

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

**FORD MOTOR COMPANY
1998 Ford Explorer 4-Door
NHTSA No. PW0202**

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



**Test Dates: August 30-31, 2004
Report Date: September 1, 2004**

FINAL REPORT

PREPARED FOR:

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF PLANNING, EVALUATION AND BUDGET
400 7TH STREET, S.W., ROOM 5208
WASHINGTON, D.C. 20590**

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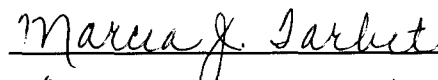


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16. Abstract A pre-standard test series was conducted on the subject 1998 Ford Explorer 4-Door, NHTSA No. PW0202, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201U pre-standard compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on August 30-31, 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 Ford Explorer, for FMVSS 201U, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on August 30-31, 2004 on a 1998 Ford Explorer 4-Door, manufactured by Ford Motor Company.

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 Ford Explorer 4-Door was equipped with A, B, C, and Rear-Pillars, a grab handle over the passenger side door and over each rear door, an adjustable seat belt anchorage on each B-pillar, a fixed seat belt anchorage on each C-pillar and a light console on the front center roof.

Upon completion of targeting the test vehicle, eleven (11) 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 eleven (11) targets chosen were:

AP1	BP1	OP1	UR1
AP2	BP2	SR1	UR2
AP3	BP4	FH2	

TABLE 2-1
SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Ford Explorer 4-Door

VEH. NHTSA NO.: PW0202 VIN: 1FMZU34X0WU COLOR: White

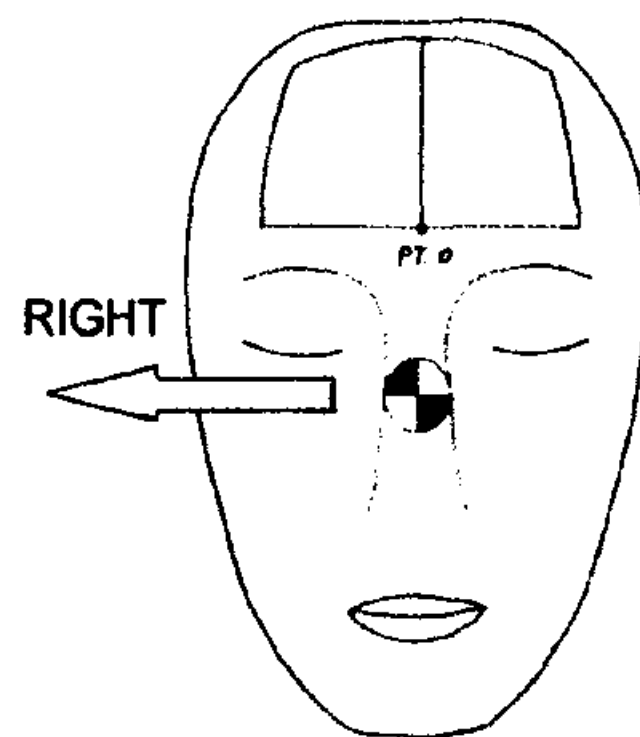
VEH. BUILD DATE: April, 1998 TEST DATES: August 30-31, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, 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	Right	110	33	23.8	884	951	15	3 Left
AP2	Left	205	40	23.7	865	926	13	0
AP3	Right	155	35	23.8	895	966	15	0
BP1	Right	90	11	23.7	966	1059	70	10 Left
BP2	Left	270	4	23.8	655	648	18	0
BP4	Right	140	-5	23.7	520	468	28	0
OP1	Right	90	1	23.5	553	512	25	0
SR1	Left	270	31	23.6	1174	1335	47	3 Left
FH2	Right	180	50	24.0	426	344	35	3 Left
UR1	Left	270	50	23.5	1083	1215	35	0
UR2	Left	270	50	23.7	928	1009	37	3 Left

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



POST TEST COMMENTS:

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

AP2 Left: Pillar trim cracked.

AP3 Right: Pillar trim cracked.

BP4 Right: Pillar trim cracked.

OP1 Right: Cracked the seat belt anchor cover.

FH2 Right: The windshield broke.

UR2 Left: Slight headliner deformation.

No damage was observed for any other targets.

REMARKS:

The targets listed were impacted in the following order:

Left: AP2, BP2, SR1, UR1, UR2

Right: AP3, AP1, FH2, BP1, BP4, OP1

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 31, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Ford Explorer 4-Door

VEH. NHTSA NO.: PW0202 VIN: 1FMZU34X0WU COLOR: White

VEH. BUILD DATE: April, 1998 TEST DATES: August 30-31, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

INTERIOR TRIM INFORMATION: A, B, C, and Rear-Pillars, a grab handle over the passenger side door and over each rear door, an adjustable seat belt anchorage on each B-pillar, a fixed seat belt anchorage on each C-pillar and a light console on the front center roof.

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: 8/27/04; Odometer Reading: 138,753 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Ford Motor Company

Date of Manufacture: April, 1998; VIN: 1FMZU34X0WU

GVWR: 2422 kg;

GAWR FRONT: 1229 kg

GAWR REAR: 1338 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 207 kpa REAR: 241 kpaRecommended Tire Size: P225/70R15

Recommended Cold Tire Pressure:

FRONT: 207 kpa REAR: 241 kpaSize of Tire on Test Vehicle: LT235/75R15Type of Spare Tire: P225/70R15; Space Saver: ; Standard: X

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ; Bucket ; Split Bench XNumber of Occupants: Front 3; Rear 3; TOTAL: 6VEHICLE CAPACITY WEIGHT (VCW) = N/A kgNo. of Occupants x 68 kg = 408 kgRated Cargo/Luggage Weight (RCLW) = 136 kg (difference)

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

Right Front = 494.0 kg Right Rear = 432.0 kgLeft Front = 533.0 kg Left Rear = 462.5 kgTOTAL FRONT = 1027.0 kg TOTAL REAR = 894.5 kg% Total Weight = 53.4 % % Total Weight = 46.6 %TOTAL DELIVERED WEIGHT = 1921.5 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1921.5 kgRated Cargo/Luggage Wt. = 136.0 kgTARGET TEST WEIGHT 2057.5 kg

WEIGHT OF TEST VEHICLE:

Right Front =	<u>488.5</u> kg	Right Rear =	<u>500.0</u> kg
Left Front =	<u>539.0</u> kg	Left Rear =	<u>532.0</u> kg
TOTAL FRONT =	<u>1027.5</u> kg	TOTAL REAR =	<u>1032.0</u> kg
% Total Weight =	<u>49.9</u> %	% Total Weight =	<u>50.1</u> %
TOTAL TEST WEIGHT = <u>2059.5</u> kg			
Weight of ballast secured in vehicle's cargo area = <u>136</u> kg			

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 866.0 mm; Left Front 854.0 mm;
 Right Rear 858.0 mm; Left Rear 824.0 mm

Pitch Angle at Right Door Sill = 0.5 Front higher
 Pitch Angle at Left Door Sill = 0.4 Front higher
 Roll Angle at Front Bumper = 0.9 Right side higher
 Roll Angle at Rear Bumper = 1.8 Right side higher

FULLY LOADED: Right Front 869.0 mm; Left Front 845.0 mm;
 Right Rear 834.0 mm; Left Rear 800.0 mm;

Pitch Angle at Right Door Sill = 0.8 Front higher
 Pitch Angle at Left Door Sill = 0.0 Front higher
 Roll Angle at Front Bumper = 0.8 Right side higher
 Roll Angle at Rear Bumper = 1.9 Right side higher

AS TARGETED: Right Front 1072.0 mm; Left Front 1069.0 mm;
 Right Rear 1060.0 mm; Left Rear 1025.0 mm;

Pitch Angle at Right Door Sill = 0.5 Front higher
 Pitch Angle at Left Door Sill = 0.0 Front higher
 Roll Angle at Front Bumper = 0.8 Right side higher
 Roll Angle at Rear Bumper = 1.9 Right side higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill = 0.5 Front higher
 Pitch Angle at Left Door Sill = 0.0 Front higher
 Roll Angle at Front Bumper = 0.8 Right side higher
 Roll Angle at Rear Bumper = 1.9 Right side higher

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill = 0.5 Front higher
Pitch Angle at Left Door Sill = 0.0 Front higher
Roll Angle at Front Bumper = 0.8 Right side higher
Roll Angle at Rear Bumper = 1.9 Right side higher

VEHICLE WHEELBASE = 2850 mm

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

RECORDED BY: David G. Gotwals

DATE: August 27, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Ford Explorer 4-DoorVEH. NHTSA NO.: PW0202 VIN: 1FMZU34X0WU COLOR: WhiteVEH. BUILD DATE: April, 1998 TEST DATES: August 30-31, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, 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 204.5°	L 250.1°
	R 105°-165°	R 109.6°	R 155.7°
B-PILLAR	L 195°-345°	L 200.1°	L 290.9°
	R 15°-165°	R 68.9°	R 160.2°

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: David G. GotwalsDATE: August 27, 2004APPROVED BY: Helen A. Kaletto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Ford Explorer 4-Door

VEH. NHTSA NO.: PW0202 VIN: 1FMZU34X0WU COLOR: White

VEH. BUILD DATE: April, 1998 TEST DATES: August 30-31, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, 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 31°
		R 0°-50°	R 0°	R 47°
	SR2A	L 0°-50°	L 0°	L 33°
		R 0°-50°	R 0°	R 50°
	SR2B	L 0°-50°	L 0°	L 33°
		R 0°-50°	R 0°	R 50°
	SR3-1	L 0°-50°	L 0°	L 48°
		R 0°-50°	R 0°	R 48°
	SR3-2	L 0°-50°	L 0°	L 48°
		R 0°-50°	R 0°	R 48°
	SR3-3	L 0°-50°	L 0°	L 25°
		R 0°-50°	R 0°	R 25°
A-PILLAR	AP1	L -5°-50°	L -5°	L 33°
		R -5°-50°	R -5°	R 33°
	AP2	L -5°-50°	L -5°	L 40°
		R -5°-50°	R -5°	R 40°

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
	AP3	L -5°-50°	L -5°	L 35°
		R -5°-50°	R -5°	R 35°
B-PILLAR	BP1	L -10°-50°	L -10°	L 11°
		R -10°-50°	R -10°	R 11°
	BP2*	L 0°-50°	L 0°	L 4°
		R 0°-50°	R 0°	R 4°
	BP3	L -10°-50°	L -10°	L -4°
		R -10°-50°	R -10°	R -4°
	BP4	L -10°-50°	L -10°	L -5°
		R -10°-50°	R -10°	R -5°
OTHER PILLAR	OP1*	L 0°-50°	L 0°	L 1°
		R 0°-50°	R 0°	R 1°
	OP2	L -10°-50°	L -10°	L -2°
		R -10°-50°	R -10°	R -2°
UPPER ROOF 1		0°-50°	0°	50°
UPPER ROOF 2		0°-50°	0°	50°
UPPER ROOF 3		0°-50°	0°	50°
UPPER ROOF 4		0°-50°	0°	35°
UPPER ROOF 5		0°-50°	0°	50°
UPPER ROOF 6		0°-50°	0°	50°

As determined using the Procedures specified in S8.13.4.2. *Targets BP2 and OP1 are seat belt anchorage locations.

RECORDED BY: David G. Gotwals

DATE: August 27, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Ford Explorer 4-DoorVEH. NHTSA NO.: PW0202 VIN: 1FMZU34X0WUC27917 COLOR: WhiteVEH. BUILD DATE: April, 1998 TEST DATES: August 30-31, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	240 mm	240 mm
T°	Horizontal ∠ {CG-F1 (Left Seat) to (Right A-Pillar)}	109.9°	--
A1°	360° - T°	250.1°	--
W°	Horizontal ∠ {CG-2 (Left Seat) to (Left A-Pillar)}	204.5°	--
A2°	A2° = W°	204.5°	--
U°	Horizontal ∠ {CG-2 (Left Seat) to (Left B-Pillar)}	290.9°	--
B1°	B1° = U°	290.9°	--
V°	Horizontal ∠ {CG-R (Left Seat) to (Left B-Pillar)}	200.1°	--
B2°	B2° = V°	200.1°	--
W° (right)	Horizontal ∠ {CG-F2 (Right Seat) to (Right A-Pillar)}	--	155.7°
A1° (right)	A1° (right) = W° (right)	--	155.7°
T° (right)	Horizontal ∠ {CG-F1 (Right Seat) to (Left A-Pillar)}	--	250.4°
A2° (right)	360° - T° (right)	--	109.6°
V° (right)	Horizontal ∠ {CG-R (Right Seat) to (Right B-Pillar)}	--	160.2°
B1° (right)	B1° (right) = V° (right)	--	160.2°
U° (right)	Horizontal ∠ {CG-F2 (Right Seat) to (Right B-Pillar)}	--	68.9°
B2° (right)	B2° (right) = U° (right)	--	68.9°
J	A-Pillar {(Plane 3) - (Plane 5)}	365.7 mm	349.7 mm
J/2	J ÷ 2	182.9 mm	174.9 mm
D1	Upper Roof {(Plane A) - (Plane B)}	2467.0 mm	
D1/2	D1 ÷ 2	1233.5 mm	
D2	Upper Roof {(Plane C) - (Plane D)}	1236.0 mm	
D2/2	D2 ÷ 2	618.0 mm	
.35D1	.35 x D1	863.5 mm	
.35D2	.35 x D2	432.6 mm	

Measurement	Description	Left Side	Right Side
N	B-Pillar {(BPR) - (lowest point on daylight opening forward of B-Pillar)}	532.2 mm	522.3 mm
N/2	B-Pillar {(BP3) - (lowest point on daylight opening forward of B-Pillar)}	266.1 mm	261.2 mm
N/4	B-Pillar {(BP4) - (lowest point on daylight opening forward of B-Pillar)}	133.1 mm	130.6 mm
Q	Q-Pillar (Plane 13 – Plane 14)	528.8 mm	522.9 mm
Q/2	Q / 2	264.4 mm	261.5 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	2071.0	-385.0	776.0	2071.0	385.0	776.0
Rear	2924.0	-385.0	796.0	2924.0	385.0	796.0

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	2071.0	-385.0	776.0	2071.0	385.0	776.0
Rear	2924.0	-385.0	796.0	2924.0	385.0	796.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1991.0	-385.0	1436.0	1991.0	385.0	1436.0
CGF2	2231.0	-385.0	1436.0	2231.0	385.0	1436.0
CGR	3084.0	385.0	1456.0	3084.0	385.0	1456.0

REFERENCE FOR VEHICLE COORDINATE SYSTEM:

RECORDED BY: David G. Gotwals

DATE: August 27, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 1998 Ford Explorer 4-DoorVEH. NHTSA NO.: PW0202 VIN: 1FMZU34X0WU COLOR: WhiteVEH. BUILD DATE: April, 1998 TEST DATES: August 30-31, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, 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	1810.8	-552.2	1577.0	--	--	Yes	--	--
REL	1828.4	-568.0	1557.5	250	33	--	1	No
AP2	1742.0	-614.6	1488.8	205	40	No	--	Yes
AP3	1620.5	-649.2	1393.7	205	35	No	--	No
A-Pillar Right Side								
AP1	1816.2	555.2	1570.2	--	--	Yes	--	--
REL	1824.2	571.7	1554.5	110	33	--	1	Yes
AP2	1728.4	620.9	1481.4	155	40	No	--	No
AP3	1618.8	649.5	1394.7	155	35	No	--	Yes
B-Pillar Left Side								
BP1	2380.8	-520.8	1642.3	270	11	No	--	No
BP2	2364.0	-596.5	1426.5	270	4	No	--	Yes
BP3	2311.2	-649.3	1376.5	270	-4	No	--	No
BP4	2383.6	-694.1	1244.5	220	-5	No	--	No
B-Pillar Right Side								
BP1	2387.0	514.5	1639.6	90	11	No	--	Yes
BP2	2365.5	591.0	1429.9	90	4	No	--	No
BP3	2314.4	645.1	1378.6	90	-4	No	--	No
BP4	2386.5	689.5	1247.1	140	-5	No	--	Yes
Other Pillar Left Side								
OPR	3200.1	-530.6	1649.0	--	--	--	--	--
OP1	3210.6	-616.9	1461.3	270	1	No	--	No

SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
OP2	3229.1	-660.4	1385.0	--	--	Yes	--	--
REL	3245.7	-662.0	1380.5	270	-2	--	1	No
Other Pillar Right Side								
OPR	3207.3	530.3	1642.2	--	--	--	--	--
OP1	3207.4	610.8	1462.1	90	1	No	--	Yes
OP2	3230.5	656.9	1380.8	--	--	Yes	--	--
REL	3258.8	656.1	1380.6	90	-2	--	1	No
Front Header Left Side								
FH1	1719.2	-438.0	1573.6	180	50	No	--	No
FH2	1686.6	-292.8	1579.4	180	50	No	--	No
Front Header Right Side								
FH1	1721.2	437.8	1577.7	180	50	No	--	No
FH2	1687.2	291.2	1583.0	180	50	No	--	Yes
Side Rail Left Side								
SR1	1960.2	-523.6	1622.3	270	31	No	--	Yes
SR2A	2111.4	-524.2	1633.4	270	33	No	--	No
SR2B	2081.3	-524.2	1631.8	270	33	No	--	No
SR3-1	2610.9	-516.0	1618.1	270	48	No	--	No
SR3-2	2766.3	-517.7	1618.4	270	48	No	--	No
SR3-3	3349.3	-562.6	1611.5	270	25	No	--	No
Side Rail Right Side								
SR1	1967.0	513.3	1616.6	--	--	Yes	--	--
REL	1982.8	505.5	1605.9	90	47	--	1	No
SR2A	2116.9	510.6	1638.6	--	--	Yes	--	--
REL	2126.2	502.0	1612.3	90	50	--	2	No
SR2B	2086.3	528.7	1643.4	--	--	Yes	--	--
REL	2076.2	498.5	1596.6	90	50	--	2	No
SR3-1	2611.1	508.0	1618.4	90	48	No	--	No
SR3-2	2763.9	508.1	1618.1	90	48	No	--	No
SR3-3	3356.7	554.9	1611.4	90	25	No	--	No
Upper Roof Left Side								
UR1	1989.6	-427.3	1654.0	270	50	No	--	Yes

SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
UR2	2384.2	-424.6	1668.8	270	50	No	--	Yes
UR3	3191.6	-429.3	1677.6	270	50	No	--	No
Upper Roof Right Side								
UR4	1987.4	426.9	1655.1	90	35	No	--	No
UR5	2384.1	428.3	1669.3	90	50	No	--	No
UR6	3202.0	430.8	1679.5	90	50	No	--	No

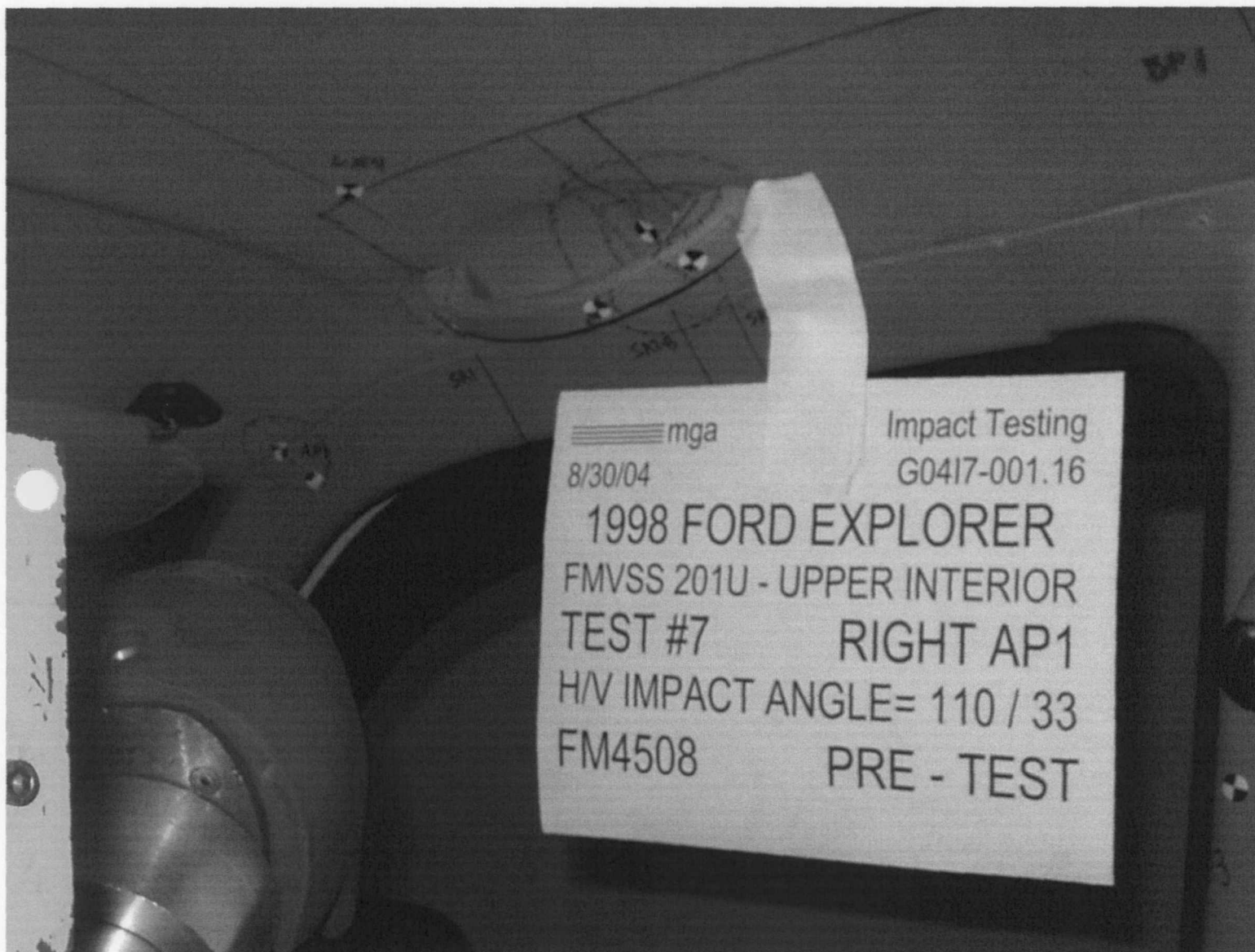
As determined using the Procedures specified in S10.1-10.13.

REMARKS:

RECORDED BY: David G. Gotwals

DATE: August 27, 2004

APPROVED BY: Helen A. Kaleto



mga

8/30/04

Impact Testing

G0417-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

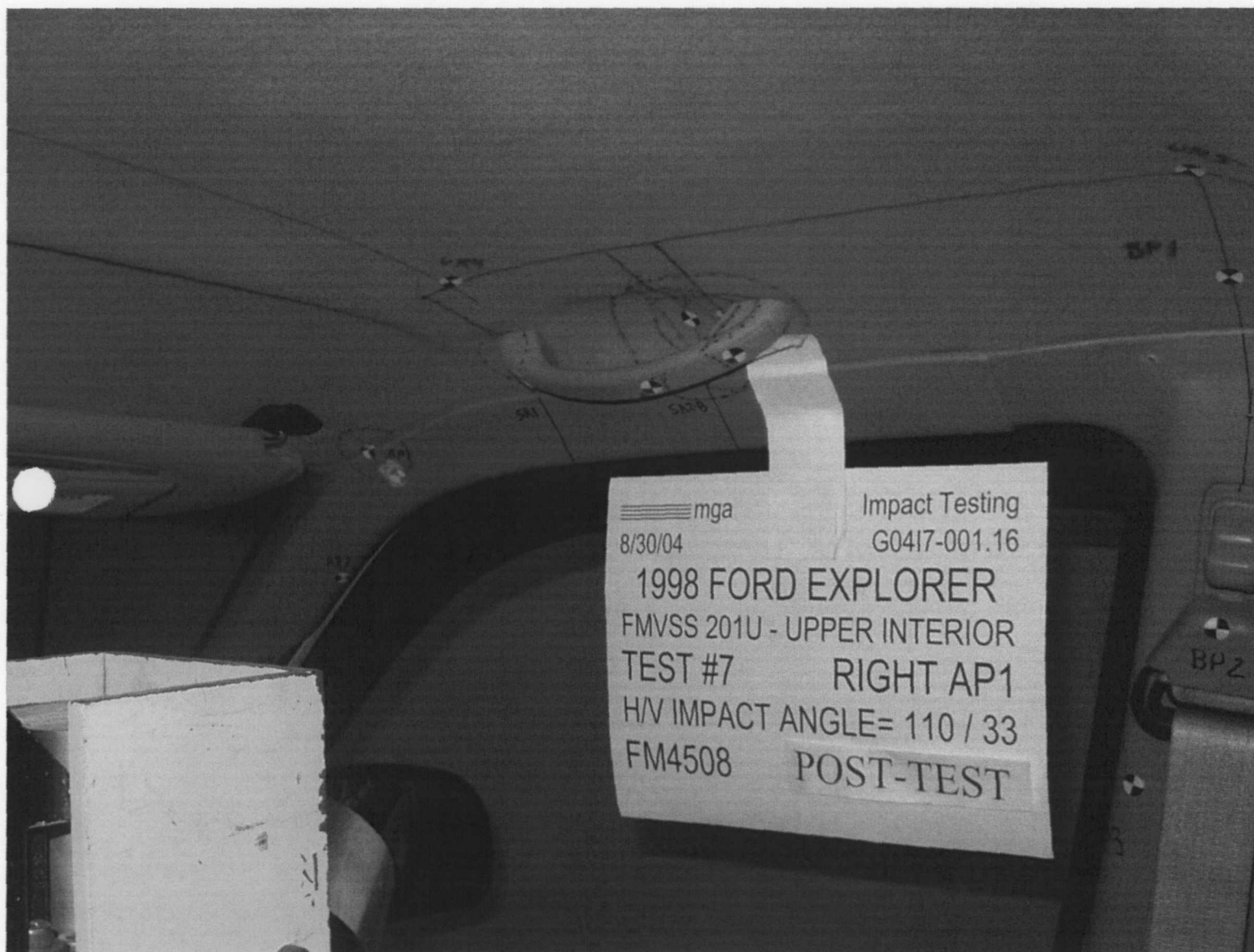
TEST #7

RIGHT AP1

H/V IMPACT ANGLE= 110 / 33

FM4508

PRE - TEST





===== mga

8/30/04

Impact Testing

G0417-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #7 RIGHT AP1

H/V IMPACT ANGLE= 110 / 33

FM4508 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): AP1 Right

Temperature:22C

MGA Test Reference No.:FM4508

Humidity:54%

Approach Horizontal Angles:110°

Time of Test:4:10 PM

Approach Vertical Angles:33°

FMH Serial No:035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
884	951	4.2	23.8	15	3 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-92.4	1.67	1.67
Y	6	J35919	93.8	1.54	1.54
Z	7	J21969	88.5	1.57	1.58

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

No visible damage

Recorded By: me g m Approved By*: Helen A. Kato Date: 8-30-04

*Only necessary for NHTSA (Government) Compliance testing.

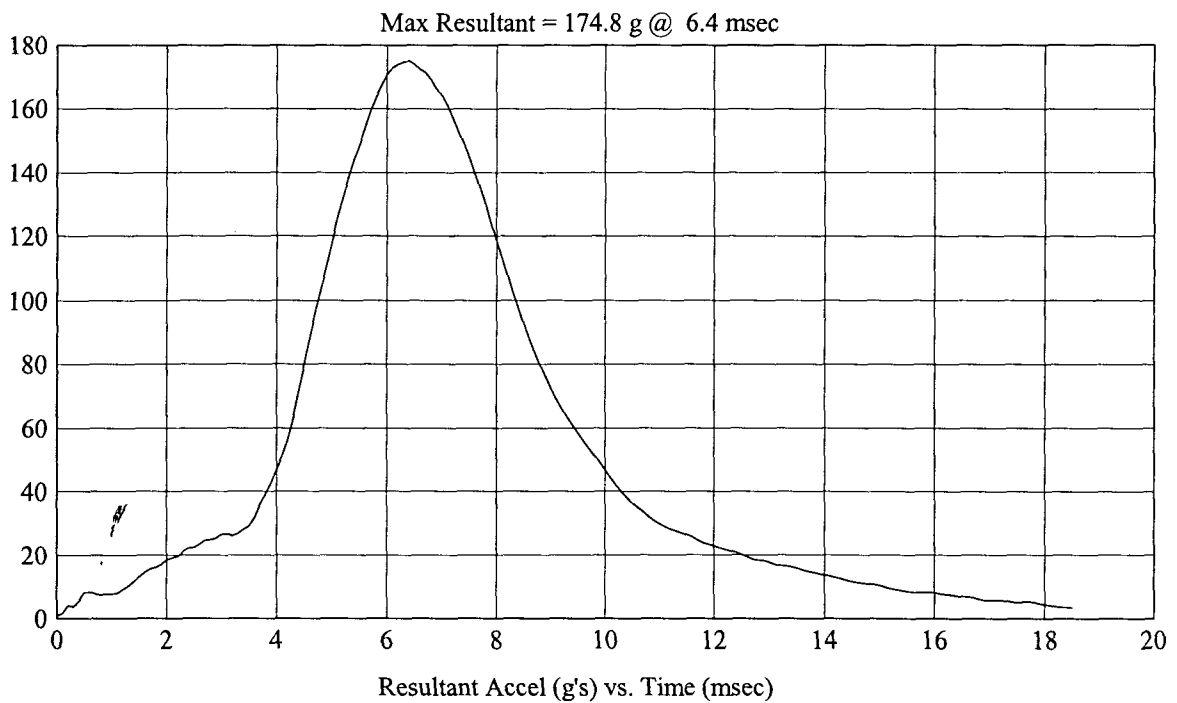
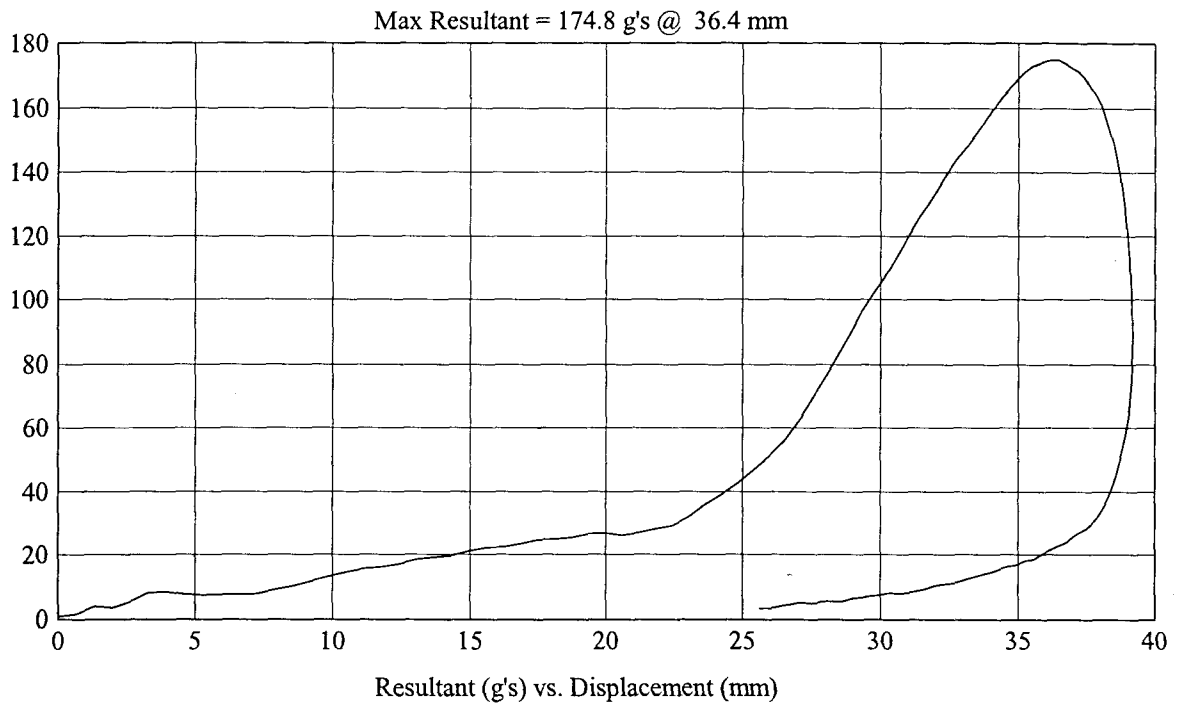
FMH
G04I7-001.16

Customer: FORD
Test # 7
FM4508
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 110/33

HIC(d) = 884, HIC = 951, Delta T = 4.2 msec



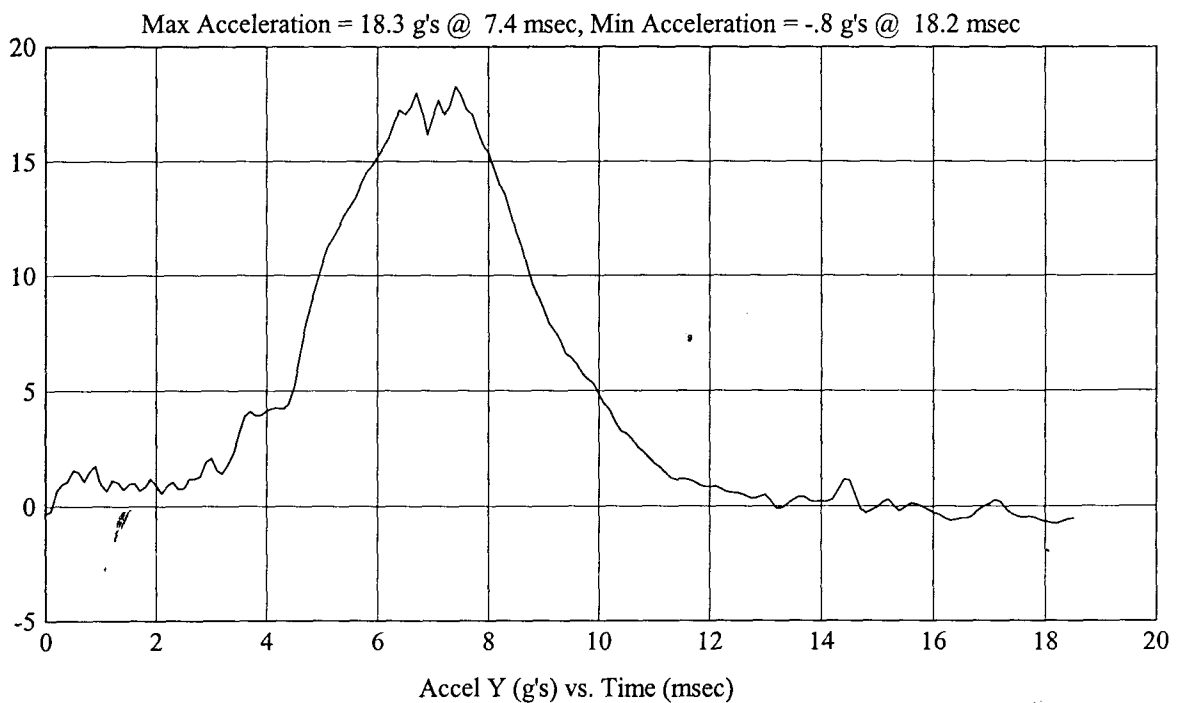
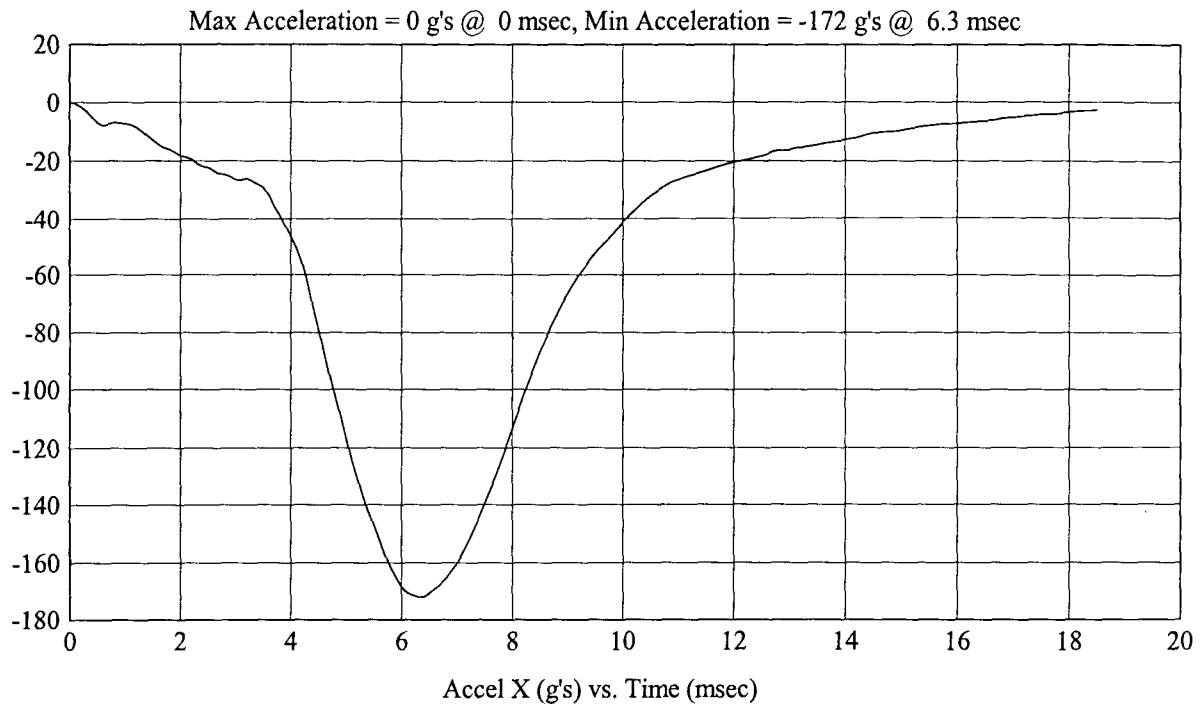
FMH
G04I7-001.16

Customer: FORD
Test # 7
FM4508
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 110/33

HIC(d) = 884, HIC = 951, Delta T = 4.2 msec



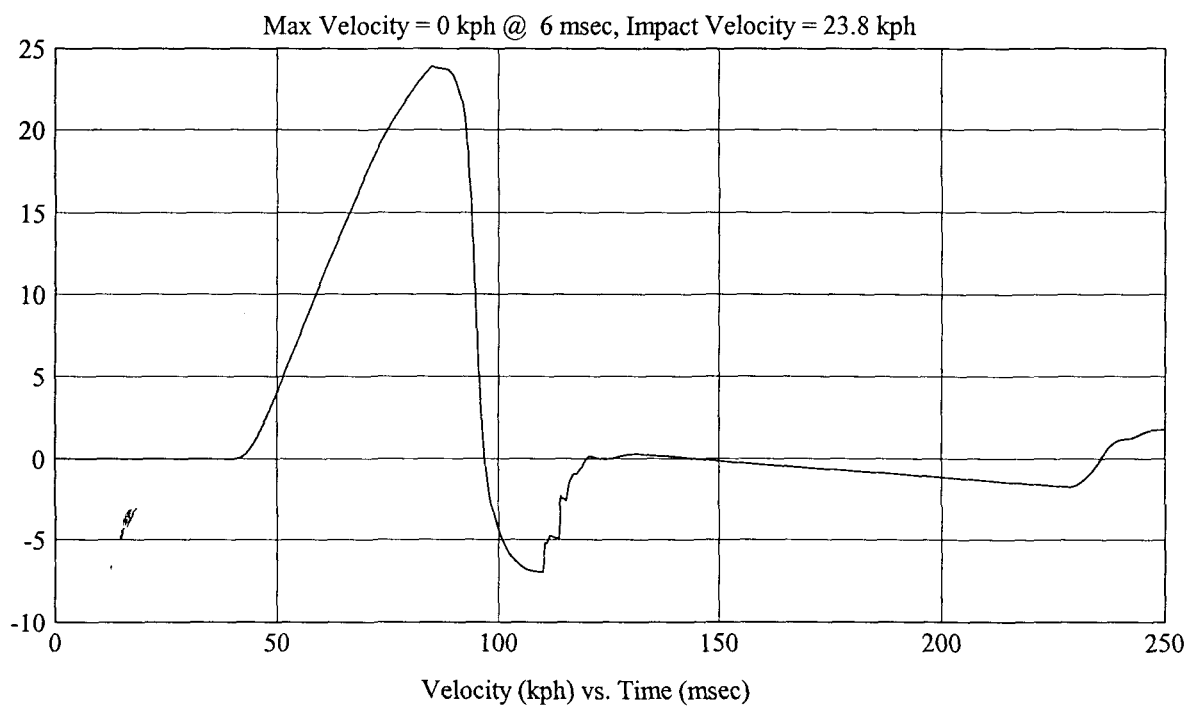
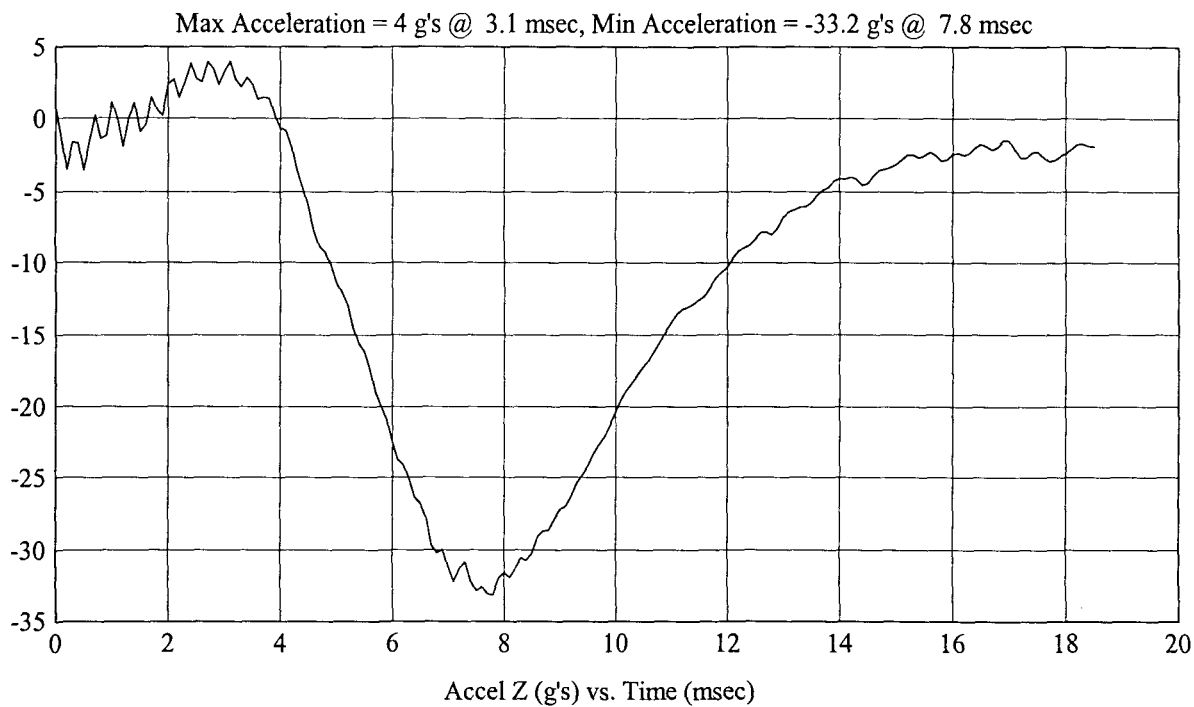
FMH
G04I7-001.16

Customer: FORD
Test # 7
FM4508
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 110/33

HIC(d) = 884, HIC = 951, Delta T = 4.2 msec



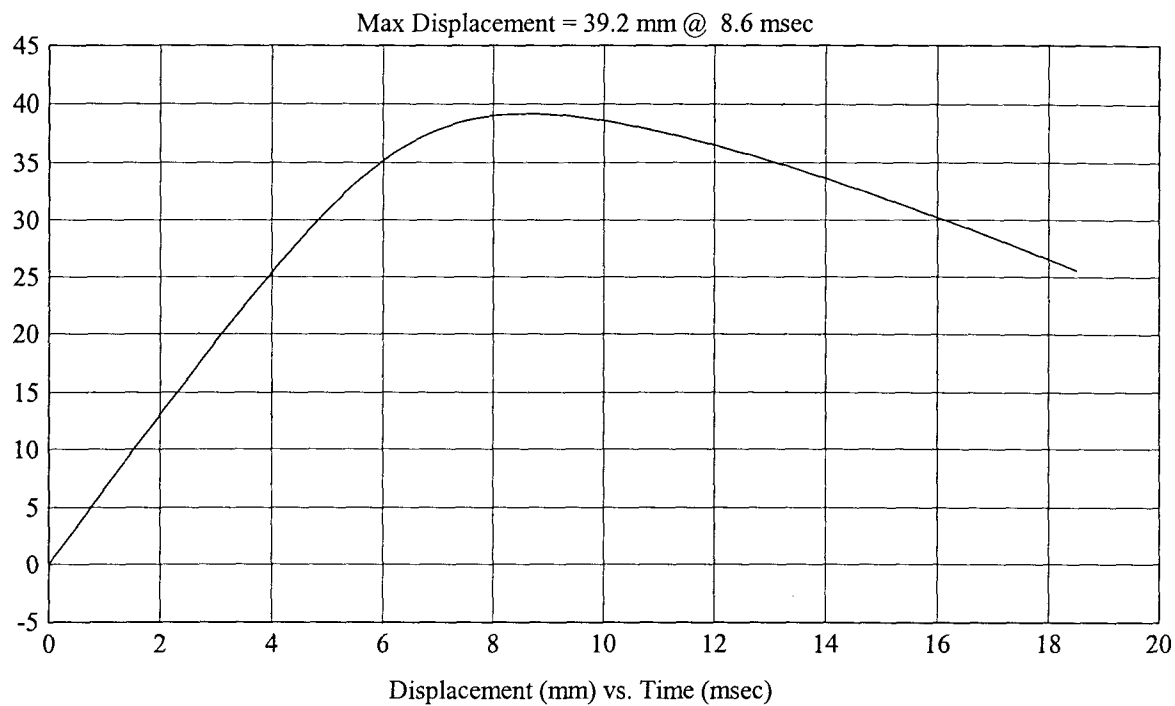
FMH
G04I7-001.16

Customer: FORD
Test # 7
FM4508
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 110/33

HIC(d) = 884, HIC = 951, Delta T = 4.2 msec



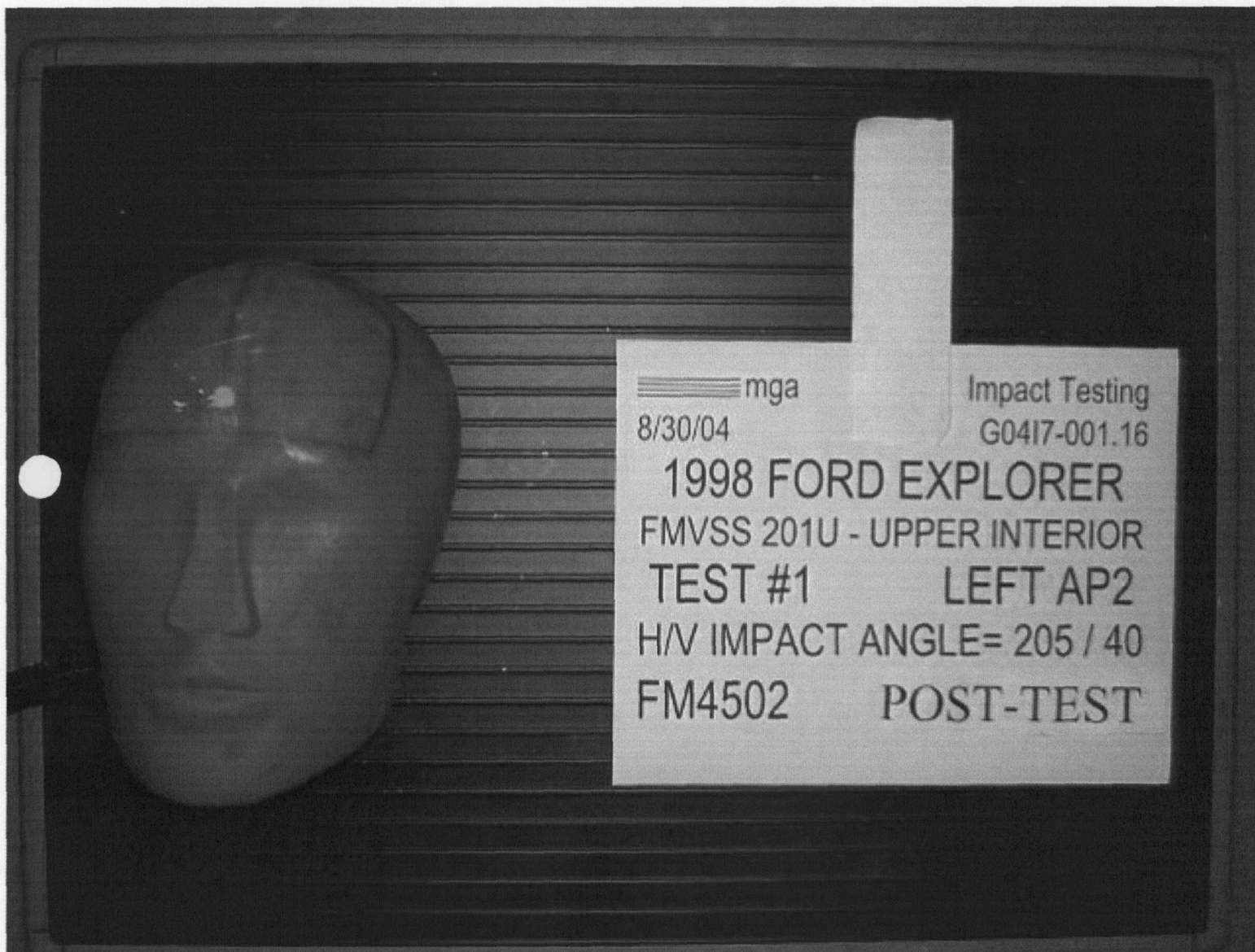




mga
8/30/04

Impact Testing
G0417-001.16

1998 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 205 / 40
FM4502 POST-TEST



SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): AP2 Left

Temperature:22C

MGA Test Reference No.:FM4502

Humidity:56%

Approach Horizontal Angles:205°

Time of Test: 9:45 AM

Approach Vertical Angles:40°

FMH Serial No:035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
865	926	5.4	23.7	13	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-92.4	1.67	1.67
Y	6	J35919	93.8	1.54	1.54
Z	7	J21969	88.5	1.58	1.58

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

Pillar trim cracked

Recorded By: m j m Approved By*: Helen A. Kuleto Date: 8-30-01

*Only necessary for NHTSA (Government) Compliance testing.

