

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

1997 SATURN SL
4-DOOR SEDAN
NHTSA NO: MV0116

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: February 10, 1997

Report Date: February 18, 1997

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY PERFORMANCE STANDARDS
OFFICE OF CRASHWORTHINESS STANDARDS
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WASHINGTON, D.C. 20590

This Final Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-93-C-02047.

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Approval Date: *March 7, 1997*

FINAL REPORT ACCEPTED BY (OCWS):

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 214D-MGA-97-17		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle New Car Assessment Program Side Impact Test of a 1997 Saturn SL 4-Door Sedan NHTSA No. MV0116			5. Report Date February 10, 1997		
			6. Performing Organization Code MGA		
7. Author(s) Hans Hauschild, Project Engineer			8. Performing Organization Report No. MGA-DOT-214-0		
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105			10. Work Unit No.		
			11. Contract or Grant No. DTNH22-93-C-02047		
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 400 Seventh St., S.W. Washington, D.C. 20590			13. Type of Report and Period Covered Final Test Report February 10, 1997 to February 18, 1997		
			14. Sponsoring Agency Code NPS-10		
15. Supplementary Notes					
16. Abstract A 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 1997 Saturn SL 4-Door to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on February 10, 1997. The impact velocity of the Moving Deformable Barrier (MDB) was 61.5 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 21°C. The target vehicle post test maximum crush was 395 mm at level 3. The test vehicle's performance follows:					
		<u>DRIVER</u>		<u>PASS.</u>	
Left Upper Rib (LUR) Accel., g		86.0		83.6	
Left Lower Rib (LLR) Accel., g		83.9		90.5	
Lower Spine (T ₁₂) Accel., g		90.4		88.4	
Thoracic Trauma Index (TTI)		88.2		89.5	
Pelvis (PEV) Accel., g		123.8		84.5	
The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					
17. Key Words New Car Assessment Program (NCAP) FMVSS No. 214D Side Impact Dummy (SID) Occupant Side Impact Protection			18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590 Telephone No. 202-366-4946 Attn: Robert Hornickle		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 299	22. Price

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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY97 NCAP Side Impact Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-93-C-02047. The purpose of this test was to evaluate side impact protection of a 1997 Saturn SL 4-Door.

This side impact test was conducted in accordance with the New Car Assessment Program Side Impact Testing Procedure dated October 1996.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes only.

SECTION 2
SUMMARY OF SIDE IMPACT TEST

A 1997 Saturn SL 4-Door was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 38.2 mph (61.5 kph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on February 10, 1997. Pre- and post-test photographs of the test vehicle, the MDB and the side impact dummies (SIDs) are included in Appendix A.

Two Side Impact Dummies (SIDs) were placed in the driver and left rear designated seating positions according to instructions specified in the New Car Assessment Program Side Impact Laboratory Test Procedure which is dated October 1996. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report.

The SIDs were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

Appendix B contains the vehicle and dummy response data traces. A summary of the side impact dummy (SID) configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.

The following table summarizes the results of the test:

Injury Criteria	Front SID	Rear SID
TTI (g)	88.2	89.5
Pelvis (g)	123.8	84.5

SECTION 3
SIDE IMPACT DUMMY (SID) AND
VEHICLE TEST DATA

DATA SHEET NO. 1
GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door
Vehicle NHTSA No.: MV0116 VIN: 1G8ZF528ZV235843
Vehicle Body Color: Silver Build Date: 11/96
Engine Data: 4 Cylinders; CID; 1.9 Liter; cc
Placement Longitudinal; X Lateral
Transmission: 5 Speed; X Manual; Automatic; Overdrive
Final Drive: Rear Wheel Drive; X Frt. Wheel Drive; Four Wheel Drive

Odometer Reading 101 miles
Options: X A/C; X Pwr. Steering; X Pwr. Brakes; Pwr. Windows;
 Cruise Control; X Tilt Wheel; Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 Psi FRONT
26 Psi REAR
Recommended Tire Size: P175/70/R14
Tires on Test Vehicle: P175/70/R14 Manufacturer: Firestone

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; 3rd Seat, 5 Total
Type of Front Seats: X Bucket; Bench; Split Bench
Type of Front Seat Back: Fixed; X Adjustable with X Lever
Vehicle Maximum Capacity Loading = 391.8 kg (A)
No. of Occupants x 68.04 kg. = 340.2 kg (B)
Cargo Capacity (A-B) = 51.6 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>318.3</u>	kg	Right Rear	=	<u>208.1</u>	kg
Left Front	=	<u>318.8</u>	kg	Left Rear	=	<u>208.6</u>	kg
TOTAL FRONT	=	<u>637.1</u>	kg	TOTAL REAR	=	<u>416.7</u>	kg
% of Total Vehicle Weight	=	<u>60.5</u>	%;	% of Total Weight	=	<u>39.5</u>	%
TOTAL WEIGHT	=	<u>1053.8</u>	kg				

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1053.8</u> kg
Cargo Carrying Capacity of Test Vehicle	=	<u>51.6</u> kg
Weight of 2 Side Impact Dummies (2 x <u>80.7</u> kg.)	=	<u>161.4</u> kg
TEST VEHICLE TARGET WEIGHT	=	<u>1266.8</u> kg

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO: (FULLY LOADED)

Right Front	=	<u>319.2</u> kg	Right Rear	=	<u>273.9</u> kg
Left Front	=	<u>375.9</u> kg	Left Rear	=	<u>297.5</u> kg
TOTAL FRONT	=	<u>695.1</u> kg	TOTAL REAR	=	<u>571.4</u> kg
% of Total Weight	=	<u>54.9</u> %	% of Total Weight	=	<u>45.1</u> %
TOTAL TEST WEIGHT	=	<u>1266.5</u> kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 666 mm Left Front 668 mm Right Rear 671 mm Left Rear 665 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 655 mm Left Front 644 mm Right Rear 643 mm Left Rear 623 mm

TEST ATTITUDE:

Right Front 651 mm Left Front 650 mm Right Rear 652 mm Left Rear 632 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2598 mm

C.G. (Fully Loaded) = 1172 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4195 mm

Centerline = 3620 mm

Left Side = 4195 mm

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

Overall Length = 4520 mm; Overall Width = 1704 mm

TEST WEIGHT:

Right Front = 338.3 kg Right Rear = 264.4 kg

Left Front = 378.7 kg Left Rear = 280.7 kg

TOTAL FRONT = 717.0 kg TOTAL REAR = 545.1 kg

% of Total Weight = 56.8% % of Total Weight = 43.2%

TOTAL VEHICLE WEIGHT = 1262.1 kg

Wheelbase = 2598 mm

Longitudinal C.G. from Center of Front Axle = 1122 mm

Impact Angle with Respect to Impactor = 90° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (268 mm above ground) = 211 mm

2. LEVEL 2 (443 mm above ground) = 394 mm

3. LEVEL 3 (542 mm above ground) = 395 mm

4. LEVEL 4 (835 mm above ground) = 308 mm

5. LEVEL 5 (1274 mm above ground) = 69 mm

Maximum Post-Test Intrusion = 395 mm

OCCUPANTS:

	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>type II belt</u> <u>and frontal airbag</u>	<u>type II belt</u>

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION:

Number of Vehicle Data Channels:	=	<u>23</u>
Number of Cameras: Onboard Vehicle	=	<u>3</u>
Offboard Vehicle	=	<u>4</u>
Deformable Barrier	=	<u>2</u>
TOTAL	=	<u>9</u>

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>1252 mm</u>
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4115 mm</u>
Wheelbase of Framework Carriage	=	<u>2591 mm</u>
Tread of Framework Carriage (Front & Rear)	=	<u>1880 mm</u>
C.G. Location Rearward of Front Axle	=	<u>1102 mm</u>
C.G. Location From Center Line	=	<u>-23 mm</u>
C.G. Location Above Ground Level	=	<u>508 mm</u>

MDB WEIGHT:

Left Front	=	<u>396.1 kg</u>	Left Rear	=	<u>284.4 kg</u>
Right Front	=	<u>383.4 kg</u>	Right Rear	=	<u>293.8 kg</u>
TOTAL FRONT	=	<u>779.5 kg</u>	TOTAL REAR	=	<u>578.2 kg</u>
TOTAL MDB WEIGHT	=	<u>1357.7 kg</u>			

Impact Angle (MDB C/L to Target Vehicle C/L) = 90° degrees

Impact Speed = Primary: 38.2 mph (61.5 kph) Secondary: 38.2 mph (61.5 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Top of Stack (813 mm) = 159 mm
2. Row B Mid Stack (686 mm) = 115 mm
3. Row C Top of Bumper (533 mm) = 83 mm
4. Row D Center of Bumper (432 mm) = 103 mm

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>to B-pillar and right front seat headrest</u>	<u>to C-pillar</u>
Arm	<u>to door trim panel</u>	<u>to door trim panel and armrest</u>
Pelvis	<u>to door trim panel</u>	<u>to door trim panel and armrest</u>
Left Knee	<u>to door trim panel</u>	<u>to door trim panel</u>
Right Knee	<u>to left knee</u>	<u>to left knee</u>

DOOR OPENING:

	<u>LEFT SIDE</u>	<u>RIGHT SIDE</u>
Front	<u>Remained closed</u>	<u>Remained closed</u>
Rear	<u>Remained closed</u>	<u>Remained closed</u>

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 8 mm forward Vertical: 16 mm high

ARM REST LOCATIONS:

Front: 248 mm from bottom of window

Rear: 256 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 146 mm Front Seat Cushion: 176 mm

Left Rear Seat Back: 137 mm Rear Seat Cushion: 207 mm

GLAZING DAMAGE:

Left front and left rear door glass and windshield

PILLAR PERFORMANCE:

None noted

SILL SEPARATION:

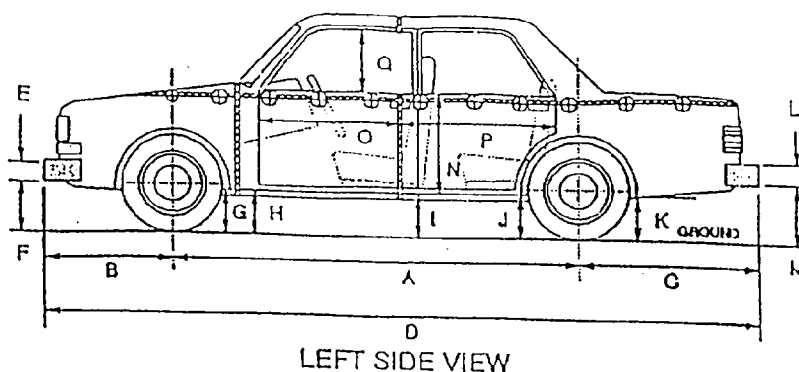
None noted

OTHER NOTABLE IMPACT EFFECTS:

Passenger airbag deployed only

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 6
VEHICLE PRE AND POST-TEST MEASUREMENTS



D = Length at Centerline
R = Right Side Length
S = Left Side Length
T = Width at B Post
E & L = Bumper Thickness

J1 = To Pinch Weld
J2 = To Sill

ALL MEASUREMENTS IN (mm)

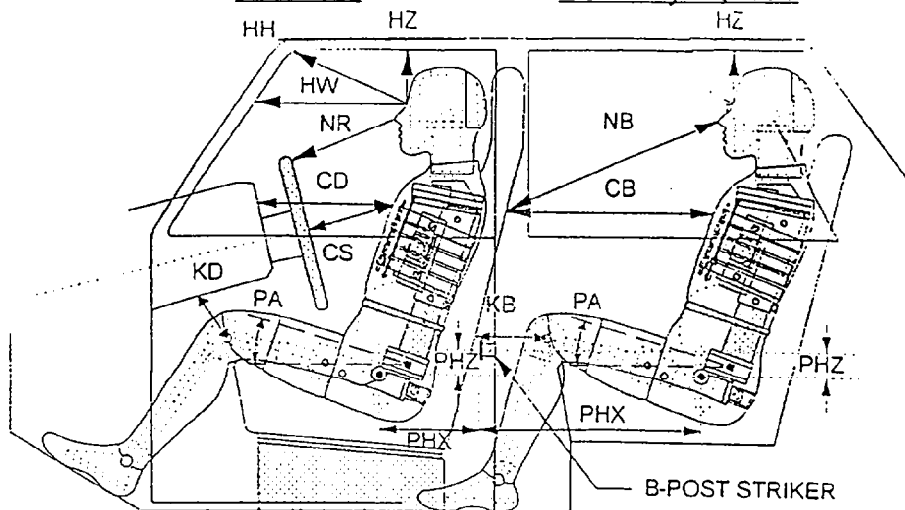
	PRE-TEST	POST-TEST	Δ CHANGE
A	2598	2580	18
B	1020	982	38
C	902	912	-10
D	4520	4474	46
E	155	155	0
F	390	410	20
G	175	210	35
H	173	238	65
I	170	220	50
J1/J2	169/165	170/168	1/3
K	188	197	9
L	210	210	0
M	265	375	110
N	620	642	-22
O	710	696	14
P	1085	1043	42
Q	445	433	12
R	4195	4200	-5
S	4195	4156	39
T	1704	1482	222

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

NHTSA NO.: MV0116 Test Date: February 10, 1997



NOTE: All dimensions are in mm with tolerance of ± 3 mm

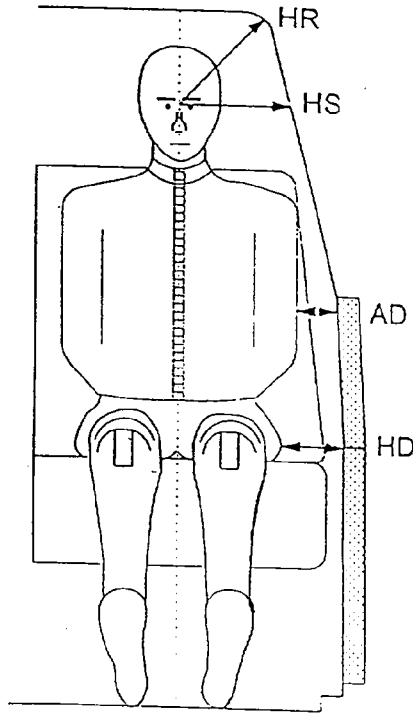
	DRIVER SID ID # 272		LEFT REAR PASSENGER SID ID # 271
HH	380	HZ	148
HW	597	NB	577
HZ	183	CB	495
NR	432	KBL (KBA)	150 (0.0°)
CD	512	KBR (KBA)	144 (0.0°)
CS	362	PA°	24.0
KDL(KDA°)	154 (30.2°)	PHX	281
KDR(KDA°)	170 (35.8°)	PHZ	393
PA°	24.4		
PHX	170		
PHZ	156		

NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

DATA SHEET NO. 8
SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

NHTSA NO.: MV0116 Test Date: February 10, 1997



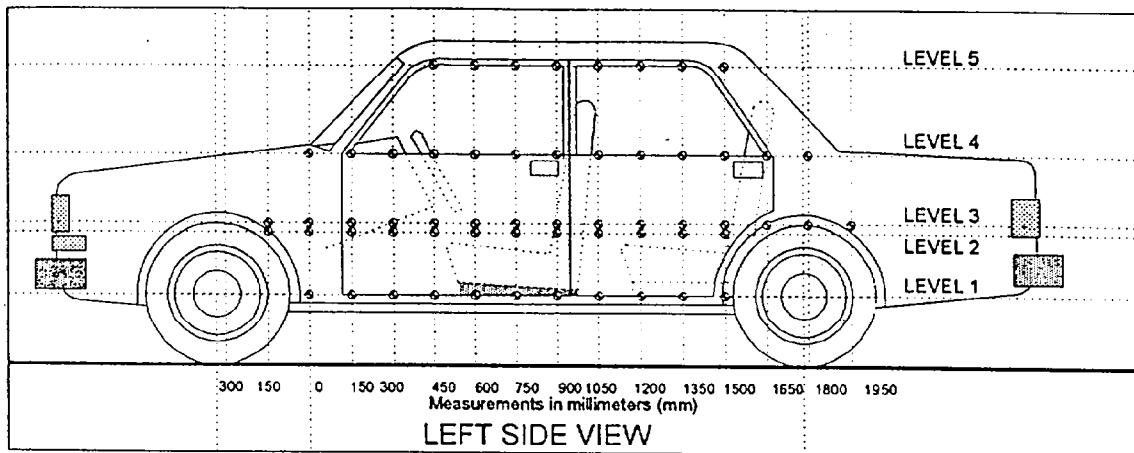
NOTE: All dimensions are in mm

	DRIVER SID ID # 272	LEFT REAR PASSENGER SID ID # 271
HR	175	178
HS	304	280
AD	108	85
HD	118	153

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

NHTSA NO.: MV0116 Test Date: February 10, 1997



MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION

MEASUREMENTS ALONG THE VERTICAL 750 mm. LINE SHOWN ABOVE

Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>268</u> mm
Level 2 @ Occupant H-Point	=	<u>443</u> mm
Level 3 @ Mid Door	=	<u>542</u> mm
Level 4 @ Window Sill	=	<u>835</u> mm
Level 5 @ Window Top	=	<u>1274</u> mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

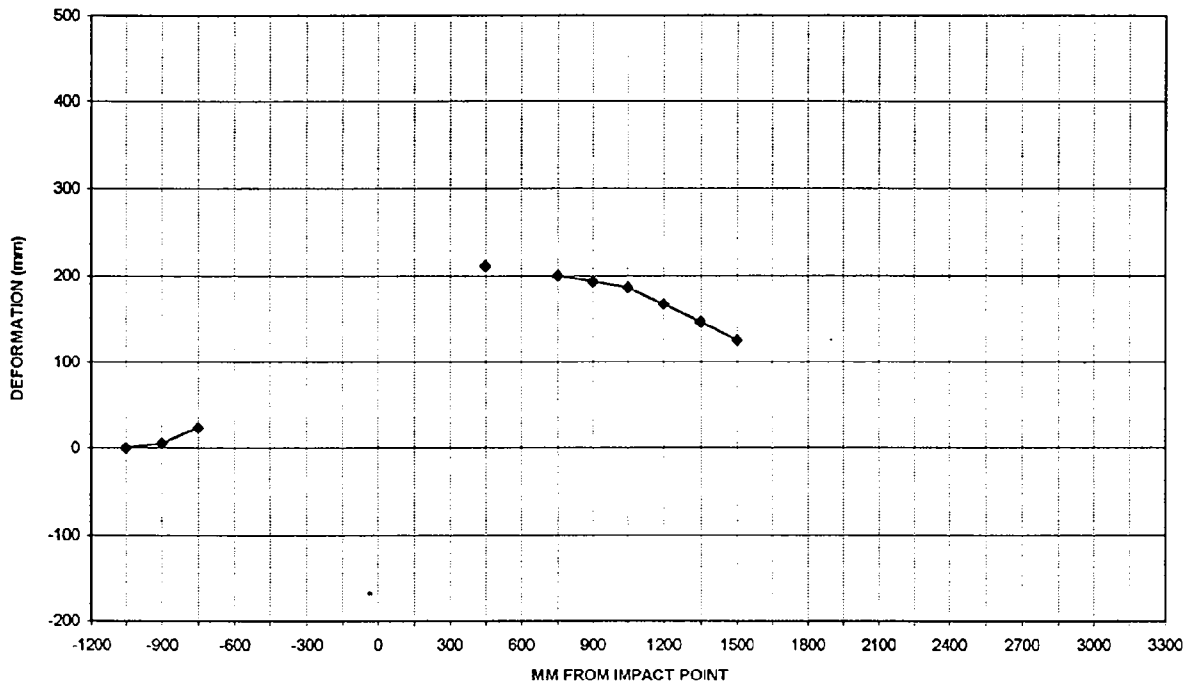
Longitudinal Distance (mm)	Level 1 - Axle Centerline		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	726	726	0
-900	673	678	5
-750	633	657	24
-600			
-450			
-300			
-150			
0 (impact point)			
150	651	*	N/A
300	653	*	N/A
450	652	863	211
600	652	*	N/A
750	655	855	200
900	652	845	193
1050	654	840	186
1200	658	825	167
1350	659	805	146
1500	659	784	125
1650	661	*	N/A
1800	662	*	N/A
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

* Body Panel Pieces Missing

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 1 - AXLE CENTERLINE

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

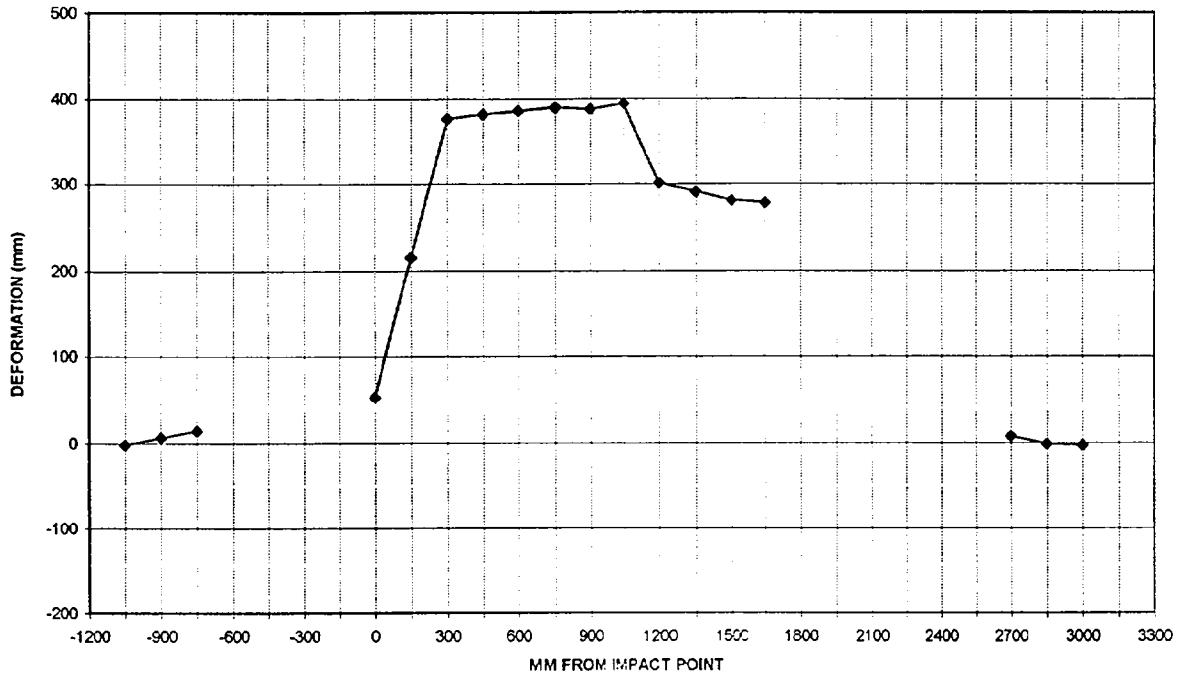
Longitudinal Distance (mm)	Level 2 - Occupant H Point		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	682	680	-2
-900	646	653	7
-750	615	630	15
-600			
-450			
-300			
-150			
0 (impact point)	597	651	54
150	599	814	215
300	598	975	377
450	597	979	382
600	597	983	386
750	597	987	390
900	598	986	388
1050	598	992	394
1200	599	900	301
1350	599	890	291
1500	599	880	281
1650	599	877	278
1800	603	*	N/A
1950			
2100			
2250			
2400			
2550			
2700	630	638	8
2850	653	652	-1
3000	686	685	-3

Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

* Body Panel Pieces Missing

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 2 - OCCUPANT H-POINT

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

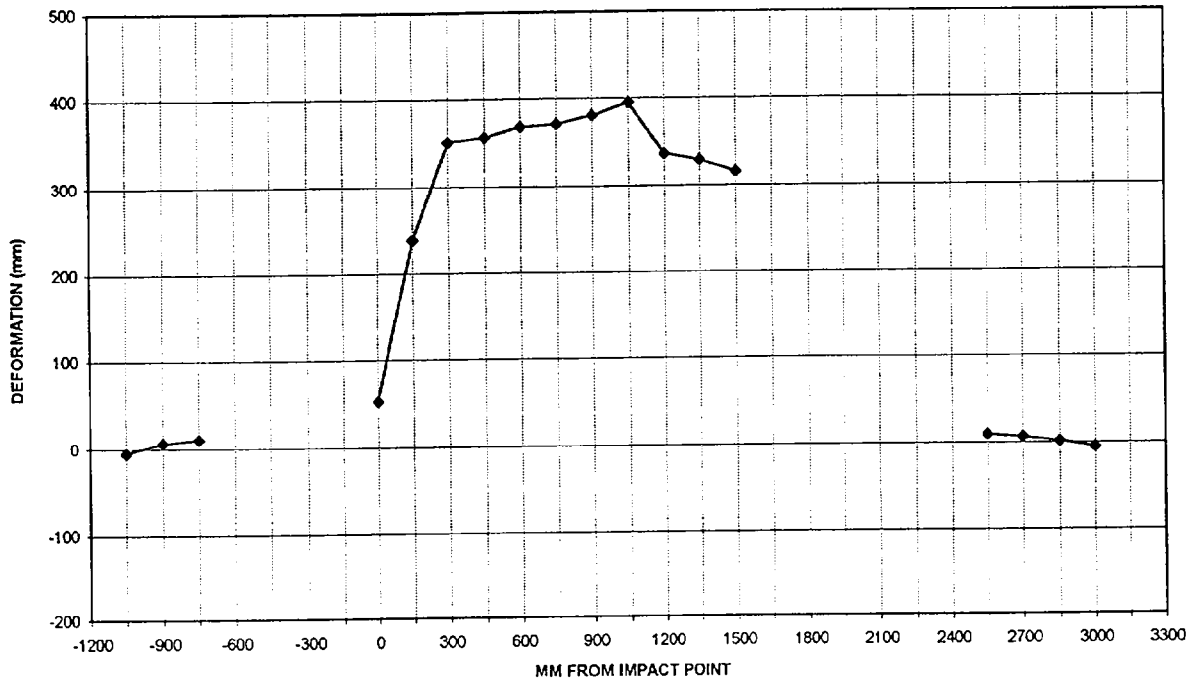
Longitudinal Distance (mm)	Level 3 - Mid Door		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	720	725	-5
-900	665	672	7
-750	626	637	11
-600			
-450			
-300			
-150			
0 (impact point)	587	641	54
150	591	829	238
300	588	939	351
450	586	942	356
600	585	953	368
750	585	956	371
900	586	967	381
1050	587	982	395
1200	588	924	336
1350	588	917	329
1500	588	903	315
1650	590	*	N/A
1800	597	*	N/A
1950	592	*	N/A
2100			
2250			
2400			
2550	622	632	10
2700	642	649	7
2850	664	666	2
3000	700	695	-5

Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

* Body Panel Pieces Missing

VEHICLE EXTERIOR STATIC CRUSH



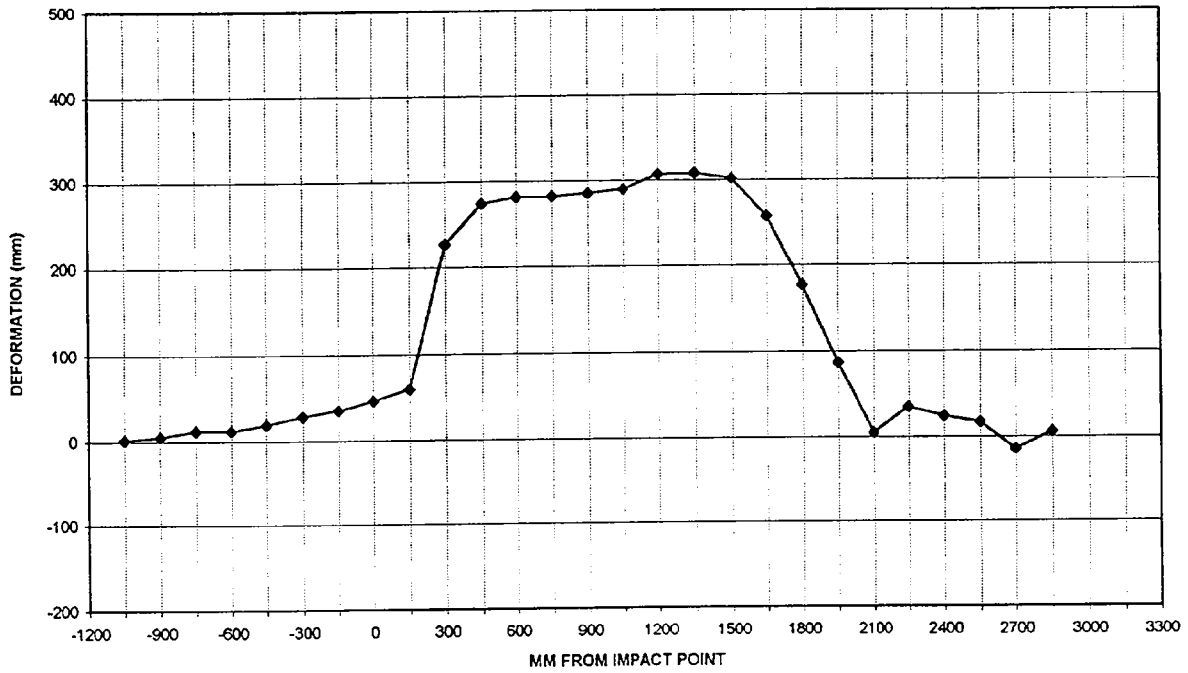
LEVEL 3 - MID DOOR

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

Longitudinal Distance (mm)	Level 4 - Window Sill		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	762	764	2
-900	710	715	5
-750	679	691	12
-600	659	671	12
-450	644	663	19
-300	634	662	28
-150	630	665	35
0 (impact point)	627	673	46
150	626	685	59
300	624	851	227
450	623	897	274
600	625	906	281
750	628	910	282
900	632	917	285
1050	632	922	290
1200	636	943	307
1350	639	947	308
1500	640	942	302
1650	643	900	257
1800	650	827	177
1950	660	747	87
2100	669	674	5
2250	678	713	35
2400	695	719	24
2550	711	728	17
2700	731	745	-14
2850	754	760	6
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH



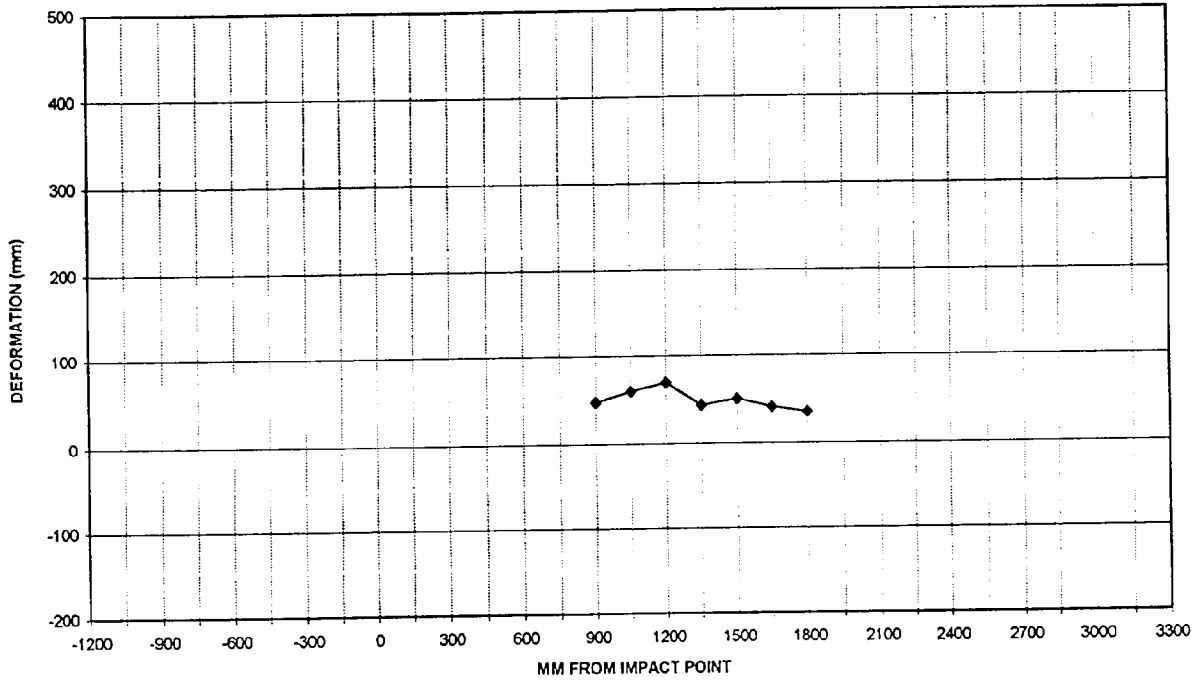
LEVEL 4 - WINDOW SILL

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

Longitudinal Distance (mm)	Level 5 - Window Top		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750			
900	884	931	47
1050	886	945	59
1200	888	957	69
1350	887	930	43
1500	883	933	50
1650	884	925	41
1800	883	918	35
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH

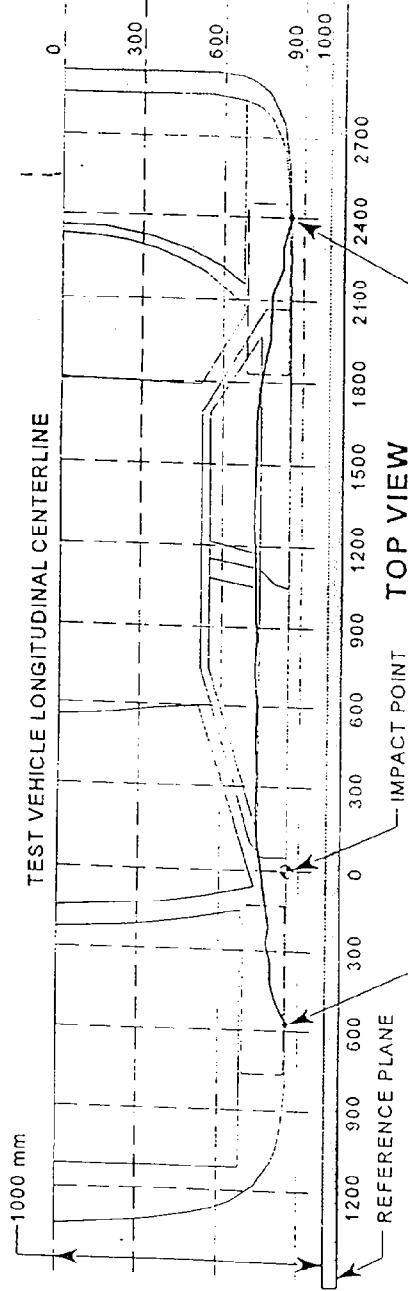


LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door
 NHTSA NO.: MV0116 Test Date: February 10, 1997



IF - FORWARDMOST POINT OF INDUCED DAMAGE

MEASUREMENT CONVENTIONS: LR - REARWARDMOST POINT OF INDUCED DAMAGE
 Forward of the impact point (towards front of vehicle) is considered negative (-).
 Rearward of the impact point (toward rear of vehicle) is considered positive (+).

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (LF = ___ mm)			
2. mm			
3. mm	N/A = Non steel bodied vehicle		
4. mm			
5. mm			
6. (LR = ___ mm)			

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

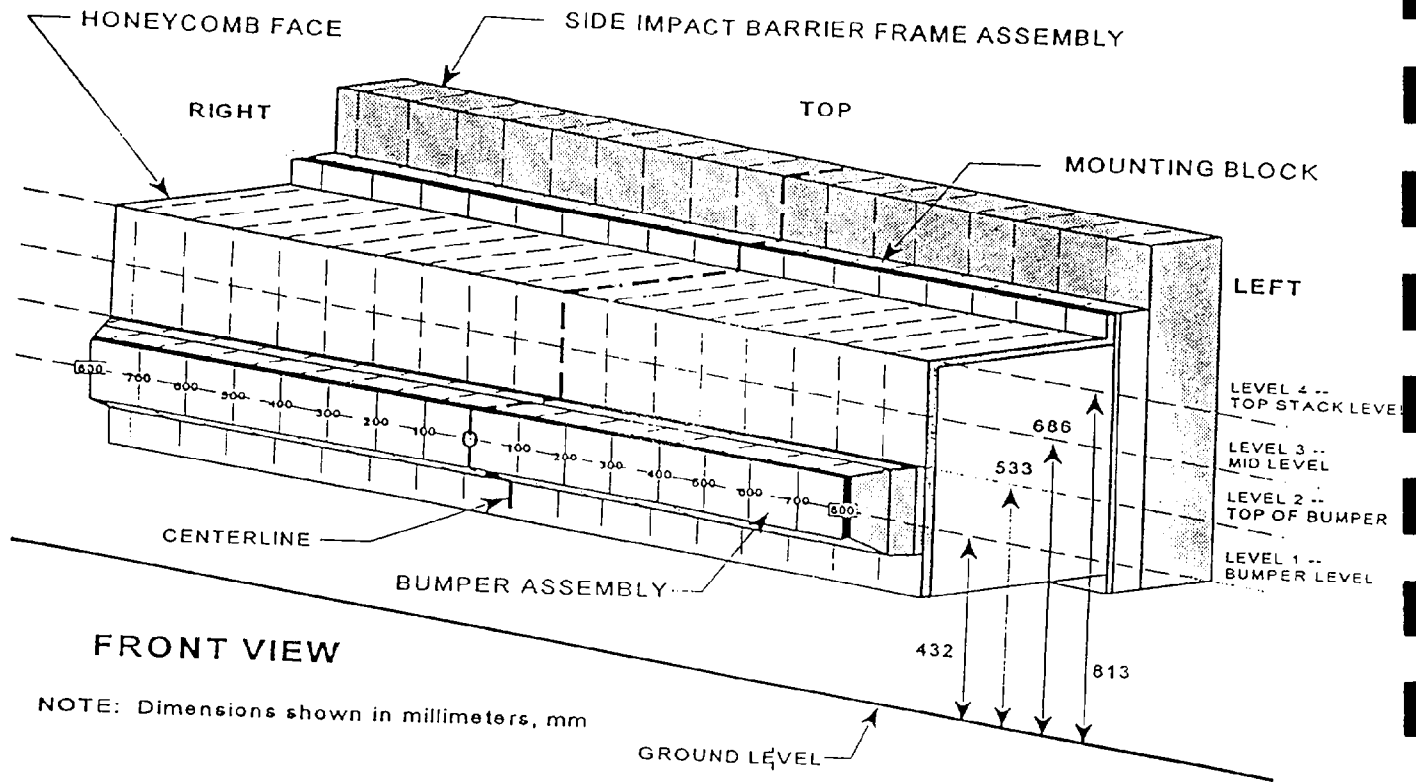
Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

Location	Height at CL	Distance Right of Center (mm)								Distance Left of Center (mm)								
		800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
Top Stack Level 4	813 mm	82	38	7	0	1	3	5	6	8	10	12	13	16	28	65	115	159
Mid Level Level 3	686 mm	66	28	2	-1	0	3	8	8	10	6	6	7	9	31	82	115	
Top Bumper Level 2	533 mm	83	53	46	35	28	26	26	27	27	29	25	33	30	34	55	81	
Mid Bumper Level 1	432 mm	88	76	60	48	40	40	32	31	29	30	30	31	32	48	87	103	

See next page for Barrier Face Graphic

DATA SHEET NO. 12 (Cont'd)

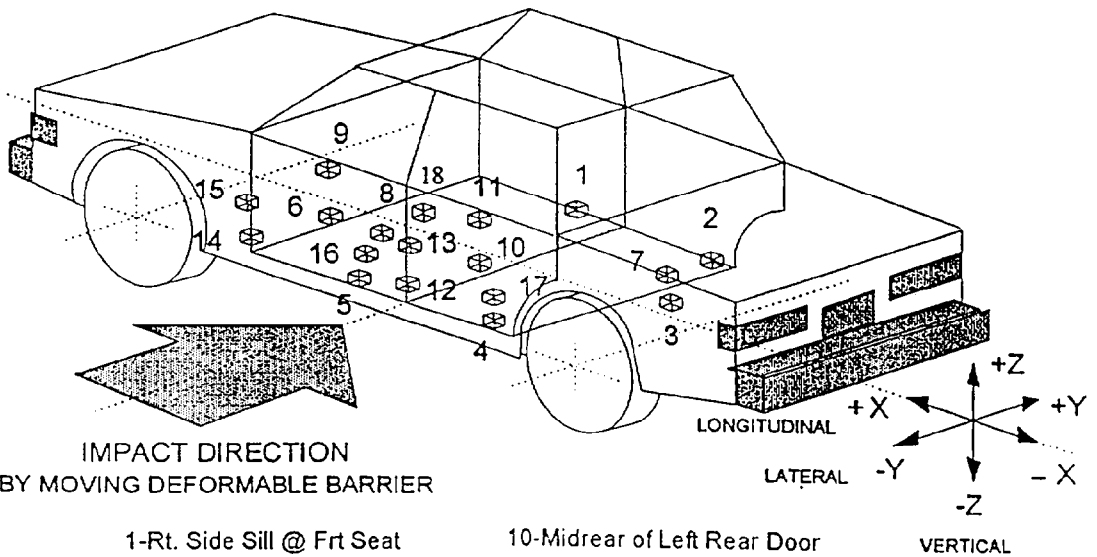


NOTE: Dimensions shown in millimeters, mm

DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997



- | | |
|--------------------------------|---------------------------------|
| 1-Rt. Side Sill @ Frt Seat | 10-Midrear of Left Rear Door |
| 2-Rt. Side Sill @ Rr. Seat | 11-Left Rear Door Upper Ctrline |
| 3-Rr. Floorpan Above Axle | 12-Left Lower B-Post |
| 4-Left Side Sill @ Rr. Seat | 13-Left Middle B-Post |
| 5-Left Side Sill @ Frt. Seat | 14-Left Lower A-Post |
| 6-Left Frt. Door On Centerline | 15-Left Middle A-Post |
| 7-Rt. Rr. Occ Compartment | 16-Front Seat Track |
| 8-Midrear of Left Frt. Door | 17-Rear Seat Track |
| 9-Left Frt. Door Upper Ctrline | 18-Vehicle C.G. |

DATA SHEET NO. 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

Accel. No.	Description	Coordinates (mm)*			Long. (X) Maximums (g's)		Lat. (Y) Maximums (g's)		Vert. (Z) Maximums (g's)		Resultant (g's)
		X	Y	Z	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	
1	Rt. Side Sill @ Front Seat	2503	633	196	5.2	-7.5	20.5	-2.7	6.4	-7.7	22.8
2	Rt. Side Sill @ Rear Seat	1342	634	202	5.6	-8.0	25.3	-3.5	4.5	-10.5	25.6
3	Rr. Floorpan Above Axle	890	0	456	2.3	-9.0	21.5	-2.9	13.0	-8.1	23.4
4	Left Side Sill @ Rr. Seat	1375	-634	198	---	---	46.5	-10.5	---	---	---
5	Left Side Sill @ Frt. Seat	2504	-633	202	---	---	251.7	-141.8	---	---	---
6	Left Front Door Centerline	2570	-701	606	---	---	355.0	-85.9	---	---	---
7	Right Rear Occupant Compartment	1679	523	332	---	---	25.0	-3.1	---	---	---
9	Left Front Door Upper Centerline	2464	-686	828	---	---	220.8	-90.9	---	---	---
10	Left Rear Door Mid Rear	1973	-657	575	---	---	434.4	-372.5	---	---	---
11	Left Rear Door Upper Centerline	1600	-687	856	---	---	303.5	-292.8	---	---	---
12	Left Lower B-Post	2024	-628	258	---	---	54.2	-13.8	---	---	---
14	Left Lower A-Post	2857	-656	308	---	---	79.0	-14.3	---	---	---
15	Left Mid A-Post	2981	-712	856	---	---	50.1	-45.4	---	---	---
16	Driver Left Seat Track	2144	-583	308	---	---	63.5	-60.9	---	---	---
18	Vehicle CG	2449	0	405	4.3	-13.9	25.0	-3.2	10.3	-11.2	26.6

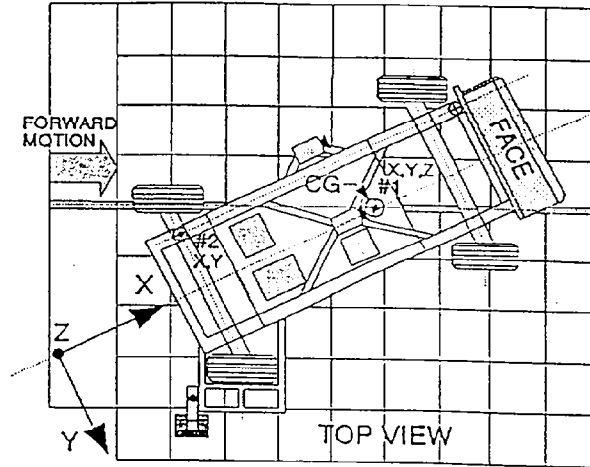
*Reference: X - Rear Bumper (+ Forward)
 Y - Vehicle Centerline (+ To right)
 Z - Ground Level (+ Up)

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997



Accel. No.	Description	Coordinates (mm)*			(+ Positive)		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.4	107	-16.9	30
	Lateral (Y)	---	---	---	2.2	57	-8.2	38
	Vertical (Z) **	---	---	---	**	---	**	---
	Resultant (R)	---	---	---	28.1	28	---	---
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X) ***	---	---	---	-0.26	-15	-22.5	29
	Lateral (Y)	---	---	---	4.8	38	-1.3	196

*Reference: X - Front Axle (+ Forward)
 Y - Vehicle Centerline (+ To right)
 Z - Ground Level (+ Up)

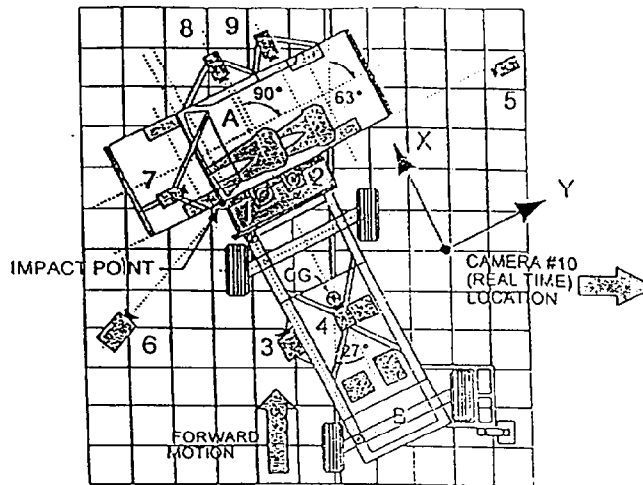
** No valid data

*** Data valid till 65 msec.

DATA SHEET NO. 15
HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time						
6	Left Impact	-880	-2230	1640		13	1010
8	Onboard Driver					8	870
9	Onboard Passenger					8	1026
7	Onboard Hood					13	1005
5	Right Impact	-360	10580	1980		25	957
1	Top Overall	-245	1250	5000		8	1070
2	Top Impact	-240	50	5000		13	870
4	Cart Overall					13	1015
3	Cart Pointer					35	1005

* Reference: (from point of impact)

- +X = Forward
- +Y = To Right
- +Z = Upward

DATA SHEET 16
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

TEST VEHICLE IMPACT TYPE: X Side Impact MDB 38.2 mph (61.5 kph)

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0	1 oz
2. For 5 minute period after vehicle motion ceases	0	5 oz
3. For next 25 minutes	0	1 oz./1 min

FUEL SPILLAGE LOCATION(S): None

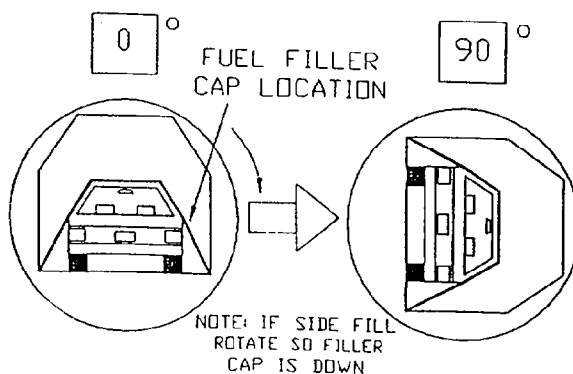
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 53 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 53 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

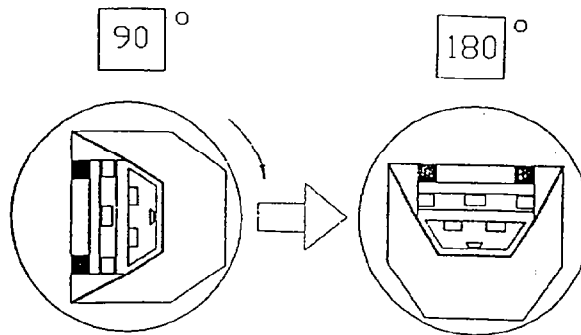
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 34 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 34 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

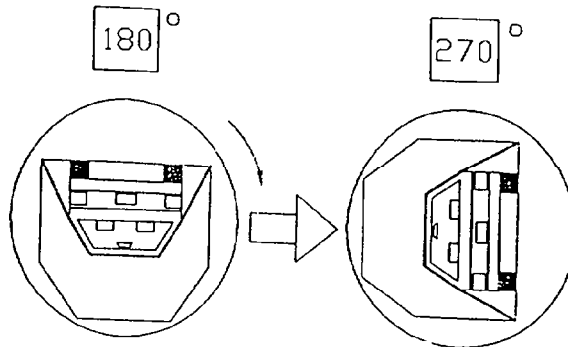
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door

Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 17 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 17 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

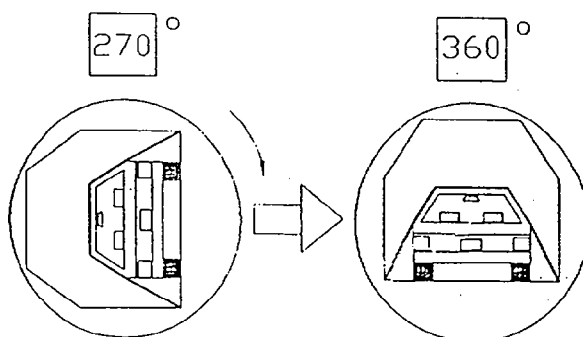
FUEL SPILLAGE LOCATIONS(S): None

DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1997/Saturn/SL/4-Door
 Vehicle NHTSA No.: MV0116 Test Date: February 10, 1997

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 37 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 37 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

APPENDIX A - PHOTOGRAPHS

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Photo No. A-47 - Right Front Attitude Point	A-47
Photo No. A-48 - Left Rear Attitude Point	A-48
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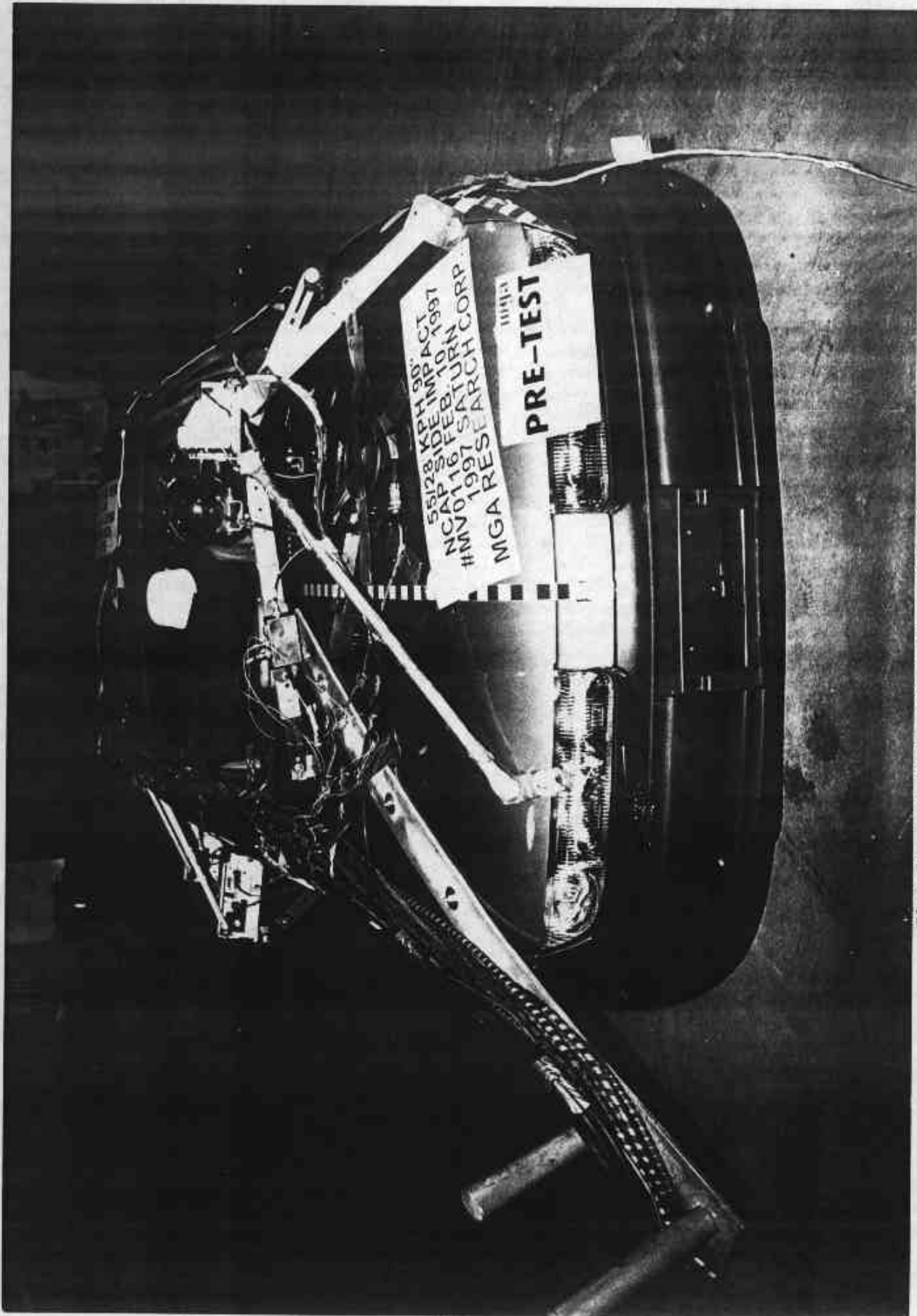


Photo No. A-1 - Pre-Test Front View of Test Vehicle

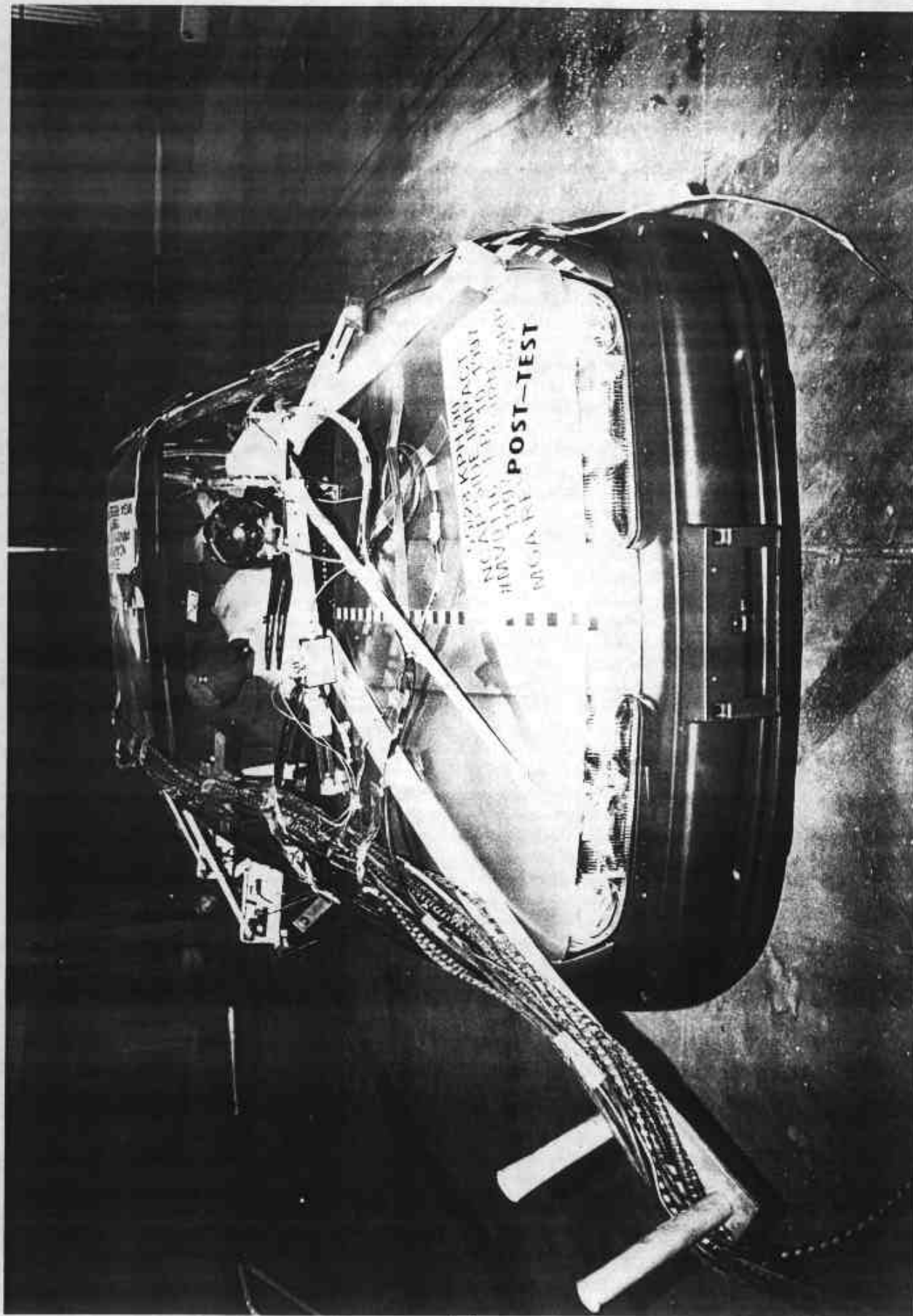


Photo No. A-2 - Post-Test Front View of Test Vehicle

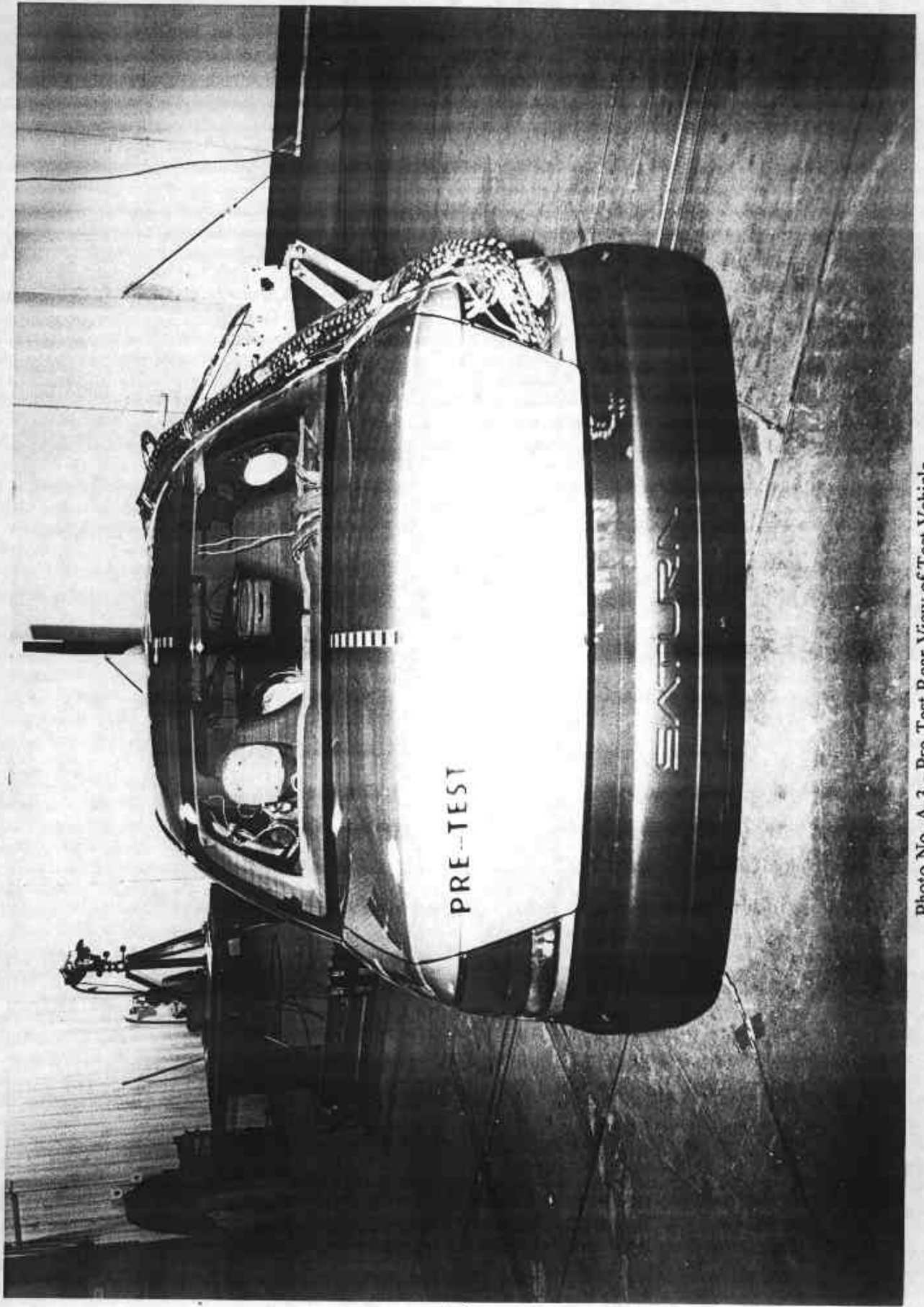


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

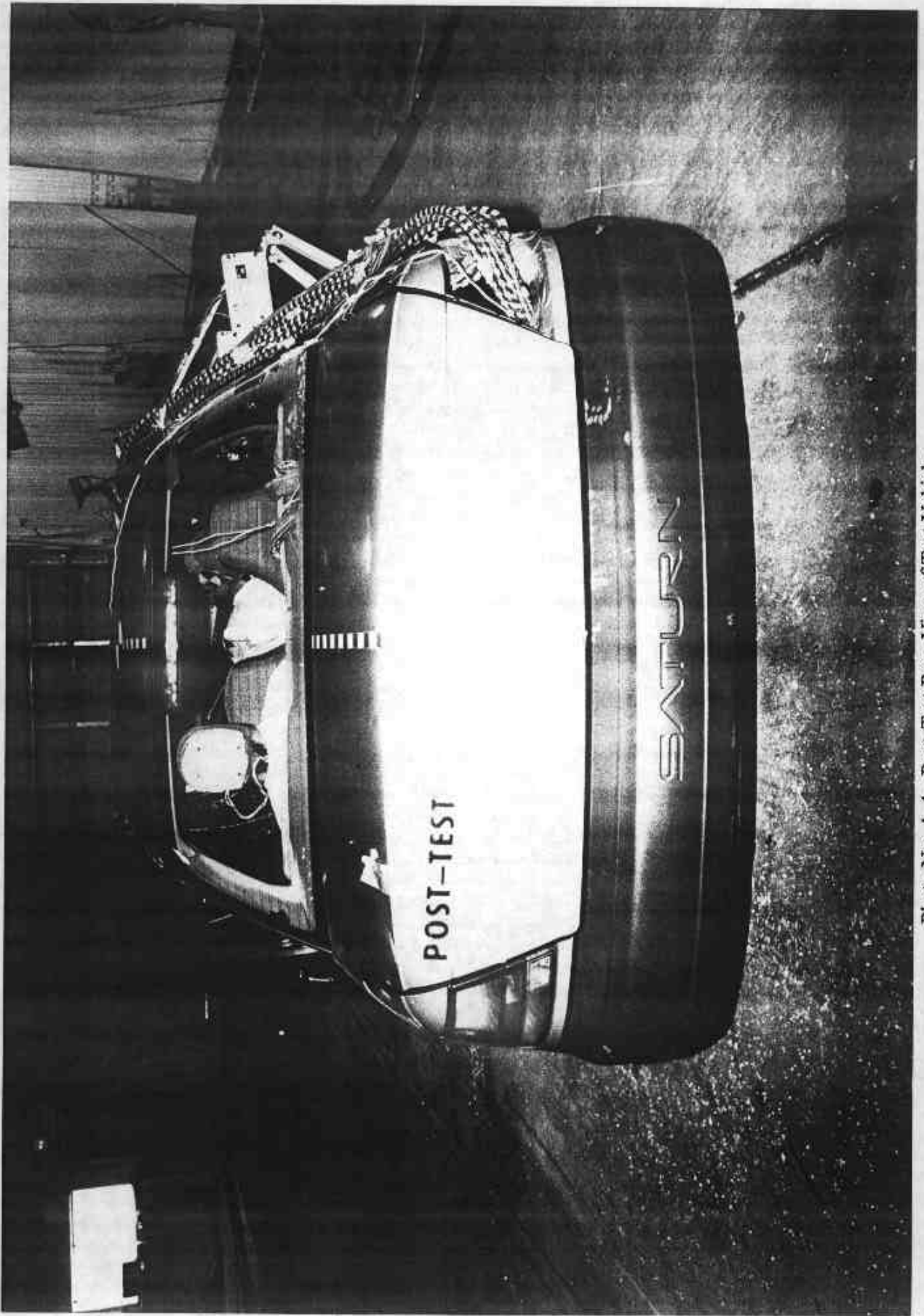


Photo No. A-4 - Post-Test Rear View of Test Vehicle

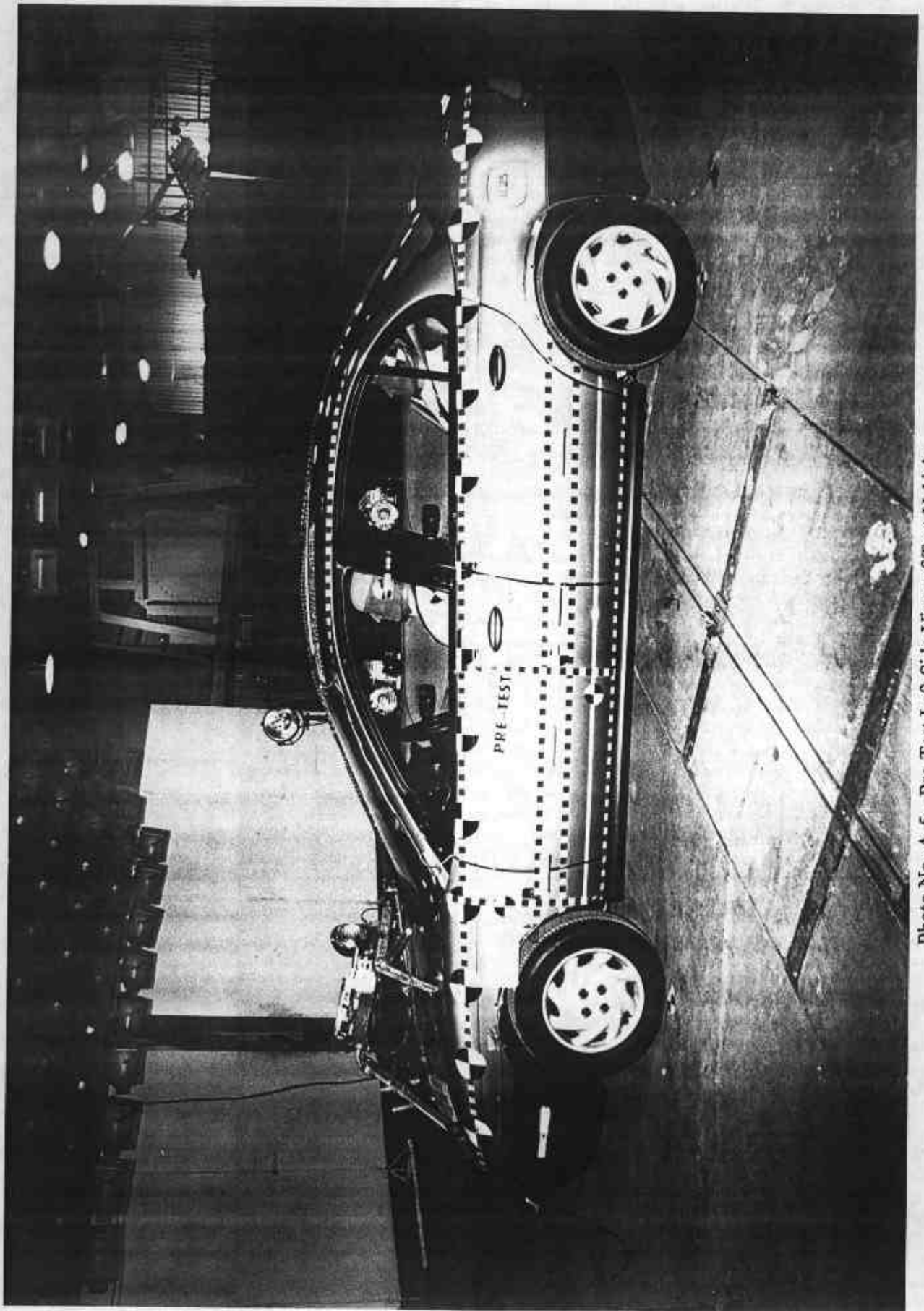


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

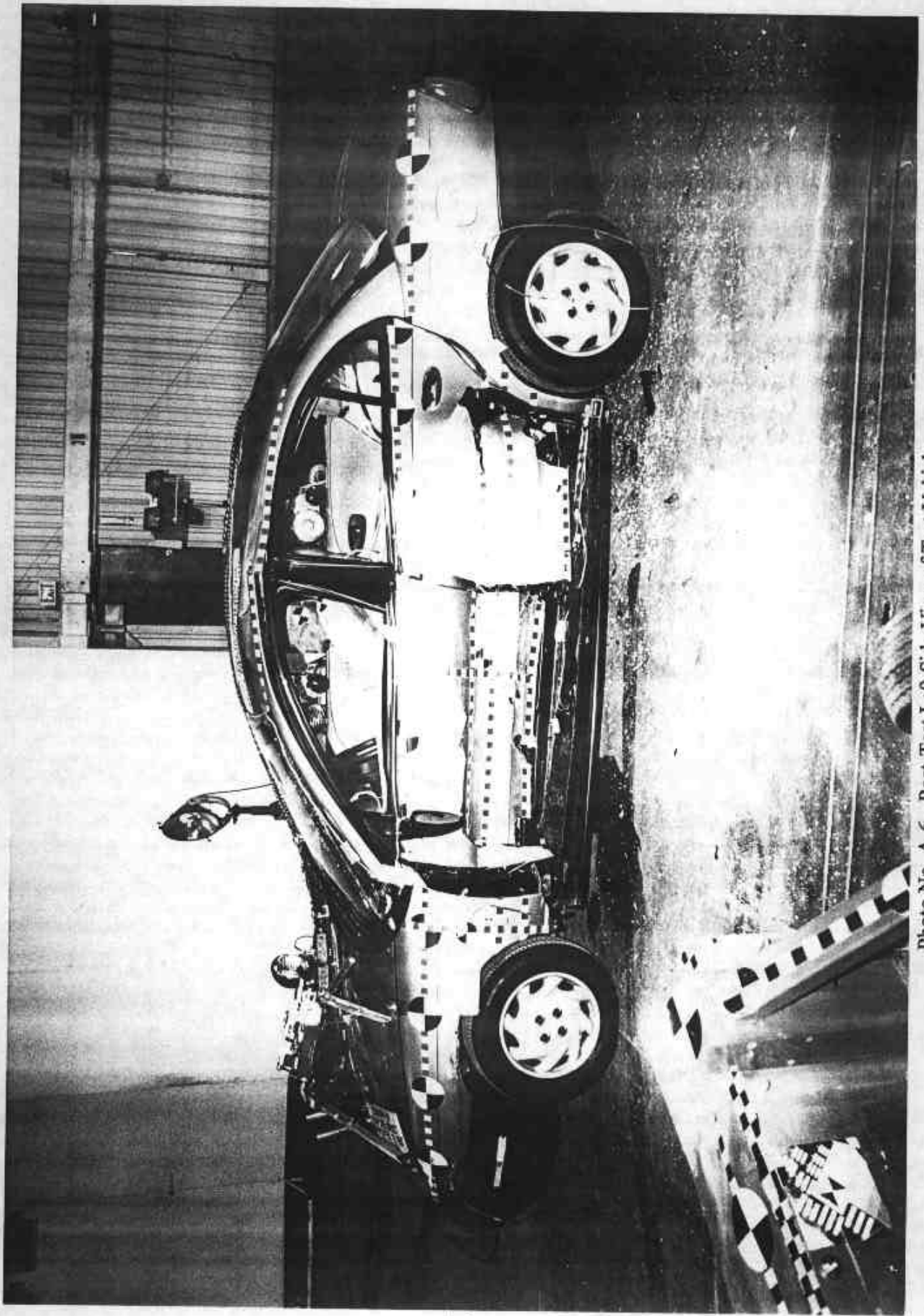


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

A-6

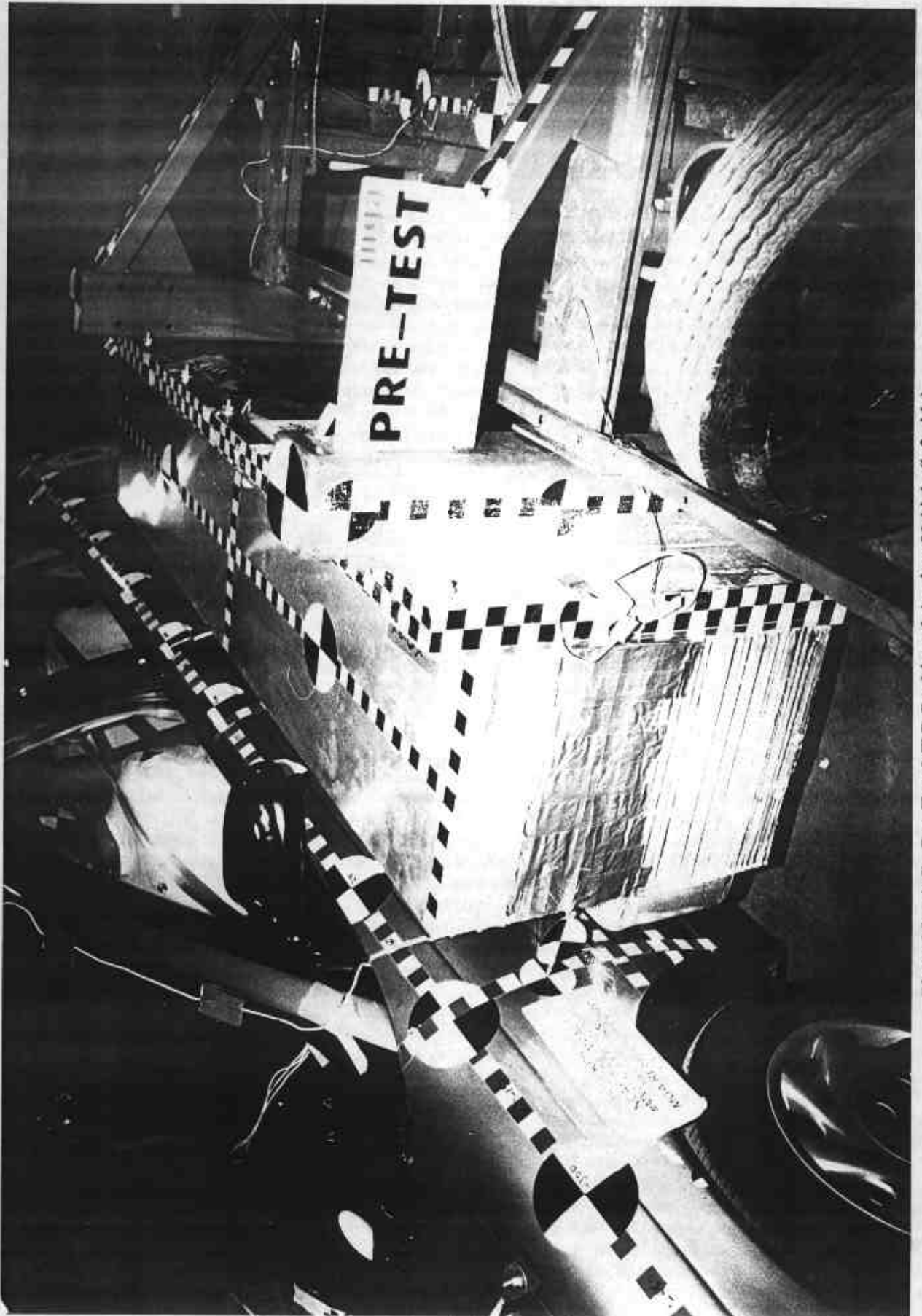


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

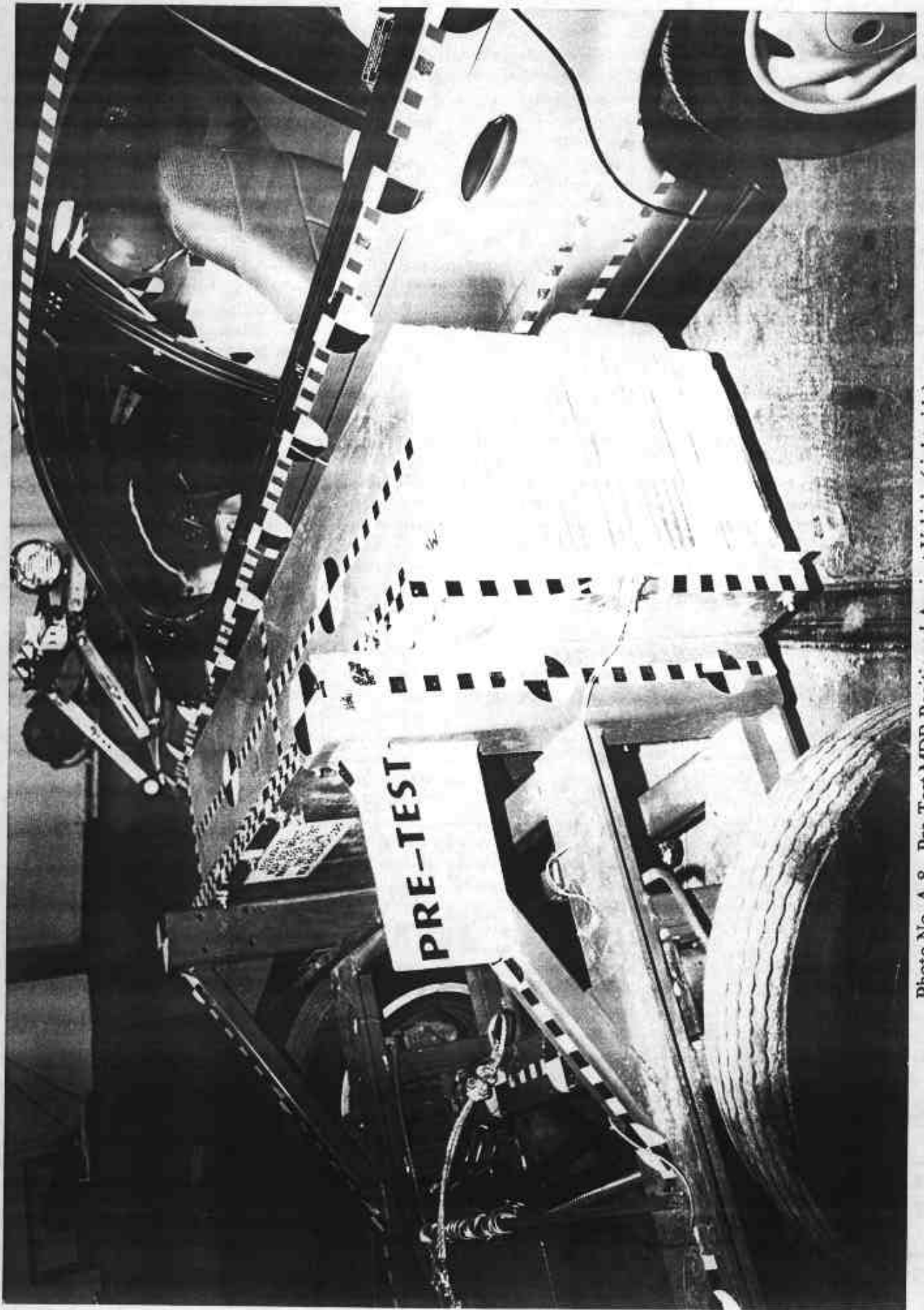


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

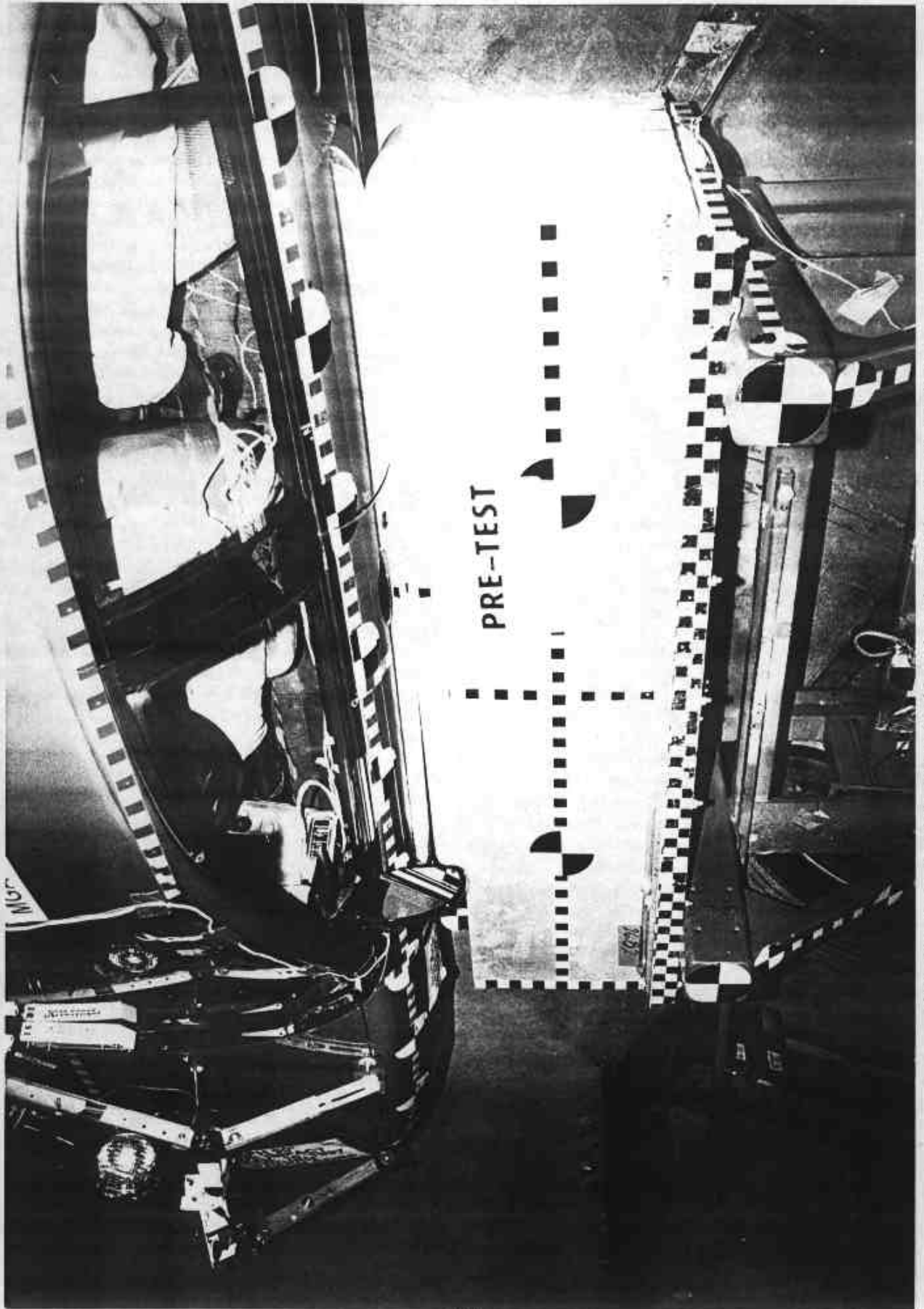


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

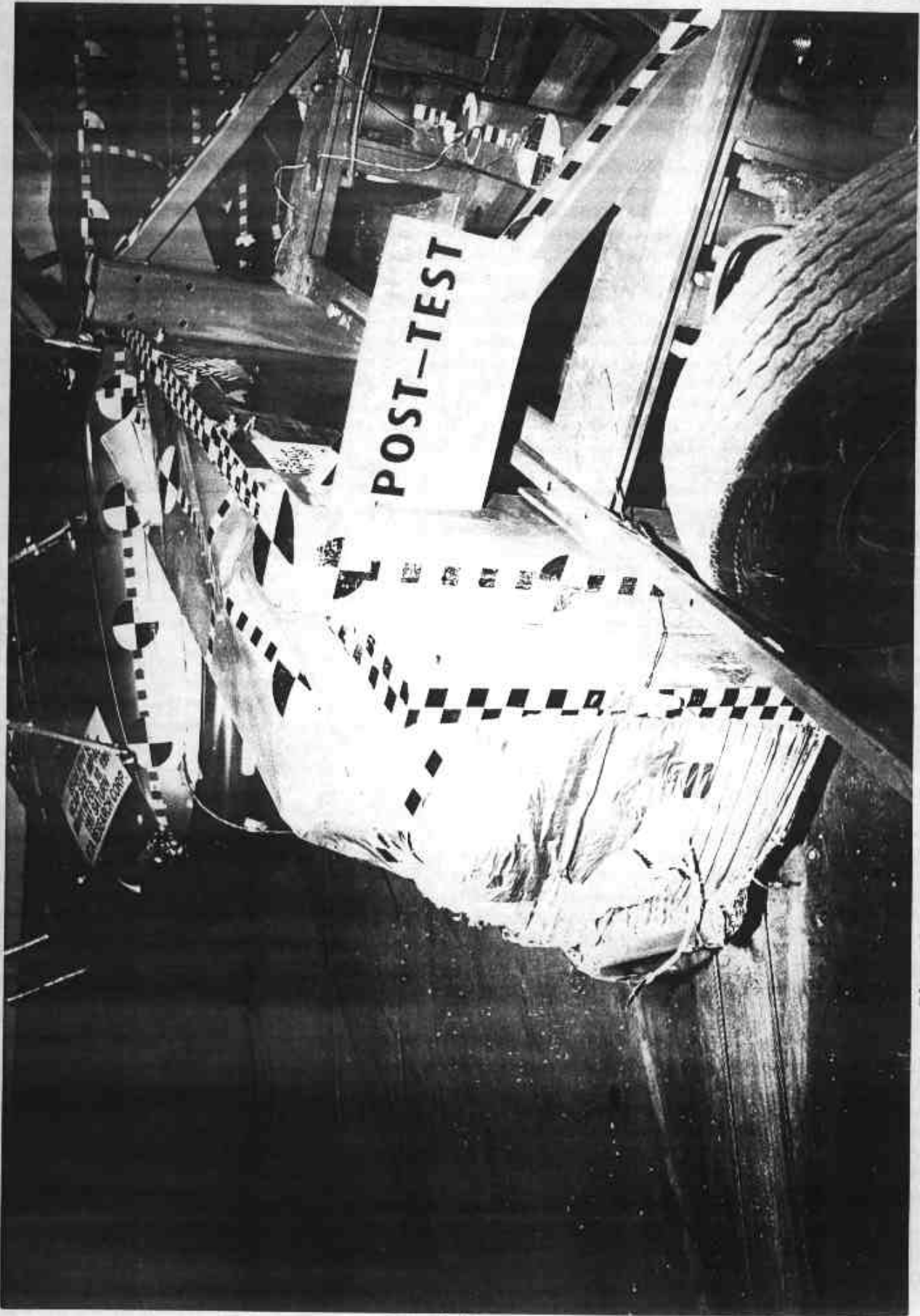


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

A-10

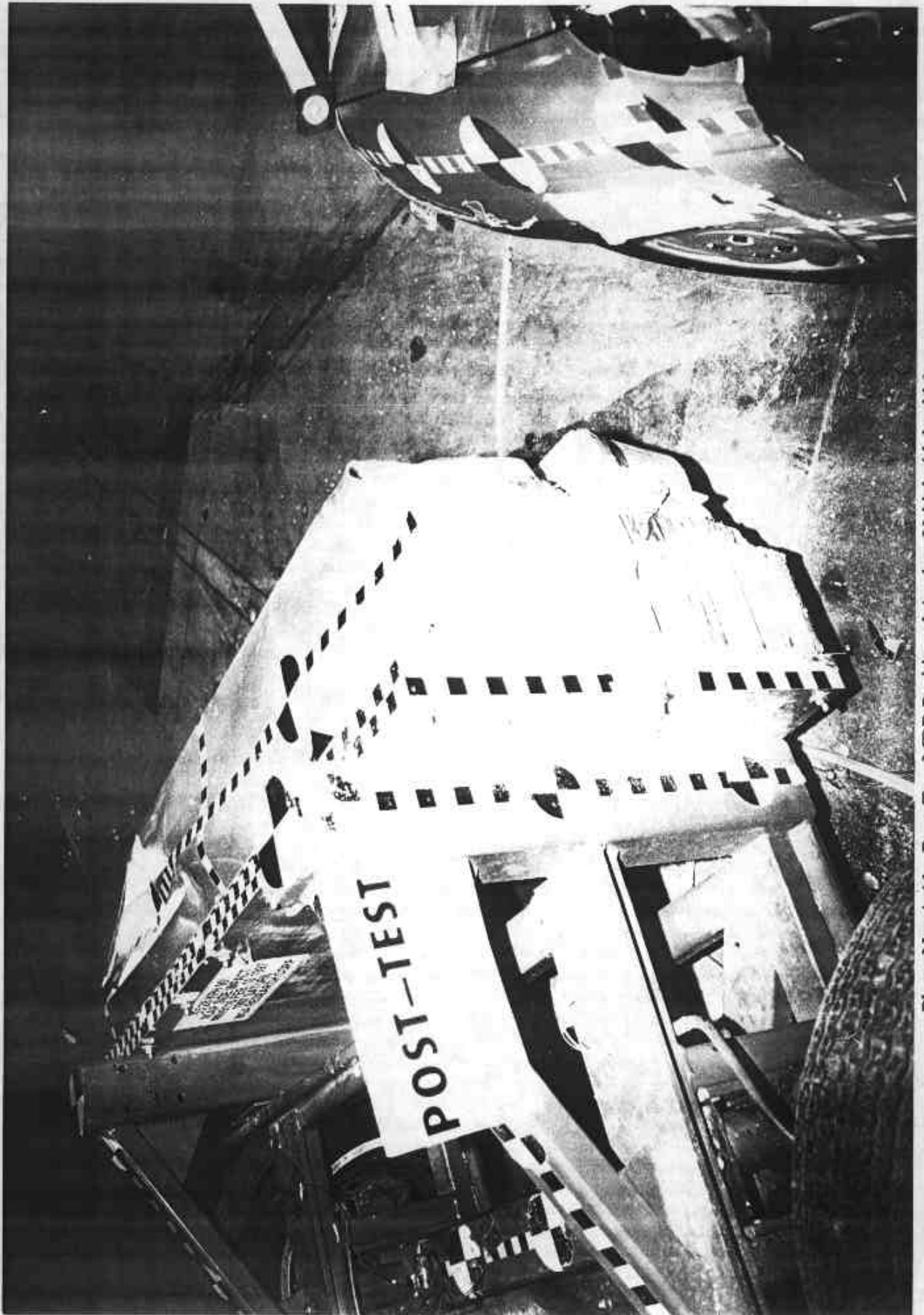


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)

A-11

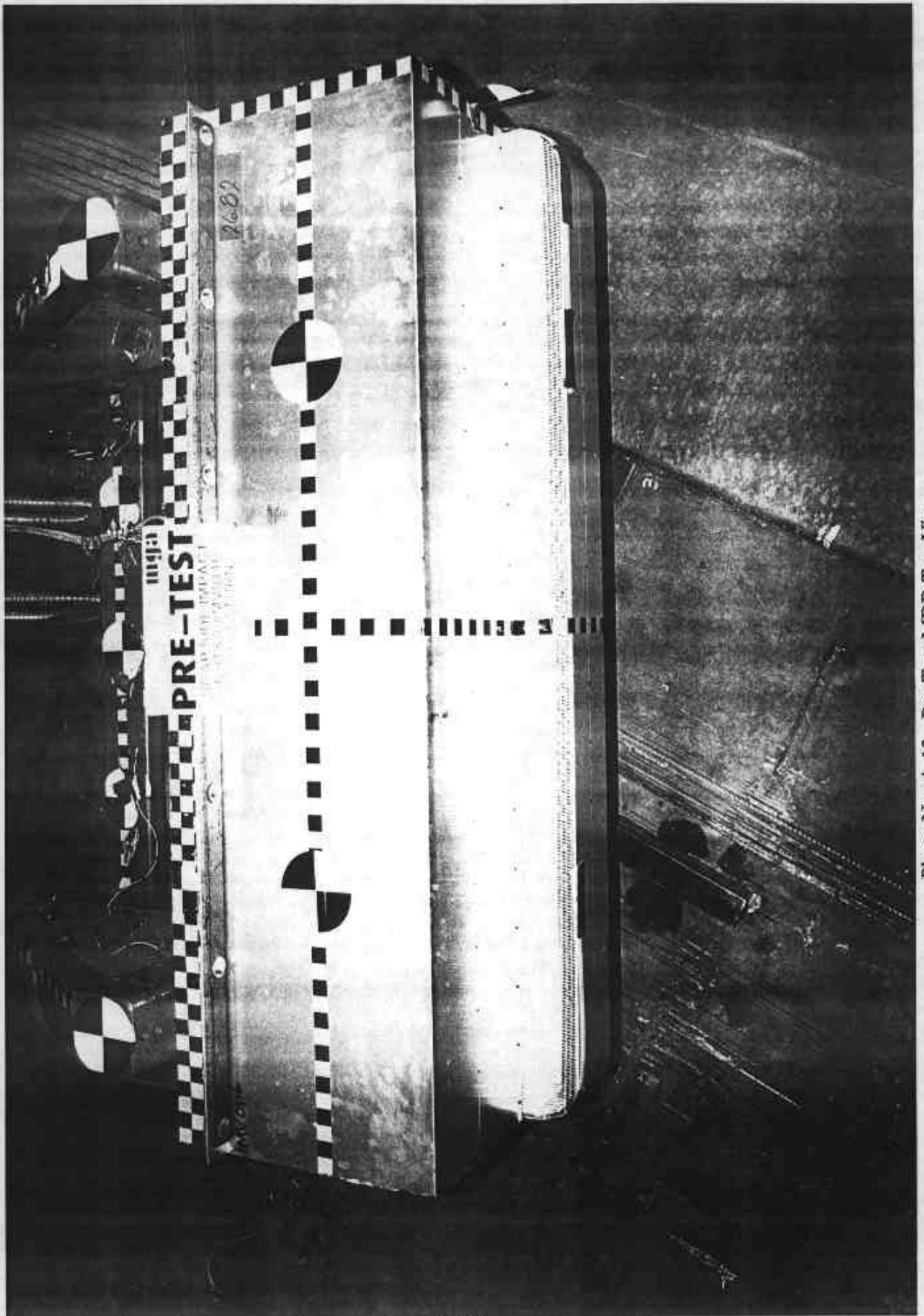


Photo No. A-12 - Pre-Test MDB Top View

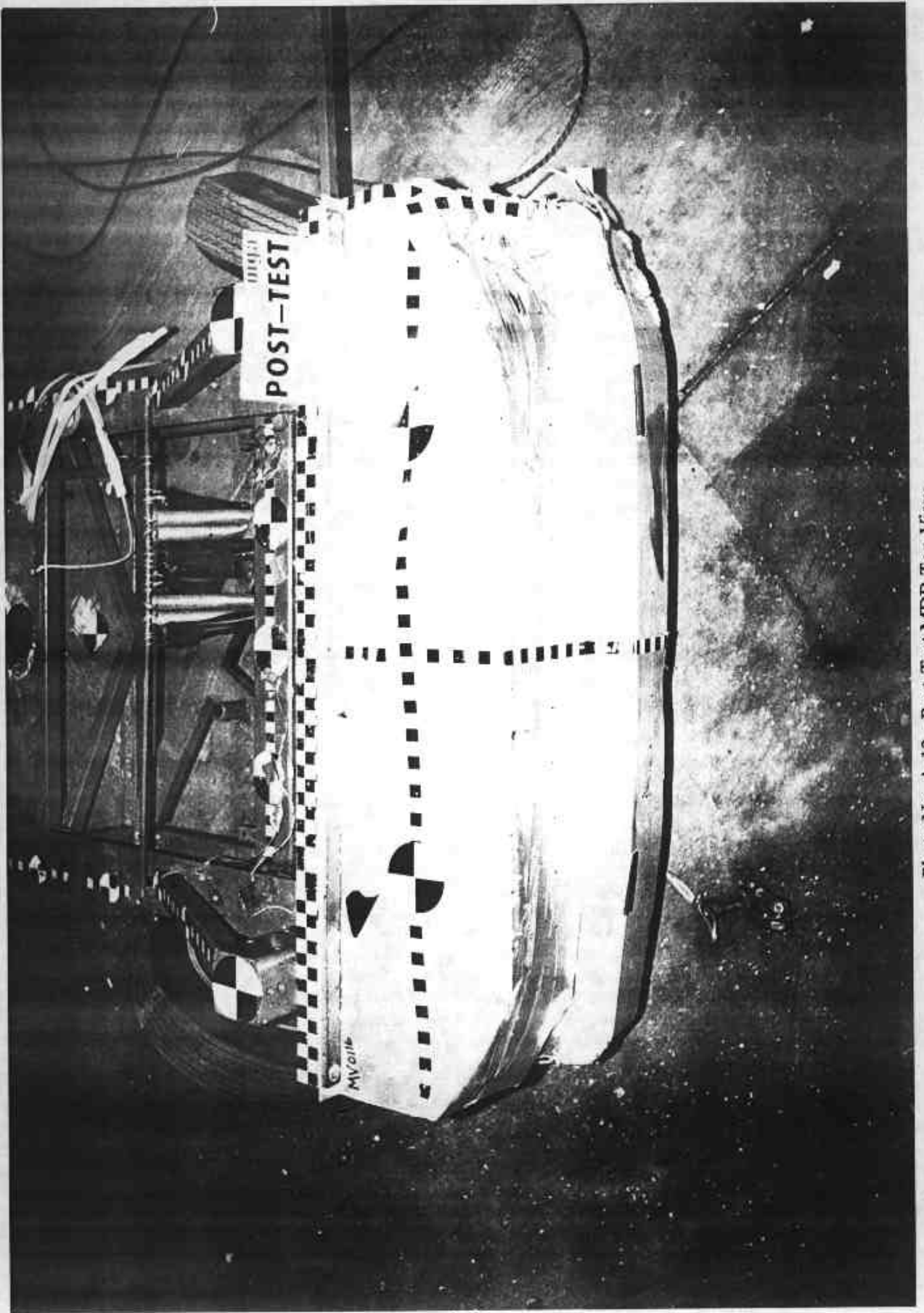
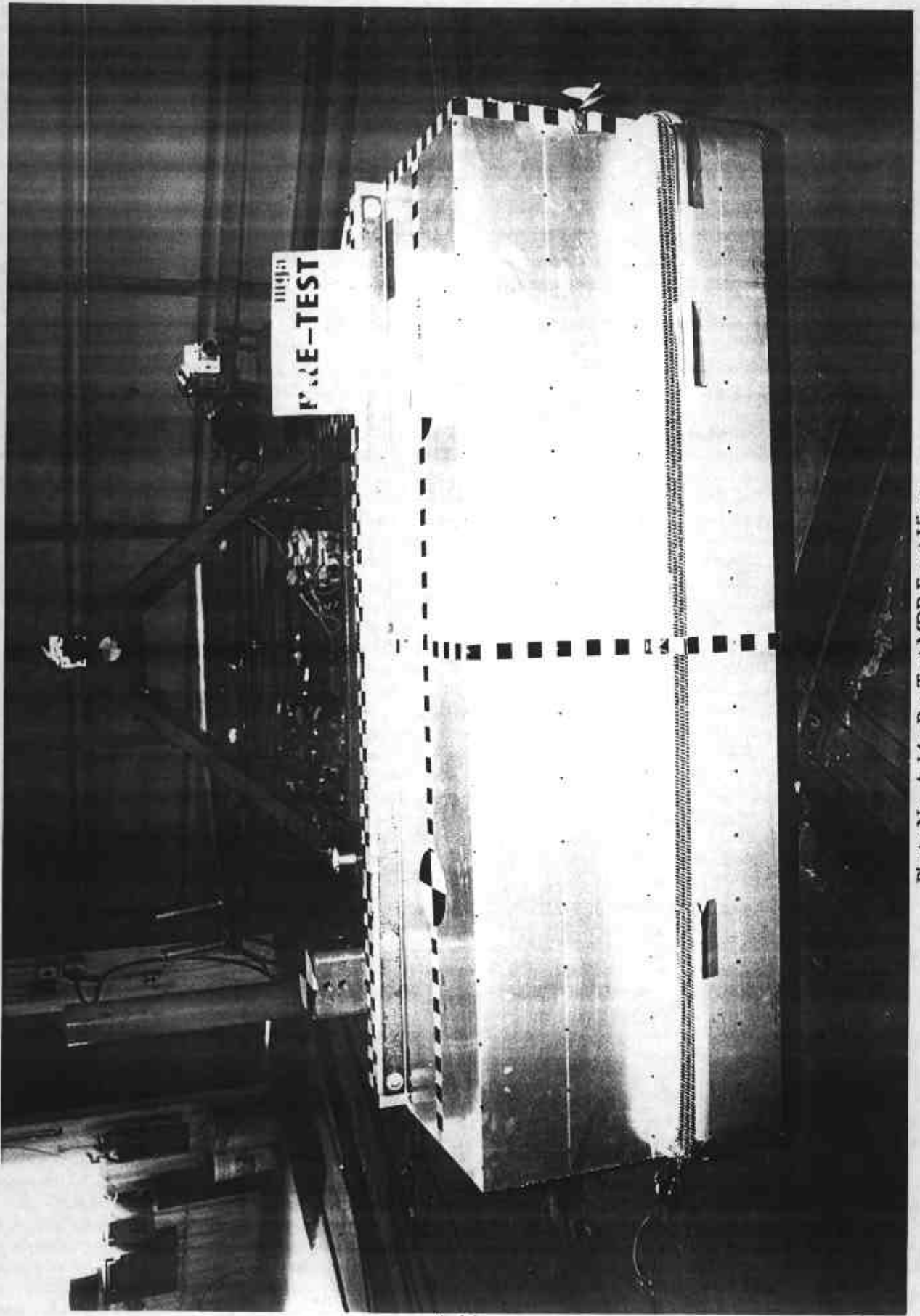


