

**SAFETY PRE-STANDARD TESTING FOR FMVSS 201U
Occupant Protection In Interior Impact
Upper Interior Head Impact Protection**

GENERAL MOTORS CORPORATION

1998 Buick LeSabre

NHTSA No. PW0100

MGA RESEARCH CORPORATION

446 Executive Drive

Troy, Michigan 48083



Test Dates: August 15-16, 2004

Report Date: August 17, 2004

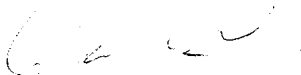
FINAL REPORT

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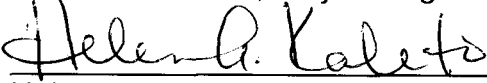
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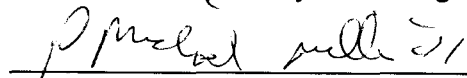


David G. Gotwals, Project Engineer



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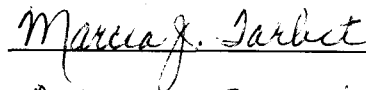


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16. Abstract A pre-standard test series was conducted on the subject 1998 Buick LeSabre, NHTSA No. PW0100, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201U pre-standard compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on August 15-16, 2004.			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact pre-standard test series was to measure the performance of the subject vehicle, a 1998 Buick LeSabre, for FMVSS 201U, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on August 15-16, 2004 on a 1998 Buick LeSabre, manufactured by General Motors Corporation.

All tests were conducted in accordance with the U. S. Department of Transportation, National Highway Traffic Safety Administration's Laboratory Test Procedure TP-201U-01 dated April 3, 1998 and the corresponding MGA Research Corporation's FMVSS 201U procedure number MGATP201U_FRAME#2 dated March 20, 2003.

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 March 20, 2003.

2.0 TEST DATA SUMMARY

The 1998 Buick LeSabre was equipped with A, B, and Rear pillars, an adjustable seat belt anchorage on each B-Pillar, and coat hooks above the rear doors.

Upon completion of targeting the test vehicle, ten (10) targets were chosen to be impacted based upon engineering judgment and discussion with the COTR. Targets were chosen which appeared most likely to give high HIC(d) values. The ten (10) targets chosen were:

AP1	BP3	RP2	UR2
AP3	BP4	SR2B	
BP1	RP1	SR3-1	

TABLE 2-1
SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Buick LeSabre

VEH. NHTSA NO.: PW0100 VIN: 1G4HP52K1WH COLOR: Tan

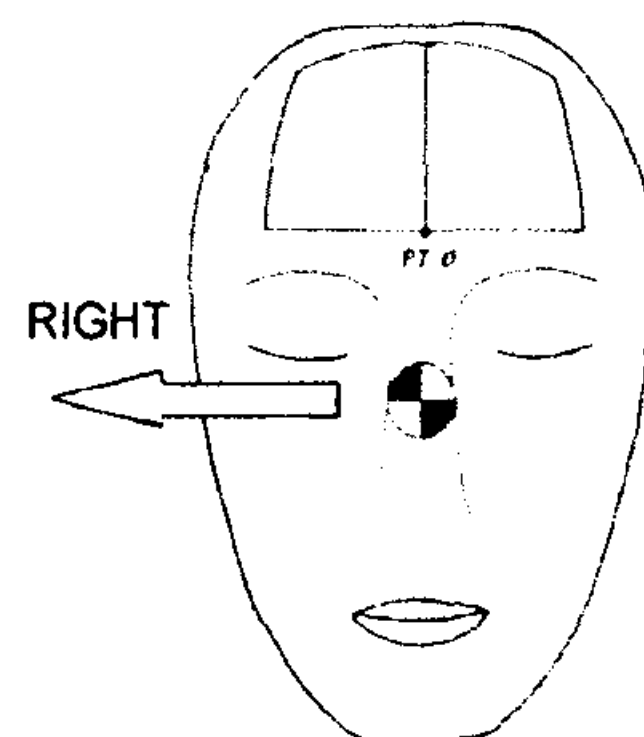
VEH. BUILD DATE: December, 1997 TEST DATES: August 15-16, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, Anthony Frontera, Bryan Hood

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Left	250	38	23.9	1064	1189	25	10 Left
AP3	Right	149	43	23.6	1296	1498	7	0
BP1	Right	90	5	23.9	598	572	71	4 Left
BP3	Left	275	3	24.0	575	542	25	10 Left
BP4	Right	161	-4	24.0	547	504	33	22 Right
RP1	Left	290	30	23.6	692	697	34	10 Left
RP2	Right	67	23	23.9	575	541	35	4 Left
SR2B	Right	90	45	23.8	1051	1172	30	7 Left
SR3-1	Left	270	31	23.8	734	752	20	3 Right
UR2	Left	270	37	23.7	869	931	57	5 Right

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



POST TEST COMMENTS:

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

BP3 Left: The B-Pillar trim cracked during impact.

RP1 Left: Deformation on pillar.

SR2B Right: Headliner deformation.

No damage was observed for any other targets.

REMARKS:

The targets listed were impacted in the following order:

Left: AP1, BP3, UR2, SR3-1, RP1

Right: AP3, SR2B, BP1, BP4, RP2

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

RECORDED BY: David G. Gotwals

DATE: August 16, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Buick LeSabre

VEH. NHTSA NO.: PW0100 VIN: 1G4HP52K1WH COLOR: Tan

VEH. BUILD DATE: December, 1997 TEST DATES: August 15-16, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, Anthony Frontera, Bryan Hood

INTERIOR TRIM INFORMATION: A, B, and Rear pillars, an adjustable seat belt anchorage on each B-Pillar, and coat hooks above each rear door.

SUNROOF INFORMATION:

Installed: Yes X No

Operation: Electric Manual

ROLL-BAR INFORMATION:

Installed: Yes X No

Padded: Yes X No

Braces: Yes X No

GENERAL INFORMATION:

Date Received: 8/11/04; Odometer Reading: 54,491 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: General Motors Corporation

Date of Manufacture: December, 1997; VIN: 1G4HP52K1WH

GVWR: 2061 kg;

GAWR FRONT: 1138 kg

GAWR REAR: 923 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 30 psi REAR: 30 psiRecommended Tire Size: P205/70R15

Recommended Cold Tire Pressure:

FRONT: 30 psi REAR: 30 psiSize of Tire on Test Vehicle: P205/70R15Type of Spare Tire: T125/70D15; Space Saver: X; Standard:

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ; Bucket ; Split Bench XNumber of Occupants: Front 3; Rear 3; TOTAL 6VEHICLE CAPACITY WEIGHT (VCW) = 488 kgNo. of Occupants x 68 kg = 408 kgRated Cargo/Luggage Weight (RCLW) = 80 kg (difference)

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

Right Front = 510.0 kg Right Rear = 274.0 kgLeft Front = 502.0 kg Left Rear = 264.0 kgTOTAL FRONT = 1012.0 kg TOTAL REAR = 538.0 kg% Total Weight = 65.3 % % Total Weight = 34.7 %TOTAL DELIVERED WEIGHT = 1550.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1550.0 kgRated Cargo/Luggage Wt. = 80.0 kgTARGET TEST WEIGHT 1630.0 kg

WEIGHT OF TEST VEHICLE:

Right Front =	<u>506.0</u> kg	Right Rear =	<u>314.0</u> kg
Left Front =	<u>501.0</u> kg	Left Rear =	<u>307.0</u> kg
TOTAL FRONT =	<u>1007.0</u> kg	TOTAL REAR =	<u>621.0</u> kg
% Total Weight =	<u>61.9</u> %	% Total Weight =	<u>38.1</u> %
TOTAL TEST WEIGHT = <u>1628.0</u> kg			
Weight of ballast secured in vehicle's cargo area = <u>78</u> kg			

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 726.0 mm; Left Front 725.0 mm;
 Right Rear 734.0 mm; Left Rear 720.0 mm

Pitch Angle at Right Door Sill = 0.2 Front higher
 Pitch Angle at Left Door Sill = 0.1 Front higher
 Roll Angle at Front Bumper = 0.2 Left higher
 Roll Angle at Rear Bumper = 0.4 Right higher

FULLY LOADED: Right Front 726.0 mm; Left Front 726.0 mm;
 Right Rear 715.0 mm; Left Rear 706.0 mm;

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

AS TARGETED: Right Front 922.0 mm; Left Front 920.0 mm;
 Right Rear 945.0 mm; Left Rear 930.0 mm;

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

AS TESTED ON RIGHT SIDE:

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

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill = 0.2 Front higherPitch Angle at Left Door Sill = 0.2 Front higherRoll Angle at Front Bumper = 0.2 Left higherRoll Angle at Rear Bumper = 0.4 Right higherVEHICLE WHEELBASE = 2811 mm

REMARKS: The seat travel distance was measured to be 230 mm for the driver front seat and 230 mm for the passenger front seat.

RECORDED BY: David G. GotwalsDATE: August 11, 2004APPROVED BY: Helen A. Kaleto

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Buick LeSabreVEH. NHTSA NO.: PW0100 VIN: 1G4HP52K1WH COLOR: TanVEH. BUILD DATE: December, 1997 TEST DATES: August 15-16, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Anthony Frontera, Bryan Hood

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195°-255°	L 209.3°	L 250.9°
	R 105°-165°	R 107.8°	R 149.9°
B-PILLAR	L 195°-345°	L 198.8°	L 285.2°
	R 15°-165°	R 73.2°	R 161.4°

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: David G. GotwalsDATE: August 11, 2004APPROVED BY: Helen A. Kaletto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Buick LeSabreVEH. NHTSA NO.: PW0100 VIN: 1G4HP52K1WH COLOR: TanVEH. BUILD DATE: December, 1997 TEST DATES: August 15-16, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Anthony Frontera, Bryan Hood

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L 0°-50°	L 0°	L 50°
		R 0°-50°	R 0°	R 50°
	FH2	L 0°-50°	L 0°	L 50°
		R 0°-50°	R 0°	R 50°
SIDE RAIL	SR1	L 0°-50°	L 0°	L 45°
		R 0°-50°	R 0°	R 45°
	SR2A	L 0°-50°	L 0°	L 35°
		R 0°-50°	R 0°	R 25°
	SR2B	L 0°-50°	L 0°	L 45°
		R 0°-50°	R 0°	R 45°
	SR3-1	L 0°-50°	L 0°	L 31°
		R 0°-50°	R 0°	R 31°
A-PILLAR	AP1	L -5°-50°	L -5°	L 38°
		R -5°-50°	R -5°	R 38°
	AP2	L -5°-50°	L -5°	L 47°
		R -5°-50°	R -5°	R 47°
	AP3	L -5°-50°	L -5°	L 43°
		R -5°-50°	R -5°	R 43°
B-PILLAR	BP1	L -10°-50°	L -10°	L 5°
		R -10°-50°	R -10°	R 5°

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
	BP2*	L 0°-50°	L 0°	L 7°
		R 0°-50°	R 0°	R 7°
	BP3	L -10°-50°	L -10°	L 3°
		R -10°-50°	R -10°	R 3°
	BP4	L -10°-50°	L -10°	L -4°
		R -10°-50°	R -10°	R -4°
REAR PILLAR	RP1	L -10°-50°	L -10°	L 30°
		R -10°-50°	R -10°	R 30°
	RP2	L -10°-50°	L -10°	L 23°
		R -10°-50°	R -10°	R 23°
REAR HEADER	RH	L 0°-50°	L -10°	L 50°
		R 0°-50°	R -10°	R 50°
UPPER ROOF 1		0°-50°	0°	50°
UPPER ROOF 2		0°-50°	0°	37°
UPPER ROOF 3		0°-50°	0°	37°
UPPER ROOF 4		0°-50°	0°	50°
UPPER ROOF 5		0°-50°	0°	37°
UPPER ROOF 6		0°-50°	0°	37°

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

RECORDED BY: David G. Gotwals

DATE: August 11, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Buick LeSabreVEH. NHTSA NO.: PW0100 VIN: 1G4HP52K1WH COLOR: TanVEH. BUILD DATE: December, 1997 TEST DATES: August 15-16, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Anthony Frontera, Bryan Hood

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	230 mm	230 mm
T°	Horizontal ∠ {CG-F1 (Left Seat) to (Right A-Pillar)}	109.1°	--
A1°	360° - T°	250.9°	--
W°	Horizontal ∠ {CG-2 (Left Seat) to (Left A-Pillar)}	209.3°	--
A2°	A2° = W°	209.3°	--
U°	Horizontal ∠ {CG-2 (Left Seat) to (Left B-Pillar)}	285.2°	--
B1°	B1° = U°	285.2°	--
V°	Horizontal ∠ {CG-R (Left Seat) to (Left B-Pillar)}	198.8°	--
B2°	B2° = V°	198.8°	--
W° (right)	Horizontal ∠ {CG-F2 (Right Seat) to (Right A-Pillar)}	--	149.9°
A1° (right)	A1° (right) = W° (right)	--	149.9°
T° (right)	Horizontal ∠ {CG-F1 (Right Seat) to (Left A-Pillar)}	--	252.2°
A2° (right)	360° - T° (right)	--	107.8°
V° (right)	Horizontal ∠ {CG-R (Right Seat) to (Right B-Pillar)}	--	161.4°
B1° (right)	B1° (right) = V° (right)	--	161.4°
U° (right)	Horizontal ∠ {CG-F2 (Right Seat) to (Right B-Pillar)}	--	73.2°
B2° (right)	B2° (right) = U° (right)	--	73.2°
J	A-Pillar {(Plane 3) - (Plane 5)}	324.0 mm	332.7 mm
J/2	J ÷ 2	162.0 mm	166.4 mm
D1	Upper Roof {(Plane A) - (Plane B)}	1630.0 mm	
D1/2	D1 ÷ 2	815.0 mm	
D2	Upper Roof {(Plane C) - (Plane D)}	1250.7 mm	
D2/2	D2 ÷ 2	625.4 mm	
.35D1	.35 x D1	570.5 mm	

Measurement	Description	Left Side	Right Side
.35D2	.35 x D2	437.7 mm	
N	B-Pillar {(BPR) - (lowest point on daylight opening forward of B-Pillar)}	432.5 mm	426.3 mm
N/2	B-Pillar {(BP3) - (lowest point on daylight opening forward of B-Pillar)}	216.3 mm	213.2 mm
N/4	B-Pillar {(BP4) - (lowest point on daylight opening forward of B-Pillar)}	108.1 mm	106.6 mm
D	R-Pillar (Point 7 - Point M)	735.0 mm	740.0 mm
3D/7	3 D / 7	315.0 mm	317.1 mm

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

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	960.0	-374.0	584.0	960.0	374.0	597.0
Rear	2066.0	-374.0	585.0	2066.0	374.0	585.0

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	960.0	-374.0	584.0	960.0	374.0	597.0
Rear	2066.0	-374.0	585.0	2066.0	374.0	585.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	890.0	-374.0	1244.0	890.0	374.0	1257.0
CGF2	1120.0	-374.0	1244.0	1120.0	374.0	1257.0
CGR	2226.0	-374.0	1245.0	2226.0	374.0	1245.0

REFERENCE FOR VEHICLE COORDINATE SYSTEM:

REMARKS: Driver upper door striker bolt (x, y, z) = (1130.3, -808.9, 749.1)

RECORDED BY: David G. Gotwals DATE: August 11, 2004

APPROVED BY: Helen A. Kalet

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Buick LeSabreVEH. NHTSA NO.: PW0100 VIN: 1G4HP52K1WH COLOR: TanVEH. BUILD DATE: December, 1997 TEST DATES: August 15-16, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Anthony Frontera, Bryan Hood

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	813.2	-561.1	1389.8	250	38	No	--	Yes
AP2	691.9	-641.1	1305.2	210	47	No	--	No
AP3	566.5	-680.0	1228.6	210	43	No	--	No
A-Pillar Right Side								
AP1	812.3	555.6	1398.3	108	38	No	--	No
AP2	694.9	636.3	1311.2	149	47	No	--	No
AP3	568.6	677.1	1232.2	149	43	No	--	Yes
B-Pillar Left Side								
BP1	1258.8	-523.7	1445.8	270	5	No	--	No
BP2	1237.1	-644.5	1222.4	270	7	No	--	No
BP3	1186.7	-662.6	1230.4	--	--	Yes	--	--
REL	1187.3	-654.6	1204.8	275	3	--	1	Yes
BP4	1272.1	-742.5	1123.3	199	-4	No	--	No
B-Pillar Right Side								
BP1	1257.1	522.8	1446.0	90	5	No	--	Yes
BP2	1239.3	641.8	1226.8	90	7	No	--	No
BP3	1193.2	658.8	1233.7	--	--	Yes	--	--
REL	1194.5	650.7	1207.3	85	3	--	1	No
BP4	1276.2	733.9	1128.0	161	-4	No	--	Yes
Rear Pillar Left Side								
RP1	2096.6	-524.2	1363.0	290	30	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					
RP2	2302.0	-623.8	1214.0	--	--	Yes	--	--
REL	2211.4	-584.0	1282.1	293	23	--	5	No
Rear Pillar Right Side								
RP1	2093.2	522.3	1372.2	70	30	No	--	No
RP2	2303.3	614.8	1222.4	--	--	Yes	--	--
REL	2203.6	583.6	1286.0	67	23	--	5	Yes
Front Header Left Side								
FH1	706.8	-440.2	1398.3	--	--	Yes	--	--
REL	721.8	-425.7	1373.8	180	50	--	2	No
FH2	687.0	-297.3	1406.4	--	--	Yes	--	--
REL	702.7	-290.1	1378.1	180	50	--	2	No
Front Header Right Side								
FH1	703.0	439.8	1399.5	--	--	Yes	--	--
REL	723.0	432.5	1380.4	180	50	--	2	No
FH2	681.2	288.8	1409.6	--	--	Yes	--	--
REL	700.4	288.4	1378.9	180	50	--	2	No
Side Rail Left Side								
SR1	962.3	-525.0	1415.3	270	45	No	--	No
SR2A	1112.5	-530.9	1432.9	270	35	No	--	No
SR2B	958.2	-525.5	1415.3	270	45	No	--	No
SR3-1	1408.7	-528.7	1441.8	270	31	No	--	Yes
Side Rail Right Side								
SR1	961.4	521.1	1421.0	90	45	No	--	No
SR2A	1111.9	526.2	1435.1	90	25	No	--	No
SR2B	956.2	521.1	1419.8	90	45	No	--	Yes
SR3-1	1406.2	528.7	1443.1	90	31	No	--	No
Rear Header Left Side								
RH	2079.6	-374.7	1413.8	0	50	No	--	No
Rear Header Right Side								
RH	2075.7	373.2	1422.5	0	50	No	--	No
Upper Roof Left Side								

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					
UR1	846.2	-433.0	1434.5	270	50	No	--	No
UR2	1257.3	-431.8	1471.1	270	37	No	--	Yes
UR3	1696.7	-431.9	1457.8	270	37	No	--	No
Upper Roof Right Side								
UR4	845.5	431.6	1436.1	270	50	No	--	No
UR5	1257.4	433.7	1471.2	90	37	No	--	No
UR6	1688.1	433.8	1458.6	90	37	No	--	No

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

REMARKS:

RECORDED BY: David G. Gotwals

DATE: August 16, 2004

APPROVED BY: Helen A. Kalet



===== mga

8/15/04

Impact Testing

G0417-001.14

1998 BUICK LESABRE PW0100

FMVSS 201U - UPPER INTERIOR

TEST #1 LEFT AP1

H/V IMPACT ANGLE= 250 / 38

FM4423

PRE-TEST



==== mga

8/15/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE PW0100

FMVSS 201U - UPPER INTERIOR

TEST #1 LEFT AP1

H/V IMPACT ANGLE= 250 / 38

FM4423

POST-TEST



MICHIGAN OPERATIONS
 DATE: 2/8/01
 SUPERCEDES: MGATP207210.2

DOC. NO.: MGATP207210.3
 REVISION NO.: 2
 PAGE 1 OF 1

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.14 VEHICLE YR/MAKE/MODEL: LeSabre 1998

GENERAL TEST PARAMETERS:

Test Number: #1

Target (Vehicle Side): AP1 Left

Temperature: 22C

MGA Test Reference No.: FM4423

Humidity: 50%

Approach Horizontal Angles: 250°

Time of Test: 4:30 PM

Approach Vertical Angles: 38°

FMH Serial No: 036

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
1064	1189	2.8	23.9	25	10 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-100.8	1.67	1.67
Y	6	J35916	100.2	1.54	1.54
Z	7	J35918	97.9	1.58	1.58

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

No visible damage.

Recorded By: [Signature] Approved By: [Signature] Date: 8/15/04

*Only necessary for NHTSA (Government) Compliance testing.

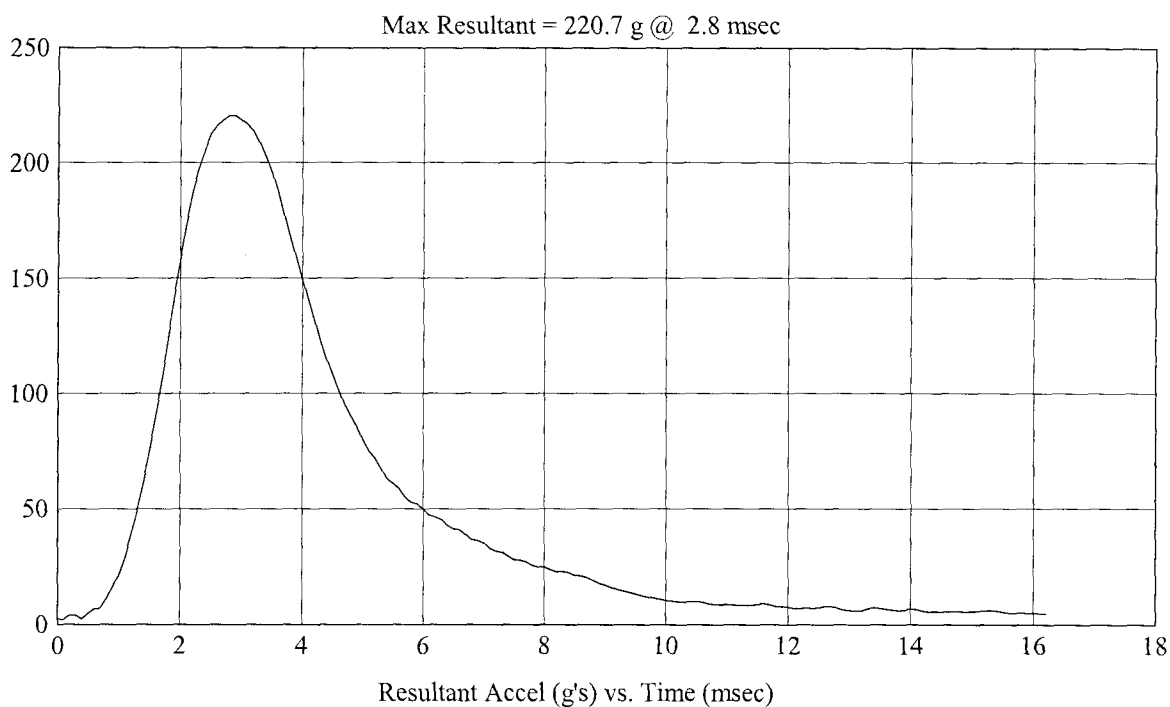
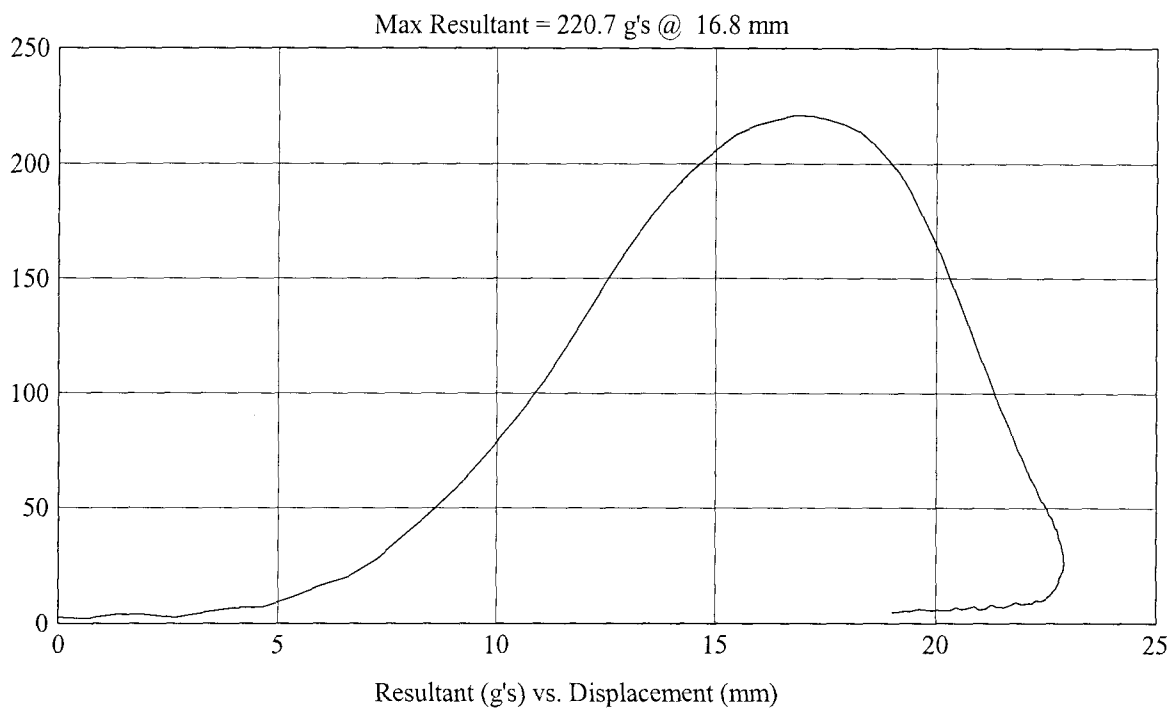
FMH
G0417-001.14

Customer: Buick
Test # 1
FM4423
Additional Desc: N/A

Vehicle Program : LeSabre
Test Date: 8/15/04

Model Year: 1998
Target: AP1
Vehicle Side: Left
Horz/Vert Angle: 250/38

HIC(d) = 1064, HIC = 1189, Delta T = 2.8 msec



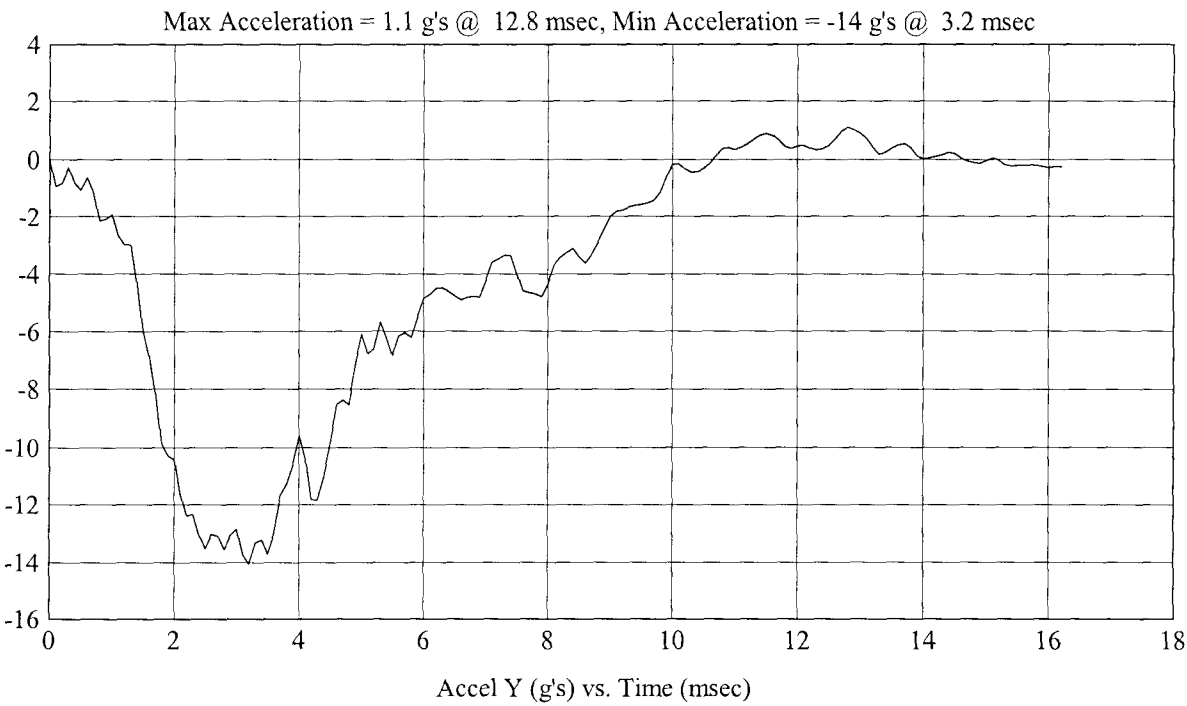
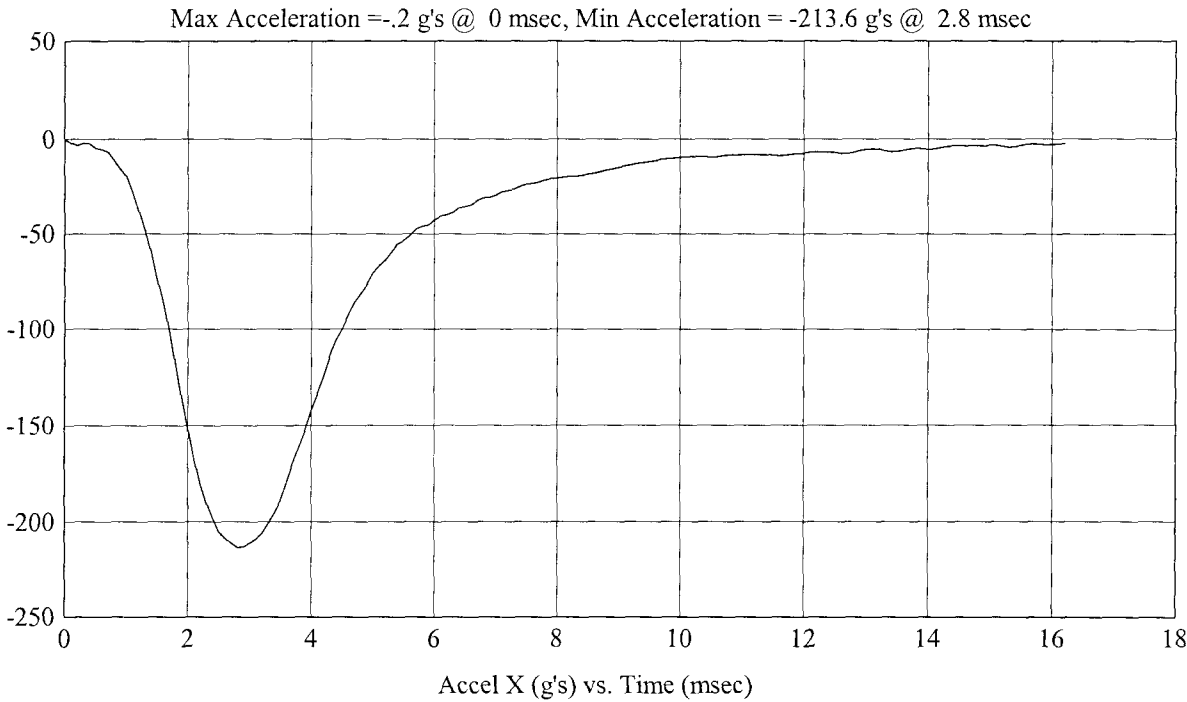
FMH
G0417-001.14

Customer: Buick
Test # 1
FM4423
Additional Desc: N/A

Vehicle Program : LeSabre
Test Date: 8/15/04

Model Year: 1998
Target: AP1
Vehicle Side: Left
Horz/Vert Angle: 250/38

HIC(d) = 1064, HIC = 1189, Delta T = 2.8 msec



FMH
G04I7-001.14

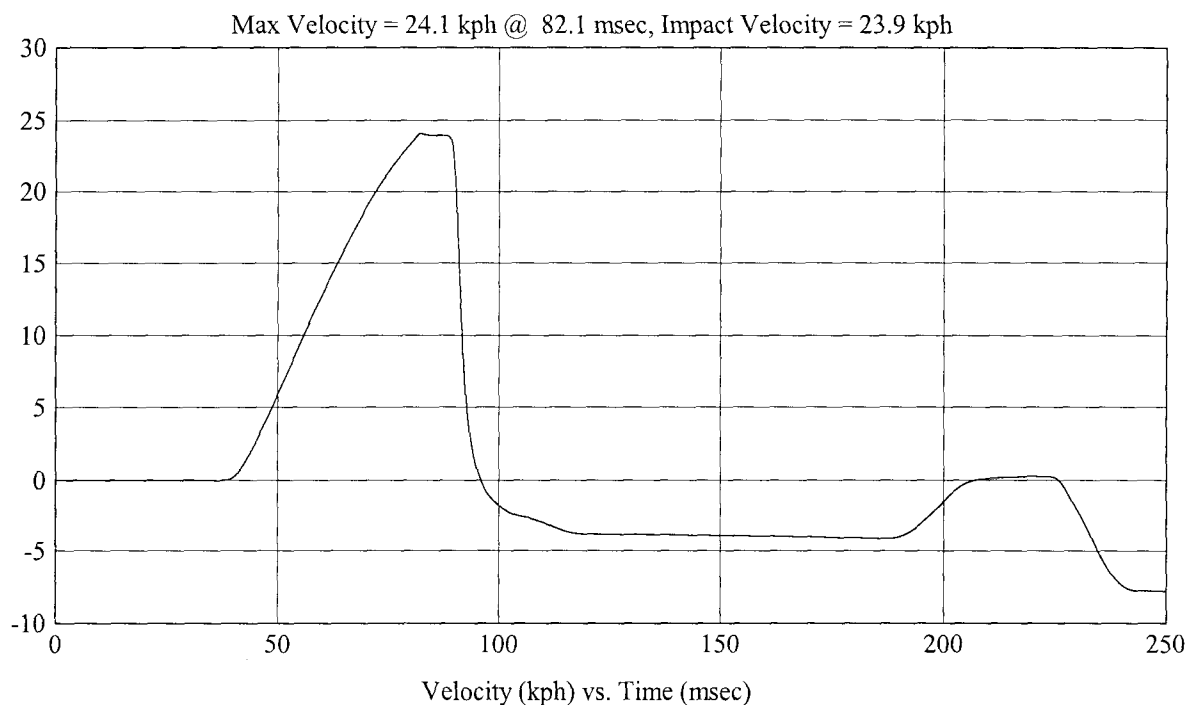
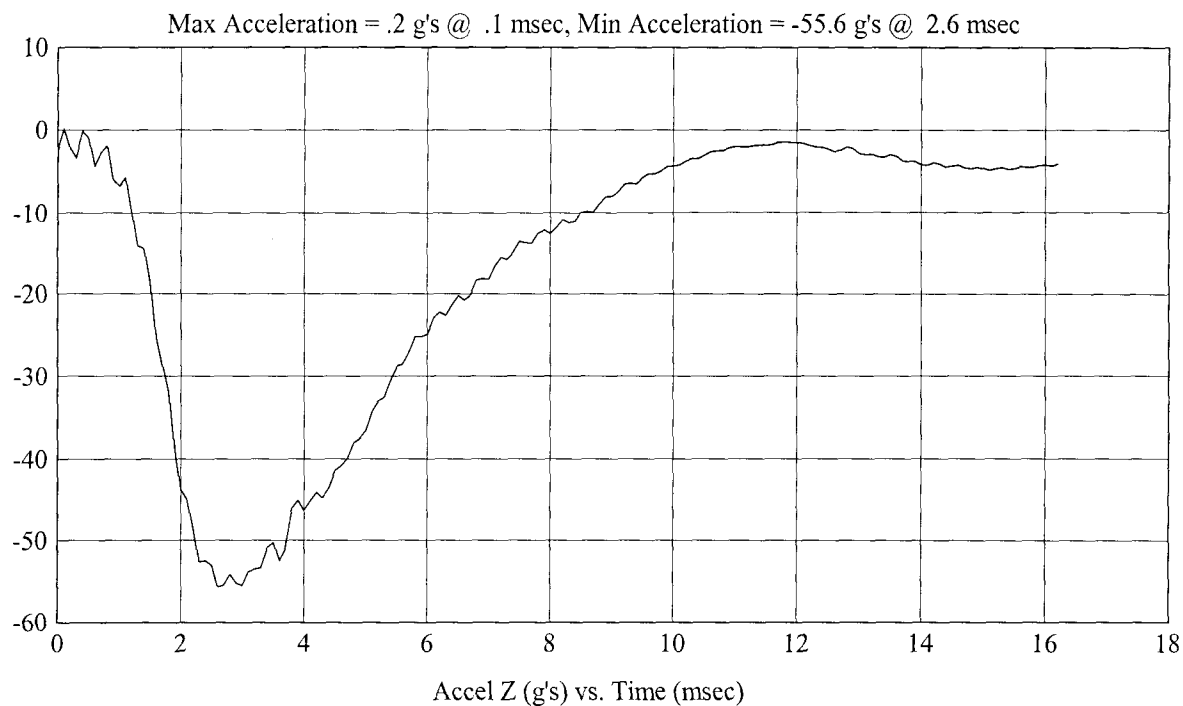
Customer: Buick
Test # 1
FM4423
Additional Desc: N/A

Vehicle Program : LeSabre

Test Date: 8/15/04

Model Year: 1998
Target: AP1
Vehicle Side: Left
Horz/Vert Angle: 250/38

HIC(d) = 1064, HIC = 1189, Delta T = 2.8 msec



FMH
G04I7-001.14

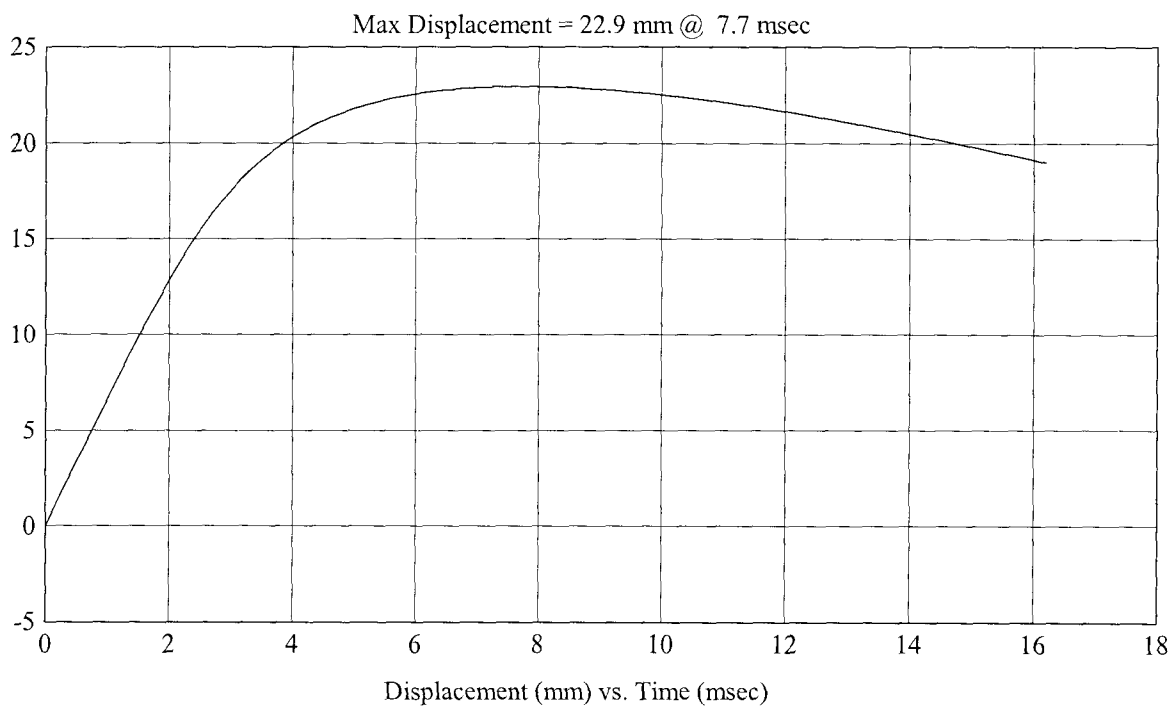
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Test # 1
FM4423
Additional Desc: N/A

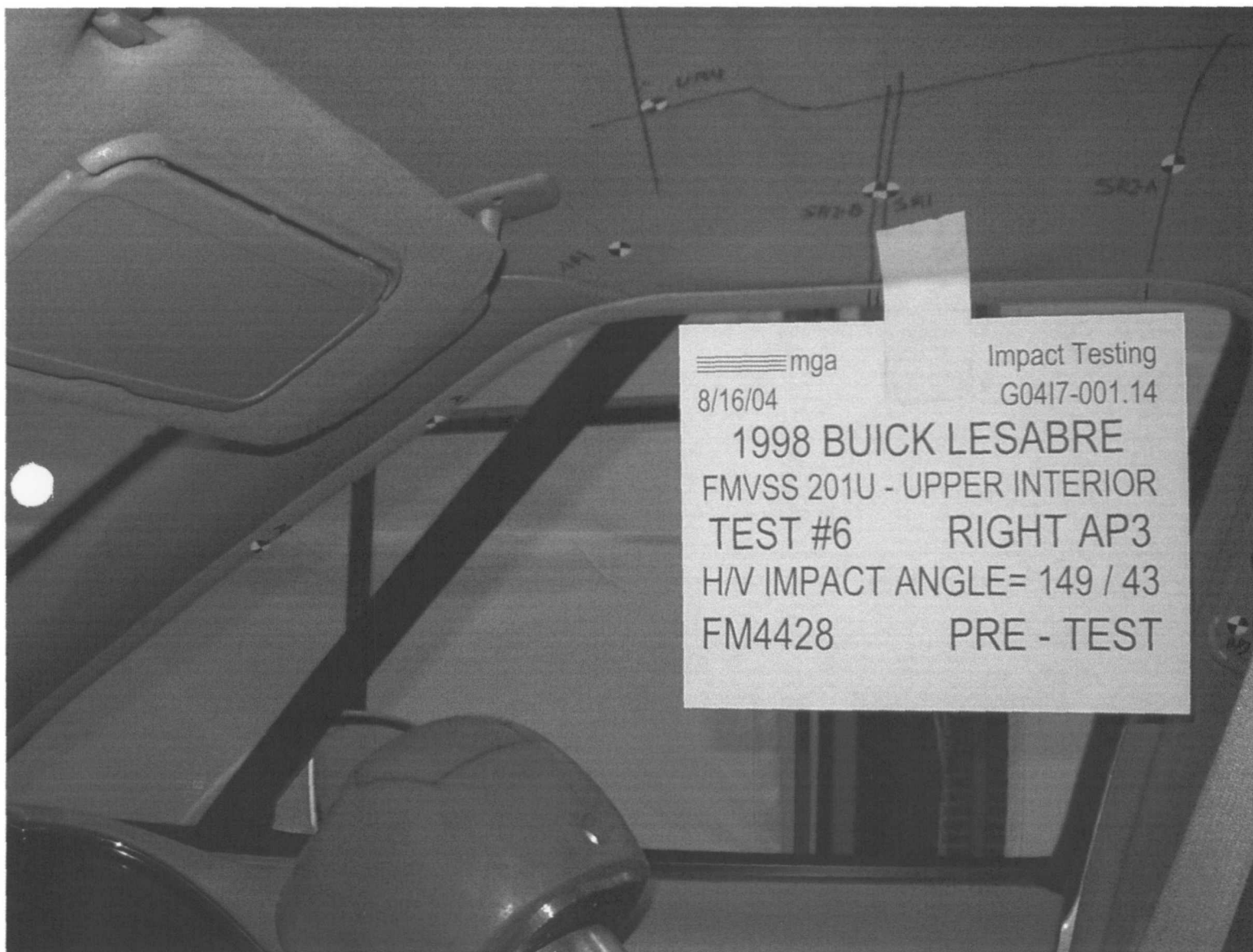
Vehicle Program : LeSabre

Test Date: 8/15/04

Model Year: 1998
Target: AP1
Vehicle Side: Left
Horz/Vert Angle: 250/38

HIC(d) = 1064, HIC = 1189, Delta T = 2.8 msec





mga

8/16/04

Impact Testing

G0417-001.14

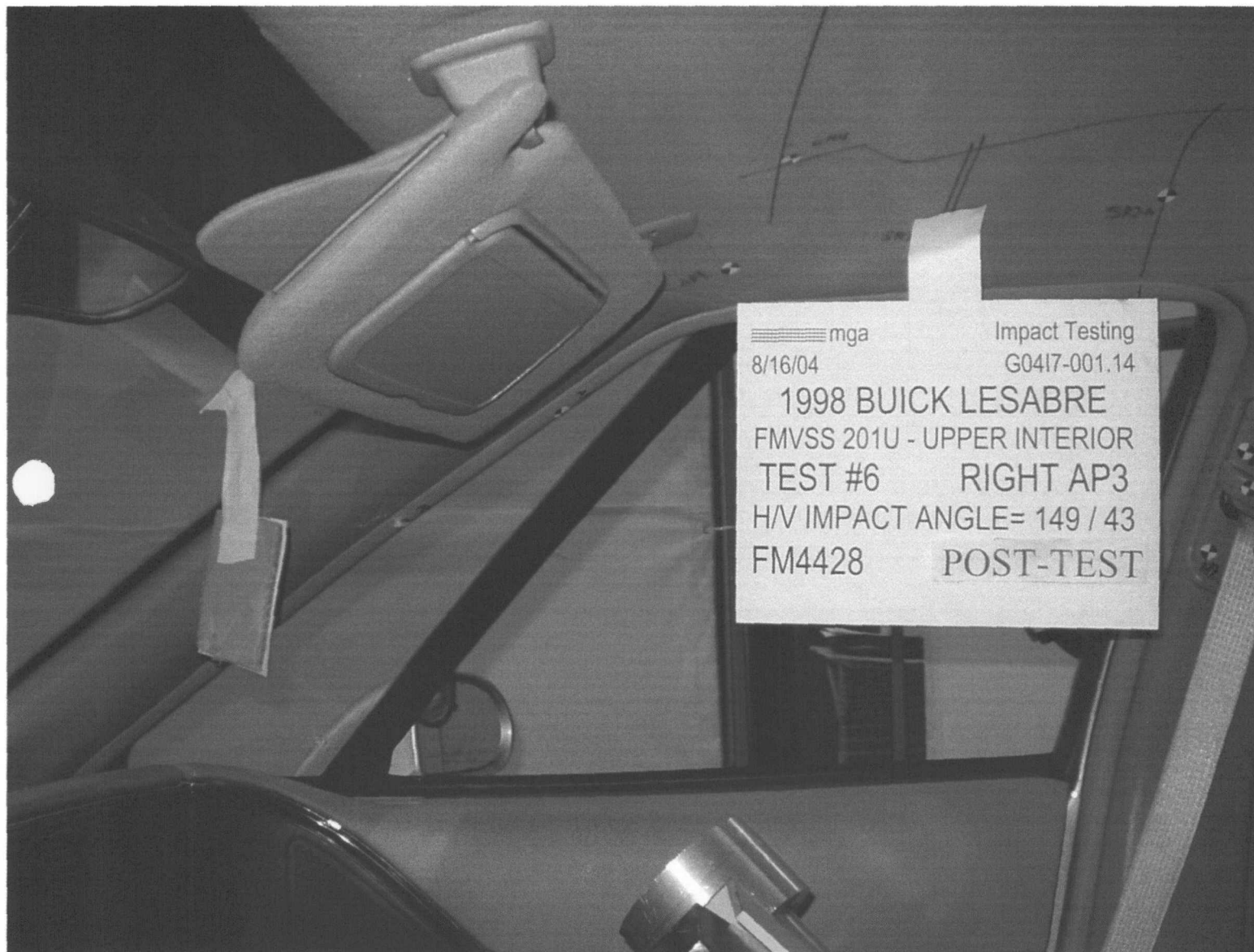
1998 BUICK LESABRE

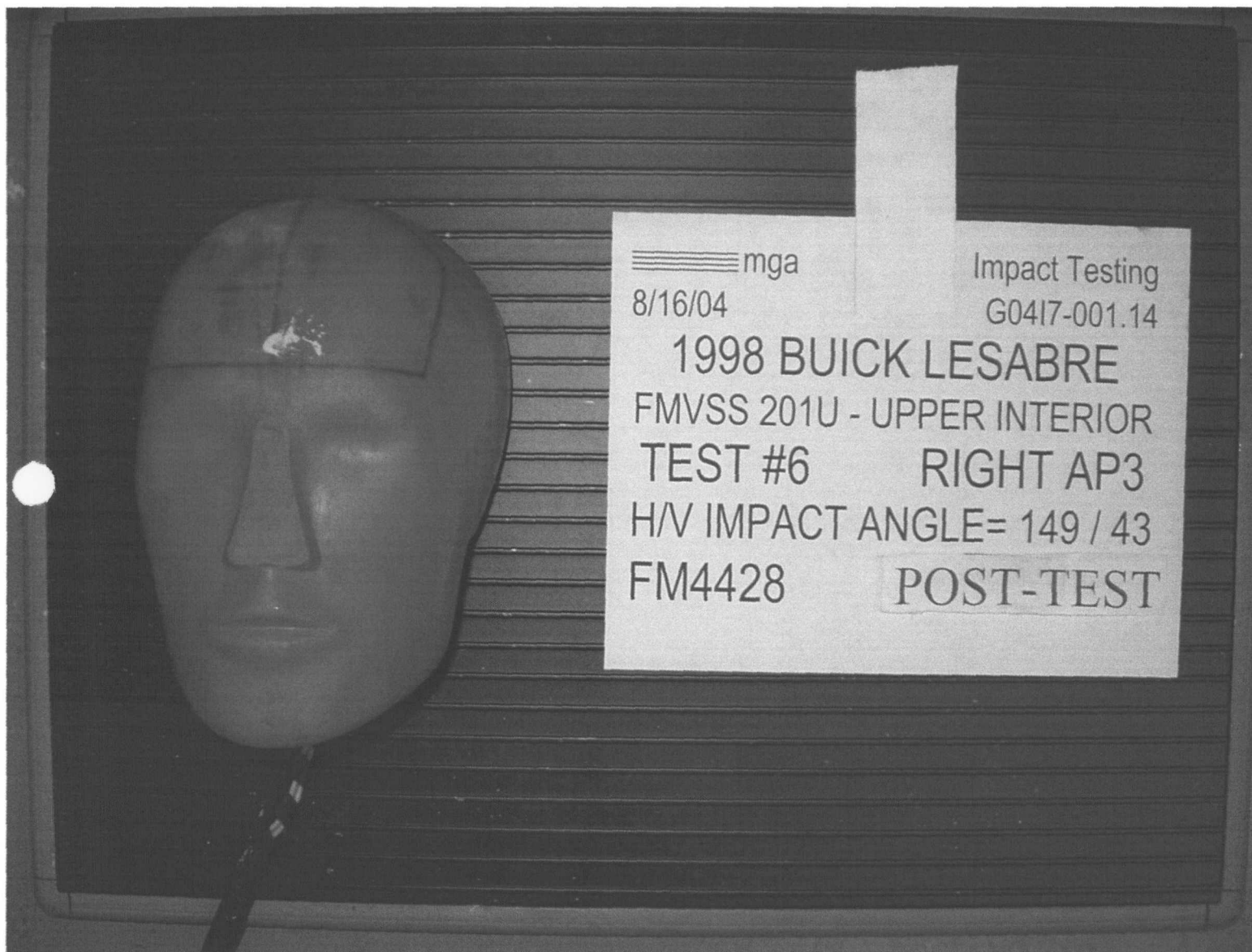
FMVSS 201U - UPPER INTERIOR

TEST #6 RIGHT AP3

H/V IMPACT ANGLE= 149 / 43

FM4428 PRE - TEST





==== mga

8/16/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #6 RIGHT AP3

H/V IMPACT ANGLE= 149 / 43

FM4428

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.14 VEHICLE YR/MAKE/MODEL:LESABRE 1998

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): AP3 Right

Temperature:22C

MGA Test Reference No.:FM4428

Humidity:48%

Approach Horizontal Angles:149°

Time of Test:2:10 PM

Approach Vertical Angles:43°

FMH Serial No:038

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
1296	1498	3.2	23.6	7	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108	1.68	1.68
Y	6	J36193	101.4	1.54	1.54
Z	7	J36353	96.8	1.59	1.58

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

No visible damage

Recorded By: ms j m Approved By: Heidi C. Kales Date: 8-16-04

*Only necessary for NHTSA (Government) Compliance testing.

