

FINAL REPORT NUMBER 201UI-MGA-08-08

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

**HONDA DE MEXICO SA, DE CV
2008 Honda CRV, 4-Door MPV
NHTSA No. C85307**

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



Test Dates: June 19-20, 2008
Report Date: August 8, 2008

FINAL REPORT

PREPARED FOR:

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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16. Abstract A compliance test series was conducted on the subject 2008 Honda CRV, 4-Door MPV, NHTSA No. C85307, 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 June 19-20, 2008. Test failures identified were as follows: None The data recorded indicates that the 2008 Honda CRV, 4-Door MPV, 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 Honda CRV, 4-Door MPV, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on June 19-20, 2008 on a 2008 Honda CRV, 4-Door MPV, manufactured by Honda de Mexico, SA, DE CV.

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 Honda CRV, 4-Door MPV, 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 each O-pillar, a seat belt anchorage on the rear passenger corner of the upper roof, a grab handle located on the side rail above each door (front and rear), and an overhead console located on the front upper roof.

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	BP1	OP2	UR1@BPR
AP2	BP2	SR2B	UR2@Forward OPR
AP3	BP4	SR3-3	UR6@OPR

The 2008 Honda CRV, 4-Door MPV, 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 Honda CRV, 4-Door MPV

VEH. NHTSA NO.: C85307 VIN: 3CZRE38368G703225 COLOR: Blue

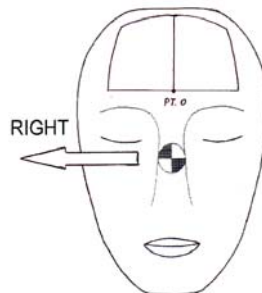
VEH. BUILD DATE: February, 2008 TEST DATES: June 19-20, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Anthony Balaskas, William Mangum

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Right	111	31	19.0	630	614	6	4 Right
AP2	Left	200	49	18.9	485	422	5	0
AP3	Right	158	45	19.4	708	718	8	5 Left
BP1	Right	90	7	18.6	446	370	40	4 Left
BP2	Right	90	9	23.4	631	616	5	10 Left
BP4	Left	200	-3	23.2	504	447	8	16 Left
OP2	Right	90	5	24.3	605	581	21	7 Left
SR2B	Left	270	45	19.0	572	538	4	7 Right
SR3-3	Left	270	35	18.8	436	357	9	15 Left
UR1@BPR	Left	270	50	23.5	640	628	27	8 Left
UR2@Fwd. OPR	Left	270	47	23.5	496	437	34	0
UR6@OPR	Right	90	49	23.7	469	401	25	5 Left

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



POST TEST COMMENTS:

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

UR1 Left: Headliner deformation. Dent on roof exterior.

UR2 Left: Headliner deformation.

UR6 Right: Headliner deformation.

REMARKS:

The targets listed were impacted in the following order:

Right: OP2, UR6@OPR, BP2, BP1, AP3, AP1

Left: SR3-3, UR2@Forward OPR, BP4, AP2, SR2B, UR1@BPR

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

RECORDED BY: Helen A. Kaleto

DATE: June 20, 2008

APPROVED BY: P. Michael Miller II

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Honda CRV, 4-Door MPV

VEH. NHTSA NO.: C85307 VIN: 3CZRE38368G703225 COLOR: Blue

VEH. BUILD DATE: February, 2008 TEST DATES: June 19-20, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Anthony Balaskas, William Mangum

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 each O-pillar, a seat belt anchorage on the rear passenger corner of the upper roof, a grab handle located on the side rail above each door (front and rear), and an overhead console located on the front upper roof.

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: April 29, 2008; Odometer Reading 72 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Honda de Mexico, SA, DE CV.

Date of Manufacture: February, 2008; VIN: 3CZRE38368G703225

GVWR: 2070 kg; GAWR FRONT: 1050 kg;

GAWR REAR: 1040 kg;

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 300 kPa REAR: 300 kPa

Recommended Tire Size: 225/65R17

Recommended Cold Tire Pressure:

FRONT: 210 kPa REAR: 210 kPa

Size of Tire on Test Vehicle: 225/65R17

Type of Spare Tire: T155/90R17; Space Saver: X; Standard _

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench _; Bucket X; Split Bench _

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

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 385 kg

No. of Occupants x 68 kg = 340 kg

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

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

Right Front = 437.5 kg Right Rear = 323.0 kg

Left Front = 457.0 kg Left Rear = 308.0 kg

TOTAL FRONT = 894.5 kg TOTAL REAR = 631.0 kg

% Total Weight = 58.6 % % Total Weight = 41.4 %

TOTAL DELIVERED WEIGHT = 1525.5 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1525.5 kg

Max. Test Cargo/Luggage Weight = 45.0 kg

Target Test Weight = 1570.5 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	<u>437.5</u> kg	Right Rear =	<u>339.5</u> kg
Left Front =	<u>457.5</u> kg	Left Rear =	<u>331.5</u> kg
TOTAL FRONT =	<u>895.0</u> kg	TOTAL REAR =	<u>671.0</u> kg
% Total Weight =	<u>57.2</u> %	% Total Weight =	<u>42.8</u> %

TOTAL TEST WEIGHT = 1566.0 kg

Weight of ballast secured in vehicle's cargo area = 41.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 803 mm; Left Front 798 mm;
Right Rear 805 mm; Left Rear 806 mm;
Pitch Angle at Right Door Sill = 0.1 Rear is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.1 Left is higher

FULLY LOADED: Right Front 800 mm; Left Front 797 mm;
Right Rear 800 mm; Left Rear 799 mm;
Pitch Angle at Right Door Sill = 0.0
Pitch Angle at Left Door Sill = 0.2 Front is higher
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.1 Left is higher

AS TARGETED: Right Front 936 mm; Left Front 941 mm;
Right Rear 926 mm; Left Rear 931 mm;
Pitch Angle at Right Door Sill = 0.1 Rear is higher
Pitch Angle at Left Door Sill = 0.2 Front is higher
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.1 Left is higher

AS TESTED ON RIGHT SIDE:

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

AS TESTED ON LEFT SIDE:

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

VEHICLE WHEELBASE = 2660 mm

REMARKS: The seat travel distance was measured to be 238 mm for the driver front seat and 238 mm for the passenger front seat.

RECORDED BY: Helen A. Kaleto

DATE: June 18, 2008

APPROVED BY: P. Michael Miller II

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

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Honda CRV, 4-Door MPV

VEH. NHTSA NO.: C85307 VIN: 3CZRE38368G703225 COLOR: Blue

VEH. BUILD DATE: February, 2008 TEST DATES: June 19-20, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Anthony Balaskas, William Mangum

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 199.3°	L 248.4°
	R 105°-165°	R 111.1°	R 158.7°
B-PILLAR	L 195°-345°	L 199.9°	L 286.9°
	R 15°-165°	R 77.0°	R 161.6°

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Helen A. Kaleto

DATE: June 18, 2008

APPROVED BY: P. Michael Miller II

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Honda CRV, 4-Door MPV

VEH. NHTSA NO.: C85307 VIN: 3CZRE38368G703225 COLOR: Blue

VEH. BUILD DATE: February, 2008 TEST DATES: June 19-20, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Anthony Balaskas, William Mangum

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 28°	
		R 0°-50°	R 0°	R 34°	
	SR2A	L 0°-50°	L 0°	L 25°	
		R 0°-50°	R 0°	R 32°	
	SR2B	L 0°-50°	L 0°	L 45°	
		R 0°-50°	R 0°	R 45°	
	SR3-1	L 0°-50°	L 0°	L 23°	
		R 0°-50°	R 0°	R 23°	
	SR3-2	L 0°-50°	L 0°	L 24°	
		R 0°-50°	R 0°	R 23°	
	SR3-3	L * 0°-50°	L 0°	L 35°	
		R 0°-50°	R 0°	R 25°	
	REAR HEADER	RH	L 0°-50°	L 0°	L Exempt
			R 0°-50°	R 0°	R Exempt

		VERTICAL ANGLE SPECIFIED RANGE		MINIMUM VERTICAL ANGLE		MAXIMUM VERTICAL ANGLE	
A-PILLAR	AP1	L	-5°-50°	L	-5°	L	31°
		R	-5°-50°	R	-5°	R	31°
	AP2	L	-5°-50°	L	-5°	L	49°
		R	-5°-50°	R	-5°	R	49°
	AP3	L	-5°-50°	L	-5°	L	44°
		R	-5°-50°	R	-5°	R	45°
B-PILLAR	BP1	L	-10°-50°	L	-10°	L	6°
		R	-10°-50°	R	-10°	R	7°
	BP2*	L	0°-50°	L	0°	L	7°
		R	0°-50°	R	0°	R	9°
	BP3	L	0°-50°	L	0°	L	8°
		R	0°-50°	R	0°	R	9°
	BP4	L	-10°-50°	L	-10°	L	-3°
		R	-10°-50°	R	-10°	R	-4°
OTHER-PILLAR	OP1*	L	0°-50°	L	0°	L	15°
		R	0°-50°	R	0°	R	15°
	OP2	L	-10°-50°	L	-10°	L	7°
		R	-10°-50°	R	-10°	R	5°
REAR PILLAR	RP1	L	-10°-50°	L	-10°	L	Exempt
		R	-10°-50°	R	-10°	R	Exempt
	RP2	L	-10°-50°	L	-10°	L	Exempt
		R	-10°-50°	R	-10°	R	Exempt
UPPER ROOF 1			0°-50°		0°		50°
UPPER ROOF 2			0°-50°		0°		47°
UPPER ROOF 3			0°-50°		0°		50°
UPPER ROOF 4			0°-50°		0°		50°
UPPER ROOF 5			0°-50°		0°		50°

	VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
UPPER ROOF 6	0°-50°	0°	49°

As determined using the Procedures specified in S8.13.4.2. *Targets BP2, OP1, and SR3-3 (Left) are seat belt anchorage locations.

RECORDED BY: Helen A. Kaleto

DATE: June 18, 2008

APPROVED BY: P. Michael Miller II

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Honda CRV, 4-Door MPV

VEH. NHTSA NO.: C85307 VIN: 3CZRE38368G703225 COLOR: Blue

VEH. BUILD DATE: February, 2008 TEST DATES: June 19-20, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Anthony Balaskas, William Mangum

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	238 mm	238 mm
T°	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	111.6°	--
A1°	360° - T°	248.4°	--
W°	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	199.3°	--
A2°	A2° = W°	199.3°	--
U°	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	286.9°	--
B1°	B1° = U°	286.9°	--
V°	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	199.9°	--
B2°	B2° = V°	199.9°	--
W° (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	158.7°
A1° (right)	A1° (right) = W° (right)	--	158.7°
T ° (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	248.9°
A2° (right)	360°-T° (right)	--	111.1°
V ° (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	161.6°
B1° (right)	B1° (right) = V° (right)	--	161.6°
U ° (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	77.0°
B2° (right)	B2° (right) = U° (right)	--	77.0°
J	A-Pillar {(Plane 3) – (Plane 5)}	342.8 mm	350.6 mm
J/2	J ÷ 2	171.4 mm	175.3 mm
D1	Upper Roof {(Plane A) – (Plane B)}	2240.0 mm	
D1/2	D1 ÷ 2	1120.0 mm	
D2	Upper Roof {(Plane C) – (Plane D)}	1086.3 mm	

Measurement	Description	Left Side	Right Side
D2/2	D2 ÷ 2	543.2 mm	
.35D1	.35 x D1	784.0 mm	
.35D2	.35 x D2	380.2 mm	
N	B-Pillar {(BPR) – (lowest point on daylight opening forward of B-Pillar)}	506.6 mm	504.4 mm
N/2	B-Pillar {(BP3) – (lowest point on daylight opening forward of B-Pillar)}	253.3 mm	252.2 mm
N/4	B-Pillar {(BP4) – (lowest point on daylight opening forward of B-Pillar)}	126.7 mm	126.1 mm
Q	O-Pillar (Plane 13 – Plane 14)	433.4 mm	431.5 mm
Q/2	Q / 2	216.7 mm	215.8 mm
D	R-Pillar (Point 7 – Point M)	886.0 mm	931.0 mm
3D/7	3*D / 7	379.7 mm	399.0 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	1364.4	-379.5	325.0	1364.4	379.5	325.0
Rear	2227.4	-359.5	388.0	2227.4	359.5	388.0

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1364.4	-379.5	325.0	1364.4	379.5	325.0
Rear	2227.4	-359.5	388.0	2227.4	359.5	388.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1286.4	-379.5	985.0	1286.4	379.5	985.0
CGF2	1524.4	-379.5	985.0	1524.4	379.5	985.0
CGR	2387.4	-359.5	1048.0	2387.4	359.5	1048.0

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Front driver door upper striker bolt hole (x, y, z) = 1532.1, -773.8, 432.8

Front passenger door upper striker bolt hole (x, y, z) = 1532.1, 773.8, 432.8

Front passenger seat outboard bolt hole (x, y, z) = 1102.4, 592.5, 38.0

REMARKS:

RECORDED BY: Helen A. Kaleto

DATE: June 18, 2008

APPROVED BY: P. Michael Miller II

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Honda CRV, 4-Door MPV

VEH. NHTSA NO.: C85307 VIN: 3CZRE38368G703225 COLOR: Blue

VEH. BUILD DATE: February, 2008 TEST DATES: June 19-20, 2008

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Anthony Balaskas, William Mangum

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	1094.7	-560.9	1097.3	248	31	No	--	No
AP2	937.8	-609.5	1010.3	200	49	No	--	Yes
AP3	783.1	-639.4	926.9	200	44	No	--	No
A-Pillar Right Side								
AP1	1095.2	562.1	1102.4	111	31	No	--	Yes
AP2	948.6	609.1	1015.2	158	49	No	--	No
AP3	786.0	636.3	927.8	158	45	No	--	Yes
B-Pillar Left Side								
BP1	1651.7	-476.9	1238.1	--	--	Yes	--	--
REL	1655.3	-510.6	1200.7	270	6	--	2	No
BP2	1632.1	-601.0	947.3	270	7	No	--	No
BP3	1632.1	-594.4	984.2	--	--	Yes	--	--
REL	1632.5	-595.6	983.0	270	8	--	2	No
BP4	1686.5	-674.1	858.0	200	-3	No	--	Yes
B-Pillar Right Side								
BP1	1654.7	479.3	1236.9	--	--	Yes	--	--
REL	1653.4	512.1	1201.7	90	7	--	2	Yes
BP2	1630.6	607.8	941.3	90	9	No	--	Yes
BP3	1631.9	600.8	984.1	--	--	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	1630.6	599.6	984.1	90	9	--	2	No
BP4	1687.0	680.1	858.5	161	-4	No	--	No
Other Pillar Left Side								
OPR	2425.6	-447.9	1215.9	--	--	--	--	--
OP1	2513.9	-584.3	946.5	270	15	No	--	No
OP2	2491.5	-605.2	999.1	--	--	Yes	--	--
REL	2433.9	-588.0	1037.6	270	7	--	3	No
Other Pillar Right Side								
OPR	2421.8	451.3	1212.2	--	--	--	--	--
OP1	2515.5	590.7	945.7	90	15	No	--	No
OP2	2491.2	612.2	996.4	--	--	Yes	--	--
REL	2432.2	595.8	1037.4	90	5	--	3	Yes
Rear Pillar Left Side								
RP1	2957.9	-452.5	1088.2	Target exempt from testing per S6.3(b).				No
RP2	2985.3	-582.2	938.1	Target exempt from testing per S6.3(b).				No
Rear Pillar Right Side								
RP1	2969.5	453.6	1090.0	Target exempt from testing per S6.3(b).				No
RP2	3007.7	583.7	939.5	Target exempt from testing per S6.3(b).				No
Front Header Left Side								
FH1	1008.3	-463.2	1137.3	180	50	No	--	No
FH2	980.3	-317.9	1142.2	180	50	No	--	No
Front Header Right Side								
FH1	1011.7	463.9	1140.2	180	50	No	--	No
FH2	984.4	316.2	1144.1	180	50	No	--	No
Side Rail Left Side								
SR1	1244.7	-497.2	1179.8	--	--	Yes	--	--
REL	1289.3	-506.4	1162.1	270	28	--	2	No
SR2A	1393.7	-500.7	1211.7	--	--	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	1452.1	-494.4	1181.5	270	25	--	3	No
SR2B	1350.9	-499.7	1213.6	--	--	Yes	--	--
REL	1351.3	-542.1	1153.8	270	45	--	3	Yes
SR3-1	1905.8	-484.2	1199.5	270	23	No	--	No
SR3-2	2064.6	-486.4	1194.8	270	24	No	--	No
SR3-3	2575.5	-507.2	1134.2	--	--	Yes	--	--
REL	2576.5	-521.7	1117.7	270	35	--	1	Yes
Side Rail Right Side								
SR1	1245.3	502.9	1175.2	--	--	Yes	--	--
REL	1288.3	509.7	1159.0	90	34	--	2	No
SR2A	1395.6	492.9	1225.1	--	--	Yes	--	--
REL	1448.4	495.6	1181.4	90	32	--	3	No
SR2B	1355.1	498.0	1213.1	--	--	Yes	--	--
REL	1354.5	542.3	1155.2	90	45	--	3	No
SR3-1	1903.0	487.9	1202.5	90	23	No	--	No
SR3-2	2065.5	490.3	1196.7	90	23	No	--	No
SR3-3	2707.9	309.2	1174.9	90	25	No	--	No
Rear Header Left Side								
RH	2915.3	-359.9	1152.1	Target exempt from testing per S6.3(b).				No
Rear Header Right Side								
RH	2908.9	359.8	1161.5	Target exempt from testing per S6.3(b).				No
Upper Roof Left Side								
UR1@BPR	1654.1	-364.8	1265.4	270	50	No	--	Yes
UR2@Fwd. OPR	2264.4	-362.1	1263.8	270	47	No	--	Yes
UR3@SR3-2	2753.8	-341.2	1199.0	270	50	No	--	No
Upper Roof Right Side								
UR4@SR2A	1572.5	358.1	1262.7	90	50	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					
UR5@Rear BPR	2141.0	360.2	1265.6	90	50	No	--	No
UR6@OPR	2425.9	361.6	1253.0	90	49	No	--	Yes

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

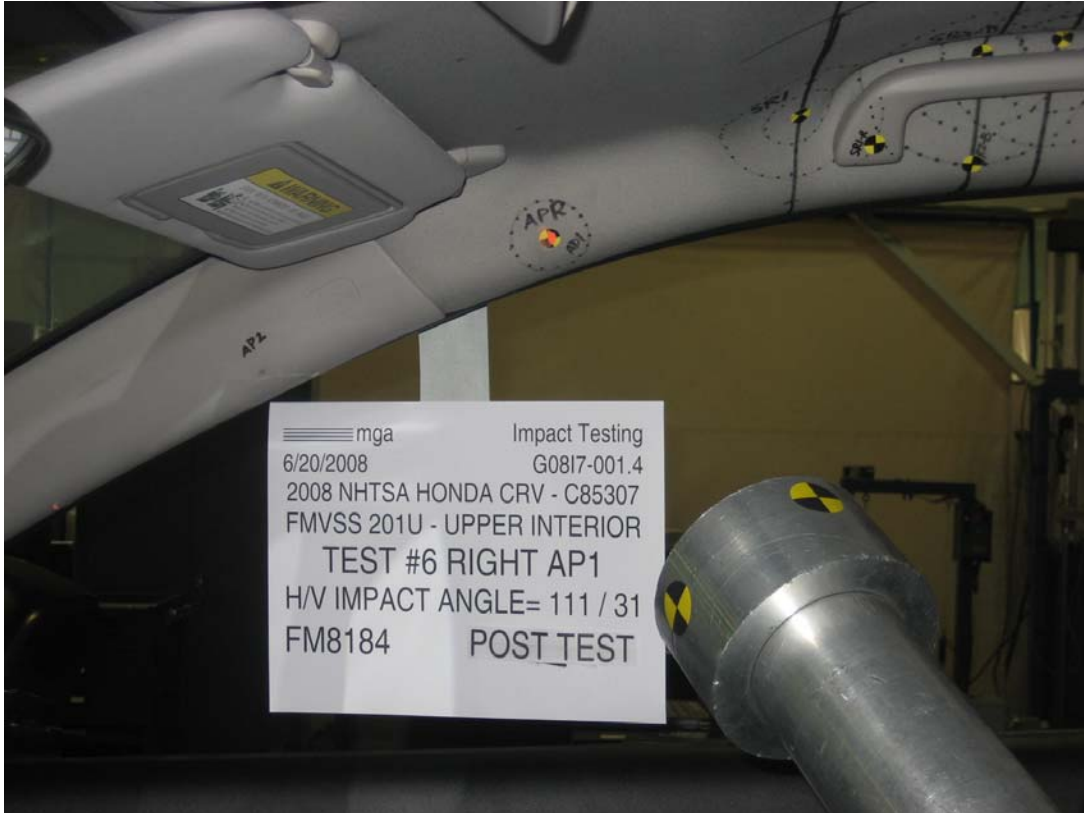
RECORDED BY: Helen A. Kaleto

DATE: June 18, 2008

APPROVED BY: P. Michael Miller II

3.0 TEST DATA (Including Acceleration and Velocity Plots)

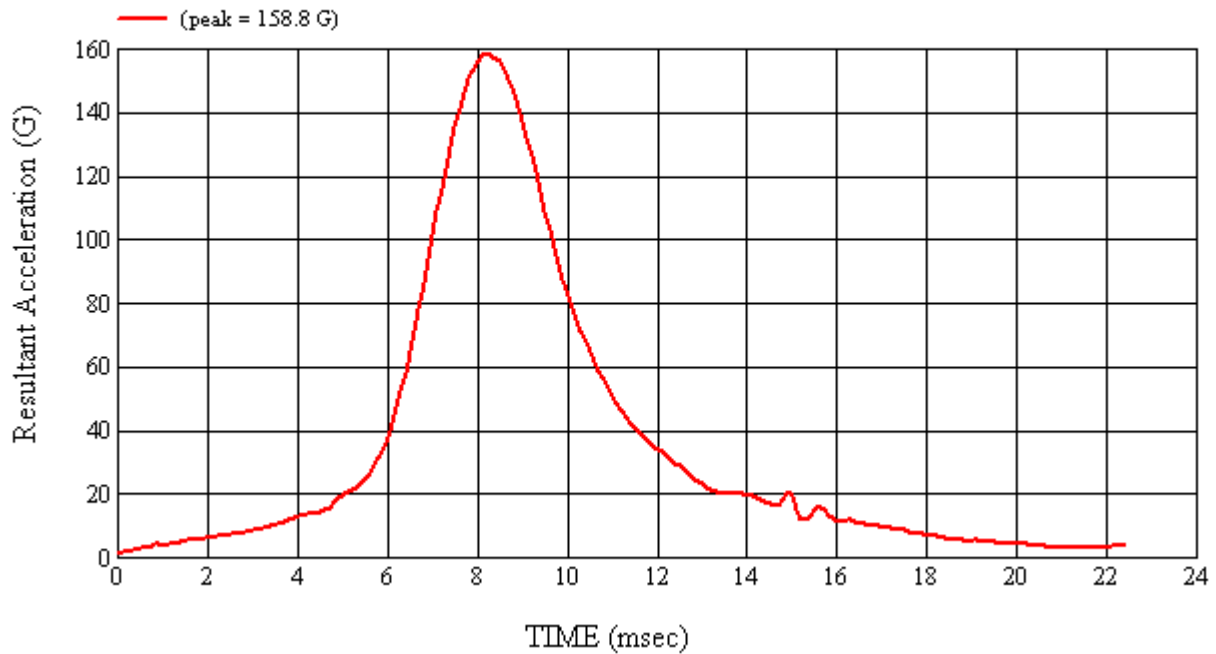
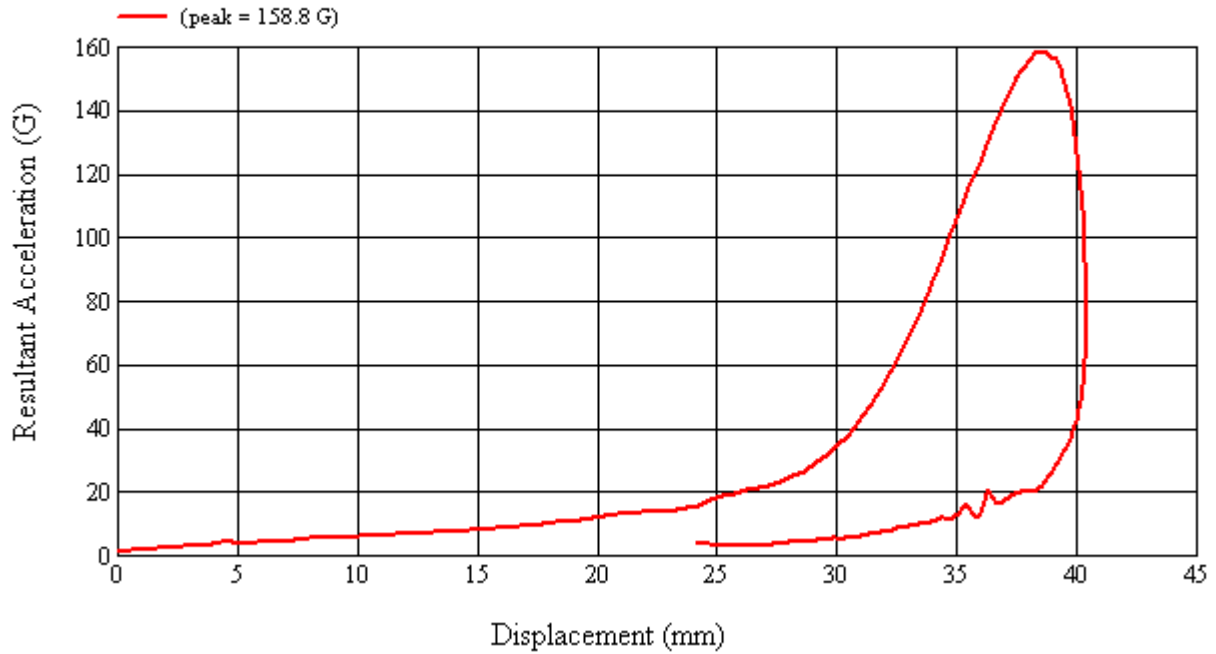


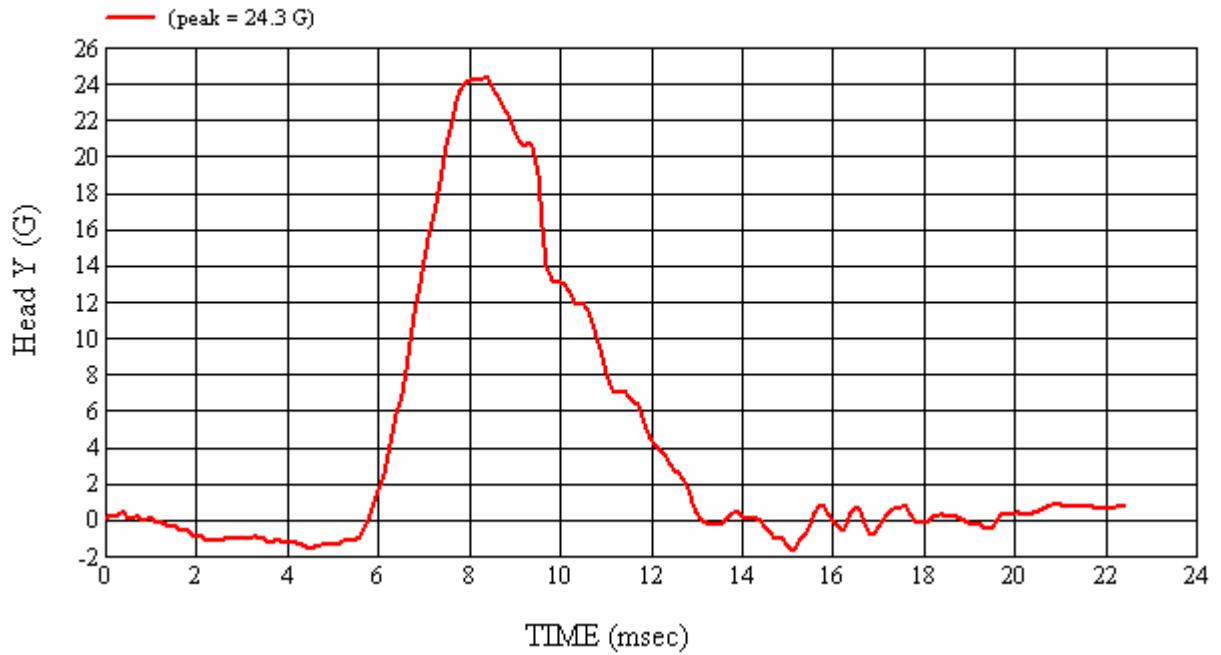
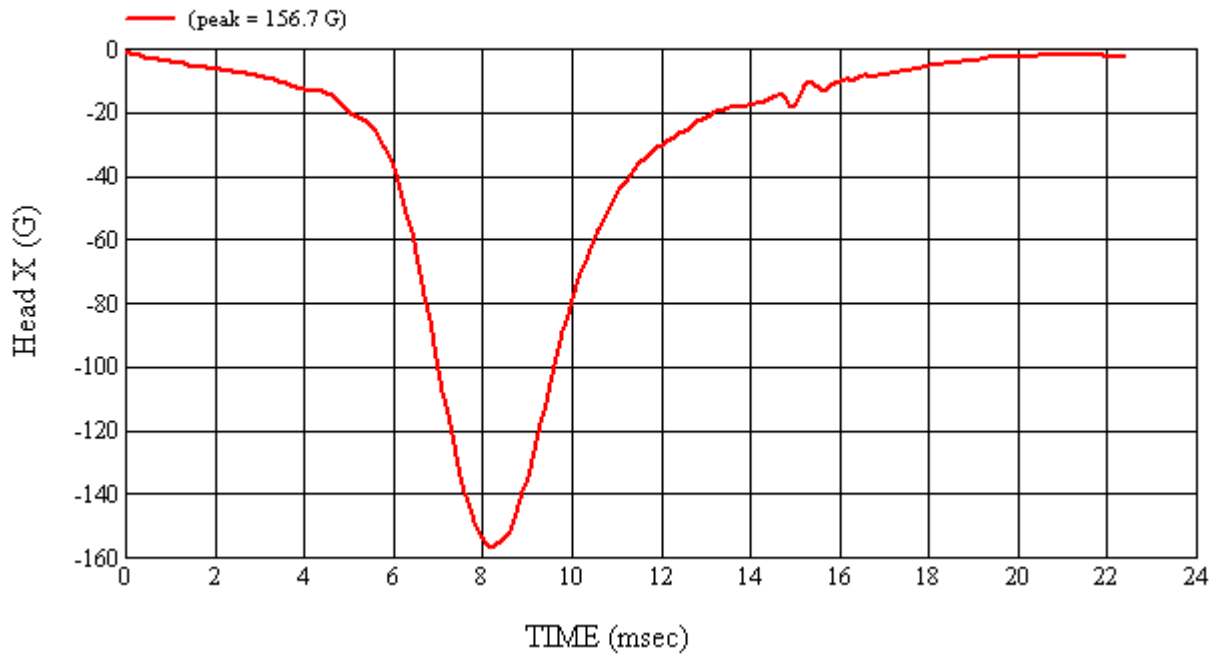


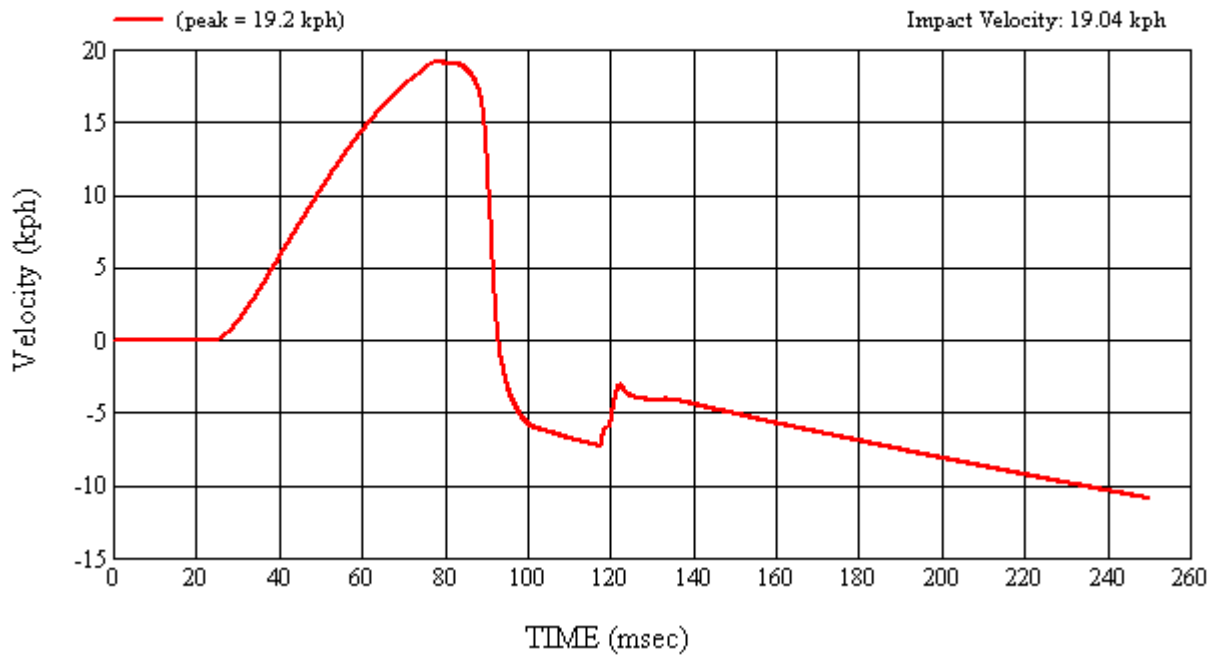
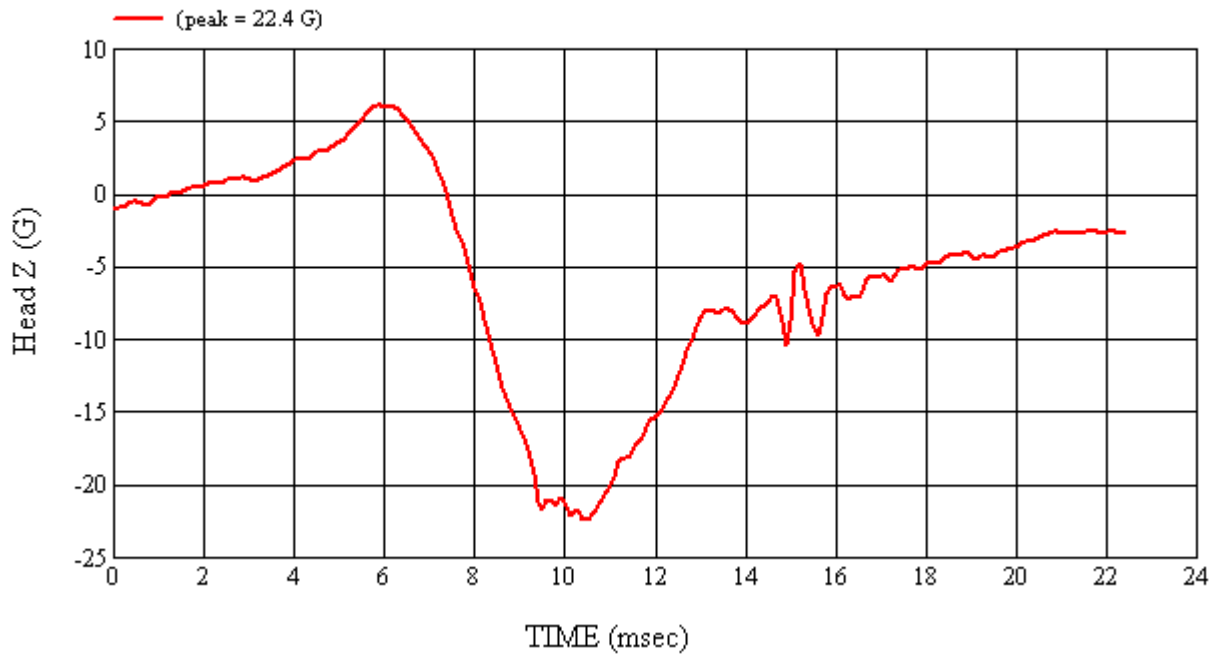
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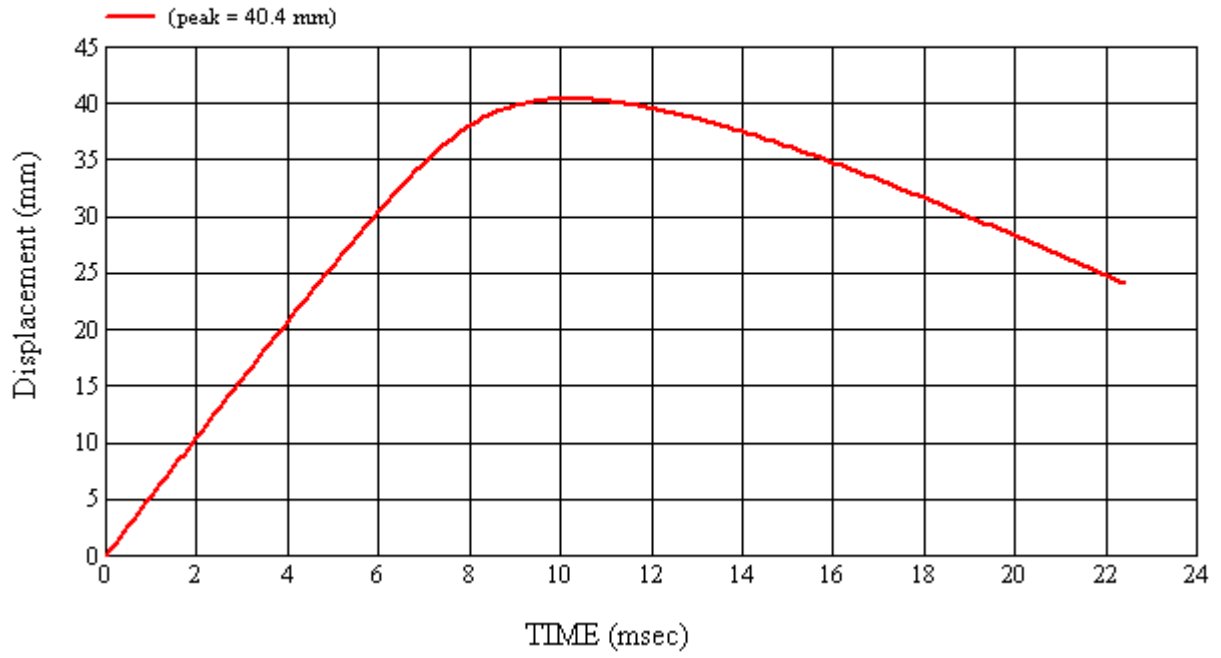
Target Location: API, Right Side

Test Date: 6/20/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): AP2Left

Temperature:20.8C

MGA Test Reference No.:FM8188

Humidity:48.8%

Approach Horizontal Angles:200°

Time of Test:3:12:22 PM

Approach Vertical Angles:49°

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
485	422	6.1	18.9	5	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.844	0.87	0.87
Y	6	J22664	93.878	1.52	1.52
Z	7	J35924	92.621	1.02	1.02

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

No visible damage.