Photo No. A-13 - Post-Test MDB Top View

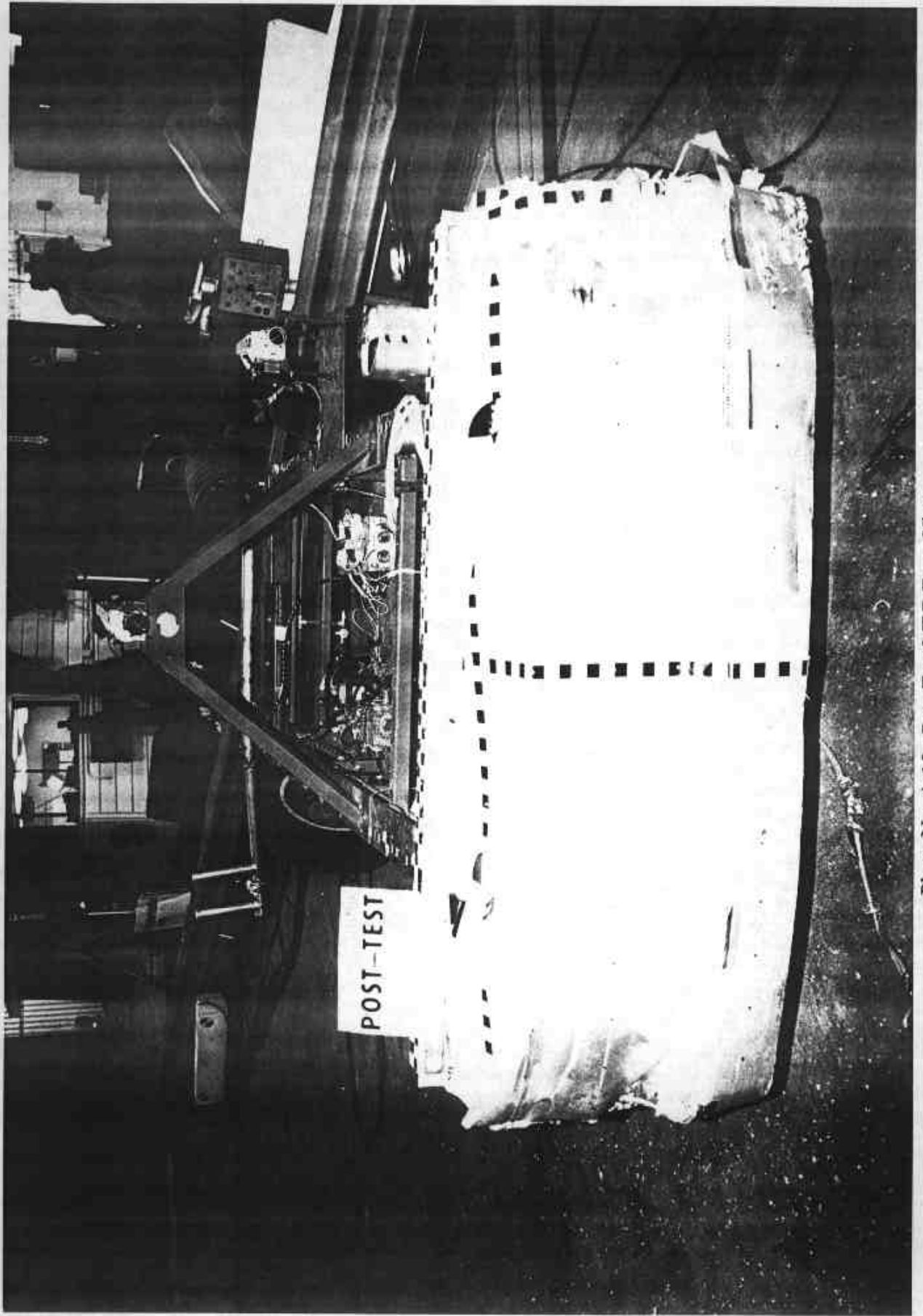
A-13



PRE-TEST

Photo No. A-14 - Pre-Test MDB Front View

A-14



POST-TEST

Photo No. A-15 - Post-Test MDB Front View

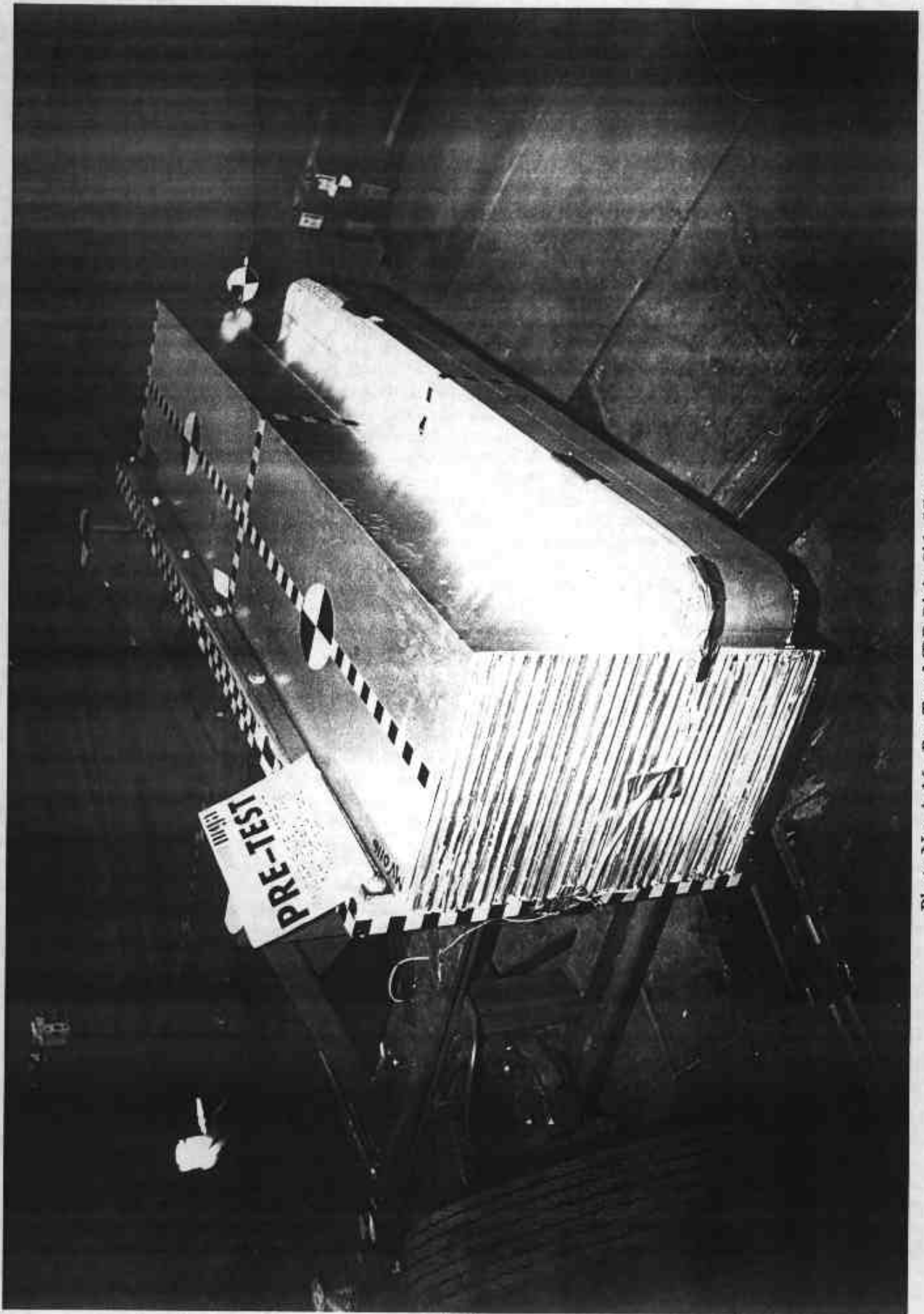


Photo No. A-16 - Pre-Test MDB Right Side View

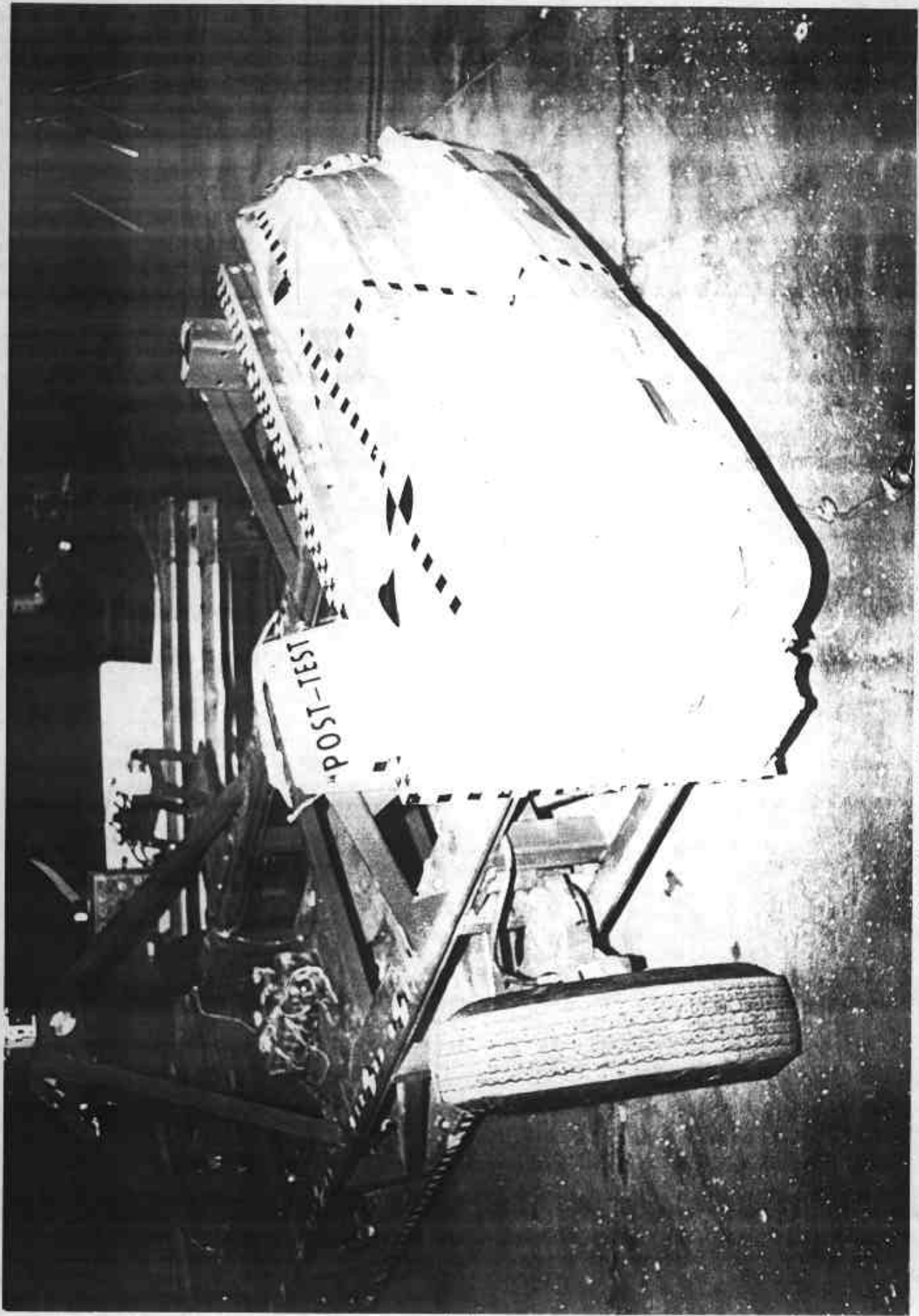


Photo No. A-17 - Post-Test MDB Right Side View

A-17

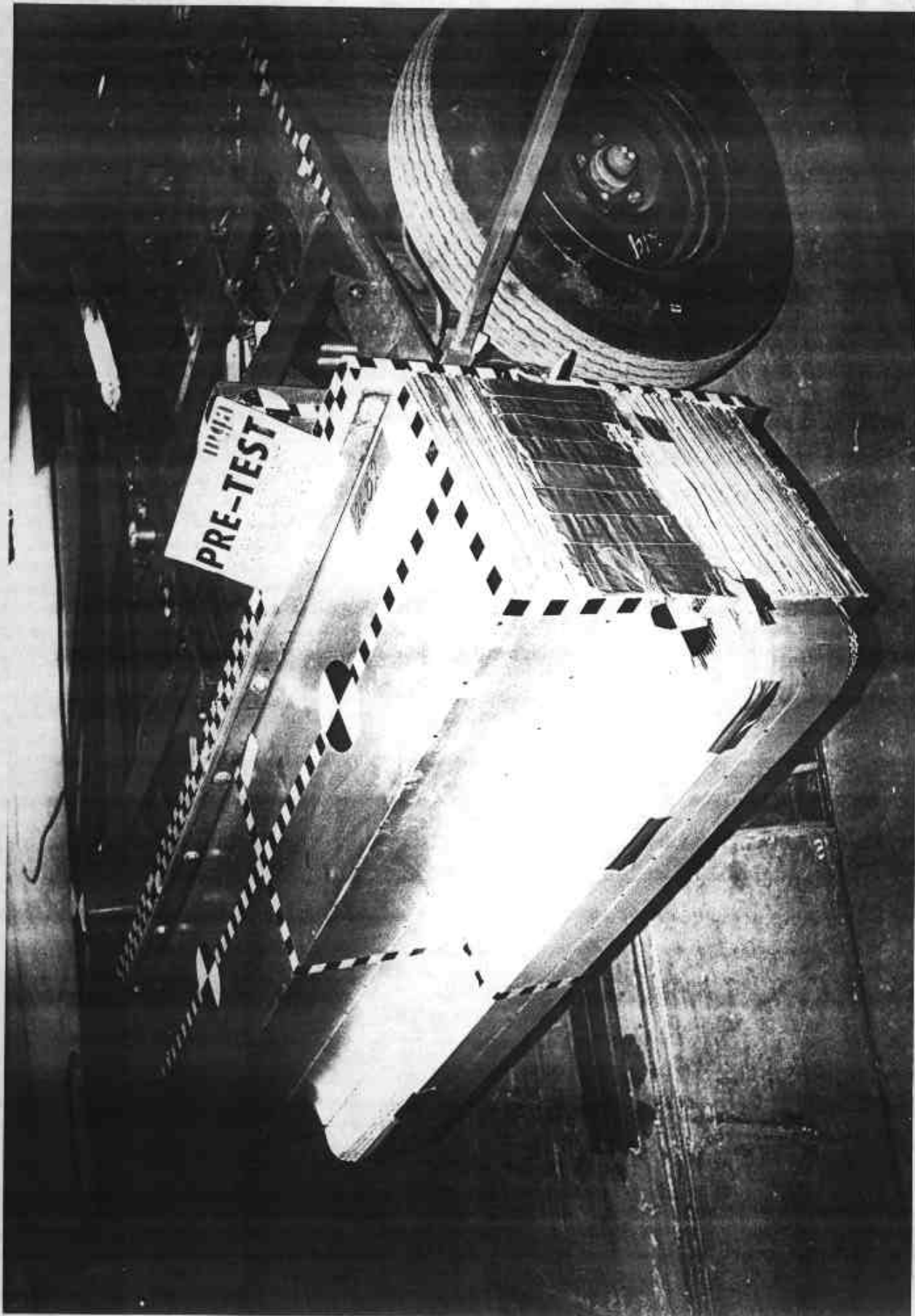


Photo No. A-18 - Pre-Test MDB Left Side View

A-18

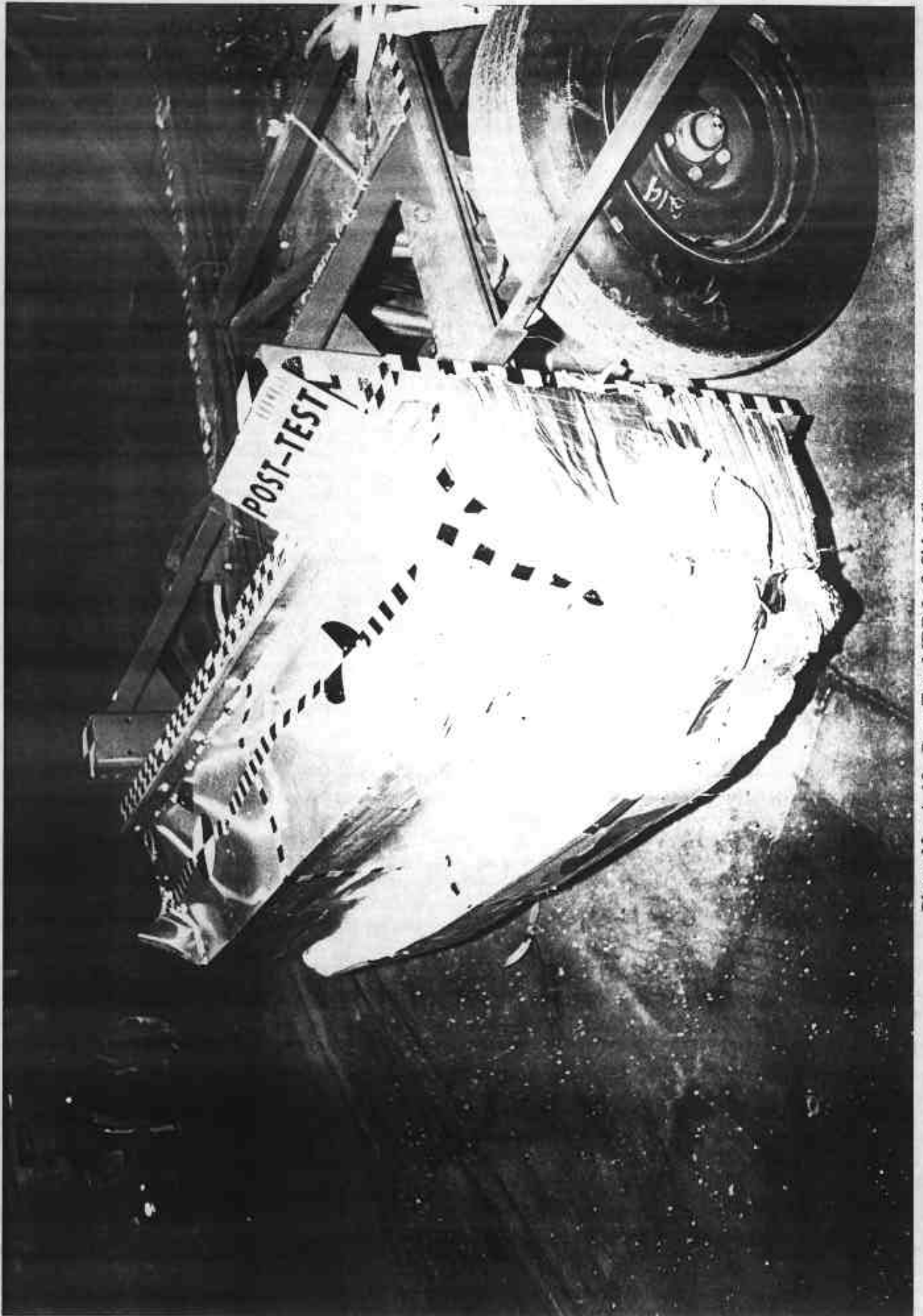


Photo No. A-19 - Post-Test MDB Left Side View

A-19

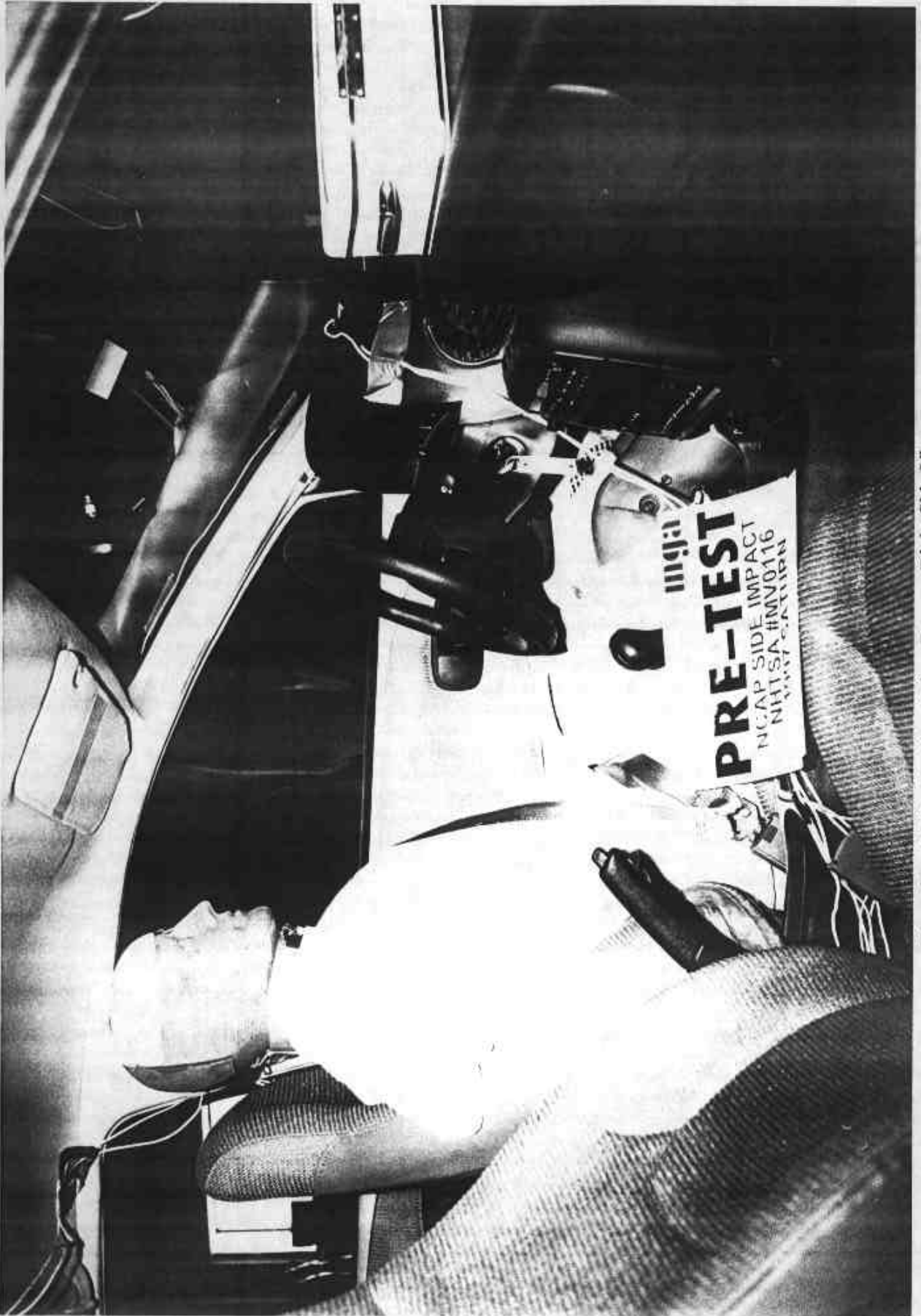


Photo No. A-20 - Pre-Test Driver Dummy Right Side View

A-20

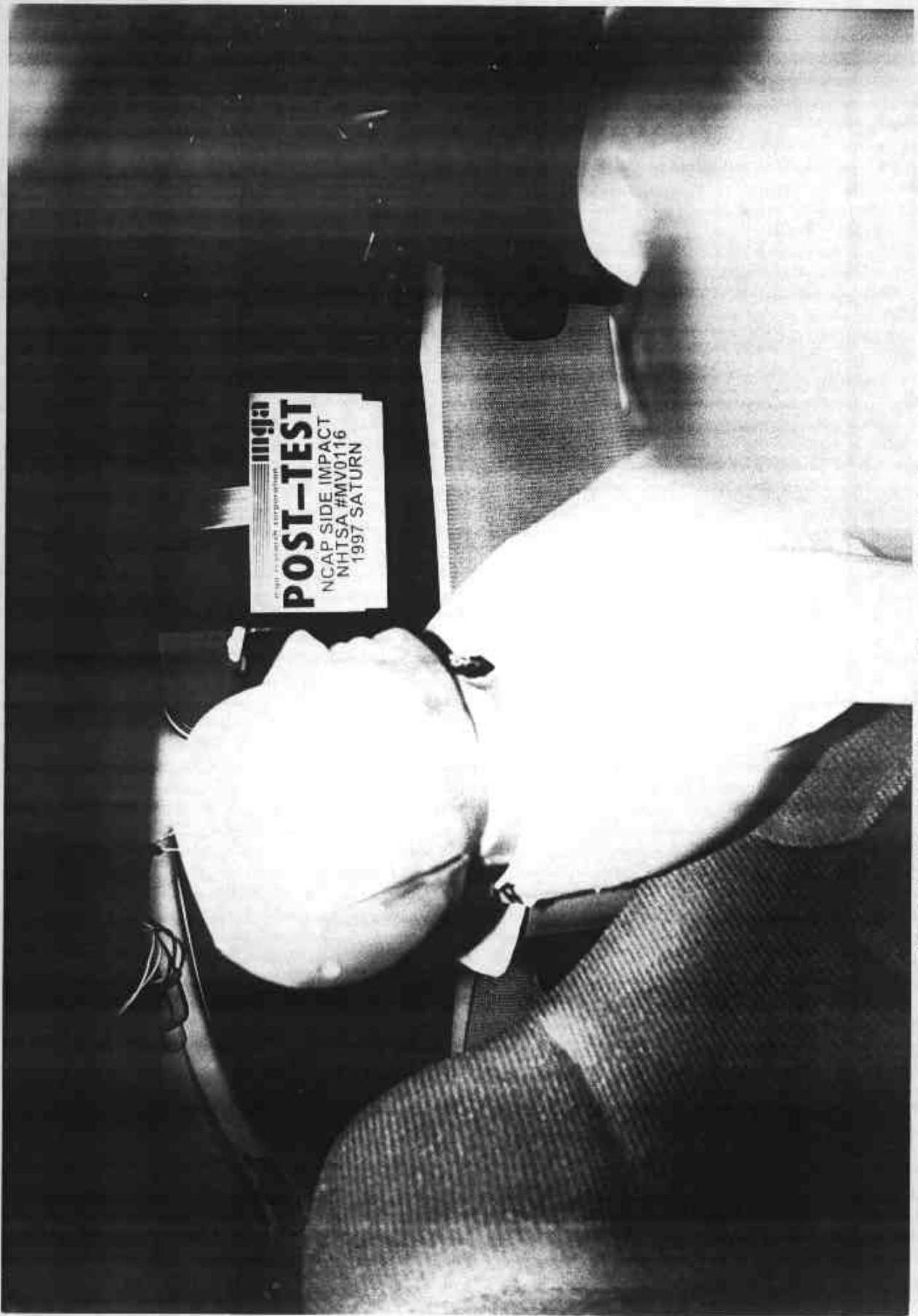


Photo No. A-21 - Post-Test Driver Dummy Right Side View

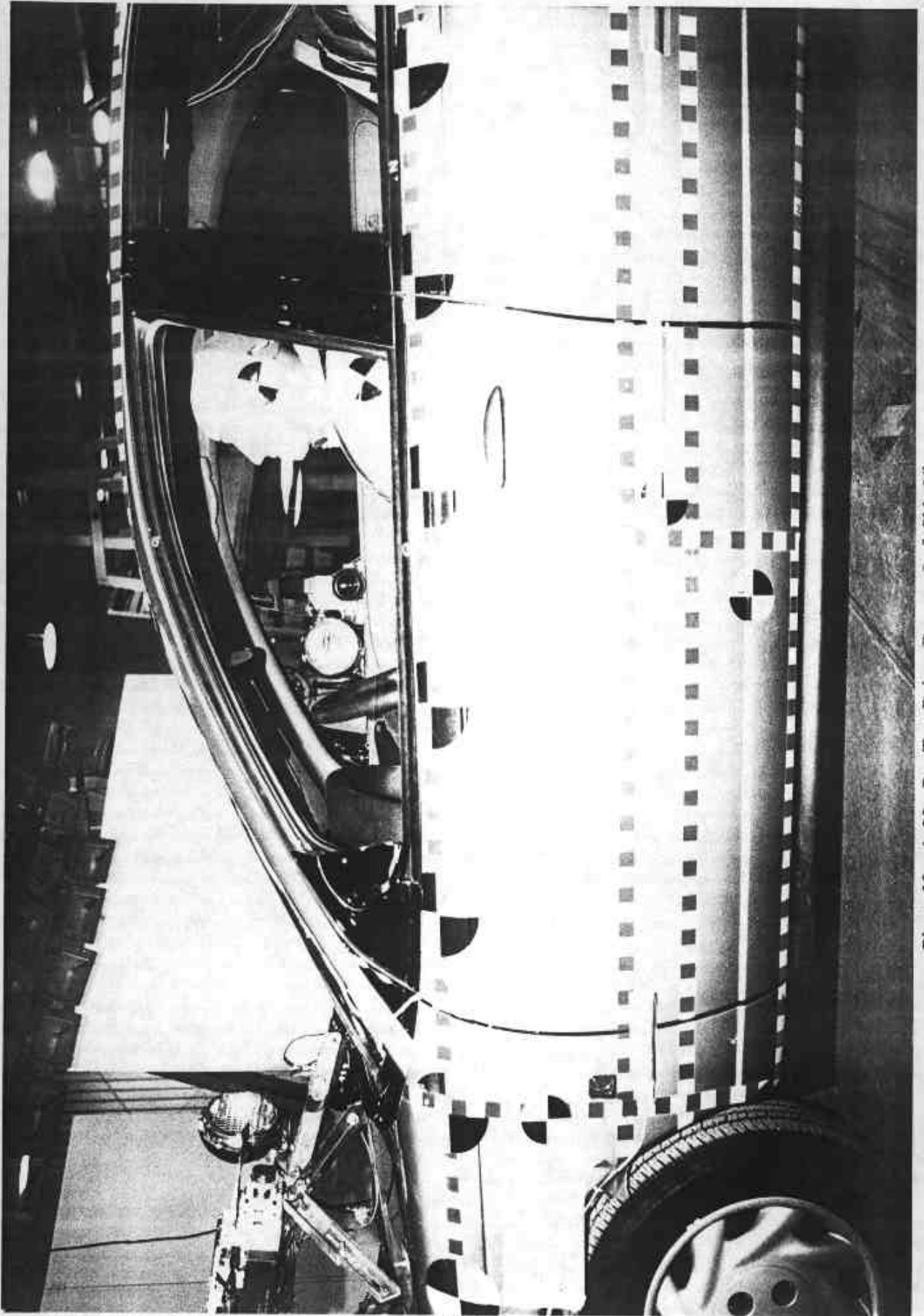
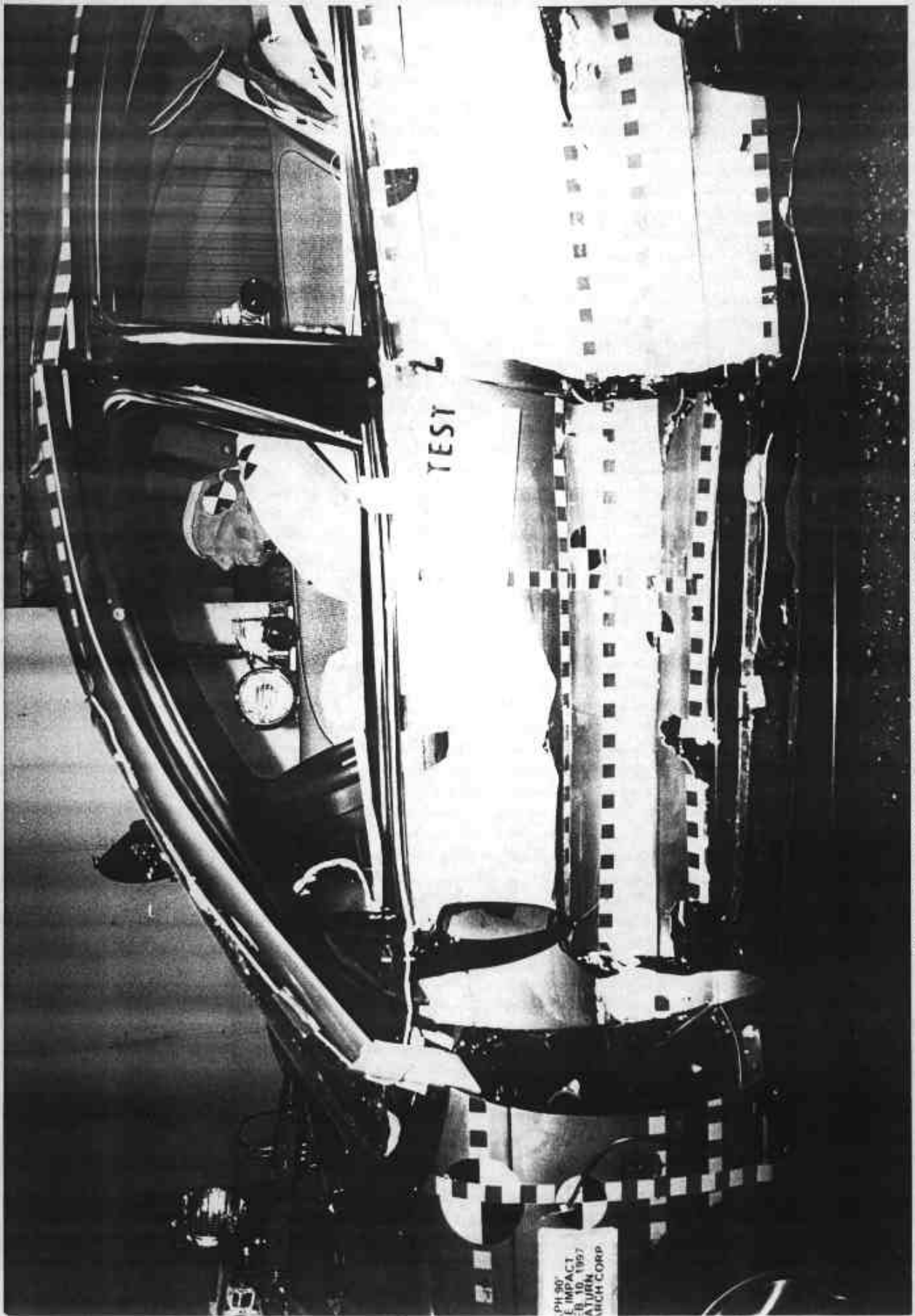


Photo No. A-22 - Pre-Test Driver Dummy Left Side View

A-22



A-23

Photo No. A-23 - Post-Test Driver Dummy Left Side View



Photo No. A-24 - Pre-Test Driver Dummy Left Side View (Door Open)

A-24



Photo No. A-25 - Pre-Test Driver Dummy Shoulder and Door Top View



A-26

Photo No. A-26 - Post-Test Driver Dummy Shoulder and Door Top View



Photo No. A-27 - Post-Test Driver Dummy Contact

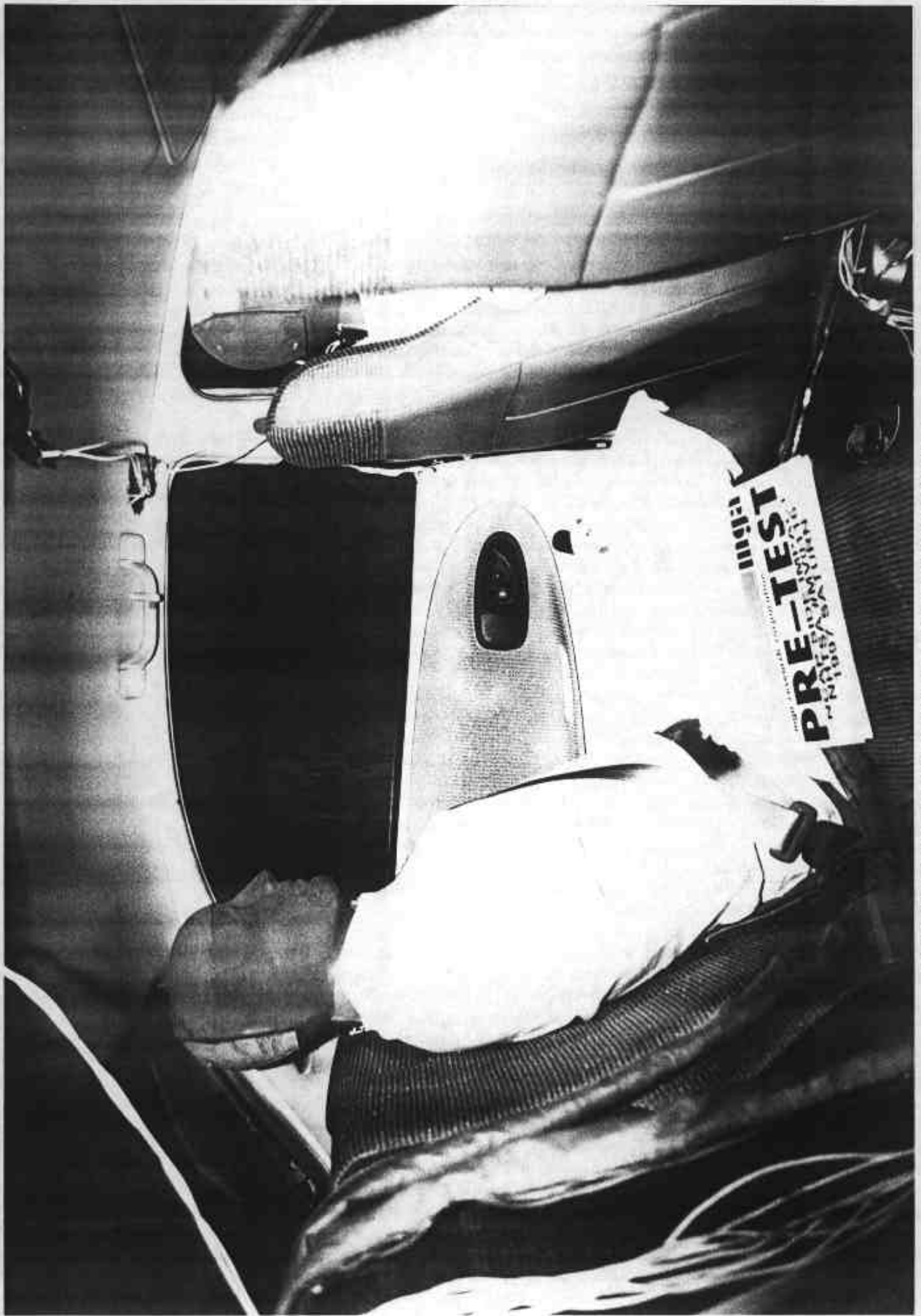


Photo No. A-28 - Pre-Test Passenger Dummy Right Side View

A-28

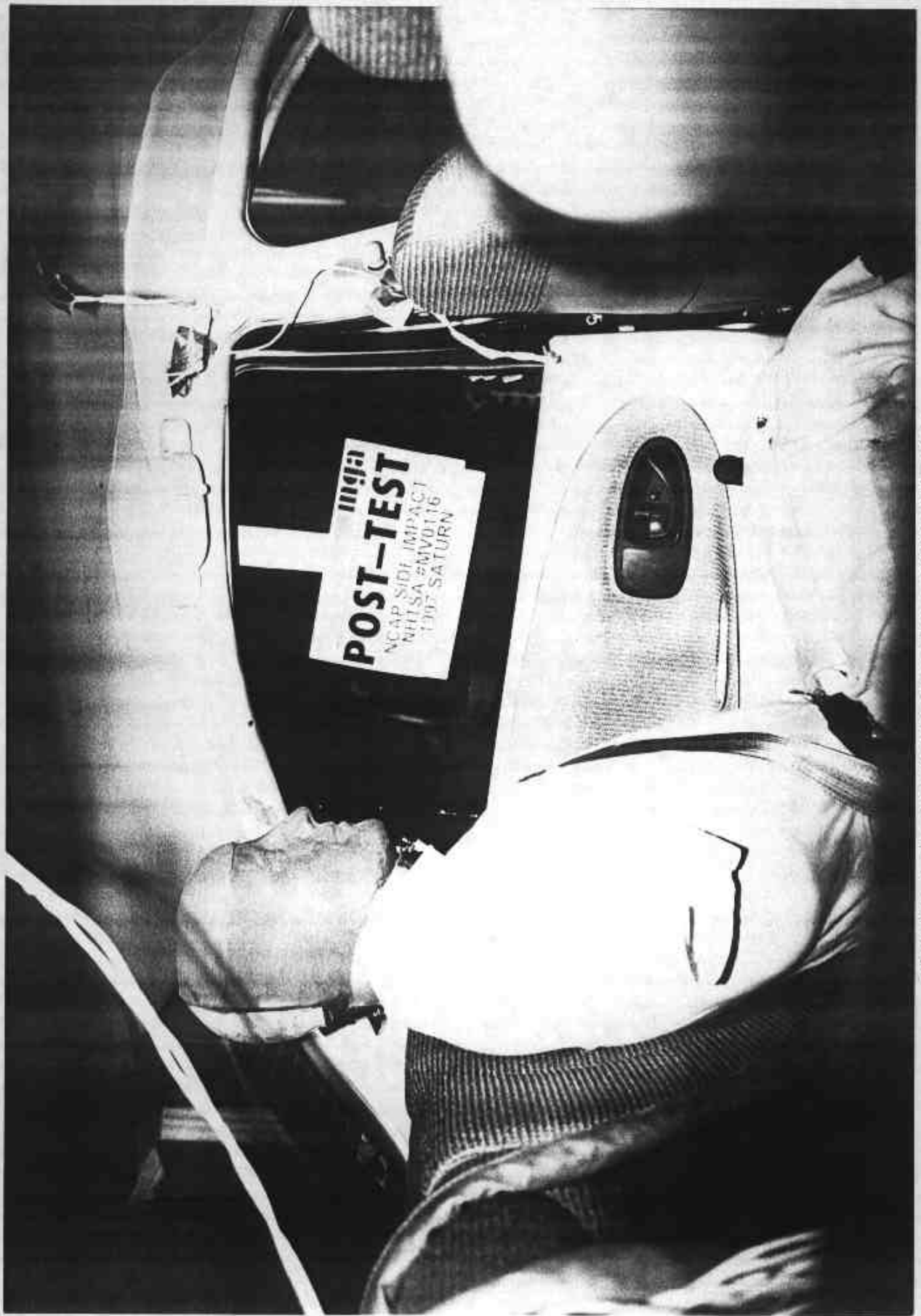


Photo No. A-29 - Post-Test Passenger Dummy Right Side View

A-29

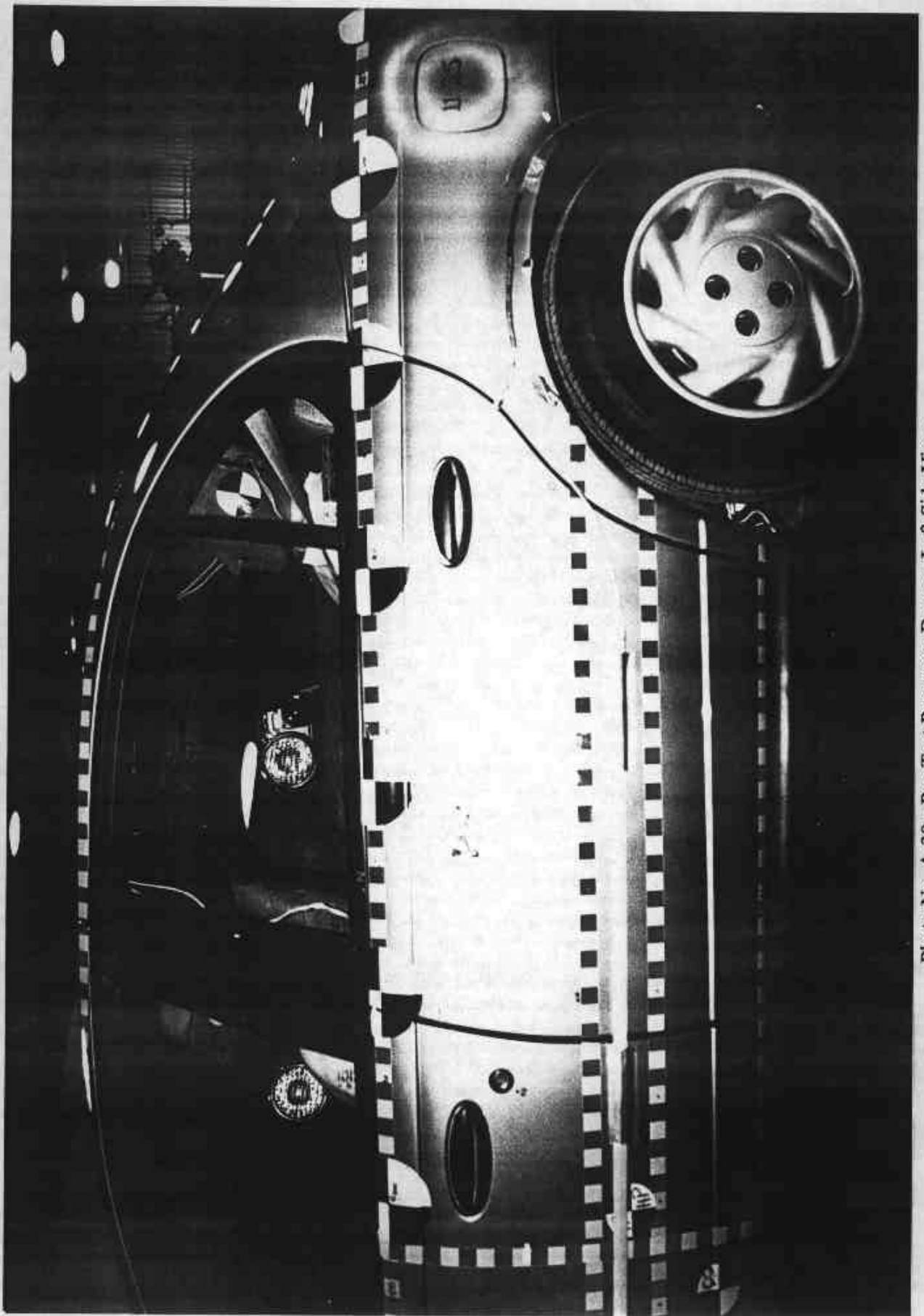


Photo No. A-30 - Pre-Test Passenger Dummy Left Side View

A-30

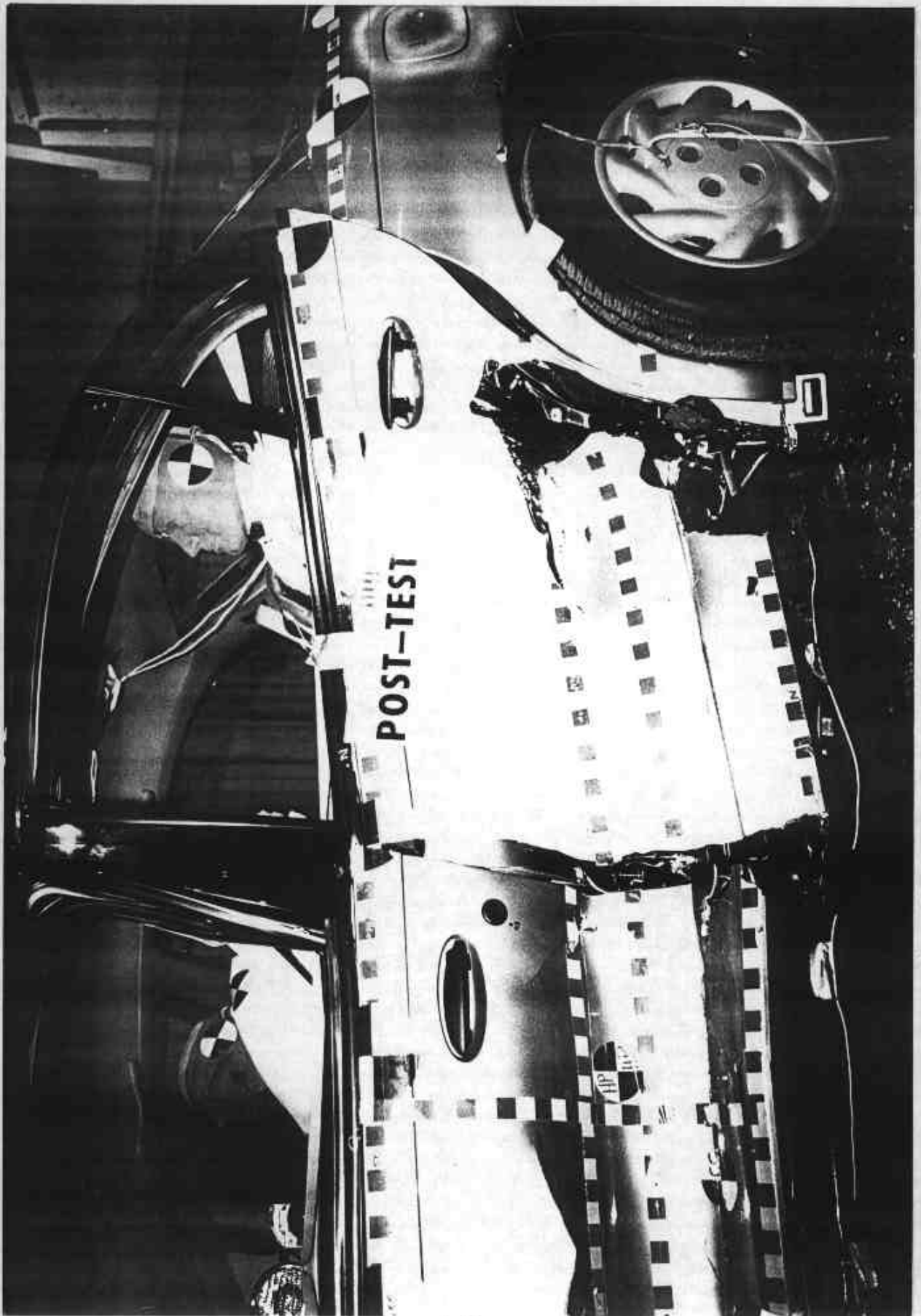


Photo No. A-31 - Post-Test Passenger Dummy Left Side View

A-31

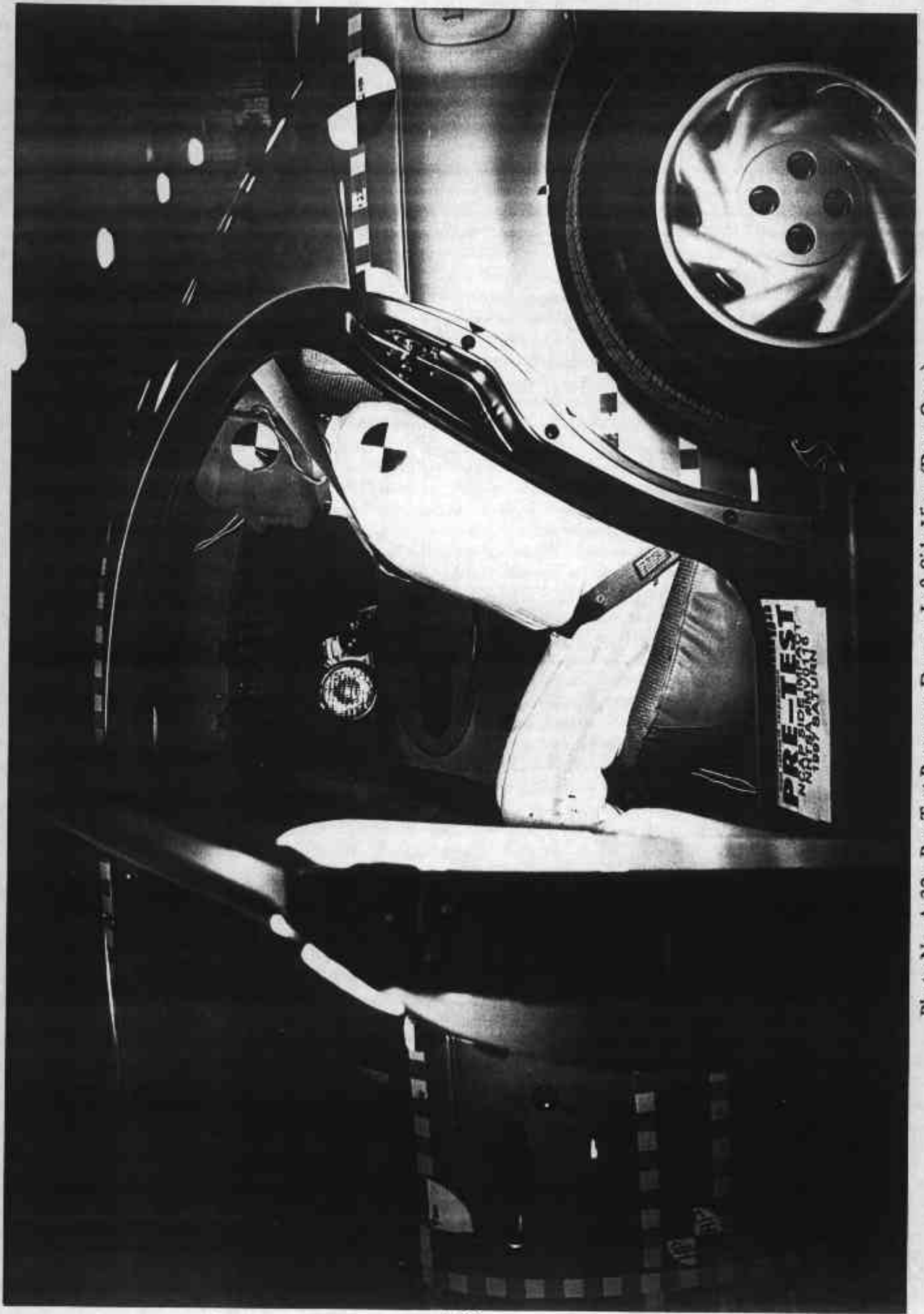


Photo No. A-32 - Pre-Test Passenger Dummy Left Side View (Door Open)

A-32

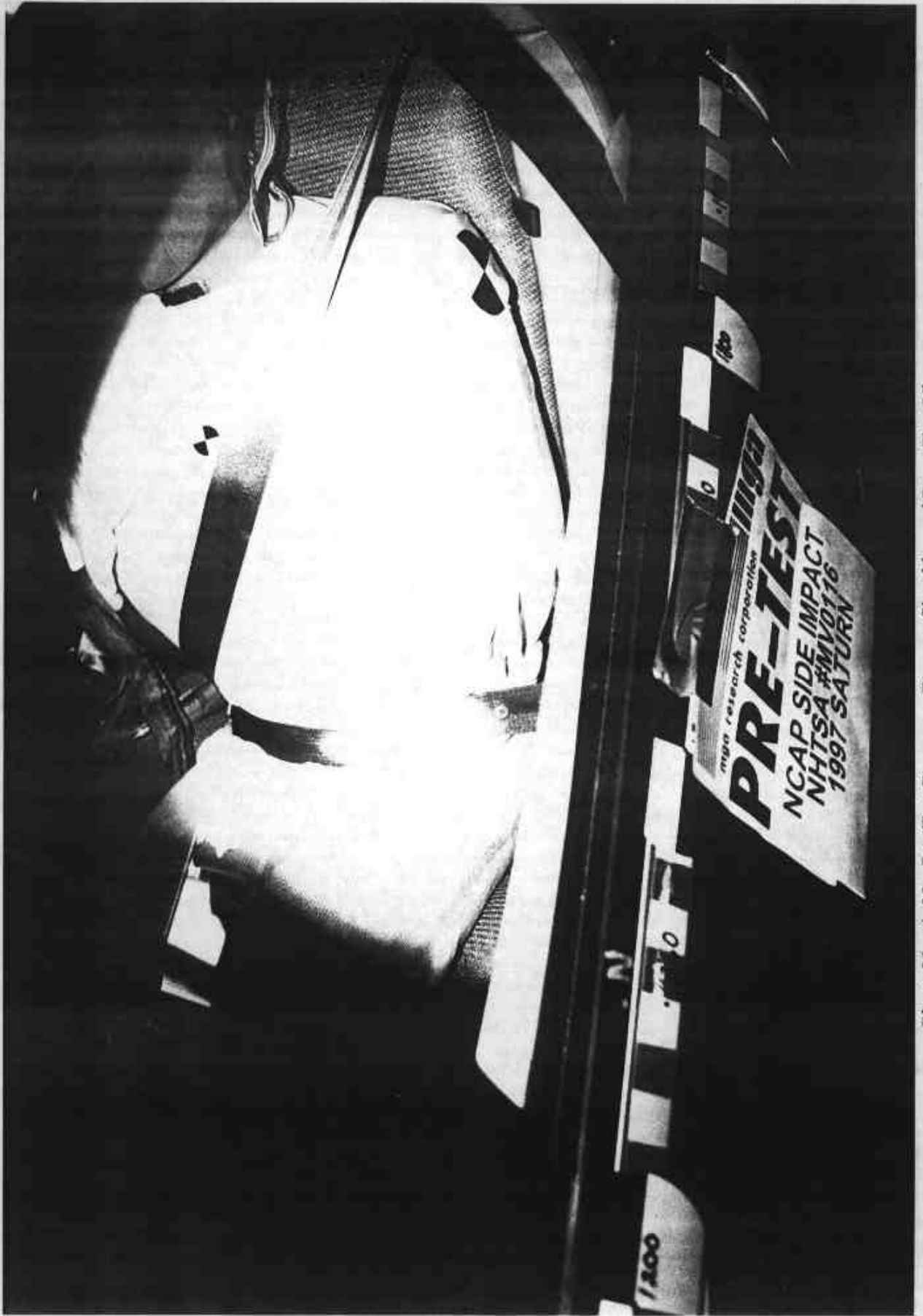


Photo No. A-33 - Pre-Test Passenger Dummy Shoulder and Door Top View



Photo No. A-34 - Post-Test Passenger Dummy Shoulder and Door Top View

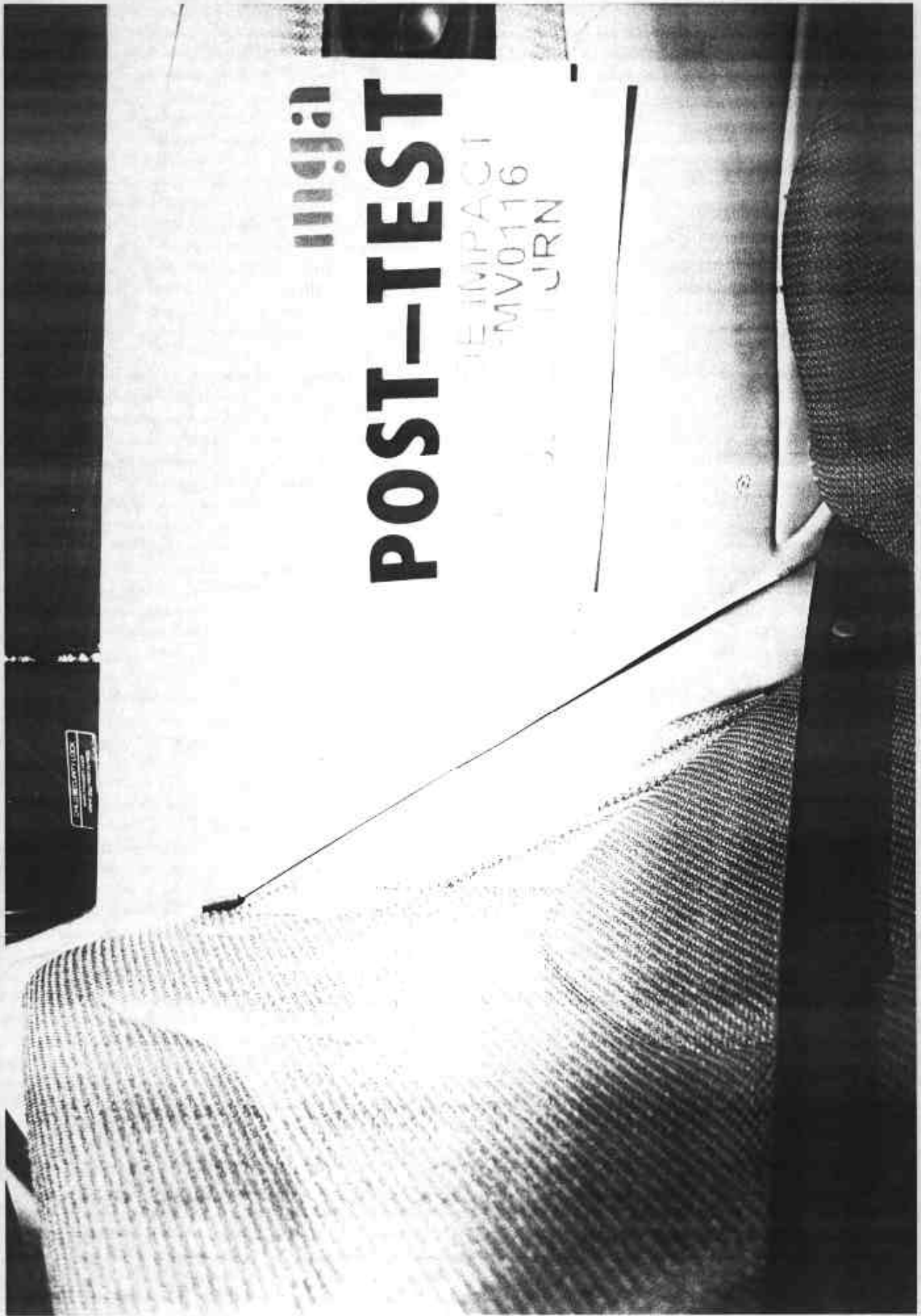


Photo No. A-35 - Post-Test Passenger Dummy Contact



Photo No. A-36 - Post-Test Passenger Dummy Head Contact



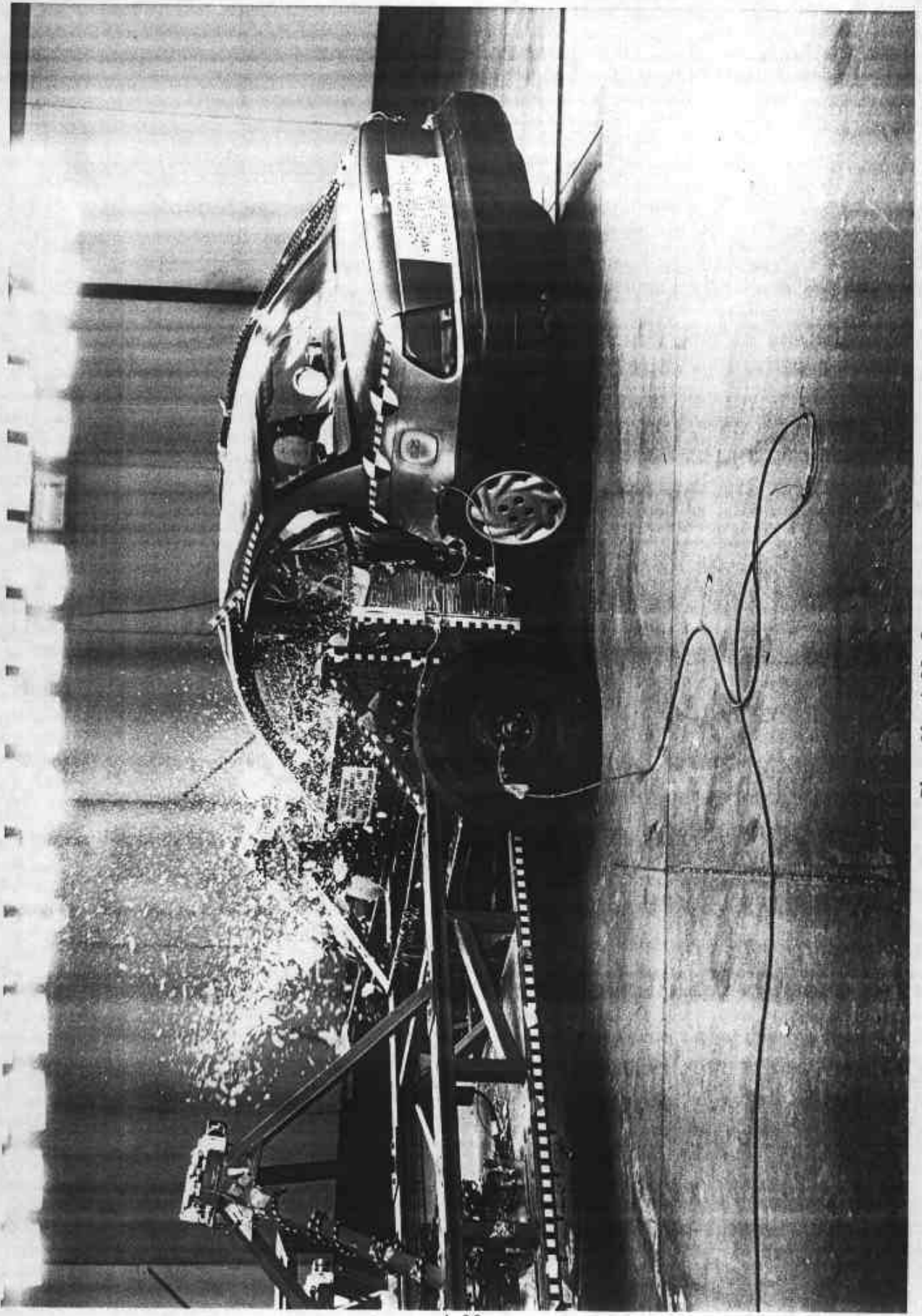
A-37

Photo No. A-37 - Pre-Test Left Front Impact Point on Vehicle



A-38

Photo No. A-38 - Post-Test Left Front Impact Point on Vehicle



A-39

Photo No. A-39 - Impact


MFD BY SATURN CORPORATION
 DATE 11/96 GAWR 3221LB 157 GAWR FRT 1628LB 157
 1461KG 0739KG 072

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

1G8ZF5282V235843 PASS CAR




TIRE-LOADING INFORMATION
 OCCUPANTS 5 VEHICLE CAPACITY WT. 550
 FRT. CTR. RR. 5 TOTAL 864
 MAXIMUM LOADING AT GAWR: 5000 LBS
 SAME AS VEHICLE CAPACITY HEIGHT 55"

TIRE SIZE, SPEED RATING, LOAD INDEX, AND COLD TIRE PRESSURE
 FRONT P175/70R14 88H 35PSI (29 KPA)
 REAR P175/70R14 88H 35PSI (29 KPA)

IF TIRE'S AIR DOT, ADD 4 PSI (29 KPA) INFO INFORMATION

Photo No. A-40 - Vehicle Certification Label

TIRE-LOADING INFORMATION

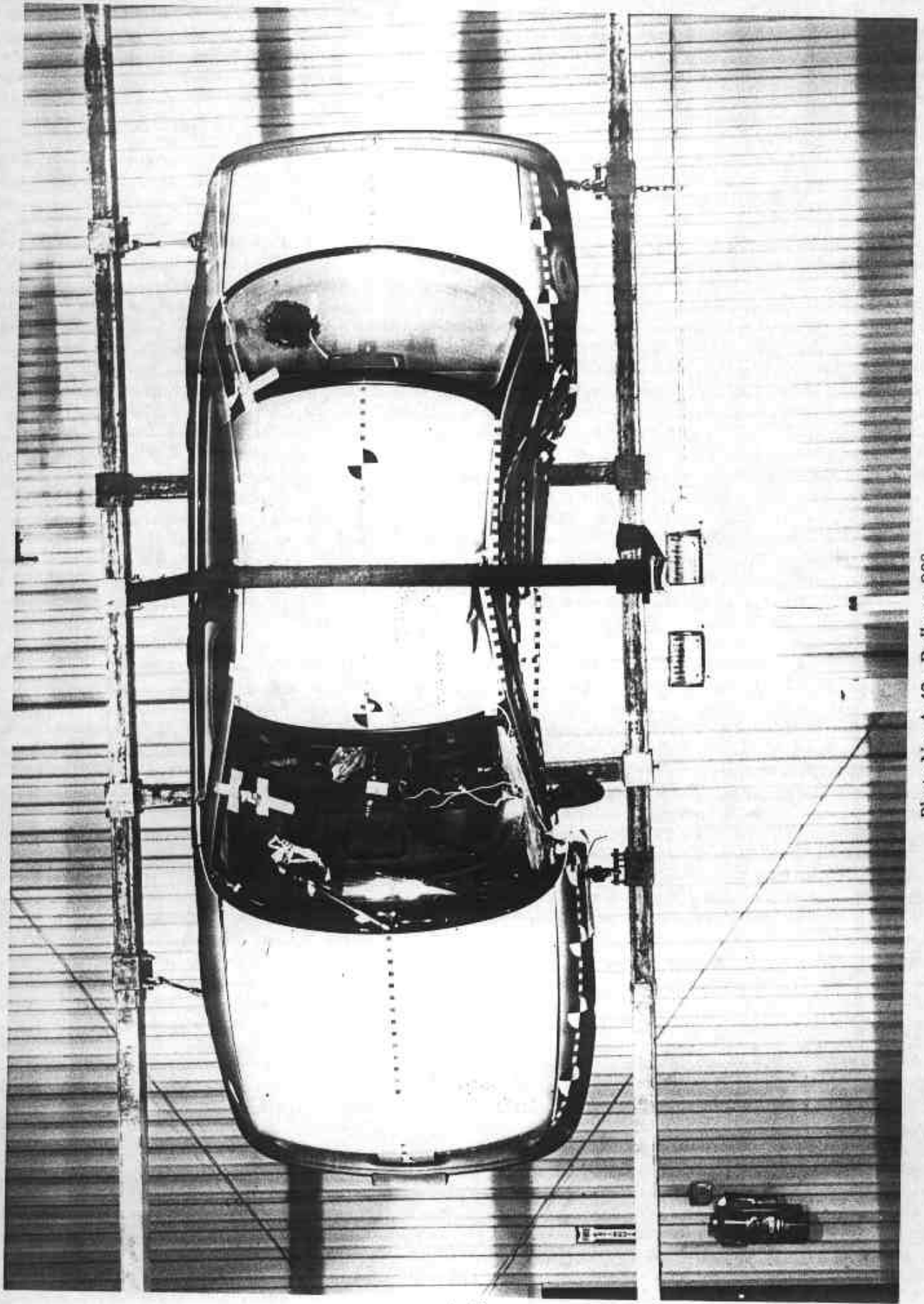
OCCUPANTS
FRT. CTR. RR. TOTAL
2 0 3 5
VEHICLE CAPACITY WT. LBS 864
VEHICLE CAPACITY WT. KG 392

MAXIMUM LOADING AT GVWR:
SAME AS VEHICLE CAPACITY WEIGHT
2235

TIRE	SIZE	SPEED RATING	COLD TIRE PRESSURE
FRONT	P175/70R14	S	30/210
REAR	P175/70R14	S	26/180
SPARE	T115/70R14	H	60/420

IF TIRES ARE HOT, ADD 4 PSI (28 KPA)
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

Photo No. A-41 - Tire Placard



A-42

Photo No. A-42 - Rollover 90°

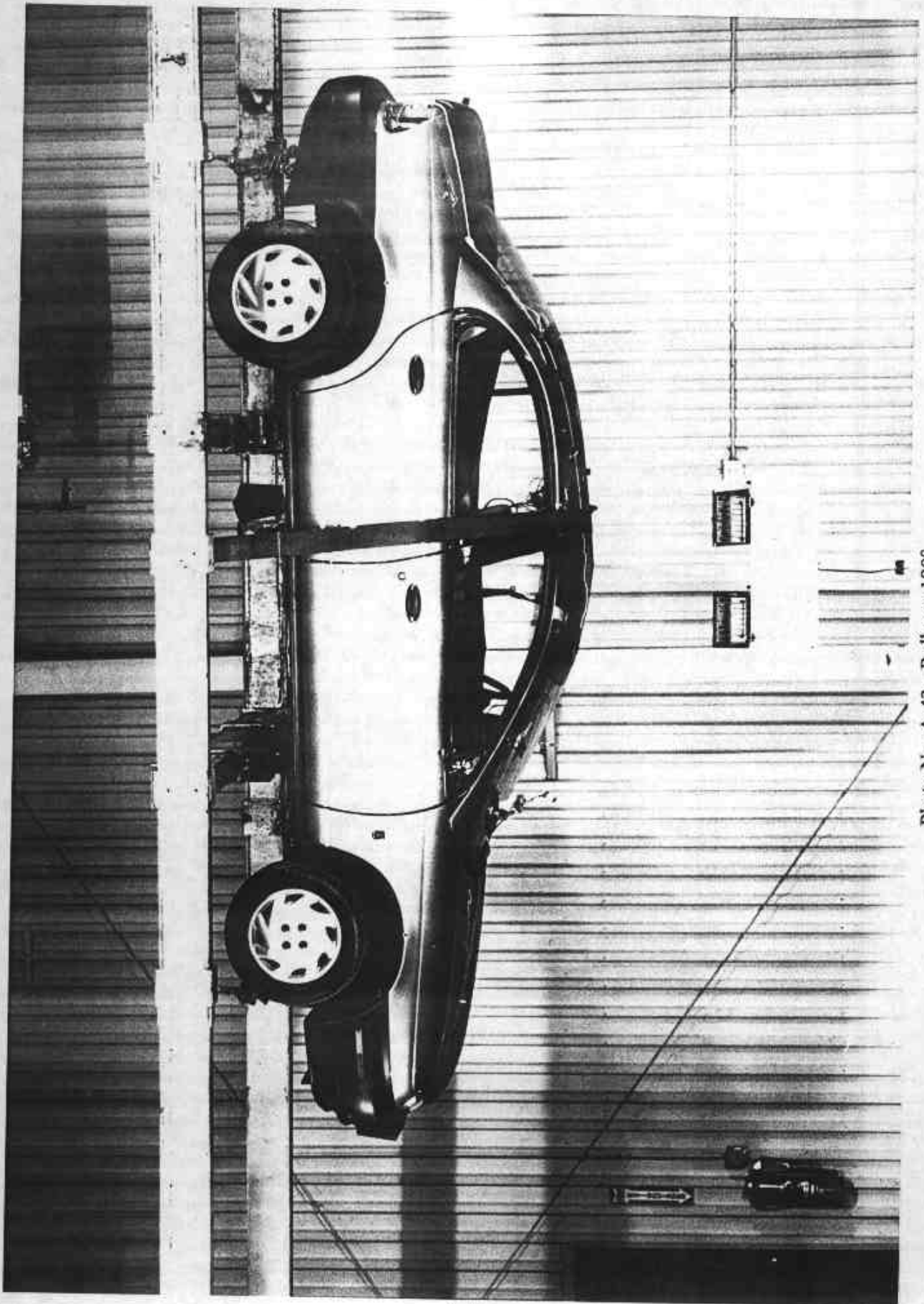
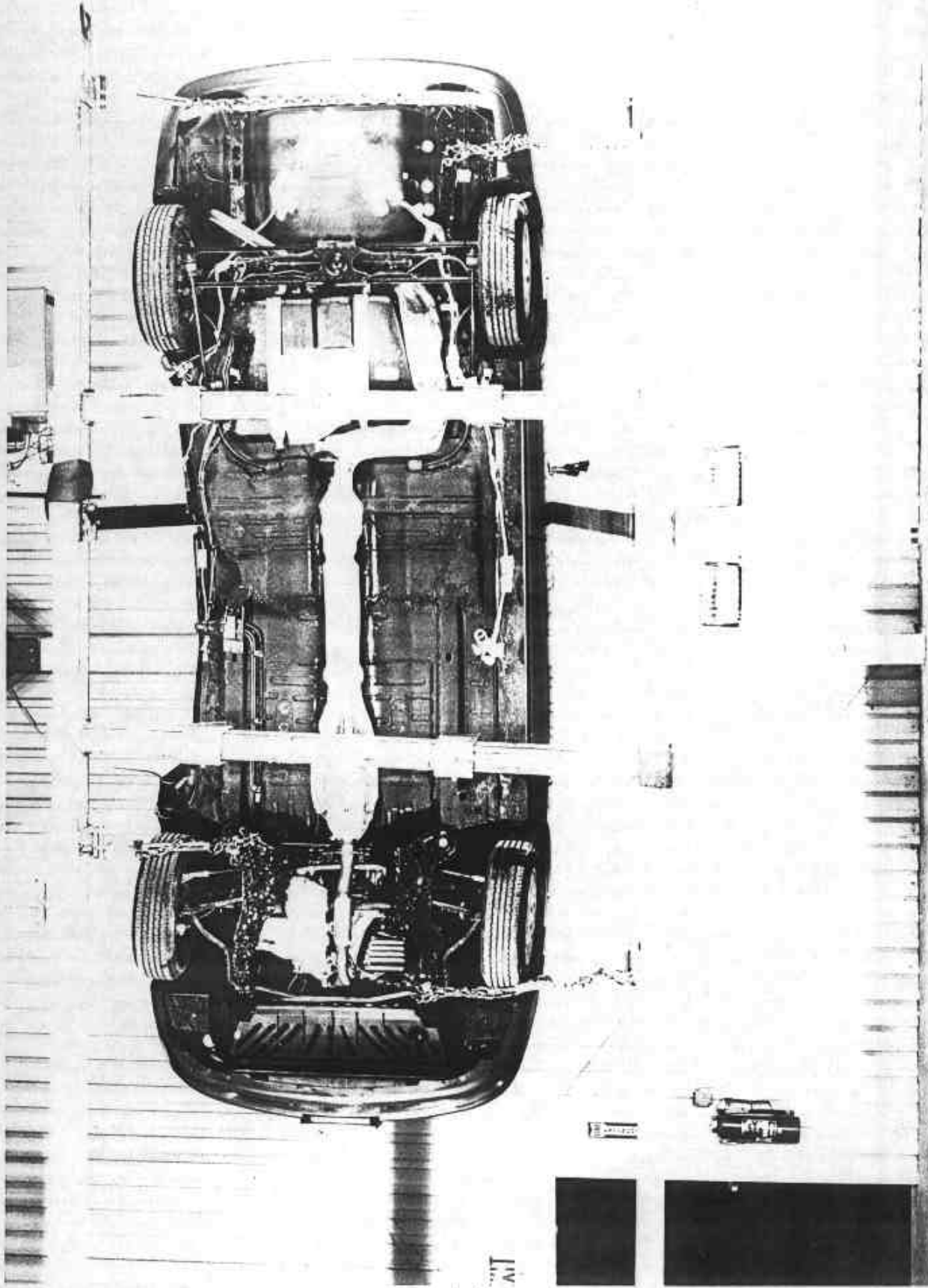


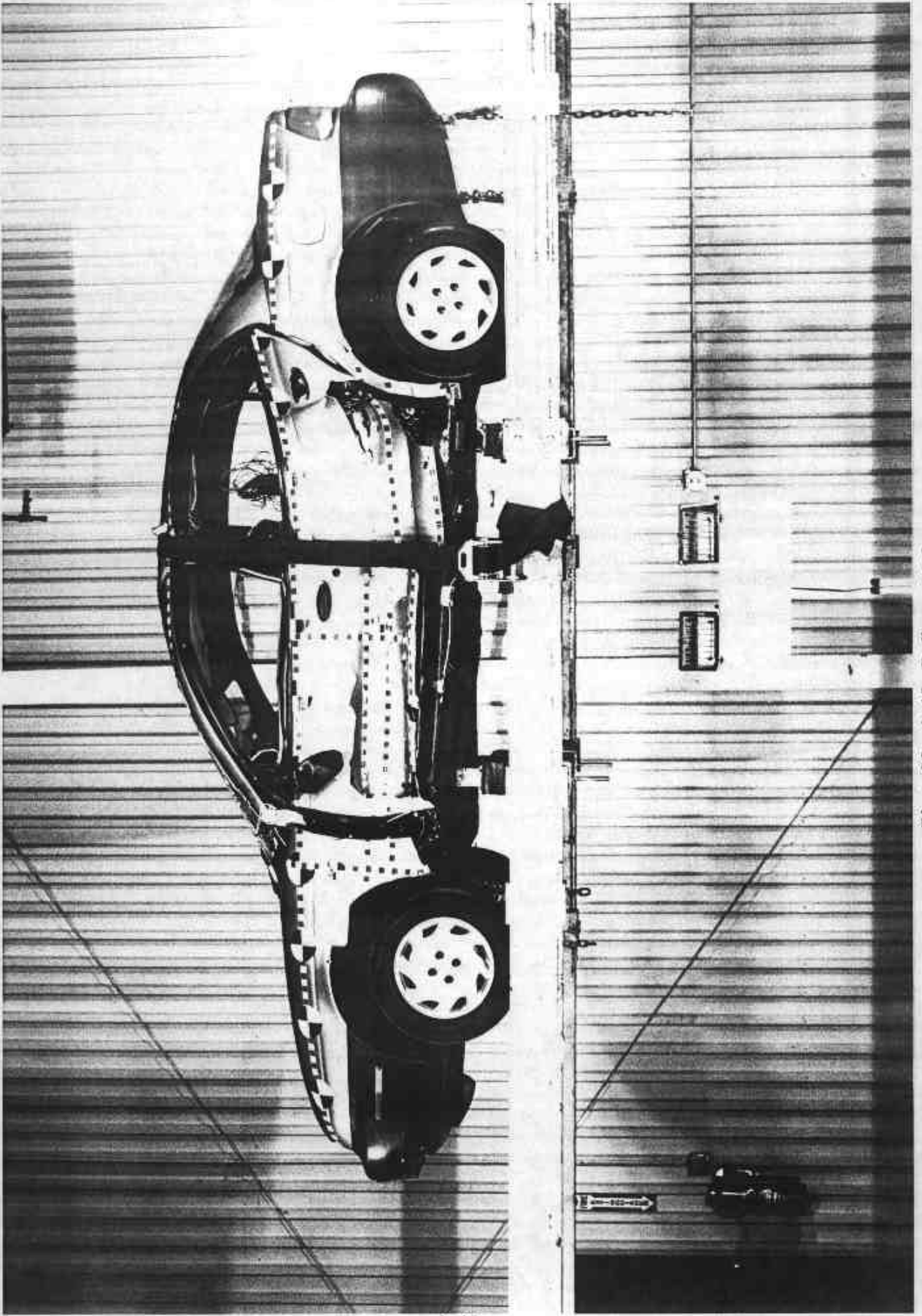
Photo No. A-43 - Rollover 180°

A-43



A-44
AT

Photo No. A-44 - Rollover 270°



A-45

Photo No. A-45 - Rollover 360°

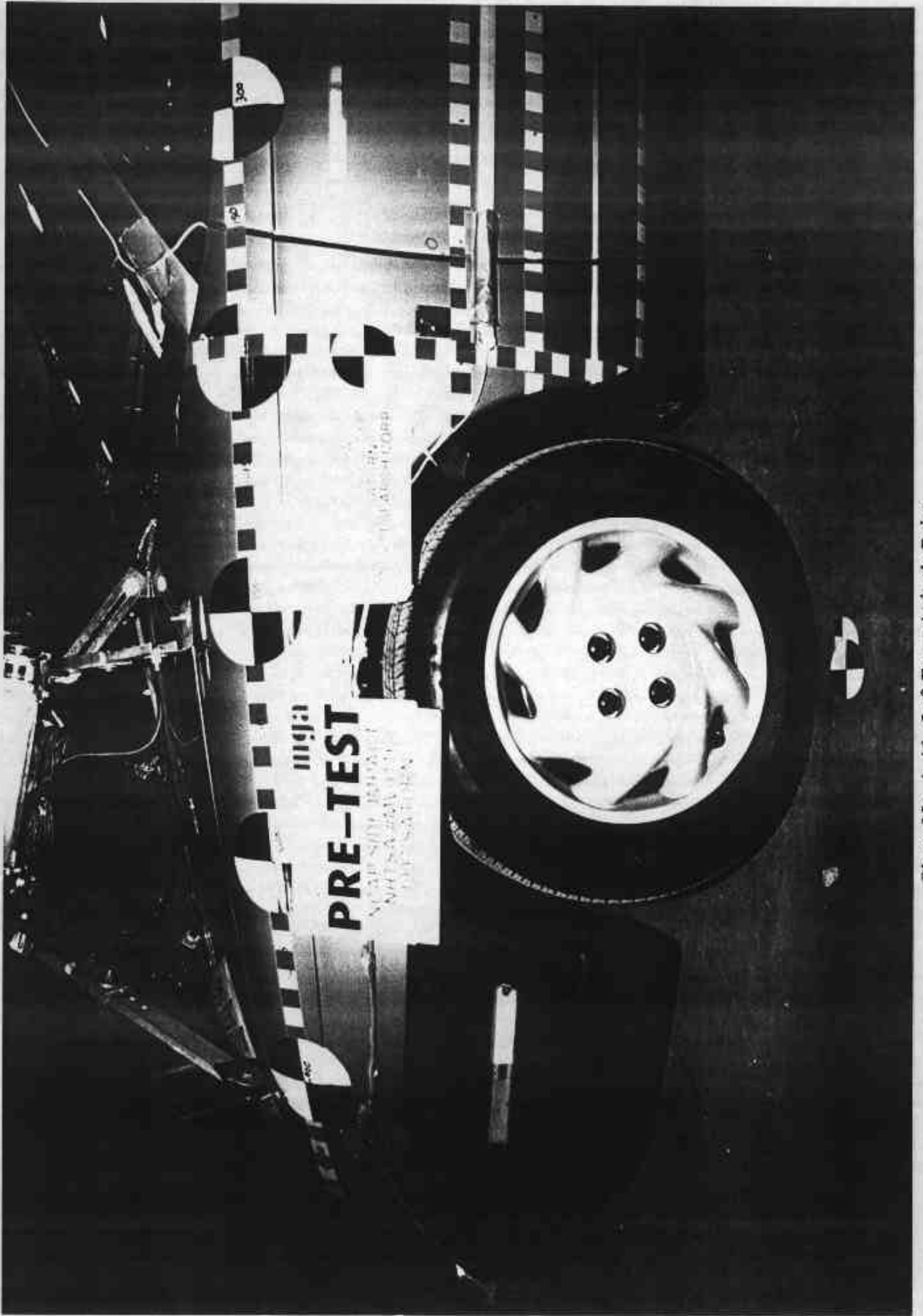


Photo No. A-46 - Left Front Attitude Point

A-46

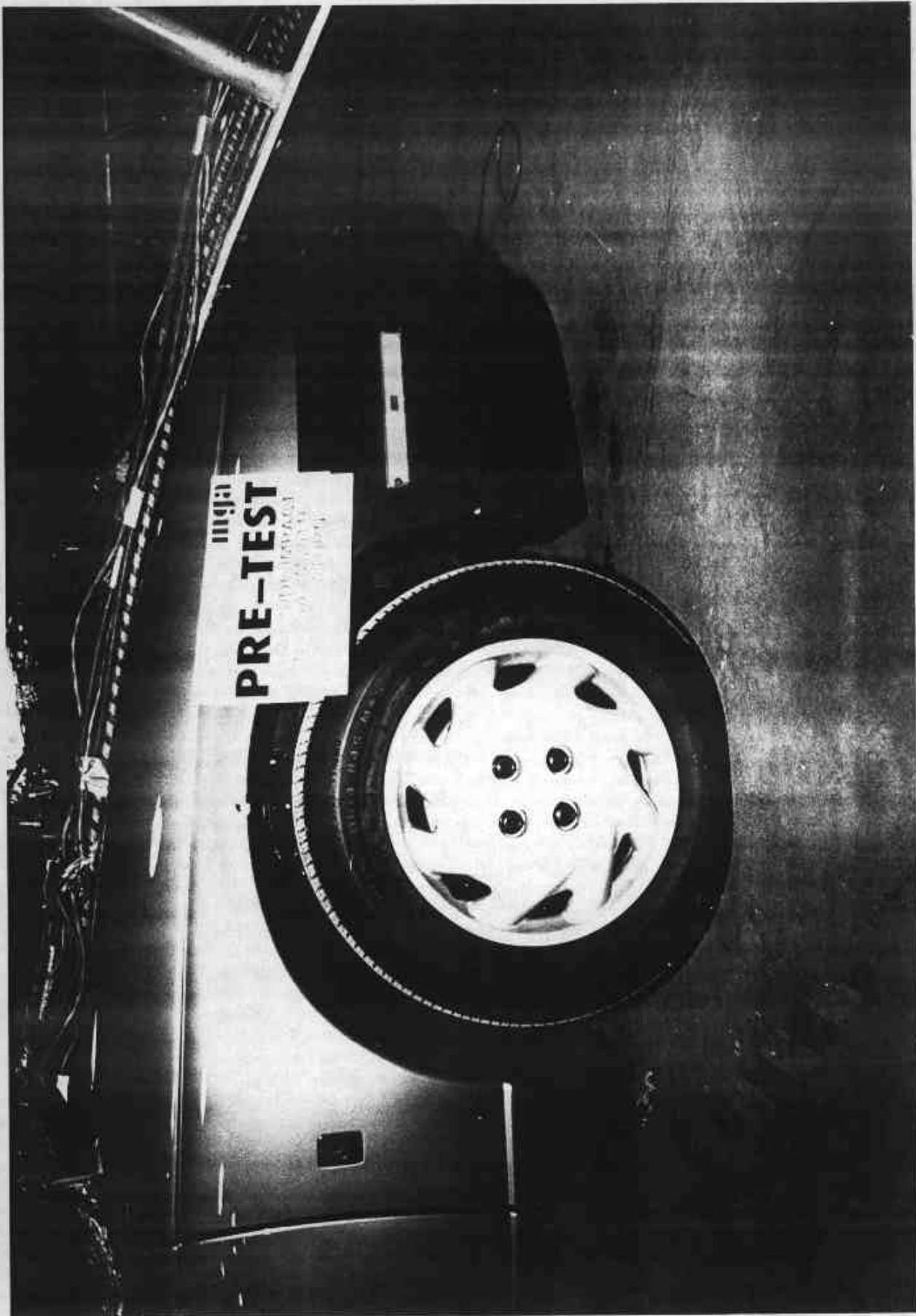


Photo No. A-47 - Right Front Attitude Point

A-47

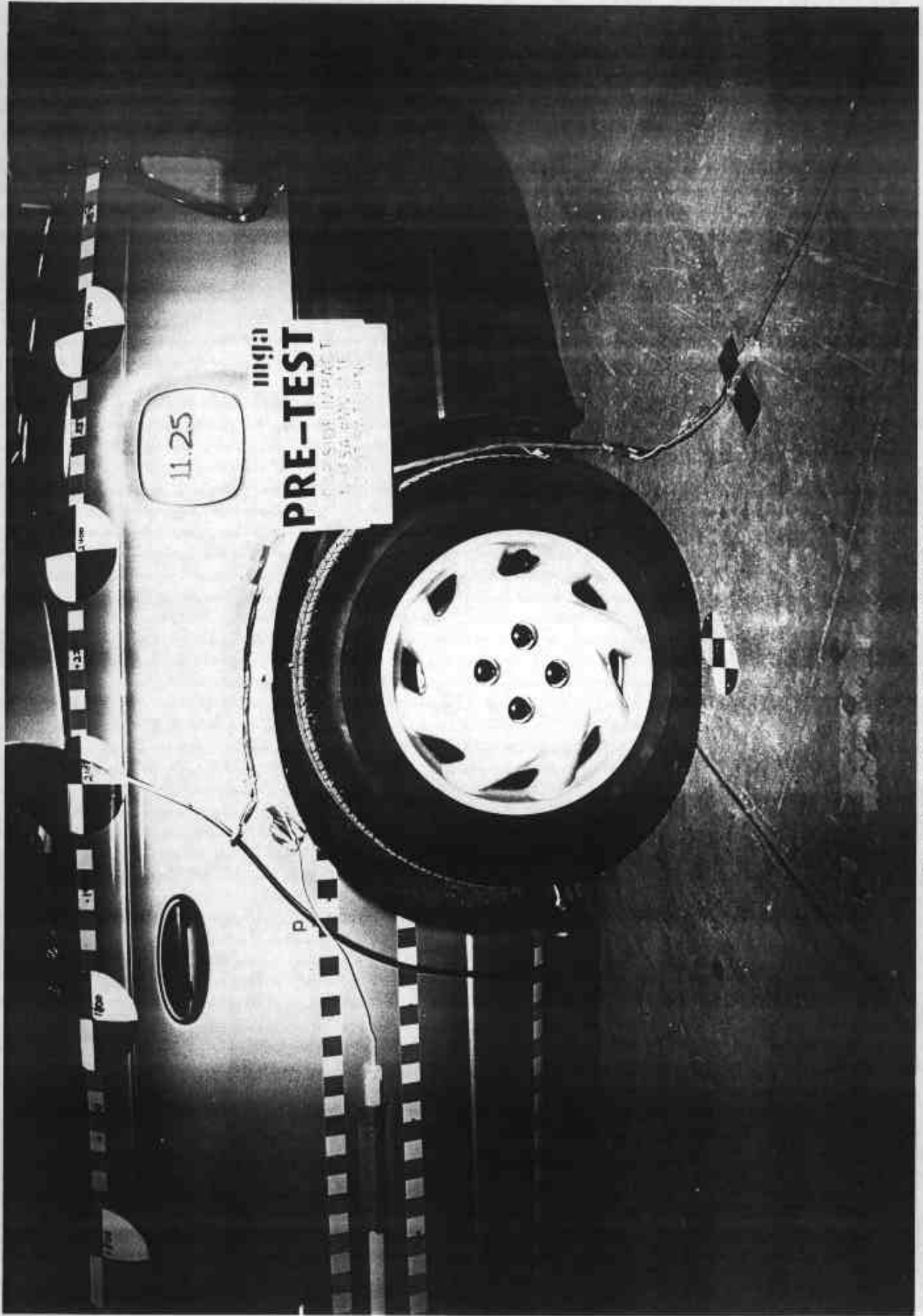


Photo No. A-48 - Left Rear Attitude Point

A-48



Photo No. A-49 - Right Rear Attitude Point

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* No valid data collected

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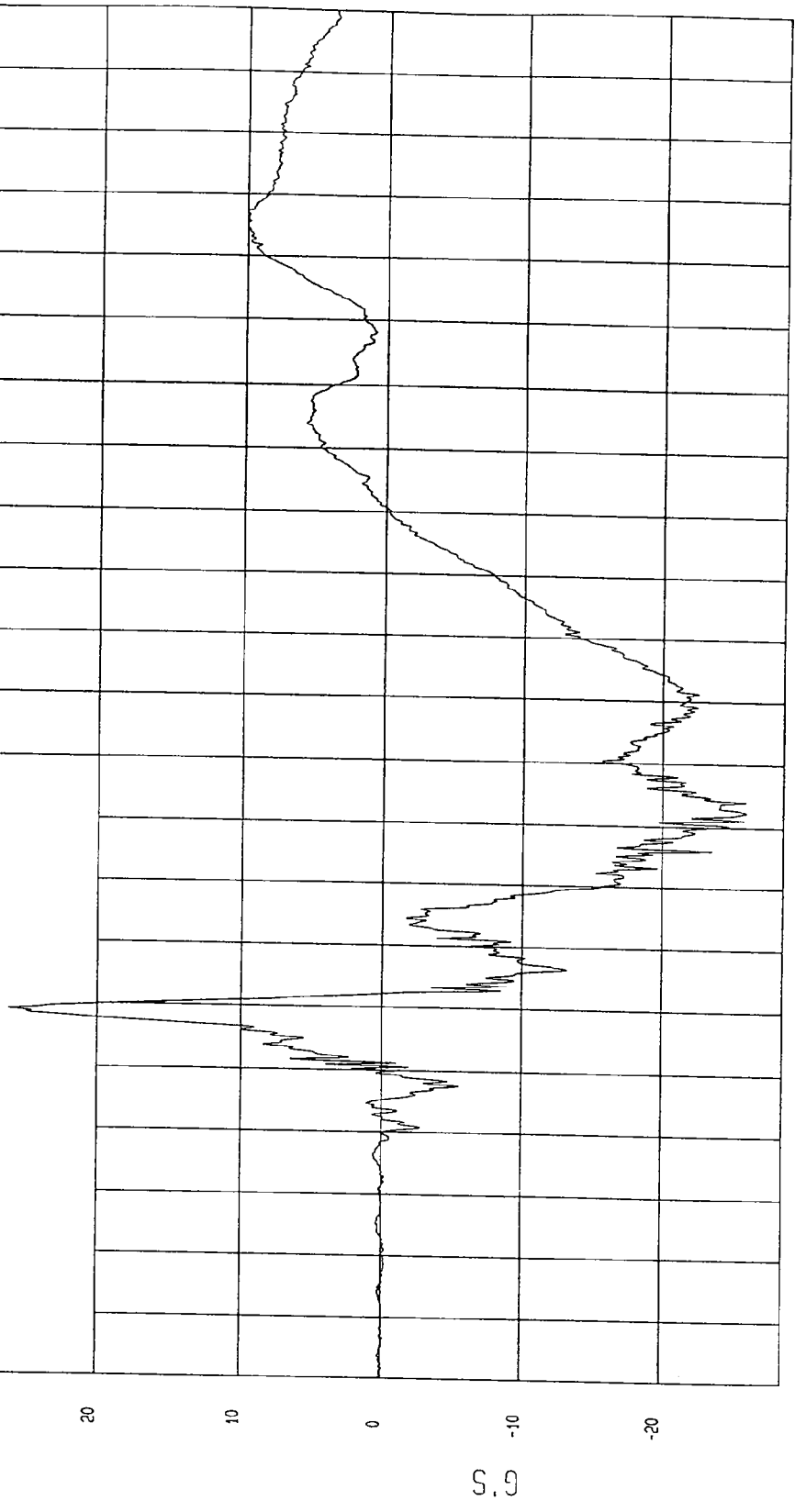
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -25.98 G'S at 72 msec
Maximum = 26.28 G'S at 39 msec