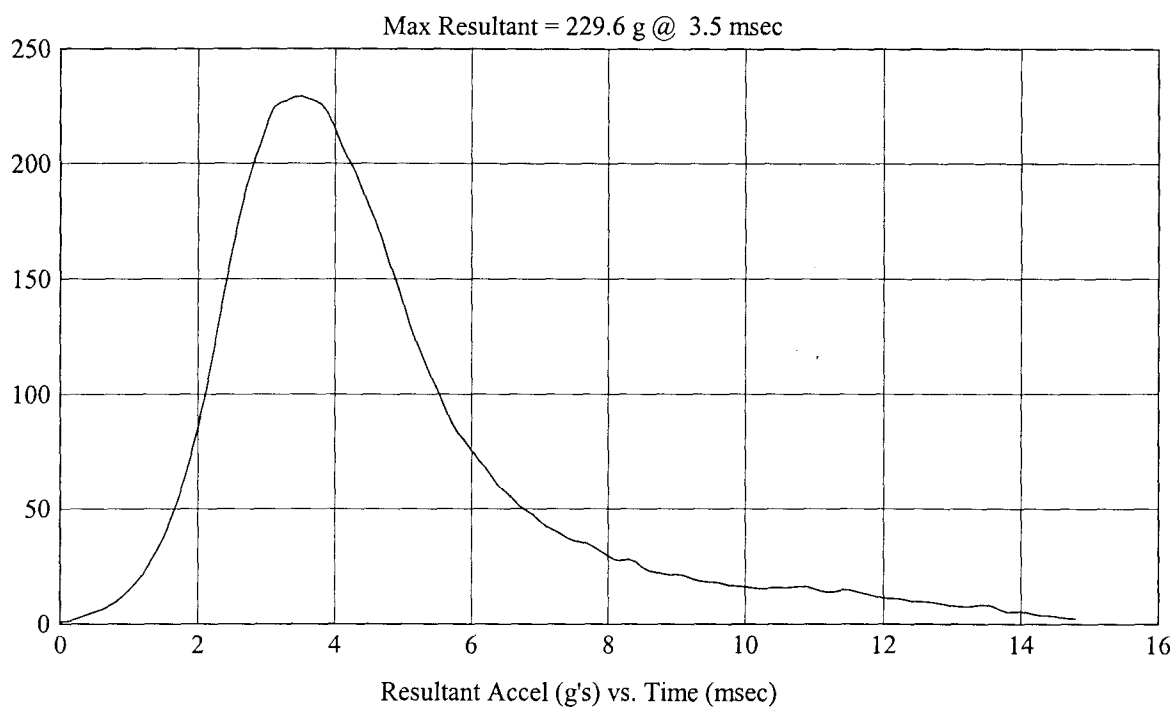
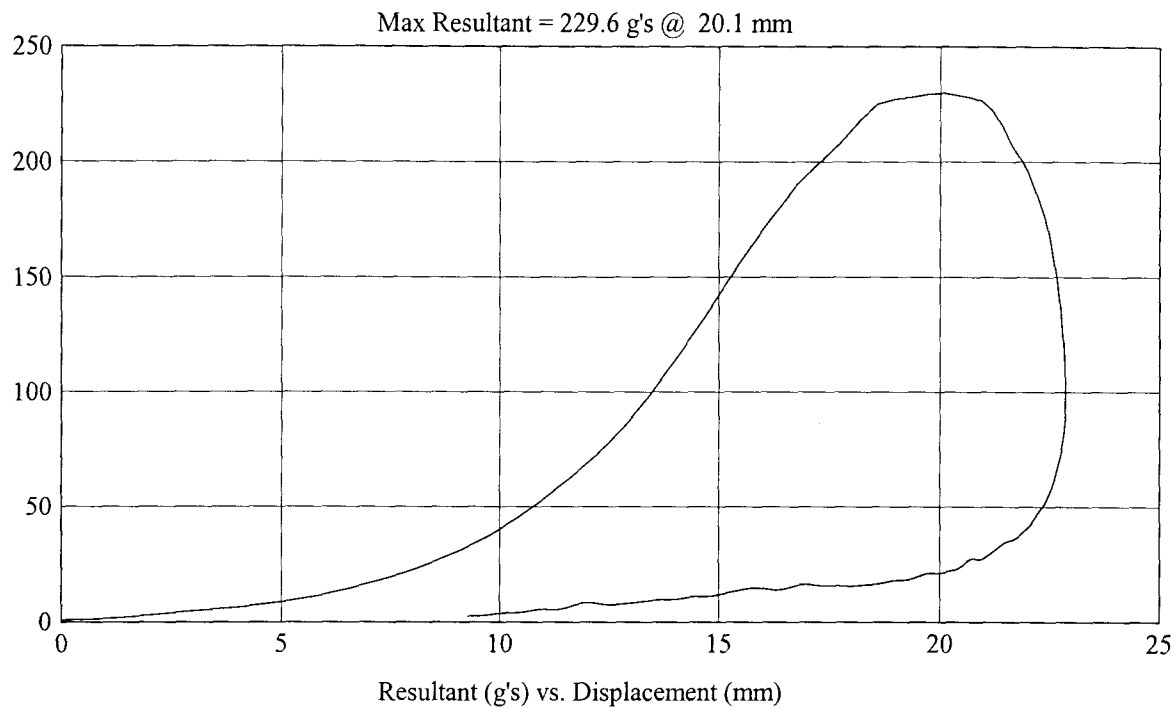
FMH
G04I7-001.14

Customer: BUICK
Test # 6
FM4428
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 149/43

HIC(d) = 1296, HIC = 1498, Delta T = 3.2 msec



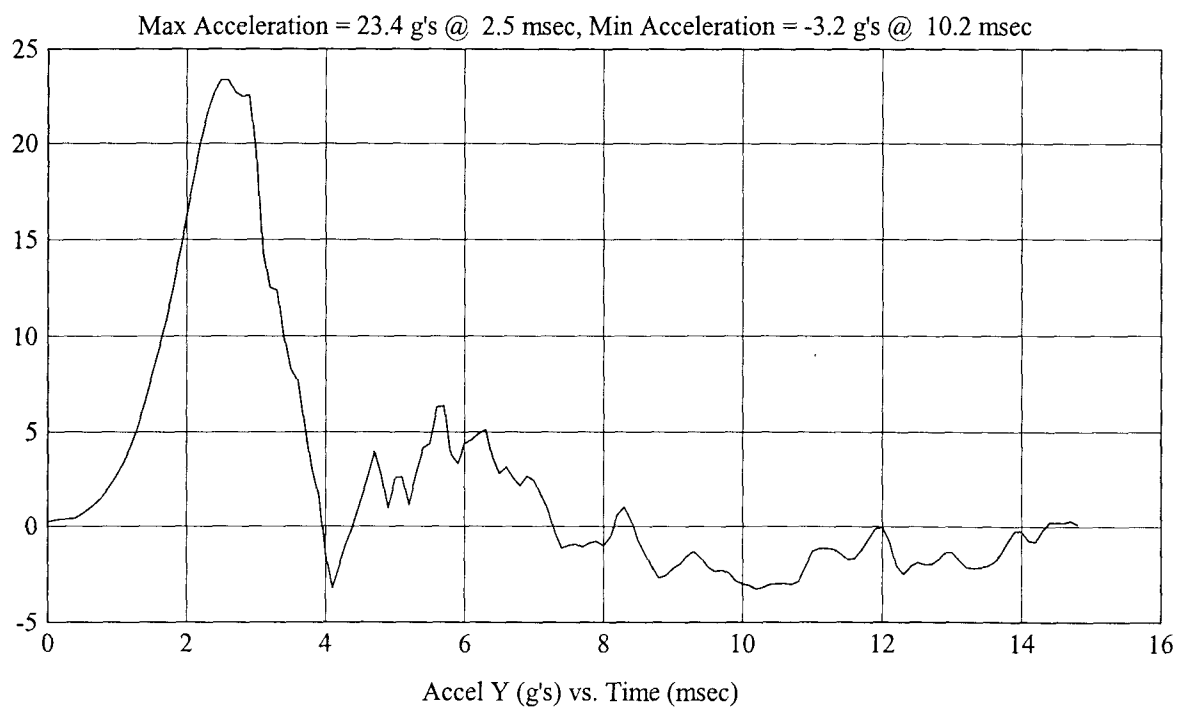
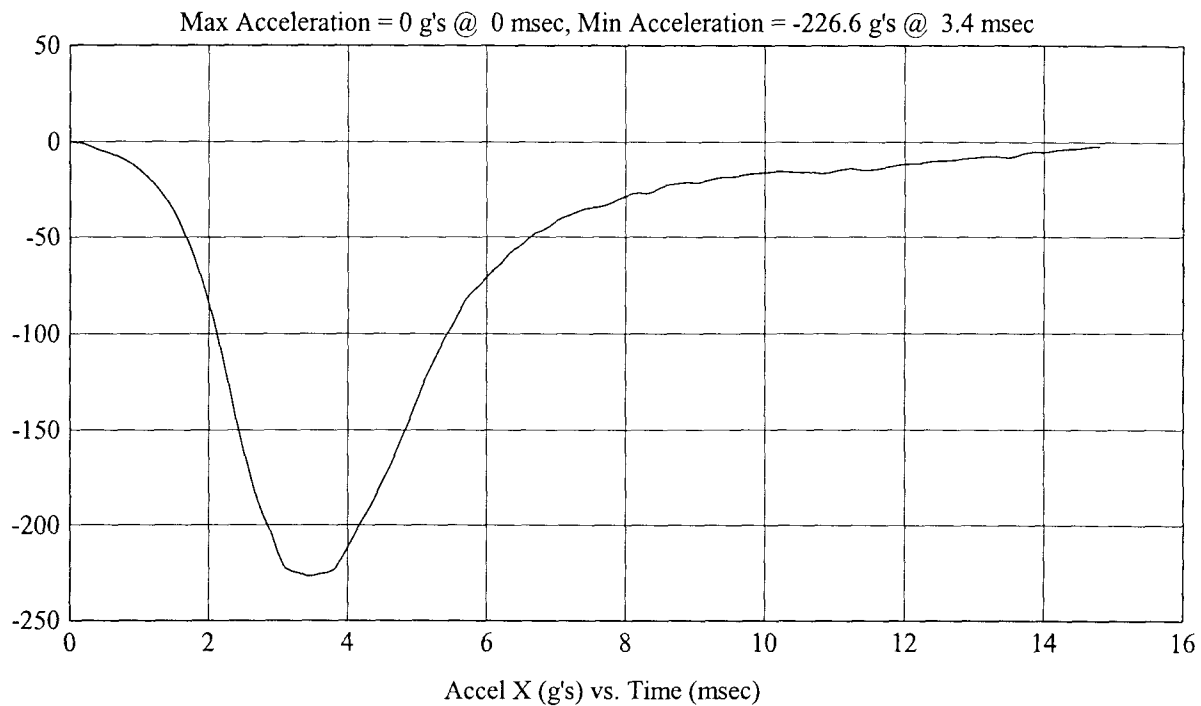
FMH
G04I7-001.14

Customer: BUICK
Test # 6
FM4428
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 149/43

HIC(d) = 1296, HIC = 1498, Delta T = 3.2 msec



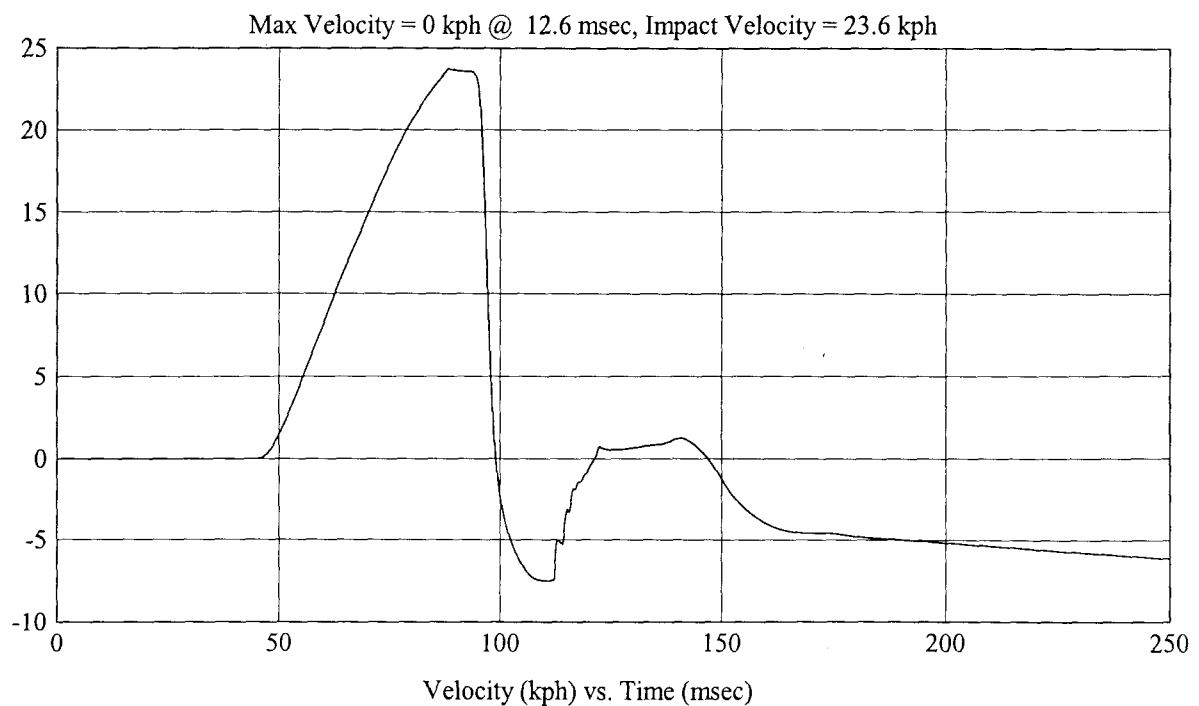
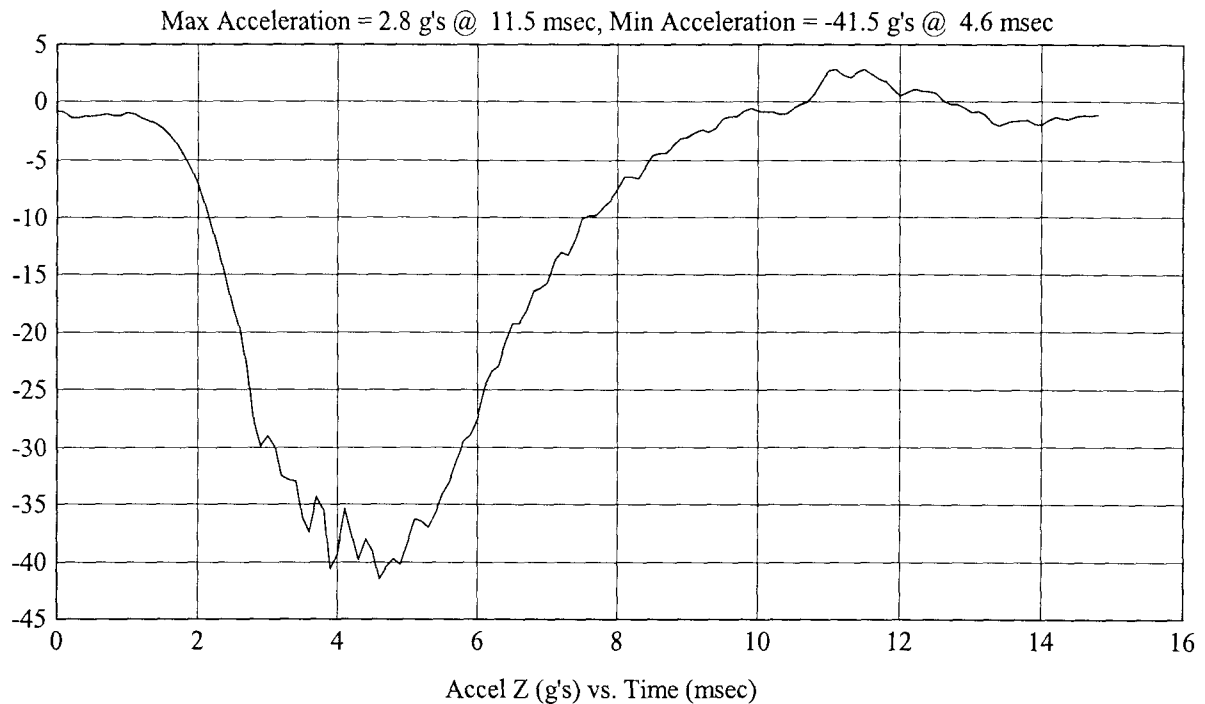
FMH
G0417-001.14

Customer: BUICK
Test # 6
FM4428
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 149/43

HIC(d) = 1296, HIC = 1498, Delta T = 3.2 msec



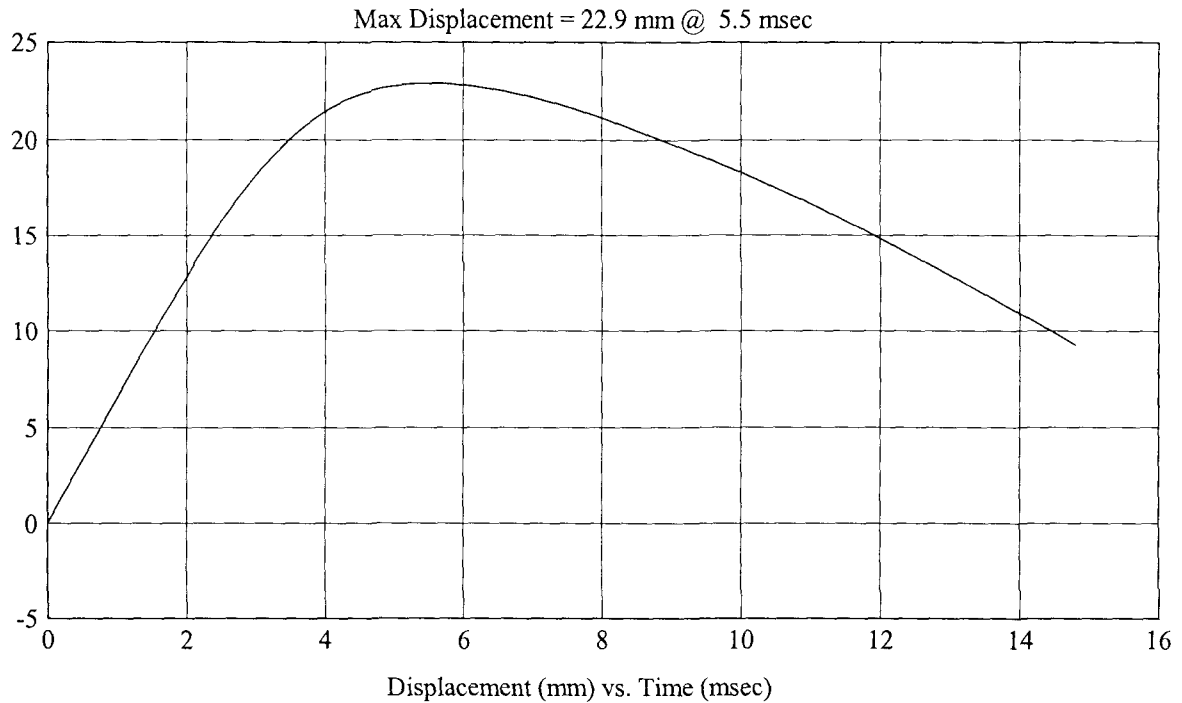
FMH
G04I7-001.14

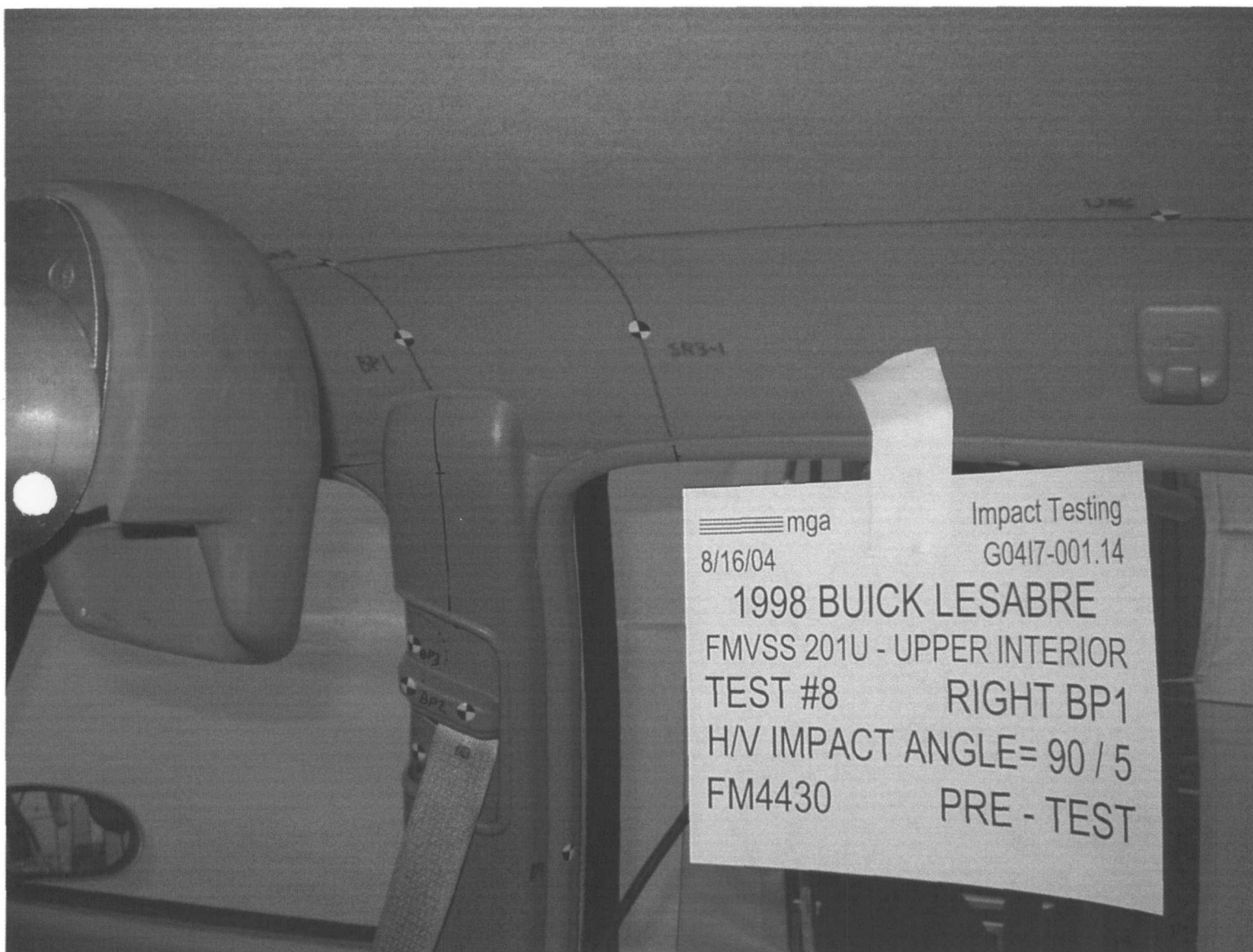
Customer: BUICK
Test # 6
FM4428
Additional Desc: N/A

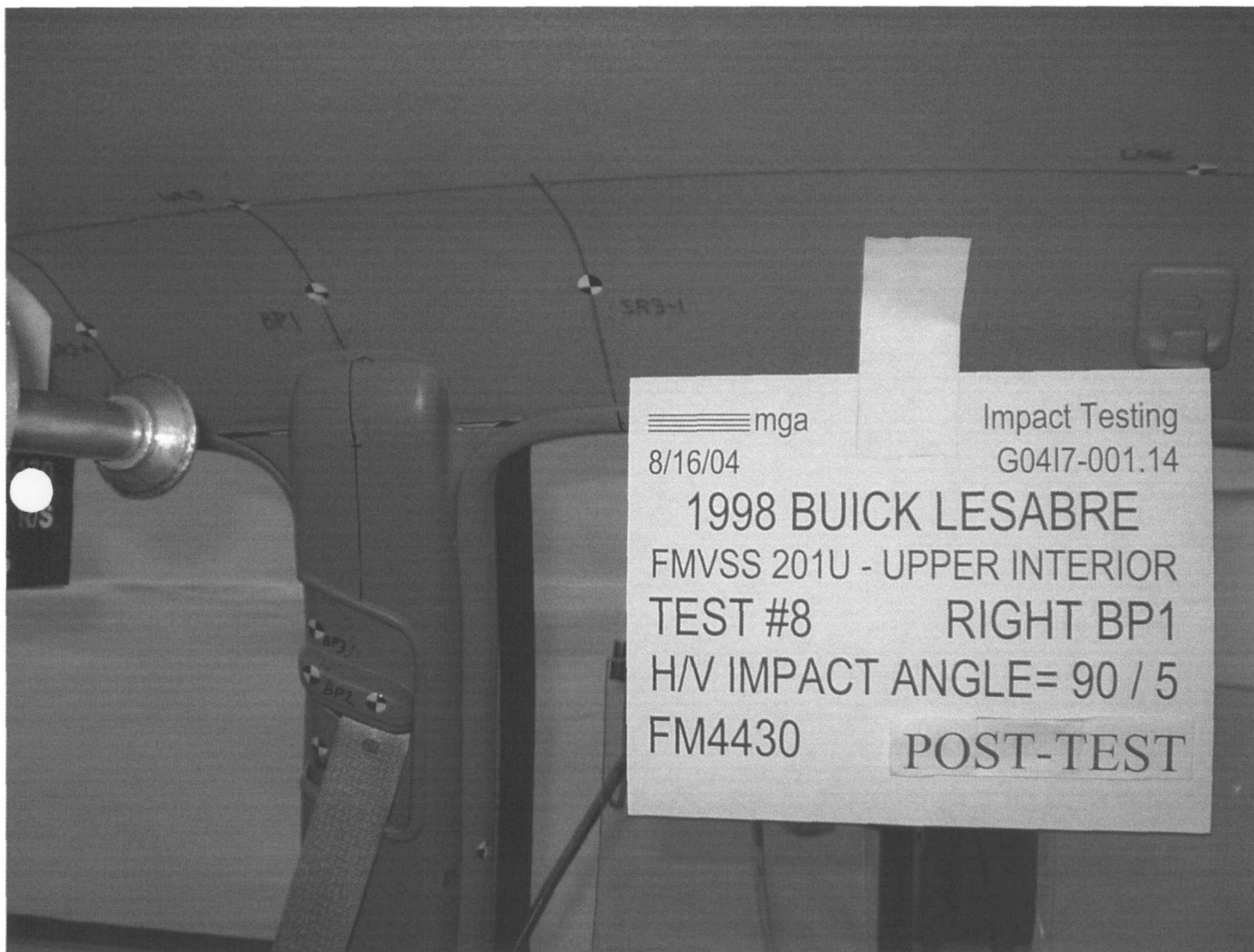
Vehicle Program : LESABRE

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 149/43

HIC(d) = 1296, HIC = 1498, Delta T = 3.2 msec







==== mga

8/16/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

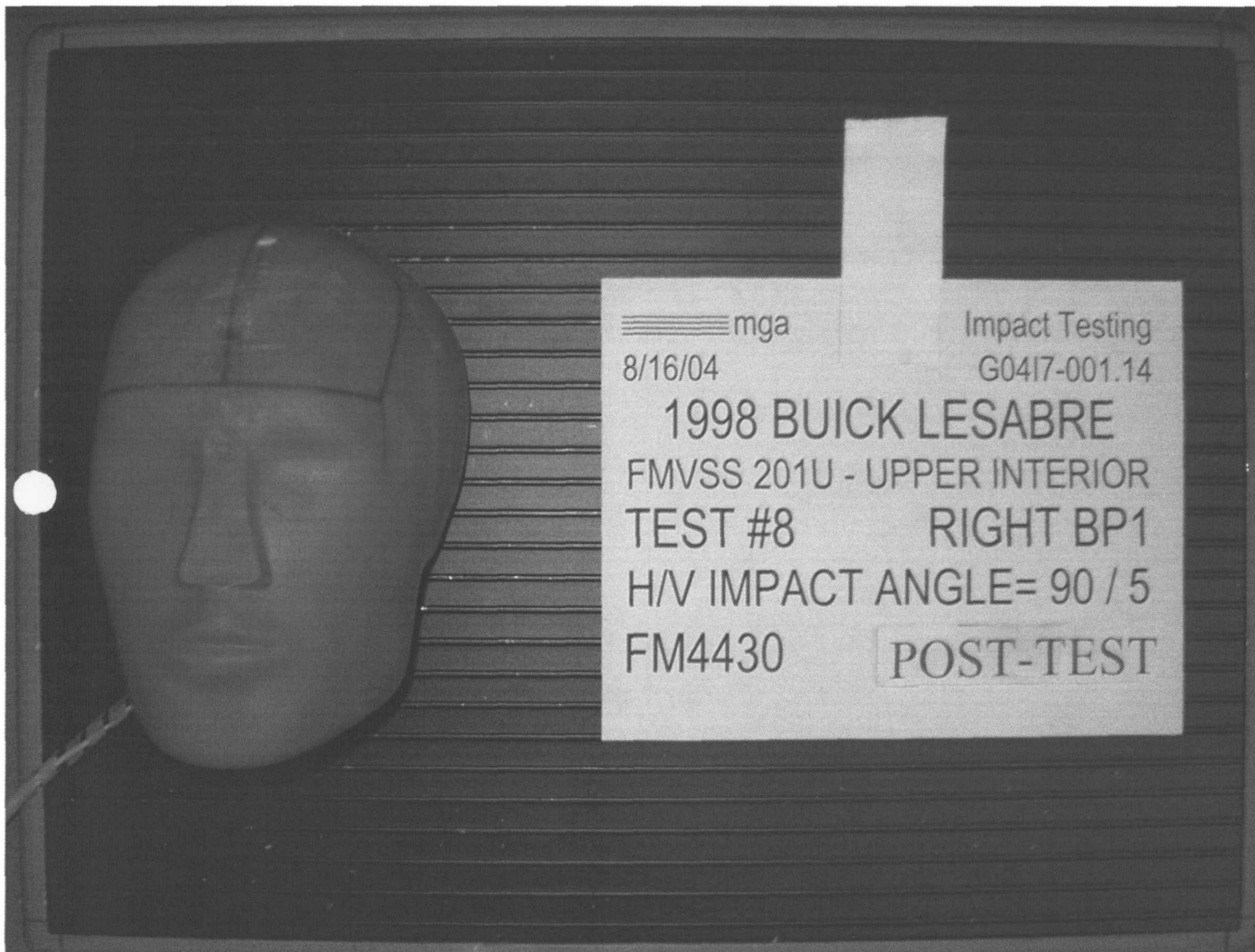
TEST #8

RIGHT BP1

H/V IMPACT ANGLE= 90 / 5

FM4430

POST-TEST



==== mga
8/16/04

Impact Testing
G0417-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #8 RIGHT BP1

H/V IMPACT ANGLE= 90 / 5

FM4430

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.14 VEHICLE YR/MAKE/MODEL: LESABRE 1998

GENERAL TEST PARAMETERS:

Test Number: #8

Target (Vehicle Side): BP1 Right

Temperature: 22C

MGA Test Reference No.: FM4430

Humidity: 47%

Approach Horizontal Angles: 90°

Time of Test: 3:20 PM

Approach Vertical Angles: 5°

FMH Serial No: 037

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
598	572	6.9	23.9	71	4 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35800	-96.6	1.67	1.67
Y	6	J35841	92.5	1.54	1.54
Z	7	J35791	90	1.58	1.58

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

No visible damage

Recorded By: mmjmc Approved By: Helen Q. Kaleb Date: 8-16-04

*Only necessary for NHTSA (Government) Compliance testing.

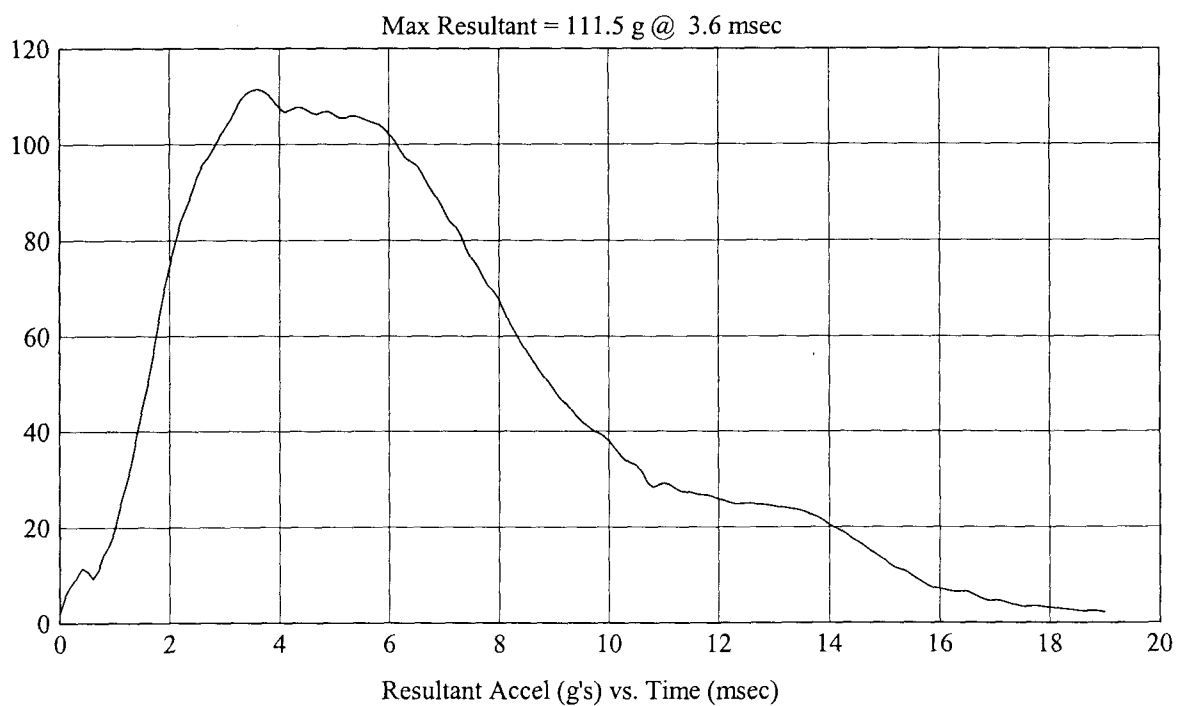
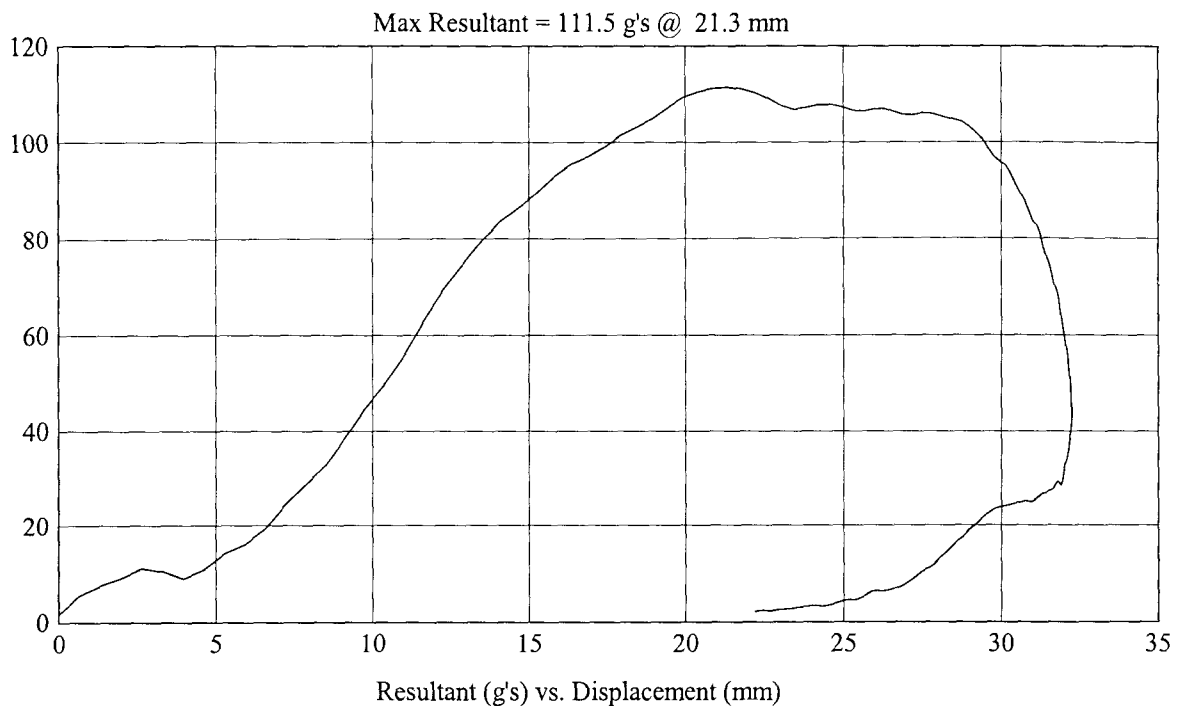
FMH
G04I7-001.14

Customer: BUICK
Test # 8
FM4430
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 598, HIC = 572, Delta T = 6.9 msec



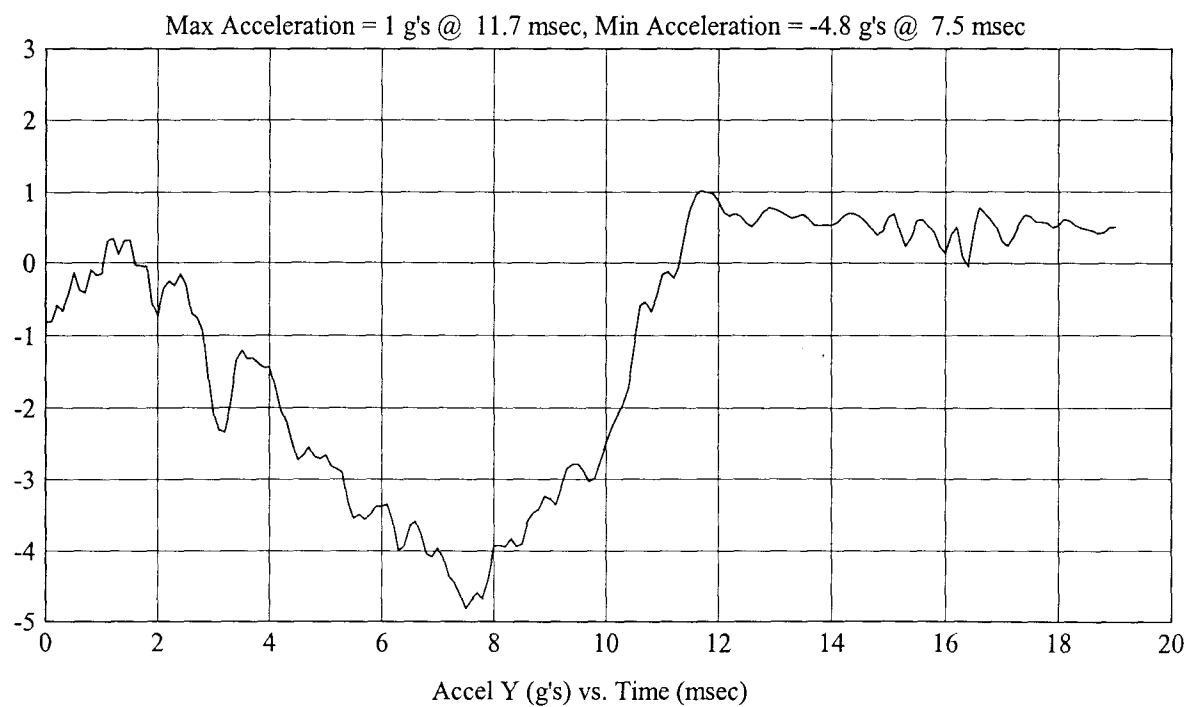
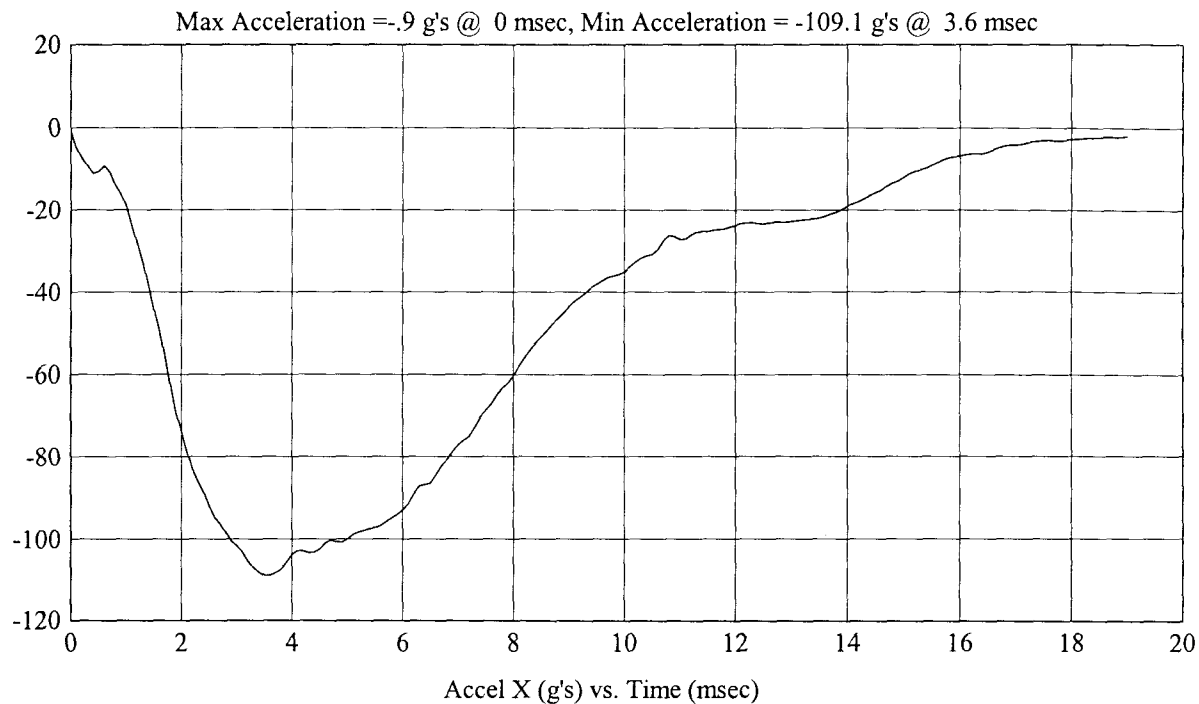
FMH
G04I7-001.14

Customer: BUICK
Test # 8
FM4430
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 598, HIC = 572, Delta T = 6.9 msec



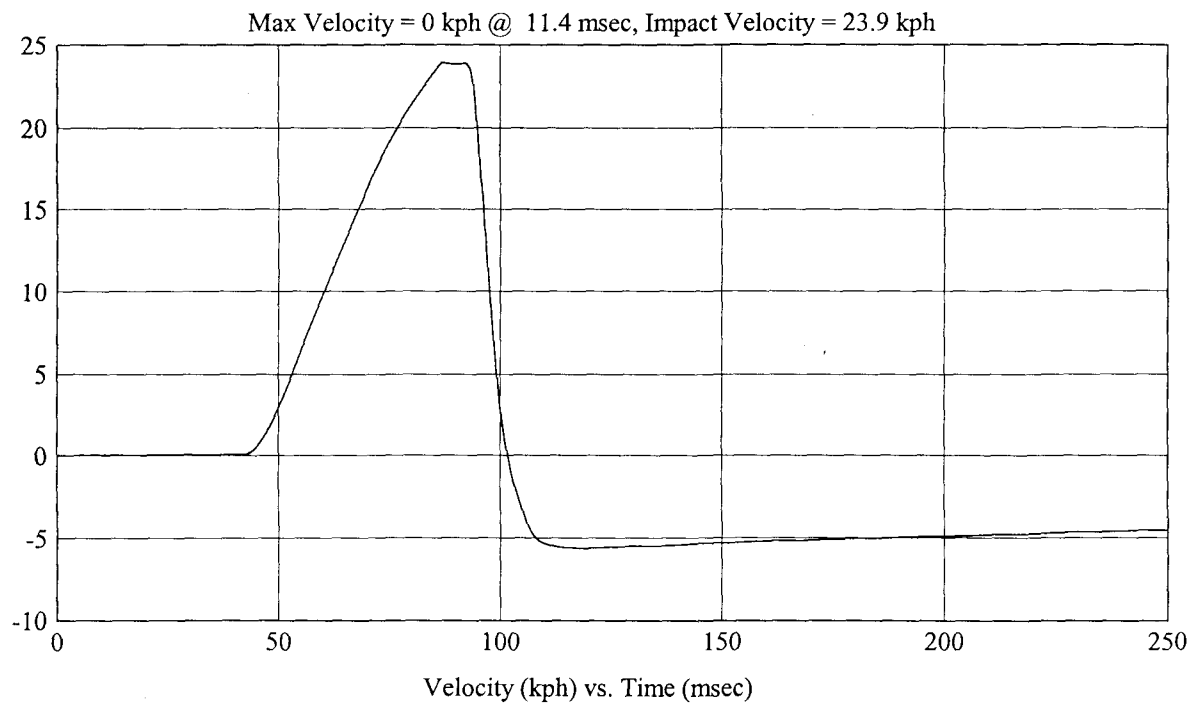
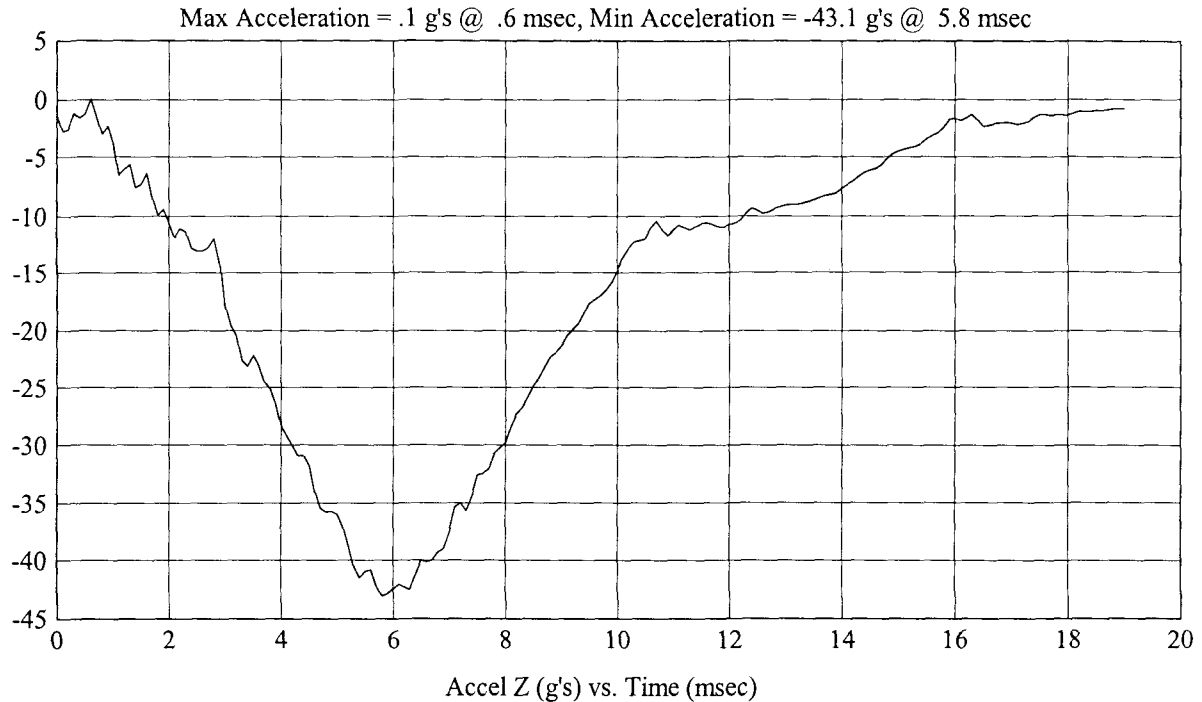
FMH
G04I7-001.14

Customer: BUICK
Test # 8
FM4430
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 598, HIC = 572, Delta T = 6.9 msec



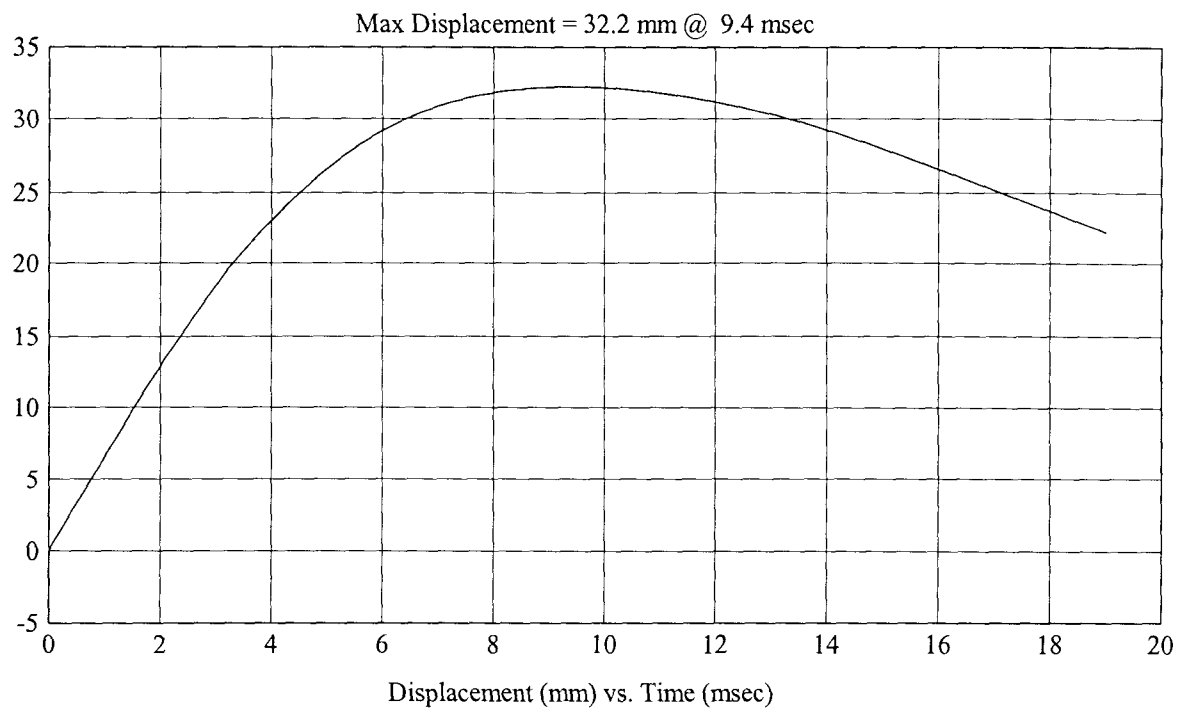
FMH
G04I7-001.14

Customer: BUICK
Test # 8
FM4430
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 598, HIC = 572, Delta T = 6.9 msec



