

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

1998 NISSAN ALTIMA
4-DOOR SEDAN
NHTSA NO: MW5201

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: November 18, 1997

Report Date: January 2, 1998

FINAL REPORT

Prepared For:

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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16. Abstract A 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 1998 Nissan Altima 4-Door Sedan 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 November 18, 1997. The impact velocity of the Moving Deformable Barrier (MDB) was 61.3 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 20°C. The target vehicle post test maximum crush was 496 mm at level 2. The test vehicle's performance follows: <table border="0" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">81</td> <td style="text-align: center;">67</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">90</td> <td style="text-align: center;">84</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">87</td> <td style="text-align: center;">90</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">88</td> <td style="text-align: center;">87</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">93</td> <td style="text-align: center;">102</td> </tr> </tbody> </table> 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.							<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	81	67	Left Lower Rib (LLR) Accel., g	90	84	Lower Spine (T ₁₂) Accel., g	87	90	Thoracic Trauma Index (TTI)	88	87	Pelvis (PEV) Accel., g	93	102
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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																			
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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY98 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 1998 Nissan Altima 4-Door Sedan.

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 1998 Nissan Altima 4-Door Sedan 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 38.1 mph (61.3 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 November 18, 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)
5. Head Center of Gravity triaxial accelerometers (X, Y, and Z-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	87
Pelvis (g)	93	102

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: 1998/Nissan/Altima/4-Door
Vehicle NHTSA No.: MW5201 VIN: 1N4DL01D6WC119744
Vehicle Body Color: Green Build Date: 7/97
Engine Data: 4 Cylinders; CID; 2.4 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 63 miles
Options: X A/C; X Pwr. Steering; X Pwr. Brakes; X Pwr. Windows;
 X Cruise Control; X Tilt Wheel; X Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 Psi FRONT
29 Psi REAR
Recommended Tire Size: P195/65/R15
Tires on Test Vehicle: P195/65/R15 Manufacturer: General

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 = 390.1 kg (A)
No. of Occupants x 68.04 kg. = 340.2 kg (B)
Cargo Capacity (A-B) = 49.9 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>401.9</u> kg	Right Rear	=	<u>267.6</u> kg
Left Front	=	<u>418.2</u> kg	Left Rear	=	<u>242.2</u> kg
TOTAL FRONT	=	<u>820.1</u> kg	TOTAL REAR	=	<u>509.8</u> kg
% of Total Vehicle Weight	=	<u>61.7</u> %;	% of Total Weight	=	<u>38.3</u> %
TOTAL WEIGHT	=	<u>1329.9</u> kg			

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1329.9</u> kg
Cargo Carrying Capacity of Test Vehicle	=	<u>49.9</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>1541.2</u> kg

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO (Fully Loaded):

Right Front	=	<u>418.7</u> kg	Right Rear	=	<u>316.6</u> kg
Left Front	=	<u>461.3</u> kg	Left Rear	=	<u>344.7</u> kg
TOTAL FRONT	=	<u>880.0</u> kg	TOTAL REAR	=	<u>661.3</u> kg
% of Total Weight	=	<u>57.1</u> %	% of Total Weight	=	<u>42.9</u> %
TOTAL TEST WEIGHT	=	<u>1541.3</u> kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 691 mm Left Front 693 mm Right Rear 683 mm Left Rear 676 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 683 mm Left Front 679 mm Right Rear 654 mm Left Rear 638 mm

TEST ATTITUDE:

Right Front 680 mm Left Front 688 mm Right Rear 655 mm Left Rear 646 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2625 mm

C.G. = 1103 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4315 mm

Centerline = 4607 mm

Left Side = 4315 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

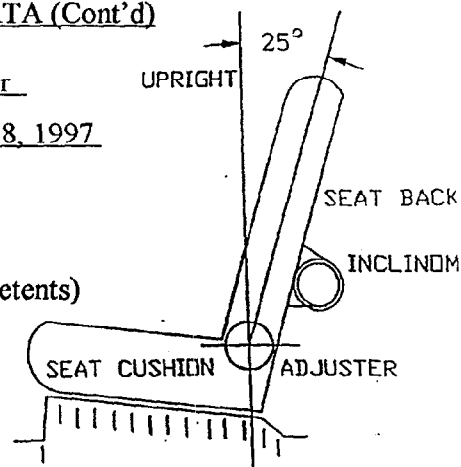
Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 230 mm (total of 20 detents)

Test Position: 11th rearward notch of 20 locking positions



FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 7th from first locking position being 0 (25°) LEFT SIDE VIEW

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: Non-adjustable

Seat Back Adjustment Position: Non-adjustable

ADJUSTABLE STEERING COLUMN POSITION: 24°

ADJUSTABLE D RING POSITION: 1 down from uppermost

WINDOW POSITIONS: Left Front Closed Left Rear Closed
Right Front Open Right Rear Open

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 15.8 gallons

Test Volume: 14.69 gallons 93 % of capacity

LOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase: = 2625 mm

Impact Point is 373 mm rearward of front axle centerline

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door
Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997
Overall Length = 4607 mm; Overall Width = 1740 mm

TEST WEIGHT:

Right Front = 431.8 kg Right Rear = 319.3 kg
Left Front = 457.2 kg Left Rear = 324.8 kg
TOTAL FRONT = 889.0 kg TOTAL REAR = 644.1 kg
% of Total Weight = 58.0 % % of Total Weight = 42.0 %
TOTAL VEHICLE WEIGHT = 1533.1 kg
Wheelbase = 2625 mm
Longitudinal C.G. from Center of Front Axle = 1103 mm
Impact Angle with Respect to Impactor = 90 ° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (270 mm above ground) = 323 mm
2. LEVEL 2 (490 mm above ground) = 496 mm
3. LEVEL 3 (605 mm above ground) = 434 mm
4. LEVEL 4 (870 mm above ground) = 377 mm
5. LEVEL 5 (1312 mm above ground) = 178 mm
Maximum Post-Test Intrusion = 496 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>24</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: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 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>1105 mm</u>
C.G. Location From Center Line	=	<u>-12 mm</u>
C.G. Location Above Ground Level	=	<u>484 mm</u>

MDB WEIGHT:

Left Front	=	<u>440.0 kg</u>	Left Rear	=	<u>242.5 kg</u>
Right Front	=	<u>338.2 kg</u>	Right Rear	=	<u>331.9 kg</u>
TOTAL FRONT	=	<u>778.2 kg</u>	TOTAL REAR	=	<u>574.4 kg</u>
TOTAL MDB WEIGHT		=	<u>1352.9 kg</u>		

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

Impact Speed = Primary: 38.1 mph (61.3 kph) Secondary: 38.1 mph (61.3 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

- | | | |
|----|---------------------------------|-----------------|
| 1. | Row A Top of Stack (813 mm) | = <u>206</u> mm |
| 2. | Row B Mid Stack (686 mm) | = <u>138</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = <u>81</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = <u>139</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>to B-post and seatback</u>	<u>to C-post, header, and</u> <u>back window</u>
Arm	<u>to rear of front door & armrest</u>	<u>to door above armrest</u>
Pelvis	<u>to door</u>	<u>to door and armrest</u>
Left Knee	<u>to door</u>	<u>to door</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: 9 mm rearward Vertical: 4 mm high

ARM REST LOCATIONS:

Front: 220 mm below bottom of window opening
Rear: 220 mm below bottom of window opening

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 173 mm Front Seat Cushion: 148 mm
Left Rear Seat Back: 41 mm Rear Seat Cushion: 259 mm

GLAZING DAMAGE:

Both struck side door glazing shattered and windshield cracked

PILLAR PERFORMANCE:

No separation noted

SILL SEPARATION:

Welds separated 910 mm forward of rear axle pinchweld for a distance of
approximately 520 mm towards rear of vehicle along sill.

OTHER NOTABLE IMPACT EFFECTS:

Barrier face stayed embedded in vehicle

AIRBAG DEPLOYMENT STATUS:

	<u>DRIVER</u>	<u>PASSENGER</u>
Frontal	<u>No</u>	<u>No</u>
Side	<u>N/A</u>	<u>N/A</u>

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

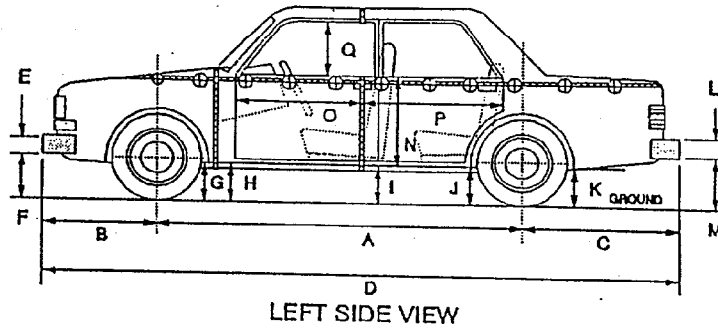
DATA SHEET NO. 5
SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door
Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

	Front Dummy ID #271			Rear Dummy ID #272		
	Pos. Direct.		Neg. Direct	Pos. Direct.		Neg. Direct
	Max (g)	Time (msec)	Max (g)	Max (g)	Time (msec)	Max (g)
RIB ACCELERATIONS						
Left Upper Rib (LUR) Y	81.5	23	-16.6	66.6	40	-12.8
Left Lower Rib (LLR) Y	89.8	21	-50.0	84.1	43	-15.7
SPINE ACCELERATIONS						
Lower Lateral Y	87.1	39	-27.7	89.7	39	-35.7
PELVIS ACCELERATIONS						
Lateral Y	93.0	29	-19.1	102.1	35	-23.5
						79

REFERENCE: Positive Direction- Longitudinal (X) = forward
Lateral (Y) = to right
Vertical (Z) = down

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)

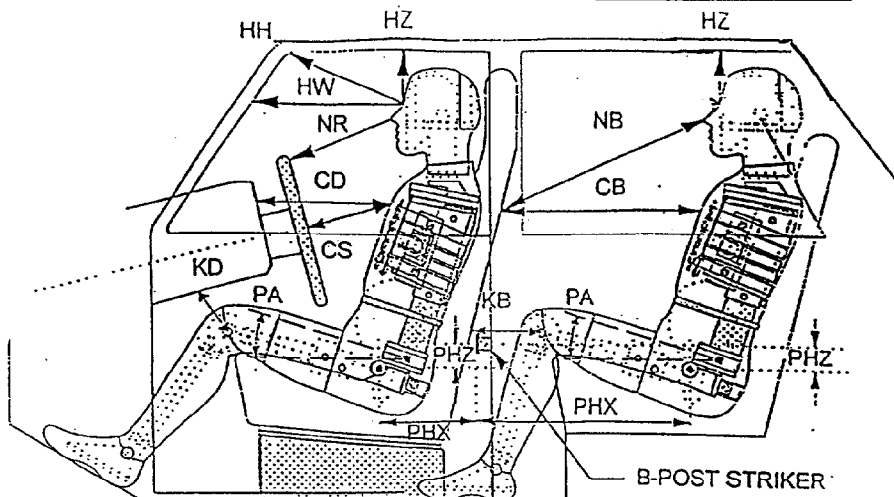
	PRE-TEST	POST-TEST	Δ CHANGE
A	2625	2615	10
B	925	958	33
C	1057	1065	8
D	4607	4638	31
E	180	180	0
F	400	420	20
G	190	258	68
H	195	239	44
I	186	233	47
J1/J2	180/179	166/183	14/4
K	257	257	0
L	330	330	0
M	340	302	38
N	678	534	144
O	718	714	4
P	1171	1076	95
Q	417	422	5
R	4315	4324	9
S	4315	4204	111
T	1740	1582	158

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

NHTSA NO.: MW5201 Test Date: November 18, 1997



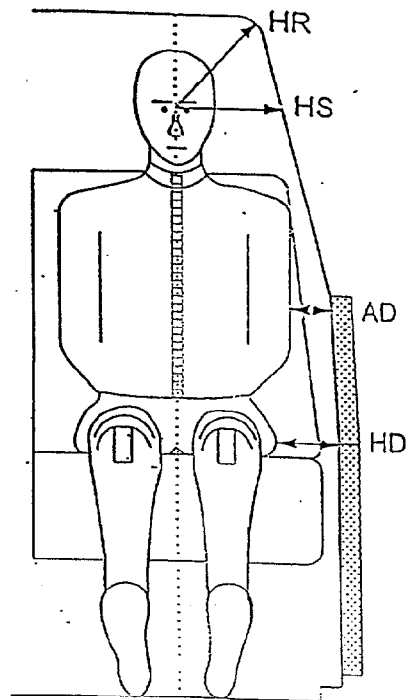
NOTE: All dimensions are in mm with tolerance of ± 3 mm

	DRIVER SID ID #271		LEFT REAR PASSENGER SID ID #272
HH	374	HZ	158
HW	644	NB	562
HZ	180	CB	475
NR	493	KBL (KBA)	218 (0.0°)
CD	564	KBR (KBA)	220 (0.0°)
CS	374	PA°	23.4°
KDL(KDA°)	201 (21.2°)	PHX	264
KDR(KDA°)	200 (21.6°)	PHZ	318
PA°	23.4°		
PHX	167		
PHZ	147		

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: 1998/Nissan/Altima/4-Door
NHTSA NO.: MW5201 Test Date: November 18, 1997



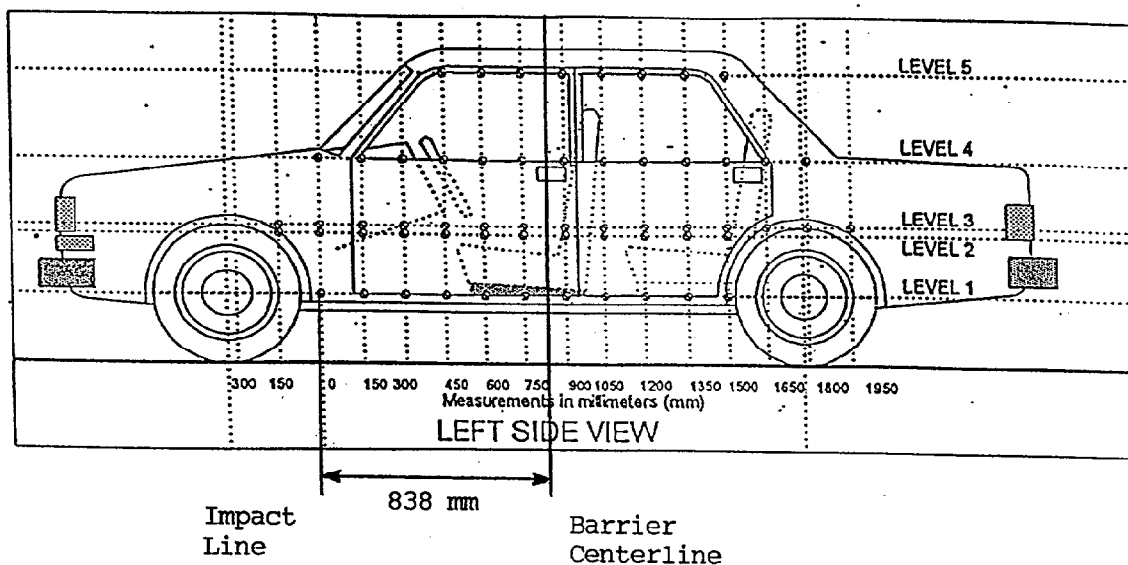
NOTE: All dimensions are in mm

	DRIVER SID ID #271	LEFT REAR PASSENGER SID ID #272
HR	232	222
HS	350	370
AD	118	132
HD	144	182

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

NHTSA NO.: MW5201 Test Date: November 18, 1997



MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION ALONG A VERTICAL LINE AT THE BARRIER CENTERLINE AS SHOWN ABOVE

Level 1 @ Axle Centerline Height (or Sill Top Height)	= <u>270</u> mm
Level 2 @ Occupant H-Point	= <u>490</u> mm
Level 3 @ Mid Door	= <u>605</u> mm
Level 4 @ Window Sill	= <u>870</u> mm
Level 5 @ Window Top	= <u>1312</u> mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	854	994	140
300	853	1051	198
450	853	1068	215
600	853	1090	237
750	853	1111	258
900	853	1134	281
1050	853	1153	300
1200	853	1176	323
1350	854	1175	321
1500	855	1078	223
1650	855	1008	153
1800	852	953	101

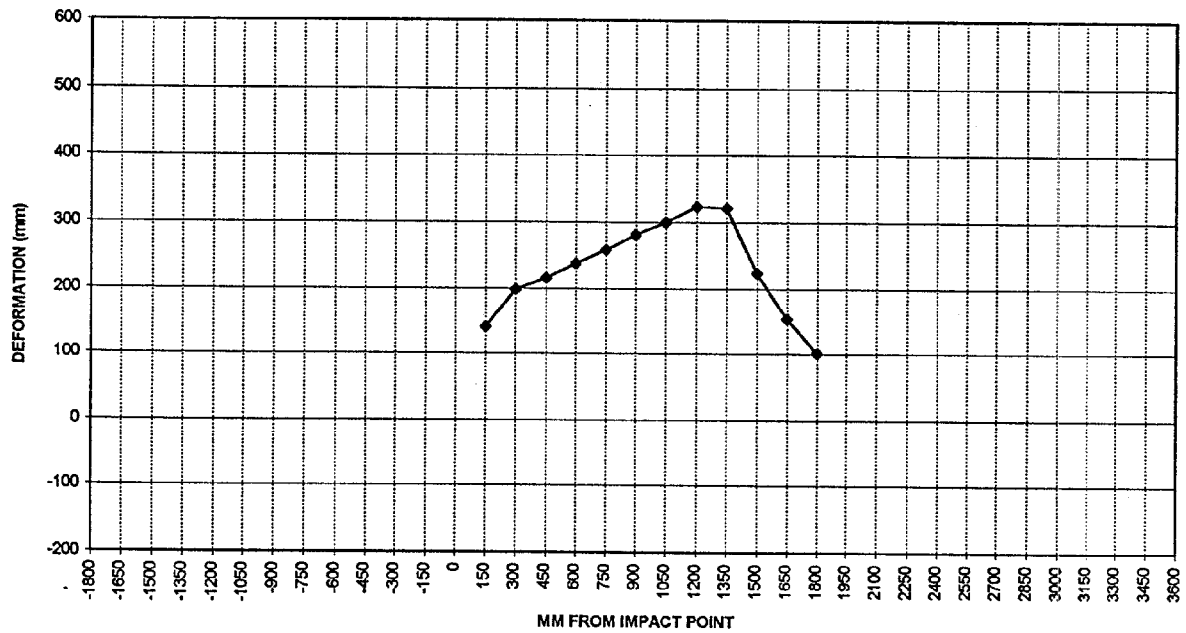
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 1 - AXLE CENTERLINE

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Occupant H-Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	806	924	118
150	806	1108	302
300	806	1176	370
450	807	1210	403
600	808	1228	420
750	808	1243	435
900	807	1254	447
1050	807	1263	456
1200	807	1259	452
1350	807	1292	485
1500	806	1302	496
1650	805	1291	486
1800	804	1236	432

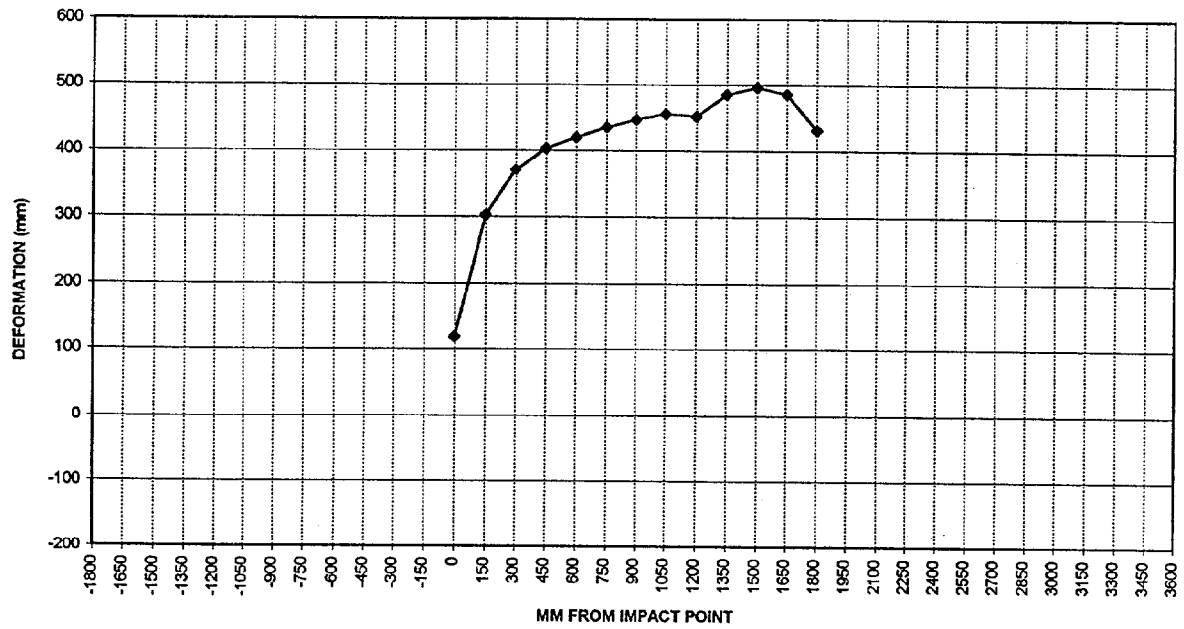
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Occupant H-Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 2 - OCCUPANT H-POINT

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 - Mid-Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	797	896	99
150	797	1051	254
300	797	1130	333
450	798	1163	365
600	798	1172	374
750	798	1186	388
900	799	1194	395
1050	798	1209	411
1200	798	1230	432
1350	799	1233	434
1500	799	1233	434
1650	797	1229	432
1800	790	1215	425

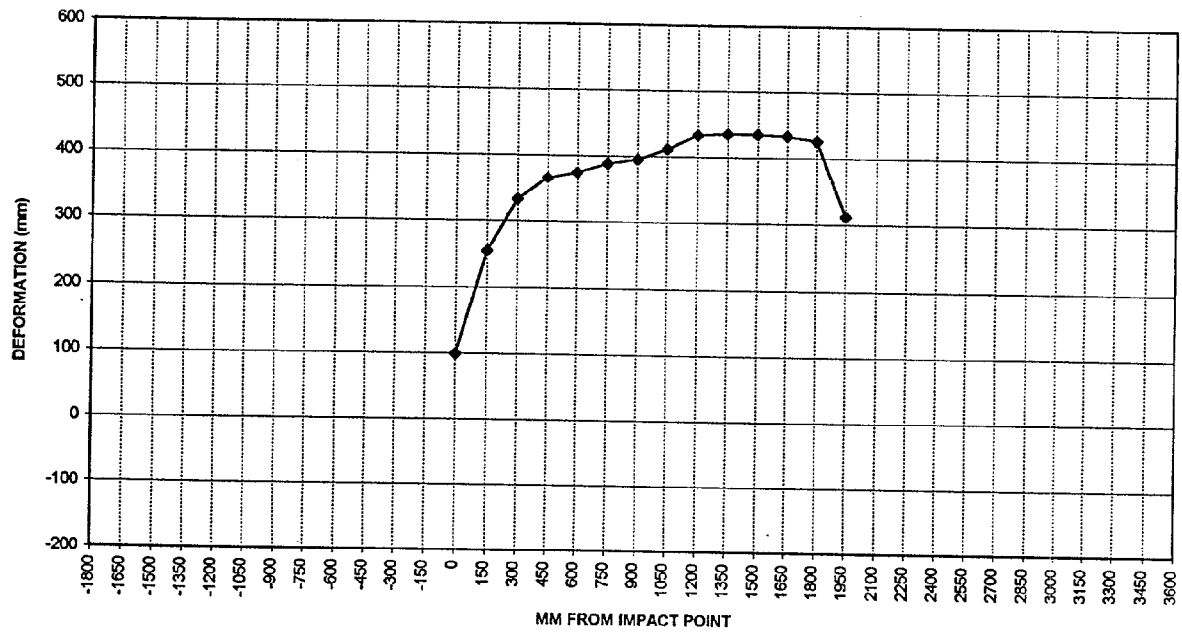
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 - Mid-Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	795	1107	312
2100			
2250			
2400			
2550			
2700			
2850			
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 3 - MID-DOOR

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 - Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900	924	942	18
-750	890	920	30
-600	870	911	41
-450	858	907	49
-300	852	909	57
-150	847	913	66
0 (impact point)	844	923	79
150	844	980	136
300	847	1074	227
450	847	1142	295
600	847	1154	307
750	848	1158	310
900	850	1177	327
1050	850	1192	342
1200	851	1223	372
1350	853	1221	368
1500	854	1226	372
1650	854	1231	377
1800	854	1163	309

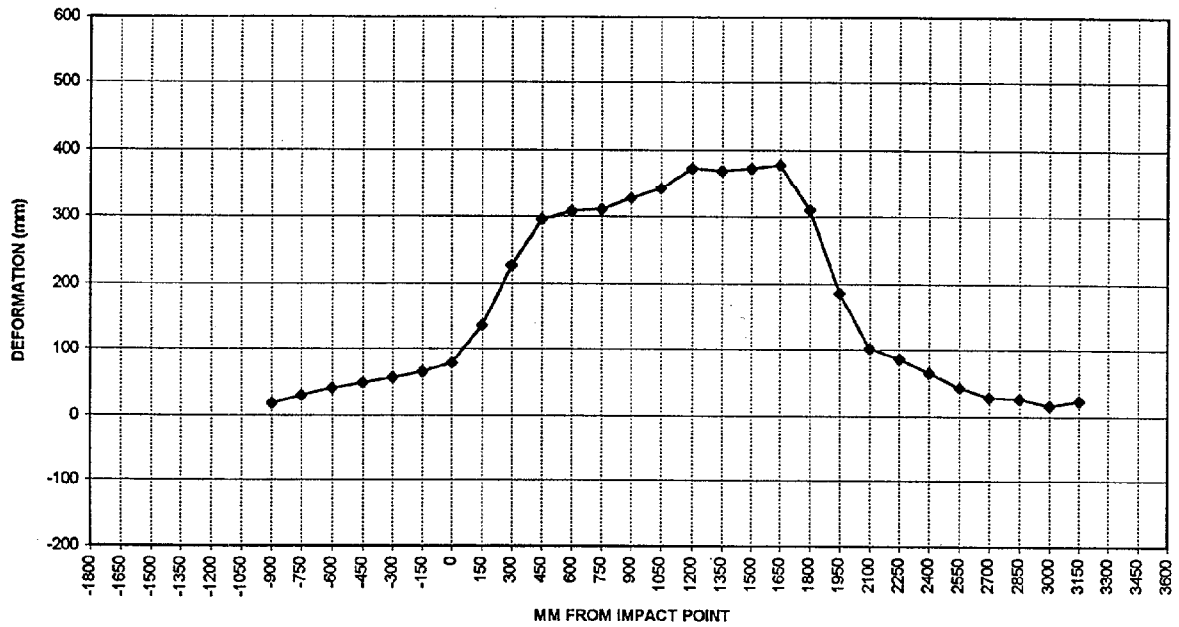
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 - Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	857	1044	187
2100	859	961	102
2250	860	946	86
2400	871	936	65
2550	885	928	43
2700	909	937	28
2850	930	956	26
3000	970	986	16
3150	1042	1065	23
3300			
3450			
3600			

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

	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750			
900	1064	1137	73
1050	1065	1174	109
1200	1067	1214	147
1350	1068	1246	178
1500	1070	1180	110
1650	1071	1116	45
1800	1073	1056	-17

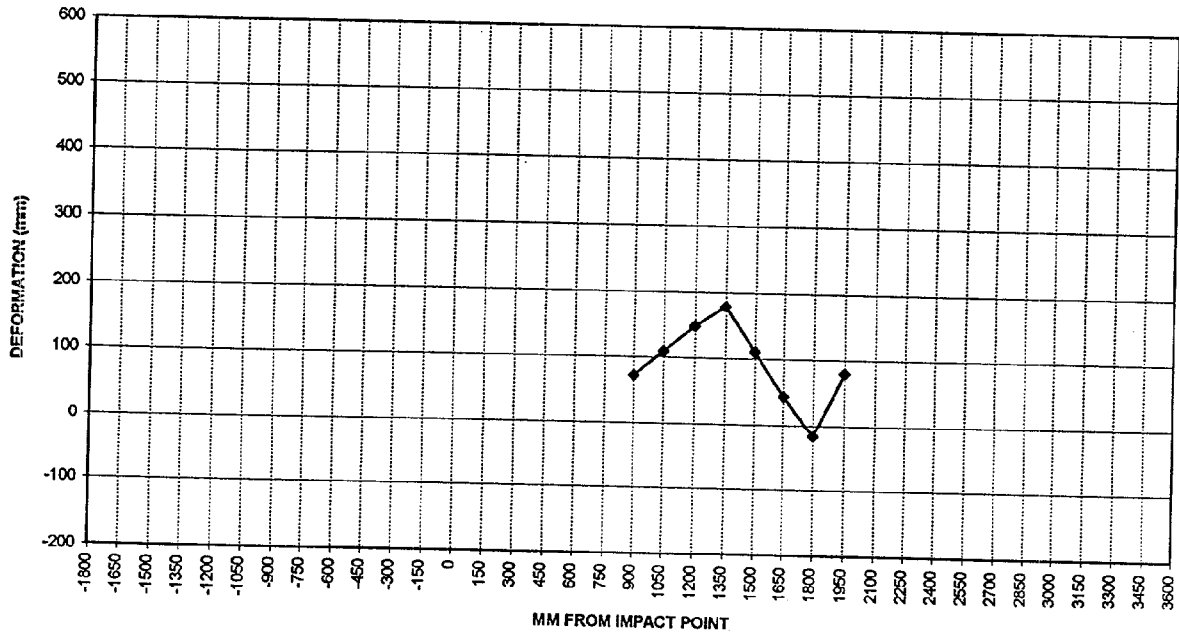
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	1081	1161	80
2100			
2250			
2400			
2550			
2700			
2850			
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



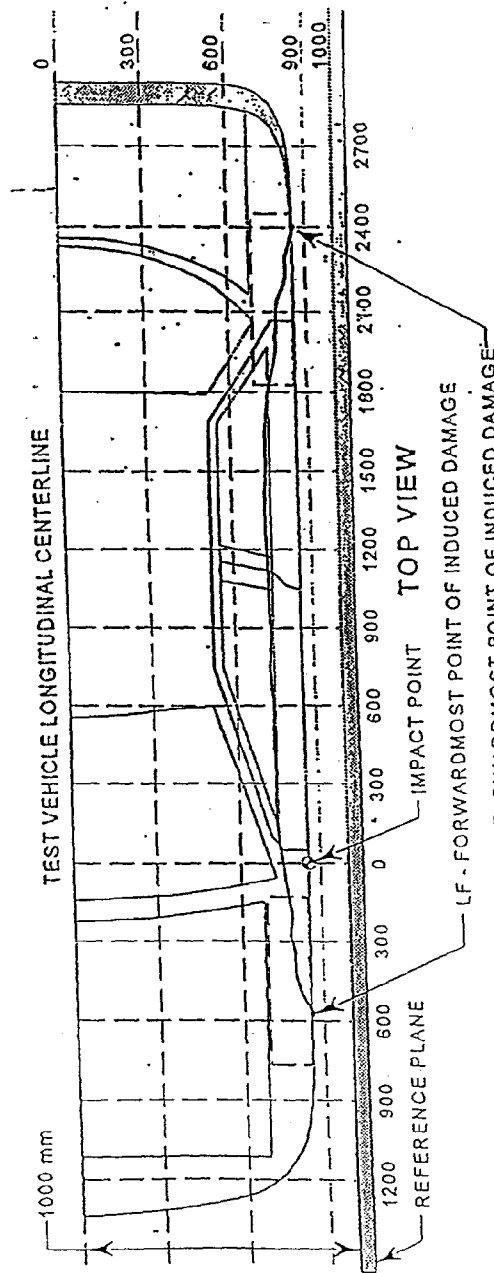
LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

NHTSA NO.: MW5201 Test Date: November 18, 1997



MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (-).
Rearward of the impact point (toward rear end of vehicle) is considered positive (+).

Crush: 497 mm

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (LF = <u>-900</u> mm)	924	924	0
2. <u>-140</u> mm	919	844	75
3. <u>600</u> mm	1235	808	427
4. <u>1380</u> mm	807	1301	494
5. <u>2250</u> mm	946	860	86
6. (LR = <u>3000</u> mm)	986	970	16

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

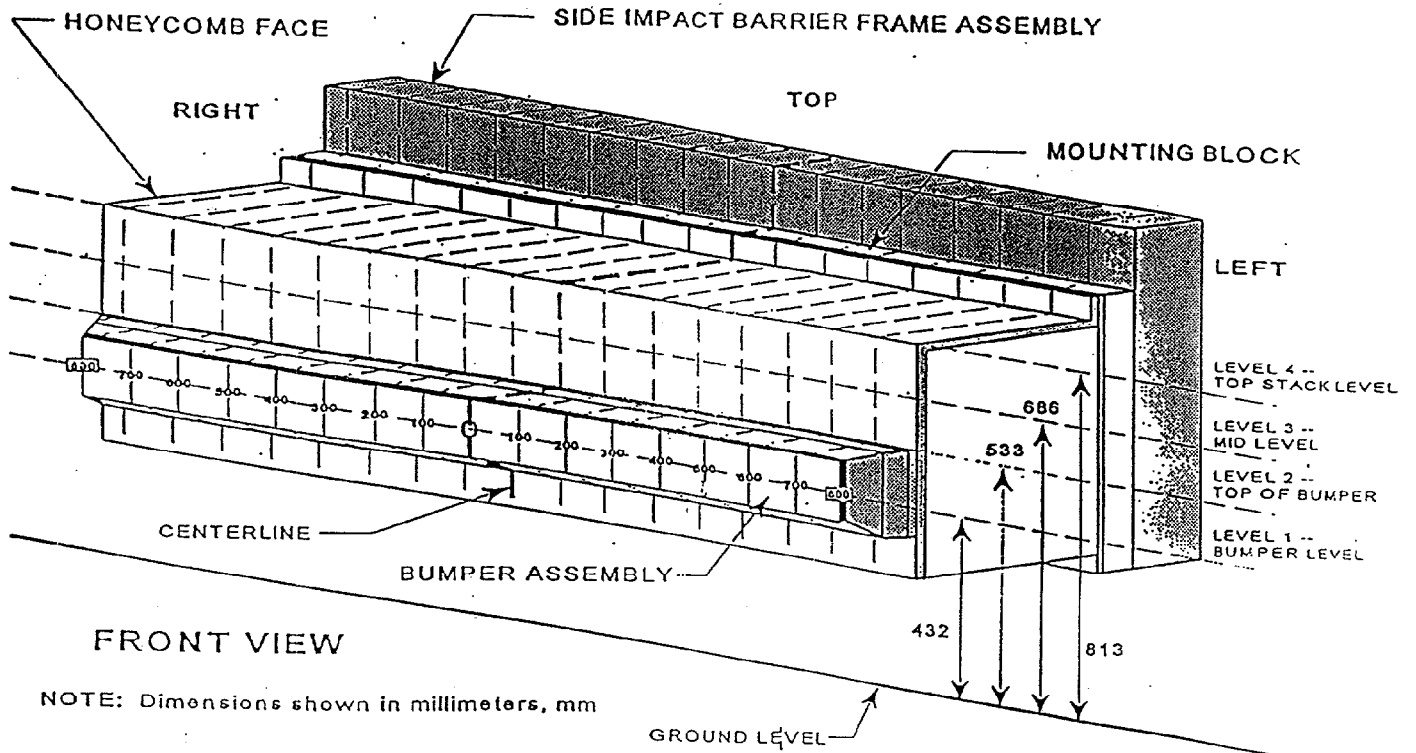
Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

Location	Height at CL	Distance Right of Center (mm)								0	Distance Left of Center (mm)							
		800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
Top Stack Level 4	813 mm	51	9	1	2	4	4	6	9	11	14	17	19	20	33	83	141	206
Mid Level Level 3	686 mm	16	-1	-4	-5	-3	-3	-1	-1	0	0	2	3	5	8	22	64	138
Top Bumper Level 2	533 mm	13	-1	-11	-11	-6	-3	-4	-4	-5	0	6	11	15	20	28	50	81
Mid Bumper Level 1	432 mm	48	33	19	17	25	36	31	29	29	32	39	43	49	53	70	103	139

See next page for Barrier Face Graphic

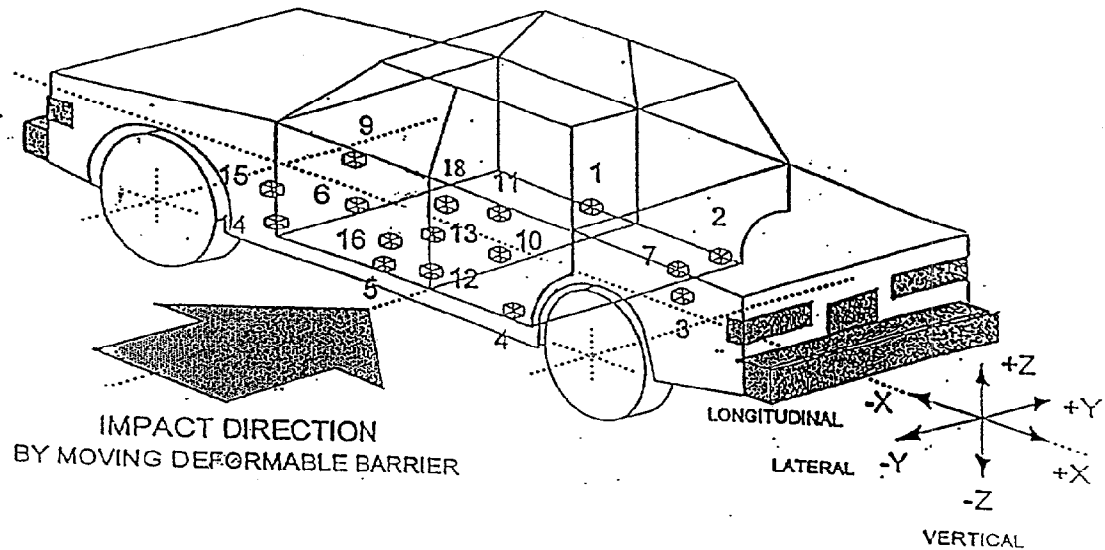
DATA SHEET NO. 12 (Cont'd)



DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997



1-RT. Side Sill @ Frt Seat
 2-RT. Side Sill @ Rr. Seat
 3-Rr. Floorpan Above Axle
 4-Left Side Sill @ Rr. Seat
 5-Left Side Sill @ Frt. Seat
 6-Left Frt. Door on Centerline
 7-Rt. Rr. Occ. Compartment
 9-Left Frt. Door Upper Ctrline

10-Midrear of Left Rear Door
 11-Left Rear Door Upper Ctrline
 12-Left Lower B-Post
 13-Left Middle B-Post
 14-Left Lower A-Post
 15-Left Middle A-Post
 16-Front Seat Track
 18-Vehicle C.G.

