FINAL REPORT NUMBER 201UI-MGA-06-07

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

LAND ROVER
2006 Land Rover LR3, 4-Door MPV
NHTSA No. C60600

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: September 13-15, 2006
Report Date: December 13, 2006

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590

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Approved By: _____

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A compliance test series was conducted on the subject 2006 Land Rover LR3, 4-Door MPV, NHTSA No. C60600, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201 compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on September 13-15, 2006. Test failures identified were as follows:

None

The data recorded indicates that the 2006 Land Rover LR3, 4-Door MPV, tested appears to comply with the upper interior requirements of FMVSS 201.</td></tr>
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2006 Land Rover LR3, 4-Door MPV, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted during September 13-15, 2006 on a 2006 Land Rover LR3, 4-Door MPV, manufactured by Land Rover in the UK.

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 COMPLIANCE TEST DATA SUMMARY

The 2006 Land Rover LR3, 4-Door MPV, was equipped with A, B, Other (O), and rear pillars, a grab handle located on the side rail above each door (front and rear), an adjustable seat belt anchorage on each B-pillar, a non-adjustable seat belt anchorage on each O-pillar, and an upper roof console located on the front and mid-position of the upper roof.

Upon completion of targeting the test vehicle, twelve (12) targets were chosen to be impacted based upon engineering judgment and certification test data provided by the manufacturer. The twelve (12) targets chosen were:

AP1	BP1	FH1	SR2-B
AP2	BP2	FH2	UR1 (BP1)
AP3	BP4	OP1	UR5 (SR3-2)

The 2006 Land Rover LR3, 4-Door MPV, tested appears to comply with the upper interior performance criteria for FMVSS 201. The HIC(d) measured using the Part 572L (Free Motion Headform) was below 1000 for each tested component.

TABLE 2-1

SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Land Rover LR3, 4-Door MPV

VEH. NHTSA NO.: C60600 VIN: SALAB24406A369458 COLOR: Silver

VEH. BUILD DATE: November, 2005 TEST DATES: September 13-15, 2006

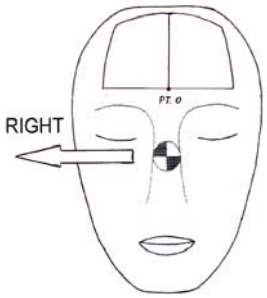
TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, 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	156	38	19.4	749	772	32	5 Left
AP2	Left	205	38	18.8	555	515	27	5 Left
AP3	Right	156	35	18.7	778	811	25	17 Left
BP1	Right	90	23	18.7	490	428	39	3 Left
BP2	Left	270	-4*	24.0	542	498	25	4 Left
BP4	Right	156	-8	23.8	475	409	22	3 Left
FH1	Left	180	20	23.6	432	352	44	33 Left
FH2	Right	180	20	23.3	333	220	48	0
OP1	Left	270	2	24.2	703	712	20	3 Left
SR2-B	Left	270	45	18.8	621	603	29	5 Left
UR1 (BP1)	Left	270	50	23.2	779	812	32	0
UR5 (SR3-2)	Right	90	40	24.3	504	447	36	0

*For BP2, the impact angle range is 0°-50° per CFR 571.201 Table 1 – Approach Angle Limits. The incorrect vertical angle was chosen for this target.

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.

BP2 Left: Cracked and dented the seat belt anchorage.

UR5 (SR3-2) Right: Broke the rear grab handle.

REMARKS:

The targets listed were impacted in the following order:

Left: AP2, SR2-B, FH1, BP2, UR1 (BP1), OP1

Right: AP3, AP1, FH2, BP4, BP1, UR5 (SR3-2)

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

RECORDED BY: Louis Campbell DATE: September 15, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Land Rover LR3, 4-Door MPV

VEH. NHTSA NO.: C60600 VIN: SALAB24406A369458 COLOR: Silver

VEH. BUILD DATE: November, 2005 TEST DATES: September 13-15, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Bryan Hood

INTERIOR TRIM INFORMATION: A, B, Other (O), and rear pillars, a grab handle located on the side rail above each door (front and rear), an adjustable seat belt anchorage on each B-pillar, a non-adjustable seat belt anchorage on each O-pillar, and an upper roof console located on the front and mid-position of the upper roof.

OTHER: The windshield wiper was broken as delivered.

SUNROOF INFORMATION:

Installed:	_____Yes	_X_ No
Operation:	_____Electric	____ Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed:	_X_Yes	___ No

ROLL-BAR INFORMATION:

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

GENERAL INFORMATION:

Date Received: 8/17/06; Odometer Reading: 10 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Land Rover in the UK

Date of Manufacture: November, 2005; VIN: SALAB24406A369458

GVWR: 3180 kg; GAWR FRONT: 1450 kg;

GAWR REAR: 1840 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 340 kpa REAR: 340 kpa

Recommended Tire Size: 255/60R18

Recommended Cold Tire Pressure:

FRONT: 230 kpa REAR: 290 kpa

Size of Tire on Test Vehicle: 255/60R18

Type of Spare Tire: T175/80R19 Saver: X; Standard_____

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench___; Bucket X; Split Bench _____

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

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 668 kg

No. of Occupants x 68 kg = 340 kg

Rated Cargo/Luggage Weight (RCLW) = 328 kg (difference)

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

Right Front =	575.0 kg	Right Rear =	651.5 kg
Left Front =	643.0 kg	Left Rear =	595.5 kg
TOTAL FRONT =	1218.0 kg	TOTAL REAR =	1247.0 kg
% Total Weight =	49.4 %	% Total Weight =	50.6 %

TOTAL DELIVERED WEIGHT = 2465.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight =	2465.0 kg
Max. Test Cargo/Luggage Weight =	136.0 kg
Target Test Weight =	2601.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	568.0 kg	Right Rear =	724.0 kg
Left Front =	641.5 kg	Left Rear =	669.0 kg
TOTAL FRONT =	1209.5 kg	TOTAL REAR =	1393.0 kg
% Total Weight =	46.5 %	% Total Weight =	53.5 %

TOTAL TEST WEIGHT = 2602.5 kg

Weight of ballast secured in vehicle's cargo area = 136.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED:

Right Front 831 mm; Left Front 829 mm;
Right Rear 848 mm; Left Rear 843 mm;
Pitch Angle at Right Door Sill = 0.4 Rear is higher
Pitch Angle at Left Door Sill = 0.1 Rear is higher
Roll Angle at Front Bumper = 0.1 Left-side is higher
Roll Angle at Rear Bumper = 0.2 Right-side is higher

FULLY LOADED:

Right Front 831 mm; Left Front 827 mm;
Right Rear 823 mm; Left Rear 823 mm;
Pitch Angle at Right Door Sill = 0.8 Rear is higher
Pitch Angle at Left Door Sill = 0.3 Front is higher
Roll Angle at Front Bumper = 0.2 Left-side is higher
Roll Angle at Rear Bumper = 0.2 Right-side is higher

AS TARGETED: Right Front 1060 mm; Left Front 1062 mm;
Right Rear 1070 mm; Left Rear 1070 mm;
Pitch Angle at Right Door Sill = 0.4 Rear is higher
Pitch Angle at Left Door Sill = 0.1 Rear is higher
Roll Angle at Front Bumper = 0.1 Left-side is higher
Roll Angle at Rear Bumper = 0.1 Right-side is higher

AS TESTED ON RIGHT SIDE:
Pitch Angle at Right Door Sill = 0.7 Rear is higher
Pitch Angle at Left Door Sill = 0.2 Front is higher
Roll Angle at Front Bumper = 0.0
Roll Angle at Rear Bumper = 0.1 Right-side higher

AS TESTED ON LEFT SIDE:
Pitch Angle at Right Door Sill = 0.6 Rear is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.1 Left-side is higher
Roll Angle at Rear Bumper = 0.2 Right-side is higher

VEHICLE WHEELBASE = 2875 mm

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

RECORDED BY: Louis Campbell DATE: September 8, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Land Rover LR3, 4-Door MPV

VEH. NHTSA NO.: C60600 VIN: SALAB24406A369458 COLOR: Silver

VEH. BUILD DATE: November, 2005 TEST DATES: September 13-15, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Bryan Hood

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195º-255º	L 204.8º	L 251.1º
	R 105º-165º	R 109.8º	R 156.1º
B-PILLAR	L 195º-345º	L 203.5º	L 281.2º
	R 15º-165º	R 78.0º	R 156.3º

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Louis Campbell DATE: September 8, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Land Rover LR3, 4-Door MPV

VEH. NHTSA NO.: C60600 VIN: SALAB24406A369458 COLOR: Silver

VEH. BUILD DATE: November, 2005 TEST DATES: September 13-15, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Bryan Hood

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L 0º-50º	L 0º	L 20º
		R 0º-50º	R 0º	R 20º
	FH2	L 0º-50º	L 0º	L 20º
		R 0º-50º	R 0º	R 20º
SIDE RAIL	SR1	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
	SR2A	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
	SR2B	L 0º-50º	L 0º	L 45º
		R 0º-50º	R 0º	R 45º
	SR3-1	L 0º-50º	L 0º	L 20º
		R 0º-50º	R 0º	R 20º
	SR3-2	L 0º-50º	L 0º	L 20º
		R 0º-50º	R 0º	R 20º
	SR3-3	L 0º-50º	L 0º	L 19º
		R 0º-50º	R 0º	R 18º
REAR HEADER	RH	L 0º-50º	L 0º	L 31º
		R 0º-50º	R 0º	R 31º

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
A-PILLAR	AP1	L -5º-50º	L -5º	L 38º
		R -5º-50º	R -5º	R 38º
	AP2	L -5º-50º	L -5º	L 35º
		R -5º-50º	R -5º	R 35º
	AP3	L -5º-50º	L -5º	L 35º
		R -5º-50º	R -5º	R 35º
B-PILLAR	BP1	L -10º-50º	L -10º	L 23º
		R -10º-50º	R -10º	R 23º
	BP2*	L 0º-50º	L 0º	L -4º
		R 0º-50º	R 0º	R -4º
	BP3	L -10º-50º	L -10º	L -7º
		R -10º-50º	R -10º	R -7º
	BP4	L -10º-50º	L -10º	L -8º
		R -10º-50º	R -10º	R -8º
OTHER PILLAR	OP1*	L 0º-50º	L 0º	L 2º
		R 0º-50º	R 0º	R 2º
	OP2	L -10º-50º	L -10º	L -2º
		R -10º-50º	R -10º	R -2º
REAR PILLAR	RP1	L -10º-50º	L -10º	L 50º
		R -10º-50º	R -10º	R 50º
	RP2	L 0º-50º	L -10º	L -10º
		R 0º-50º	R -10º	R -10º
UPPER ROOF 1		0º-50º	0º	50º
UPPER ROOF 2		0º-50º	0º	20º
UPPER ROOF 3		0º-50º	0º	35º
UPPER ROOF 4		0º-50º	0º	45º
UPPER ROOF 5		0º-50º	0º	40º

	VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
UPPER ROOF 6	0º-50º	0º	31º

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

RECORDED BY: Louis Campbell DATE: September 8, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Land Rover LR3, 4-Door MPV

VEH. NHTSA NO.: C60600 VIN: SALAB24406A369458 COLOR: Silver

VEH. BUILD DATE: November, 2005 TEST DATES: September 13-15, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, Bryan Hood

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	240 mm	240 mm
Tº	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	108.9º	--
A1º	360º - Tº	251.1º	--
Wº	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	204.8º	--
A2º	A2º = Wº	204.8º	--
Uº	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	281.2º	--
B1º	B1º = Uº	281.2º	--
Vº	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	203.5º	--
B2º	B2º = Vº	203.5º	--
Wº (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	156.1º
A1º (right)	A1º (right) = Wº (right)	--	156.1º
T º (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	250.2º
A2º (right)	360º-Tº (right)	--	109.8°
V º (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	156.3º
B1º (right)	B1º (right) = Vº (right)	--	156.3º
U º (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	78.0º
B2º (right)	B2º (right) = Uº (right)	--	78.0º
J	A-Pillar {(Plane 3) - (Plane 5)}	350.4 mm	349.9 mm
J/2	J ÷ 2	175.2 mm	175.0 mm
D1	Upper Roof {(Plane A) - (Plane B)}	2626.0 mm	
D1/2	D1 ÷ 2	1313.0 mm	
D2	Upper Roof {(Plane C) - (Plane D)}	1384.9 mm	

Measurement	Description	Left Side	Right Side
D2/2	D2 ÷ 2	692.5 mm	
.35D1	.35 x D1	919.1 mm	
.35D2	.35 x D2	484.7 mm	
N	B-Pillar {(BPR) - (lowest point on daylight opening forward of B-Pillar)}	547.4 mm	545.1 mm
N/2	B-Pillar {(BP3) - (lowest point on daylight opening forward of B-Pillar)}	273.7 mm	272.6 mm
N/4	B-Pillar {(BP4) - (lowest point on daylight opening forward of B-Pillar)}	136.9 mm	136.3 mm
Q	O-Pillar (Plane 13 – Plane 14)	533.5 mm	525.1 mm
Q/2	Q / 2	266.8 mm	262.6 mm
D	R-Pillar (Point 7 – Point M)	1085.0 mm	1087.0 mm
3D/7	3*D / 7	465.0 mm	465.9 mm

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

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	2089.6	-423.7	730.6	2089.2	416.2	726.6
Rear	2946.4	-394.3	785.1	2946.0	385.6	781.3

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1487.0	-420.0	525.0	1487.0	420.0	525.0
Rear	2342.0	-390.0	593.0	2342.0	390.0	593.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	2009.6	-423.7	1390.6	2009.2	416.2	1386.6
CGF2	2249.6	-423.7	1390.6	2249.2	416.2	1386.6
CGR	3106.4	-394.3	1445.1	3106.0	385.6	1441.3

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Driver front door striker, upper bolt hole (x, y, z) = 1606.0, -815.0, 600.1

Passenger front door striker, upper bolt hole (x, y, z) = 1606.0, 815.0, 600.1

Passenger front outboard, seat bolt hole (x, y, z) = 1131.6, 632.8, 212.0

REMARKS:

RECORDED BY: Louis Campbell DATE: September 8, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Land Rover LR3, 4-Door MPV

VEH. NHTSA NO.: C60600 VIN: SALAB24406A369458 COLOR: Silver

VEH. BUILD DATE: November, 2005 TEST DATES: September 13-15, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen A. Kaleto, Louis Campbell, 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	1210.1	-652.0	1332.4	205	38	No	--	No
AP2	1098.2	-676.6	1242.2	205	35	No	--	Yes
AP3	988.9	-699.3	1153.4	205	35	No	--	No
A-Pillar Right Side								
AP1	1210.6	642.9	1335.6	156	38	No	--	Yes
AP2	1097.7	670.6	1245.6	156	35	No	--	No
AP3	990.6	696.4	1157.6	156	35	No	--	Yes
B-Pillar Left Side								
BP1	1760.9	-566.8	1419.4	--	--	Yes	--	--
REL	1758.4	-579.4	1397.4	270	23	--	1	No
BP2	1736.8	-686.3	1150.3	270	-4	No	--	Yes
BP3	1685.6	-701.7	1144.0	270	-7	No	--	No
BP4	1800.0	-741.5	1008.4	204	-8	No	--	No
B-Pillar Right Side								
BP1	1766.1	561.0	1420.8	--	--	Yes	--	--
REL	1767.8	573.6	1399.4	90	23	--	1	Yes
BP2	1738.8	678.3	1158.1	90	-4	No	--	No
BP3	1687.1	694.1	1147.2	90	-7	No	--	No
BP4	1800.8	732.6	1011.5	156	-8	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					
Other Pillar Left Side								
OPR	2686.2	-534.6	1437.2	--	--	No	--	No
OP1	2683.7	-679.1	1187.3	270	2	No	--	Yes
OP2	2724.9	-681.6	1168.9	270	-2	No	--	No
Other Pillar Right Side								
OPR	2688.5	538.5	1427.4	--	--	No	--	No
OP1	2686.0	667.2	1194.0	90	2	No	--	No
OP2	2727.3	675.3	1166.0	90	-2	No	--	No
Rear Pillar Left Side								
RP1	3369.2	-567.0	1395.1	Target exempt from testing per S6.3(b).				No
RP2	3500.3	-607.9	1245.9	Target exempt from testing per S6.3(b).				No
Rear Pillar Right Side								
RP1	3363.3	568.5	1392.8	Target exempt from testing per S6.3(b).				No
RP2	3507.1	586.6	1244.1	Target exempt from testing per S6.3(b).				No
Front Header Left Side								
FH1	1118.0	-553.4	1380.1	--	--	Yes	--	--
REL	1099.9	-512.4	1356.3	180	20	--	2	Yes
FH2	1078.9	-405.7	1367.4	180	20	No	--	No
Front Header Right Side								
FH1	1117.6	546.7	1380.2	--	--	Yes	--	--
REL	1097.5	507.4	1357.2	180	20	--	2	No
FH2	1078.2	400.7	1368.1	180	20	No	--	Yes
Side Rail Left Side								
SR1	1359.2	-569.6	1381.0	270	50	No	--	No
SR2A	1509.7	-573.9	1394.2	--	--	Yes	--	--
REL	1532.9	-580.8	1387.9	270	50	--	1	No
SR2B	1459.9	-587.3	1416.6	--	--	Yes	--	--
REL	1459.2	-623.5	1381.7	270	45	--	2	Yes
SR3-1	2251.1	-499.7	1472.9	270	20	No	--	No

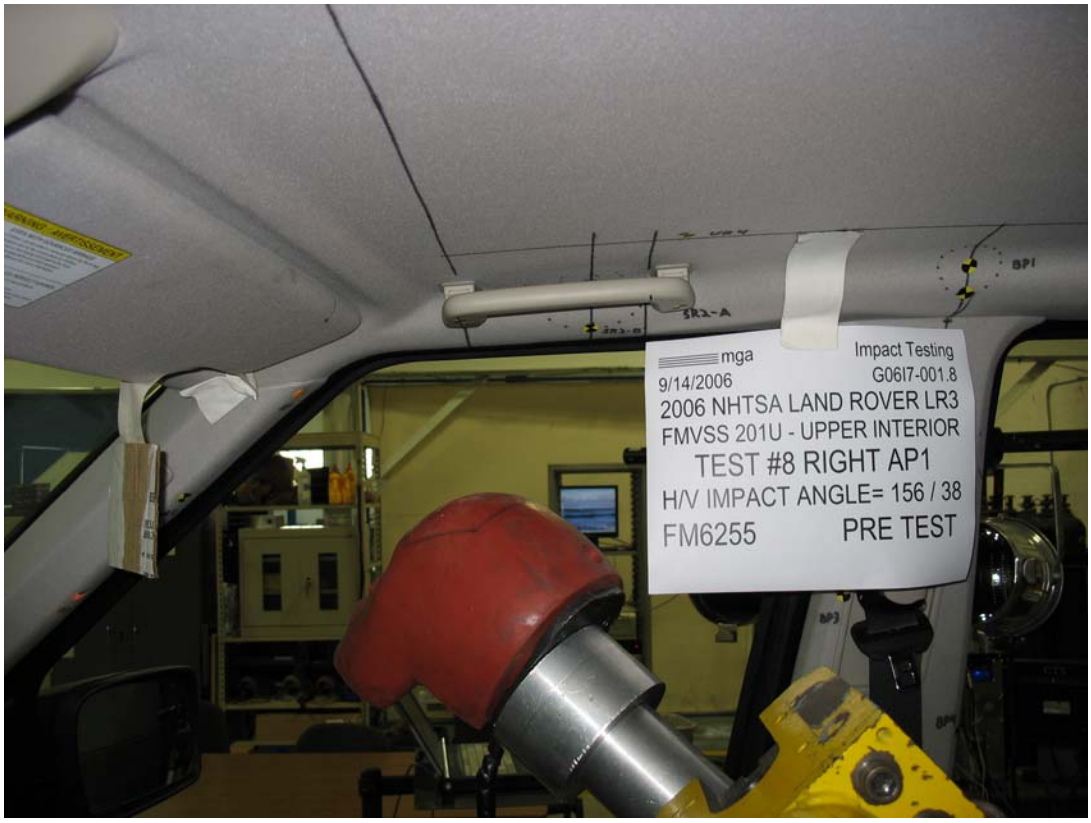
SUMMARY OF TARGETING RESULTS								
Target	**Location (mm)**			**Horizontal Angle (deg)**	**Vertical Angle (deg)**	**Relocation (Yes/No)**	**Extension (# of 25 mm Spheres)**	**Impact (Yes/No)**
	x	**y**	**z**					
SR3-2	2418.4	-500.6	1474.4	270	20	No	--	No
SR3-3	2836.2	-533.0	1440.3	270	19	No	--	No
Side Rail Right Side								
SR1	1360.4	563.5	1382.8	90	50	No	--	No
SR2A	1509.7	566.1	1396.3	--	--	Yes	--	--
REL	1534.9	571.5	1391.0	90	50	--	1	No
SR2B	1464.9	581.7	1419.9	--	--	Yes	--	--
REL	1464.7	619.4	1383.7	90	45	--	2	No
SR3-1	2251.5	488.7	1476.2	90	20	No	--	No
SR3-2	2422.8	488.6	1479.3	90	20	No	--	No
SR3-3	2839.4	524.3	1438.0	90	18	No	--	No
Rear Header Left Side								
RH	3309.4	-398.3	1516.4	Target exempt from testing per S6.3(b).				--
REL	3285.8	-398.1	1516.1	Target exempt from testing per S6.3(b).				No
Rear Header Right Side								
RH	3313.3	383.1	1516.6	Target exempt from testing per S6.3(b).				--
REL	3287.9	381.8	1517.3	Target exempt from testing per S6.3(b).				No
Upper Roof Left Side								
UR1 (BP1)	1760.3	-477.4	1432.6	270	50	No	--	Yes
UR2 (SR3-1)	2142.0	-479.4	1502.2	270	20	No	--	No
UR3 (OP1)	2685.4	-479.0	1458.5	270	35	No	--	No
Upper Roof Right Side								
UR4 (SR2-A)	1530.4	472.5	1427.2	90	45	No	--	No
UR5 (SR3-2)	2411.4	393.7	1515.2	90	40	No	--	Yes
UR6 (SR3-3)	2907.5	426.3	1514.7	90	31	No	--	No

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

REMARKS: Targets AP1, AP2, AP3, BP1, RP1, SR1, SR2A, SR2B, SR3-1, SR3-2, and SR3-3 are located in the curtain airbag zone and subject to a reduced velocity impact if tested.

RECORDED BY: Louis Campbell DATE: September 8, 2006
APPROVED BY: Helen A. Kaleto

3.0 **TEST DATA** (Including Acceleration and Velocity Plots)




mga
Impact Testing
9/14/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP1
H/V IMPACT ANGLE= 156 / 38
FM6255
POST TEST


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP1
H/V IMPACT ANGLE= 156 / 38
FM6255
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/NHTSA/LAND ROVER LR3

GENERAL TEST PARAMETERS:

Test Number:#8

Target (Vehicle Side): AP1Right

Temperature:21C

MGA Test Reference No.:FM6255

Humidity:54%

Approach Horizontal Angles:156º

Time of Test:2:58 PM

Approach Vertical Angles:38º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
749	772	3	19.4	32	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.29	1.29
Y	6	J36193	102.7	1.79	1.79
Z	7	J36353	97.2	1.31	1.31

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

No visible damage.

Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 9/14/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: NHTSA
Test # 8
FM6255
Additional Desc: N/A

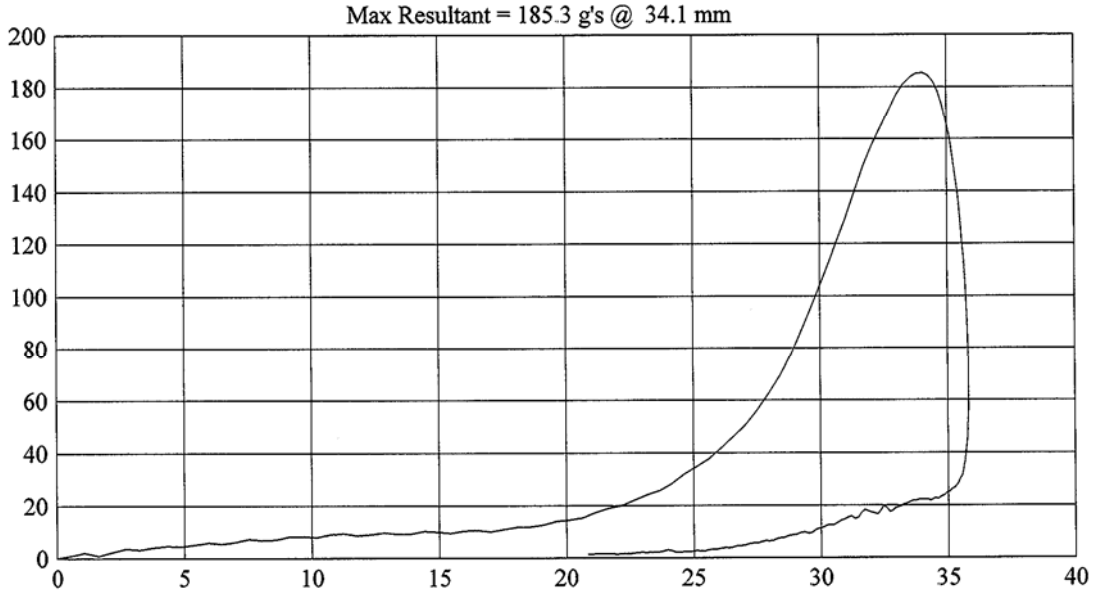
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 156/38

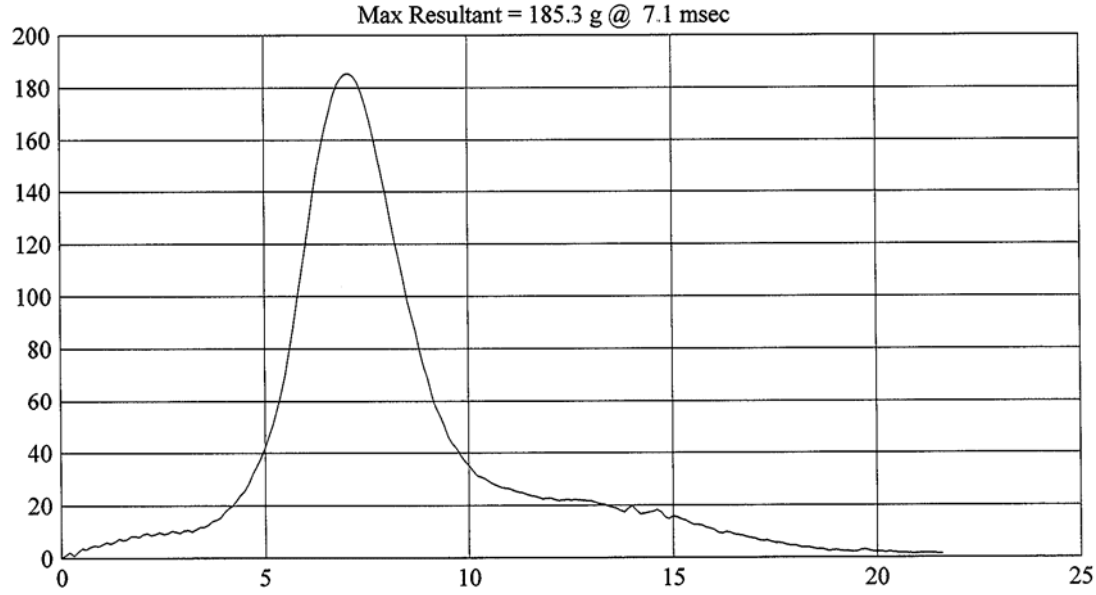
HIC(d) = 749, HIC = 772, Delta T = 3 msec

Max Resultant = 185.3 g's @ 34.1 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 185.3 g @ 7.1 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 8
FM6255
Additional Desc: N/A

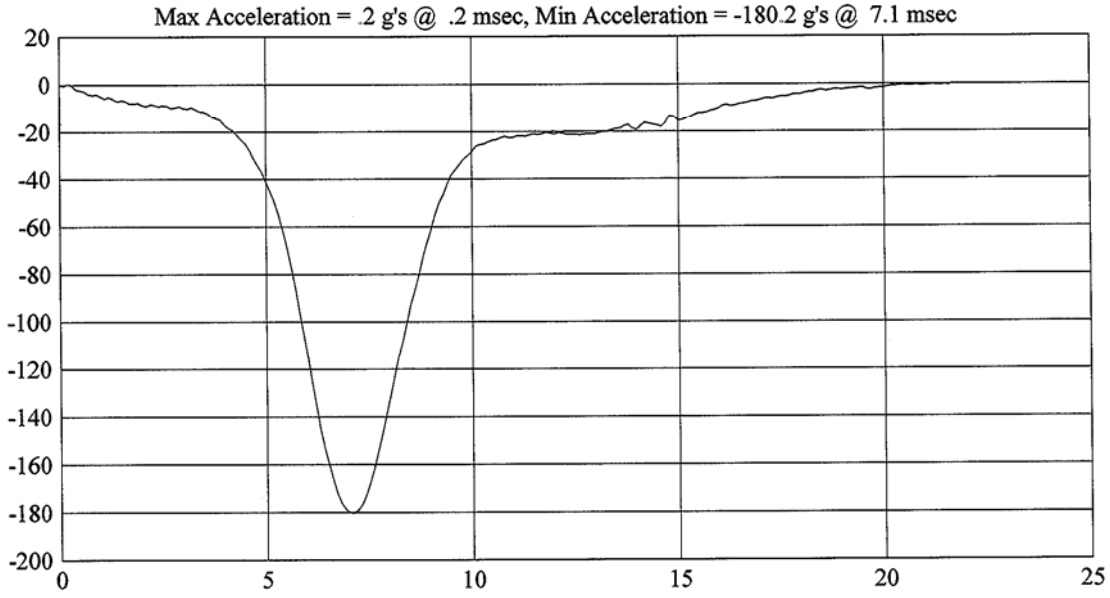
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 156/38

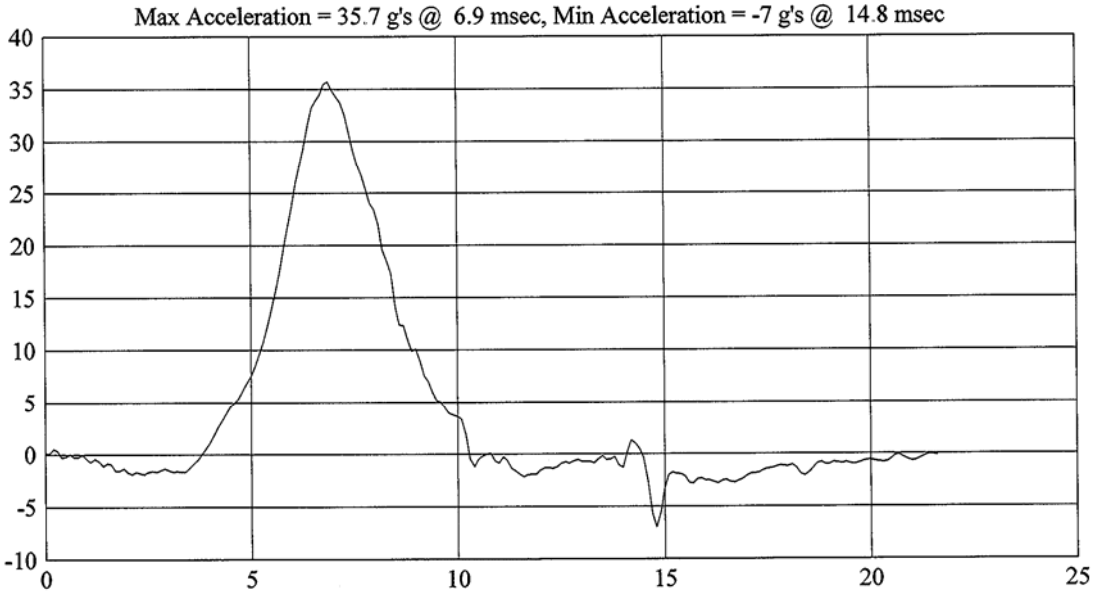
HIC(d) = 749, HIC = 772, Delta T = 3 msec

Max Acceleration = .2 g's @ .2 msec, Min Acceleration = -180.2 g's @ 7.1 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 35.7 g's @ 6.9 msec, Min Acceleration = -7 g's @ 14.8 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 8
FM6255
Additional Desc: N/A

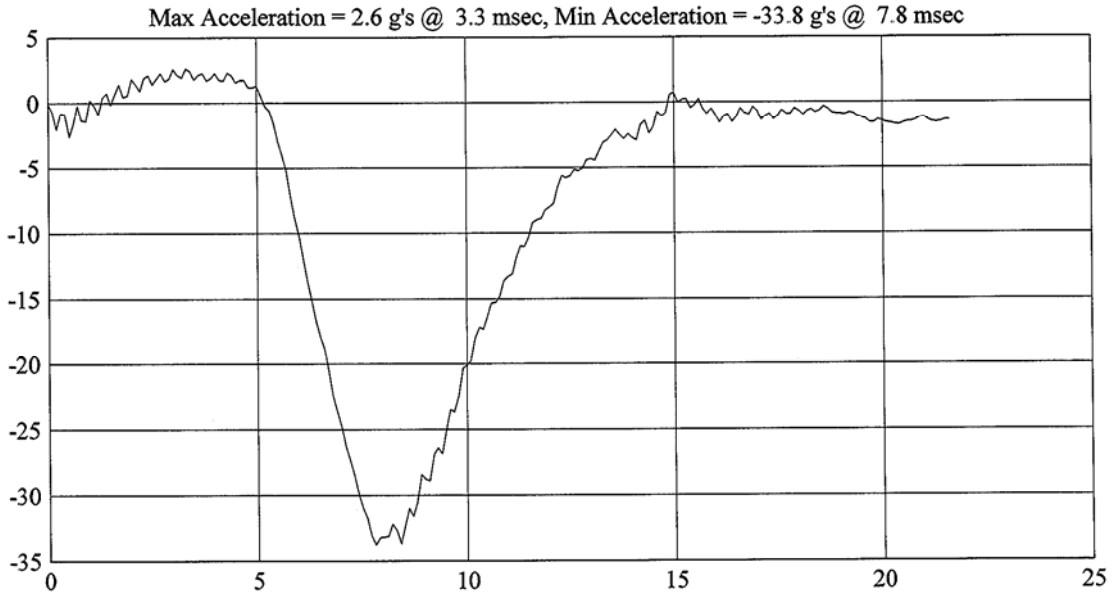
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 156/38

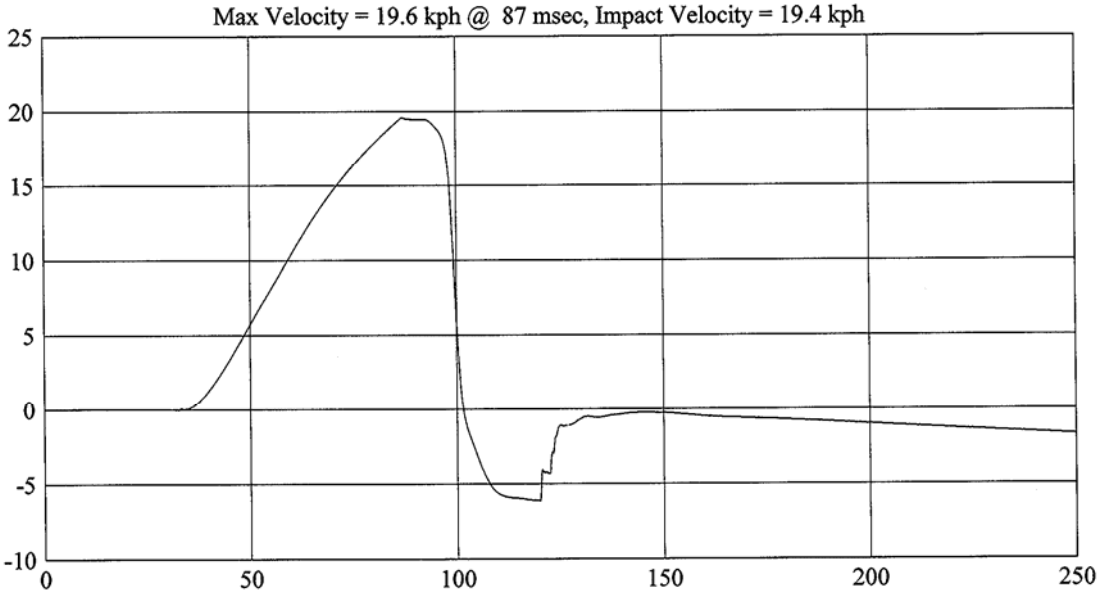
HIC(d) = 749, HIC = 772, Delta T = 3 msec

Max Acceleration = 2.6 g's @ 3.3 msec, Min Acceleration = -33.8 g's @ 7.8 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 19.6 kph @ 87 msec, Impact Velocity = 19.4 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 8
FM6255
Additional Desc: N/A

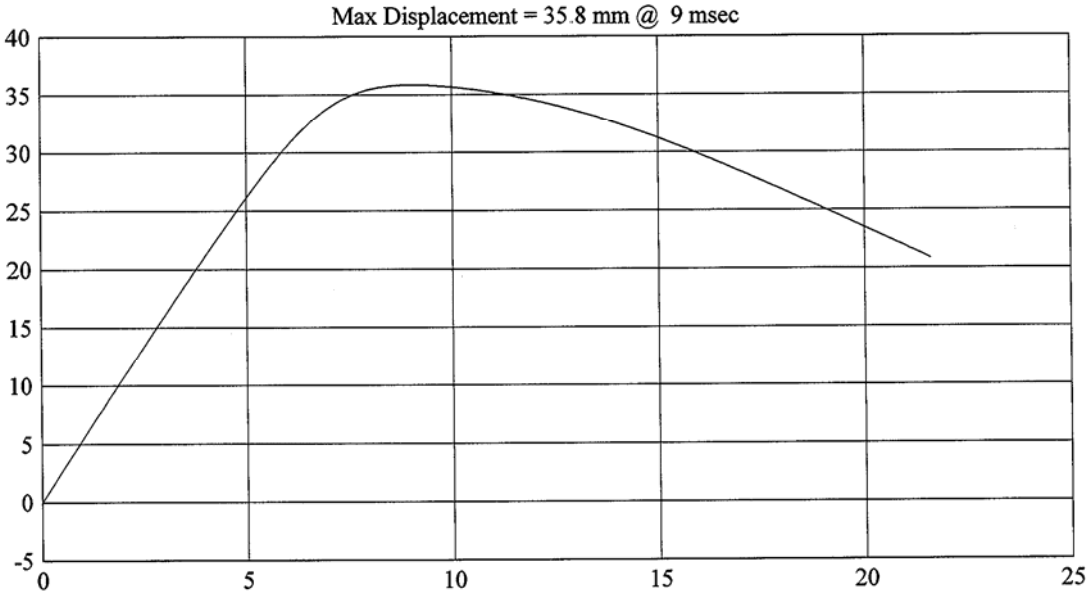
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 156/38

HIC(d) = 749, HIC = 772, Delta T = 3 msec

Max Displacement = 35.8 mm @ 9 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 205 / 38
FM6248
PRE TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 205 / 38
FM6248
POST TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP2
H/V IMPACT ANGLE= 205 / 38
FM6248
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/DOT/NHTSA/Land Rover LR3

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): AP2Left

Temperature:20C

MGA Test Reference No.:FM6248

Humidity:59%

Approach Horizontal Angles:205º

Time of Test:10:41 AM

Approach Vertical Angles:38º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
555	515	3.9	18.8	27	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.29	1.28
Y	6	J35919	94.4	1.79	1.79
Z	7	J22664	94.3	1.30	1.29

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

No visible damage.

