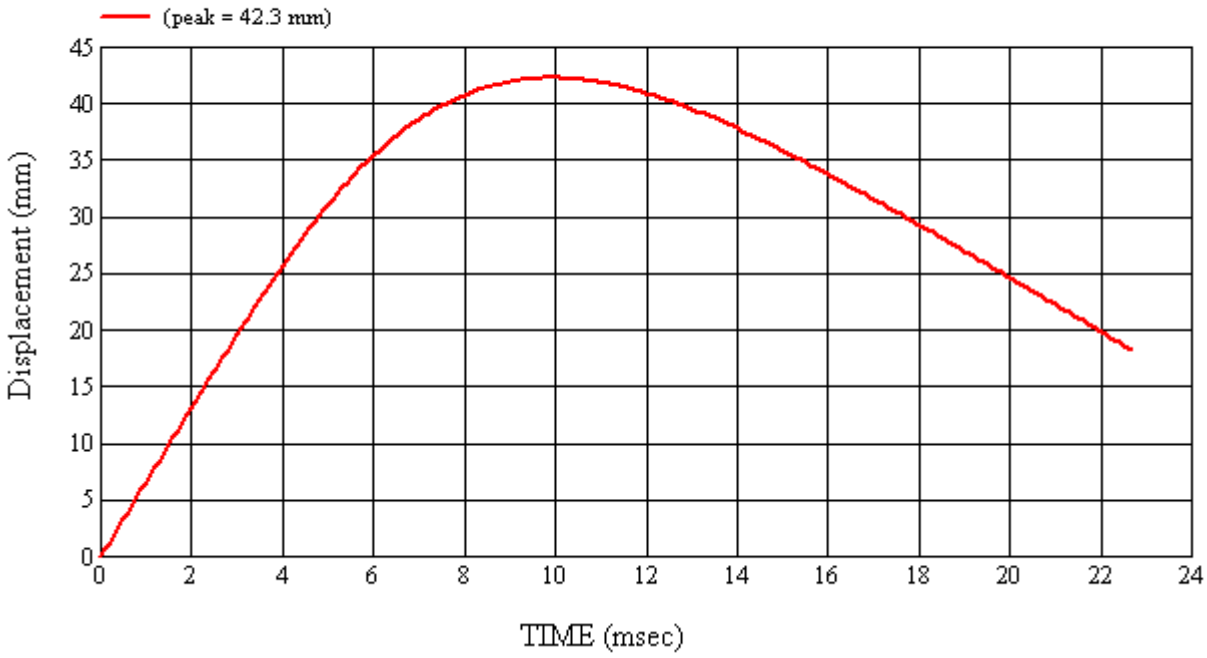



(peak = 137.3 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 8.7 G)
Head Y (G)
6
4
2
0
-2
-4
-6
-8
-10
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 11.9 G)
Head Z (G)
6
4
2
0
-2
-4
-6
-8
-10
-12
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 24.0 kph)
Impact Velocity: 23.86 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (msec)


(peak = 42.3 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

The following section lists the test equipment for the compliance test series. Items marked with an asterisk are calibrated by an external lab. An additional summary table is given for the pre and post-test calibration data for the Free Motion Headforms. The temperature trace to confirm testing was conducted between 66ºF and 78ºF (19ºC – 26ºC) is included in Appendix A. Calibration certificates can be found in Appendix B.

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
FMVSS 201U Test Frame (includes the propulsion control system, actuator, test frame, and DAS)	MGA Research Corp.	MGA-100-FMH	Test System	N/A	N/A
Free Motion Headforms	UTAMA UTAMA UTAMA	035 037 038	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Vision Research	Miro	Record Event	N/A	N/A
*FARO™	Faro Technologies	S08059801273	Targeting	0.1 mm	Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Digital Protractor	 Stanley N/A Mitutoyo	 TPM926 -- MGA00048	 Measurement Targeting FMH setup Horizontal Measurement	 1 mm N/A 0.5°	Annual
*Temperature Recorder	Dickson	MGA00152	Record Temperature and Humidity	± 1°C ± 1% RH	Annual
* Scale	Detecto	MGA00783	Weigh FMH Head	± 0.01 lb	Annual
*Vehicle Scale	Sterling Scale Co.	26032389	Weighing Vehicle	± .5 kg	Annual

Each headform was calibrated by an engineer after the headform had soaked in an environment of 66ºF to 78ºF (19ºC to 26ºC) for a period of at least four hours.

Each headform was found to comply with the performance criteria under Part 572L for pre and post-test calibrations. That is, the peak resultant acceleration was between 225 and 275 G's, the peak lateral acceleration was less than 15 G's, the headform weighed between 9.9 and 10.1 lbs., the pulse was determined to be unimodal, and there was no major damage to the headform.

TABLE 4-2 FMH CALIBRATION SUMMARY

FMH Serial #		Headform Calibration Date	Weight (lbs)	Temp (ºC)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#035	3/30/2010	9.90	21.8	22.3	245.0	10.9	Yes
Post	#035	4/7/2010	9.90	21.4	55.6	255.1	7.7	Yes
Pre	#037	3/30/2010	9.96	21.7	23.0	242.9	9.3	Yes
Post	#037	4/7/2010	9.96	21.4	55.6	257.1	6.0	Yes
Pre	#038	3/30/2010	9.90	21.8	23.2	254.0	13.5	Yes
Post	#038	4/7/2010	9.90	21.4	55.6	261.8	9.1	Yes

4-1 Pre-Test Calibration

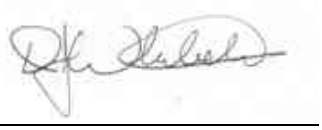
HEAD DROP TEST SUMMARY
PART 572L

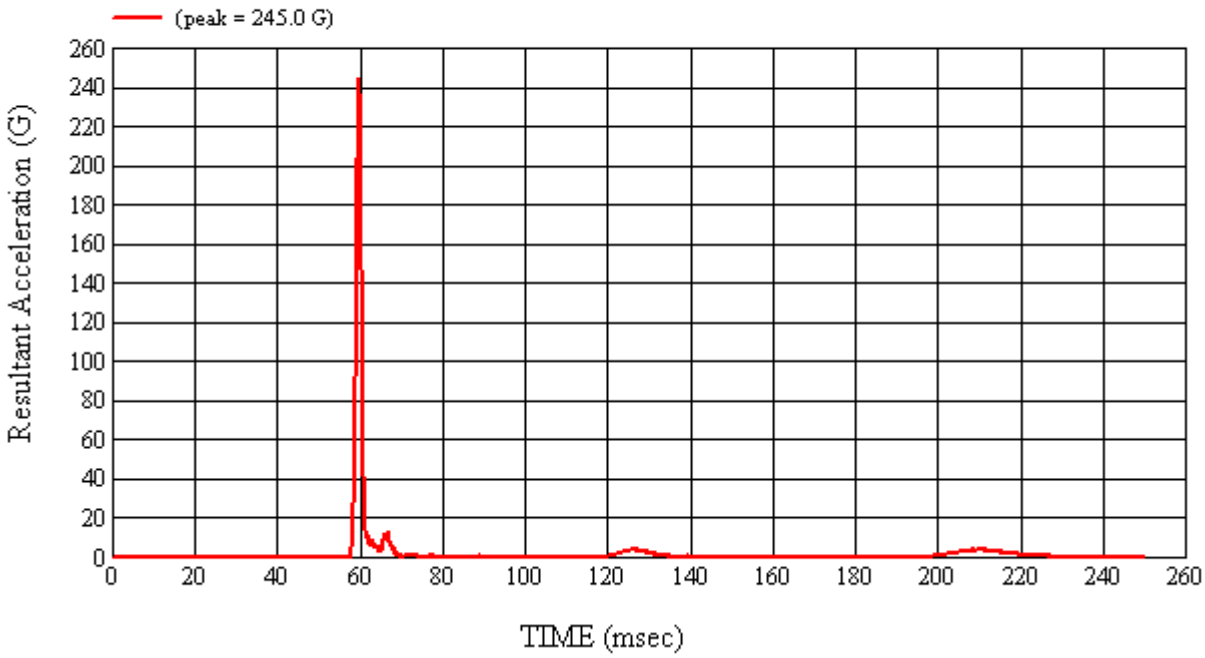
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 3/30/2010 CALIBRATION TIME: 4:44:53 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	21.8
Relative Humidity	10% to 70%	22.3
Peak Resultant Acceleration	225 G's to 275 G's	245.0
Peak Lateral Acceleration	15 G's Maximum	10.9
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J35919	02/17/10	08/17/10
2	ENDEVCO	7264-2000	J22664	02/17/10	08/17/10
3	ENDEVCO	7264-2000	J35924	02/17/10	08/17/10

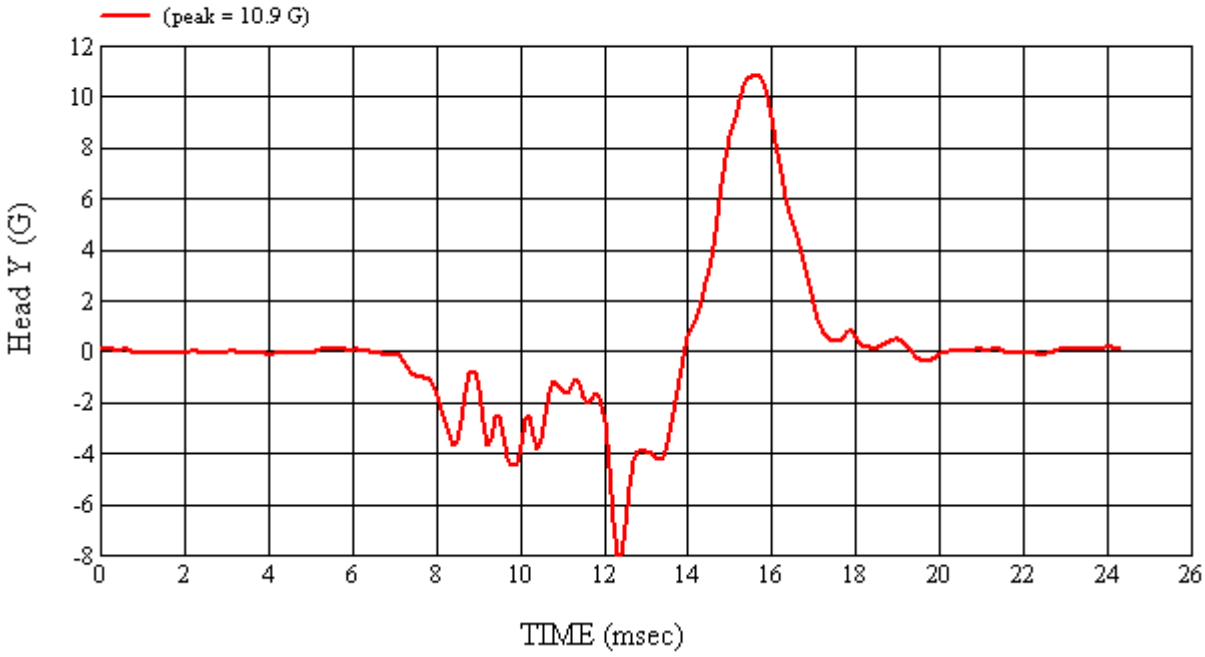
REMARKS:

RECORDED BY:  DATE: 3/30/2010

APPROVED BY: 



Head 035 (Pre) Calibration #H35006



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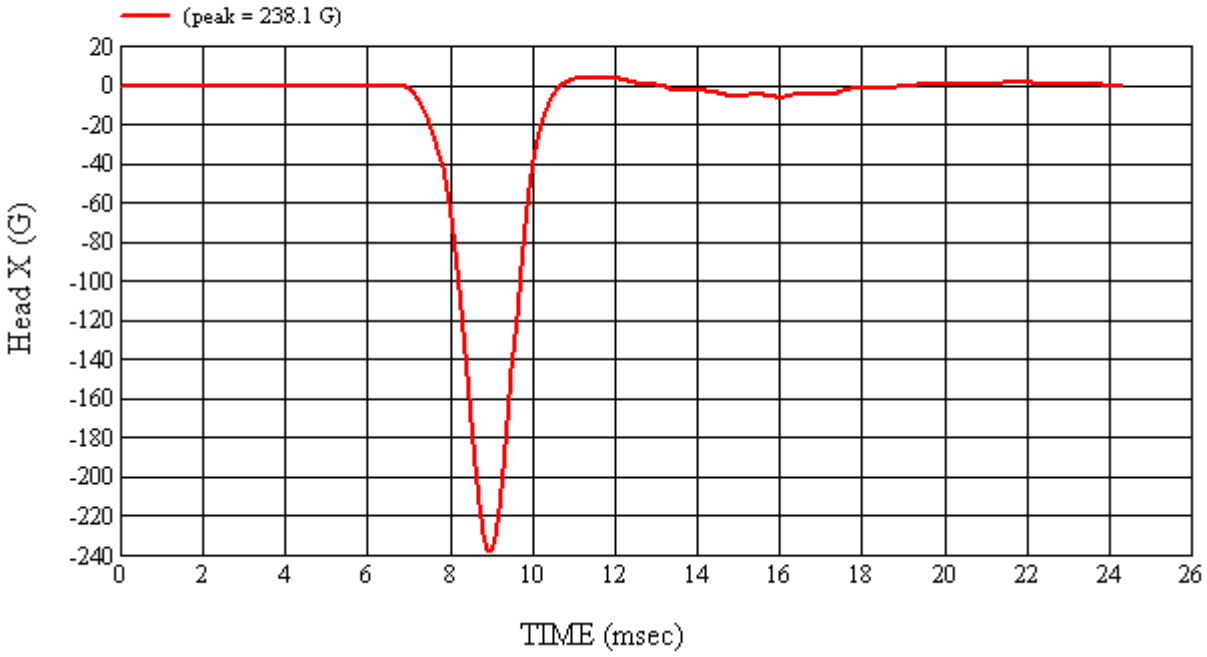