DATA SHEET NO. 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 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	2518	662	240	3.0	4.9	18.9	3.0	3.6	7.2	19.5
2	Rt. Side Sill @ Rear Seat	1534	662	210	2.8	5.1	26.1	5.6	9.7	7.7	27.3
3	Rr. Floorpan Above Axle	1188	0	470	8.2	9.7	19.5	3.1	9.8	10.7	20.9
4	Left Side Sill @ Rr. Seat (1)	1555	-682	260	---	---	56.0	18.2	---	---	---
5	Left Side Sill @ Frt. Seat	2515	-682	220	---	---	28.1	5.6	---	---	---
6	Left Front Door Centerline	2546	-757	680	---	---	246.6	118.1	---	---	---
7	Right Rear Occupant Compartment	1833	383	303	---	---	25.9	12.2	---	---	---
9	Left Front Door Upper Centerline	2596	-760	844	---	---	227.4	119.2	---	---	---
10	Left Rear Door Mid Rear	1634	-754	688	---	---	169.0	84.3	---	---	---
11	Left Rear Door Upper Centerline	1642	-762	875	---	---	181.8	85.7	---	---	---
12	Left Lower B-Post	2048	-678	306	---	---	72.6	15.7	---	---	---
13	Left Mid B-Post	2083	-721	884	---	---	176.3	49.9	---	---	---
14	Left Lower A-Post	3046	-698	299	---	---	46.6	4.9	---	---	---
15	Left Mid A-Post	3074	-760	932	---	---	16.4	2.2	---	---	---
16	Driver Left Seat Track	2263	-555	225	---	---	119.7	18.7	---	---	---
18	Vehicle CG (2)	2533	40	400	17.7	49.0	46.8	50.6	34.1	27.2	61.6

*Reference: X - Rear Bumper (+ Forward) (1) Data not valid after approximately 30 msec. (Sensor separated from vehicle)

Y - Vehicle Centerline (+ To right) (2) Data not valid after approximately 30 msec. (Sensor separated from vehicle)

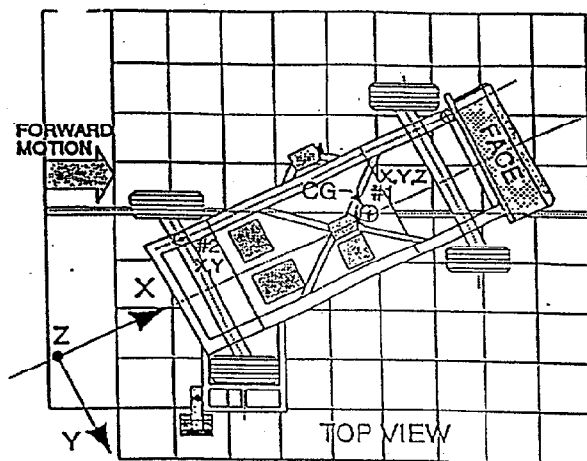
Z - Ground Level (+ Up)

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997



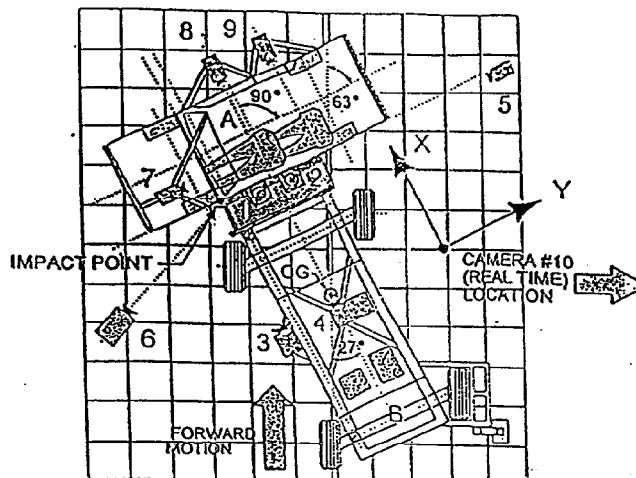
Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.5	171	17.8	32
	Lateral (Y)	---	---	---	3.7	59	5.6	20
	Vertical (Z)	---	---	---	20.0	47	18.8	41
	Resultant (R)	---	---	---	25.0	41	---	---
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	2.3	174	23.4	35
	Lateral (Y)	---	---	---	3.8	30	1.5	192

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

DATA SHEET NO. 15
HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time						
6	Left Impact	-540	-2420	1660		13	1176
8	Onboard Driver					8	987
9	Onboard Passenger					8	1224
7	Onboard Hood					13	980
5	Right Impact	-1020	10280	1660		25	1000
1	Top Overall	30	1340	5000		8	1075
2	Top Impact	-290	0	5000		13	952
4	Cart Overall					13	1010
3	Cart Pointer					35	901

* 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: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: MW5201

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 38.1 mph (61.3 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

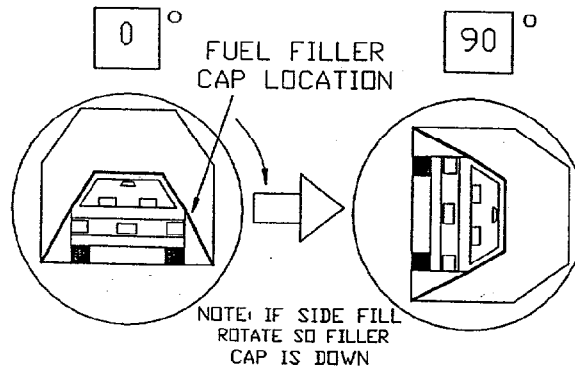
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 52 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 52 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

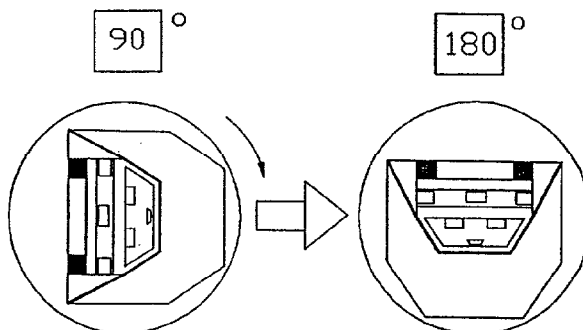
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 31 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 31 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

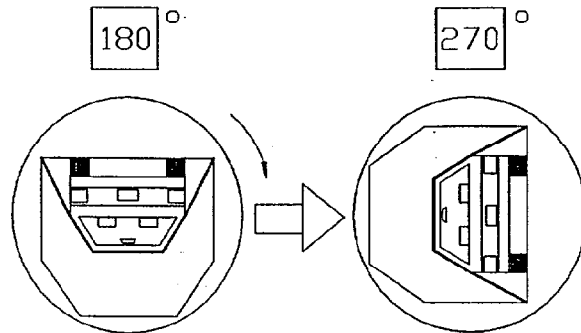
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 1997

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 18 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 18 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

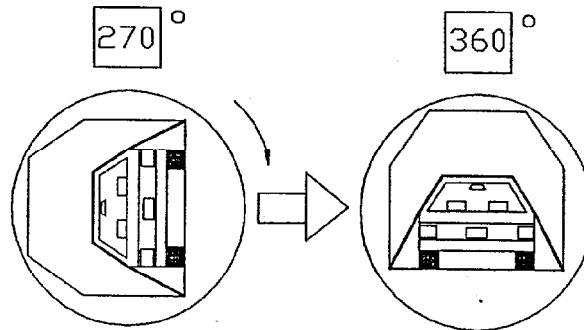
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Nissan/Altima/4-Door

Vehicle NHTSA No.: MW5201 Test Date: November 18, 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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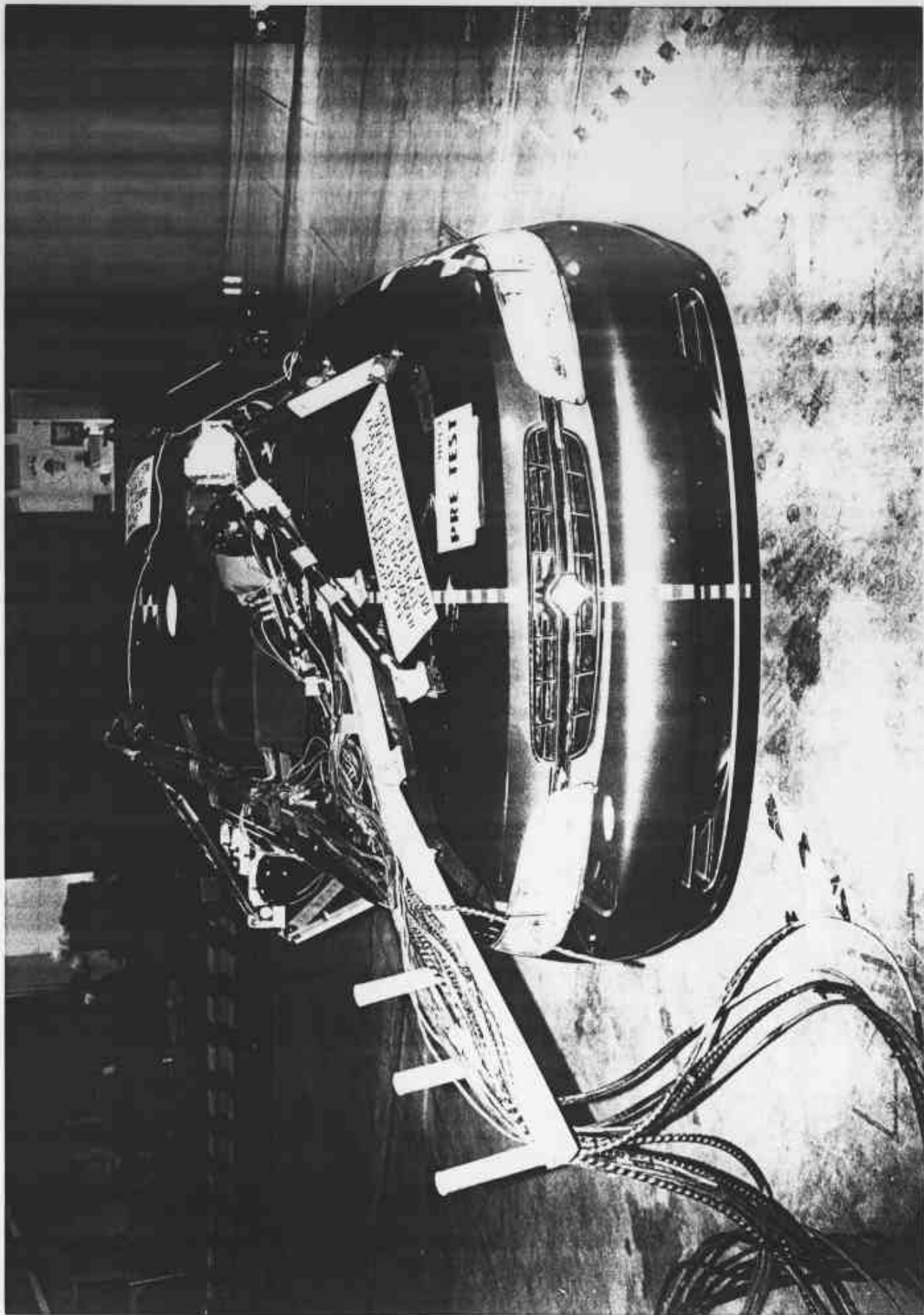


Photo No. A-1 - Pre-Test Front View of Test Vehicle

A-1

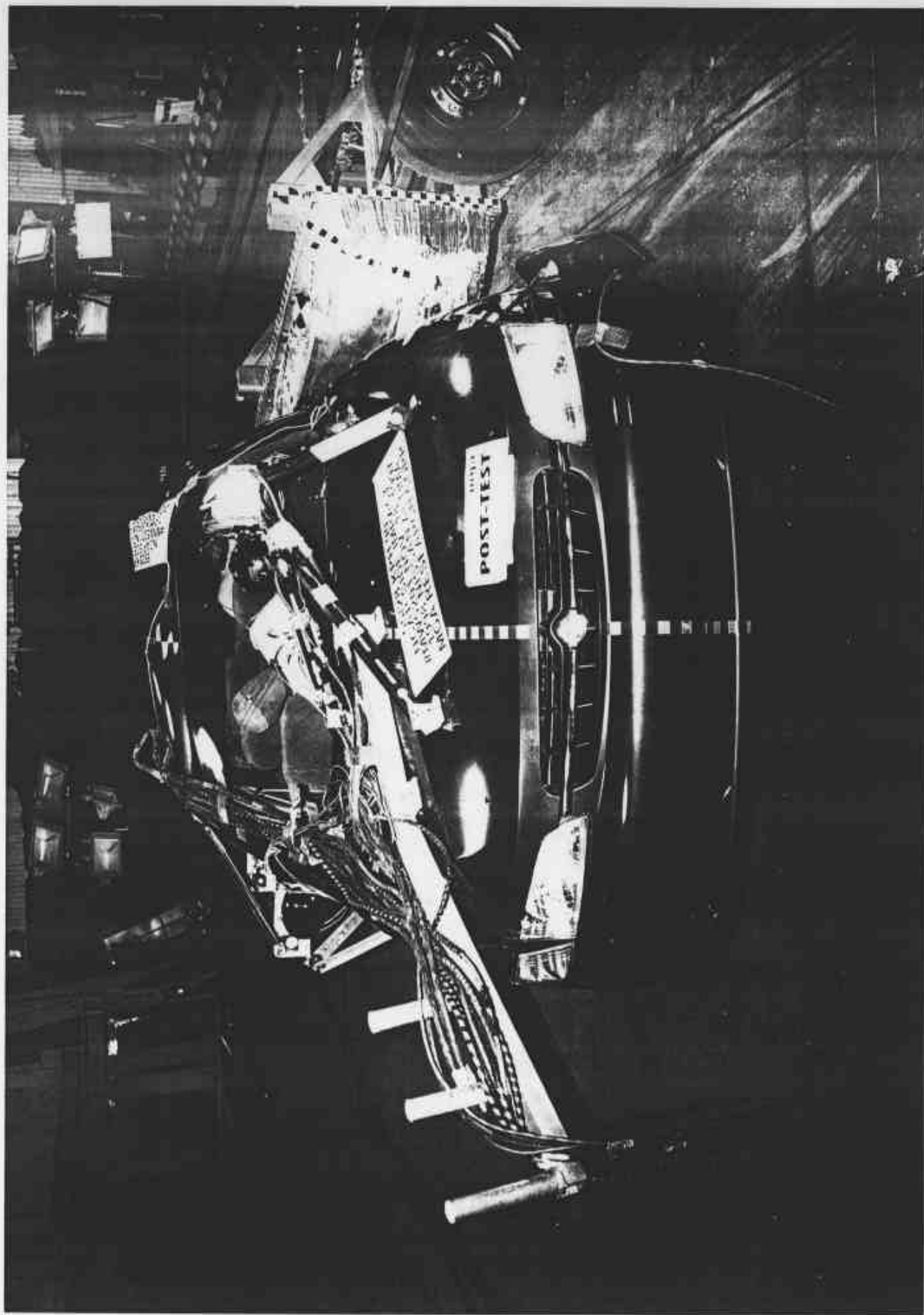


Photo No. A-2 - Post-Test Front View of Test Vehicle

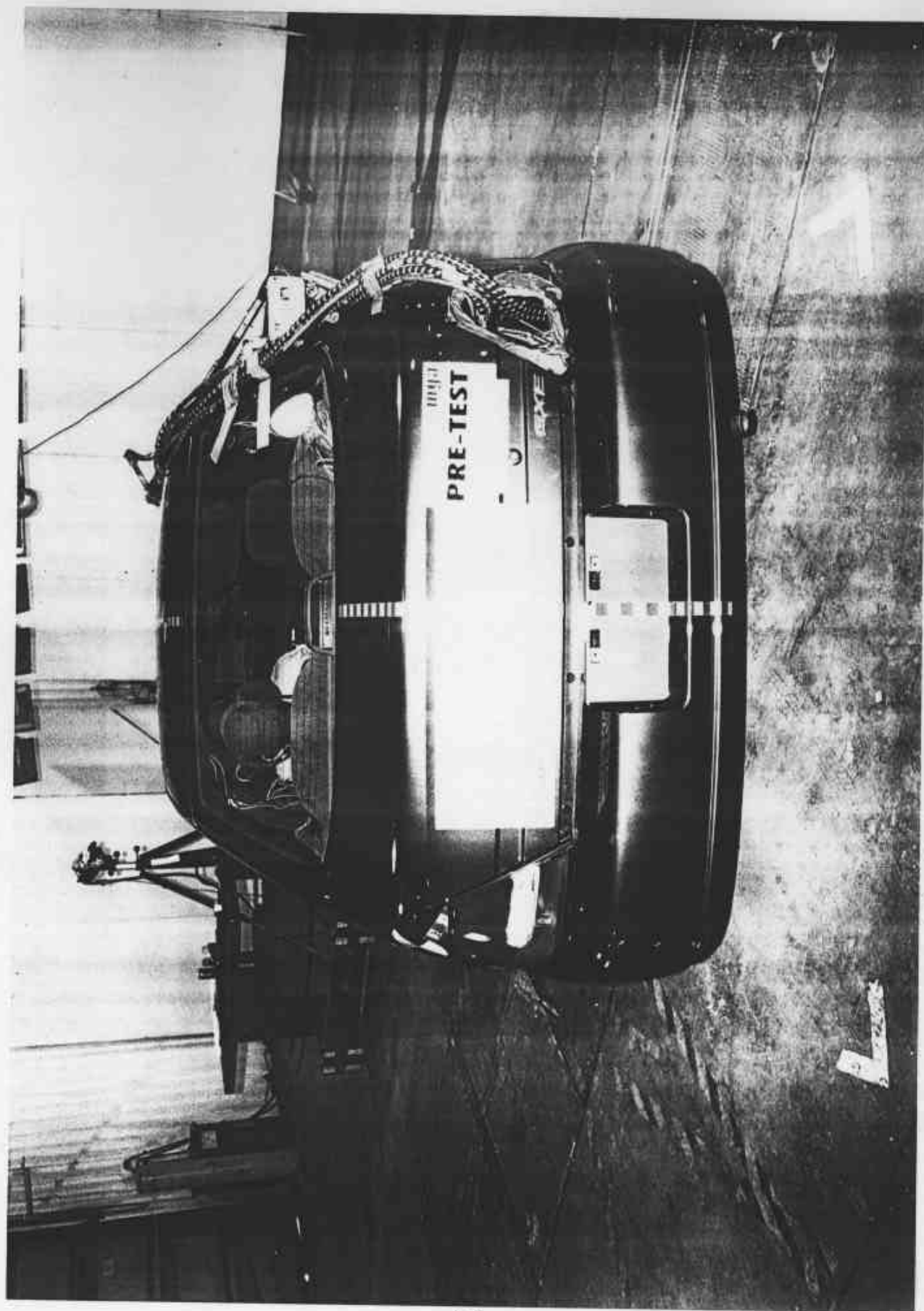
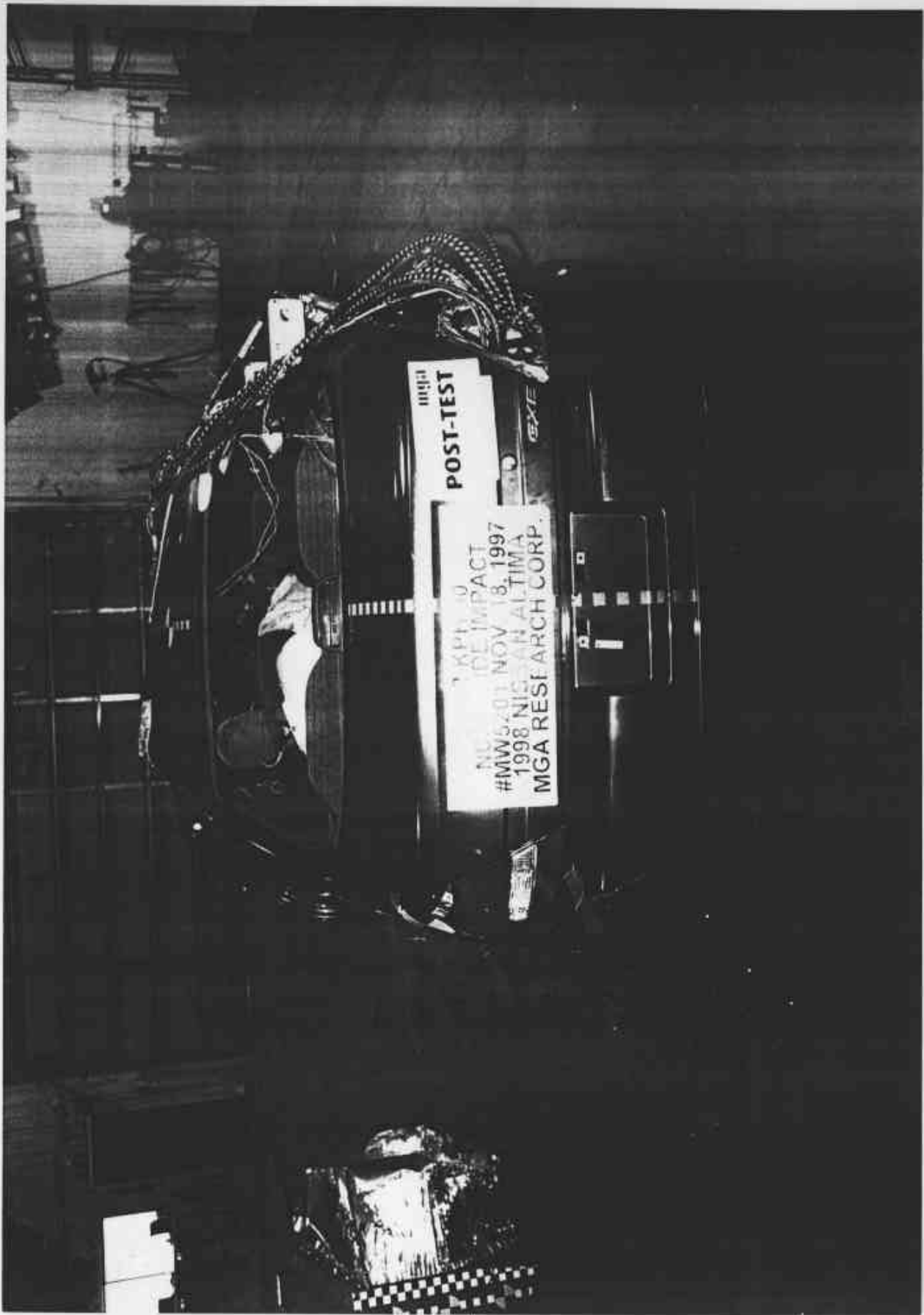


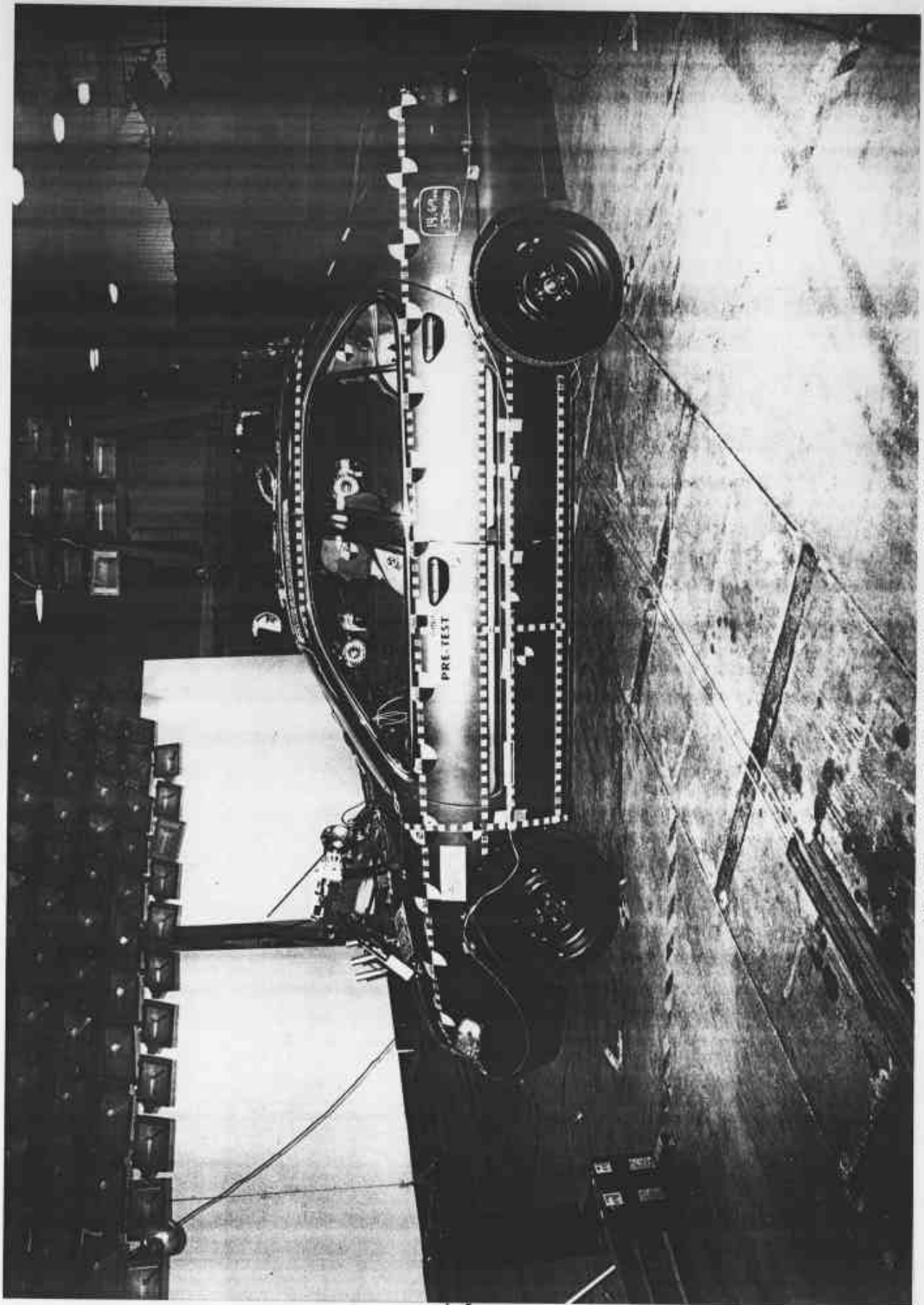
Photo No. A-3 - Pre-Test Rear View of Test Vehicle

