FINAL REPORT NUMBER 201UI-MGA-08-02

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

TOYOTA MOTOR MANUFACTURING, TEXAS, INC.
2008 Toyota Tundra, Double Cab
NHTSA No. C85108

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: March 18-20, 2008
Report Date: April 11, 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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Approval Date: April 30, 2008

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 201UI-MGA-08-02	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 201 Compliance Testing of a 2008 Toyota Tundra, Double Cab, NHTSA No. C85108		5. Report Date April 11, 2008 6. Performing Organization Code MGA	
7. Author(s) Helen A. Kaleto, Project Manager Helen A. Kaleto, Project Engineer		8. Performing Organization Report No. 201UI-MGA-08-02	
9. Performing Organization Name and Address MGA Research Corporation 446 Executive Drive Troy, Michigan 48083		10. Work Unit No. 11. Contract or Grant No. DTNH22-04-C-11027	
12. Sponsoring Agency Name and Address U.S. Department Of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance 1200 New Jersey Avenue, SE West Building 4th Floor Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report 14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test series was conducted on the subject 2008 Toyota Tundra, Double Cab, NHTSA No. C85108, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201 compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on March 18-20, 2008. Test failures identified were as follows: None The data recorded indicates that the 2008 Toyota Tundra, Double Cab, tested appears to comply with the upper interior requirements of FMVSS 201.			
17. Key Words Compliance Testing Safety Engineering FMVSS 201UI 2008 Toyota Tundra, Double Cab		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division, Mail Code: NPO-410 1200 New Jersey Avenue, SE West Building Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 173	22. Price N/A

Form DOT F 1700.7 (8-69)

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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 Toyota Tundra, Double Cab, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on March 18-20, 2008 on a 2008 Toyota Tundra, Double Cab, manufactured by Toyota Motor Manufacturing, Texas, Inc.

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 Toyota Tundra, Double Cab, was equipped with A, B, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a fixed seat belt anchorage on each rear pillar, a grab handle located on the side rail above the front passenger door, assist handles located on the driver and passenger A and B-pillars, and an overhead console.

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	SR2B	UR3@Rear Side Rail Over Coat Hook
AP2	BP4	RH	UR4@SR2B
AP3	FH1	UR2@BPR	UR5@SR3-1

The 2008 Toyota Tundra, Double Cab, 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 Toyota Tundra, Double Cab

VEH. NHTSA NO.: C85108 VIN: 5TFRV54188X045778 COLOR: Silver Sky Metallic

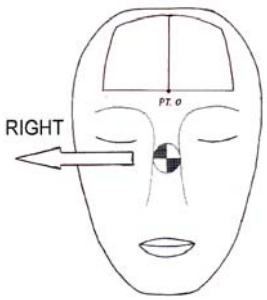
VEH. BUILD DATE: December, 2007 TEST DATES: March 18-20, 2008

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	111	25	18.9	510	456	24	1 Right
AP2	Left	196	10	17.8	350	243	39	10 Left
AP3	Right	163	42	18.7	373	274	7	2 Right
BP2	Left	270	4	23.3	598	572	7	2 Right
BP4	Right	153	-10	23.1	585	555	25	5 Right
FH1	Left	180	50	24.5	706	716	30	10 Left
SR2B	Left	270	49	19.2	553	513	24	1 Left
RH	Right	0	50	22.5	690	694	21	10 Left
UR2@BPR	Left	270	50	23.2	438	360	18	4 Left
UR3@Rear Side Rail Over Coat Hook	Left	270	44	23.5	397	306	25	4 Left
UR4@SR2B	Right	90	50	23.5	417	332	19	11 Left
UR5@SR3-1	Right	90	50	23.4	469	401	27	0

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.

AP3 Right: Grab handle displacement.

BP2 Left: D-Ring cover pushed in.

FH1 Left: Windshield broke.

RH Right: Headliner deformation. Trim around glass dented inward.

UR3@Rear Side Rail Over Coat Hook Left: Headliner deformation.

UR4@SR2B Right: Headliner deformation.

UR5@SR3-1 Right: Headliner deformation.

REMARKS:

The targets listed were impacted in the following order:

Left: AP2, FH1, SR2B, BP2, UR2@BPR, UR3@Rear Side Rail Over Coat Hook

Right: AP3, AP1, UR4@SR2B, BP4, UR5@SR3-1, RH

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: March 20, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Toyota Tundra, Double Cab

VEH. NHTSA NO.: C85108 VIN: 5TFRV54188X045778 COLOR: Silver Sky Metallic

VEH. BUILD DATE: December, 2007 TEST DATES: March 18-20, 2008

TEST LABORATORY: MGA Research Corporation

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

INTERIOR TRIM INFORMATION: A, B, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a fixed seat belt anchorage on each rear pillar, a grab handle located on the side rail above the front passenger door, assist handles located on the driver and passenger A and B-pillars, and an overhead console.

SUNROOF INFORMATION:

Installed:	_____Yes	_X_ No
Operation:	_____Electric	____ Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed:	_X_Yes	___ No

ROLL-BAR INFORMATION:

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

GENERAL INFORMATION:

Date Received: 01/14/08; Odometer Reading 11 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Toyota Motor Manufacturing, Texas, Inc.

Date of Manufacture: December, 2007; VIN: 5TFRV54188X045778

GVWR: 3125 kg; GAWR FRONT: 1765 kg;

GAWR REAR: 1855 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 210 kPa REAR: 230 kPa

Recommended Tire Size: P255/70R18

Recommended Cold Tire Pressure:

FRONT: 210 kPa REAR: 230 kPa

Size of Tire on Test Vehicle: P255/70R18

Type of Spare Tire: P255/70R18; Space Saver:__; Standard X

VEHICLE CAPACITY DATA:

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

Number of Occupants: Front 3; Rear 3; TOTAL 6

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 665 kg

No. of Occupants x 68 kg = 408 kg

Rated Cargo/Luggage Weight (RCLW) =257 kg (difference)

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

Right Front =	668.5 kg	Right Rear =	515.5 kg
Left Front =	701.0 kg	Left Rear =	535.0 kg
TOTAL FRONT =	1369.5 kg	TOTAL REAR =	1050.5 kg
% Total Weight =	56.6 %	% Total Weight =	43.4 %

TOTAL DELIVERED WEIGHT = 2420.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 2420.0 kg

Max. Test Cargo/Luggage Weight = 136.0 kg (136 kg max. limit)

Target Test Weight = 2556.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	668.0 kg	Right Rear =	585.0 kg
Left Front =	700.0 kg	Left Rear =	602.0 kg
TOTAL FRONT =	1368.0 kg	TOTAL REAR =	1187.0 kg
% Total Weight =	53.5 %	% Total Weight =	46.5 %

TOTAL TEST WEIGHT = 2555.0 kg

Weight of ballast secured in vehicle's cargo area = 134.7 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED:
Right Front 938 mm; Left Front 940 mm;
Right Rear 1016 mm; Left Rear 1027 mm;
Pitch Angle at Right Door Sill = 0.9 Rear is higher
Pitch Angle at Left Door Sill = 1.2 Rear is higher
Roll Angle at Front Bumper = 0.4 Left is higher
Roll Angle at Rear Bumper = 0.1 Left is higher

FULLY LOADED:
Right Front 938 mm; Left Front 940 mm;
Right Rear 1004 mm; Left Rear 1012 mm;
Pitch Angle at Right Door Sill = 0.6 Rear is higher
Pitch Angle at Left Door Sill = 0.9 Rear is higher
Roll Angle at Front Bumper = 0.4 Left is higher
Roll Angle at Rear Bumper = 0.2 Left is higher

AS TARGETED:
Right Front 1123 mm; Left Front 1115 mm;
Right Rear 1188 mm; Left Rear 1190 mm;
Pitch Angle at Right Door Sill = 0.8 Rear is higher
Pitch Angle at Left Door Sill = 1.0 Rear is higher
Roll Angle at Front Bumper = 0.4 Left is higher
Roll Angle at Rear Bumper = 0.2 Left is higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill =	0.6 Rear is higher
Pitch Angle at Left Door Sill =	1.0 Rear is higher
Roll Angle at Front Bumper =	0.4 Left is higher
Roll Angle at Rear Bumper =	0.2 Left is higher

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill =	0.8 Rear is higher
Pitch Angle at Left Door Sill =	1.0 Rear is higher
Roll Angle at Front Bumper =	0.4 Left is higher
Roll Angle at Rear Bumper =	0.2 Left is higher

VEHICLE WHEELBASE = 3700 mm

REMARKS: The seat travel distance was measured to be 240 mm for the driver front seat and 240 mm for the passenger front seat.

RECORDED BY: Louis Campbell DATE: March 17, 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 Toyota Tundra, Double Cab

VEH. NHTSA NO.: C85108 VIN: 5TFRV54188X045778 COLOR: Silver Sky Metallic

VEH. BUILD DATE: December, 2007 TEST DATES: March 18-20, 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 195º-255º	L 196.2º	L 249.3º
	R 105º-165º	R 110.5º	R 162.9º
B-PILLAR	L 195º-345º	L 206.7º	L 275.5º
	R 15º-165º	R 84.5º	R 153.3º

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Louis Campbell DATE: March 17, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Toyota Tundra, Double Cab

VEH. NHTSA NO.: C85108 VIN: 5TFRV54188X045778 COLOR: Silver Sky Metallic

VEH. BUILD DATE: December, 2007 TEST DATES: March 18-20, 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 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
	FH2	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
SIDE RAIL	SR1	L 0º-50º	L 0º	L 40º
		R 0º-50º	R 0º	R 42º
	SR2A	L 0º-50º	L 0º	L 49º
		R 0º-50º	R 0º	R 50º
	SR2B	L 0º-50º	L 0º	L 49º
		R 0º-50º	R 0º	R 50º
	SR3-1	L 0º-50º	L 0º	L 38º
		R 0º-50º	R 0º	R 36º
REAR HEADER	RH	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
A-PILLAR	AP1	L -5º-50º	L -5º	L 25º
		R -5º-50º	R -5º	R 25º
	AP2	L -5º-50º	L -5º	L 10º
		R -5º-50º	R -5º	R 11º

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
A-PILLAR	AP3	L -5º-50º	L -5º	L 40º
		R -5º-50º	R -5º	R 42º
B-PILLAR	BP1	L -10º-50º	L -10º	L 35º
		R -10º-50º	R -10º	R 36º
	BP2*	L 0º-50º	L 0º	L 4º
		R 0º-50º	R 0º	R 5º
	BP3	L -10º-50º	L -10º	L -4º
		R -10º-50º	R -10º	R -4º
	BP4	L -10º-50º	L -10º	L -10º
		R -10º-50º	R -10º	R -10º
REAR PILLAR	RP1	L -10º-50º	L -10º	L 22º
		R -10º-50º	R -10º	R 20º
	RP2*	L 0º-50º	L 0º	L 0º
		R 0º-50º	R 0º	R 0º
UPPER ROOF 1		0º-50º	0º	48º
UPPER ROOF 2		0º-50º	0º	50º
UPPER ROOF 3		0º-50º	0º	44º
UPPER ROOF 4		0º-50º	0º	50º
UPPER ROOF 5		0º-50º	0º	50º
UPPER ROOF 6		0º-50º	0º	49º

As determined using the Procedures specified in S8.13.4.2. *Targets BP2 and RP2 are seat belt anchorage locations.

RECORDED BY: Louis Campbell DATE: March 17, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Toyota Tundra, Double Cab

VEH. NHTSA NO.: C85108 VIN: 5TFRV54188X045778 COLOR: Silver Sky Metallic

VEH. BUILD DATE: December, 2007 TEST DATES: March 18-20, 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)	240 mm	240 mm
Tº	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	110.7º	--
A1º	360º - Tº	249.3º	--
Wº	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	196.2º	--
A2º	A2º = Wº	196.2º	--
Uº	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	275.5º	--
B1º	B1º = Uº	275.5º	--
Vº	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	206.7º	--
B2º	B2º = Vº	206.7º	--
Wº (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	162.9º
A1º (right)	A1º (right) = Wº (right)	--	162.9º
T º (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	249.5º
A2º (right)	360º-Tº (right)	--	110.5º
V º (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	153.3º
B1º (right)	B1º (right) = Vº (right)	--	153.3º
U º (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	84.5º
B2º (right)	B2º (right) = Uº (right)	--	84.5º
J	A-Pillar {(Plane 3) – (Plane 5)}	369.0 mm	375.2 mm
J/2	J ÷ 2	184.5 mm	187.6 mm
D1	Upper Roof {(Plane A) – (Plane B)}	1597.7 mm	
D1/2	D1 ÷ 2	798.9 mm	
D2	Upper Roof {(Plane C) – (Plane D)}	1426.8 mm	

Measurement	Description	Left Side	Right Side
D2/2	D2 ÷ 2	713.4 mm	
.35D1	.35 x D1	559.2 mm	
.35D2	.35 x D2	499.4 mm	
N	B-Pillar {(BPR) – (lowest point on daylight opening forward of B-Pillar)}	500.6 mm	501.3 mm
N/2	B-Pillar {(BP3) – (lowest point on daylight opening forward of B-Pillar)}	250.3 mm	250.7 mm
N/4	B-Pillar {(BP4) – (lowest point on daylight opening forward of B-Pillar)}	125.2 mm	125.3 mm
D	R-Pillar (Point 7 – Point M)	764.0 mm	764.0 mm
3D/7	3*D / 7	327.4 mm	327.4 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	-821.0	-463.5	-2250.4	-820.9	466.1	-2249.9
Rear	-27	-448.4	-2223.1	-26.8	451.2	-2222.5

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	2496.0	-465.0	1433.2	2496.0	465.0	1433.2
Rear	3290.5	-450.0	1445.0	3290.5	450.0	1445.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CG-F1	-901.0	-463.5	-1590.4	-900.9	466.1	-1589.9
CG-F2	-661.0	-463.5	-1590.4	-660.9	466.1	-1589.9
CG-R	133.0	-448.4	-1563.1	133.2	451.2	-1562.5
3rd Row	-3126.6	0.8	-3072.5	-3126.6	0.8	-3072.5

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Driver door striker upper bolt hole (x, y, z) = 2668.8, -901.7, 1593.5

Passenger door striker upper bolt hole (x, y, z) = 2668.8, 901.7, 1593.5

Driver seat front outboard anchorage bolt hole (x, y, z) = 2118.1, -682.0, 1108.1

REMARKS:

RECORDED BY: Louis Campbell DATE: March 17, 2008

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2008 Toyota Tundra, Double Cab

VEH. NHTSA NO.: C85108 VIN: 5TFRV54188X045778 COLOR: Silver Sky Metallic

VEH. BUILD DATE: December, 2007 TEST DATES: March 18-20, 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	2135.2	-629.2	2229.9	--	--	Yes	--	--
REL	2160.6	-659.9	2202.9	249	25	--	2	No
AP2	2072.4	-687.0	2143.9	196	10	No	--	Yes
AP3	1970.6	-664.4	2049.1	196	40	No	--	No
A-Pillar Right Side								
AP1	2135.8	630.5	2230.0	--	--	Yes	--	--
REL	2163.3	663.2	2204.2	111	25	--	2	Yes
AP2	2071.9	687.9	2143.7	163	11	No	--	No
AP3	1960.0	663.3	2046.9	163	42	No	--	Yes
B-Pillar Left Side								
BP1	2764.9	-572.9	2287.9	270	35	No	--	No
BP2	2740.9	-716.8	2066.8	270	4	No	--	Yes
BP3	2690.2	-740.5	2039.9	270	-4	No	--	No
BP4	2821.7	-789.6	1913.3	207	-10	No	--	No
B-Pillar Right Side								
BP1	2765.8	575.4	2289.0	90	36	No	--	No
BP2	2744.9	718.9	2069.4	90	5	No	--	No
BP3	2691.2	745.8	2038.9	90	-4	No	--	No
BP4	2823.3	795.7	1911.2	153	-10	No	--	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					
Rear Pillar Left Side								
RP1	3429.5	-598.4	2247.7	275	22	No	--	No
RP2	3557.1	-685.1	2083.8	270	0	No	--	No
Rear Pillar Right Side								
RP1	3430.3	602.0	2247.2	85	20	No	--	No
RP2	3537.8	703.6	2088.9	90	0	No	--	No
Front Header Left Side								
FH1	2058.1	-515.9	2238.0	180	50	No	--	Yes
FH2	2037.9	-364.5	2246.8	180	50	No	--	No
Front Header Right Side								
FH1	2059.4	516.8	2239.0	180	50	No	--	No
FH2	2038.5	368.3	2247.2	180	50	No	--	No
Side Rail Left Side								
SR1	2285.0	-603.9	2259.5	270	40	No	--	No
SR2A	2435.3	-596.0	2274.4	270	49	No	--	No
SR2B	2463.7	-595.8	2275.5	270	49	No	--	Yes
SR3-1	2915.4	-595.2	2279.8	270	38	No	--	No
Side Rail Right Side								
SR1	2286.3	606.9	2261.9	90	42	No	--	No
SR2A	2436.4	605.4	2291.4	--	--	Yes	--	--
REL	2436.8	581.6	2280.4	90	50	--	1	No
SR2B	2465.8	606.3	2292.5	--	--	Yes	--	--
REL	2464.8	582.3	2282.7	90	50	--	1	No
SR3-1	2916.1	595.8	2281.8	90	36	No	--	No
Rear Header Left Side								
RH	3463.4	-447.9	2299.8	0	50	No	--	No
Rear Header Right Side								
RH	3464.0	452.1	2299.2	0	50	No	--	Yes

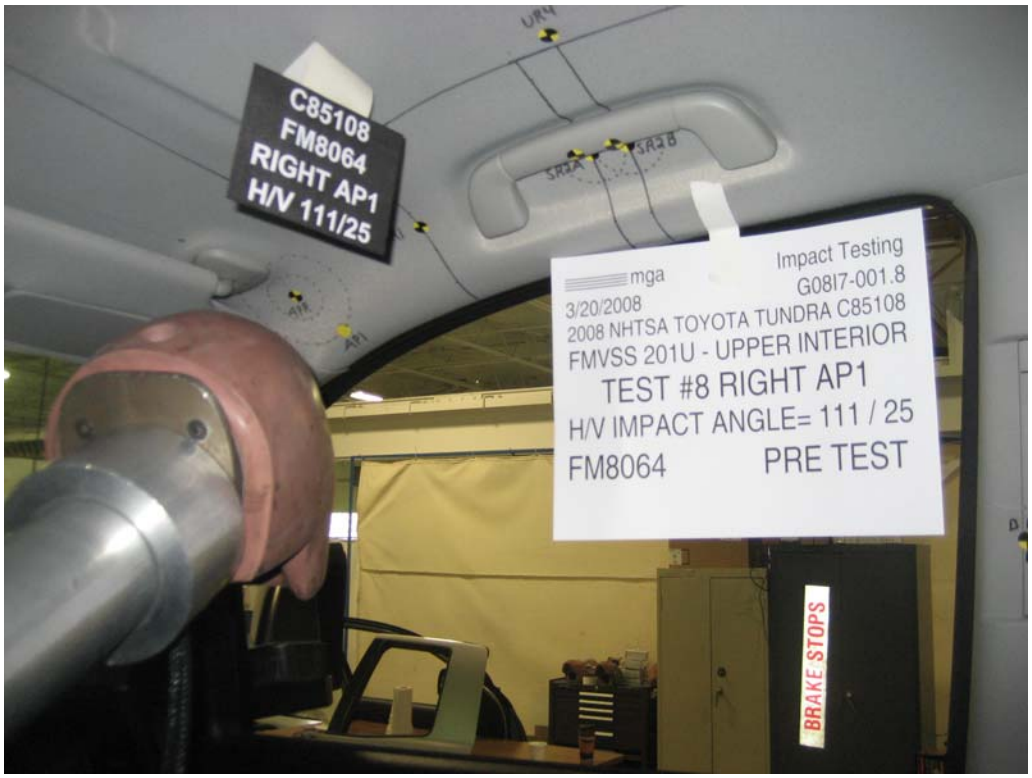
SUMMARY OF TARGETING RESULTS								
Target	**Location (mm)**			**Horizontal Angle (deg)**	**Vertical Angle (deg)**	**Relocation (Yes/No)**	**Extension (# of 25 mm Spheres)**	**Impact (Yes/No)**
	x	**y**	**z**					
Upper Roof Left Side								
UR1@SR1	2355.4	-487.1	2302.0	270	48	No	--	No
UR2@BPR	2766.6	-487.4	2318.7	270	50	No	--	Yes
UR3@Rear Side Rail Over Coat Hook	3121.9	-487.2	2327.8	270	44	No	--	Yes
Upper Roof Right Side								
UR4@SR2B	2466.5	491.0	2321.8	90	50	No	--	Yes
UR5@SR3-1	2942.4	489.6	2327.9	90	50	No	--	Yes
UR6@RCNR	3311.7	491.9	2318.8	90	49	No	--	No

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

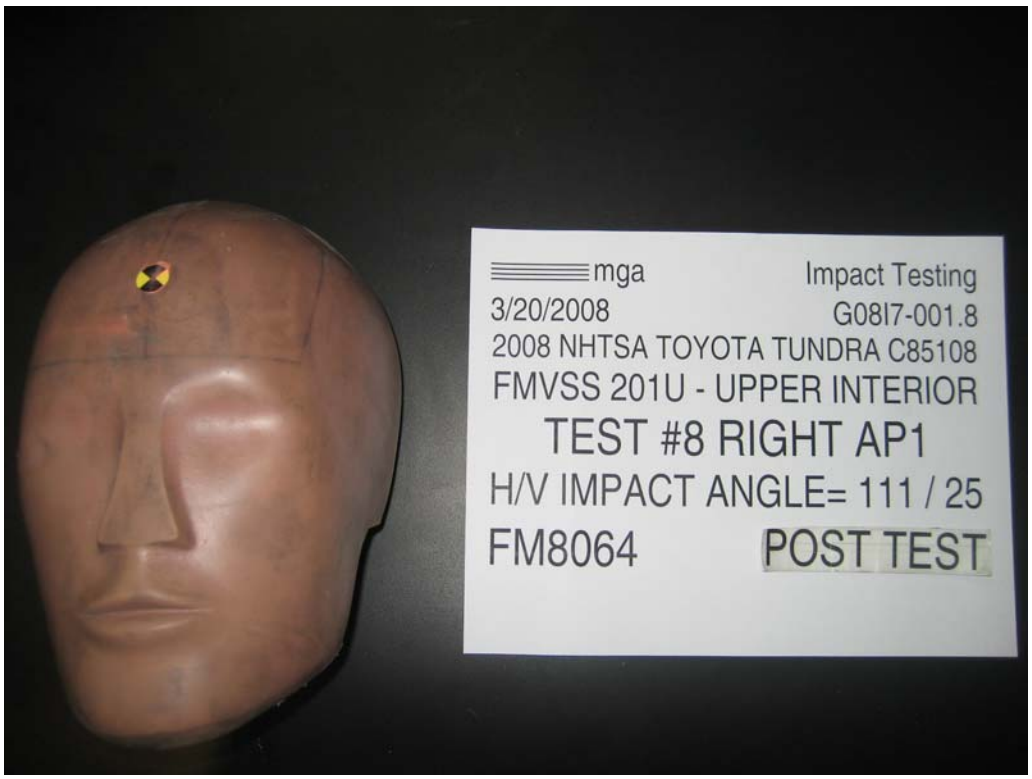
RECORDED BY: Louis Campbell DATE: March 17, 2008

APPROVED BY: Helen A. Kaleto

3.0 TEST DATA (Including Acceleration and Velocity Plots)




C85108
FM8064
RIGHT AP1
H/V 111/25
SR2A
SR2B
mga
Impact Testing
G08I7-001.8
3/20/2008
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP1
H/V IMPACT ANGLE= 111 / 25
FM8064
POST TEST


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP1
H/V IMPACT ANGLE= 111 / 25
FM8064
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#8

Target (Vehicle Side): AP1Right

Temperature:22C

MGA Test Reference No.:FM8064

Humidity:21%

Approach Horizontal Angles:111º

Time of Test:9:59:52 AM

Approach Vertical Angles:25º

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
510	456	3.3	18.9	24	1 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

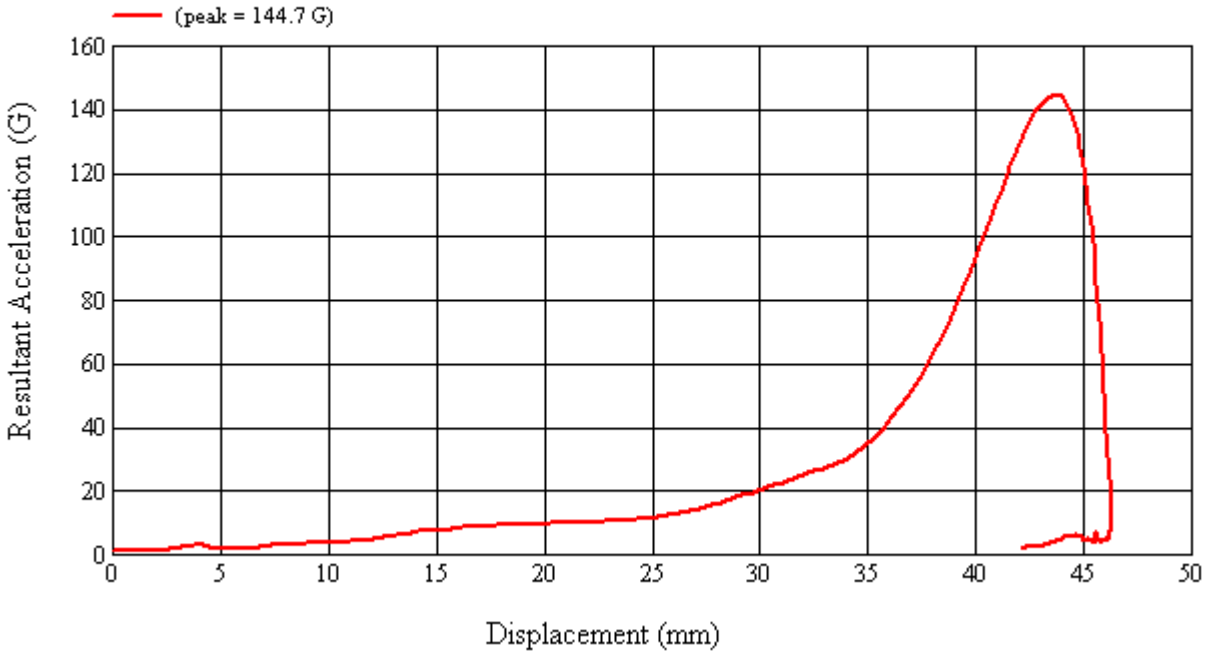
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

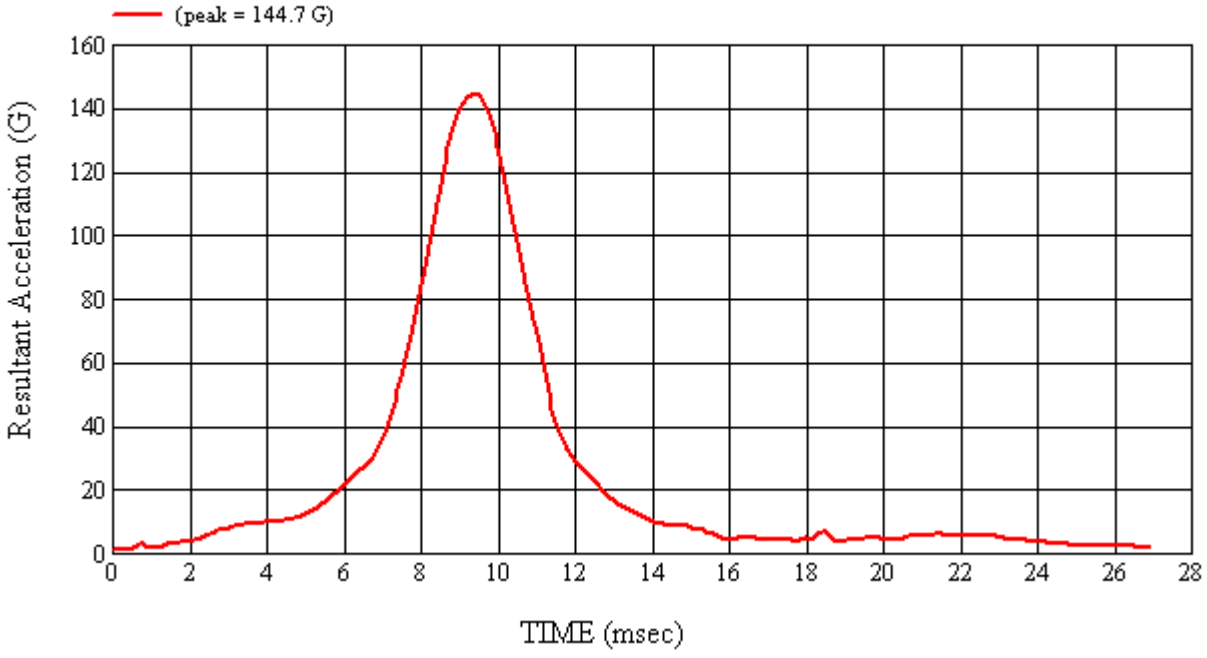
No visible damage.

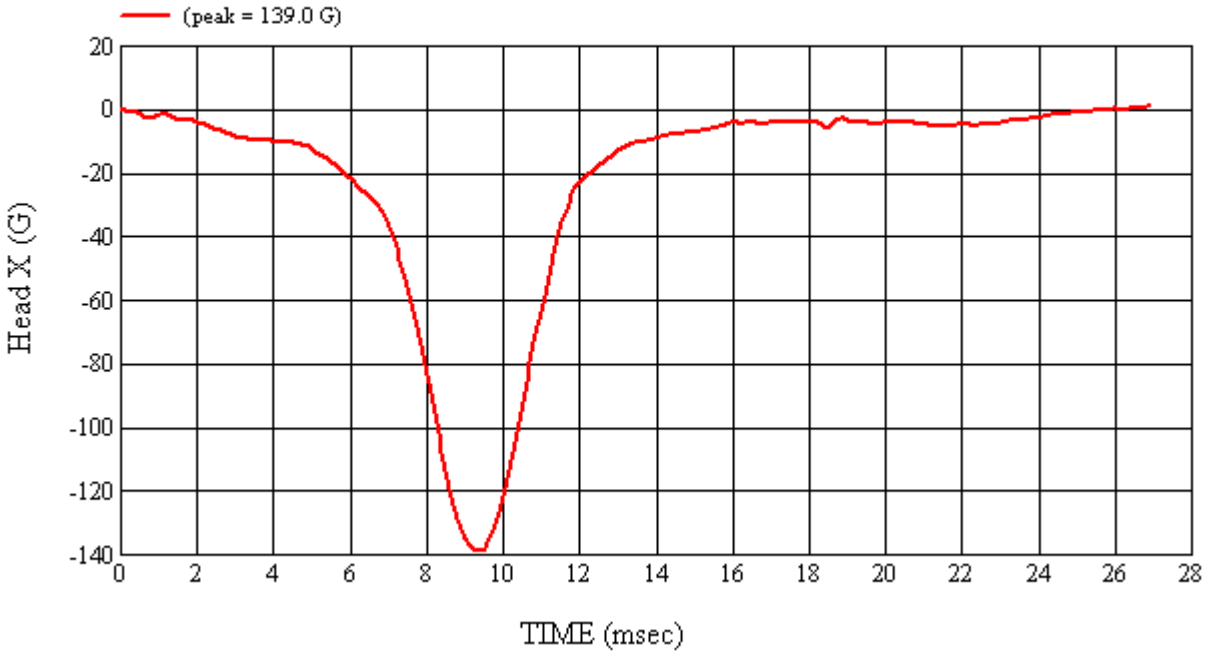
Recorded By: _____ Approved By*: _____ Date: 3/20/2008

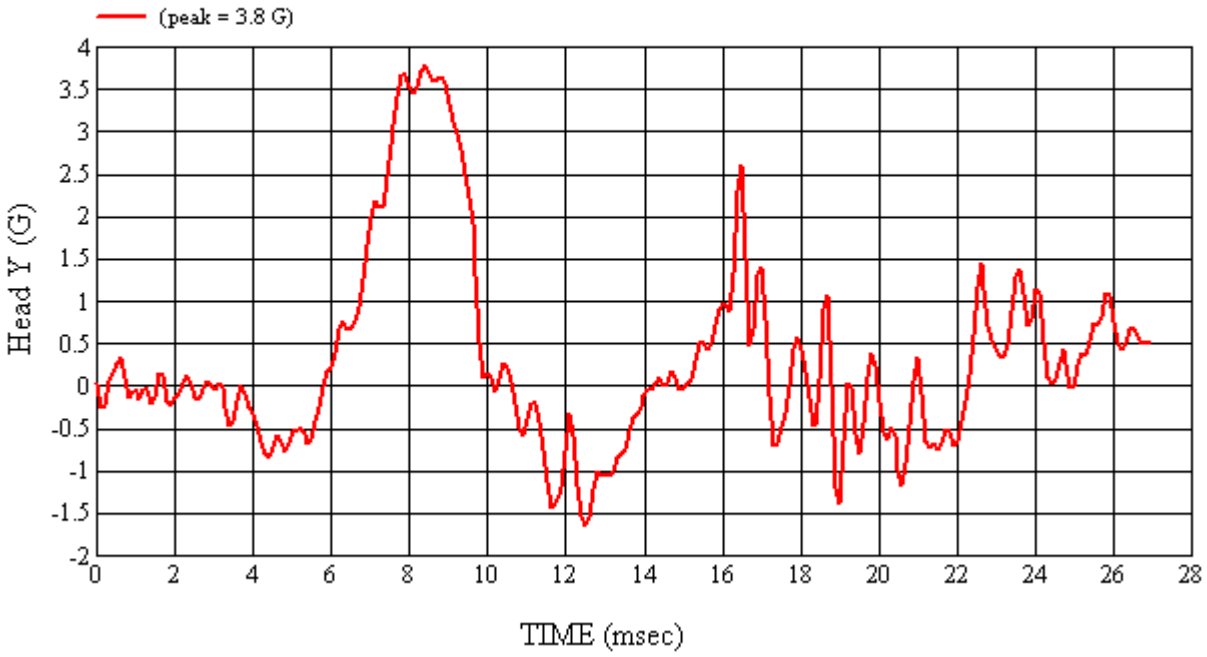
*Only necessary for NHTSA (Government) Compliance testing.

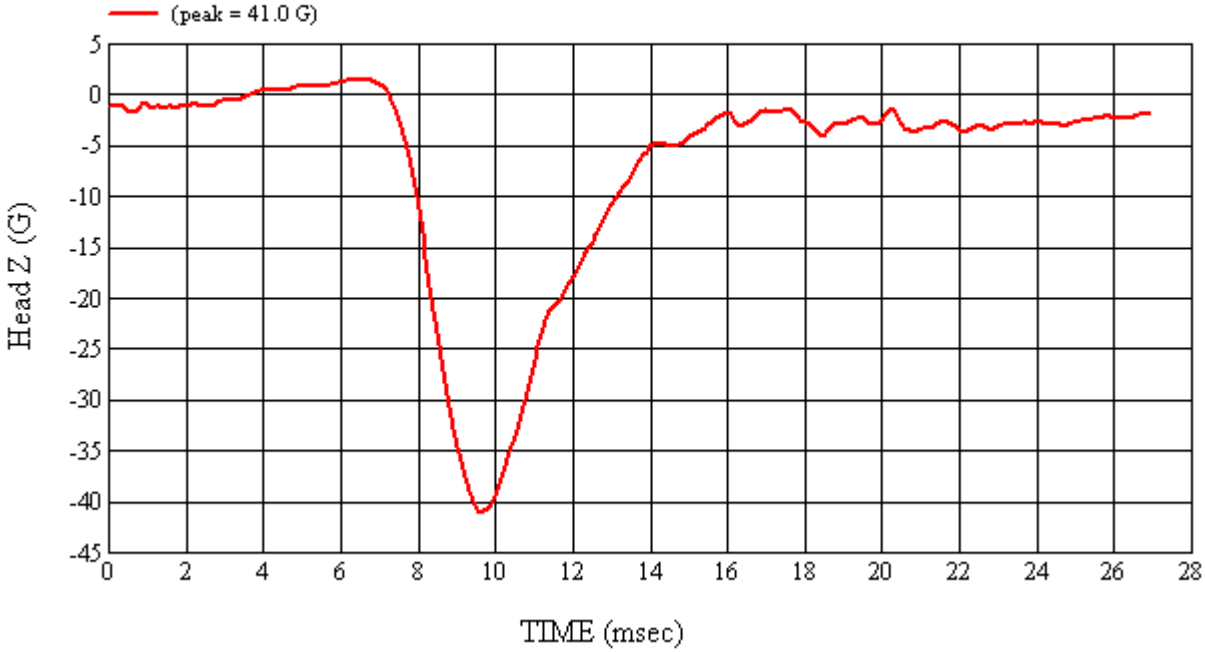
MGA Test #: FM8064 Target Location: AP1, Right Side Test Date: 3/20/2008

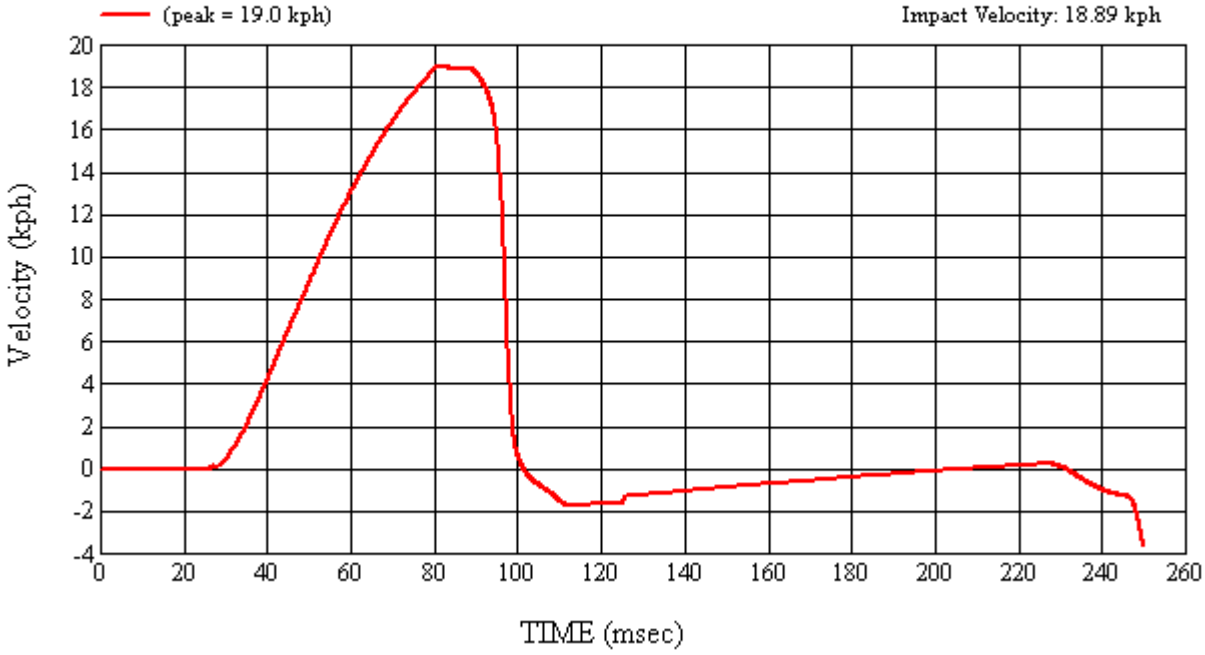





(peak = 139.0 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


(peak = 3.8 G)
Head Y (G)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


(peak = 41.0 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


(peak = 19.0 kph)
Impact Velocity: 18.89 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

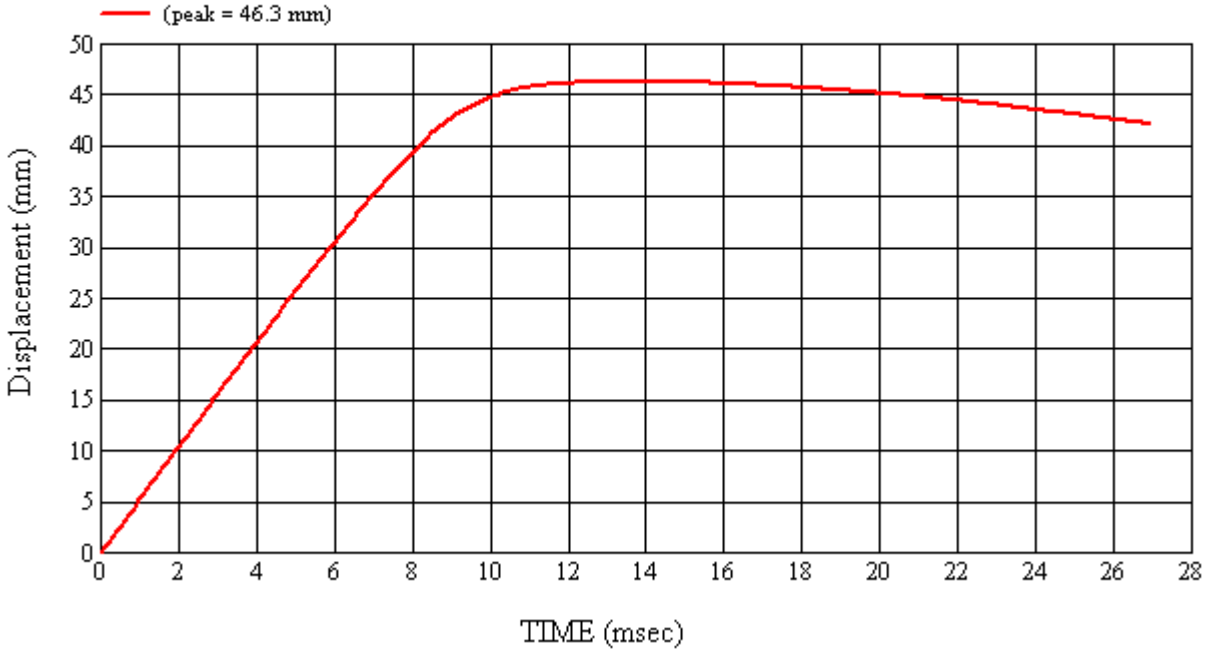
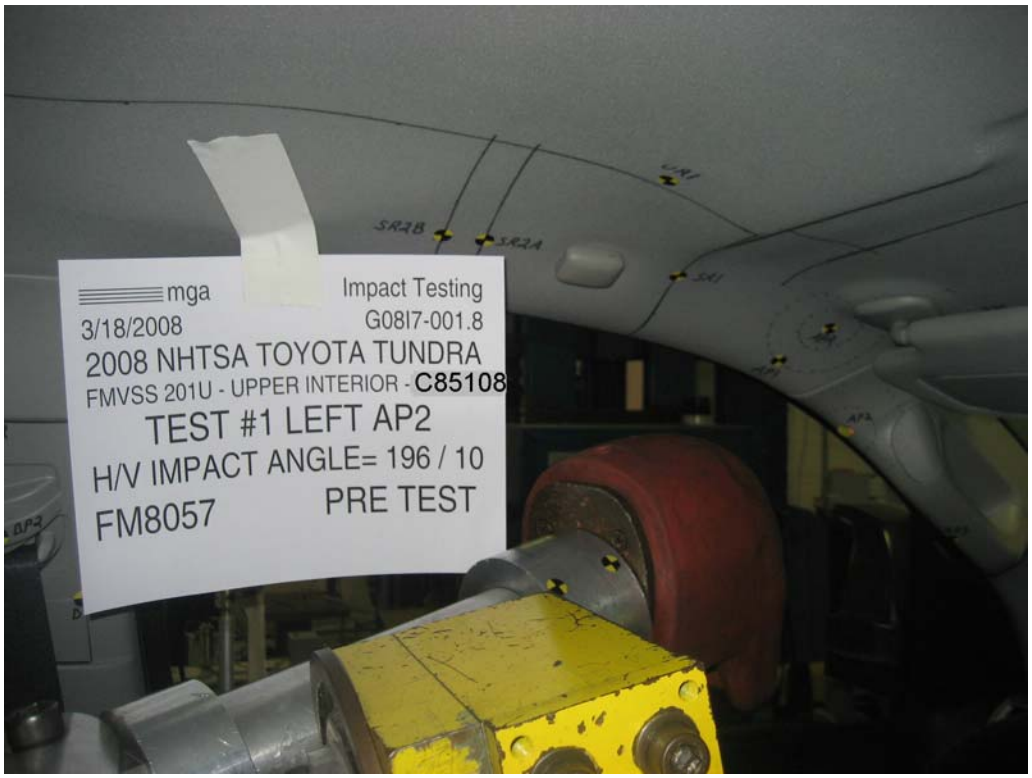


Figure 14 Test #FM8064


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA
FMVSS 201U - UPPER INTERIOR - C85108
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 196 / 10
FM8057
PRE TEST


mga
3/18/2008
Impact Testing
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA
FMVSS 201U - UPPER INTERIOR - C85108
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 196 / 10
FM8057
POST TEST


mga
3/18/2008
Impact Testing
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA
FMVSS 201U - UPPER INTERIOR - C85108
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 196 / 10
FM8057
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): AP2Left

Temperature:23C

MGA Test Reference No.:FM8057

Humidity:32%

Approach Horizontal Angles:196º

Time of Test:1:47:41 PM

Approach Vertical Angles:10º

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
350	243	7.5	17.8	39	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	0.86
Y	6	J35919	97.442	0.84	0.84
Z	7	J35924	93.891	1.83	1.83

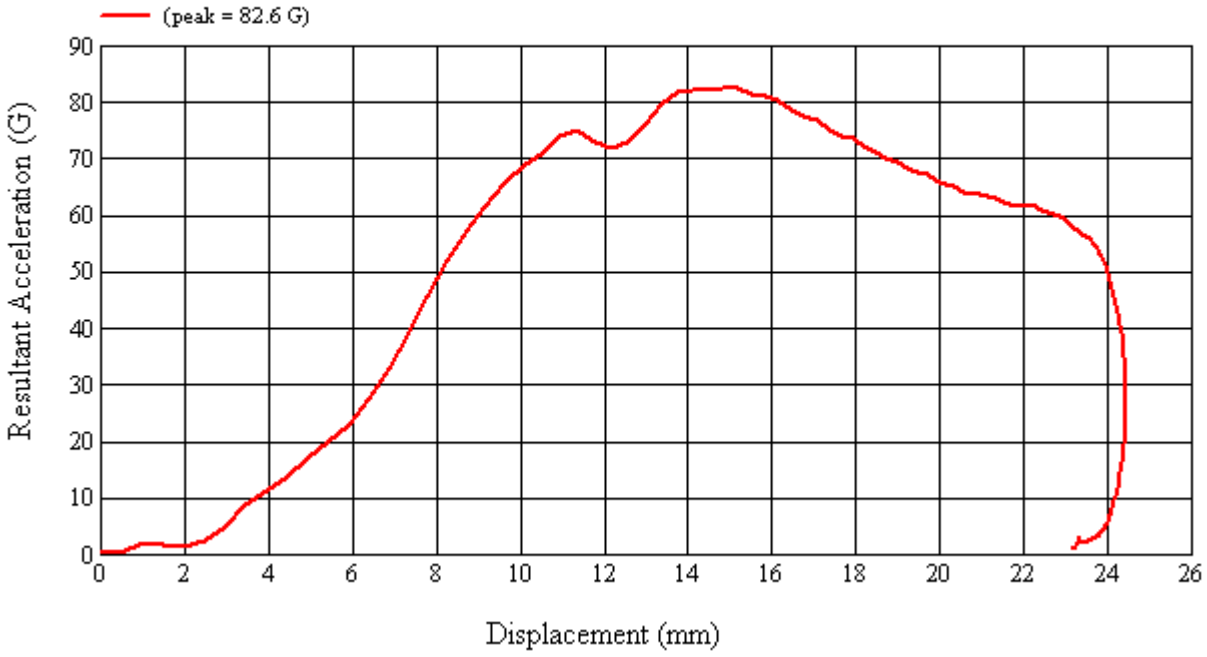
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

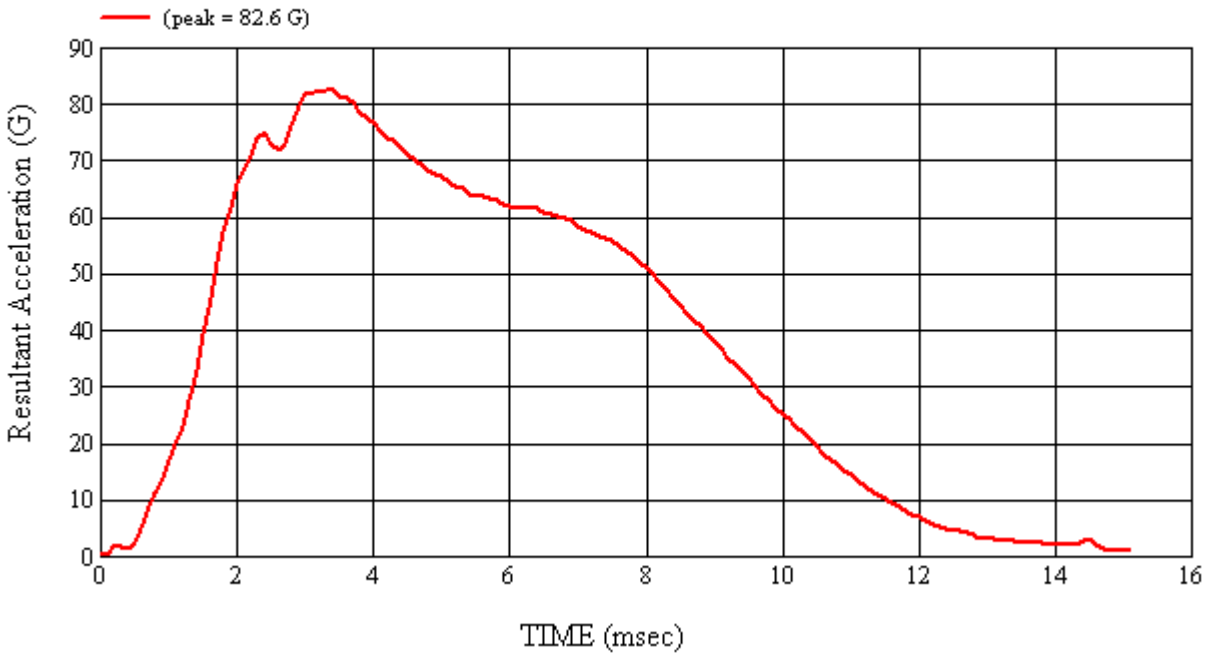
No visible damage.

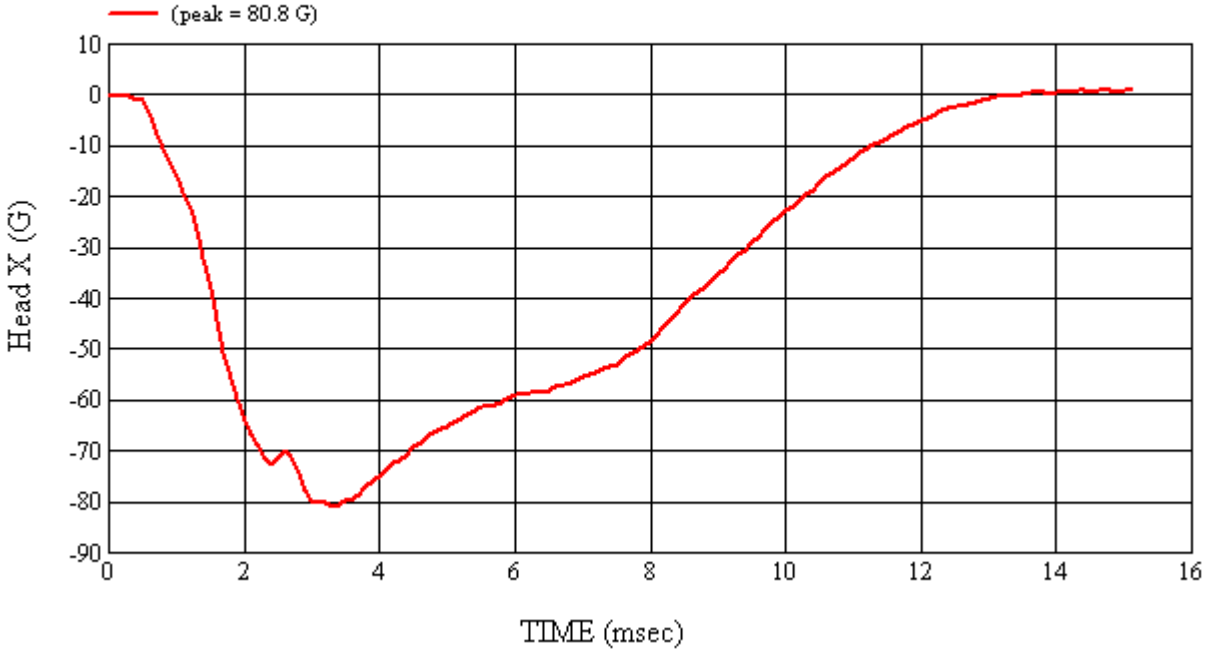
Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 3/18/2008

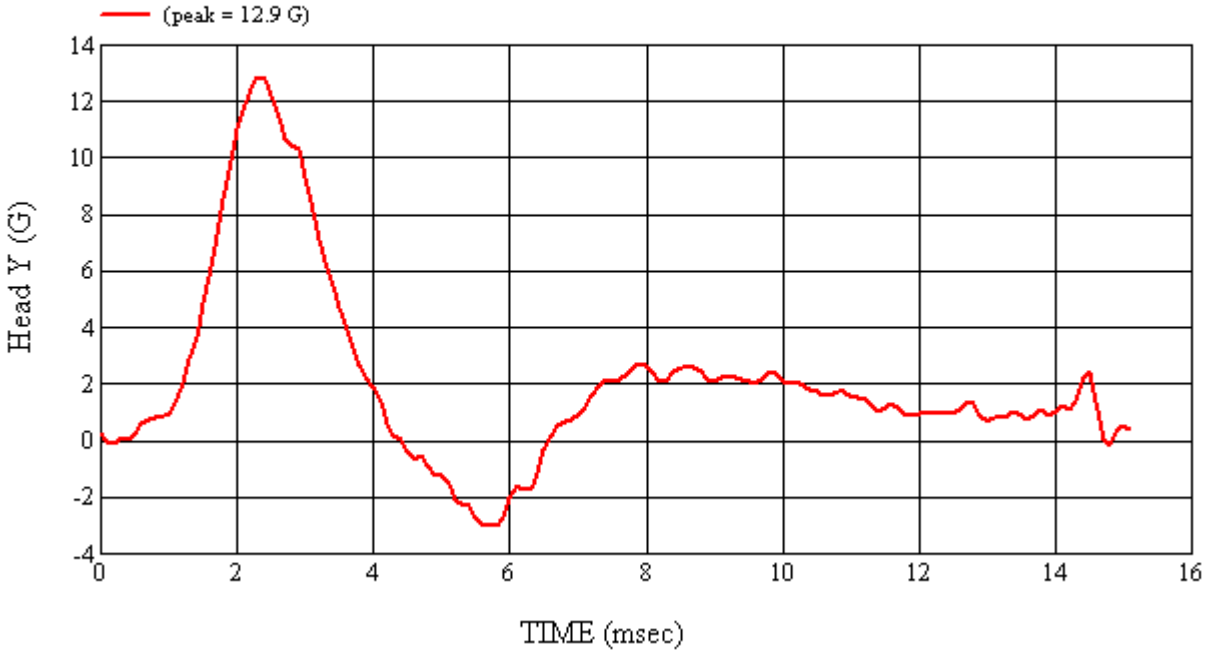
*Only necessary for NHTSA (Government) Compliance testing.