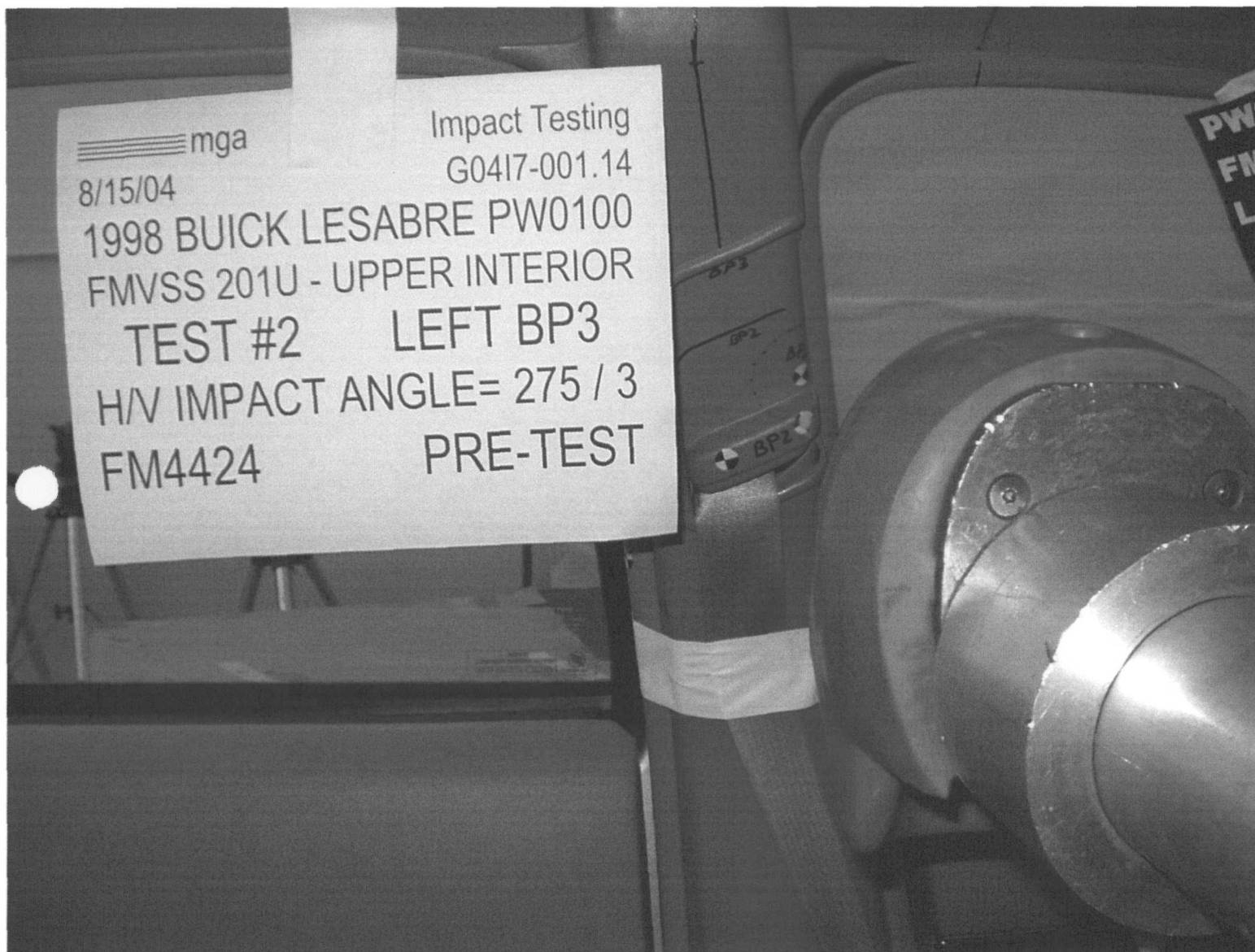
mga
8/15/04

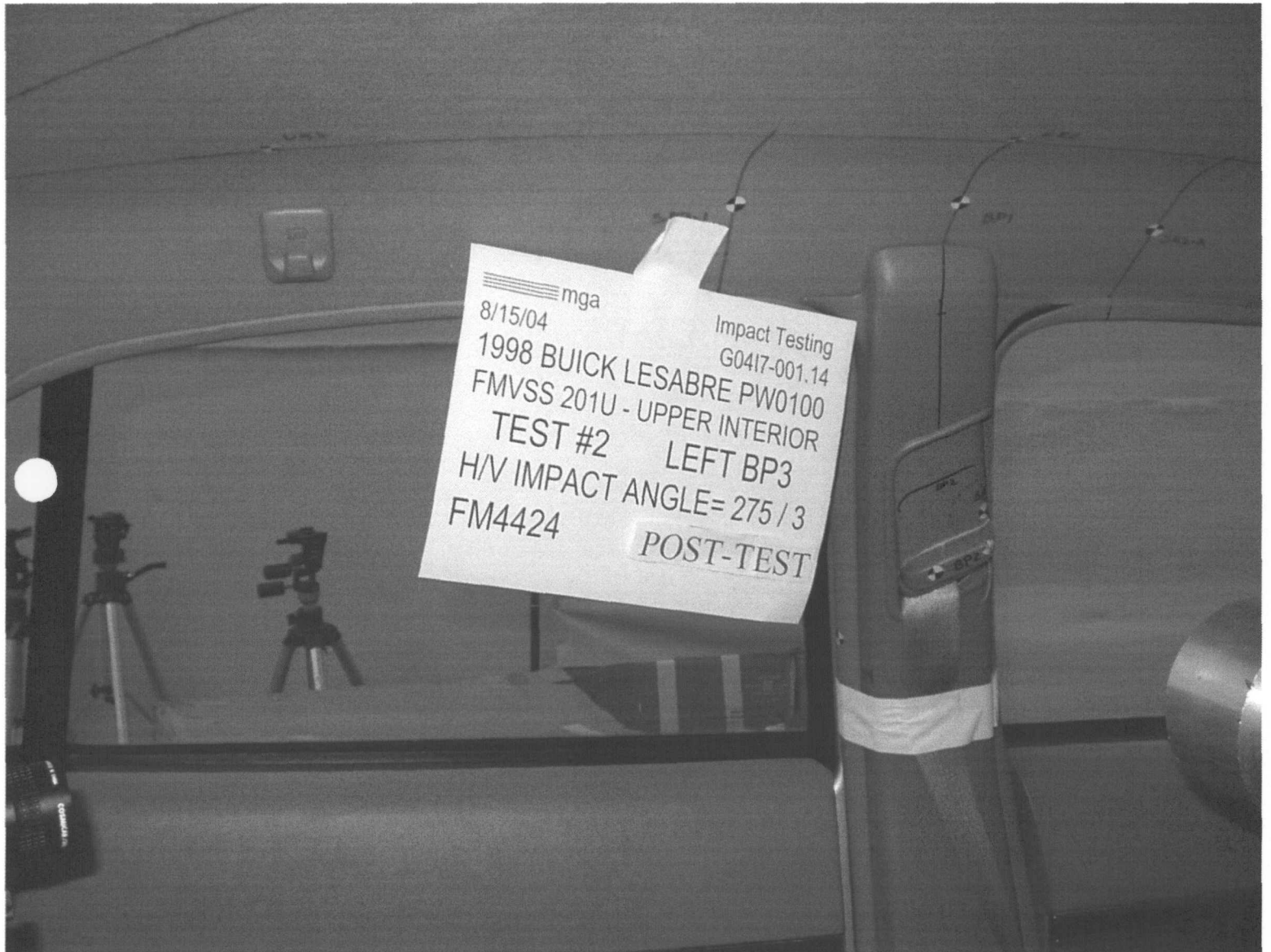
Impact Testing
G0417-001.14

1998 BUICK LESABRE PW0100
FMVSS 201U - UPPER INTERIOR

TEST #2 LEFT BP3
H/V IMPACT ANGLE= 275 / 3

FM4424 PRE-TEST





mga Impact Testing
8/15/04 G0417-001.14
1998 BUICK LESABRE PW0100
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT BP3
H/V IMPACT ANGLE= 275 / 3
FM4424 POST-TEST



SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.14 VEHICLE YR/MAKE/MODEL:LeSabre 1998

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): BP3 Left

Temperature:22C

MGA Test Reference No.:FM4424

Humidity:47%

Approach Horizontal Angles:275°

Time of Test:3:58 PM

Approach Vertical Angles:3°

FMH Serial No:037

TEST RESULTS:

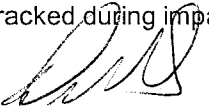
HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
575	542	5.5	24.0	25	10 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35800	-96.6	1.67	1.67
Y	6	J35841	92.5	1.54	1.54
Z	7	J35791	90	1.58	1.58

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

B-pillar trim cracked during impact.

Recorded By:  Approved By:  Date: 8/15/07

*Only necessary for NHTSA (Government) Compliance testing.

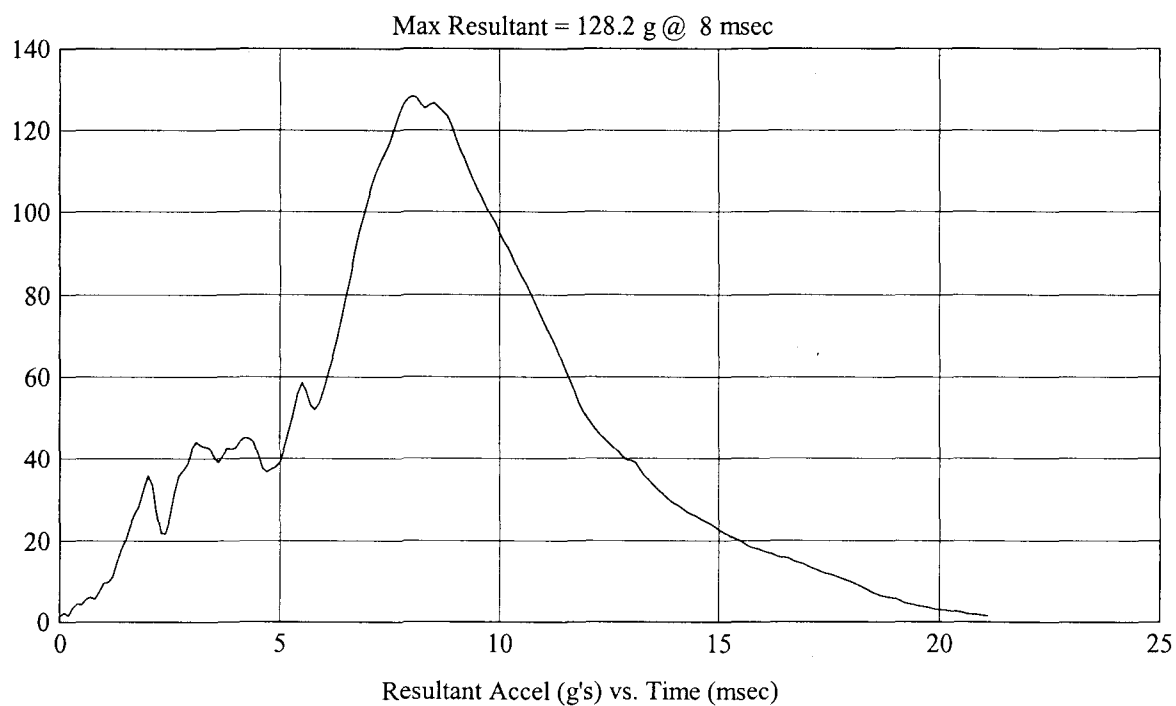
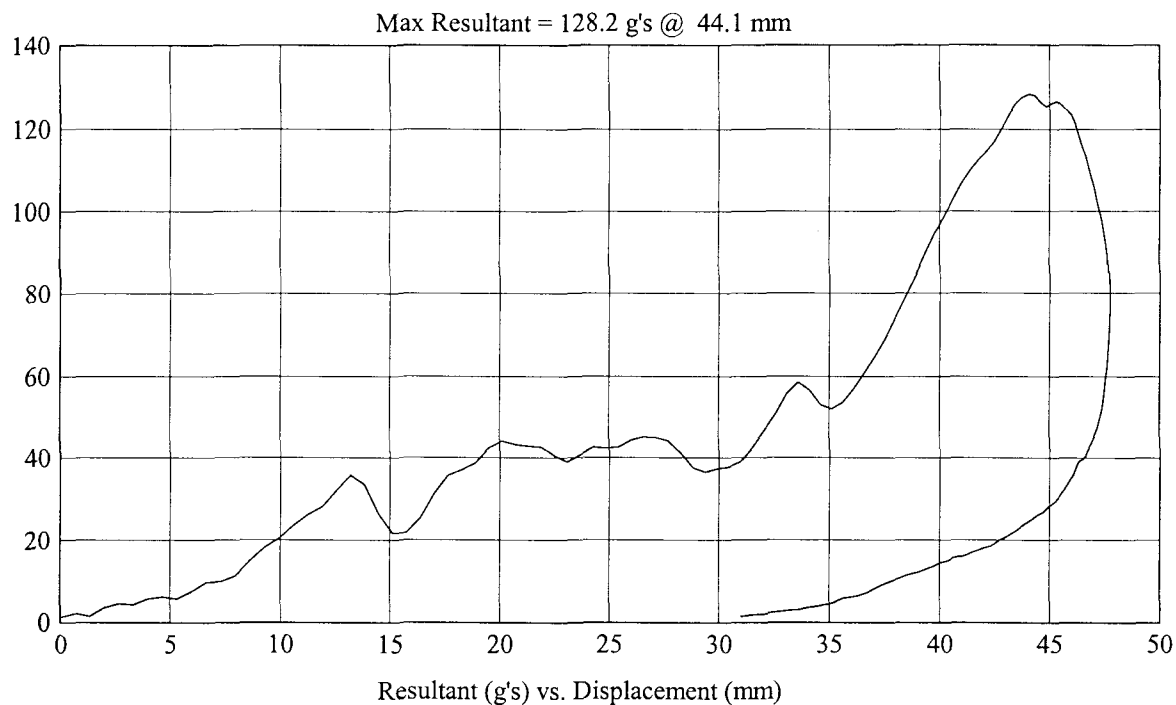
FMH
G04I7-001.14

Customer: Buick
Test # 2
FM4424
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: BP3
Vehicle Side: Left
Horz/Vert Angle: 275/3

HIC(d) = 575, HIC = 542, Delta T = 5.5 msec



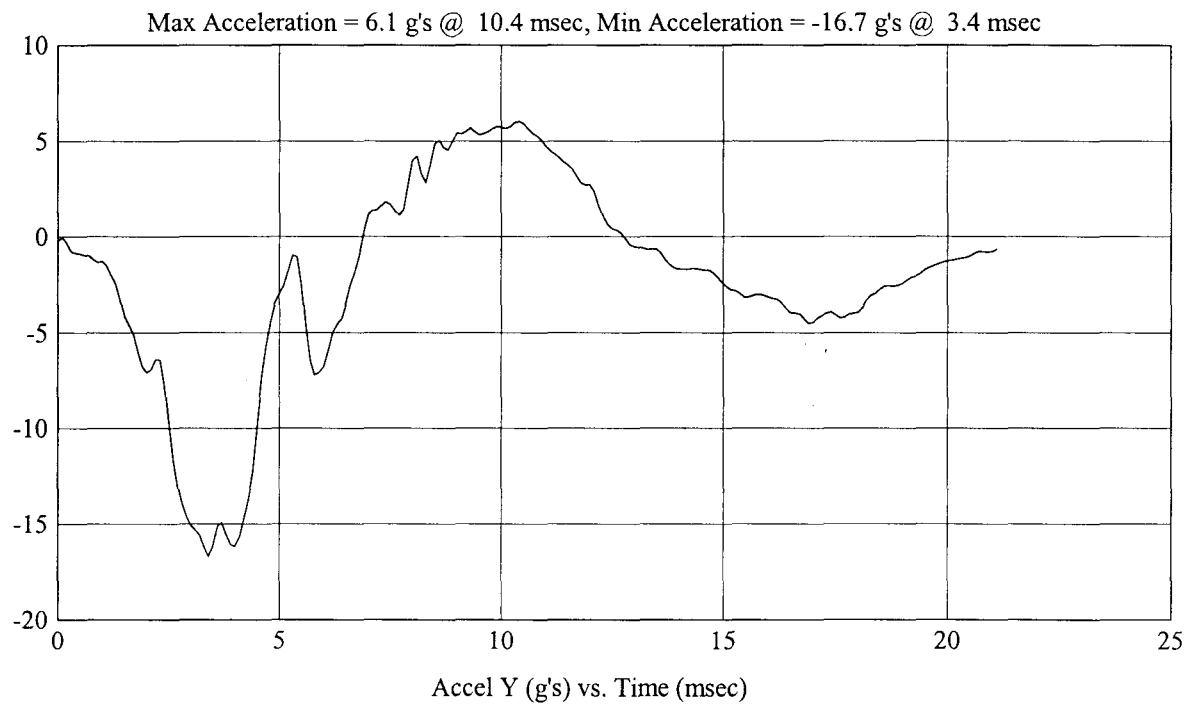
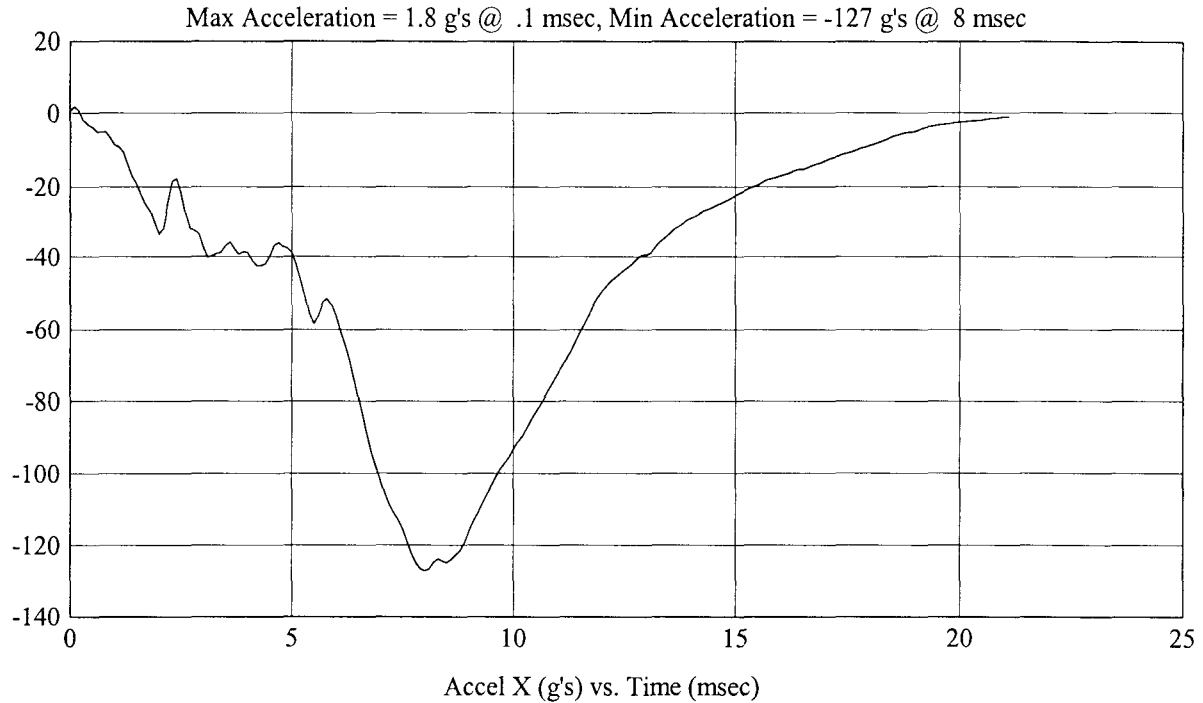
FMH
G04I7-001.14

Customer: Buick
Test # 2
FM4424
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: BP3
Vehicle Side: Left
Horz/Vert Angle: 275/3

HIC(d) = 575, HIC = 542, Delta T = 5.5 msec



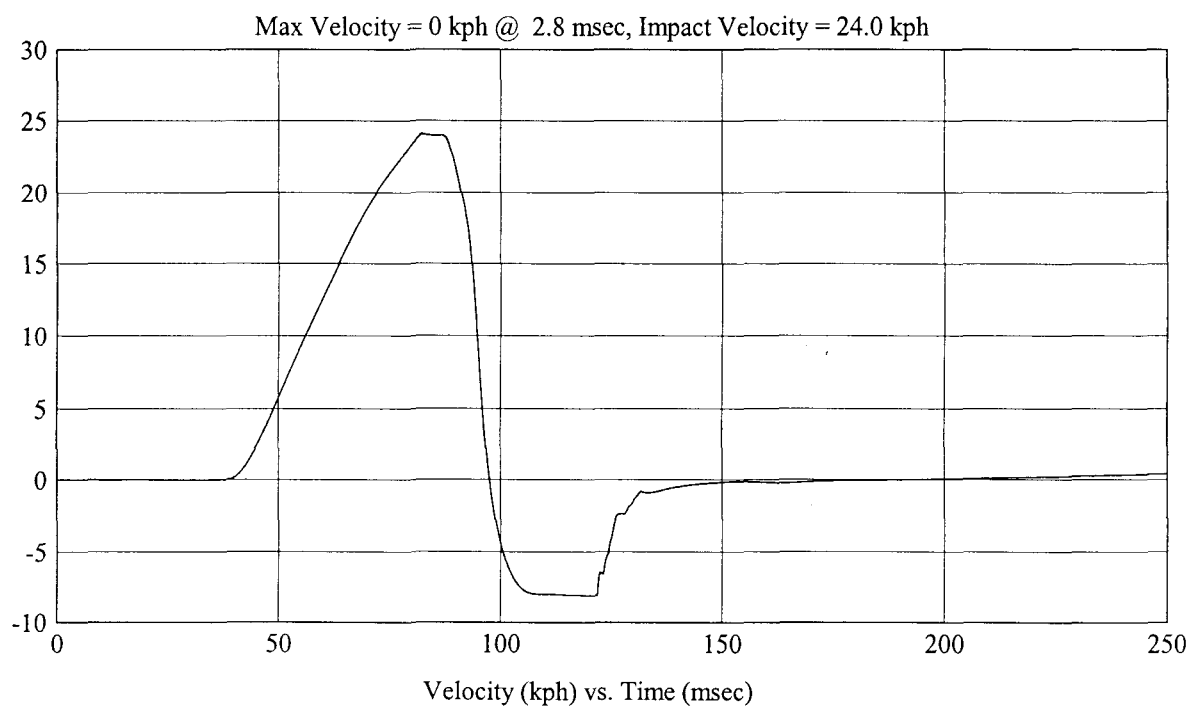
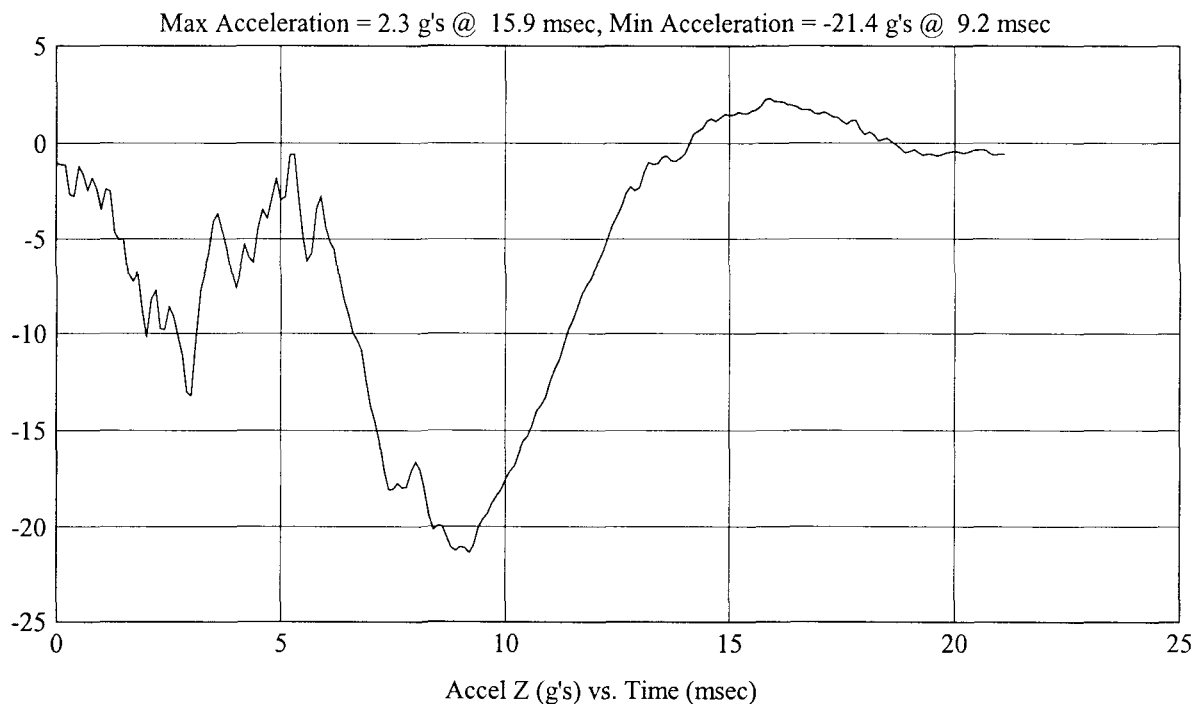
FMH
G04I7-001.14

Customer: Buick
Test # 2
FM4424
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: BP3
Vehicle Side: Left
Horz/Vert Angle: 275/3

HIC(d) = 575, HIC = 542, Delta T = 5.5 msec



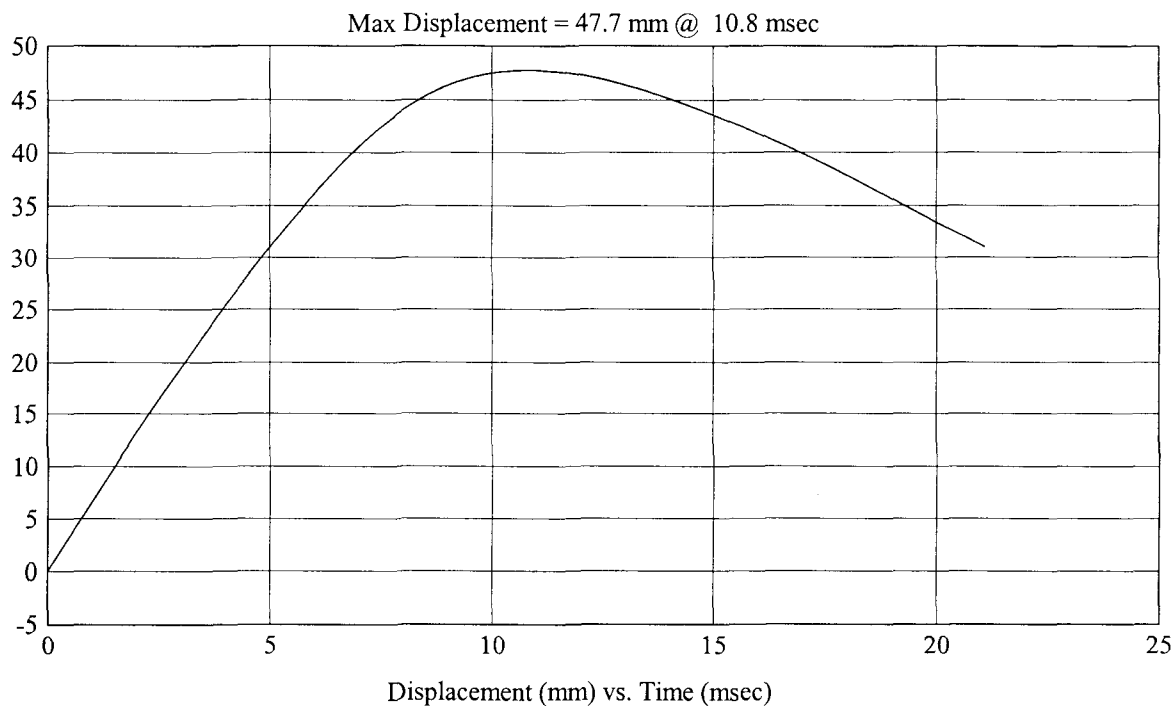
FMH
G04I7-001.14

Customer: Buick
Test # 2
FM4424
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: BP3
Vehicle Side: Left
Horz/Vert Angle: 275/3

HIC(d) = 575, HIC = 542, Delta T = 5.5 msec



mga
8/16/04

Impact Testing
G0417-001.14

1998 BUICK LESABRE
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP4
H/V IMPACT ANGLE= 161 / -4
FM4431 PRE-TEST







8/16/04 mga

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #9 RIGHT BP4

H/V IMPACT ANGLE= 161 / -4

FM4431

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.14 VEHICLE YR/MAKE/MODEL:LESABRE 1998

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): BP4 Right

Temperature:22C

MGA Test Reference No.:FM4431

Humidity:48%

Approach Horizontal Angles:161°

Time of Test:5:15 PM

Approach Vertical Angles:-4°

FMH Serial No:038

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
547	504	4.9	24.0	33	22 R

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108	1.68	1.68
Y	6	J36193	101.4	1.54	1.54
Z	7	J36353	96.8	1.58	1.58

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

No visible damage

Recorded By: *[Signature]* Approved By: *[Signature]* Date: 8-16-04

*Only necessary for NHTSA (Government) Compliance testing.

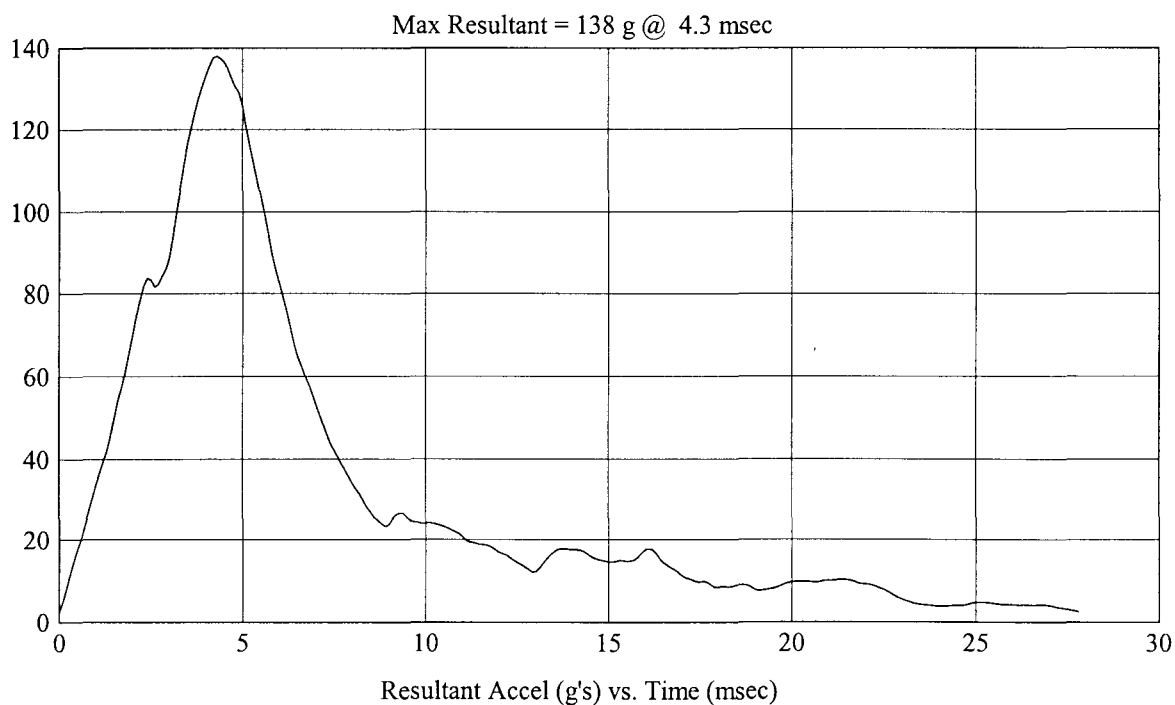
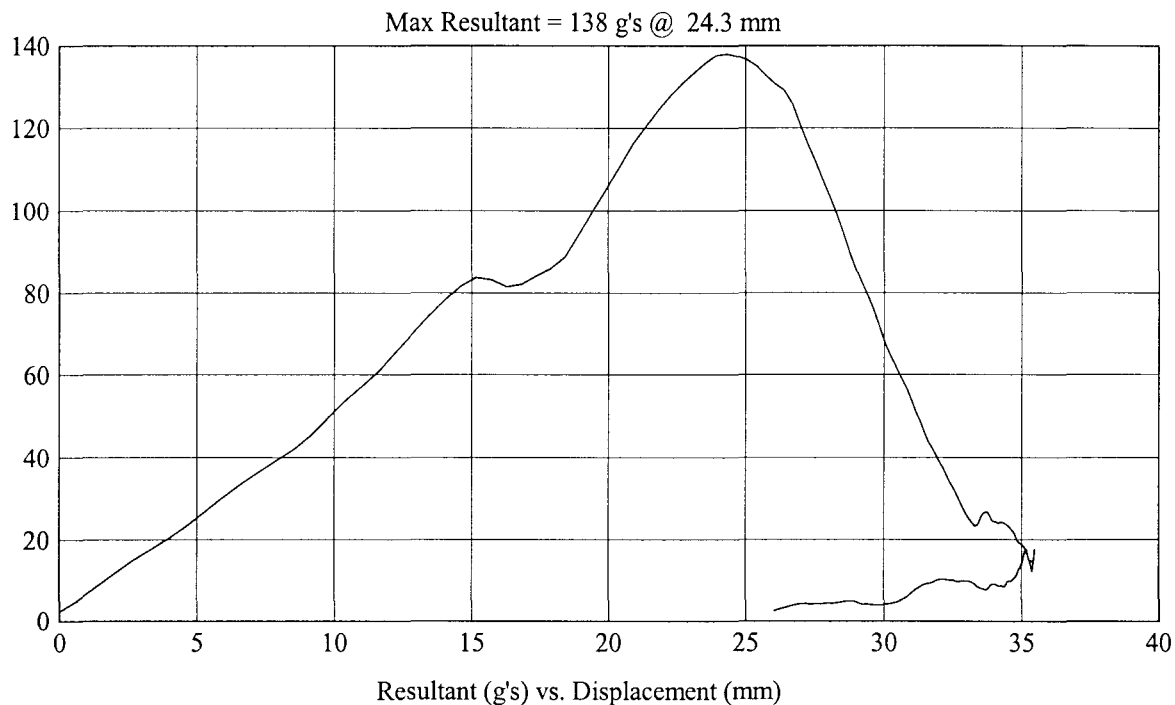
FMH
G04I7-001.14

Customer: BUICK
Test # 9
FM4431
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 161/-4

HIC(d) = 547, HIC = 504, Delta T = 4.9 msec



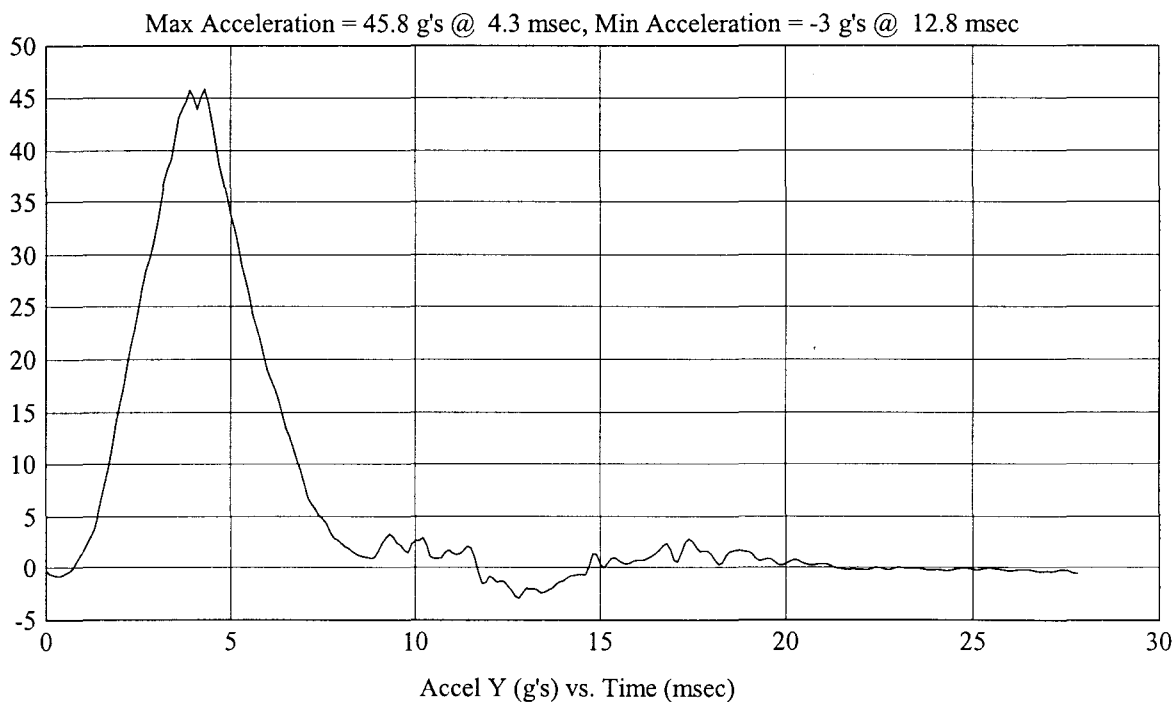
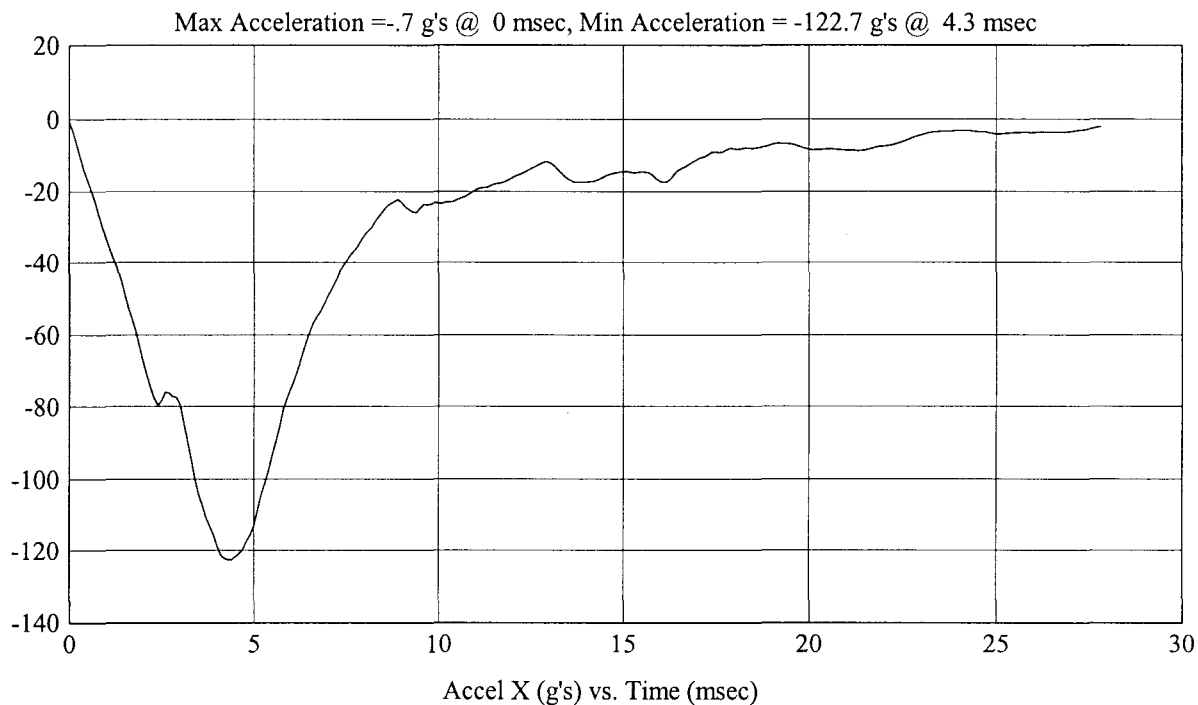
FMH
G04I7-001.14

Customer: BUICK
Test # 9
FM4431
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 161/-4

HIC(d) = 547, HIC = 504, Delta T = 4.9 msec



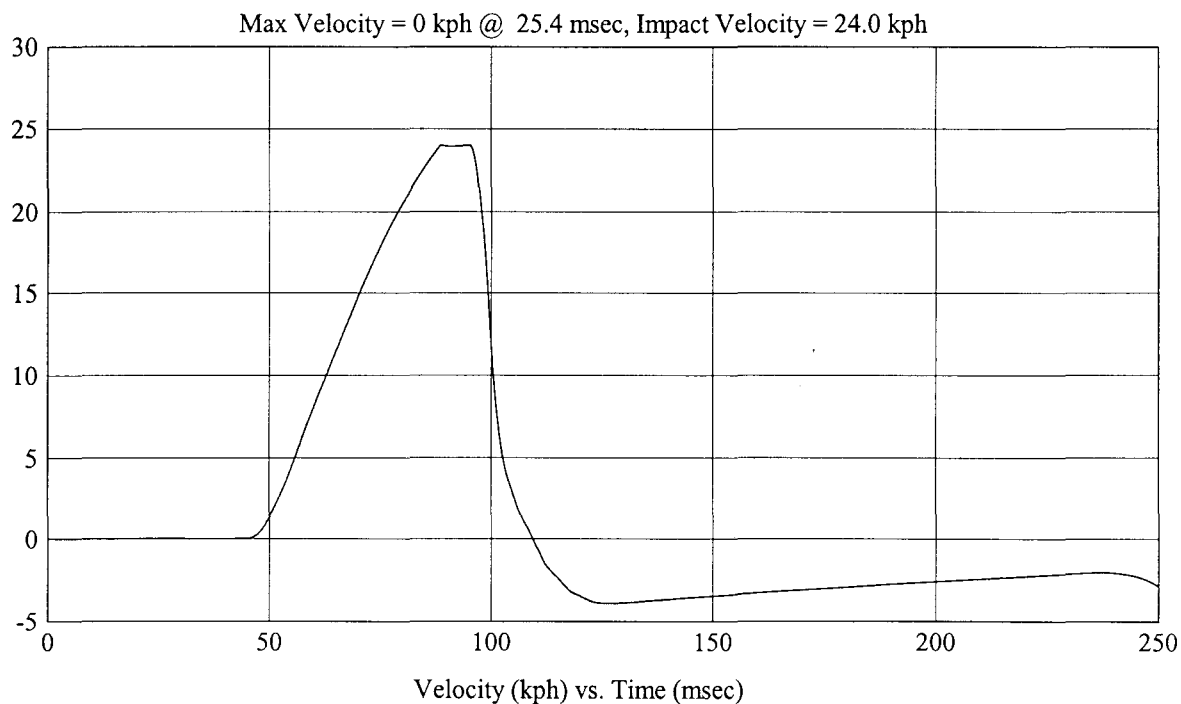
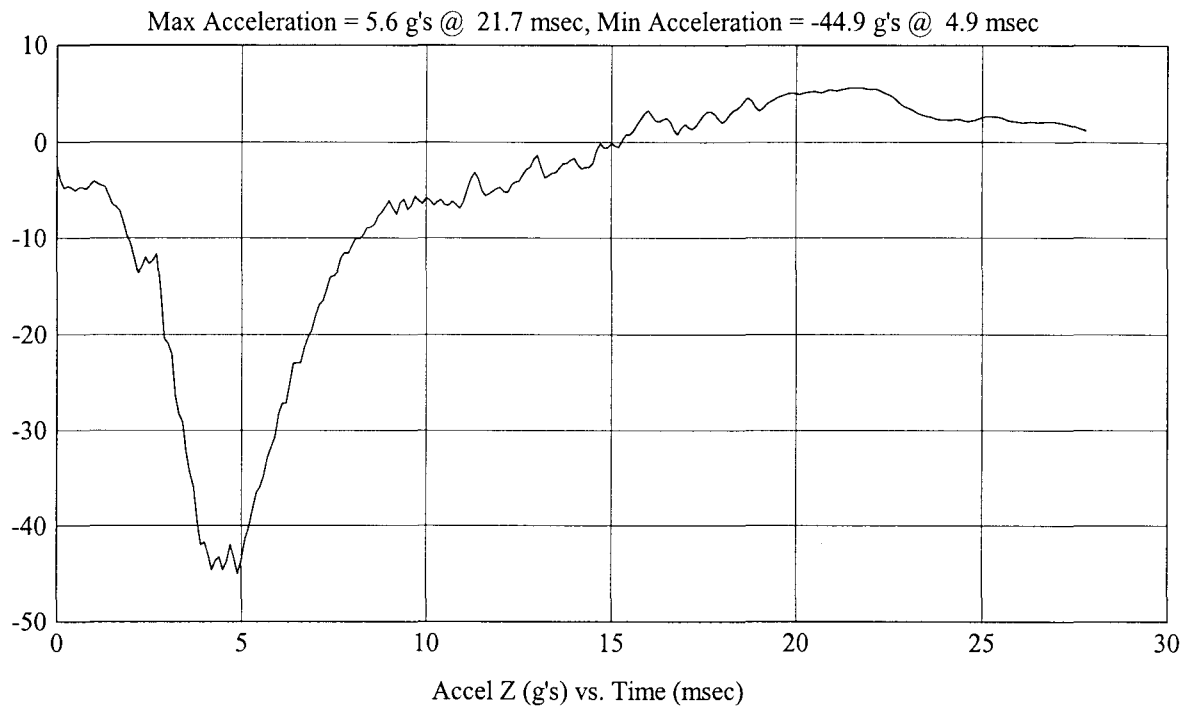
FMH
G04I7-001.14

Customer: BUICK
Test # 9
FM4431
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 161/-4

HIC(d) = 547, HIC = 504, Delta T = 4.9 msec



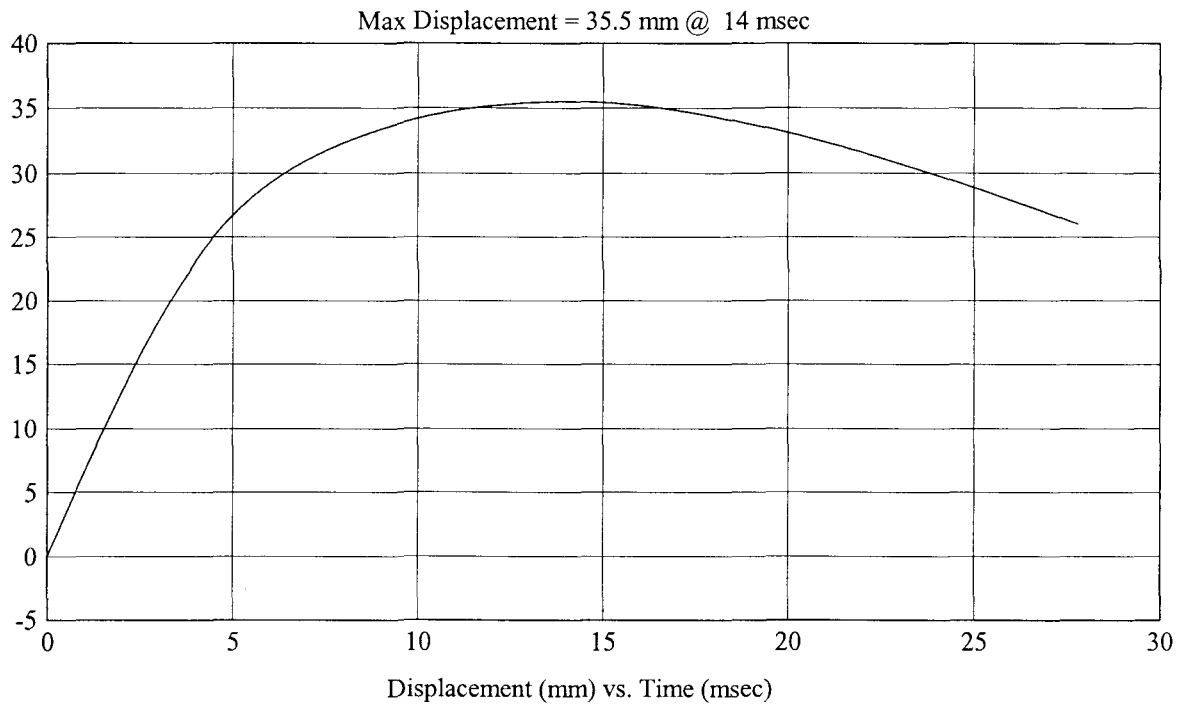
FMH
G04I7-001.14

Customer: BUICK
Test # 9
FM4431
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 161/-4

HIC(d) = 547, HIC = 504, Delta T = 4.9 msec



 mga

8/16/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

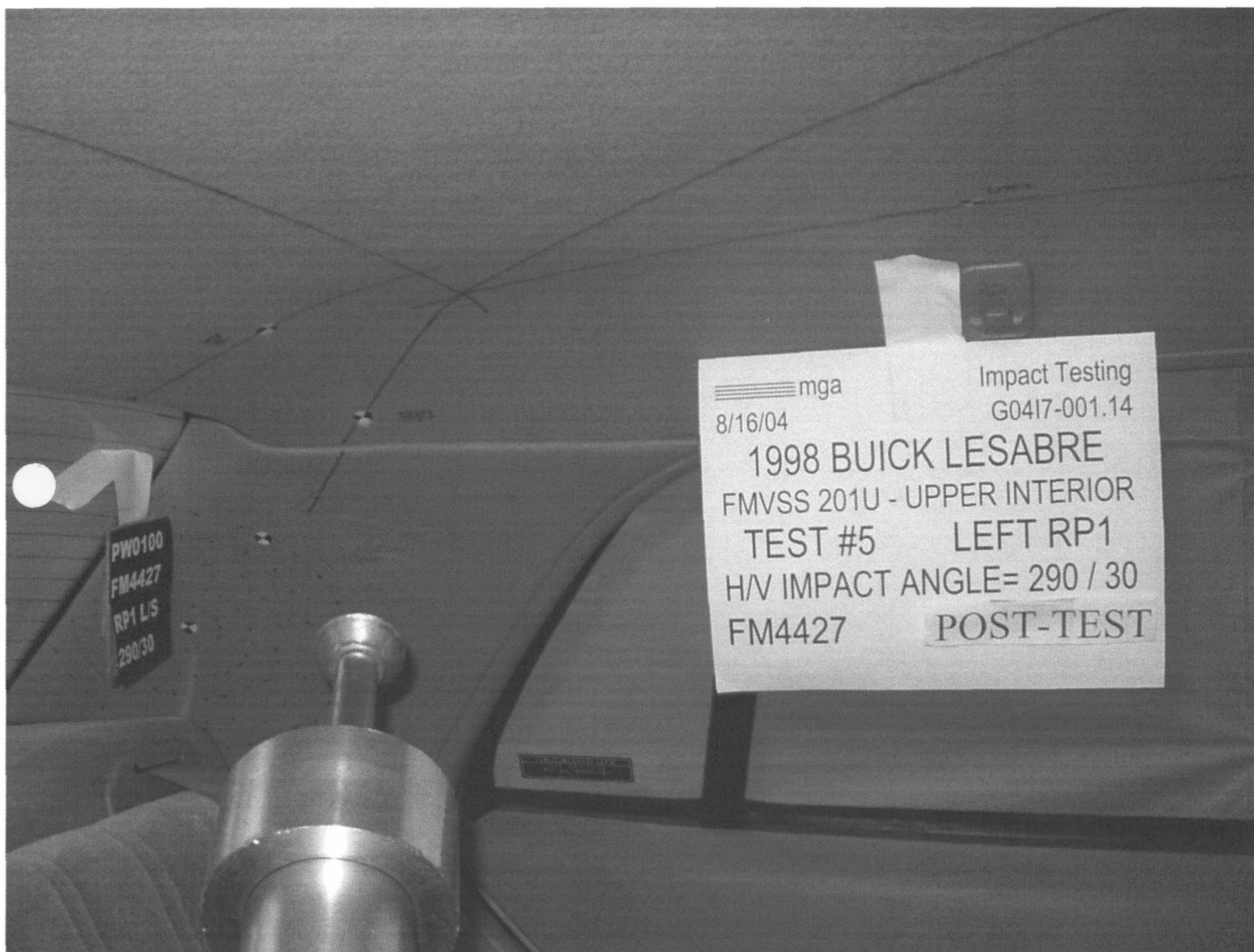
FMVSS 201U - UPPER INTERIOR

TEST #5 LEFT RP1

H/V IMPACT ANGLE= 290 / 30

FM4427

PRE - TEST





mga
8/16/04

Impact Testing
G04I7-001.14

1998 BUICK LESABRE
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT RP1
H/V IMPACT ANGLE= 290 / 30
FM4427 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.14 VEHICLE YR/MAKE/MODEL:LESABRE 1998

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): RP1 Left

Temperature:22C

MGA Test Reference No.:FM4427

Humidity:48%

Approach Horizontal Angles:290°

Time of Test:10:20 AM

Approach Vertical Angles:30°

FMH Serial No:037

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
692	697	8	23.6	34	10 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35800	-96.6	1.67	1.67
Y	6	J35841	92.5	1.54	1.54
Z	7	J35791	90	1.58	1.58

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

Deformation on pillar

Recorded By: mmj Approved By: Helen A. Kalish Date: 8-16-04

*Only necessary for NHTSA (Government) Compliance testing.