A-3



A-4

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



A-5

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

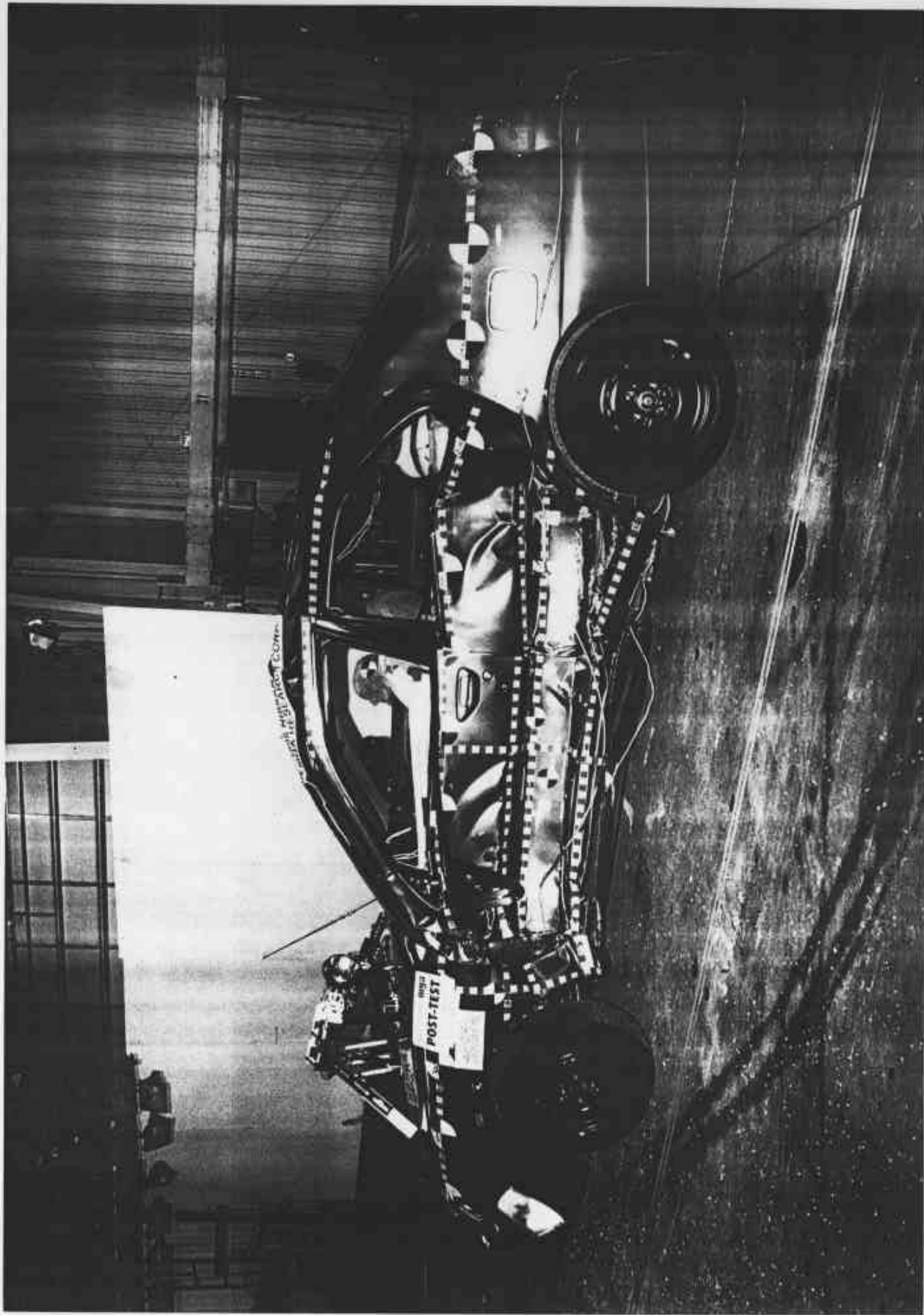


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

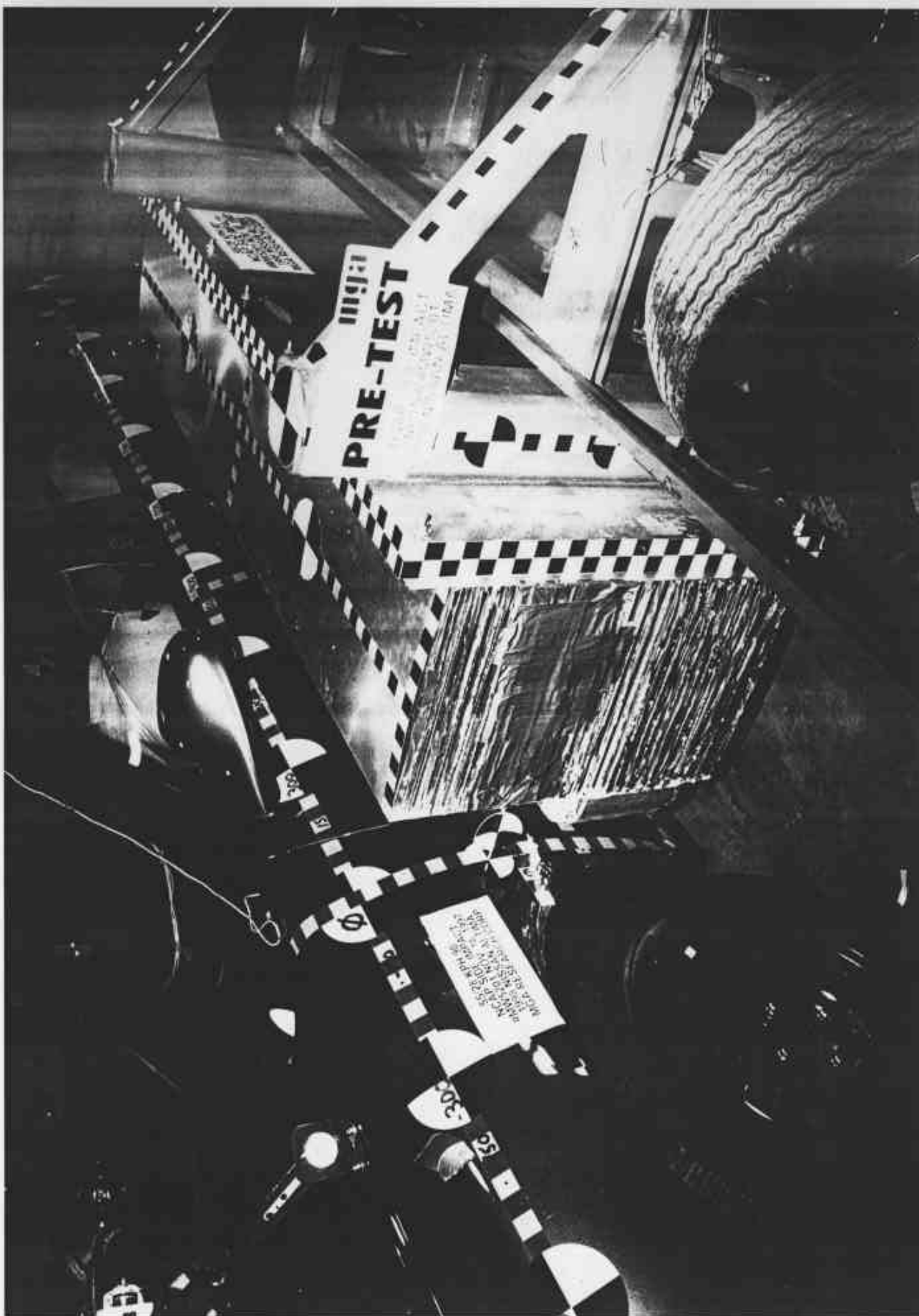


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

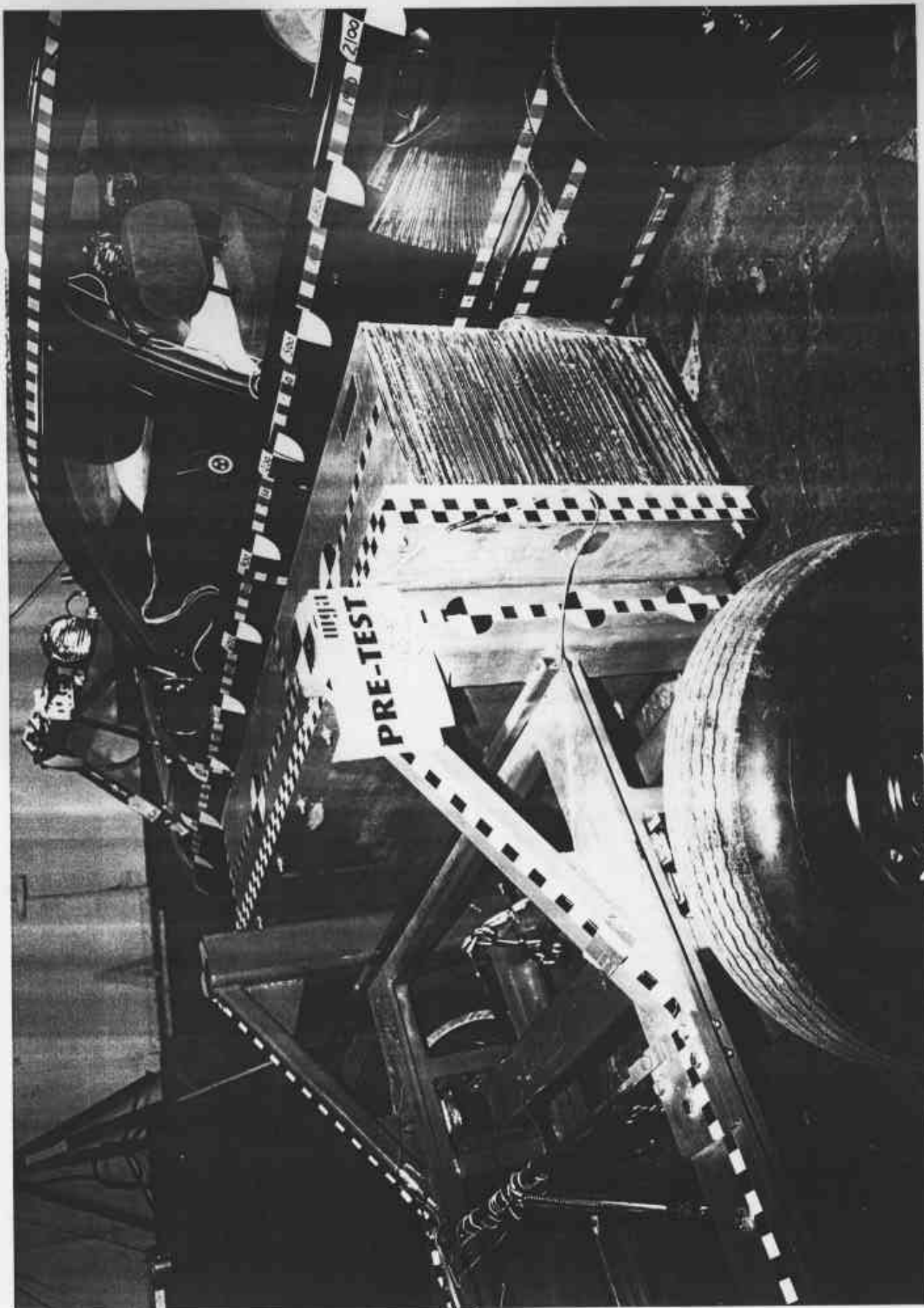


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

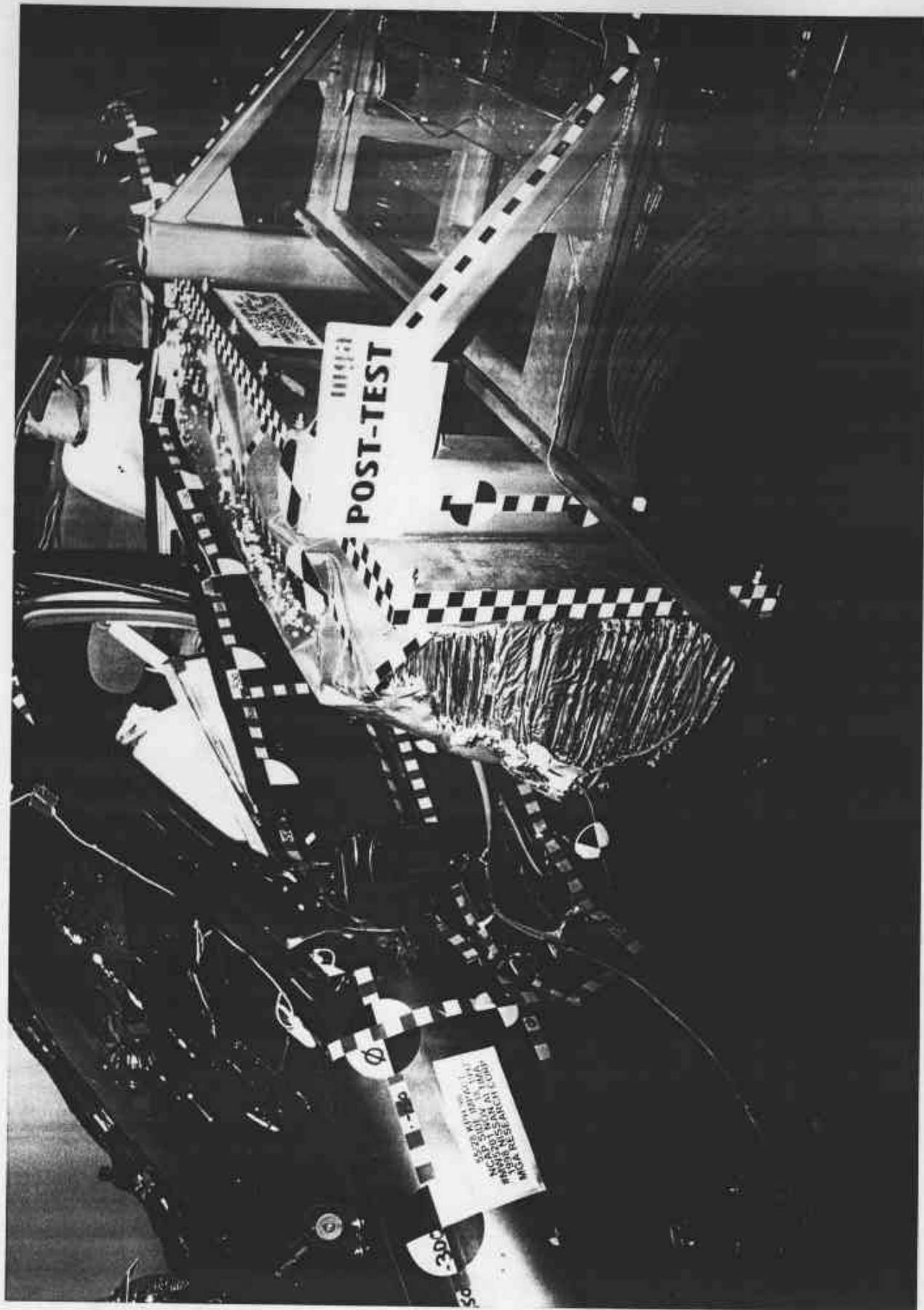


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

A-10

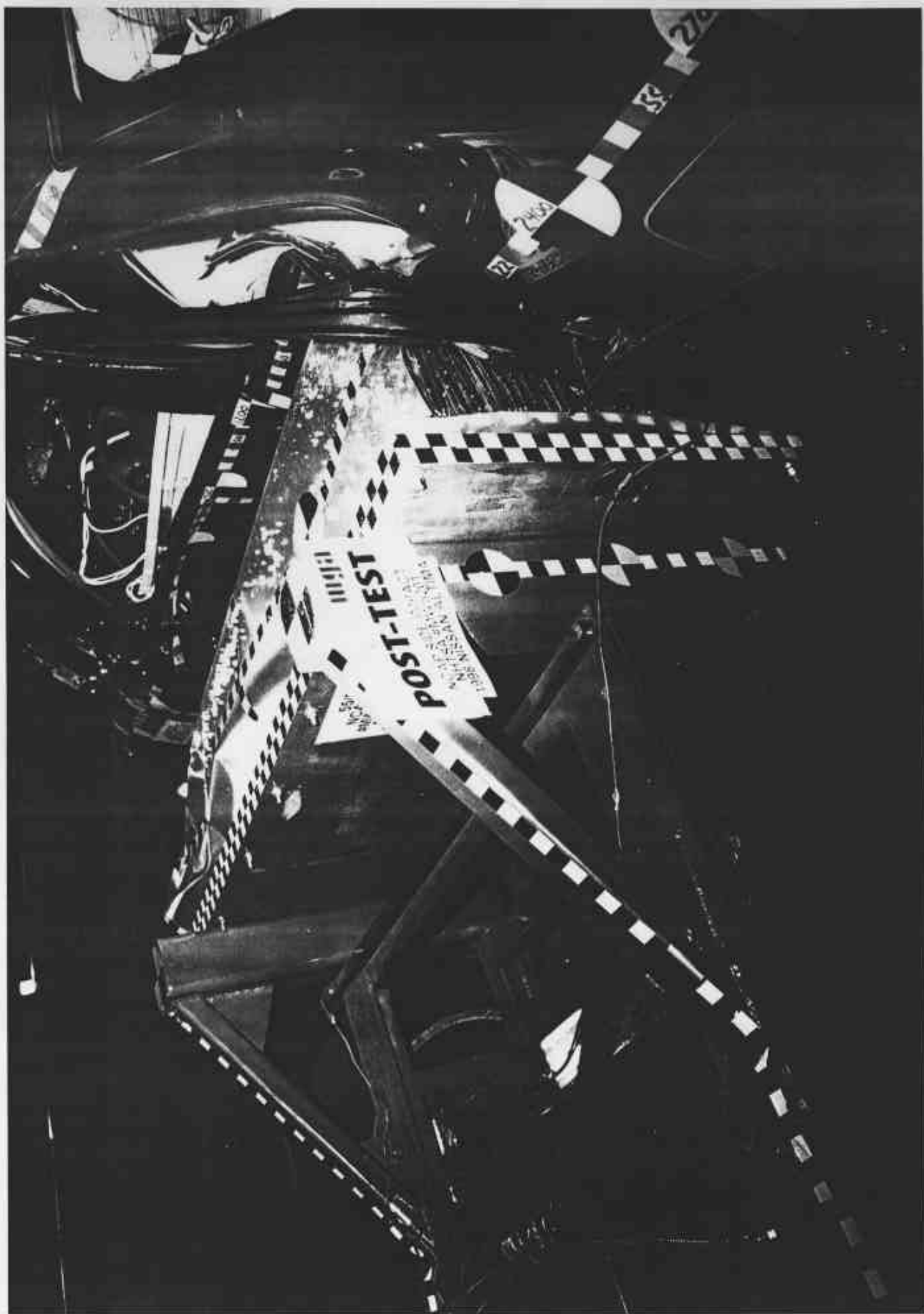


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)



Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

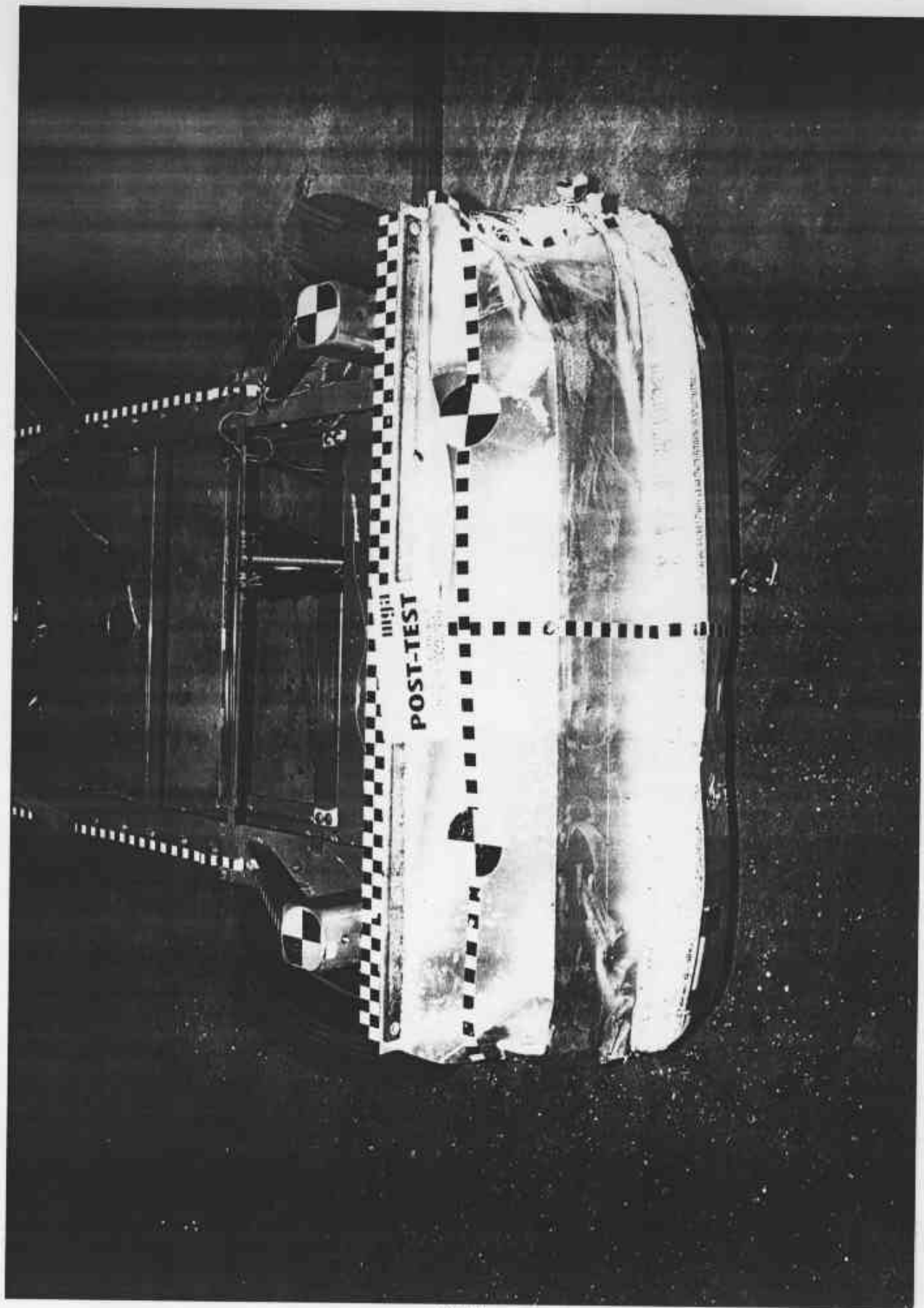
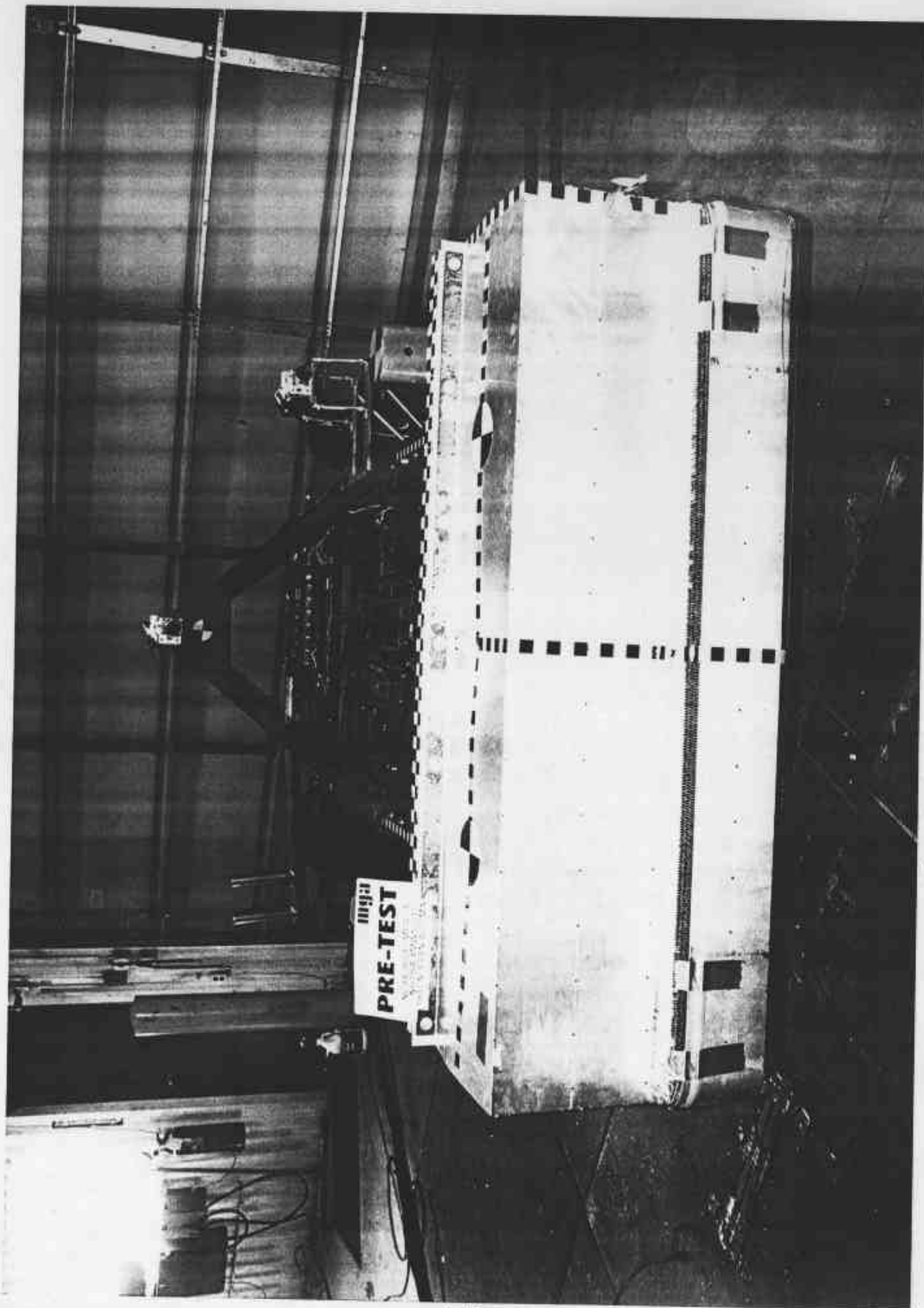
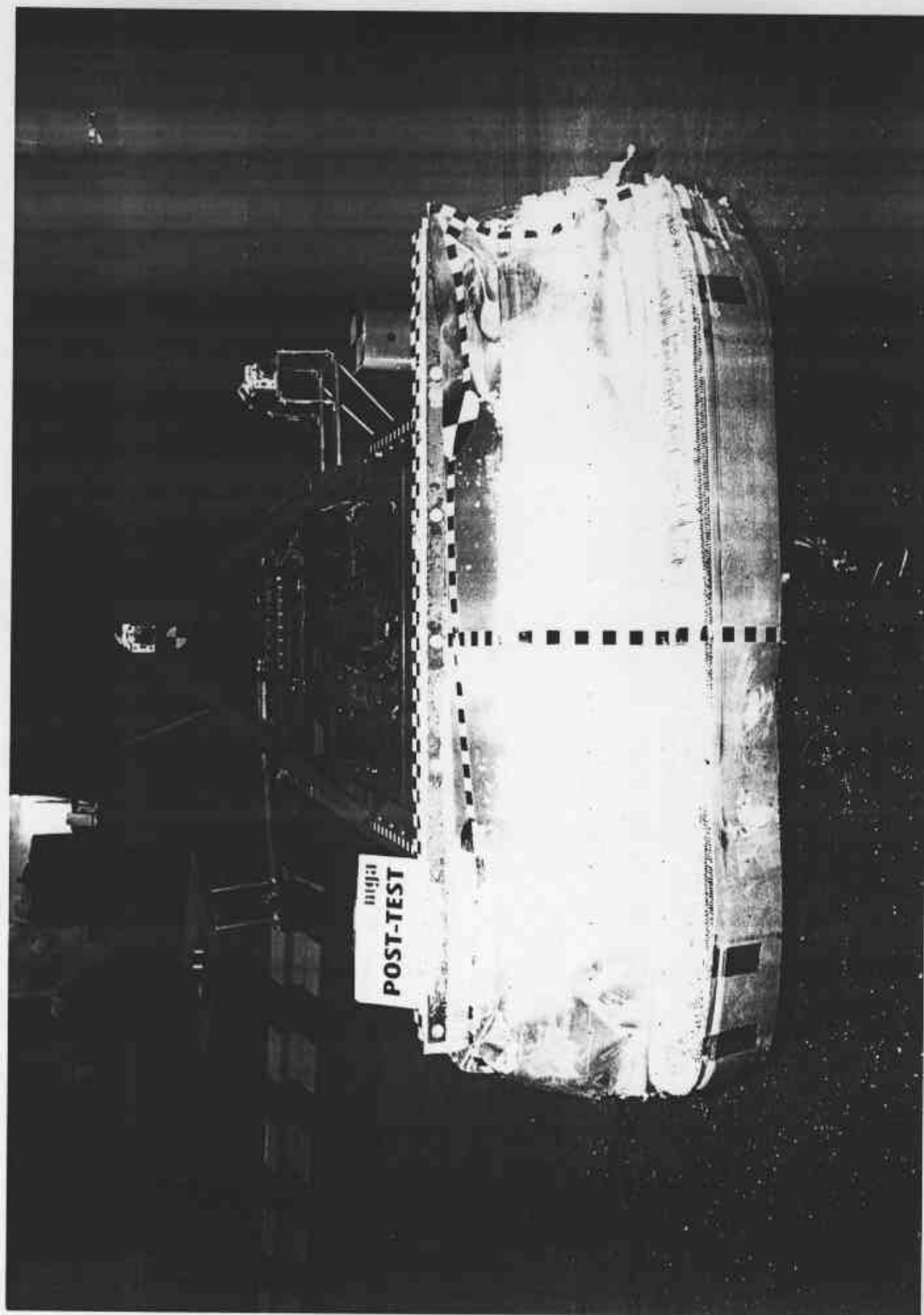


Photo No. A-14 - Post-Test MDB Top View



A-15

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



A-16

Photo No. A-16 - Post-Test MDB Front View

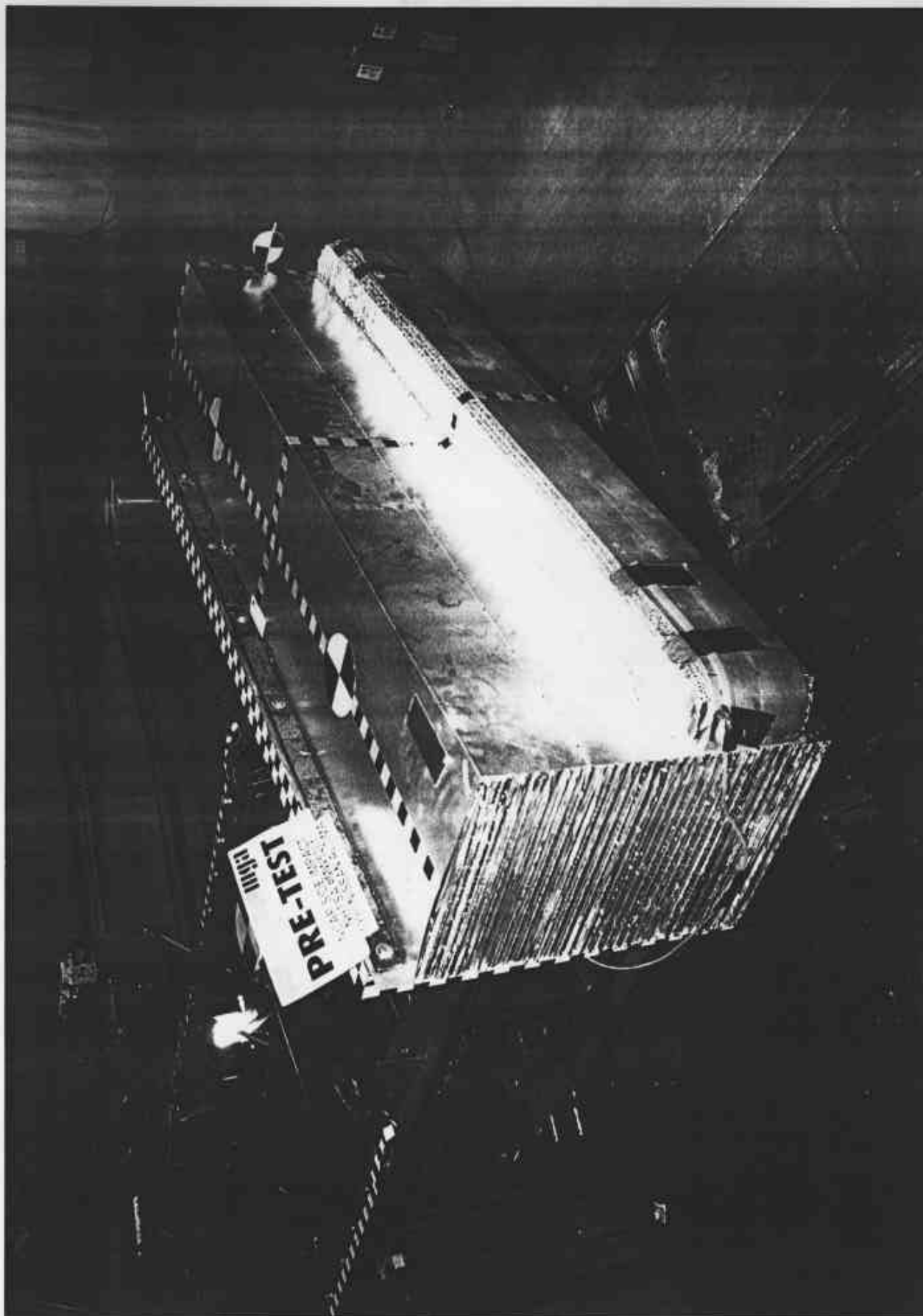
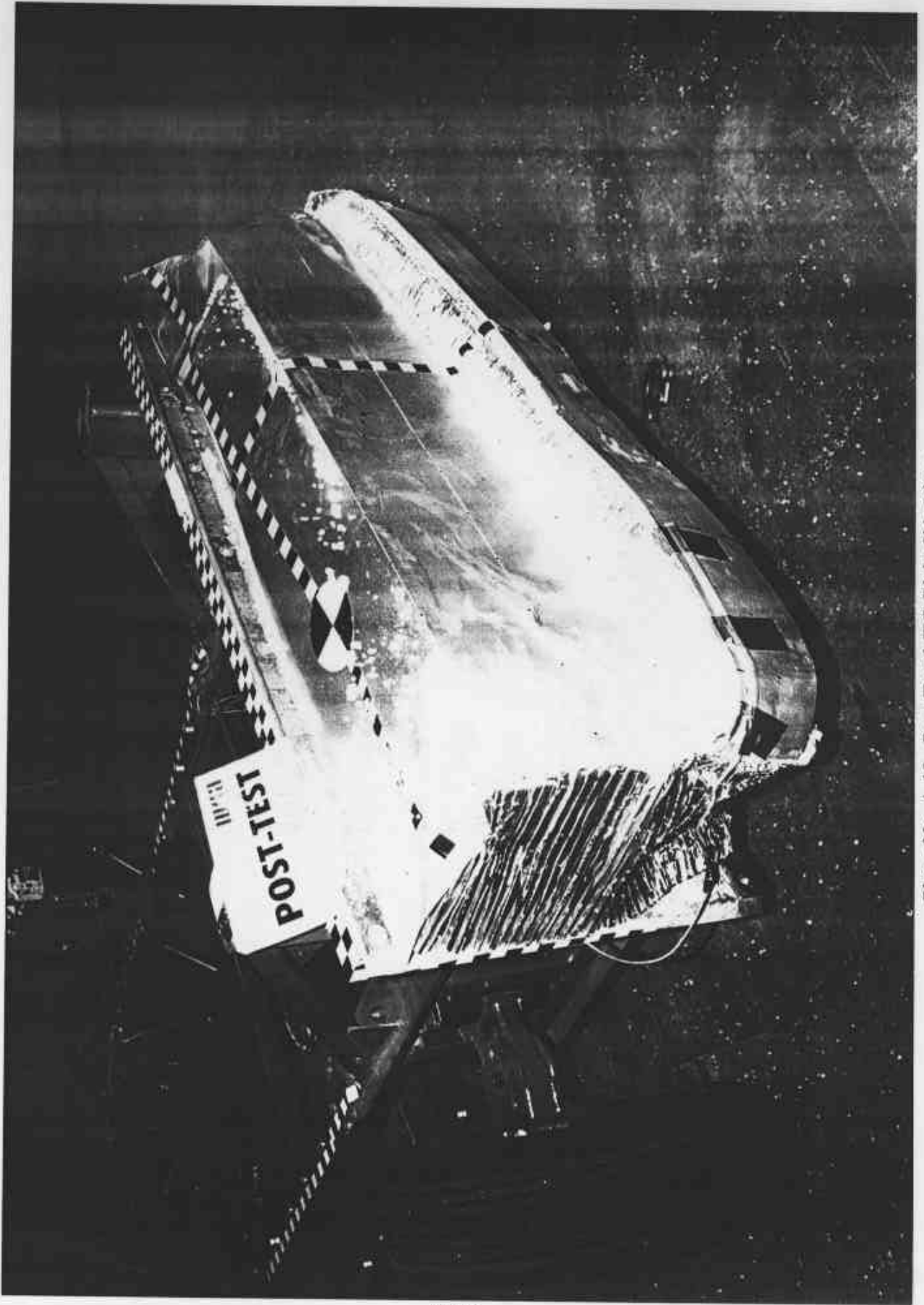