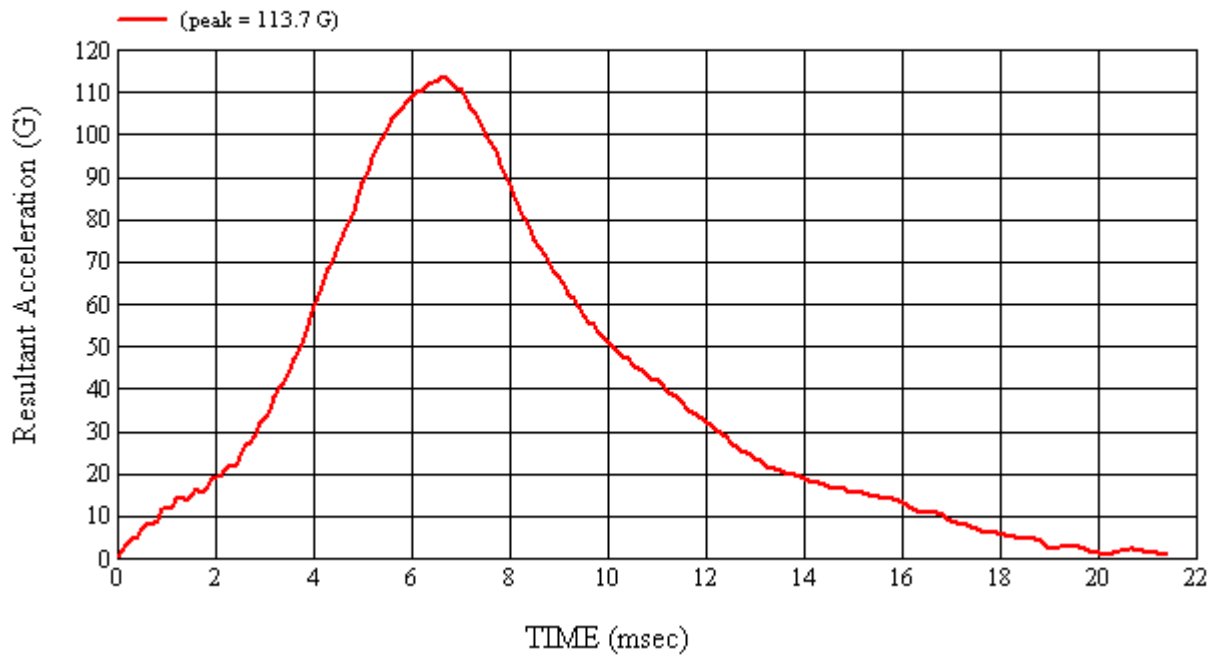
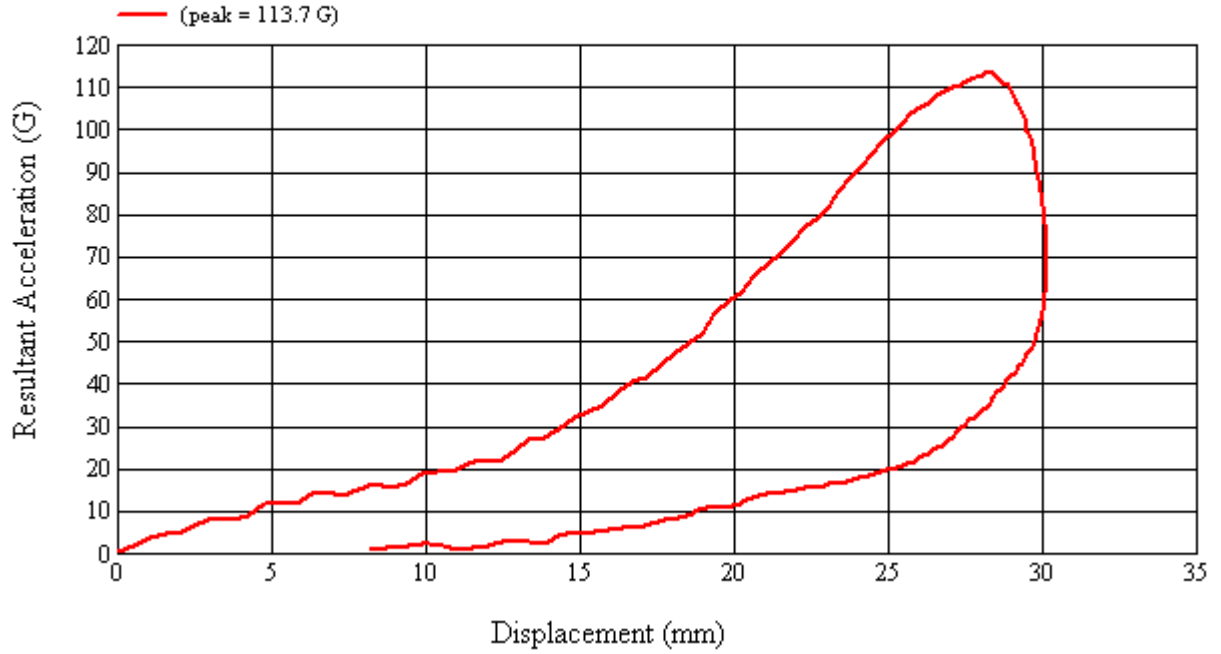
Recorded By: Deena A. Kalato Approved By*: P. M. [Signature] Date: 6/20/2008

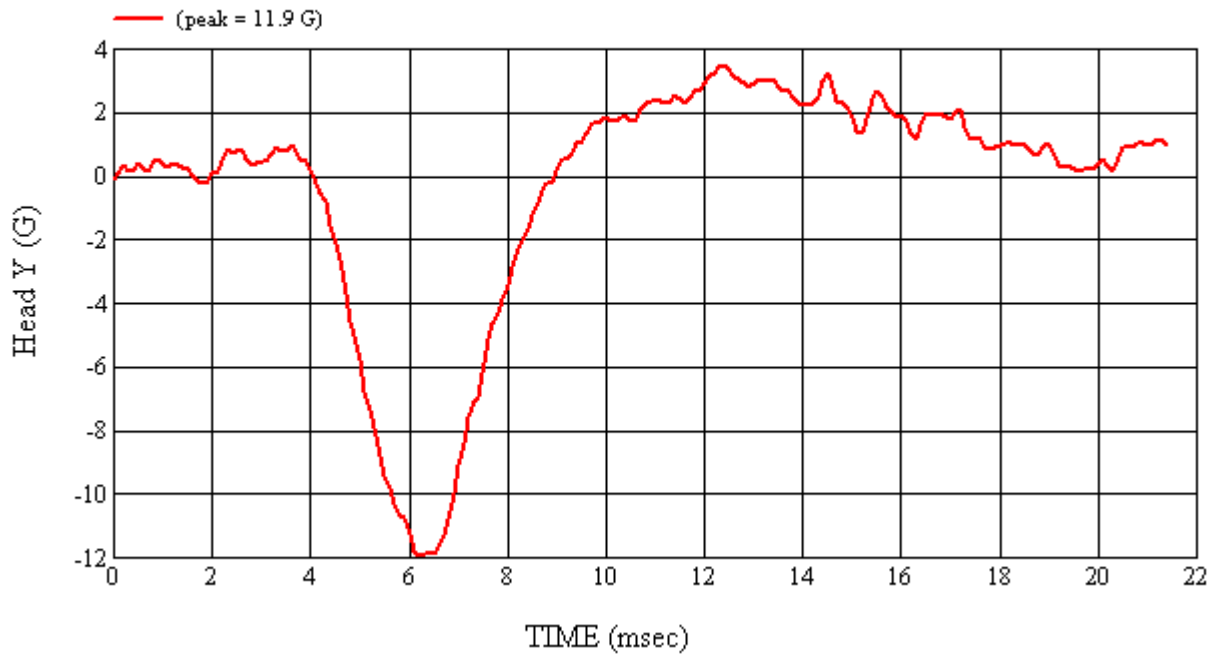
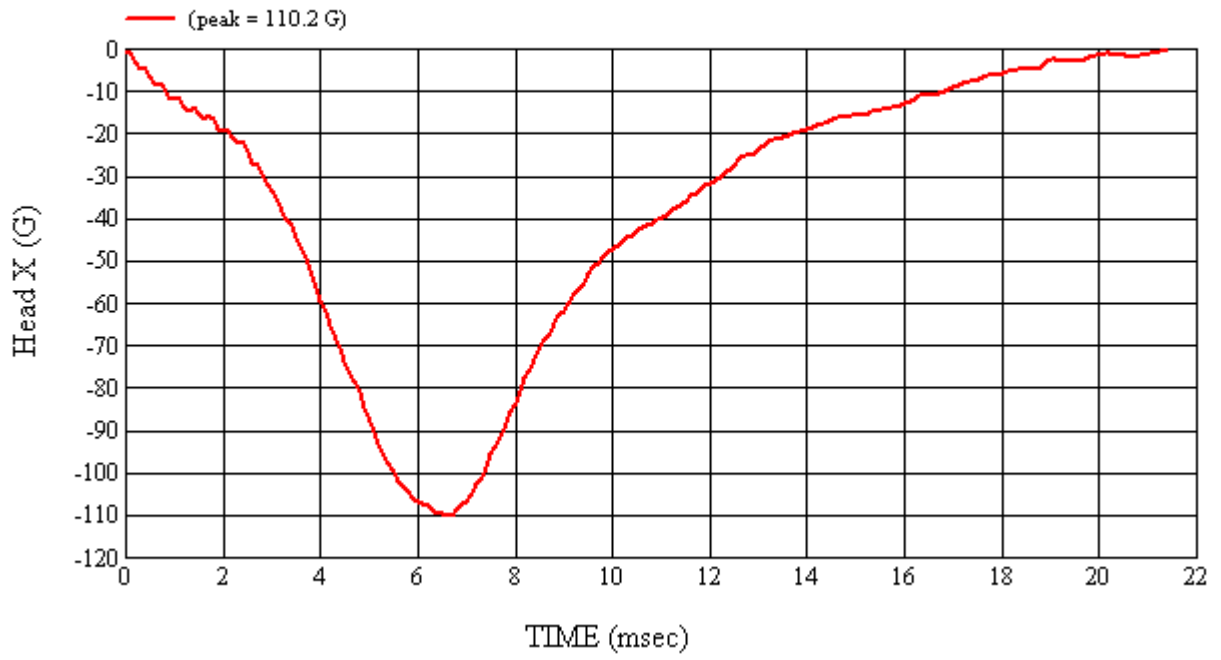
*Only necessary for NHTSA (Government) Compliance testing.

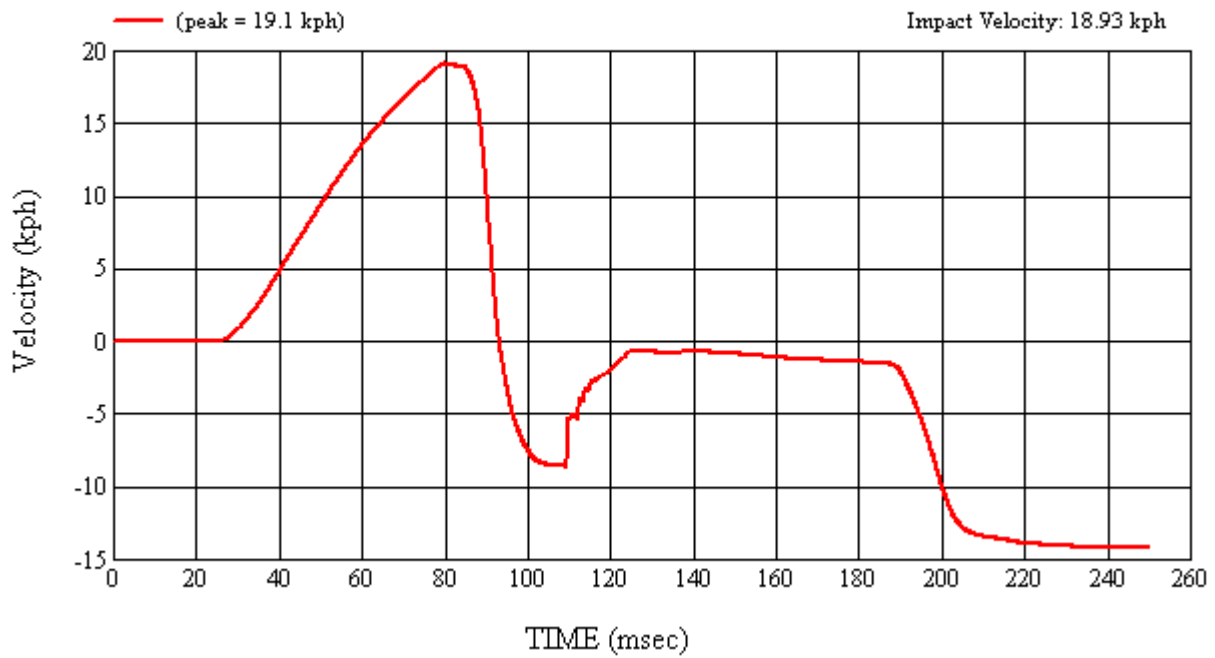
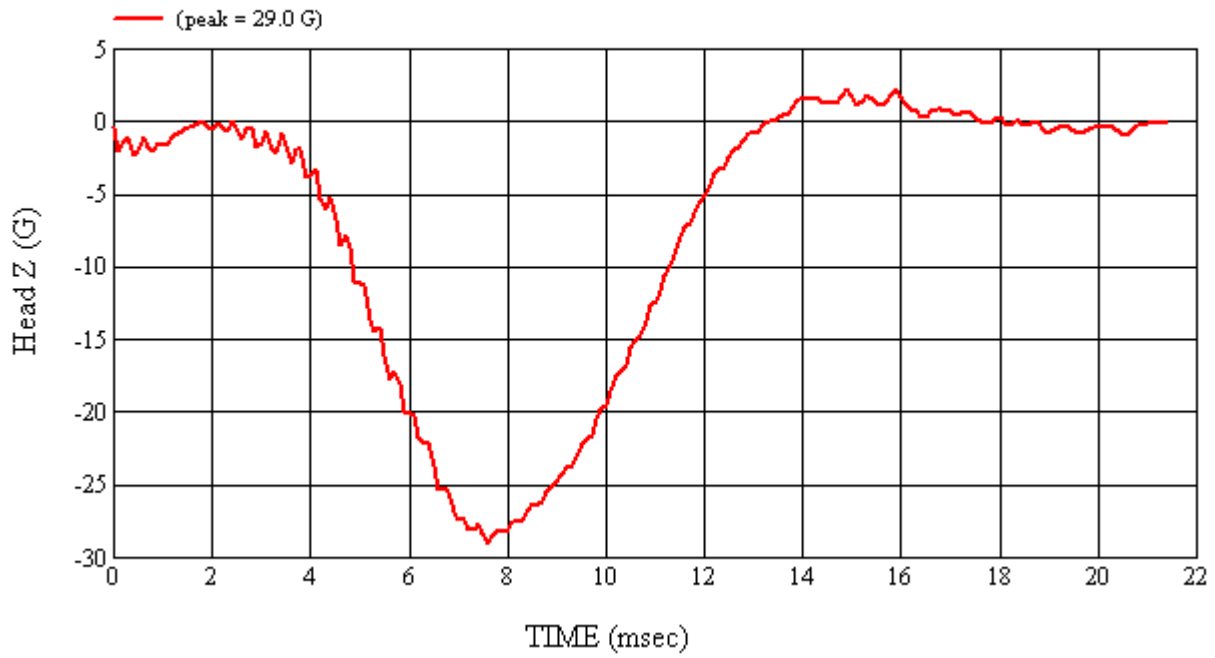
MGA Test #: FM8188

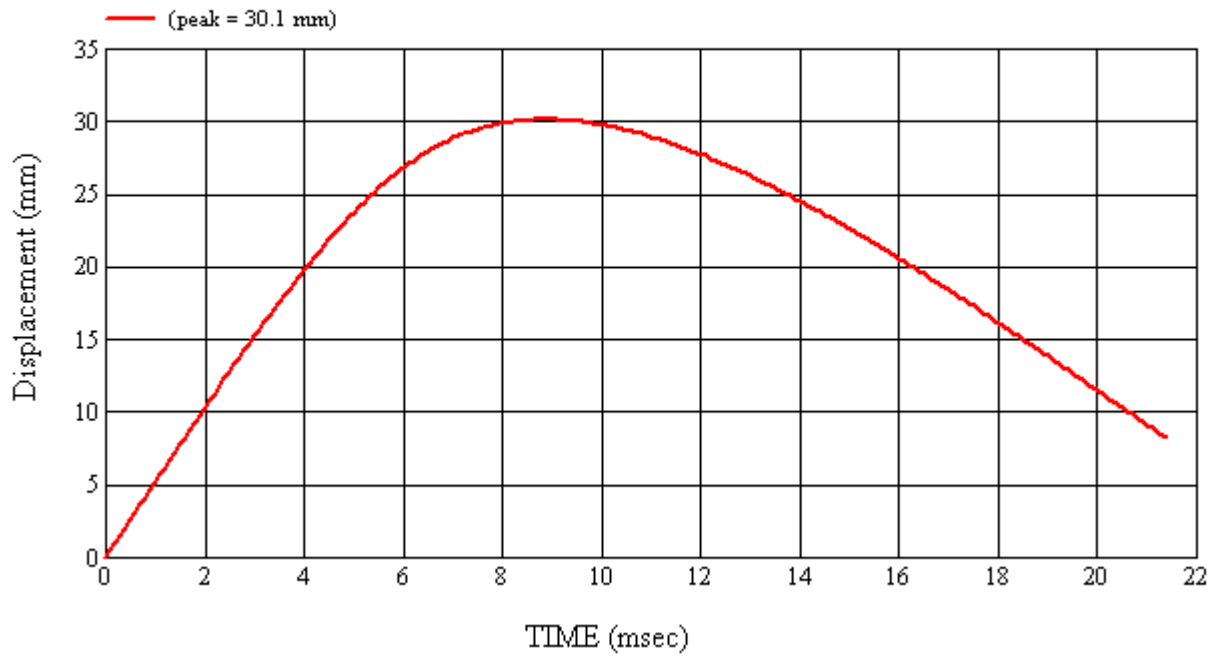
Target Location: AP2, Left Side

Test Date: 6/20/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Target (Vehicle Side): AP3Right	Test Number:#5
MGA Test Reference No.:FM8183	Temperature:21.8C
Approach Horizontal Angles:158°	Humidity:54.6%
Approach Vertical Angles:45°	Time of Test:9:28:44 AM
Additional Description:	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
708	718	4.4	19.4	8	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-114.533	0.87	0.87
Y	6	J14103	92.424	1.52	1.52
Z	7	J35800	96.462	1.02	1.02

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

No visible damage.

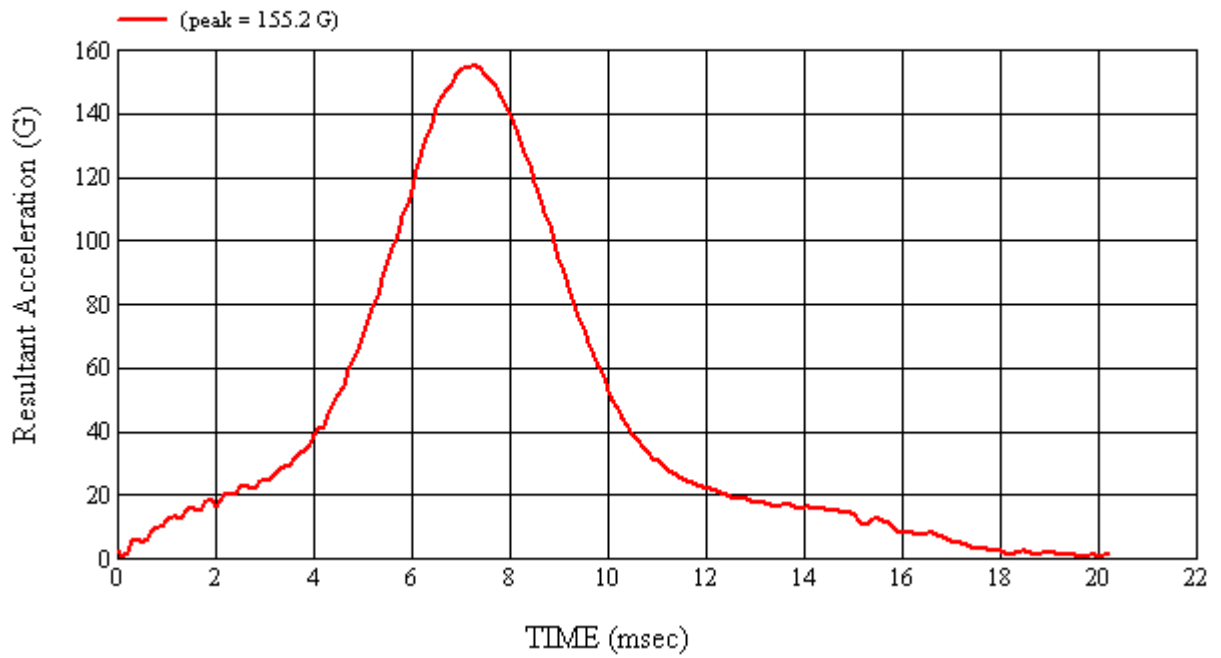
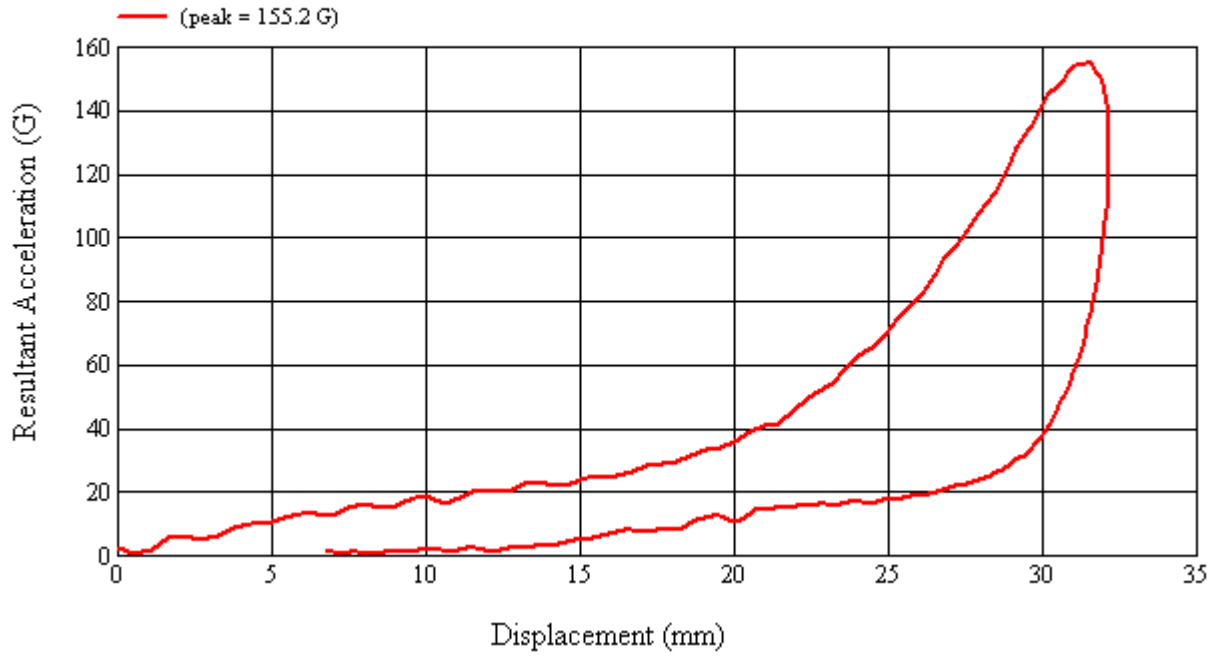
Recorded By: *Heena A. Kalato* Approved By*: *P. M. ...* Date: 6/20/2008

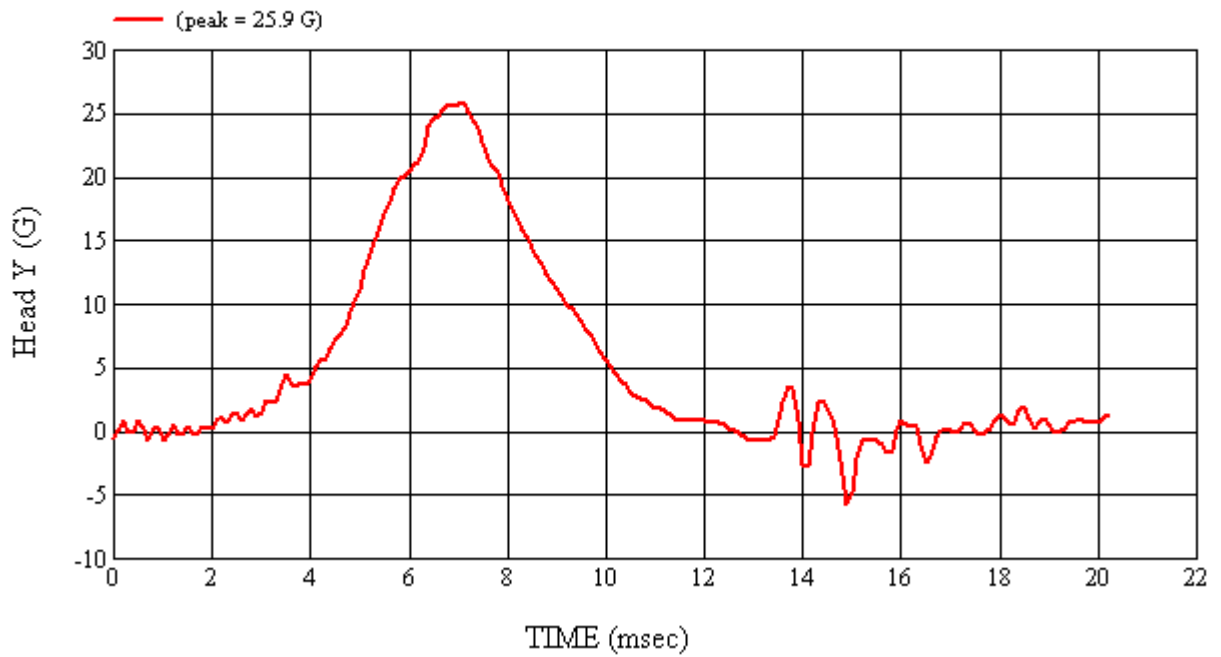
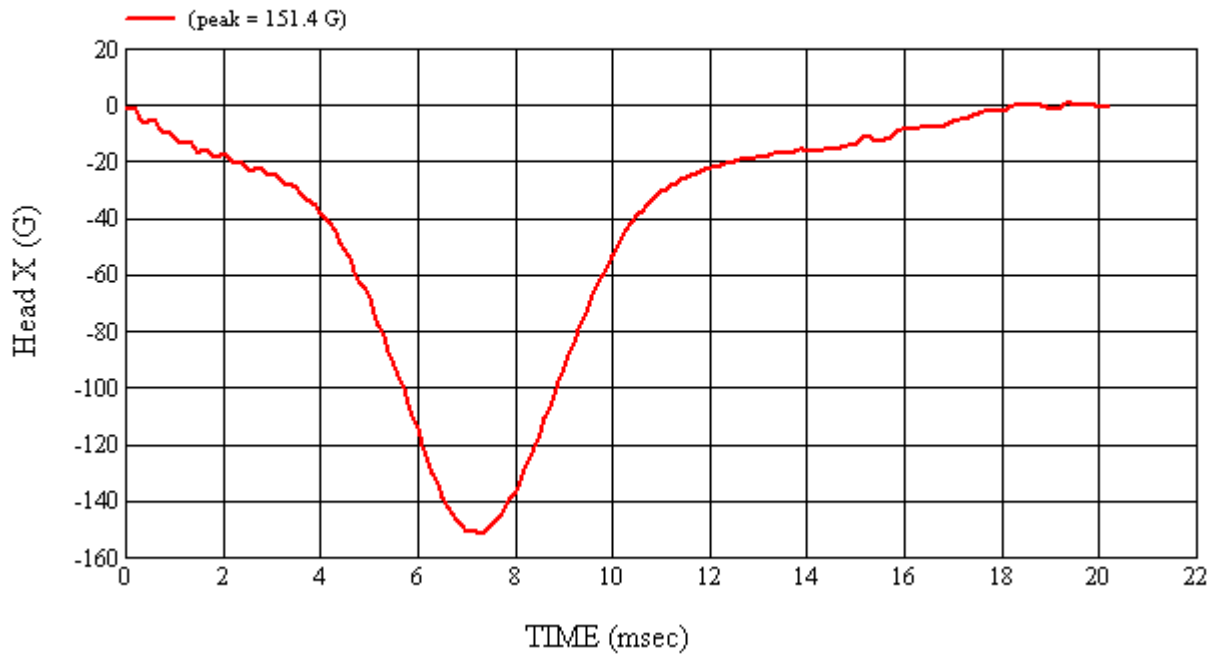
*Only necessary for NHTSA (Government) Compliance testing.

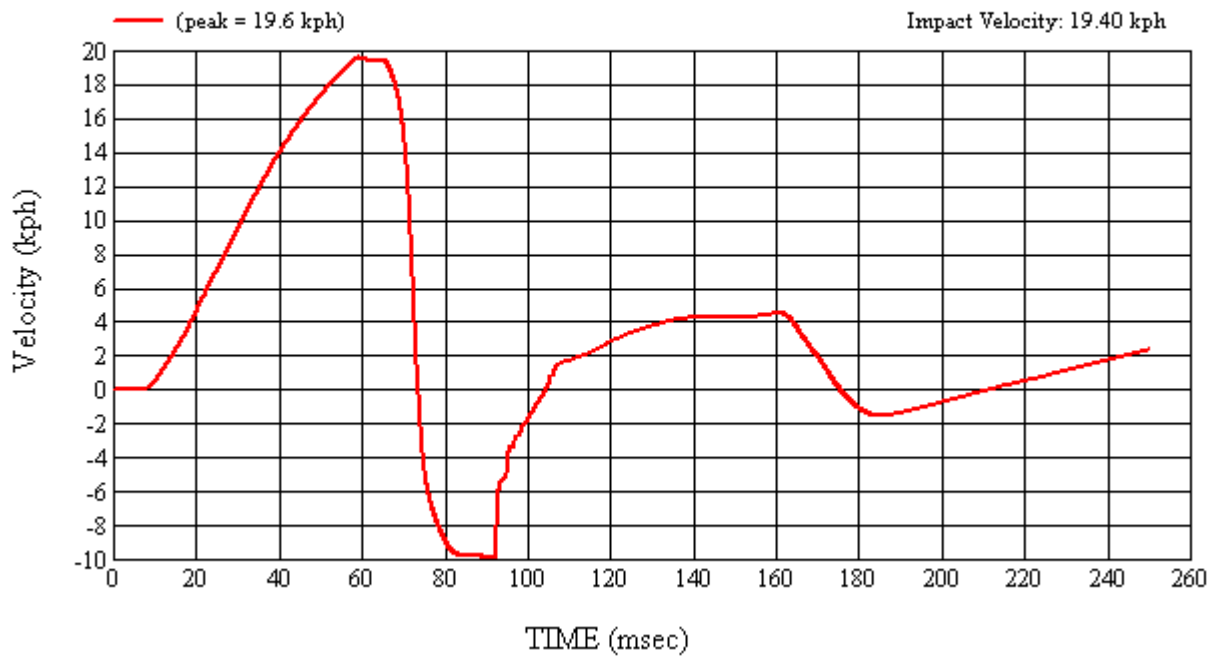
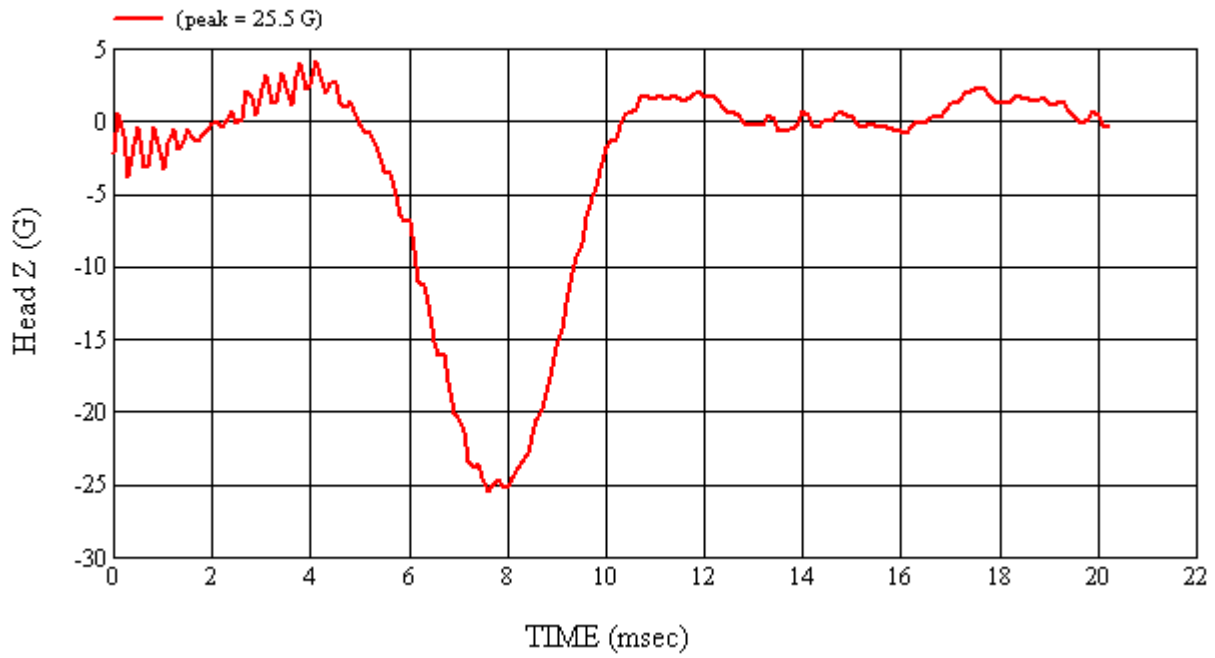
MGA Test #: FM8183

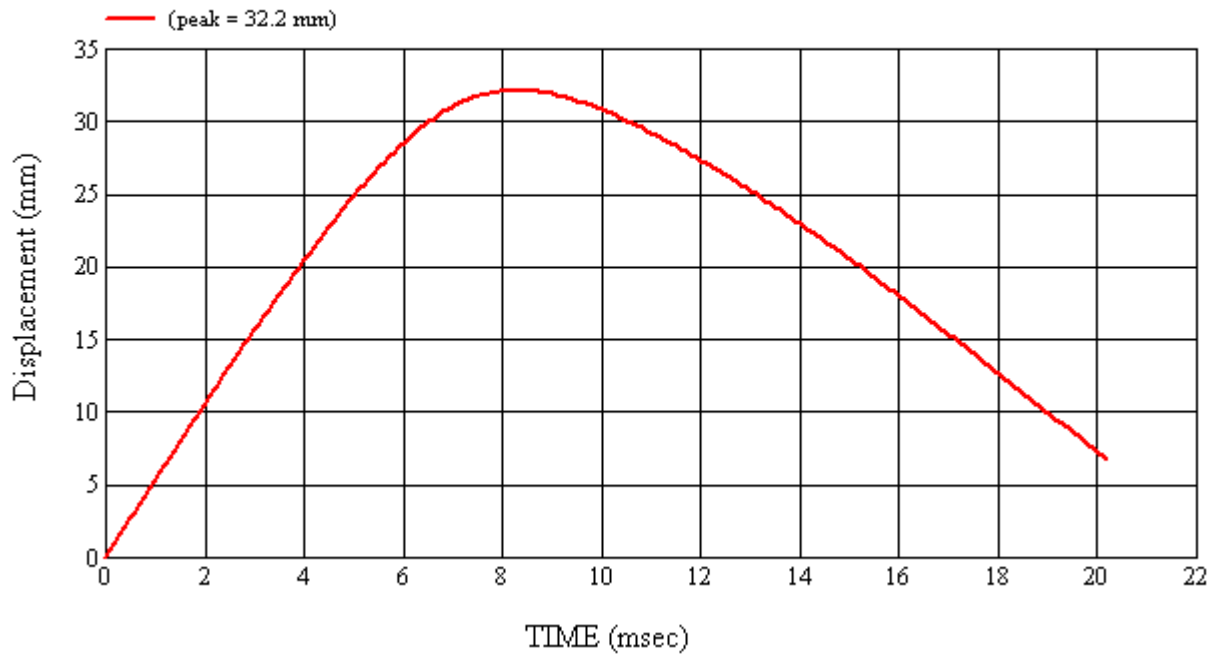
Target Location: AP3, Right Side

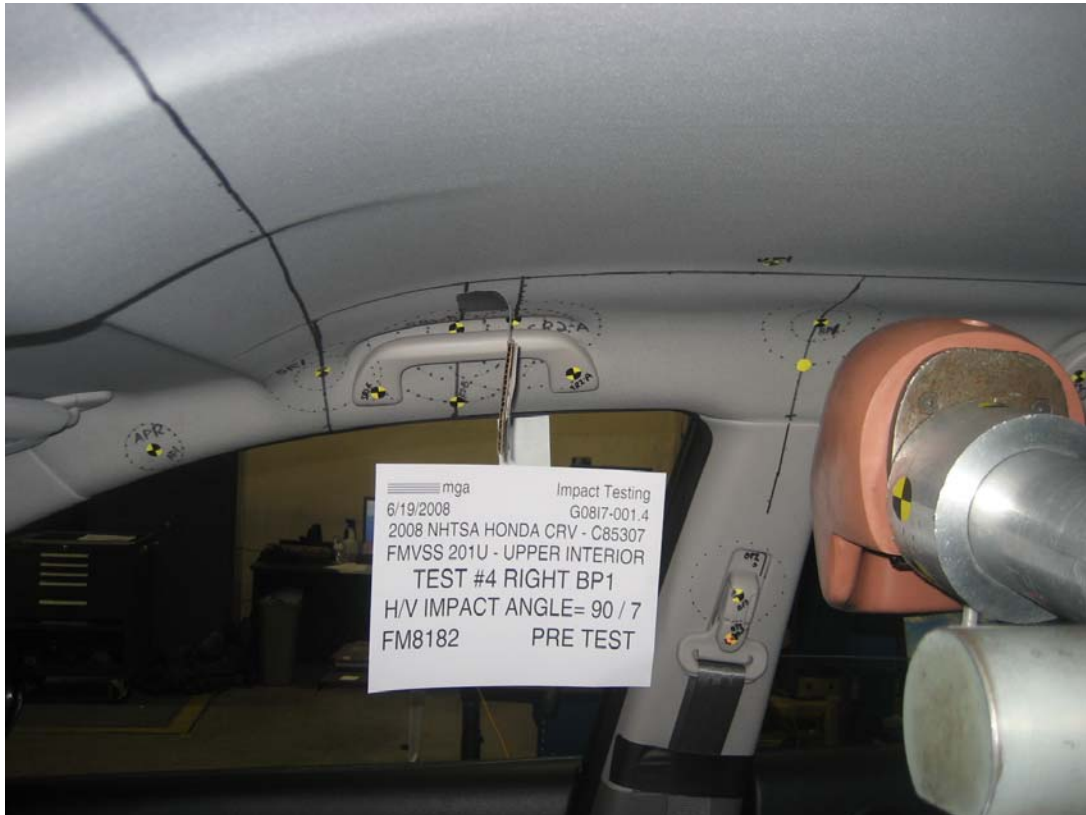
Test Date: 6/20/2008

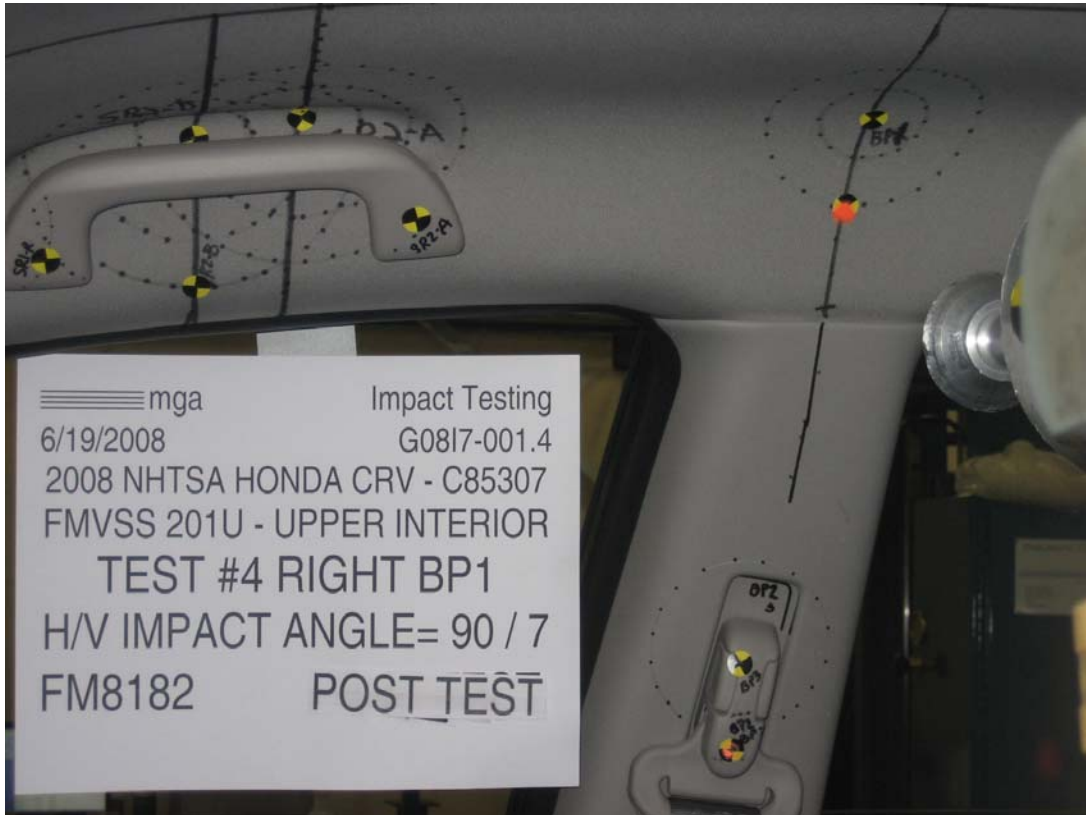












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): BP1Right

Temperature:20.9C

MGA Test Reference No.:FM8182

Humidity:51.6%

Approach Horizontal Angles:90°

Time of Test:5:18:17 PM

Approach Vertical Angles:7°

FMH Serial No:[035]

Additional Description:2 relocations

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
446	370	7.7	18.6	40	4 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.844	0.87	0.87
Y	6	J22664	93.878	1.52	1.52
Z	7	J35924	92.621	1.02	1.02

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

No visible damage.