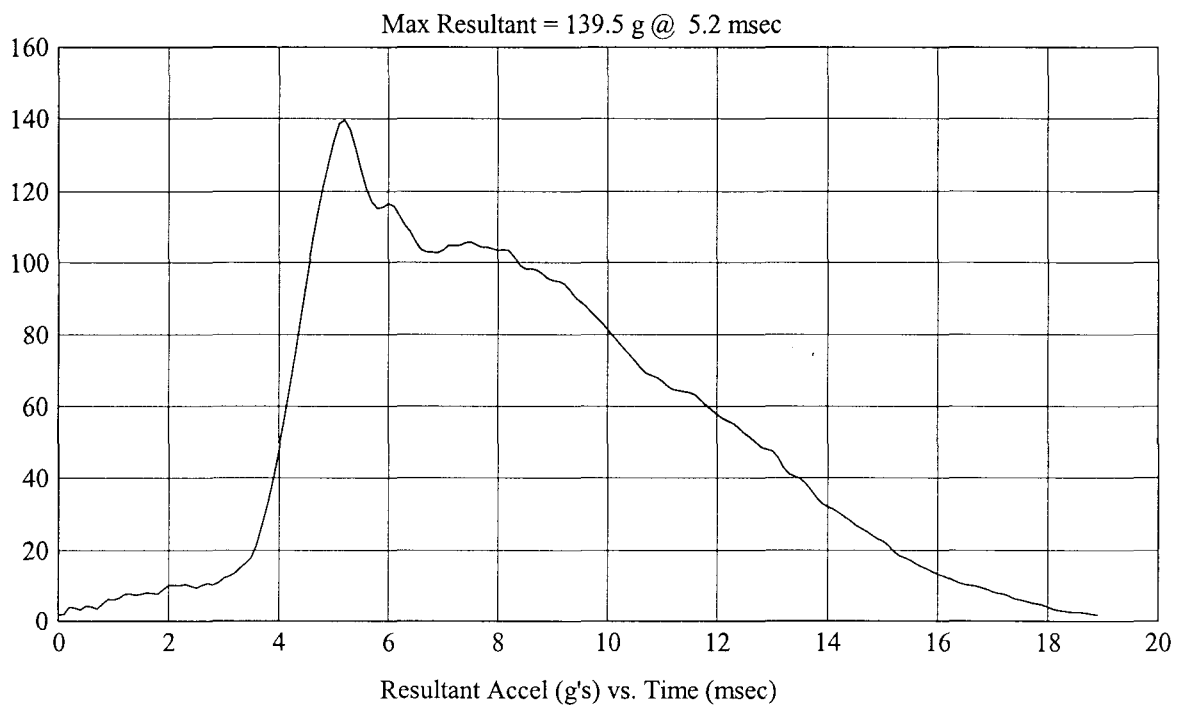
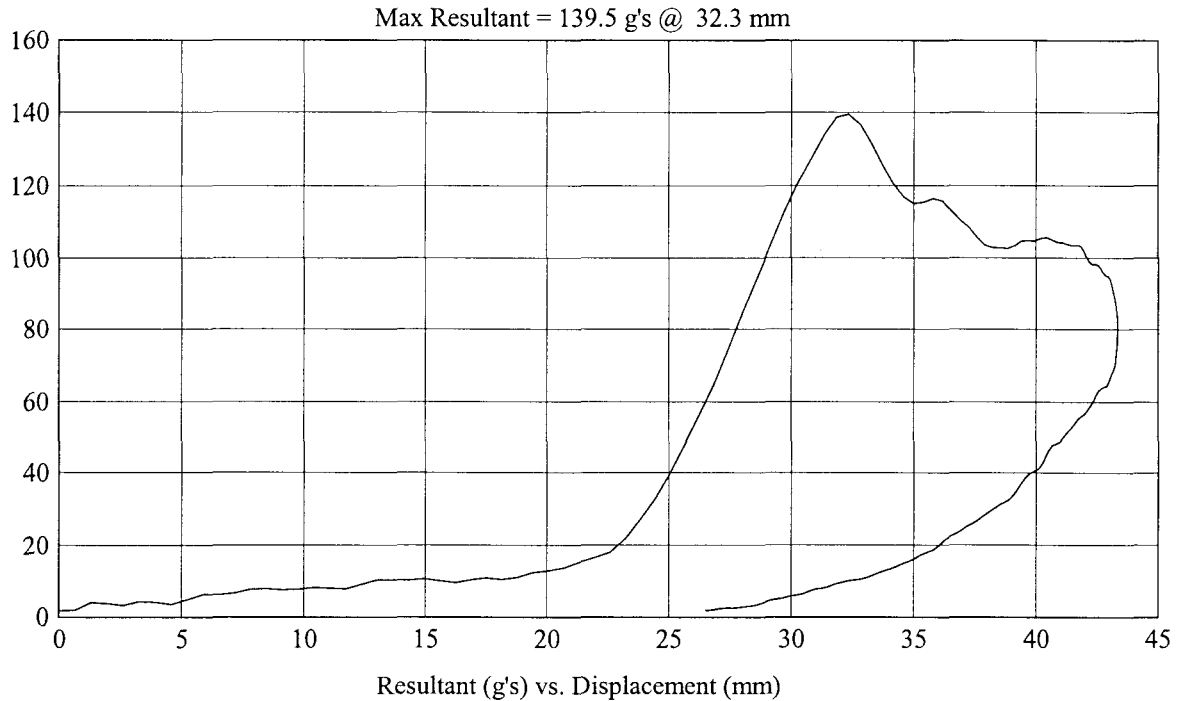
FMH
G0417-001.14

Customer: BUICK
Test # 5
FM4427
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: RP1
Vehicle Side: Left
Horz/Vert Angle: 290/30

HIC(d) = 692, HIC = 697, Delta T = 8 msec



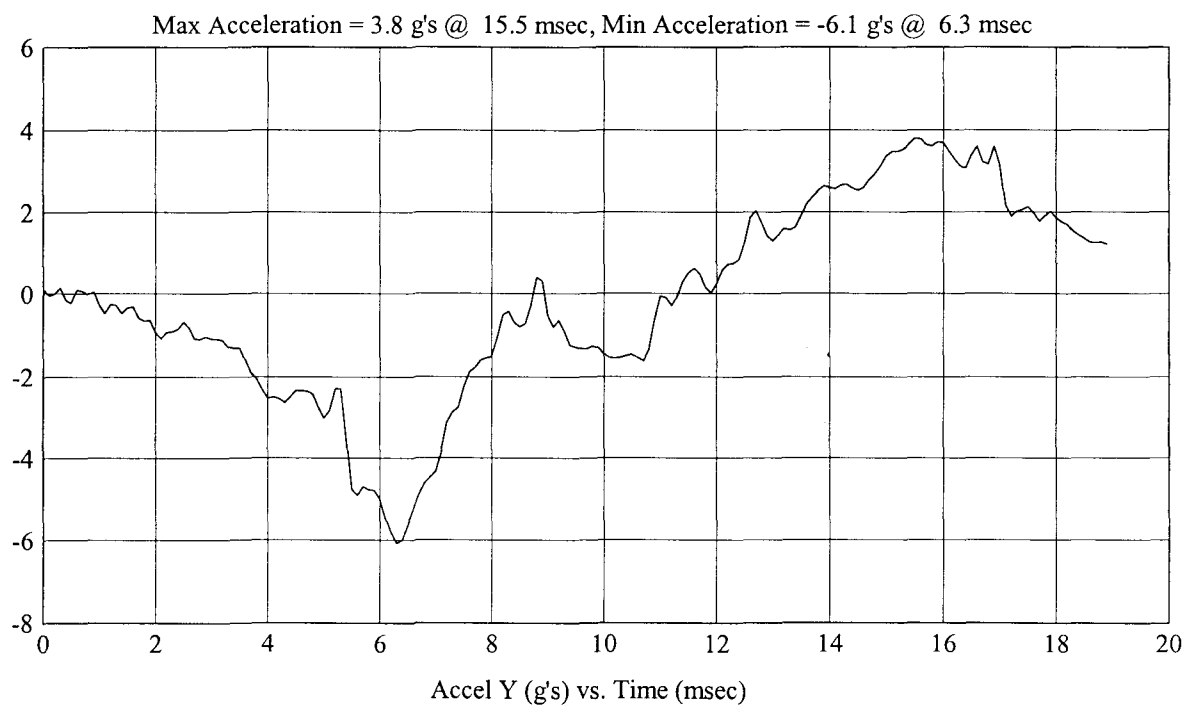
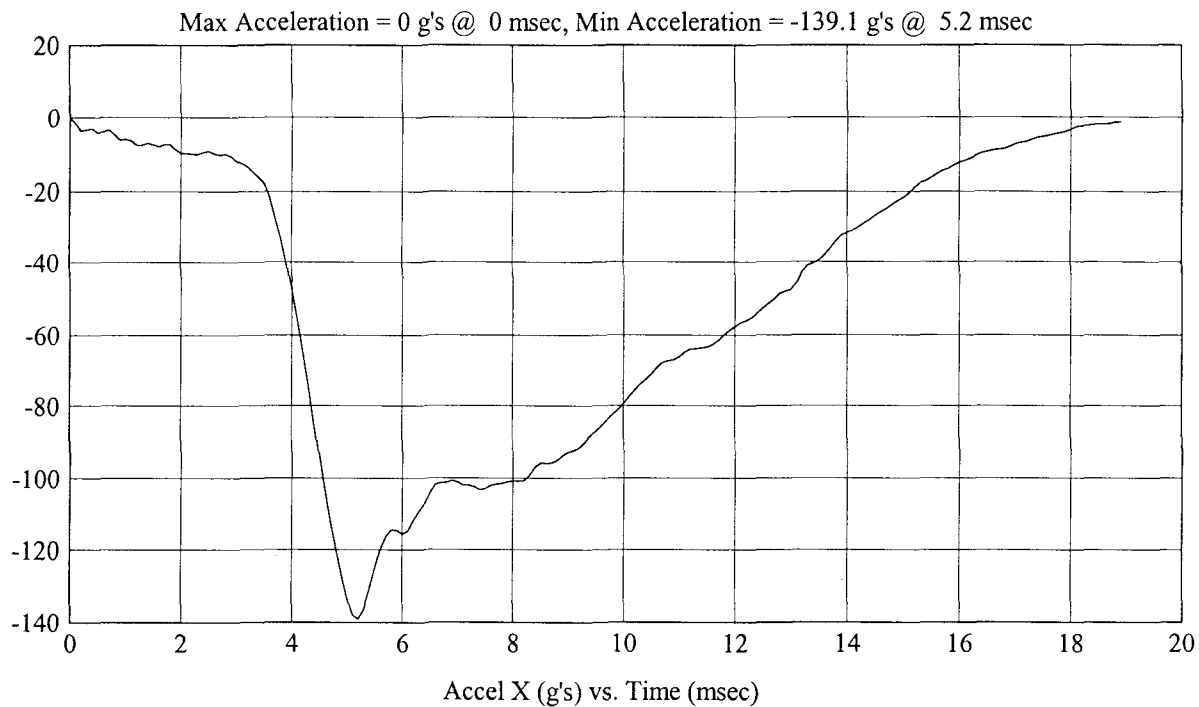
FMH
G0417-001.14

Customer: BUICK
Test # 5
FM4427
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: RP1
Vehicle Side: Left
Horz/Vert Angle: 290/30

HIC(d) = 692, HIC = 697, Delta T = 8 msec



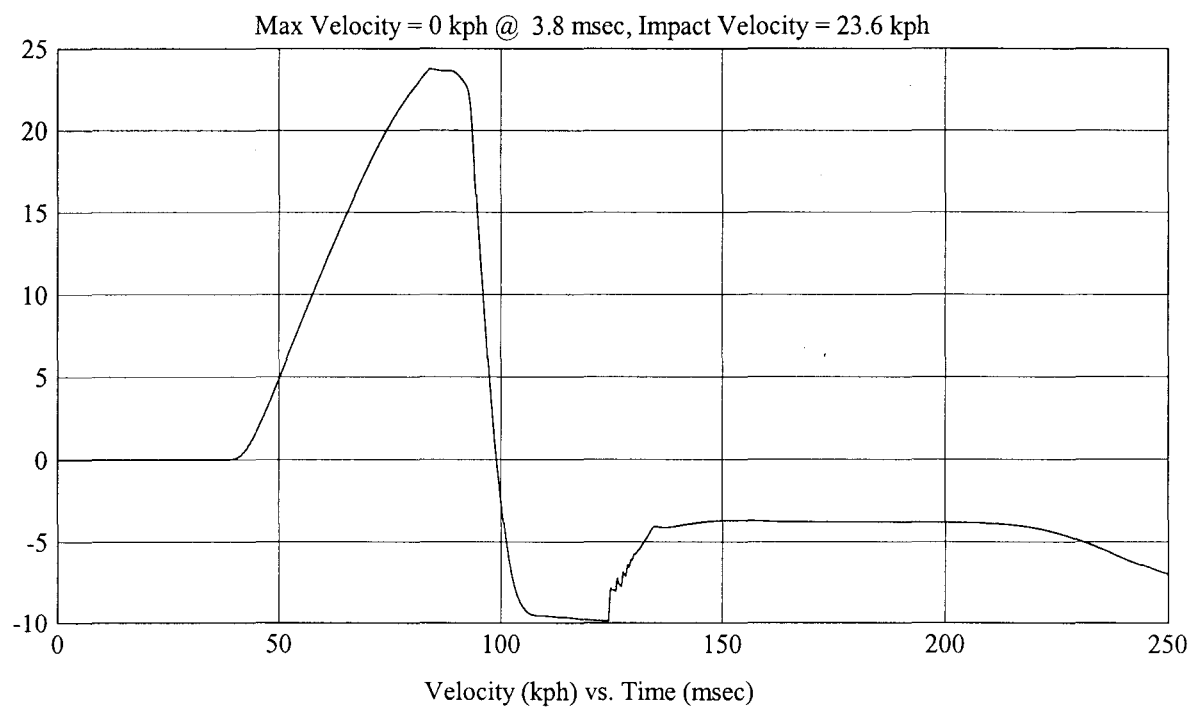
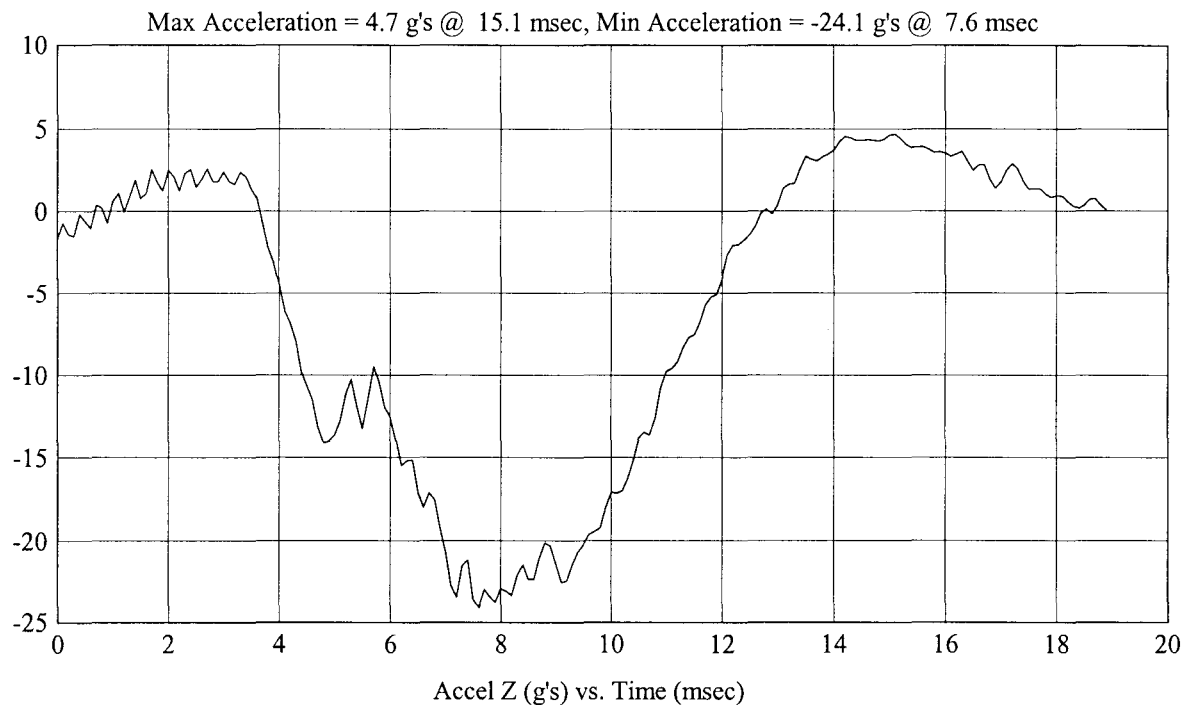
FMH
G0417-001.14

Customer: BUICK
Test # 5
FM4427
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: RP1
Vehicle Side: Left
Horz/Vert Angle: 290/30

HIC(d) = 692, HIC = 697, Delta T = 8 msec



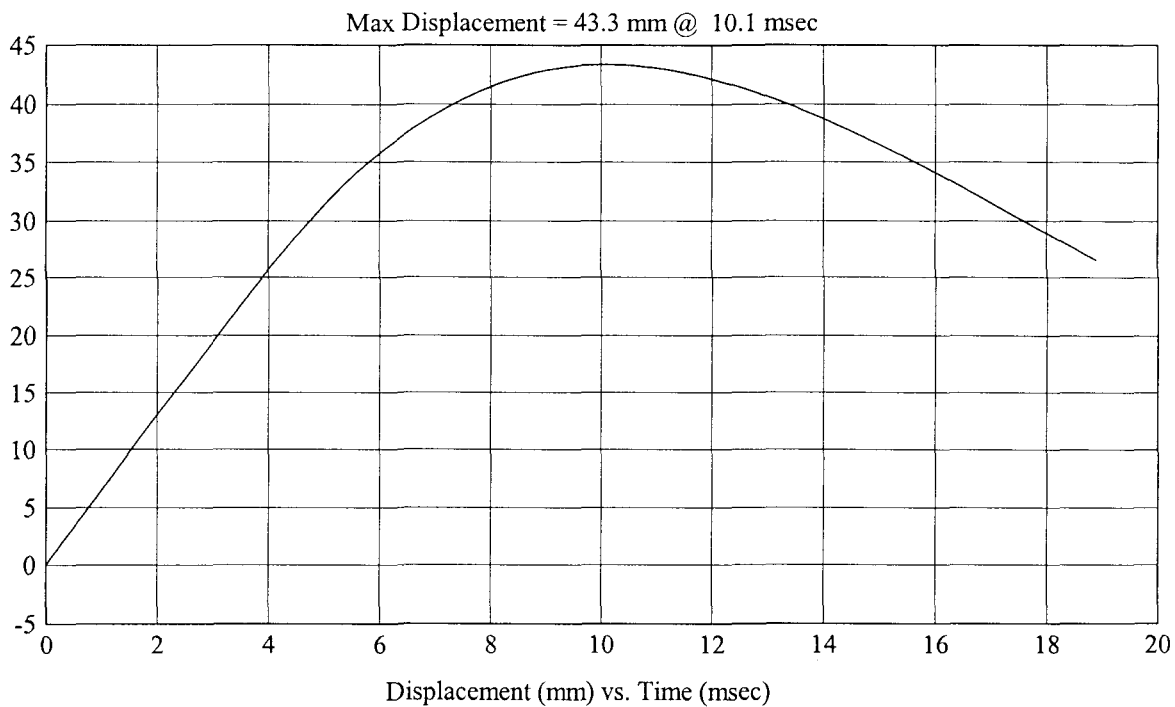
FMH
G04I7-001.14

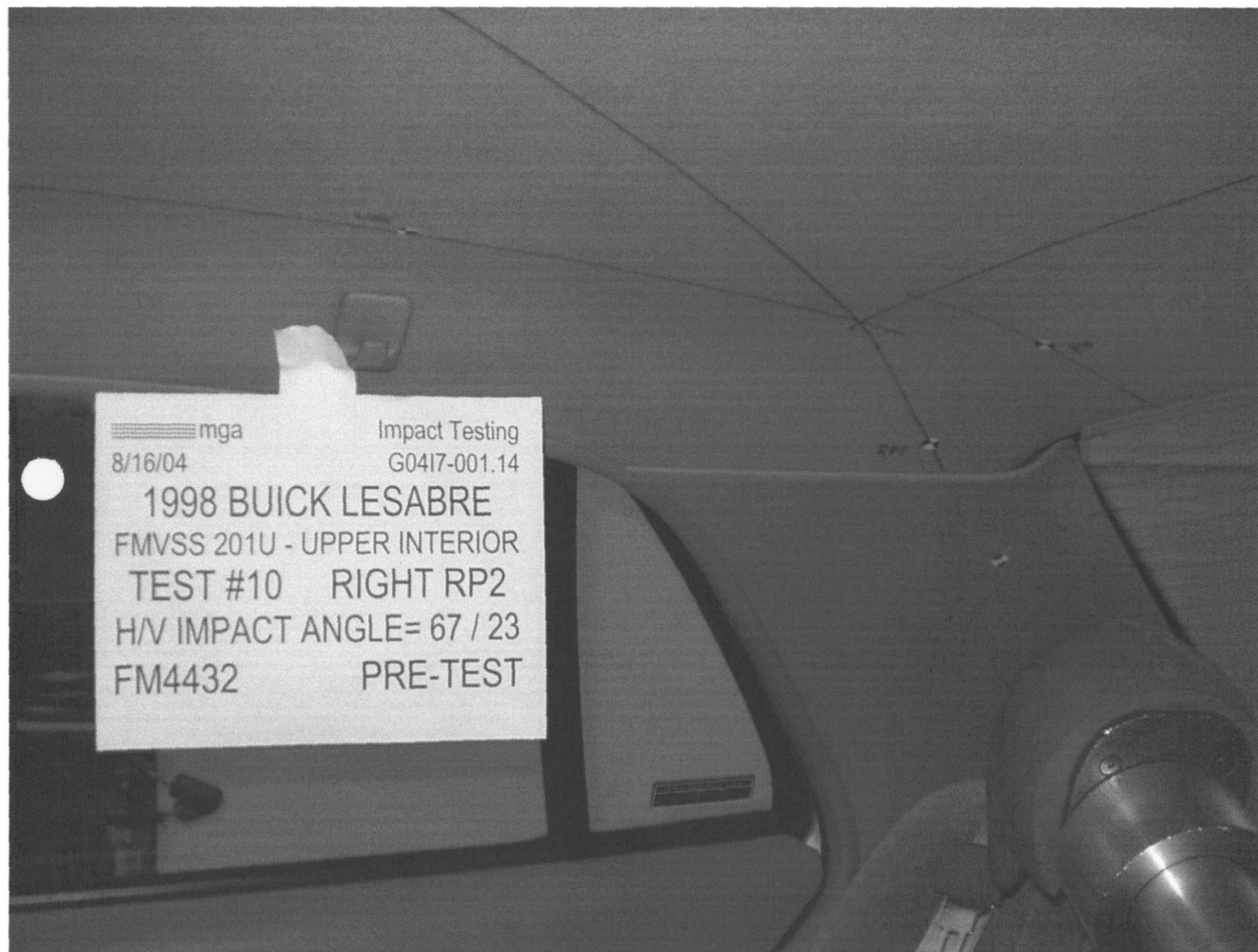
Customer: BUICK
Test # 5
FM4427
Additional Desc: N/A

Vehicle Program : LESABRE

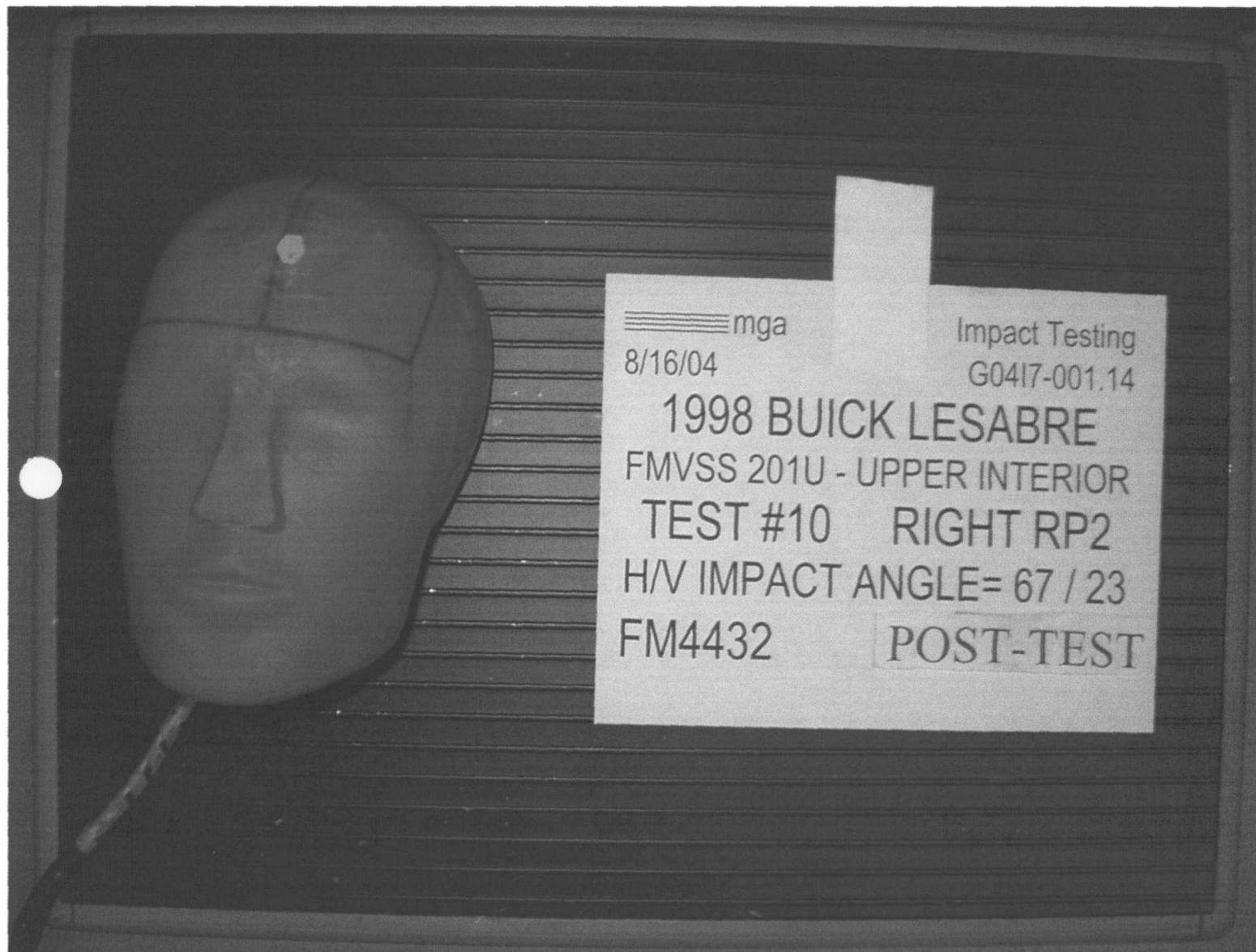
Model Year: 1998
Target: RP1
Vehicle Side: Left
Horz/Vert Angle: 290/30

HIC(d) = 692, HIC = 697, Delta T = 8 msec









==== mga

8/16/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #10 RIGHT RP2

H/V IMPACT ANGLE= 67 / 23

FM4432

POST-TEST

MICHIGAN OPERATIONS
 DATE: 2/8/01
 SUPERCEDES: MGATP207210.2

DOC. NO.: MGATP207210.3
 REVISION NO.: 2
 PAGE 1 OF 1

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.14 VEHICLE YR/MAKE/MODEL: LESABRE 1998

GENERAL TEST PARAMETERS:

Test Number: #10

Target (Vehicle Side): RP2 Right

Temperature: 22C

MGA Test Reference No.: FM4432

Humidity: 48%

Approach Horizontal Angles: 67°

Time of Test: 5:45PM

Approach Vertical Angles: 23°

FMH Serial No: 036

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
575	541	10.4	23.9	35	4 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-100.8	1.67	1.67
Y	6	J35916	100.2	1.54	1.54
Z	7	J35918	97.9	1.58	1.58

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

No visible damage

Recorded By: Mark J. [Signature] Approved By*: Helen Q. Kalita Date: 8/16/04
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G04I7-001.14

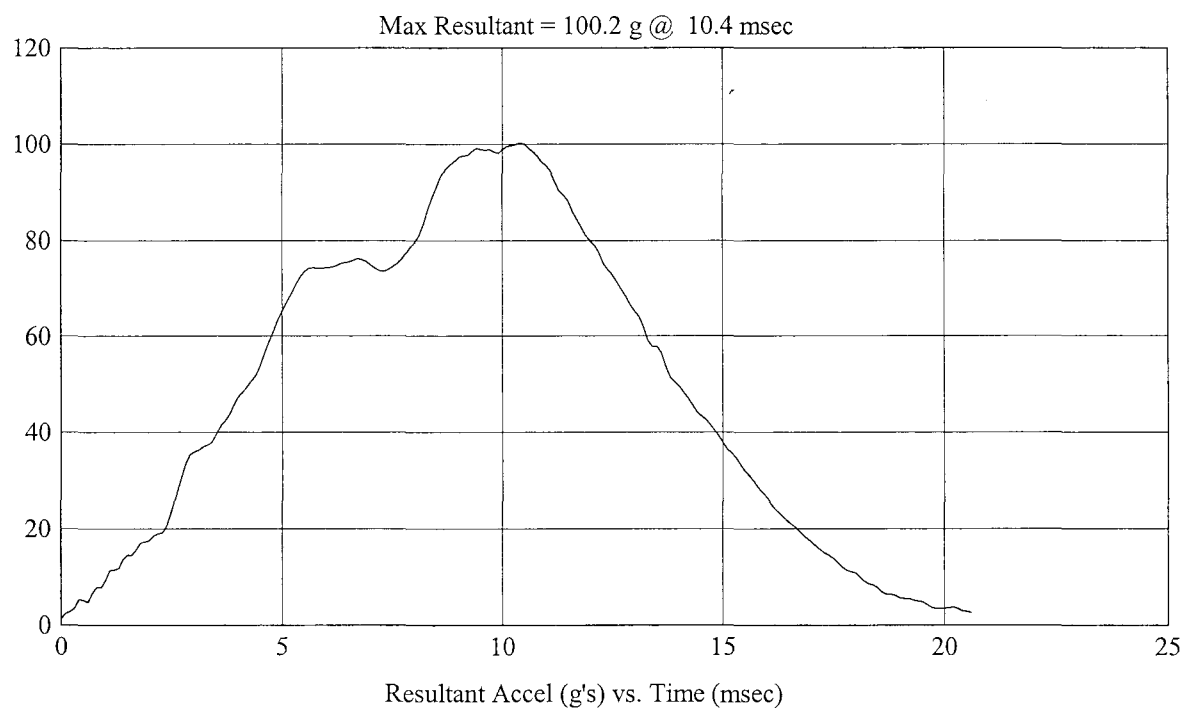
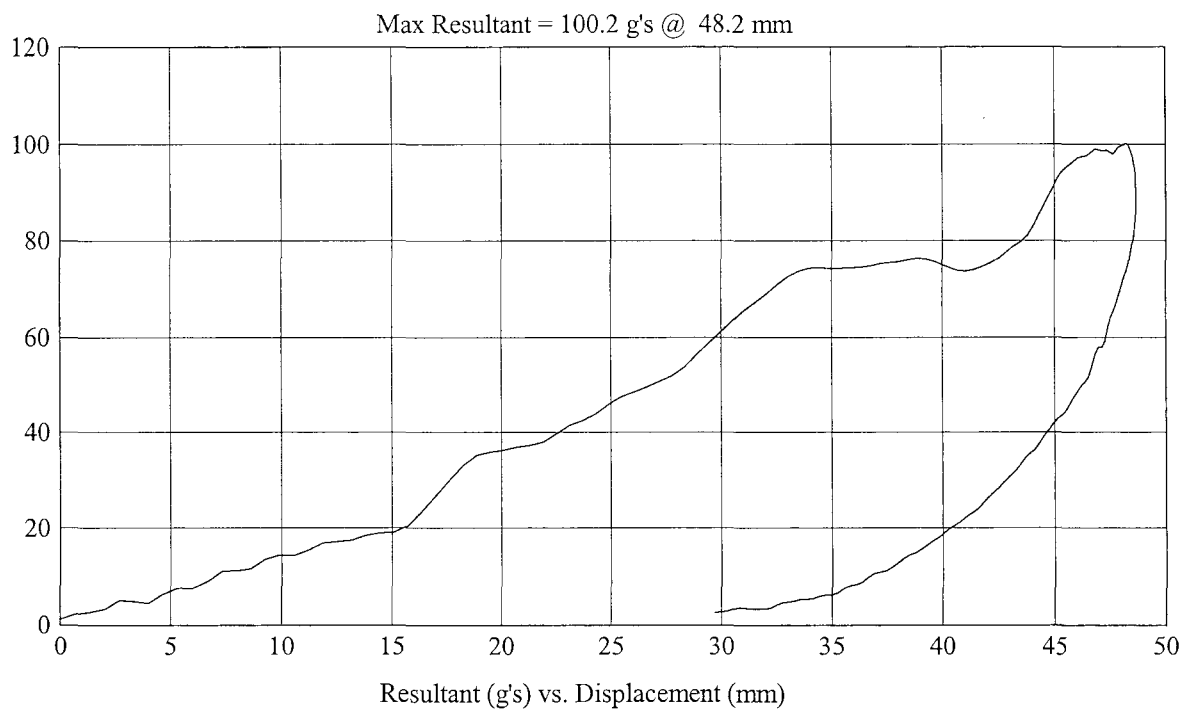
Customer: BUICK
Test # 10
FM4432
Additional Desc: N/A

Vehicle Program : LESABRE

Test Date: 8/16/04

Model Year: 1998
Target: RP2
Vehicle Side: Right
Horz/Vert Angle: 67/23

HIC(d) = 575, HIC = 541, Delta T = 10.4 msec



FMH
G04I7-001.14

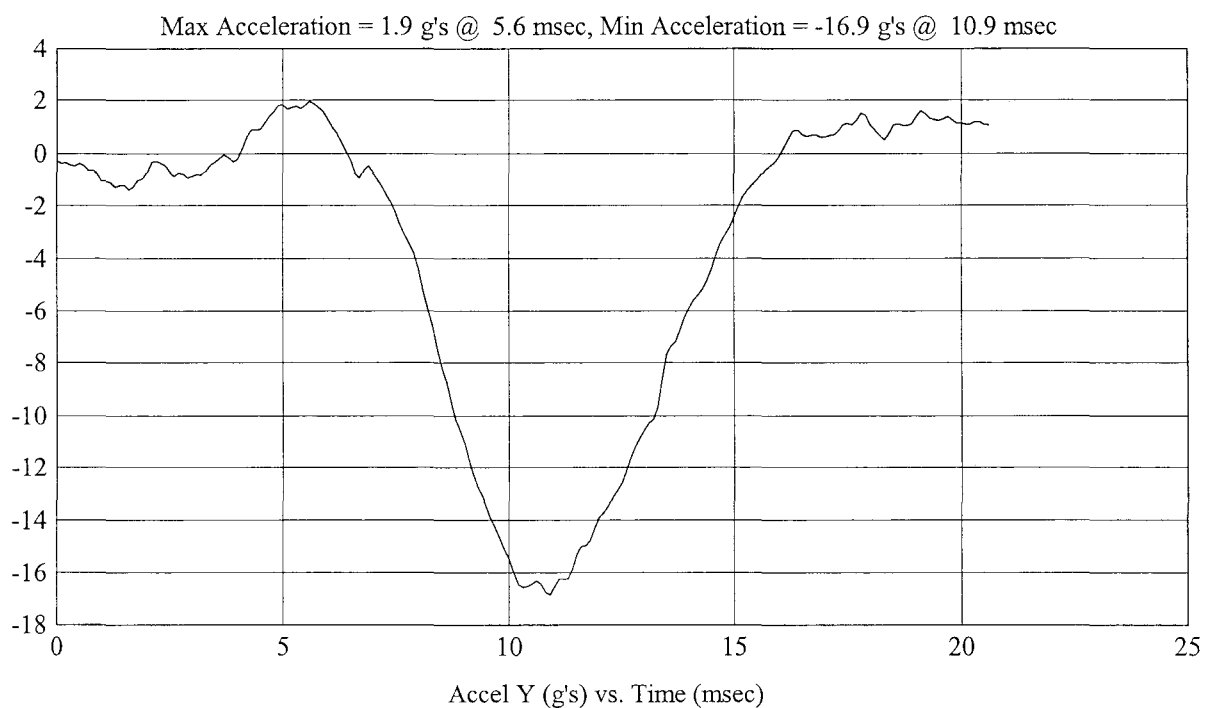
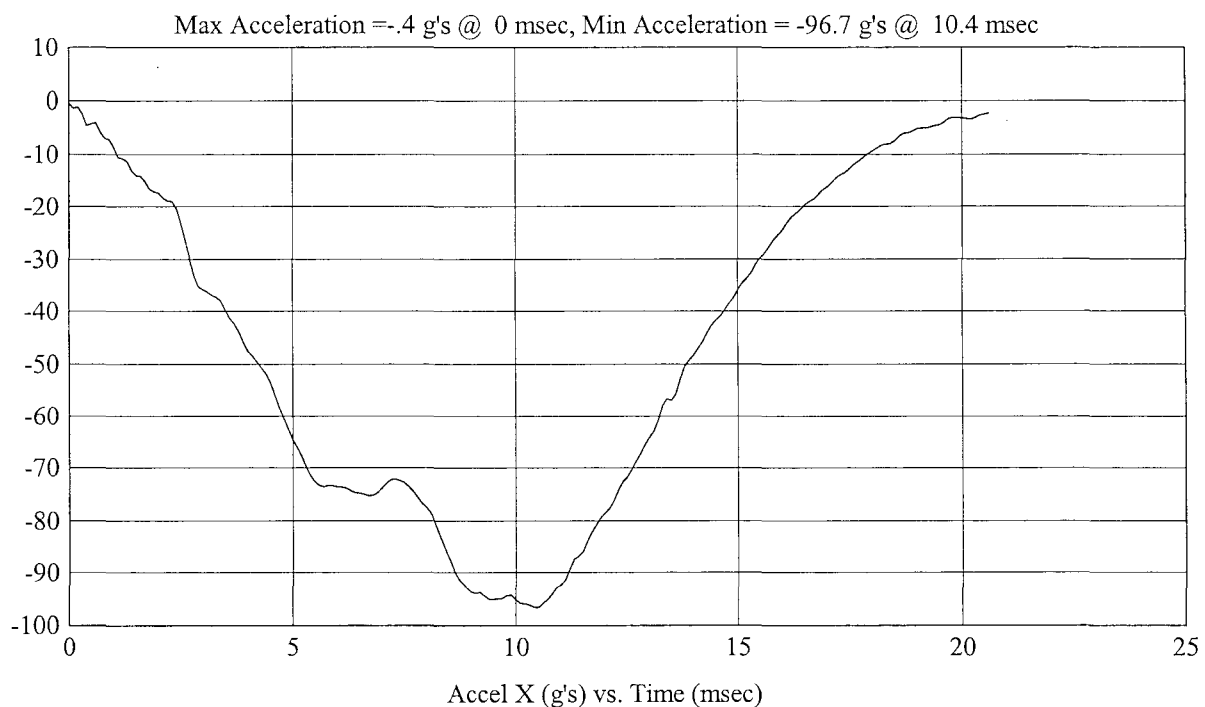
Customer: BUICK
Test # 10
FM4432
Additional Desc: N/A

Vehicle Program : LESABRE

Test Date: 8/16/04

Model Year: 1998
Target: RP2
Vehicle Side: Right
Horz/Vert Angle: 67/23

HIC(d) = 575, HIC = 541, Delta T = 10.4 msec



FMH
G04I7-001.14

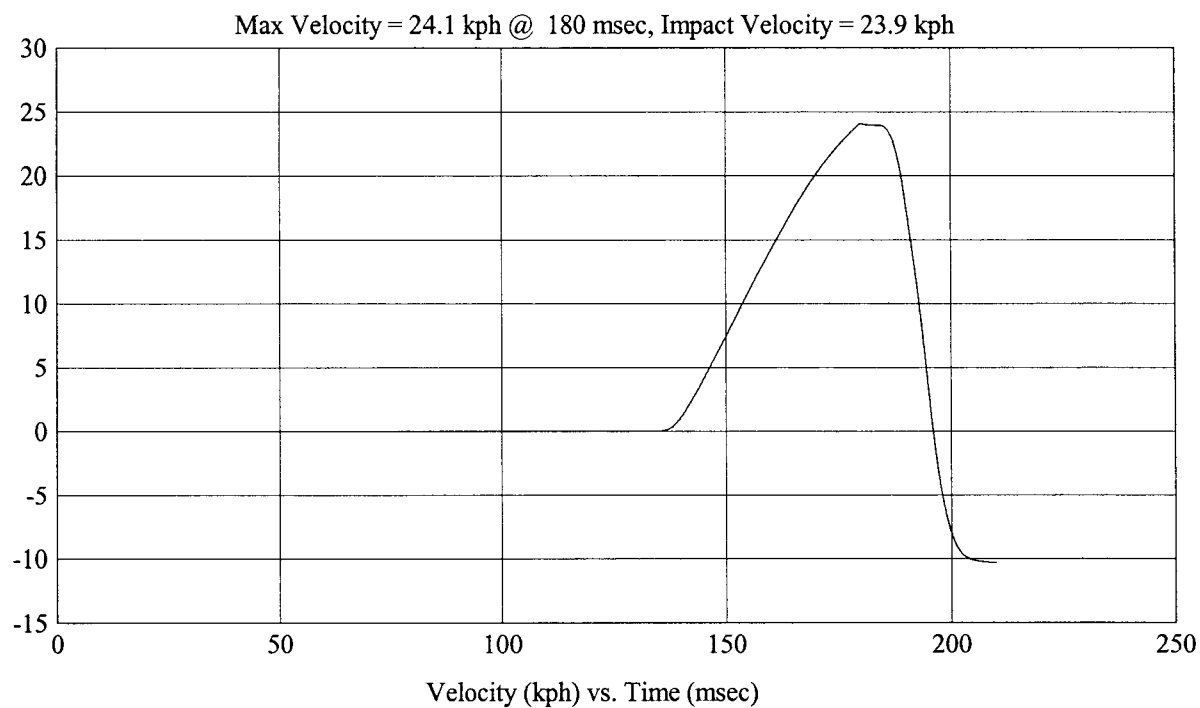
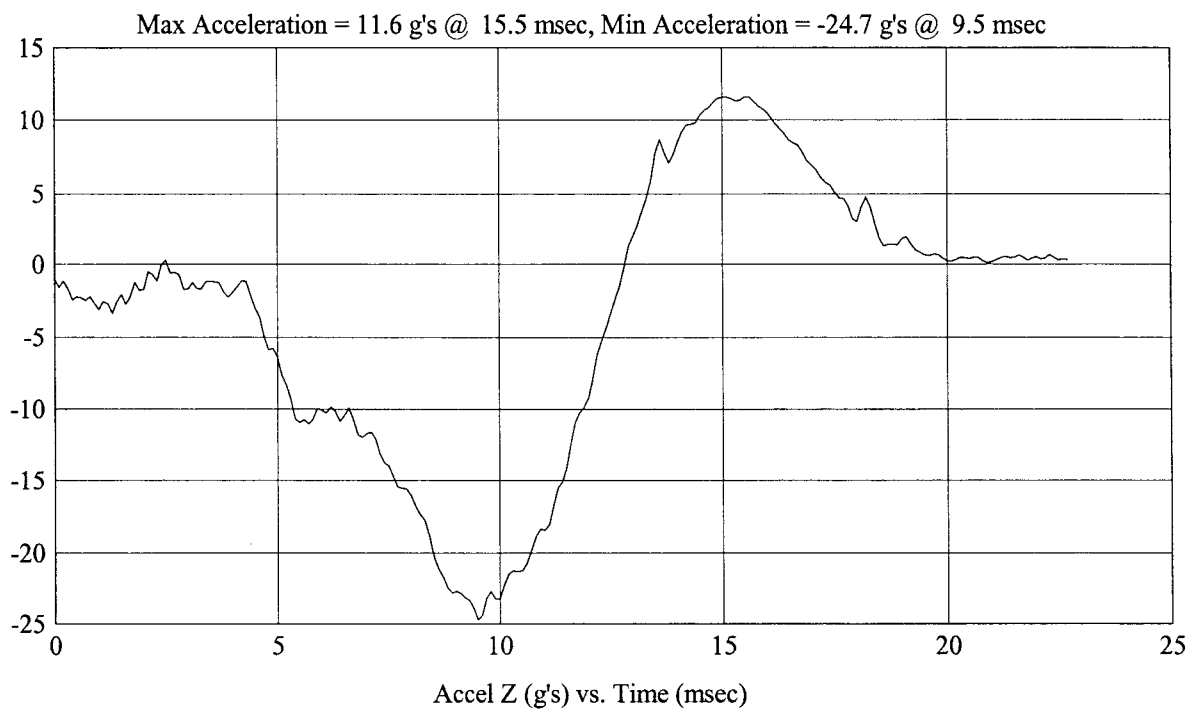
Customer: BUICK
Test # 10
FM4432
Additional Desc: N/A

Vehicle Program : LESABRE

Test Date: 8/16/04

Model Year: 1998
Target: RP2
Vehicle Side: Right
Horz/Vert Angle: 67/23

HIC(d) = 575, HIC = 541, Delta T = 10.4 msec



FMH
G04I7-001.14

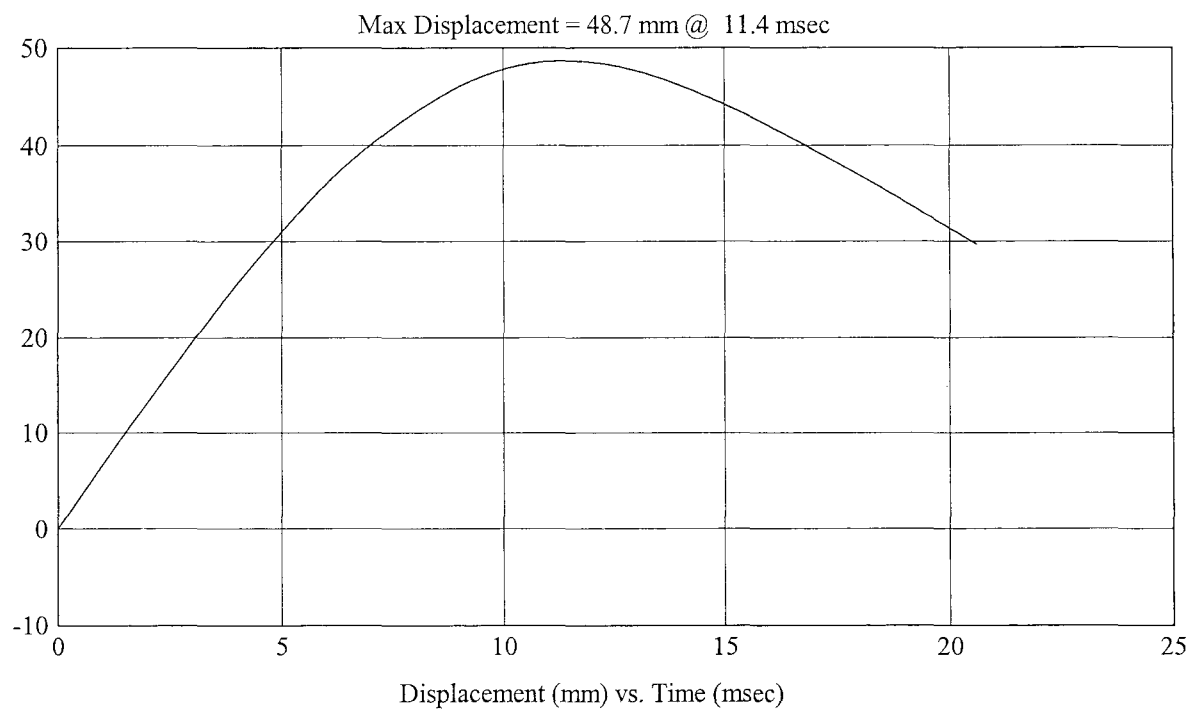
Customer: BUICK
Test # 10
FM4432
Additional Desc: N/A