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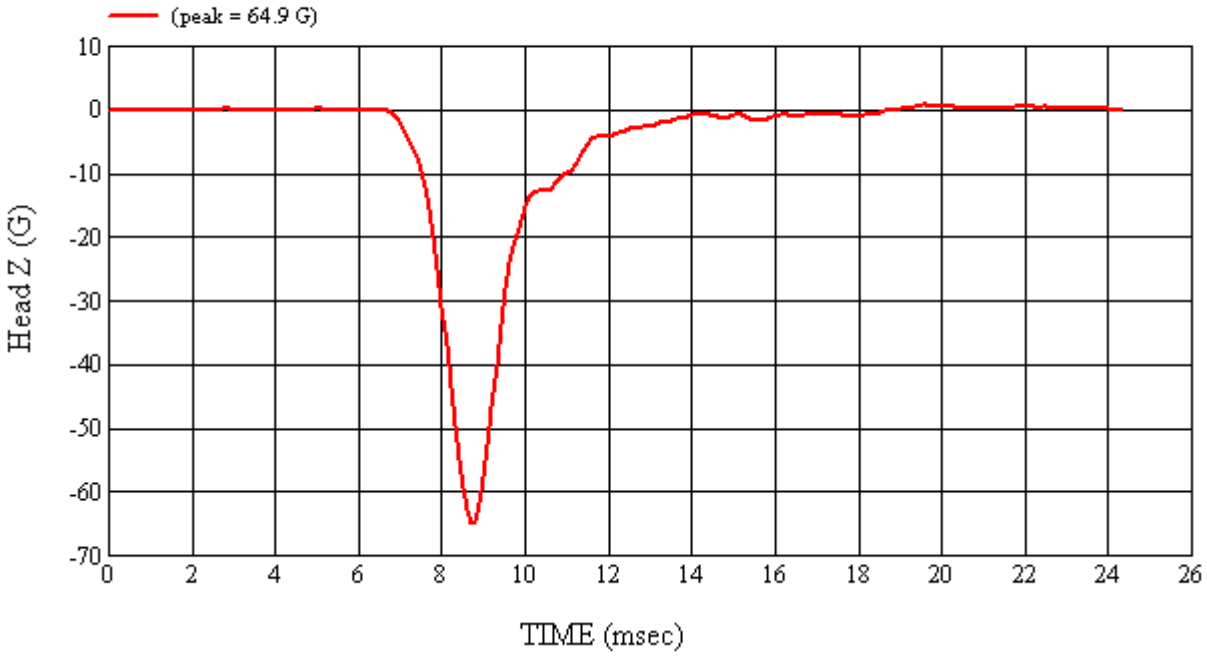


Head 035 (Pre) Calibration #H35006

4-2 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

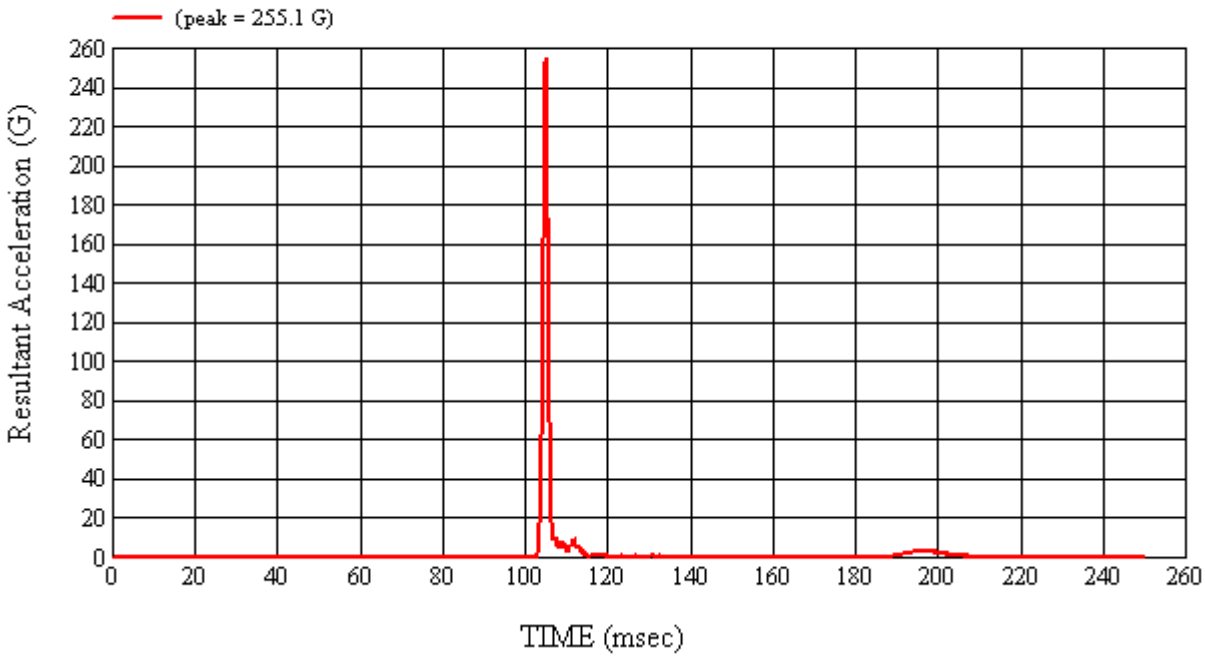
HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 4/7/2010 CALIBRATION TIME: 12:26:29 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	55.6
Peak Resultant Acceleration	225 G's to 275 G's	261.8
Peak Lateral Acceleration	15 G's Maximum	9.1
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J22700	03/12/10	09/12/10
2	ENDEVCO	7264-2000	J36197	03/12/10	09/12/10
3	ENDEVCO	7264-2000	J36353	03/12/10	09/12/10

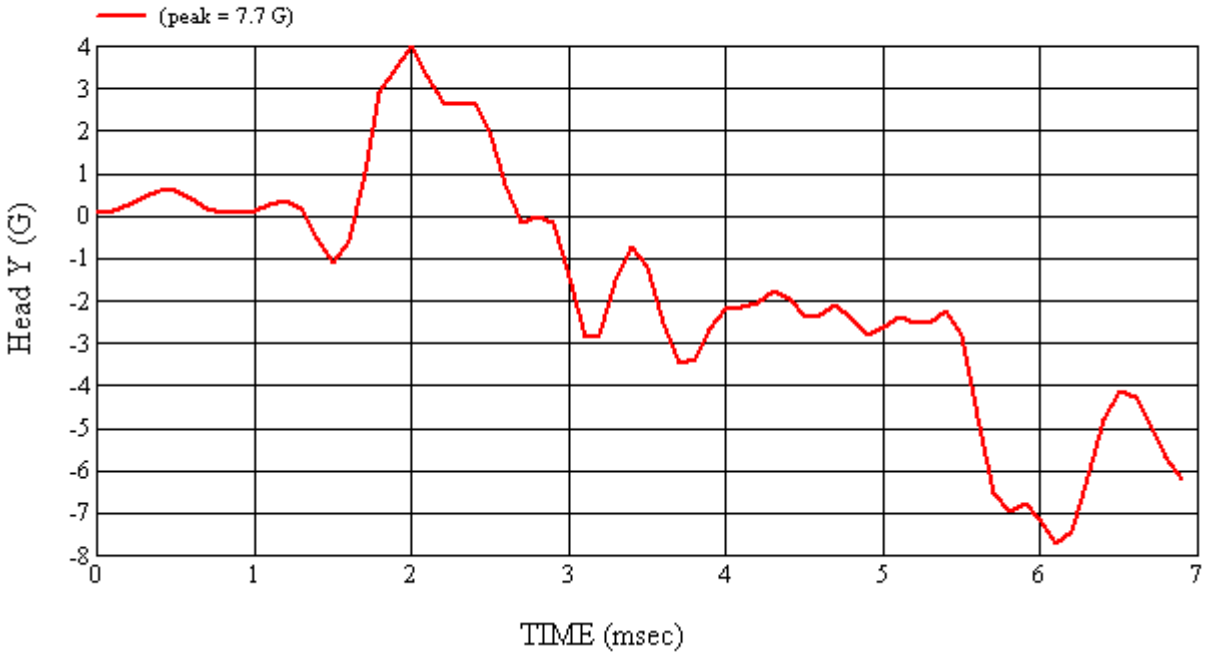
REMARKS:

RECORDED BY:  DATE: 4/7/2010

APPROVED BY: 



Head 035 (Post) Calibration #H35007



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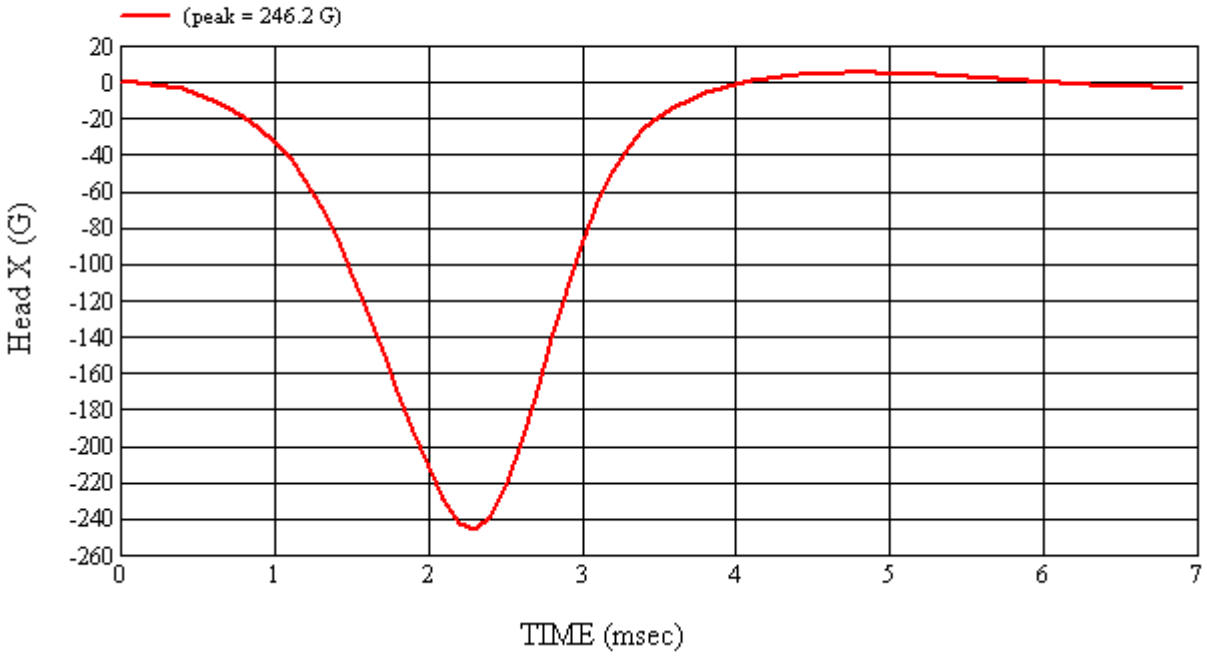

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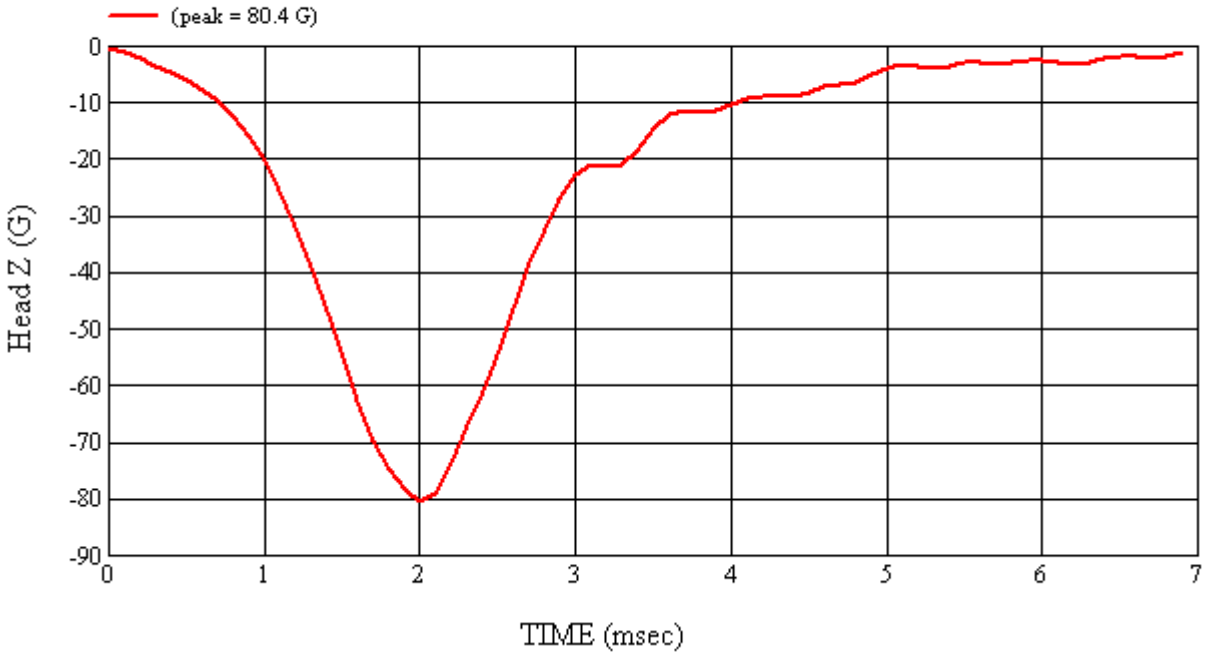


Head 035 (Post) Calibration #H35007

4-3 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

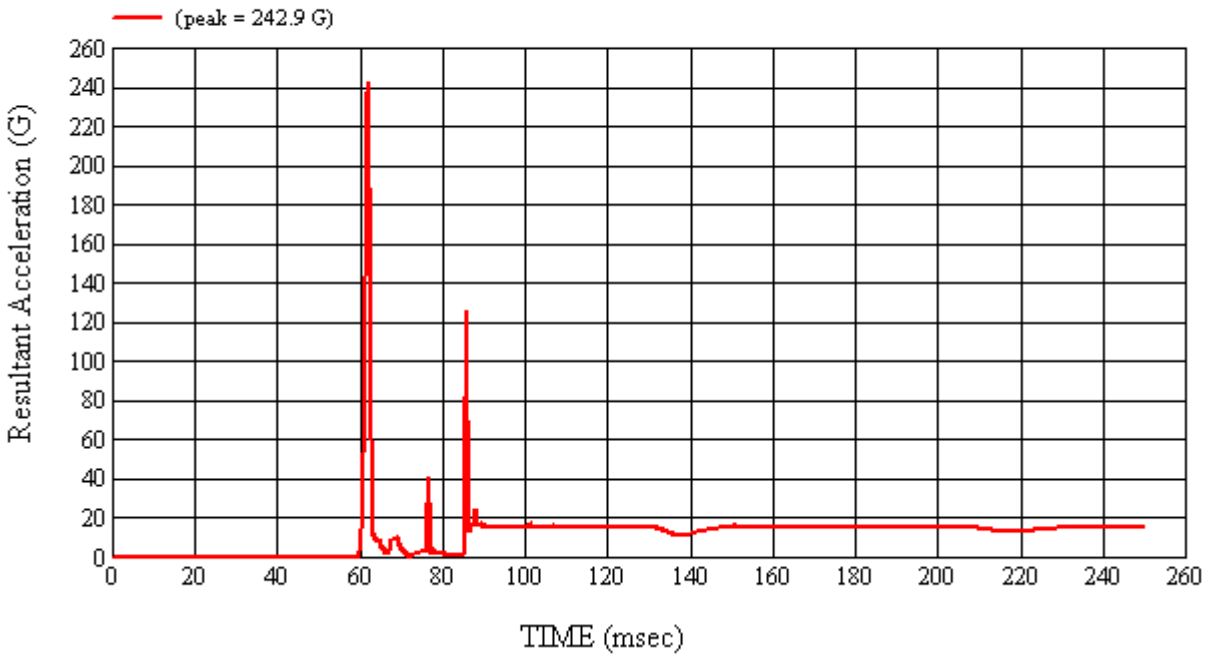
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 3/30/2010 CALIBRATION TIME: 5:07:57 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	21.7
Relative Humidity	10% to 70%	23.0
Peak Resultant Acceleration	225 G's to 275 G's	242.9
Peak Lateral Acceleration	15 G's Maximum	9.3
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	AHTB2	02/17/10	08/17/10
2	ENDEVCO	7264-2000	J14103	02/17/10	08/17/10
3	ENDEVCO	7264-2000	J35800	02/17/10	08/17/10