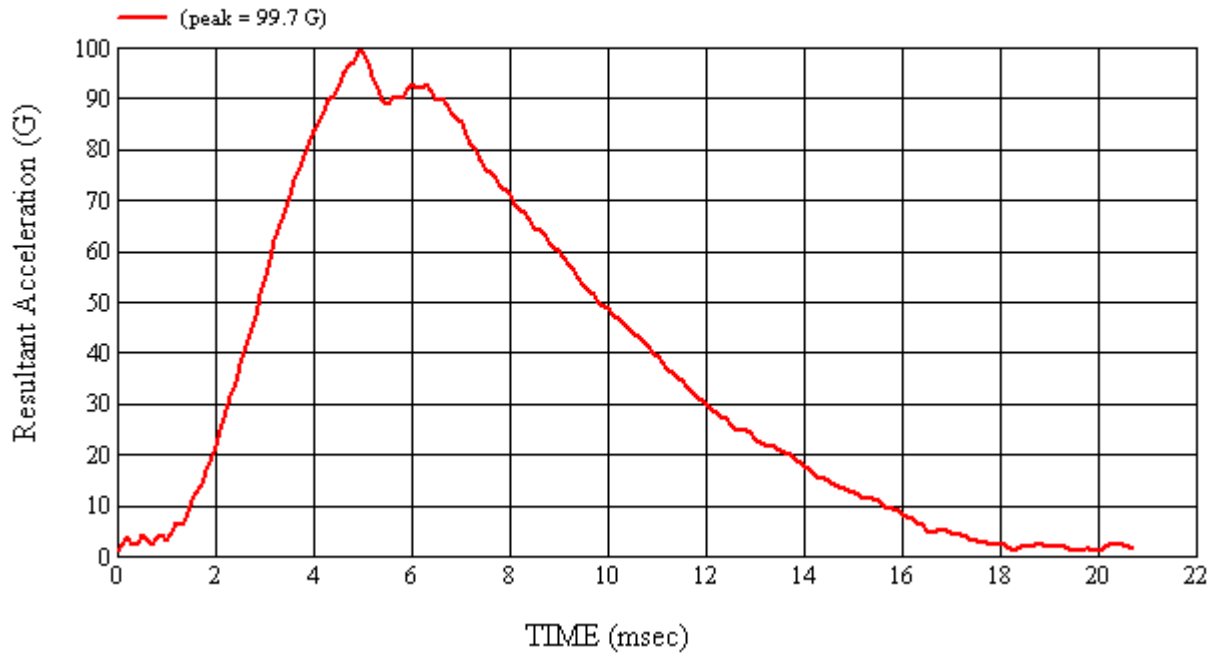
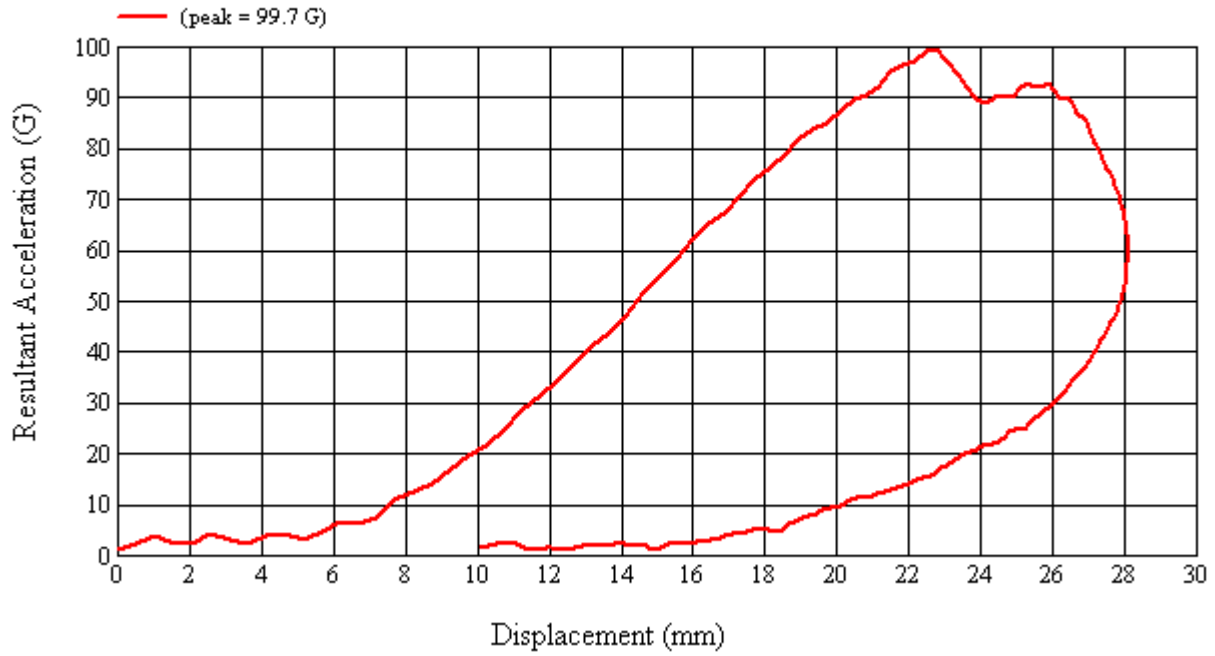
Recorded By: Deena A. Kalato Approved By*: P. M. [Signature] Date: 6/19/2008

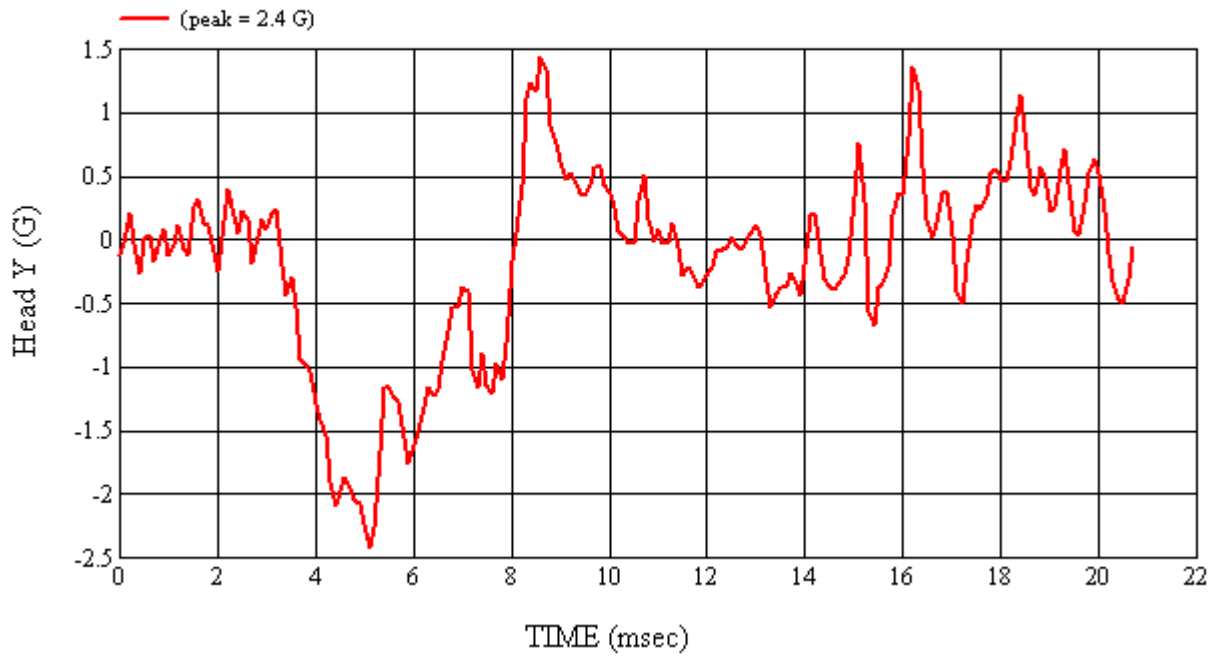
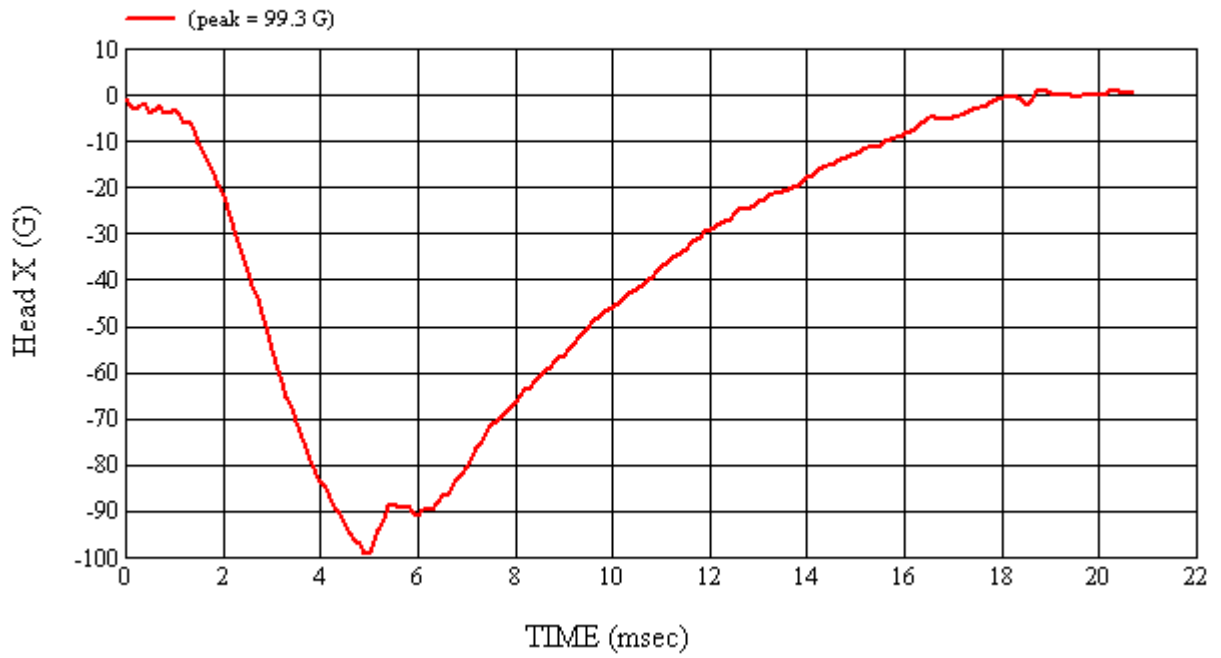
*Only necessary for NHTSA (Government) Compliance testing.

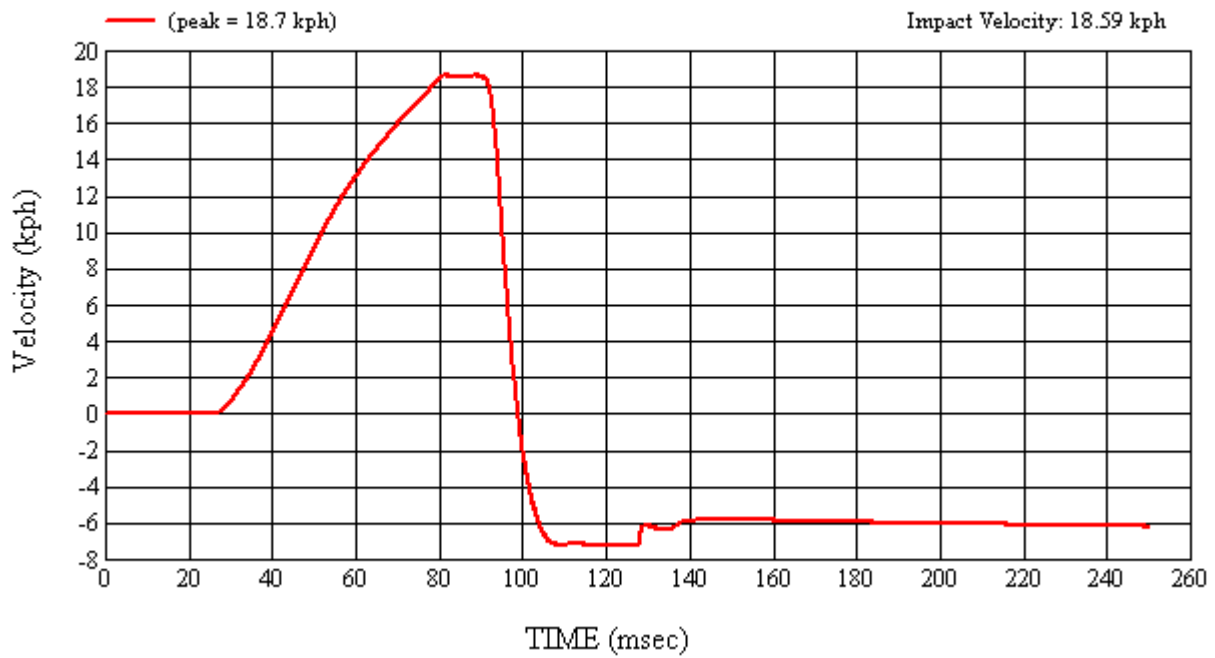
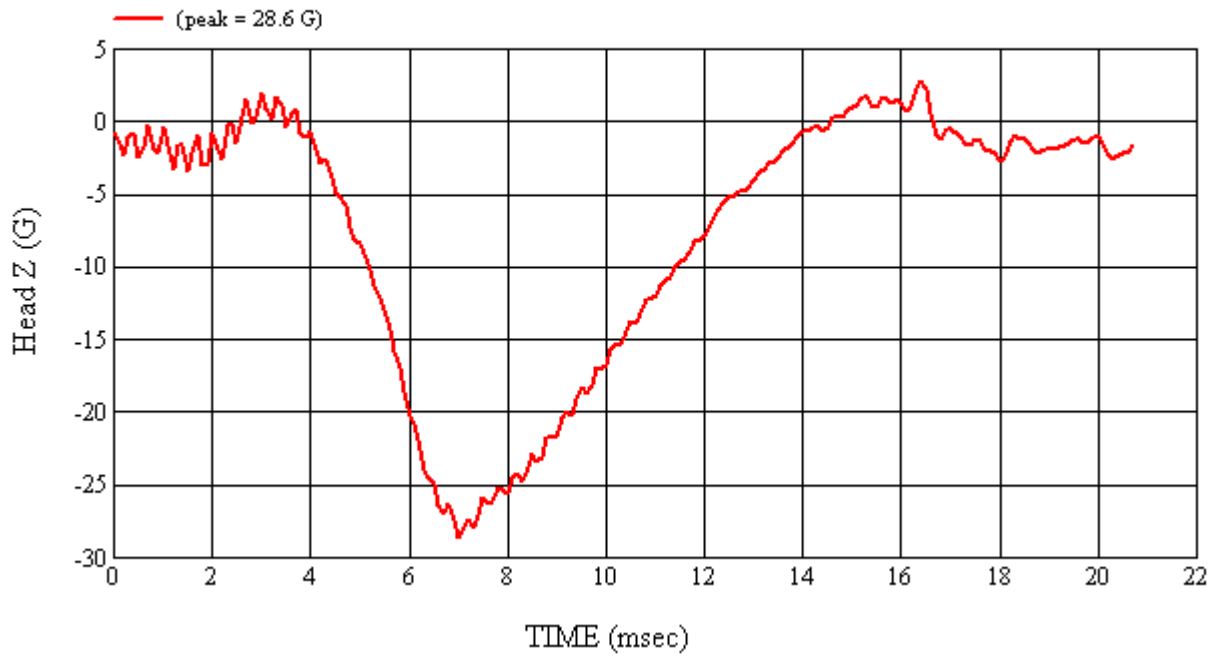
MGA Test #: FM8182

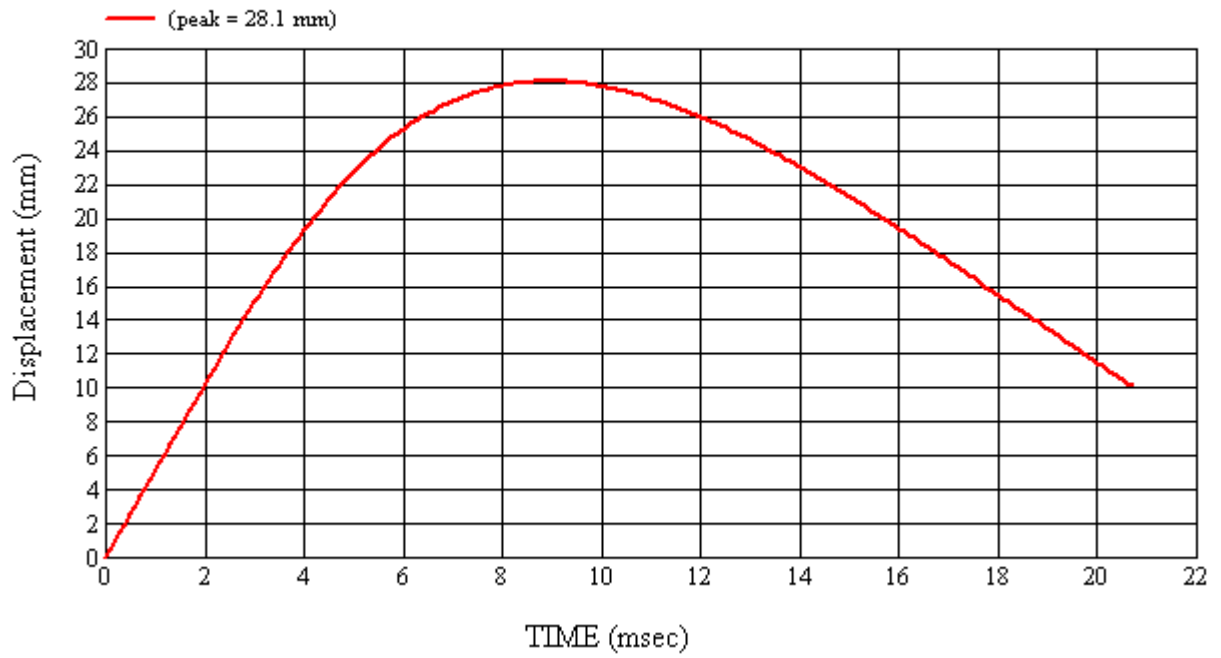
Target Location: BP1, Right Side

Test Date: 6/19/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Target (Vehicle Side): BP2Right
 MGA Test Reference No.:FM8181
 Approach Horizontal Angles:90°
 Approach Vertical Angles:9°
 Additional Description:

Test Number:#3
 Temperature:20.9C
 Humidity:51.2%
 Time of Test:3:40:52 PM
 FMH Serial No:[038]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
631	616	7.3	23.4	5	10 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-95.015	0.87	0.86
Y	6	J36197	108.737	1.52	1.52
Z	7	J36353	98.754	1.02	1.03

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

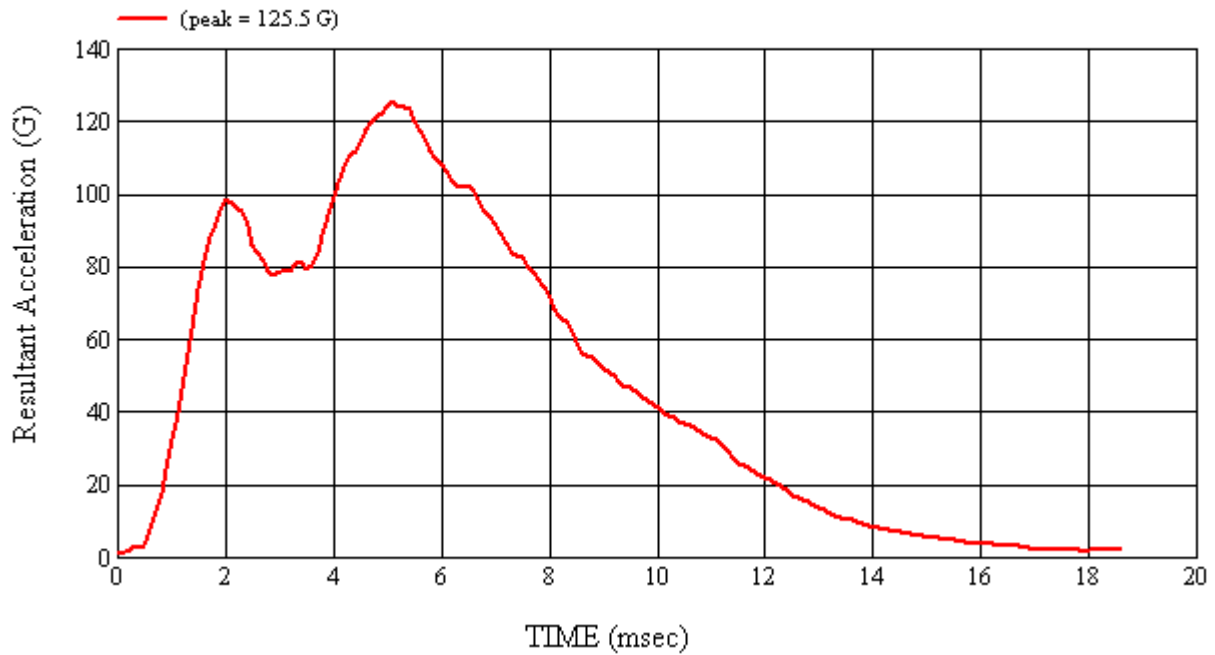
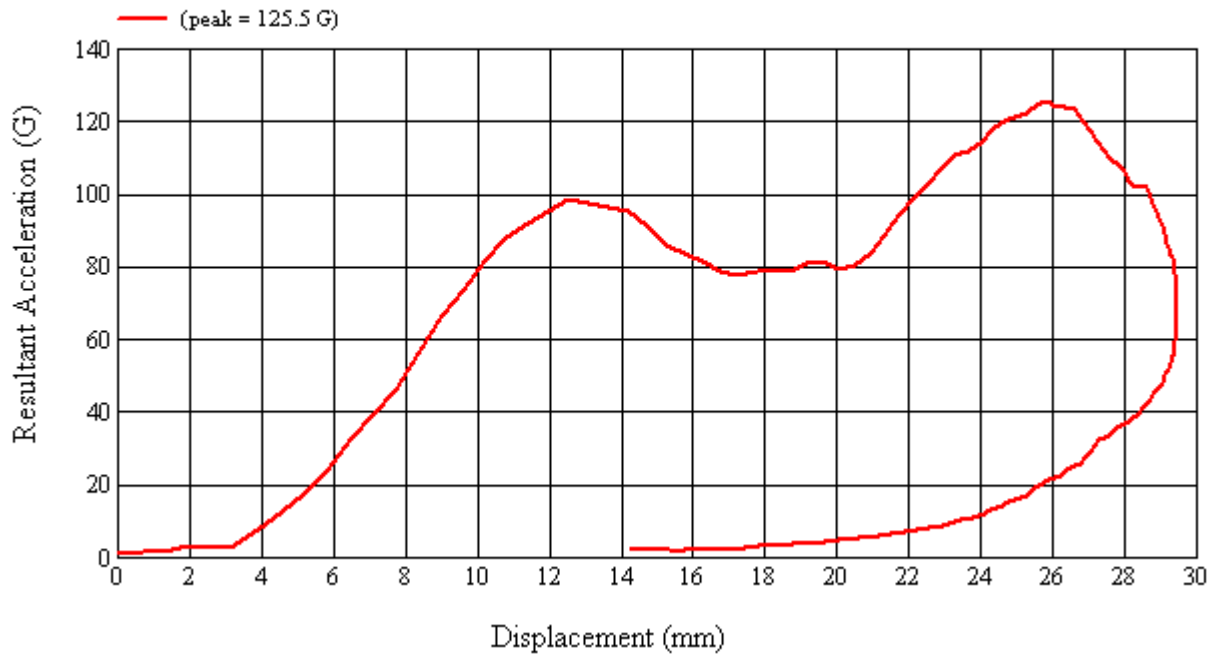
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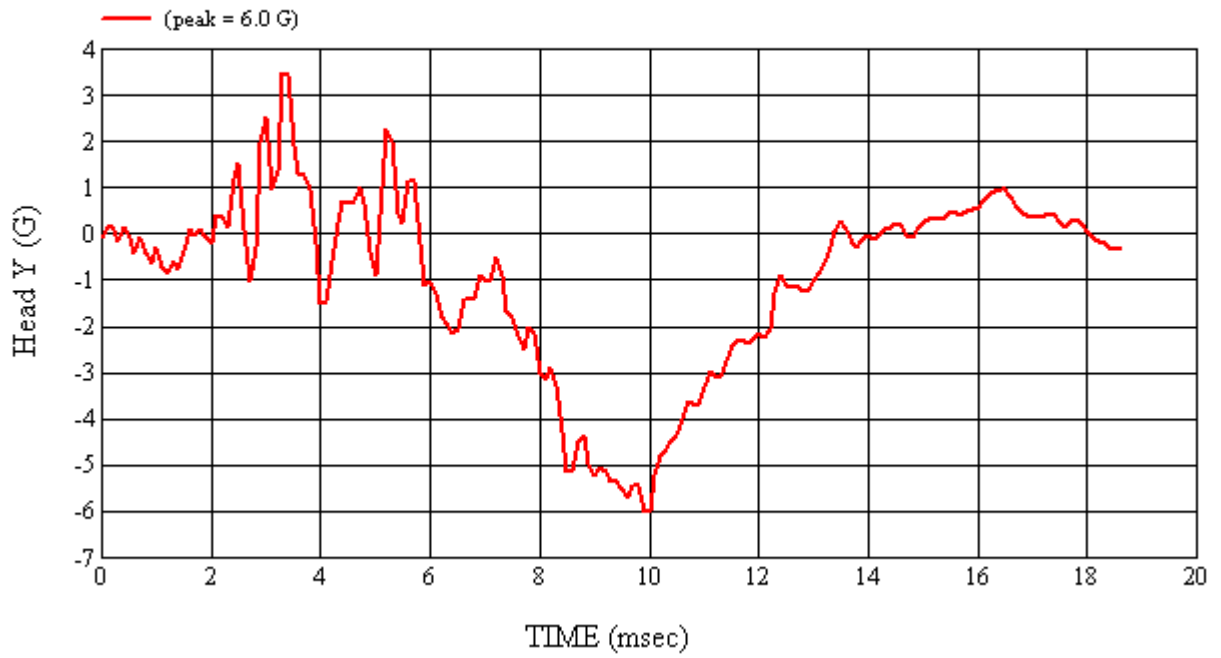
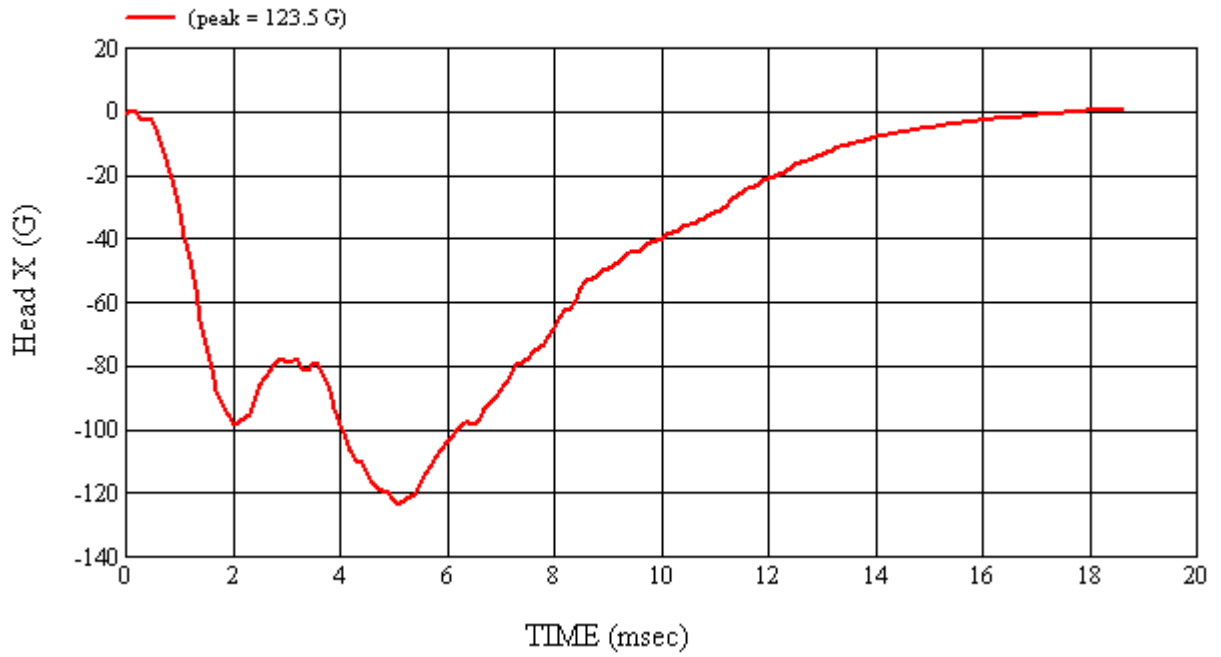
Recorded By: Alexander Kalato Approved By*: P. M. [Signature] Date: 6/19/2008
 *Only necessary for NHTSA (Government) Compliance testing.

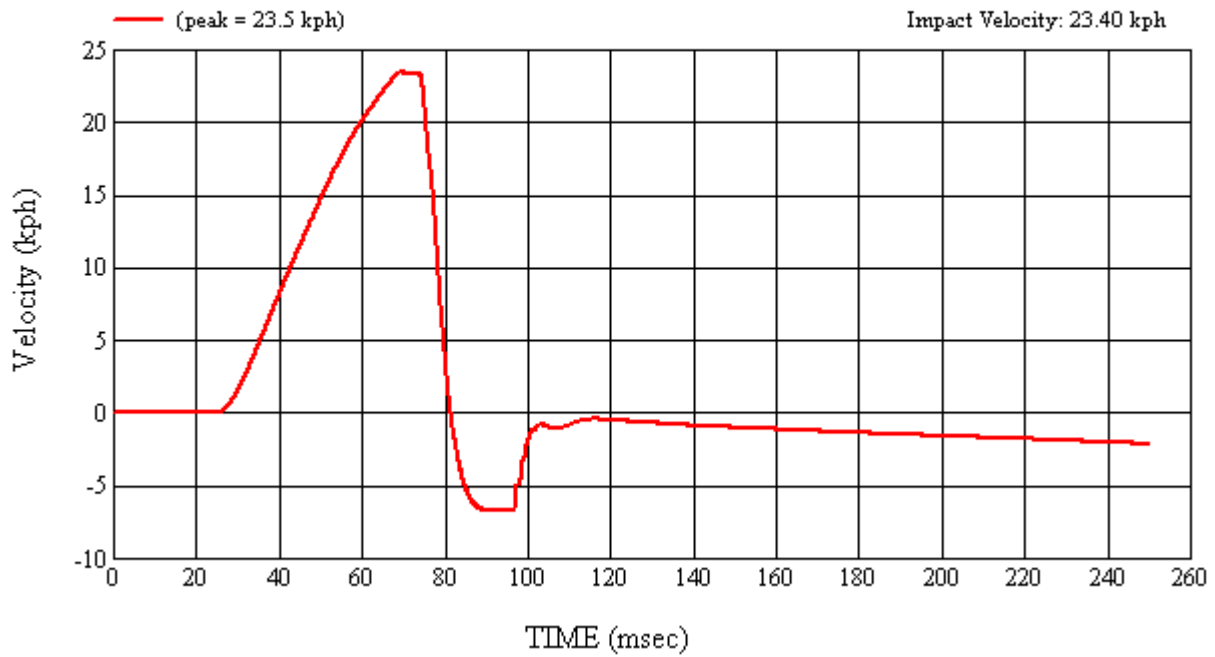
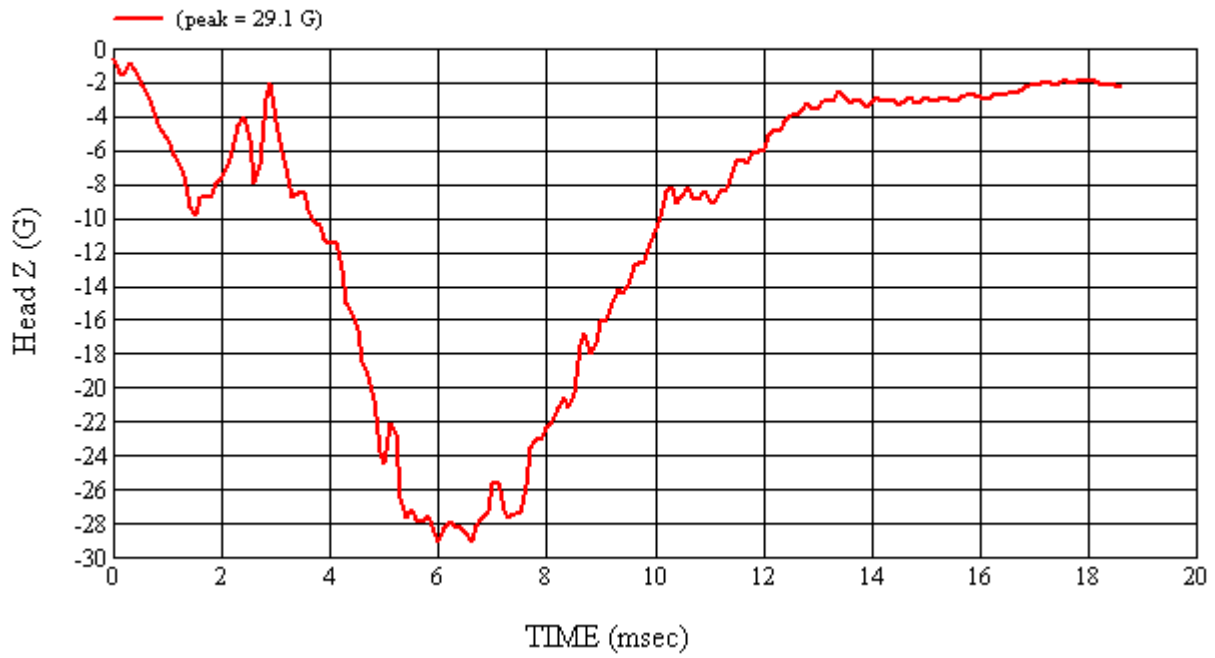
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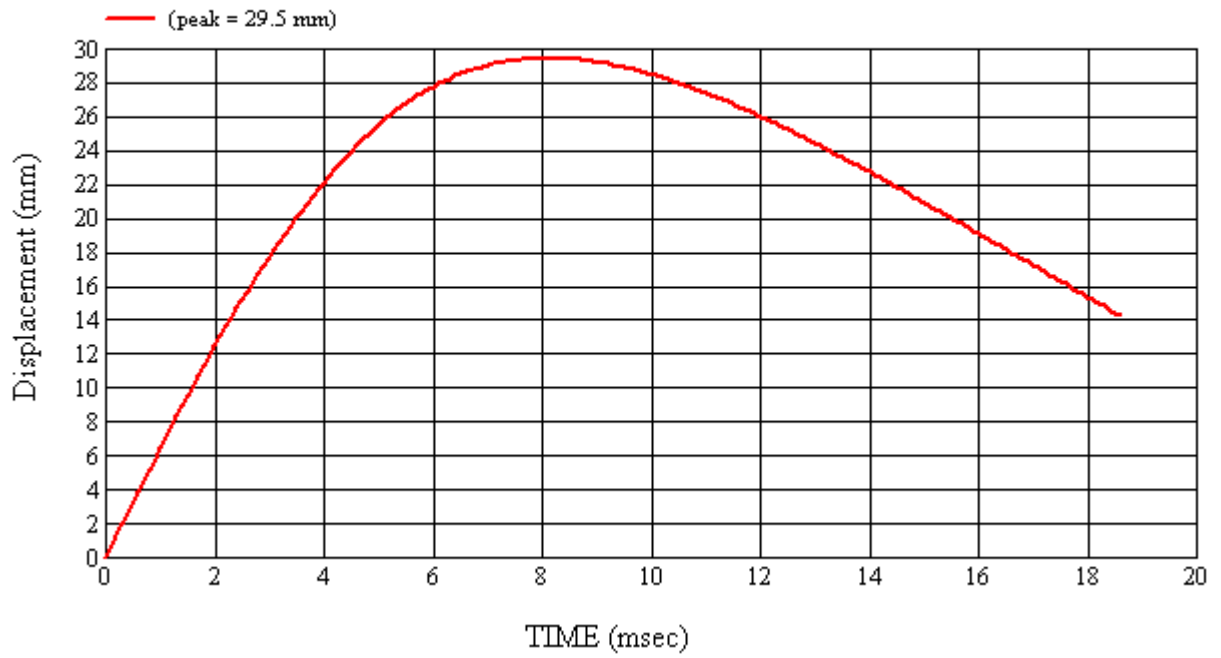
Target Location: BP2, Right Side

Test Date: 6/19/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Target (Vehicle Side): BP4 Left	Test Number:#9
MGA Test Reference No.:FM8187	Temperature:20.9C
Approach Horizontal Angles:200°	Humidity:47.7%
Approach Vertical Angles:-3°	Time of Test:2:20:13 PM
Additional Description:	FMH Serial No:[038]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
504	447	10.4	23.2	8	16 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-95.015	0.87	0.86
Y	6	J36197	108.737	1.52	1.52
Z	7	J36353	98.754	1.02	1.02

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

No visible damage.

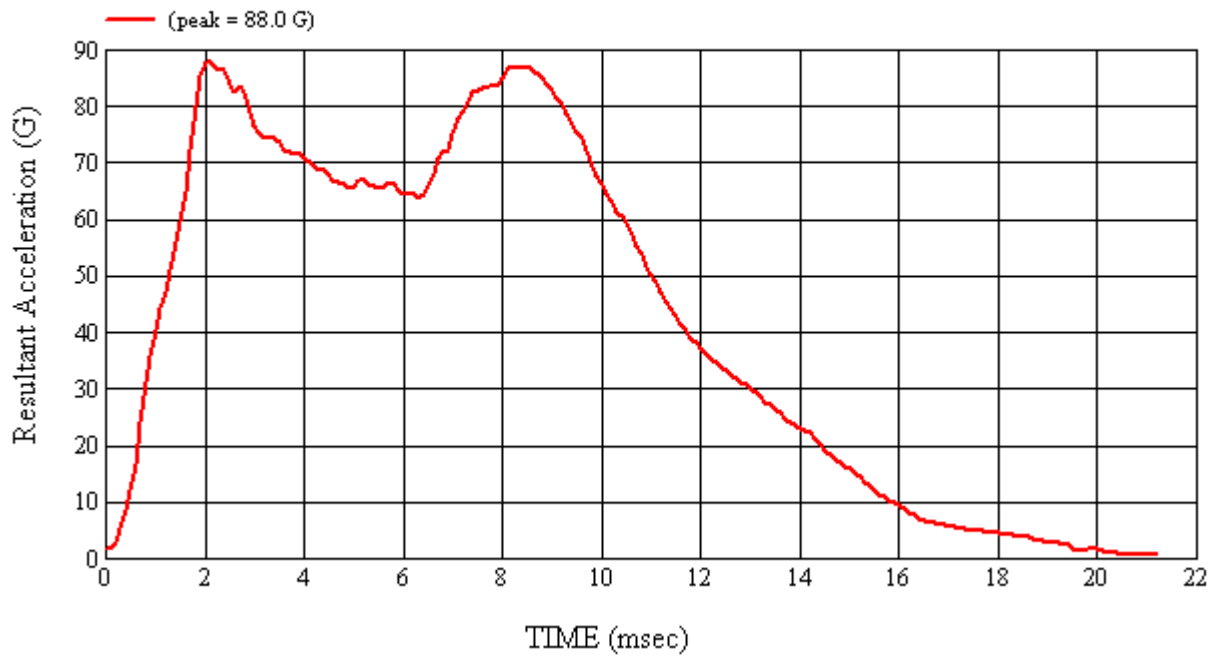
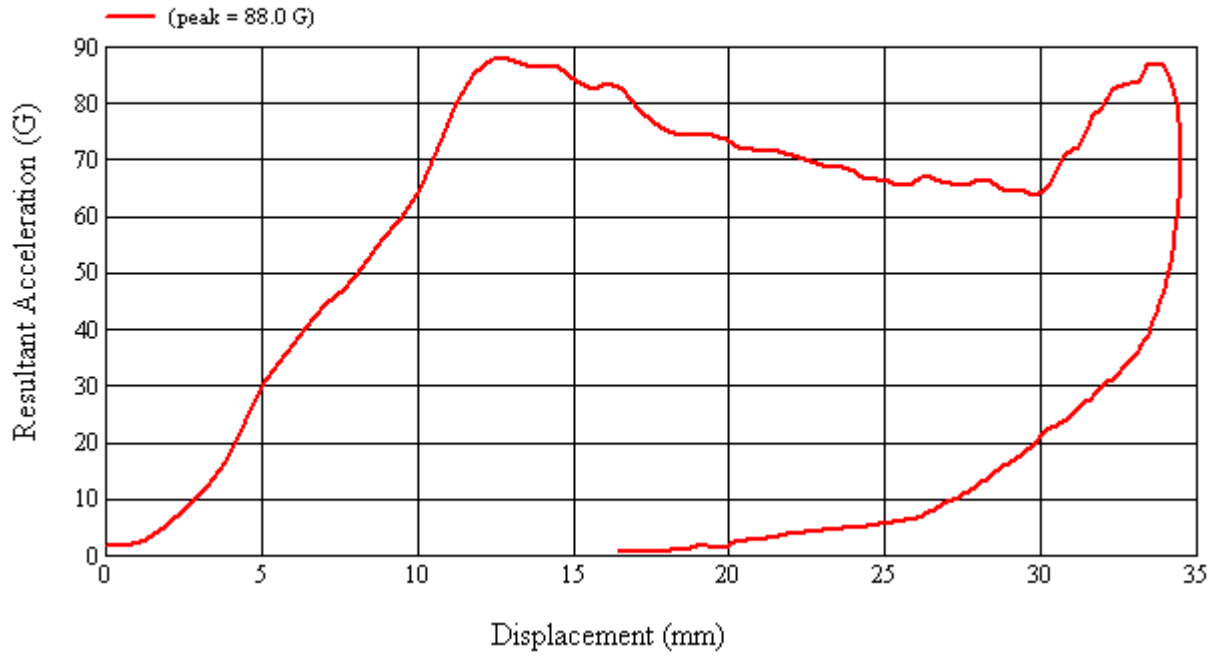
Recorded By: *Deena A. Kalato* Approved By*: *P. M. ...* Date: 6/20/2008

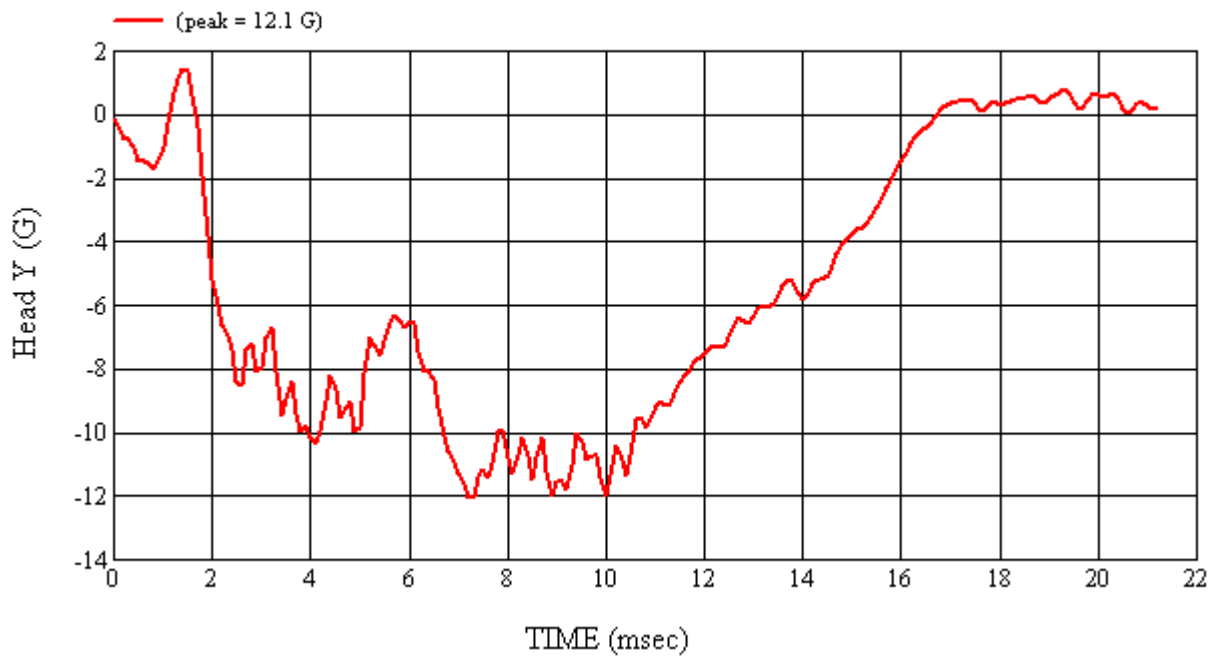
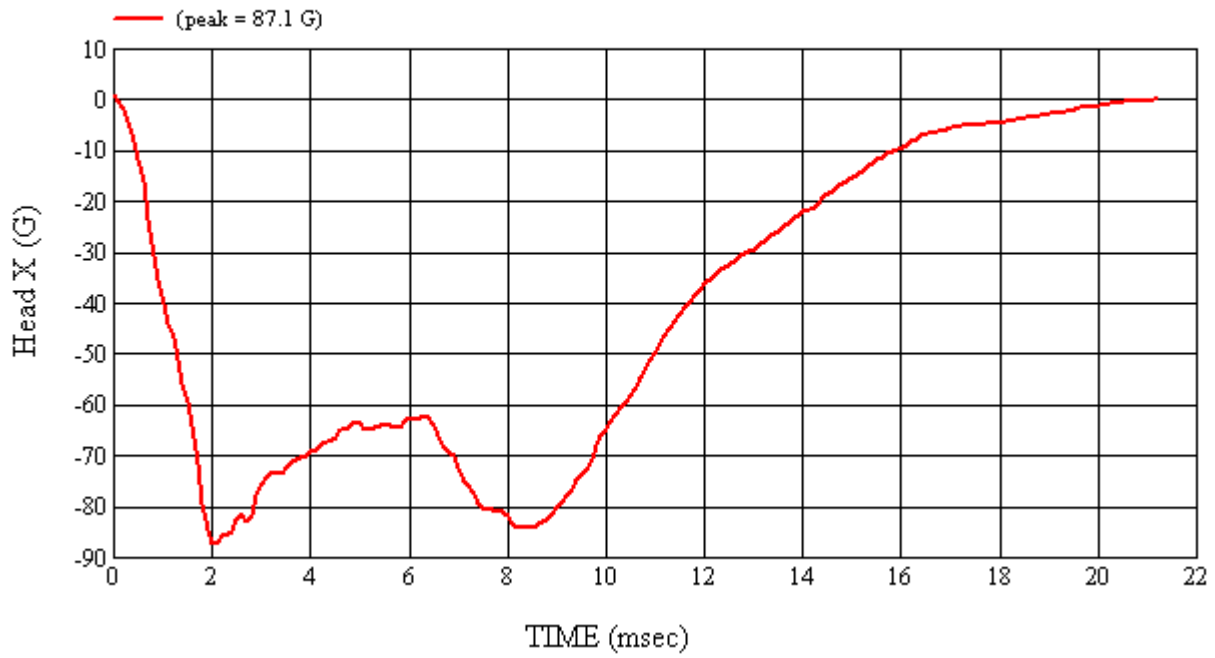
*Only necessary for NHTSA (Government) Compliance testing.