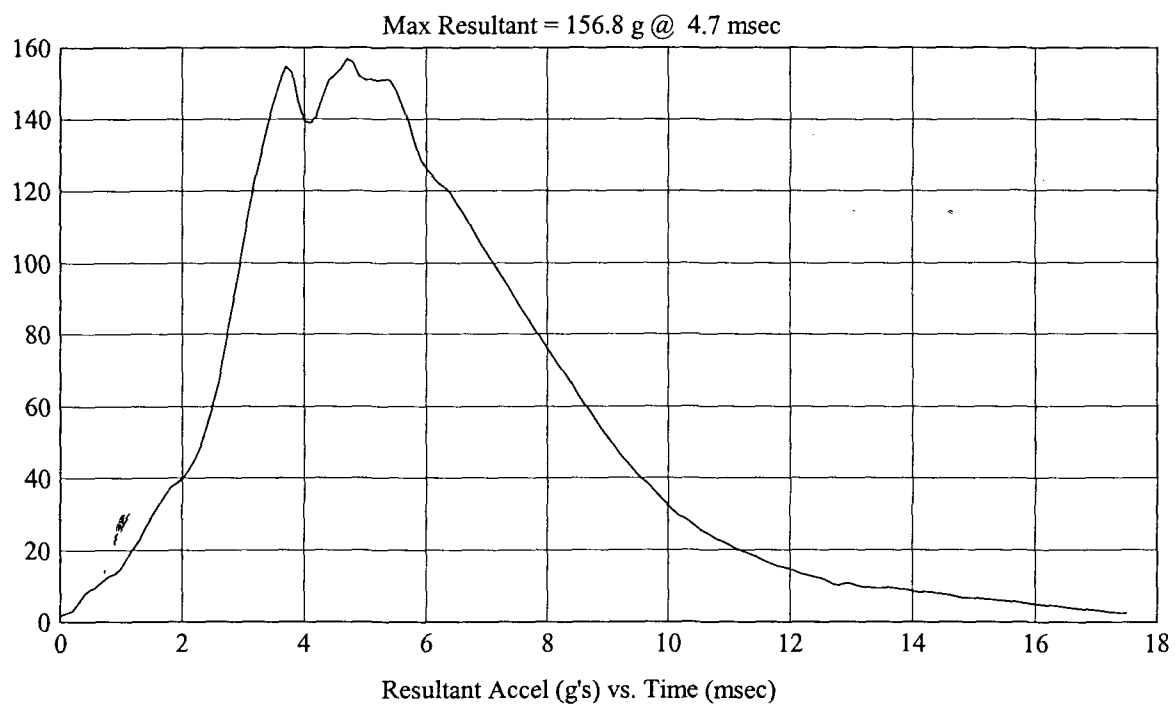
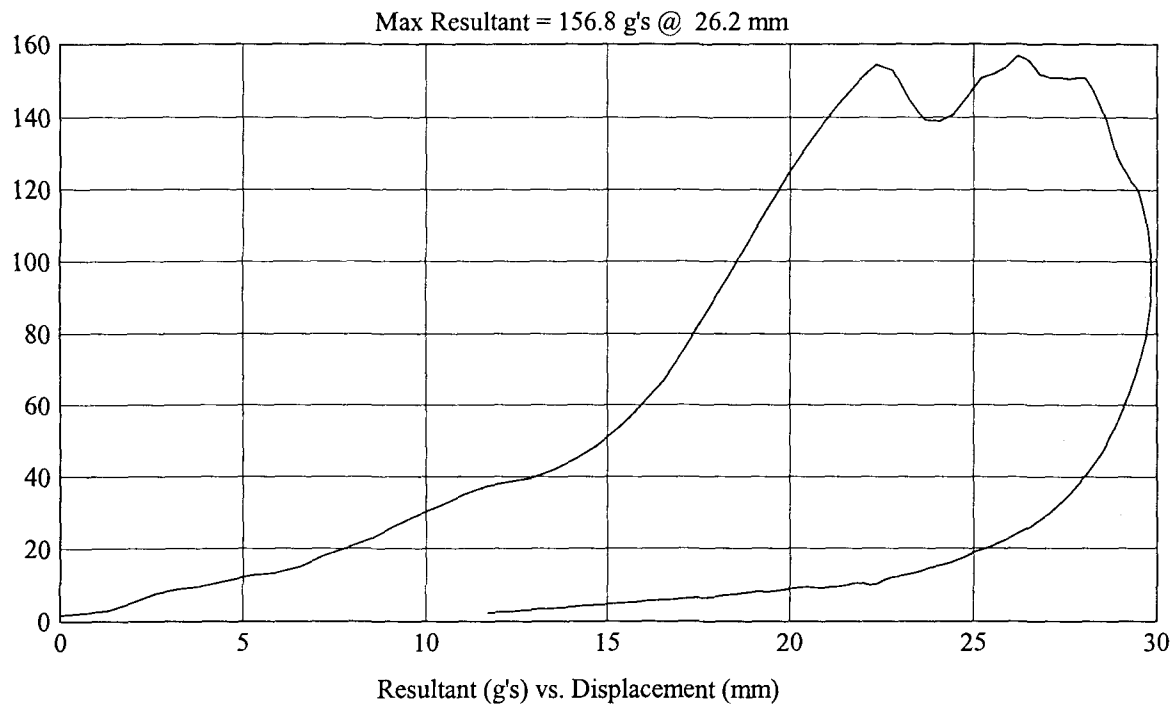
FMH
G04I7-001.16

Customer: FORD
Test # 1
FM4502
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/40

HIC(d) = 865, HIC = 926, Delta T = 5.4 msec



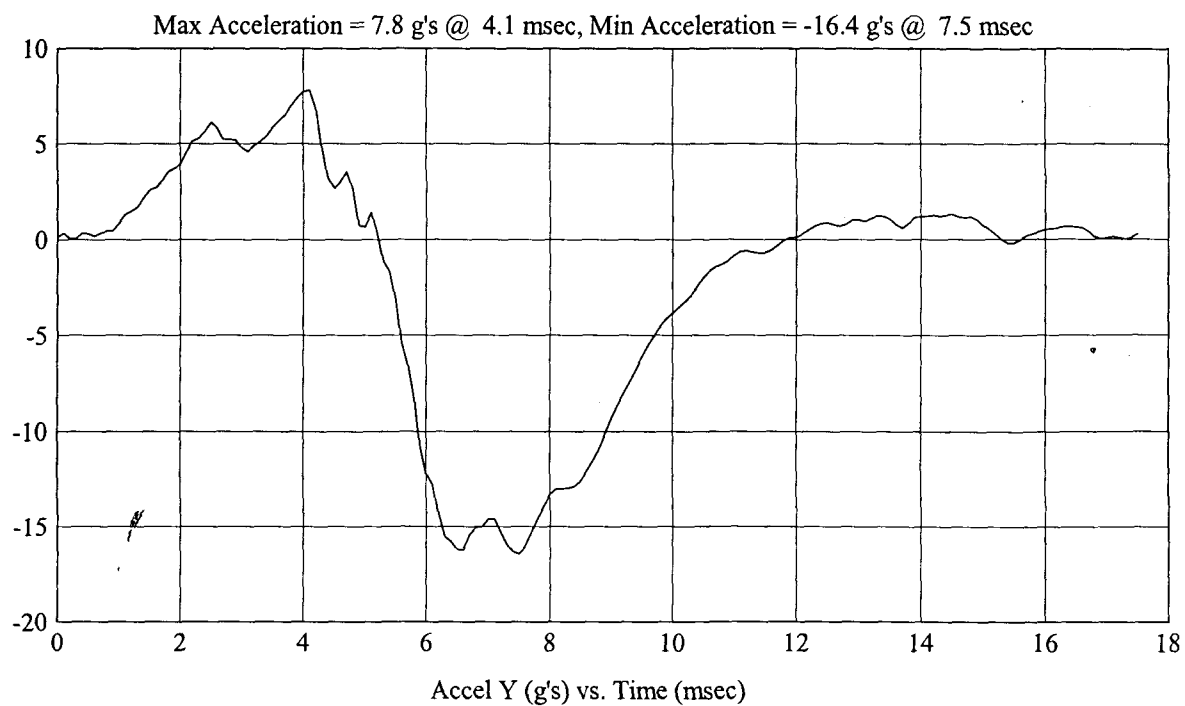
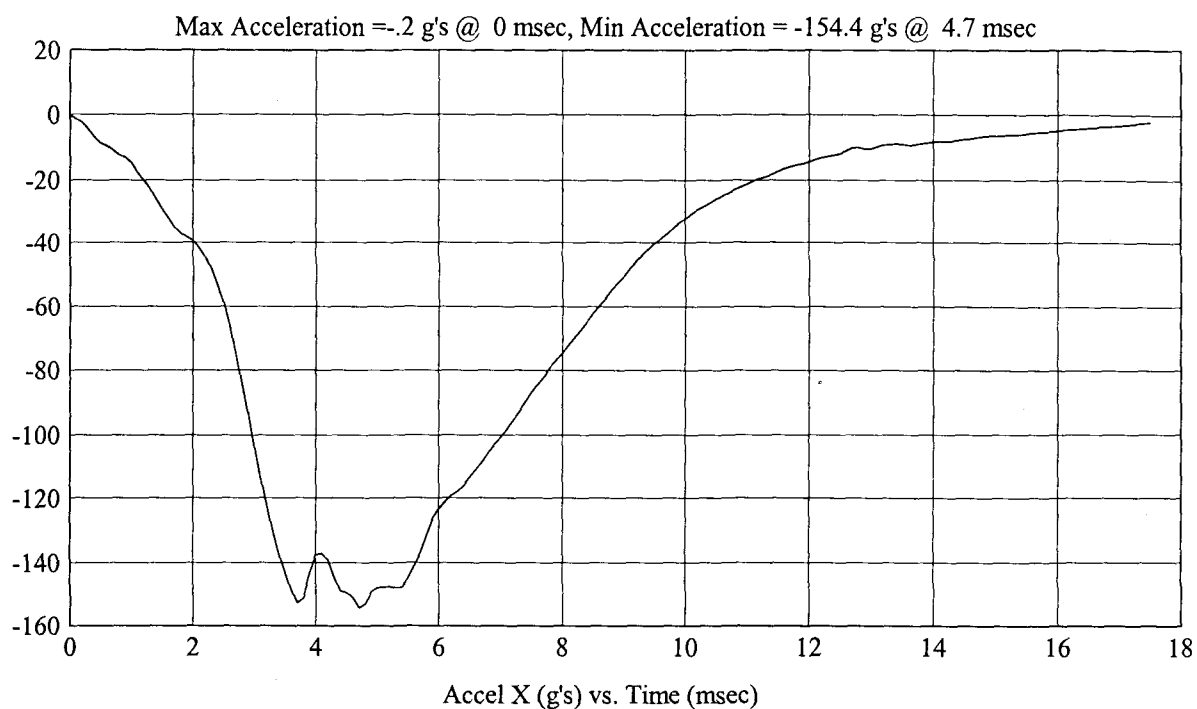
FMH
G04I7-001.16

Customer: FORD
Test # 1
FM4502
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/40

HIC(d) = 865, HIC = 926, Delta T = 5.4 msec



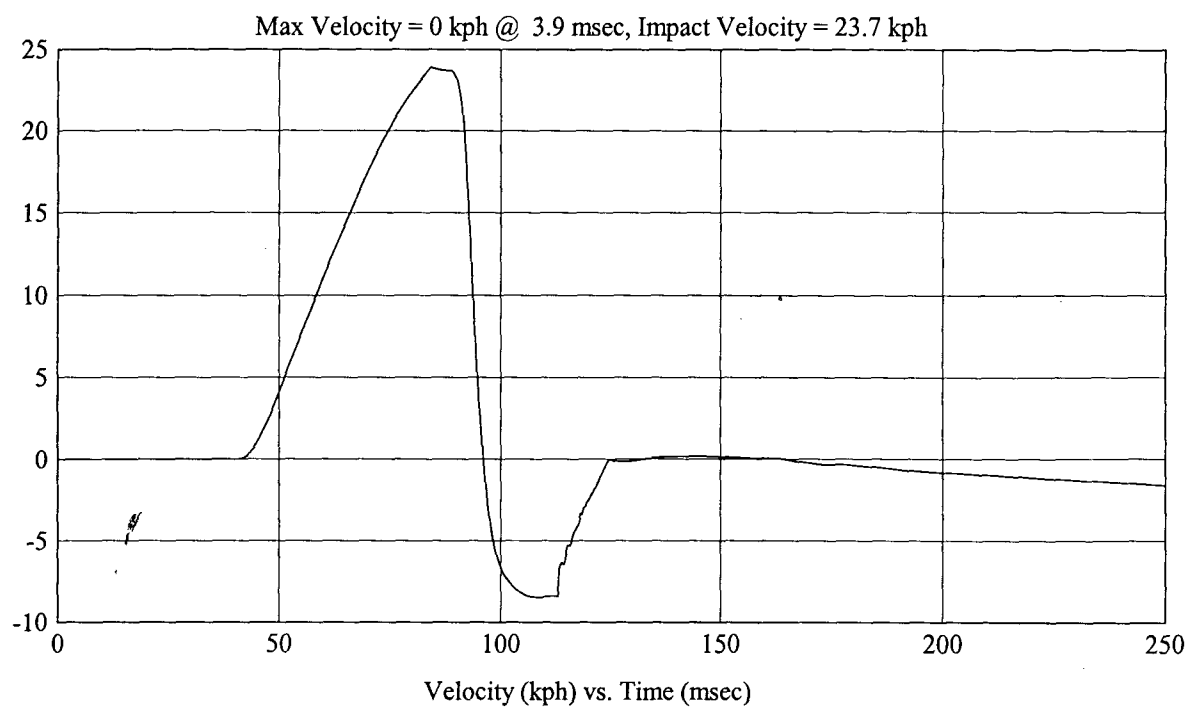
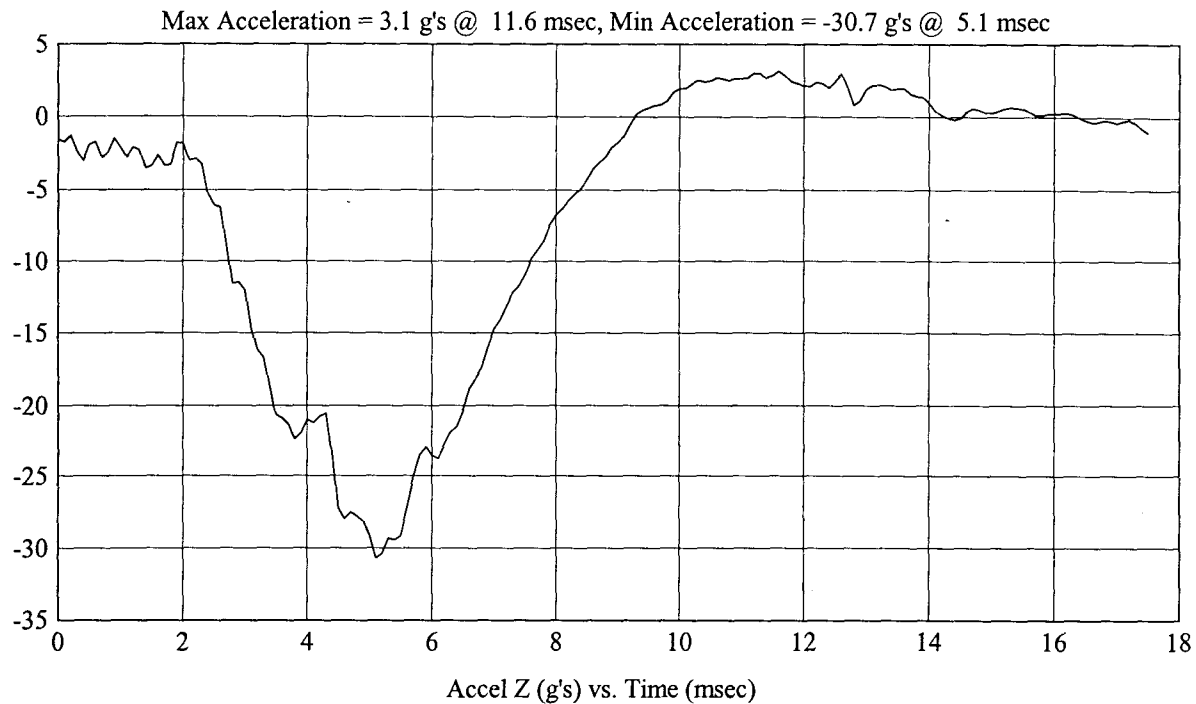
FMH
G04I7-001.16

Customer: FORD
Test # 1
FM4502
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/40

HIC(d) = 865, HIC = 926, Delta T = 5.4 msec



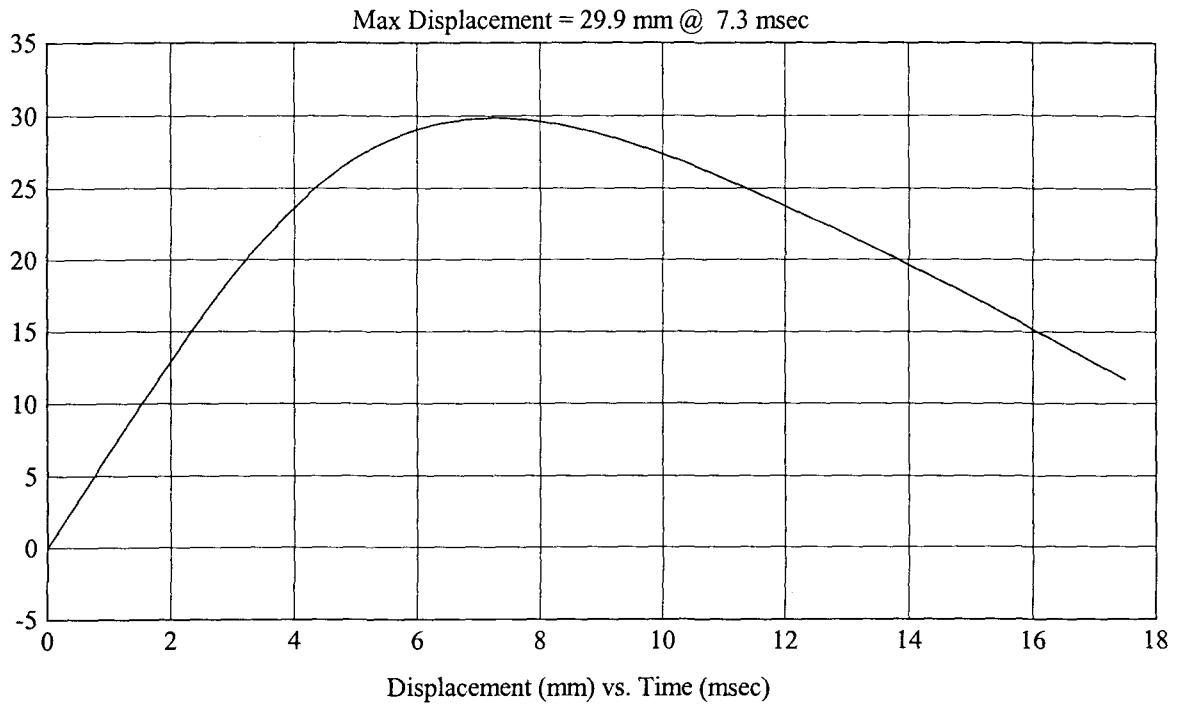
FMH
G04I7-001.16

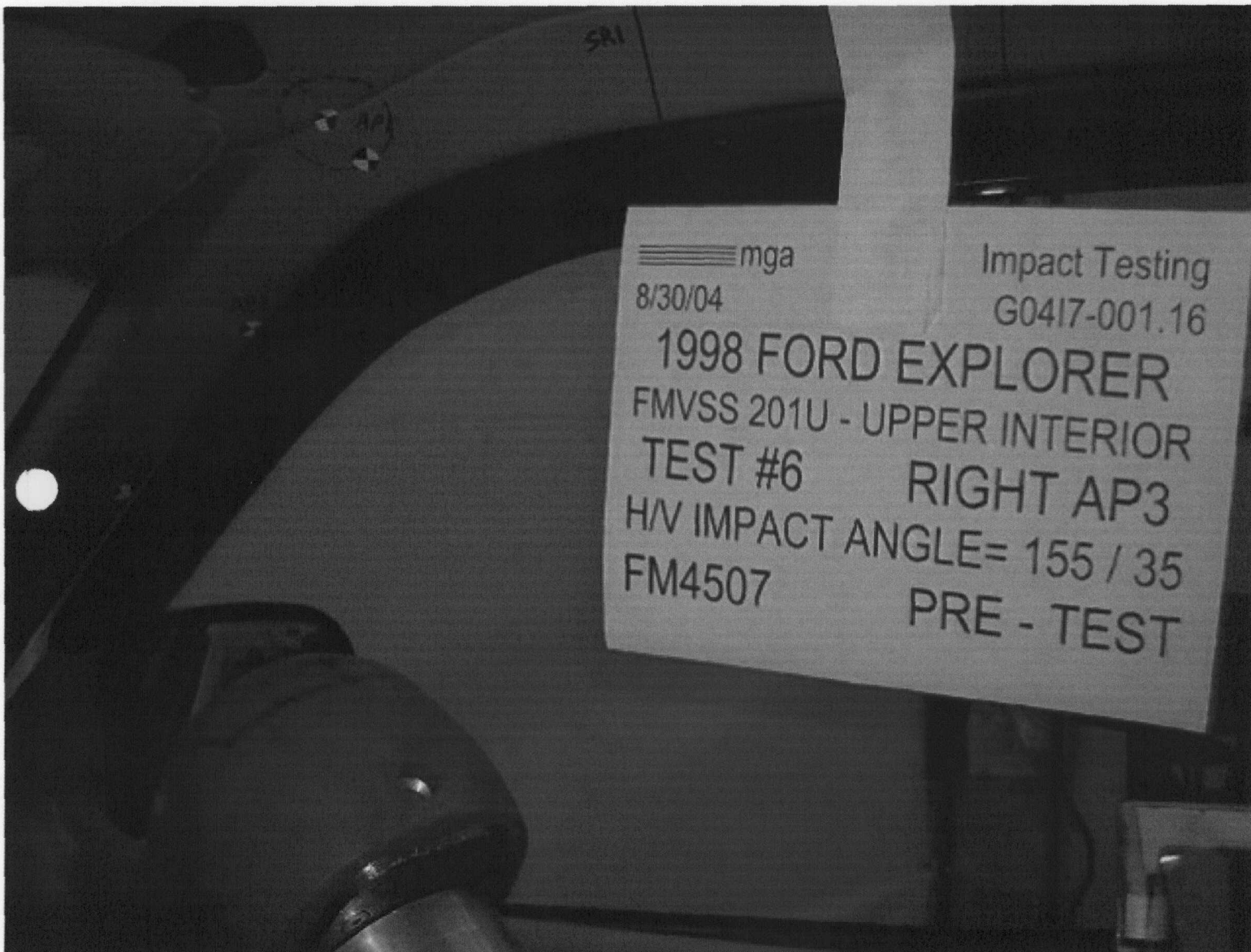
Customer: FORD
Test # 1
FM4502
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/40

HIC(d) = 865, HIC = 926, Delta T = 5.4 msec





mga

8/30/04

Impact Testing

G04I7-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

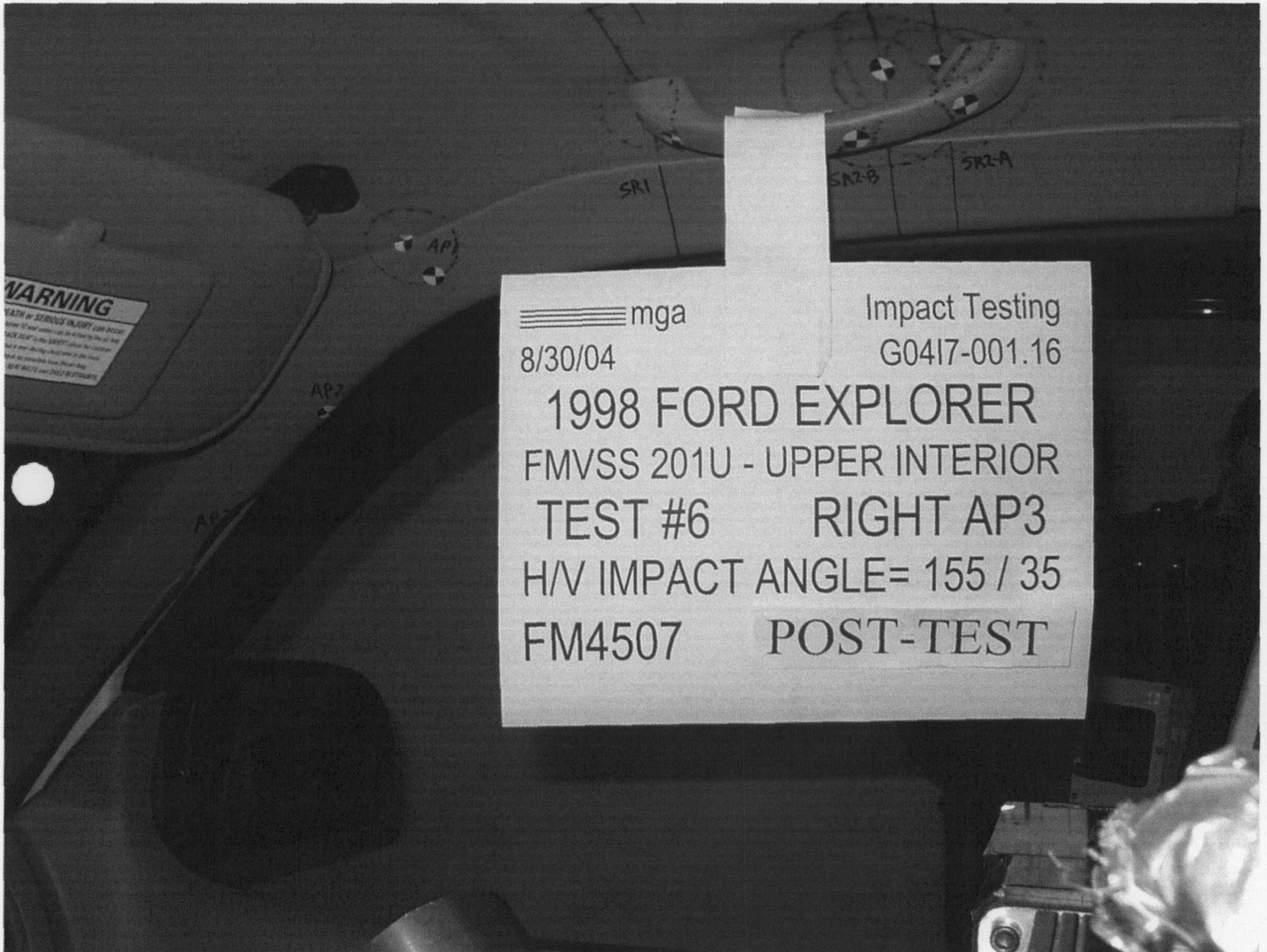
TEST #6

RIGHT AP3

H/V IMPACT ANGLE= 155 / 35

FM4507

PRE - TEST



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8/30/04

Impact Testing
G0417-001.16

1998 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #6 RIGHT AP3
H/V IMPACT ANGLE= 155 / 35
FM4507 POST-TEST



==== mga

8/30/04

Impact Testing

G04I7-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #6 RIGHT AP3

H/V IMPACT ANGLE= 155 / 35

FM4507 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): AP3 Right

Temperature:22C

MGA Test Reference No.:FM4507

Humidity:56%

Approach Horizontal Angles:155°

Time of Test:3:30 PM

Approach Vertical Angles:35°

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
895	966	5.9	23.8	15	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	1.67	1.68
Y	6	J36193	101.4	1.54	1.55
Z	7	J36353	96.8	1.58	1.57

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

Cracked pillar trim

Recorded By: Jim J. A. Approved By*: Heidi G. Kalish Date: 8-30-04

*Only necessary for NHTSA (Government) Compliance testing.

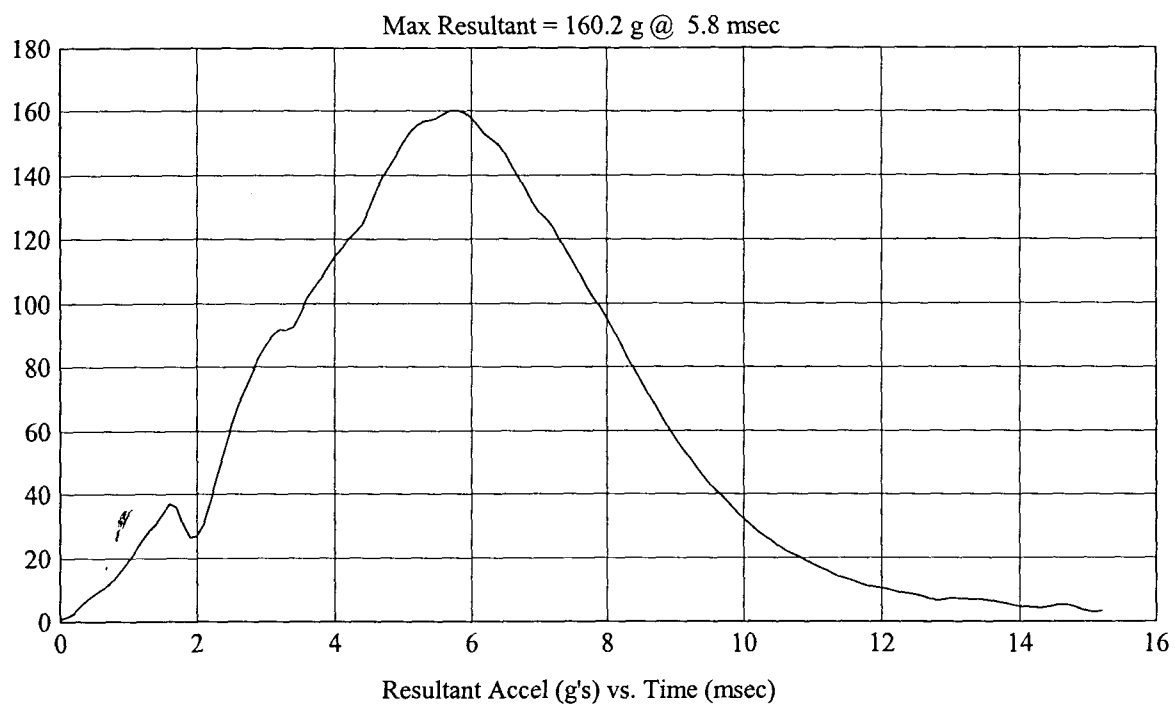
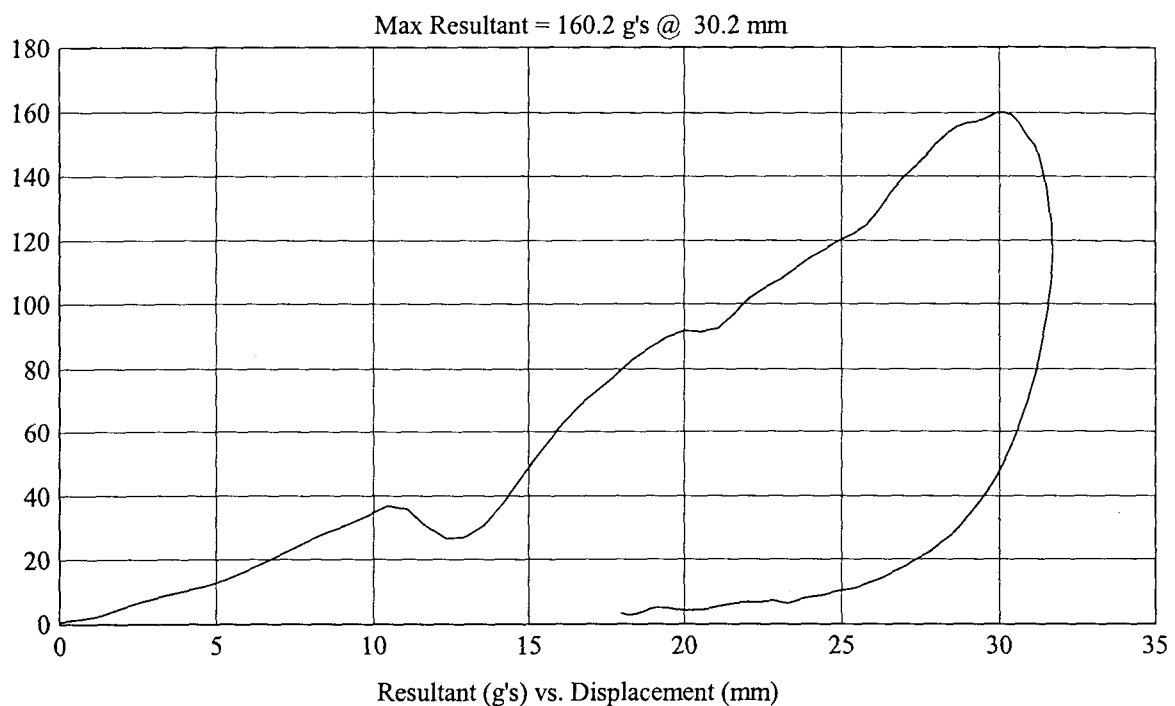
FMH
G04I7-001.16

Customer: FORD
Test # 6
FM4507
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 155/35

HIC(d) = 895, HIC = 966, Delta T = 5.9 msec



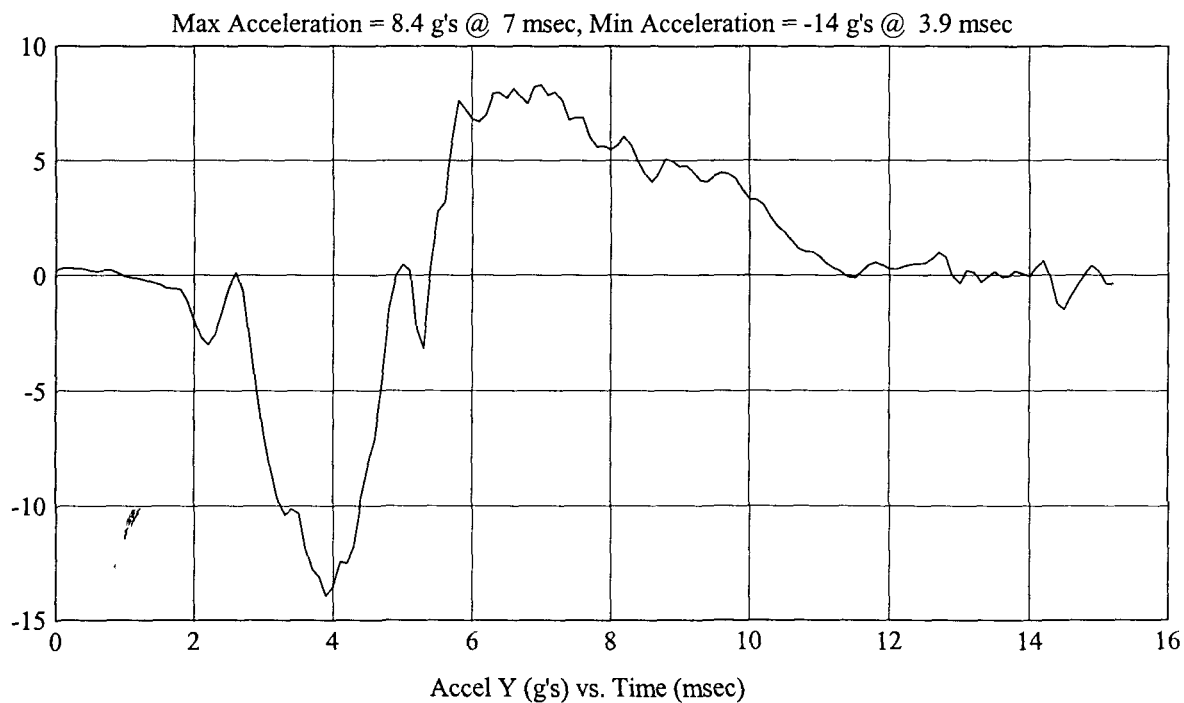
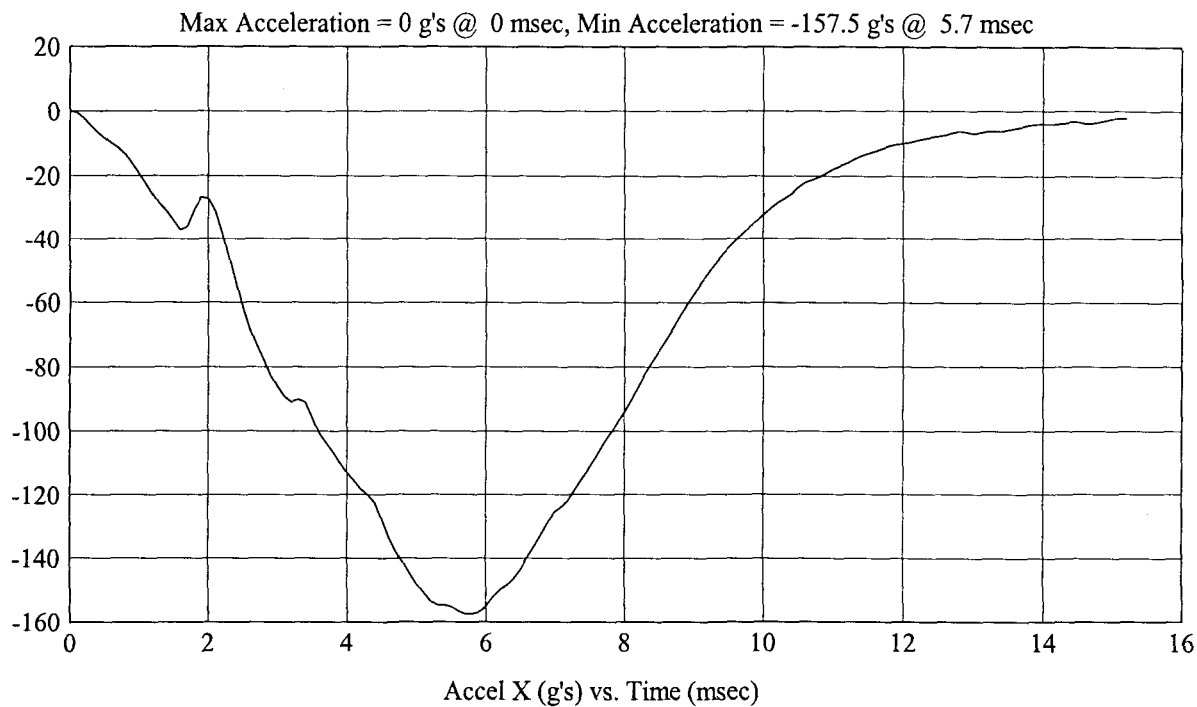
FMH
G04I7-001.16

Customer: FORD
Test # 6
FM4507
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 155/35

HIC(d) = 895, HIC = 966, Delta T = 5.9 msec



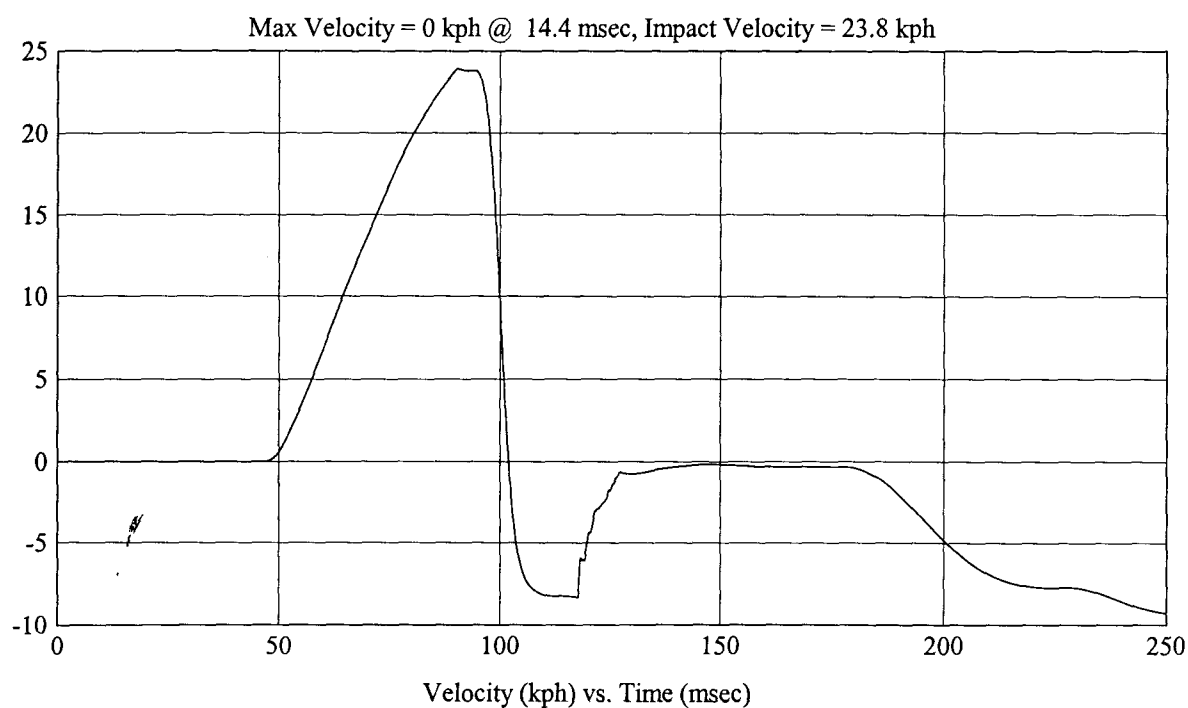
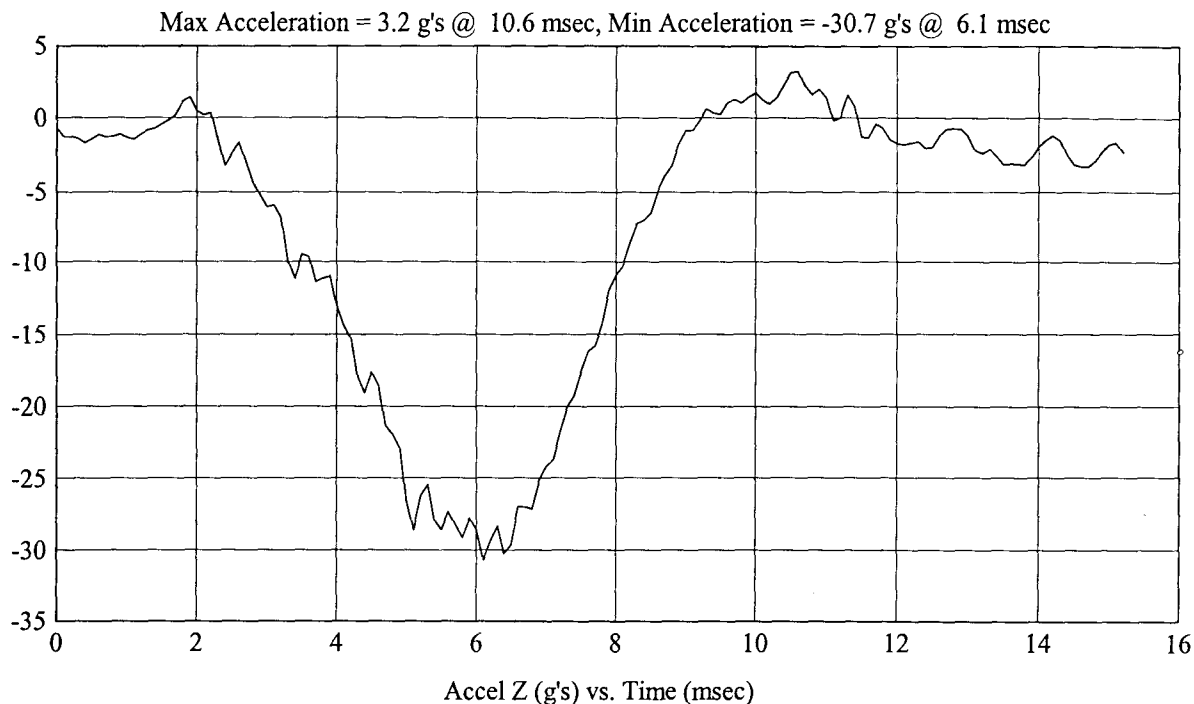
FMH
G04I7-001.16

Customer: FORD
Test # 6
FM4507
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 155/35

HIC(d) = 895, HIC = 966, Delta T = 5.9 msec



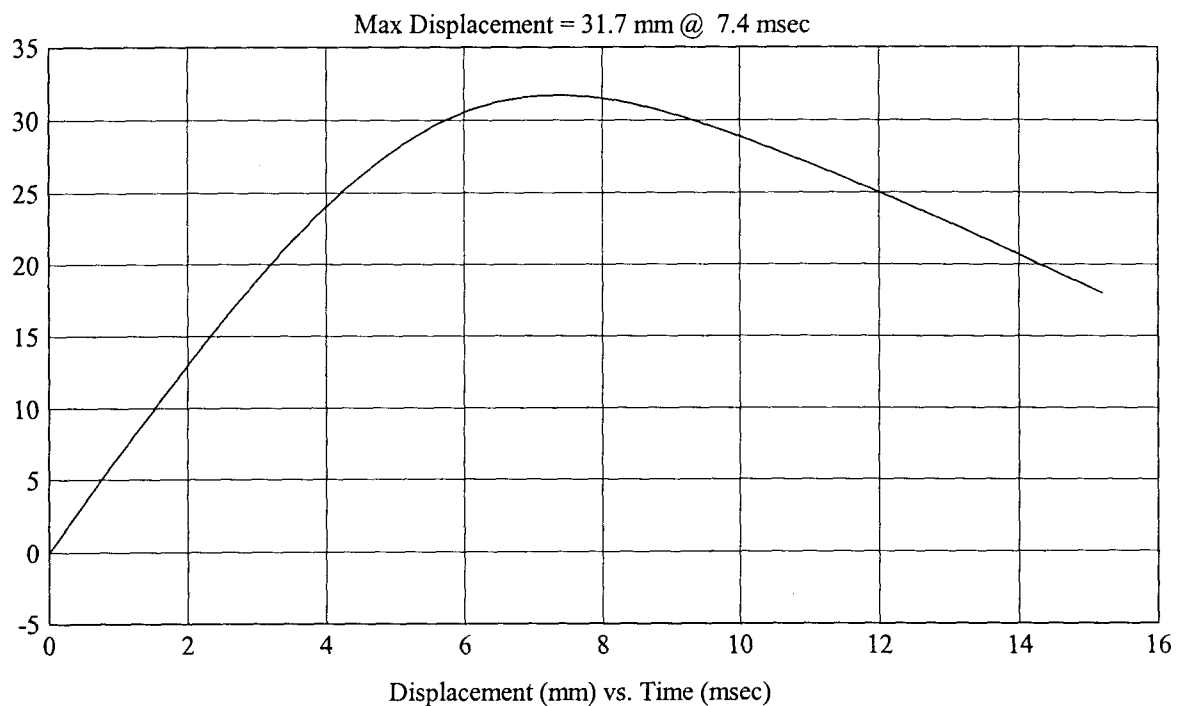
FMH
G04I7-001.16

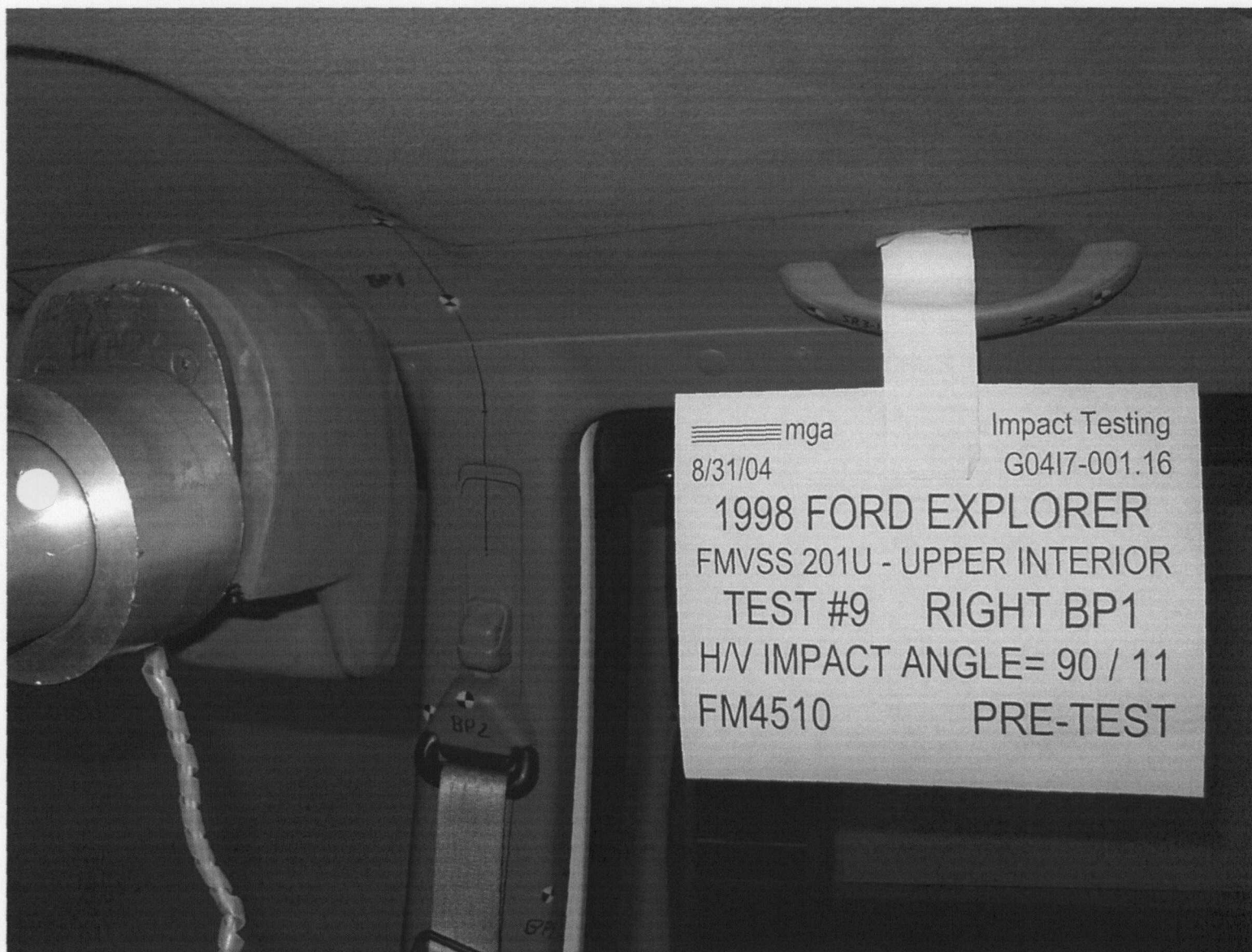
Customer: FORD
Test # 6
FM4507
Additional Desc: N/A

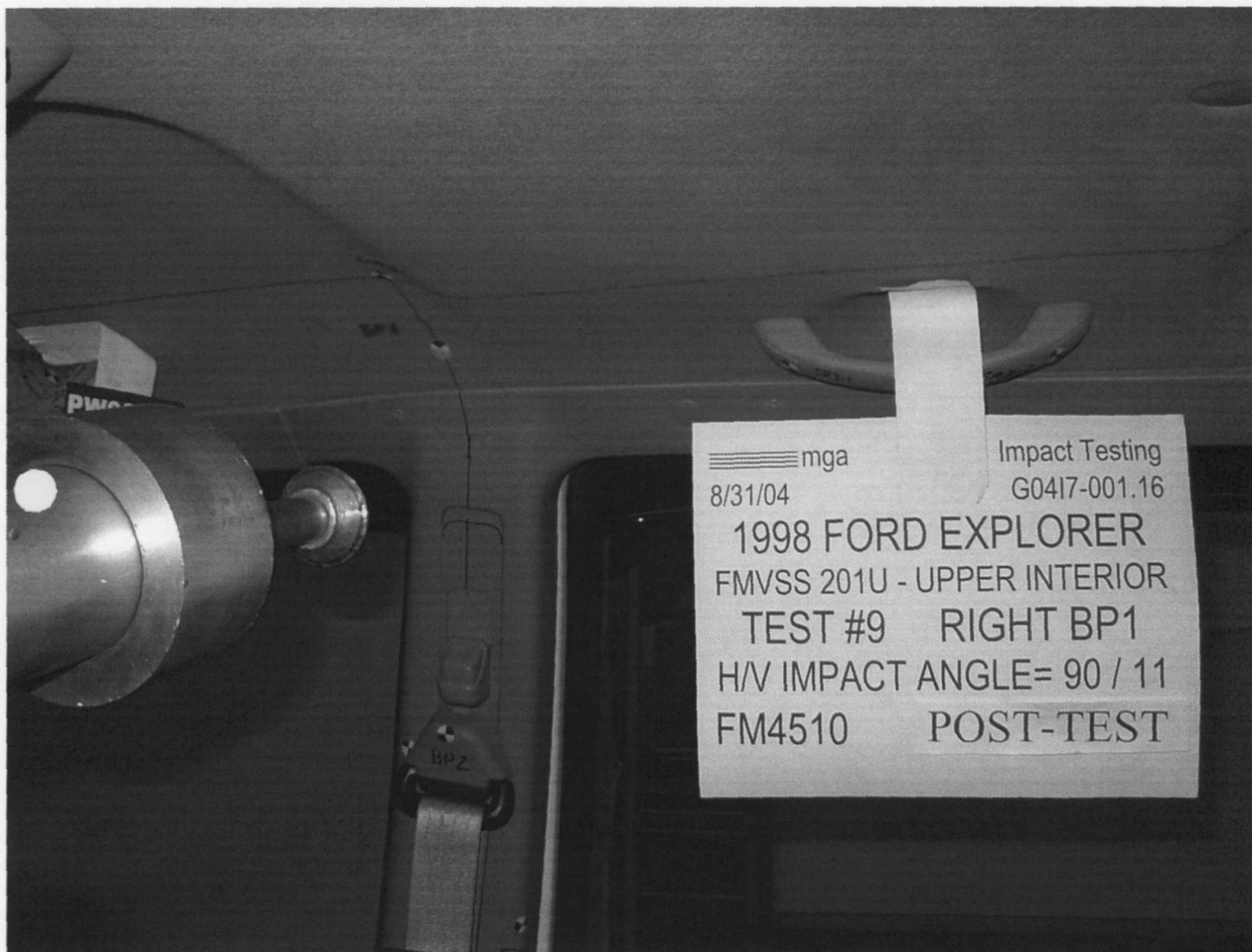
Vehicle Program : EXPLORER

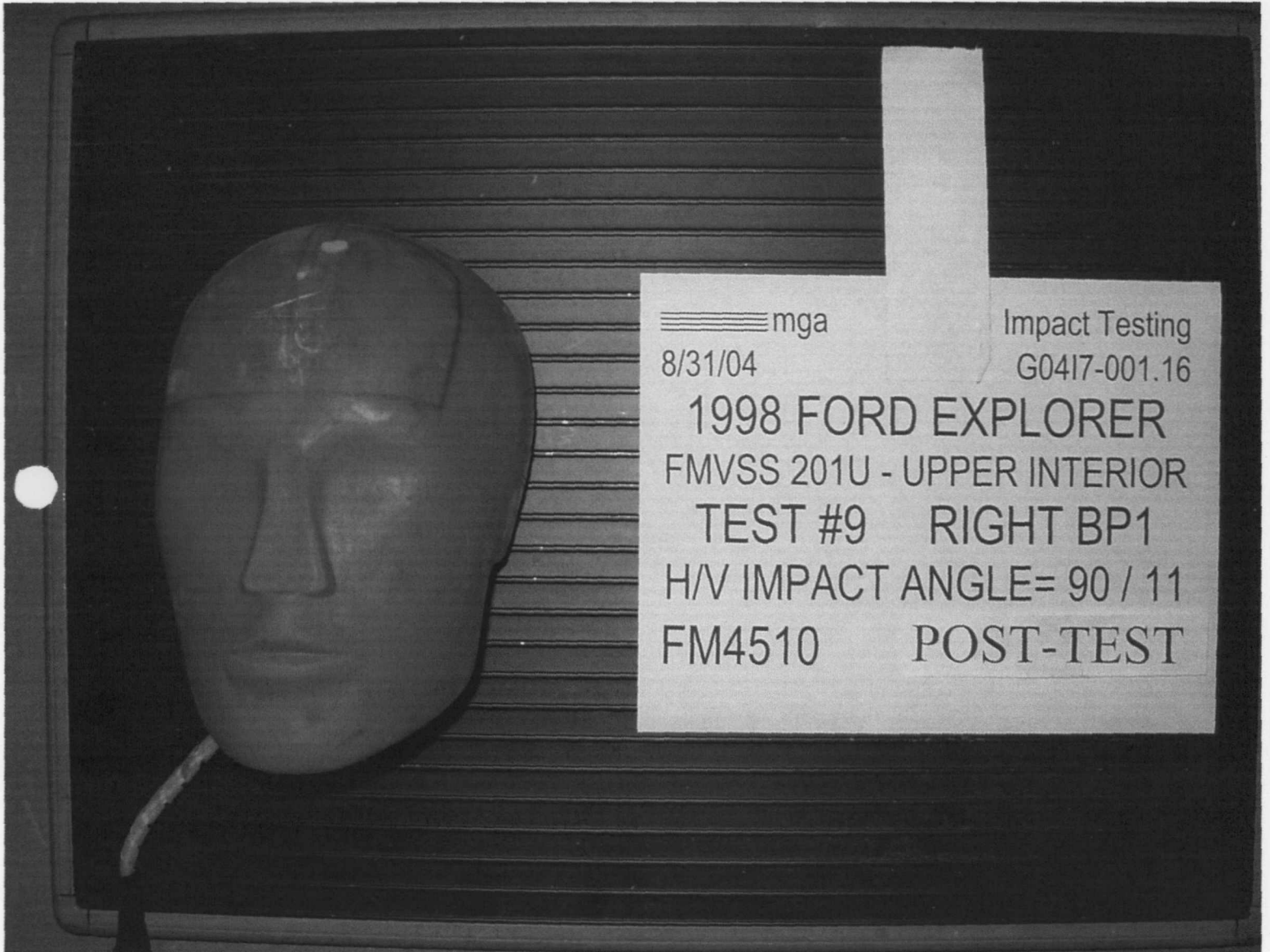
Model Year: 1998
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 155/35

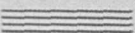
HIC(d) = 895, HIC = 966, Delta T = 5.9 msec









 mga
8/31/04

Impact Testing
G0417-001.16

1998 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP1
H/V IMPACT ANGLE= 90 / 11
FM4510 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Target (Vehicle Side): BP1 Right

MGA Test Reference No.:FM4510

Approach Horizontal Angles:90°

Approach Vertical Angles:11°

Test Number:#9

Temperature:22C

Humidity:54%

Time of Test:9:00 AM

FMH Serial No:035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
966	1059	5.5	23.7	70	10 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-92.4	1.67	1.67
Y	6	J35919	93.8	1.54	1.54
Z	7	J21969	88.5	1.58	1.58

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

No visible damage

Recorded By: Approved By*: Heleen A. Kaleb Date: 8-31-04

*Only necessary for NHTSA (Government) Compliance testing.