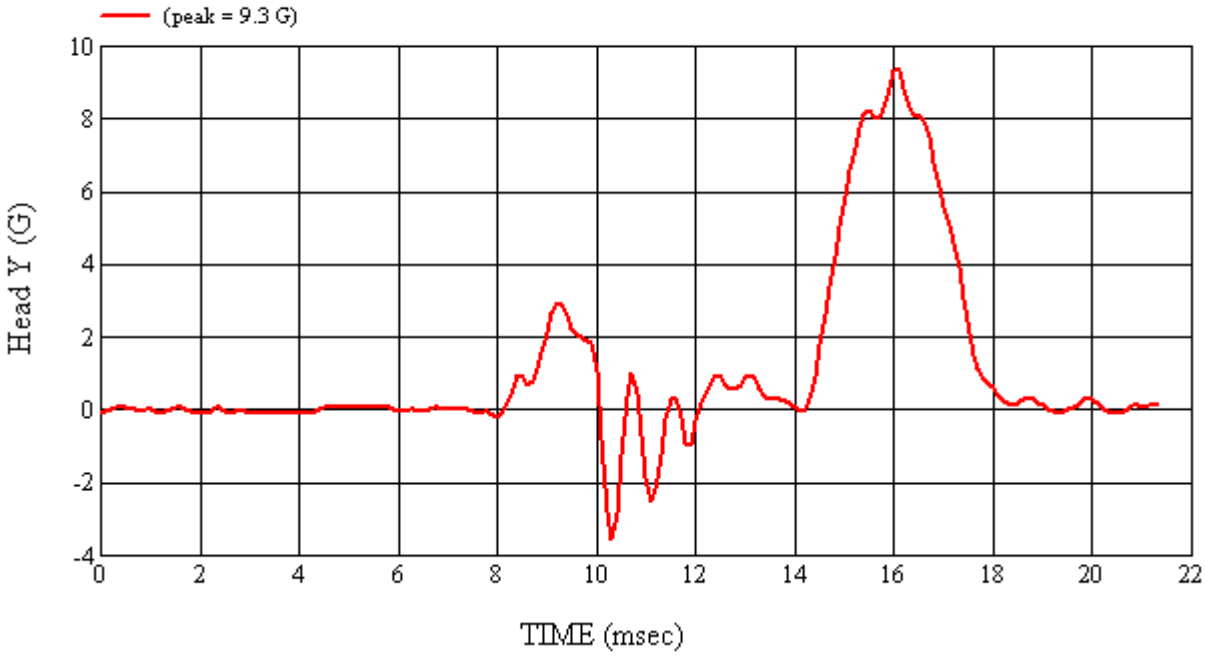
REMARKS:

RECORDED BY:  DATE: 3/30/2010

APPROVED BY: 



Head 037 (Pre) Calibration #H37006



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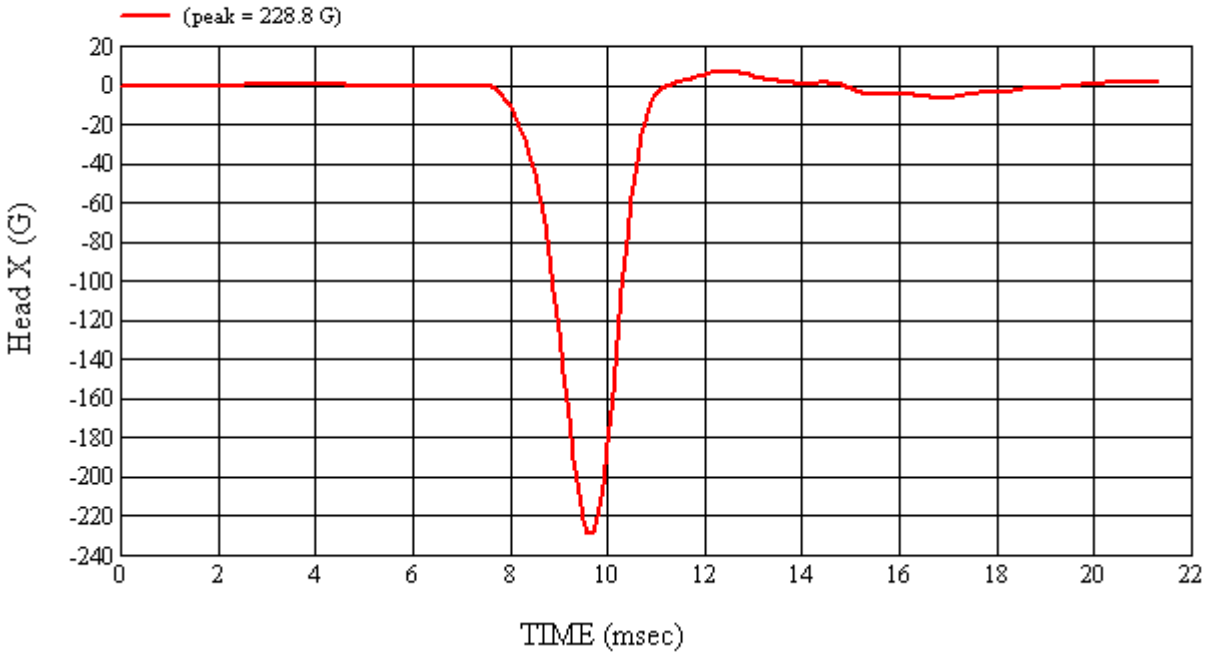

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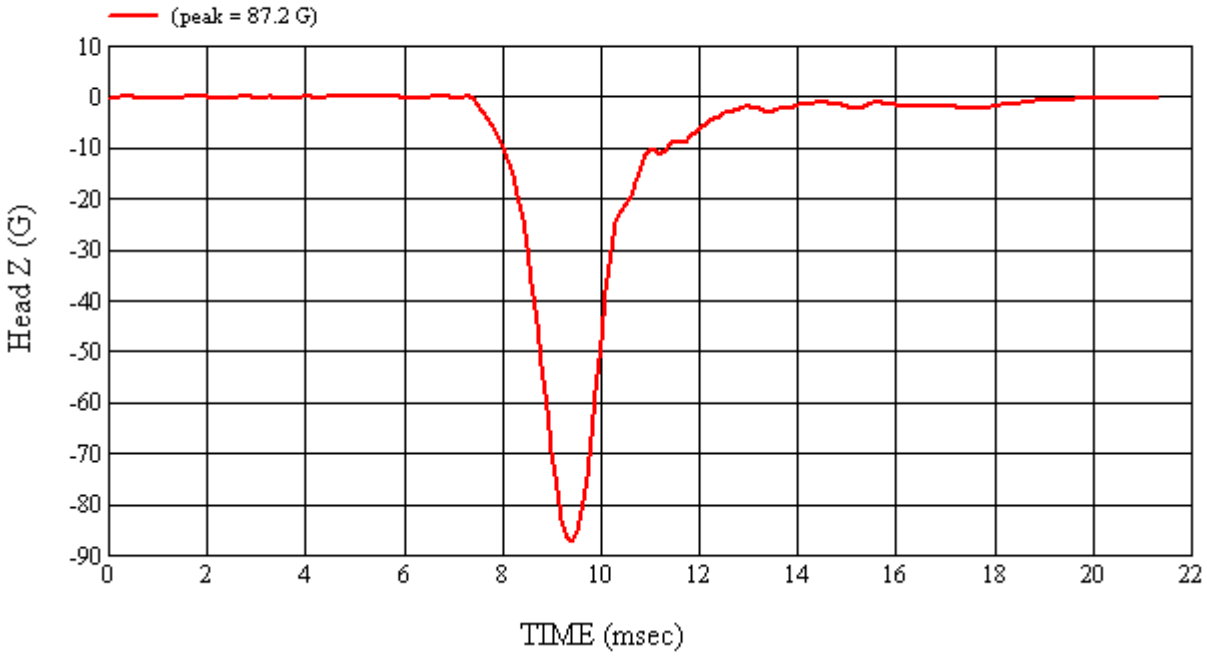


Head 037 (Pre) Calibration #H37006

4-4 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

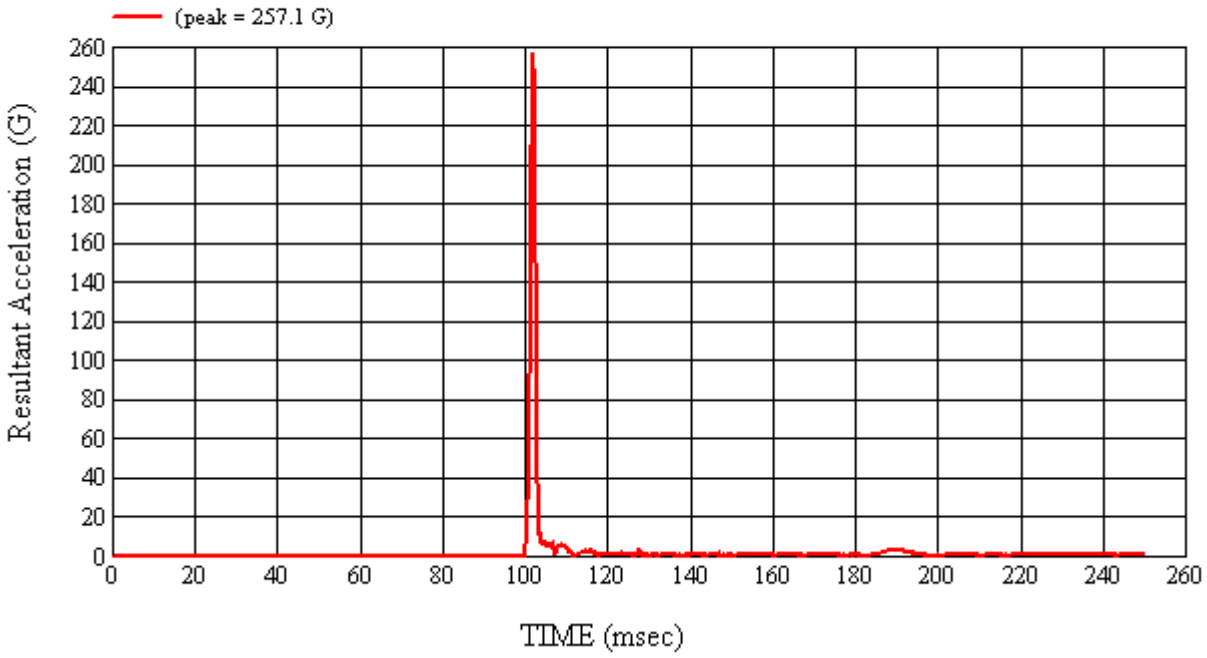
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 4/7/2010 CALIBRATION TIME: 11:57:42 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	55.6
Peak Resultant Acceleration	225 G's to 275 G's	255.1
Peak Lateral Acceleration	15 G's Maximum	7.7
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J35919	02/17/10	08/17/10
2	ENDEVCO	7264-2000	J22664	02/17/10	08/17/10
3	ENDEVCO	7264-2000	J35924	02/17/10	08/17/10

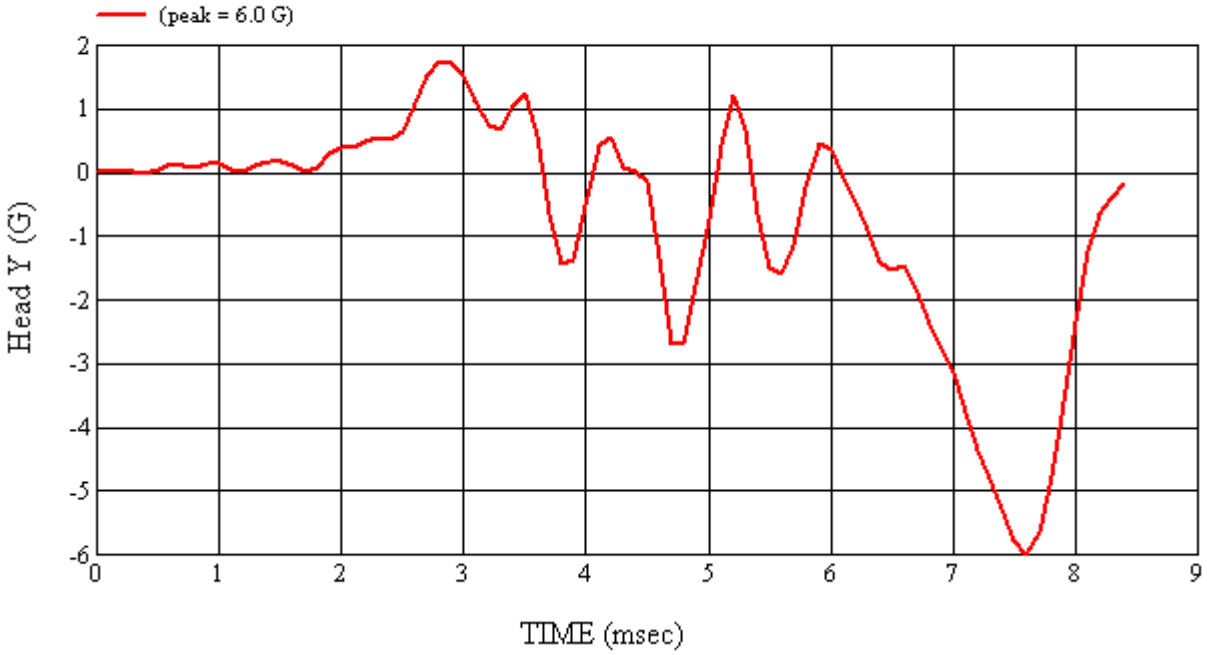
REMARKS:

RECORDED BY:  DATE: 4/7/2010

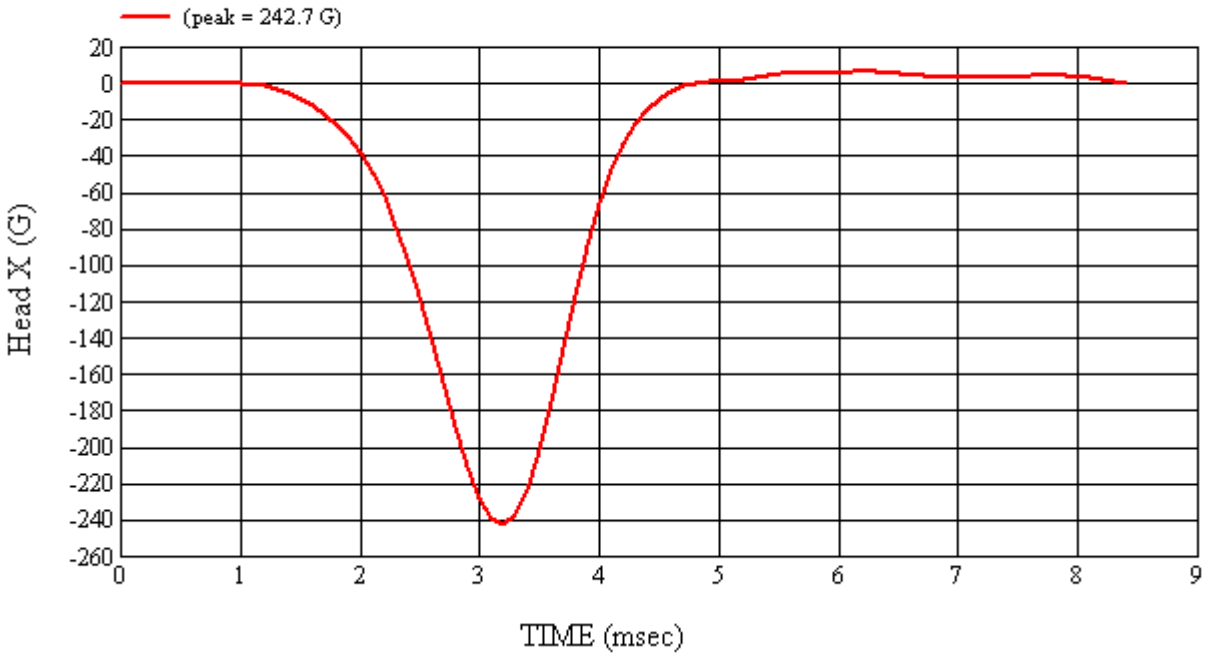
APPROVED BY: 



Head 037 (Post) Calibration #H37007



Head 037 (Post) Calibration #H37007



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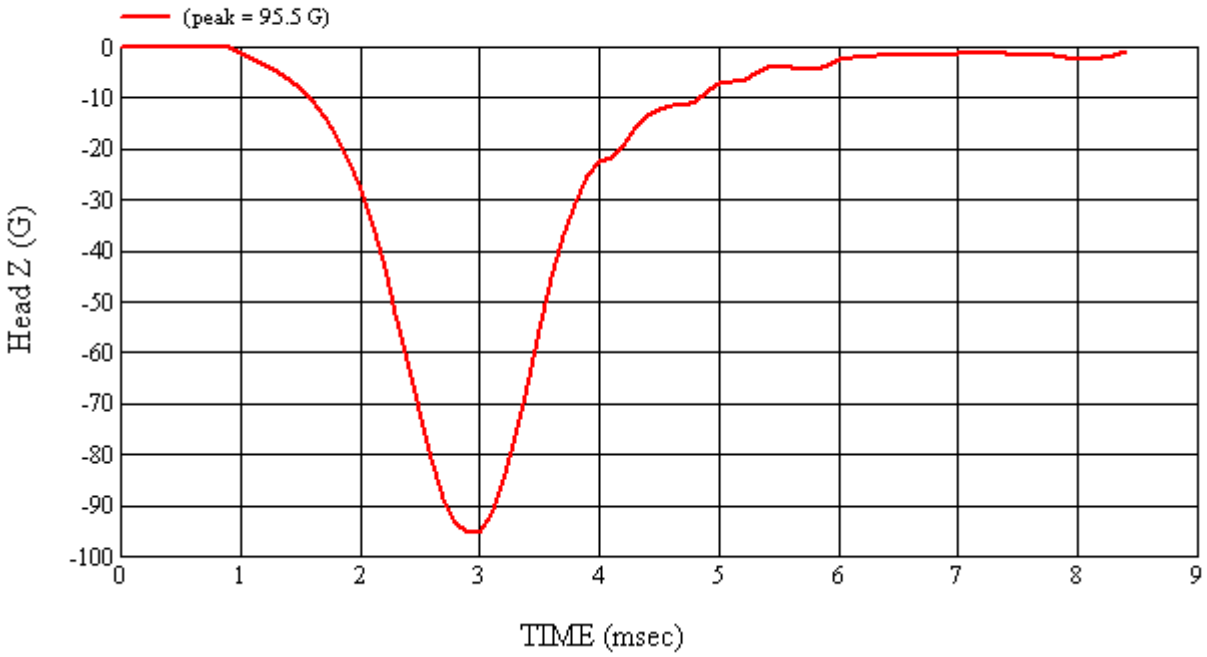


Head 037 (Post) Calibration #H37007

4-5 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

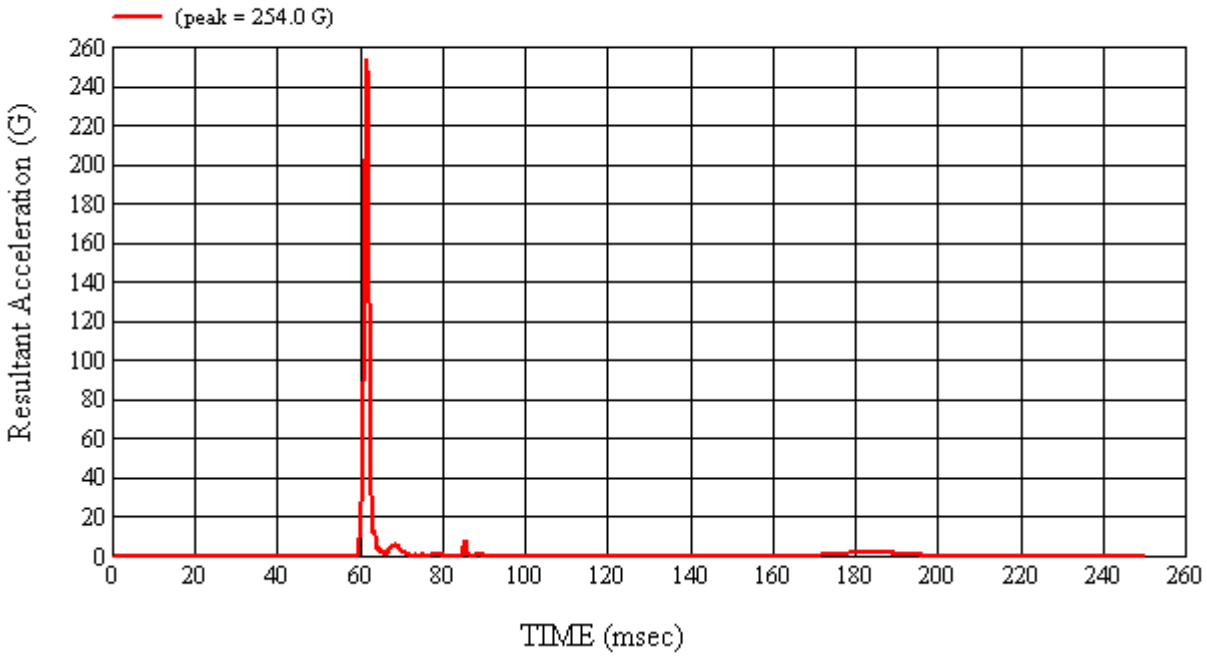
HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 3/30/2010 CALIBRATION TIME: 5:24:01 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	21.8
Relative Humidity	10% to 70%	23.2
Peak Resultant Acceleration	225 G's to 275 G's	254.0
Peak Lateral Acceleration	15 G's Maximum	13.5
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J22700	03/12/10	09/12/10
2	ENDEVCO	7264-2000	J36197	03/12/10	09/12/10
3	ENDEVCO	7264-2000	J36353	03/12/10	09/12/10

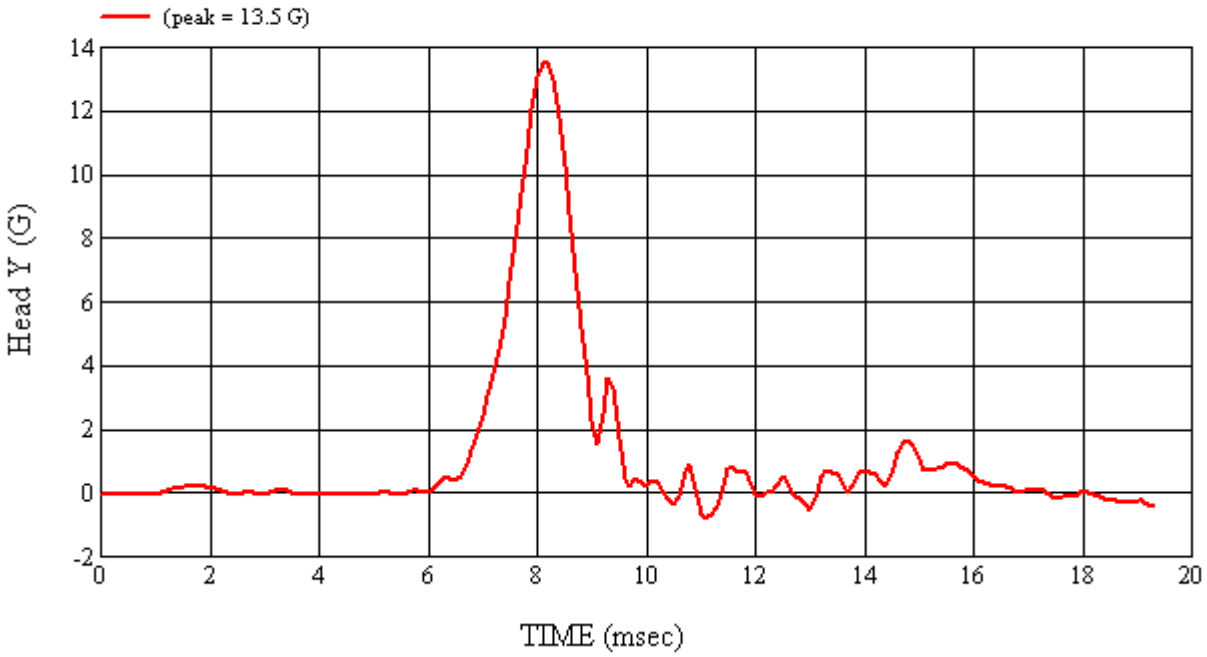
REMARKS:

RECORDED BY:  DATE: 3/30/2010

APPROVED BY: 



Head 038 (Pre) Calibration #H38005



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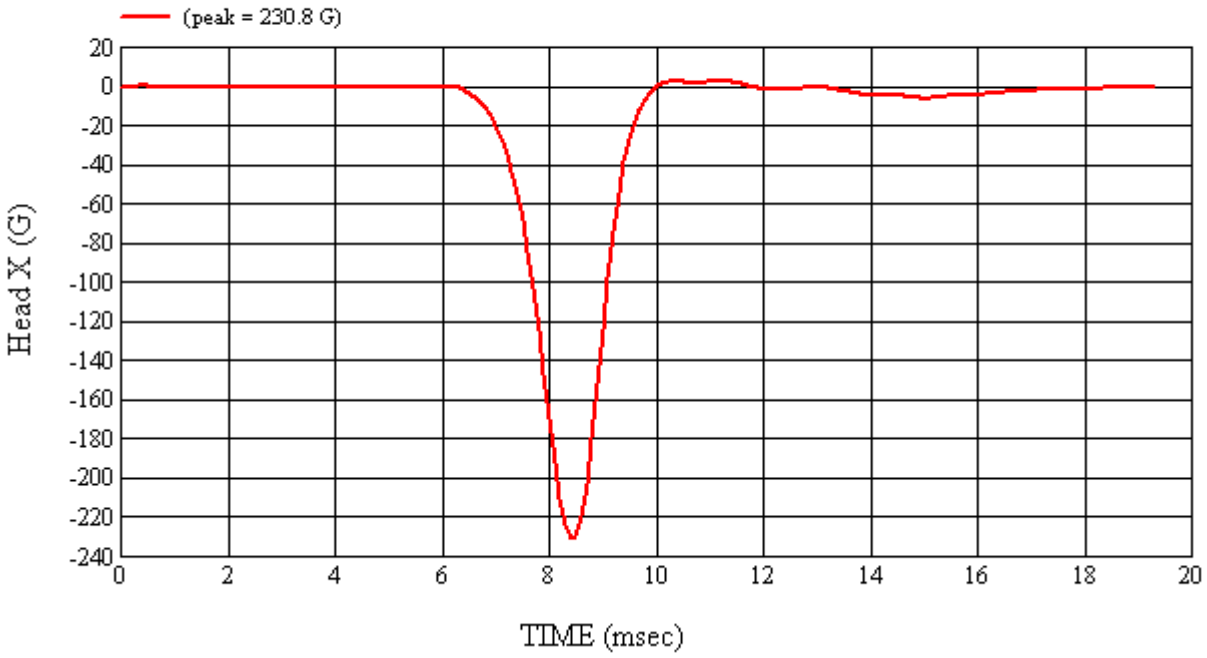

