

FINAL REPORT NUMBER 201UI-MGA-08-07

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

**FUJI HEAVY INDUSTRIES, LTD.
2008 Subaru Impreza, 4-Door H/B
NHTSA No. C85502**

**MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083**




Test Dates: February 19-21, 2008
Report Date: February 29, 2008

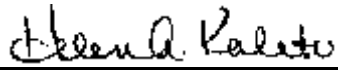
FINAL REPORT

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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WASHINGTON, D.C. 20590**

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16. Abstract A compliance test series was conducted on the subject 2008 Subaru Impreza, 4-Door H/B, NHTSA No. C85502, 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 February 19-21, 2008. Test failures identified were as follows: None The data recorded indicates that the 2008 Subaru Impreza, 4-Door H/B, tested appears to comply with the upper interior requirements of FMVSS 201.					
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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 2008 Subaru Impreza, 4-Door H/B, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on February 19-21, 2008 on a 2008 Subaru Impreza, 4-Door H/B, manufactured by Fuji Heavy Industries, Ltd.

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 July 1, 2005.

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 July 1, 2005.

2.0 COMPLIANCE TEST DATA SUMMARY

The 2008 Subaru Impreza, 4-Door H/B, was equipped with A, B, O (Other), and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a fixed seat belt anchorage on the right rear pillar, and a grab handle located on the side rail above each door (front and rear).

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:

AP1	BP2	FH1	UR4@SR2A
AP2	BP4	SR1	UR5@Rear of BPR
AP3	OP1	UR2@BPR	UR6@OP1

The 2008 Subaru Impreza, 4-Door H/B, 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: 2008 Subaru Impreza, 4-Door H/B

VEH. NHTSA NO.: C85502 VIN: JF1GH61608H813547 COLOR: Red

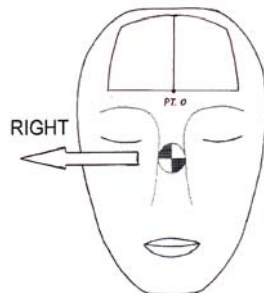
VEH. BUILD DATE: October, 2007 TEST DATES: February 19-21, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Salvatore Pizzo

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Right	113	25	18.3	423	340	10	17 Right
AP2	Left	202	47	18.6	396	304	9	10 Left
AP3	Right	158	45	18.5	346	238	20	2 Left
BP2	Right	90	0	23.7	523	472	15	5 Left
BP4	Left	199	-6	22.5	562	524	11	15 Left
OP1	Left	270	32	18.3	538	492	33	8 Left
FH1	Left	180	50	23.0	723	737	16	2 Left
SR1	Left	270	18	18.2	347	239	23	8 Left
UR2@BPR	Left	270	37	23.0	778	810	57	5 Left
UR4@SR2A	Right	90	41	23.0	677	677	35	7 Left
UR5@Rear of BPR	Right	90	35	23.7	592	565	38	0
UR6@OPR	Right	90	42	23.4	816	862	28	3 Right

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 Left: A-pillar displacement.

SR1 Left: Headliner deformation.

UR4@SR2A Right: Headliner deformation.

UR5@Rear of BPR: Headliner deformation.

UR6 @OPR Right: Headliner deformation.

REMARKS:

The targets listed were impacted in the following order:

Left: AP2, FH1, SR1, BP4, UR2@BPR, OP1

Right: AP3, AP1, UR4@SR2A, BP2, UR5@Rear of BPR, UR6@OPR

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

RECORDED BY: Louis Campbell

DATE: February 21, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Subaru Impreza, 4-Door H/B

VEH. NHTSA NO.: C85502 VIN: JF1GH61608H813547 COLOR: Red

VEH. BUILD DATE: October, 2007 TEST DATES: February 19-21, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Salvatore Pizzo

INTERIOR TRIM INFORMATION: A, B, O (Other), and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a fixed seat belt anchorage on the right rear pillar, and a grab handle located on the side rail above each door (front and rear).

SUNROOF INFORMATION:

Installed: Yes No

Operation: Electric Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed: Yes No

ROLL-BAR INFORMATION:

Installed: Yes No

Padded: Yes No

Braces: Yes No

GENERAL INFORMATION:

Date Received: 01/14/08; Odometer Reading 425 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Fuji Heavy Industries, Inc.

Date of Manufacture: October, 2007; VIN: JF1GH61608H813547

GVWR: 1950 kg; GAWR FRONT: 900 kg;

GAWR REAR: 1000 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 230 kPa REAR: 220 kPa

Recommended Tire Size: 205/55R16

Recommended Cold Tire Pressure:

FRONT: 230 kPa REAR: 220 kPa

Size of Tire on Test Vehicle: 205/55R16

Type of Spare Tire: T125/70D17; 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) = 408 kg

No. of Occupants x 68 kg = 340 kg

Rated Cargo/Luggage Weight (RCLW) = 68 kg (difference)

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

Right Front = 394.5 kg Right Rear = 287.2 kg

Left Front = 415.0 kg Left Rear = 290.5 kg

TOTAL FRONT = 809.5 kg TOTAL REAR = 577.5 kg

% Total Weight = 58.4 % % Total Weight = 41.6 %

TOTAL DELIVERED WEIGHT = 1387.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1387.0 kg

Max. Test Cargo/Luggage Weight = 68.0 kg

Target Test Weight = 1455.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	<u>393.0</u> kg	Right Rear =	<u>320.5</u> kg
Left Front =	<u>415.5</u> kg	Left Rear =	<u>324.0</u> kg
TOTAL FRONT =	<u>808.5</u> kg	TOTAL REAR =	<u>644.5</u> kg
% Total Weight =	<u>55.6</u> %	% Total Weight =	<u>44.4</u> %

TOTAL TEST WEIGHT = 1453.0 kg

Weight of ballast secured in vehicle's cargo area = 67.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 702 mm; Left Front 699 mm;
Right Rear 710 mm; Left Rear 707 mm;
Pitch Angle at Right Door Sill = 0.2 Front is higher
Pitch Angle at Left Door Sill = 0.4 Front is higher
Roll Angle at Front Bumper = 0.4 Right is higher
Roll Angle at Rear Bumper = 0.5 Right is higher

FULLY LOADED: Right Front 702 mm; Left Front 699 mm;
Right Rear 696 mm; Left Rear 697 mm;
Pitch Angle at Right Door Sill = 0.6 Front is higher
Pitch Angle at Left Door Sill = 0.8 Front is higher
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.2 Right is higher

AS TARGETED: Right Front 898 mm; Left Front 892 mm;
Right Rear 891 mm; Left Rear 890 mm;
Pitch Angle at Right Door Sill = 0.2 Front is higher
Pitch Angle at Left Door Sill = 0.4 Front is higher
Roll Angle at Front Bumper = 0.4 Right is higher
Roll Angle at Rear Bumper = 0.5 Right is higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill = 0.4 Front is higher
Pitch Angle at Left Door Sill = 0.4 Front is higher
Roll Angle at Front Bumper = 0.4 Right is higher
Roll Angle at Rear Bumper = 0.5 Right is higher

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill = 0.2 Front is higher
Pitch Angle at Left Door Sill = 0.4 Front is higher
Roll Angle at Front Bumper = 0.4 Right is higher
Roll Angle at Rear Bumper = 0.5 Right is higher

VEHICLE WHEELBASE = 2630 mm

REMARKS: The seat travel distance was measured to be 220 mm for the driver front seat and 220 mm for the passenger front seat.

RECORDED BY: Louis Campbell

DATE: February 14, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-3
HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Subaru Impreza, 4-Door H/B

VEH. NHTSA NO.: C85502 VIN: JF1GH61608H813547 COLOR: Red

VEH. BUILD DATE: October, 2007 TEST DATES: February 19-21, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Salvatore Pizzo

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B

PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195°-255°	L 202.4°	L 249.6°
	R 105°-165°	R 112.7°	R 158.1°
B-PILLAR	L 195°-345°	L 198.8°	L 276.8°
	R 15°-165°	R 86.9°	R 160.7°

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Louis Campbell

DATE: February 14, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Subaru Impreza, 4-Door H/B

VEH. NHTSA NO.: C85502 VIN: JF1GH61608H813547 COLOR: Red

VEH. BUILD DATE: October, 2007 TEST DATES: February 19-21, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Salvatore Pizzo

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L 0°-50°	L 0°	L 50°
		R 0°-50°	R 0°	R 50°
	FH2	L 0°-50°	L 0°	L 50°
		R 0°-50°	R 0°	R 50°
SIDE RAIL	SR1	L 0°-50°	L 0°	L 18°
		R 0°-50°	R 0°	R 20°
	SR2A	L 0°-50°	L 0°	L 40°
		R 0°-50°	R 0°	R 42°
	SR2B	L 0°-50°	L 0°	L 18°
		R 0°-50°	R 0°	R 19°
	SR3-1	L 0°-50°	L 0°	L 23°
		R 0°-50°	R 0°	R 23°
	SR3-2	L 0°-50°	L 0°	L 43°
		R 0°-50°	R 0°	R 25°
	SR3-3	L 0°-50°	L 0°	L 32°
		R 0°-50°	R 0°	R 31°
REAR HEADER	RH	L 0°-50°	L 0°	L 50°
		R 0°-50°	R 0°	R 50°

		VERTICAL ANGLE SPECIFIED RANGE		MINIMUM VERTICAL ANGLE		MAXIMUM VERTICAL ANGLE	
A-PILLAR	AP1	L	-5°-50°	L	-5°	L	23°
		R	-5°-50°	R	-5°	R	25°
	AP2	L	-5°-50°	L	-5°	L	47°
		R	-5°-50°	R	-5°	R	50°
	AP3	L	-5°-50°	L	-5°	L	45°
		R	-5°-50°	R	-5°	R	45°
B-PILLAR	BP1	L	-10°-50°	L	-10°	L	17°
		R	-10°-50°	R	-10°	R	25°
	BP2*	L	0°-50°	L	0°	L	0°
		R	0°-50°	R	0°	R	0°
	BP3	L	0°-50°	L	0°	L	0°
		R	0°-50°	R	0°	R	0°
	BP4	L	-10°-50°	L	-10°	L	-6°
		R	-10°-50°	R	-10°	R	-5°
OTHER-PILLAR	OP1	L	-10°-50°	L	-10°	L	32°
		R	-10°-50°	R	-10°	R	33°
	OP2	L	-10°-50°	L	-10°	L	2°
		R	-10°-50°	R	-10°	R	4°
REAR PILLAR	RP1	L	-10°-50°	L	-10°	L	38°
		R	-10°-50°	R	-10°	R	17°
	RP2	L	0°-50°	L	0°	L	8°
		R	0°-50°	R	0°	R	7°
UPPER ROOF 1			0°-50°		0°		41°
UPPER ROOF 2			0°-50°		0°		37°
UPPER ROOF 3			0°-50°		0°		32°
UPPER ROOF 4			0°-50°		0°		41°
UPPER ROOF 5			0°-50°		0°		35°

	VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
UPPER ROOF 6	0°-50°	0°	42°

As determined using the Procedures specified in S8.13.4.2. *Target BP2 is a seat belt anchorage location.

RECORDED BY: Louis Campbell

DATE: February 14, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Subaru Impreza, 4-Door H/B

VEH. NHTSA NO.: C85502 VIN: JF1GH61608H813547 COLOR: Red

VEH. BUILD DATE: October, 2007 TEST DATES: February 19-21, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Salvatore Pizzo

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	220 mm	220 mm
T°	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	110.4°	--
A1°	360° - T°	249.6°	--
W°	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	202.4°	--
A2°	A2° = W°	202.4°	--
U°	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	276.8°	--
B1°	B1° = U°	276.8°	--
V°	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	198.8°	--
B2°	B2° = V°	198.8°	--
W° (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	158.1°
A1° (right)	A1° (right) = W° (right)	--	158.1°
T ° (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	247.3°
A2° (right)	360°-T° (right)	--	112.7°
V ° (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	160.7°
B1° (right)	B1° (right) = V° (right)	--	160.7°
U ° (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	86.9°
B2° (right)	B2° (right) = U° (right)	--	86.9°
J	A-Pillar {(Plane 3) – (Plane 5)}	336.3 mm	335.8 mm
J/2	J ÷ 2	168.2 mm	167.9 mm
D1	Upper Roof {(Plane A) – (Plane B)}	1744.0 mm	
D1/2	D1 ÷ 2	872.0 mm	

Measurement	Description	Left Side	Right Side
D2	Upper Roof {(Plane C) – (Plane D)}	1154.0 mm	
D2/2	D2 ÷ 2	577.0 mm	
.35D1	.35 x D1	610.4 mm	
.35D2	.35 x D2	503.9 mm	
N	B-Pillar {(BPR) – (lowest point on daylight opening forward of B-Pillar)}	413.1 mm	414.6 mm
N/2	B-Pillar {(BP3) – (lowest point on daylight opening forward of B-Pillar)}	206.6 mm	207.3 mm
N/4	B-Pillar {(BP4) – (lowest point on daylight opening forward of B-Pillar)}	103.3 mm	103.7 mm
Q	O-Pillar (Plane 13 – Plane 14)	365.8 mm	365.2 mm
Q/2	Q / 2	182.9 mm	182.6 mm
D	R-Pillar (Point 7 – Point M)	745.0 mm	740.0 mm
3D/7	3*D / 7	319.3 mm	317.1 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	1293.1	-355.0	258.4	1304.4	355.0	238.4
Rear	2064.8	-365.0	295.3	2064.8	365.0	295.3

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1293.1	-355.0	258.4	1304.4	355.0	238.4
Rear	2064.8	-365.0	295.3	2064.8	365.0	295.3

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1233.1	-355.0	918.4	1244.4	355.0	898.4
CGF2	1453.1	-355.0	918.4	1464.4	355.0	898.4
CGR	2224.8	-365.0	955.3	2224.8	365.0	955.3

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Front upper door striker bolt head right (x, y, z) = 1397.8, 760.3, 432.8

Front upper door striker bolt head left (x, y, z) = 1397.8, -769.3, 432.8

Front side sill drain hold left (x, y, z) = 795.0, -748.0, 82.5

REMARKS:

RECORDED BY: Louis Campbell

DATE: February 14, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Subaru Impreza, 4-Door H/B

VEH. NHTSA NO.: C85502 VIN: JF1GH61608H813547 COLOR: Red

VEH. BUILD DATE: October, 2007 TEST DATES: February 19-21, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Salvatore Pizzo

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	1064.3	-523.1	1071.6	--	--	Yes	--	--
REL	1076.0	-538.6	1027.7	250	23	--	9	No
AP2	1018.6	-566.1	984.5	202	47	No	--	Yes
AP3	863.6	-600.3	904.4	202	45	No	--	No
A-Pillar Right Side								
AP1	1068.3	523.5	1071.4	--	--	Yes	--	--
REL	1085.9	542.4	1027.7	113	25	--	2	Yes
AP2	1018.0	566.7	984.3	158	50	No	--	No
AP3	863.1	598.1	904.5	158	45	No	--	Yes
B-Pillar Left Side								
BP1	1547.8	-456.3	1120.9	270	17	No	--	No
BP2	1511.6	-582.3	867.1	270	0	No	--	No
BP3	1473.6	-594.9	915.3	270	0	No	--	No
BP4	1560.4	-644.3	813.0	199	-6	No	--	Yes
B-Pillar Right Side								
BP1	1547.8	453.3	1122.2	90	25	No	--	No
BP2	1512.7	583.3	864.1	90	0	No	--	Yes
BP3	1471.7	595.4	915.5	90	0	No	--	No
BP4	1560.6	643.7	812.9	161	-5	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					
Other Pillar Left Side								
OP1	2187.2	-438.6	1110.3	270	32	No	--	Yes
OP2	2279.7	-586.8	927.7	--	--	Yes	--	--
REL	2255.1	-584.5	926.5	270	2	--	1	No
Other Pillar Right Side								
OP1	2191.0	439.5	1111.0	90	33	No	--	No
OP2	2276.5	583.8	929.3	--	--	Yes	--	--
REL	2254.6	583.2	924.5	90	4	No	--	No
Rear Pillar Left Side								
RP1	2510.8	-476.1	996.7	315	38	No	--	No
RP2	2587.7	-597.0	845.8	--	--	--	--	--
REL	2622.4	-565.3	835.5	285	8	No	--	No
Rear Pillar Right Side								
RP1	2507.2	477.7	1000.5	54	38	No	--	No
RP2	2478.3	516.4	868.9	Target exempt from testing per S6.3(b).				No
Front Header Left Side								
FH1	1001.7	-406.8	1083.3	180	50	No	--	Yes
FH2	982.2	-256.4	1093.2	--	--	Yes	--	--
REL	985.6	-303.3	1090.1	180	50	No	2	No
Front Header Right Side								
FH1	1001.5	405.7	1083.1	180	50	No	--	No
FH2	982.1	258.1	1092.9	--	--	Yes	--	--
REL	989.4	310.0	1090.5	180	50	No	2	No
Side Rail Left Side								
SR1	1214.3	-478.6	1093.8	--	--	Yes	--	--
REL	1222.3	-482.3	1083.5	270	18	--	1	Yes
SR2A	1365.2	-473.3	1099.4	270	40	No	--	No
SR2B	1247.2	-487.0	1118.7	--	--	Yes	--	--

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					
REL	1074.7	-540.5	1026.4	270	18	--	2	No
SR3-1	1849.9	-449.2	1116.8	270	23	No	--	No
SR3-2	2018.1	-449.0	1103.5	270	43	No	--	No
SR3-3	2337.7	-461.2	1074.3	270	32	No	--	No
Side Rail Right Side								
SR1	1218.6	478.2	1094.1	--	--	Yes	--	--
REL	1228.3	484.6	1082.3	90	20	--	1	No
SR2A	1368.3	474.2	1097.7	90	42	No	--	No
SR2B	1247.0	486.9	1118.9	--	--	Yes	--	--
REL	1074.7	-540.5	1026.4	90	19	--	2	--
SR3-1	1855.1	450.4	1117.3	90	23	No	--	No
SR3-2	2019.9	446.9	1110.5	90	25	No	--	No
SR3-3	2340.9	462.7	1075.2	90	31	No	--	No
Rear Header Left Side								
RH	2535.9	-364.6	1040.6	0	50	No	--	No
Rear Header Right Side								
RH	2535.3	364.8	1043.2	0	50	No	--	No
Upper Roof Left Side								
UR1@Front Side Rail	1321.9	-392.0	1157.5	270	41	No	--	No
UR2@BPR	1550.3	-395.0	1149.6	270	37	No	--	Yes
UR3@SR3-2	2015.7	-391.7	1154.8	270	32	No	--	No
Upper Roof Right Side								
UR4@SR2A	1425.0	397.5	1164.7	90	41	No	--	Yes
UR5@Rear BPR	1724.2	396.3	1164.0	90	35	No	--	Yes
UR6@OP1	2194.6	393.5	1132.2	90	42	No	--	No

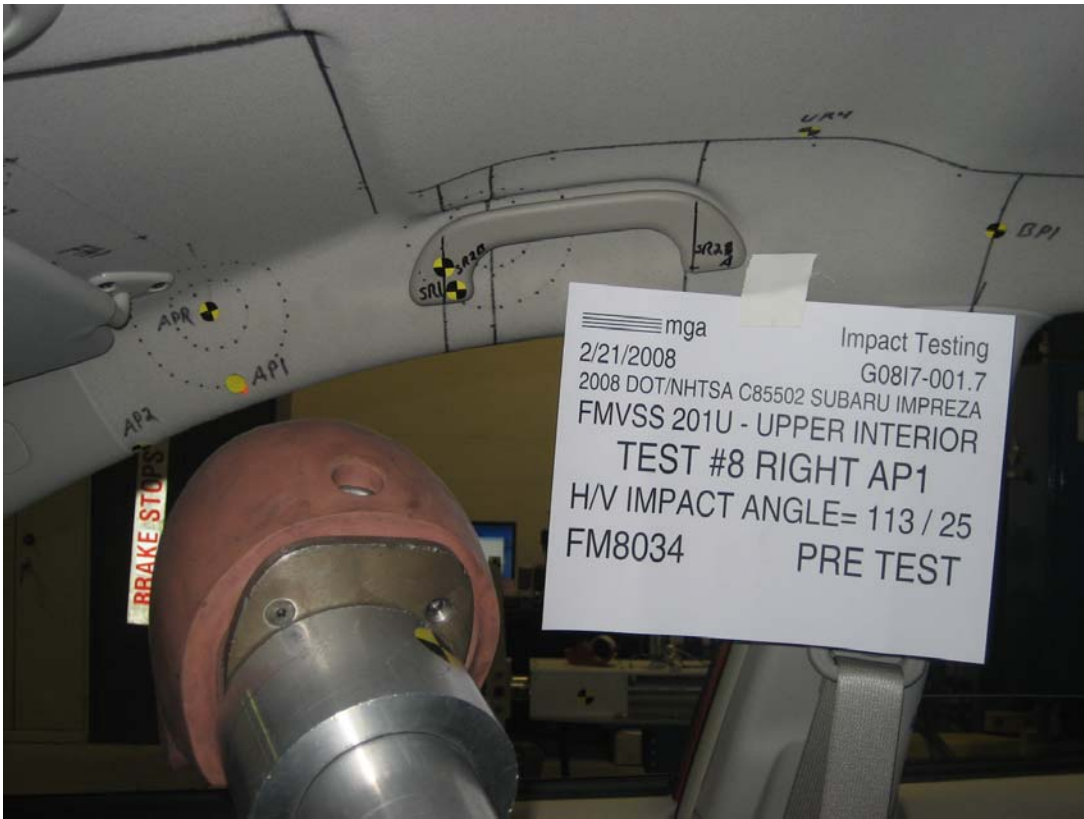
As determined using the Procedures specified in S10.1-10.13.

RECORDED BY: Louis Campbell

DATE: February 18, 2008

APPROVED BY: Helen A. Kalet

3.0 TEST DATA (Including Acceleration and Velocity Plots)





SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.7 VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru Impreza

GENERAL TEST PARAMETERS:

Test Number:#8
 Target (Vehicle Side): AP1Right Temperature:21C
 MGA Test Reference No.:FM8034 Humidity:12%
 Approach Horizontal Angles:113° Time of Test:11:42:14 AM
 Approach Vertical Angles:25° FMH Serial No:[072]
 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
423	340	5.3	18.3	10	17 Right

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J43743	-92.483	0.87	0.87
Y	6	J43745	97.812	0.85	0.85
Z	7	J43746	89.249	1.83	1.83

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

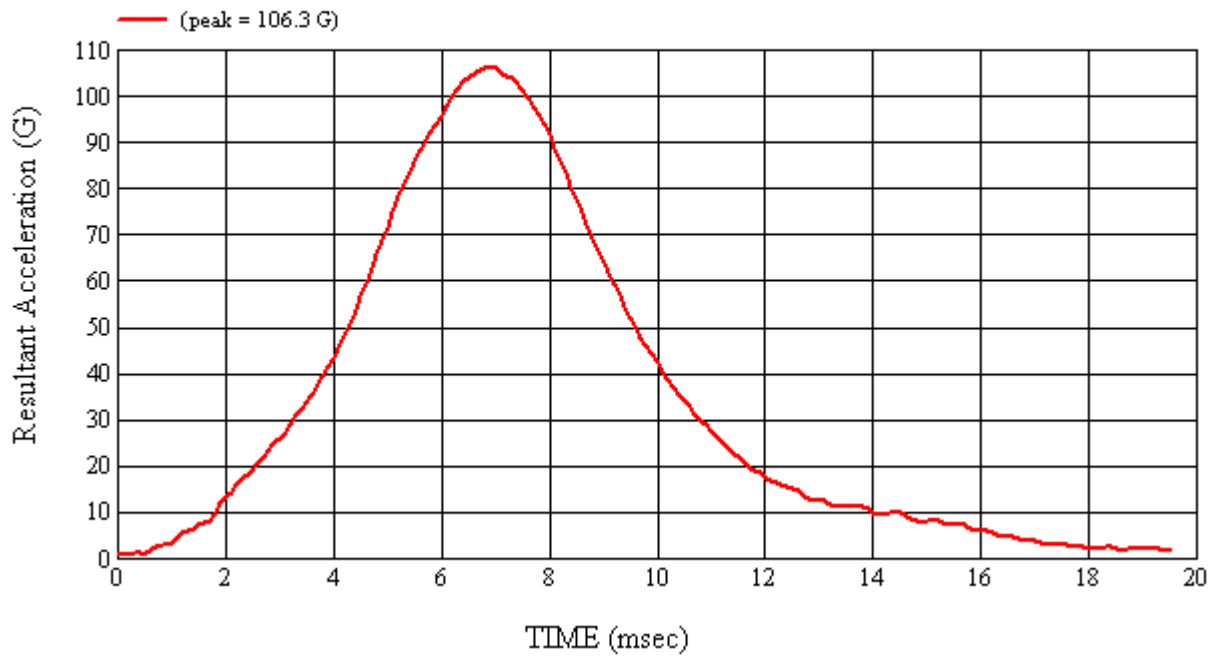
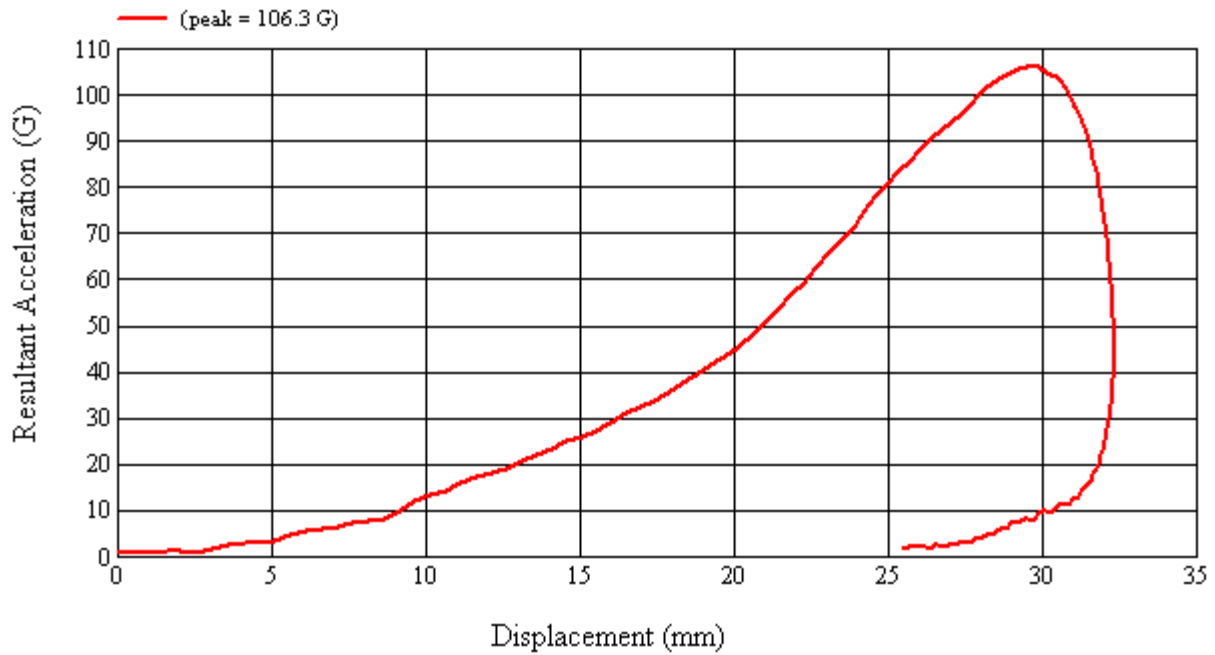
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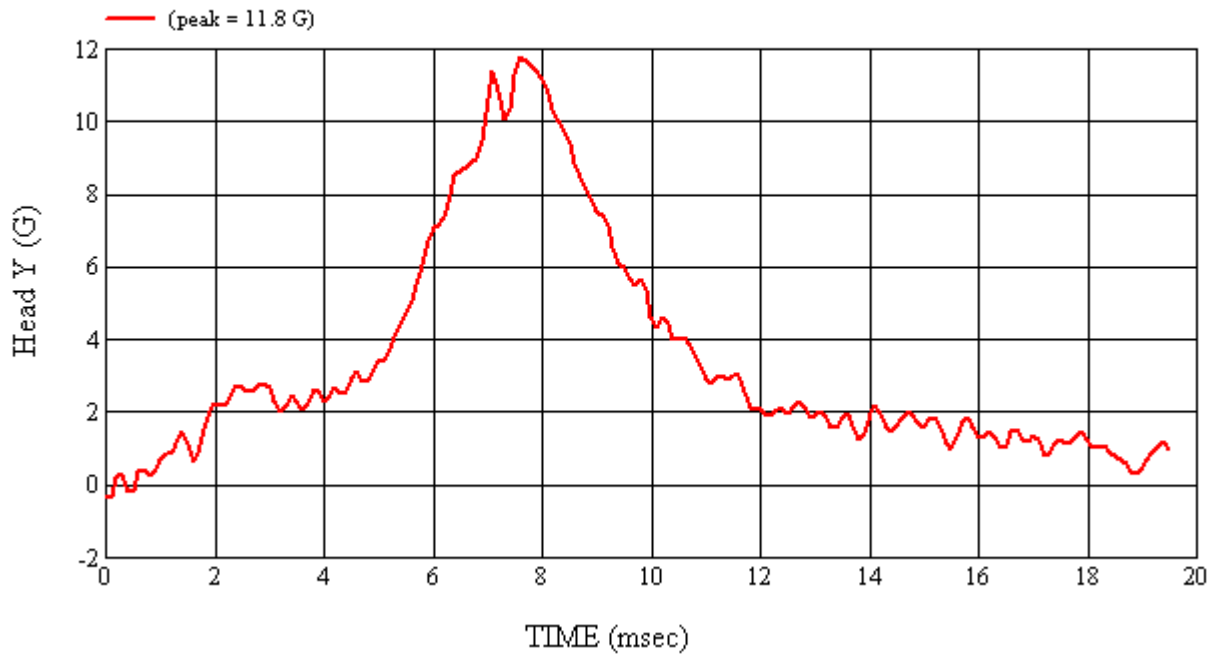
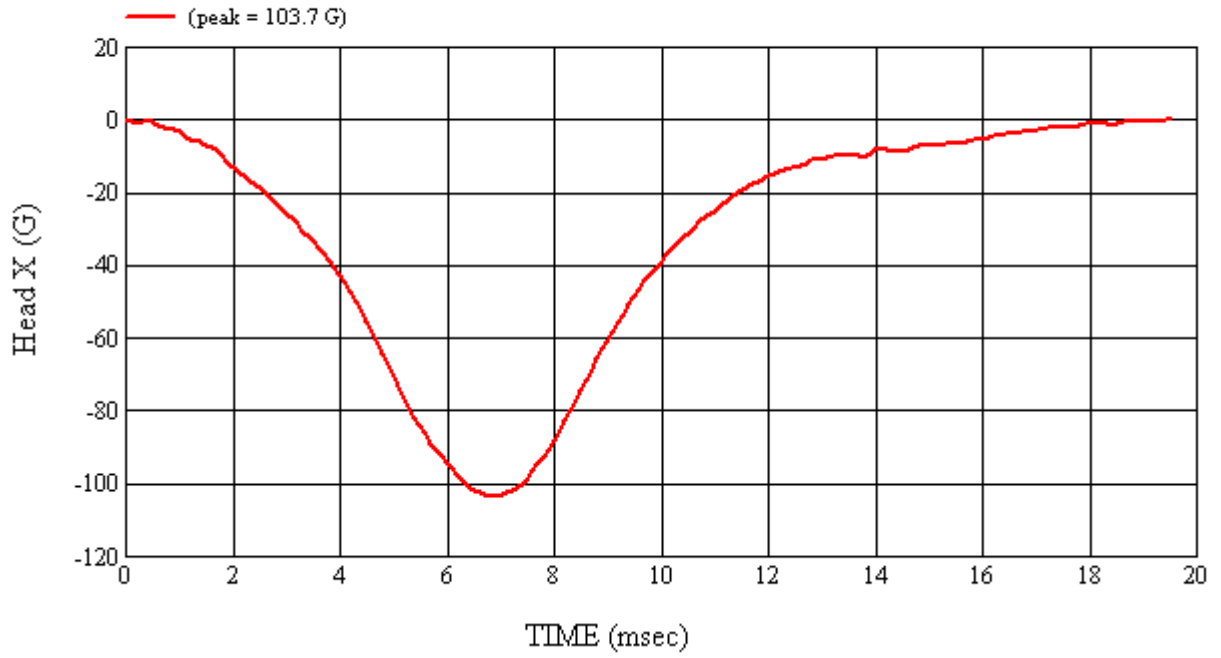
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/21/2008
 *Only necessary for NHTSA (Government) Compliance testing.

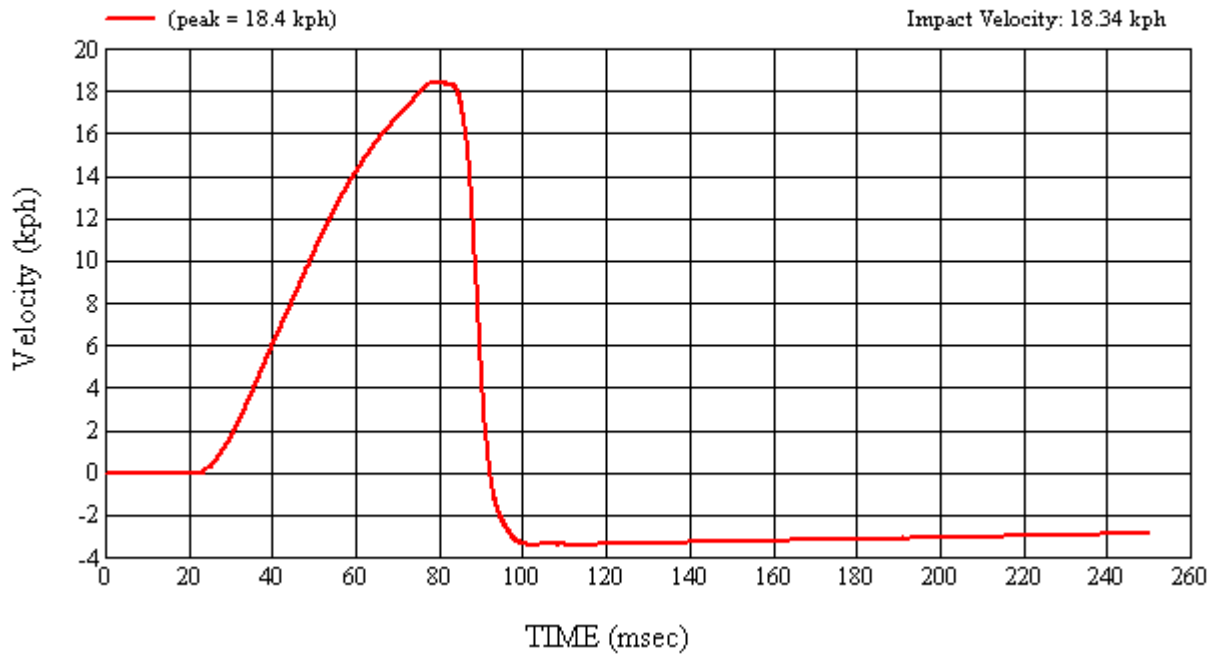
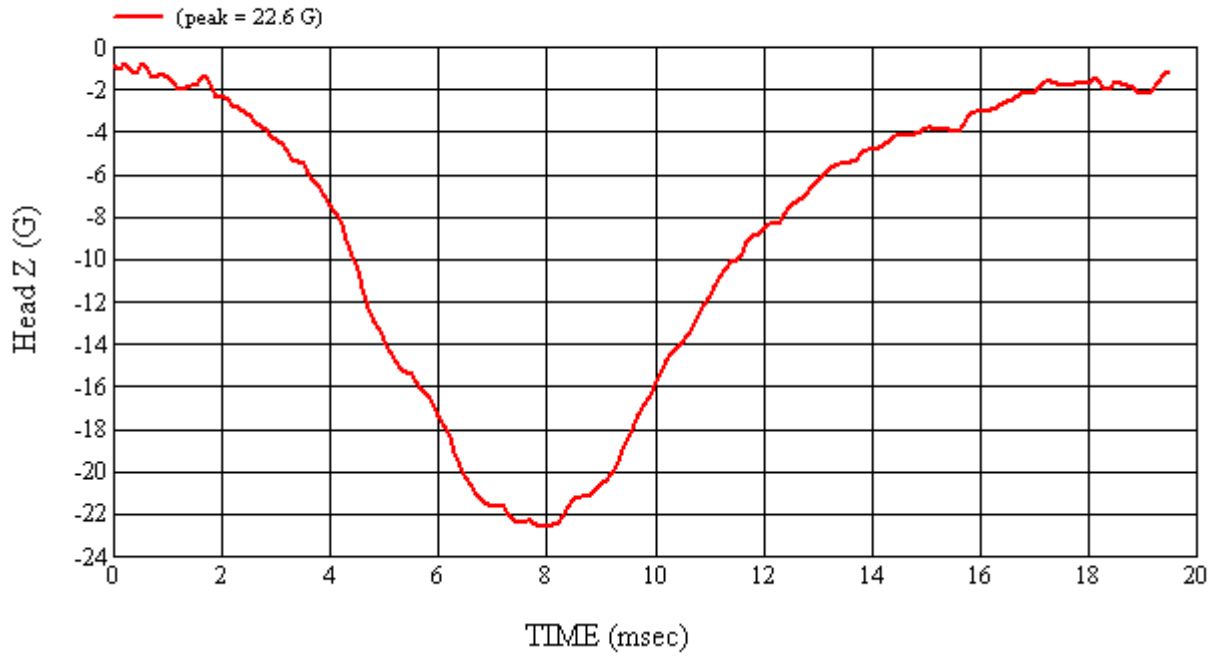
MGA Test #: FM8034

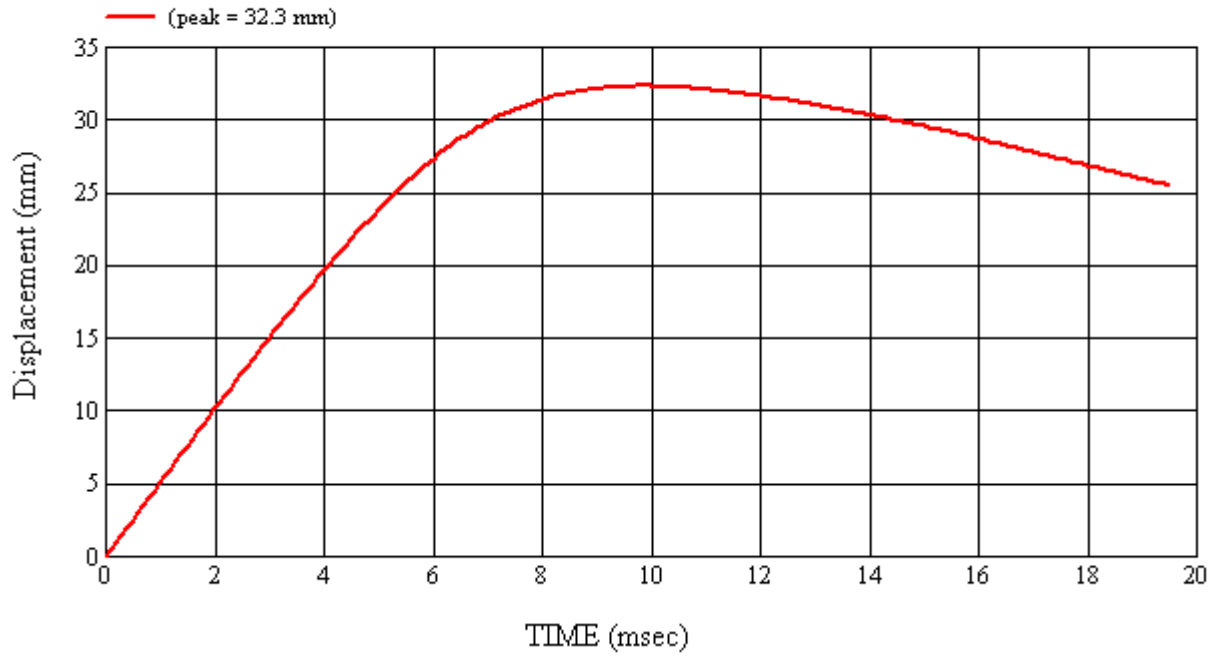
Target Location: API, Right Side

Test Date: 2/21/2008

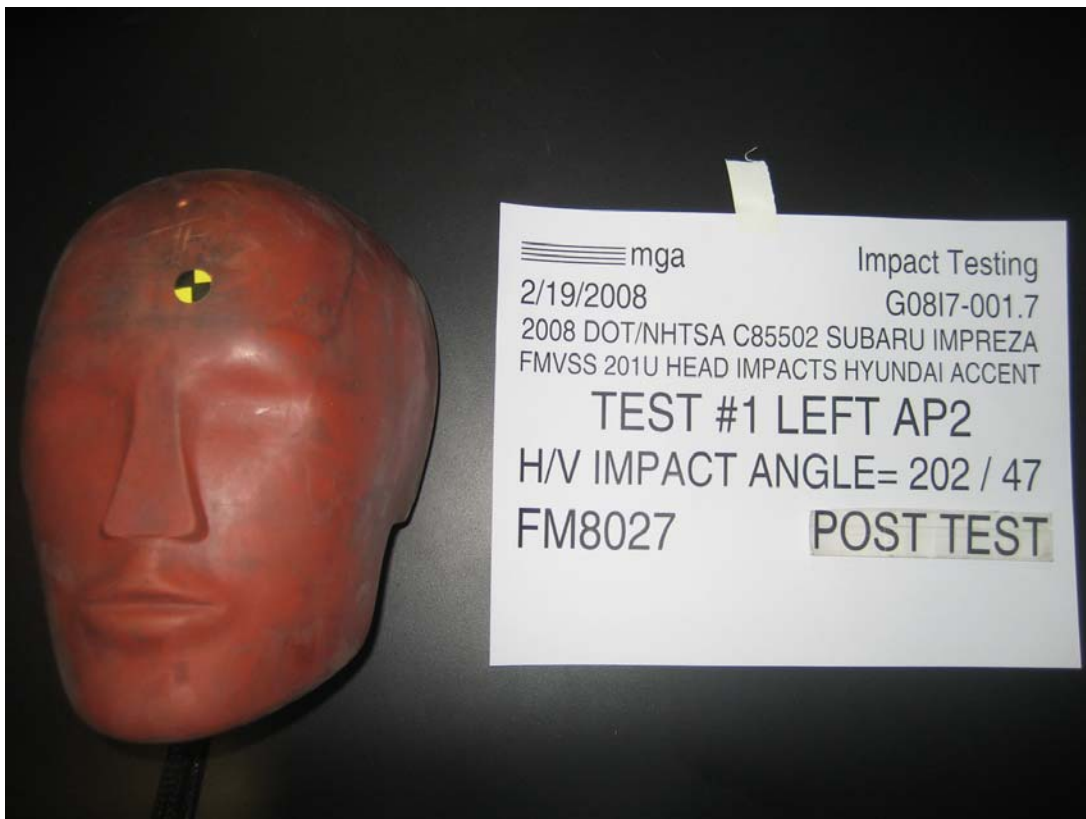
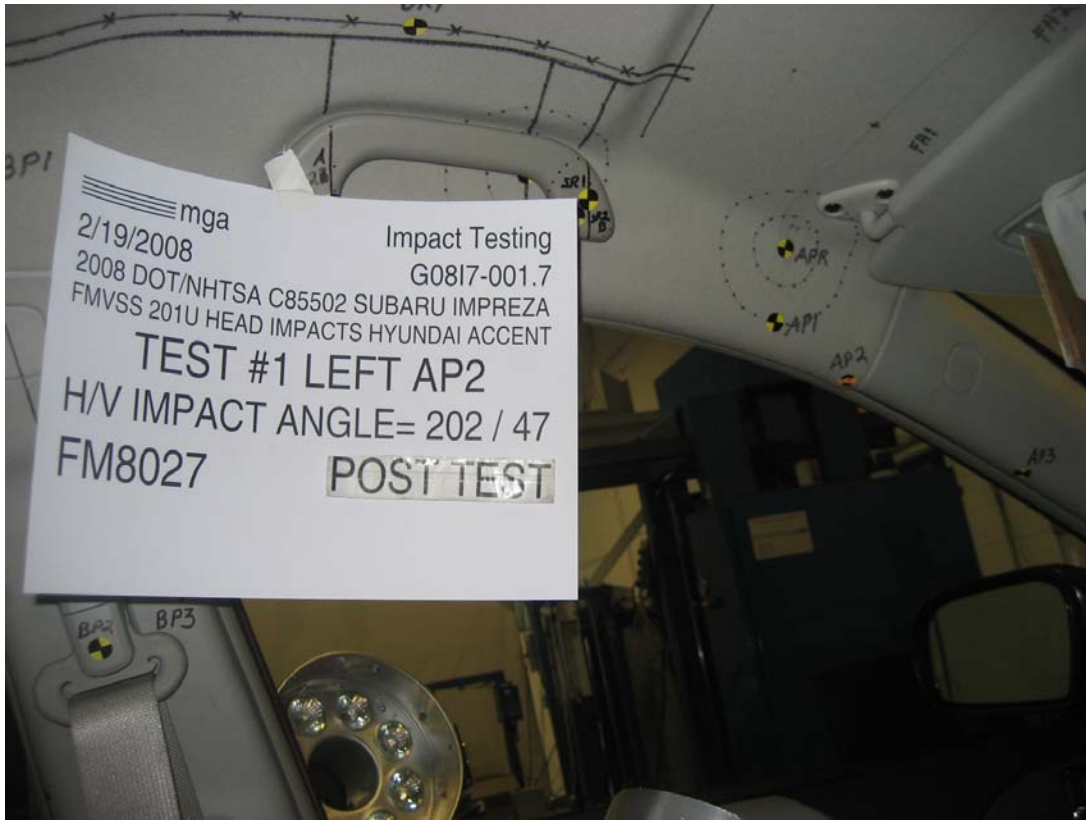












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
Impreza

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): AP2Left

Temperature:20C

MGA Test Reference No.:FM8027

Humidity:12%

Approach Horizontal Angles:202°

Time of Test:1:38:36 PM

Approach Vertical Angles:47°

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
396	304	10.4	18.6	9	10 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22664	-94.161	0.87	0.87
Y	6	J35919	97.442	0.85	0.85
Z	7	J35924	93.891	1.83	1.83

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

A-pillar displacement.

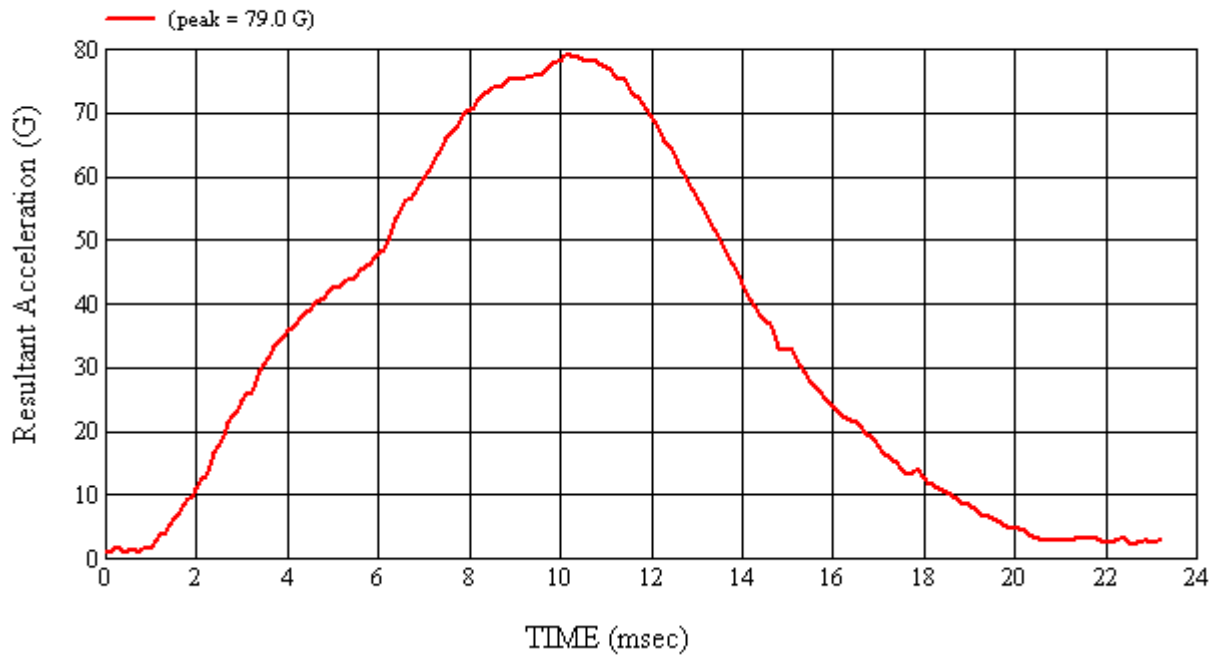
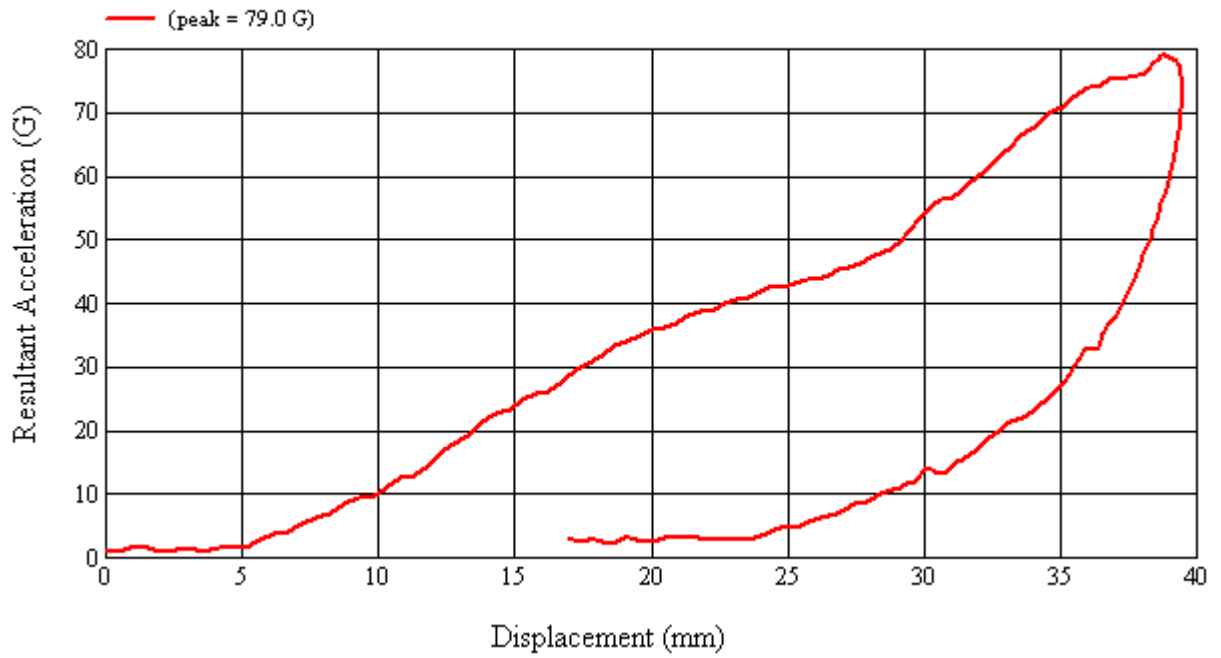
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/19/2008

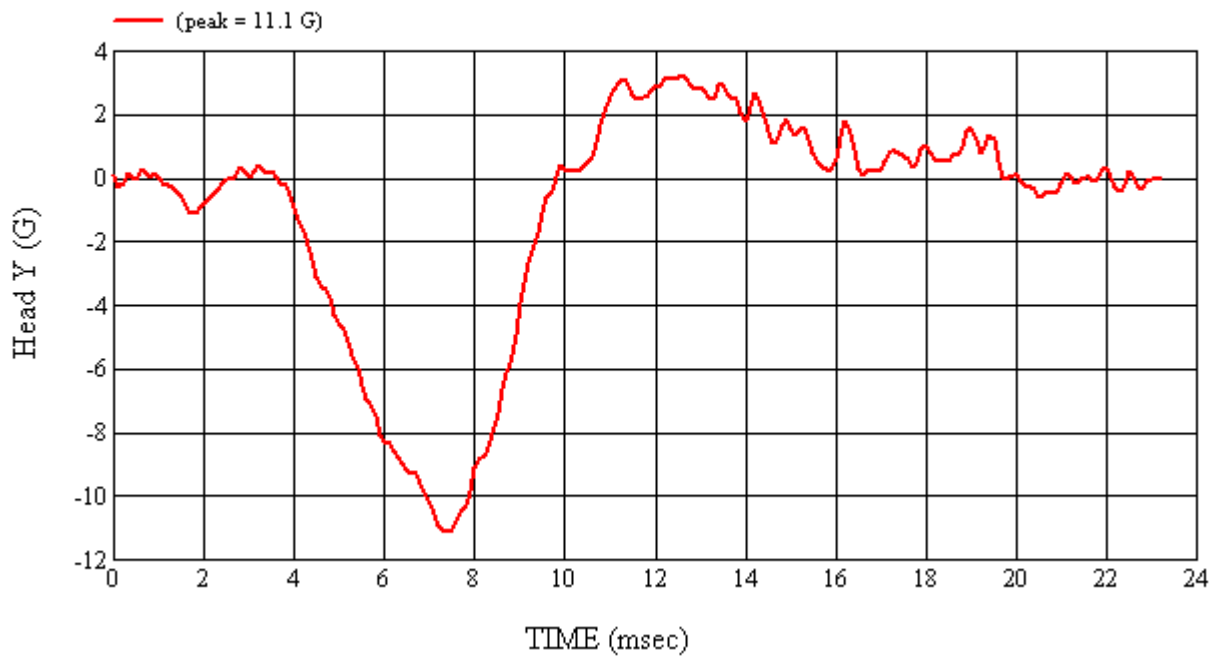
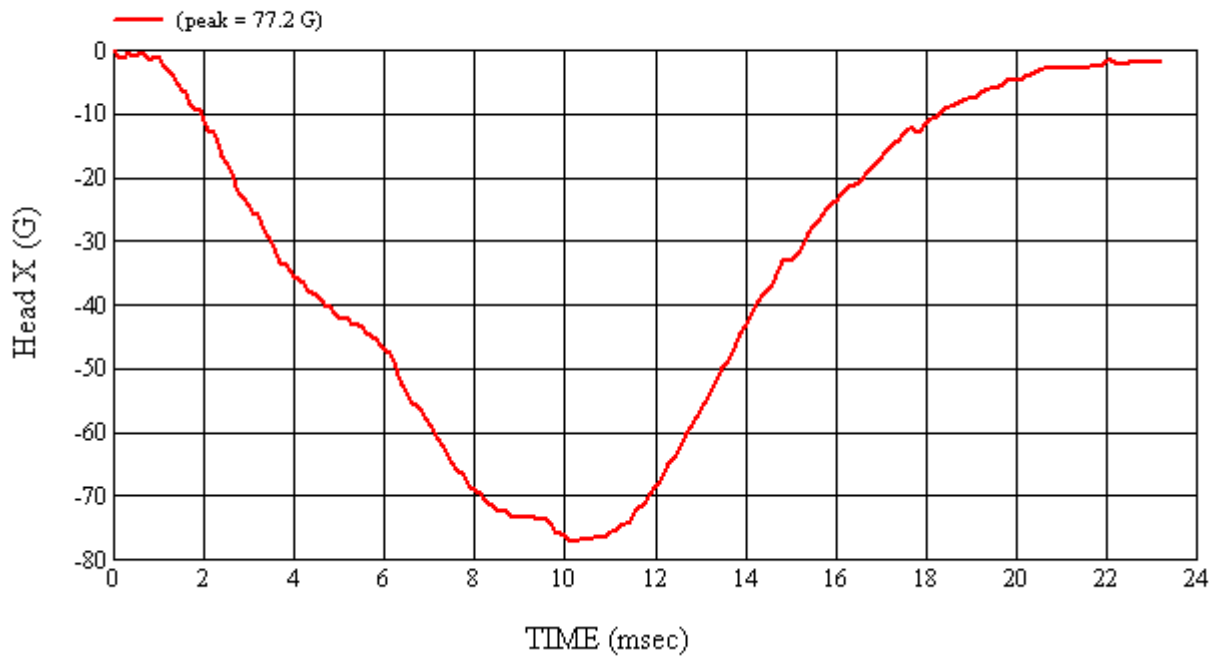
*Only necessary for NHTSA (Government) Compliance testing.