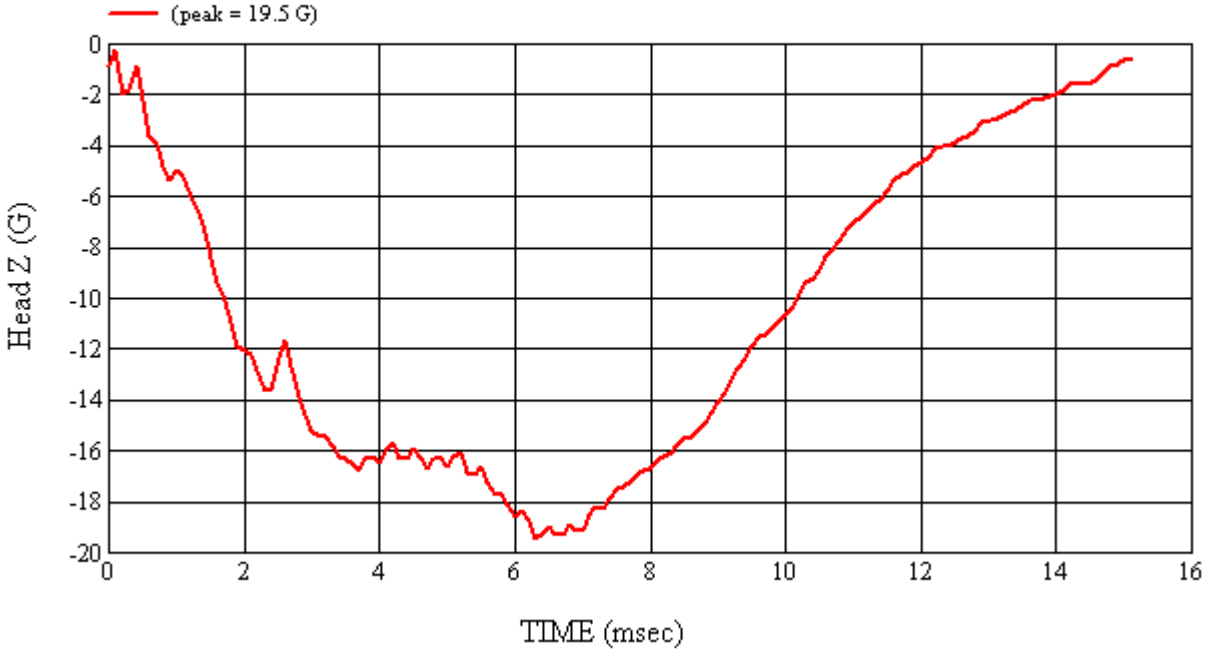
MGA Test #: FM8057 Target Location: AP2, Left Side Test Date: 3/18/2008

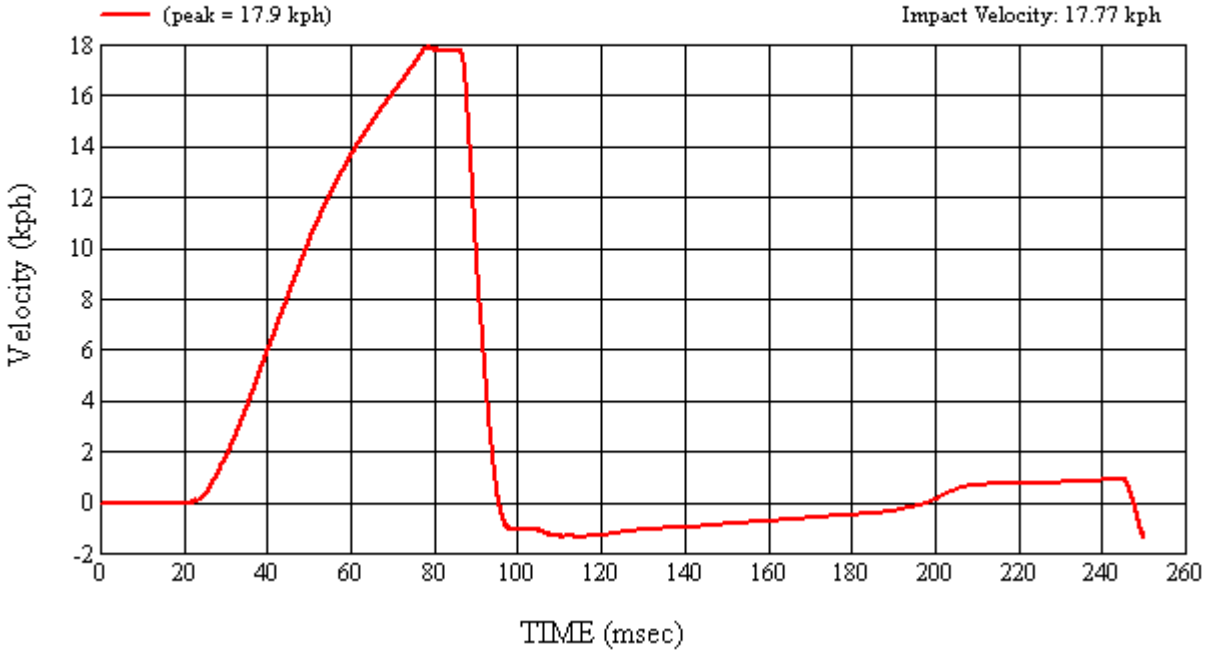


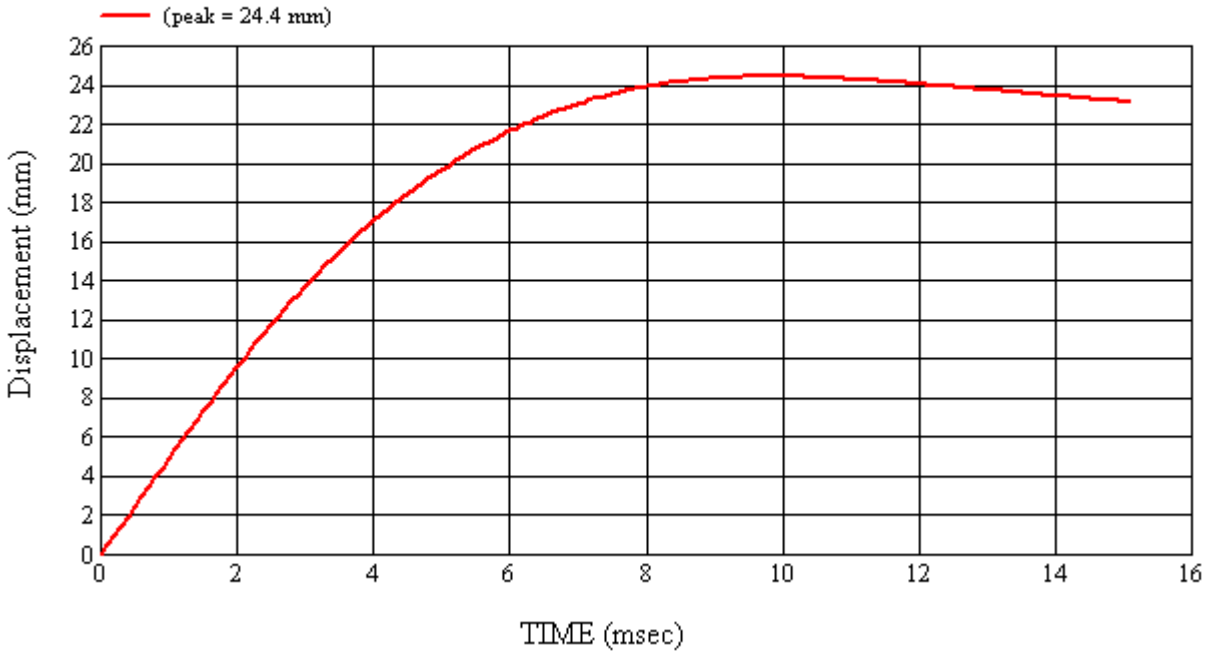



(peak = 80.8 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
TIME (msec)

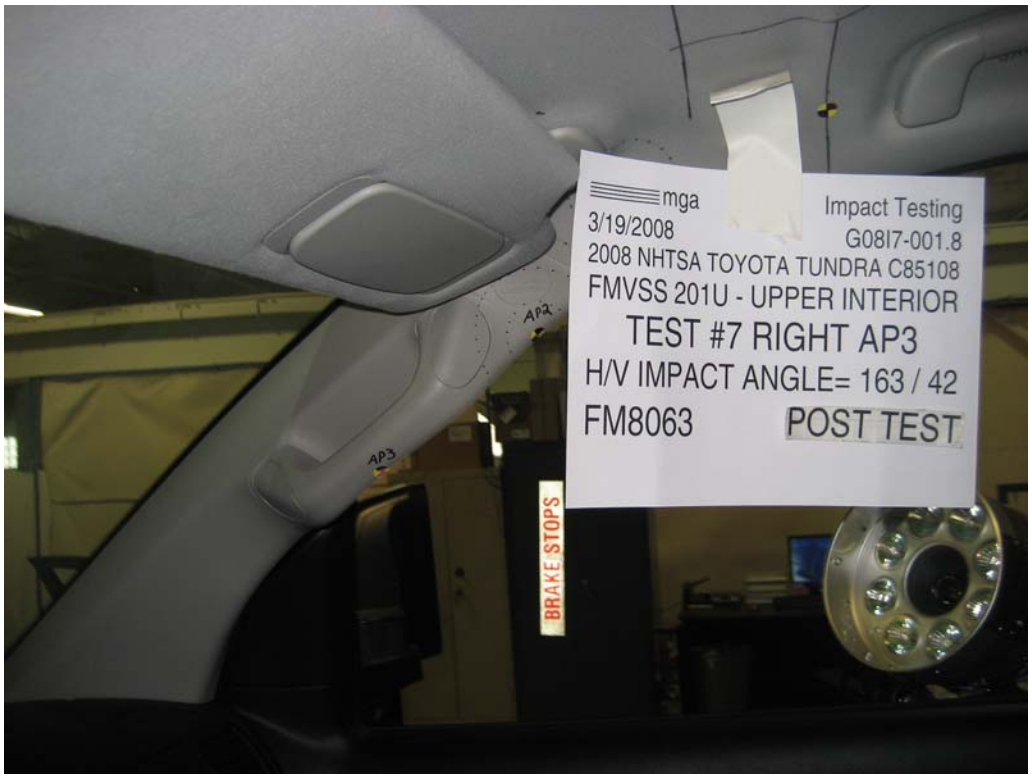

(peak = 12.9 G)
Head Y (G)
14
12
10
8
6
4
2
0
-2
-4
0
2
4
6
8
10
12
14
16
TIME (msec)


(peak = 19.5 G)
Head Z (G)
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
0
2
4
6
8
10
12
14
16
TIME (msec)


(peak = 17.9 kph)
Impact Velocity: 17.77 kph
Velocity (kph)
18
16
14
12
10
8
6
4
2
0
-2
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 24.4 mm)
Displacement (mm)
TIME (msec)
0
2
4
6
8
10
12
14
16
18
20
22
24
26


mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT AP3
H/V IMPACT ANGLE= 163 / 42
FM8063
PRE TEST
AP3


mga
3/19/2008
Impact Testing
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT AP3
H/V IMPACT ANGLE= 163 / 42
FM8063
POST TEST
AP2
AP3
BRAKE STOPS


mga
3/19/2008
Impact Testing
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT AP3
H/V IMPACT ANGLE= 163 / 42
FM8063
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): AP3Right

Temperature:22C

MGA Test Reference No.:FM8063

Humidity:30%

Approach Horizontal Angles:163º

Time of Test:5:05:06 PM

Approach Vertical Angles:42º

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
373	274	9.2	18.7	7	2 Right

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

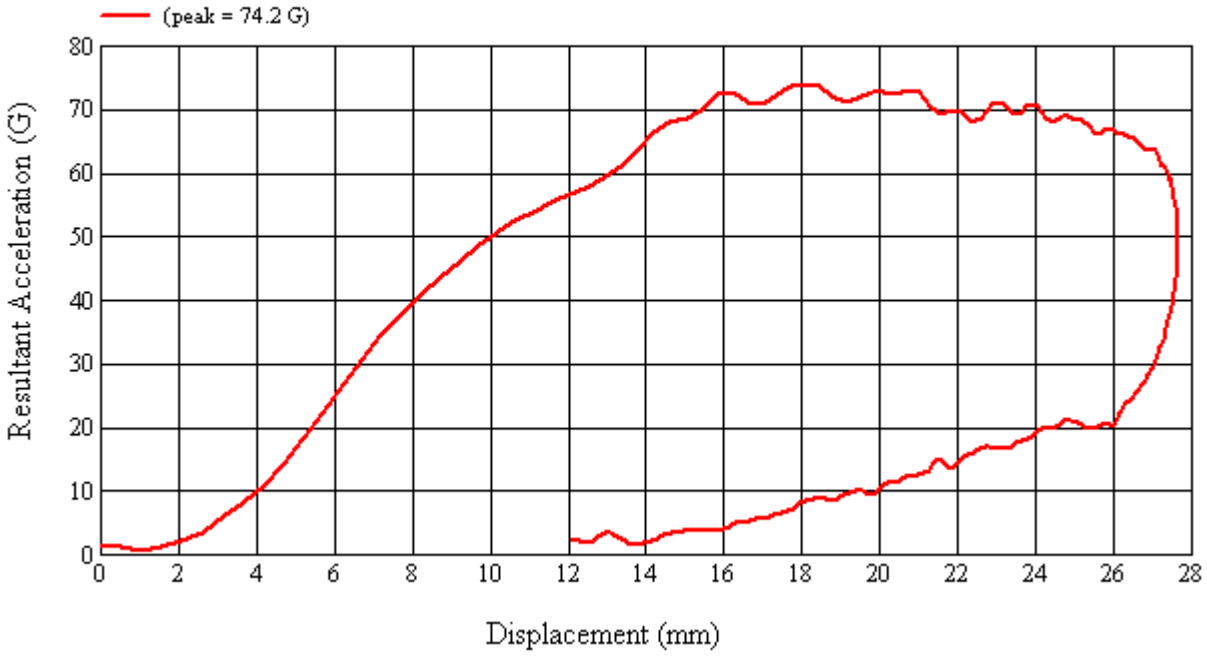
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

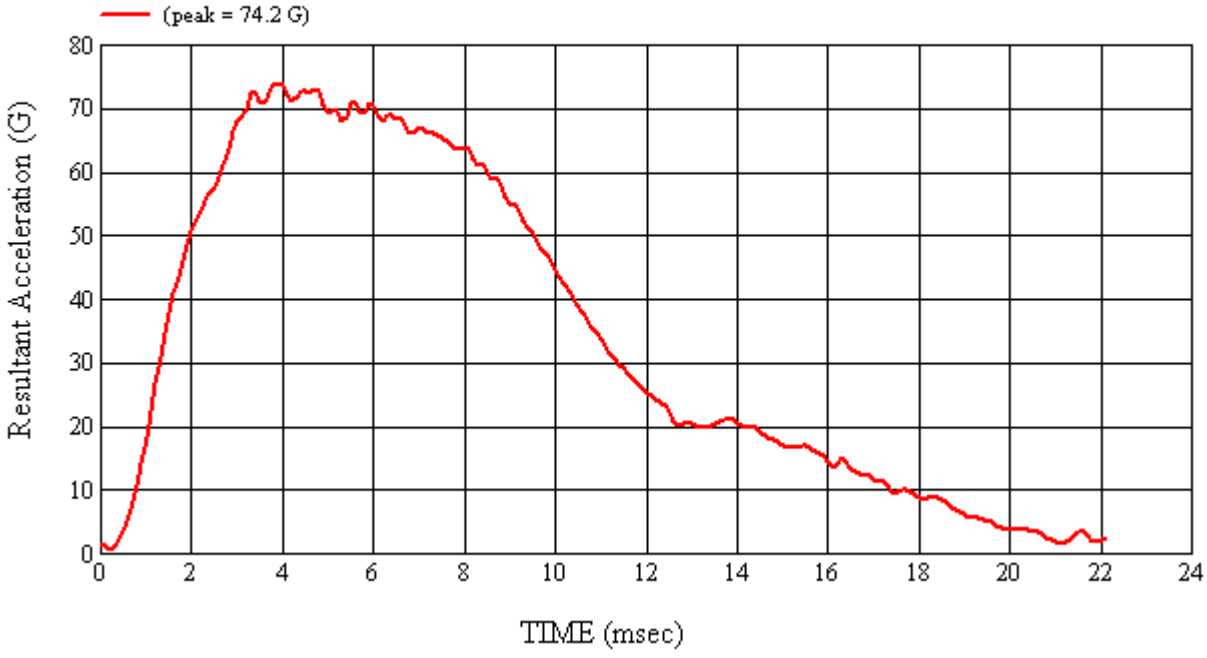
Grab handle displacement.

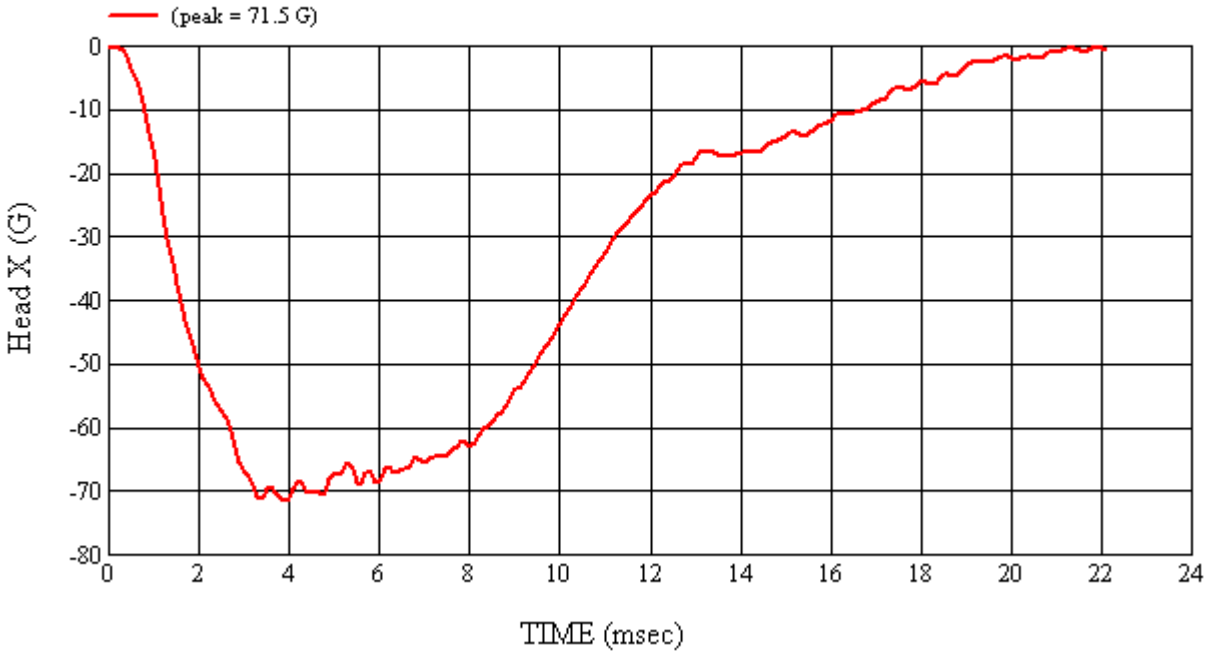
Recorded By: _____ Approved By*: _____ Date: 3/19/2008

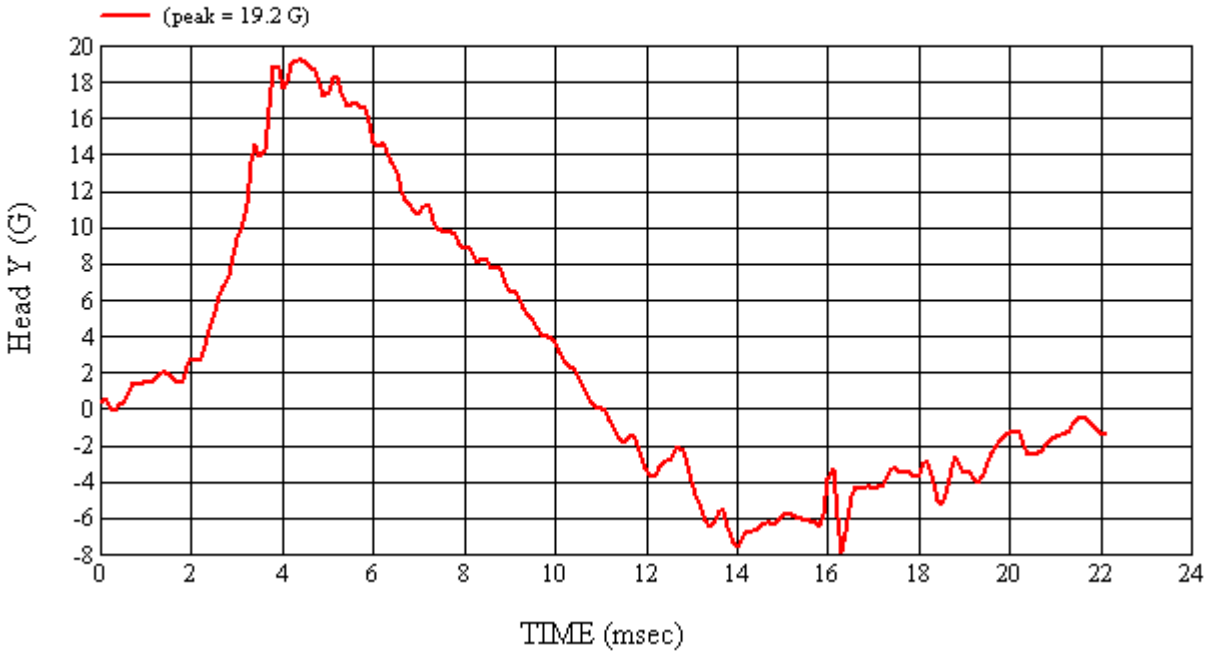
*Only necessary for NHTSA (Government) Compliance testing.

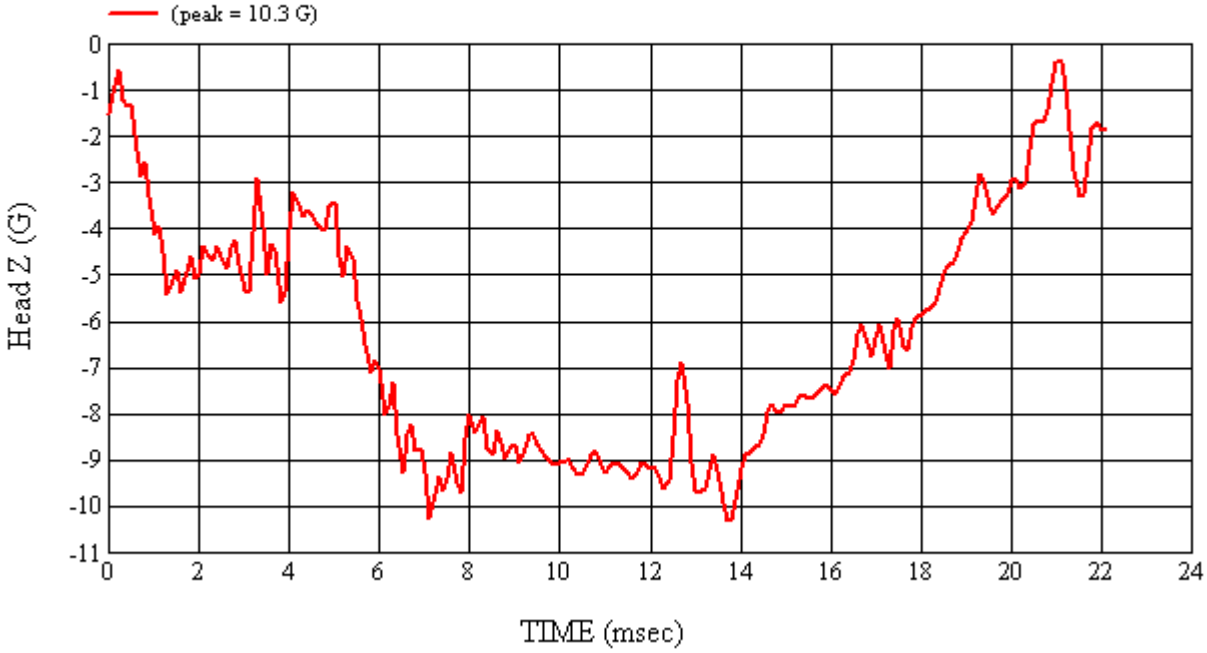
MGA Test #: FM8063 Target Location: AP3, Right Side Test Date: 3/19/2008

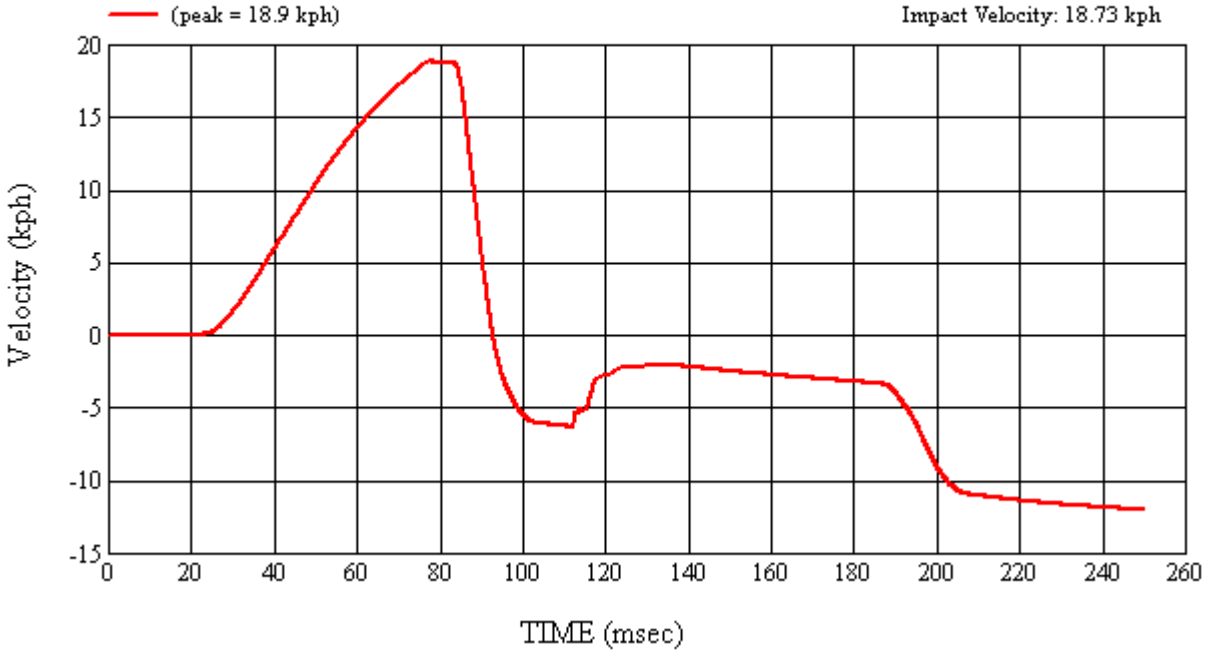


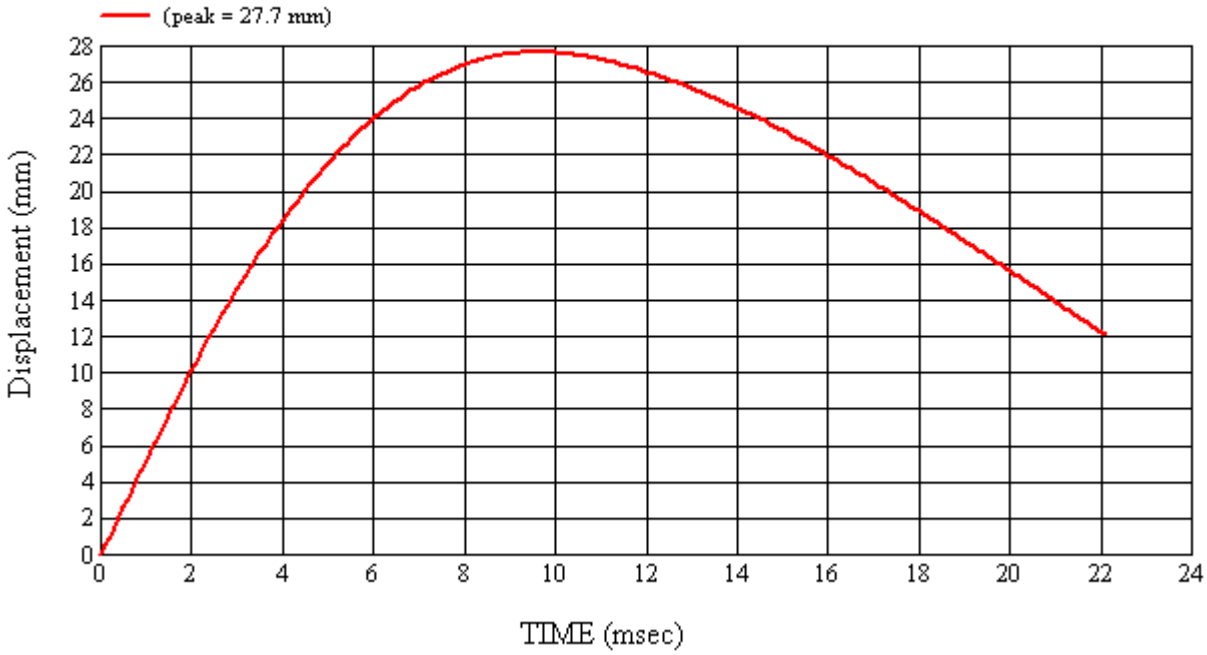


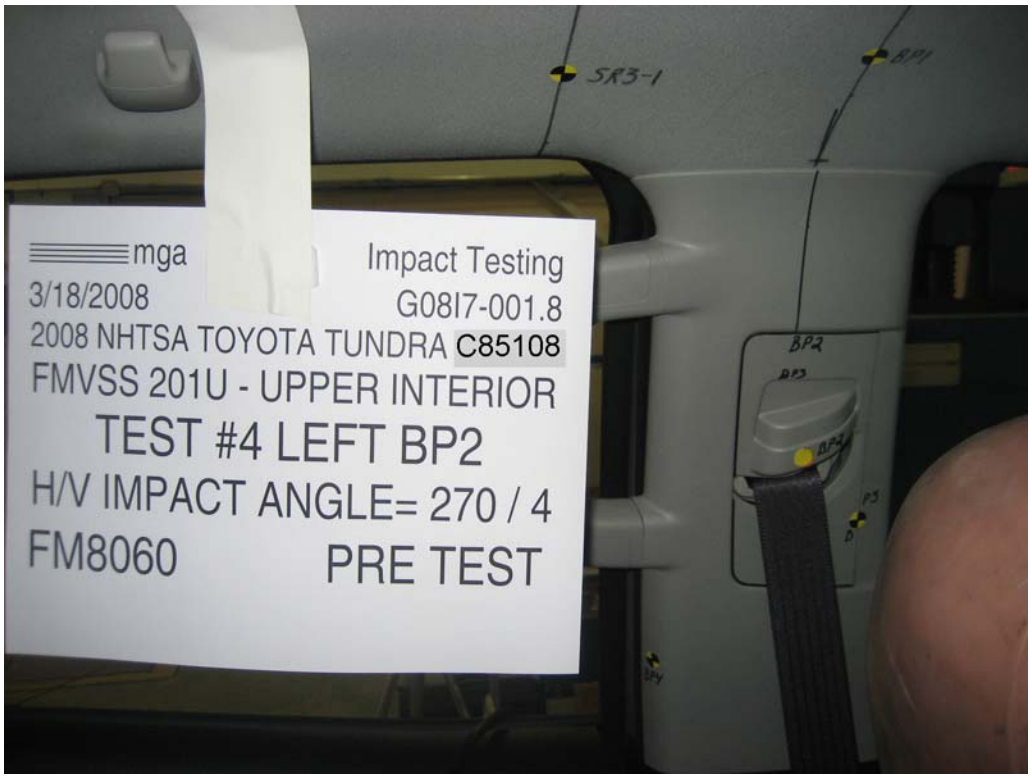

(peak = 71.5 G)
Head X (G)
0
-10
-20
-30
-40
-50
-60
-70
-80
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

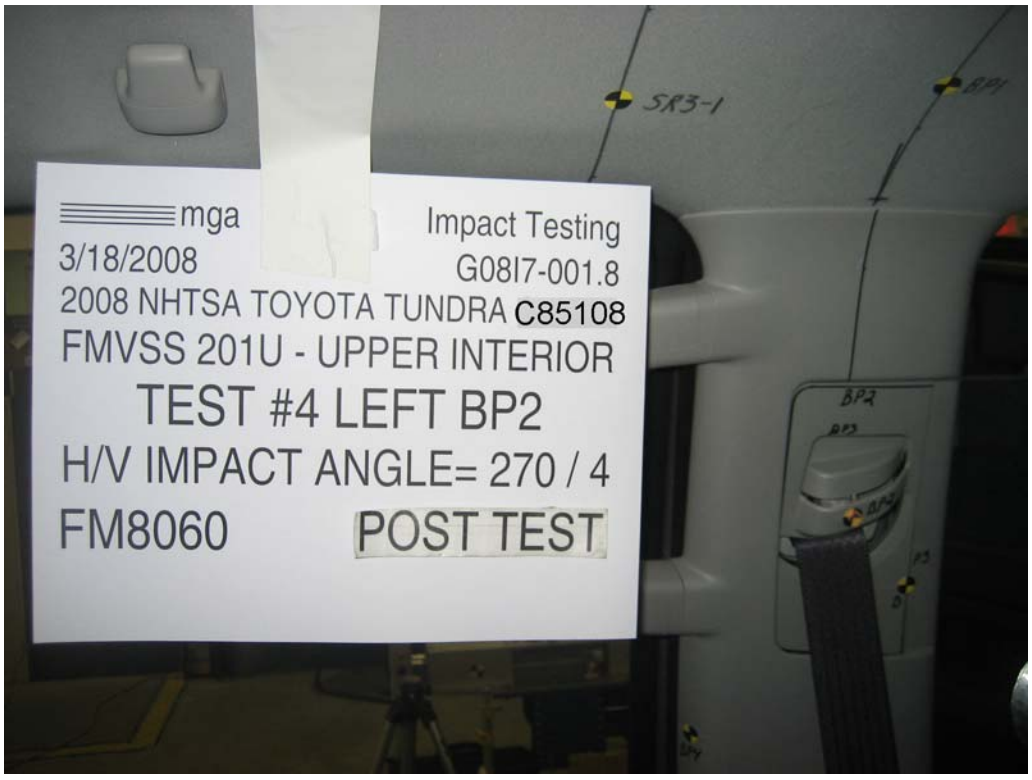

(peak = 19.2 G)
Head Y (G)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 10.3 G)
Head Z (G)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 18.9 kph)
Impact Velocity: 18.73 kph
Velocity (kph)
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 27.7 mm)
Displacement (mm)
TIME (msec)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28


SR3-1
BP1
BP2
mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT BP2
H/V IMPACT ANGLE= 270 / 4
FM8060
PRE TEST


SR3-1
mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT BP2
H/V IMPACT ANGLE= 270 / 4
FM8060
POST TEST


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT BP2
H/V IMPACT ANGLE= 270 / 4
FM8060
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): BP2Left

Temperature:23C

MGA Test Reference No.:FM8060

Humidity:34%

Approach Horizontal Angles:270º

Time of Test:4:52:17 PM

Approach Vertical Angles:4º

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
598	572	6.4	23.3	7	2 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

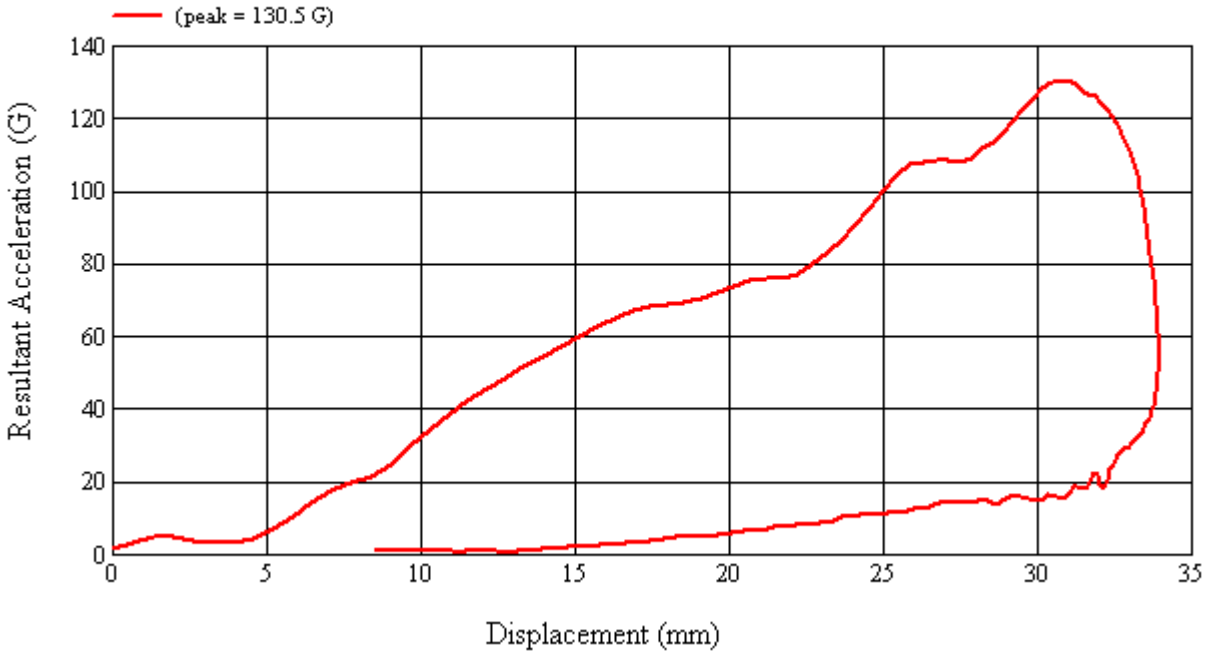
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

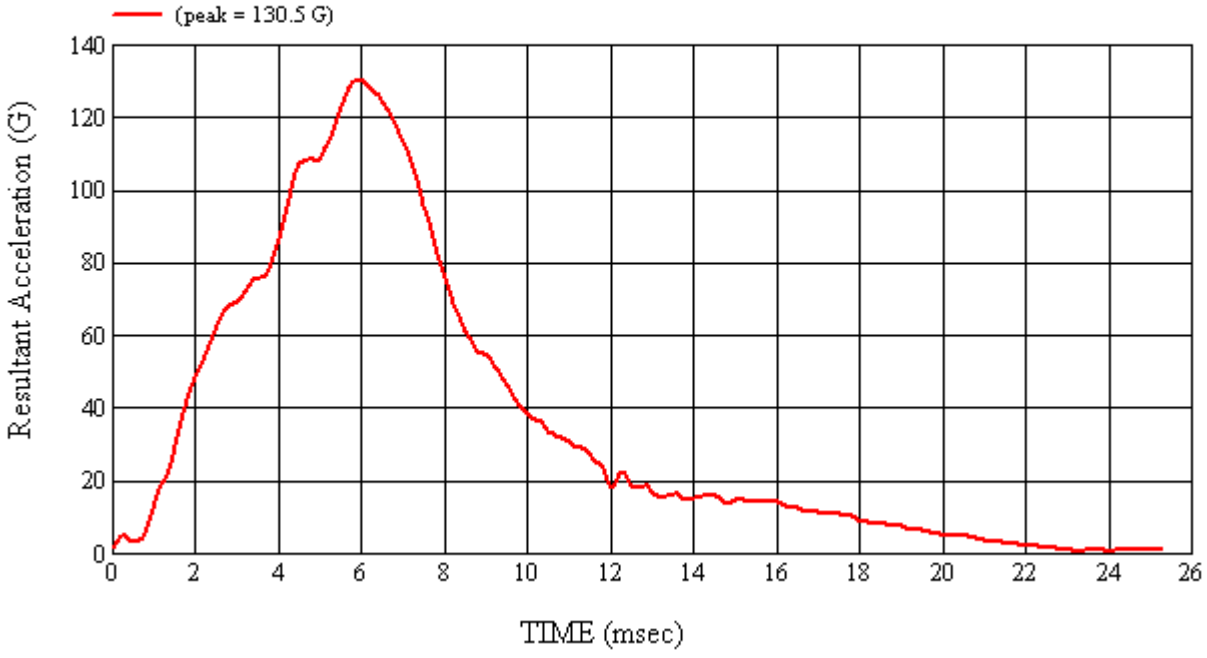
D-ring cover pushed in.

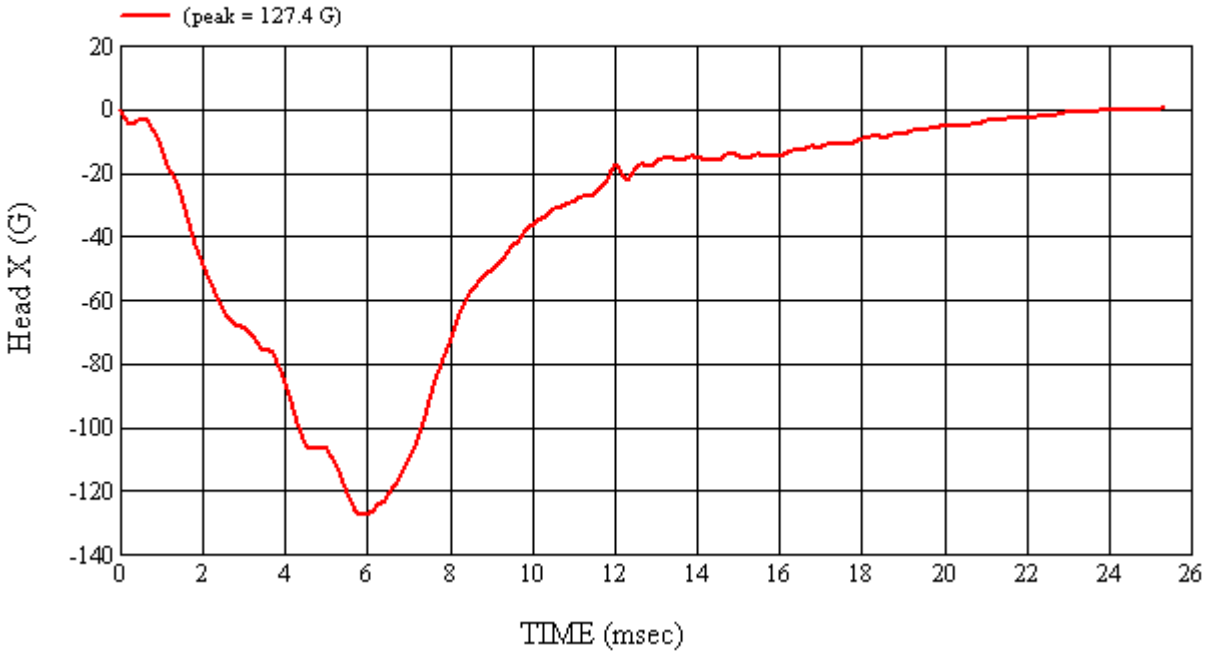
Recorded By: _____ Approved By*: _____ Date: 3/18/2008

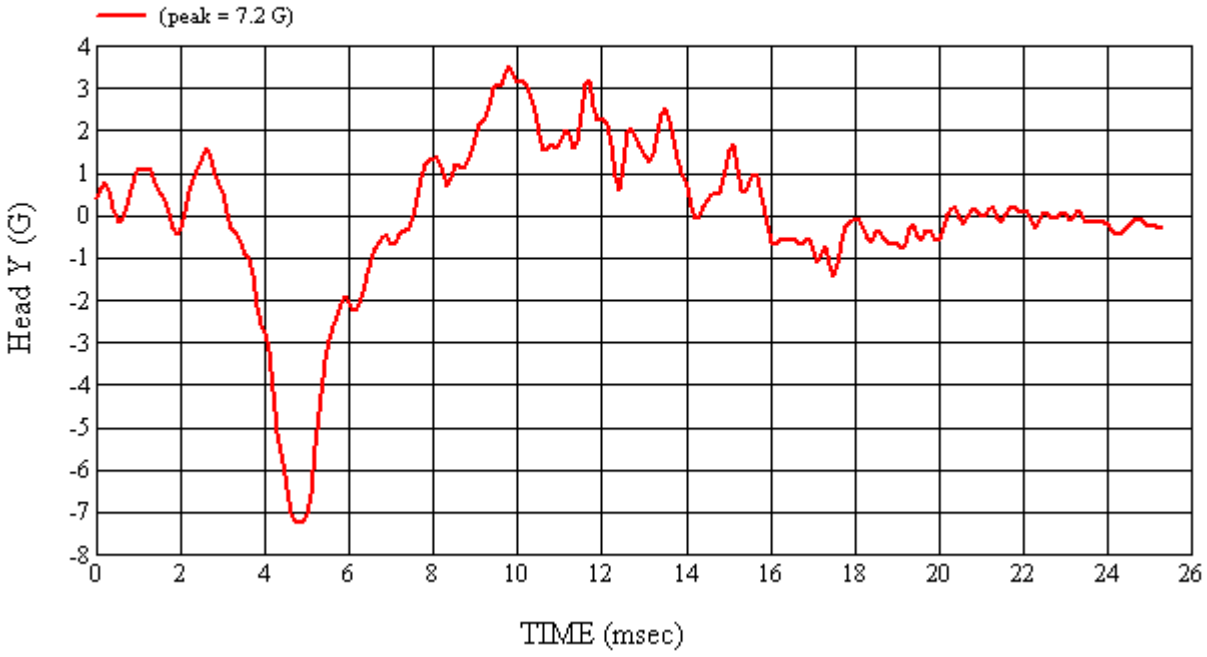
*Only necessary for NHTSA (Government) Compliance testing.