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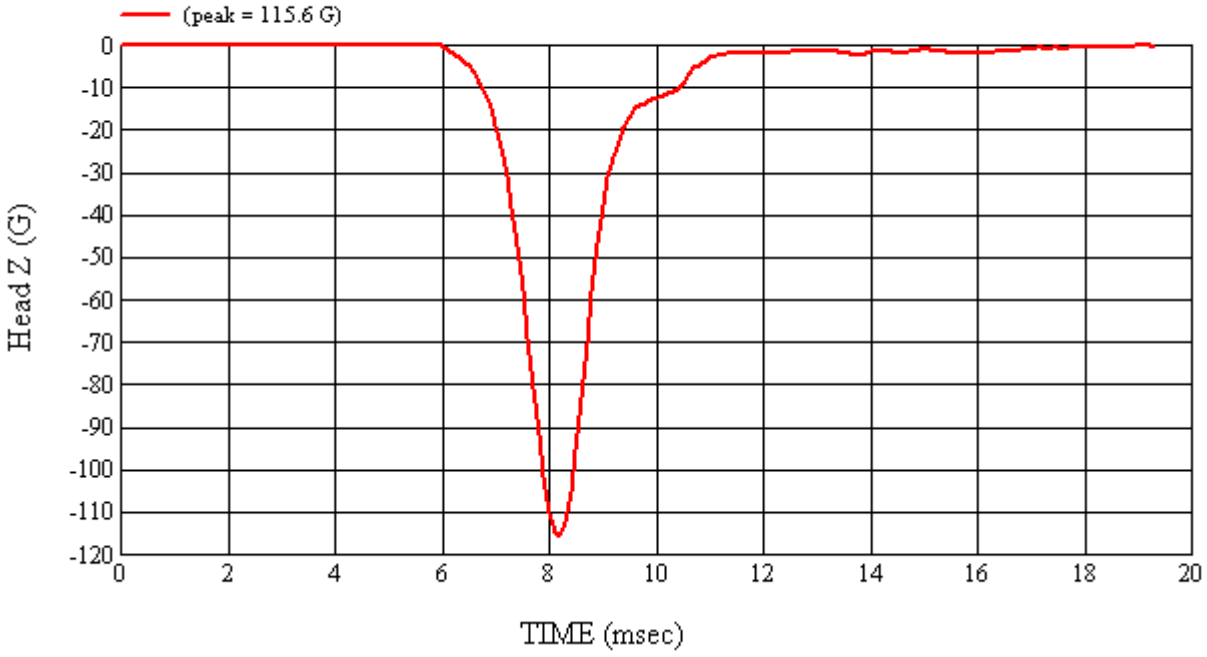


Head 038 (Pre) Calibration #H38005

4-6 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

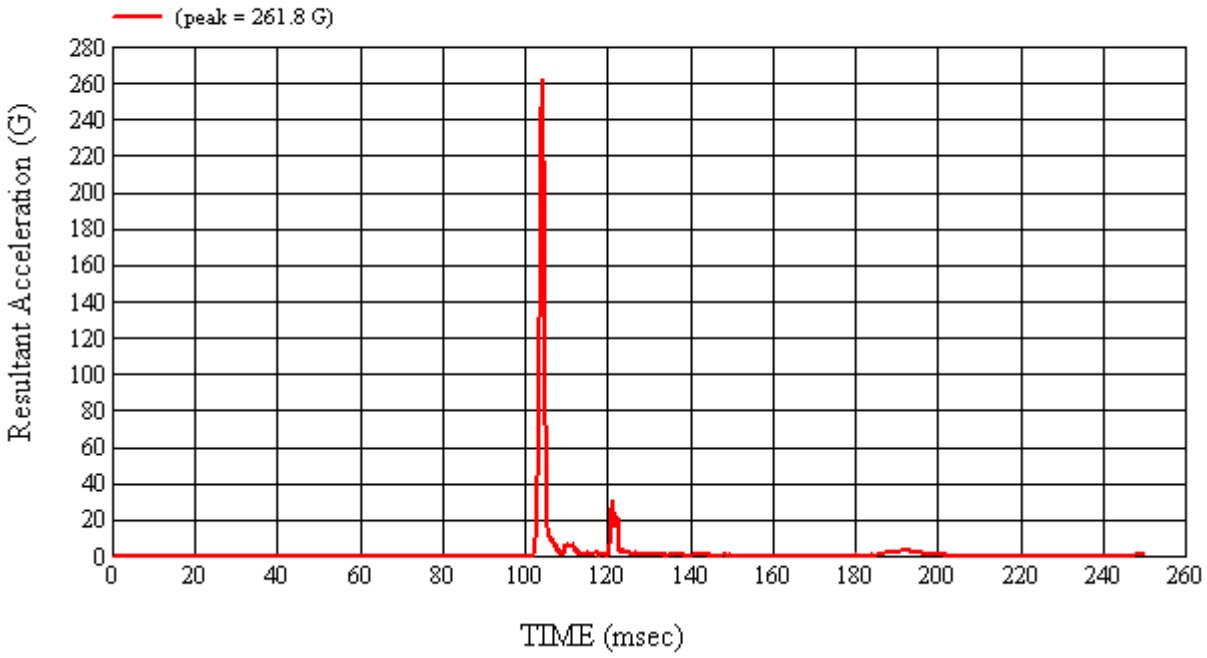
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 4/7/2010 CALIBRATION TIME: 12:12:30 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	55.6
Peak Resultant Acceleration	225 G's to 275 G's	257.1
Peak Lateral Acceleration	15 G's Maximum	6.0
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	AHTB2	02/17/10	08/17/10
2	ENDEVCO	7264-2000	J14103	02/17/10	08/17/10
3	ENDEVCO	7264-2000	J35800	02/17/10	08/17/10

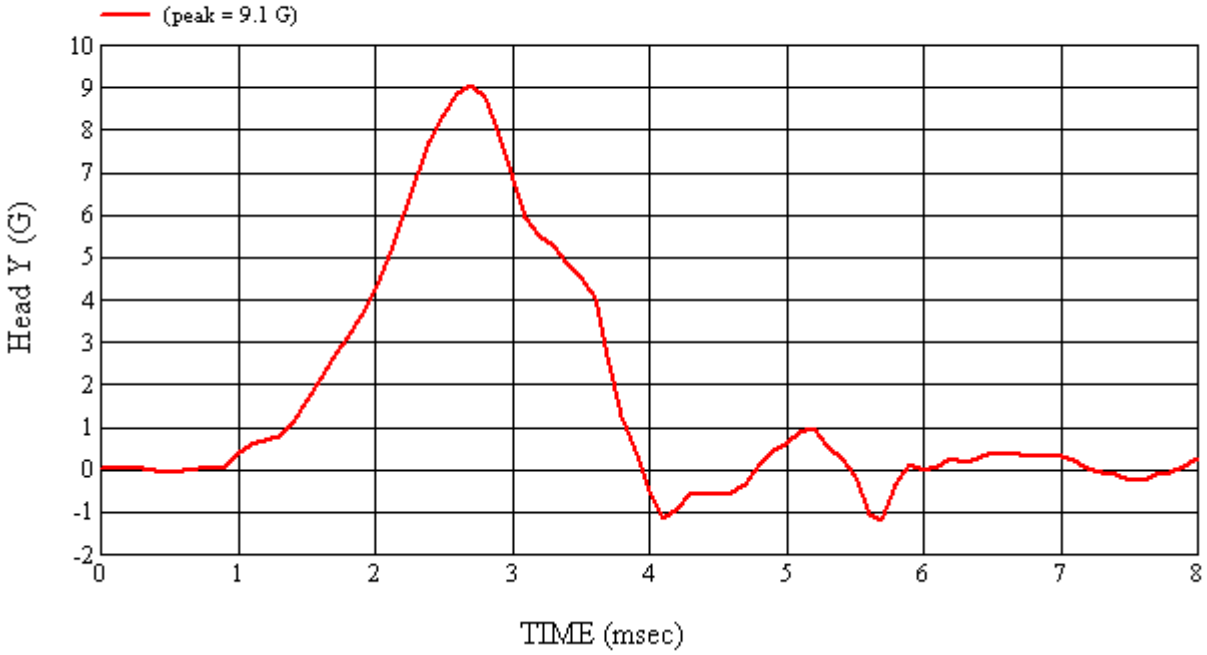
REMARKS:

RECORDED BY: _____ DATE: __4/7/2010____

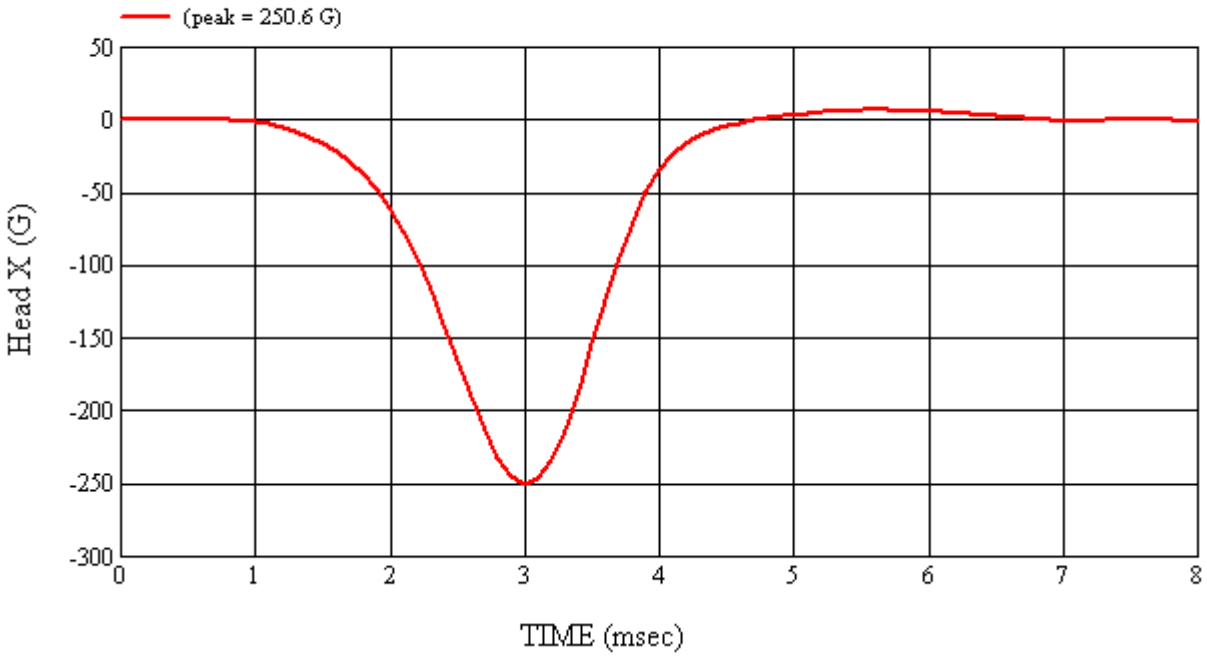
APPROVED BY: _____



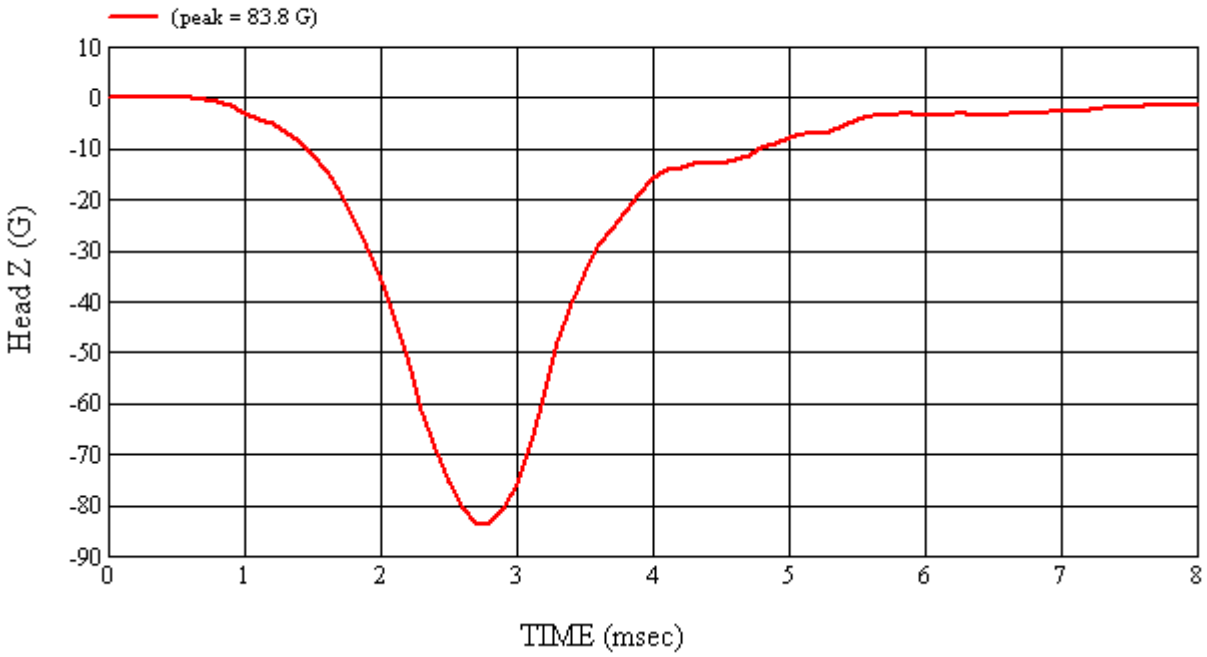
Head 038 (Post) Calibration #H38006



Head 038 (Post) Calibration #H38006

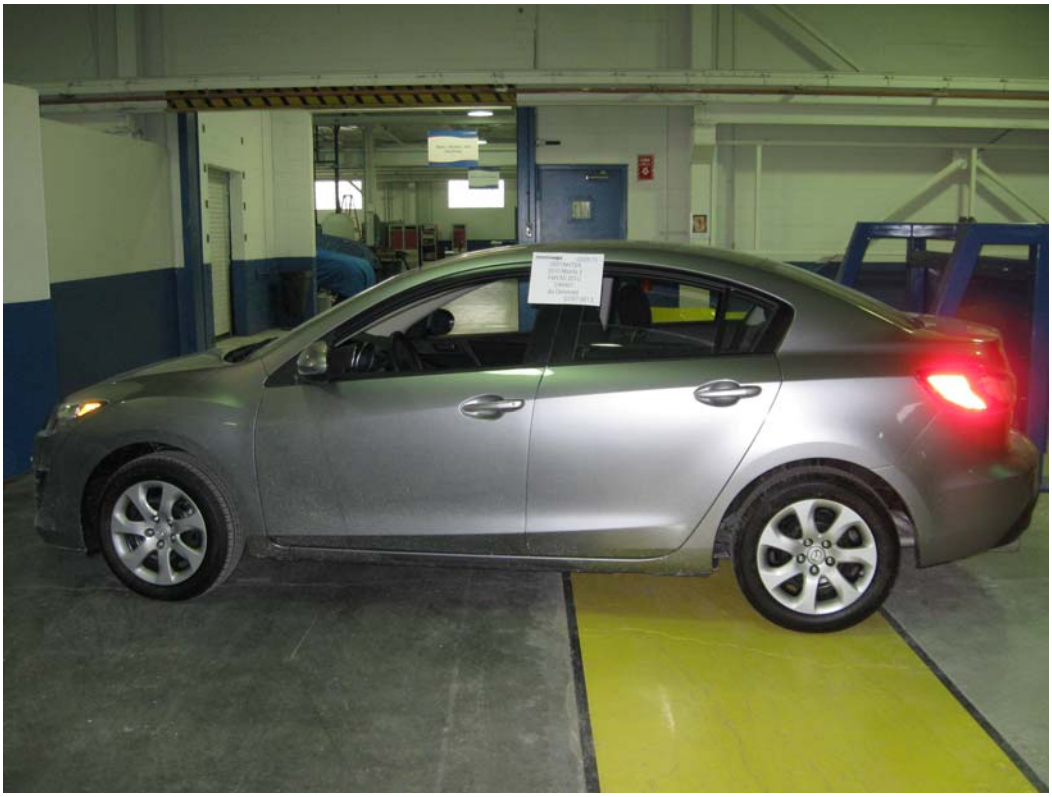


Head 038 (Post) Calibration #H38006

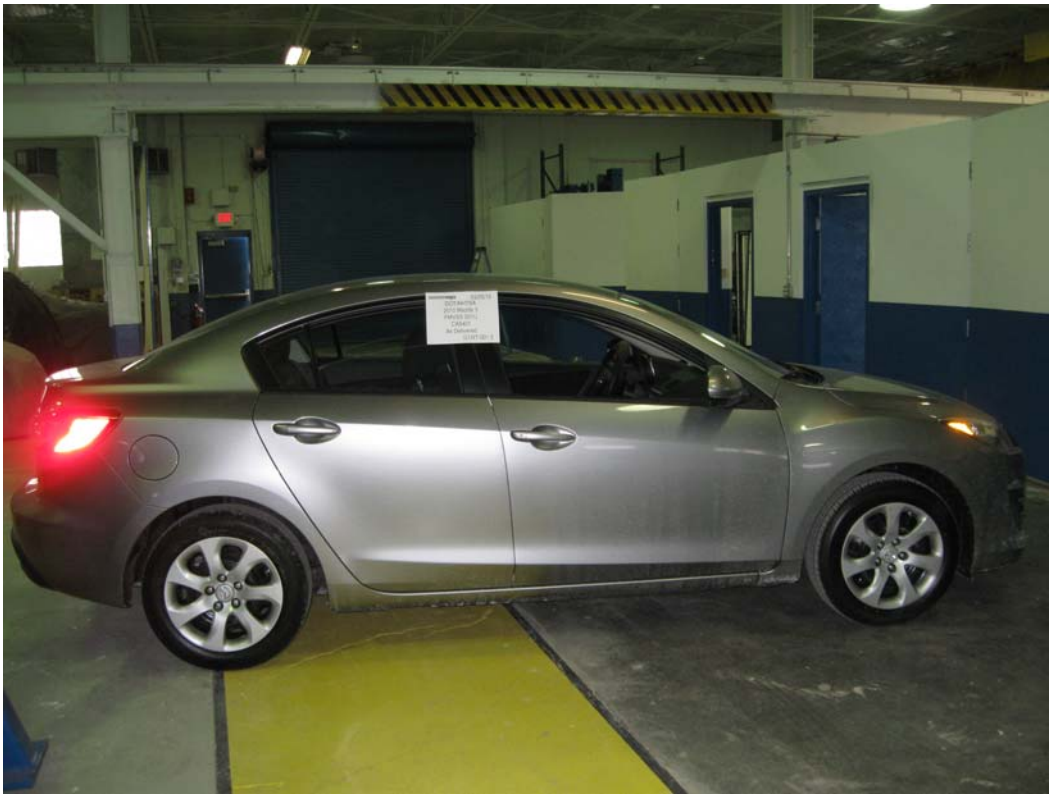


Head 038 (Post) Calibration #H38006

5.0 PHOTOGRAPHS

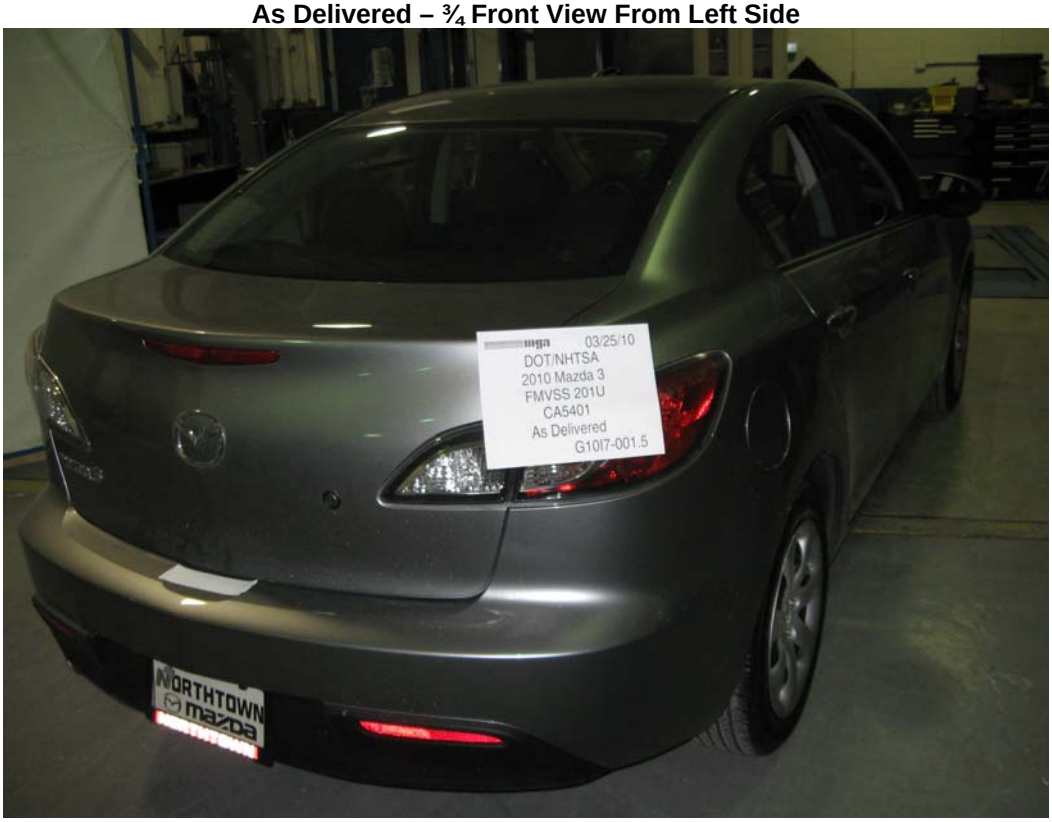


As Delivered – Left Side View

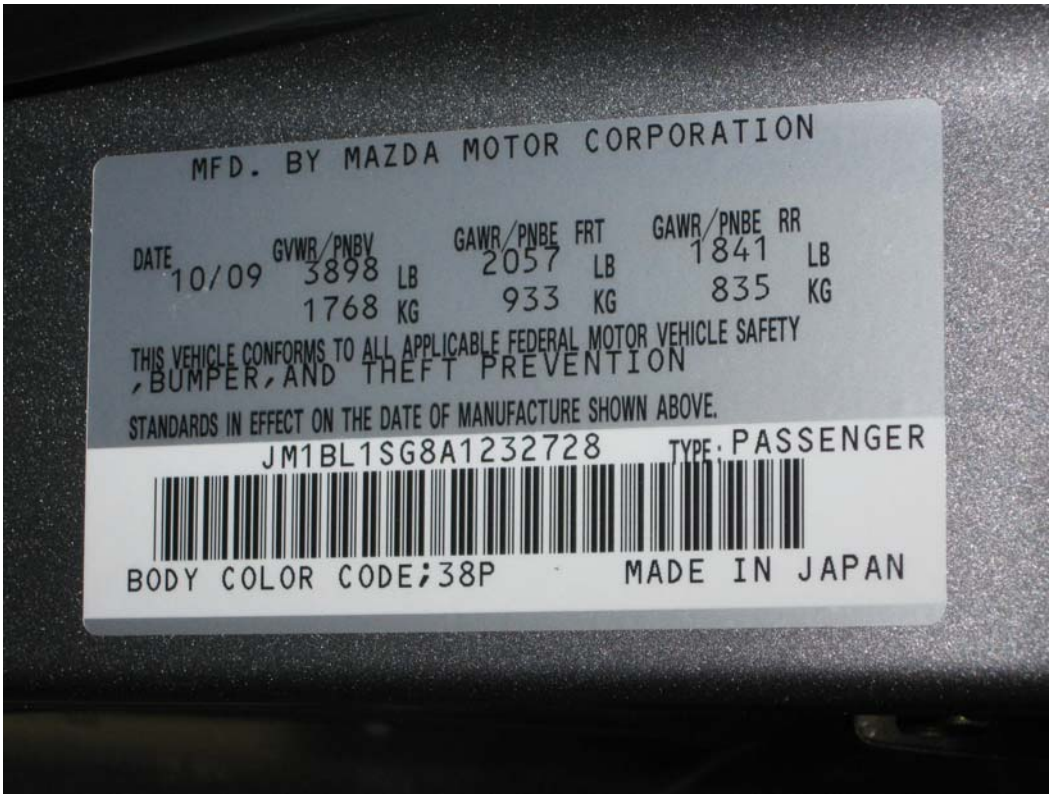


As Delivered – Right Side View

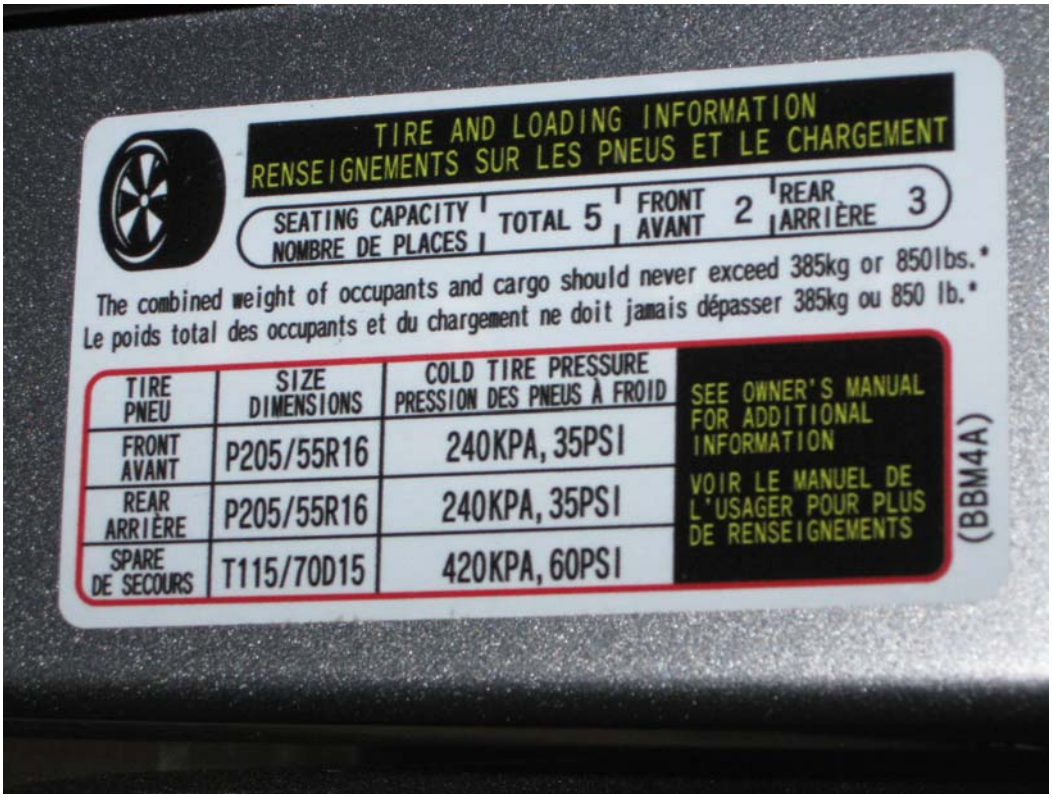
As Delivered – ¾ Front View From Left Side



As Delivered – ¾ Rear View From Right Side



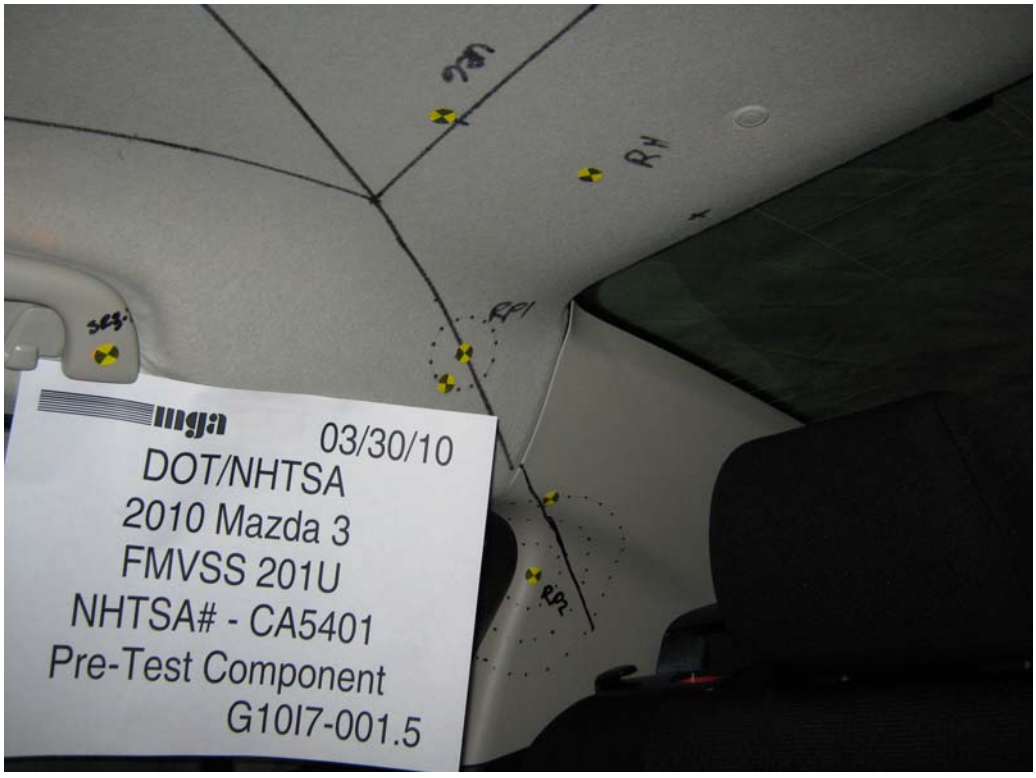
As Delivered – Vehicle's Certification Label