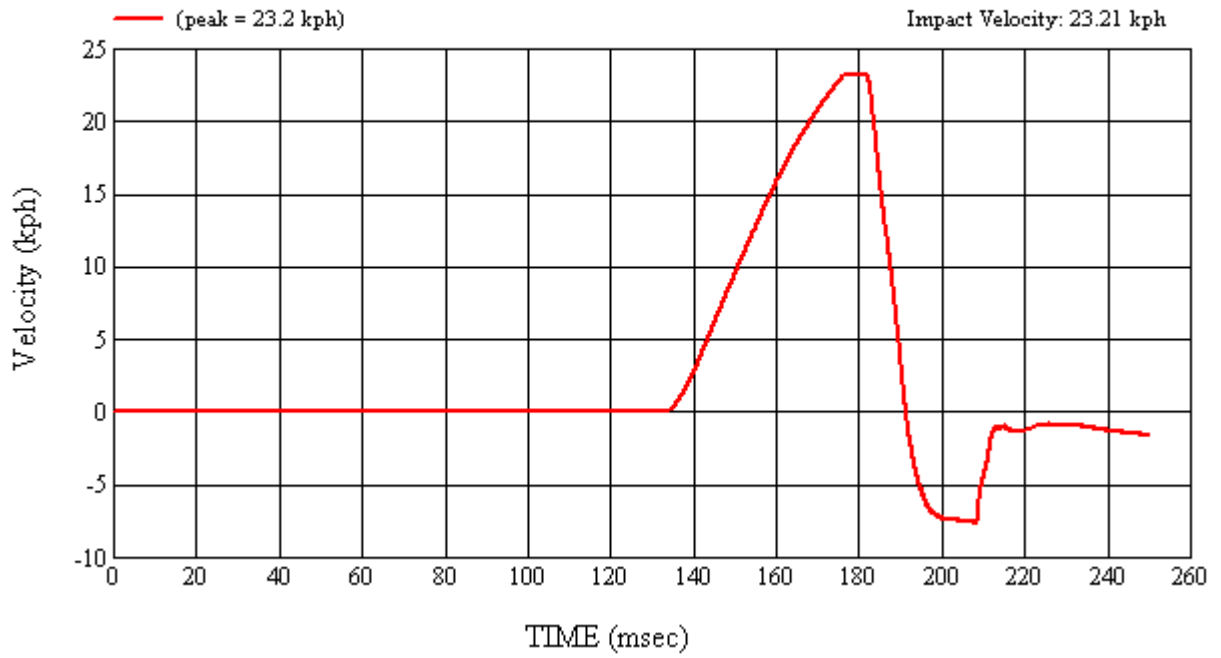
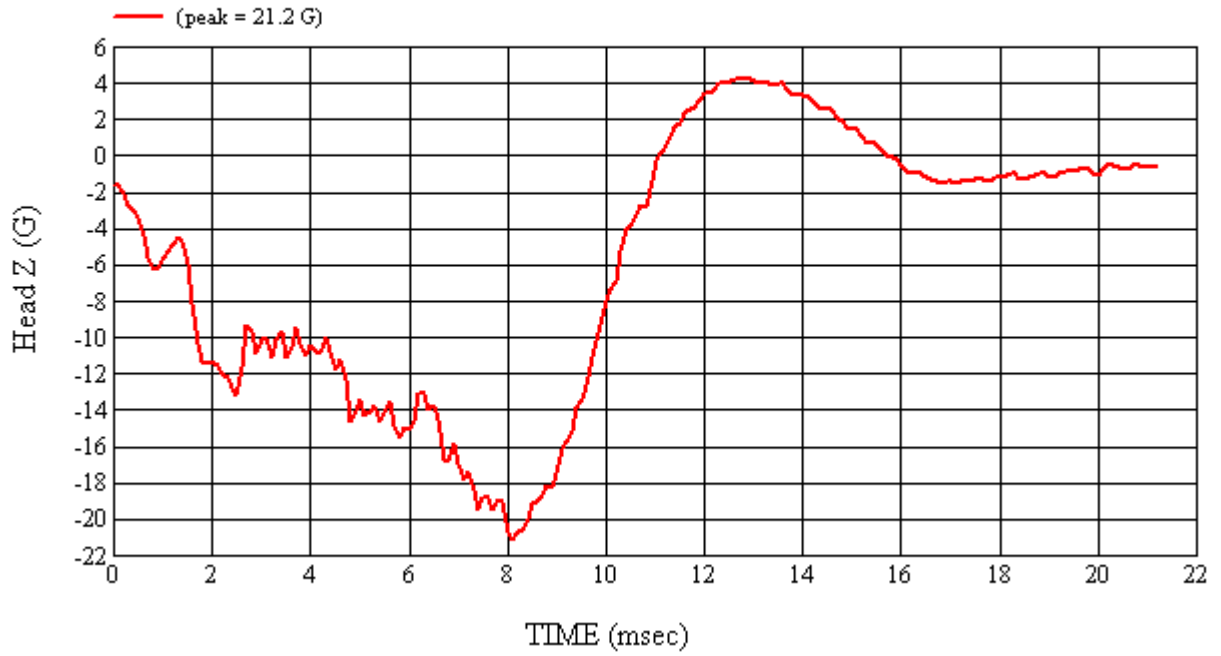
MGA Test #: FM8187

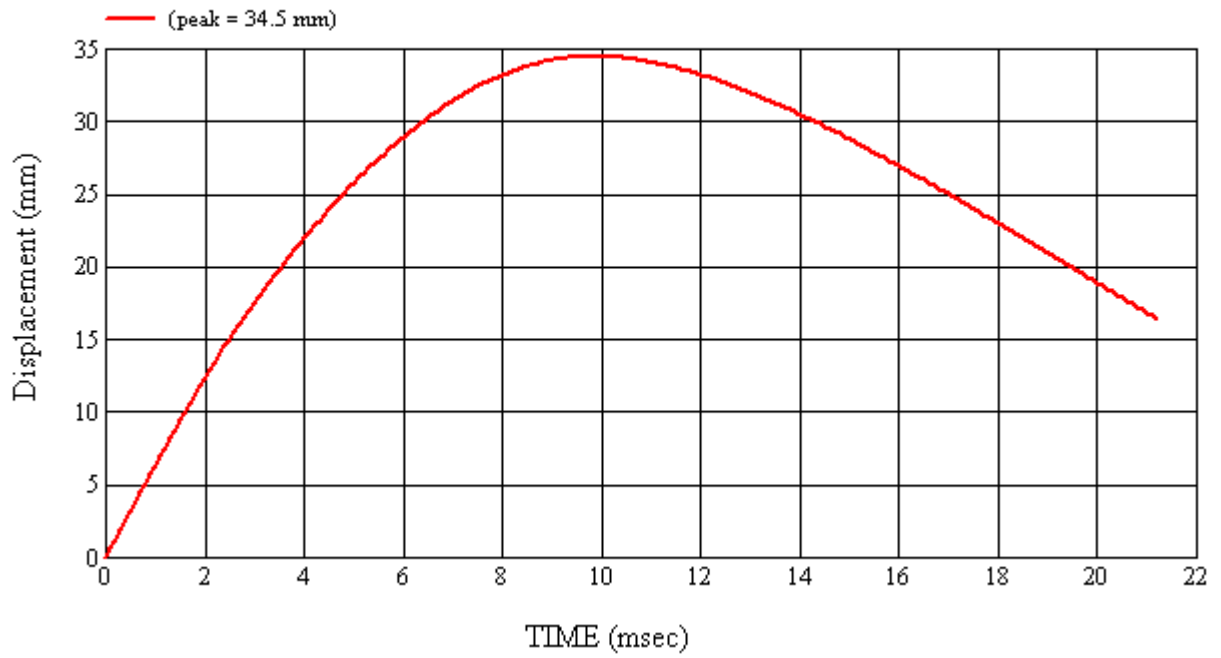
Target Location: BP4, Left Side

Test Date: 6/20/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0817-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Target (Vehicle Side): OP2 Right	Test Number:#1
MGA Test Reference No.:FM8179	Temperature:21.2C
Approach Horizontal Angles:90°	Humidity:49.4%
Approach Vertical Angles:5°	Time of Test:1:57:16 PM
Additional Description:3 relocations	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
605	581	8.8	24.3	21	7 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.844	0.87	0.86
Y	6	J22664	93.878	1.52	1.52
Z	7	J35924	92.621	1.02	1.02

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

No visible damage.

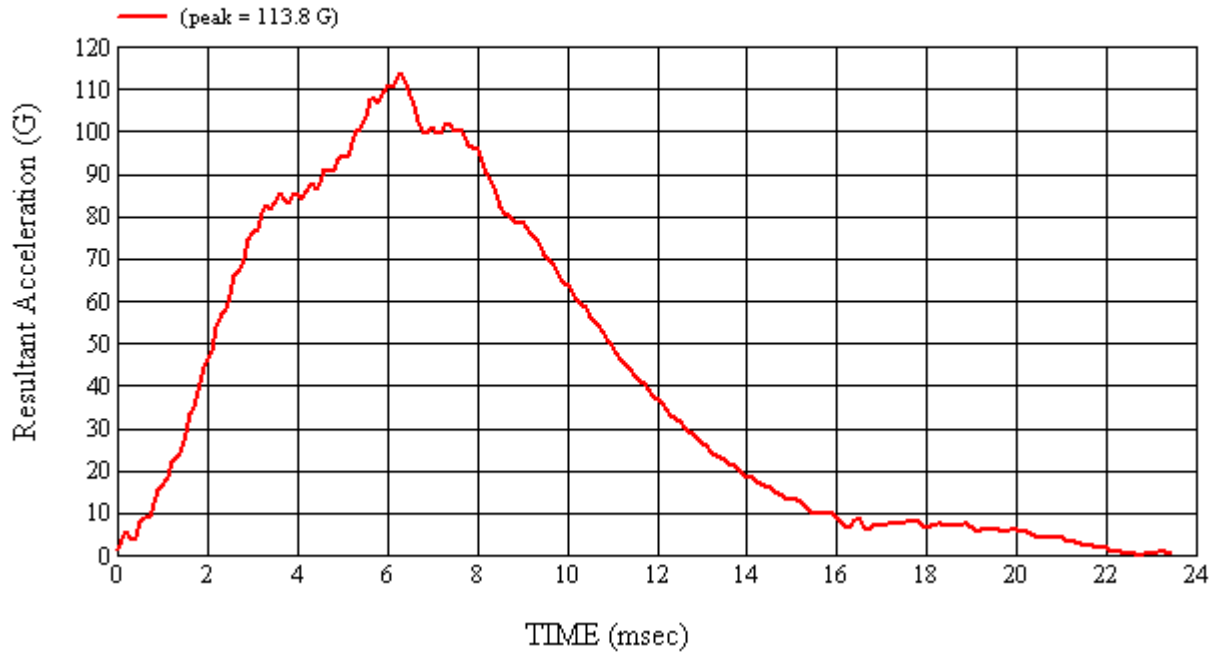
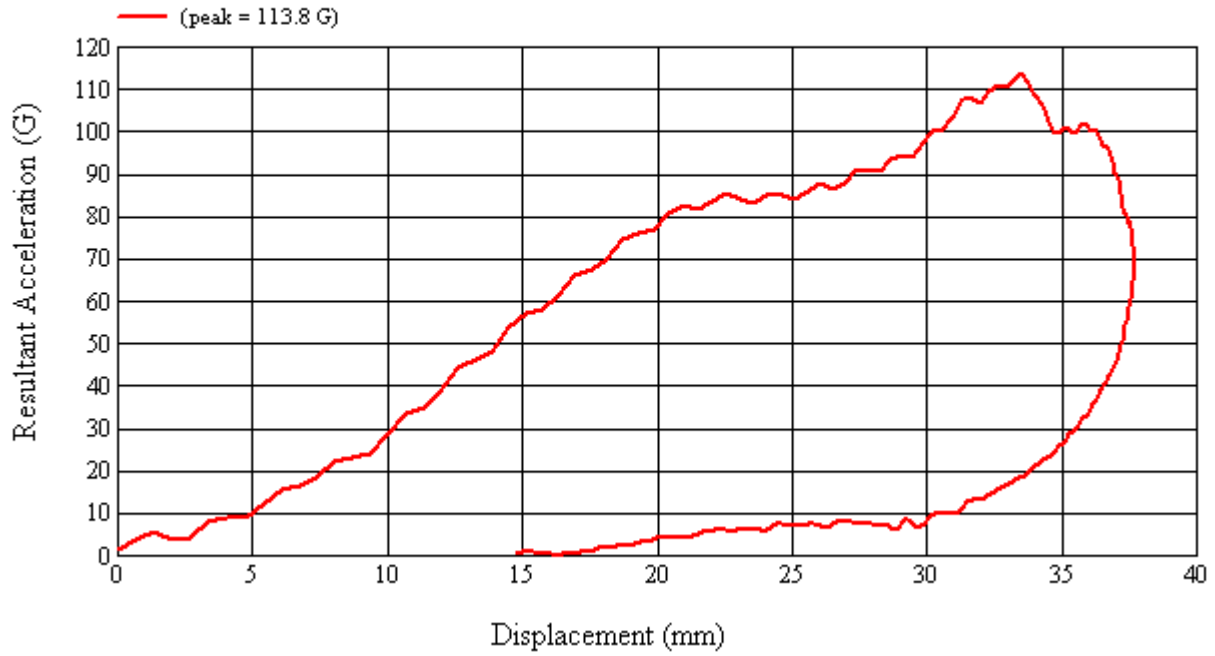
Recorded By: Alexander Kalato Approved By*: P. M. [Signature] Date: 6/19/2008

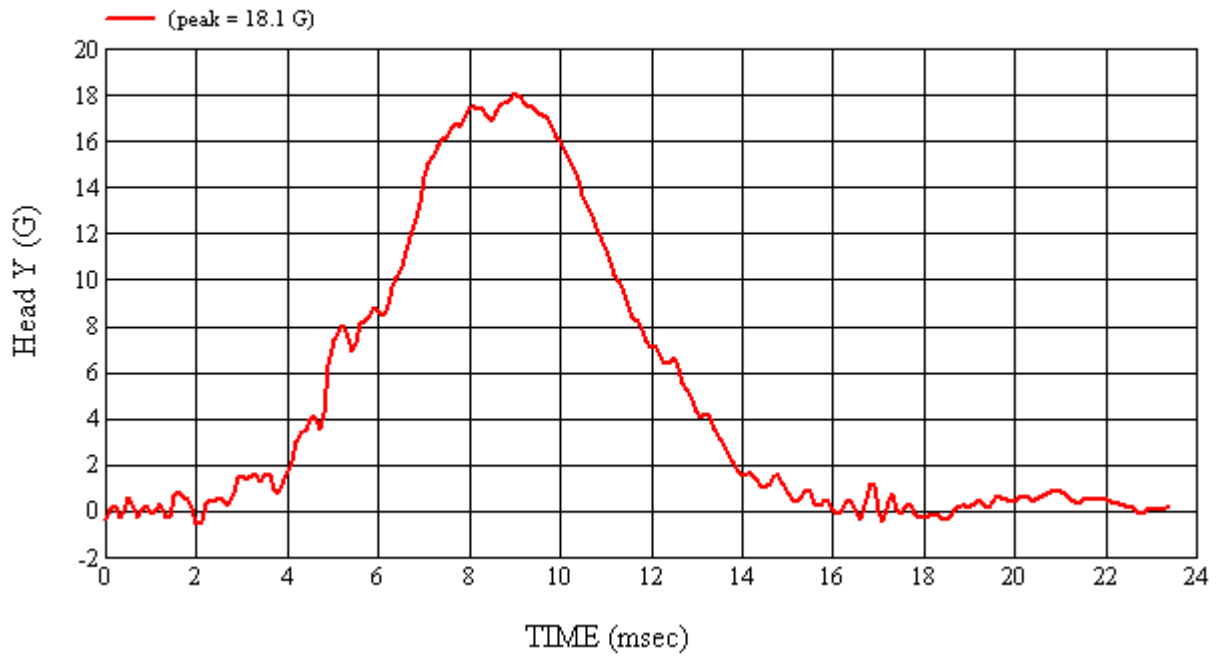
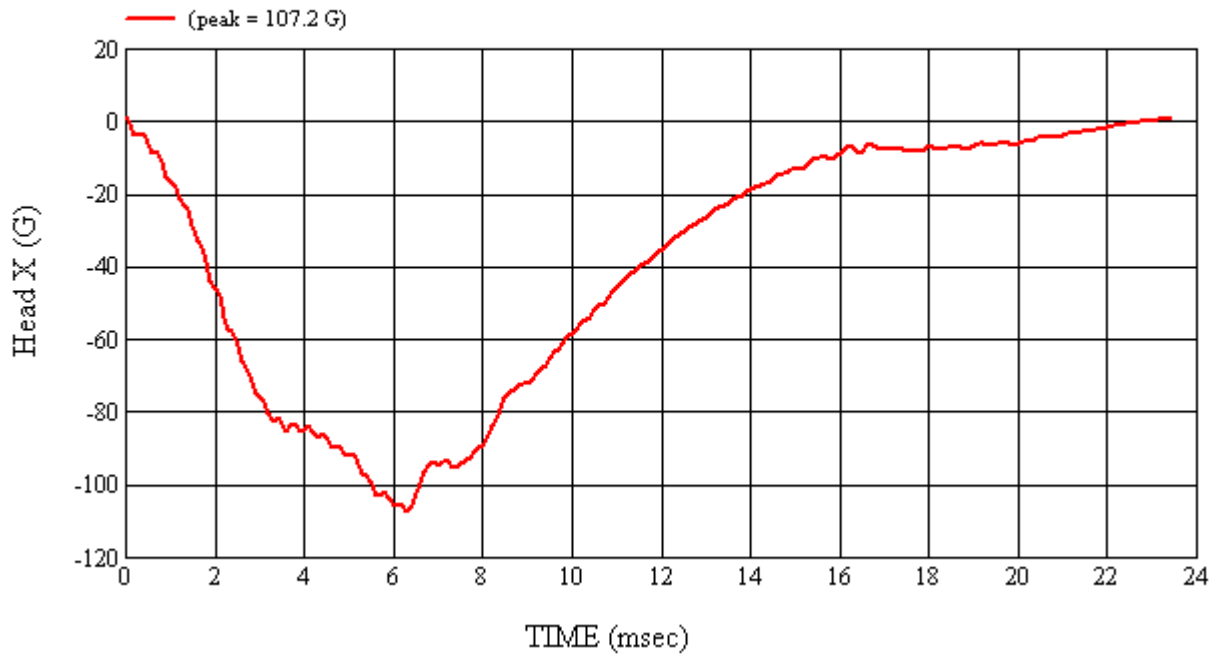
*Only necessary for NHTSA (Government) Compliance testing.

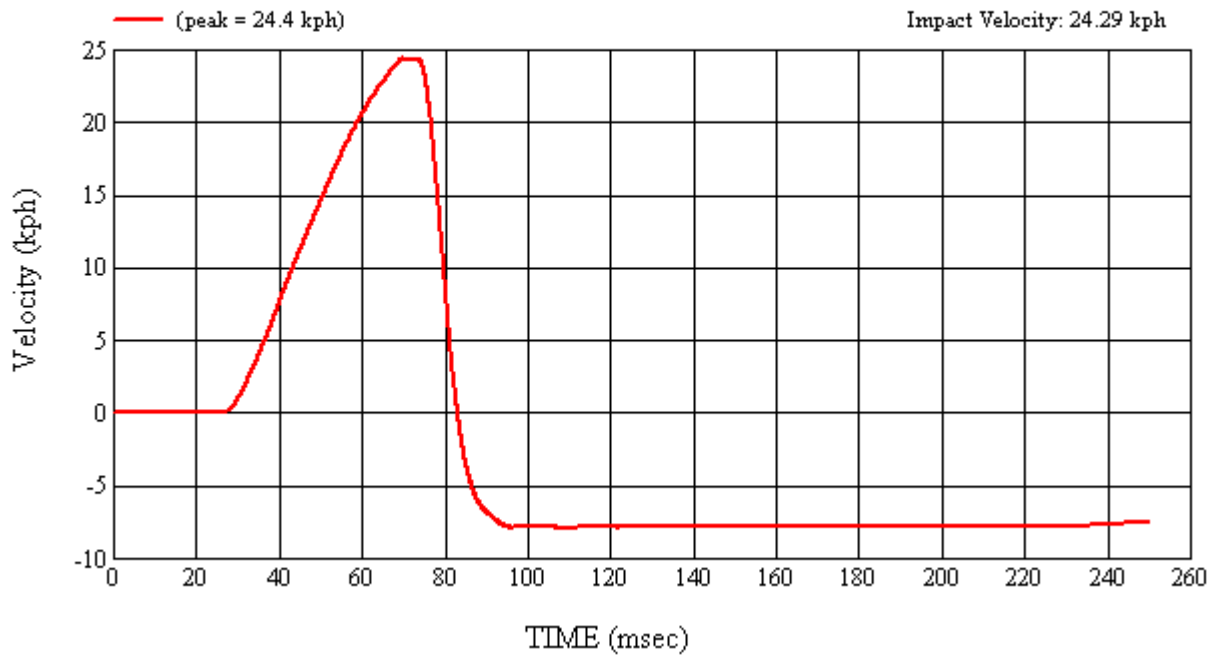
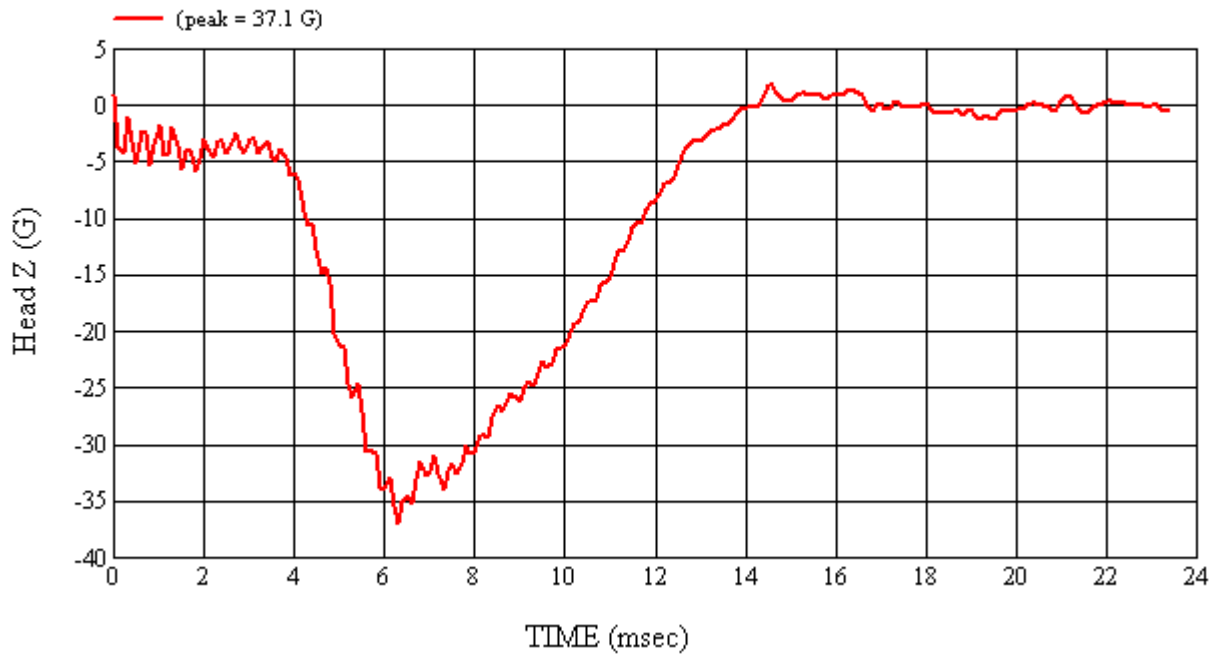
MGA Test #: FM8179

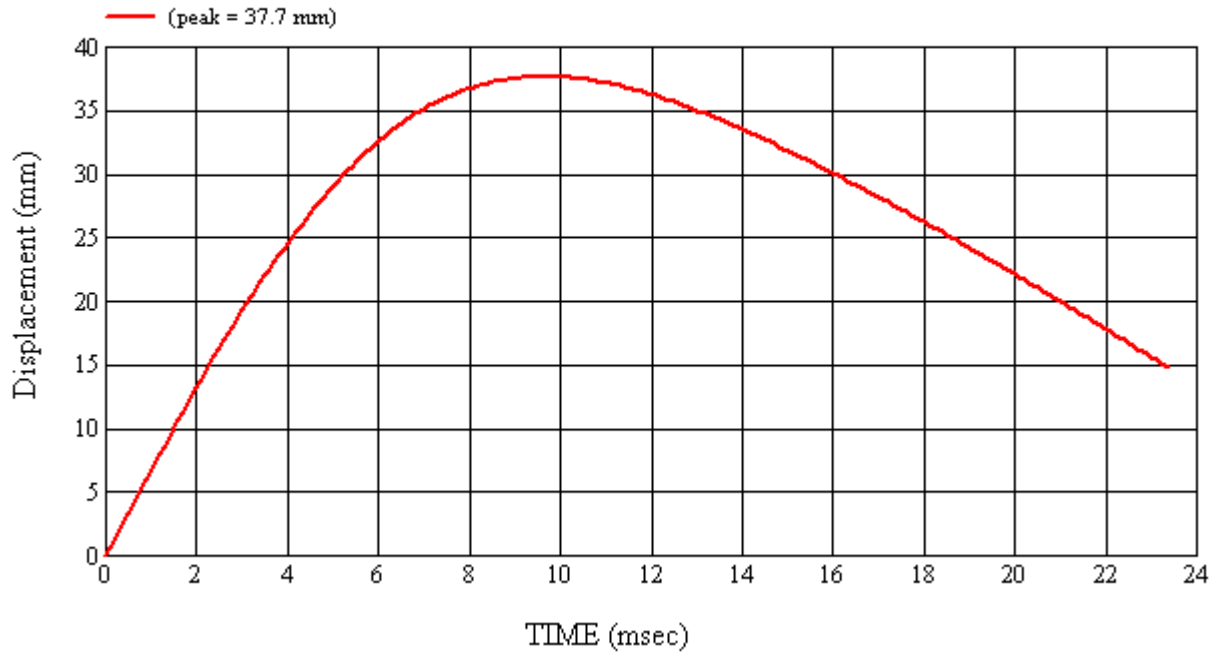
Target Location: OP2, Right Side

Test Date: 6/19/2008

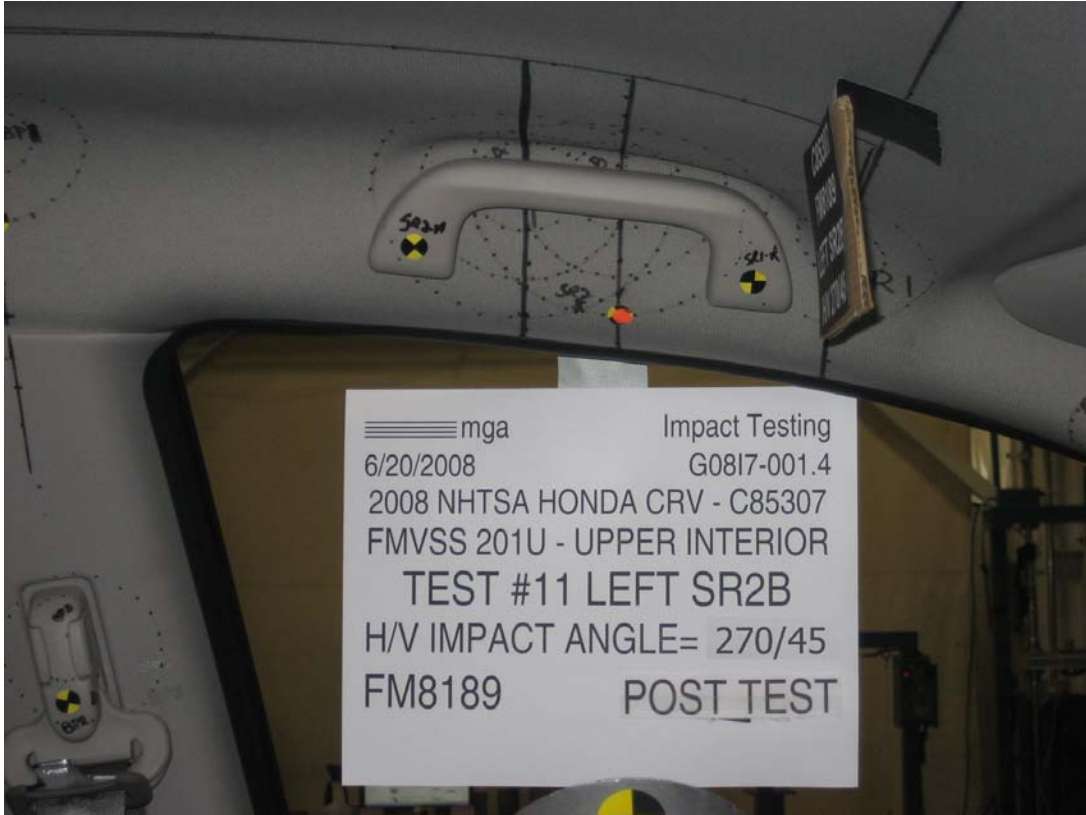












SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Test Number:#11
 Target (Vehicle Side): SR2B Left Temperature:20.4C
 MGA Test Reference No.:FM8189 Humidity:50.4%
 Approach Horizontal Angles:270° Time of Test:4:22:06 PM
 Approach Vertical Angles:45° FMH Serial No:[037]
 Additional Description:3 relocations

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
572	538	4.5	19.0	4	7 Right

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-114.533	0.87	0.87
Y	6	J14103	92.424	1.52	1.52
Z	7	J35800	96.462	1.02	1.02

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

No visible damage.

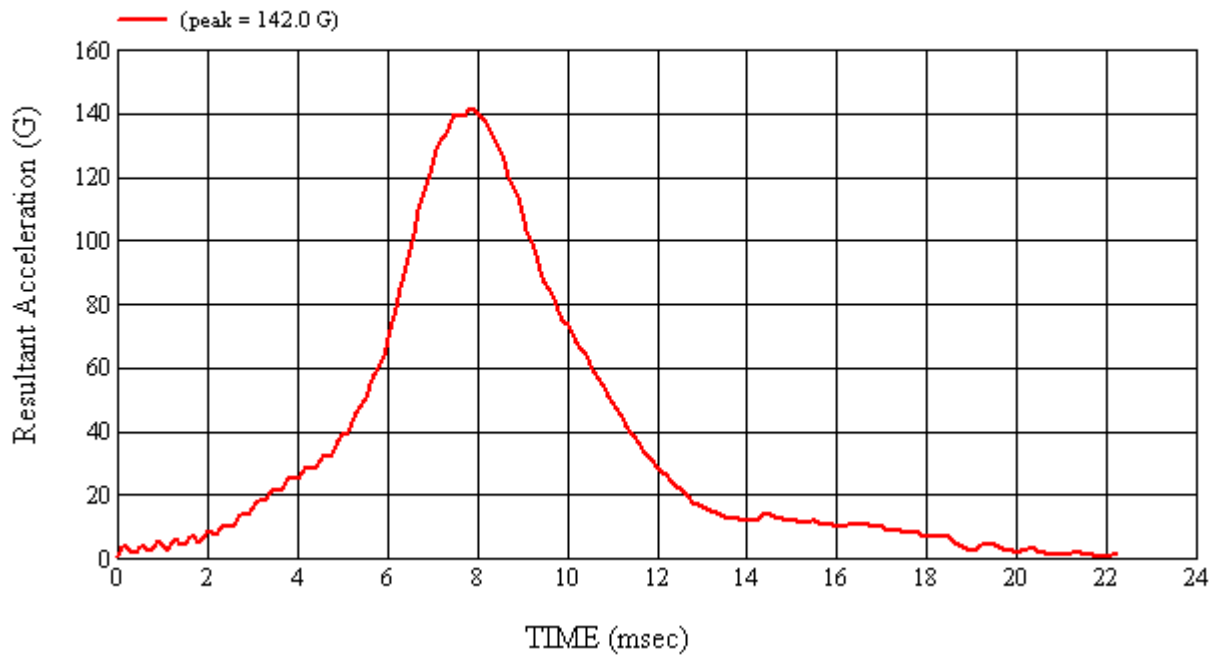
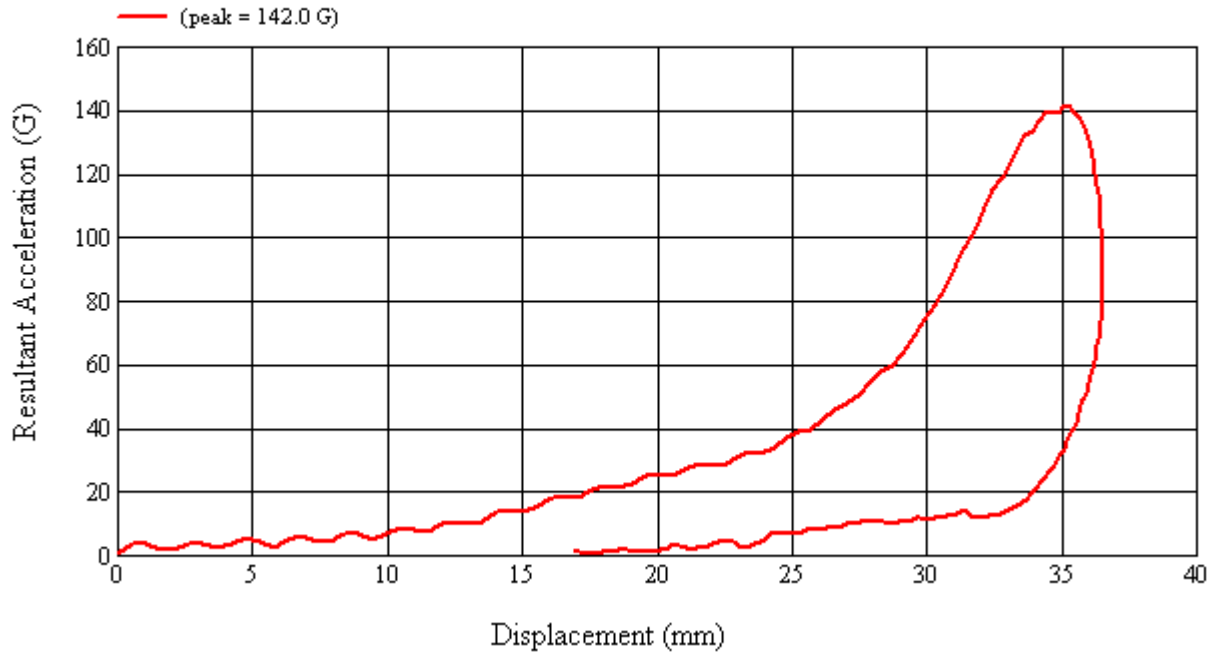
Recorded By: *Deena A. Kalato* Approved By*: *P. Michael* Date: 6/20/2008

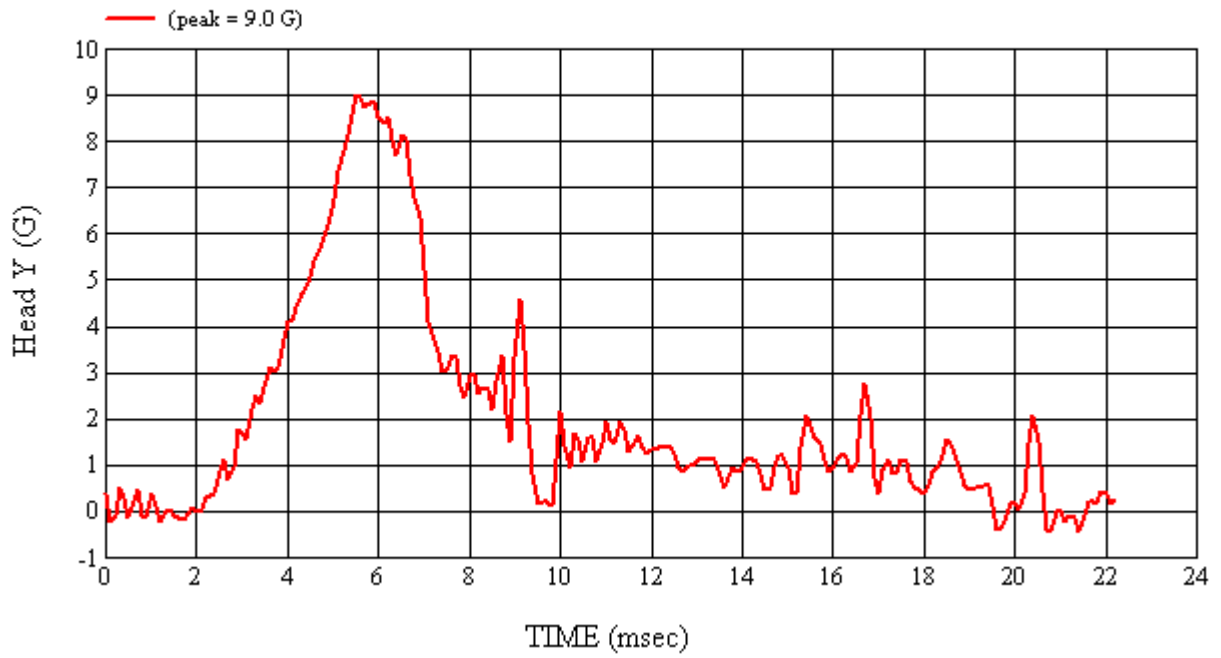
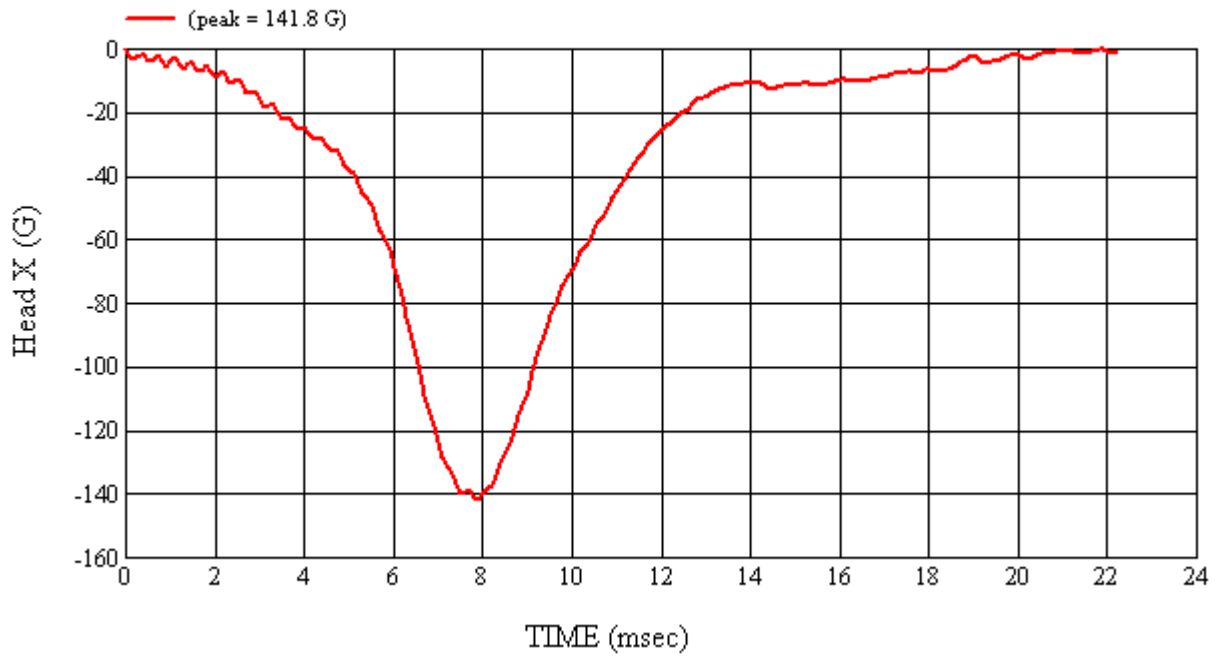
*Only necessary for NHTSA (Government) Compliance testing.