Recorded By: _____ Approved By*: _____ Date: 9/13/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

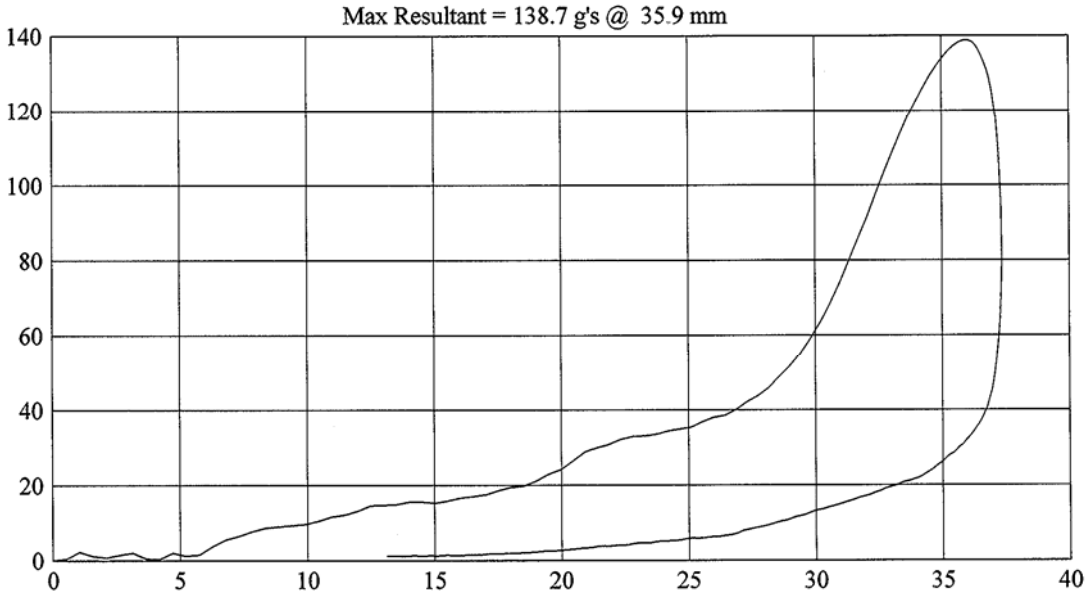
Customer: DOT/NHTSA
Test # 1
FM6248
Additional Desc: N/A

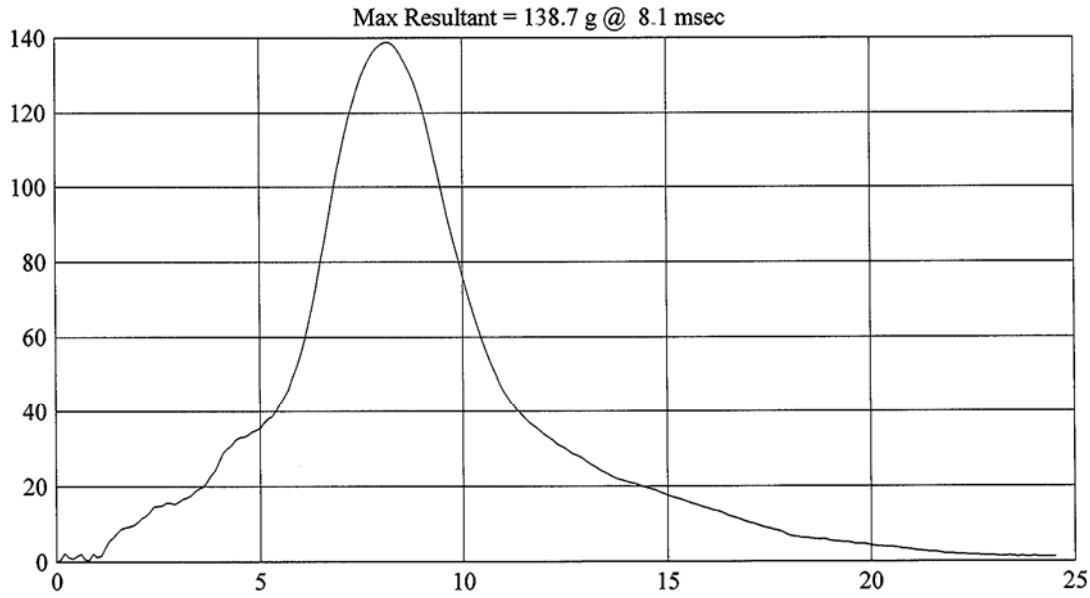
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/38

HIC(d) = 555, HIC = 515, Delta T = 3.9 msec





FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 1
FM6248
Additional Desc: N/A

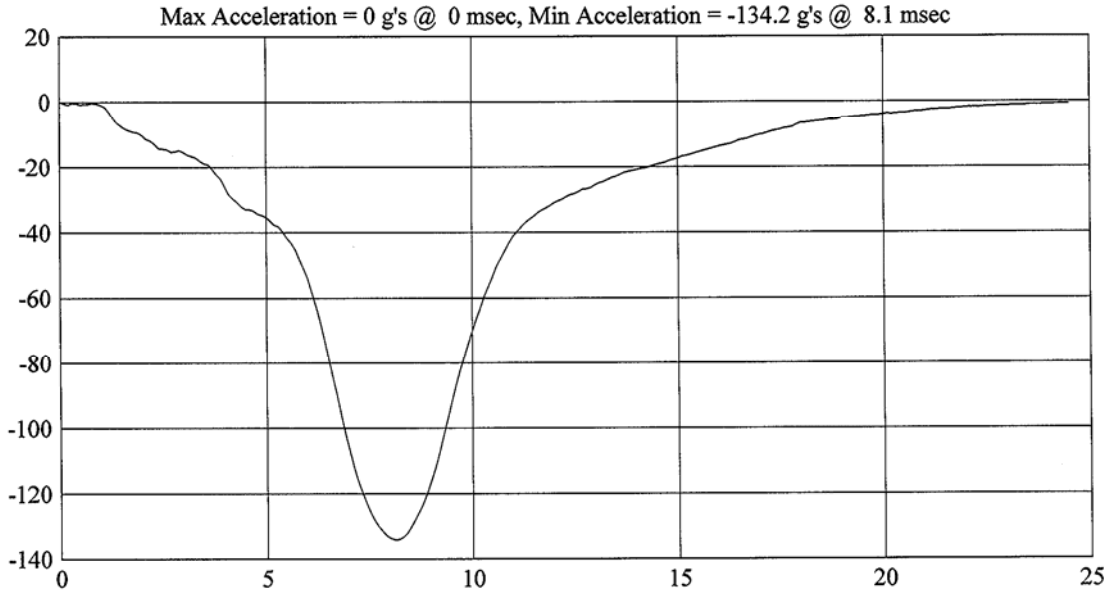
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/38

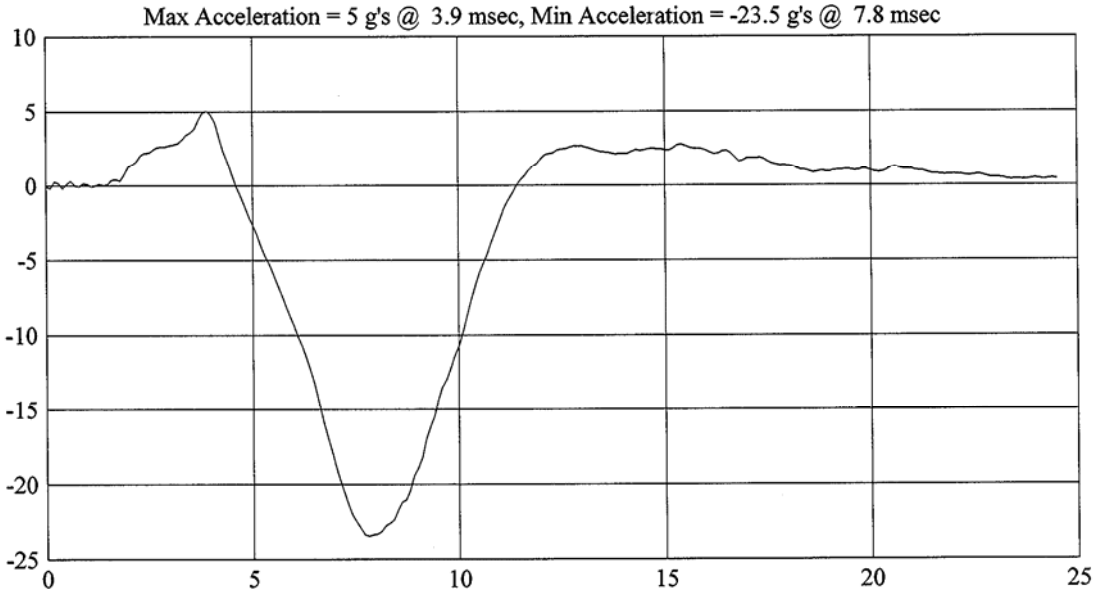
HIC(d) = 555, HIC = 515, Delta T = 3.9 msec

Max Acceleration = 0 g's @ 0 msec, Min Acceleration = -134.2 g's @ 8.1 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 5 g's @ 3.9 msec, Min Acceleration = -23.5 g's @ 7.8 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 1
FM6248
Additional Desc: N/A

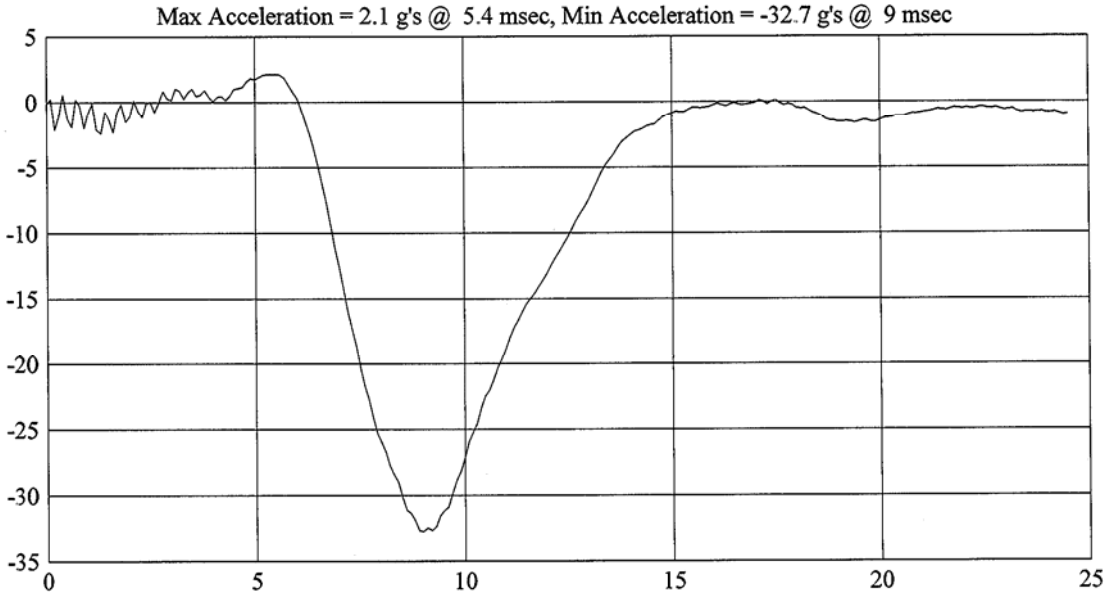
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/38

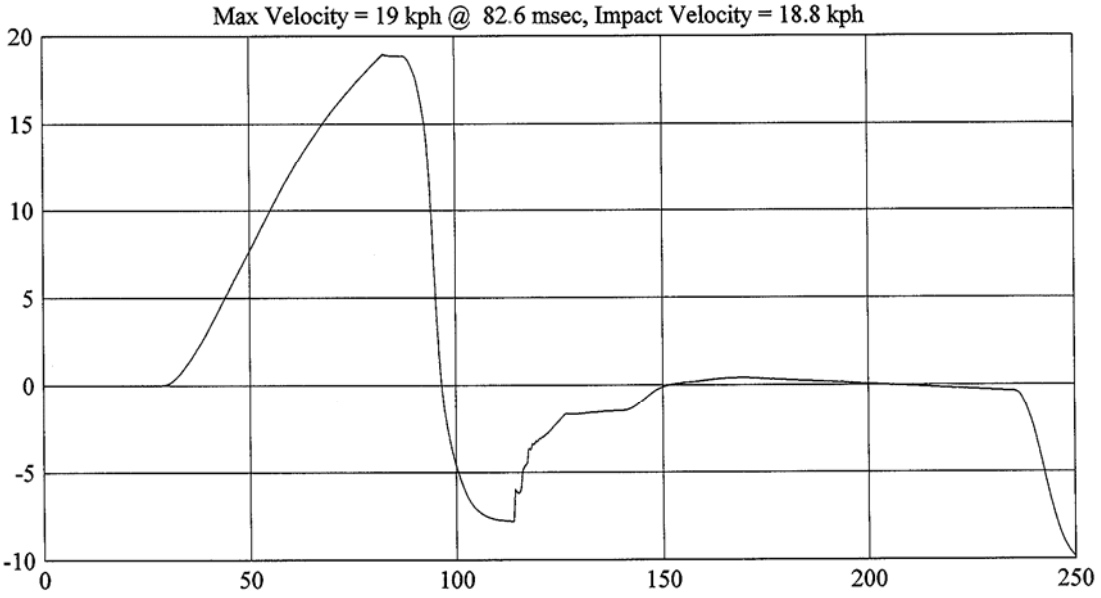
HIC(d) = 555, HIC = 515, Delta T = 3.9 msec

Max Acceleration = 2.1 g's @ 5.4 msec, Min Acceleration = -32.7 g's @ 9 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 19 kph @ 82.6 msec, Impact Velocity = 18.8 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 1
FM6248
Additional Desc: N/A

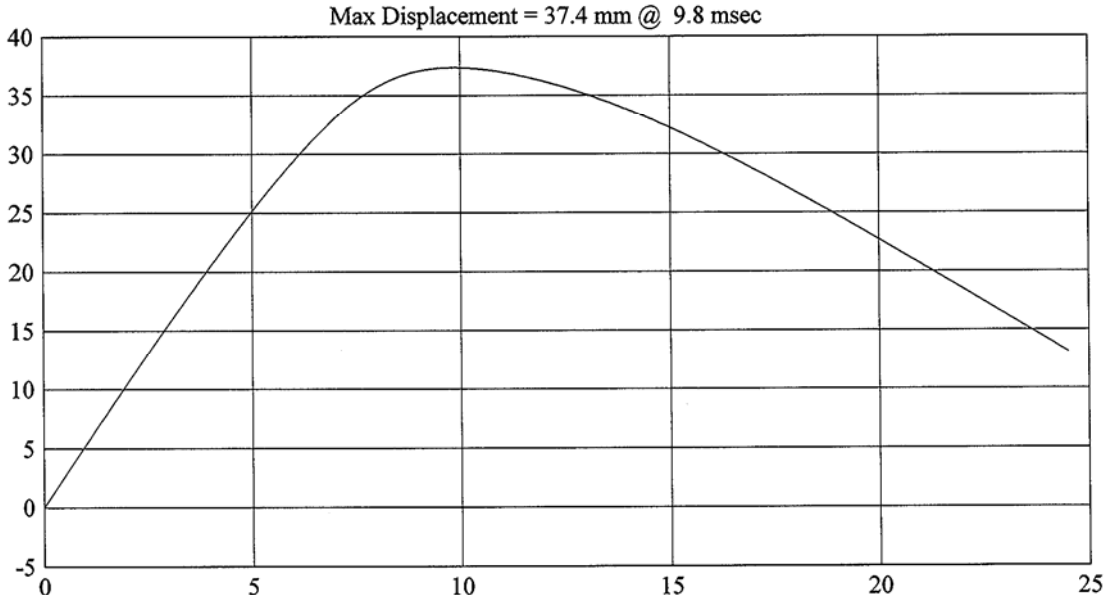
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 205/38

HIC(d) = 555, HIC = 515, Delta T = 3.9 msec

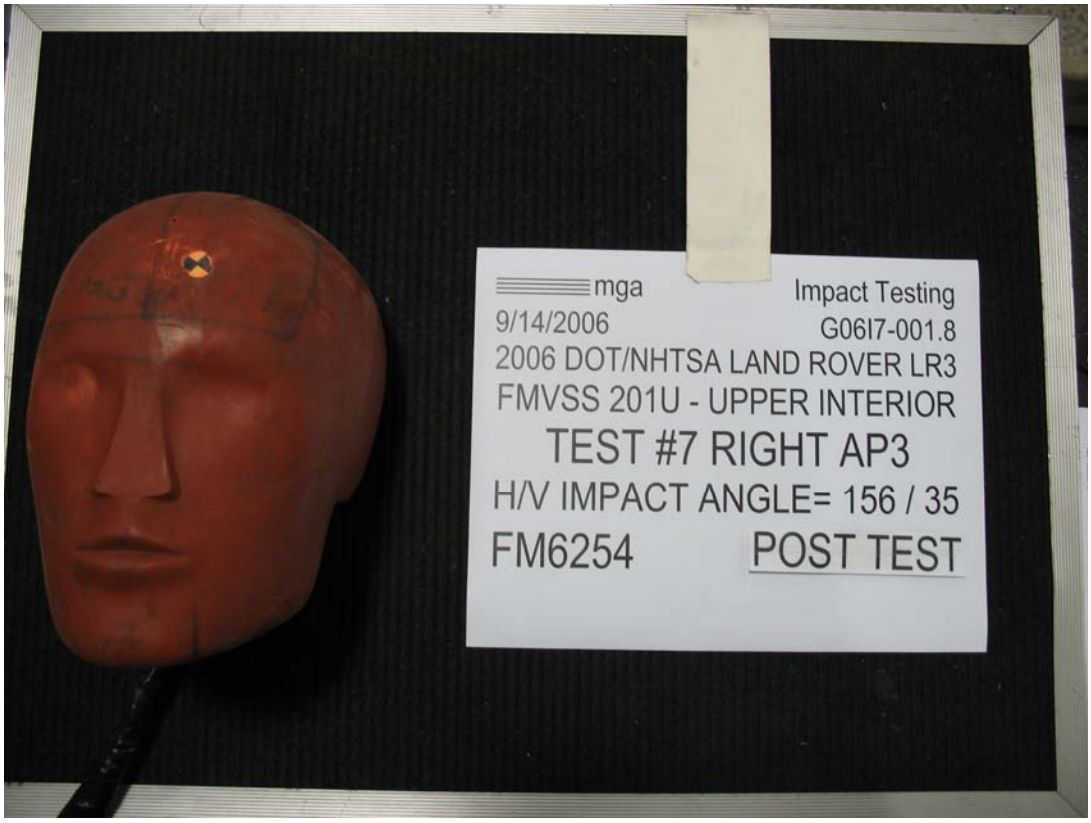
Max Displacement = 37.4 mm @ 9.8 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT AP3
H/V IMPACT ANGLE= 156 / 35
FM6254
PRE TEST


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT AP3
H/V IMPACT ANGLE= 156 / 35
FM6254
POST TEST


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT AP3
H/V IMPACT ANGLE= 156 / 35
FM6254
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/NHTSA/LAND ROVER LR3

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): AP3Right

Temperature:21C

MGA Test Reference No.:FM6254

Humidity:55%

Approach Horizontal Angles:156º

Time of Test: 2:10 PM

Approach Vertical Angles:35º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
778	811	3.3	18.7	25	17 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.29	1.30
Y	6	J35919	94.4	1.79	1.79
Z	7	J22664	94.3	1.31	1.30

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

No visible damage.

Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 9/14/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: NHTSA
Test # 7
FM6254
Additional Desc: N/A

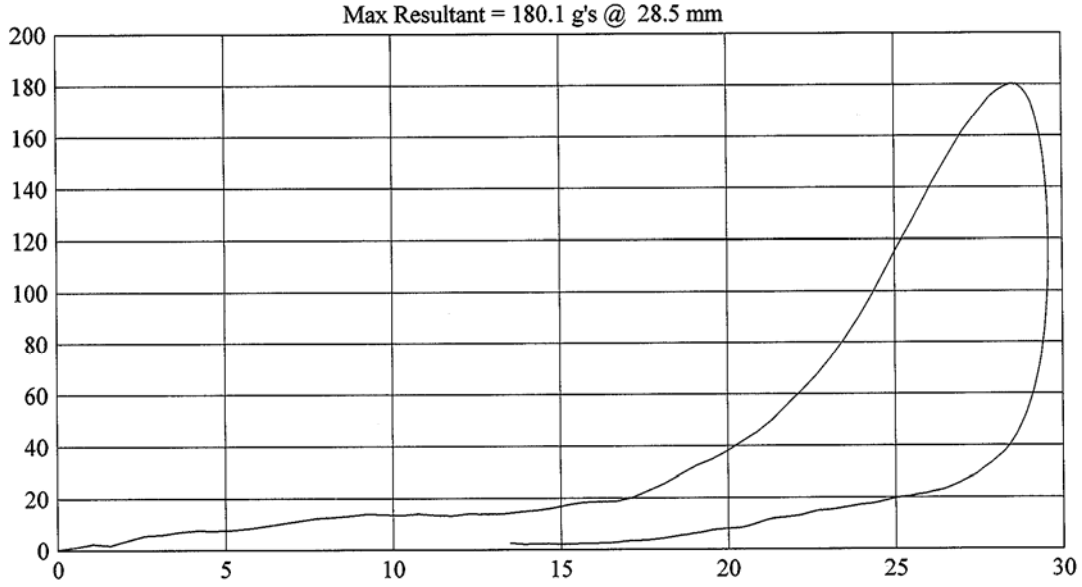
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 156/35

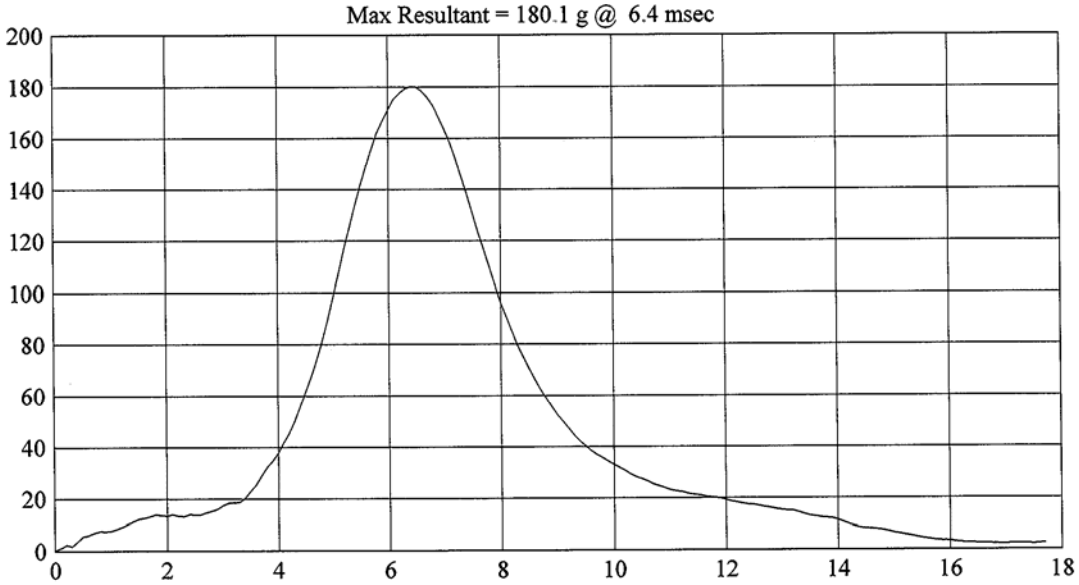
HIC(d) = 778, HIC = 811, Delta T = 3.3 msec

Max Resultant = 180.1 g's @ 28.5 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 180.1 g @ 6.4 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 7
FM6254
Additional Desc: N/A

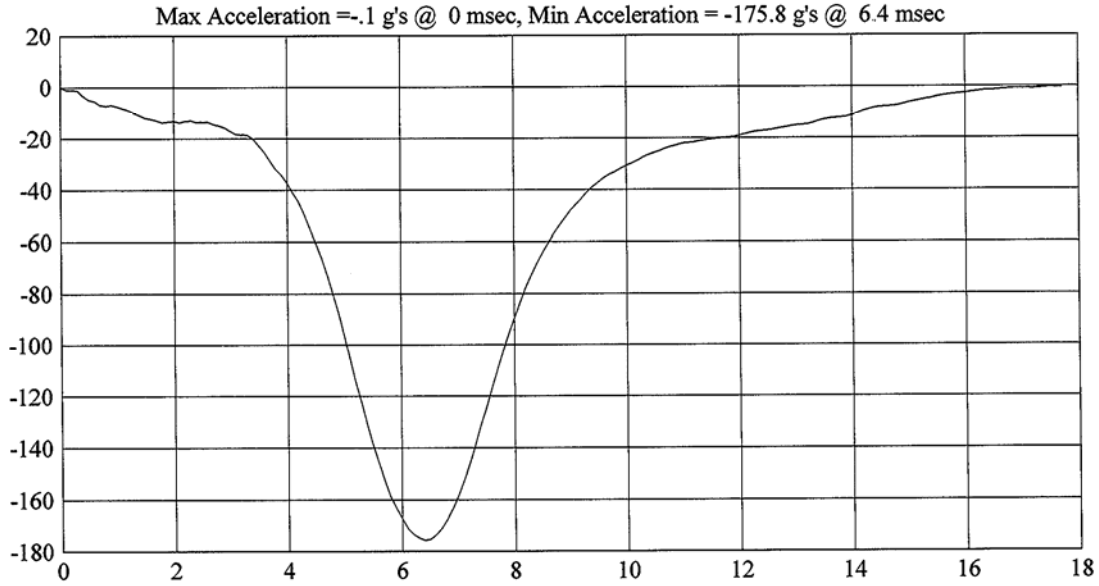
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 156/35

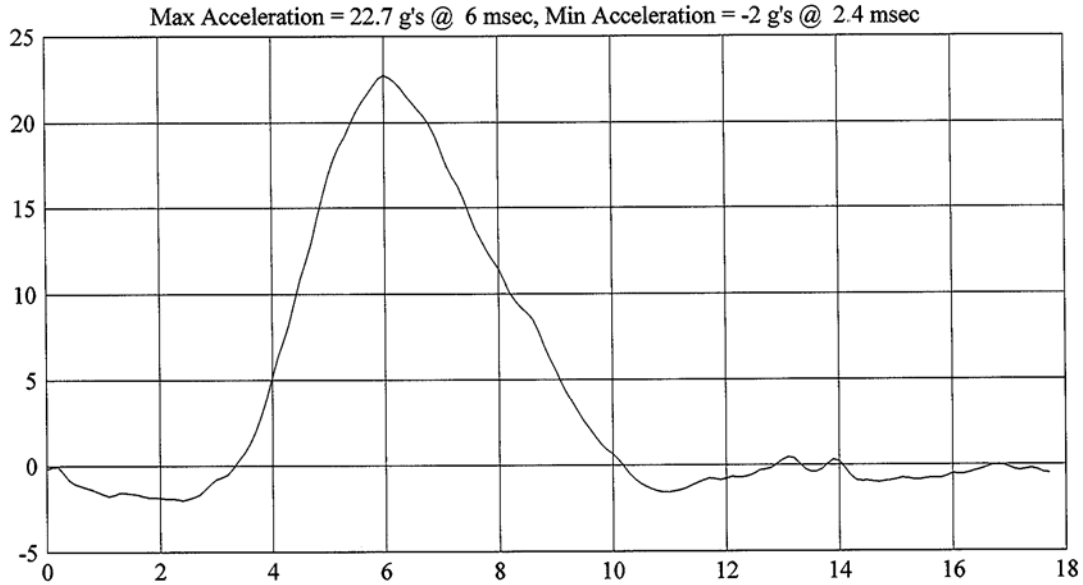
HIC(d) = 778, HIC = 811, Delta T = 3.3 msec

Max Acceleration =-.1 g's @ 0 msec, Min Acceleration = -175.8 g's @ 6.4 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 22.7 g's @ 6 msec, Min Acceleration = -2 g's @ 2.4 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 7
FM6254
Additional Desc: N/A

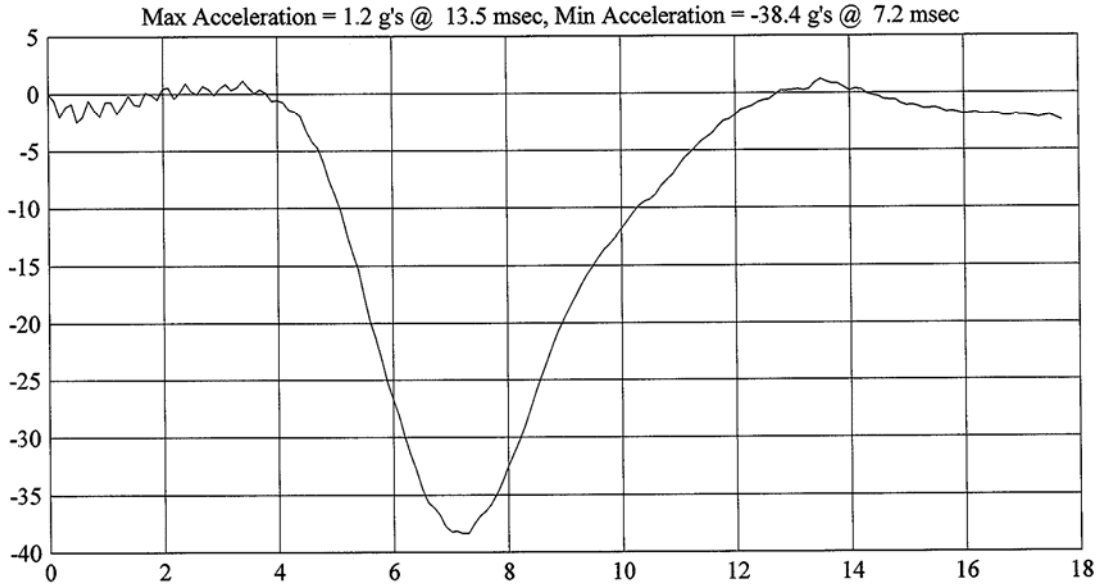
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 156/35

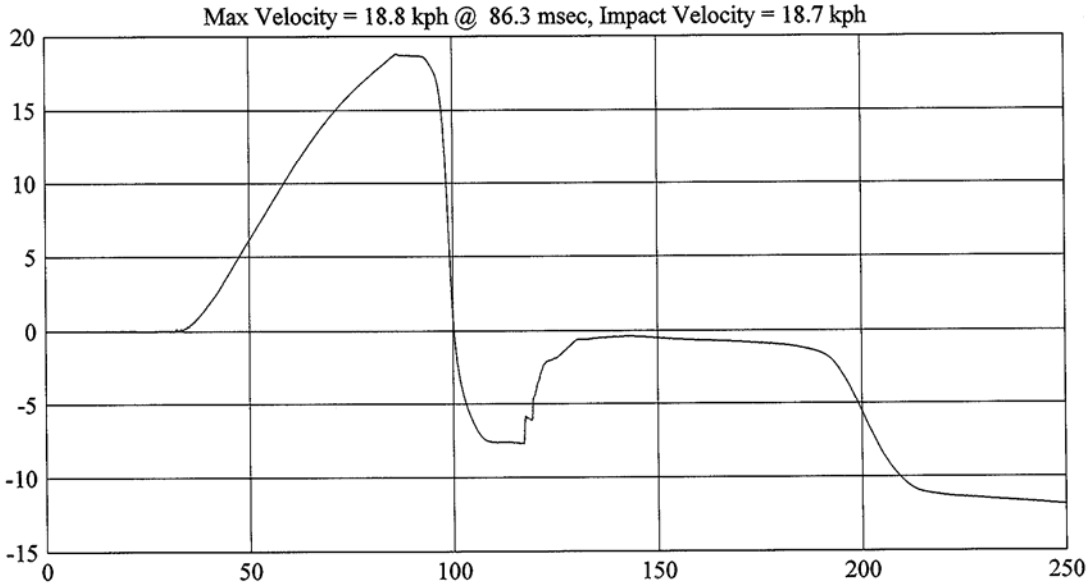
HIC(d) = 778, HIC = 811, Delta T = 3.3 msec

Max Acceleration = 1.2 g's @ 13.5 msec, Min Acceleration = -38.4 g's @ 7.2 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 18.8 kph @ 86.3 msec, Impact Velocity = 18.7 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 7
FM6254
Additional Desc: N/A

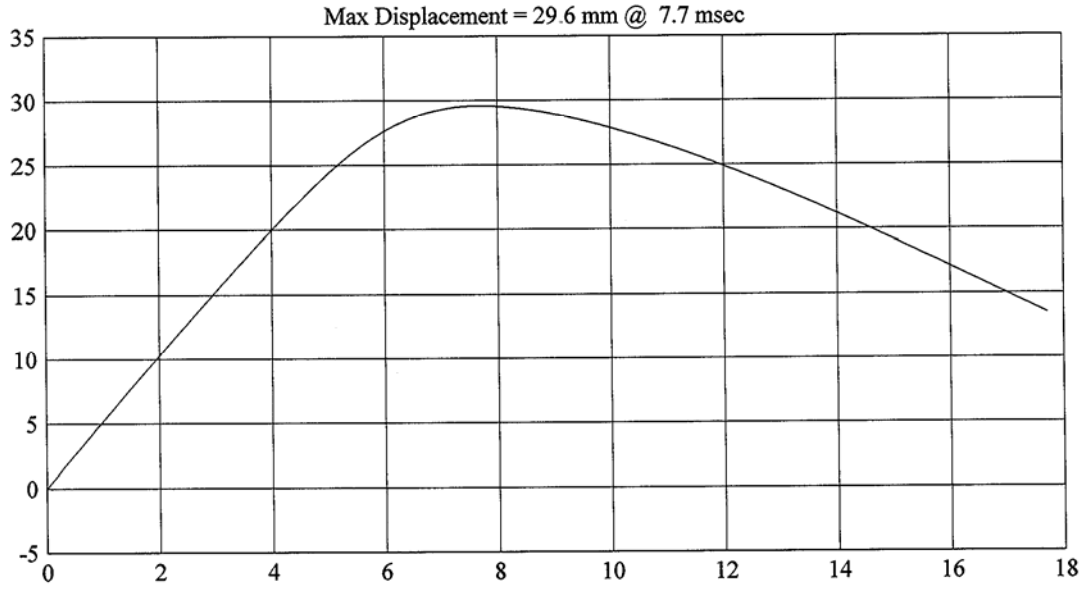
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 156/35

HIC(d) = 778, HIC = 811, Delta T = 3.3 msec

Max Displacement = 29.6 mm @ 7.7 msec



Displacement (mm) vs. Time (msec)


mga
9/15/2006
Impact Testing
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT BP1
H/V IMPACT ANGLE= 90 / 23
FM6258
PRE TEST


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT BP1
H/V IMPACT ANGLE= 90 / 23
FM6258
POST TEST
BRAKE STOPS


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT BP1
H/V IMPACT ANGLE= 90 / 23
FM6258
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/NHTSA/LAND ROVER LR3

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): BP1Right

Temperature:21C

MGA Test Reference No.:FM6258

Humidity:55%

Approach Horizontal Angles:90º

Time of Test:9:40 AM

Approach Vertical Angles:23º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
490	428	6.3	18.7	39	3 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.29	1.29
Y	6	J36193	102.7	1.80	1.79
Z	7	J36353	97.2	1.31	1.31

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

No visible damage.