As Delivered – Vehicle's Tire Information Label

Pre-Test Component Photographs


BP1
BP2
BP3
mga
03/30/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
NHTSA# - CA5401
Pre-Test Component
G10I7-001.5


RH
RP1
RP2
mga
03/30/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
NHTSA# - CA5401
Pre-Test Component
G10I7-001.5

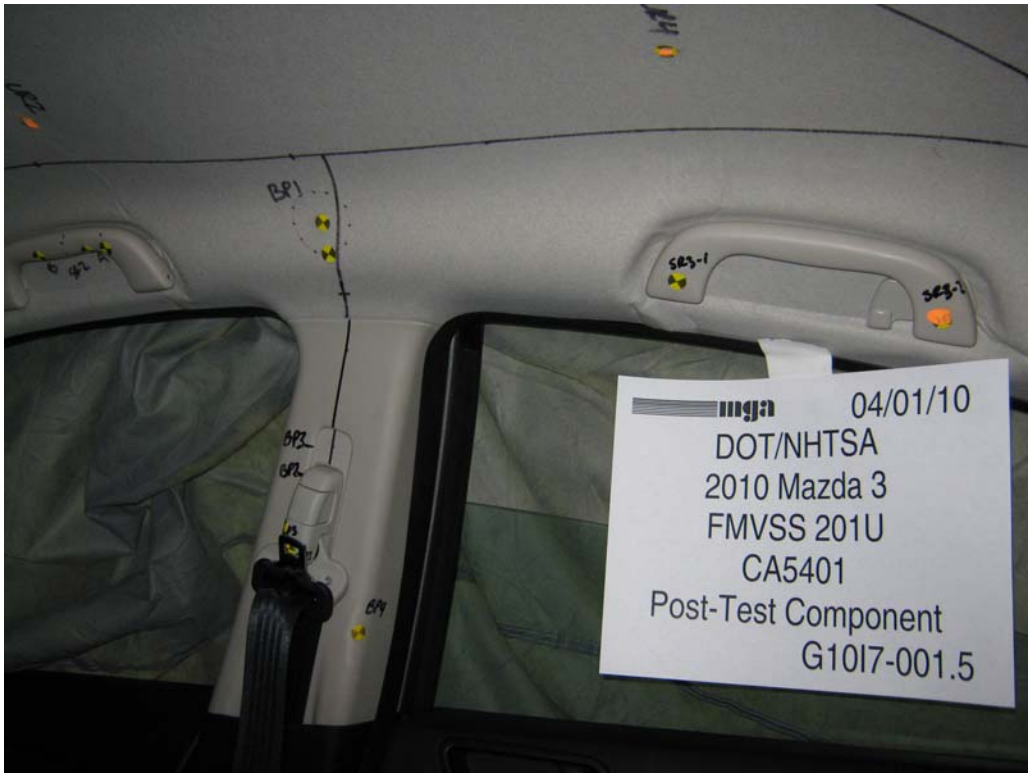

RH
RP1
SR3-1
mga
03/30/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
NHTSA# - CA5401
Pre-Test Component
G10I7-001.5


BP1
A
SR2
B
SR1
UR1
BP3
BP2
mga
03/30/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
NHTSA# - CA5401
Pre-Test Component
G10I7-001.5

Post-Test Component Photographs

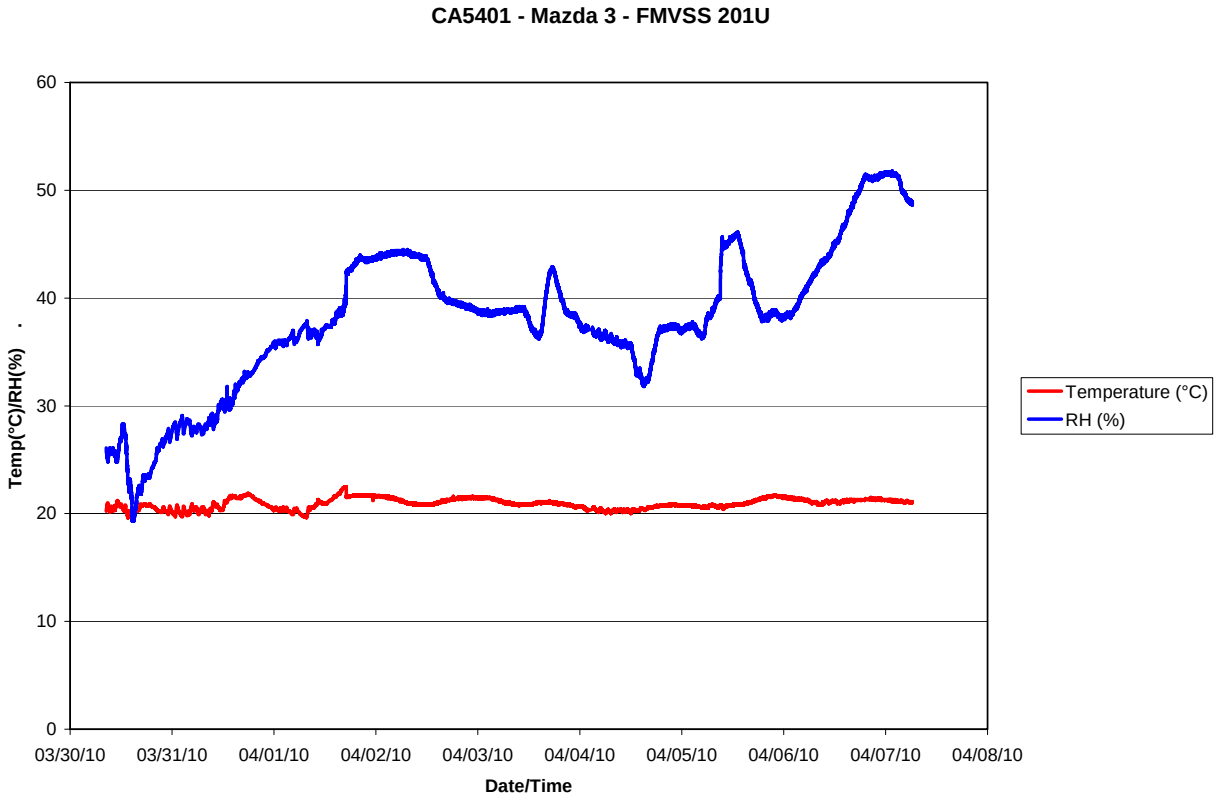

04/01/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
CA5401
Post-Test Component
G10I7-001.5


04/01/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
CA5401
Post-Test Component
G10I7-001.5


mga
04/01/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
CA5401
Post-Test Component
G10I7-001.5


mga
04/01/10
DOT/NHTSA
2010 Mazda 3
FMVSS 201U
CA5401
Post-Test Component
G10I7-001.5

Appendix A – Temperature Trace



Appendix B – Calibration Certificates

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J35919
Capacity/Range: (G's)	2,000

Calibration Date:	2/17/2010
New DLR(Units:G'S) 100K SHUNT [1]	96.3
Linearity: [2]	0.99974
New vs Old Sensitivit (% Difference)	0.8
Temperature:	70 °F
Humidity:	25 %
Sensitivity (mV/V/G):	0.025792
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Helen A Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J22664
Capacity/Range: (G's)	2,000

Calibration Date:	2/17/2010
New DLR(Units:G'S) [1] 100K SHUNT	95.2
Linearity:[2]	0.99973
New vs Old Sensitivit (% Difference)	0.6
Temperature:	70 ^{o}F
Humidity:	25 %
Sensitivity (mV/V/G):	0.026097
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Helen A. Kalista

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J35924
Capacity/Range: (G's)	2,000

Calibration Date:	2/17/2010
New DLR(Units:G'S) [1] 100K SHUNT	93.8
Linearity:[2]	0.99915
New vs Old Sensitivit (% Difference)	-0.1
Temperature:	70 °F
Humidity:	25 %
Sensitivity (mV/V/G):	0.026486
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Helen A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	AHTB2
Capacity/Range: (G's)	2,000

Calibration Date:	2/17/2010
New DLR(Units:G'S) 100K SHUNT [1]	116.9
Linearity: [2]	0.99971
New vs Old Sensitivit (% Difference)	0.3
Temperature:	70 °F
Humidity:	25 %
Sensitivity (mV/V/G):	0.021276
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Steven A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J14103
Capacity/Range: (G's)	2,000

Calibration Date:	2/17/2010
New DLR(Units:G'S) 100K SHUNT [1]	94.2
Linearity: [2]	0.99963
New vs Old Sensitivit (% Difference)	0.2
Temperature:	70 ^{o}F
Humidity:	25 %
Sensitivity (mV/V/G):	0.026374
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Eileen A. Kalista

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J35800
Capacity/Range: (G's)	2,000

Calibration Date:	2/17/2010
New DLR(Units:G'S) [1] 100K SHUNT	98.2
Linearity:[2]	0.99961
New vs Old Sensitivit (% Difference)	0.4
Temperature:	70 °F
Humidity:	25 %
Sensitivity (mV/V/G):	0.02528
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Helen A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J22700
Capacity/Range: (G's)	2,000

Calibration Date:	3/12/2010
New DLR(Units:G'S) 100K SHUNT [1]	96.5
Linearity: [2]	0.99962
New vs Old Sensitivit (% Difference)	0.7
Temperature:	69 °F
Humidity:	46.9
Sensitivity (mV/V/G):	0.025769
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Helen A. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J36197
Capacity/Range: (G's)	2,000

Calibration Date:	3/12/2010
New DLR(Units:G'S) 100K SHUNT [1]	109.5
Linearity: [2]	0.99976
New vs Old Sensitivit (% Difference)	0.5
Temperature:	69 °F
Humidity:	46.9
Sensitivity (mV/V/G):	0.022699
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Helen A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	8/21/2009
Calibrated By:	Schober

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J36353
Capacity/Range: (G's)	2,000

Calibration Date:	3/12/2010
New DLR(Units:G'S) 100K SHUNT [1]	99.5
Linearity: [2]	0.99945
New vs Old Sensitivit (% Difference)	0.6
Temperature:	69 °F
Humidity:	46.9
Sensitivity (mV/V/G):	0.024972
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Helen A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

Certificate of Calibration

Schober Calibration Service, Inc.
28265 Beck Road, Unit C-22
Wixom, MI 48393
Phone: (248) 735-9600 FAX: (248) 735-9646

ACCREDITED
CALIBRATION 1563.01

Certificate Number: 0002580:1249117013

CUSTOMER: MGA Research Corporation
446 Executive Drive
Troy MI 48083
Contact: Thomas Hutter

Calibration Location: **In House**

Equipment Calibrated

Manufacturer:	PCB	Date Received:	07/31/2009
Description:	Accelerometer	Date Calibrated:	08/01/2009
Model Number:	352C03	Calibration Due Date:	08/01/2010
Serial Number:	95980	Calibration Procedure:	CP0003
Asset Number:		Revision:	
Received Status:	Good	Performed By:	Al Schober

Condition as Received: In Tolerance
Condition as Returned: In Tolerance

Notes:

Ambient Calibration Conditions

Ambient Temperature: 22 °C Relative Humidity: 51 % RH Barometric Pressure: mbar

Calibration Equipment Used

Asset Number:	Manufacturer:	Model:	Serial:	Cal Due:
RMS002	PCB	301A03	254	12 Jun 2010
RMS003	PCB	353B04	37067	09 Jun 2010
RMS005	Beran	801A	9506	18 Mar 2010
RMS006	Beran	801B	9701	18 Mar 2010
RMS007	Beran	475	182340	18 Mar 2010

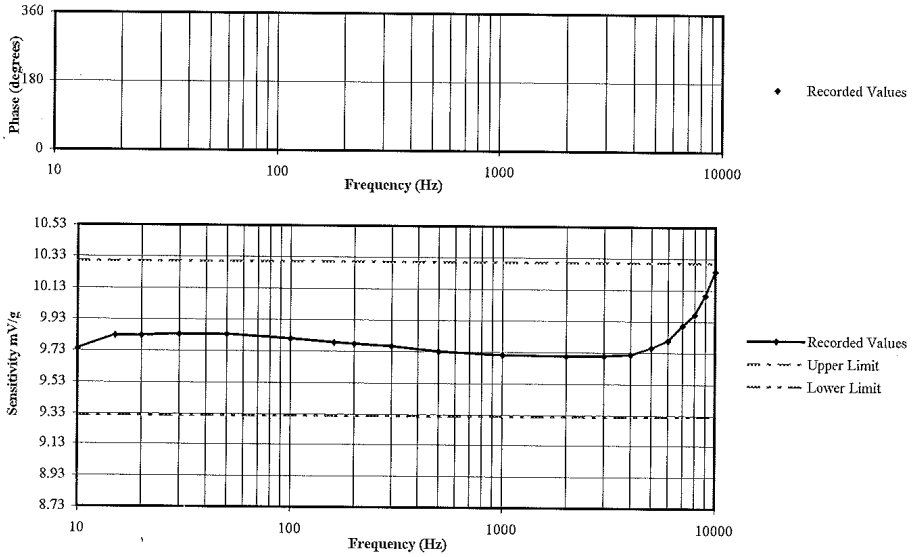
The Uncertainty is estimated using expanded uncertainties and coverage factor (k) of 2, providing a confidence level of approximately 95%.
This calibration is traceable to the international system of units (SI) through standards calibrated by accredited laboratories, or through standards calibrated at NIST. This laboratory meets the requirements of ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994. This certificate shall not be reproduced, except in full, without prior written approval by Schober Calibration Service.
Calibration interval determined by the customer. When determining the calibration interval, the customer should take into consideration that any number of factors may cause the calibration item to drift out of calibration before the calibration interval has expired.
The results herein apply only to the calibration of the item described above. No sampling plan was used for this calibration.