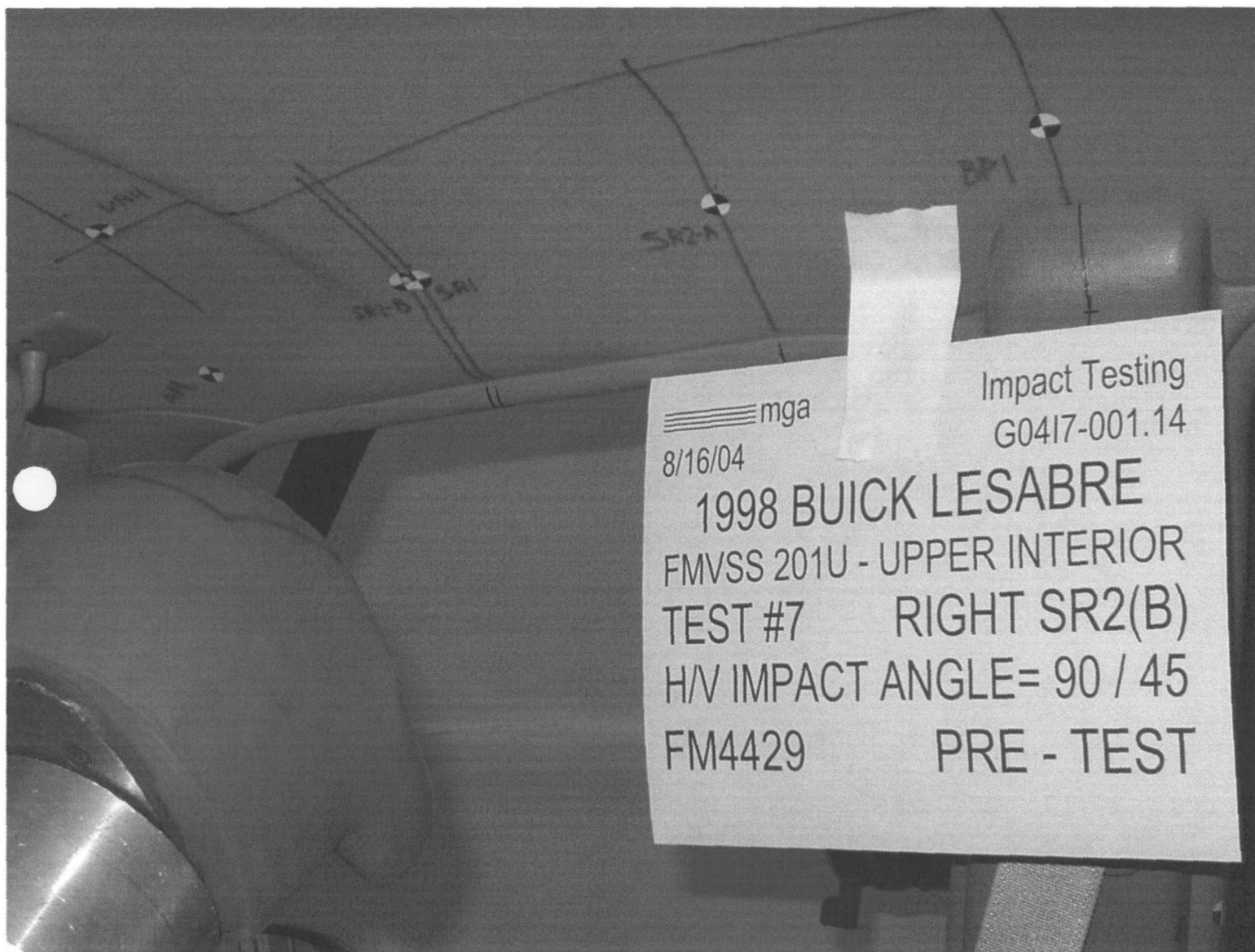
Vehicle Program : LESABRE

Test Date: 8/16/04

Model Year: 1998
Target: RP2
Vehicle Side: Right
Horz/Vert Angle: 67/23

HIC(d) = 575, HIC = 541, Delta T = 10.4 msec



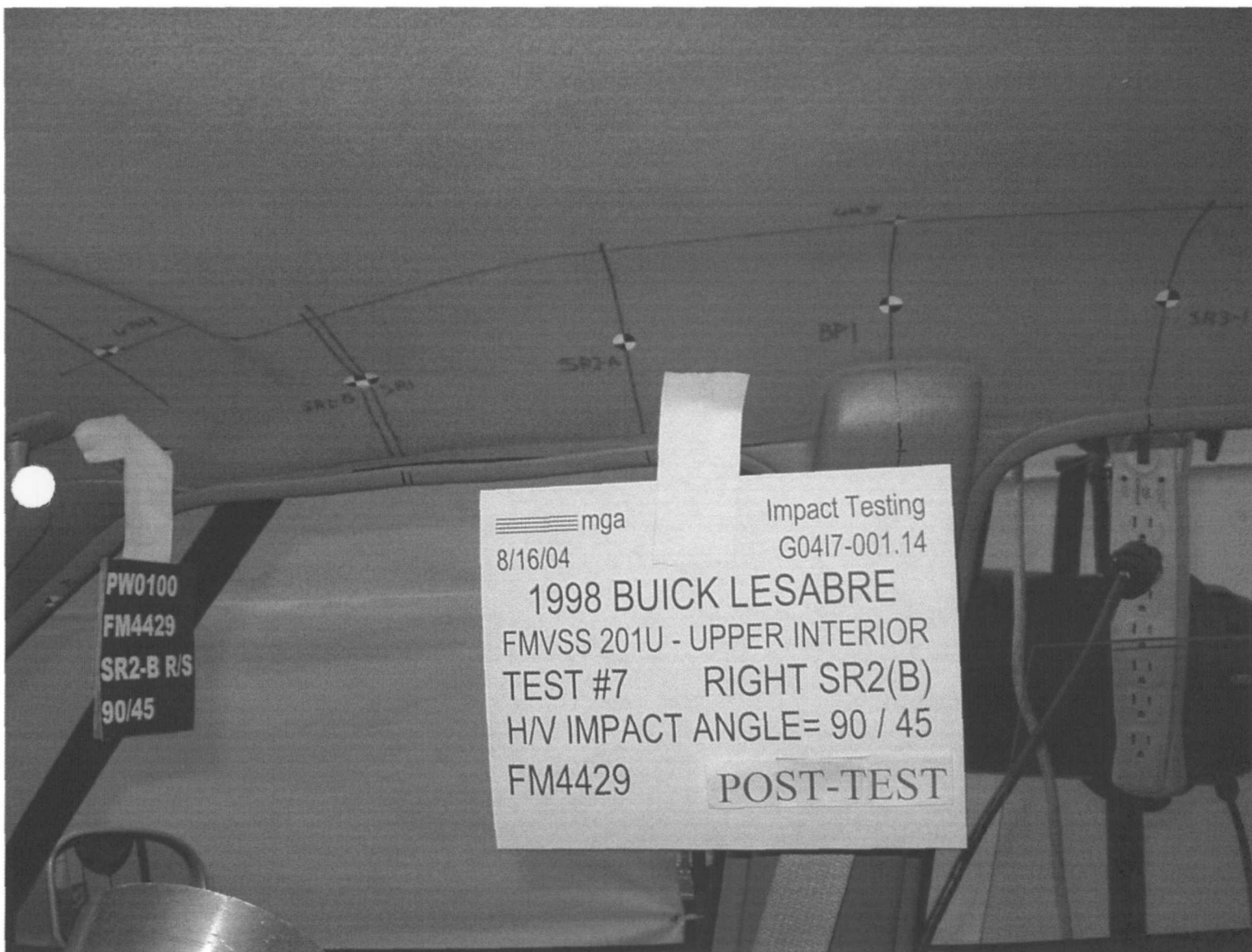


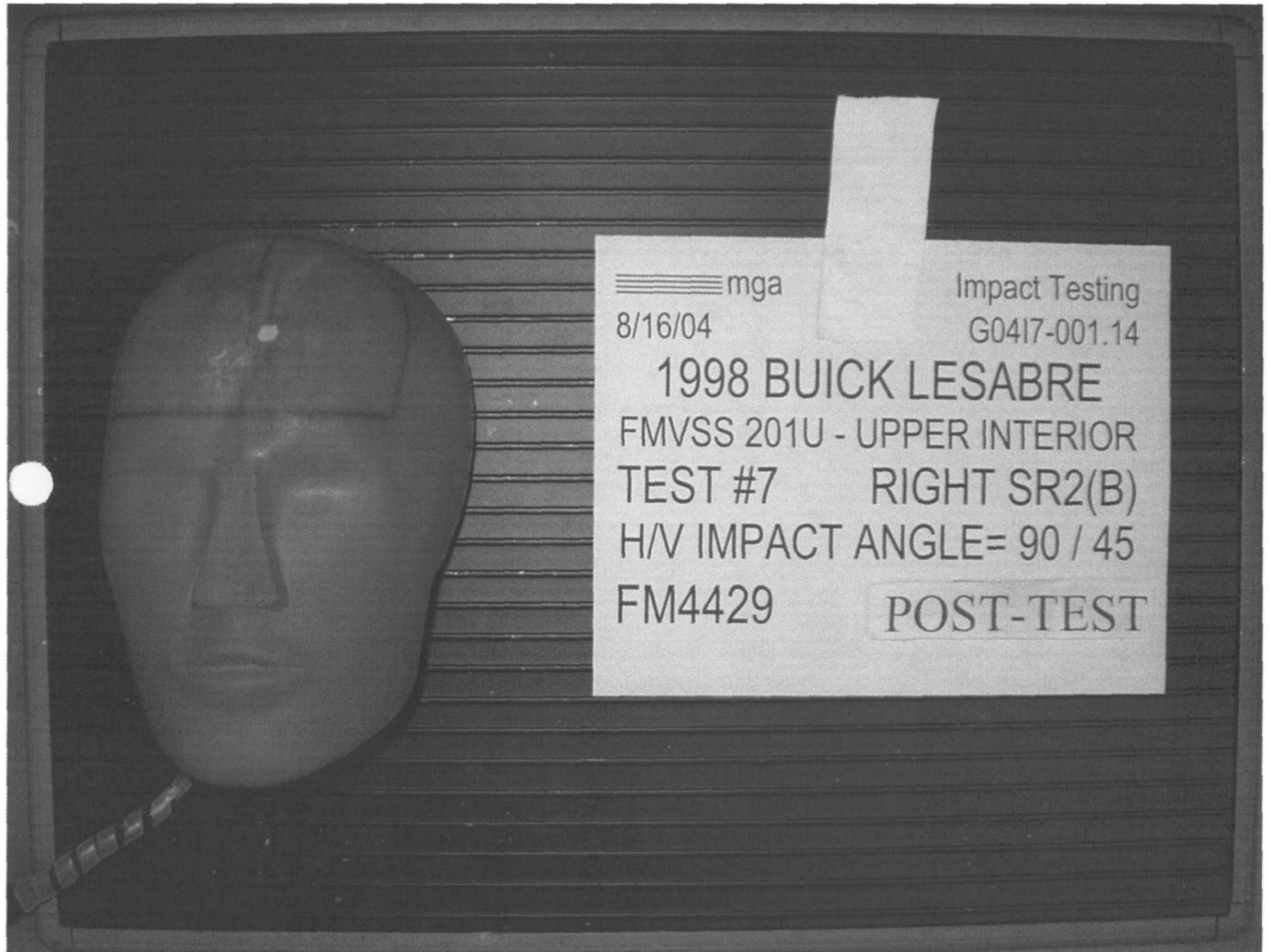
mga

8/16/04

Impact Testing
G04I7-001.14

1998 BUICK LESABRE
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR2(B)
H/V IMPACT ANGLE= 90 / 45
FM4429 PRE - TEST





==== mga

8/16/04

Impact Testing

G0417-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #7 RIGHT SR2(B)

H/V IMPACT ANGLE= 90 / 45

FM4429

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.14 VEHICLE YR/MAKE/MODEL: LESABRE 1998

GENERAL TEST PARAMETERS:

Test Number: #7

Target (Vehicle Side): SR2(b) Right

Temperature: 22C

MGA Test Reference No.: FM4429

Humidity: 47%

Approach Horizontal Angles: 90°

Time of Test: 2:40 PM

Approach Vertical Angles: 45°

FMH Serial No: 036

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
1051	1172	5.5	23.8	30	7 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-100.8	1.67	1.67
Y	6	J35916	100.2	1.54	1.54
Z	7	J35918	97.9	1.58	1.58

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

Headliner deformation

Recorded By: mm j. Lee Approved By*: Heleen K. Kaleb Date: 8-16-04

*Only necessary for NHTSA (Government) Compliance testing.

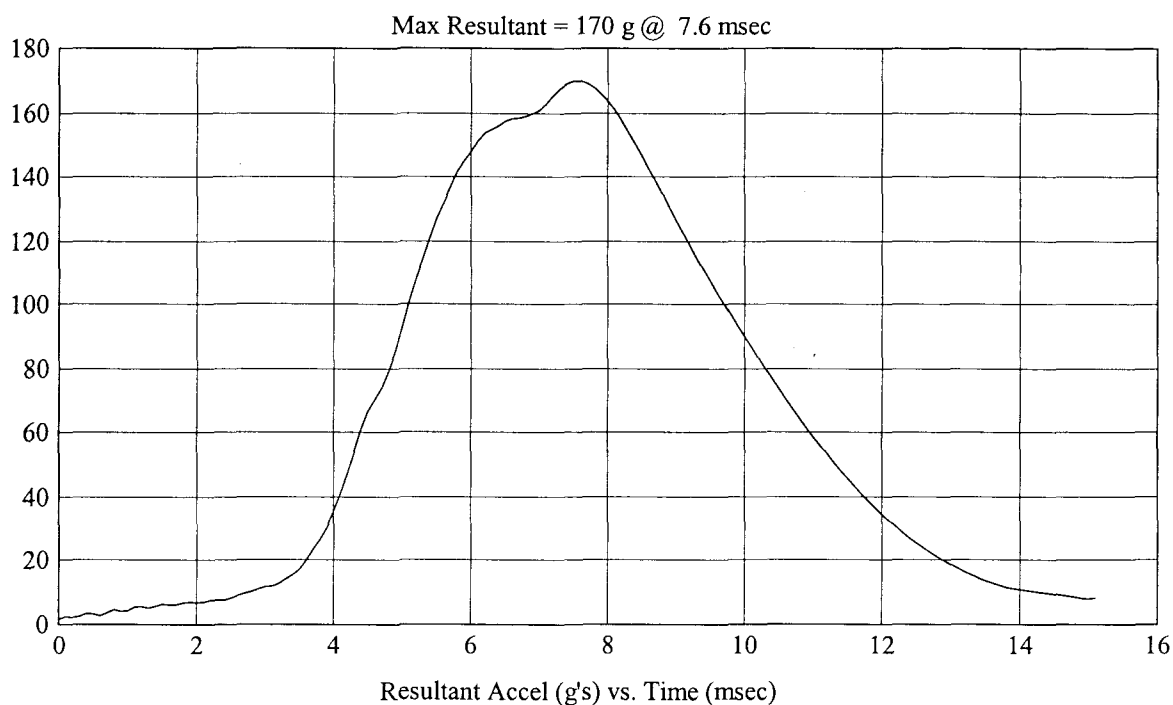
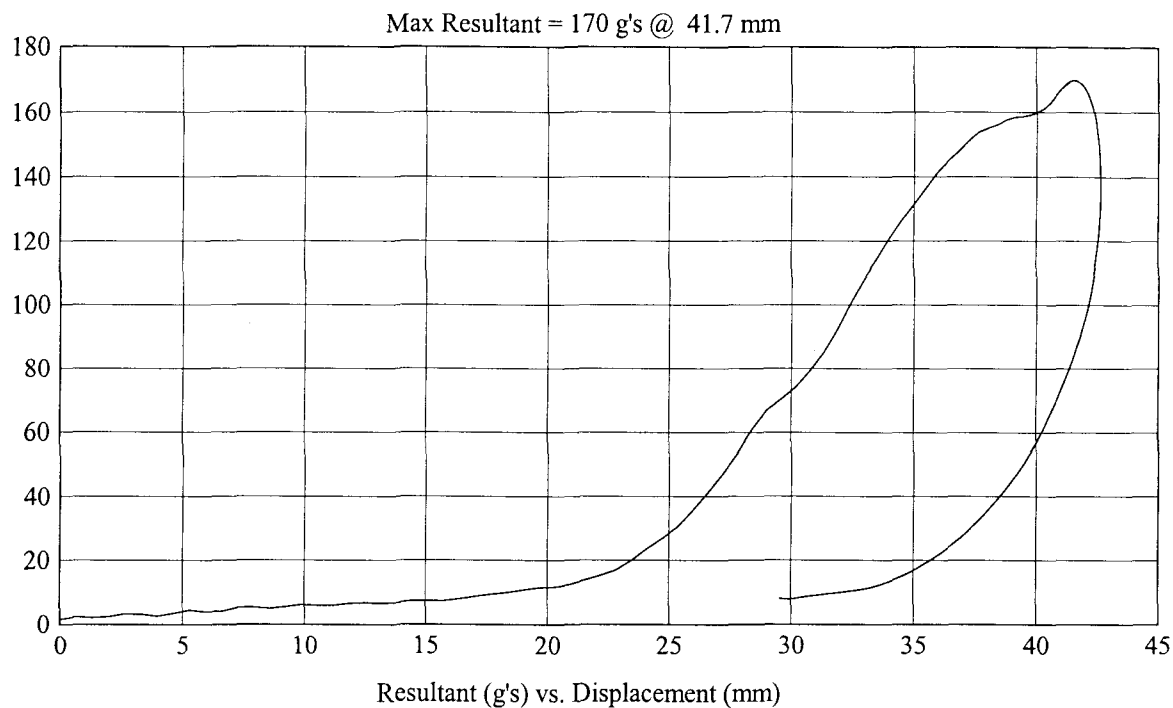
FMH
G04I7-001.14

Customer: BUICK
Test # 7
FM4429
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/45

HIC(d) = 1051, HIC = 1172, Delta T = 5.5 msec



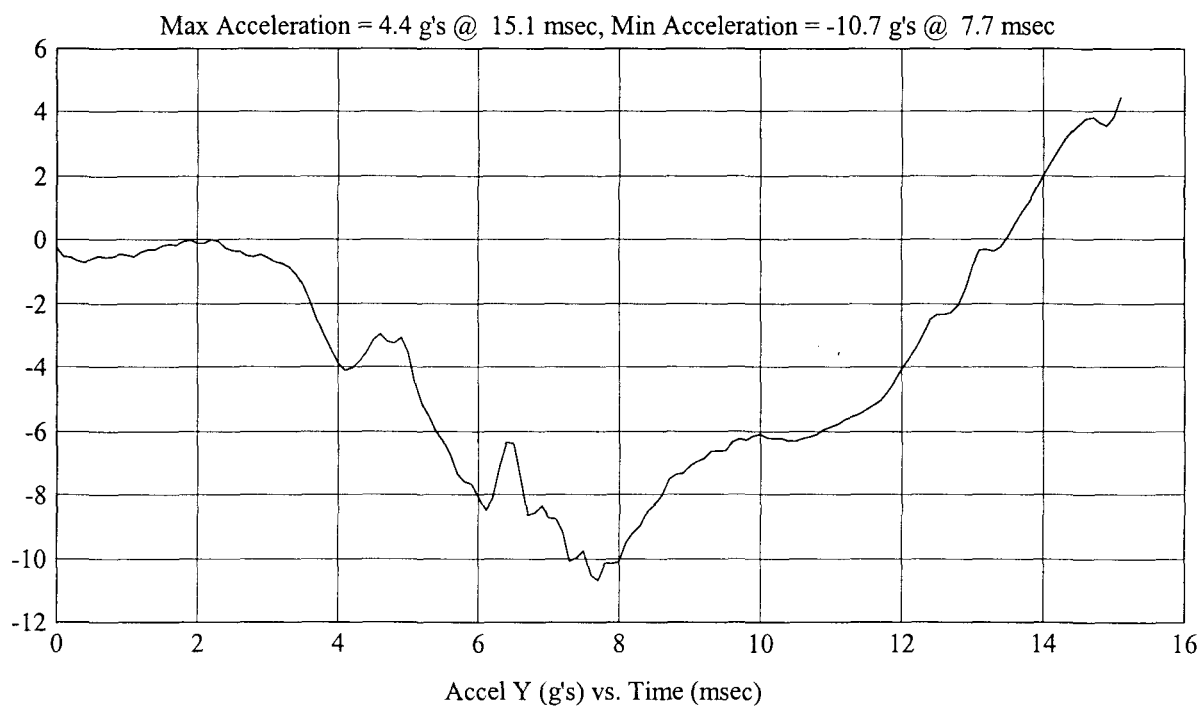
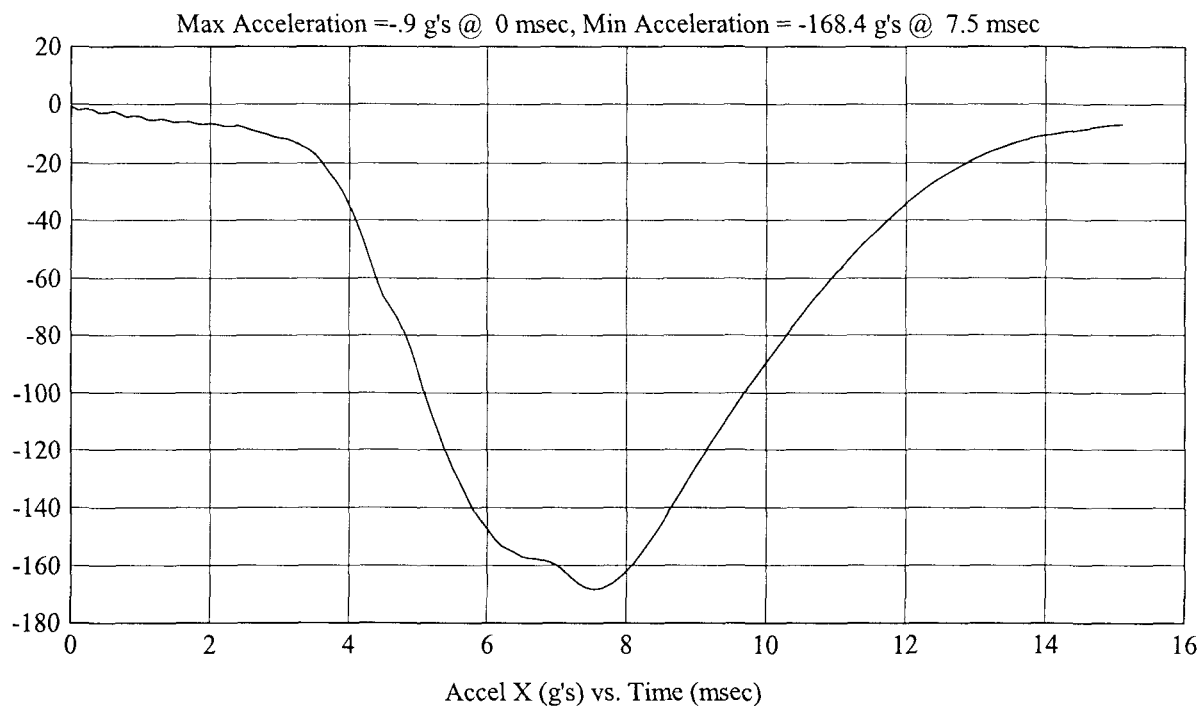
FMH
G04I7-001.14

Customer: BUICK
Test # 7
FM4429
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/45

HIC(d) = 1051, HIC = 1172, Delta T = 5.5 msec



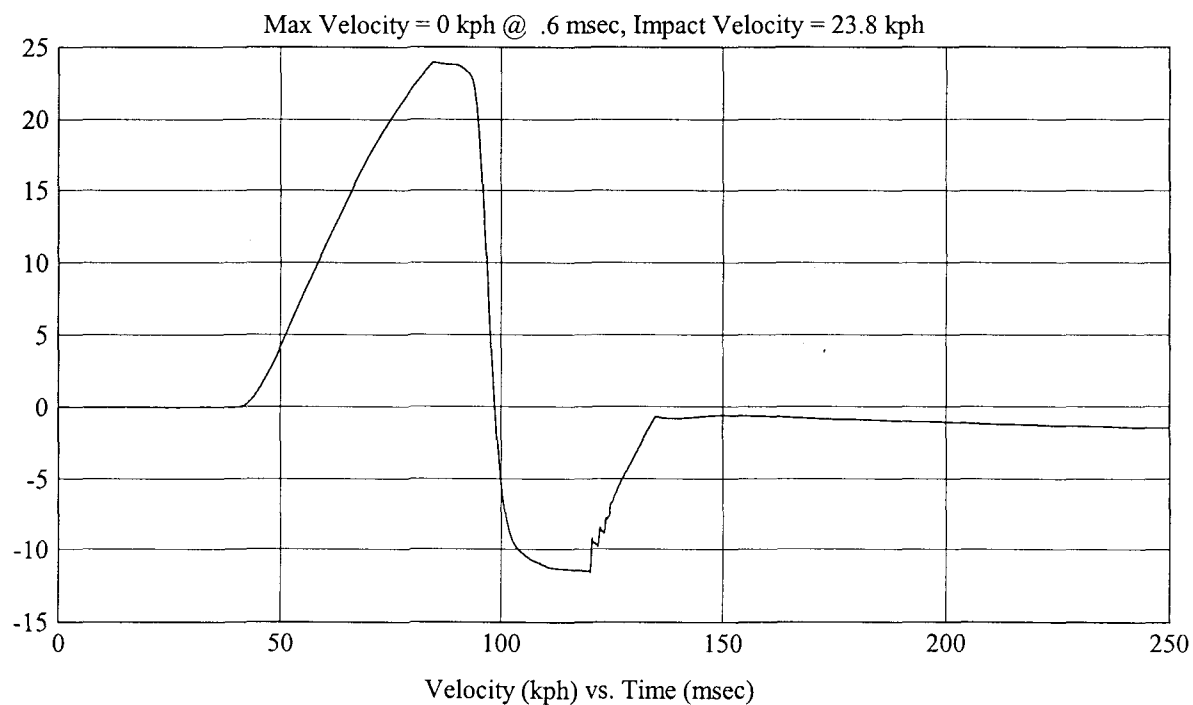
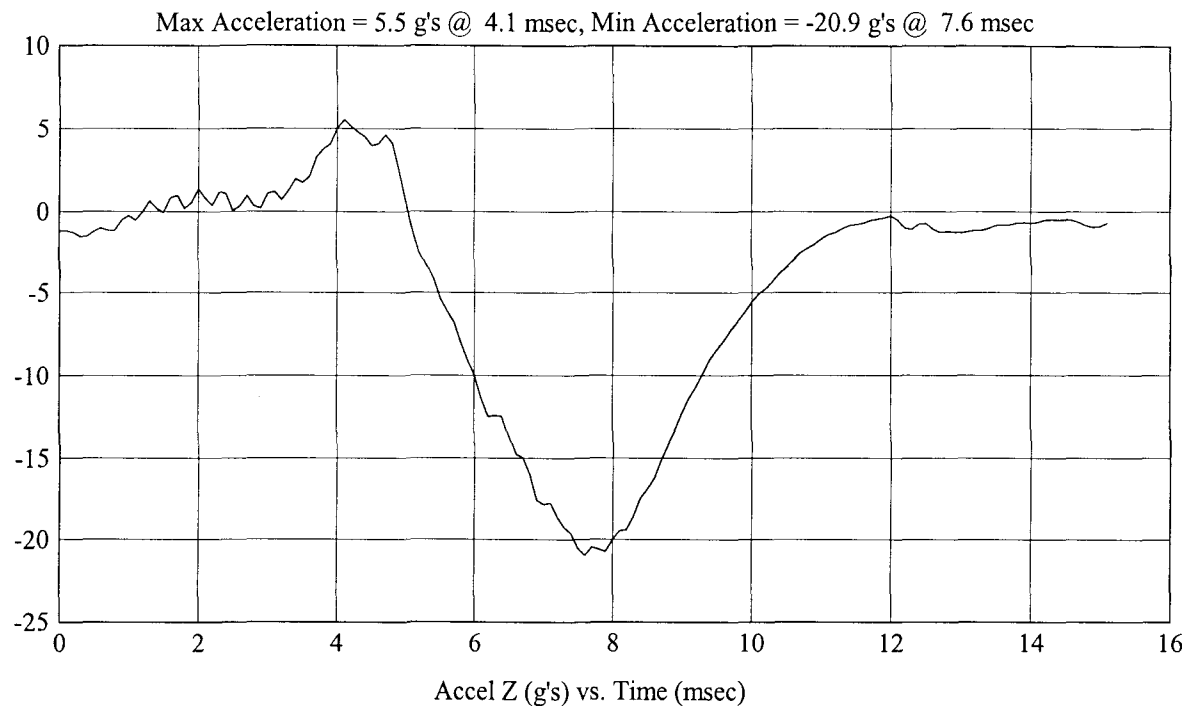
FMH
G04I7-001.14

Customer: BUICK
Test # 7
FM4429
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/45

HIC(d) = 1051, HIC = 1172, Delta T = 5.5 msec



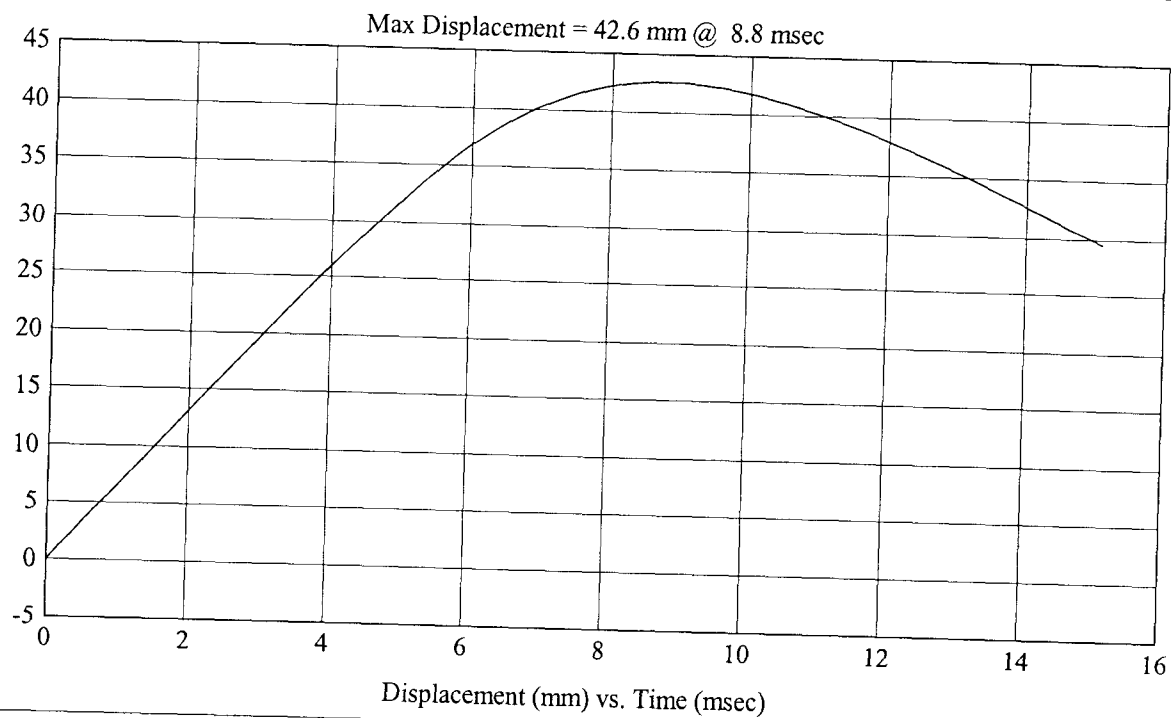
FMH
G0417-001.14

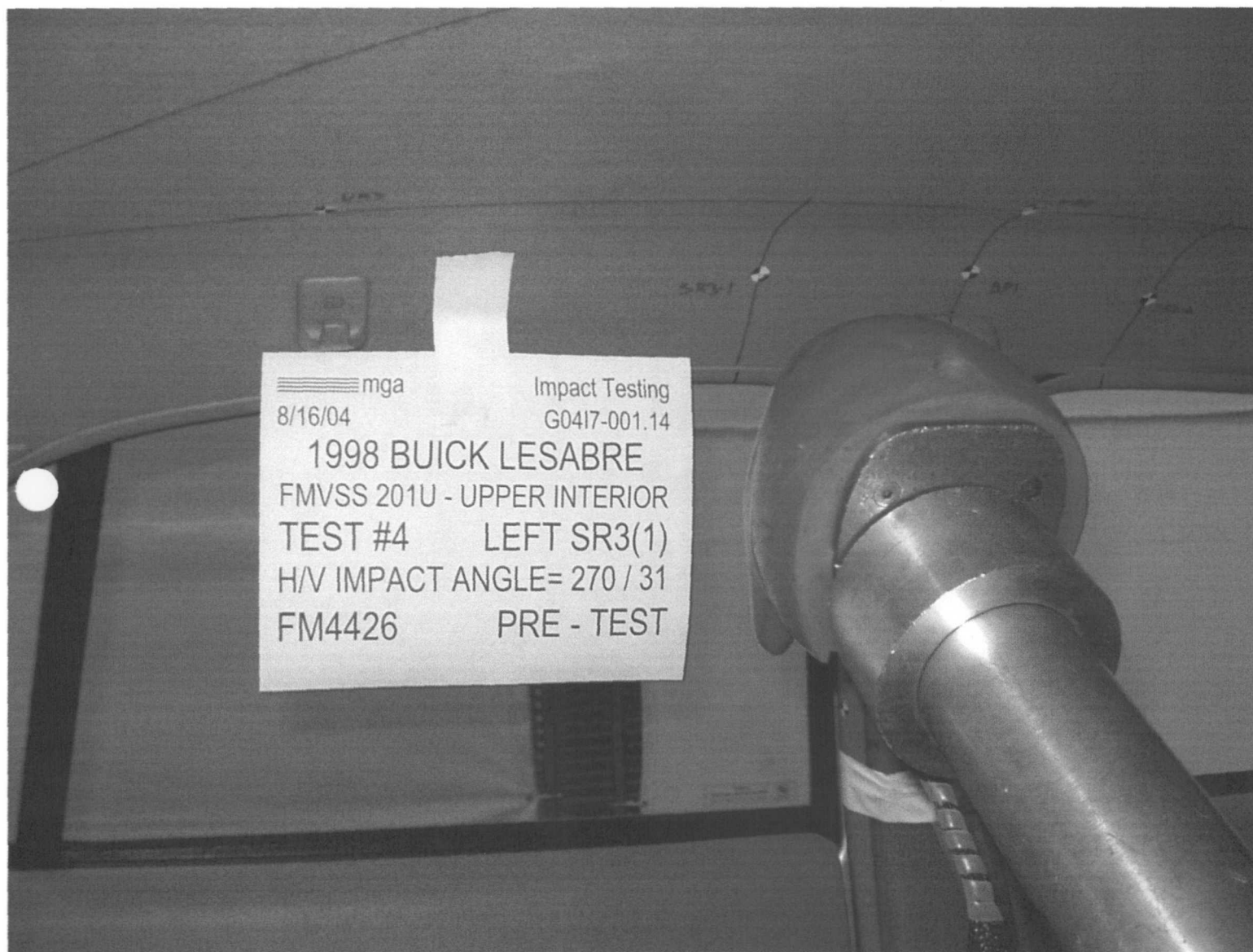
Customer: BUICK
Test # 7
FM4429
Additional Desc: N/A

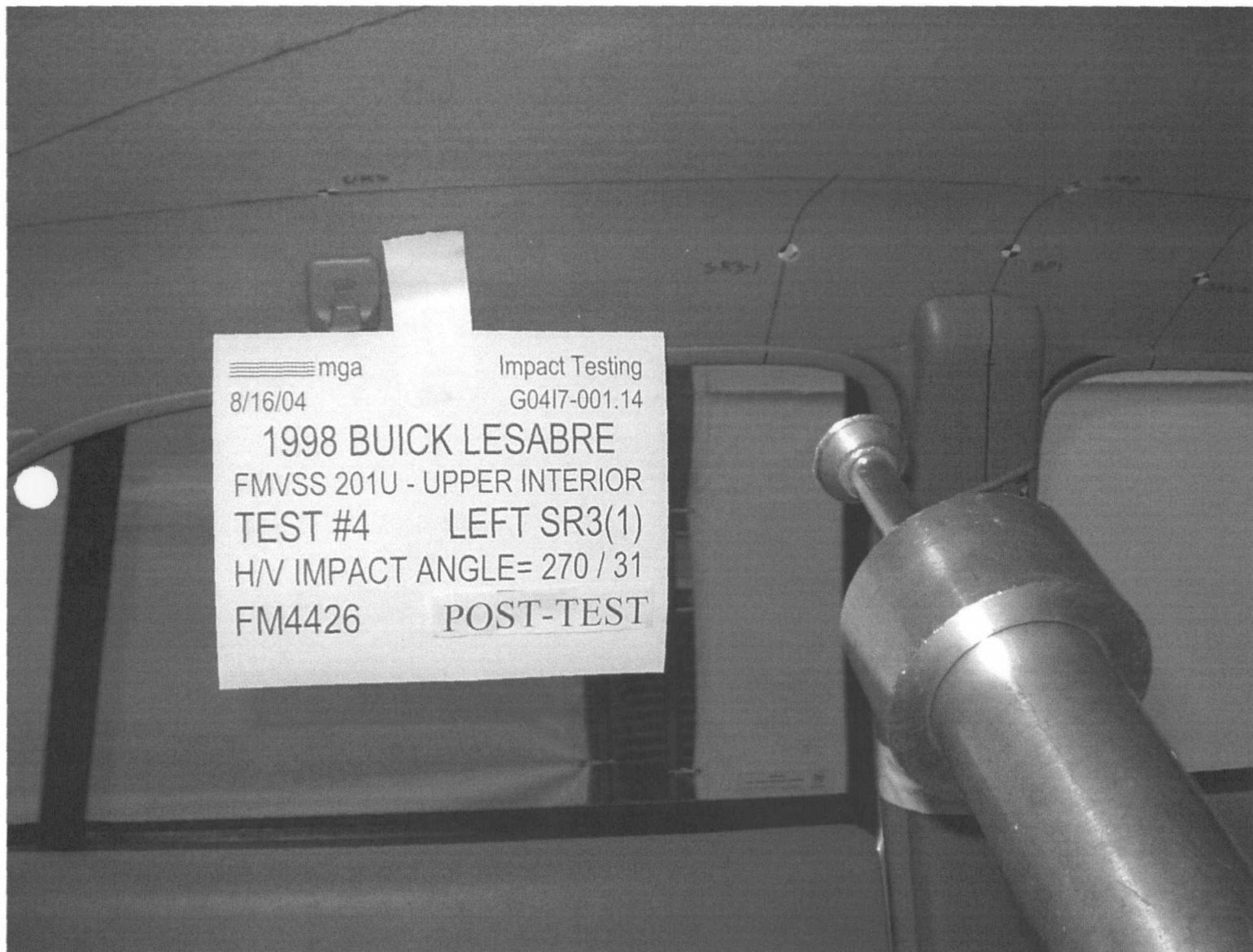
Vehicle Program : LESABRE

Model Year: 1998
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/45

HIC(d) = 1051, HIC = 1172, Delta T = 5.5 msec







mga

8/16/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #4 LEFT SR3(1)

H/V IMPACT ANGLE= 270 / 31

FM4426

POST-TEST



===== mga

8/16/04

Impact Testing

G04I7-001.14

1998 BUICK LESABRE

FMVSS 201U - UPPER INTERIOR

TEST #4 LEFT SR3(1)

H/V IMPACT ANGLE= 270 / 31

FM4426

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.14 VEHICLE YR/MAKE/MODEL:LESABRE 1998

GENERAL TEST PARAMETERS:

Target (Vehicle Side): SR3(1) Left

MGA Test Reference No.:FM4426

Approach Horizontal Angles:270°

Approach Vertical Angles:31°

Test Number:#4

Temperature:22C

Humidity:46%

Time of Test: 9:45 AM

FMH Serial No:036

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
734	752	8.9	23.8	20	3 R

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-100.8	1.67	1.67
Y	6	J35916	100.2	1.54	1.55
Z	7	J35918	97.9	1.58	1.58

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

No visible damage

Recorded By: Sam J. Kim Approved By: Heleen D. Kalish Date: 8-16-04

*Only necessary for NHTSA (Government) Compliance testing.

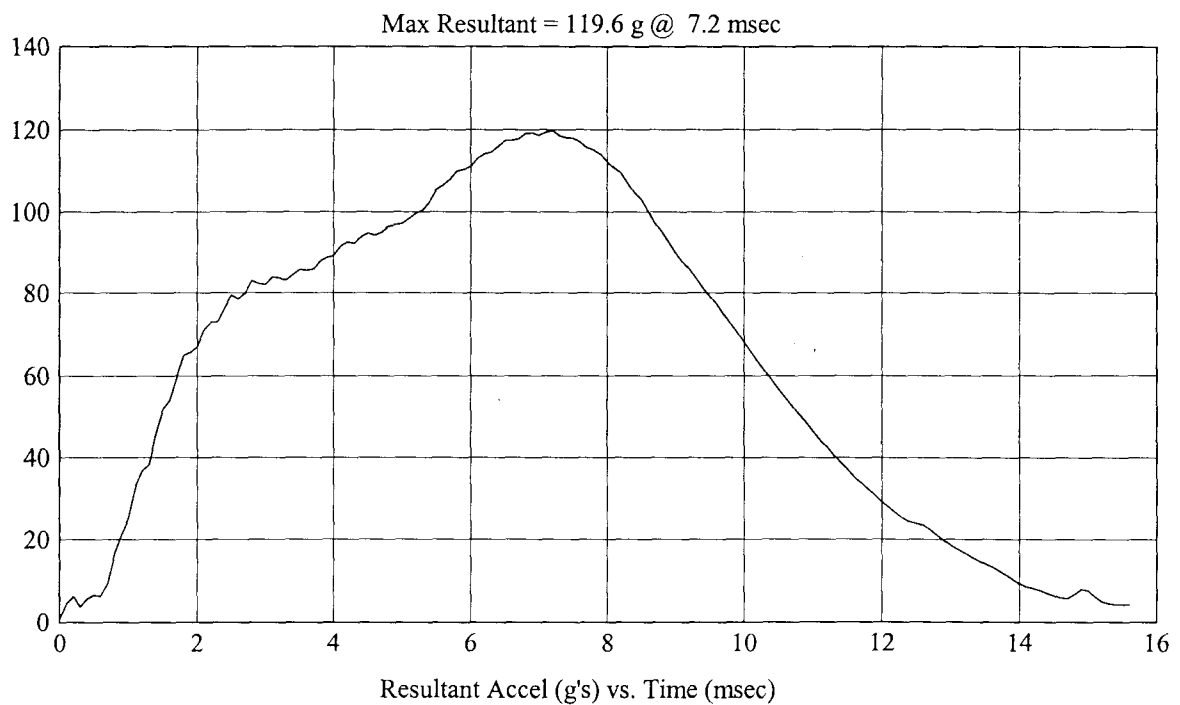
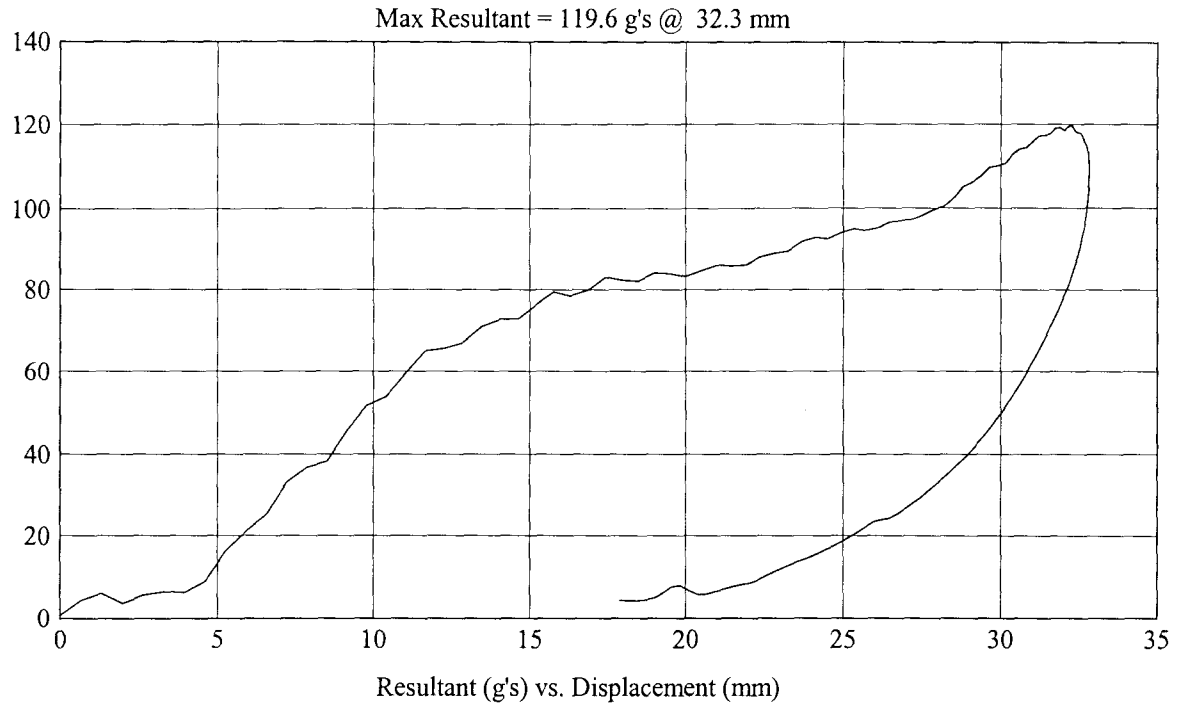
FMH
G04I7-001.14

Customer: BUICK
Test # 4
FM4426
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 734, HIC = 752, Delta T = 8.9 msec



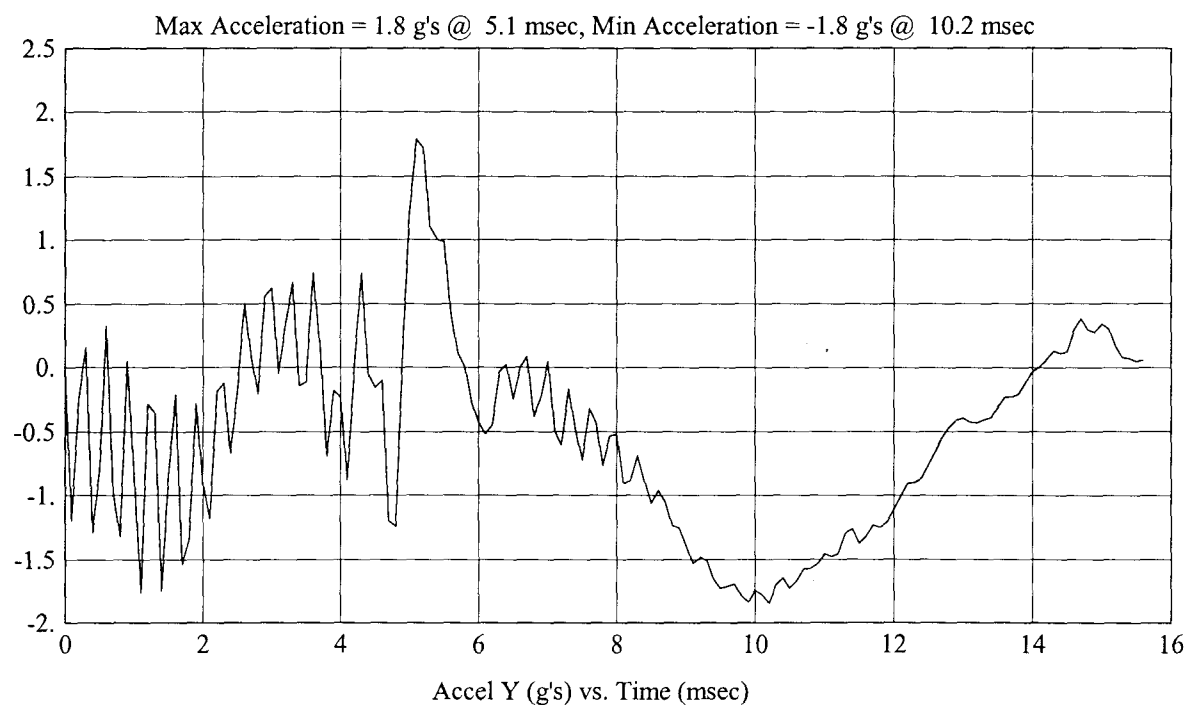
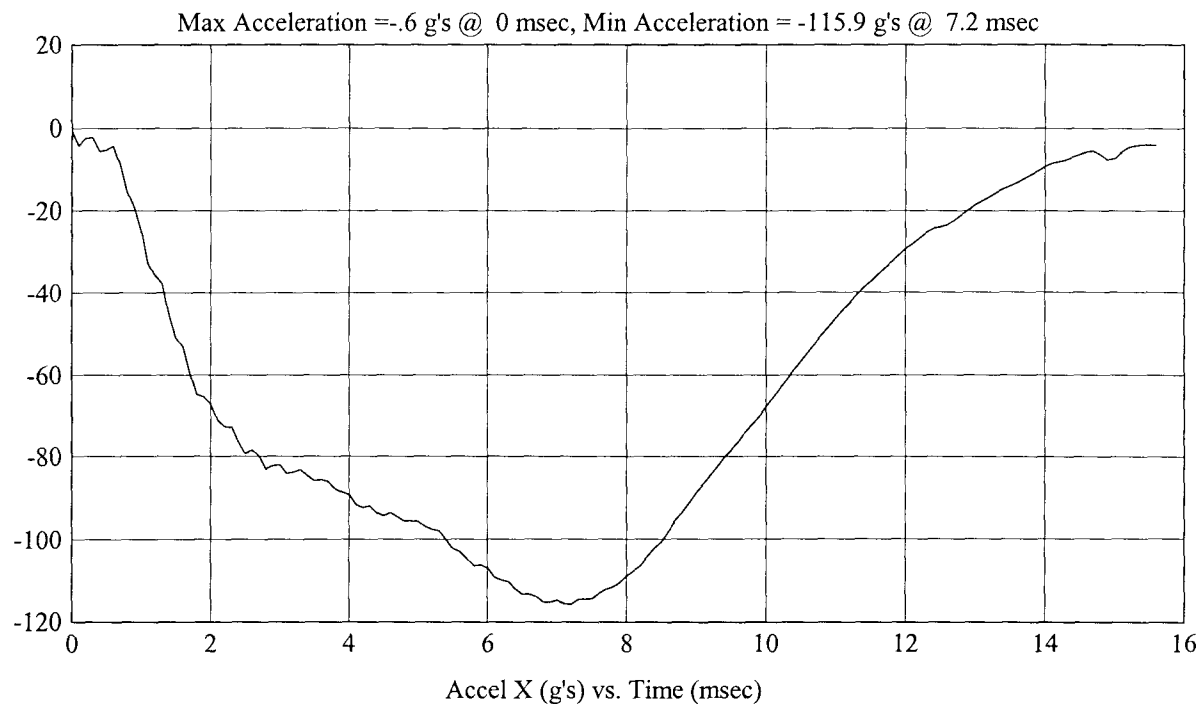
FMH
G0417-001.14

Customer: BUICK
Test # 4
FM4426
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 734, HIC = 752, Delta T = 8.9 msec



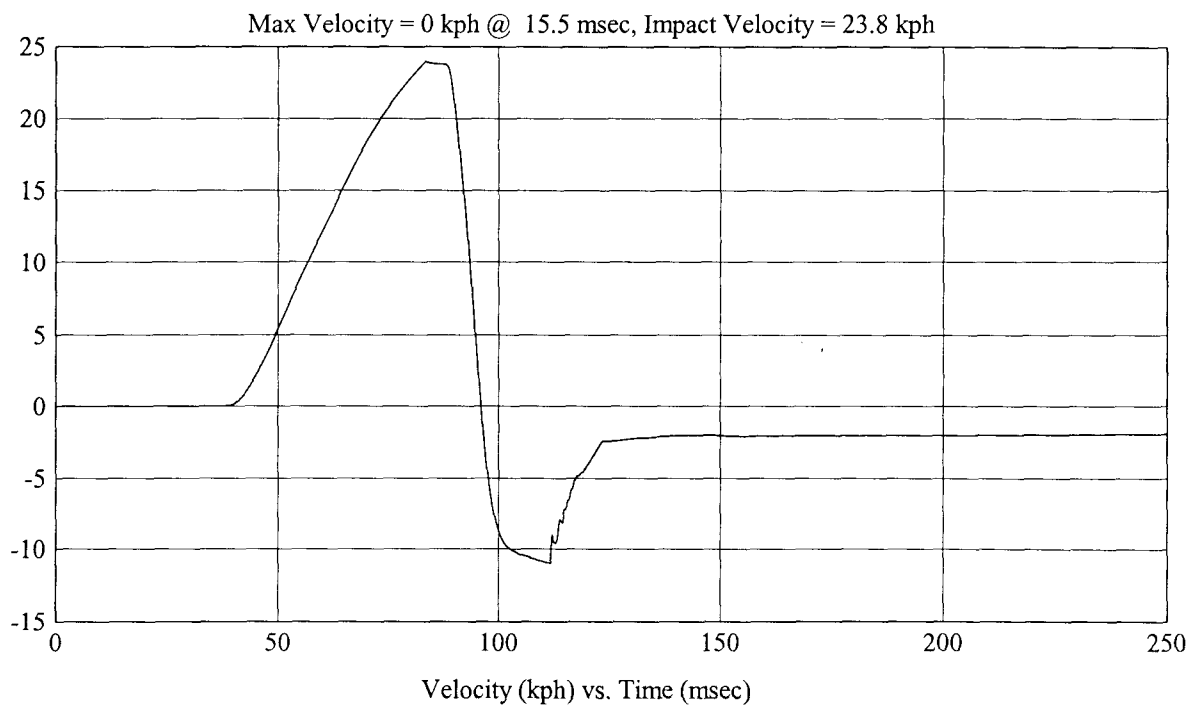
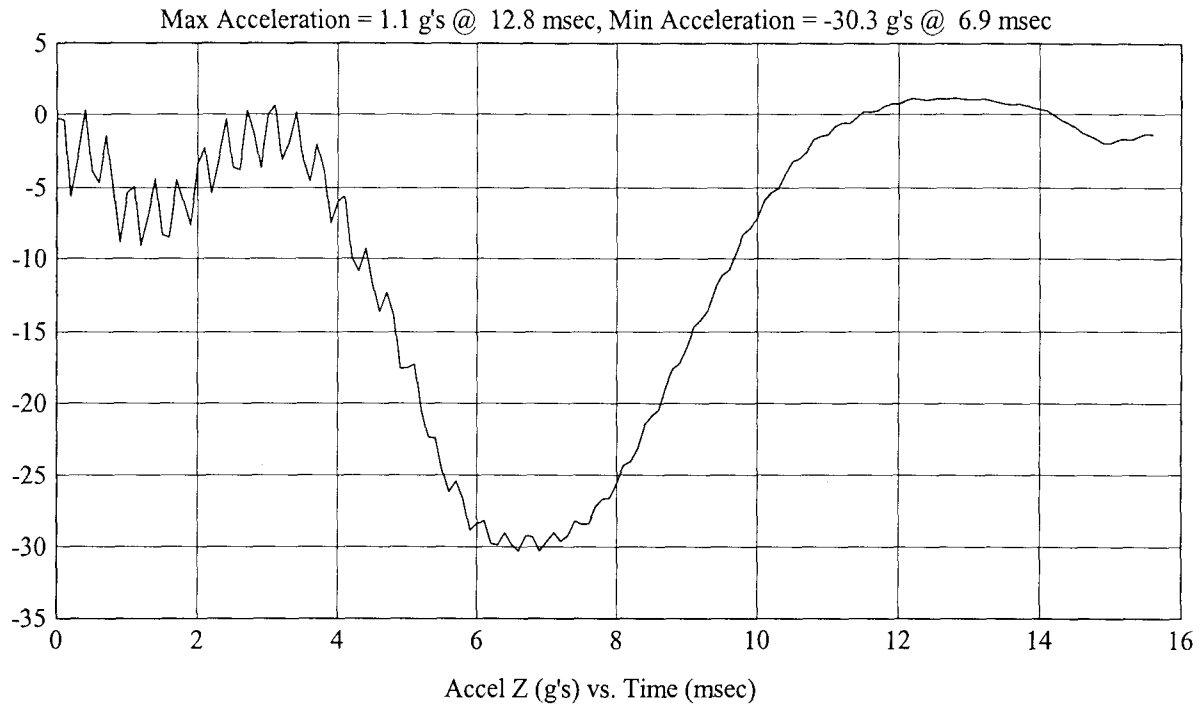
FMH
G0417-001.14

Customer: BUICK
Test # 4
FM4426
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 734, HIC = 752, Delta T = 8.9 msec



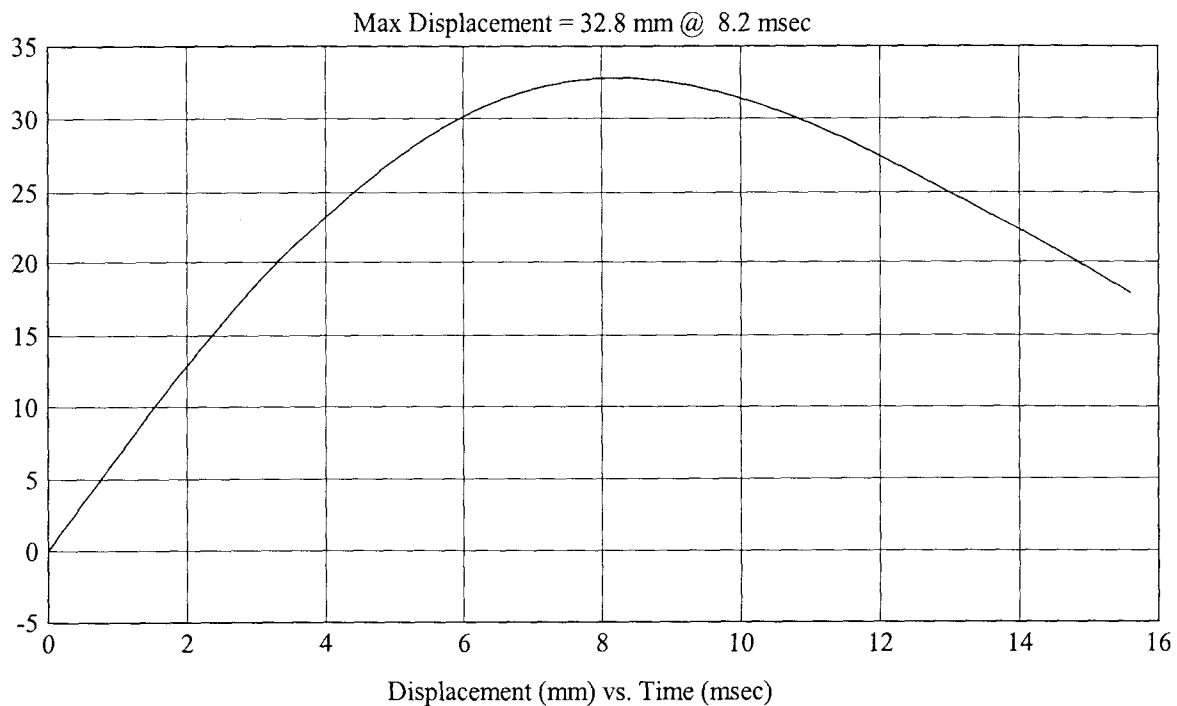
FMH
G04I7-001.14

Customer: BUICK
Test # 4
FM4426
Additional Desc: N/A

Vehicle Program : LESABRE

Model Year: 1998
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 734, HIC = 752, Delta T = 8.9 msec





mga Impact Testing
8/15/04 G0417-001.14
1998 BUICK LESABRE PW0100
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR(2)
H/V IMPACT ANGLE= 270 / 37
FM4425 PRE-TEST



mga Impact Testing
8/15/04 G0417-001.14
1998 BUICK LESABRE PW0100
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR(2)
H/V IMPACT ANGLE= 270 / 37
FM4425 POST-TEST



SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.14 VEHICLE YR/MAKE/MODEL:LeSabre 1998

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): UR(2) Left

Temperature:22C

MGA Test Reference No.:FM4425

Humidity:47%

Approach Horizontal Angles:270°

Time of Test:4:35 PM

Approach Vertical Angles:37°

FMH Serial No:038

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
869	931	5.5	23.7	57	5 R

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108	1.68	1.68
Y	6	J36193	101.4	1.54	1.54
Z	7	J36353	96.8	1.58	1.59

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

No visible damage.