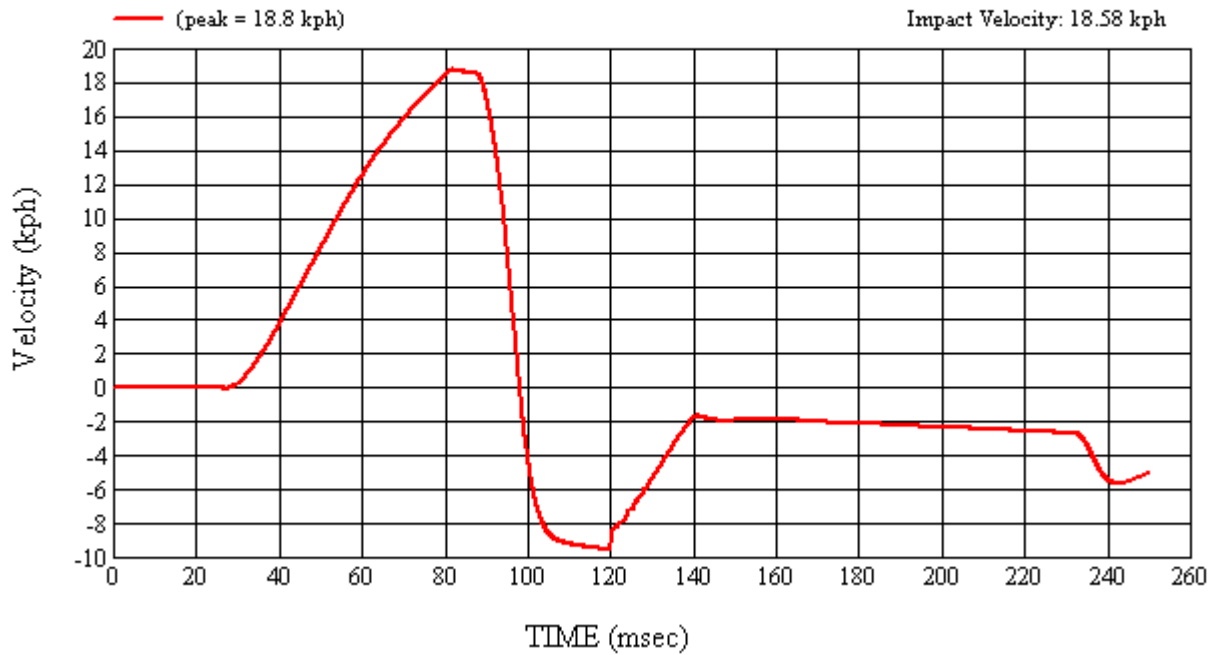
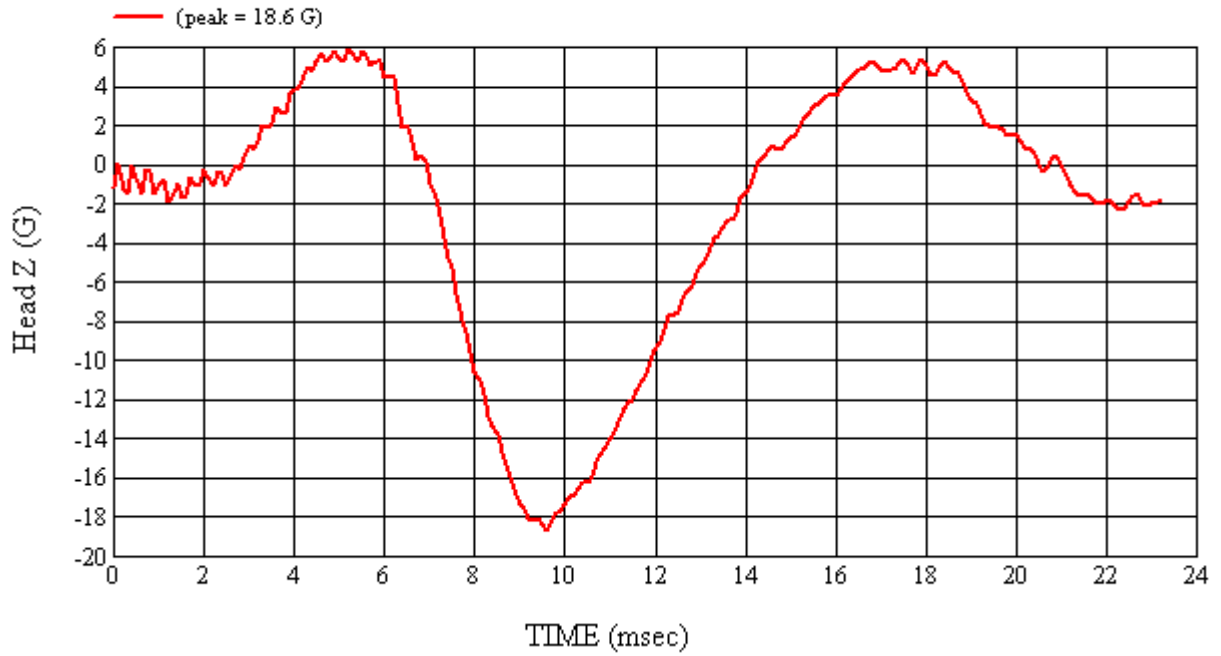
MGA Test #: FM8027

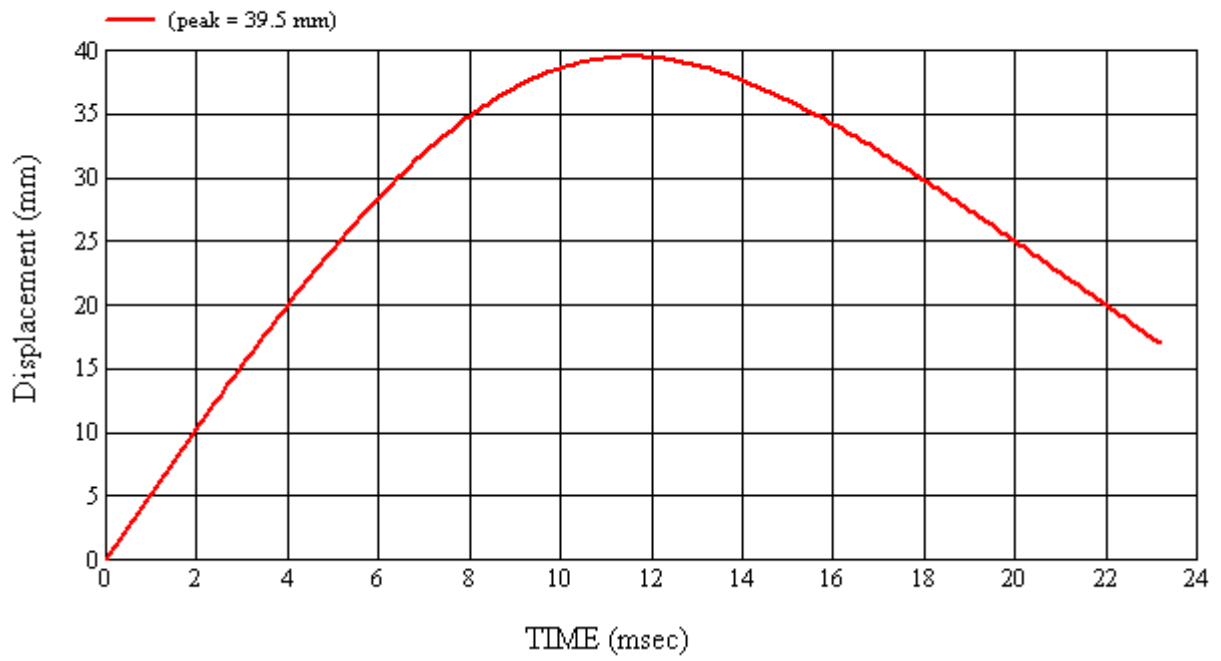
Target Location: AP2, Left Side

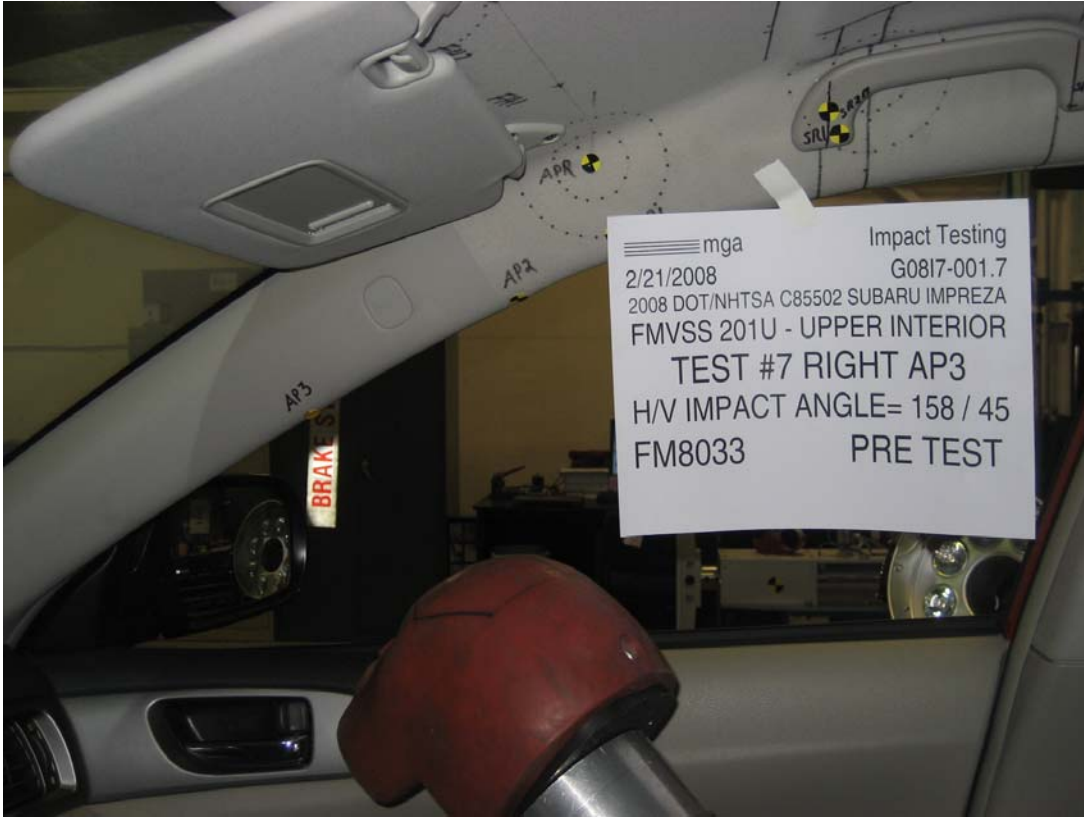
Test Date: 2/19/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
Impreza

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): AP3Right

Temperature:21C

MGA Test Reference No.:FM8033

Humidity:12%

Approach Horizontal Angles:158°

Time of Test:9:47:28 AM

Approach Vertical Angles:45°

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
346	238	10.5	18.5	20	2 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J14103	-94.598	0.87	0.87
Y	6	J36197	110.692	0.85	0.85
Z	7	J36353	99.391	1.83	1.83

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

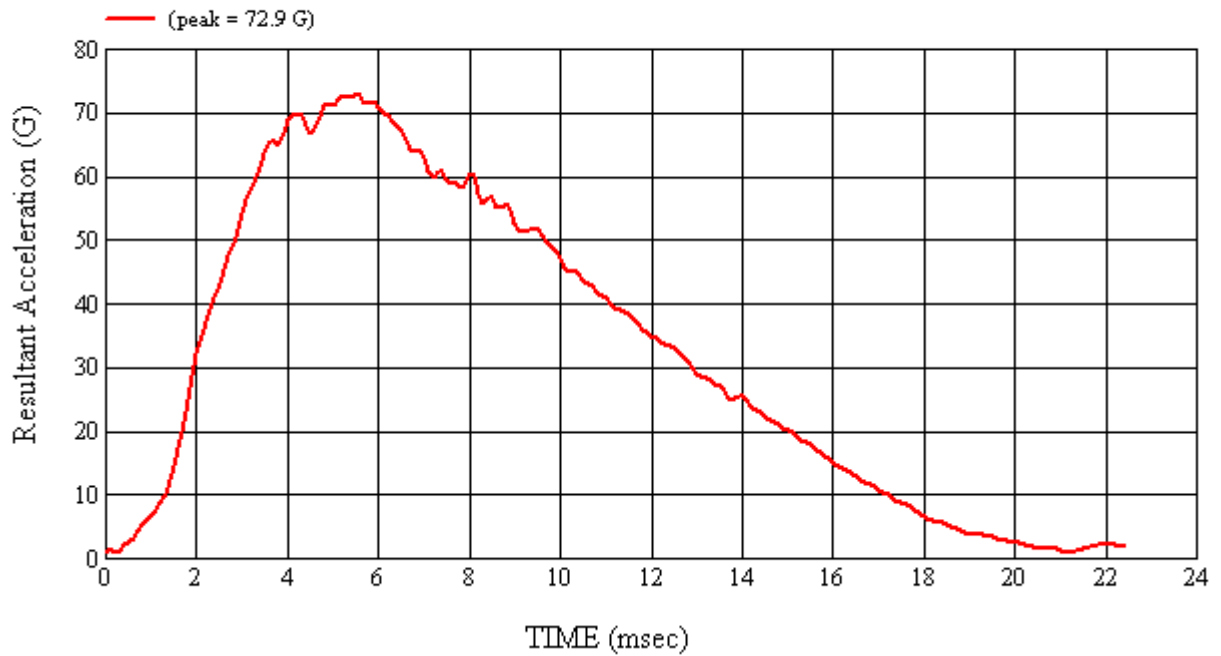
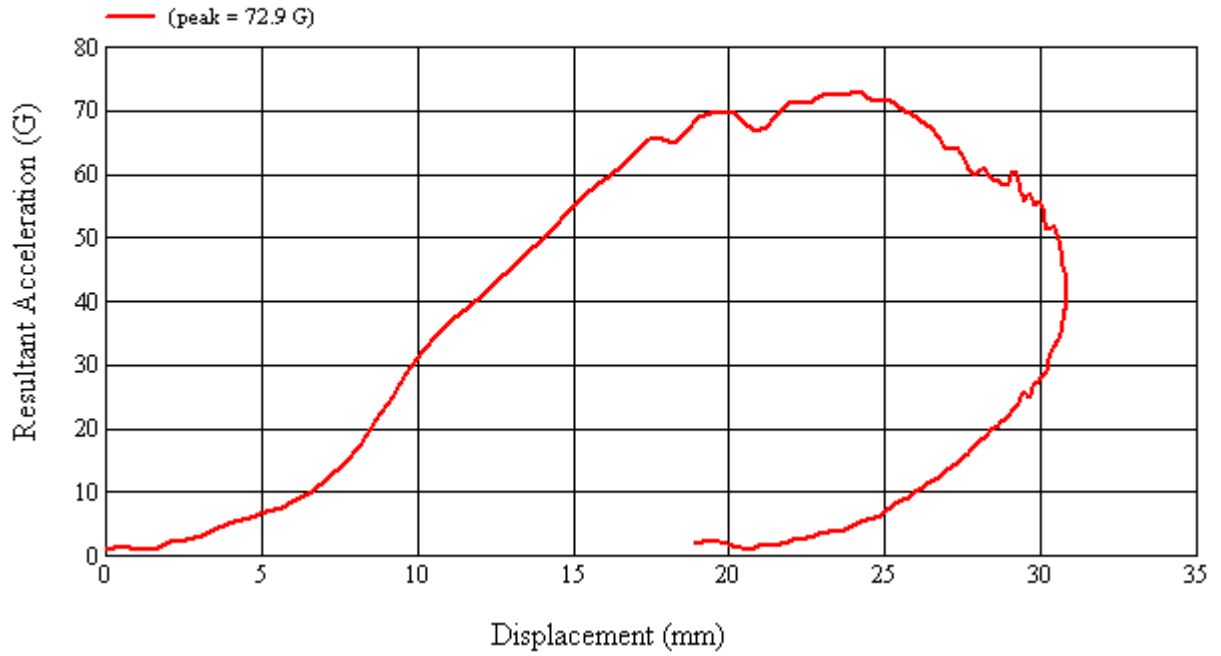
No visible damage.

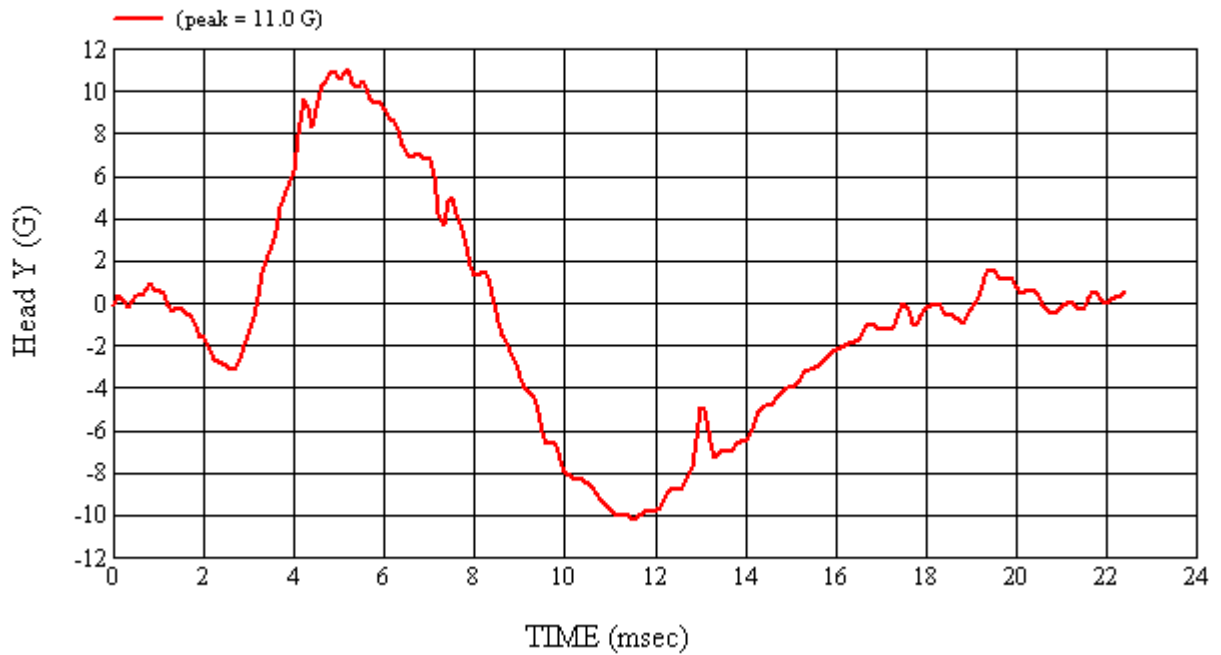
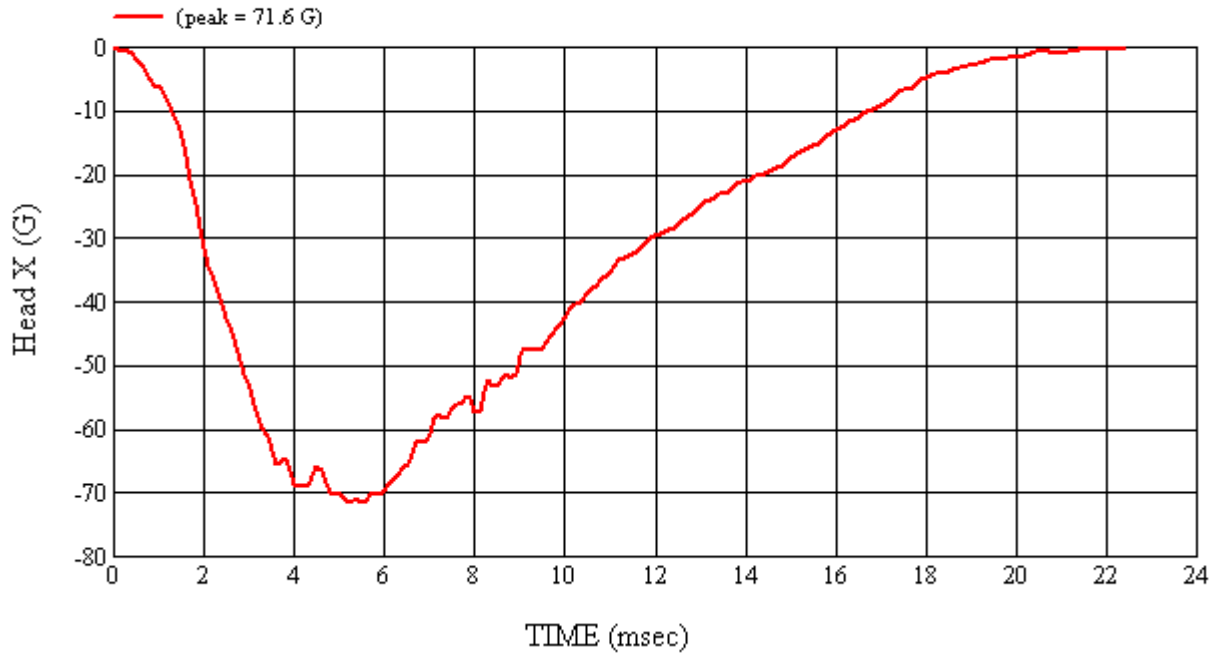
Recorded By: *Janice Campbell* Approved By*: *Heena A. Kalita* Date: 2/21/2008
*Only necessary for NHTSA (Government) Compliance testing.

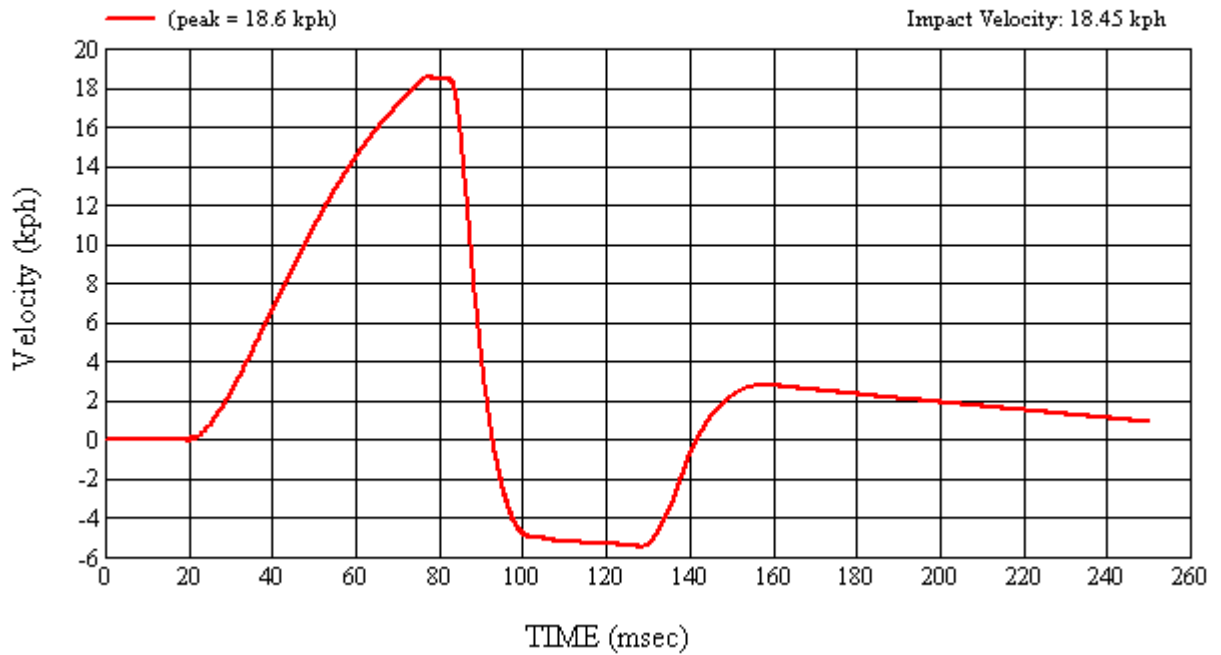
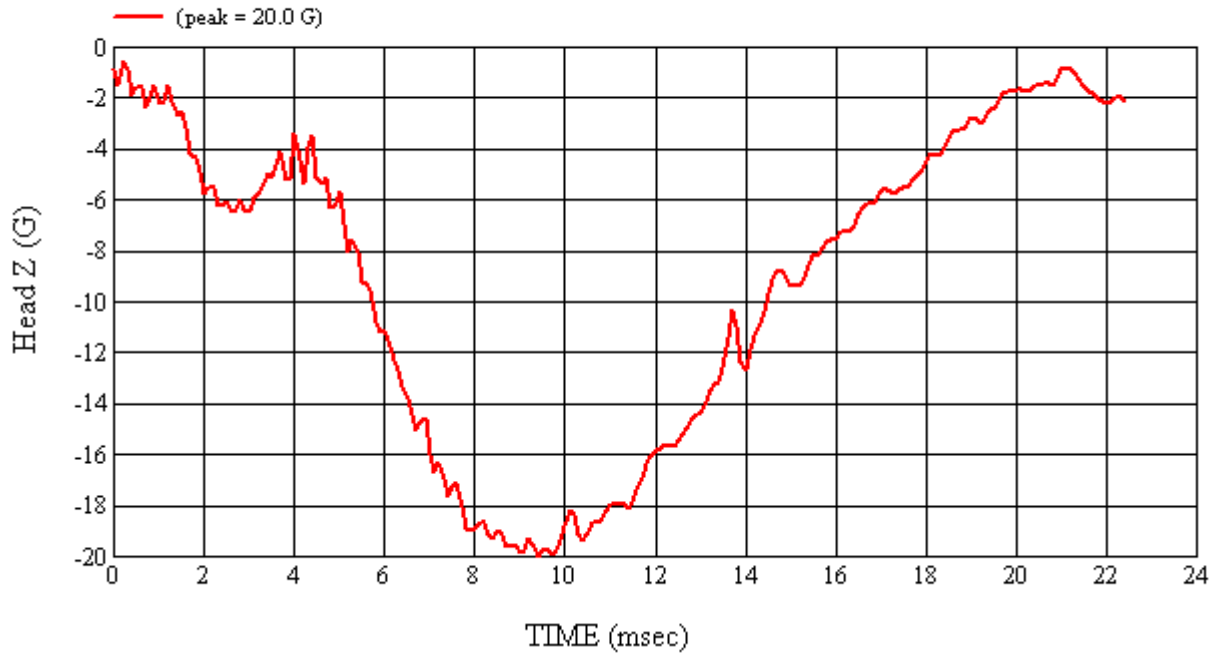
MGA Test #: FM8033

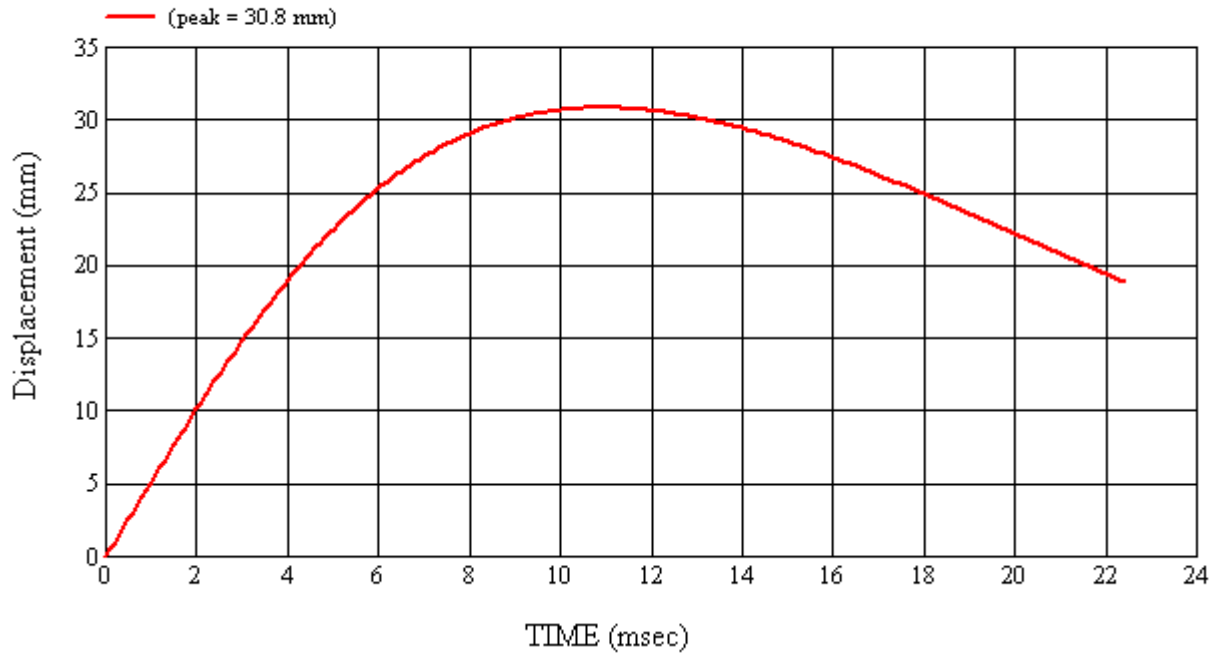
Target Location: AP3, Right Side

Test Date: 2/21/2008

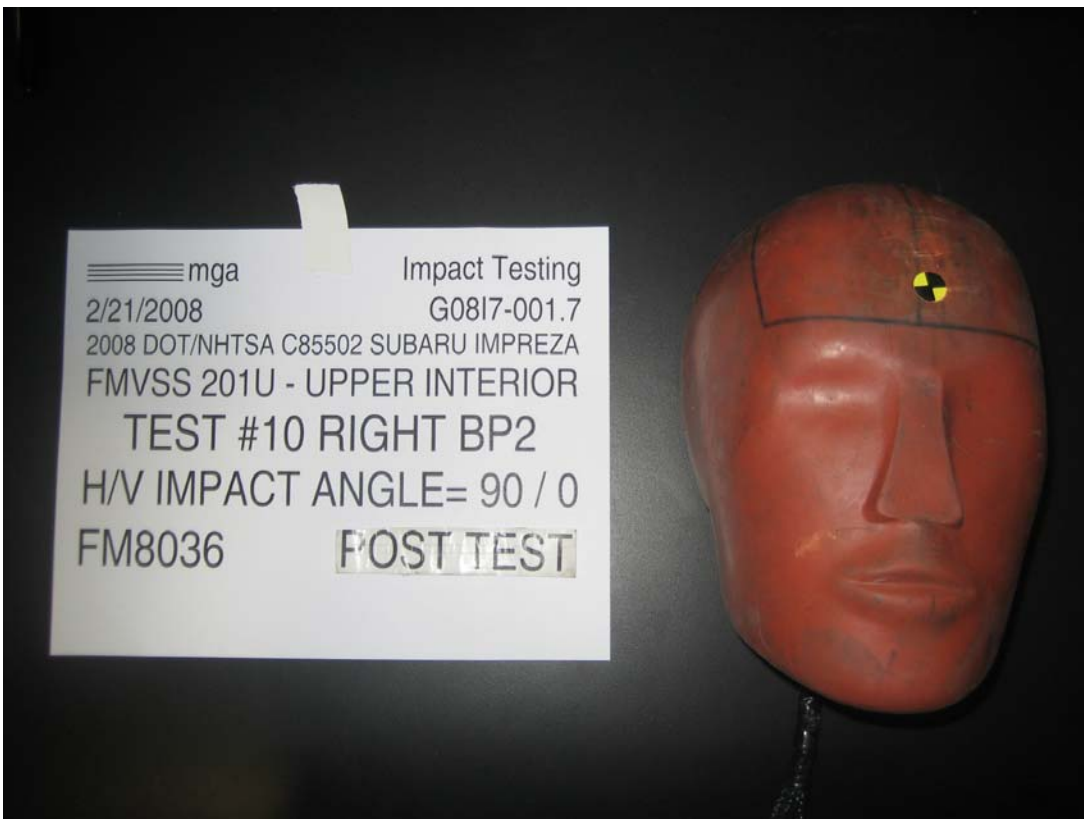
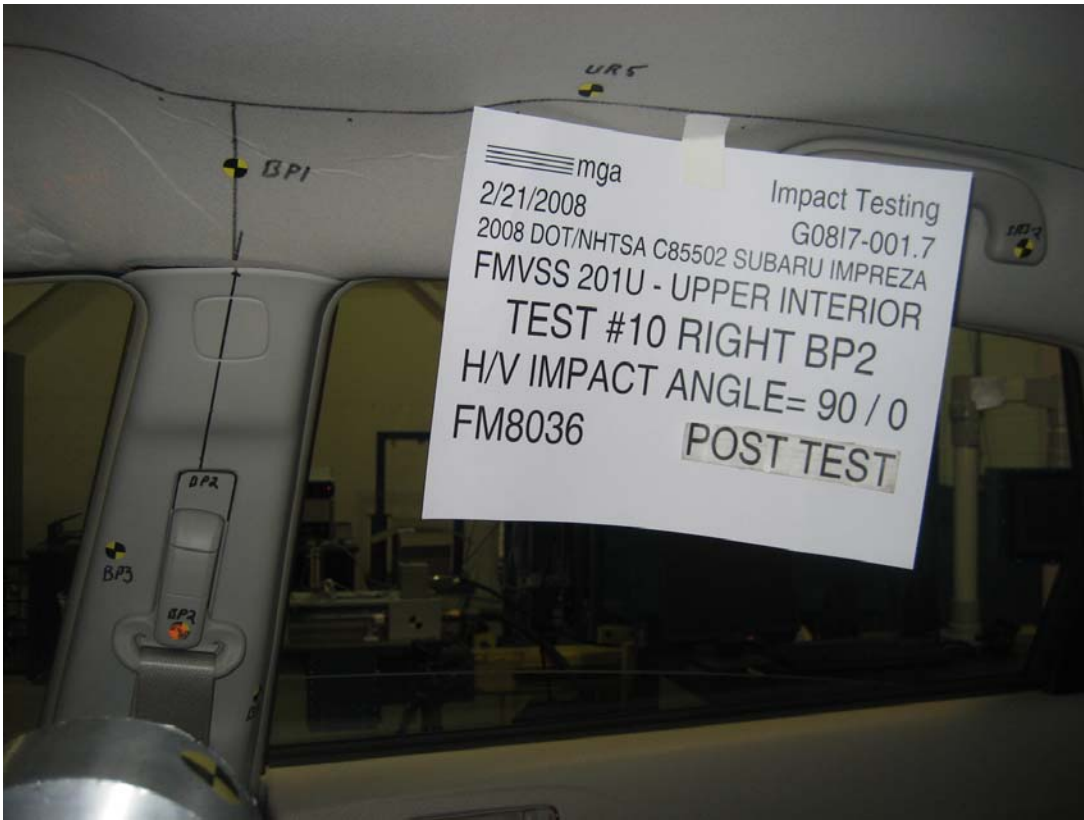












Post-Test Photo #2 of Test #FM8036

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
Impreza

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): BP2Right

Temperature:22C

MGA Test Reference No.:FM8036

Humidity:14%

Approach Horizontal Angles:90°

Time of Test:3:21:26 PM

Approach Vertical Angles:0°

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
523	472	8.9	23.7	15	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22696	-100.013	0.87	0.87
Y	6	J35791	91.856	0.85	0.85
Z	7	J35800	97.996	1.83	1.83

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

No visible damage.

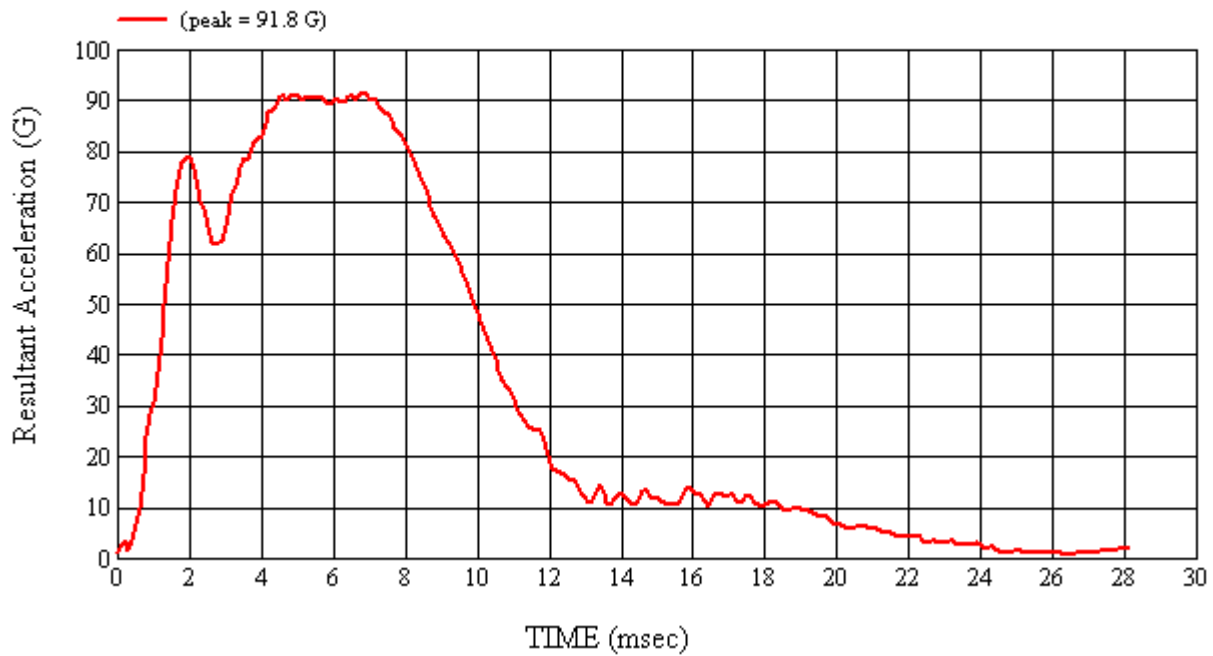
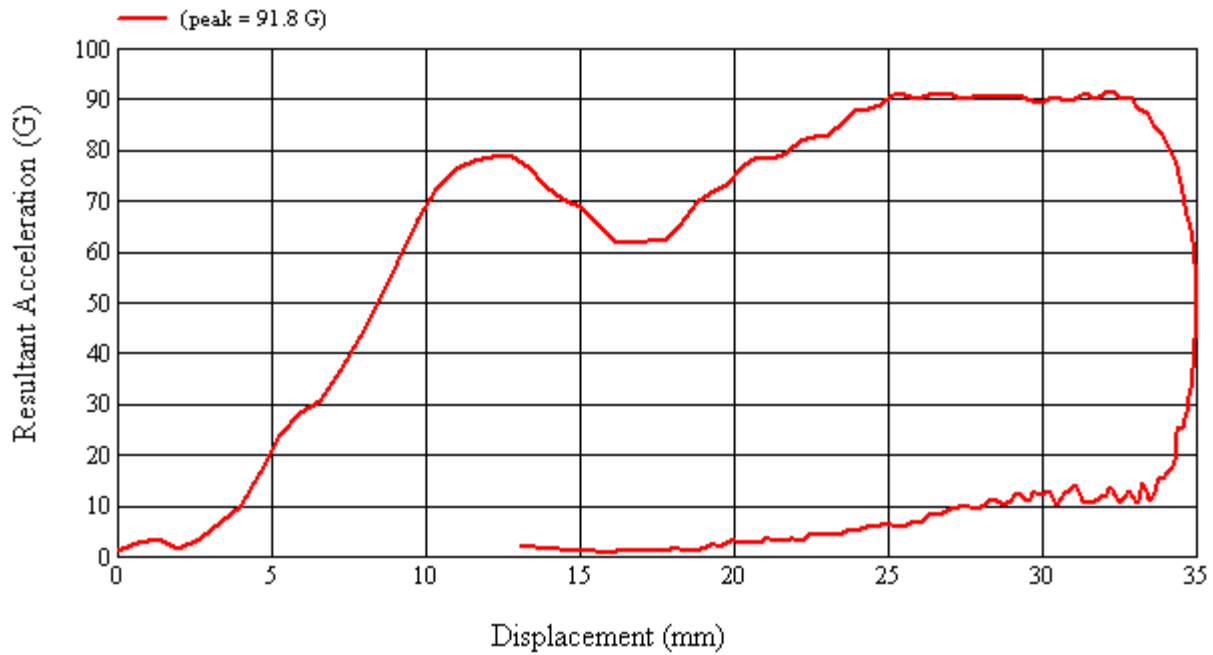
Recorded By: *Janis Campbell* Approved By*: *Heena A. Kalita* Date: 2/21/2008

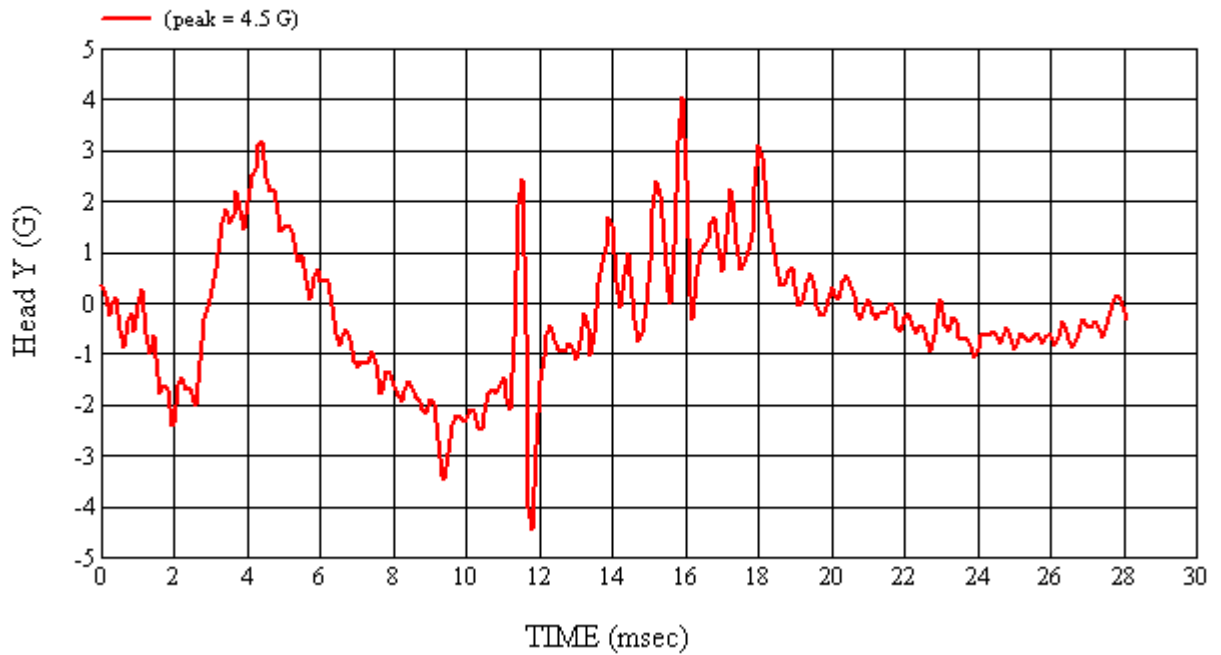
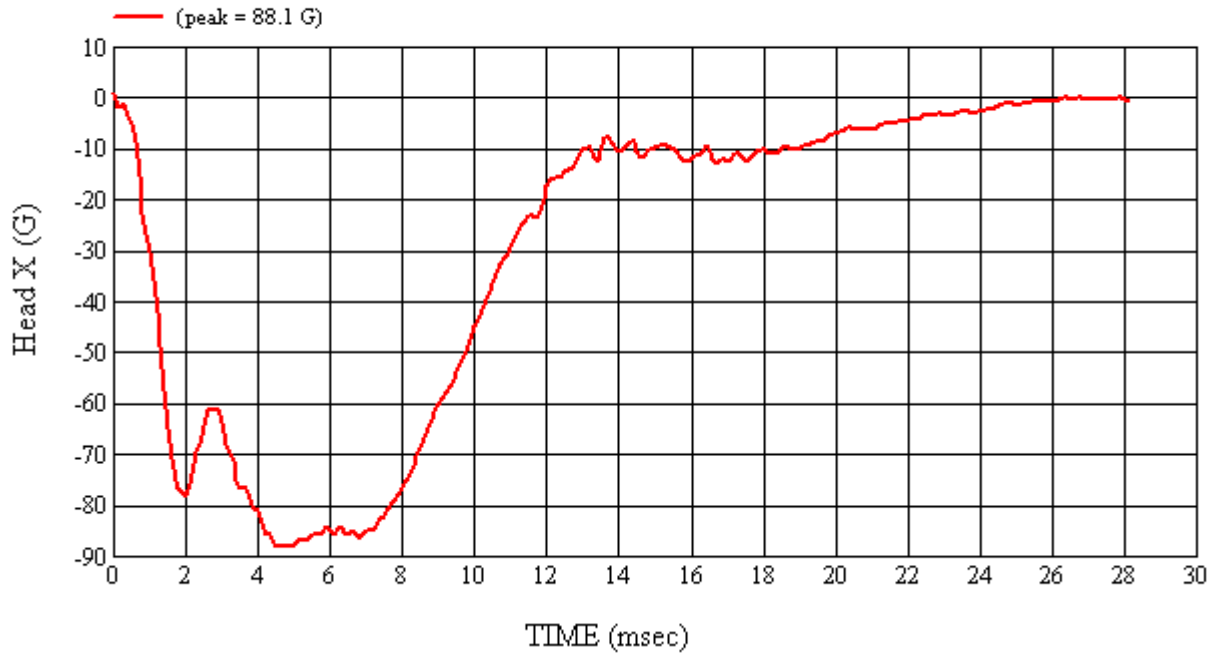
*Only necessary for NHTSA (Government) Compliance testing.