Recorded By: [signature] Approved By*: [signature] Date: 9/15/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: NHTSA
Test # 11
FM6258
Additional Desc: N/A

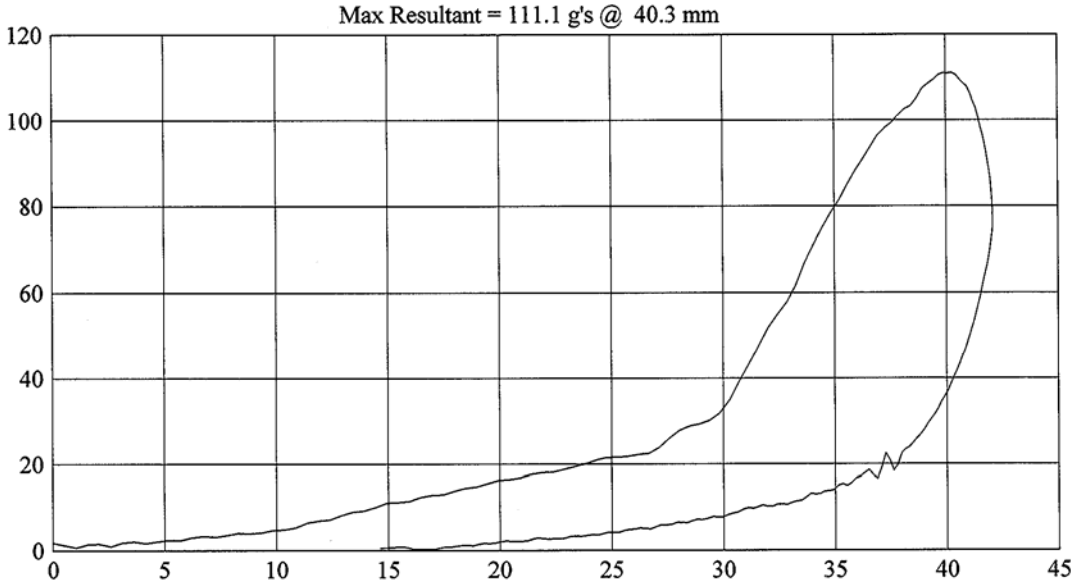
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/23

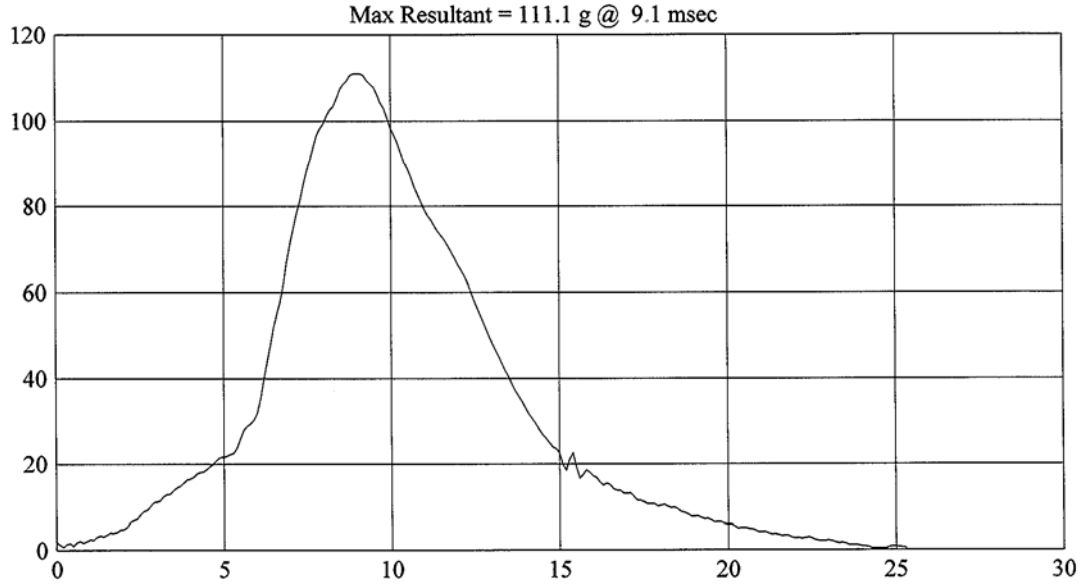
HIC(d) = 490, HIC = 428, Delta T = 6.3 msec

Max Resultant = 111.1 g's @ 40.3 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 111.1 g @ 9.1 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 11
FM6258
Additional Desc: N/A

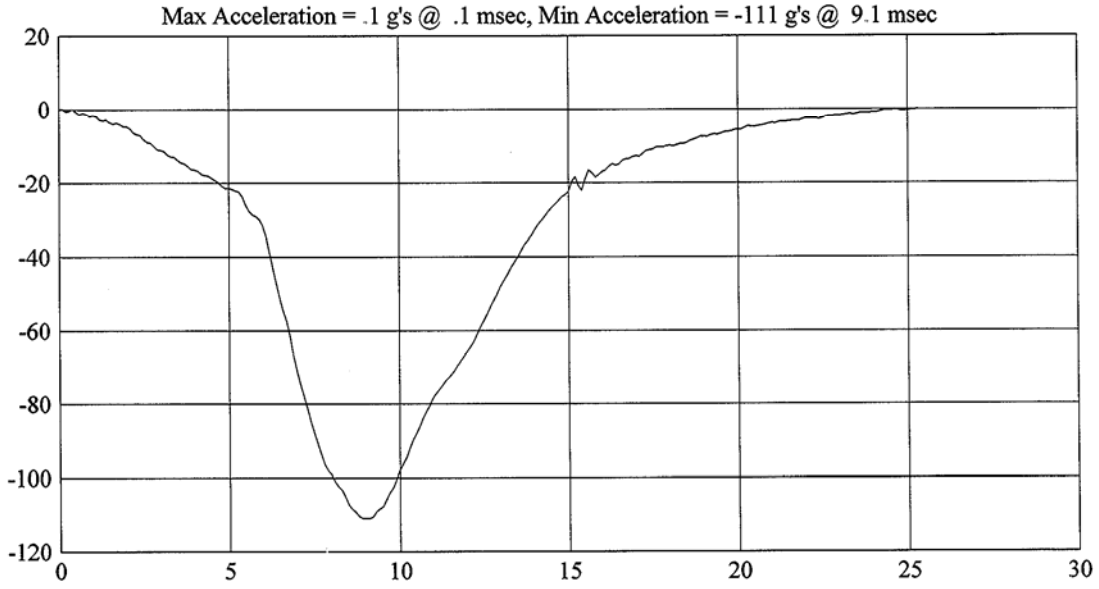
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/23

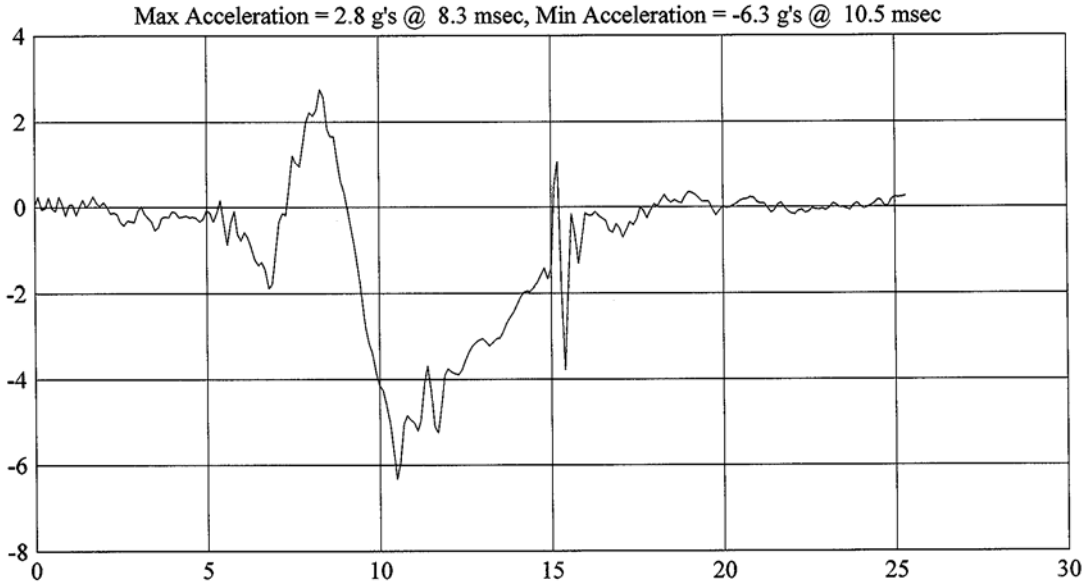
HIC(d) = 490, HIC = 428, Delta T = 6.3 msec

Max Acceleration = .1 g's @ .1 msec, Min Acceleration = -111 g's @ 9.1 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 2.8 g's @ 8.3 msec, Min Acceleration = -6.3 g's @ 10.5 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 11
FM6258
Additional Desc: N/A

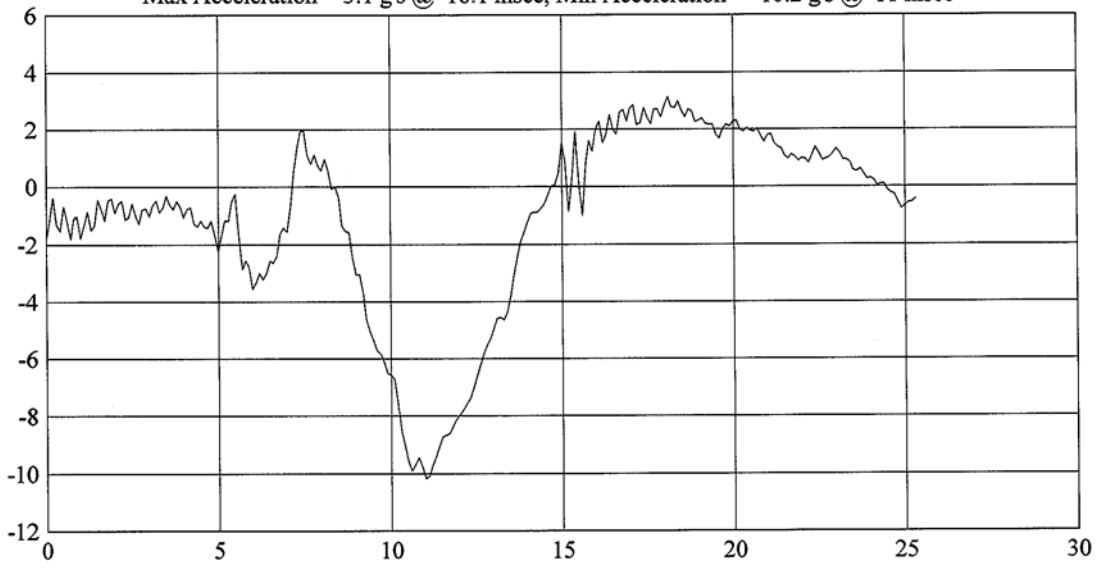
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/23

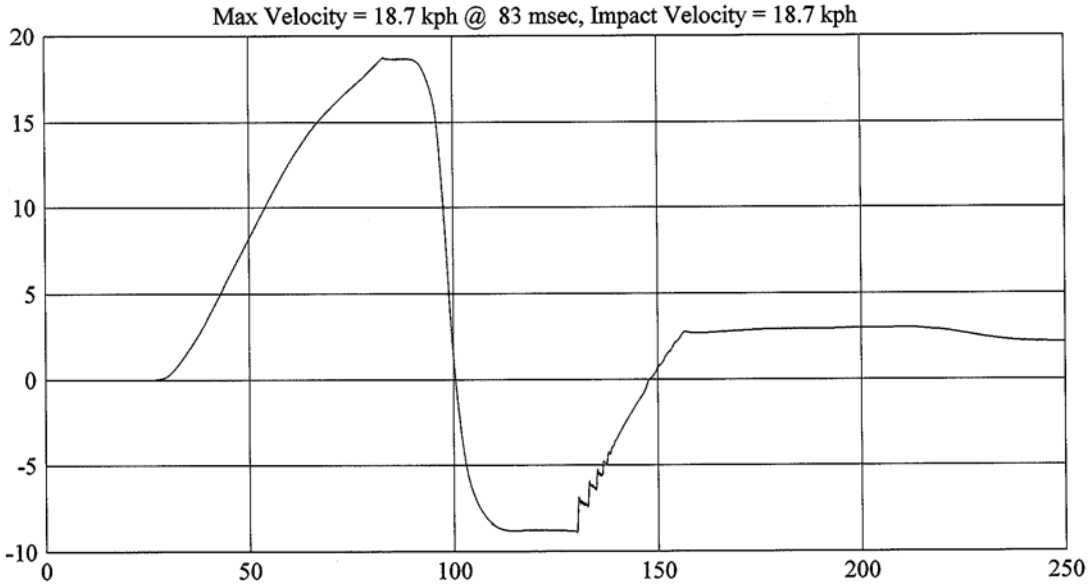
HIC(d) = 490, HIC = 428, Delta T = 6.3 msec

Max Acceleration = 3.1 g's @ 18.1 msec, Min Acceleration = -10.2 g's @ 11 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 18.7 kph @ 83 msec, Impact Velocity = 18.7 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 11
FM6258
Additional Desc: N/A

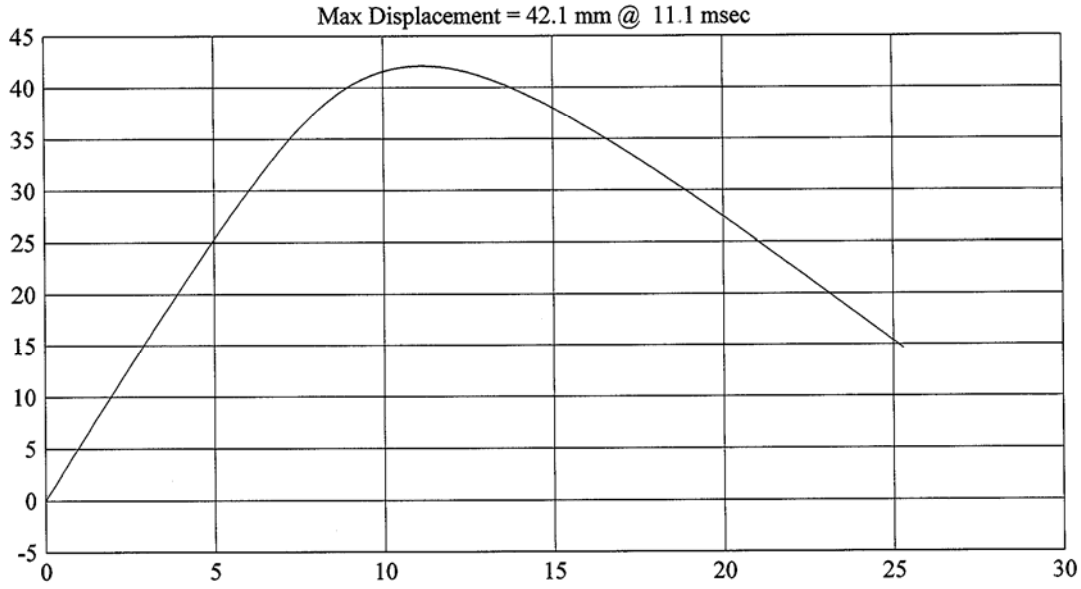
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/23

HIC(d) = 490, HIC = 428, Delta T = 6.3 msec

Max Displacement = 42.1 mm @ 11.1 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT BP2
H/V IMPACT ANGLE= 270 / -4
FM6251
PRE TEST
C60600


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT BP2
H/V IMPACT ANGLE= 270 / -4
FM6251
POST TEST
C60600
FM6251
LEFT BP2


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT BP2
H/V IMPACT ANGLE= 270 / -4
FM6251
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/DOT/NHTSA/Land Rover LR3

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): BP2Left

Temperature:21C

MGA Test Reference No.:FM6251

Humidity:63%

Approach Horizontal Angles:270º

Time of Test:2:20 PM

Approach Vertical Angles:-4º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
542	498	7.1	24.0	25	4 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.29	1.29
Y	6	J35919	94.4	1.79	1.79
Z	7	J22664	94.3	1.31	1.30

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

Cracked and dented the seat belt anchorage.

Recorded By: _____ Approved By*: _____ Date: 9/13/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 4
FM6251
Additional Desc: N/A

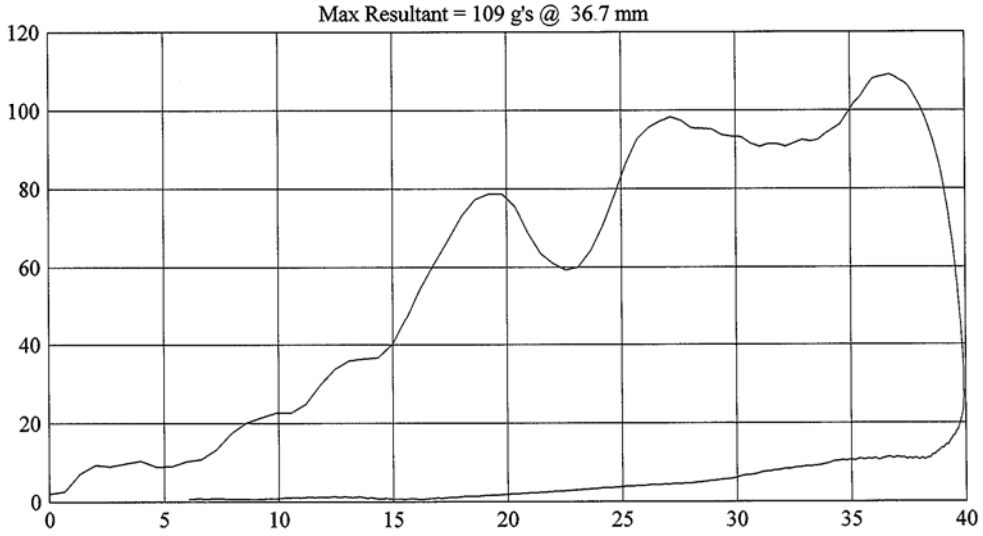
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/-4

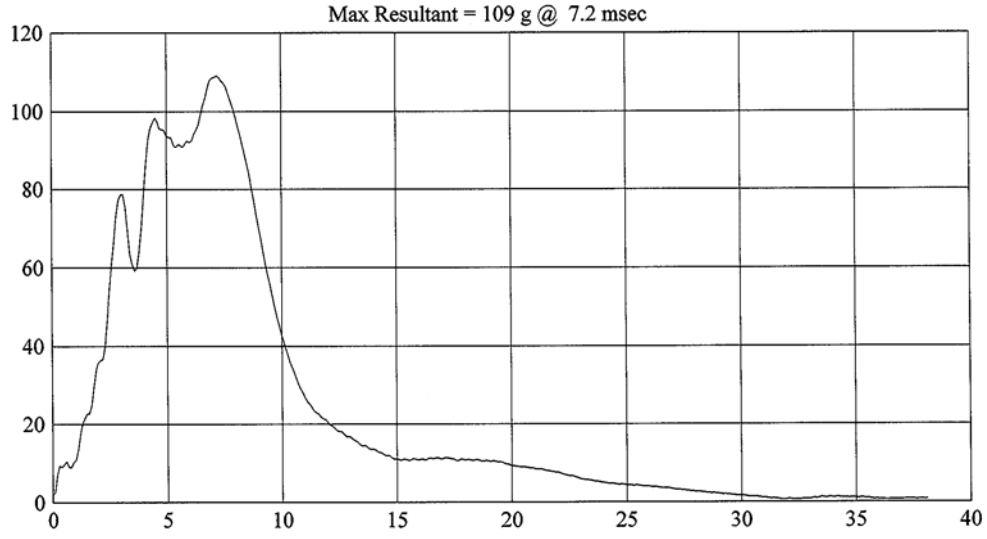
HIC(d) = 542, HIC = 498, Delta T = 7.1 msec

Max Resultant = 109 g's @ 36.7 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 109 g @ 7.2 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 4
FM6251
Additional Desc: N/A

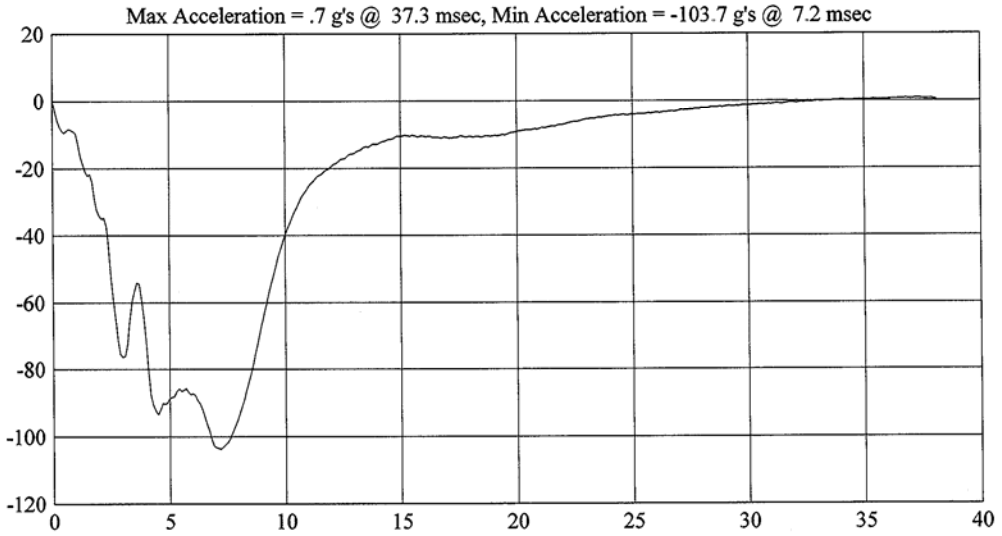
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/-4

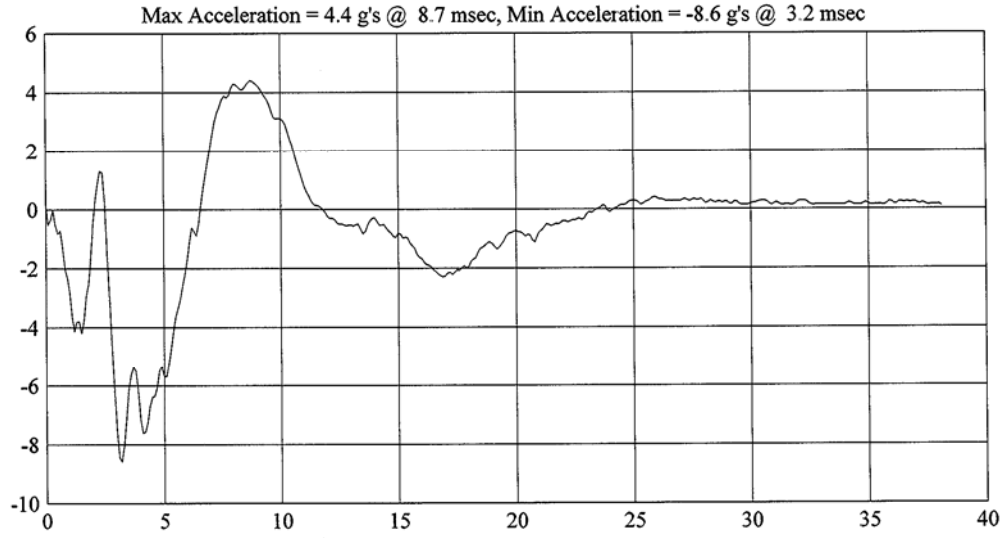
HIC(d) = 542, HIC = 498, Delta T = 7.1 msec

Max Acceleration = .7 g's @ 37.3 msec, Min Acceleration = -103.7 g's @ 7.2 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 4.4 g's @ 8.7 msec, Min Acceleration = -8.6 g's @ 3.2 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 4
FM6251
Additional Desc: N/A

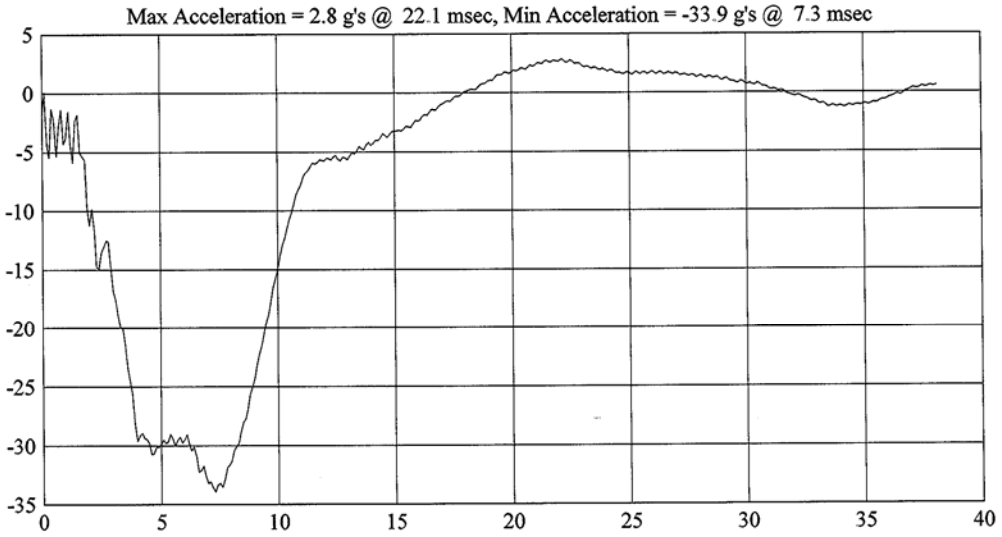
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/-4

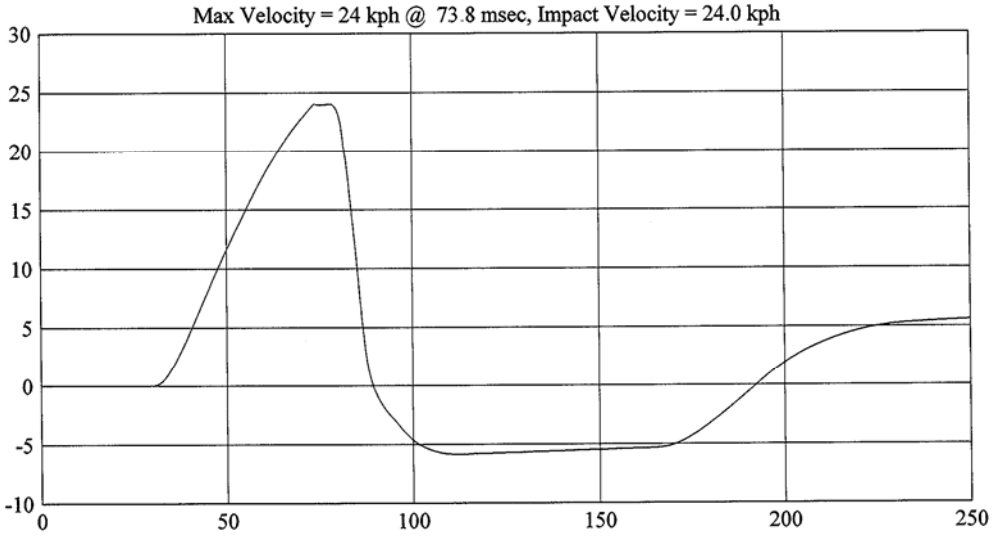
HIC(d) = 542, HIC = 498, Delta T = 7.1 msec

Max Acceleration = 2.8 g's @ 22.1 msec, Min Acceleration = -33.9 g's @ 7.3 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 24 kph @ 73.8 msec, Impact Velocity = 24.0 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 4
FM6251
Additional Desc: N/A

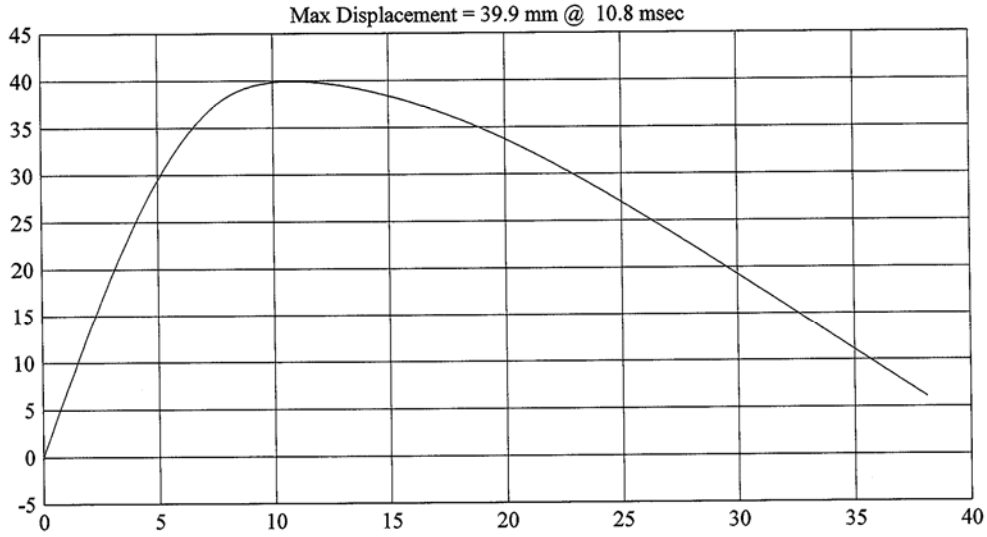
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/-4

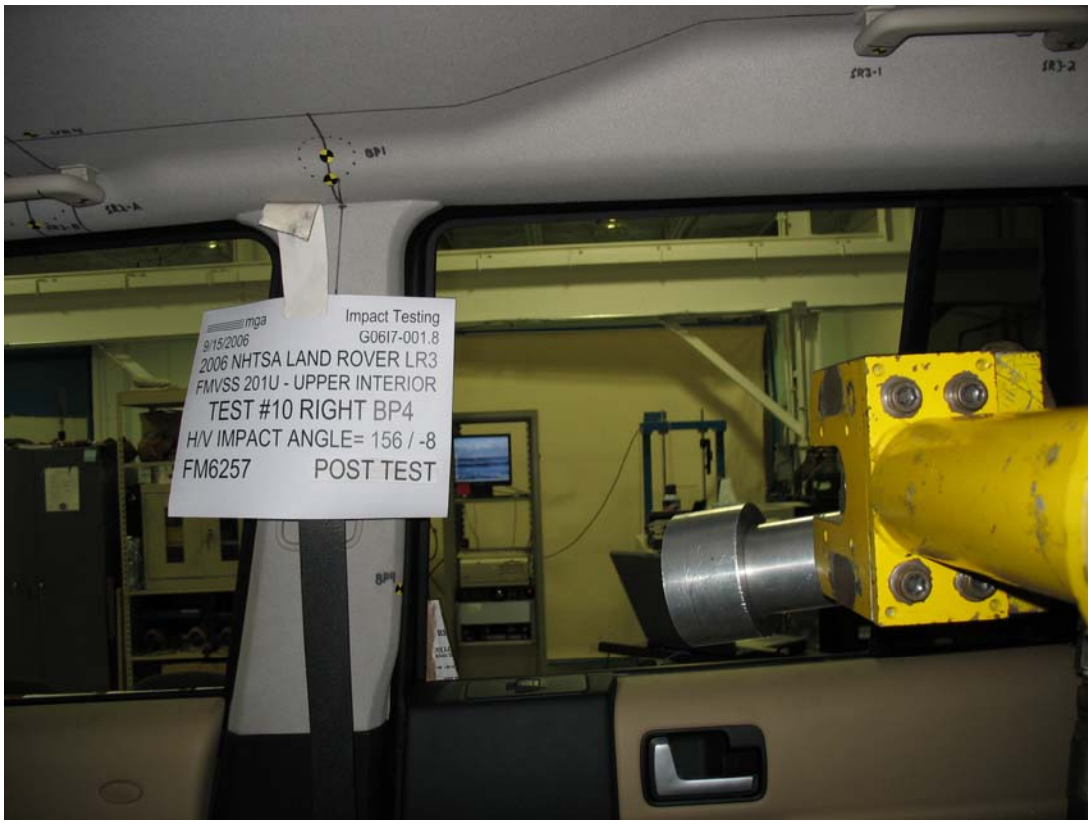
HIC(d) = 542, HIC = 498, Delta T = 7.1 msec

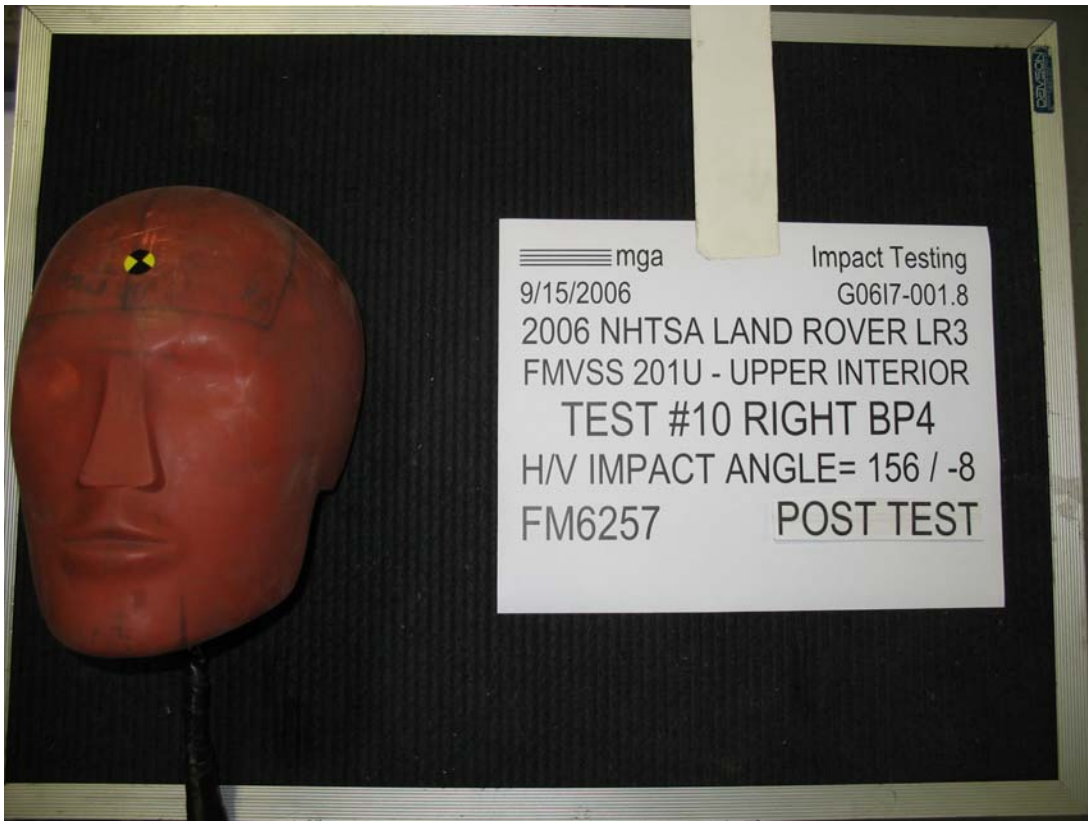
Max Displacement = 39.9 mm @ 10.8 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
G06I7-001.8
9/15/2006
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 156 / -8
FM6257
PRE TEST


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 156 / -8
FM6257
POST TEST


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 156 / -8
FM6257
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/NHTSA/LAND ROVER LR3

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): BP4Right

Temperature:21C

MGA Test Reference No.:FM6257

Humidity:55%

Approach Horizontal Angles:156º

Time of Test:8:53 AM

Approach Vertical Angles:-8º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
475	409	8.5	23.8	22	3 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.29	1.29
Y	6	J35919	94.4	1.79	1.79
Z	7	J22664	94.3	1.31	1.31

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

No visible damage.

Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 9/15/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: NHTSA
Test # 10
FM6257
Additional Desc: N/A

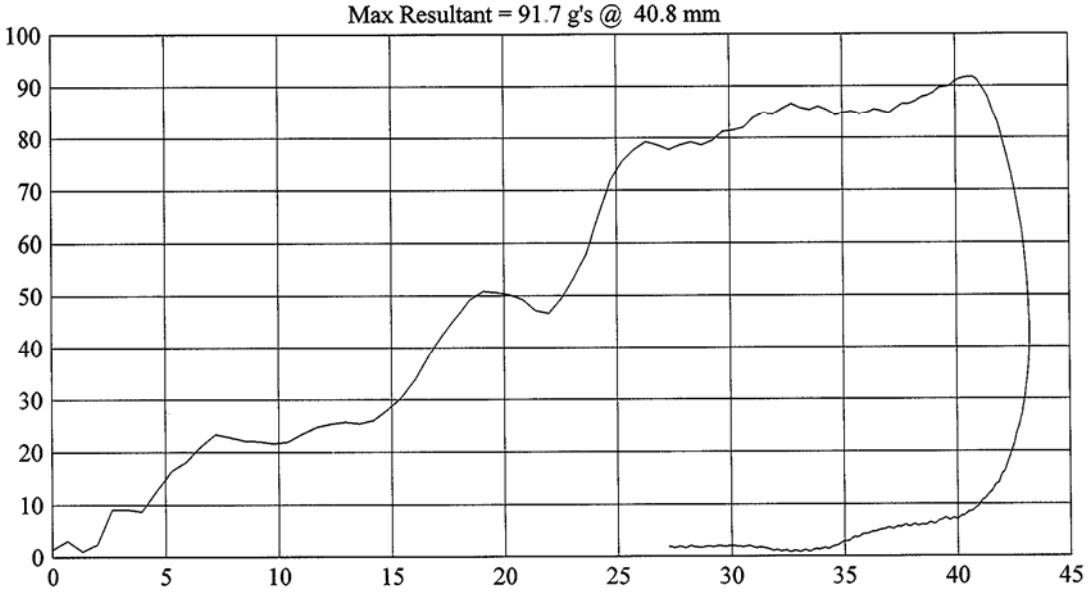
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 156/-8

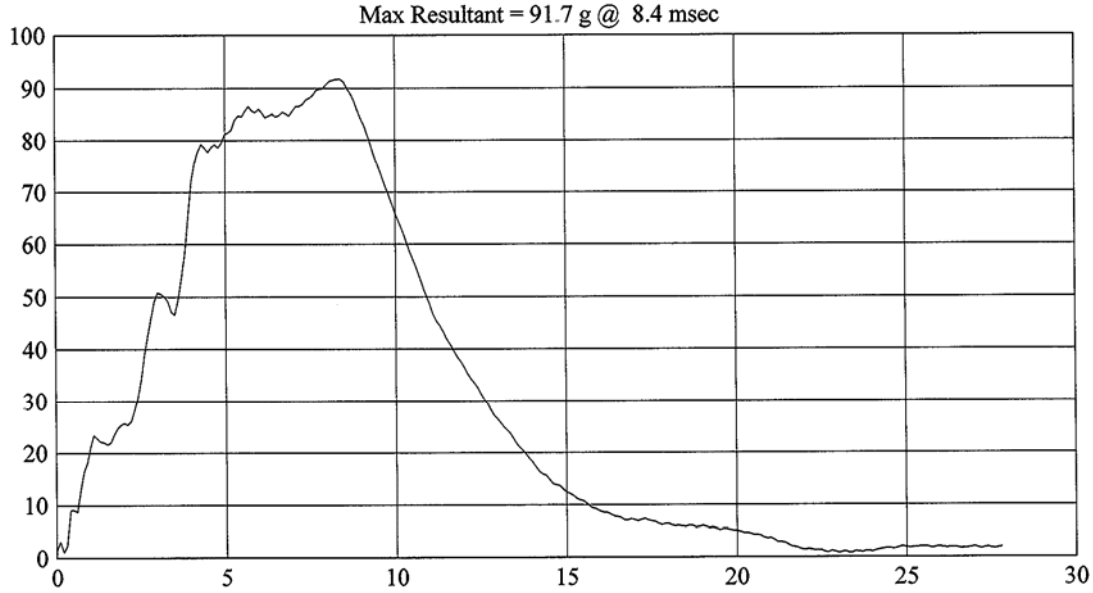
HIC(d) = 475, HIC = 409, Delta T = 8.5 msec

Max Resultant = 91.7 g's @ 40.8 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 91.7 g @ 8.4 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 10
FM6257
Additional Desc: N/A

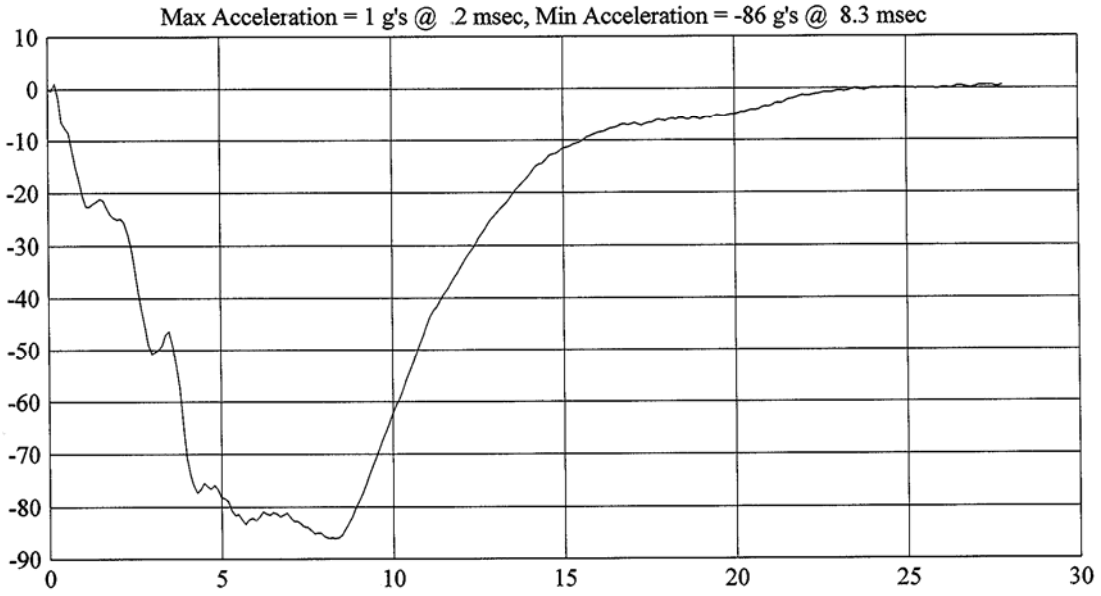
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 156/-8

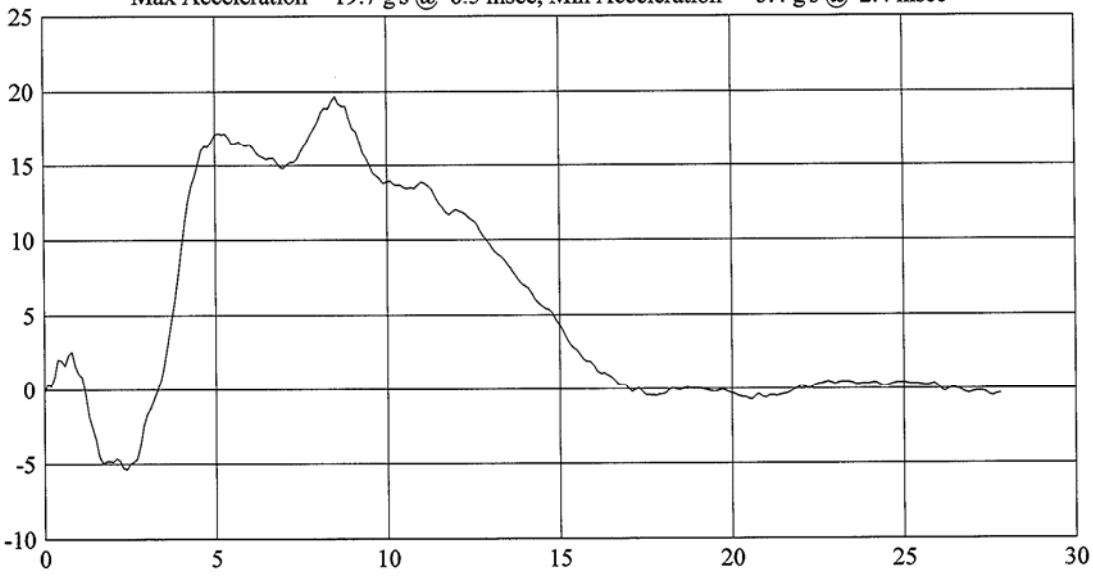
HIC(d) = 475, HIC = 409, Delta T = 8.5 msec

Max Acceleration = 1 g's @ .2 msec, Min Acceleration = -86 g's @ 8.3 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 19.7 g's @ 8.5 msec, Min Acceleration = -5.4 g's @ 2.4 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 10
FM6257
Additional Desc: N/A

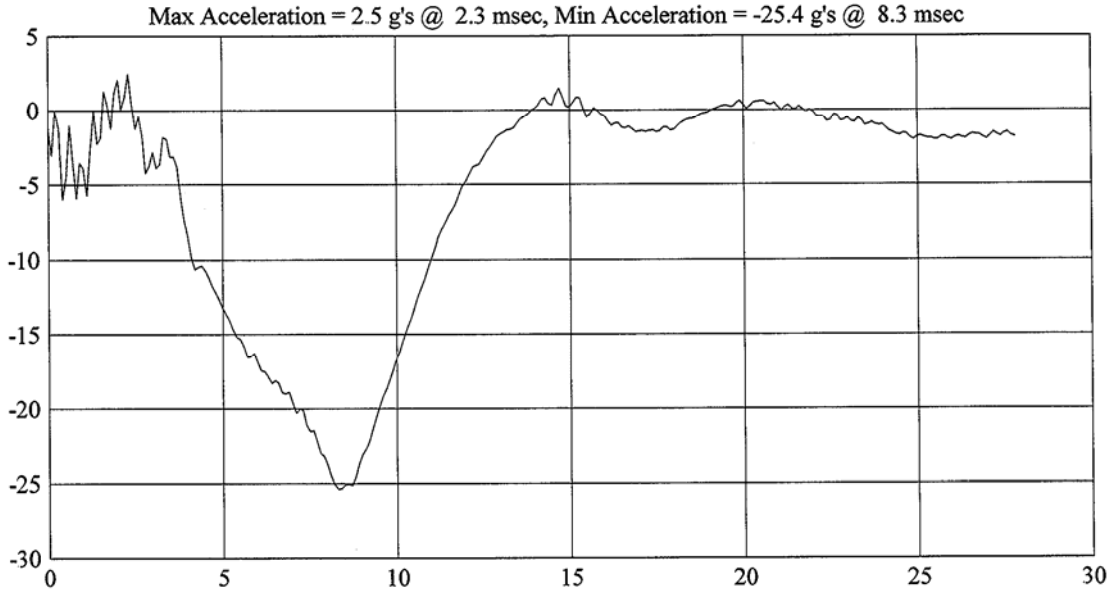
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 156/-8

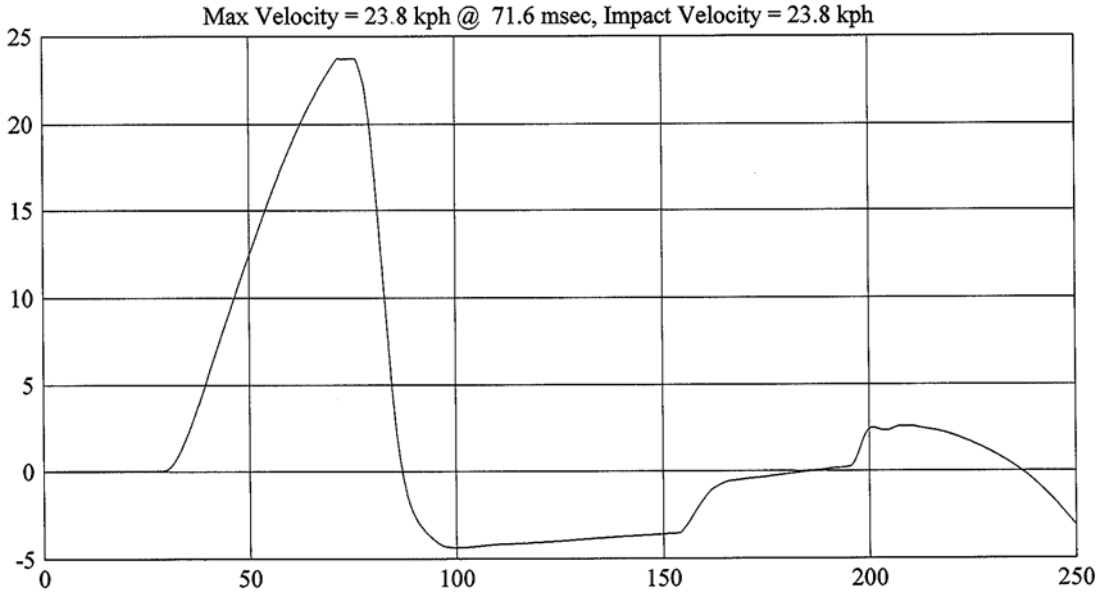
HIC(d) = 475, HIC = 409, Delta T = 8.5 msec

Max Acceleration = 2.5 g's @ 2.3 msec, Min Acceleration = -25.4 g's @ 8.3 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 23.8 kph @ 71.6 msec, Impact Velocity = 23.8 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 10
FM6257
Additional Desc: N/A

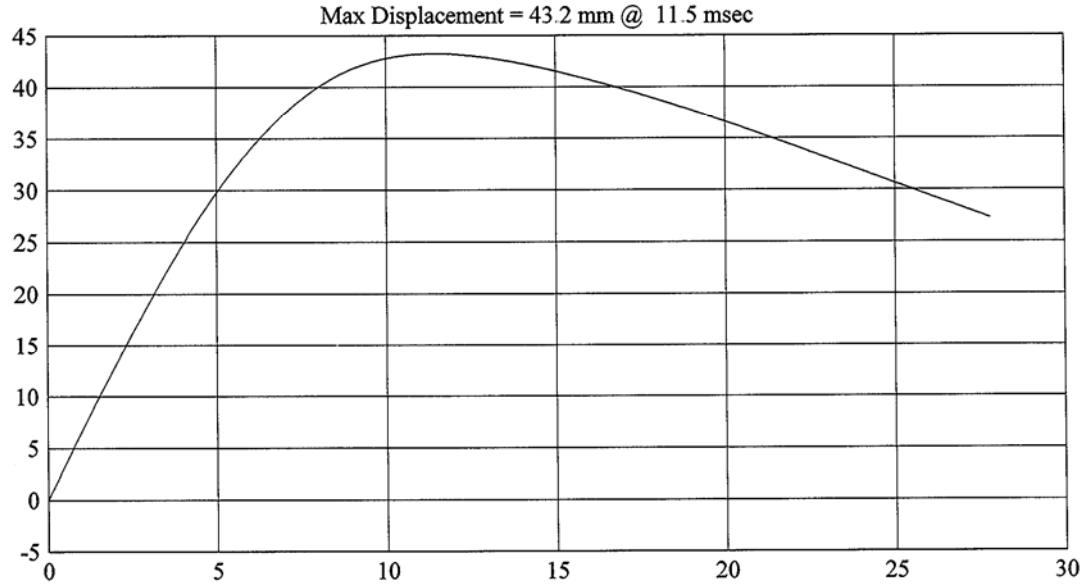
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: BP4
Vehicle Side: Right
Horz/Vert Angle: 156/-8

HIC(d) = 475, HIC = 409, Delta T = 8.5 msec

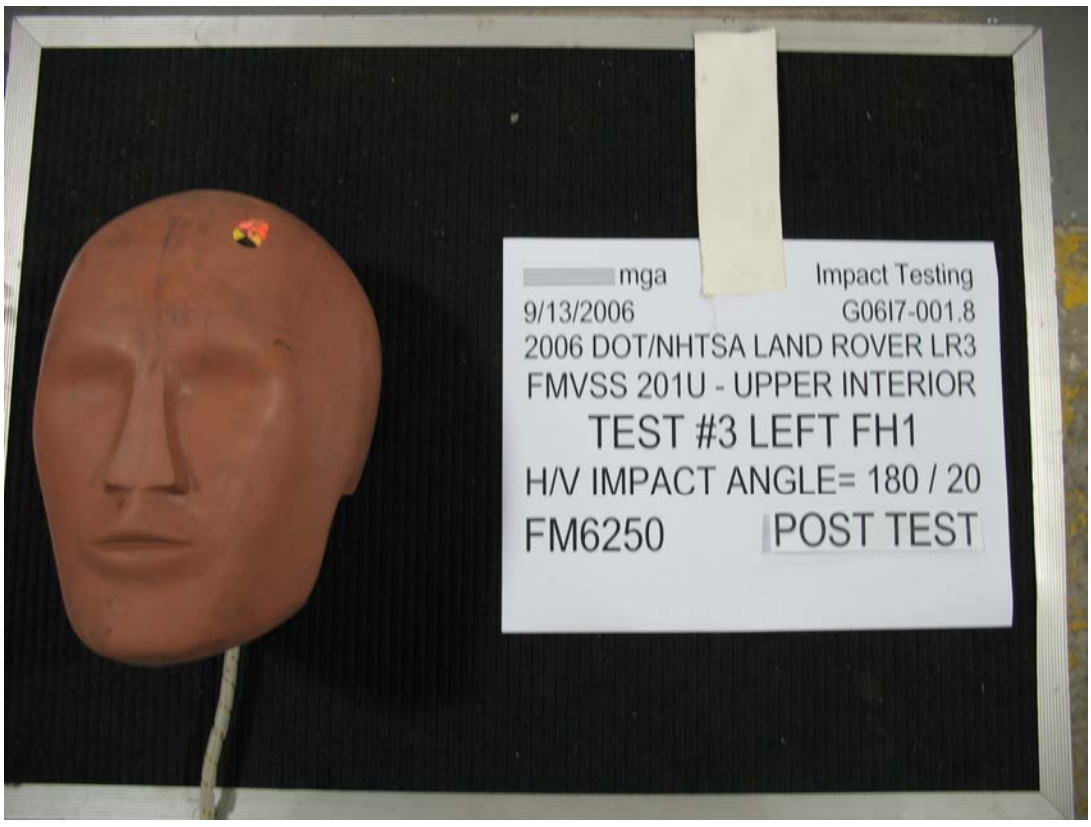
Max Displacement = 43.2 mm @ 11.5 msec



Displacement (mm) vs. Time (msec)


mga
9/13/2006
Impact Testing
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH1
H/V IMPACT ANGLE= 180 / 20
FM6250
PRE TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH1
H/V IMPACT ANGLE= 180 / 20
FM6250
POST TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH1
H/V IMPACT ANGLE= 180 / 20
FM6250
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/DOT/NHTSA/Land Rover LR3

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): FH1Left

Temperature:21C

MGA Test Reference No.:FM6250

Humidity:63%

Approach Horizontal Angles:180º

Time of Test:11:55 AM

Approach Vertical Angles:20º

FMH Serial No:[039]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
432	352	4.6	23.6	44	33 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J13753	-103.6	1.29	1.29
Y	6	J22700	94.4	1.79	1.79
Z	7	J32734	95.5	1.31	1.31

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

No visible damage.

Recorded By: ____________ Approved By*: ____________ Date: 9/13/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 3
FM6250
Additional Desc: N/A

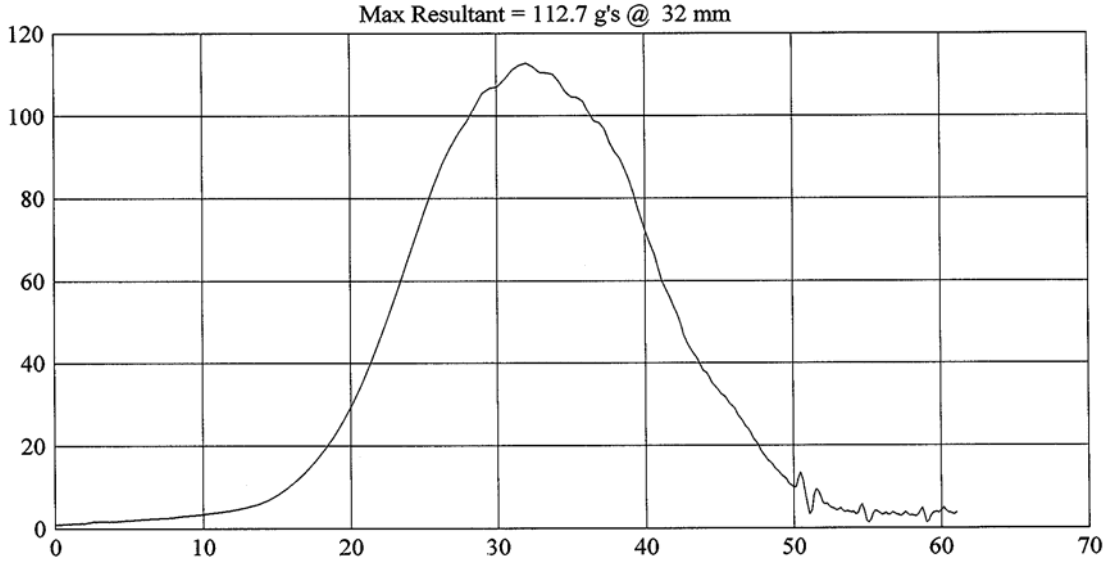
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: FH1
Vehicle Side: Left
Horz/Vert Angle: 180/20

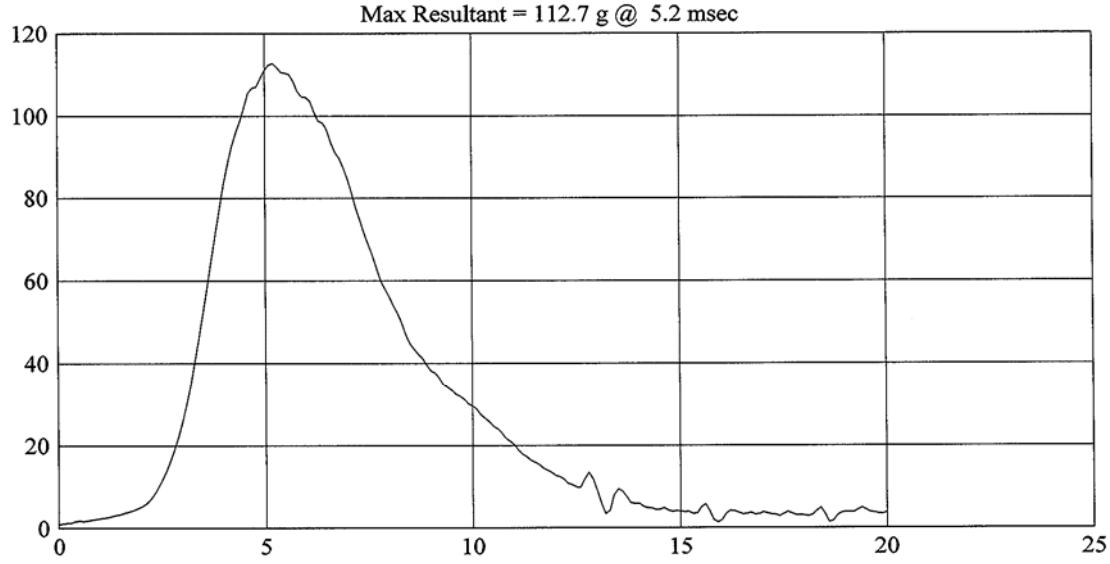
HIC(d) = 432, HIC = 352, Delta T = 4.6 msec

Max Resultant = 112.7 g's @ 32 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 112.7 g @ 5.2 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 3
FM6250
Additional Desc: N/A

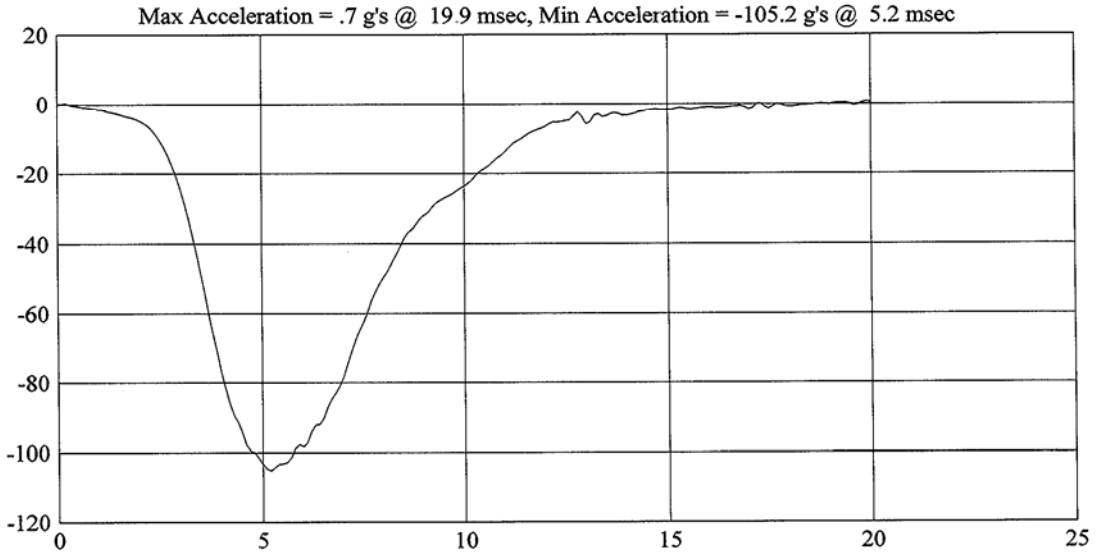
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: FH1
Vehicle Side: Left
Horz/Vert Angle: 180/20

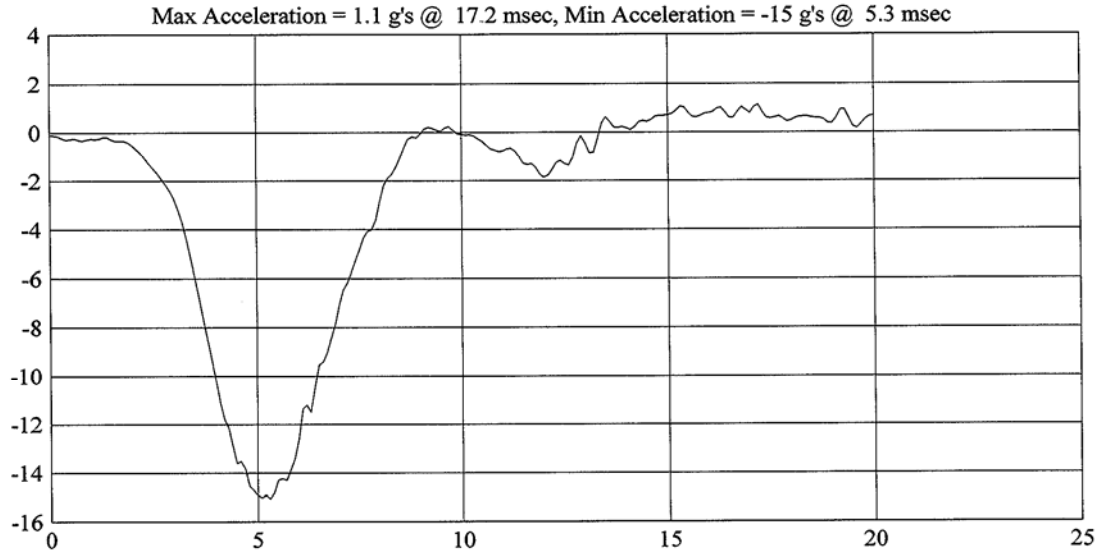
HIC(d) = 432, HIC = 352, Delta T = 4.6 msec

Max Acceleration = .7 g's @ 19.9 msec, Min Acceleration = -105.2 g's @ 5.2 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 1.1 g's @ 17.2 msec, Min Acceleration = -15 g's @ 5.3 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 3
FM6250
Additional Desc: N/A

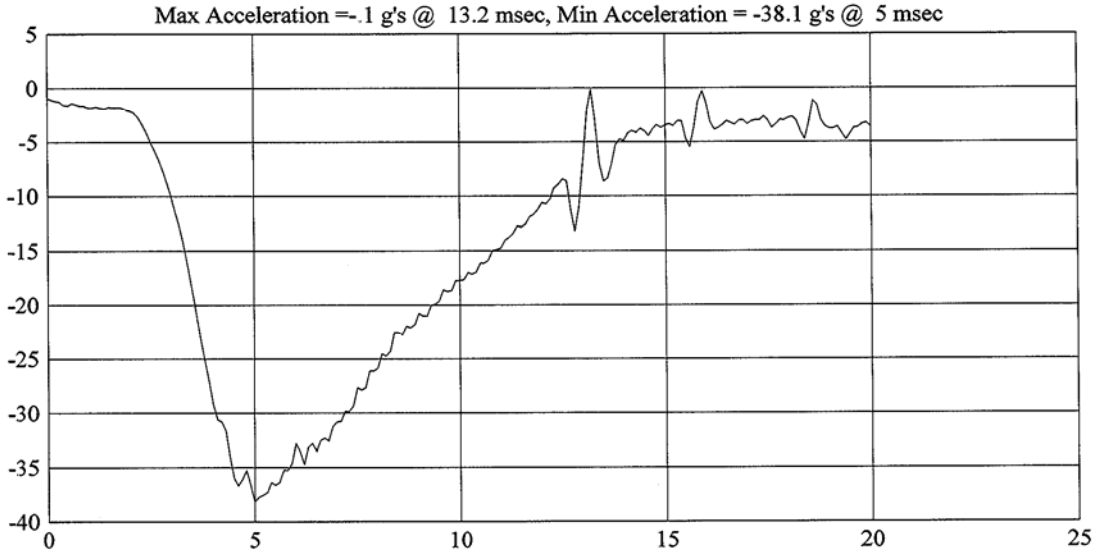
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: FH1
Vehicle Side: Left
Horz/Vert Angle: 180/20

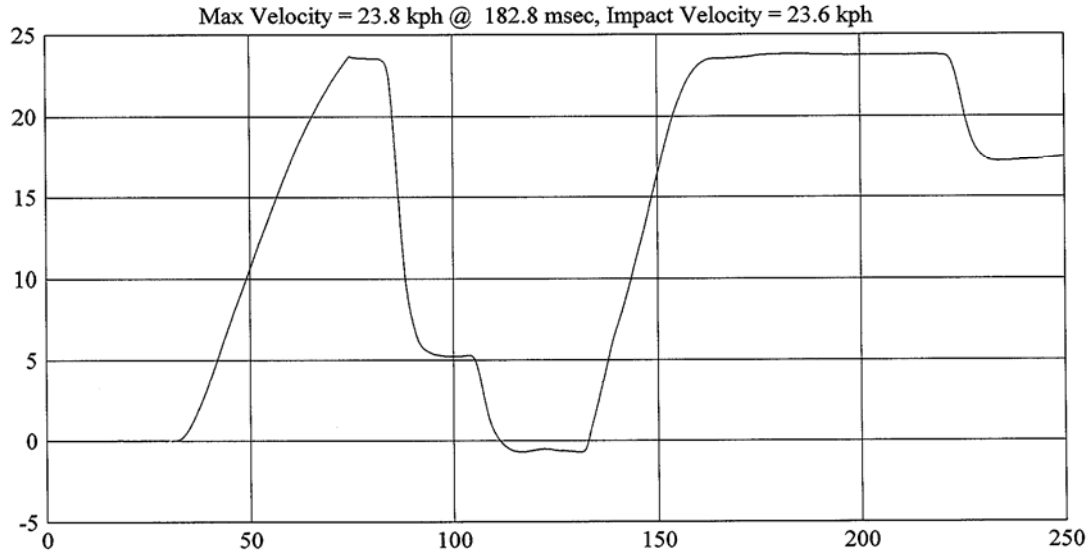
HIC(d) = 432, HIC = 352, Delta T = 4.6 msec

Max Acceleration =-.1 g's @ 13.2 msec, Min Acceleration = -38.1 g's @ 5 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 23.8 kph @ 182.8 msec, Impact Velocity = 23.6 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 3
FM6250
Additional Desc: N/A

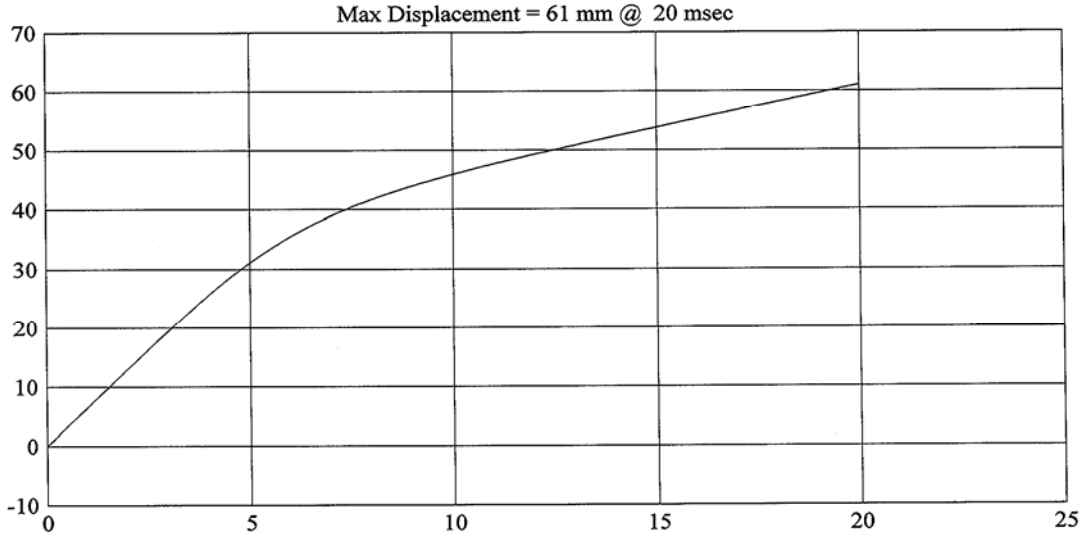
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: FH1
Vehicle Side: Left
Horz/Vert Angle: 180/20

HIC(d) = 432, HIC = 352, Delta T = 4.6 msec

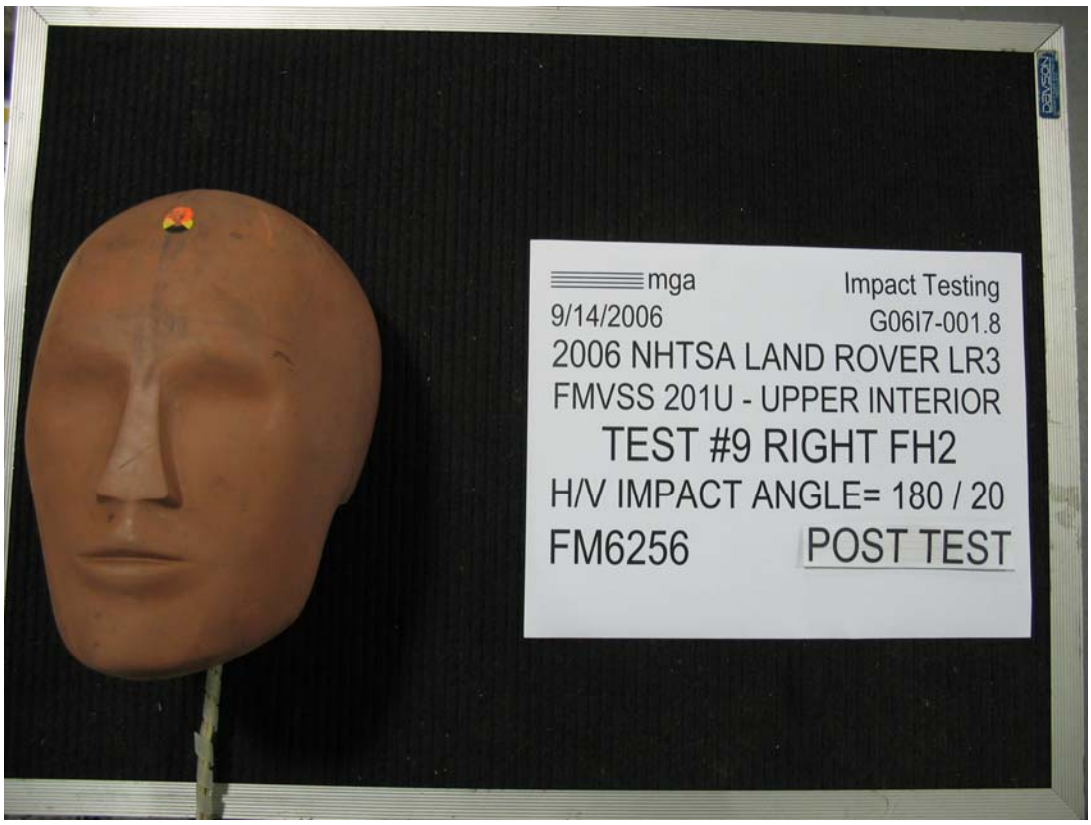
Max Displacement = 61 mm @ 20 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT FH2
H/V IMPACT ANGLE= 180 / 20
FM6256
PRE TEST


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT FH2
H/V IMPACT ANGLE= 180 / 20
FM6256
POST TEST


mga
Impact Testing
9/14/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT FH2
H/V IMPACT ANGLE= 180 / 20
FM6256
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/NHTSA/LAND ROVER LR3

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): FH2Right

Temperature:21C

MGA Test Reference No.:FM6256

Humidity:53%

Approach Horizontal Angles:180º

Time of Test:3:40 PM

Approach Vertical Angles:20º

FMH Serial No:[039]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
333	220	6.9	23.3	48	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J13753	-103.6	1.29	1.29
Y	6	J22700	94.4	1.79	1.79
Z	7	J32734	95.5	1.31	1.31

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

No visible damage.

Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 9/14/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: NHTSA
Test # 9
FM6256
Additional Desc: N/A

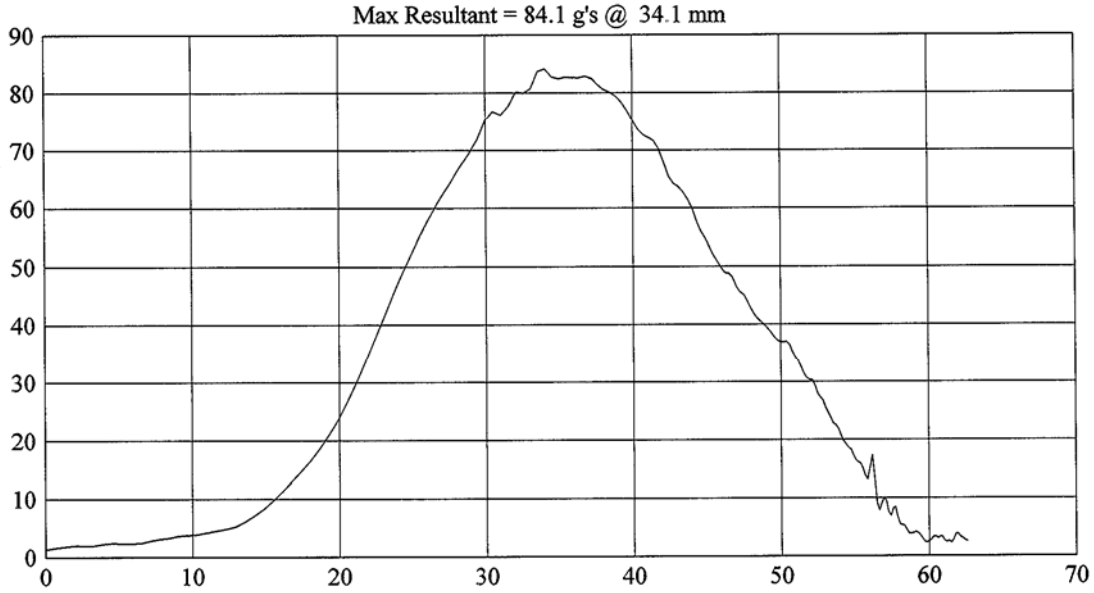
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/20

HIC(d) = 333, HIC = 220, Delta T = 6.9 msec

Max Resultant = 84.1 g's @ 34.1 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 84.1 g @ 5.6 msec

Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 9
FM6256
Additional Desc: N/A

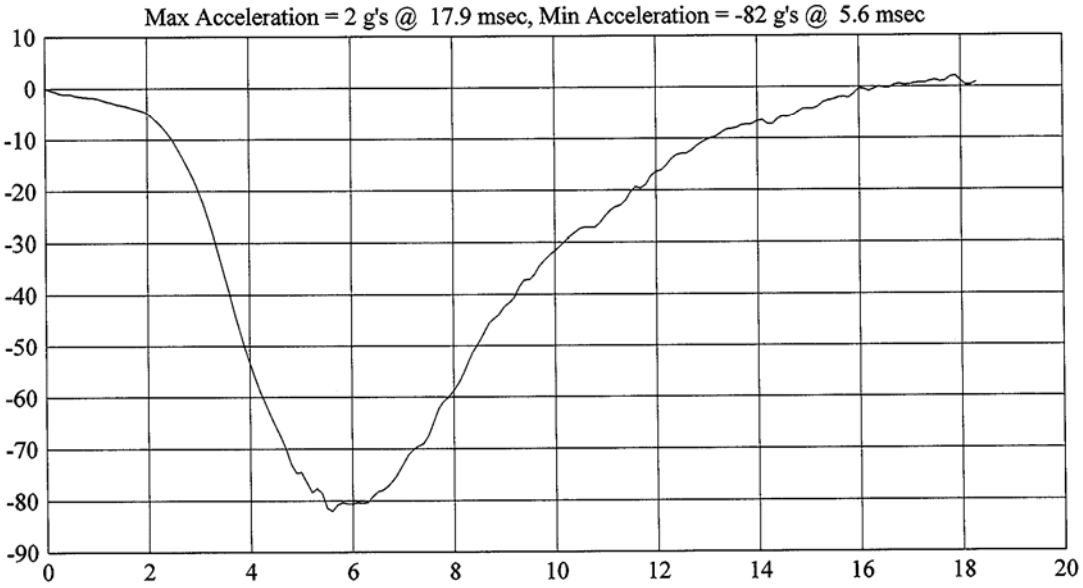
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/20

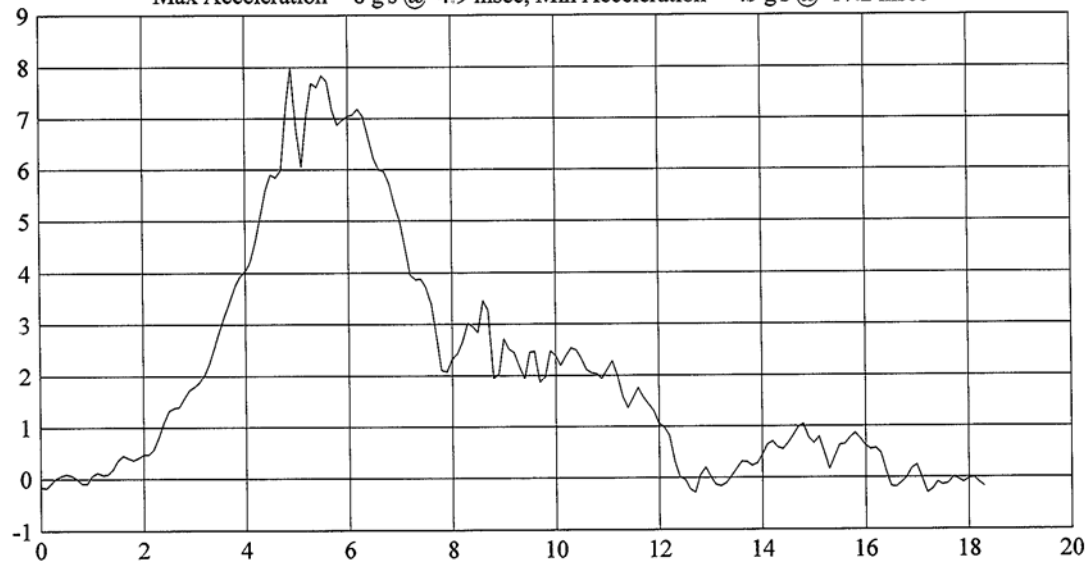
HIC(d) = 333, HIC = 220, Delta T = 6.9 msec

Max Acceleration = 2 g's @ 17.9 msec, Min Acceleration = -82 g's @ 5.6 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 8 g's @ 4.9 msec, Min Acceleration = -.3 g's @ 17.2 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 9
FM6256
Additional Desc: N/A

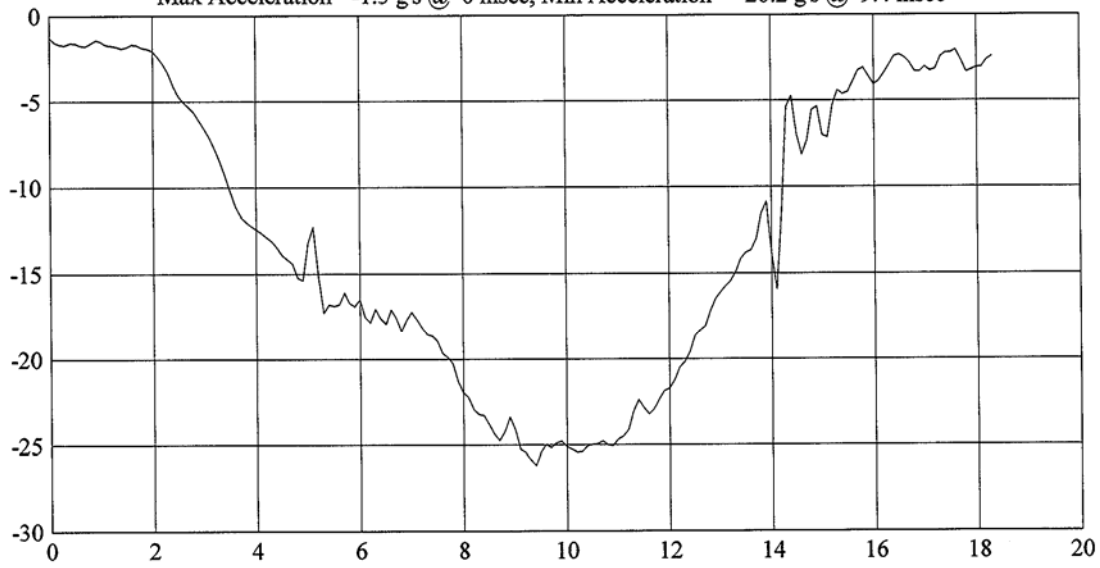
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

Model Year: 2006
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/20

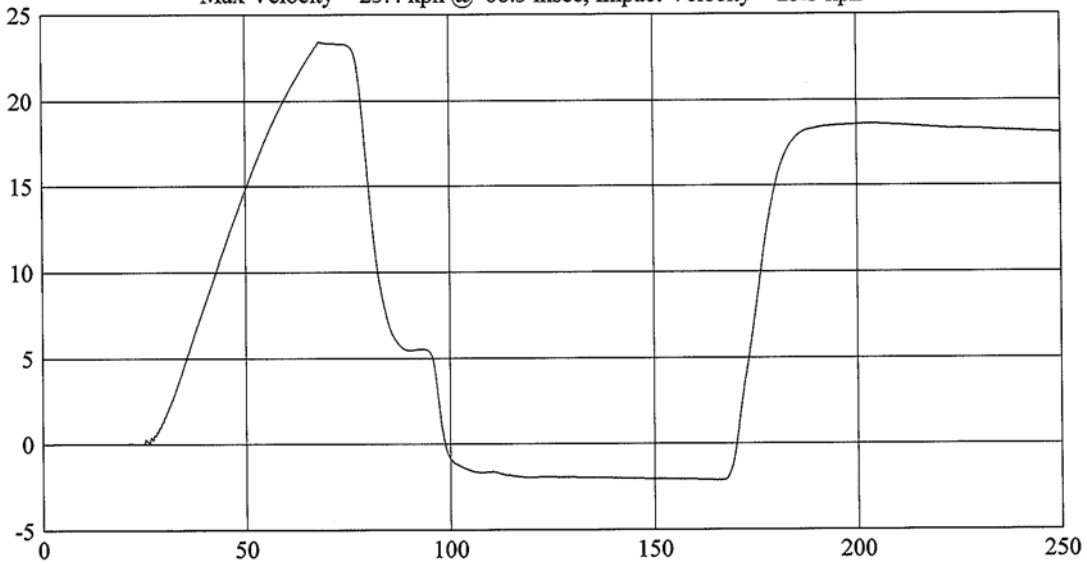
HIC(d) = 333, HIC = 220, Delta T = 6.9 msec

Max Acceleration =-1.3 g's @ 0 msec, Min Acceleration = -26.2 g's @ 9.4 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 23.4 kph @ 68.3 msec, Impact Velocity = 23.3 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 9
FM6256
Additional Desc: N/A

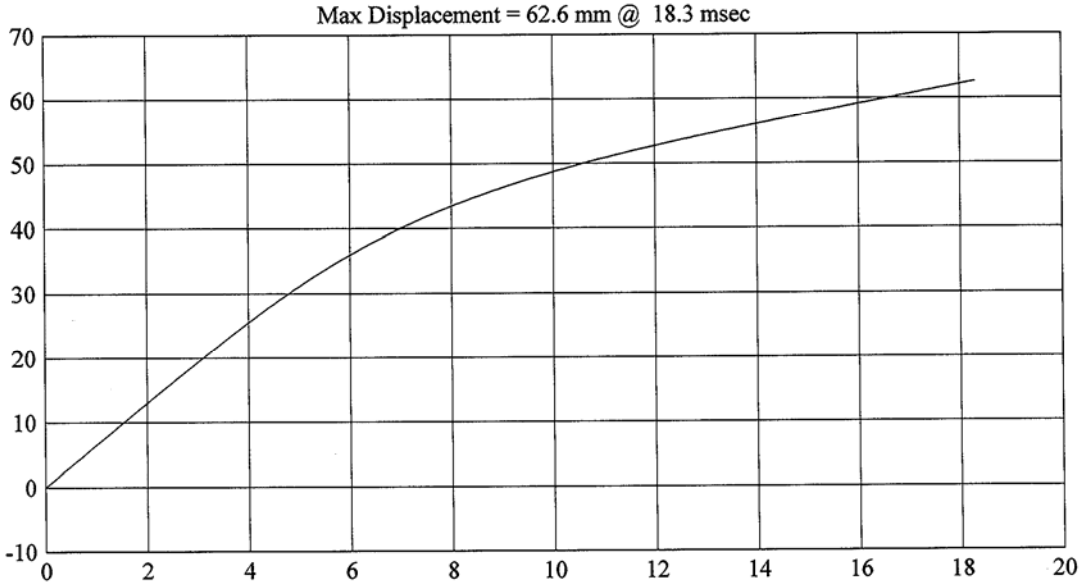
Vehicle Program : LAND ROVER LR3

Test Date: 9/14/2006

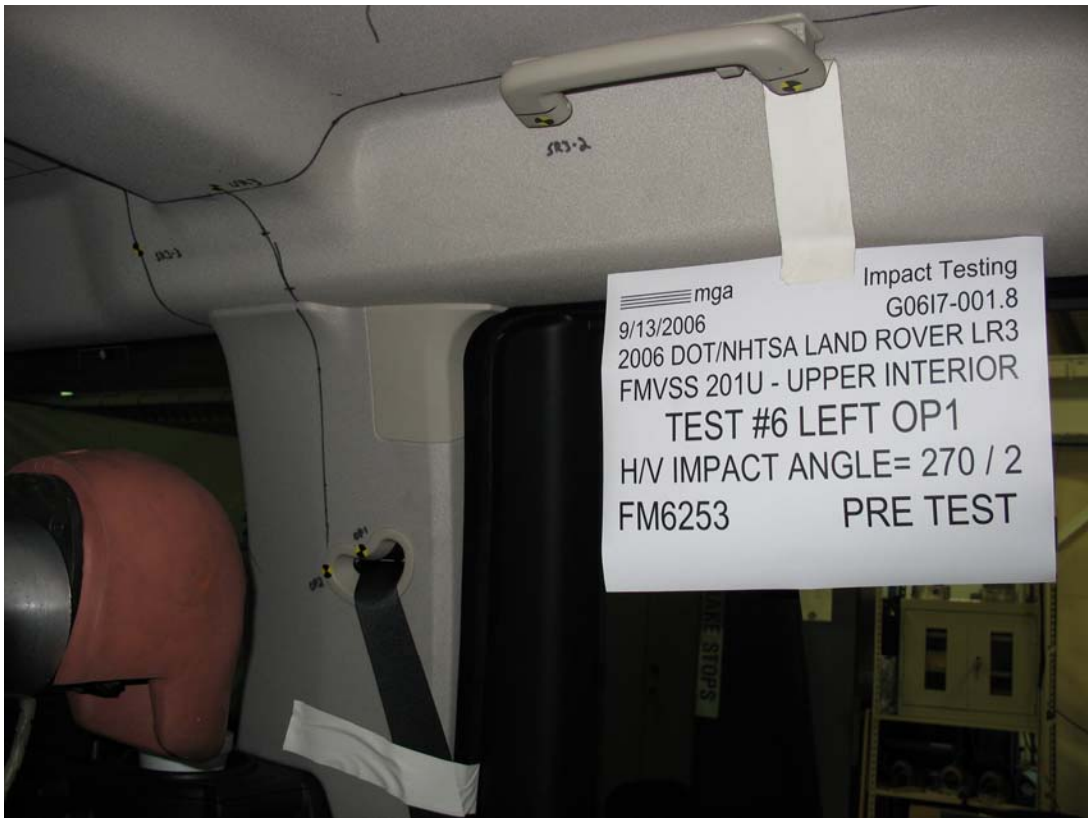
Model Year: 2006
Target: FH2
Vehicle Side: Right
Horz/Vert Angle: 180/20

HIC(d) = 333, HIC = 220, Delta T = 6.9 msec

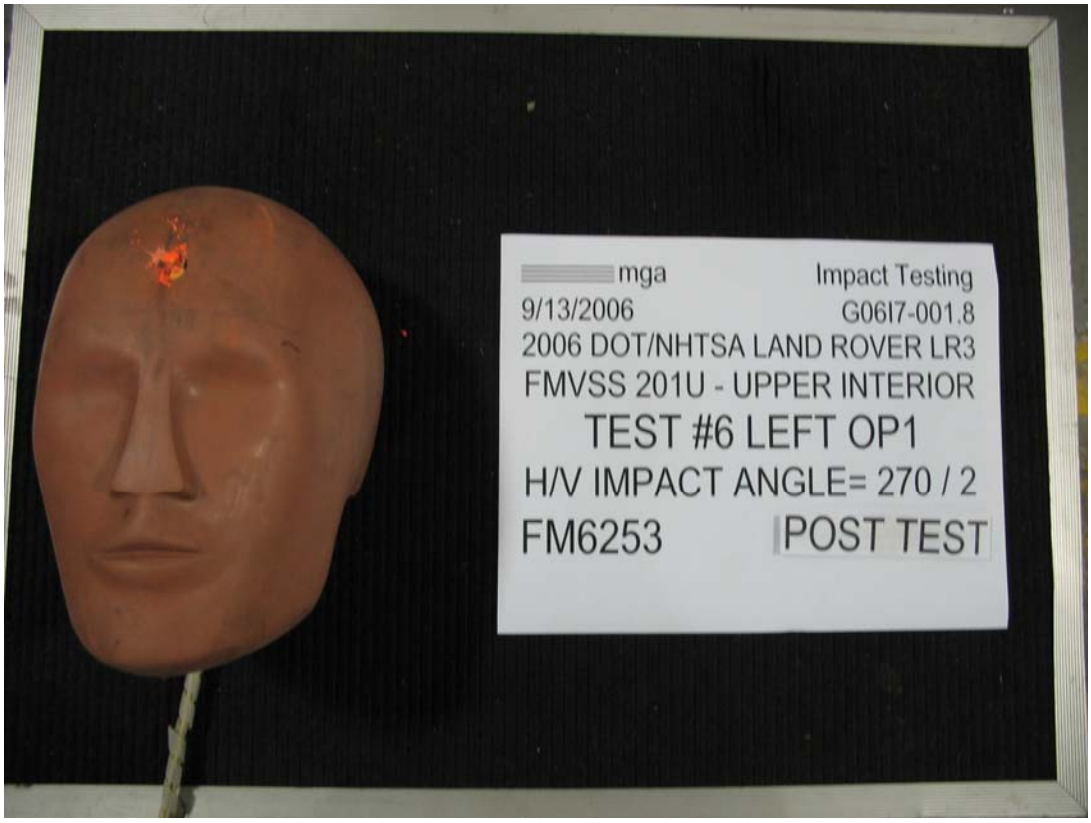
Max Displacement = 62.6 mm @ 18.3 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
G06I7-001.8
9/13/2006
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT OP1
H/V IMPACT ANGLE= 270 / 2
FM6253
PRE TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT OP1
H/V IMPACT ANGLE= 270 / 2
FM6253
POST TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT OP1
H/V IMPACT ANGLE= 270 / 2
FM6253
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/DOT/NHTSA/Land Rover LR3

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): OP1Left

Temperature:21C

MGA Test Reference No.:FM6253

Humidity:61%

Approach Horizontal Angles:270º

Time of Test:3:29 PM

Approach Vertical Angles:2º

FMH Serial No:[039]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
703	712	7	24.2	20	3 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J13753	-103.6	1.29	1.29
Y	6	J22700	94.4	1.79	1.79
Z	7	J32734	95.5	1.31	1.30

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

No visible damage.

Recorded By: Louis Campbell Approved By*: Helen A. Kaleta Date: 9/13/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 6
FM6253
Additional Desc: N/A

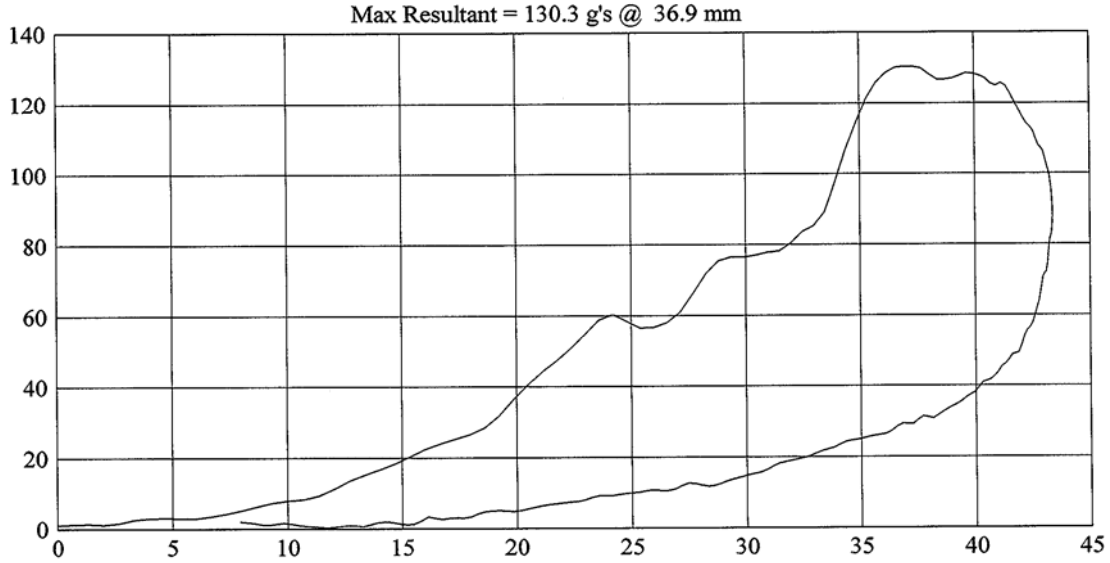
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/2

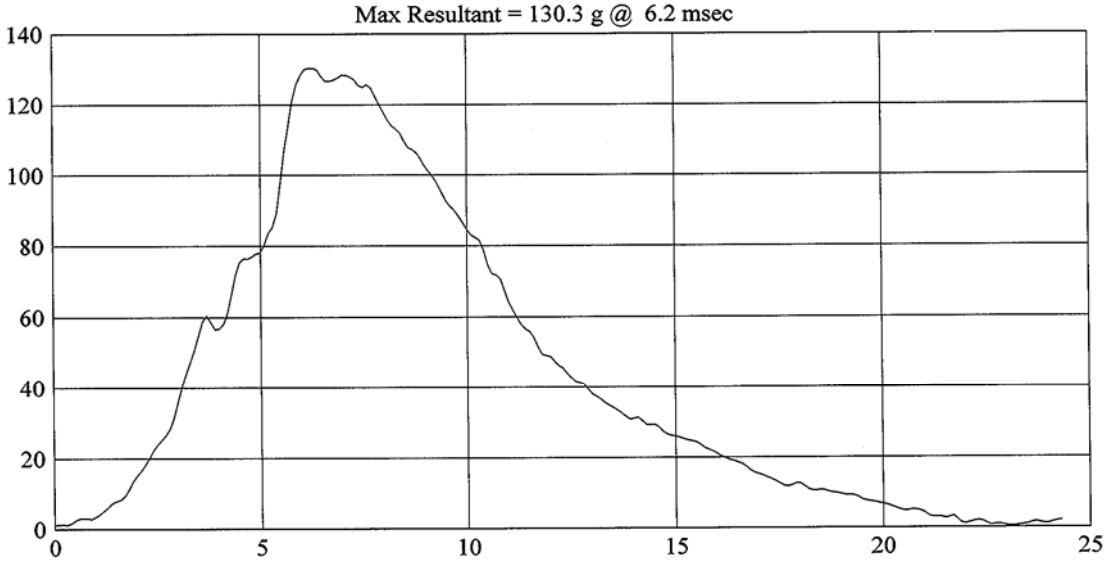
HIC(d) = 703, HIC = 712, Delta T = 7 msec

Max Resultant = 130.3 g's @ 36.9 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 130.3 g @ 6.2 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 6
FM6253
Additional Desc: N/A

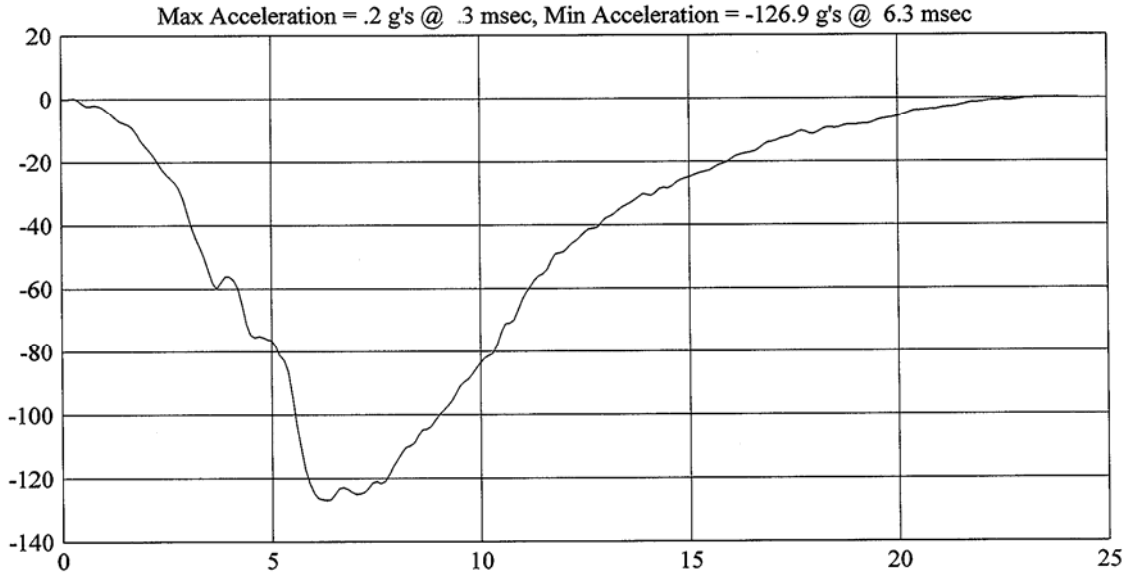
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/2

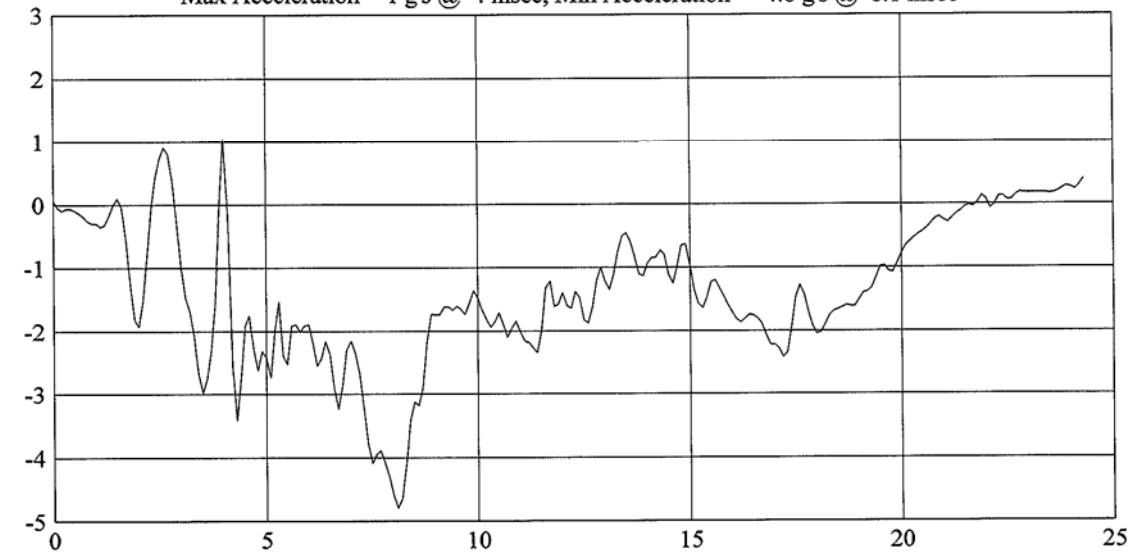
HIC(d) = 703, HIC = 712, Delta T = 7 msec

Max Acceleration = .2 g's @ .3 msec, Min Acceleration = -126.9 g's @ 6.3 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 1 g's @ 4 msec, Min Acceleration = -4.8 g's @ 8.1 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 6
FM6253
Additional Desc: N/A

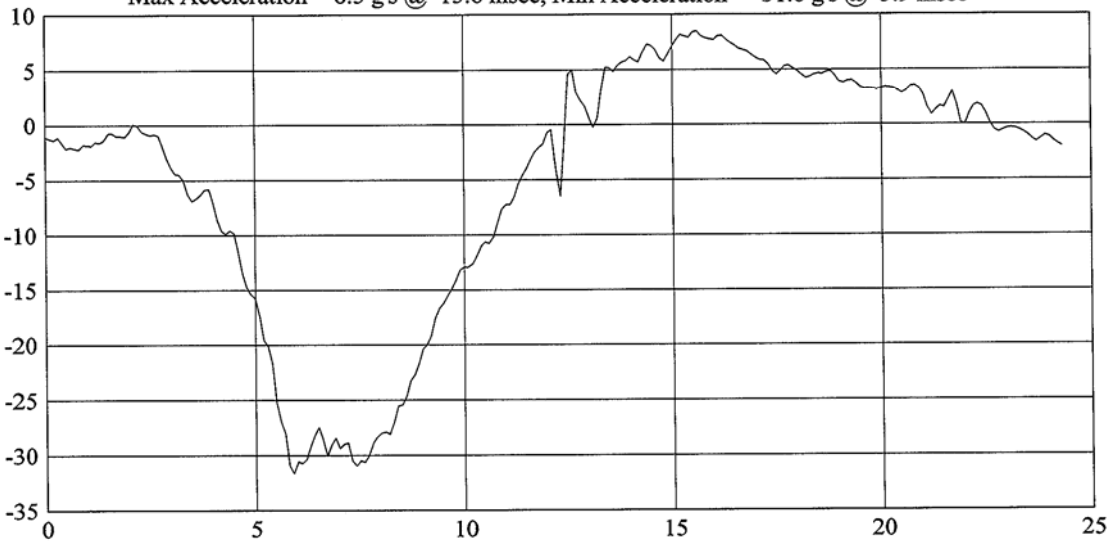
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/2

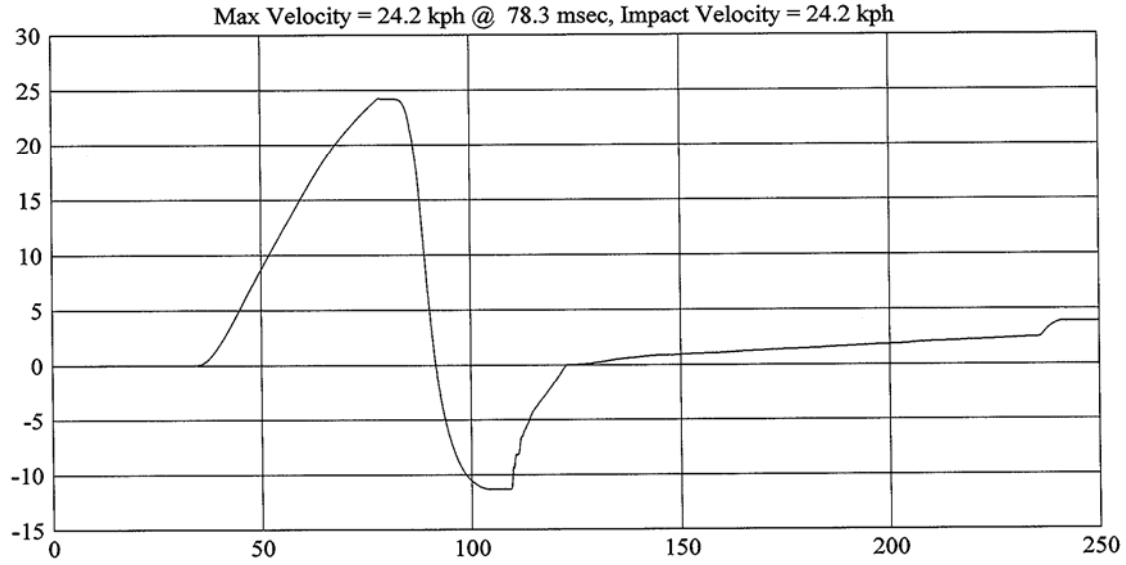
HIC(d) = 703, HIC = 712, Delta T = 7 msec

Max Acceleration = 8.5 g's @ 15.6 msec, Min Acceleration = -31.6 g's @ 5.9 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 24.2 kph @ 78.3 msec, Impact Velocity = 24.2 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 6
FM6253
Additional Desc: N/A

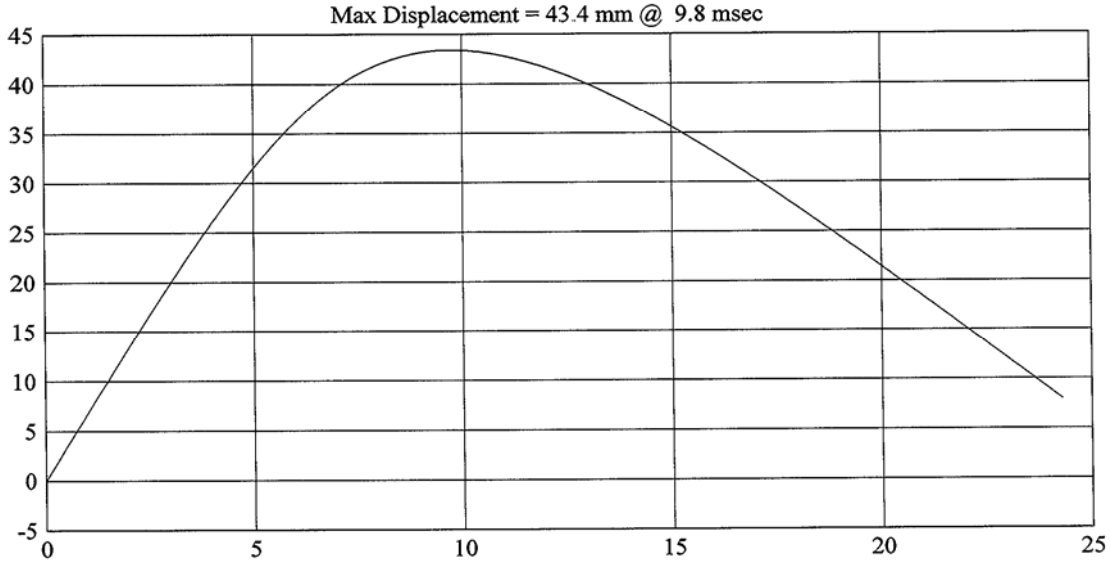
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/2

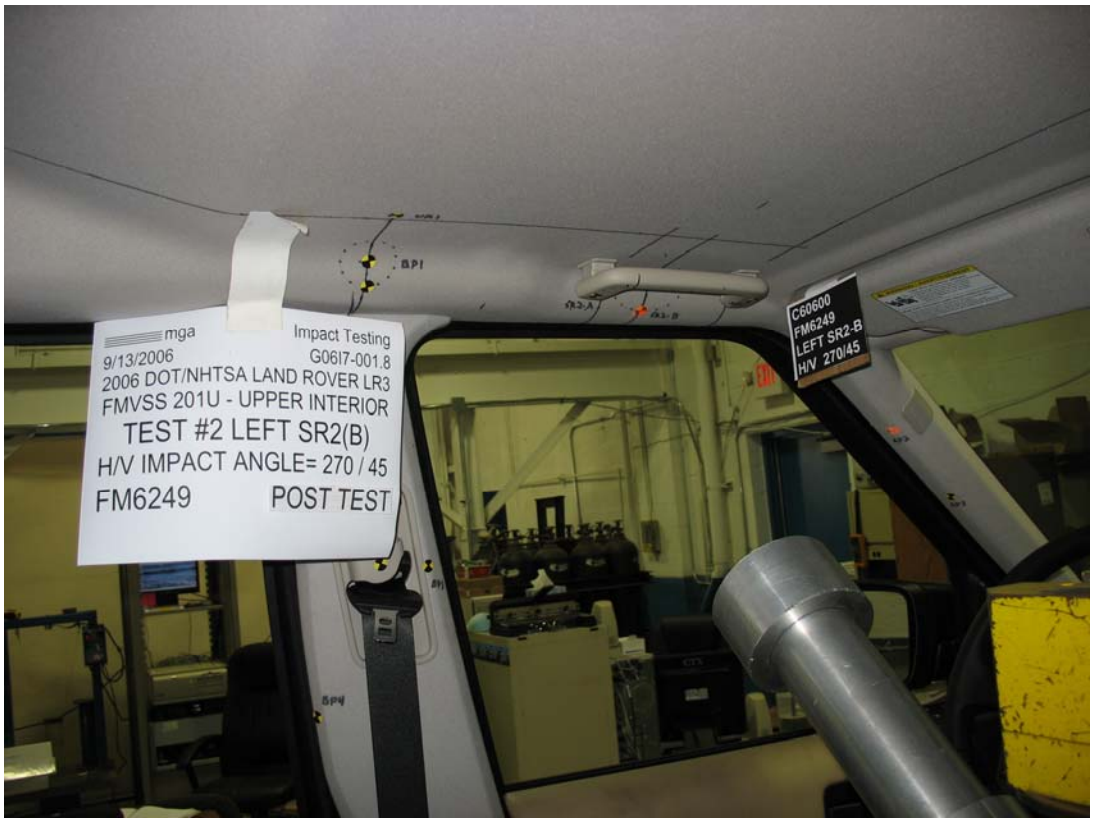
HIC(d) = 703, HIC = 712, Delta T = 7 msec

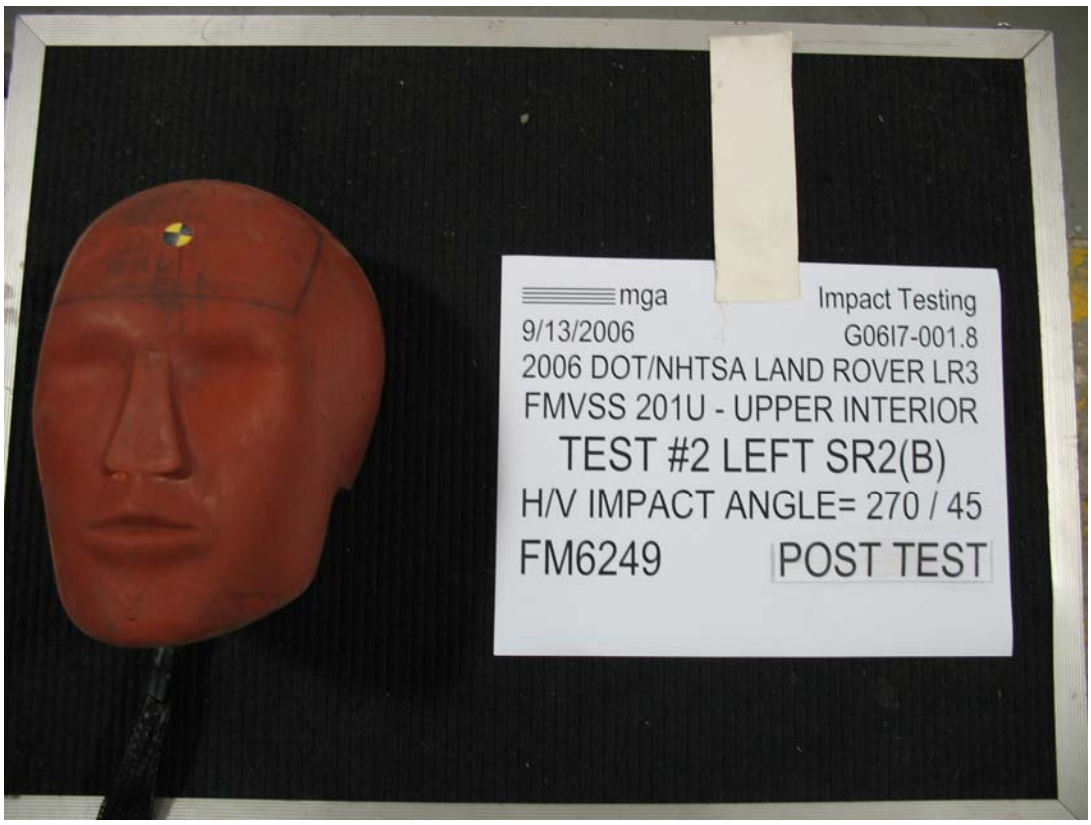
Max Displacement = 43.4 mm @ 9.8 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2(B)
H/V IMPACT ANGLE= 270 / 45
FM6249
PRE TEST
C60600
FM6249
LEFT SR2-B
H/V 270/45


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2(B)
H/V IMPACT ANGLE= 270 / 45
FM6249
POST TEST
C60600
FM6249
LEFT SR2-B
H/V 270/45


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2(B)
H/V IMPACT ANGLE= 270 / 45
FM6249
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/DOT/NHTSA/Land Rover LR3

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): SR2(b)Left

Temperature:21C

MGA Test Reference No.:FM6249

Humidity:59%

Approach Horizontal Angles:270º

Time of Test:11:12 AM

Approach Vertical Angles:45º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
621	603	4	18.8	29	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.29	1.29
Y	6	J36193	102.7	1.79	0.00
Z	7	J36353	97.2	1.30	1.29

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

No visible damage.