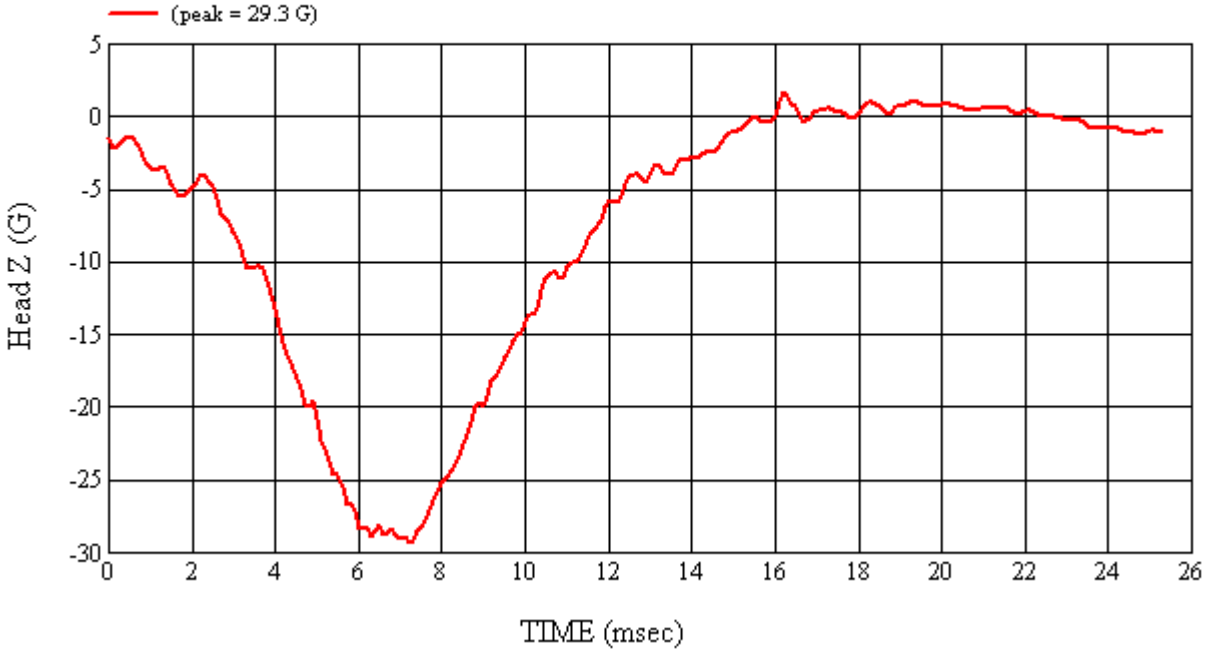
MGA Test #: FM8060 Target Location: BP2, Left Side Test Date: 3/18/2008

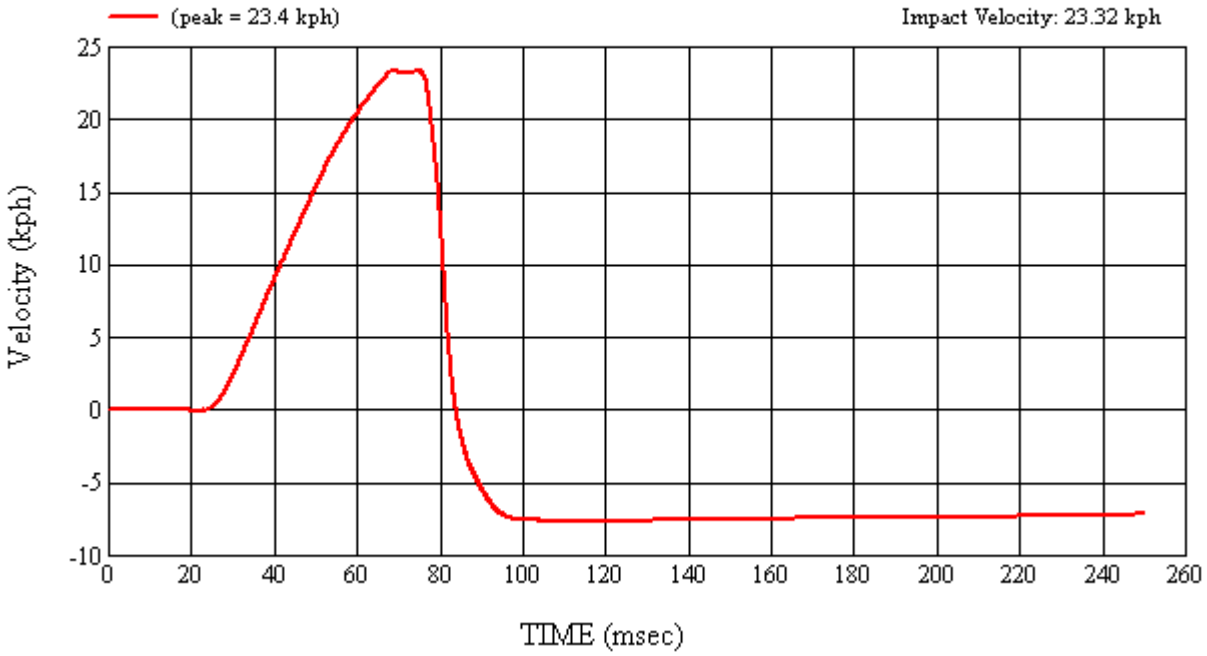


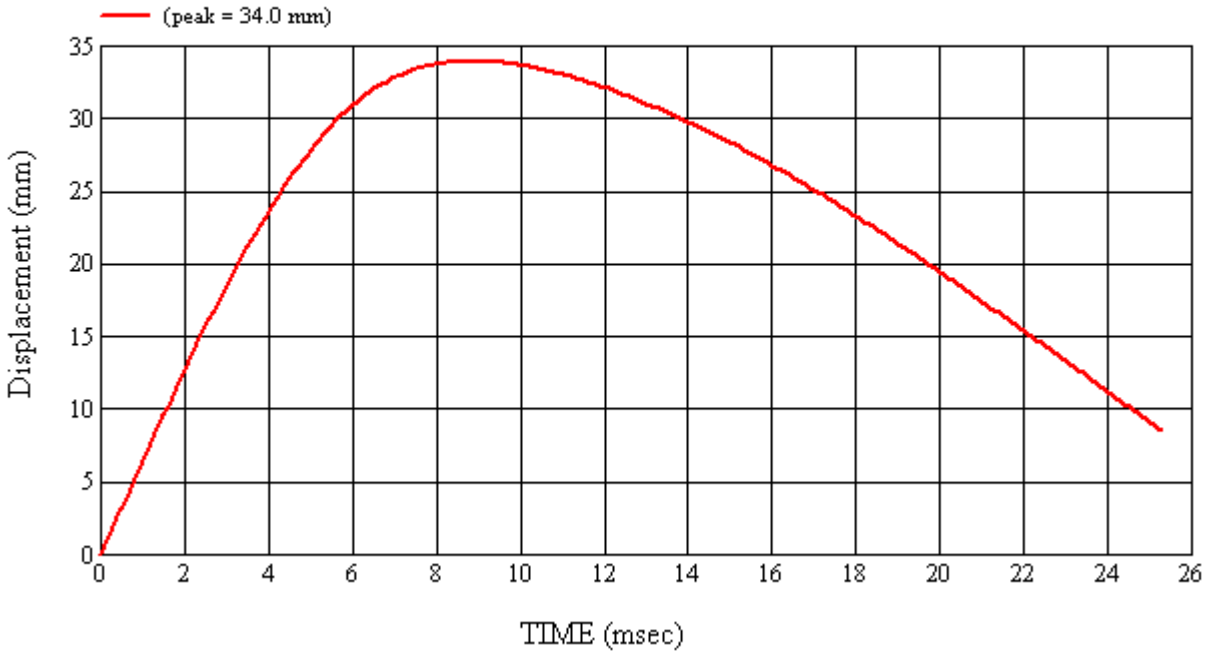


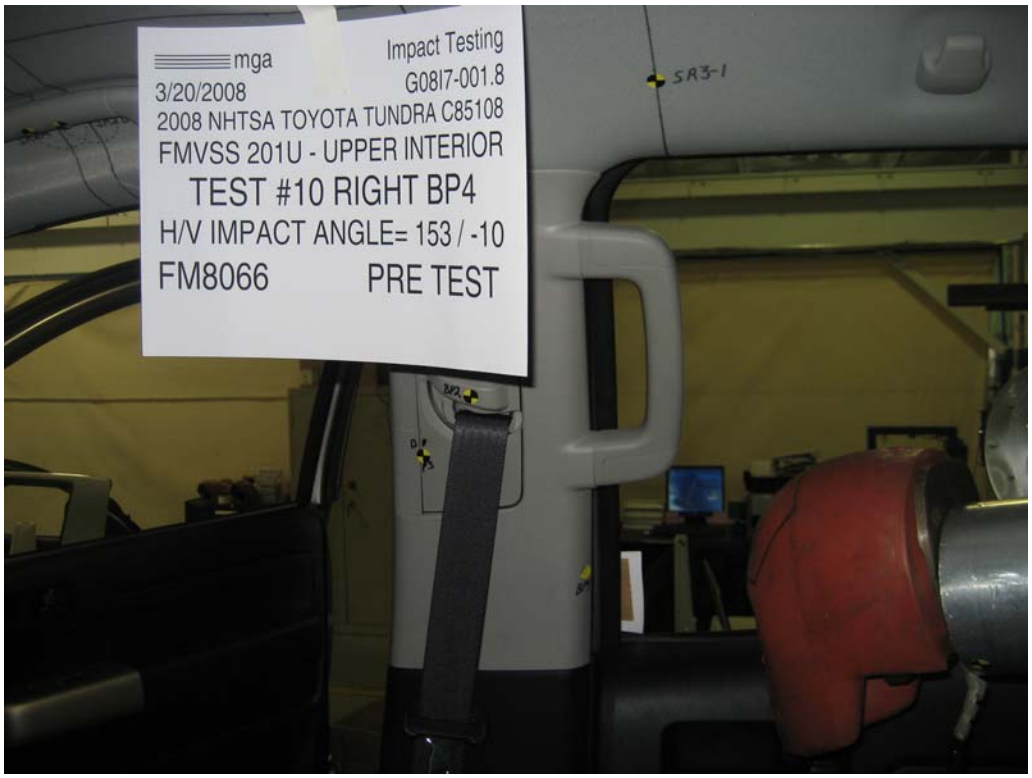

(peak = 127.4 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

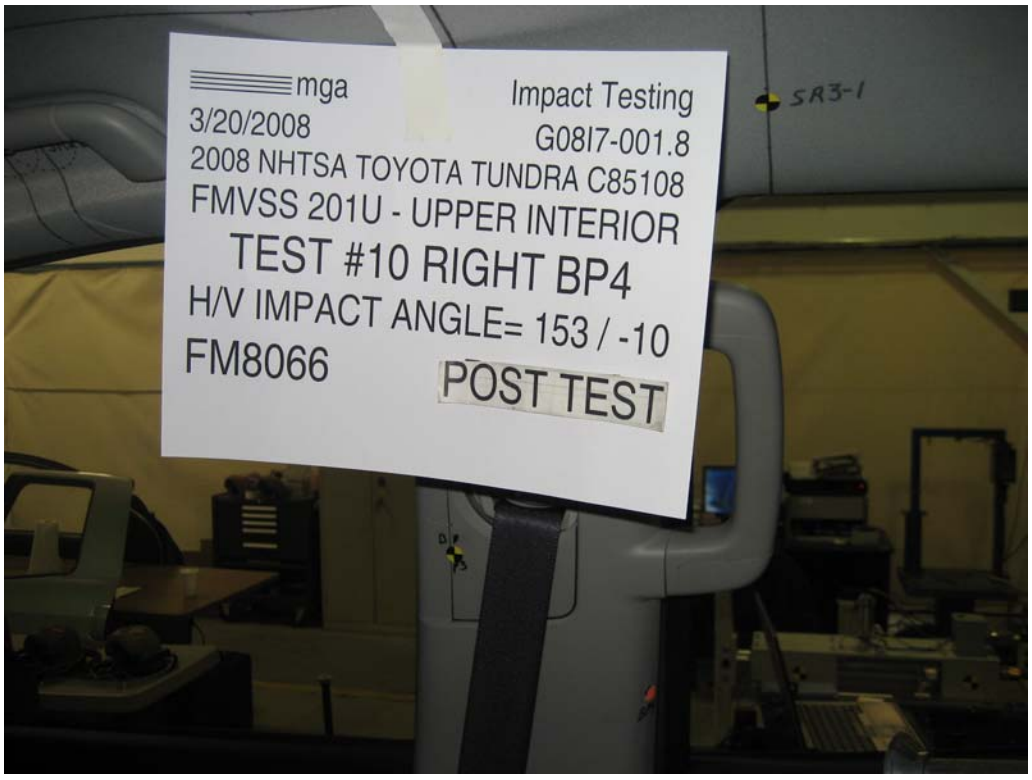

(peak = 7.2 G)
Head Y (G)
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 29.3 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 23.4 kph)
Impact Velocity: 23.32 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 34.0 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 153 / -10
FM8066
PRE TEST
SR3-1


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 153 / -10
FM8066
POST TEST
SR3-1


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 153 / -10
FM8066
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): BP4Right

Temperature:22C

MGA Test Reference No.:FM8066

Humidity:21%

Approach Horizontal Angles:153º

Time of Test:11:46:01 AM

Approach Vertical Angles:-10º

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
585	555	9.3	23.1	25	5 Right

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

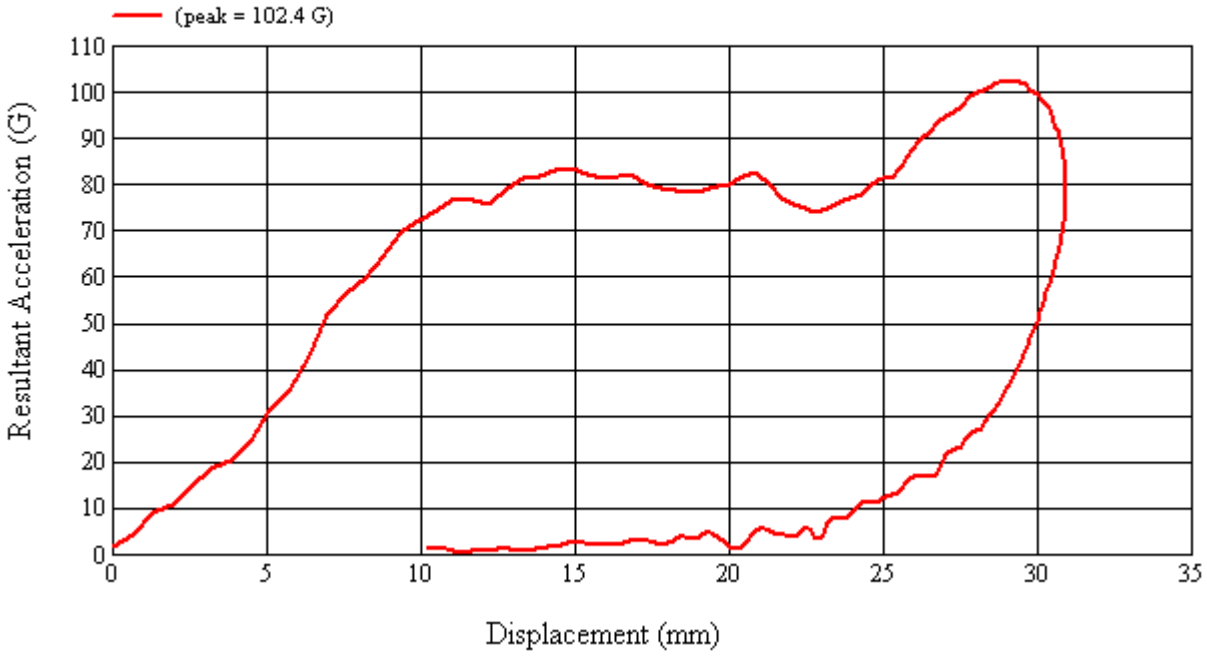
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

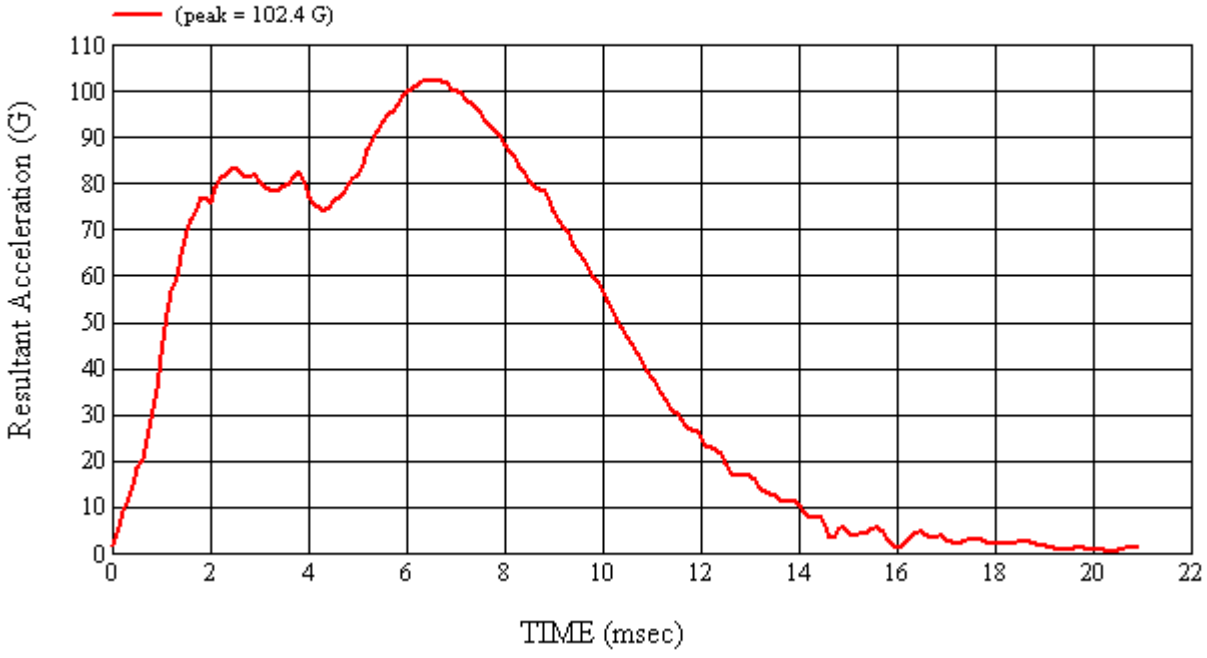
No visible damage.

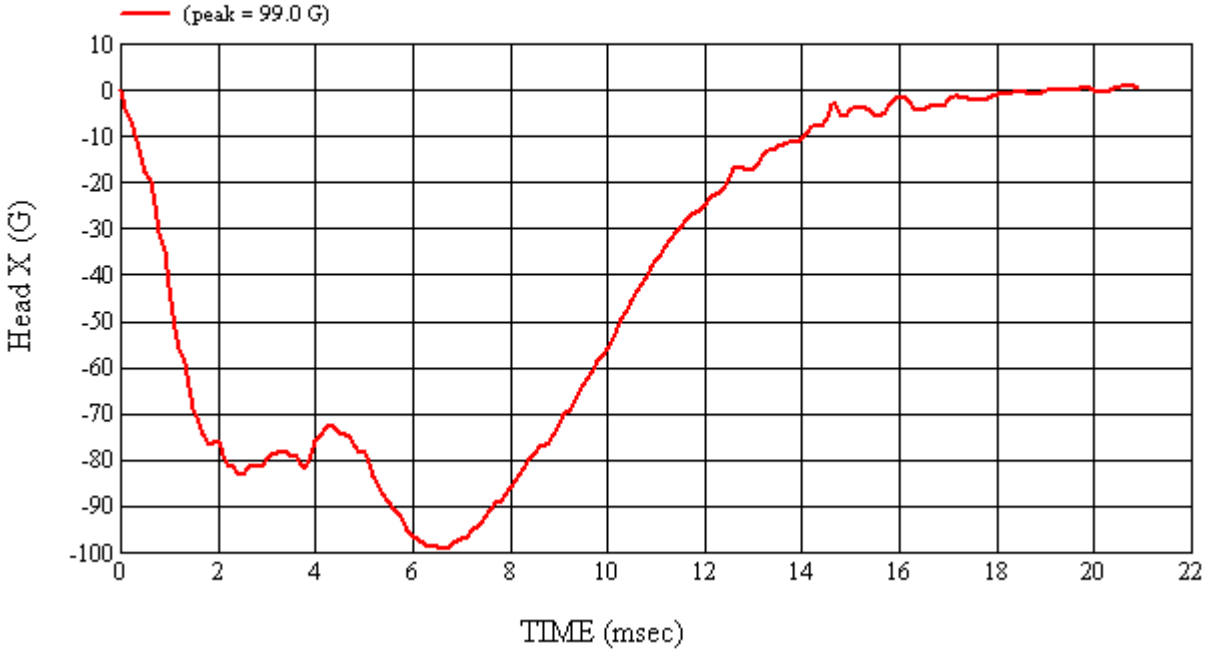
Recorded By: _____ Approved By*: _____ Date: 3/20/2008

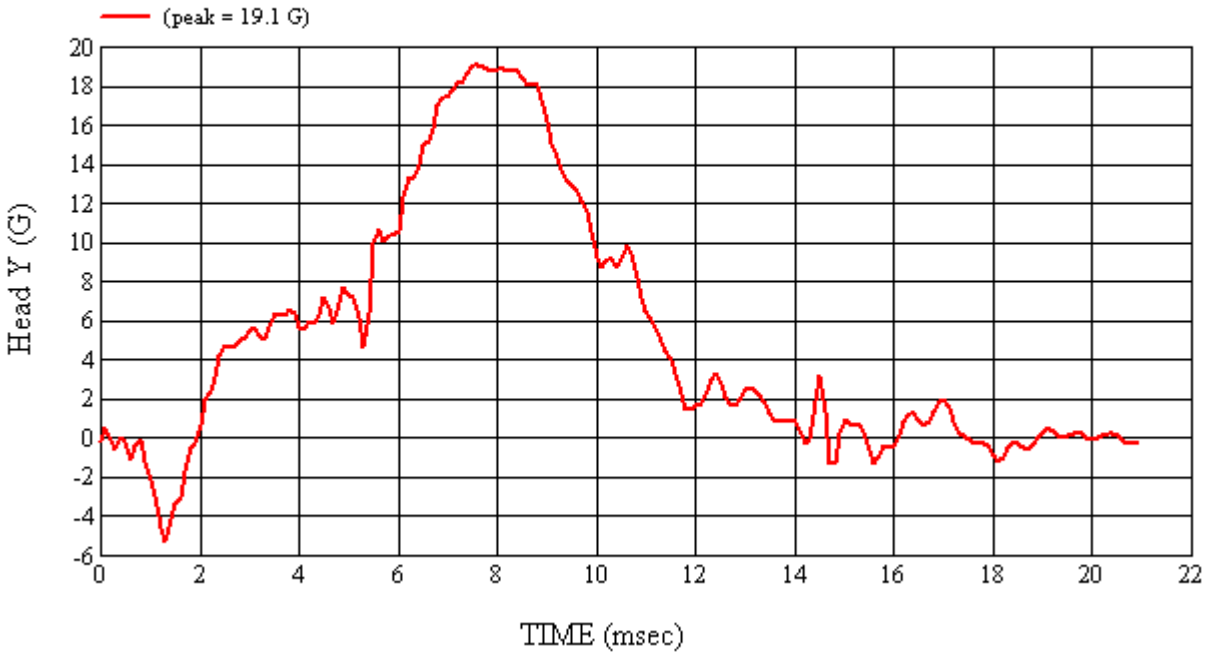
*Only necessary for NHTSA (Government) Compliance testing.

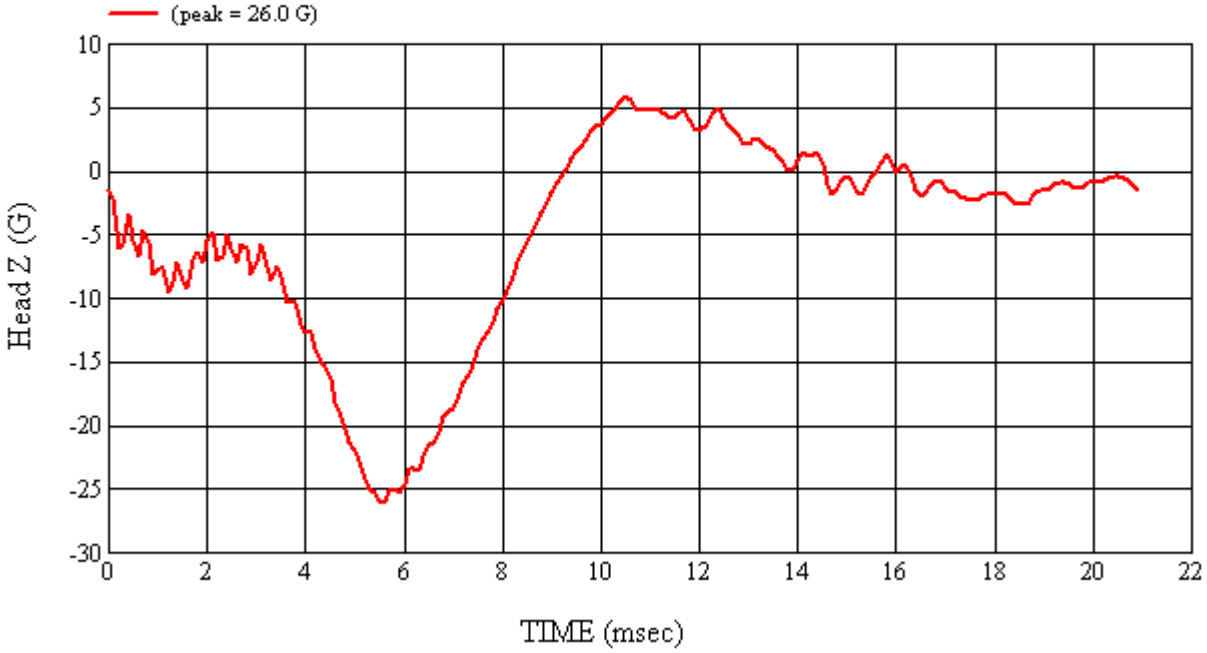
MGA Test #: FM8066 Target Location: BP4, Right Side Test Date: 3/20/2008

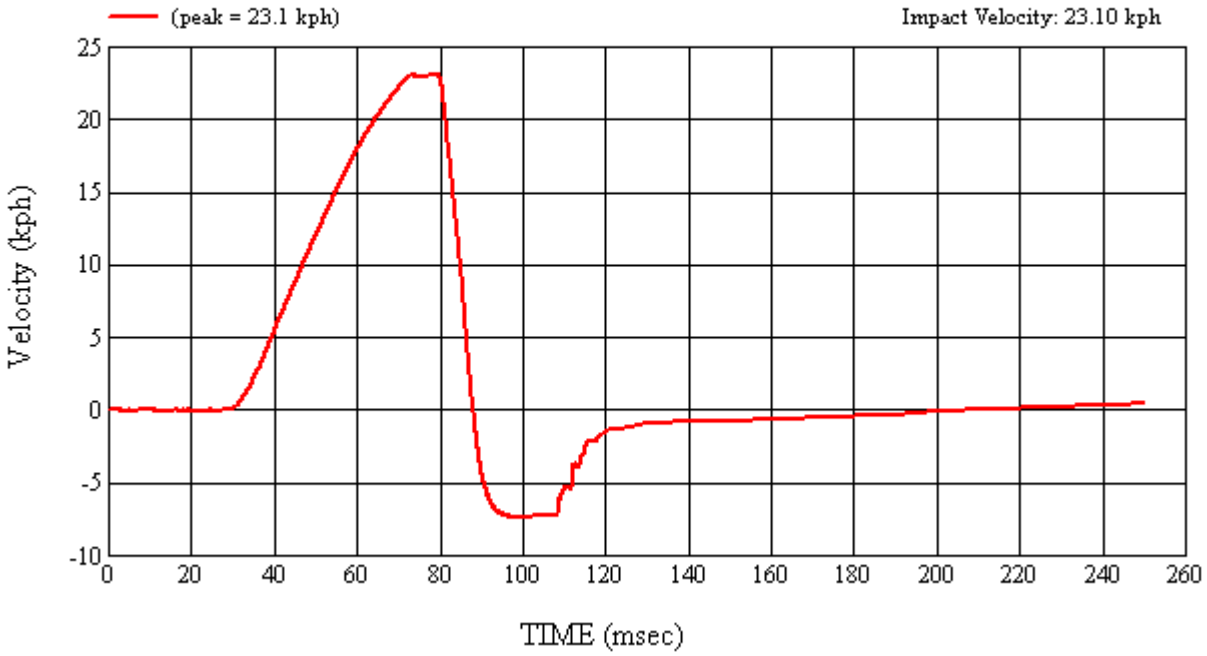


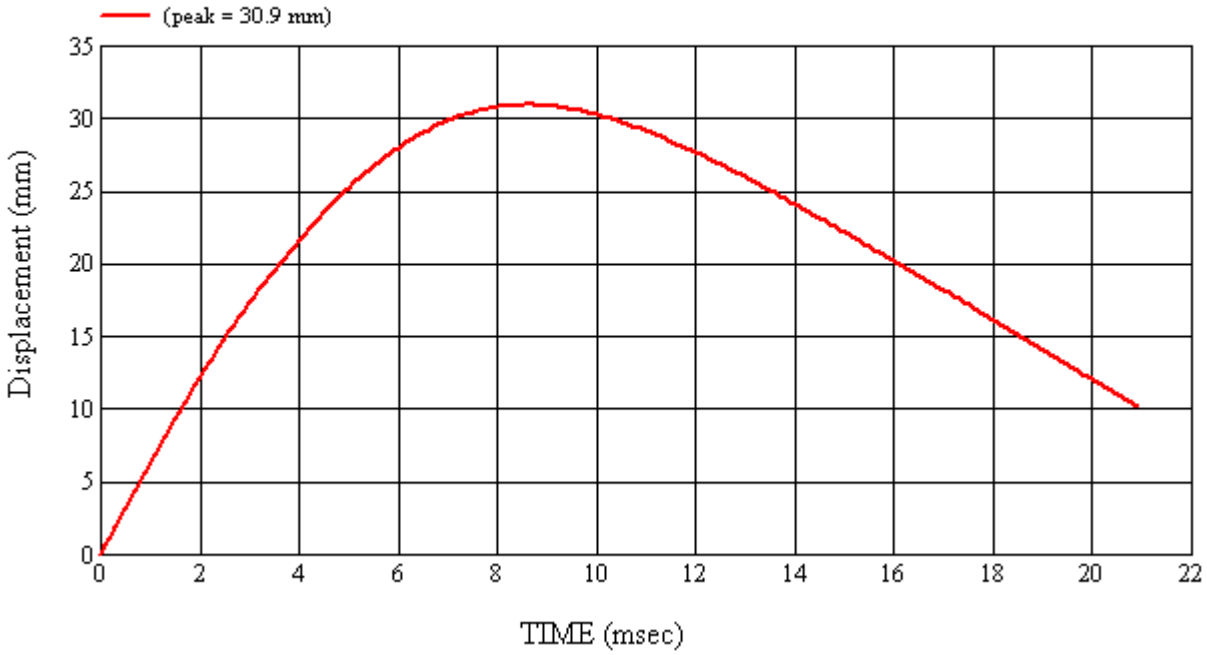


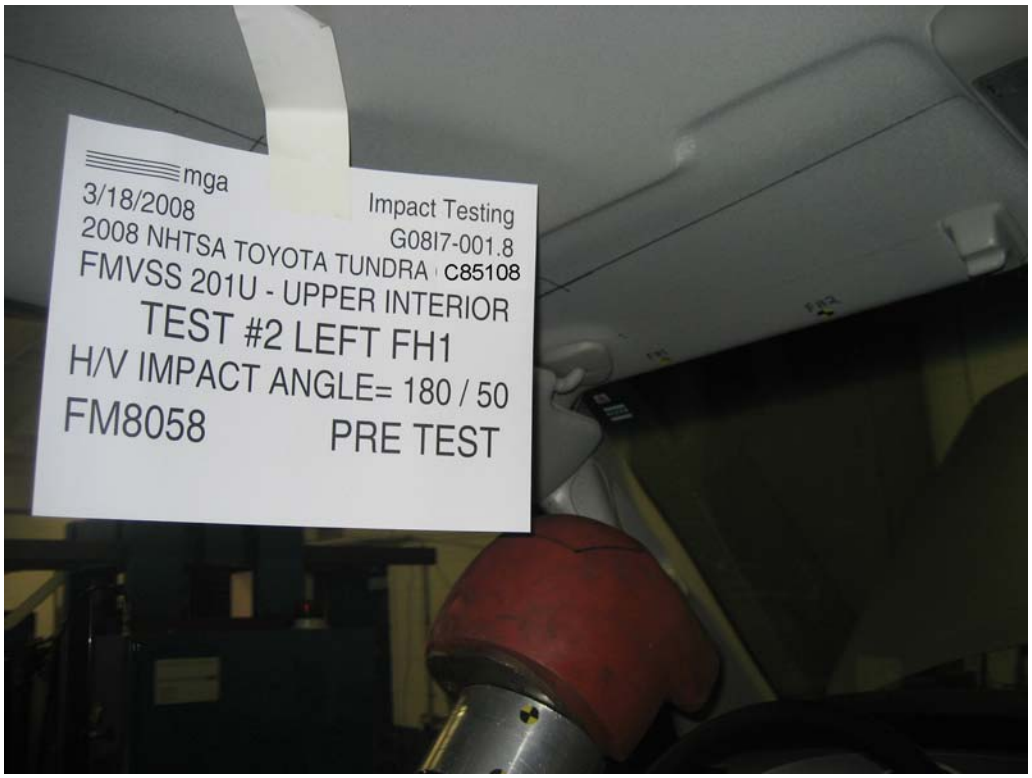

(peak = 99.0 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 19.1 G)
Head Y (G)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 26.0 G)
Head Z (G)
10
5
0
-5
-10
-15
-20
-25
-30
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 23.1 kph)
Impact Velocity: 23.10 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 30.9 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


mga
3/18/2008
Impact Testing
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
FM8058
PRE TEST


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
FM8058
POST TEST
C85108
FM8051
LEFT FH1
H/V 180/50


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT FH1
H/V IMPACT ANGLE= 180 / 50
FM8058
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): FH1Left

Temperature:23C

MGA Test Reference No.:FM8058

Humidity:34%

Approach Horizontal Angles:180º

Time of Test:3:00:21 PM

Approach Vertical Angles:50º

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
706	716	3.3	24.5	30	10 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	0.84
Z	7	J35800	97.996	1.83	1.83

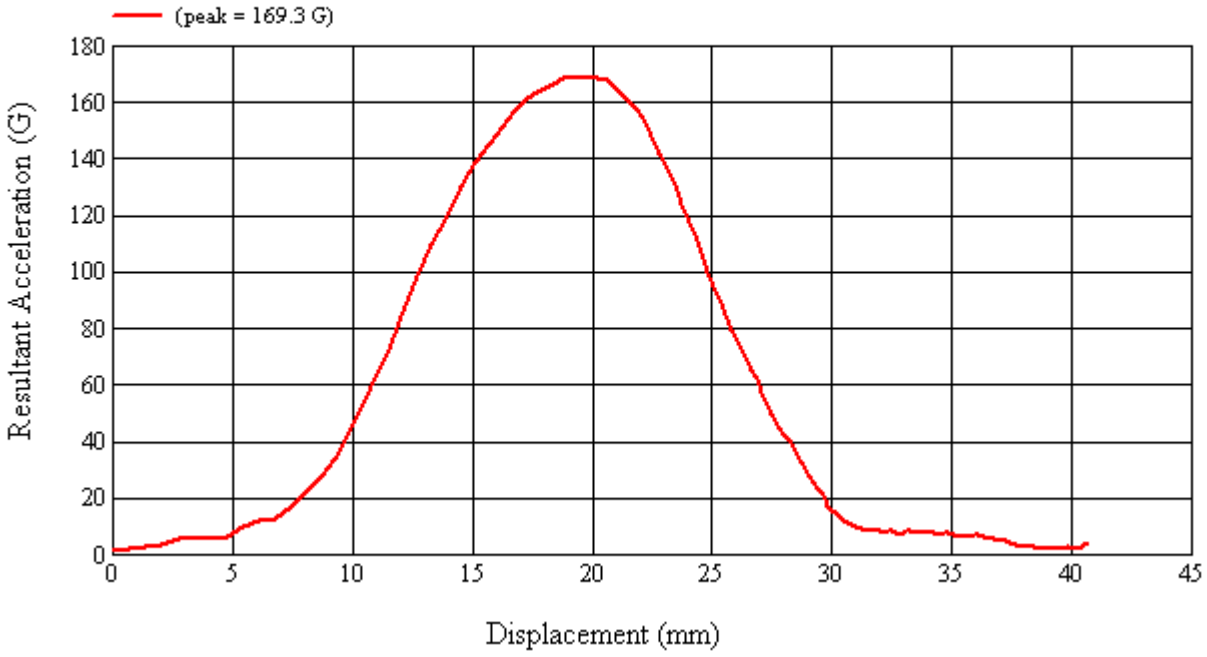
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

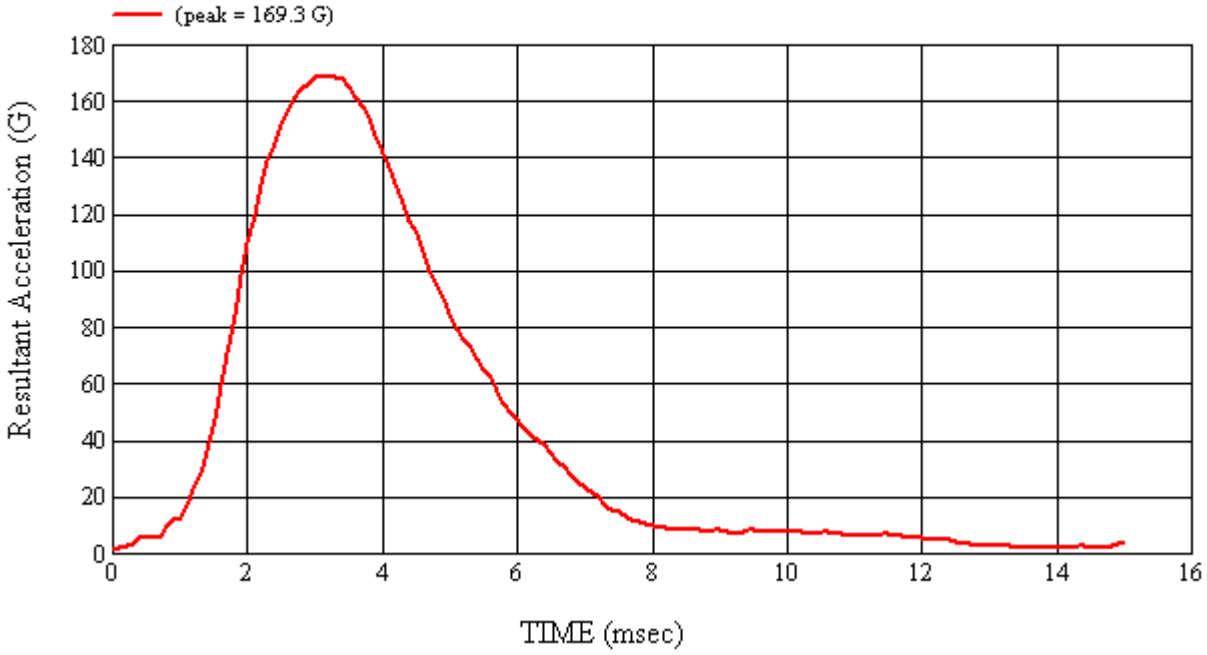
Windshield broke.

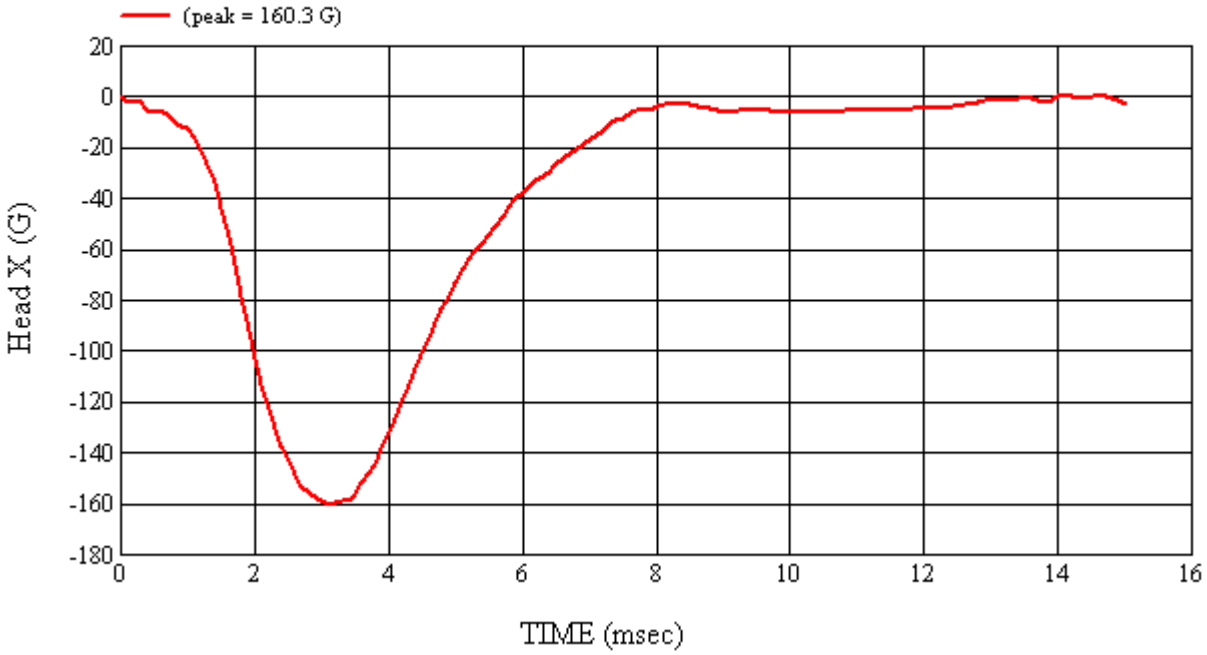
Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 3/18/2008

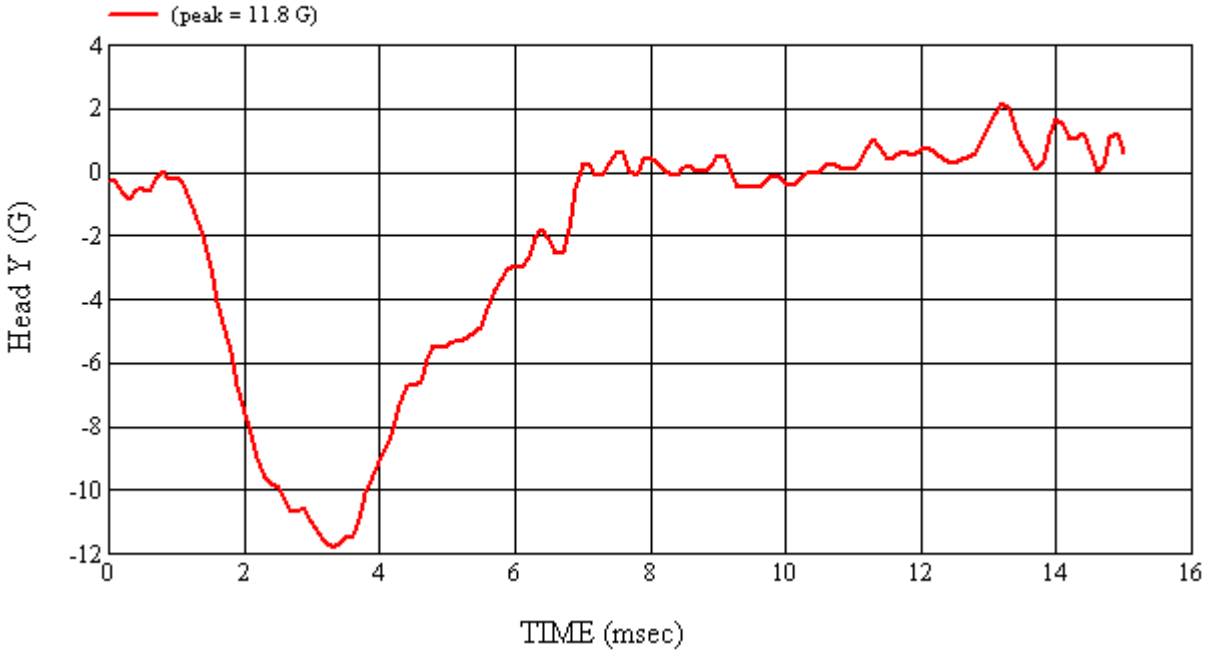
*Only necessary for NHTSA (Government) Compliance testing.

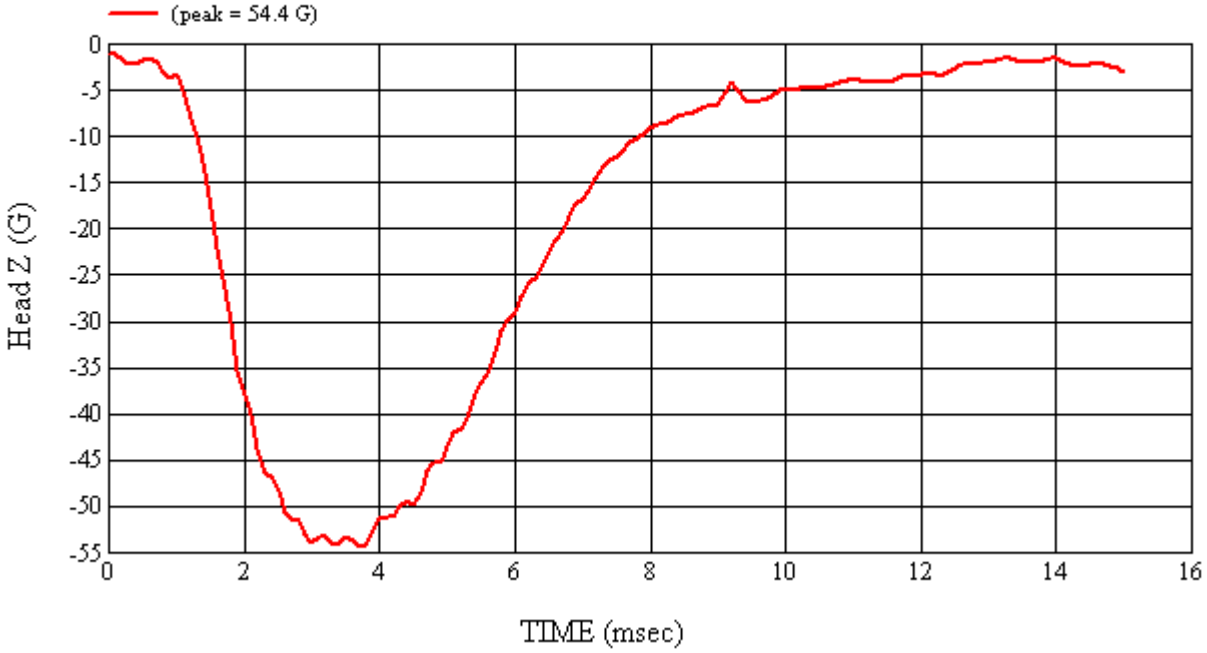
MGA Test #: FM8058 Target Location: FH1, Left Side Test Date: 3/18/2008

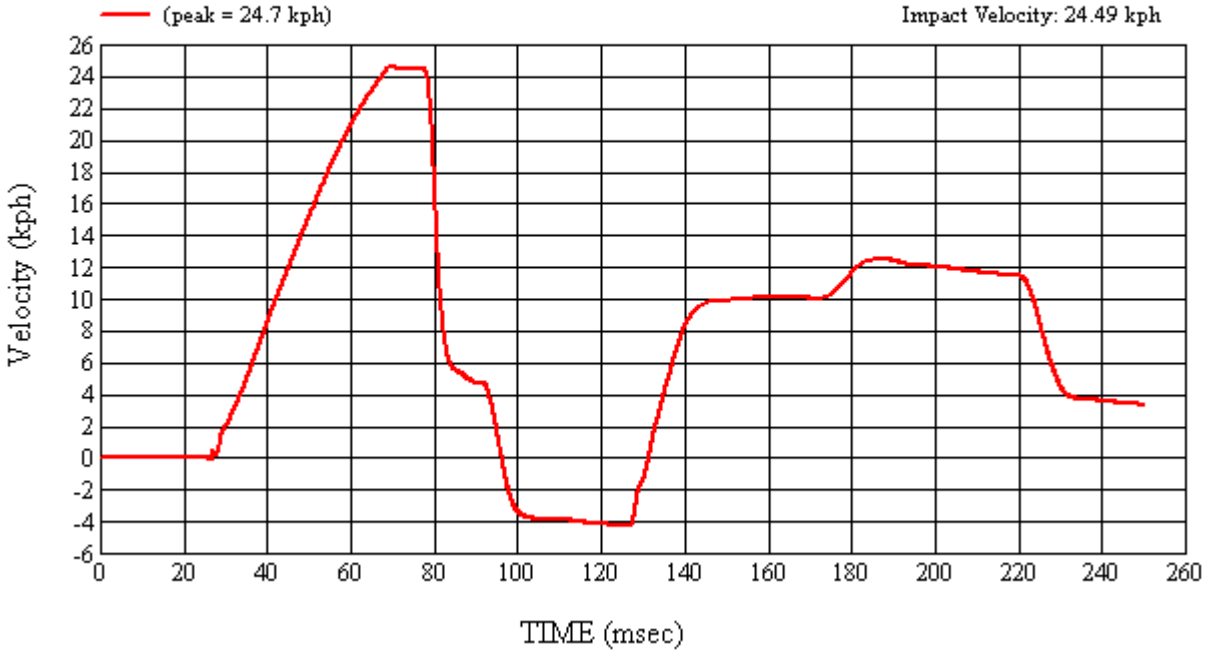


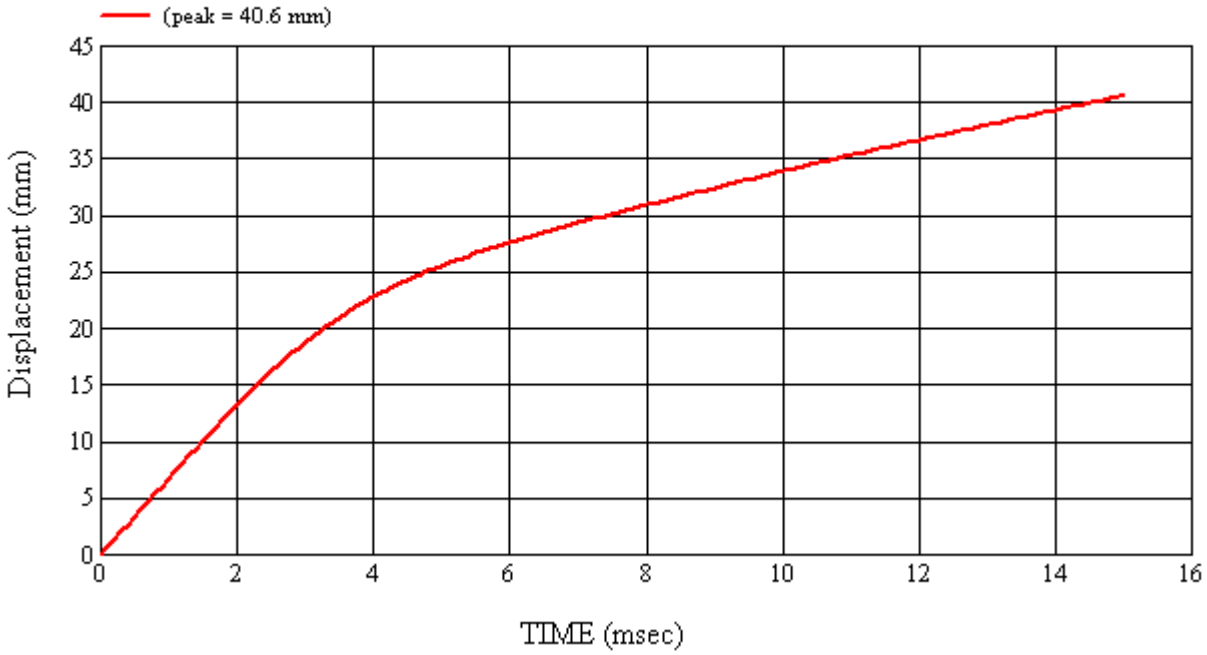



(peak = 160.3 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
0
2
4
6
8
10
12
14
16
TIME (msec)

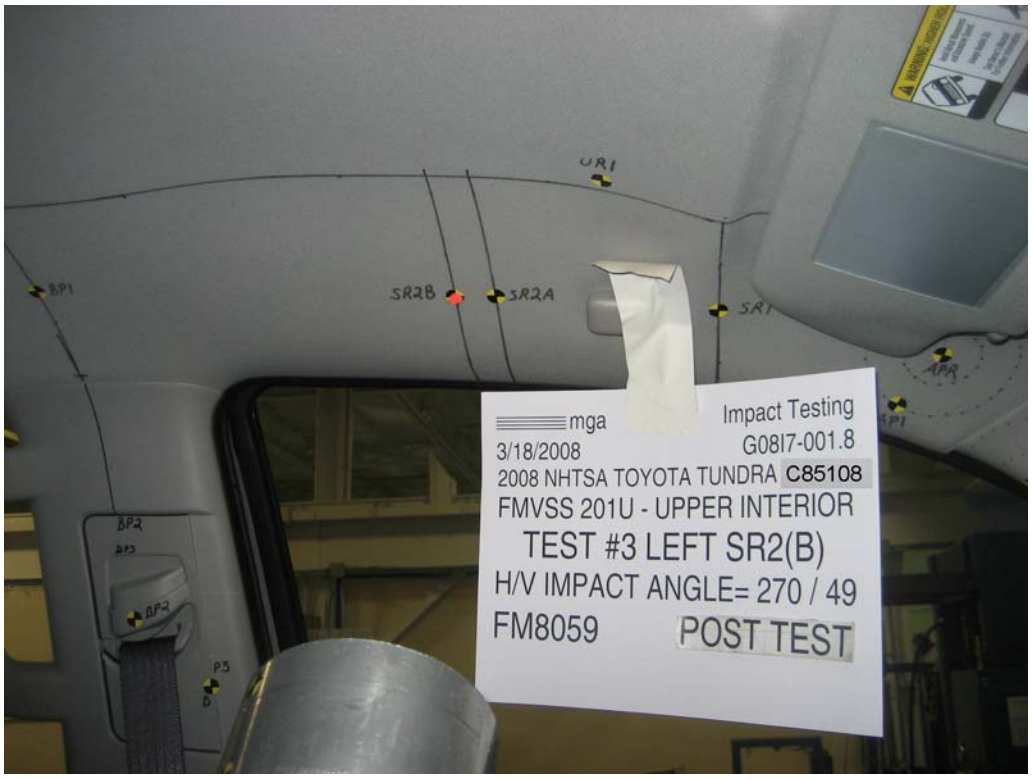

(peak = 11.8 G)
Head Y (G)
4
2
0
-2
-4
-6
-8
-10
-12
0
2
4
6
8
10
12
14
16
TIME (msec)

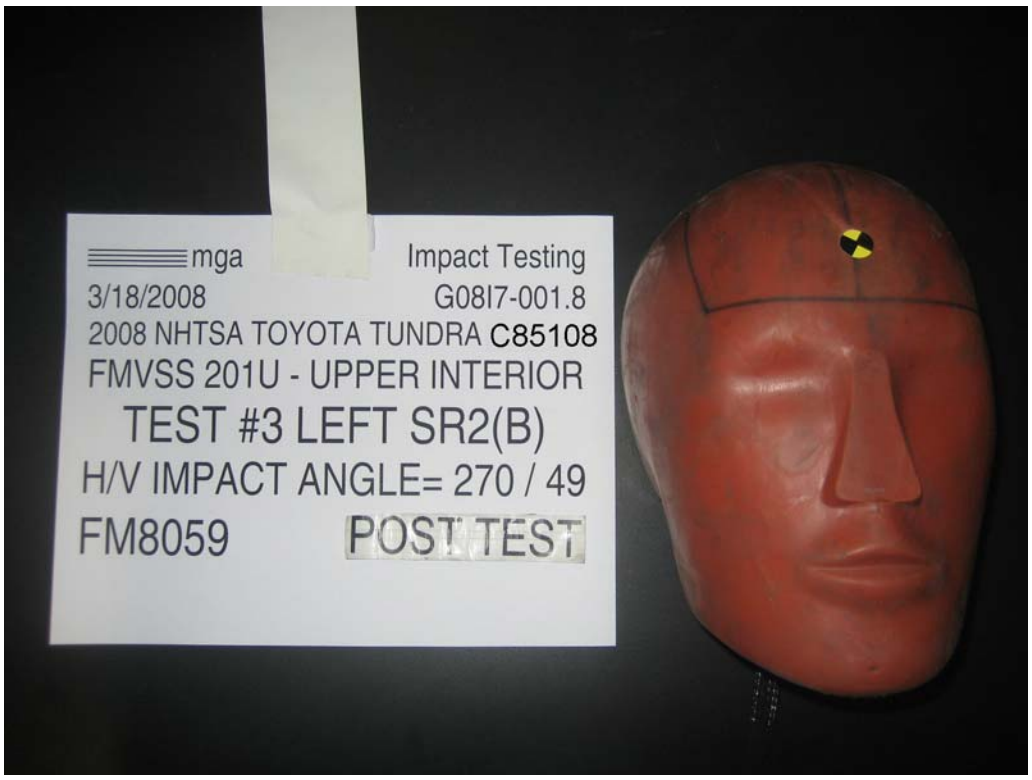

(peak = 54.4 G)
Head Z (G)
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
0
2
4
6
8
10
12
14
16
TIME (msec)


(peak = 24.7 kph)
Impact Velocity: 24.49 kph
Velocity (kph)
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


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


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT SR2(B)
H/V IMPACT ANGLE= 270 / 49
FM8059
PRE TEST
C 80303
FM8059
LEFT SR2B
H/V 270/50


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT SR2(B)
H/V IMPACT ANGLE= 270 / 49
FM8059
POST TEST


mga
Impact Testing
3/18/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT SR2(B)
H/V IMPACT ANGLE= 270 / 49
FM8059
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): SR2(b)Left

Temperature:23C

MGA Test Reference No.:FM8059

Humidity:34%

Approach Horizontal Angles:270º

Time of Test:4:08:39 PM

ApproachVertical Angles:49º

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
553	513	4.9	19.2	24	1 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

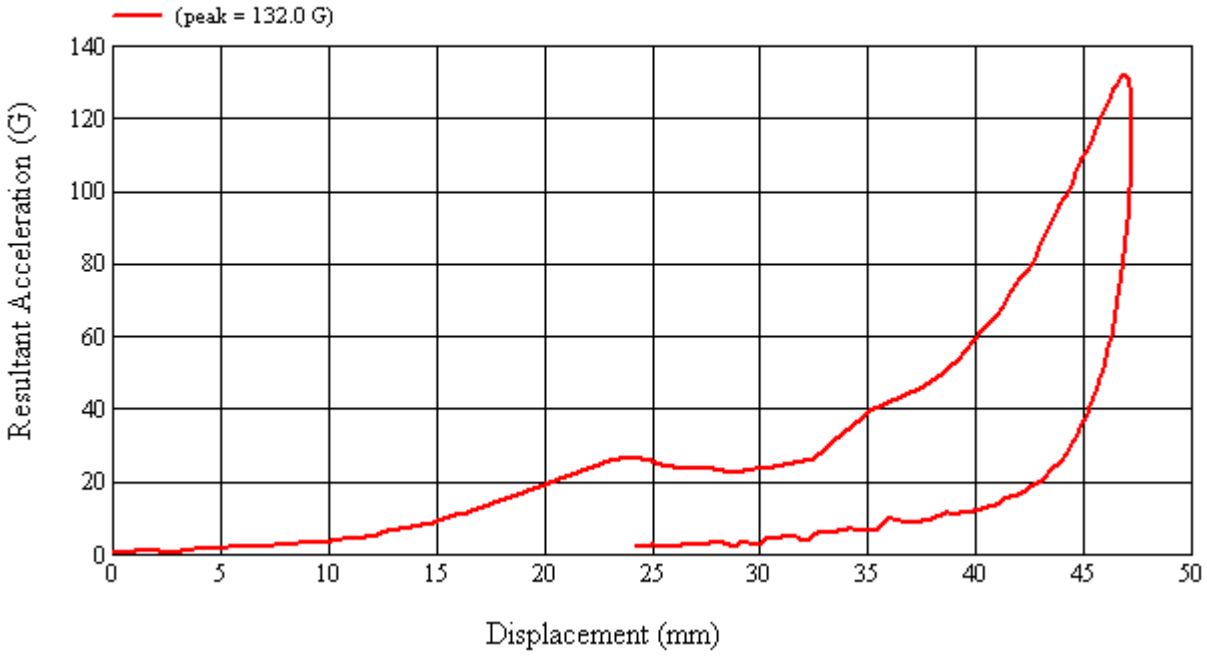
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

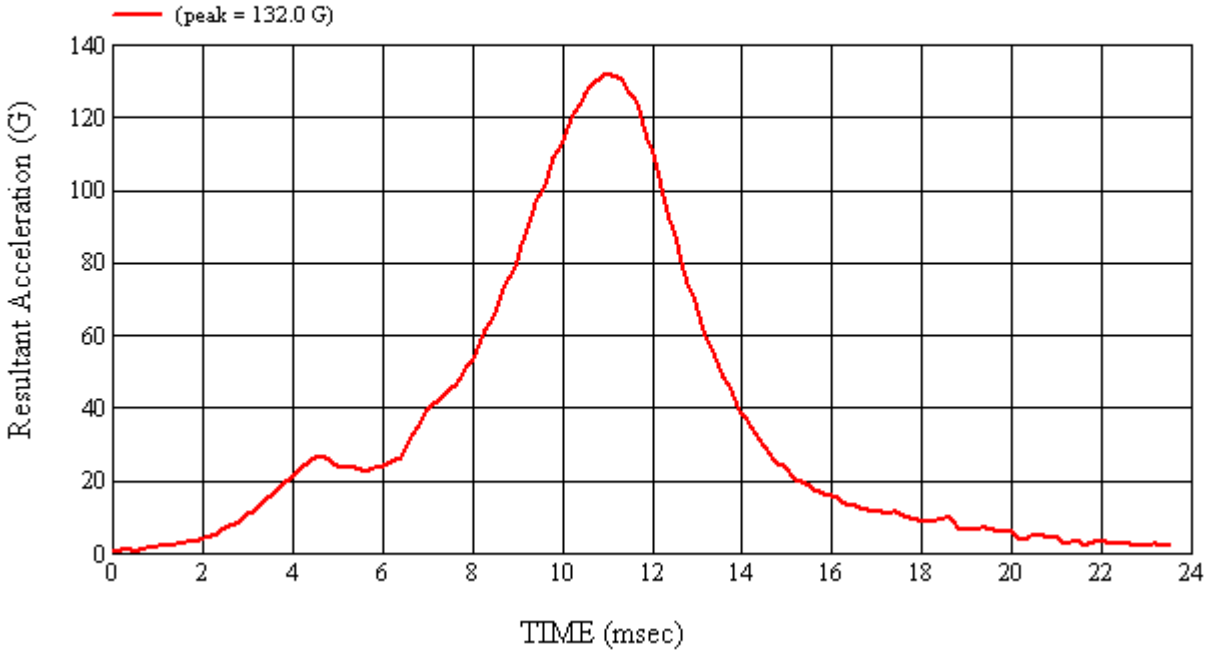
No visible damage.