Recorded By:

Approved By*:

Date: 8/15/04

*Only necessary for NHTSA (Government) Compliance testing.

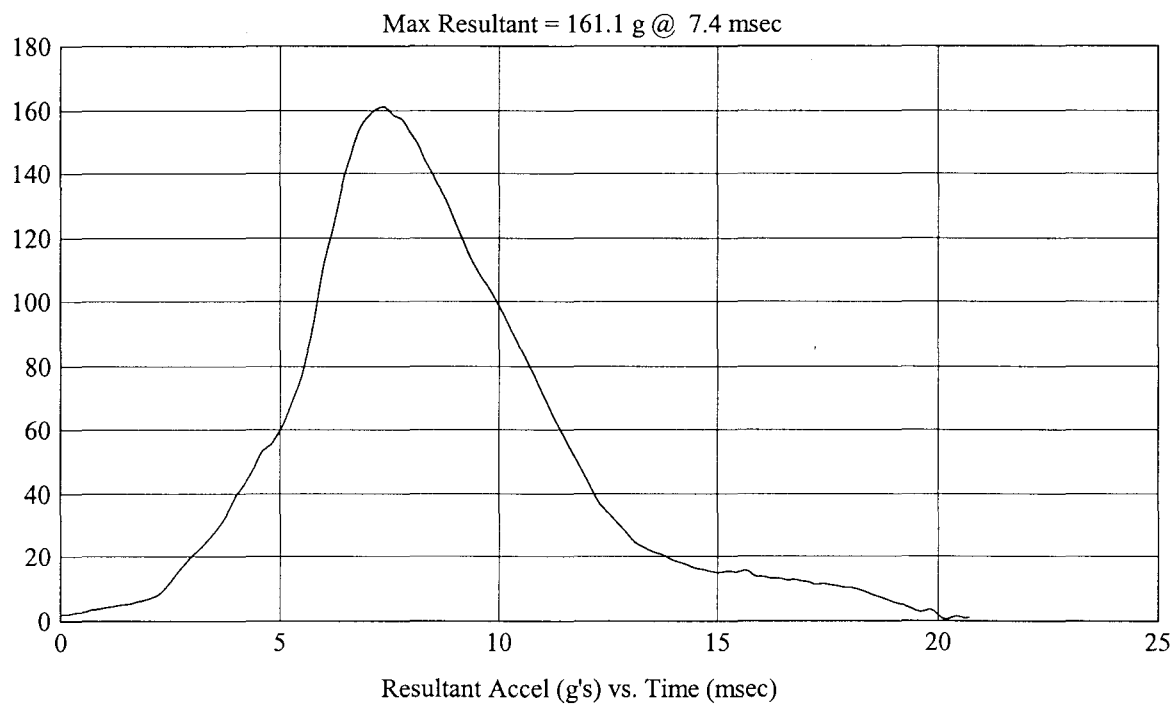
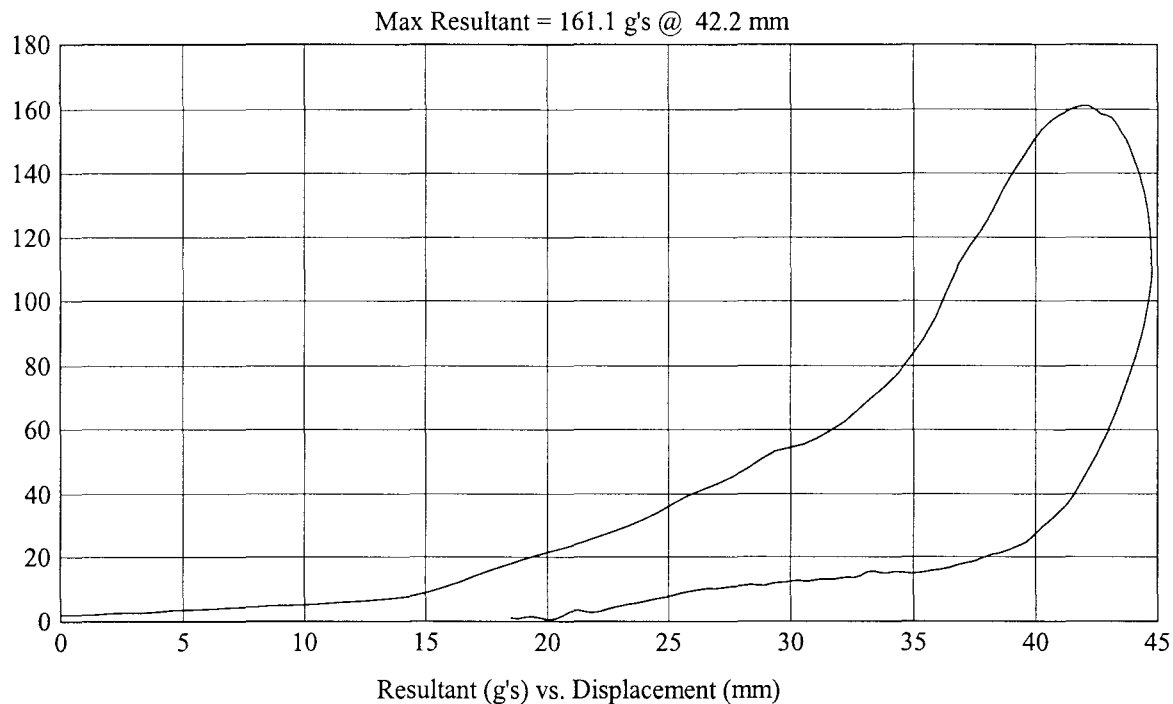
FMH
G04I7-001.14

Customer: Buick
Test # 3
FM4425
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: UR(2)
Vehicle Side: Left
Horz/Vert Angle: 270/37

HIC(d) = 869, HIC = 931, Delta T = 5.5 msec



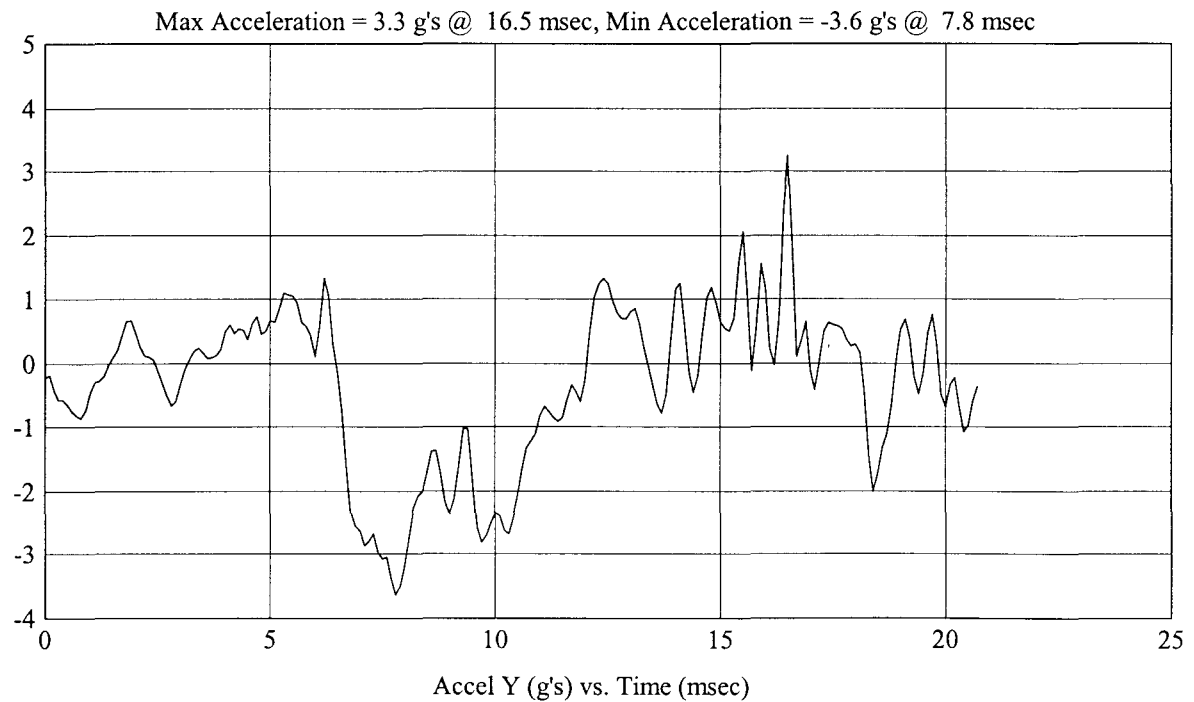
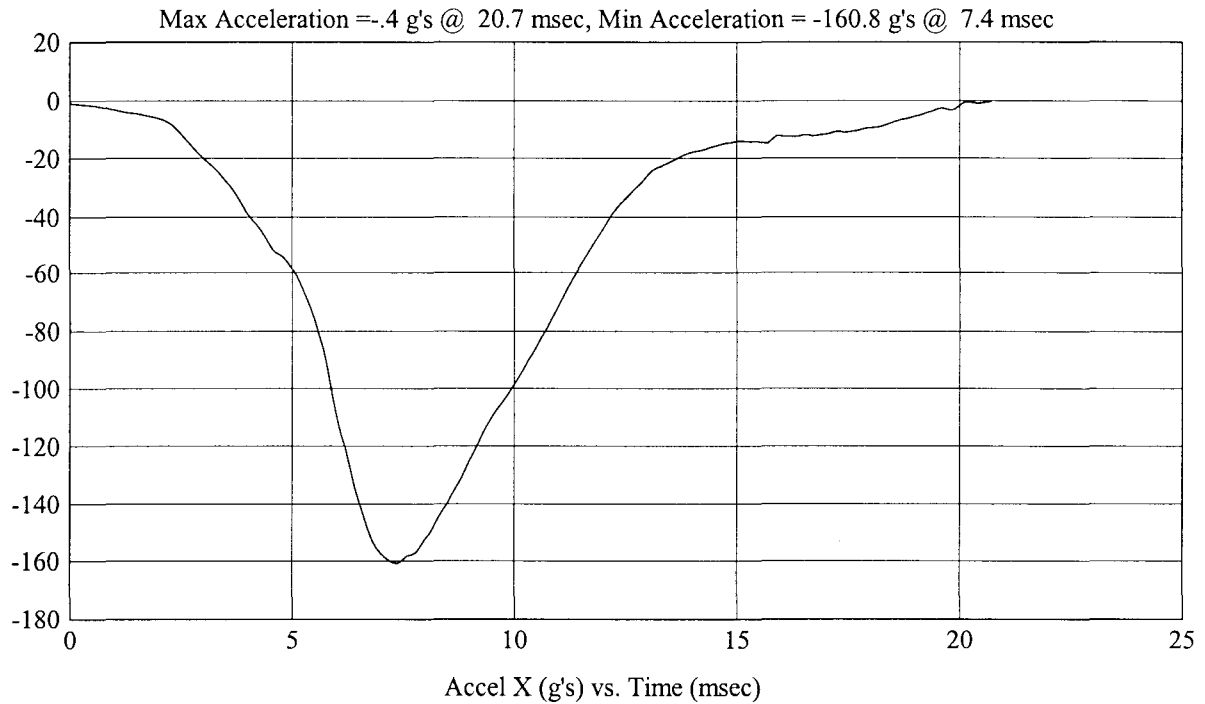
FMH
G04I7-001.14

Customer: Buick
Test # 3
FM4425
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: UR(2)
Vehicle Side: Left
Horz/Vert Angle: 270/37

HIC(d) = 869, HIC = 931, Delta T = 5.5 msec



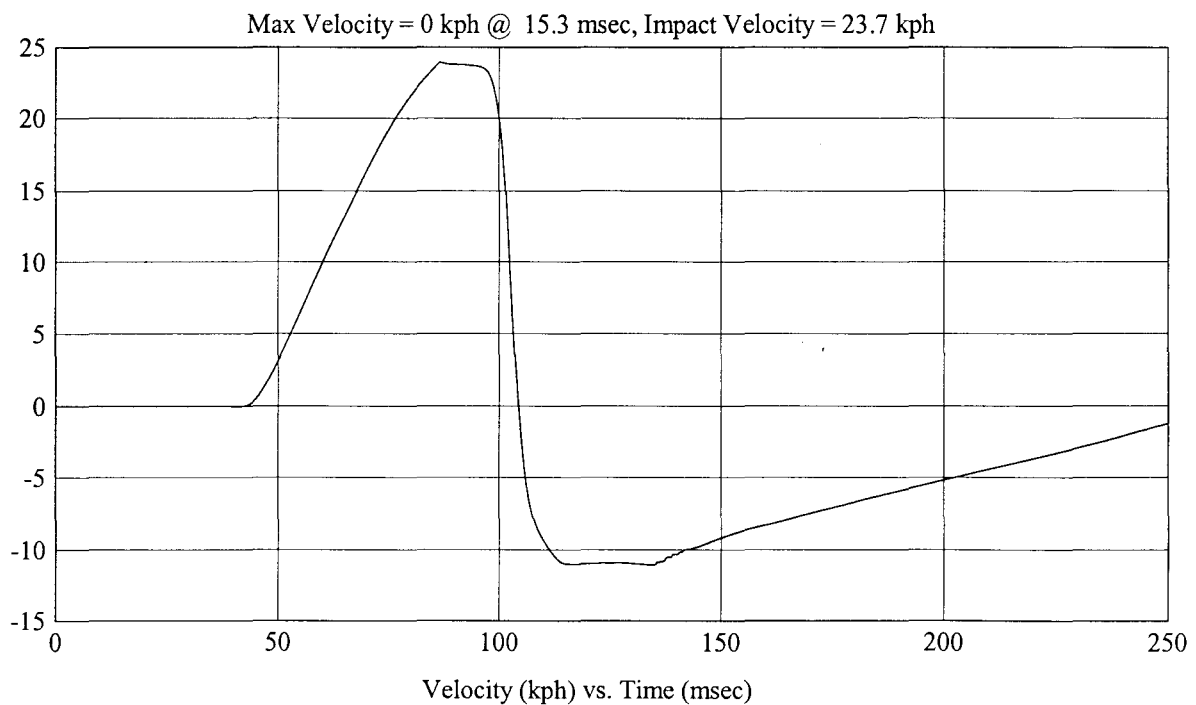
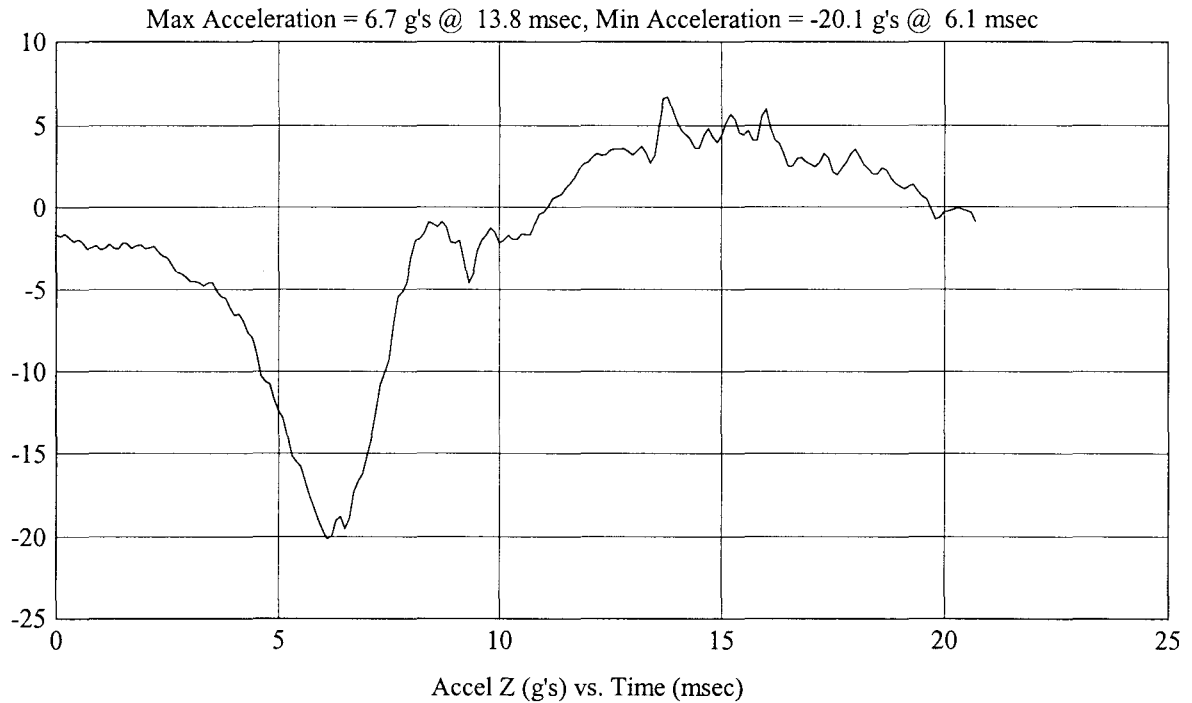
FMH
G04I7-001.14

Customer: Buick
Test # 3
FM4425
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: UR(2)
Vehicle Side: Left
Horz/Vert Angle: 270/37

HIC(d) = 869, HIC = 931, Delta T = 5.5 msec



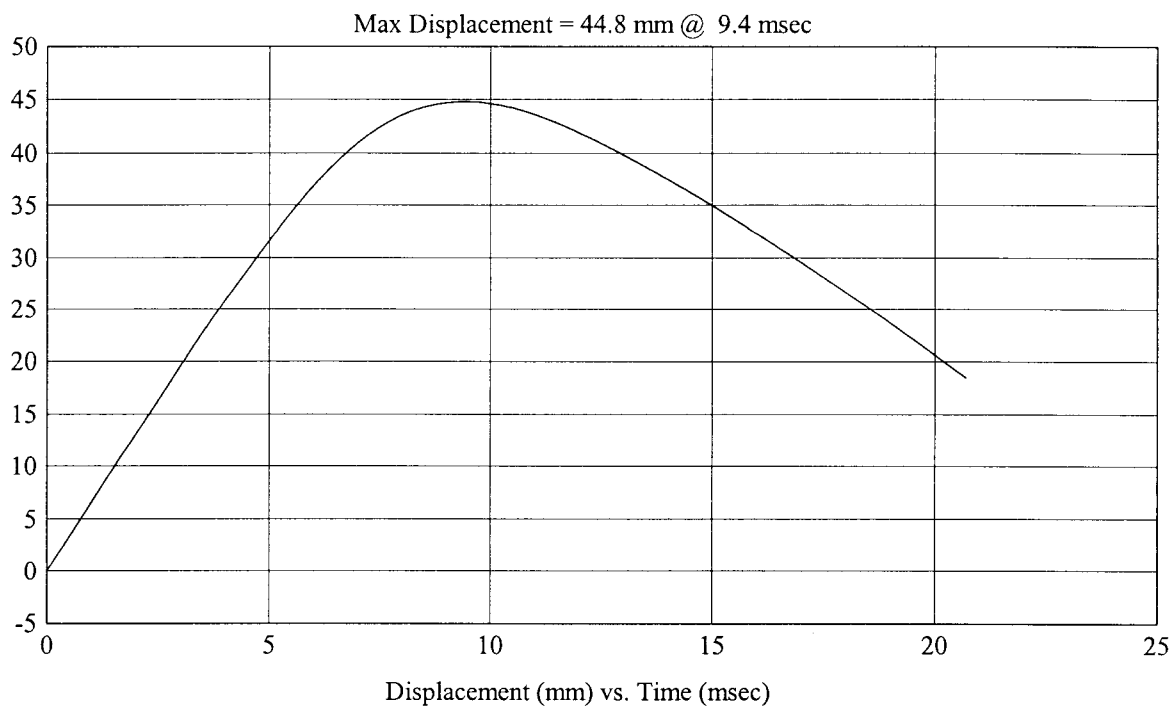
FMH
G04I7-001.14

Customer: Buick
Test # 3
FM4425
Additional Desc: N/A

Vehicle Program : LeSabre

Model Year: 1998
Target: UR(2)
Vehicle Side: Left
Horz/Vert Angle: 270/37

HIC(d) = 869, HIC = 931, Delta T = 5.5 msec



4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

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

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
*Digital Inclinator	Mitutoyo	PRO 360	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	036 037 038	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Kodak	RO1000	Record Event	N/A	N/A
*FARO™	Faro Technologies	G08020203122	Targeting	0.1 mm	Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Protractor	Stanley N/A Mitutoyo	289 -- --	Measurement Targeting FMH setup Horizontal Measurement	1 mm N/A 0.5°	Annual
*Vehicle Scale 9804-022/9805-175	Cardinal	8950F	Weighing Vehicle	± .5 kg	Annual
* Scale	Detecto	AP-20	Weigh FMH Head	± 0.01 lb	Annual
*Temperature Recorder	Dickson	TR-320	Record Temperature and Humidity	± 1°C ± 1% RH	Annual

TABLE 4-2 FMH CALIBRATION SUMMARY DATA SUMMARY TABLE

FMH Serial #		Weight (lbs)	Temp (°C)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#36	10.03	21.0	52.0	244.7	8.3	Yes
Post	#36	10.03	22.0	48.0	241.2	13.2	Yes
Pre	#37	9.96	21.0	52.0	253.7	8.1	Yes
Post	#37	9.96	22.0	48.0	252.1	6.7	Yes
Pre	#38	9.99	22.0	50.0	247.8	7.5	Yes
Post	#38	9.99	22.0	48.0	237.1	14.3	Yes

RECORDED BY: David G. GotwalsDATE: August 16, 2004APPROVED BY: Helen A. Kaleto

MICHIGAN OPERATIONS
DATE: 3/20/03
SUPERCEDES: MGATPHDT.5

DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY
PART 572L

Per LE Sample

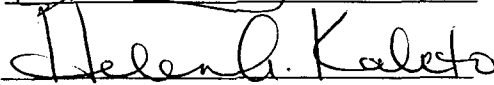
HEADFORM SERIAL NUMBER: <u>36</u> CALIBRATION DATE: <u>8/15/01</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	<u>10.03</u>
Temperature	19° C to 26° C	<u>21° C</u>
Relative Humidity	10% to 70%	<u>52%</u>
Peak Resultant Acceleration	225 G's to 275 G's	<u>244.7</u>
Peak Lateral Acceleration	15 G's Maximum	<u>8.3</u>
Unimodal Acceleration Curve	YES	<u>YES</u>

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
<u>1</u>	ENDEVCO	7264-2000	<u>J35923</u>	<u>5/23/07</u>	<u>11/23/07</u>
<u>3</u>	ENDEVCO	7264-2000	<u>J35916</u>	<u>5/23/07</u>	<u>11/23/07</u>
<u>4</u>	ENDEVCO	7264-2000	<u>J35918</u>	<u>5/23/07</u>	<u>11/23/07</u>

REMARKS:

RECORDED BY: 

DATE: 8/15/07

APPROVED BY: 

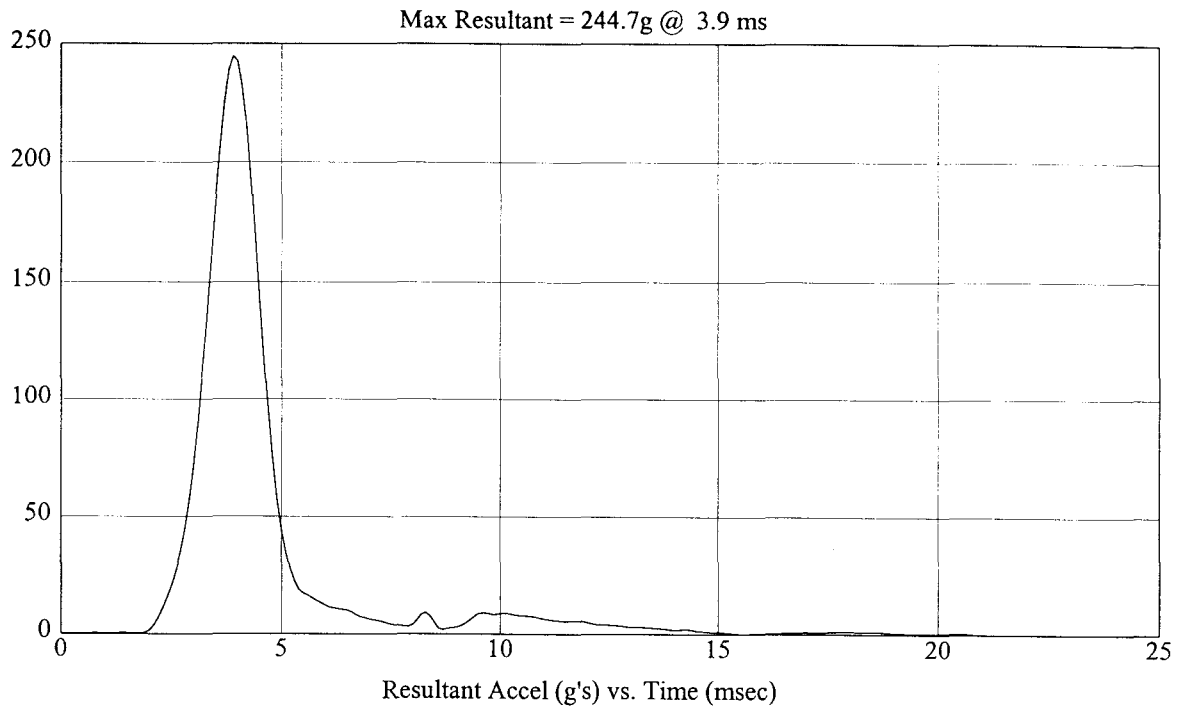
Head Drop
(Preliminary Test Report)

4-4

Test Number: H36246
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001

Test Date: 8/15/04
Head #: 36



Head Drop
(Preliminary Test Report)

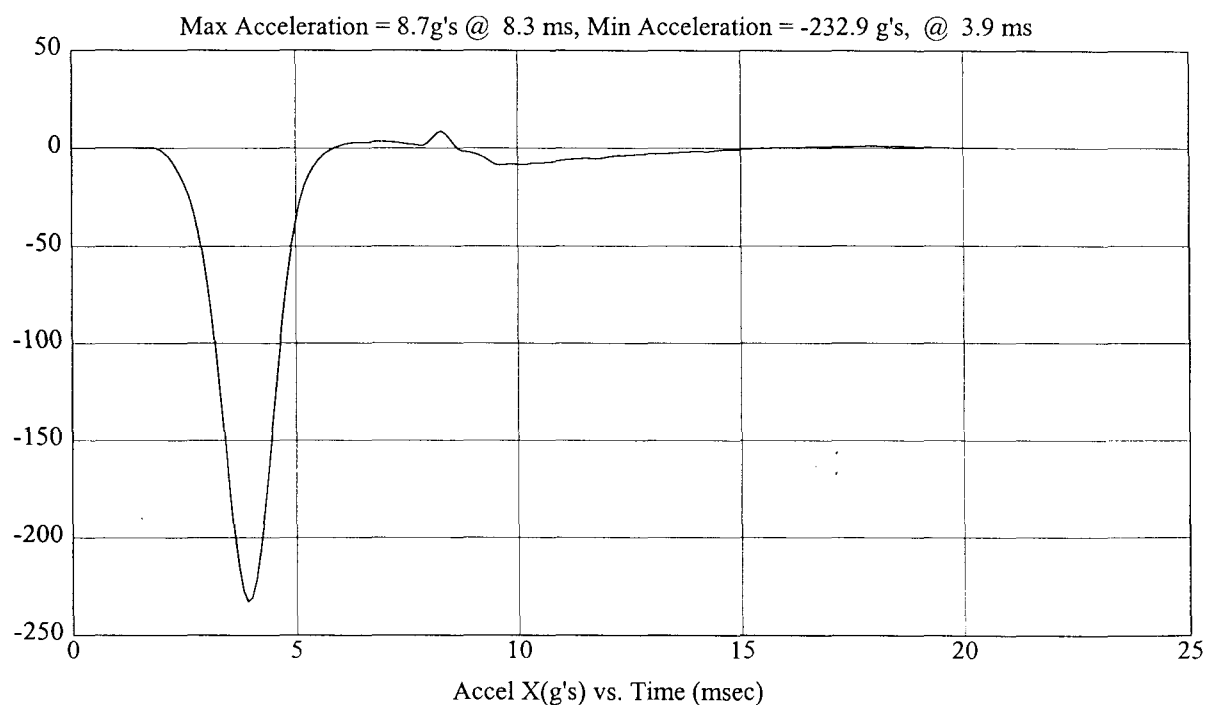
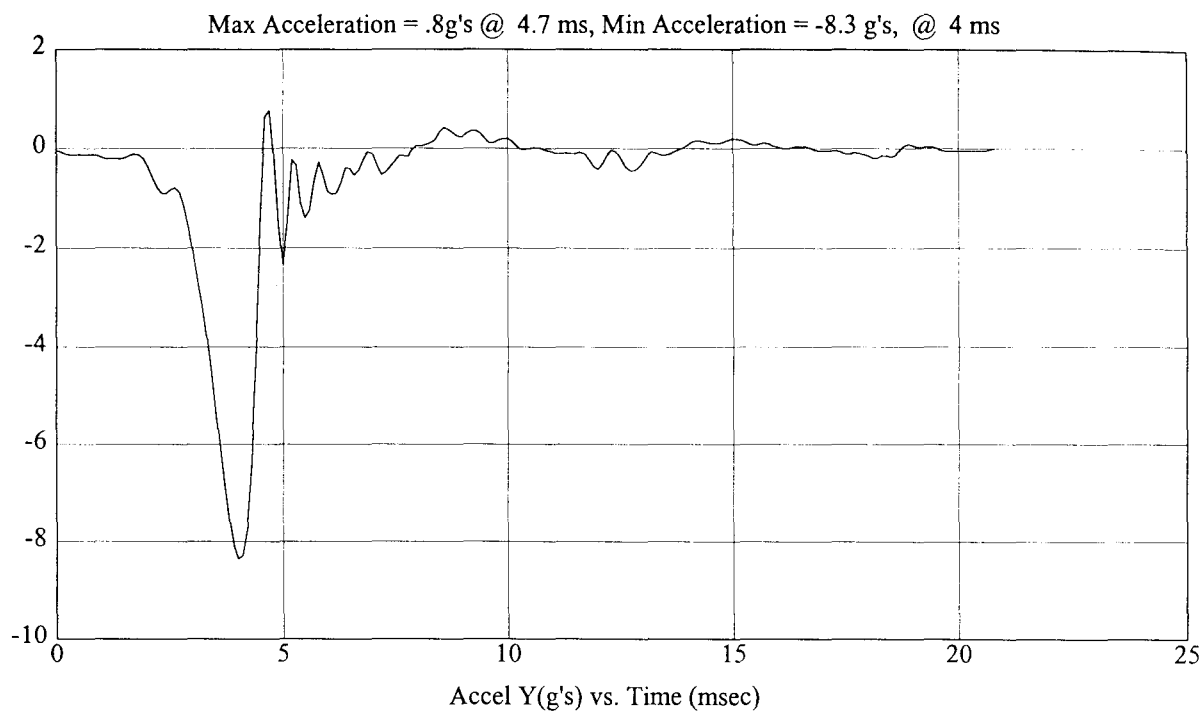
Test Number: H36246

MGA Job Number: G04I7-001

Test Date: 8/15/04

Test Description: Pre - Test Calibration

Head #: 36



Head Drop
(Preliminary Test Report)

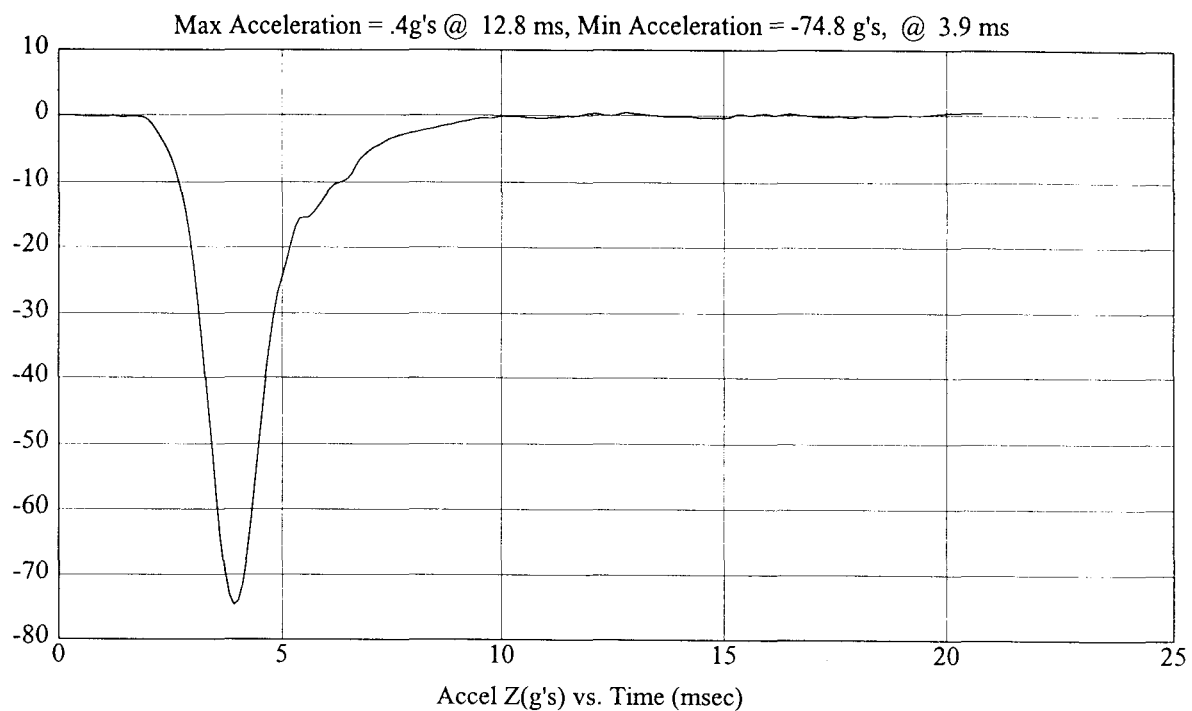
Test Number: H36246

MGA Job Number: G04I7-001

Test Date: 8/15/04

Test Description: Pre - Test Calibration

Head #: 36



MICHIGAN OPERATIONS
DATE: 3/20/03
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Post to SAGE

**HEAD DROP TEST SUMMARY
PART 572L**

HEADFORM SERIAL NUMBER: <u>36</u> CALIBRATION DATE: <u>8-16-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.03
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	48
Peak Resultant Acceleration	225 G's to 275 G's	241.2
Peak Lateral Acceleration	15 G's Maximum	13.2
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	535973	5-23-04	11-23-04
3	ENDEVCO	7264-2000	535916	5-23-04	11-23-04
4	ENDEVCO	7264-2000	535918	5-23-04	11-23-04

REMARKS:

RECORDED BY: *[Signature]*

DATE: 8-16-04

APPROVED BY: *[Signature]*

Head Drop
(Preliminary Test Report)

4-8

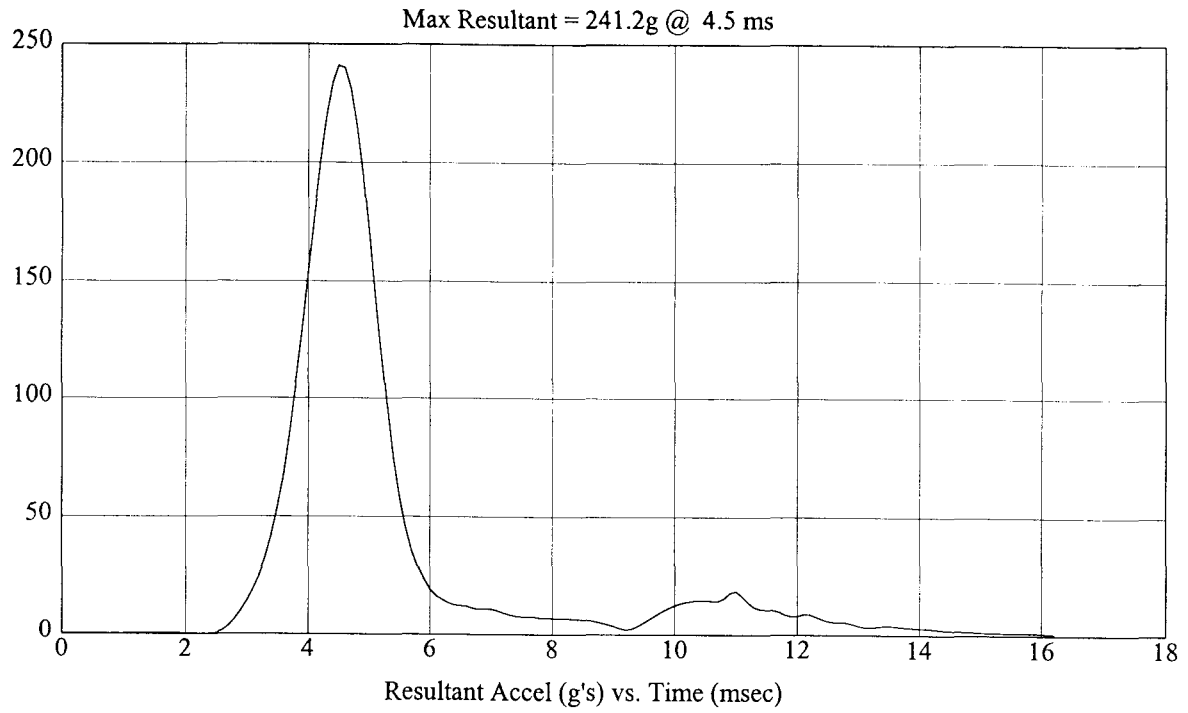
Test Number: H36247

MGA Job Number: G04I7-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head # : 36



Head Drop
(Preliminary Test Report)

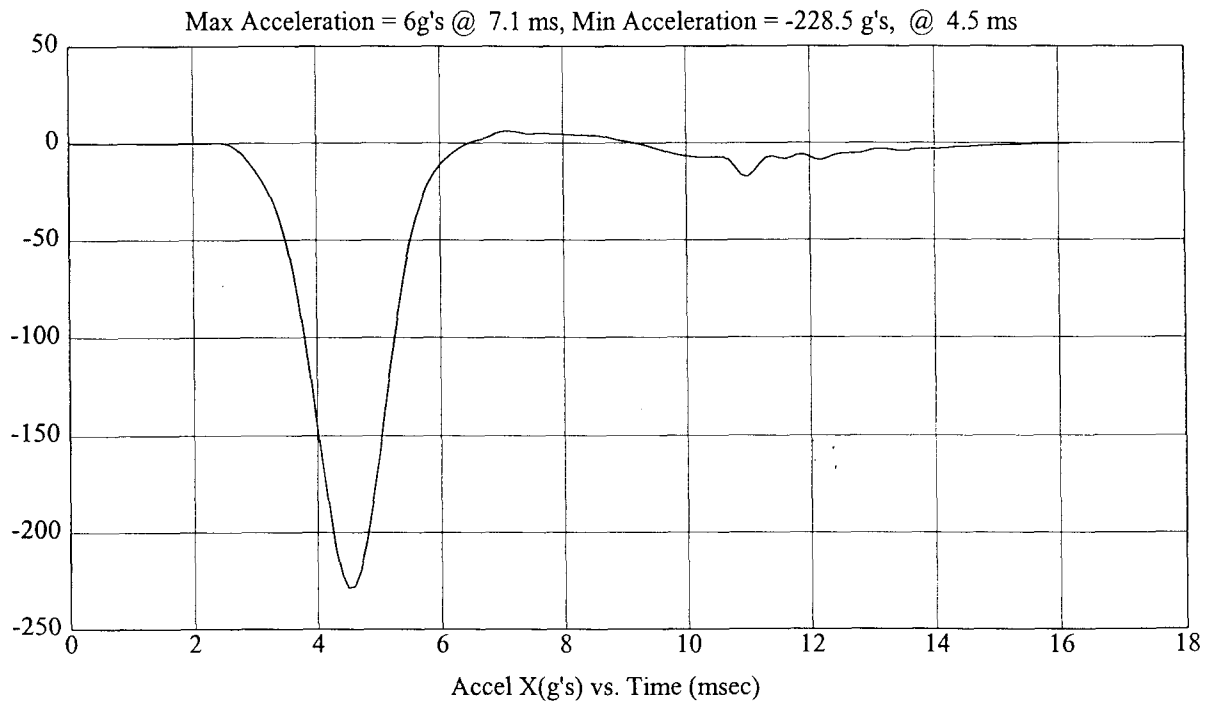
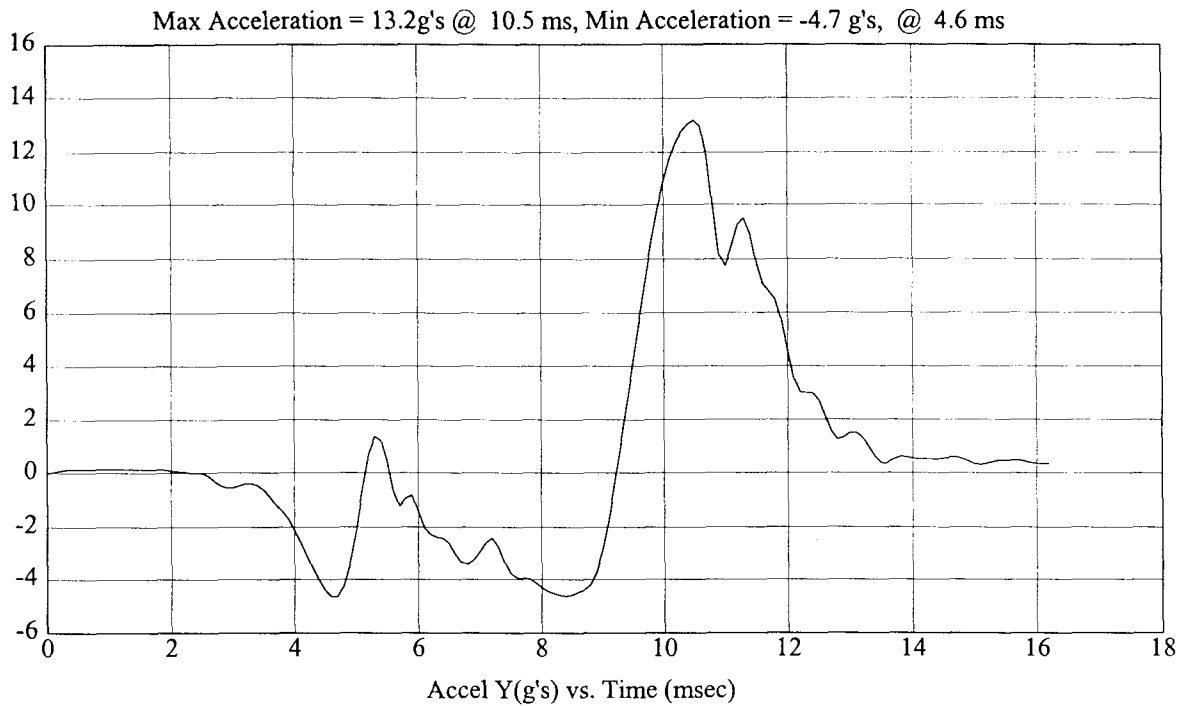
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MGA Job Number: G0417-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head #: 36



Head Drop
(Preliminary Test Report)

4-10

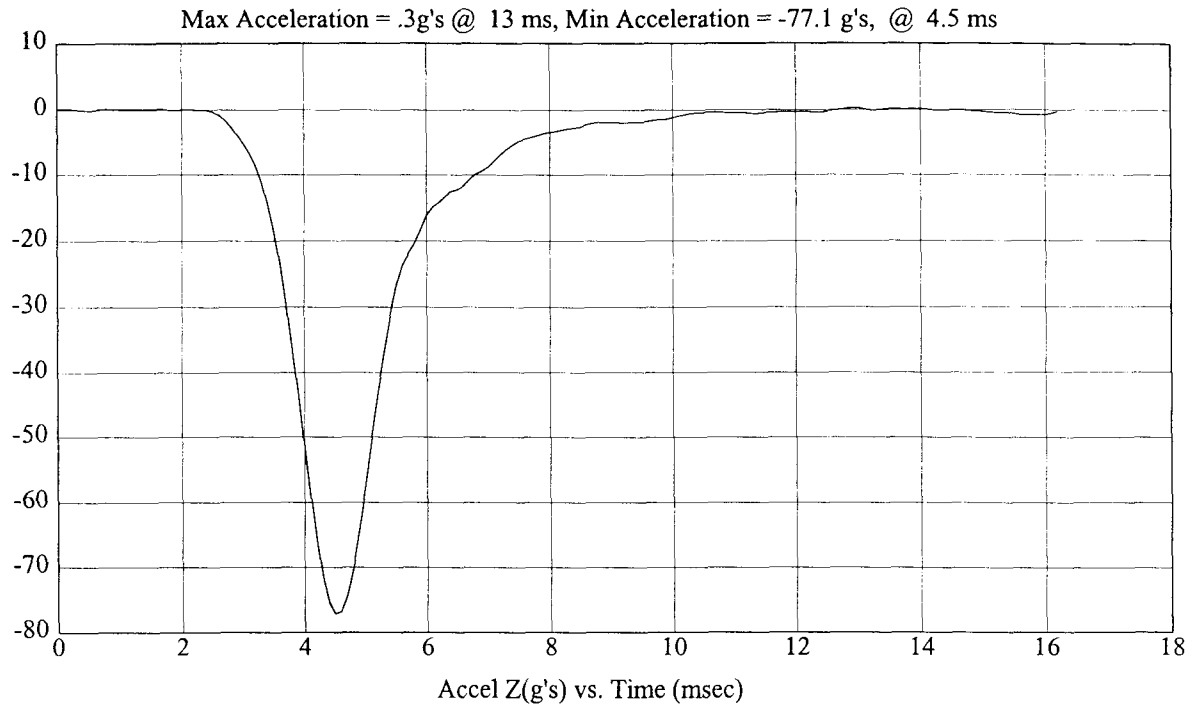
Test Number: H36247

MGA Job Number: G04I7-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head # : 36