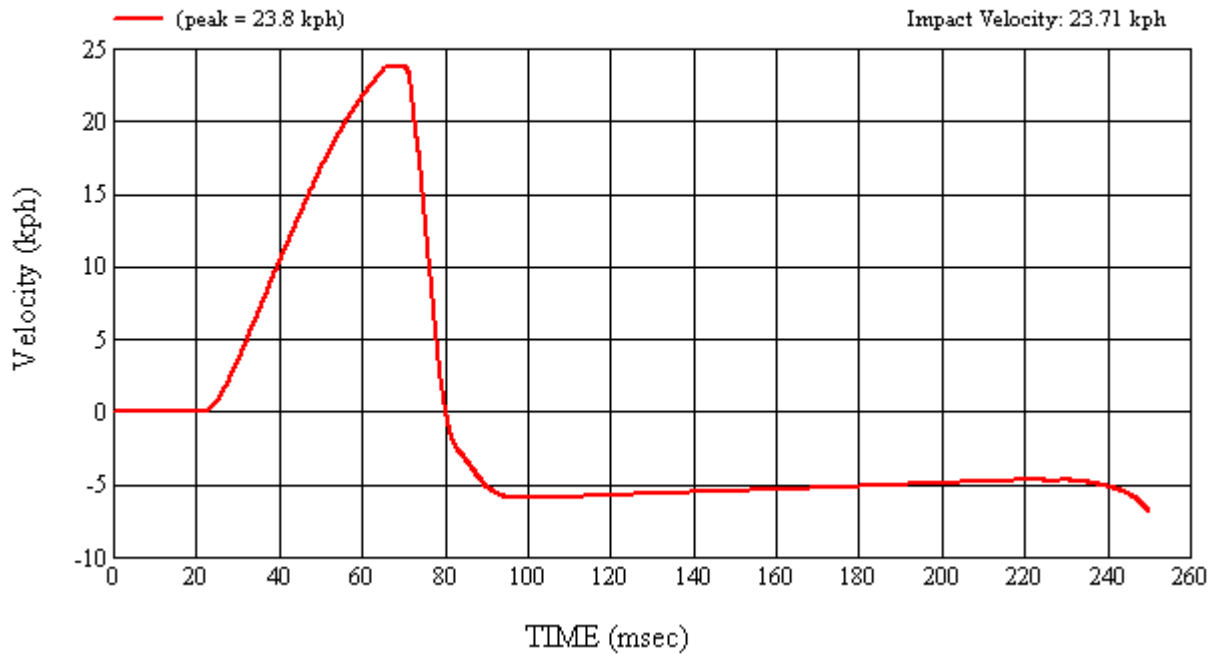
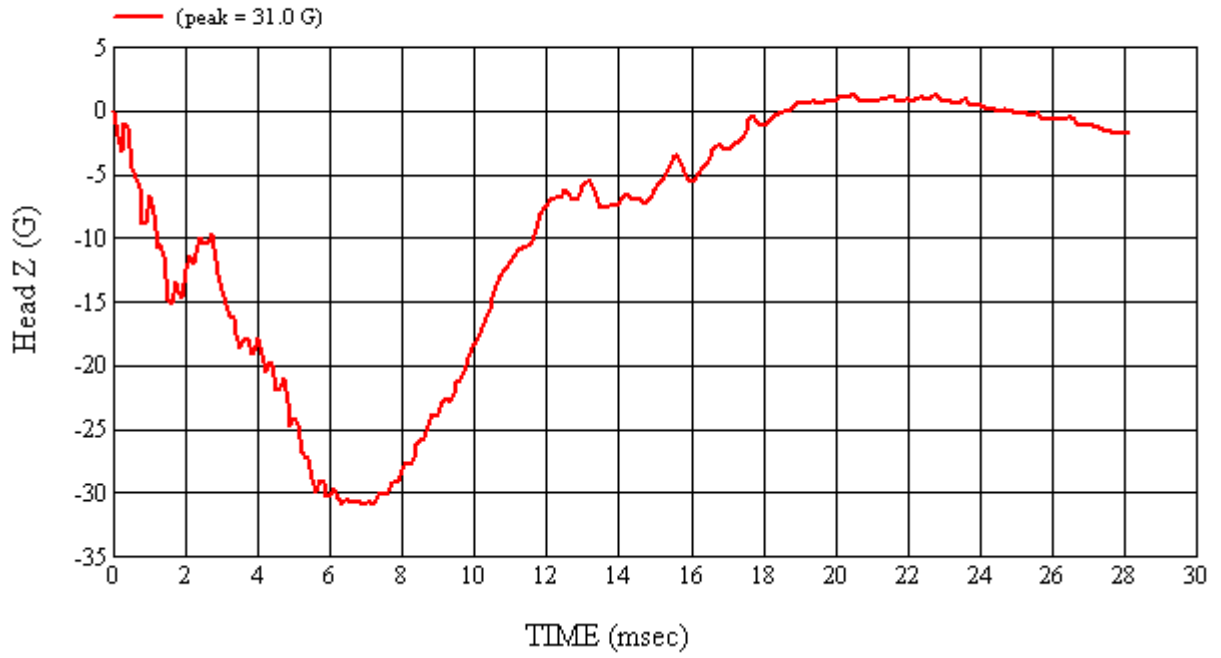
MGA Test #: FM8036

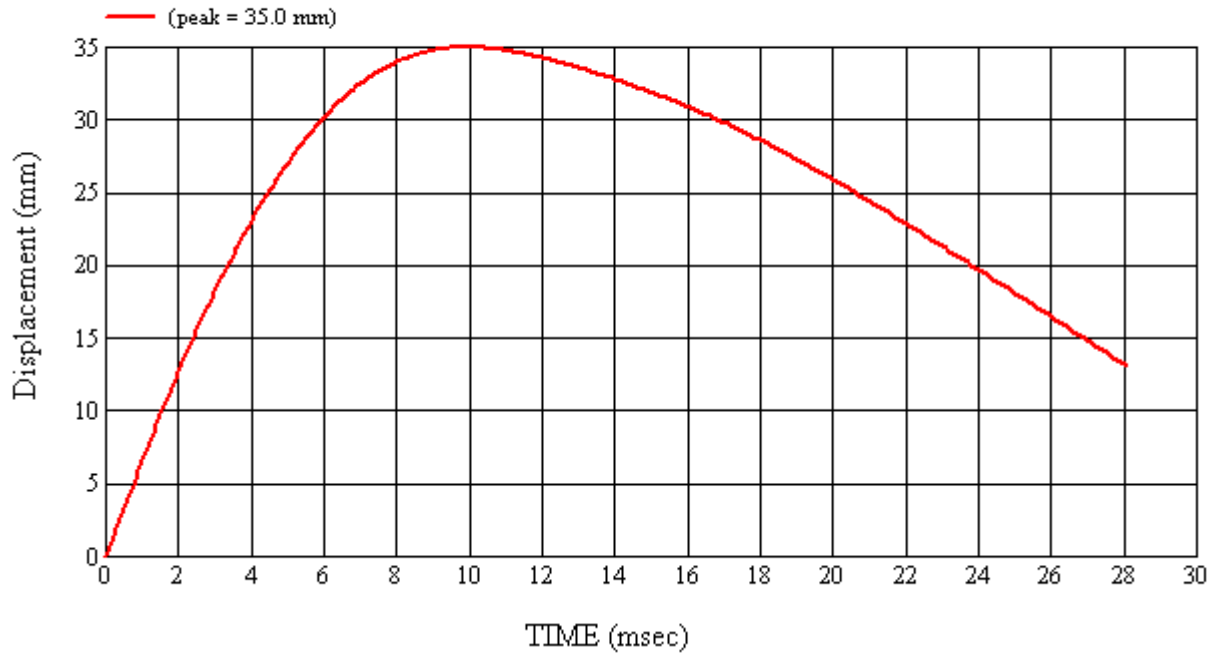
Target Location: BP2, Right Side

Test Date: 2/21/2008

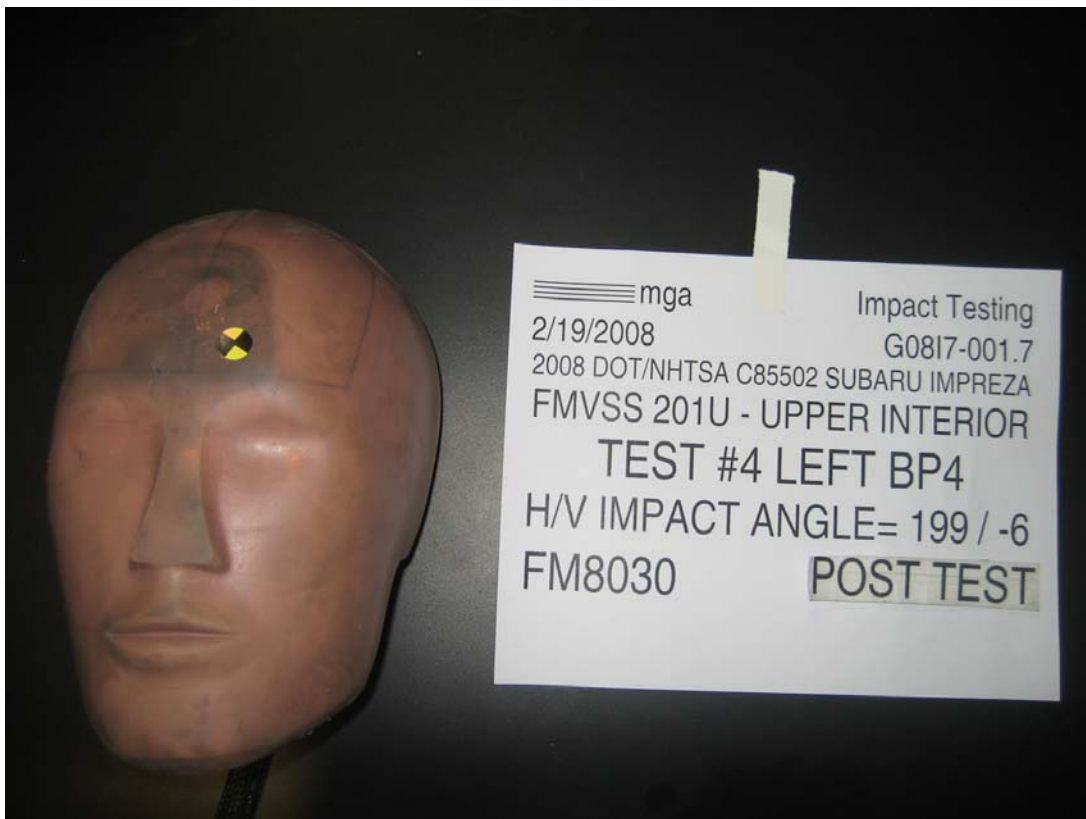
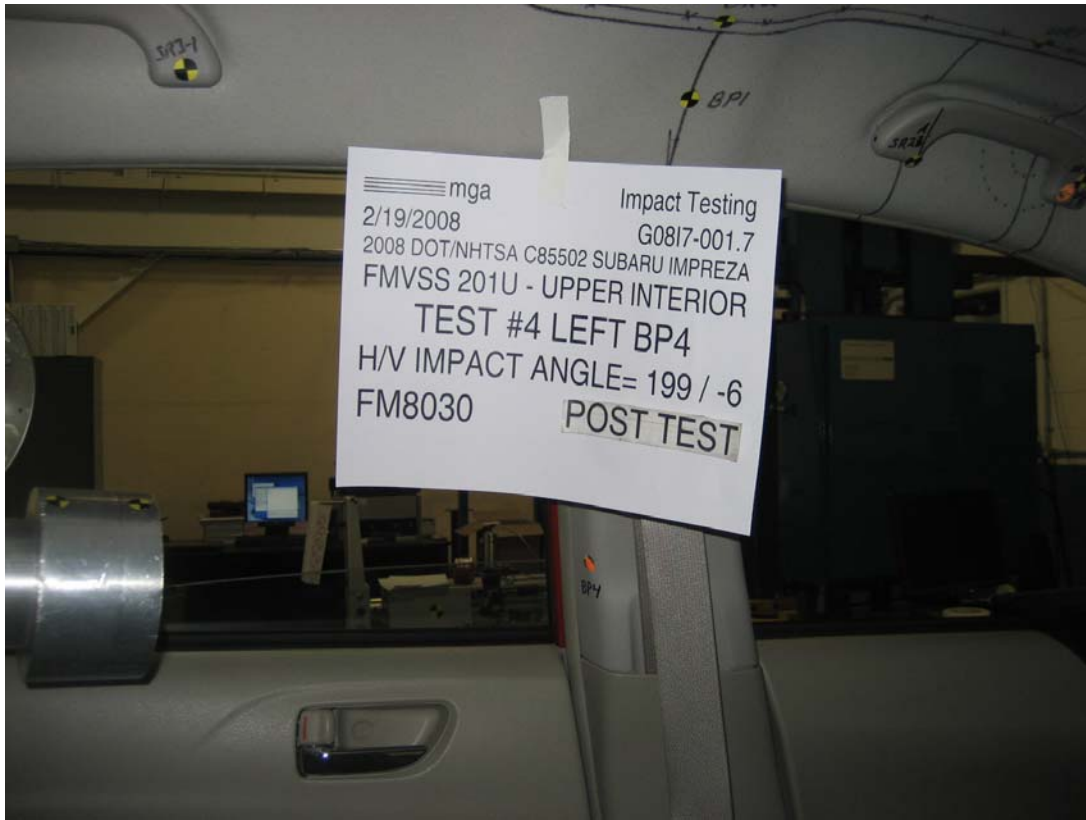












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.7 VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru Impreza

GENERAL TEST PARAMETERS: Test Number:#4
 Target (Vehicle Side): BP4Left Temperature:22C
 MGA Test Reference No.:FM8030 Humidity:14%
 Approach Horizontal Angles:199° Time of Test:4:55:54 PM
 Approach Vertical Angles:-6° FMH Serial No:[072]
 Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
562	524	5	22.5	11	15 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J43743	-92.483	0.87	0.87
Y	6	J43745	97.812	0.85	0.85
Z	7	J43746	89.249	1.83	1.83

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

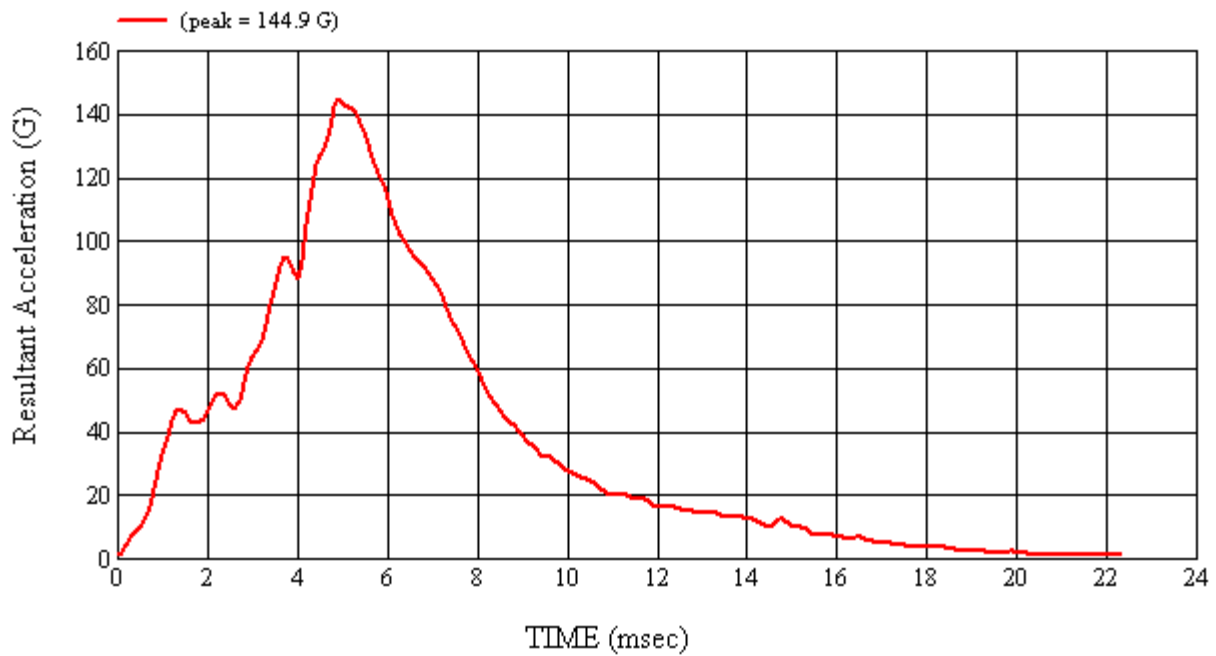
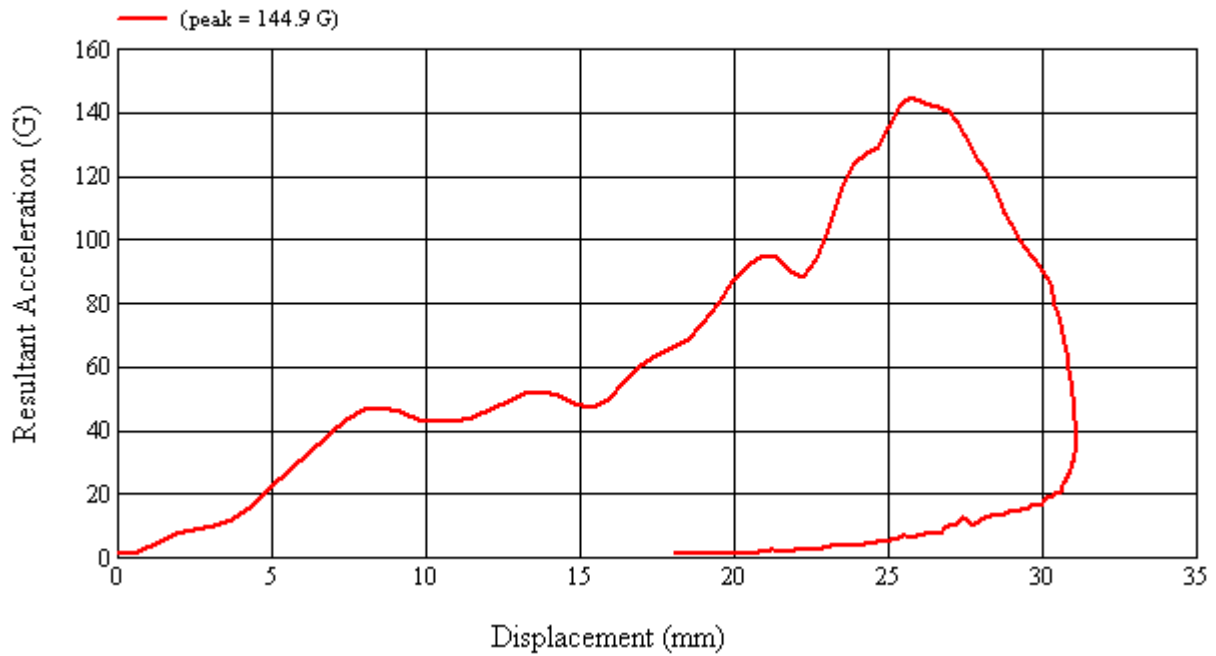
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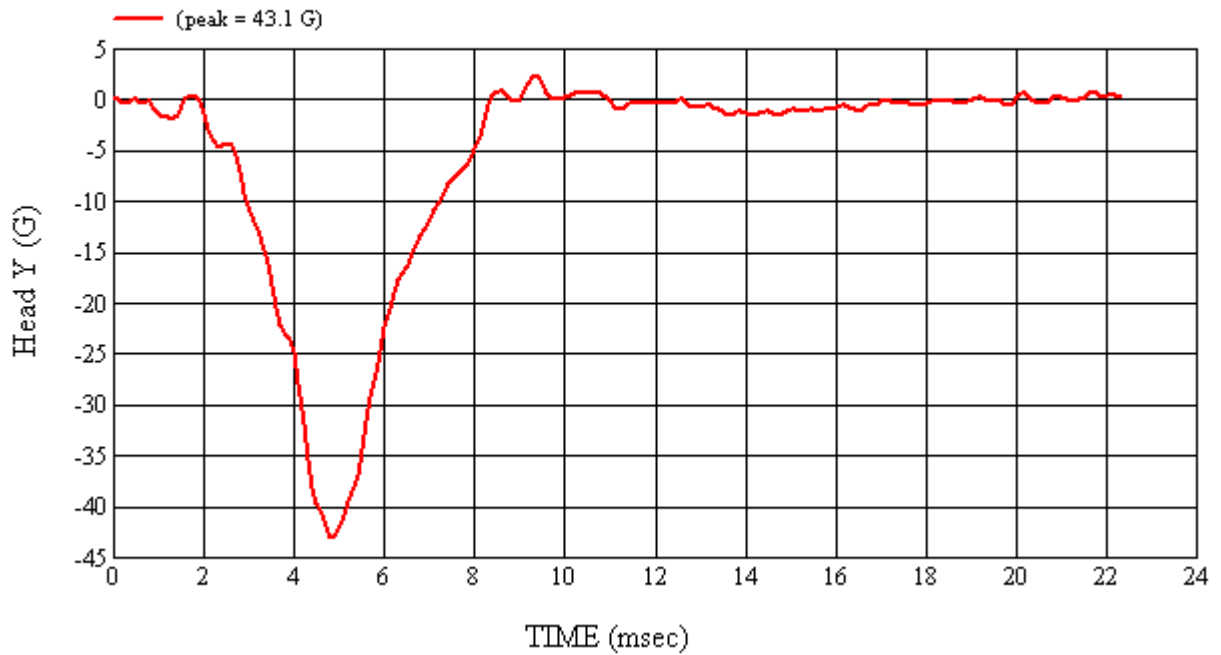
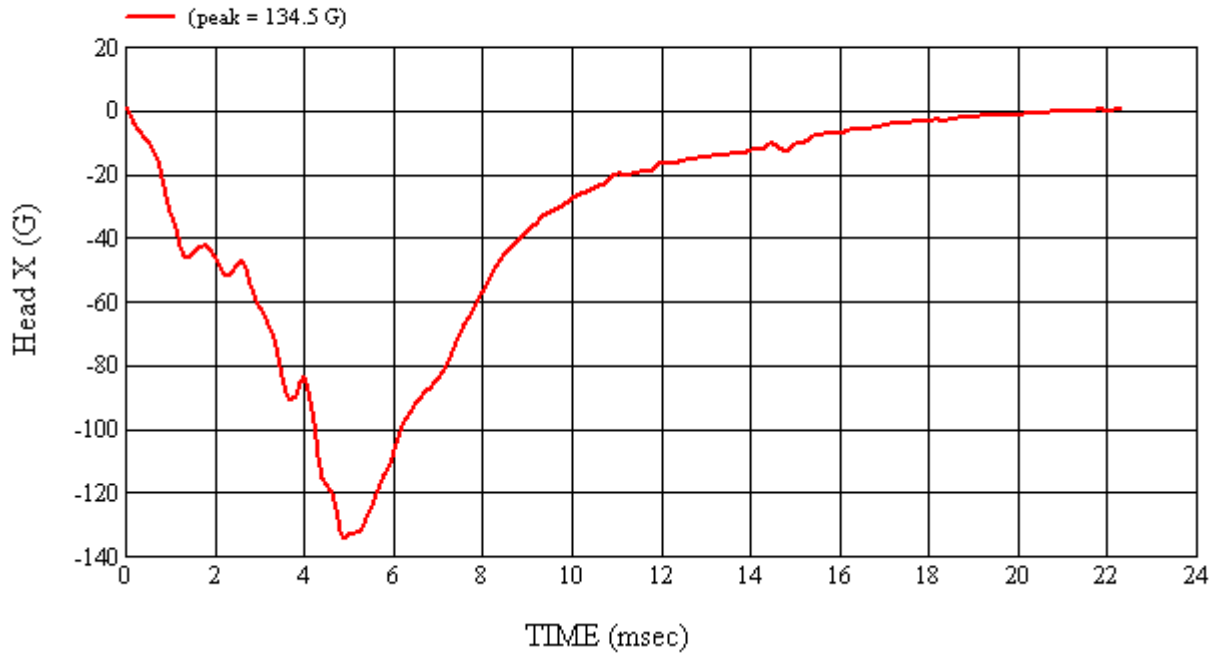
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/19/2008
 *Only necessary for NHTSA (Government) Compliance testing.

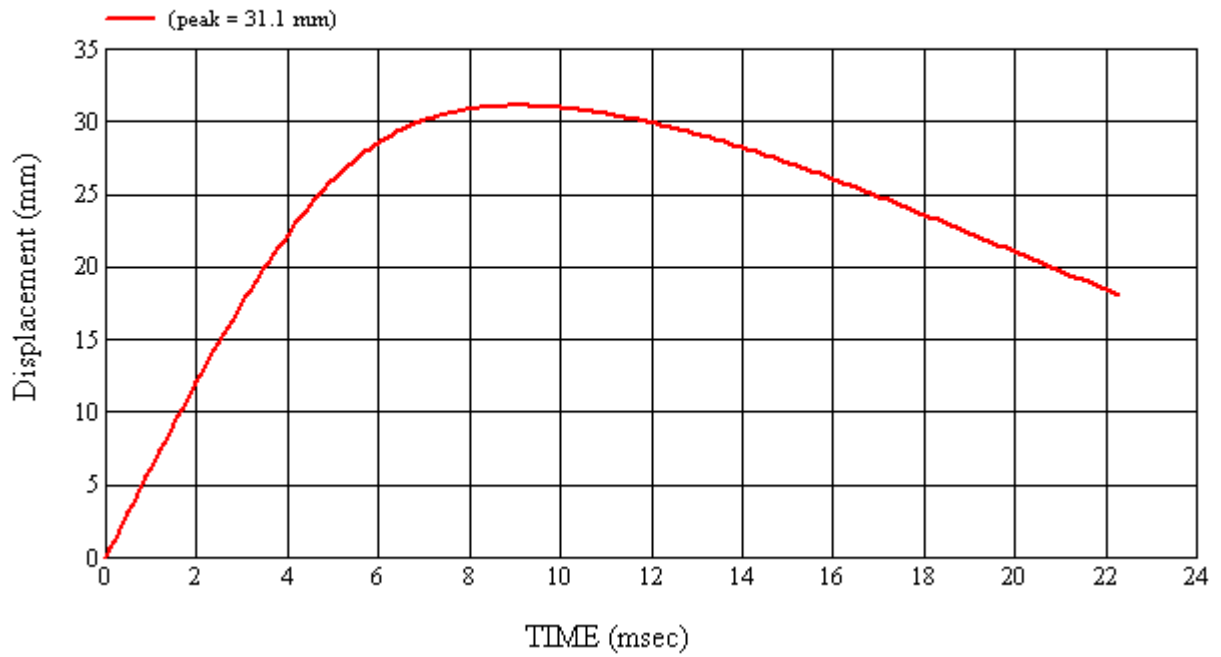
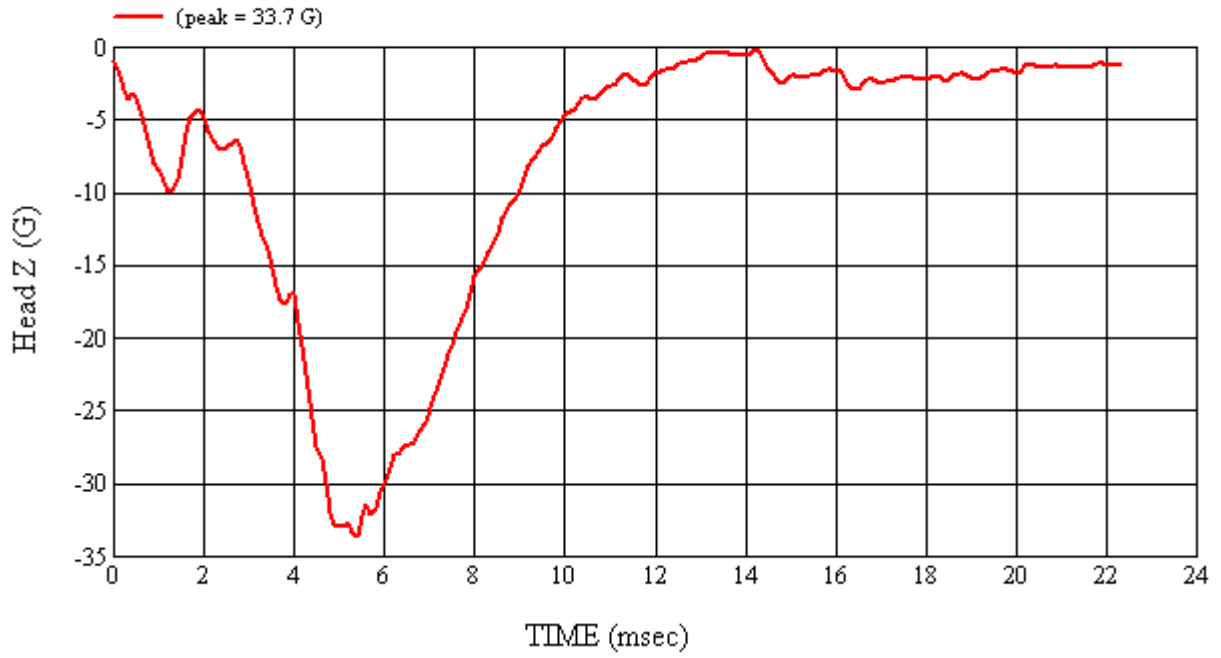
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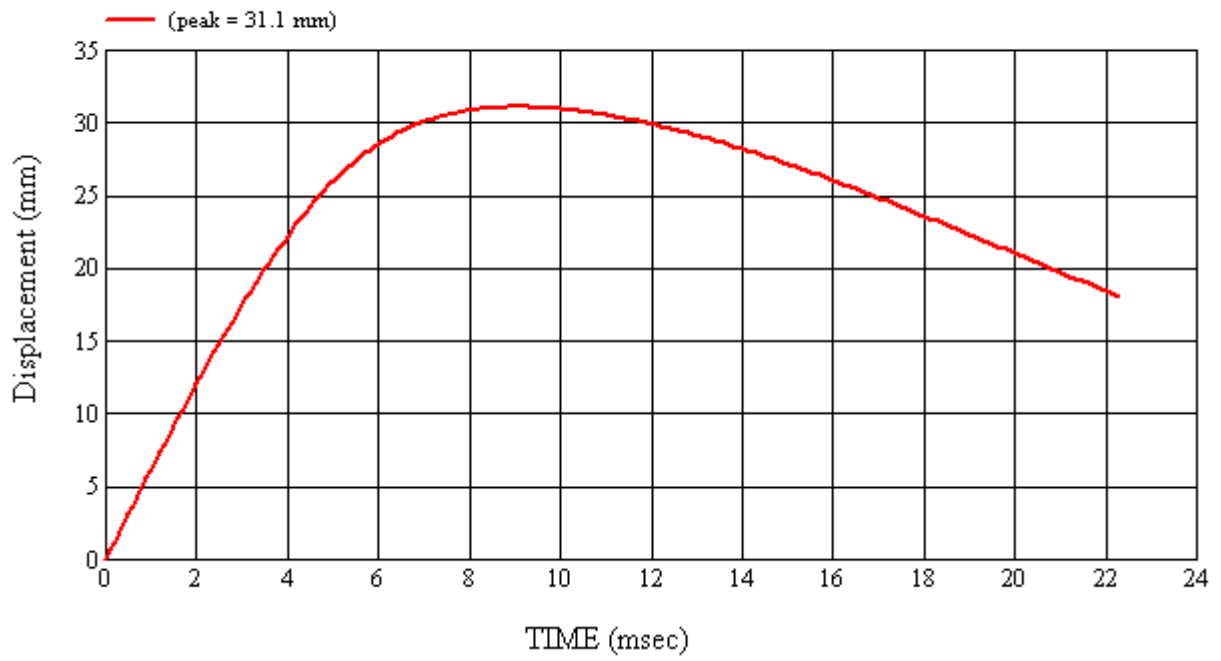
Target Location: BP4, Left Side

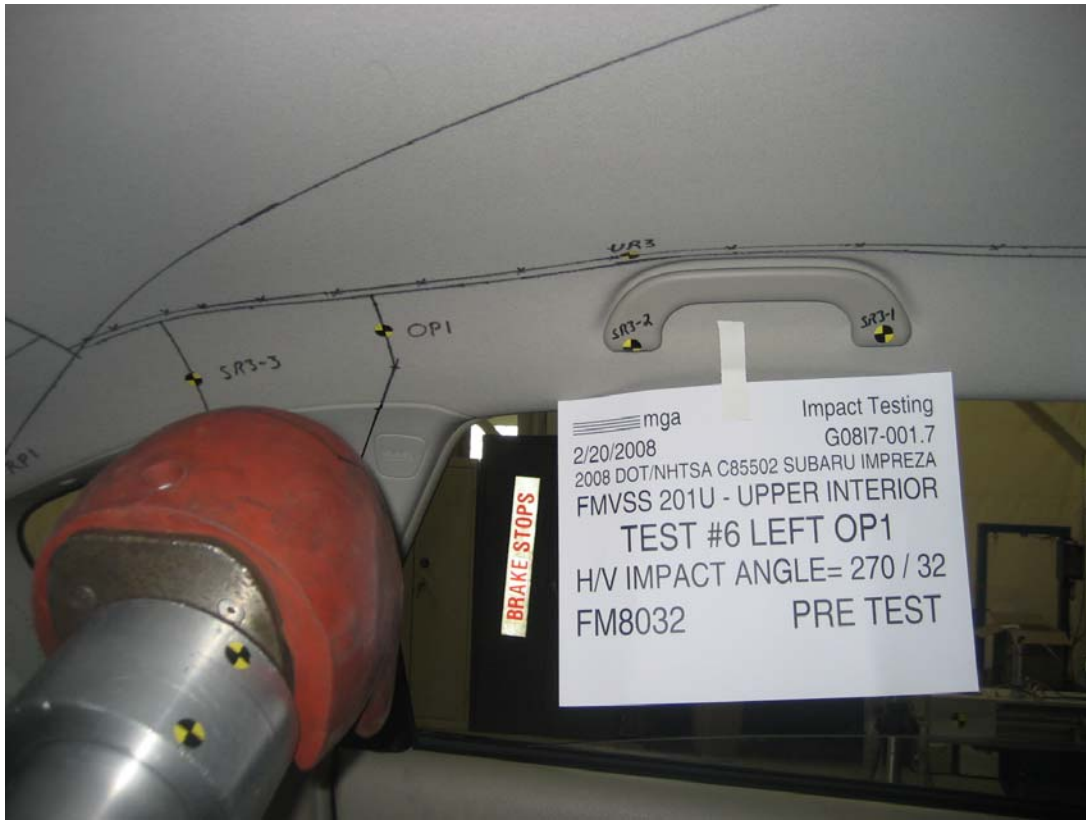
Test Date: 2/19/2008













JOB/NHTSA NO: G08I7-001.7 VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
Impreza

GENERAL TEST PARAMETERS:

Target (Vehicle Side): OP1Left

MGA Test Reference No.:FM8032

Approach Horizontal Angles:270°

Approach Vertical Angles:32°

Additional Description:

Test Number:#6

Temperature:21C

Humidity:13%

Time of Test:3:17:07 PM

FMH Serial No:[037]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
538	492	5.8	18.3	33	8 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22696	-100.013	0.87	0.87
Y	6	J35791	91.856	0.85	0.85
Z	7	J35800	97.996	1.83	1.83

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

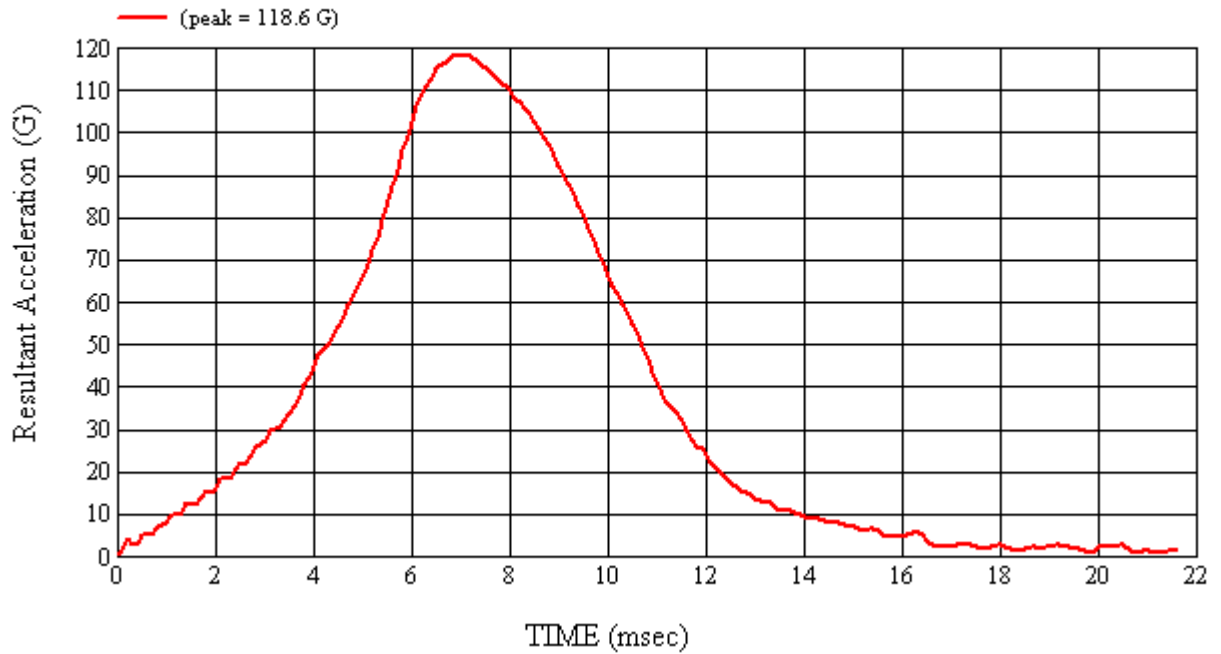
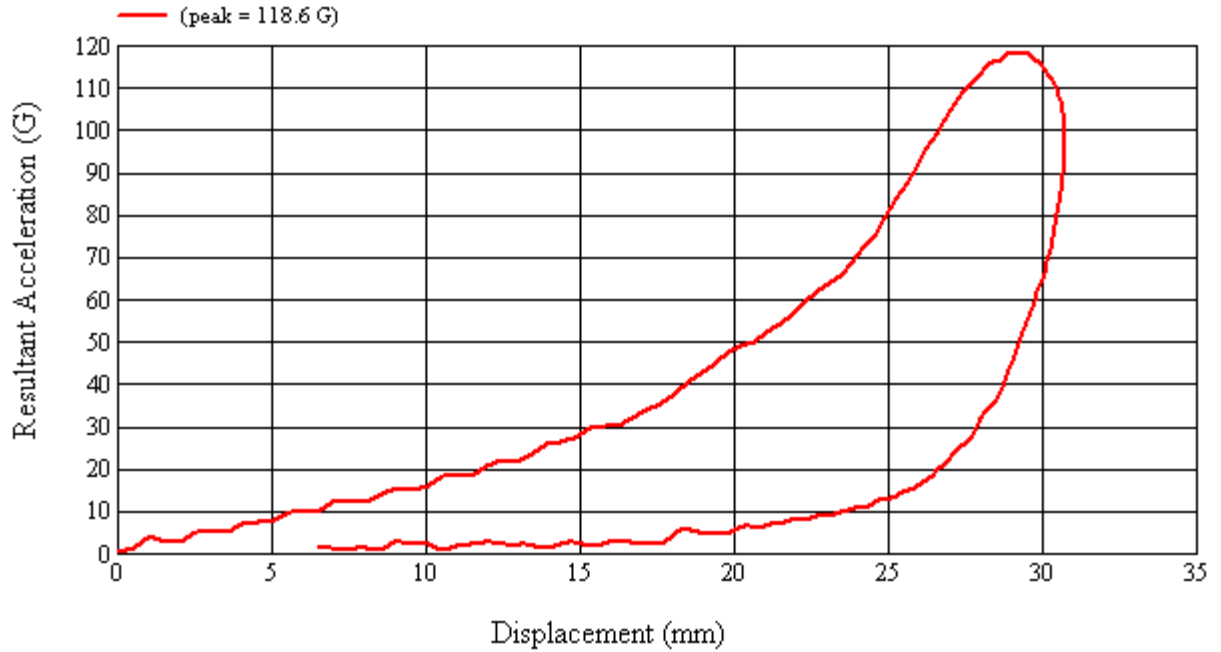
No visible damage.

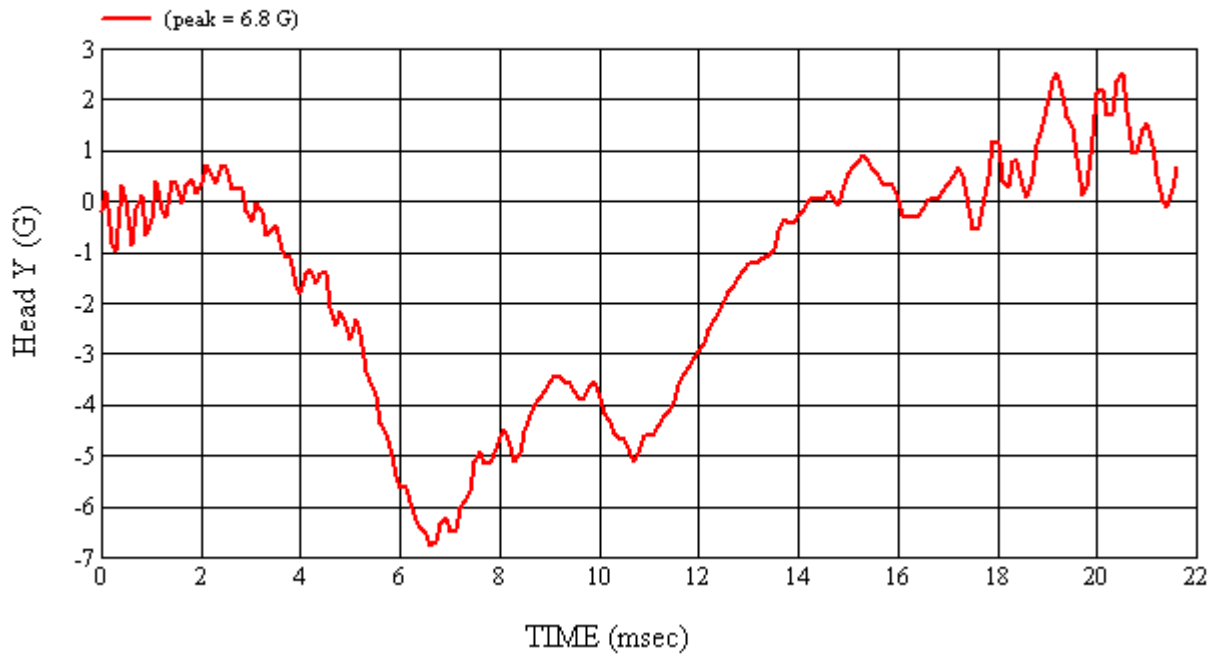
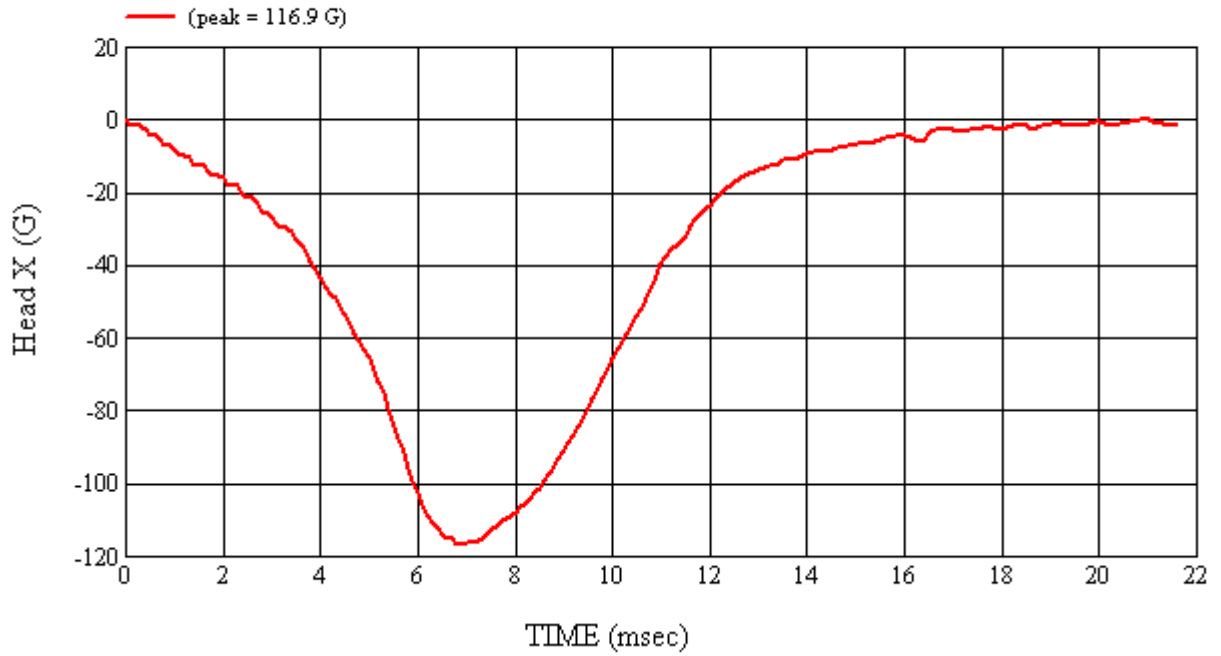
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/20/2008
*Only necessary for NHTSA (Government) Compliance testing.

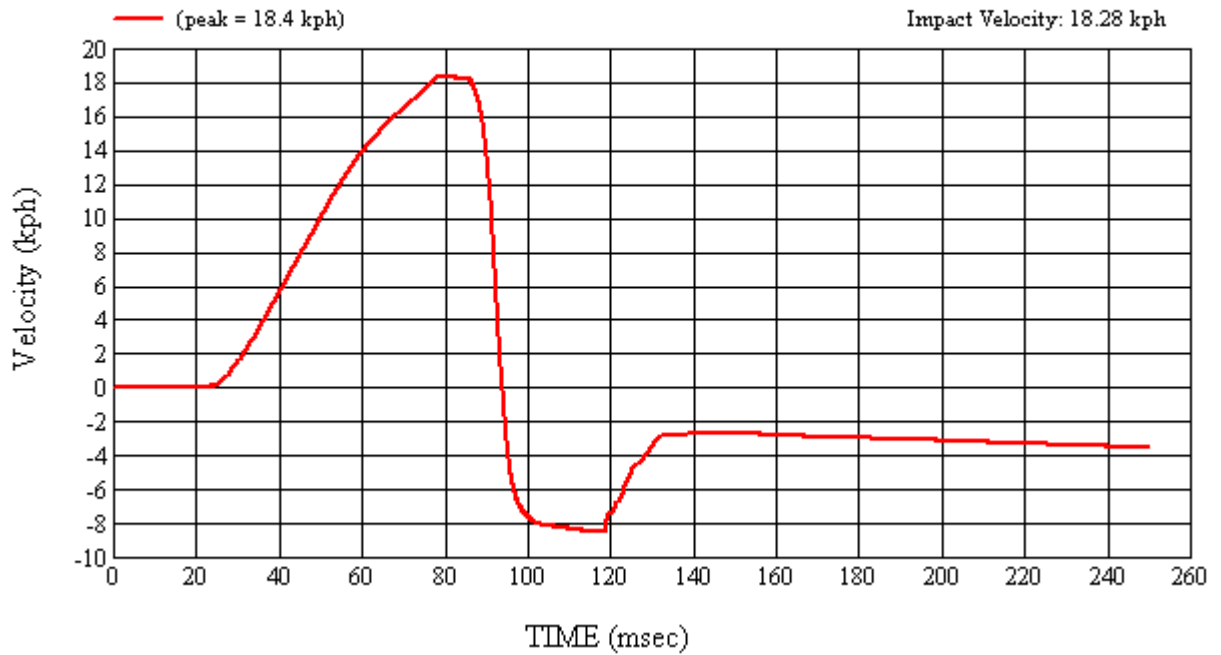
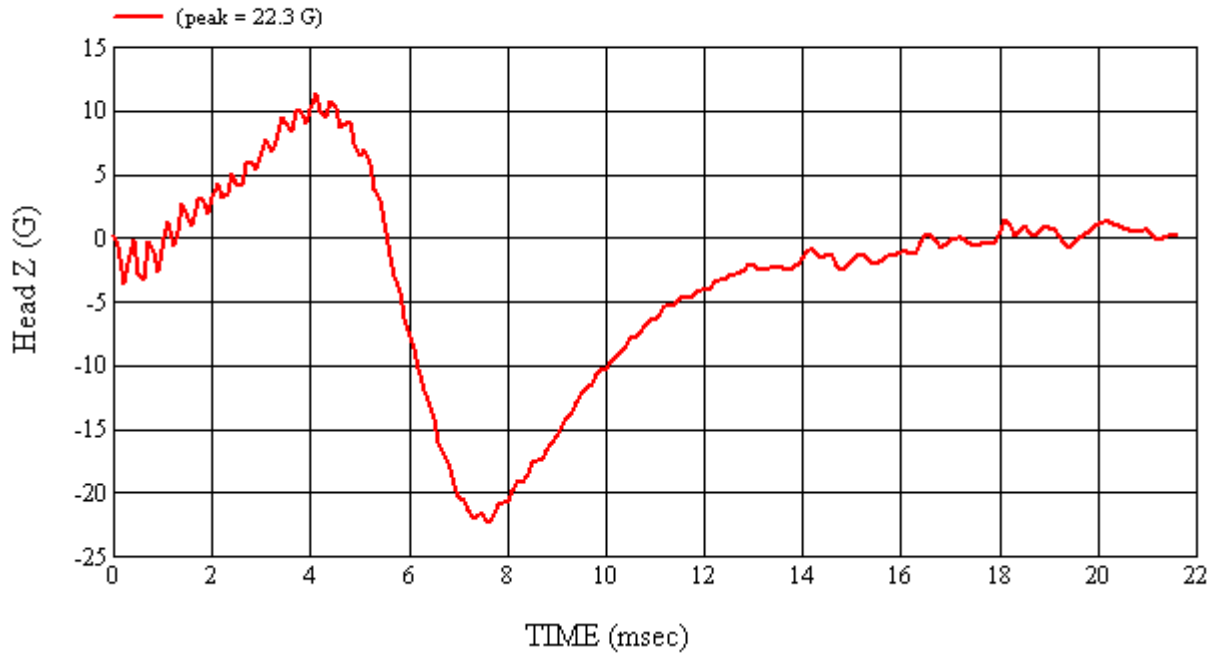
MGA Test #: FM8032

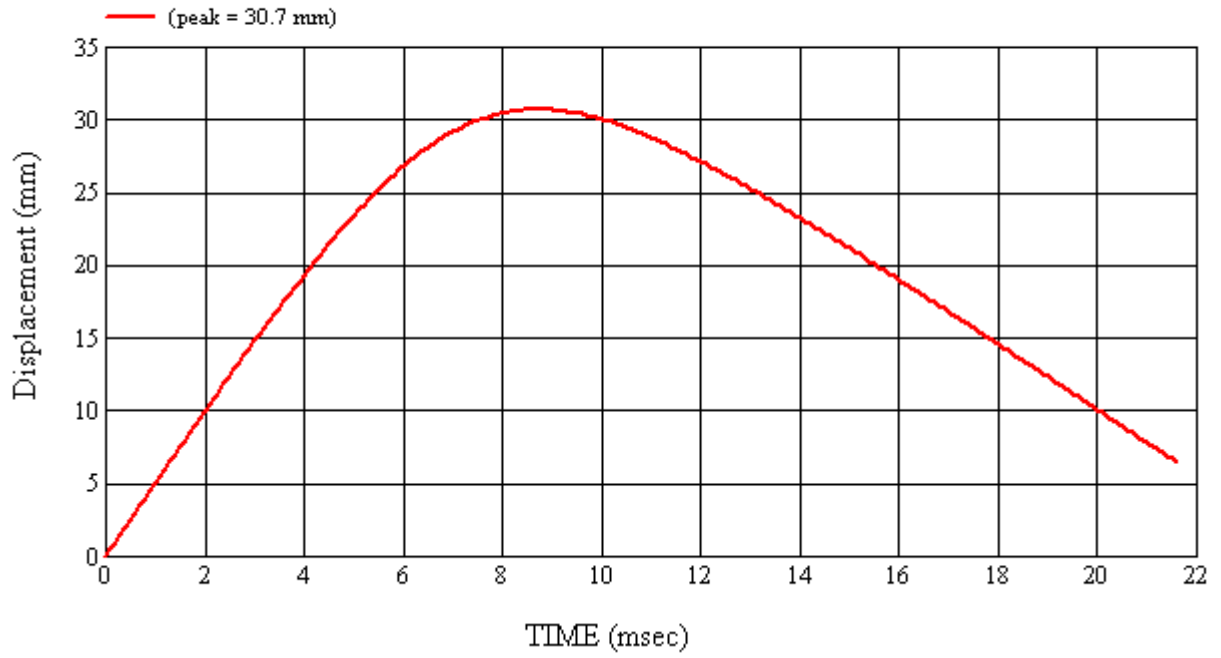
Target Location: OPI, Left Side

Test Date: 2/20/2008

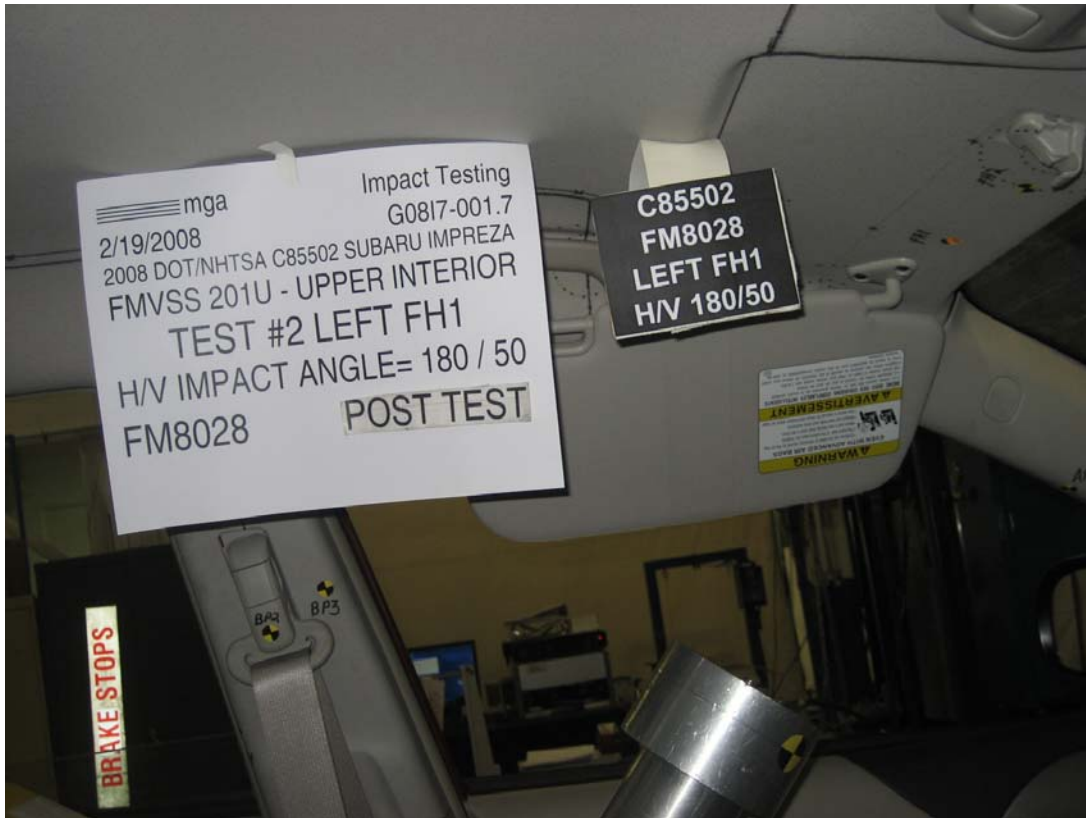












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
 Impreza

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): FH1Left

Temperature:21C

MGA Test Reference No.:FM8028

Humidity:15%

Approach Horizontal Angles:180°

Time of Test:2:41:43 PM

Approach Vertical Angles:50°

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
723	737	5.2	23.0	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	J22696	-100.013	0.87	0.87
Y	6	J35791	91.856	0.85	0.85
Z	7	J35800	97.996	1.83	1.83

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

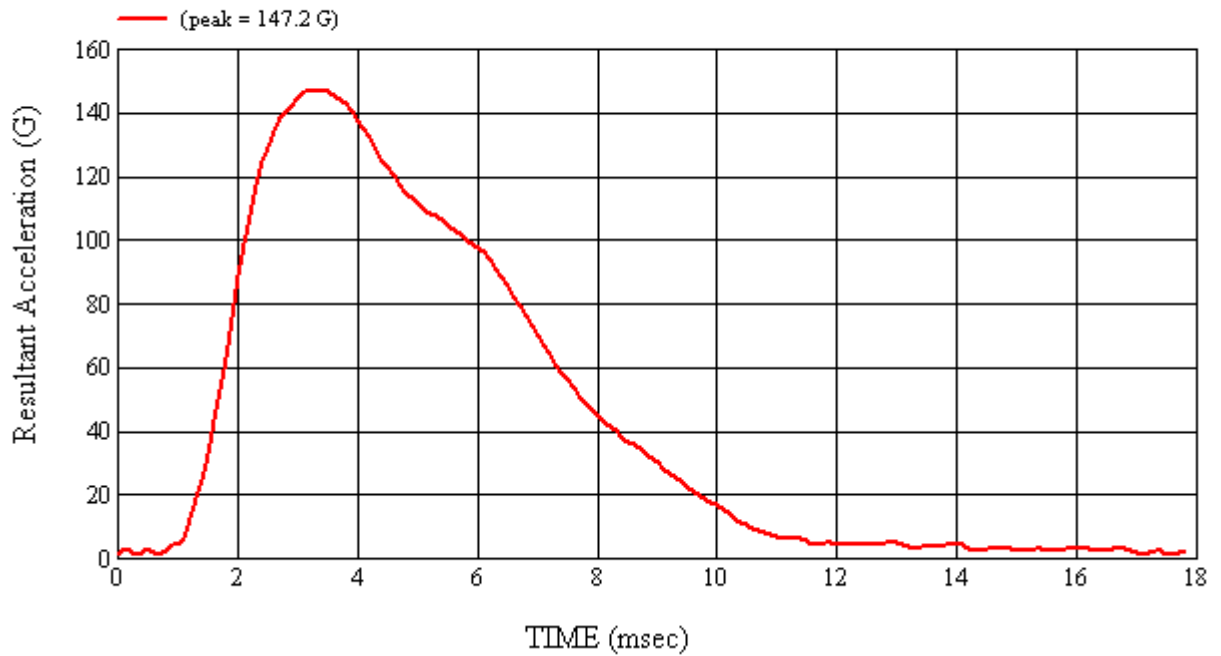
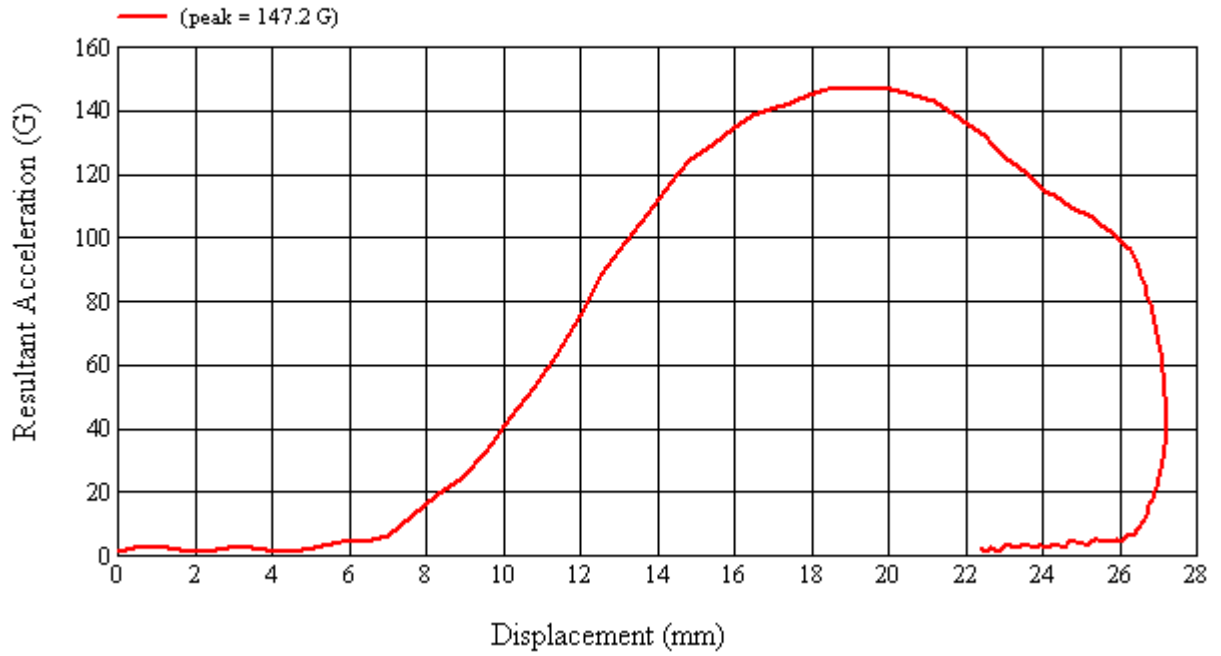
No visible damage.