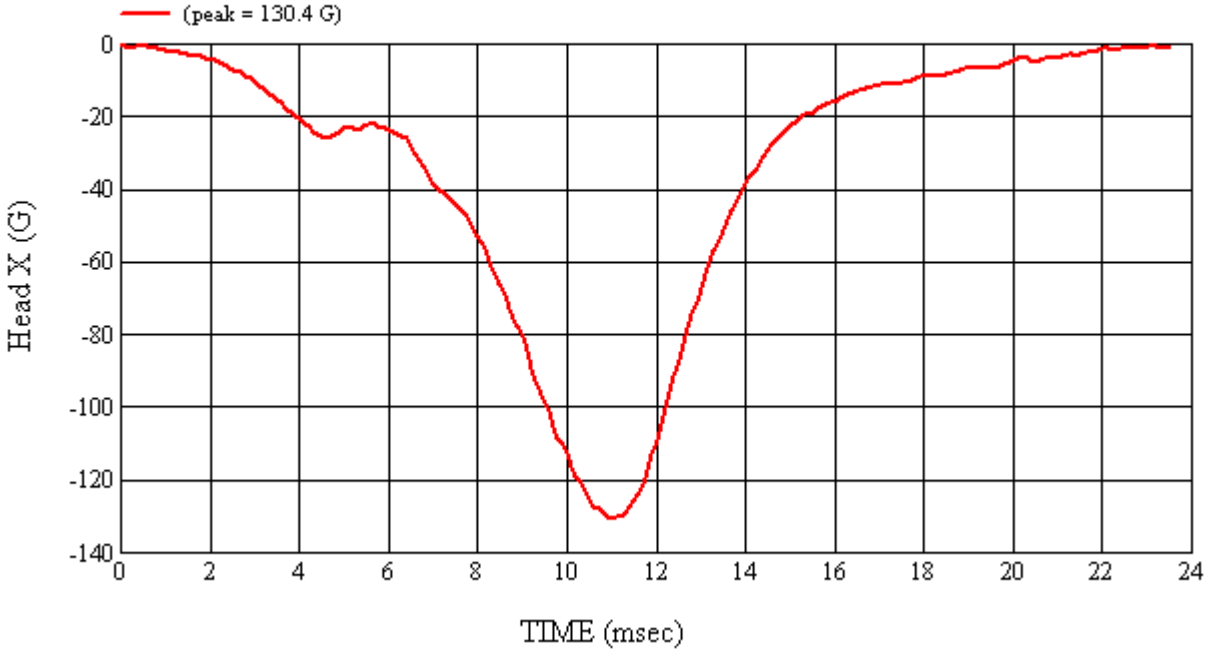
Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 3/18/2008

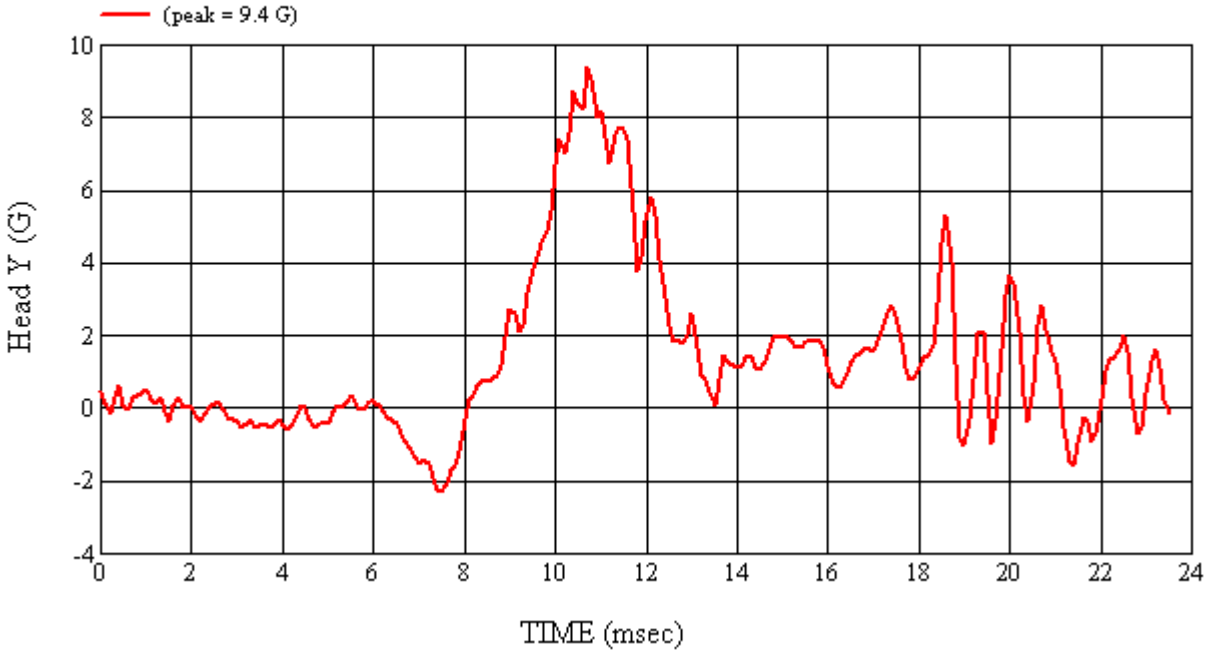
*Only necessary for NHTSA (Government) Compliance testing.

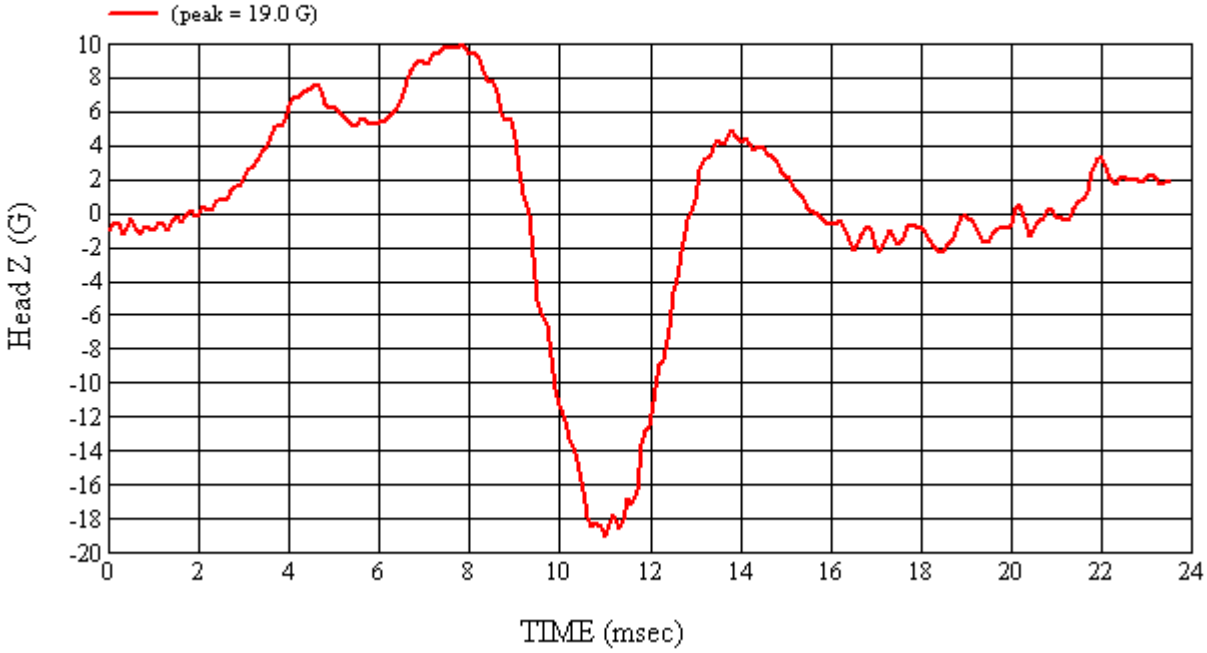
MGA Test #: FM8059 Target Location: SR2(b), Left Side Test Date: 3/18/2008

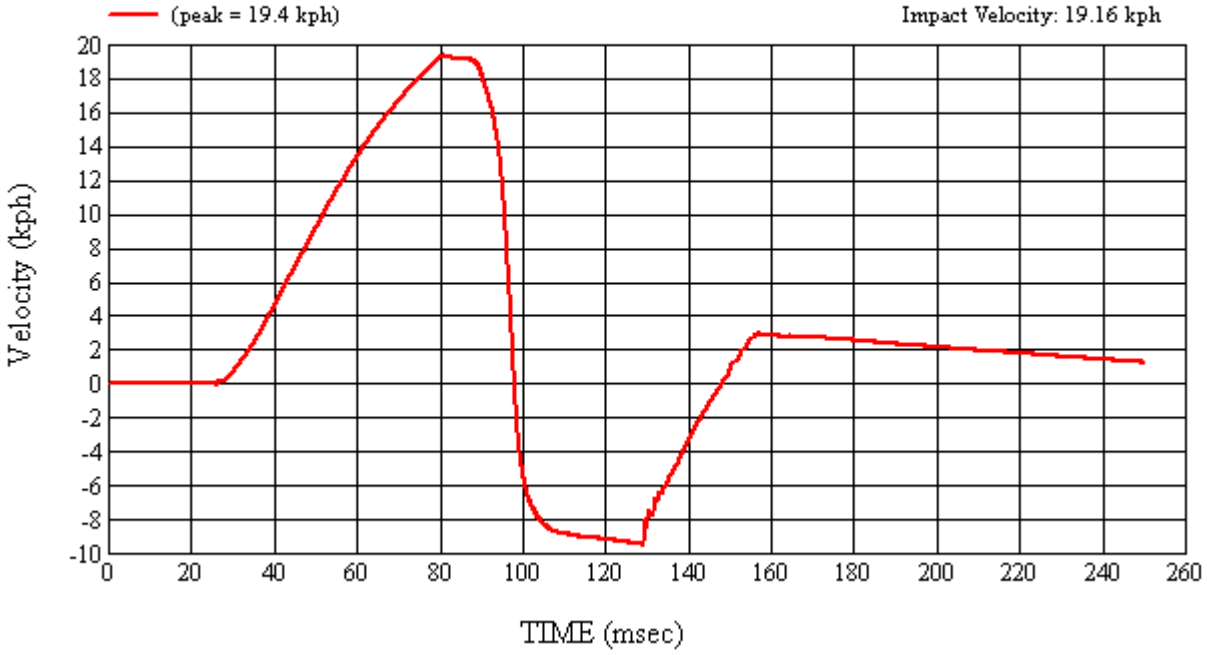


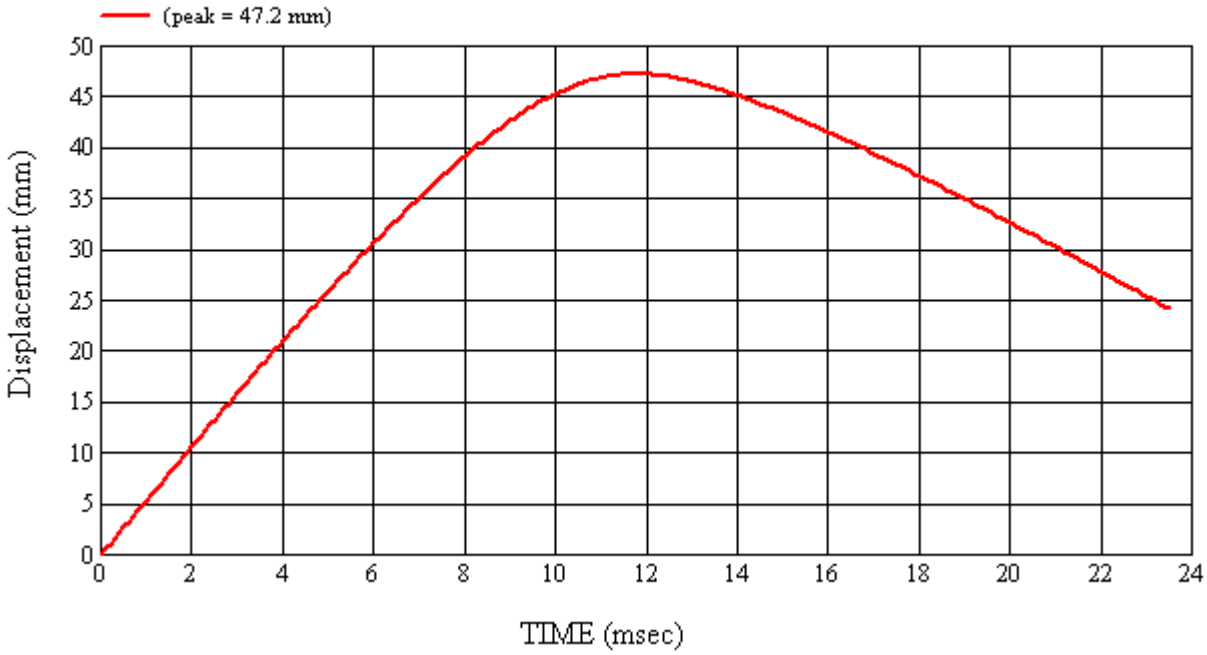


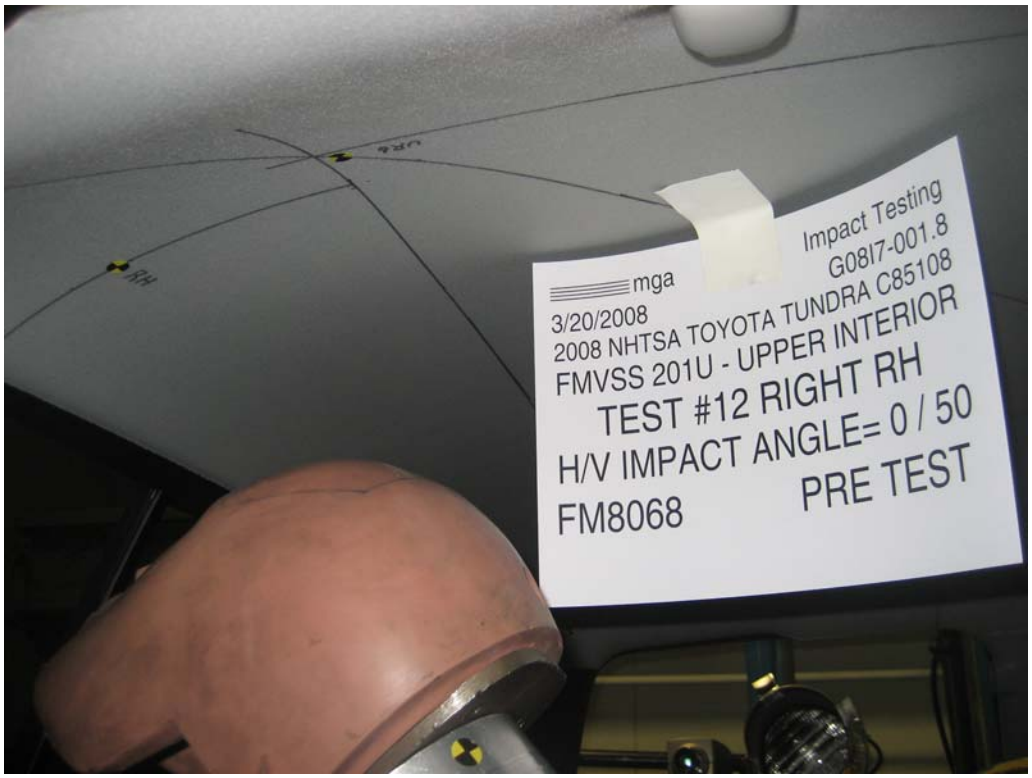

(peak = 130.4 G)
Head X (G)
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

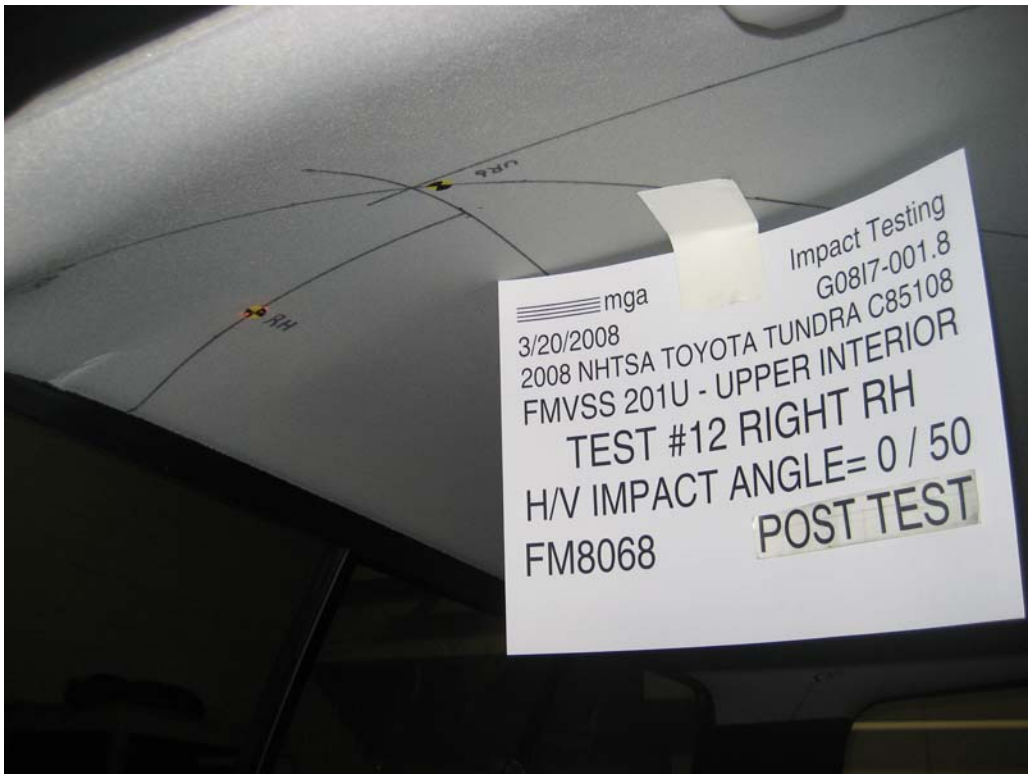

(peak = 9.4 G)
Head Y (G)
10
8
6
4
2
0
-2
-4
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

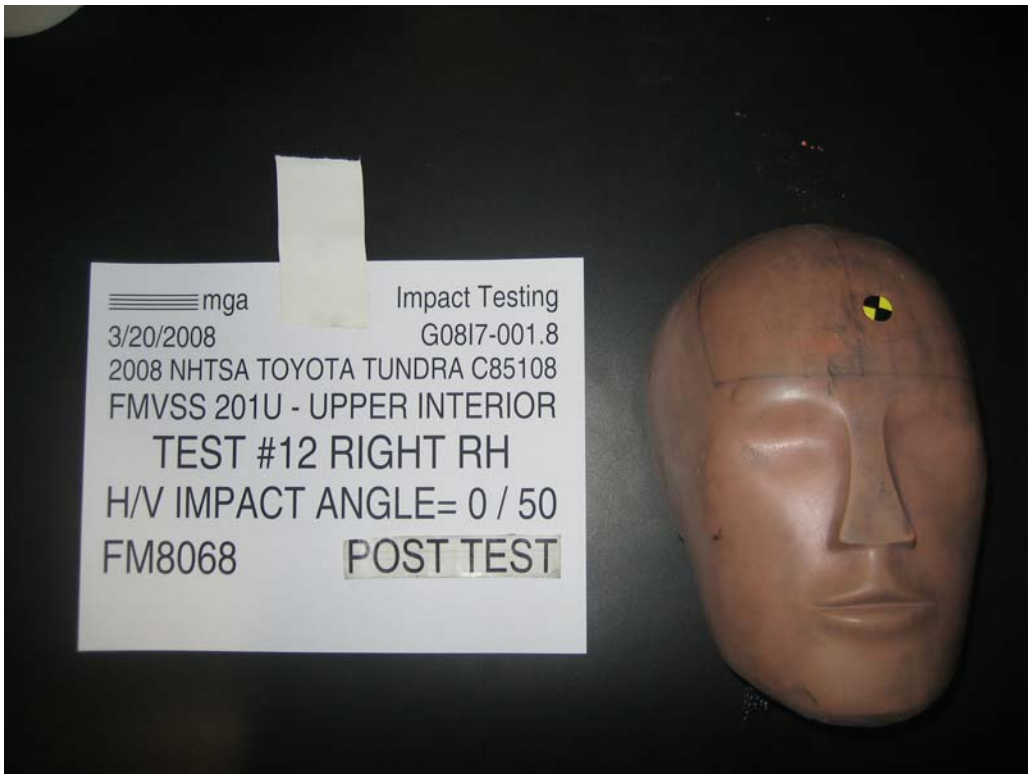

(peak = 19.0 G)
Head Z (G)
TIME (msec)


(peak = 19.4 kph)
Impact Velocity: 19.16 kph
Velocity (kph)
TIME (msec)


(peak = 47.2 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
50
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


RH
mga
Impact Testing
G08I7-001.8
3/20/2008
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
FM8068
PRE TEST


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
FM8068
POST TEST


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
FM8068
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): RH Right

Temperature:22C

MGA Test Reference No.:FM8068

Humidity:19%

Approach Horizontal Angles:0º

Time of Test:3:30:46 PM

Approach Vertical Angles:50º

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
690	694	7	22.5	21	10 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

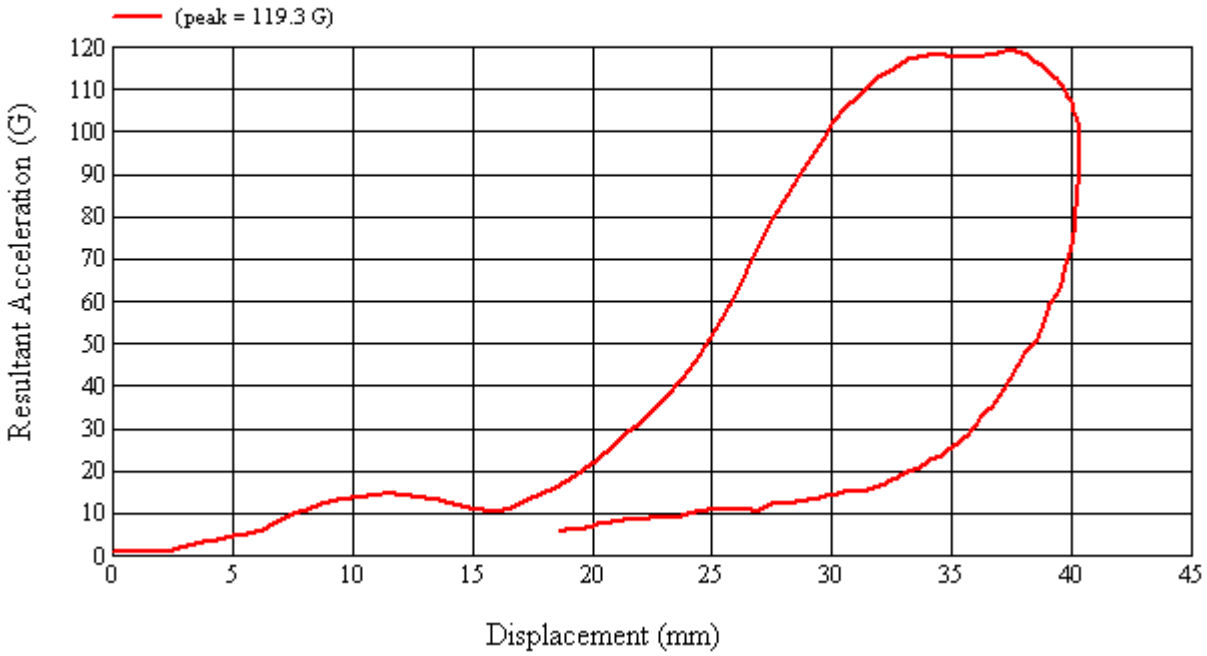
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

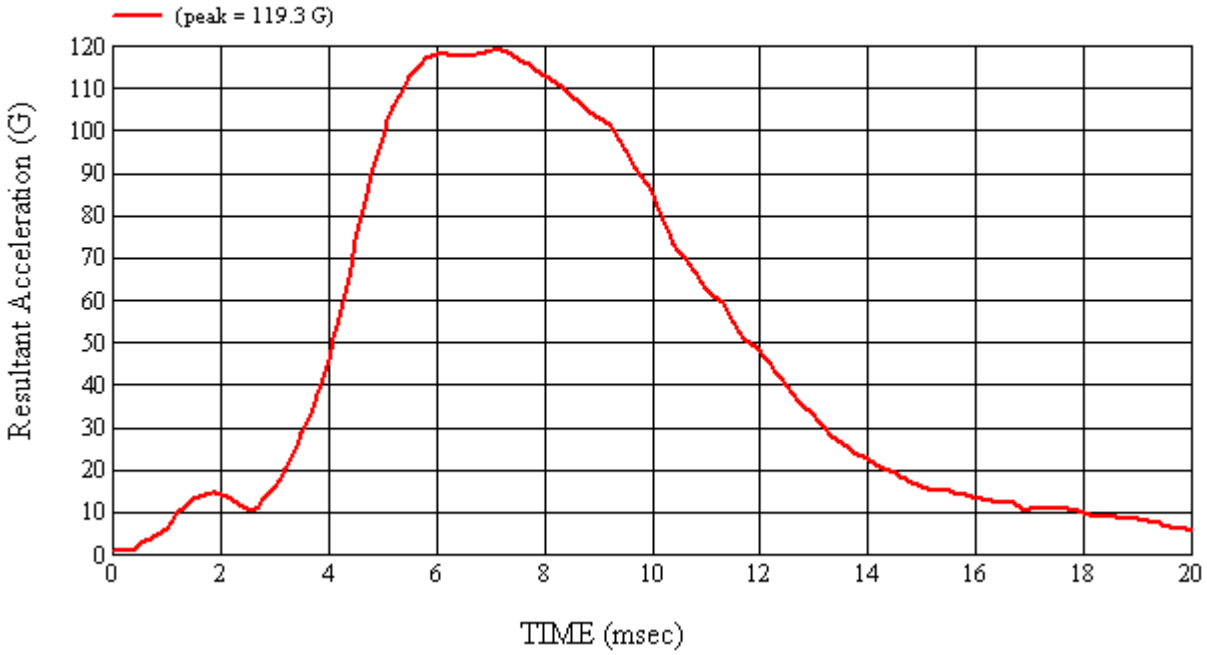
Headliner deformation. Trim around glass dented inward.

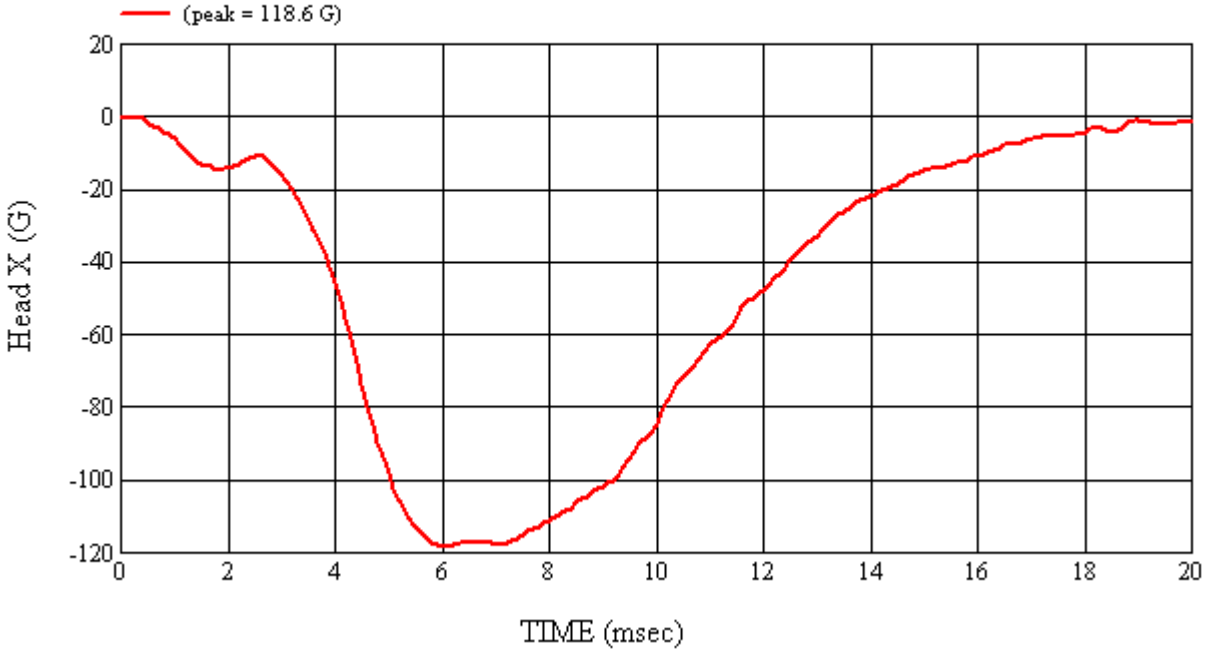
Recorded By: Scott Campbell Approved By*: Helen A. Kalata Date: 3/20/2008

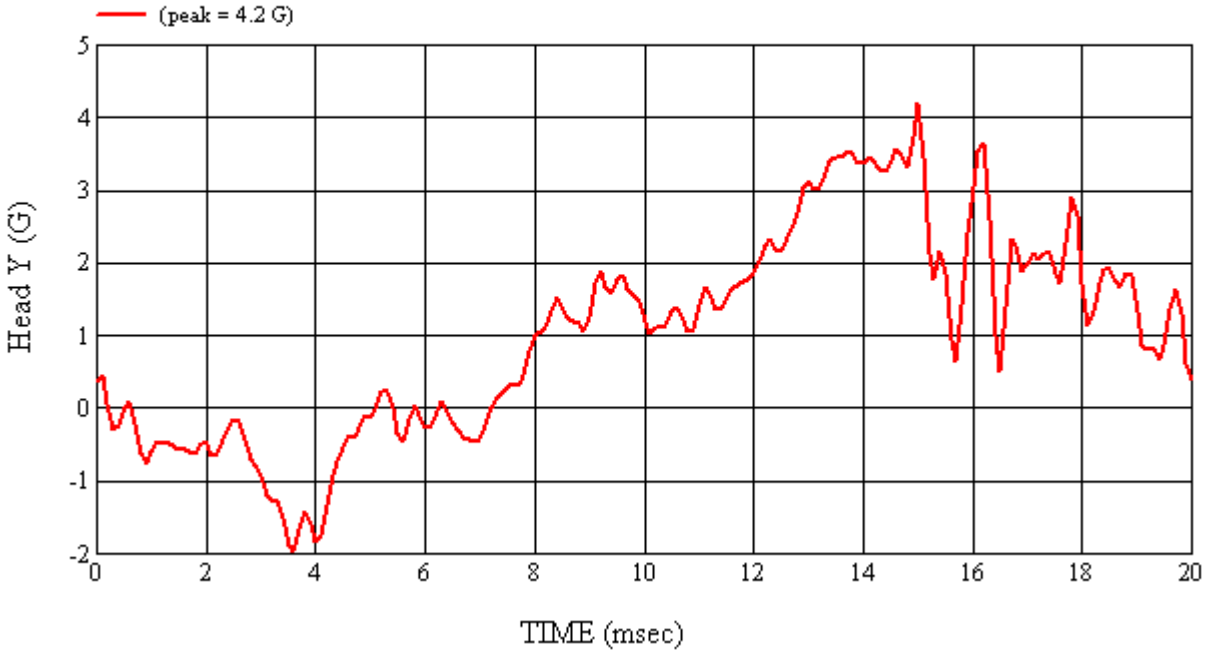
*Only necessary for NHTSA (Government) Compliance testing.

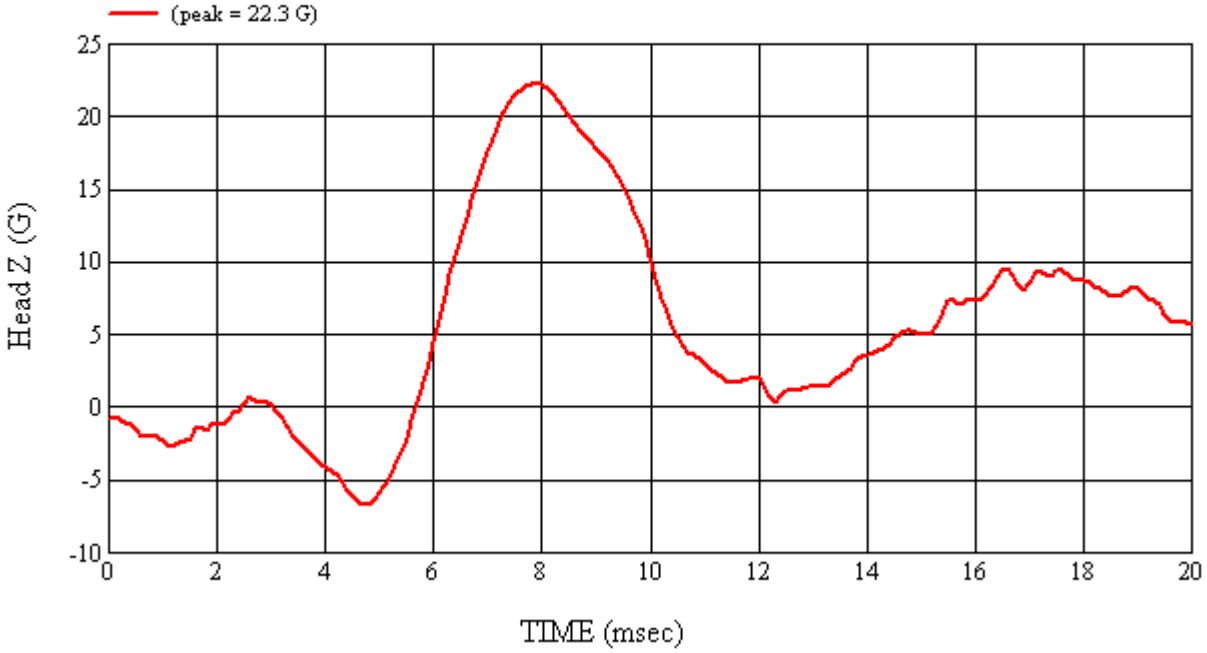
MGA Test #: FM8068 Target Location: RH, Right Side Test Date: 3/20/2008

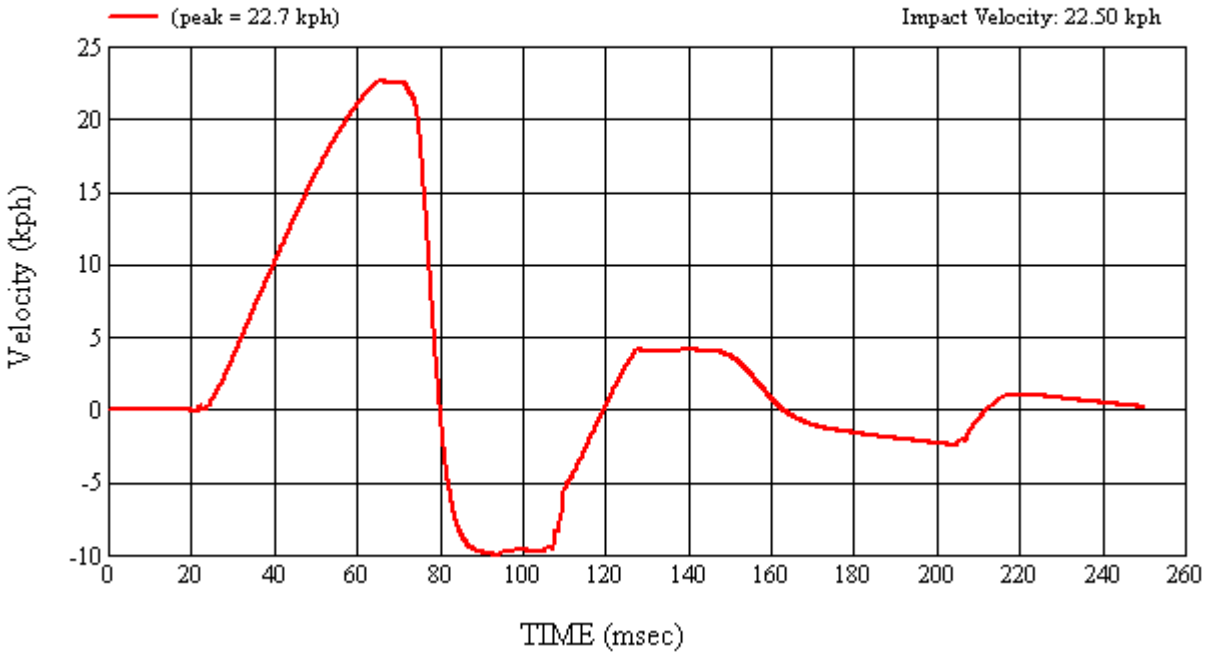


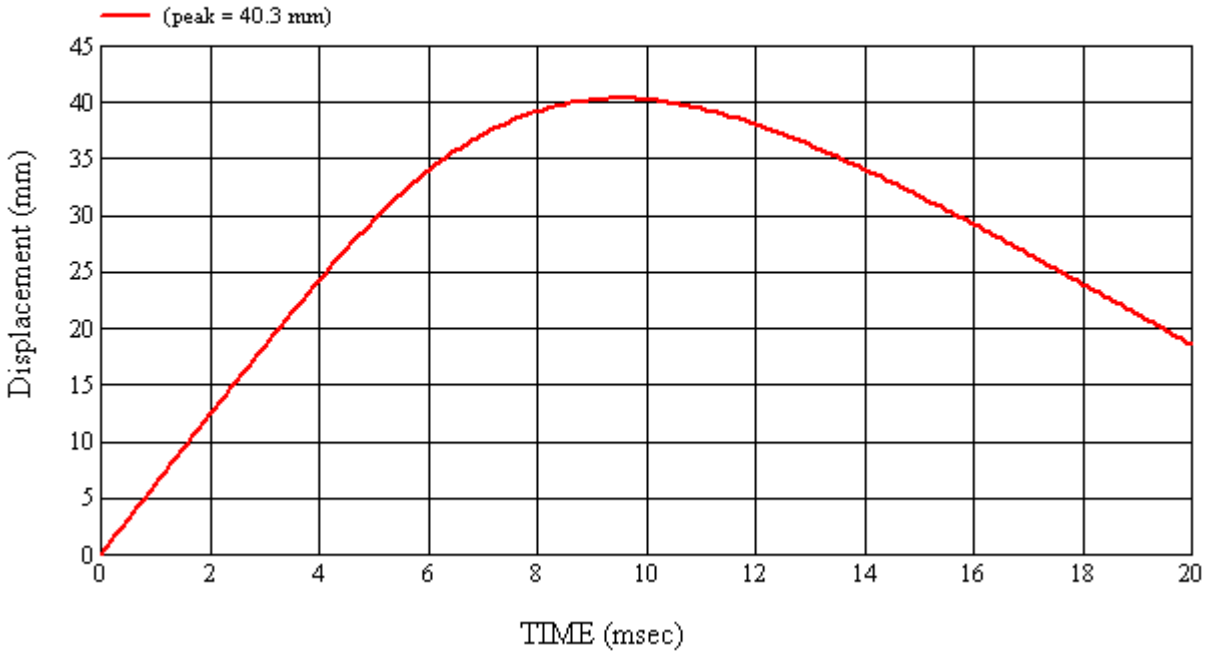


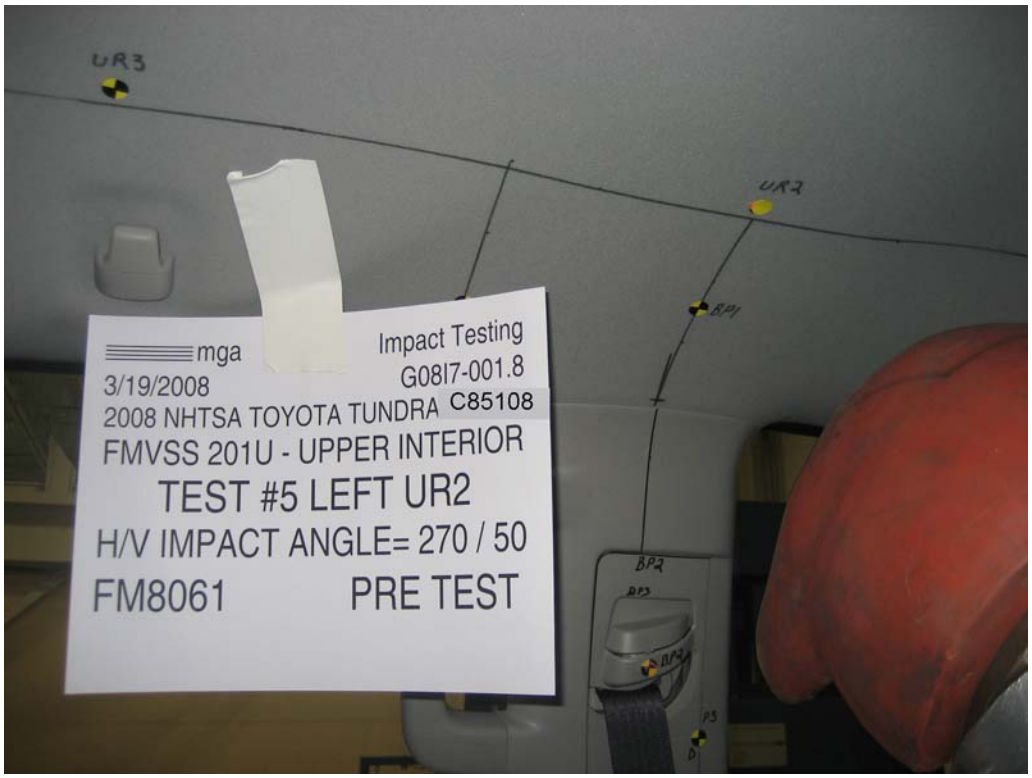

(peak = 118.6 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

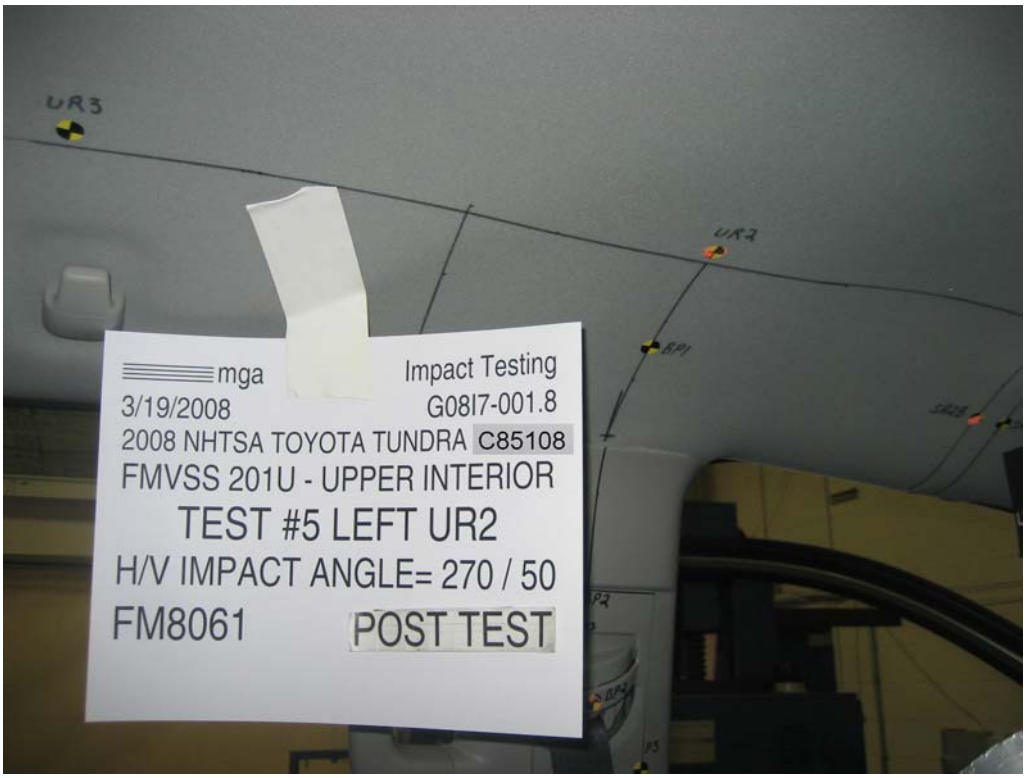

(peak = 4.2 G)
Head Y (G)
5
4
3
2
1
0
-1
-2
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

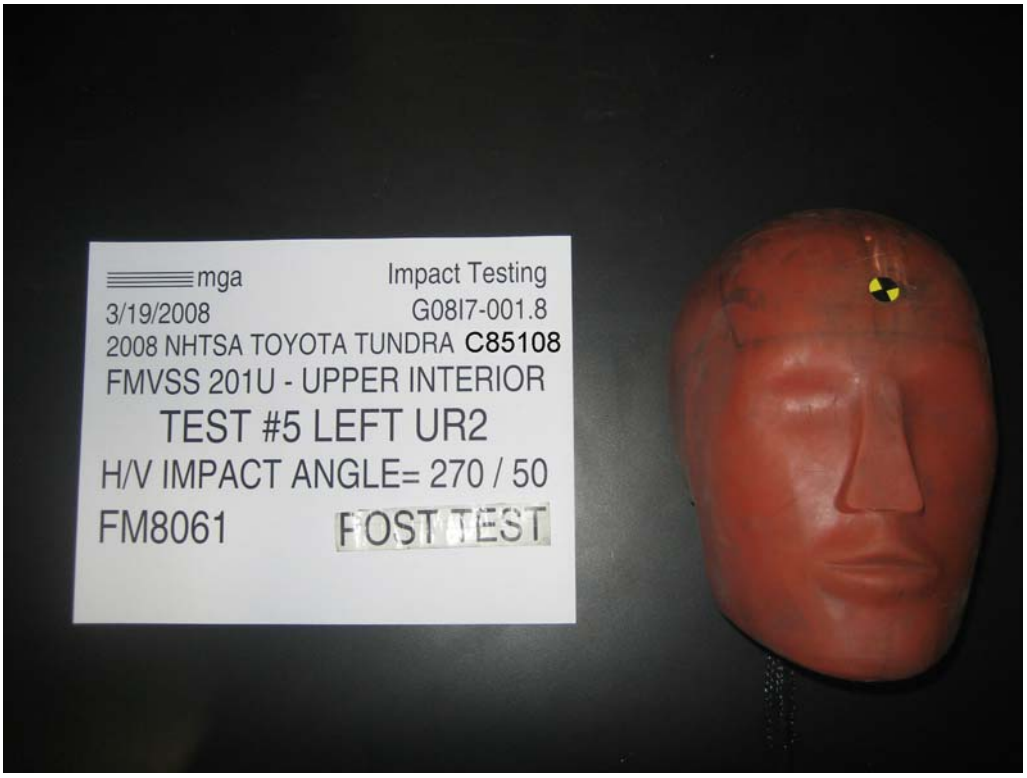

(peak = 22.3 G)
Head Z (G)
25
20
15
10
5
0
-5
-10
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 22.7 kph)
Impact Velocity: 22.50 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 40.3 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


UR3
UR2
BP1
BP2
BP3
mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT UR2
H/V IMPACT ANGLE= 270 / 50
FM8061
PRE TEST


UR3
UR2
mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT UR2
H/V IMPACT ANGLE= 270 / 50
FM8061
POST TEST


mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT UR2
H/V IMPACT ANGLE= 270 / 50
FM8061
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): UR2Left

Temperature:23C

MGA Test Reference No.:FM8061

Humidity:33%

Approach Horizontal Angles:270º

Time of Test:10:50:28 AM

Approach Vertical Angles:50º

FMH Serial No:[035]

Additional Description:@ BPR

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
438	360	8.1	23.2	18	4 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

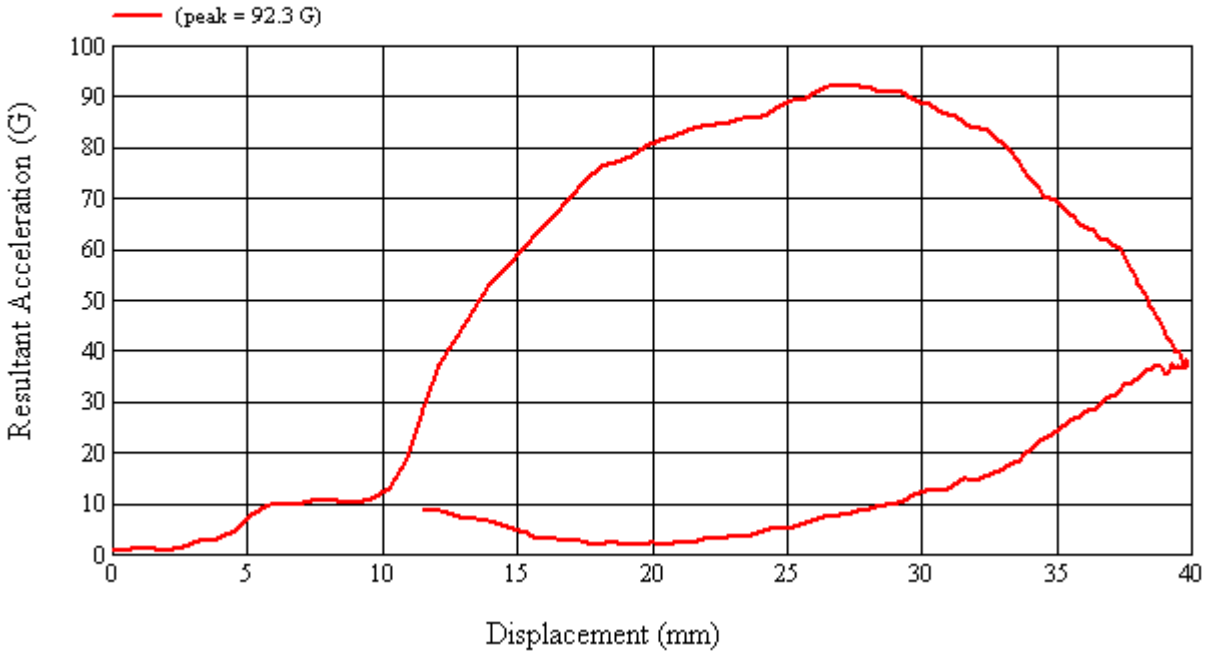
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

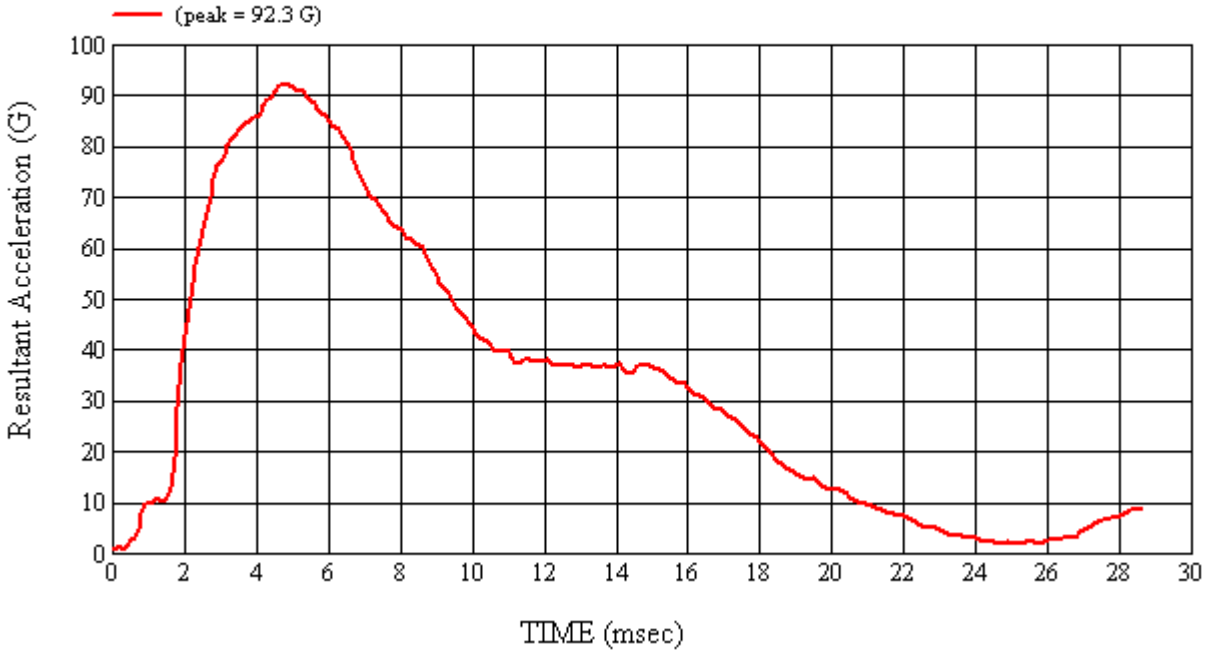
No visible damage.