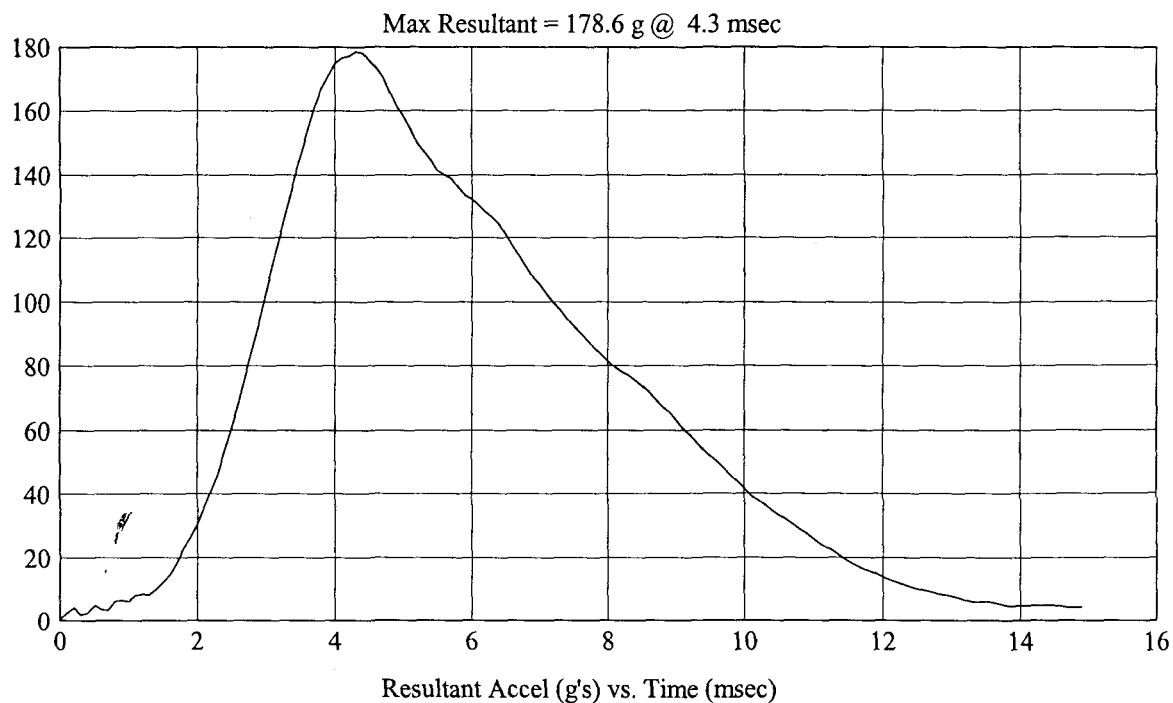
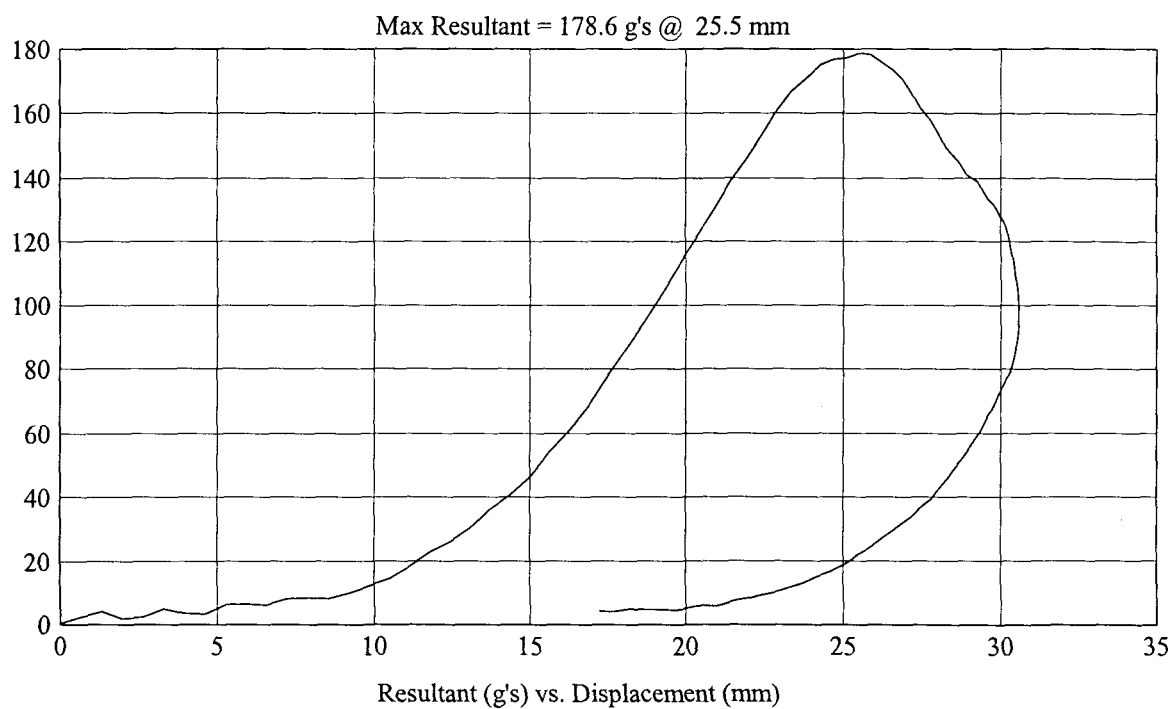
FMH
G0417-001.16

Customer: FORD
Test # 9
FM4510
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/11

HIC(d) = 966, HIC = 1059, Delta T = 5.5 msec



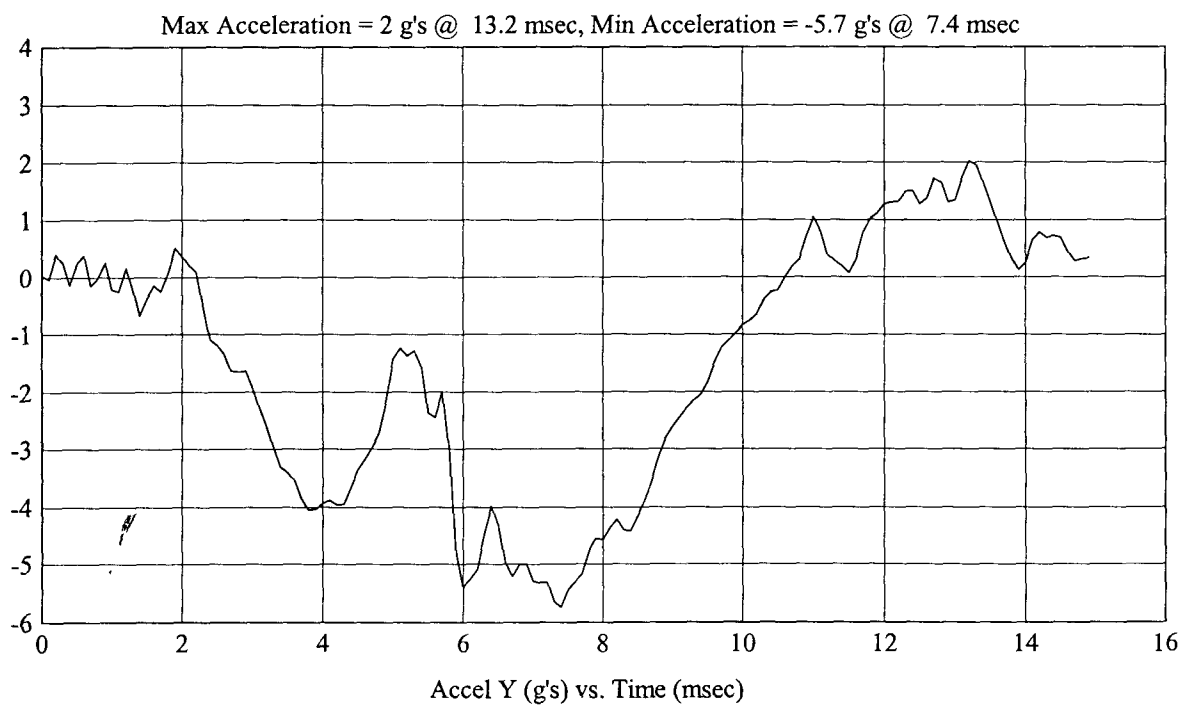
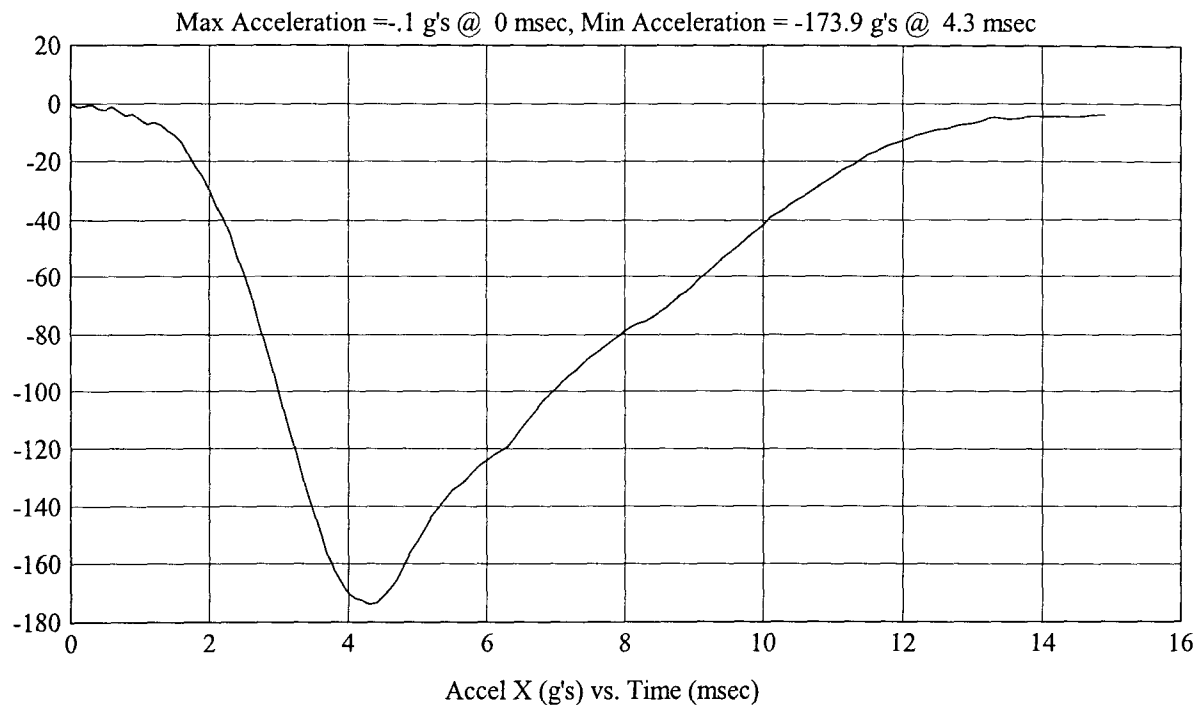
FMH
G04I7-001.16

Customer: FORD
Test # 9
FM4510
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/11

HIC(d) = 966, HIC = 1059, Delta T = 5.5 msec



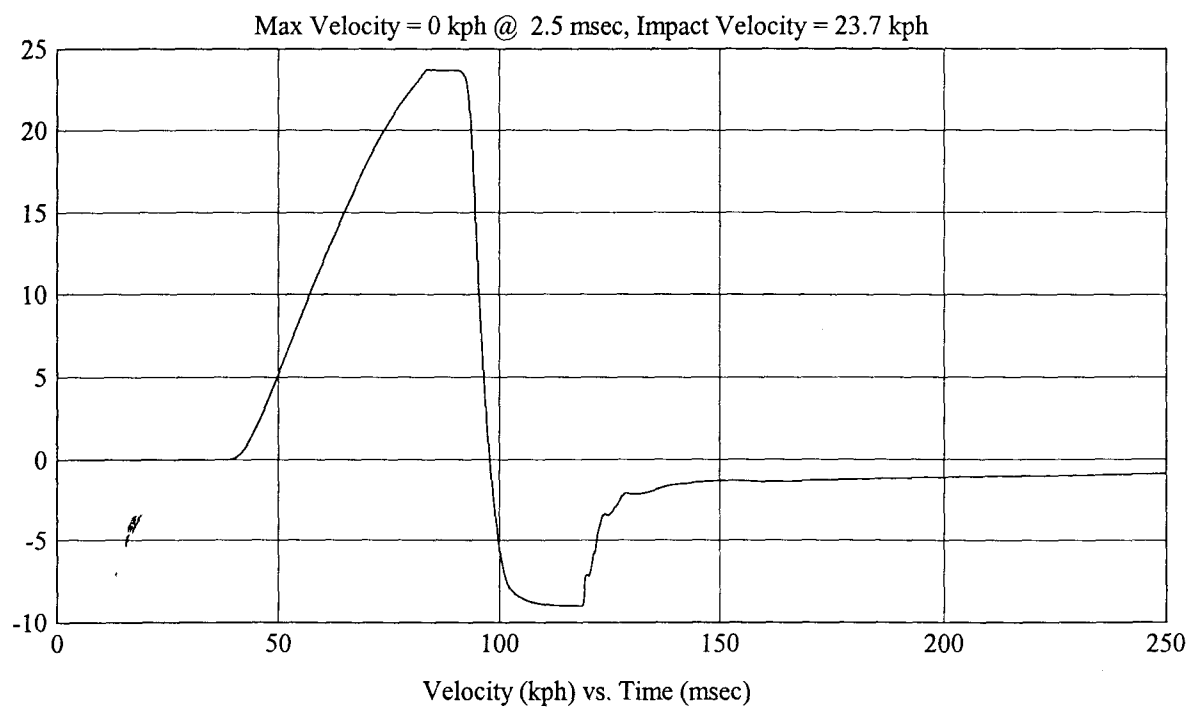
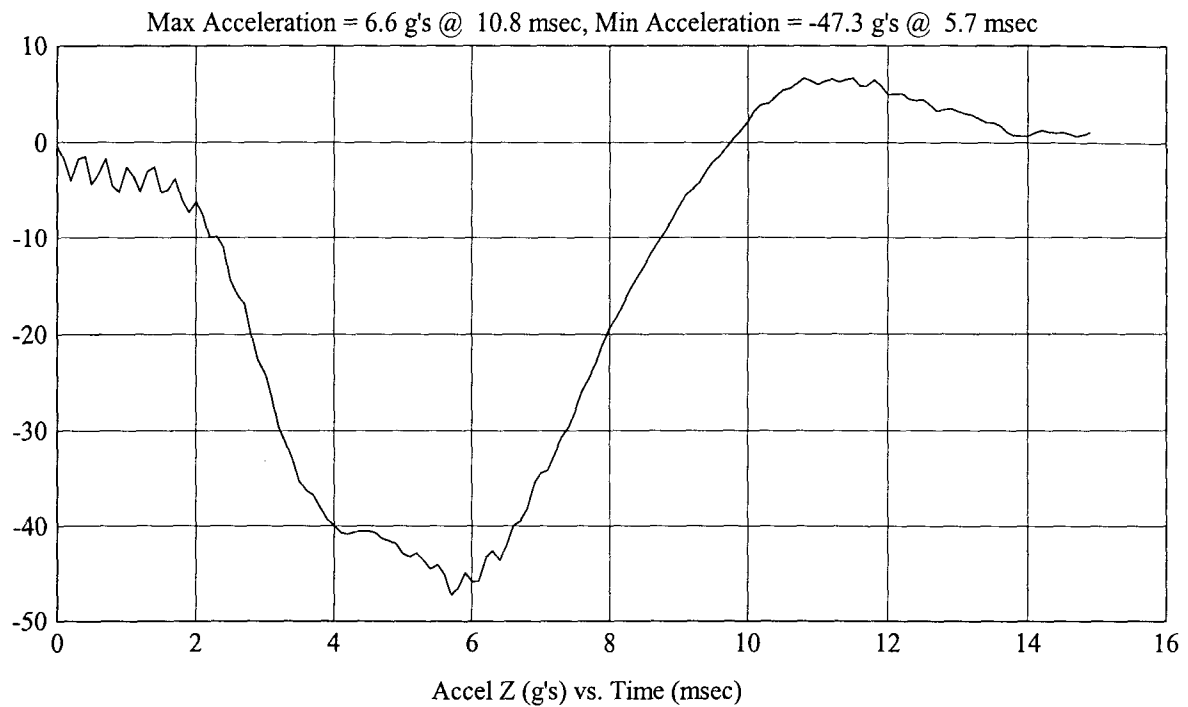
FMH
G04I7-001.16

Customer: FORD
Test # 9
FM4510
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/11

HIC(d) = 966, HIC = 1059, Delta T = 5.5 msec



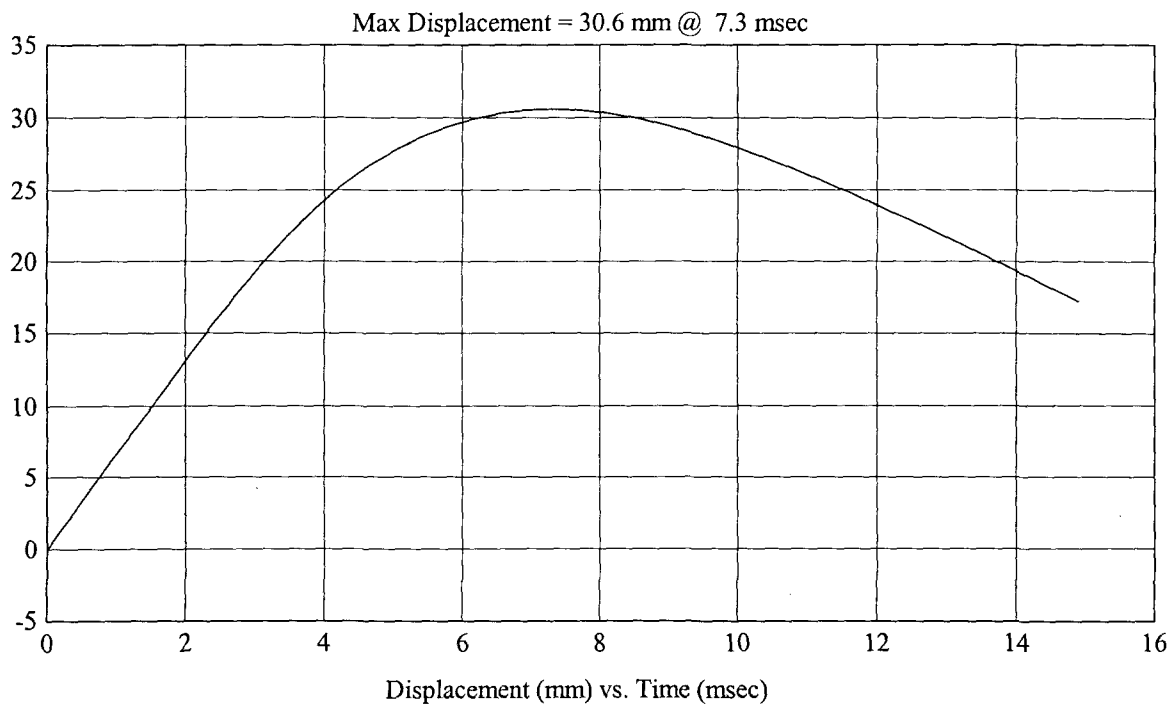
FMH
G04I7-001.16

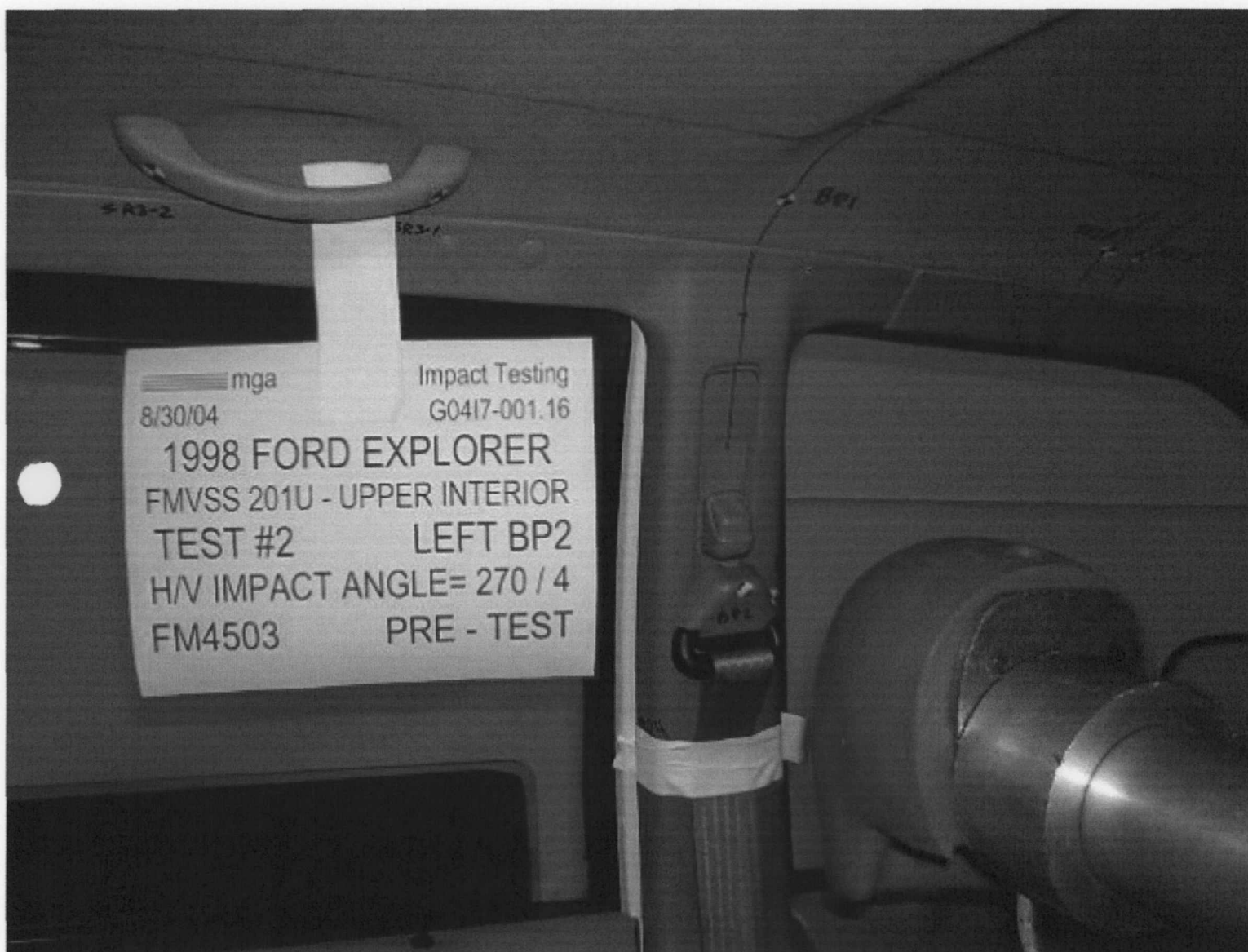
Customer: FORD
Test # 9
FM4510
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/11

HIC(d) = 966, HIC = 1059, Delta T = 5.5 msec





mga
8/30/04

Impact Testing
G0417-001.16

1998 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT BP2
H/V IMPACT ANGLE= 270 / 4
FM4503 POST-TEST

PW0202
FM4503
BP2 L/C



==== mga

8/30/04

Impact Testing

G04I7-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #2

LEFT BP2

H/V IMPACT ANGLE= 270 / 4

FM4503

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Target (Vehicle Side): BP2 Left

MGA Test Reference No.:FM4503

Approach Horizontal Angles:270°

Approach Vertical Angles:4°

Test Number:#2

Temperature:22C

Humidity:56%

Time of Test:10:30 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
655	648	6	23.8	18	0

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: m j r Approved By*: Heen A. Kuleto Date: 6-30-04

*Only necessary for NHTSA (Government) Compliance testing.

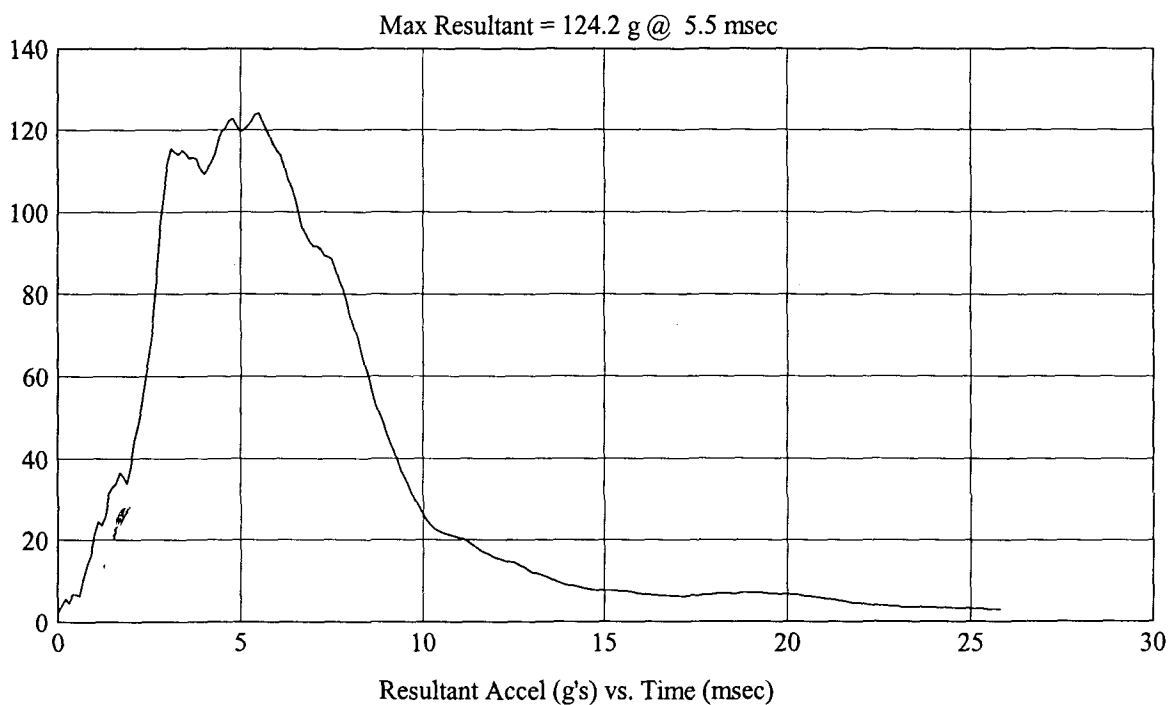
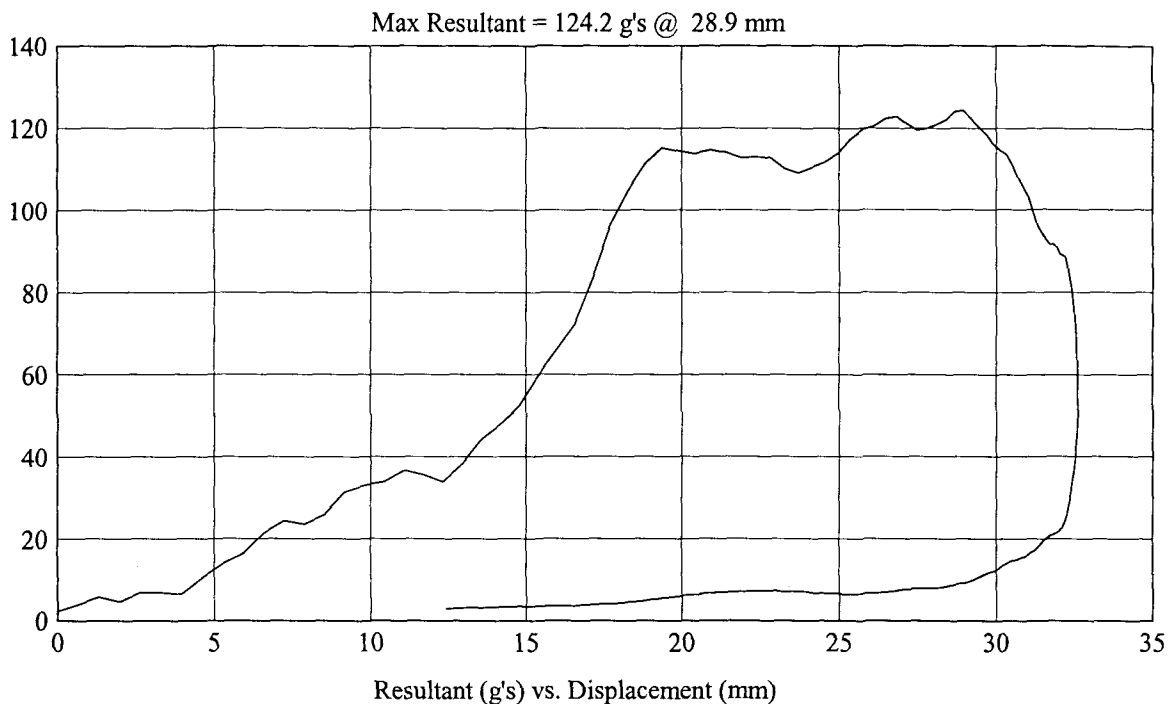
FMH
G04I7-001.16

Customer: FORD
Test # 2
FM4503
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 655, HIC = 648, Delta T = 6 msec



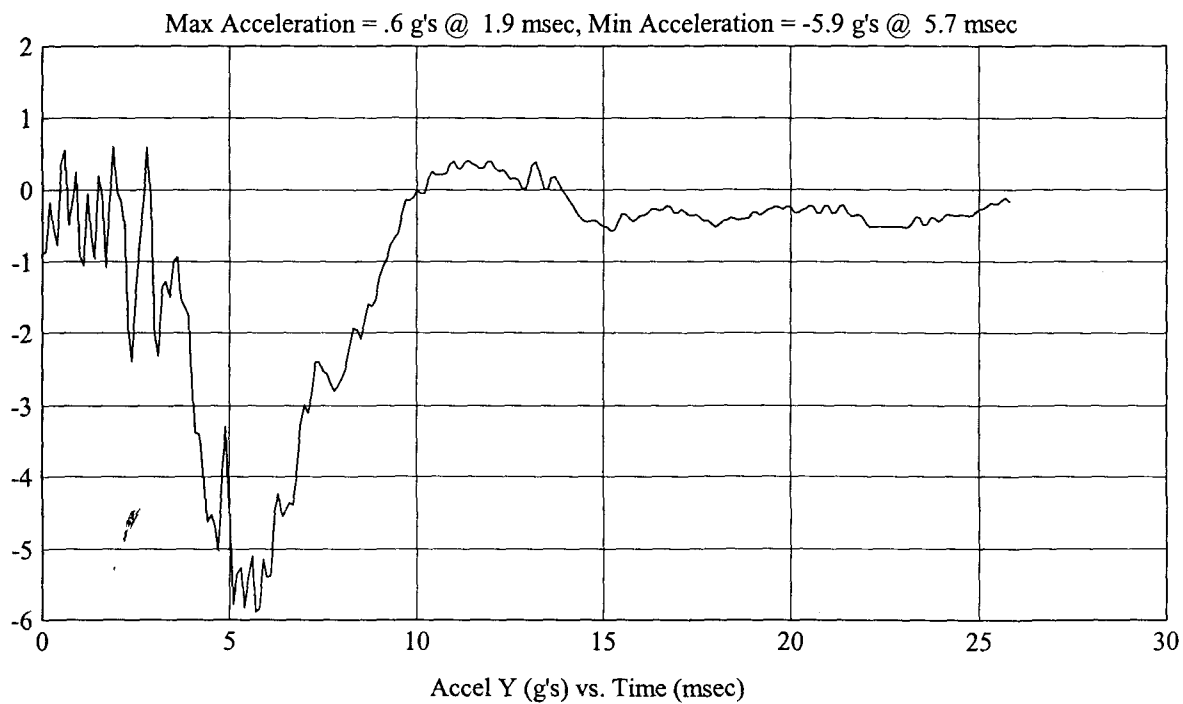
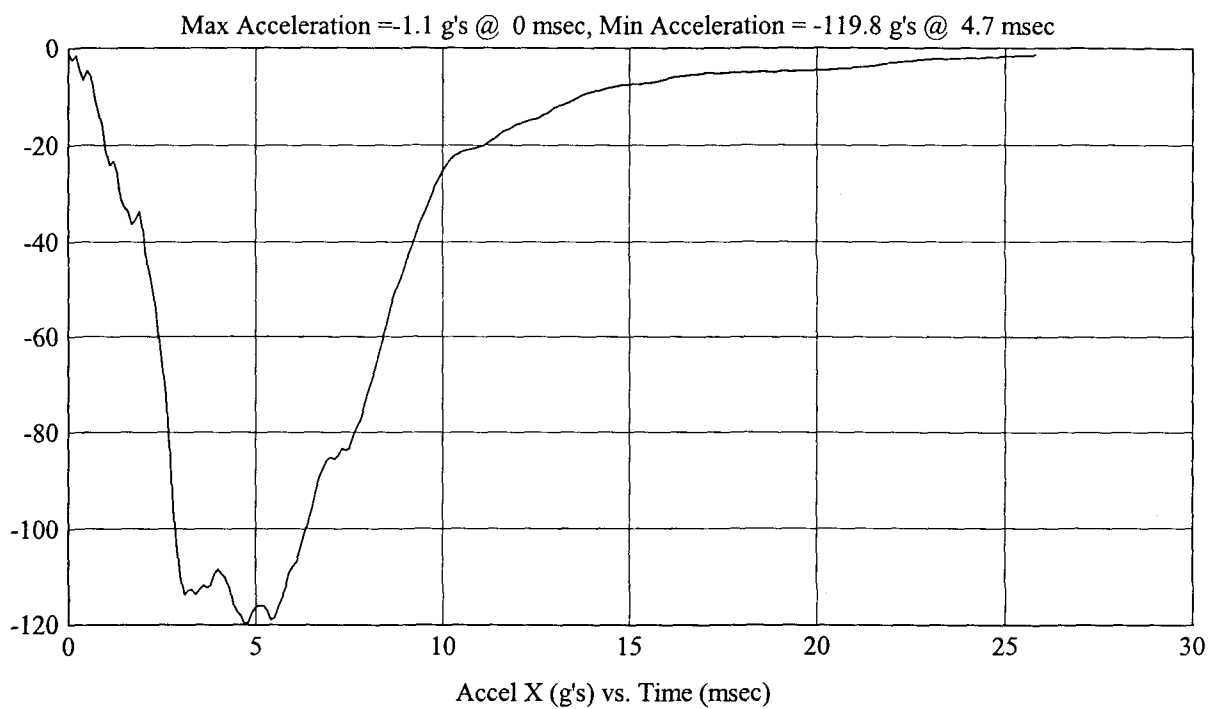
FMH
G04I7-001.16

Customer: FORD
Test # 2
FM4503
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 655, HIC = 648, Delta T = 6 msec



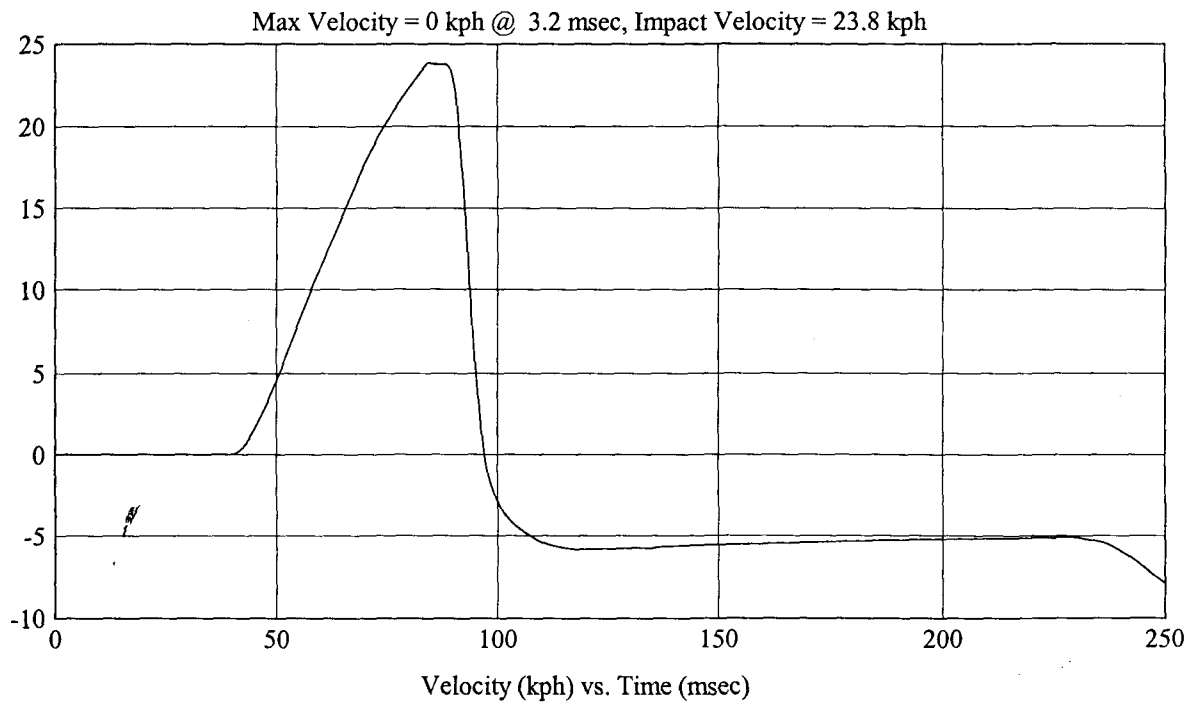
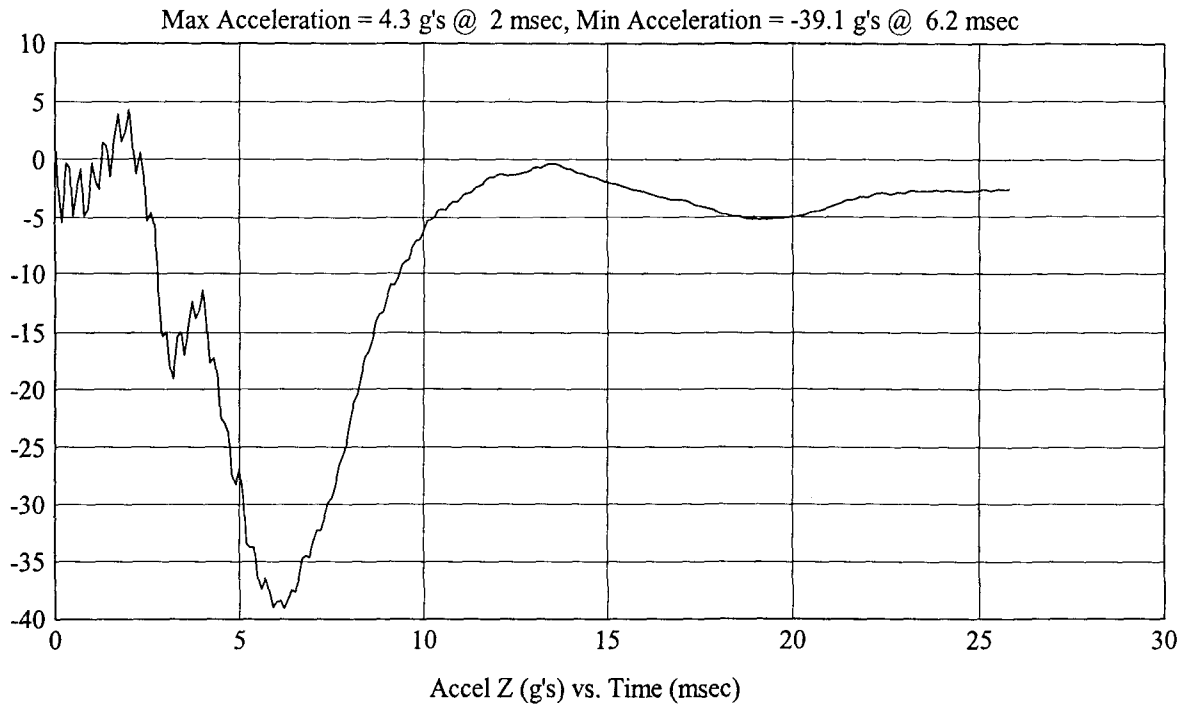
FMH
G04I7-001.16

Customer: FORD
Test # 2
FM4503
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 655, HIC = 648, Delta T = 6 msec



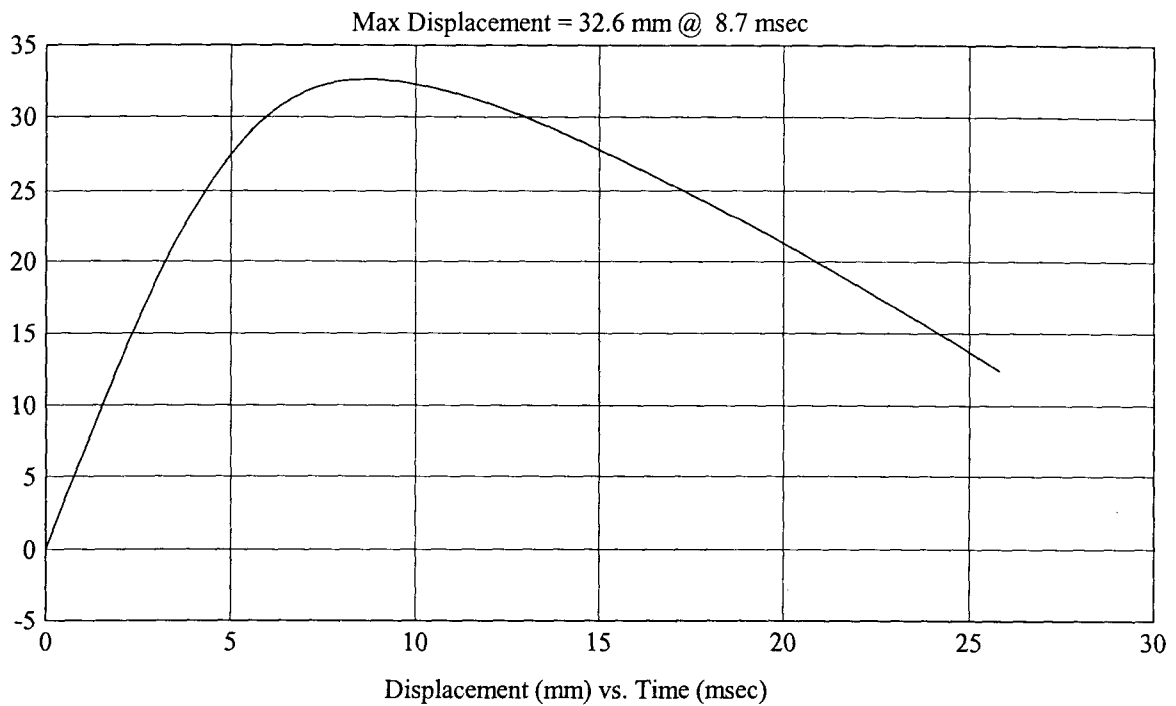
FMH
G04I7-001.16

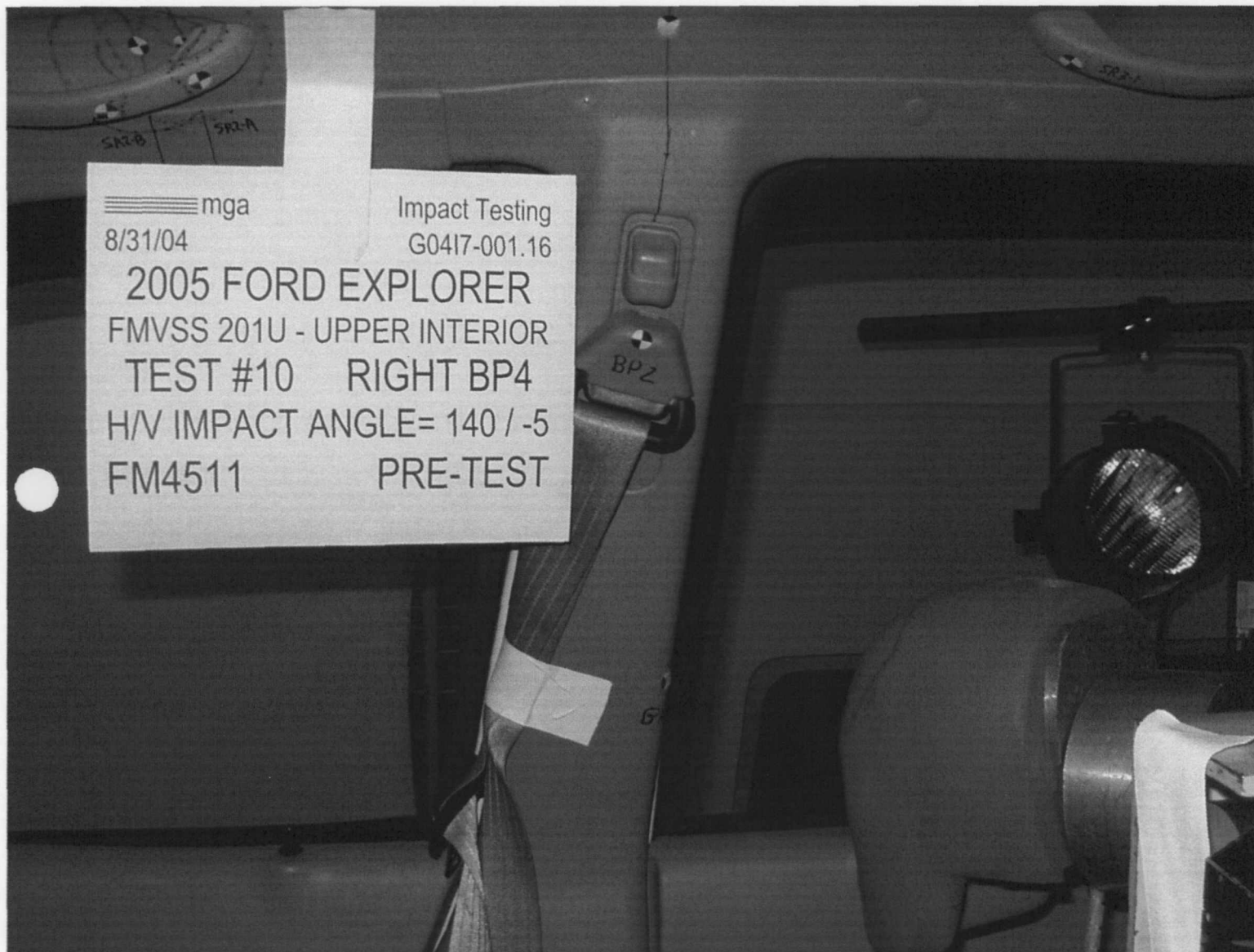
Customer: FORD
Test # 2
FM4503
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 655, HIC = 648, Delta T = 6 msec



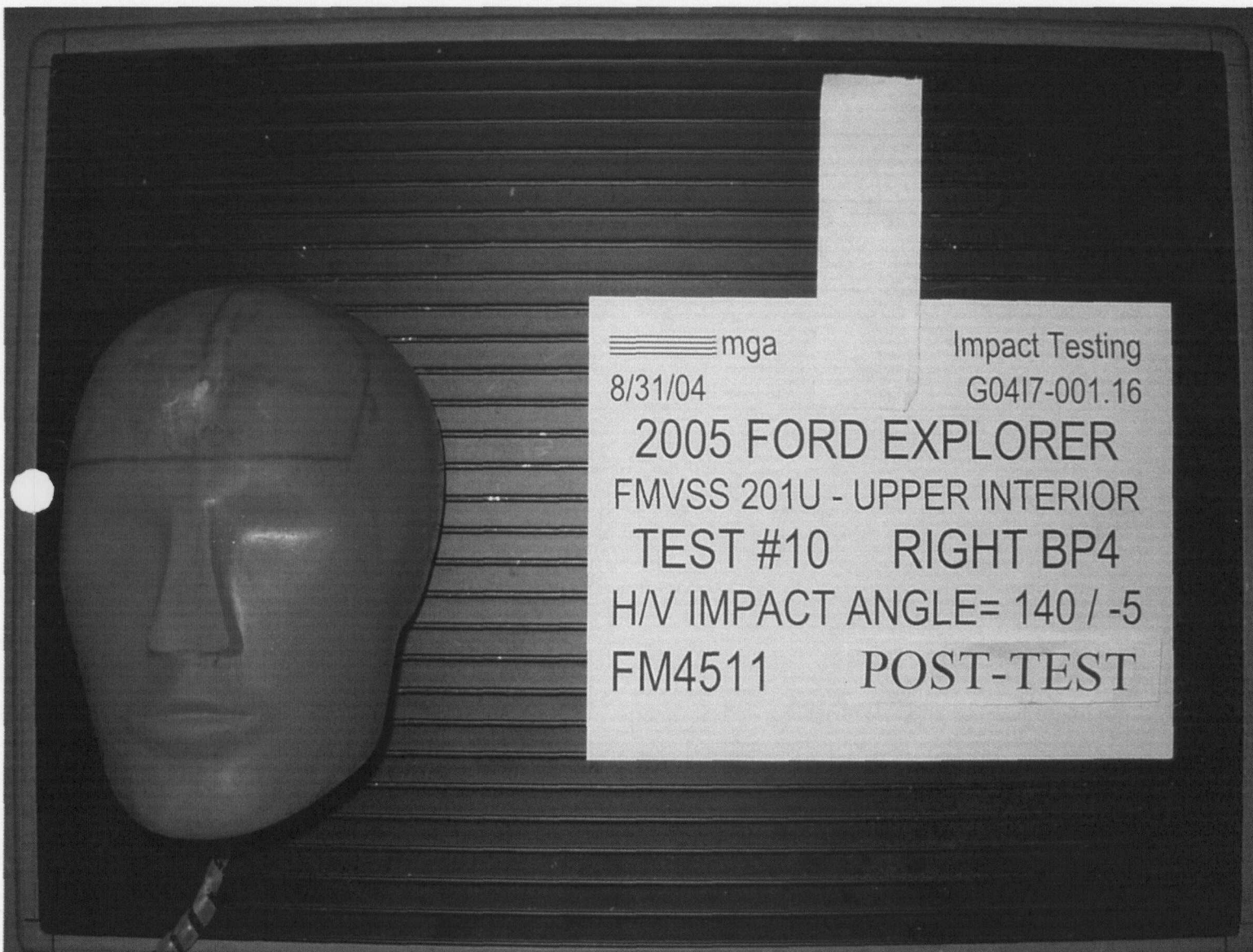


mga
8/31/04

Impact Testing
G0417-001.16

2005 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 140 / -5
FM4511 POST-TEST





==== mga

8/31/04

Impact Testing

G0417-001.16

2005 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #10 RIGHT BP4

H/V IMPACT ANGLE= 140 / -5

FM4511 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 2005

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): BP4 Right

Temperature:22C

MGA Test Reference No.:FM4511

Humidity:55%

Approach Horizontal Angles:140°

Time of Test: 10:45 PM

Approach Vertical Angles:-5°

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
520	468	5.5	23.7	28	0

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.):

Cracked pillar trim

Recorded By: [Signature] Approved By*: Helen Q. Kales Date: 8-31-04

*Only necessary for NHTSA (Government) Compliance testing.

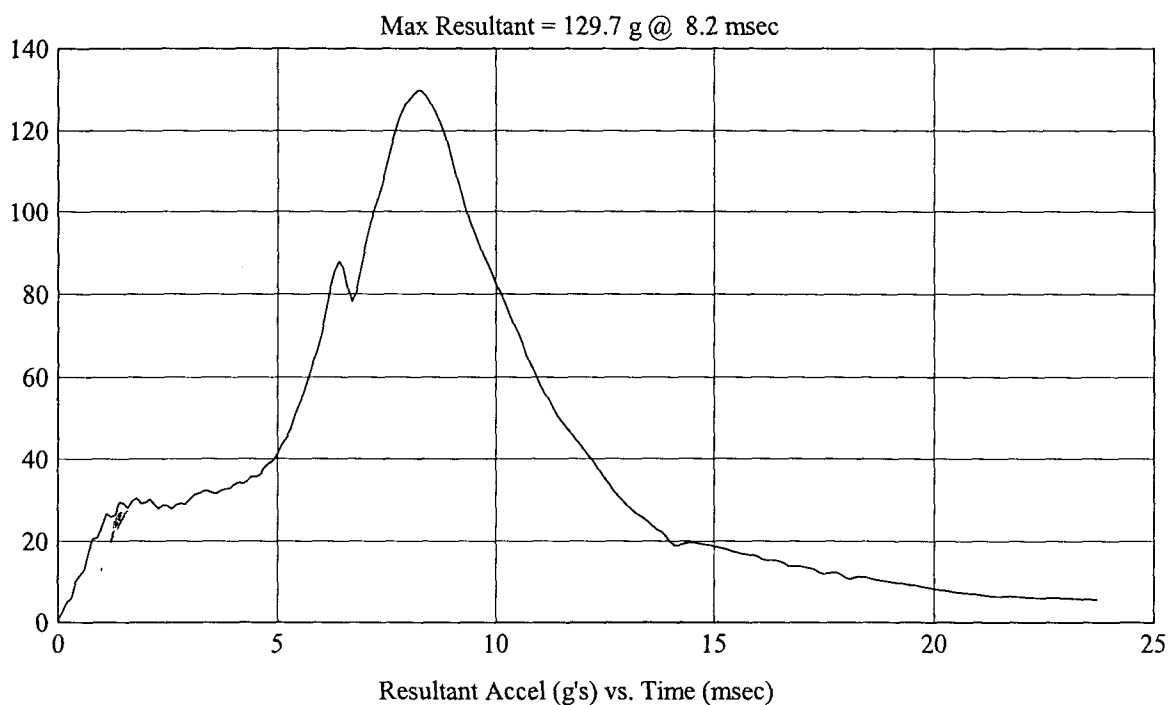
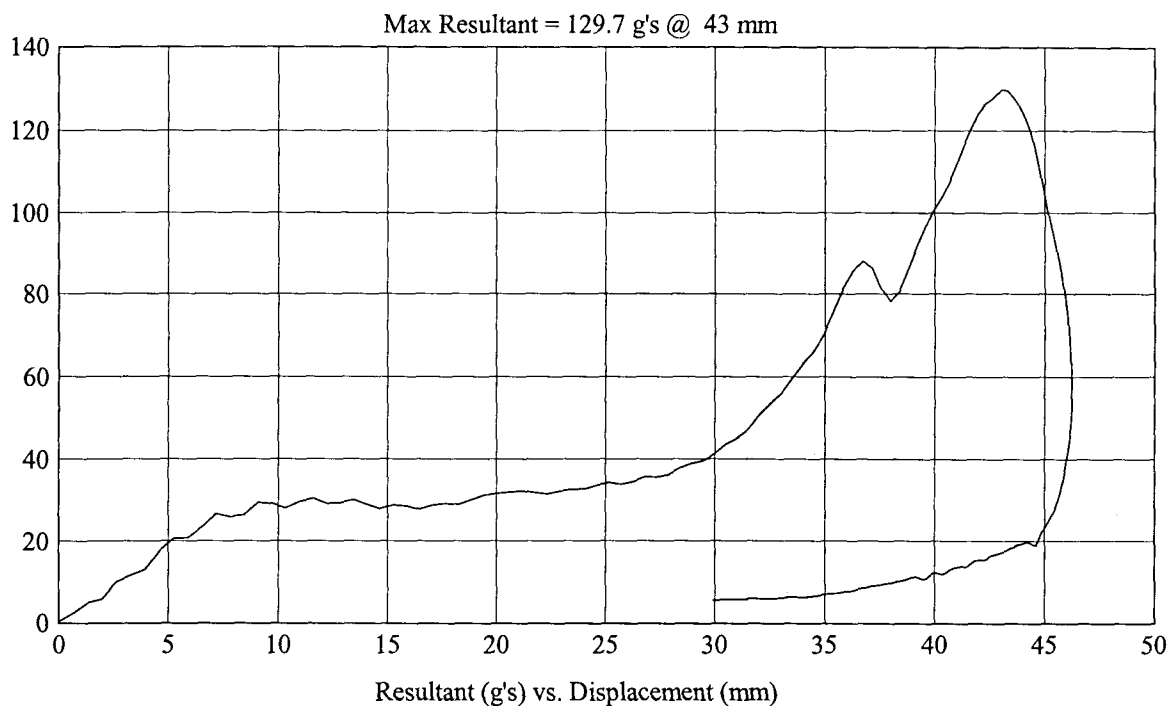
FMH
G04I7-001.16

Customer: FORD
Test # 10
FM4511
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 140/-5

HIC(d) = 520, HIC = 468, Delta T = 5.5 msec



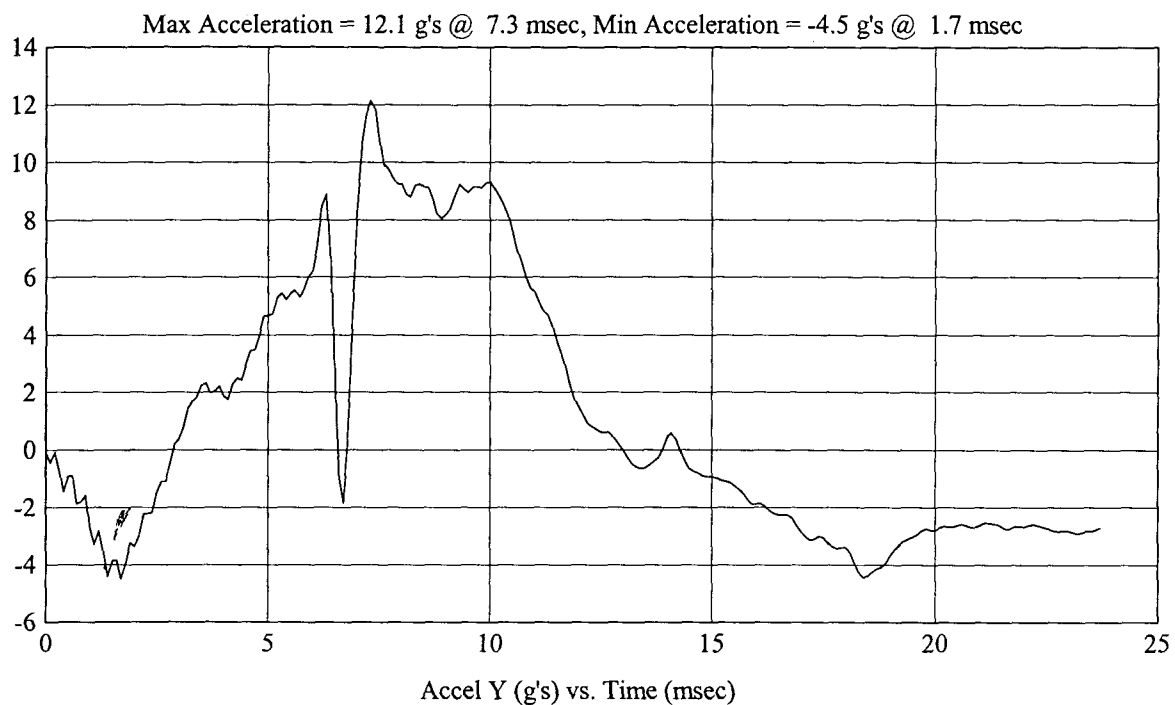
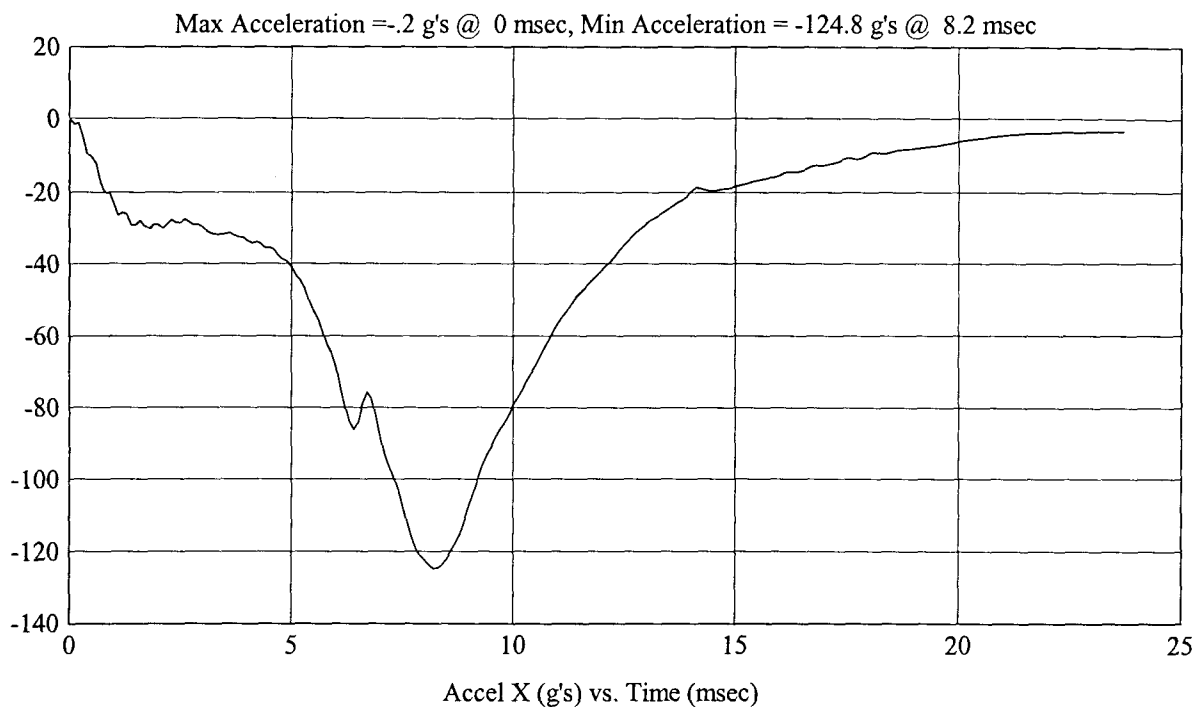
FMH
G04I7-001.16

Customer: FORD
Test # 10
FM4511
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 140/-5