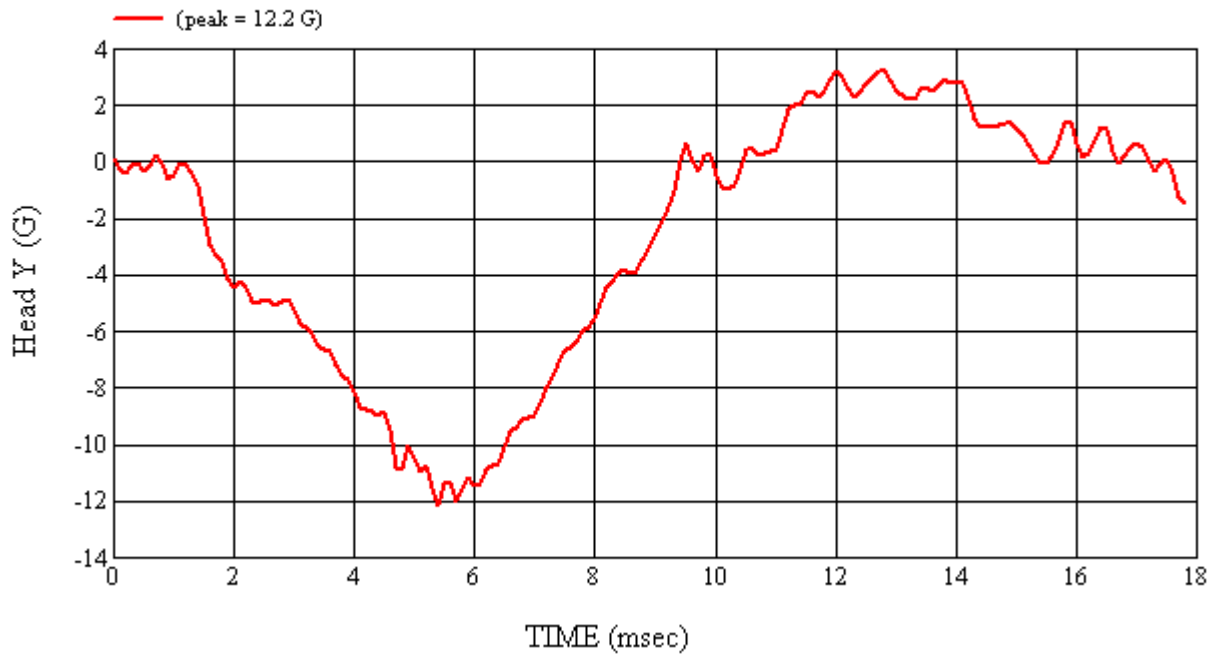
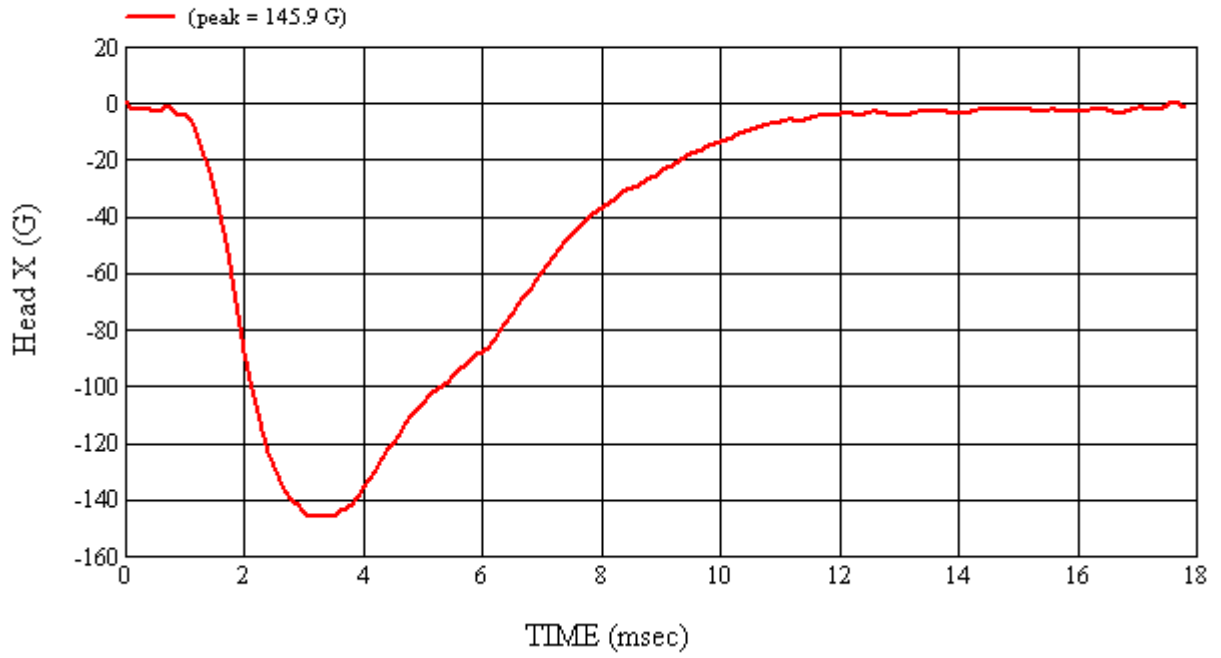
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/19/2008
 *Only necessary for NHTSA (Government) Compliance testing.

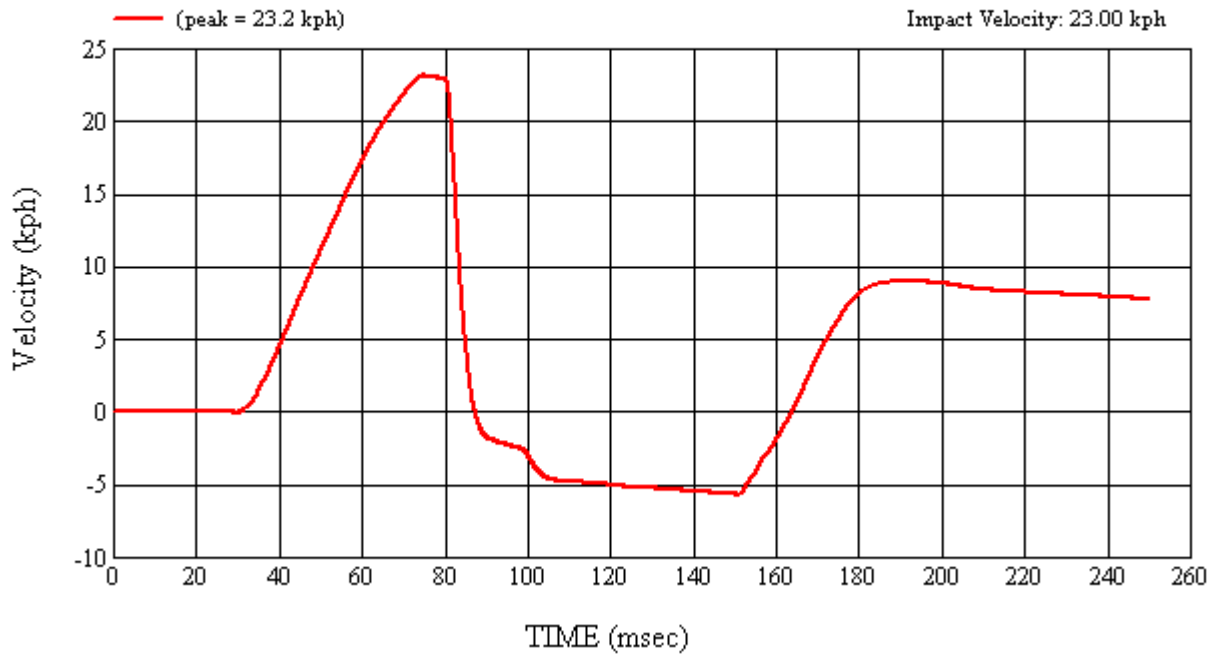
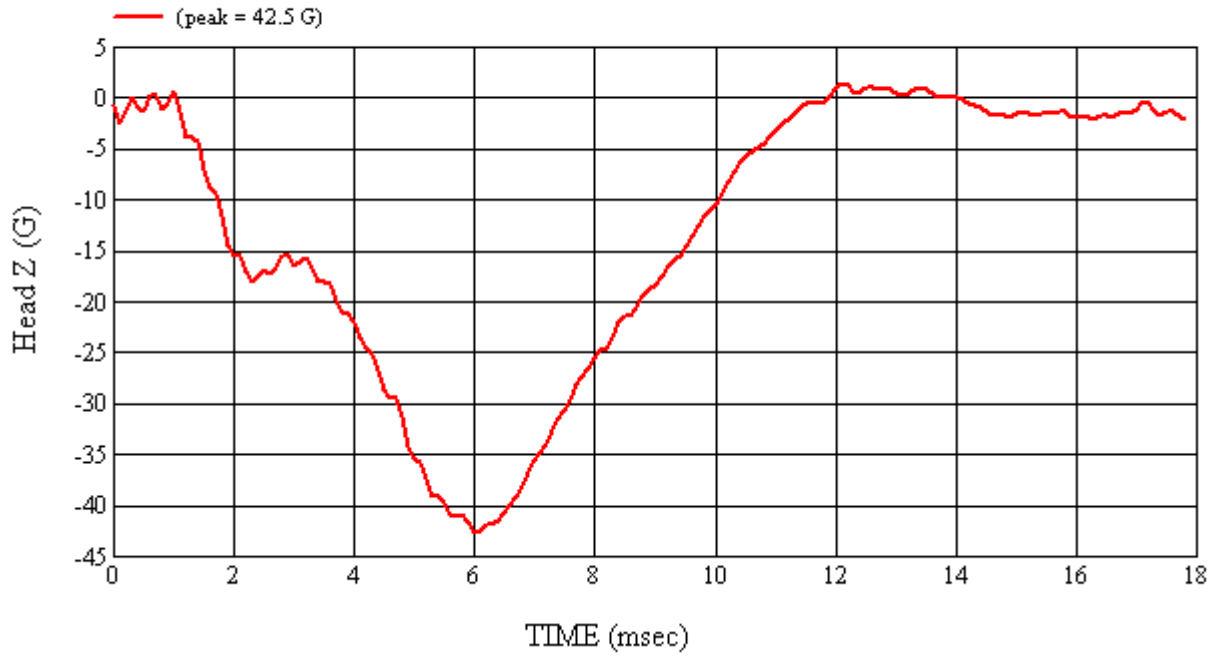
MGA Test #: FM8028

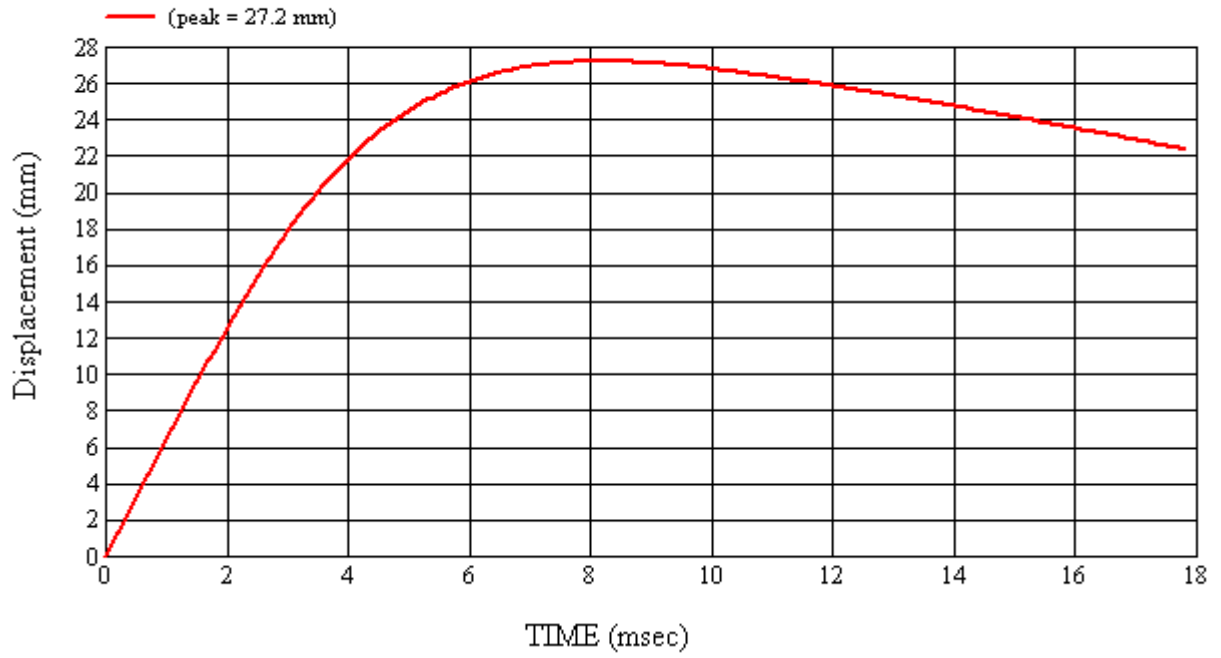
Target Location: FH1, Left Side

Test Date: 2/19/2008

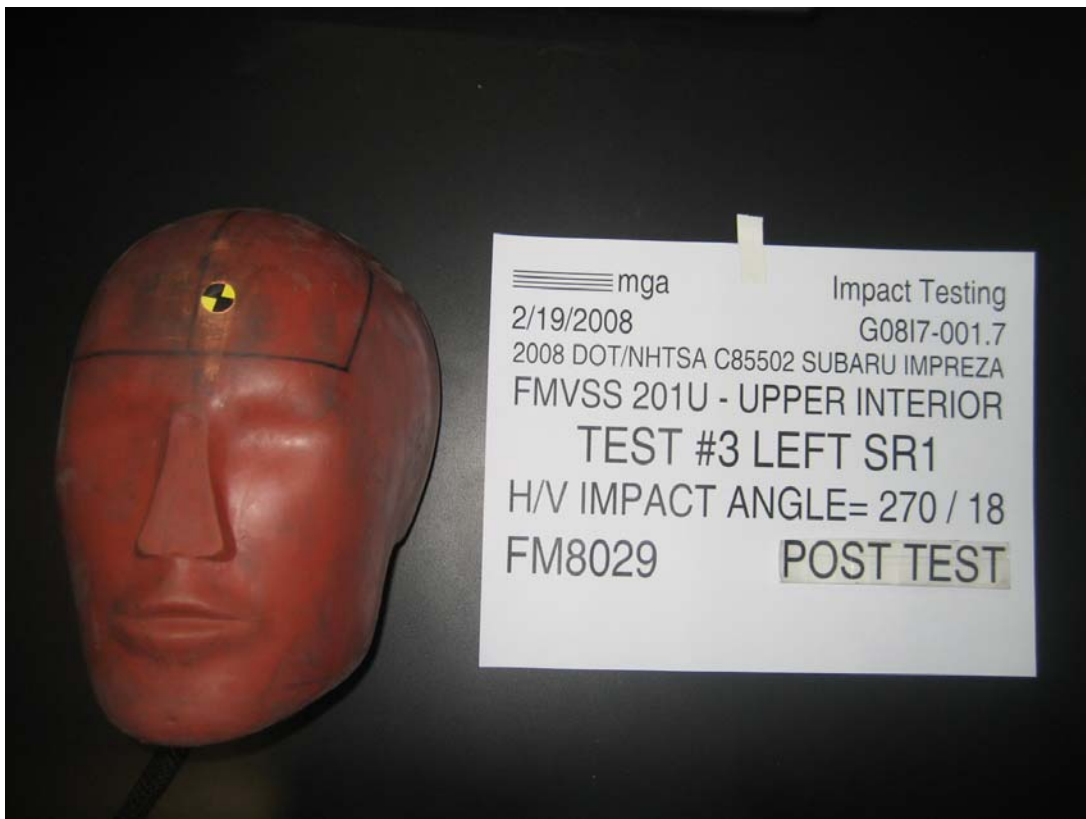












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
Impreza

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): SR1Left

Temperature:21C

MGA Test Reference No.:FM8029

Humidity:14%

Approach Horizontal Angles:270°

Time of Test:3:55:01 PM

Approach Vertical Angles:18°

FMH Serial No:[038]

Additional Description:1 Relocation.

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
347	239	7.2	18.2	23	8 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J14103	-94.598	0.87	0.87
Y	6	J36197	110.692	0.85	0.85
Z	7	J36353	99.391	1.83	1.83

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

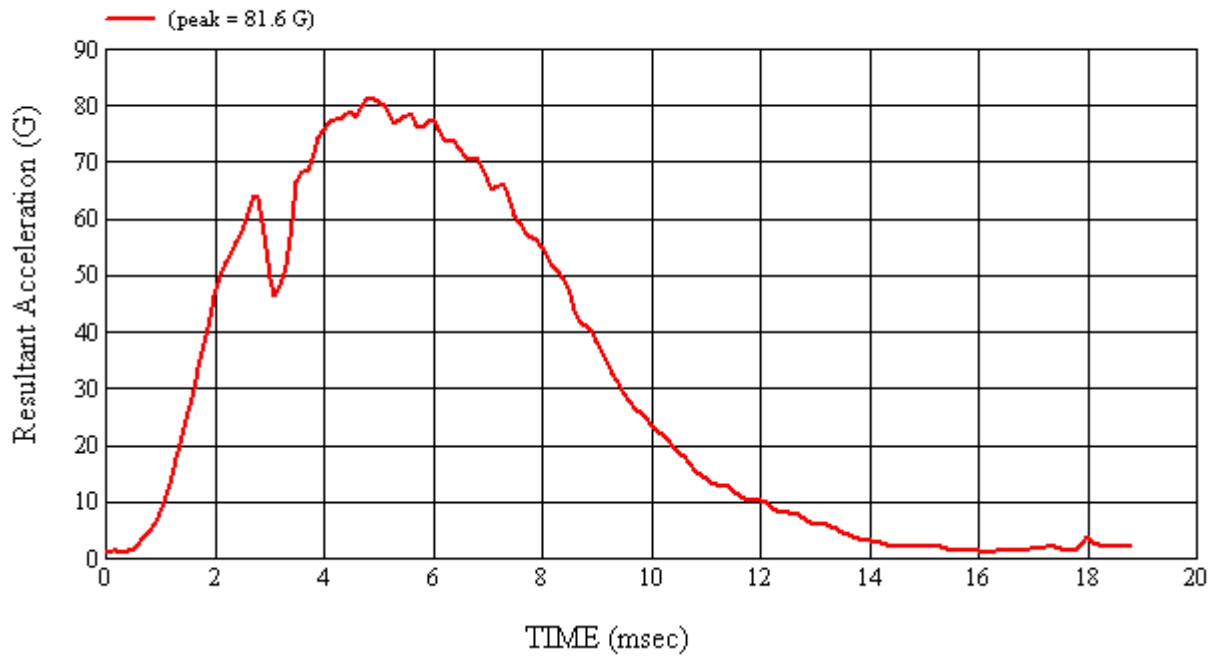
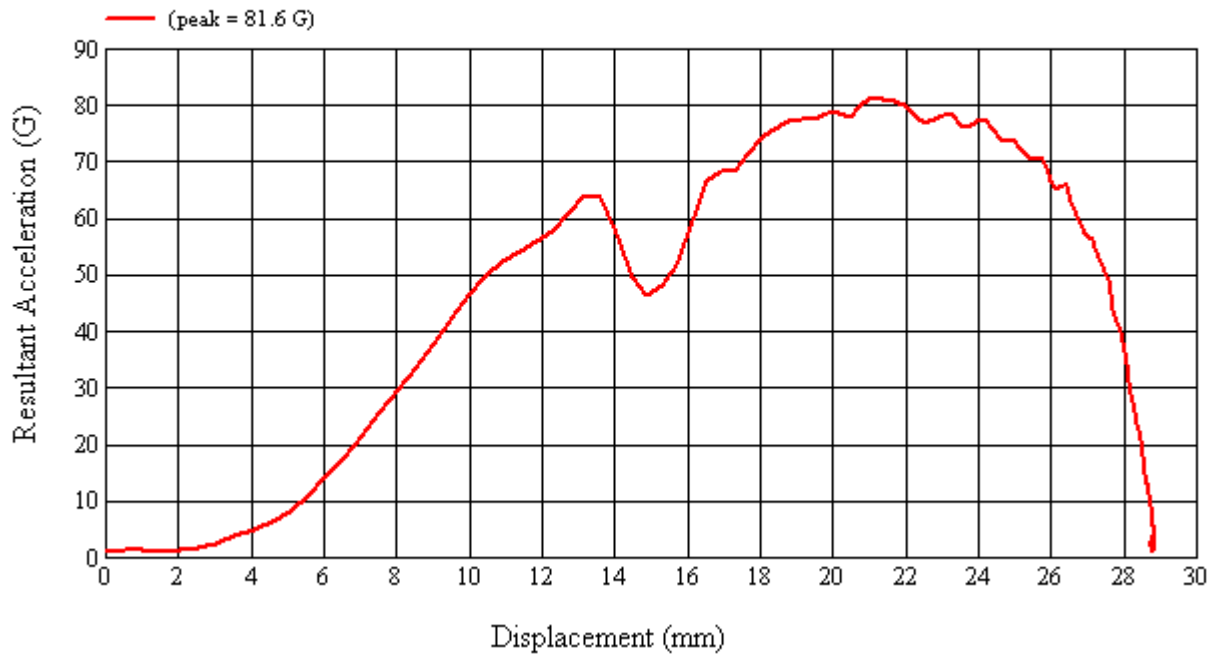
Headliner deformation.

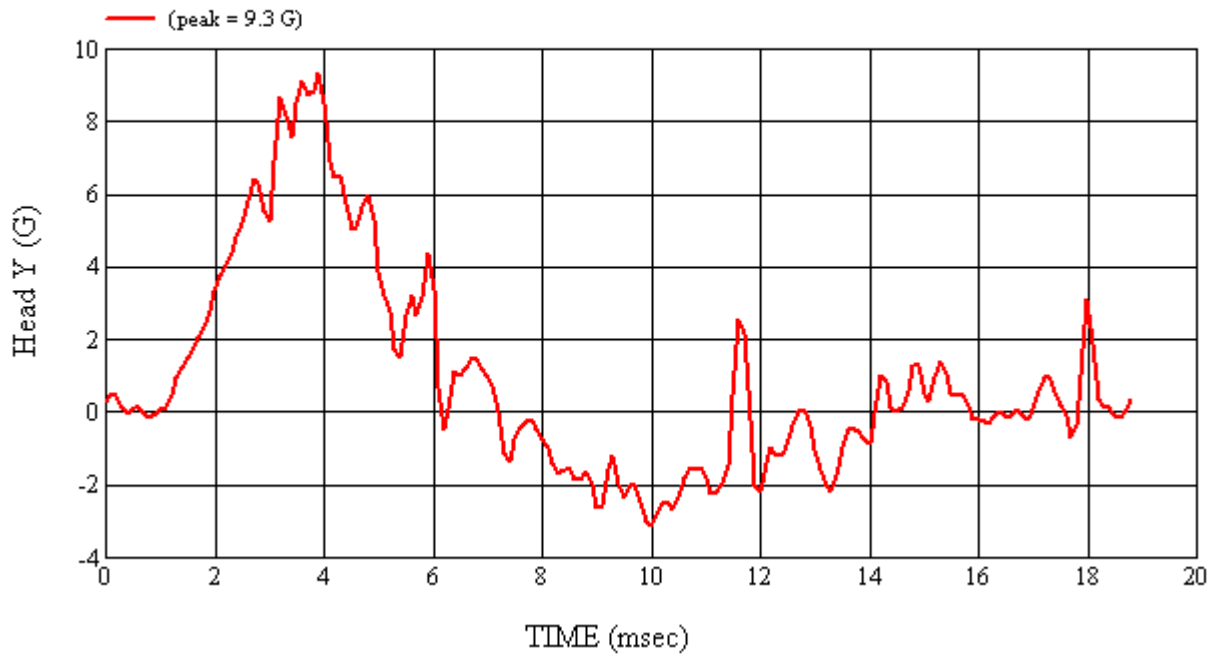
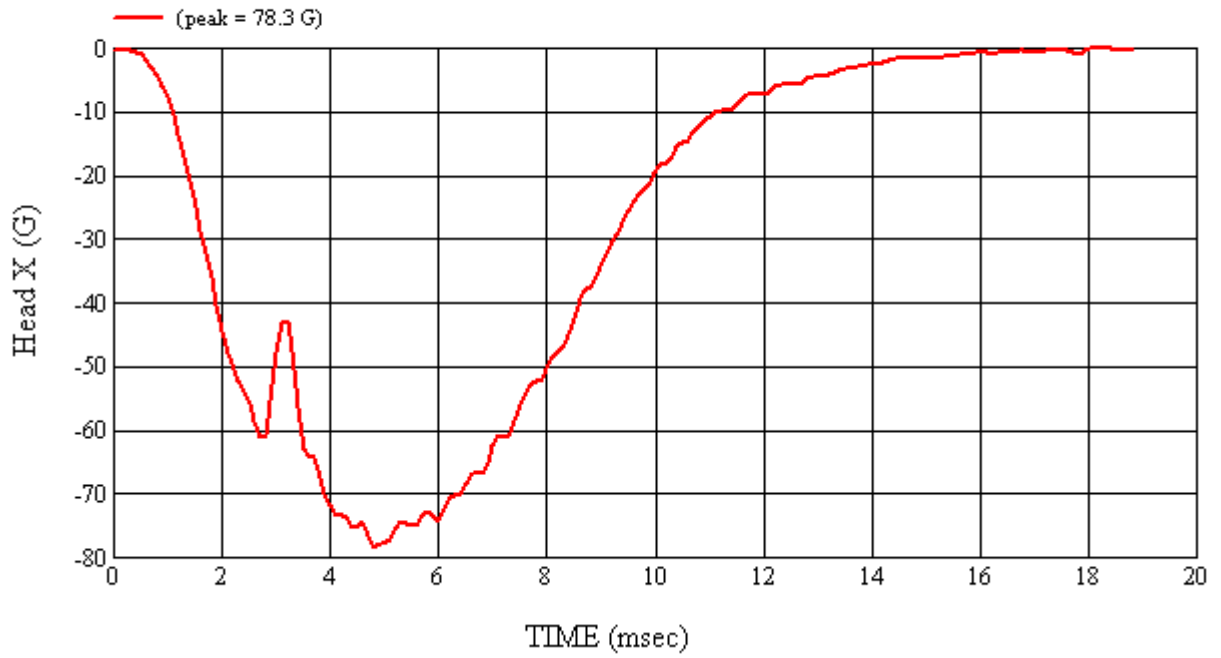
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/19/2008
*Only necessary for NHTSA (Government) Compliance testing.

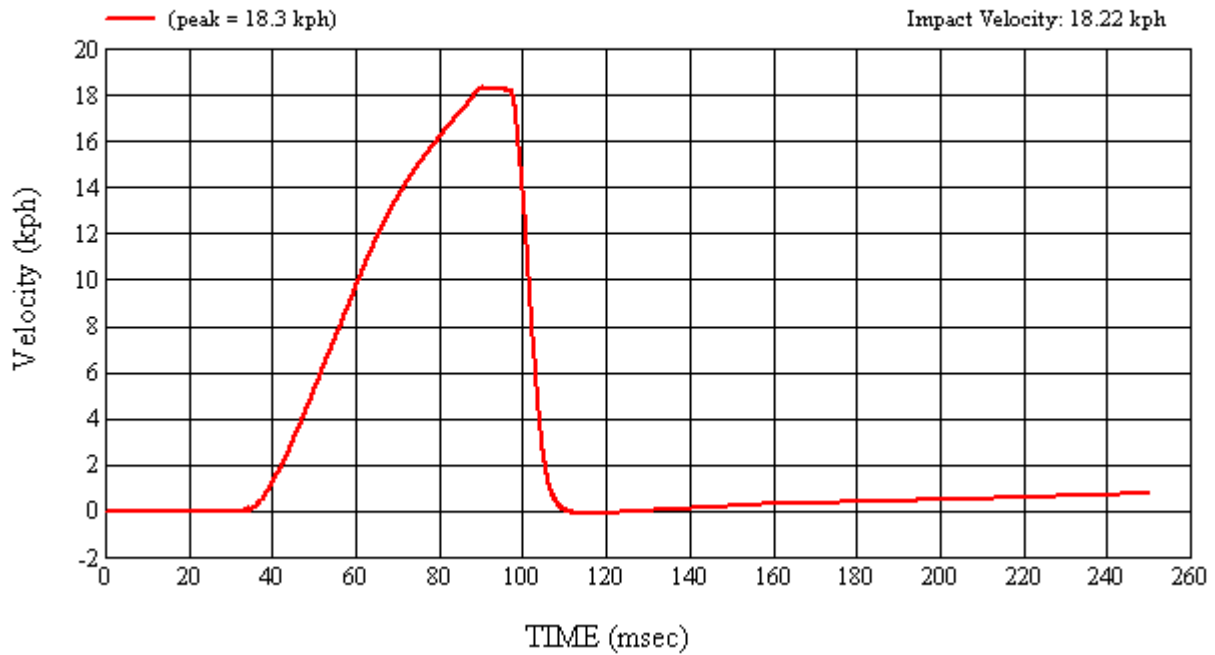
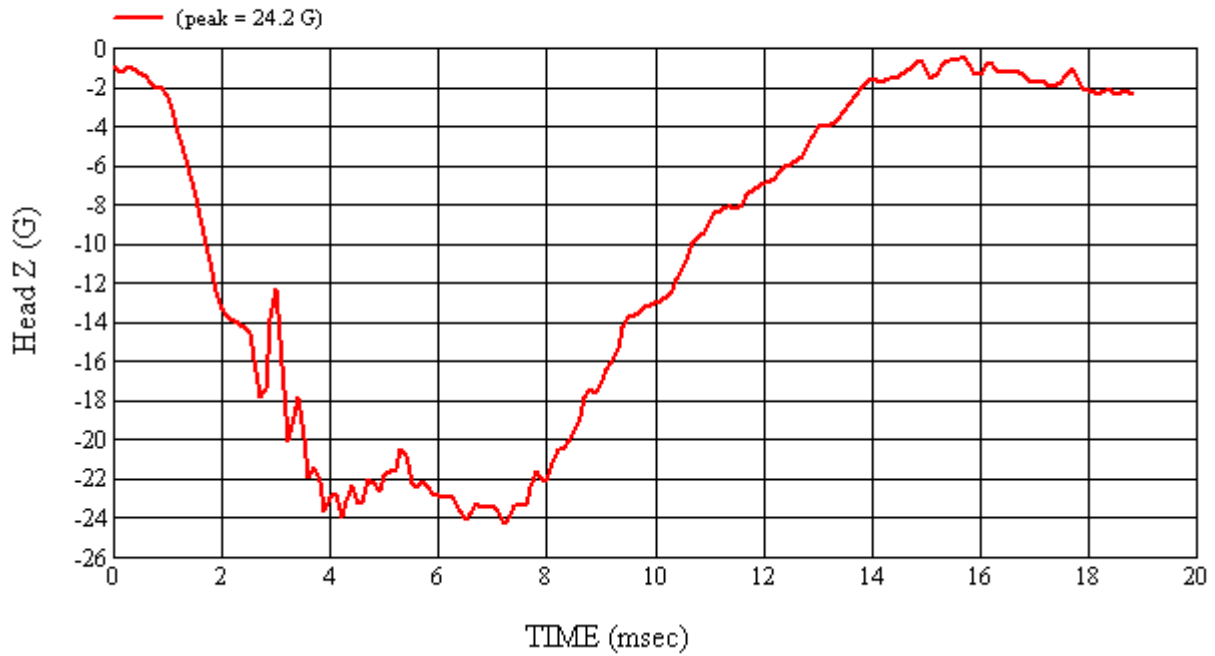
MGA Test #: FM8029

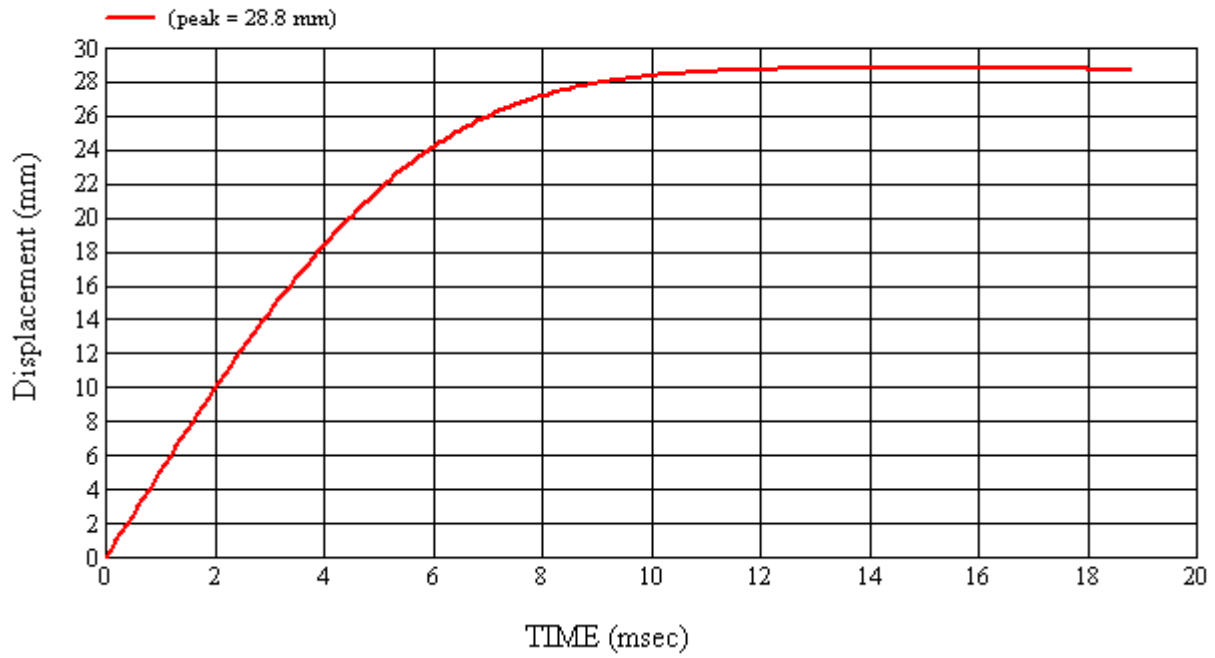
Target Location: SR1, Left Side

Test Date: 2/19/2008

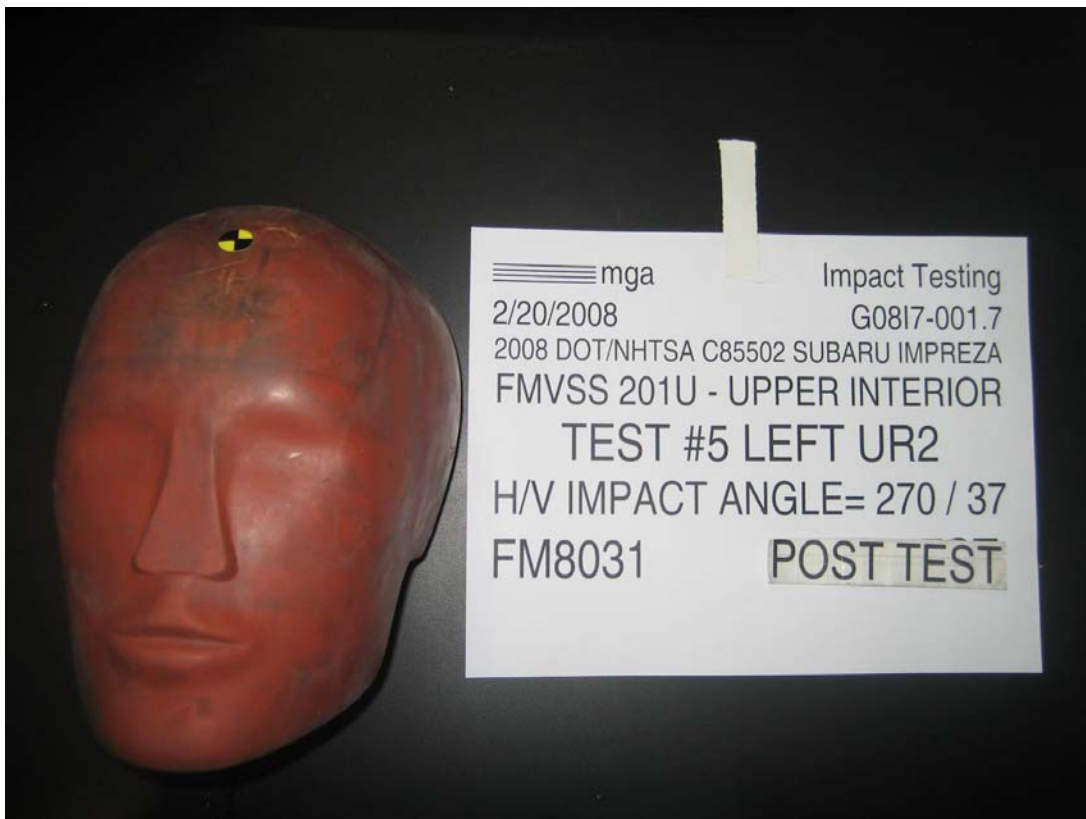
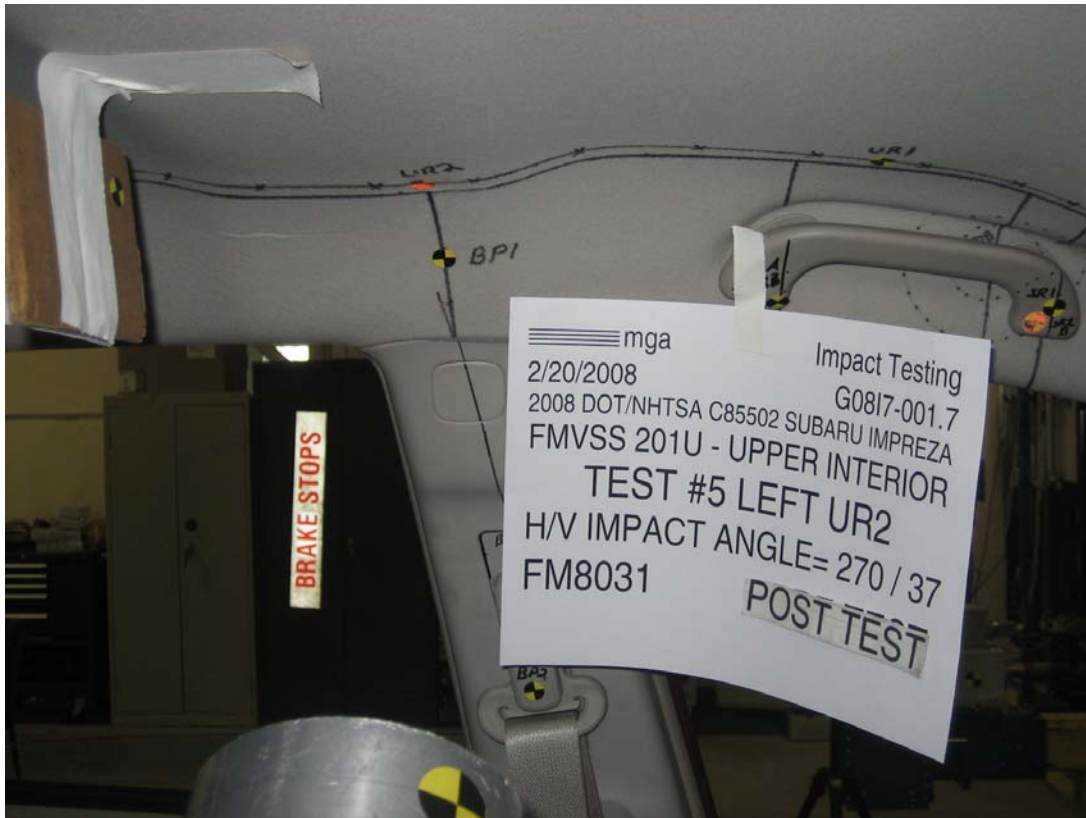












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.7 VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru Impreza

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR2Left

MGA Test Reference No.:FM8031

Approach Horizontal Angles:270°

Approach Vertical Angles:37°

Additional Description:@ BPR

Test Number:#5

Temperature:21C

Humidity:13%

Time of Test:11:32:08 AM

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
778	810	7	23.0	57	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22664	-94.161	0.87	0.87
Y	6	J35919	97.442	0.85	0.85
Z	7	J35924	93.891	1.83	1.83

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

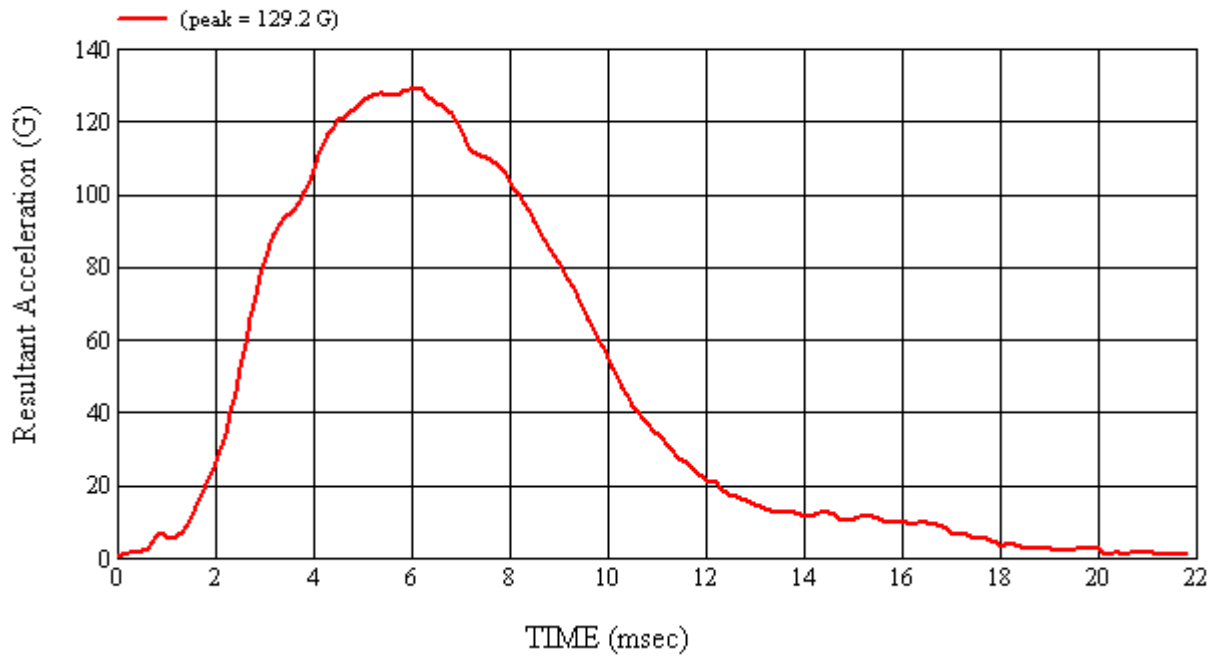
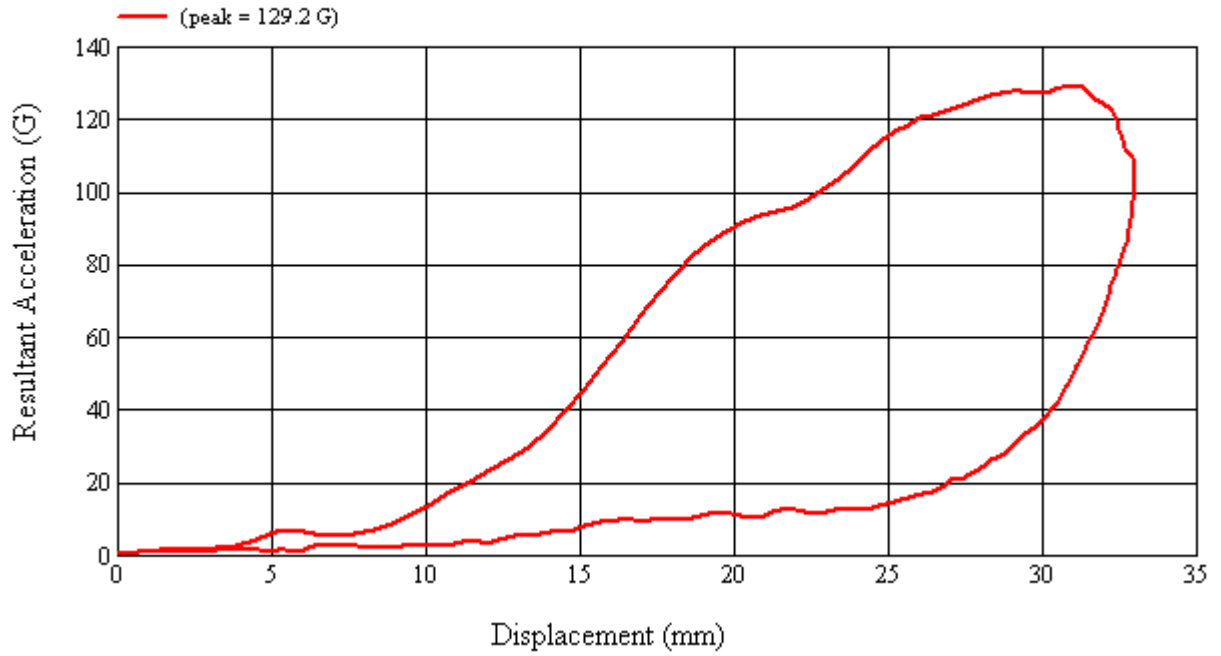
No visible damage.

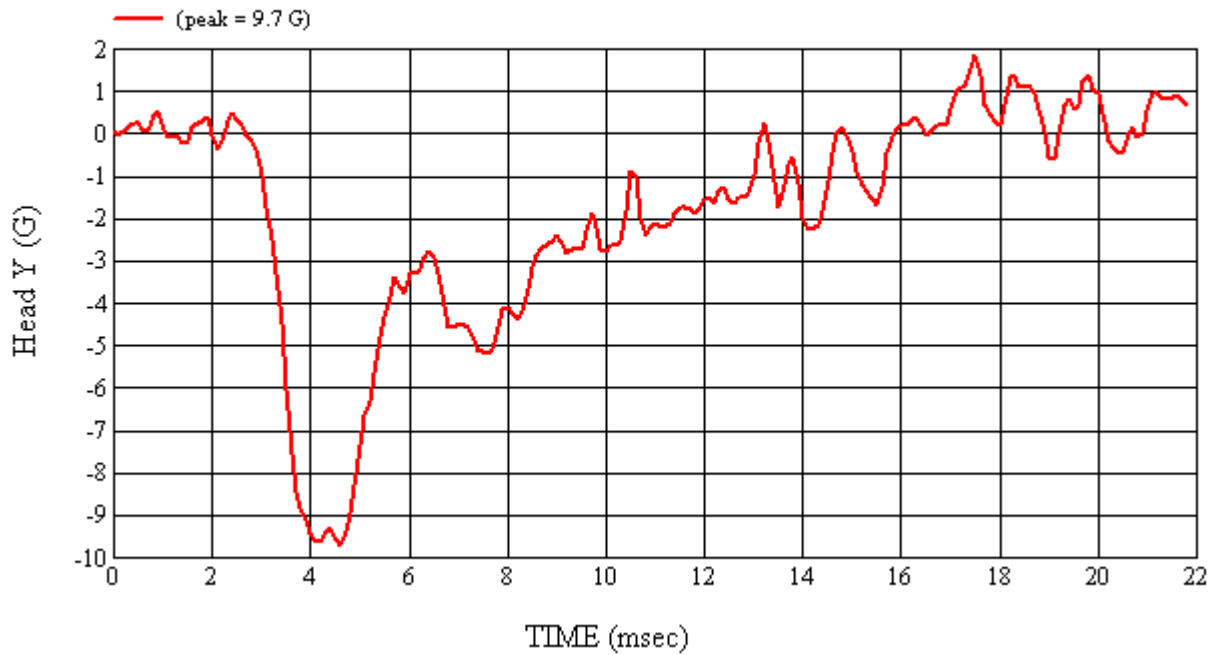
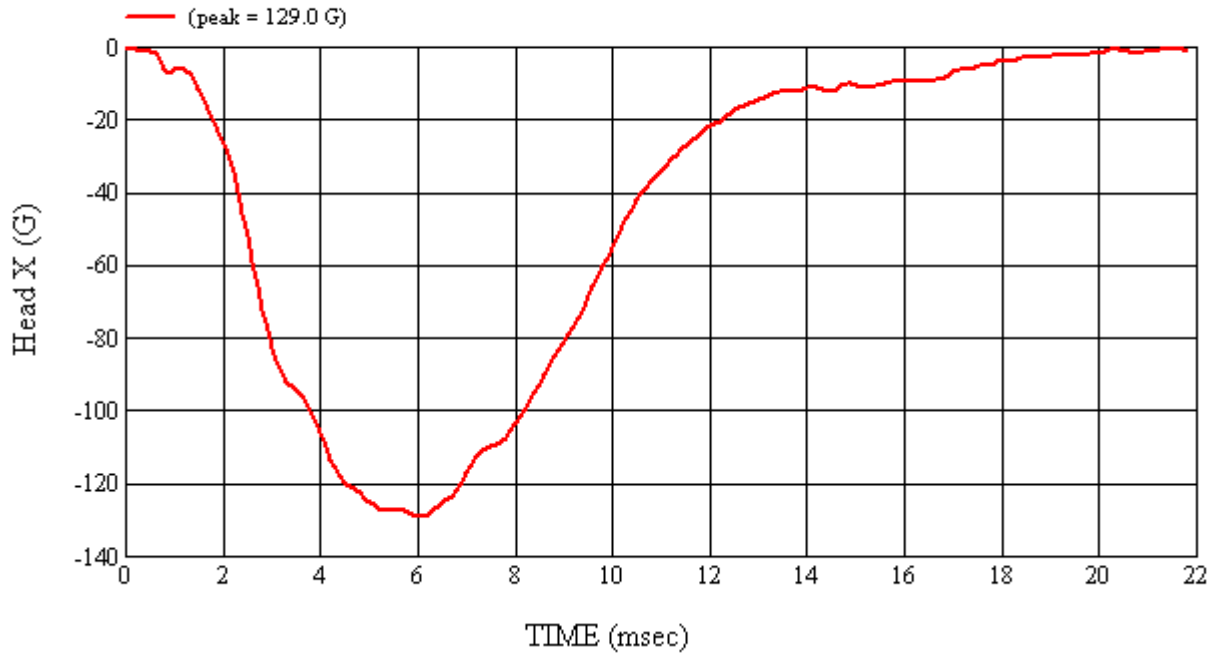
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/20/2008
 *Only necessary for NHTSA (Government) Compliance testing.