MICHIGAN OPERATIONS
DATE: 3/20/03
SUPERCEDES: MGATPHDT.5

DOC. NO.: MGATP201UHD
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HEAD DROP TEST SUMMARY
PART 572L

PRELIMINARY

HEADFORM SERIAL NUMBER: <u>37</u> CALIBRATION DATE: <u>8/15/07</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	<u>9.96</u>
Temperature	19° C to 26° C	<u>21° C</u>
Relative Humidity	10% to 70%	<u>52%</u>
Peak Resultant Acceleration	225 G's to 275 G's	<u>253.7</u>
Peak Lateral Acceleration	15 G's Maximum	<u>8.1</u>
Unimodal Acceleration Curve	YES	<u>YES</u>

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
<u>1</u>	ENDEVCO	7264-2000	<u>J35800</u>	<u>5/3/07</u>	<u>11/3/07</u>
<u>3</u>	ENDEVCO	7264-2000	<u>J35841</u>	<u>5/3/07</u>	<u>11/3/07</u>
<u>7</u>	ENDEVCO	7264-2000	<u>J35791</u>	<u>5/3/07</u>	<u>11/3/07</u>

REMARKS:

RECORDED BY: 

DATE: 8/15/07

APPROVED BY: 

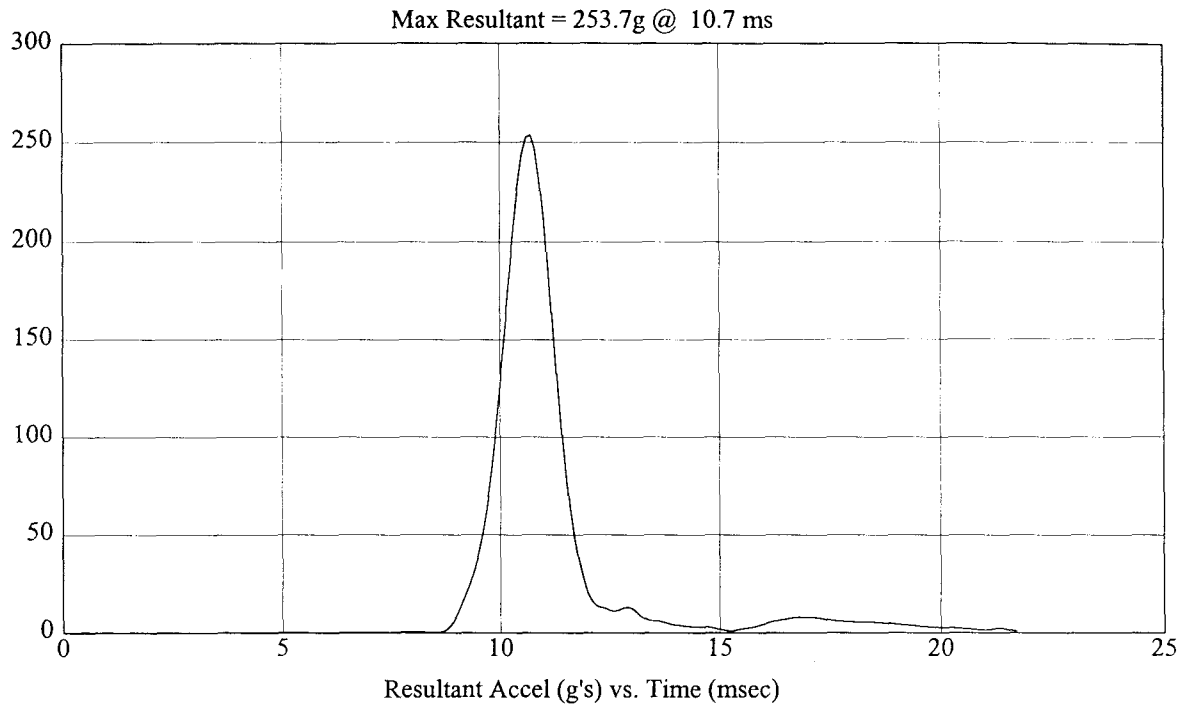
Head Drop
(Preliminary Test Report)

4-12

Test Number: H37128
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001

Test Date: 8/15/04
Head # : 37



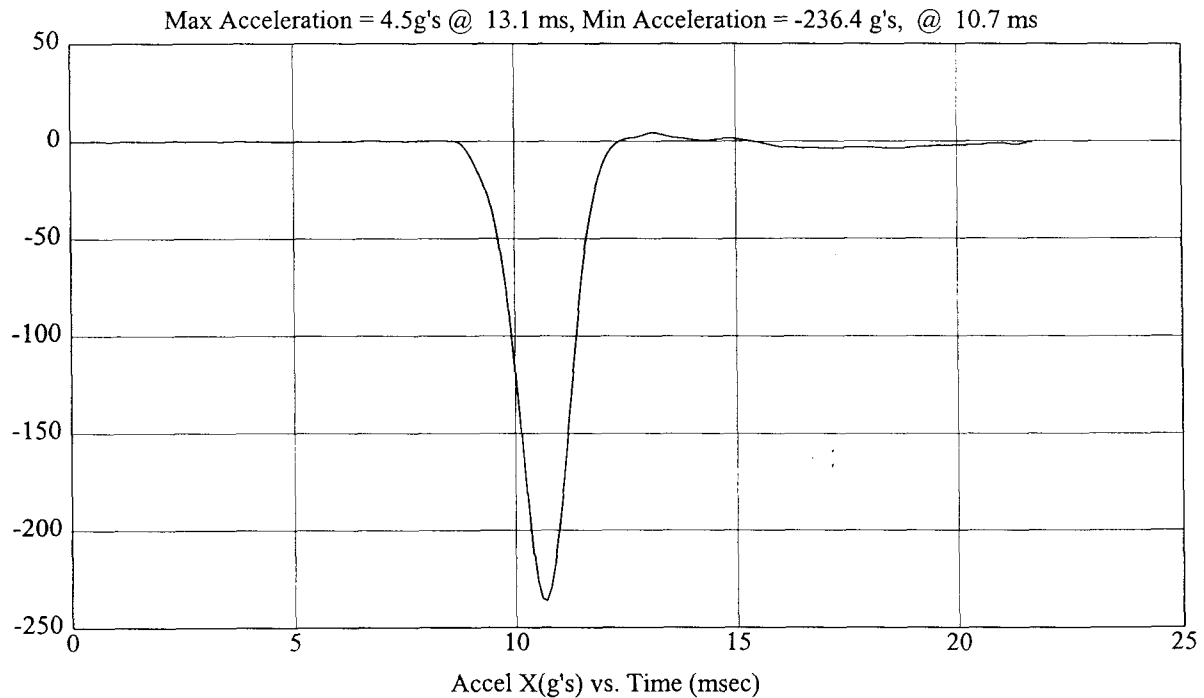
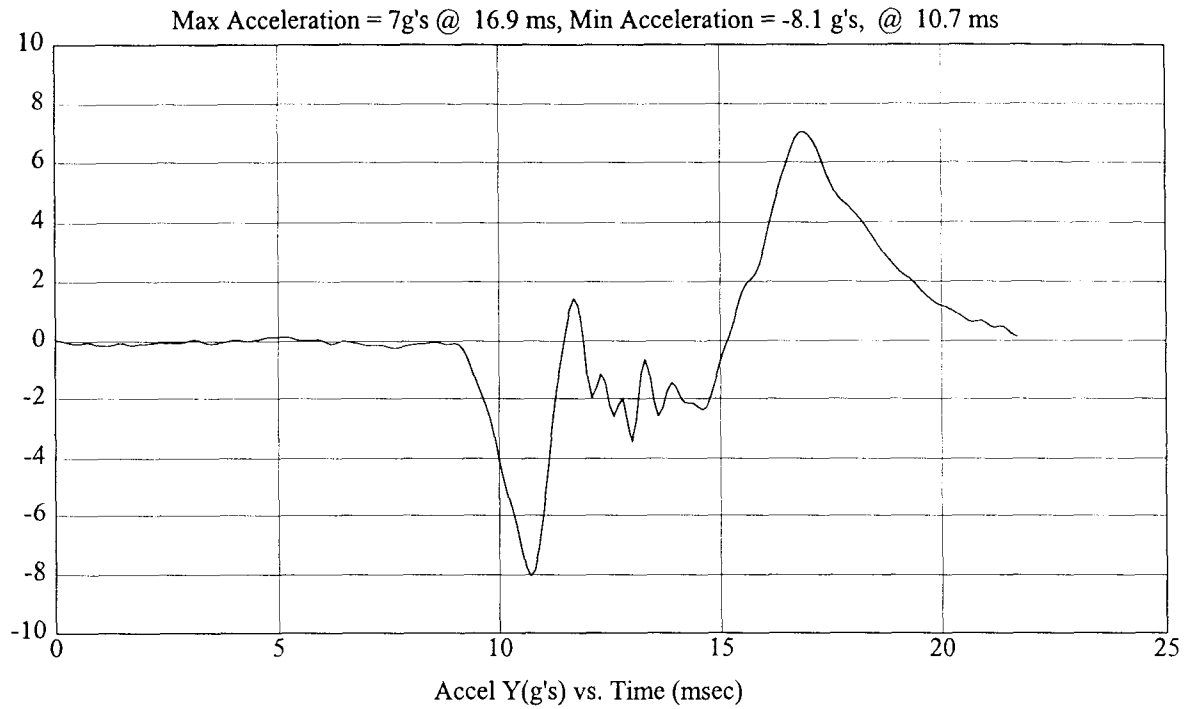
Head Drop
(Preliminary Test Report)

4-13

Test Number: H37128
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001

Test Date: 8/15/04
Head #: 37



Head Drop
(Preliminary Test Report)

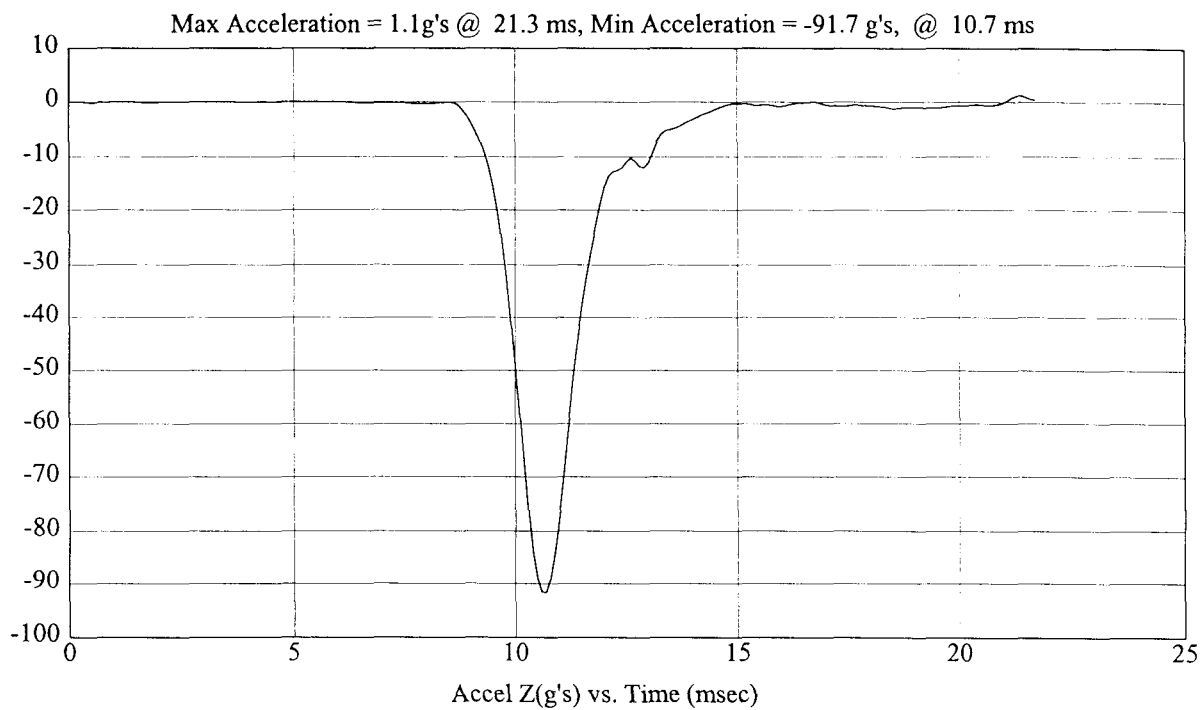
Test Number: H37128

MGA Job Number: G04I7-001

Test Date: 8/15/04

Test Description: Pre - Test Calibration

Head #: 37



**HEAD DROP TEST SUMMARY
PART 572L**

Post Lesane

HEADFORM SERIAL NUMBER: <u>37</u> CALIBRATION DATE: <u>8-16-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	48
Peak Resultant Acceleration	225 G's to 275 G's	252.1
Peak Lateral Acceleration	15 G's Maximum	6.7
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J35800	5-3-04	11-3-04
3	ENDEVCO	7264-2000	J35841	5-3-04	11-3-04
4	ENDEVCO	7264-2000	J35711	5-3-04	11-3-04

REMARKS:

RECORDED BY: *[Signature]*

DATE: 8-16-04

APPROVED BY: *[Signature]*

Head Drop
(Preliminary Test Report)

4-16

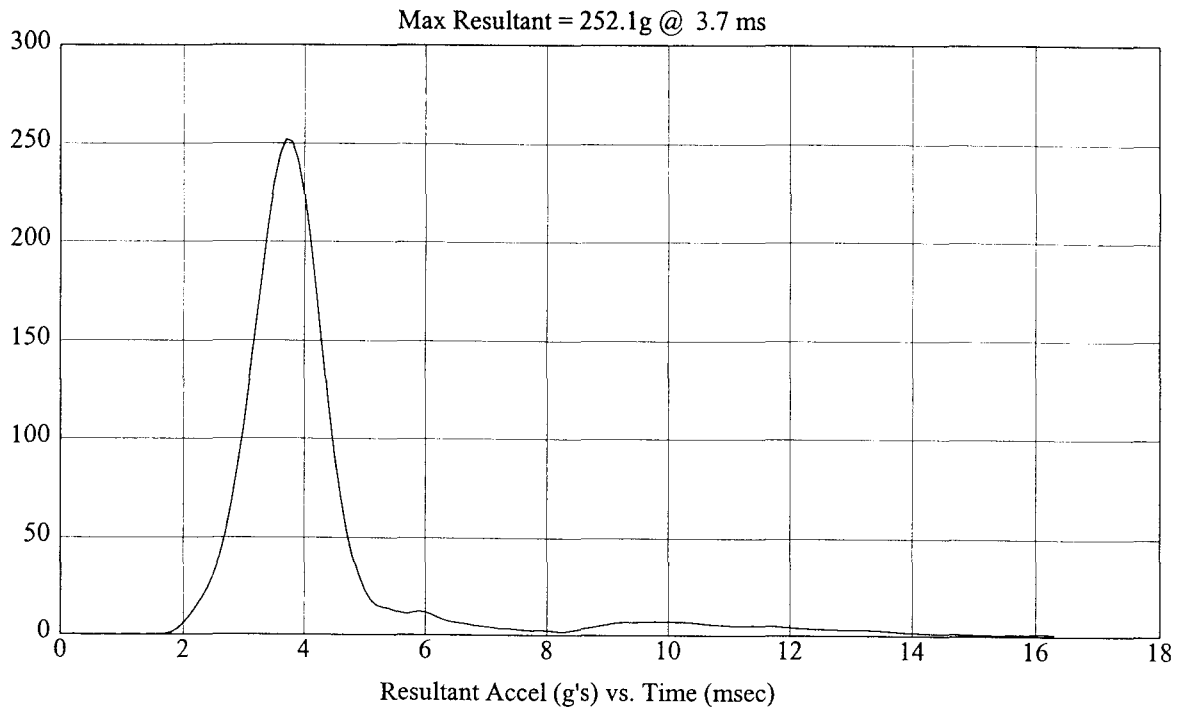
Test Number: H37129

MGA Job Number: G0417-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head #: 37



Head Drop
(Preliminary Test Report)

4-17

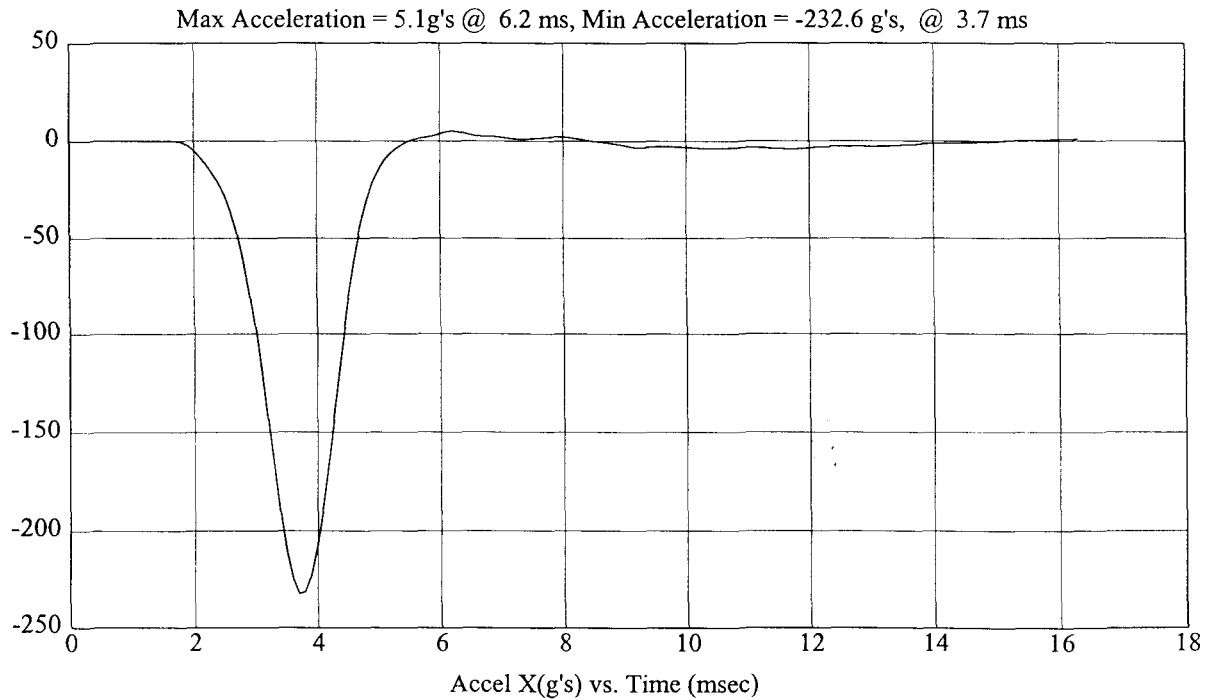
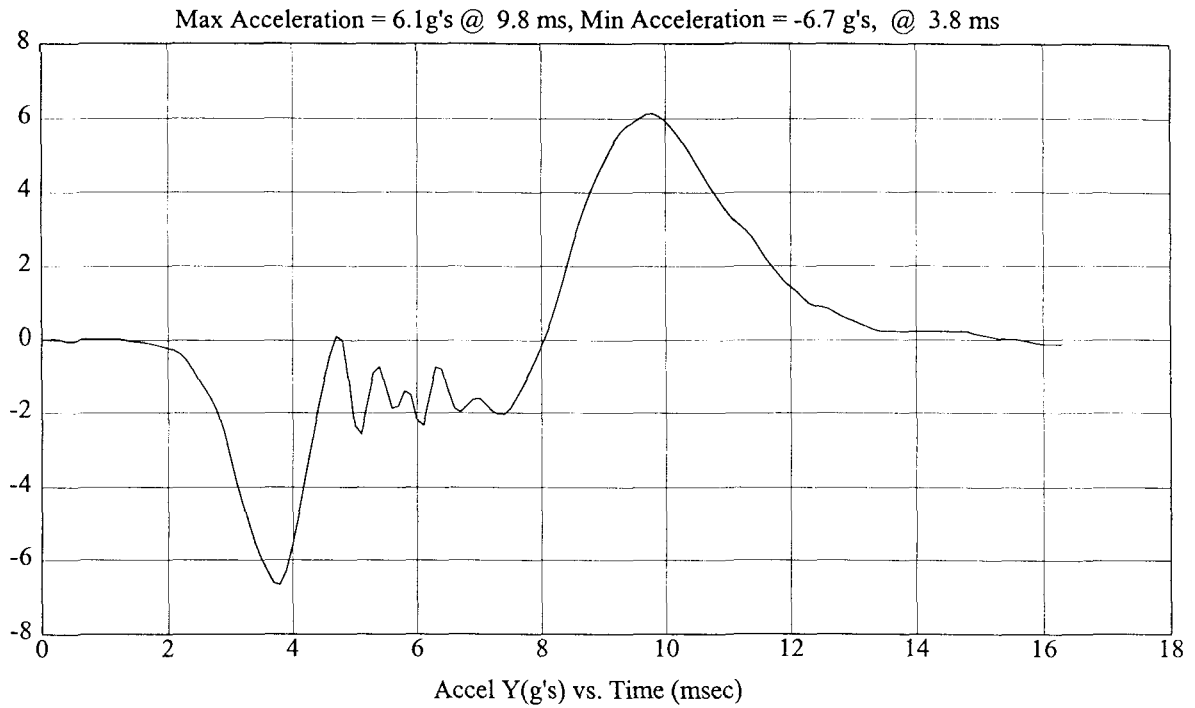
Test Number: H37129

MGA Job Number: G04I7-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head #: 37



Head Drop
(Preliminary Test Report)

4-18

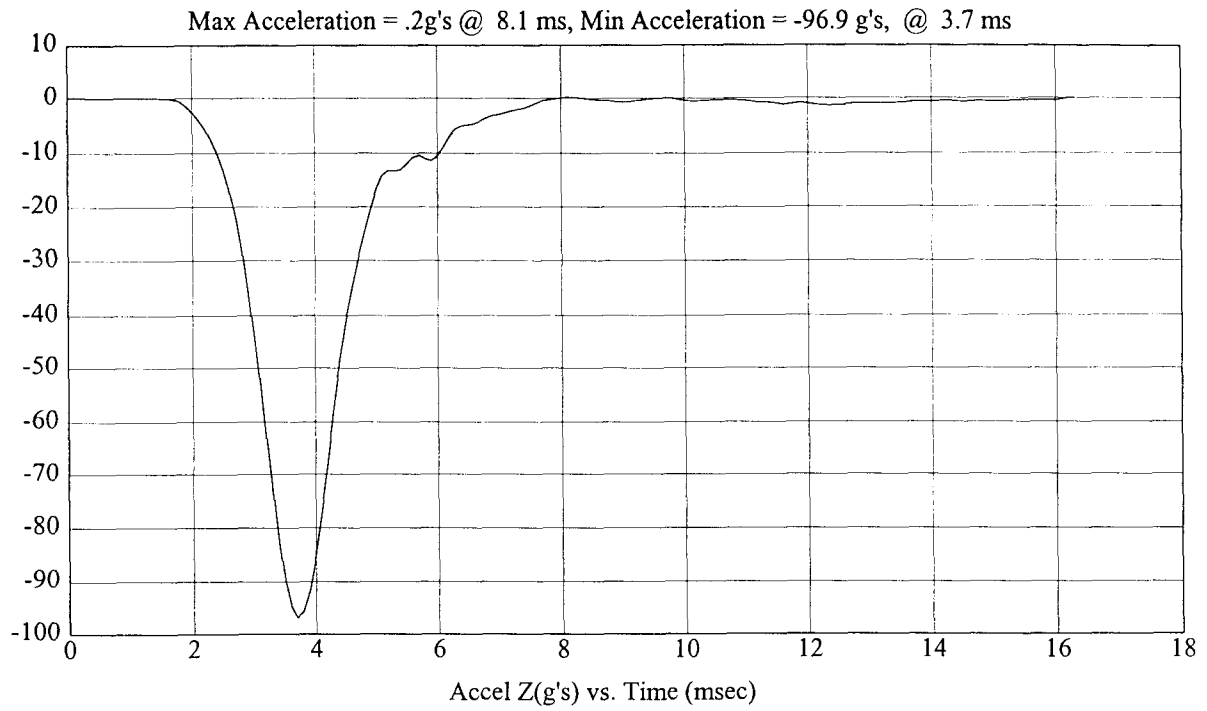
Test Number: H37129

MGA Job Number: G04I7-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head # : 37



MICHIGAN OPERATIONS
DATE: 3/20/03
SUPERCEDES: MGATPHDT.5

DOC. NO.: MGATP201UHD
REVISION NO.: 6
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PRE-LESAME

**HEAD DROP TEST SUMMARY
PART 572L**

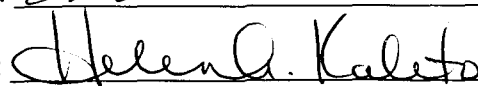
HEADFORM SERIAL NUMBER: <u>38</u>		CALIBRATION DATE: <u>8/15/02</u>
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	<u>9.95</u>
Temperature	19° C to 26° C	<u>22° C</u>
Relative Humidity	10% to 70%	<u>50</u>
Peak Resultant Acceleration	225 G's to 275 G's	<u>247.8</u>
Peak Lateral Acceleration	15 G's Maximum	<u>7.5</u>
Unimodal Acceleration Curve	YES	<u>YES</u>

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
<u>1</u>	ENDEVCO	7264-2000	<u>J36197</u>	<u>5/23/07</u>	<u>11/23/07</u>
<u>3</u>	ENDEVCO	7264-2000	<u>J36193</u>	<u>5/23/07</u>	<u>11/23/07</u>
<u>4</u>	ENDEVCO	7264-2000	<u>J36353</u>	<u>5/23/07</u>	<u>11/23/07</u>

REMARKS:

RECORDED BY: 

DATE: 8/15/04

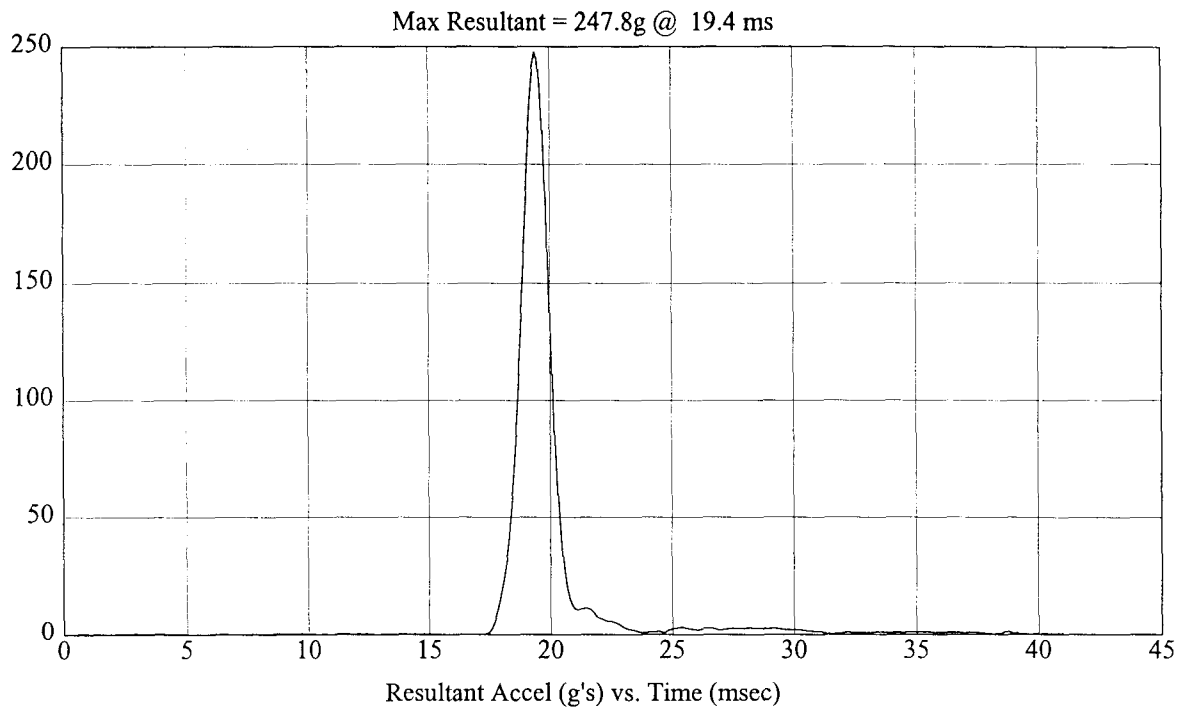
APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H38234
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001

Test Date: 8/15/04
Head # : 38

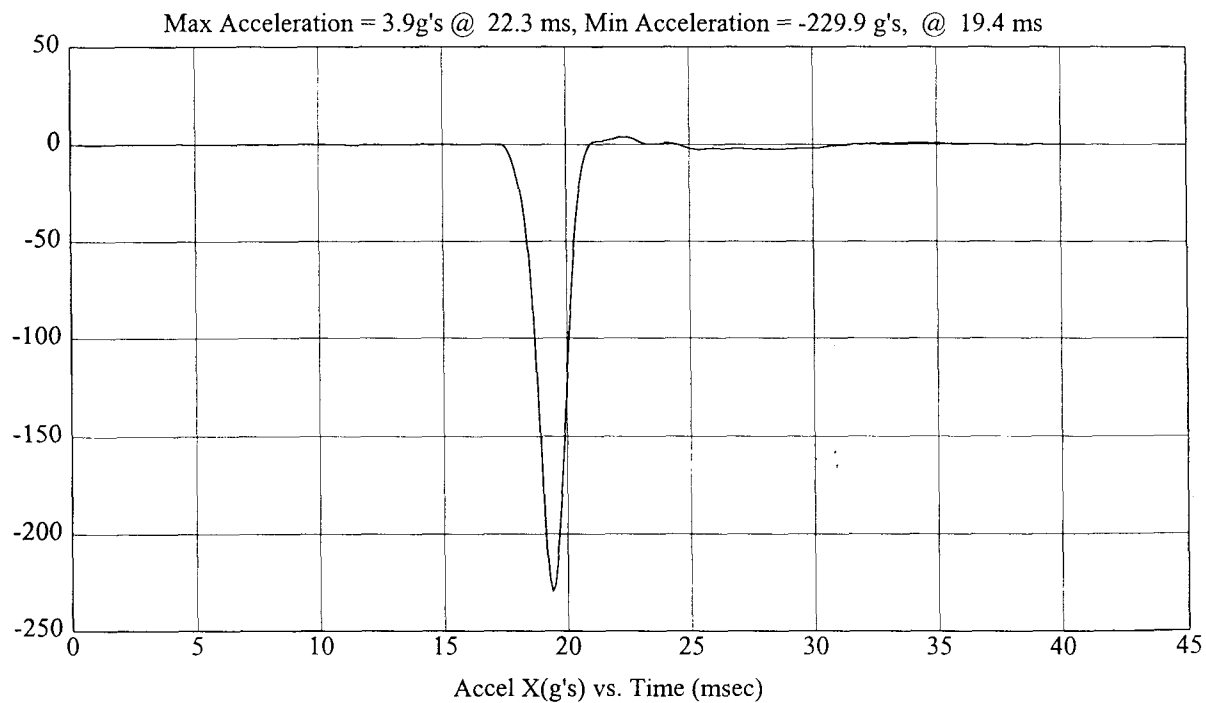
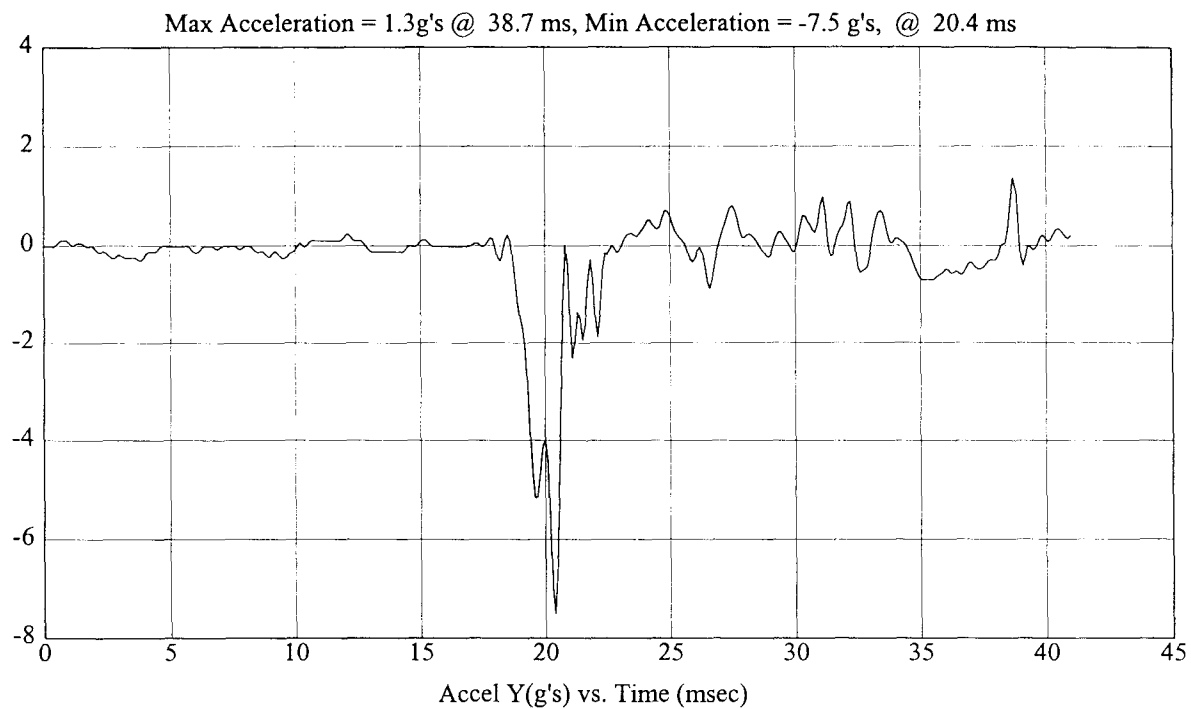


Head Drop
(Preliminary Test Report)

Test Number: H38234
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001

Test Date: 8/15/04
Head #: 38

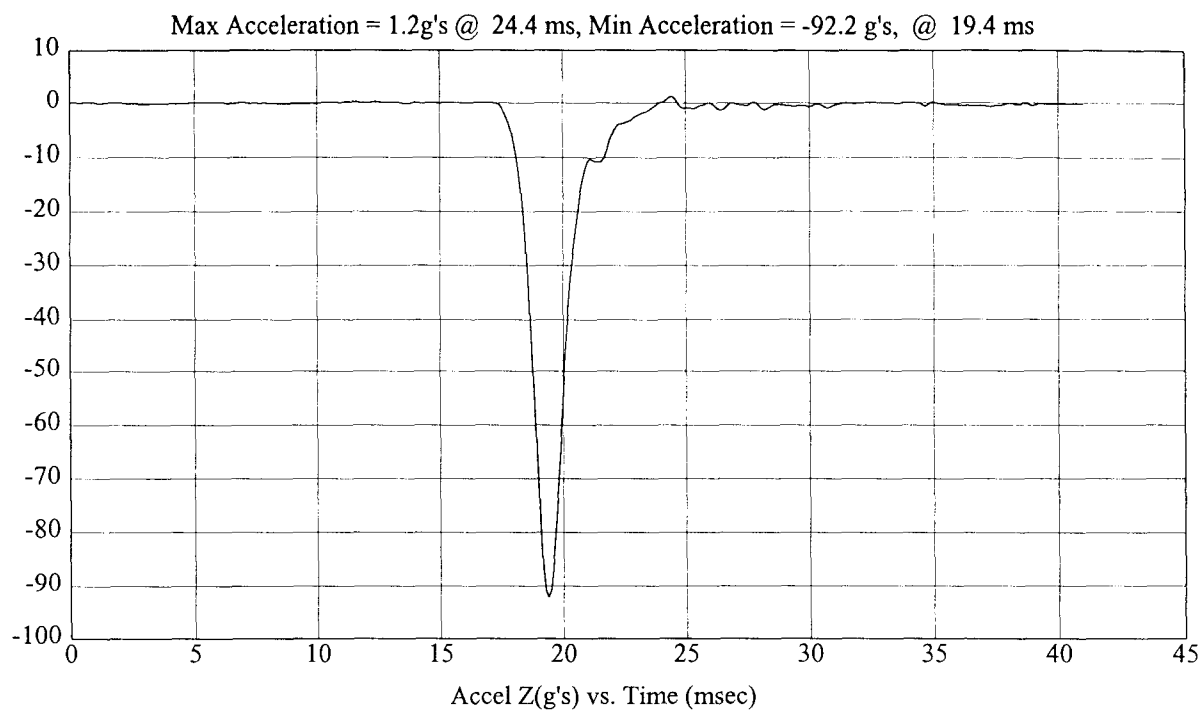


Head Drop
(Preliminary Test Report)

Test Number: H38234
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001

Test Date: 8/15/04
Head # : 38



HEAD DROP TEST SUMMARY
PART 572L

Post 60477-001.14

HEADFORM SERIAL NUMBER: <u>30</u> CALIBRATION DATE: <u>6-16-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.99
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	46
Peak Resultant Acceleration	225 G's to 275 G's	237.1
Peak Lateral Acceleration	15 G's Maximum	14.3
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	536197	5-23-04	11-03-04
3	ENDEVCO	7264-2000	536195	5-23-04	11-03-04
4	ENDEVCO	7264-2000	536353	5-23-04	11-23-04

REMARKS:

RECORDED BY: [Signature]

DATE: 6-16-04

APPROVED BY: [Signature]

Head Drop
(Preliminary Test Report)

4-24

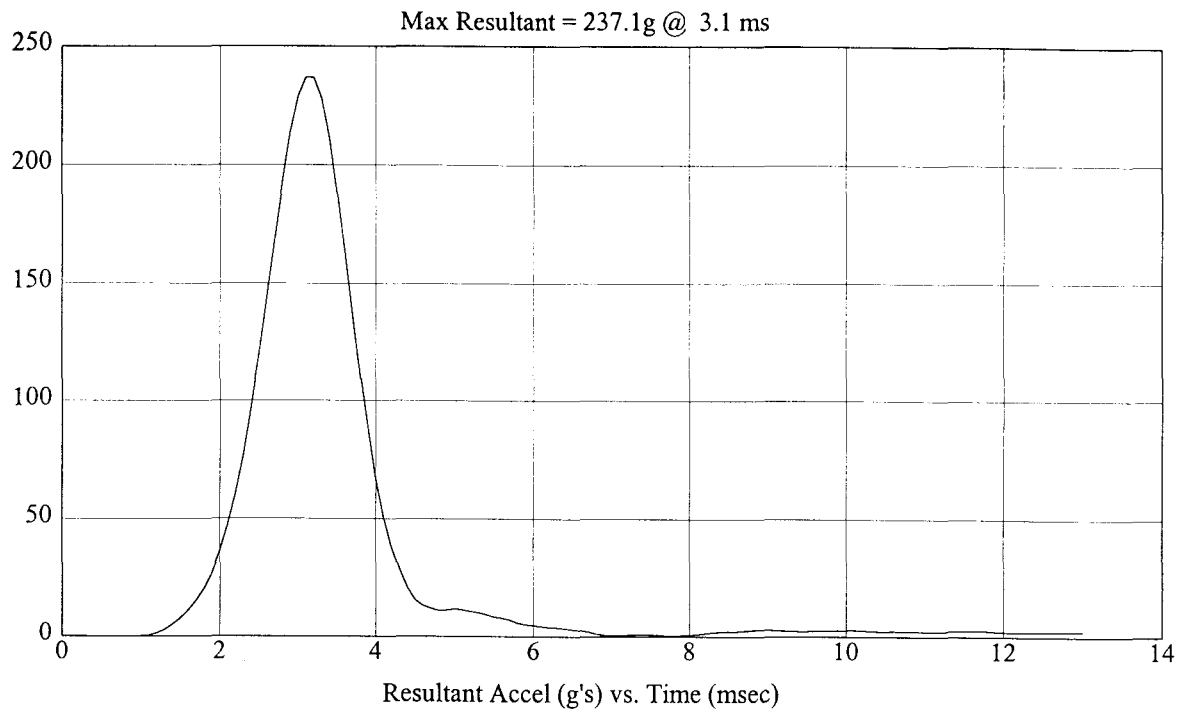
Test Number: H38235

MGA Job Number: G04I7-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head # : 38



Head Drop
(Preliminary Test Report)

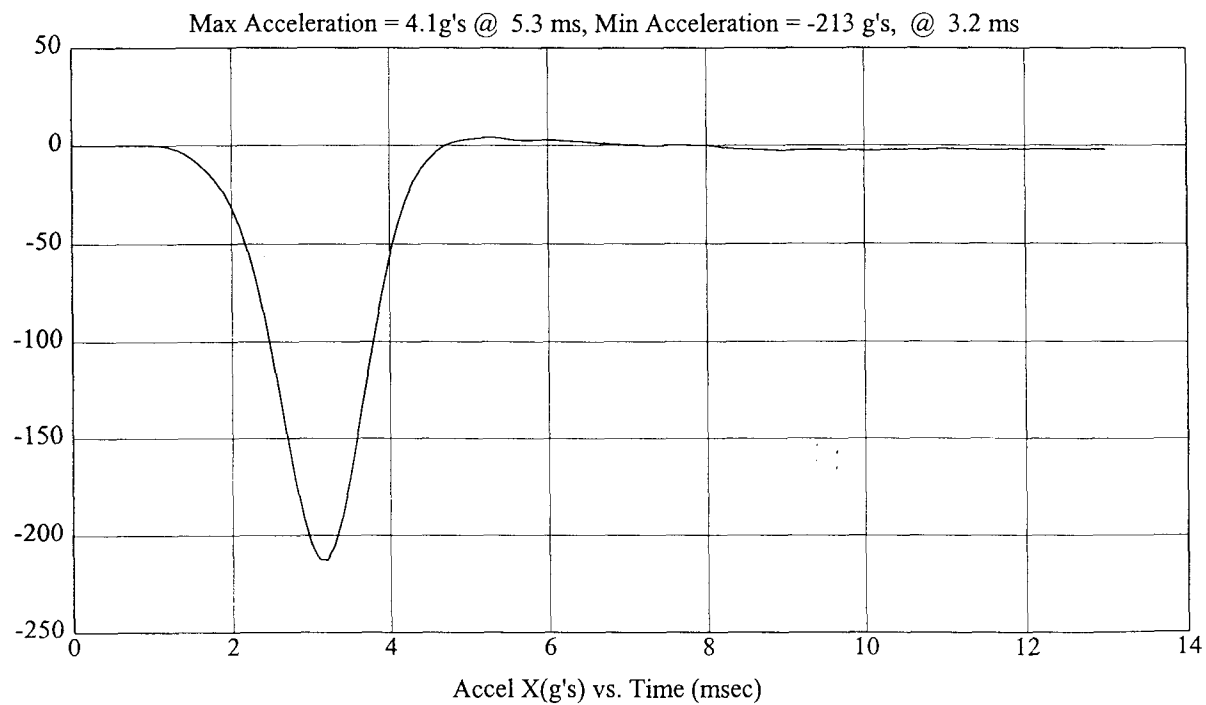
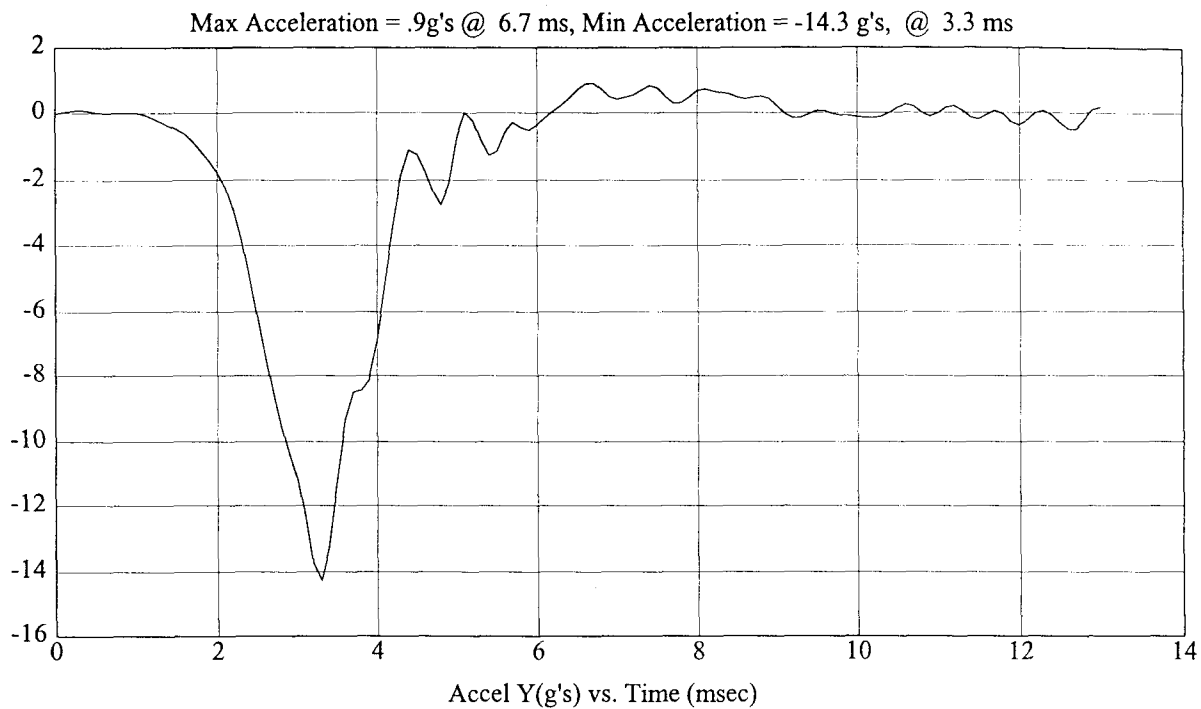
Test Number: H38235