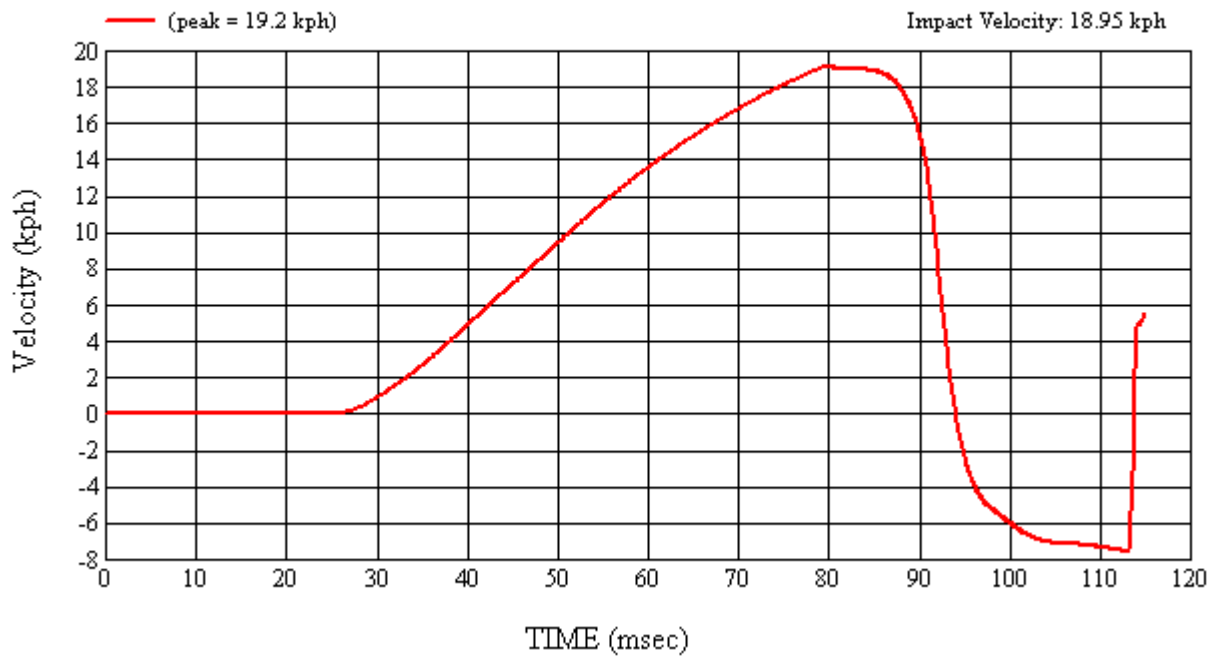
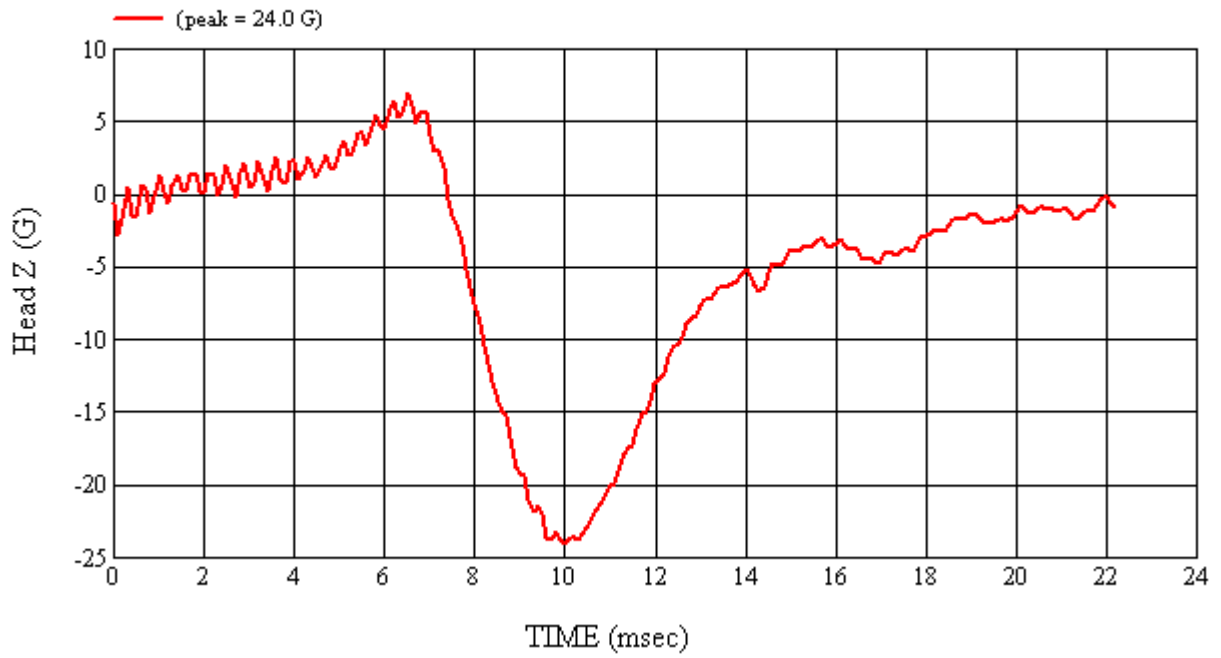
MGA Test #: FM8189

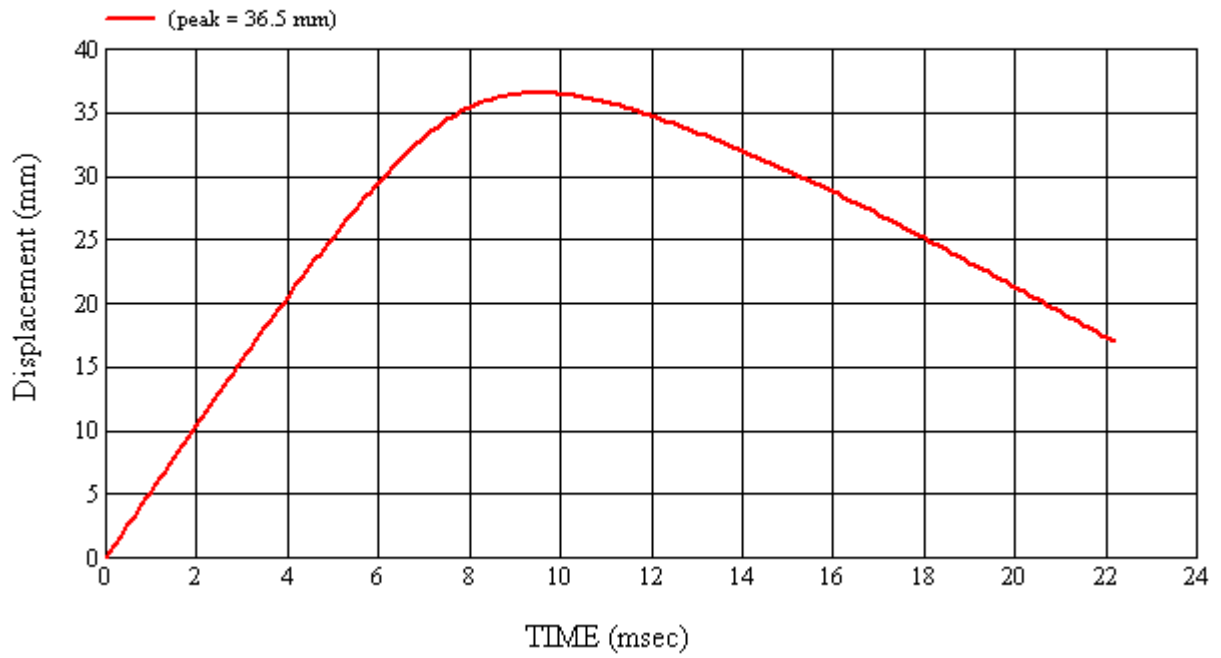
Target Location: SR2B, Left Side

Test Date: 6/20/2008









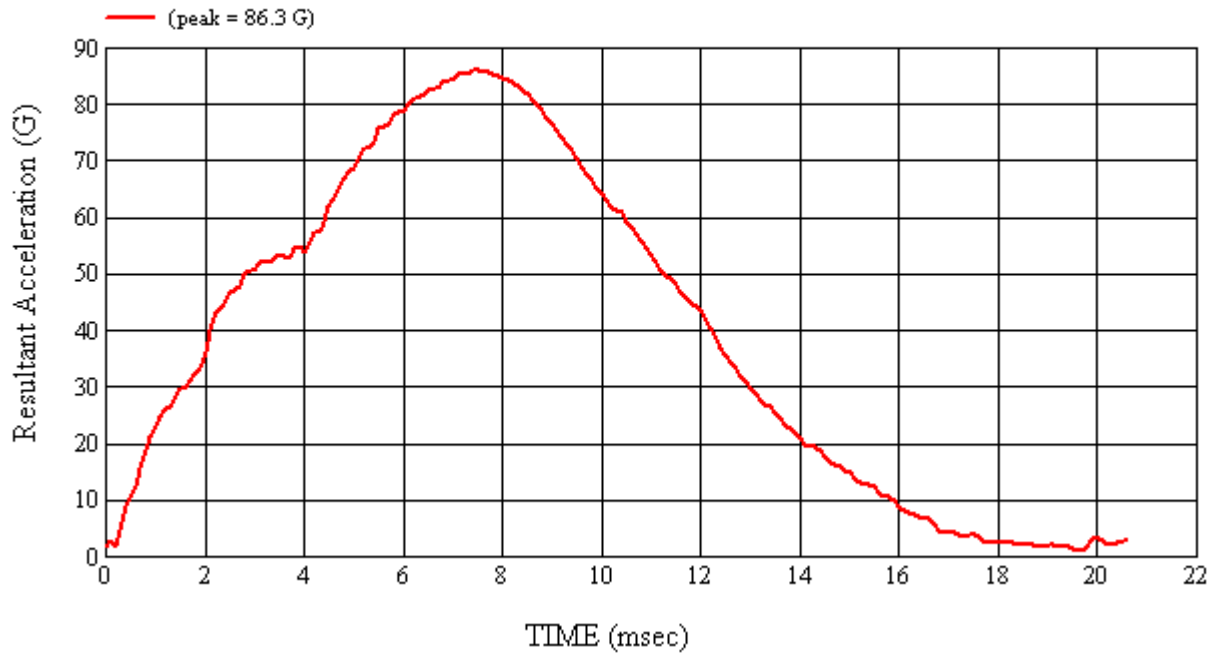
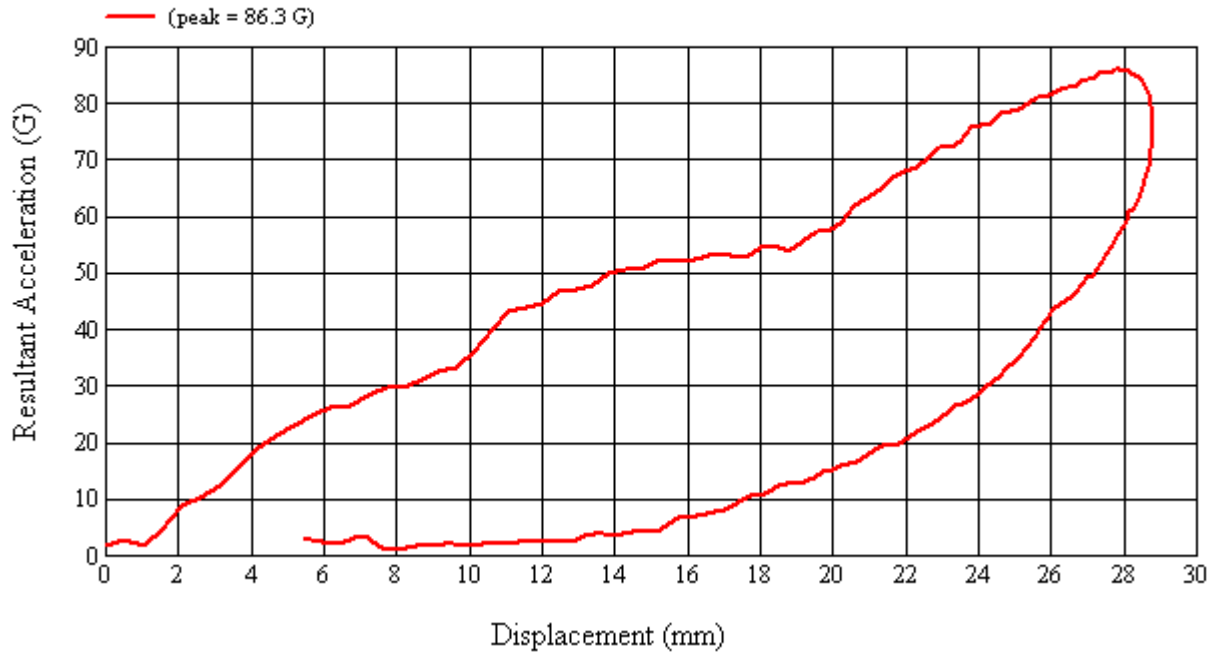


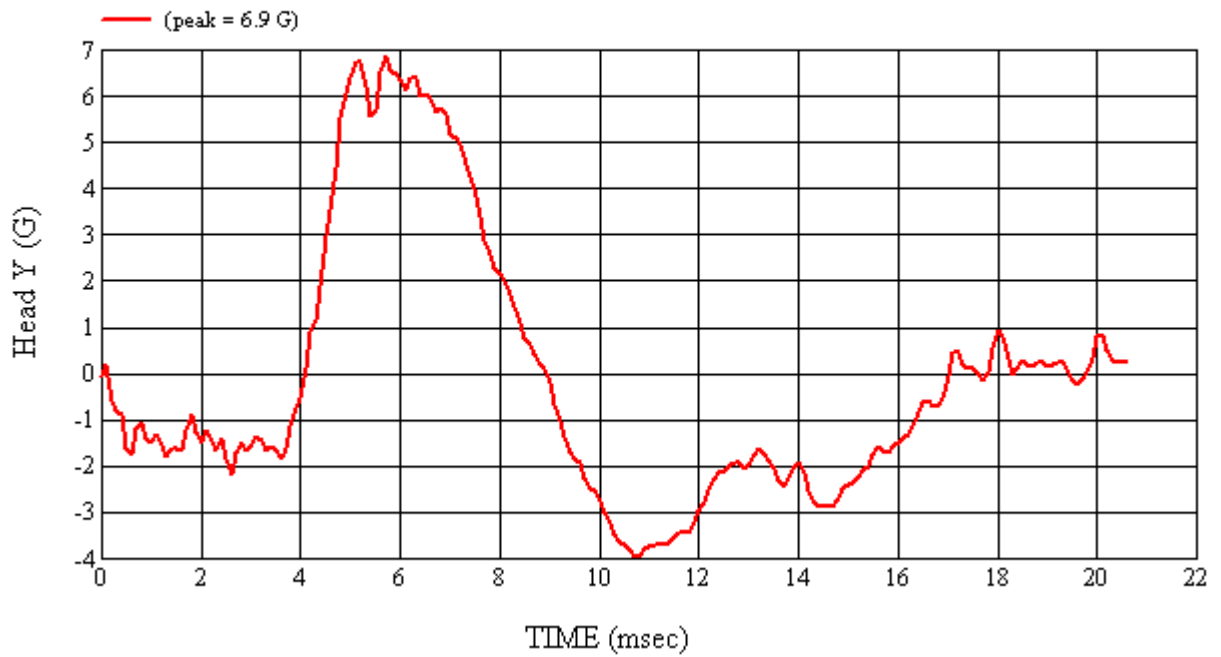
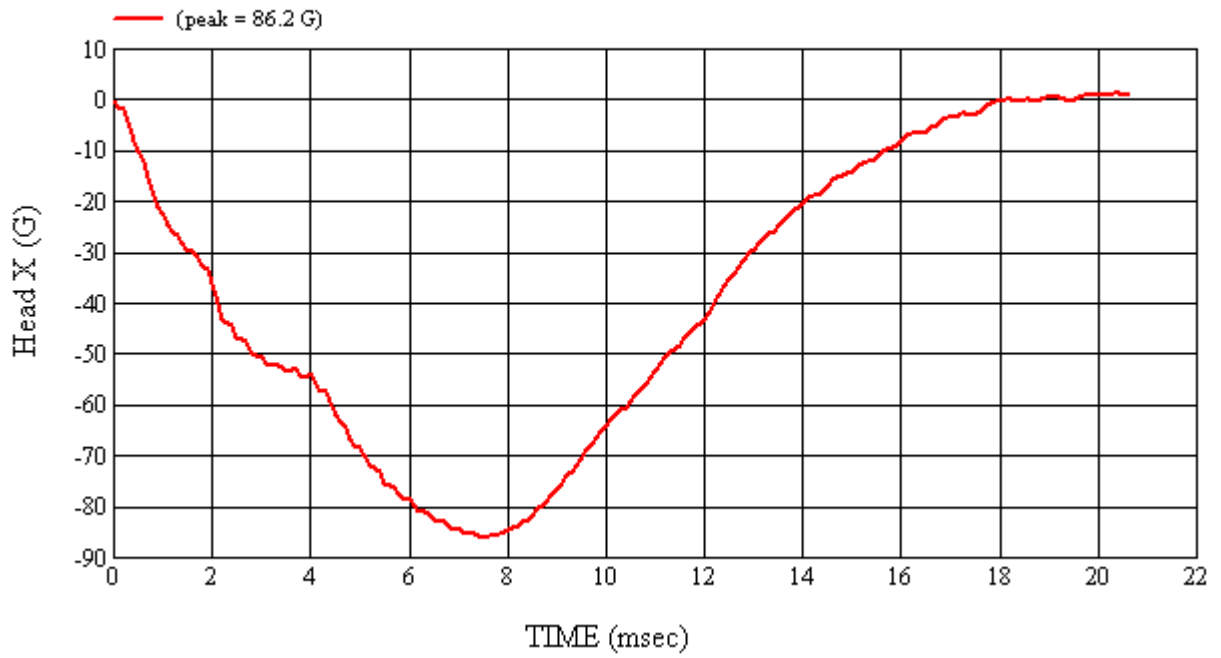


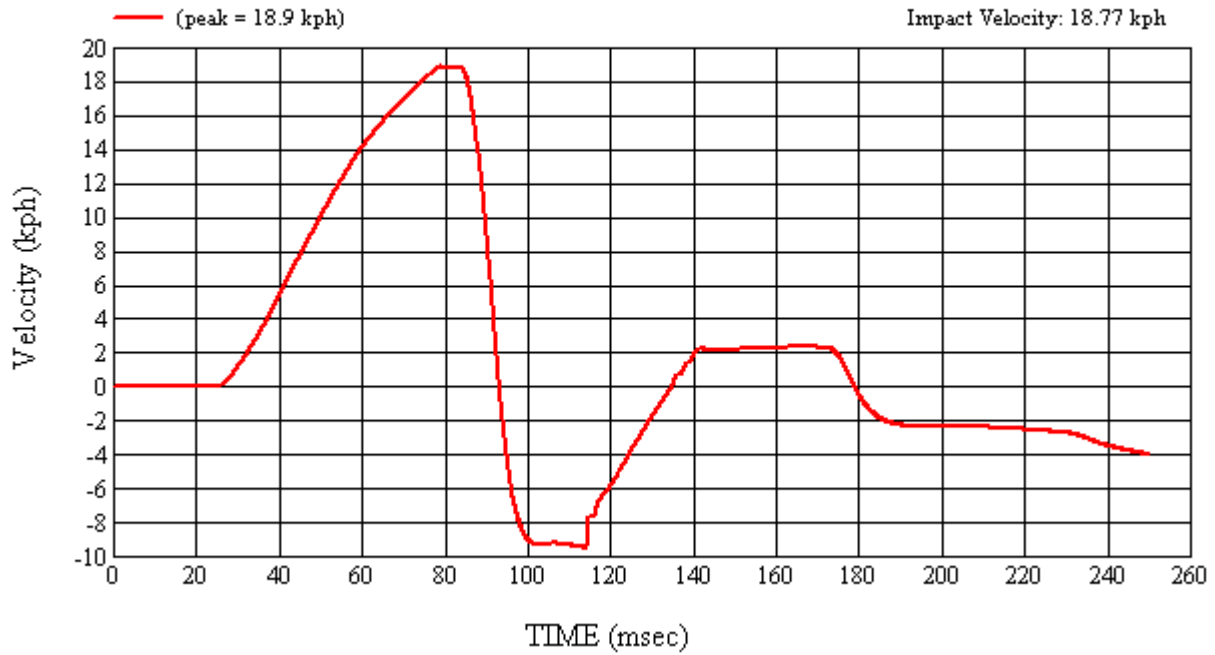
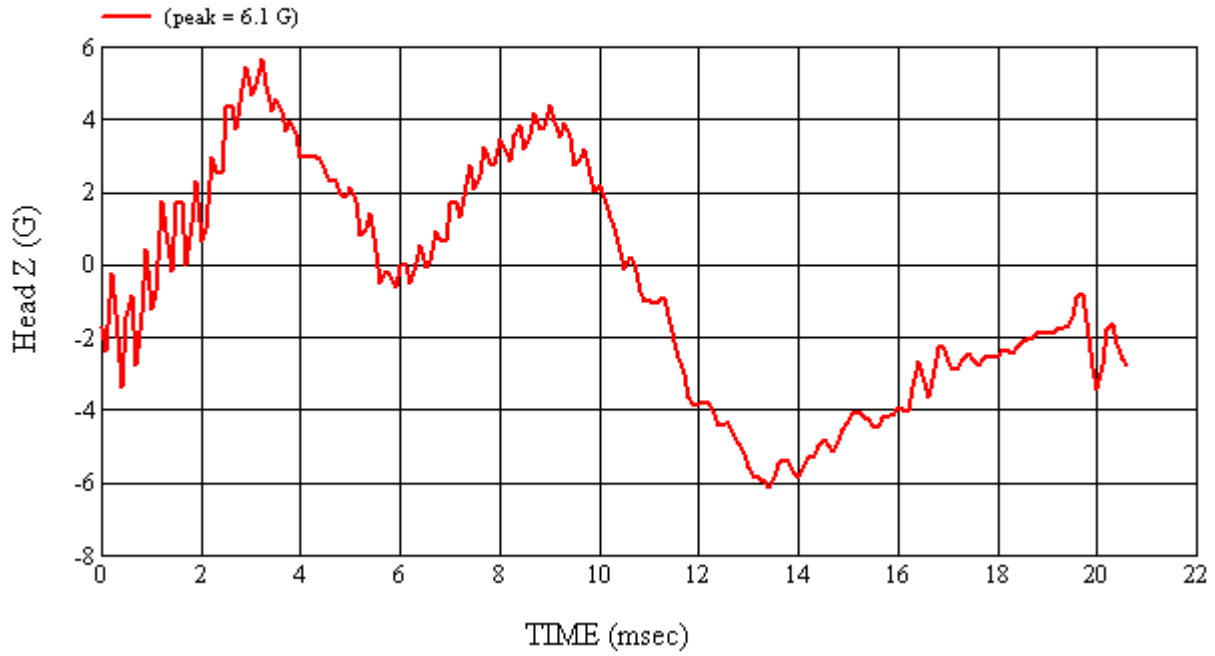
MGA Test #: FM8185

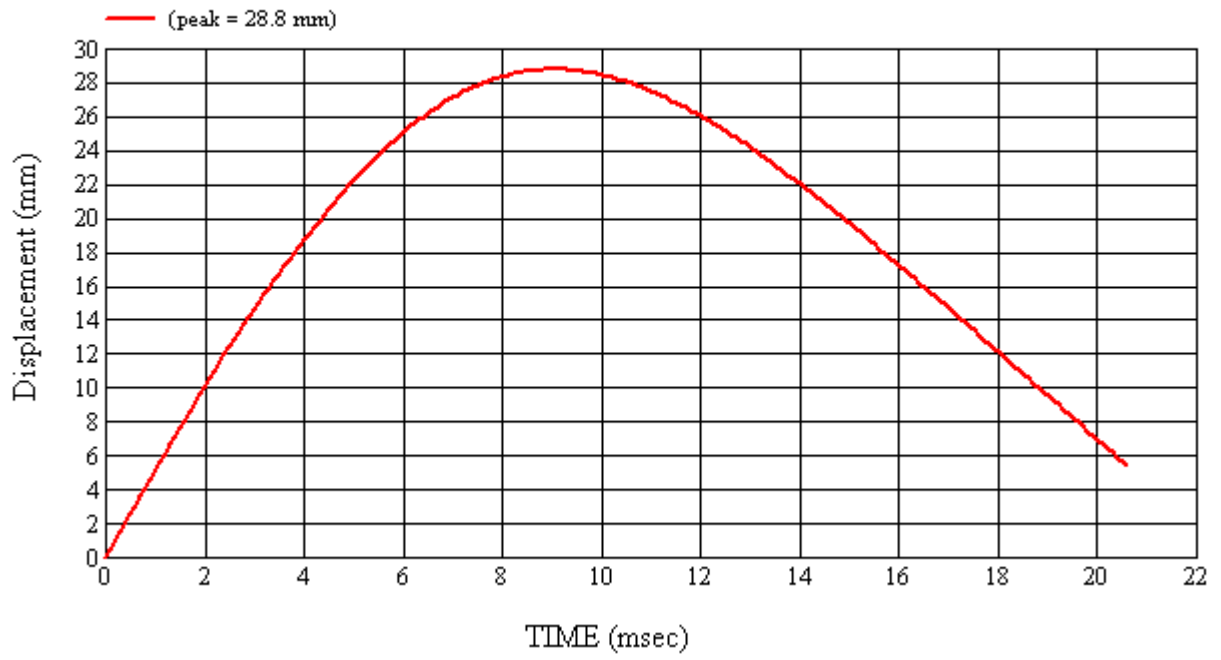
Target Location: SR3-3, Left Side

Test Date: 6/20/2008











SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Test Number:#12
Target (Vehicle Side): UR1Left Temperature:20.4C
MGA Test Reference No.:FM8190 Humidity:51.3%
Approach Horizontal Angles:270° Time of Test:5:30:56 PM
Approach Vertical Angles:50° FMH Serial No:[038]
Additional Description:@ BPR

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
640	628	9.1	23.5	27	8 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-95.015	0.87	0.87
Y	6	J36197	108.737	1.52	1.52
Z	7	J36353	98.754	1.02	1.02

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

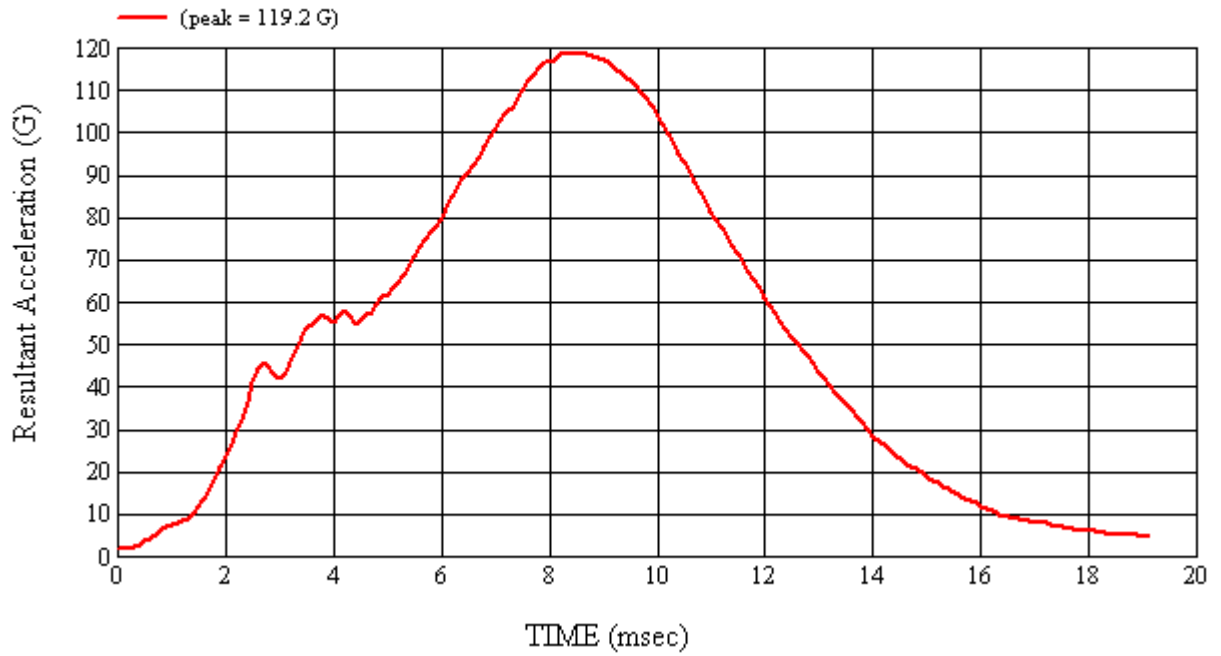
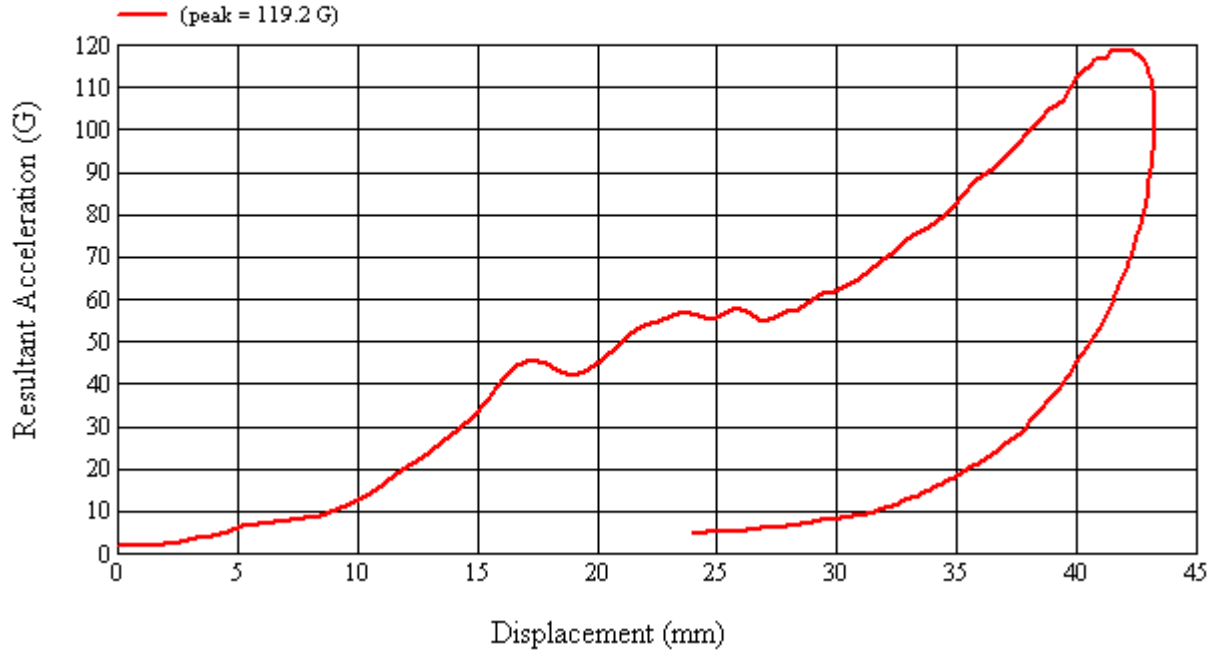
Headliner deformation. Dent on roof exterior.

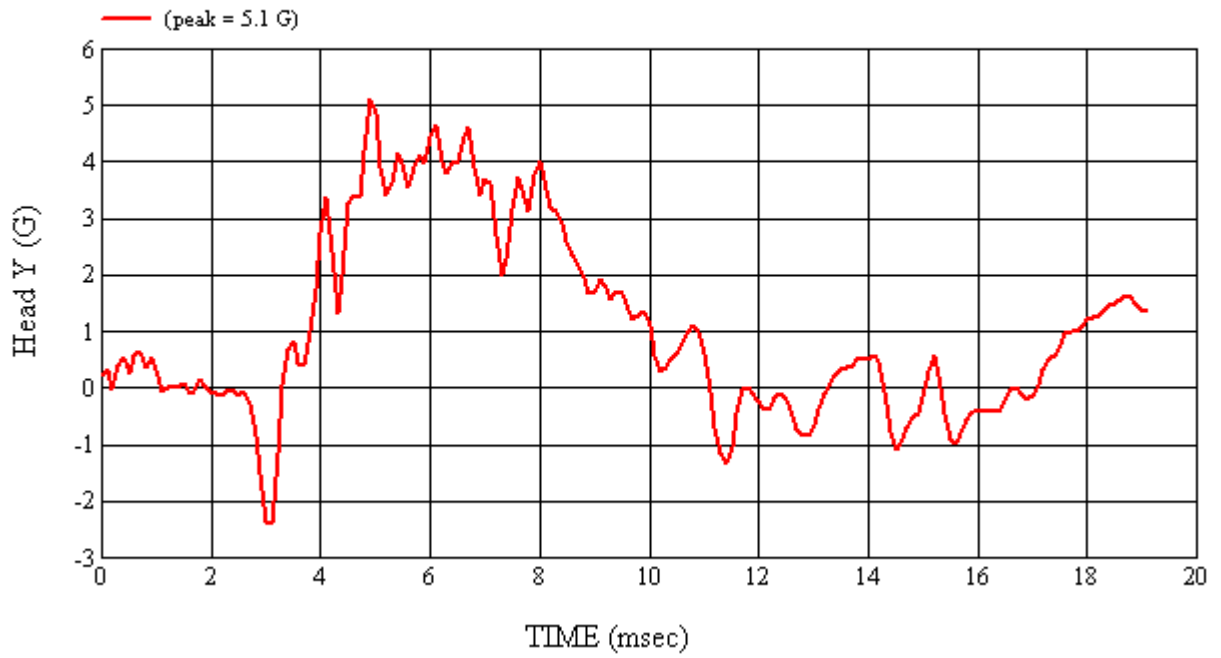
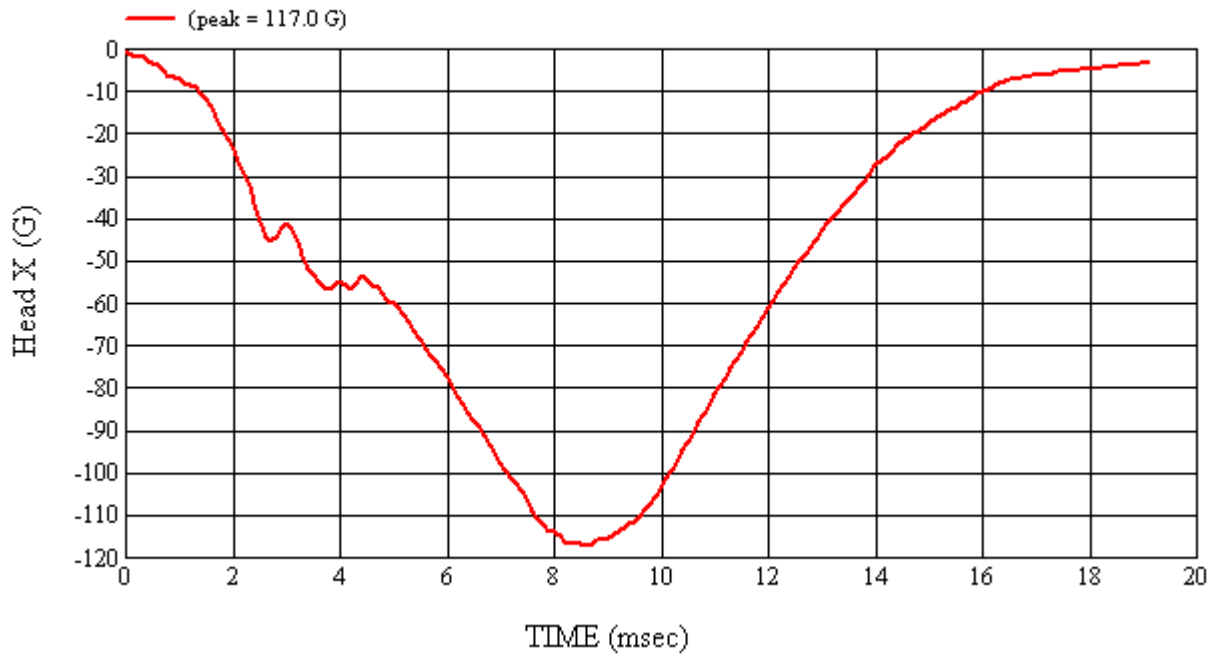
Recorded By: Alexander Kalato Approved By*: P. M. Smith Date: 6/20/2008
*Only necessary for NHTSA (Government) Compliance testing.