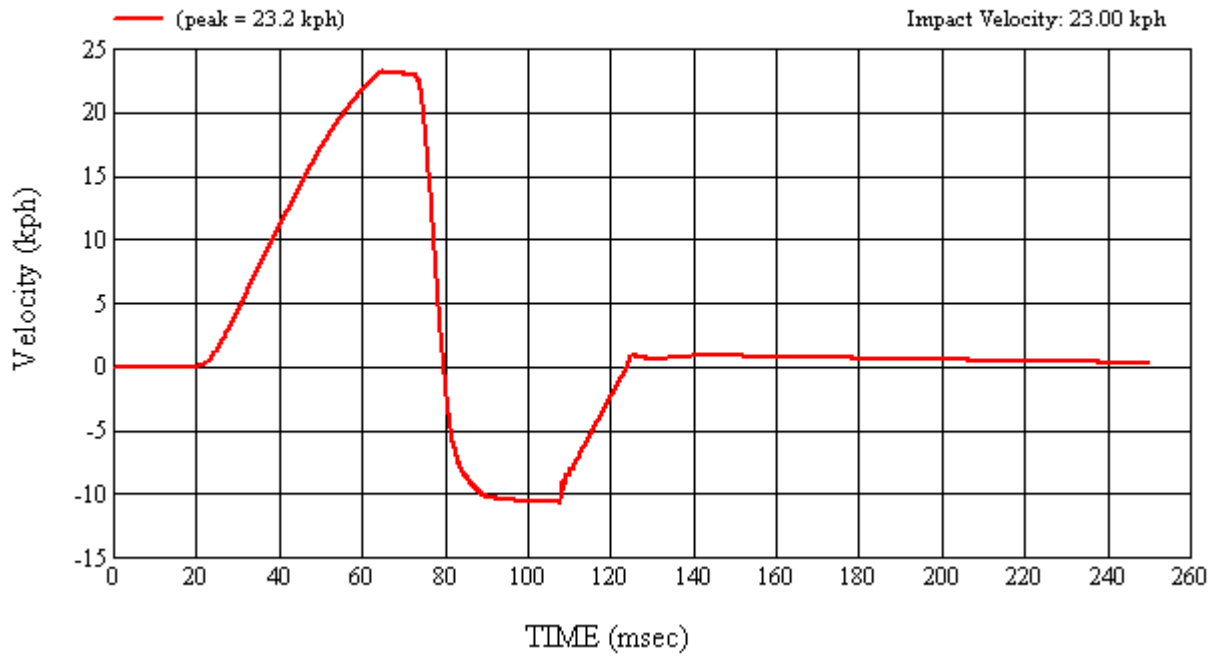
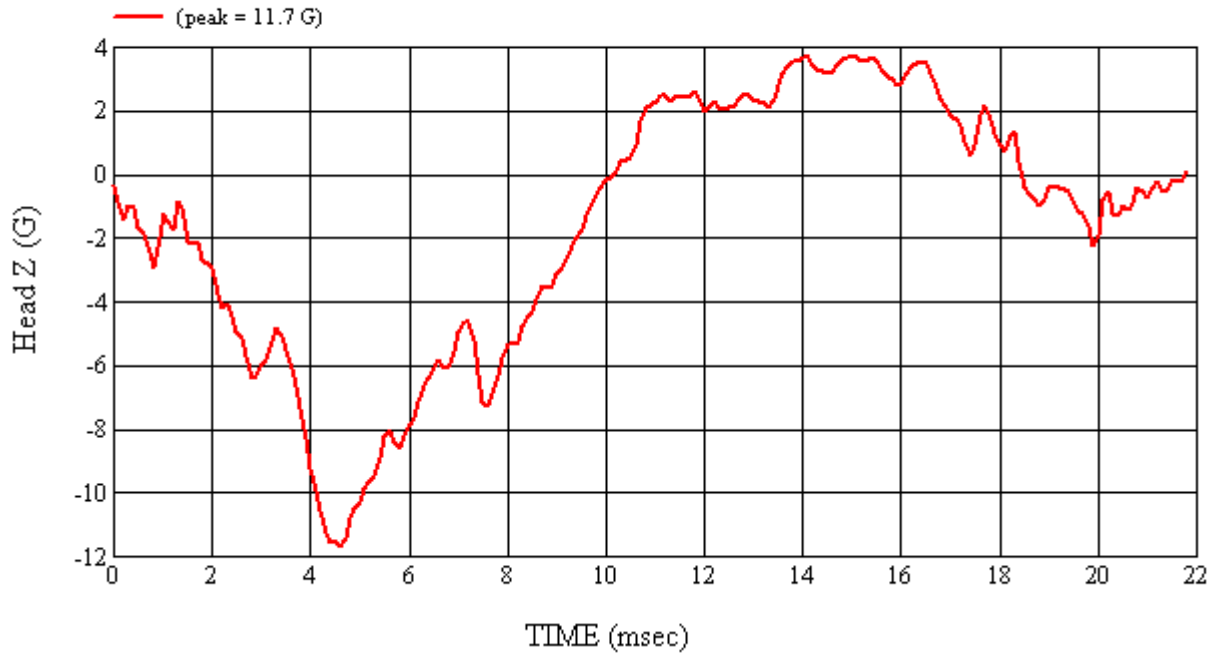
MGA Test #: FM8031

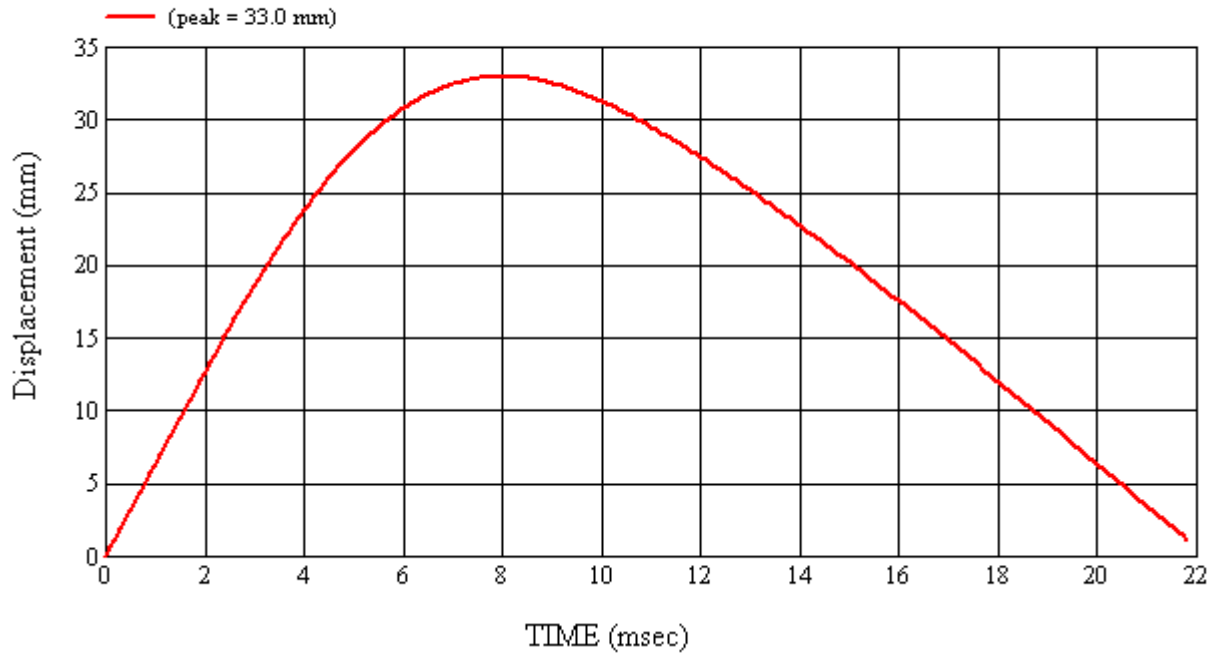
Target Location: UR2, Left Side

Test Date: 2/20/2008

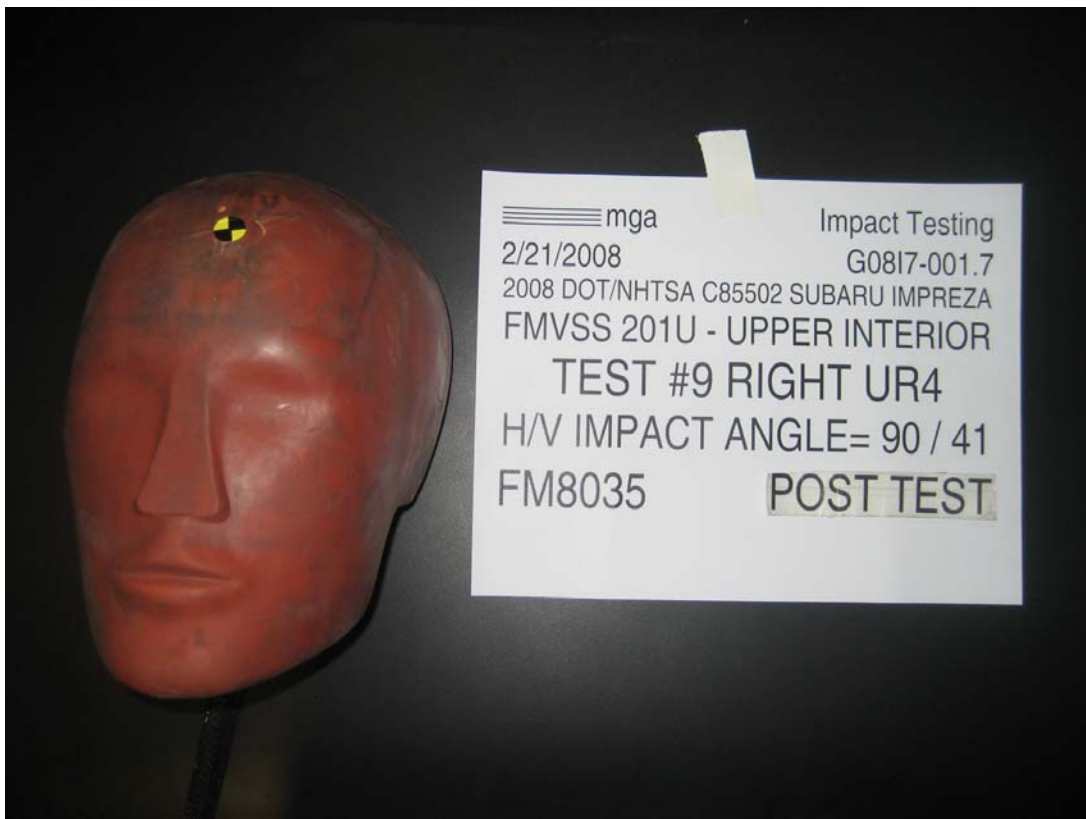
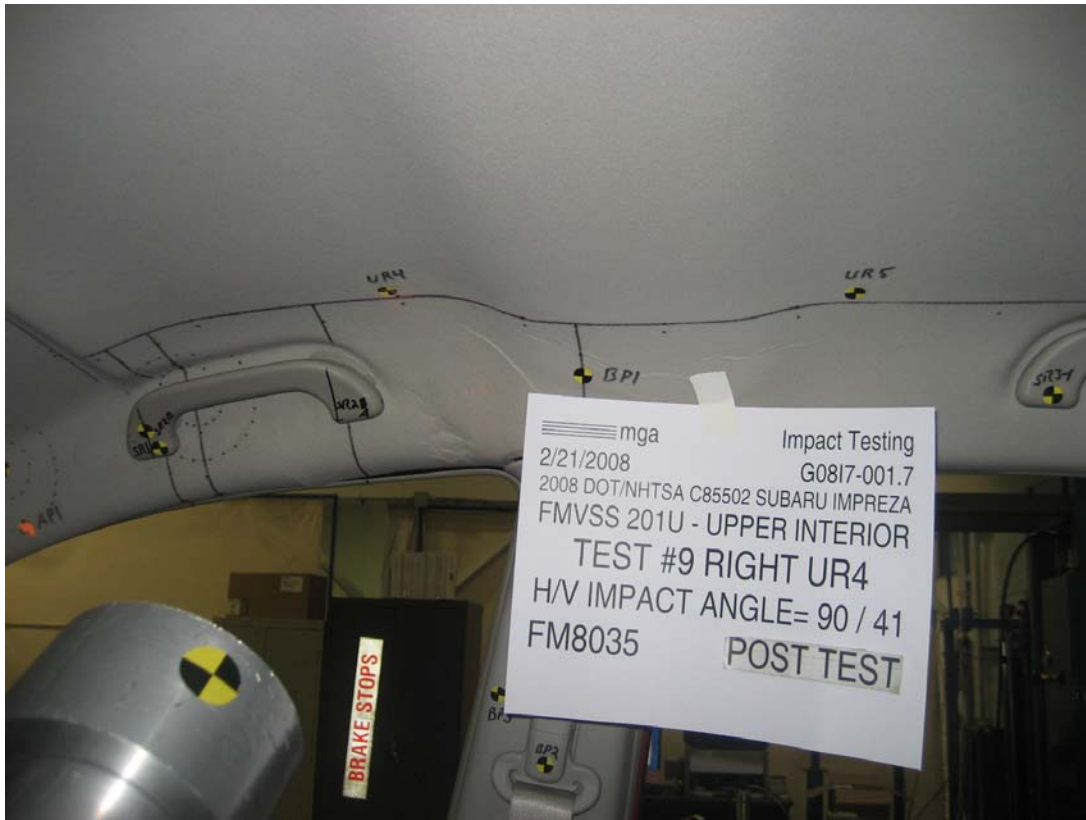












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
 Impreza

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): UR4Right

Temperature:21C

MGA Test Reference No.:FM8035

Humidity:13%

Approach Horizontal Angles:90°

Time of Test:2:35:53 PM

Approach Vertical Angles:41°

FMH Serial No:[035]

Additional Description:@ SR2A

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
677	677	7.8	23.0	35	7 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22664	-94.161	0.87	0.87
Y	6	J35919	97.442	0.85	0.85
Z	7	J35924	93.891	1.83	1.83

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

Headliner deformation.

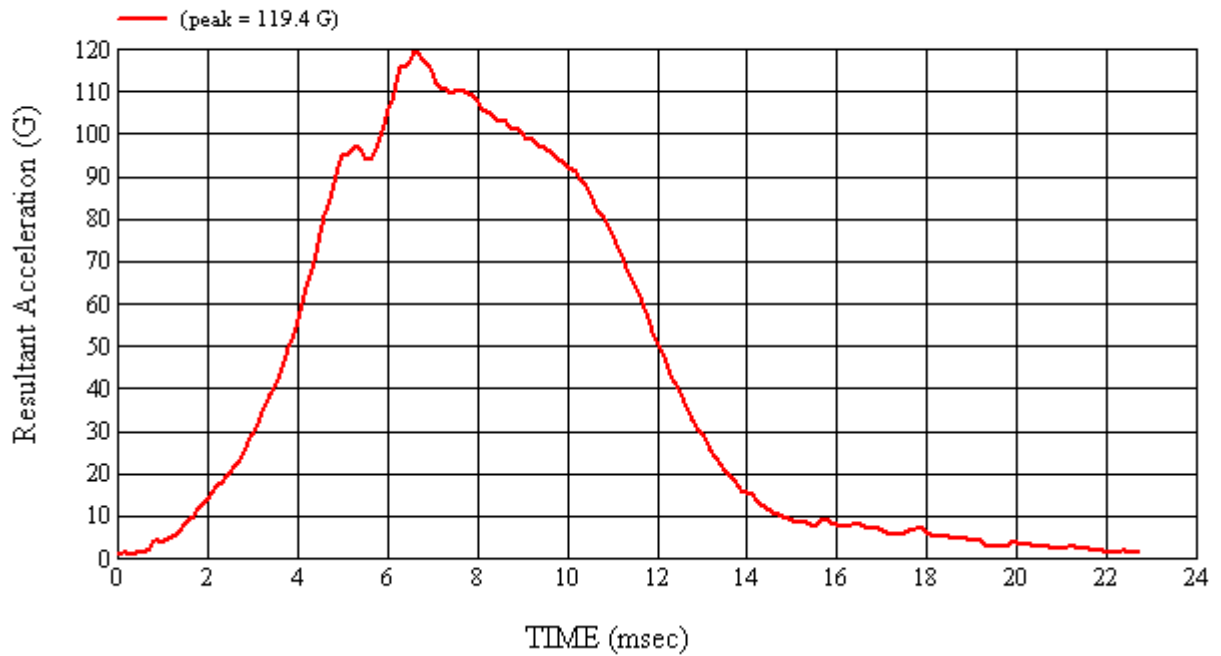
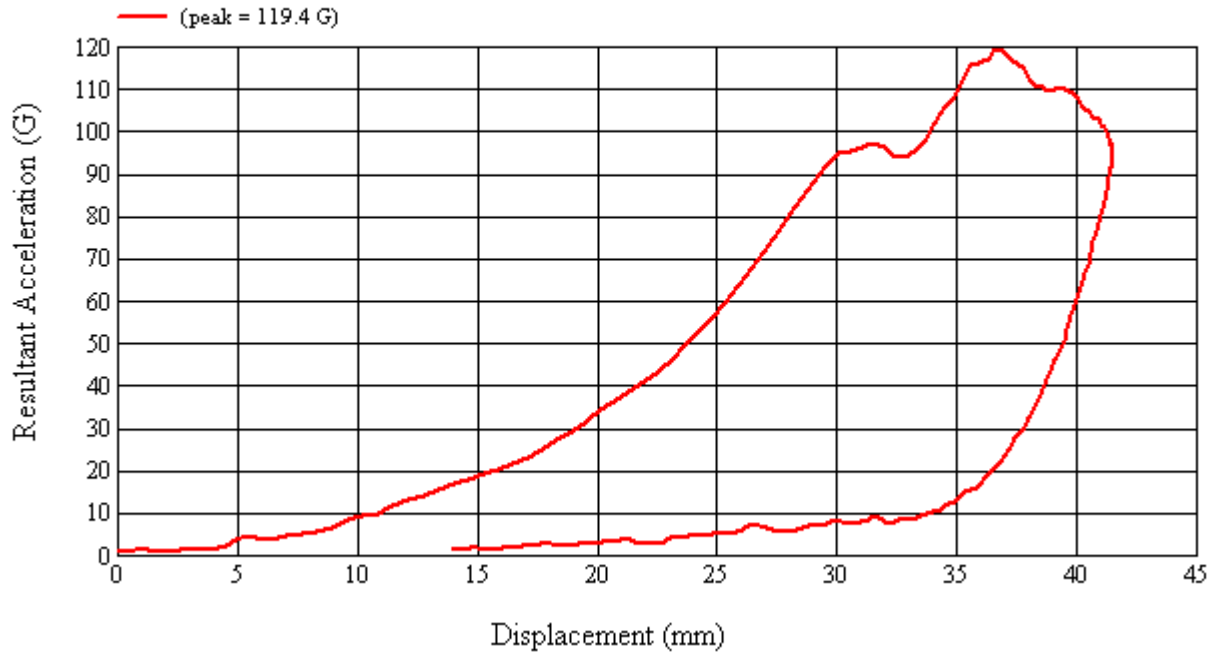
Recorded By: *Janis Campbell* Approved By*: *Heena A. Kalita* Date: 2/21/2008

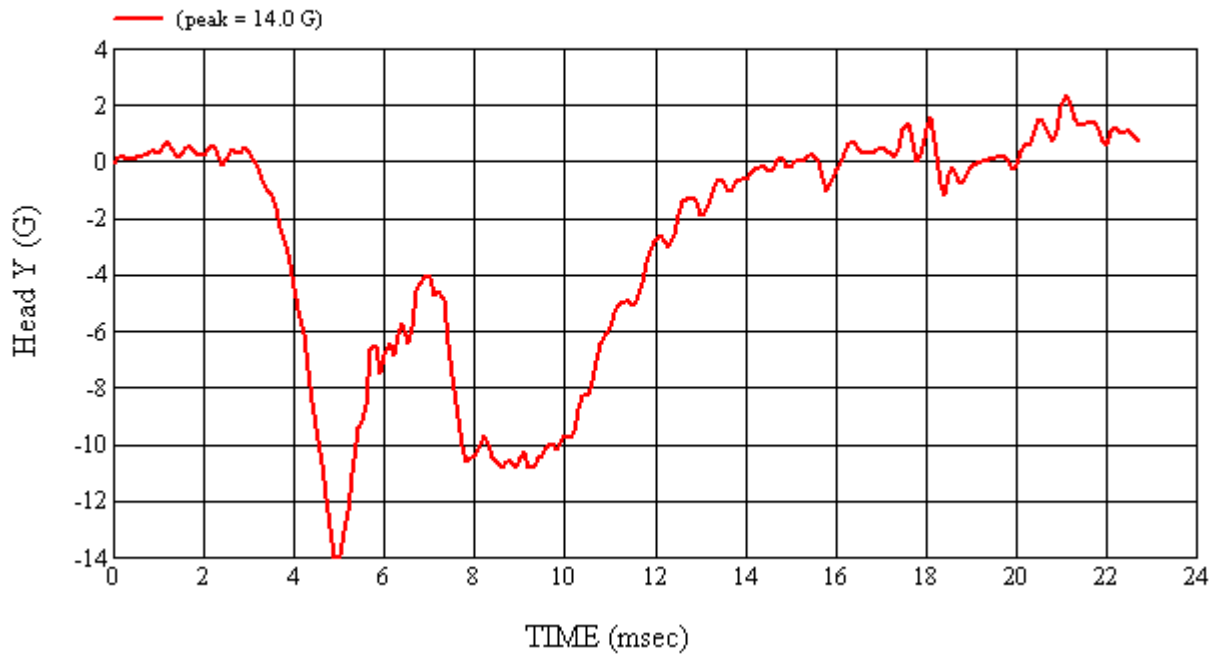
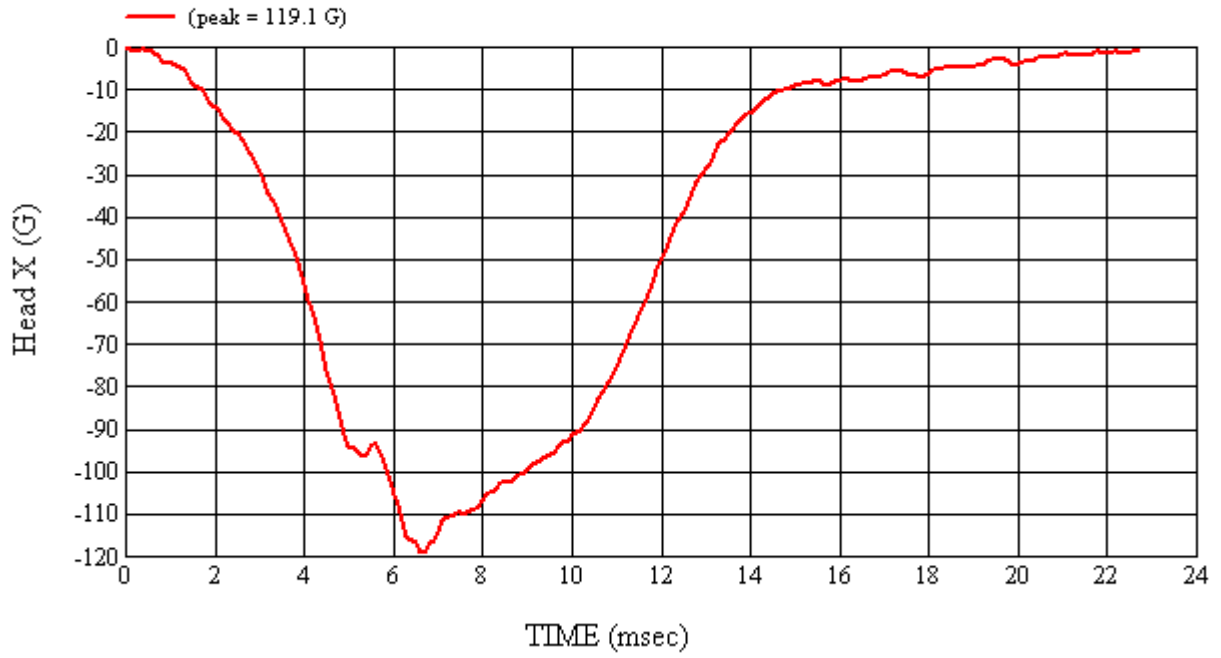
*Only necessary for NHTSA (Government) Compliance testing.

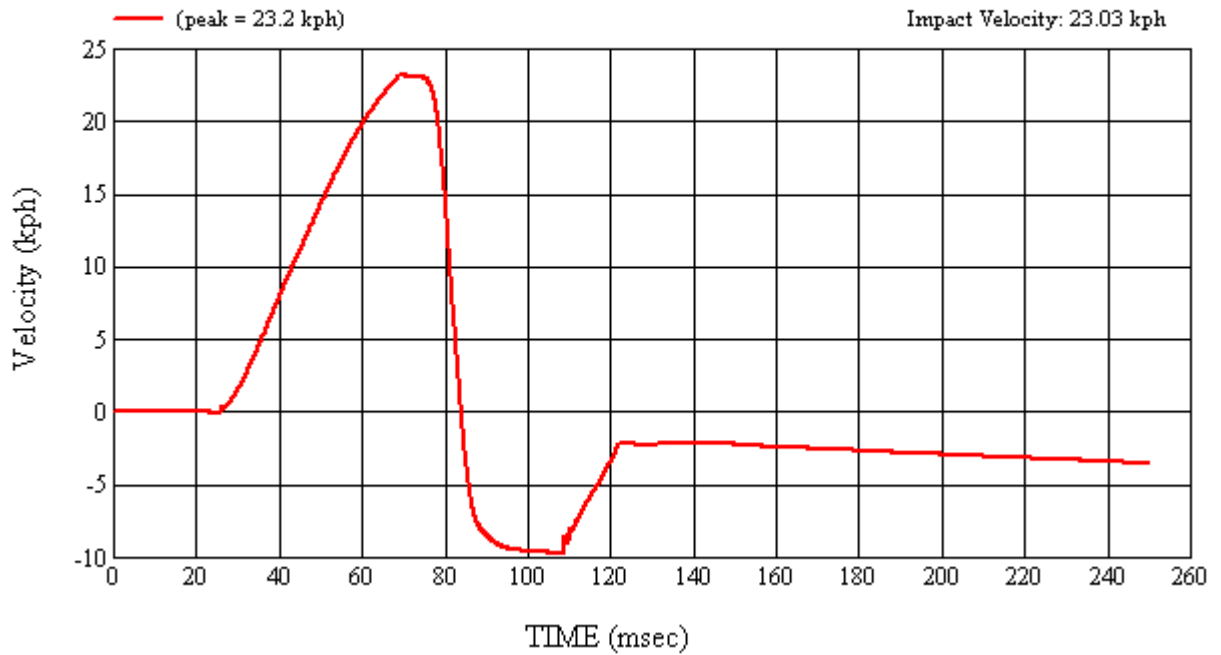
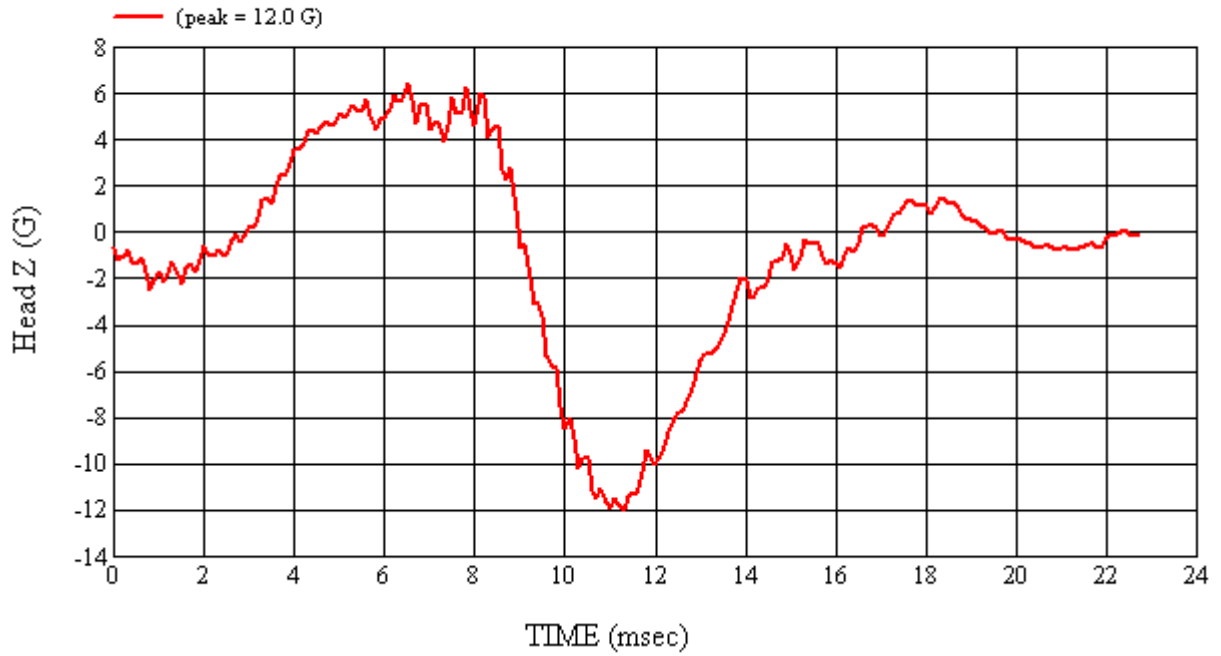
MGA Test #: FM8035

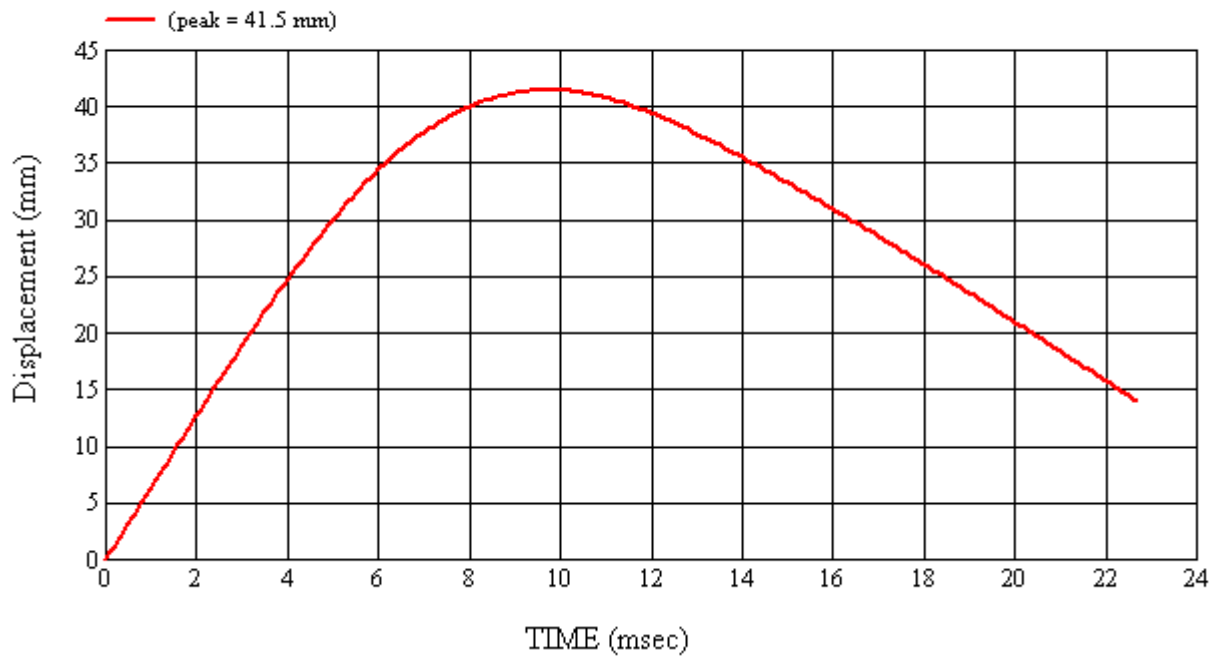
Target Location: UR4, Right Side

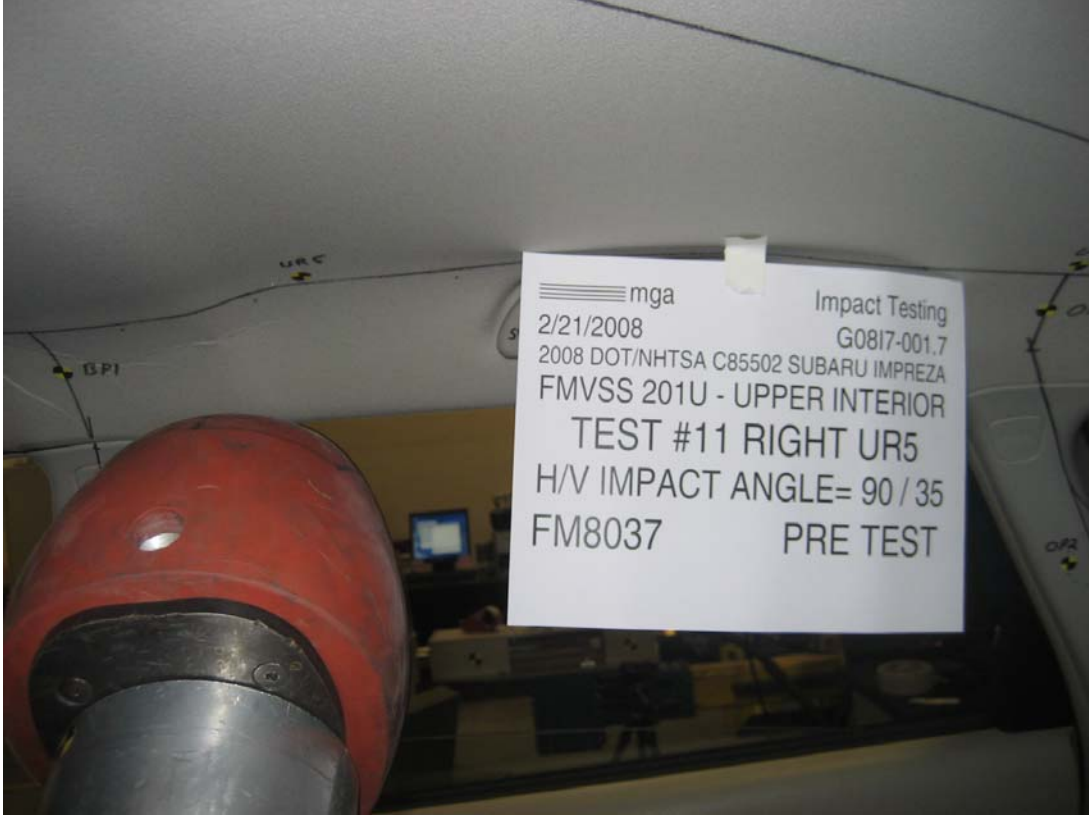
Test Date: 2/21/2008

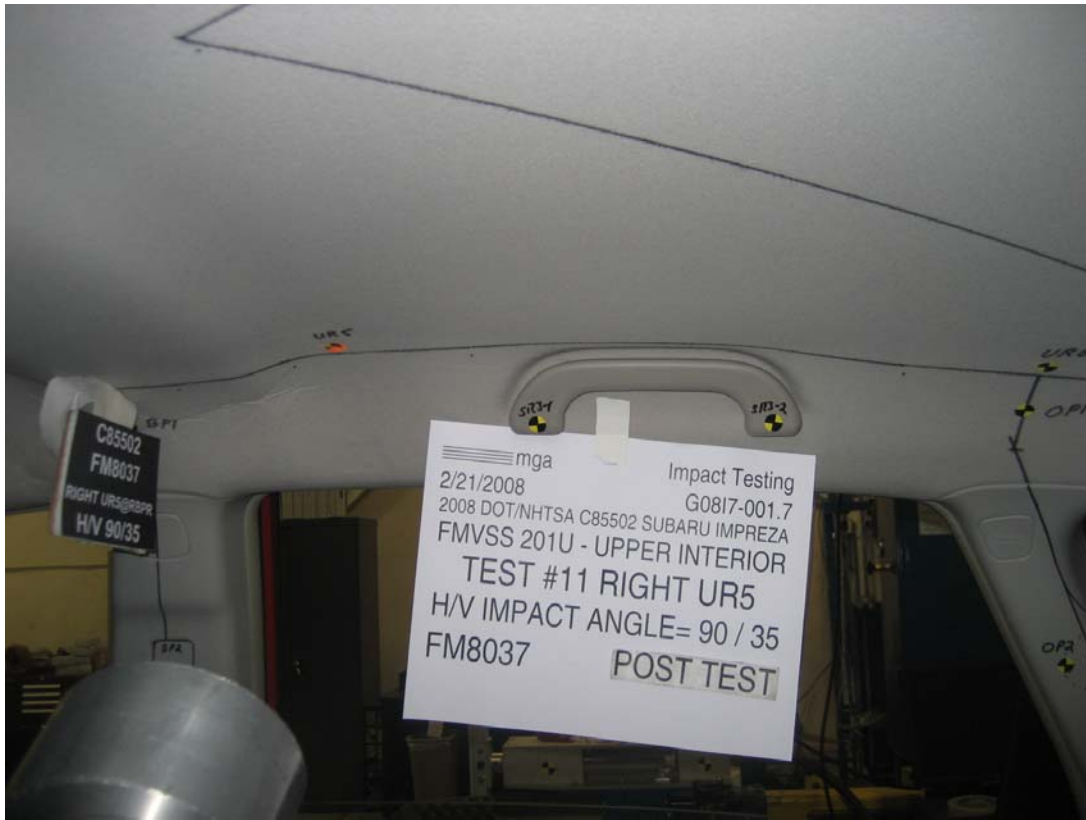












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
 Impreza

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): UR5Right

Temperature:22C

MGA Test Reference No.:FM8037

Humidity:14%

Approach Horizontal Angles:90°

Time of Test:4:12:04 PM

Approach Vertical Angles:35°

FMH Serial No:[038]

Additional Description:@ Rear of BPR

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
592	565	8.4	23.7	38	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J14103	-94.598	0.87	0.87
Y	6	J36197	110.692	0.85	0.85
Z	7	J36353	99.391	1.83	1.83

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

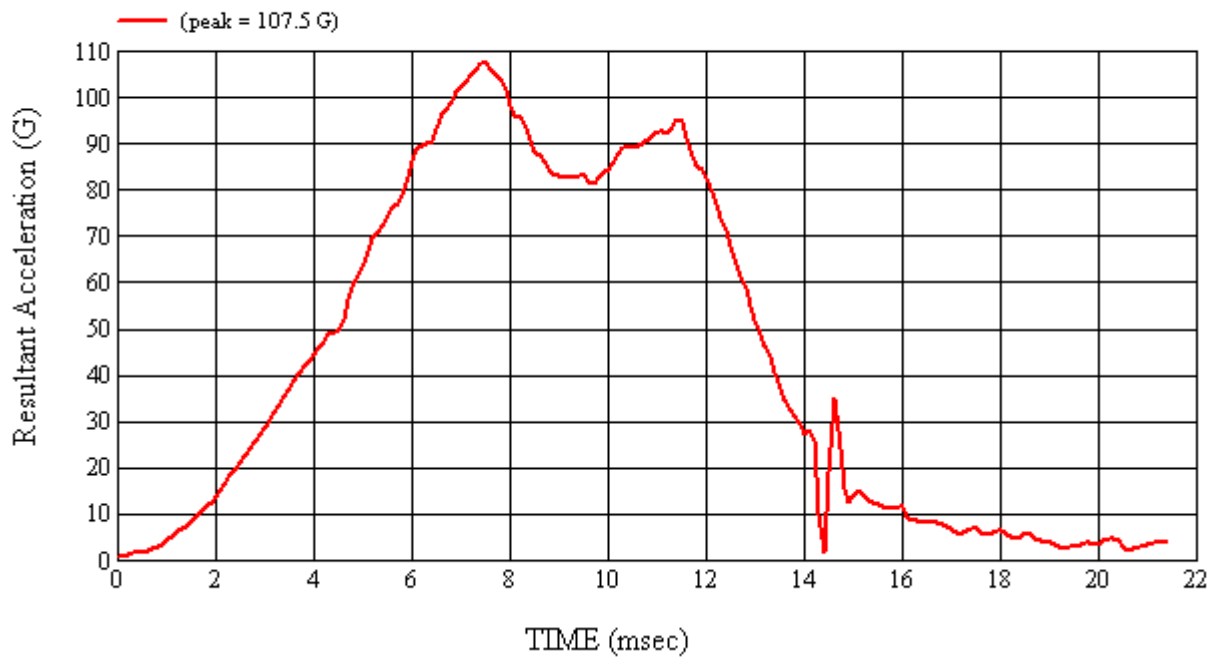
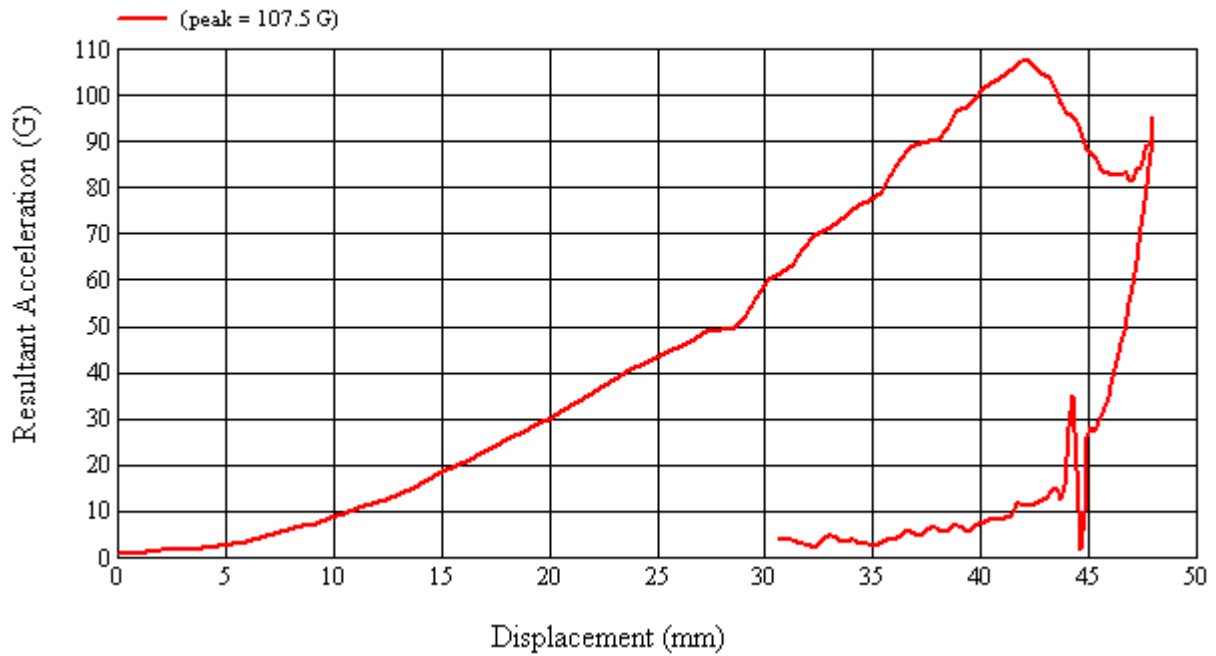
Headliner deformation.

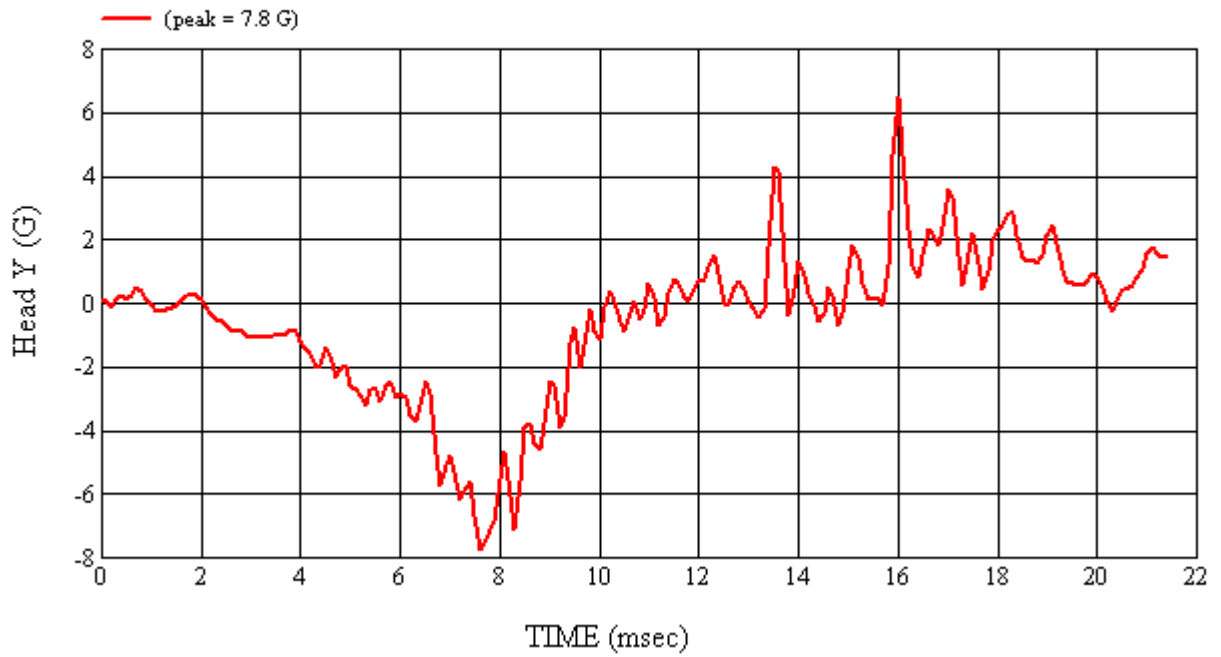
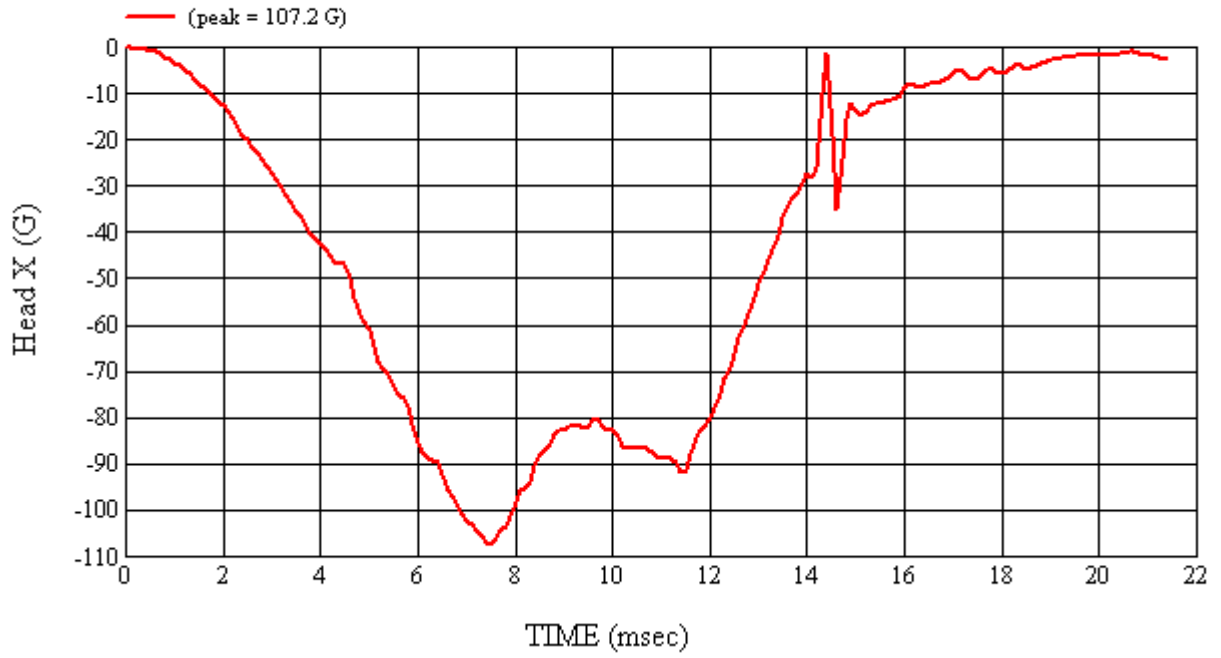
Recorded By: *Scott Campbell* Approved By*: *Heena A. Kalita* Date: 2/21/2008
 *Only necessary for NHTSA (Government) Compliance testing.

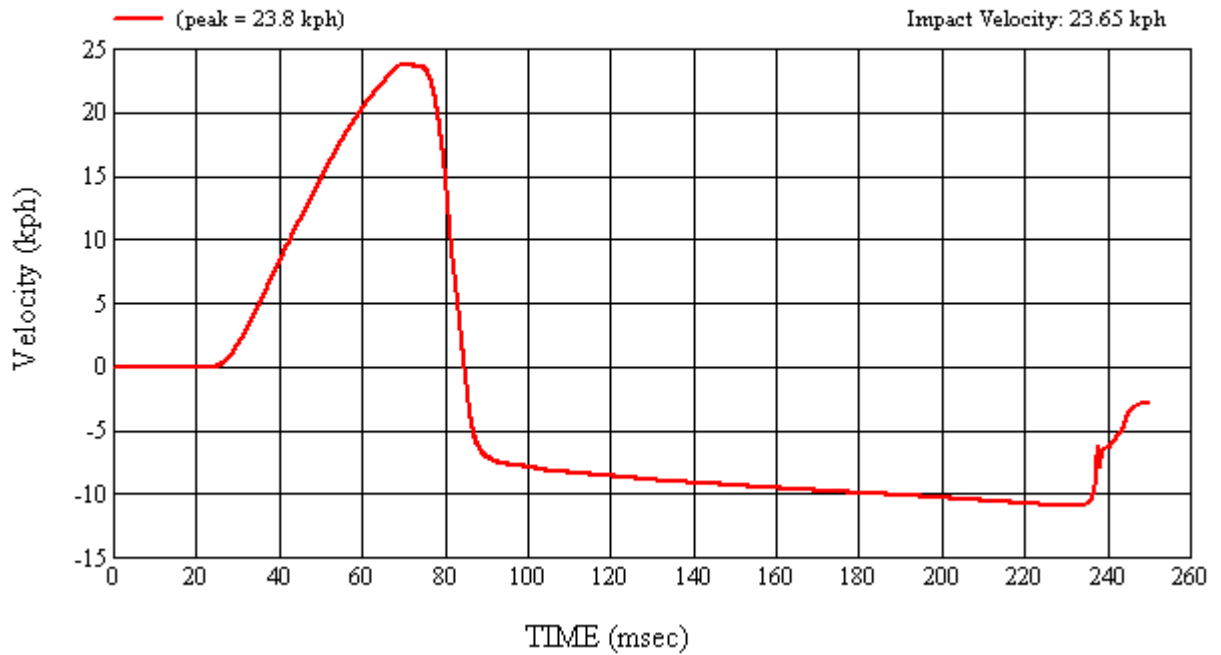
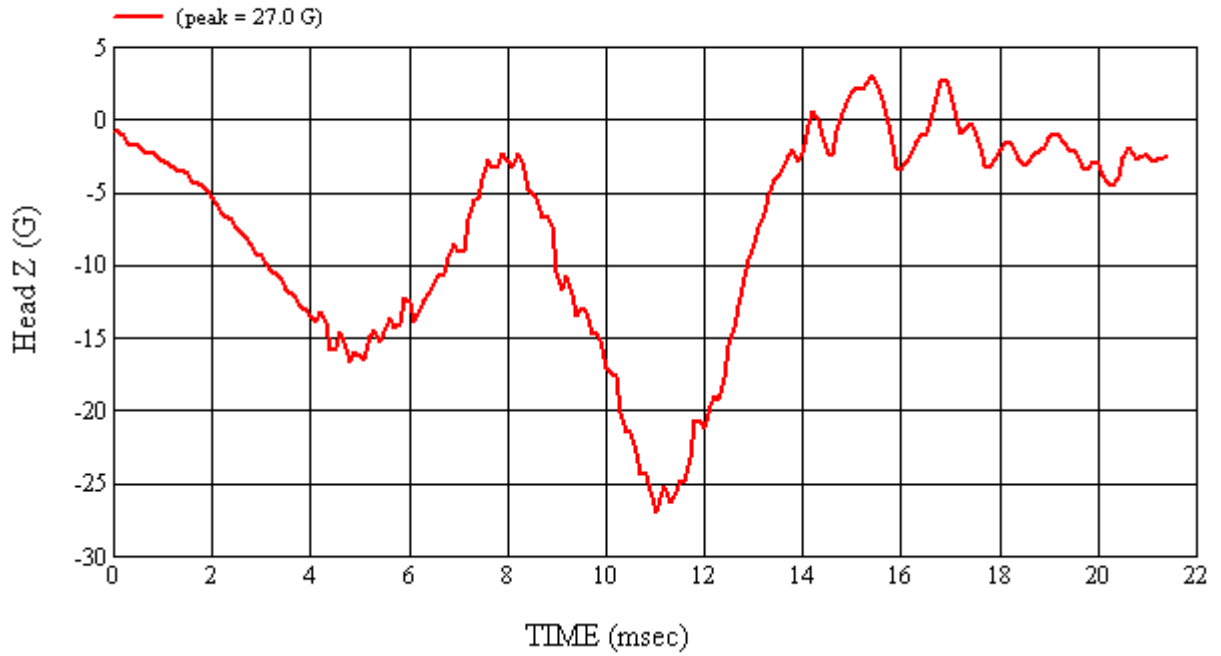
MGA Test #: FM8037

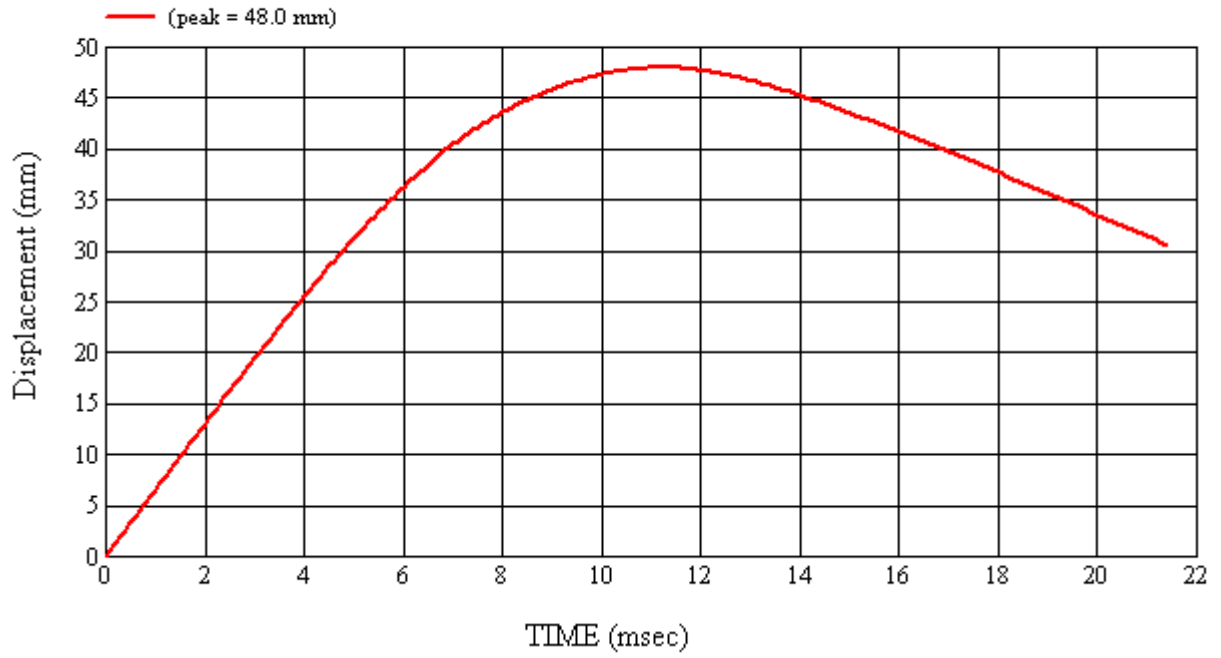
Target Location: UR5, Right Side

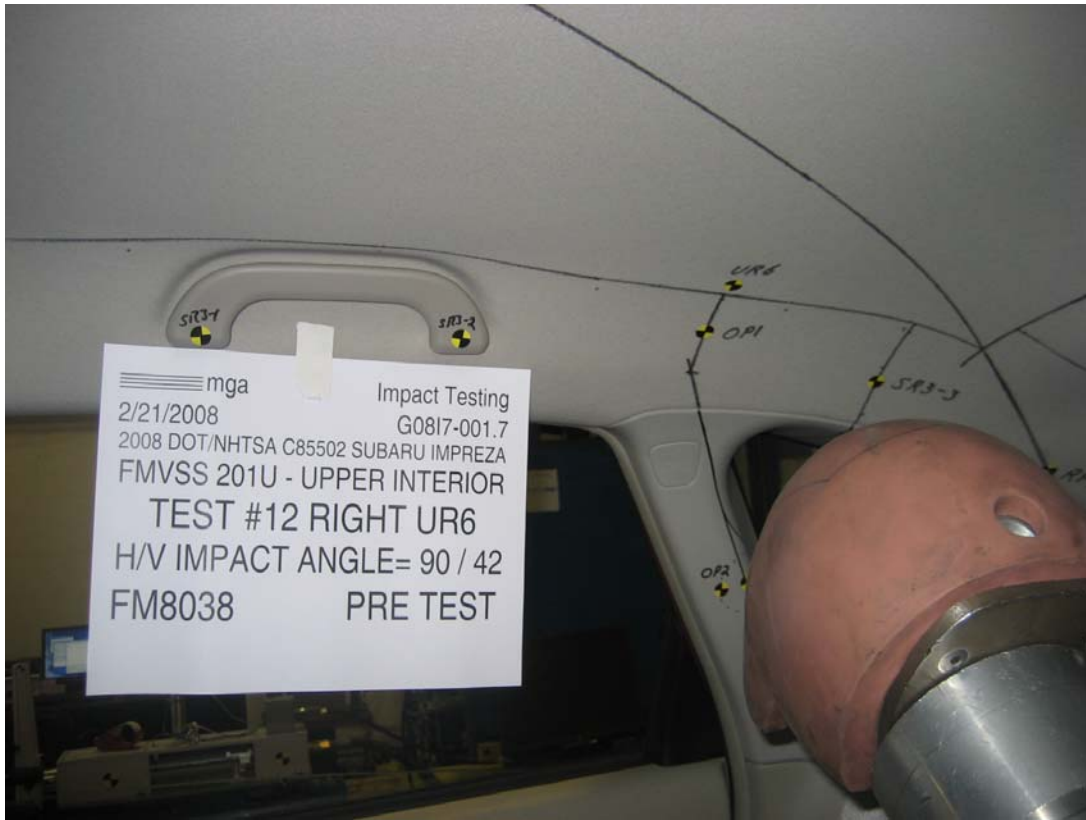
Test Date: 2/21/2008

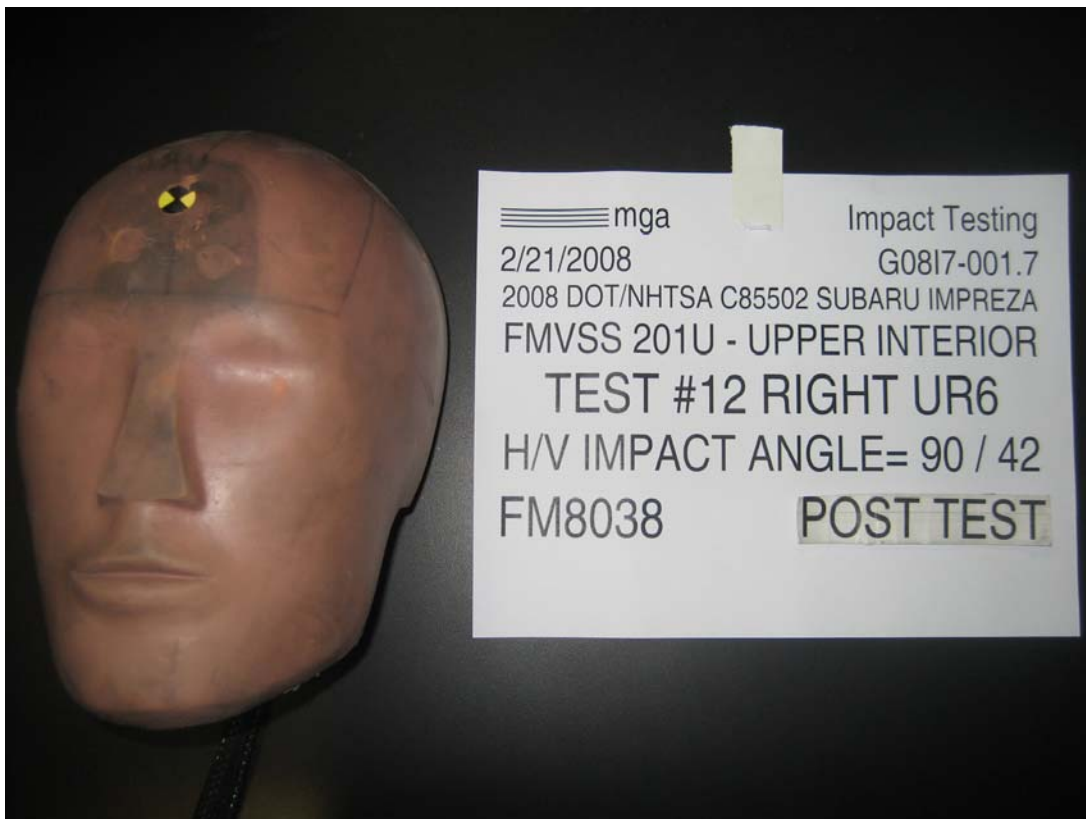
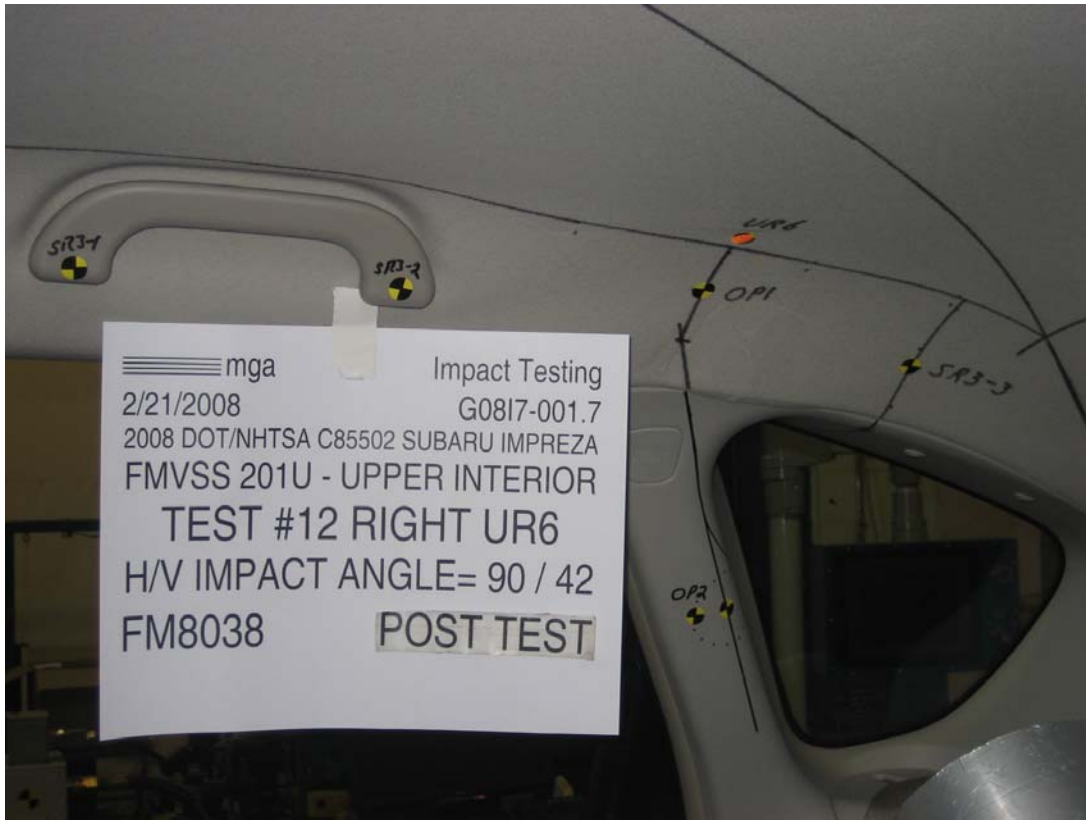












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.7

VEHICLE YR/MAKE/MODEL:2008/DOT/NHTSA C85502/Subaru
Impreza

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): UR6Right

Temperature:21C

MGA Test Reference No.:FM8038

Humidity:14%

Approach Horizontal Angles:90°

Time of Test:4:56:09 PM

Approach Vertical Angles:42°

FMH Serial No:[072]

Additional Description:@ OPR

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
816	862	6.2	23.4	28	3 Right

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J43743	-92.483	0.87	0.87
Y	6	J43745	97.812	0.85	0.85
Z	7	J43746	89.249	1.83	1.83

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

Headliner deformation.