HIC(d) = 520, HIC = 468, Delta T = 5.5 msec



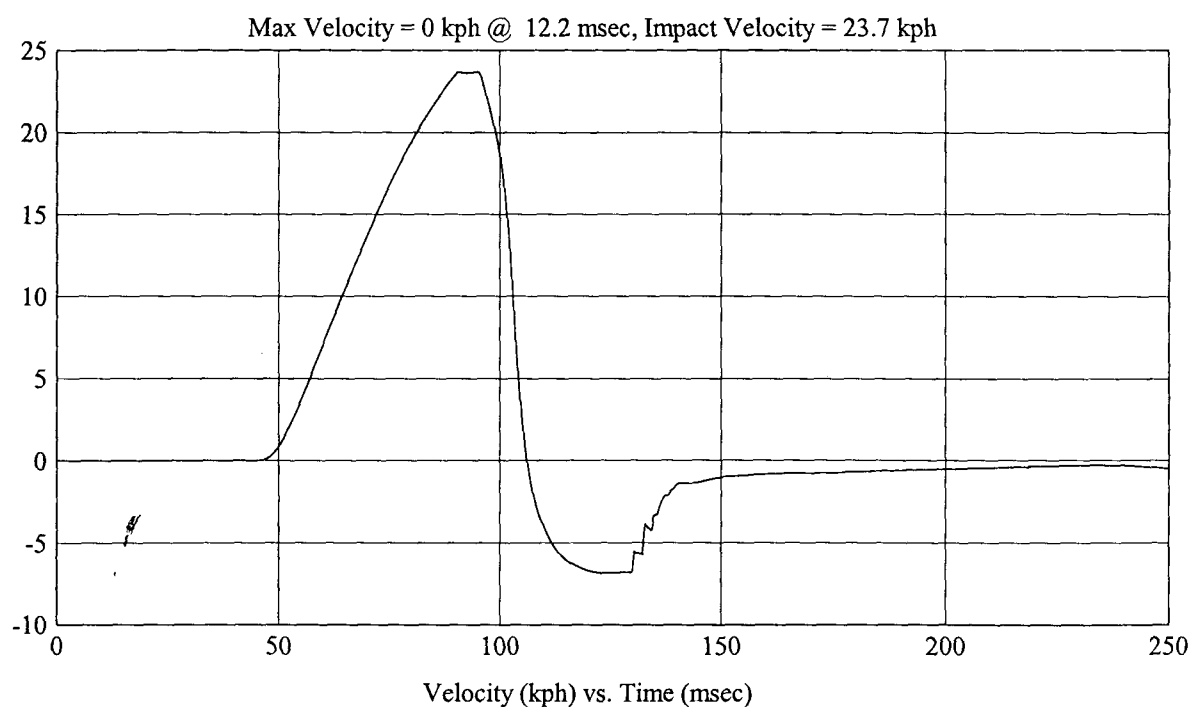
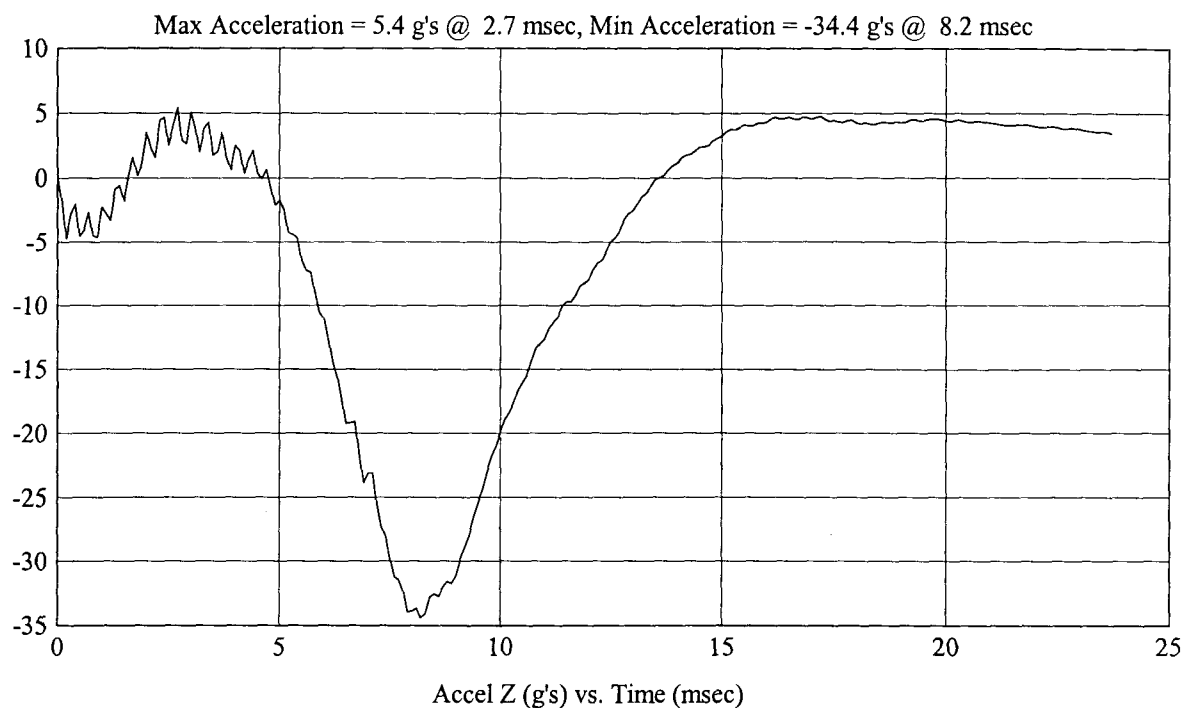
FMH
G04I7-001.16

Customer: FORD
Test # 10
FM4511
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 140/-5

HIC(d) = 520, HIC = 468, Delta T = 5.5 msec



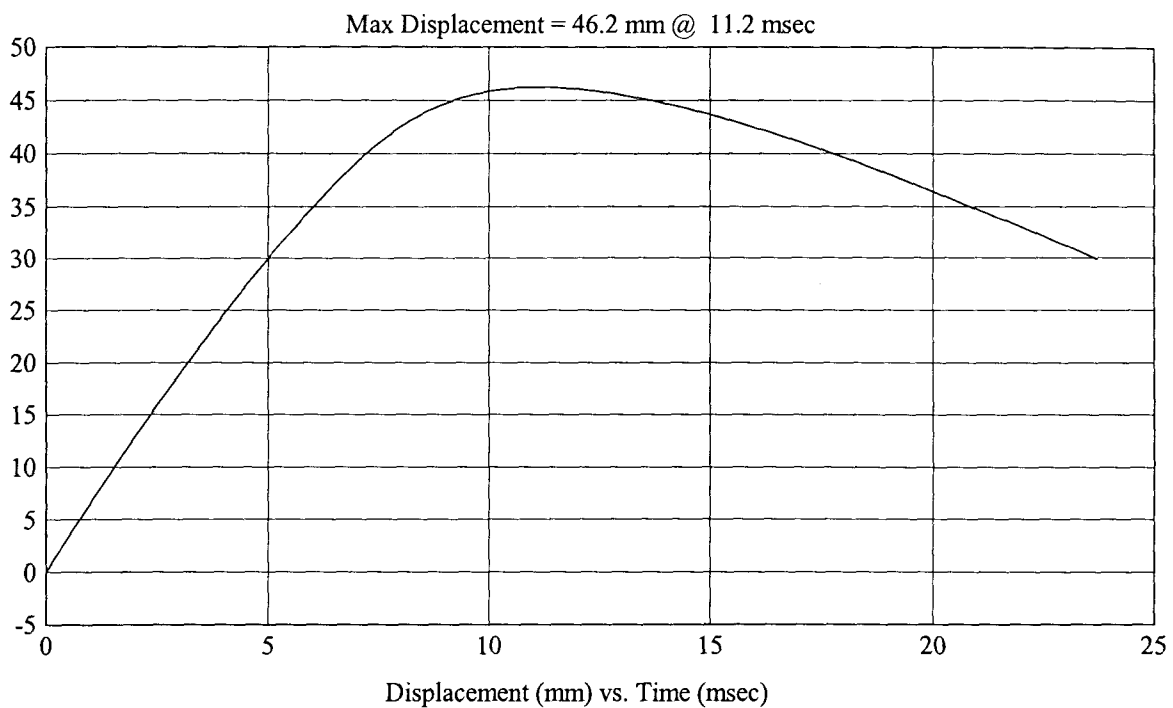
FMH
G04I7-001.16

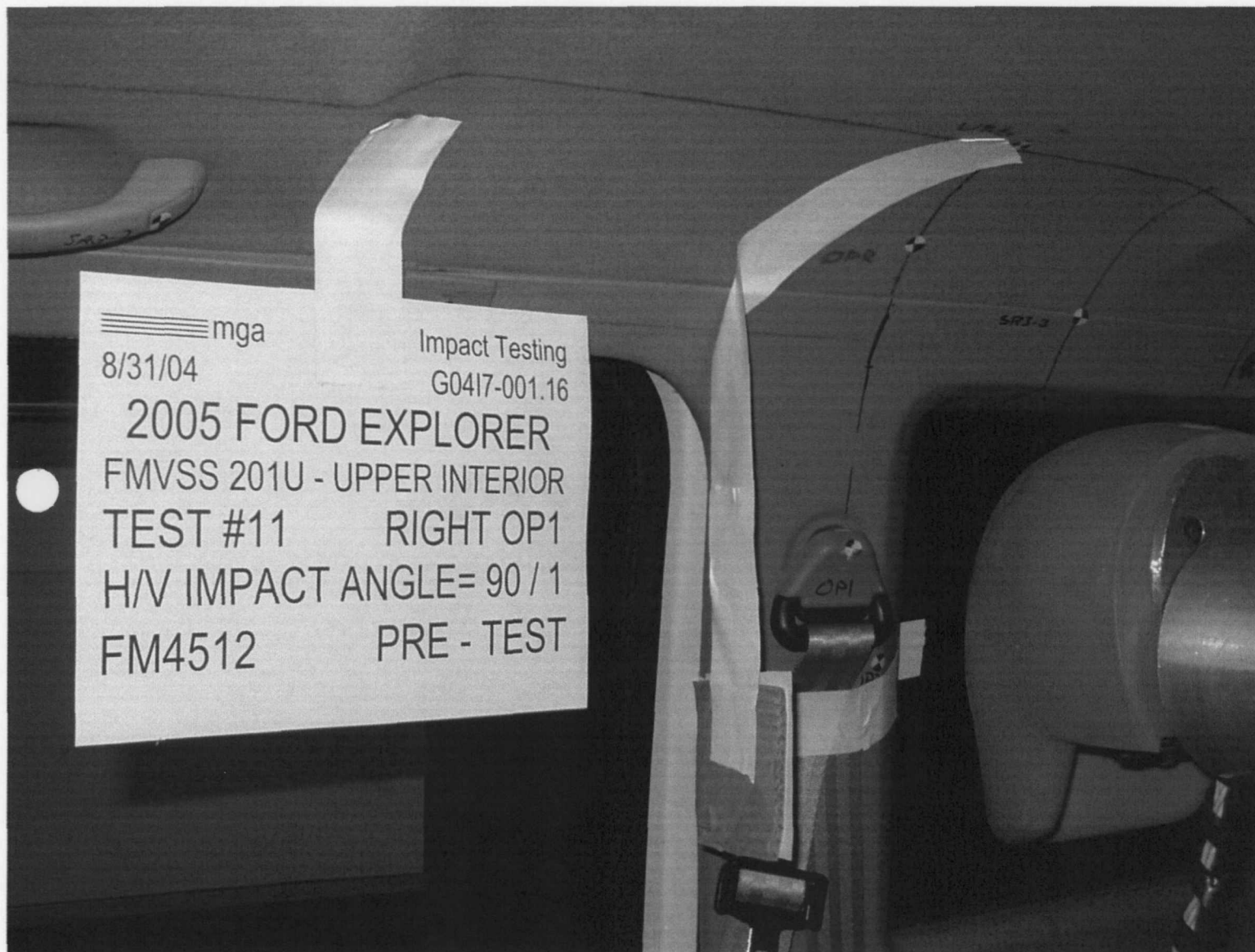
Customer: FORD
Test # 10
FM4511
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 140/-5

HIC(d) = 520, HIC = 468, Delta T = 5.5 msec

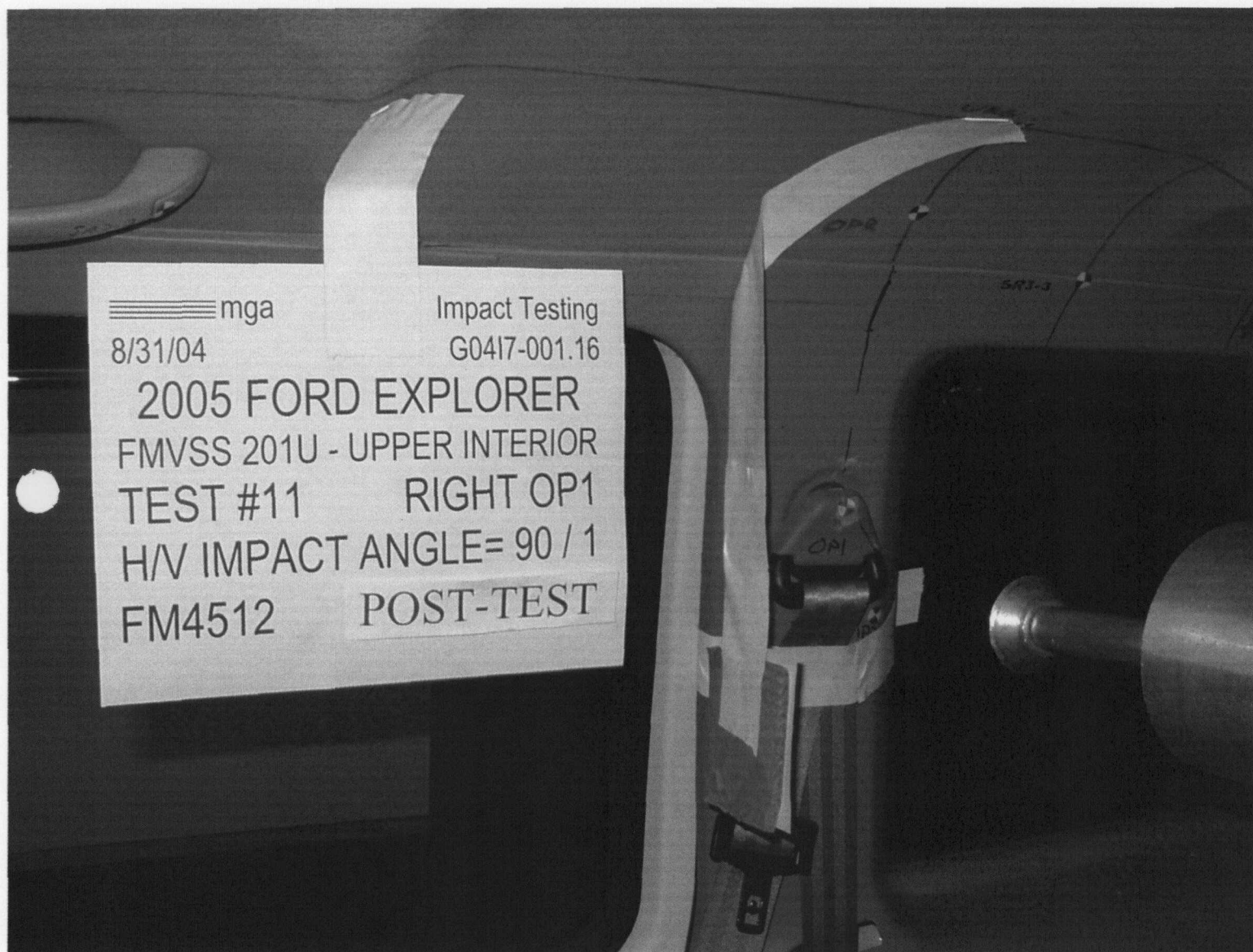


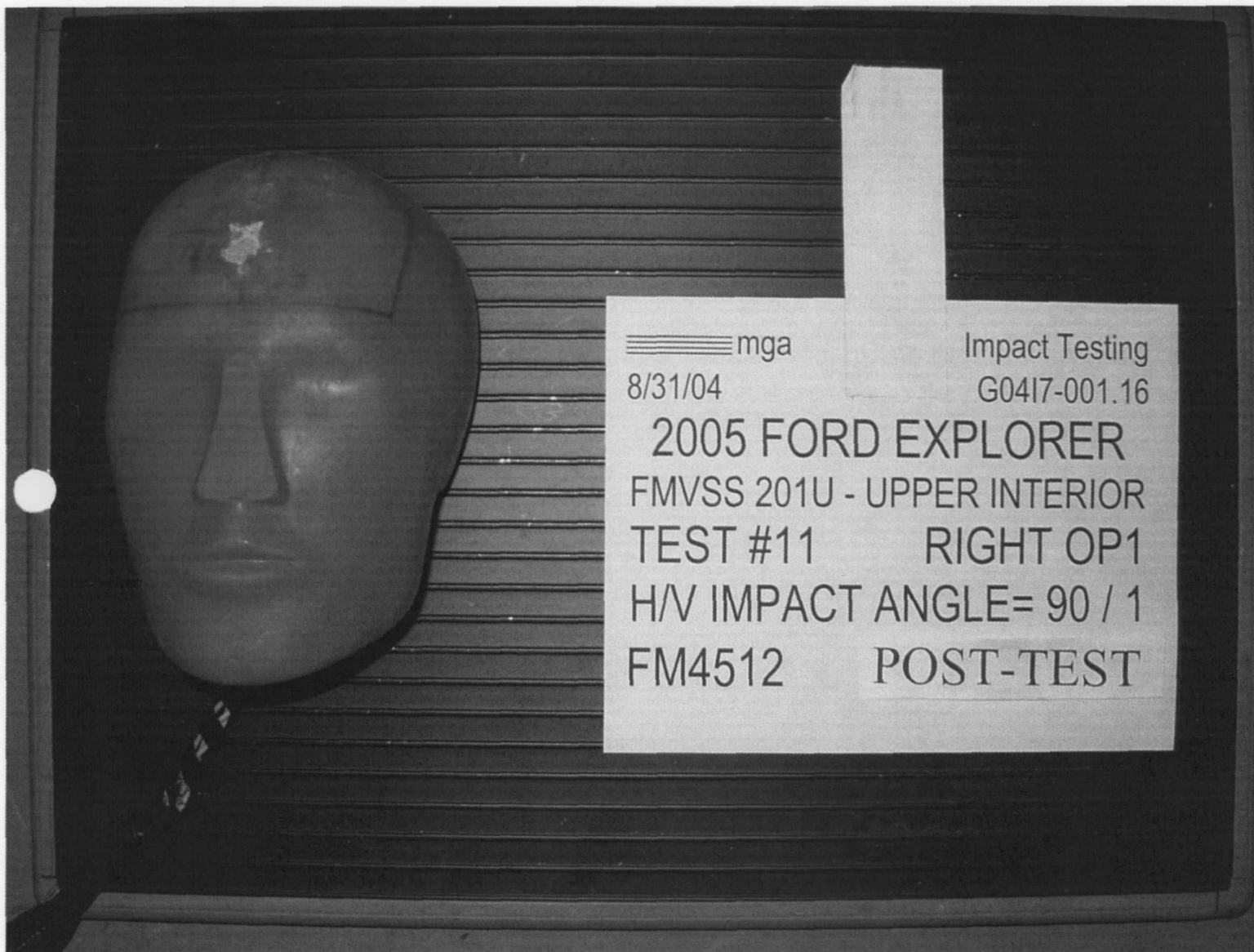


==== mga
8/31/04

Impact Testing
G0417-001.16

2005 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT OP1
H/V IMPACT ANGLE= 90 / 1
FM4512 POST-TEST





==== mga

8/31/04

Impact Testing

G04I7-001.16

2005 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #11 RIGHT OP1

H/V IMPACT ANGLE= 90 / 1

FM4512 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 2005

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): OP1 Right

Temperature:22C

MGA Test Reference No.:FM4512

Humidity:55%

Approach Horizontal Angles:90°

Time of Test:11:15 AM

Approach Vertical Angles:1°

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
553	512	7.7	23.5	25	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	1.67	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.):

Cracked seat belt anchor cover

Recorded By: [Signature] Approved By*: Heleen A. Kalito Date: 8-31-04

*Only necessary for NHTSA (Government) Compliance testing.

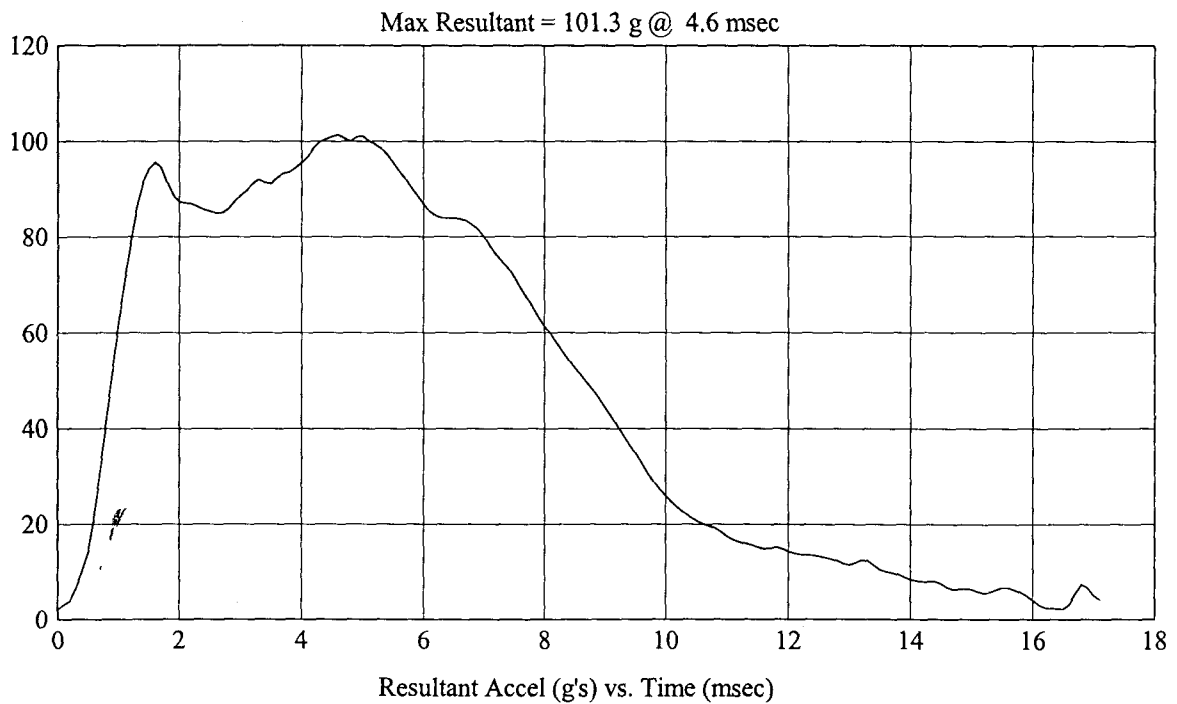
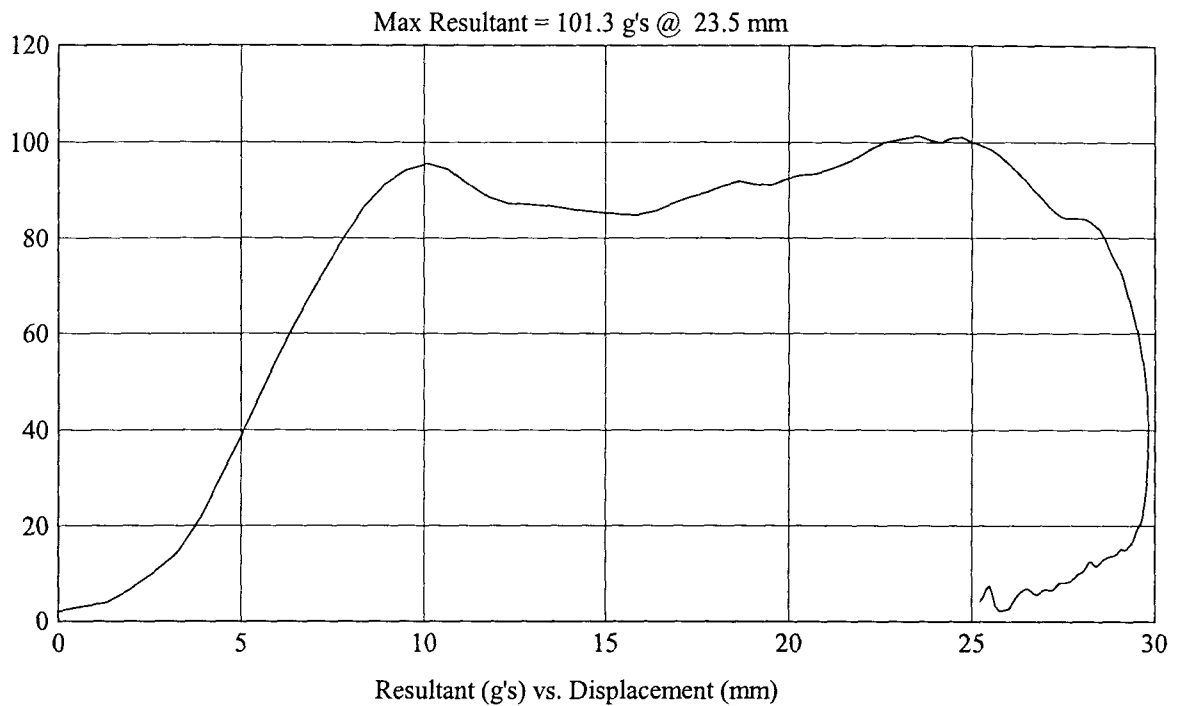
FMH
G04I7-001.16

Customer: FORD
Test # 11
FM4512
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: OP1
Vehicle Side: Right
Horz/Vert Angle: 90/1

HIC(d) = 553, HIC = 512, Delta T = 7.7 msec



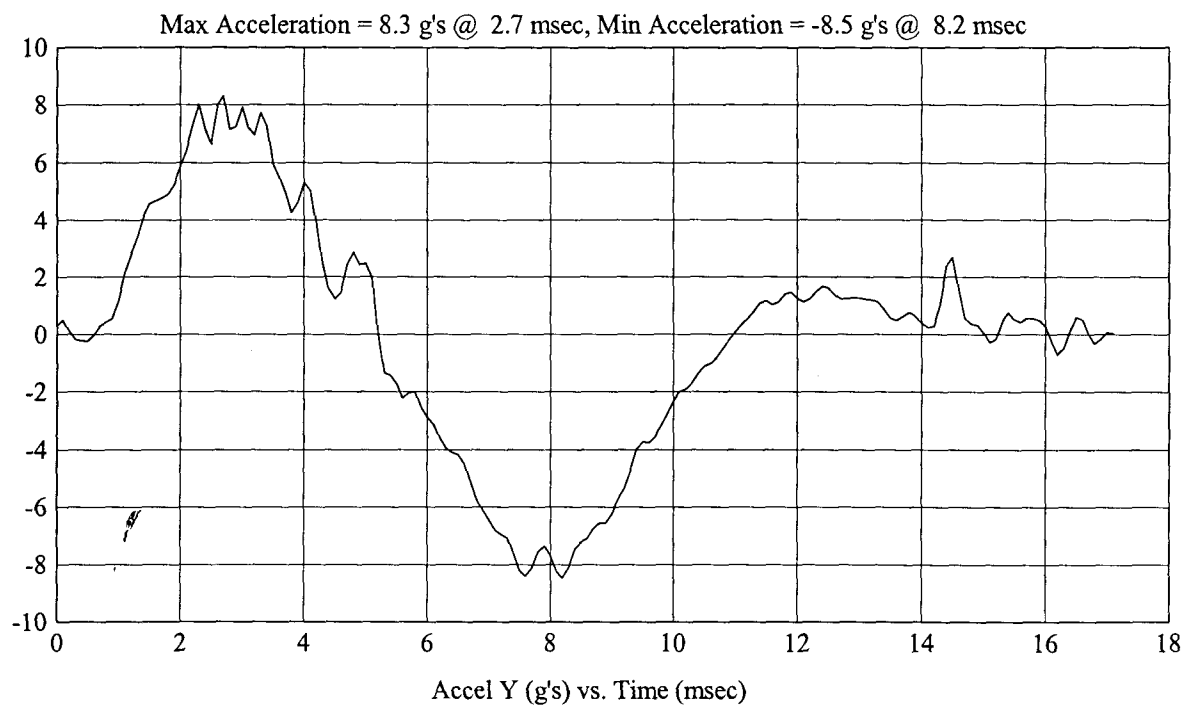
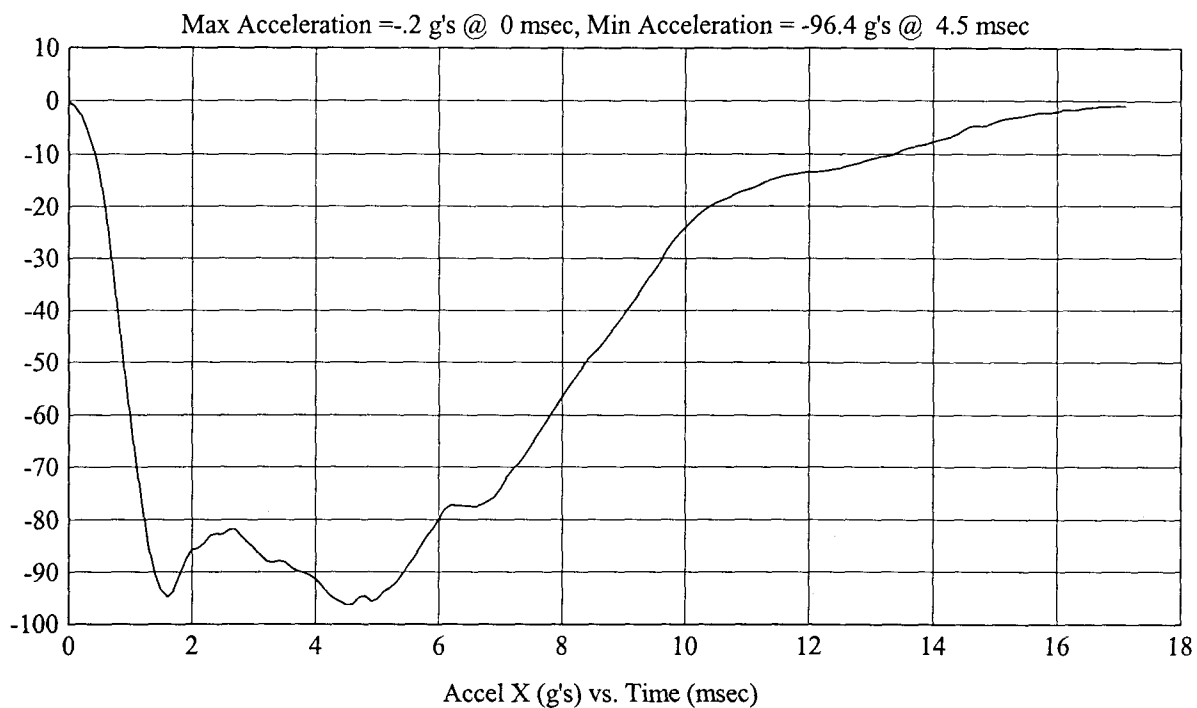
FMH
G04I7-001.16

Customer: FORD
Test # 11
FM4512
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: OP1
Vehicle Side: Right
Horz/Vert Angle: 90/1

HIC(d) = 553, HIC = 512, Delta T = 7.7 msec



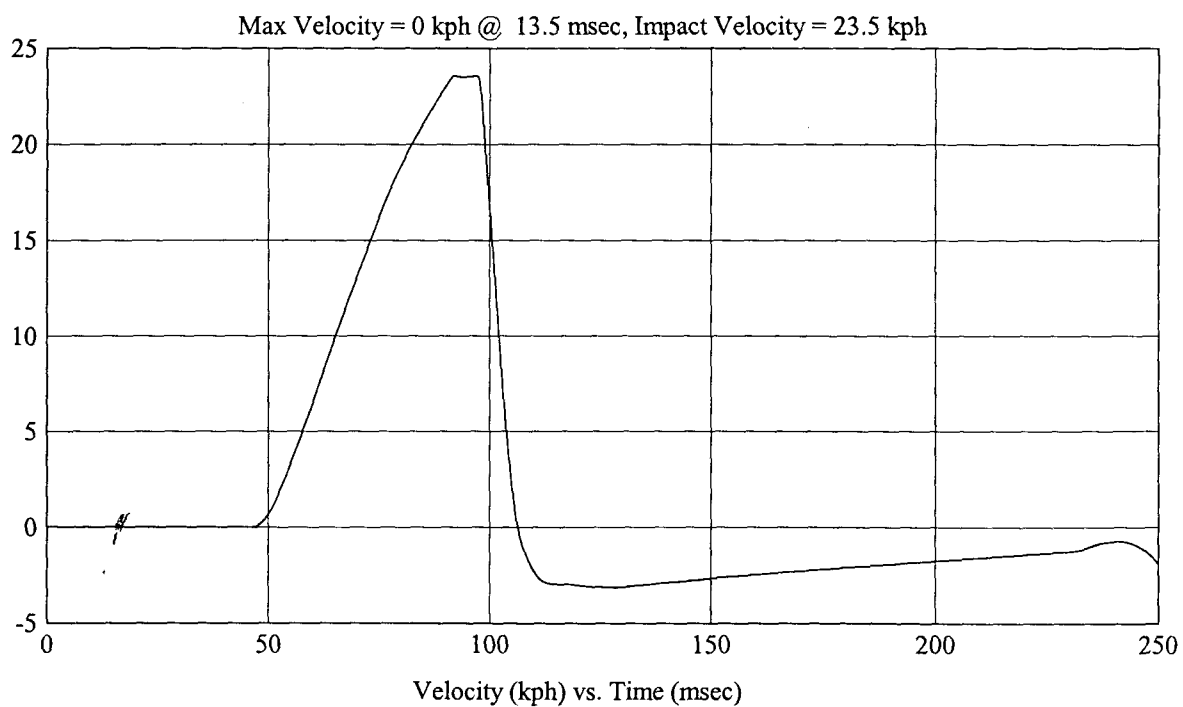
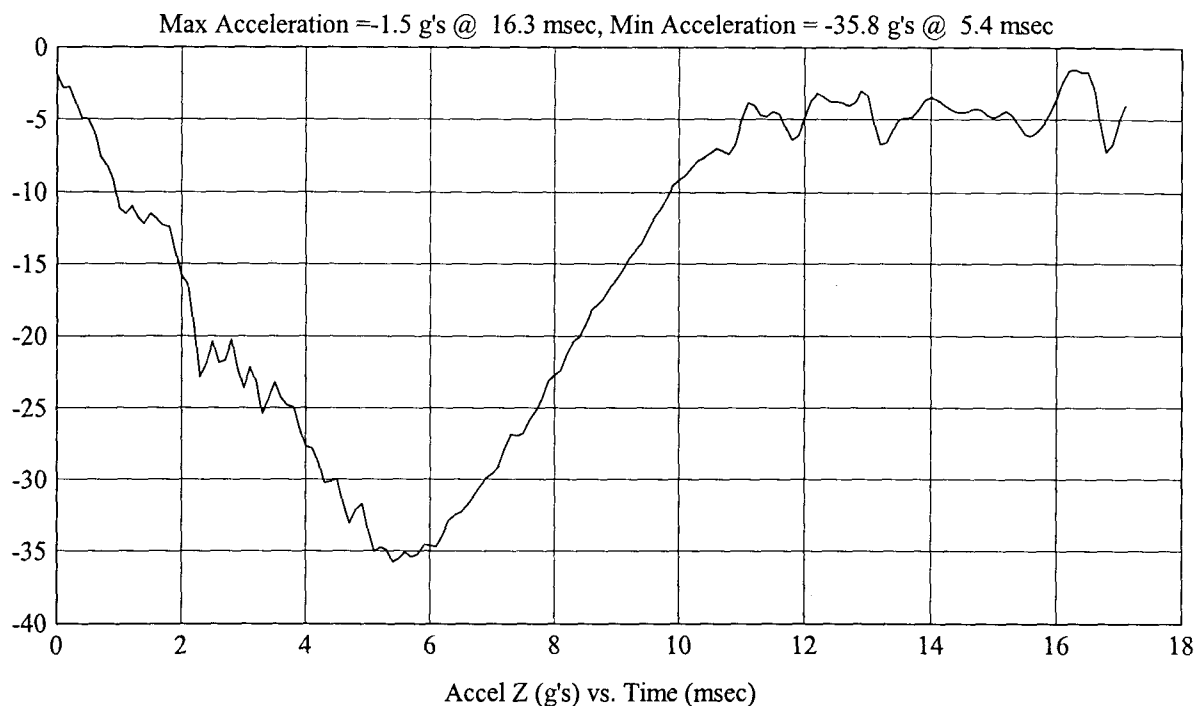
FMH
G04I7-001.16

Customer: FORD
Test # 11
FM4512
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 2005
Target: OP1
Vehicle Side: Right
Horz/Vert Angle: 90/1

HIC(d) = 553, HIC = 512, Delta T = 7.7 msec



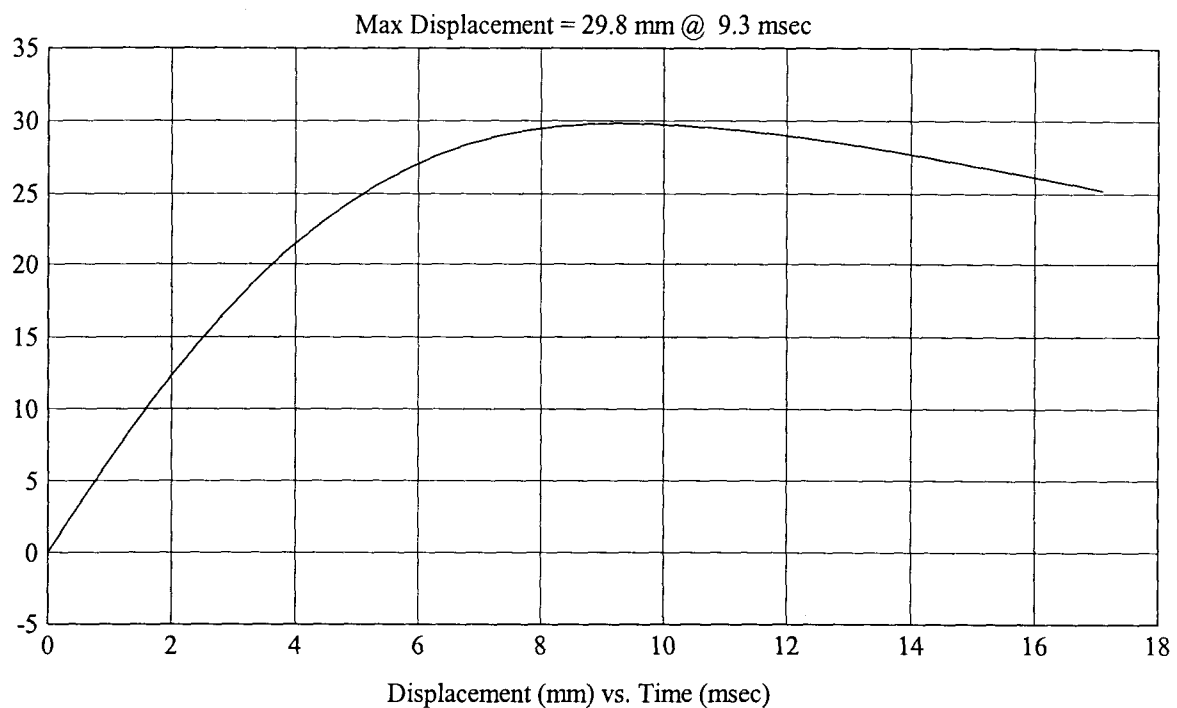
FMH
G04I7-001.16

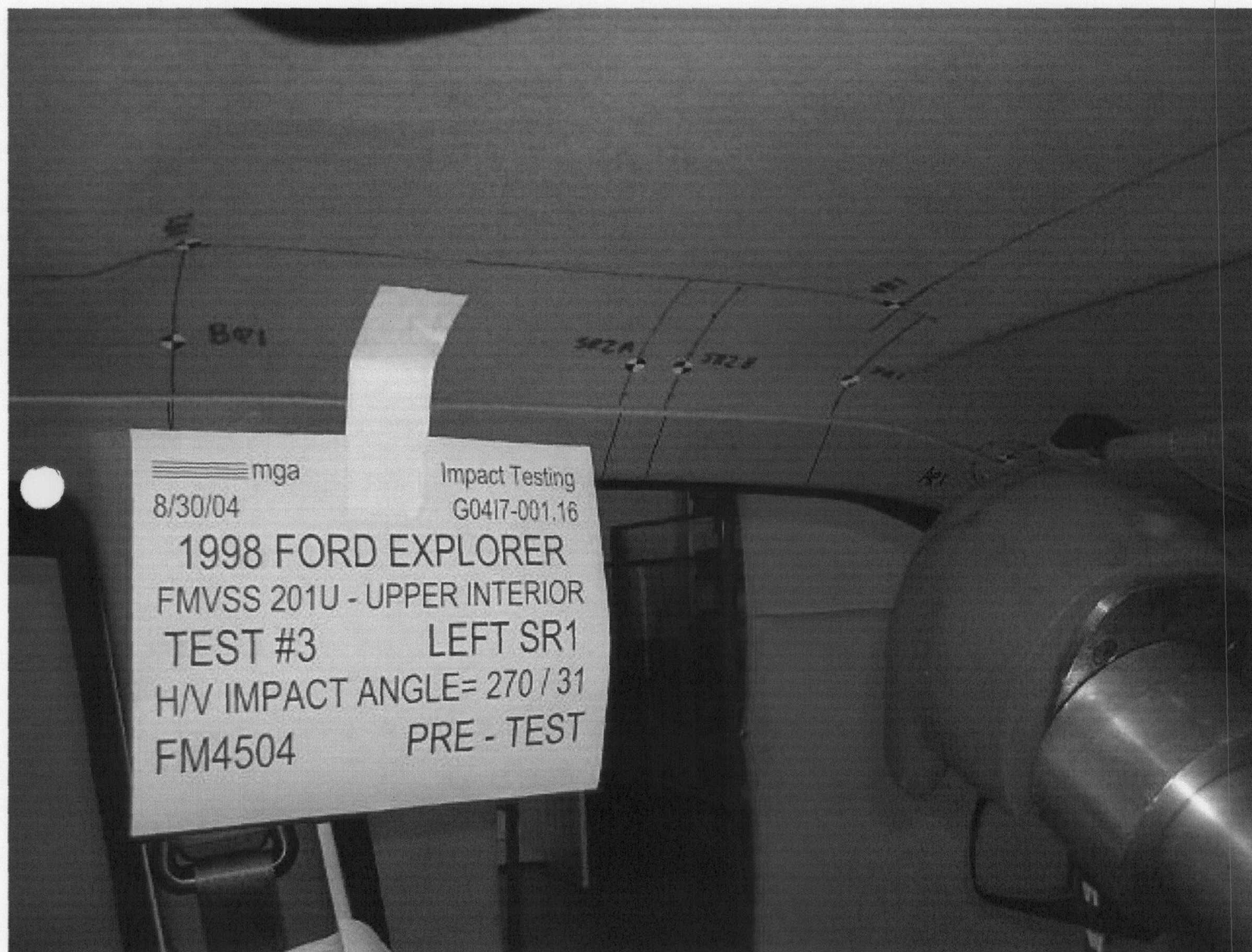
Customer: FORD
Test # 11
FM4512
Additional Desc: N/A

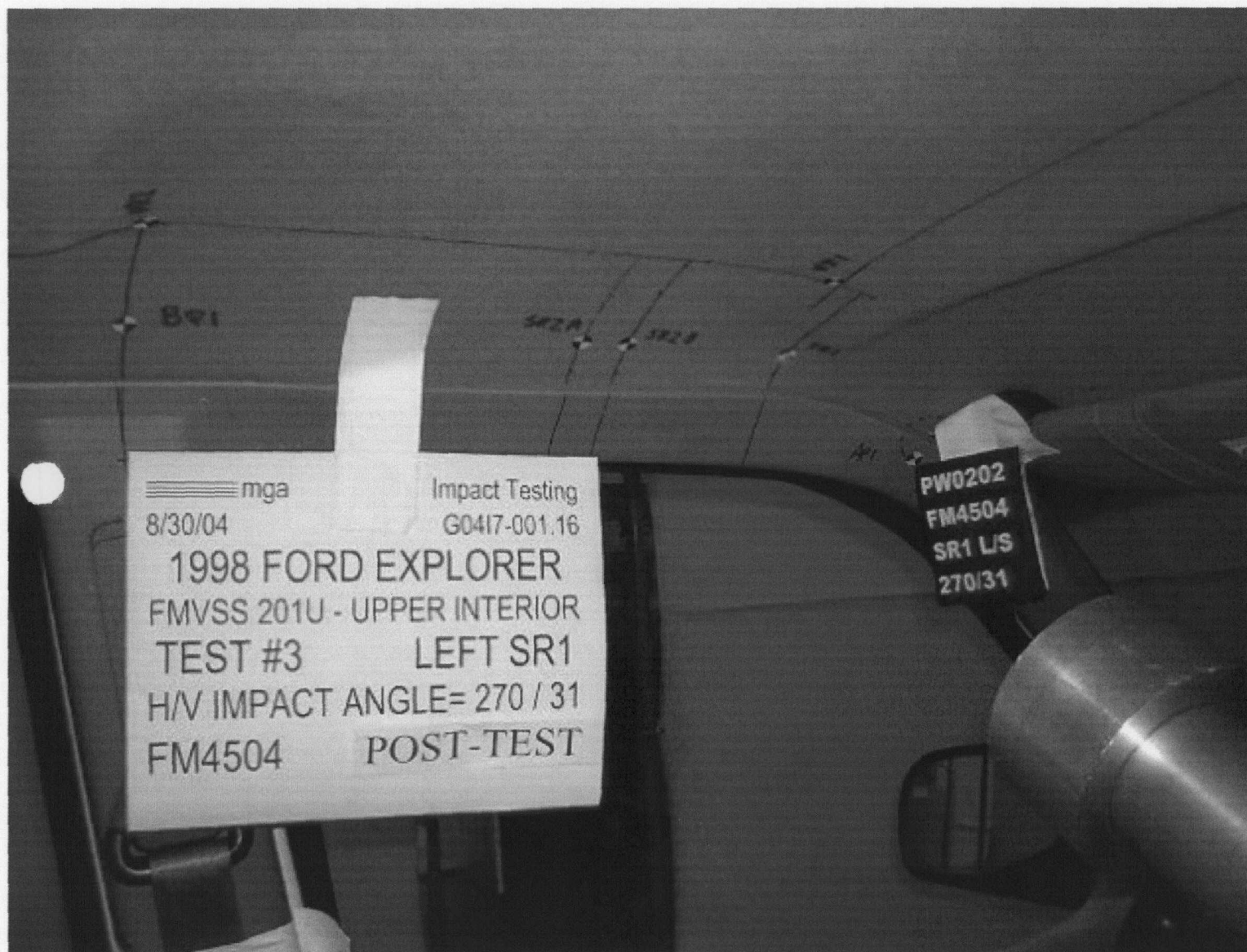
Vehicle Program : EXPLORER

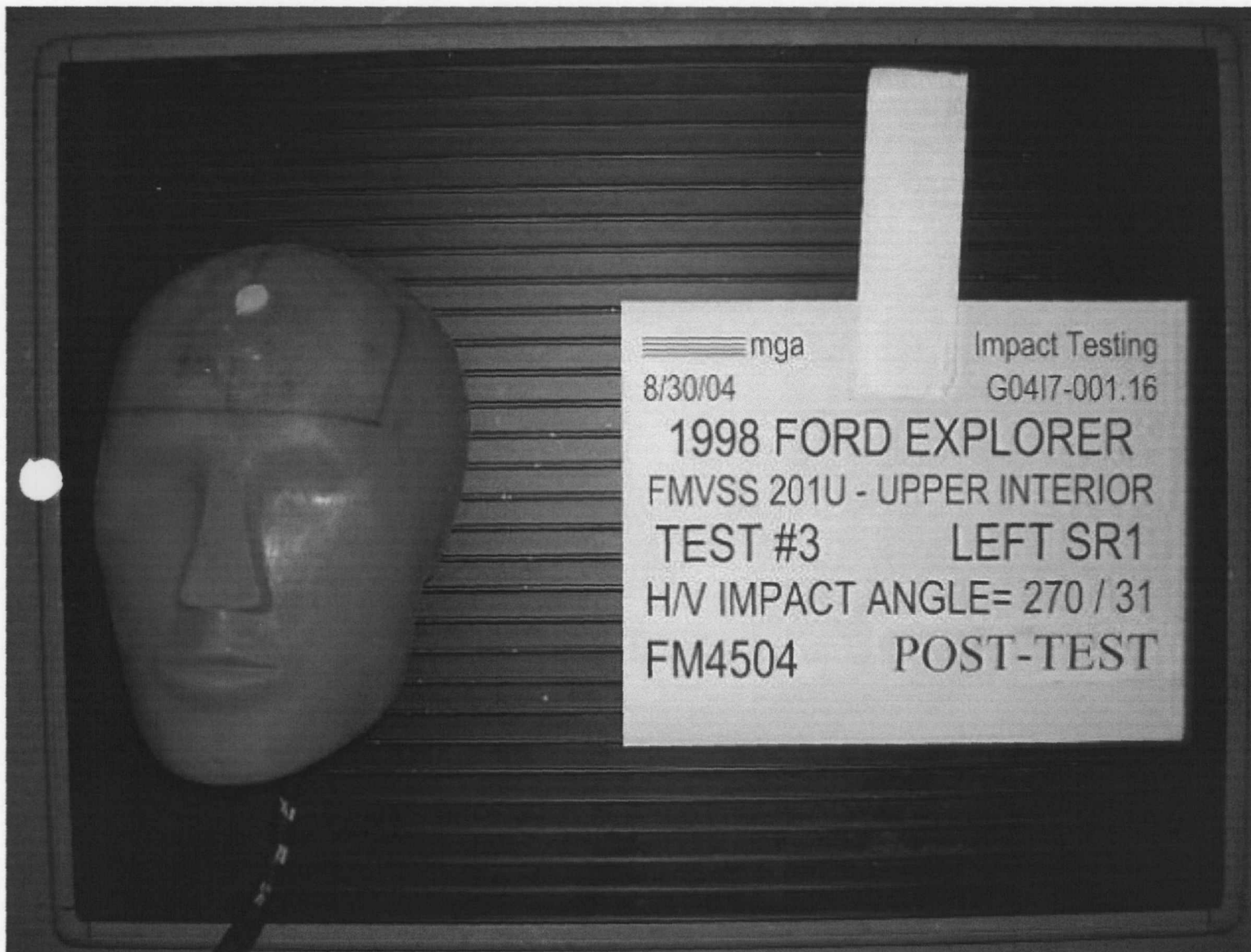
Model Year: 2005
Target: OP1
Vehicle Side: Right
Horz/Vert Angle: 90/1

HIC(d) = 553, HIC = 512, Delta T = 7.7 msec









==== mga

Impact Testing

8/30/04

G0417-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #3 LEFT SR1

H/V IMPACT ANGLE= 270 / 31

FM4504 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Target (Vehicle Side): SR1 Left

MGA Test Reference No.:FM4504

Approach Horizontal Angles:270°

Approach Vertical Angles:31°

Test Number:#3

Temperature:22C

Humidity:57%

Time of Test:11:30 AM

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
1174	1335	4.7	23.6	47	3 L

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	1.65
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: mm J. J. Approved By*: W. A. Kaldon Date: 8-30-04

*Only necessary for NHTSA (Government) Compliance testing.

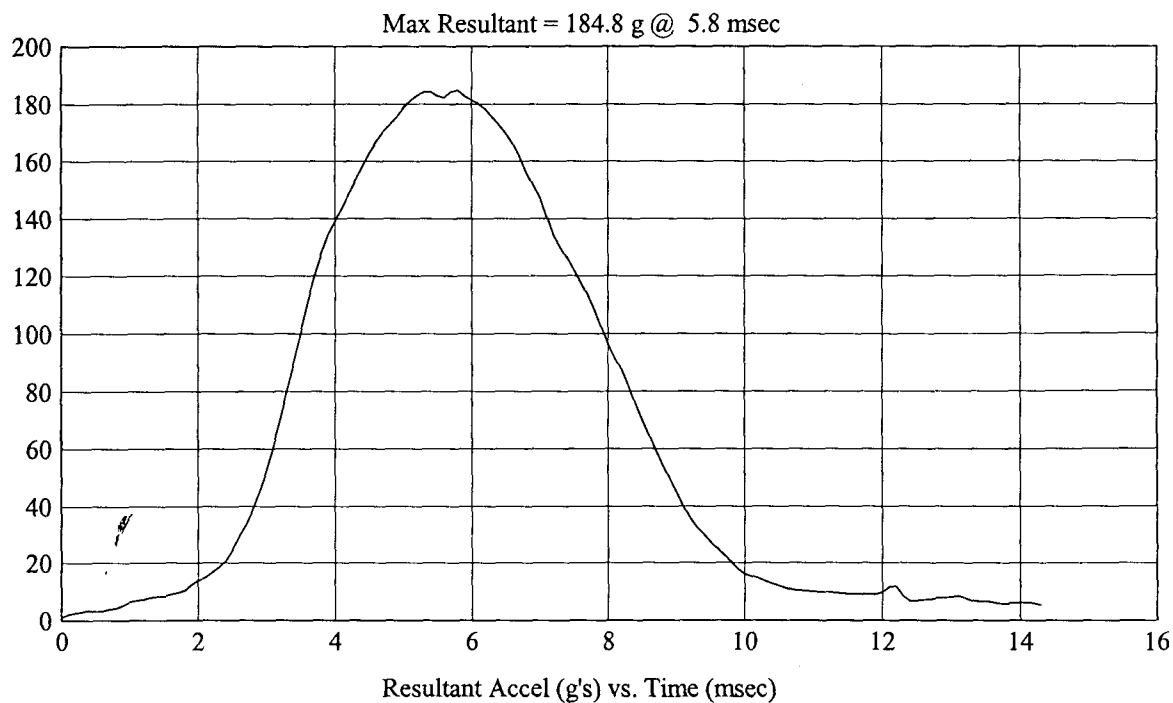
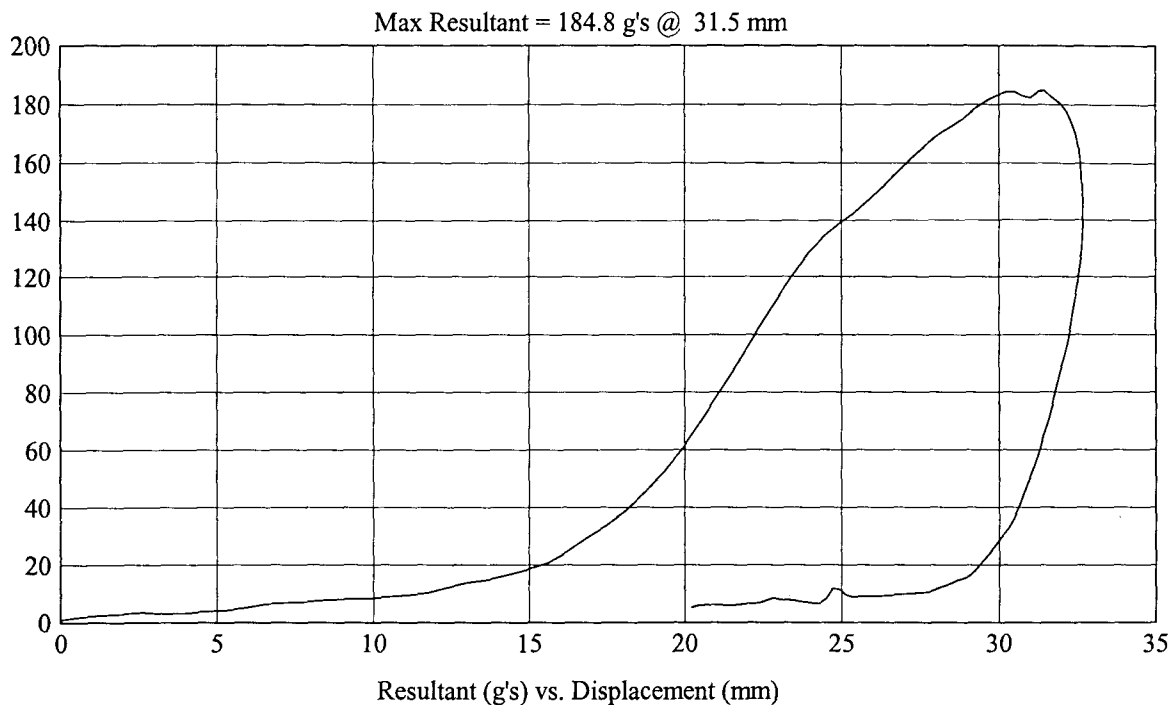
FMH
G04I7-001.16

Customer: FORD
Test # 3
FM4504
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 1174, HIC = 1335, Delta T = 4.7 msec



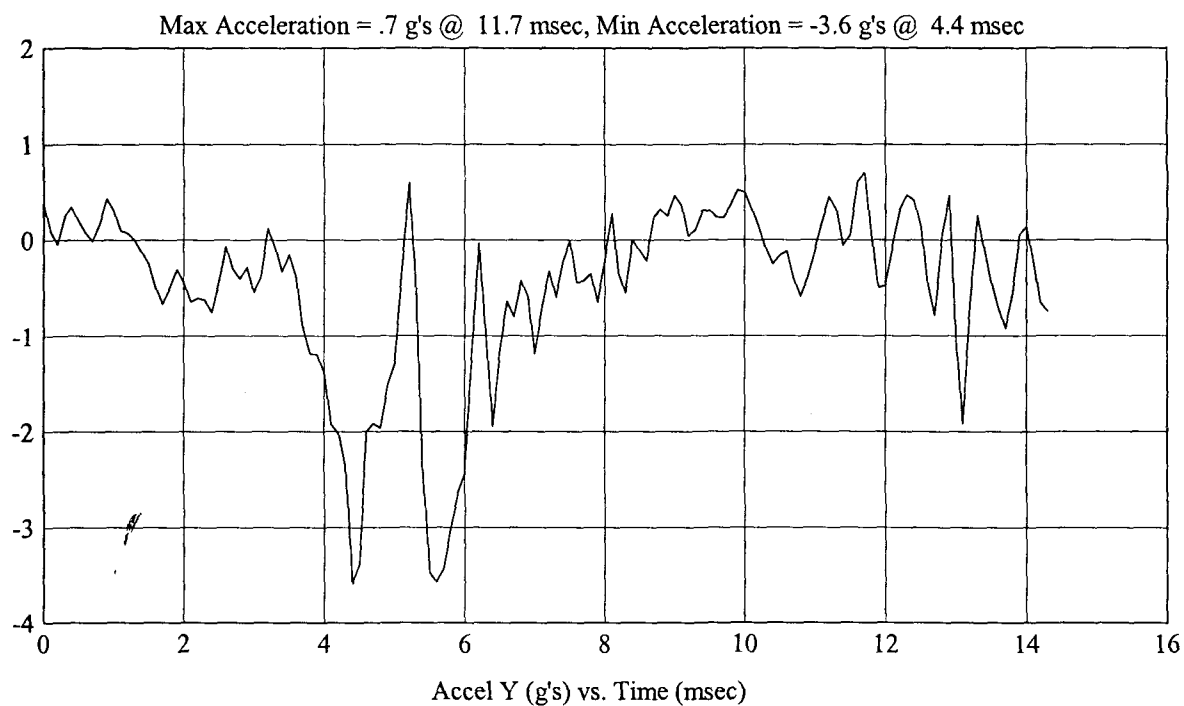
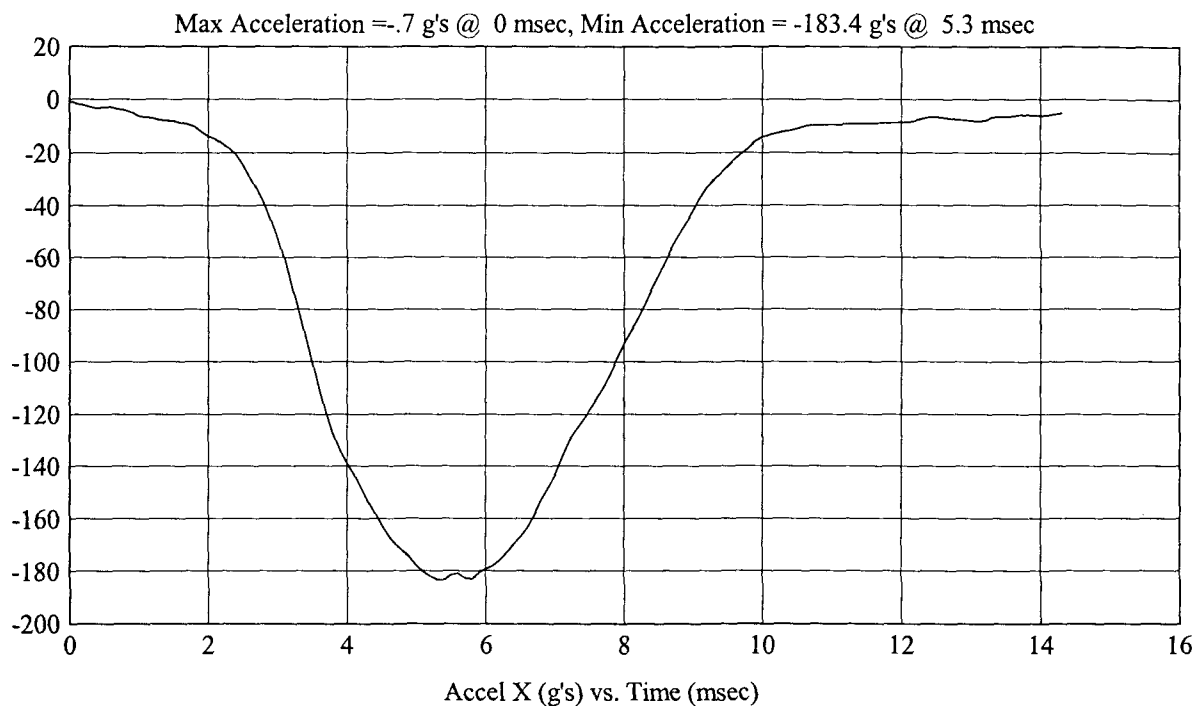
FMH
G04I7-001.16