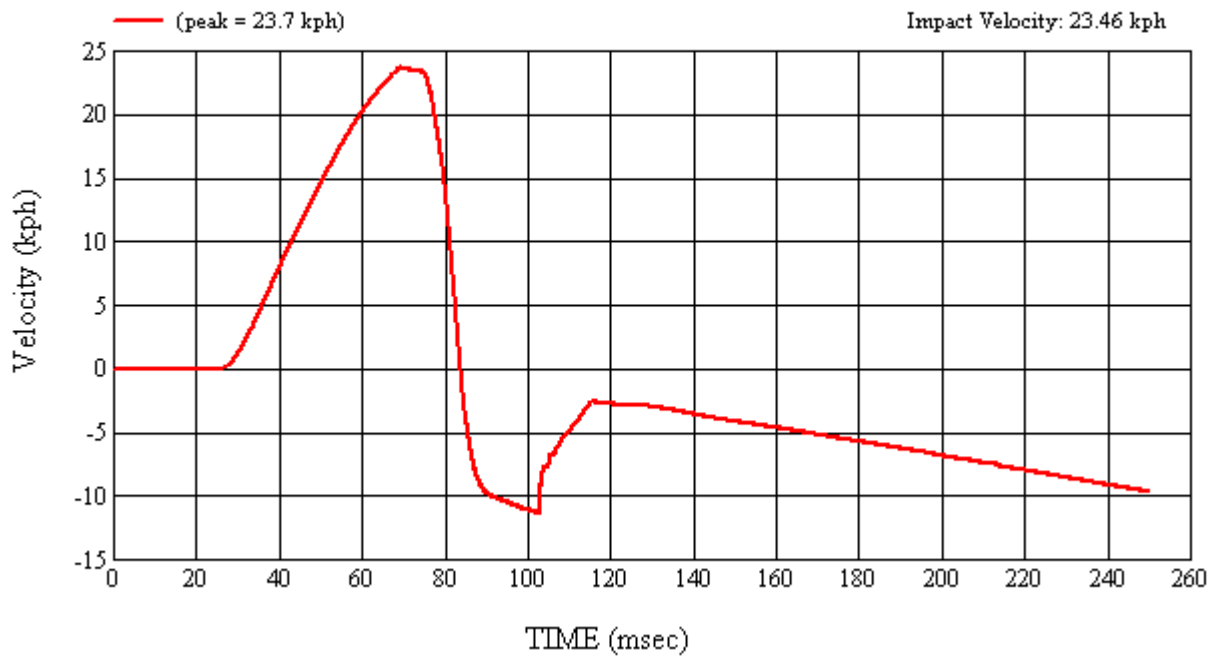
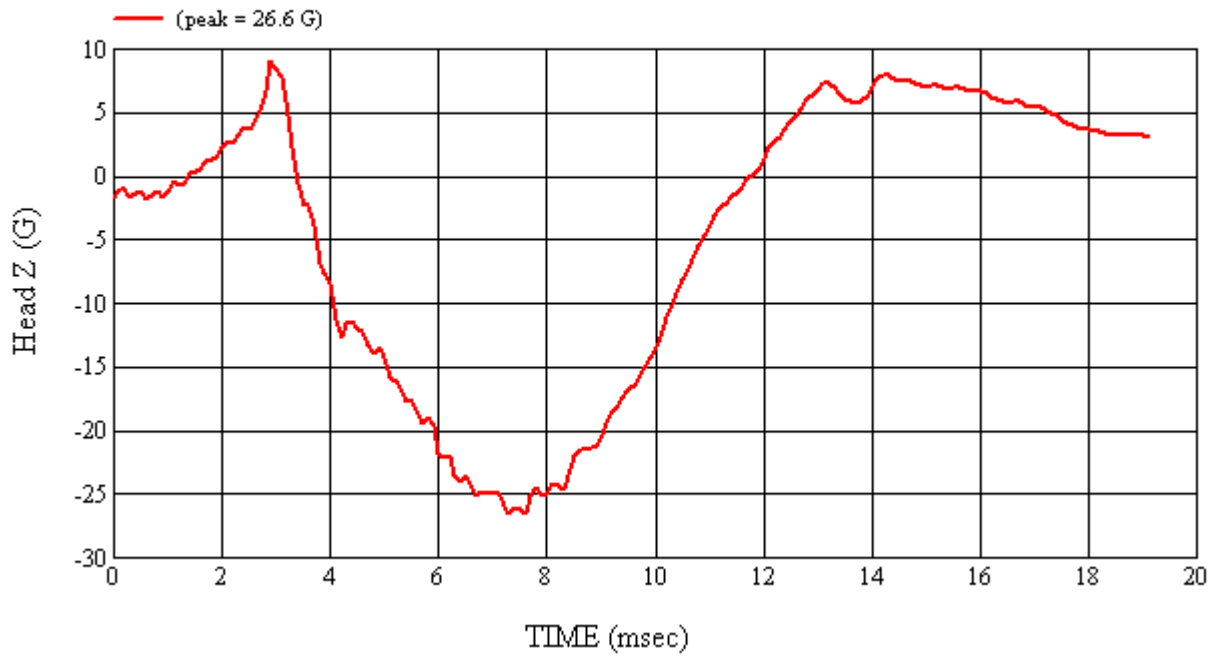
MGA Test #: FM8190

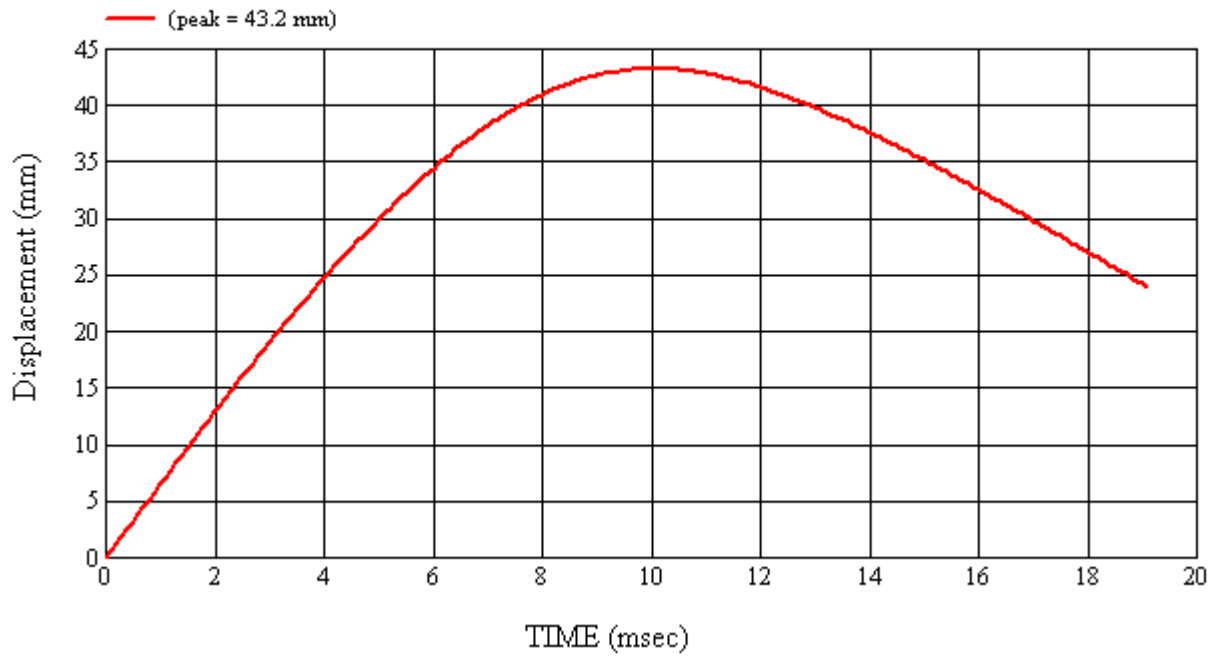
Target Location: UR1, Left Side

Test Date: 6/20/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR2 Left
 MGA Test Reference No.:FM8186
 Approach Horizontal Angles:270°
 Approach Vertical Angles:47°
 Additional Description:@ Forward OPR

Test Number:#8
 Temperature:21.4C
 Humidity:47.4%
 Time of Test:12:41:06 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
496	437	8.3	23.5	34	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-114.533	0.87	0.87
Y	6	J14103	92.424	1.52	1.52
Z	7	J35800	96.462	1.02	1.02

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

Headliner deformation.

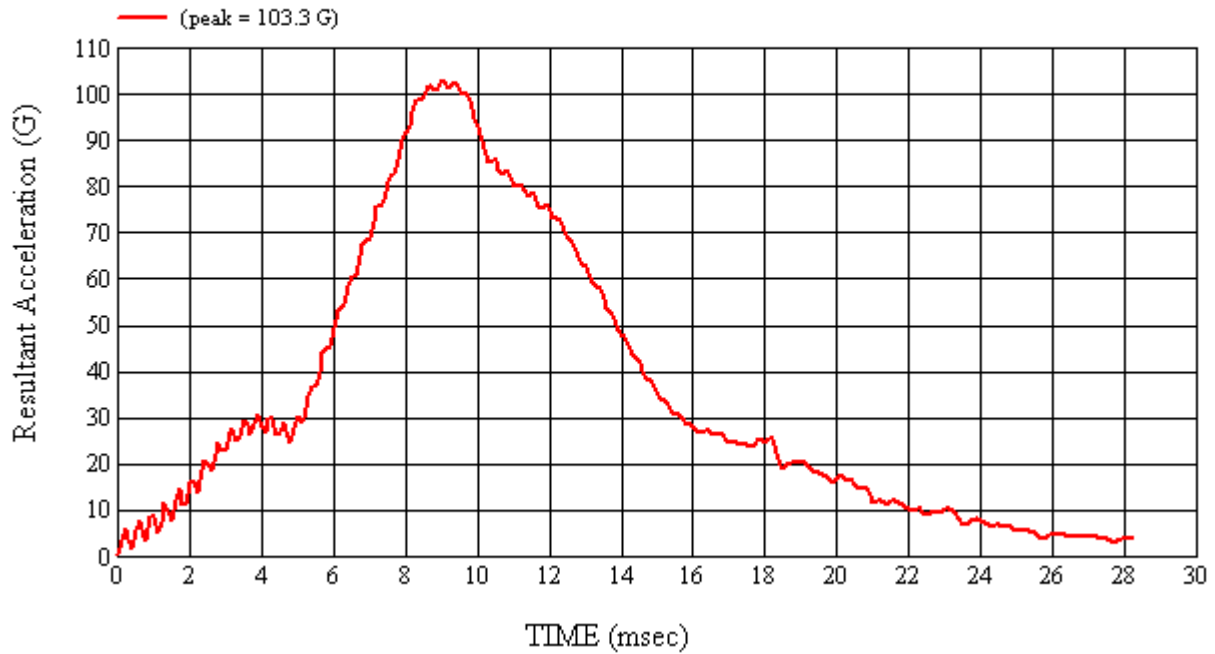
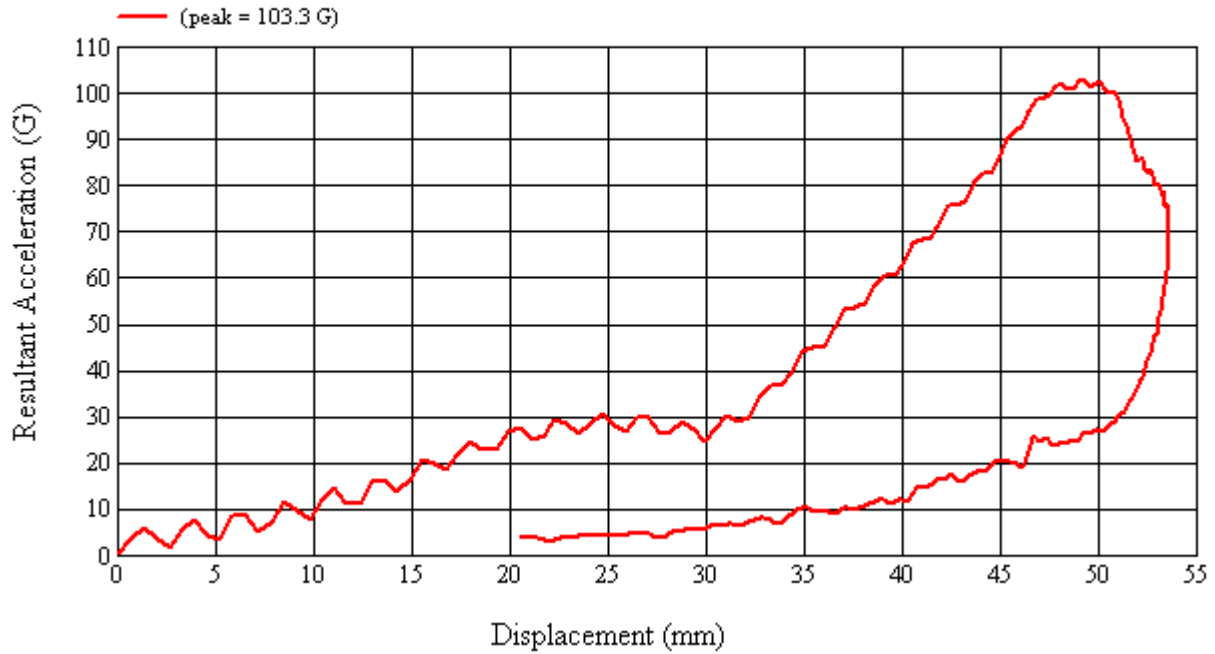
Recorded By: *Aben A. Kalata* Approved By*: *P. Michael Miller* Date: 6/20/2008

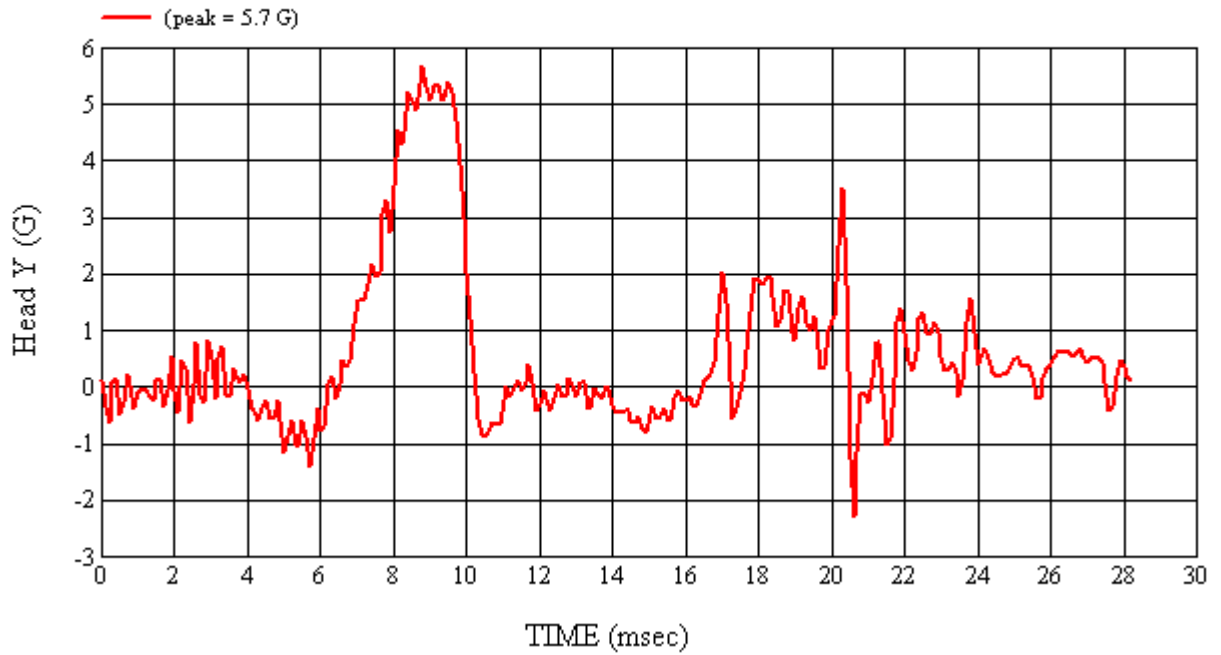
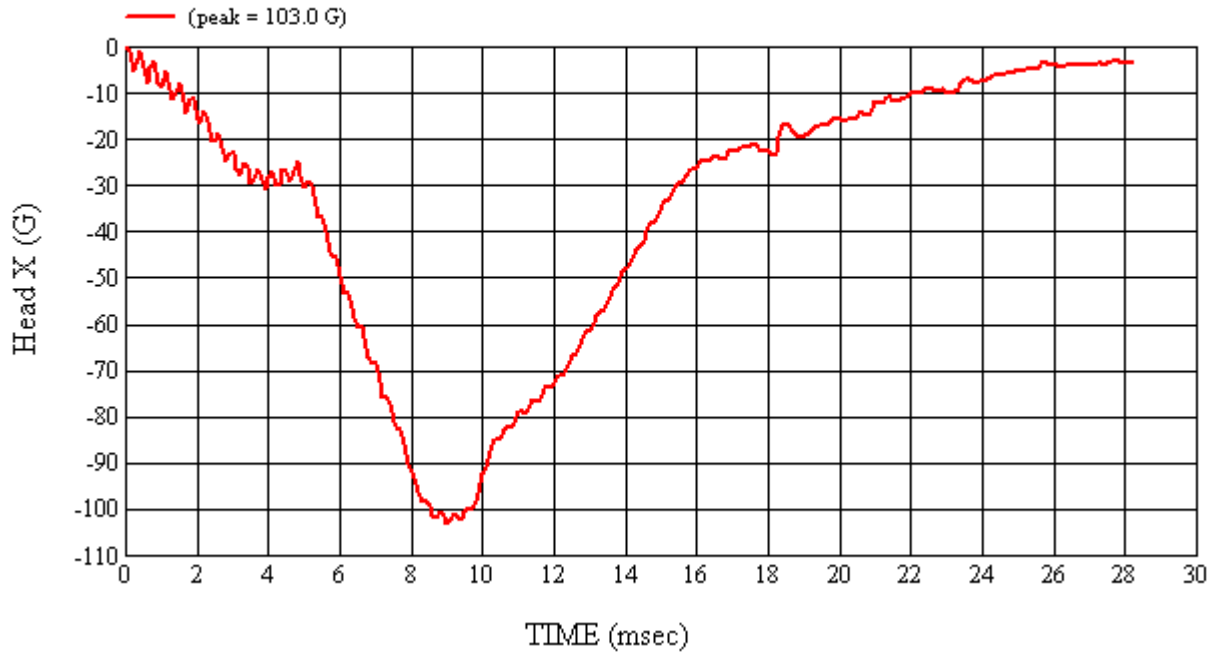
*Only necessary for NHTSA (Government) Compliance testing.

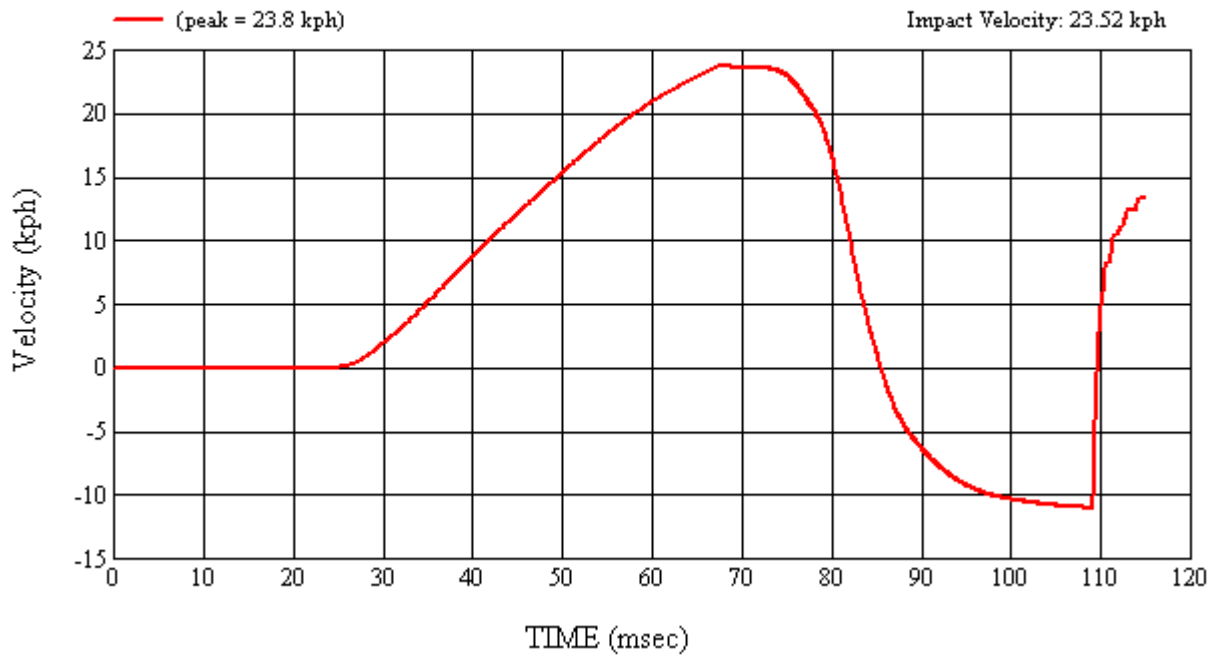
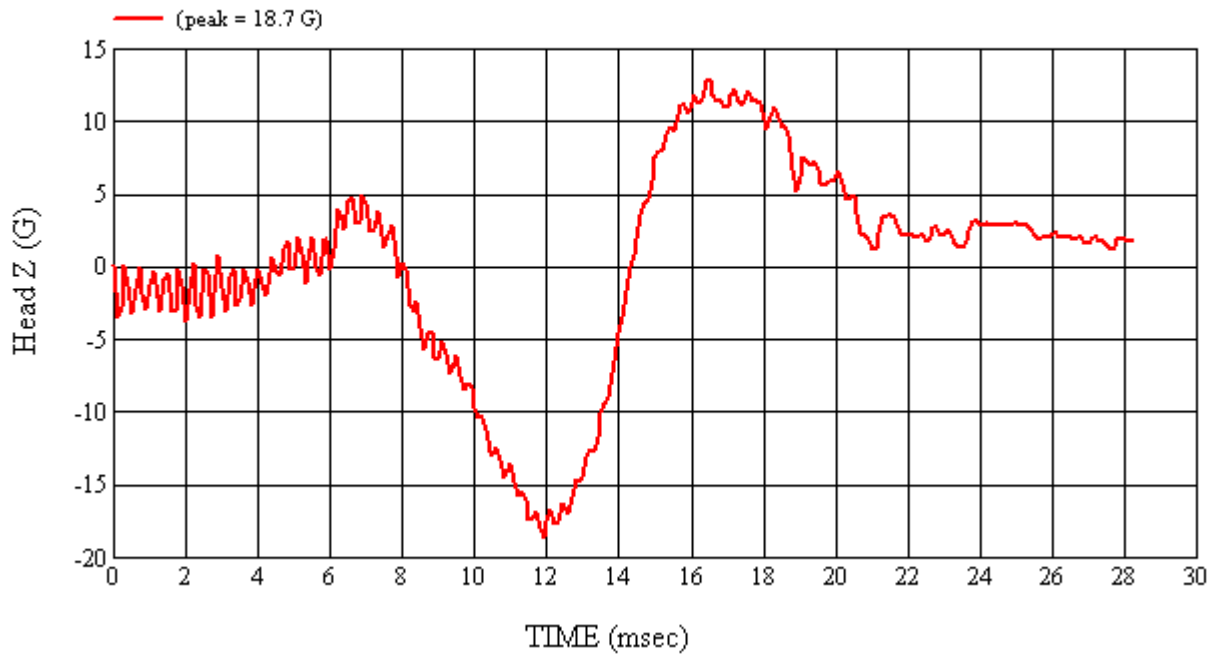
MGA Test #: FM8186

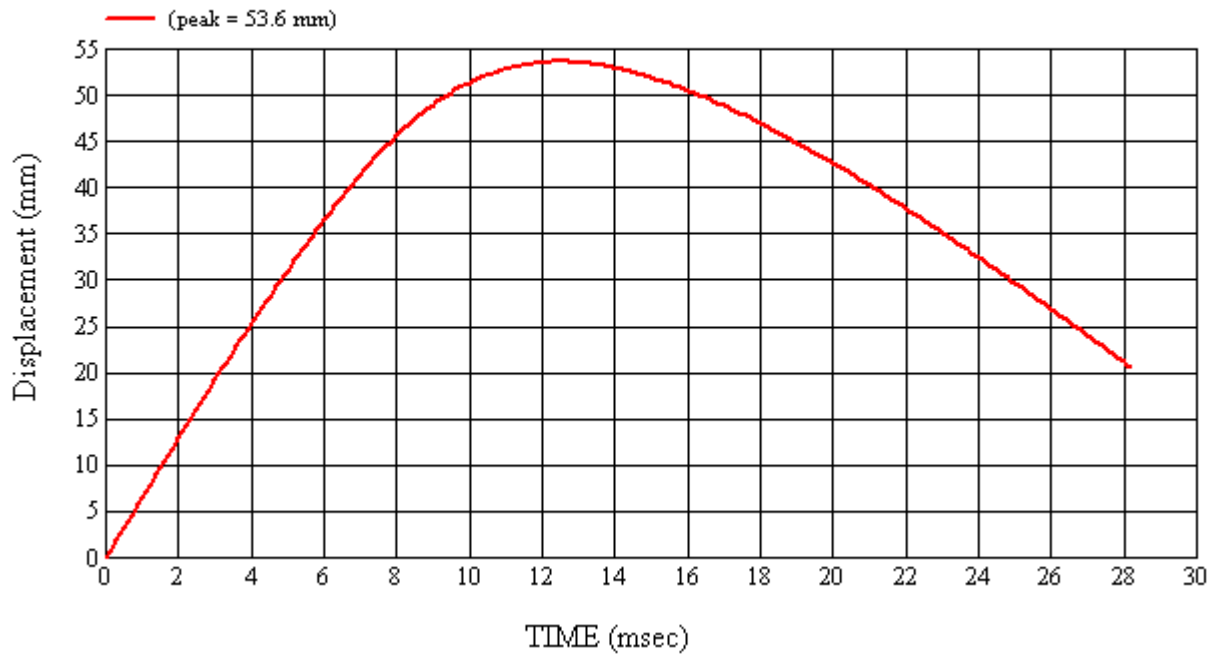
Target Location: UR2, Left Side

Test Date: 6/20/2008













SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.4 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Honda CRV - C85307

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR6 Right

MGA Test Reference No.:FM8180

Approach Horizontal Angles:90°

Approach Vertical Angles:49°

Additional Description:@ OPR

Test Number:#2

Temperature:20.9C

Humidity:50.8%

Time of Test:2:41:37 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
469	401	12.3	23.7	25	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	AHTB2	-114.533	0.87	0.86
Y	6	J14103	92.424	1.52	1.53
Z	7	J35800	96.462	1.02	1.02

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

Headliner deformation.

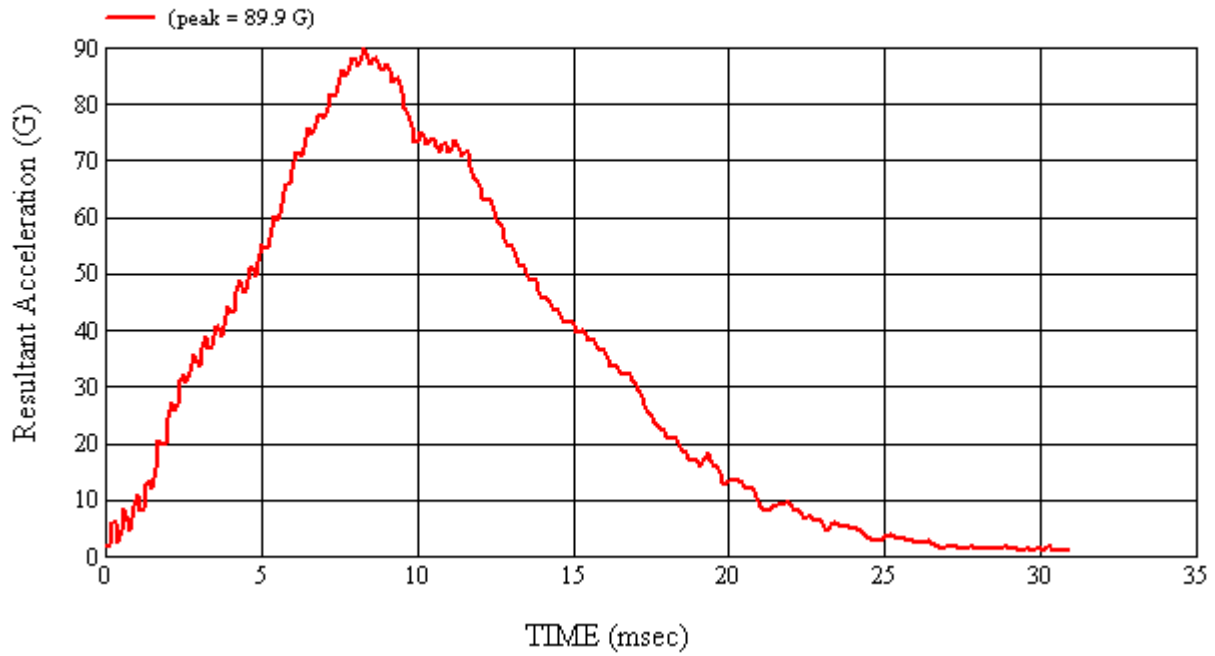
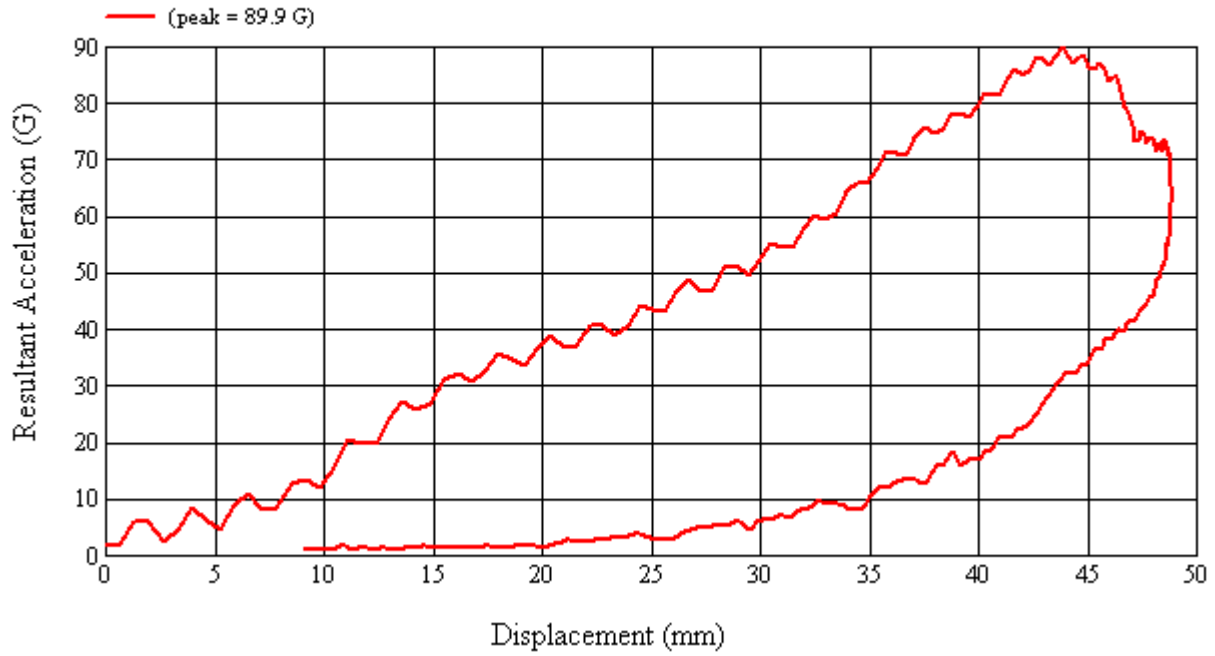
Recorded By: Aben A. Kalato Approved By*: P. M. [Signature] Date: 6/19/2008

*Only necessary for NHTSA (Government) Compliance testing.

MGA Test #: FM8180

Target Location: UR6, Right Side

Test Date: 6/19/2008



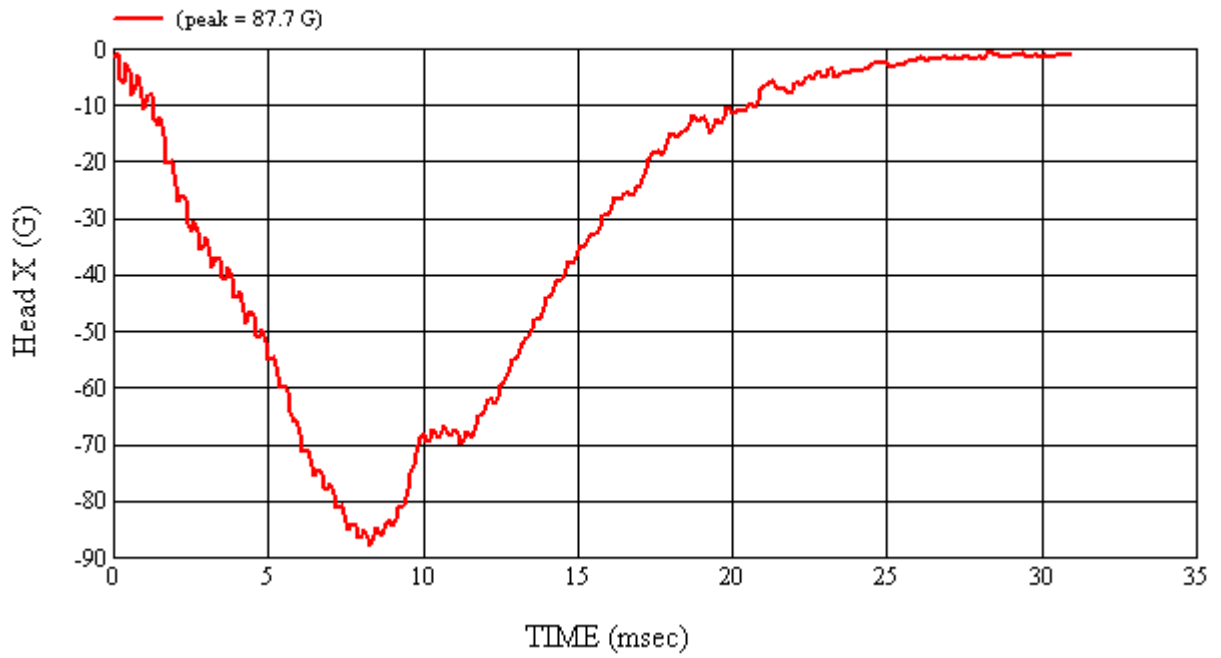
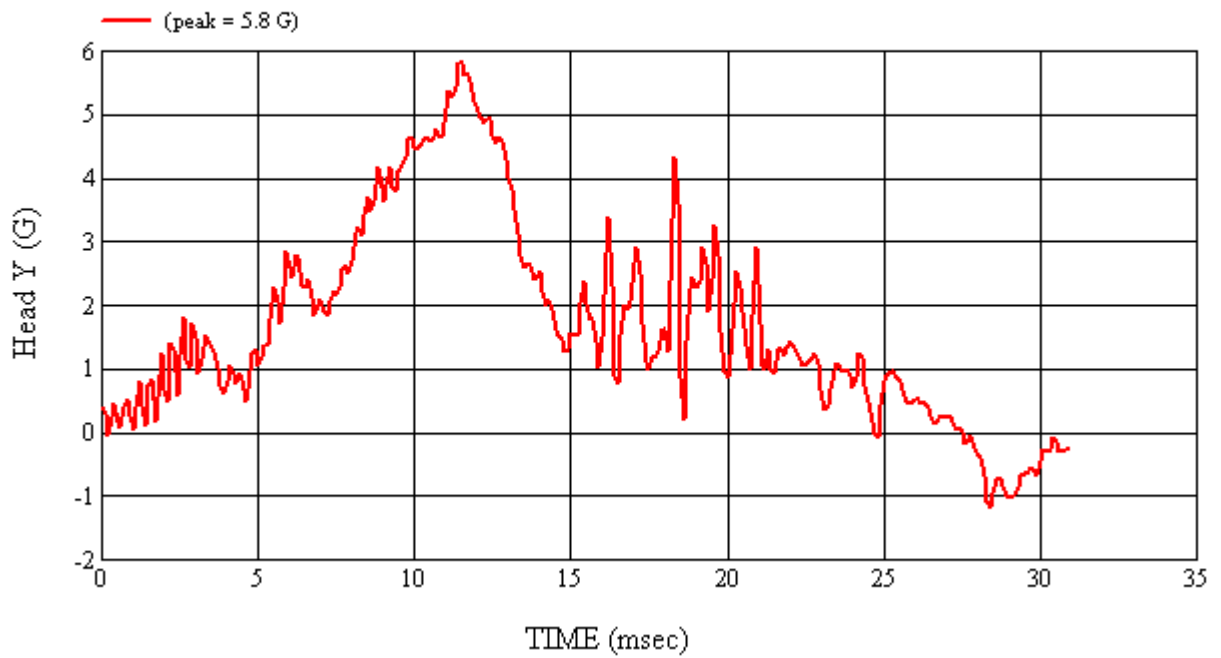
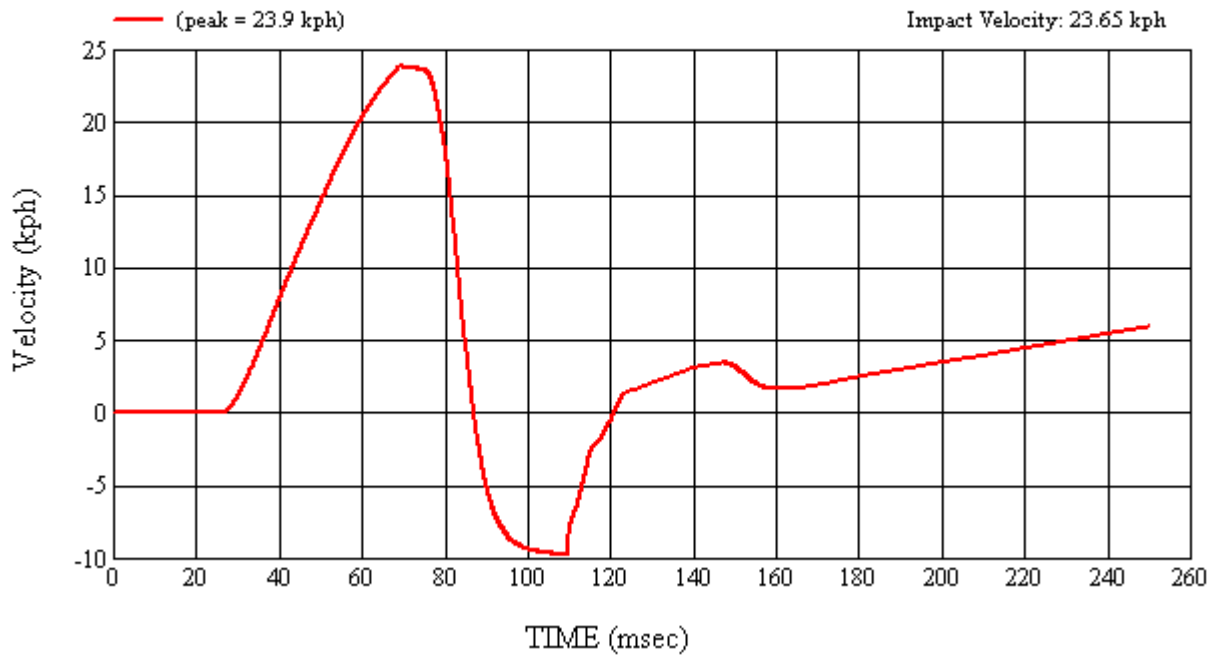
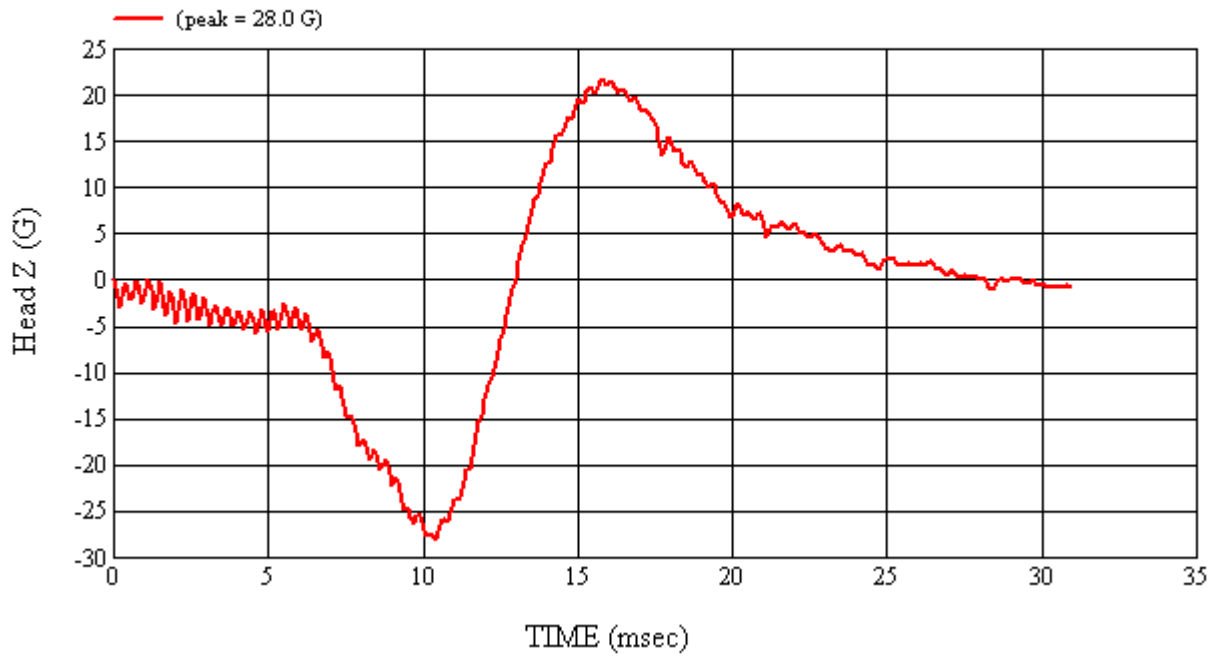
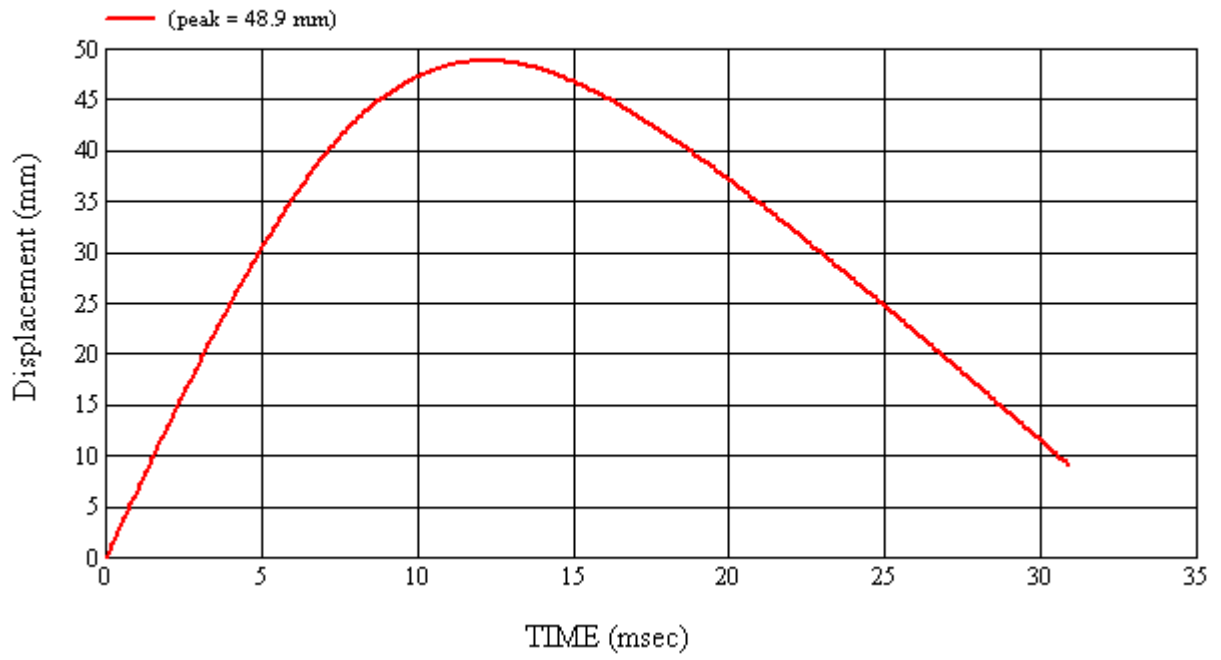