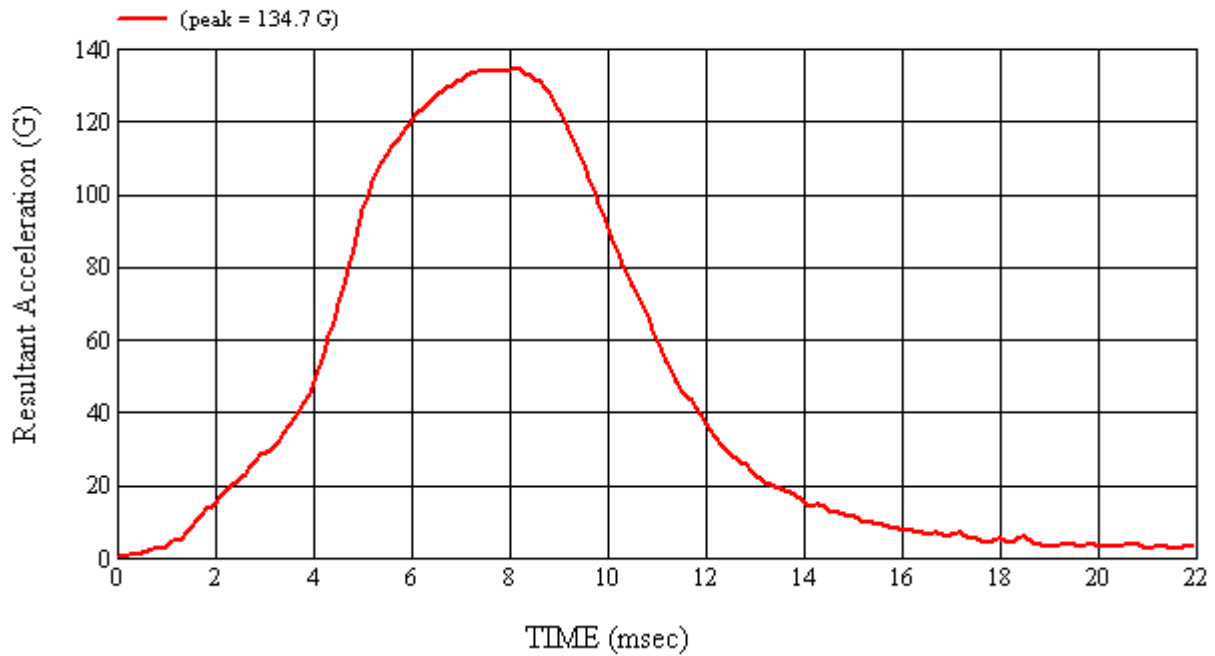
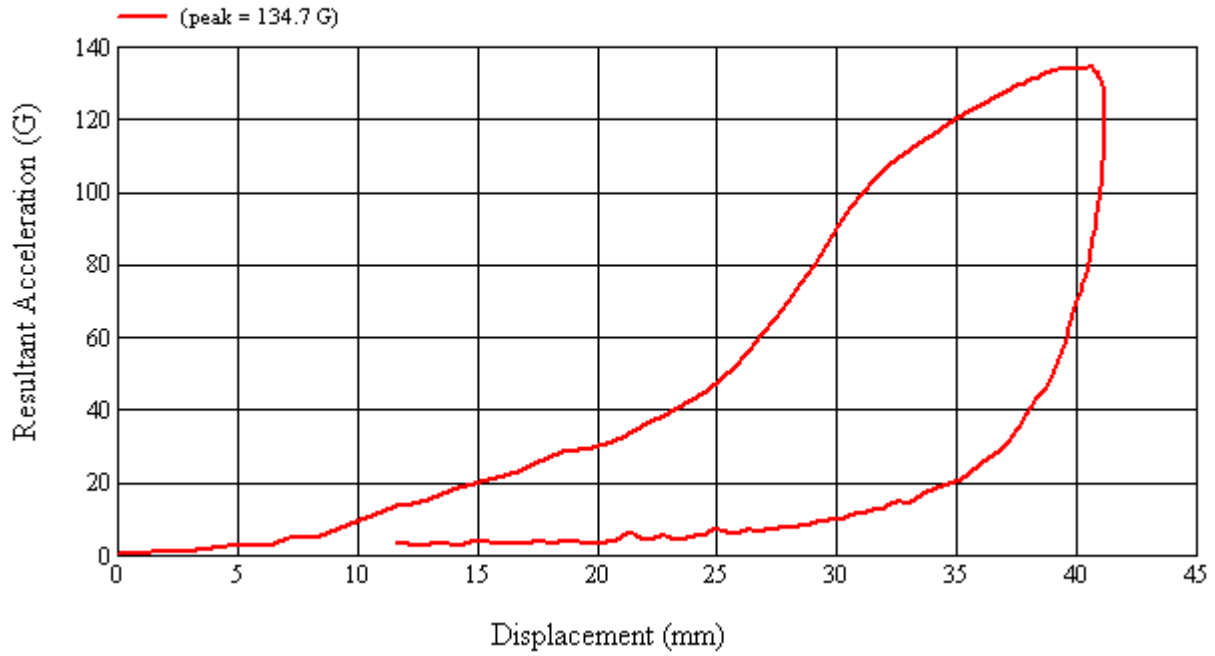
Recorded By: *Janita Campbell* Approved By*: *Heena A. Kalita* Date: 2/21/2008

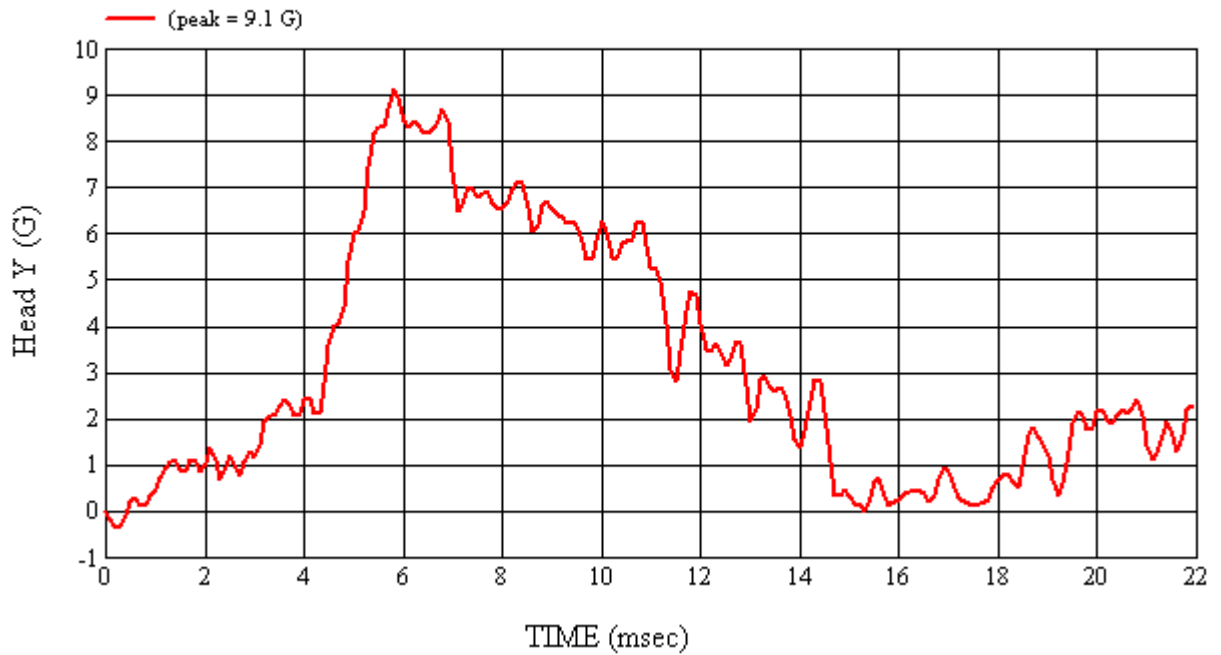
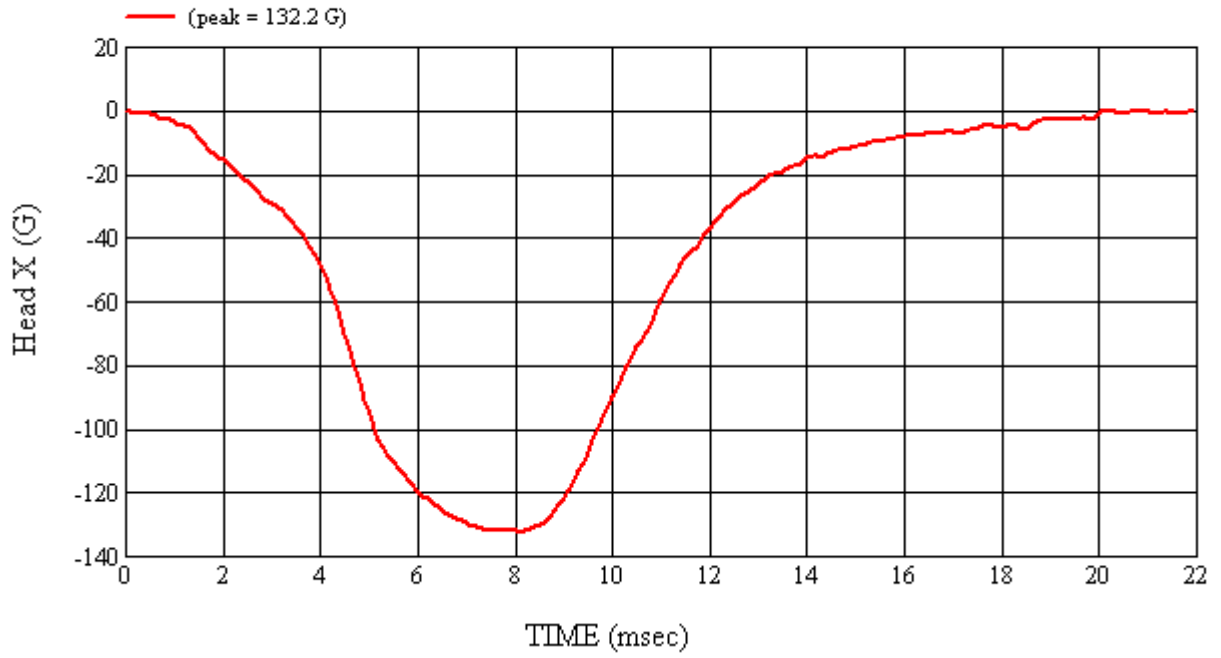
*Only necessary for NHTSA (Government) Compliance testing.

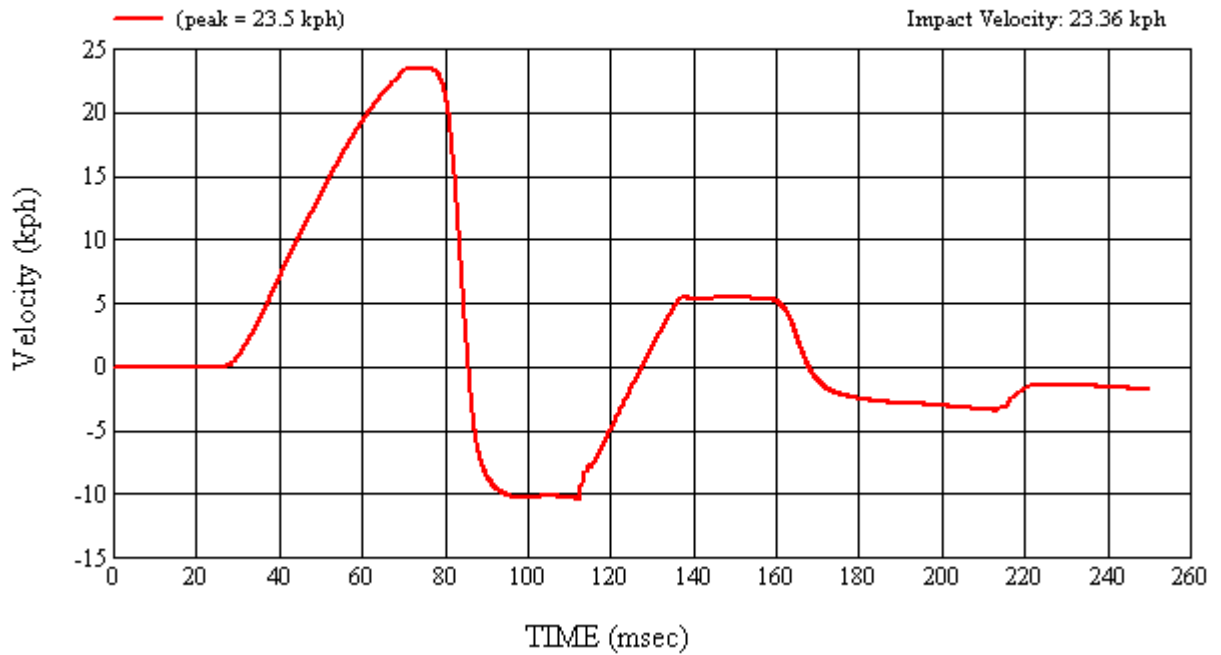
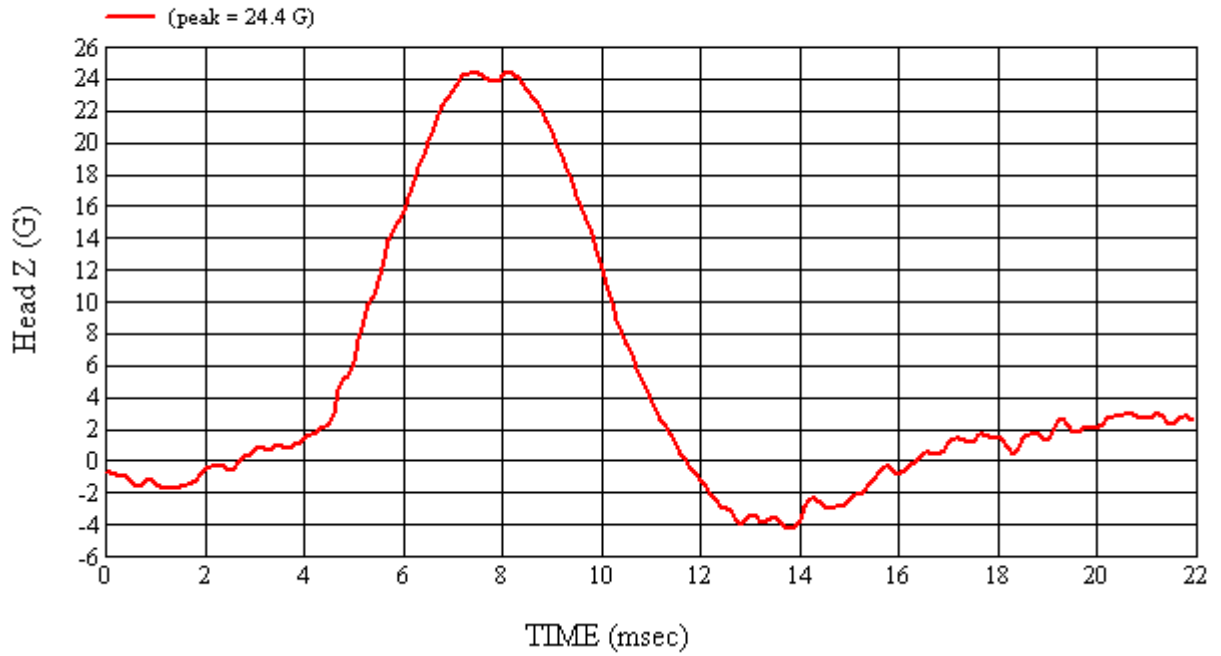
MGA Test #: FM8038

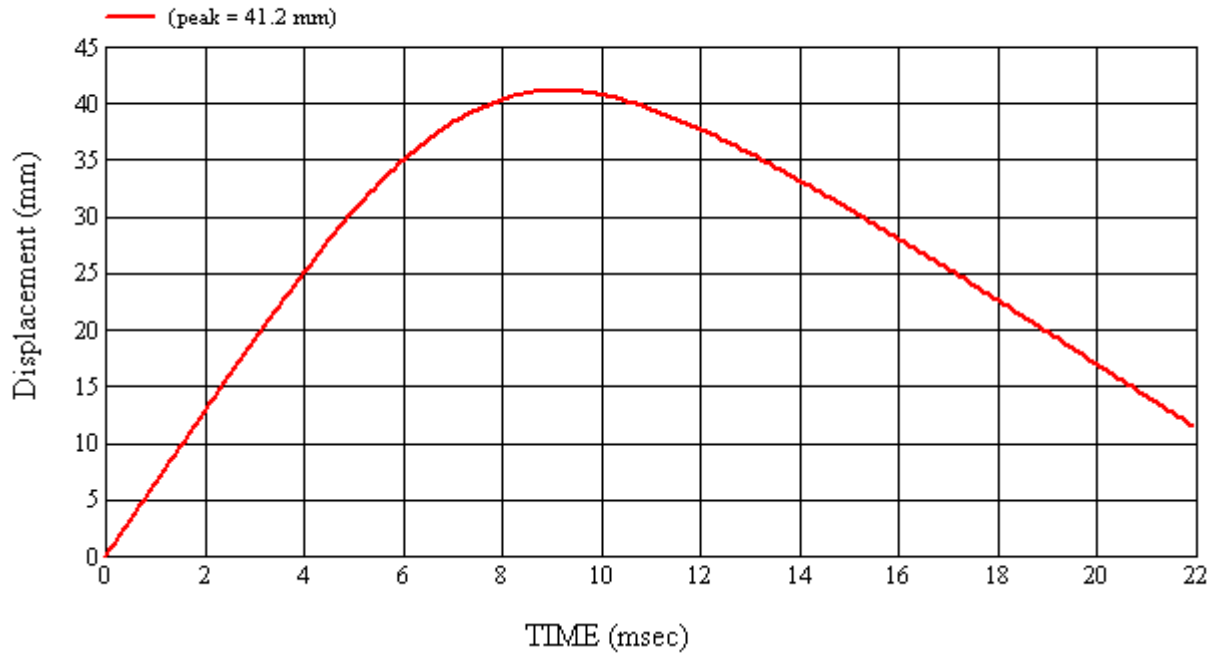
Target Location: UR6, Right Side

Test Date: 2/21/2008









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 66°F and 78°F (19°C – 26°C) 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
*Digital Inclinometer	Macklanburg-Duncan	PRO 360 (MGA00048)	Set Angle of FMH/Targeting	0.1°	Annual
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	035 037 038 072	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Redlake	HGLE	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 Macklanburg-Duncan	TPM052 -- MGA00071	Measurement Targeting FMH setup Horizontal Measurement	1 mm N/A 0.5°	Annual
*Temperature Recorder	Dickson	FH125	Record Temperature and Humidity	± 1°C ± 1% RH	Annual
* Scale	Detecto	MGA00081	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 66°F to 78°F (19°C to 26°C) 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 (°C)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#035	2/18/2008	10.08	20.6	26.8	229.7	8.9	Yes
Post	#035	2/22/2008	10.00	21.4	17.1	249.2	2.8	Yes
Pre	#037	2/18/2008	10.10	20.6	26.8	241.1	5.7	Yes
Post	#037	2/22/2008	10.10	21.4	17.1	236.6	4.3	Yes
Pre	#038	2/18/2008	9.96	20.6	26.8	242.7	14.0	Yes
Post	#038	2/22/2008	9.96	21.4	17.1	241.0	7.0	Yes
Pre	#072	2/18/2008	10.10	20.6	26.8	245.1	9.8	Yes
Post	#072	2/22/2008	10.10	21.4	17.1	232.0	9.6	Yes

4-1 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

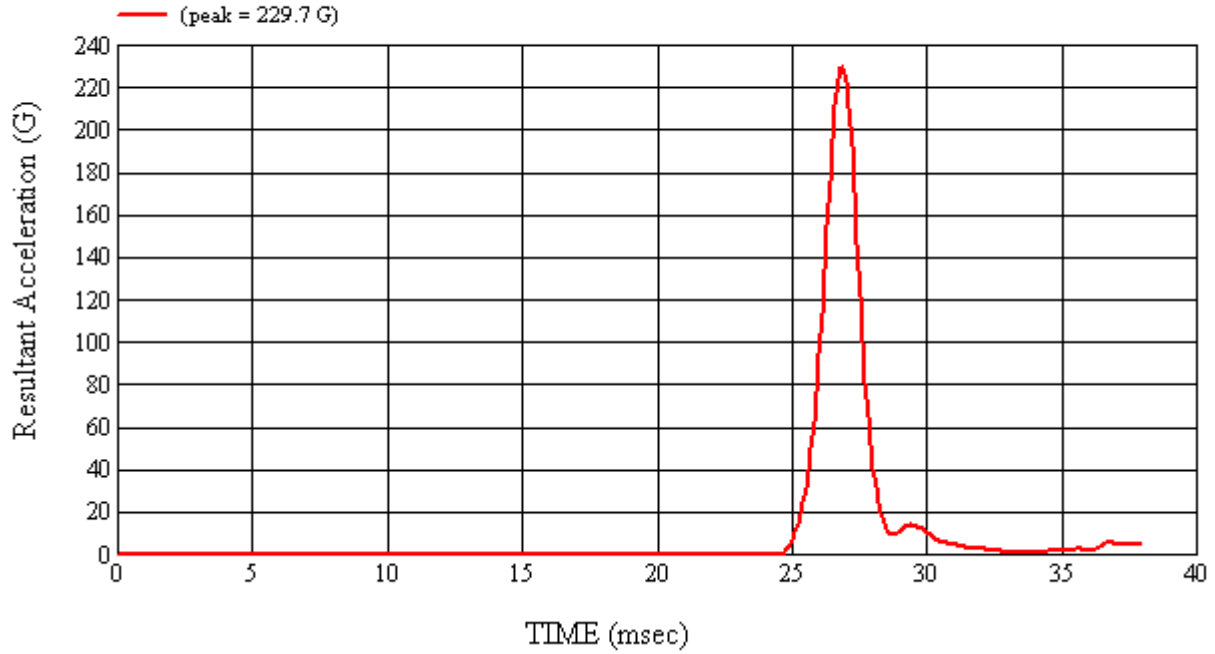
HEADFORM SERIAL NUMBER: 035		CALIBRATION DATE: 2/18/2008
CALIBRATION TIME: 3:04:08 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.08
Temperature	19° C to 26° C	20.6
Relative Humidity	10% to 70%	26.8
Peak Resultant Acceleration	225 G's to 275 G's	229.7
Peak Lateral Acceleration	15 G's Maximum	8.9
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	J22664	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J35919	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J35924	10/30/07	04/30/08

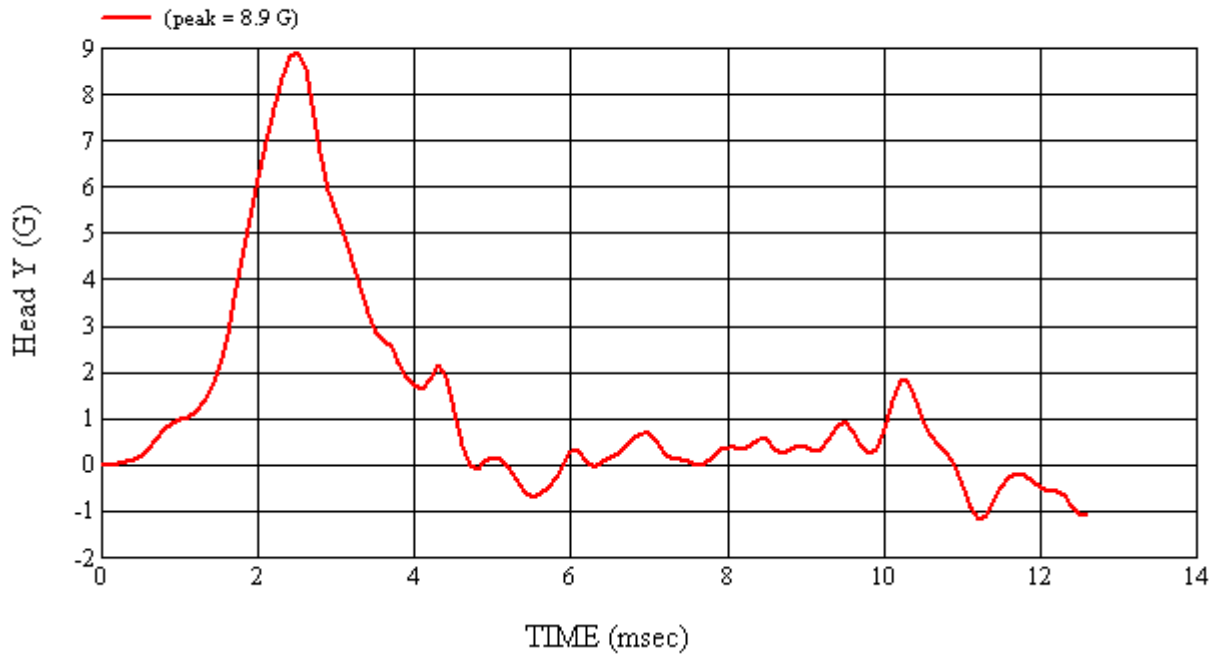
REMARKS:

RECORDED BY:  DATE: 2/18/2008

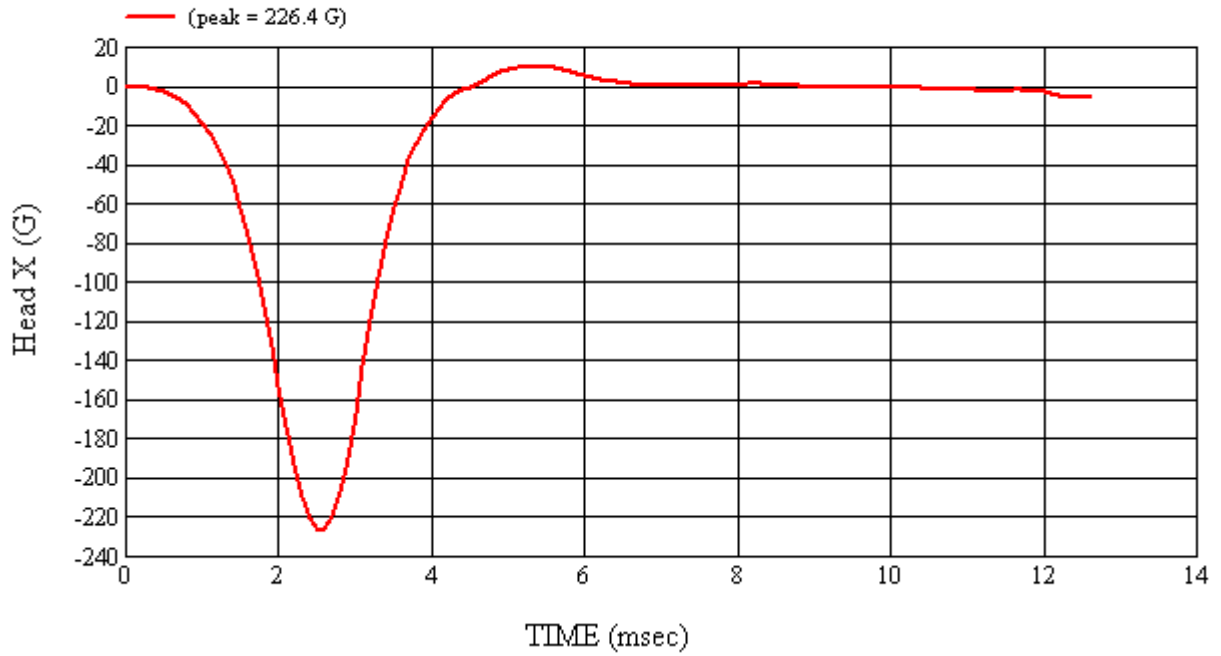
APPROVED BY: 



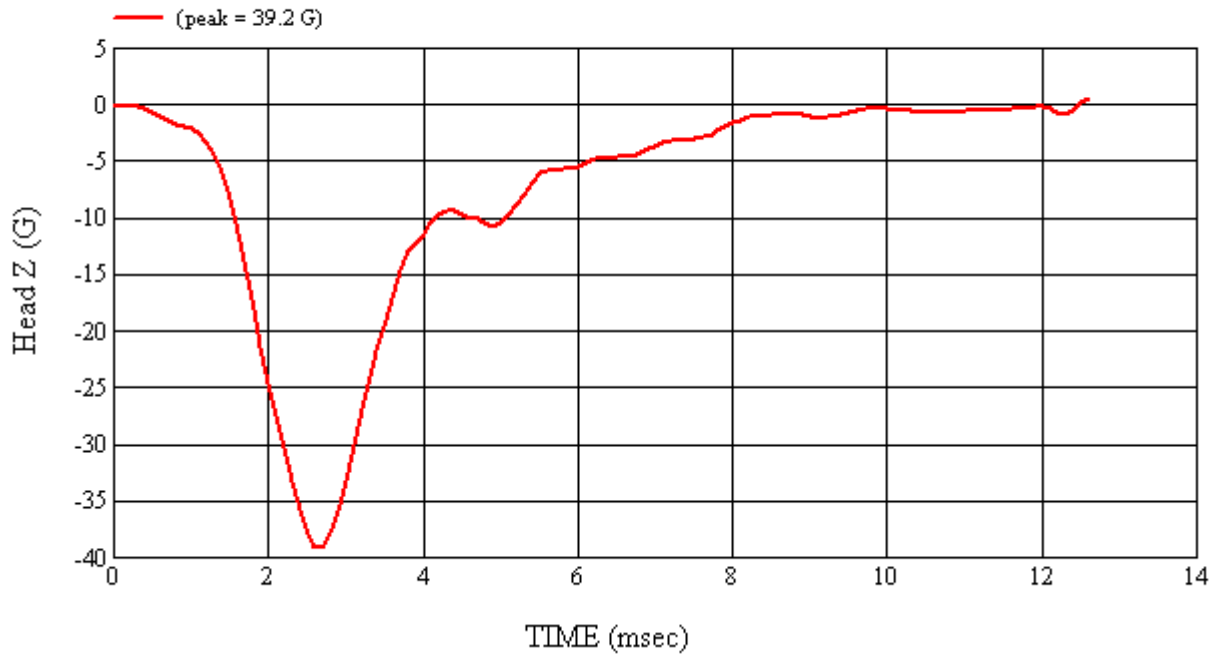
Head 035 (Pre) Calibration #H35003



Head 035 (Pre) Calibration #H35003



Head 035 (Pre) Calibration #H35003



Head 035 (Pre) Calibration #H35003

4-2 Post-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

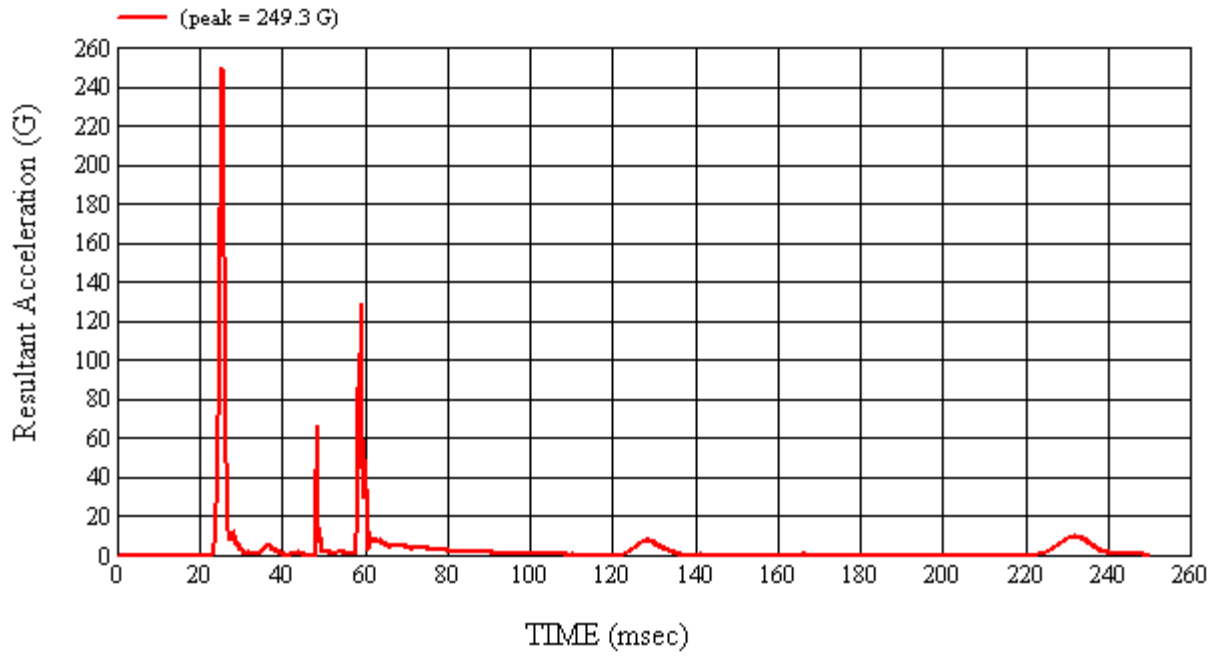
HEADFORM SERIAL NUMBER: 035		CALIBRATION DATE: 2/22/2008
CALIBRATION TIME: 11:31:18 AM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.08
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	17.1
Peak Resultant Acceleration	225 G's to 275 G's	249.2
Peak Lateral Acceleration	15 G's Maximum	2.8
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	J22664	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J35919	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J35924	10/30/07	04/30/08

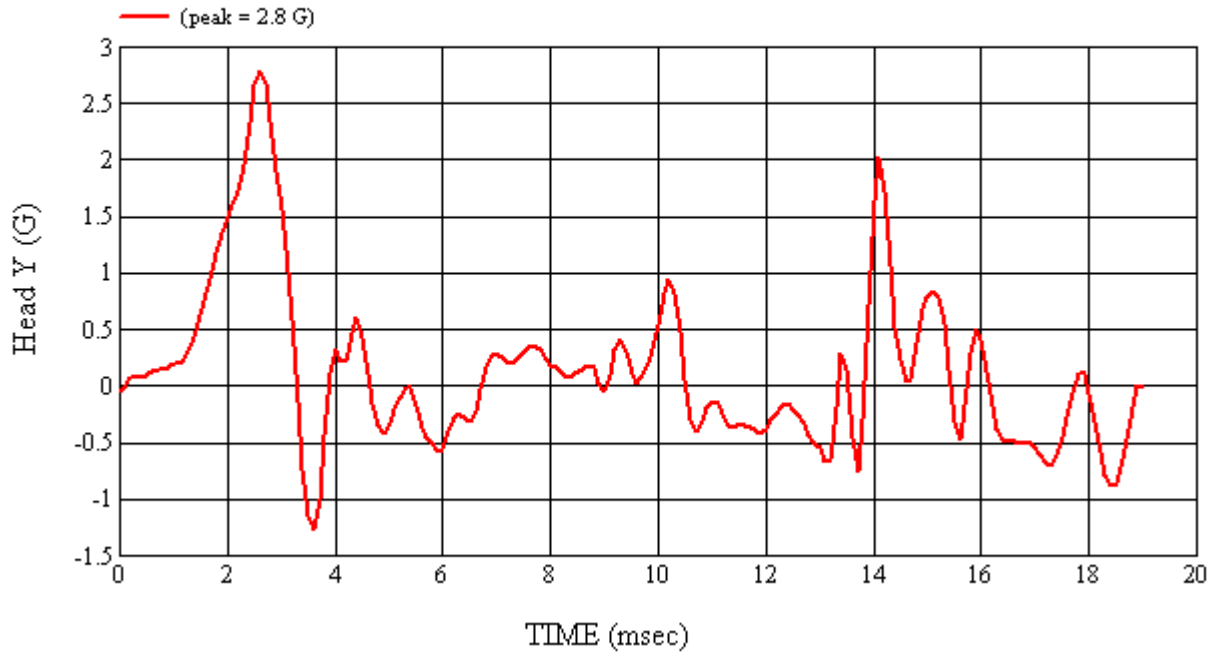
REMARKS:

RECORDED BY:  DATE: 2/22/2008

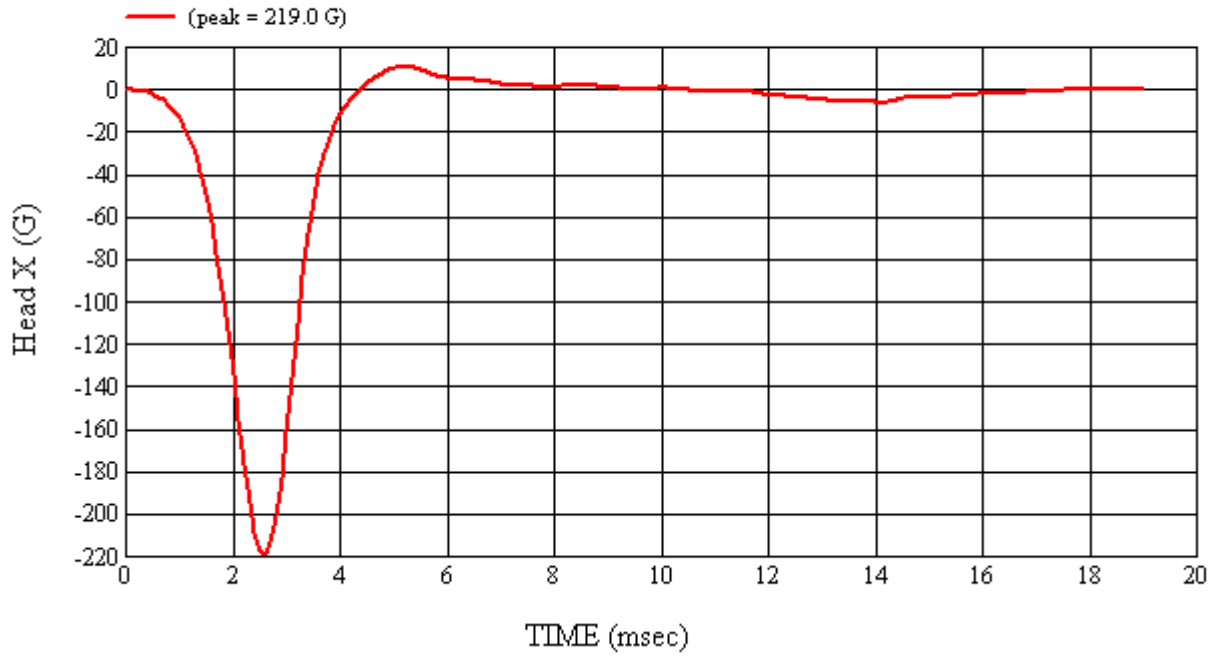
APPROVED BY: 



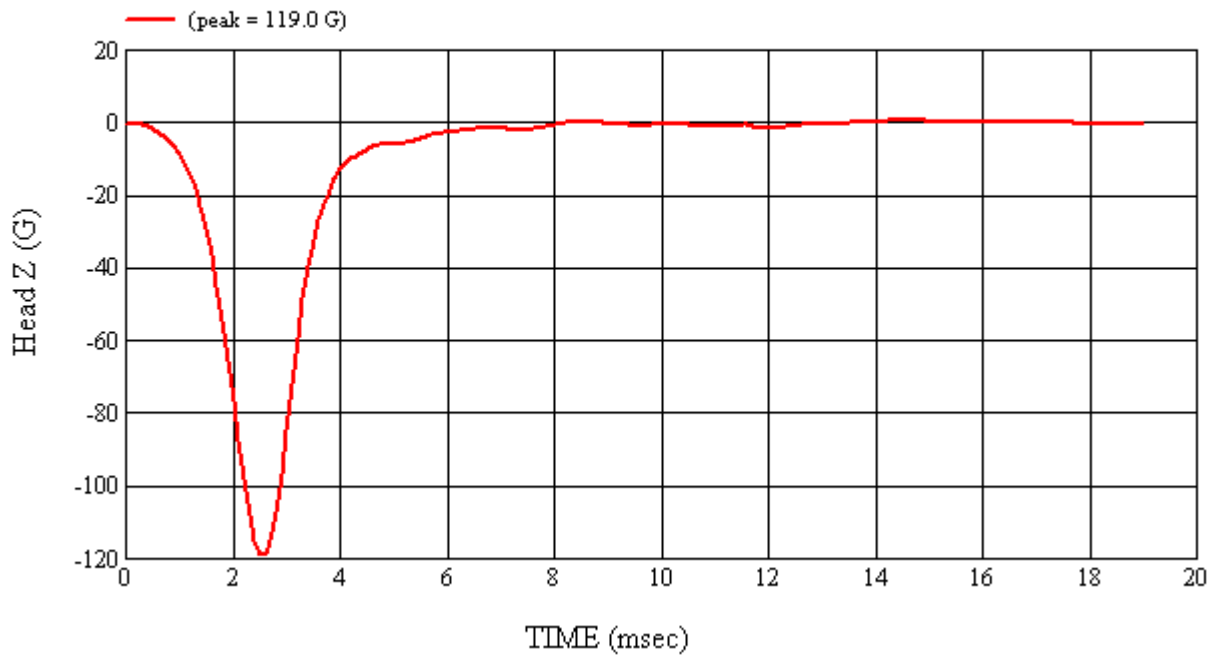
Head 035 (Post) Calibration #H35004



Head 035 (Post) Calibration #H35004



Head 035 (Post) Calibration #H35004



Head 035 (Post) Calibration #H35004

4-3 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

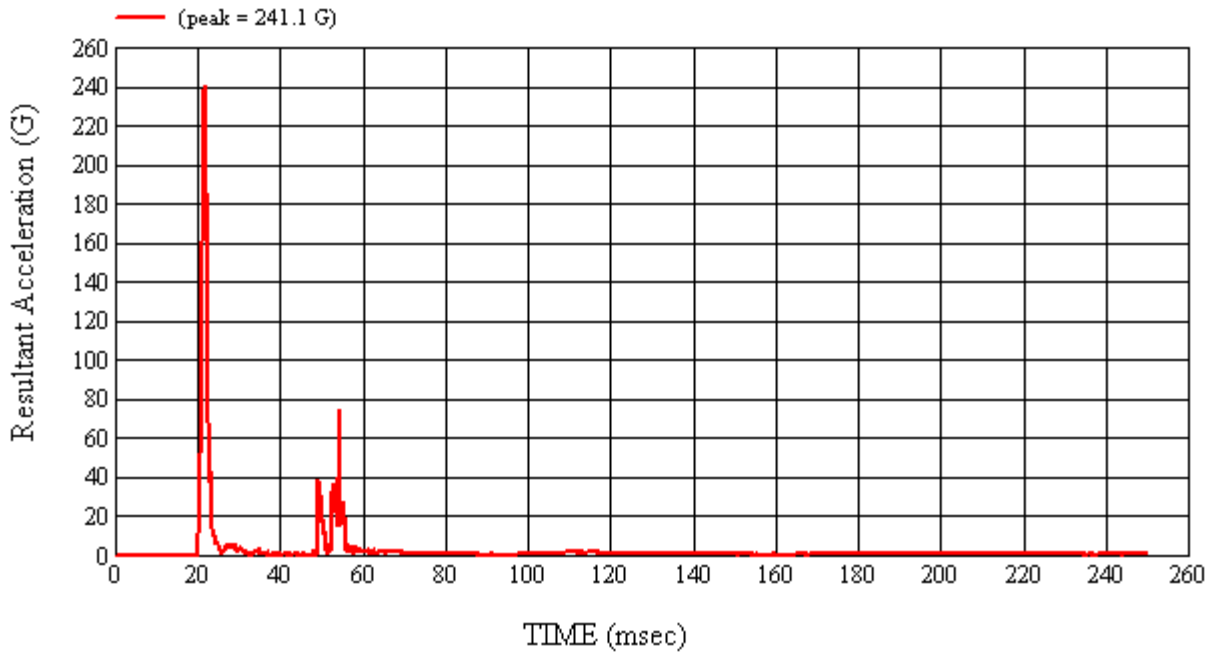
HEADFORM SERIAL NUMBER: 037		CALIBRATION DATE: 2/18/2008
CALIBRATION TIME: 3:34:08 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	20.6
Relative Humidity	10% to 70%	26.8
Peak Resultant Acceleration	225 G's to 275 G's	241.1
Peak Lateral Acceleration	15 G's Maximum	5.7
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	J22696	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J35791	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J35800	10/30/07	04/30/08

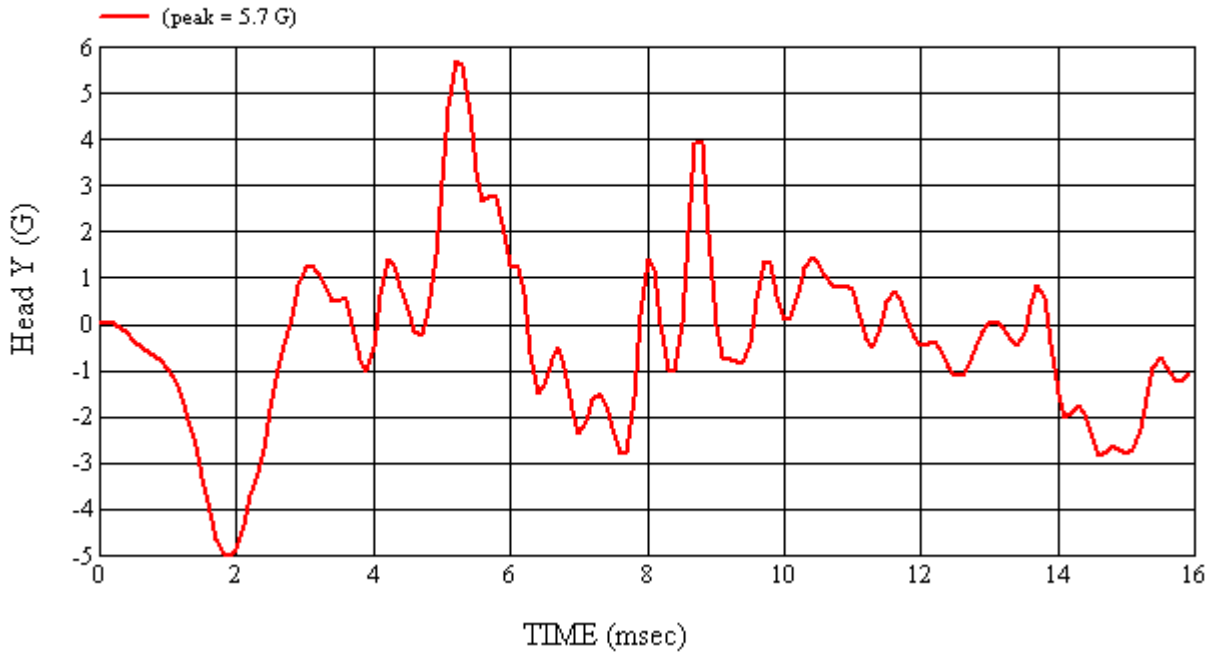
REMARKS:

RECORDED BY:  DATE: 2/18/2008

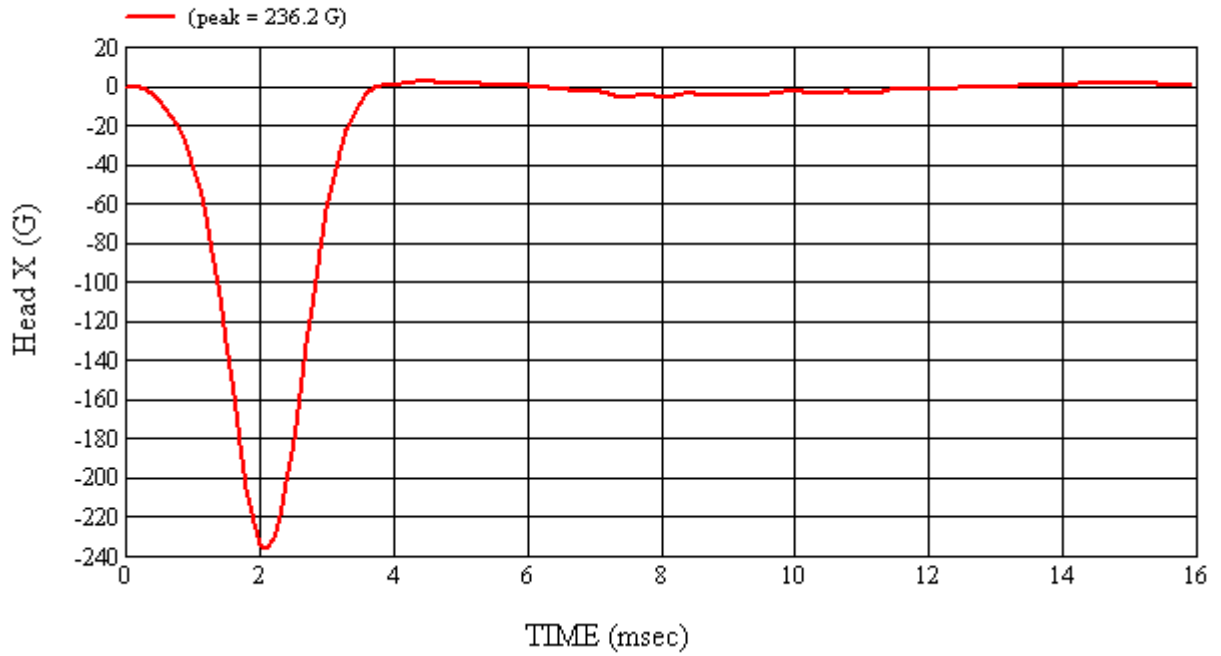
APPROVED BY: 