Customer: FORD
Test # 3
FM4504
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 1174, HIC = 1335, Delta T = 4.7 msec



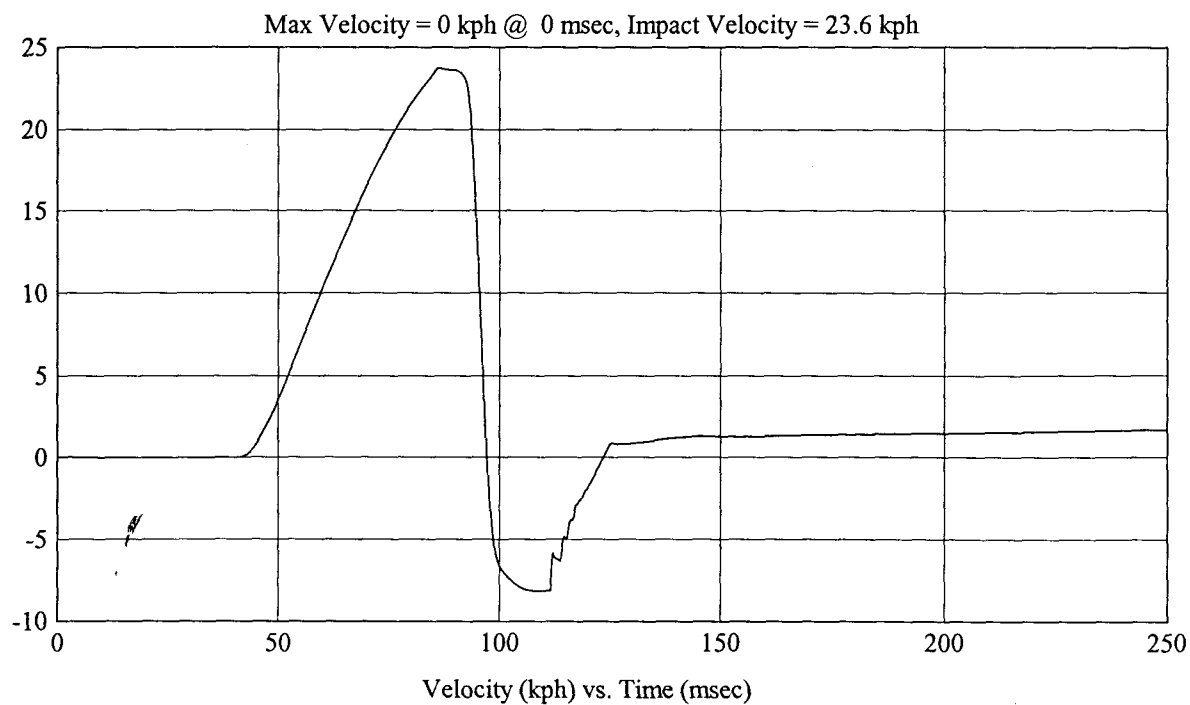
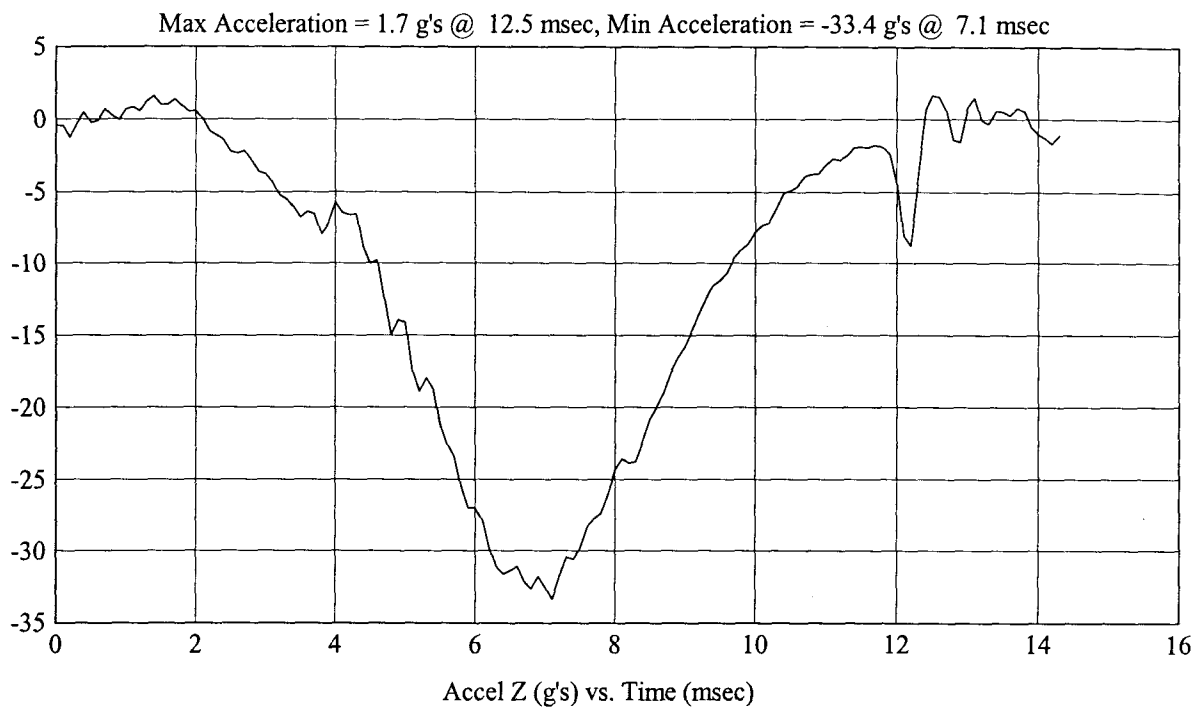
FMH
G04I7-001.16

Customer: FORD
Test # 3
FM4504
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 1174, HIC = 1335, Delta T = 4.7 msec



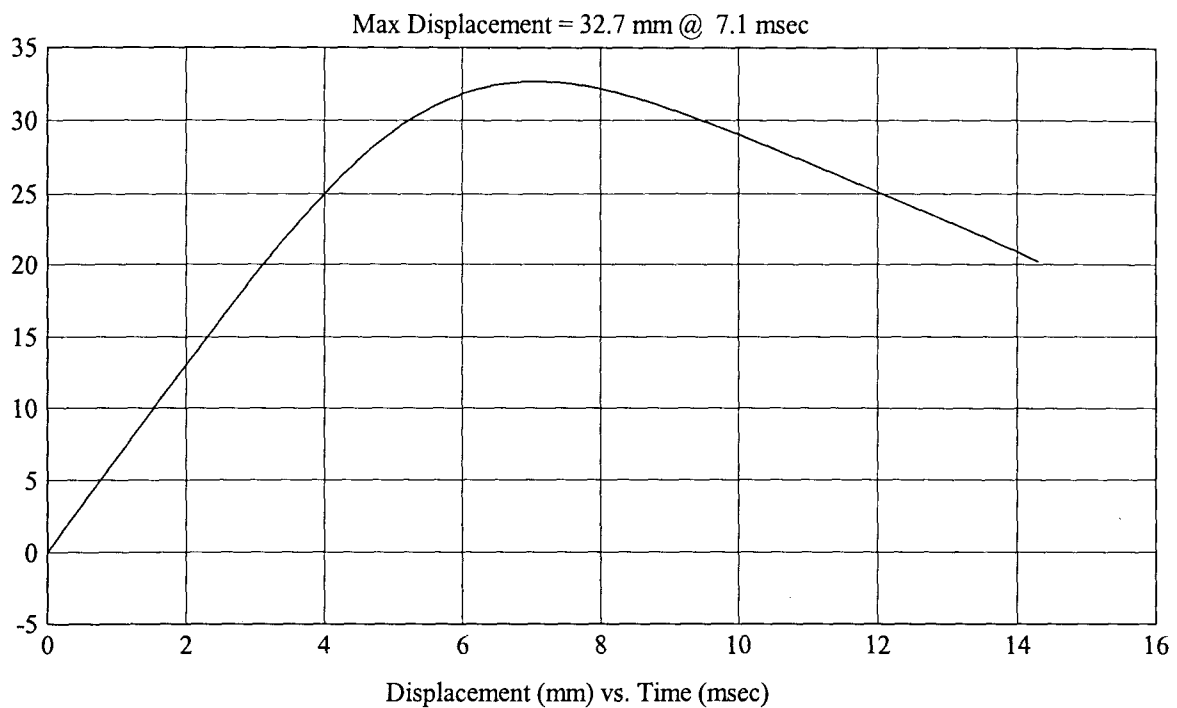
FMH
G04I7-001.16

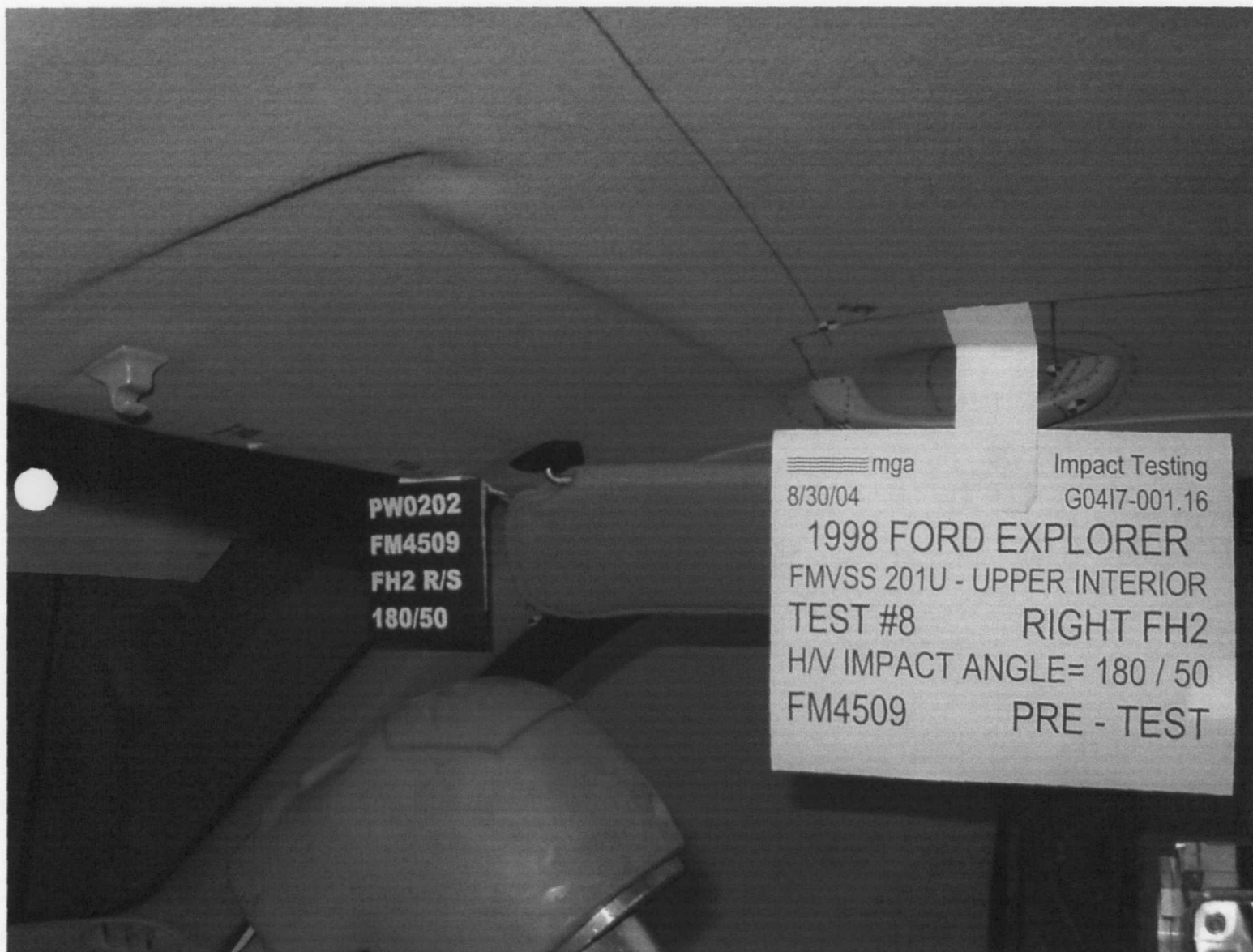
Customer: FORD
Test # 3
FM4504
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/31

HIC(d) = 1174, HIC = 1335, Delta T = 4.7 msec





PW0202
FM4509
FH2 R/S
180/50

mga
8/30/04

Impact Testing
G0417-001.16

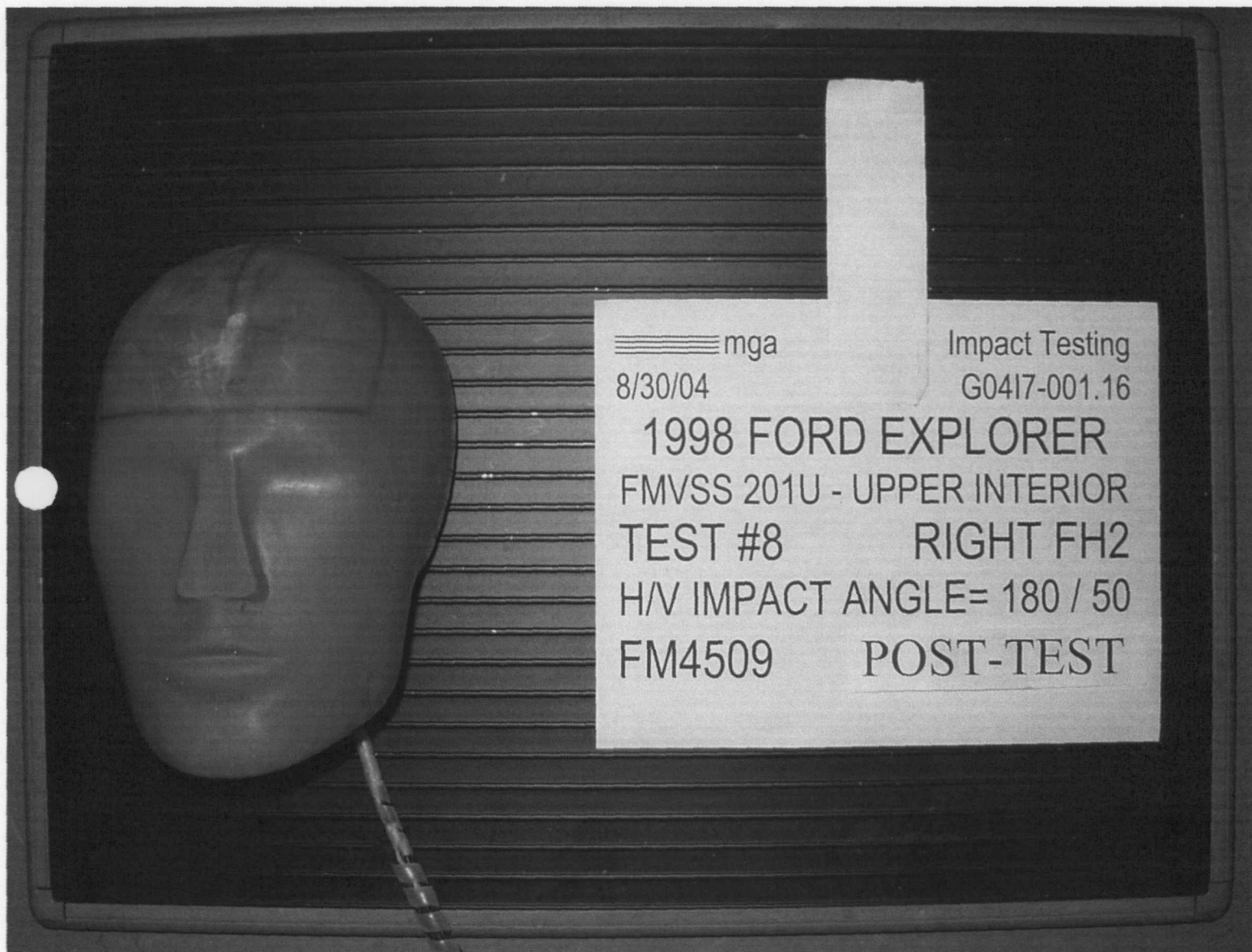
1998 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
FM4509 PRE - TEST

PW0202
FM4509
FH2 R/S
180/50

mga
8/30/04

Impact Testing
G0417-001.16

1998 FORD EXPLORER
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
FM4509 POST-TEST



===== mga

8/30/04

Impact Testing

G0417-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #8

RIGHT FH2

H/V IMPACT ANGLE= 180 / 50

FM4509

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G04I7-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Test Number:#8

Target (Vehicle Side): FH2 Right

Temperature:22C

MGA Test Reference No.:FM4509

Humidity:54%

Approach Horizontal Angles:180°

Time of Test:4:10 PM

Approach Vertical Angles:50°

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
426	344	7	24.0	35	3 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	1.57	1.49

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

Broke windshield

Recorded By: Approved By*: Heena A. Kaleto Date: 8-30-04

*Only necessary for NHTSA (Government) Compliance testing.

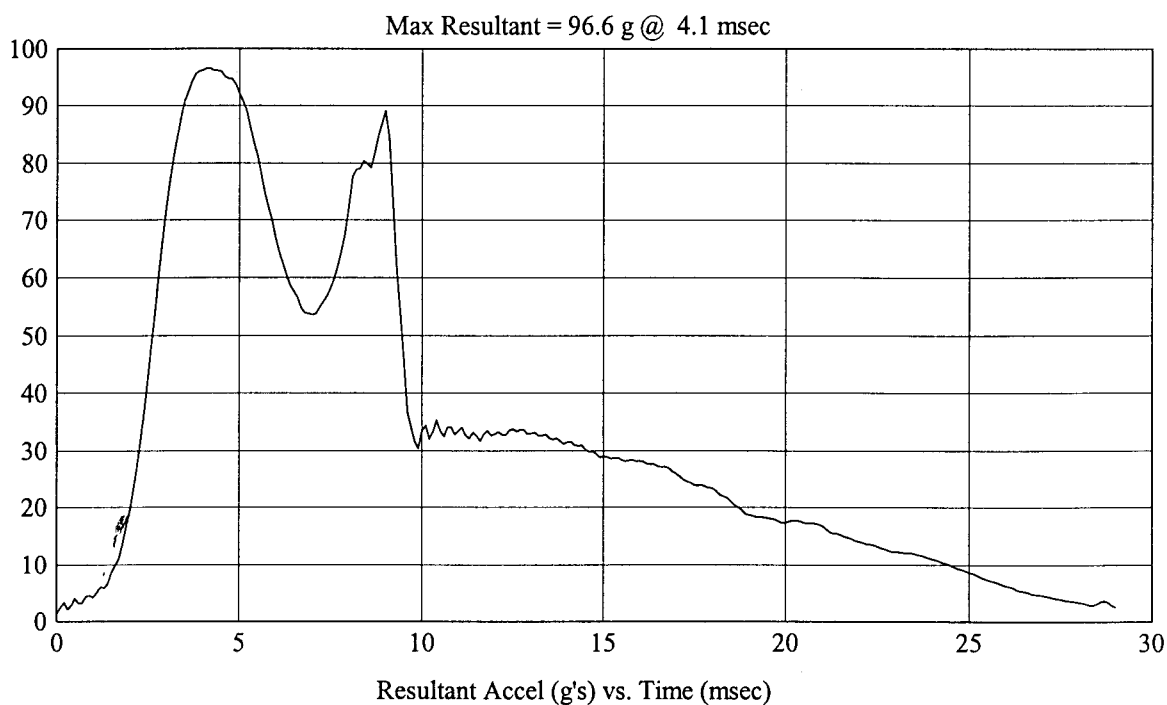
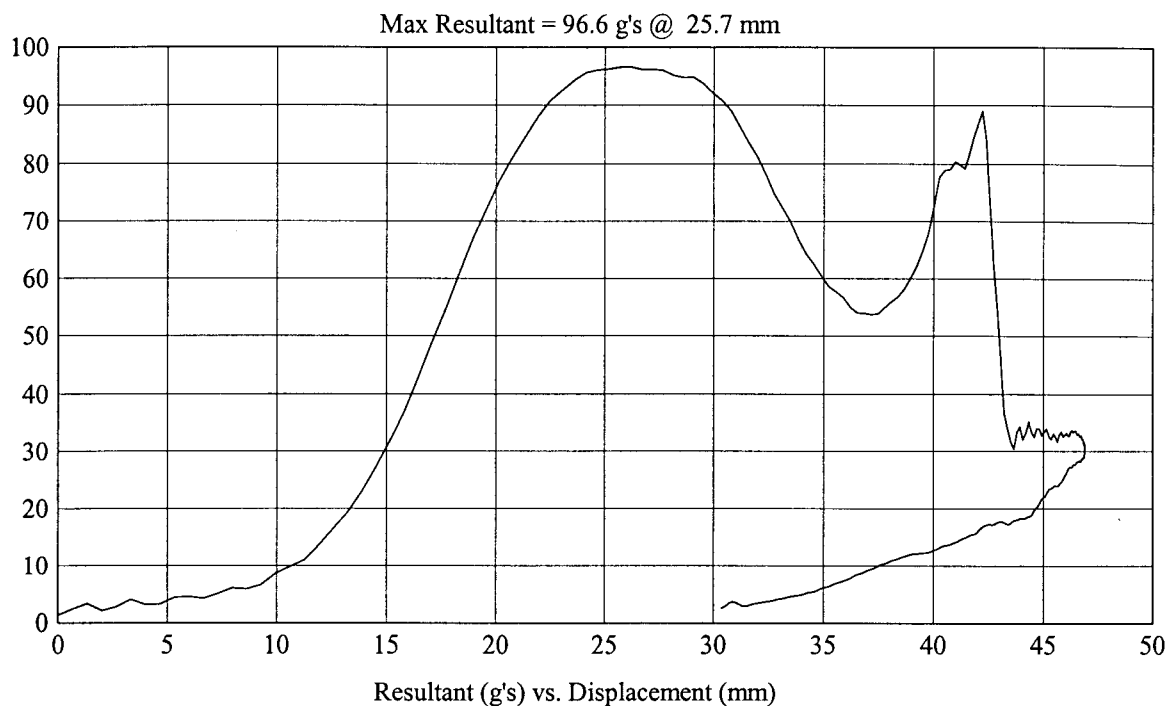
FMH
G04I7-001.16

Customer: FORD
Test # 8
FM4509
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 426, HIC = 344, Delta T = 7 msec



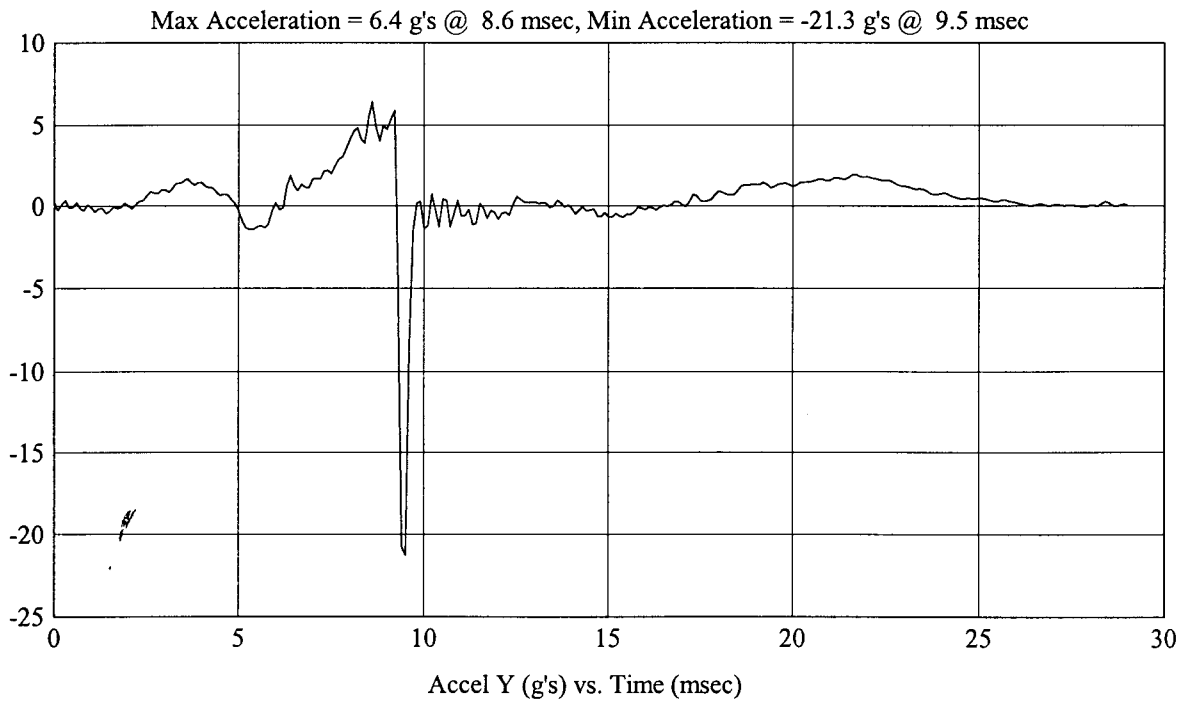
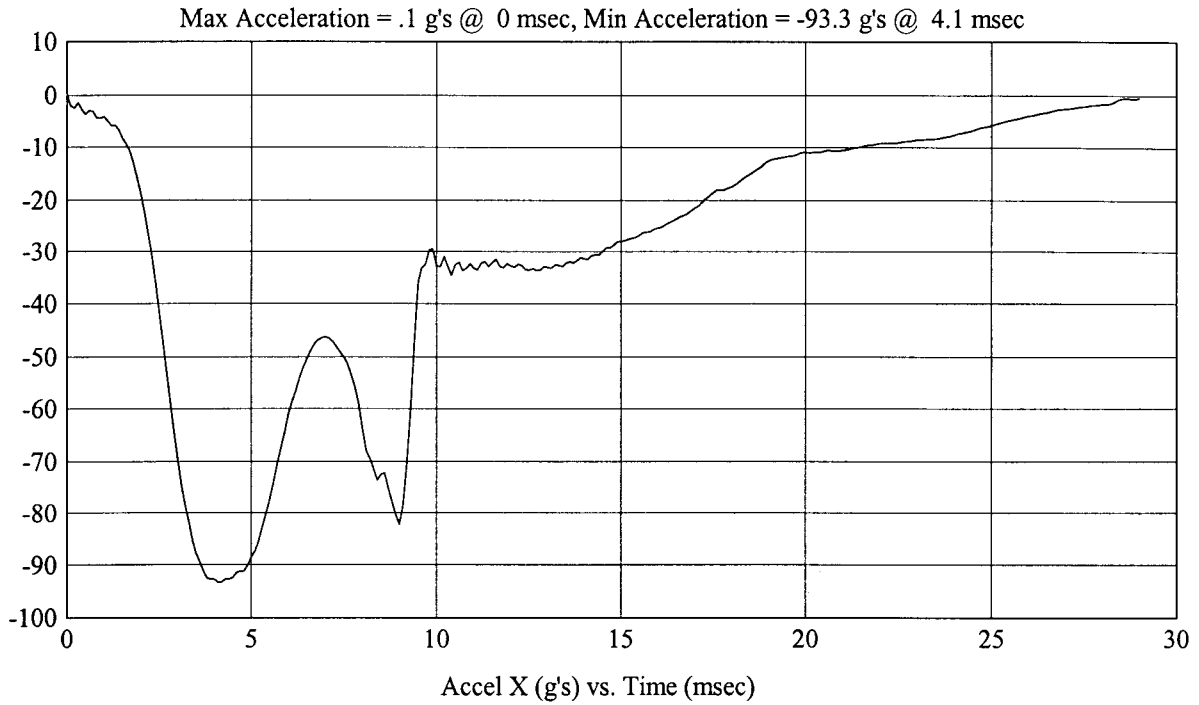
FMH
G04I7-001.16

Customer: FORD
Test # 8
FM4509
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 426, HIC = 344, Delta T = 7 msec



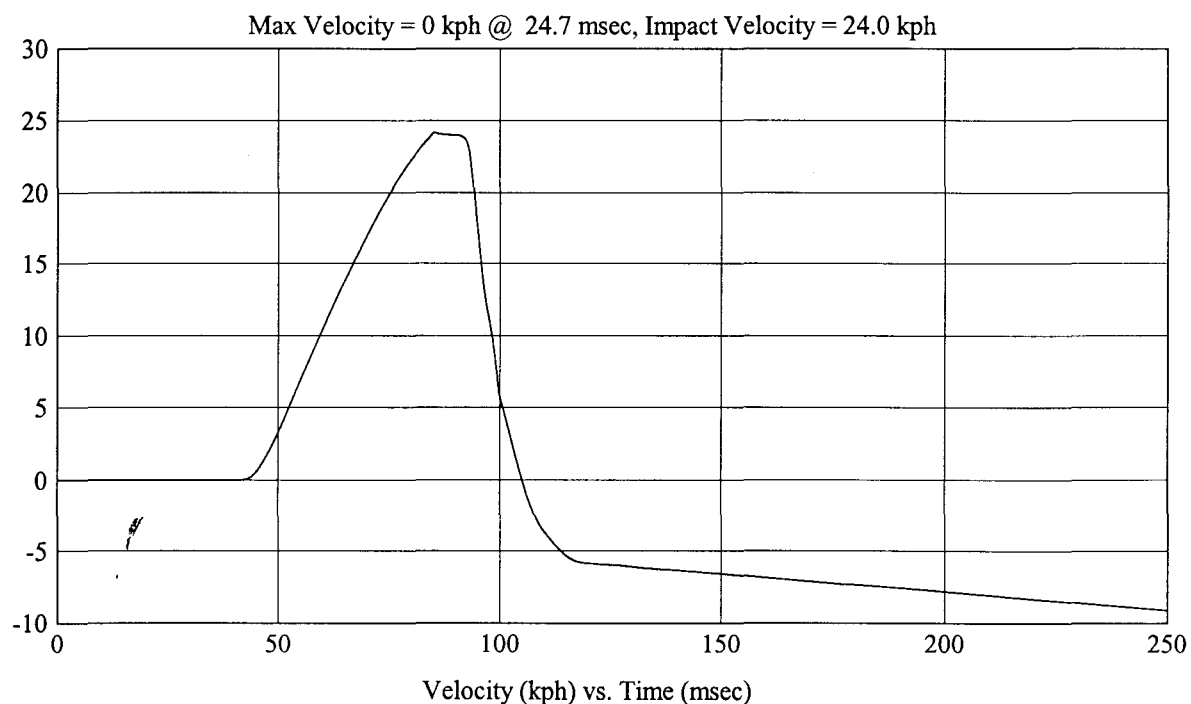
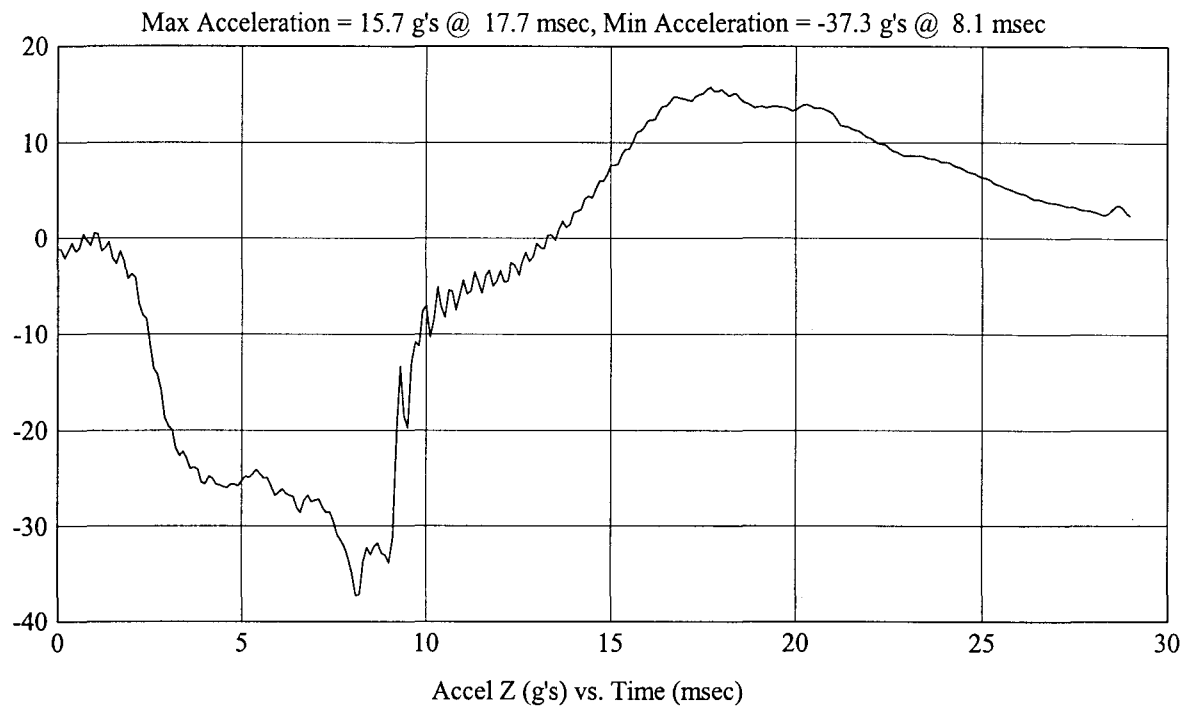
FMH
G04I7-001.16

Customer: FORD
Test # 8
FM4509
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 426, HIC = 344, Delta T = 7 msec



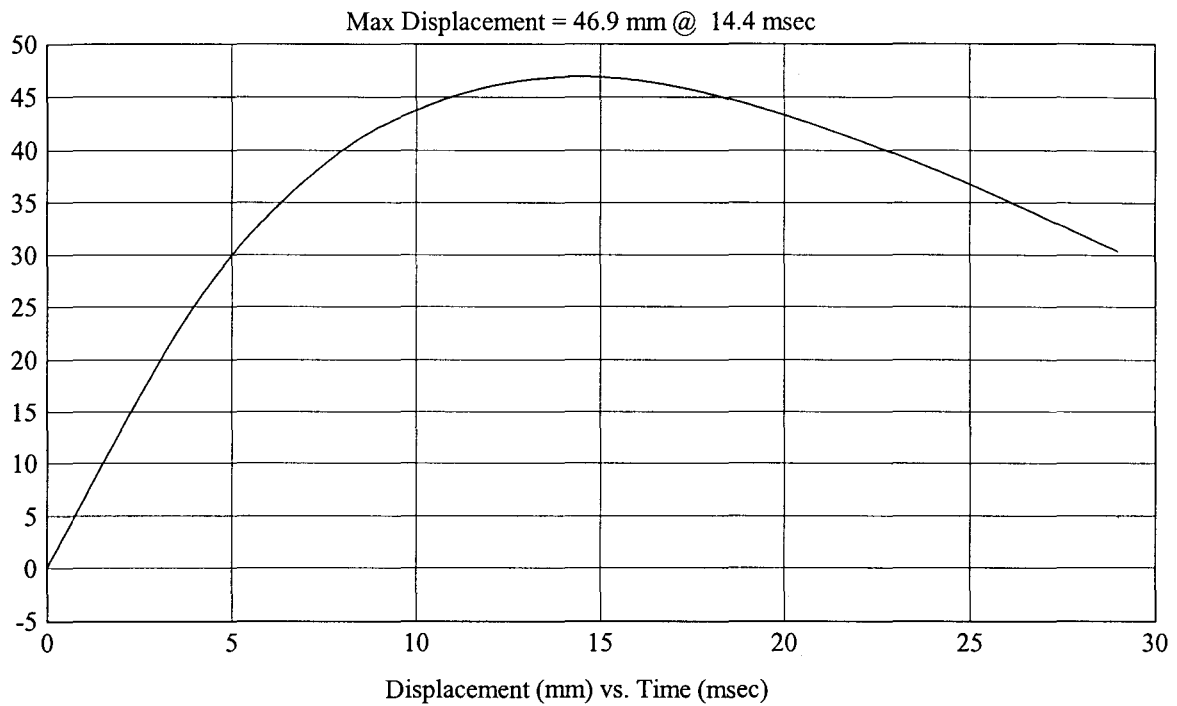
FMH
G04I7-001.16

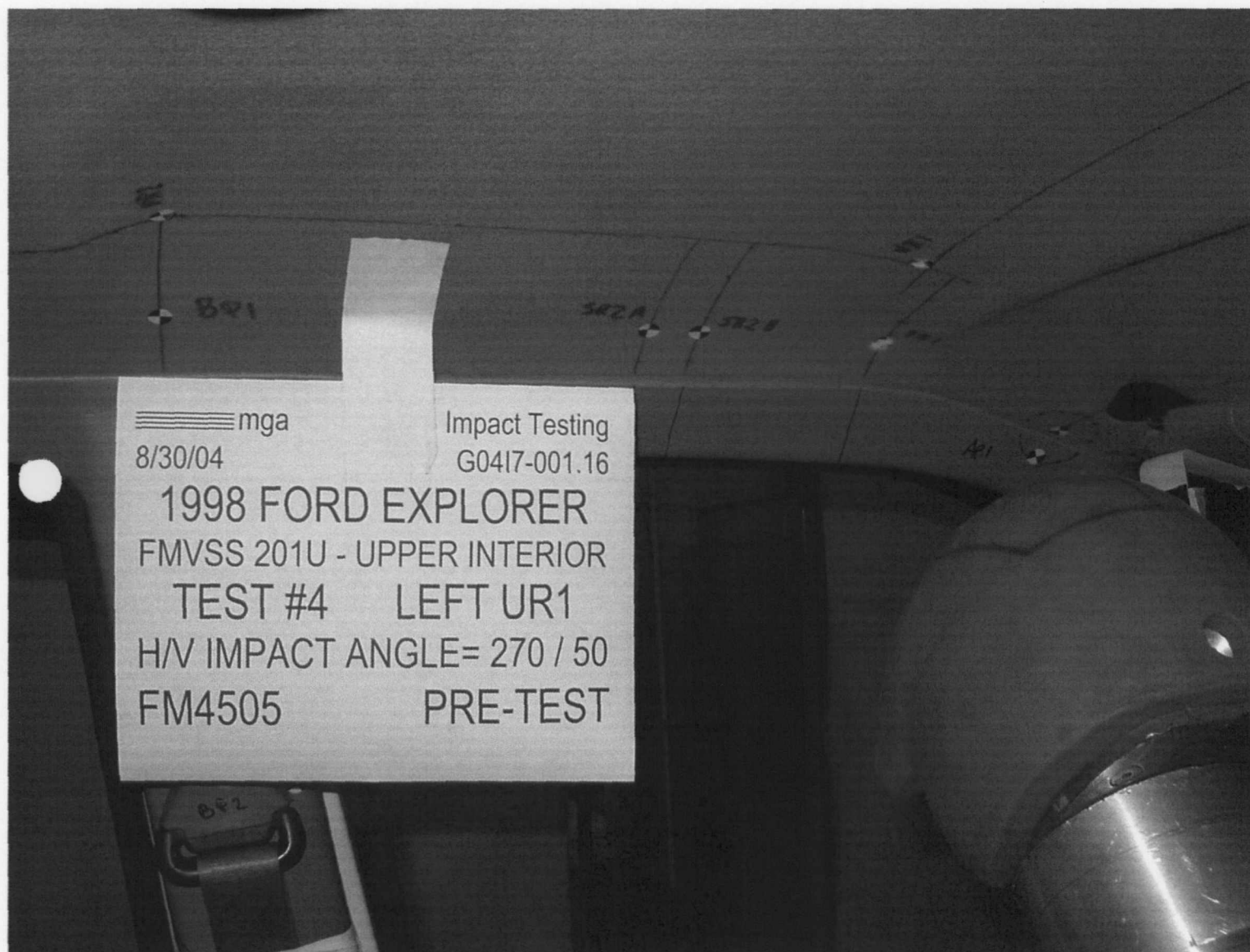
Customer: FORD
Test # 8
FM4509
Additional Desc: N/A

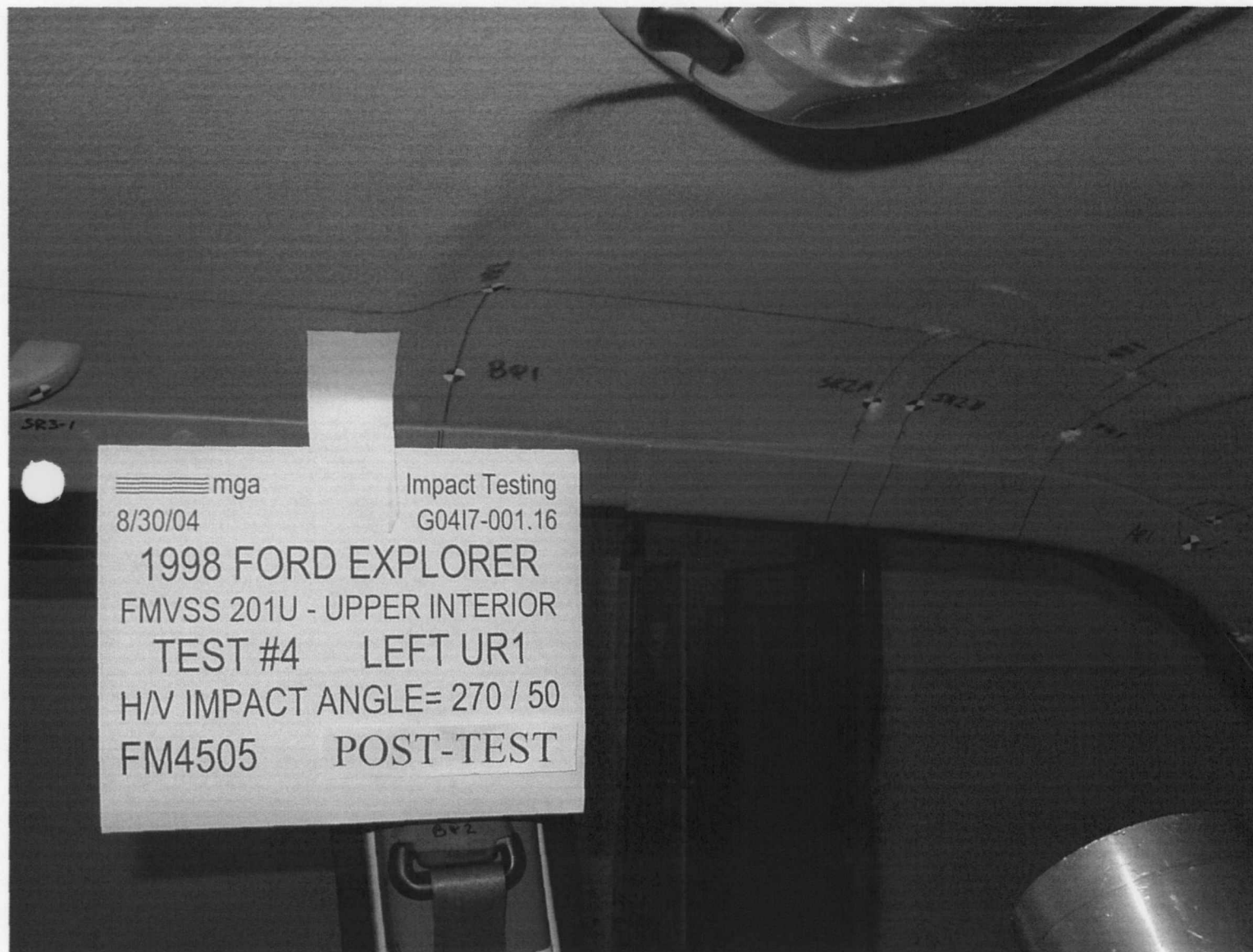
Vehicle Program : EXPLORER

Model Year: 1998
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 426, HIC = 344, Delta T = 7 msec







mga

8/30/04

Impact Testing

G0417-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #4 LEFT UR1

H/V IMPACT ANGLE= 270 / 50

FM4505 POST-TEST



==== mga

8/30/04

Impact Testing

G04I7-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #4 LEFT UR1

H/V IMPACT ANGLE= 270 / 50

FM4505

POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): UR1 Left

Temperature:22C

MGA Test Reference No.:FM4505

Humidity:54%

Approach Horizontal Angles:270°

Time of Test:1:00 PM

Approach Vertical Angles:50°

FMH Serial No:035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
1083	1215	4.7	23.5	35	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-92.4	1.67	1.67
Y	6	J35919	93.8	1.54	1.54
Z	7	J21969	88.5	1.58	1.60

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

No visible damage

Recorded By: mm j mc Approved By*: Helen Q. Kato Date: 8-30-04

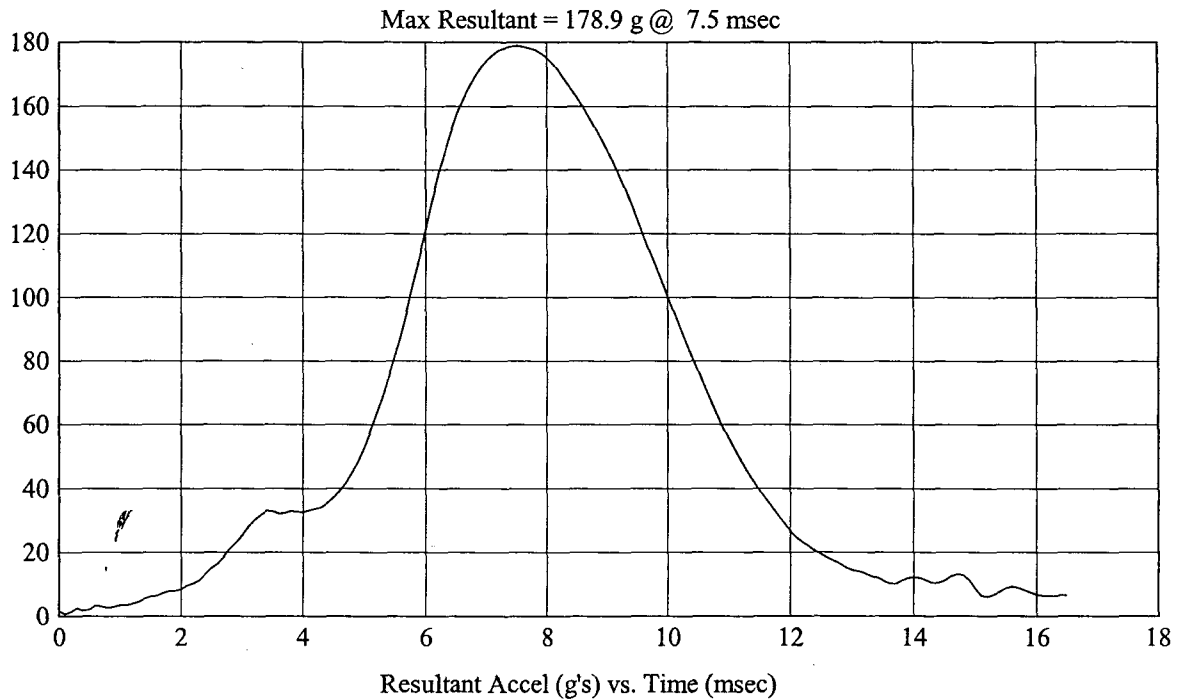
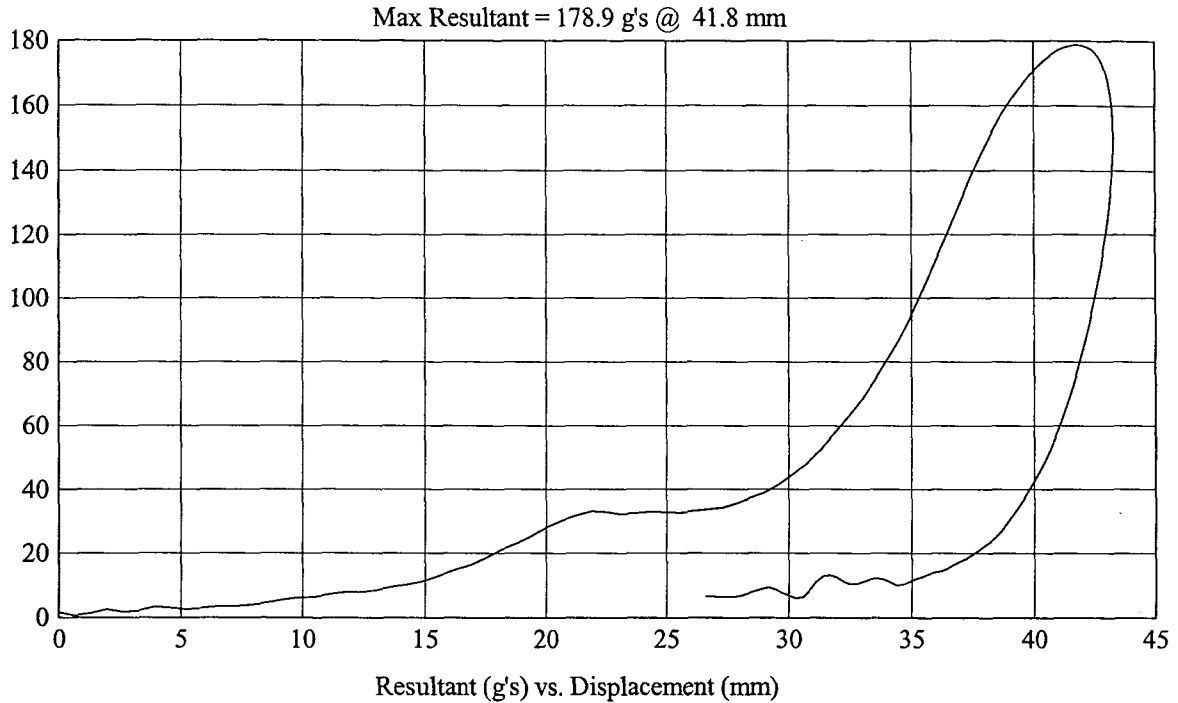
*Only necessary for NHTSA (Government) Compliance testing.