Photo No. A-17 - Pre-Test MDB Right Side View

A-17



A-18

Photo No. A-18 - Post-Test MDB Right Side View

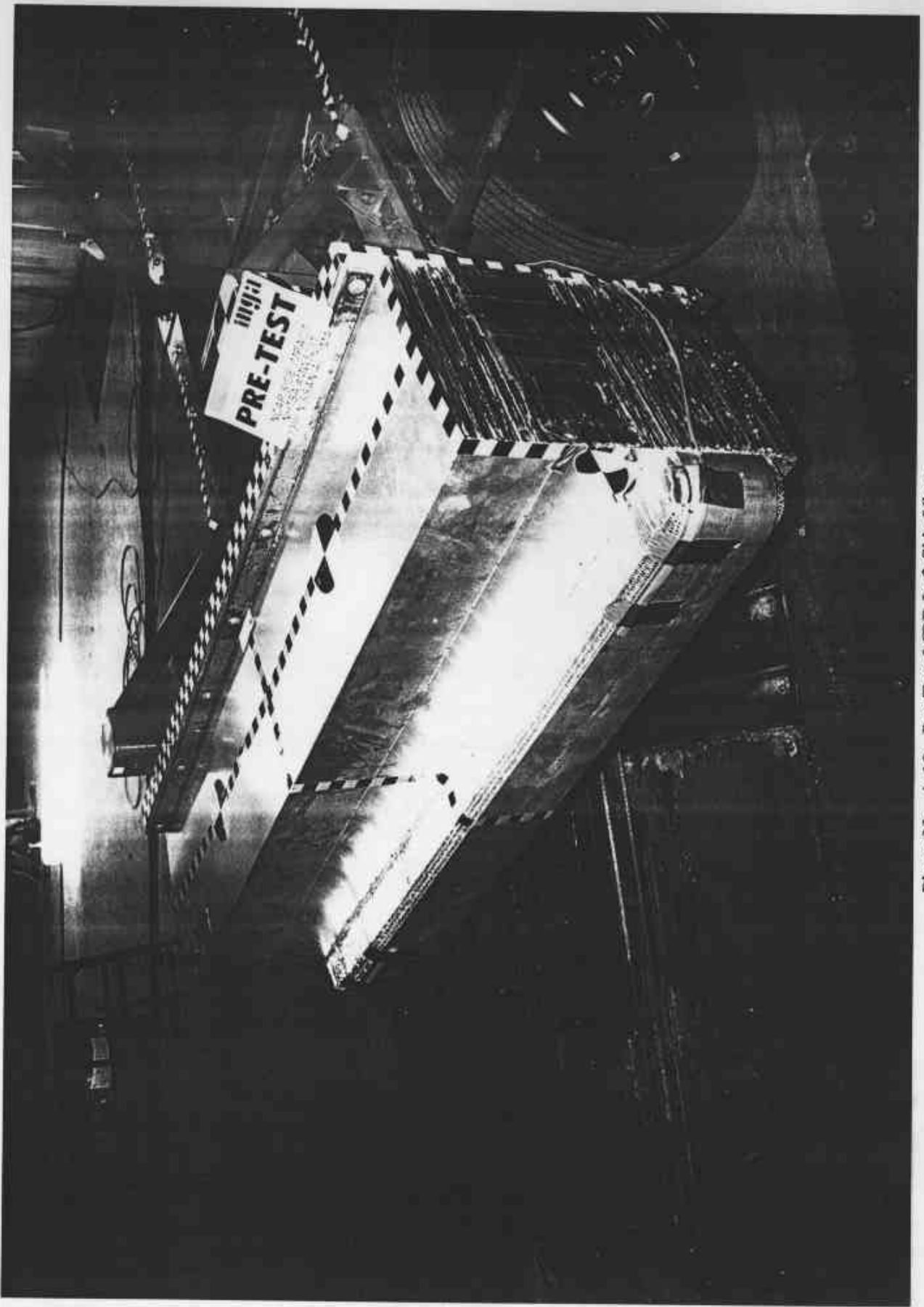


Photo No. A-19 - Pre-Test MDB Left Side View

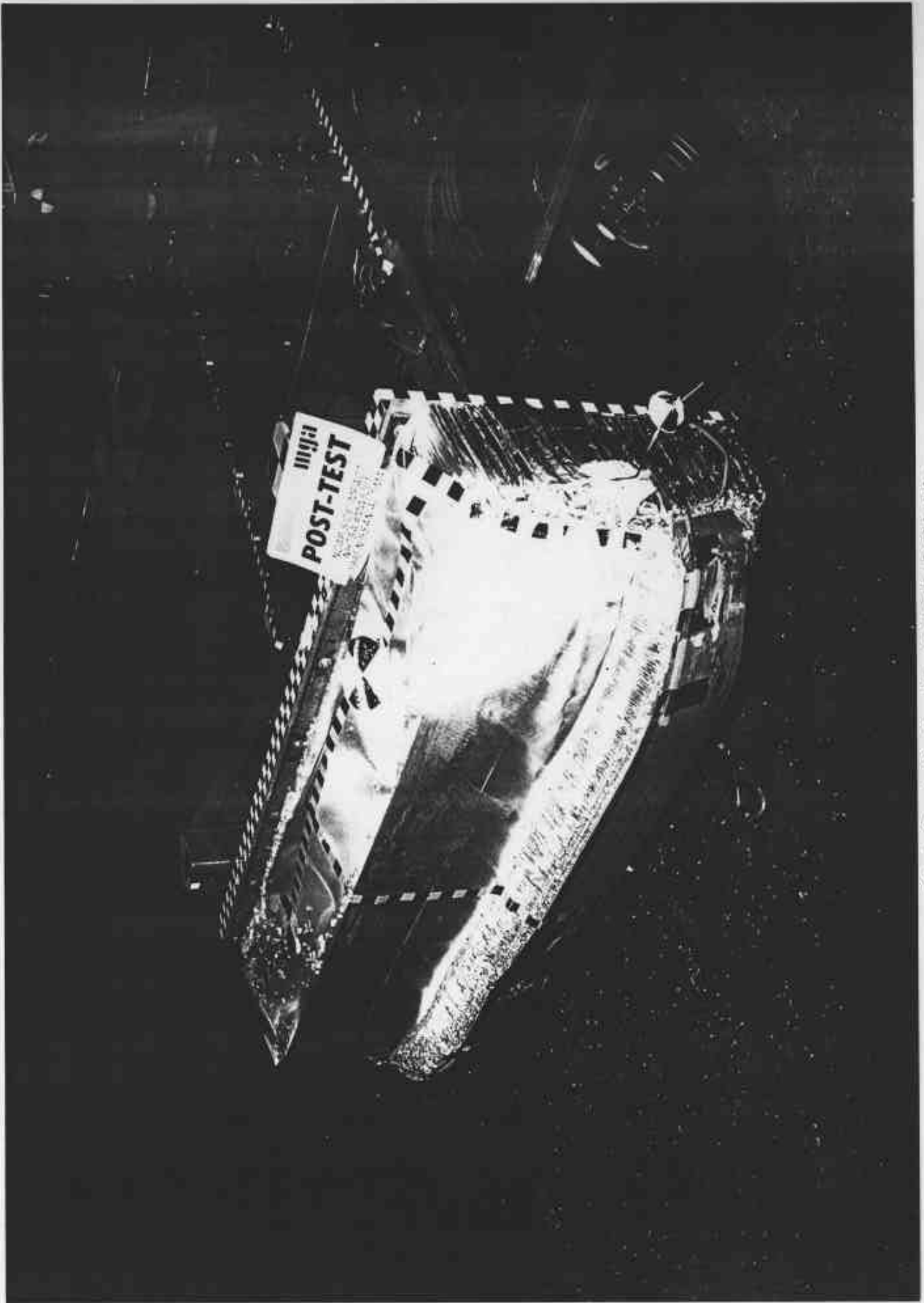


Photo No. A-20 - Post-Test MDB Left Side View

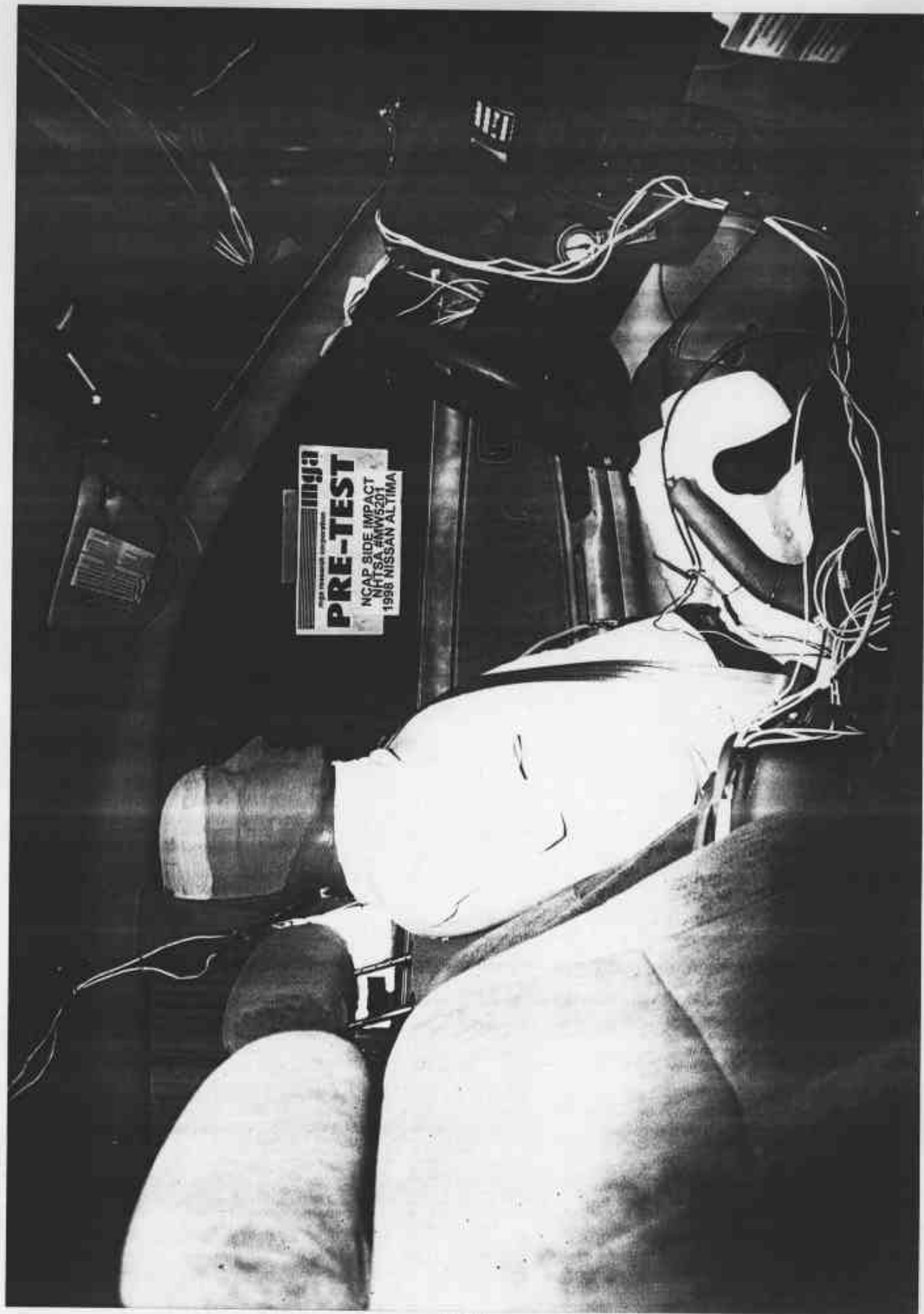
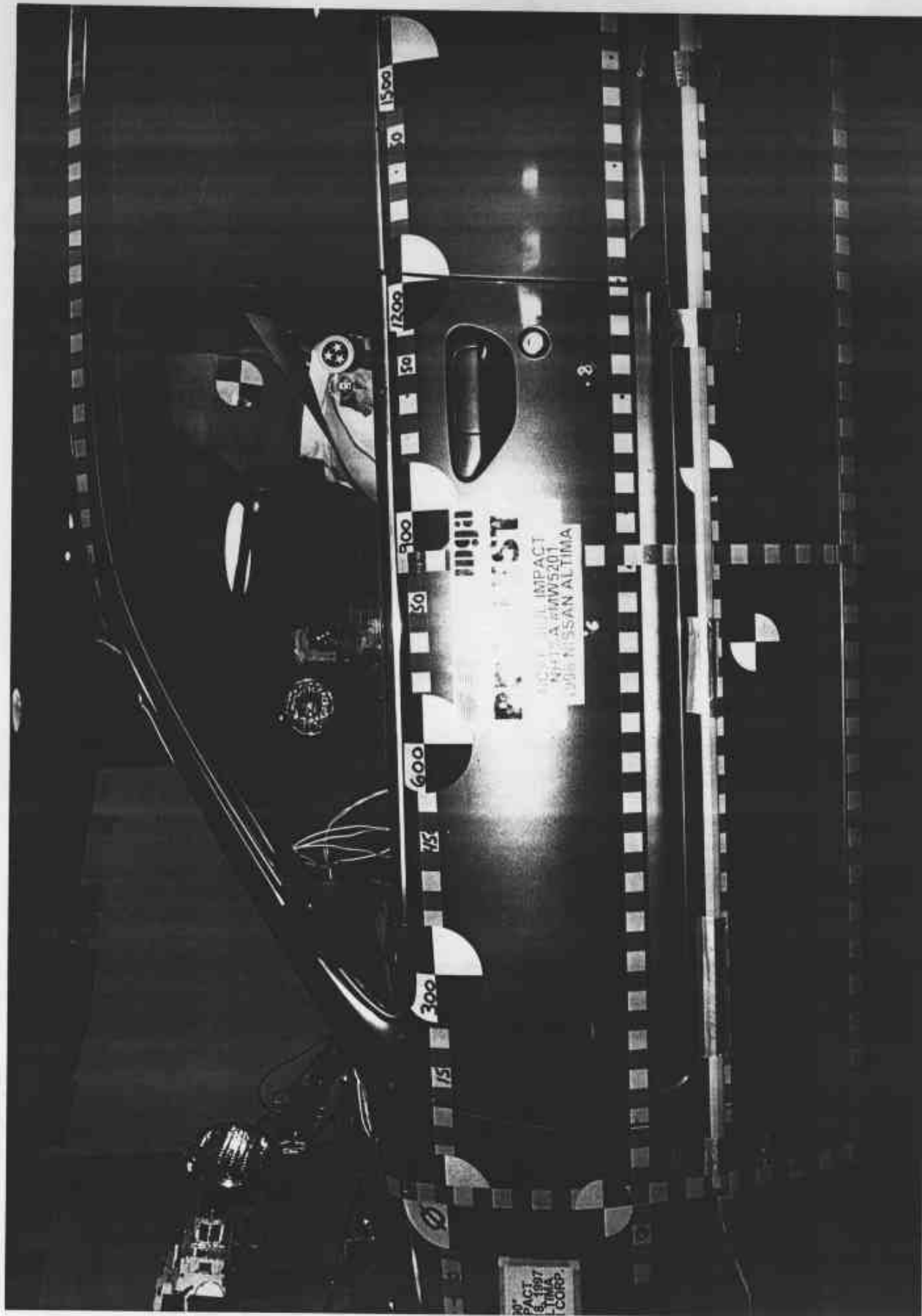


Photo No. A-21 - Pre-Test Driver Dummy Right Side View



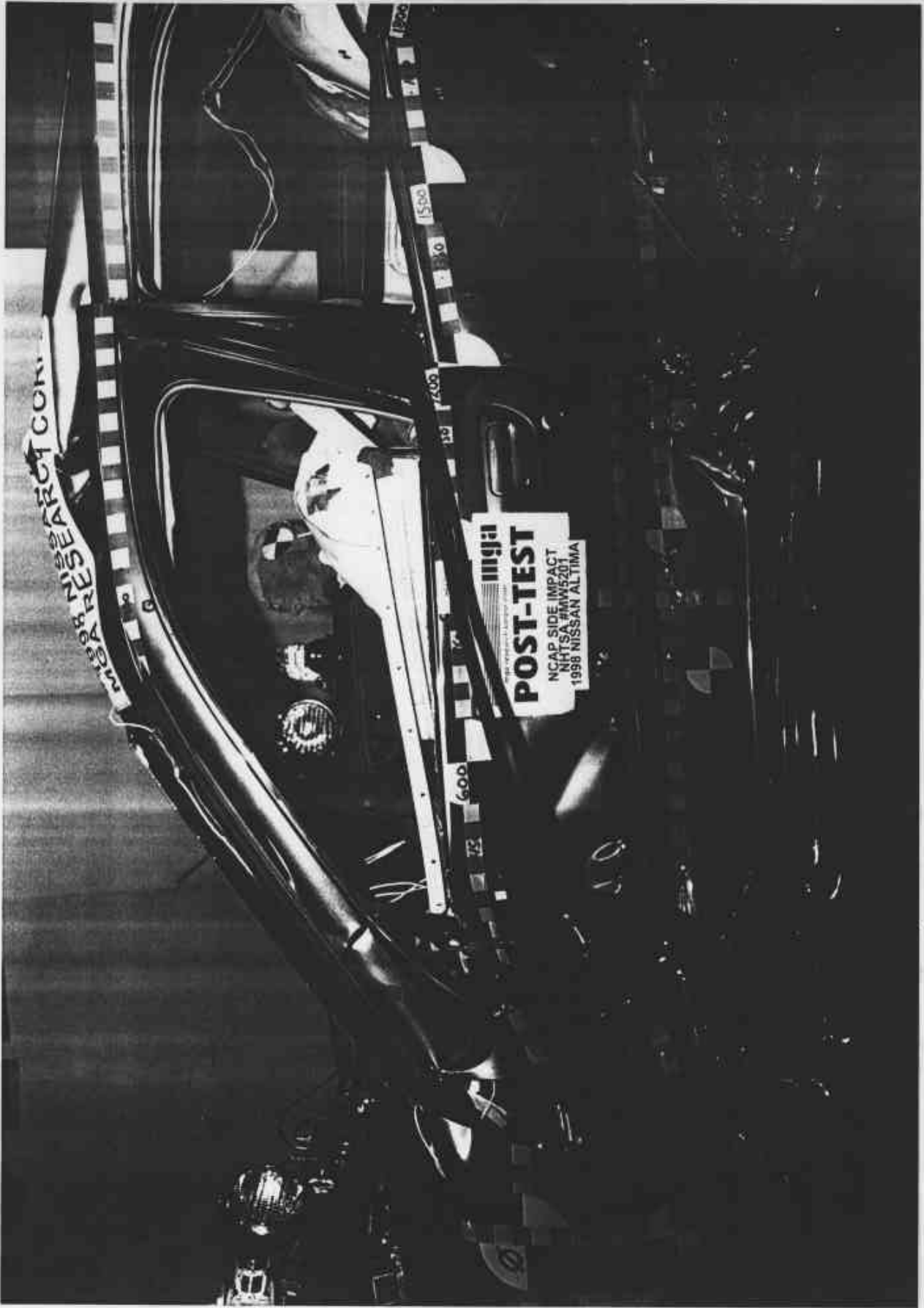
A-22

Photo No. A-22 - Post-Test Driver Dummy Right Side View



A-23

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



A-24

Photo No. A-24 - Post-Test Driver Dummy Left Side View



Photo No. A-25 - Pre-Test Driver Dummy Left Side View (Door Open)



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



A-27

Photo No. A-27 - Post-Test Driver Dummy Shoulder and Door Top View



Photo No. A-28 - Post-Test Driver Dummy Contact

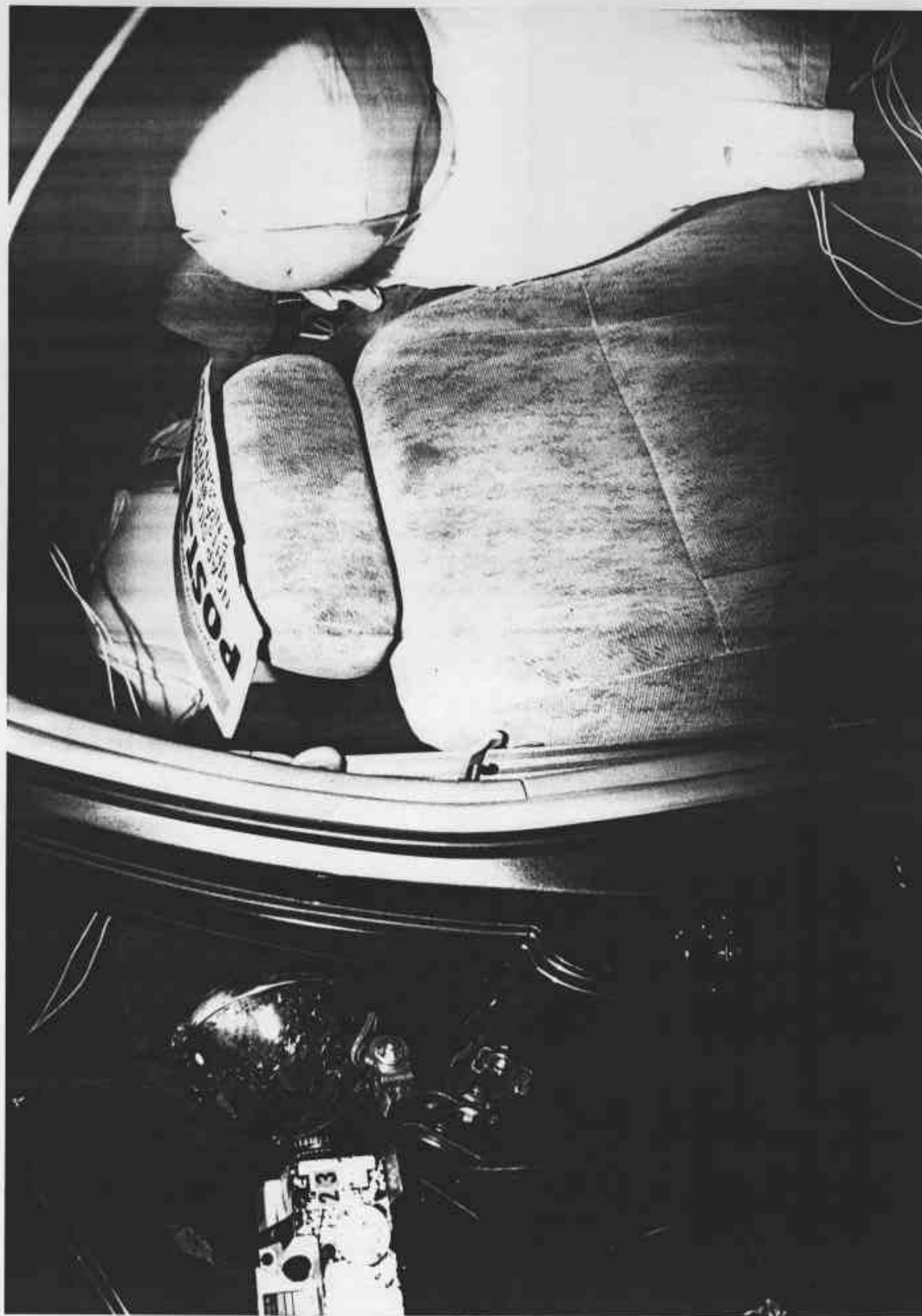
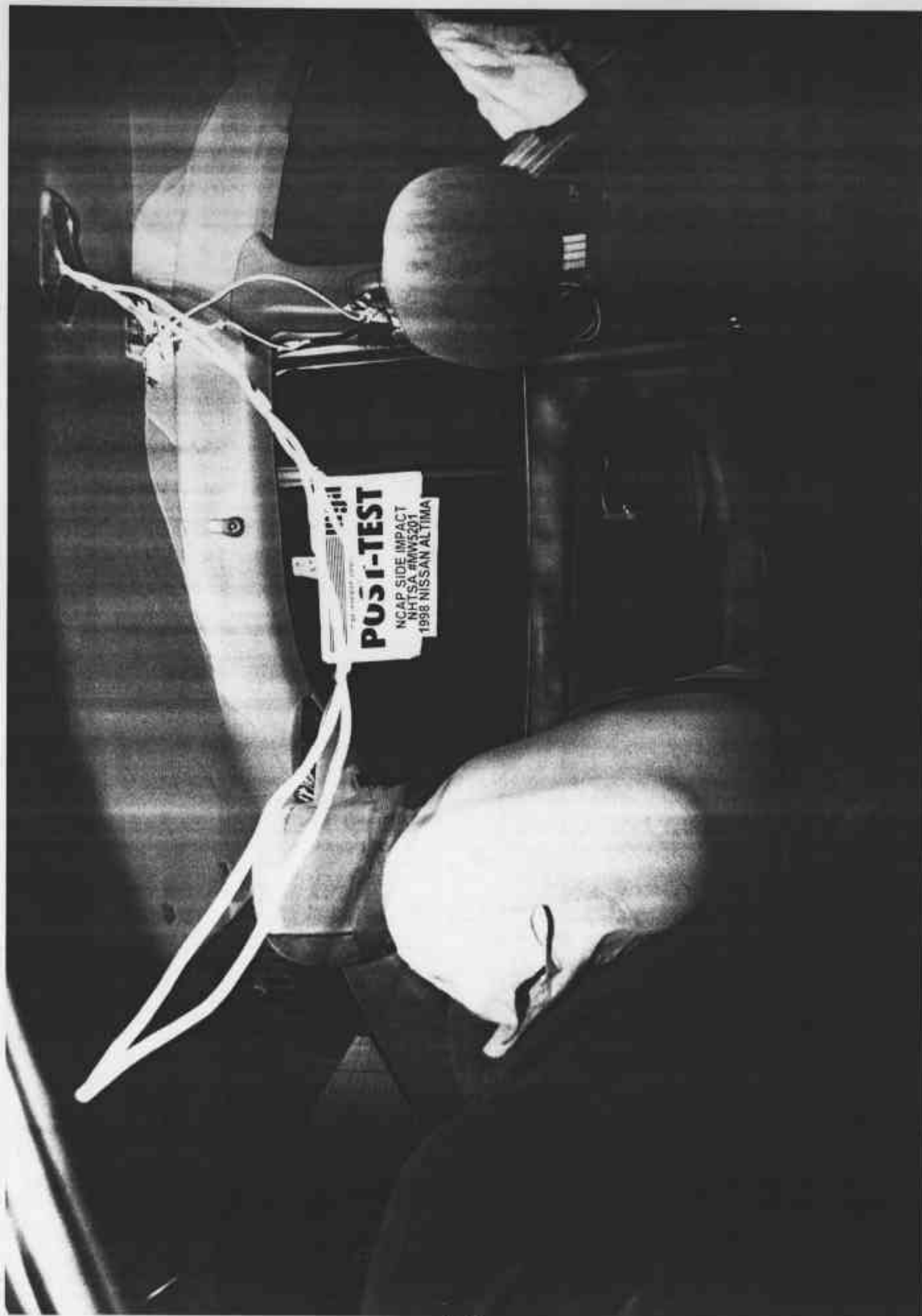


Photo No. A-29 - Post-Test Driver Dummy Head Contact

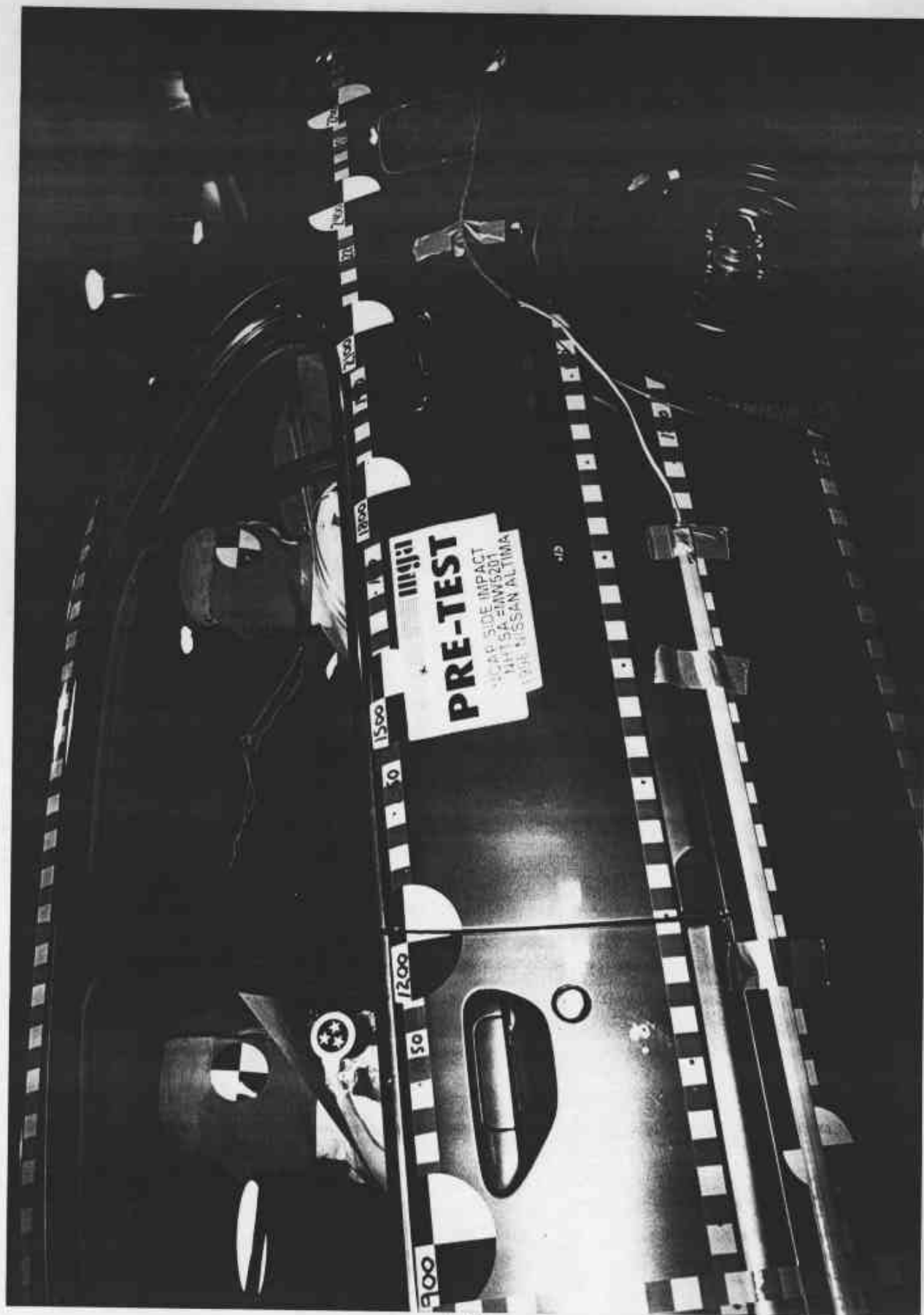


Photo No. A-30 - Pre-Test Passenger Dummy Right Side View



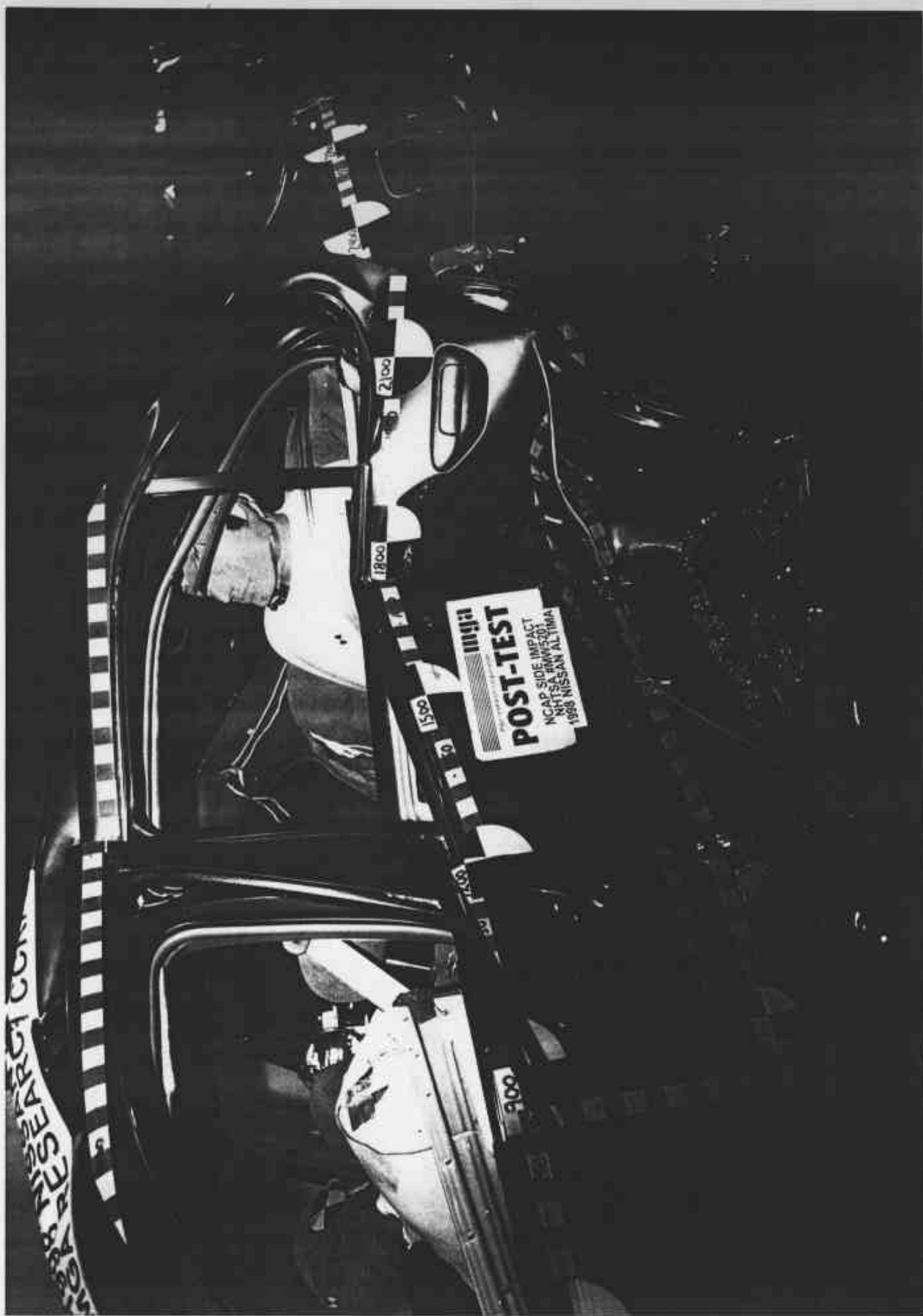
A-31

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



A-32

Photo No. A-32 - Pre-Test Passenger Dummy Left Side View



A-33

Photo No. A-33 - Post-Test Passenger Dummy Left Side View

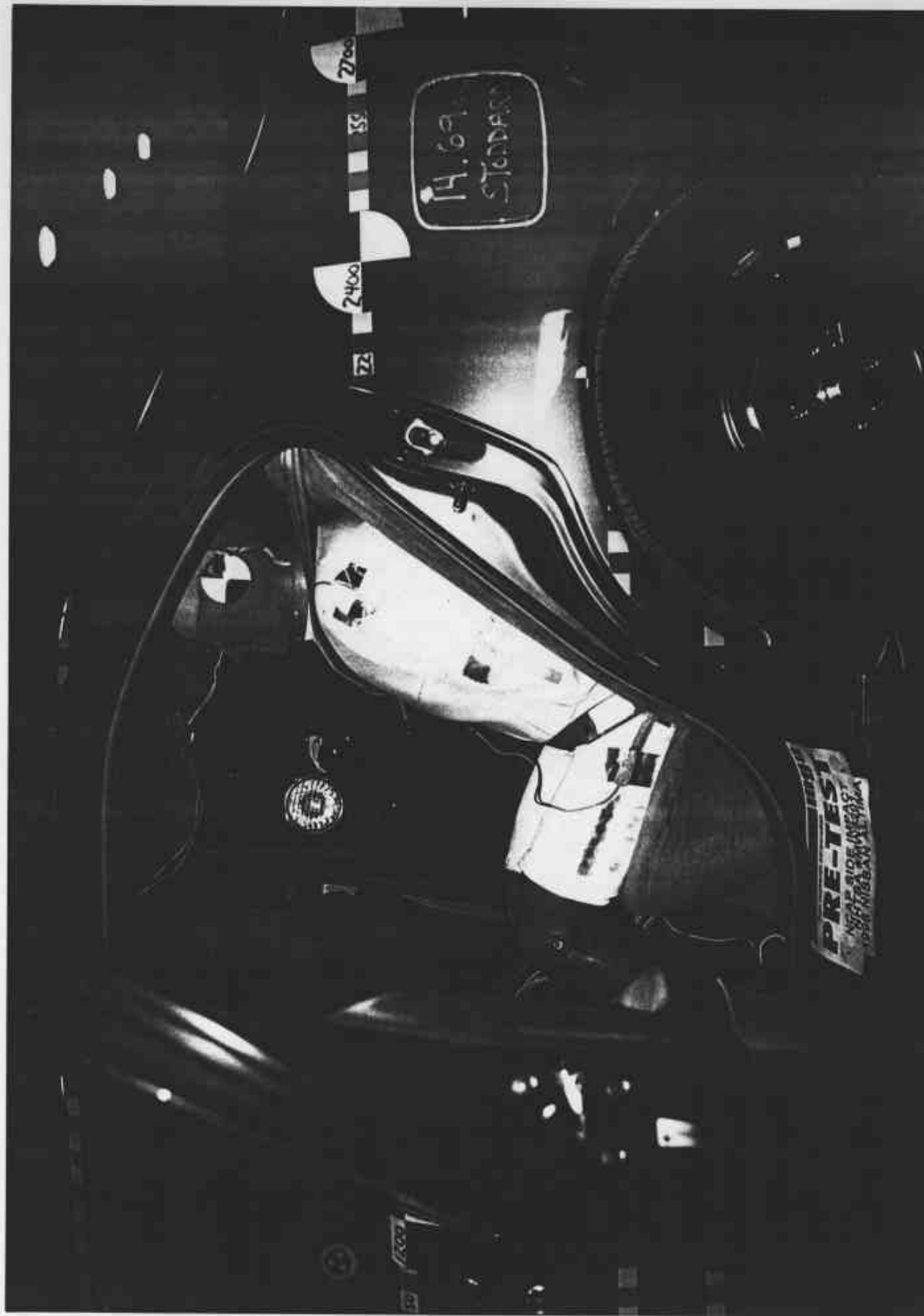


Photo No. A-34 - Pre-Test Passenger Dummy Left Side View (Door Open)