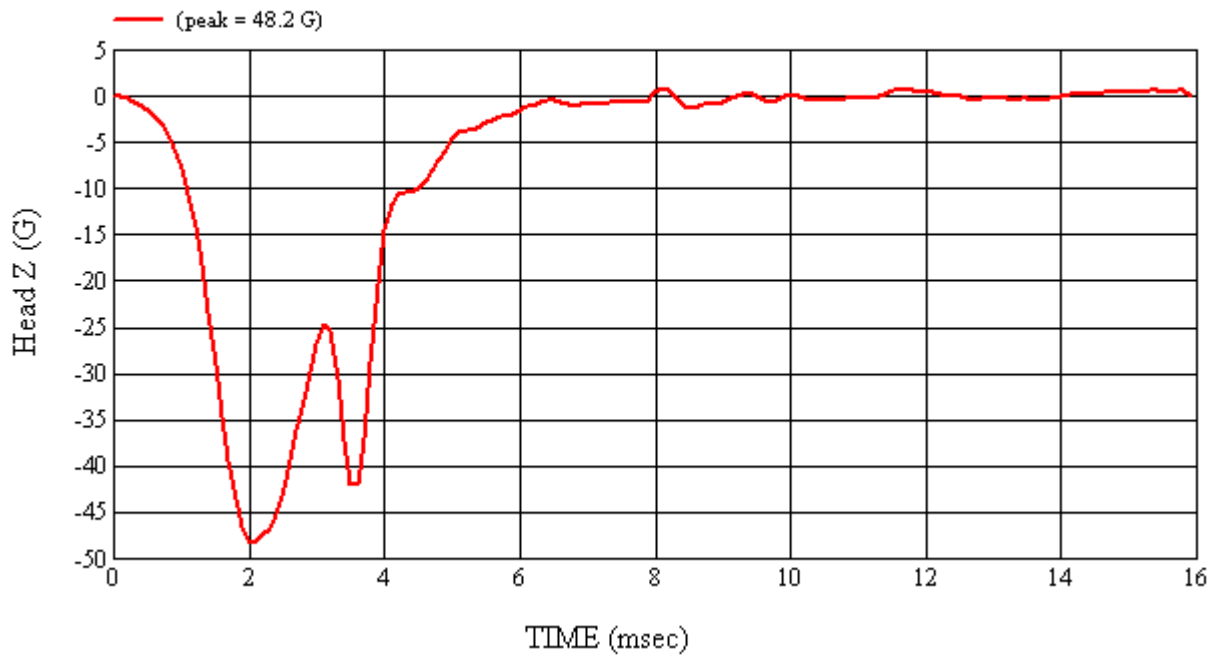
Head 037 (Pre) Calibration #H37003



Head 037 (Pre) Calibration #H37003



Head 037 (Pre) Calibration #H37003



Head 037 (Pre) Calibration #H37003

4-4 Post-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

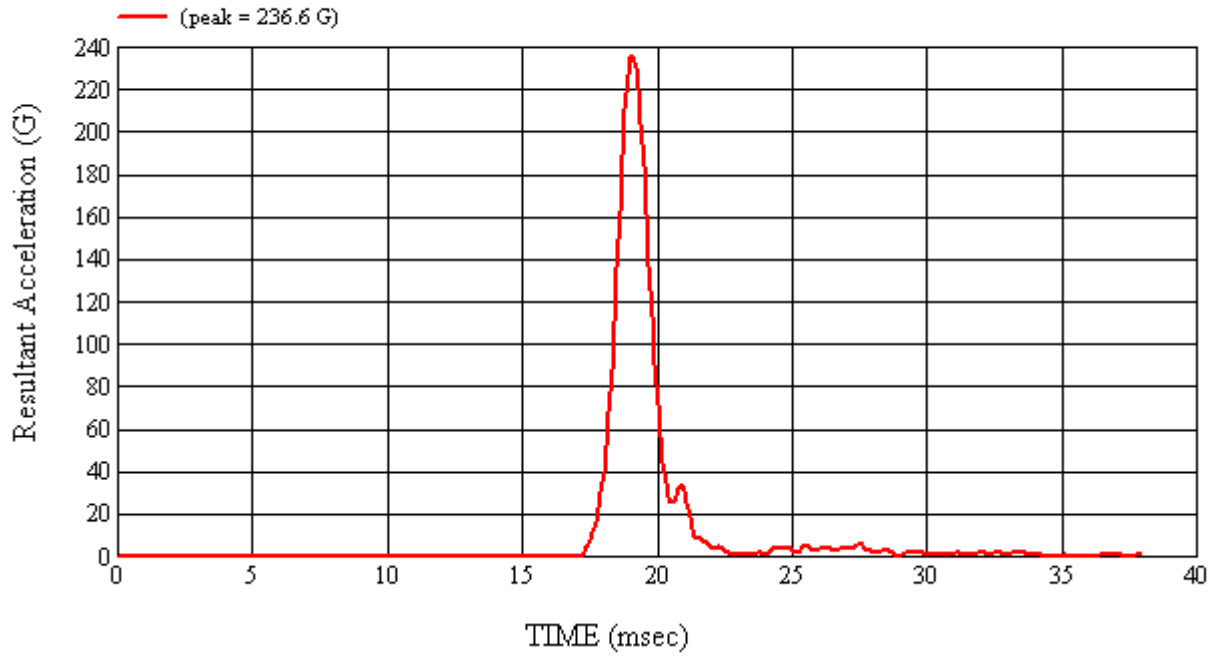
HEADFORM SERIAL NUMBER: 037		CALIBRATION DATE: 2/22/2008
CALIBRATION TIME: 11:53:59 AM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	17.1
Peak Resultant Acceleration	225 G's to 275 G's	236.6
Peak Lateral Acceleration	15 G's Maximum	4.3
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	J22696	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J35791	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J35800	10/30/07	04/30/08

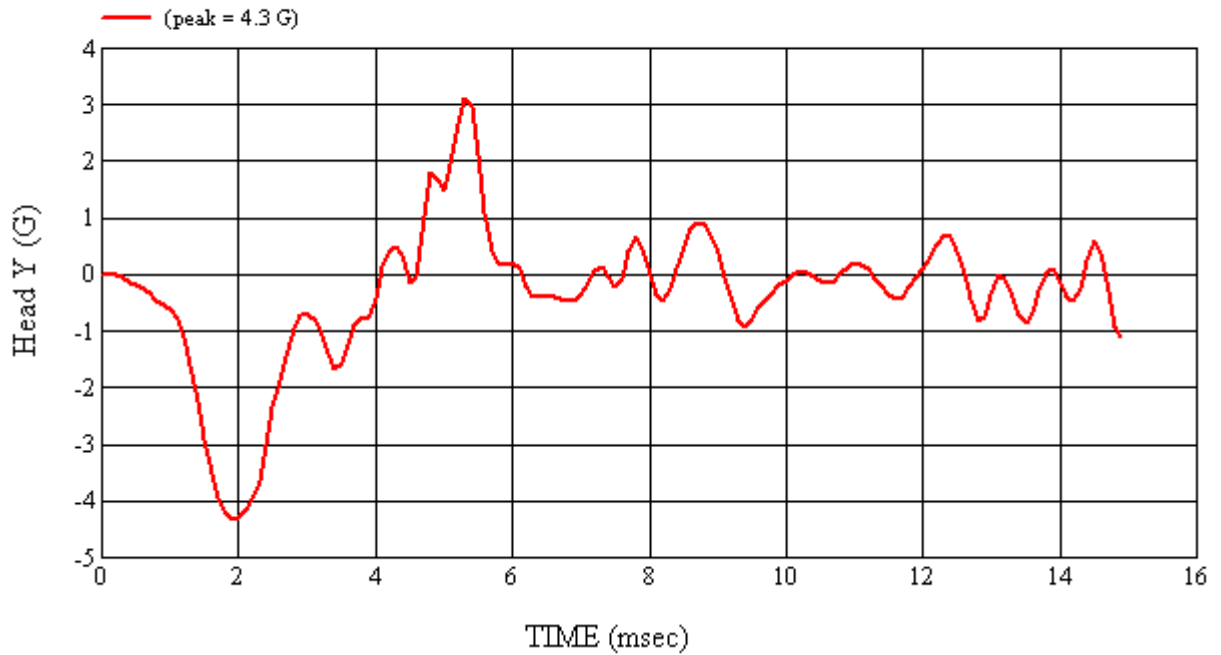
REMARKS:

RECORDED BY:  DATE: 2/22/2008

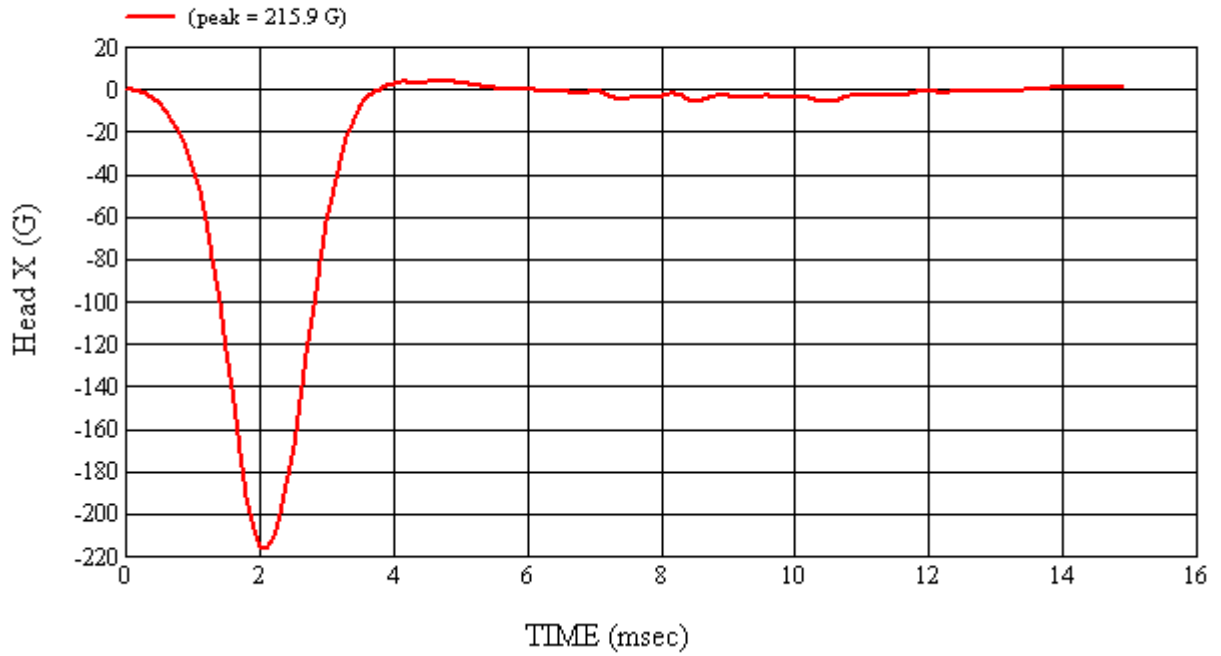
APPROVED BY: 



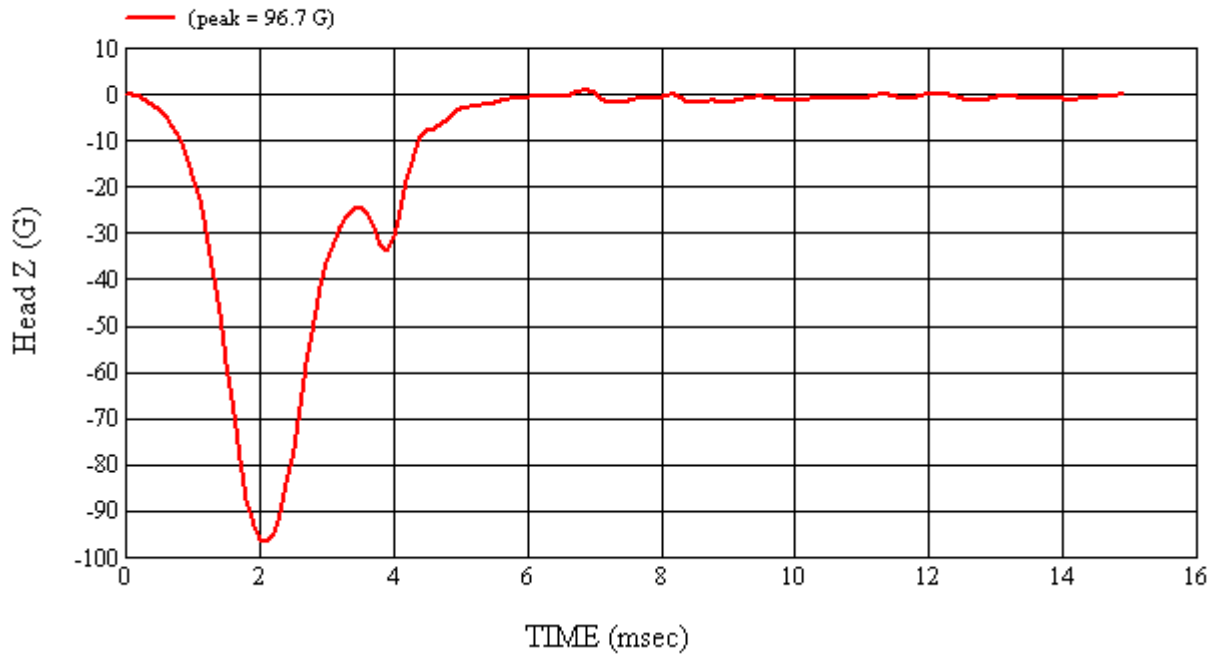
Head 037 (Post) Calibration #H37004



Head 037 (Post) Calibration #H37004



Head 037 (Post) Calibration #H37004



Head 037 (Post) Calibration #H37004

4-5 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

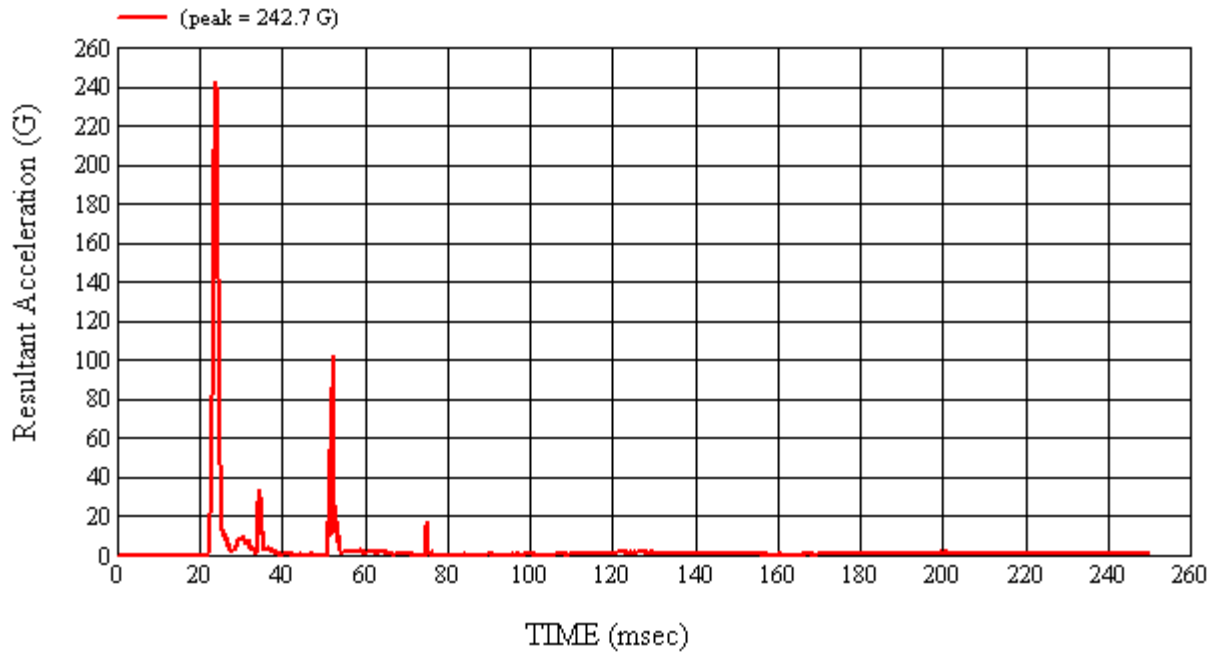
HEADFORM SERIAL NUMBER: 038		CALIBRATION DATE: 2/18/2008
CALIBRATION TIME: 3:59:36 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	20.6
Relative Humidity	10% to 70%	26.8
Peak Resultant Acceleration	225 G's to 275 G's	242.7
Peak Lateral Acceleration	15 G's Maximum	14.0
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	J14103	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J36197	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J36353	10/30/07	04/30/08

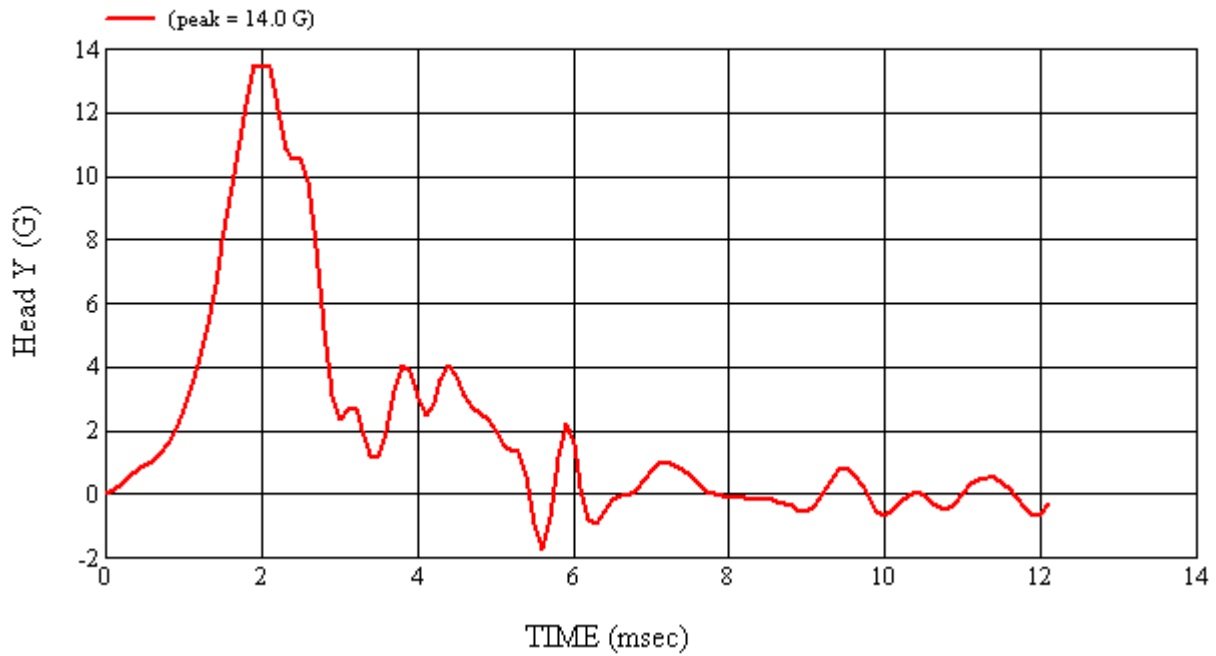
REMARKS:

RECORDED BY:  DATE: 2/18/2008

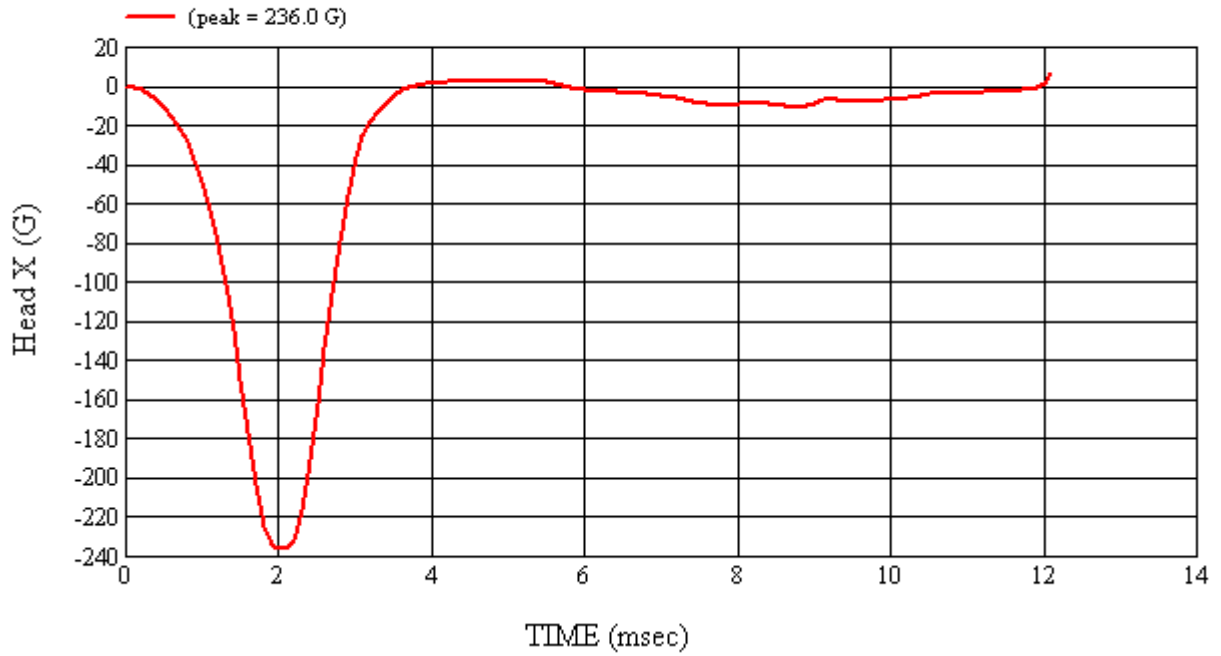
APPROVED BY: 



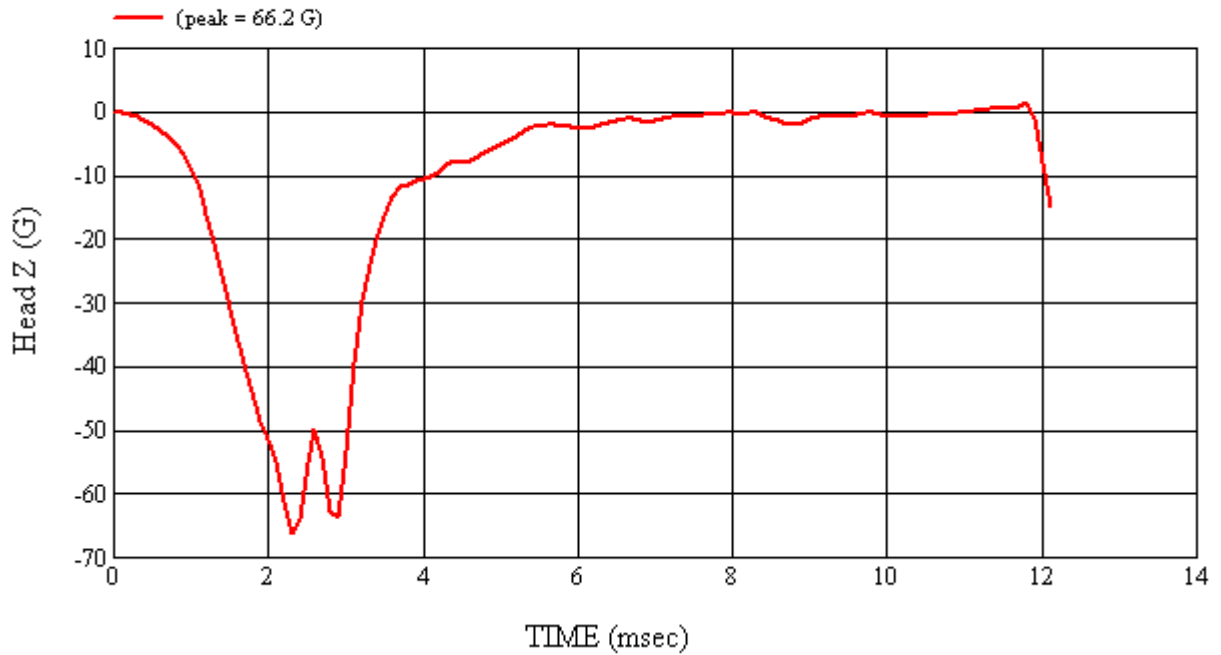
Head 038 (Pre) Calibration #H38003



Head 038 (Pre) Calibration #H38003



Head 038 (Pre) Calibration #H38003



Head 038 (Pre) Calibration #H38003

4-6 Post-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

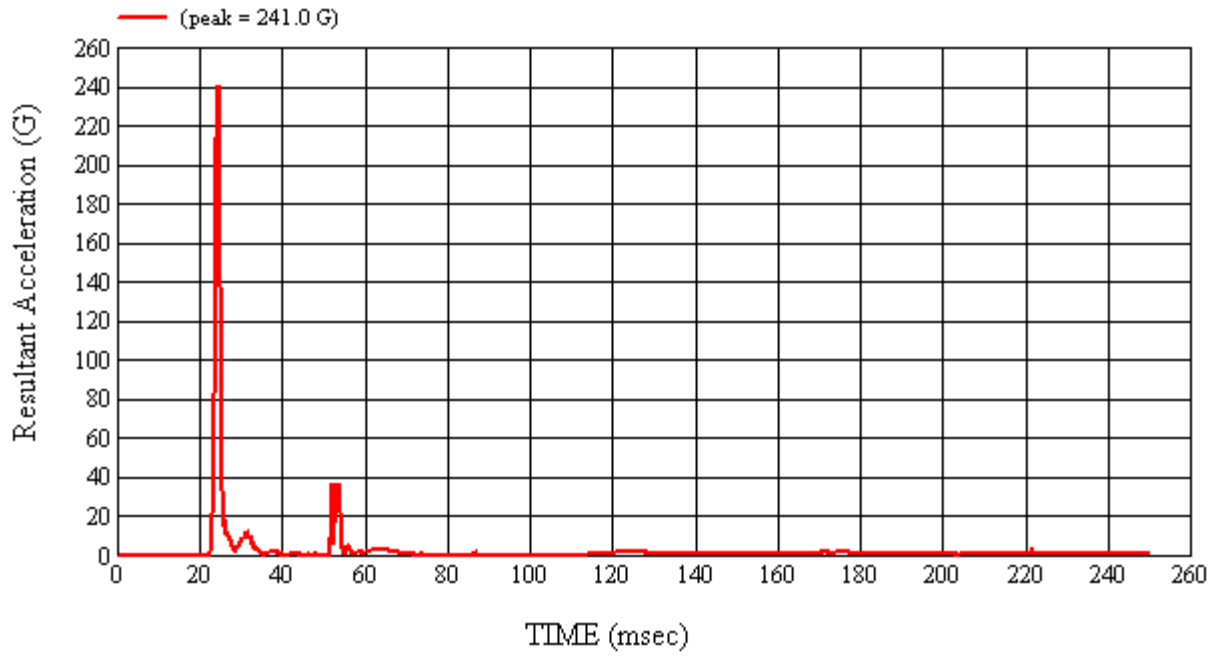
HEADFORM SERIAL NUMBER: 038		CALIBRATION DATE: 2/22/2008
CALIBRATION TIME: 2:01:58 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	17.1
Peak Resultant Acceleration	225 G's to 275 G's	241.0
Peak Lateral Acceleration	15 G's Maximum	7.0
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	J14103	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J36197	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J36353	10/30/07	04/30/08

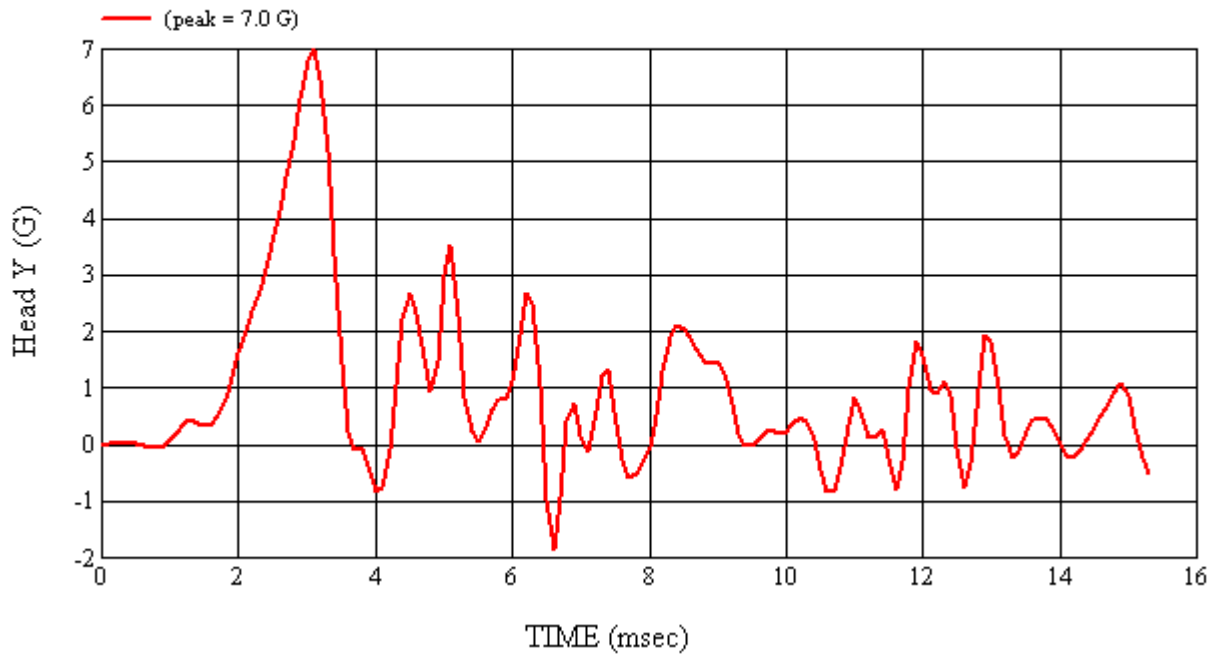
REMARKS:

RECORDED BY:  DATE: 2/22/2008

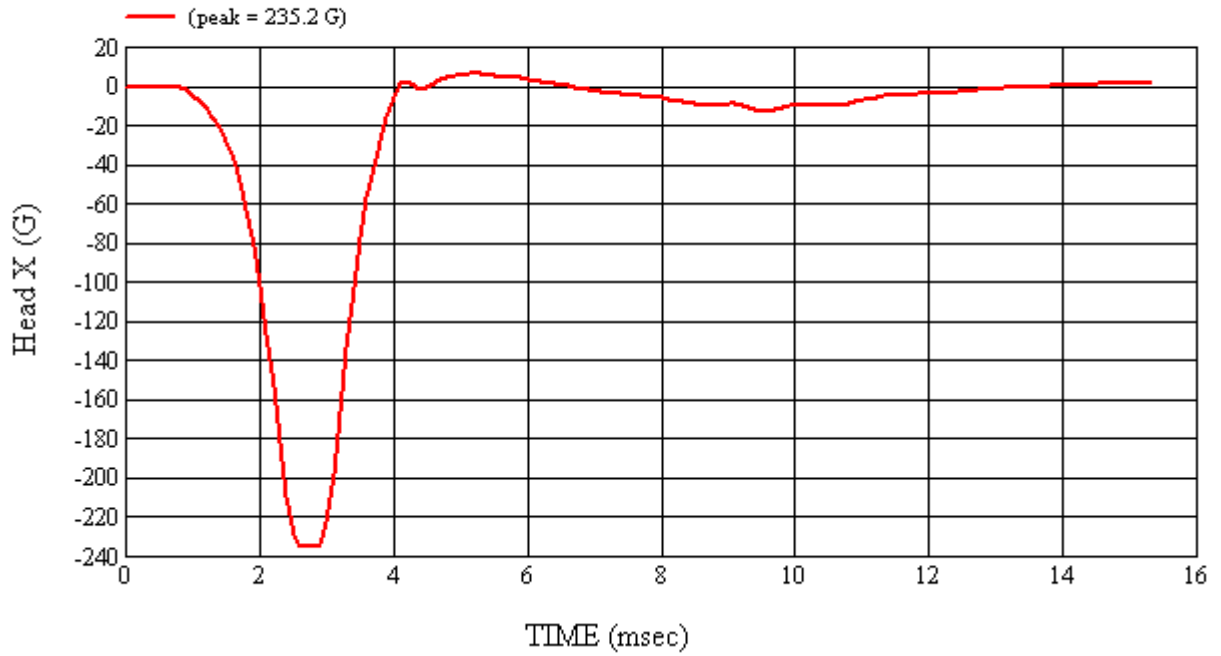
APPROVED BY: 



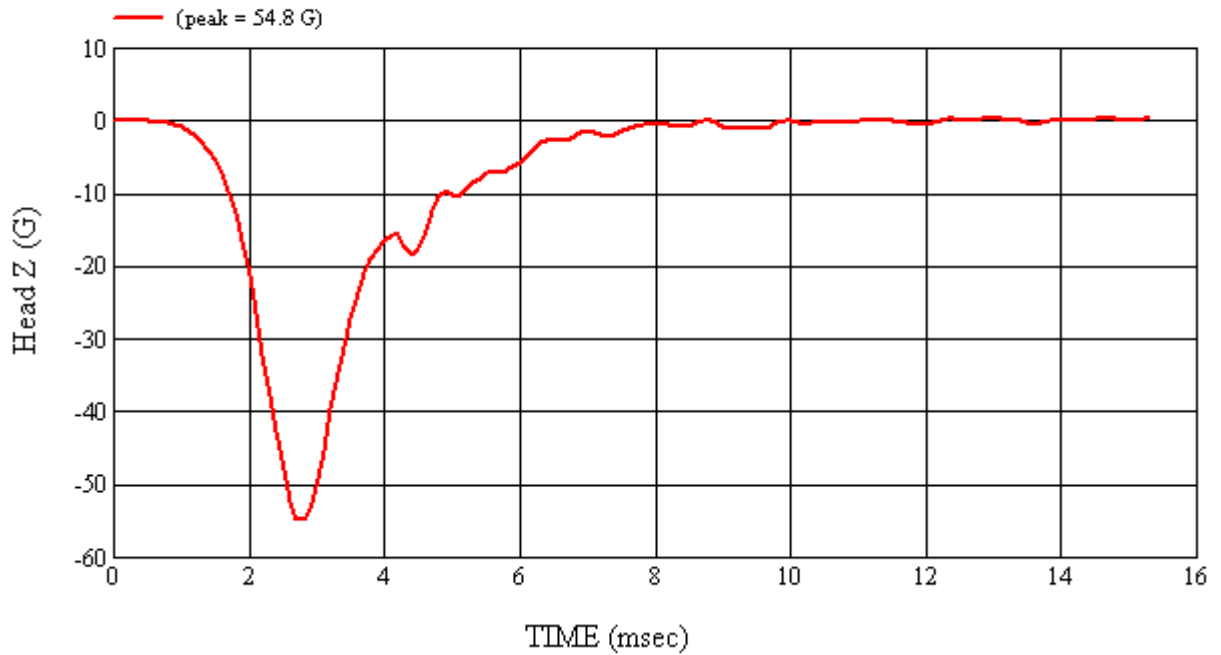
Head 038 (Post) Calibration #H38004



Head 038 (Post) Calibration #H38004



Head 038 (Post) Calibration #H38004



Head 038 (Post) Calibration #H38004

4-7 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

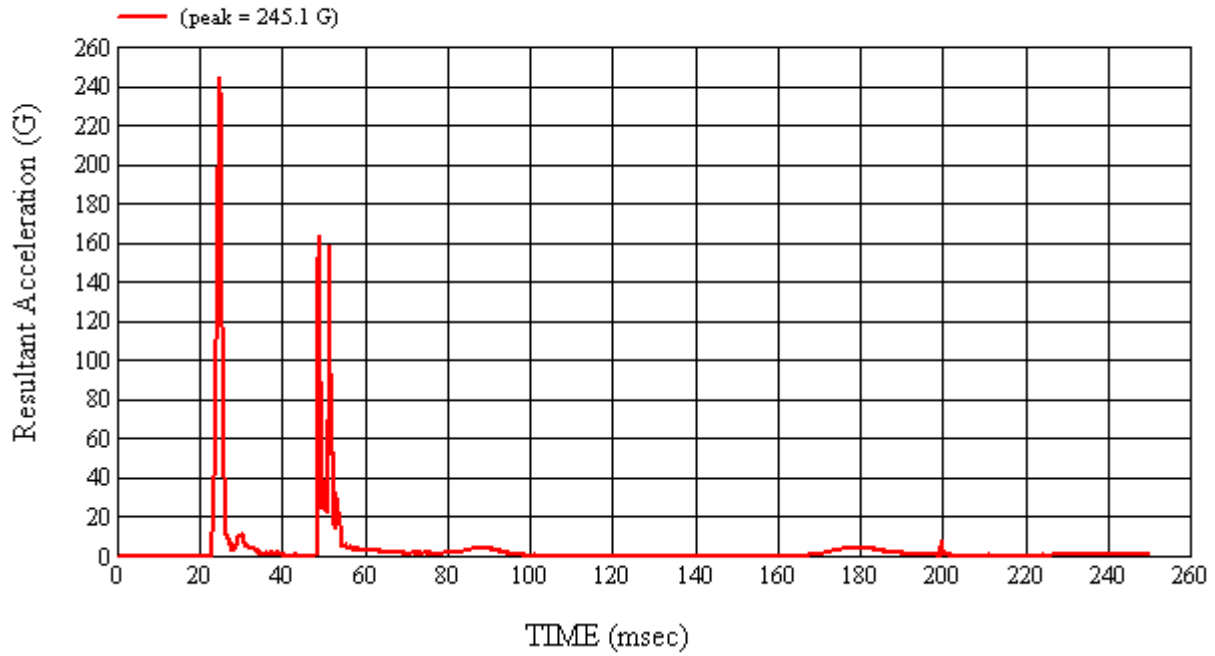
HEADFORM SERIAL NUMBER:		CALIBRATION DATE:
		CALIBRATION TIME:
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	20.6
Relative Humidity	10% to 70%	26.8
Peak Resultant Acceleration	225 G's to 275 G's	245.1
Peak Lateral Acceleration	15 G's Maximum	9.8
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	J43743	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J43745	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J43746	10/30/07	04/30/08

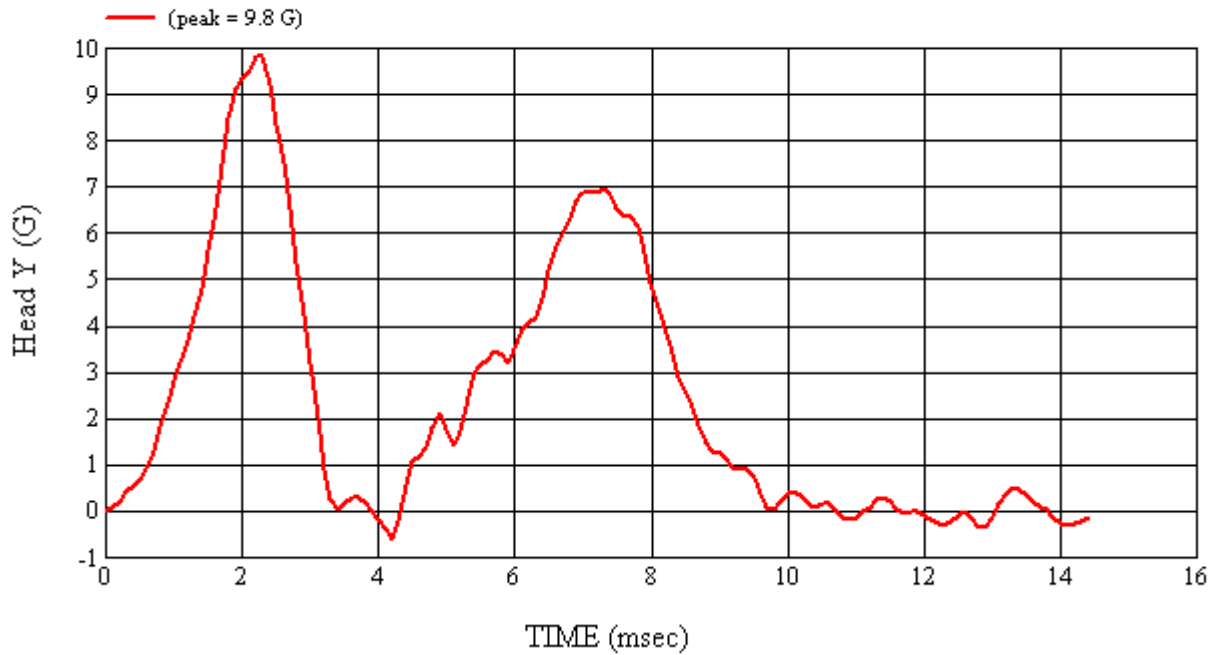
REMARKS:

RECORDED BY:  DATE: 2/18/2008

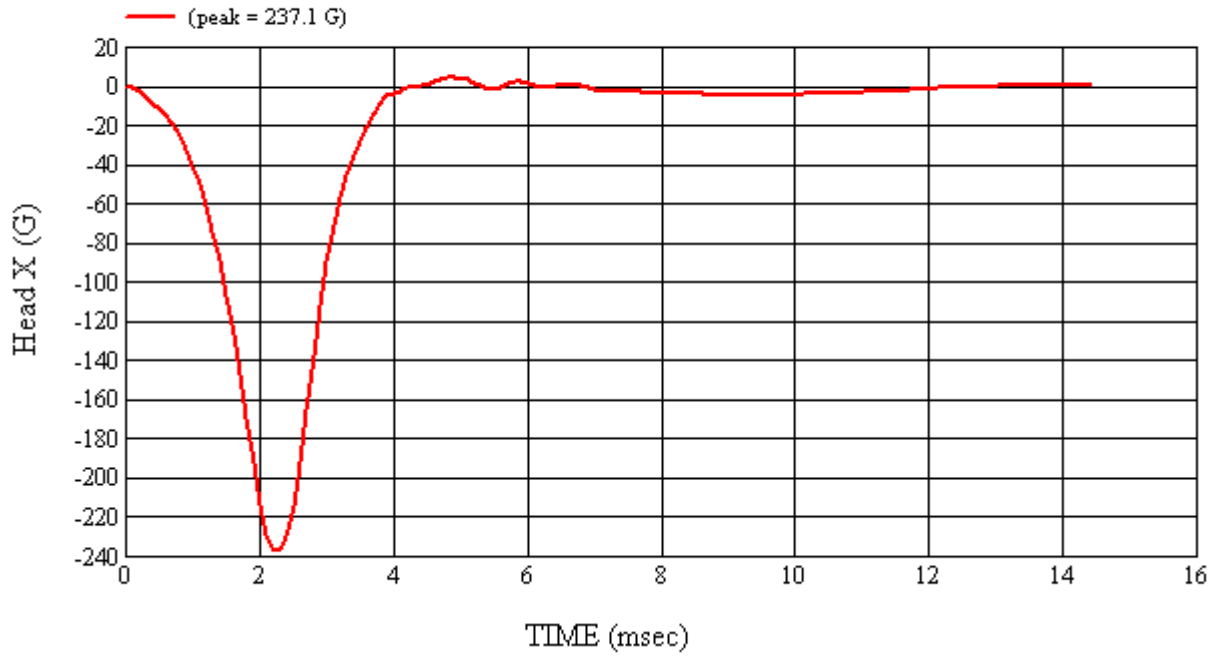
APPROVED BY: 



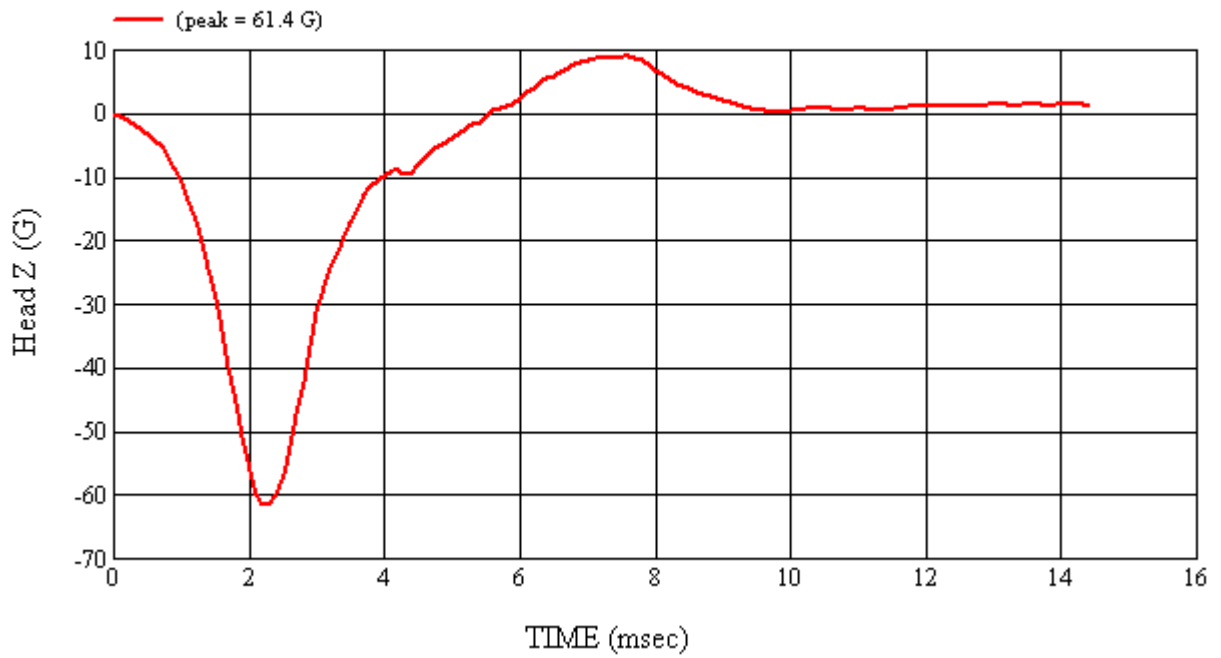
Head 072 (Pre) Calibration #H72003



Head 072 (Pre) Calibration #H72003



Head 072 (Pre) Calibration #H72003



Head 072 (Pre) Calibration #H72003

4-8 Post-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

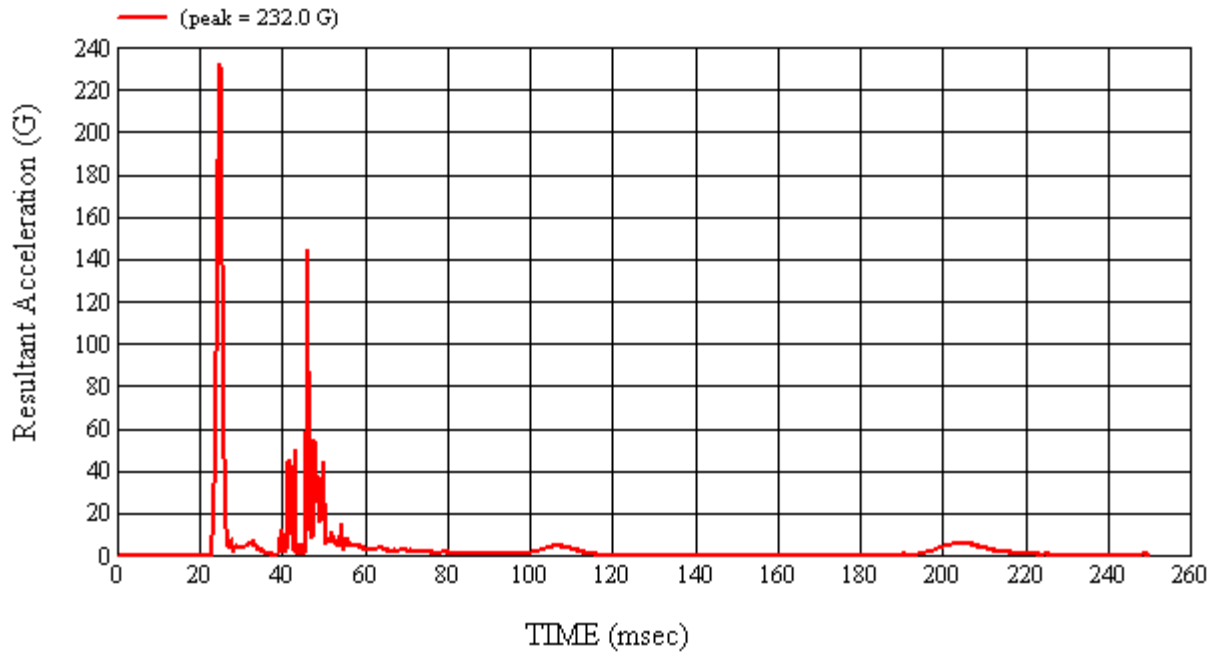
HEADFORM SERIAL NUMBER: 072		CALIBRATION DATE: 2/22/2008
CALIBRATION TIME: 3:46:11 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	21.4
Relative Humidity	10% to 70%	17.1
Peak Resultant Acceleration	225 G's to 275 G's	232.0
Peak Lateral Acceleration	15 G's Maximum	9.6
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	J43743	10/30/07	04/30/08
2	ENDEVCO	7264-2000	J43745	10/30/07	04/30/08
3	ENDEVCO	7264-2000	J43746	10/30/07	04/30/08

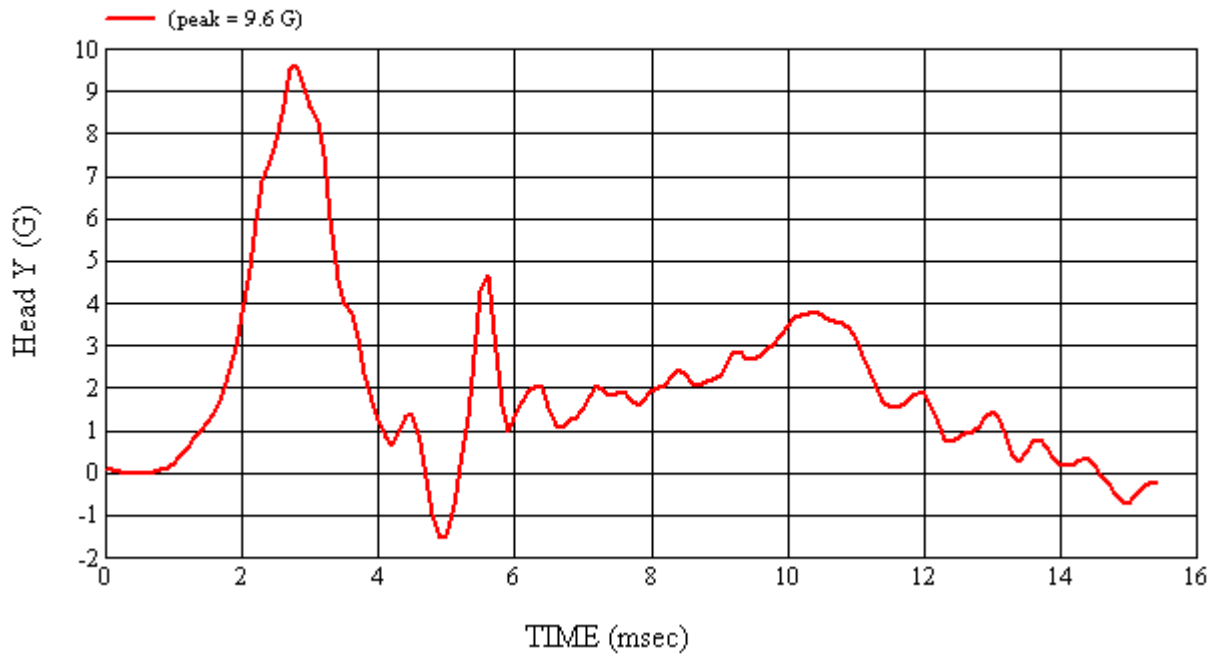
REMARKS:

RECORDED BY:  DATE: 2/22/2008

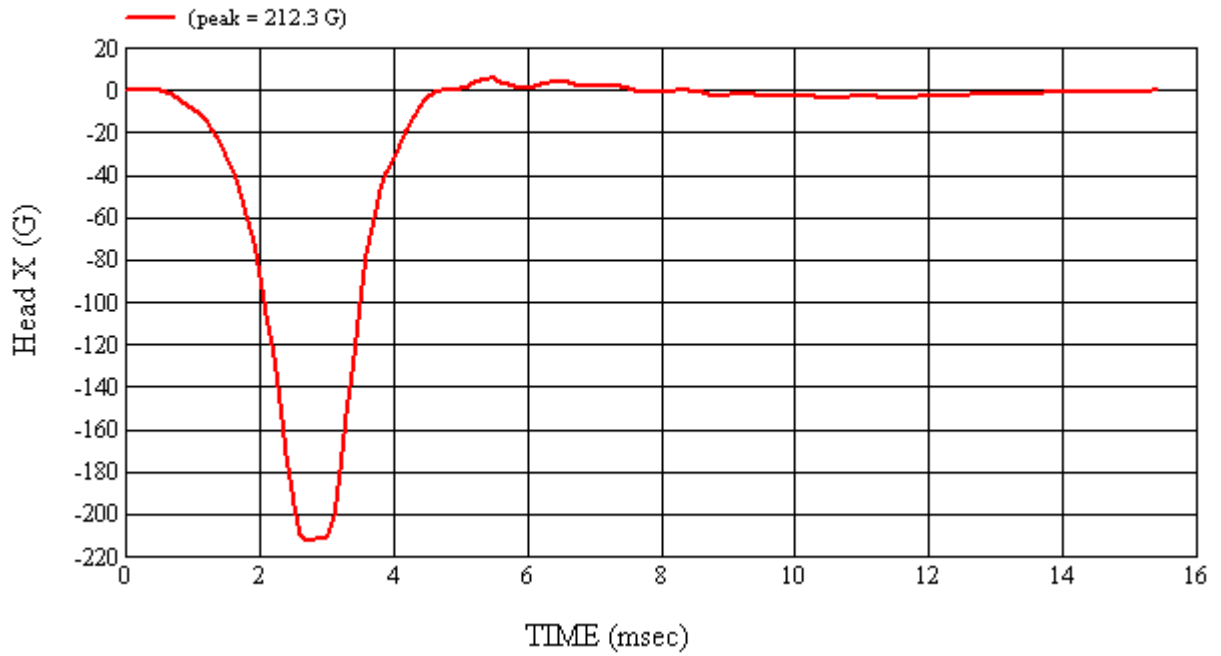
APPROVED BY: 