Customer: FORD
Test # 4
FM4505
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 1083, HIC = 1215, Delta T = 4.7 msec



Customer: FORD

Test # 4

FM4505

Additional Desc: N/A

Vehicle Program : EXPLORER

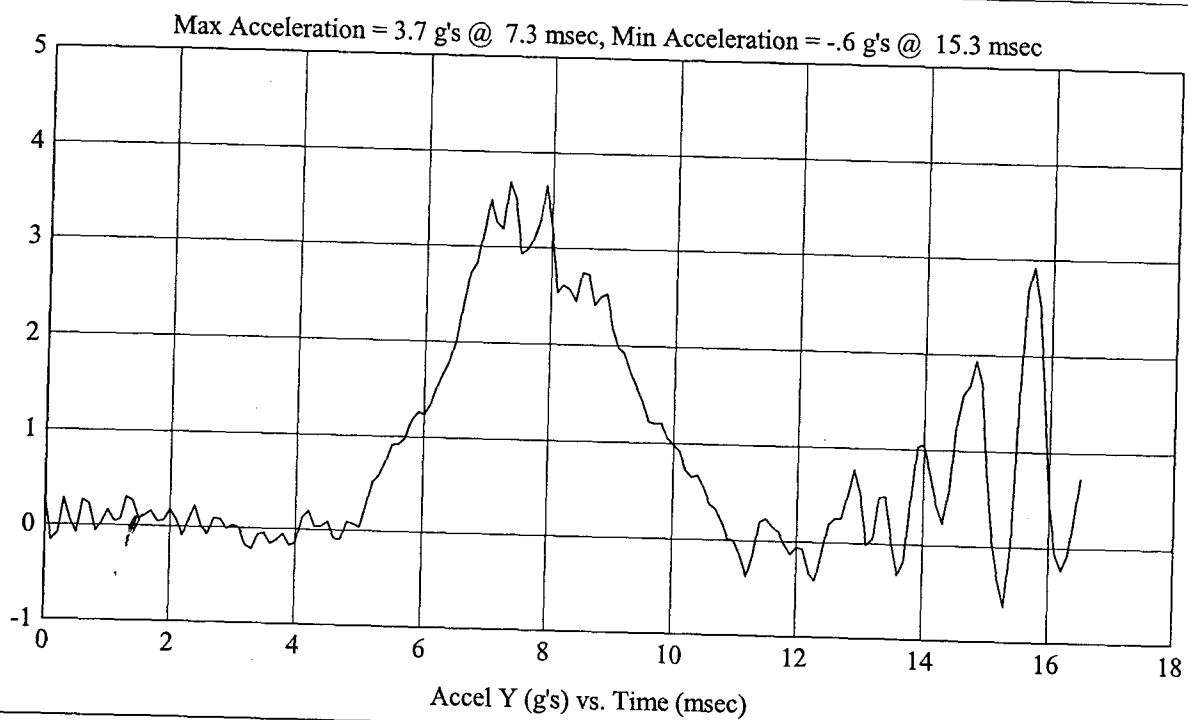
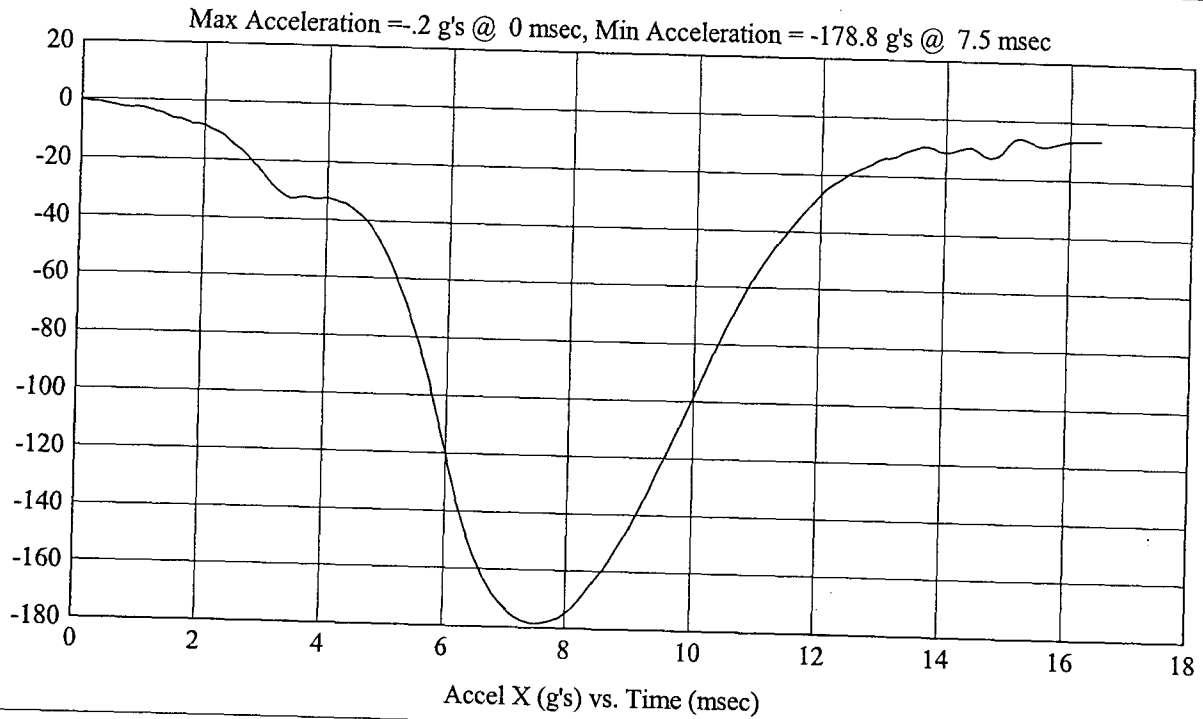
Model Year: 1998

Target: UR1

Vehicle Side: Left

Horz/Vert Angle: 270/50

HIC(d) = 1083, HIC = 1215, Delta T = 4.7 msec

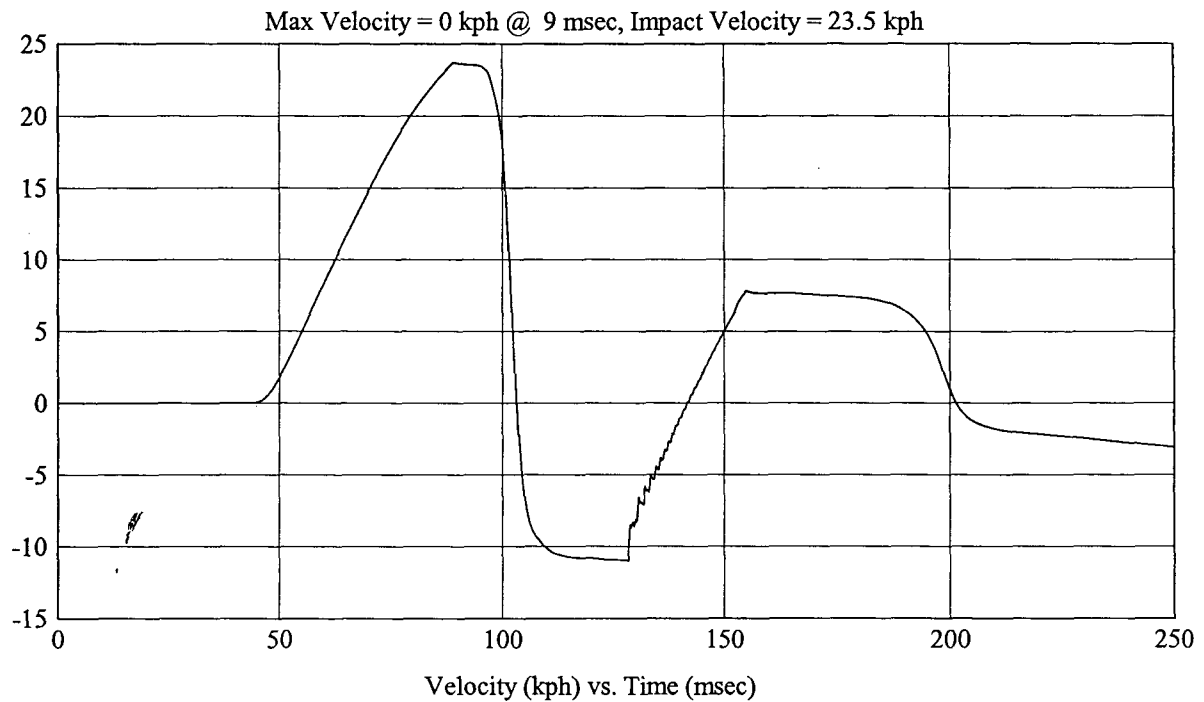
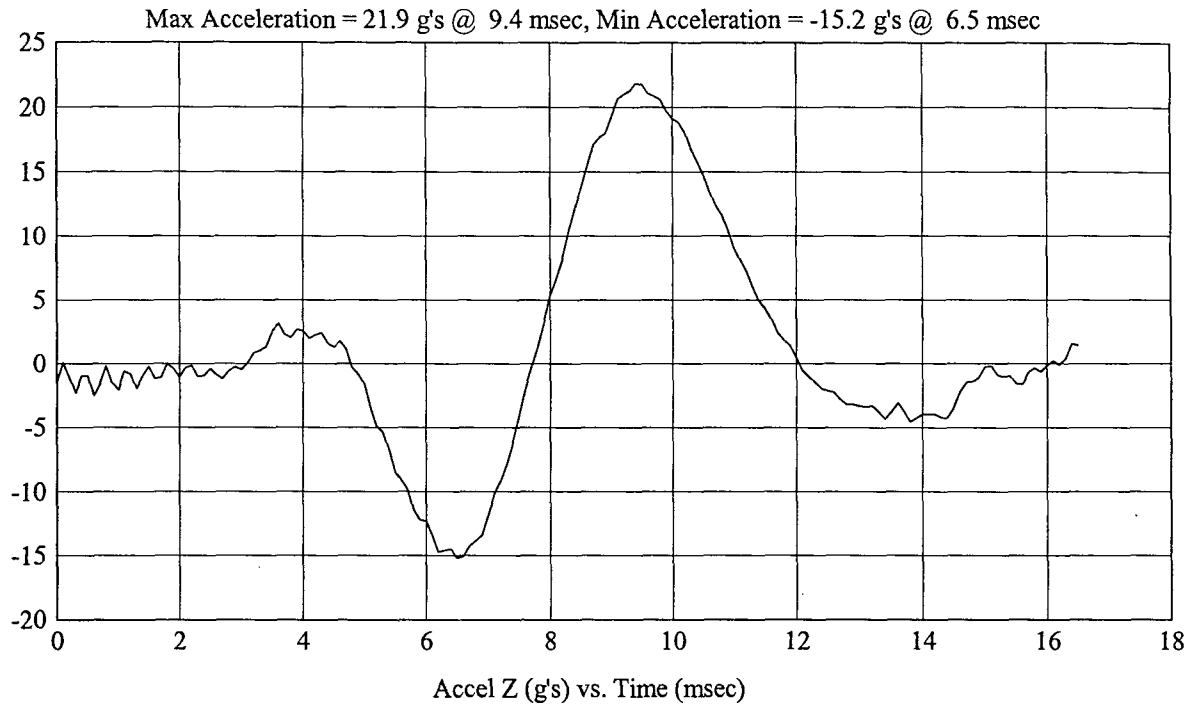


Customer: FORD
Test # 4
FM4505
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 1083, HIC = 1215, Delta T = 4.7 msec

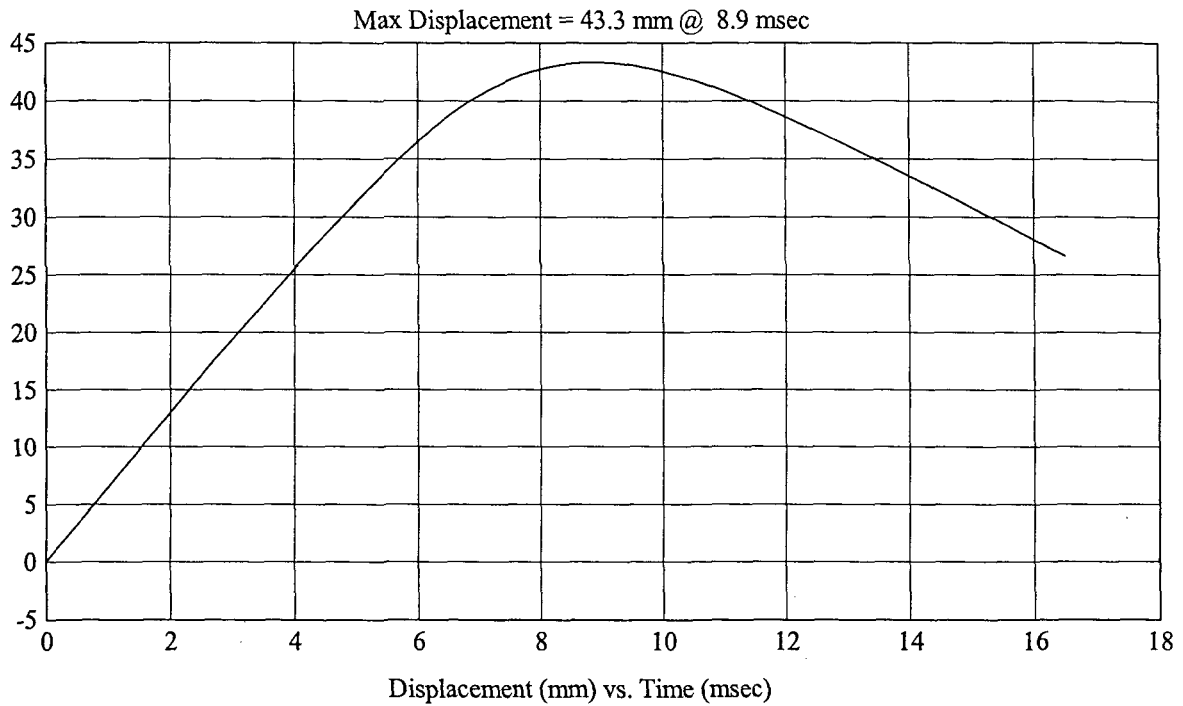


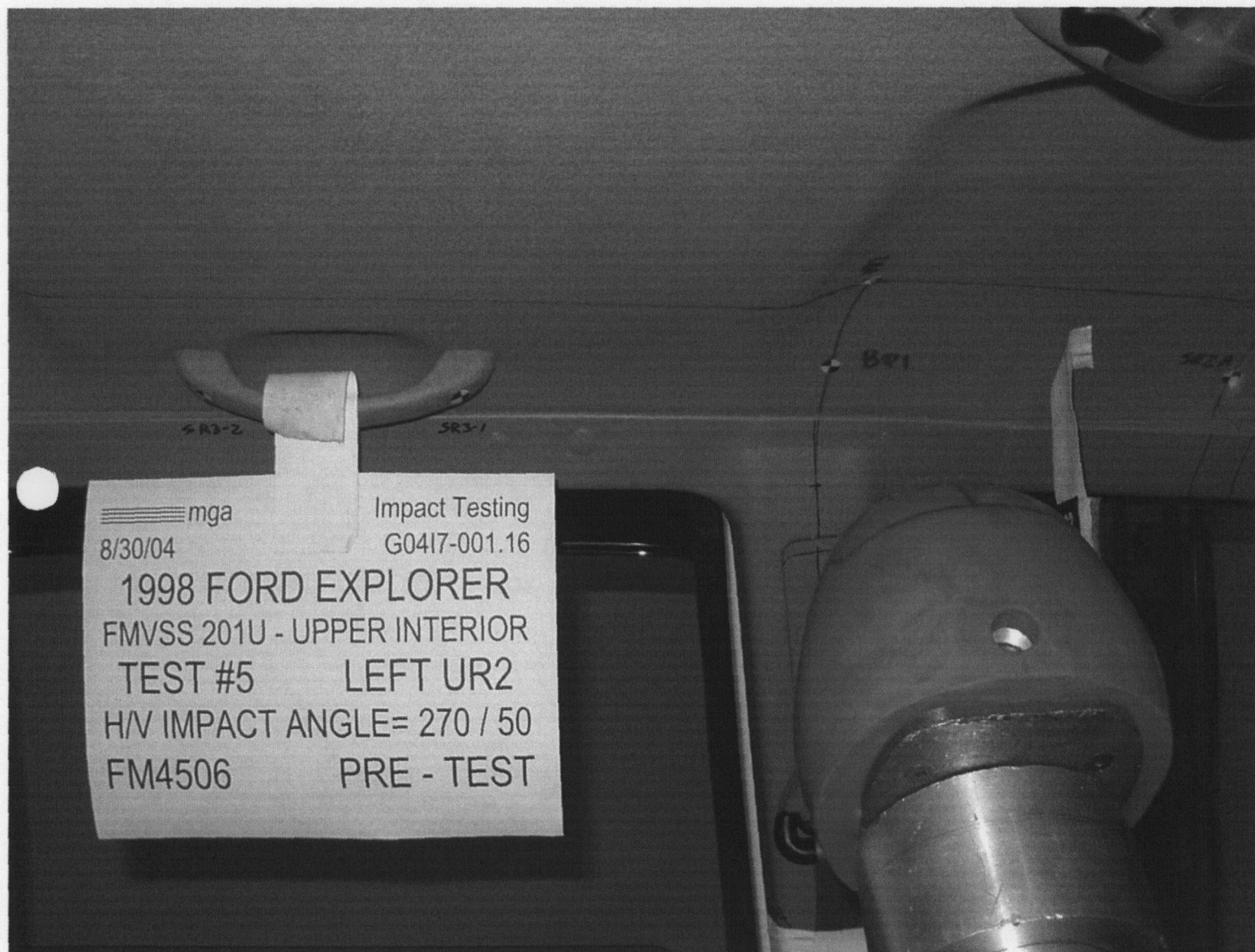
Customer: FORD
Test # 4
FM4505
Additional Desc: N/A

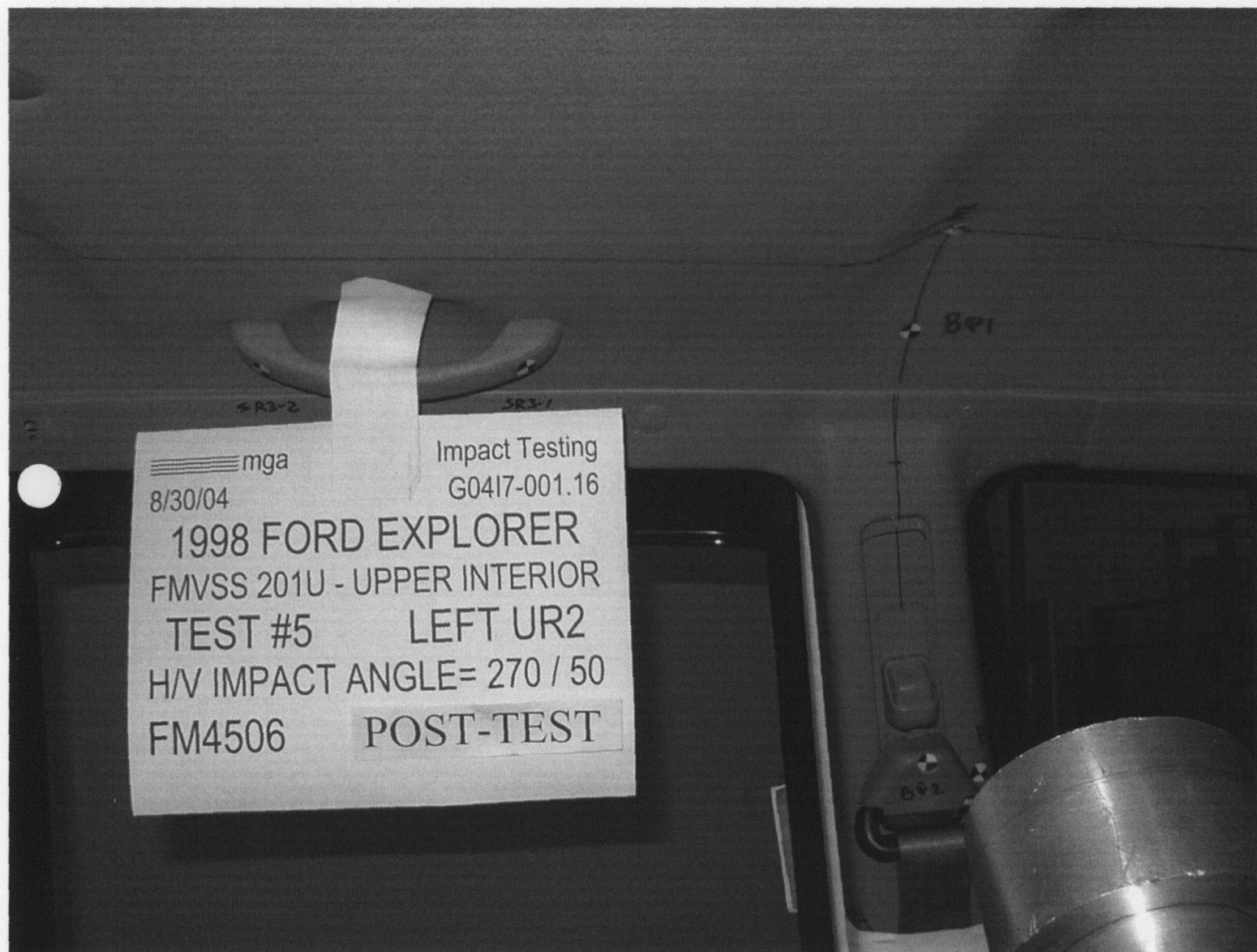
Vehicle Program : EXPLORER

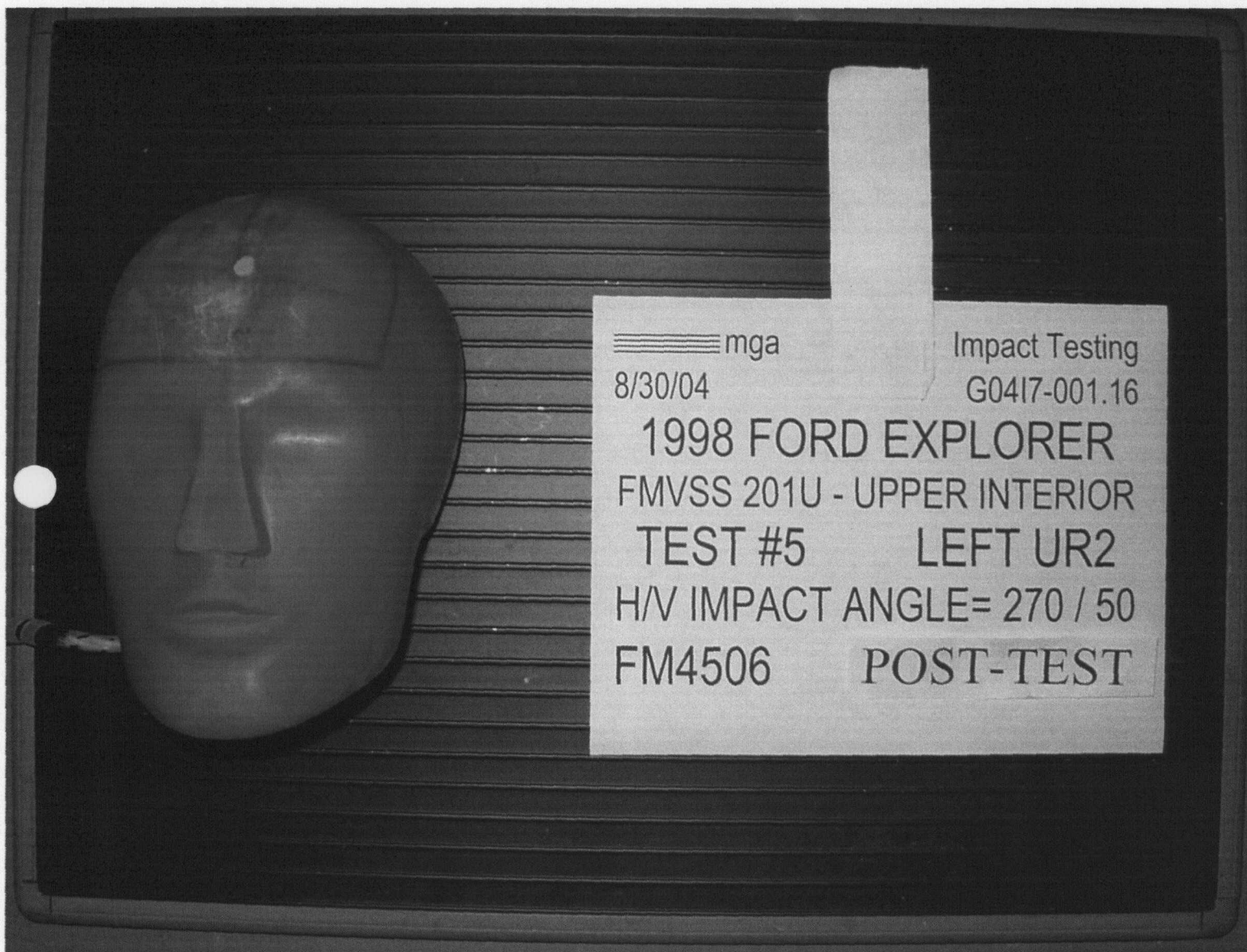
Model Year: 1998
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 1083, HIC = 1215, Delta T = 4.7 msec









==== mga

8/30/04

Impact Testing

G04I7-001.16

1998 FORD EXPLORER

FMVSS 201U - UPPER INTERIOR

TEST #5 LEFT UR2

H/V IMPACT ANGLE= 270 / 50

FM4506 POST-TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0417-001.16 VEHICLE YR/MAKE/MODEL:EXPLORER 1998

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): UR2 Left

Temperature:22C

MGA Test Reference No.:FM4506

Humidity:54%

Approach Horizontal Angles:270°

Time of Test:1:38 PM

Approach Vertical Angles:50°

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
928	1009	4.1	23.7	37	3 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.):

Slight headliner deformation

Recorded By: [Signature] Approved By: Helen A. Kallala Date: 8-30-01

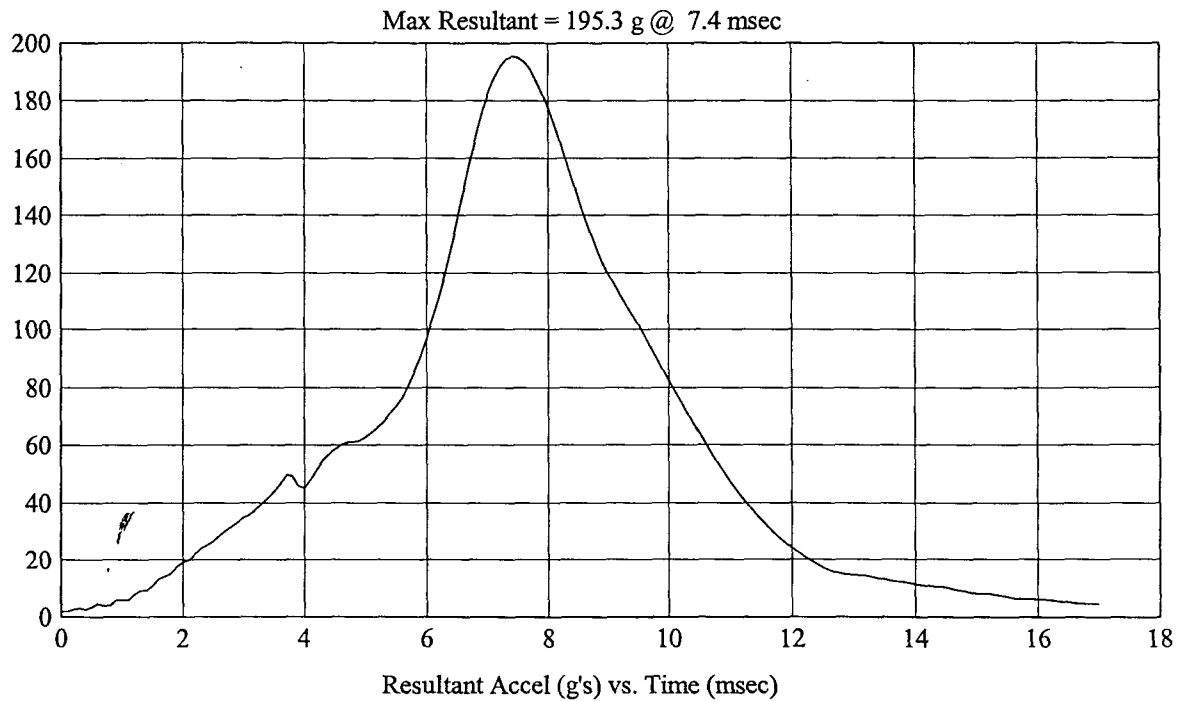
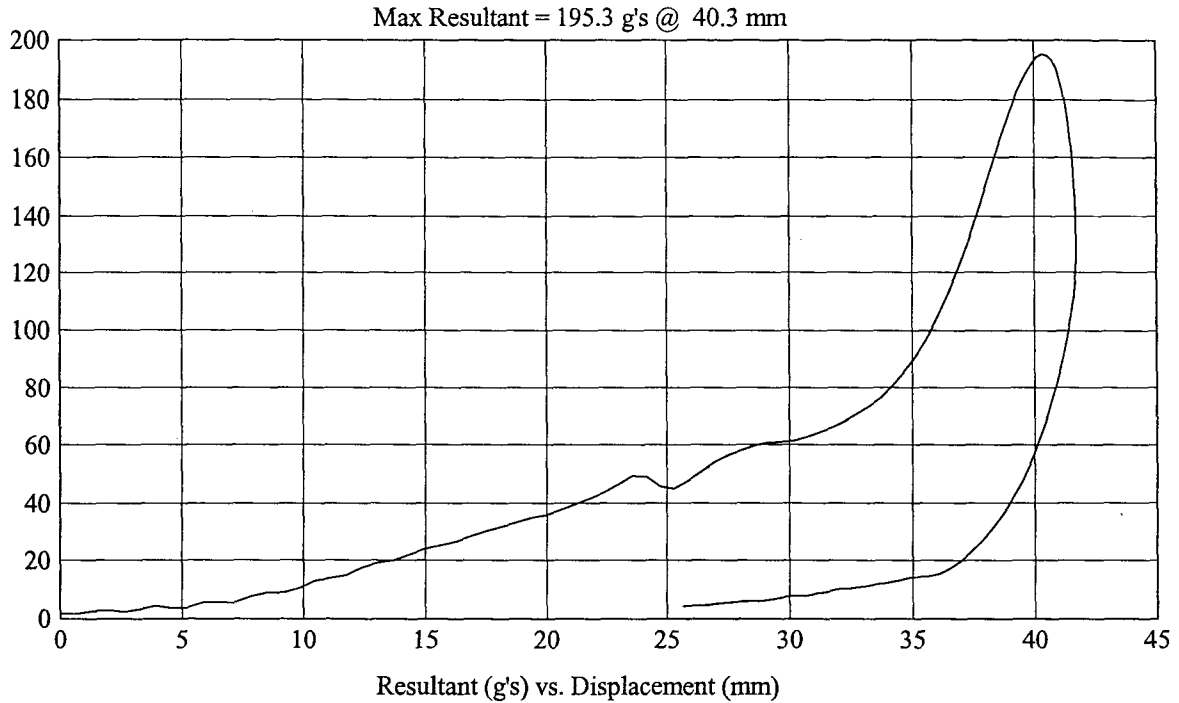
*Only necessary for NHTSA (Government) Compliance testing.

Customer: FORD
Test # 5
FM4506
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 928, HIC = 1009, Delta T = 4.1 msec

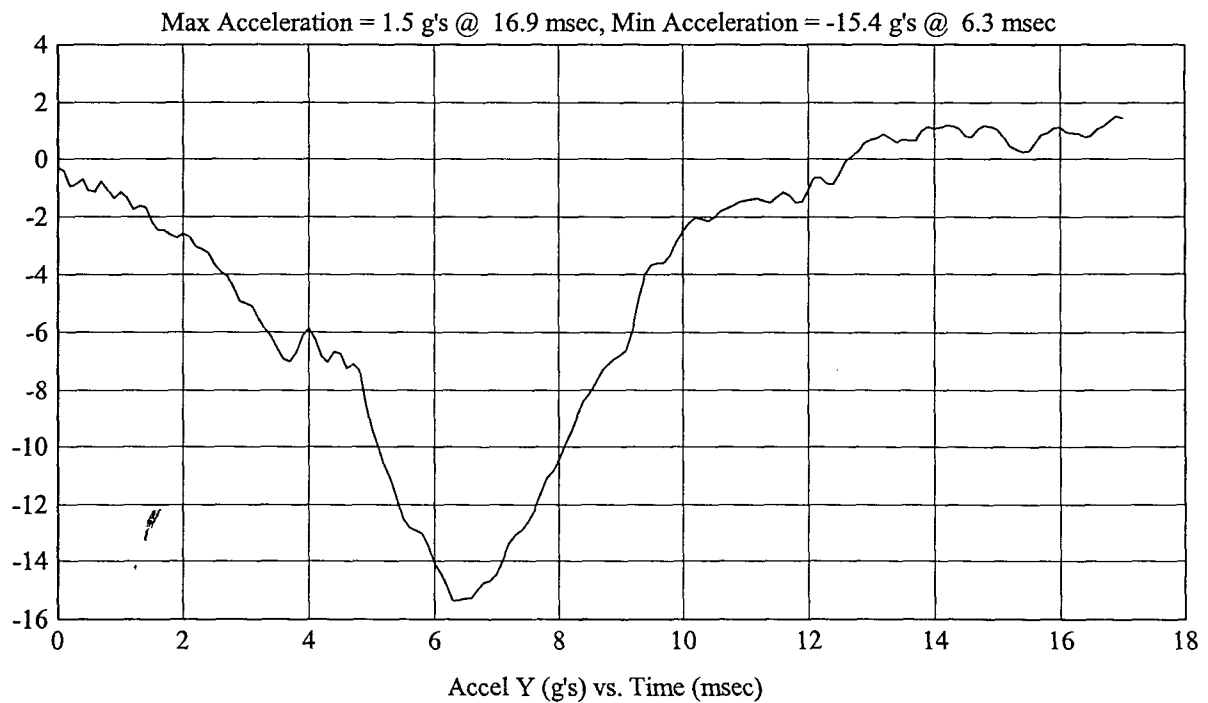
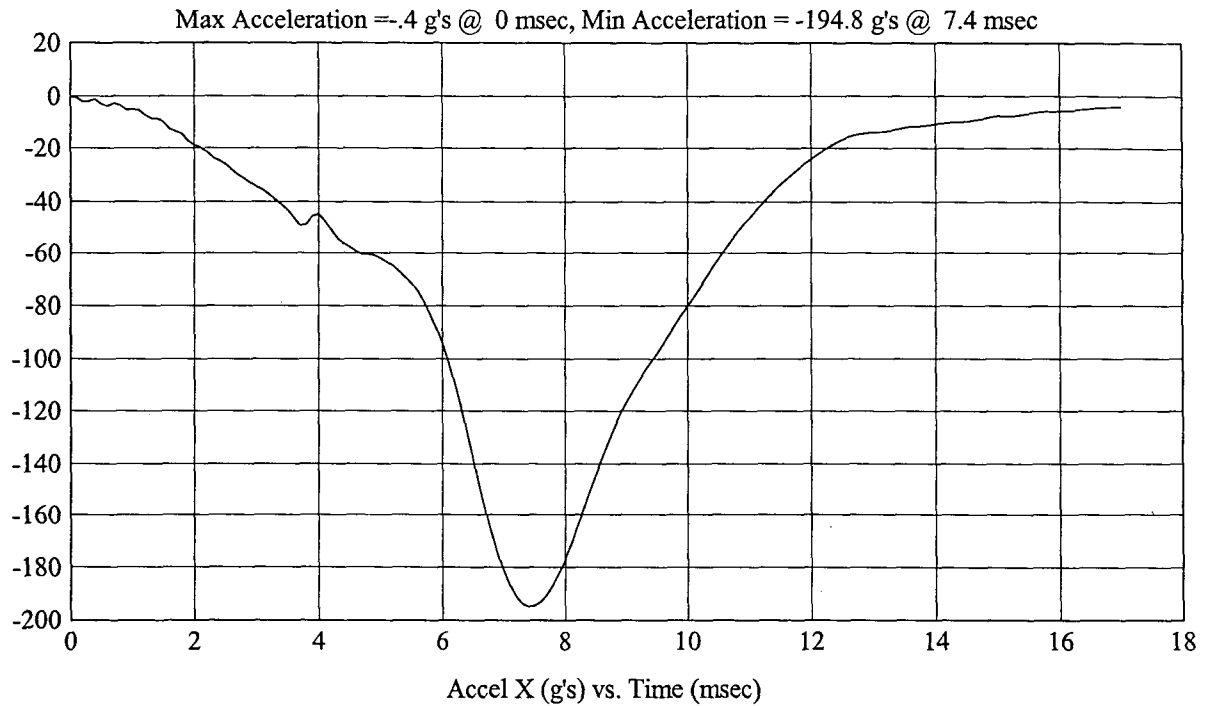


Customer: FORD
Test # 5
FM4506
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 928, HIC = 1009, Delta T = 4.1 msec

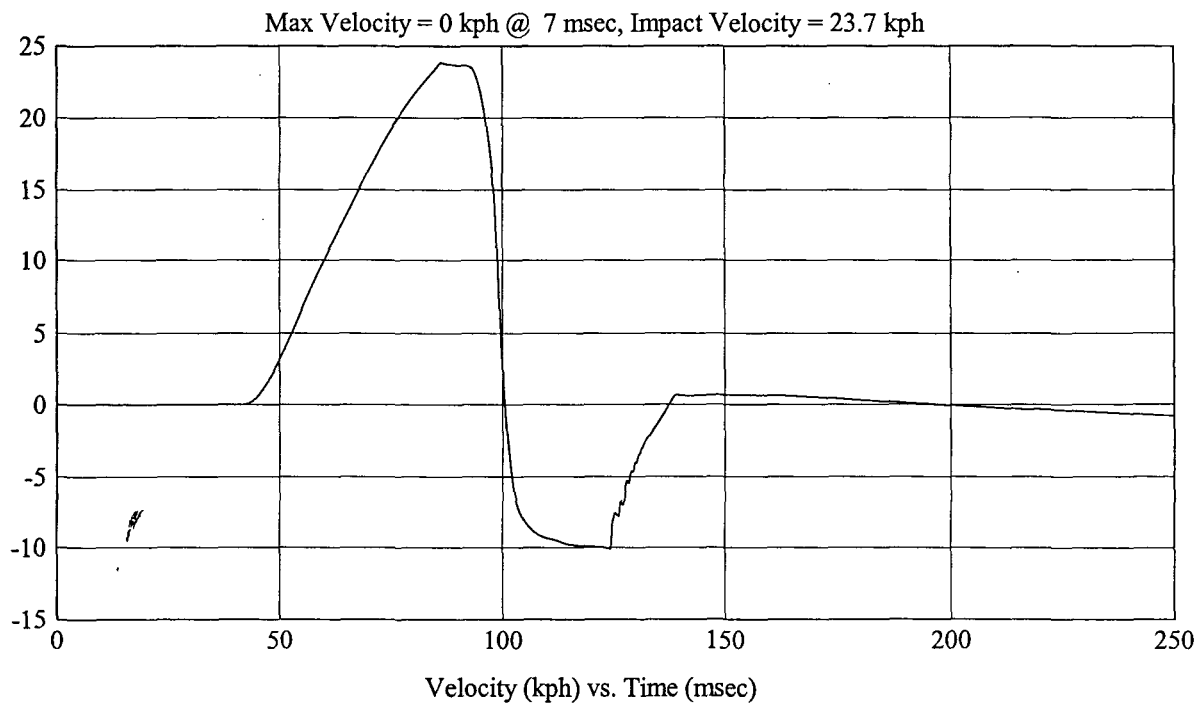
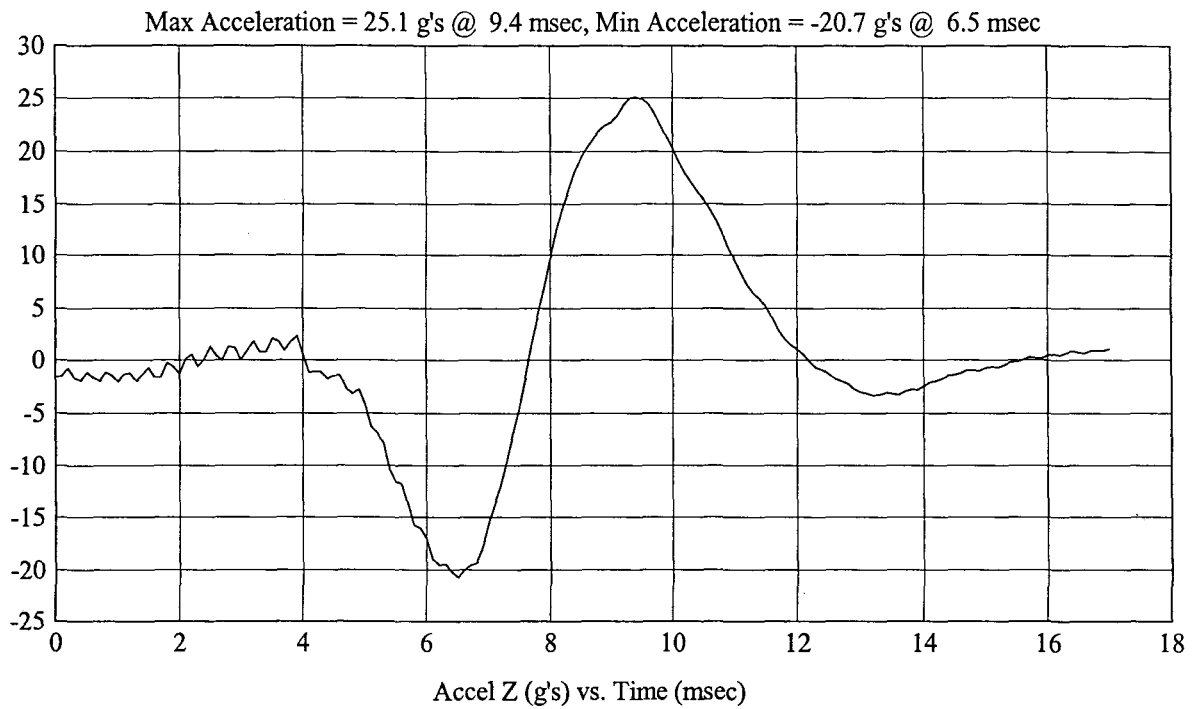


Customer: FORD
Test # 5
FM4506
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 928, HIC = 1009, Delta T = 4.1 msec

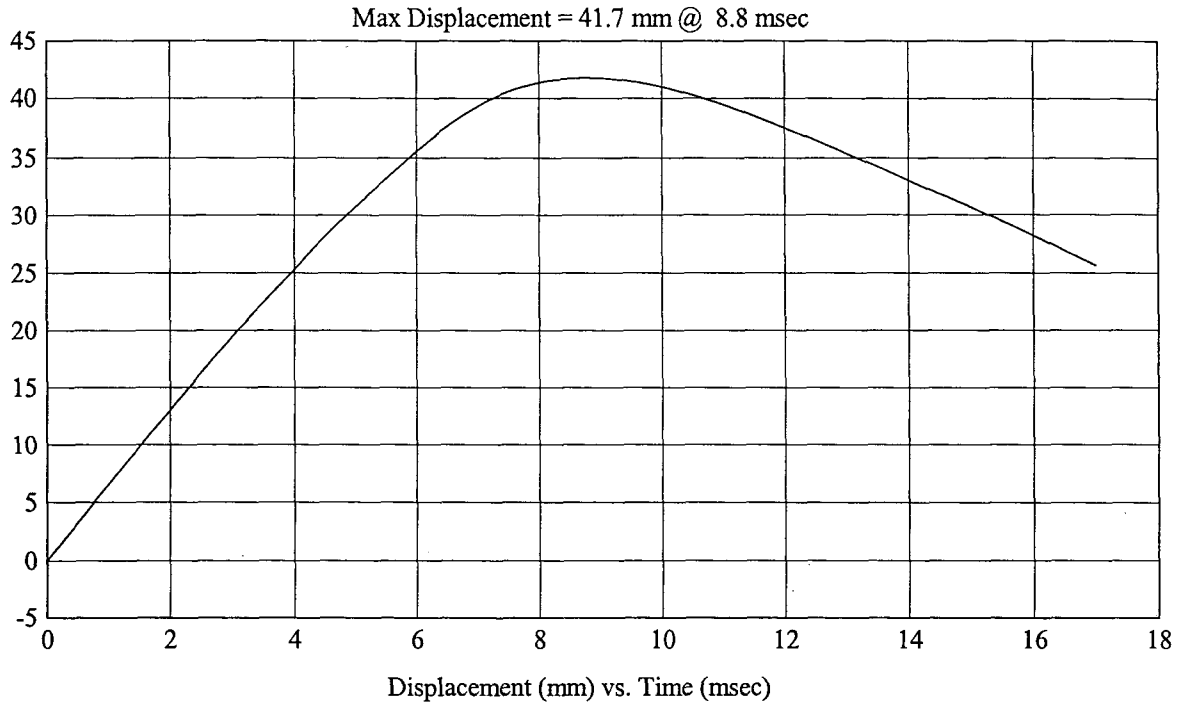


Customer: FORD
Test # 5
FM4506
Additional Desc: N/A

Vehicle Program : EXPLORER

Model Year: 1998
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 928, HIC = 1009, Delta T = 4.1 msec



1.0 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 information can be found in Appendix B.

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
*Digital Inclinometer	Mitutoyo	PRO 360	Set Angle of FMH/Targeting	0.1°	Annual
FMVSS 201U Test Frame (includes the propulsion control system, actuator, test frame, and DAS)	MGA Research Corp.	MGA-100-FMH	Test System	N/A	N/A
Free Motion Headforms	UTAMA UTAMA UTAMA	035 036 038	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	#35	10.02	22.0	68.0	248.8	2.3	Yes
Post	#35	10.02	22.0	57.0	232.8	11.7	Yes
Pre	#36	10.03	22.0	68.0	261.1	7.2	Yes
Post	#36	10.03	22.0	57.0	256.5	7.7	Yes
Pre	#38	9.99	22.0	68.0	263.6	12.8	Yes
Post	#38	9.99	22.0	57.0	254.4	8.2	Yes

RECORDED BY: David G. GotwalsDATE: August 31, 2004APPROVED BY: Helen A. Kaletto

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

Pre 6017-001.16
DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>035</u> CALIBRATION DATE: <u>8-28-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.02
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	60
Peak Resultant Acceleration	225 G's to 275 G's	248.0
Peak Lateral Acceleration	15 G's Maximum	2.3
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	535924	5-21-04	11-21-04
3	ENDEVCO	7264-2000	535919	5-21-04	11-21-04
4	ENDEVCO	7264-2000	521069	5-19-04	11-19-04

REMARKS:

RECORDED BY:

DATE:

APPROVED BY:

Head Drop
(Preliminary Test Report)

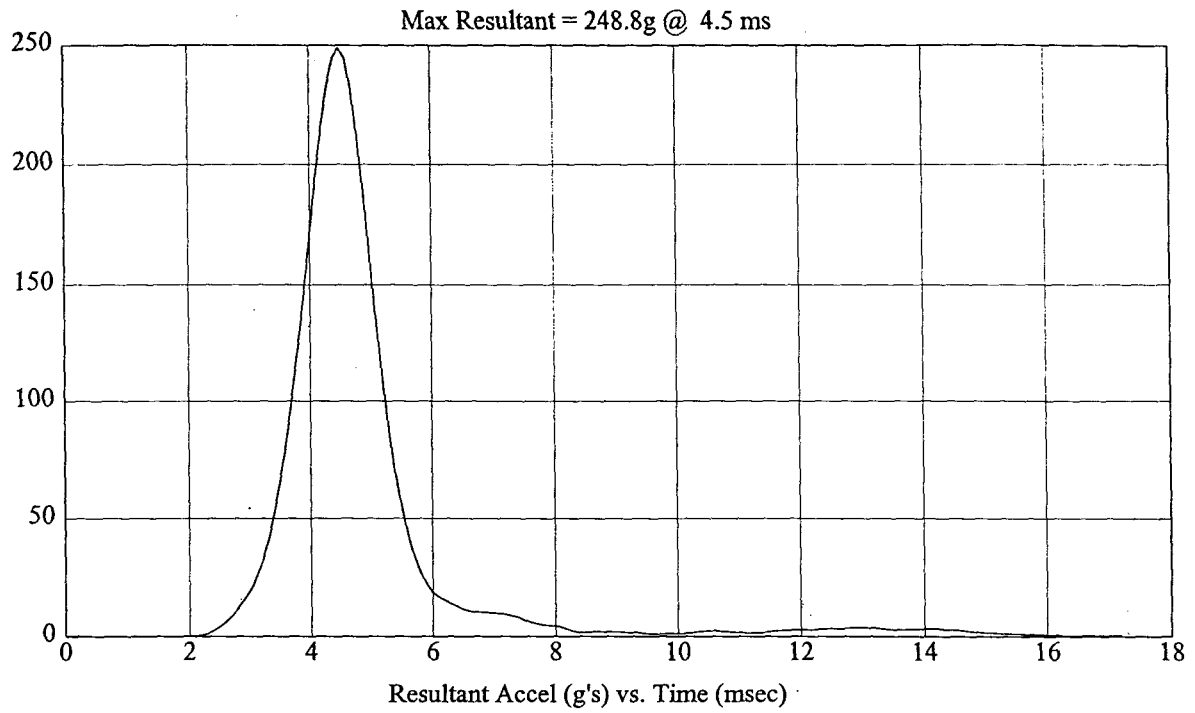
Test Number: H35255

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head #: 35



Head Drop
(Preliminary Test Report)

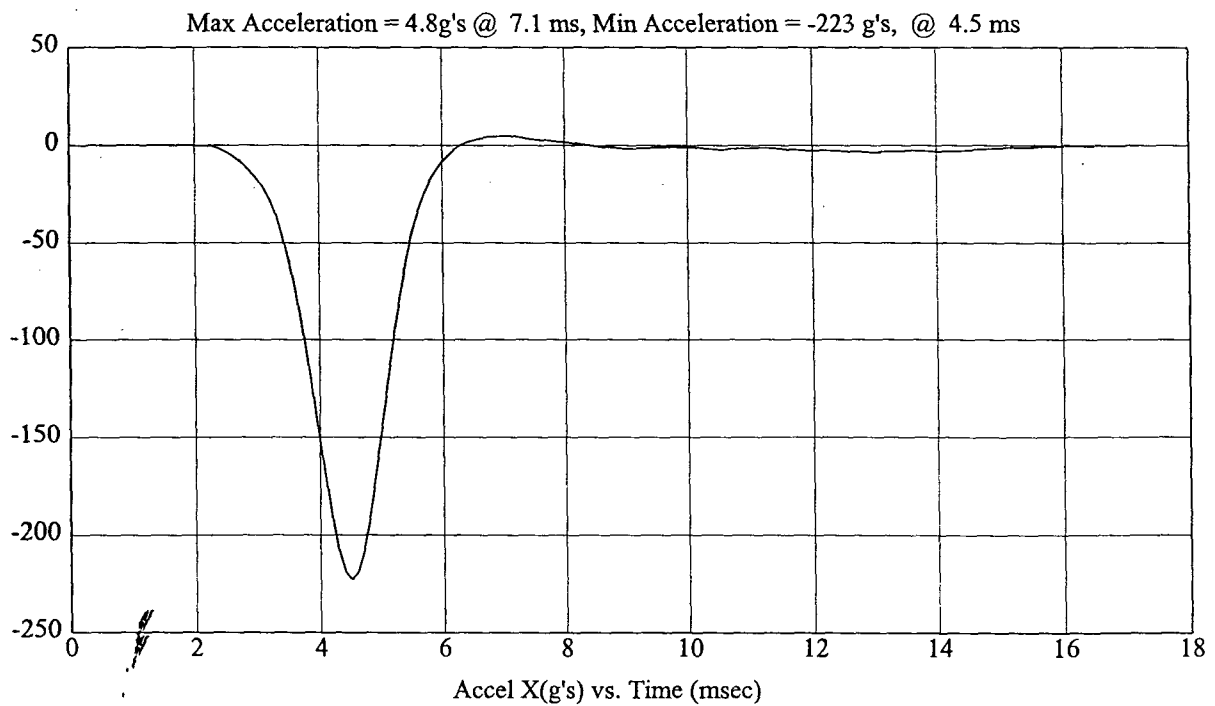
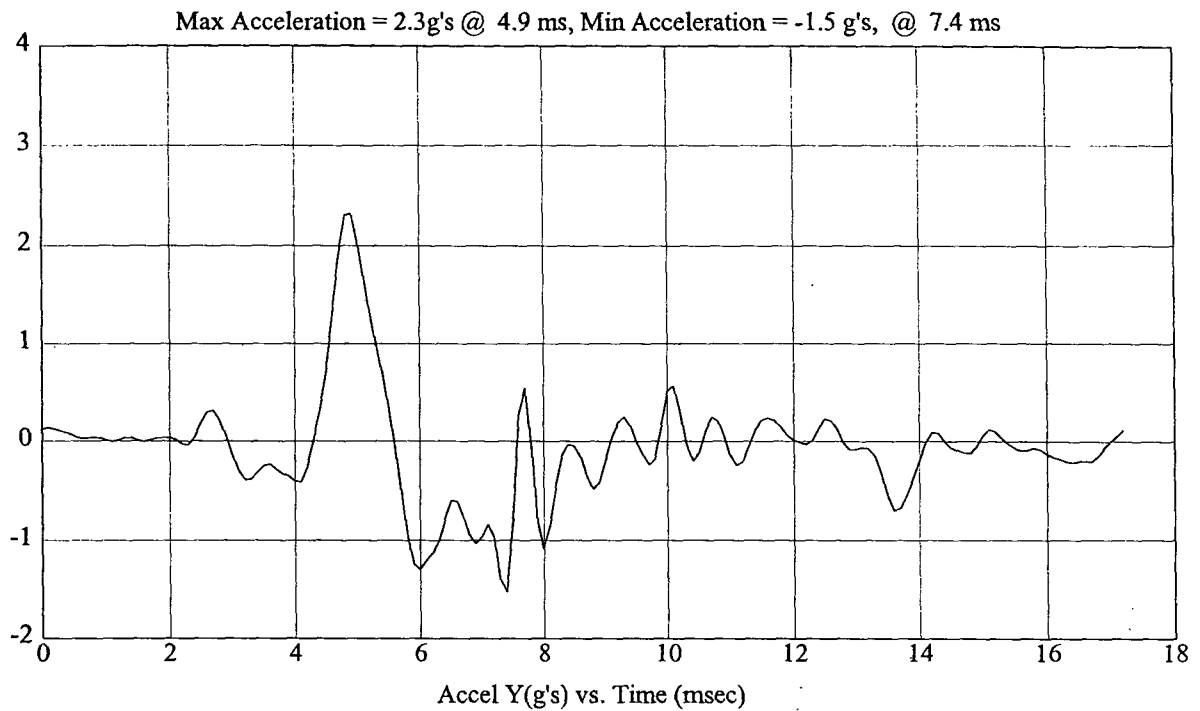
Test Number: H35255

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head #: 35



Head Drop
(Preliminary Test Report)

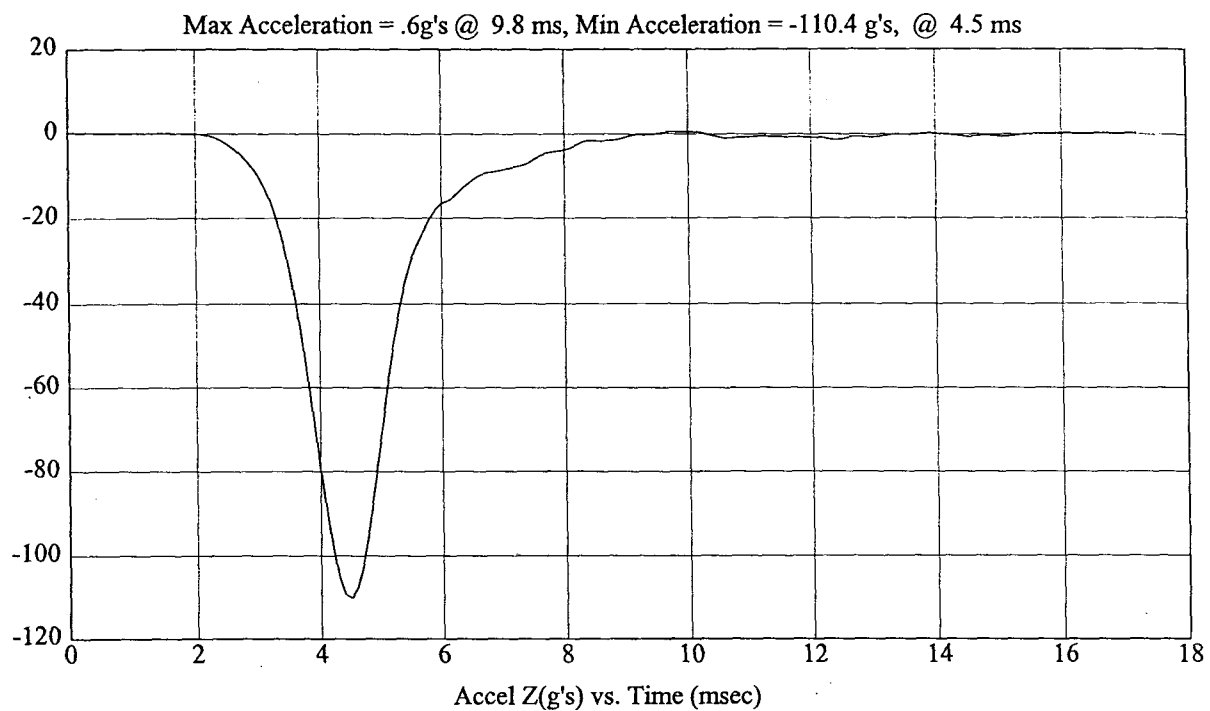
Test Number: H35255

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head #: 35



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

Test 60177-001.16
DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>035</u> CALIBRATION DATE: <u>8-31-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.02
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	57
Peak Resultant Acceleration	225 G's to 275 G's	232.8
Peak Lateral Acceleration	15 G's Maximum	11.7
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	J35924	5-20-04	11-20-04
3	ENDEVCO	7264-2000	J35919	5-20-04	11-20-04
4	ENDEVCO	7264-2000	J21969	5-19-04	11-19-04

REMARKS:

RECORDED BY: *R. A. All* DATE: 8-31-04

APPROVED BY: *M. J. K.*

Head Drop
(Preliminary Test Report)

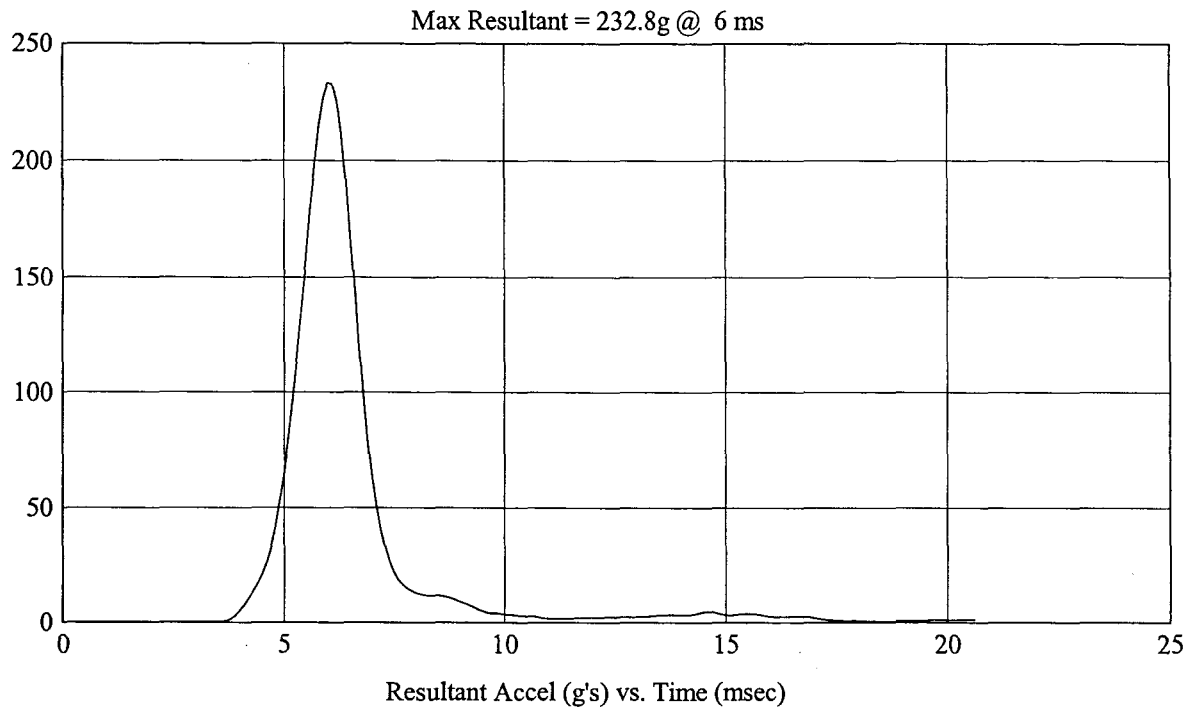
Test Number: H35256

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head # : 35



Head Drop
(Preliminary Test Report)

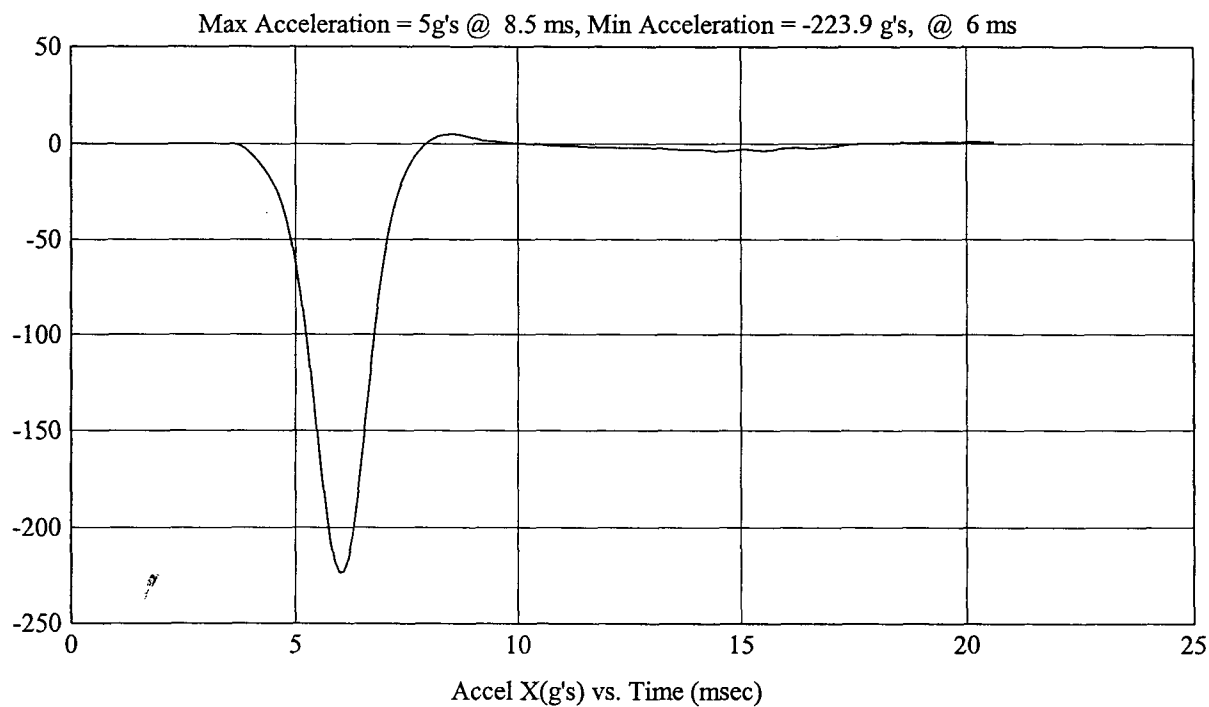
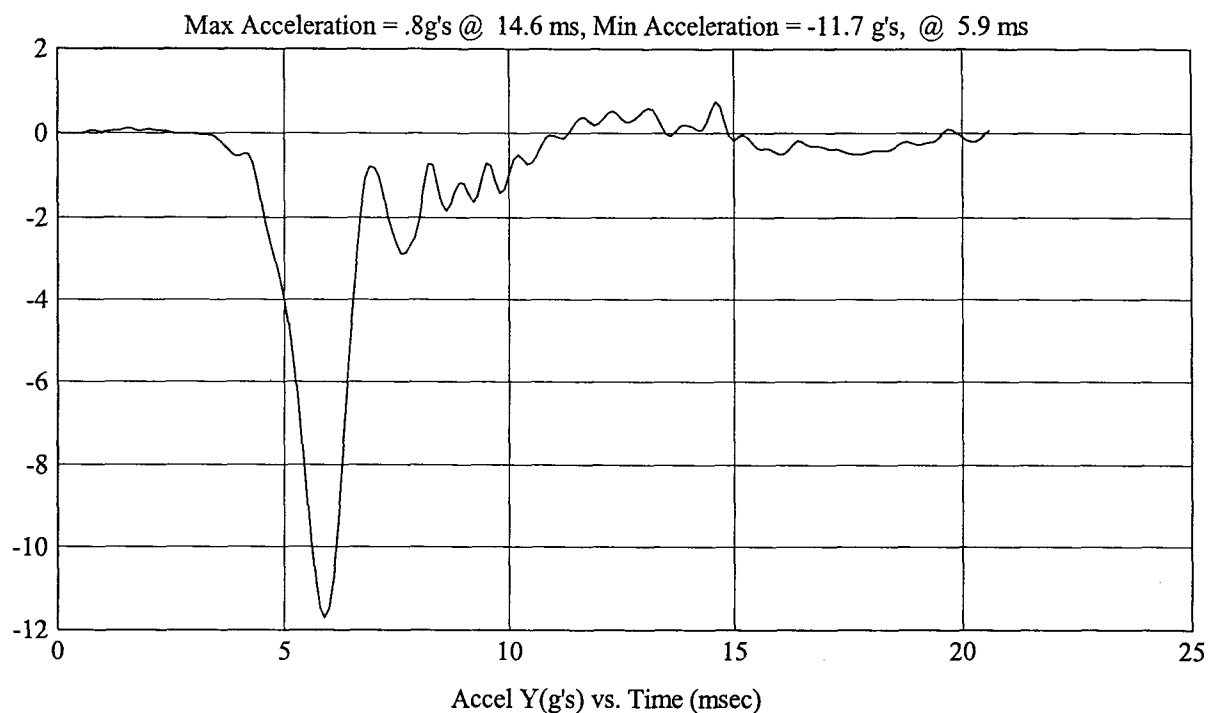
Test Number: H35256