MGA Job Number: G04I7-001.14

Test Date: 8/16/04

Test Description: Post - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

4-26

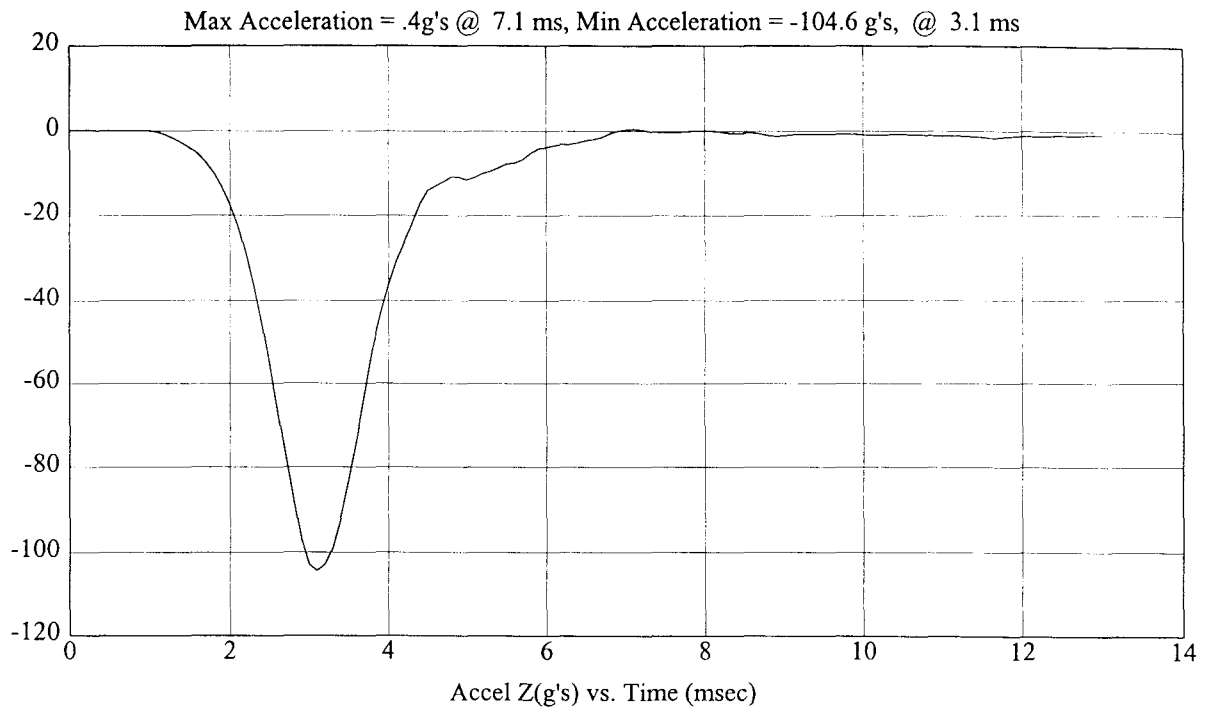
Test Number: H38235

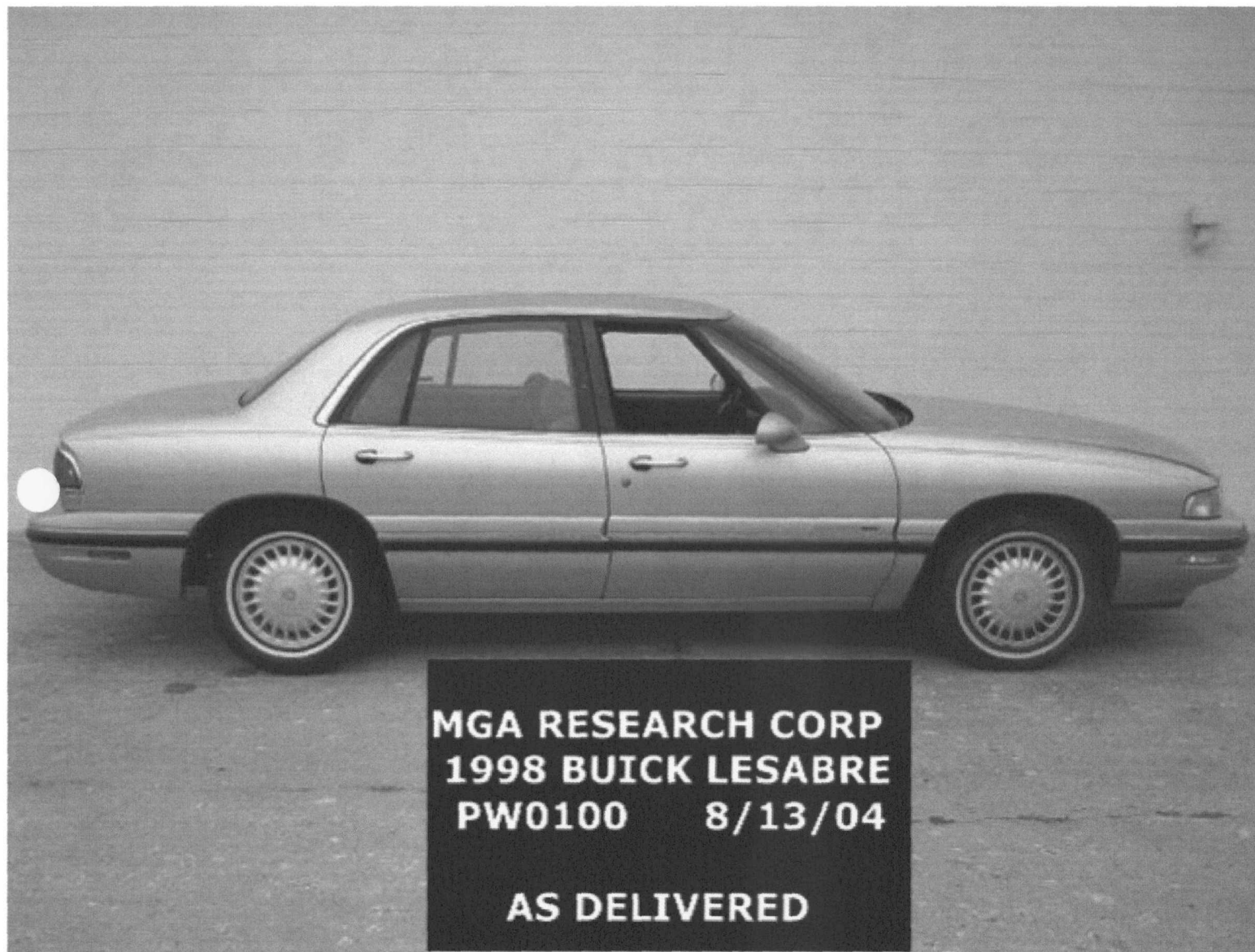
MGA Job Number: G04I7-001.14

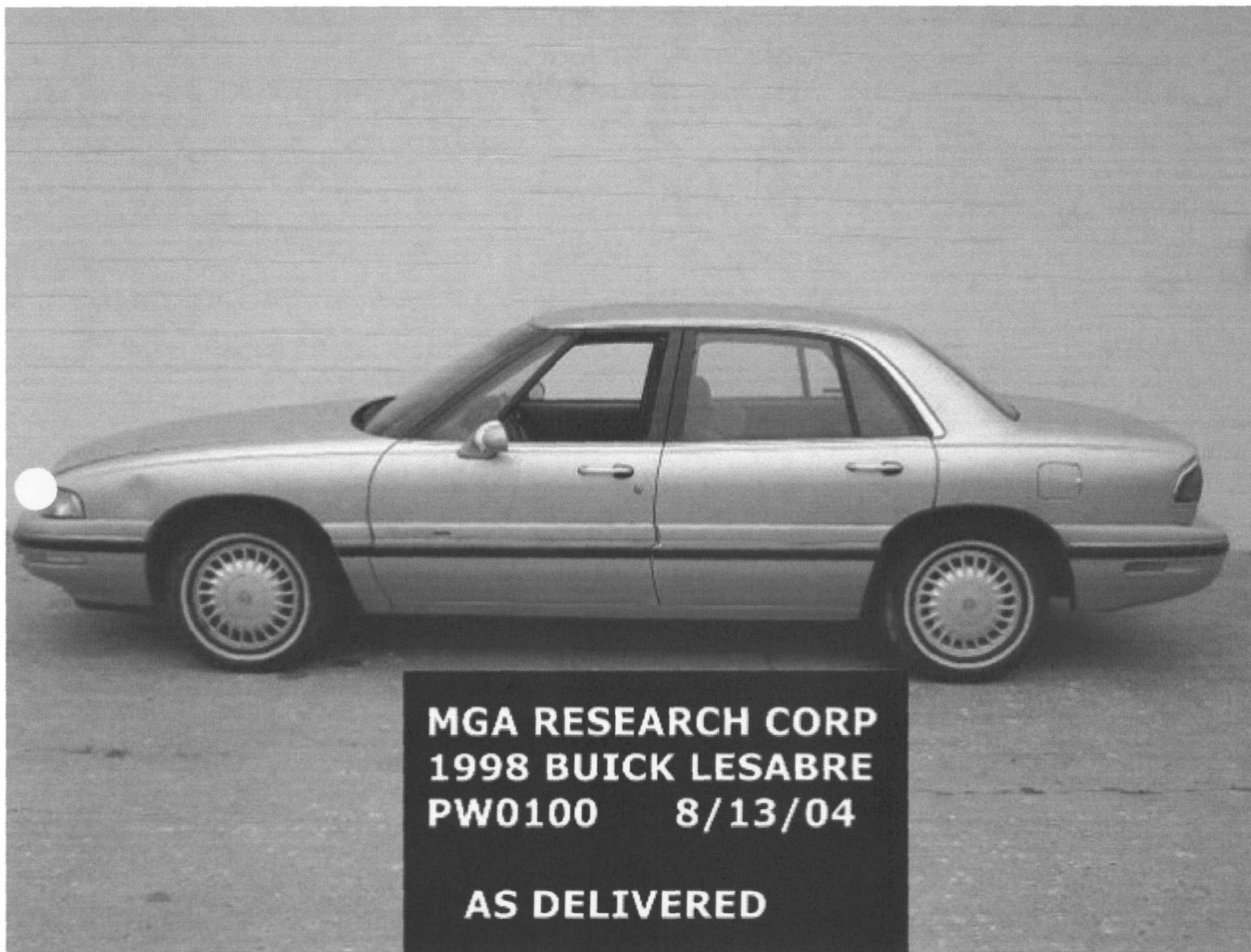
Test Date: 8/16/04

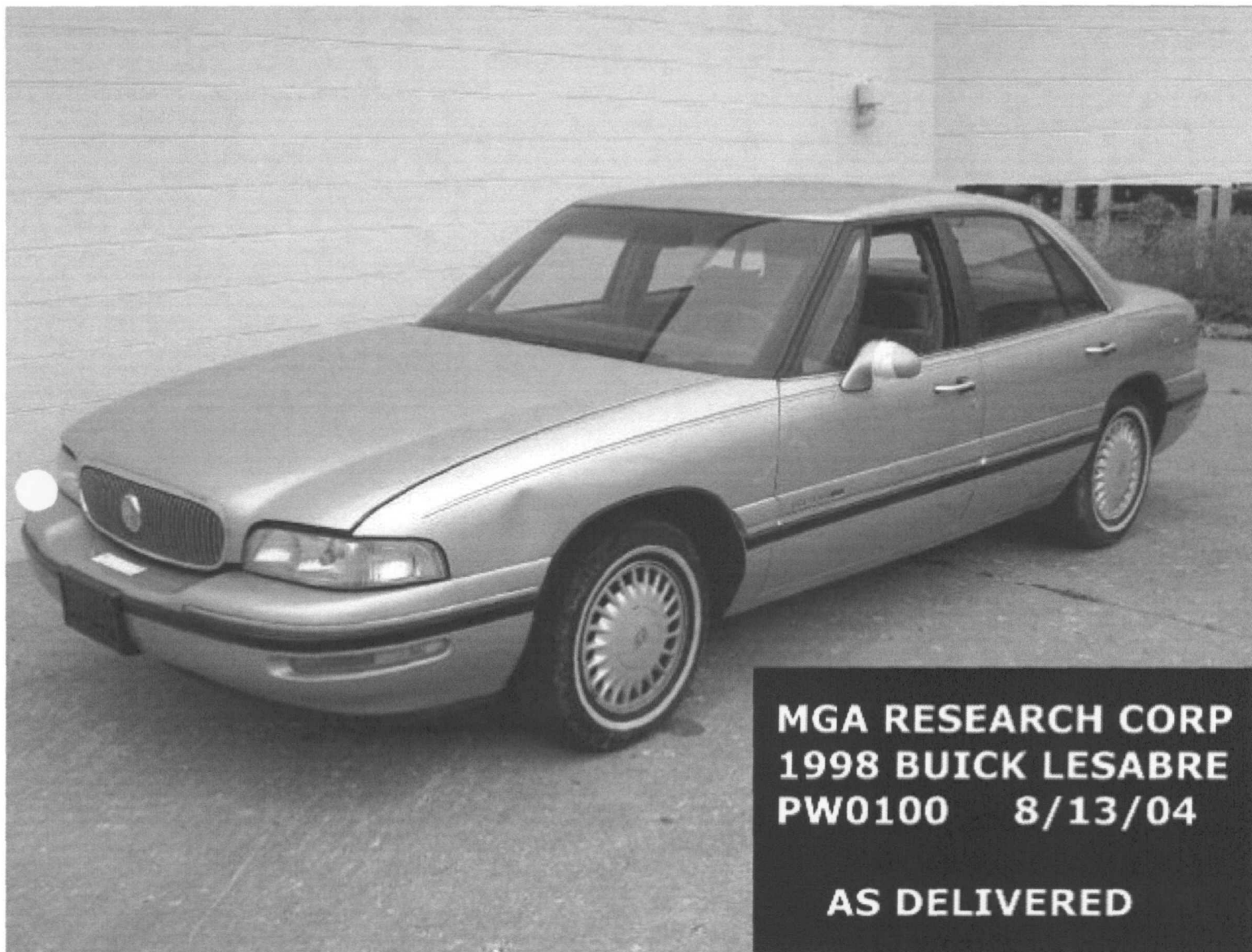
Test Description: Post - Test Calibration

Head # : 38









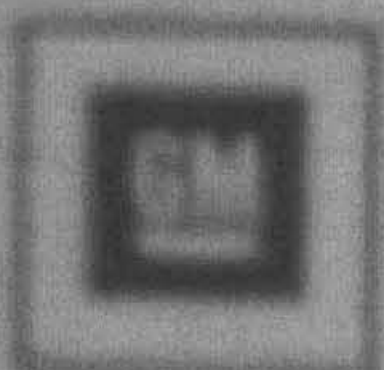
MGA RESEARCH CORP
1998 BUICK LESABRE
PW0100 8/13/04

AS DELIVERED



**MGA RESEARCH CORP
1998 BUICK LESABRE
PW0100 8/13/04**

AS DELIVERED



TIRE - LOADING INFORMATION

OCCUPANTS				VEHICLE CAP. WT.	
FRT.	CTR.	RR.	TOTAL	KG	LBS
3	0	3	6	488	1076

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.

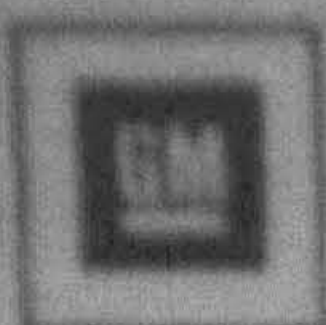
1G4HP52K1WH [REDACTED]

MODEL: HP69 HAA

	TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT	P205/70R15	S	210KPA(30PSI)
RR	P205/70R15	S	210KPA(30PSI)
SPA	T125/70D15	M	420KPA(60PSI)

IF TIRES ARE HOT, ADD 28KPA(4LBS)

SEE OWNER'S MANUAL FOR MORE INFORMATION



MFD BY GENERAL MOTORS CORP

DATE
12/97GVWR
2061 KG
4543 LBGAWR FRT
1138 KG
2509 LBGAWR RR
923 KG
2034 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR
VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN
EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

1G4HP52K1WH [REDACTED]

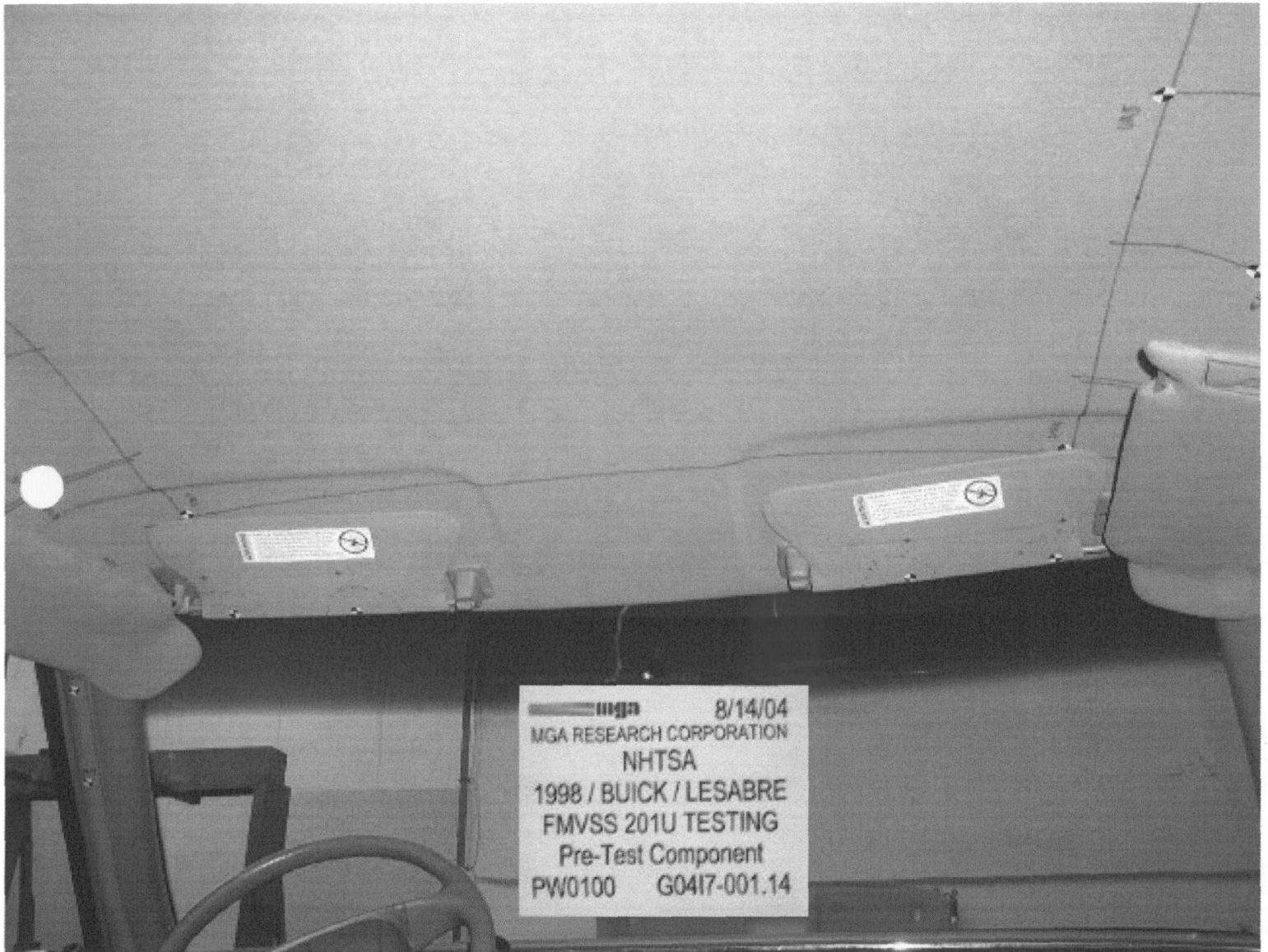
TYPE: PASS CAR

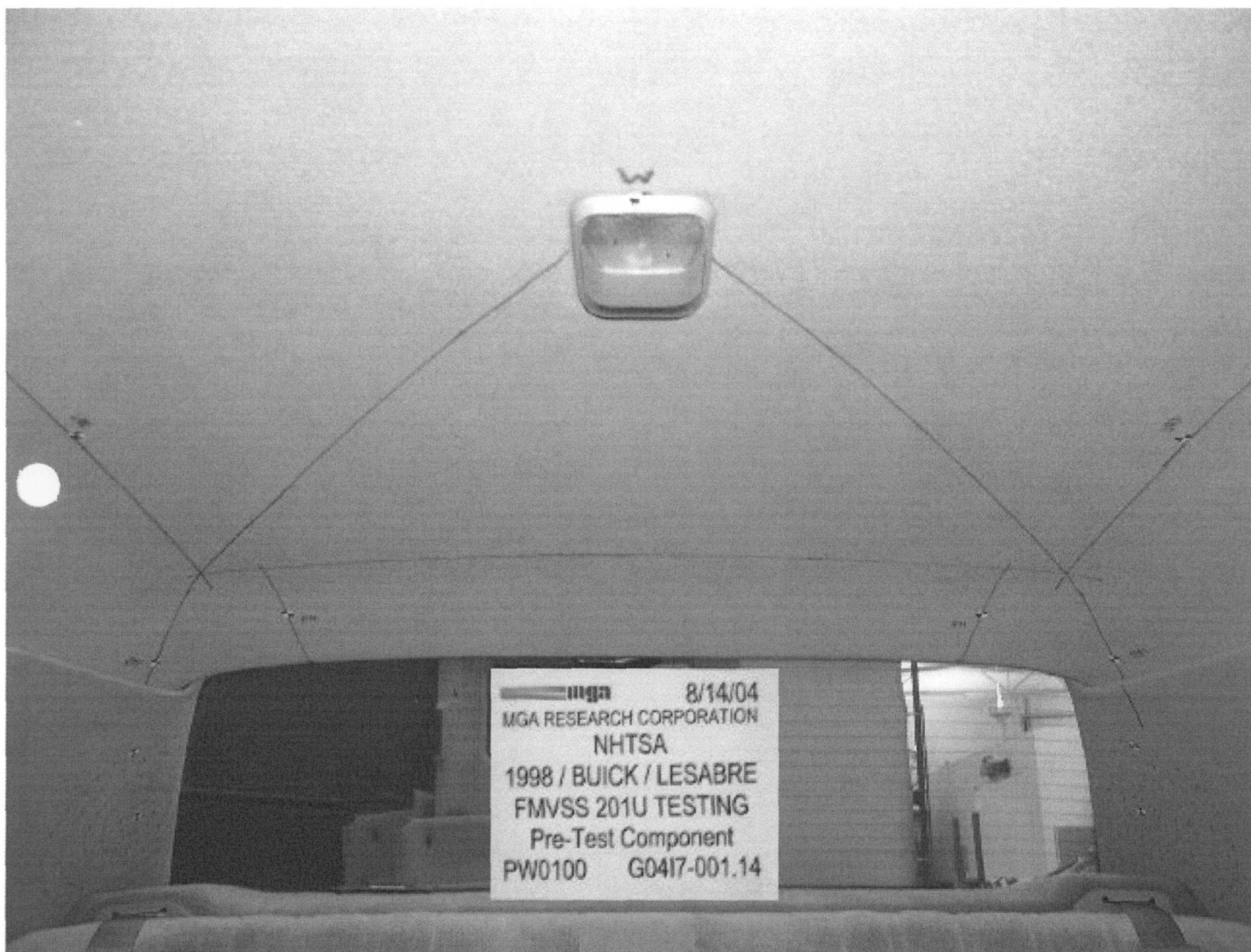












mga 8/14/04
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NHTSA
1998 / BUICK / LESABRE
FMVSS 201U TESTING
Pre-Test Component
PW0100 G0417-001.14

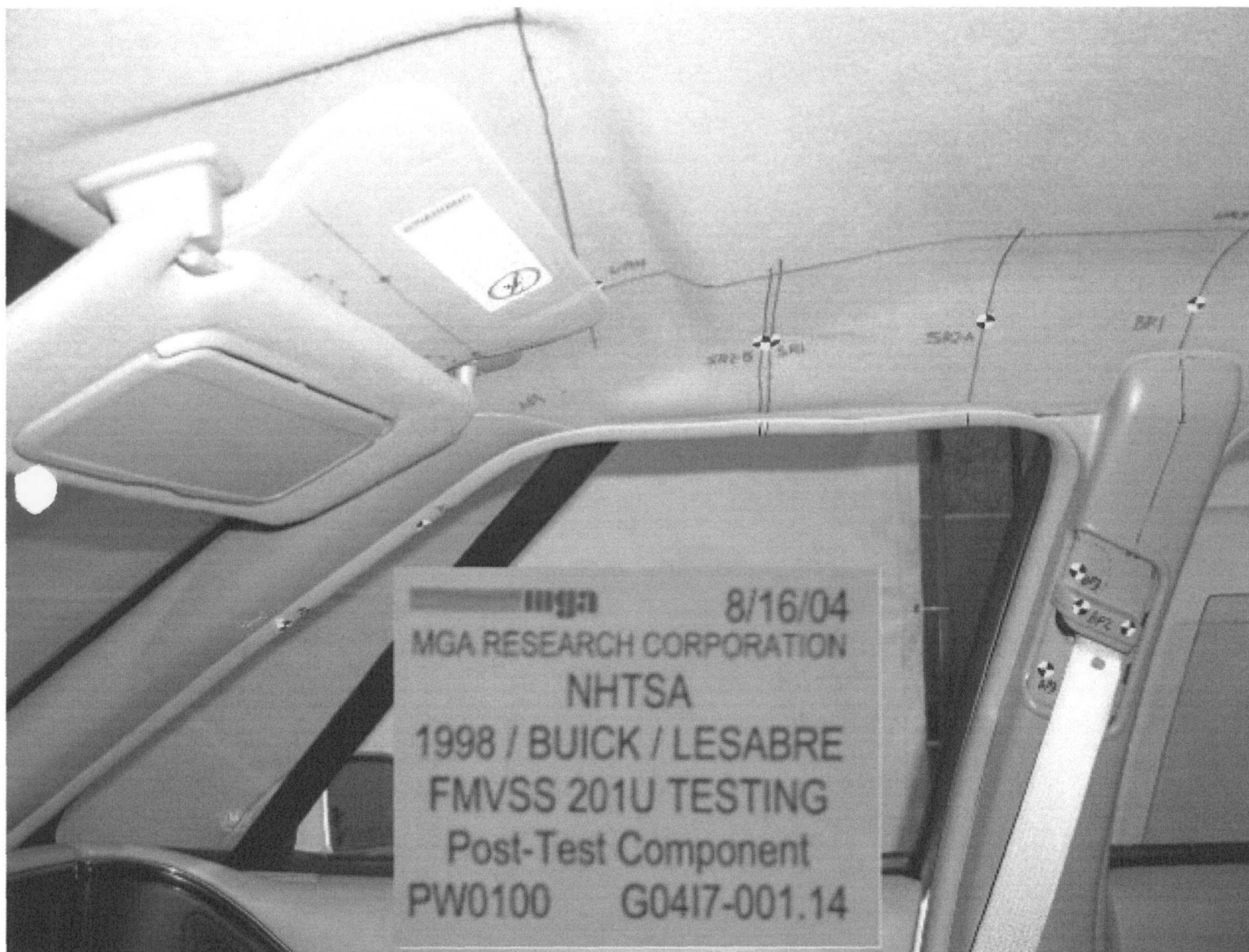






A black and white photograph showing the interior of a vehicle, likely a car, with a focus on the dashboard and steering wheel area. A white identification tag is placed in the foreground, partially obscuring the view. The tag contains text identifying the vehicle as a 1998 Buick Lesabre and mentions FMVSS 201U testing. The background shows the interior components of the vehicle, including the dashboard, steering wheel, and various mechanical parts.

mga 8/16/04
MGA RESEARCH CORPORATION
NHTSA
1998 / BUICK / LESABRE
FMVSS 201U TESTING
Post-Test Component
PW0100 G04I7-001.14



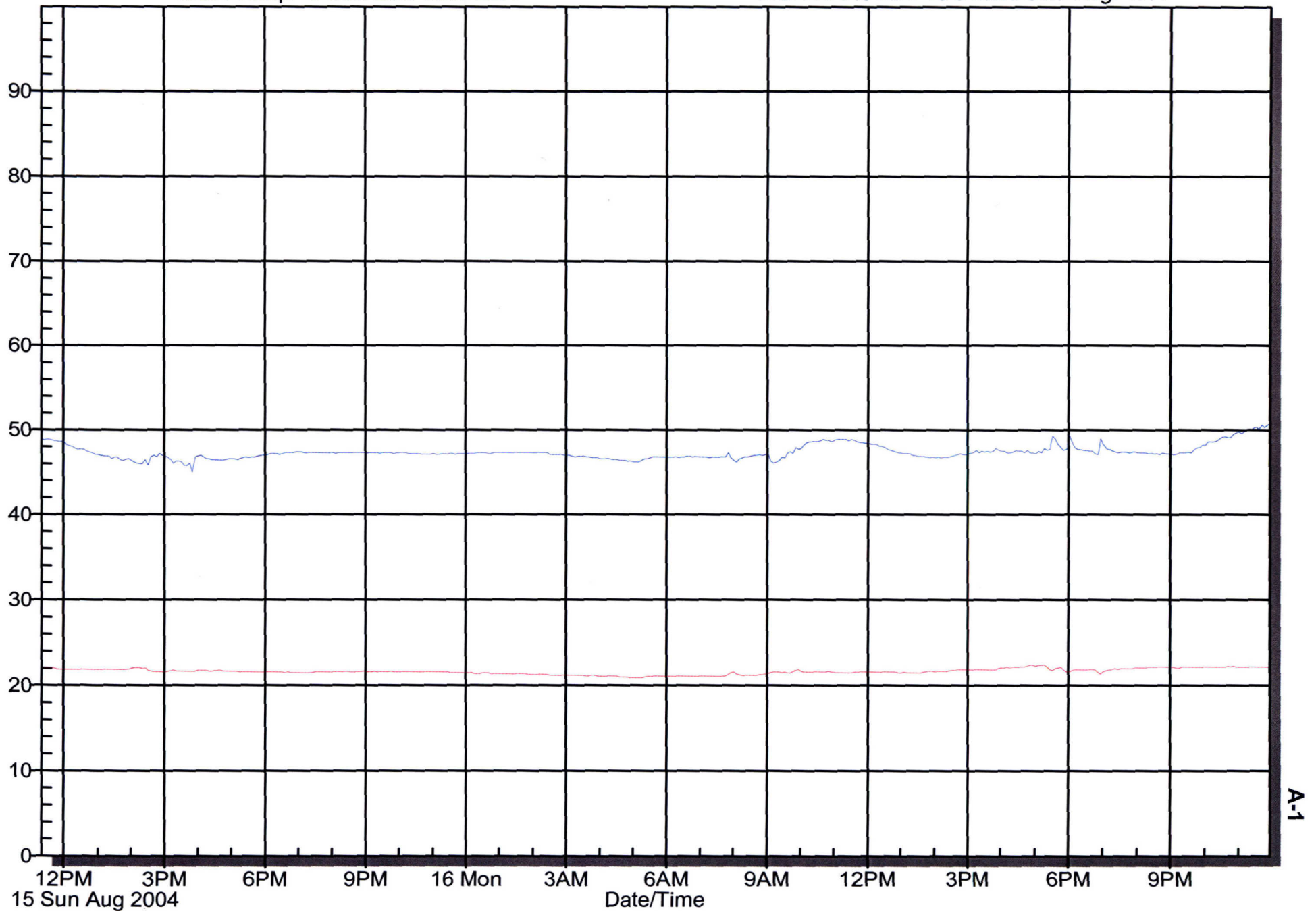


PW0100 1998 Buick LeSabre

Temperature Trace August 15-16, 2004

MGA-Temp/°C Min: 20.9 Max: 22.4

MGA-RH/% Min: 45.0 Max: 50.9 Avg: 47.4





mga research corporation
CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J35800	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/3/04	Calibration Date: 4/8/03
	Calibrated By: <i>Kevin J. Rust/MTS</i>

Test Reference Number: A0408

New DLR (100k , Units: G): 96.6

StdDeviation (%): 0.109

% Difference in DLR (New vs. Old): 0.741

Temperature (°F): 68

Humidity (%): 31

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
 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: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J35841	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/3/04	Calibration Date: 4/8/03
	Calibrated By: <i>Kevin J. Rust/MTS</i>

Test Reference Number: A0408

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

StdDeviation (%) 0.578

% Difference in DLR (New vs. Old): 0.496

Temperature (°F): 68

Humidity (%): 31

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
 All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties
 expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J35791	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/3/04	Calibration Date: 4/8/03
	Calibrated By: <i>Kevin J. Rust/MTS</i>

Test Reference Number: A0408

New DLR (100k , Units: G): 90.0

StdDeviation (%): 0.402

% Difference in DLR (New vs. Old): 0.702

Temperature (°F): 68

Humidity (%): 31

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J36197	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/23/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0412

New DLR (100k , Units: G): 108.0

StdDeviation (%): 0.915

% Difference in DLR (New vs. Old): 0.719

Temperature (°F): 74

Humidity (%): 50

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J36193	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/23/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0412

New DLR (100k , Units: G): 101.4

StdDeviation (%): 0.375

% Difference in DLR (New vs. Old): -3.509

Temperature (°F): 74

Humidity (%): 50

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J36353	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/23/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0412

New DLR (100k , Units: G): 96.8

StdDeviation (%): 0.376

% Difference in DLR (New vs. Old): -0.677

Temperature (°F): 74

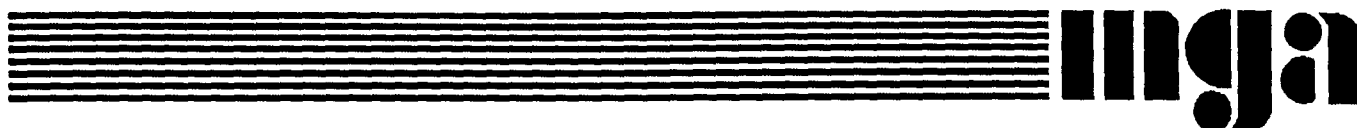
Humidity (%): 50

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: 301M09/484B
S/N: J35923	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/23/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0412

New DLR (100k , Units: G): 100.8

StdDeviation (%): 0.782

% Difference in DLR (New vs. Old): -1.506

Temperature (°F): 74

Humidity (%): 50

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: <i>301M09/484B</i>
S/N: J35916	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 5/23/04	Calibration Date: <i>5/11/04</i>
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0412

New DLR (100k , Units: G): 100.2

StdDeviation (%) 0.215

% Difference in DLR (New vs. Old): 0.872

Temperature (°F): 74

Humidity (%): 50

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
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: <i>Reference Accelerometer</i>
Model: 7624-2000	Model: <i>301M09/484B</i>
S/N: J35918	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 5/23/04	Calibration Date: <i>5/11/04</i>
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0412

New DLR (100k , Units: G): 97.9

StdDeviation (%) 0.929

% Difference in DLR (New vs. Old): -0.762

Temperature (°F): 74

Humidity (%): 50

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
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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~Certificate of Calibration~

Model Number: 484B	N.I.S.T. Project #: 6720012
Serial Number: 2470	Calibration Date: 05/11/2004
Description: Signal Conditioner	Recalibration Date:
Test Procedure: AT-106-1	Calibration Technician: Chris Vega CV. #36
Temperature: 74° F	Relative Humidity: 42%

<u>TESTS</u>	<u>BEFORE</u>	<u>AFTER</u>
INPUT VOLTAGE ($24 \pm 0.1V$)	24.02	24.02
ICP CURRENT ($4 \pm 0.6mA$)	3.97	3.97
DC OFFSET A.C. MODE (volts)	-.001	-.001
GAIN (REF 1 VRMS, 1kHz)	1.0000	NOT ADJUSTABLE
DRIFT (DC MODE)	< 2mV/min.	NOT ADJUSTABLE
FREQUENCY RESPONSE 10 Vp-p, 1 kHz REFERENCE	FLAT TO 200kHz	NOT ADJUSTABLE

As Received: In tolerance

As Left: In tolerance

Special Notes: MGA Research

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 with coverage factor of 2) for scale factors is $\pm 0.2\%$.

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~ Calibration Certificate ~

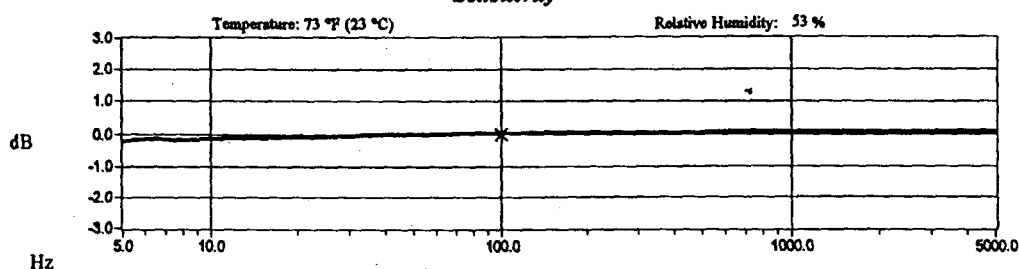
Per ISO 10063-21

Model Number: 301M09/484B (394M17 SYSTEM)Serial Number: 862/2470Description: ICP® AccelerometerMethod: Back-to-Back Comparison CalibrationManufacturer: PCB

Calibration Data

Sensitivity @ 100.0 Hz 31.17 mV/g Output Bias 8.6 VDC
 (3.179 mV/m/s²) Transverse Sensitivity 3.0 %

Sensitivity



Data Points

Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)
5.0	-2.5	REF. FREQ.	0.0	5000.0	1.1
10.0	-1.9	300.0	0.7		
15.0	-1.4	500.0	0.8		
30.0	-0.6	1000.0	1.0		
50.0	-0.2	3000.0	1.1		

Mounting Surface: Stainless Steel with Epoxy Grease Coating Fastener: Steel Mount Verifier

Acceleration Level (g): 0.05 g (PK 1 m/s²)

*This acceleration level may be limited by shaker displacement at low frequencies. If the stated level cannot be obtained, the calibration system uses the following formula to set the vibration amplitude: Acceleration Level (g) = 0.010 x (freq).

Condition of Unit

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

Notes

1. Calibration is NIST Traceable thru Project 822/267400 and PTB Traceable thru Project 1055.
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/NCCL 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 C-DDate: 05/13/04

PAGE 1 of 1

PCB PIEZOTRONICS™

VIBRATION DIVISION

3425 Walden Avenue Depew, NY 14043

TEL: 815-634-0013 FAX: 716-635-3886 www.pcb.com

m21-316728399-34



MTS Systems Corporation Metrology Laboratory



14000 Technology Drive

Eden Prairie, MN 55344

Web Site: www.mts.com/services/metrology

Certificate of Calibration

For MTS Asset Number: SN862

Description: STANDARD ACCELEROMETER

Serial Number: 862 / 2470

Mfr / Model: PCB/301M09 / 484B

Customer: MGA RESEARCH

Certificate #: SN862:1049812898

This document applies only to the calibration of the item described above and the specific calibration performed by the MTS Metrology Laboratory. If shown below, the calibration interval has been requested by the customer or is a recommended interval established by the MTS Metrology Laboratory. The stability of the UUT over time depends on many factors outside our control. It is the responsibility of those using the item described above to quantify their measurement uncertainty and evaluate the adequacy of their measurement process to demonstrate that measurement traceability is credibly maintained.

The MTS Metrology Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA) to perform calibration in electrical, mechanical, dimensional, time/frequency, temperature/humidity, vibration, and acoustics. A2LA Certificate Number 1044.01 is valid to May 31, 2004. The basis for this accreditation is the international standard for calibration laboratories, ISO/IEC 17025 "General Requirements for the Competence of Calibration and Testing Laboratories".

Calibrations are performed with standards whose values or measurement results are traceable to one or more of the following: National Institute of Standards and Technology, natural physical constants, consensus standards, or by a ratio technique.

CALIBRATION INFORMATION

Received:	SEE REPORT	Calibration Date: (mmdd/yyyy)	04/08/2003	Temperature:	72°F
Returned:	SEE REPORT	Calibration Due: (mmdd/yyyy)	04/08/2004	Humidity:	18 %
Calibration Procedure:	1365	Procedure Revision:	B		
Note:	NONE				

STANDARDS USED FOR CALIBRATION

MTS Asset #	Manufacturer	Model Number	Description	Cal. Date	Cal. Due
16780	KISTLER	8802 SYSTEM	REFERENCE ACCELEROMETER	10/16/2002	10/16/2003
11774	HEWLETT PACKARD	35660A	SIGNAL ANALYZER	01/10/2003	04/29/2003
16700	MB DYNAMICS	CAL50	CALIBRATION SHAKER	NA	NA
11882	BRUEL+KJAER	2706	POWER AMPLIFIER	NA	NA

CALIBRATION UNCERTAINTY STATEMENT

Certified by: Kevin J. Rust, Metrology Technician

Printed on: 04/08/2003

Page 1 of 2

If you have questions regarding this Certificate of Calibration please call 952-937-4208. This certificate may not be reproduced, except in full, without written approval from the MTS Metrology Laboratory. The Calibration Uncertainty Statement is valid for the print date of the Certificate of Calibration.

QMS #0407, Rev. 10, Rev. Date 17-Dec-01.

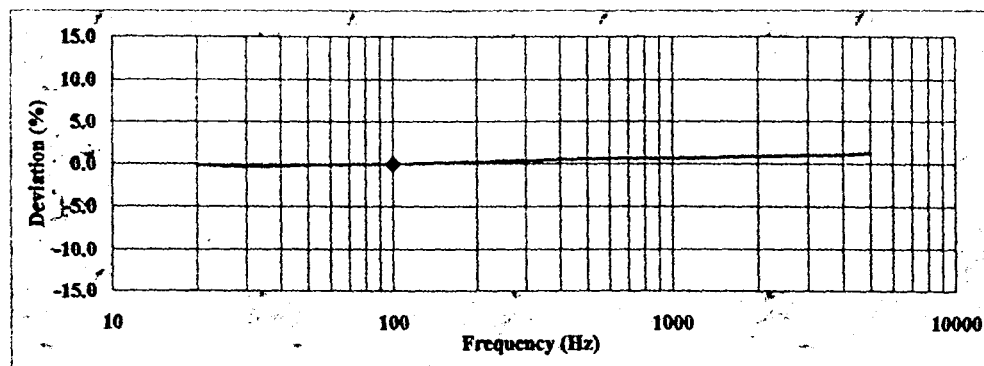


MTS METROLOGY LABORATORY CALIBRATION REPORT OF TEST



MANUFACTURER:	PCB	CUSTOMER NAME:	MGA Research
MODEL NUMBER:	301M09 / 484B	CALIBRATION DATE:	08-Apr-03
SERIAL NUMBER:	862 / 2470	TEMP. / HUMIDITY:	72°F / 18%
MTS ASSET NUMBER:	SN862	CERTIFIED BY:	Kevin J. Rust

SENSITIVITY / FREQUENCY RESPONSE



Test Frequency (Hz):

20	30	50	100	500	1000	2000	3000	4000	5000
----	----	----	-----	-----	------	------	------	------	------

Acceleration (g's pk):

2	5	10	10	10	10	10	10	10	10
---	---	----	----	----	----	----	----	----	----

Output Sensitivity (mV/g):

31.15	31.06	31.12	31.17	31.34	31.37	31.43	31.48	31.49	31.56
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Frequency Response (%):

-0.06	-0.35	-0.16	Ref.	0.55	0.64	0.83	0.99	1.03	1.25
-------	-------	-------	------	------	------	------	------	------	------

NOTES:

- 1) Sensitivity derived from the output of matching 484B power unit (SN 2470) set to the AC coupling and 11V bias modes.
- 2) Accelerometer Bias Voltage: 8.7 VDC, Excitation Current: 4 mA nominal.

REMARKS:

- 1) The accelerometer listed above was calibrated using a comparison technique against a MTS Working Standard Accelerometer per MTS Metrology Calibration Procedure 1366 (RevB).
- 2) The uncertainties of the calibration process do not exceed: 1.5% from 10Hz to <100Hz, 1.2% from 100Hz to 2.5kHz, 2.5% from >2.5kHz to 10kHz. These calibration process uncertainties are expressed at approximately the 95% confidence level (k=2).
- 3) This report shall not be reproduced, except in full, without written permission from the MTS Metrology Laboratory.

CALIBRATION STANDARDS USED: MTS Asset #16780, #11774, #16700, #11882

Interim Certification Document

Part Description: Gold Series Faro Arm

Serial Number: G08020203122

Single Point 2 Sigma: G08-00 +/-0.051mm (+/-0.0020 in)

Linear Displacement 2 Sigma: G08-00 +/-0.072mm (+/-0.0028 in)

Certification Date: February 03, 2004

MEASUREMENT STANDARDS, N.I.S.T., U.K.A.S. TRACEABILITY

Bal-Tec Invar Ball Bar Kit	Kit Serial Number: 473	N.I.S.T. Test No.: FBB-473-12012003 Date: 12/01/2003
		U.K.A.S. Cert. No.: FBB-473-12012003 Date: 12/01/2003
Mitutoyo Corporation, 10mm Step Gage	Code No.: 515-744, Serial No.: 810107	N.I.S.T. Control No.: 279517 Date: 01/13/2003
Measuring Range: 1.5m		U.K.A.S. Cert. No.: 133193 Date: 12/18/2002

CERTIFICATION RESULTS

A basic 4 quadrant certification included with all Gold Series and comprised of: 2 vertical level single point repeatability test in 4 quadrants with 5 repeats from 4 directions.	PASSED
12 Step gauge tests in 12 positions.	PASSED
FARO ball bar 10 points per quadrant in 4 quadrants.	PASSED
3 lengths in 8 positions free ball bar test.	PASSED

This instrument, as received, was within specifications.

Ambient Temperature: 22°C ± 3°C

Technician:

Rafael Rocha

02/03/04

Rafael Rocha

02/03/04

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

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

Faro Technologies, Inc.
ph. (407) 333-9911

125 Technology Park
1-800-736-2771

Lake Mary, FL 32746
(407) 333-8056 fax

FARO

Revised: January 22, 2004

F:\control\forms\07qcontr\English\07frm07-006.doc



Certificate Number: 20040729Cal

Detroit Testing Laboratory, Inc.



7111 E. 11 Mile Road, Warren, MI 48092-2709 • (586) 754-9000 • FAX (586) 754-9046 • www.dtl-inc.com

Certificate of Calibration

Equipment Information

Customer: MGA Research Corporation
446 Executive Drive
Troy, MI 48083

Model: AP 20
Serial Number: E33603-0213
Manufacturer: Deteco
Description: Scale

System ID: MGA00081

Customer Asset No.:

Calibration Information

Calibration Date: 3/24/04
Calibration Due: 3/24/05
Calibration Interval: 12 Month

Procedure Used: 33K6-4-72-1/98
Calibrated to: MFR SPEC

Rec'd In Tol:¹ Yes/Pass
Returned In Tol:¹ Yes/Pass
Performed On Site: No

Temperature: 24 °C
Humidity: 37 %RH

Calibration Limitation:

The Uncertainty of the Measurements Pertaining to This Calibration are Estimated to be: (0.006 + 0.01% Ind) lb

¹ Pass/Fail or In/Out of Tolerance statements are opinions only of the person performing the calibration based on data from measurements at the time they were made, procedure utilized, professional experience, and the uncertainty associated with this calibration. It is ultimately up to the user of this equipment to determine if this item meets their specific requirements for accuracy for its intended application.

Calibration Standards Used

System ID:	Model:	Serial:	Manufacturer	Description:	Date Due:
09126	CT485B	61201050	OMEGA	Thermohumidigraph	5/12/04
07580	CLASS C	07580	TROEMNER	WEIGHT SET	9/11/04

Any calibration interval and due date of this device, if stated, is at the request of the customer. Due to the fact that many variables may effect drift of reported values over time there is no assurance implied that this item will maintain it's stated accuracy through the end of this interval.

This Calibration has been performed per requirements of ISO 17025-1999. Reported results are from standards with accuracies that are traceable to the International Systems of Units (SI), derived from physical constants, ratio measurements, national measurement standards, or compared to consensus standards. Measurement uncertainty is expressed at a confidence level of approximately 95% (coverage factor k=2).

Signature: <u>Jerry Wells</u> Jerry Wells	Date: <u>3-24-04</u> Technician	Approved: <u>Paul G. Wells</u> Date: <u>3-24-04</u>
Date Printed: 03/24/04	Printed By: Jerry Wells	Page: 1 of 2 QFC 1048-1 Rev 4/17/03

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Detroit Testing Laboratory, Inc.

CALIBRATION DATA SHEET

Date: 3/24/04
DTL I.D: MGA00081
Cert. Number: 20040729Cal

Cal Point lb std	Reading As Found lb uut	Reading As Left lb uut	Deviation As Found lb	Deviation As Left lb	% of Allowed Dev as Found	% of Allowed Dev as Left
5.00	5.00	5.00	0.00	0.00	0.0	0.0
10.00	10.01	10.00	0.01	0.00	100.0	0.0
15.00	15.01	15.00	0.01	0.00	100.0	0.0
20.00	20.01	20.00	0.01	0.00	100.0	0.0

MICHIGAN OPERATIONS
DATE: 3/21/03
SUPERCEDES: MQATPTMC.3

DOC. NO.: MQATPTMC
REVISION NO.: 4
PAGE 3 OF 3

Tape Measure Calibration Certificate

Reference Steel Rule

Brand: GEE
S/N: 118033
Calibration Date: 11.24.3

Subject Tape Measure

Brand: STANLEY
S/N: 289
Calibration Date: 1.7.4

Reference mm	Subject Tape Measure	Difference	Reference mm	Subject Tape Measure	Difference
0	0	0	450	450	0
25	25	0	475	475	0
50	50	0	500	500	0
75	75	0	525	525	0
100	100	0	550	550	0
125	125	0	575	575	0
150	150	0	600	600	0
175	175	0	625	625	0
200	200	0	650	650	0
225	225	0	675	675	0
250	250	0	700	700	0
275	275	0	725	725	0
300	300	0	750	750	0
325	325	0	775	775	0
350	350	0	800	800	0
375	375	0	825	825	0
400	400	0	850	850	0
425	425	0	875	875	0

If all differences are ± 1 mm, then the tape measure is acceptable.

Pass X Fail Maximum Difference = 0

Date: 1.7.05

Performed By: Rf Mill

Certificate of Instrument Calibration and Testing

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

Customer Instrument

Dickson Model Number: **TR320**

Serial Number: **04018409**

Calibration Technician: **Kitty McQuinn**

Calibration Date: **01/22/2004**

Calibration Standards

General Camera Model # 813

Ser. # 0050004 / 3360002

Accuracy: $\pm 4\%$ FS RH and $\pm 1^\circ\text{F}$

Certified February, 2003 / August, 2003

Ametek Model # A1011 Ser. # 12513-9417

RTQ Precision Probe Ser. # 496013 Accuracy: $\pm 2^\circ\text{F}$

Certified February, 2003

Cole Parmer Model # PT1000/ 90111-00

Ser. # 10067049 / Ser. # 18148037 Accuracy: $\pm 1^\circ\text{F}$

Certified June, 2003

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. Drift 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/CSL Z540, ISO/IEC guide 25, and ISO 17025 as appropriate. Recalibration of the customer instrument is recommended within 6 months after the unit is placed into service. Any number of factors may cause the calibration item to drift before the recommended interval has expired. A2LA Certificate Number: 1621-01

Environmental Conditions

72°F

41%RH

Calibration Standard Reading	Customer Instrument Reading	Unit Specifications
Humidity (%RH)	Humidity (%RH)	Humidity
22.4	22.9	$\pm 2\%$ RH
55	56.1	$\pm 2\%$ RH
86.6	86.2	$\pm 2\%$ RH
Temperature °F	Temperature °F	Temperature
7.8	7.1	$\pm 1.3^\circ\text{F} (\pm 0.7^\circ\text{C})$
76.4	75	
111.5	111.4	

The TR320 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 40.7°F and $\pm 1.1\%$ 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 # **TR320**

Serial #: **04018409**

3. Please return via:

☐ Ground Freight*

☐ 2nd Day Air*

☐ Next Day Air*

*Charges added at factory

2. ☐ 1-Point Deluxe NIST Calibration \$149.00

☐ 3-Point Deluxe NIST Calibration \$199.00

☐ 3-Point Ultima Deluxe A2LA NIST \$299.00 (with incoming reading)

☐ N995 - User selectable NIST Temperature points \$50.00 each

(to be selected in addition to one of the above calibration options)

☐ N997 - Next Day Service \$50.00 (Not available for ULTIMA service)

4. Ship To:

Bill To:

Charts/Pens

(Order now and receive them with your calibrated unit)

☐ 6 Red Pens

☐ 3 Red/3 Blue Pens

☐ Chart* (60 per box)

Order No.

Qty.

Price Ea.

P222

P246

C

\$36 pk.

\$36 pk.

\$24 box

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

934 South Westwood Avenue Addison, Illinois 60101 510-543-3747 Fax 630-543-0458

NuWeigh, Inc.

10421 Enterprise Drive
 Davisburg, MI 48350
 248-922-1435 Fax: 248-922-1465
 ISO/IEC 17025 ACCREDITED

CALIBRATION / TEST REPORT

Page 1 of 1

SCR 4365

Customer: <u>MCA Research</u>	Date of service: <u>3-23-04</u>	Location: <u>C-3</u>
Address: <u>446 Executive Dr</u>	Last known test date: <u>3-25-03</u>	Environmental conditions acceptable ☒ Yes ☐ No
City: <u>Troy</u> State: <u>MI</u> Zip: <u>48063</u>	Frequency: ☒ Annual ☐ Semi Annual ☐ Quarterly ☐ Monthly ☐ Bi Monthly ☐ Other	

Indicator Mfg.	Platform Mfg.	Indicator Mfg.	Platform Mfg.
Model: <u>Cardinal</u>	Model: <u>Cardinal</u>	Model:	Model:
Serial No.: <u>708</u>	Serial No.: <u>8950 F</u>	Serial No.:	Serial No.:
Seal Applied? ☐ Yes ☒ No	Platform size: <u>28"x28"</u>	Seal Applied? ☐ Yes ☒ No	Platform size:
Customer Id.: <u>Shop</u>	Cap. & Grads: <u>2000 x 1 lb</u>	Customer Id.:	Cap. & Grads:
Printer Mfg./model:	General device condition: ☒ Good ☐ Fair ☐ Poor	Printer Mfg./model:	General device condition: ☐ Good ☐ Fair ☐ Poor
Weight Applied	Reading as Found	Error as Found	Reading as Left
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>100 lb</u>	<u>100</u>	<u>0</u>	<u>0</u>
<u>300 lb</u>	<u>300</u>	<u>0</u>	<u>0</u>
<u>500 lb</u>	<u>500</u>	<u>0</u>	<u>0</u>
<u>300 lb</u>	<u>300</u>	<u>0</u>	<u>0</u>
<u>100 lb</u>	<u>100</u>	<u>0</u>	<u>0</u>
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>X</u>	<u>X</u>	<u>X</u>	<u>0</u>
Load Section #1	<u>100</u>	<u>0</u>	<u>0</u>
Load Section #2	<u>100</u>	<u>0</u>	<u>0</u>
Load Section #3	<u>100</u>	<u>0</u>	<u>0</u>
Load Section #4	<u>100</u>	<u>0</u>	<u>0</u>

Scale meets NIB44 tolerance: Yes ☒ No ☐
 Standards used (serial nos.): 6-15
 Estimated measurement uncertainty of applied load is .038 %
 Traceable report nos. MI 10-01-6285

RECOMMENDATIONS/OPINIONS

No adjustments needed
Scale Tested good

Scale meets NIB44 tolerance: Yes ☐ No ☐
 Standards used (serial nos.):
 Estimated measurement uncertainty of applied load is %
 Traceable report nos.

RECOMMENDATIONS/OPINIONS

Test procedure: NuWeigh Quality Manual and Procedures, Handbook 44

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Mike Kuntz
 TECHNICIAN

3-23-04
 DATE

George Baker
 CUSTOMER

White - Customer Copy

Canary - File Copy

SCR Rev 7.6.02



Certificate Number: 20040204Cal

Detroit Testing Laboratory, Inc.



7111 E. 11 Mile Road, Warren, MI 48092-2709 • (586) 754-9000 • FAX (586) 754-9045 • www.dtl-inc.com

Certificate of Calibration

Equipment Information

Customer: MGA Research Corporation
446 Executive Drive
Troy, MI 48083

Model: Pro 360
Serial Number: NONE
Manufacturer: Mitutoyo
Description: Protractor

System ID: MGA00072

Customer Asset No.: MGA00072(012904)

Calibration Information

Calibration Date: 1/28/04
Calibration Due: 1/28/05
Calibration Interval: 12 Month
Rec'd In Tol: ¹ Yes/Pass
Returned In Tol: ¹ Yes/Pass
Performed On Site: No

Procedure Used: 33K6-4-1597-1/99
Calibrated to: MFR SPEC
Temperature: 20 °C
Humidity: 35 %RH

Calibration Limitation:

The Uncertainty of the Measurements Pertaining to This Calibration are Estimated to be: Various

¹ Pass/Fail or In/Out of Tolerance statements are opinions only of the person performing the calibration based on data from measurements at the time they were made, procedure utilized, professional experience, and the uncertainty associated with this calibration. It is ultimately up to the user of this equipment to determine if this item meets their specific requirements for accuracy for its intended application.

Calibration Standards Used

System ID:	Model:	Serial:	Manufacturer	Description:	Date Due:
09098	CT485B	61201094	Omega	Thermohumidigraph	7/28/04
07748	2 X 2'	13928	TRU-STONE	Granite Surface Plate	2/19/04
10493	SP-66-S1	9902	Suburban Tool, Inc.	Sine Plate	2/17/06
09156	CHALLENGER 81 P	09156	AA JANSSON	Gage Blocks	3/5/04

Any calibration interval and due date of this device, if stated, is at the request of the customer. Due to the fact that many variables may effect drift of reported values over time there is no assurance implied that this item will maintain it's stated accuracy through the end of this interval.

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Signature: <u>Paul Wonsowicz</u> Paul Wonsowicz Technician	Date: <u>1-29-04</u>	Approved: <u>[Signature]</u> Date: <u>1/30/04</u>
Date Printed: 01/29/04	Printed By: Paul Wonsowicz	Page: 1 of 2 QFC 1048-1 Rev 4/17/03

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