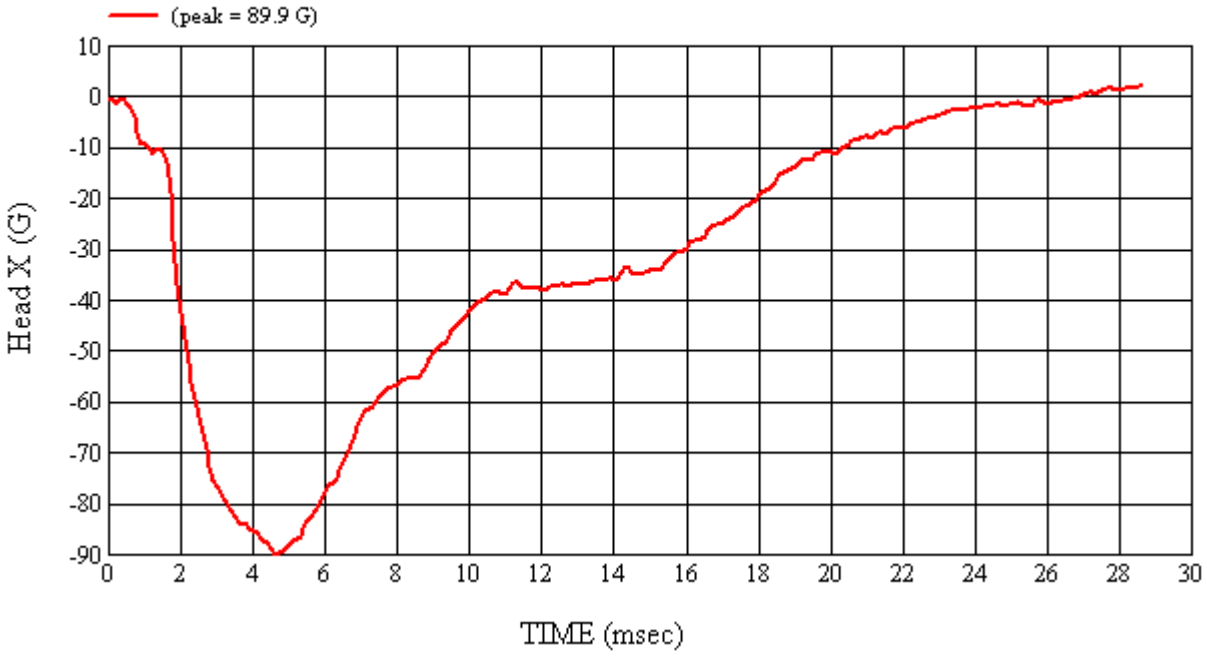
Recorded By: _____ Approved By*: _____ Date: 3/19/2008

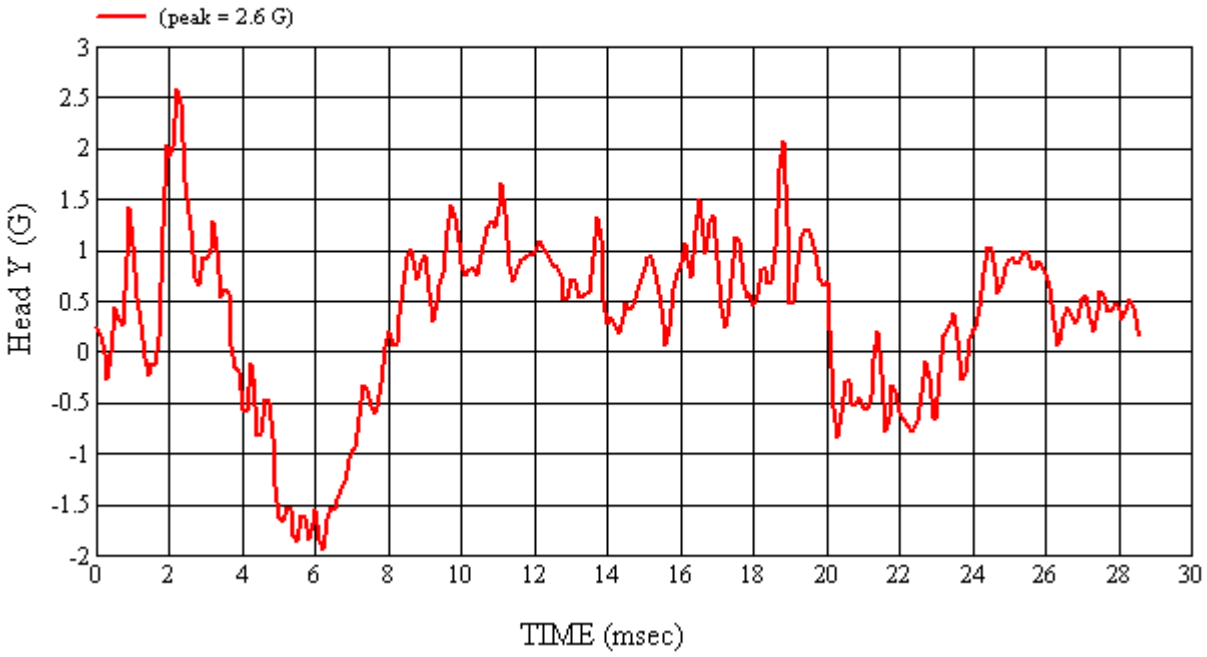
*Only necessary for NHTSA (Government) Compliance testing.

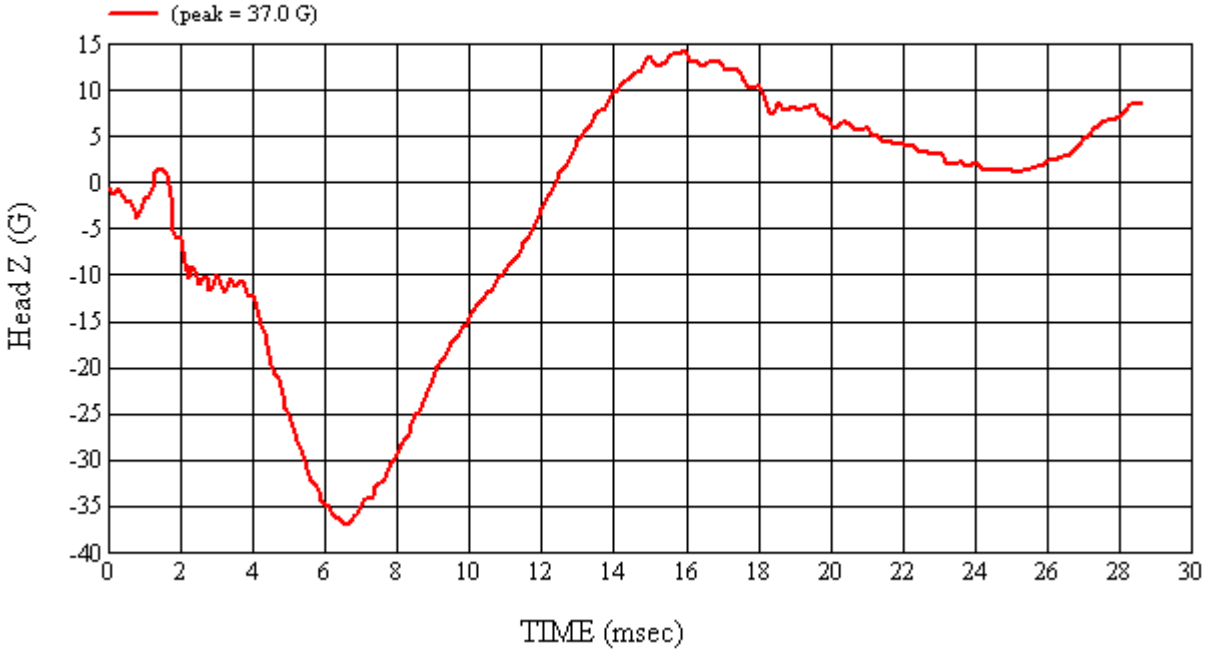
MGA Test #: FM8061 Target Location: UR2, Left Side Test Date: 3/19/2008

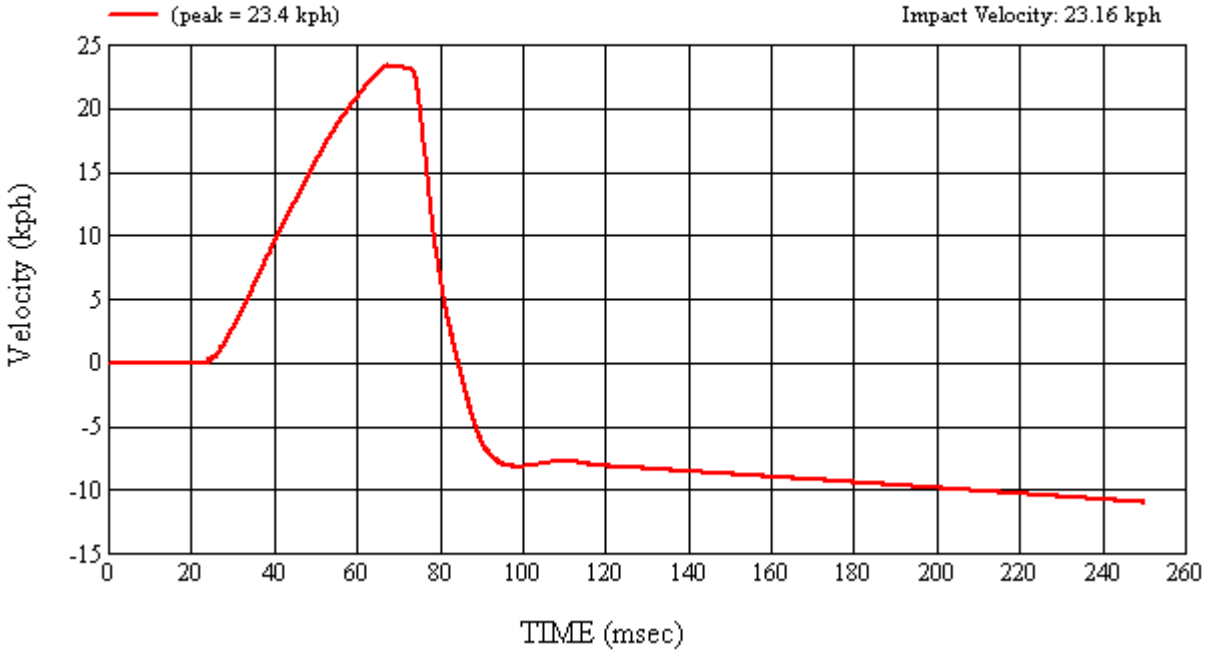


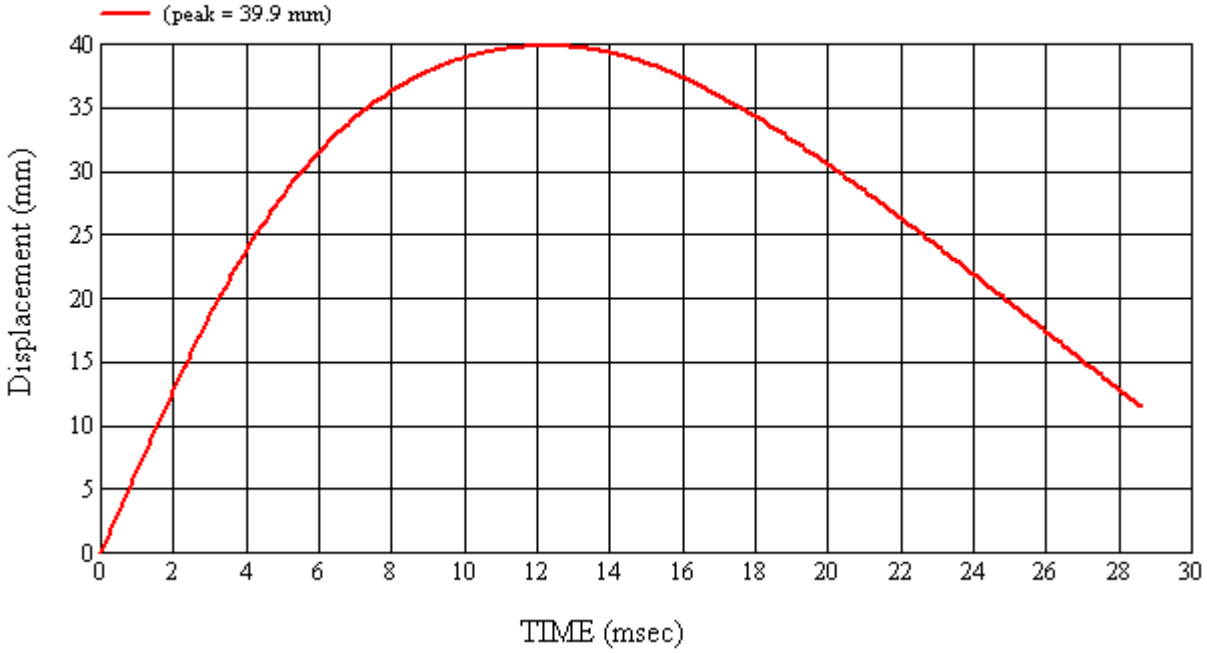


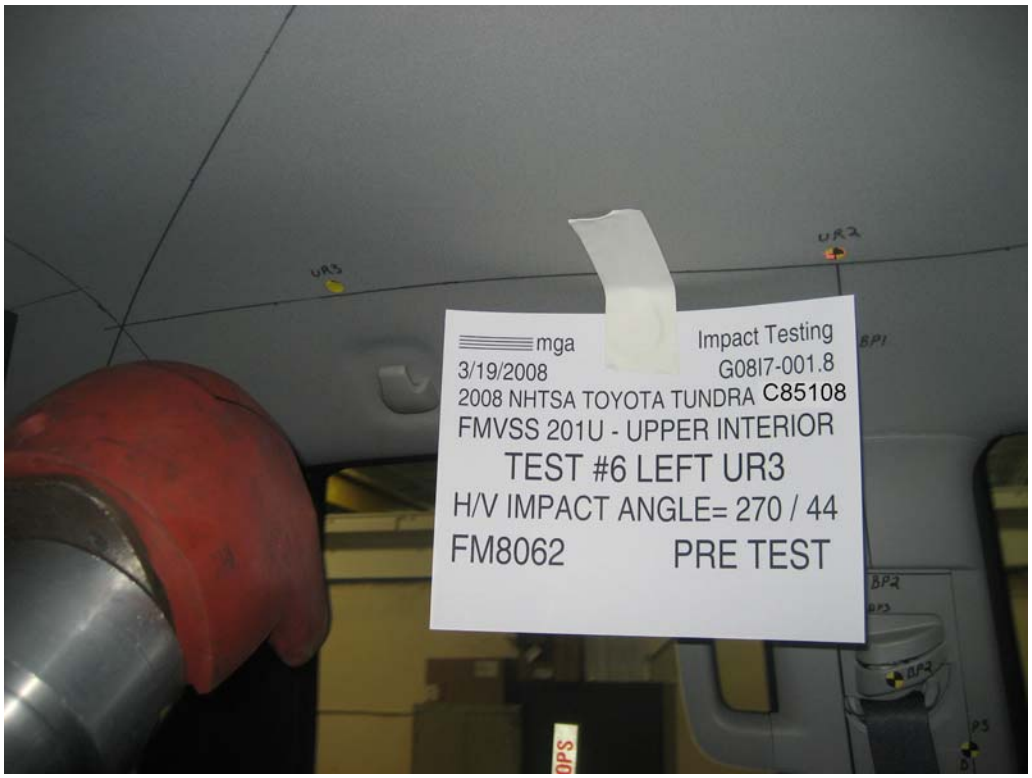

(peak = 89.9 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)

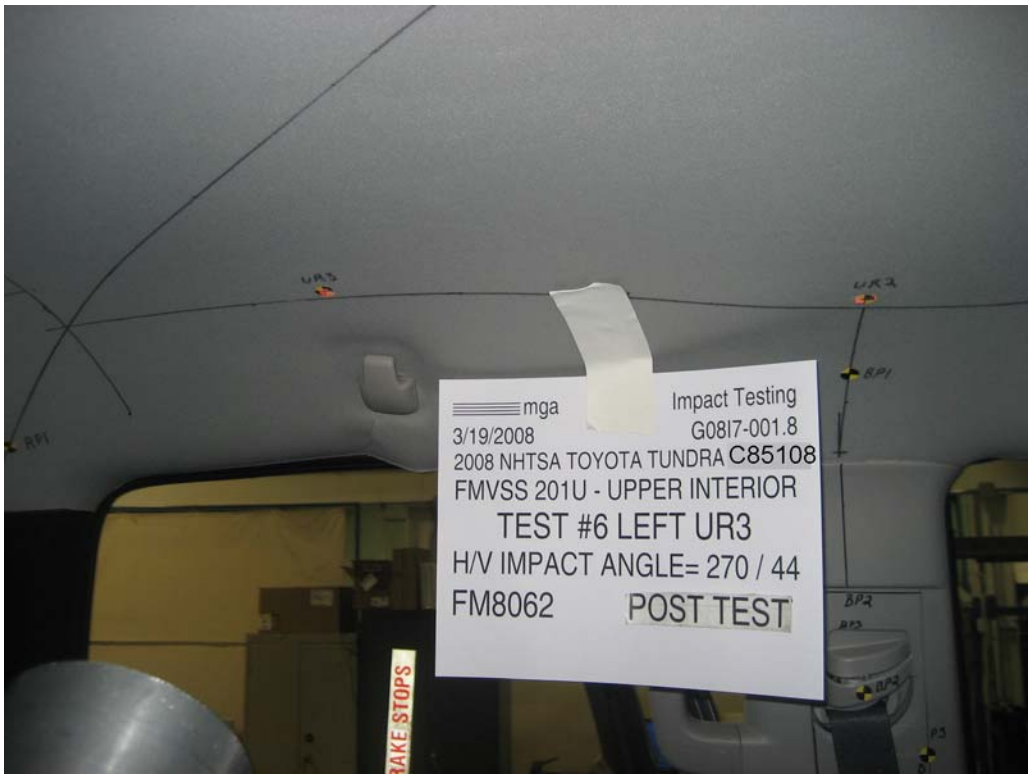

(peak = 2.6 G)
Head Y (G)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)


(peak = 37.0 G)
Head Z (G)
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)


(peak = 23.4 kph)
Impact Velocity: 23.16 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 39.9 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)


mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT UR3
H/V IMPACT ANGLE= 270 / 44
FM8062
PRE TEST


mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT UR3
H/V IMPACT ANGLE= 270 / 44
FM8062
POST TEST


mga
Impact Testing
3/19/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT UR3
H/V IMPACT ANGLE= 270 / 44
FM8062
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): UR3Left

Temperature:23C

MGA Test Reference No.:FM8062

Humidity:33%

Approach Horizontal Angles:270º

Time of Test:11:56:24 AM

Approach Vertical Angles:44º

FMH Serial No:[037]

Additional Description:@ Rear side rail over coat hook

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
397	306	12.5	23.5	25	4 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

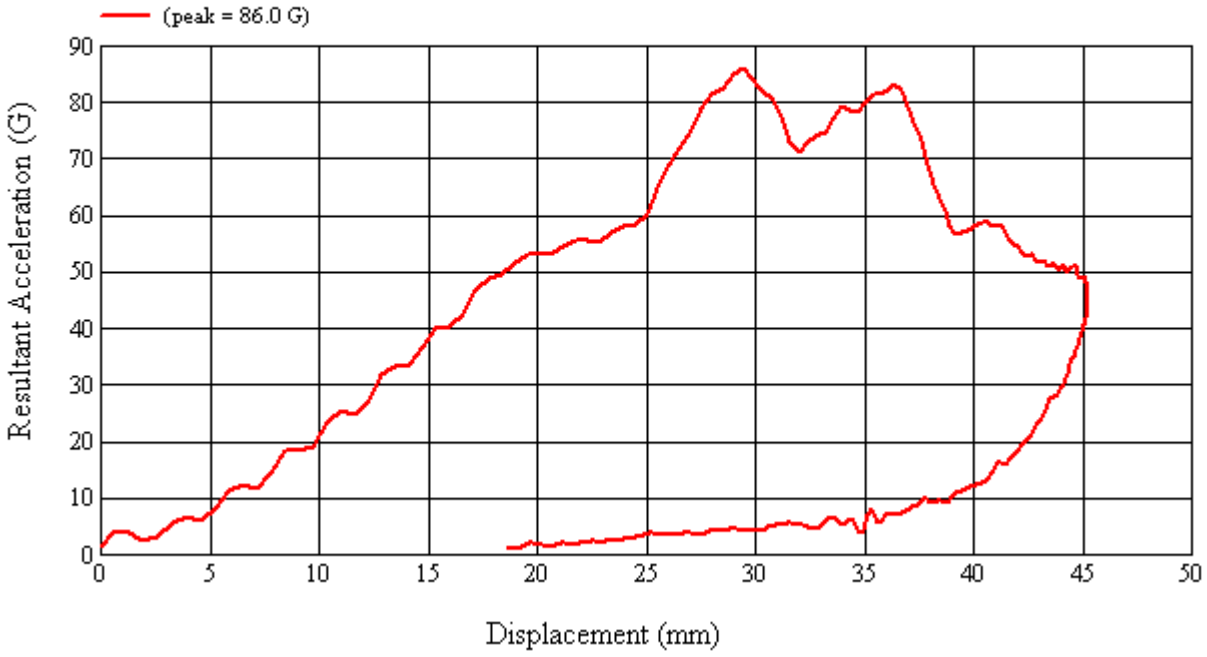
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

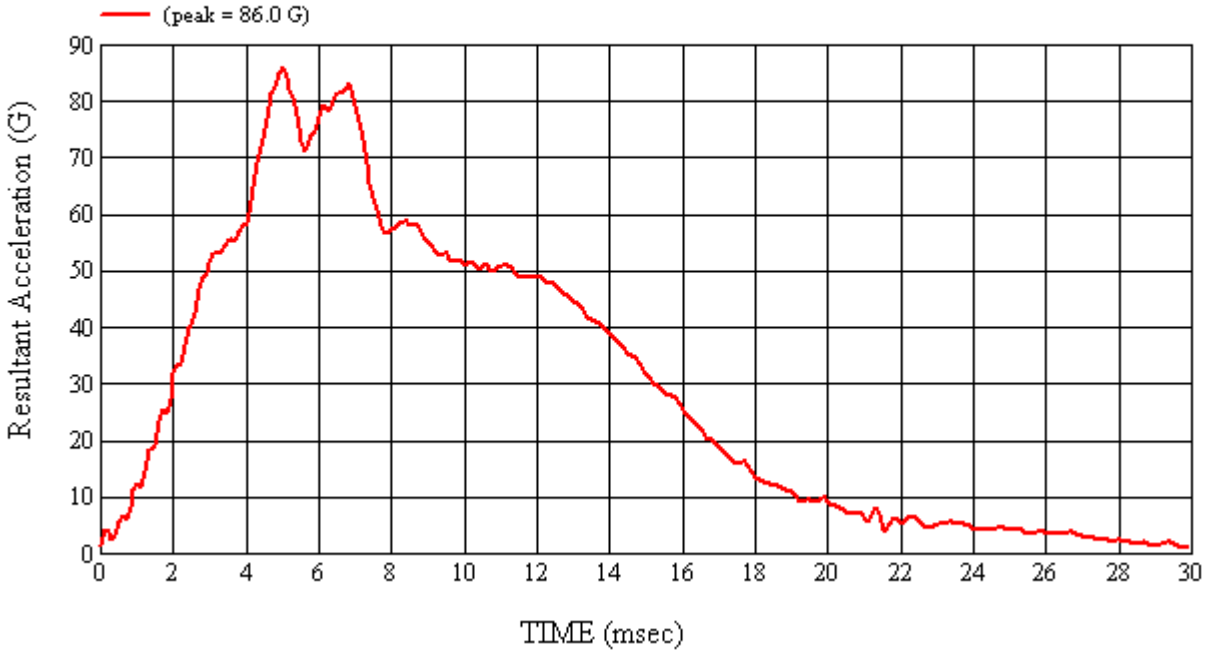
Headliner deformation.

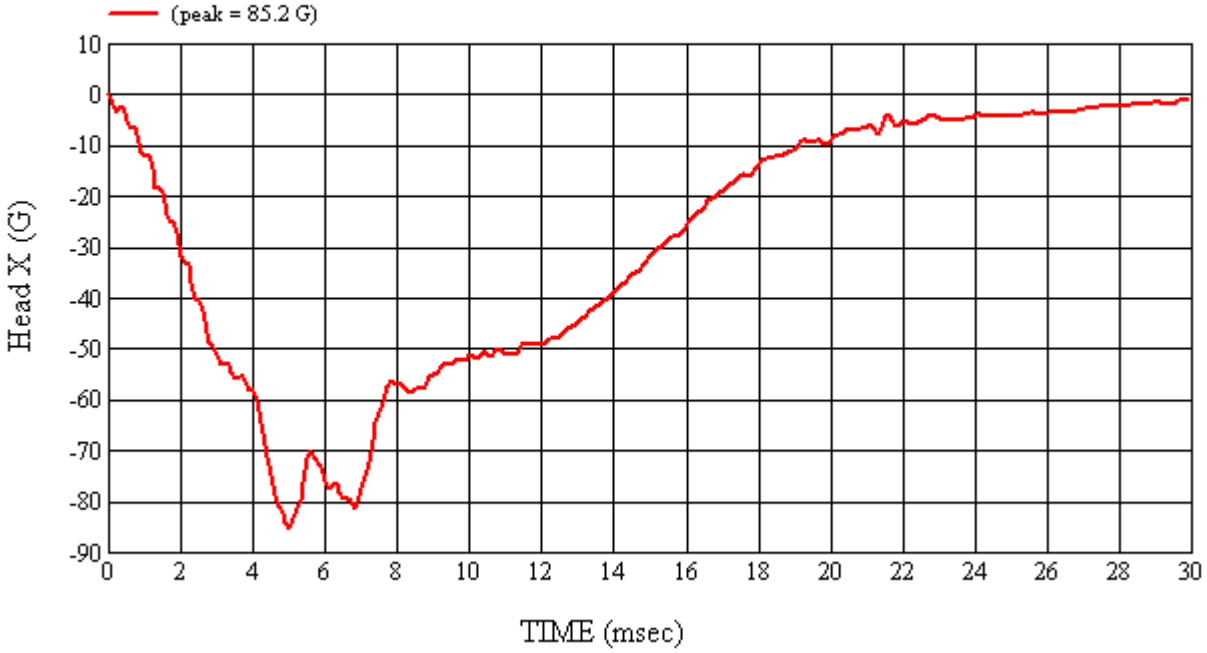
Recorded By: _____ Approved By*: _____ Date: 3/19/2008

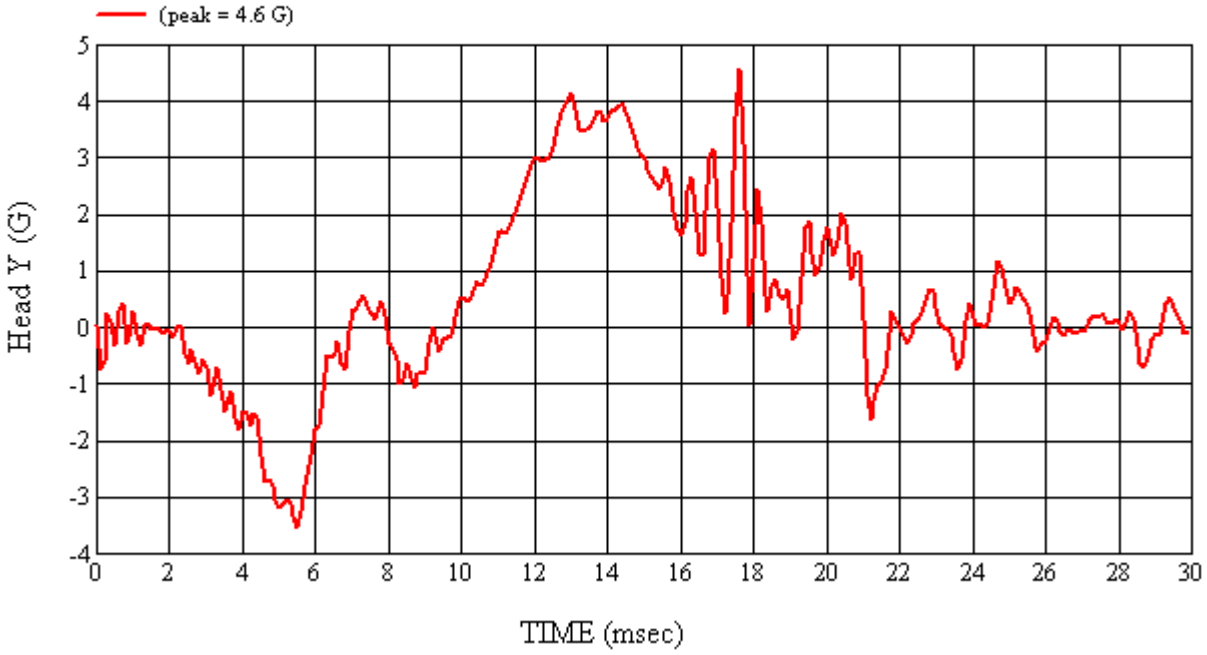
*Only necessary for NHTSA (Government) Compliance testing.

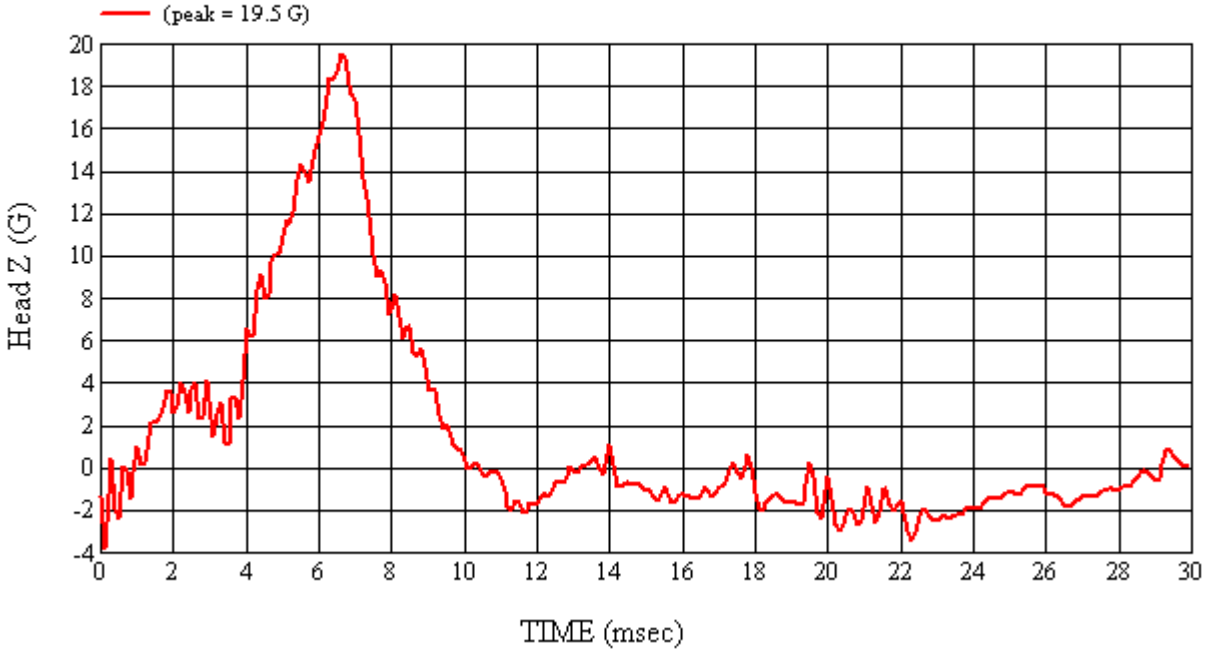
MGA Test #: FM8062 Target Location: UR3, Left Side Test Date: 3/19/2008

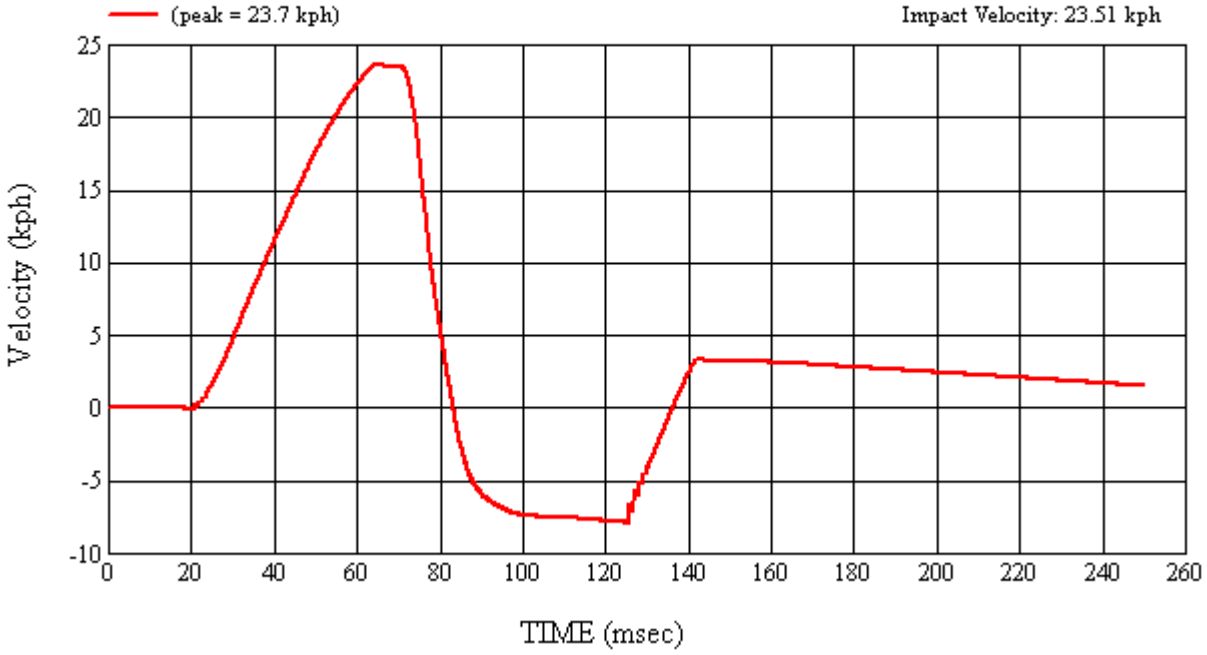


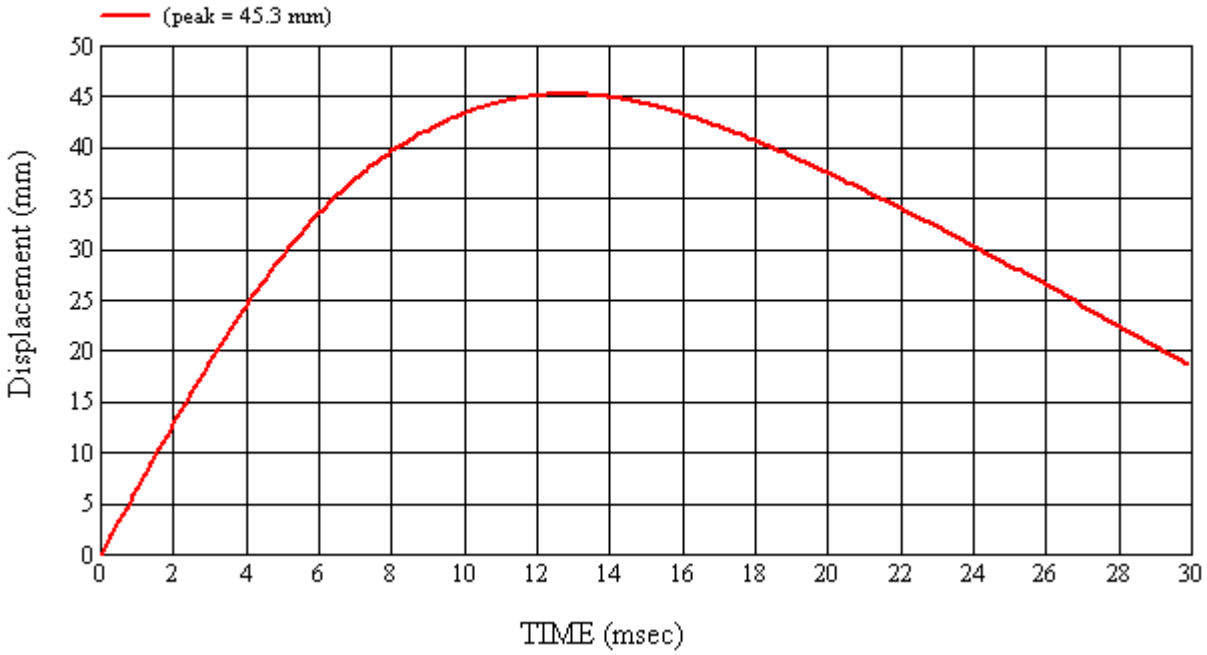



(peak = 85.2 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)


(peak = 4.6 G)
Head Y (G)
5
4
3
2
1
0
-1
-2
-3
-4
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)

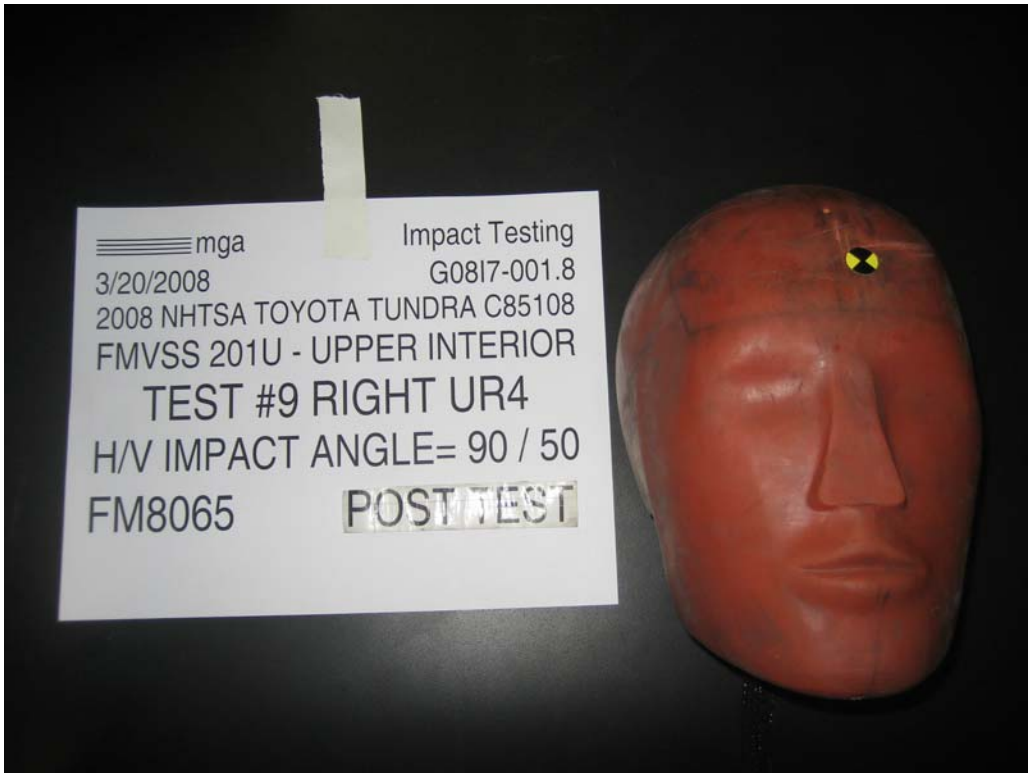

(peak = 19.5 G)
Head Z (G)
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.51 kph
Velocity (kph)
TIME (msec)


(peak = 45.3 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
50
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
TIME (msec)


C85108
FM8065
mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
FM8065
PRE TEST


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
FM8065
POST TEST


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
FM8065
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): UR4Right

Temperature:22C

MGA Test Reference No.:FM8065

Humidity:21%

Approach Horizontal Angles:90º

Time of Test:10:38:06 AM

Approach Vertical Angles:50º

FMH Serial No:[035]

Additional Description:@ SR2B

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
417	332	14.1	23.5	19	11 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

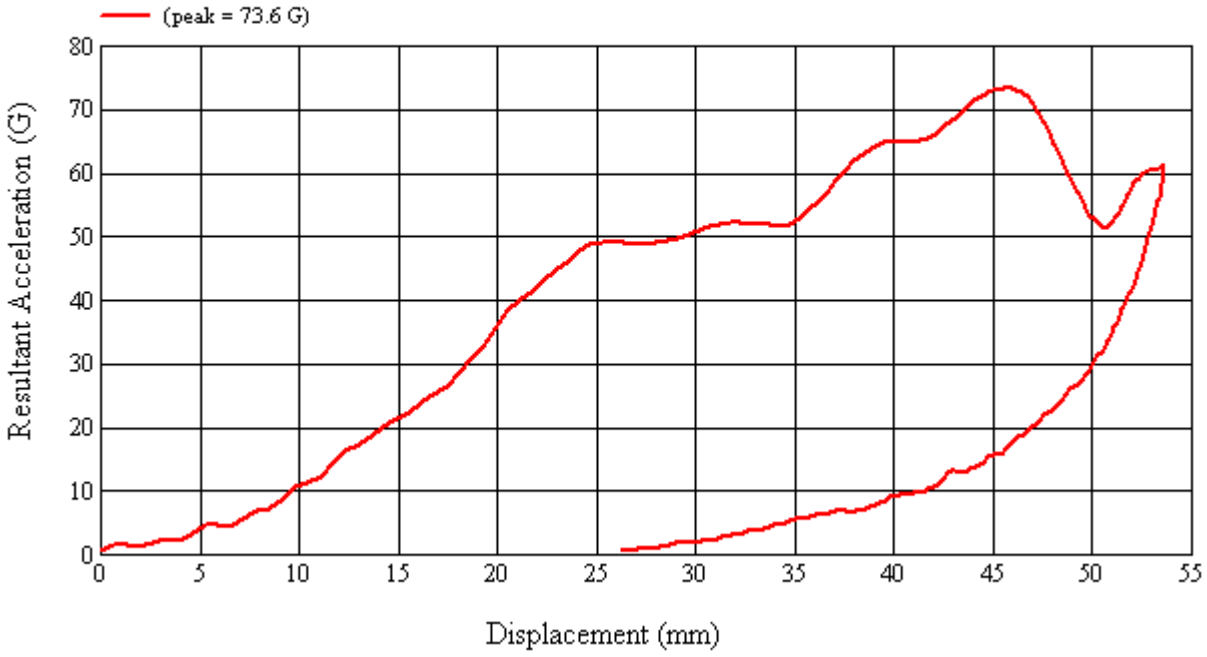
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

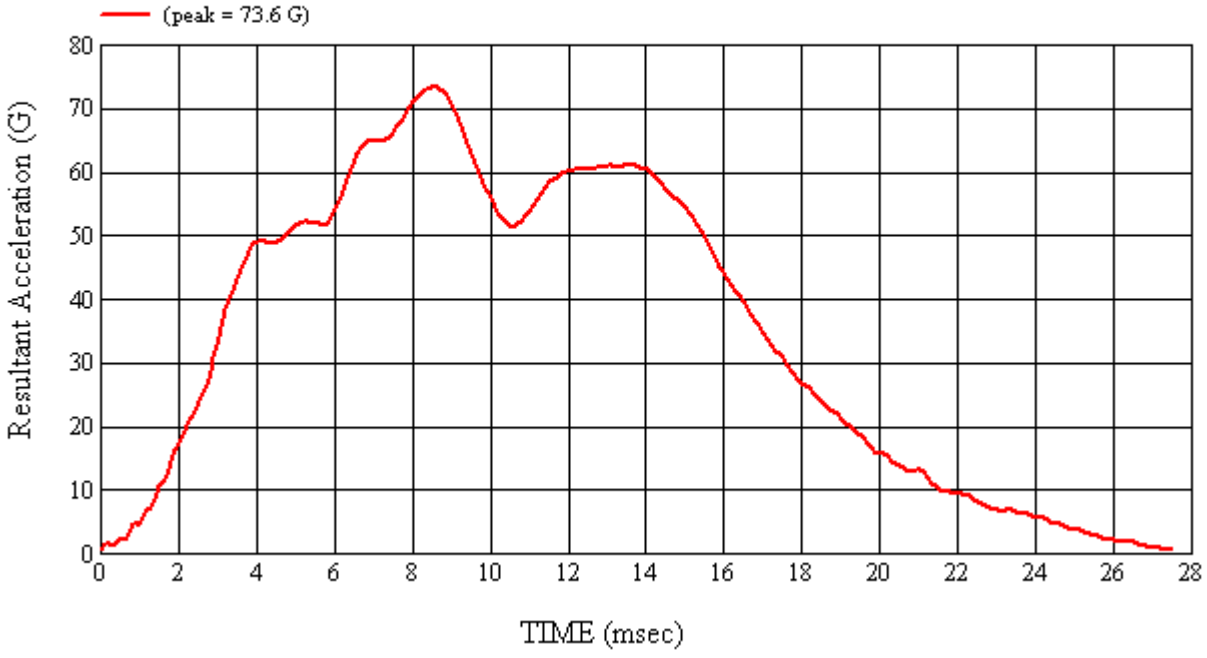
Headliner deformation.

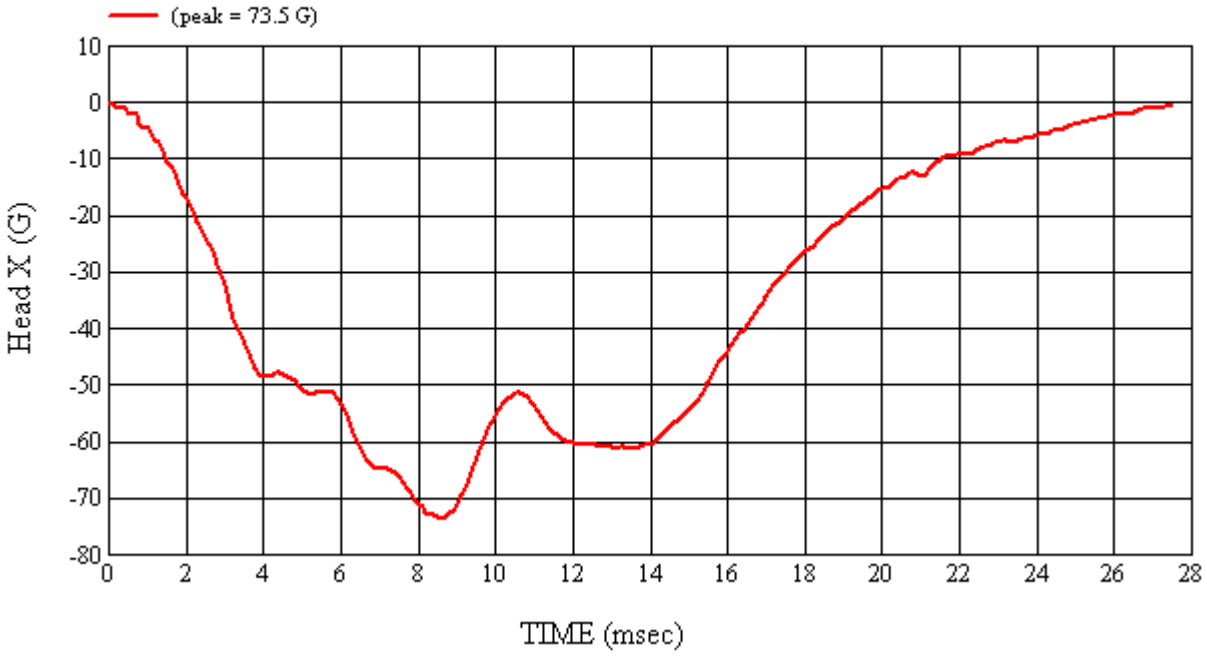
Recorded By: _____ Approved By*: _____ Date: 3/20/2008

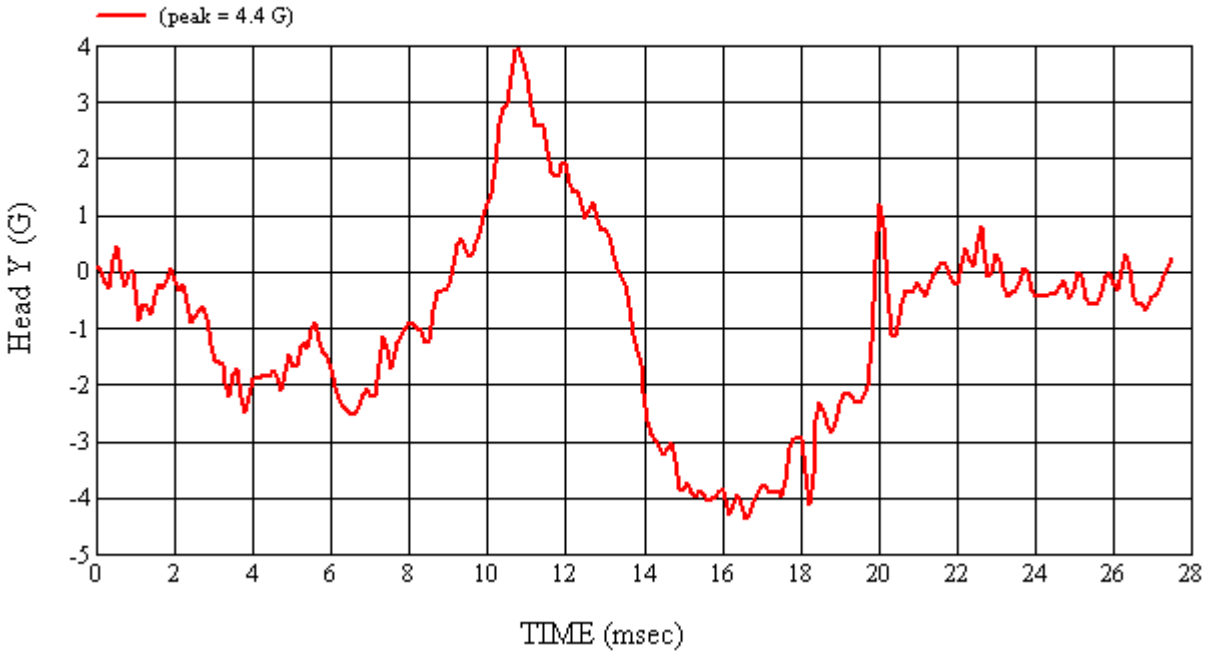
*Only necessary for NHTSA (Government) Compliance testing.