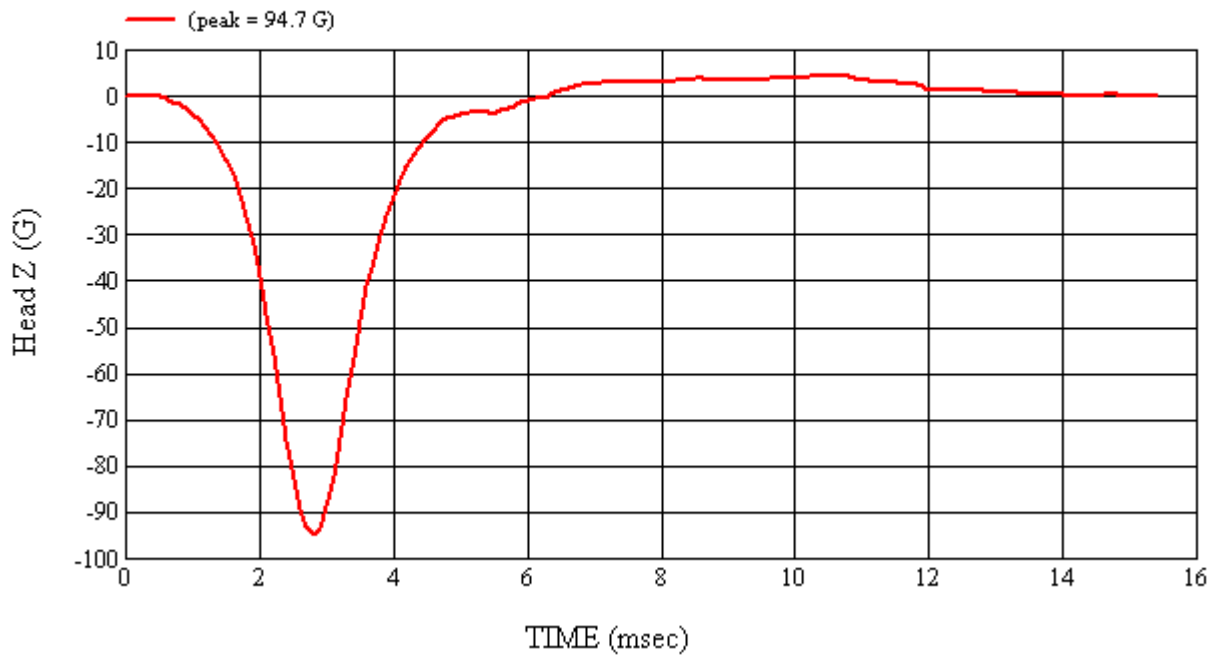
Head 072 (Post) Calibration #H72004



Head 072 (Post) Calibration #H72004



Head 072 (Post) Calibration #H72004



Head 072 (Post) Calibration #H72004

5.0 PHOTOGRAPHS



As Delivered – Left Side View



As Delivered – Right Side View



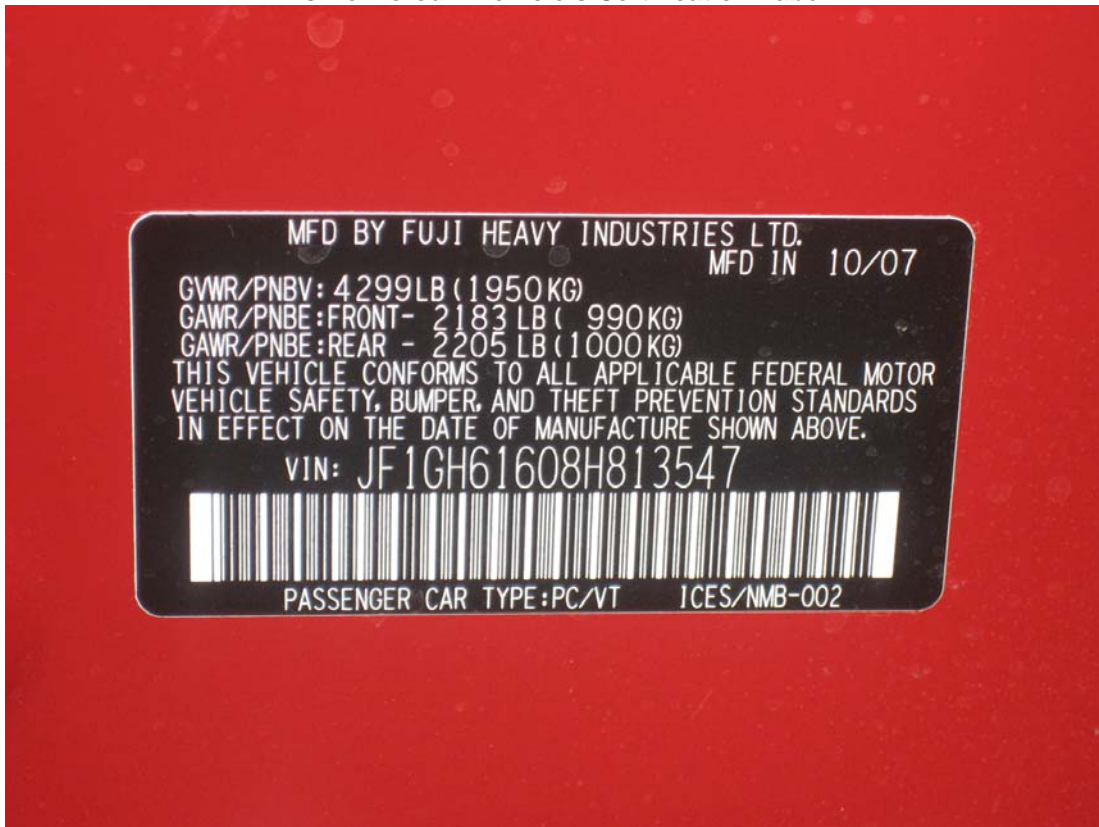
As Delivered – ¾ Front View From Left Side



As Delivered – Rear View From Right Side

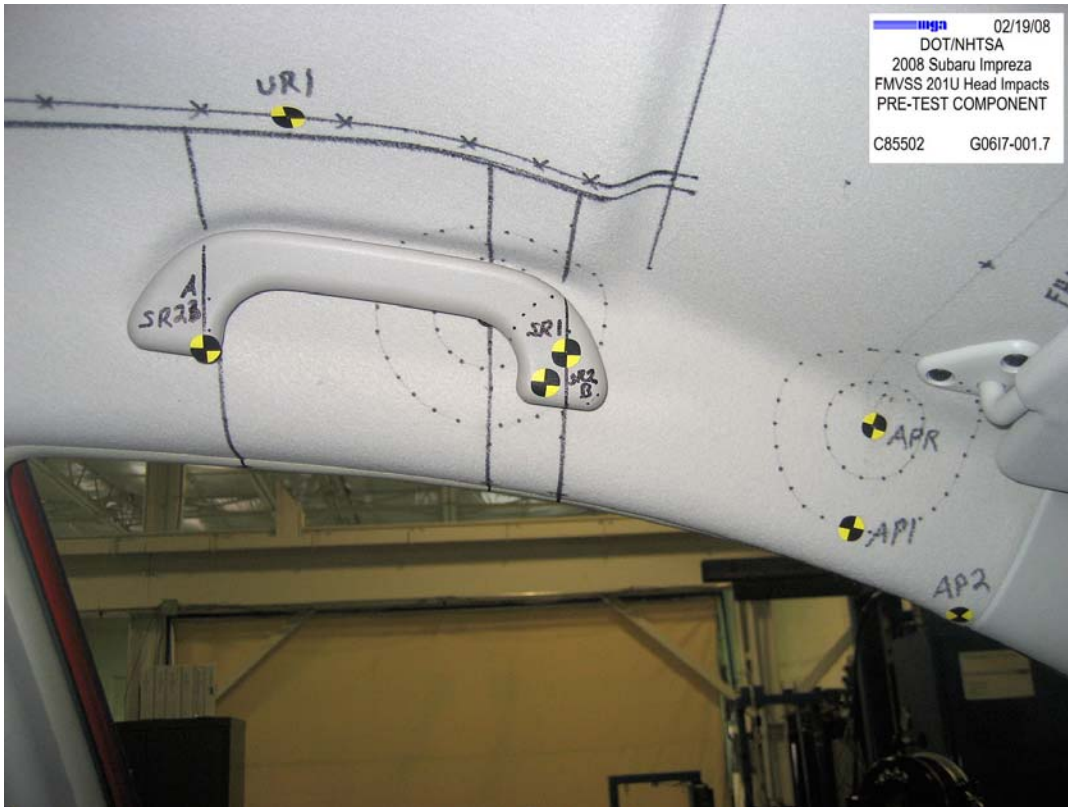


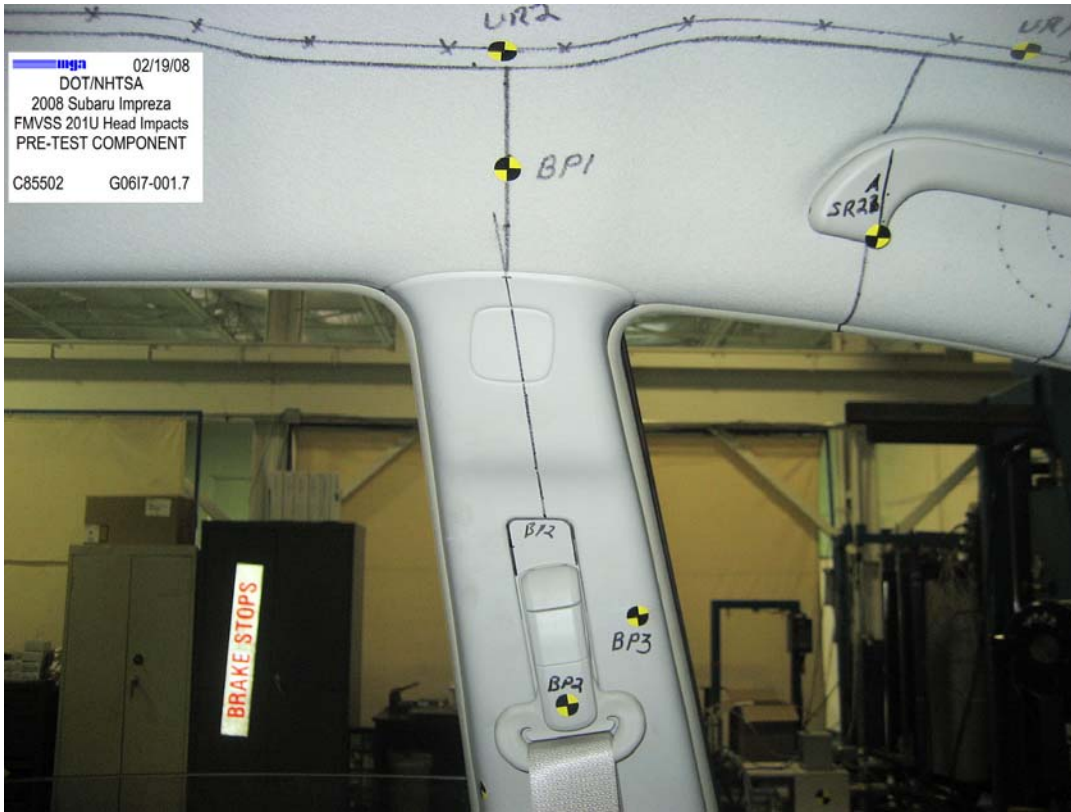
As Delivered – Vehicle’s Certification Label

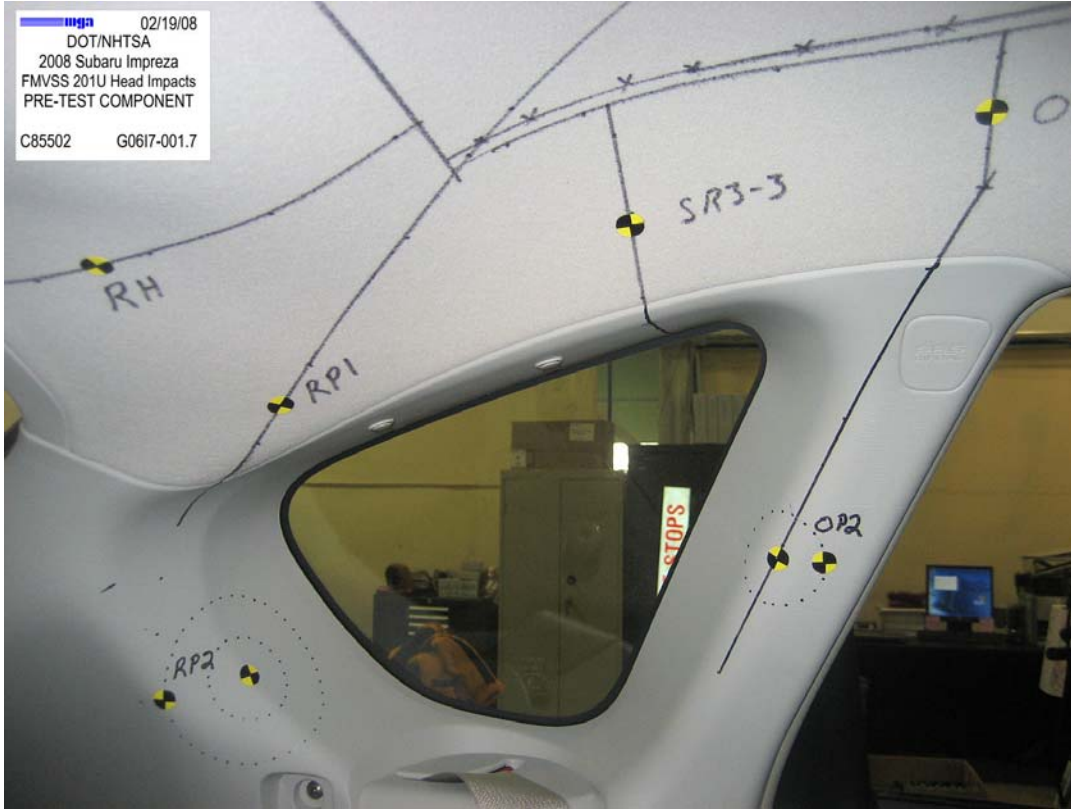


As Delivered – Vehicle’s Tire Information Label

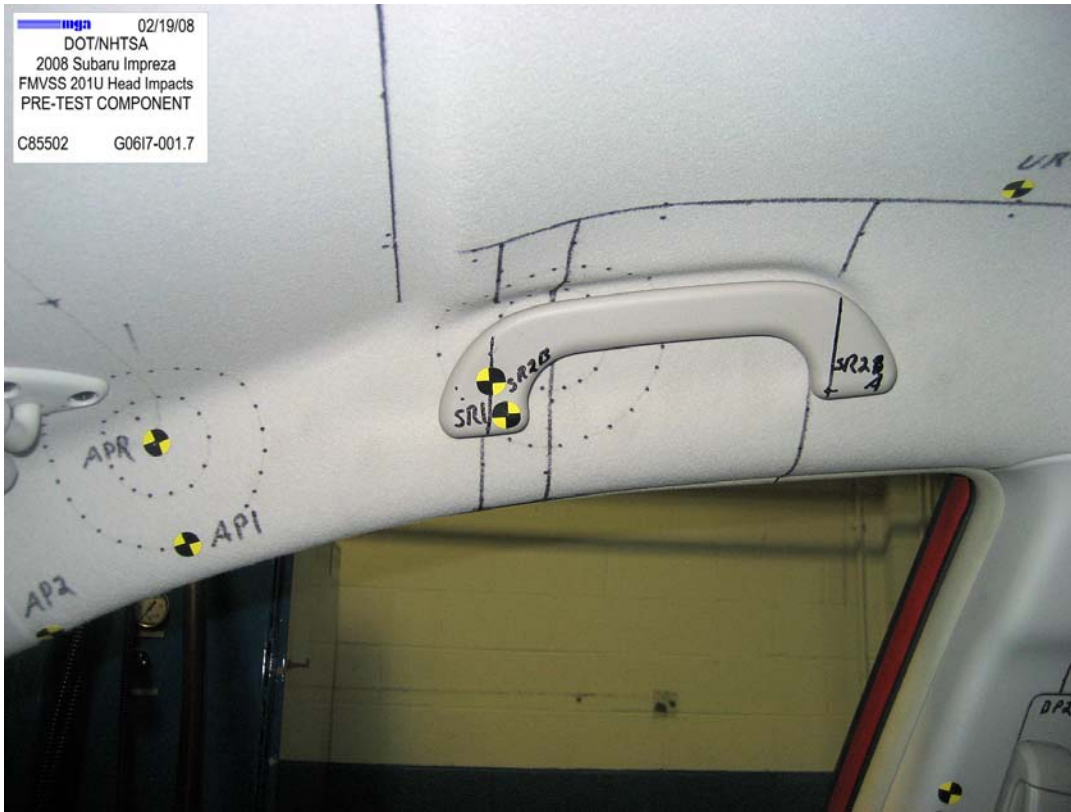
Pre-Test Component Photographs





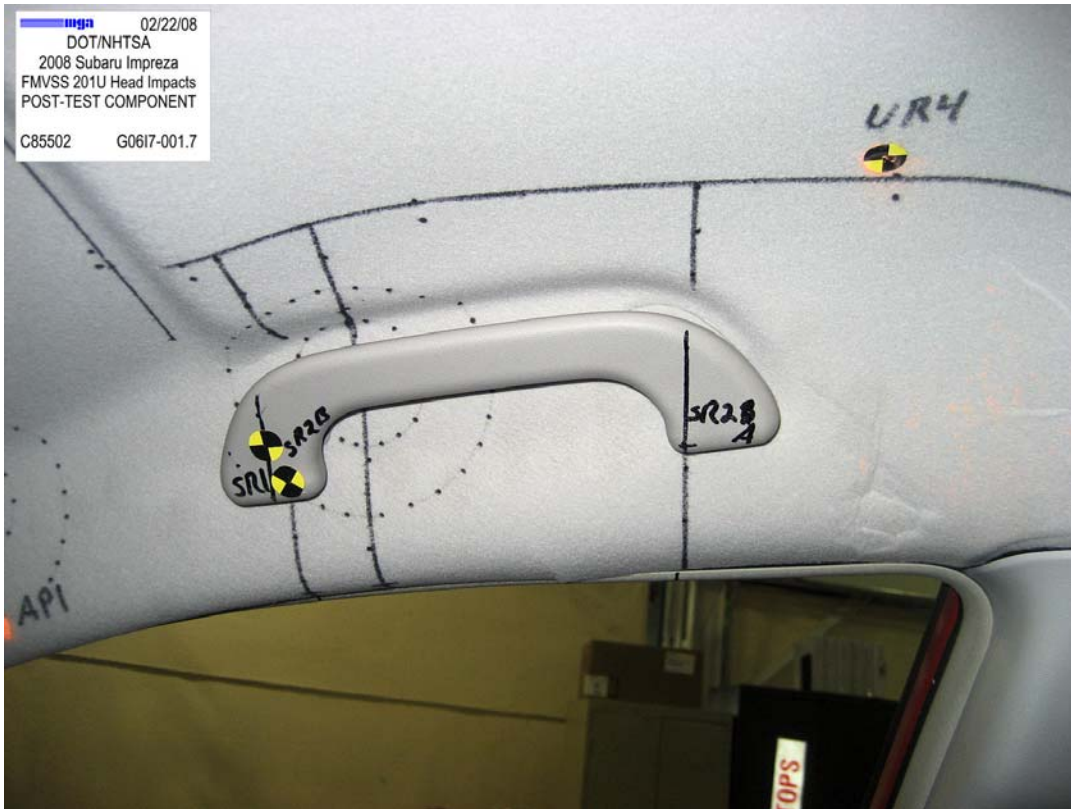


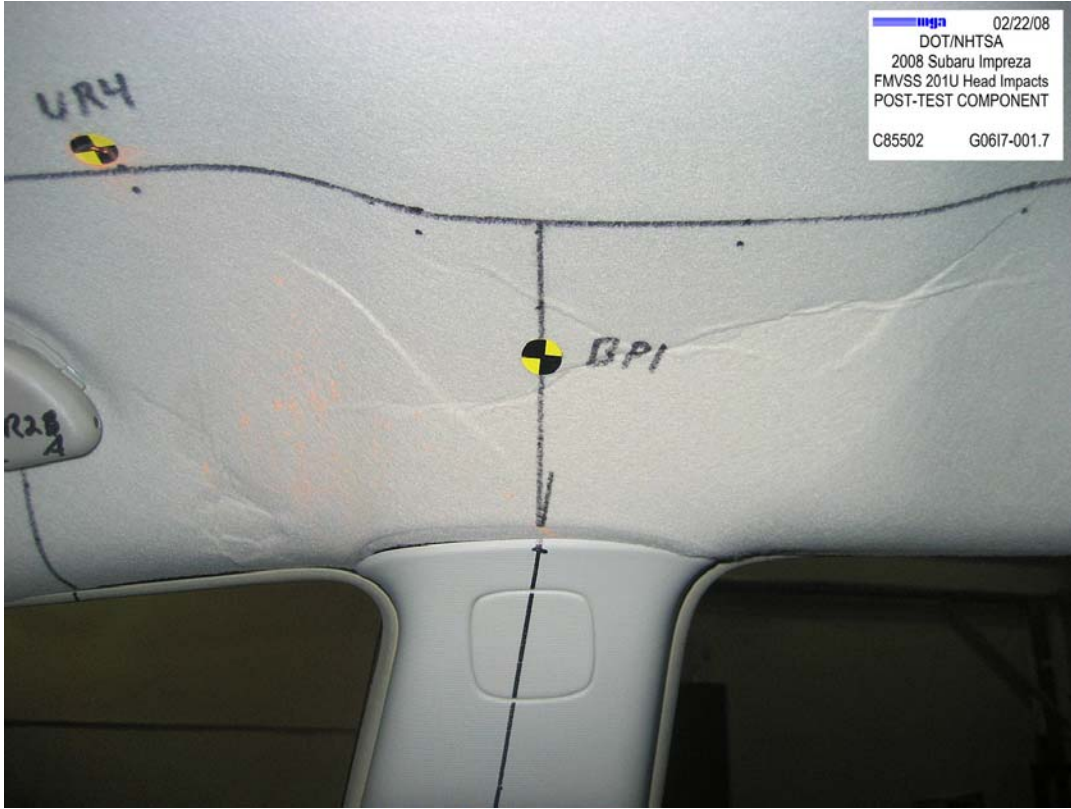


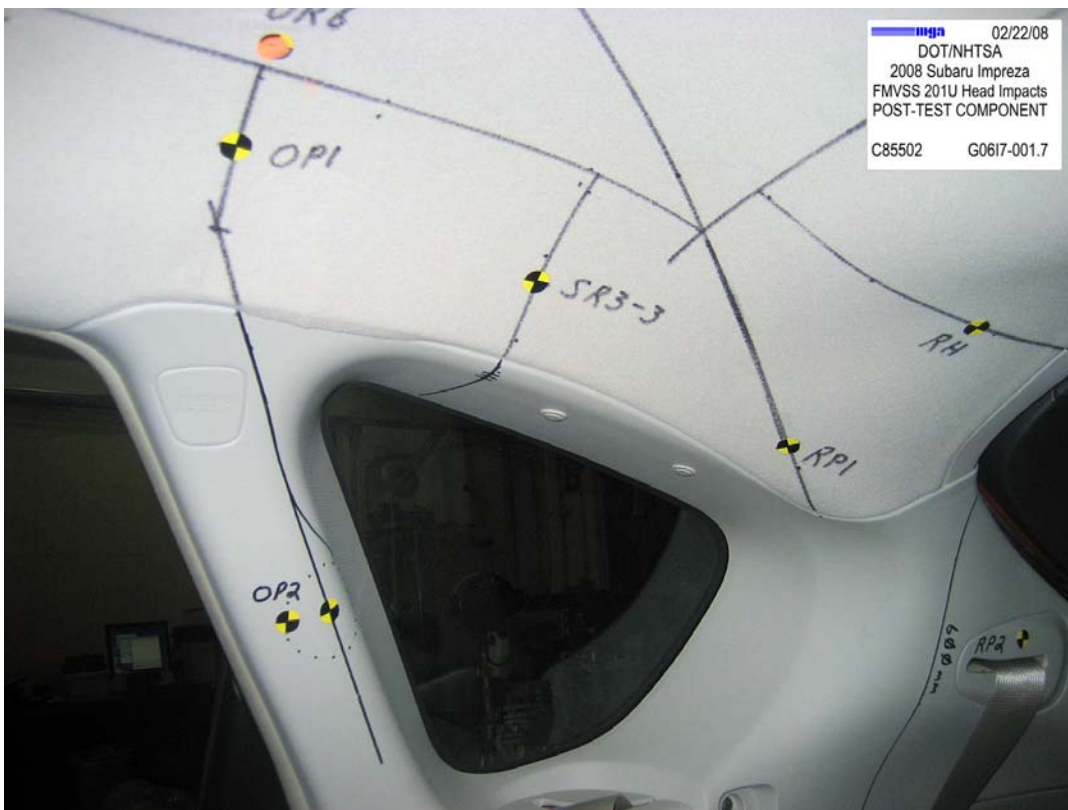




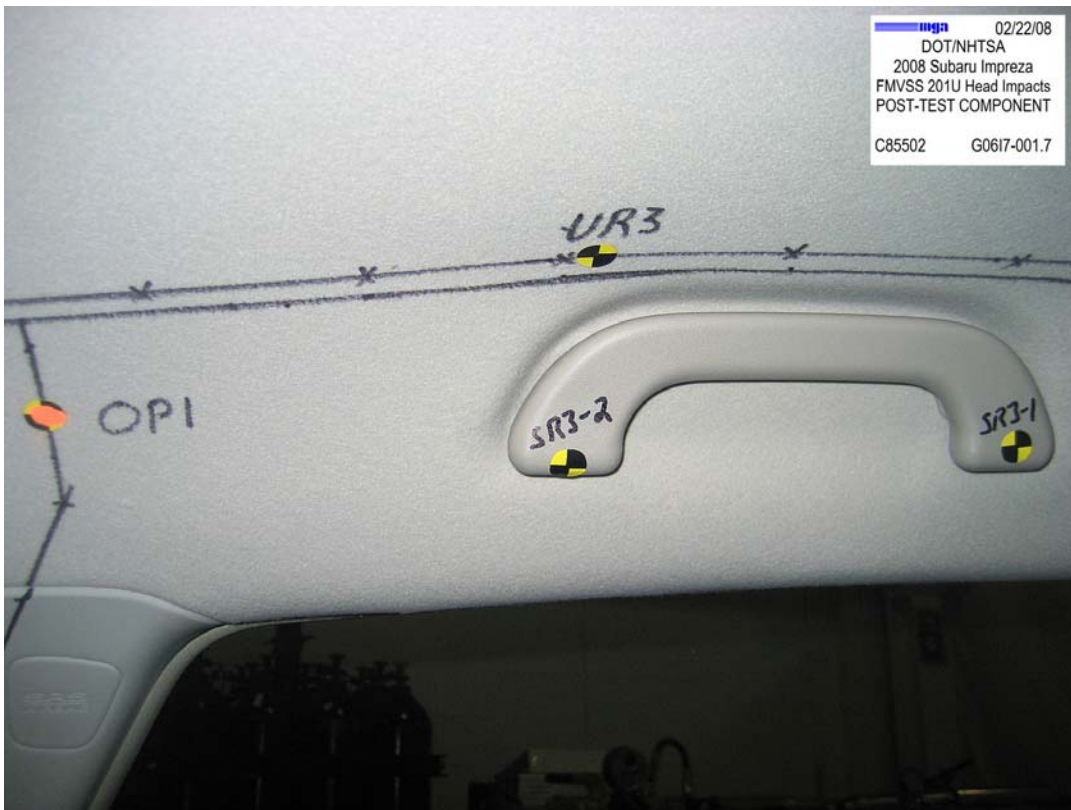
Post-Test Component Photographs



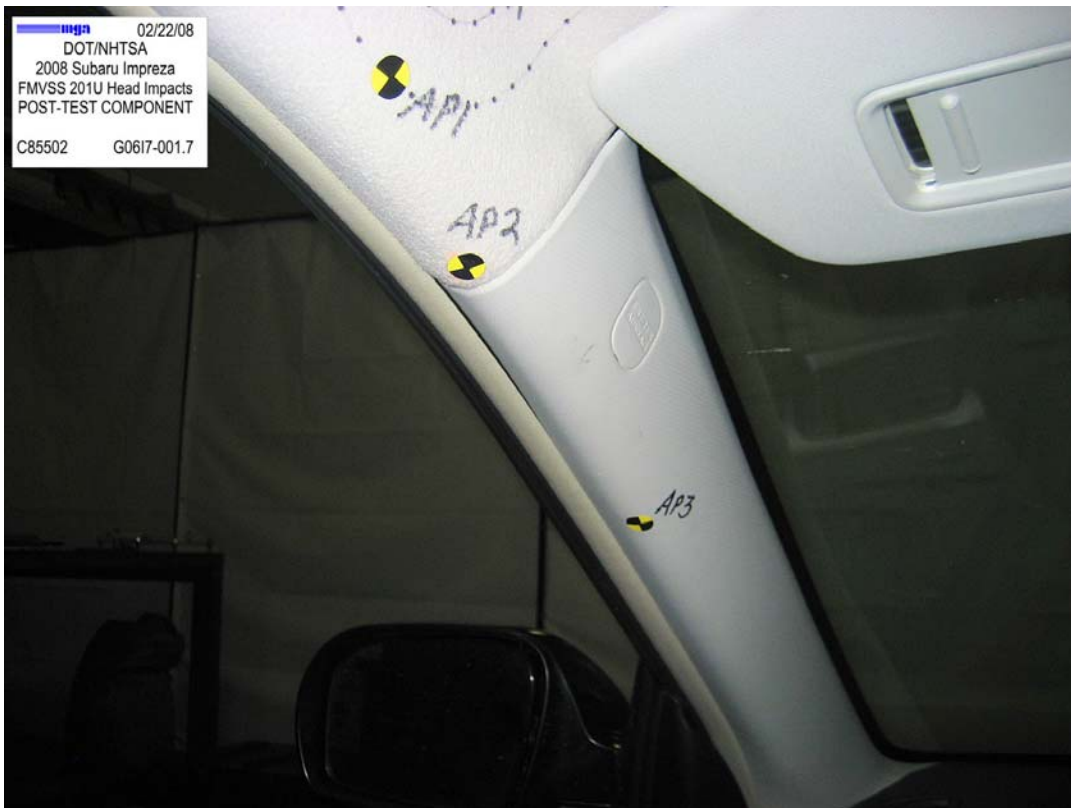






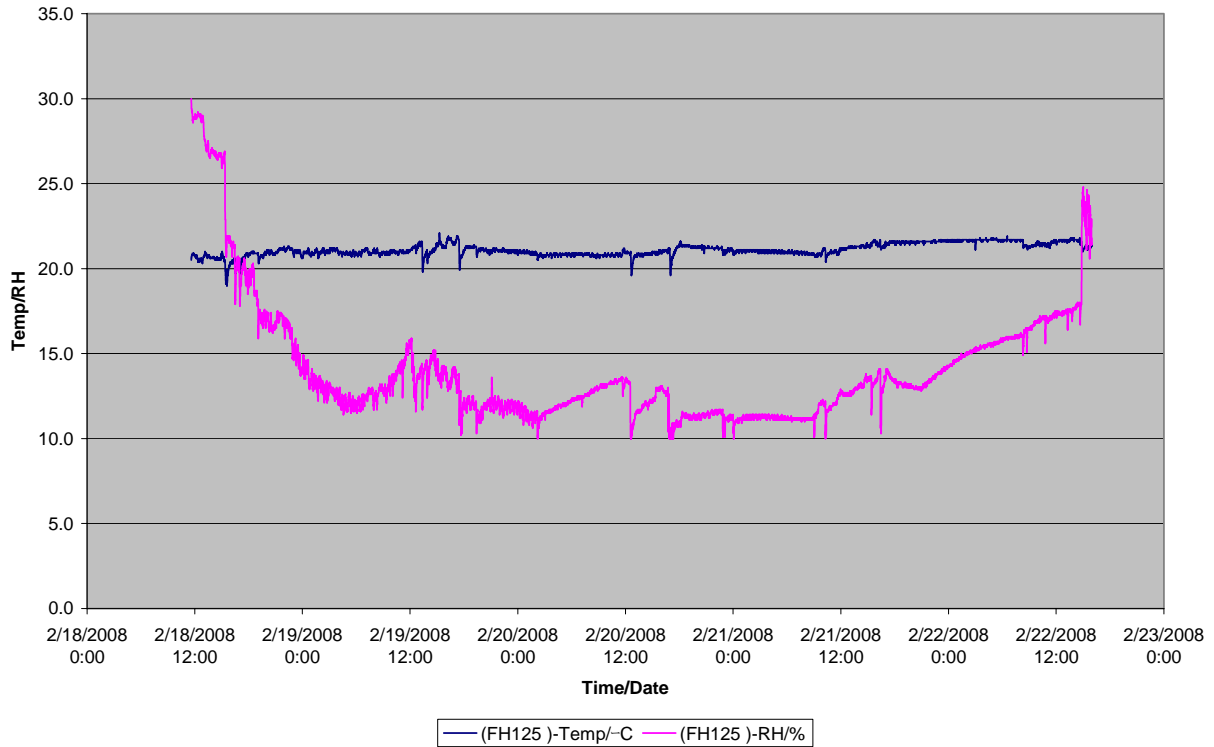






Appendix A – Temperature Trace

C85502 Subaru Impreza G08I7-001.7



Appendix B – Calibration Certificates

Calibration Certificate

Part Description: Silver Certification Date: 02/14/08 Serial#: S08-05-98-01273
 Single Point (Max-Min/2) Specification: S08-05 +/--076mm (+/--0030") Certificate#: S0127339492
 Volumetric (Max Deviation) Specification: S08-05 +/--108mm (+/--0042") Temperature: See attached data

Measurement Standards Traceability

Ball Bar Kit Asset Number: 1041 Calibration Date: 12/10/07 *SI Traceability: L20071012MG1
 Thermometer Asset Number: 668 Calibration Date: 01/16/08 *SI Traceability: A2LA-3775260

*The artifact above has been calibrated with a device traceable to the International System of Units (SI) through a National Metrological Institute (NMI) or through an ISO 17025 Accredited Laboratory. Expanded measurement uncertainty is 3.9 * 5.9X micrometers, where X-measured value in meters. Uncertainty is expressed at approximately a 95% Level of Confidence using k=2.00.

Certification 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 and certification conforms to procedures developed in accordance with ASME B89.4.22-2004.

Instrument condition as received:

Within specifications

Instrument condition outgoing:

Within specifications

Technician: Neil Maclean Date: 2/14/08

This certificate shall not be reproduced, except in full, without permission of FARO Technologies, Inc.

FARO Technologies, Inc.
Michigan Regional Office
PH1:248-669-8620

FAX:248-669-8656
L-A-B Cert Number: L1147.01





4700 Barden Court S.E. • Kentwood, MI 49512 • Telephone: 616.698.3124 • Fax: 616.698.2364

Certificate of Calibration

MGA Research
 446 Executive Drive
 Troy, MI 48063

Order Number: **56406**
 Certificate Number: **070928602**
 Page: 1 of 1

Gauge Number: **MGA00071**
 Gauge Desc: **Digital Protractor**
 Manufacturer: **N/A**
 Model Number: **Pro 360**
 Serial Number: **N/A**

Customer PO: **A070372**
 Last Calibration: **N/A**
 Calibration Date: **9/28/07**
 Next Calibration: **9/28/08**

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/NCCL 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.

<u>Standard Used</u>	<u>Cal Date</u>	<u>Due Date</u>	<u>Traceable No.</u>	<u>Calibration Procedure</u> <u>Uncertainty Expressed at</u> <u>95% confidence (K=2)</u>
Gage Blk Set ID# 24281	12/18/06	12/18/07	061218601	0.0015°
DoAll Sine Bar ID#1879	12/29/06	12/29/07	081229125	0.0015°

Results:

<u>Units</u>	<u>As Found Readings</u>		
	<u>Nominal</u>	<u>Actual</u>	<u>Deviation</u>
Decimal Deg.	5.00	5.1	0.10
	10.00	10.1	0.10
	20.00	20.1	0.10
<u>Tolerance</u>	30.00	30.1	0.10
0-10° ± 0.1°	40.00	40.1	0.10
11-79° ± 0.2°	Reference Level Check: Within ± 0.1 degrees		
80-90° ± 0.1°			

<u>As Left Readings</u>		
<u>Nominal</u>	<u>Actual</u>	<u>Deviation</u>
5.00	5.1	0.10
10.00	10.1	0.10
20.00	20.1	0.10
30.00	30.1	0.10
40.00	40.1	0.10
Reference Level Check: Within ± 0.1 degrees		

Comments: Environmental conditions during calibration: 69 °F, 43% RH.

Karen Shipley issued: 10/2/07
 Karen Shipley/bjk
 Calibration Technician

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

QA 10/8/07

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: Mitutoyo
 S/N: M6A00606
 Calibration Date: 11.16.07

Subject Tape Measure

Brand: STANLEY
 S/N: TPM 052
 Calibration Date: 12.3.07

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

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

Date: 12.3.07 Performed By: [Signature]

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 0.2\%$.
 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.

QA 12/5/07

Certificate of Instrument Calibration and Testing

Calibration report shall not be reproduced, except in full, without written authorization from Dickson.

Customer Instrument

Dickson Model Number: FH125
Serial Number: 06018122
Calibration Technician: Dan Gawel
Calibration Date: 05/01/2007

Calibration Standards

General Eastern: Model # M3
 Ser. # 0850800 / 2360502
 Accuracy: $\pm .4\%$ FS RH and $\pm .4$ °F
 Certified April, 2006
 Azonix Model # A1011 Ser. # T2513-9027
 RTD Platinum Probe Ser. # 496013 Accuracy: $\pm .2$ °F
 Certified April, 2006



*The calibration standards are traceable through the
 National Institute of Standards and Technology.*

Calibration Procedure P1130

The customer instrument was compared to the calibration standard. Drifts and faults were determined, and any necessary mechanical or electronic adjustments were taken. The Dickson calibration system conforms to the requirements of MIL-STD-45662A, ANSI/NCSL Z540, and ISO 17025 as appropriate. Recalibration of the customer instrument is recommended within 6-12 months after the unit is placed into service. Any number of factors may cause the calibration item to drift before the recommended interval has expired. This certificate only relates to this specific unit.

Environmental Conditions

72 °F 41 %RH

Calibration Standard Reading	Customer Instrument Reading	Unit Specification
Humidity (%RH)	Humidity (%RH)	Humidity
14.9	16.6	$\pm 2\%$ RH
67.8	68.5	$\pm 2\%$ RH
85.3	86.4	$\pm 3\%$ RH
Temperature °F (°C)	Temperature °F (°C)	Temperature
12.8 (-10.7)	13.1 (-10.5)	± 1.8 °F (± 1.0 °C)
73.3 (22.9)	73.2 (22.9)	
112.3 (44.6)	112.1 (44.5)	

The FH125 has an ISO/IEC 17025 required NIST Technical note 1297, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, estimated measurement uncertainty at 95% CL (K=2) of ± 0.7 °F and ± 1 %RH

FOR YOUR NEXT CALIBRATION NO PHONE CALLS REQUIRED

Fill out and send this form along with your instrument to Dickson. Label the outside of the box with "CCM" - that is your RA#.

That's all there is to it!

1. Purchase Order #: _____
 Name: _____
 Phone: _____
 Model #: **FH125**
 Serial #: **06018122**

3. Please return via:
 Ground Freight*
 2nd Day Air*
 Next Day Air*
 *Charges added at factory

A 3-pt Deluxe NIST will be performed unless otherwise requested

Returned UPS 2nd Day unless otherwise requested

2. 1-Point Deluxe NIST Calibration \$149.00
 3-Point Deluxe NIST Calibration \$199.00
 3-Point Ultima Deluxe A2LA NIST \$299.00 (with incoming reading)
 N995 - User selectable NIST Temperature points \$50.00 each
 (to be selected in addition to one of the above calibration options)
 N997 - Next Day Service \$50.00 (Not available for ULTIMA service)

4. Ship To: _____

Charts/Pens

(Order now and receive them with your calibrated unit)

	Order No.	Qty.	Price Ea
<input type="checkbox"/> 6 Red Pens	P222	_____	\$36 pk
<input type="checkbox"/> 3 Red/3 Blue Pens	P246	_____	\$36 pk
<input type="checkbox"/> Charts* (60 per box)	C ___	_____	\$24 box

Bill To: _____

*Please fill in the chart order number. For a listing of available charts got to www.dicksonweb.com, click on "product search" and select the product type, "Parts - Accessories"

Prices are subject to change

Let Dickson remind you the next time your unit is due for calibration. Register for our FREE Calibration Club now at www.dicksonweb.com

Dickson Calibration Services

930 South Westwood Avenue Addison, Illinois 60101 630-543-3747 Fax 630-543-0498

✍ 5/3/07

ULTIMA (Data as Received)

Customer Instrument

Dickson Model Number: FH125
Serial Number: 06018122
Calibration Technician: Dan Gawel
Calibration Date: 05/01/2007

Unit was received in working condition, or received repairs not related to it's calibration or accuracy.

Calibration Procedure P1130

The customer instrument was compared to the calibration standard. The Dickson calibration system conforms to the requirements of MIL-STD-45662A and ANSI/NCSL Z540, and ISO 17025 as appropriate. Recalibration of the customer instrument is recommended within 6-12 months after the unit is placed into service.

Environmental Conditions 72 °F 41 %RH

Calibration Standard Reading	Customer Instrument Reading	Unit Specification
Humidity (%RH)	Humidity (%RH)	Humidity
16.4	18.8	± 2% RH
62.4	58.3	± 2% RH
84	79	± 3% RH
Temperature °F	Temperature °F	Temperature
13.1	13.9	± 1.8 °F (± 1.0 °C)
71.3	71	
110.5	110.8	

FOR YOUR NEXT CALIBRATION NO PHONE CALLS REQUIRED

Fill out and send this form along with your instrument to Dickson. Label the outside of the box with "CCM" - that is your RA#
That's all there is to it!

1. Purchase Order #: _____
 Name: _____
 Phone: _____
 Model #: **FH125**
 Serial #: **06018122**

3 Please return via:
 Ground Freight*
 2nd Day Air*
 Next Day Air*
 *Charges added at factory

A 3-pt Deluxe NIST will be performed unless otherwise requested

Returned UPS 2nd Day unless otherwise requested

2. 1-Point Deluxe NIST Calibration \$149.00
 3-Point Deluxe NIST Calibration \$199.00
 3-Point Ultima Deluxe A2LA NIST \$299.00 (with incoming reading)
 N995 - User selectable NIST Temperature points \$50.00 each
 (to be selected in addition to one of the above calibration options)
 N997- Next Day Service \$50.00 (Not available for ULTIMA service)

4 Ship To: _____

Bill To: _____

Charts/Pens

(Order now and receive them with your calibrated unit)

	Order No	Qty	Price Ea
<input type="checkbox"/> 6 Red Pens	P222	_____	\$36 pk
<input type="checkbox"/> 3 Red/3 Blue Pens	P246	_____	\$36 pk
<input type="checkbox"/> Charts* (60 per box)	C_ _ _	_____	\$24 box

*Please fill in the chart order number. For a listing of available charts got to www.dicksonweb.com, click on "product search" and select the product type, "Parts, Accessories."

Prices are subject to change

Let Dickson remind you the next time your unit is due for calibration. Register for our FREE Calibration Club now at www.dicksonweb.com

Dickson Calibration Services

930 South Westwood Avenue Addison, Illinois 60101 630-543-3747 Fax 630-543-0498



4700 Barden Court S.E. • Kentwood, MI 49512 • Telephone: 616.698.3124 • Fax: 616.698.2384

Certificate of Calibration

MGA Research
 446 Executive Drive
 Troy, MI 48063

Order Number: 55304
 Certificate Number: 070709906
 Page: 1 of 1

Gauge Number: MGA00081
 Gauge Desc: 0 to 20.00lb x 0.01lb Digital Scale
 Manufacturer: Detecto
 Model Number: AP-20
 Serial Number: E33603-0213

Customer PO: N/A
 Last Calibration: 7/7/06
 Calibration Date: 7/9/07
 Next Calibration: 7/9/08

As Found Condition: In Tolerance

As Left Condition: In Tolerance

MetroCal Inc. maintains reference standards of measurement which traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal's Procedure No. CP-042 and the relevant sections of the manufacturers manual. This Calibration complies with the 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.

Calibration Procedure
 Uncertainty Expressed at
 95% confidence, (K=2)
 +/-0.001% of Load

Standard Used	Cal. Date	Due Date	Traceable No.
Dead Weight Set ID#2463	8/10/06	8/10/08	MI-04-06-8325

Results:
 Tolerance used: ± 0.02

Units: lbs TI Division/Increment: 0.01

Weight Test	As Found			As Left		
	Nominal	Indication	Deviation	Nominal	Indication	Deviation
0-25% fs	5.00	5.00	0.00	5.00	5.00	0.00
26-50% fs	10.00	9.99	-0.01	10.00	9.99	-0.01
51-75% fs	15.00	14.99	-0.01	15.00	14.99	-0.01
76-100% fs	20.00	19.99	-0.01	20.00	19.99	-0.01
Beam 2						
0-25% fs						
26-50% fs						
51-75% fs						
76-100% fs						
Beam 3						
0-25% fs						
26-50% fs						
51-75% fs						
76-100% fs						
Shift Test: Pass			Shift Test: Pass			
Half Load Test: Pass			Half Load Test: Pass			

Comments: Environmental conditions during calibration: 87 deg F., 47 % RH

Chad Rosema issued: 7/9/07
 Chad Rosema/bjk
 Calibration Technician

Checked box indicate this calibration was performed at the customers facility

CA 7/24/07

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: MGA Research **Cert#** 07-3173 **Temp/Humidity:** 78/40
Location of Calibration: 2839 Elliott Troy MI 48083
Calibration Date: 7/17/2007 **Cal Due:** Jul-08 **Condition of Item:** GOOD
Equipment Make: SW Scales **Model:** SW Deluxe **Serial/ID:** 26032389 **Capacity:** 8800x1lb

Applied Test Wt	Before Adustment	Tolerance	In-Tolerance Y/N	After Adjustment	In-Tolerance Y/N	Unc
LF 0lb	0lb	1lb	y	0lb	y	0.5
LF 50lb	50lb	1lb	y	50lb	y	0.5
LF 1000lb	1000lb	2lb	y	1000lb	y	0.5
LF 2200lb	2199lb	2lb	y	2199lb	y	0.5
LR 0lb	0lb	1lb	y	0lb	y	0.5
LR 50lb	50lb	1lb	y	50lb	y	0.5
LR 1000lb	1000lb	2lb	y	1000lb	y	0.5
LR 2200lb	2200lb	2lb	y	2200lb	y	0.5

shift test
 N/A
 PADS

Platform #1 Platform #2 Platform #3
 Pass Pass Pass
 Fail Fail Fail

Tests performed: Repeatability Linearity Sensitivity Discrimination

Page 1 of 2
Technician _____
COMMENTS/ The scale is accurate and working fine. The scale holds a good zero,also the
weights used system is in a storage trunk.
 Sterling House Weights

Scale Certified Scale Rejected

Sterling Scale Service Rep: Larry V. **Date:** 7/17/2007 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

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: MGA Research **Cert#** 07-3173 **Temp/Humidity:** 78/40
Location of Calibration: 2839 Elliott Troy MI 48083
Calibration Date: 7/17/2007 **Cal Due:** Jul-08 **Condition of Item:** GOOD
Equipment Make: SW Scales **Model:** SW Deluxe **Serial/ID:** 26032389 **Capacity:** 8800x1lb

Applied Test Wt	Before Adustment	Tolerance	In-Tolerance Y/N	After Adjustment	In-Tolerance Y/N	Unc
RF 0lb	0lb	1lb	y	0lb	y	0.5
RF 50lb	50lb	1lb	y	50lb	y	0.5
RF 1000lb	1000lb	2lb	y	1000lb	y	0.5
RF 2200lb	2200lb	2lb	y	2200lb	y	0.5
RR 0lb	0lb	1lb	y	0lb	y	0.5
RR 50lb	50lb	1lb	y	50lb	y	0.5
RR 1000lb	1000lb	2lb	y	1000lb	y	0.5
RR 2200lb	2199lb	2lb	y	2199lb	y	0.5

shift test
N/A
PADS

Platform #1 Platform #2 Platform #3

Pass Pass Pass

Fail Fail Fail

Tests performed: Repeatability Linearity Sensitivity Discrimination

Page 2 of 2

Technician _____
COMMENTS/ The scale is accurate and working fine.
weights used Sterling House Weights

Scale Certified

Scale Rejected

Sterling Scale Service Rep: Larry V. **Date:** 7/17/2007 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



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J43746	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 10/30/2007	Calibration Date: 7/20/2007
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0714

New DLR (100k , Units:G): 89.2

StdDeviation (%) 0.202

% Difference in DLR (New vs. Old): -0.94

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$. 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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J43745	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0714

New DLR (100k , Units:G): 97.8

StdDeviation (%) 0.287

% Difference in DLR (New vs. Old): 0.113

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$.
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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J43743	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 10/30/2007	Calibration Date: 7/20/2007
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0714

New DLR (100k , Units:G): 92.5

StdDeviation (%) 0.264

% Difference in DLR (New vs. Old): -1.168

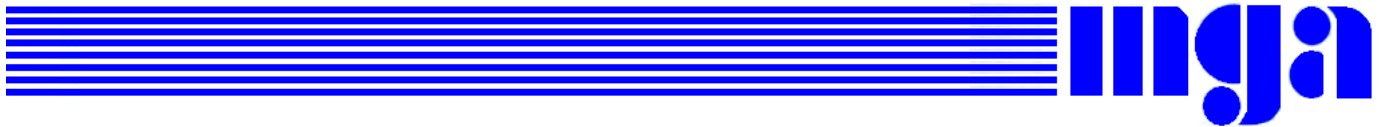
Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$. 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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J36353	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 99.4

StdDeviation (%) 0.346

% Difference in DLR (New vs. Old): 1.014

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$.
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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J36197	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 110.7

StdDeviation (%) 0.159

% Difference in DLR (New vs. Old): 0.612

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$.
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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J14103	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 94.6

StdDeviation (%) 0.172

% Difference in DLR (New vs. Old): 1.175

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$.
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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J35800	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 98.0

StdDeviation (%) 0.78

% Difference in DLR (New vs. Old): -1.192

Temperature (°F): 74

Humidity (%): 36

Performed By: 

Approved By: 

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$. 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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J35791	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 91.9

StdDeviation (%) 0.194

% Difference in DLR (New vs. Old): 1.127

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$. 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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J22696	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 100.0

StdDeviation (%) 0.559

% Difference in DLR (New vs. Old): -1.242

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$.
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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J35924	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 93.9

StdDeviation (%) 0.188

% Difference in DLR (New vs. Old): 0.228

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$.
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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35919	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 10/30/2007	Calibration Date: 7/20/2007
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 97.4

StdDeviation (%) 0.299

% Difference in DLR (New vs. Old): -1.589

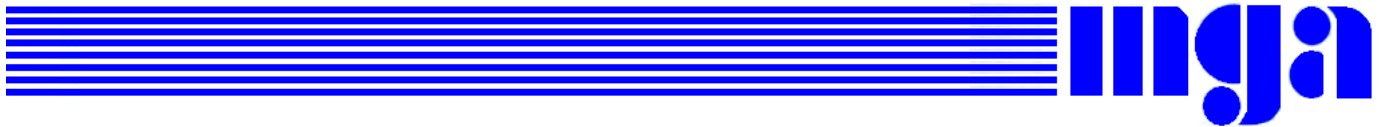
Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$. 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 $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J22664	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 10/30/2007	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0720

New DLR (100k , Units:G): 94.2

StdDeviation (%) 0.496

% Difference in DLR (New vs. Old): -1.807

Temperature (°F): 74

Humidity (%): 36

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.7\%$. 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 $k=2$.

~ Calibration Certificate ~

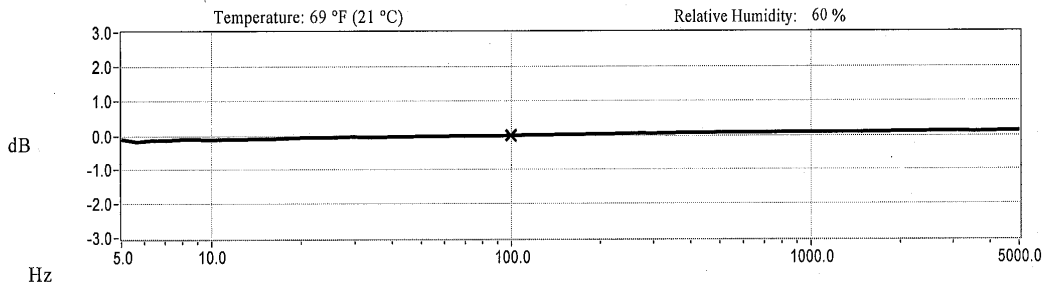
Per ISO 16063-21

Model Number: 301M09/484B (394M17 SYSTEM)
Serial Number: 862/2470
Description: ICP® Accelerometer **Method:** Back-to-Back Comparison Calibration
Manufacturer: PCB

Calibration Data

Sensitivity @ 100.0 Hz **31.03 mV/g** **Output Bias** **8.6 VDC**
 (3.16 mV/m/s²) **Transverse Sensitivity** **3.0 %**

Sensitivity Plot



Data Points

Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)
5.0	-1.2	REF. FREQ.	0.0	5000.0	1.5
10.0	-1.4	300.0	0.6		
15.0	-1.0	500.0	0.9		
30.0	-0.4	1000.0	1.0		
50.0	-0.3	3000.0	1.4		

Mounting Surface: Stainless Steel w/Silicone Grease Coating Fastener: Stud Mount Fixture Orientation: Vertical
 Acceleration Level (rms)*: 10.0 g (98.1 m/s²)
*The acceleration level may be limited by shaker displacement at low frequencies. If the listed level cannot be obtained, the calibration system uses the following formula to set the vibration amplitude; Acceleration Level (g) = 0.010 x (freq).
 *The gravitational constant used for calculations by the calibration system is; 1 g = 9.80665 m/s².

Condition of Unit

As Found: In Tolerance, No Adjustment Necessary
As Left: In Tolerance

Notes


1. Calibration is NIST Traceable thru Project 822/271196 and PTB Traceable thru Project 5399.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 9001, ISO 10012-1, ANSI/NCSL Z540-1-1994 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. Measurement uncertainty (95% confidence level with coverage factor of 2) for frequency ranges tested during calibration are as follows: 5-9 Hz; +/- 2.0%, 10-99 Hz; +/- 1.5%, 100-1999 Hz; +/- 1.0%, 2-10 kHz; +/- 2.5%.

Technician: Chuck DiMaggio CD 855 7/27/06 **Date:** 07/27/06



3425 Walden Avenue Depew, NY 14043
 TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

~Certificate of Calibration~

Model Number: 484B	PCB Control #: QC214/QC184/QC198/CA514
Serial Number: 2470	Calibration Date: 07/22/2006
Description: Signal Conditioner	Recalibration Date:
Test Procedure: AT-106-1	Calibration Technician: James Higbee 2b 
Temperature: 70° F	Relative Humidity: 58%

Volts	Current (mA)	Gain*
24.0	3.9	1.000

As Received: In tolerance, no adjustment required.

As Left: In tolerance.

Special Notes:

This document certifies that the equipment referenced above meets published specifications. The calibration procedure is in compliance with ISO 10012-1, and former MIL-STD-45662A and is traceable to NIST. *Measurement uncertainty (95% confidence level w/coverage factor of 2) for scale factors is +/- 0.2%.

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PCB Piezotronics, Inc.



3425 Walden Avenue Depew, New York, USA 14043-2495

For any questions concerning this certificate, please call PCB at (716) 684-0001 and ask for an application engineer.