DRIVER HEAD X ACCELERATION

1 ——— 897024AF.A12 Filterclass (1000)



MCA Research
02-08-1997 14:43

TIME (SECONDS)

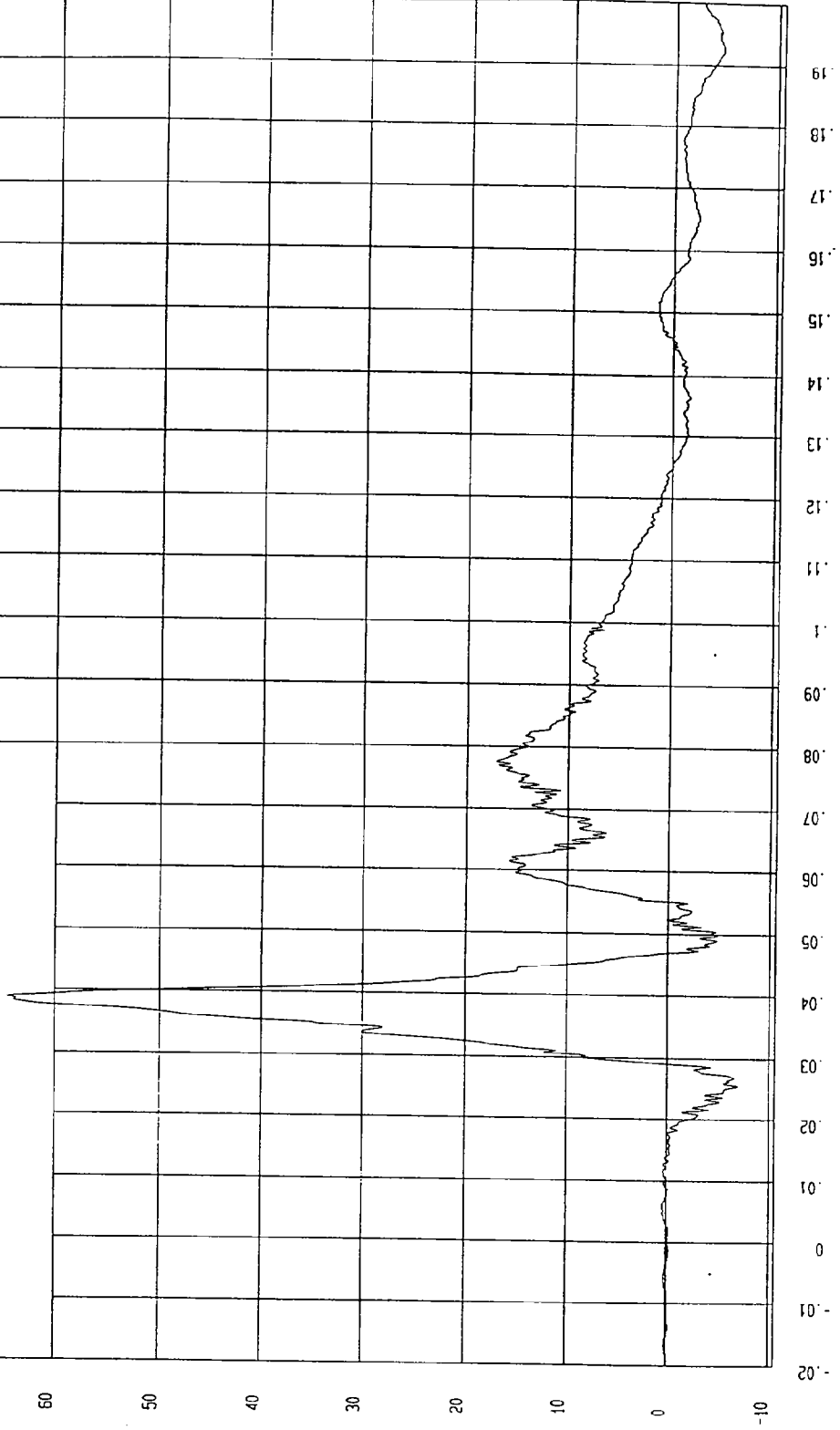
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV01116) Speed: 38.2 MPH 61.5 KPH

Minimum = -5.96 G'S at 25 msec Maximum = 64.48 G'S at 39 msec

DRIVER HEAD Y ACCELERATION

1 097024AF.A13 FilterClass (1000)



MGA Research
02-08-1997 14.43

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

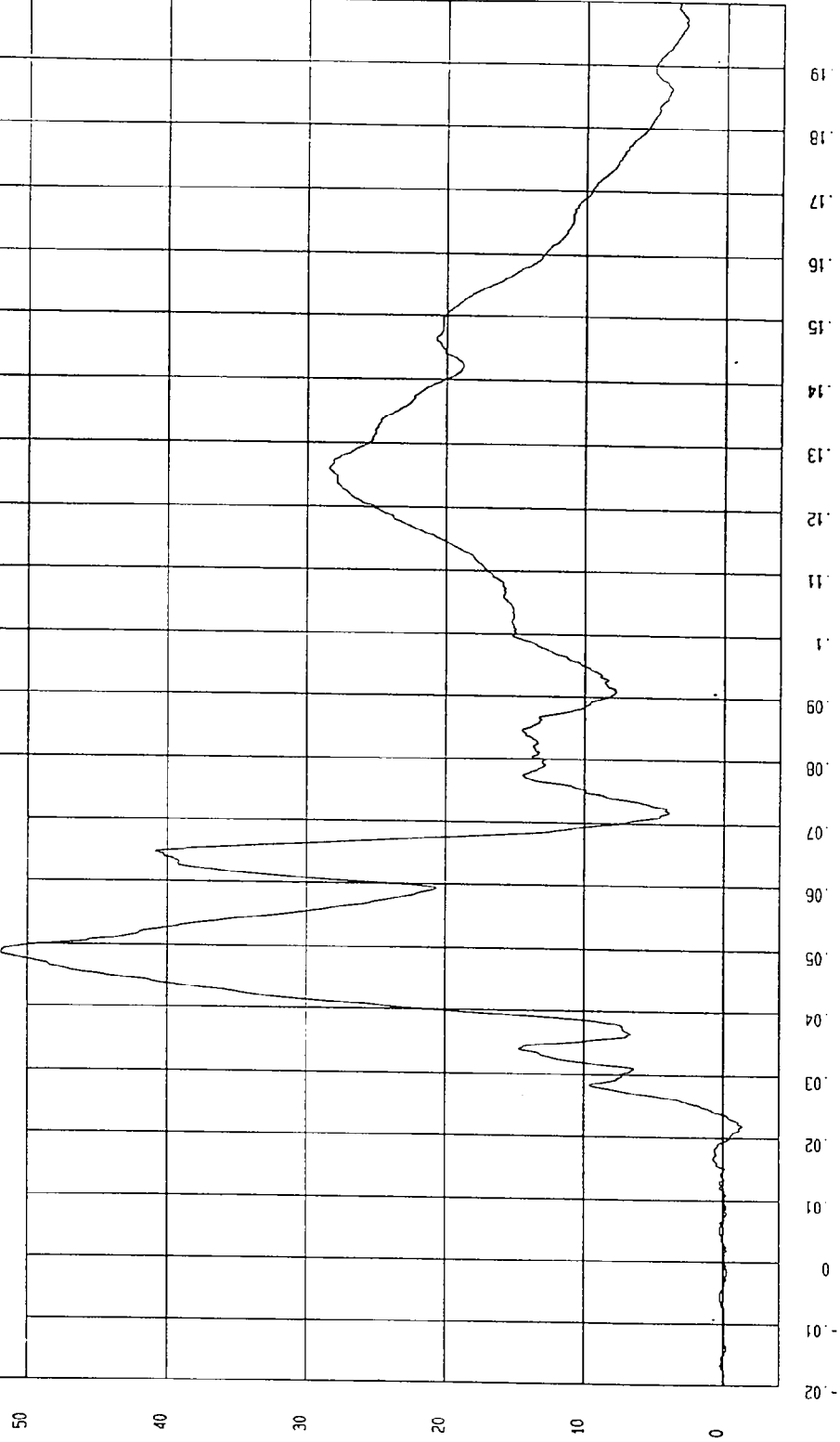
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.34 G'S at 22 msec

Maximum = 51.88 G'S at 49 msec

DRIVER HEAD Z ACCELERATION

1 897024AF A14 FilterClass (1000)



MGA Research
02-08-1997 1A.44

TIME (SECONDS)

S.9

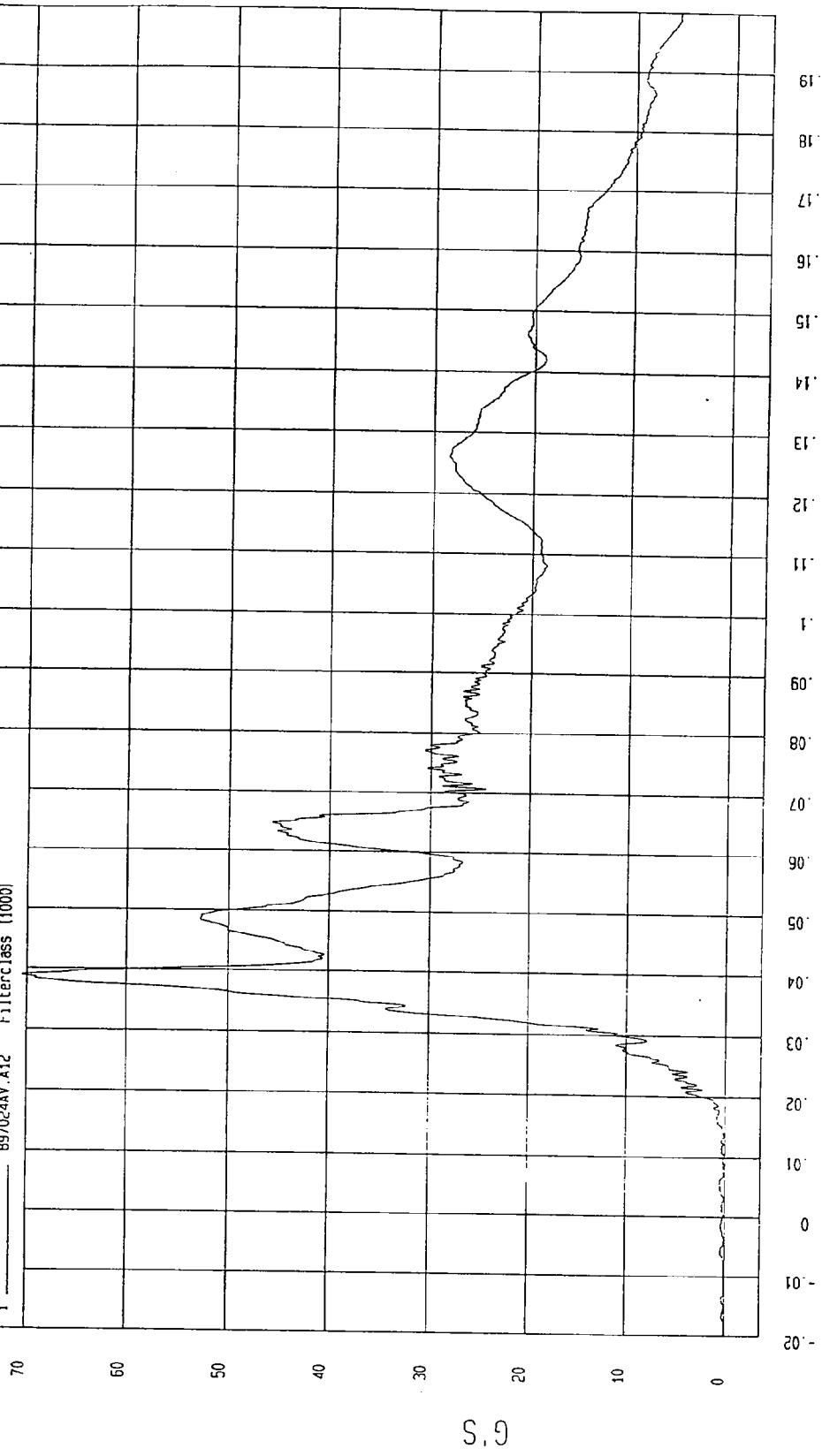
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV01116) Speed: 38.2 MPH 61.5 KPH

Minimum = 9.11E-03 G'S at -4 msec Maximum = 70.51 G'S at 39 msec

DRIVER HEAD RESULTANT

1 897024AV A12 Filterclass (1000)



NCA Research
02-08-1997 14:44

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

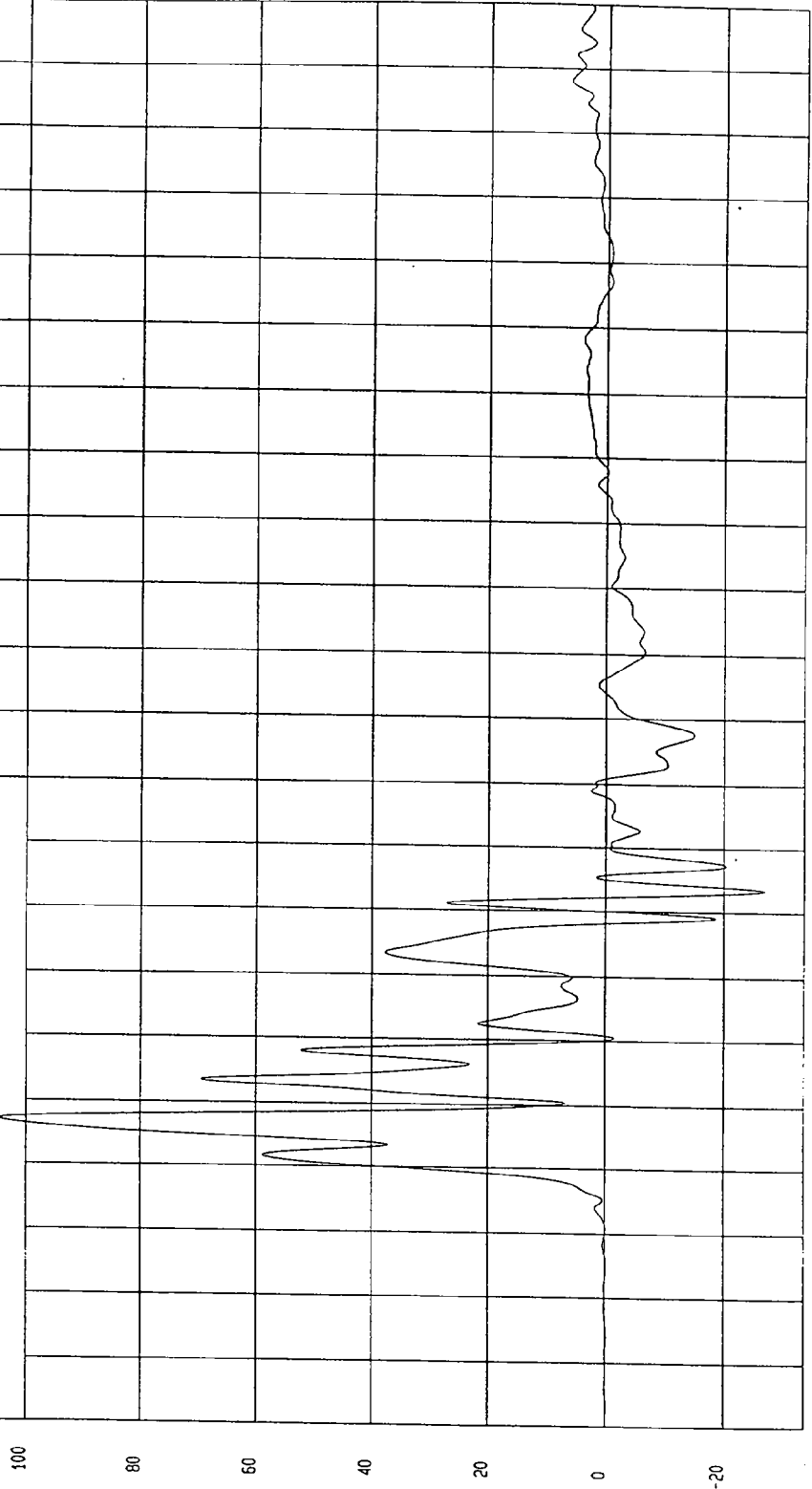
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -27.00 G'S at 64 msec

Maximum = 104.35 G'S at 27 msec

DRIVER UPPER RIB Y ACCELERATION

1 897024AF.A15 FilterClass (180)



TIME (SECONDS)

NSA Research
02-08-1997 14:55

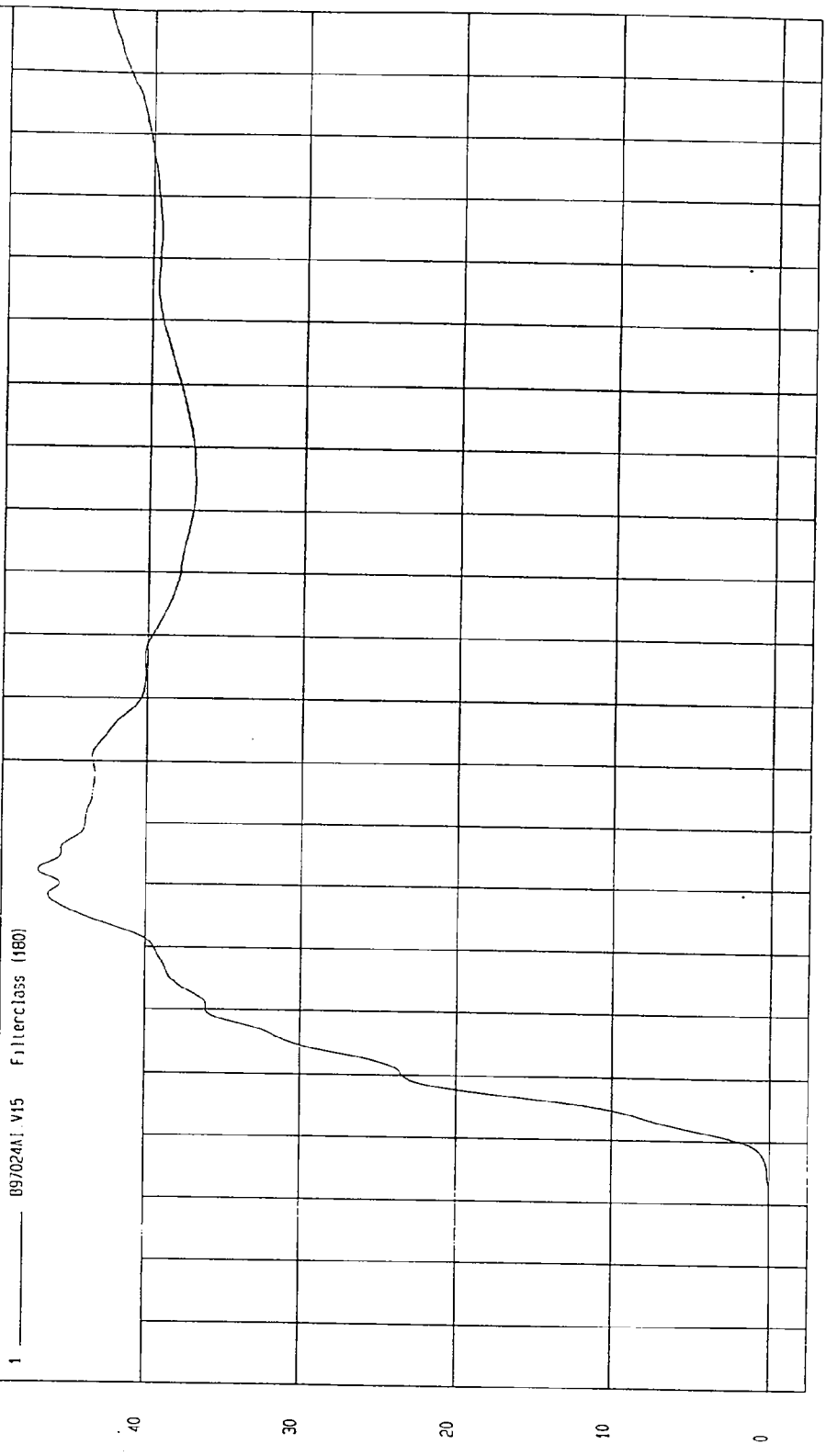
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV01116) Speed: 38.2 MPH 61.5 KPH

Minimum = -8.15E-03 KPH at -16 msec
Maximum = 47.02 KPH at 62 msec

DRIVER UPPER RIB Y VELOCITY

1 ——— 09/024N1.V15 Filterclass (180)



MGA Research
02-08-1997 14.47

TIME Seconds

KPH

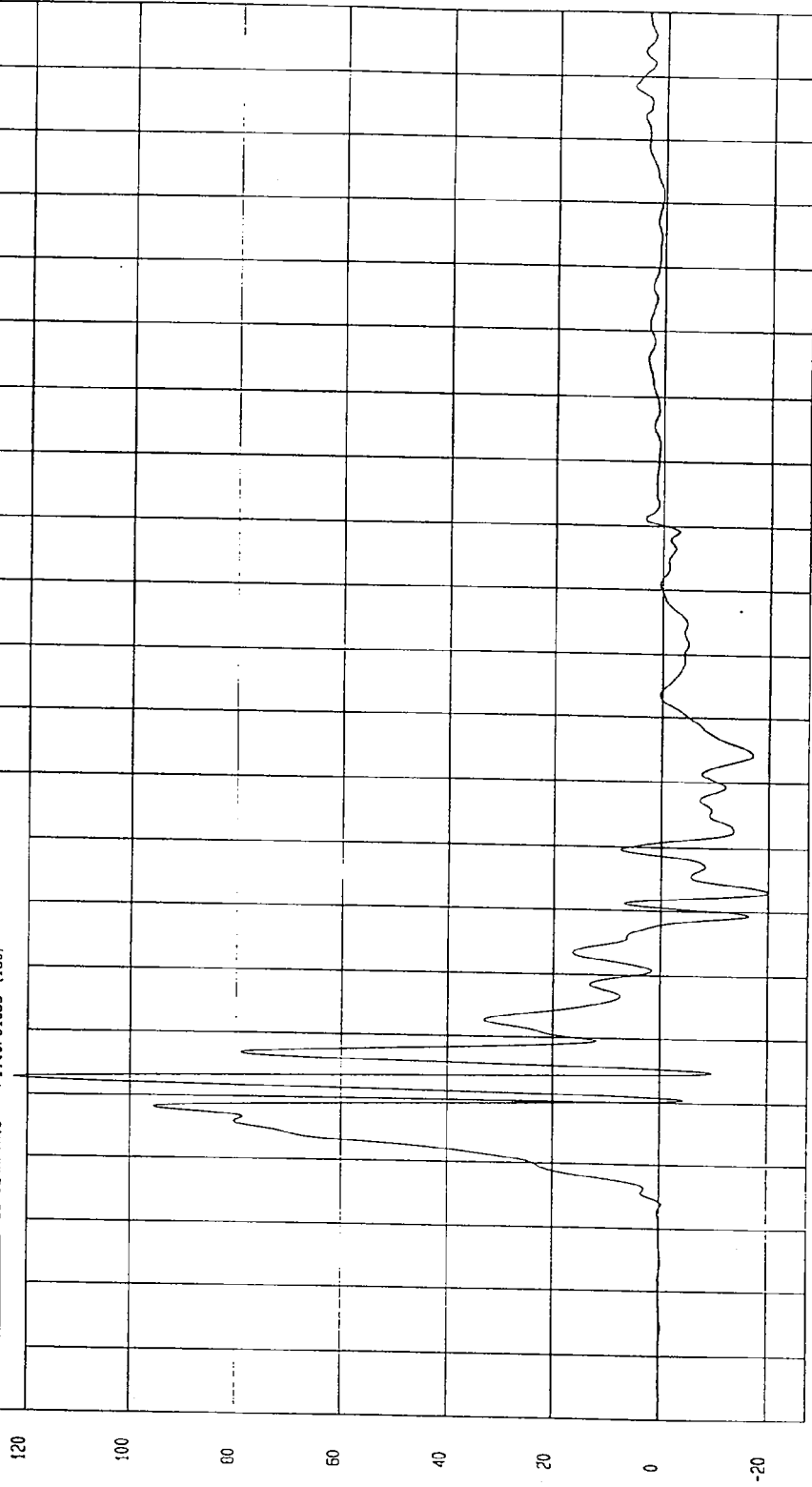
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -20.10 G'S at 63 msec
Maximum = 122.51 G'S at 33 msec

DRIVER LOWER RIB Y ACCELERATION

1 ——— B97024AF A16 Filterclass (180)



MSA Research
02-08-1997 14:55

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

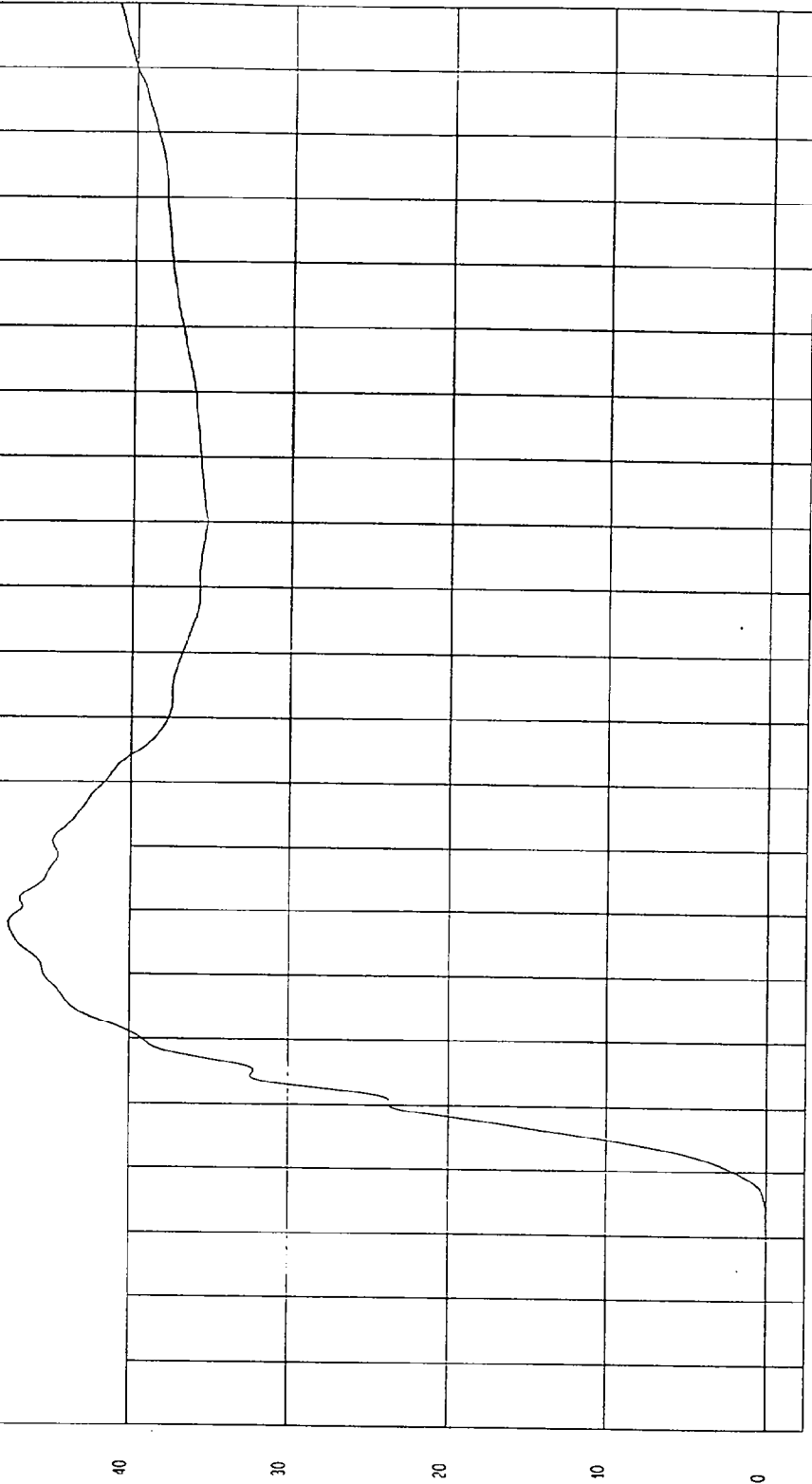
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.66E-02 KPH at -4 msec

Maximum = 47.55 KPH at 58 msec

DRIVER LOWER RIB Y VELOCITY

1 897024A1.Y16 Filterclass (180)



MCA Research
02-08-1997 14:47

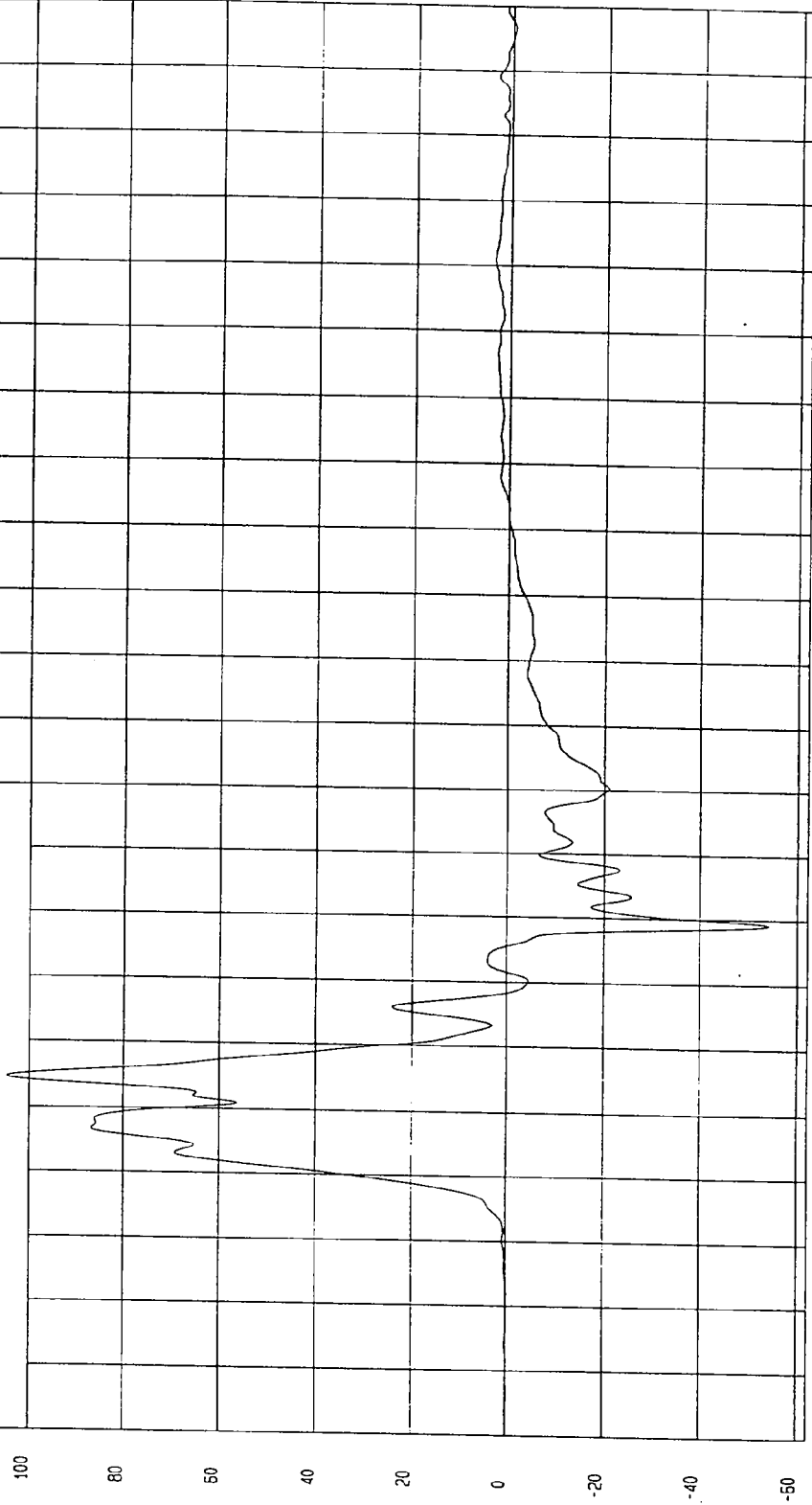
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -54.16 G'S at 59 msec
Maximum = 104.67 G'S at 35 msec

DRIVER LOWER SPINE Y ACCELERATION

1 B97024AF.A17 Filterclass (180)



MCA Research
02-08-1997 14:55

TIME (SECONDS)

G.S

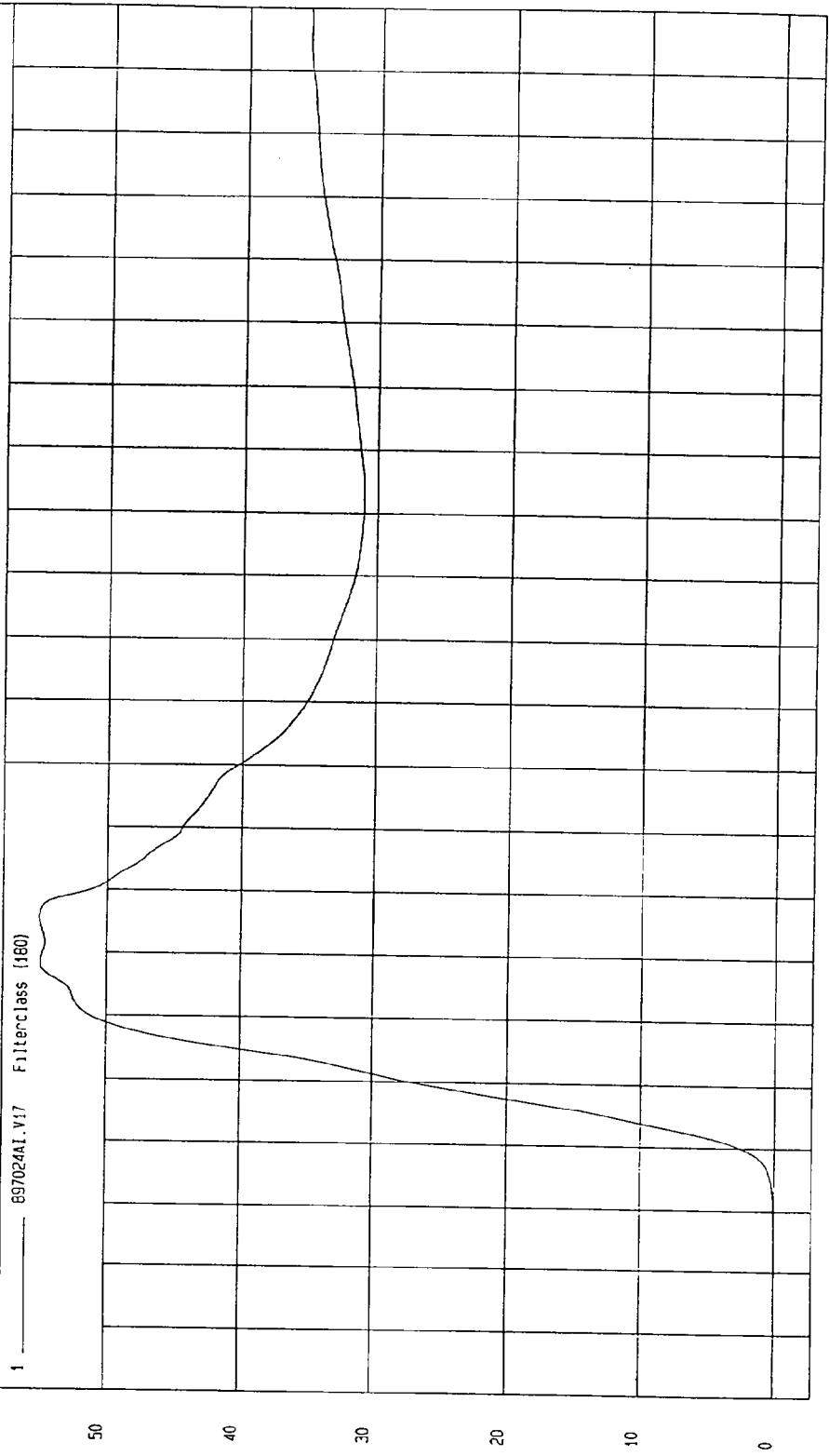
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.10E-02 KPH at 3 msec
Maximum = 54.89 KPH at 56 msec

DRIVER LOWER SPINE Y VELOCITY

1 897024A1.V17 Filterclass (160)



MCA Research
02-08-1997 14:48

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

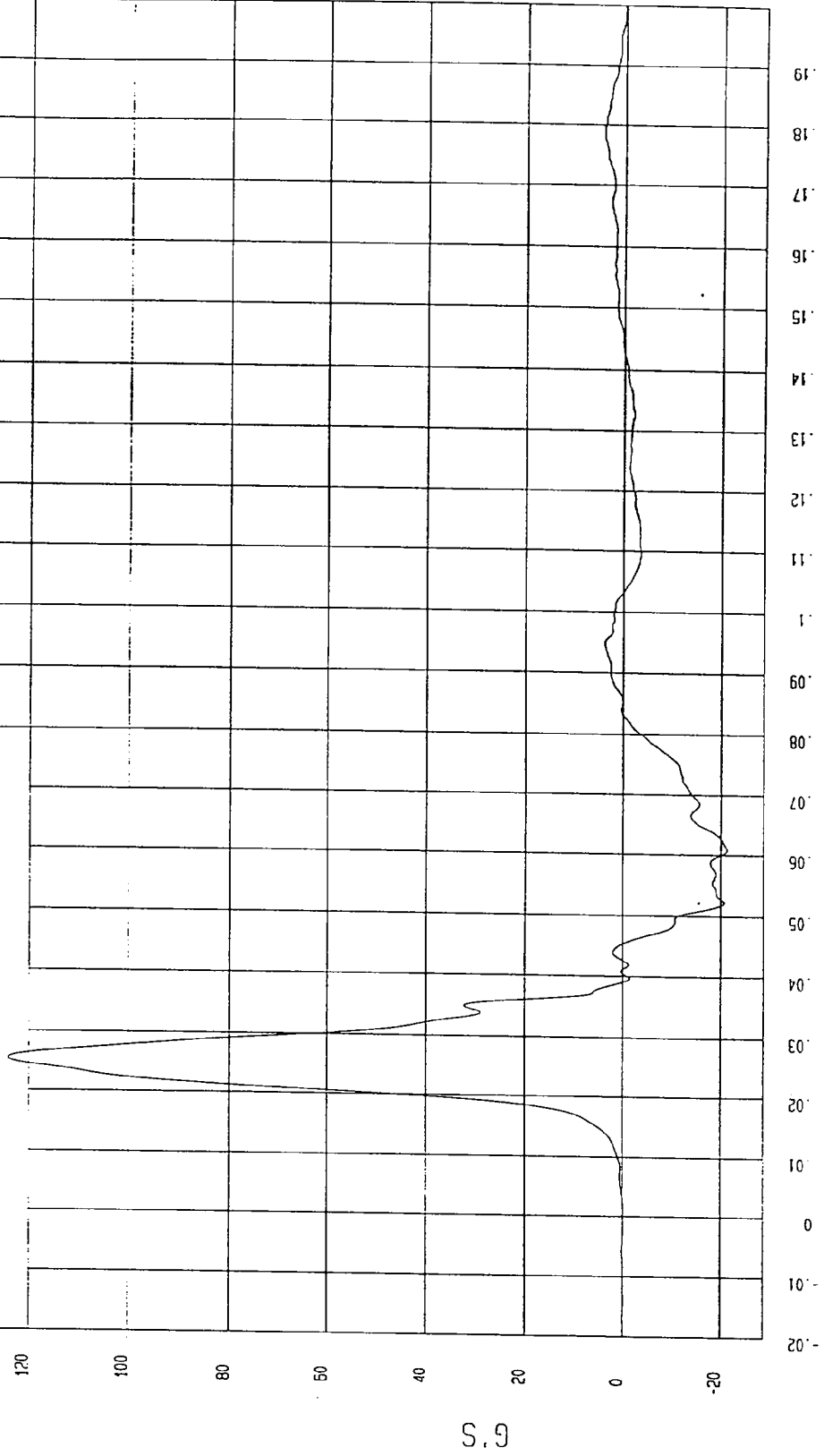
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -21.21 G'S at 61 msec

Maximum = 123.95 G'S at 26 msec

DRIVER PELVIS Y ACCELERATION

1 897024AF.A18 Filterclass (180)



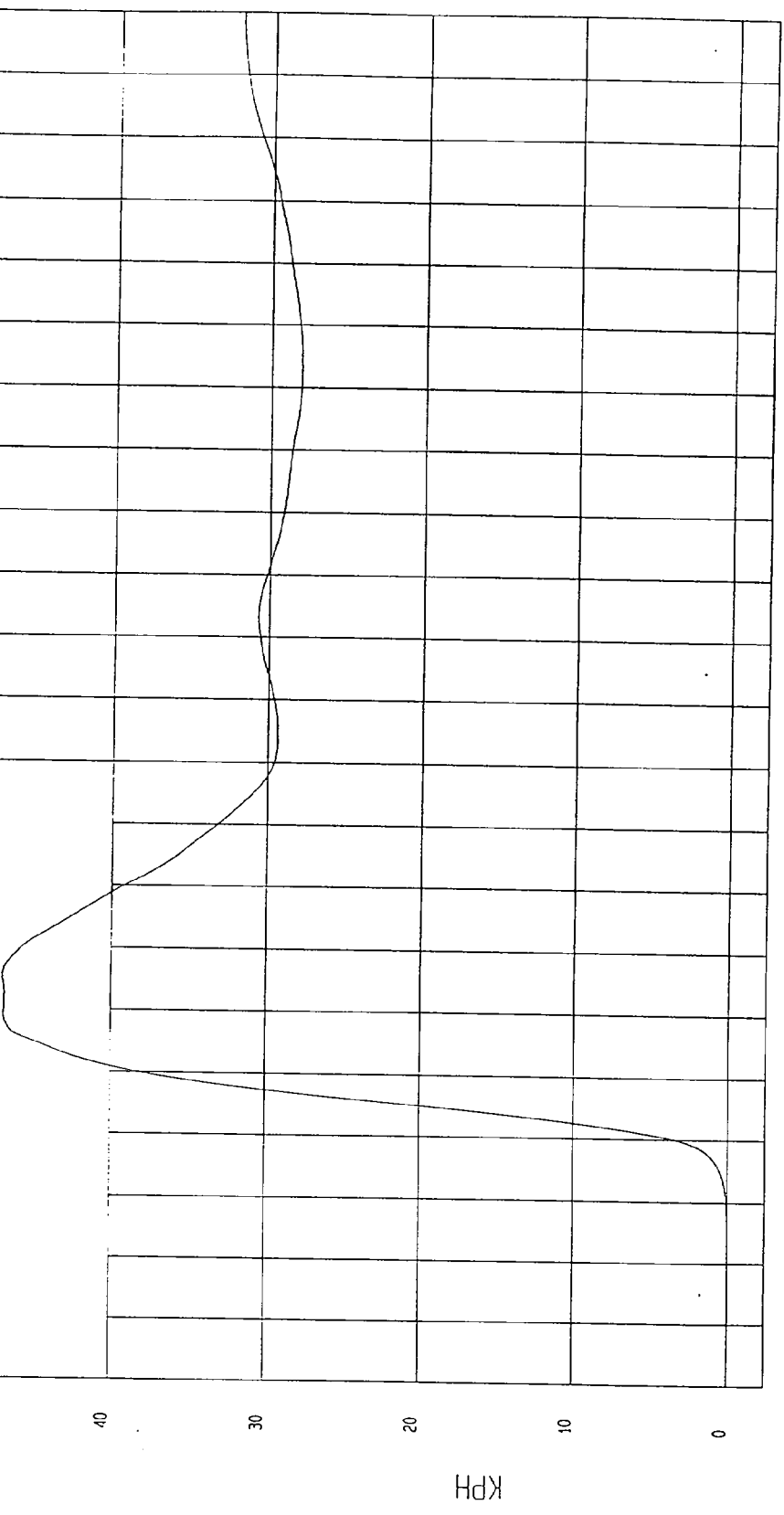
MCA Research
02-08-1997 14:55

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -4.24E-02 KPH at 3 msec Maximum = 46.95 KPH at 45 msec

DRIVER PELVIS Y VELOCITY

1 8970241.V18 Filterclass (180)



TIME Seconds
MOA Research
02-08-1997 14:48

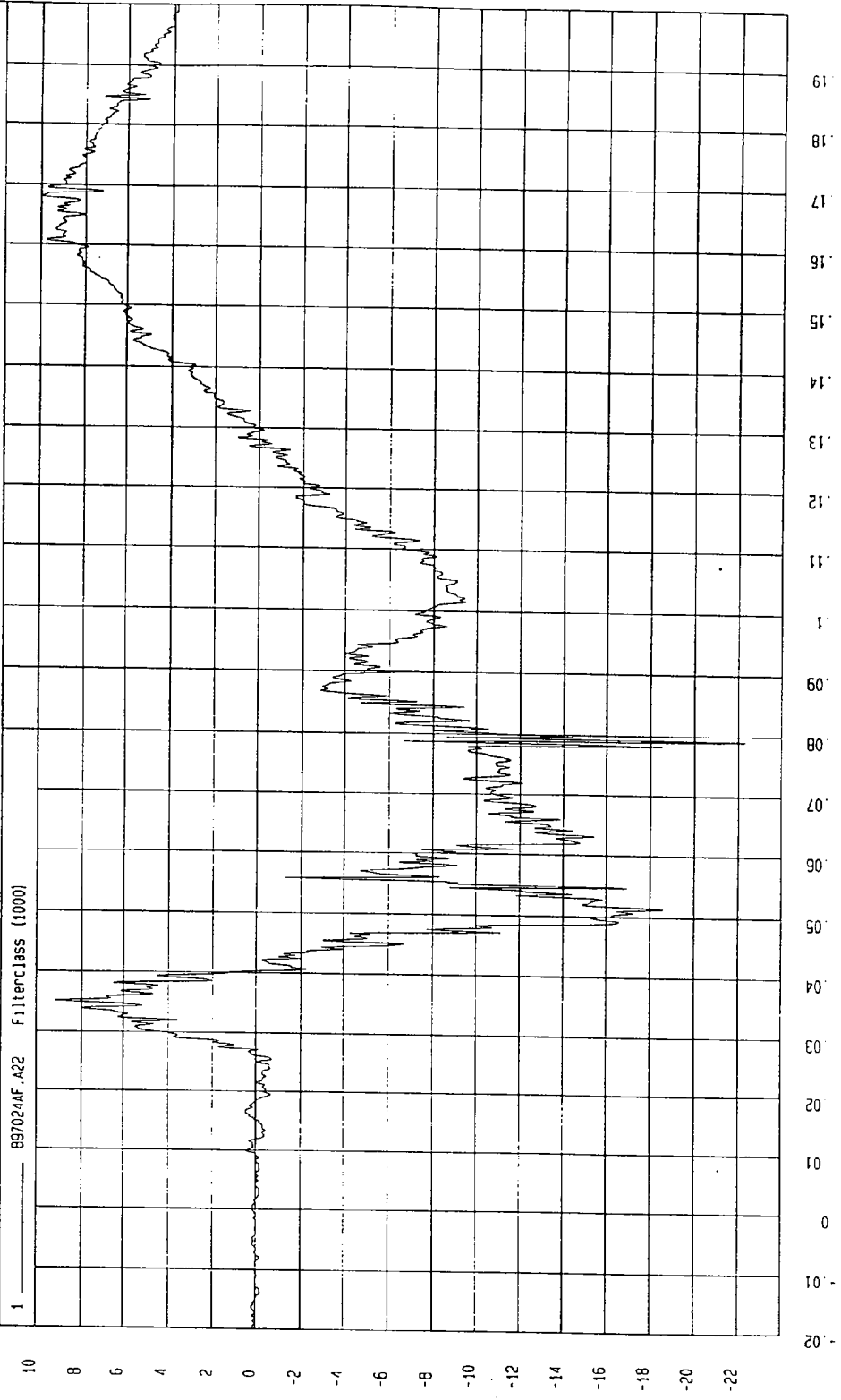
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -22.32 G'S at 79 msec

Maximum = 10.02 G'S at 168 msec

REAR PASSENGER HEAD X ACCELERATION



MSA Research
02-08-1997 14:44

TIME (SECONDS)

S.G

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

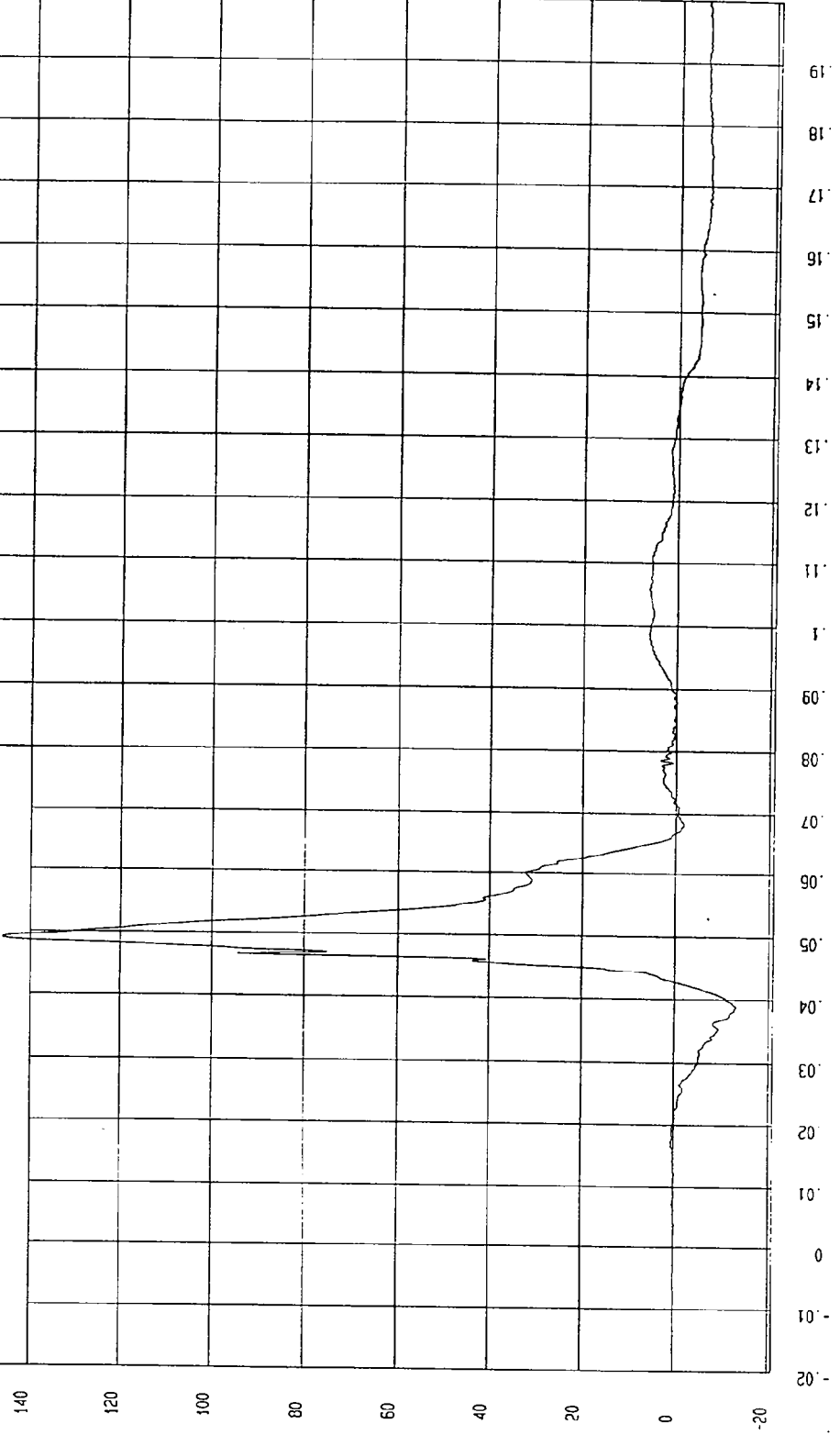
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -12.93 G'S at 39 msec

Maximum = 145.85 G'S at 49 msec

REAR PASSENGER HEAD Y ACCELERATION

1 897024F.A23 Filterclass (1000)



MGA Research
02-08-1997 14:44

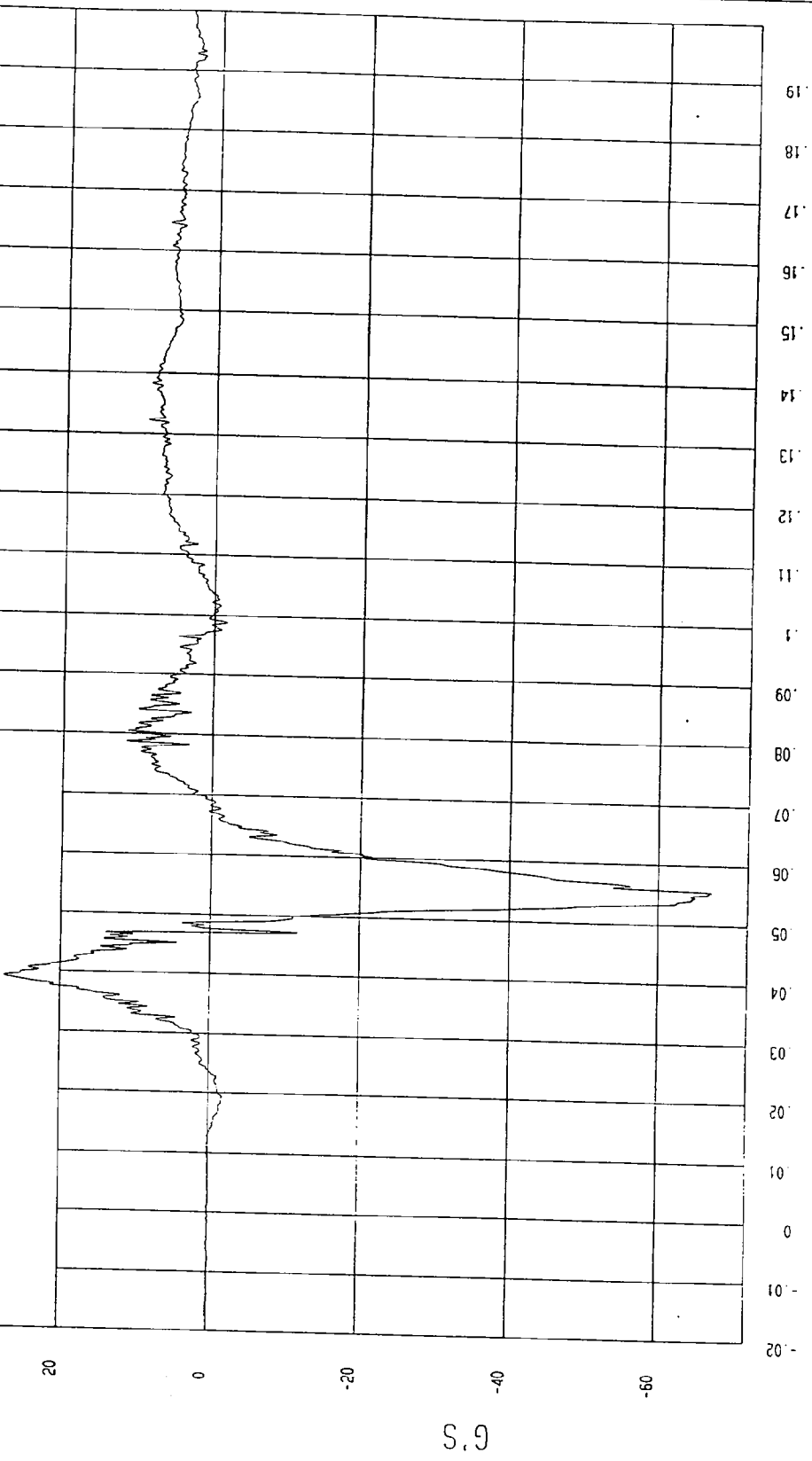
TIME (SECONDS)

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997
 COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH
 Minimum = -67.00 G'S at 56 msec Maximum = 27.48 G'S at 39 msec

REAR PASSENGER HEAD Z ACCELERATION

1 897024NF.A24 Filterclass (1000)



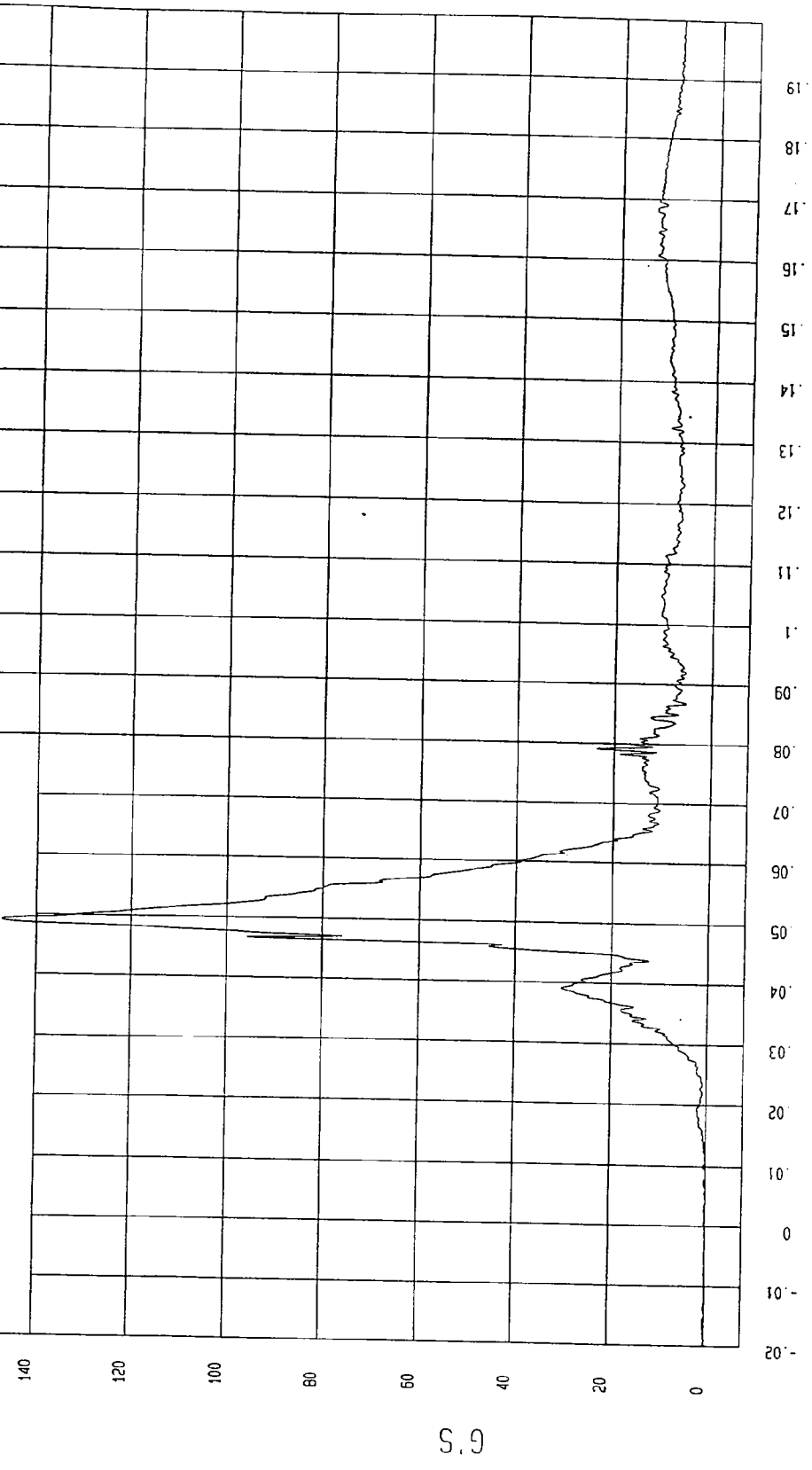
MCA Research
 02-08-1997 14:44

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 1.04E-02 G'S at -13 msec Maximum = 146.95 G'S at 49 msec

REAR PASSENGER HEAD RESULTANT

1 897024AV.A32 Filterclass (1000)



MCA Research
02-08-1997 1A: 44

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -7.23 G'S at 108 msec Maximum = 86.00 G'S at 34 msec

REAR PASSENGER UPPER RIB Y ACCELERATION

1 B97024AF.425 Filterclass (180)

80

60

40

20

0

G

1.19

1.18

1.17

1.16

1.15

1.14

1.13

1.12

1.11

1.10

0.09

0.08

0.07

0.06

0.05

0.04

0.03

0.02

0.01

0

-0.01

-0.02

TIME (SECONDS)

MCA Research
02-08-1997 14:55

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

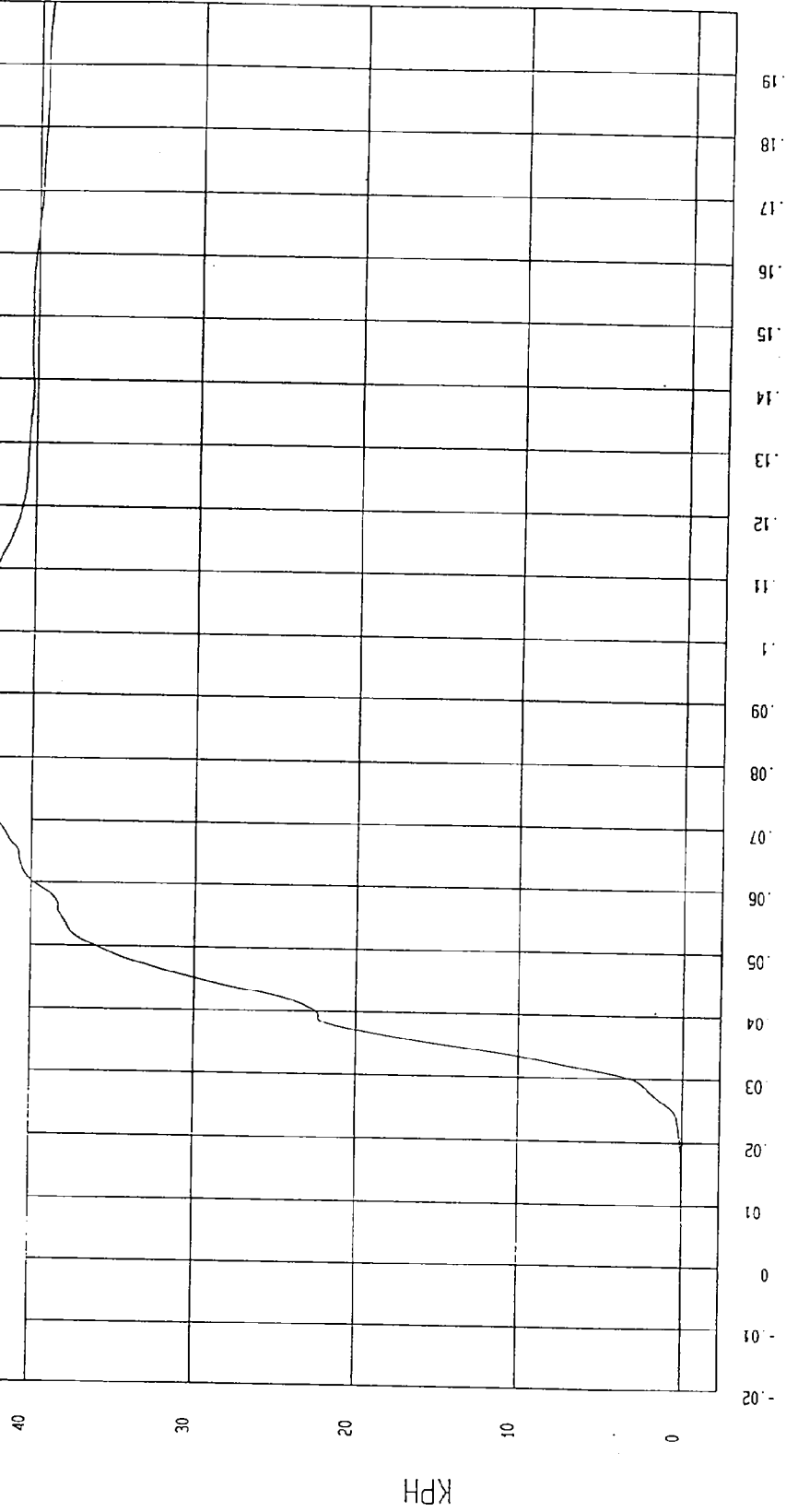
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.79E-02 KPH at 1 msec

Maximum = 45.13 KPH at 85 msec

REAR PASSENGER UPPER RIB Y VELOCITY

1 ——— B97024AI.Y25 Filterclass (180)



NCA Research
02-08-1997 14:48

TIME Seconds

KPH

TEST DATE: 02-10-1997

TEST: NCAP HIGH SPEED LATERAL IMPACT

Speed: 38.2 MPH 61.5 KPH

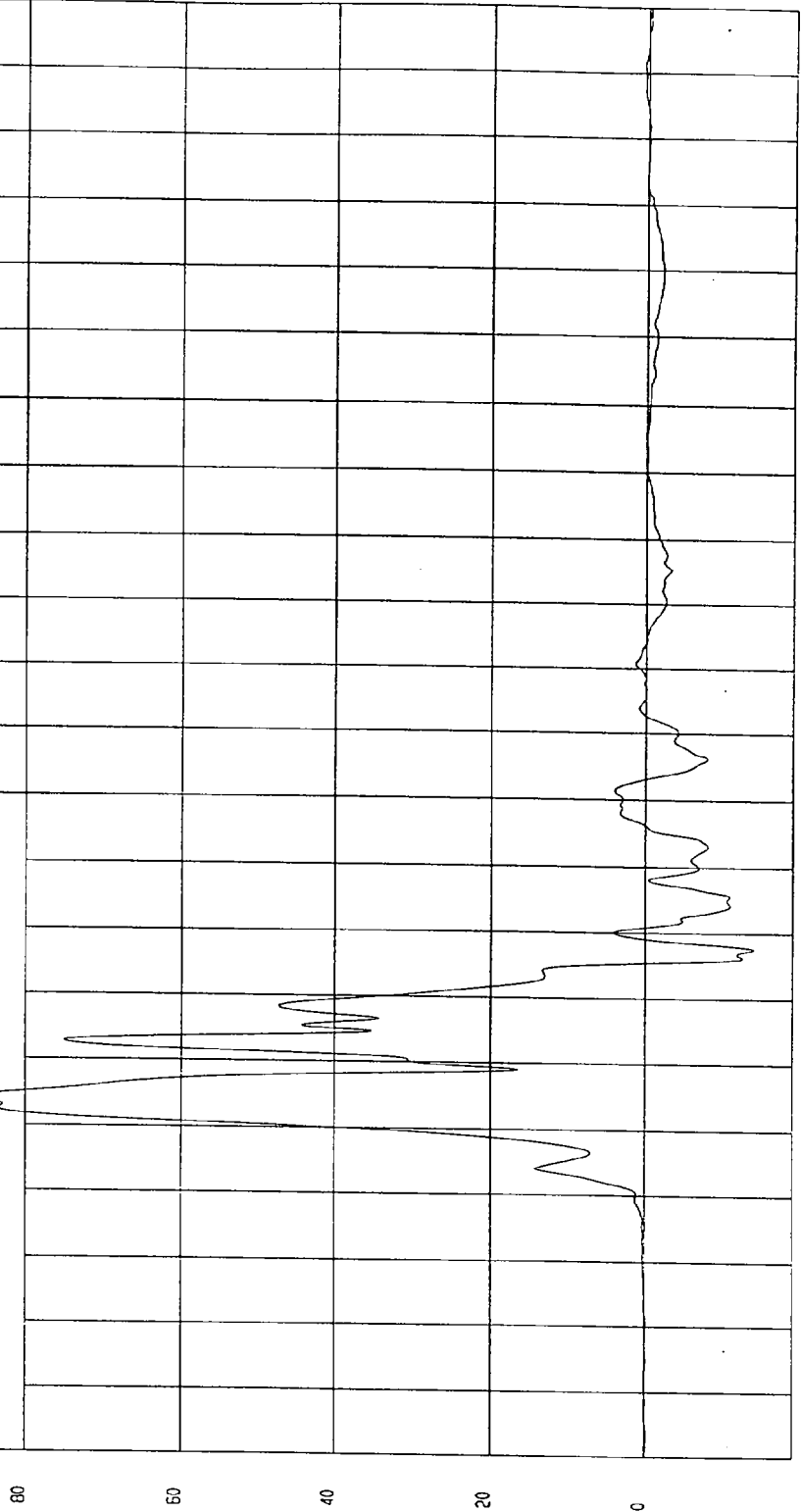
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116)

Maximum = 86.29 G'S at 34 msec

Minimum = -14.09 G'S at 58 msec

REAR PASSENGER LOWER RIB Y ACCELERATION

1 ——— B97024AF.A26 Filterclass (180)



TIME (SECONDS)

MSC Research
02-08-1997 14:55

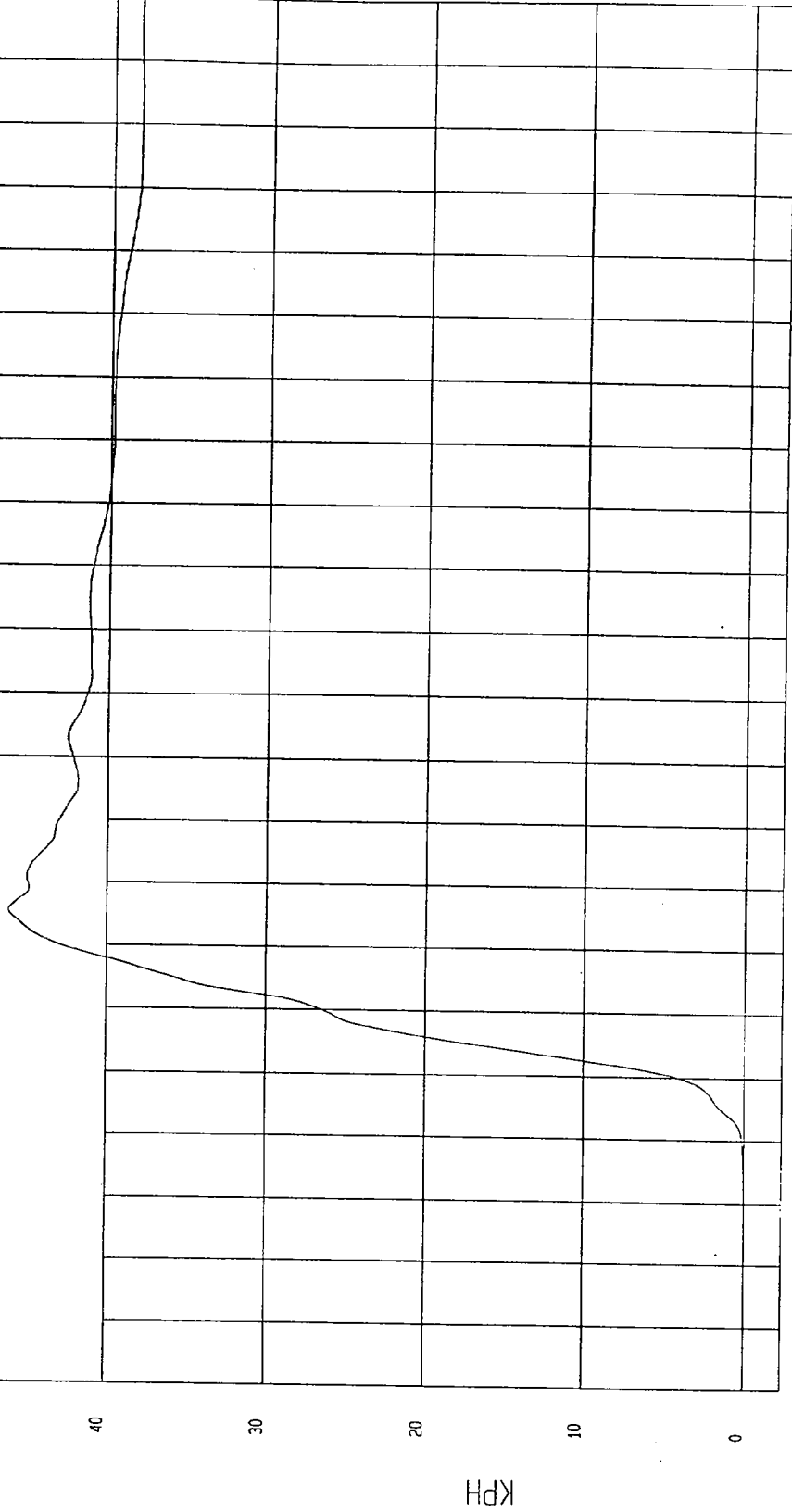
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.42E-02 KPH at 2 msec
Maximum = 46.27 KPH at 55 msec

REAR PASSENGER LOWER RIB Y VELOCITY

1 ——— 897024A1.V26 Filterclass (180)



WCA Research
02-06-1997 14:48

TIME Seconds

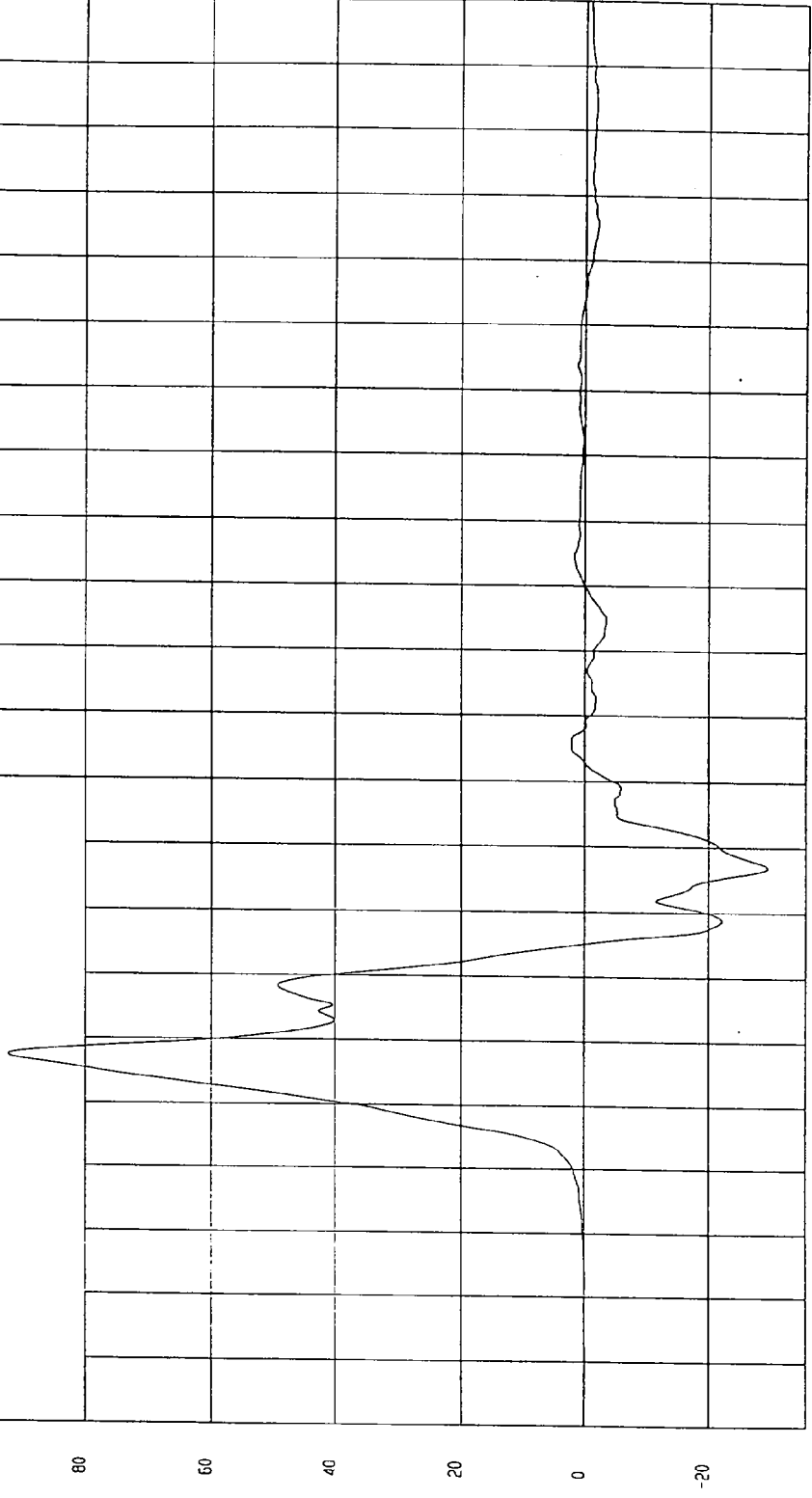
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -29.56 G'S at 67 msec
Maximum = 92.28 G'S at 37 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION

1 897024AF.A27 Filterclass (180)



MCA Research
02-08-1997 14.55

TIME (SECONDS)

G.S

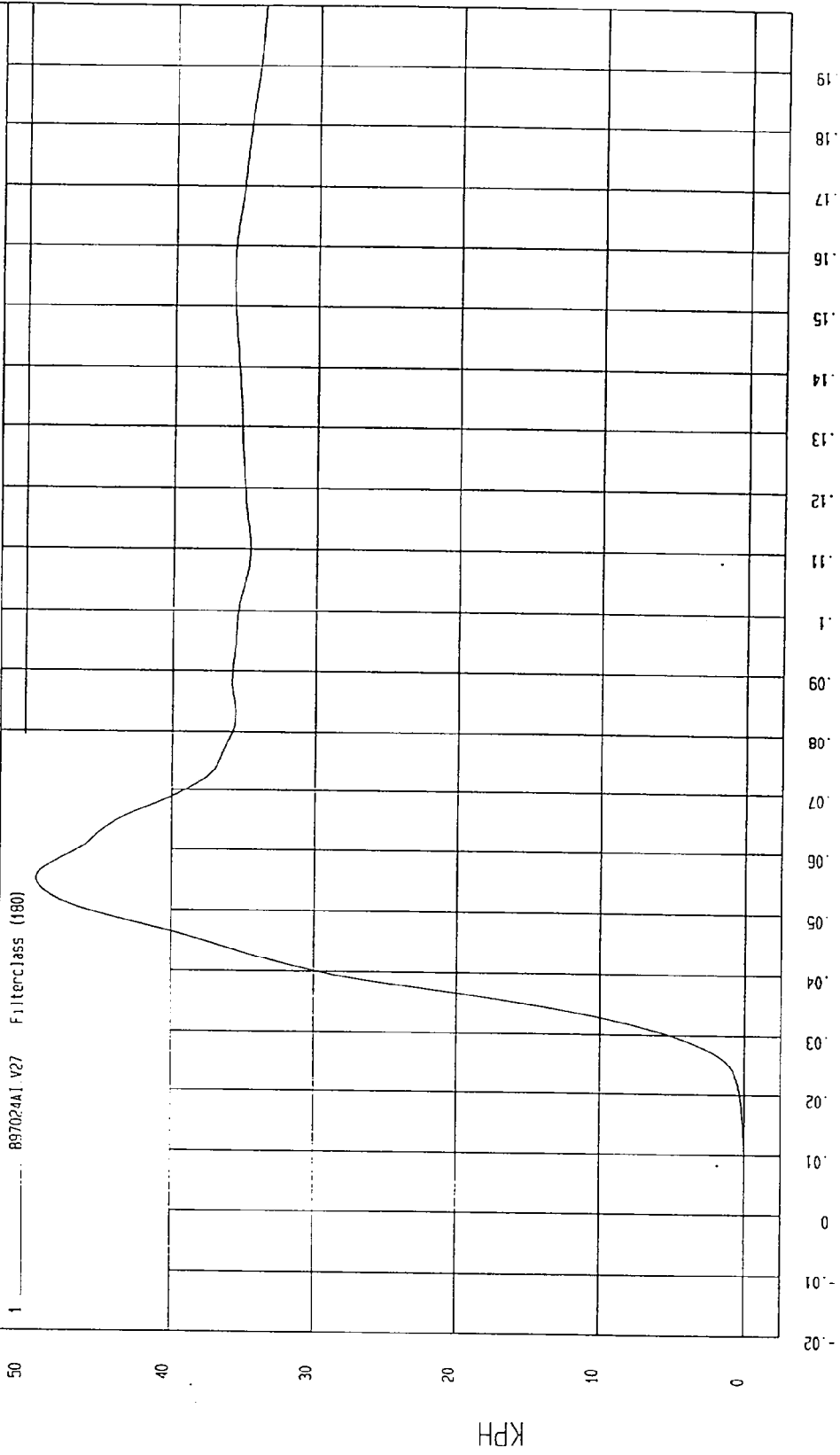
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 49.22 KPH at 55 msec

REAR PASSENGER LOWER SPINE Y VELOCITY

1 897024A1.V27 FilterClass (180)



WEA Research
02-08-1997 14:48

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH
Minimum = -16.50 G'S at 64 msec Maximum = 83.72 G'S at 31 msec

REAR PASSENGER PELVIS Y ACCELERATION



TIME (SECONDS)

MCA Research
02-08-1997 14:56

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

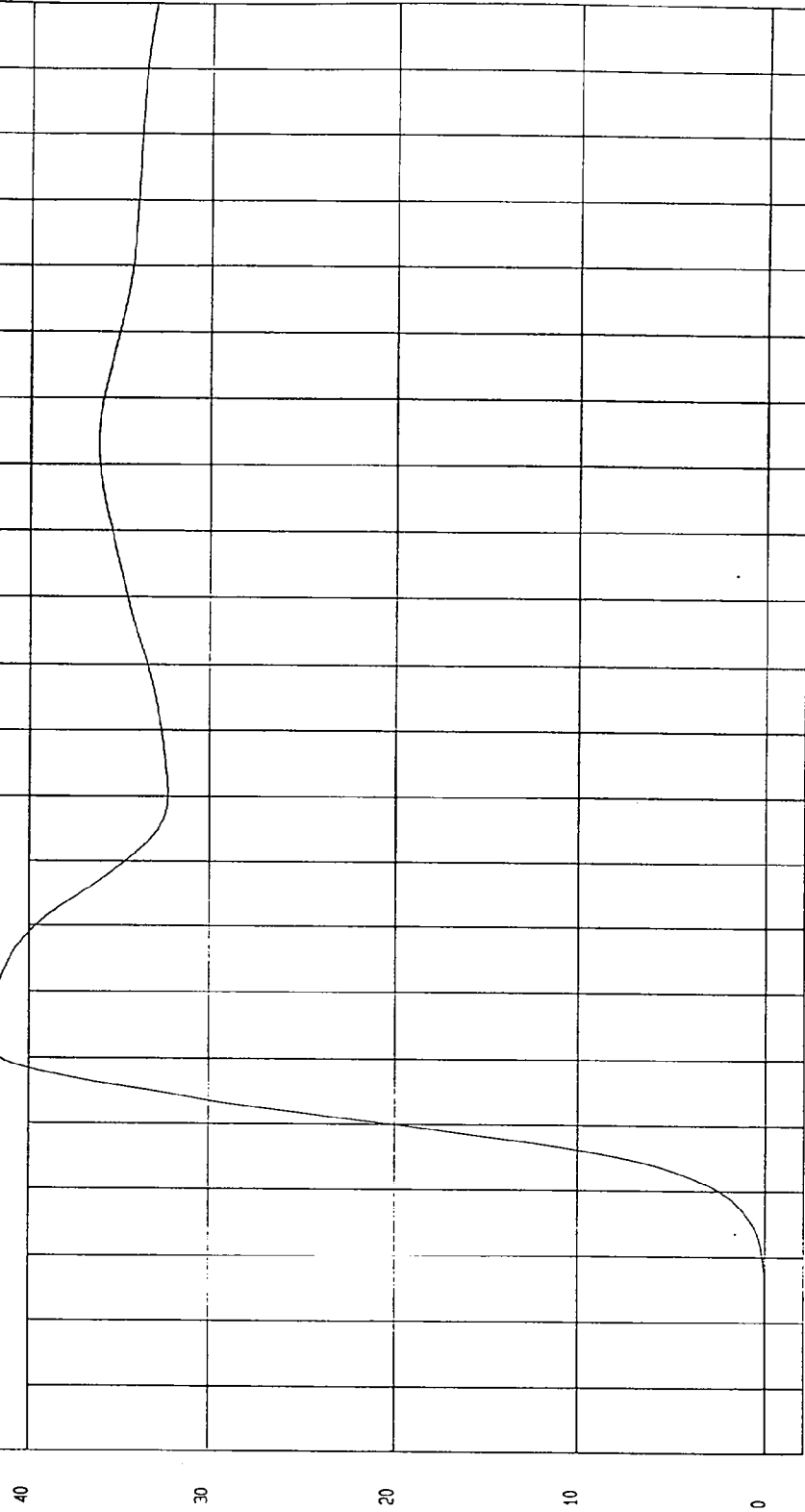
COMPONENT: 1997 SATURN SL 4 DOOR (MV01116) Speed: 38.2 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec

Maximum = 41.90 KPH at 48 msec

REAR PASSENGER PELVIS Y VELOCITY

1 ——— B97024M1.V28 Filterclass (180)



MGA Research
02-08-1997 14.48

TIME Seconds

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

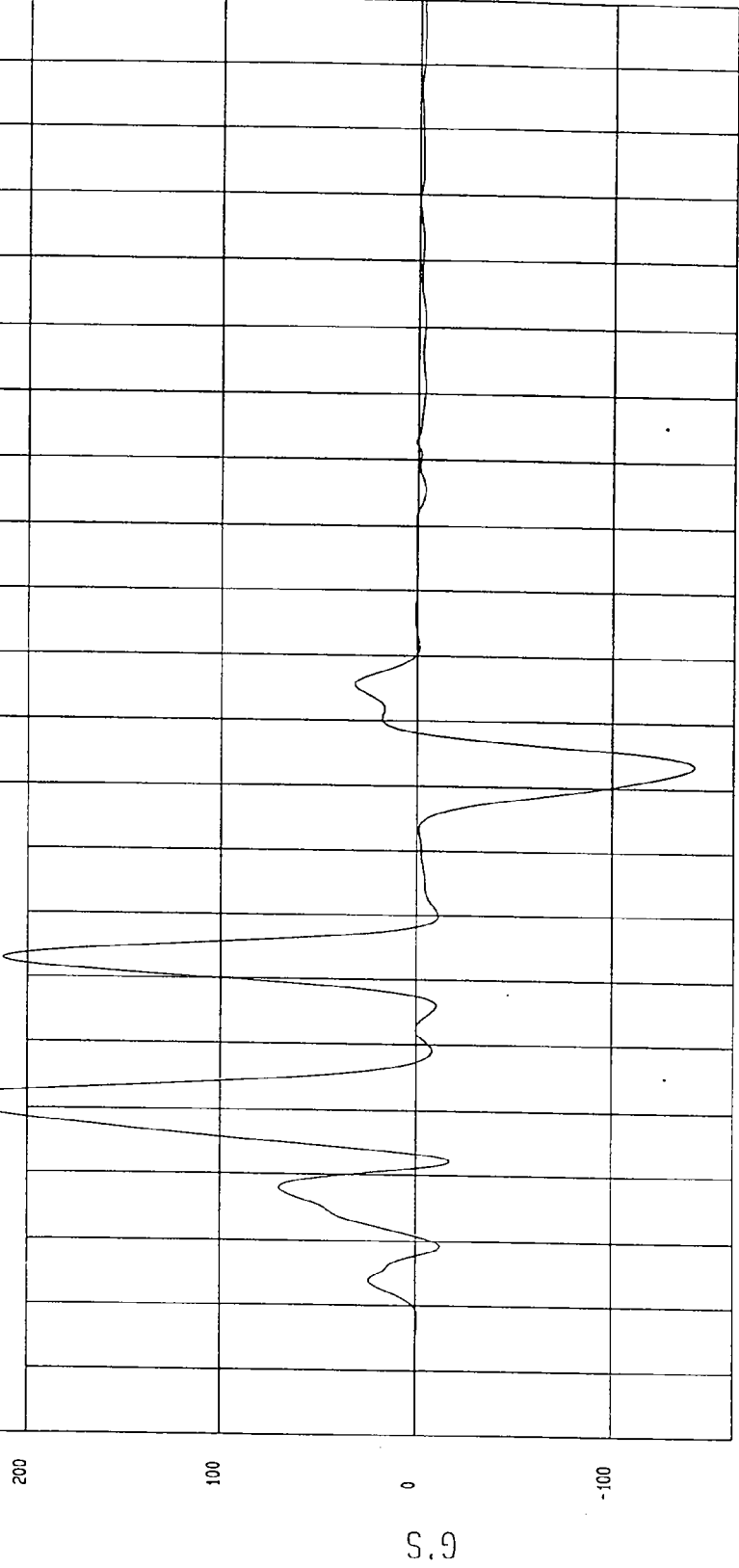
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -141.79 G'S at 83 msec

Maximum = 251.68 G'S at 31 msec

LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

1 ——— B97024AF.A38 Filterclass (60)



TIME (SECONDS)

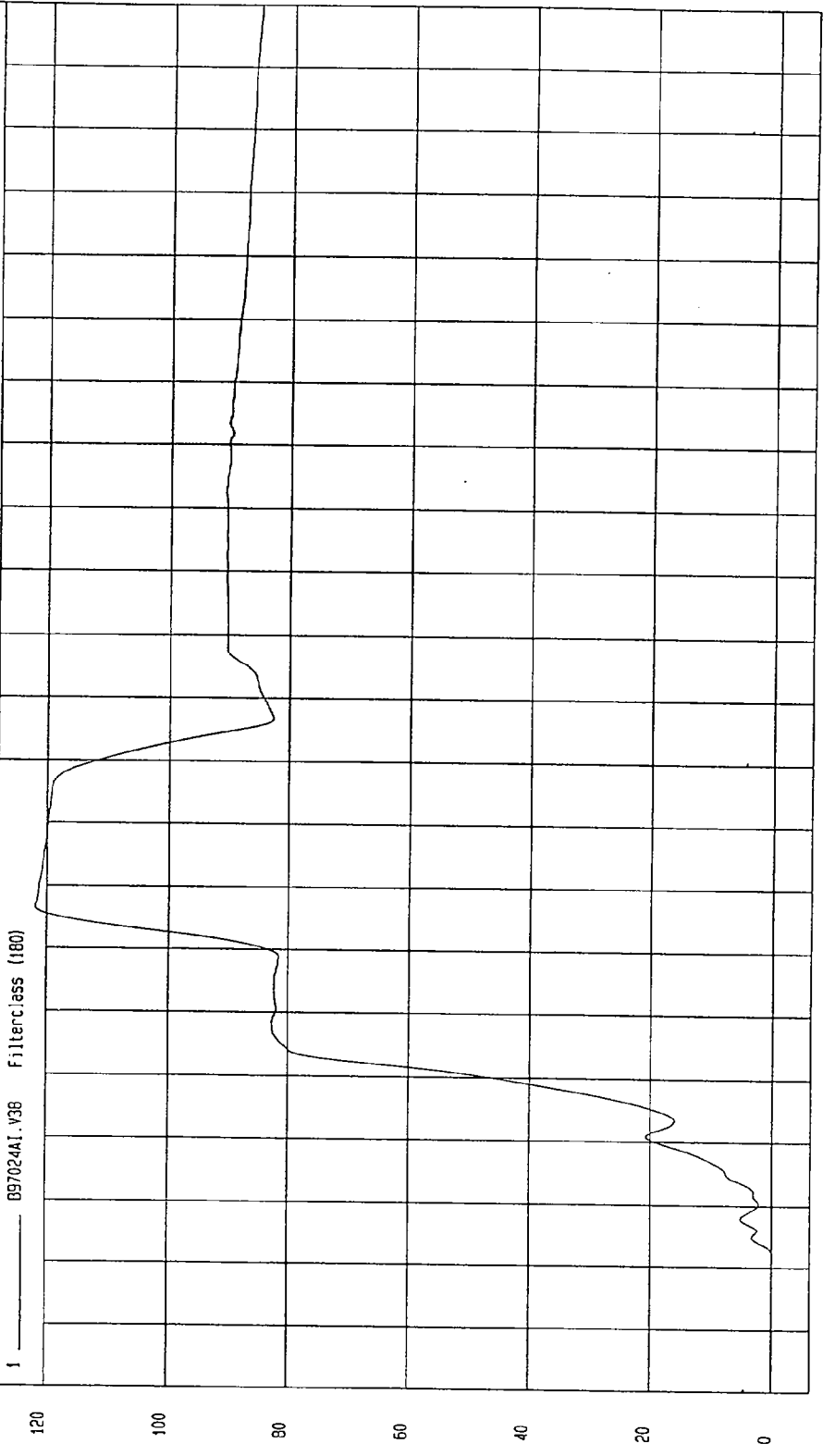
MGA Research
02-08-1997 14.49

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -4.51E-02 KPH at 2 msec Maximum = 121.84 KPH at 56 msec