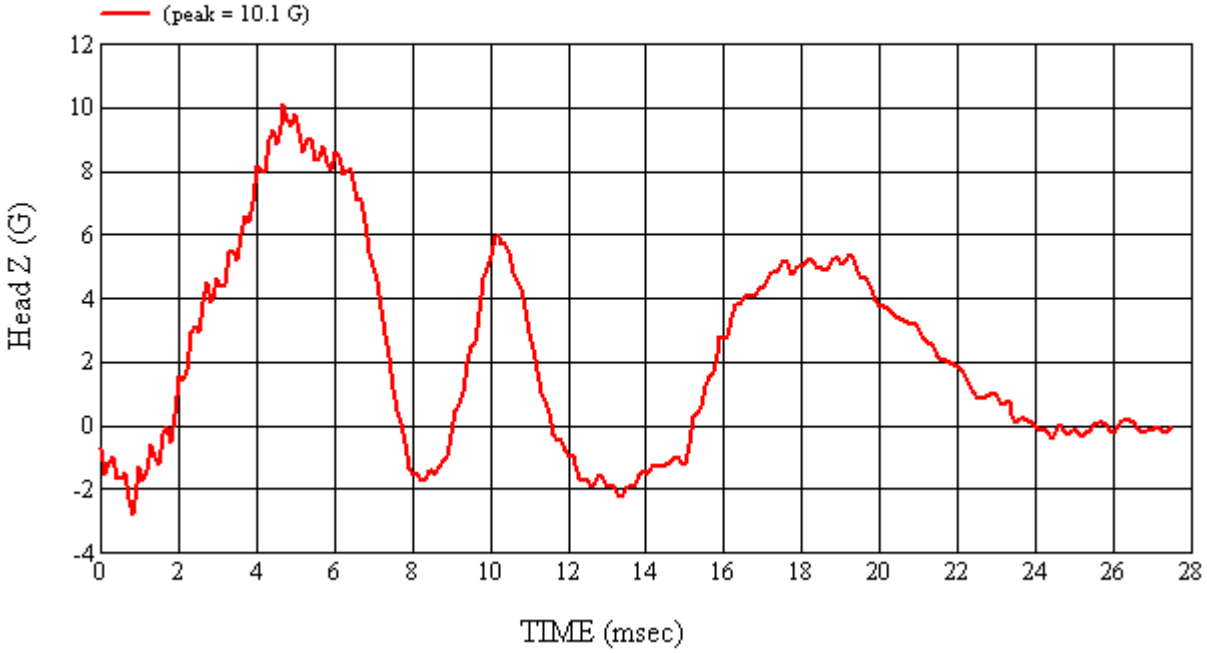
MGA Test #: FM8065 Target Location: UR4, Right Side Test Date: 3/20/2008

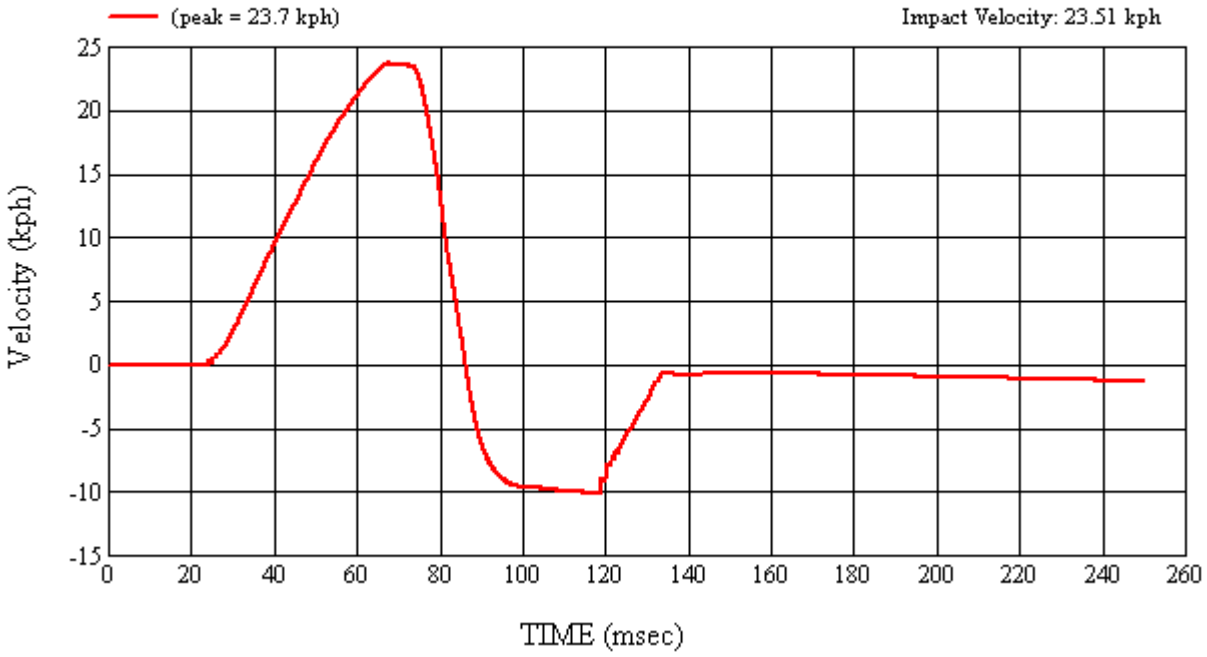


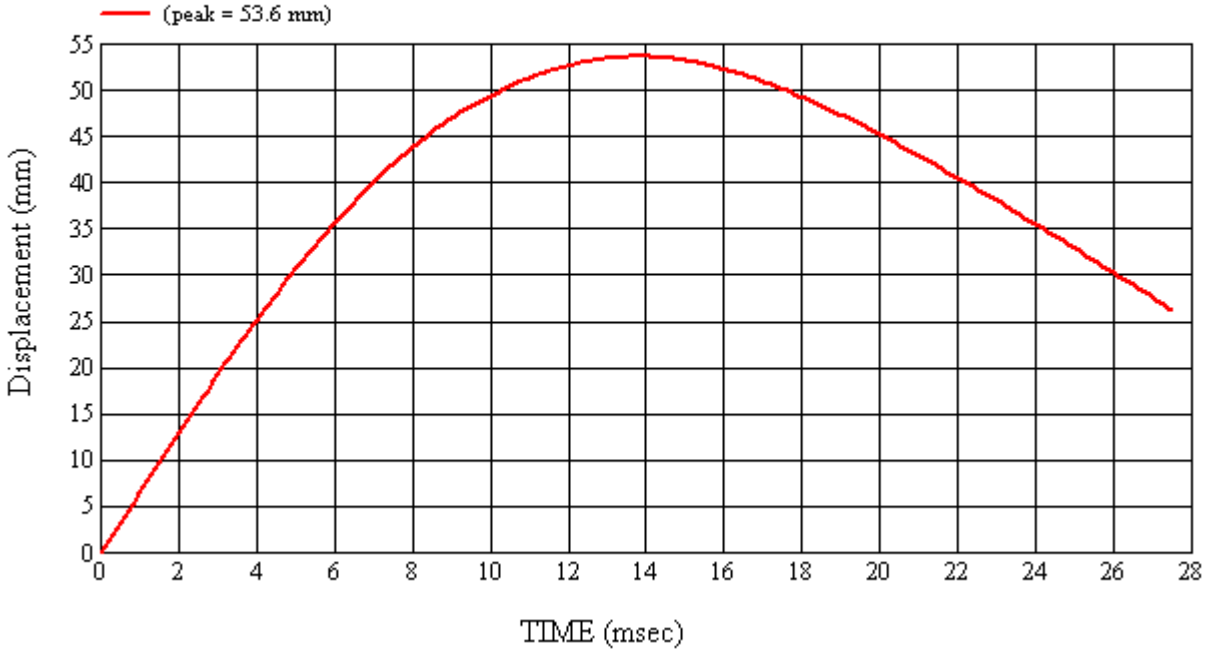


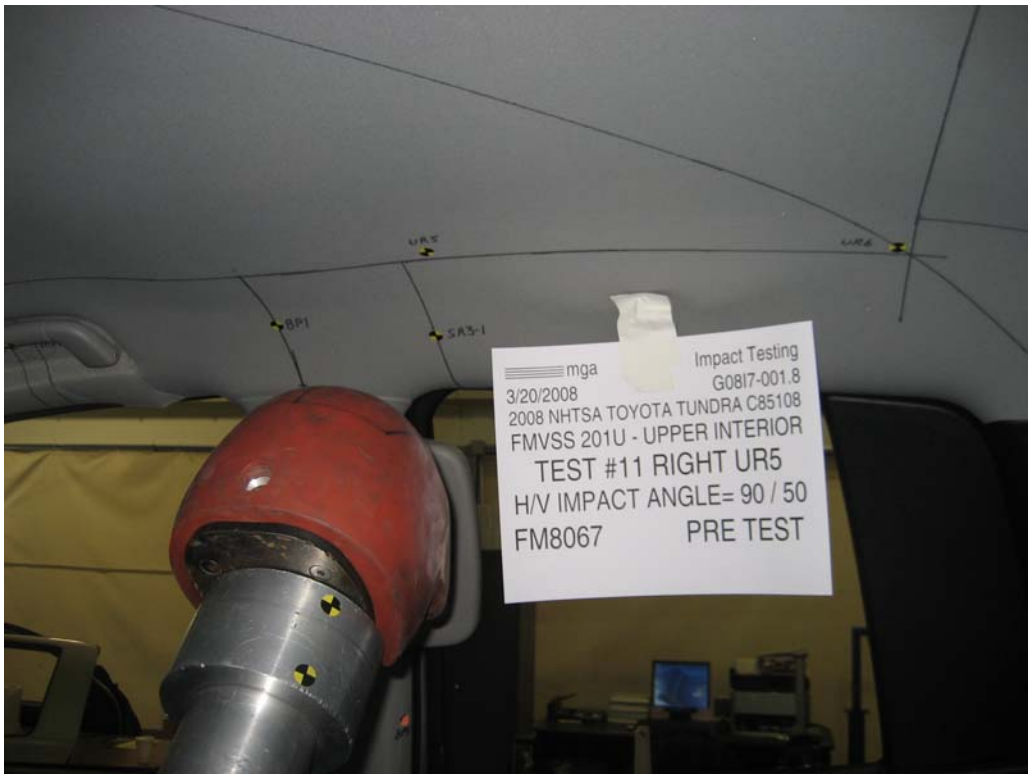

(peak = 73.5 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


(peak = 4.4 G)
Head Y (G)
4
3
2
1
0
-1
-2
-3
-4
-5
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)

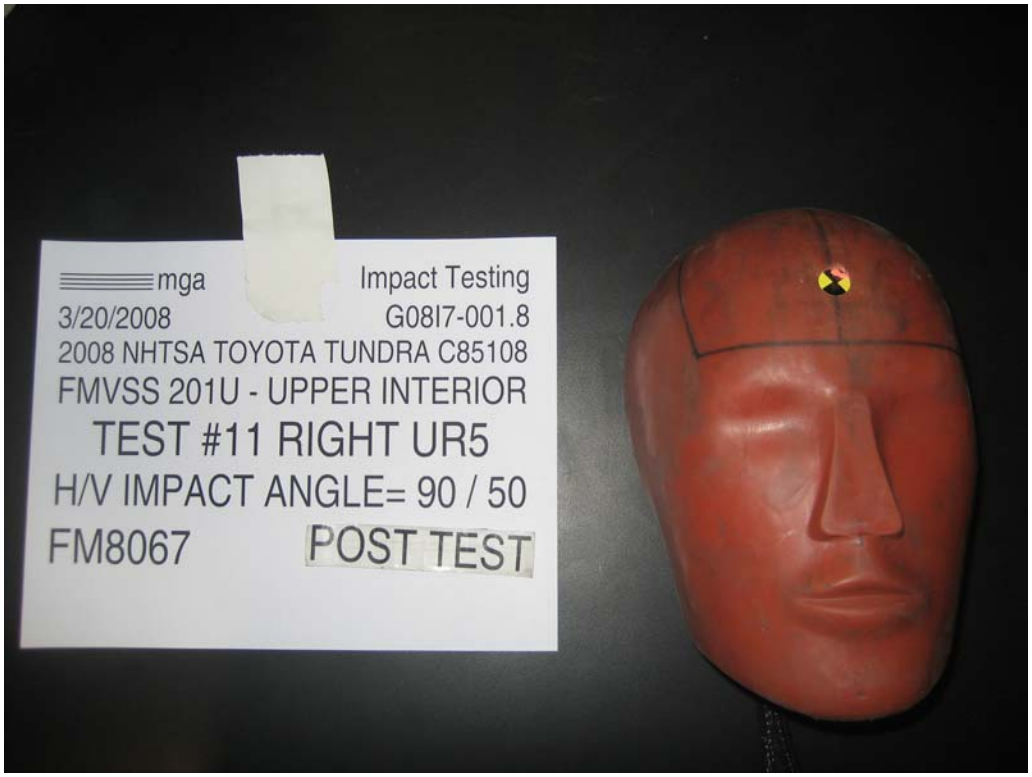

(peak = 10.1 G)
Head Z (G)
12
10
8
6
4
2
0
-2
-4
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.51 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 53.6 mm)
Displacement (mm)
55
50
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
TIME (msec)


UR5
UR6
BP1
SA3-1
mga
Impact Testing
G08I7-001.8
3/20/2008
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR5
H/V IMPACT ANGLE= 90 / 50
FM8067
PRE TEST


UR5
BP1
SA3-1
BP2
mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR5
H/V IMPACT ANGLE= 90 / 50
FM8067
POST TEST


mga
Impact Testing
3/20/2008
G08I7-001.8
2008 NHTSA TOYOTA TUNDRA C85108
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR5
H/V IMPACT ANGLE= 90 / 50
FM8067
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G08I7-001.8 VEHICLE YR/MAKE/MODEL:2008/NHTSA/Toyota Tundra C85108

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): UR5Right

Temperature:22C

MGA Test Reference No.:FM8067

Humidity:20%

Approach Horizontal Angles:90º

Time of Test:2:14:08 PM

Approach Vertical Angles:50º

FMH Serial No:[038]

Additional Description:@ SR3-1

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
469	401	12.1	23.4	27	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

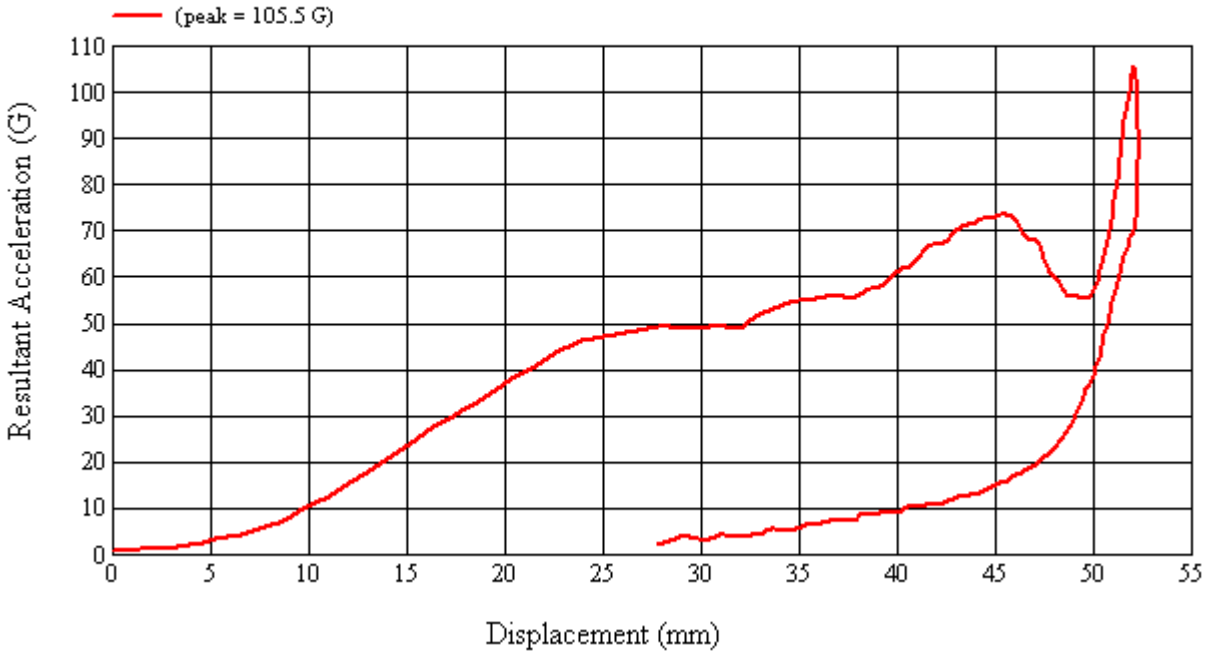
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

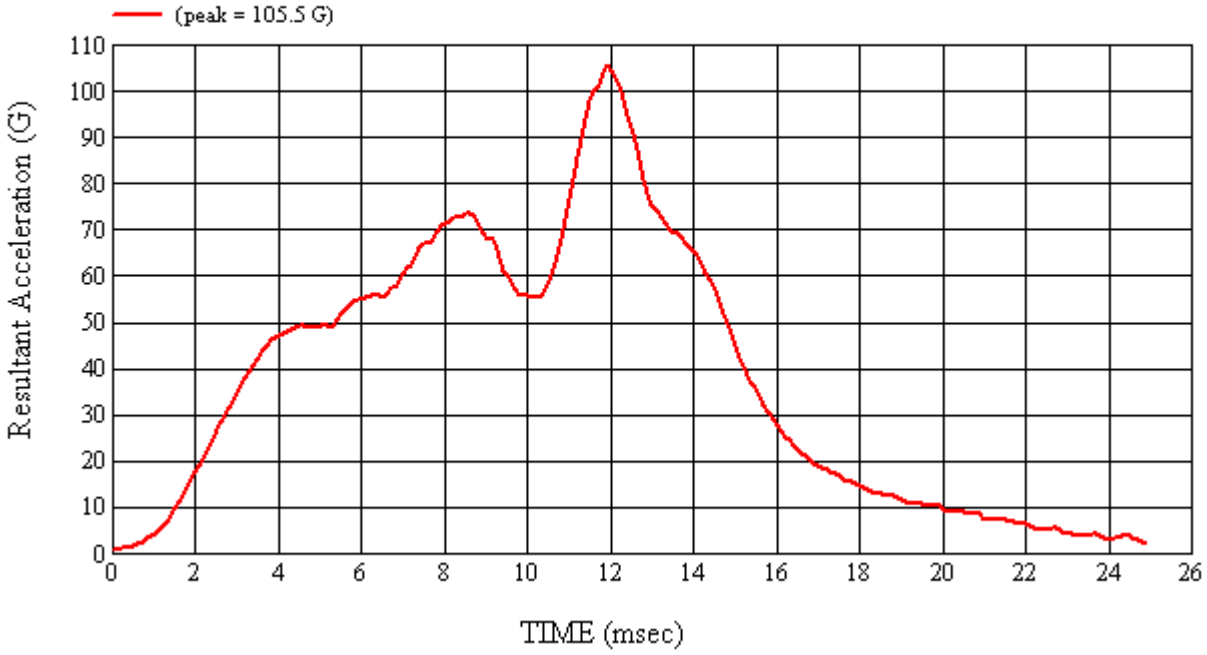
Headliner deformation.

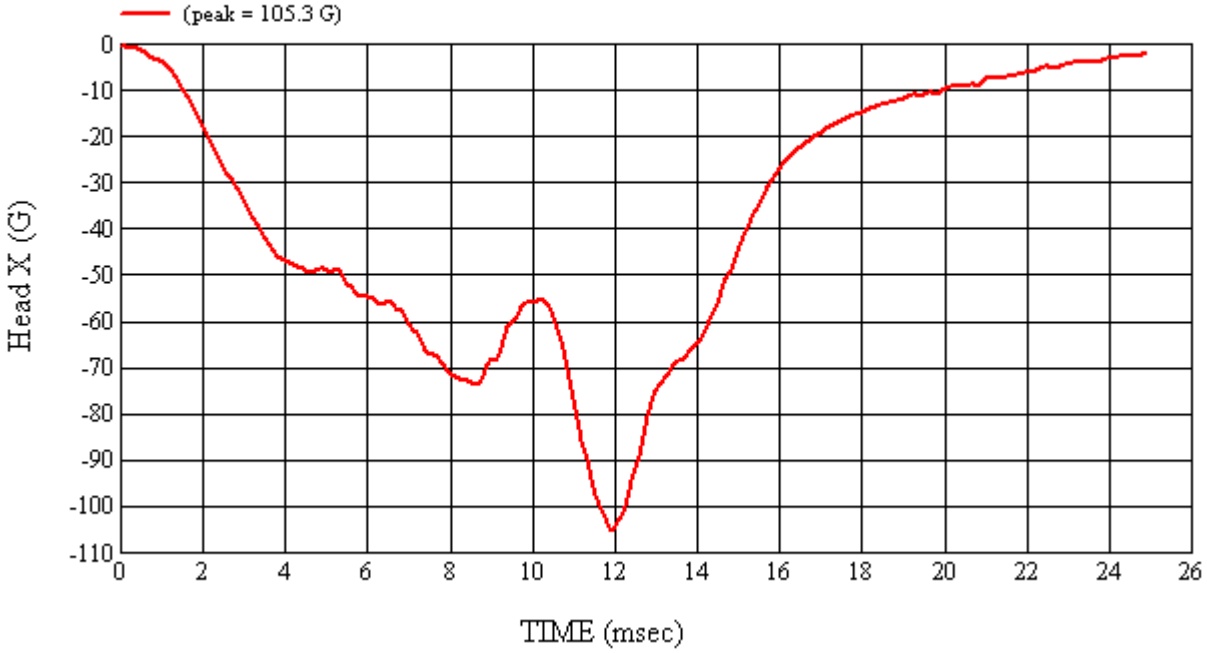
Recorded By: Louis Campbell Approved By*: Helen A. Kaleta Date: 3/20/2008

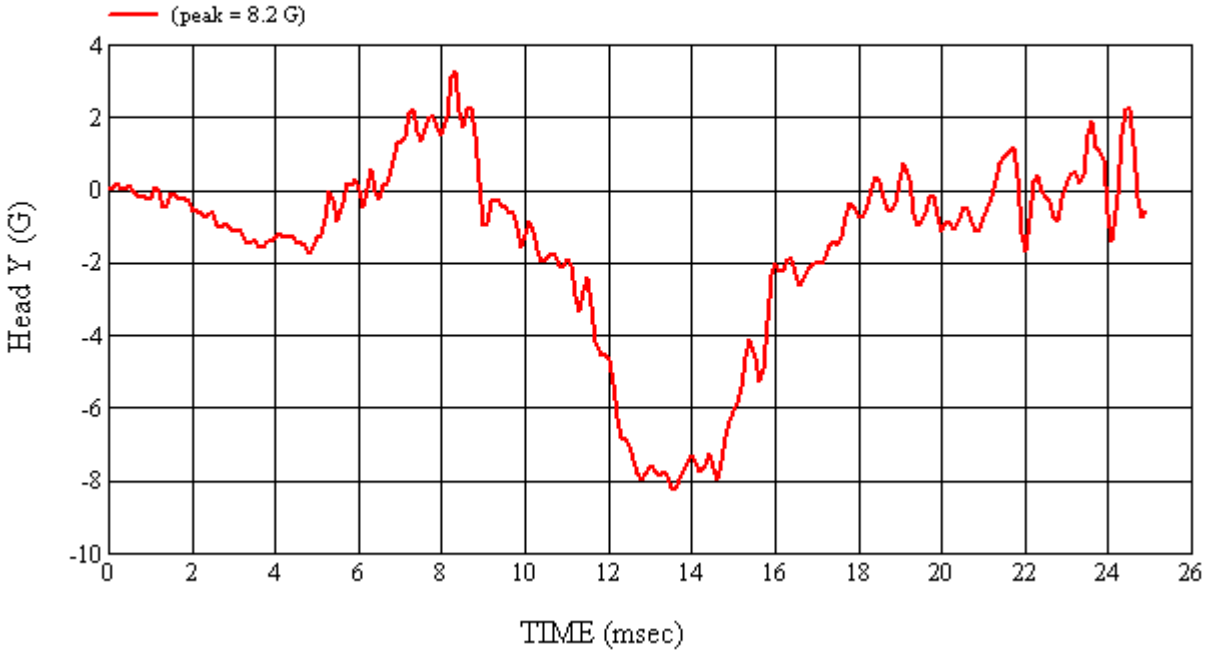
*Only necessary for NHTSA (Government) Compliance testing.

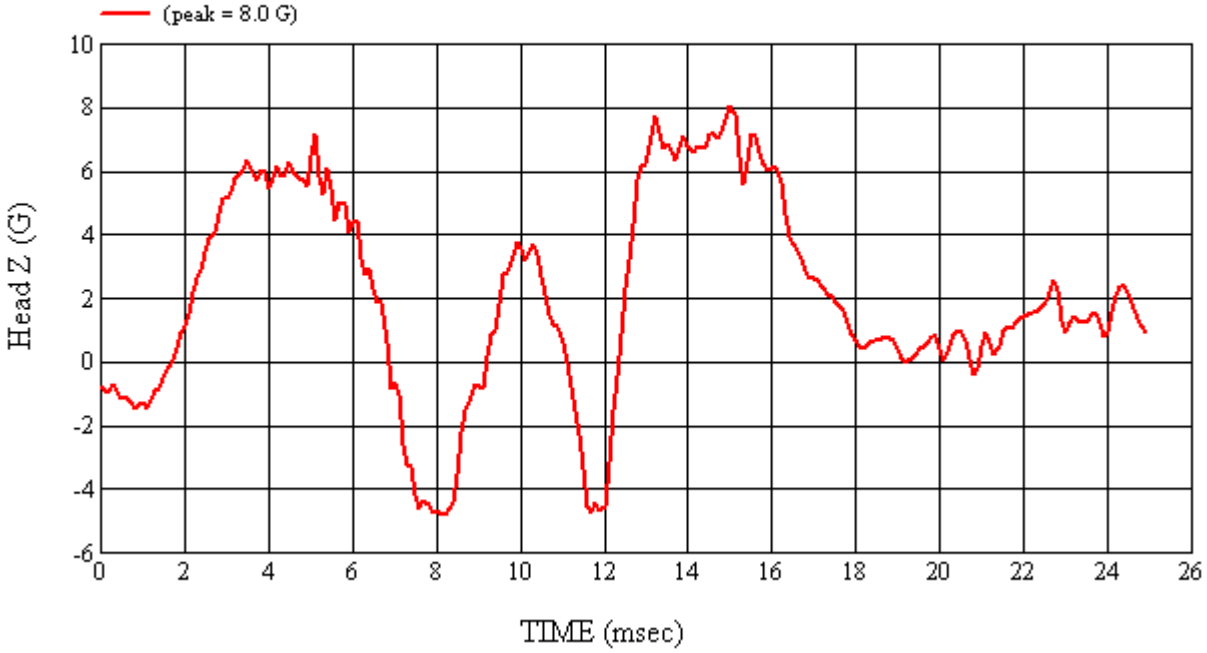
MGA Test #: FM8067 Target Location: UR5, Right Side Test Date: 3/20/2008

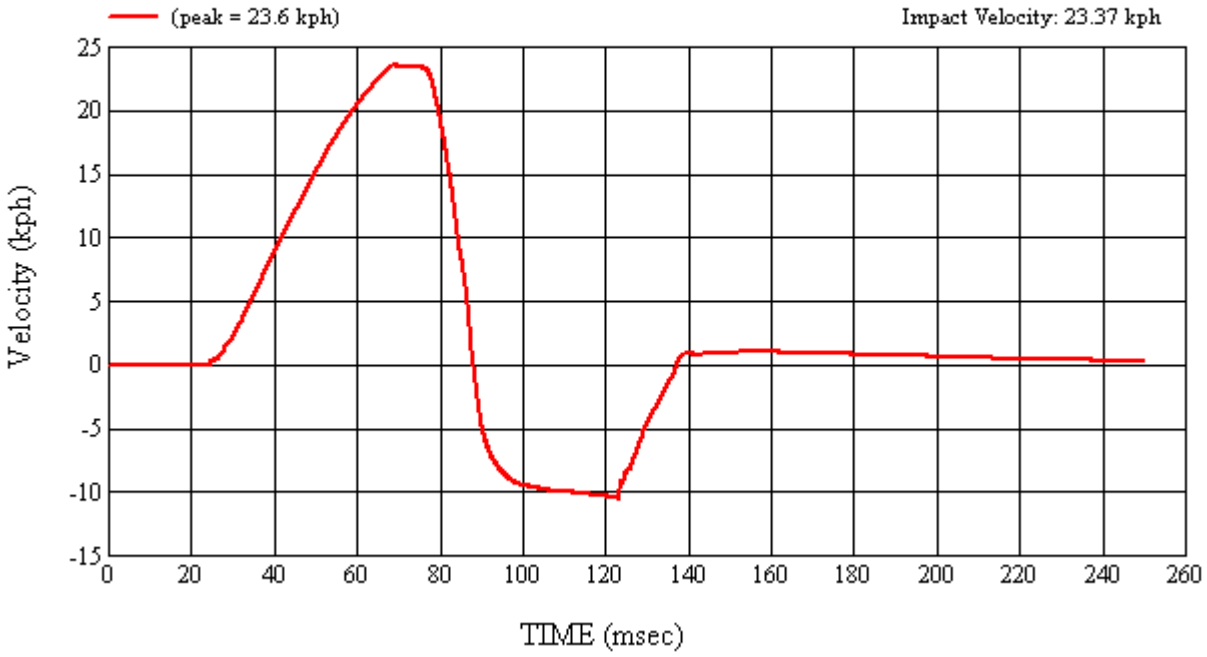


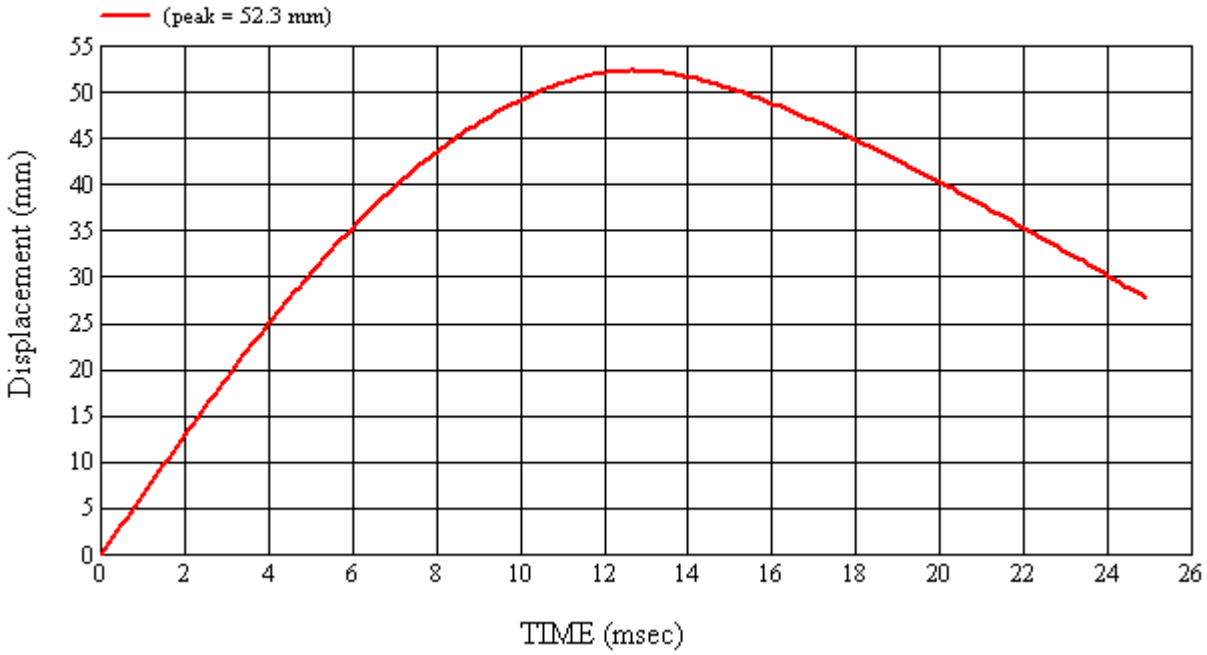



(peak = 105.3 G)
Head X (G)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 8.2 G)
Head Y (G)
4
2
0
-2
-4
-6
-8
-10
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 8.0 G)
Head Z (G)
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 23.6 kph)
Impact Velocity: 23.37 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 52.3 mm)
Displacement (mm)
55
50
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

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

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
*Digital Inclinometer	Mitutoyo	PRO 360 (MGA00071)	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 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	 Mitutoyo N/A Pro 360	 TPM057 -- 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	SW Scales	26032389	Weighing Vehicle	± .5 kg	Annual

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

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

TABLE 4-2 FMH CALIBRATION SUMMARY

FMH Serial #		Headform Calibration Date	Weight (lbs)	Temp (ºC)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#035	3/17/2008	10.08	22.0	19.5	235.1	7.4	Yes
Post	#035	3/24/2008	10.08	22.0	18.0	238.6	3.1	Yes
Pre	#037	3/17/2008	10.10	22.0	19.5	251.3	2.9	Yes
Post	#037	3/24/2008	10.10	22.0	18.0	248.5	3.4	Yes
Pre	#038	3/17/2008	9.92	22.0	19.5	243.6	12.3	Yes
Post	#038	3/24/2008	9.92	22.0	18.0	242.0	5.2	Yes
Pre	#072	3/17/2008	10.10	22.0	19.5	234.0	6.5	Yes
Post	#072	3/24/2008	10.10	22.0	18.0	235.9	6.4	Yes

4-1 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

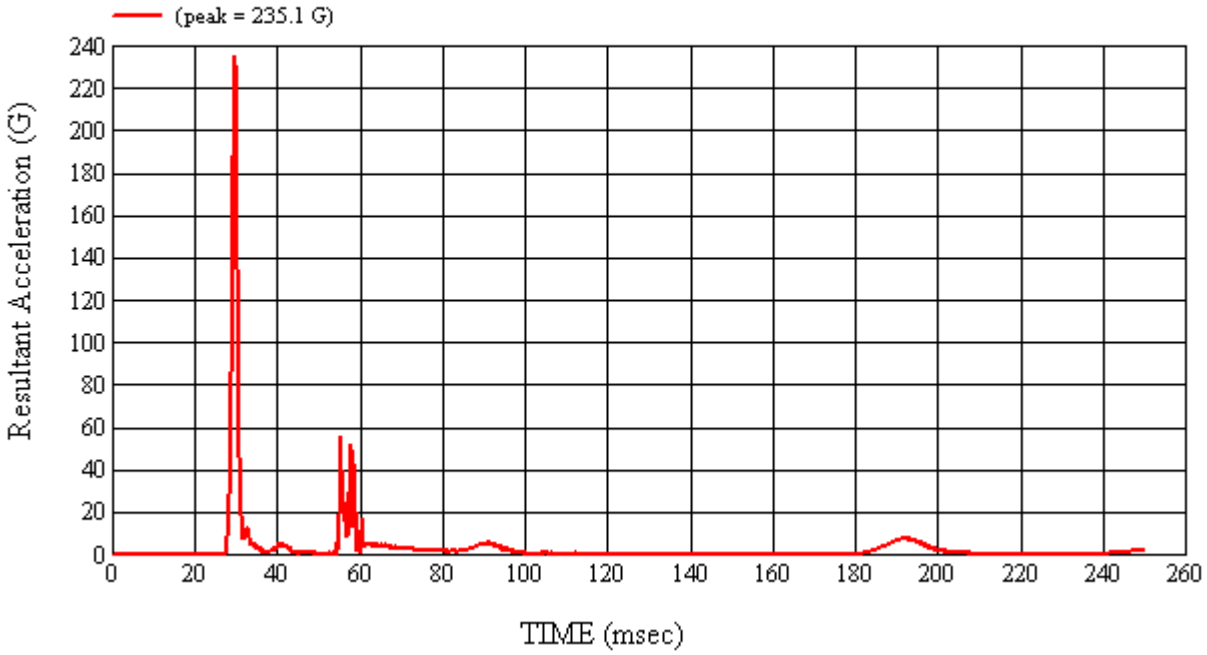
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 3/17/2008 CALIBRATION TIME: 11:40:58 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.08
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	19.5
Peak Resultant Acceleration	225 G's to 275 G's	235.1
Peak Lateral Acceleration	15 G's Maximum	7.4
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	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

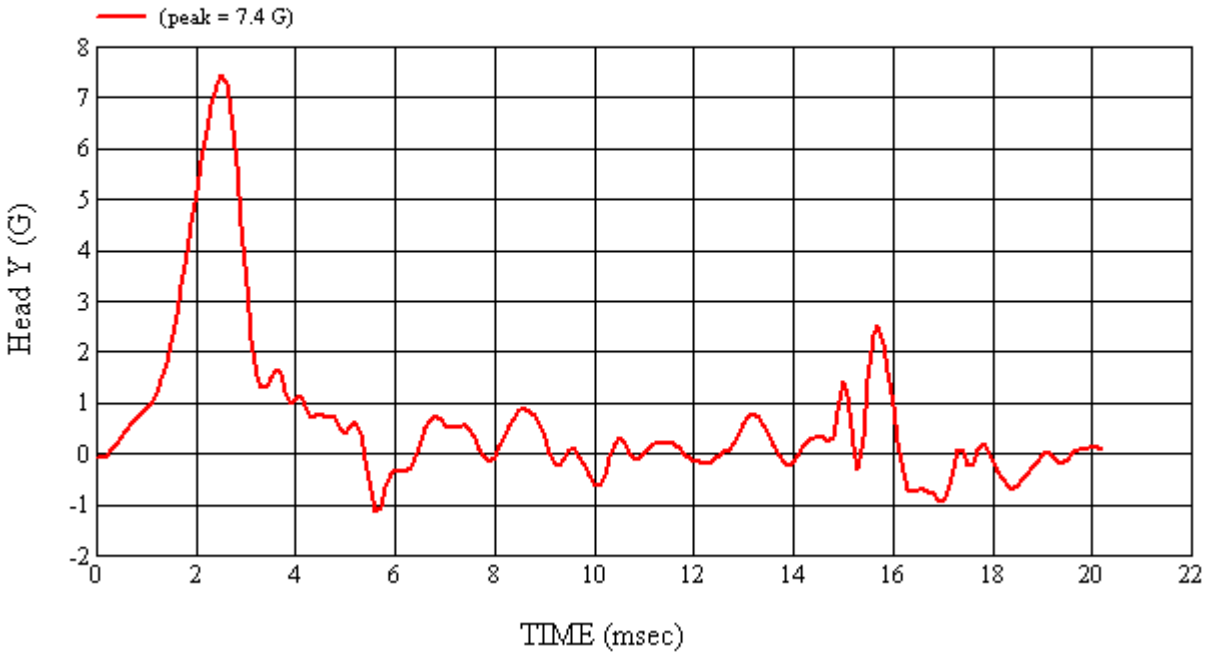
REMARKS:

RECORDED BY: Kevin Campbell DATE: 3/17/2008

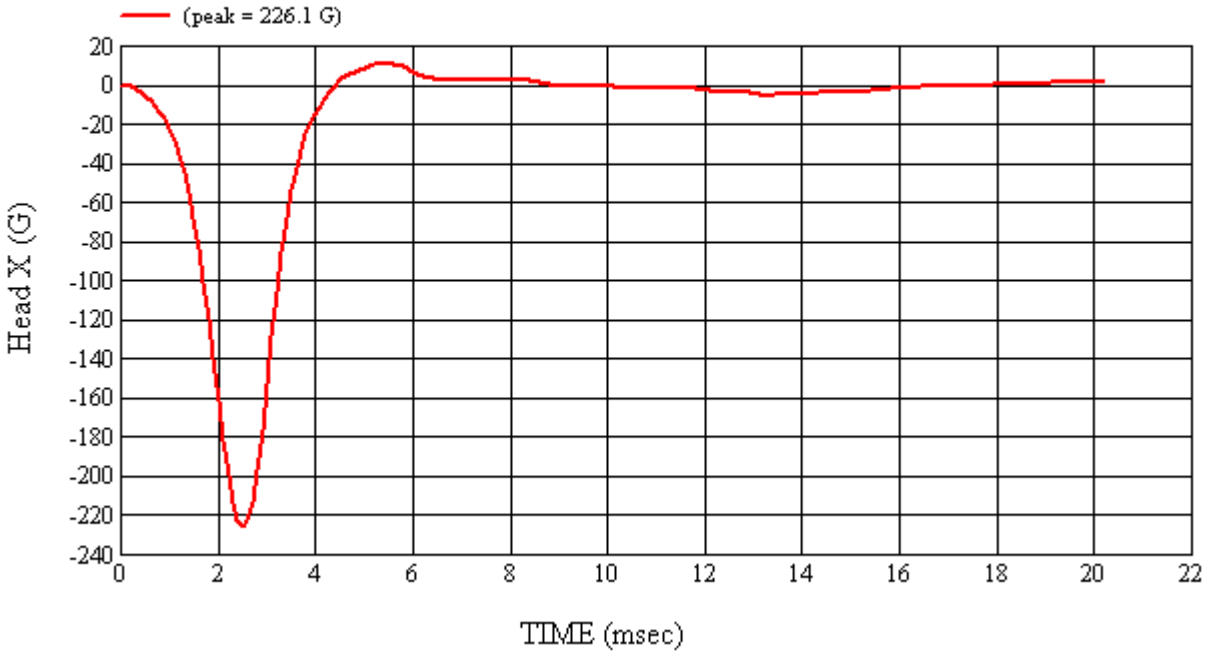
APPROVED BY: Helen A. Kaleto



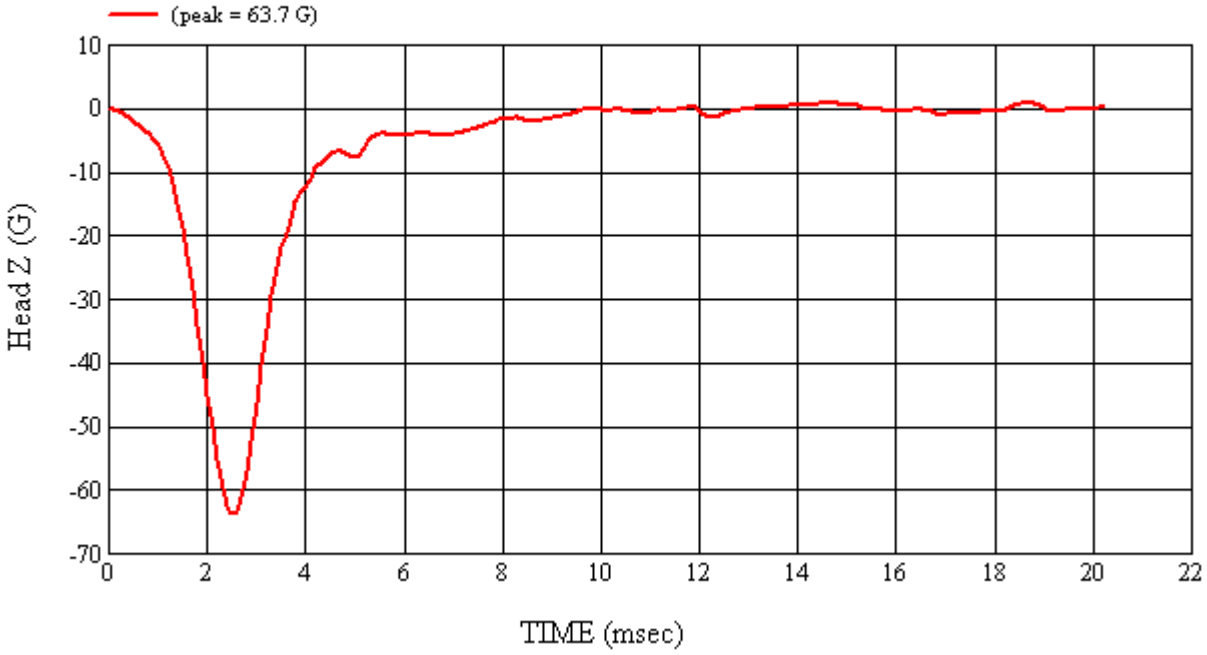
Head 035 (Pre) Calibration #H35005



Head 035 (Pre) Calibration #H35005



Head 035 (Pre) Calibration #H35005



Head 035 (Pre) Calibration #H35005

4-2 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

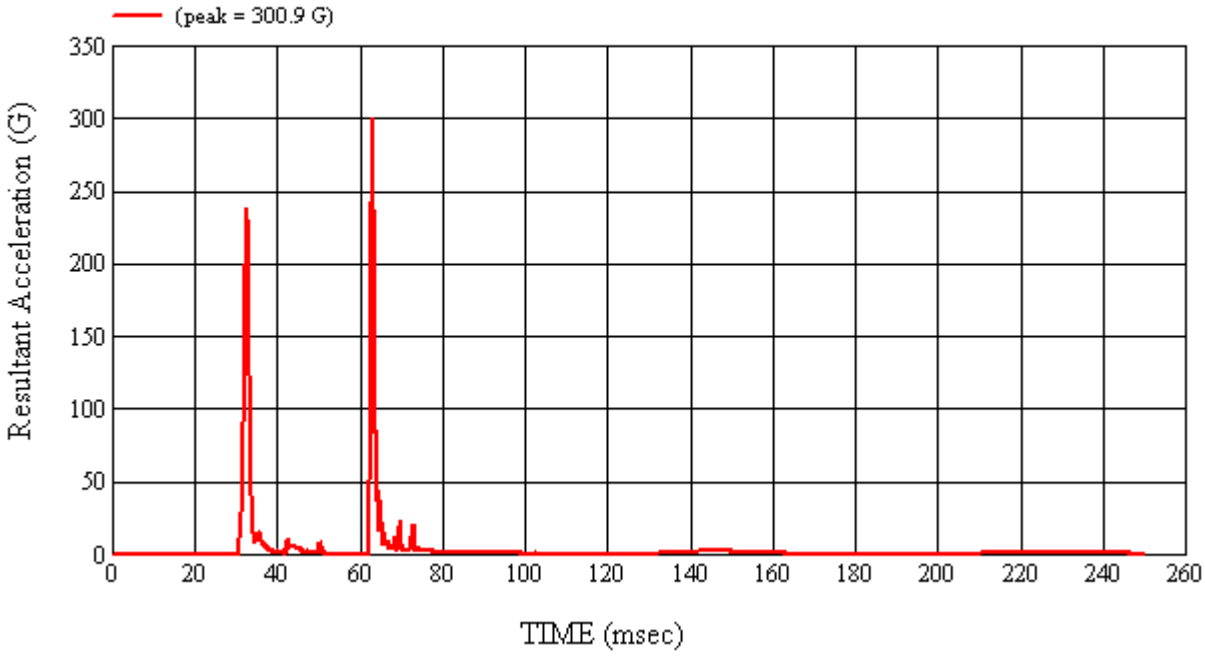
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 3/24/2008 CALIBRATION TIME: 10:21:48 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.08
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	18
Peak Resultant Acceleration	225 G's to 275 G's	238.6
Peak Lateral Acceleration	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	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

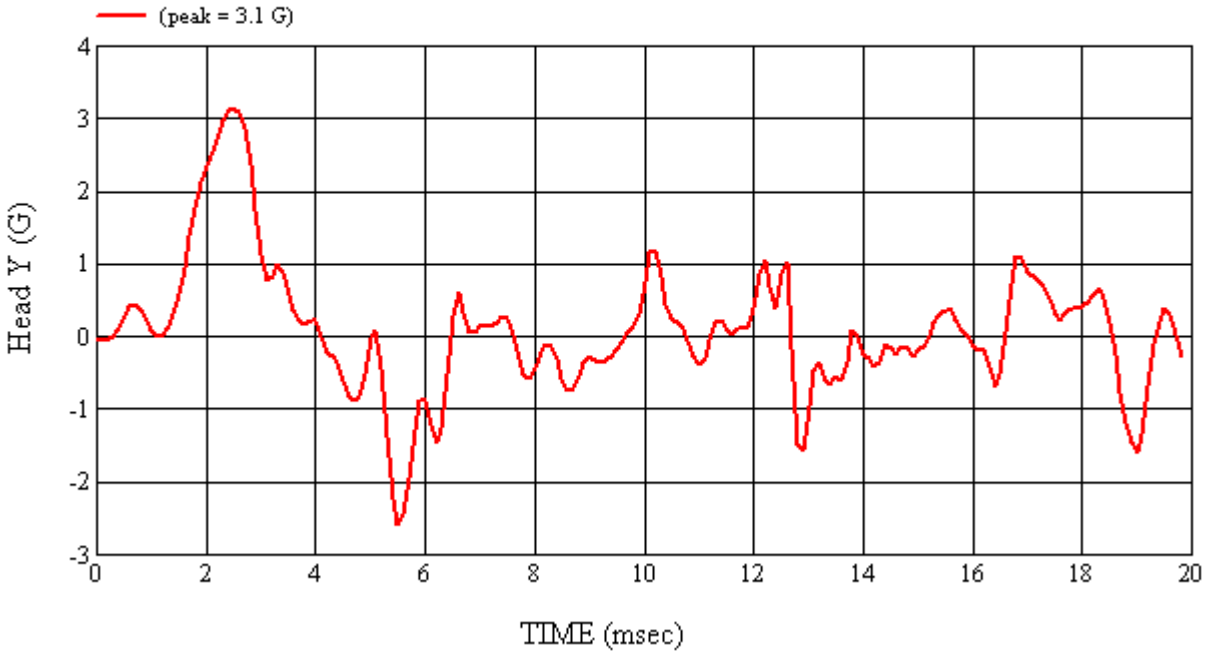
REMARKS:

RECORDED BY: Kevin Campbell DATE: 3/24/2008

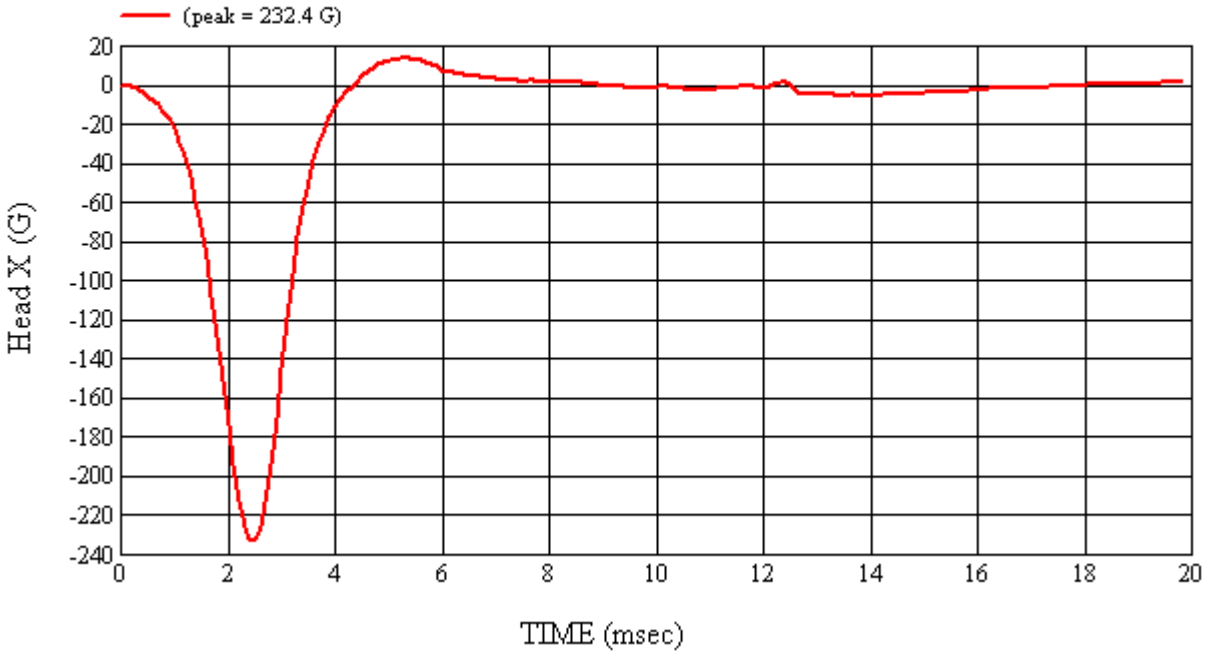
APPROVED BY: Helen A. Kaleto



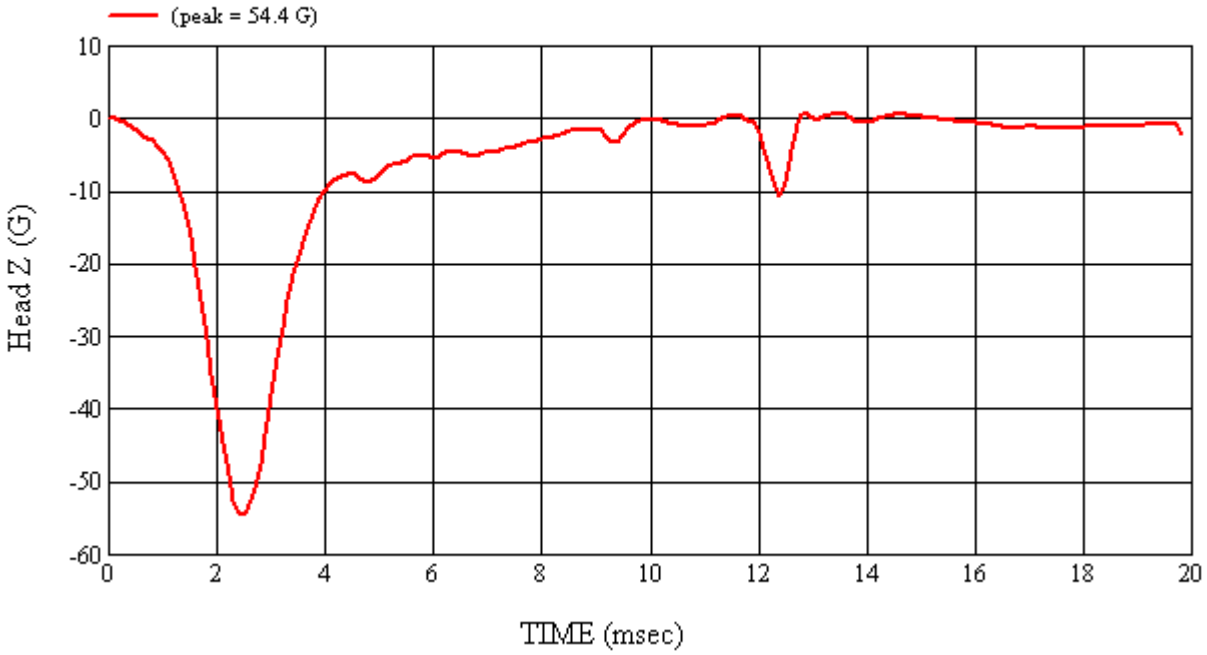
Head 035 (Post) Calibration #H35006



Head 035 (Post) Calibration #H35006



Head 035 (Post) Calibration #H35006



Head 035 (Post) Calibration #H35006

4-3 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

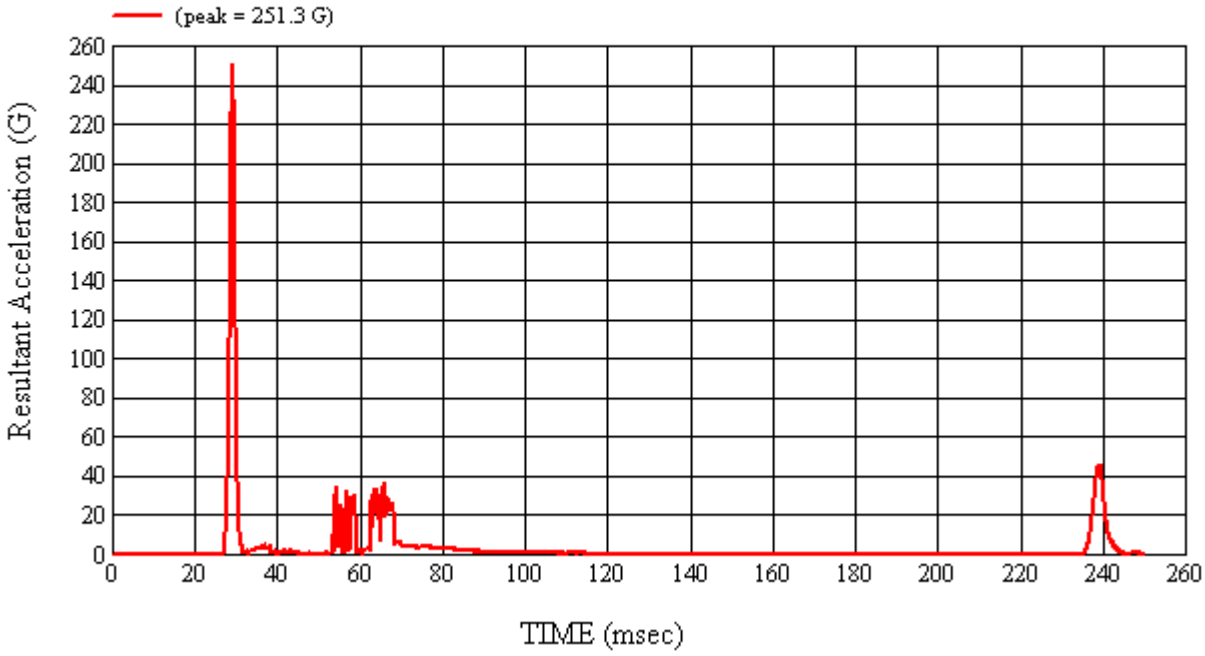
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 3/17/2008 CALIBRATION TIME: 12:05:42 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	19.5
Peak Resultant Acceleration	225 G's to 275 G's	251.3
Peak Lateral Acceleration	15 G's Maximum	2.9
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	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