Approved By: Quality Manager Date: 8-21-09

Serial Number: 95980 **Date: 8/1/09**

Specifications: Nominal Sensitivity: 10mV/g±5%
Frequency Reponse: 10 to 10000Hz ±5%

Results: Measured Nominal Sensitivity: 9.812 mV/g at 100 Hz 1 g Peak
Test Profile: 10Hz - 10000Hz



Frequency Hz	Sensitivity mV/g	Phase Deg	Frequency Hz	Sensitivity mV/g	Phase Deg	Frequency Hz	Sensitivity mV/g	Phase Deg
10	9.74	-178.3°	300	9.76	-179.0°	7000	9.90	-178.9°
15	9.83	-178.5°	500	9.73	-179.1°	8000	9.97	-178.9°
20[1]	9.83	-178.7°	1000	9.71	-179.0°	9000	10.09	-178.9°
30	9.84	-178.8°	2000	9.70	-179.0°	10000	10.25	-179.0°
50	9.84	-179.0°	3000	9.71	-178.9°	0	0.00	0.0°
100	9.81	-179.0°	4000	9.72	-178.9°	0	0.00	0.0°
160[1]	9.79	-179.0°	5000	9.76	-179.1°	0	0.00	0.0°
200[1]	9.78	-179.0°	6000[1]	9.81	-179.0°	0	0.00	0.0°

[1] These frequencies are not traceable to NIST.

* These measurements are not within manufacturers stated specifications.

Calibration Certificate

Part Description: Silver **Certification Date:** 10/1/2009 (MMDDYYYY) **Serial#:** S08-05-98-01273

Single Point - (Max-Min)/2 Specification: S08-05 .076mm (.0030") **Certificate#:** S0127340087

Volumetric (Max Deviation) Specification: S08-05 +/-.108mm (+/-.0042") **Temperature:** See attached data

Measurement Standards Traceability

Ball Bar Kit	Asset Number: 1039	Calibration Due: 1/1/2010	*SI Traceability: METAS-L20081128MG1
Thermometer	Asset Number: TQ023	Calibration Due: 12/30/2009	*SI Traceability: NVLAP-A8C22083-1
Reference Sphere	Asset Number: TQ1176	Calibration Due: 5/21/2010	*SI Traceability: NIST-821/270114-04

The artifacts above have been calibrated with a device traceable to the International System of Units (SI) through a National Metrological Institute (NMI) or through an ISO17025 Accredited Laboratory.
Measurement uncertainty is 3.9 + 5.9X micrometers, where X = length in meters.
Uncertainty is expressed at approximately a 95% Level of Confidence using k=2.00.

Calibration Results*

3 Single Point Articulation Tests at <=20%, 20%-80% and >=80% range.	PASSED
1 Effective diameter sphere test.	PASSED
20 Volumetric ball bar tests in 4 quadrants and 2 orientations.	PASSED

*Calibration conforms to procedures developed in accordance with ASME B89.4.22-2004. See attached data for measurement results.

Instrument condition as received: Inoperative

Instrument condition outgoing: Within specifications

Technician: Harry Van Horn Date: 10/1/09

FARO Technologies, Inc.
PH1:1-800-736-2771
PH2:407-333-9911
FAX:407-333-8056
L-A-B Cert Number:L1147-1

125 Technology Park
Lake Mary, FL 32746
USA

10/15/09

FARO®

LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 Accredited

f:\control\records\05manufa\partspec\XH08-0495.eps Rev1 RevDate: 12/08/04

MetroCal Inc.
ACCREDITED
CALIBRATION CERT #0513.01
4700 Barden Court SE, Kentwood MI 49512, Telephone: 616-698-3124, Fax: 616-698-2364, www.metrocal.com

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Order Number: **67210**
Certificate Number: **100216801**
Page: **1 of 1**

Gauge Number: **MGA00048**
Gauge Desc: **Digital Protractor**
Manufacturer: **Mitutoyo**
Model Number: **Pro 360**
Serial Number: **N/A**

Customer PO: **N/A**
Last Calibration: **12/12/08**
Calibration Date: **2/16/10**
Next Calibration: **2/16/11**

As Found Condition: **In Tolerance**

As Left Condition: **In Tolerance**

MetroCal, Inc maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Procedure CP045 and complies with the ANSI/NCSL Z540-1 and ISO/IEC 17025 Standards. Results shall not be reproduced, except in full, without the written approval of MetroCal, Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence (K=2)
Gage Blk Set ID# 24281	1/4/10	1/4/11	Cert# 100104801	0.0015°
DoAll Sine Bar ID#1879	1/21/10	1/21/11	Cert# 100121125	0.0015°

Results:

As Found Readings

Units	Nominal	Actual	Deviation
Decimal Deg.	5.00	5.1	0.10
	10.00	10.1	0.10
	20.00	20.0	0.00
Tolerance	30.00	30.1	0.10
± 0.1°	40.00	40.1	0.10

Reference Level Check: Within ± 0.1 degrees

As Left Readings

Nominal	Actual	Deviation
5.00	5.1	0.10
10.00	10.1	0.10
20.00	20.0	0.00
30.00	30.1	0.10
40.00	40.1	0.10

Reference Level Check: Within ± 0.1 degrees

Comments: Environmental conditions during calibration: 68 °F, 40% RH.

Issued: 2/16/10

Shannon Shoemaker
Calibration Technician

☐ Checked box indicate this calibration was performed at the customers facility.

@ 2/22/10

MICHIGAN OPERATIONS
DATE: 2/7/04
SUPERCEDES: MGATPTMC.5

DOC. NO.: MGATPTMC
REVISION NO.: 6
PAGE 3 OF 3

Tape Measure Calibration Certificate

Reference Steel Rule
Brand: GEI
S/N: M6A 00067
Calibration Date: 1/23/09

Subject Tape Measure
Brand: GWSHAIE
S/N: TPM 926
Calibration Date: 5/26/09

Reference in (mm)	Subject Tape Measure	Difference	Reference in (mm)	Subject Tape Measure	Difference
0 (0)	0	0	18 (450)	450	0
1 (25)	25	0	19 (475)	475	0
2 (50)	50	0	20 (500)	500	0
3 (75)	75	0	21 (525)	525	0
4 (100)	100	0	22 (550)	550	0
5 (125)	125	0	23 (575)	575	0
6 (150)	150	0	24 (600)	600	0
7 (175)	175	0	25 (625)	625	0
8 (200)	200	0	26 (650)	650	0
9 (225)	225	0	27 (675)	675	0
10 (250)	250	0	28 (700)	700	0
11 (275)	275	0	29 (725)	725	0
12 (300)	300	0	30 (750)	750	0
13 (325)	325	0	31 (775)	775	0
14 (350)	350	0	32 (800)	800	0
15 (375)	375	0	33 (825)	825	0
16 (400)	400	0	34 (850)	850	0
17 (425)	425	0	35 (875)	875	0

If all differences are ± 1/32 of an inch (1 mm), then the tape measure is acceptable.
Pass X Fail ____ Maximum Difference = 0

Date: 5/26/09 Performed By: [signature]

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ± 0.2%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

Certificate of Calibration

Schober Calibration Service, Inc.
2550 Oakley Park Road, Suite #300
Walled Lake, MI 48390
Phone: (248) 926-6000 FAX: (248) 926-6006

ACCREDITED
CALIBRATION 1563.01

Certificate Number: 0001591:1244035380

CUSTOMER: MGA Research Corporation
446 Executive Drive
Troy MI 48083
Contact: Thomas Hutter

Calibration Location: **On-site**

Equipment Calibrated

Manufacturer:	Dickson	Date Received:	06/03/2009
Description:	Temp/Humidity Recorder	Date Calibrated:	06/03/2009
Model Number:	FH125	Calibration Due Date:	06/03/2010
Serial Number:	06163263	Calibration Procedure:	CP0001
Asset Number:	MGA00152	Revision:	
Received Status:	Good	Performed By:	P. Vella

Condition as Received: In Tolerance
Condition as Returned: In Tolerance

Notes:

Ambient Calibration Conditions

Ambient Temperature: 23 °C Relative Humidity: 45 % RH Barometric Pressure: mbar

Calibration Equipment Used

Asset Number:	Manufacturer:	Model:	Serial:	Cal Due:
RMS042	Fluke/Hart	1502A	A6C537	24 Apr 2010
RMS043	Hart Scientific	5614	778109	24 Apr 2010
RMS045	Vaisala	HMP76	C0630009	27 Mar 2010

The Uncertainty is estimated using expanded uncertainties and coverage factor (k) of 2, providing a confidence level of approximately 95%.
This calibration is traceable to the international system of units (SI) through standards calibrated by accredited laboratories, or through standards calibrated at NIST. This laboratory meets the requirements of ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994. This certificate shall not be reproduced, except in full, without prior written approval by Schober Calibration Service.
Calibration interval determined by the customer. When determining the calibration interval, the customer should take into consideration that any number of factors may cause the calibration item to drift out of calibration before the calibration interval has expired.
The results herein apply only to the calibration of the item described above. No sampling plan was used for this calibration.

Approved By: Quality Manager Date: 7-29-09

TMH 7/29/09

Calibration Data

MFG/MODEL: **Dickson / FH125**

Serial / ID #: **06163263 / MGA00152**

Customer: **MGA Research**

Date Calibrated: **06/03/09**

Certificate No.: **0001591:1244035380**

All calculations and data transfers have been reviewed for accuracy and completeness

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit
Data Logger with Sensor System Tests					
Channel 1					
	-22.8° C	-23.8° C	-23.2° C	-23.2° C	-21.8° C
	23.8° C	22.8° C	24.0° C	24.0° C	24.8° C
	39.6° C	38.6° C	38.8° C	38.8° C	40.6° C
Channel 2 (RH @ 21° C)					
	41.4 %rh	39.4 %rh	42.8 %rh	42.8 %rh	43.4 %rh
	72.4 %rh	70.4 %rh	74.1 %rh	74.1 %rh	74.4 %rh
Calibration Performed By: P. Vella					

Bold Font Indicates Out Of Tolerance Condition.

Temperature Measurement Standard Uncertainty U_{temp}= 0.65°C

Relative Humidity Measurement Standard Uncertainty U_{rh}= 2.22%

7/27/09

MetroCal inc.

ACCREDITED
CALIBRATION CERT #0513.01

4700 Barden Court SE, Kentwood MI 49512, Telephone: 616-698-3124, Fax: 616-698-2364, www.metrocal.com

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Order Number: **65274**
Certificate Number: **090814711**
Page: **1 of 1**

Gauge Number: **MGA00783**
Gauge Desc: **0 to 20 lb. X .01 lb. Digital Scale**
Manufacturer: **Detecto**
Model Number: **AP-20**
Serial Number: **E10807-0187**

Customer PO: **A071735**
Last Calibration: **7/24/08**
Calibration Date: **8/14/09**
Next Calibration: **8/14/10**

As Found Condition: **See Results**

As Left Condition: **See Results**

MetroCal Inc. maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Procedure CP042 and relevant sections of the manufacturer's manual. This calibration complies with ISO/IEC 17025 and ANSI/NCSL Z540-1 Standards. Results shall not be reproduced except in full without the written approval of MetroCal Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal. Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence , (K=2)
Weight Set ID# 2463	9/3/08	9/3/10	MI-07-07-8945	+/-0.001% of Load

Results:
Tolerance used: Class III

Units: lbs **TI Division/Increment:** .01 lb.

	As Found				As Left		
Weight Test	**Nominal**	**Indication**	**Deviation**		**Nominal**	**Indication**	**Deviation**
0-25% fs	5.00	5.01	0.01		5.00	5.01	0.01
26-50% fs	10.00	10.02	0.02		10.00	10.02	0.02
51-75% fs	15.00	15.02	0.02		15.00	15.02	0.02
76-100% fs	20.00	20.03	0.03		20.00	20.03	0.03
Shift Test:	Pass			**Shift Test:**	Pass		
Half Load Test:	Pass			**Half Load Test:**	Pass		

Comments: Environmental conditions during calibration: 68 °F, 40 % RH.

Bill Rinzema
Calibration Technician

Issued: 8/17/09

☐ Checked box indicate this calibration was performed at the customers facility.

@ 8/18/09

Sterling Scale Co., Inc.
20950 Boening St.
Southfield, MI 48075

Certificate of Calibration

F410/12-3
Rev. Date 11/23/05

calibration cert. 1448.01

Customer: M G A ***Cert#*** 09-5841 ***Temp/Humidity:*** 75/35
Location of Calibration: 2839 Elliott Troy, MI 48083
Calibration Date: 7/27/2009 ***Cal Due:*** Jul-10 ***Condition of Item:*** fair
Equipment Make: Intercomp ***Model:*** SWD-Deluxe ***Serial/ID:*** 26032389 ***Capacity:*** 2200lb x 1lb

Applied Test Wt	*Before Adus*	*Tolerance*	*In-Tolerance Y/N*	*After Adjustment*	*In-Tolerance Y/N*	*Unc*
RF 100lb	100lb	1lb	y	100lb	y	.11lb
2000lb	2000lb	2lb	y	2000lb	y	.5lb
LF 100lb	100lb	1lb	y	100lb	y	.11lb
2000lb	2000lb	2lb	y	2000lb	y	.5lb
RR 100lb	100lb	1lb	y	100lb	y	.11lb
2000lb	2000lb	2lb	y	2000lb	y	.5lb
LR 100lb	100lb	1lb	y	100lb	y	.11lb
2000lb	2000lb	2lb	y	2000lb	y	.5lb

shift test
N/A

Platform # Platform #2 Platform #3

☐ Pass ☐ Pass ☐ Pass

☐ Fail ☐ Fail ☐ Fail

Tests performed: ☑ Repeat ☑ Linearit ☐ Sensitivity ☑ Discrimination

Technician COMMENTS/ weights used
Scale pass all test perform on it
Scale have stable zero & weight reading.
Our test weights are on file.

☑ Scale Certified ☐ Scale Rejected

Sterling Scale Service Rep Wayne **Date:** **7/27/2009** 1 of 1

The above item has been calibrated using the relevant EPO or OEM procedures utilizing test weights
Traceable to International Systems of Units (SI), through the Michigan Department of Agriculture.
Test numbers on file. Expanded uncertainty(k=2) confidence level of 95% as reported.
Results relate only to items listed.
The reported uncertainty is valid only for the environment in which it is determined.
Any number of factors may cause the item to drift out of calibration before recommended interval has expired
This report shall not be reproduced, except in full without approval of the laboratory
Tolerances followed are maintenance/acceptance per HB 44 or as detremined by the customer

7/27/09
HAM