LEFT SIDE SILL AT FRONT SEAT Y VELOCITY



MCA Research
02-08-1997 14: 49

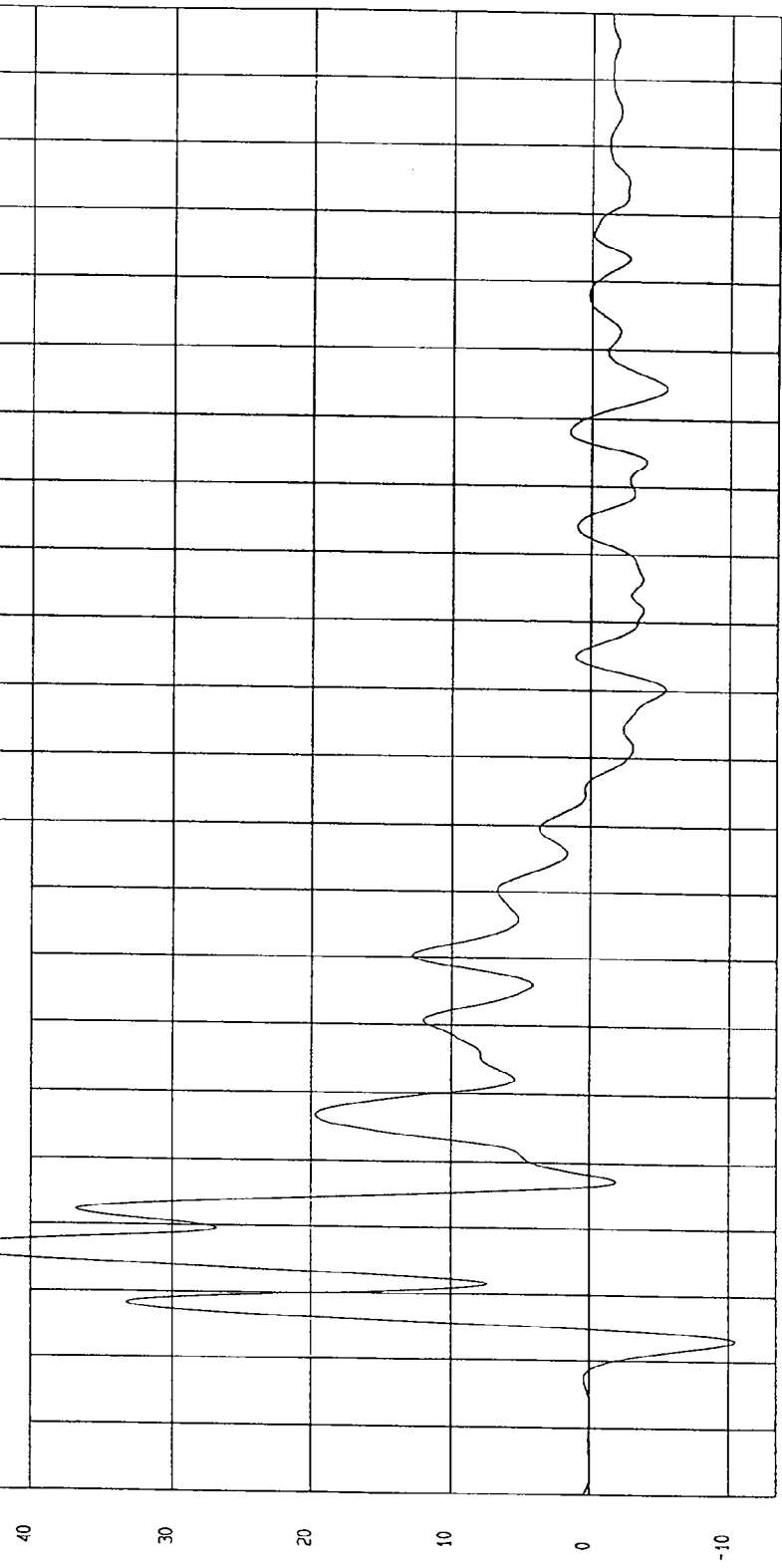
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -10.47 G'S at 3 msec Maximum = 46.48 G'S at 16 msec

LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

1 ——— 897024AF.A39 Filterclass (60)



TIME (SECONDS) MGA Research 02-08-1997 14.49

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

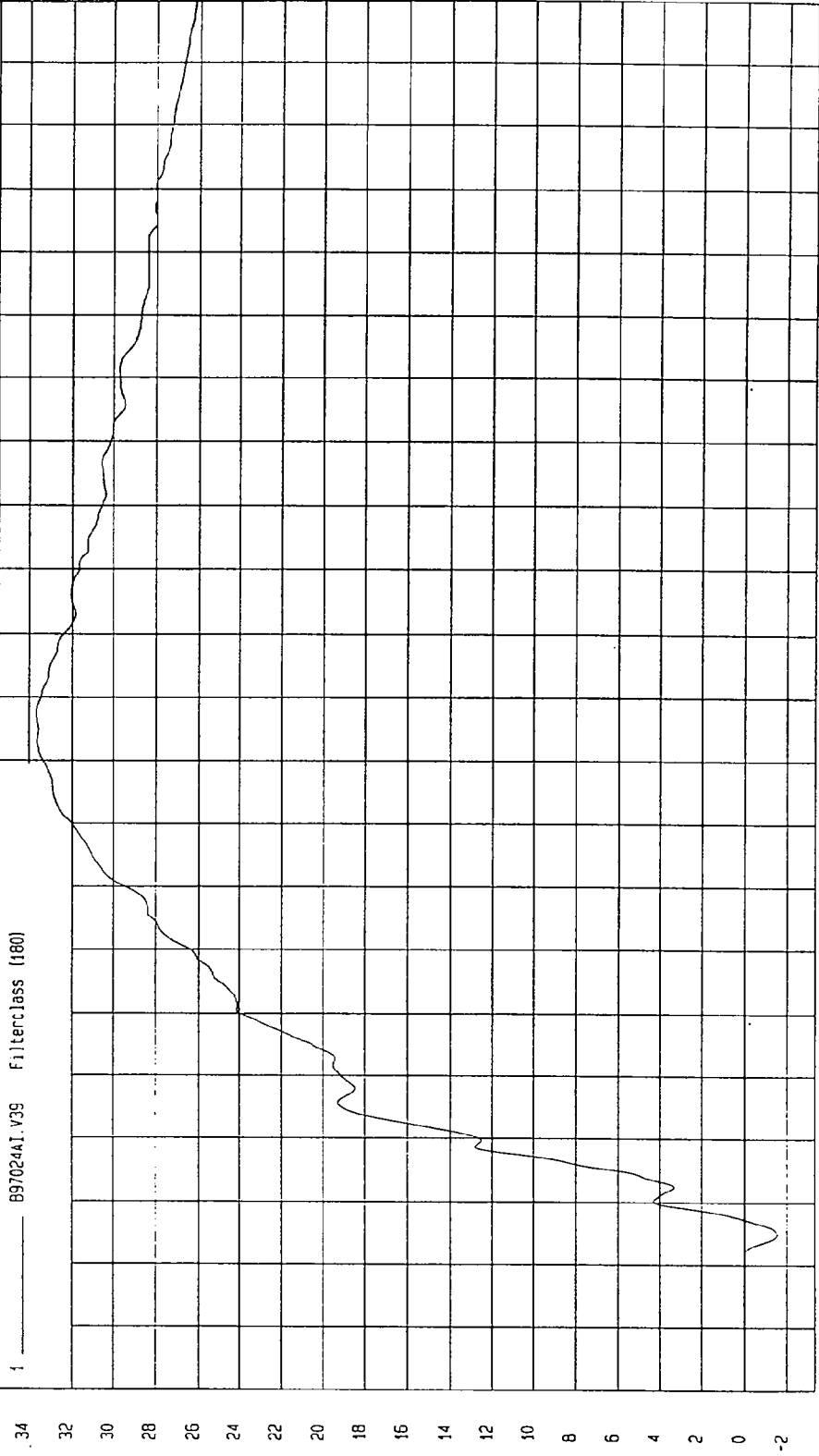
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.53 KPH at 5 msec

Maximum = 33.68 KPH at 88 msec

LEFT SIDE SILL AT REAR SEAT Y VELOCITY

1 B97024A1.V39 FilterClass (180)



TIME Seconds

MCA Research
02-08-1997 14:49

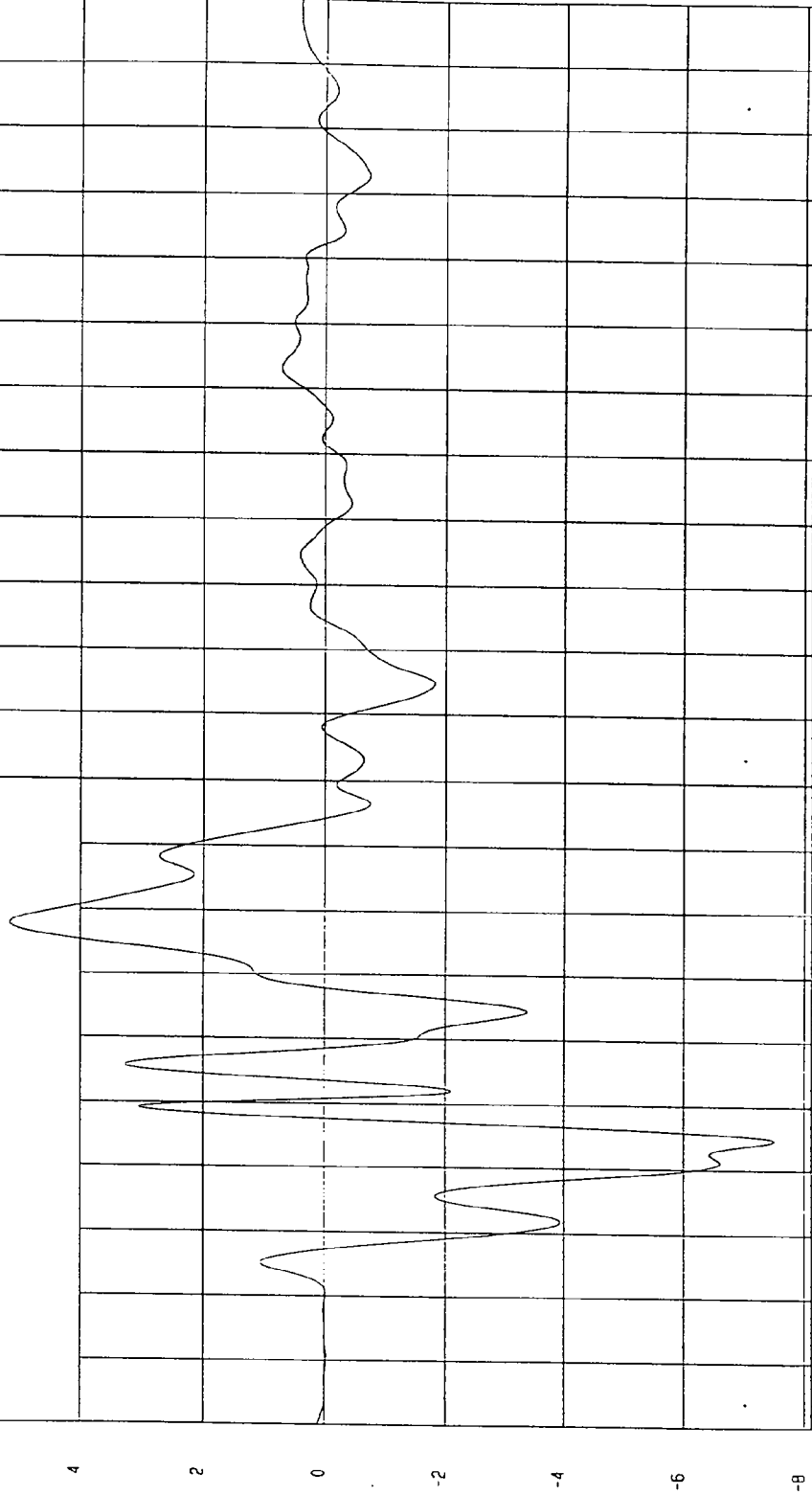
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -7.48 G'S at 25 msec
Maximum = 5.17 G'S at 58 msec

RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION

1 897024AF.A32 Filterclass (60)



MCA Research
02-08-1997 14:45

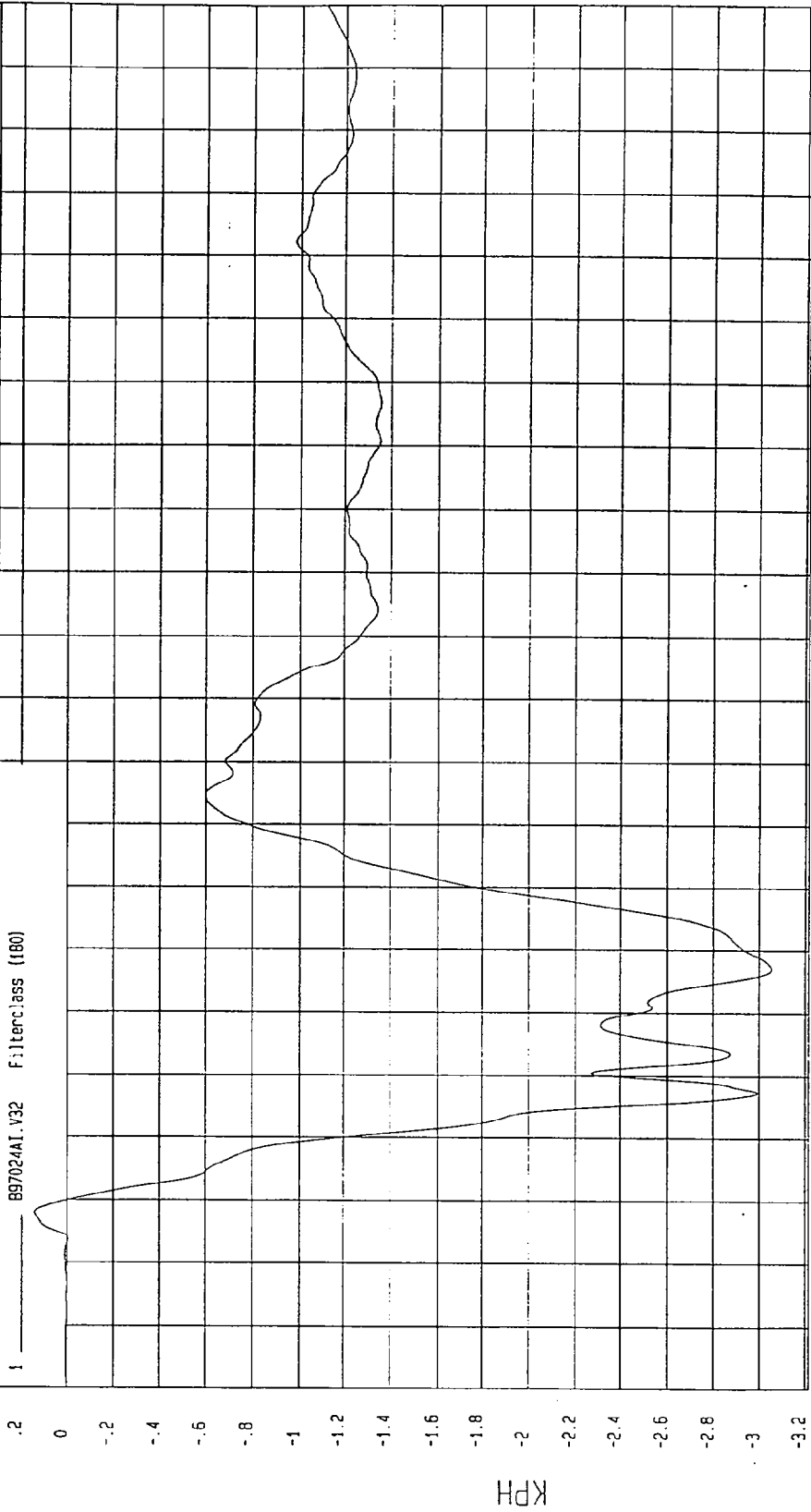
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.05 KPH at 47 msec Maximum = .14 KPH at 8 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY

1 897024AI.V32 Filterclass (180)



MCA Research
02-08-1997 14:49

TIME Seconds

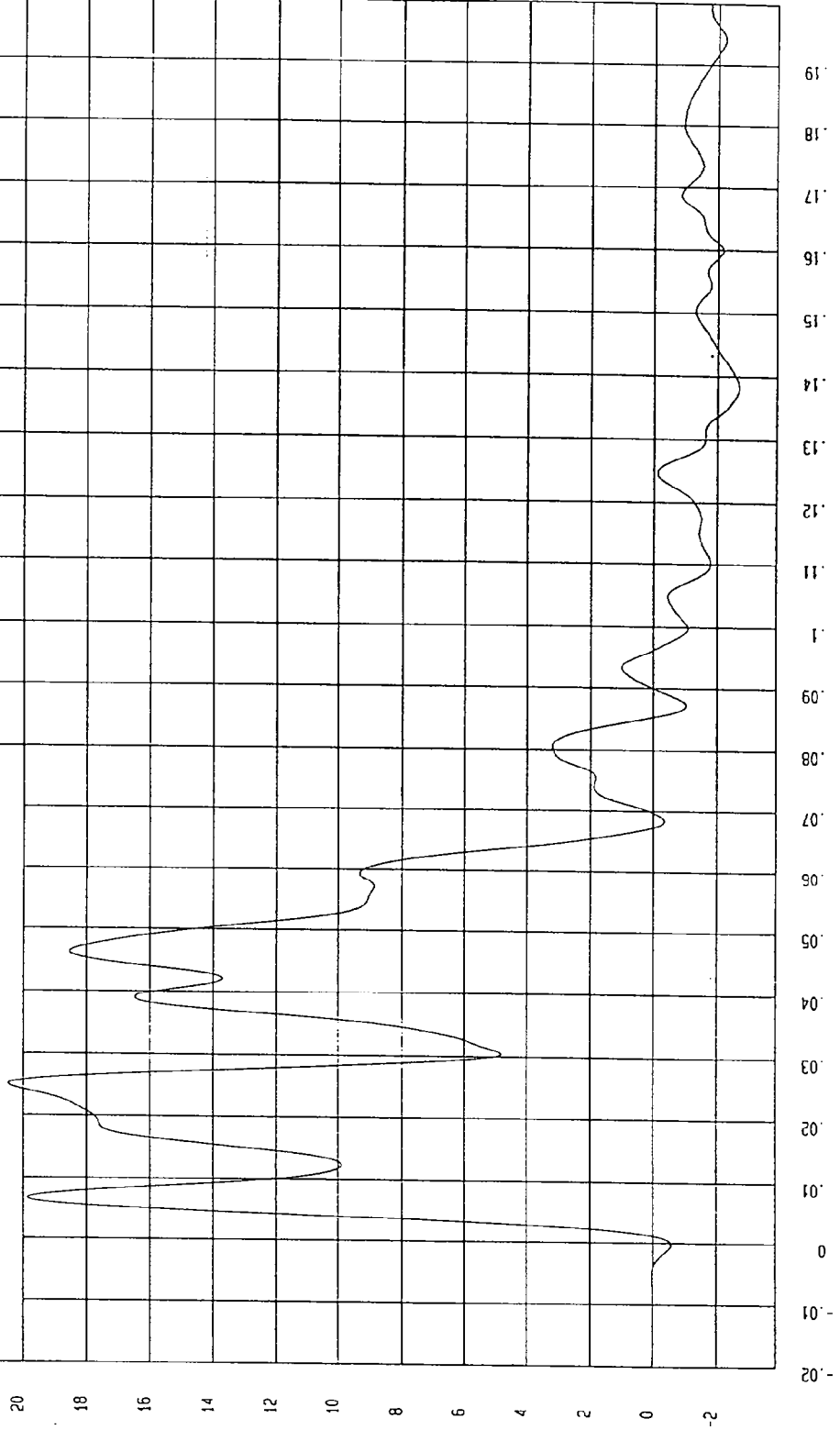
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.68 G'S at 138 msec
Maximum = 20.48 G'S at 25 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

1 — B97024F.A33 FilterClass (60)



MSA Research
02-08-1997 14:50

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

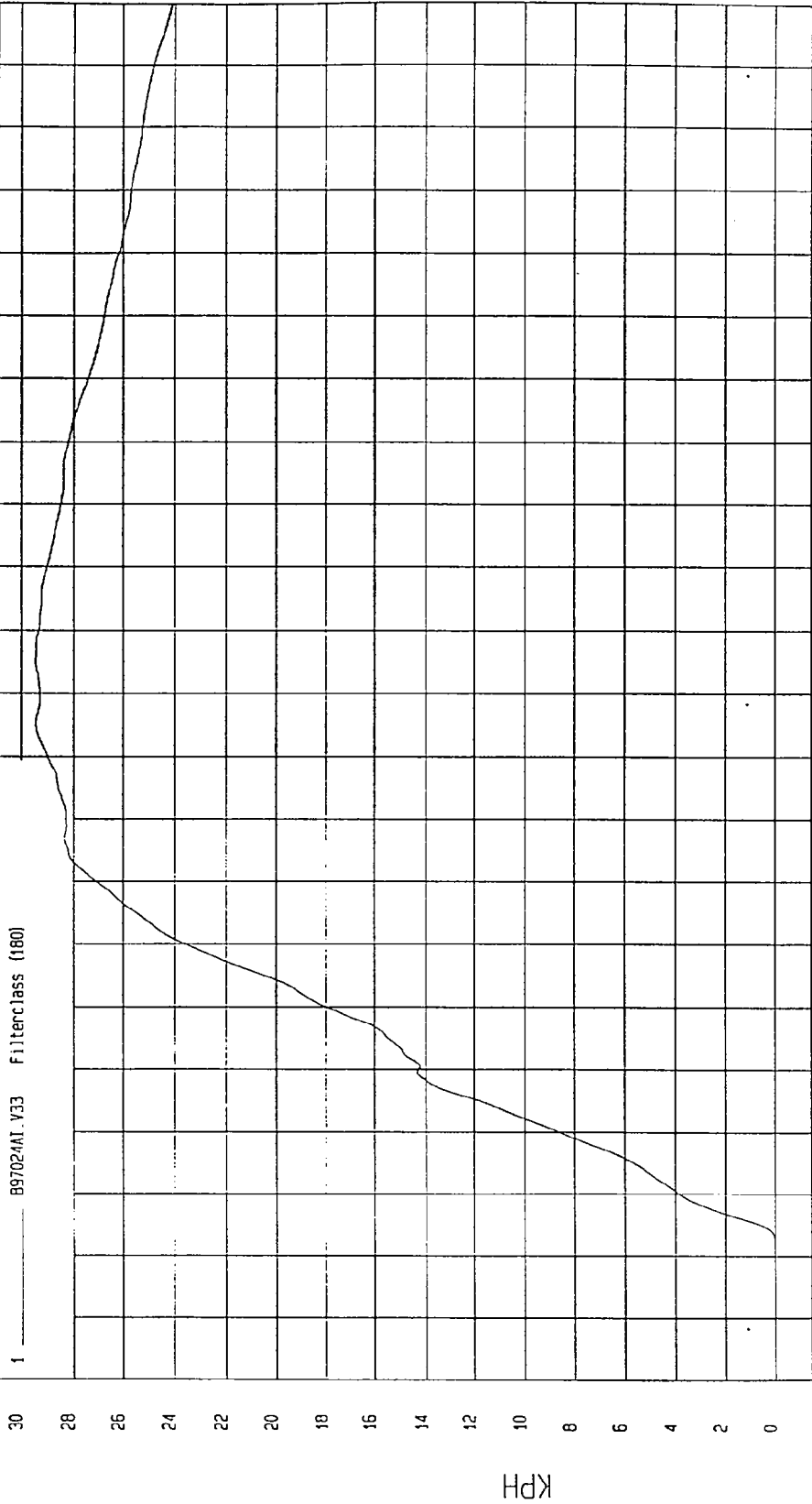
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec

Maximum = 29.45 KPH at 95 msec

RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY

1 B97024AT.V33 Filterclass (180)



MGA Research
02-08-1997 14:50

TIME Seconds

KPH

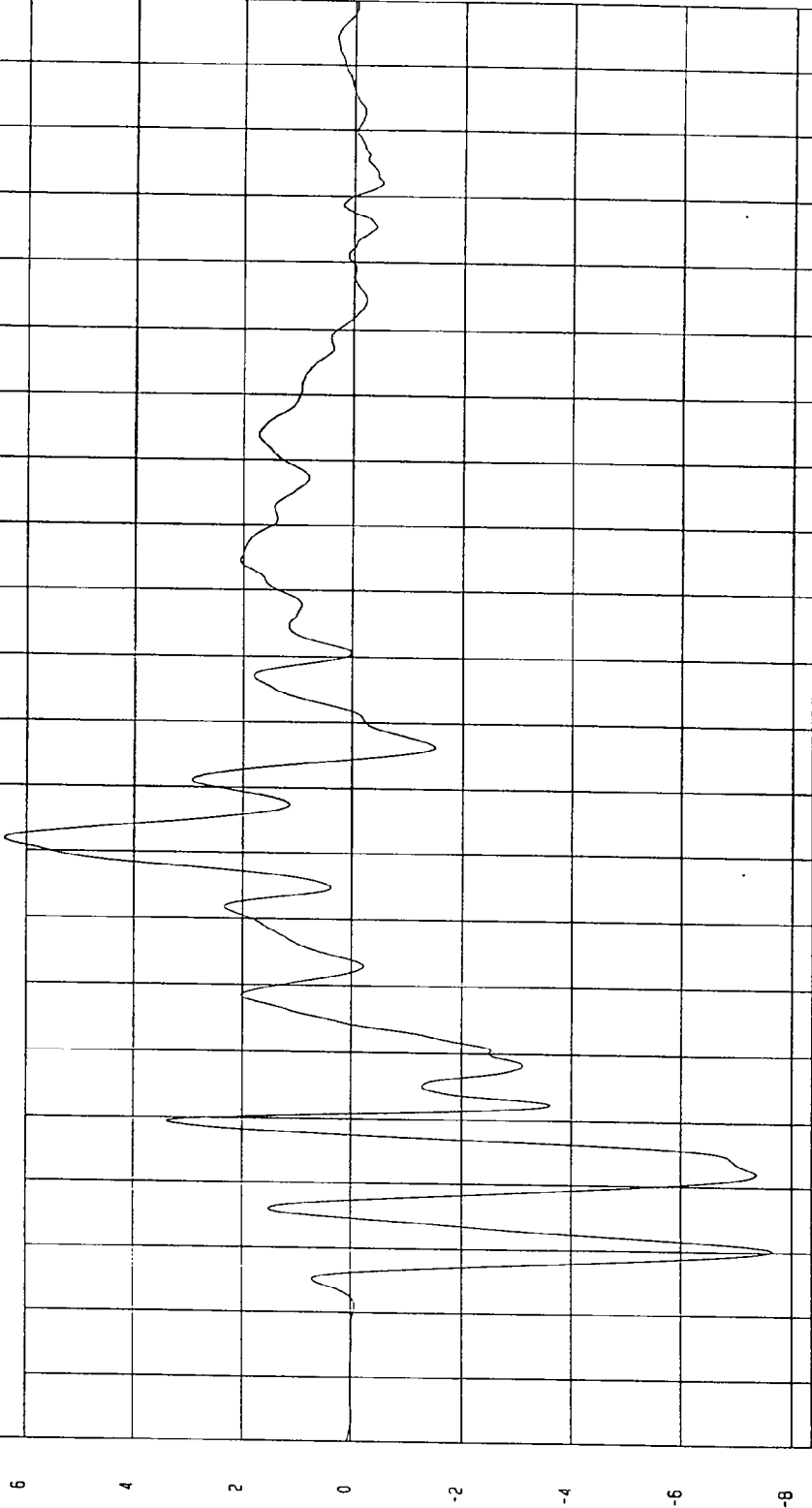
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -7.65 G'S at 10 msec
Maximum = 6.38 G'S at 72 msec

RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

1 ——— 897024F.A34 Filterclass (60)



MPA Research
02-08-1997 14:50

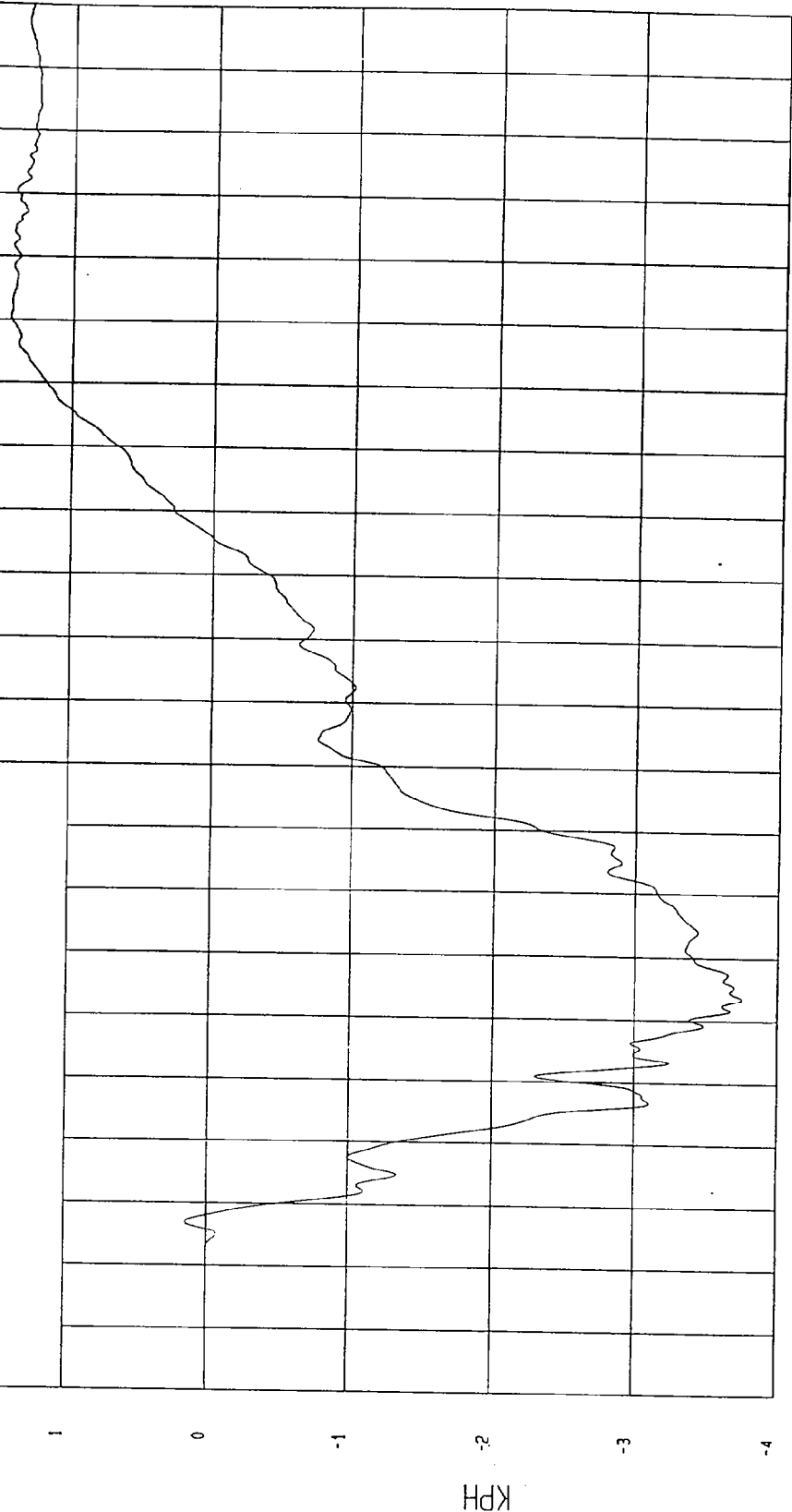
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.74 KPH at 44 msec Maximum = 1.43 KPH at 151 msec

RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY

1 ——— 897024A1.V34 Filterclass (180)



NSA Research
02-08-1997 14:50

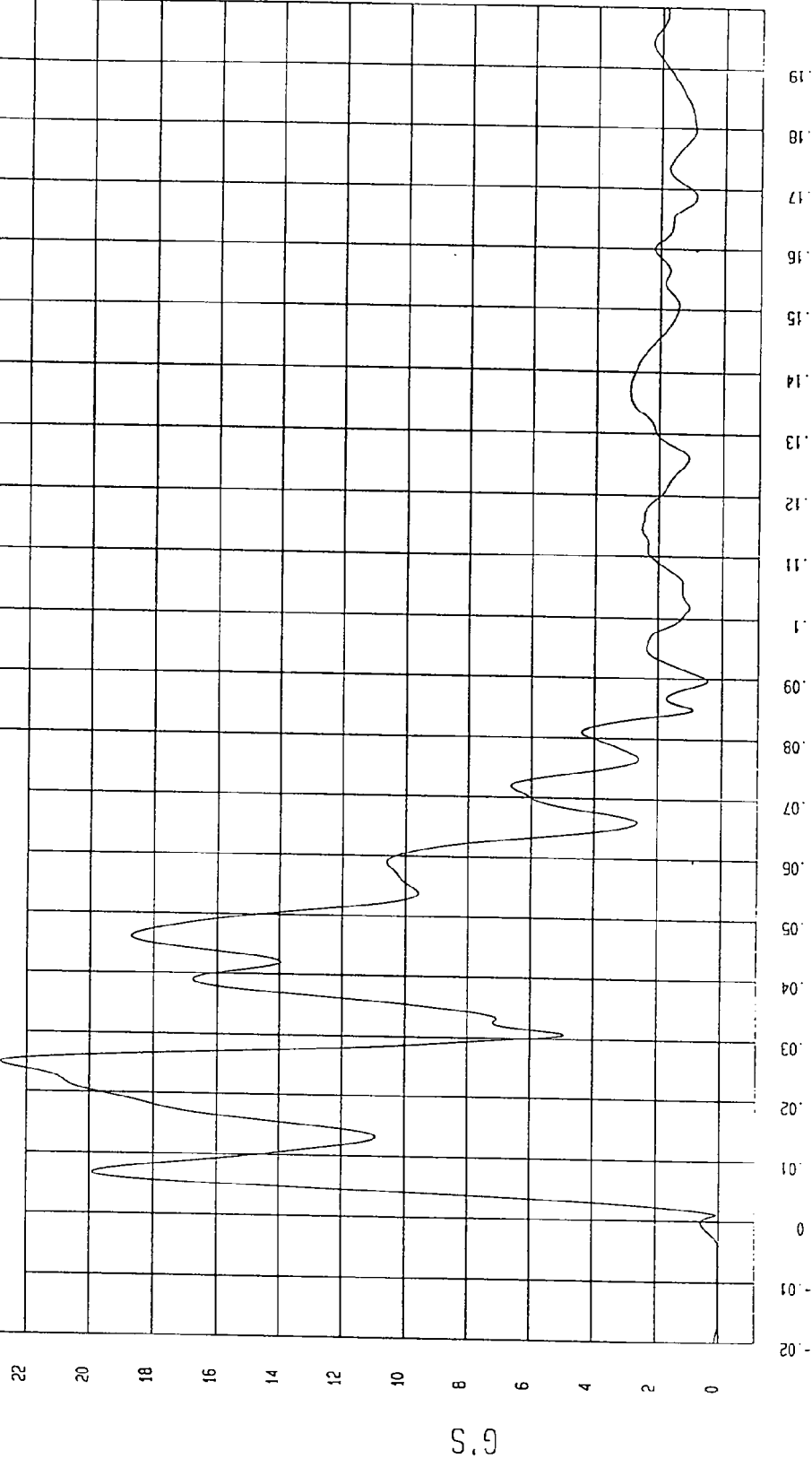
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 1.25E-02 G'S at -17 msec
Maximum = 22.80 G'S at 25 msec

RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

1 _____ B97024AV.A32 Filterclass (60)



HSA Research
02-08-1997 14:54

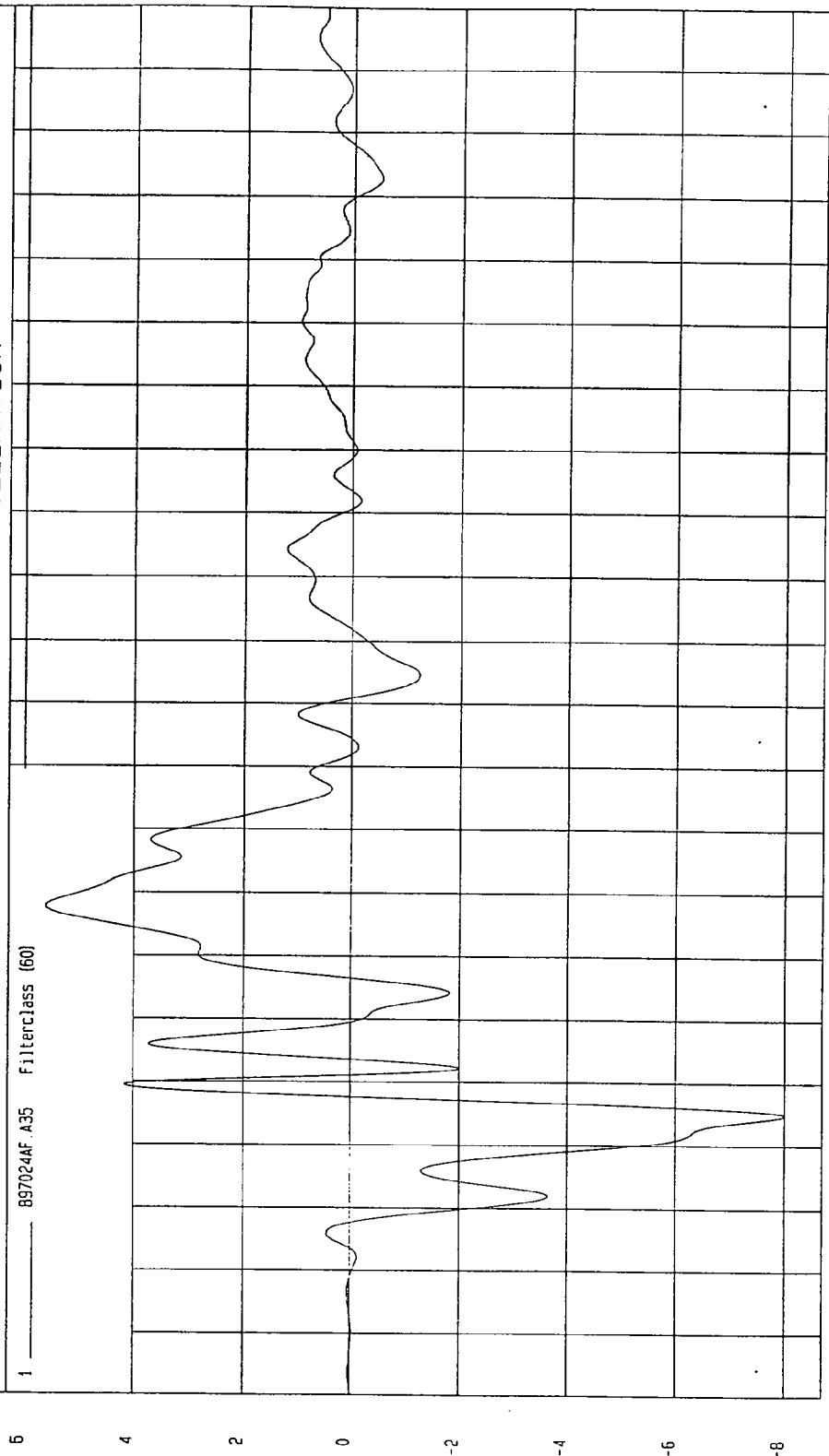
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -8.01 G'S at 25 msec
Maximum = 5.62 G'S at 58 msec

RIGHT SIDE SILL AT REAR SEAT X ACCELERATION

1 897024AF.A35 FilterClass (60)



NSA Research
02-08-1997 14:50

TEST DATE: 02-10-1997

TEST: NCAP HIGH SPEED LATERAL IMPACT

Speed: 38.2 MPH 61.5 KPH

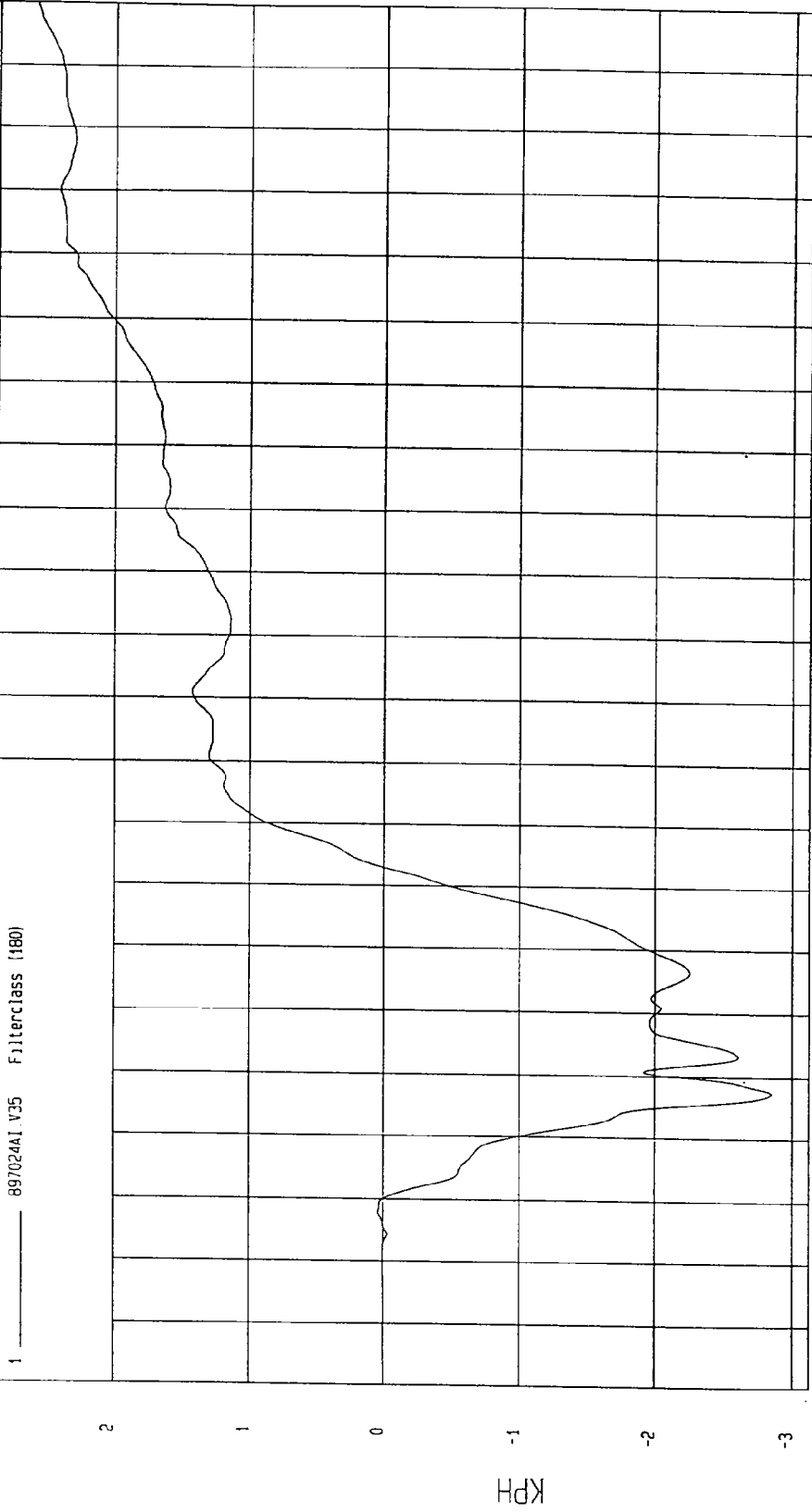
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116)

Maximum = 2.58 KPH at 200 msec

Minimum = -2.85 KPH at 27 msec

RIGHT SIDE SILL AT REAR SEAT X VELOCITY

1 ——— 897024A1.V35 Filterclass (180)



MCA Research
02-08-1997 14:50

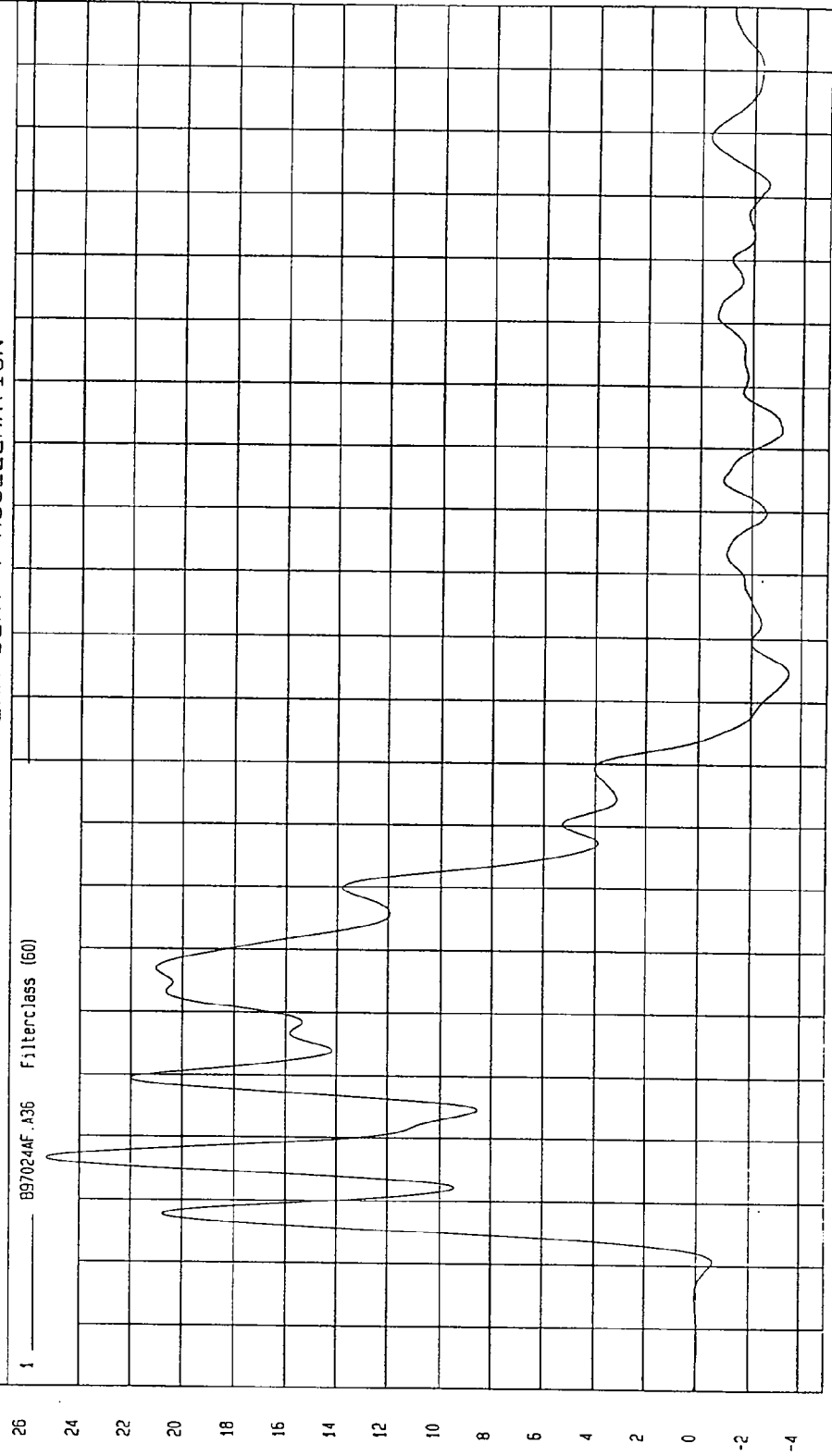
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.51 G'S at 95 msec
Maximum = 25.25 G'S at 16 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

1 897024AF.A36 Filterclass (60)



MGA Research
02-08-1997 14.50

TIME (SECONDS)

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

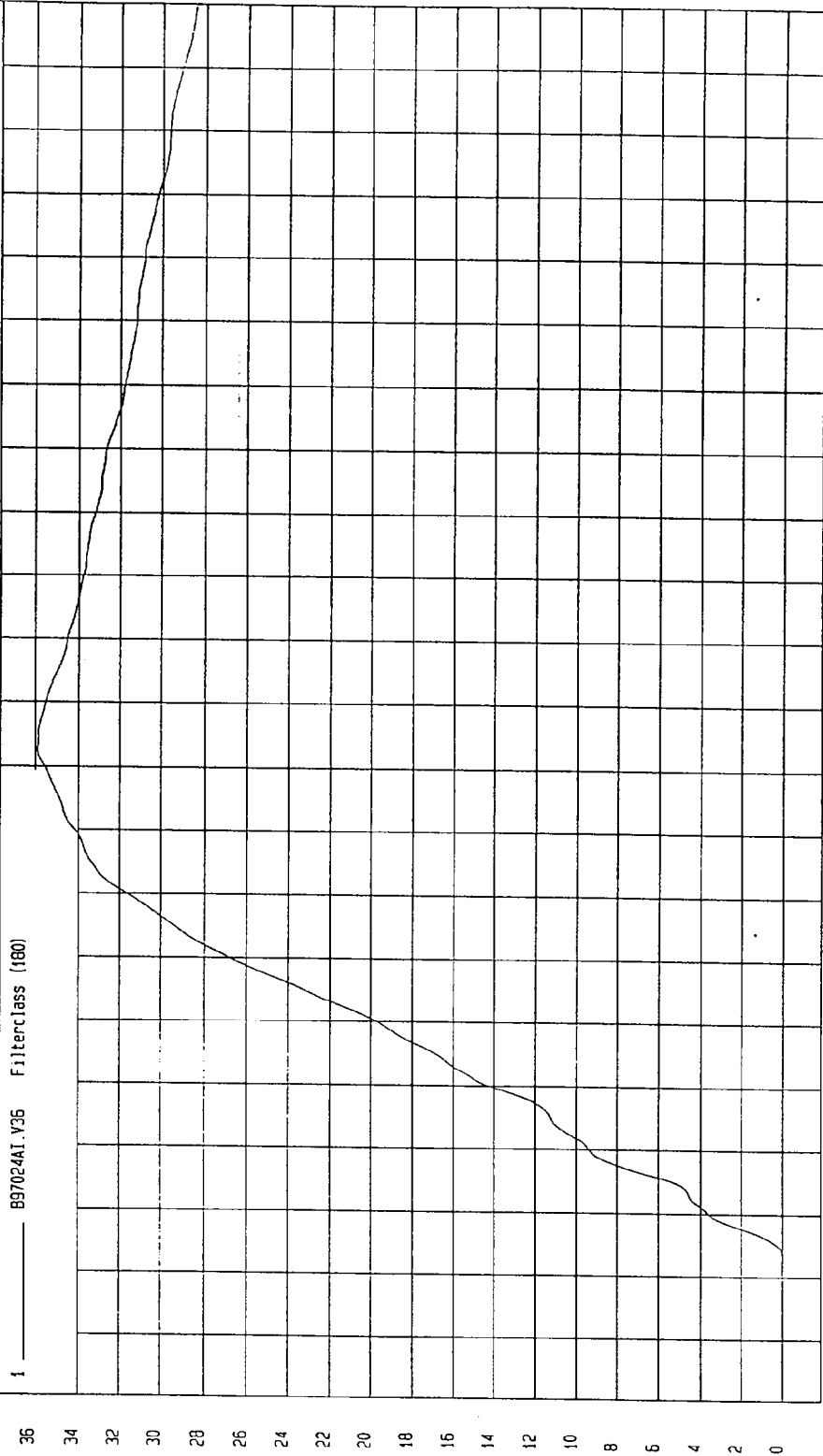
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -6.50E-03 KPH at -8 msec

Maximum = 35.88 KPH at 82 msec

RIGHT SIDE SILL AT REAR SEAT Y VELOCITY

1 ——— B97024A1.V36 Filterclass (180)



TIME Seconds

MCA Research
02-08-1997 14:50

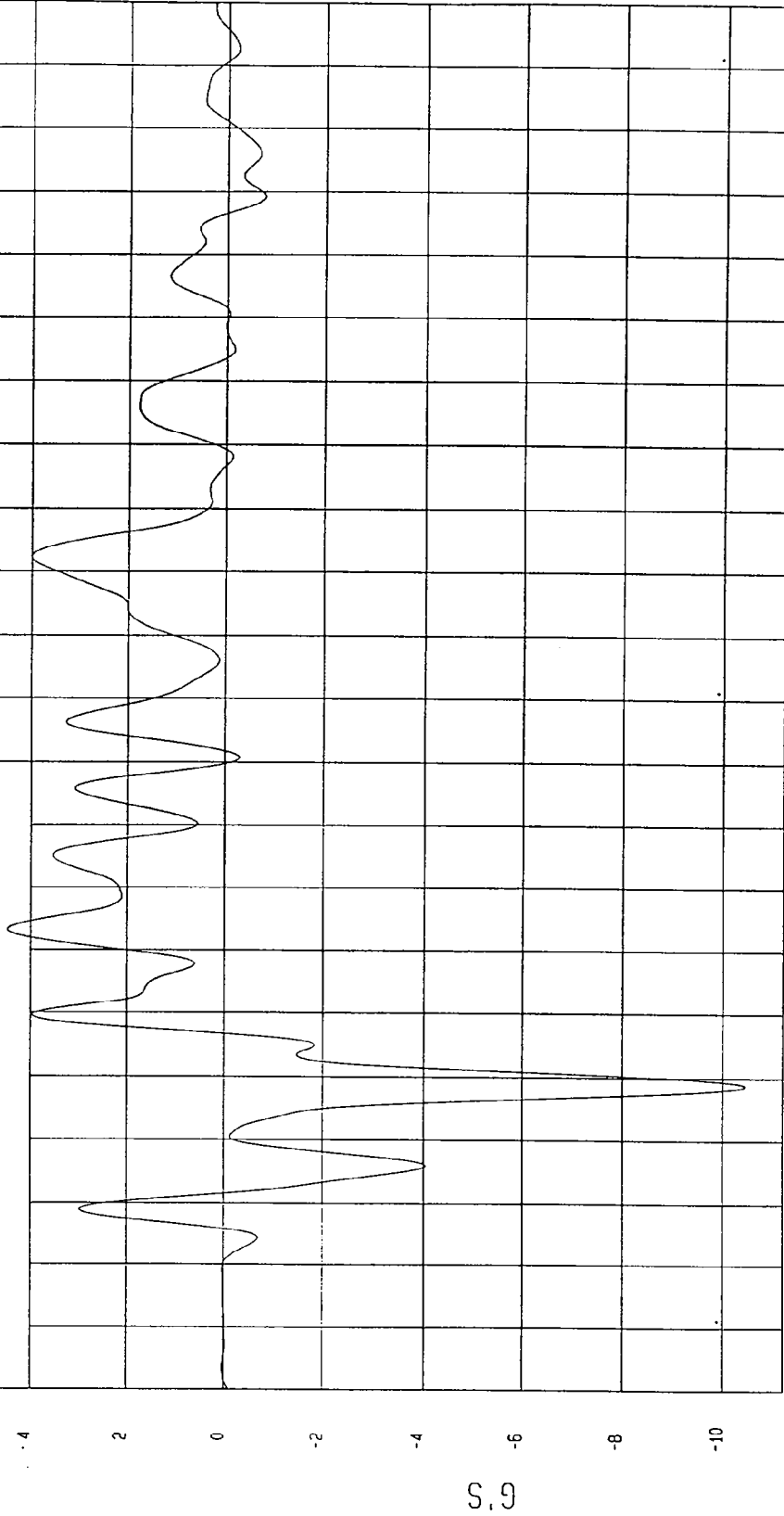
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -10.45 G'S at 29 msec Maximum = 4.47 G'S at 53 msec

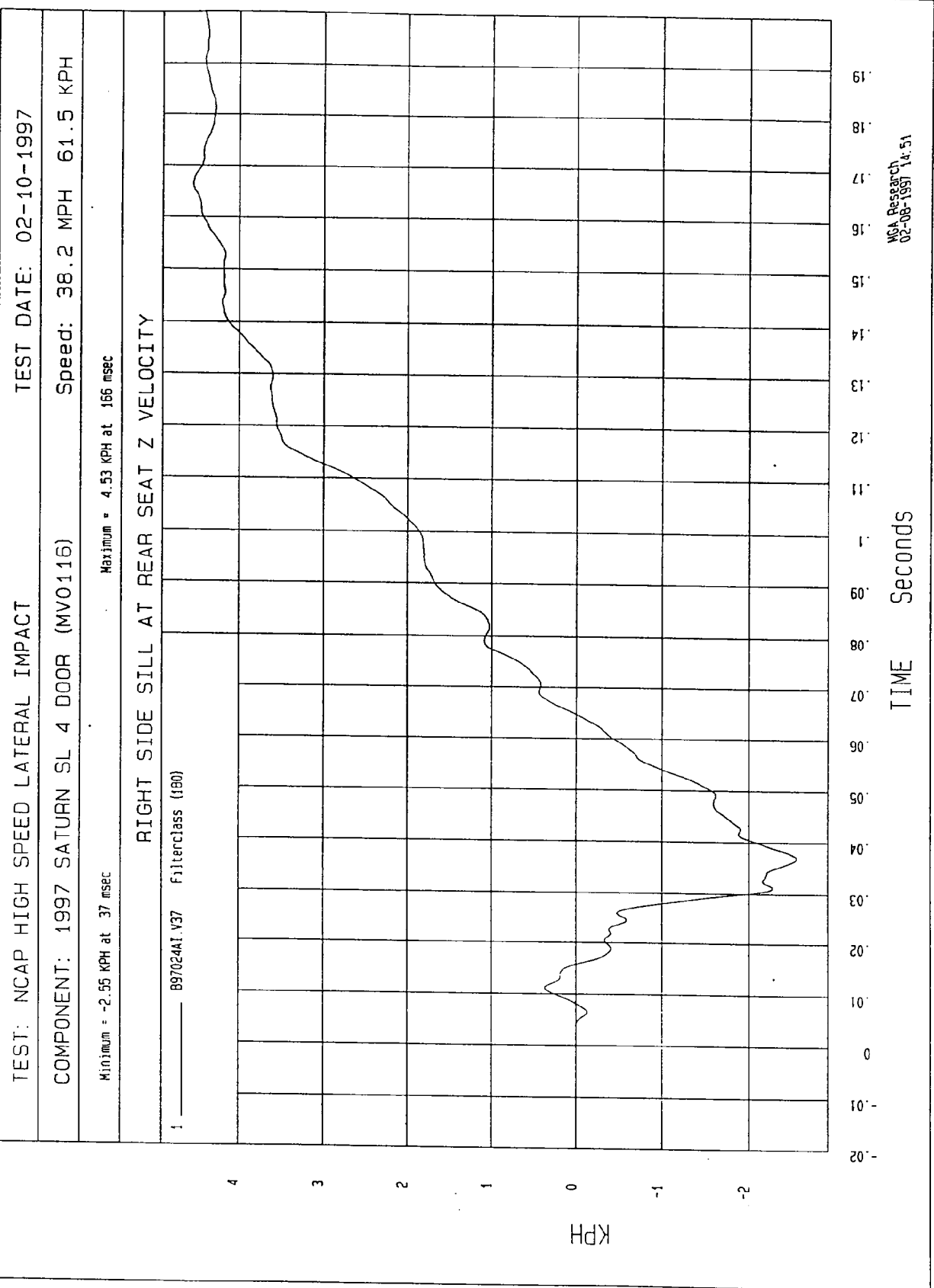
RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION

1 89702MAF.A37 Filterclass (60)



TIME (SECONDS) 0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

NCA Research
02-08-1997 14.51



NCA Research
 02-08-1997 14.51

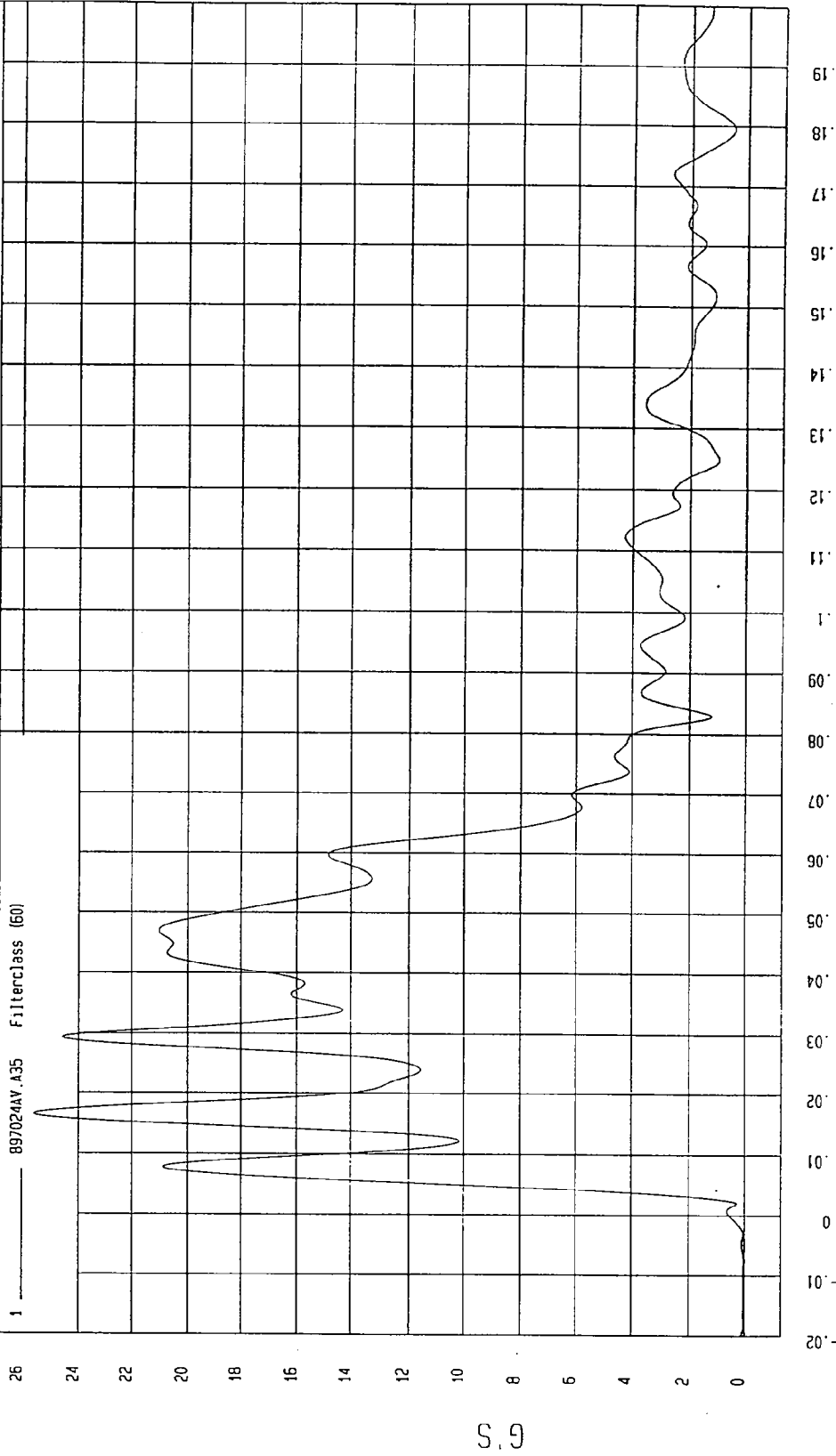
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0115) Speed: 38.2 MPH 61.5 KPH

Minimum = 1.31E-02 G'S at -0 msec Maximum = 25.59 G'S at 16 msec

RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

1 897024AV.A35 Filterclass (60)



MCA Research
02-08-1997 14:54

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

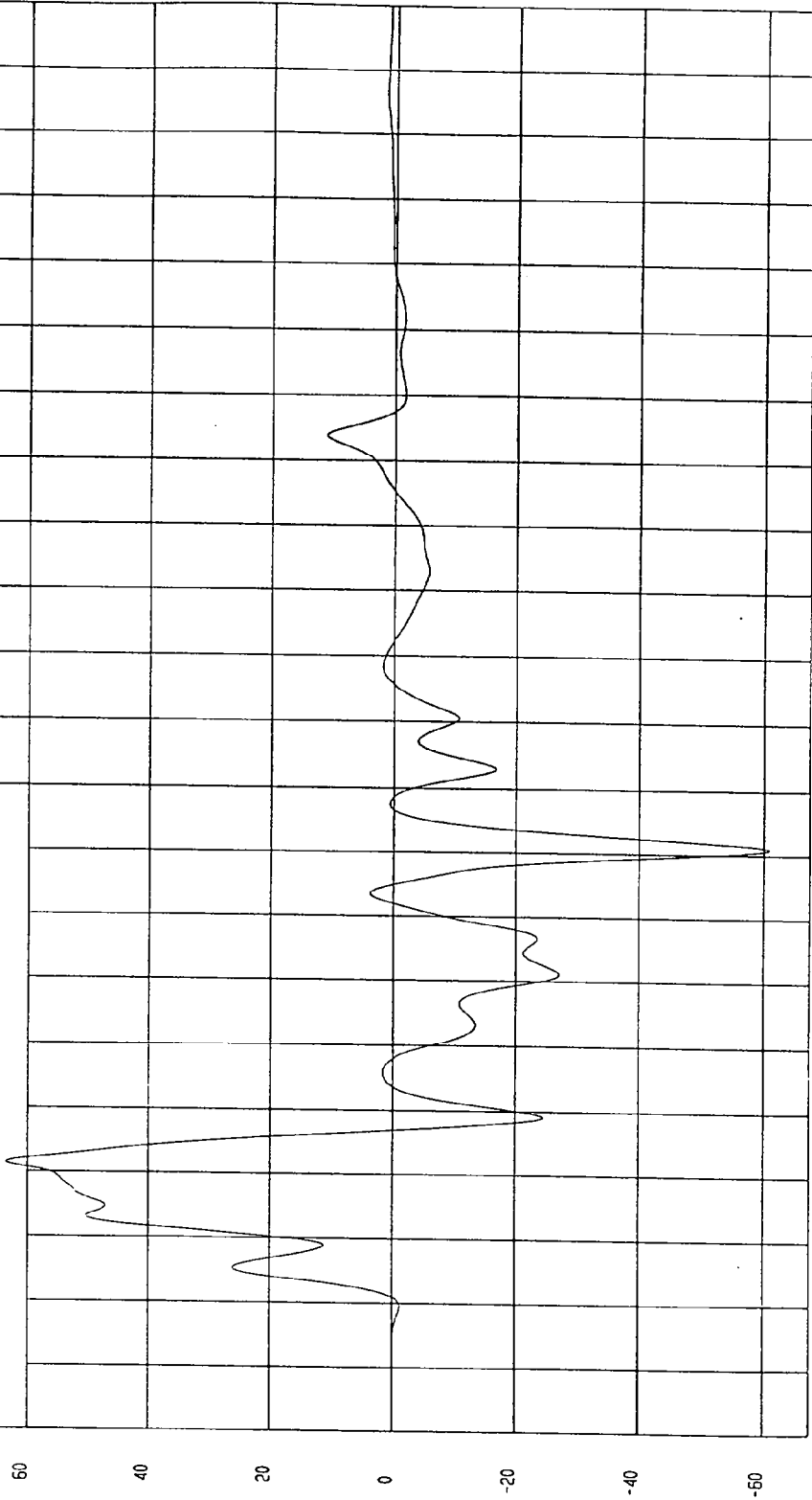
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -60.85 G'S at 71 msec

Maximum = 63.47 G'S at 22 msec

DRIVER SEAT TRACK Y ACCELERATION

1 ——— B97024F.A40 Filterclass (60)



MCA Research
02-08-1997 14:51

TIME (SECONDS)

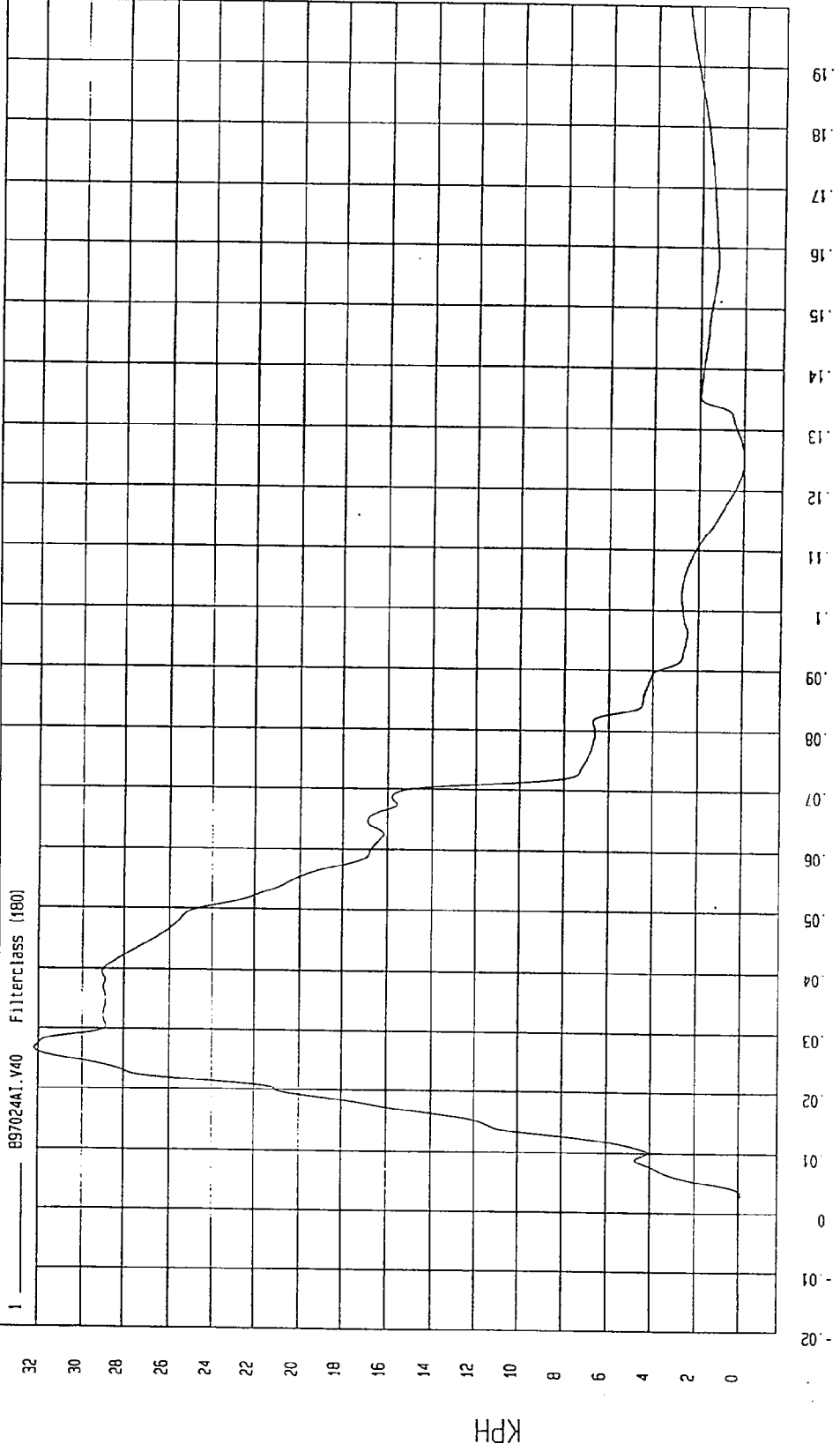
G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

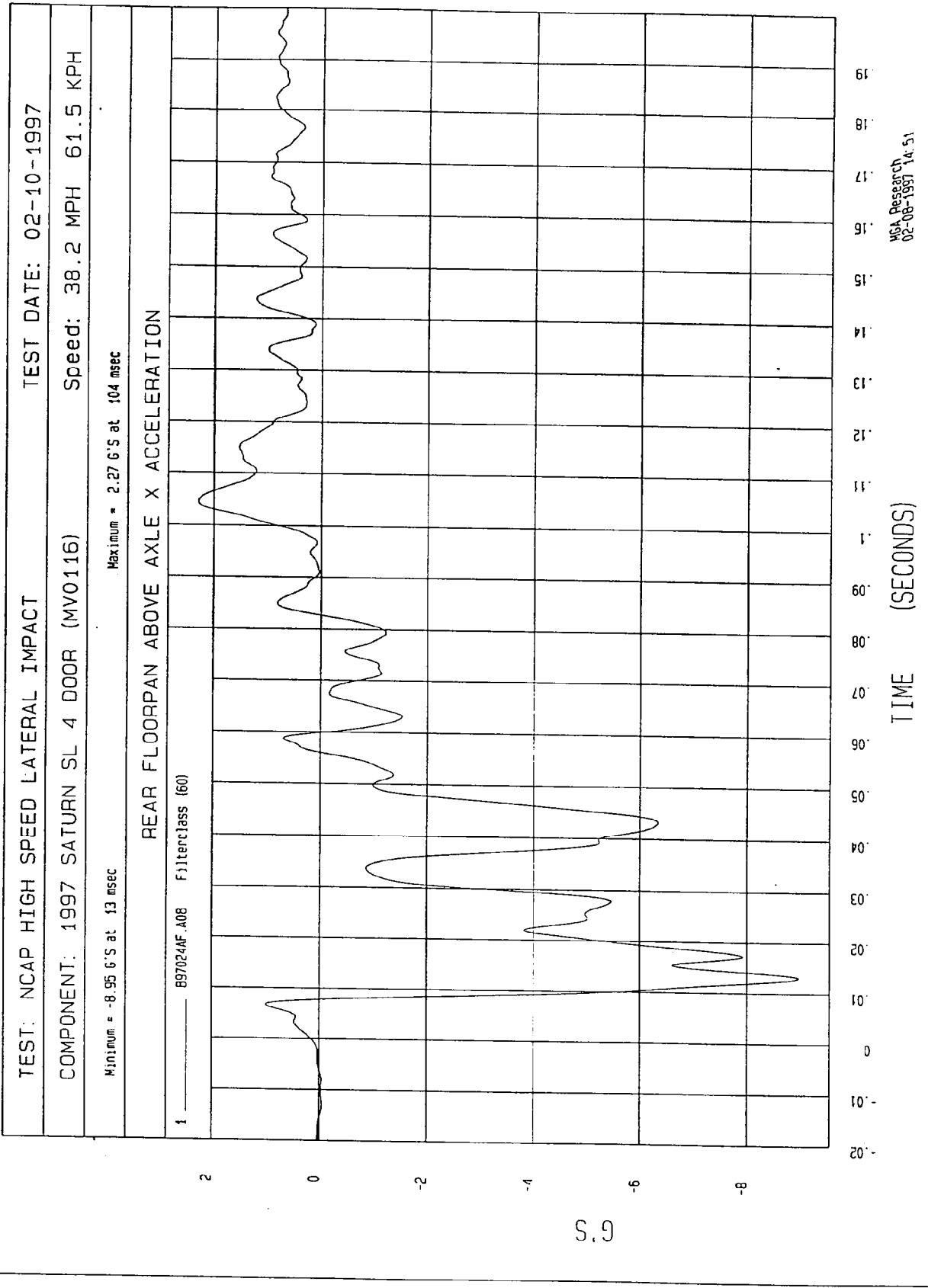
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -.09 KPH at .3 msec
Maximum = 32.16 KPH at .27 msec

DRIVER SEAT TRACK Y VELOCITY



MCA Research
02-08-1997 14:51



TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

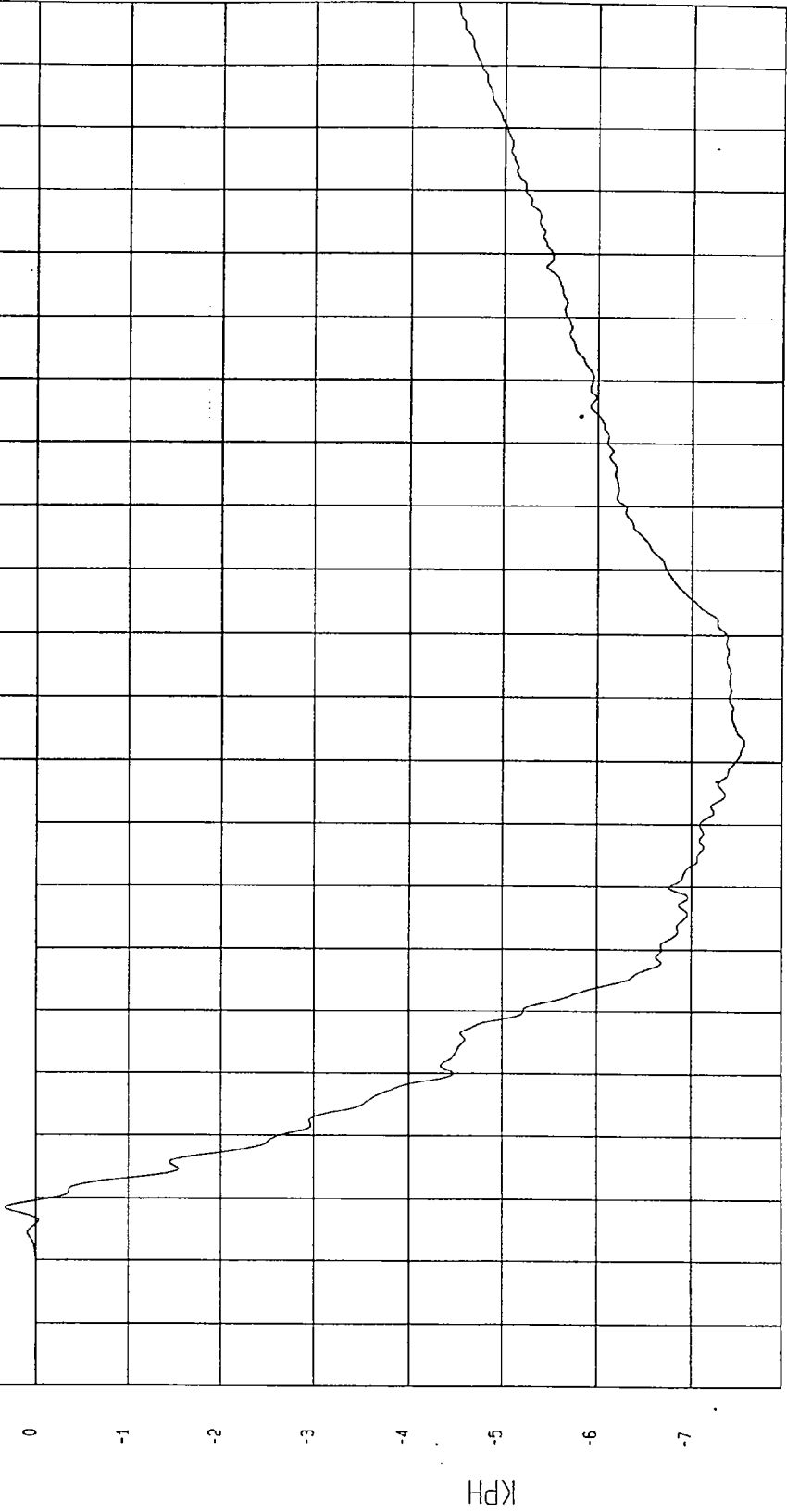
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -7.55 KPH at 83 msec

Maximum = .32 KPH at 8 msec

REAR FLOORPAN ABOVE AXLE X VELOCITY

1 997024AI.V08 Filterclass (180)



MSA Research
02-08-1997 14:51

TIME Seconds

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

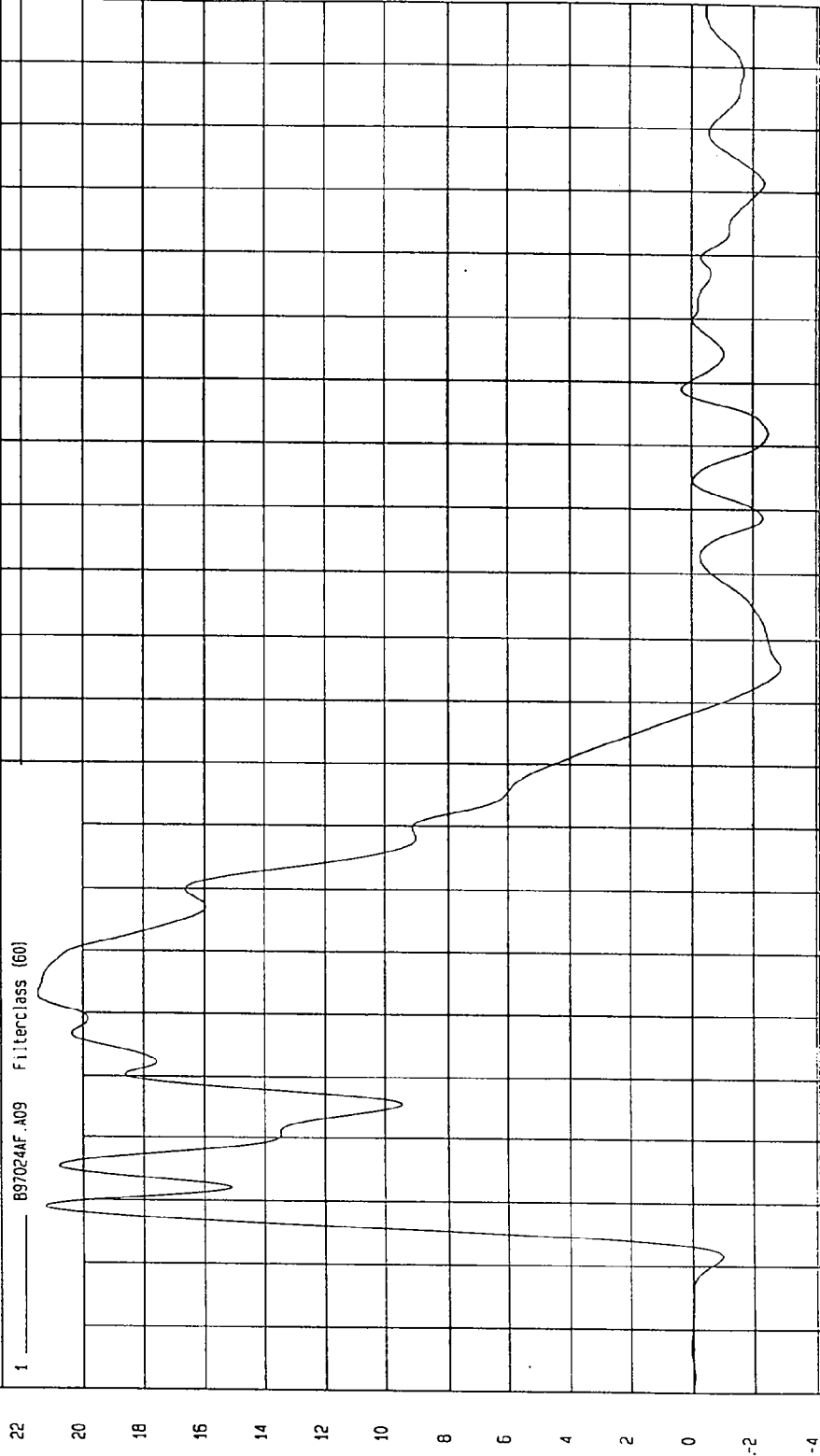
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.88 G'S at 96 msec

Maximum = 21.47 G'S at 43 msec

REAR FLOORPAN ABOVE AXLE Y ACCELERATION

1 B97024AF.A09 Filterclass (60)



MGA Research
02-08-1997 14:51

TIME (SECONDS)

S.G

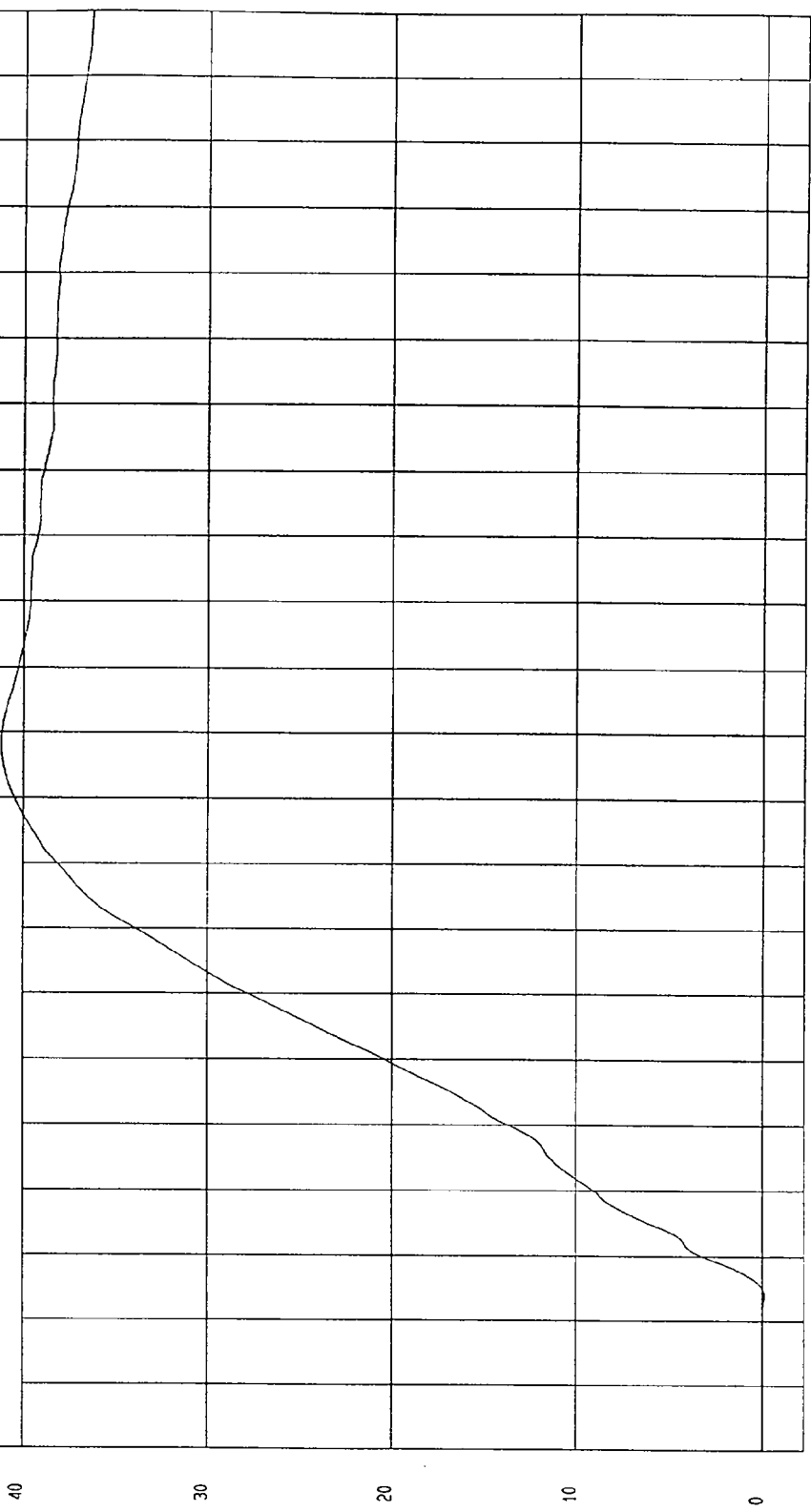
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -10 KPH at 4 msec Maximum = 41.15 KPH at 88 msec

REAR FLOORPAN ABOVE AXLE Y VELOCITY

1 09/024A1.V09 FilterClass (180)



TIME Seconds
MSA Research
02-08-1997 14:51

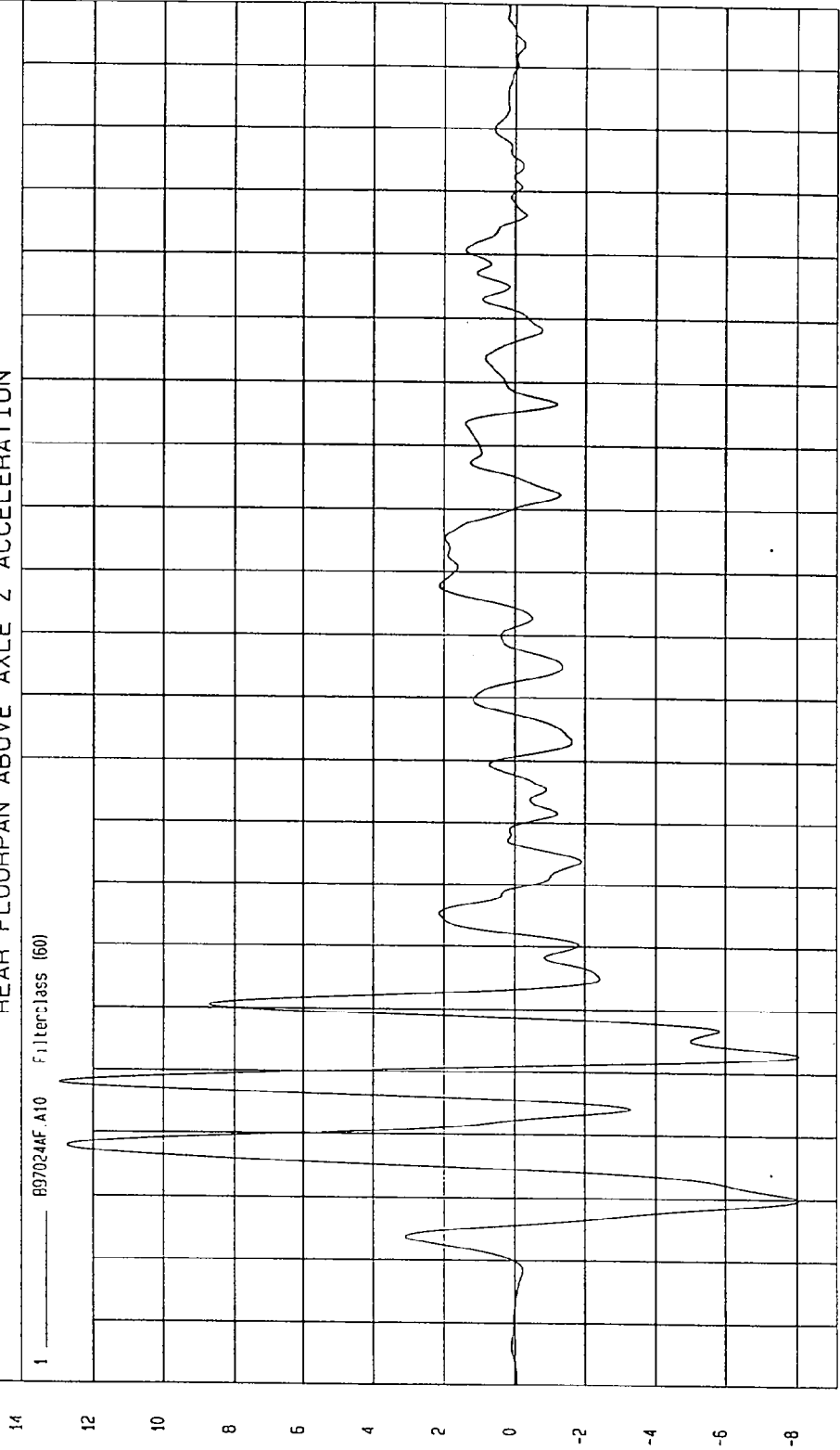
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -8.07 G'S at 10 msec Maximum = 12.95 G'S at 28 msec

REAR FLOORPAN ABOVE AXLE Z ACCELERATION

1 8970244F.A10 Filterclass (60)



HGA Research
02-08-1997 14:51

TIME (SECONDS)

G.S

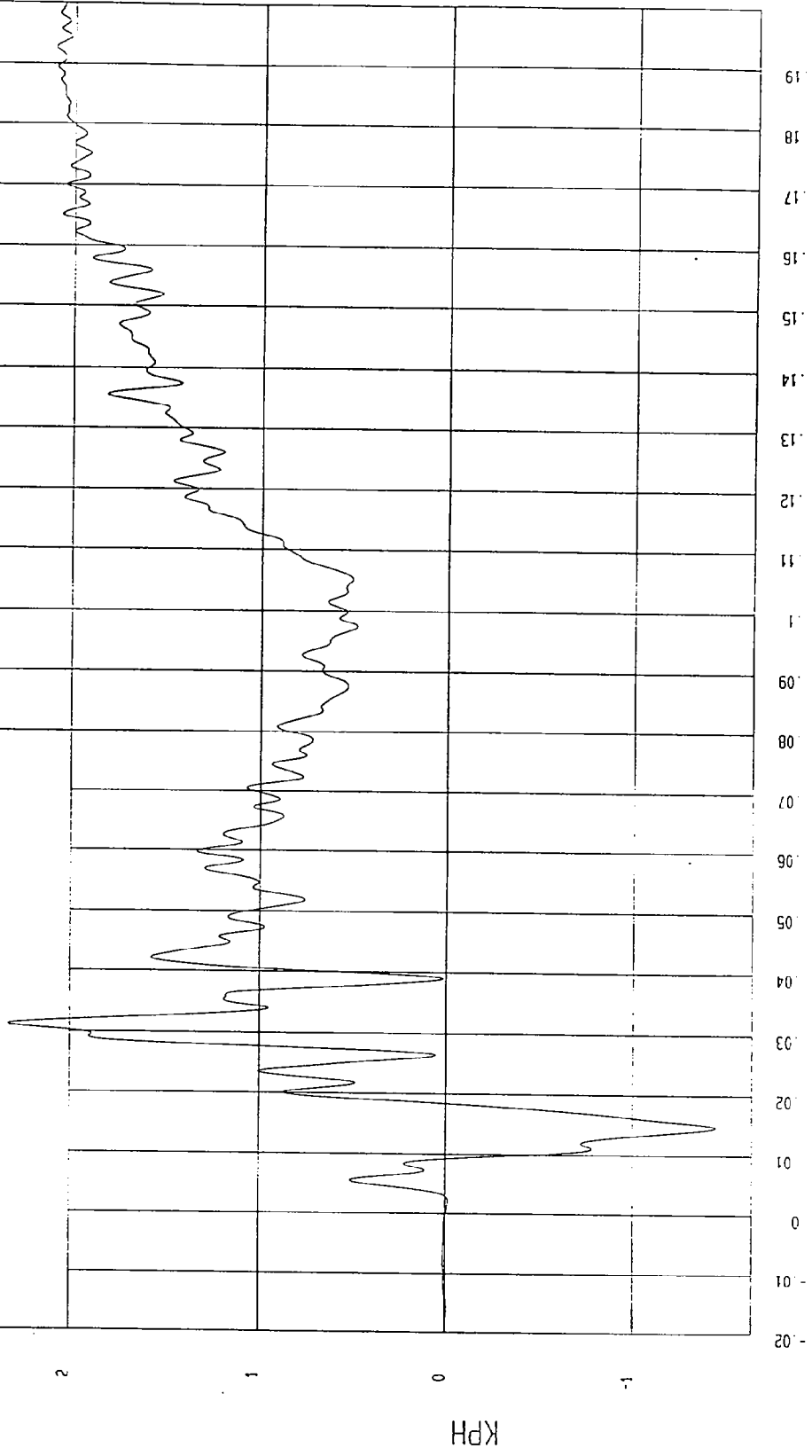
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.43 KPH at 15 msec
Maximum = 2.32 KPH at 31 msec

REAR FLOORPAN ABOVE AXLE Z VELOCITY

1 ——— 897024A1.V10 Filterclass (180)



MCA Research
02-08-1997 14:51

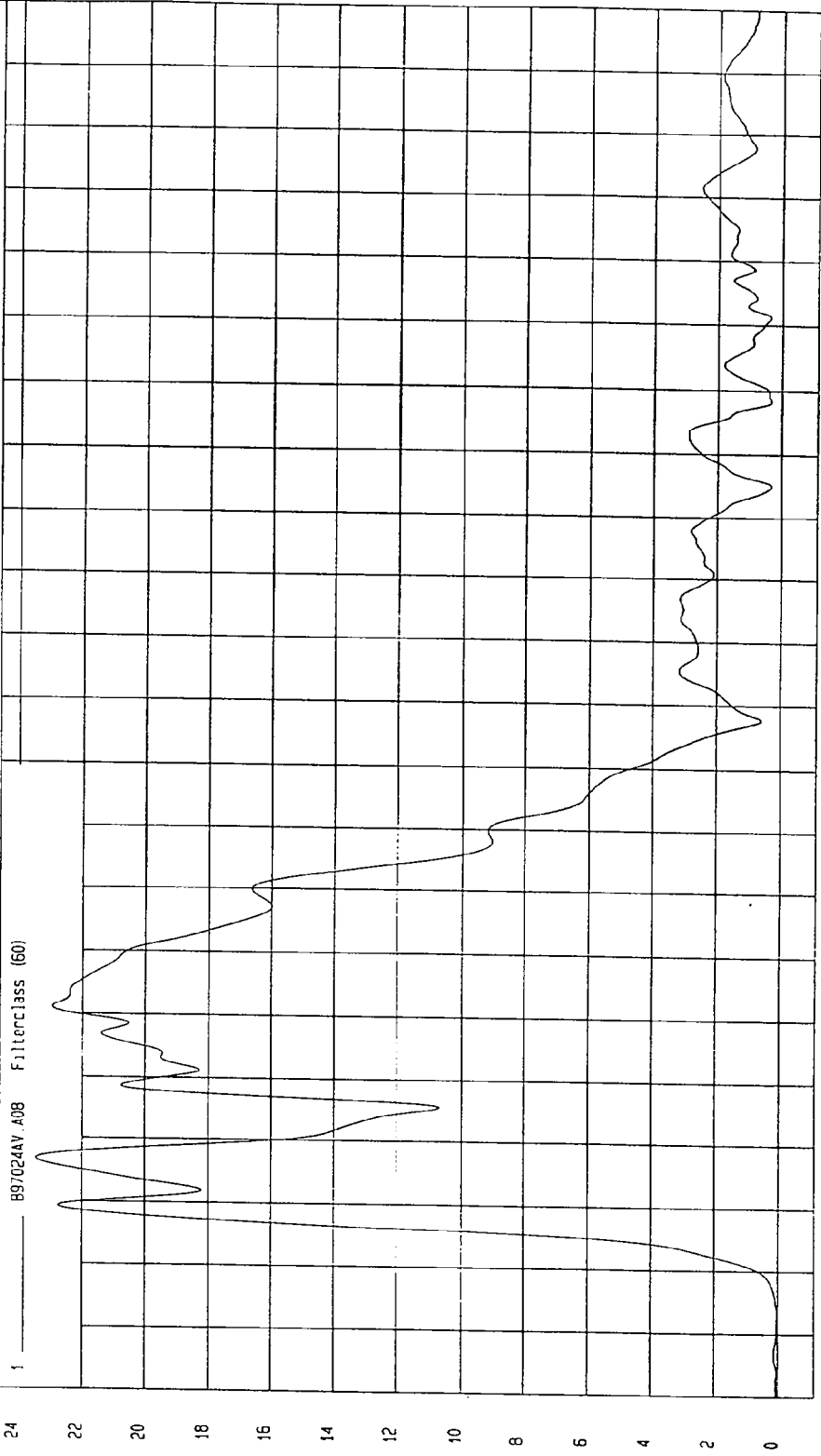
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 2.14E-02 G'S at -7 msec
Maximum = 23.44 G'S at 17 msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