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head #: 35



Head Drop
(Preliminary Test Report)

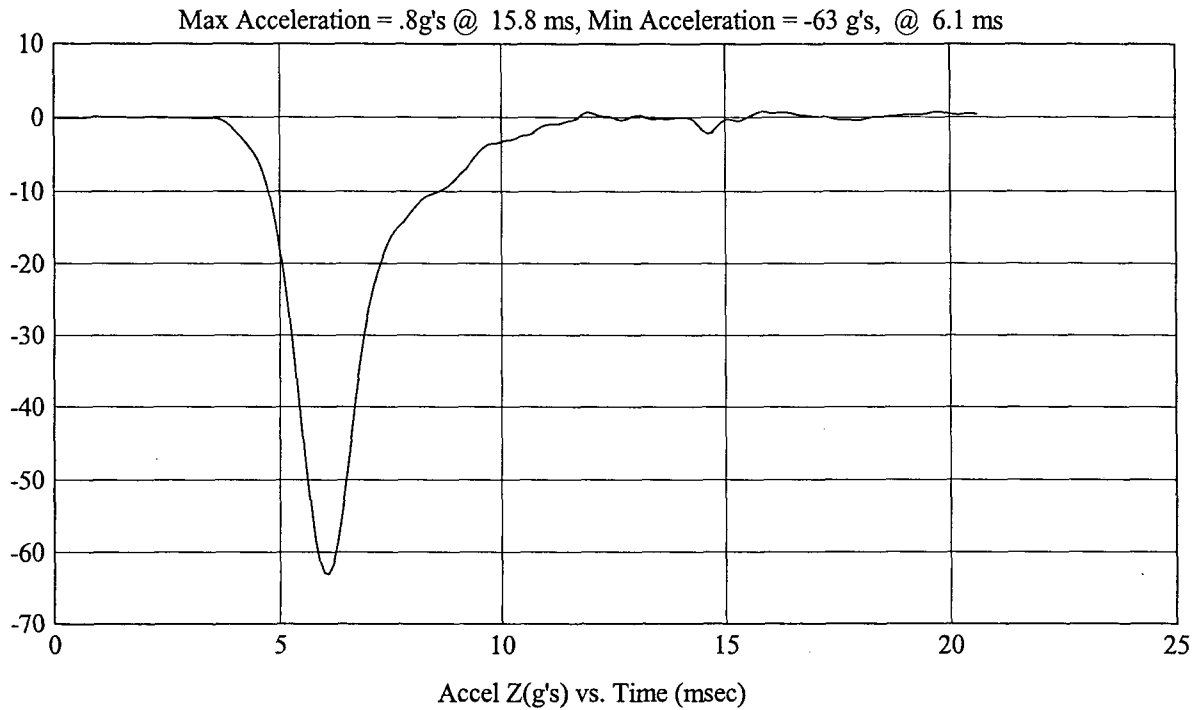
Test Number: H35256

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head # : 35



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

Pre 64417-00116
DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>36</u> CALIBRATION DATE: <u>8-28-04</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%	68
Peak Resultant Acceleration	225 G's to 275 G's	261.1
Peak Lateral Acceleration	15 G's Maximum	7.2
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	J35923	5-23-04	11-23-04
3	ENDEVCO	7264-2000	J35916	5-23-04	11-23-04
4	ENDEVCO	7264-2000	J35918	5-23-04	11-23-04

REMARKS:

RECORDED BY: [Signature]

DATE: 8-28-04

APPROVED BY: [Signature]

Head Drop
(Preliminary Test Report)

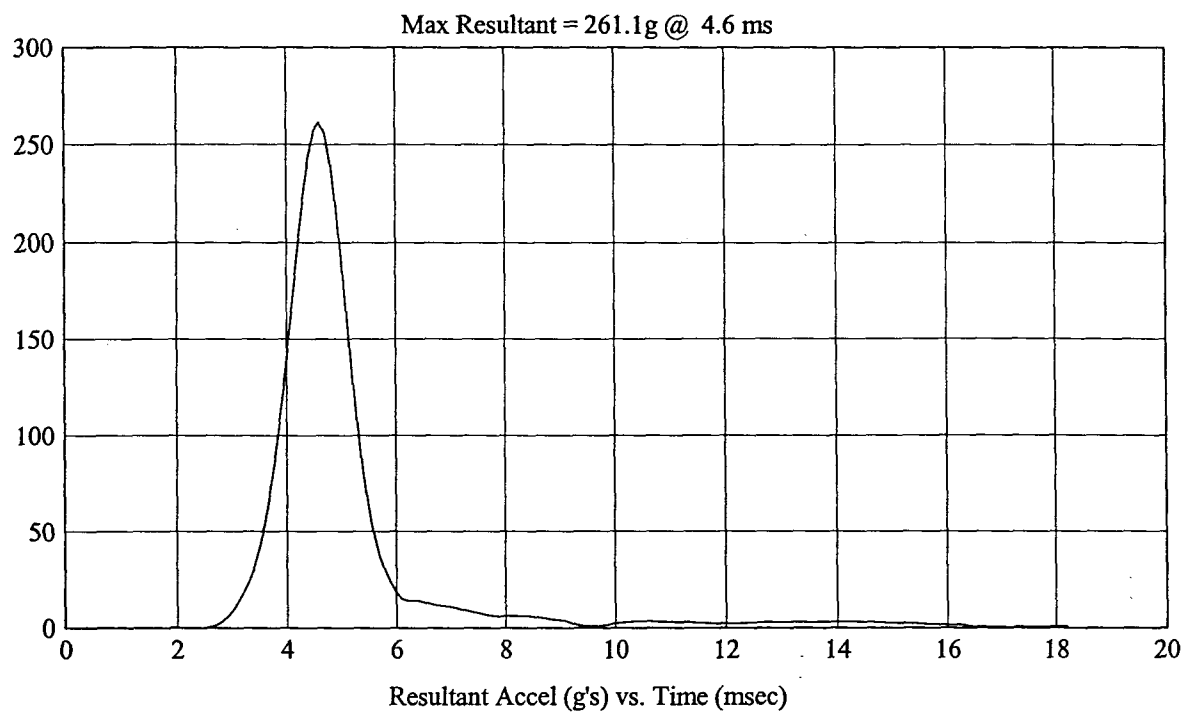
Test Number: H36254

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head #: 36



Head Drop
(Preliminary Test Report)

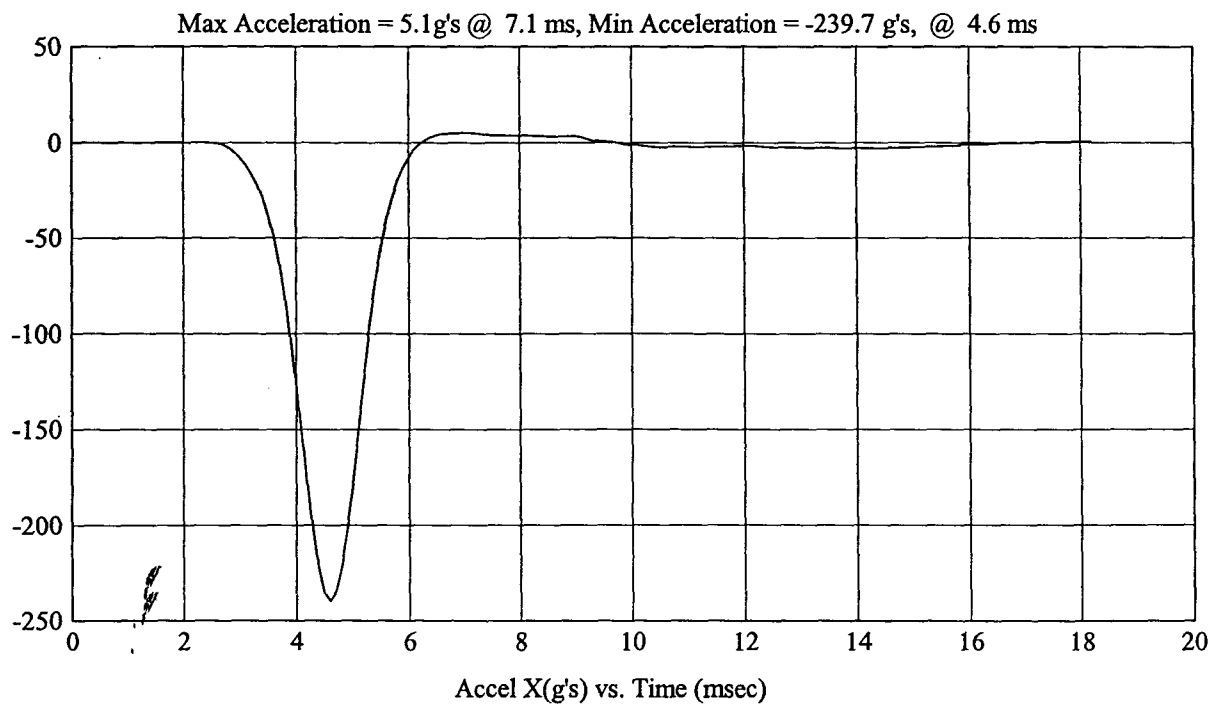
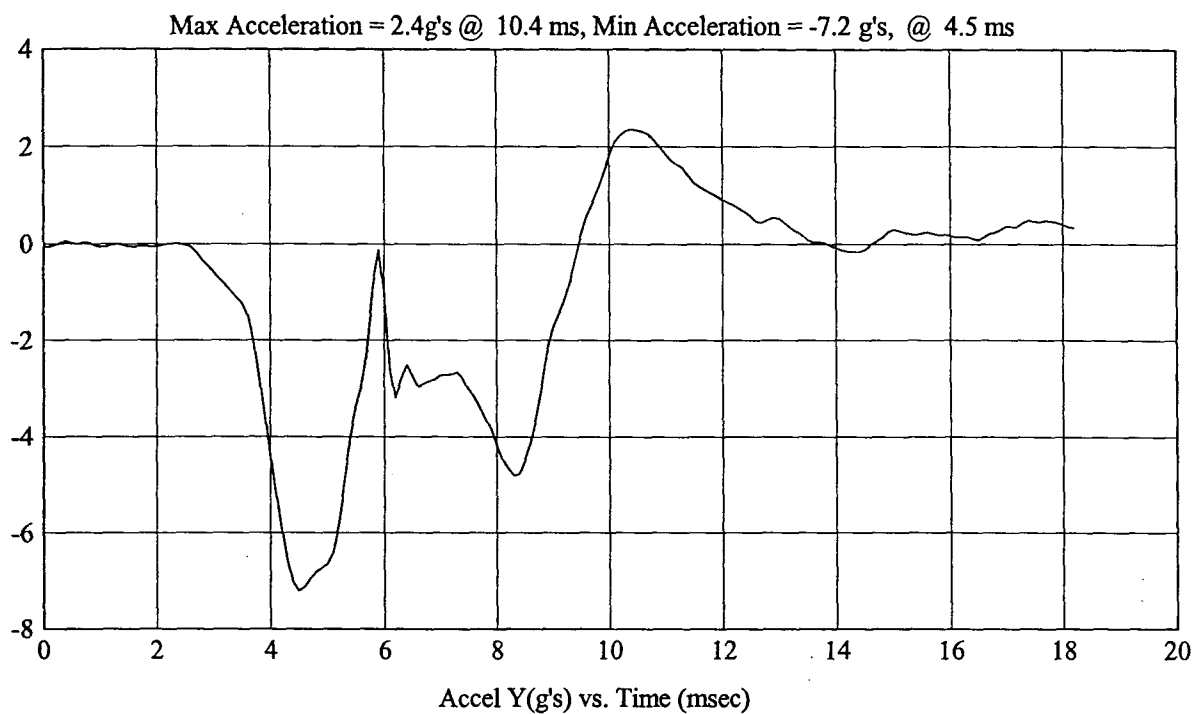
Test Number: H36254

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head # : 36



Head Drop
(Preliminary Test Report)

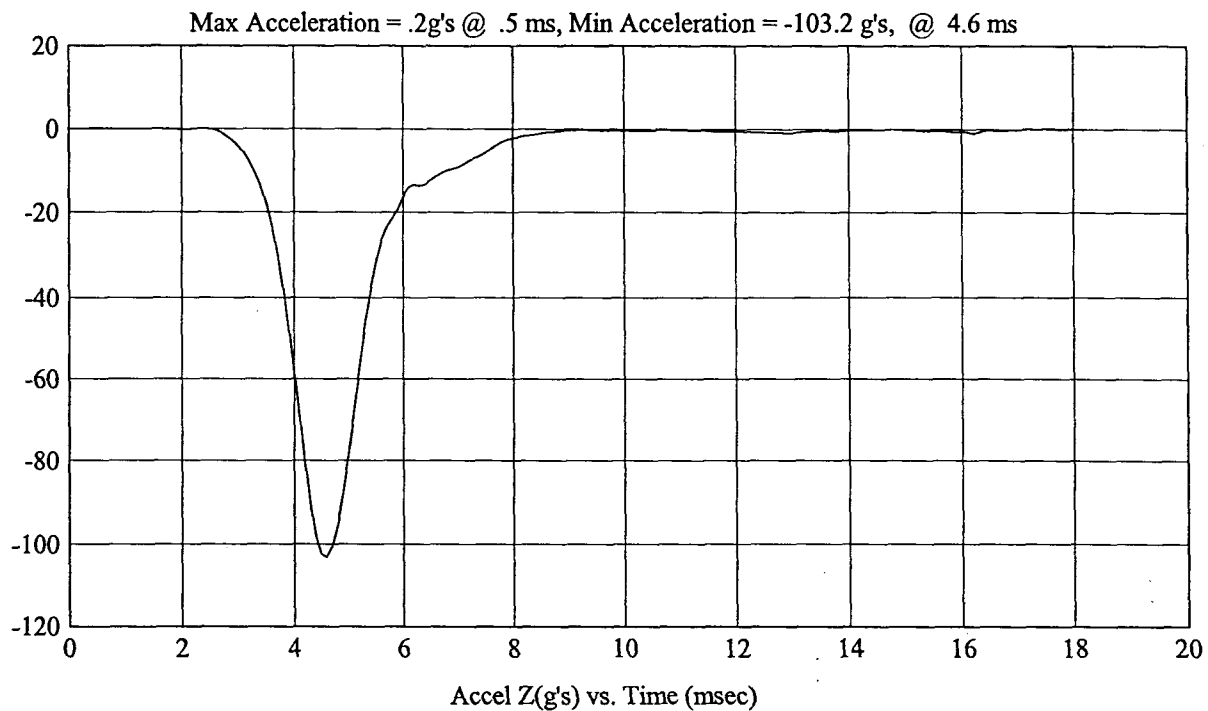
Test Number: H36254

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head # : 36



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

8-31-04 *BA*

HEADFORM SERIAL NUMBER: <u>036</u> CALIBRATION DATE: <u>8-28-04</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%	57
Peak Resultant Acceleration	225 G's to 275 G's	256.5
Peak Lateral Acceleration	15 G's Maximum	7.7
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J35923	5-23-04	11-23-04
3	ENDEVCO	7264-2000	J35916	5-23-04	11-23-04
4	ENDEVCO	7264-2000	J35918	5-23-04	11-23-04

REMARKS:

RECORDED BY:

Ra. Wal

DATE:

8-31-04 *BA*
~~8-28-04~~

APPROVED BY:

[Signature]

Head Drop
(Preliminary Test Report)

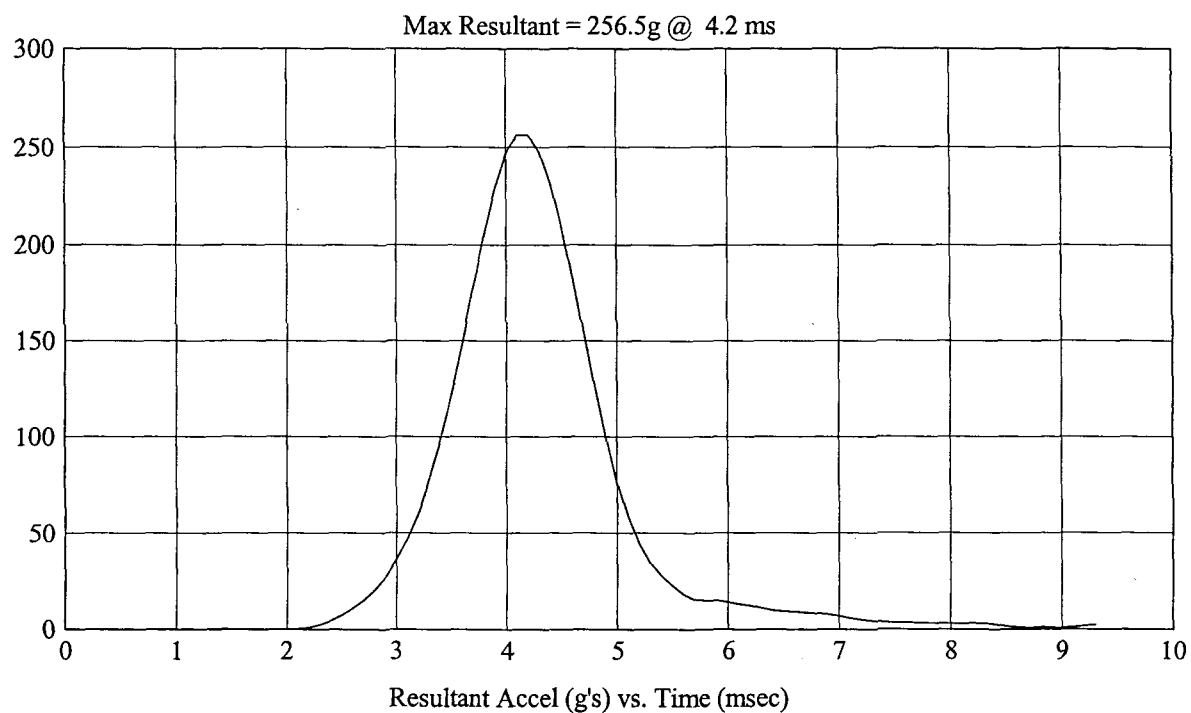
Test Number: H36255

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head # : 036



Head Drop
(Preliminary Test Report)

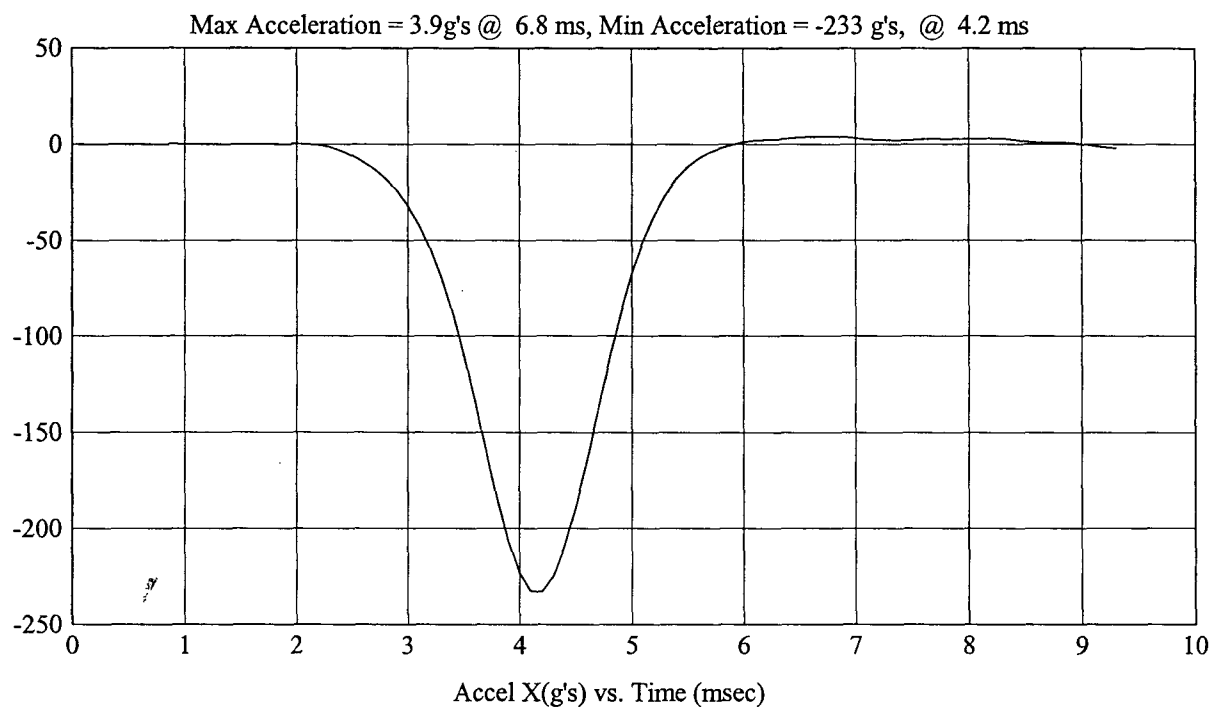
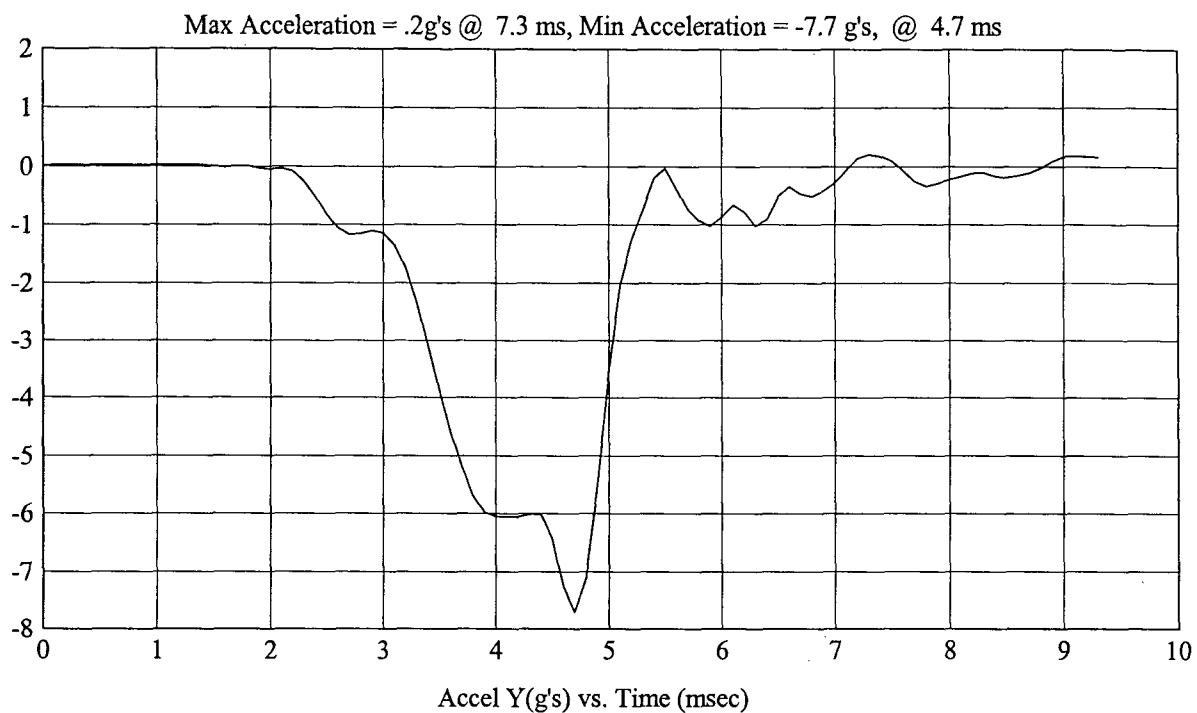
Test Number: H36255

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head # : 036



Head Drop
(Preliminary Test Report)

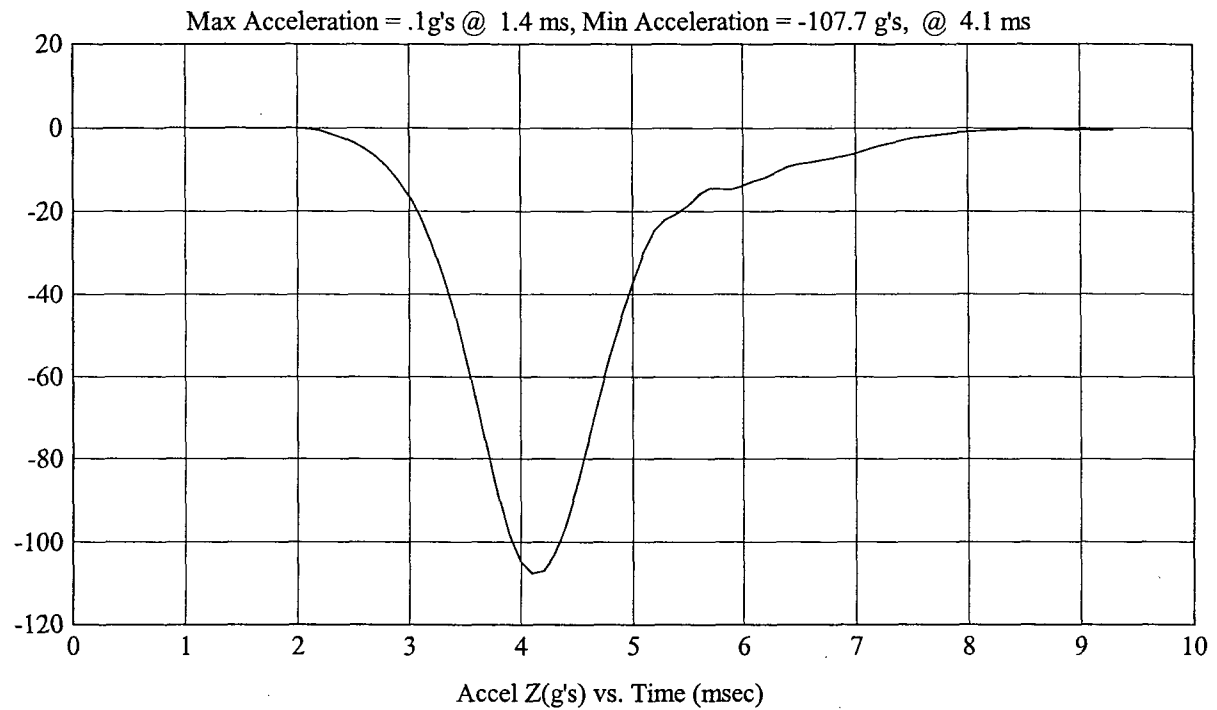
Test Number: H36255

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head #: 036



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

Pre 60477021.16
DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>38</u>		CALIBRATION DATE: <u>8-28-04</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%	68
Peak Resultant Acceleration	225 G's to 275 G's	263.6
Peak Lateral Acceleration	15 G's Maximum	12.8
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J36197	5-23-04 2108-0	11-23-04
3	ENDEVCO	7264-2000	J36193	5-23-04 1044	11-23-04
4	ENDEVCO	7264-2000	J36353	5-23-04 968	11-23-04

REMARKS:

RECORDED BY: [Signature]

DATE: 8-28-04

APPROVED BY: [Signature]

Head Drop
(Preliminary Test Report)

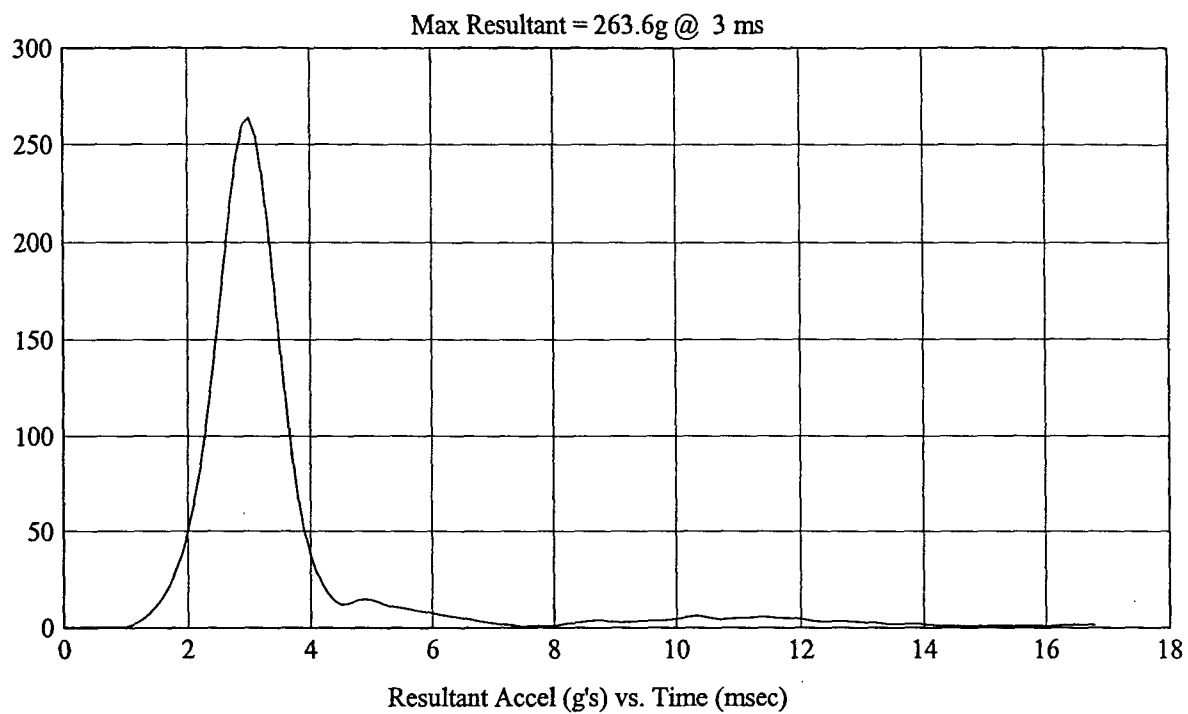
Test Number: H38240

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

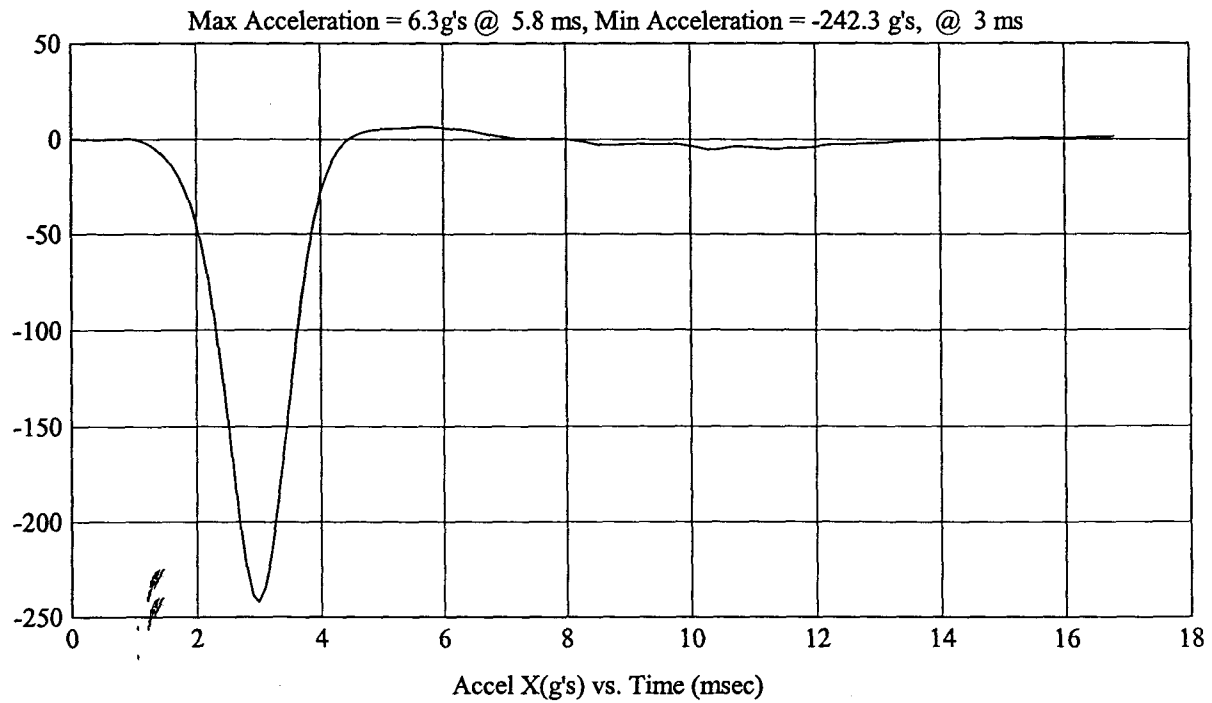
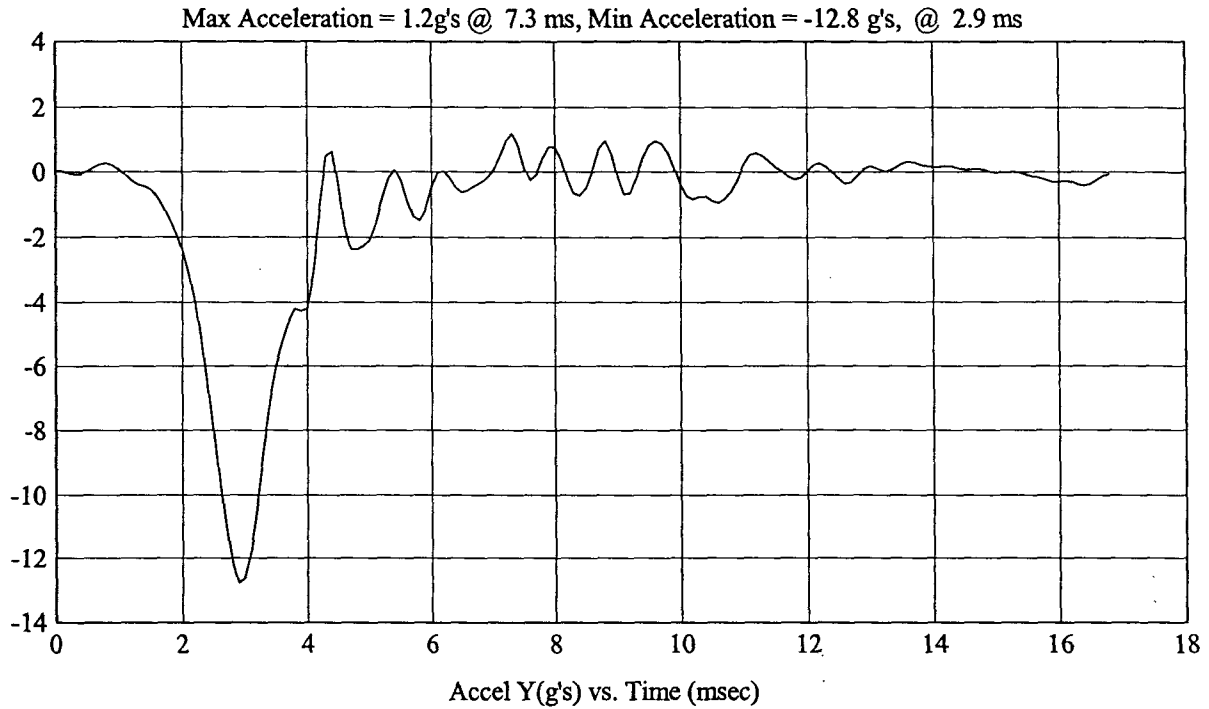
Test Number: H38240

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

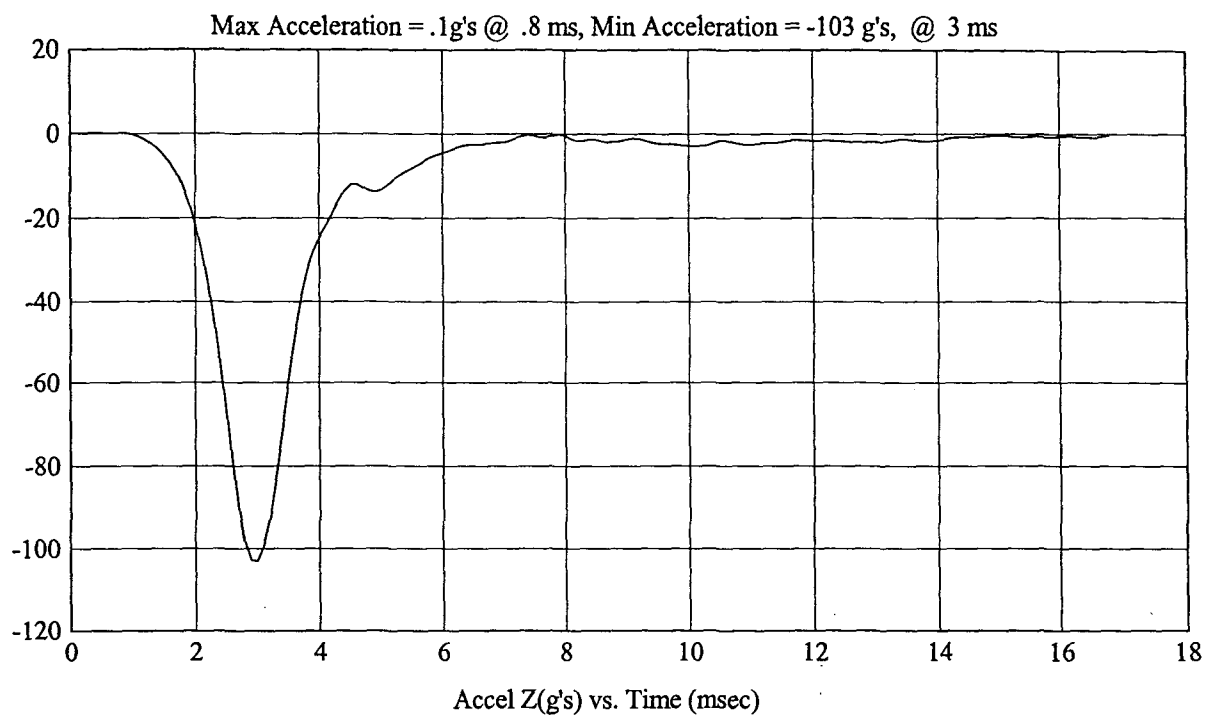
Test Number: H38240

MGA Job Number: G04I7-001.16

Test Date: 8/28/04

Test Description: Pre - Test Calibration

Head # : 38



**HEAD DROP TEST SUMMARY
PART 572L**

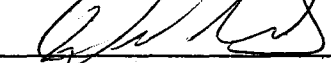
HEADFORM SERIAL NUMBER: <u>038</u> CALIBRATION DATE: <u>8-31-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.99
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	57
Peak Resultant Acceleration	225 G's to 275 G's	254.4
Peak Lateral Acceleration	15 G's Maximum	8.2
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	J36197	5-23-04	11-23-04
3	ENDEVCO	7264-2000	J36193	5-23-04	11-23-04
4	ENDEVCO	7264-2000	J36353	5-23-04	11-23-04

REMARKS:

RECORDED BY: 

DATE: 8-31-04

APPROVED BY: 

Head Drop
(Preliminary Test Report)

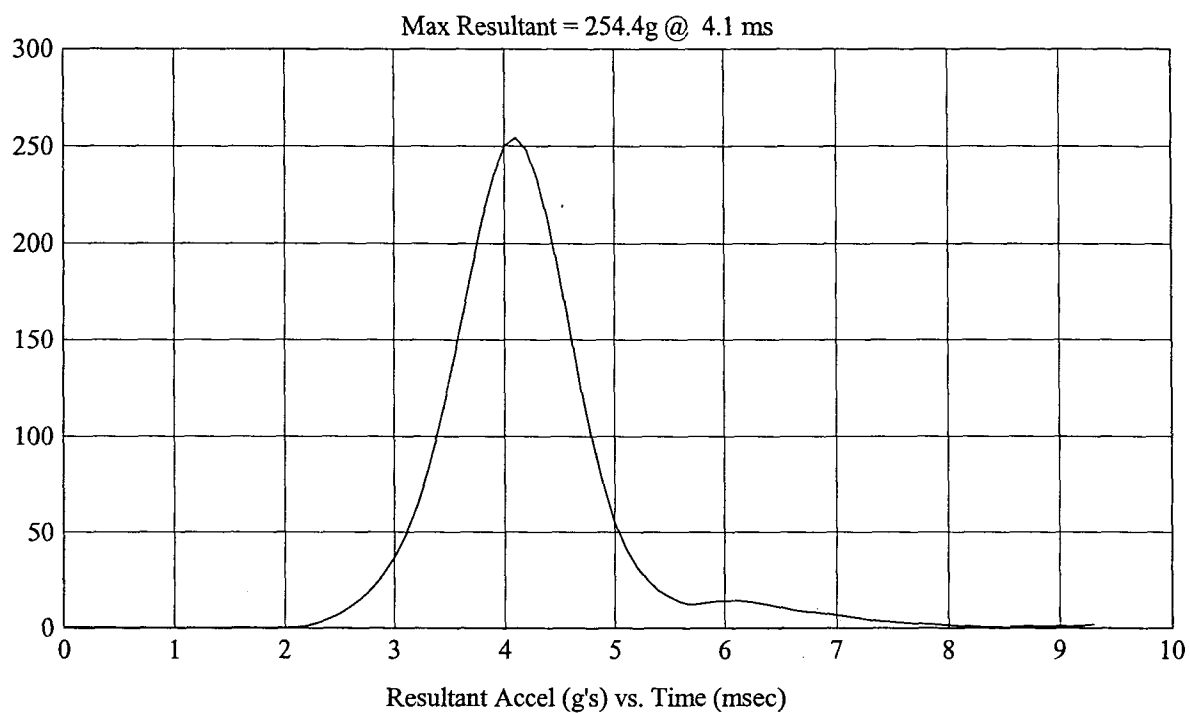
Test Number: H38241

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head # : 038



Head Drop
(Preliminary Test Report)

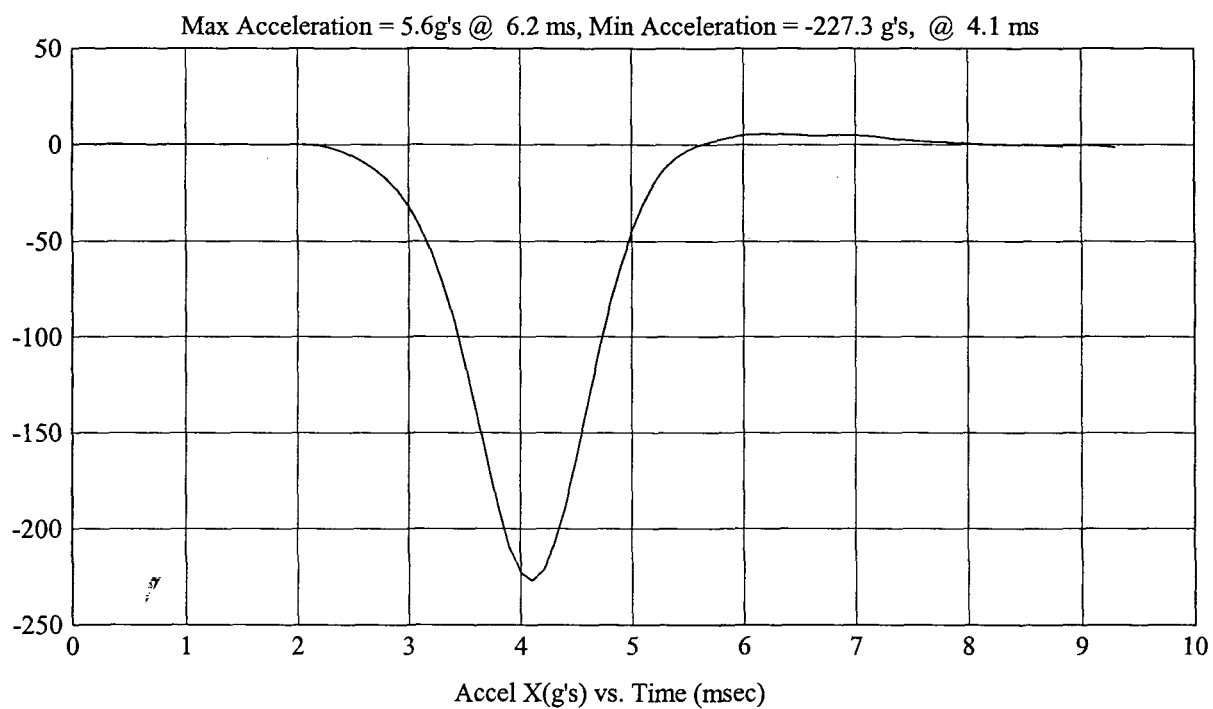
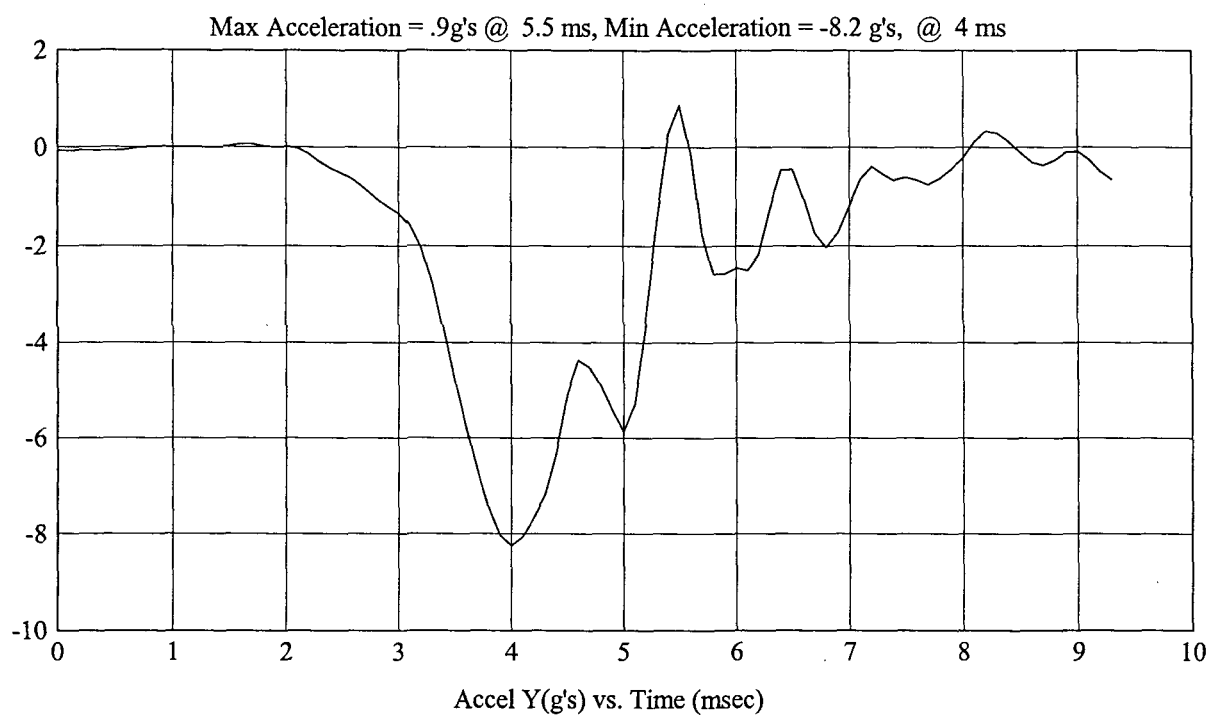
Test Number: H38241

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

Head # : 038



Head Drop
(Preliminary Test Report)

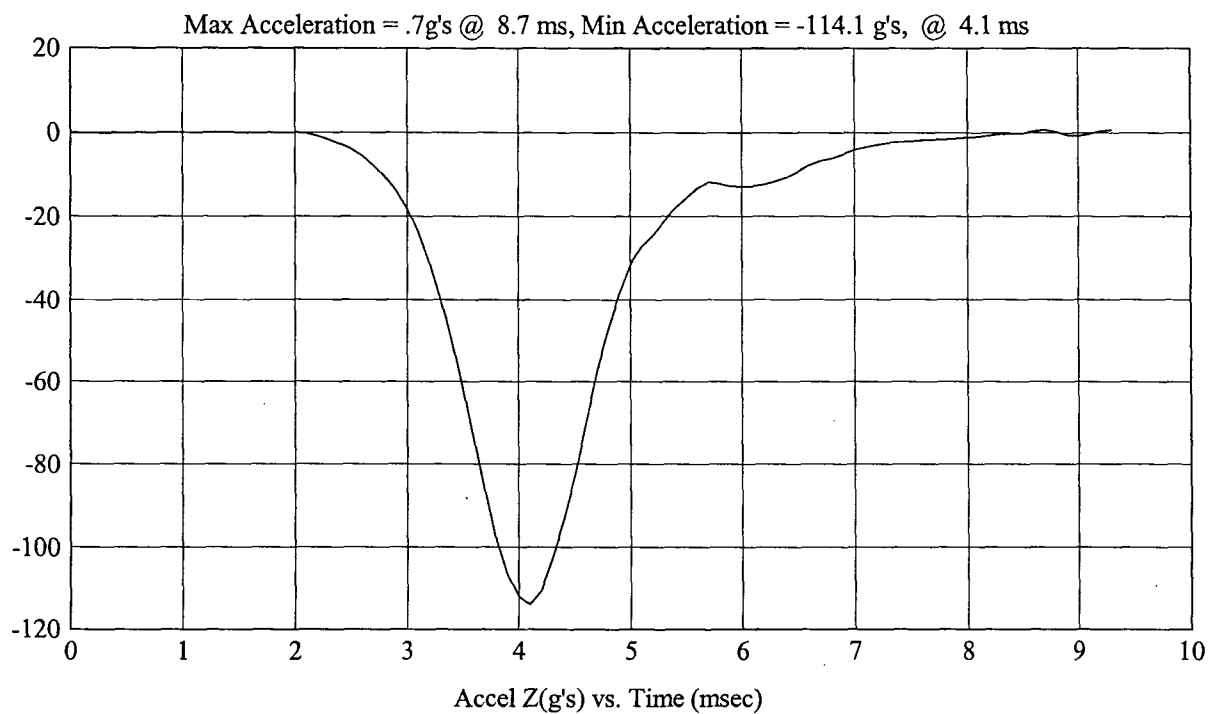
Test Number: H38241

MGA Job Number: G04I7-001.16

Test Date: 8/31/04

Test Description: Post - Test Calibration

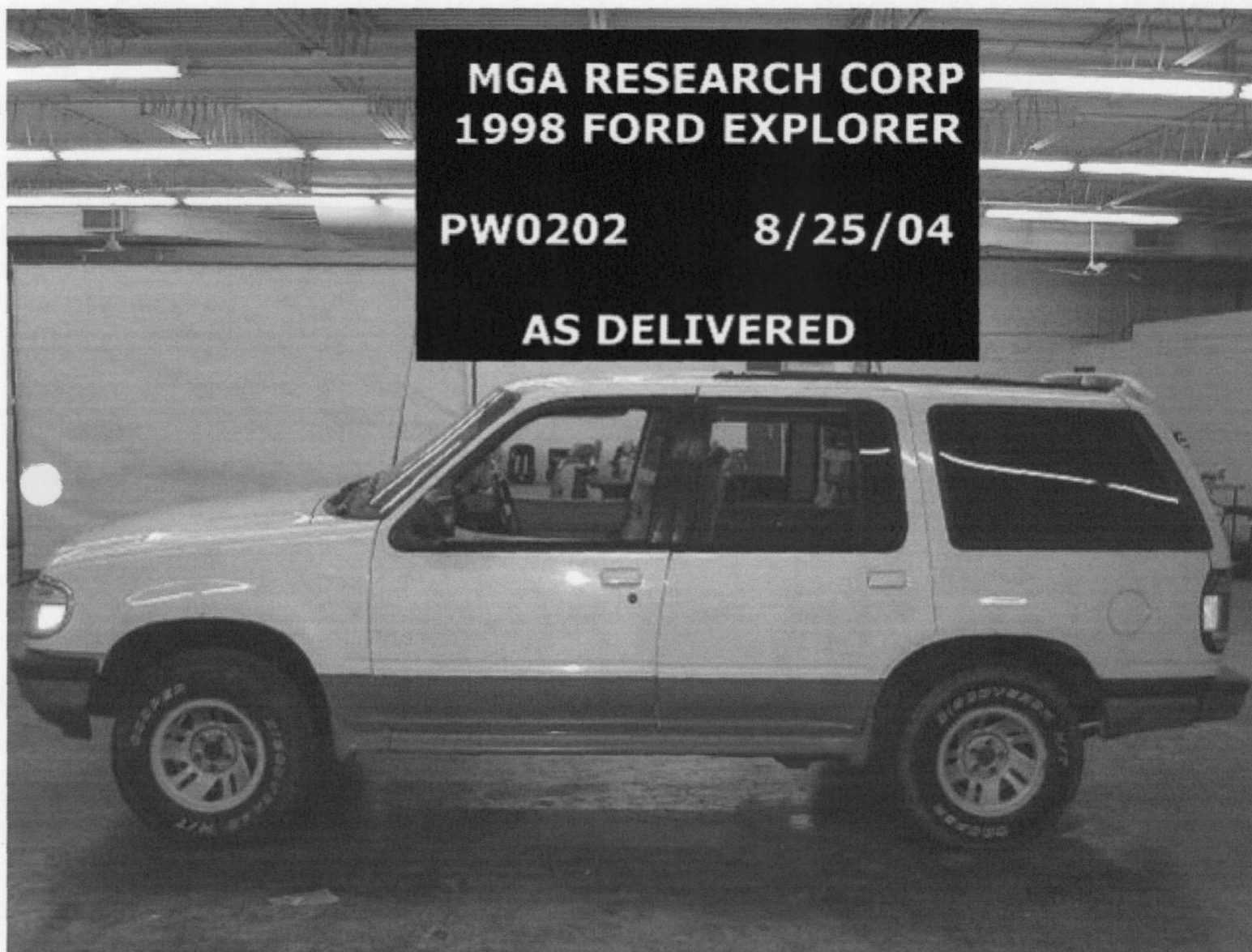
Head # : 038



**MGA RESEARCH CORP
1998 FORD EXPLORER**

PW0202 8/25/04

AS DELIVERED



**MGA RESEARCH CORP
1998 FORD EXPLORER
PW0202 8/25/04**

AS DELIVERED







MFD. BY FORD MOTOR CO. IN U.S.A.