Recorded By: Travis Campbell Approved By*: Eileen A. Kaleto Date: 9/13/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 2
FM6249
Additional Desc: N/A

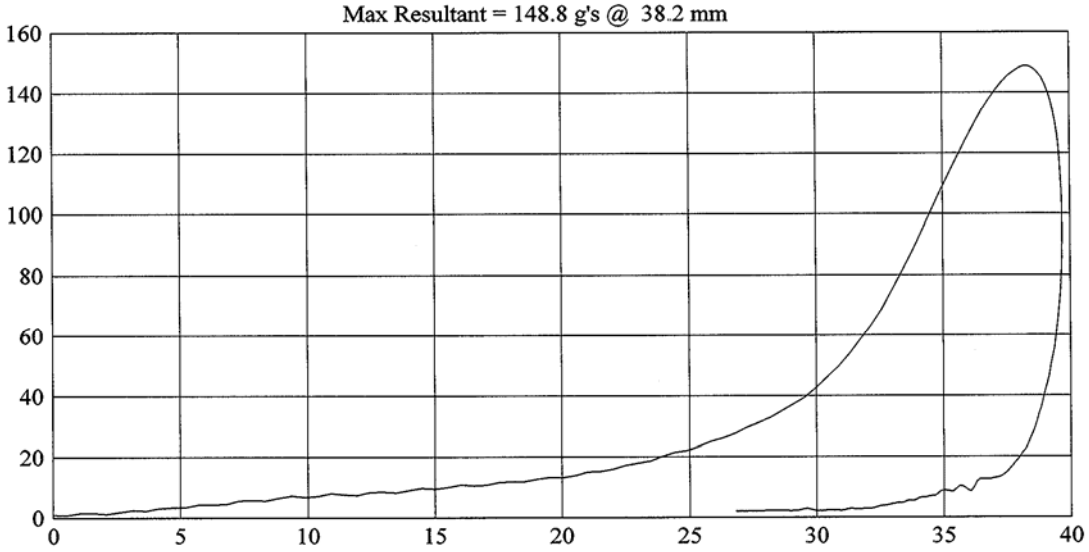
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: SR2(b)
Vehicle Side: Left
Horz/Vert Angle: 270/45

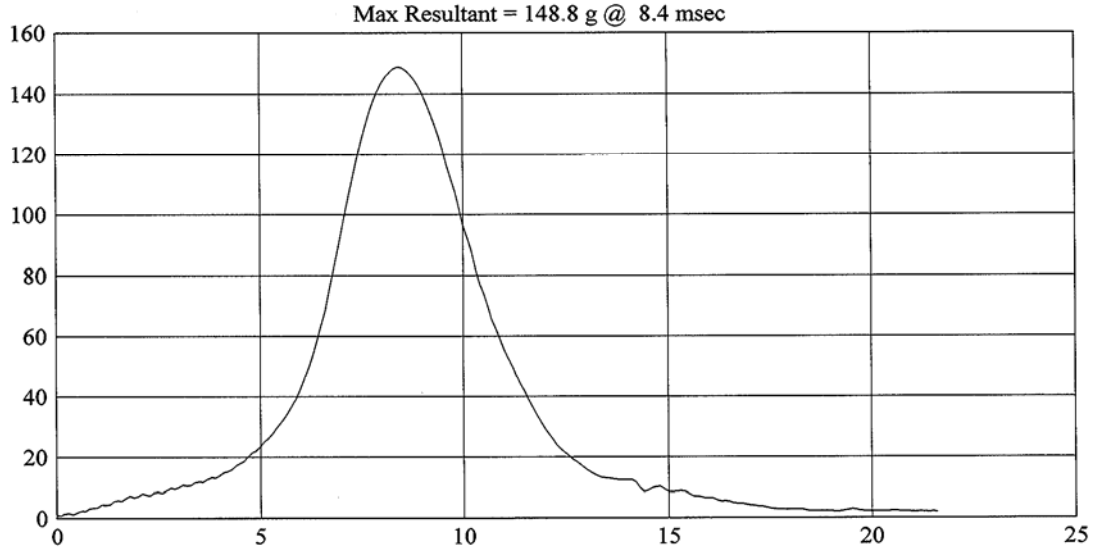
HIC(d) = 621, HIC = 603, Delta T = 4 msec

Max Resultant = 148.8 g's @ 38.2 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 148.8 g @ 8.4 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 2
FM6249
Additional Desc: N/A

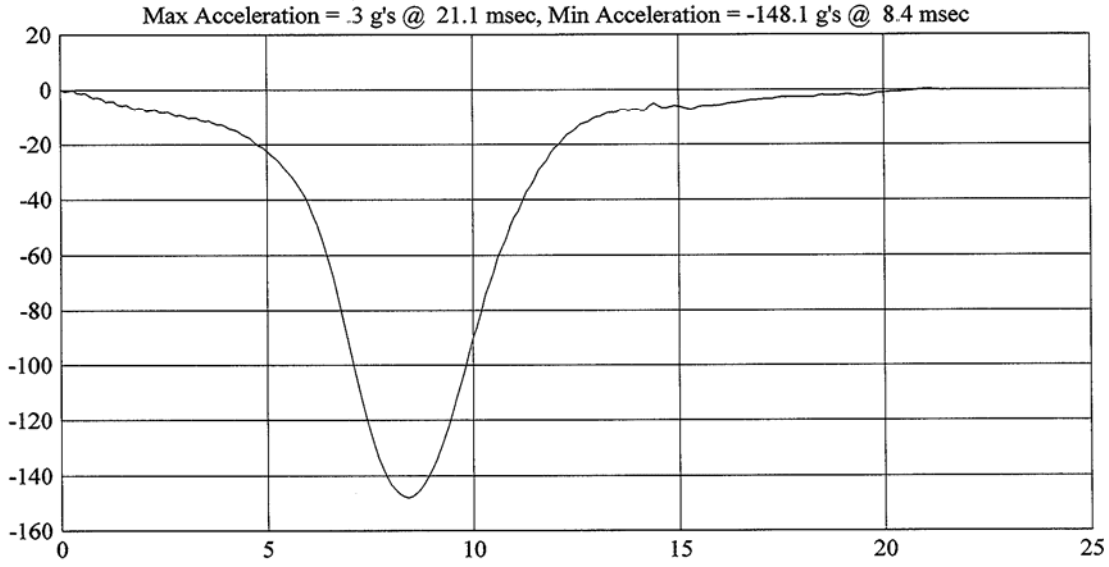
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: SR2(b)
Vehicle Side: Left
Horz/Vert Angle: 270/45

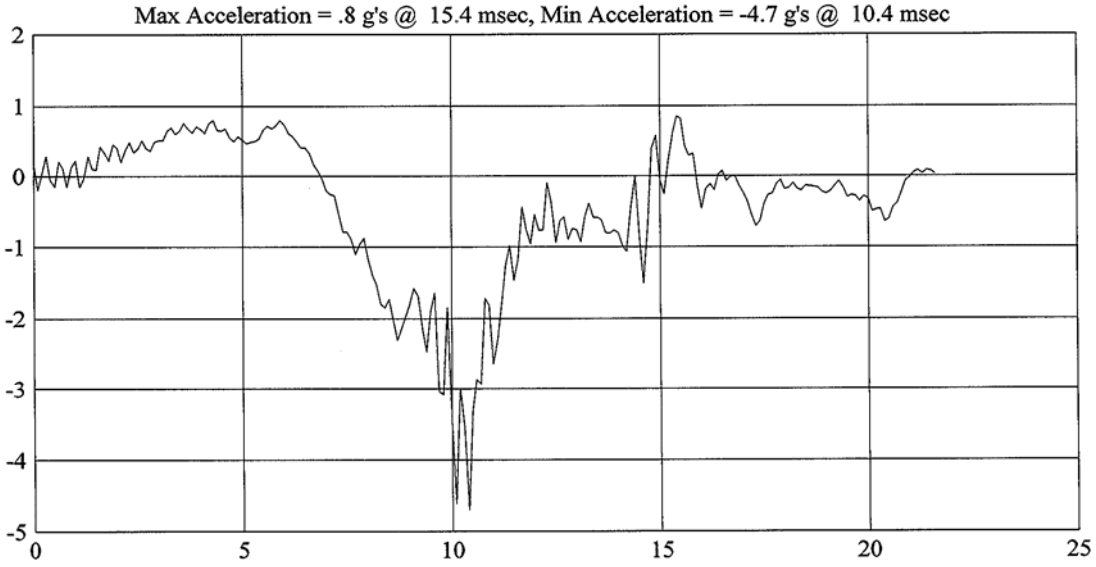
HIC(d) = 621, HIC = 603, Delta T = 4 msec

Max Acceleration = .3 g's @ 21.1 msec, Min Acceleration = -148.1 g's @ 8.4 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = .8 g's @ 15.4 msec, Min Acceleration = -4.7 g's @ 10.4 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 2
FM6249
Additional Desc: N/A

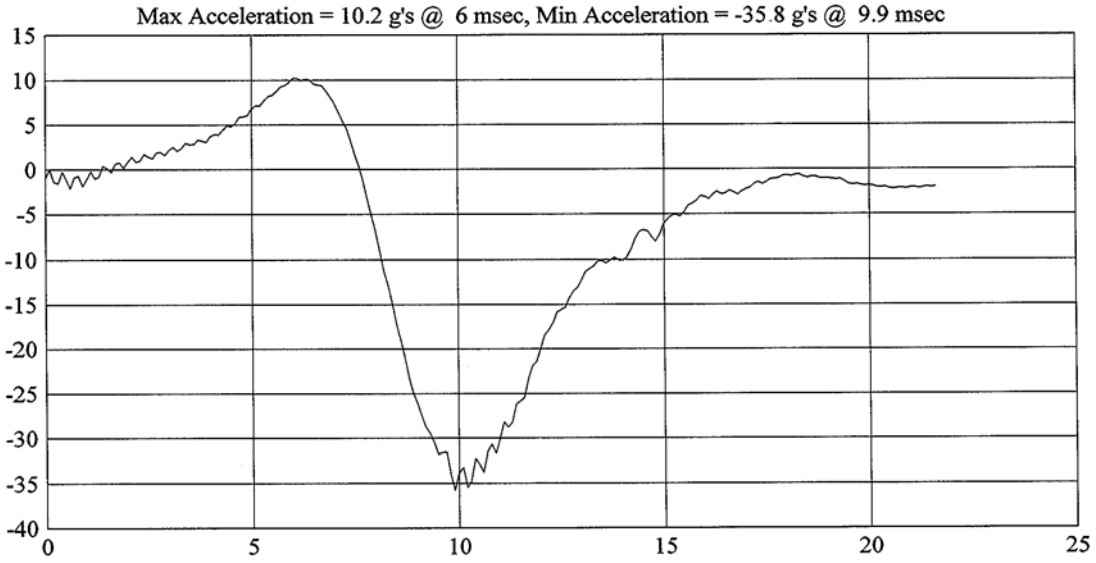
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: SR2(b)
Vehicle Side: Left
Horz/Vert Angle: 270/45

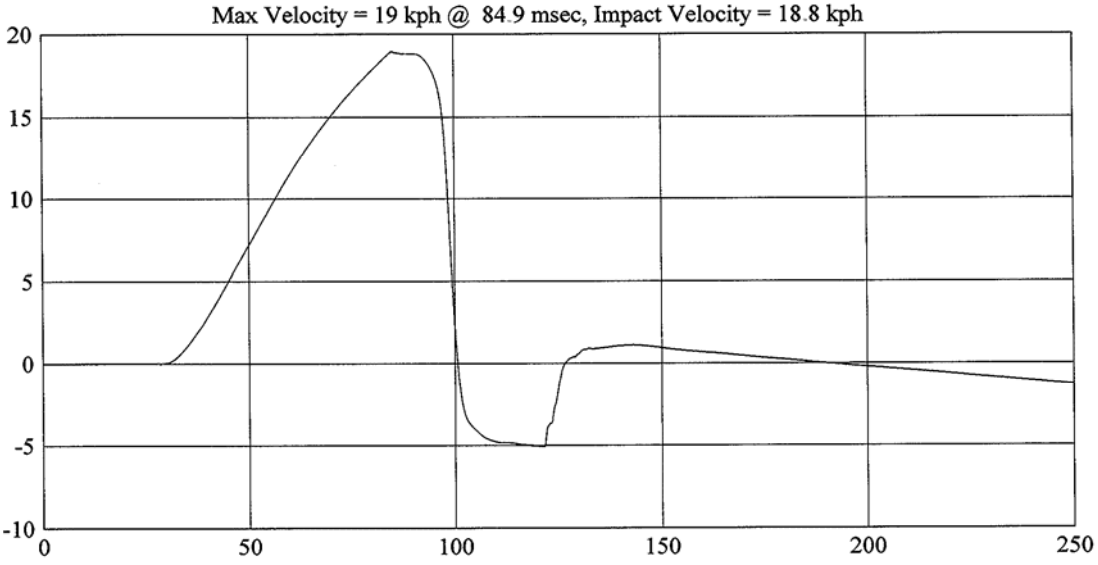
HIC(d) = 621, HIC = 603, Delta T = 4 msec

Max Acceleration = 10.2 g's @ 6 msec, Min Acceleration = -35.8 g's @ 9.9 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 19 kph @ 84.9 msec, Impact Velocity = 18.8 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

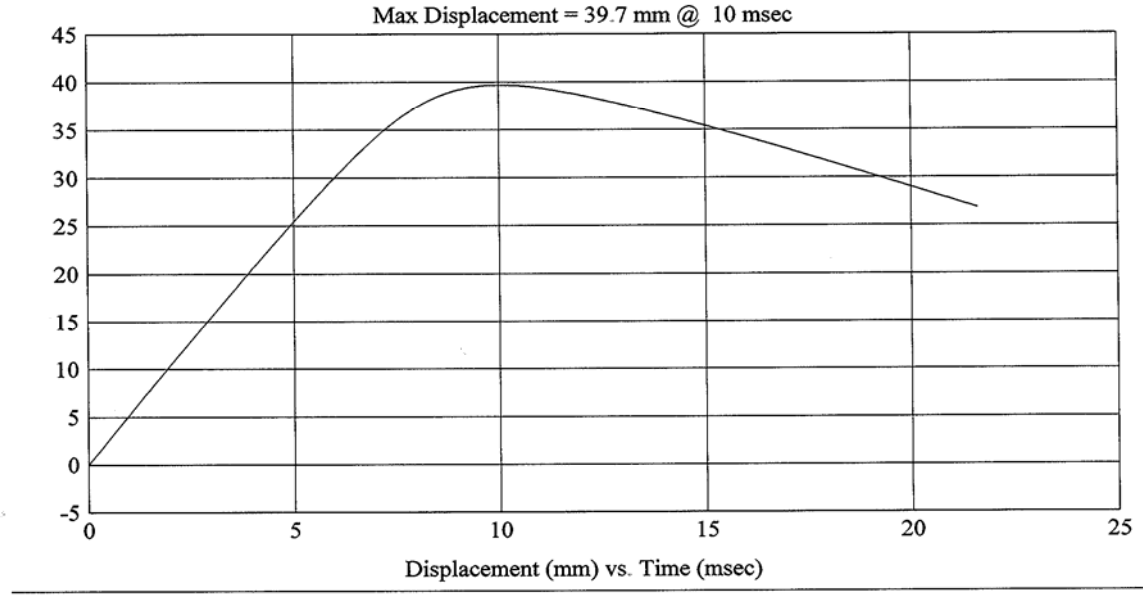
Customer: DOT/NHTSA
Test # 2
FM6249
Additional Desc: N/A

Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: SR2(b)
Vehicle Side: Left
Horz/Vert Angle: 270/45

HIC(d) = 621, HIC = 603, Delta T = 4 msec




mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
FM6252
PRE TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
FM6252
POST TEST


mga
Impact Testing
9/13/2006
G06I7-001.8
2006 DOT/NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
FM6252
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/DOT/NHTSA/Land Rover LR3

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): UR1Left

Temperature:21C

MGA Test Reference No.:FM6252

Humidity:62%

Approach Horizontal Angles:270º

Time of Test:2:54 PM

Approach Vertical Angles:50º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
779	812	6	23.2	32	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.29	1.29
Y	6	J36193	102.7	1.79	1.79
Z	7	J36353	97.2	1.30	1.30

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

No visible damage.

Recorded By: Louis Campbell Approved By*: Helen A. Kaleto Date: 9/13/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 5
FM6252
Additional Desc: N/A

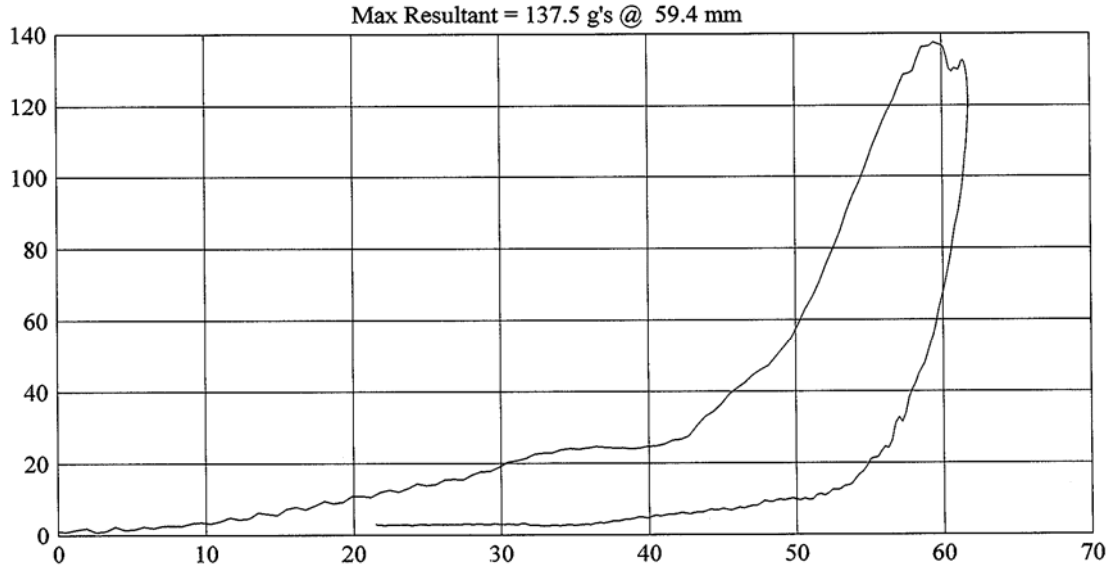
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

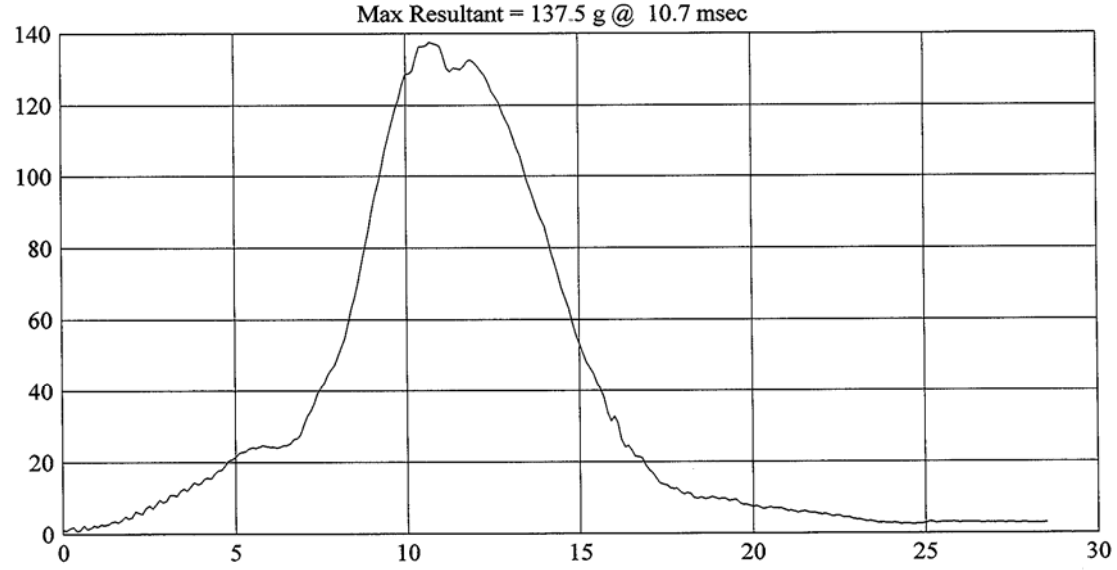
HIC(d) = 779, HIC = 812, Delta T = 6 msec

Max Resultant = 137.5 g's @ 59.4 mm



Resultant (g's) vs. Displacement (mm)

Max Resultant = 137.5 g @ 10.7 msec



Resultant Accel (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 5
FM6252
Additional Desc: N/A

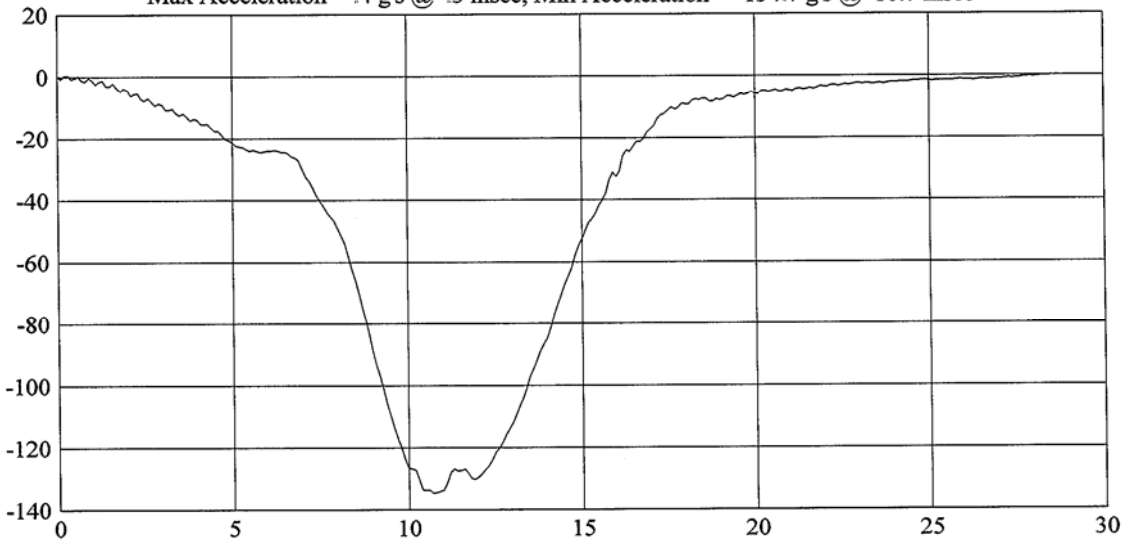
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

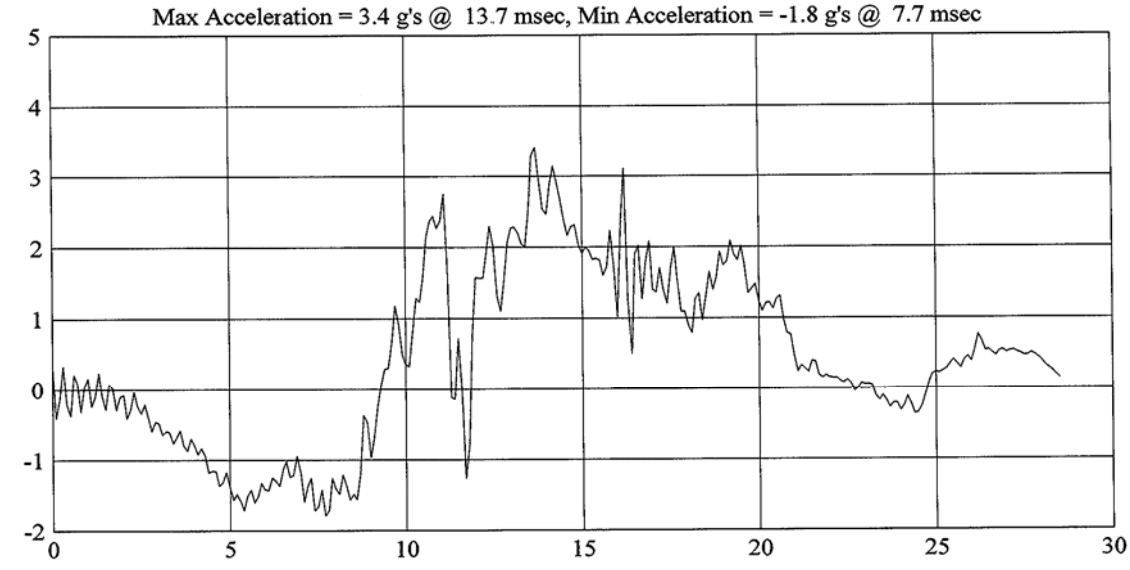
HIC(d) = 779, HIC = 812, Delta T = 6 msec

Max Acceleration = .4 g's @ .3 msec, Min Acceleration = -134.7 g's @ 10.7 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 3.4 g's @ 13.7 msec, Min Acceleration = -1.8 g's @ 7.7 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 5
FM6252
Additional Desc: N/A

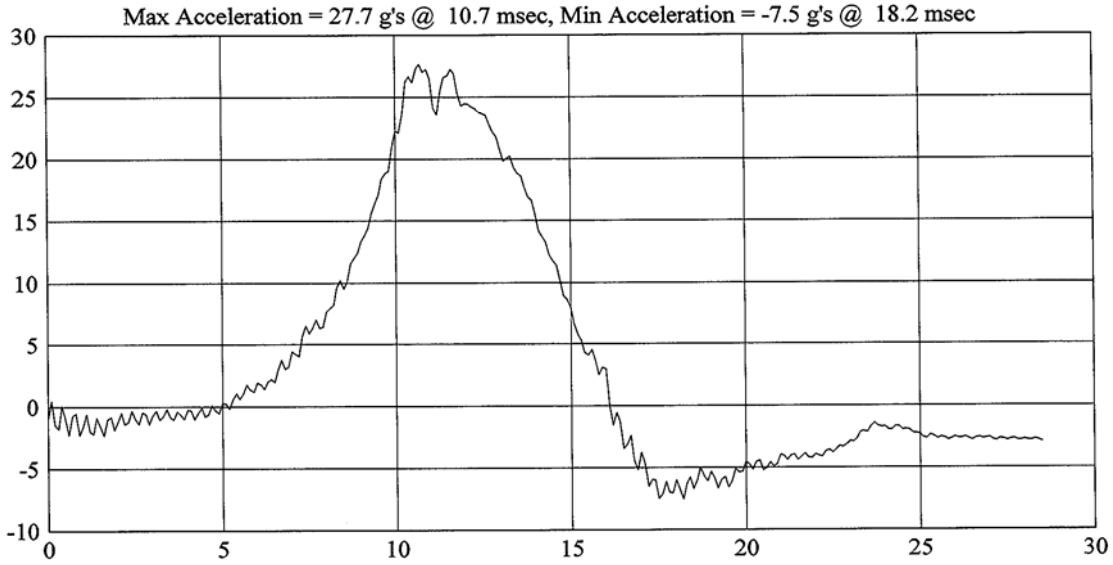
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

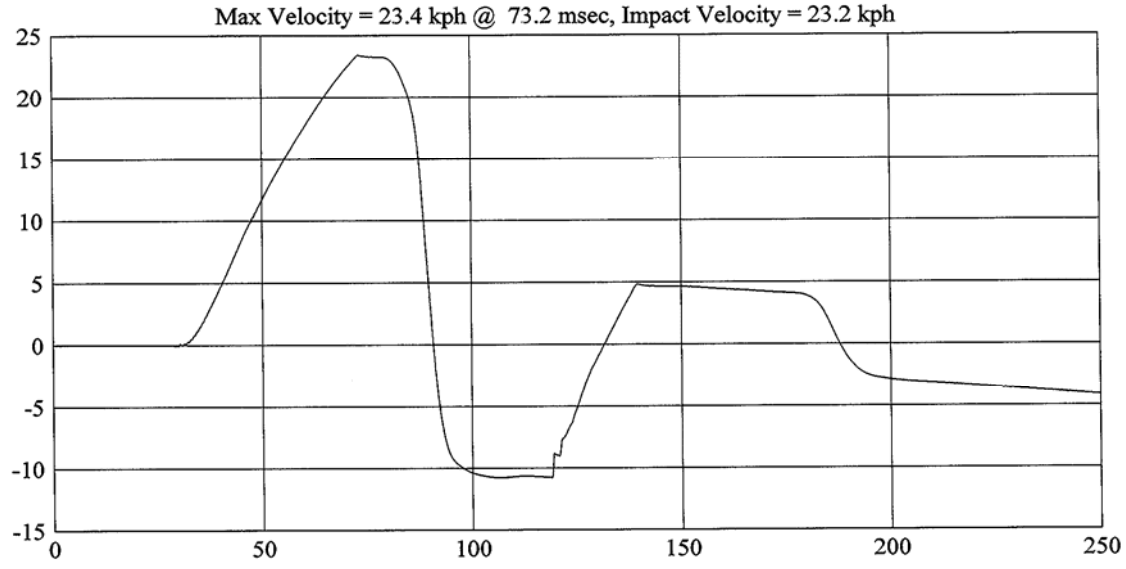
HIC(d) = 779, HIC = 812, Delta T = 6 msec

Max Acceleration = 27.7 g's @ 10.7 msec, Min Acceleration = -7.5 g's @ 18.2 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 23.4 kph @ 73.2 msec, Impact Velocity = 23.2 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

Customer: DOT/NHTSA
Test # 5
FM6252
Additional Desc: N/A

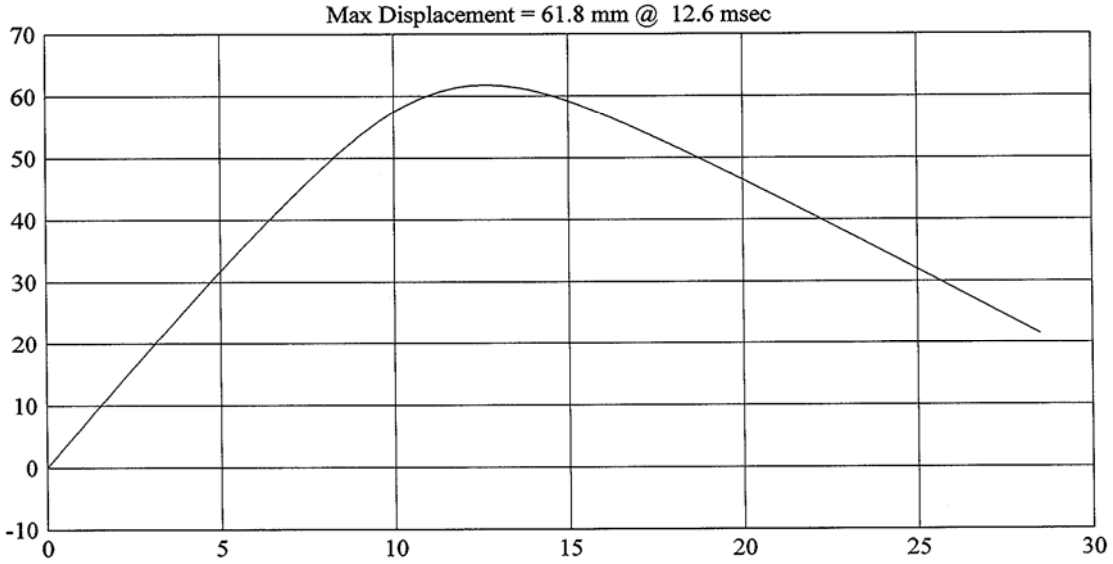
Vehicle Program : Land Rover LR3

Test Date: 9/13/2006

Model Year: 2006
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 779, HIC = 812, Delta T = 6 msec

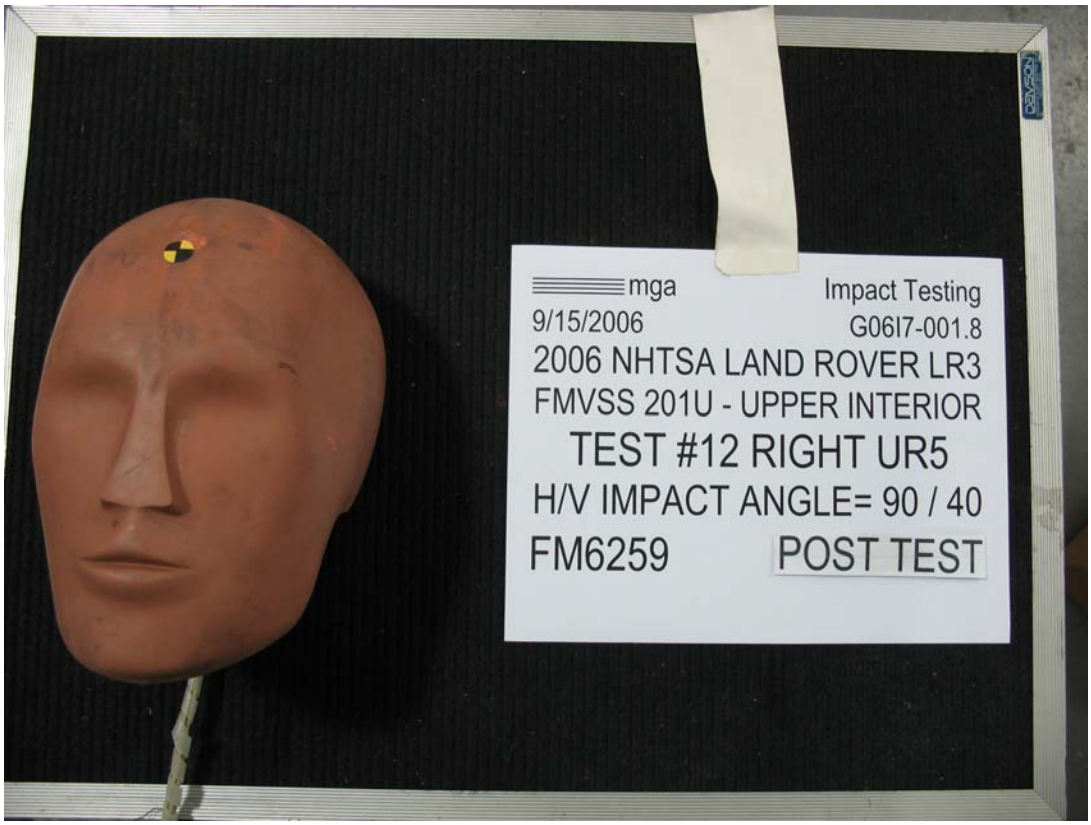
Max Displacement = 61.8 mm @ 12.6 msec



Displacement (mm) vs. Time (msec)


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT UR5
H/V IMPACT ANGLE= 90 / 40
FM6259
PRE TEST


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT UR5
H/V IMPACT ANGLE= 90 / 40
FM6259
POST TEST


mga
Impact Testing
9/15/2006
G06I7-001.8
2006 NHTSA LAND ROVER LR3
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT UR5
H/V IMPACT ANGLE= 90 / 40
FM6259
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.8 VEHICLE YR/MAKE/MODEL:2006/NHTSA/LAND ROVER LR3

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): UR5Right

Temperature:21C

MGA Test Reference No.:FM6259

Humidity:55%

Approach Horizontal Angles:90º

Time of Test:10:24 AM

Approach Vertical Angles:40º

FMH Serial No:[039]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
504	447	10.4	24.3	36	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J13753	-103.6	1.29	1.29
Y	6	J22700	94.4	1.79	1.79
Z	7	J32734	95.5	1.31	1.31

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

Broke the rear grab handle below the target location.

Recorded By: Kevin Campbell Approved By*: Helen A. Kaleto Date: 9/15/2006

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.8

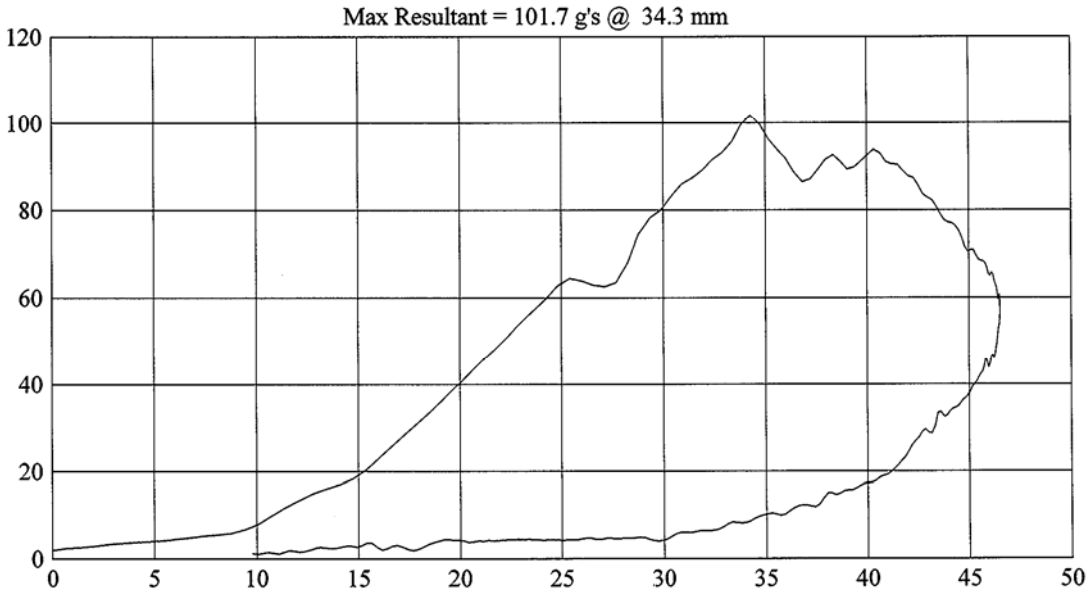
Customer: NHTSA
Test # 12
FM6259
Additional Desc: N/A

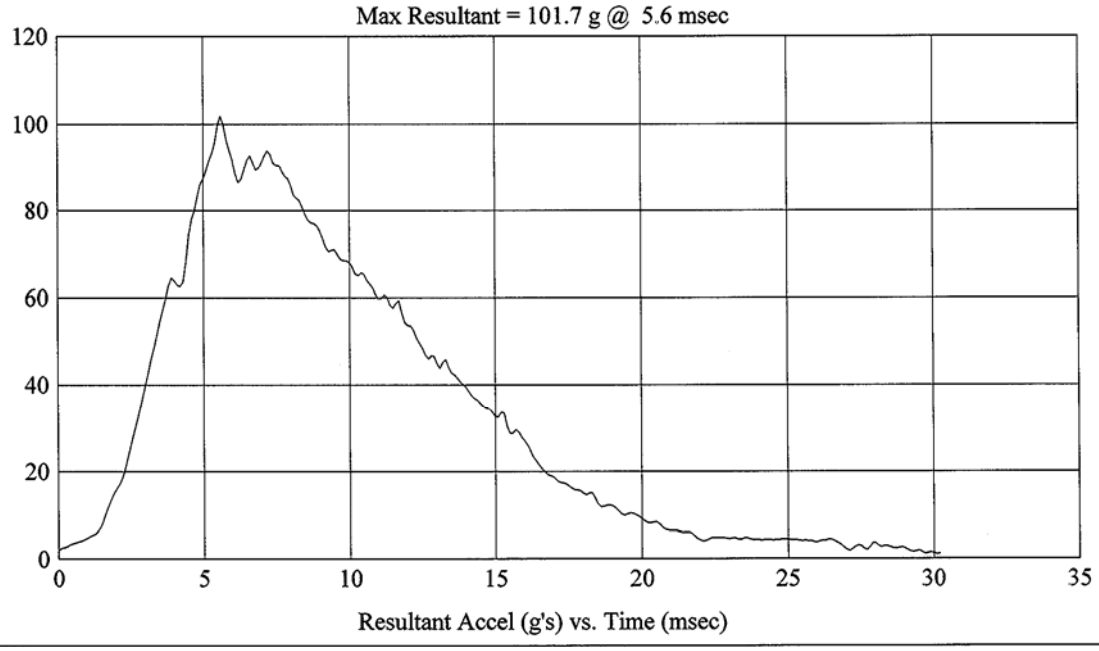
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/40

HIC(d) = 504, HIC = 447, Delta T = 10.4 msec





FMH
G06I7-001.8

Customer: NHTSA
Test # 12
FM6259
Additional Desc: N/A

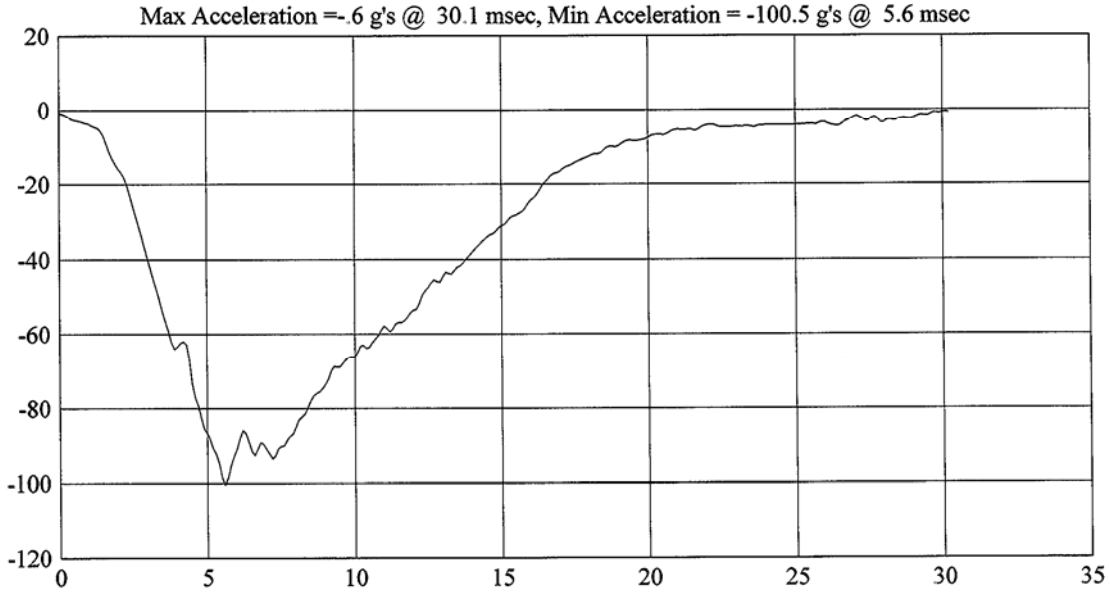
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/40