1 ——— B97024V_A08 Filterclass (60)



MOA Research
02-08-1997 14.54

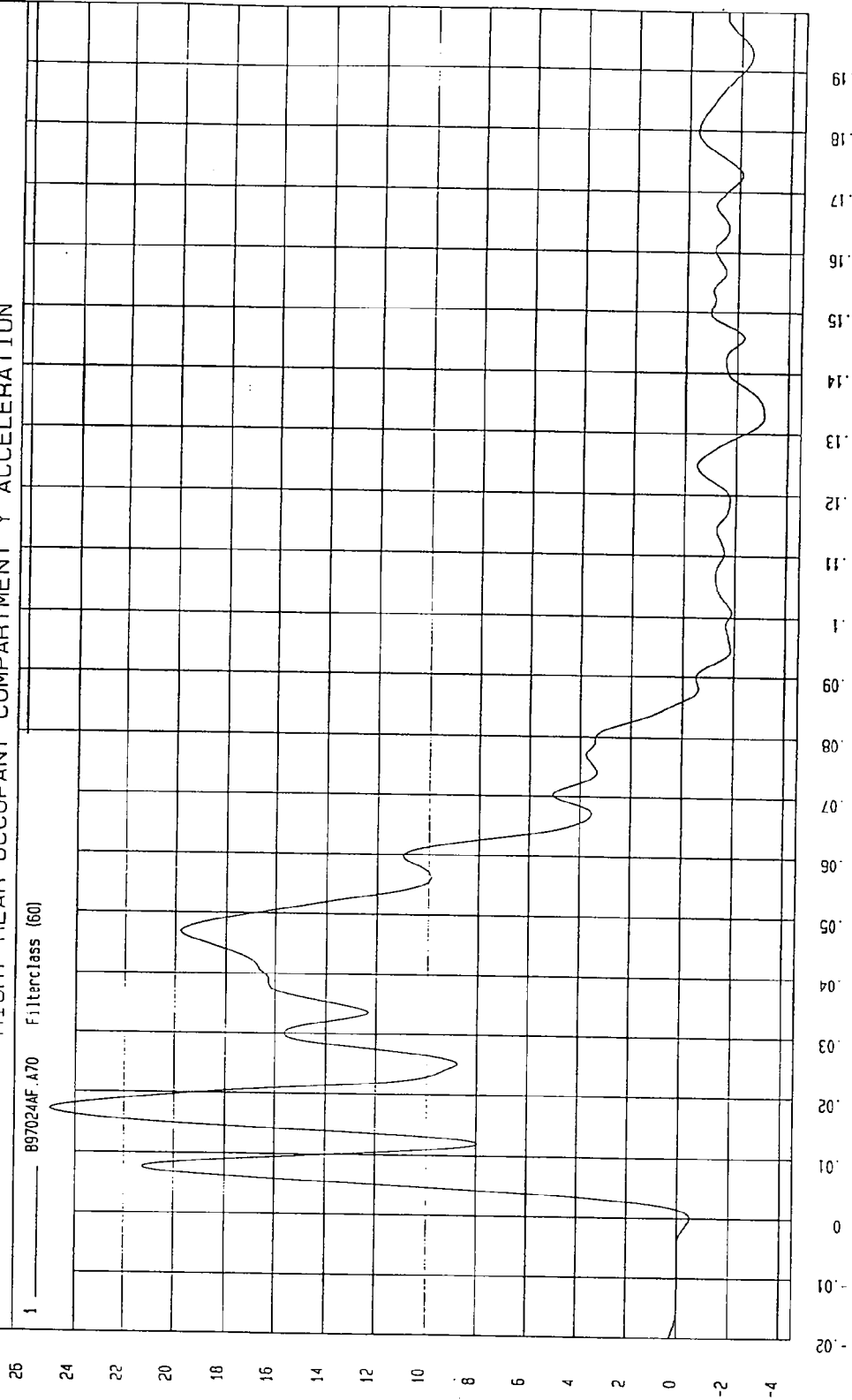
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.09 G'S at 133 msec Maximum = 24.98 G'S at 17 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION

1 897024AF.A70 Filterclass (60)



MSA Research
02-08-1997 14:52

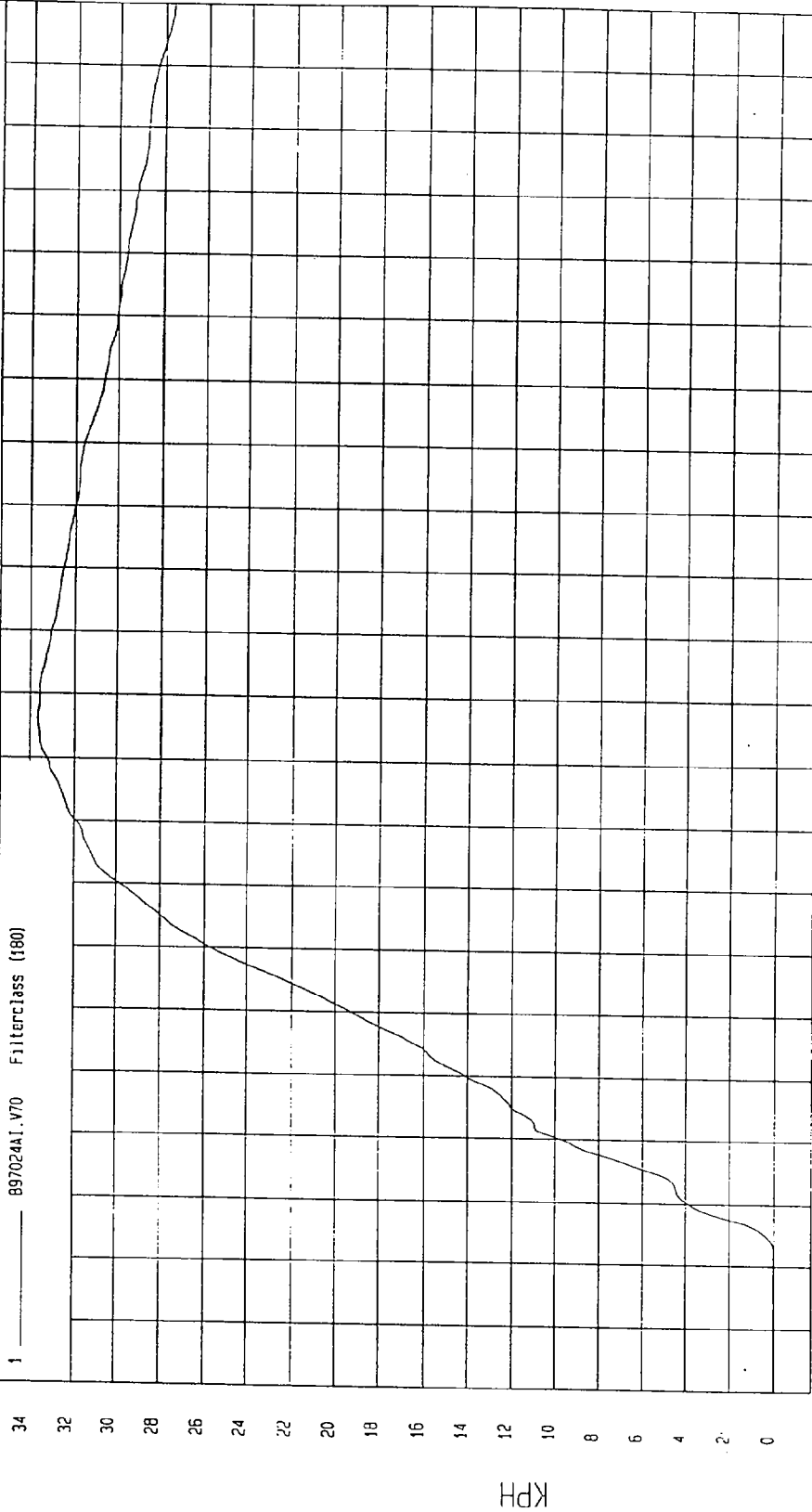
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 33.67 KPH at 86 msec

RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY

1 897024A1.V70 Filterclass (180)



MCA Research
02-08-1997 14:52

TIME Seconds

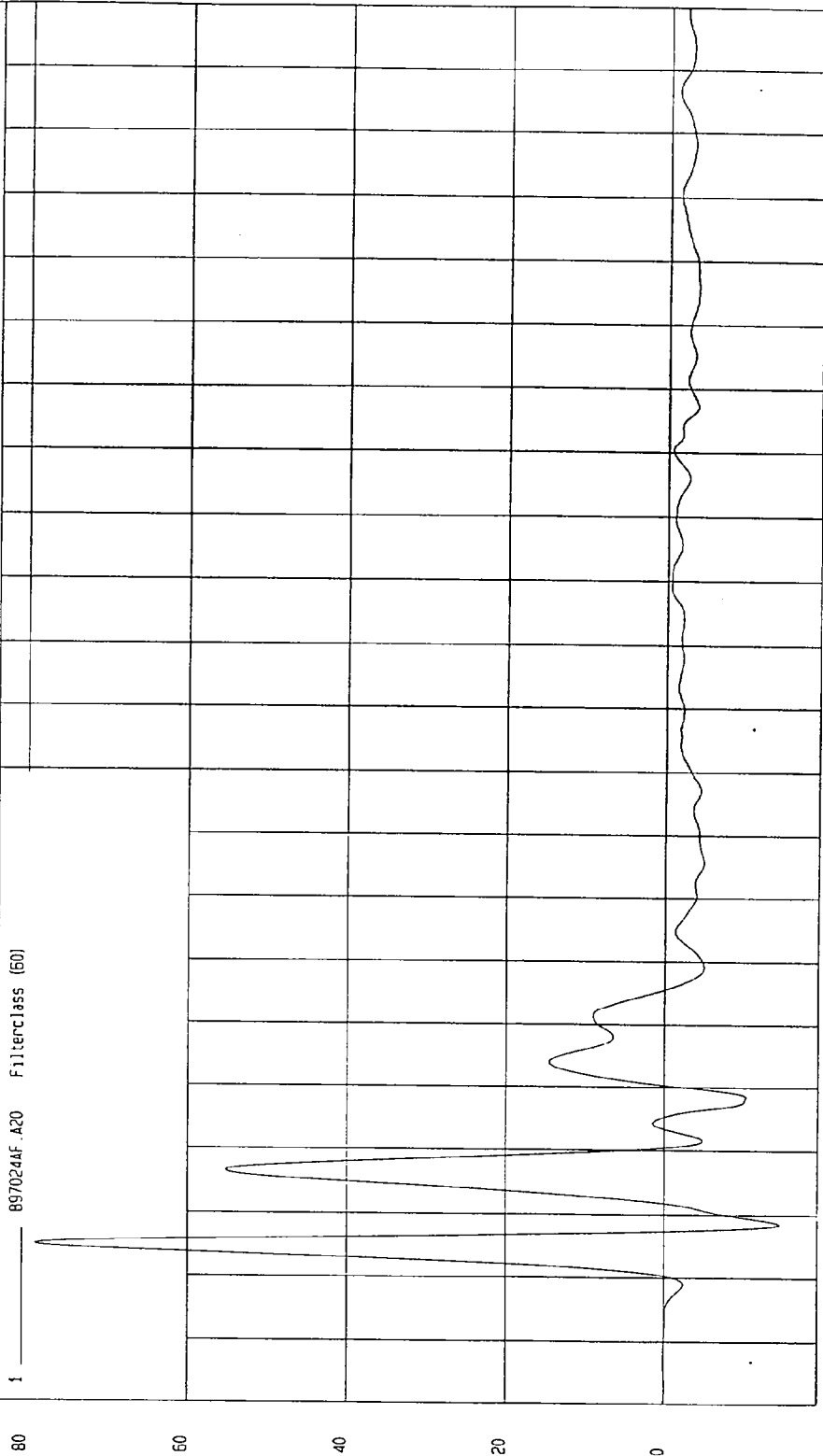
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -14.31 G'S at 8 msec
Maximum = 79.01 G'S at 5 msec

LEFT LOWER A-POST Y ACCELERATION

1 897024F.A20 FilterClass (50)



MGA Research
02-08-1997 14:52

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.36E-02 KPH at -4 msec Maximum = 20.31 KPH at 45 msec

LEFT LOWER A-POST Y VELOCITY

1 897024A1.V20 Filterclass (180)



TIME Seconds
MSA Research
02-08-1997 14:52

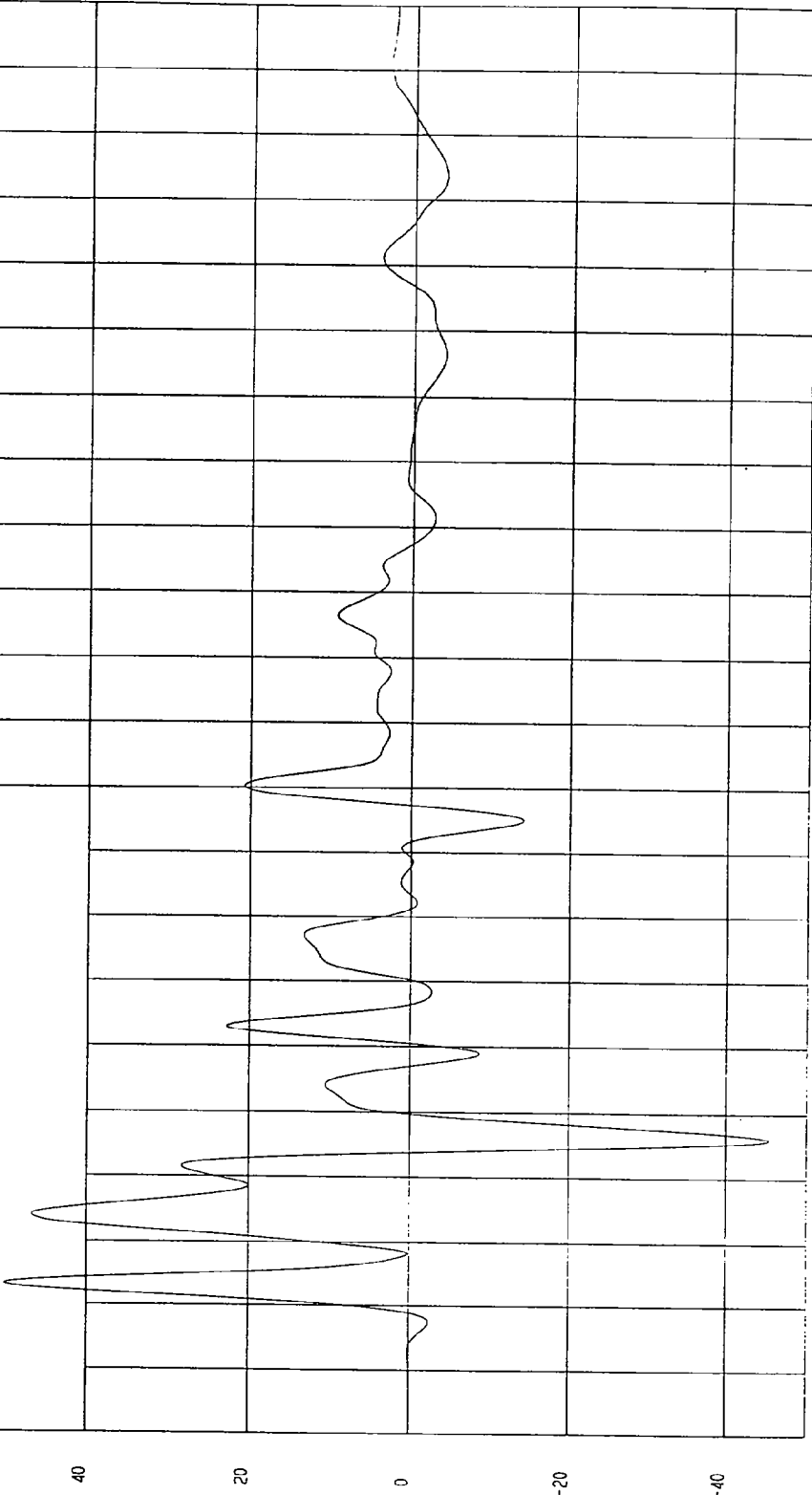
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -45.42 G'S at 26 msec Maximum = 50.09 G'S at 3 msec

LEFT MID A-POST Y ACCELERATION

1 897024AF.A19 Filterclass (60)



TIME (SECONDS) 0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 -0.02

MGA Research
02-08-1997 14:52

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

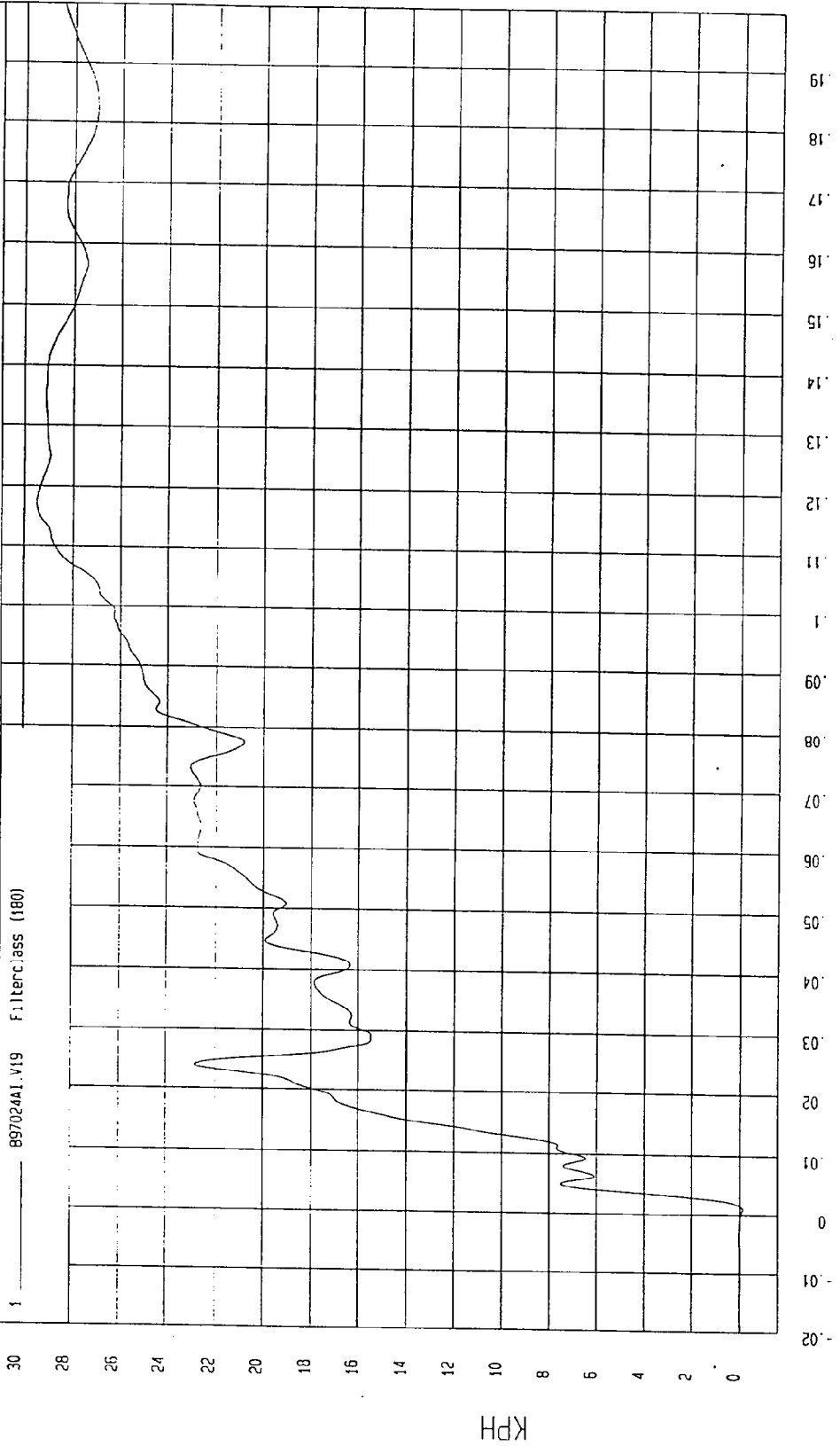
COMPONENT: 1997 SATURN SL 4 DOOR (MVO115) Speed: 38.2 MPH 61.5 KPH

Minimum = .11 KPH at 1 msec

Maximum = 29.46 KPH at 117 msec

LEFT MID A-POST Y VELOCITY

1 897024A1.V19 Filter: class (180)



MCA Research
02-08-1997 14:52

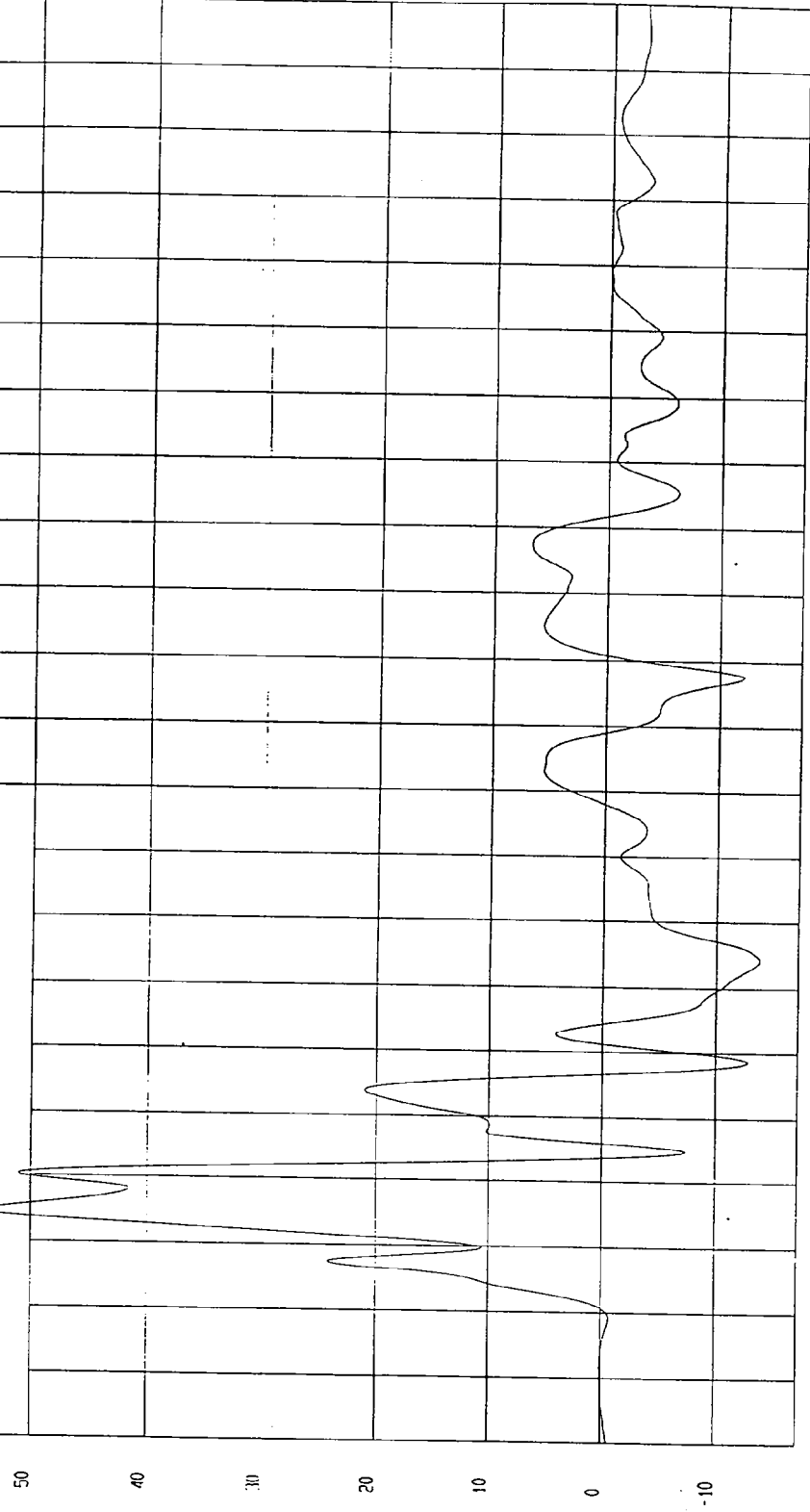
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -13.77 G'S at 54 msec
Maximum = 54.19 G'S at 15 msec

LEFT LOWER B-POST Y ACCELERATION

1 89702MAF A30 Filterclass (50)



WCA Research
02-08-1997 14:52

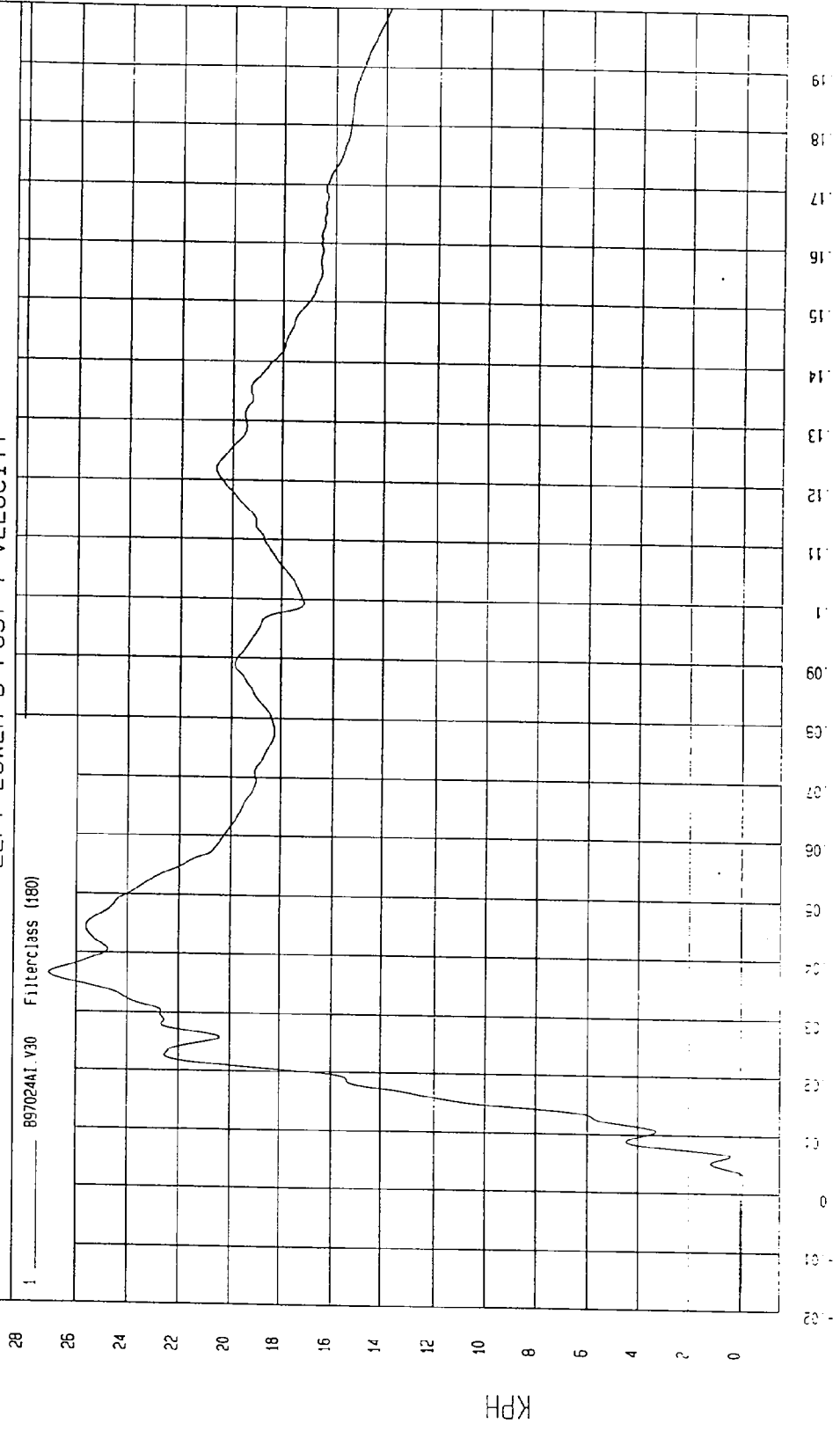
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -14 KPH at 3 msec Maximum = 27.04 KPH at 36 msec

LEFT LOWER B-POST Y VELOCITY

1 897024AI.V30 Filterclass (180)



MGA Research
02-08-1997 14:52

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116)

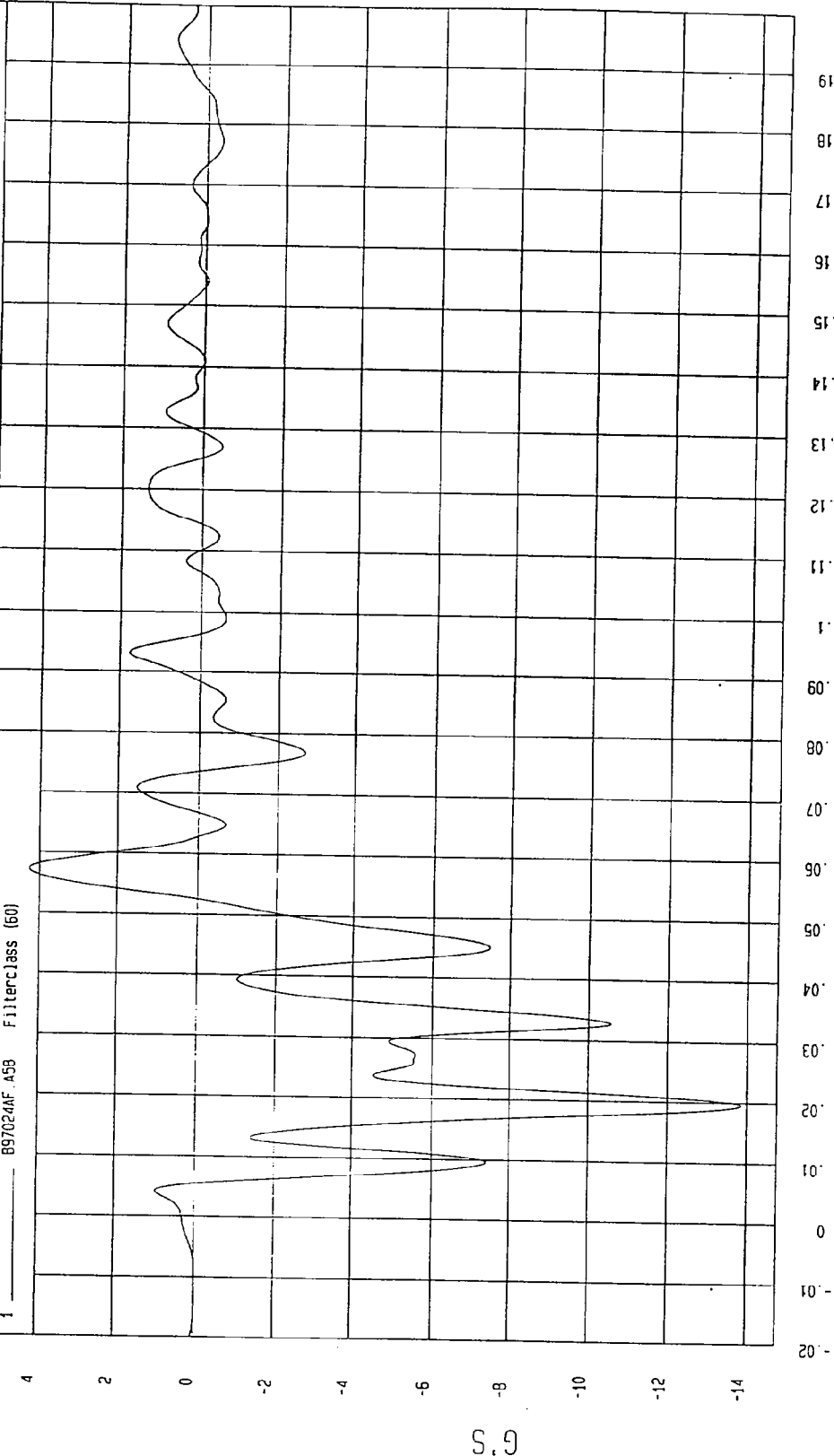
Speed: 38.2 MPH 61.5 KPH

Minimum = -13.85 G'S at 20 msec

Maximum = 4.25 G'S at 57 msec

VEHICLE CG X ACCELERATION

1 ——— B97024AF.A58 FilterClass (60)



MGA Research
02-08-1997 14.53

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

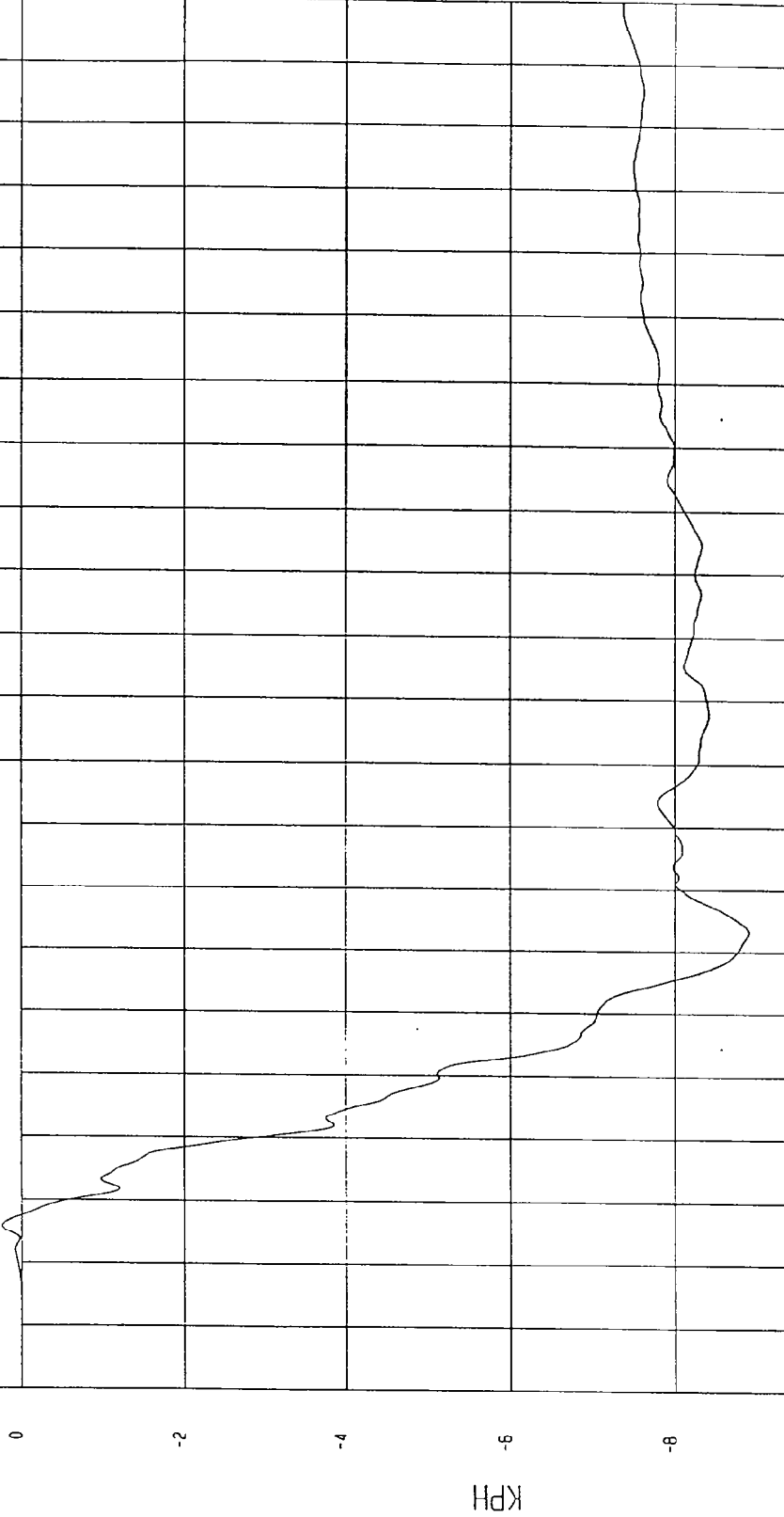
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -8.90 KPH at 53 msec

Maximum = .23 KPH at 6 msec

VEHICLE CG X VELOCITY

1 897024A1.V58 Filterclass (f80)



MGA Research
02-08-1997 14:53

TIME Seconds

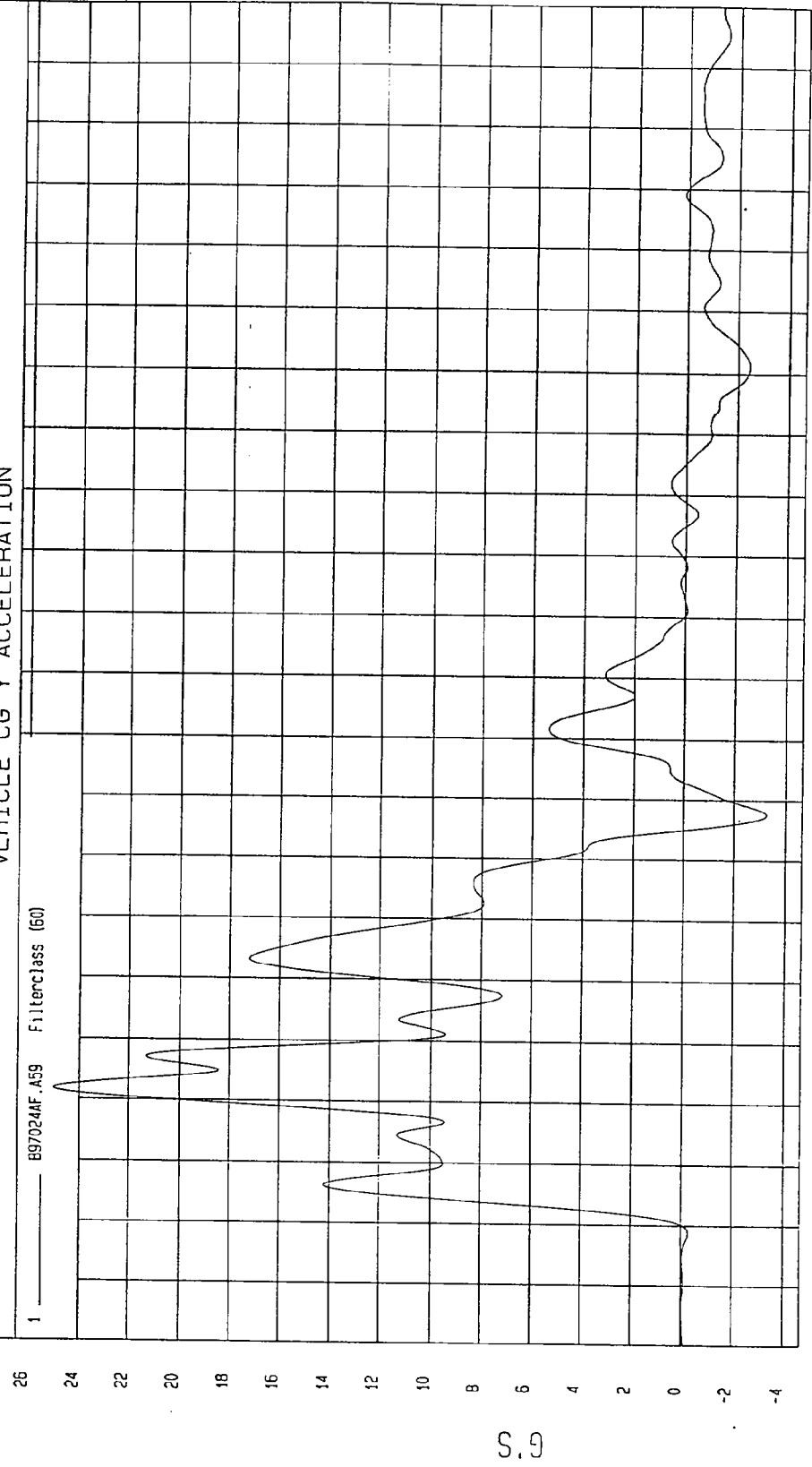
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.24 G'S at 68 msec Maximum = 25.02 G'S at 22 msec

VEHICLE CG Y ACCELERATION

1 B97024AF.A59 Filterclass (60)



TIME (SECONDS)

MSA Research
02-08-1997 14:53

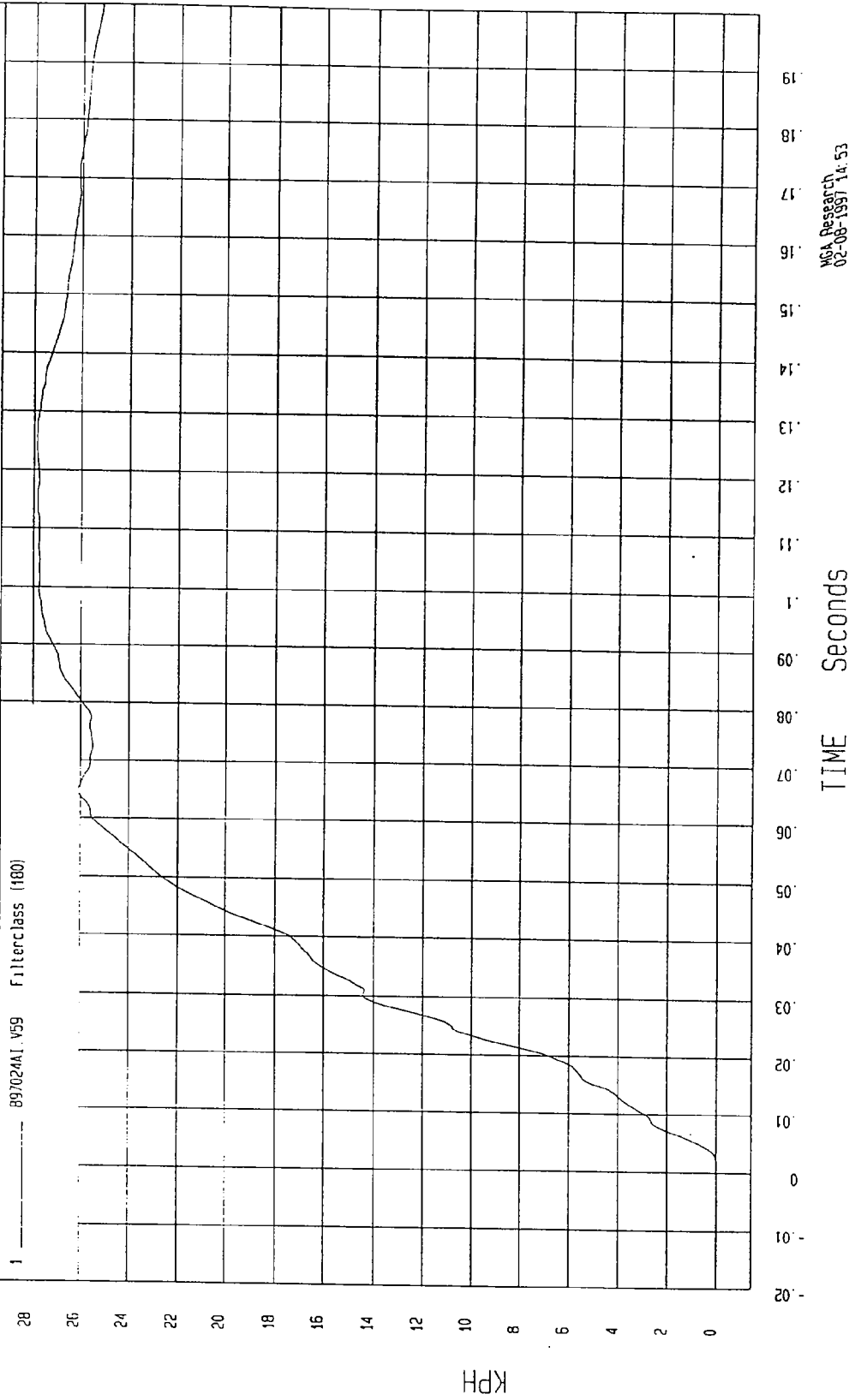
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.33E-02 KPH at -4 msec

Maximum = 27.88 KPH at 124 msec

VEHICLE CG Y VELOCITY

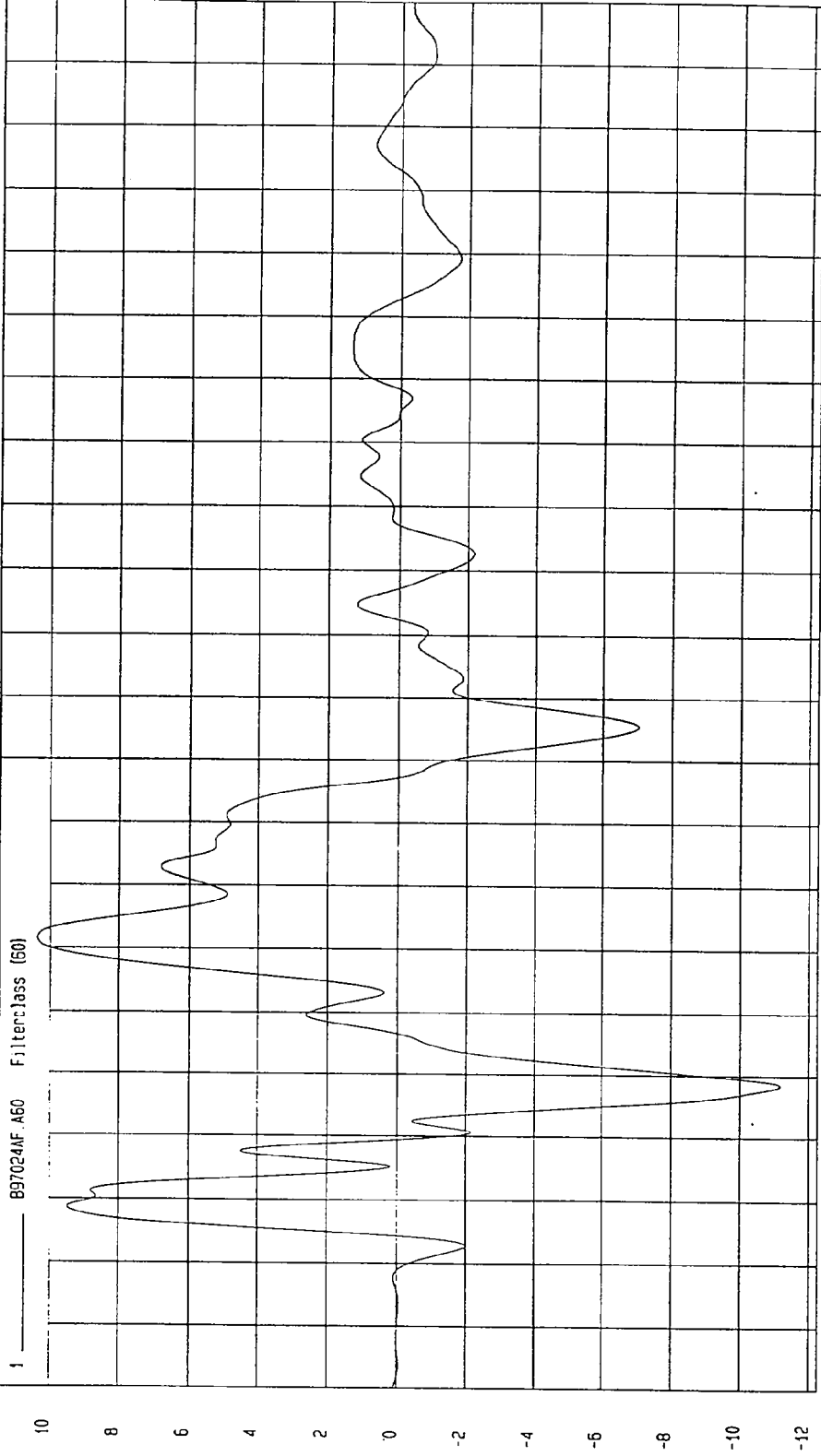


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -11.17 G'S at 28 msec Maximum = 10.34 G'S at 52 msec

VEHICLE CG Z ACCELERATION



TIME (SECONDS)

MCA Research
02-08-1997 14:53

S.G

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -.37 KPH at 5 msec
Maximum = 7.05 KPH at 76 msec

VEHICLE CG Z VELOCITY

1 897024A1.V60 Filterclass (180)



TIME Seconds
MGA Research
02-08-1997 14:53

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

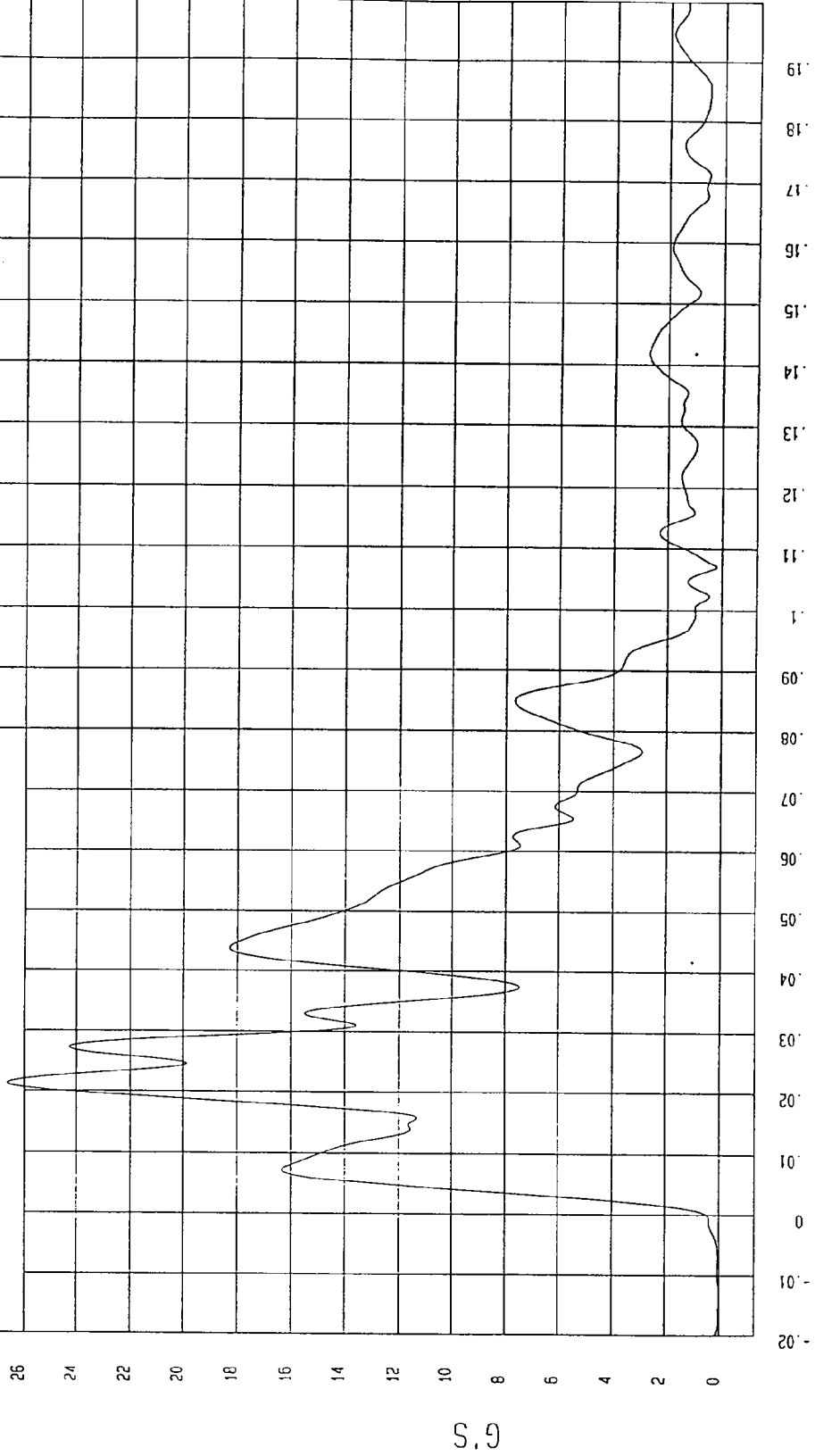
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 2.03E-02 G'S at -13 msec

Maximum = 26.63 G'S at 21 msec

VEHICLE CG RESULTANT ACCELERATION

1 097024AV.458 Filterclass (60)



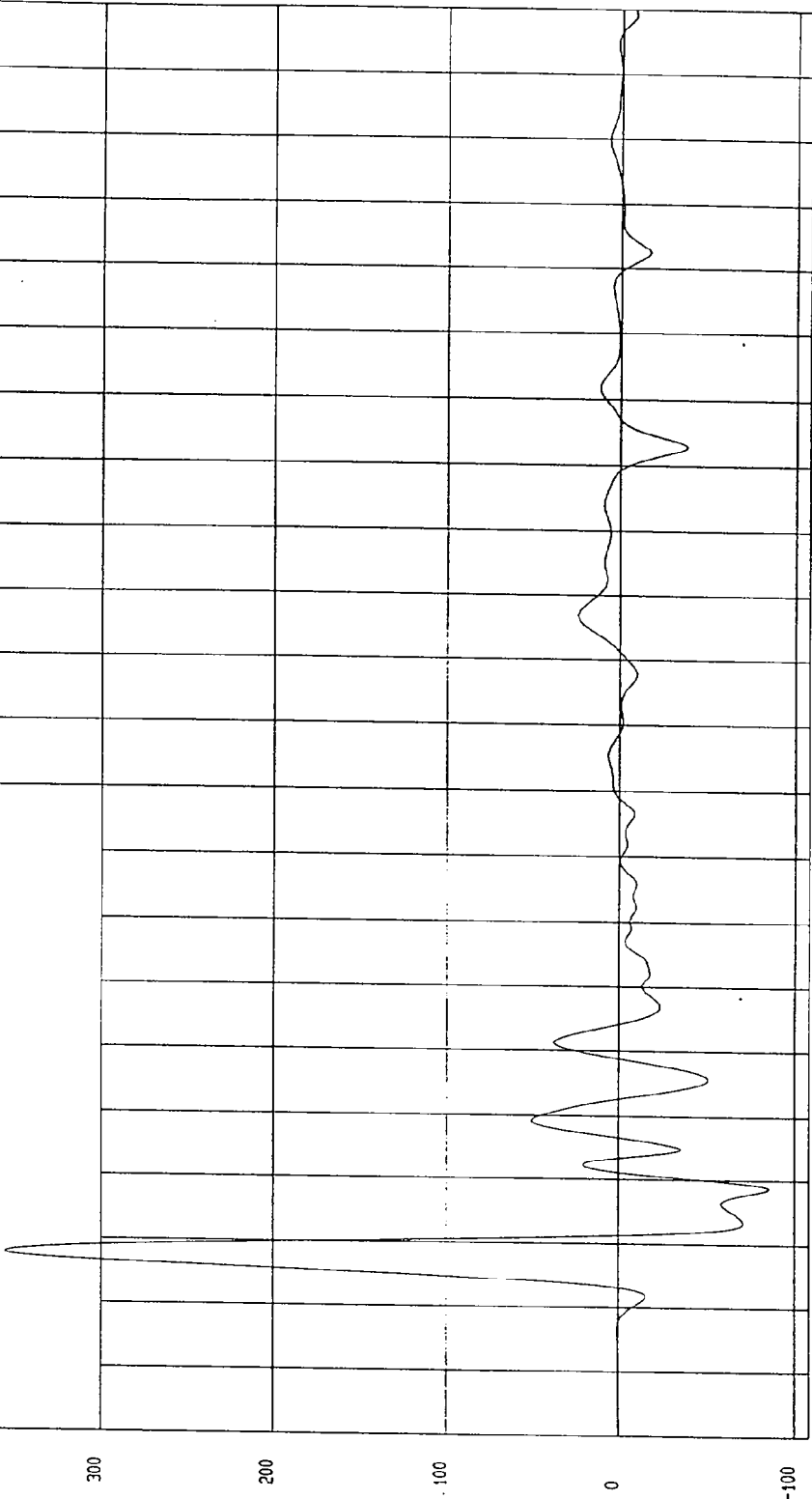
MCA Research
02-08-1997 14:55

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -85.85 G'S at 19 msec Maximum = 354.93 G'S at 8 msec

LEFT FRONT DOOR CENTERLINE Y ACCELERATION

1 897024AF.A75 Filterclass (60)



TIME (SECONDS)
NSA Research
02-08-1997 14:53

G.S

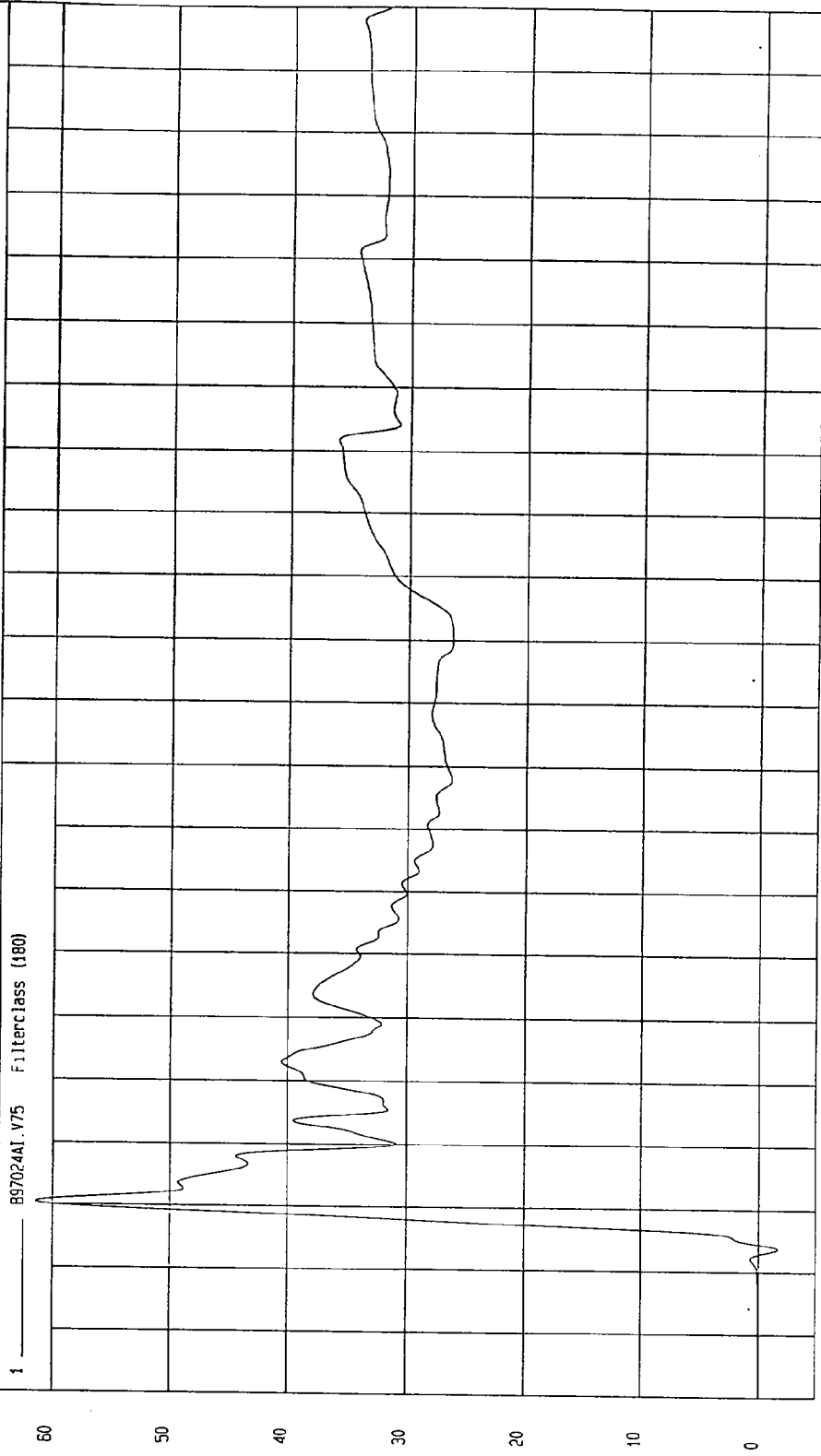
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MVO116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.61 KPH at 4 msec
Maximum = 61.40 KPH at 10 msec

LEFT FRONT DOOR CENTERLINE Y VELOCITY

1 ——— B97024I.V75 Filterclass (180)



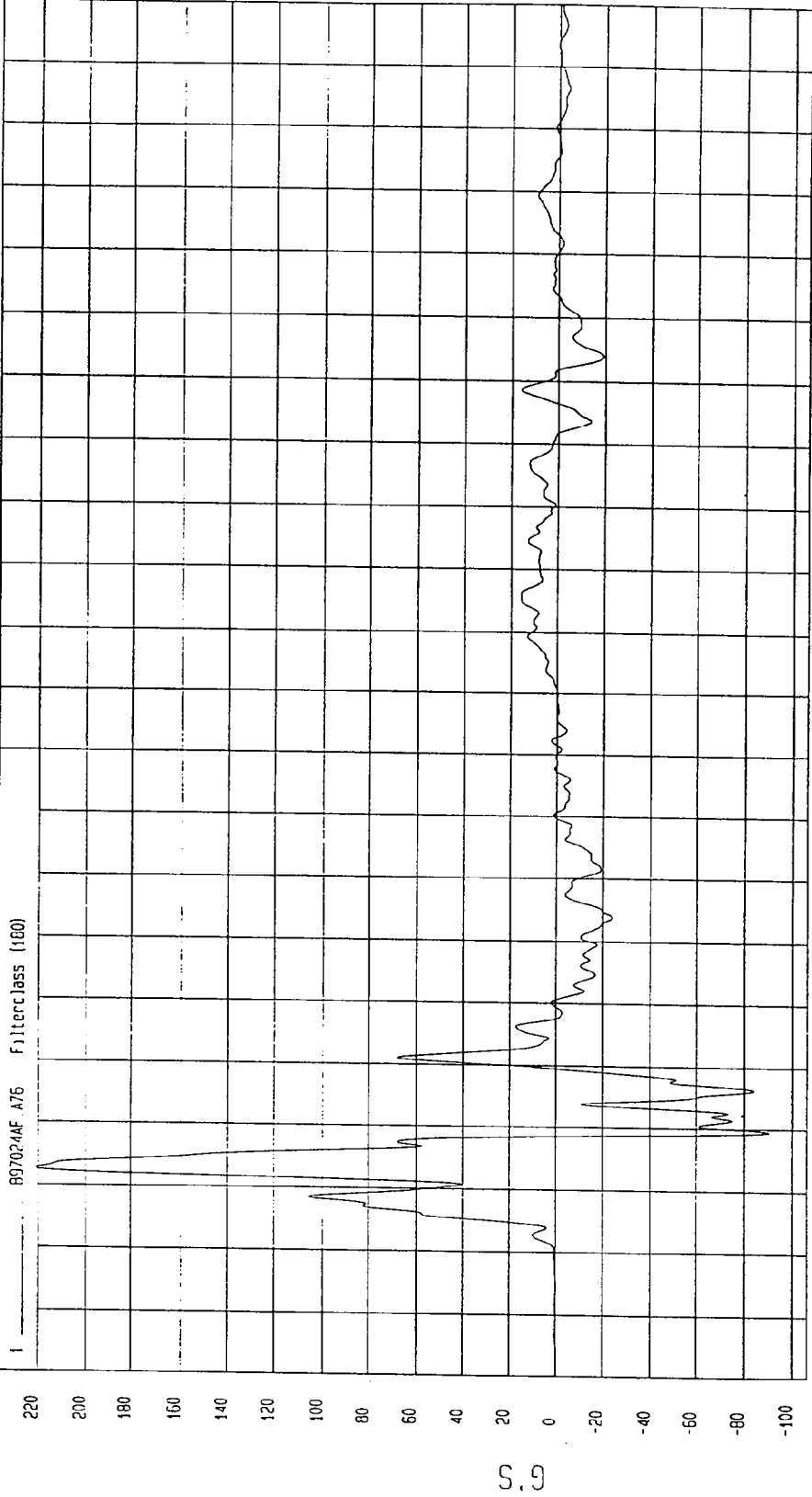
MEA Research
02-08-1997 14:53

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -90.90 G'S at 20 msec
Maximum = 220.83 G'S at 13 msec

LEFT FRONT DOOR UPPER CENTERLINE Y ACCELERATION



MGA Research
02-08-1997 14:53

TIME (SECONDS)

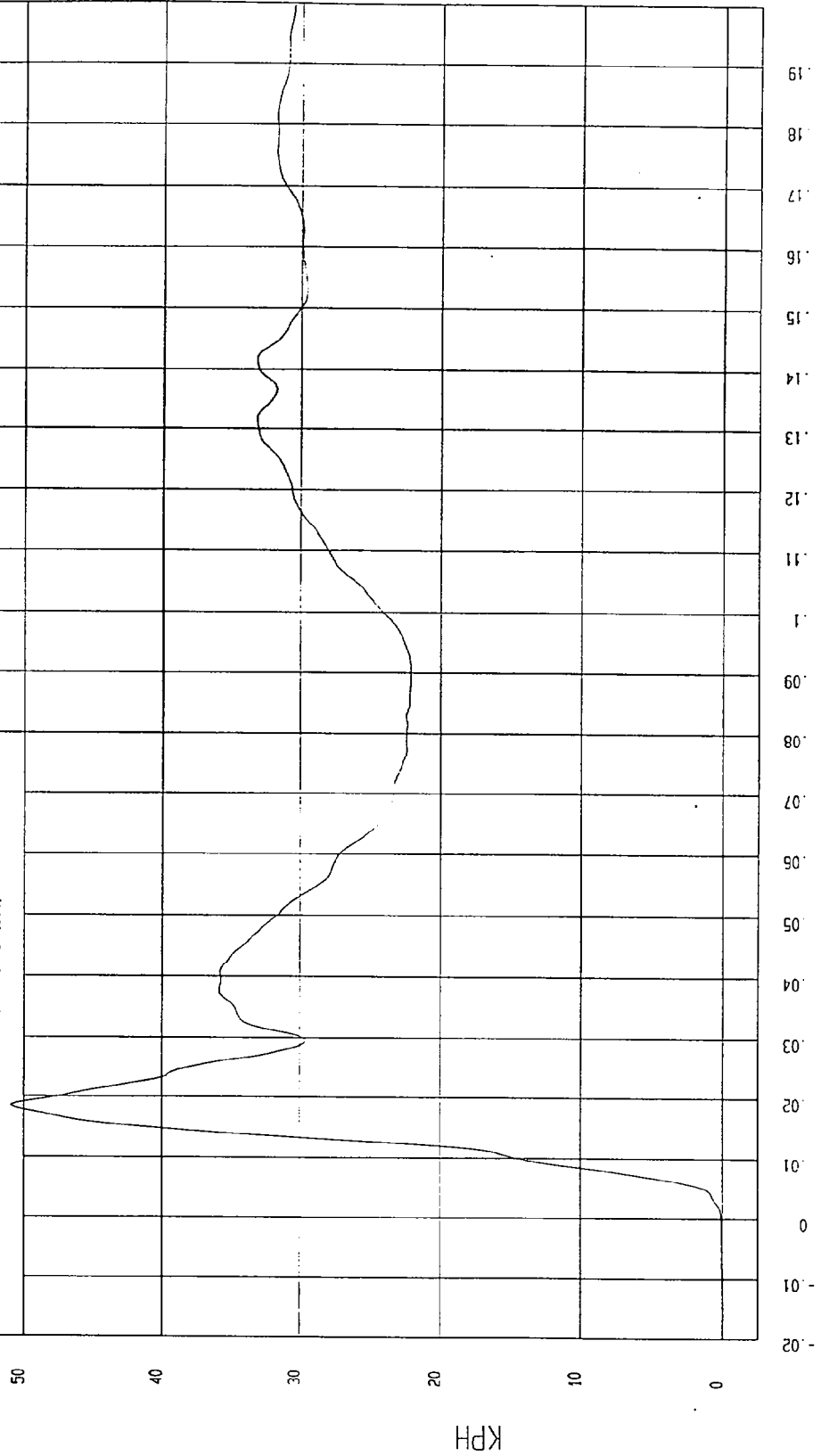
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.41E-02 KPH at -15 msec Maximum = 50.92 KPH at 18 msec

LEFT FRONT DOOR UPPER CENTERLINE Y VELOCITY

1 897024I.V76 Filterclass (180)



MGA Research
02-08-1997 14:53

TIME Seconds

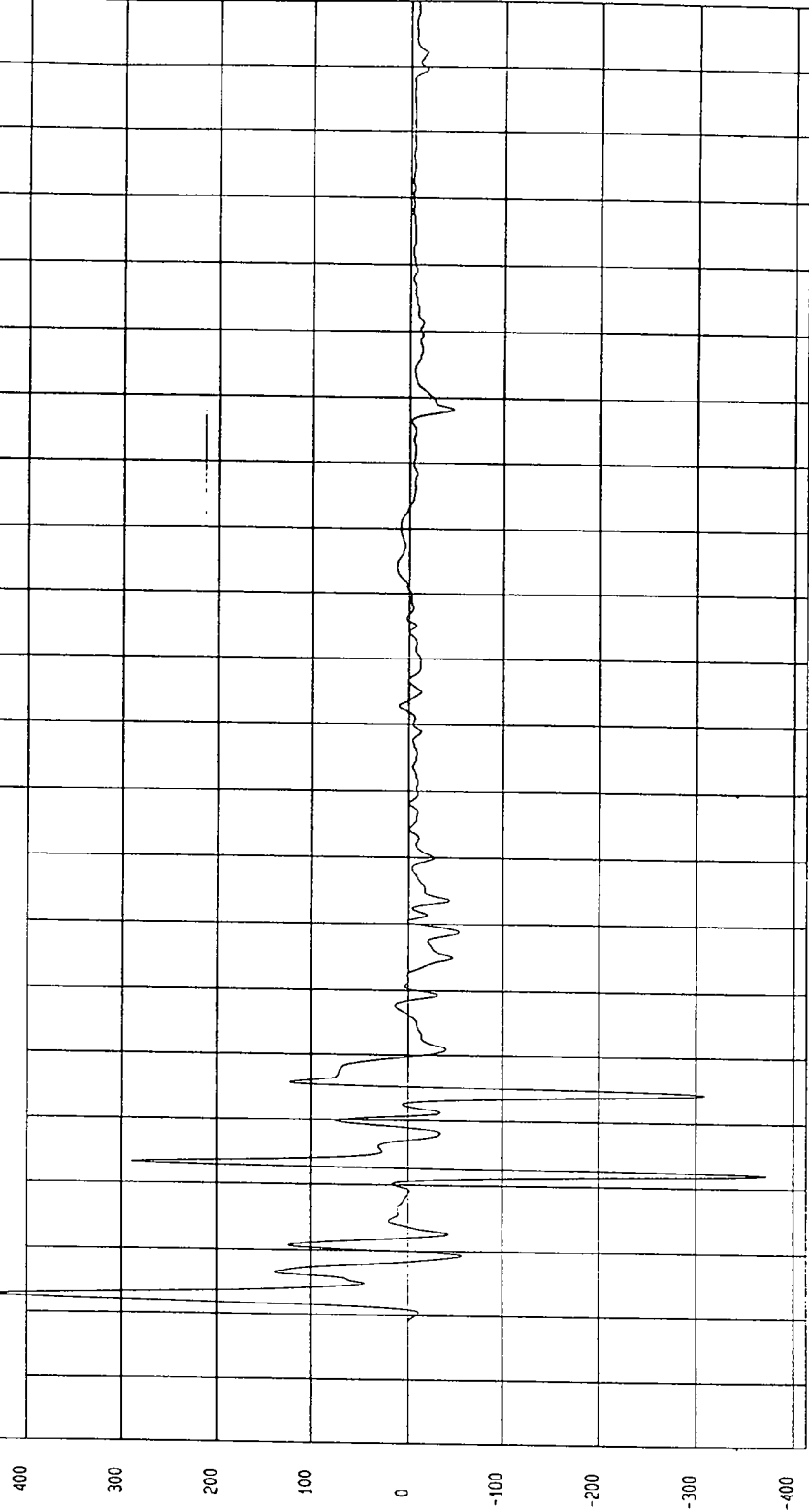
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -372.45 G'S at 22 msec
Maximum = 434.38 G'S at 3 msec

LEFT REAR DOOR MIDREAR Y ACCELERATION

1 897024AF.A77 Filterclass (180)



MGA Research
02-08-1997 14:54

TIME (SECONDS)

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

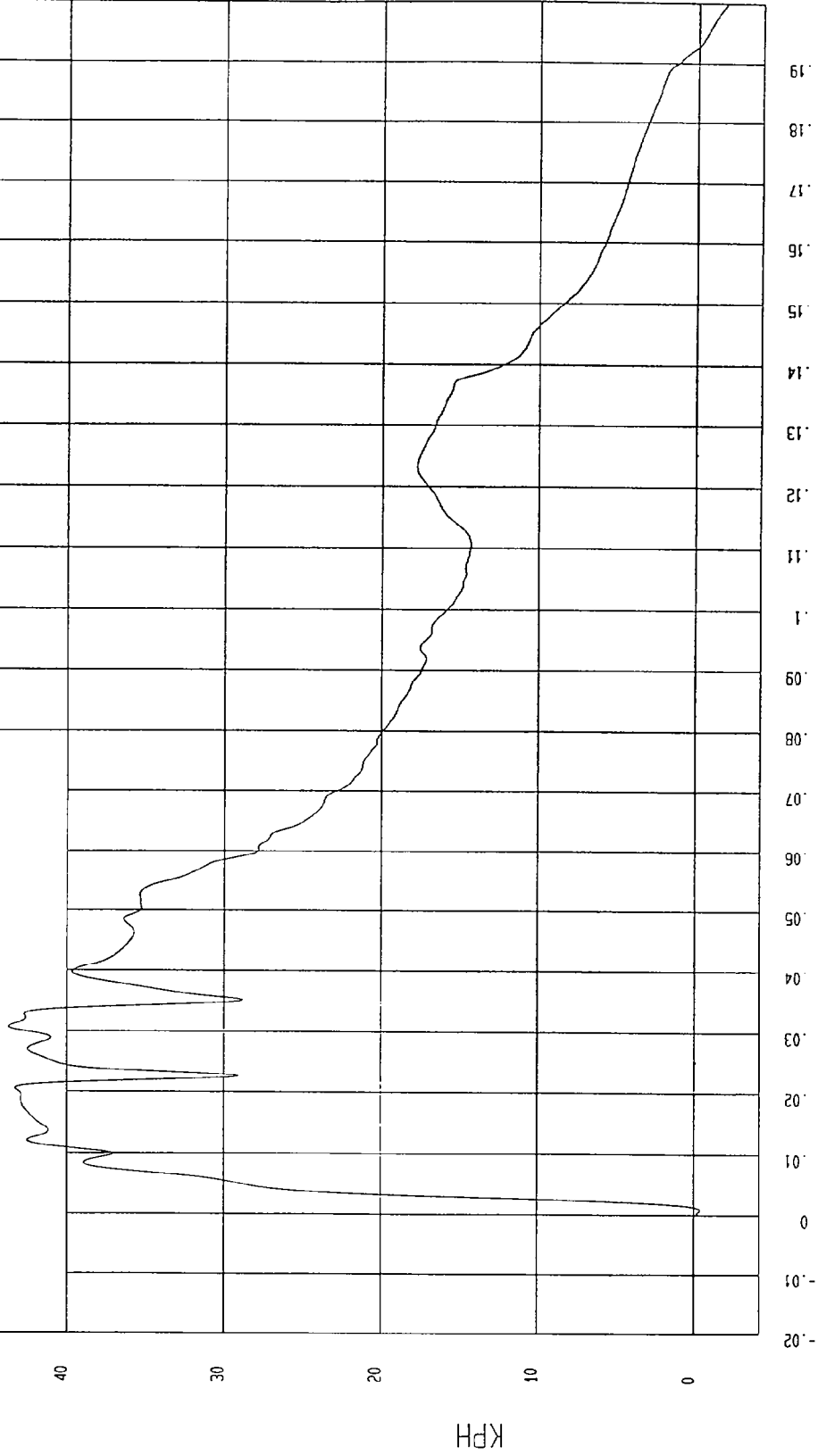
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.78 KPH at 200 msec

Maximum = 43.78 KPH at 31 msec

LEFT REAR DOOR MIDREAR Y VELOCITY

1 ——— 897024A1.V77 Filterclass (180)



MGA Research
02-08-1997 14:54

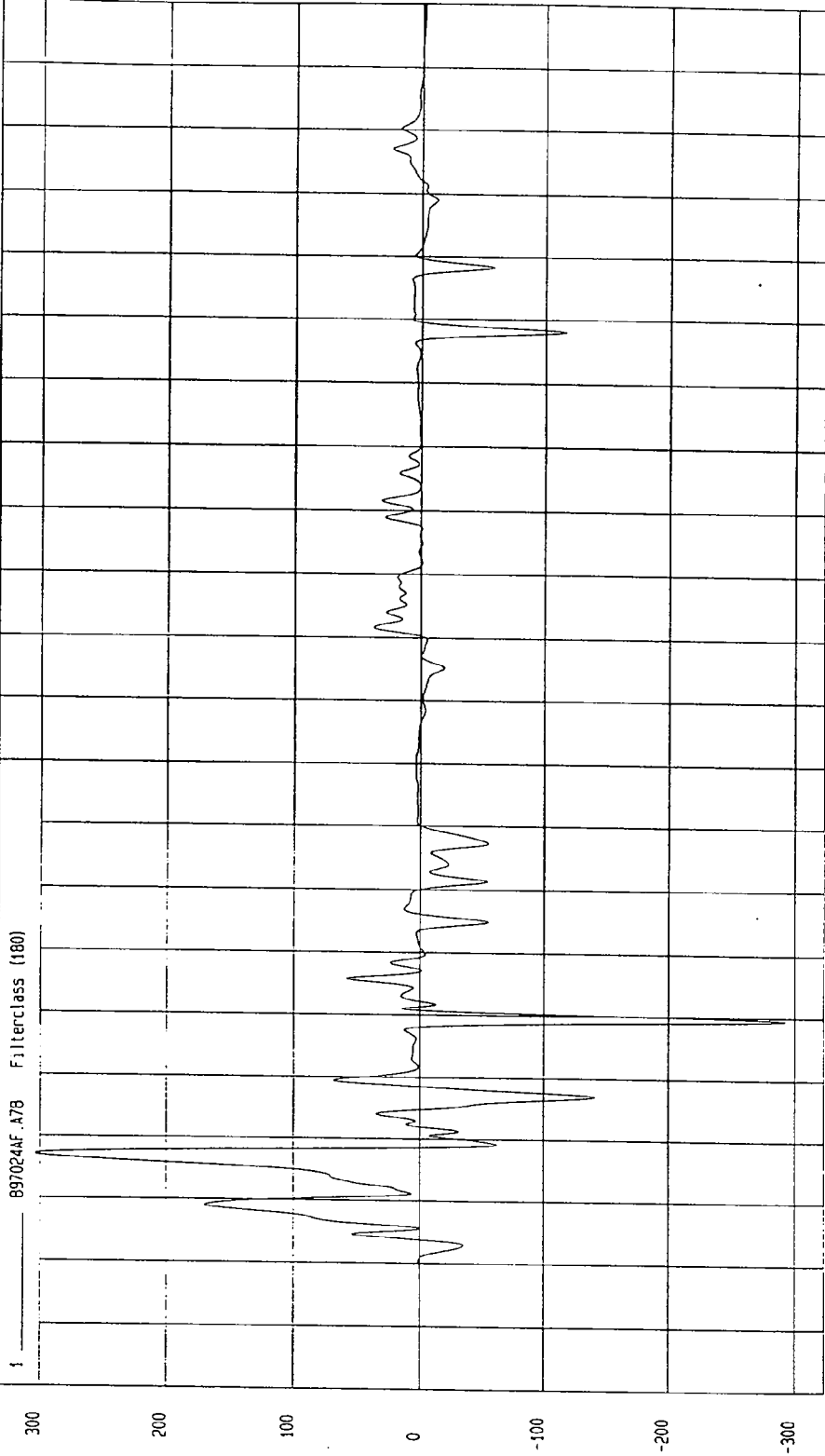
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -292.01 G'S at 40 msec Maximum = 303.48 G'S at 17 msec

LEFT REAR DOOR UPPER CENTERLINE Y ACCELERATION

897024AF.A78 Filterclass (180)



19

18

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-02

MGA Research
02-08-1997 14:54

TIME (SECONDS)

G.S

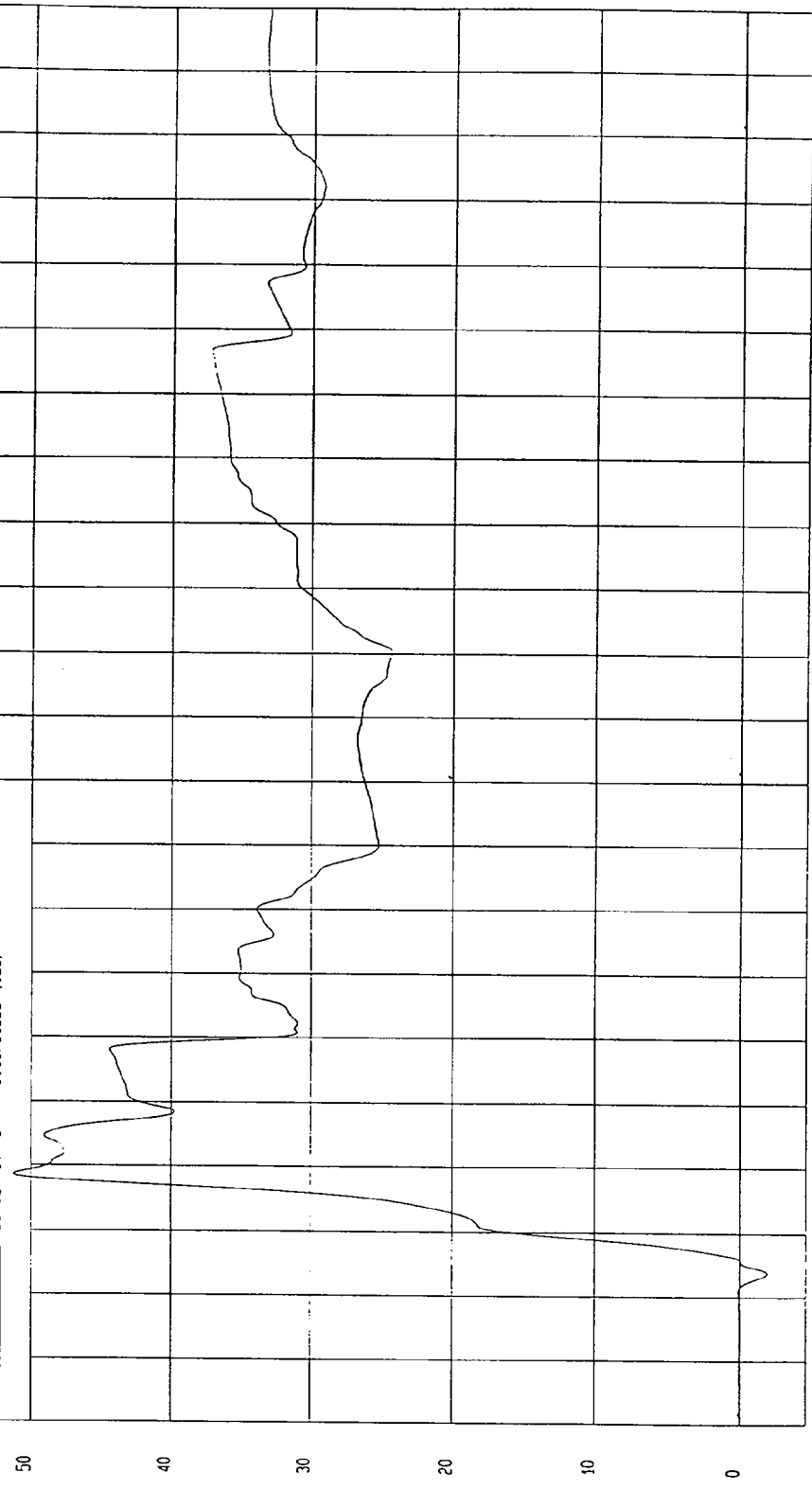
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.91 KPH at 4 msec Maximum = 51.20 KPH at 19 msec

LEFT REAR DOOR UPPER CENTERLINE Y VELOCITY

1 89702441.V78 Filterclass (180)



TIME Seconds
MGA Research
02-08-1997 14.5A

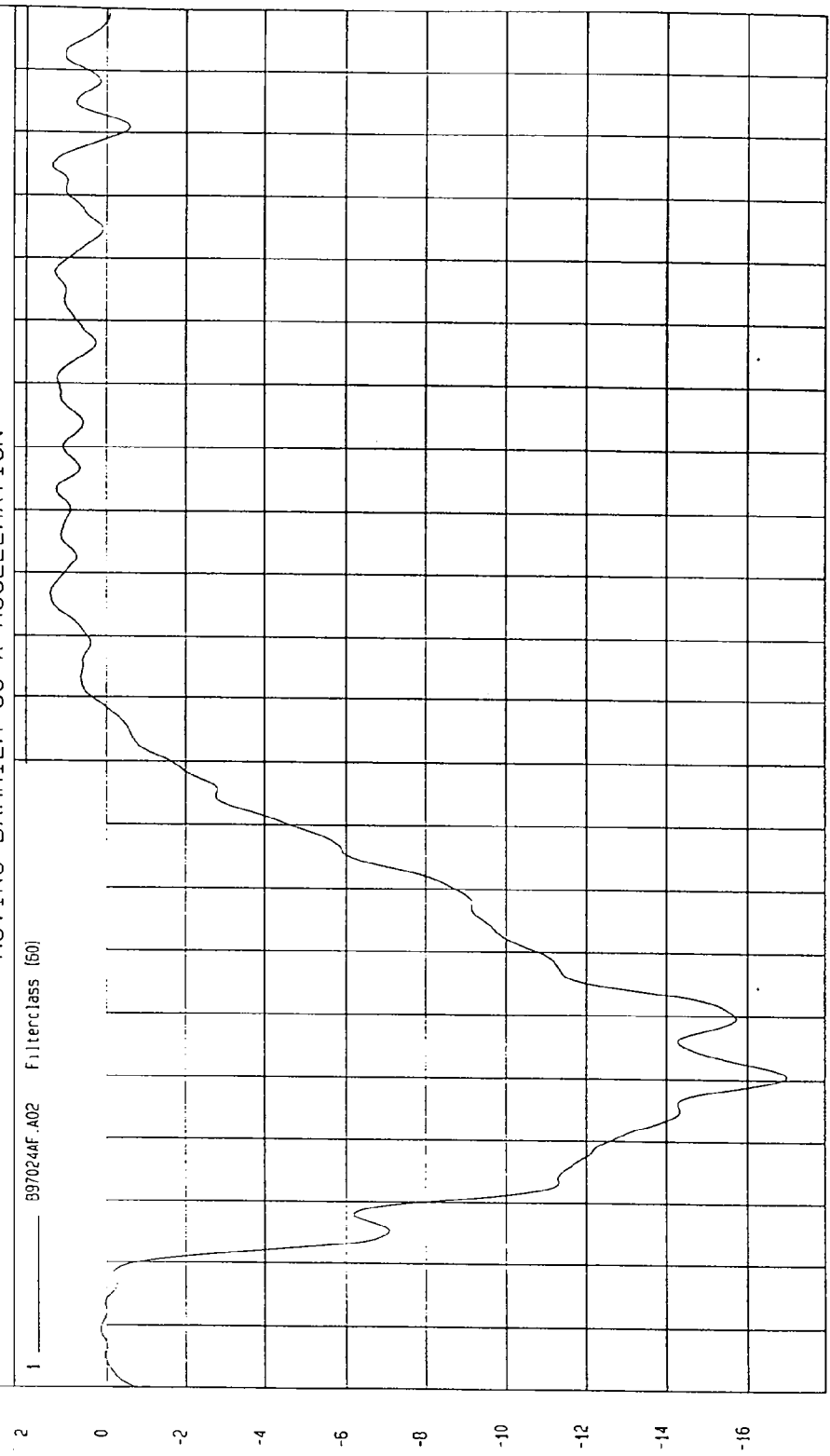
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -16.94 G'S at 30 msec
Maximum = 1.39 G'S at 107 msec

MOVING BARRIER CG X ACCELERATION

1 997024AF.A02 Filter: class (50)



MCA Research
02-14-1997 15.03

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

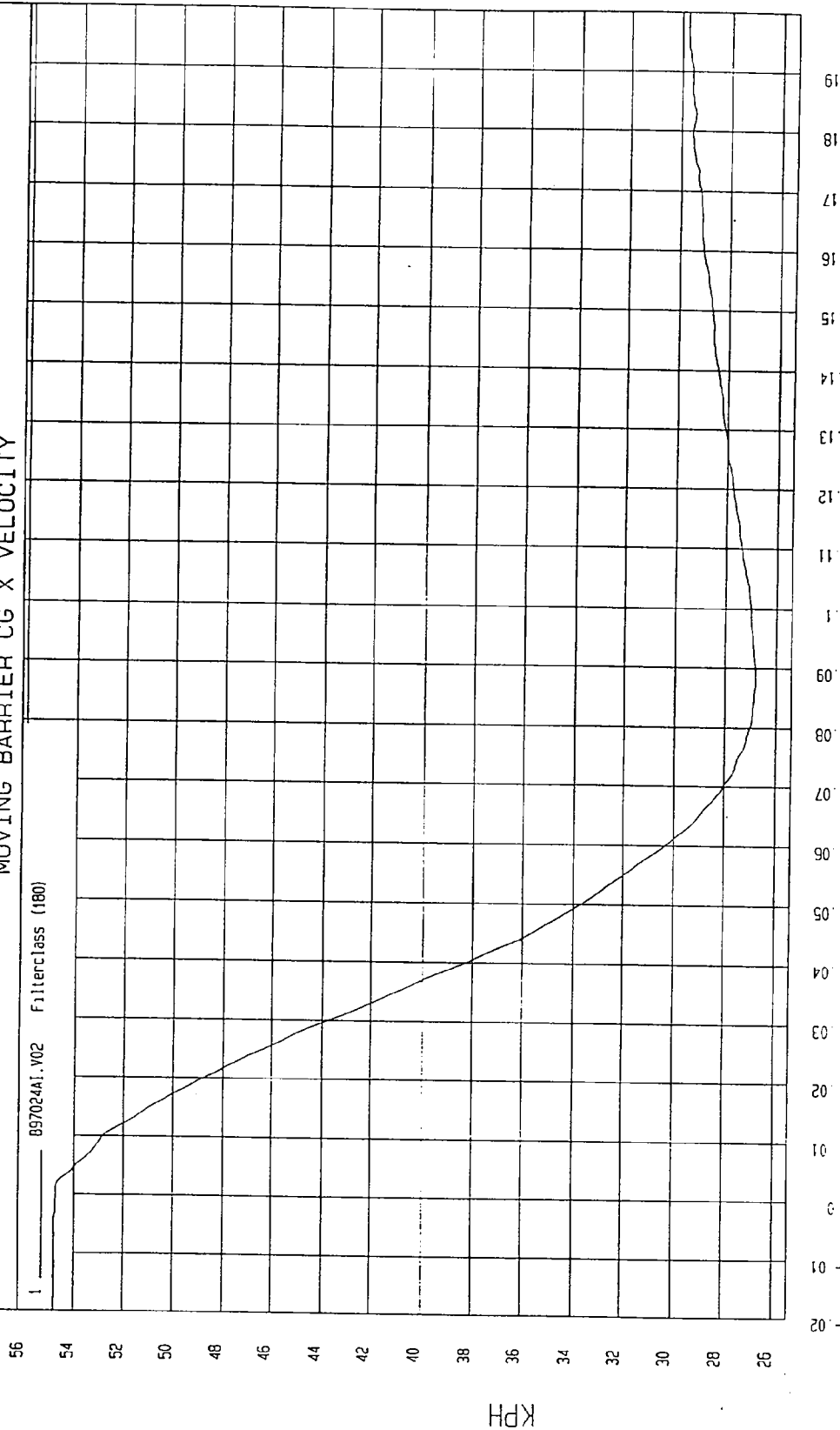
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 26.81 KPH at 89 msec

Maximum = 54.81 KPH at -5 msec

MOVING BARRIER CG X VELOCITY

097024A1.V02 Filterclass (180)



MCA Research
02-14-1997 15.05

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

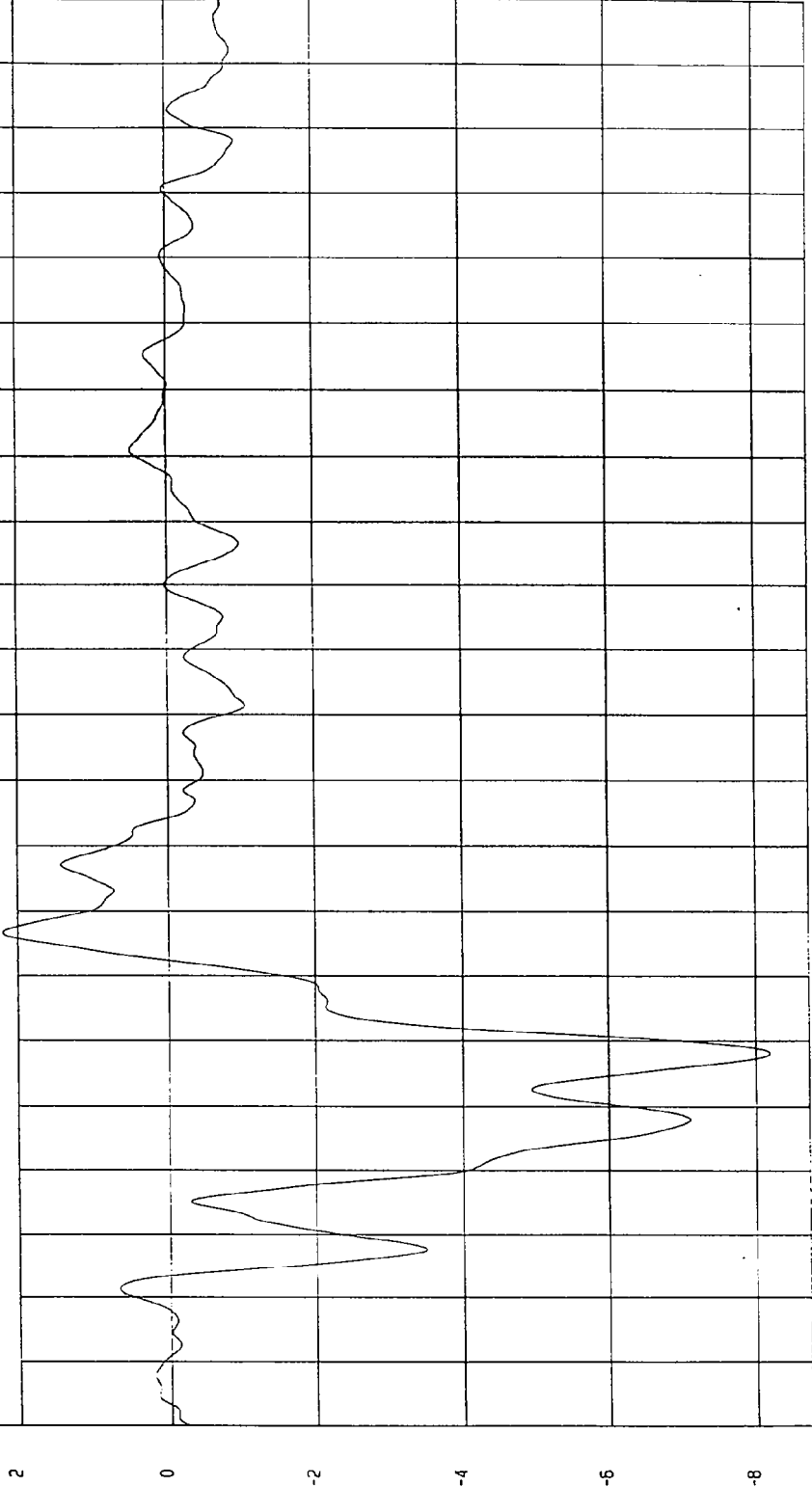
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 8.20 G'S at 38 msec

Maximum = 2.20 G'S at 57 msec

MOVING BARRIER CG Y ACCELERATION

1 097024AF.A03 Filterclass (60)



M&A Research
02-14-1997 15:03

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

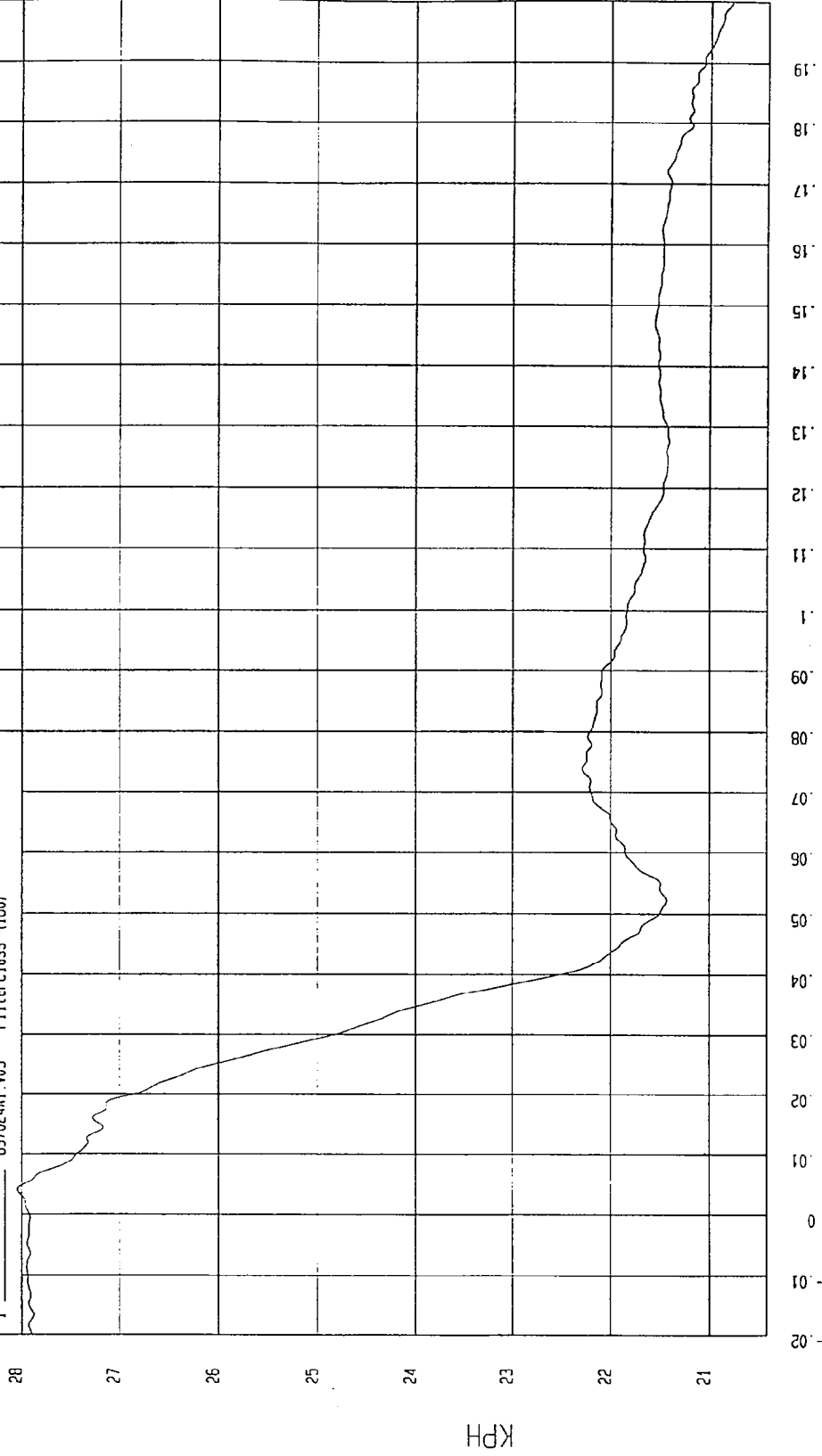
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 20.77 KPH at 200 msec

Maximum = 28.04 KPH at 4 msec

MOVING BARRIER CG Y VELOCITY

1 897024A1.V03 FilterClass (180)



MGA Research
02-14-1997 15:05

MOVING BARRIER CENTER OF GRAVITY Z ACCELERATION VS. TIME

NO VALID DATA COLLECTED

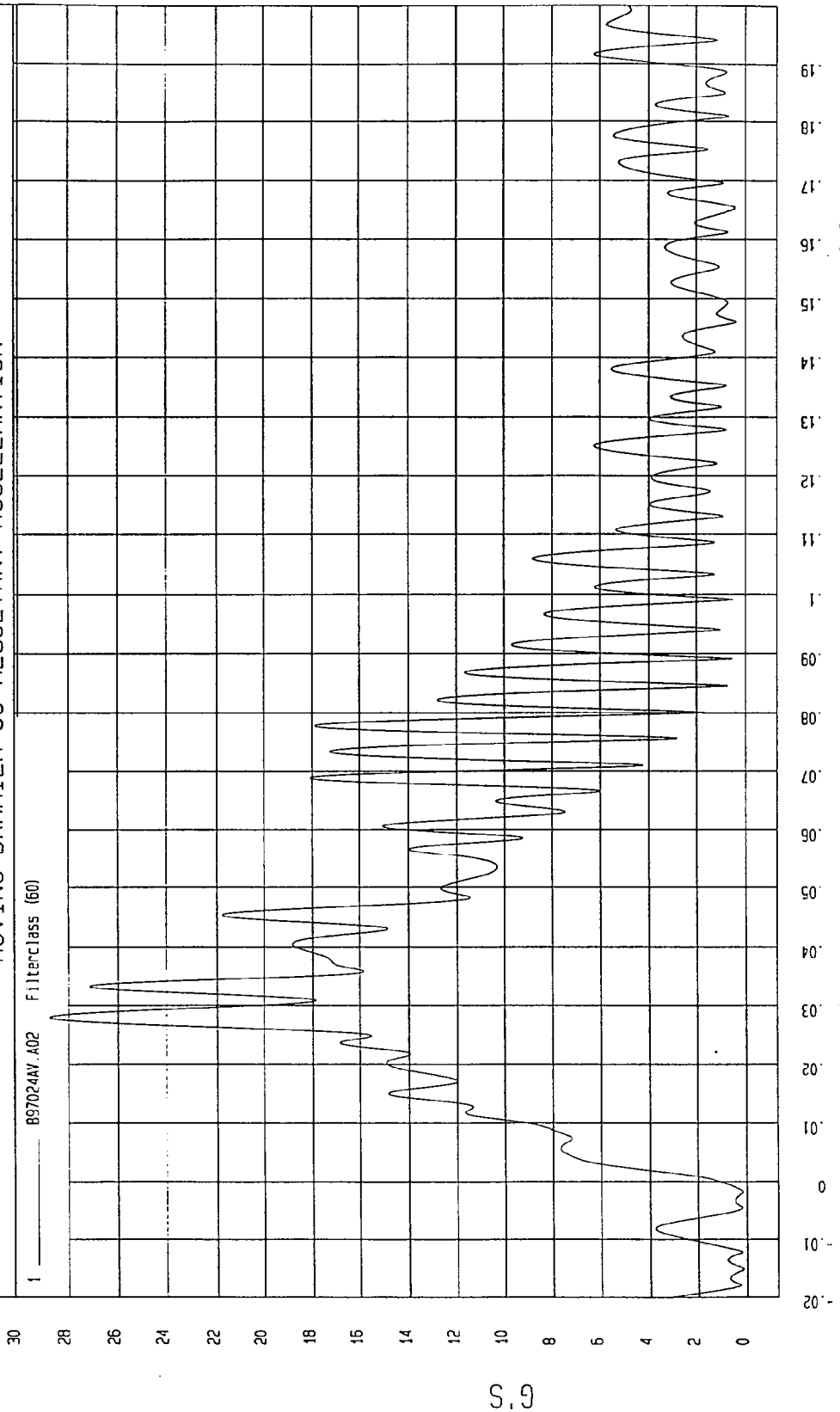


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = .16 G'S at .15 msec Maximum = 28.71 G'S at 28 msec

MOVING BARRIER CG RESULTANT ACCELERATION



MCA Research
02-08-1997 14.55

TIME (SECONDS)

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MVO116) Speed: 38.2 MPH 61.5 KPH

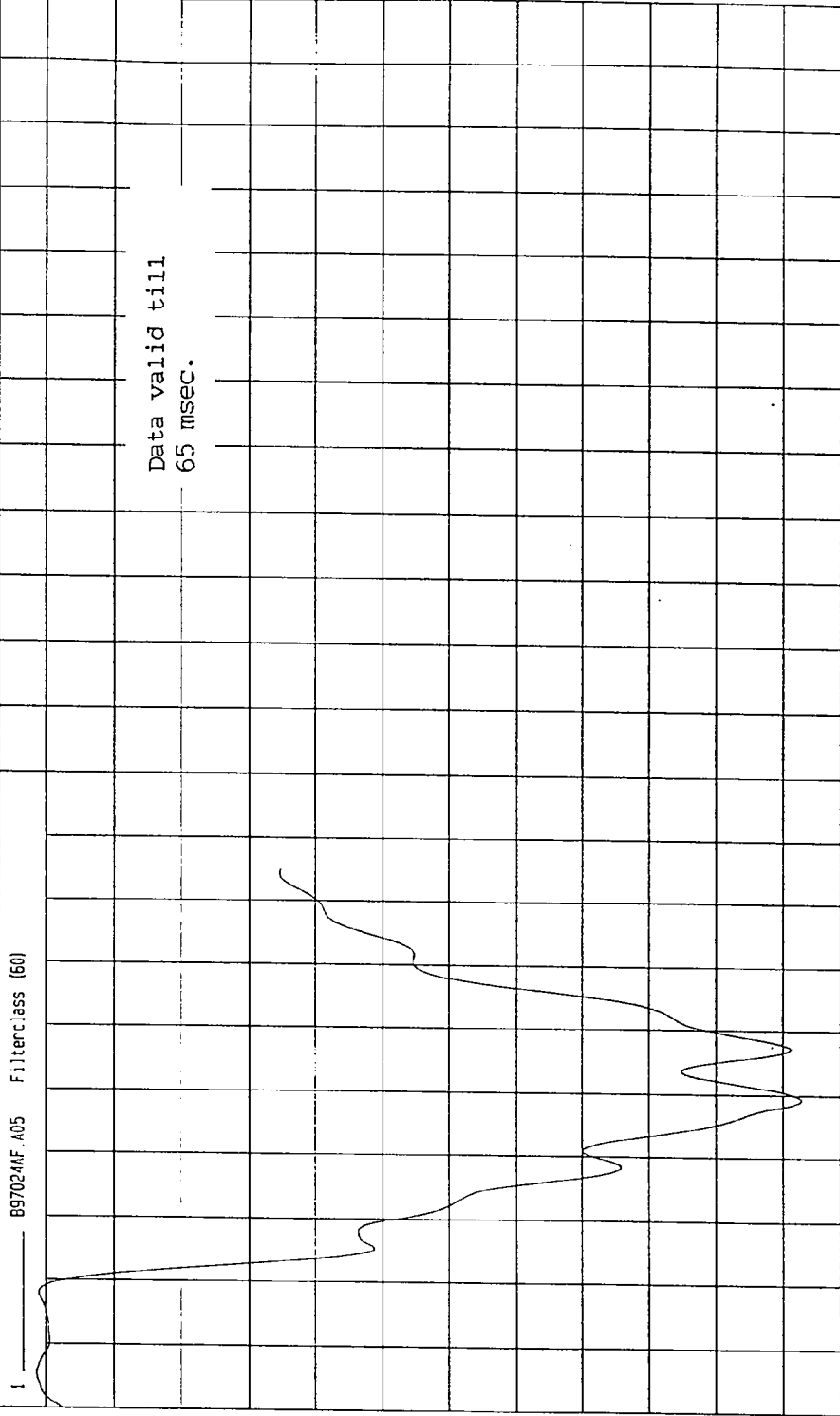
Minimum = -22.54 G'S at 29 msec

Maximum = .26 G'S at -15 msec

MOVING BARRIER REAR AXLE X ACCELERATION

1 B97024AF.A05 Filterc.ass (60)

Data valid till
65 msec.