Figure 10 Test #FM8180







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	Mitutoyo	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	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 Mitutoyo	TPM829 -- MGA00048	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	6/18/2008	9.90	21.0	47.0	239.7	5.2	Yes
Post	#035	6/23/2008	9.90	22.0	56.0	243.8	3.1	Yes
Pre	#037	6/18/2008	9.96	21.0	47.0	261.1	9.9	Yes
Post	#037	6/23/2008	9.96	22.0	56.0	268.2	3.4	Yes
Pre	#038	6/18/2008	9.92	21.0	47.0	262.7	5.2	Yes
Post	#038	6/23/2008	9.92	22.0	56.0	265.8	6.8	Yes

4-1 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

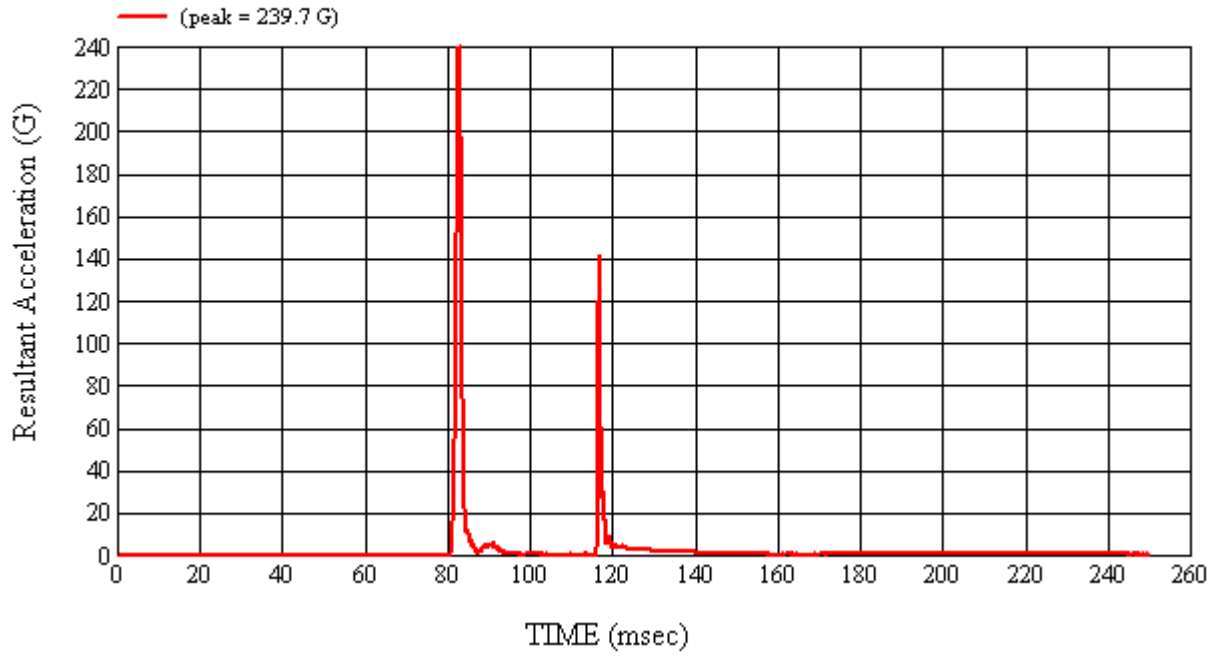
HEADFORM SERIAL NUMBER: 035		CALIBRATION DATE: 6/18/2008
CALIBRATION TIME: 2:06:34 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	21
Relative Humidity	10% to 70%	47
Peak Resultant Acceleration	225 G's to 275 G's	239.7
Peak Lateral Acceleration	15 G's Maximum	5.2
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J35919	04/22/08	10/22/08
2	ENDEVCO	7264-2000	J22664	04/22/08	10/22/08
3	ENDEVCO	7264-2000	J35924	04/22/08	10/22/08

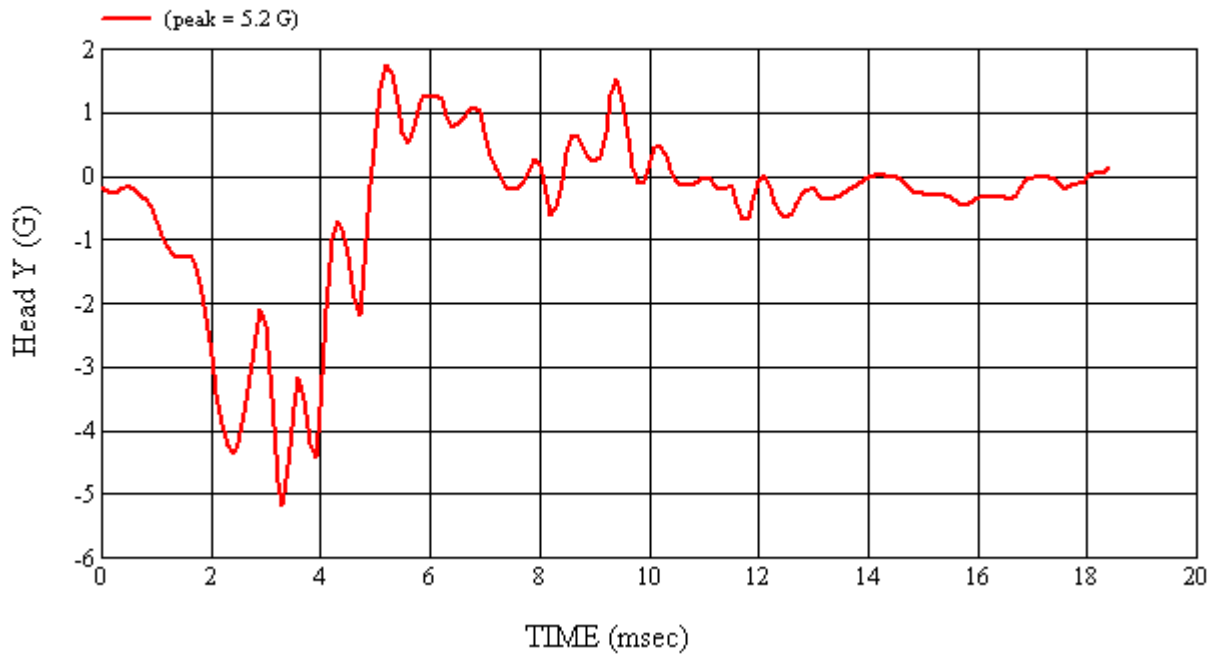
REMARKS:

RECORDED BY: *Chielli* DATE: 6/18/2008

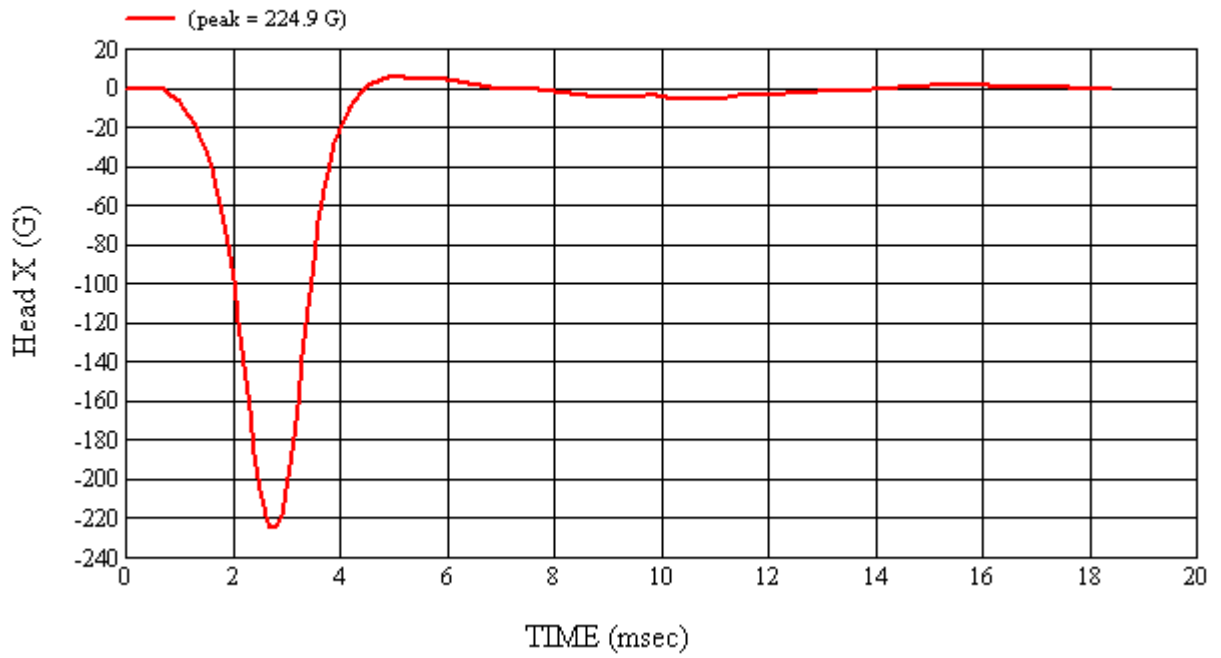
APPROVED BY: *Heena A. Kalita*



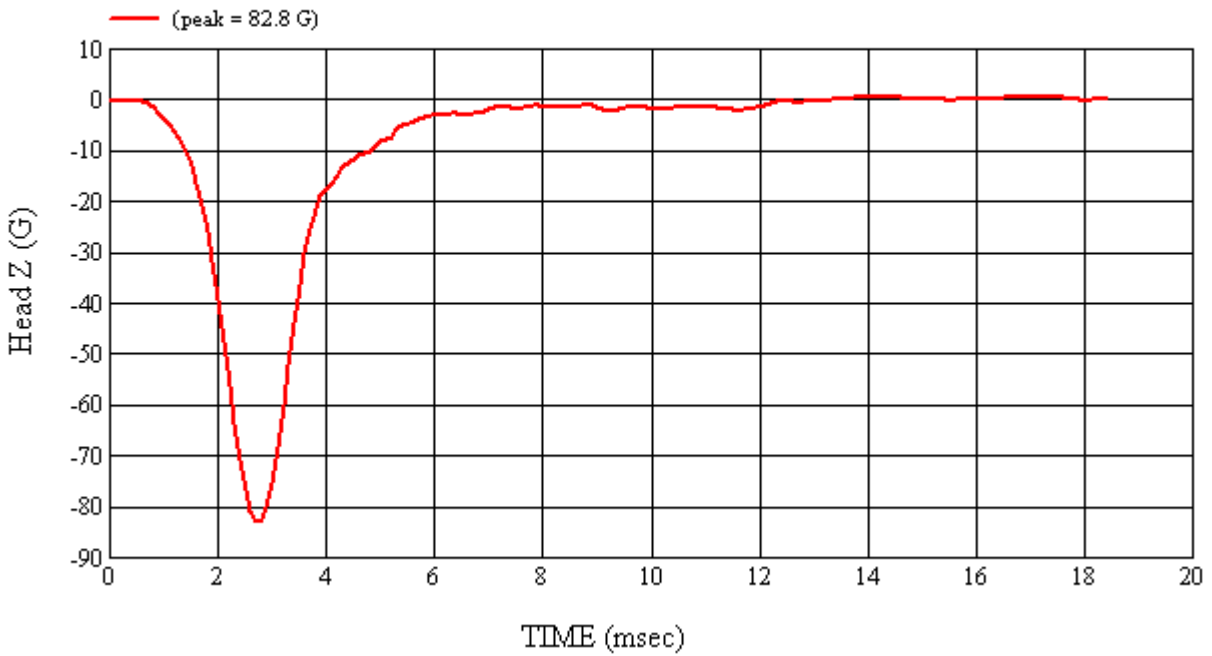
Head 035 (Pre) Calibration #H35024



Head 035 (Pre) Calibration #H35024



Head 035 (Pre) Calibration #H35024



Head 035 (Pre) Calibration #H35024

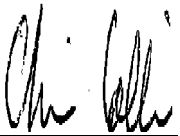
4-2 Post-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

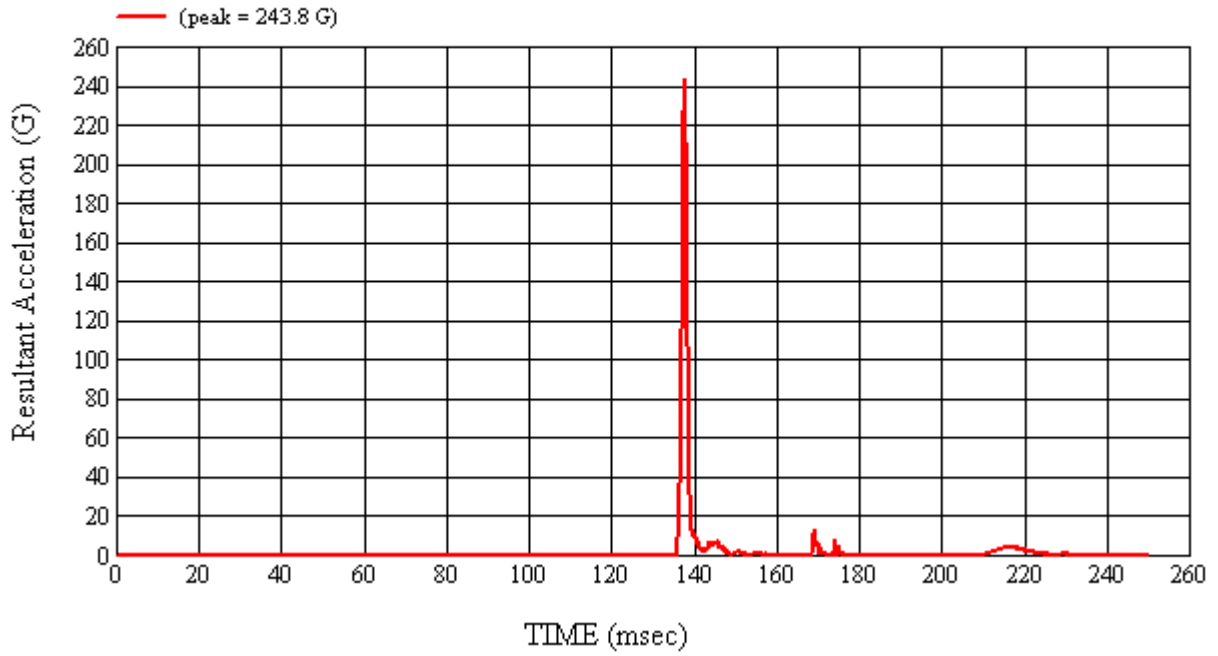
HEADFORM SERIAL NUMBER: 035		CALIBRATION DATE: 6/23/2008
CALIBRATION TIME: 10:34:34 AM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	56
Peak Resultant Acceleration	225 G's to 275 G's	243.8
Peak Lateral Acceleration	15 G's Maximum	3.1
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J35919	04/22/08	10/22/08
2	ENDEVCO	7264-2000	J22664	04/22/08	10/22/08
3	ENDEVCO	7264-2000	J35924	04/22/08	10/22/08

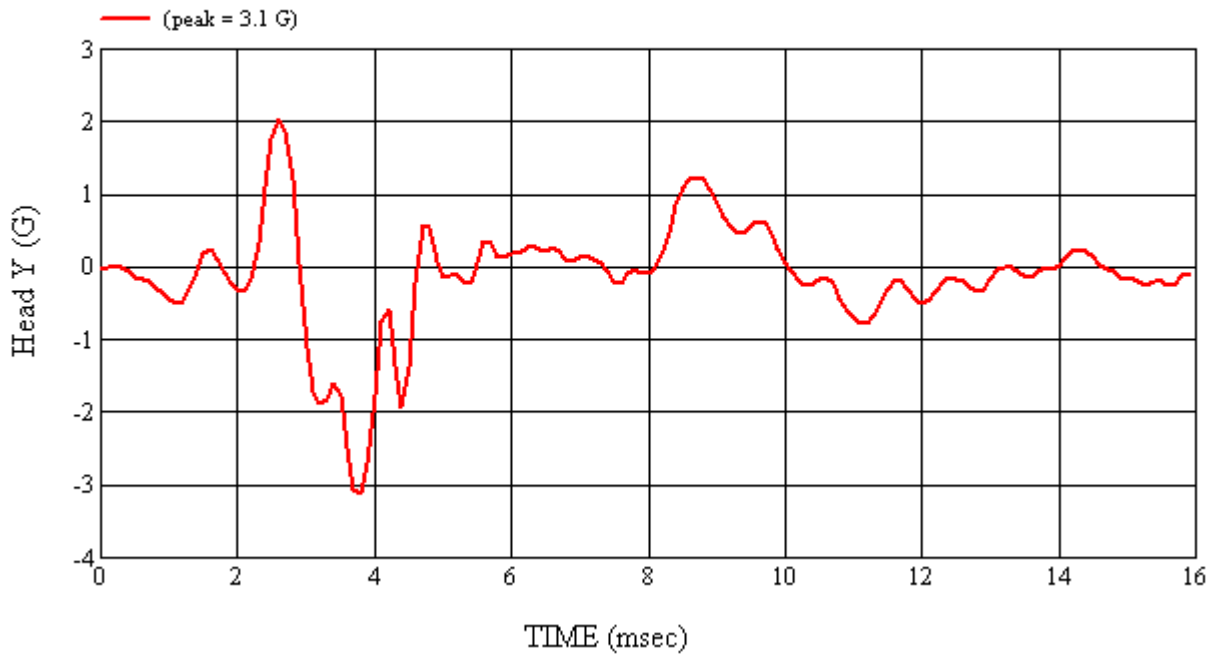
REMARKS:

RECORDED BY:  DATE: 6/23/2008

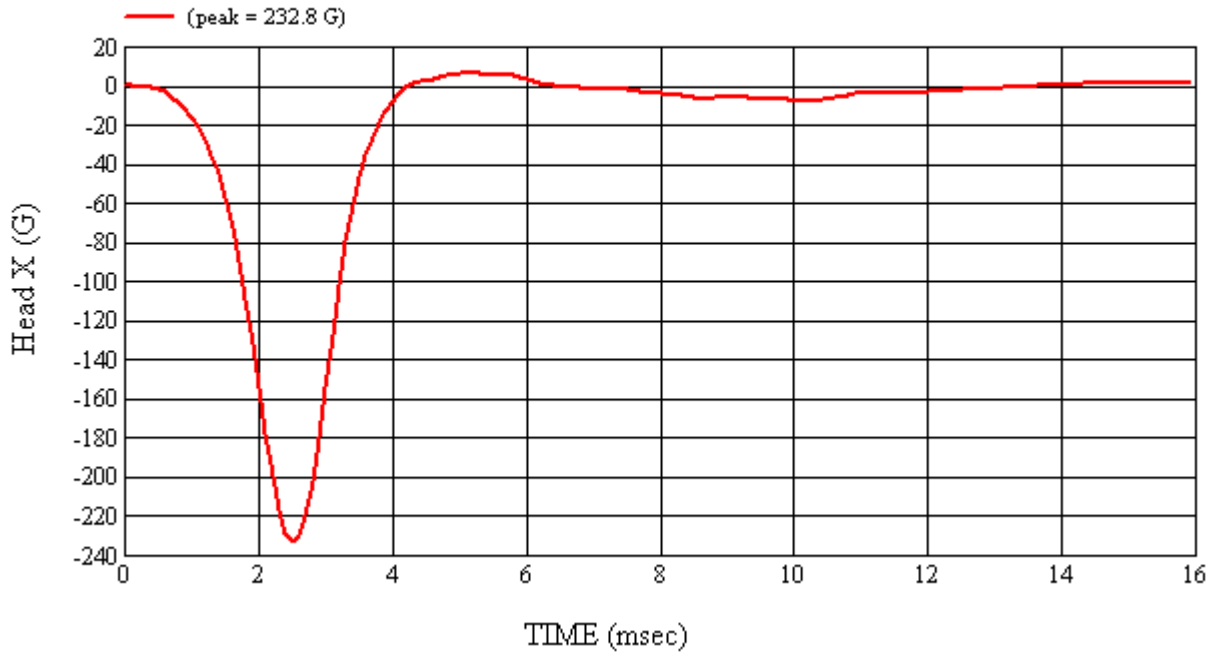
APPROVED BY: 



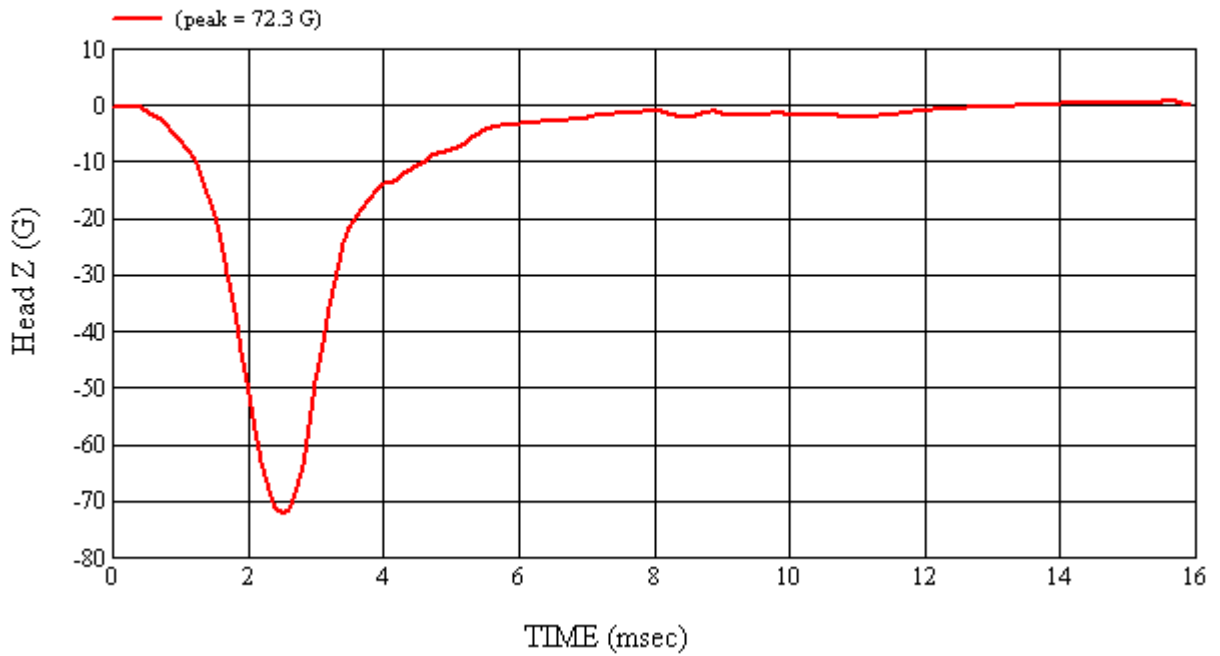
Head 035 (Post) Calibration #H35025



Head 035 (Post) Calibration #H35025



Head 035 (Post) Calibration #H35025



Head 035 (Post) Calibration #H35025

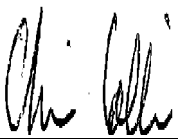
4-3 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

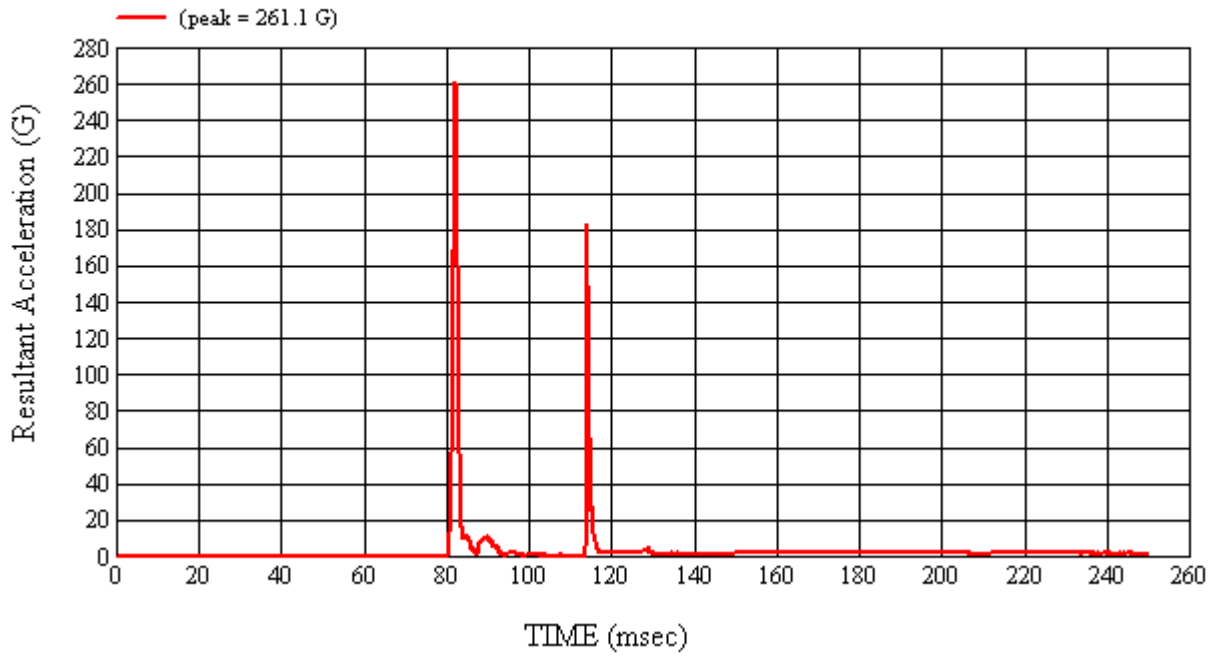
HEADFORM SERIAL NUMBER: 037		CALIBRATION DATE: 6/18/2008
CALIBRATION TIME: 2:23:52 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	21
Relative Humidity	10% to 70%	47
Peak Resultant Acceleration	225 G's to 275 G's	261.1
Peak Lateral Acceleration	15 G's Maximum	9.9
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	AHTB2	04/22/08	10/22/08
2	ENDEVCO	7264-2000	J14103	04/22/08	10/22/08
3	ENDEVCO	7264-2000	J35800	04/22/08	10/22/08

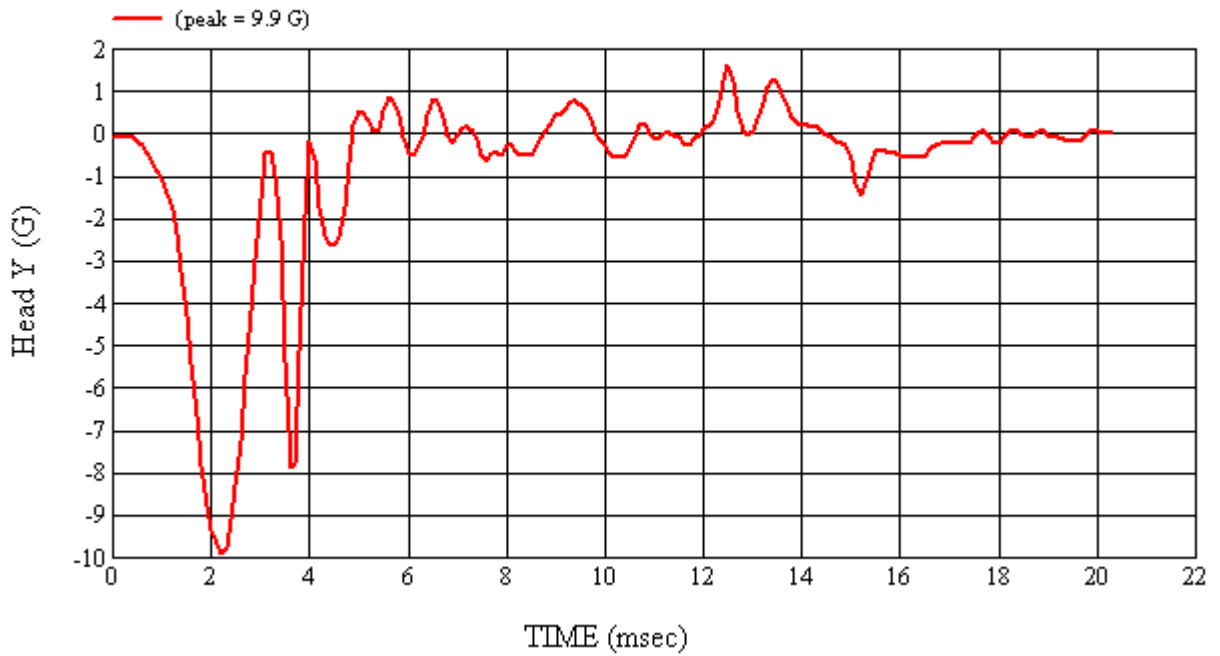
REMARKS:

RECORDED BY:  DATE: 6/18/2008

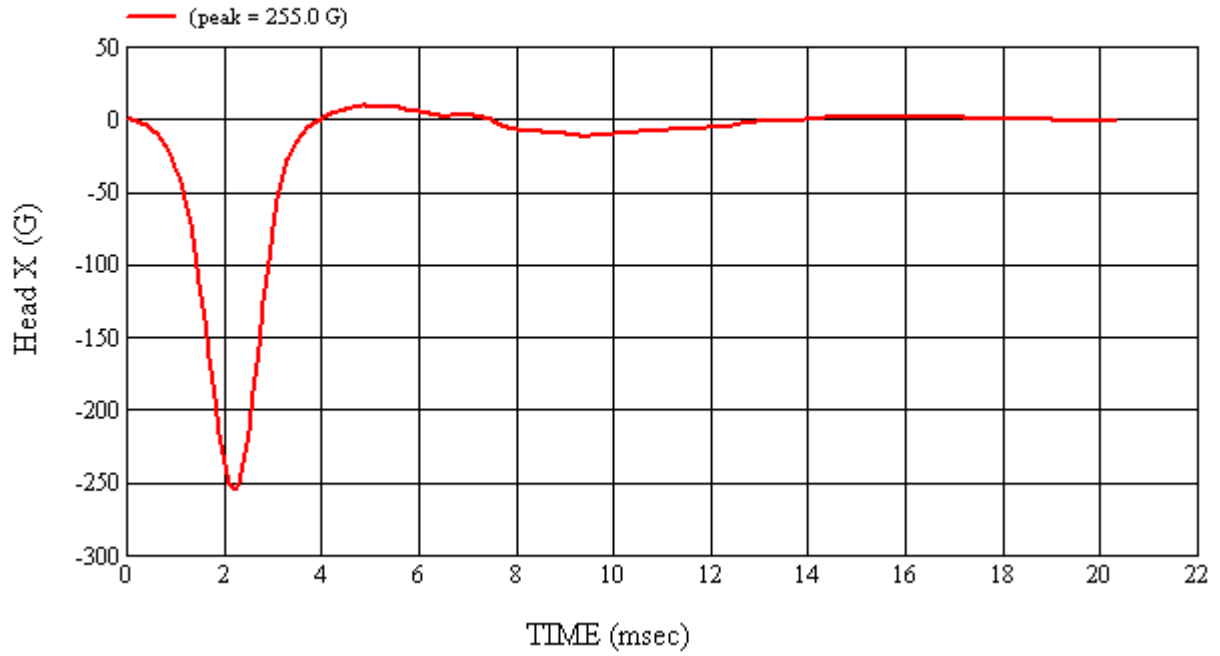
APPROVED BY: 



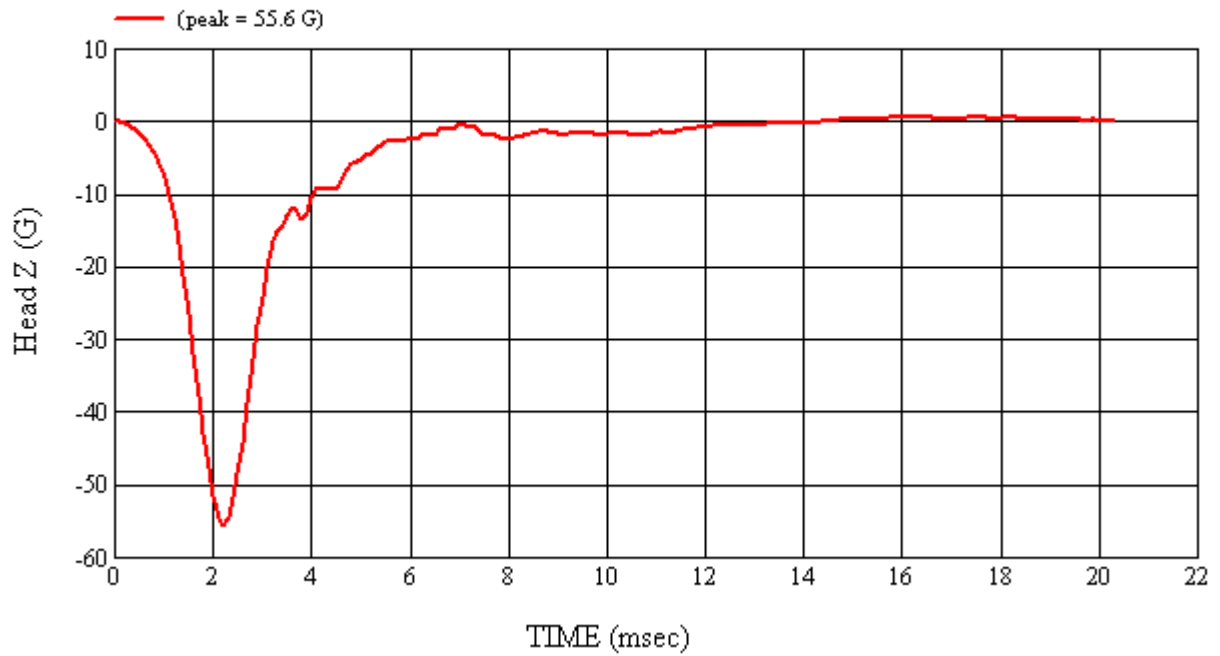
Head 037 (Pre) Calibration #H37021



Head 037 (Pre) Calibration #H37021



Head 037 (Pre) Calibration #H37021



Head 037 (Pre) Calibration #H37021

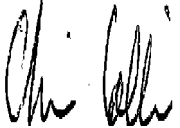
4-4 Post-Test Calibration


**HEAD DROP TEST SUMMARY
 PART 572L**

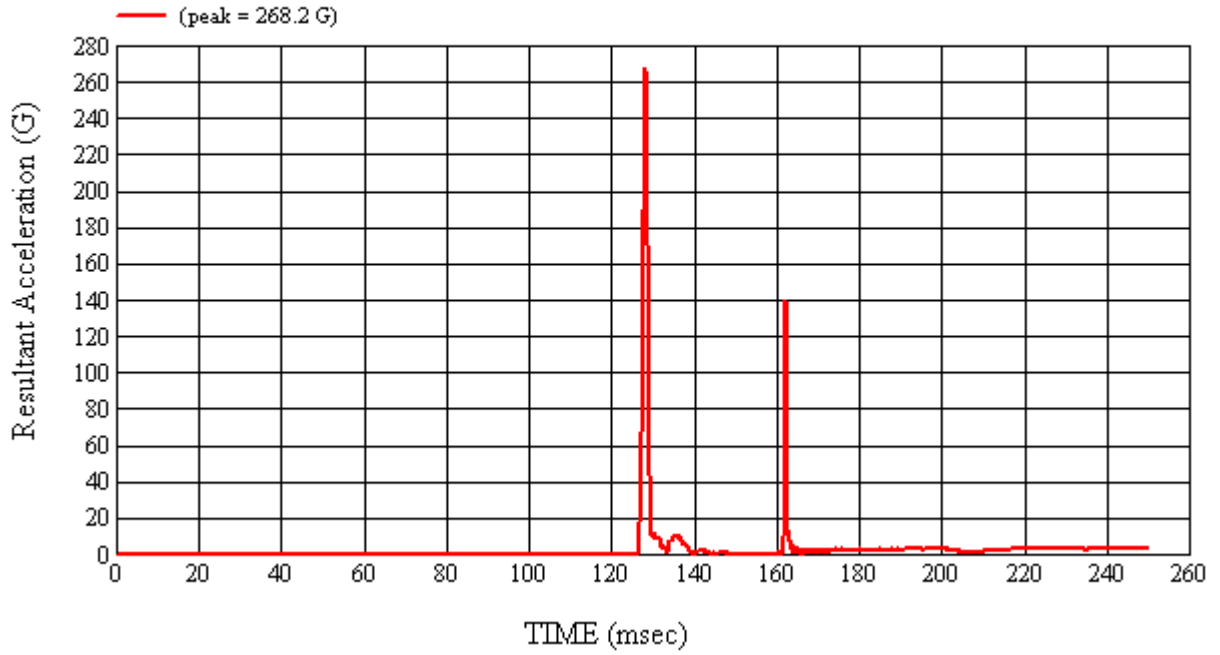
HEADFORM SERIAL NUMBER: 037		CALIBRATION DATE: 6/23/2008
CALIBRATION TIME: 10:55:01 AM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	56
Peak Resultant Acceleration	225 G's to 275 G's	268.2
Peak Lateral Acceleration	15 G's Maximum	3.4
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	AHTB2	04/22/08	10/22/08
2	ENDEVCO	7264-2000	J14103	04/22/08	10/22/08
3	ENDEVCO	7264-2000	J35800	04/22/08	10/22/08

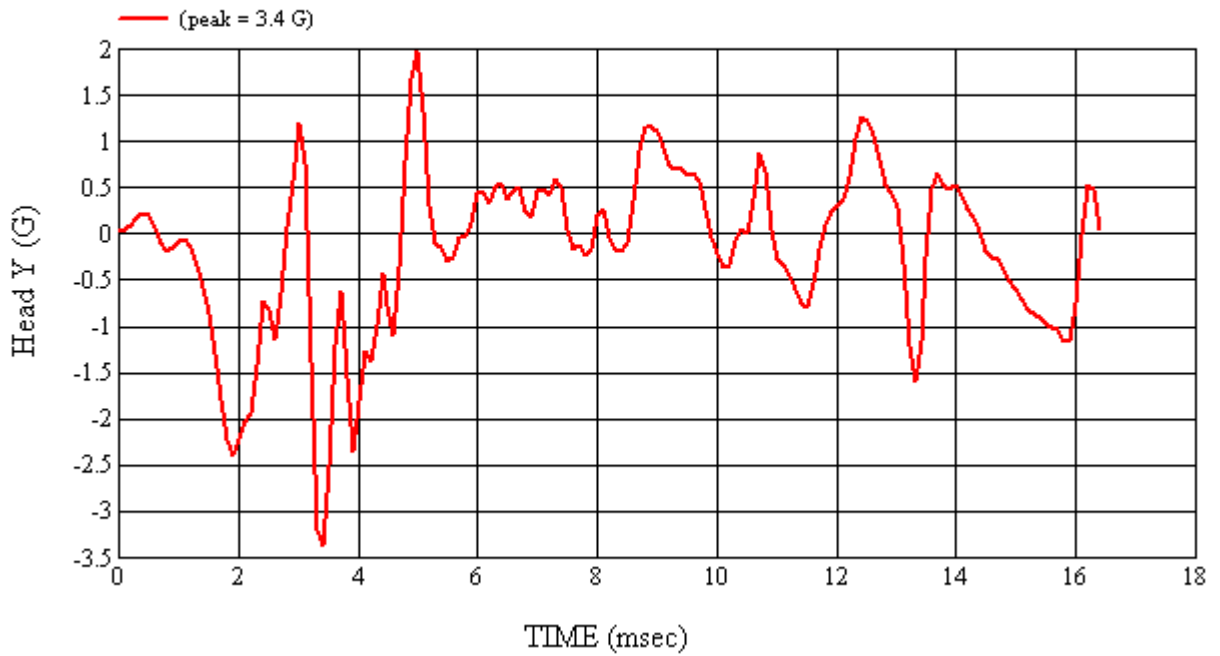
REMARKS:

RECORDED BY:  DATE: 6/23/2008

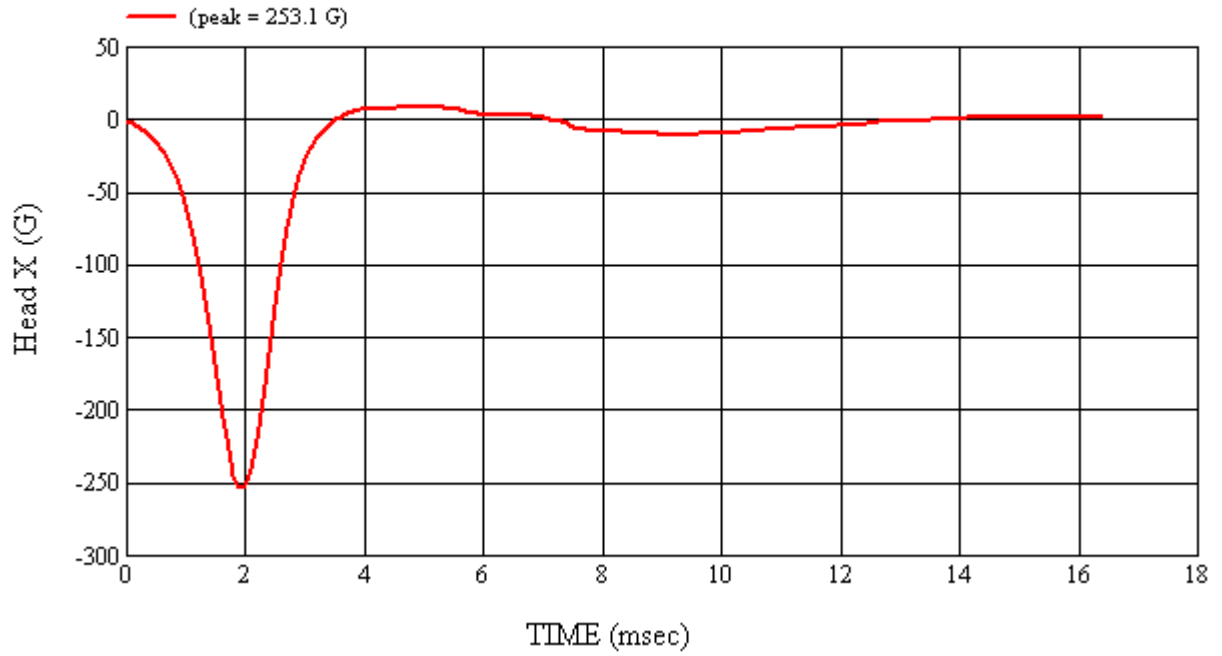
APPROVED BY: 



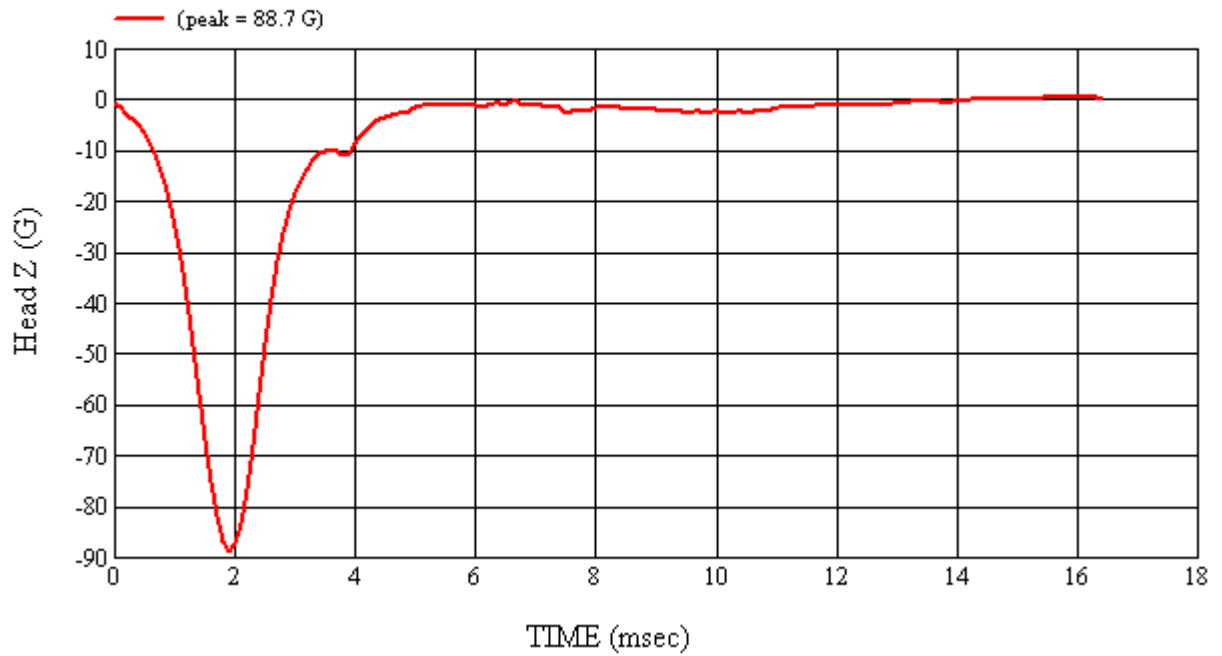
Head 037 (Post) Calibration #H37022



Head 037 (Post) Calibration #H37022



Head 037 (Post) Calibration #H37022



Head 037 (Post) Calibration #H37022

4-5 Pre-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

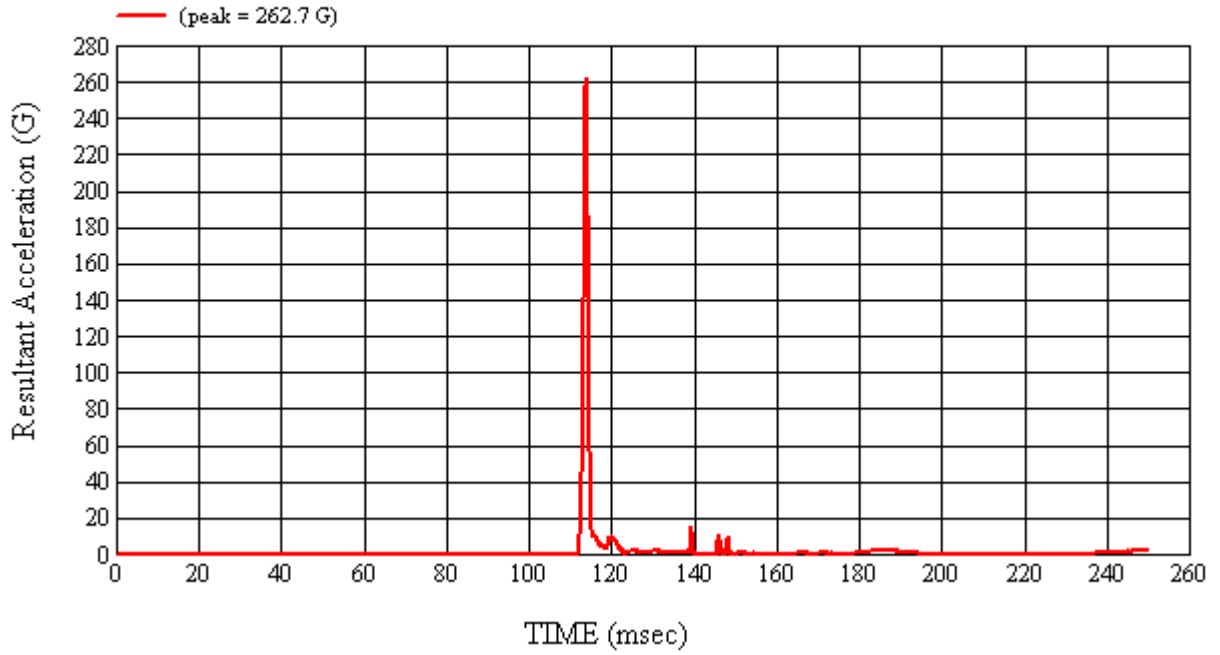
HEADFORM SERIAL NUMBER: 038		CALIBRATION DATE: 6/18/2008
CALIBRATION TIME: 2:41:33 PM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	21
Relative Humidity	10% to 70%	47
Peak Resultant Acceleration	225 G's to 275 G's	262.7
Peak Lateral Acceleration	15 G's Maximum	5.2
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J22700	04/15/08	10/15/08
2	ENDEVCO	7264-2000	J36197	04/15/08	10/15/08
3	ENDEVCO	7264-2000	J36353	04/15/08	10/15/08

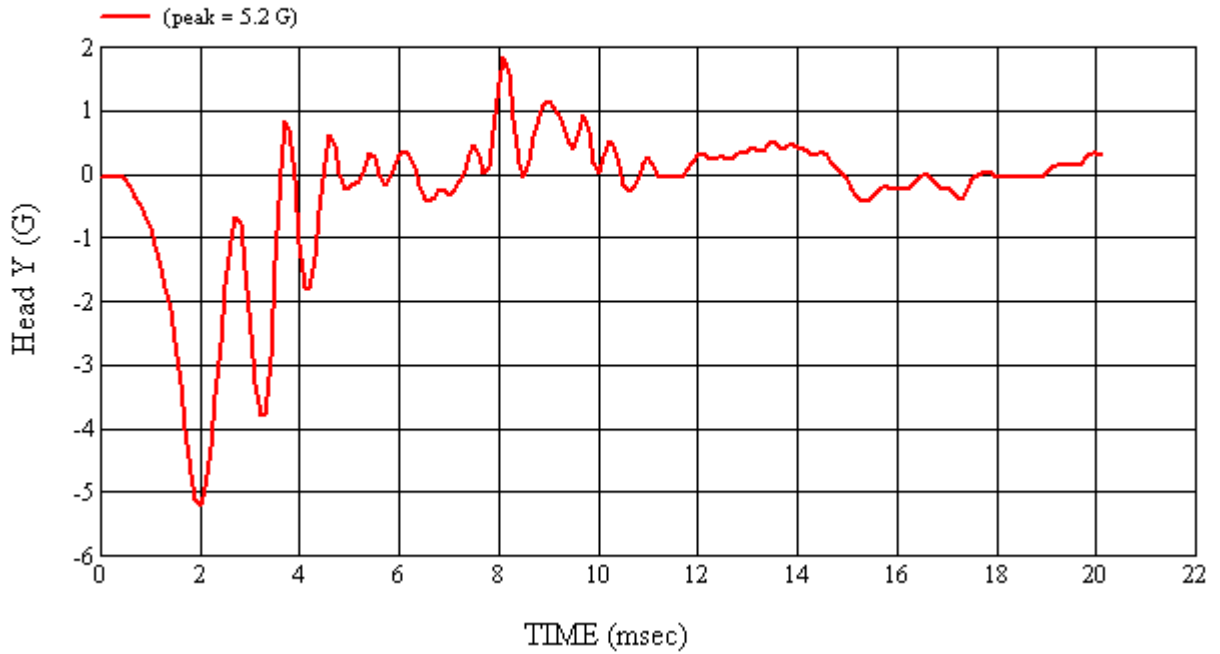
REMARKS:

RECORDED BY:  DATE: 6/18/2008

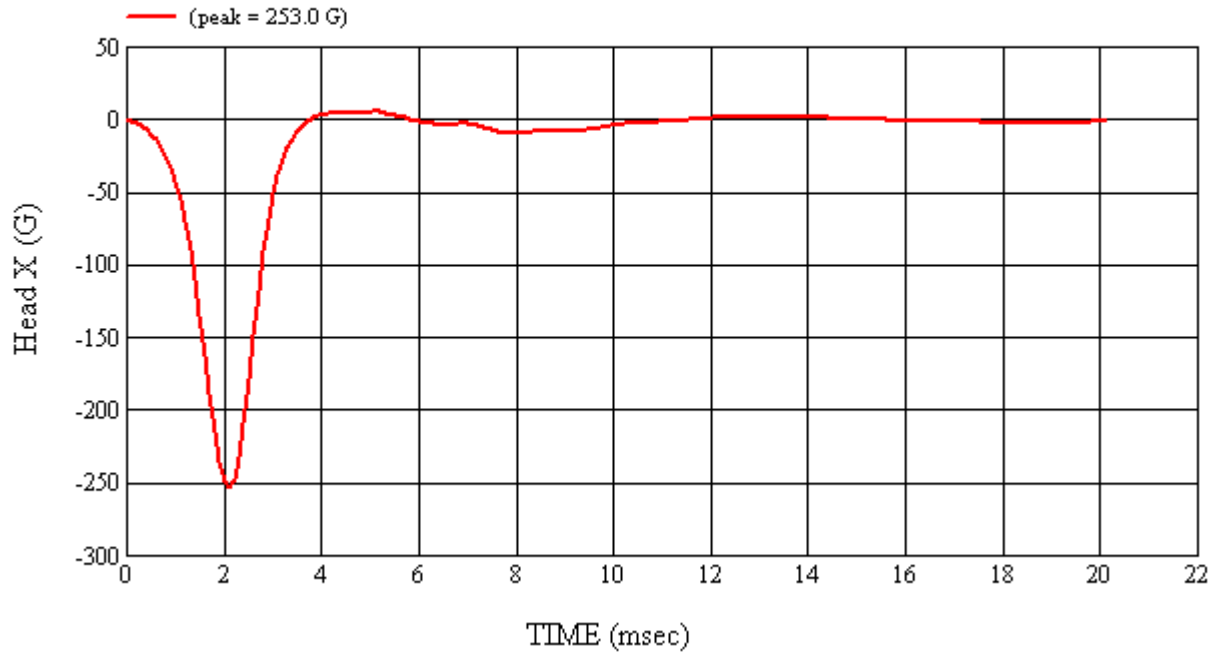
APPROVED BY: 



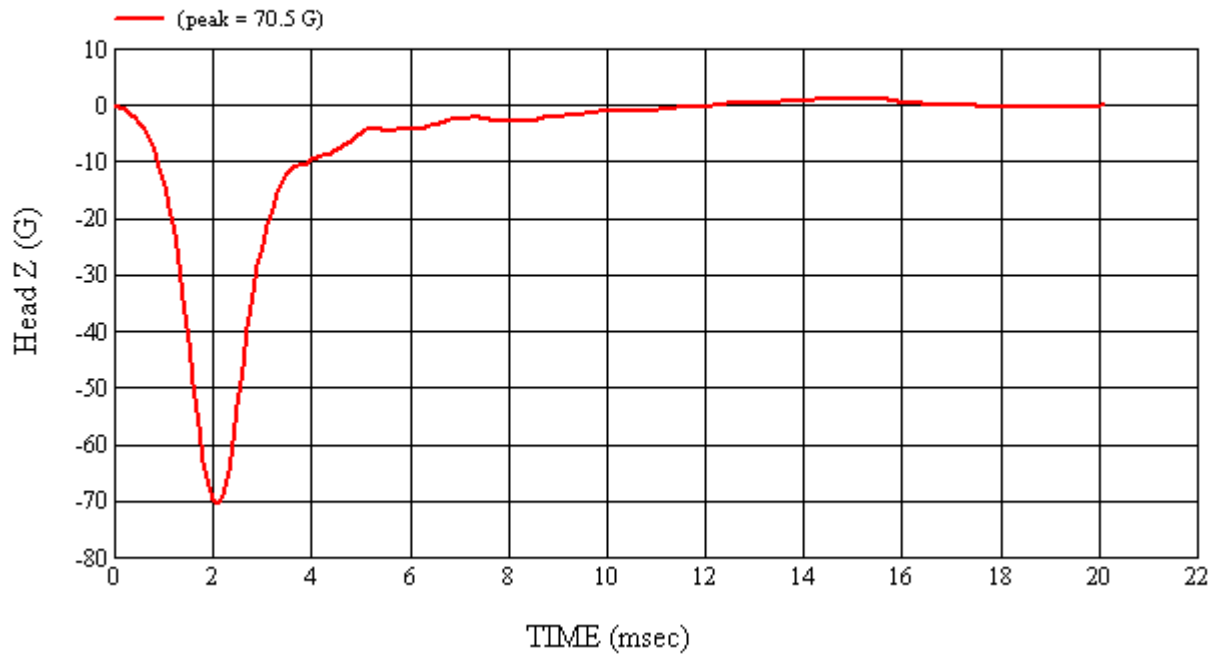
Head 038 (Post) Calibration #H38021



Head 038 (Post) Calibration #H38021



Head 038 (Post) Calibration #H38021



Head 038 (Post) Calibration #H38021

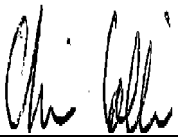
4-6 Post-Test Calibration

**HEAD DROP TEST SUMMARY
 PART 572L**

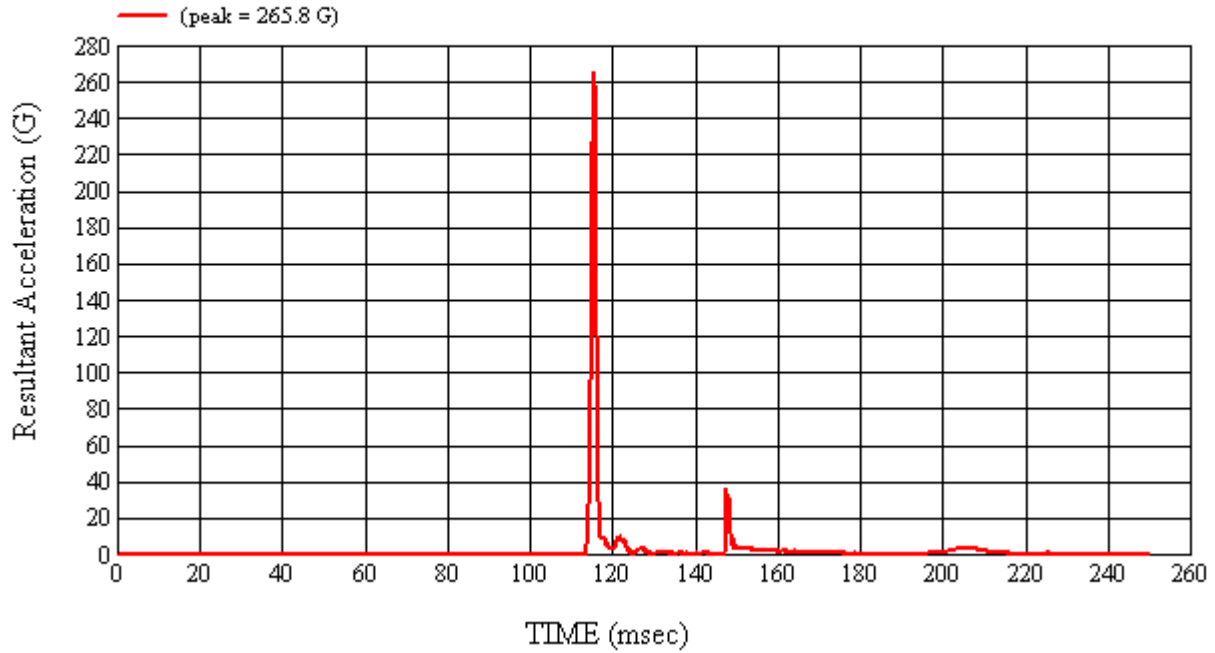
HEADFORM SERIAL NUMBER: 038		CALIBRATION DATE: 6/23/2008
CALIBRATION TIME: 11:11:35 AM		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	56
Peak Resultant Acceleration	225 G's to 275 G's	265.8
Peak Lateral Acceleration	15 G's Maximum	6.8
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	J22700	04/15/08	10/15/08
2	ENDEVCO	7264-2000	J36197	04/15/08	10/15/08
3	ENDEVCO	7264-2000	J36353	04/15/08	10/15/08

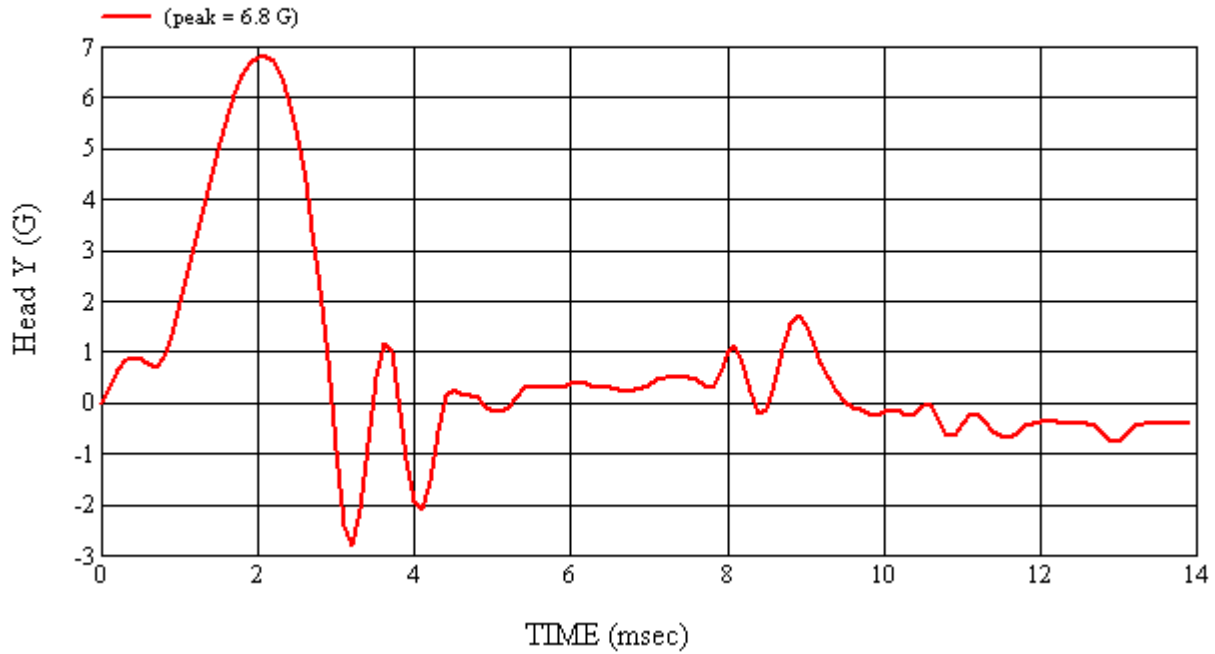
REMARKS:

RECORDED BY:  DATE: 6/23/2008

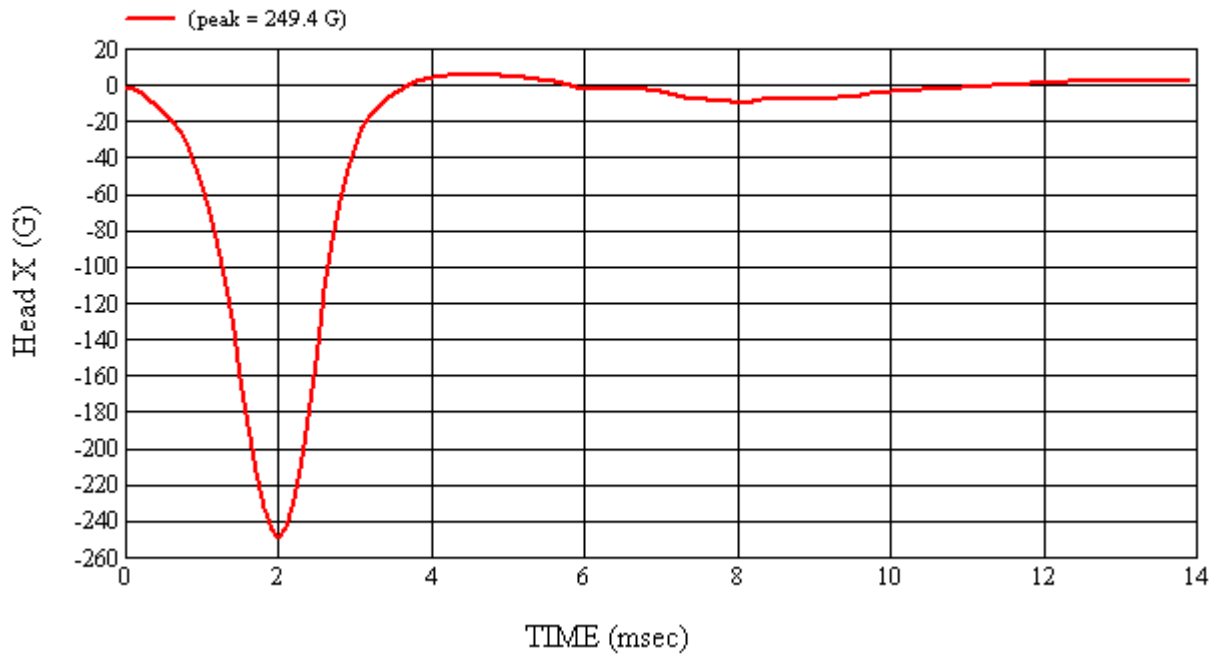
APPROVED BY: 



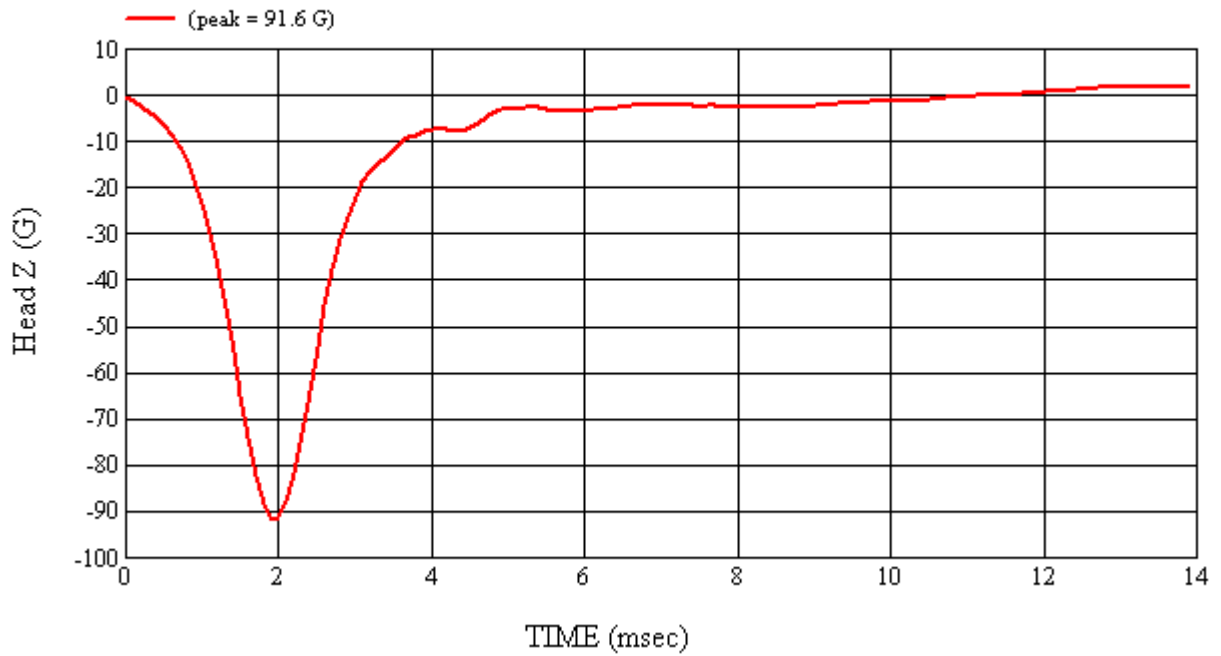
Head 038 (Post) Calibration #H38022



Head 038 (Post) Calibration #H38022



Head 038 (Post) Calibration #H38022



Head 038 (Post) Calibration #H38022

5.0 PHOTOGRAPHS



As Delivered – Left Side View



As Delivered – Right Side View



As Delivered – ¾ Front View From Left Side



As Delivered – ¾ Rear View From Right Side



As Delivered – Vehicle’s Certification Label



As Delivered – Vehicle’s Tire Information Label

Pre-Test Component Photographs









Post-Test Component Photographs



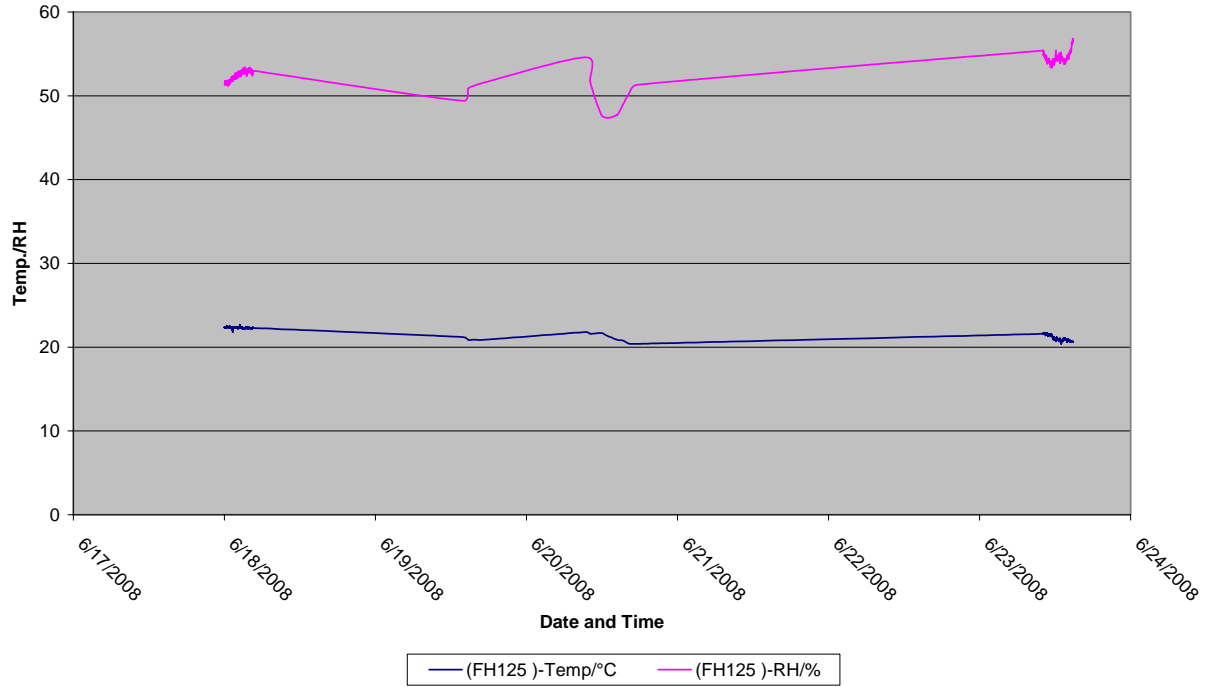






Appendix A – Temperature Trace

Temperature Recording
2008 Honda CR-V, NHTSA No. C85307
June 18, 2008 to June 23, 2008



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: 968 Calibration Date: 01/16/08 *SI Traceability: A2LA-3775280

*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

This certificate shall not be reproduced, except in full, without permission of FARO Technologies, Inc. The results of this certificate relate only to the items calibrated or tested.

FARO Technologies, Inc.
Michigan Regional Office
PH: 248-689-8620

FAX: 248-689-8656
L-A-B Cert Number: L1147.01

Technician: Neil Maclean Date: 2/14/08





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 48083

Order Number: 57208
 Certificate Number: 071126703
 Page: 1 of 1

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

Customer PO: A070457
 Last Calibration: 9/26/06
 Calibration Date: 11/26/07
 Next Calibration: 11/26/08

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/NCSS Z540-1 and ISO/IEC 17025 Standards. Results shall not be reproduced, except in full, without the written approval of MetroCal, Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence (K=2)
Gage Blk Set ID# 105	6/12/07	6/12/08	821/273187-06	0.0015°
DoAll Sine Bar ID#1879	12/29/06	12/29/07	061229125	0.0015°

Results:

Units	As Found Readings		
	Nominal	Actual	Deviation
Decimal Deg.	5.00	5.0	0.00
	10.00	9.9	-0.10
	20.00	20.0	0.00
Tolerance	30.00	30.1	0.10
± 0.1 degrees	40.00	40.0	0.00

Reference Level Check: Within ± 0.1 degrees

Units	As Left Readings		
	Nominal	Actual	Deviation
	5.00	5.0	0.00
	10.00	9.9	-0.10
	20.00	20.0	0.00
	30.00	30.1	0.10
	40.00	40.0	0.00

Reference Level Check: Within ± 0.1 degrees

Comments: Environmental conditions during calibration: 68 °F, 39% RH.
 No adjustments required.

Bill Rinzema issued: 11-26-07
 Bill Rinzema
 Calibration Technician

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

PA 12/3/07

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: JOHNSON LEVEL & TOOL
 S/N: MG600123
 Calibration Date: 1/15/2008

Subject Tape Measure

Brand: STANLEY
 S/N: TFM 829
 Calibration Date: 3.1.2008

Reference ID (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)	25	0
8 (200)	8	0	26 (650)	26	0
9 (225)	9	0	27 (675)	27	0
10 (250)	10	0	28 (700)	28	0
11 (275)	11	0	29 (725)	29	0
12 (300)	12	0	30 (750)	30	0
13 (325)	13	0	31 (775)	31	0
14 (350)	14	0	32 (800)	32	0
15 (375)	15	0	33 (825)	33	0
16 (400)	16	0	34 (850)	34	0
17 (425)	17	0	35 (875)	35	0

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

Pass Fail Maximum Difference = 0

Date: 3.1.2008 Performed By: J. Miller

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 2/20/08



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

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

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

Customer P.O. 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# 08-4567 Temp/Humidity: 70-20
 Location of Calibration: 2839 Elliott Ave. Troy MI 48063
 Calibration Date: 8/18/2008 Cal Due: 7-09 Condition of Item: Good
 Equipment Make: Intercomp Model: SWD Deluxe Serial ID: 28032380
 Capacity: single pad capacity 2200 x 1lb

Applied Test Wt	Before Adjustment	Tolerance	In-Tolerance Y/N	After Adjustment	In-Tolerance Y/N	Unc .5lb	
100lb	100lb	1lb	y	n/a	n/a	.5lb	RR
1000lb	1000lb	2lb	y	n/a	n/a	.5lb	
100lb	101lb	1lb	y	n/a	n/a	.5lb	LR
1000lb	1000lb	2lb	y	n/a	n/a	.5lb	
100lb	100lb	1lb	y	n/a	n/a	.5lb	RF
1000lb	1000lb	2lb	y	n/a	n/a	.5lb	
100lb	100lb	1lb	y	n/a	n/a	.5lb	LF
1000lb	1000lb	2lb	y	n/a	n/a	.5lb	

shift test

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

Tests performed: Repeatability Linear Sensitivity Discrimination

Technician: System passes all tests.

COMMENTS/

Test wts used: Our test weights s/n on file.

Scale Certified Scale Rejected

Sterling Scale Service Rep: ED Date: 8/12/2008 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 determined by the customer

QA 6/19/08



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

Certificate of Calibration

MGA Research
 446 Executive Drive
 Troy, MI 48083

Order Number: **59556**
 Certificate Number: **080506600**
 Page: **1 of 1**

Gauge Number: **MGA00777**
 Gauge Desc: **Digital Temperature/Humidity Recorder**
 Manufacturer: **Dickson**
 Model Number: **FH125**
 Serial Number: **06018122**

Customer PO: **A070658**
 Last Calibration: **N/A**
 Calibration Date: **5/6/08**
 Next Calibration: **5/6/09**

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 CP053 and complies with the ANSI/NCSL Z540-1 and ISO/IEC 17025 Standards. Results shall not be reproduced, except in full, without the written approval of MetroCal, Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used
 CL26 Calibrator ID# 10901
 Standard RTD Probe ID#4525

Cal. Date
 12/31/07
 6/13/07

Due Date
 12/31/08
 6/13/08

Traceable No.
 10901:1199107512
 Cert# P143088

Calibration Procedure
Uncertainty Expressed
95% confidence, (K=2)
 Calibrator System Unc
 0.75 °F

Results:

<u>Units</u>	<u>Standard</u> <u>RTD Reading</u>	<u>Actual</u> <u>Gage Reading</u>	<u>Error</u>
°C	7.0	7.2	0.2
	21.9	22.3	0.4
Tolerance	33.6	33.2	-0.4
± 1.8°F (± 1°C)			

As Found

As Left

<u>Standard</u> <u>RTD Reading</u>	<u>Actual</u> <u>Gage Reading</u>	<u>Error</u>
7.0	7.2	0.2
21.9	22.3	0.4
33.6	33.2	-0.4

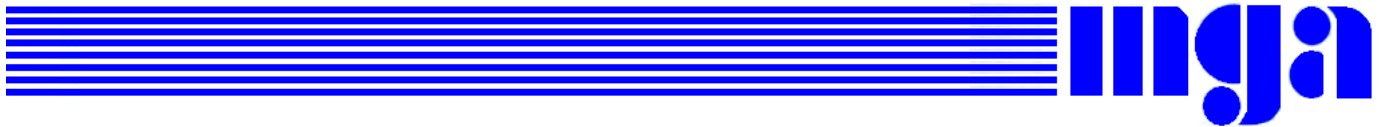
Comments: Environmental conditions during calibration: 71° F, 35% RH.
 No adjustments required. Calibrated temperature only per client request.

Karen Shipley
 Karen Shipley
 Calibration Technician

Issued: 5/6/08

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

AS 5/6/08



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: J22700	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 4/15/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0803
New DLR (100k , Units:G): 95.0
StdDeviation (%) 0.388
% Difference in DLR (New vs. Old): -1.175
Temperature (°F): 72
Humidity (%): 24

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: 4/15/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0803
New DLR (100k , Units:G): 108.7
StdDeviation (%) 0.547
% Difference in DLR (New vs. Old): -1.766
Temperature (°F): 72
Humidity (%): 24

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: 4/15/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0803
New DLR (100k , Units:G): 98.8
StdDeviation (%) 0.455
% Difference in DLR (New vs. Old): -0.641
Temperature (°F): 72
Humidity (%): 24

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 $k=2$.



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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: AHTB2	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 4/22/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0806

New DLR (100k , Units:G): 114.5

StdDeviation (%) 0.414

% Difference in DLR (New vs. Old): 0

Temperature (°F): 72

Humidity (%): 24

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 $k=2$.



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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: 4/22/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0806
New DLR (100k , Units:G): 92.4
StdDeviation (%) 0.309
% Difference in DLR (New vs. Old): -1.298
Temperature (°F): 72
Humidity (%): 24

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 $k=2$.



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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: 4/22/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0806

New DLR (100k , Units:G): 96.5

StdDeviation (%) 0.35

% Difference in DLR (New vs. Old): 0.045

Temperature (°F): 72

Humidity (%): 24

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 $k=2$.



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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: J35919	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 4/22/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0807

New DLR (100k , Units:G): 95.8

StdDeviation (%) 0.819

% Difference in DLR (New vs. Old): -1.64

Temperature (°F): 72

Humidity (%): 24

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 $k=2$.



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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: 4/22/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0807

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

StdDeviation (%) 1.153

% Difference in DLR (New vs. Old): -0.3

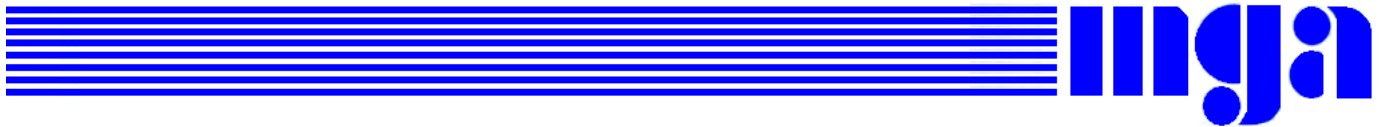
Temperature (°F): 72

Humidity (%): 24

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: 4/22/2008	Calibration Date: <i>7/20/2007</i>
	Calibrated By: <i>Chuck DiMaggio</i>

Test Reference Number: A0807

New DLR (100k , Units:G): 92.6

StdDeviation (%) 1.03

% Difference in DLR (New vs. Old): -1.352

Temperature (°F): 72

Humidity (%): 24

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 ~

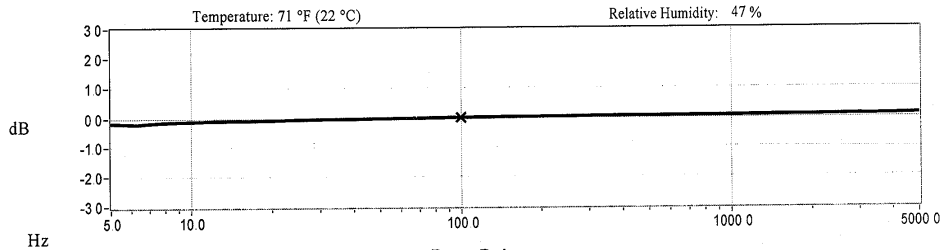
Per ISO 16063-21

Model Number: 301M09/484B (394M17 SYSTEM)
Serial Number: 862/2470 (MGA00739)
Description: ICP® Accelerometer **Method:** Back-to-Back Comparison Calibration
Manufacturer: PCB
 ACS-10

Calibration Data

Sensitivity @ 100.0 Hz 31.36 mV/g Output Bias 8.6 VDC
 (3.20 mV/m/s²) Transverse Sensitivity 3.0 %

Sensitivity Plot



Data Points

Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)
5.0	-2.0	REF. FREQ.	0.0	5000.0	1.2
10.0	-1.3	300.0	0.4		
15.0	-1.0	500.0	0.5		
30.0	-0.5	1000.0	0.6		
50.0	-0.3	3000.0	1.0		

Mounting Surface: Stainless Steel w/Silicone Grease Coating Fastener: Stud Mount Fixture Orientation: Vertical
 Acceleration Level (ms²): 10.0 g @ 1 ms²
 *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)² *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 822/274086 and PTB Traceable thru Project 1060
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 Date: 07/23/07



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

7/24/07
 CAL-3268027234.03

~Certificate of Calibration~

Model Number: 484B	PCB Control #: QC214/QC184/QC198/CA514
Serial Number: 2470	Calibration Date: 07/20/07
Description: Signal Conditioner	Recalibration Date:
Test Procedure: AT-106-1	Calibration Technician: James Higbee 2b 
Temperature: 71° F	Relative Humidity: 51%

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