DATE: 04/98

GVWR: 5340LB / 2422KG

FRONT GAWR: 2710LB

REAR GAWR: 2950LB

1229KG

WITH

1338KG

WITH

P225/70R15SL

TIRES

P225/70R15SL

TIRES

15X7.0J

RIMS

15X7.0J

RIMS

AT 207 kPa/30

PSI COLD

AT 241 kPa/35

PSI COLD

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

VIN: 1F MZU34X0WU [REDACTED]

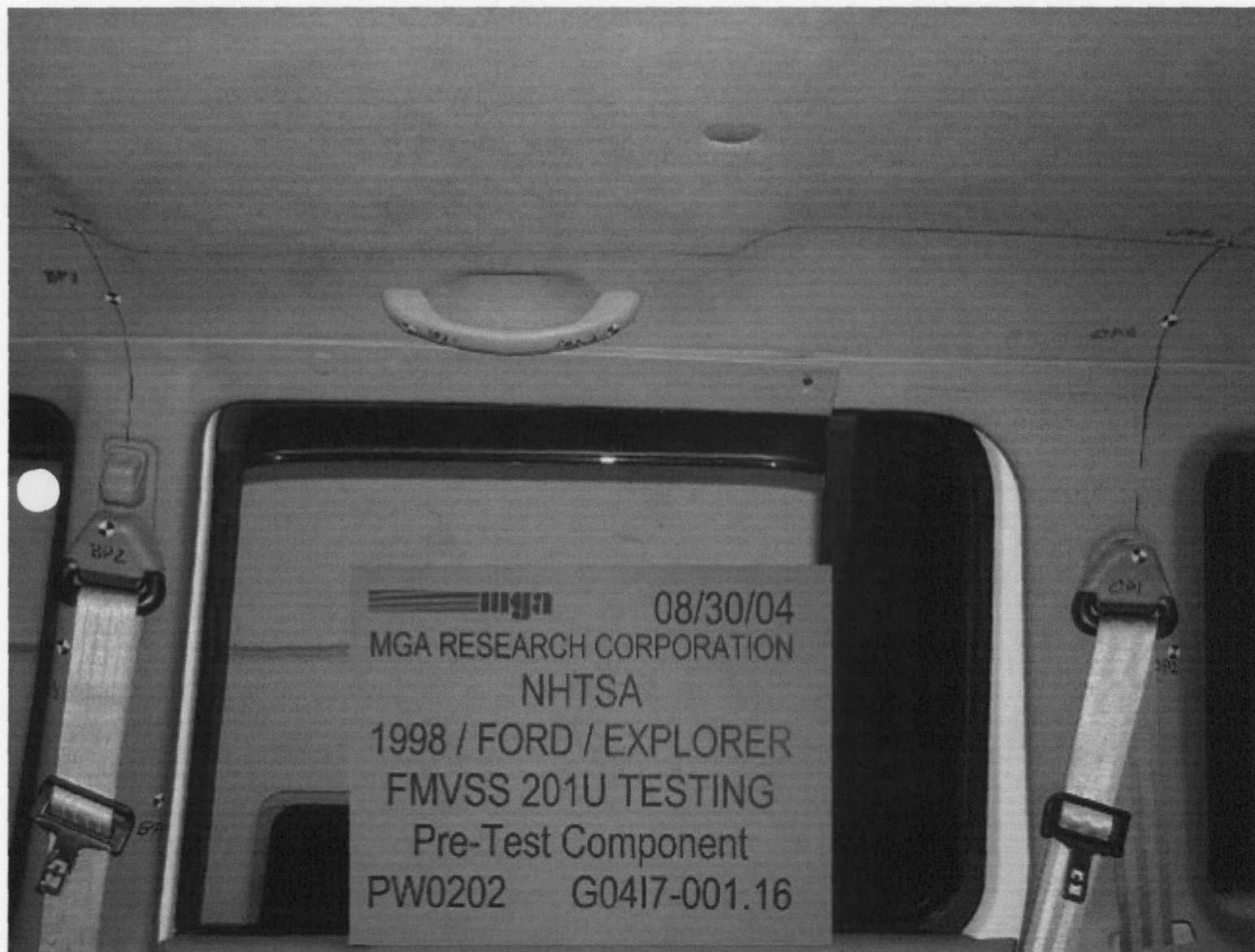
F0140
T0247

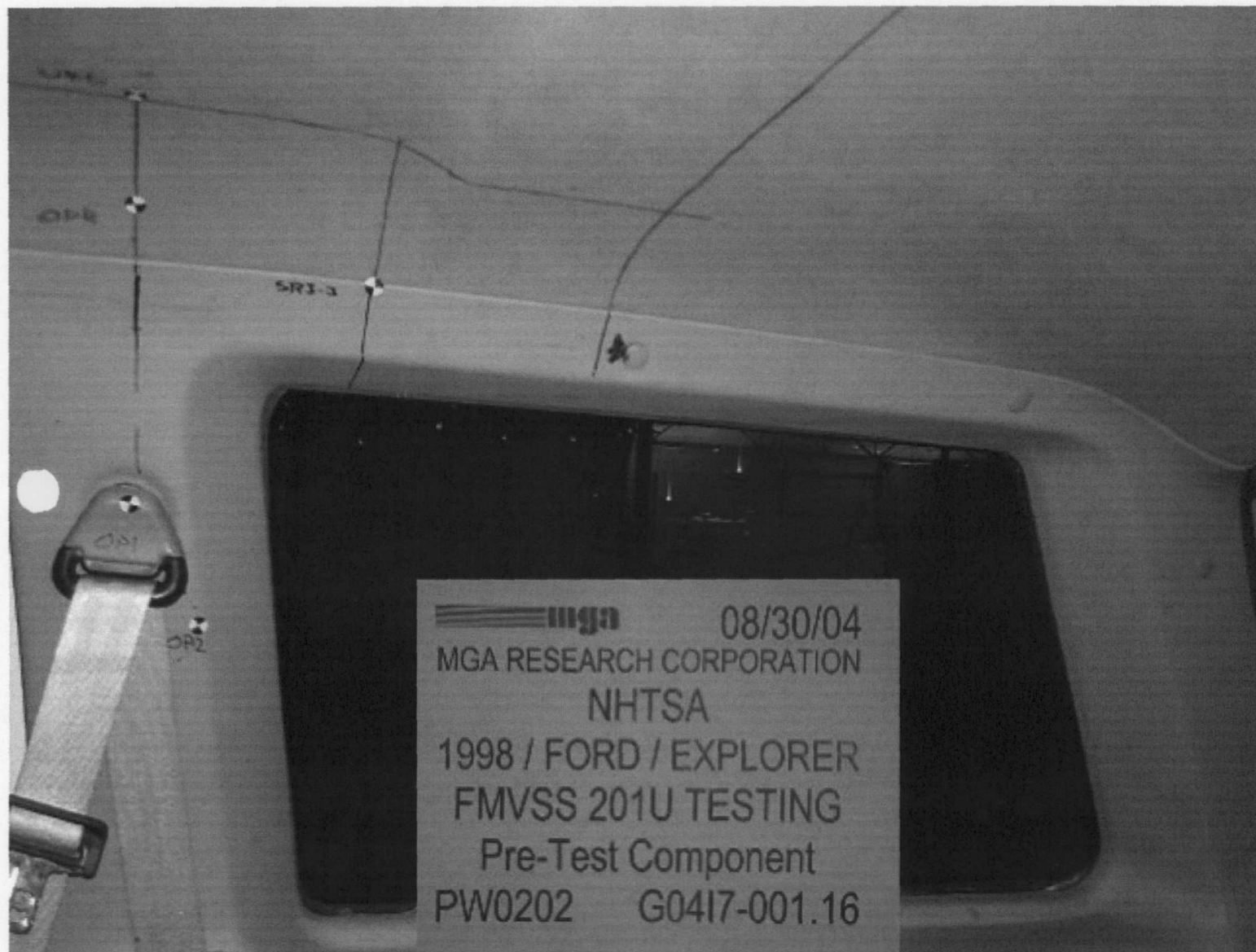
TYPE: MPV [REDACTED]

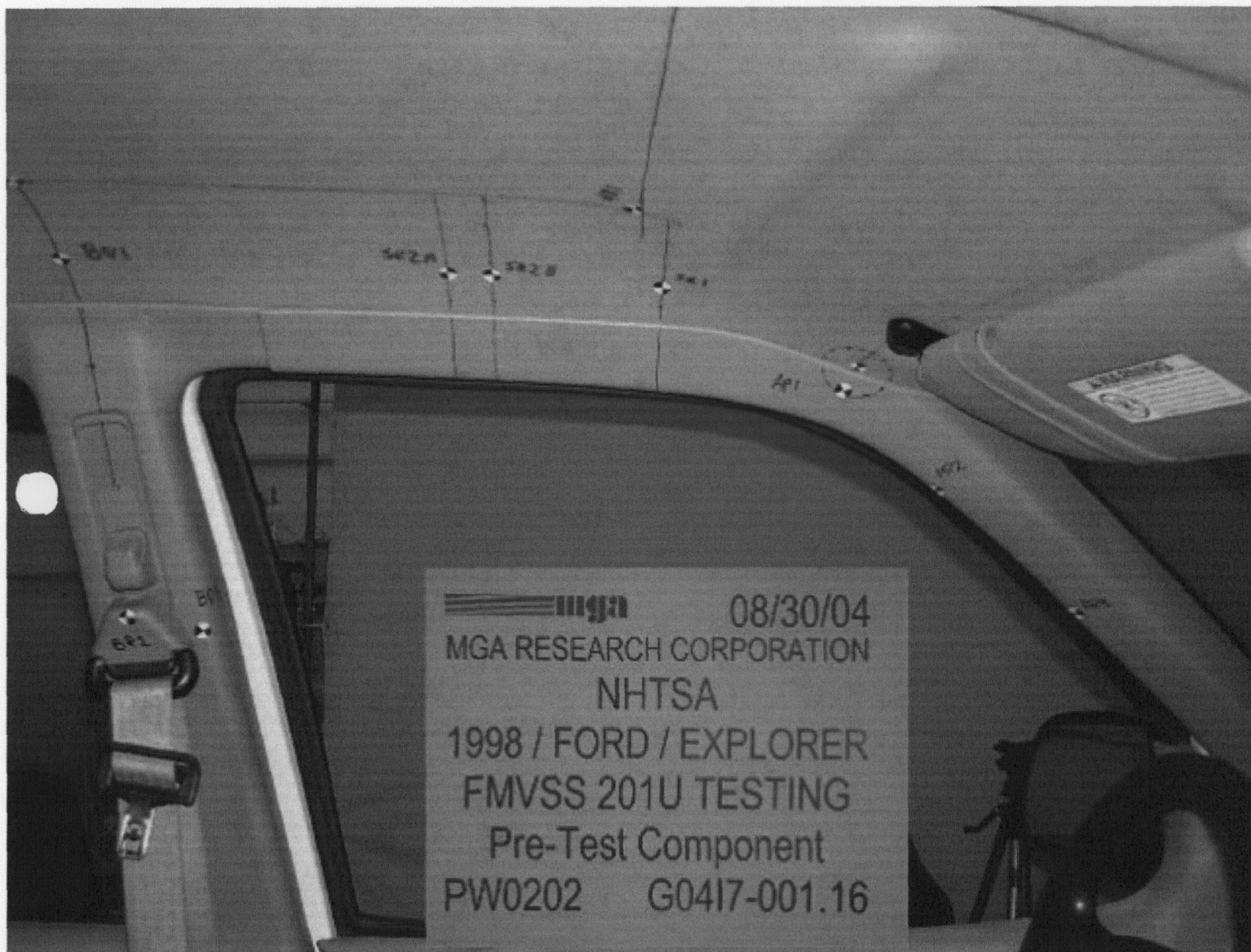
EXT PNT:	YZ	RC: 13	DSO:
WB	BRK	INT TR	TP/PS
112	4	MX	9
			AXLE
			D4
			TR
			D
			BF
			UTC

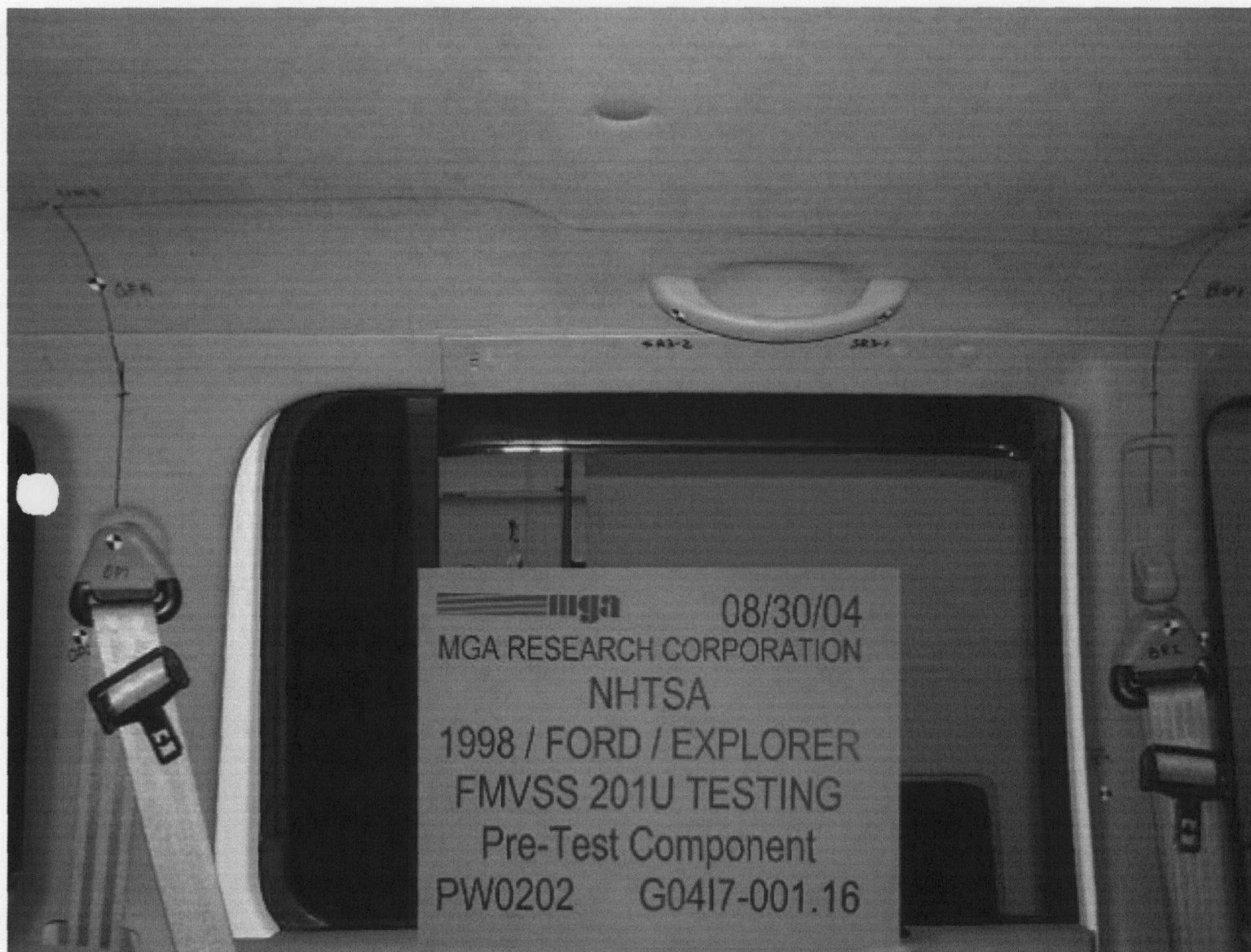
F85B-1520472-AB



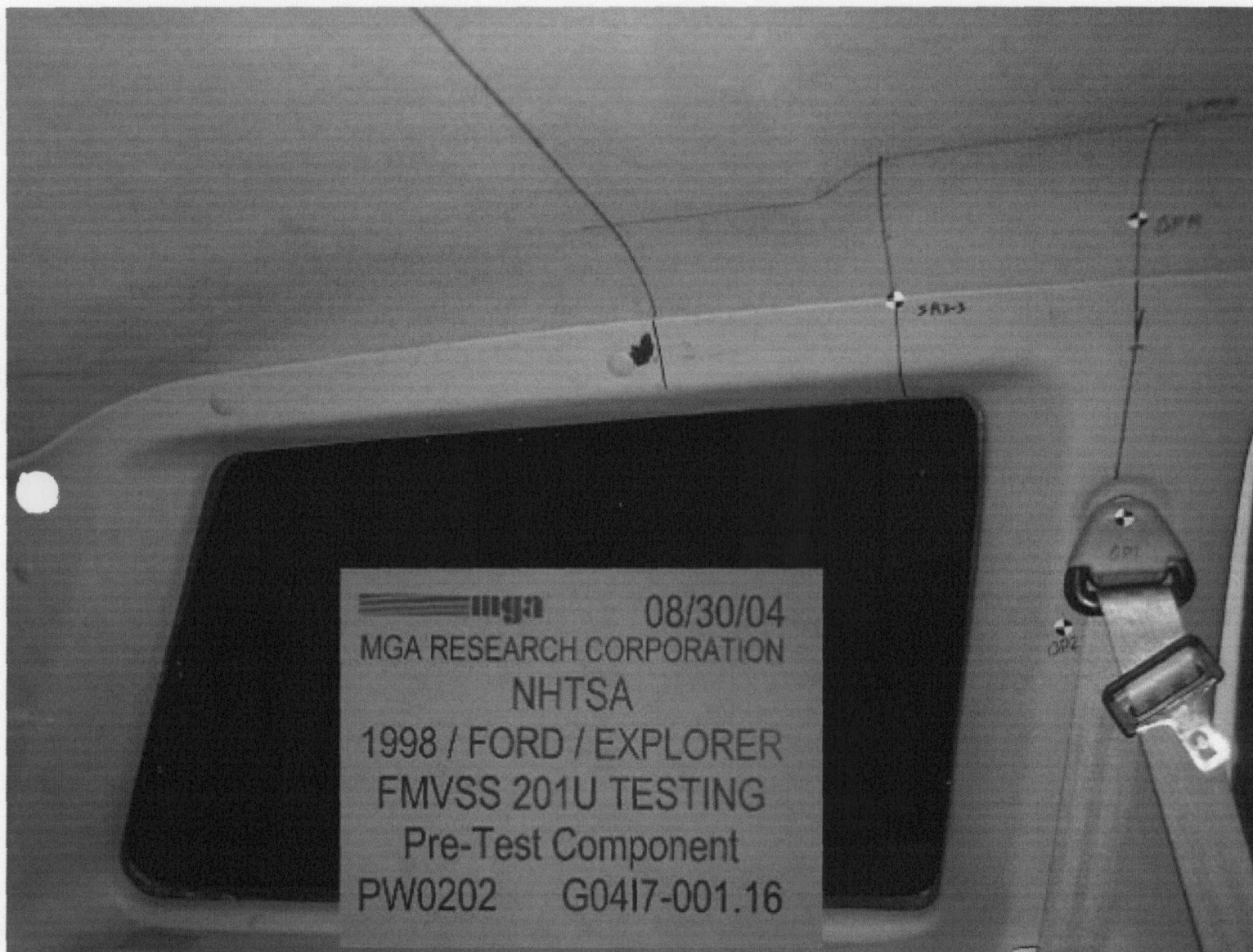




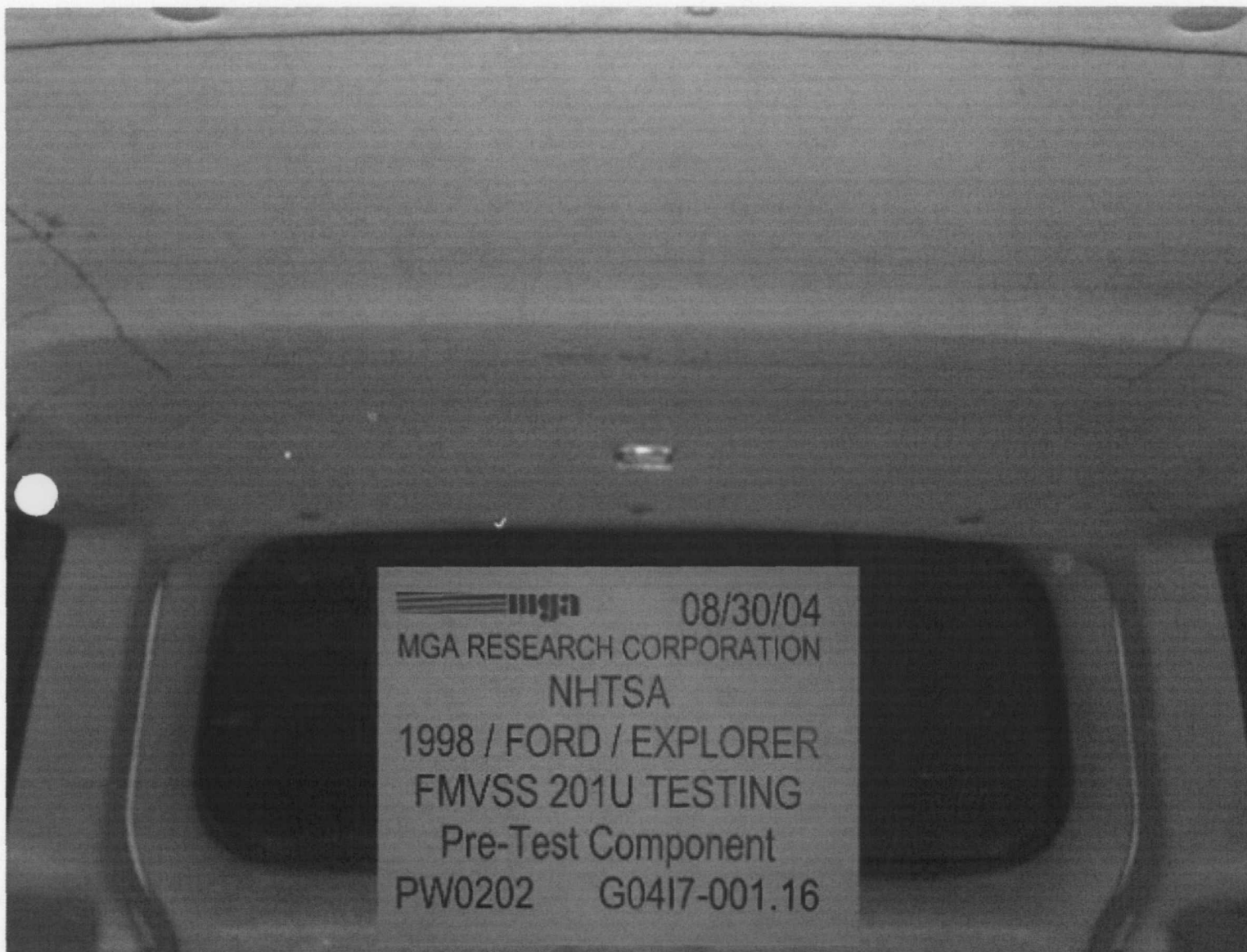




 08/30/04
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NHTSA
1998 / FORD / EXPLORER
FMVSS 201U TESTING
Pre-Test Component
PW0202 G0417-001.16

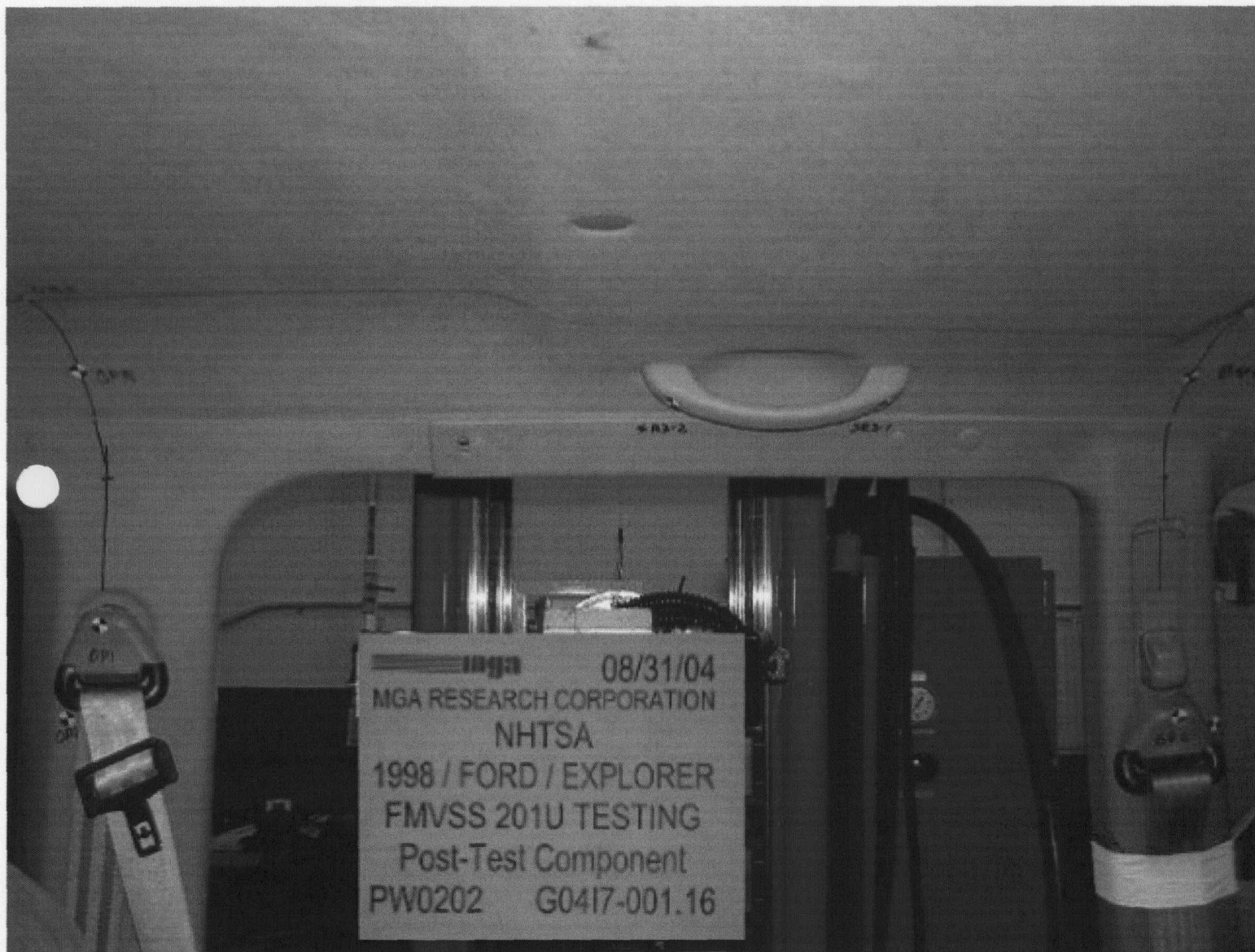


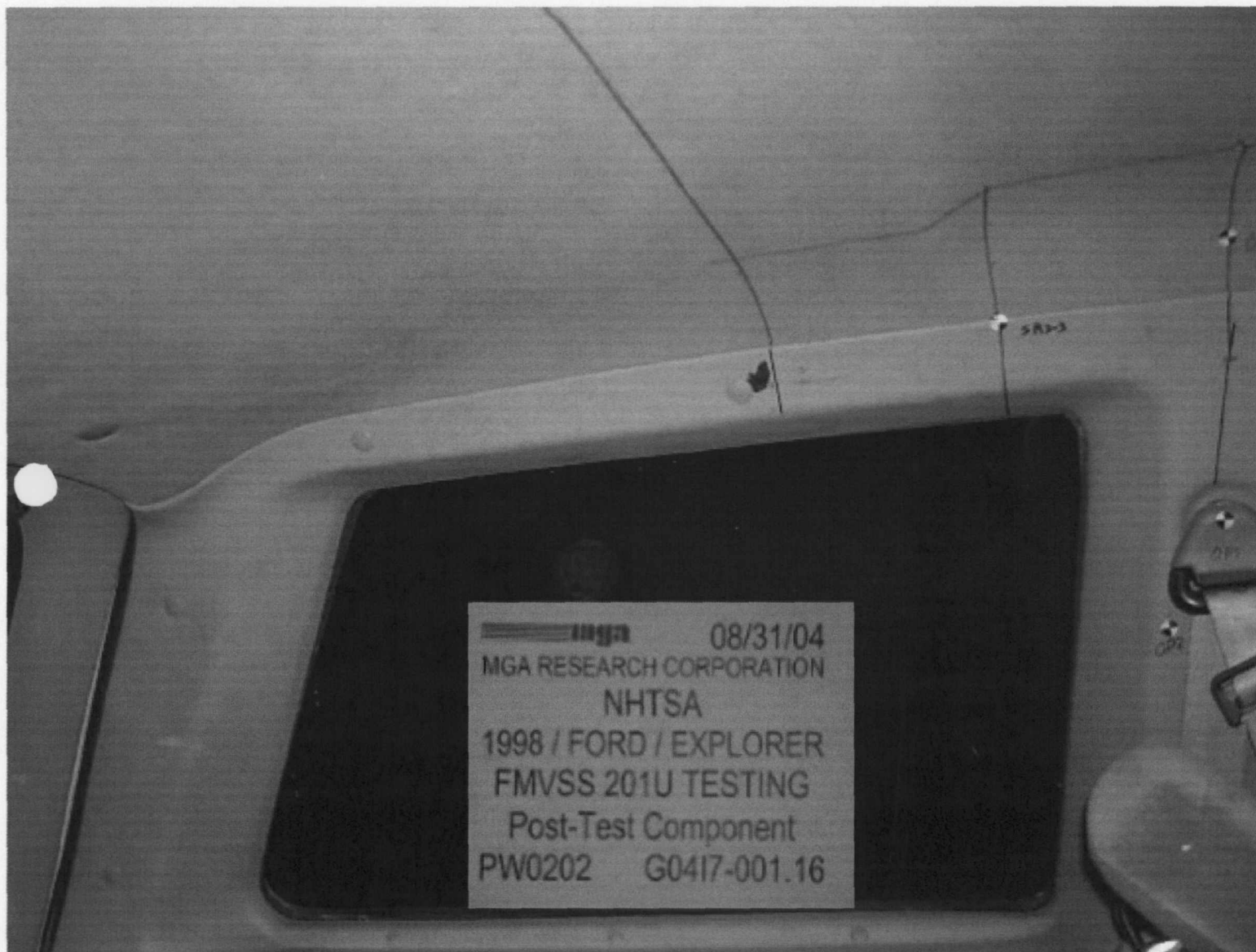


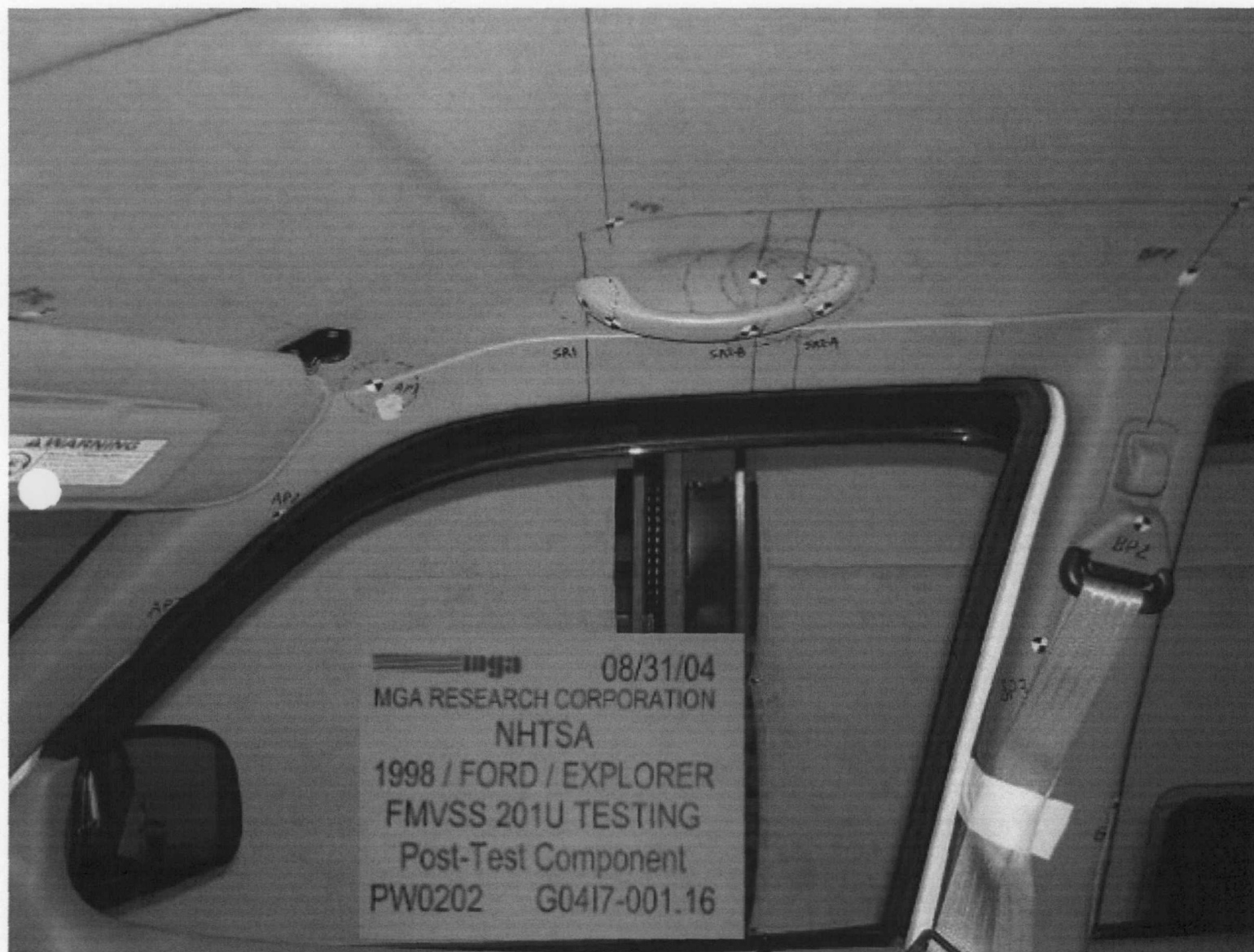


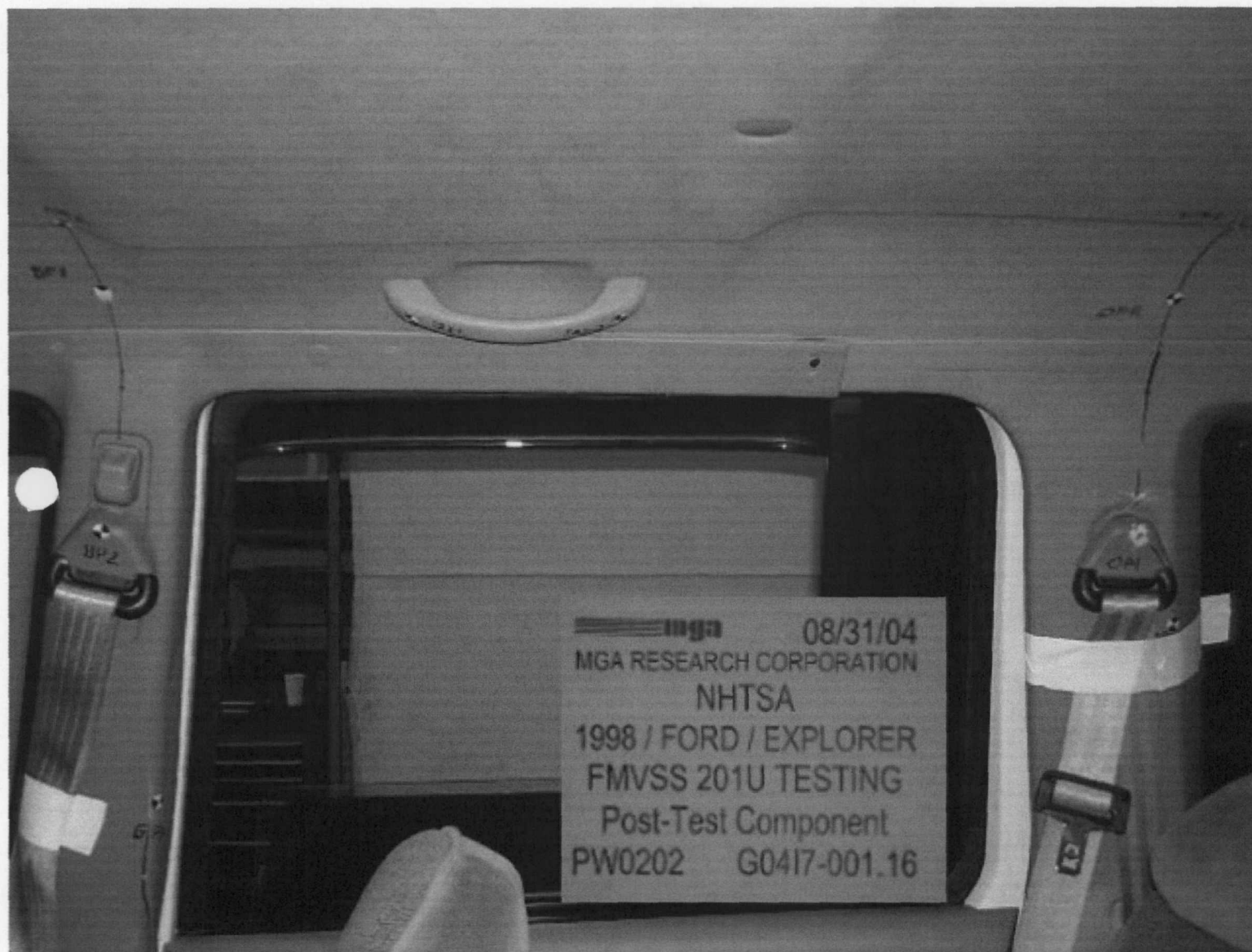
 08/30/04
MGA RESEARCH CORPORATION
NHTSA
1998 / FORD / EXPLORER
FMVSS 201U TESTING
Pre-Test Component
PW0202 G04I7-001.16

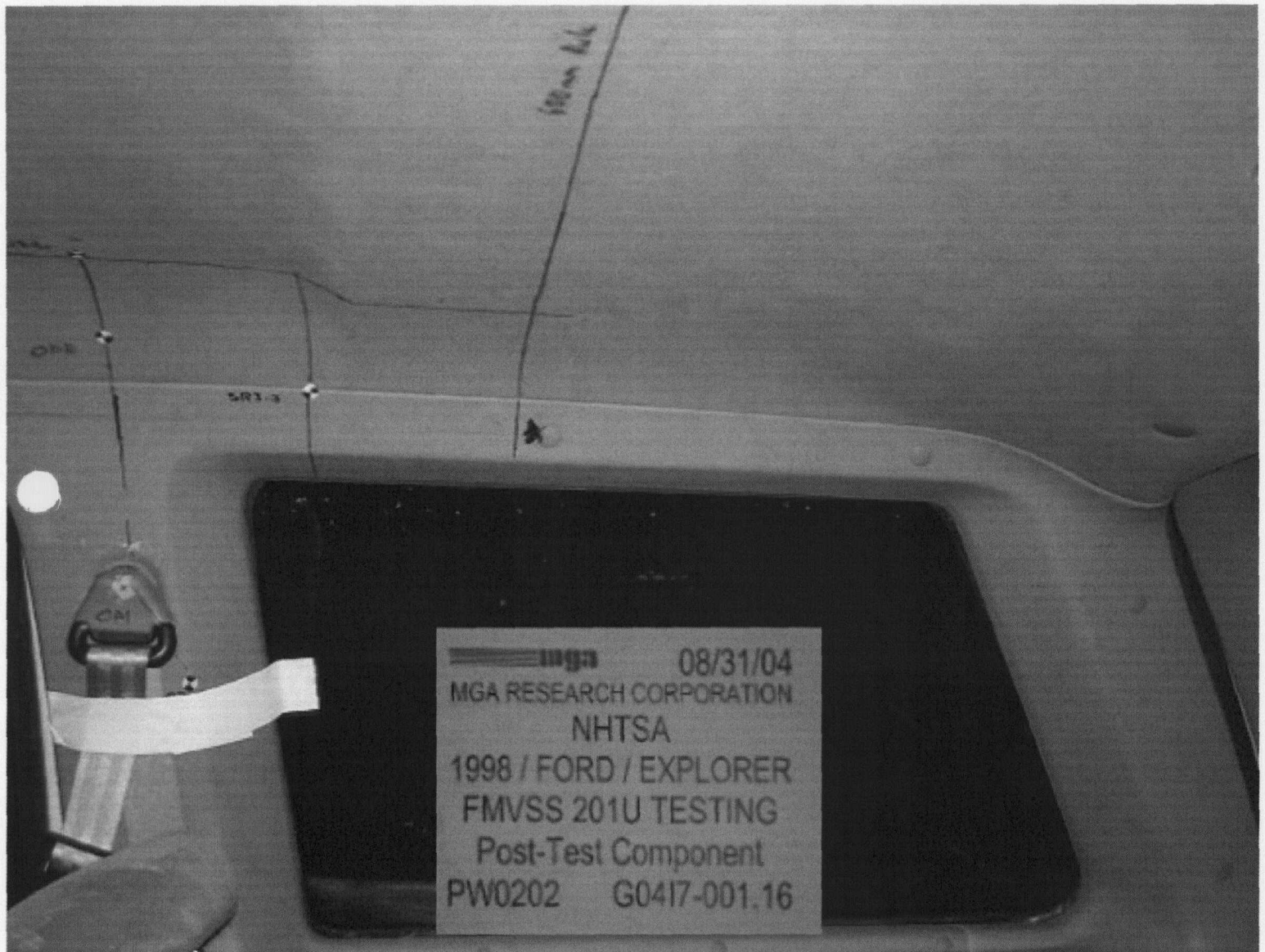




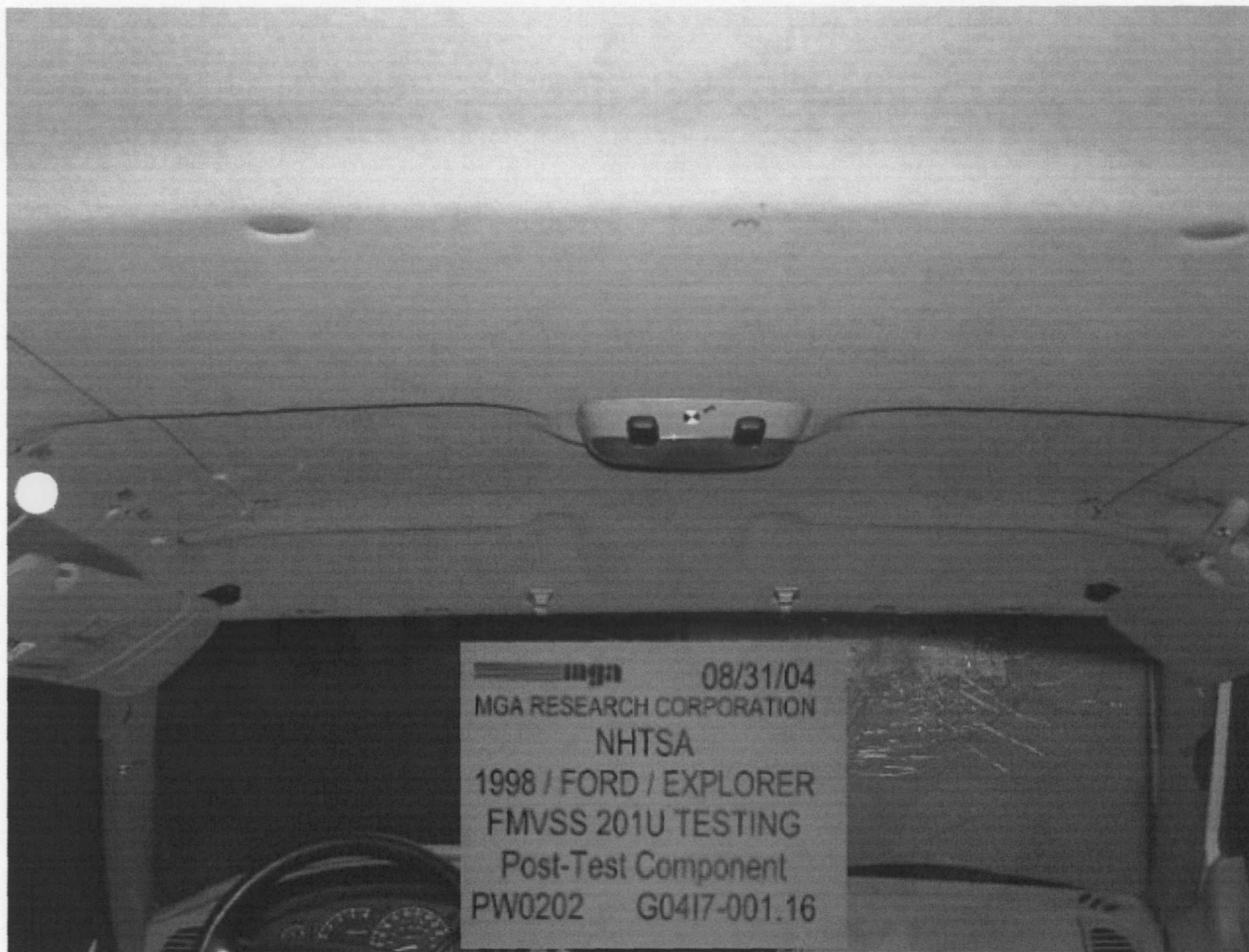




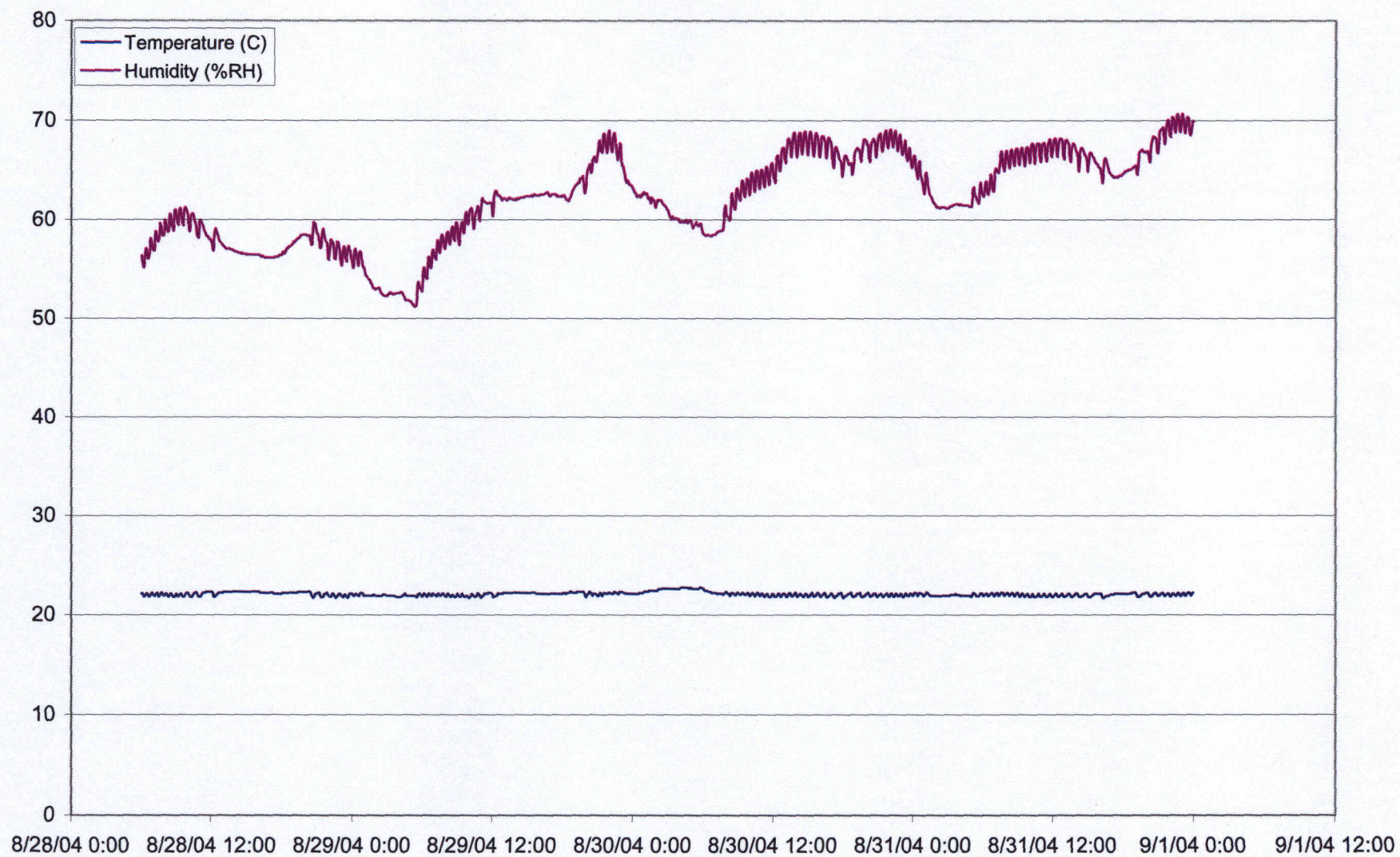


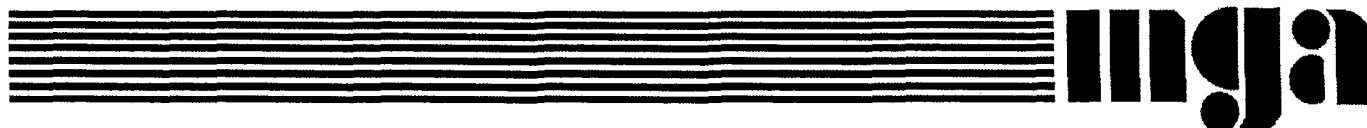






1998 Ford Explorer PW0202
August 28th - 31st, 2004





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: J21969	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/19/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0409

New DLR (100k , Units: G): 88.5

StdDeviation (%) 0.194

% Difference in DLR (New vs. Old): -1.641

Temperature (°F): 73

Humidity (%): 43

Performed By:

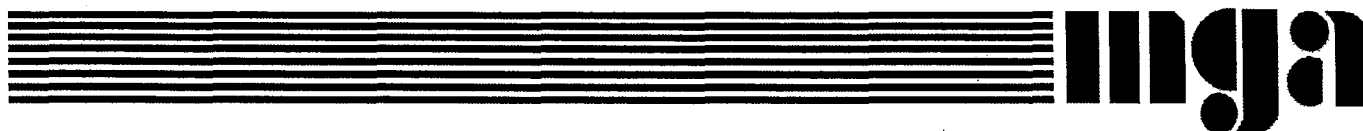
Approved By:

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: J35924	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/21/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0410

New DLR (100k , Units: G): 92.3

StdDeviation (%) 0.106

% Difference in DLR (New vs. Old): 0.506

Temperature (°F): 72

Humidity (%): 47

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: J35919	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 5/21/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0410

New DLR (100k , Units: G): 93.8

StdDeviation (%): 0.066

% Difference in DLR (New vs. Old): -0.27

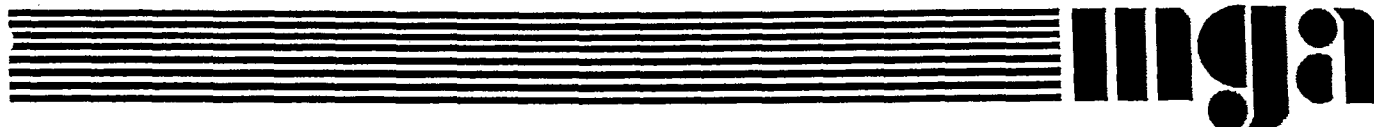
Temperature (°F): 72

Humidity (%): 47

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:

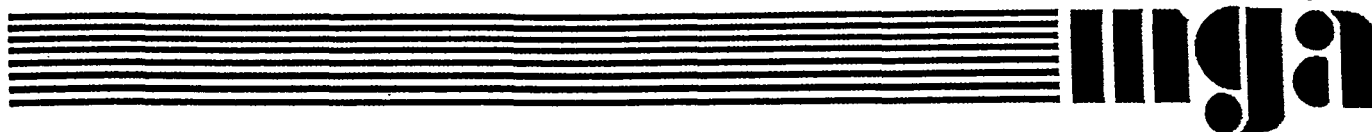
Approved By:

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: 301M09/484B
S/N: J35916	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): 100.2

StdDeviation (%): 0.215

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

Temperature (°F): 74

Humidity (%): 50

Performed By:

Keith Campbell

Approved By:

Donald A. Kalito

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: J35918	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): 97.9

StdDeviation (%): 0.929

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

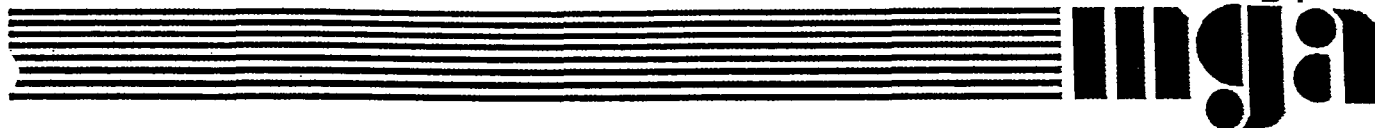
Temperature (°F): 74

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 $k=2$.



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: J36197	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): 108.0

StdDeviation (%) 0.915

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

Temperature (°F): 74

Humidity (%): 50

Performed By: *James Campbell*

Approved By: *Donald A. Kalito*

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 $k=2$.



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: J36193	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): 101.4

StdDeviation (%): 0.375

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

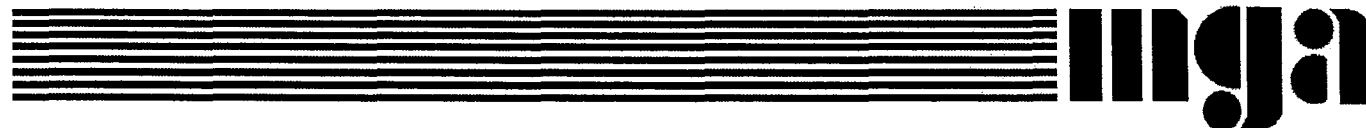
Temperature (°F): 74

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 $k=2$.



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: J36353	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): 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 $k=2$.

~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 whooverage factor of 2) for scale factors is +/- 0.2%.

This certificate may not be reproduced, except in full, without written approval of

~ Calibration Certificate ~

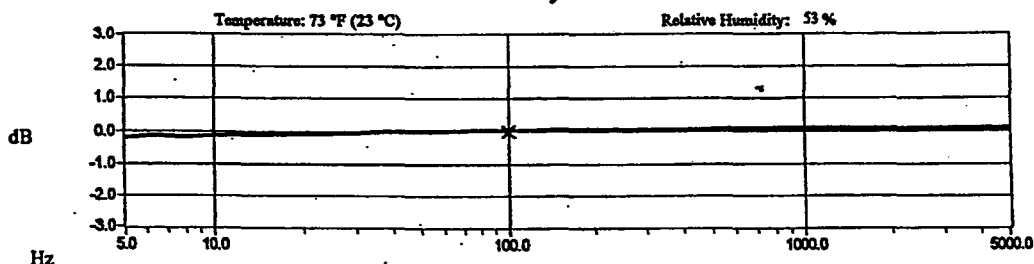
Per ISO 10063-21

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

Calibration Data

Sensitivity @ 100.0 Hz **31.17 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 Brass Grounding Fastener: Steel Mount

Vertical

Acceleration Level (g): **14.5 g (PEL 1 m/s²)**

*The measurement 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) = 0.016 x (Hz)^{1.5}.

Condition of Unit

As Found: **In Tolerance, No Adjustment Necessary**As 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 CD**Date: **05/13/04**

PAGE 1 of 1

PCB PIEZOTRONICS™
 VIBRATION DIVISION

3425 Walden Avenue Depew, NY 14043
 TEL: 814-684-0013 FAX: 716-683-3116 www.pcb.com

m21-3167283389.34



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.: M6A00072(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:
09093	CT485B	61201094	Omega	Thermohygrometer	7/28/04
07743	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.

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>Paul Wonsowicz</u> Paul Wonsowicz	Date: <u>1-29-04</u> Technician	Approved: <u>[Signature]</u> Date: <u>1/30/04</u>
Date Printed: 01/29/04 Printed By: Paul Wonsowicz		Page: 1 of 2 QFC 1043-1 Rev 4/17/03

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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 Gauge

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\07qcont\English\07frm07-006.doc

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

NuWeigh, Inc.

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

CALIBRATION / TEST REPORTPage 1 of 1

SCR 4365

Customer: <u>MGA Research</u>	Date of service: <u>3-23-04</u>	Location: <u>C-S</u>
Address: <u>446 Executive Dr.</u>	Last known test date: <u>3-28-03</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>708</u>	Model: <u>8950 F</u>	Model:	Model:
Serial No.: <u>9804-022</u>	Serial No.: <u>9805-175</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. & Grade: <u>2000x1 lb</u>	Customer Id.:	Cap. & Grade:
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>100 lb</u>	<u>100</u>	<u>0</u>	
<u>300 lb</u>	<u>300</u>	<u>0</u>	
<u>500 lb</u>	<u>500</u>	<u>0</u>	
<u>300 lb</u>	<u>300</u>	<u>0</u>	
<u>100 lb</u>	<u>100</u>	<u>0</u>	
<u>0</u>	<u>0</u>	<u>0</u>	
<u>X</u>	<u>X</u>	<u>X</u>	
Load Section #1	<u>100</u>	<u>0</u>	
Load Section #2	<u>100</u>	<u>0</u>	
Load Section #3	<u>100</u>	<u>0</u>	
Load Section #4	<u>100</u>	<u>0</u>	

Scale meets HB44 tolerance: Yes ☒ No ☐Standards used (serial nos.): 6-15Estimated measurement uncertainty of applied load is 0.38 %Traceable report nos. MI 10-01-6285**RECOMMENDATIONS/OPINIONS**

No adjustments needed
Scale Tested good.

Scale meets HB44 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 Kintz
 TECHNICIAN

3-23-04
 DATE

George Baber
 CUSTOMER

White - Customer Copy

Canary - File Copy

SCR Rev. 7.602



Certificate Number: 20040729Cal

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: AP 20
Serial Number: E33603-0213
Manufacturer: Detecto
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	612010507	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 W.</u> Paul W.	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 out	Reading As Left lb out	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

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 McReynolds*

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

Calibration Standards

General Eastern Model # M3

Ser. # 0850806 / 2360602

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

Certified February, 2003 / August, 2003

Azoxis Model # A1011 Ser. # T2513-9027

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

Certified February, 2003

Cole Parmer Model # PT1000/90111-00

Ser. # 10067869 / Ser. # 10148057 Accuracy: $\pm 4^\circ\text{F}$

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. Drifts and faults were determined, and any necessary mechanical or electronic adjustments were taken. The Dickson calibration system conforms to the requirements of MIL-STD-45661A, ANSE/NCST, 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 Specification
Humidity (%RH)	Humidity (%RH)	Humidity
22.1	22.9	$\pm 2\%$ RH
55	58.1	$\pm 2\%$ RH
86.6	88.2	$\pm 3\%$ RH
Temperature °F	Temperature °F	Temperature
-7.6	-7.1	$\pm 1.8^\circ\text{F}$ ($\pm 1.0^\circ\text{C}$)
75.1	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 $\pm 0.7^\circ\text{F}$ 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: _____

Charts/Pens

(Order now and receive them with your calibrated unit)

	Order No.	Qty.	Price Ea.
☐ 6 Red Pens	P222	_____	\$36 pk.
☐ 3 Red/3 Blue Pens	P246	_____	\$36 pk.
☐ Charts* (60 per box)	C	_____	\$24 box

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

Prices are subject to change

Bill To: _____

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

Dickson Calibration Services

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