MGA Research
02-14-1997 15:09

TIME (SECONDS)

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 22.93 KPH at 65 msec Maximum = 54.85 KPH at -11 msec

MOVING BARRIER REAR AXLE X VELOCITY

1 B97024A1.V05 Filterclass (180)

KPH

Time (Seconds)	Velocity (KPH)
0.00	54.85
0.01	54.0
0.02	52.0
0.03	50.0
0.04	48.0
0.05	46.0
0.06	44.0
0.07	42.0
0.08	40.0
0.09	38.0
0.10	36.0
0.11	34.0
0.12	32.0
0.13	30.0
0.14	28.0
0.15	26.0
0.16	24.0
0.17	23.0
0.18	22.93

TIME Seconds

NEA Research
02-14-1997 15.09

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

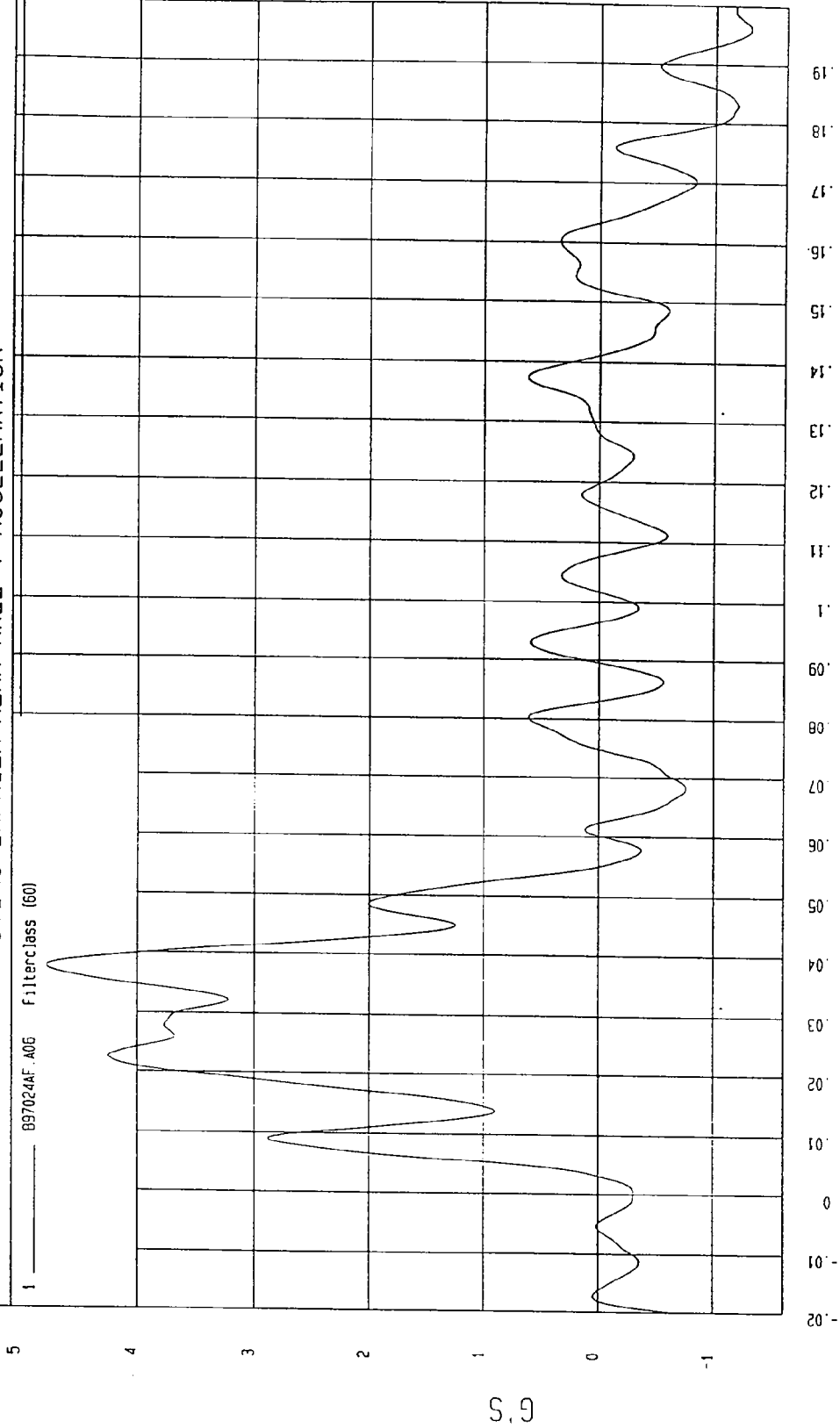
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.30 G'S at 196 msec

Maximum = 4.76 G'S at 38 msec

MOVING BARRIER REAR AXLE Y ACCELERATION

1 897024AF.A06 Filterclass (60)



MGA Research
02-14-1997 15.04

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

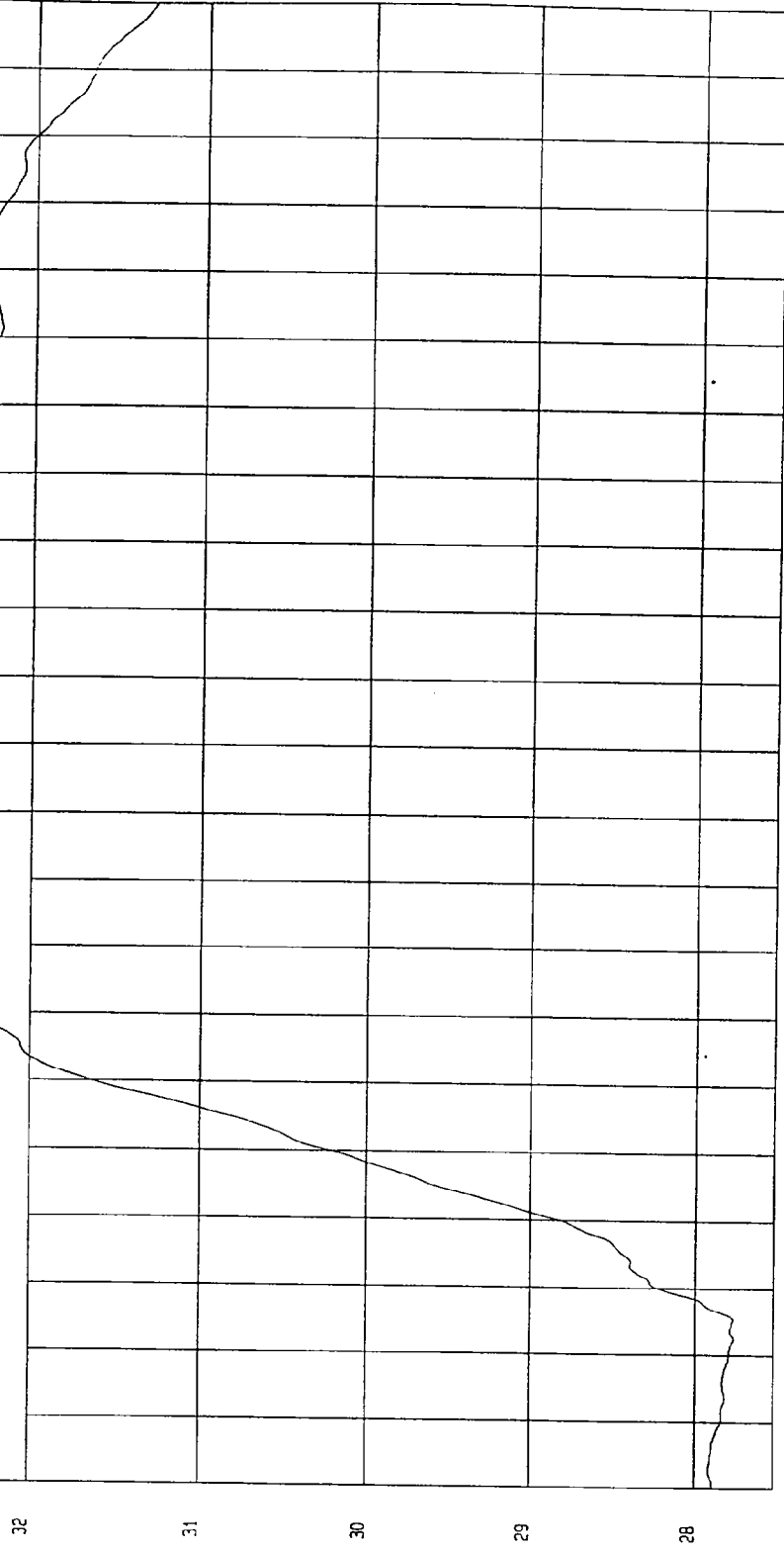
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 27.77 KPH at 2 msec

Maximum = 32.52 KPH at 54 msec

MOVING BARRIER REAR AXLE Y VELOCITY

1 B97024A1.V06 Filterclass (160)



TIME Seconds
MGA Research
02-14-1997 15:05

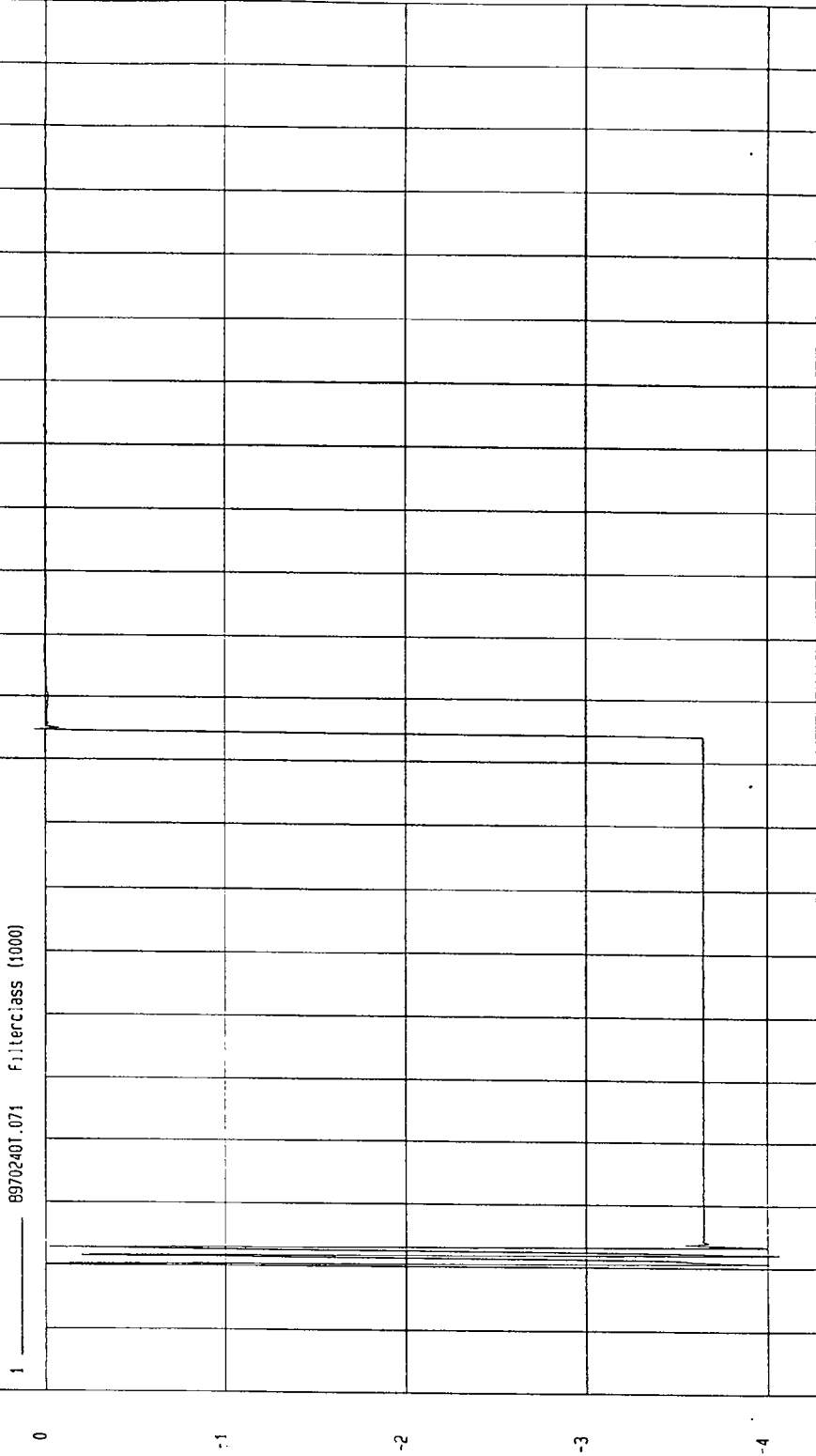
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -4.06 VOLTS at 2 msec Maximum = 5.90E-02 VOLTS at 85 msec

LEFT BARRIER CONTACT

1 8970240T.071 Filterclass (1000)



MSA Research
02-14-1997 15:04

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

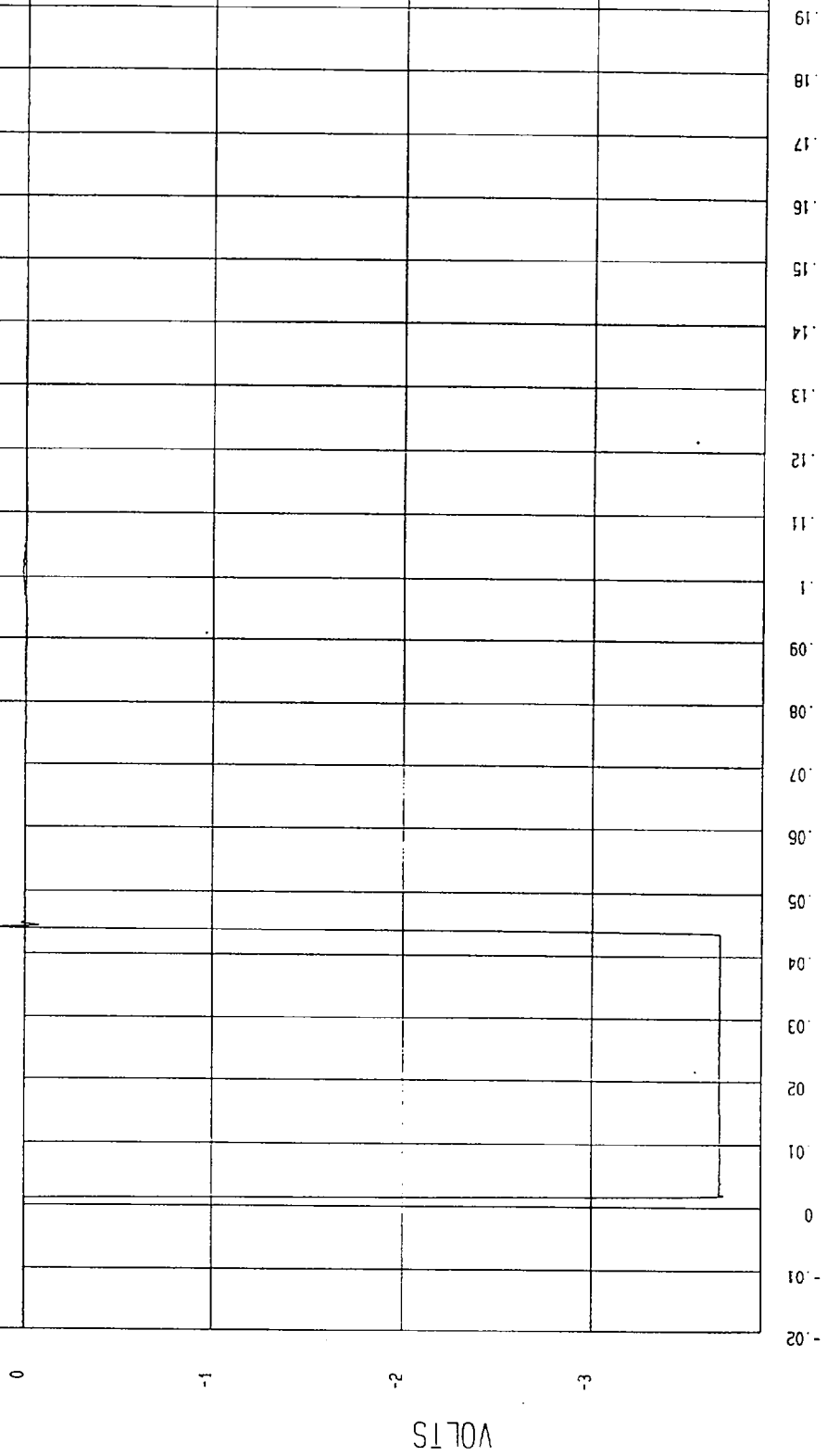
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -3.67 VOLTS at 2 msec

Maximum = .21 VOLTS at 44 msec

RIGHT BARRIER CONTACT

1 8970240T.072 Filterclass (1000)



MGA Research
02-14-1997 15.04

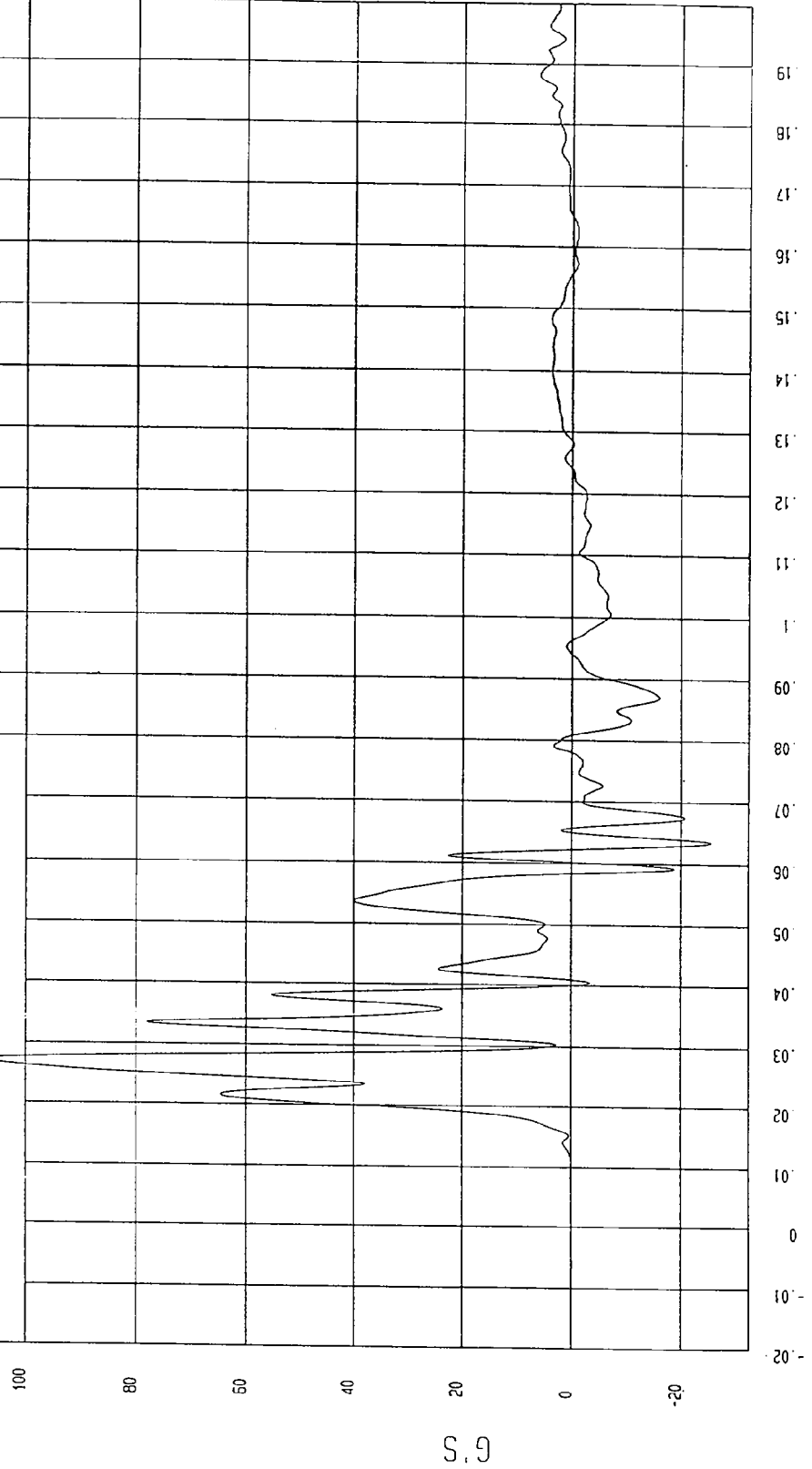
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -25.59 G'S at 64 msec Maximum = 106.87 G'S at 27 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION

1 897024AF.A61 Filterclass (180)



NGA Research
02-08-1997 14.56

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

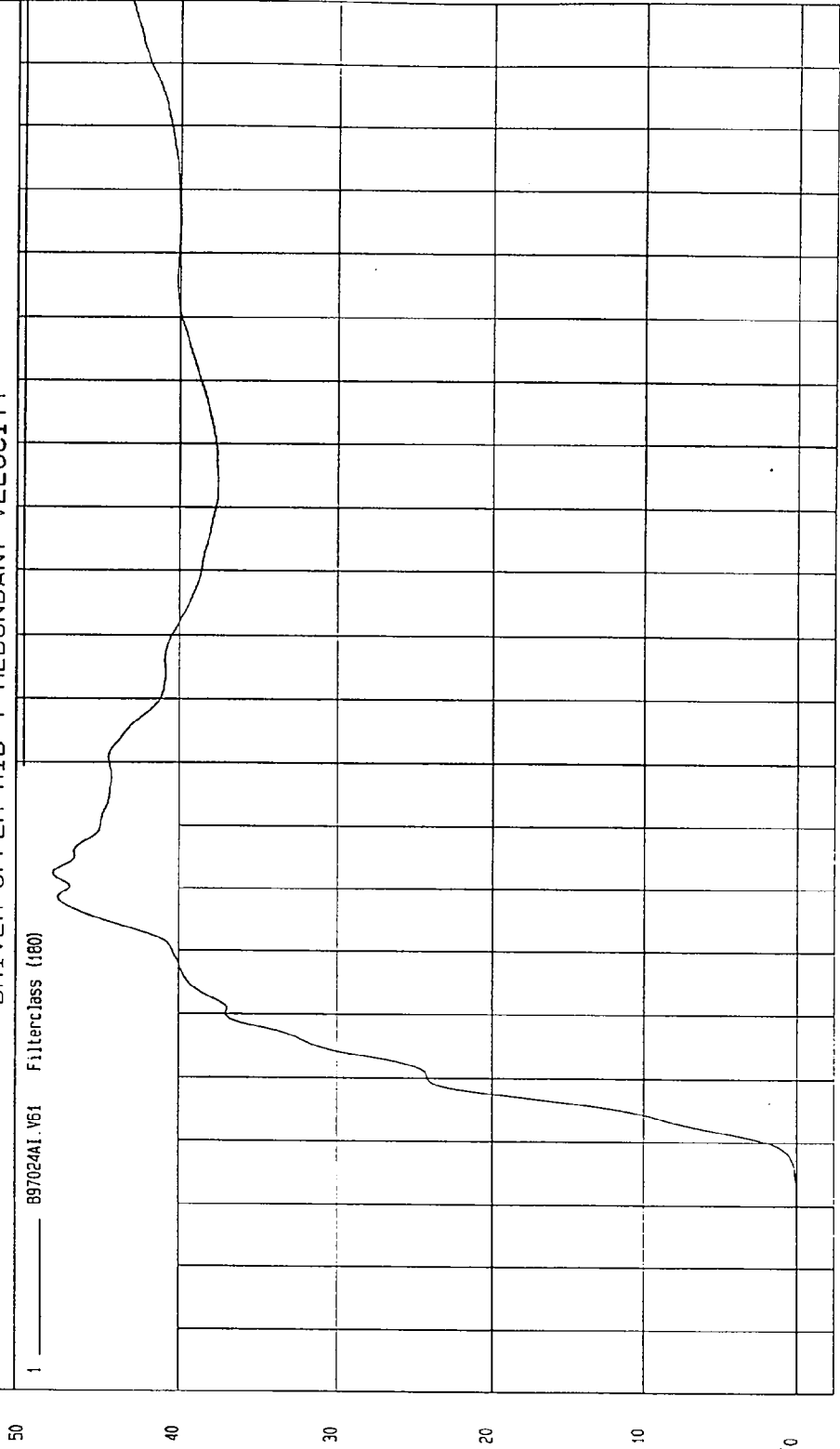
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -8.6(E-04 KPH at -16 msec

Maximum = 48.08 KPH at 62 msec

DRIVER UPPER RIB Y REDUNDANT VELOCITY

1 ——— 897024AI.V61 Filterclass (180)



NSA Research
02-08-1997 14:48

TIME Seconds

KPH

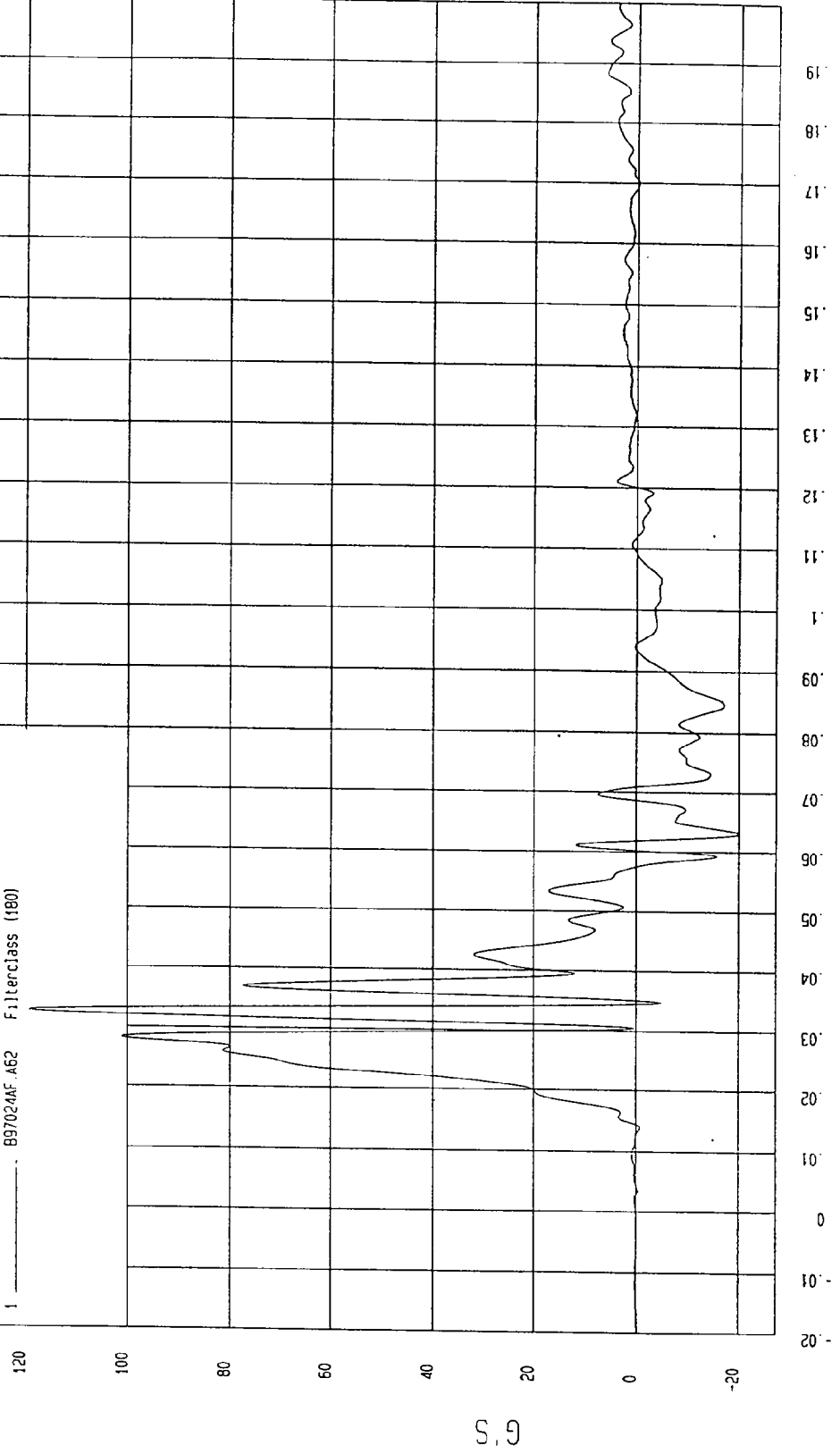
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -20.19 G'S at 63 msec Maximum = 119.36 G'S at 33 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION

1 B9702AF.A62 Filterclass (f80)



MSA Research
02-09-1997 14:56

TIME (SECONDS)

G'S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

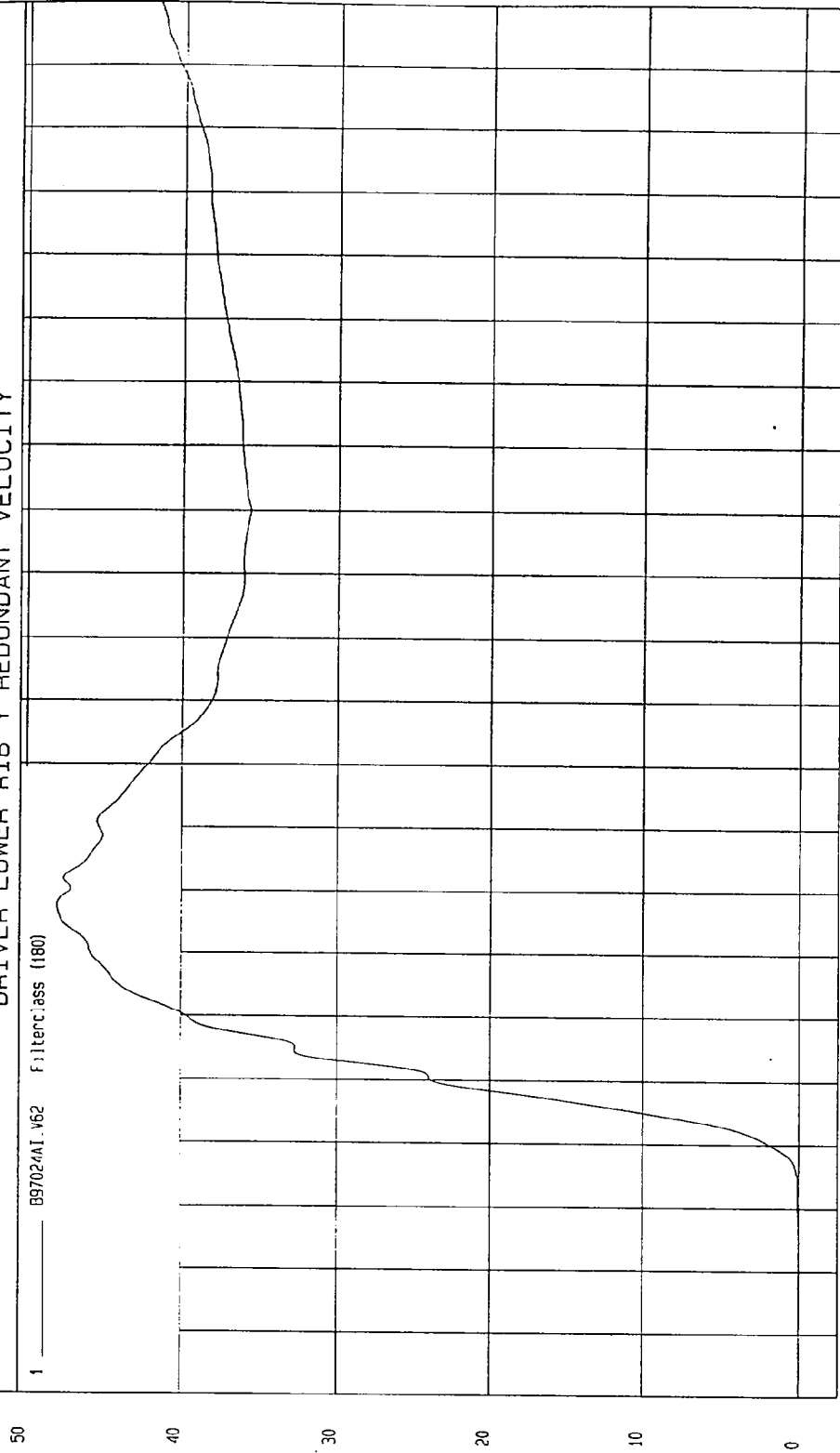
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -2.14E-02 KPH at -16 msec

Maximum = 48.04 KPH at 57 msec

1 ——— BS7024AI.V62 Filter: class (180)

DRIVER LOWER RIB Y REDUNDANT VELOCITY



MGA Research
02-08-1997 1A, 4B

TIME Seconds

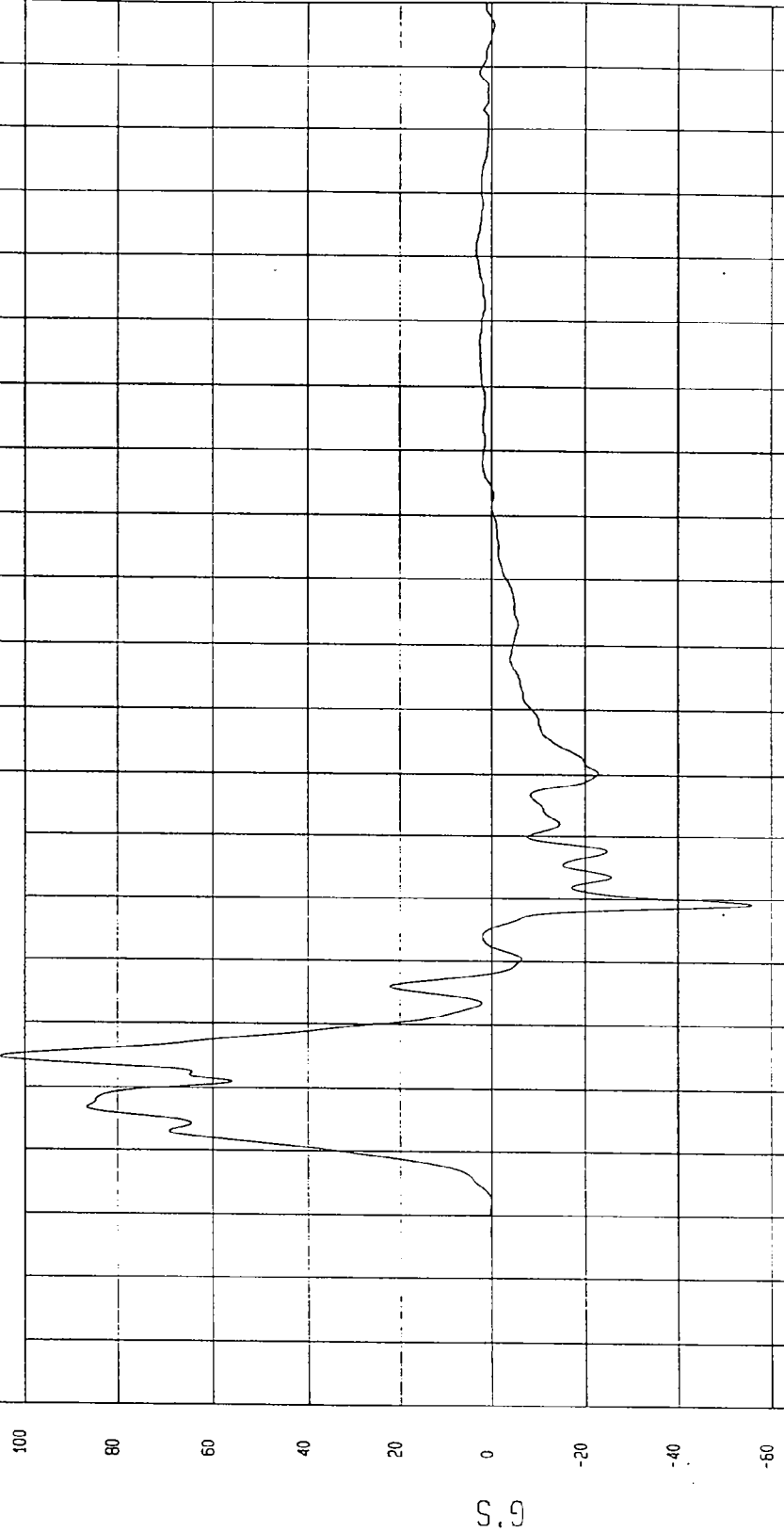
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -55.90 G'S at 59 msec Maximum = 105.23 G'S at 35 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION

1 897024AF.A63 Filterclass (180)



USA Research
02-08-1997 14:56

TIME (SECONDS)

TEST DATE: 02-10-1997

TEST: NCAP HIGH SPEED LATERAL IMPACT

Speed: 38.2 MPH 61.5 KPH

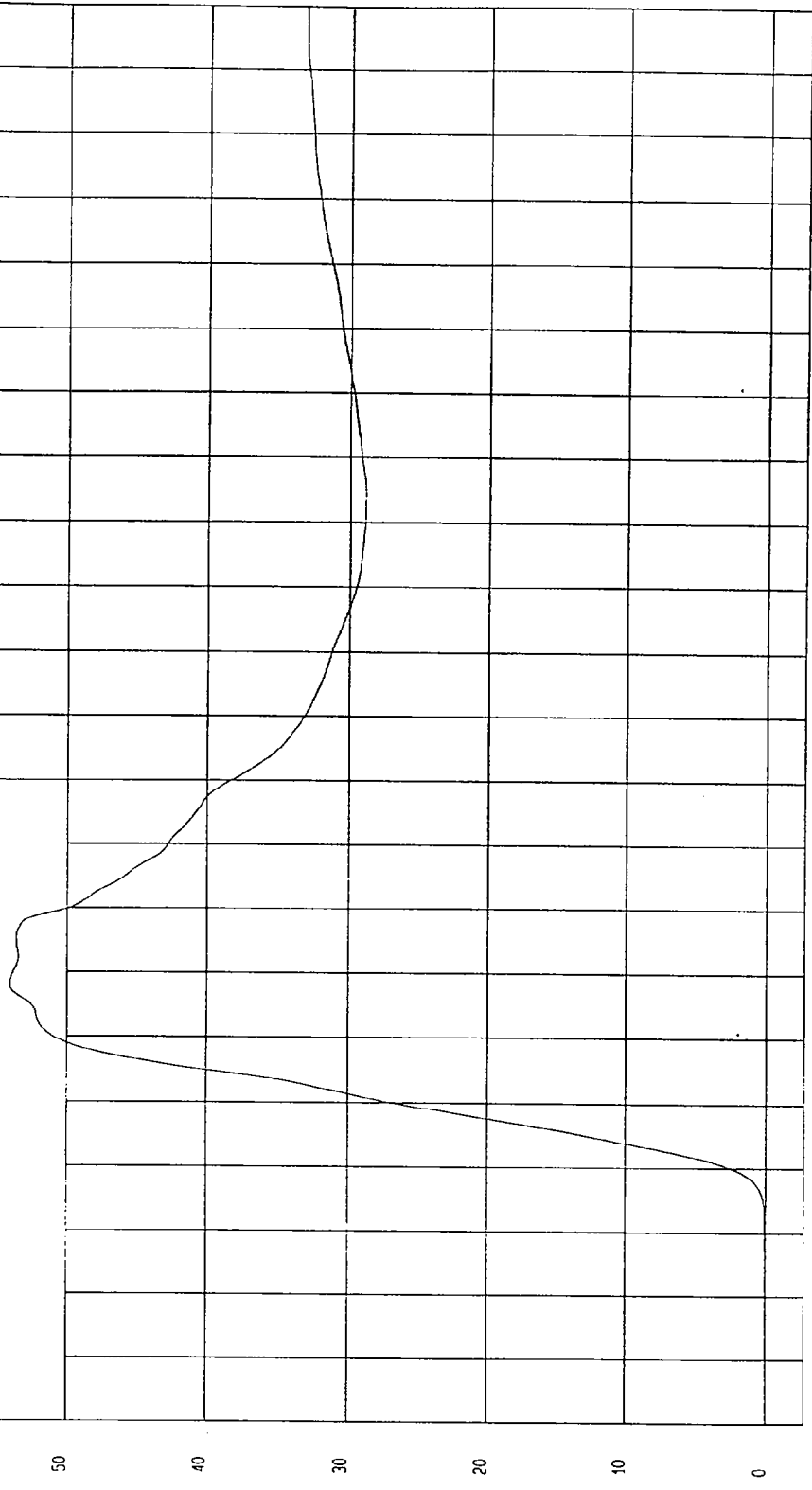
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116)

Maximum = 54.22 KPH at 48 msec

Minimum = -3.75E-04 KPH at -19 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY

1 — 897024A1.V53 Filterclass (160)



TIME Seconds

MCA Research
02-08-1997 14: 46

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -21.34 G'S at 52 msec
Maximum = 123.57 G'S at 25 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION

1 — 897024F.A65 Filterclass (180)



MCA Research
02-08-1997 14: 56

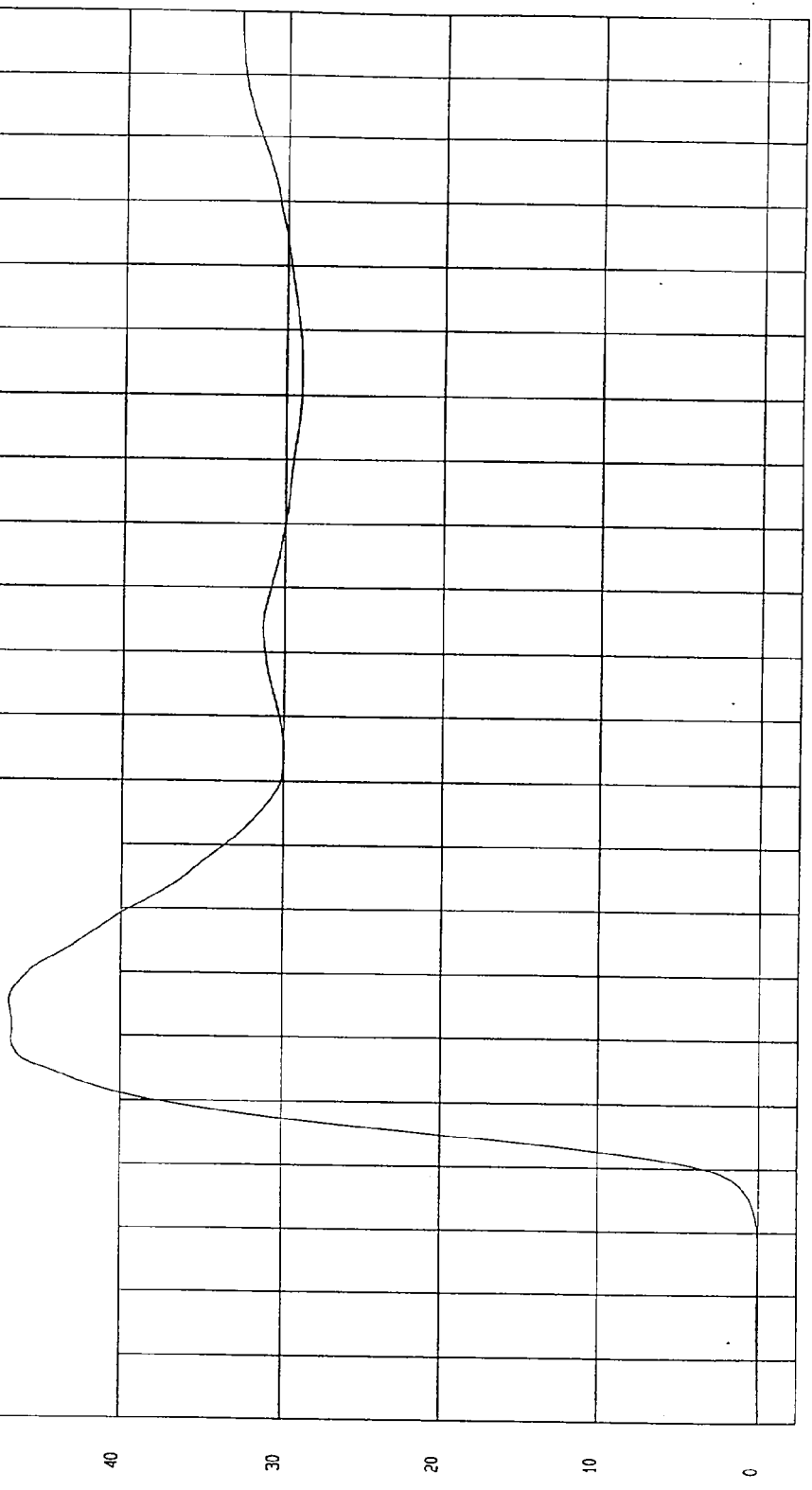
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 46.94 KPH at 45 msec

DRIVER PELVIS Y REDUNDANT VELOCITY

1 897024N1.V65 Filterclass (180)



TIME Seconds
MGA Research
02-14-1997 15:03

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

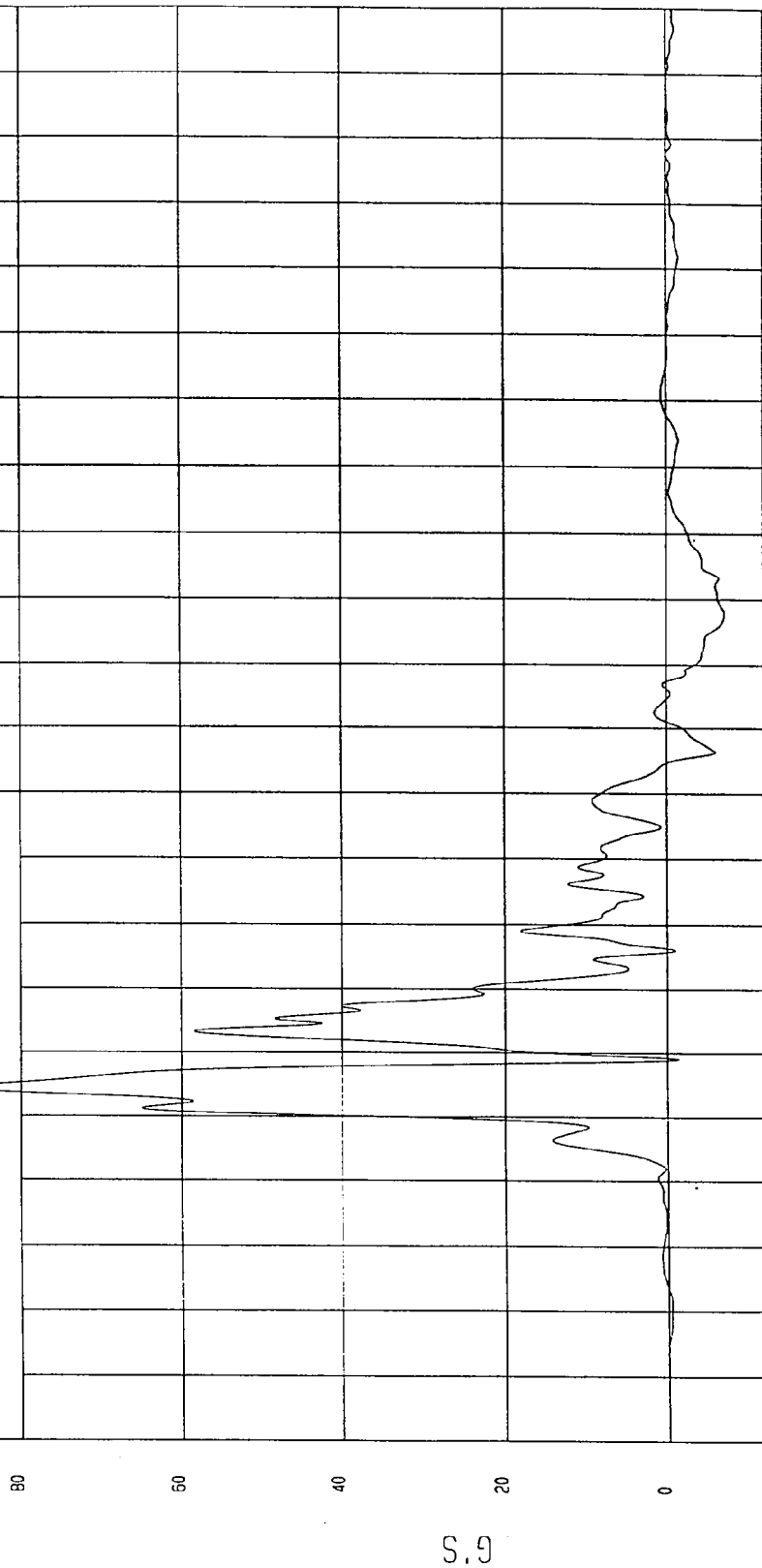
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -6.95 G'S at 108 msec

Maximum = 88.00 G'S at 34 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION

1 ——— 897024AF.A66 Filterclass (180)



MGA Research
02-08-1997 14:56

TIME (SECONDS)

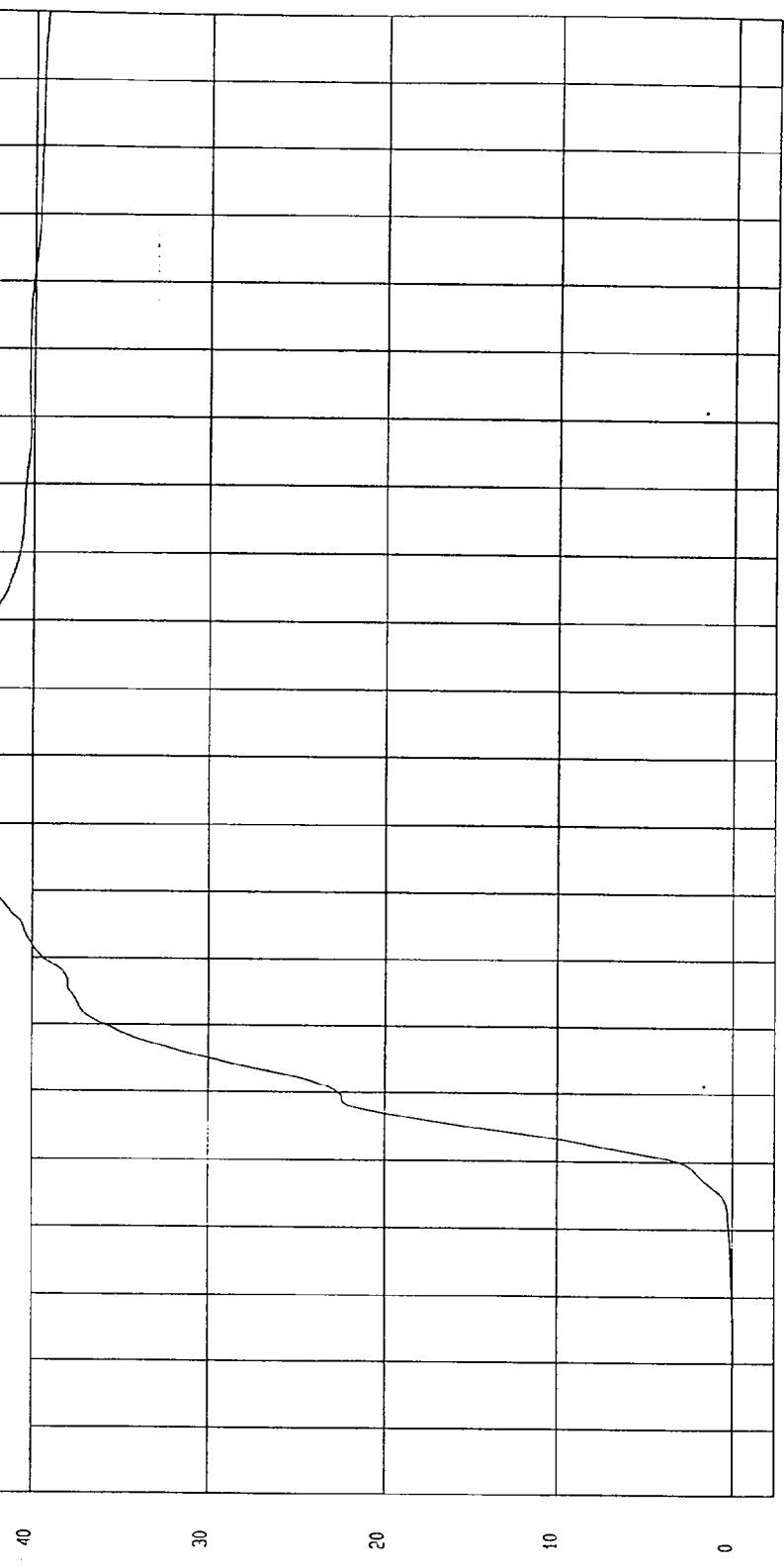
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -.07 KPH at 3 msec
Maximum = 45.12 KPH at 85 msec

REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY

1 ——— B97024A1.V66 Filterclass (180)



MGA Research
02-08-1997 14:48

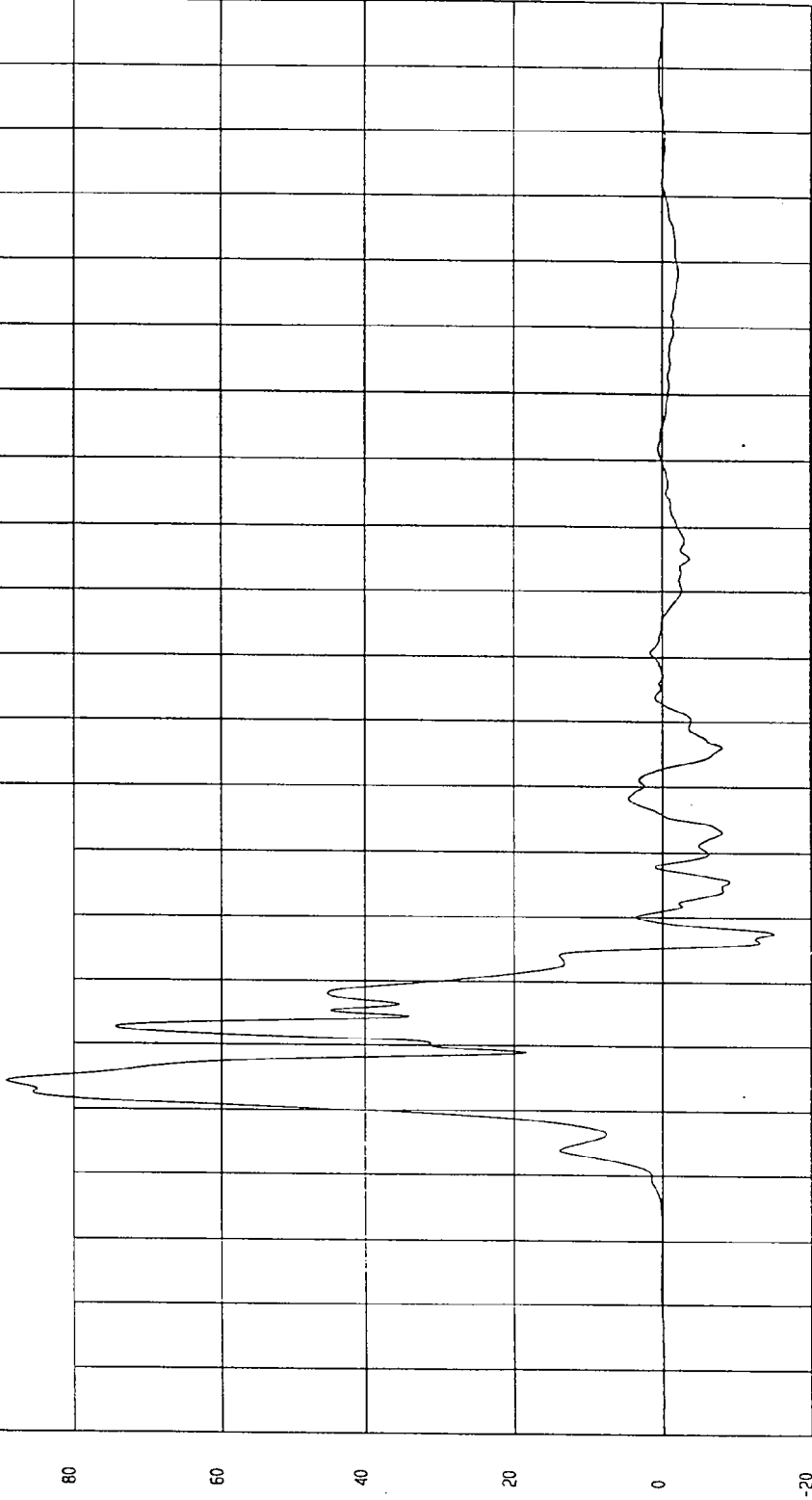
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -15.05 G'S at 58 msec Maximum = 88.84 G'S at 34 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 — 897024AF.467 Filterclass (180)



MEA Research
02-08-1997 14:56

TIME (SECONDS)

G.S

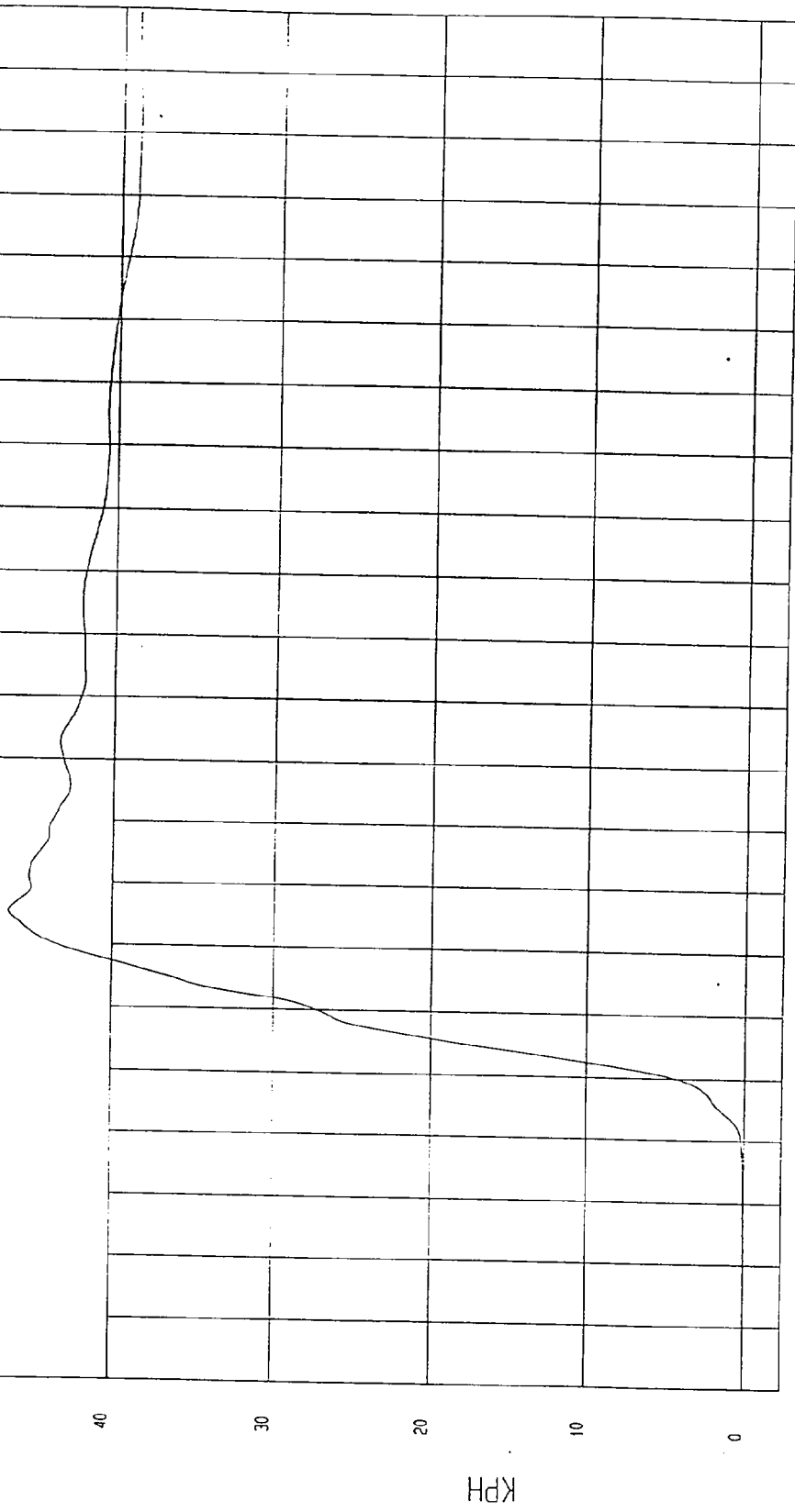
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -1.94E-02 KPH at -3 msec
Maximum = 46.58 KPH at 55 msec

REAR PASSENGER LOWER RIB Y REDUNDANT VELOCITY

1 897024A1.V57 Filterclass (180)



MSA Research
02-08-1997 14:46

TIME Seconds

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

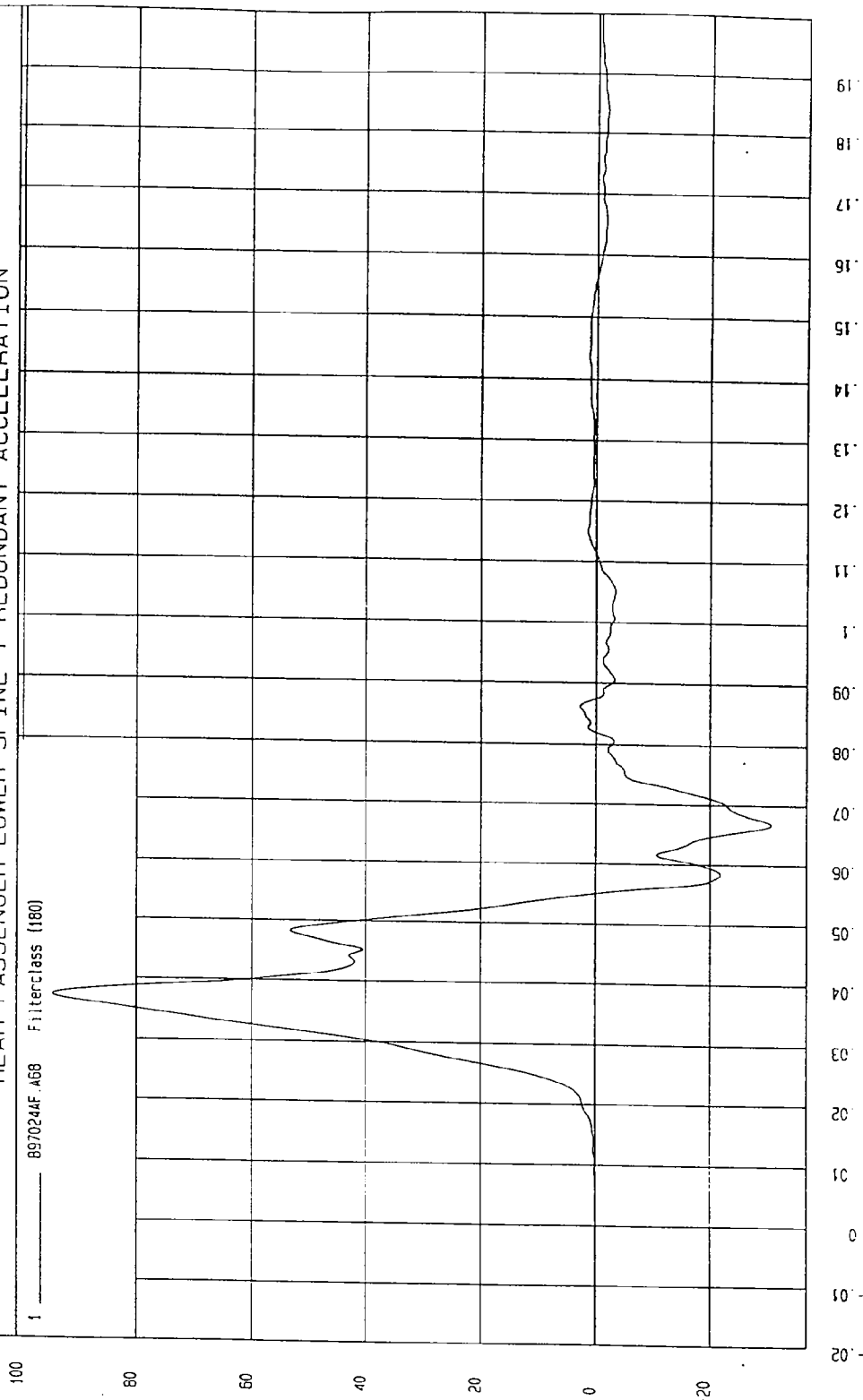
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -30.49 G'S at 67 msec

Maximum = 94.77 G'S at 37 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION

1 8970244F.A68 Filterclass (180)



MGA Research
02-08-1997 14:56

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116)

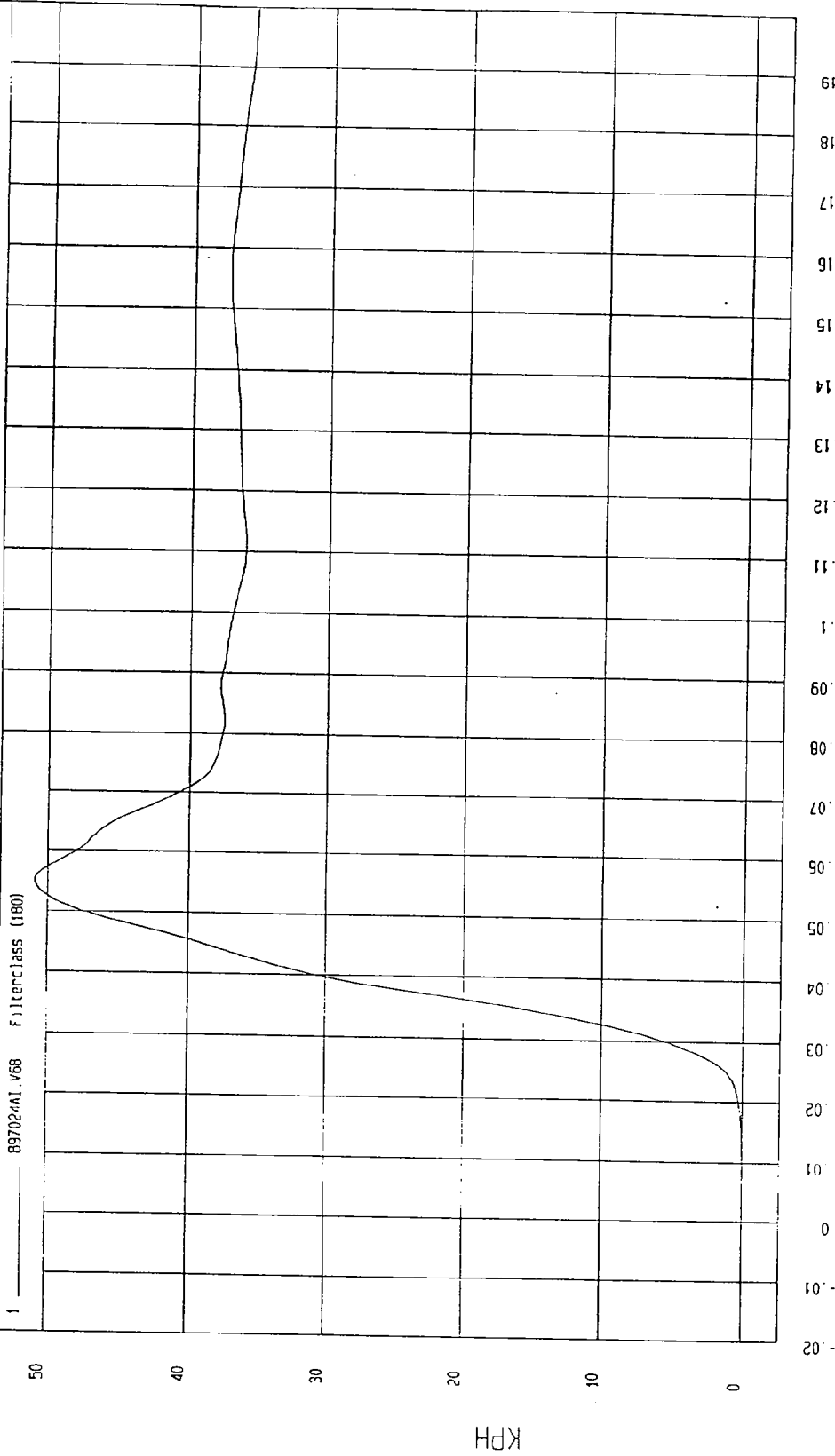
Speed: 38.2 MPH 61.5 KPH

Minimum = -7 G4E-03 KPH at 2 msec

Maximum = 50.85 KPH at 55 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY

1 897024M1.V68 Filterclass (180)



NCA Research
02-08-1997 14:49

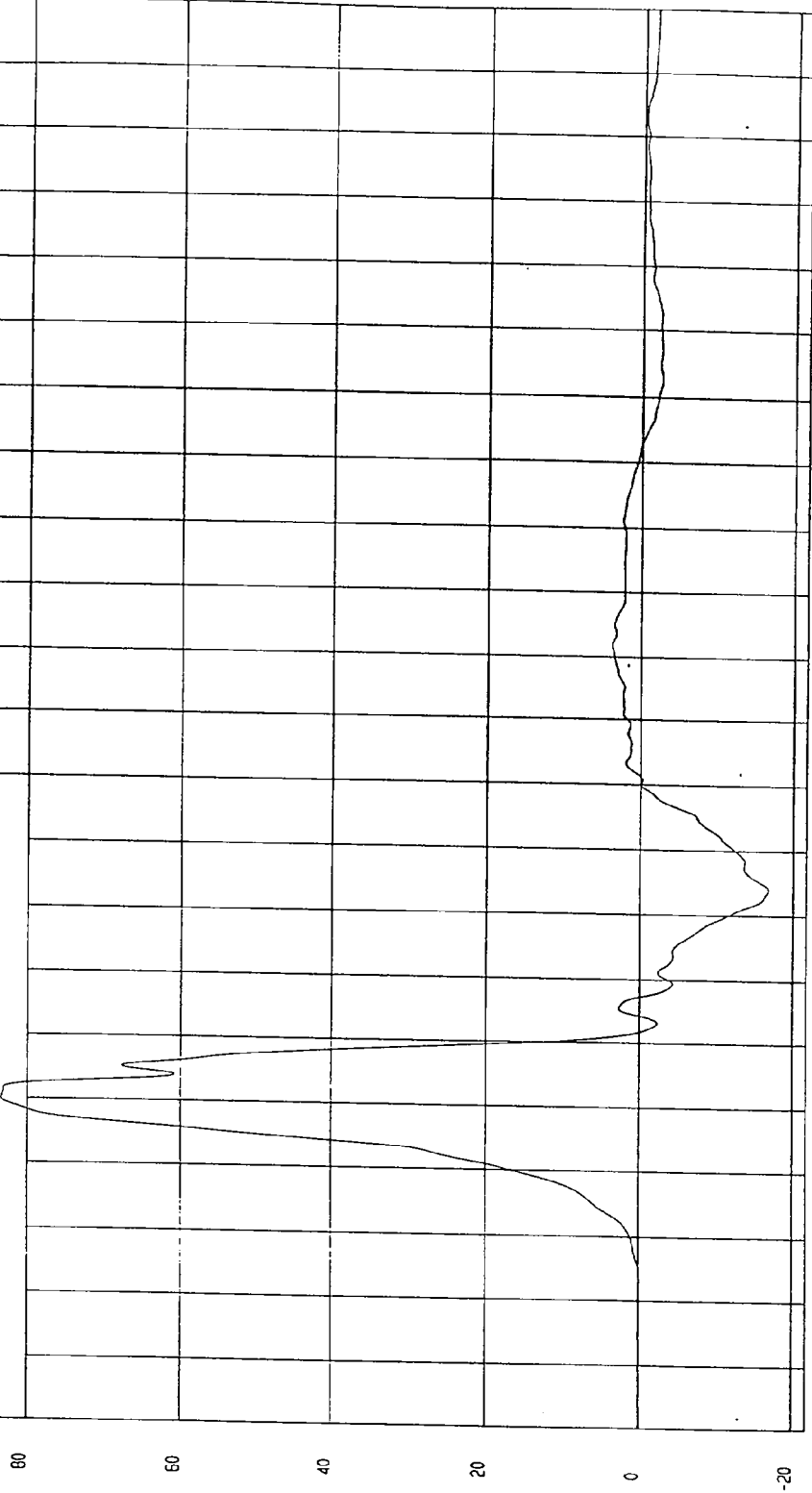
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -16.76 G'S at 64 msec Maximum = 83.20 G'S at 30 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION

1 897024F.A69 Filterclass (180)



MVA Research
02-00-1997 14.57

TIME (SECONDS)

G.S

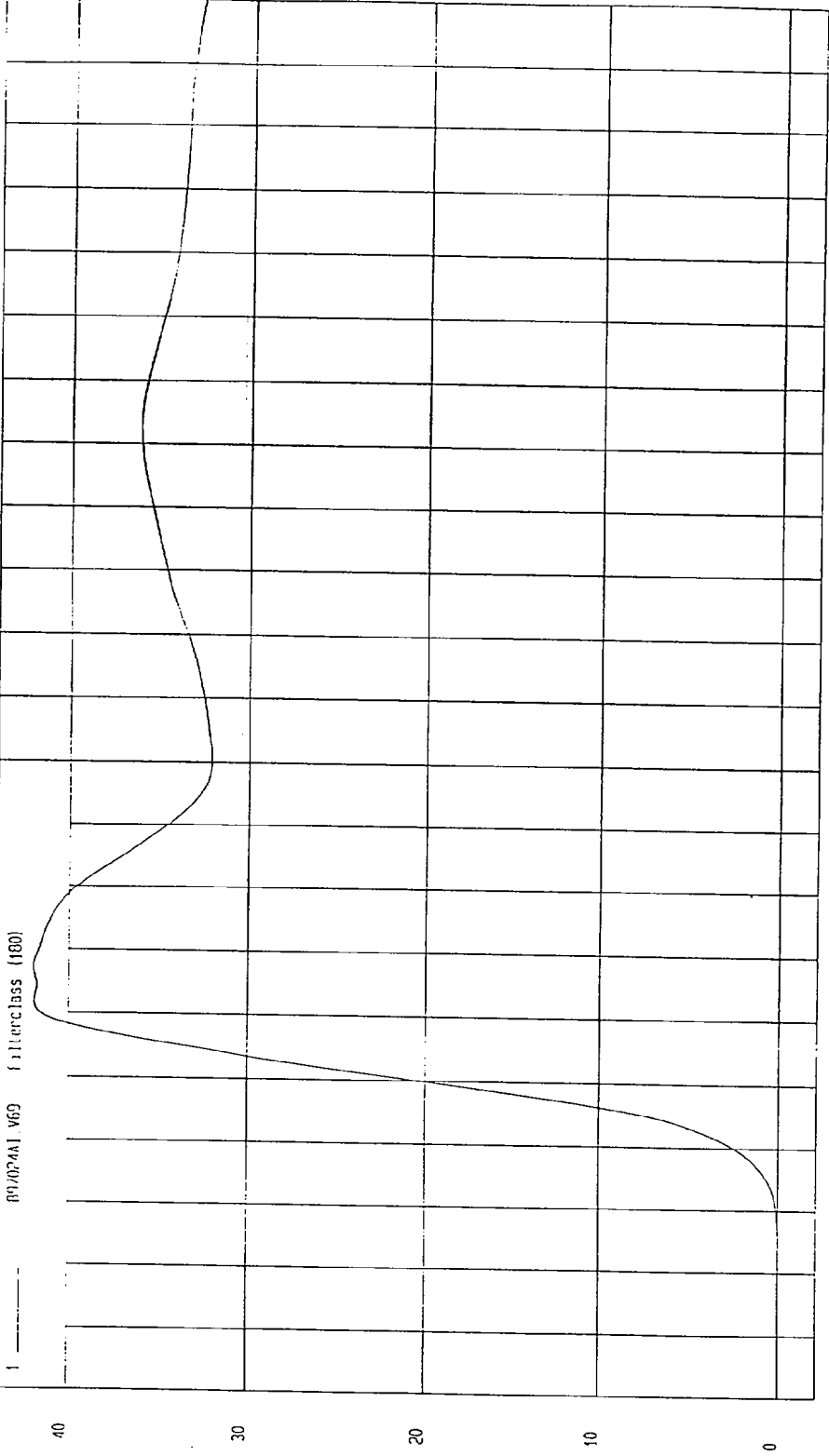
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -9.94E-03 KPH at -7 msec
Maximum = 41.89 KPH at 47 msec

REAR PASSENGER PELVIS Y REDUNDANT VELOCITY

1 --- 89/02/41 V60 Filterclass (180)



TIME Seconds
MGA Research
02-08-1997 14:49

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

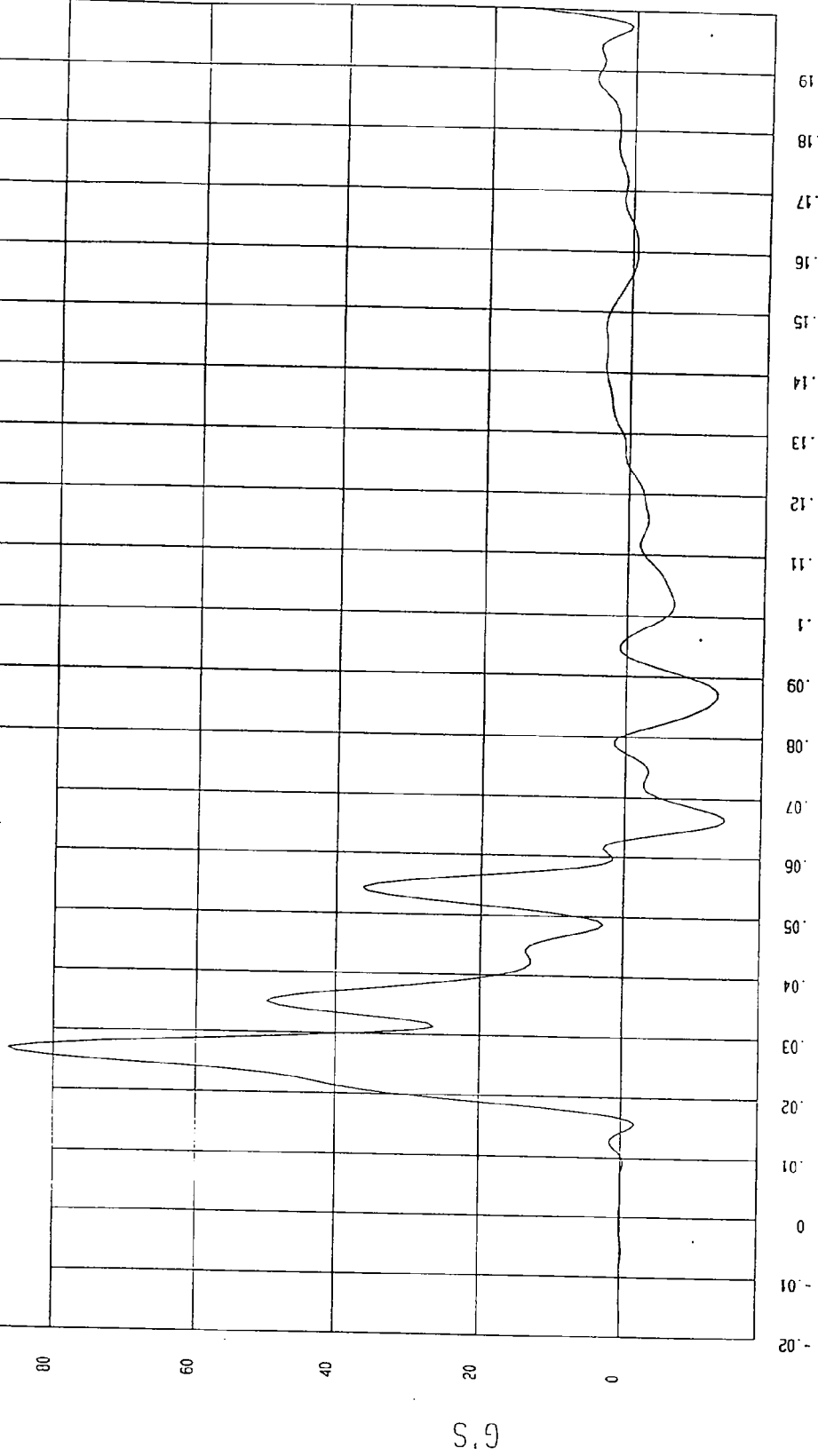
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -13.90 G'S at 66 msec
Maximum = 85.98 G'S at 27 msec

DRIVER UPPER RIB Y ACCELERATION

1 897024F1.R15 Filterclass (FIR Filtered)



MSA Research
02-08-1997 14: 42

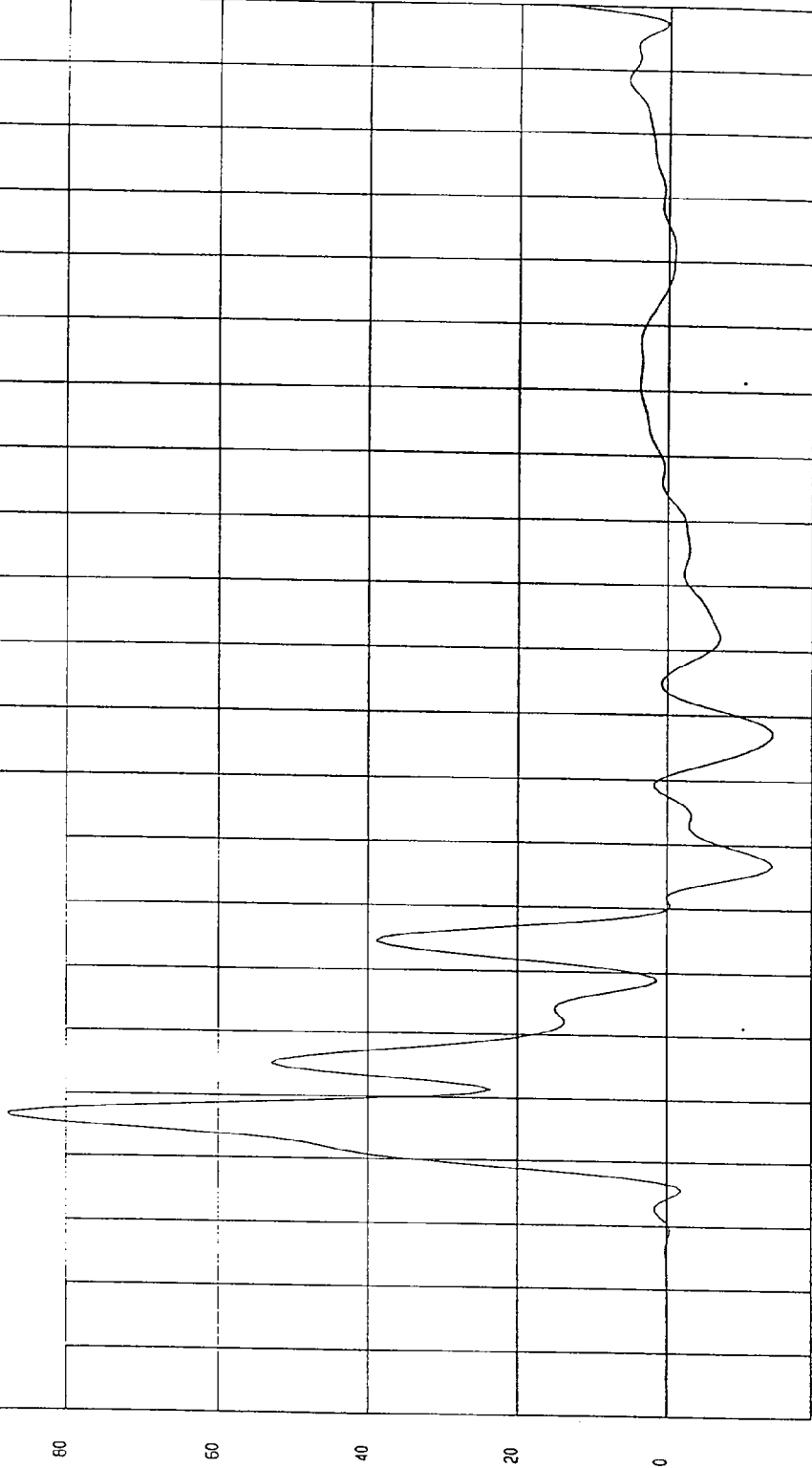
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -13.54 G'S at 67 msec
Maximum = 87.47 G'S at 27 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION

1 897024F1.R61 Filterclass (FIR Filtered)



NSA Research
02-08-1997 14:42

TIME (SECONDS)

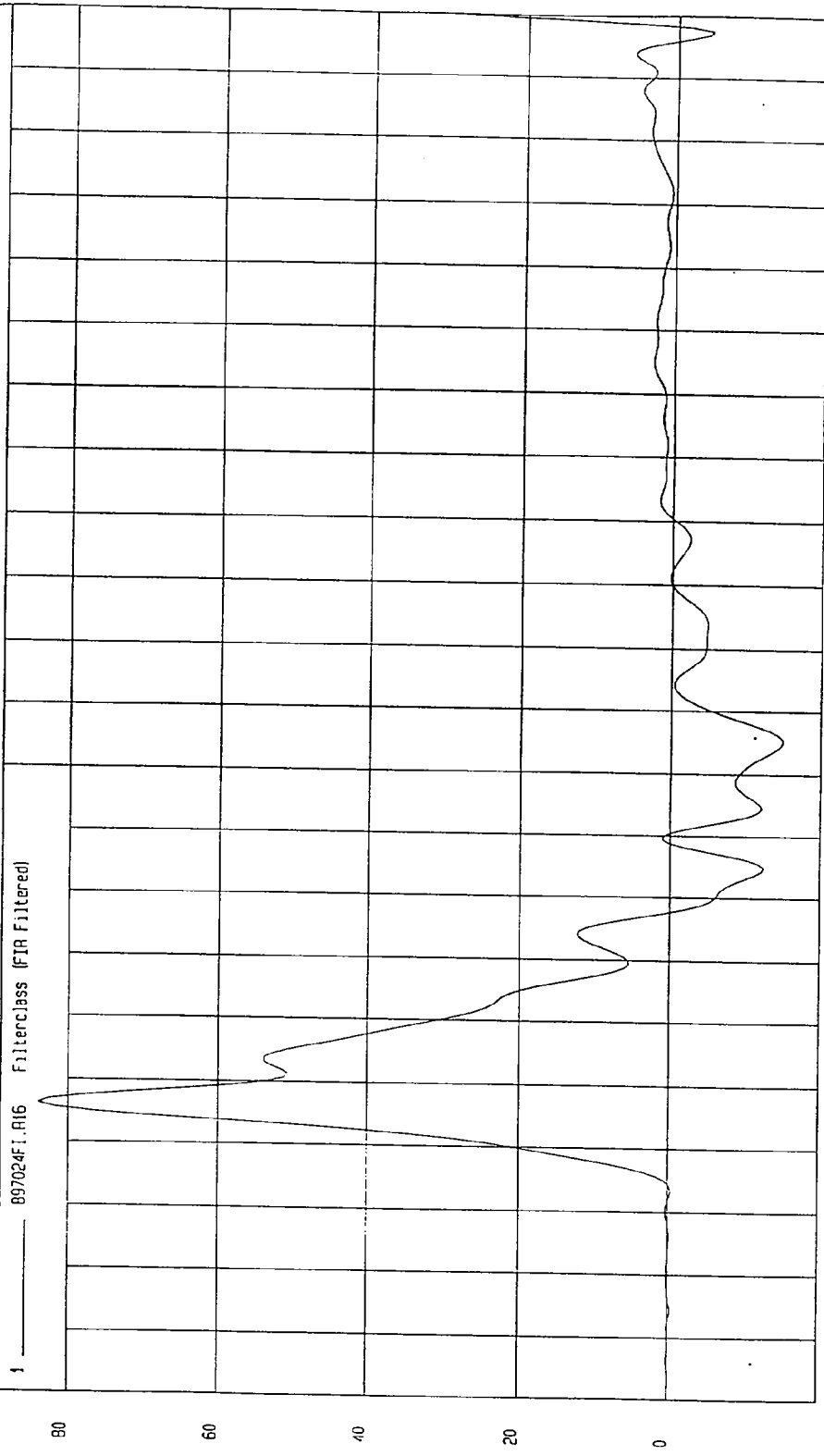
G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -14.70 G'S at 85 msec
Maximum = 83.88 G'S at 26 msec

DRIVER LOWER RIB Y ACCELERATION



MGA Research
02-08-1997 14:42

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

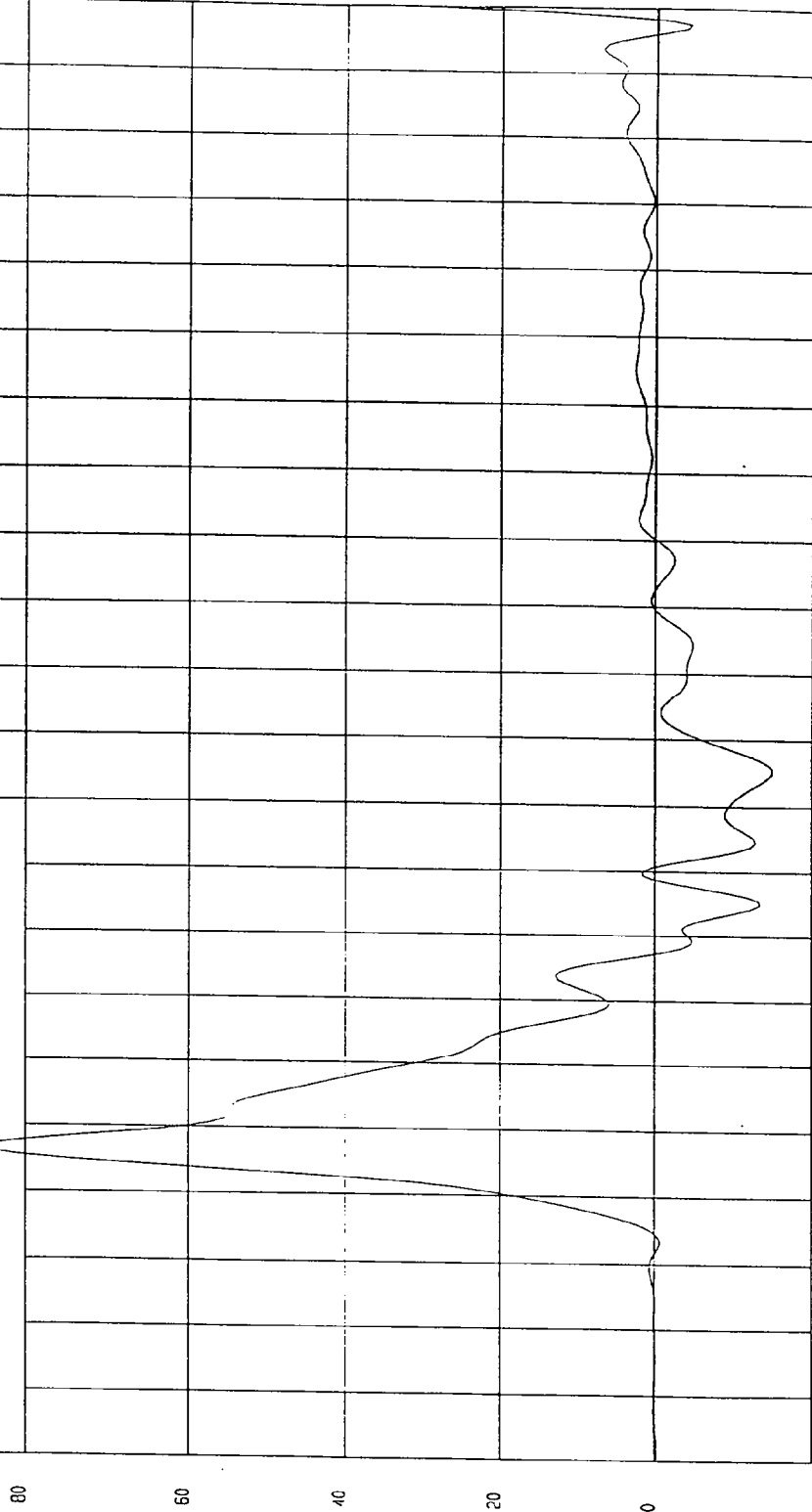
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -14.78 G'S at 85 msec

Maximum = 84.90 G'S at 27 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION

1 ——— 897024FI.R62 Filterclass (FIR Filtered)



MCA Research
02-08-1997 14.42

TIME (SECONDS)

G.S

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

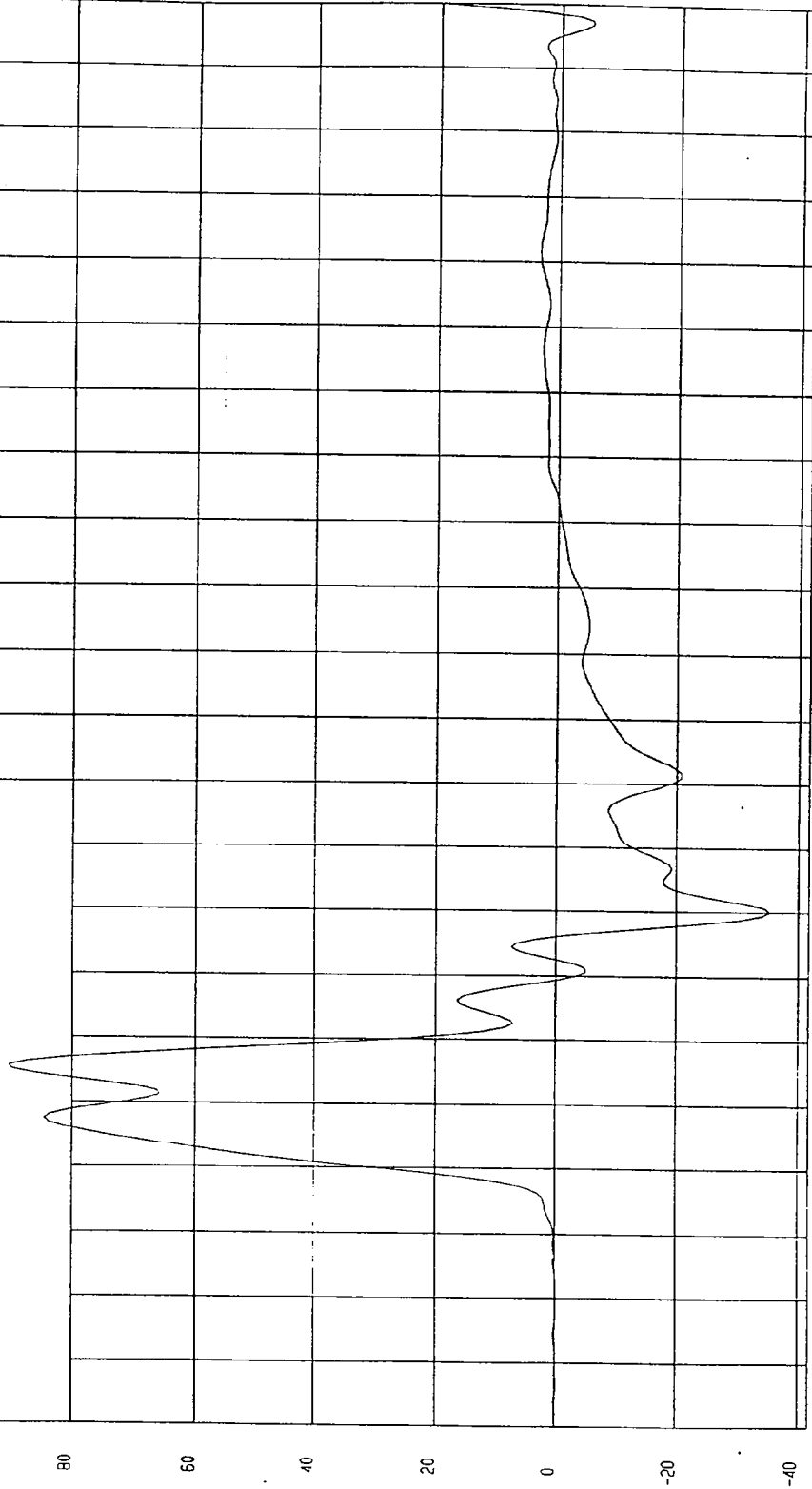
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = 35.34 G'S at 60 msec

Maximum = 90.35 G'S at 36 msec

DRIVER LOWER SPINE Y ACCELERATION

1 09702401.017 Filterclass (FIR Filtered)



MSC Research
02-08-1997 14.42

TIME (SECONDS)

G.S.