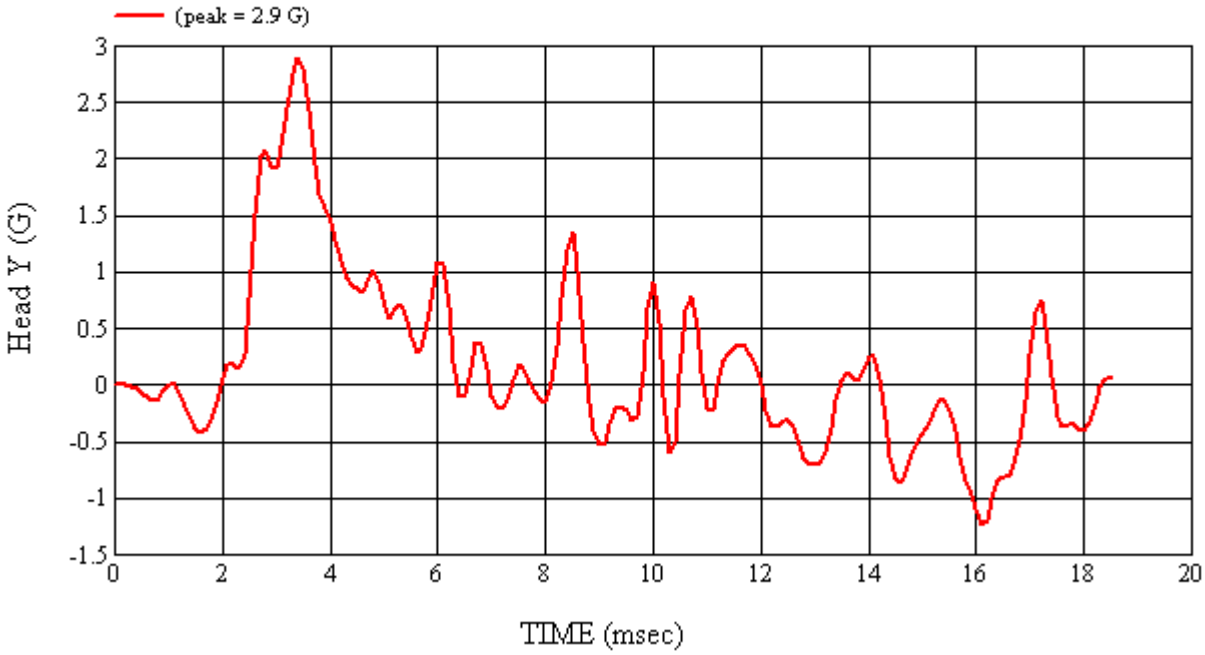
REMARKS:

RECORDED BY: Kaitlin Campbell DATE: 3/17/2008

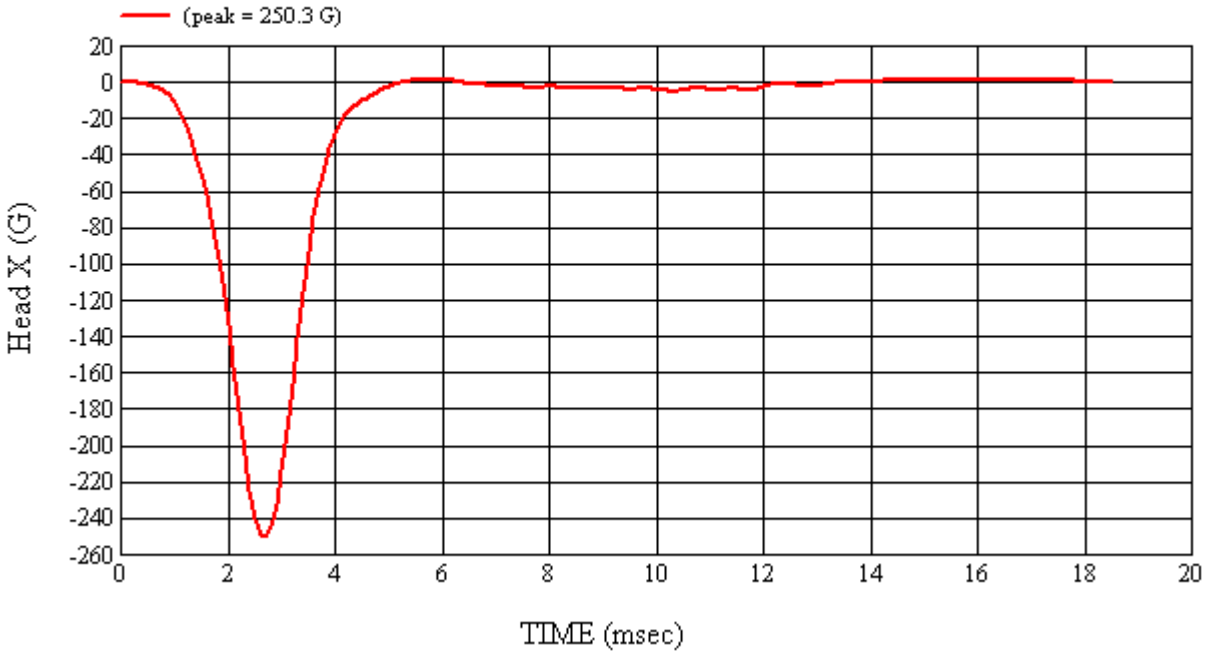
APPROVED BY: Helen A. Kaleto



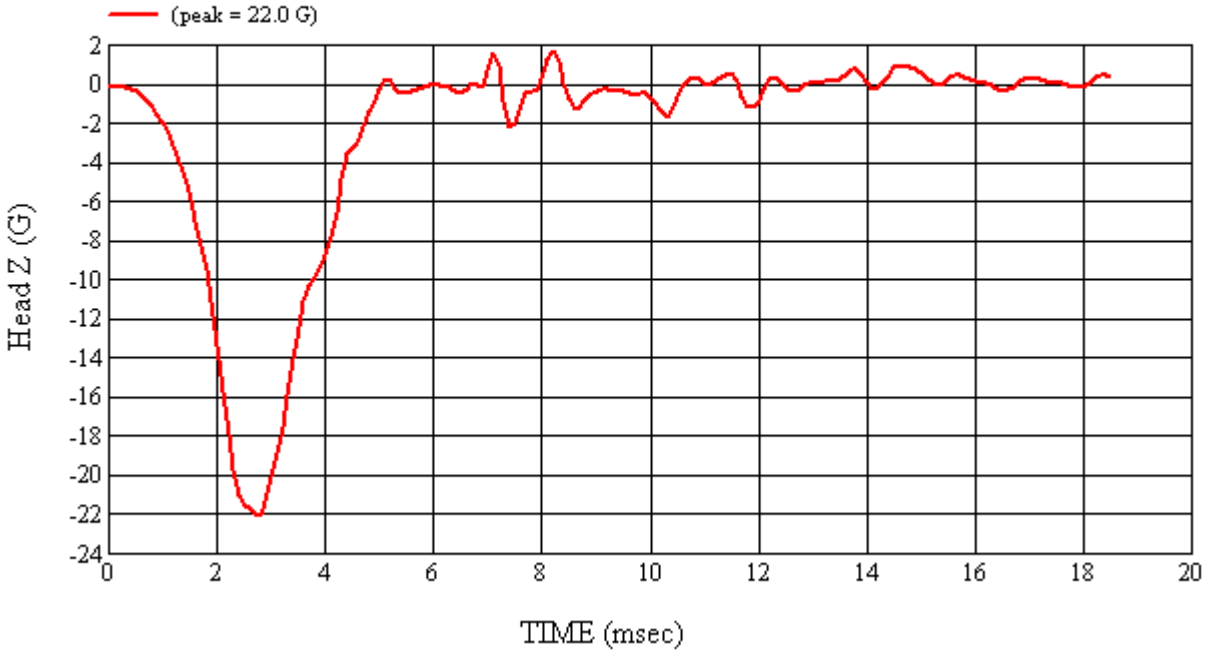
Head 037 (Pre) Calibration #H37005



Head 037 (Pre) Calibration #H37005



Head 037 (Pre) Calibration #H37005



Head 037 (Pre) Calibration #H37005

4-4 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

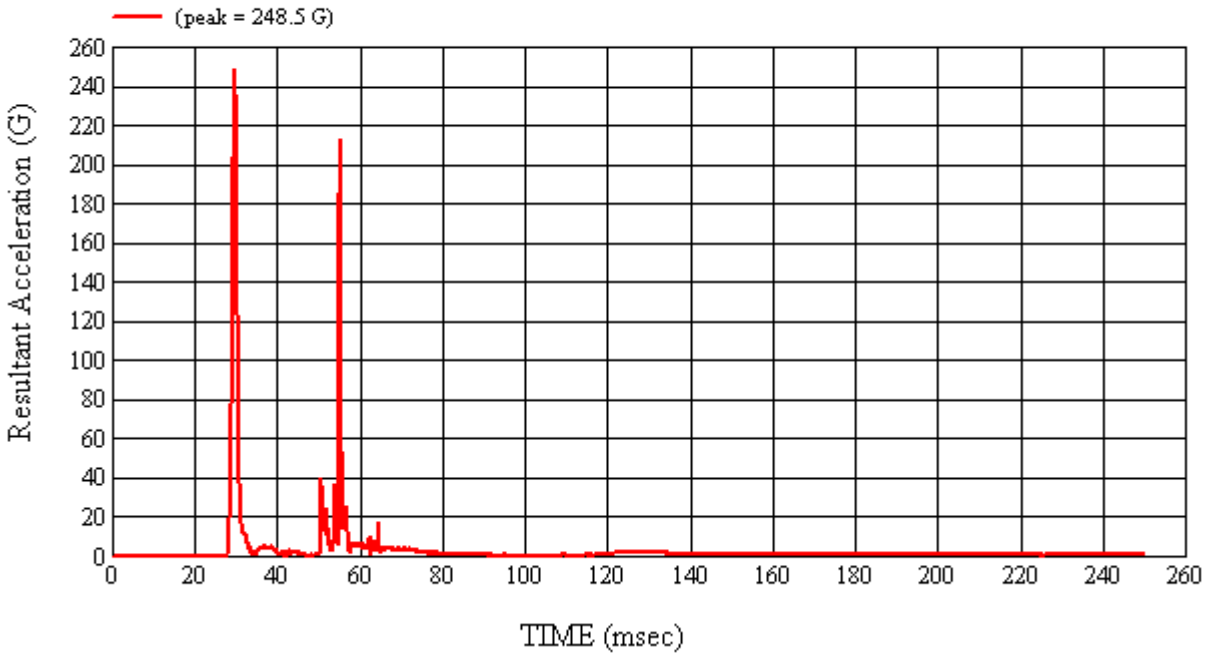
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 3/24/2008 CALIBRATION TIME: 10:44:03 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	18
Peak Resultant Acceleration	225 G's to 275 G's	248.5
Peak Lateral Acceleration	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	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

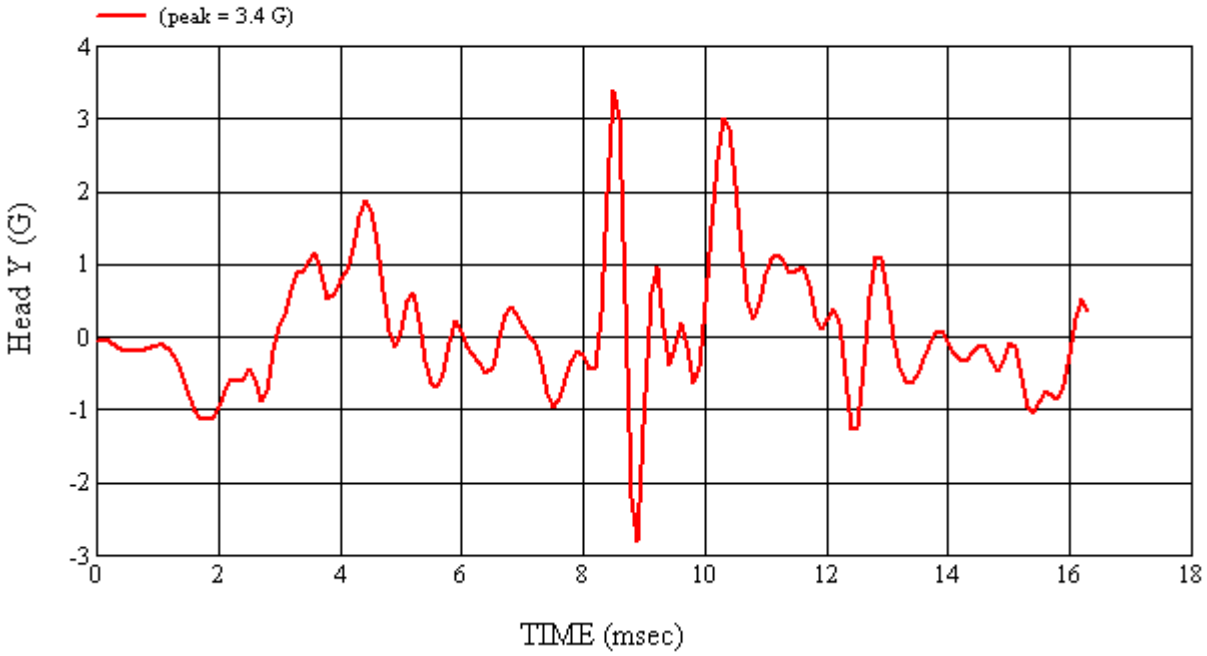
REMARKS:

RECORDED BY: _____ DATE: 3/24/2008

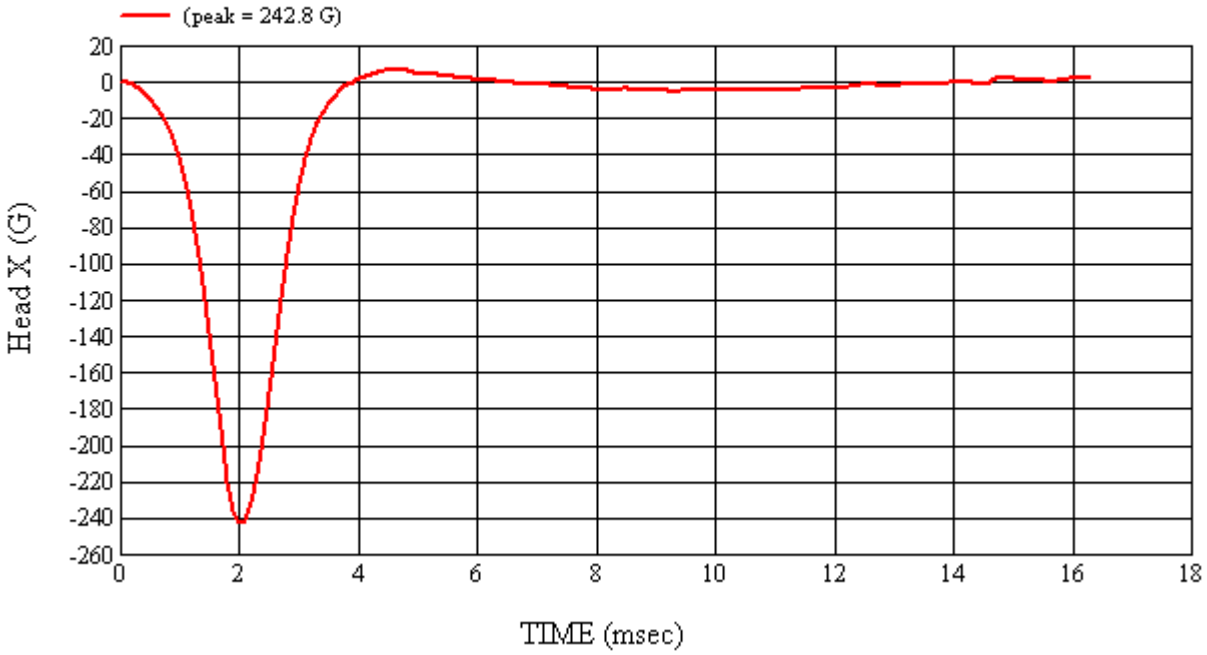
APPROVED BY: _____



Head 037 (Post) Calibration #H37006



Head 037 (Post) Calibration #H37006



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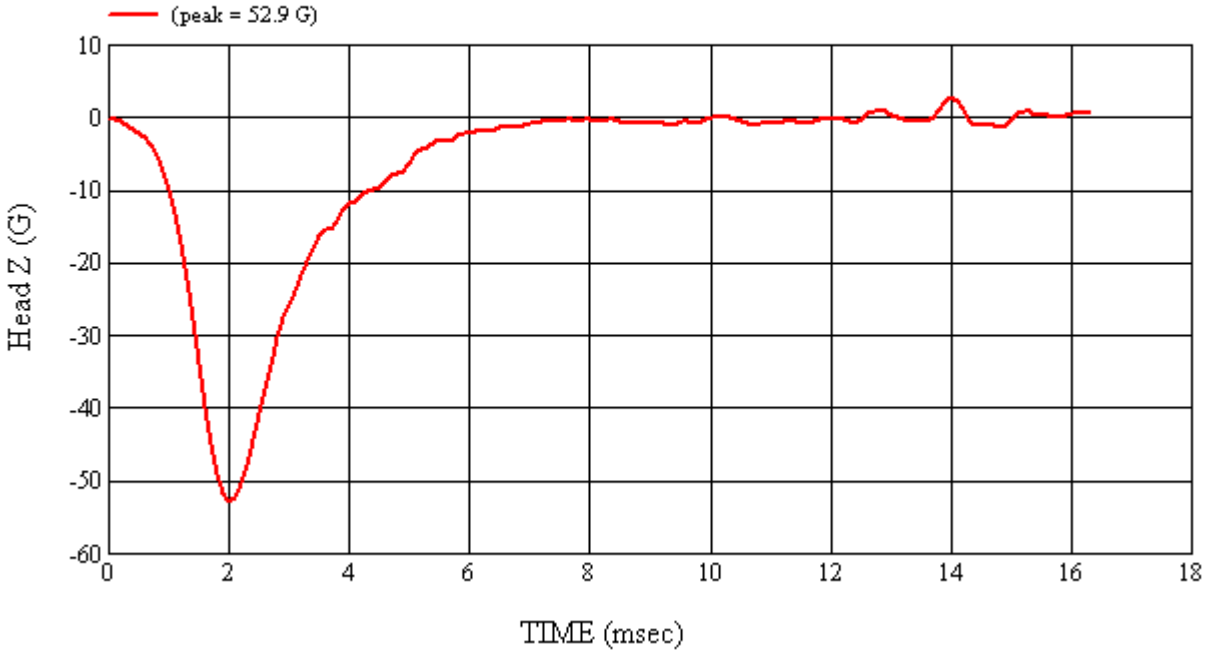


Head 037 (Post) Calibration #H37006

4-5 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 3/17/2008 CALIBRATION TIME: 12:20:23 PM	
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%	19.5
Peak Resultant Acceleration	225 G's to 275 G's	243.6
Peak Lateral Acceleration	15 G's Maximum	12.3
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION

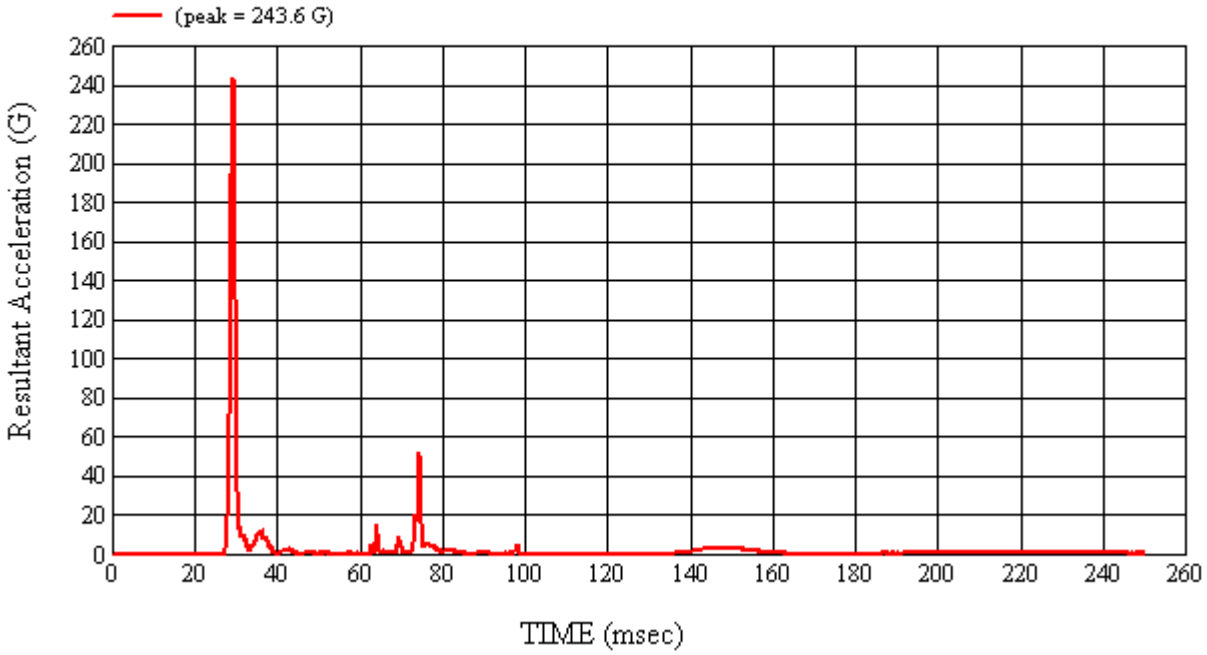
HEAD ACCELEROMETERS

Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	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

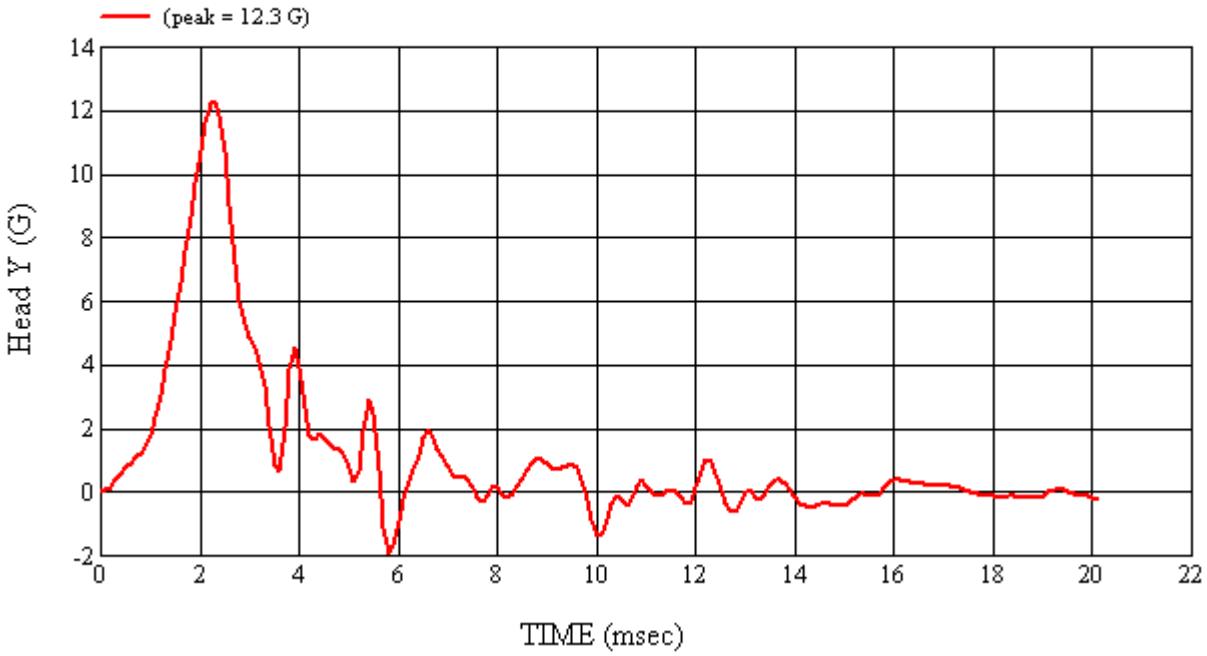
REMARKS:

RECORDED BY: _____ DATE: 3/17/2008

APPROVED BY: _____



Head 038 (Pre) Calibration #H38005



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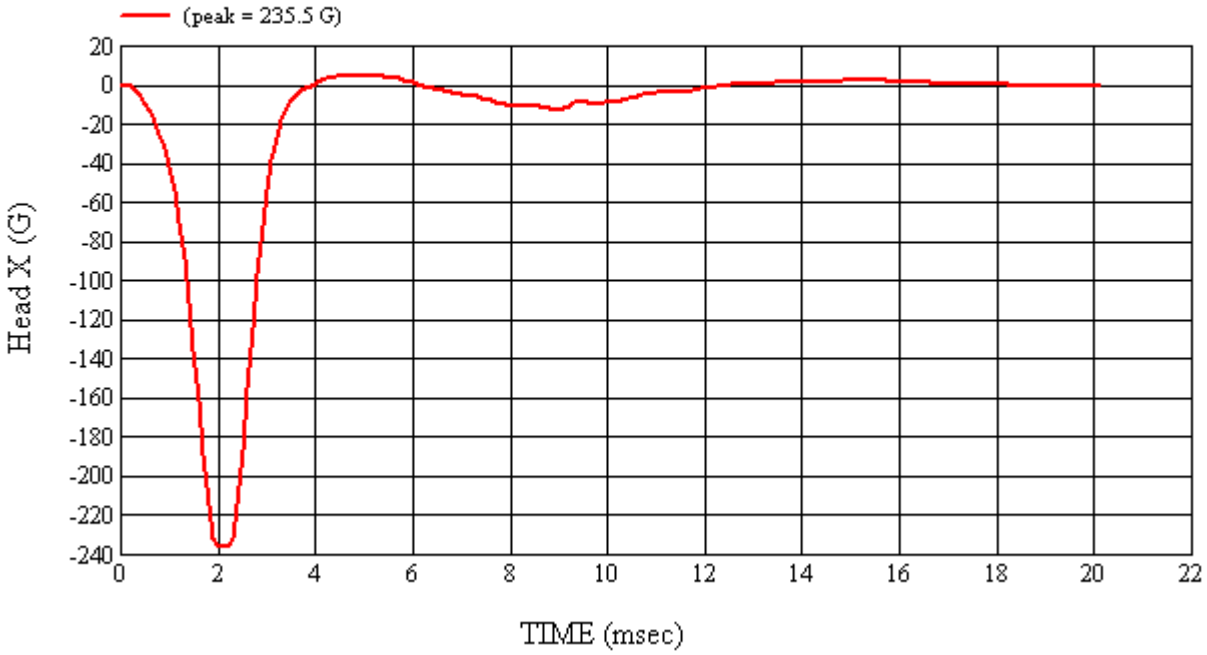

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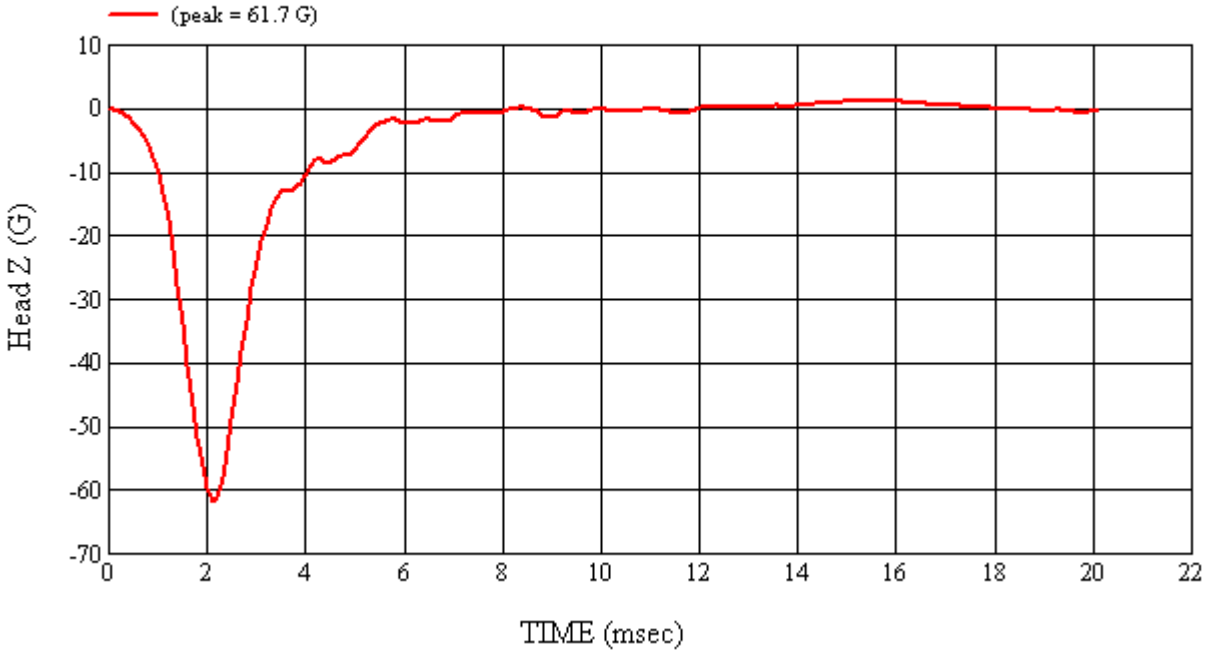


Head 038 (Pre) Calibration #H38005

4-6 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

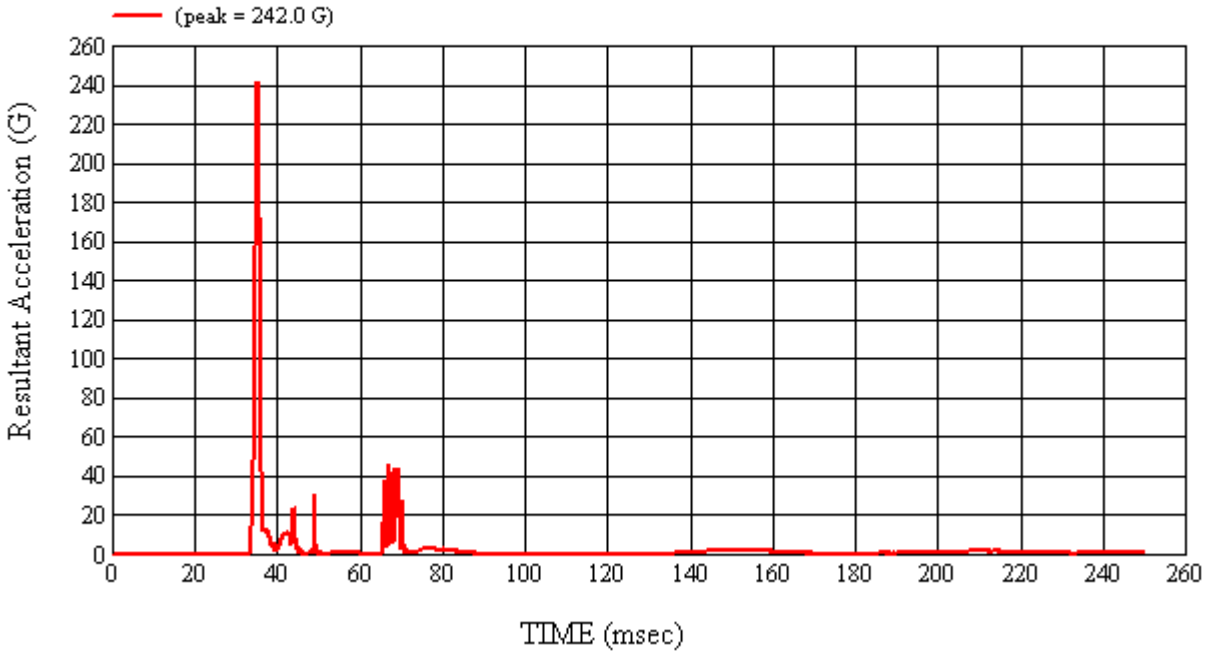
HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 3/24/2008 CALIBRATION TIME: 11:13:57 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	18
Peak Resultant Acceleration	225 G's to 275 G's	242.0
Peak Lateral Acceleration	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	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

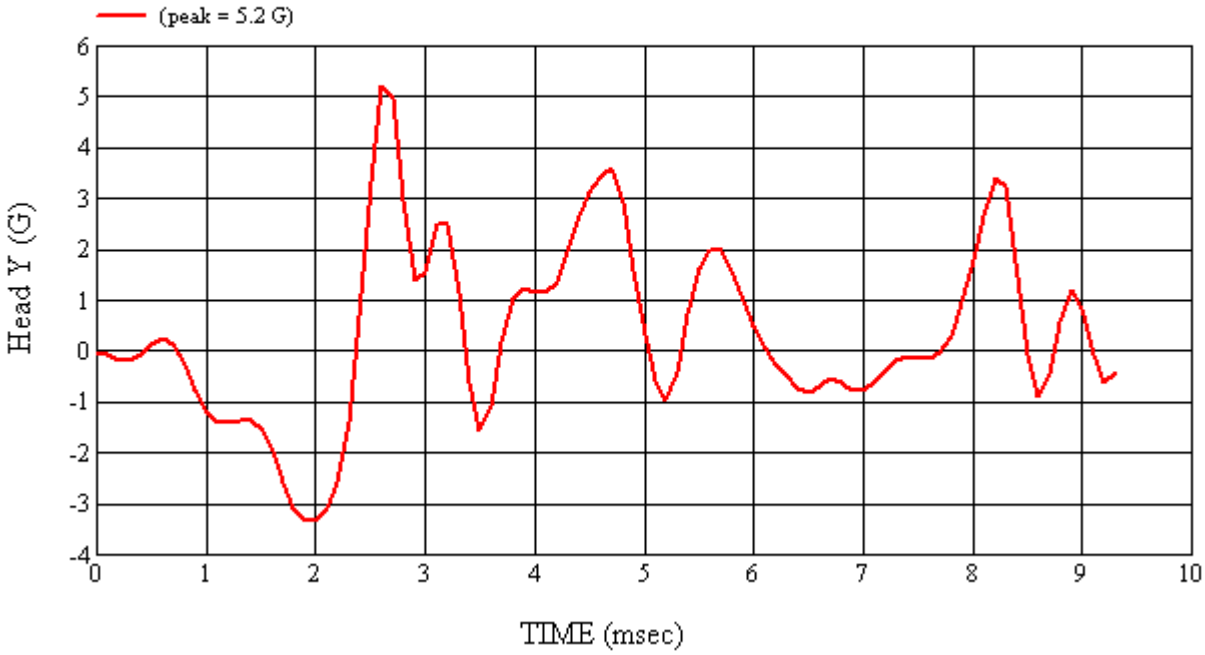
REMARKS:

RECORDED BY: Kevin Campbell DATE: 3/24/2008

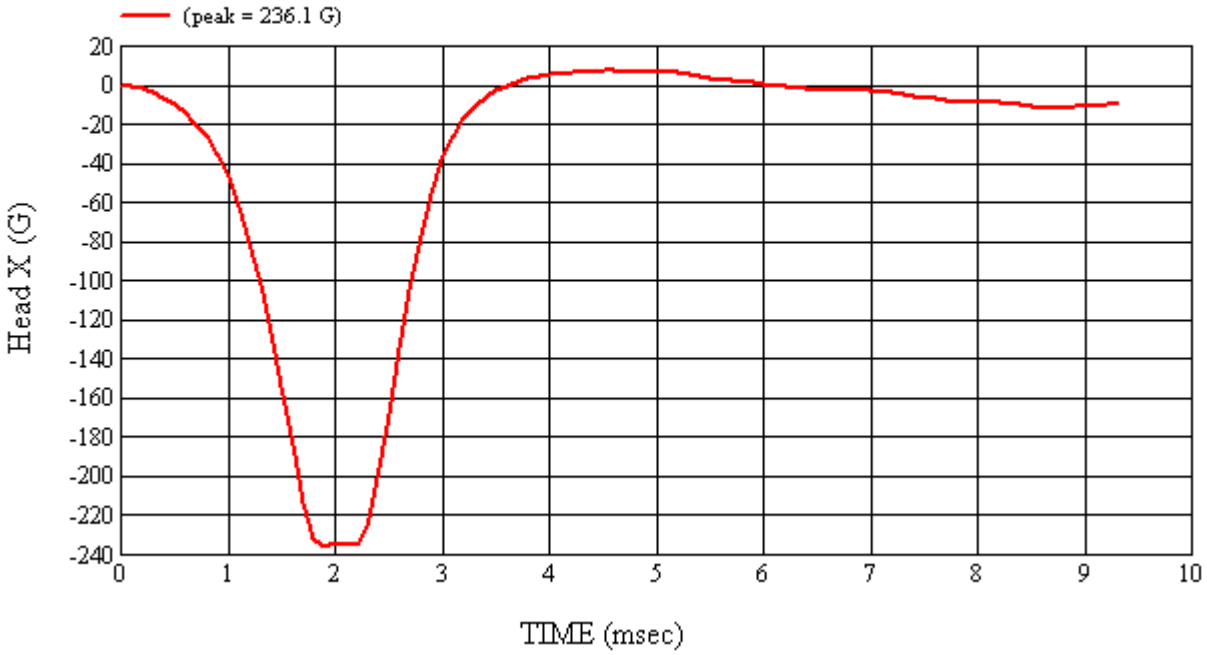
APPROVED BY: Helen A. Kaleto



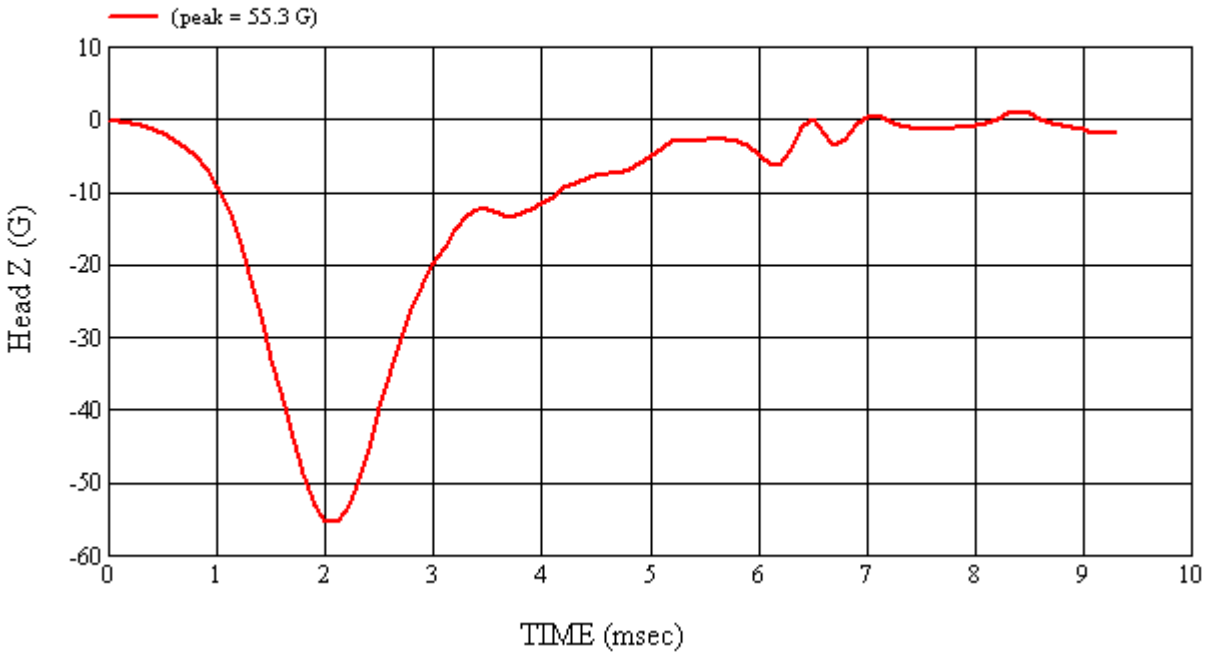
Head 038 (Post) Calibration #H38006



Head 038 (Post) Calibration #H38006



Head 038 (Post) Calibration #H38006



Head 038 (Post) Calibration #H38006

4-7 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

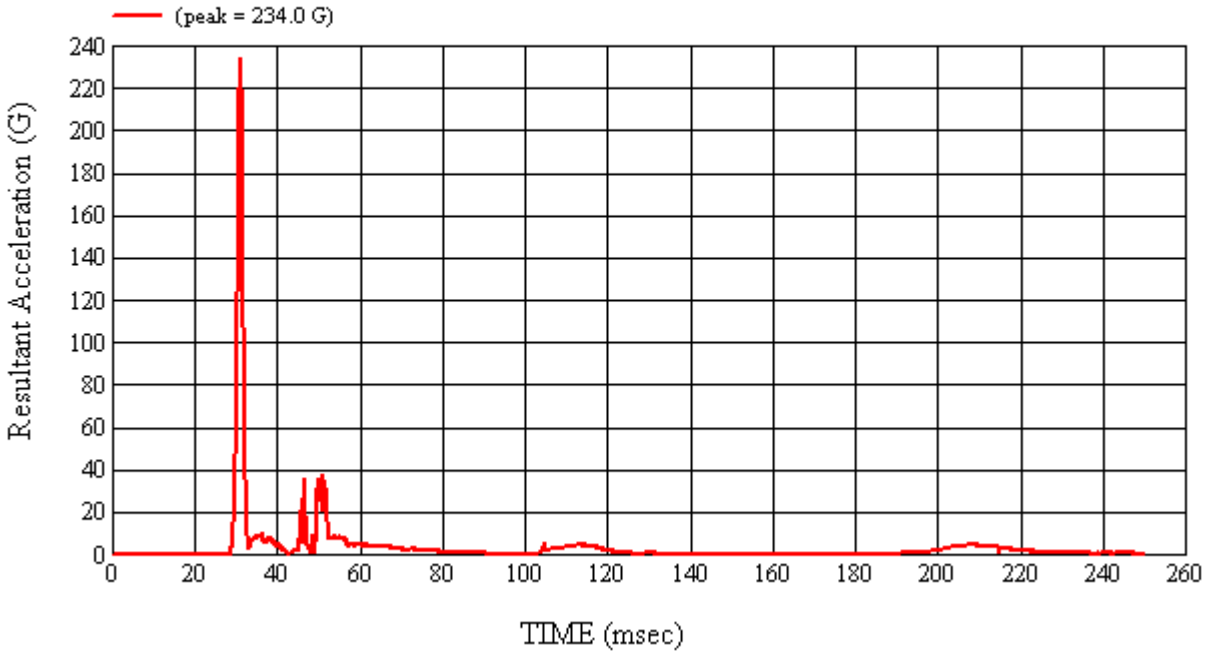
HEADFORM SERIAL NUMBER: 072	CALIBRATION DATE: 3/17/2008 CALIBRATION TIME: 11:13:57 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	19.5
Peak Resultant Acceleration	225 G's to 275 G's	234.0
Peak Lateral Acceleration	15 G's Maximum	6.5
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	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

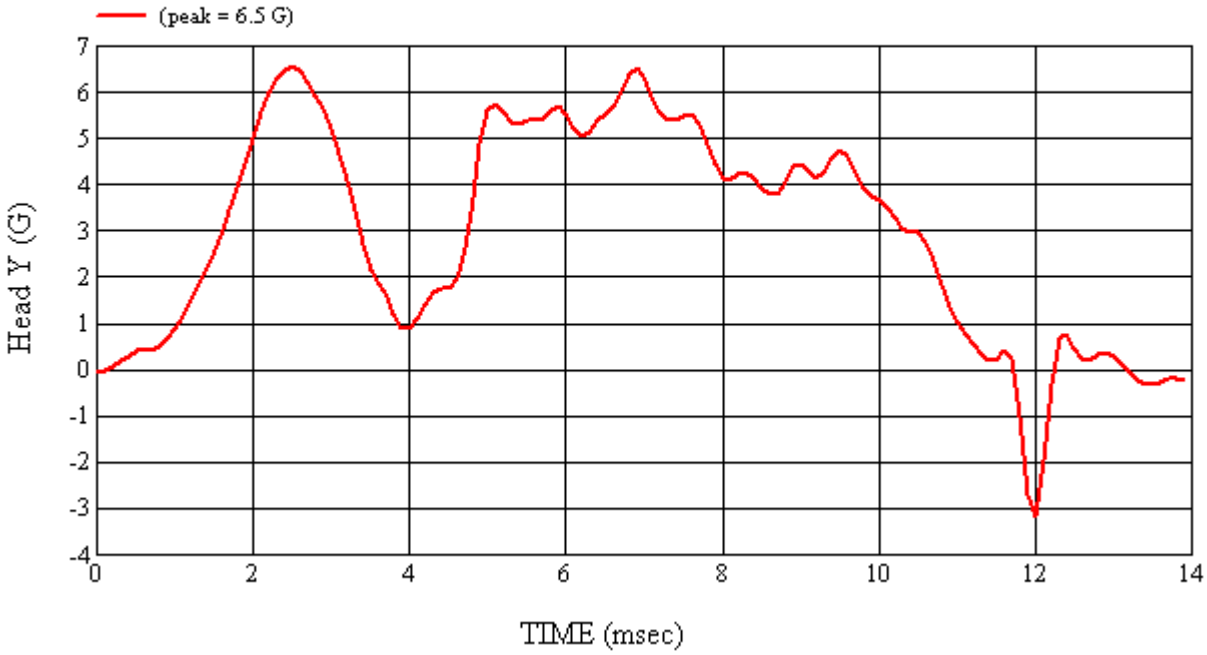
REMARKS:

RECORDED BY: Kevin Campbell DATE: 3/17/2008

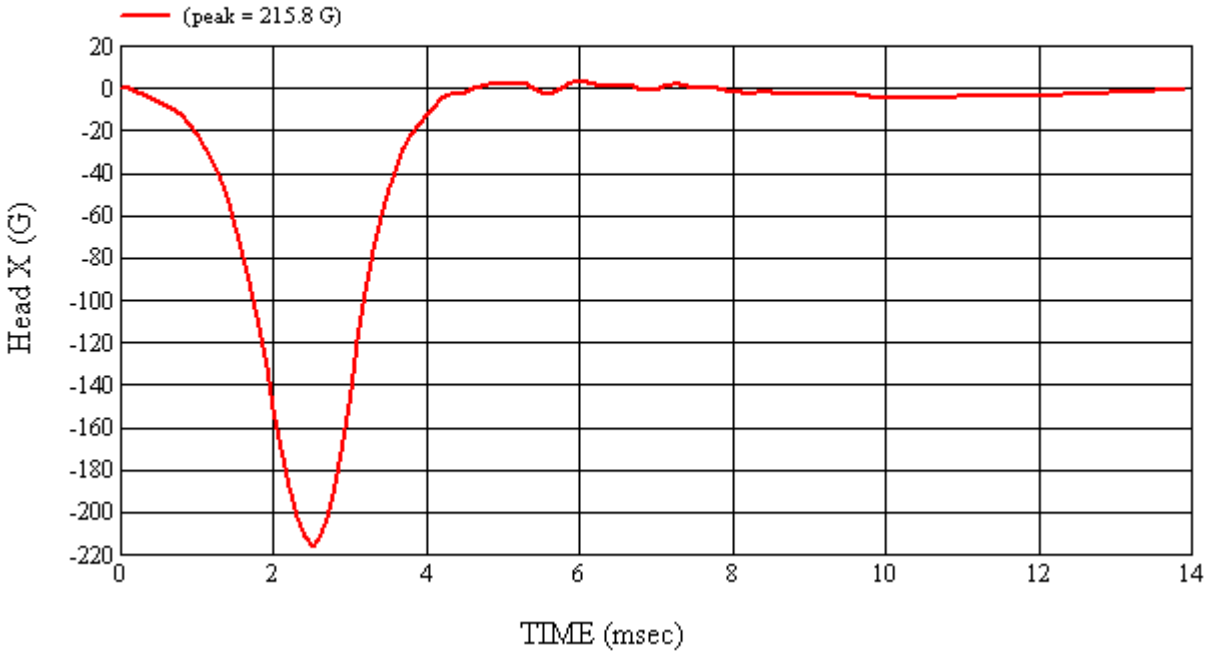
APPROVED BY: Helen A. Kaleto



Head 072 (Pre) Calibration #H72005



Head 072 (Pre) Calibration #H72005



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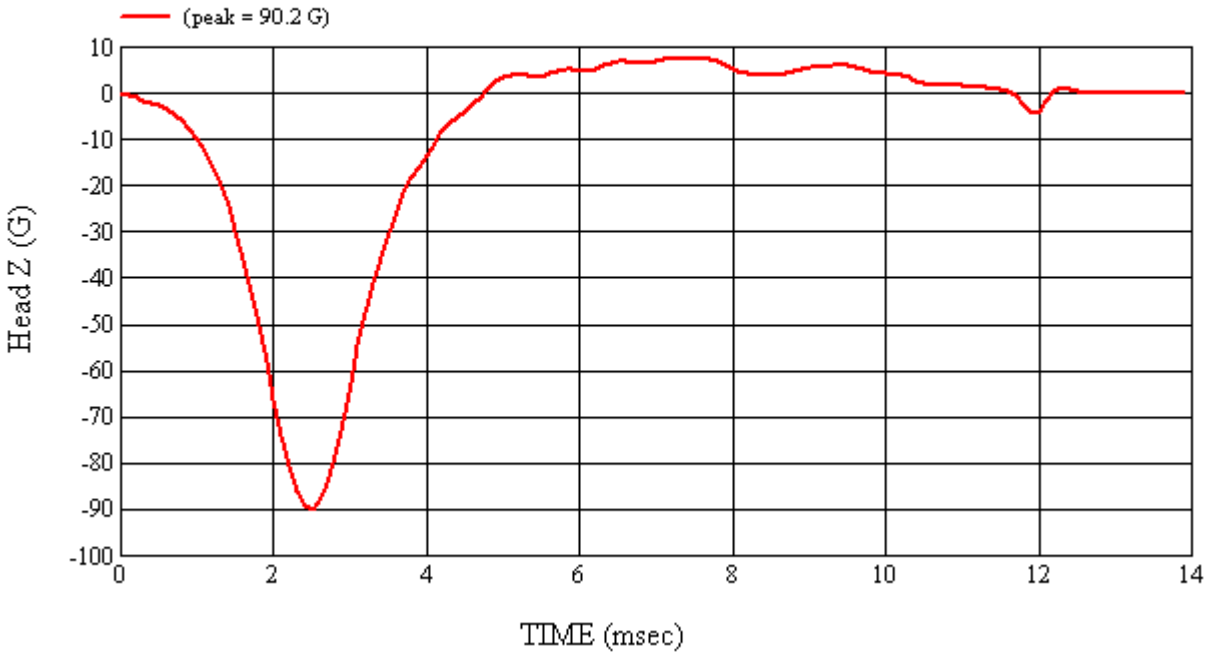


Head 072 (Pre) Calibration #H72005

4-8 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

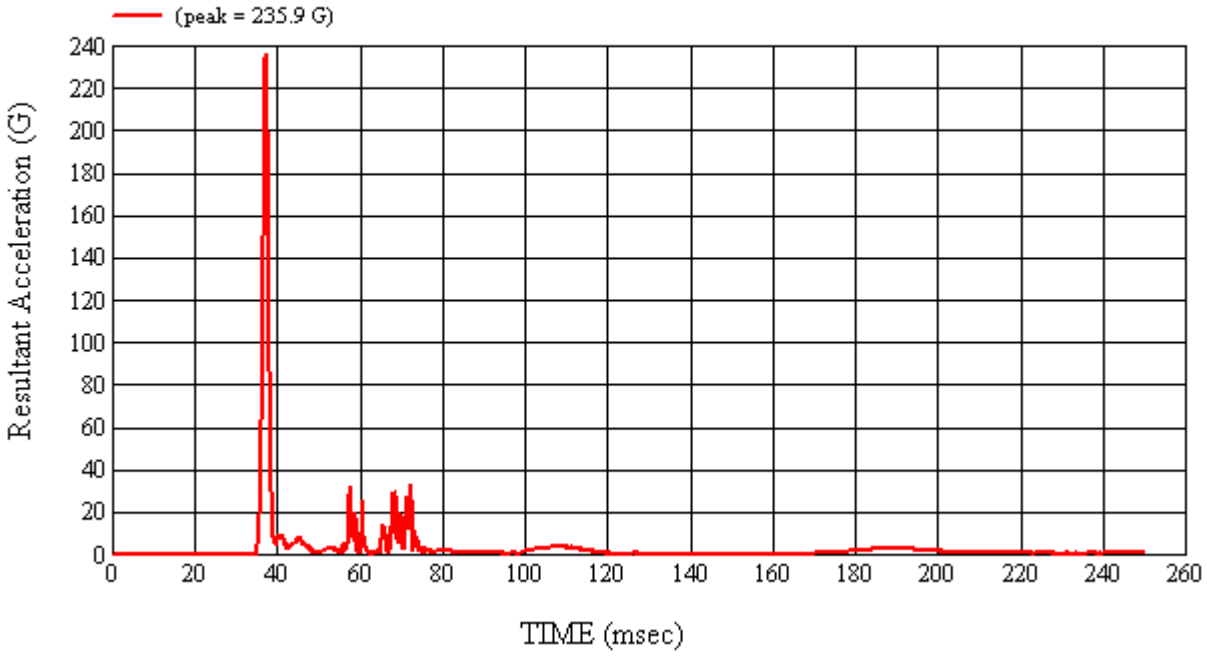
HEADFORM SERIAL NUMBER: 072	CALIBRATION DATE: 3/24/2008 CALIBRATION TIME: 11:28:17 AM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.10
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	18
Peak Resultant Acceleration	225 G's to 275 G's	235.9
Peak Lateral Acceleration	15 G's Maximum	6.4
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	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