A-35

Photo No. A-35 - Pre-Test Passenger Dummy Shoulder and Door Top View

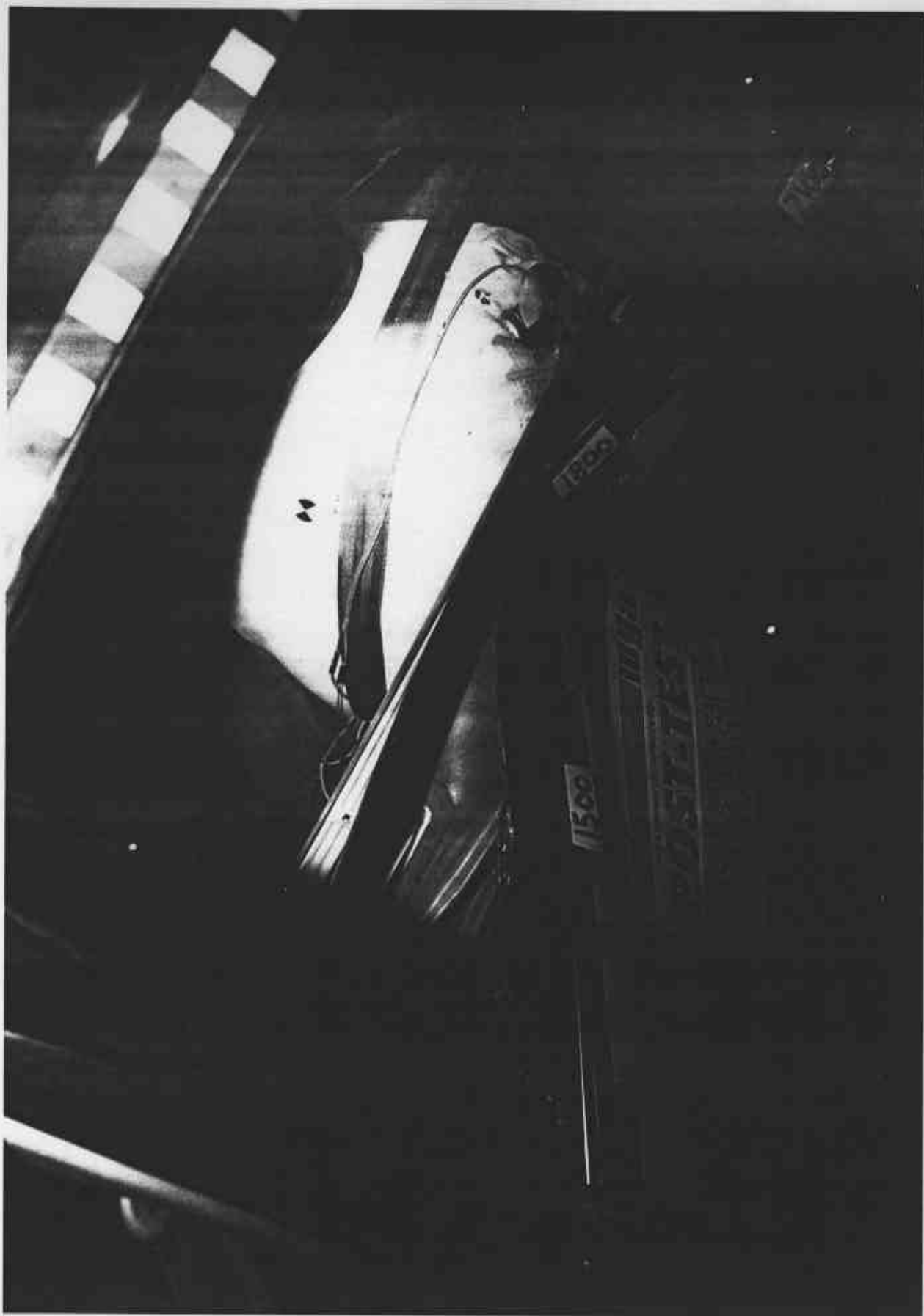


Photo No. A-36 - Post-Test Passenger Dummy Shoulder and Door Top View

A-36



Photo No. A-37 - Post-Test Passenger Dummy Contact

A-37



Photo No. A-38 - Post-Test Passenger Dummy Head Contact

A-38

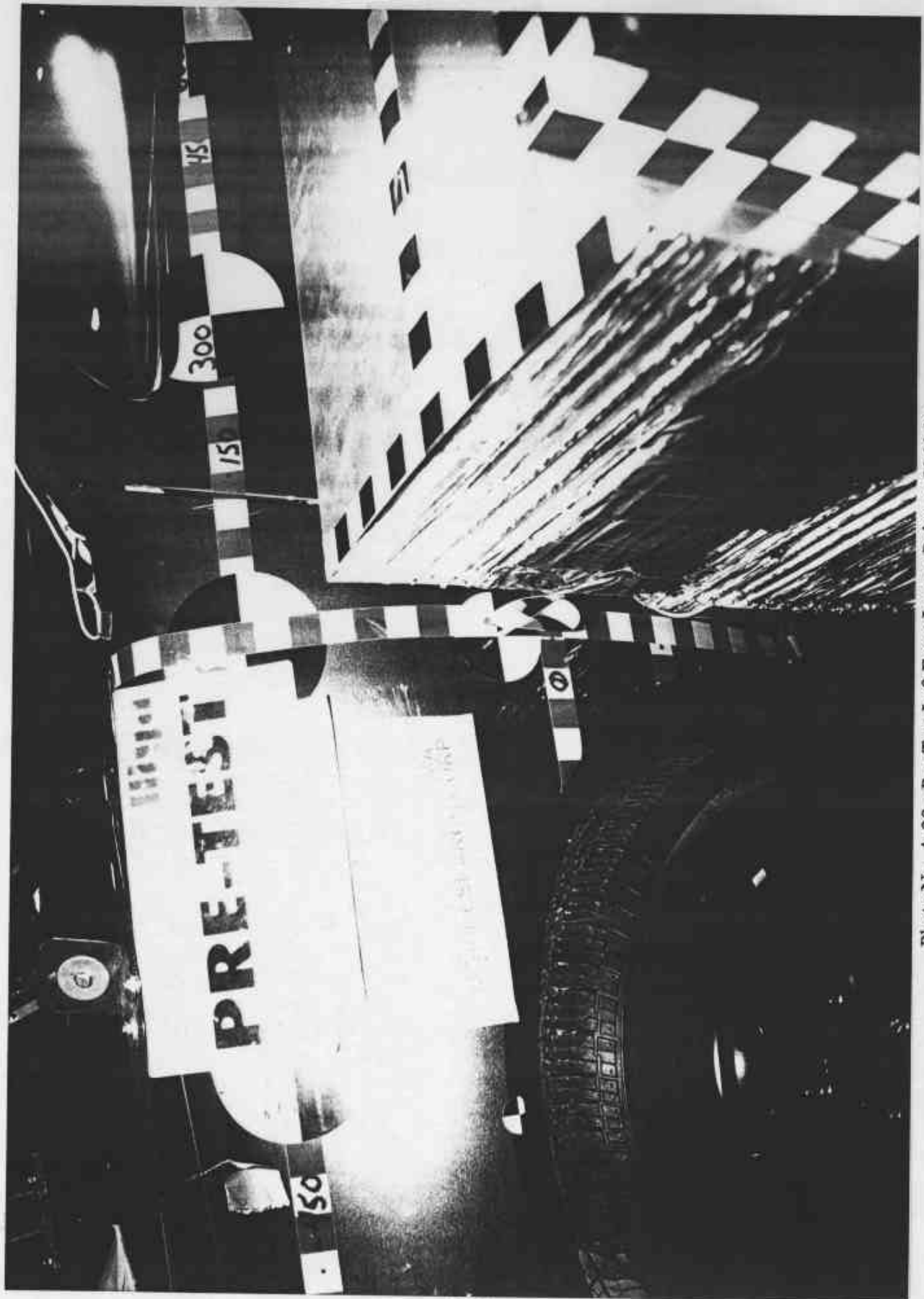
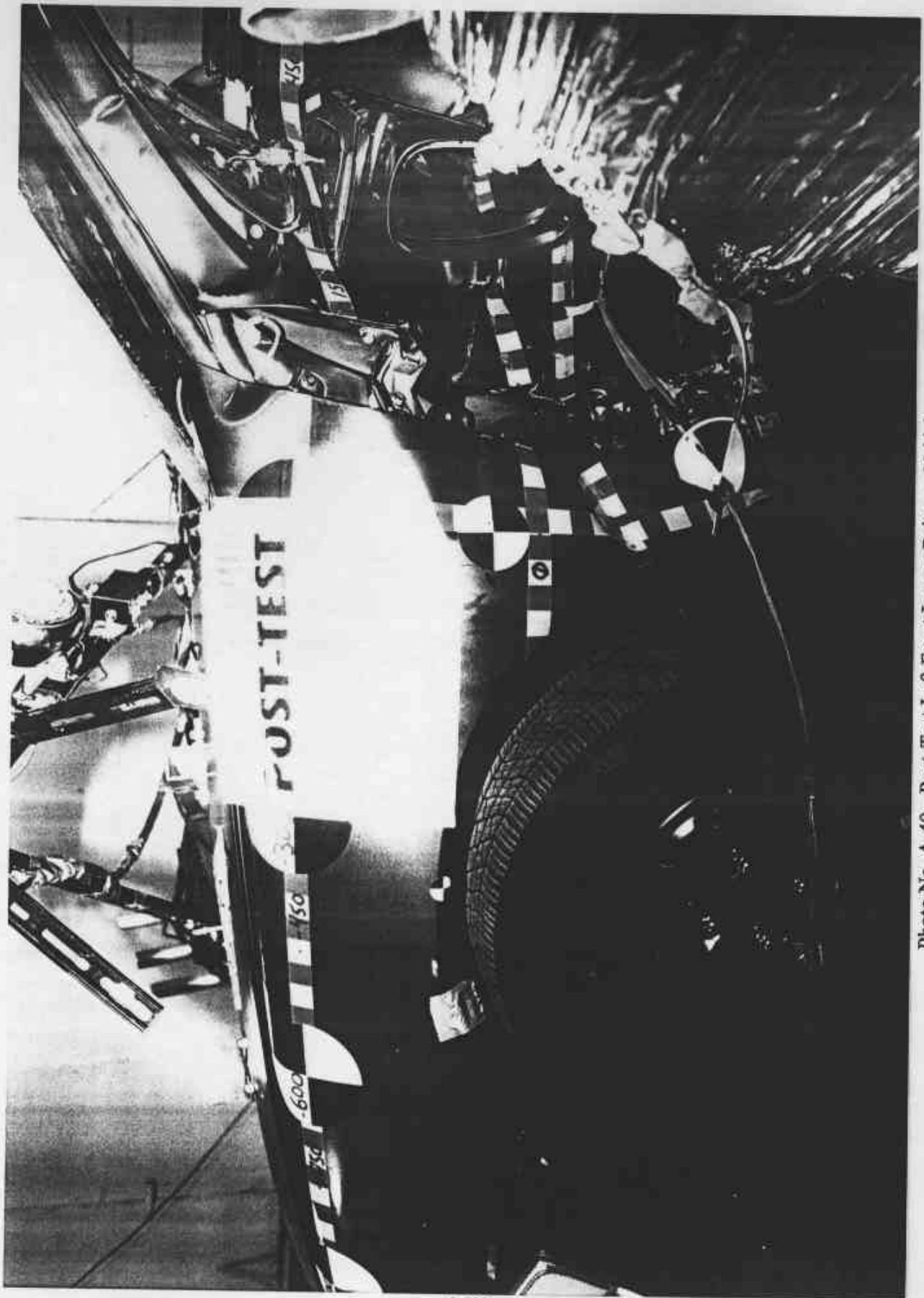


Photo No. A-39 - Pre-Test Left Front Impact Point on Vehicle



A-40

Photo No. A-40 - Post-Test Left Front Impact Point on Vehicle

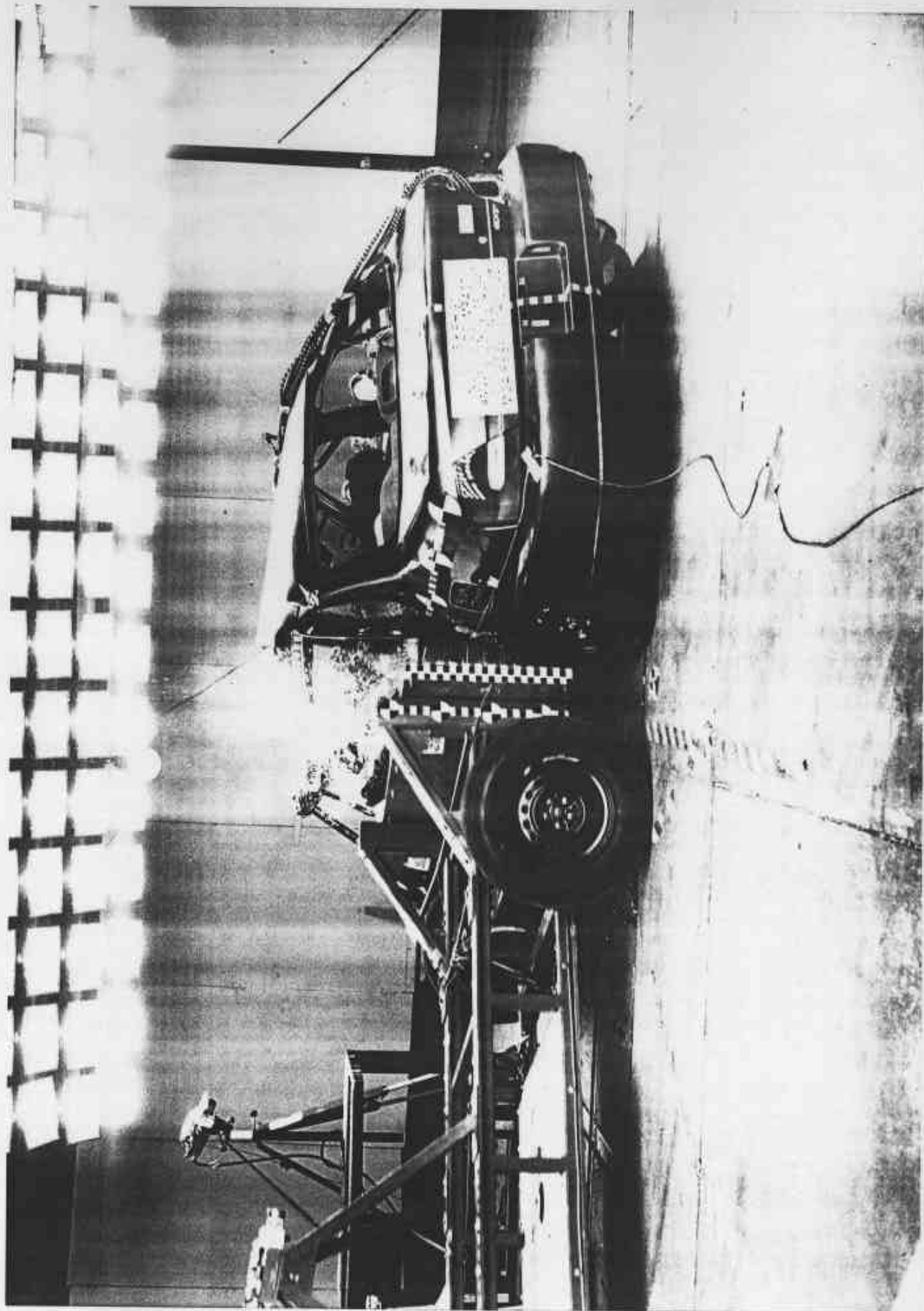


Photo No. A-41 - Impact

A-41

MANUFACTURED BY NISSAN MOTOR CO., LTD.

DATE 07/97 GEAR 2152 LB 2550 LB
GWR FR. 2152 LB GWR RR. 1853 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY, BUMPER AND THEFT PREVENTION STANDARDS
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION.

VIN: 1N4DL01D6WC119744 PASSENGER CAR

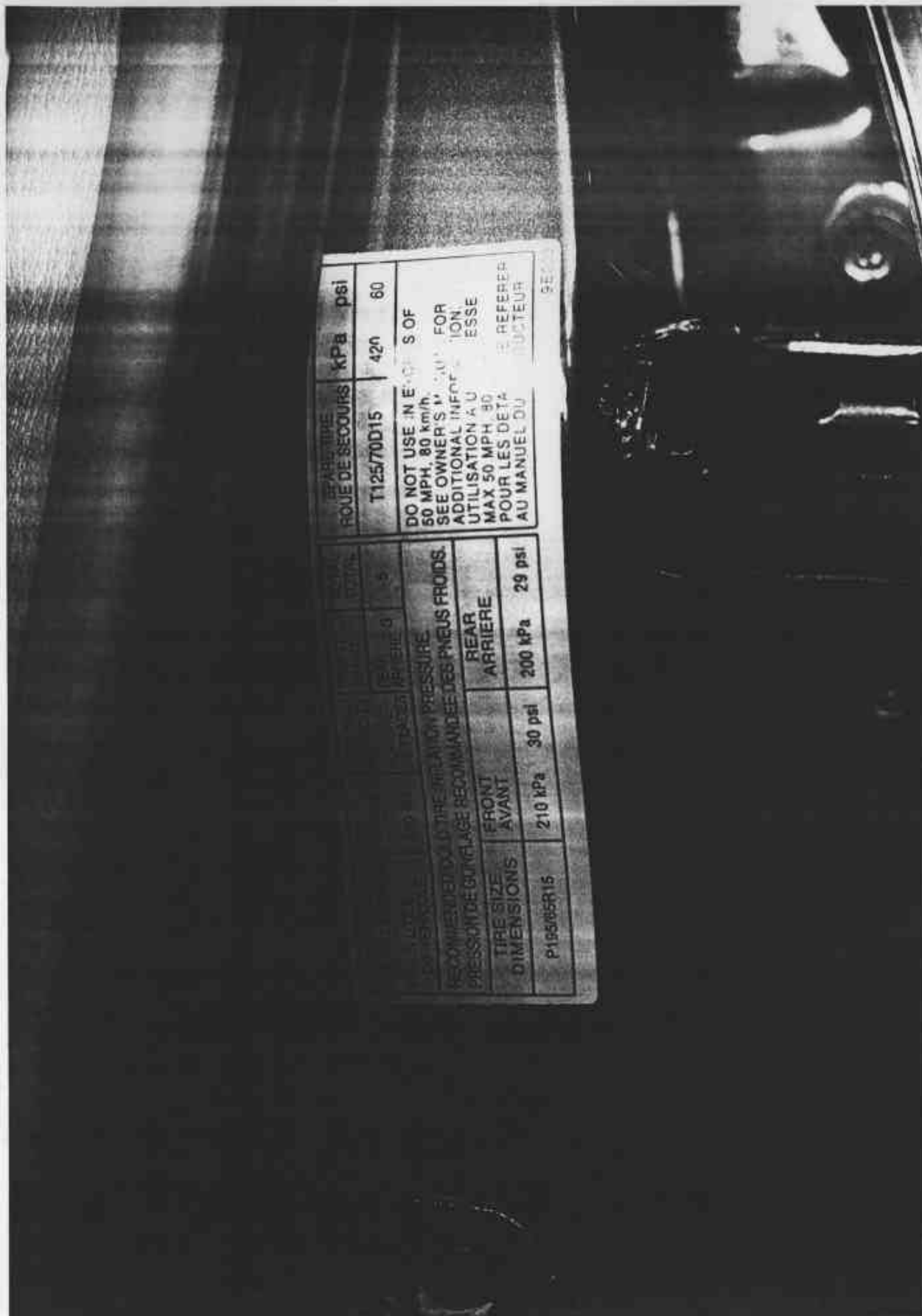
COLOR 1911 TRANS 504 ENGINE
504 1911 TRANS 504 KRE40E 2330T 02000

MODEL 1 88GLBF-EUR 535



1N4DL01D6WC119744

Photo No. A-42 - Vehicle Certification Label



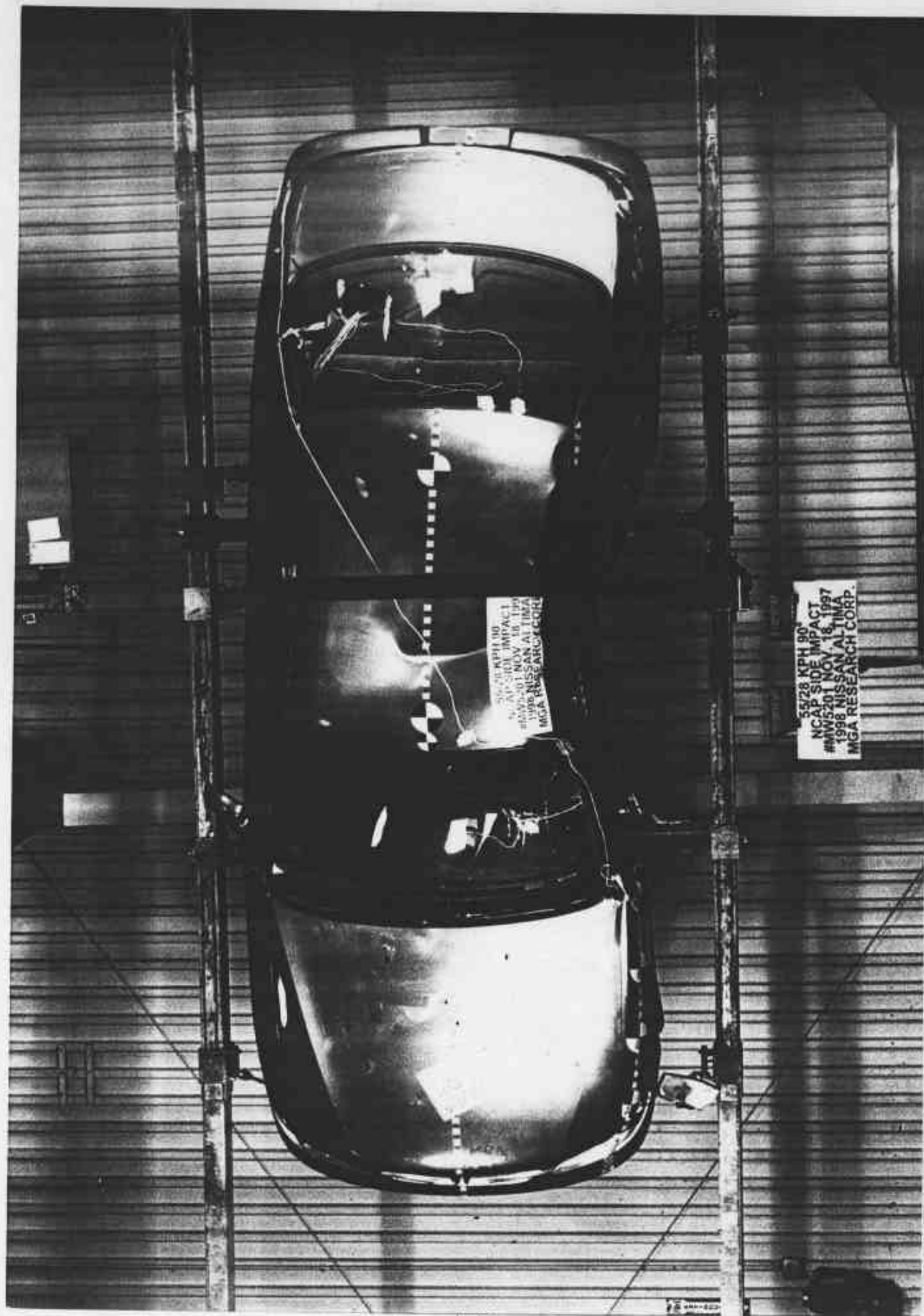
TYPE DE PNEU TIRE TYPE	PRESSION RECOMMANDÉE RECOMMENDED PRESSURE
T125/70D15	420 kPa 60 psi

DO NOT USE IN EXCESS OF
50 MPH, 80 km/h. FOR
SEE OWNER'S MANUAL FOR
ADDITIONAL INFORMATION.
UTILISATION AU
MAX 50 MPH, 80
POUR LES DÉTAILS
AU MANUEL DU PROPRIÉTAIRE

RECOMMANDÉES DE LA TIRE RECOMMANDÉES DE LA TIRE	
PRESSION RECOMMANDÉE RECOMMENDED PRESSURE	PRESSION RECOMMANDÉE RECOMMENDED PRESSURE
FRONT AVANT	210 kPa 30 psi
REAR ARRIÈRE	200 kPa 29 psi

TIRE SIZE
DIMENSIONS
P195/65R15

Photo No. A-43 - Tire Placard



A-44

Photo No. A-44 - Rollover 90°

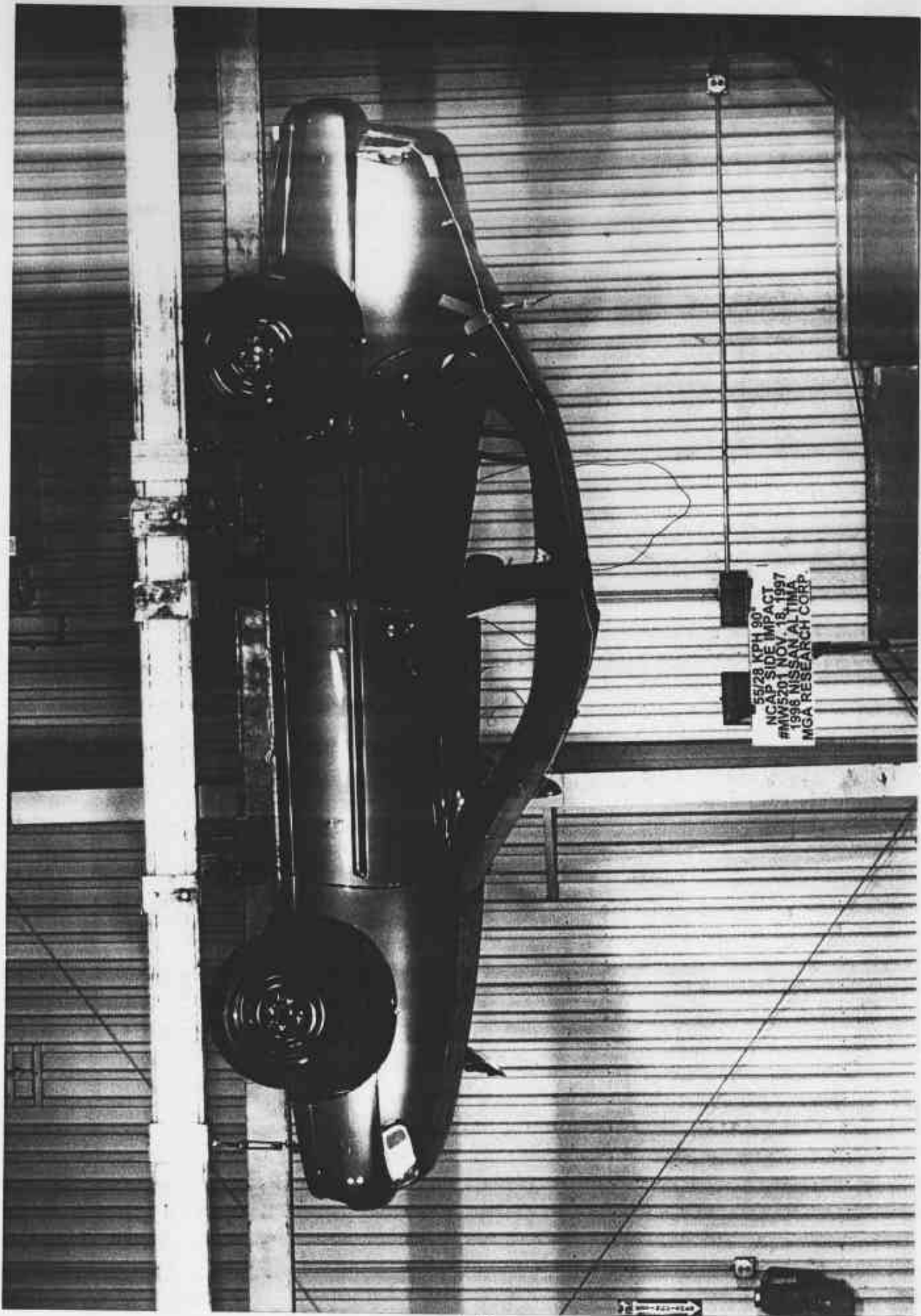
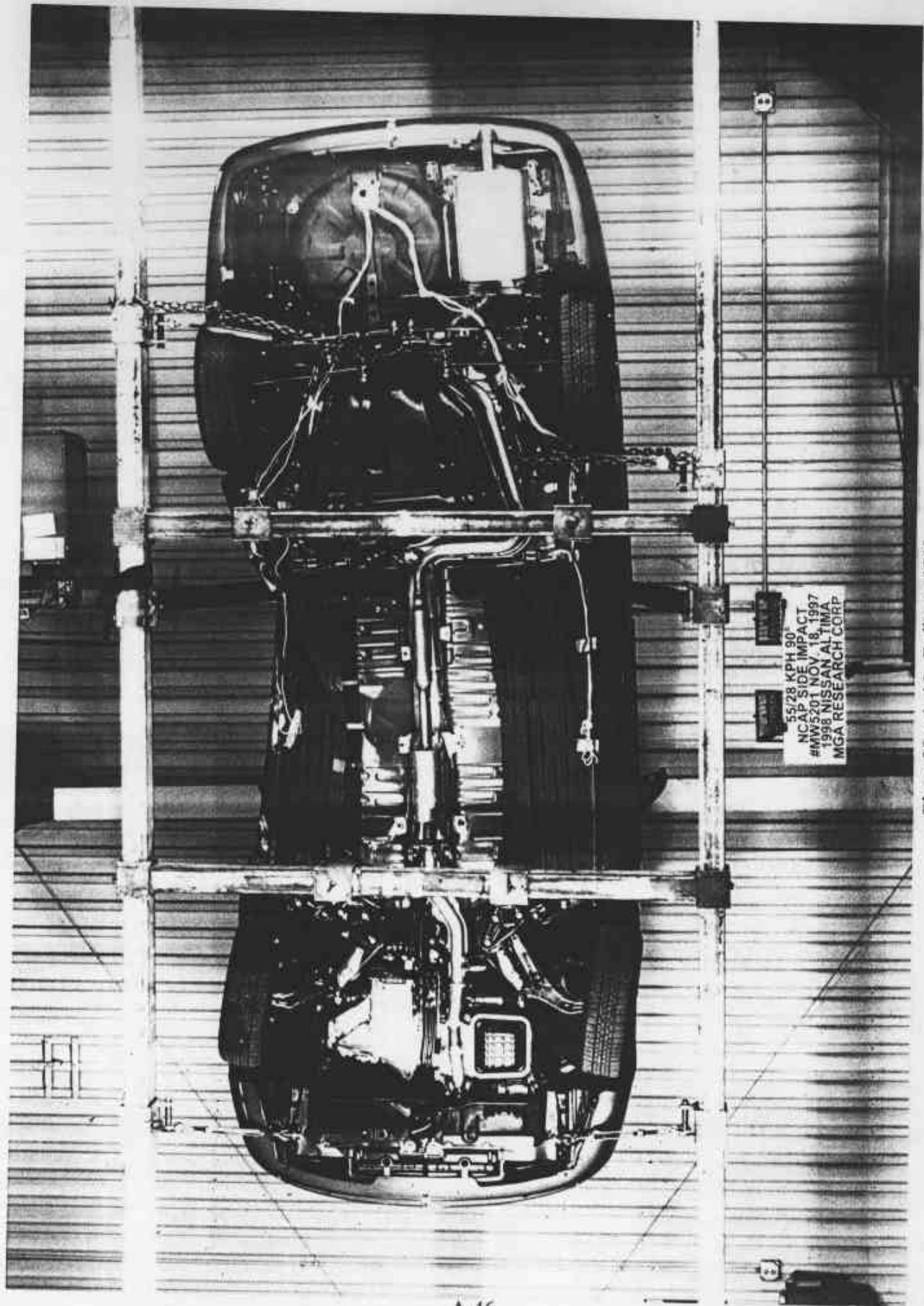


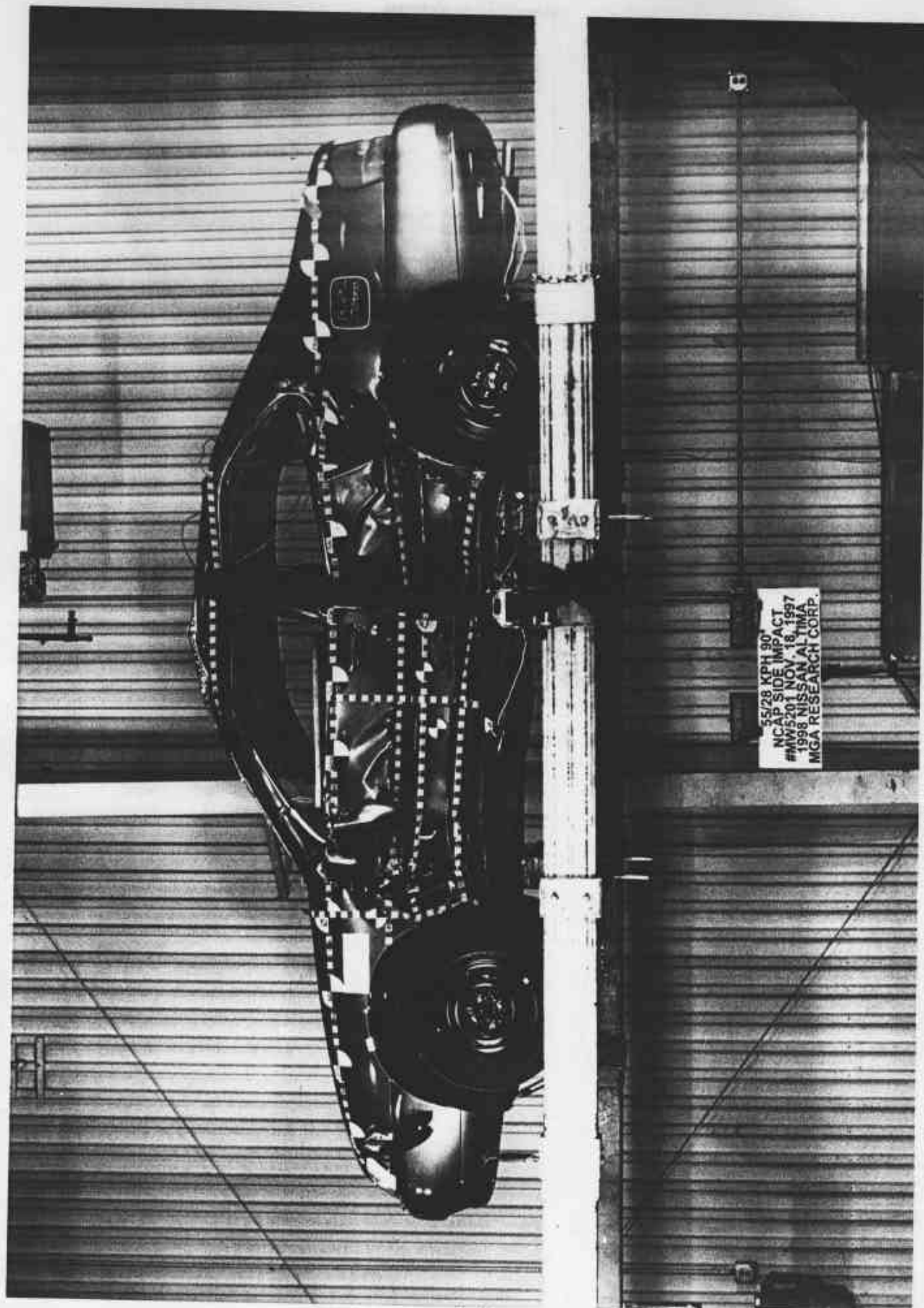
Photo No. A-45 - Rollover 180°

A-45



A-46

Photo No. A-46 - Rollover 270°



55/28 KPH 90°
NCAP SIDE IMPACT
#AW5701 NOV 18, 1997
1998 NISSAN ALTIMA
MGA RESEARCH CORP.