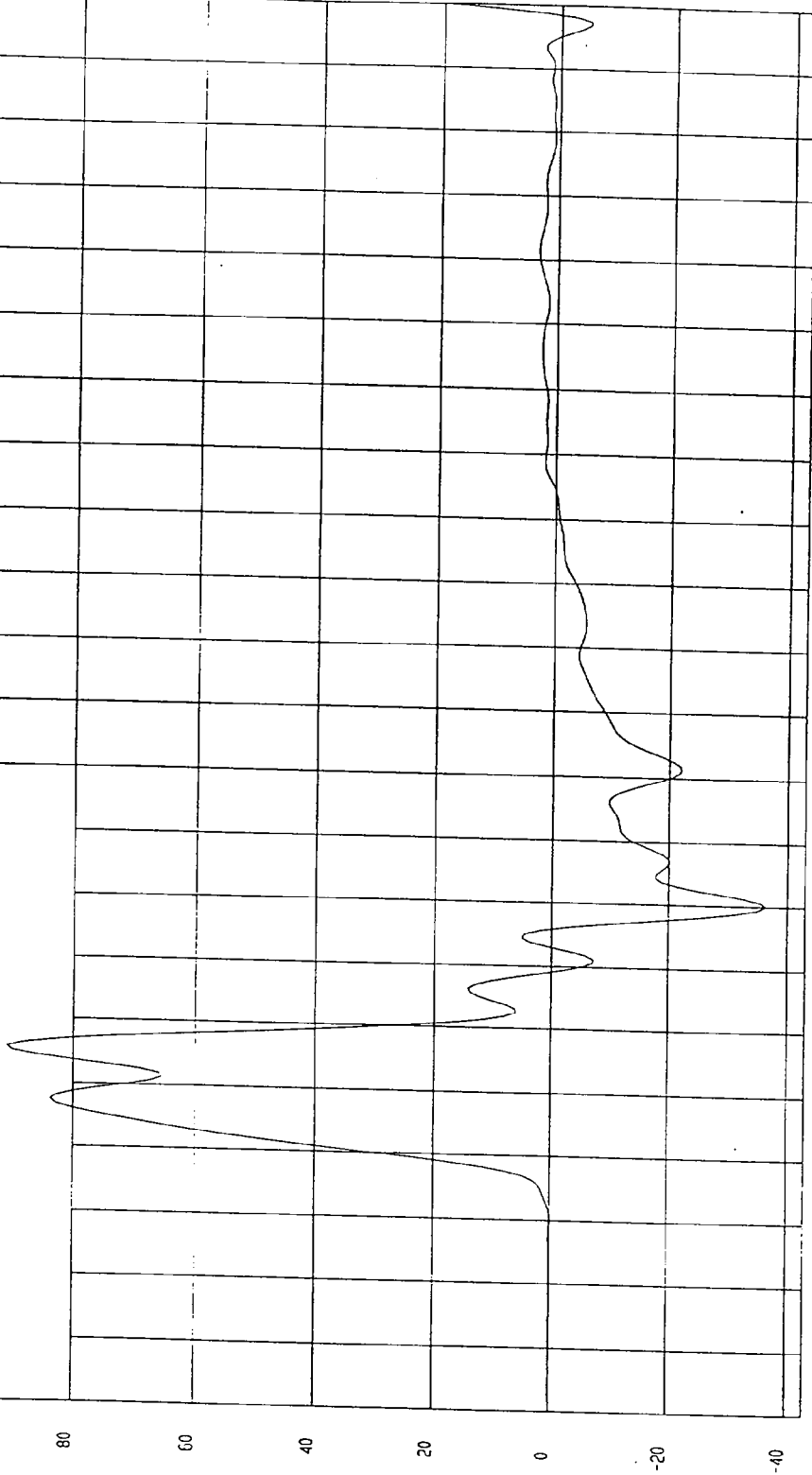
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -36.42 G'S at 60 msec
Maximum = 91.08 G'S at 36 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION

097024F1.R63 Filterclass (FIR Filtered)

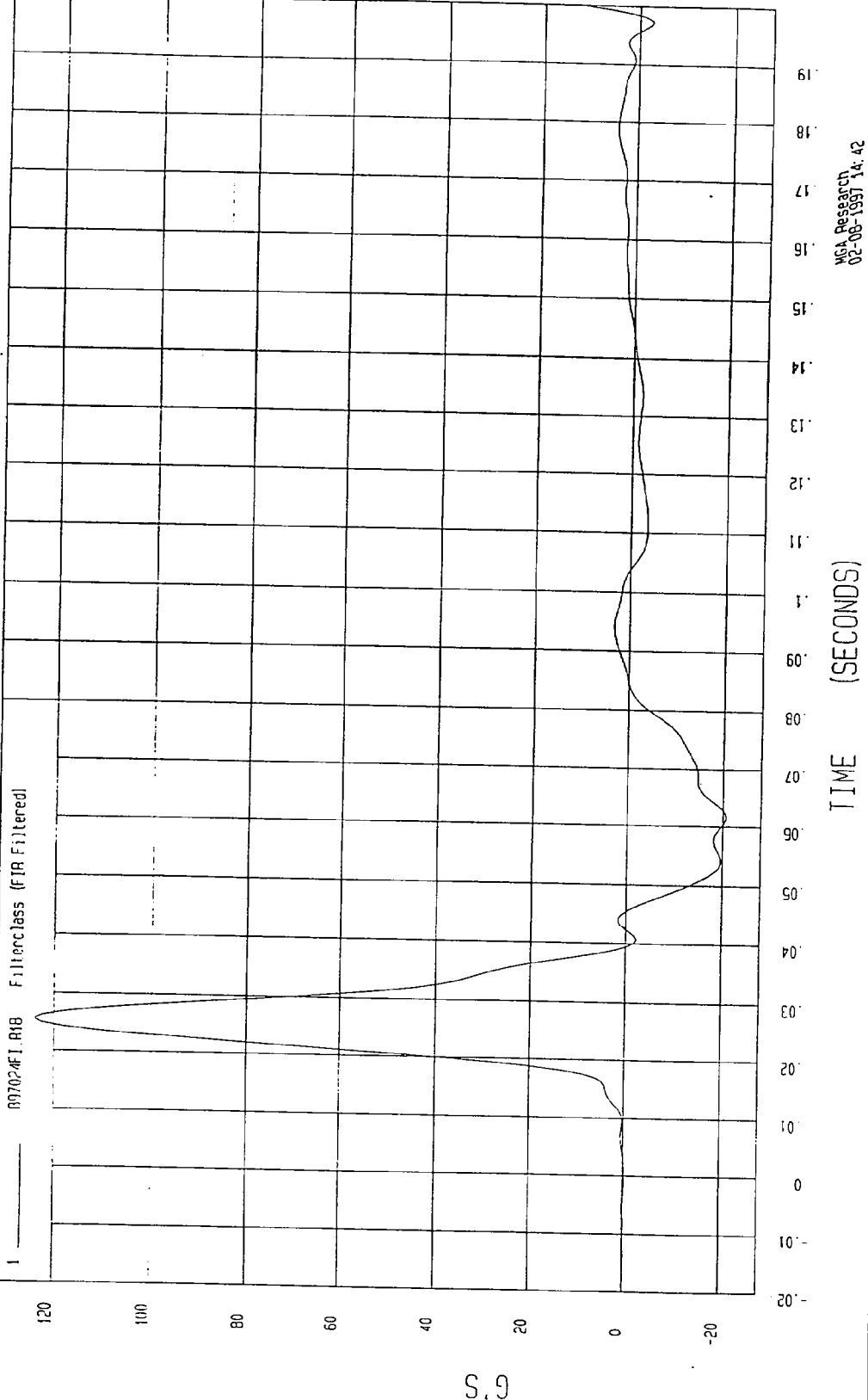


MSA Research
02-08-1997 14:42

TIME (SECONDS)

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH
Minimum = -20.64 G'S at 52 msec Maximum = 123.84 G'S at 26 msec

DRIVER PELVIS Y ACCELERATION



MGA Research
02-08-1997 14:42

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

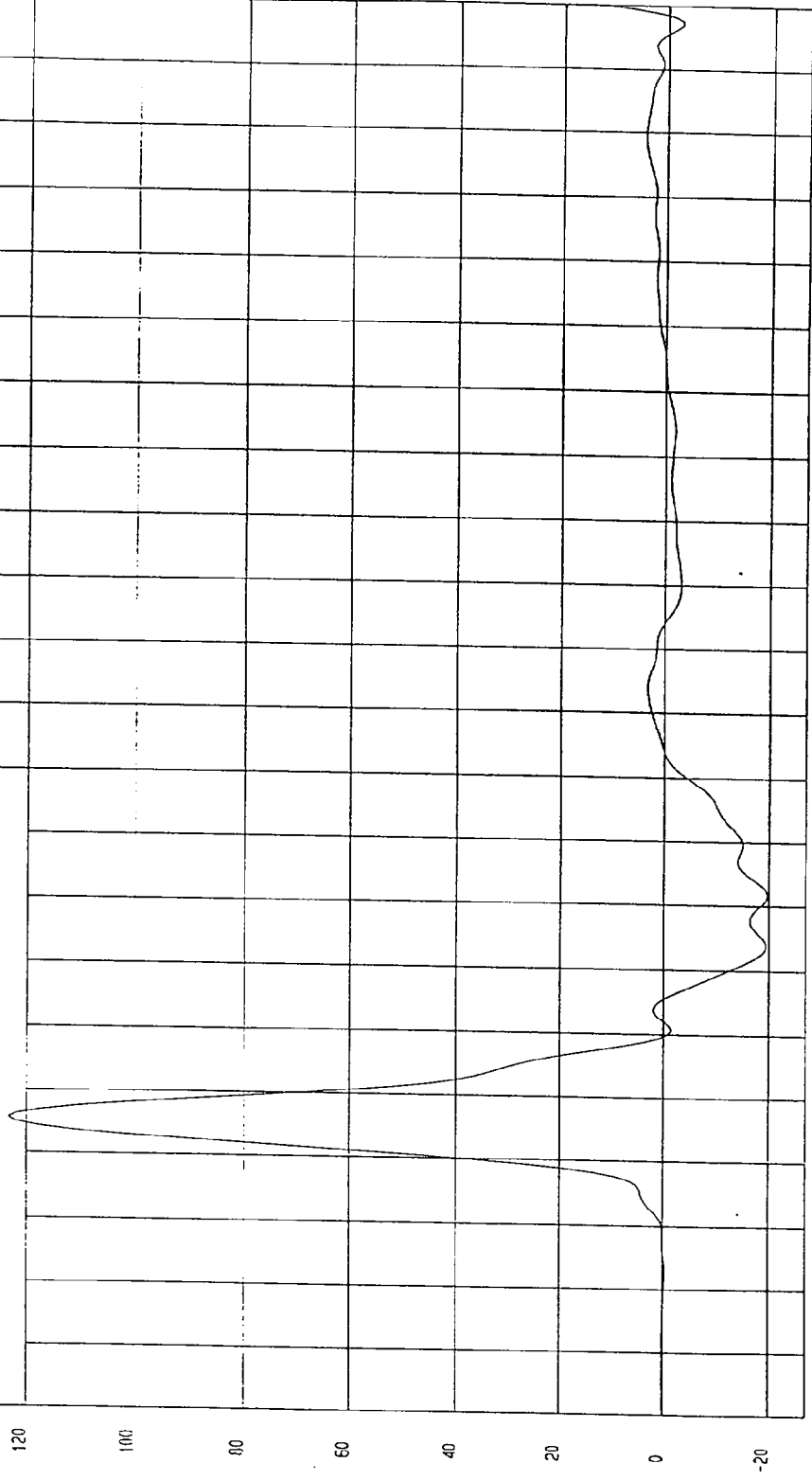
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -19.74 G'S at 62 msec

Maximum = 123.27 G'S at 26 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION

1 097024E1 065 Filter: class (FIR Filtered)



TIME (SECONDS)

MSA Research
02-08-1997 14:42

G.S

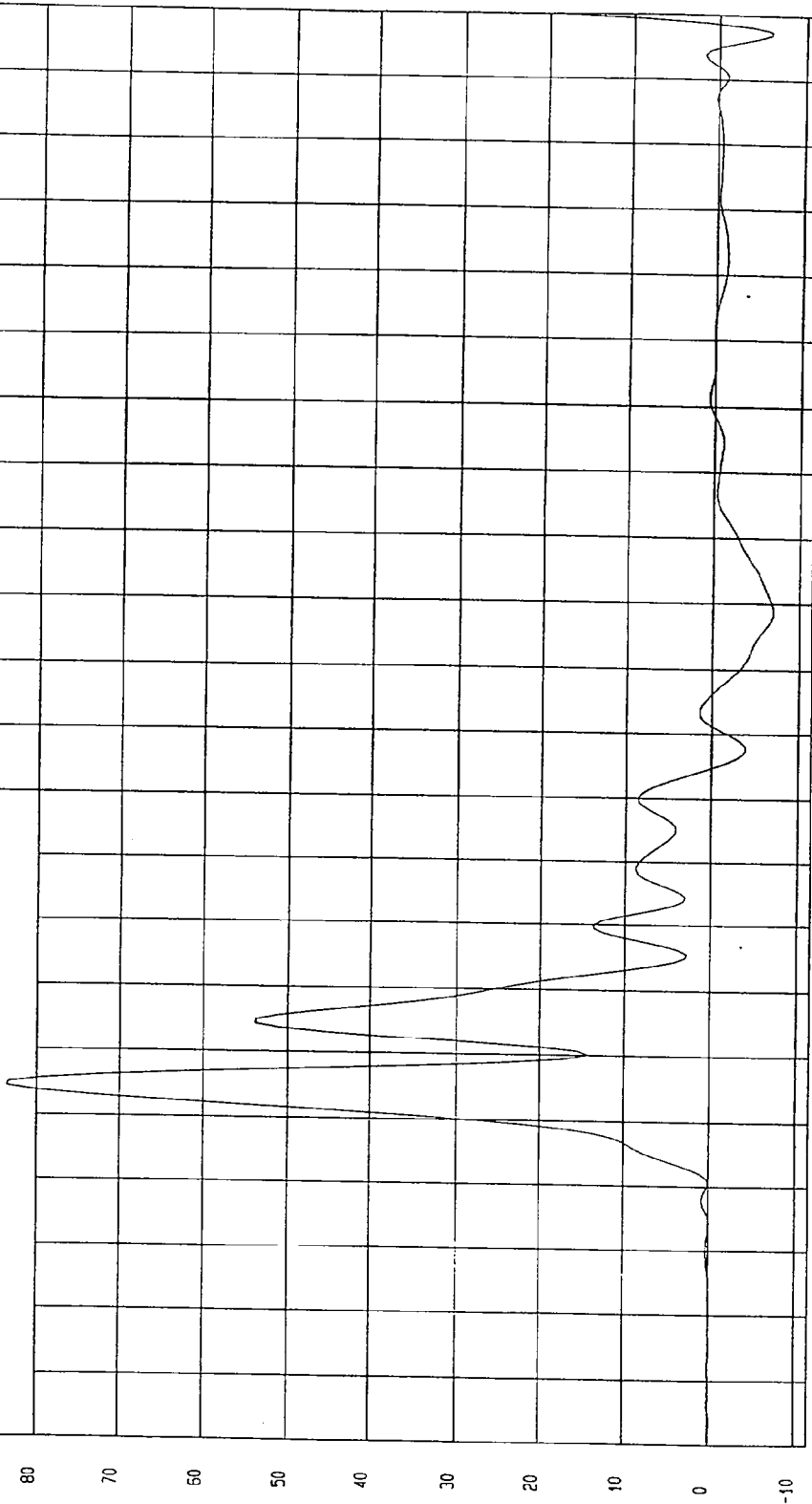
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -6.97 G'S at 109 msec Maximum = 83.59 G'S at 34 msec

REAR PASSENGER UPPER RIB Y ACCELERATION

1 897024F1 R25 Filterclass (FIR Filtered)



MCA Research
02-08-1997 14:42

TIME (SECONDS)

G'S

TEST DATE: 02-10-1997

TEST: NCAP HIGH SPEED LATERAL IMPACT

Speed: 38.2 MPH 61.5 KPH

COMPONENT: 1997 SATURN SL 4 DOOR (MVO116)

Minimum = -6.73 G'S at 109 msec

Maximum = 85.00 G'S at 34 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION

1 ——— P97024FI.R56 Filterclass (FIR Filtered)

80

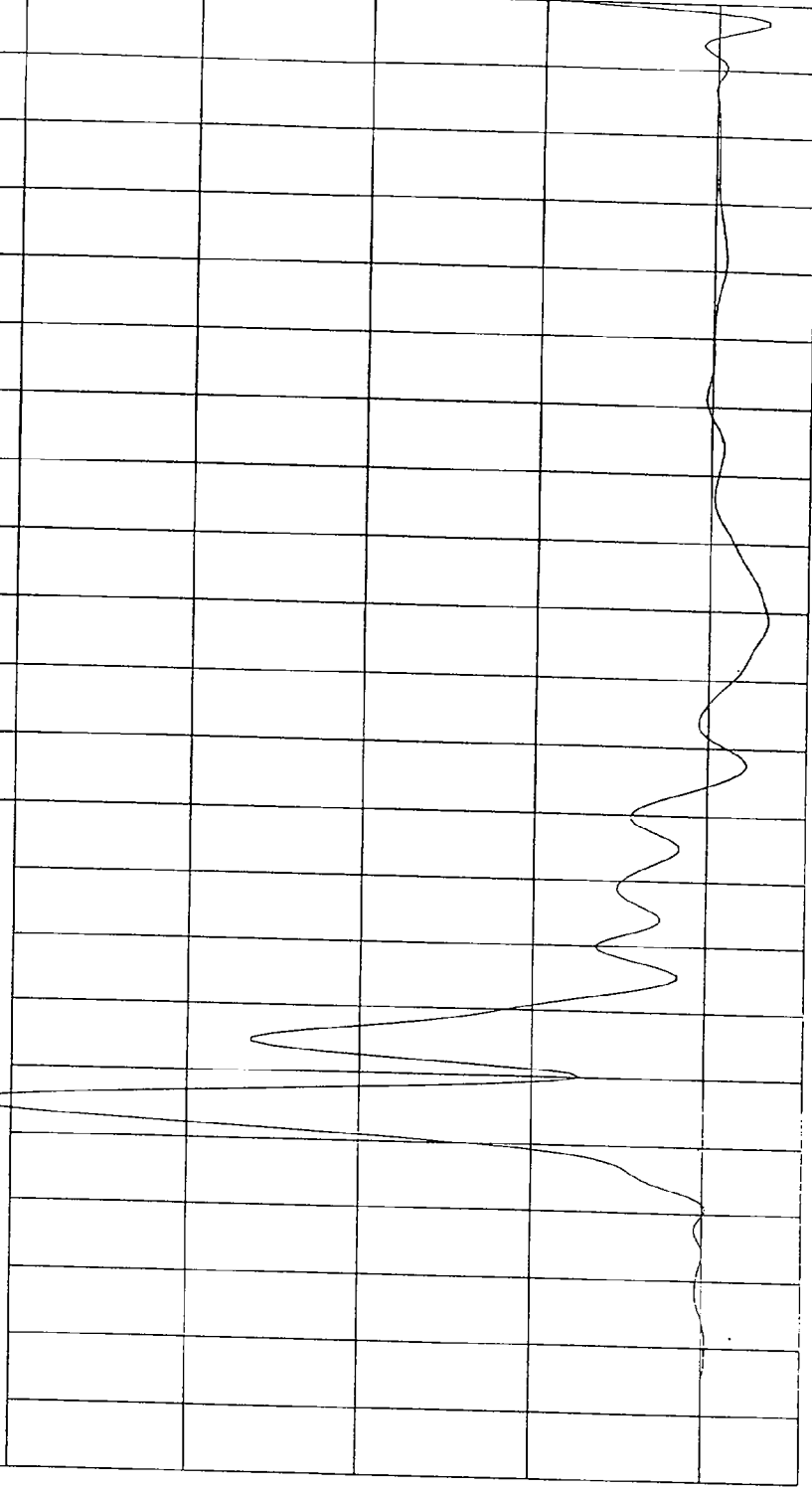
60

40

20

0

G



MGA Research
02-08-1997 14.42

TIME (SECONDS)

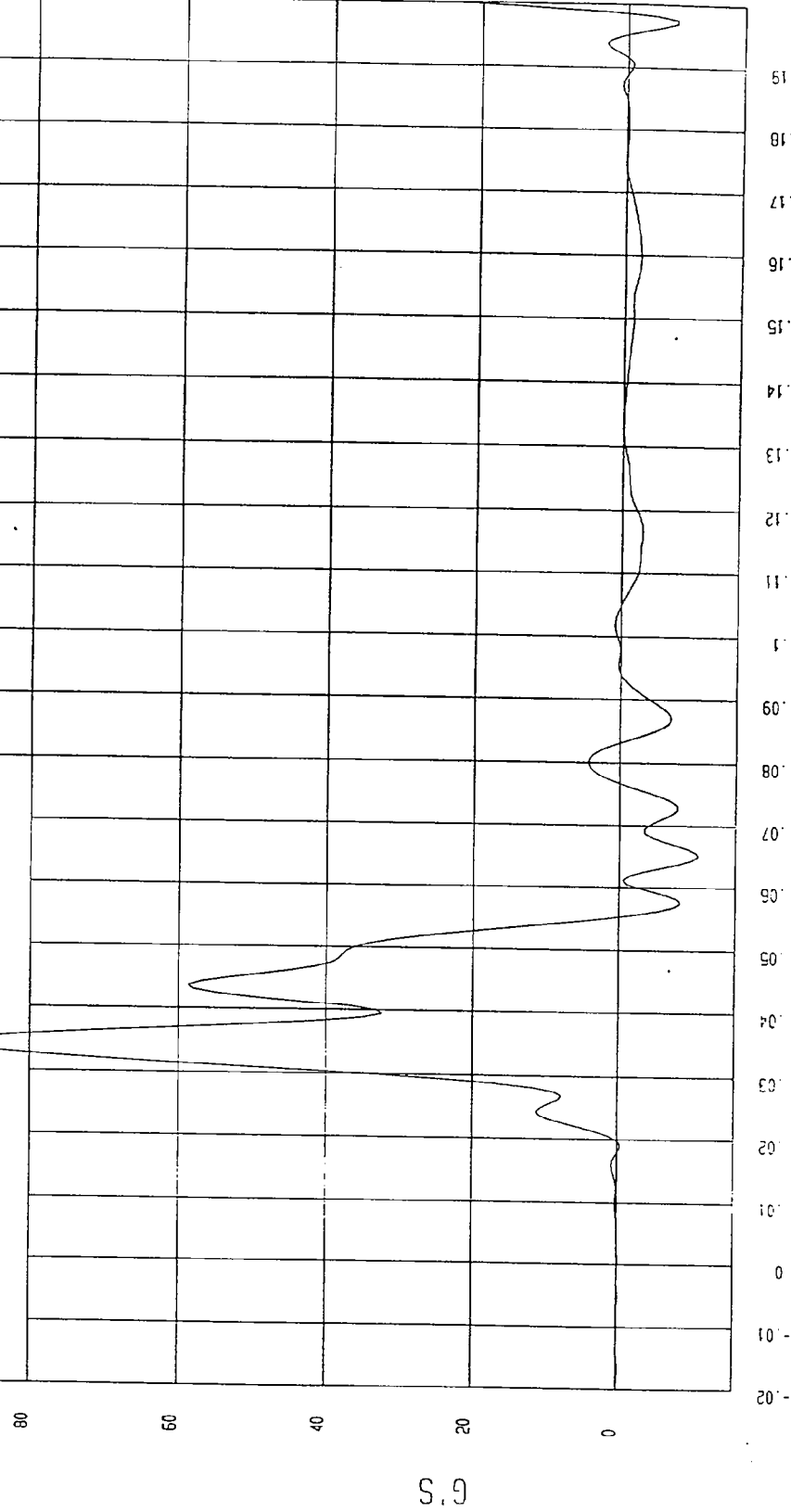
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -10.69 G'S at 65 msec
Maximum = 90.45 G'S at 34 msec

REAR PASSENGER LOWER RIB Y ACCELERATION

1 _____ 897024FI.R26 Filterclass (FIR Filtered)



MSA Research
02-08-1997 14: 43

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

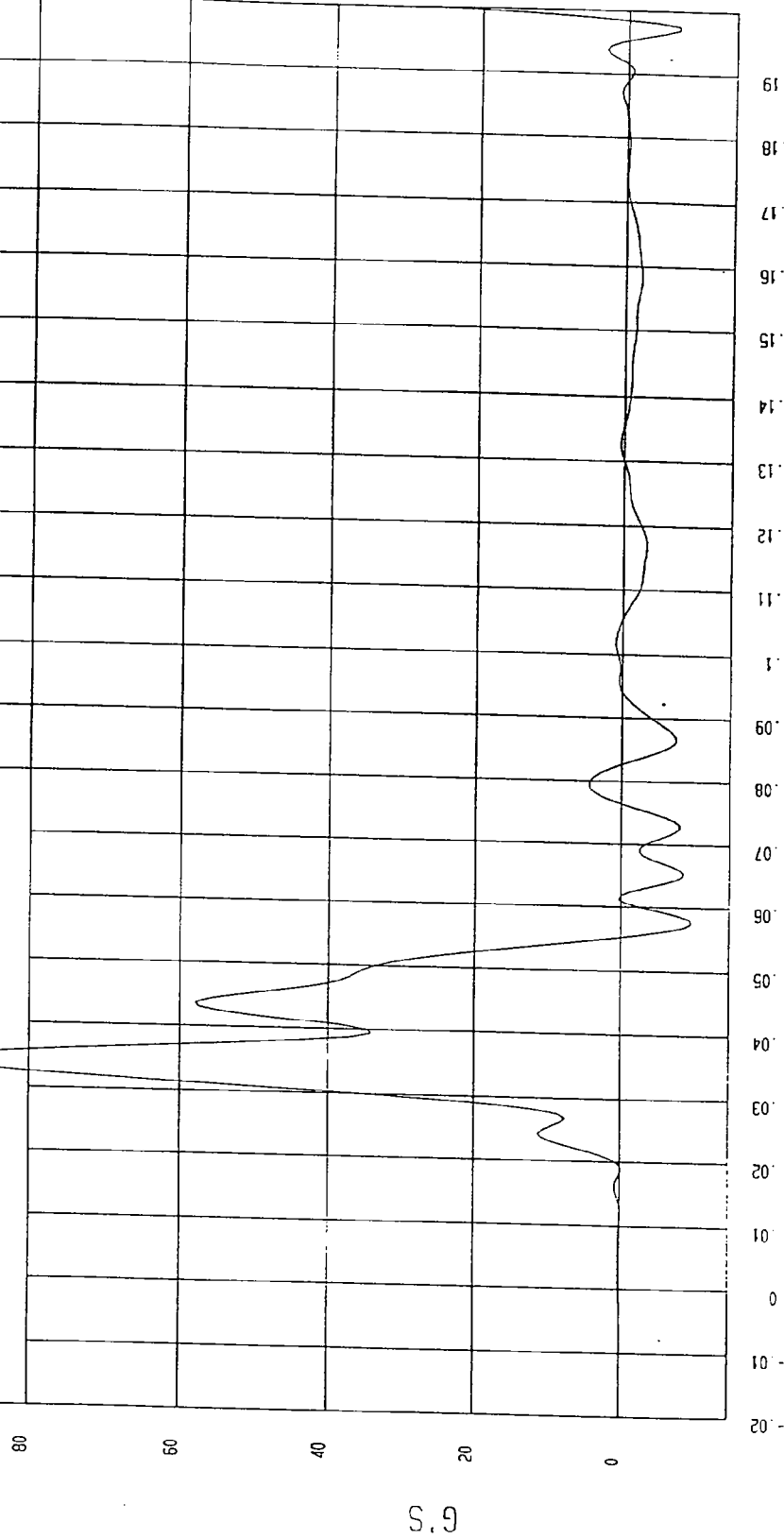
COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -9.27 G'S at 58 msec

Maximum = 92.59 G'S at 34 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 897024F1.R67 Filterclass (FIR Filtered)



MGA Research
02-08-1997 14:43

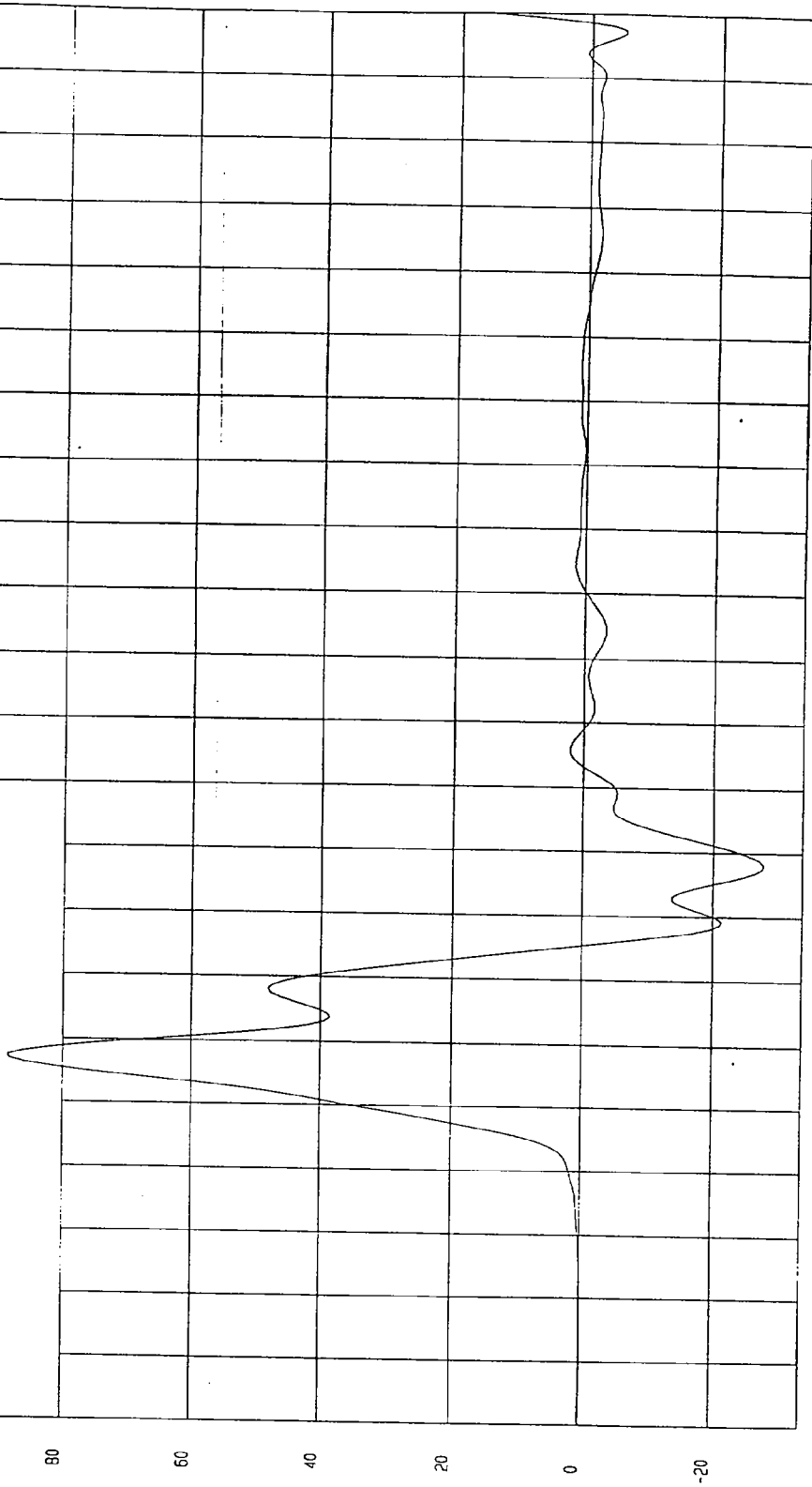
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -27.76 G'S at 68 msec
Maximum = 88.42 G'S at 38 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION

1 897024F1.R27 Filterclass (FIR Filtered)



NGA Research
02-08-1997 14: 43

TIME (SECONDS)

G.S

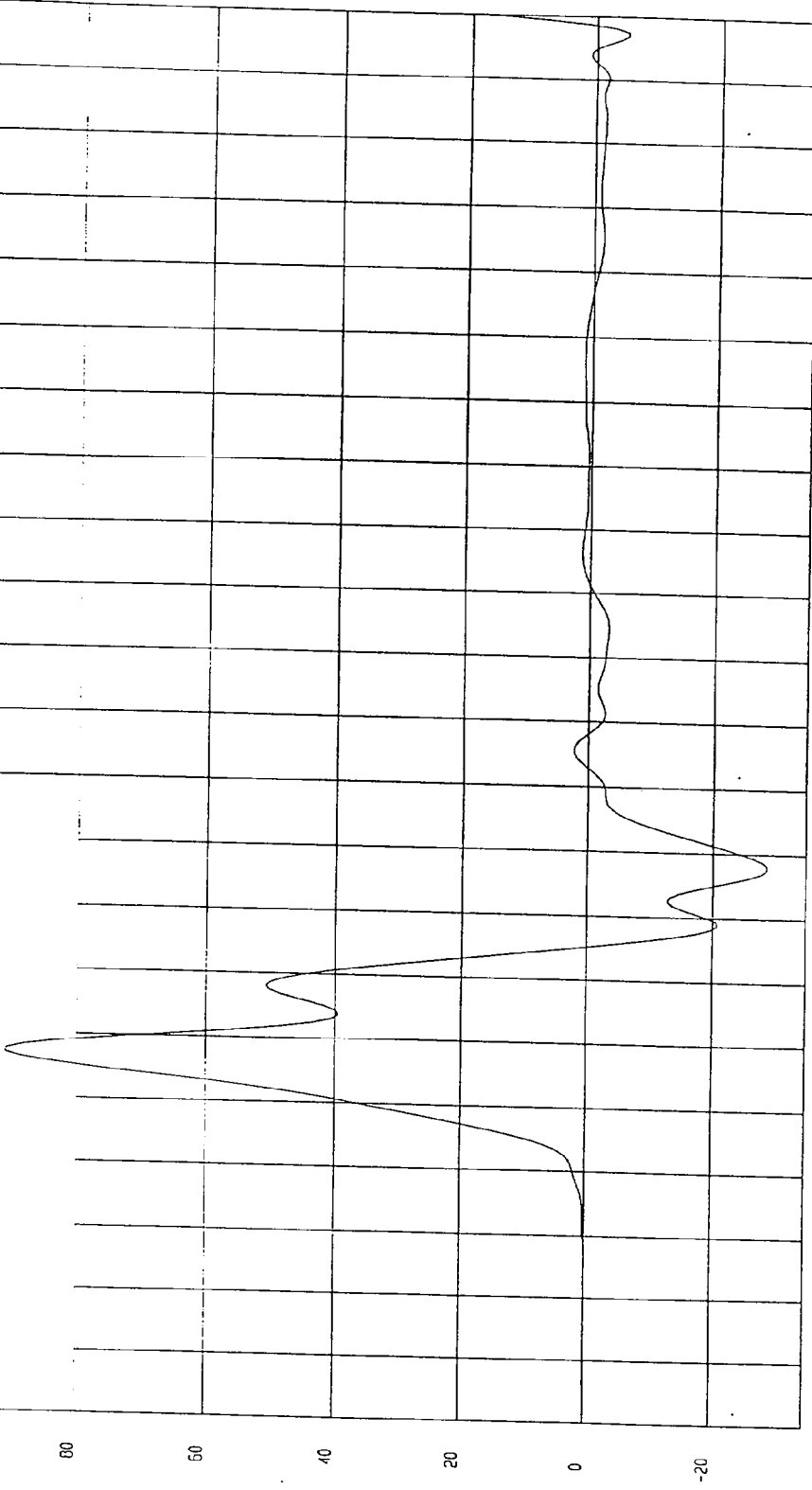
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -28.50 G'S at 68 msec
Maximum = 91.07 G'S at 37 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION

1 ——— 897024FI.H60 FilterClass (FIR Filtered)



MGA Research
02-08-1997 14: 43

TIME (SECONDS)

G.S

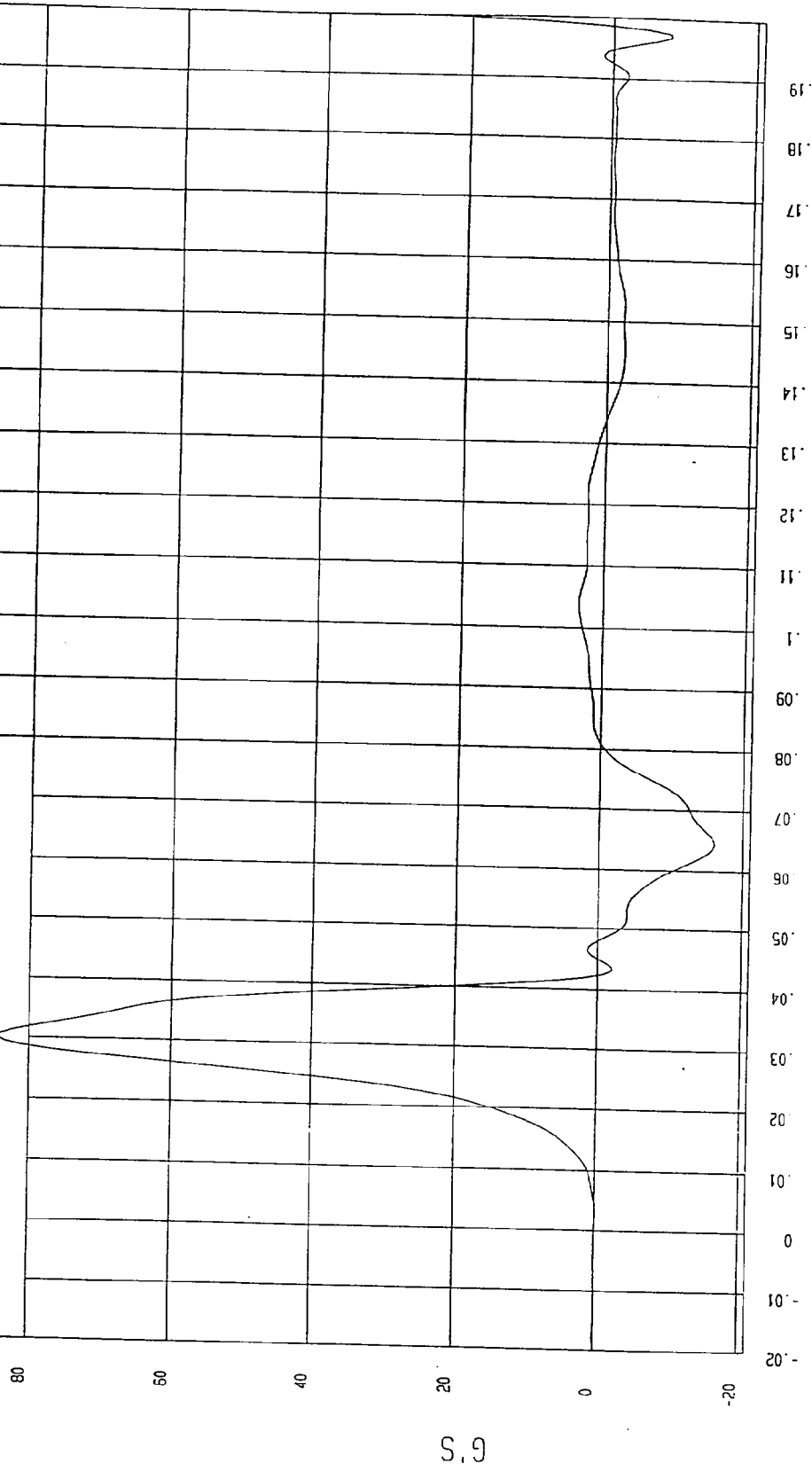
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -16.03 G'S at 64 msec Maximum = 84.45 G'S at 30 msec

REAR PASSENGER PELVIS Y ACCELERATION

1 897024FI.R28 Filterclass (FIR Filtered)



MCA Research
02-08-1997 14.43

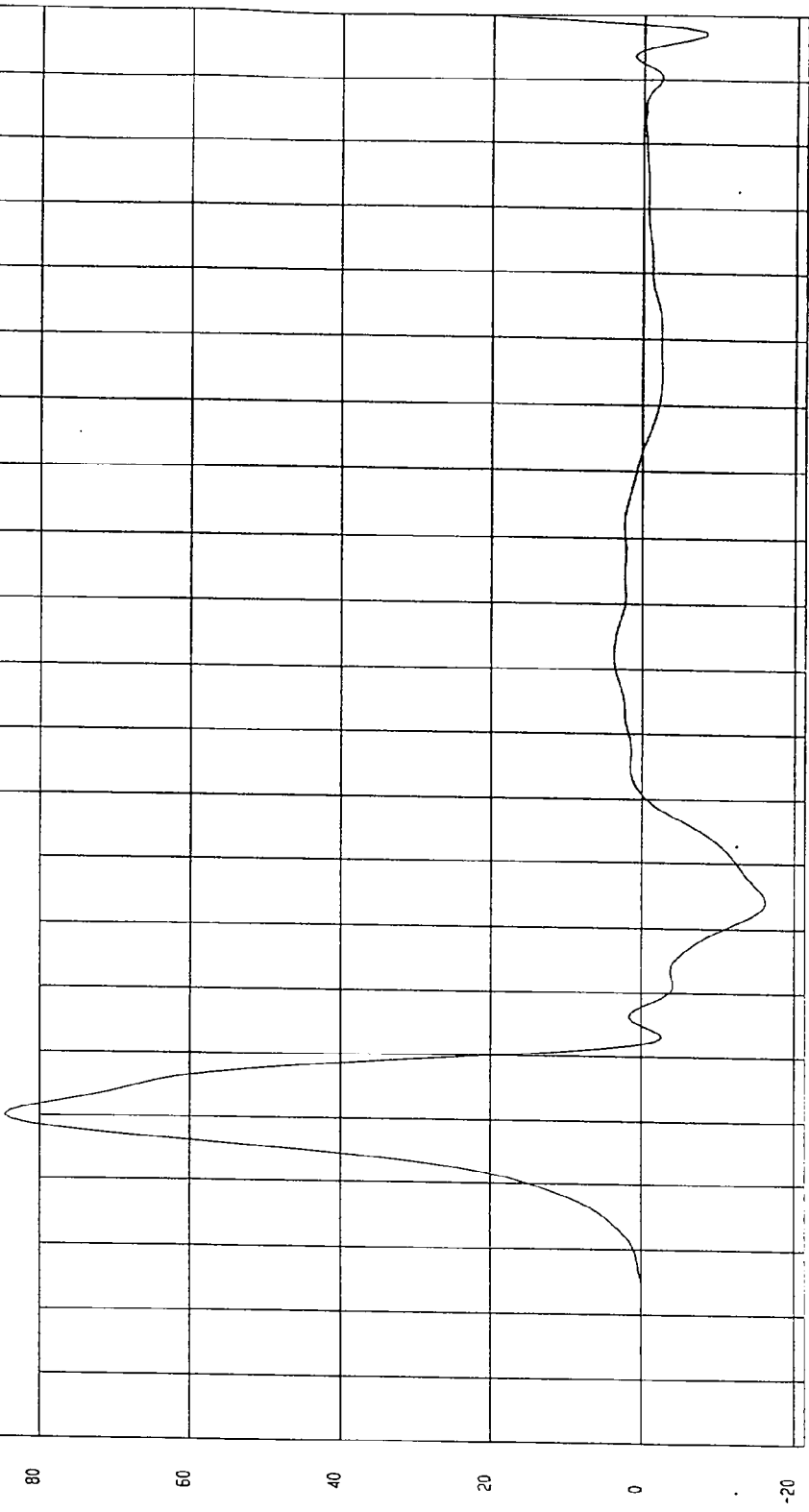
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 02-10-1997

COMPONENT: 1997 SATURN SL 4 DOOR (MV0116) Speed: 38.2 MPH 61.5 KPH

Minimum = -16.28 G'S at 64 msec Maximum = 84.60 G'S at 30 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION

1 897024FI.R69 FilterClass (FIR Filtered)



TIME (SECONDS)

H&A Research
02-08-1997 14:43

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-97-DC17

DUMMY PERFORMANCE CALIBRATIONS

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

1997 SATURN SL 4 DOOR
NHTSA NO. MV0116

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: February 10, 1997

Report Date: February 18, 1997

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
ROOM 5313, NPS-10
400 SEVENTH STREET, S.W.
Washington, D.C. 20590

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	VEHICLE AND DUMMY TEMPERATURE	7-1

PRE-TEST CERTIFICATION DATA

Front Dummy Serial Number: 272

Calibration Test Results Summary

Dummy Serial Number: 272

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

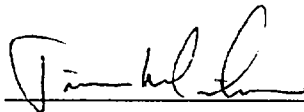
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

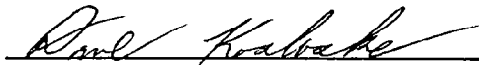
DATE OF VERIFICATION: February 7, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.20
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.6
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION
 THORACIC SHOCK ABSORBER TEST
 SIDE IMPACT DUMMY (SID)

DATE: February 7, 1997

DUMMY NUMBER: 272

TEST NUMBER: D9732678

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78° F	70°
RELATIVE HUMIDITY		10 - 70%	17%
VELOCITY 10 ft/s	FORCE (lb.)	188 - 253	193
	DISPLACEMENT (in.)	1.18 - 1.38	1.31
VELOCITY 14 ft/s	FORCE (lb.)	389 - 472	432
	DISPLACEMENT (in.)	1.26 - 1.47	1.42
VELOCITY 20 ft/s	FORCE (lb.)	841 - 1000	963
	DISPLACEMENT (in.)	1.30 - 1.57	1.50

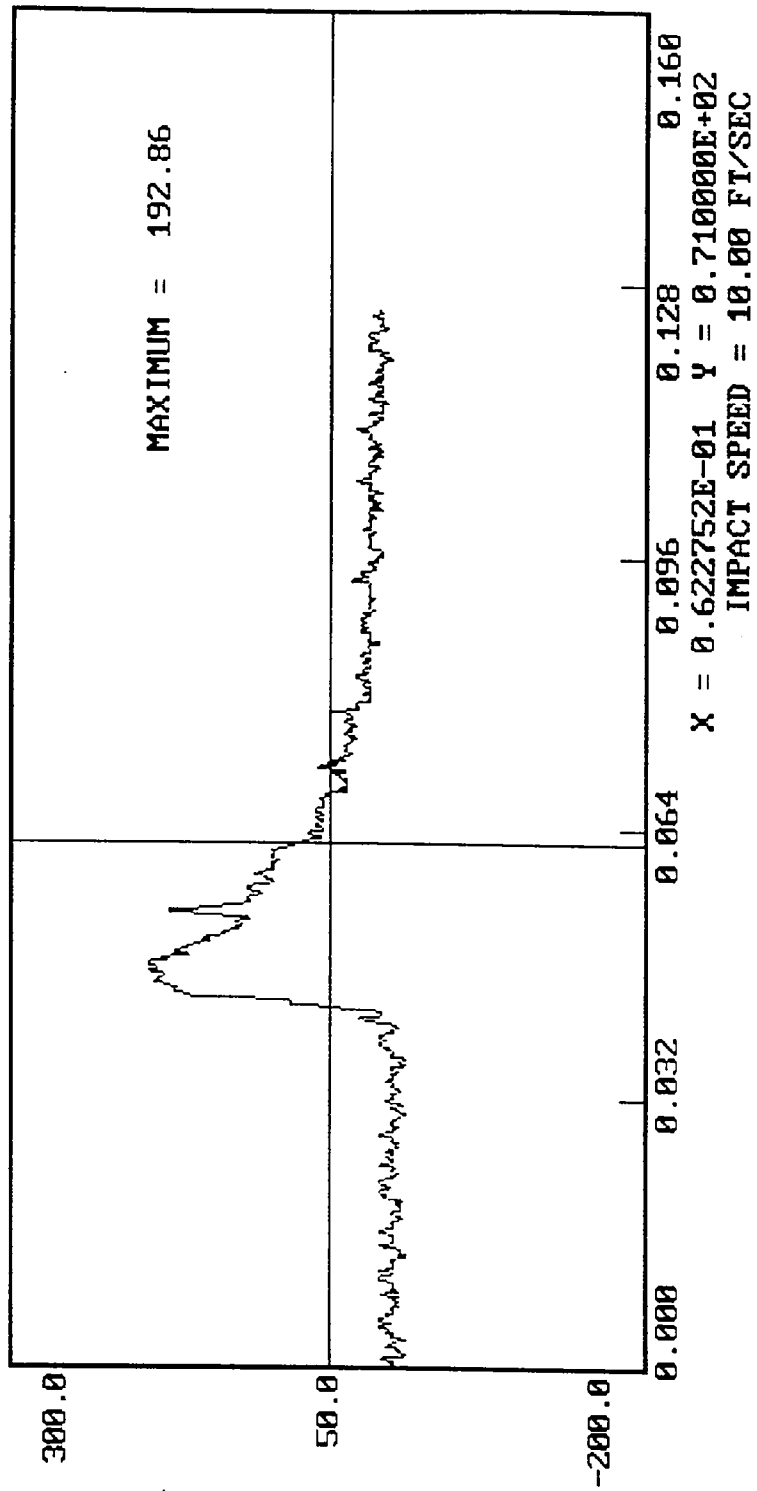
TEST MEETS SPECIFICATIONS

TECHNICIAN Jim Mahan

APPROVED BY Rene Kosbade

DUMMY CALIBRATION - DAMPENER BENCH TEST
DUMMY # 272
FORCE (LBS) VS. TIME ((SECONDS))

02-07-1997 11:27

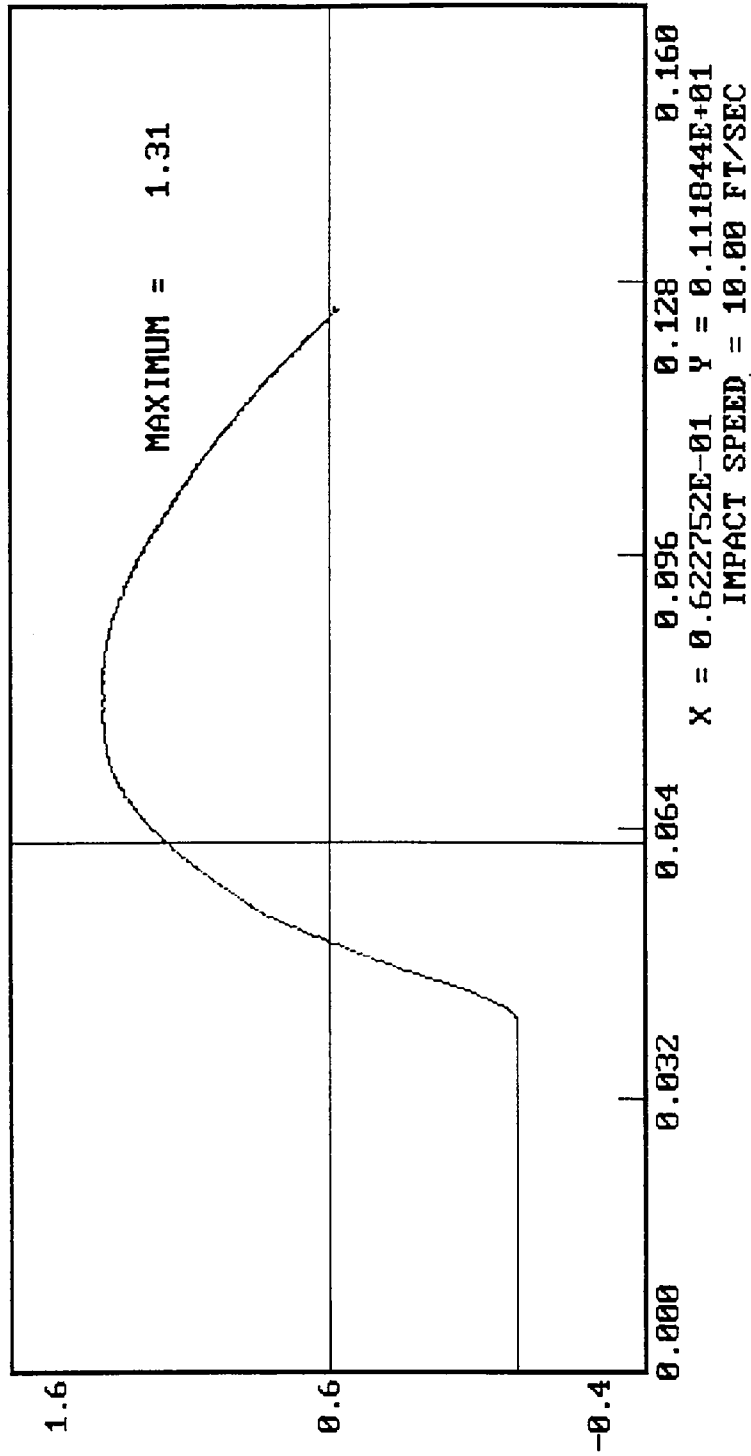


02-07-1997 11:27

DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 272

DISPLACEMENT (IN) VS. TIME ((SECONDS))

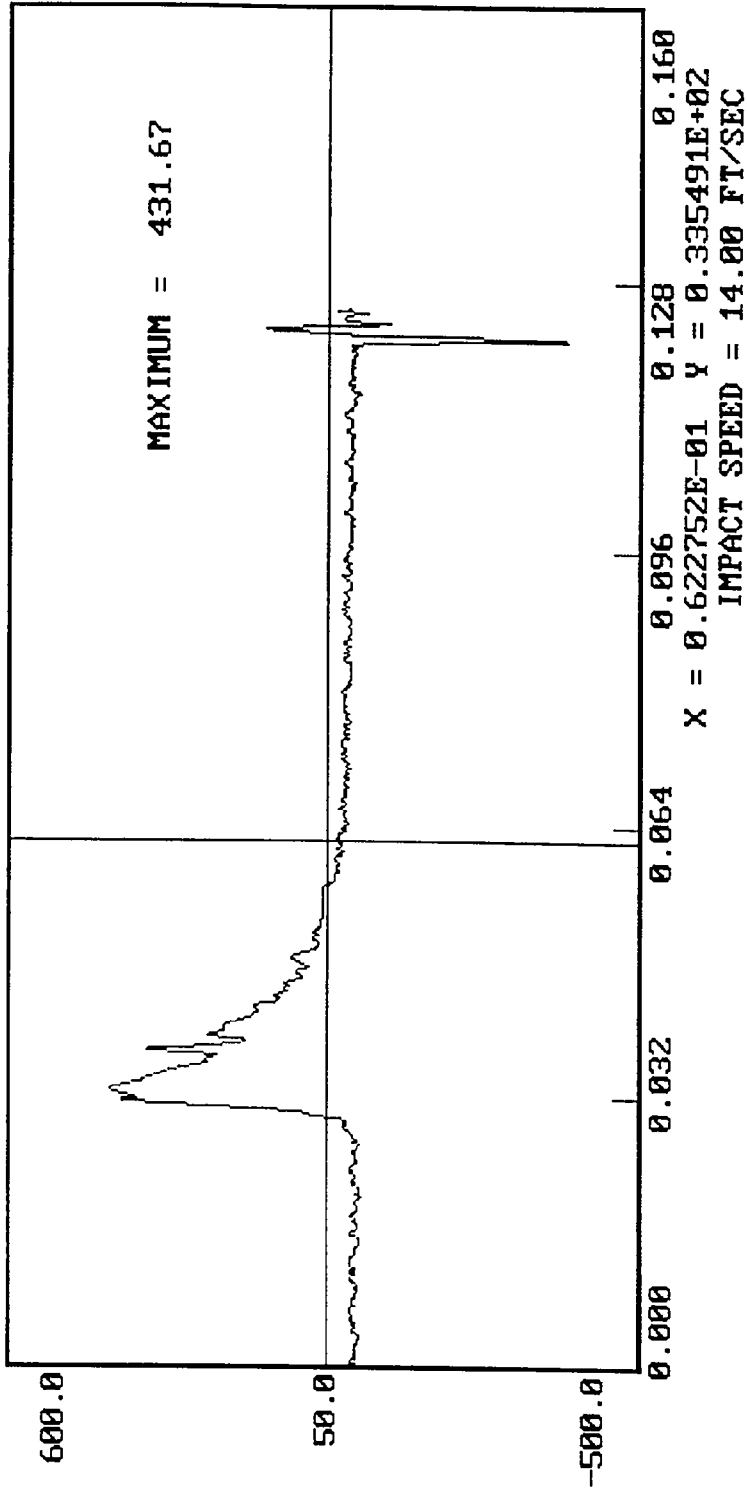


DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 272

FORCE (LBS) VS. TIME ((SECONDS))

02-07-1997 11:31

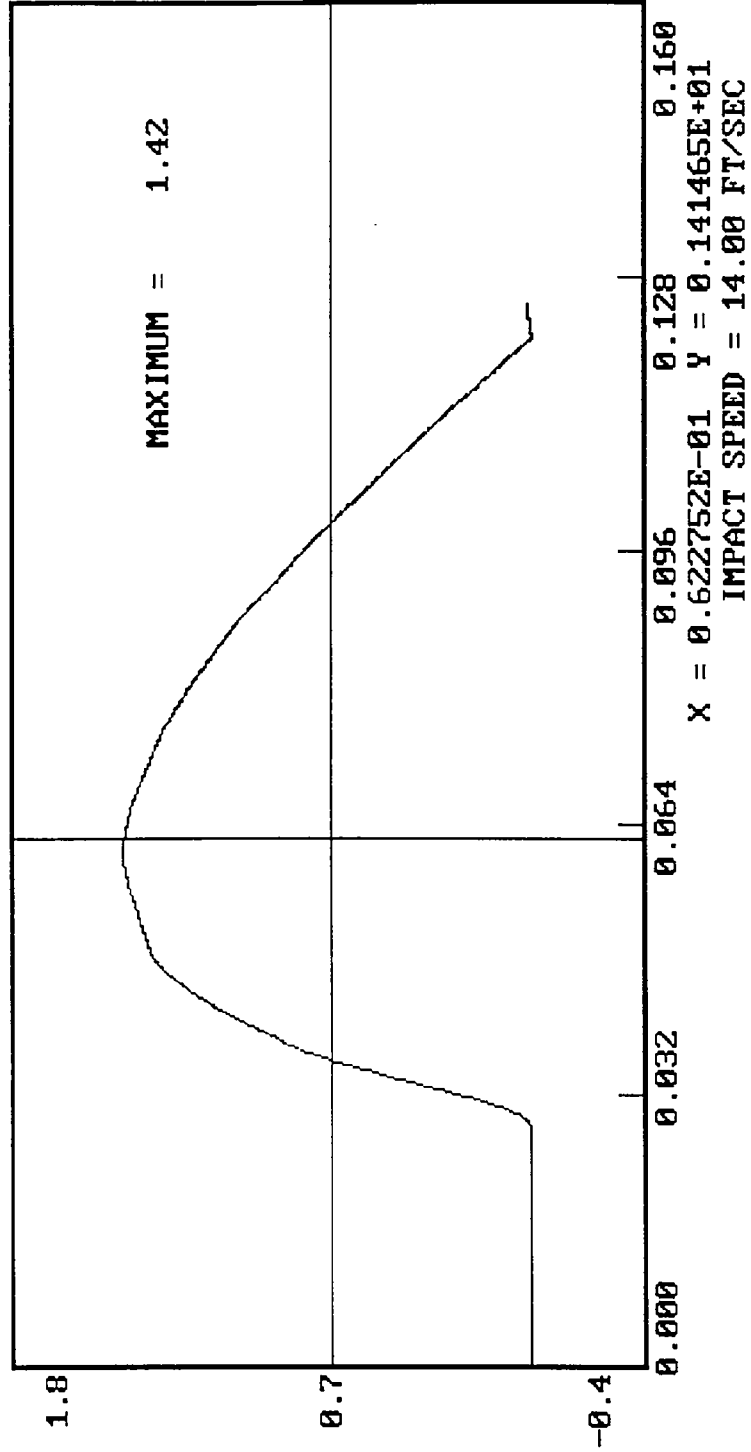


02-07-1997 11:31

DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 272

DISPLACEMENT (IN) VS. TIME ((SECONDS))

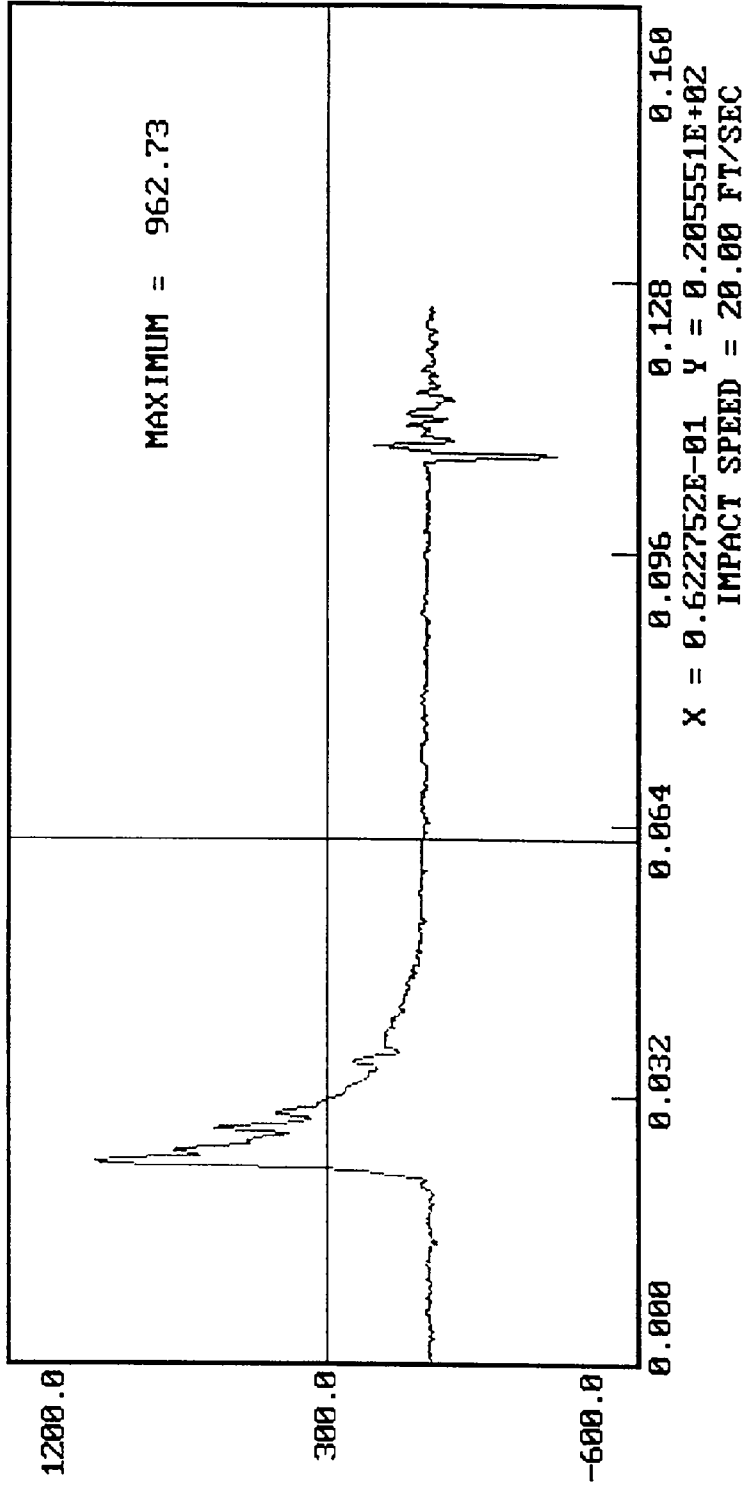


02-07-1997 11:44

DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 272

FORCE (LBS) VS. TIME ((SECONDS))

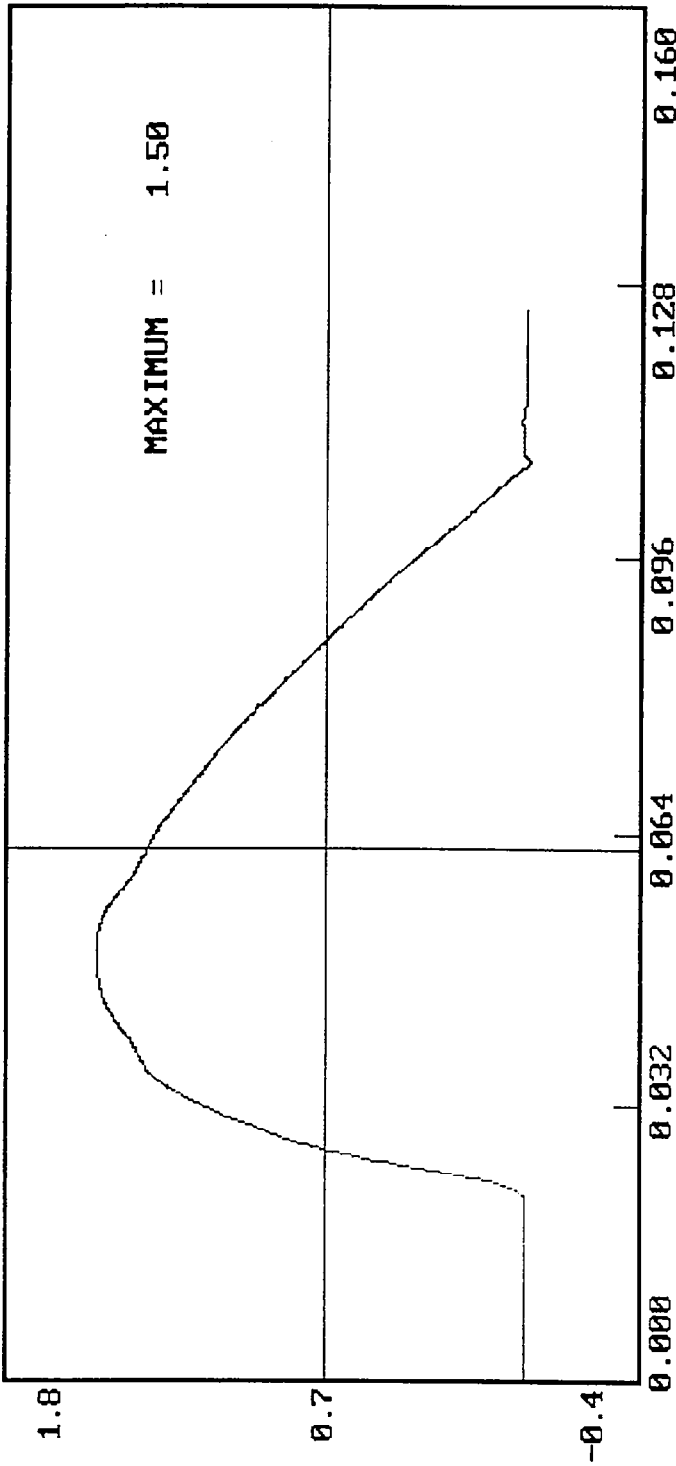


02-07-1997 11:44

DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 272

DISPLACEMENT (IN) VS. TIME ((SECONDS))



X = 0.622752E-01 Y = 0.132054E+01
IMPACT SPEED = 20.00 FT/SEC

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 7, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97322

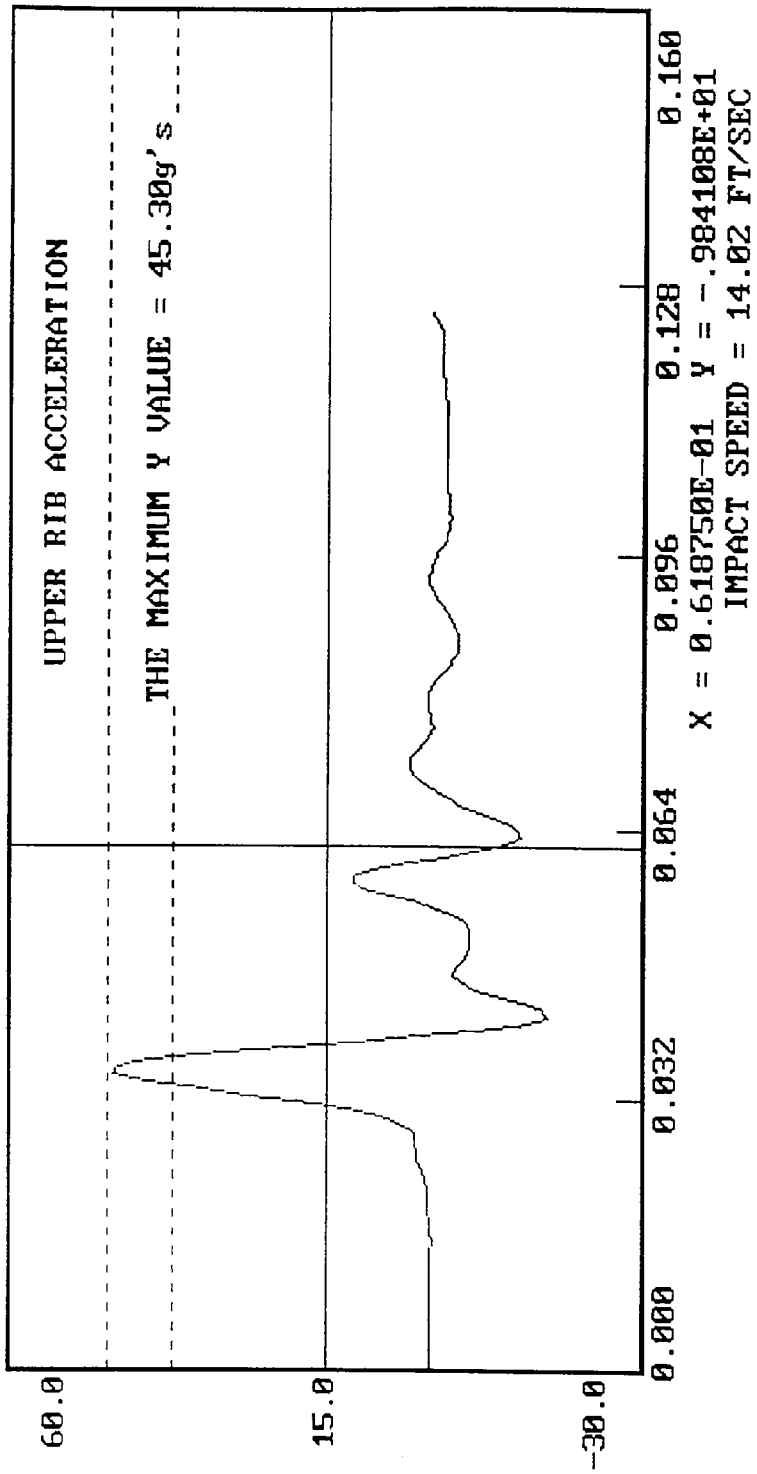
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	17%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	44
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Hilal

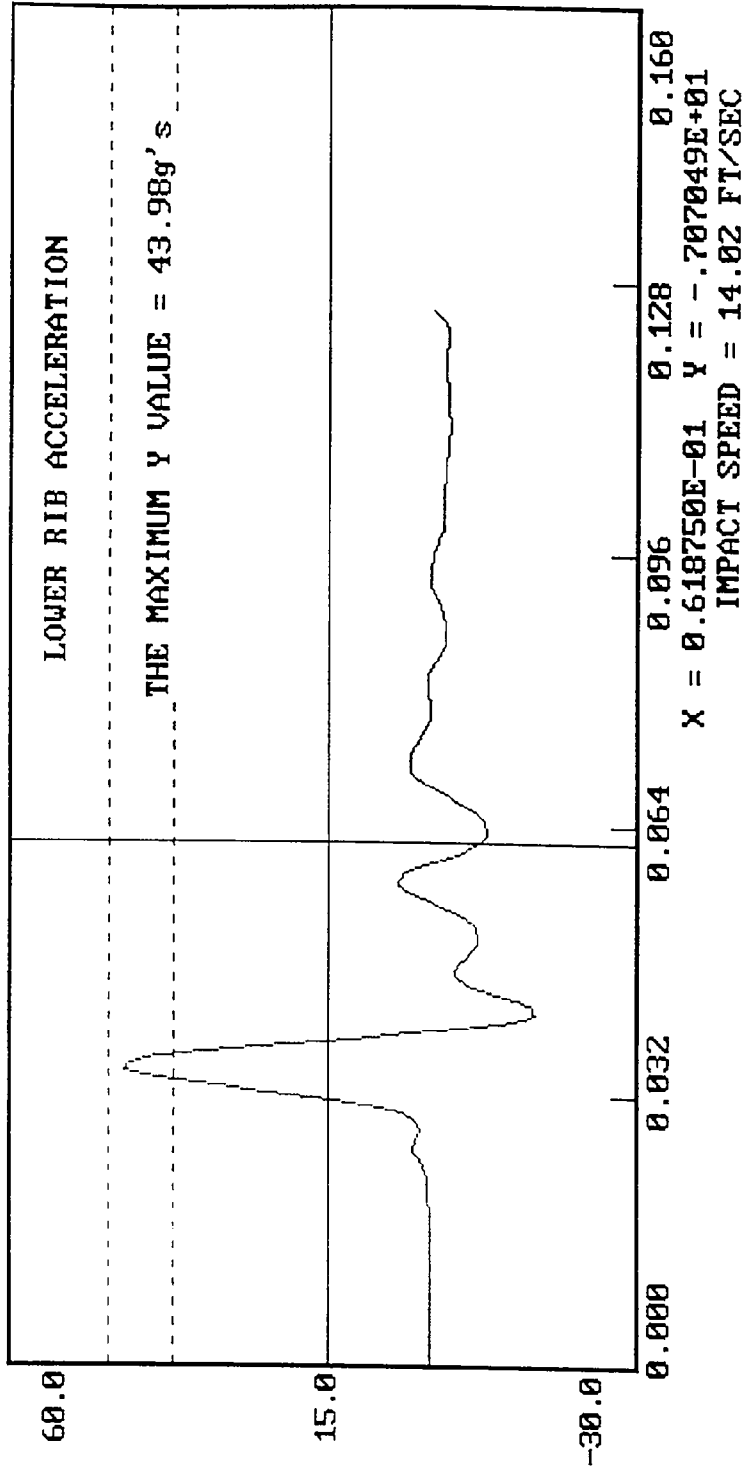
APPROVED BY Rene Krapake

DUMMY CALIBRATION THORAX IMPACT 02-07-1997 17:22
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



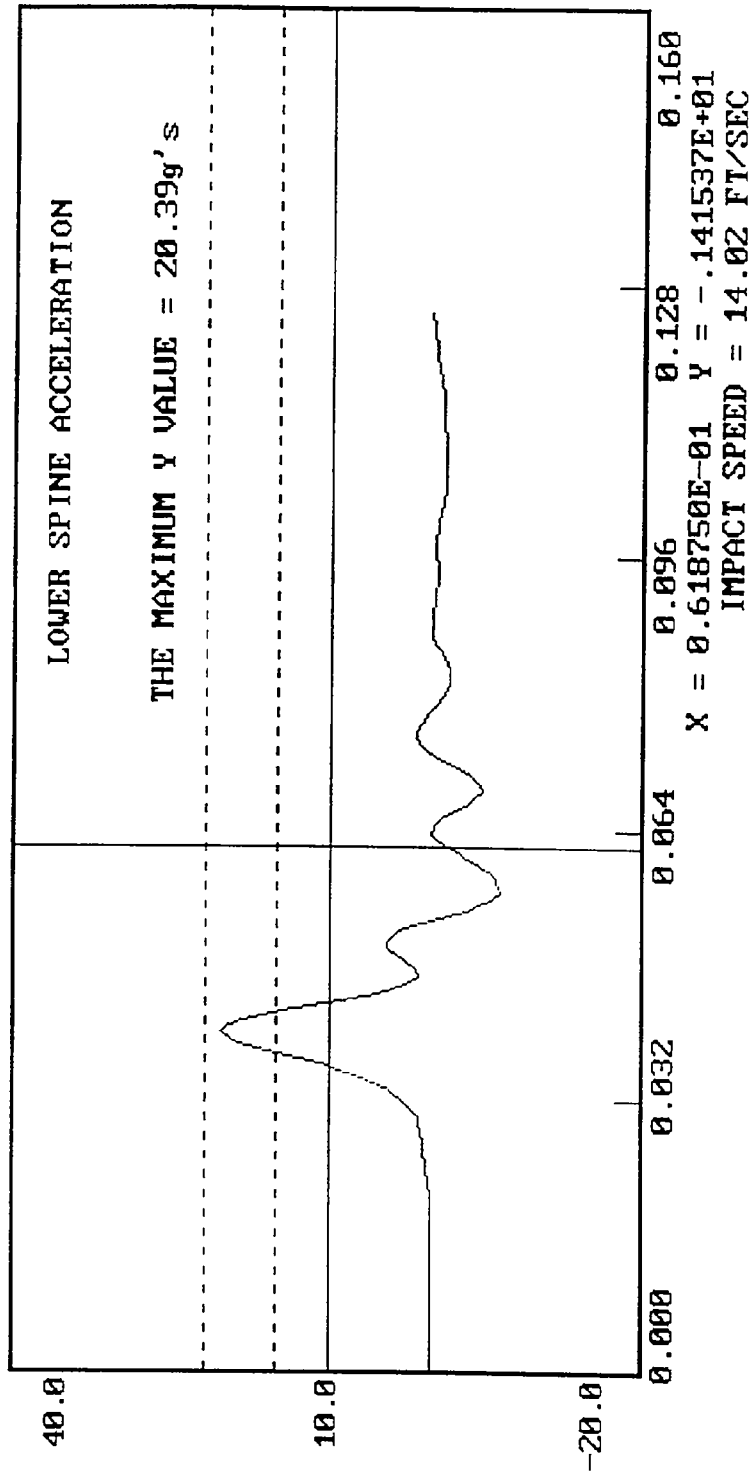
02-07-1997 17:22

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-07-1997 17:25



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

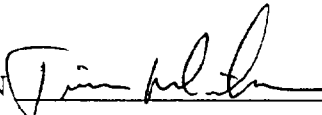
DATE: February 7, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97323

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	17%
PROBE SPEED	13.8 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	60

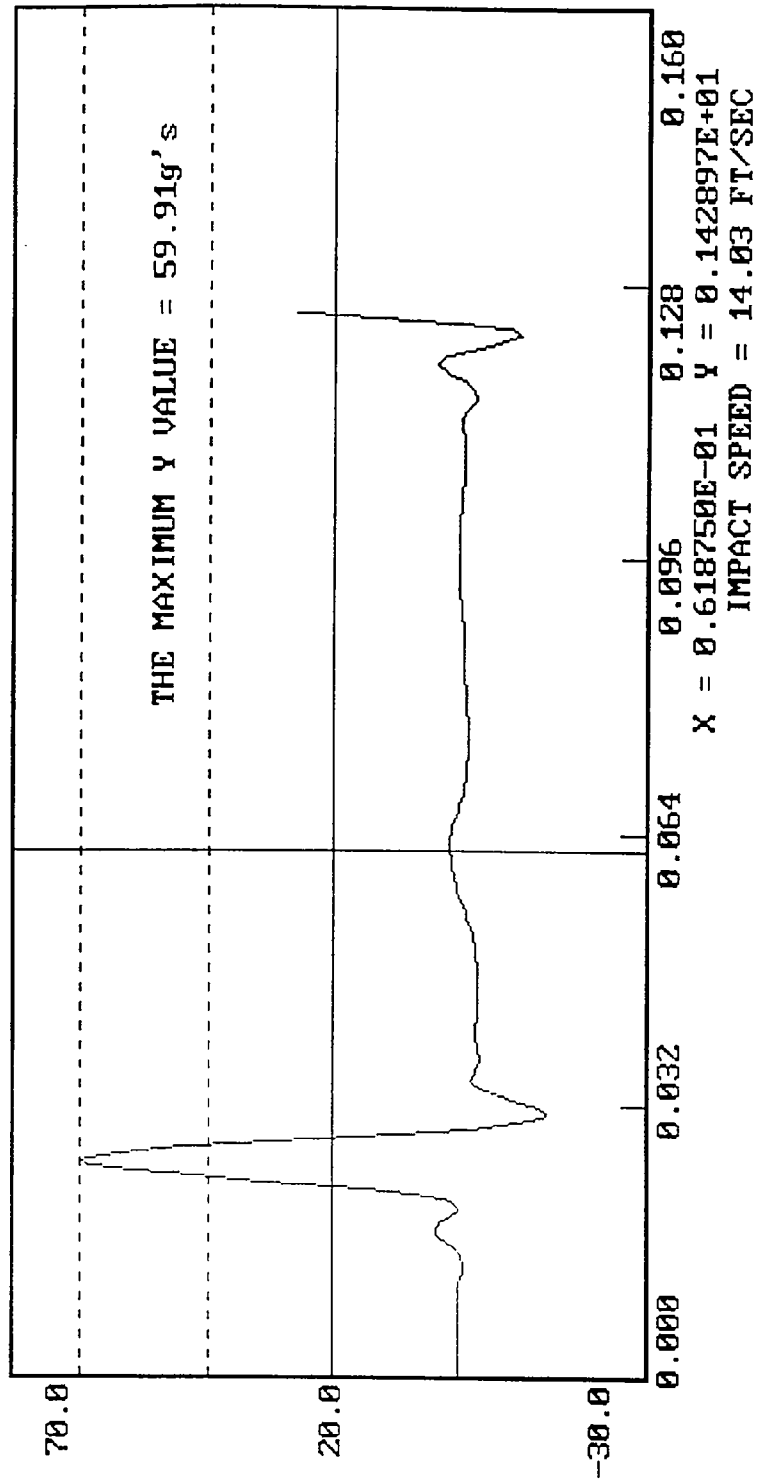
TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

DUMMY CALIBRATION - PELVIS IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-07-1997 17:31



MGA RESEARCH CORPORATION
ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)
SIDE IMPACT DUMMY (SID)

DATE: January 31, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97324

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	16%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.2
FORCE @ 0.75 in	36.7 - 49.8 lbs	43.1
FORCE @ 1.0 in	50 - 63 lbs	56
FORCE @ 1.3 in	73 - 88 lbs	77

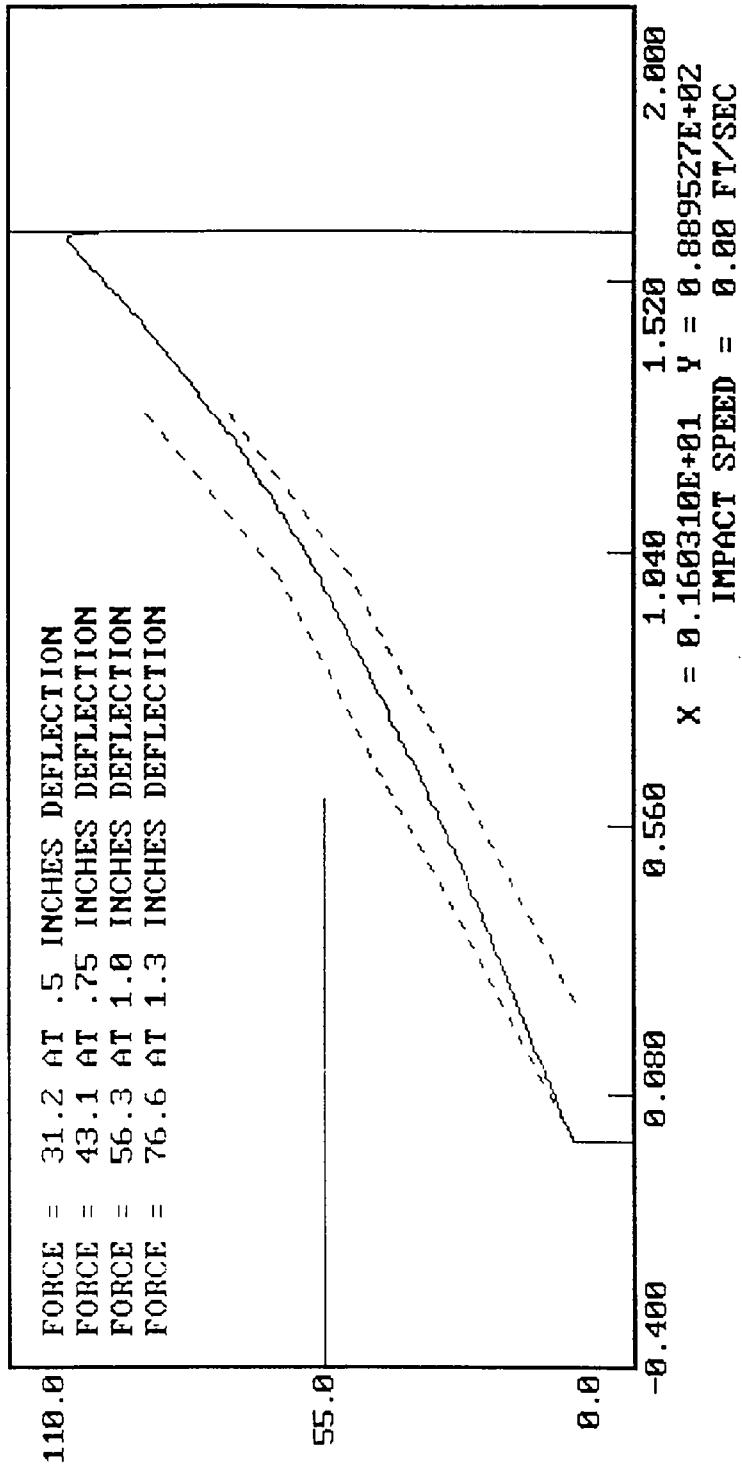
TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Melia

APPROVED BY Paul Kobake

DUMMY CALIBRATION - ABDOMEN COMPRESSION
DUMMY # 272
01-31-1997 12:31

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 31, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97325

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	36
FORCE @ 40°	46 - 58 lbs	52
RETURN ANGLE	12° maximum	1°

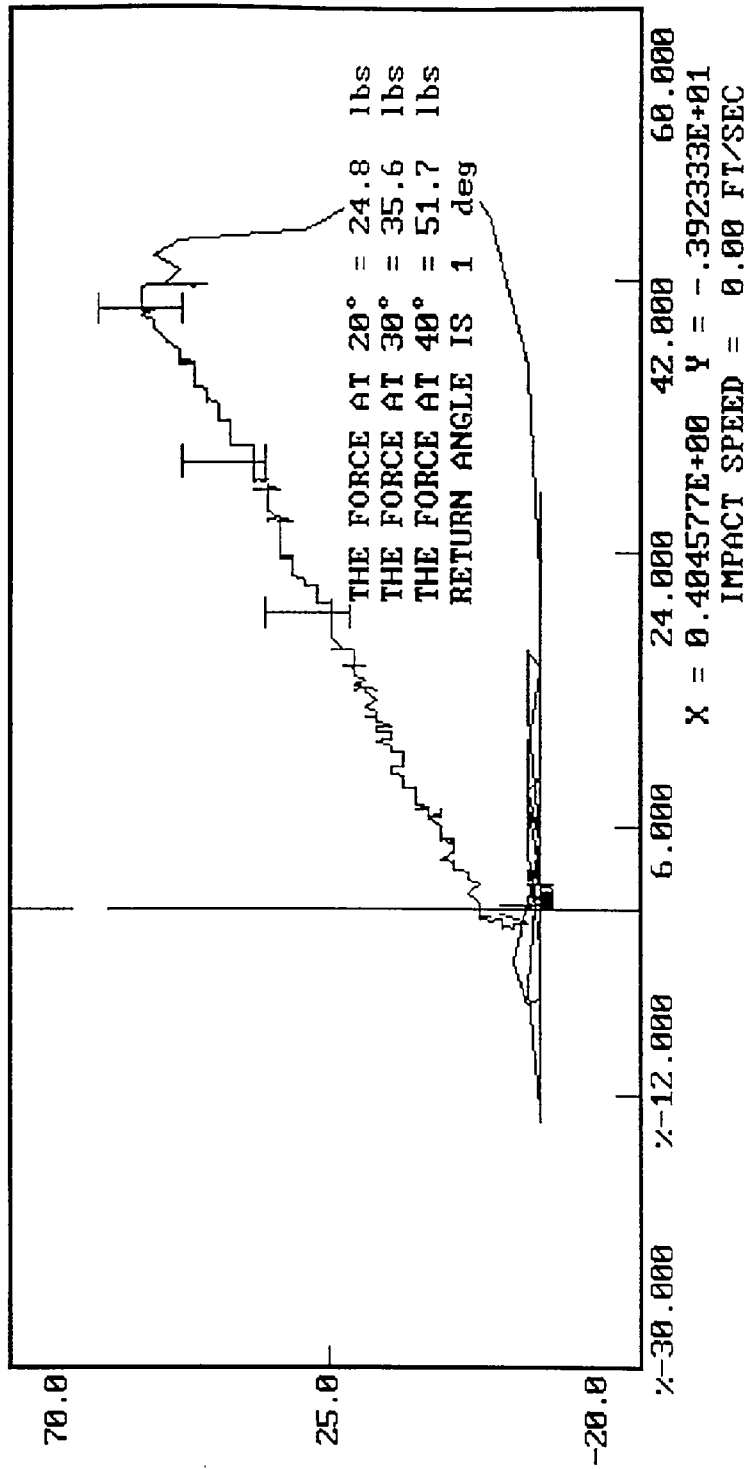
TEST MEETS SPECIFICATIONS

TECHNICIAN *Tim Hill*

APPROVED BY *Dave Kusabe*

01-31-1997 14:07

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 272
FORCE (LBS) VS. TORSO ROTATION (DEGREES)