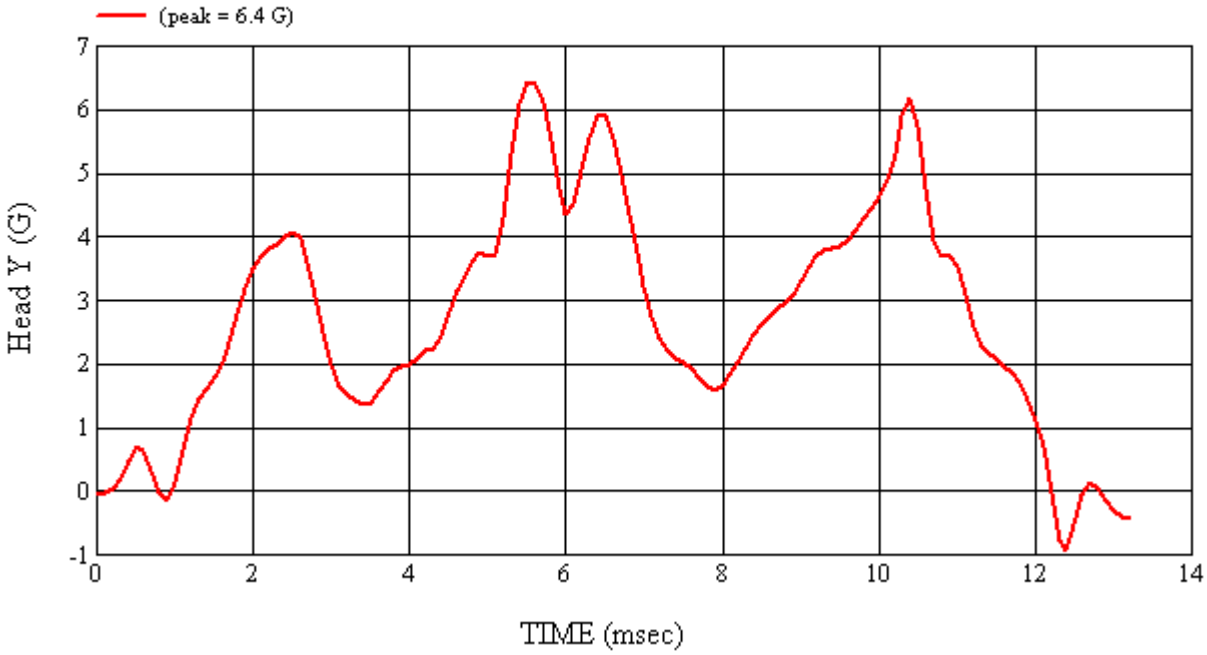
REMARKS:

RECORDED BY: Kaitlin Campbell DATE: 3/24/2008

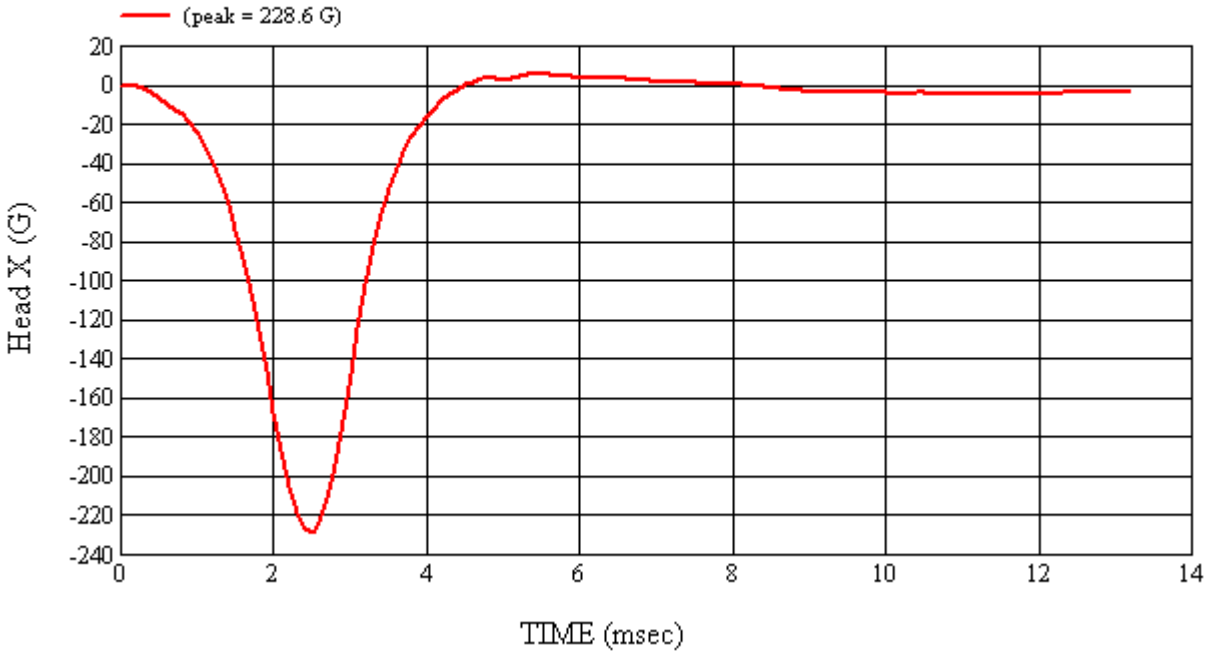
APPROVED BY: Helen A. Kaleto



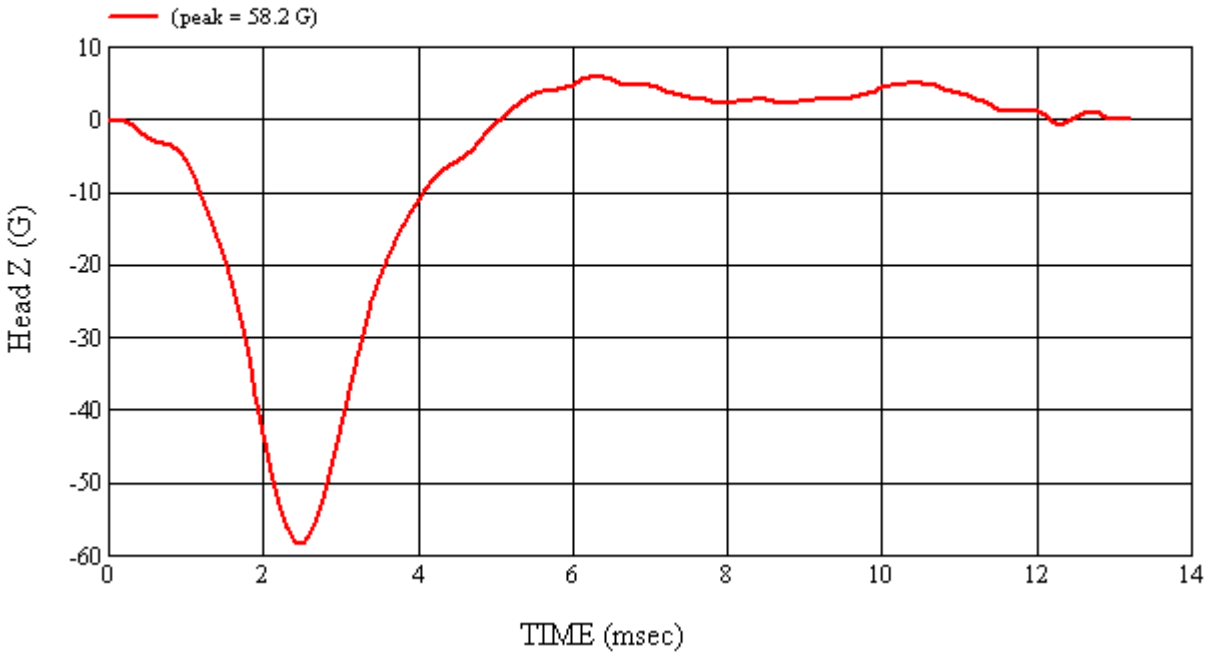
Head 072 (Post) Calibration #H72006



Head 072 (Post) Calibration #H72006



Head 072 (Post) Calibration #H72006



Head 072 (Post) Calibration #H72006

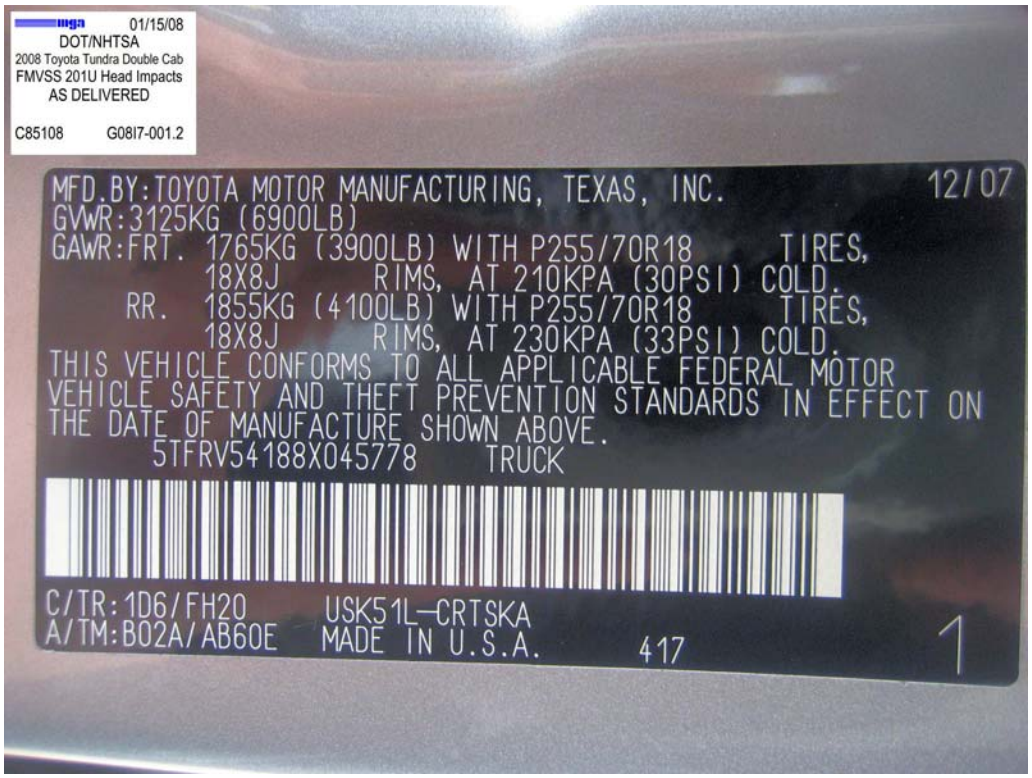
5.0 PHOTOGRAPHS

As Delivered – Left Side View

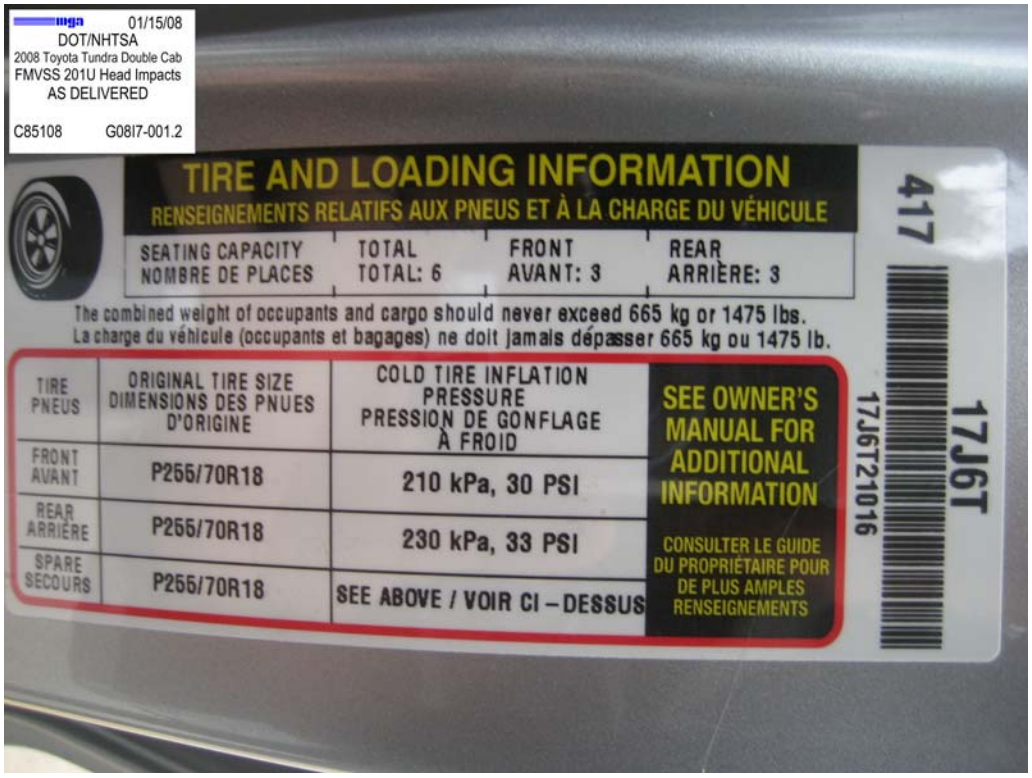
As Delivered – Right Side View

As Delivered – ¾ Front View From Left Side

As Delivered – Rear View From Left Side

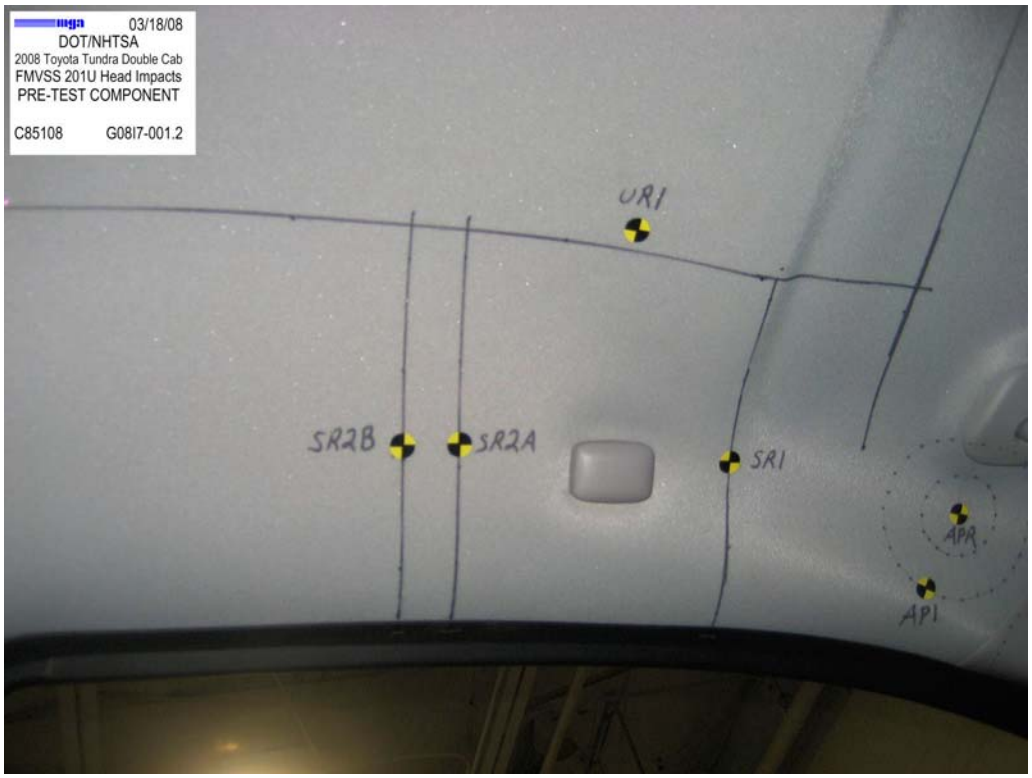


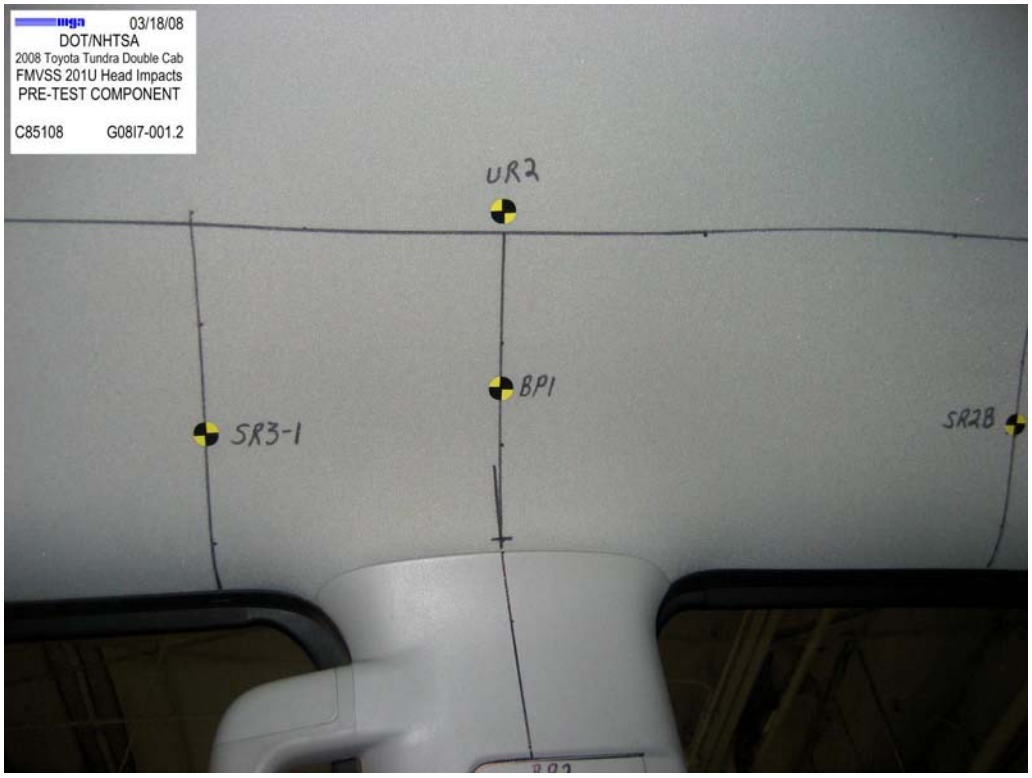
As Delivered – Vehicle's Certification Label



As Delivered – Vehicle's Tire Information Label

Pre-Test Component Photographs


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR1
SR2B
SR2A
SR1
APR
API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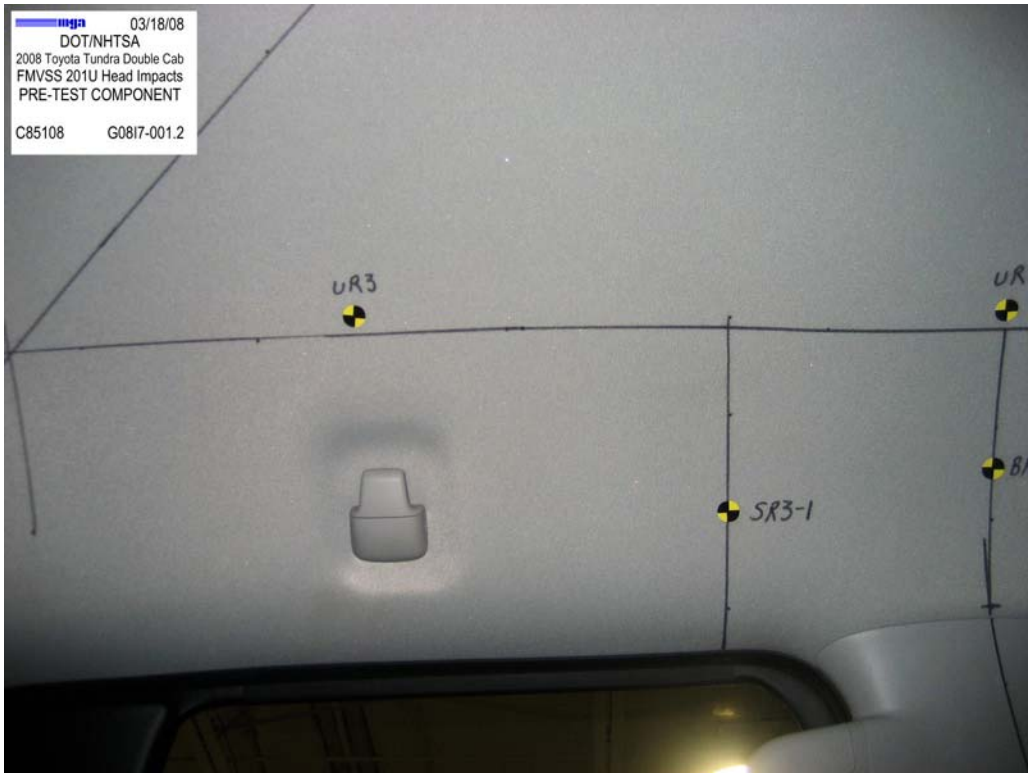
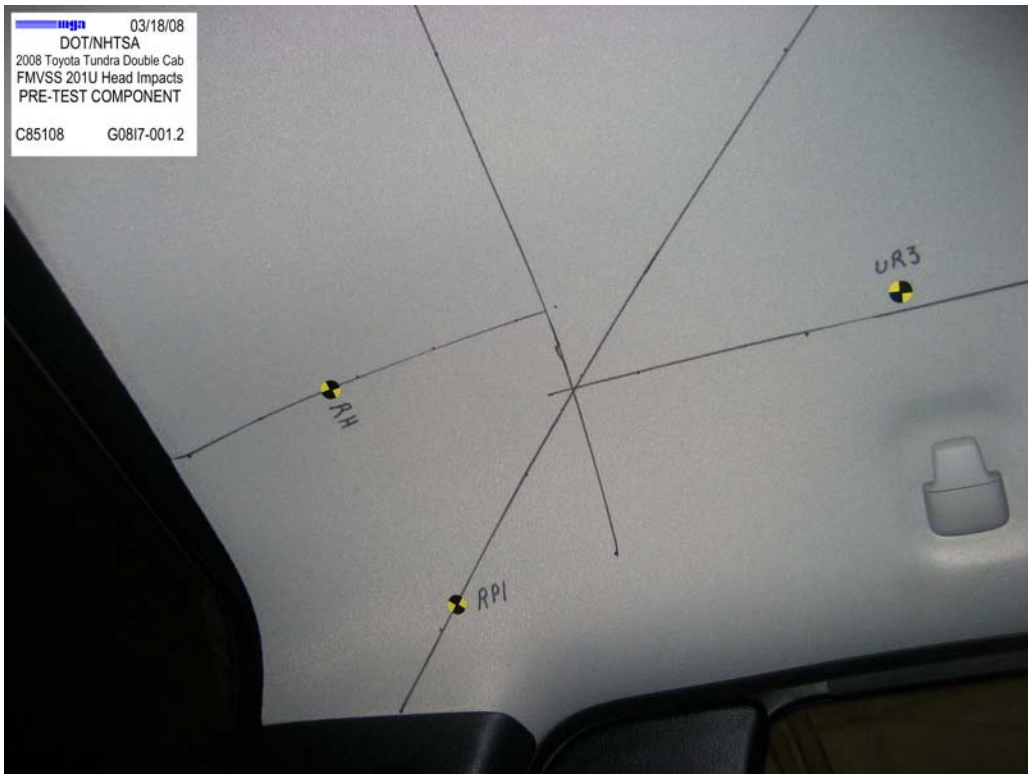
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR2
BPI
SR3-1
SR2B


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
BP2
BP3
BP2
P3
D
BP4


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR3
SR3-1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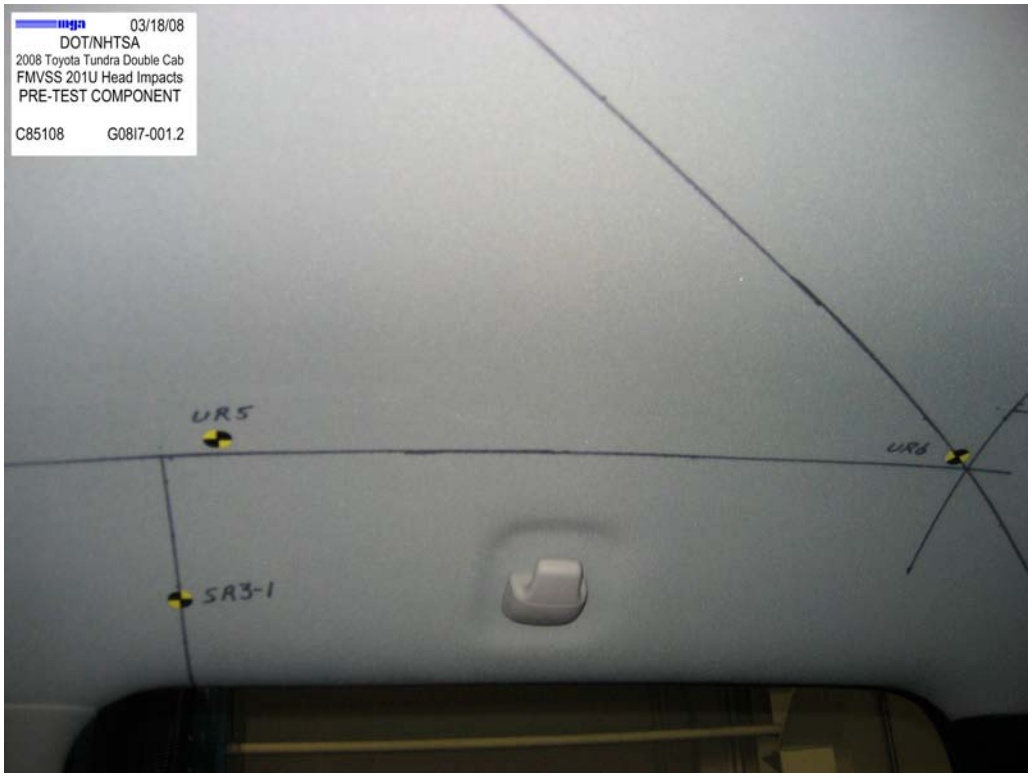
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
uR3
RH
RPI


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR6
RH
RPI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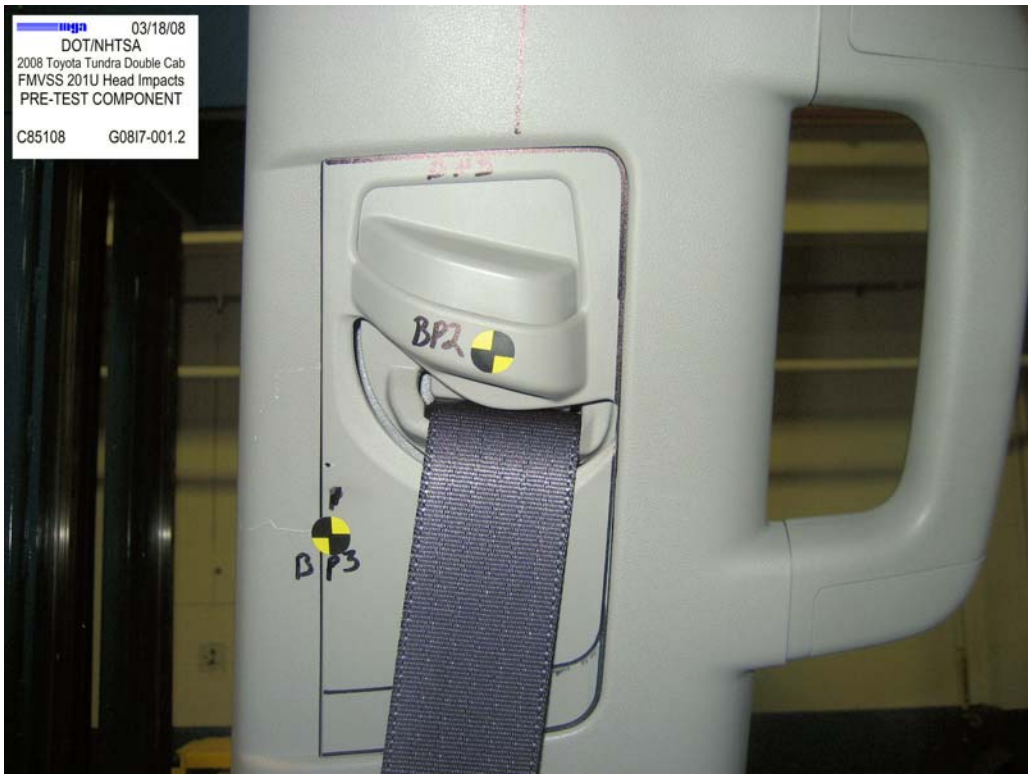
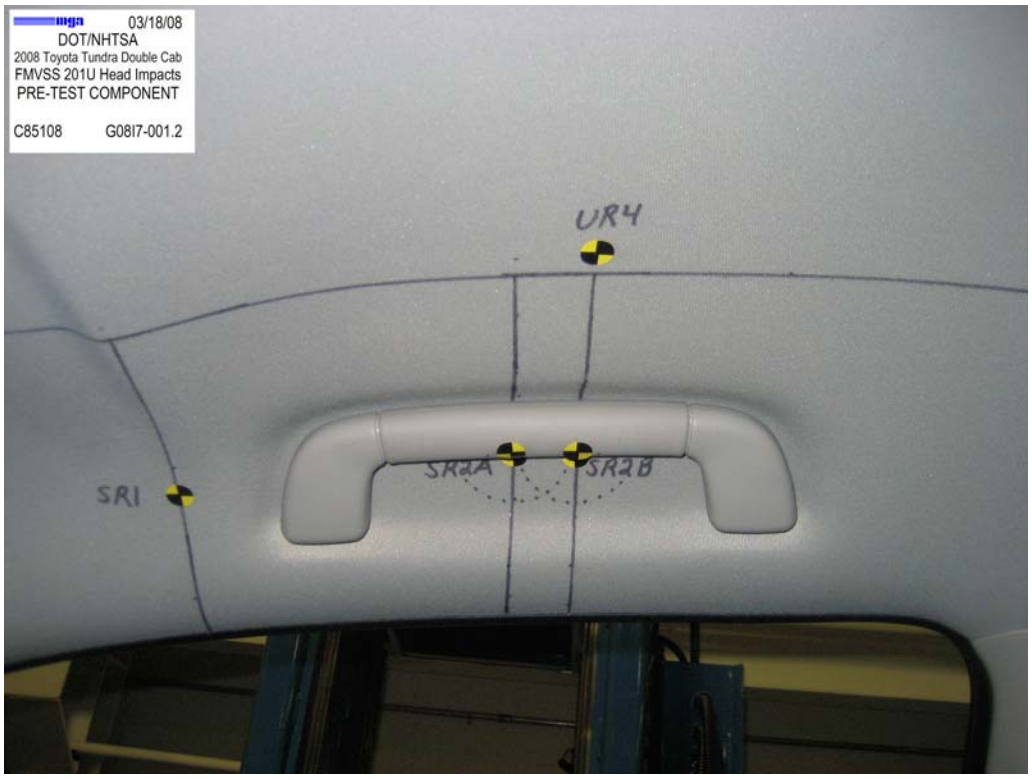
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR5
UR6
SA3-1


mga 03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR5
BP1
SR3-1


mga 03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
BP2
BP3


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
BP2
BP3


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
BP3
BP4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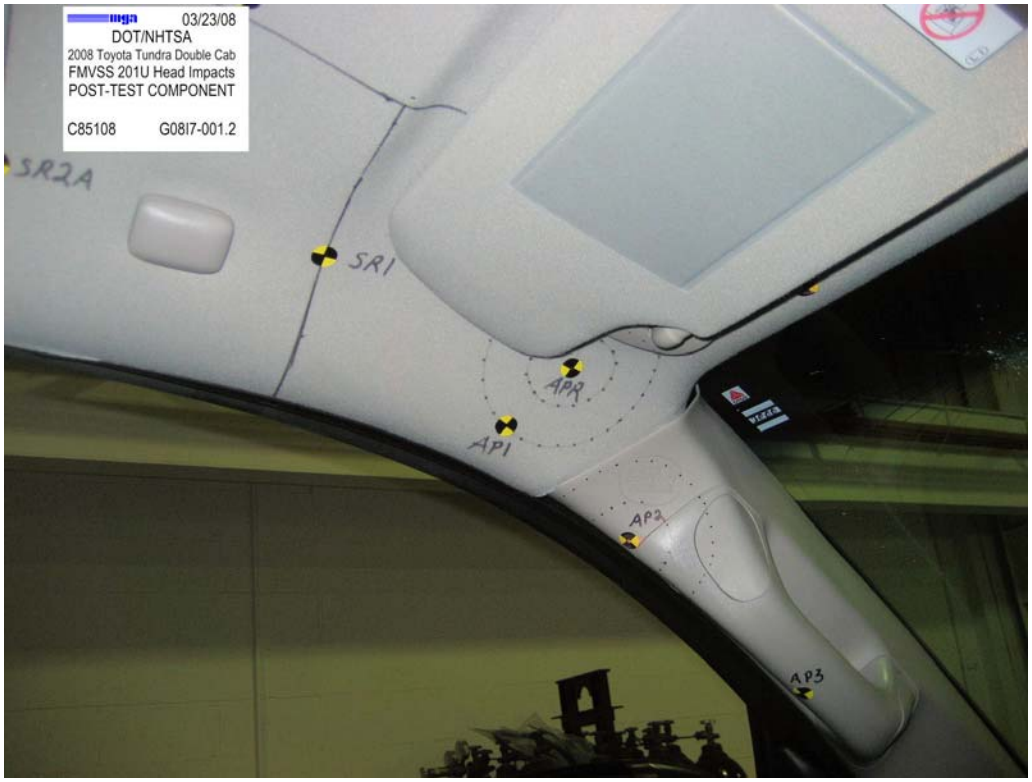
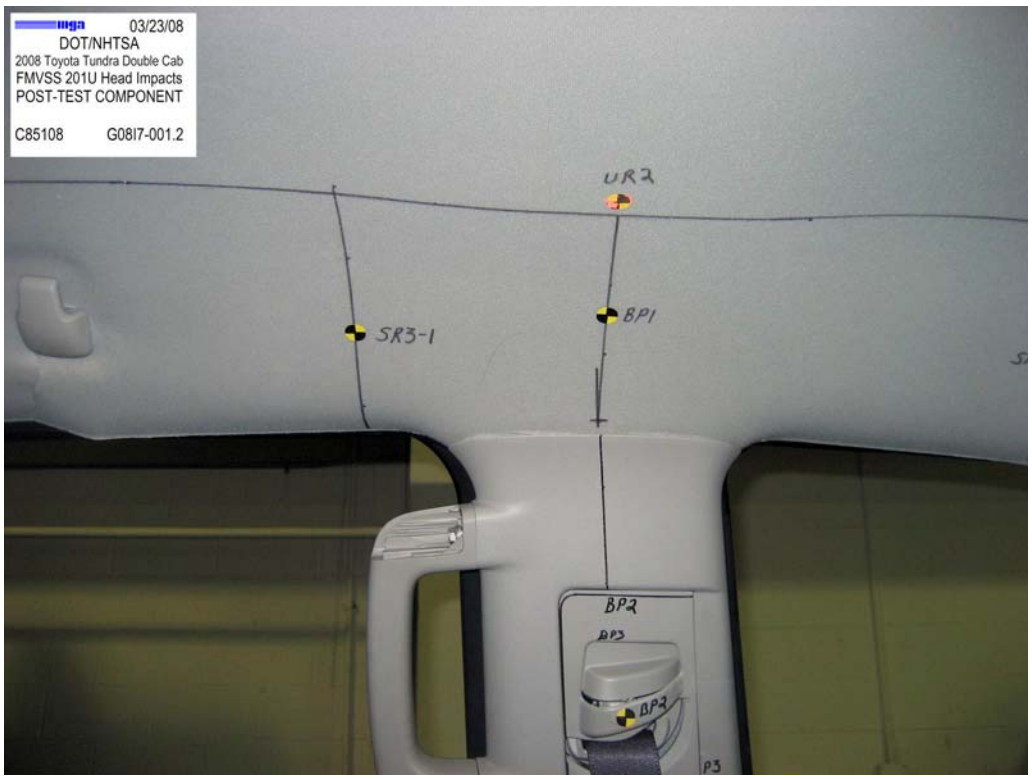
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
UR4
SR1
SR2A
SR2B


03/18/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
PRE-TEST COMPONENT
C85108 G08I7-001.2
APR
AP1
AP2
AP3

Post-Test Component Photographs




mga 03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR2
UR1
BP1
SR2B
SR2A
SR1
BP2

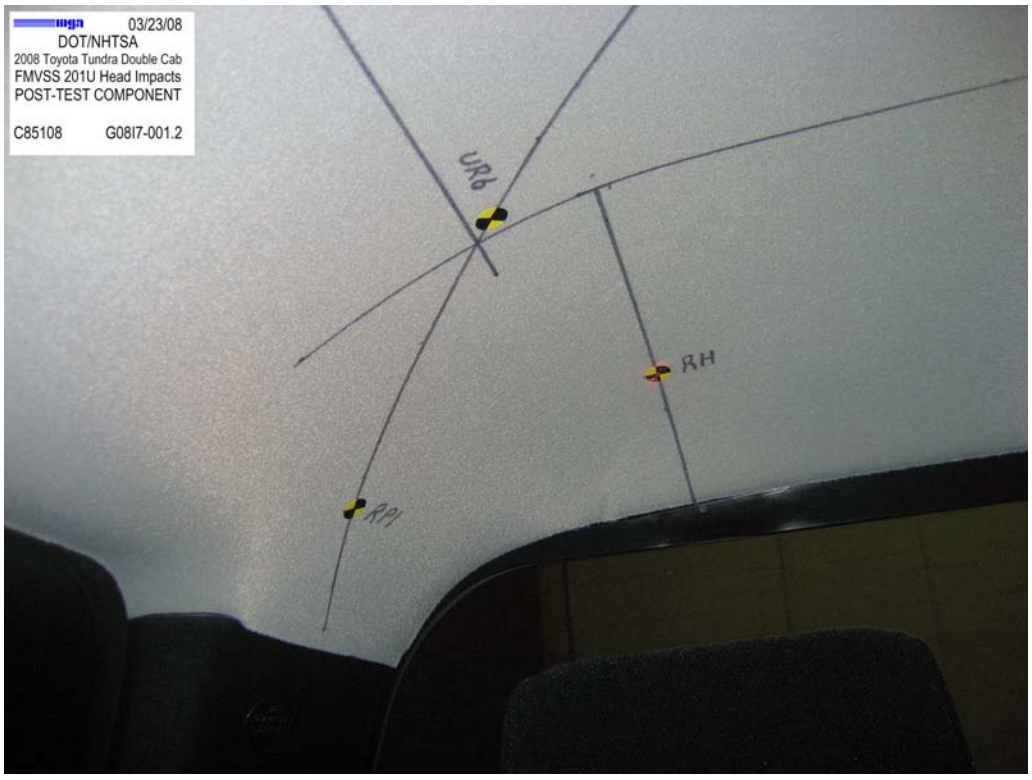

mga 03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR2
SR3-1
BP1
BP2
BP3
BP2
P3

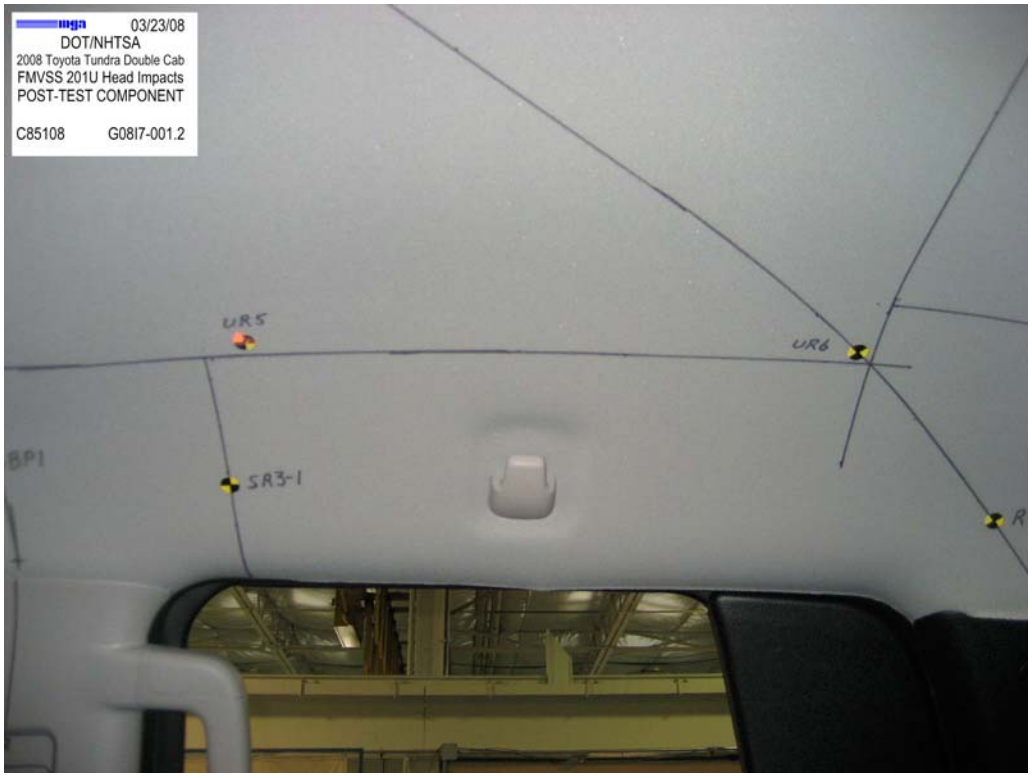

03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
SR3-1
BP2
BP3
BP2
P3
D

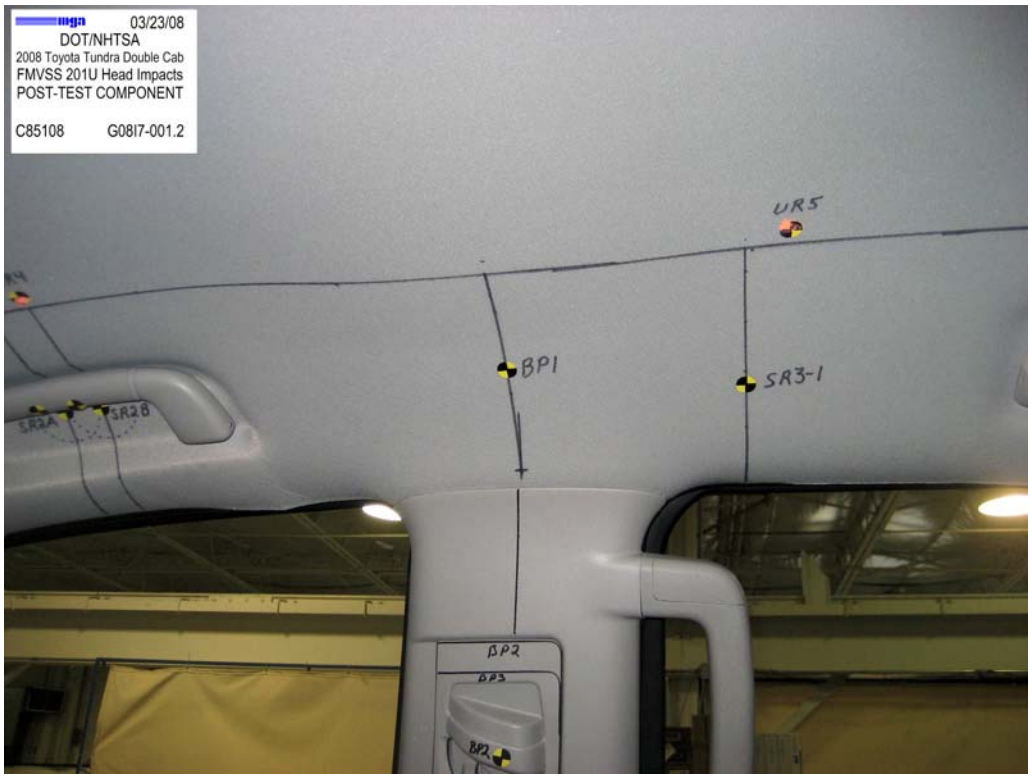

03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR3
RH
RP1


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR3


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR6
RH
RP1


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR5
UR6
SR3-1

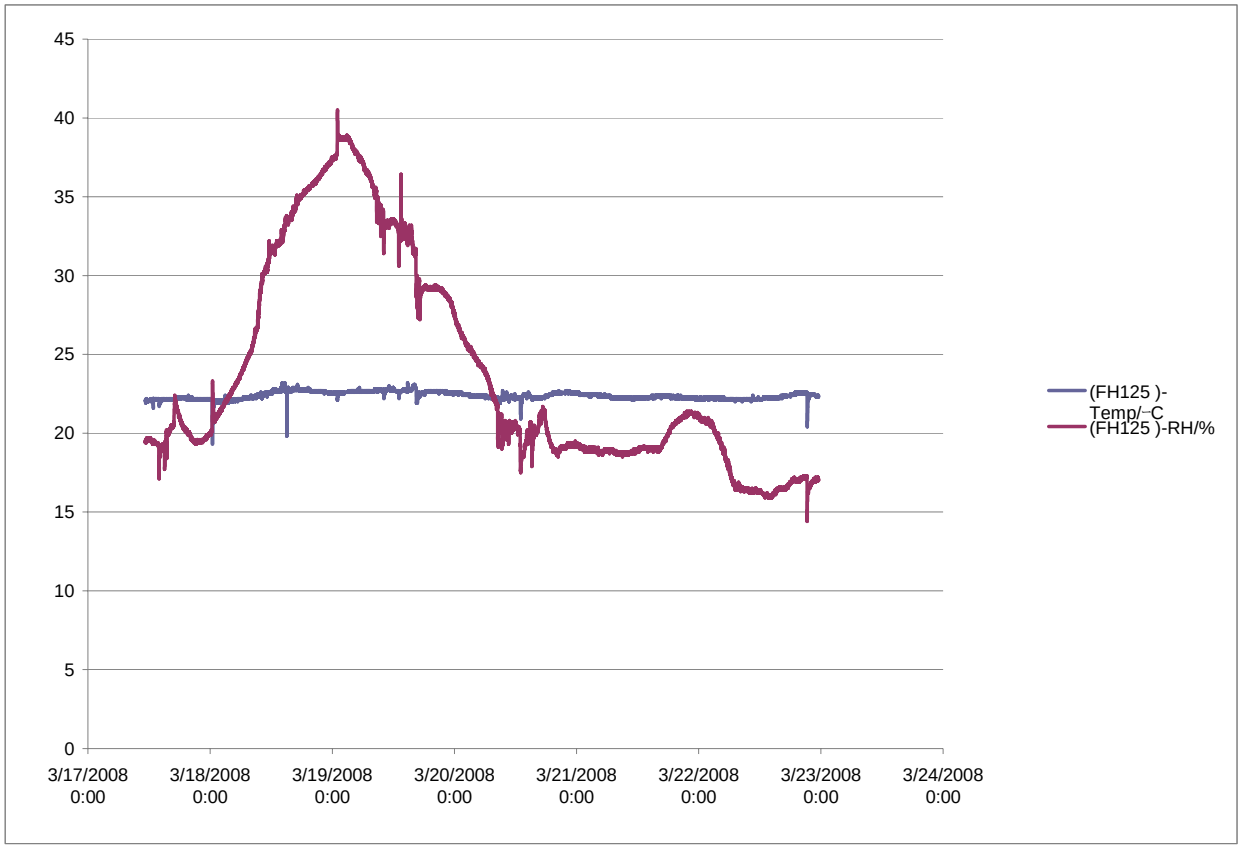

03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR5
BP1
SR3-1
SR2A
SR2B
BP2
BP3


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
BP2
BP3
BRAKE STOPS


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
UR4
SR1
APR
API
AP2
BP2
STOPS


03/23/08
DOT/NHTSA
2008 Toyota Tundra Double Cab
FMVSS 201U Head Impacts
POST-TEST COMPONENT
C85108 G08I7-001.2
ADVERTENCIA
SRI
APR
API
AP2
AP3

Appendix A – Temperature Trace



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 ISO17025 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.
The results of this certificate relate only to the items calibrated or tested.

FARO Technologies, Inc.
Michigan Regional Office
PH1:248-669-8620
FAX:248-669-8656
L-A-B Cert Number: L1147.01

46998 Magellan Drive
Wixom, MI 48393
USA

FARO®

Page 1 of 6

LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 Accredited

Revised: January 2, 2008

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

MetroCal inc.
#0513.01
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 48083

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

Standard Used	Cal Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence (K=2)
Gage Blk Set ID# 24281	12/18/06	12/18/07	061218601	0.0015°
DoAll Sine Bar ID#1879	12/29/06	12/29/07	061229125	0.0015°

Results:

As Found Readings

Units	Nominal	Actual	Deviation
Decimal Deg.	5.00	5.1	0.10
	10.00	10.1	0.10
	20.00	20.1	0.10
Tolerance	30.00	30.1	0.10
0-10° ± 0.1°	40.00	40.1	0.10
11-79° ± 0.2°			
80-90° ± 0.1°			

Reference Level Check: Within ± 0.1 degrees

As Left Readings

Nominal	Actual	Deviation
5.00	5.1	0.10
10.00	10.1	0.10
20.00	20.1	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: M6AC0606
Calibration Date: 11·16·07

Subject Tape Measure

Brand: STANLEY
S/N: TPM 057
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 ± 1/32 of an inch (1 mm), then the tape measure is acceptable.
Pass X Fail ____ Maximum Difference = 0

Date: 12·3·07 Performed By: RJM.II

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

12/5/07

Certificate of Instrument Calibration and Testing

Customer Instrument

Dickson Model Number: FH125

Serial Number: 06018122

Calibration Technician Dan Gawel

Calibration Date: 05/01/2007

Calibration Standards

ACCREDITED Cert # 1621.01

General Eastern: Model # M3
Ser. # 0850800 / 2360502
Accuracy: ± .4% FS RH and ± .4 °F
Certified April, 2006

Azonix Model # A1011 Ser. # T2513-9027
RTD Platinum Probe Ser. # 496013 Accuracy: ± .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 recomended 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	± 2% RH
67.8	68.5	± 2% RH
85.3	86.4	± 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 ±1.1 %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

A 3-pt Deluxe NIST will be performed 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)

Charts/Pens
(Order now and receive them with your calibrated unit)

	Order No.	Qty.	Price Ea.
☐ 6 Red Pens	P222	____	$36 pk
☐ 3 Red/3 Blue Pens	P246	____	$36 pk
☐ 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

3. Please return via:
   ☐ Ground Freight*
   ☐ 2nd Day Air*
   ☐ Next Day Air*

***Charges added at factory**

Returned UPS 2nd Day unless otherwise requested

4. Ship To: _____

Bill To: _____

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

5/5/07

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

A 3-pt Deluxe NIST will be performed 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)

3. Please return via:
   ☐ Ground Freight*
   ☐ 2nd Day Air*
   ☐ Next Day Air*

***Charges added at factory**

Returned UPS 2nd Day unless otherwise requested

4. Ship To: _____

Bill To: _____

Charges/Pens
(Order now and receive them with your calibrated unit)

	Order No	Qty	Price Ea
☐ 6 Red Pens	P222	____	$36 pk
☐ 3 Red/3 Blue Pens	P246	____	$36 pk
☐ 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

MetroCal inc
#0512.01
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 48083

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.

Standard Used	Cal. Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence , (K=2)
Dead Weight Set ID#2463	8/10/06	8/10/08	MI-04-06-8325	+/-0.001% of Load

Results:
Tolerance used: ± 0.02

Units: lbs — **TI Division/Increment:** 0.01

	As Found				As Left		
Weight Test	**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.

7/24/07

Safety Compliance Testing for FMVSS 201UI
"Occupant Protection In Interior Impact"
Page 158 of 173
C85108 / DTNH22-04-C-11027 / G07I7-001.08

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#*** O7-3173 ***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/ weights used: The scale is accurate and working fine. The scale holds a good zero,also the 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

4/14/08

Safety Compliance Testing for FMVSS 201UI
"Occupant Protection In Interior Impact"
Page 159 of 173
C85108 / DTNH22-04-C-11027 / G07I7-001.08

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/ weights used
The scale is accurate and working fine.
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

4/14/08

mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
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: *Chuck DiMaggio*

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 ±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.

446 executive drive • troy, mi 48083
248 / 577-5001 • fax 248 / 577-5025
www.mgaresearch.com

mga research corporation

CALIBRATION CERTIFICATE

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

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 ±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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www.mgaresearch.com

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
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: *Chuck DiMaggio*

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 ±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:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J36353	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 10/30/2007	**Calibration Date:** *7/20/2007*
	Calibrated By: *Chuck DiMaggio*

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 ±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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mga research corporation

CALIBRATION CERTIFICATE

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

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 ±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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mga research corporation

CALIBRATION CERTIFICATE

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

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 ±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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mga research corporation

CALIBRATION CERTIFICATE

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

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 ±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:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J35791	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 10/30/2007	**Calibration Date:** *7/20/2007*
	Calibrated By: *Chuck DiMaggio*

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 ±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:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J22696	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 10/30/2007	**Calibration Date:** *7/20/2007*
	Calibrated By: *Chuck DiMaggio*

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 ±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:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J35924	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 10/30/2007	**Calibration Date:** *7/20/2007*
	Calibrated By: *Chuck DiMaggio*

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 ±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:** *Reference Accelerometer*
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: *Chuck DiMaggio*

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 ±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:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J22664	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 10/30/2007	**Calibration Date:** *7/20/2007*
	Calibrated By: *Chuck DiMaggio*

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 ±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* ~

Per ISO 16063-21

Model Number: 301M09/484B (394M17 SYSTEM)

Serial Number: 862/2470 (MGA00739)

Description: ICP® Accelerometer Method: Back-to-Back Comparison Calibration

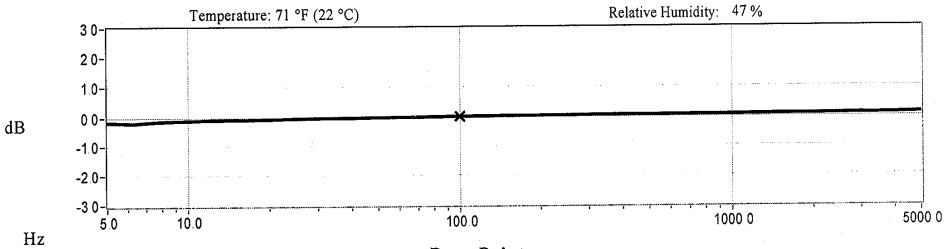
Manufacturer: PCB

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 (rms)[1]: 10.0 g (98.1 m/s²)²

[1]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

[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

ACCREDITED
Cert No 1862.01

PCB PIEZOTRONICS INC
VIBRATION DIVISION
3425 Walden Avenue Depew, NY 14043
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7/24/07

CAL3 - 3268027234.03

PAGE 1 of 1

~Certificate of Calibration~

Model Number: 484B
Serial Number: 2470
Description: Signal Conditioner
Test Procedure: AT-106-1
Temperature: 71° F

PCB Control #: QC214/QC184/QC198/CA514
Calibration Date: 07/20/07
Recalibration Date:
Calibration Technician: James Higbee 2b
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%.

ACCREDITED
Cert. No. 1862.01

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