A-47

Photo No. A-47 - Rollover 360°

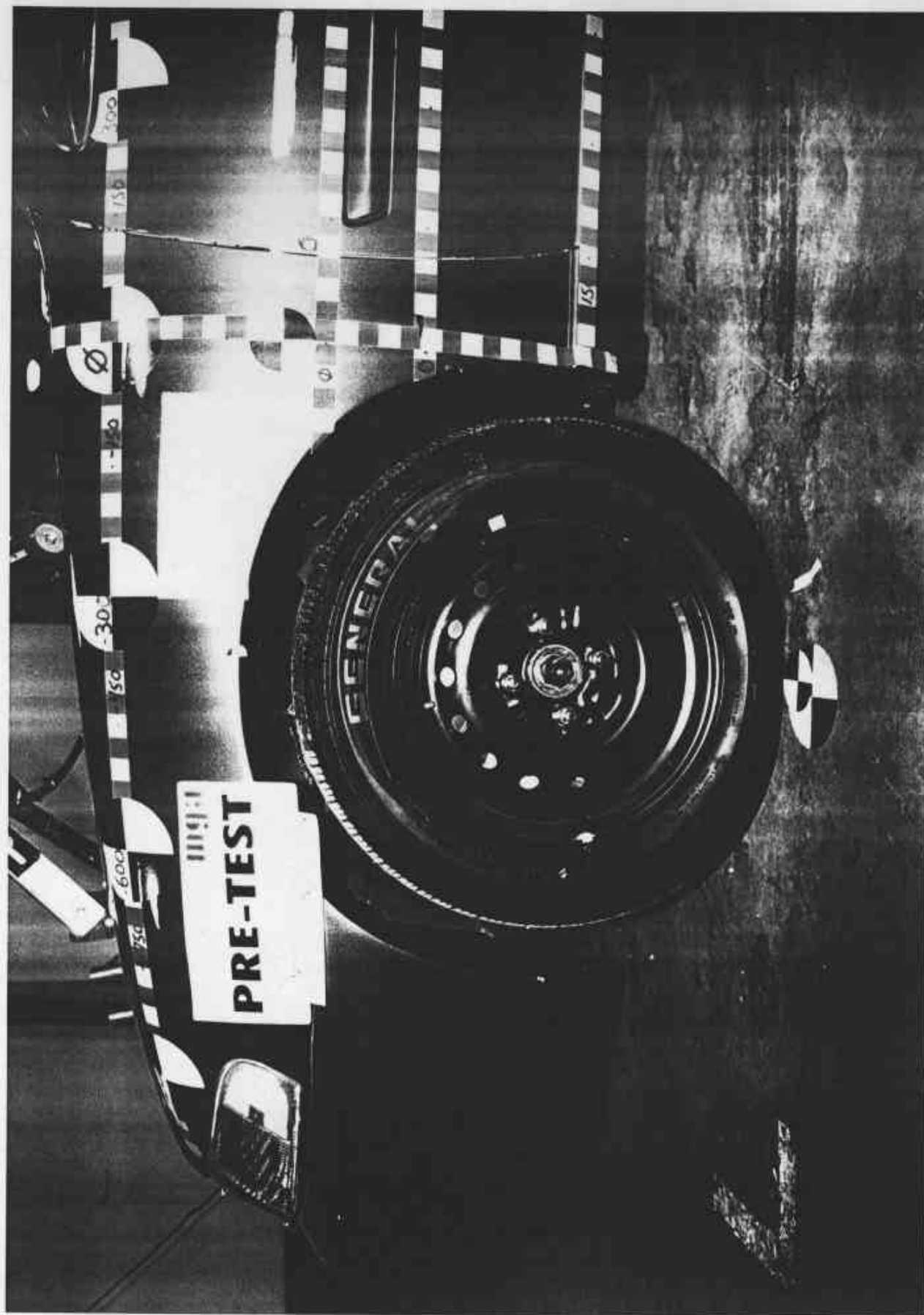


Photo No. A-48 - Left Front Attitude Point

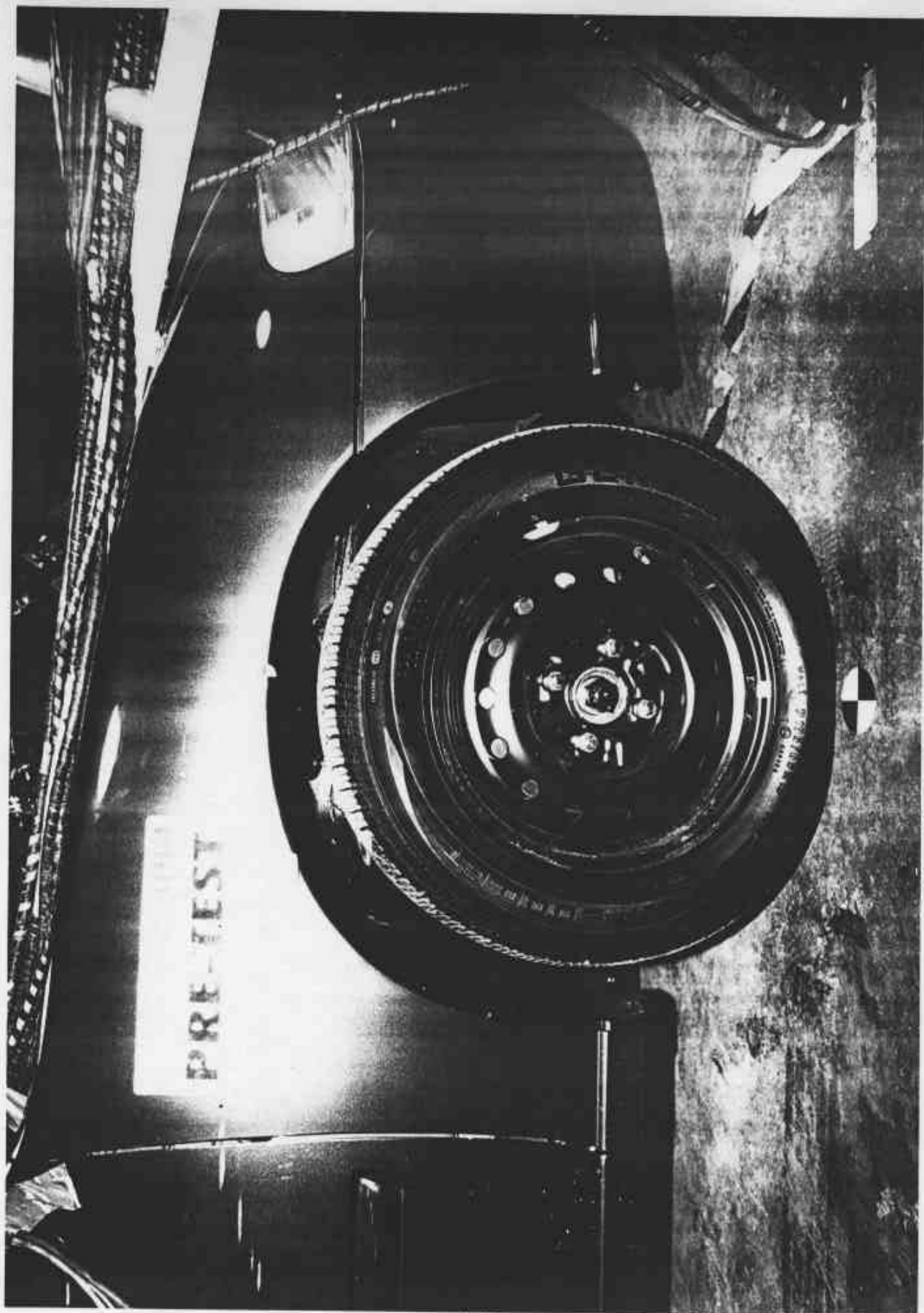


Photo No. A-49 - Right Front Attitude Point

A-49



Photo No. A-50 - Left Rear Attitude Point

A-50



Photo No. A-51 - Right Rear Attitude Point

A-51

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* Data not valid after approximately 30 msec.

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* Data not valid after approximately 30 msec.

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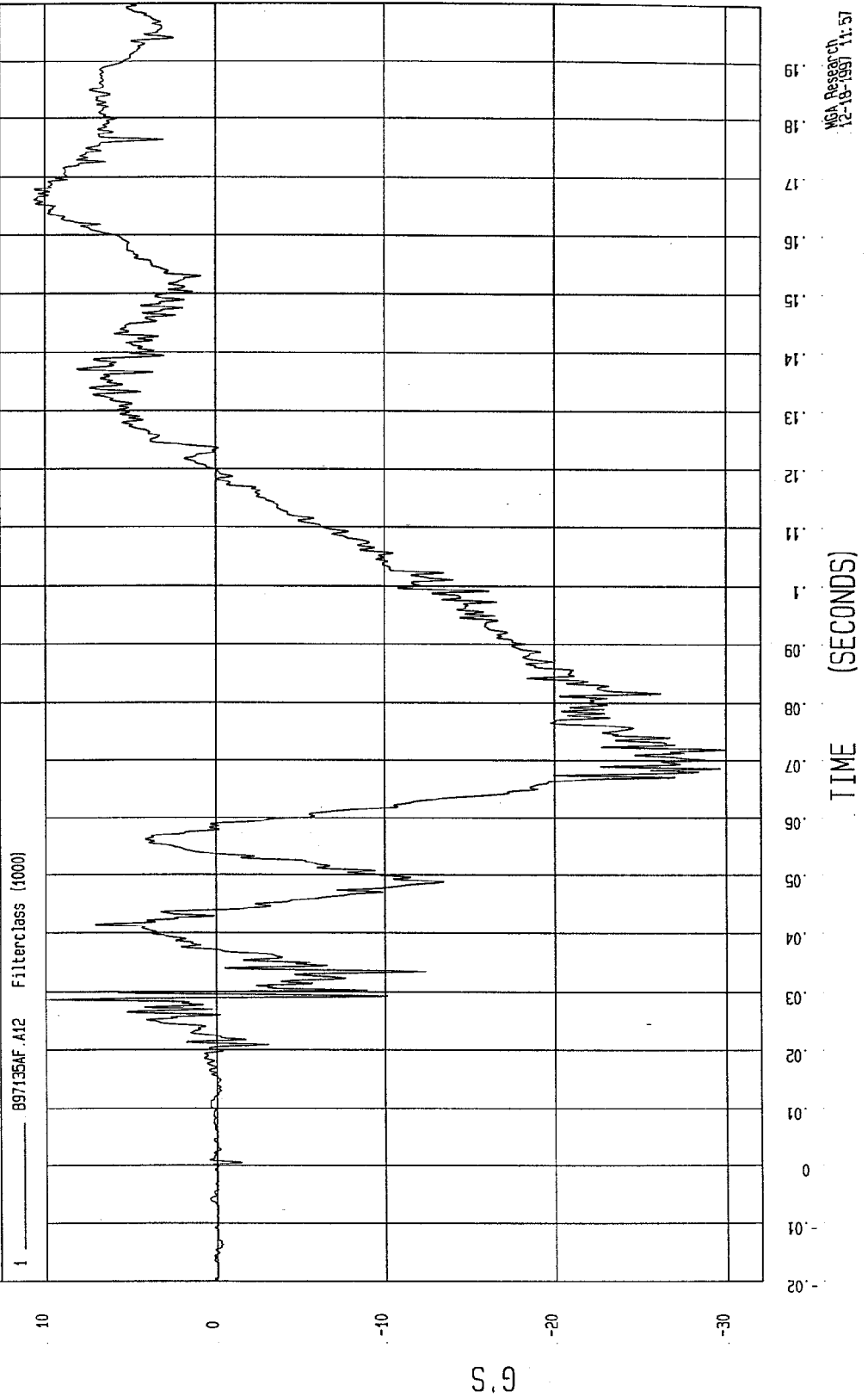
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TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -29.96 G'S at 72 msec Maximum = 10.61 G'S at 166 msec

DRIVER HEAD X ACCELERATION



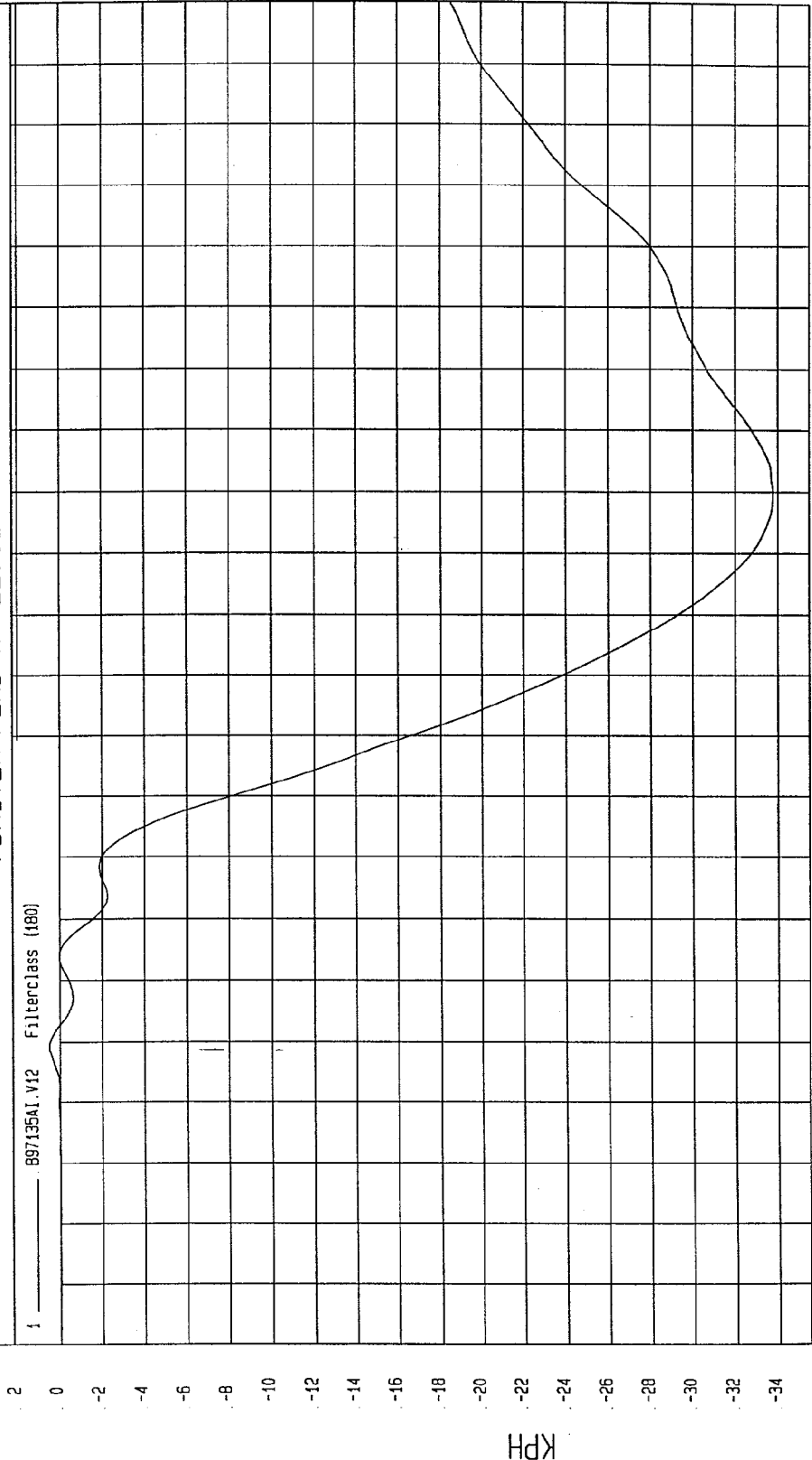
NSA Research
12-18-1997 11:57

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -33.77 KPH at 120 msec Maximum = .52 KPH at 29 msec

DRIVER HEAD X VELOCITY



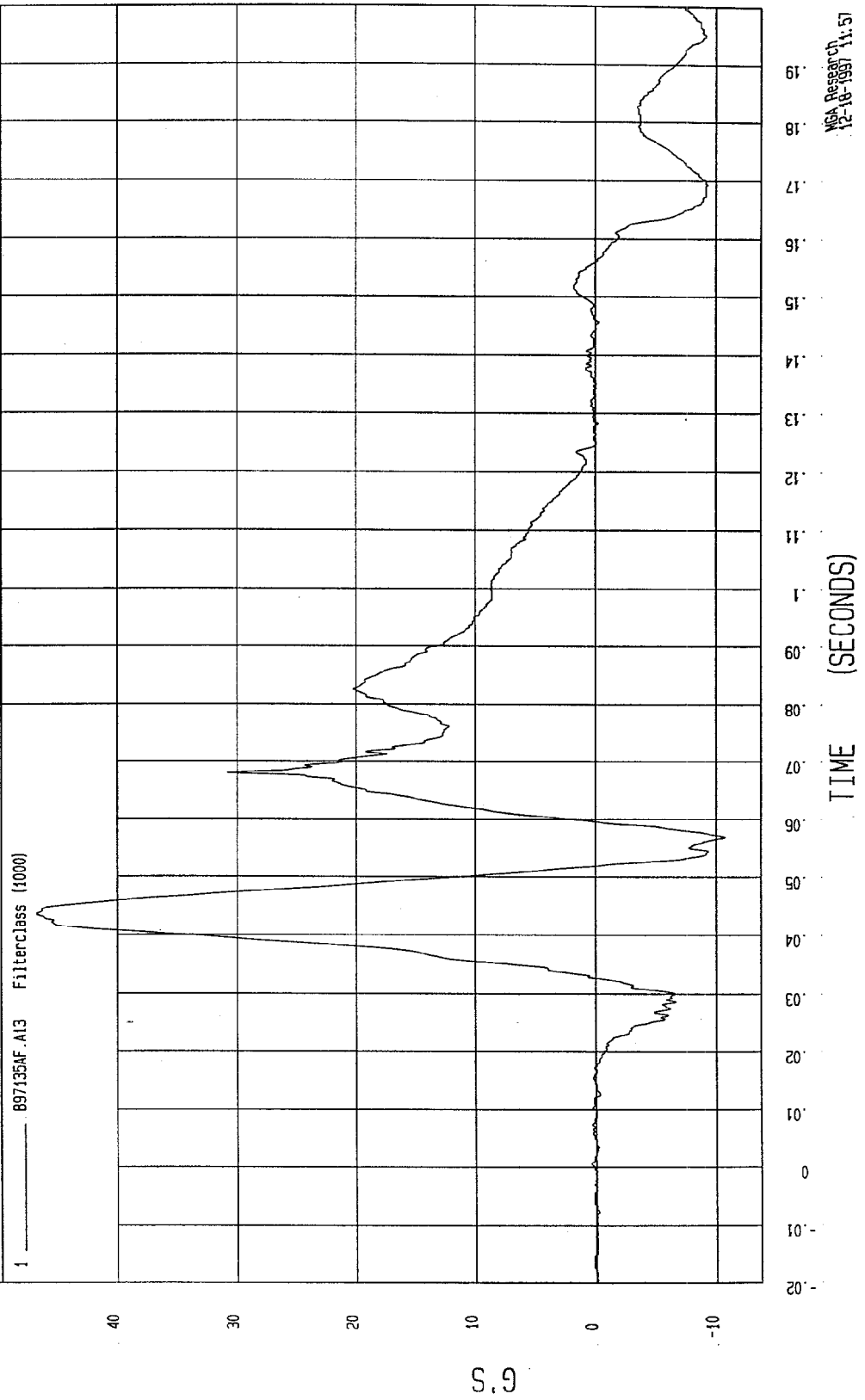
TIME Seconds

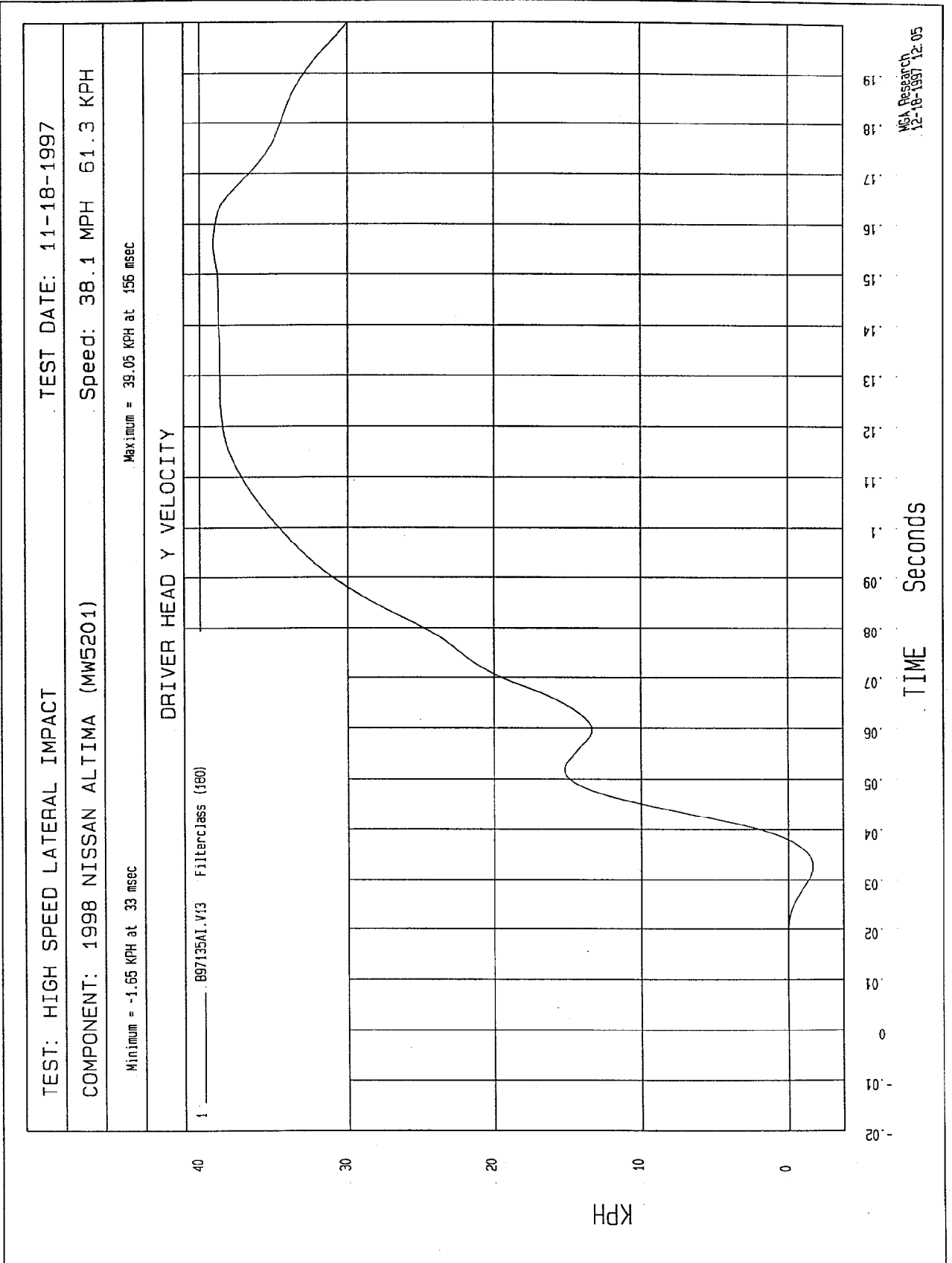
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W&A Research
12-18-1997 12:05

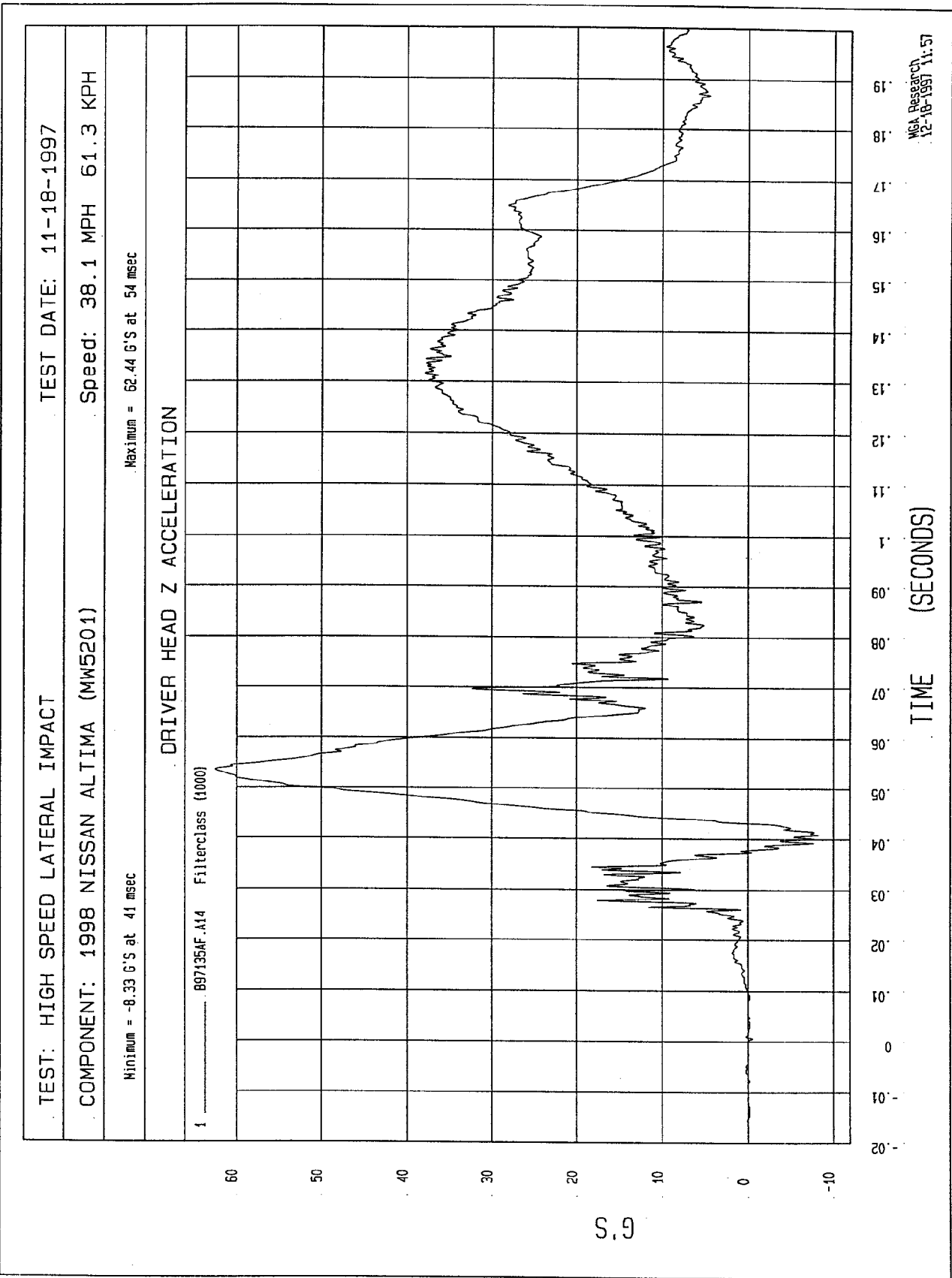
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COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH
Minimum = -10.70 G'S at 57 msec Maximum = 46.67 G'S at 44 msec

DRIVER HEAD Y ACCELERATION





MGA Research
12-18-1997 12:05

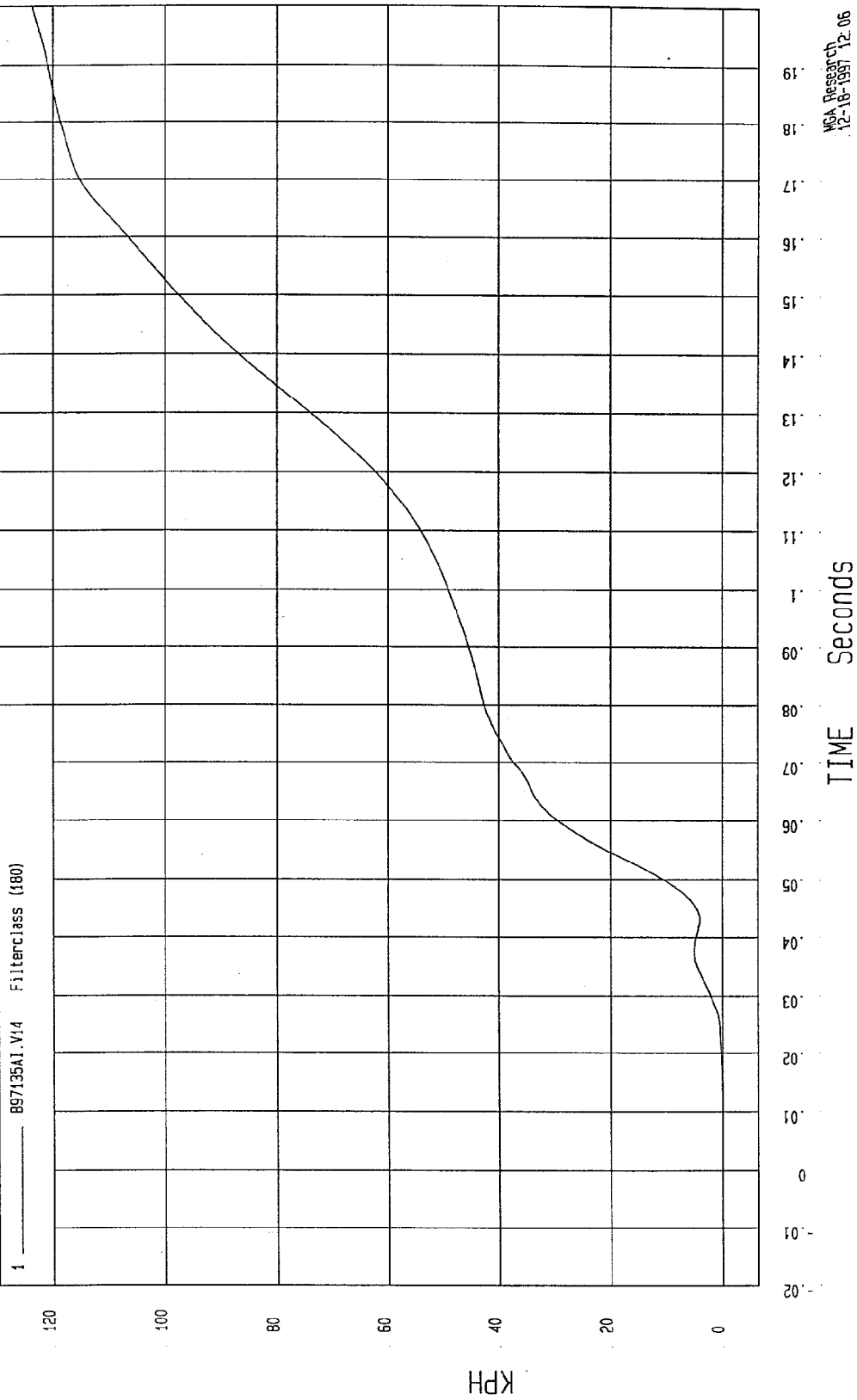


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -.02 KPH at 10 msec Maximum = 123.59 KPH at 200 msec

DRIVER HEAD Z VELOCITY



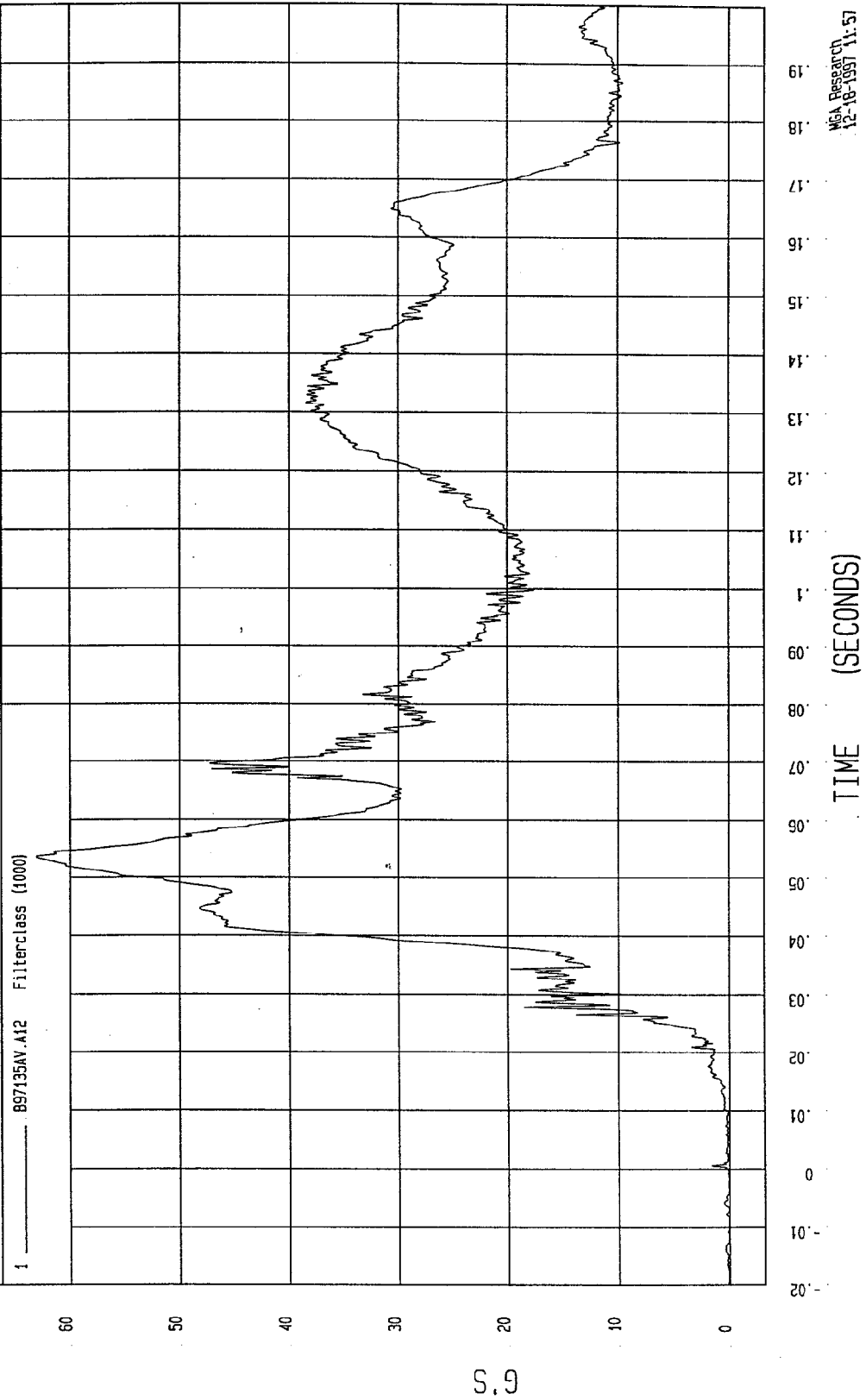
MOA Research
12-18-1997 12:06

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = 3.82E-03 G'S at 2 msec Maximum = 63.03 G'S at 54 msec