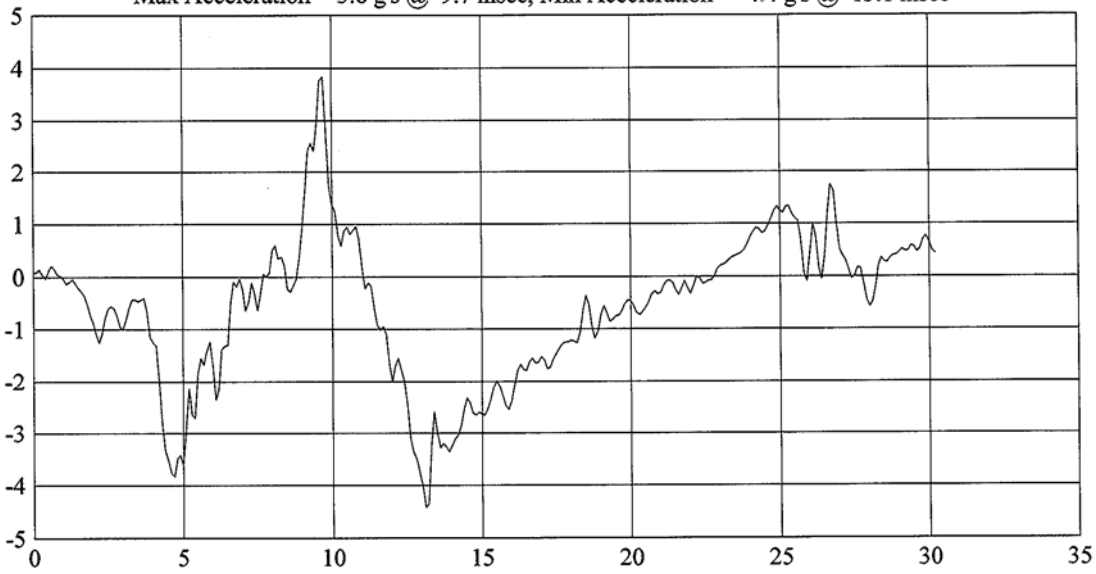
HIC(d) = 504, HIC = 447, Delta T = 10.4 msec

Max Acceleration =-.6 g's @ 30.1 msec, Min Acceleration = -100.5 g's @ 5.6 msec



Accel X (g's) vs. Time (msec)

Max Acceleration = 3.8 g's @ 9.7 msec, Min Acceleration = -4.4 g's @ 13.1 msec



Accel Y (g's) vs. Time (msec)

FMH
G06I7-001.8

Customer: NHTSA
Test # 12
FM6259
Additional Desc: N/A

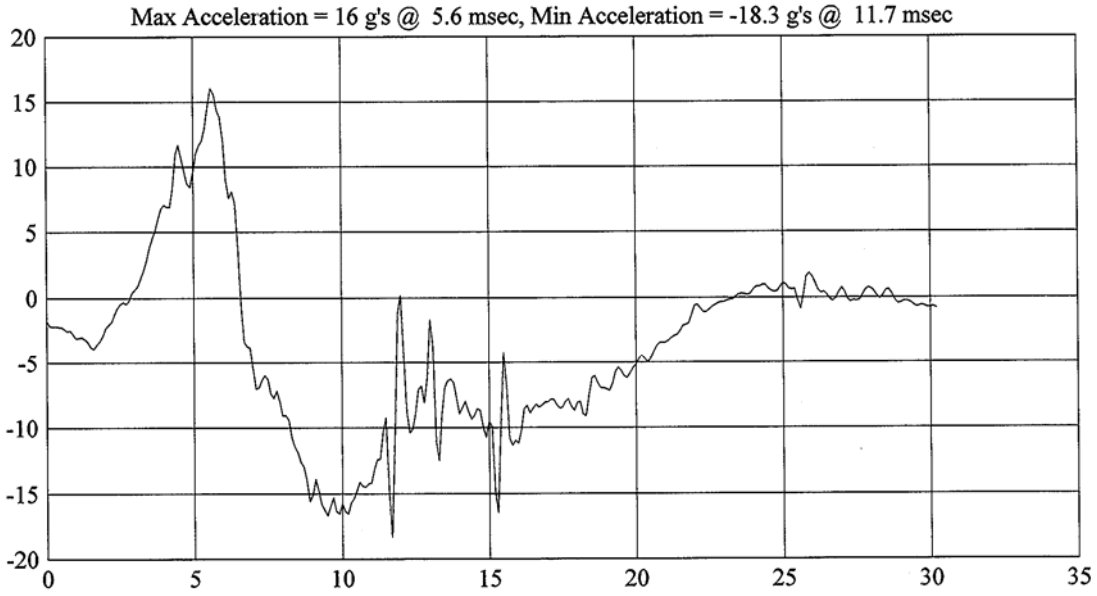
Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/40

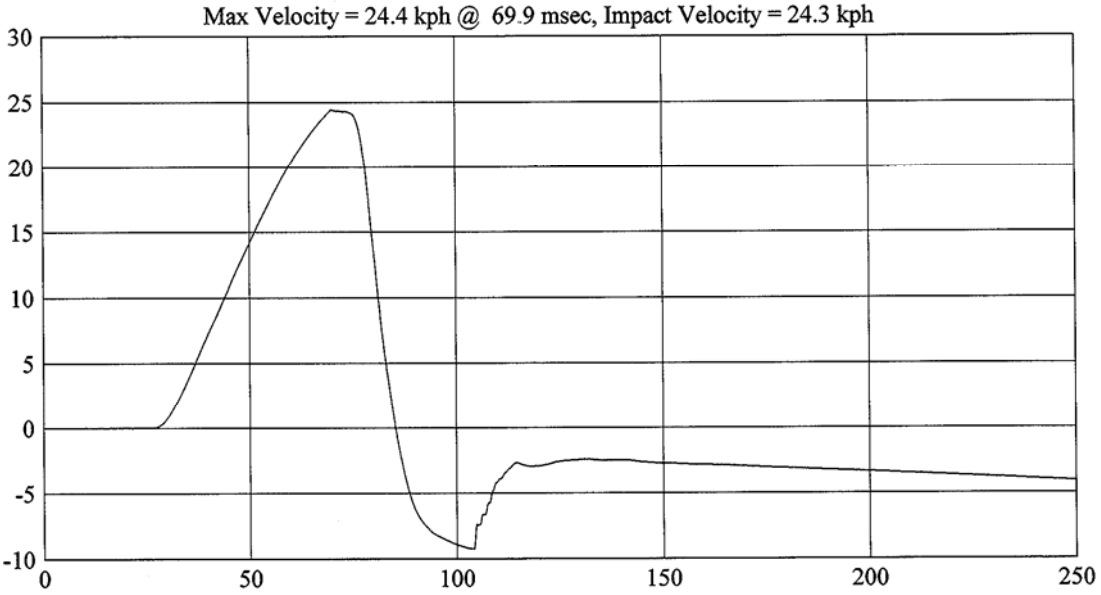
HIC(d) = 504, HIC = 447, Delta T = 10.4 msec

Max Acceleration = 16 g's @ 5.6 msec, Min Acceleration = -18.3 g's @ 11.7 msec



Accel Z (g's) vs. Time (msec)

Max Velocity = 24.4 kph @ 69.9 msec, Impact Velocity = 24.3 kph



Velocity (kph) vs. Time (msec)

FMH
G06I7-001.8

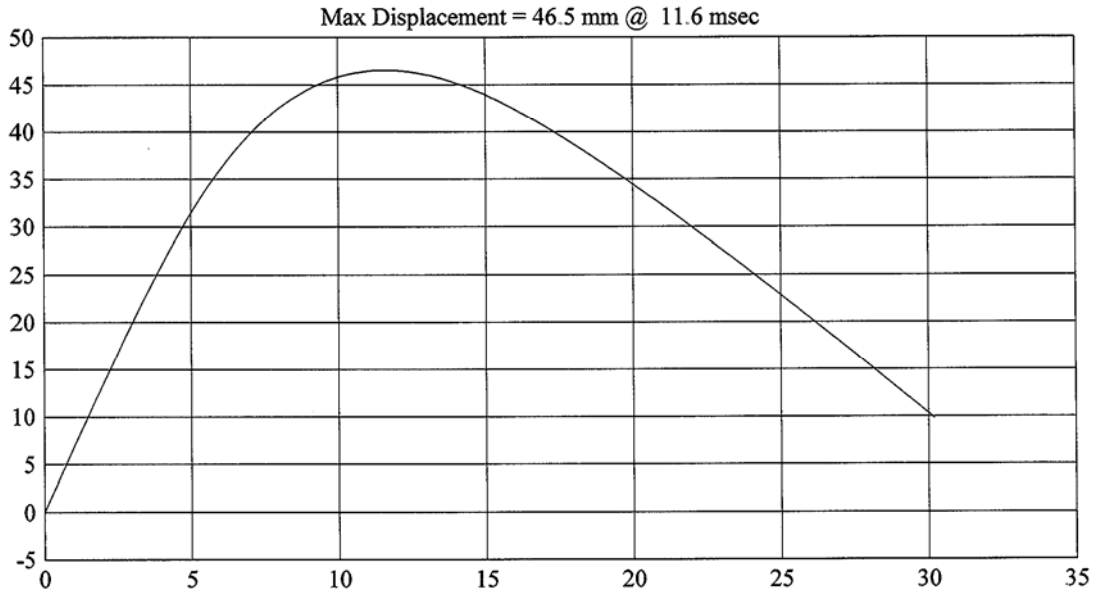
Customer: NHTSA
Test # 12
FM6259
Additional Desc: N/A

Vehicle Program : LAND ROVER LR3

Test Date: 9/15/2006

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/40

HIC(d) = 504, HIC = 447, Delta T = 10.4 msec



4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

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

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
*Digital Inclinometer	Macklanburg-Duncan	PRO 360 (MGA00060)	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	035 038 039	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Redlake	HGLE	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 Macklenburg-Duncan	 617 -- MGA00060	 Measurement Targeting FMH setup Horizontal Measurement	 1 mm N/A 0.5°	Annual
*Vehicle Scale	Intercomp	26032389	Weighing Vehicle	± .5 kg	Annual
* Scale	Detecto	AP-20 (MGA00081)	Weigh FMH Head	± 0.01 lb	Annual
*Temperature Recorder	Dickson	FH125	Record Temperature and Humidity	± 1°C ± 1% RH	Annual

TABLE 4-2 FMH CALIBRATION DATA SUMMARY TABLE

FMH Serial #		Weight (lbs)	Temp (^{O}C)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#35	10.03	21.0	66.0	247.7	1.8	Yes
Post	#35	10.03	22.0	53.0	245.7	10.2	Yes
Pre	#38	9.92	21.0	66.0	263.7	4.8	Yes
Post	#38	9.92	22.0	53.0	261.9	7.7	Yes
Pre	#39	10.00	21.0	66.0	257.9	6.5	Yes
Post	#39	10.00	22.0	53.0	249.2	8.6	Yes

RECORDED BY: Louis Campbell DATE: September 15, 2006

APPROVED BY: Helen A. Kaleto

4.1 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: __035____	CALIBRATION DATE: _09/12/2006___	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.03
Temperature	19° C to 26° C	21
Relative Humidity	10% to 70%	66
Peak Resultant Acceleration	225 G's to 275 G's	247.7
Peak Lateral Acceleration	15 G's Maximum	1.8
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	J35924	04/06/06	10/06/06
2	ENDEVCO	7264-2000	J35919	04/06/06	10/06/06
3	ENDEVCO	7264-2000	J22664	04/06/06	10/06/06

REMARKS:

RECORDED BY: _____ DATE: __09/12/2006____

APPROVED BY: _____

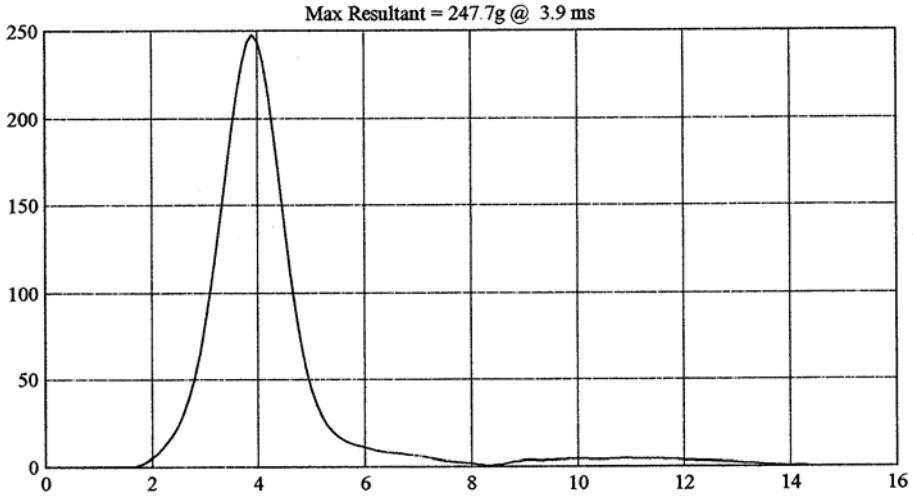
Head Drop
(Preliminary Test Report)

Test Number: H35331
Test Description: Pre

MGA Job Number: G06I7-001.8

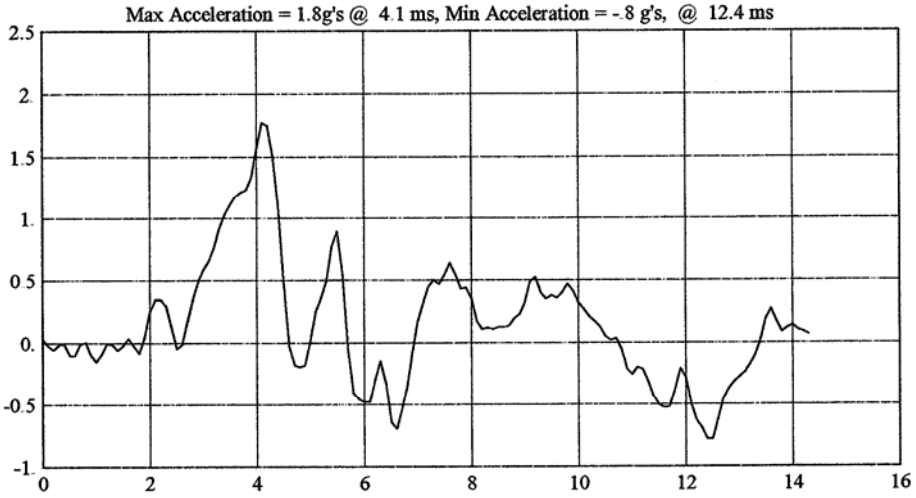
Test Date: 09/12/2006
Head # : 035

Max Resultant = 247.7g @ 3.9 ms



Resultant Accel (g's) vs. Time (msec)

Max Acceleration = 1.8g's @ 4.1 ms, Min Acceleration = -.8 g's, @ 12.4 ms



Accel Y(g's) vs. Time (msec)

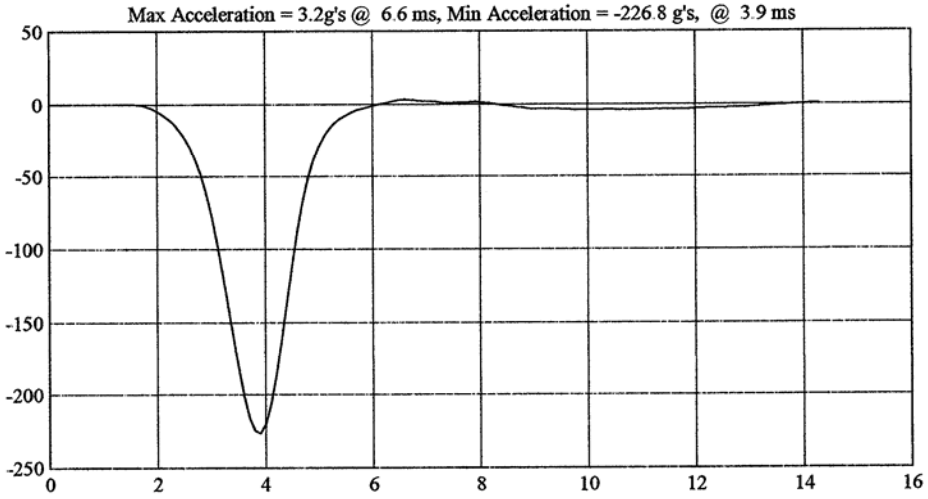
Head Drop
(Preliminary Test Report)

Test Number: H35331
Test Description: Pre

MGA Job Number: G06I7-001.8

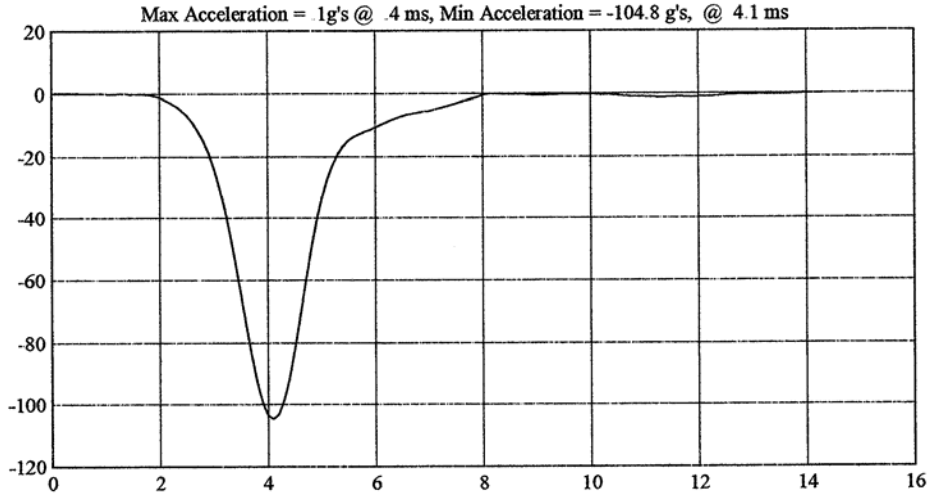
Test Date: 09/12/2006
Head # : 035

Max Acceleration = 3.2g's @ 6.6 ms, Min Acceleration = -226.8 g's, @ 3.9 ms



Accel X(g's) vs. Time (msec)

Max Acceleration = 1g's @ .4 ms, Min Acceleration = -104.8 g's, @ 4.1 ms



Accel Z(g's) vs. Time (msec)

page 2 of 2

4.2 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 035 CALIBRATION DATE: 09/15/2006

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%	53
Peak Resultant Acceleration	225 G's to 275 G's	245.7
Peak Lateral Acceleration	15 G's Maximum	10.2
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	J35924	04/06/06	10/06/06
2	ENDEVCO	7264-2000	J35919	04/06/06	10/06/06
3	ENDEVCO	7264-2000	J22664	04/06/06	10/06/06

REMARKS:

RECORDED BY: _____ DATE: 09/15/2006

APPROVED BY: Helen R. Kaleto

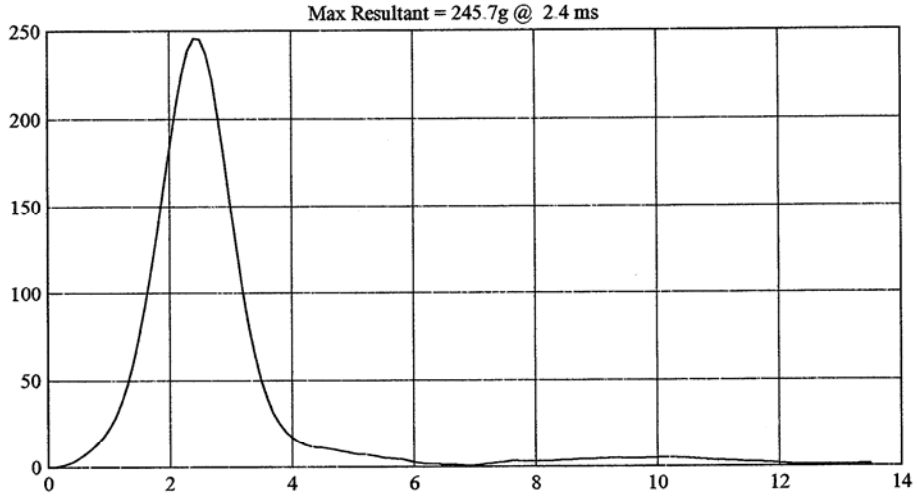
Head Drop
(Preliminary Test Report)

Test Number: H35332
Test Description: Post

MGA Job Number: G06I7-001.8

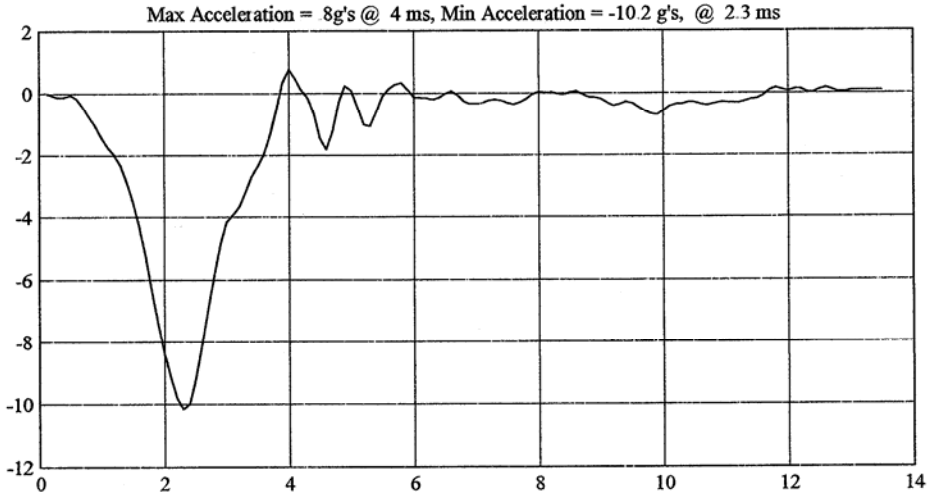
Test Date: 09/15/2006
Head # : 035

Max Resultant = 245.7g @ 2.4 ms



Resultant Accel (g's) vs. Time (msec)

Max Acceleration = 8g's @ 4 ms, Min Acceleration = -10.2 g's, @ 2.3 ms



Accel Y(g's) vs. Time (msec)

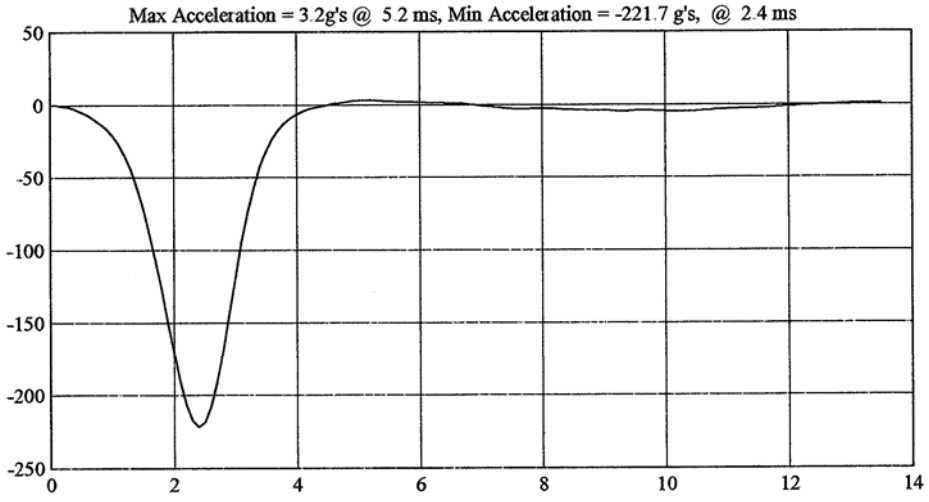
Head Drop
(Preliminary Test Report)

Test Number: H35332
Test Description: Post

MGA Job Number: G06I7-001.8

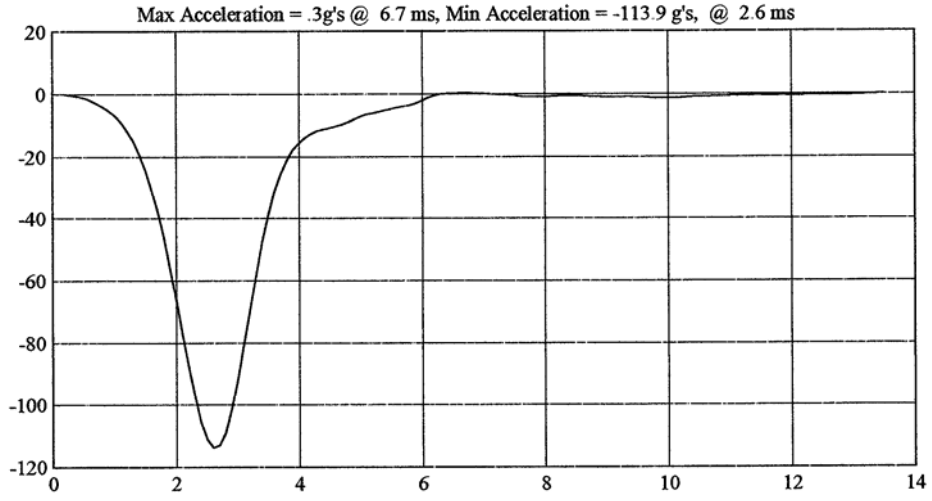
Test Date: 09/15/2006
Head # : 035

Max Acceleration = 3.2g's @ 5.2 ms, Min Acceleration = -221.7 g's, @ 2.4 ms



Accel X(g's) vs. Time (msec)

Max Acceleration = .3g's @ 6.7 ms, Min Acceleration = -113.9 g's, @ 2.6 ms



Accel Z(g's) vs. Time (msec)

4.3 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 09/12/2006	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	21
Relative Humidity	10% to 70%	66
Peak Resultant Acceleration	225 G's to 275 G's	263.7
Peak Lateral Acceleration	15 G's Maximum	4.8
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	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J36193	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J36353	04/07/06	10/07/06

REMARKS:

RECORDED BY: Kaitlin Campbell DATE: 09/12/2006

APPROVED BY: Helen A. Kalesto

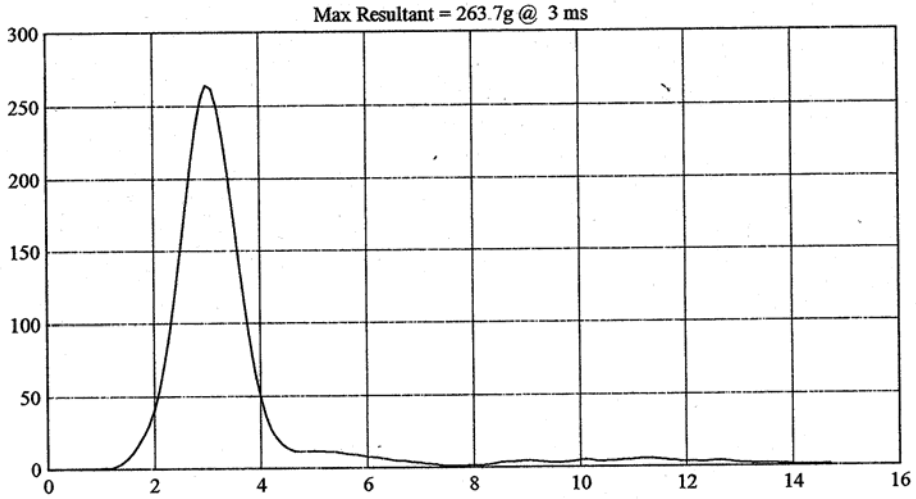
Head Drop
(Preliminary Test Report)

Test Number: H38307
Test Description: Pre

MGA Job Number: G06I7-001.8

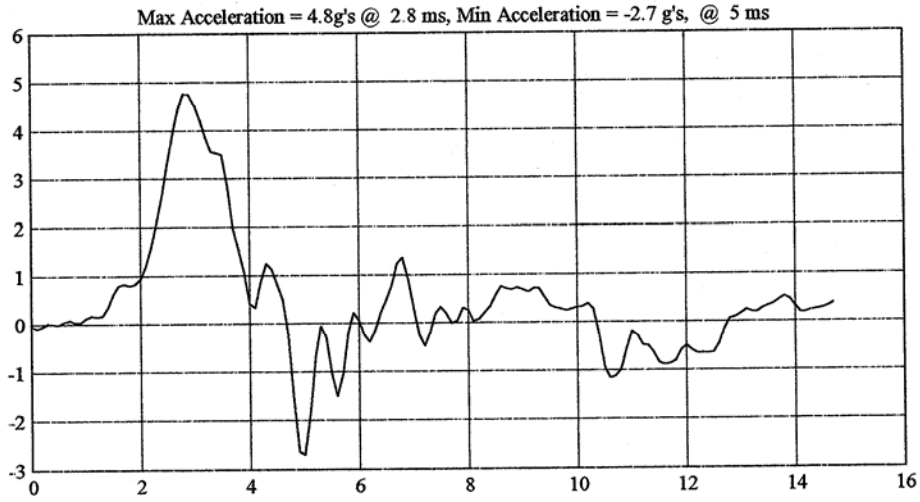
Test Date: 09/12/2006
Head # : 038

Max Resultant = 263.7g @ 3 ms



Resultant Accel (g's) vs. Time (msec)

Max Acceleration = 4.8g's @ 2.8 ms, Min Acceleration = -2.7 g's, @ 5 ms

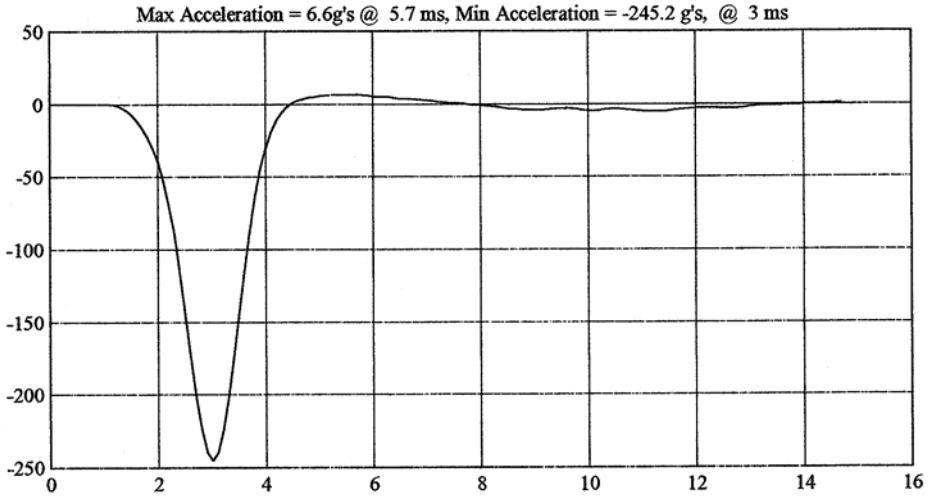


Accel Y(g's) vs. Time (msec)

Head Drop
(Preliminary Test Report)

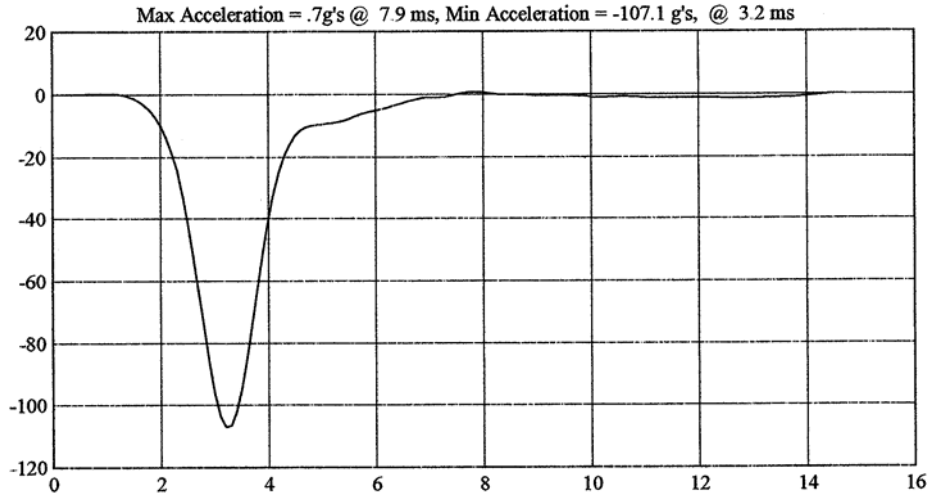
Test Number: H38307 MGA Job Number: G06I7-001.8 Test Date: 09/12/2006
Test Description: Pre Head # : 038

Max Acceleration = 6.6g's @ 5.7 ms, Min Acceleration = -245.2 g's, @ 3 ms



Accel X(g's) vs. Time (msec)

Max Acceleration = .7g's @ 7.9 ms, Min Acceleration = -107.1 g's, @ 3.2 ms



Accel Z(g's) vs. Time (msec)

4.4 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: __038____	CALIBRATION DATE: _09/15/2006___	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	53
Peak Resultant Acceleration	225 G's to 275 G's	261.9
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	J36197	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J36193	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J36353	04/07/06	10/07/06

REMARKS:

RECORDED BY: Kaitlin Campbell DATE: __09/15/2006____

APPROVED BY: Helen A. Kaleto

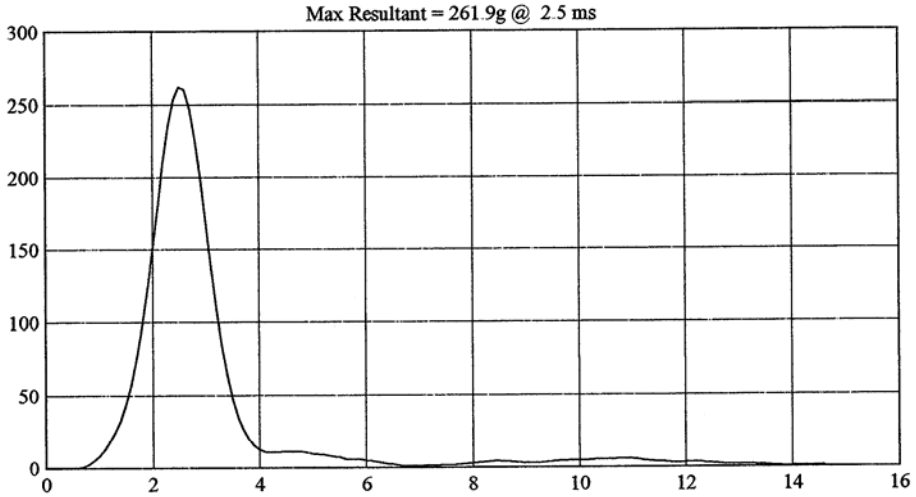
Head Drop
(Preliminary Test Report)

Test Number: H38308
Test Description: Post

MGA Job Number: G06I7-001.8

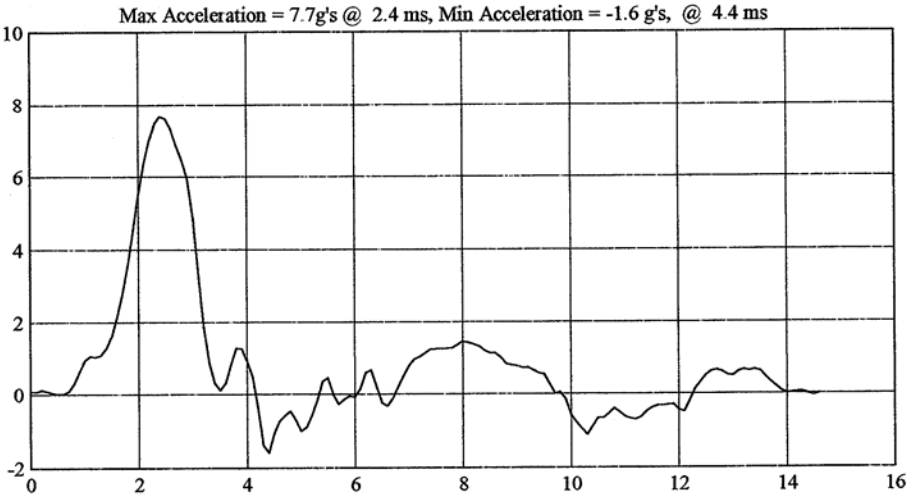
Test Date: 09/15/2006
Head # : 038

Max Resultant = 261.9g @ 2.5 ms



Resultant Accel (g's) vs. Time (msec)

Max Acceleration = 7.7g's @ 2.4 ms, Min Acceleration = -1.6 g's, @ 4.4 ms



Accel Y(g's) vs. Time (msec)

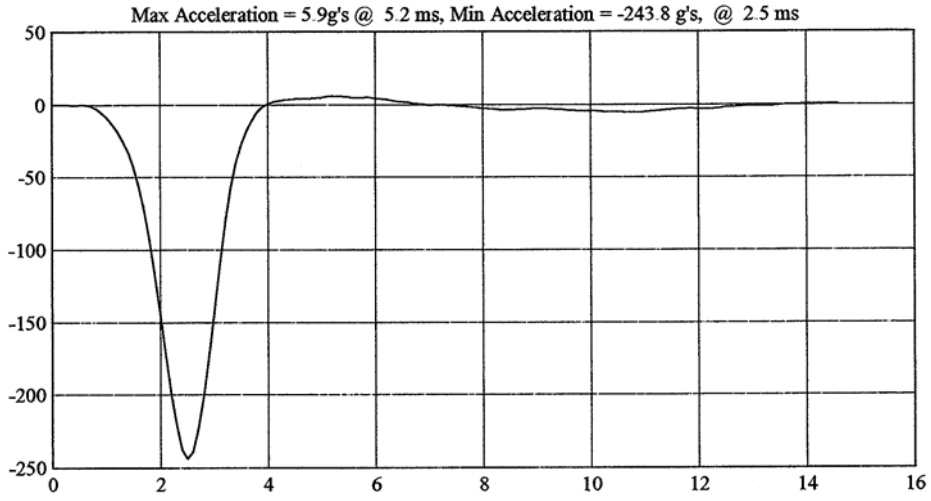
Head Drop
(Preliminary Test Report)