PRE-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

DATE OF VERIFICATION: February 7, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75" - 20.50"	20.40
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: *Jim [Signature]*

APPROVED BY: *Rene Kabsche*

MGA RESEARCH CORPORATION
 THORACIC SHOCK ABSORBER TEST
 SIDE IMPACT DUMMY (SID)

DATE: February 7, 1997

DUMMY NUMBER: 271

TEST NUMBER: D9731678

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78° F	70°
RELATIVE HUMIDITY		10 - 70%	16%
VELOCITY 10 ft/s	FORCE (lb.)	188 - 253	205
	DISPLACEMENT (in.)	1.18 - 1.38	1.32
VELOCITY 14 ft/s	FORCE (lb.)	389 - 472	436
	DISPLACEMENT (in.)	1.26 - 1.47	1.43
VELOCITY 20 ft/s	FORCE (lb.)	841 - 1000	990
	DISPLACEMENT (in.)	1.30 - 1.57	1.50

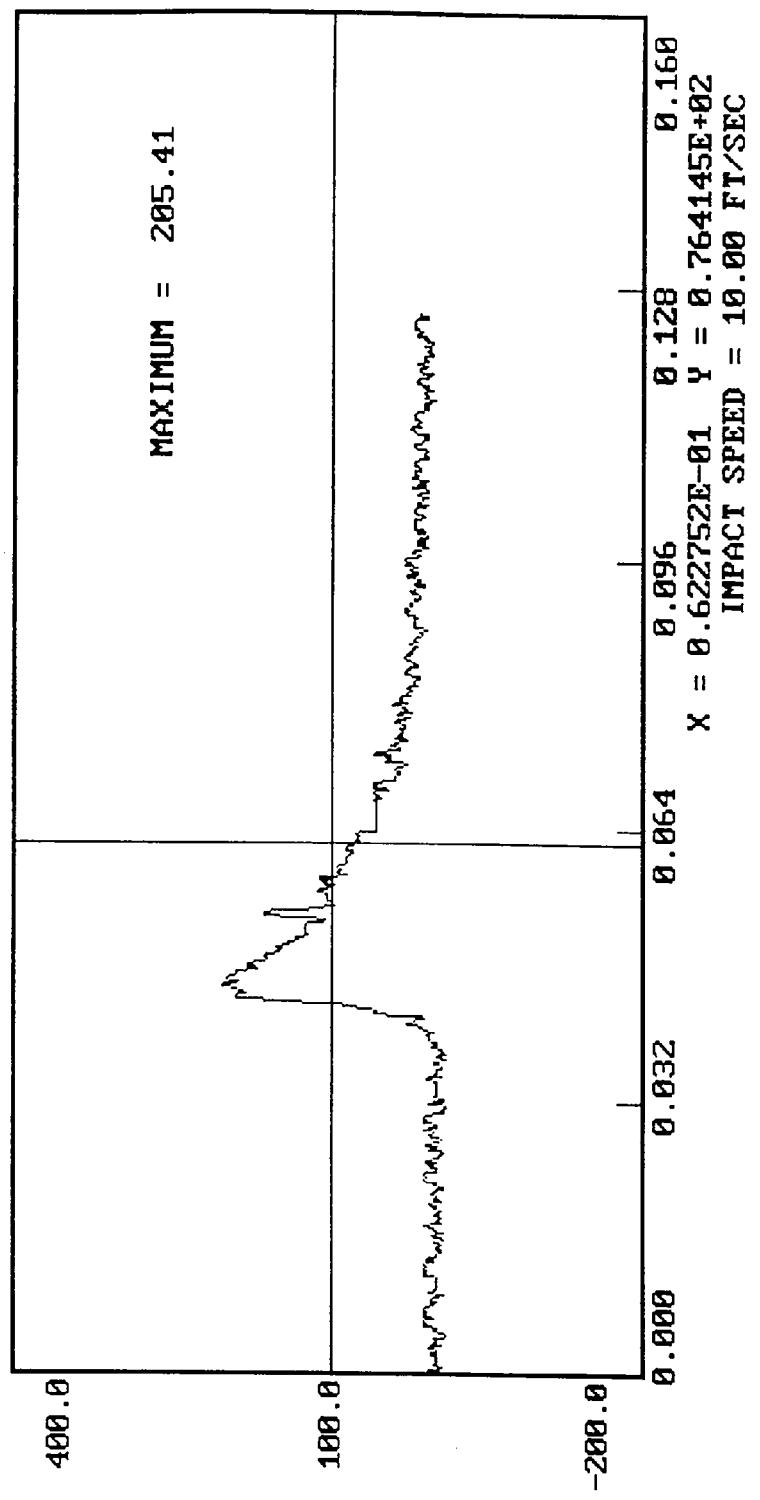
TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Hill

APPROVED BY Paul Kabake

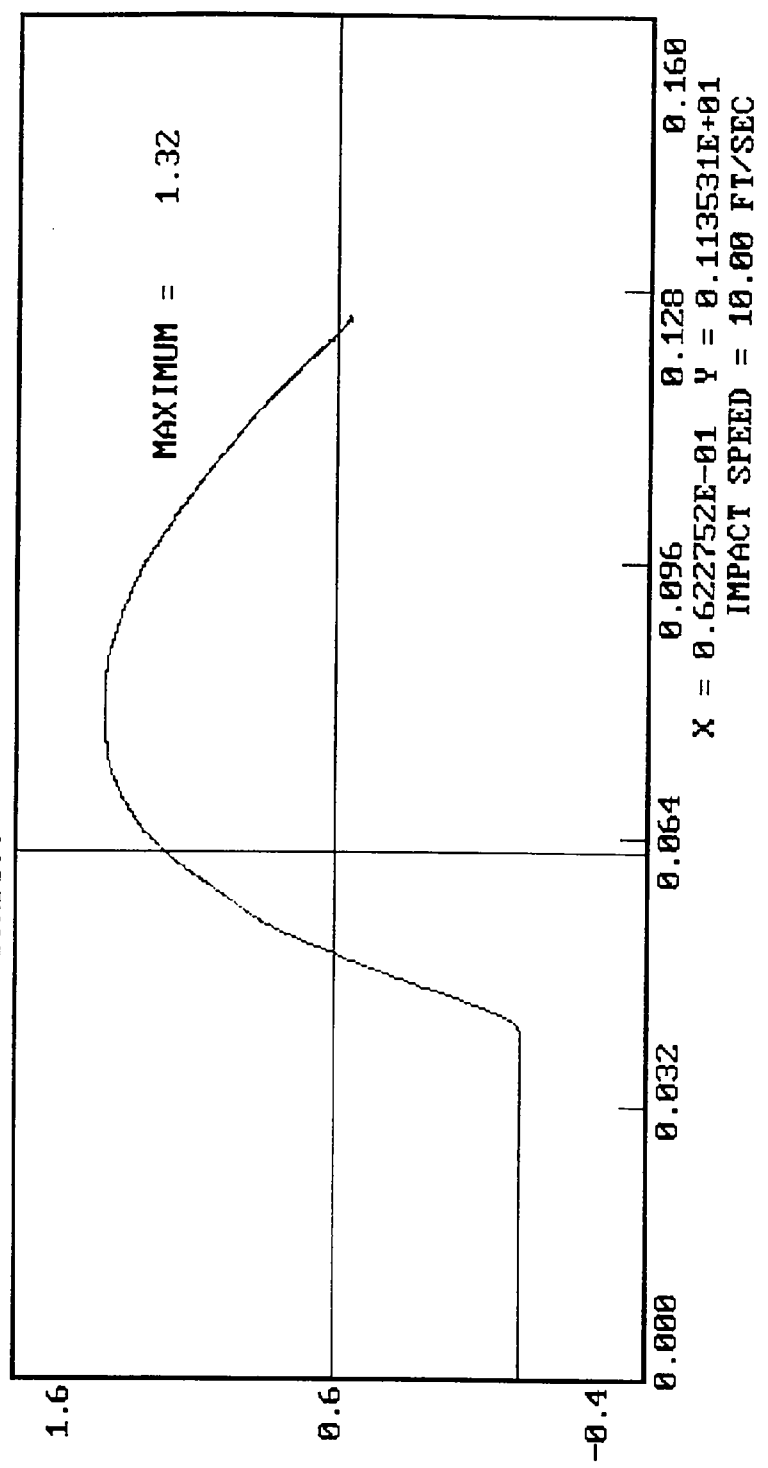
DUMMY CALIBRATION - DAMPENER BENCH TEST
DUMMY # 271
FORCE (LBS) VS. TIME ((SECONDS))

02-07-1997 10:35



DUMMY CALIBRATION - DAMPENER BENCH TEST
DUMMY # 271
DISPLACEMENT (IN) VS. TIME ((SECONDS))

02-07-1997 10:35

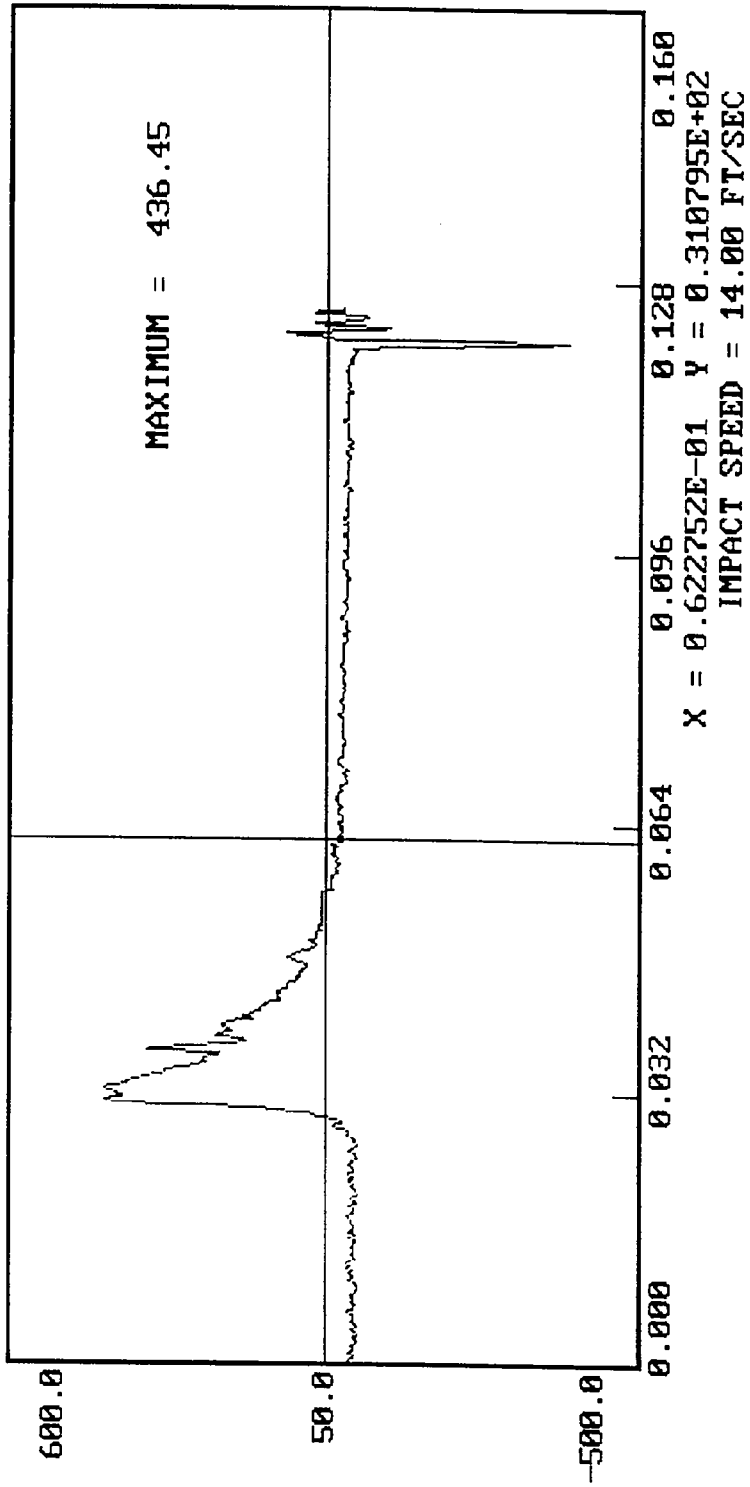


02-07-1997 10:49

DUMMY CALIBRATION - DAMPENER BENCH TEST

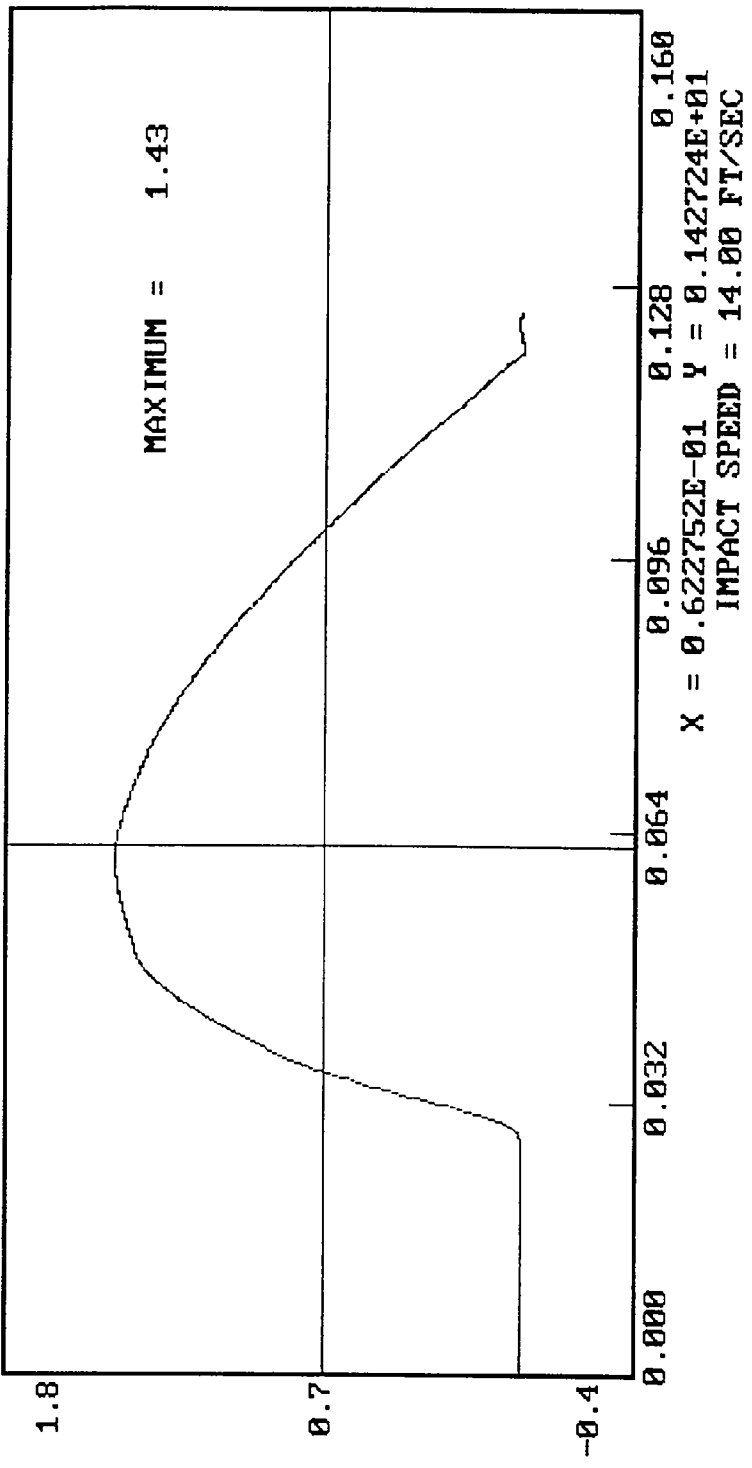
DUMMY # 271

FORCE (LBS) VS. TIME ((SECONDS))



02-07-1997 10:49

DUMMY CALIBRATION - DAMPENER BENCH TEST
DUMMY # 271
DISPLACEMENT (IN) VS. TIME ((SECONDS))

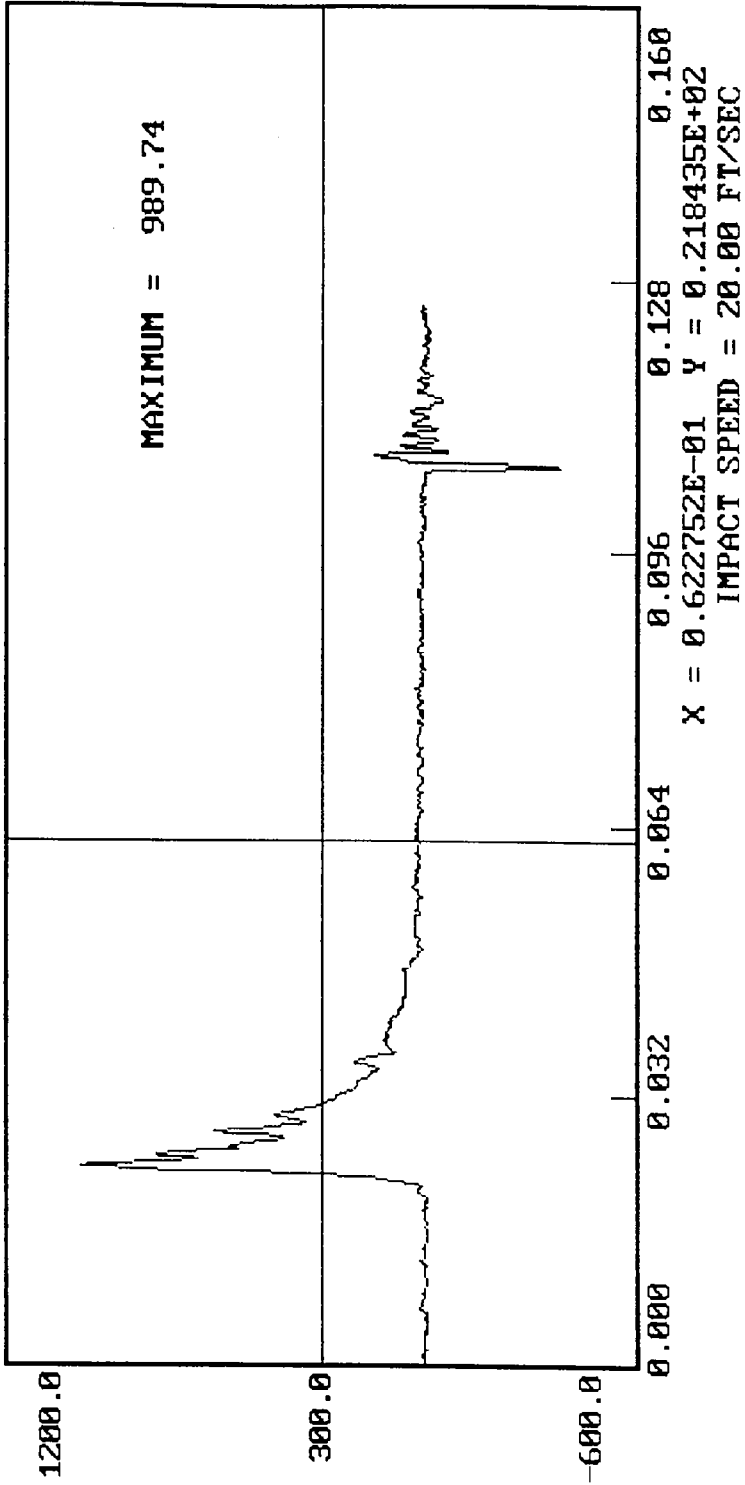


02-07-1997 11:08

DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 271

FORCE (LBS) VS. TIME ((SECONDS))

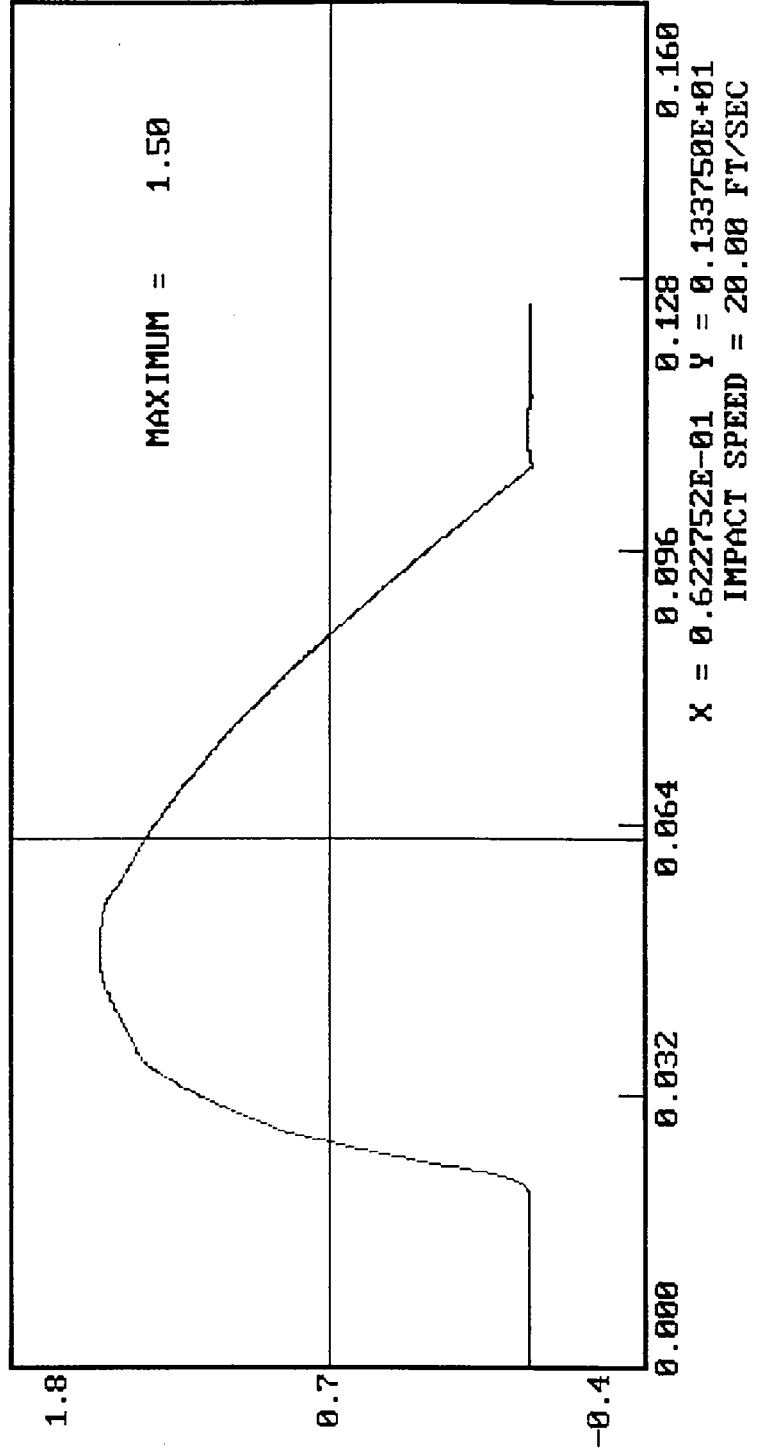


02-07-1997 11:08

DUMMY CALIBRATION - DAMPENER BENCH TEST

DUMMY # 271

DISPLACEMENT (IN) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 7, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97312

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	17%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	39
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	19

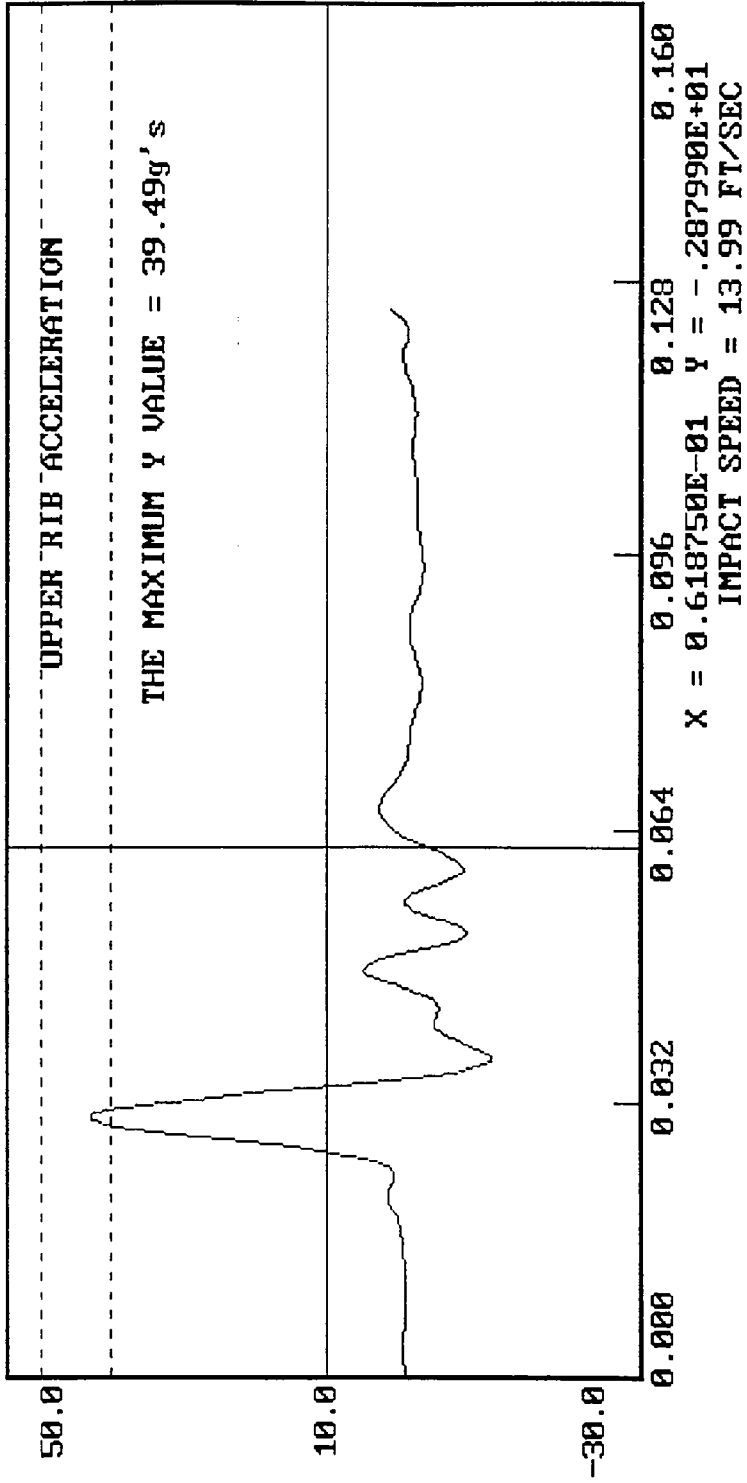
TEST MEETS SPECIFICATIONS

TECHNICIAN Tim White

APPROVED BY Paul Korbak

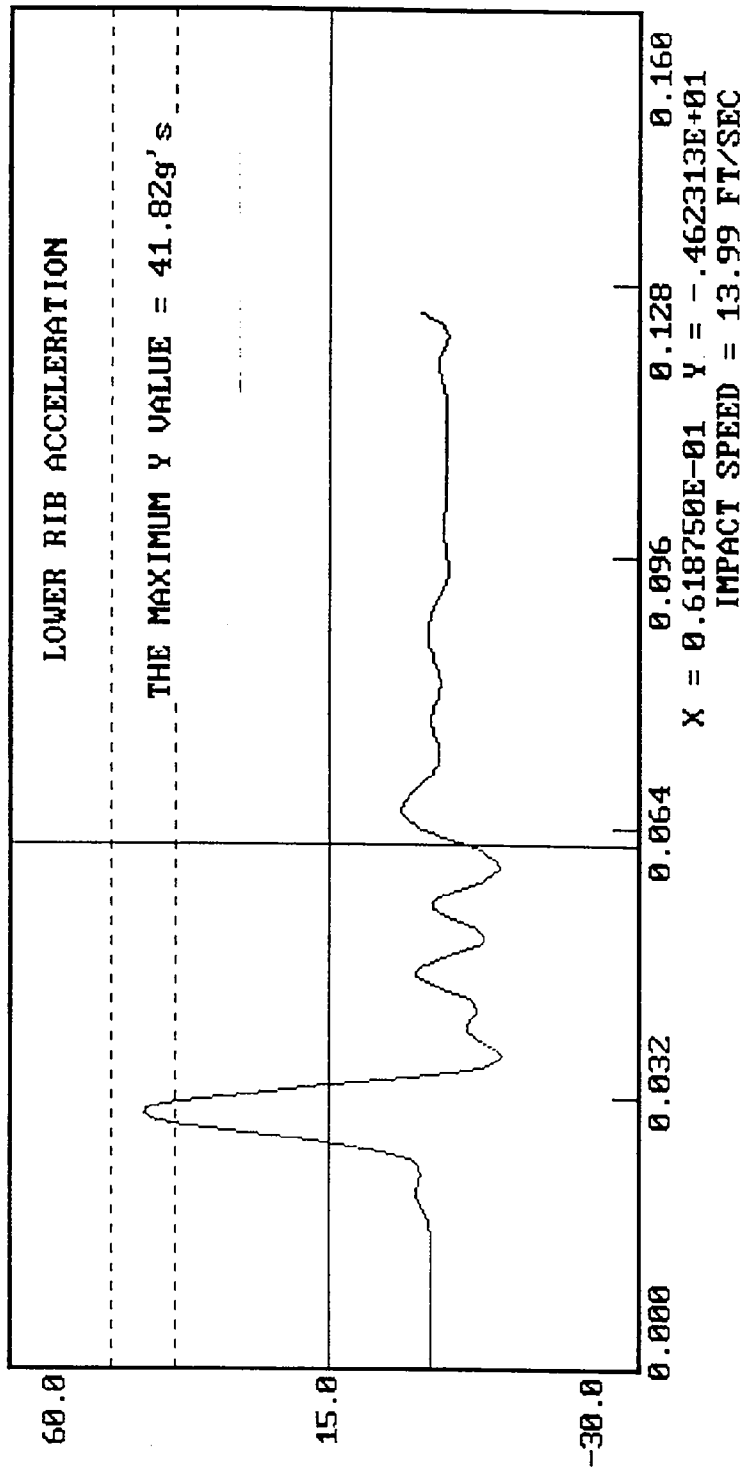
DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-07-1997 15:21



DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-07-1997 15:21

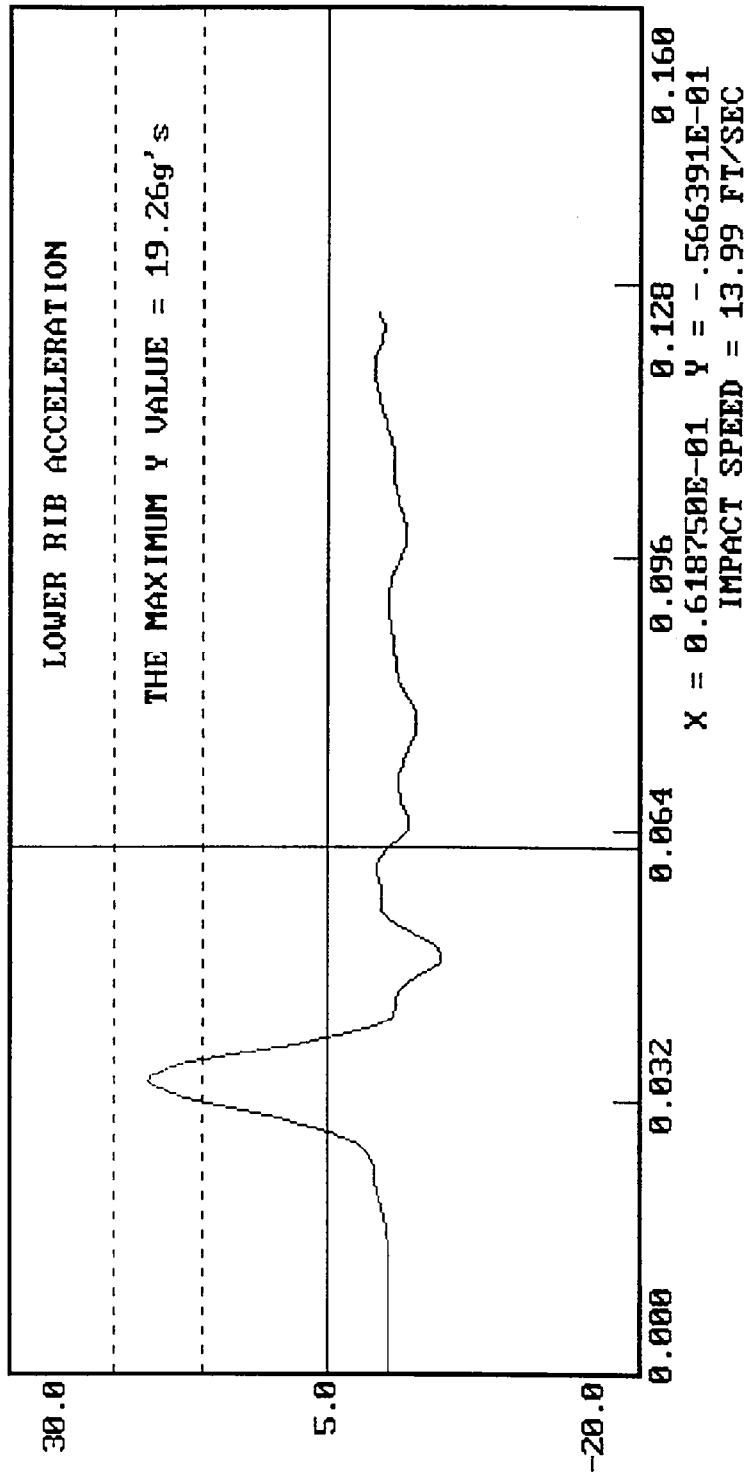


02-07-1997 15:21

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 271

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 7, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97313

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	17%
PROBE SPEED	13.8 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	53

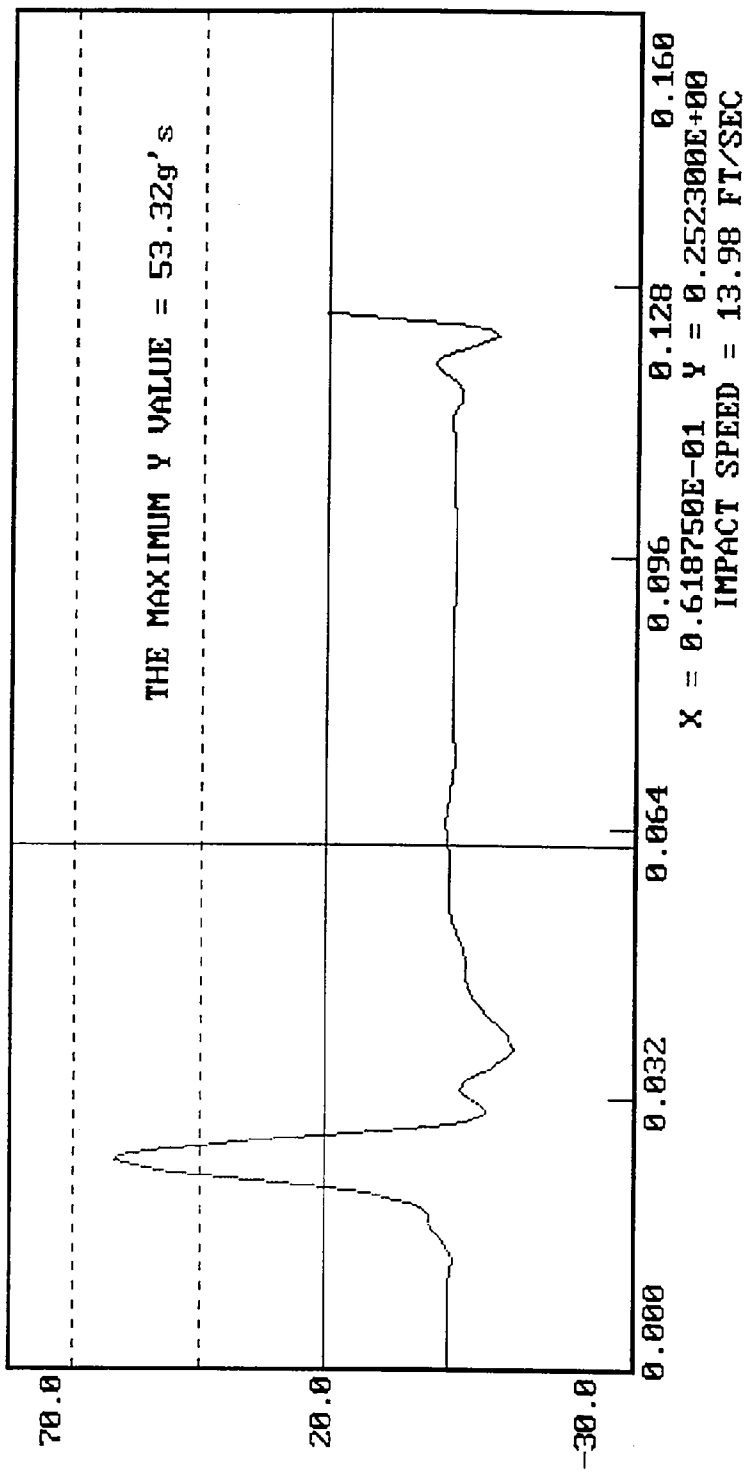
TEST MEETS SPECIFICATIONS

TECHNICIAN Jim White

APPROVED BY Russ Kabane

DUMMY CALIBRATION - PELVIS IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-07-1997 15:32



MGA RESEARCH CORPORATION
ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)
SIDE IMPACT DUMMY (SID)

DATE: January 31, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97314

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	16%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.3
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.5
FORCE @ 1.0 in	50 - 63 lbs	59
FORCE @ 1.3 in	73 - 88 lbs	80

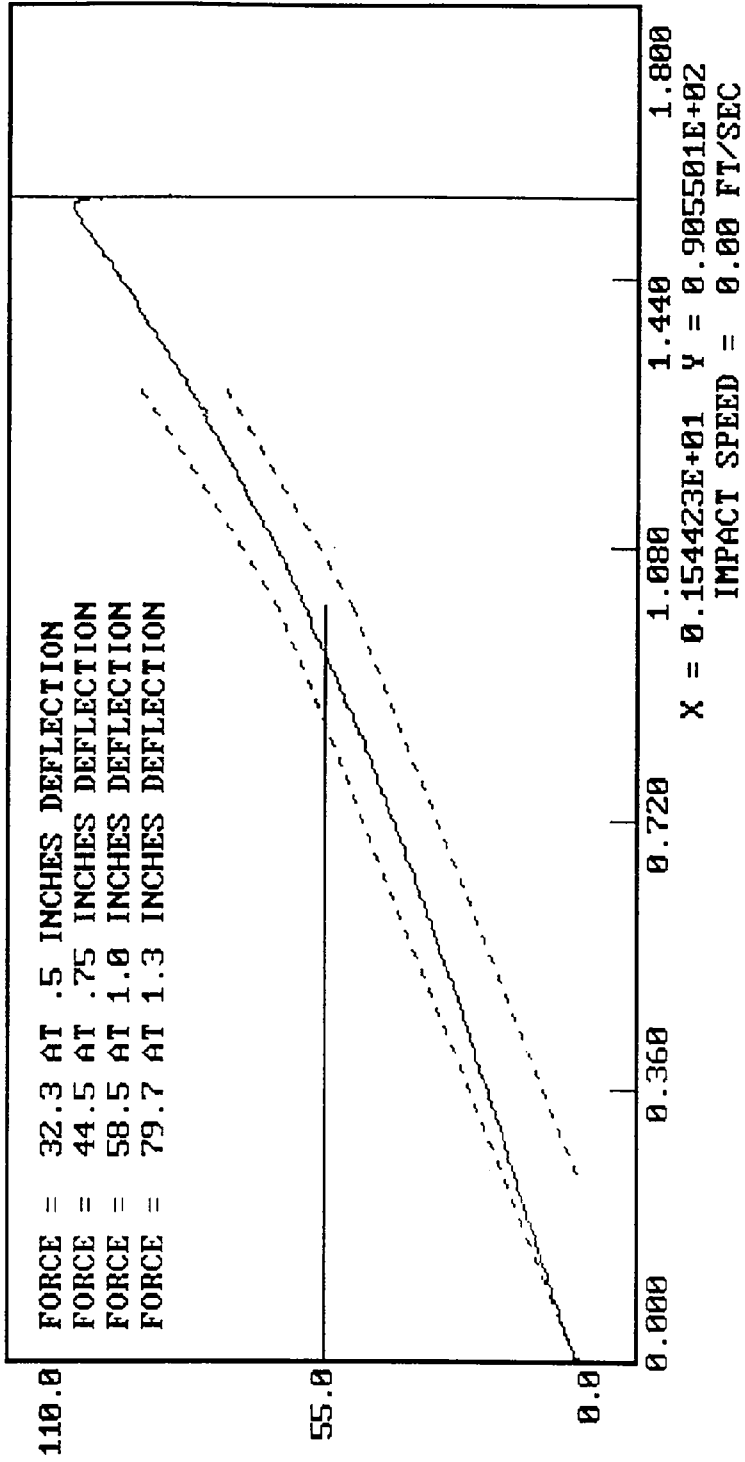
TEST MEETS SPECIFICATIONS

TECHNICIAN Tim White

APPROVED BY Rene Koubake

DUMMY CALIBRATION - ABDOMEN COMPRESSION
 DUMMY # 271
 01-31-1997 12:28

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 31, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97315

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	29
FORCE @ 30°	34 - 46 lbs	37
FORCE @ 40°	46 - 58 lbs	52
RETURN ANGLE	12° maximum	1°

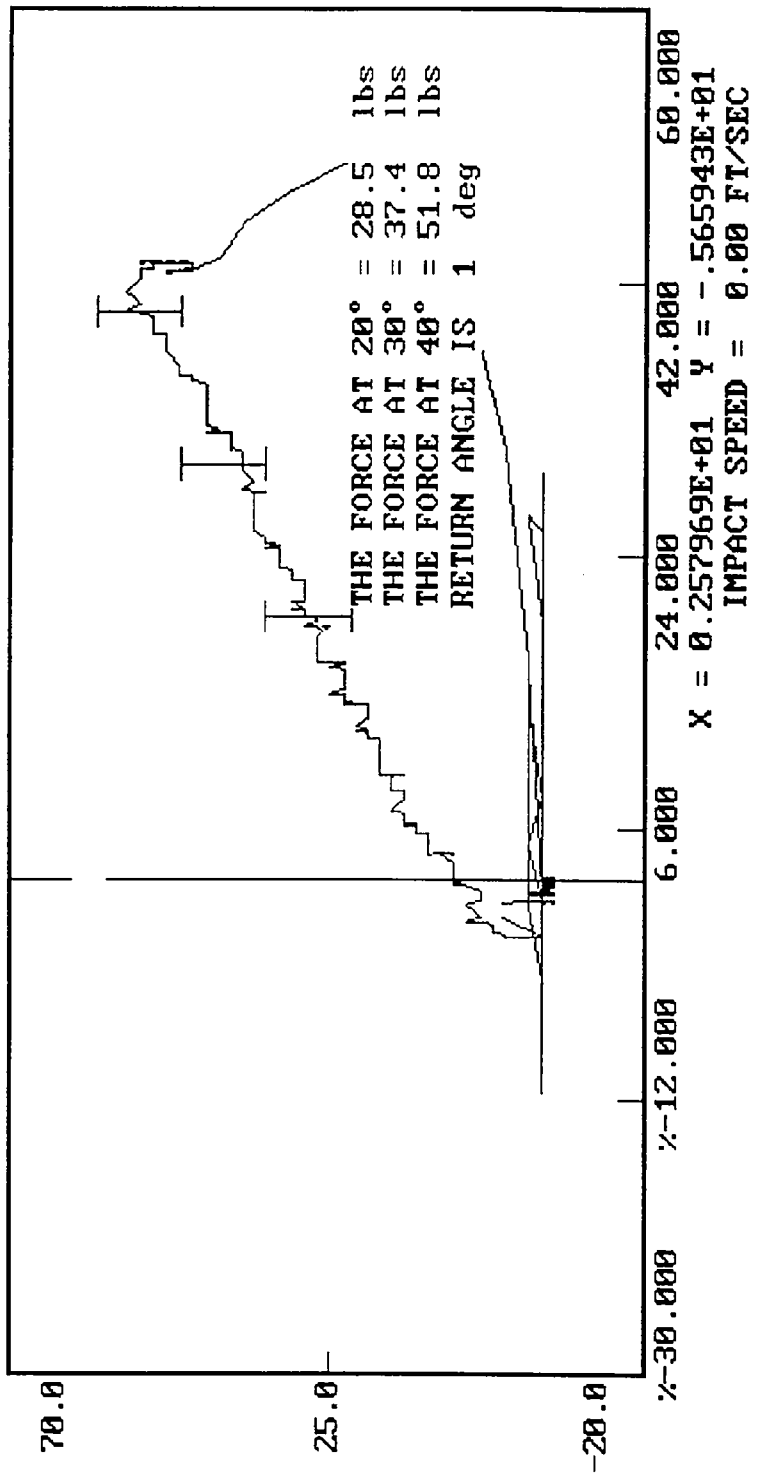
TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Hillem

APPROVED BY Rene Kabaha

01-31-1997 15:09

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 271
FORCE (LBS) VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Front Dummy Serial Number: 272

Calibration Test Results Summary

Dummy Serial Number: 272

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: February 13, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.20
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.6
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: Tim M. [Signature]

APPROVED BY: [Signature]

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 13, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97422

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	11%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	43
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

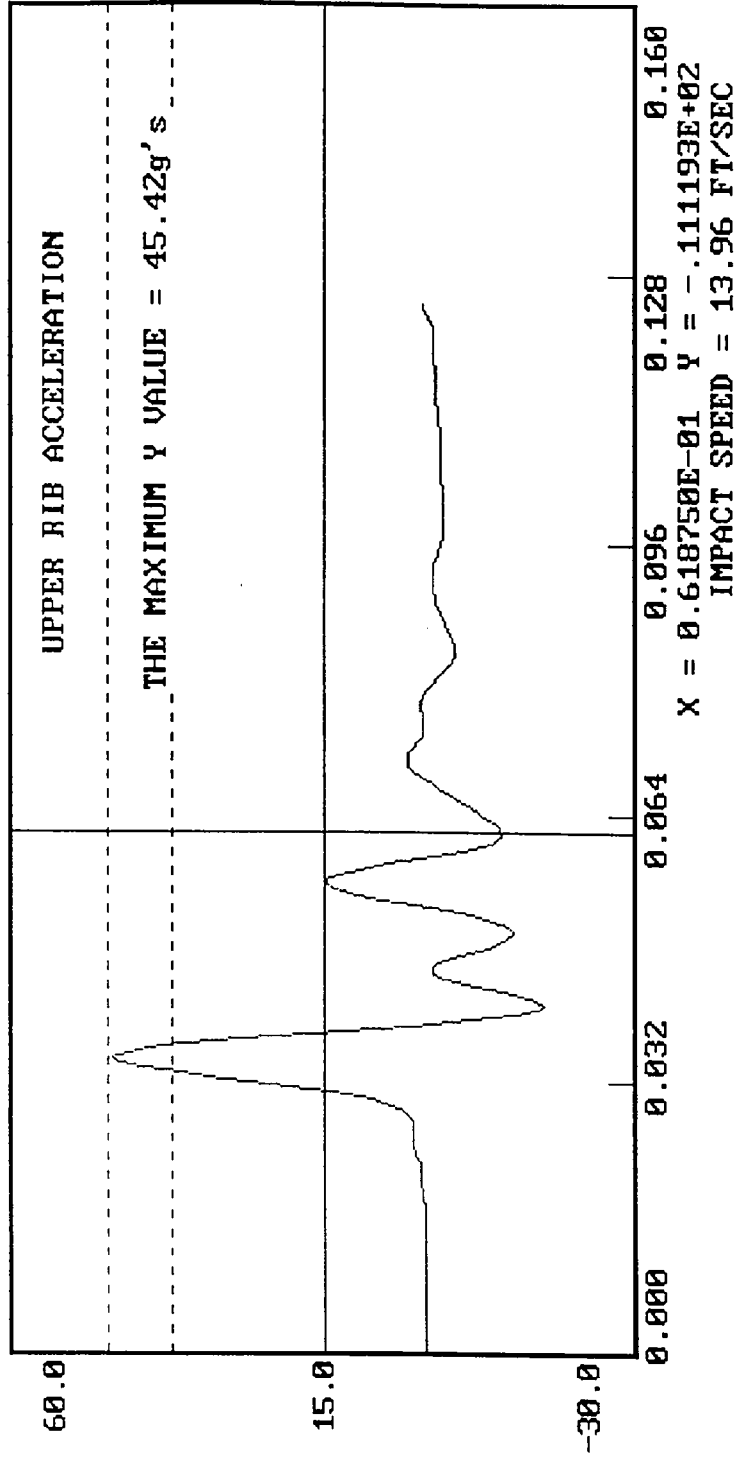
TECHNICIAN Tim Hill

APPROVED BY Dave Kroboske

02-13-1997 10:52

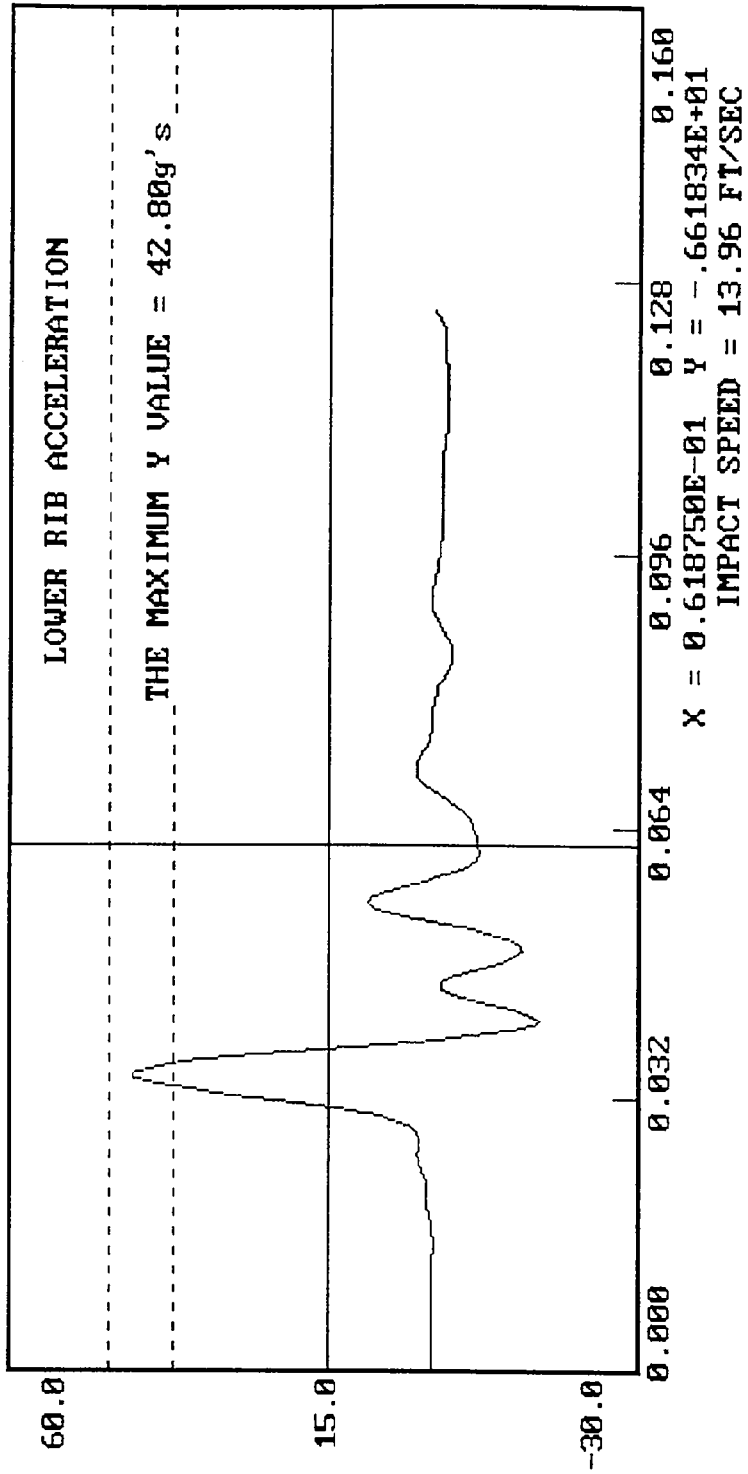
DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272

ACCELERATION (G'S) VS. TIME ((SECONDS))



02-13-1997 10:52

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))

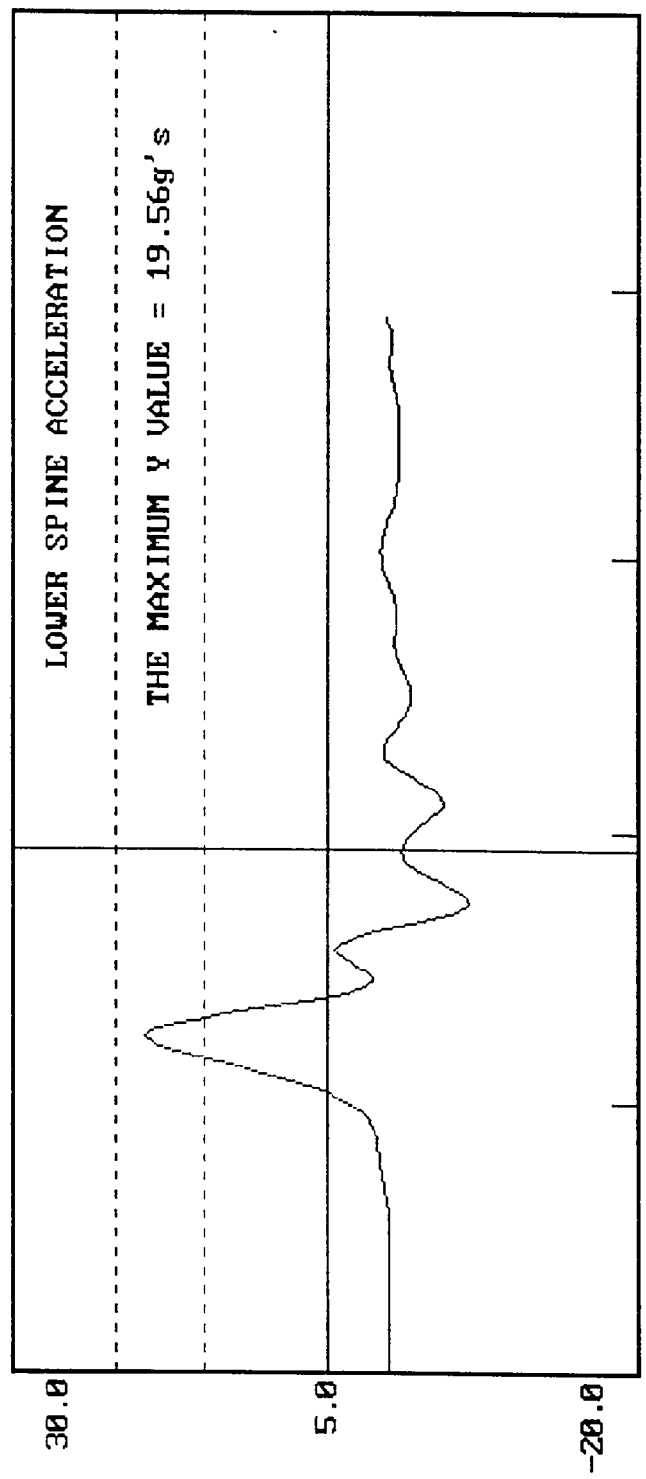


02-13-1997 10:54

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 272

ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = -.105000E+01
IMPACT SPEED = 13.96 FT/SEC

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 13, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97423

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	11%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	46

TEST MEETS SPECIFICATIONS

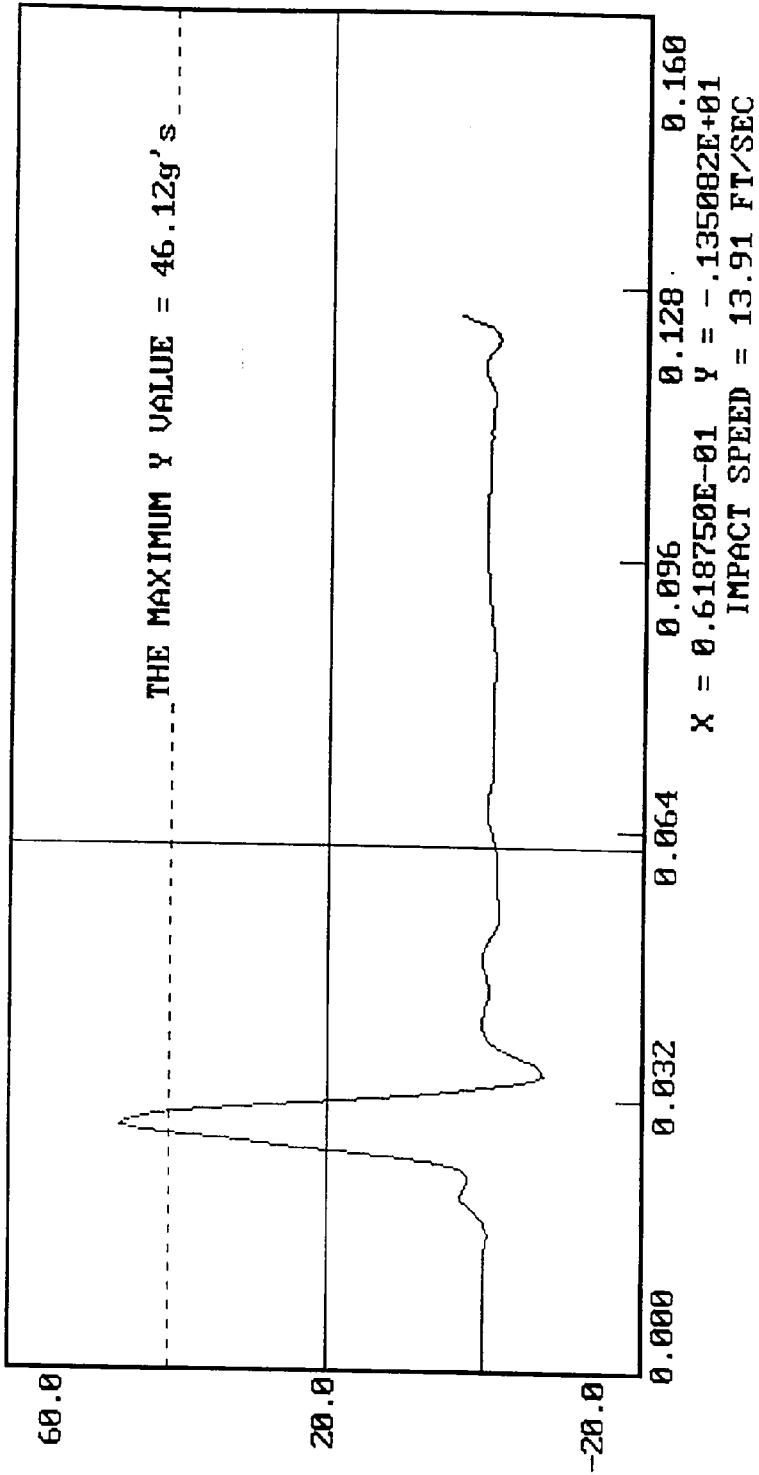
TECHNICIAN Tim Kish

APPROVED BY Steve Koobako

DUMMY CALIBRATION - PELVIS IMPACT
DUMMY # 272

02-13-1997 11:03

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: February 13, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97424

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	14%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.2
FORCE @ 0.75 in	36.7 - 49.8 lbs	43.6
FORCE @ 1.0 in	50 - 63 lbs	59
FORCE @ 1.3 in	73 - 88 lbs	78

TEST MEETS SPECIFICATIONS

TECHNICIAN Jim White

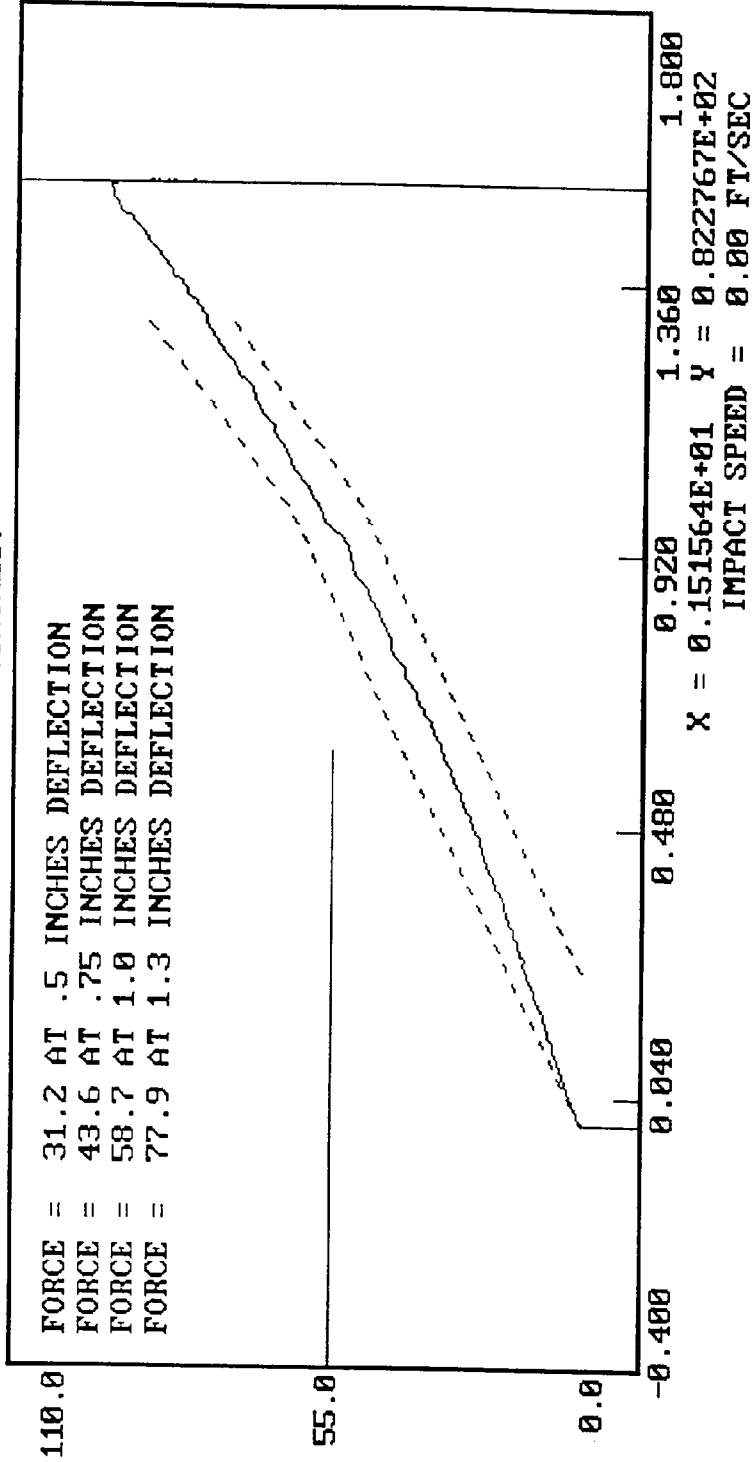
APPROVED BY Paul Korbabe

DUMMY CALIBRATION - ABDOMEN COMPRESSION
DUMMY # 272

02-13-1997 18:02

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)

FORCE = 31.2 AT .5 INCHES DEFLECTION
FORCE = 43.6 AT .75 INCHES DEFLECTION
FORCE = 58.7 AT 1.0 INCHES DEFLECTION
FORCE = 77.9 AT 1.3 INCHES DEFLECTION



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: February 13, 1997

DUMMY NUMBER: 272

TEST NUMBER: D97425

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	14%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	29
FORCE @ 30°	34 - 46 lbs	40
FORCE @ 40°	46 - 58 lbs	50
RETURN ANGLE	12° maximum	1°

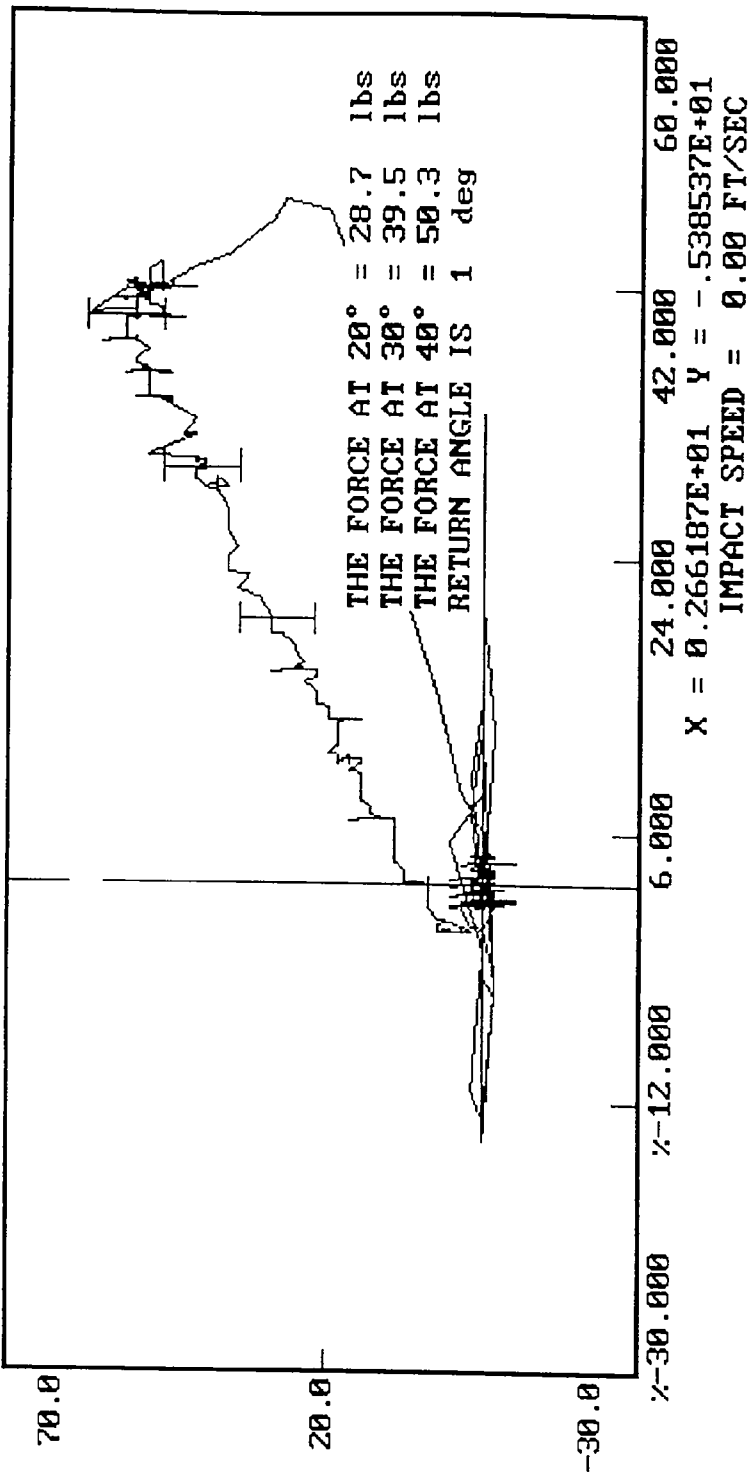
TEST MEETS SPECIFICATIONS

TECHNICIAN Tim [Signature]

APPROVED BY Russ [Signature]

02-13-1997 17:37

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 272
FORCE (LBS) VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

DATE OF VERIFICATION: February 13, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75" - 20.50"	20.40
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: Jim White

APPROVED BY: Paul Koberke

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 12, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97412

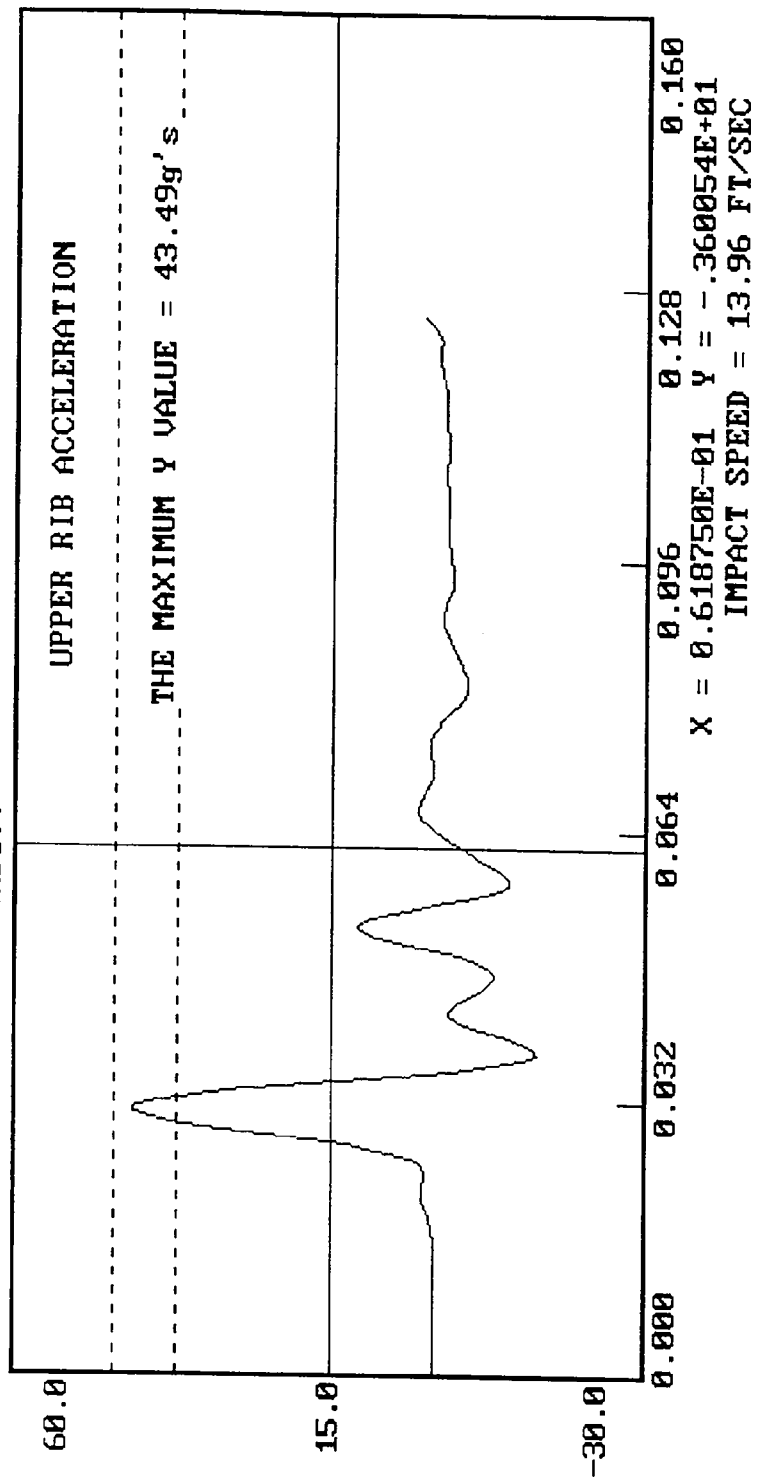
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	14%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	45
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN Tim White

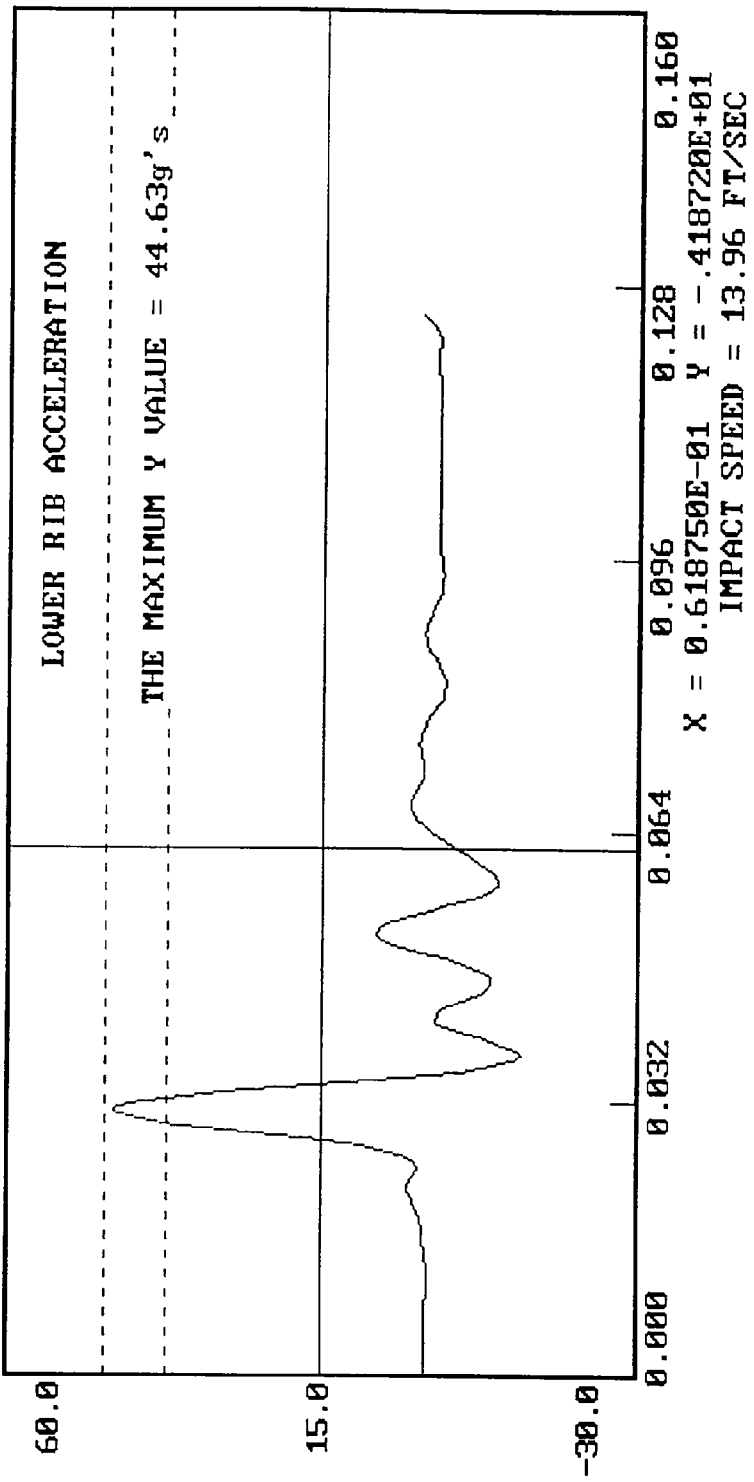
APPROVED BY Rene Kababe

DUMMY CALIBRATION - THORAX IMPACT
 DUMMY # 271
 02-12-1997 15:12
 ACCELERATION (G'S) VS. TIME ((SECONDS))



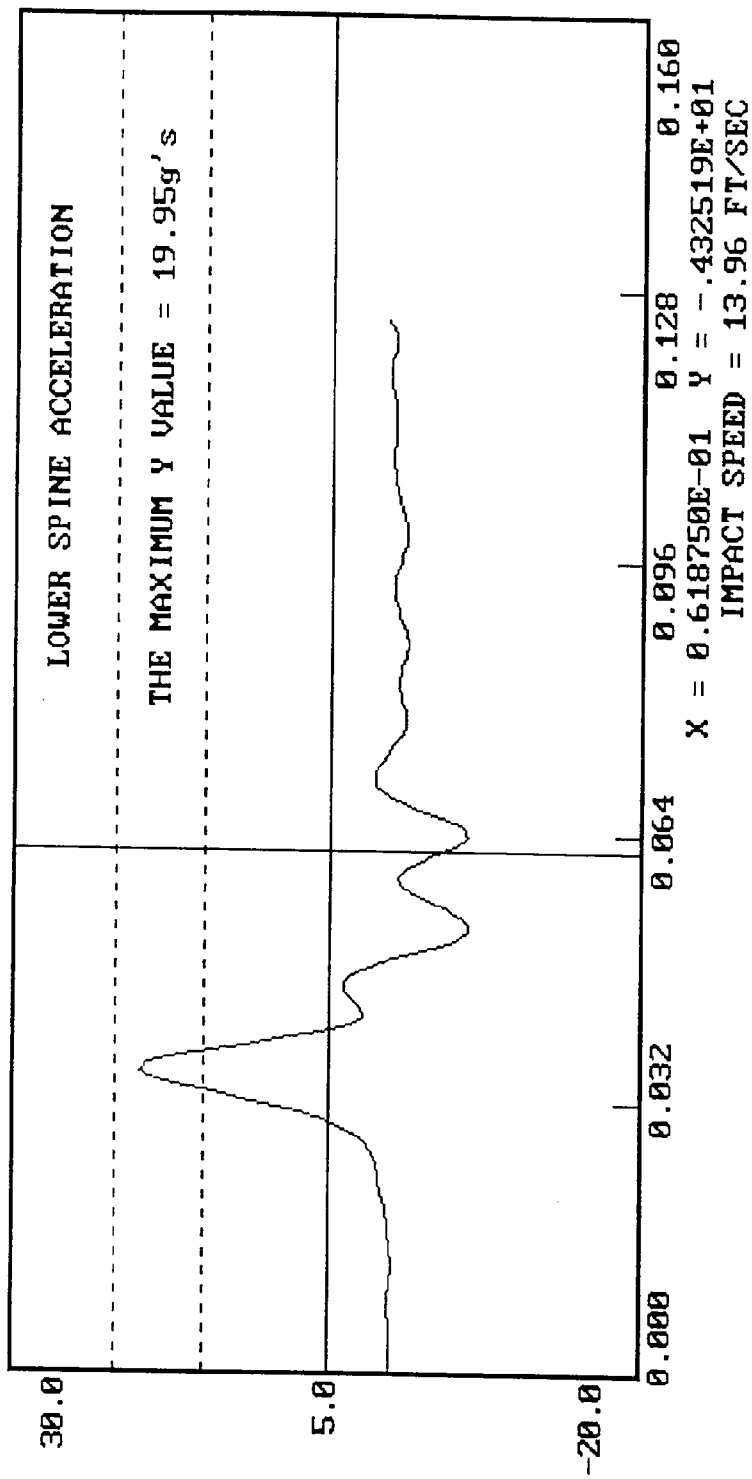
DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-12-1997 15:12



DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))

02-12-1997 15:14



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 12, 1997

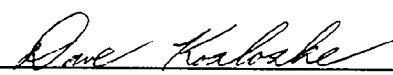
DUMMY NUMBER: 271

TEST NUMBER: D97413

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	14%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	51

TEST MEETS SPECIFICATIONS

TECHNICIAN 

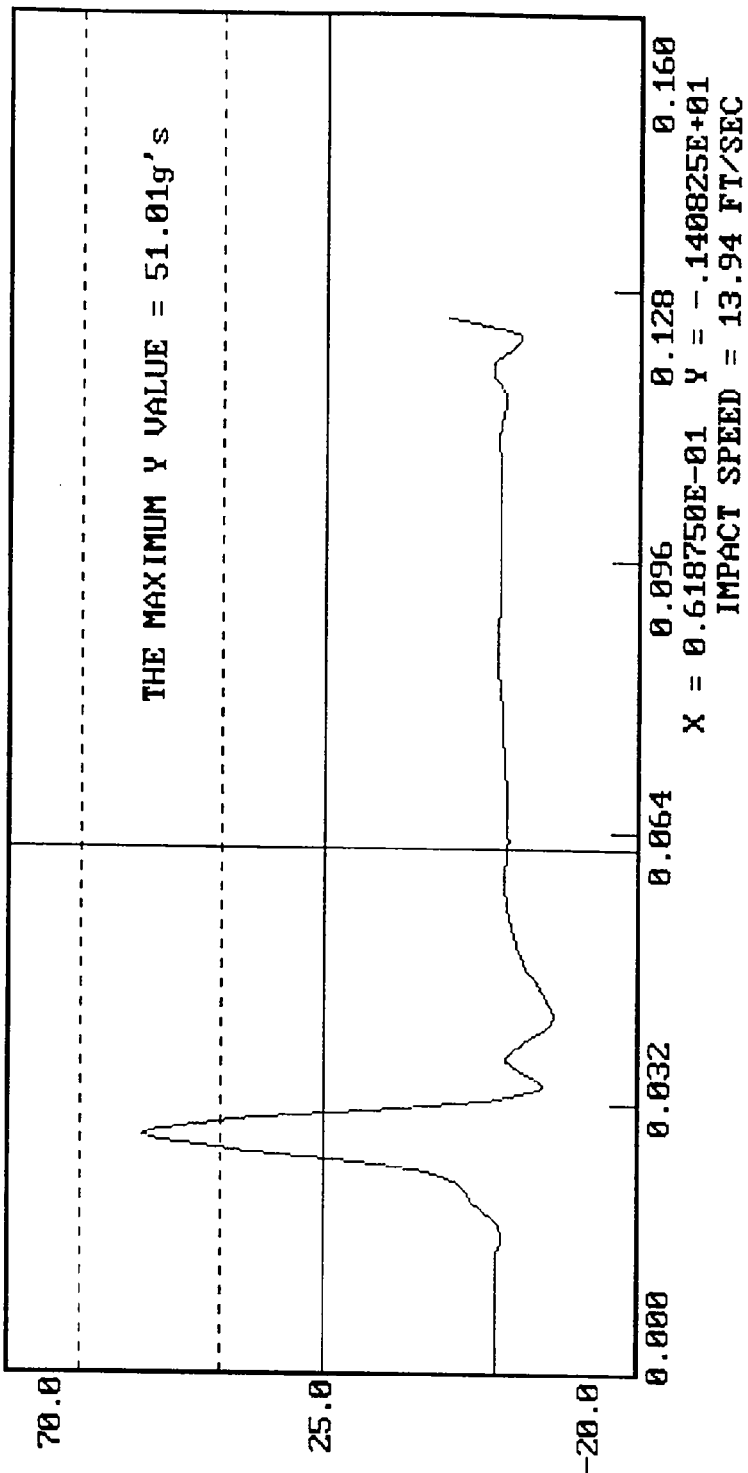
APPROVED BY 

02-12-1997 15:36

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 271

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION
ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)
SIDE IMPACT DUMMY (SID)

DATE: February 13, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97414

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	14%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.4
FORCE @ 0.75 in	36.7 - 49.8 lbs	43.5
FORCE @ 1.0 in	50 - 63 lbs	57
FORCE @ 1.3 in	73 - 88 lbs	76

TEST MEETS SPECIFICATIONS

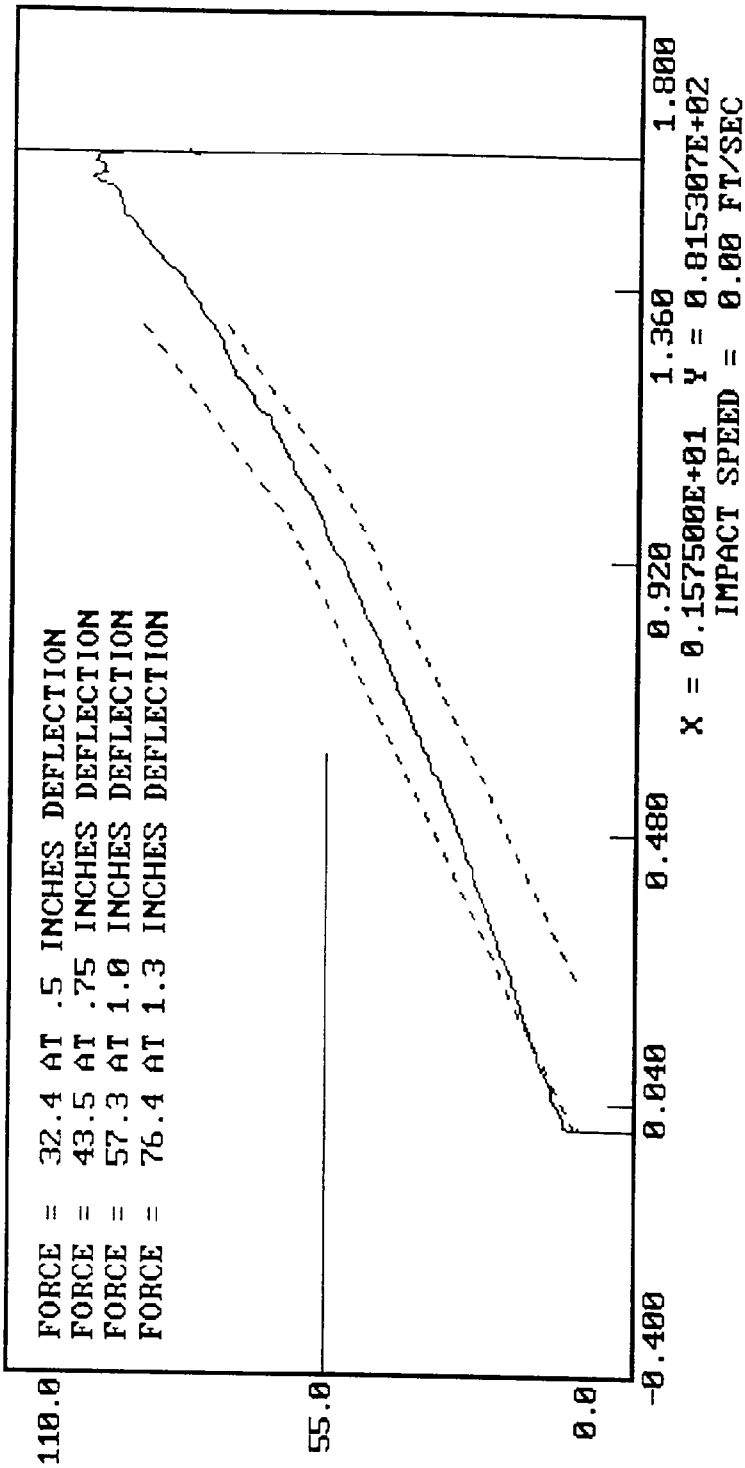
TECHNICIAN Jim White

APPROVED BY Rene Kebabek

DUMMY CALIBRATION - ABDOMEN COMPRESSION
DUMMY # 271

02-13-1997 17:57

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: February 13, 1997

DUMMY NUMBER: 271

TEST NUMBER: D97415

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	14%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	34
FORCE @ 40°	46 - 58 lbs	47
RETURN ANGLE	12° maximum	1°

TEST MEETS SPECIFICATIONS

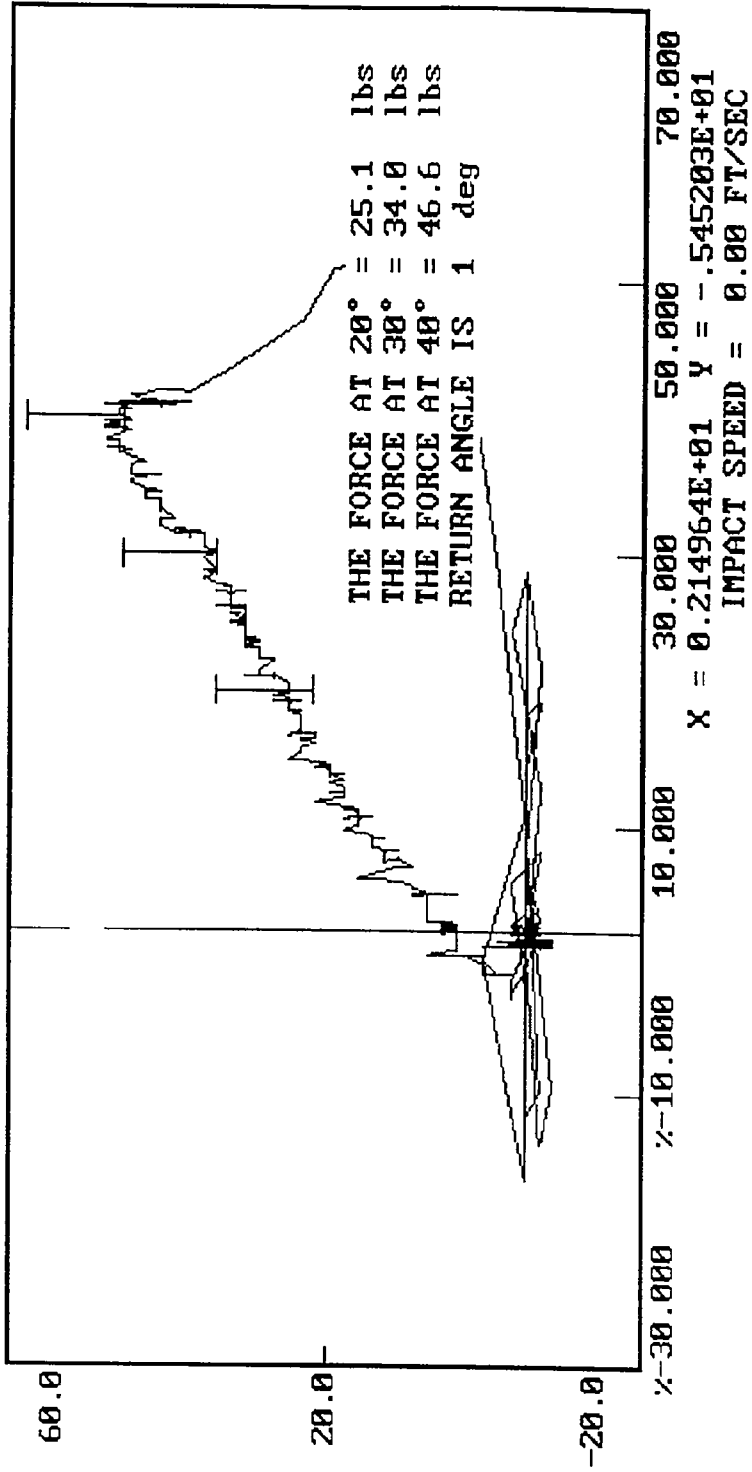
TECHNICIAN *Tim Phillips*

APPROVED BY *Rene Kebabek*

DUMMY CALIBRATION - LUMBAR FLEXION

DUMMY # 271

FORCE (LBS) VS. TORSO ROTATION (DEGREES)



POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 272

Inspected By: Tim Michnay

Date: February 13, 1997

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other	Rib wrap torn on impact side--replaced	

NOTES: (include component/problem/action/reason):

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 271

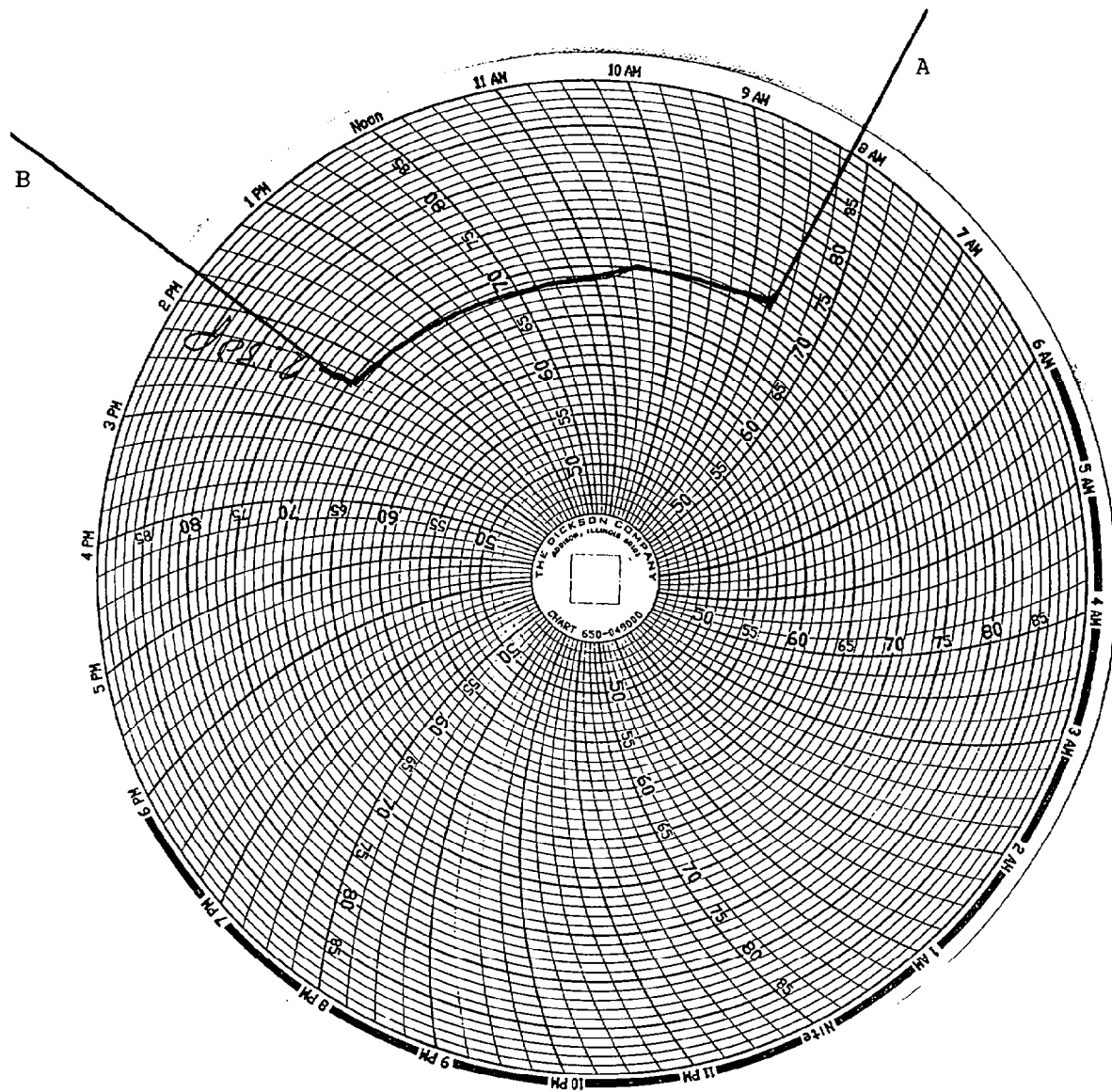
Inspected By: Tim Michnay

Date: February 13, 1996

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

VEHICLE AND DUMMY TEMPERATURE



A = dummies installed in vehicle
B = test conducted

APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR DRIVER DUMMY NO. 272

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	ALFJ7	Endevco	12/09/96
Lower Rib Y	APYN0	Endevco	12/09/96
Lower Spine Y	AP0G2	Endevco	12/09/96
Pelvis Y	APY15	Endevco	12/09/96
Upper Rib Redundant Y	ALDD6	Endevco	12/09/96
Lower Rib Redundant Y	APYN3	Endevco	12/09/96
Lower Spine Redundant Y	API38	Endevco	12/09/96
Pelvis Redundant Y	APY16	Endevco	12/09/96

INSTRUMENTS FOR PASSENGER DUMMY NO. 271

LEFT REAR PASSENGER			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AP2A4	Endevco	9/16/96
Lower Rib Y	AP1B3	Endevco	9/16/96
Lower Spine Y	ANAP1	Endevco	9/16/96
Pelvis Y	AHTC3	Endevco	9/16/96
Upper Rib Redundant Y	AP2D8	Endevco	9/16/96
Lower Rib Redundant Y	APIC6	Endevco	9/16/96
Lower Spine Redundant Y	ANAT6	Endevco	9/16/96
Pelvis Redundant Y	AGP53	Endevco	9/16/96

VEHICLE INSTRUMENT CALIBRATION

		VEHICLE ACCELEROMETERS	
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	C25-A04	Entran	1/06/97
Moving Barrier CG Y	C25-A06	Entran	1/07/97
Moving Barrier CG Z	B13-Z02	Entran	7/11/96
Moving Barrier Rear Axle X	D05-R19	Entran	1/02/97
Moving Barrier Rear Axle Y	D05-R20	Entran	1/02/97
Left Mid A-Post Y	G19-G08	Entran	1/08/97
Left Lower A-Post Y	E13-D02	Entran	1/03/97
Left Lower B-Post Y	C25-A11	Entran	12/03/96
Rear Floorpan Above Axle X	C05-Z13	Entran	12/04/96
Rear Floorpan Above Axle Y	B02-G09	Entran	12/03/96
Rear Floorpan Above Axle Z	MGA144	Entran	1/06/97
Driver Seat Track Y	D05-R03	Entran	1/03/97
Right Side Sill at Front Seat X	MGA125	Entran	1/06/97
Right Side Sill at Front Seat Y	D05-R16	Entran	1/06/97
Right Side Sill at Front Seat Z	H07-A25	Entran	1/02/97
Right Side Sill at Rear Seat X	L14-D10	Entran	1/07/97
Right Side Sill at Rear Seat Y	C25-A17	Entran	1/02/97
Right Side Sill at Rear Seat Z	A10-G07	Entran	1/03/97
Left Side Sill at Front Seat Y	L18-G02	Entran	1/02/97

VEHICLE INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS		
SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	L14-D05 Entran	1/03/97
Right Rear Occupant Compartment Y	H07-A20 Entran	1/06/97
Vehicle CG X	E24-G10 Entran	1/02/97
Vehicle CG Y	L18-E01 Entran	1/02/97
Vehicle CG Z	J23-E01 Entran	1/02/97
Left Front Door on Centerline	J06-D17 Entran	1/03/97
Left Front Door Upper Centerline	G19-G12 Entran	1/08/97
Left Rear Door Mid Rear Centerline	E25-G11 Entran	1/08/97
Left Rear Door Upper Centerline	E24-G04 Entran	1/03/97

Note: All Endevo accelerometers are Model No. 7264-2000 All Entran accelerometers are Model No. EGE-72