DRIVER HEAD RESULTANT

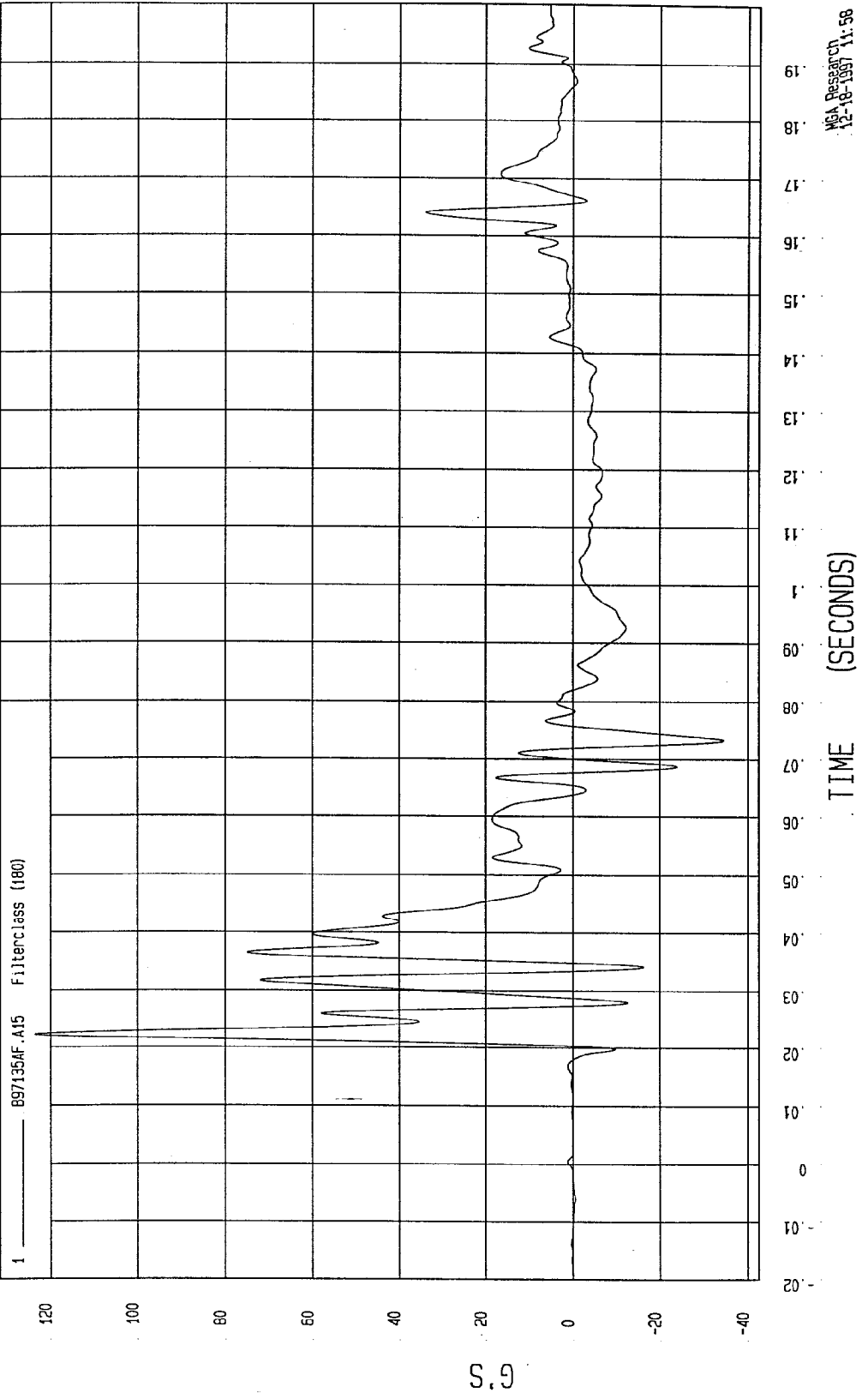


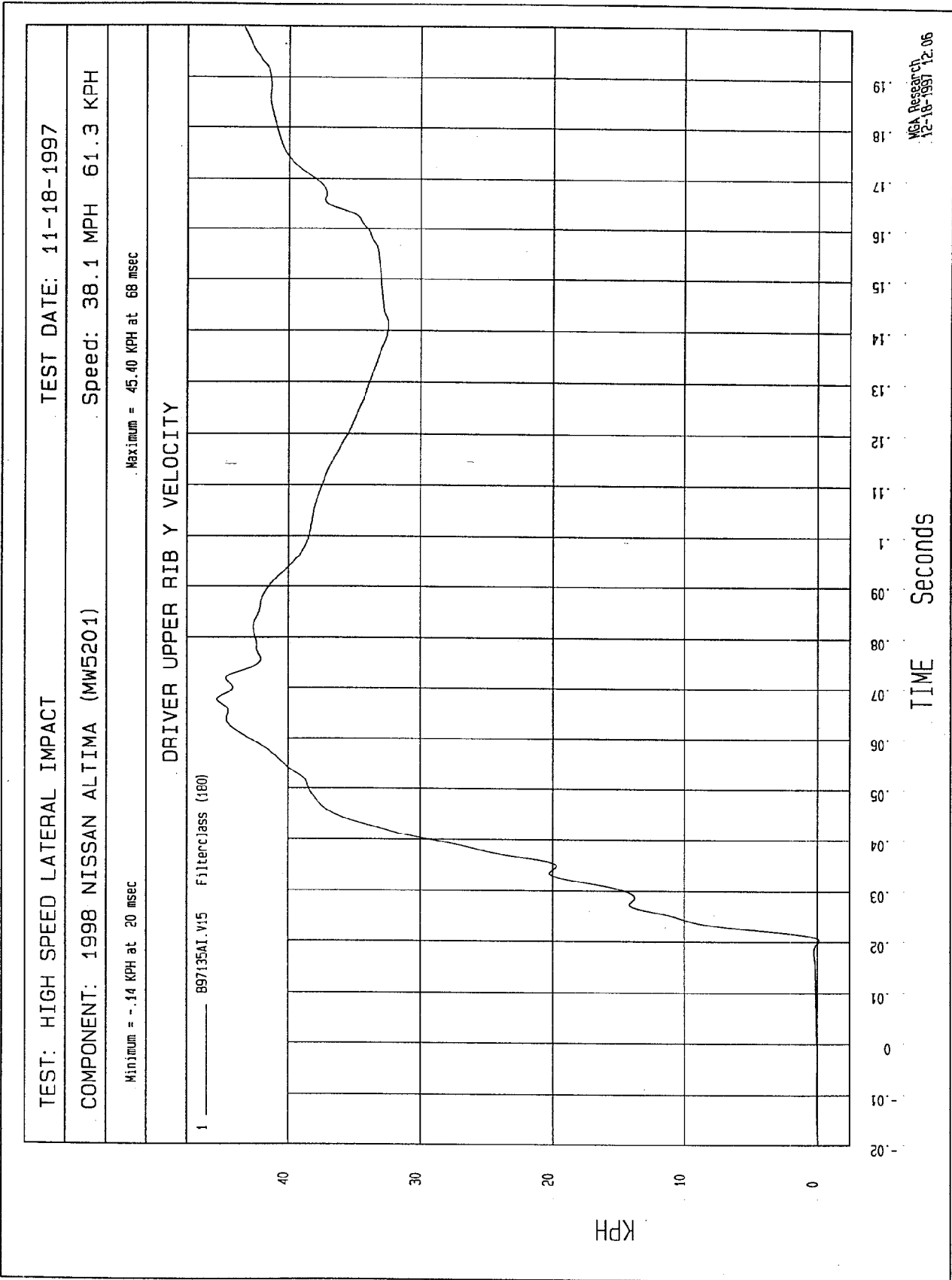
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -34.55 G'S at 73 msec Maximum = 123.58 G'S at 22 msec

DRIVER UPPER RIB Y ACCELERATION



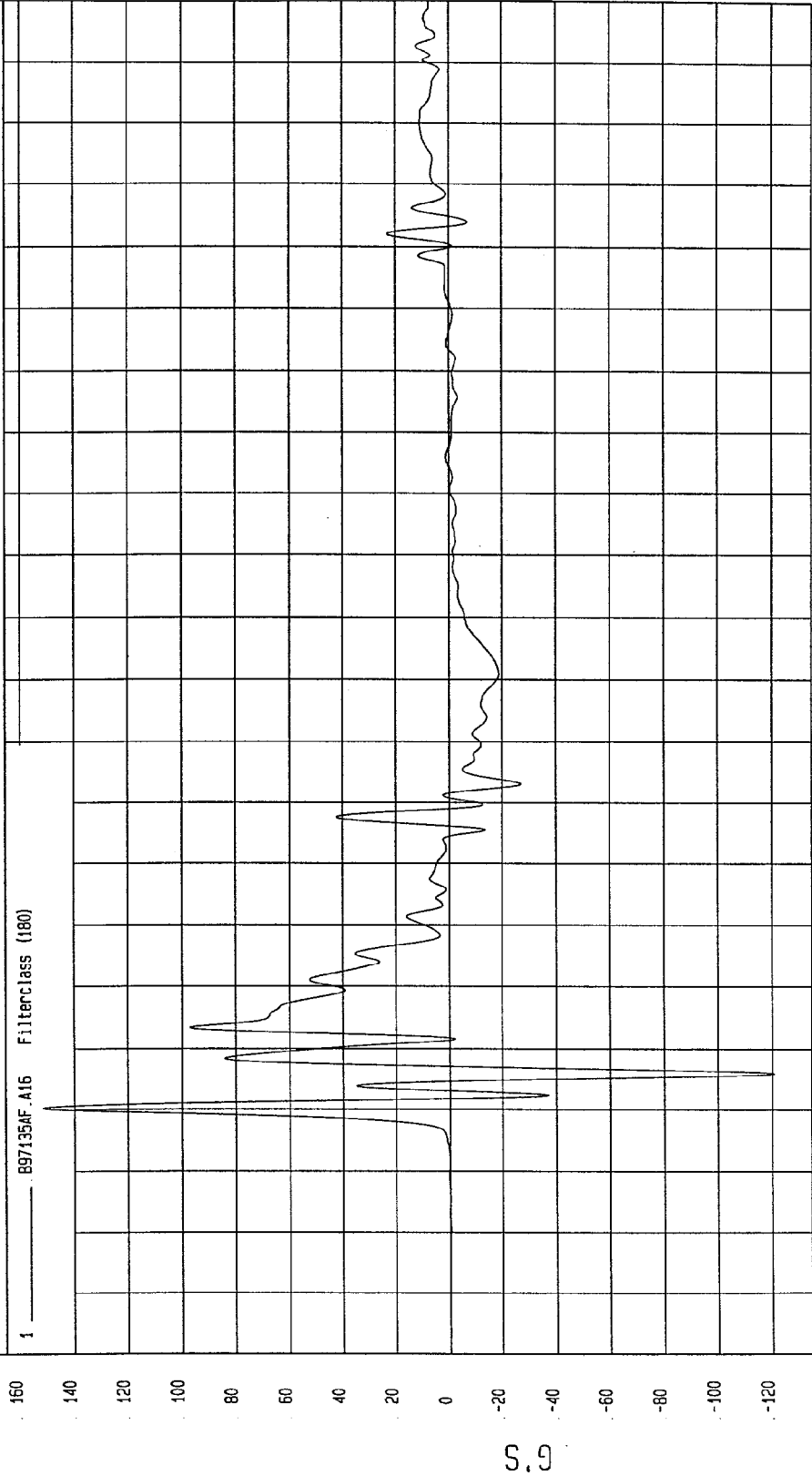


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

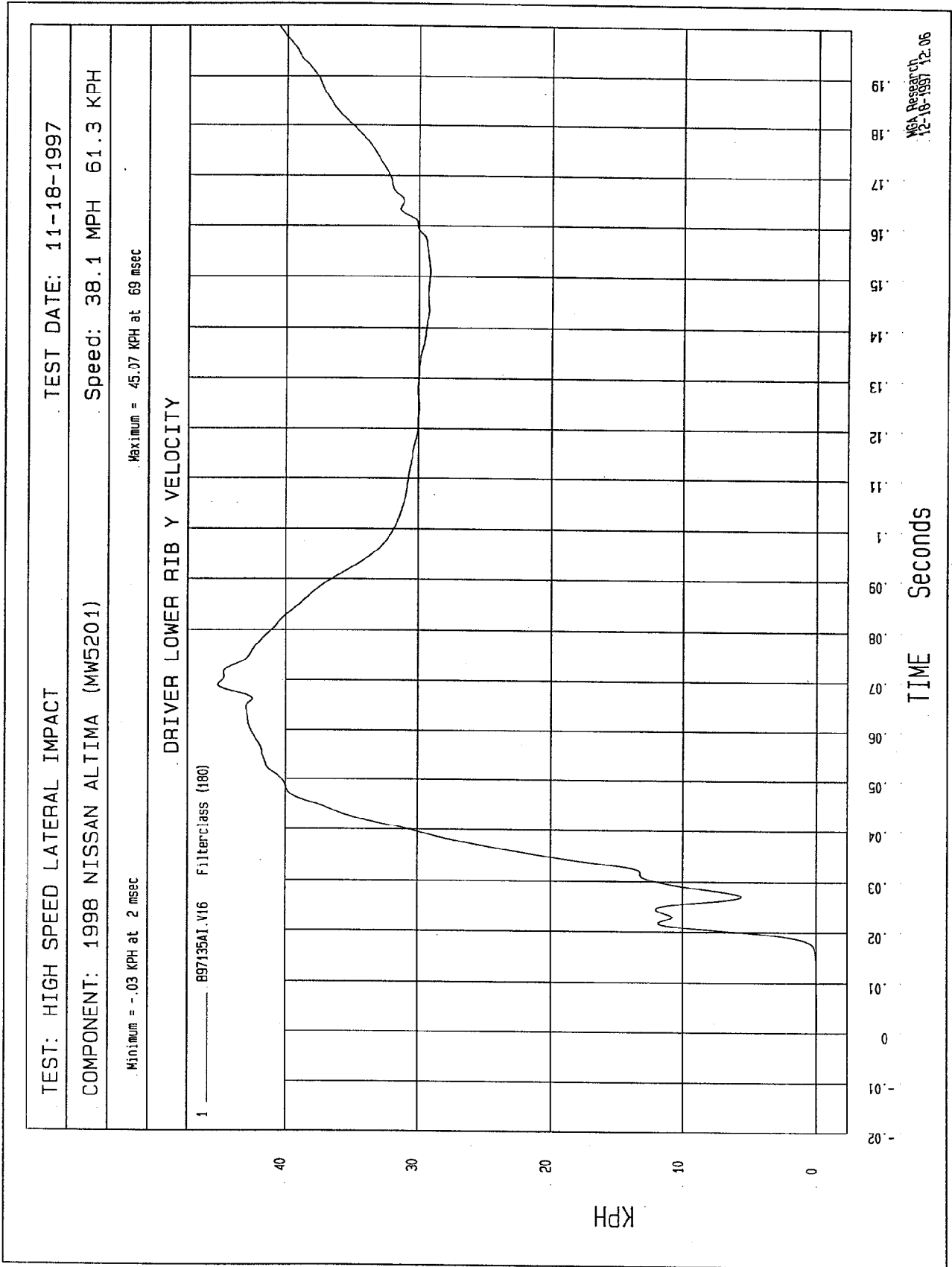
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

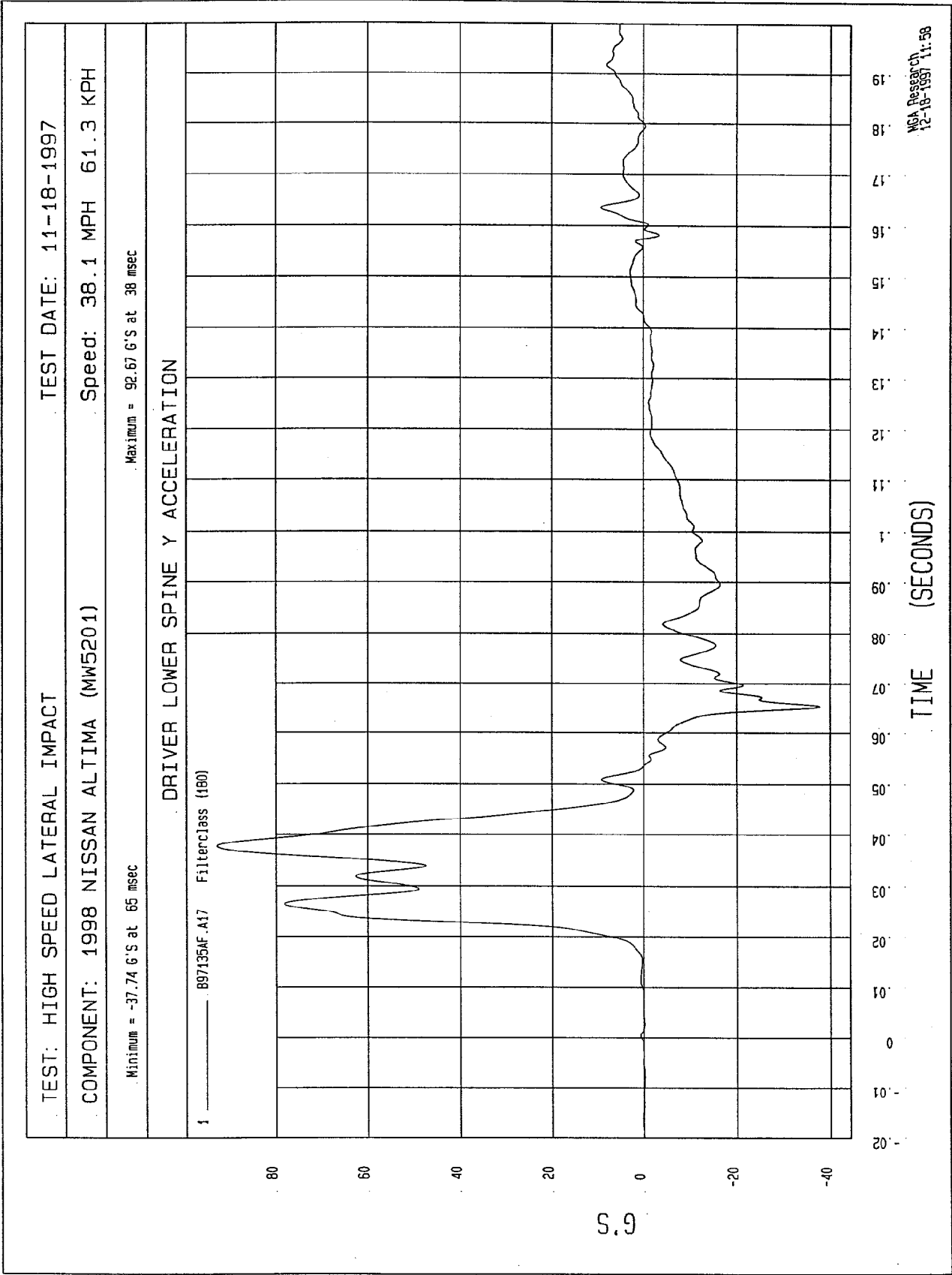
Minimum = -120.85 G'S at 26 msec Maximum = 151.77 G'S at 20 msec

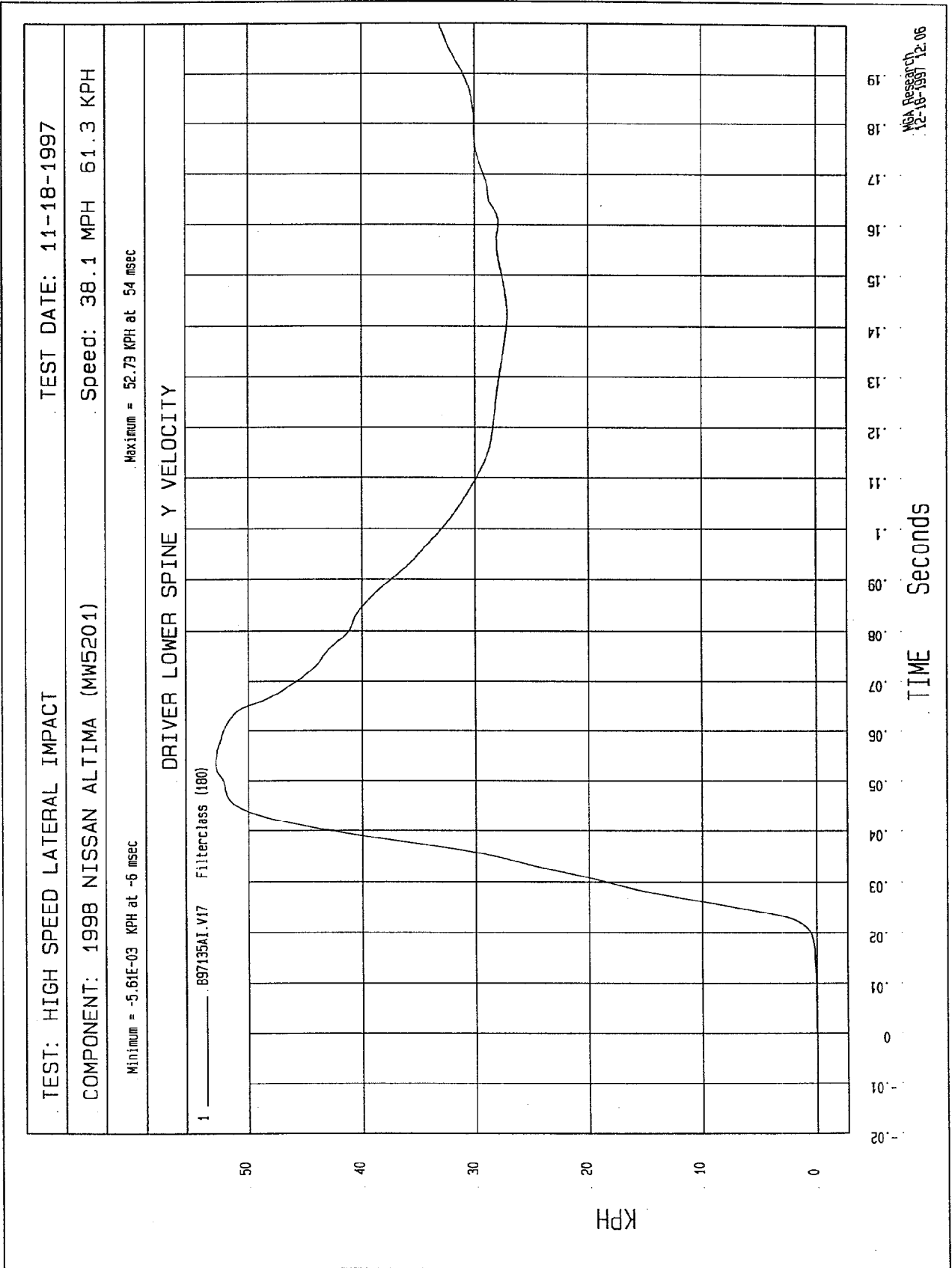
DRIVER LOWER RIB Y ACCELERATION



WCA Research
12-18-1997 11:38

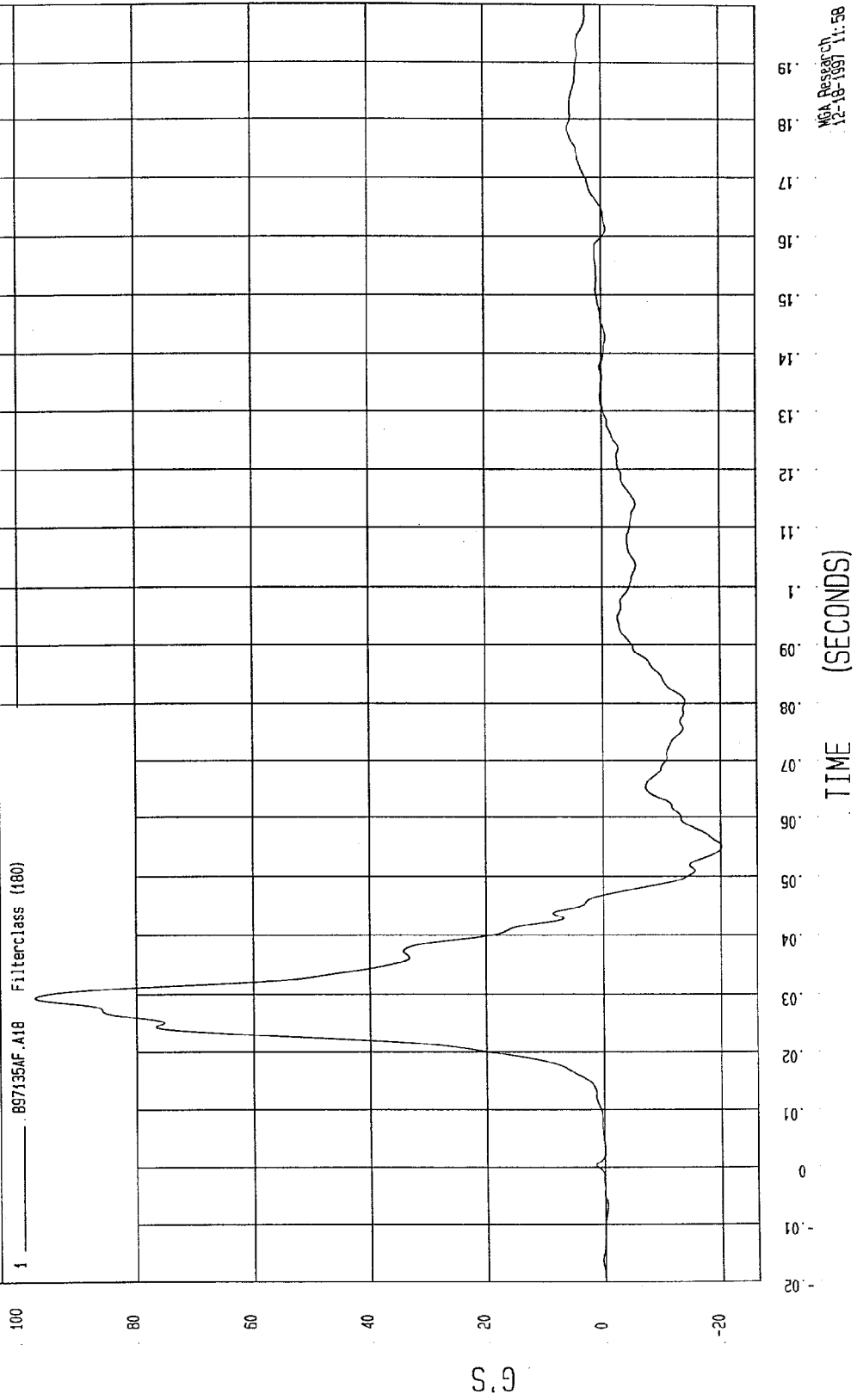




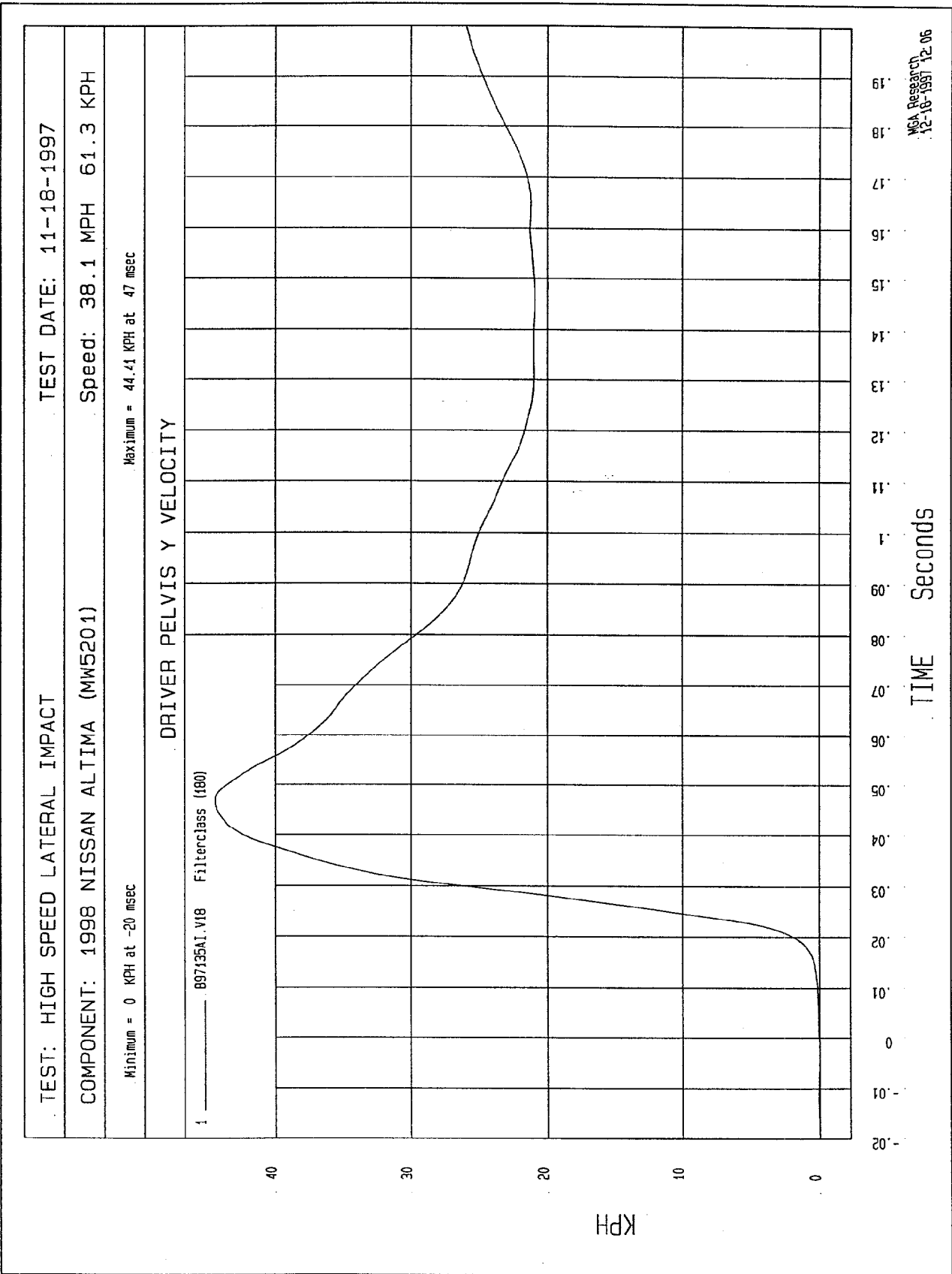


TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -20.22 G'S at 55 msec	
Maximum = 97.28 G'S at 30 msec	

DRIVER PELVIS Y ACCELERATION

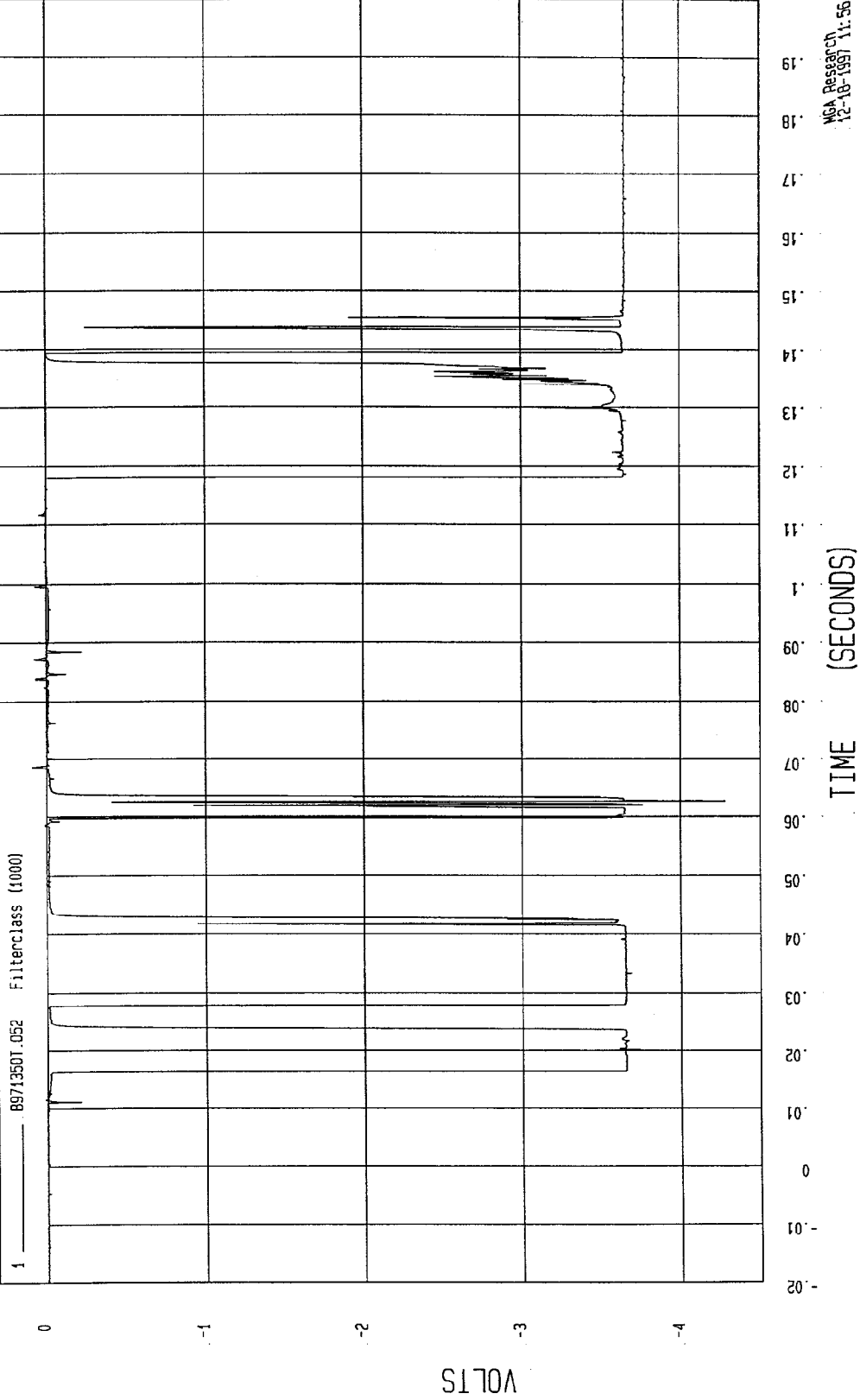


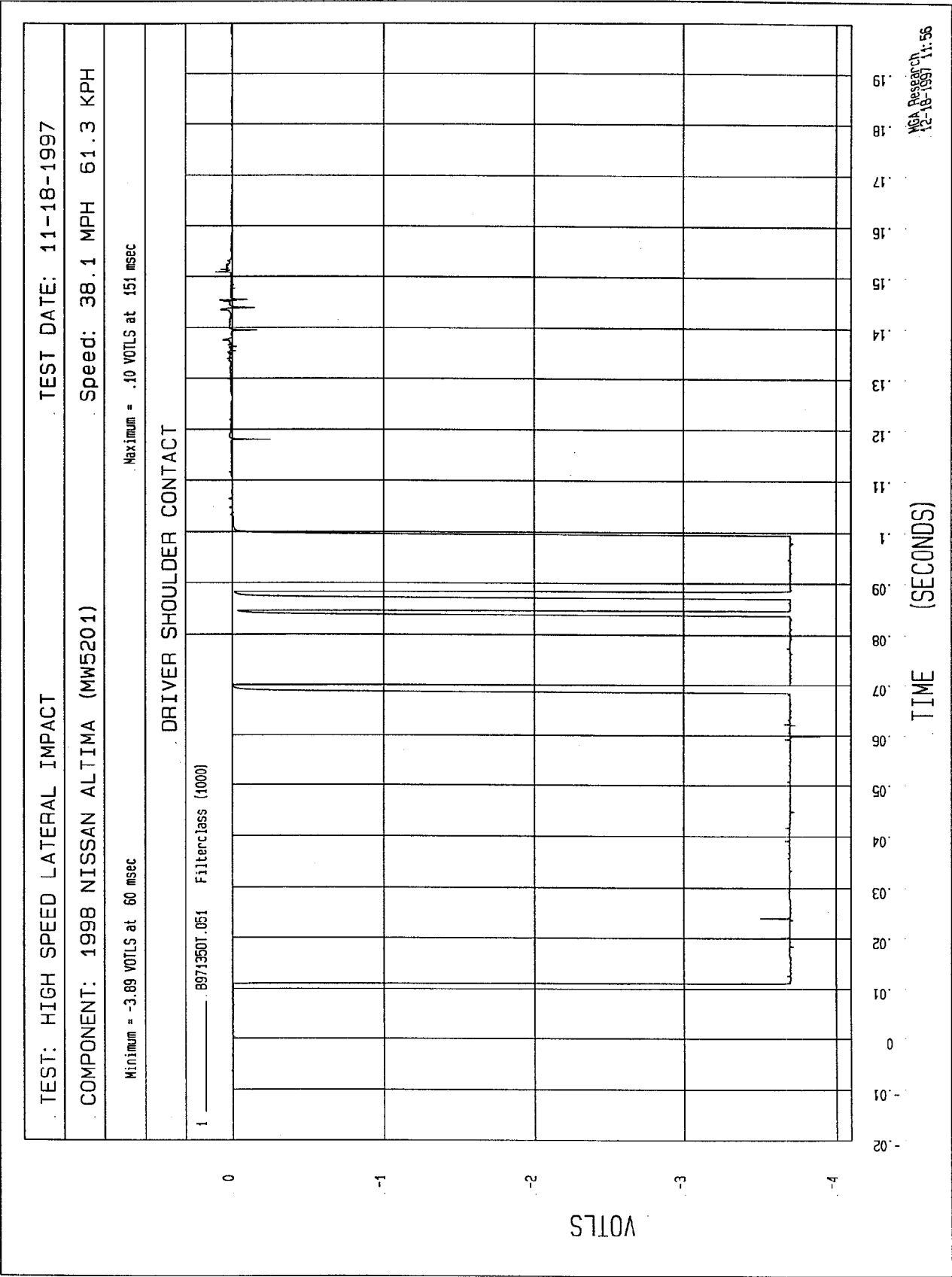
NGA Research
12-18-1997 11:58



TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -4.27 VOLTS at 63 msec	Maximum = 8.85E-02 VOLTS at 69 msec