Test Number: H38308
Test Description: Post

MGA Job Number: G06I7-001.8

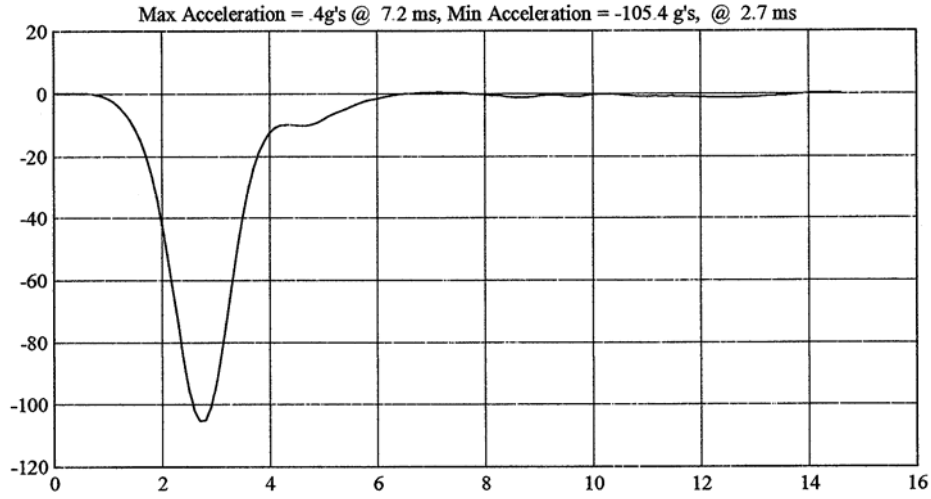
Test Date: 09/15/2006
Head # : 038

Max Acceleration = 5.9g's @ 5.2 ms, Min Acceleration = -243.8 g's, @ 2.5 ms



Accel X(g's) vs. Time (msec)

Max Acceleration = .4g's @ 7.2 ms, Min Acceleration = -105.4 g's, @ 2.7 ms



Accel Z(g's) vs. Time (msec)

4.5 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: __039____	CALIBRATION DATE: _09/12/2006___	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.00
Temperature	19° C to 26° C	21
Relative Humidity	10% to 70%	66
Peak Resultant Acceleration	225 G's to 275 G's	257.9
Peak Lateral Acceleration	15 G's Maximum	6.5
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J13753	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J22700	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J32734	04/07/06	10/07/06

REMARKS:

RECORDED BY: Kaitlin Campbell DATE: __09/12/2006____

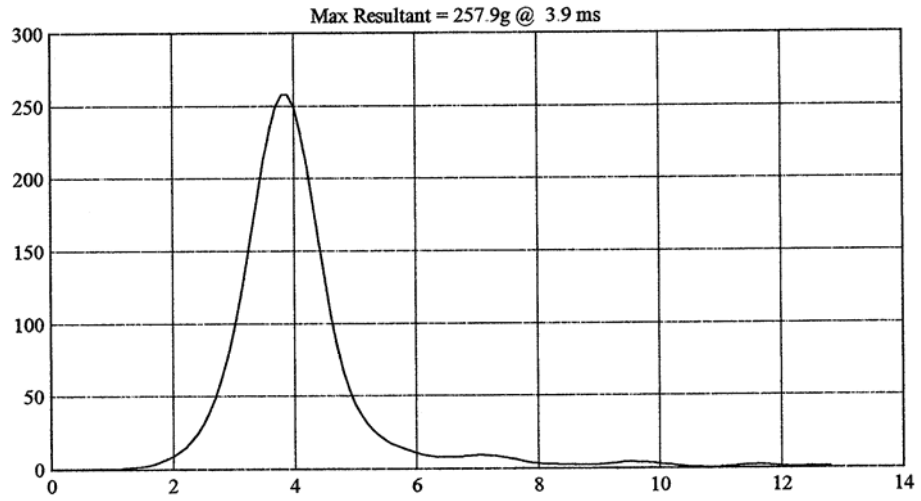
APPROVED BY: Helen A. Kalata

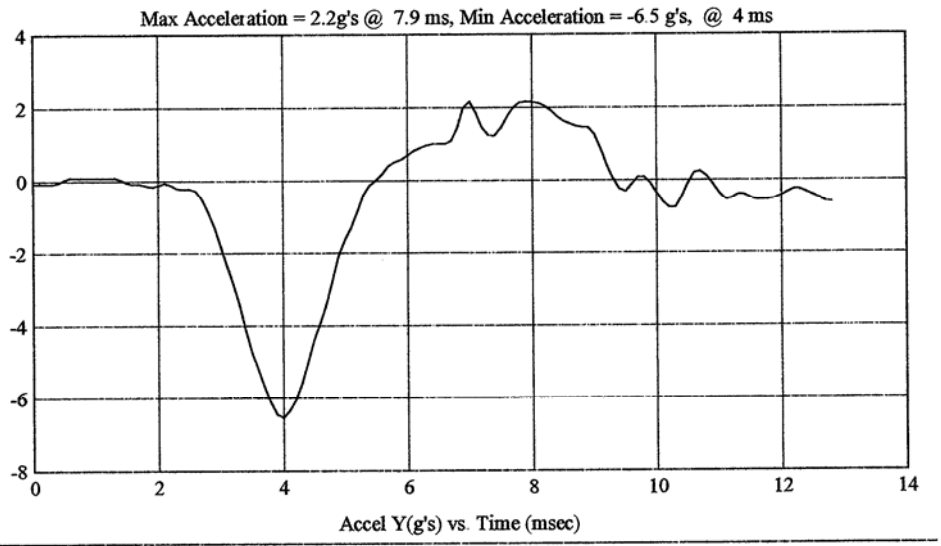
Head Drop
(Preliminary Test Report)

Test Number: H39018
Test Description: Pre

MGA Job Number: G06I7-001.8

Test Date: 09/12/2006
Head # : 039

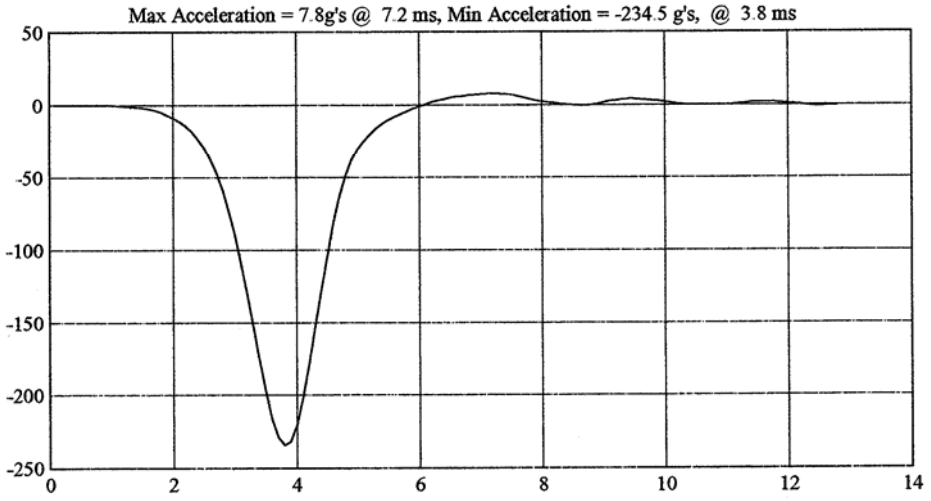




Head Drop
(Preliminary Test Report)

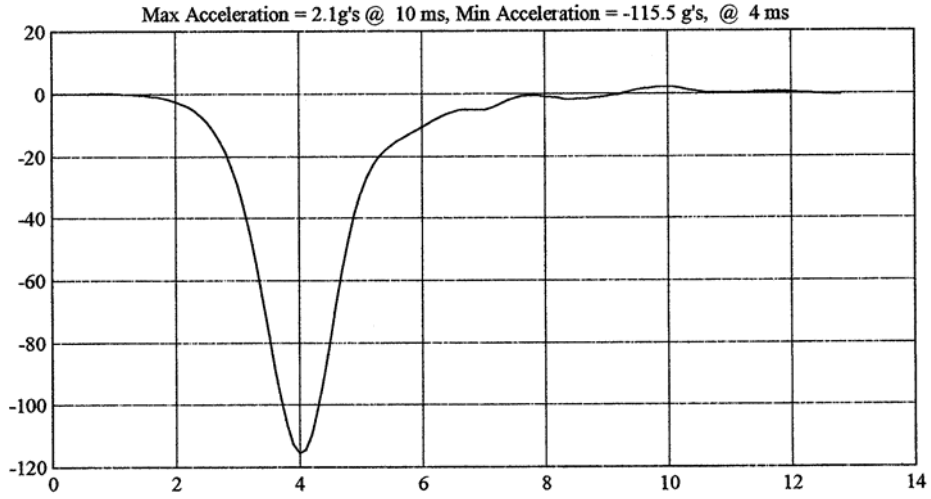
Test Number: H39018 MGA Job Number: G06I7-001.8 Test Date: 09/12/2006
Test Description: Pre Head # : 039

Max Acceleration = 7.8g's @ 7.2 ms, Min Acceleration = -234.5 g's, @ 3.8 ms



Accel X(g's) vs. Time (msec)

Max Acceleration = 2.1g's @ 10 ms, Min Acceleration = -115.5 g's, @ 4 ms



Accel Z(g's) vs. Time (msec)

page 2 of 2

4.6 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 039	CALIBRATION DATE: 09/15/2006	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	10.00
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	53
Peak Resultant Acceleration	225 G's to 275 G's	249.2
Peak Lateral Acceleration	15 G's Maximum	8.6
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J13753	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J22700	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J32734	04/07/06	10/07/06

REMARKS:

RECORDED BY: _____ DATE: 09/15/2006

APPROVED BY: Helen R. Kalista

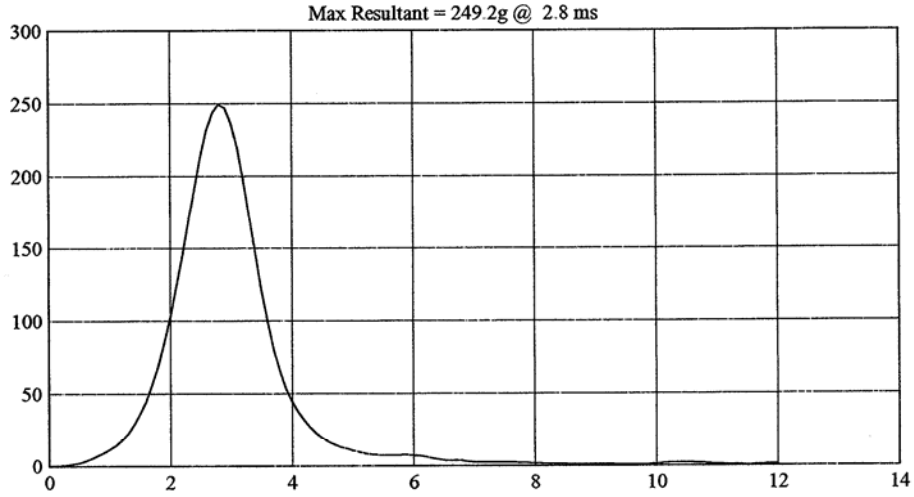
Head Drop
(Preliminary Test Report)

Test Number: H39019
Test Description: Post

MGA Job Number: G06I7-001.8

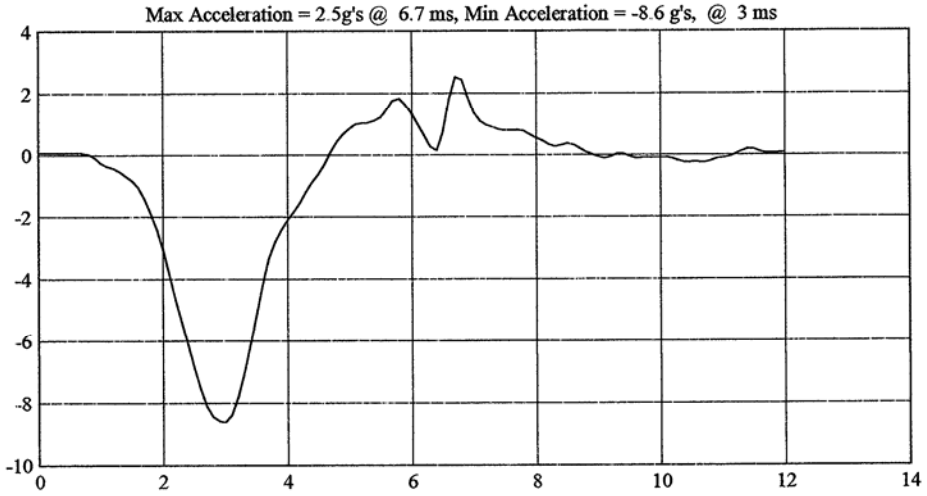
Test Date: 09/15/2006
Head # : 039

Max Resultant = 249.2g @ 2.8 ms



Resultant Accel (g's) vs. Time (msec)

Max Acceleration = 2.5g's @ 6.7 ms, Min Acceleration = -8.6 g's, @ 3 ms



Accel Y(g's) vs. Time (msec)

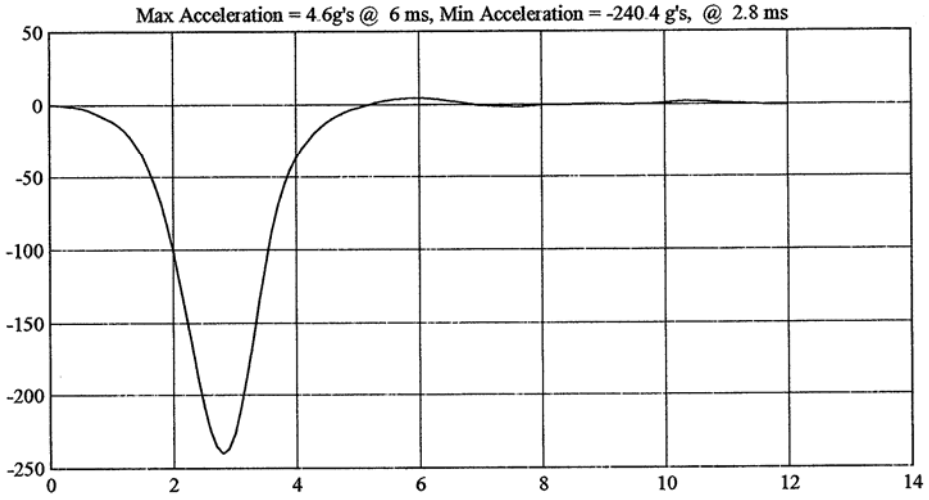
Head Drop
(Preliminary Test Report)

Test Number: H39019
Test Description: Post

MGA Job Number: G06I7-001.8

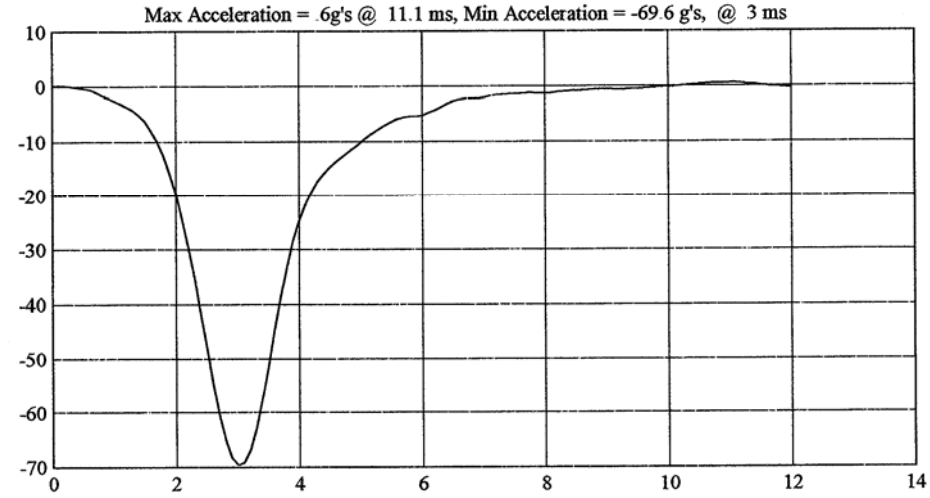
Test Date: 09/15/2006
Head # : 039

Max Acceleration = 4.6g's @ 6 ms, Min Acceleration = -240.4 g's, @ 2.8 ms



Accel X(g's) vs. Time (msec)

Max Acceleration = .6g's @ 11.1 ms, Min Acceleration = -69.6 g's, @ 3 ms



Accel Z(g's) vs. Time (msec)

5.0 PHOTOGRAPHS - As Delivered

Left-side View

Right-side view

¾ Front View From Left Side

¾ Rear View from Right Side

Vehicle's Certification Label

Vehicle's Tire Information Label

Pre-Test Component Photographs


BP1
BP2
BP3
BP4

Post-Test Component Photographs


mga
09/15/06
NHTSA
2006 LAND ROVER LR3
FMVSS 201U TESTING
POST-TEST COMPONENT
C60600
G06I7-001.8

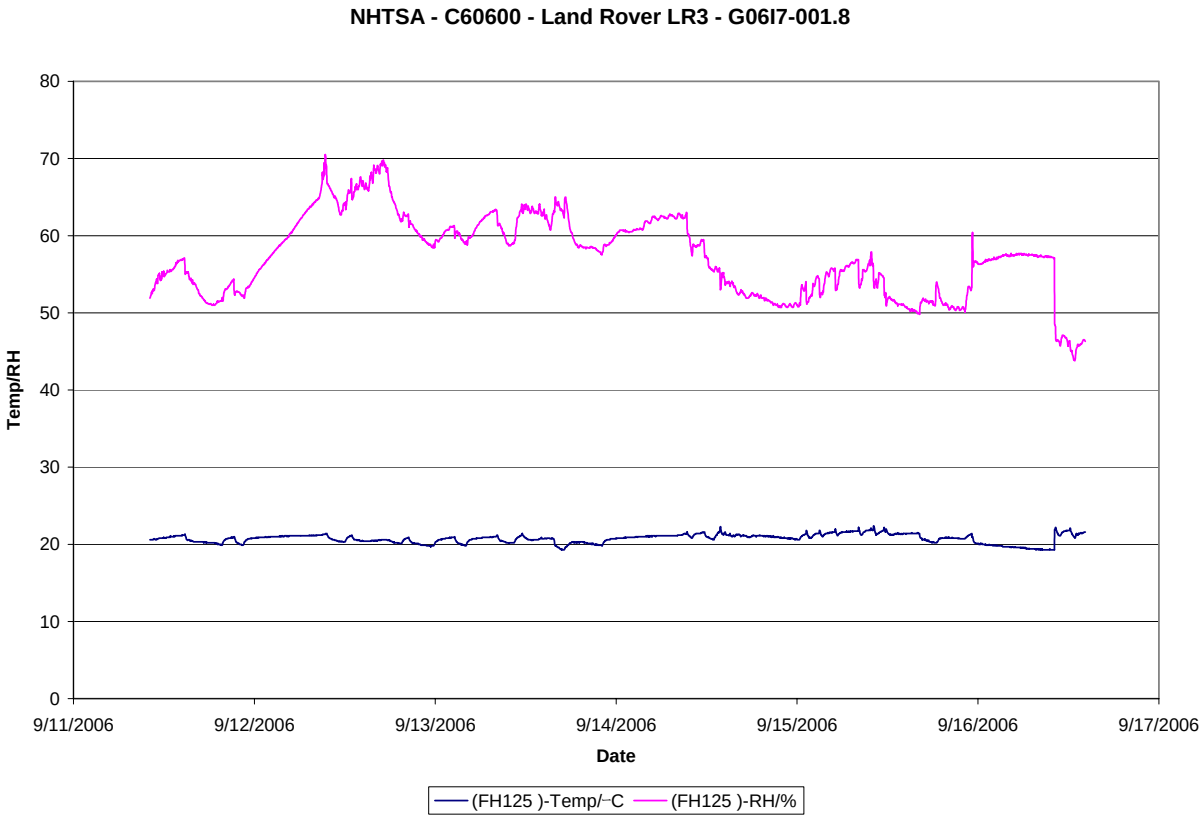

mga
09/15/06
NHTSA
2006 LAND ROVER LR3
FMVSS 201U TESTING
POST-TEST COMPONENT
C60600
G06I7-001.8


mga
09/15/06
NHTSA
2006 LAND ROVER LR3
FMVSS 201U TESTING
POST-TEST COMPONENT
C60600
G06I7-001.8


mga
09/15/06
NHTSA
2006 LAND ROVER LR3
FMVSS 201U TESTING
POST-TEST COMPONENT
C60600
G06I7-001.8


09/15/06
NHTSA
2006 LAND ROVER LR3
FMVSS 201U TESTING
POST-TEST COMPONENT
C60600
G06I7-001.8

Appendix A - Temperature Trace(s)



Appendix B -Calibration Certificates

mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J35924	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/06/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number:	A0602
New DLR (100k **, Units:G):**	91.4
StdDeviation (%)	0.333
% Difference in DLR (New vs. Old):	-0.253
Temperature (^{o}F):	74
Humidity (%):	34

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J35919	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/06/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number: A0602

New DLR (100k **, Units:G):** 94.4

StdDeviation (%) 0.447

% Difference in DLR (New vs. Old): -0.659

Temperature (^{o}F): 74

Humidity (%): 34

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J22664	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/06/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number: A0602

New DLR (100k **, Units:G):** 94.3

StdDeviation (%) 0.379

% Difference in DLR (New vs. Old): 1.167

Temperature (°F): 74

Humidity (%): 34

Performed By: Matt Kerr

Approved By: Helen A. Kaluto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J36197	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/07/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number: A0604

New DLR (100k **, Units:G):** 108.8

StdDeviation (%) 0.008

% Difference in DLR (New vs. Old): -1.418

Temperature (°F): 72

Humidity (%): 38

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J36193	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/07/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number: A0604

New DLR (100k **, Units:G):** 102.7

StdDeviation (%) 0.015

% Difference in DLR (New vs. Old): -1.848

Temperature (°F): 72

Humidity (%): 38

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J36353	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/07/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number:	A0604
New DLR (100k **, Units:G):**	97.2
StdDeviation (%)	0.003
% Difference in DLR (New vs. Old):	-0.381
Temperature (°F):	72
Humidity (%):	38

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J13753	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/07/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number: A0603

New DLR (100k **, Units:G):** 103.6

StdDeviation (%) 0.411

% Difference in DLR (New vs. Old): .013

Temperature (°F): 72

Humidity (%): 38

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J22700	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/07/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number:	A0603
New DLR (100k **, Units:G):**	94.4
StdDeviation (%)	0.342
% Difference in DLR (New vs. Old):	-1.008
Temperature (°F):	72
Humidity (%):	38

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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

mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	**Name:** *Reference Accelerometer*
Model: 7264-2000	**Model:** *301M09/484B*
S/N: J32734	**S/N:** *862/247*
Capacity: 2000 G	**Capacity:** *170 G*
Calibration Date: 04/07/2006	**Calibration Date:** *06/13/2005*
	Calibrated By: *Chuck DiMaggio/PCB Piezotronics, Inc.*

Test Reference Number:	A0603
New DLR (100k **, Units:G):**	95.5
StdDeviation (%)	0.25
% Difference in DLR (New vs. Old):	1.345
Temperature (°F):	72
Humidity (%):	38

Performed By: Matt Kerr

Approved By: Helen A. Kaleto

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ±4.1%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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

08/24/05 14:40 FAX 716 685 3886 PCB PIEZOTRONICS 002/00

~ Calibration Certificate ~

Per ISO 16063-21

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

Serial Number: 862/2470

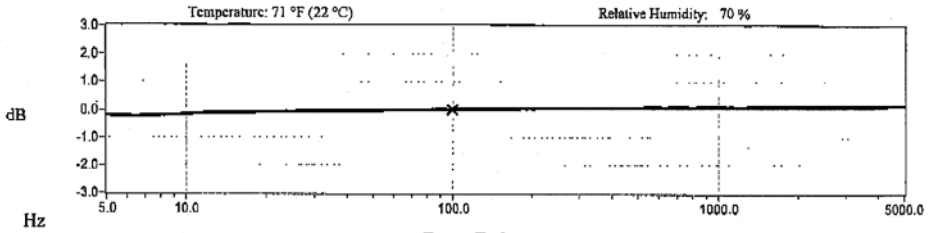
Description: ICP® Accelerometer Method: Back-to-Back Comparison Calibration

Manufacturer: PCB

Calibration Data

Sensitivity @ 100.0 Hz	**31.05**	**mV/g**	Output Bias	8.6	VDC
	(3.17	**mV/m/s²)**	Transverse Sensitivity	3.0	%

Sensitivity



Data Points

Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)
5.0	-2.3	REF. FREQ.	0.0	5000.0	1.8
10.0	-1.9	300.0	0.6		
15.0	-1.4	500.0	0.8		
30.0	-0.7	1000.0	1.0		
50.0	-0.4	3000.0	1.4		

Mounting Surface: Stainless Steel w/Silicone Grease Coating Fastener: Stud Mount Vertical
Acceleration Level (rms)*: 10.0 g (98.1 m/s²)*
*The acceleration level may be limited by shaker displacement at low frequencies. If the listed level cannot be obtained, the calibration system uses the following formula to set the vibration amplitude: Acceleration Level (g) = 0.010 x (f(Hz))²
*The gravitational constant used for calculations by the calibration system is: 1 g = 9.80665 m/s².

Condition of Unit

As Found: In Tolerance, No Adjustment Necessary

As Left: In Tolerance

Notes

1. Calibration is NIST Traceable thru Project 822/271196 and PTB Traceable thru Project 5399.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 9001, ISO 10012-1, ANSI/NCSL Z540-1-1994 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. Due to state of the art limitations, the test accuracy ratio is 2:1. 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 Date: 06/13/05

ACCREDITED
Cert No 1862.01

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

PAGE 1 of 1

cal3 - 2201505619.39

~Certificate of Calibration~

Model Number: 484B
Serial Number: 2470
Description: Signal Conditioner
Test Procedure: AT-106-1
Temperature: 70° F

N.I.S.T. Project #: F2565002/5UU2VF-2-1/81000539626720012
Calibration Date: 6/15/2005
Recalibration Date:
Calibration Technician: James Higbee 2b
Relative Humidity: 54%

Volts	*Current (mA)*	*Gain**
24.0	3.85	1.000

As Received: In tolerance, no adjustment required.

As Left: In tolerance.

Special Notes:

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

ACCREDITED
Cert. No. 1862.01

PCB PIEZOTRONICS

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

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

Interim Certification Document

rt Description: Gold **Certification Date:** 07/21/06 **Serial#:** G08-02-02-03122

ngle Point 2 Sigma: G08-02 +/-.051mm (+/-.0020") **Certificate#:** G0312238919

near Displacement 2 Sigma: G08-02 +/-.072mm (+/-.0028") **Ambient Temperature: 22°C +/- 3°C**

easurement Standards Traceability

Ball Bar Kit	Asset Number: 1041	Calibration Date: 06/07/06	*SI Traceability: NPL-LL0101/0501
10mm Step Gauge, Mitutoyo Code No.: 515-744 Measuring range: 1.5m	Asset Number: 682	Calibration Date: 10/03/05	*SI Traceability: NIST-821/270467-04

*The artifact above has been calibrated with a device traceable to the International System of Units (SI) through a National Metrological Institute (NMI) or through an ISO17025 Accredited Laboratory. Expanded measurement uncertainty is 3.9 + 5.9X micrometers, where X=measured value in meters. Uncertainty is expressed at approximately the 95% Level of Confidence using k=2.00.

ertification Results

A basic four quadrant certification included with all FARO Arms and comprised of: 2 vertical level single point repeatability test in 4 quadrants with 5 repeats from 4 directions	**PASSED**
Step Gauge Test in 4 quadrants, 3 orientations per quadrant	**PASSED**
3 Length, 3 position free ball bar test in 4 quadrants	**PASSED**

Calibration and certification conforms to procedures developed in accordance with ASME B89.4.22-200X.

Instrument condition as received
Not within specifications

Instrument condition outgoing
Within specifications

Technician: David Richards Date: 7/21/06

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

FAX:248-669-8656

46998 Magellan Drive
Wixom, MI 48393
USA

FARO®

LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 Accredited

MICHIGAN OPERATIONS
DATE: 2/7/04
SUPERCEDES: MGATPTMC.5

DOC. NO.: MGATPTMC
REVISION NO.: 6
PAGE 3 OF 3

Tape Measure Calibration Certificate

Reference Steel Rule
Brand: GEI SYRACUSE
S/N: MGA00067
Calibration Date: 8.30.05

Subject Tape Measure
Brand: STANLEY
S/N: Q17
Calibration Date: 12.20.2005

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

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

Date: 12.20.2005 Performed By: [signature]

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

[signature] 1/5/06

MetroCal inc.
#0513.01
4700 Barden Court S.E. • Kentwood, MI 49512 • Telephone: 616.698.3124 • Fax: 616.698.2364

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Order Number: **48016**
Report Number: **060209704**
Page: **1 of 1**

Gauge Number: **MGA00060**
Gauge Desc: **Digital Protractor**
Manufacturer: **Macklanburg-Duncan**
Model Number: **Pro 360**
Serial Number: **N/A**

Customer PO: **07-05-1517**
Last Calibration: **1/19/05**
Calibration Date: **2/9/06**
Next Calibration: **2/9/07**

As Found Condition: **In Tolerance** As Left Condition: **In Tolerance**

MetroCal Inc. maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Proc. No. CP045 and complies with the ANSI/NCSL Z540-1 and ISO/IEC 17025 Standards. Results shall not be reproduced except in full without the written approval of MetroCal, Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration Item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence (K=2)
Gage Blk Set ID# 105	6/6/05	6/6/06	821/270003-04	(0.6R + 2L)microinches
DoAll Sine Bar ID#1879	12/6/05	12/6/06	821/270003-04 & 3600042619	

Results:

As Found Readings

Units	Nominal	Actual	Deviation
Decimal Deg.	5.00	5.0	0.00
	10.00	10.0	0.00
	20.00	19.9	-0.10
Tolerance	30.00	29.9	-0.10
± 0.1°	40.00	40.0	0.00

Reference Level Check: Within +/- .1 degrees

As Left Readings

Nominal	Actual	Deviation
5.00	5.0	0.00
10.00	10.0	0.00
20.00	19.9	-0.10
30.00	29.9	-0.10
40.00	40.0	0.00

Reference Level Check: Within +/- .1 degrees

Comments: Environmental conditions during calibraiton: 68 deg. F., 41 % RH.
No adjustments required.

Bill Rinzema/bjk
Calibration Technician
issued: 2-9-06

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

JH 2/21/06

Form: F410/12-3 Revision Date 03-11-03
Revision Level: E
STANDARD FORM

20950 Boening St.
Southfield Mi.48075
Phone (248) 358-0590 Fax (248) 355-2529

Sterling Scale Company Inc.
Scale Certificate of Calibration

Customer: MGA RESEARCH

Location of Calibration: 446 EXECUTIVE DRIVE
TROY, MI 48083

Certification Number: 9436

Date of Calibration: 7-20-06

**Next Calibration Due: 7-07

Environmental Condition: (Good) Fair Poor

Make:	Model:	Serial/ID#:	Capacity:
SW SCALES	SW DELUXE	26032389	8800 x 11b

This certifies that the above scale has been calibrated using the relevant EPO, original equipment manufacturer calibration procedures along with Handbook 44 tolerances using weights traceable to the National Institute of Standards and Technology as well as the International Systems of Units (SI).

Sterling Scale Weight/Weight kit serial #: 1216, 1218, 1220, 1221, 50967, 10002

Calibrated to class: III

Date Weight/Weight kit calibrated: 4/06 9/05

Date Weight/Weight kit due: 4/08 9/07

Expanded Uncertainty (k=2) confidence level of 95% is reported with the before and after readings on next page.

Temperature 78 Humidity 66

Pg 1 of 3

These items relate only to these results
Tolerances followed are maintenance/acceptance per HB-44
This report shall not be reproduced, except in full, without written approval of the laboratory.
**** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.**
The reported uncertainty is valid only for the environment in which it is determined.

7/20/06

A2LA ACCREDITED
1448.01

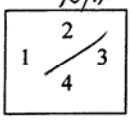
Form: F410/12-3 Revision Date 03-11-03
Revision Level: E
STANDARD FORM

20950 Boening St.
Southfield Mi.48075
Phone (248) 358-0590 Fax (248) 358-0590

Sterling Scale Company Inc.
Scale Certificate of Calibration

	Applied Test Weight	Before Adjustment	Tolerance +/-	in tolerance Y / N	After Adjustment	in tolerance Y / N	expanded uncertainty
RP1)	50 LB	50 LB	1 LB	Y	50 LB	Y	.003 LB
	1000 LB	1000 LB	2 LB	Y	1000 LB	Y	.06 LB
	2200 LB	2200 LB	2 LB	Y	2200 LB	Y	.13 LB
RP2)	50 LB	50 LB	1 LB	Y	50 LB	Y	.003 LB
	1000 LB	1000 LB	2 LB	Y	1000 LB	Y	.06 LB
	2200 LB	2200 LB	2 LB	Y	2200 LB	Y	.13 LB

Shift test. N/A



4 PAD SYSTEM

	1	2	3	4
Before Adj.				
After Adj.				

Scale condition as found: GOOD

Tests performed: ☒ Repeatability ☒ Linearity ☐ Sensitivity ☒ Discrimination

☒ **Scale Certified** ☐ **Scale Rejected**

If scale is rejected, why?

GARY
Sterling Scale Service Rep. **Date:** 1-20-06 pg 2 of 3

These items relate only to these results.
This report shall not be reproduced, except in full, without written approval of the laboratory.
Tolerances followed are maintenance/acceptance per HB-44
**** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.**

ACCREDITED
1448.01

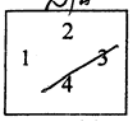
Form: F410/12-3 Revision Date 03-11-03
Revision Level: E
STANDARD FORM

20950 Boening St.
Southfield Mi.48075
Phone (248) 358-0590 Fax (248) 358-0590

Sterling Scale Company Inc.
Scale Certificate of Calibration

	Applied Test Weight	Before Adjustment	Tolerance +/-	in tolerance Y / N	After Adjustment	in tolerance Y / N	expanded uncertainty
LR3)	50 LB	50 LB	1 LB	Y	50 LB	Y	.003 LB
	1000 LB	1000 LB	2 LB	Y	1000 LB	Y	.06 LB
	2200 LB	2200 LB	2 LB	Y	2200 LB	Y	.13 LB
LF4)	50 LB	50 LB	1 LB	Y	50 LB	Y	.003 LB
	1000 LB	1000 LB	2 LB	Y	1000 LB	Y	.06 LB
	2200 LB	2200 LB	2 LB	Y	2200 LB	Y	.13 LB

Shift test. N/A



4 PAD System

	1	2	3	4
Before Adj.				
After Adj.				

Scale condition as found: GOOD

Tests performed: ☒ Repeatability ☒ Linearity ☐ Sensitivity ☒ Discrimination

☒ **Scale Certified** ☐ **Scale Rejected**

If scale is rejected, why?

GARY
Sterling Scale Service Rep. **Date:** 7-26-06 pg 3 of 3

These items relate only to these results.
This report shall not be reproduced, except in full, without written approval of the laboratory.
Tolerances followed are maintenance/acceptance per HB-44
**** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.**

ACCREDITED
1448.01

MetroCal inc.
#0513.01
4700 Barden Court S.E. • Kentwood, MI 49512 • Telephone: 616.698.3124 • Fax: 616.698.2364

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Order Number: **50054**
Report Number: **060707606**
Page: **1 of 1**

Gauge Number: **MGA00081**
Gauge Desc: **0 to 20lb x .01lb Digital Scale**
Manufacturer: **Detecto**
Model Number: **AP-20**
Serial Number: **E33603-0213**

Customer PO: **07-05-1590**
Last Calibration: **4/8/05**
Calibration Date: **7/7/06**
Next Calibration: **7/7/07**

As Found Condition: **In Tolerance**

As Left Condition: **In Tolerance**

MetroCal Inc. maintains reference standards of measurement which traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal's Procedure No. CP-042 and the relevant sections of the manufacturers manual. This Calibration complies with the ISO/IEC 17025 and ANSI/NCSL Z540-1 Standards. Results shall not be reproduced except in full without the written approval of MetroCal Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal. Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence , (K=2)
Dead Weight Set ID#2463	8/20/04	8/20/06	MI-04-04-7444	+/-0.001% of Load

Results:

Tolerance used: ± 1 Division

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

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

Comments: Environmental conditions during calibration: 68° F, 40% RH.

Karen Shipley issued: 7/7/06
Karen Shipley/bjk
Calibration Technician

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

7/12/06

Certificate of Instrument Calibration and Testing

Customer Instrument

Dickson Model Number: FH125
Serial Number: 06018122
Calibration Technician *Dan Gawel*
Calibration Date: 01/20/2006

Calibration Standards

ACCREDITED Cert # 1621.01

General Eastern: Model # M3
Ser. # 0850800 / 2360502
Accuracy: ± .4% FS RH and ± .4 °F
Certified Feb, 2005

Azonix Model # A1011 Ser. # T2513-9027
RTD Platinum Probe Ser. # 496013 Accuracy: ± .2 °F
Certified March, 2005

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

Calibration Procedure P1130

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

Environmental Conditions

72 °F 41 %RH

Calibration Standard Reading	Customer Instrument Reading	Unit Specification
Humidity (%RH)	Humidity (%RH)	Humidity
21.1	22.4	± 2% RH
30.7	30.6	± 2% RH
80.3	81.3	± 3% RH
Temperature °F	Temperature °F	Temperature
12.4	12.5	± 1.8 °F (± 1.0 °C)
72.7	73.1	
111.1	110.7	

The FH125 has an ISO/IEC 17025 required NIST Technical note 1297, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, estimated measurement uncertainty at 95% CL (K=2) of ±0 7°F and ±1 1 %RH

FOR YOUR NEXT CALIBRATION NO PHONE CALLS REQUIRE

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

That's all there is to it!

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

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

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

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

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

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

Prices are subject to change

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

Returned UPS 2nd Day unless otherwise requested

4. Ship To: _____

Bill To: _____

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

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