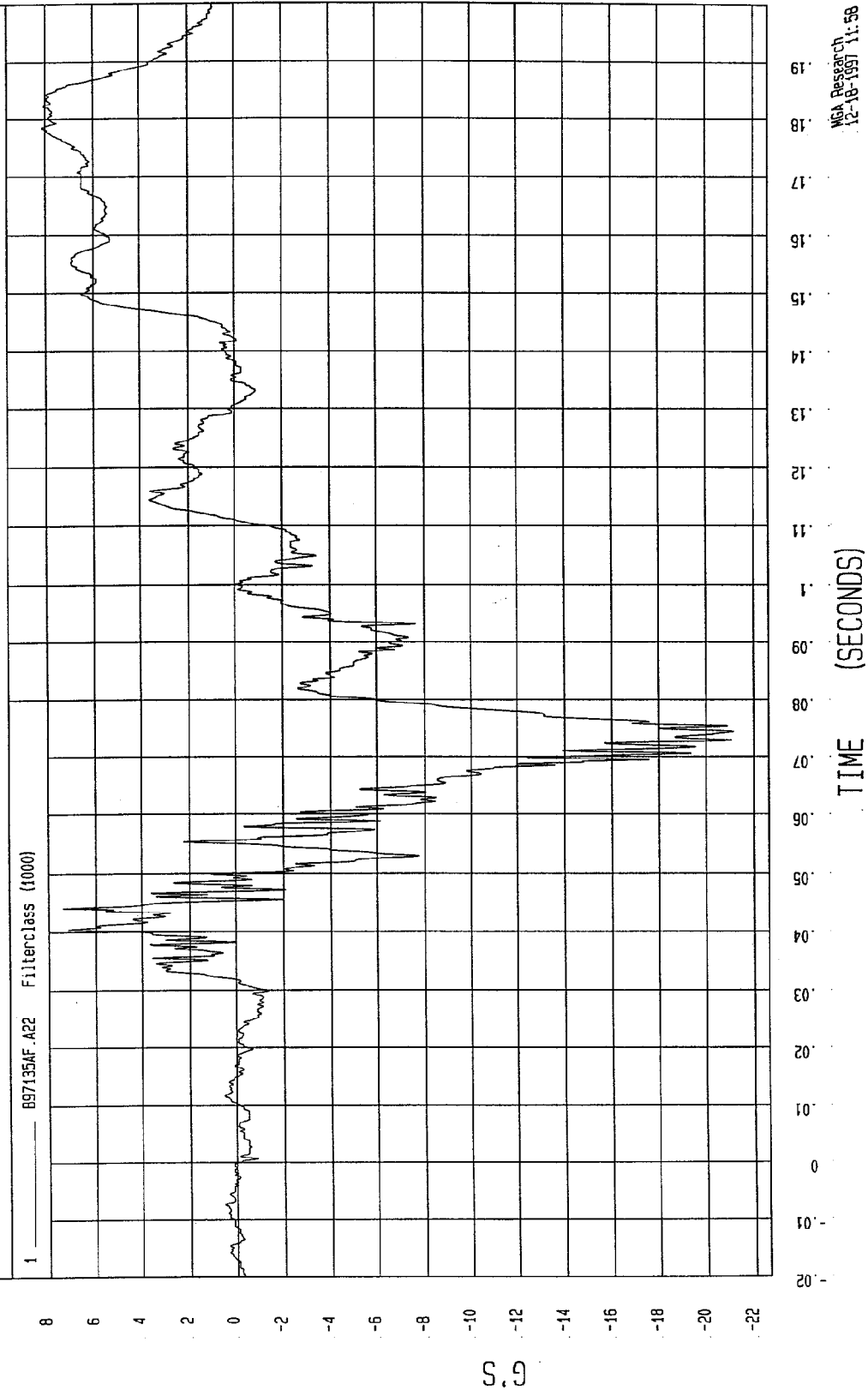
DRIVER LEG CONTACT





TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -21.14 G'S at 74 msec	Maximum = 8.16 G'S at 178 msec

REAR PASSENGER HEAD X ACCELERATION



WGL Research
12-18-1997 11:58

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

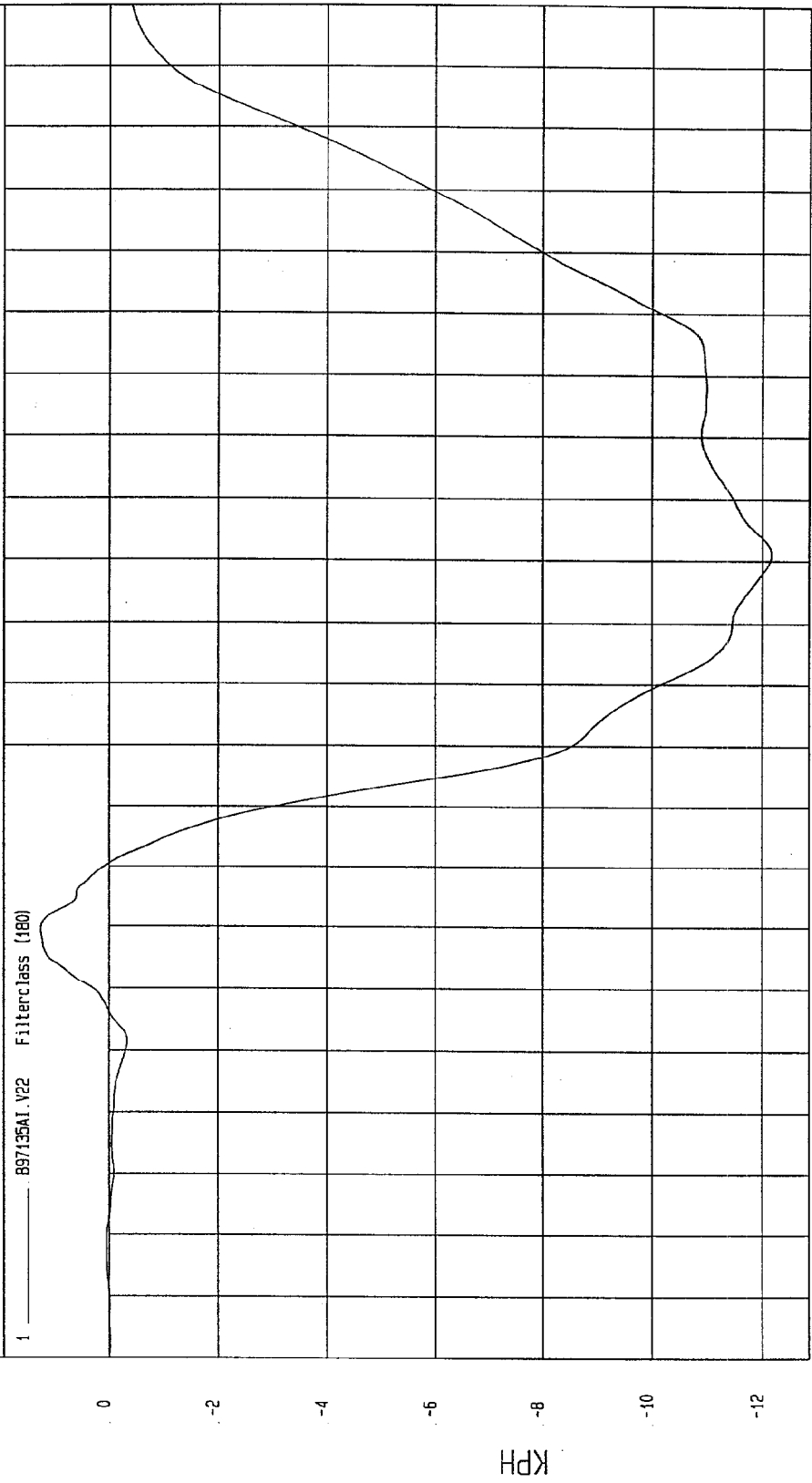
SPEED: 38.1 MPH 61.3 KPH

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Maximum = 1.24 KPH at 50 msec

Minimum = -12.17 KPH at 111 msec

REAR PASSENGER HEAD X VELOCITY

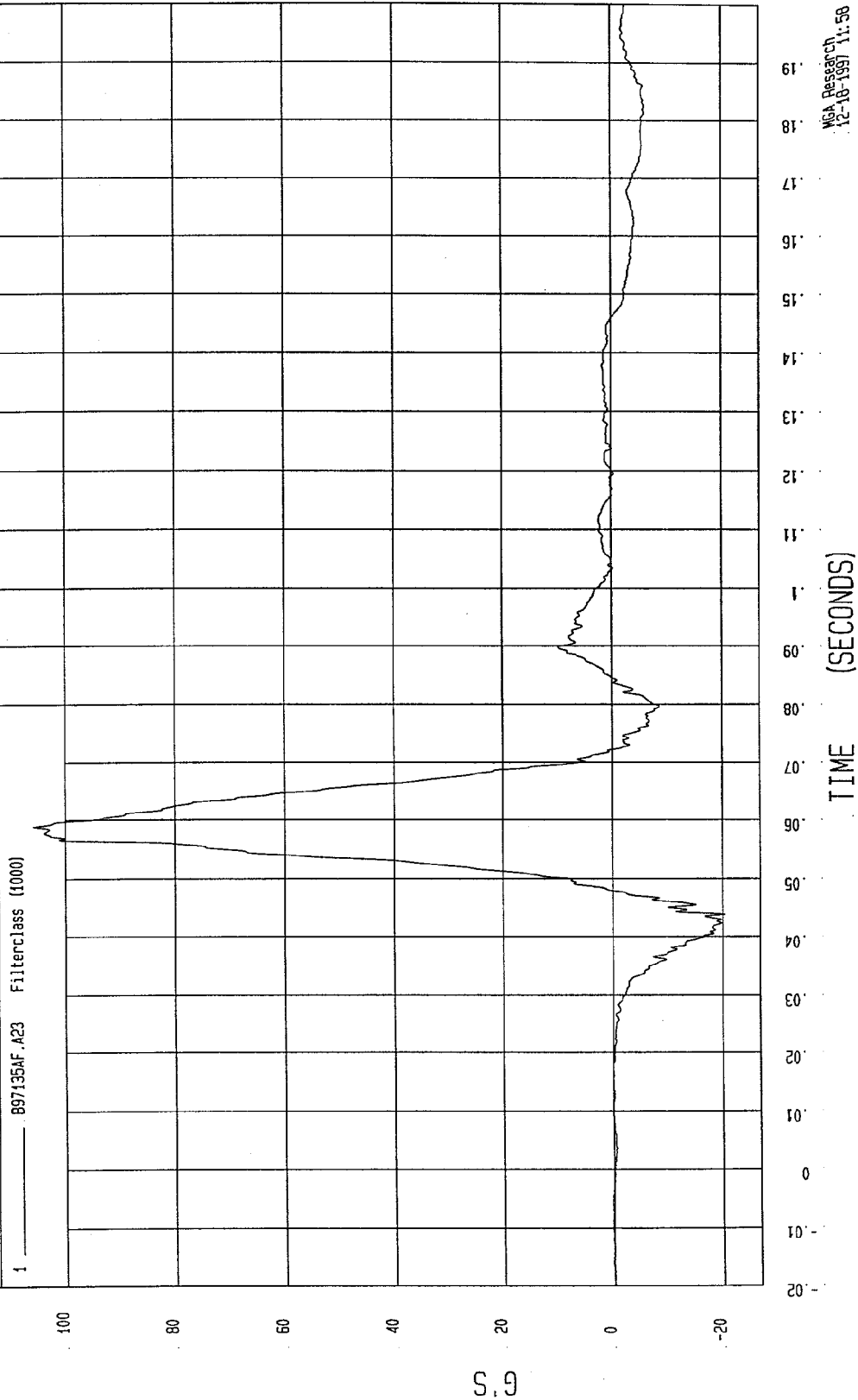


TIME Seconds

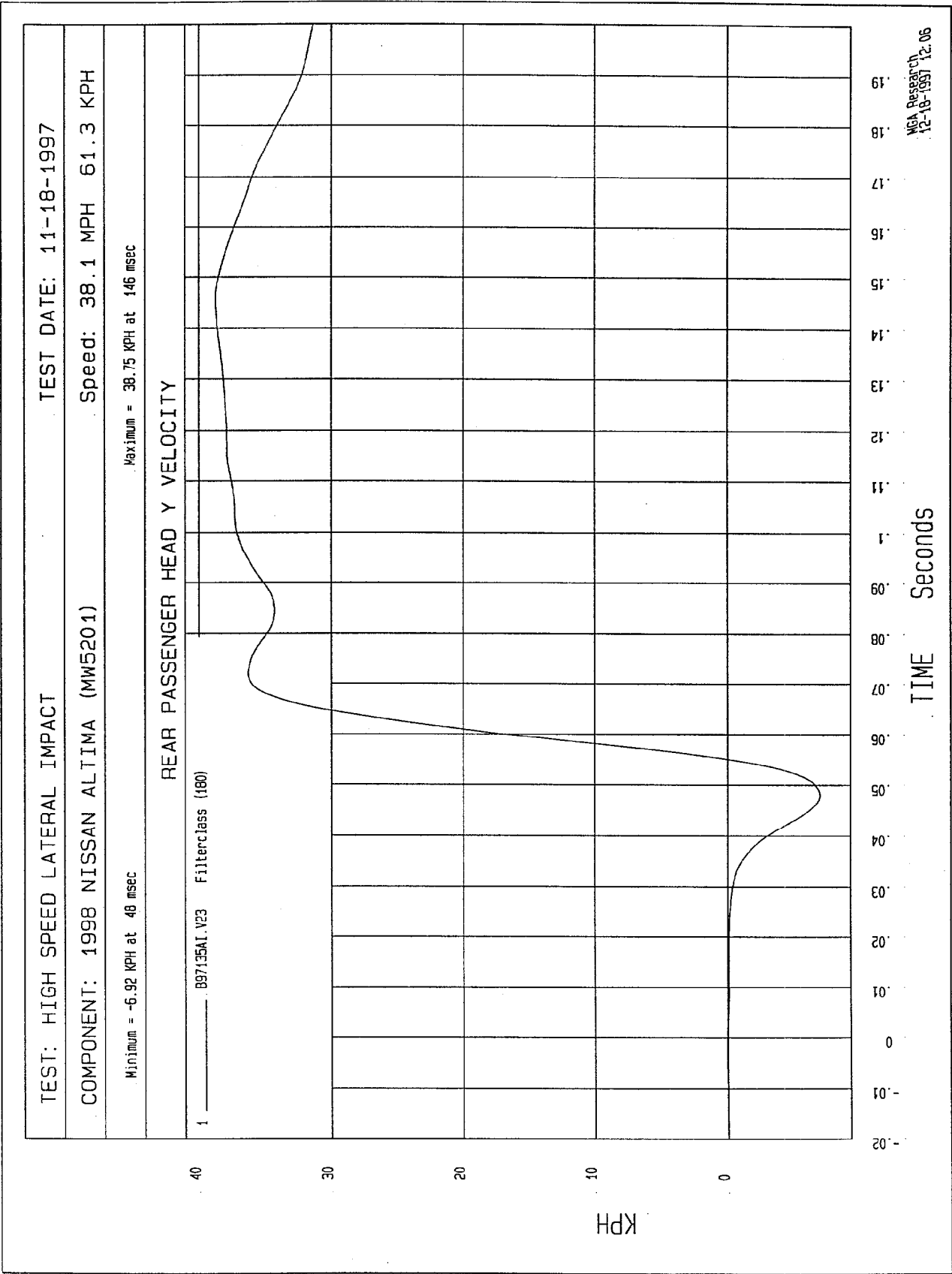
NSA Research
12-18-1997 12:06

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -20.45 G'S at 44 msec	
Maximum = 105.65 G'S at 59 msec	

REAR PASSENGER HEAD Y ACCELERATION

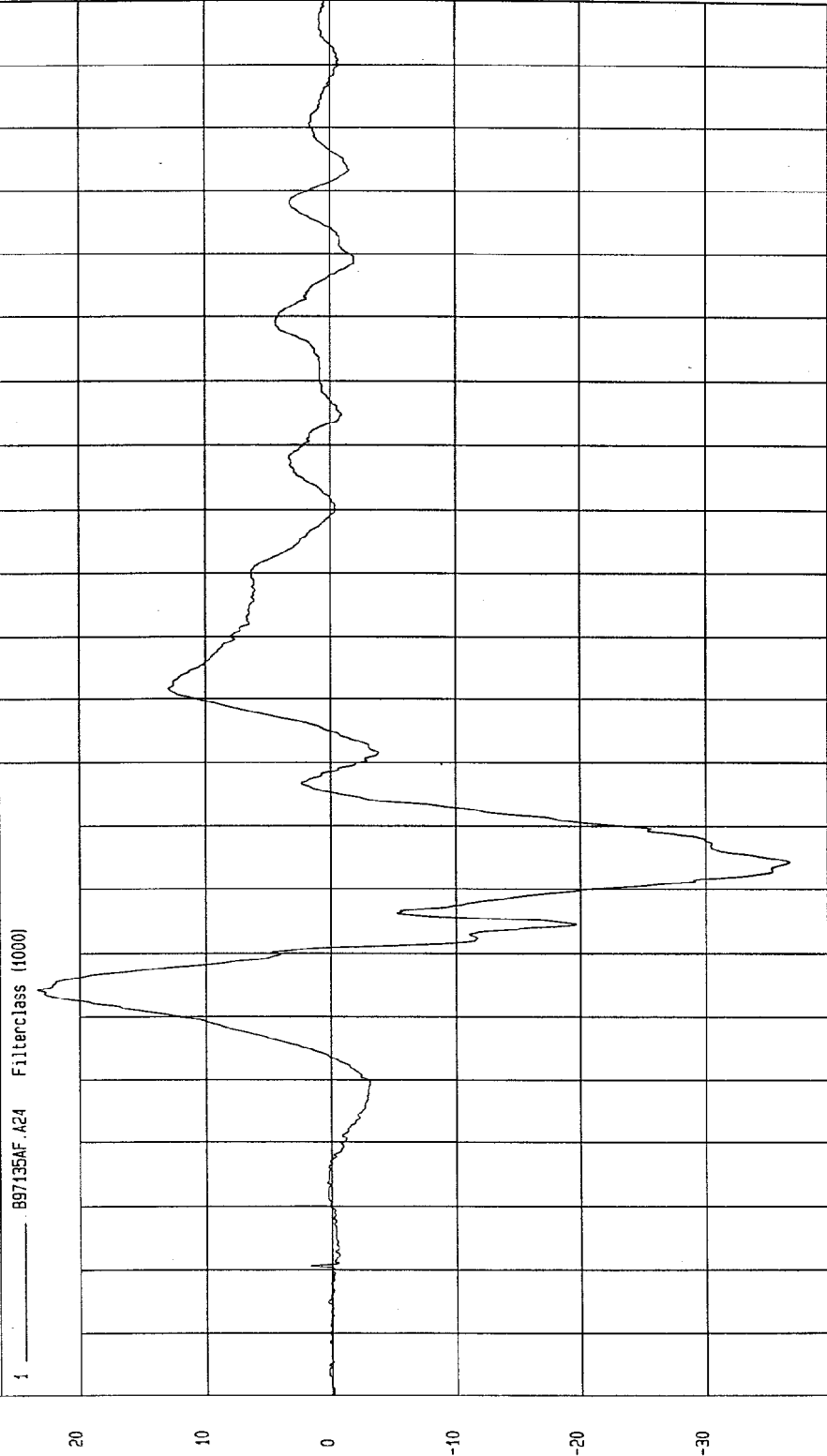


WGA Research
12-18-1997 11:58



TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -36.61 G'S at 64 msec	
Maximum = 23.33 G'S at 44 msec	

REAR PASSENGER HEAD Z ACCELERATION



TIME (SECONDS)

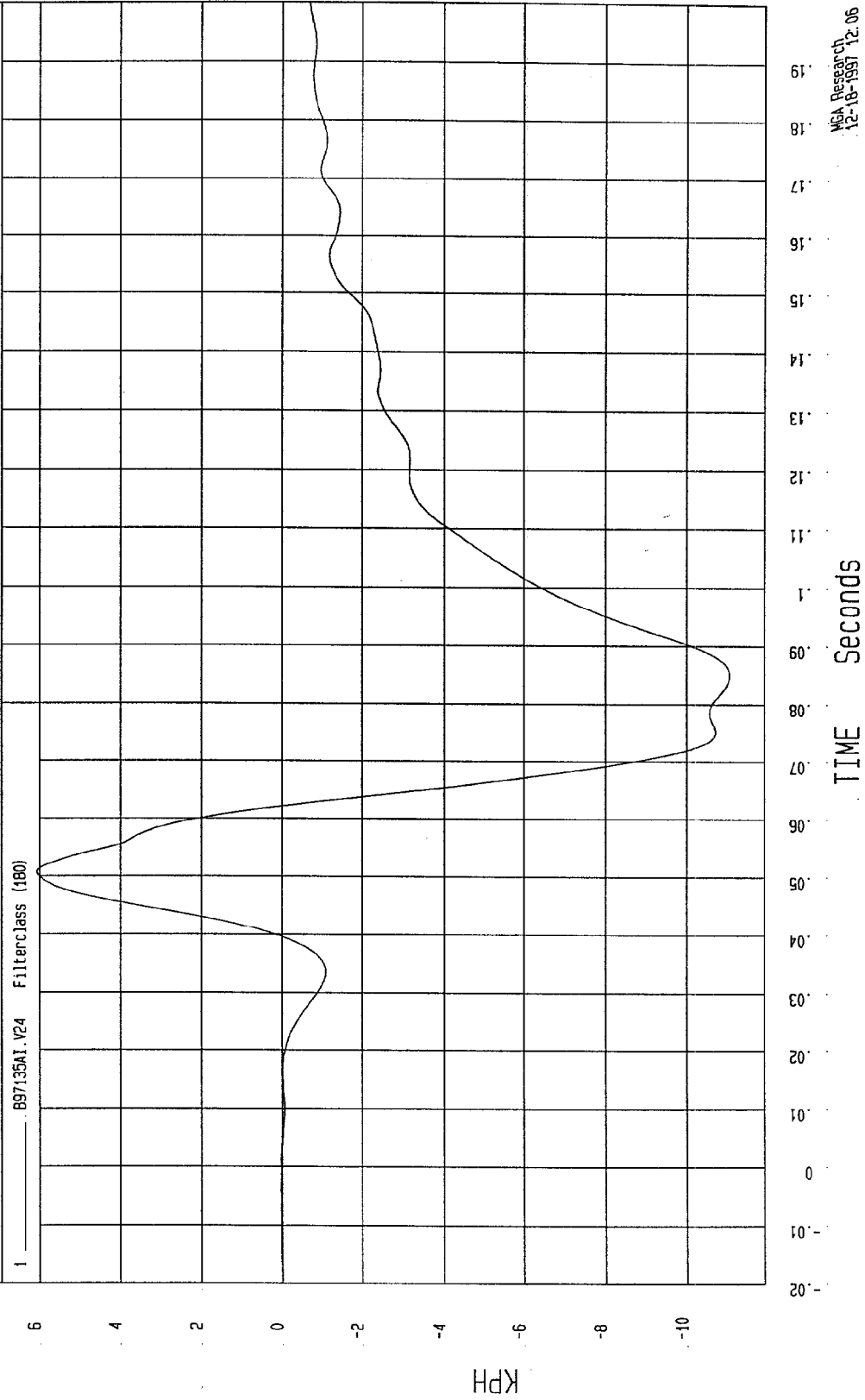
MSA Research
12-18-1997 11:58

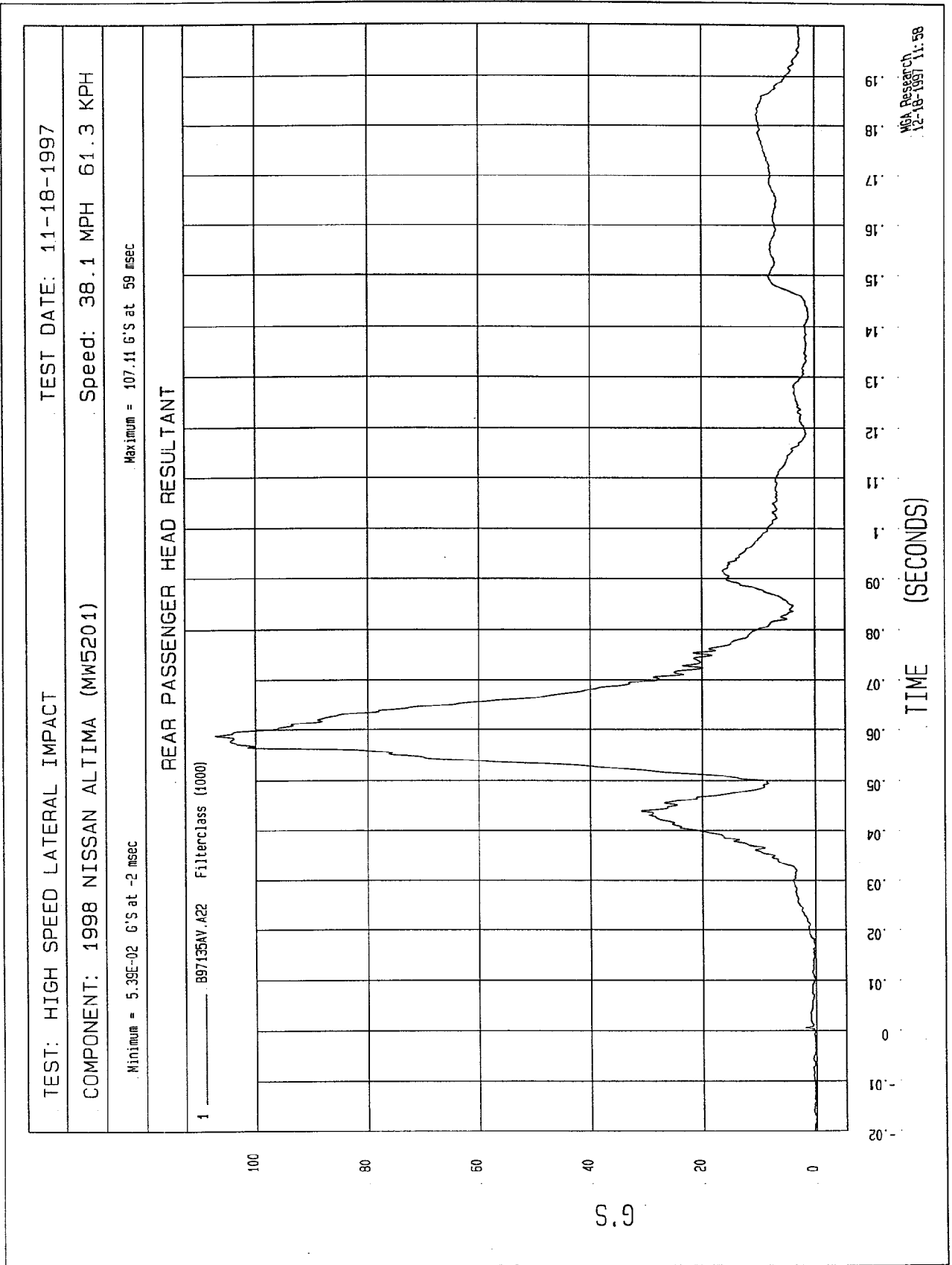
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -11.04 KPH at 85 msec
Maximum = 6.07 KPH at 51 msec

REAR PASSENGER HEAD Z VELOCITY





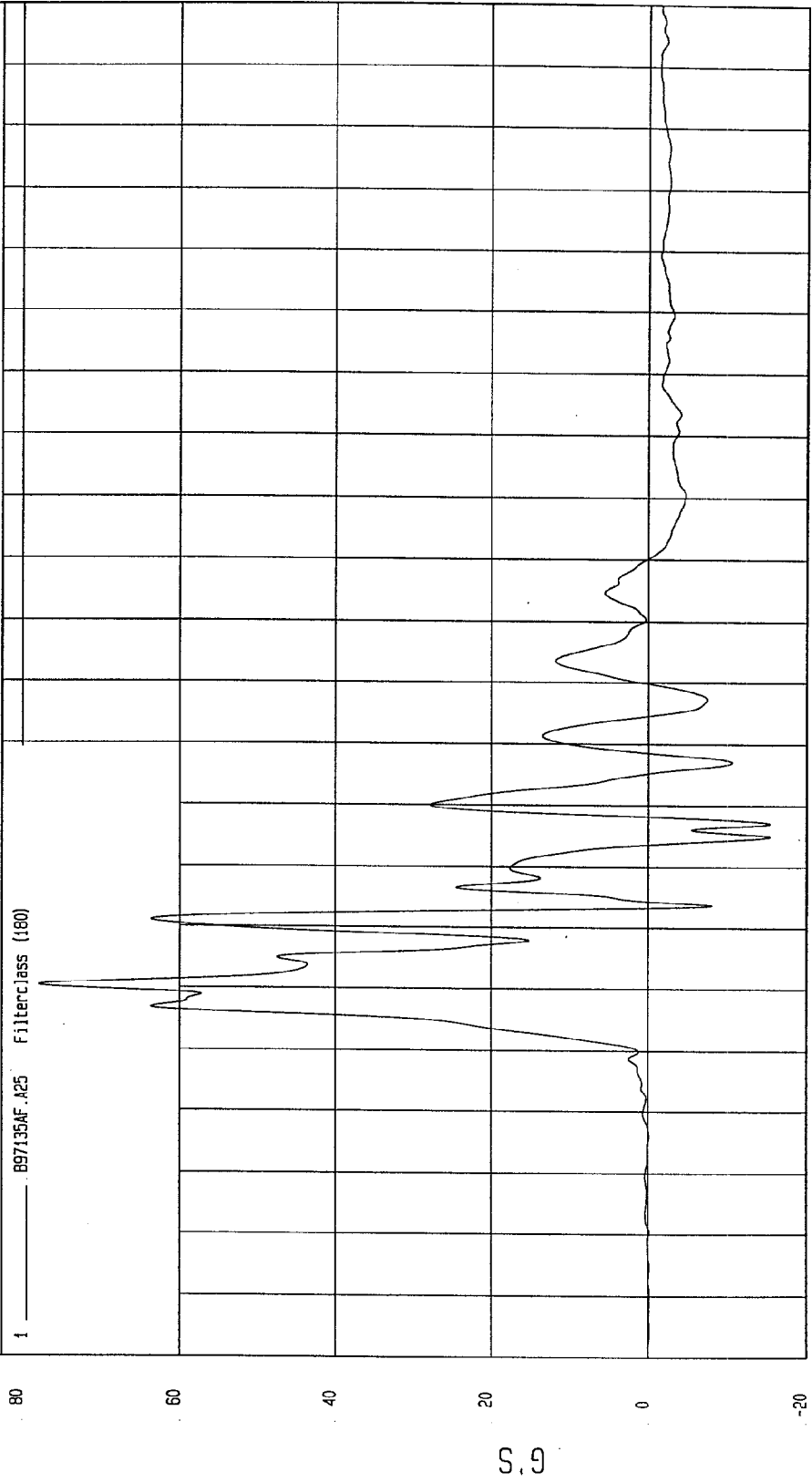
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

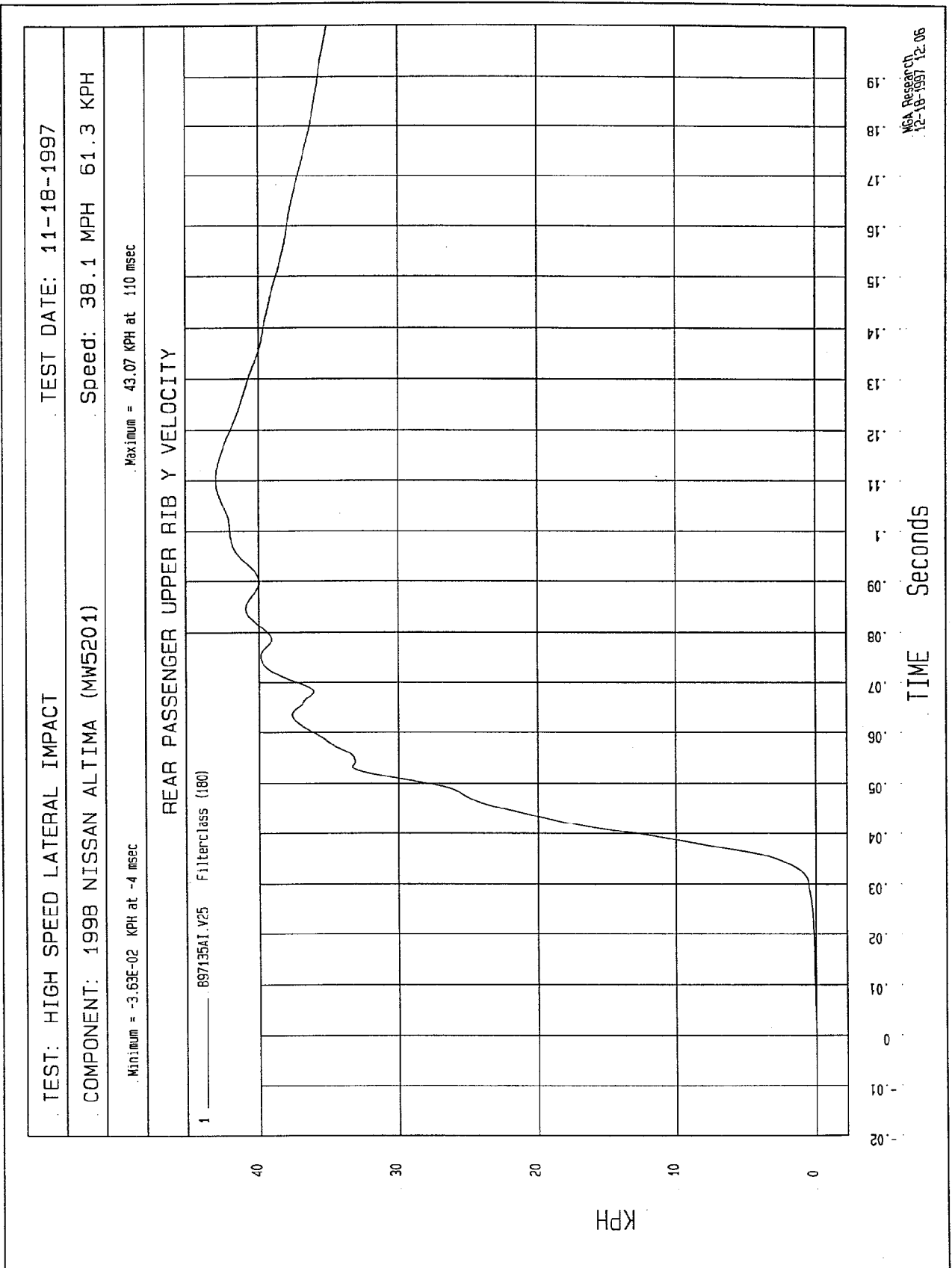
Minimum = -15.44 G'S at 65 msec Maximum = 77.90 G'S at 40 msec

REAR PASSENGER UPPER RIB Y ACCELERATION

1 897135AF.A25 Filterclass (180)



NCA Research
12-18-1997 11:58



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Speed: 38.1 MPH 61.3 KPH

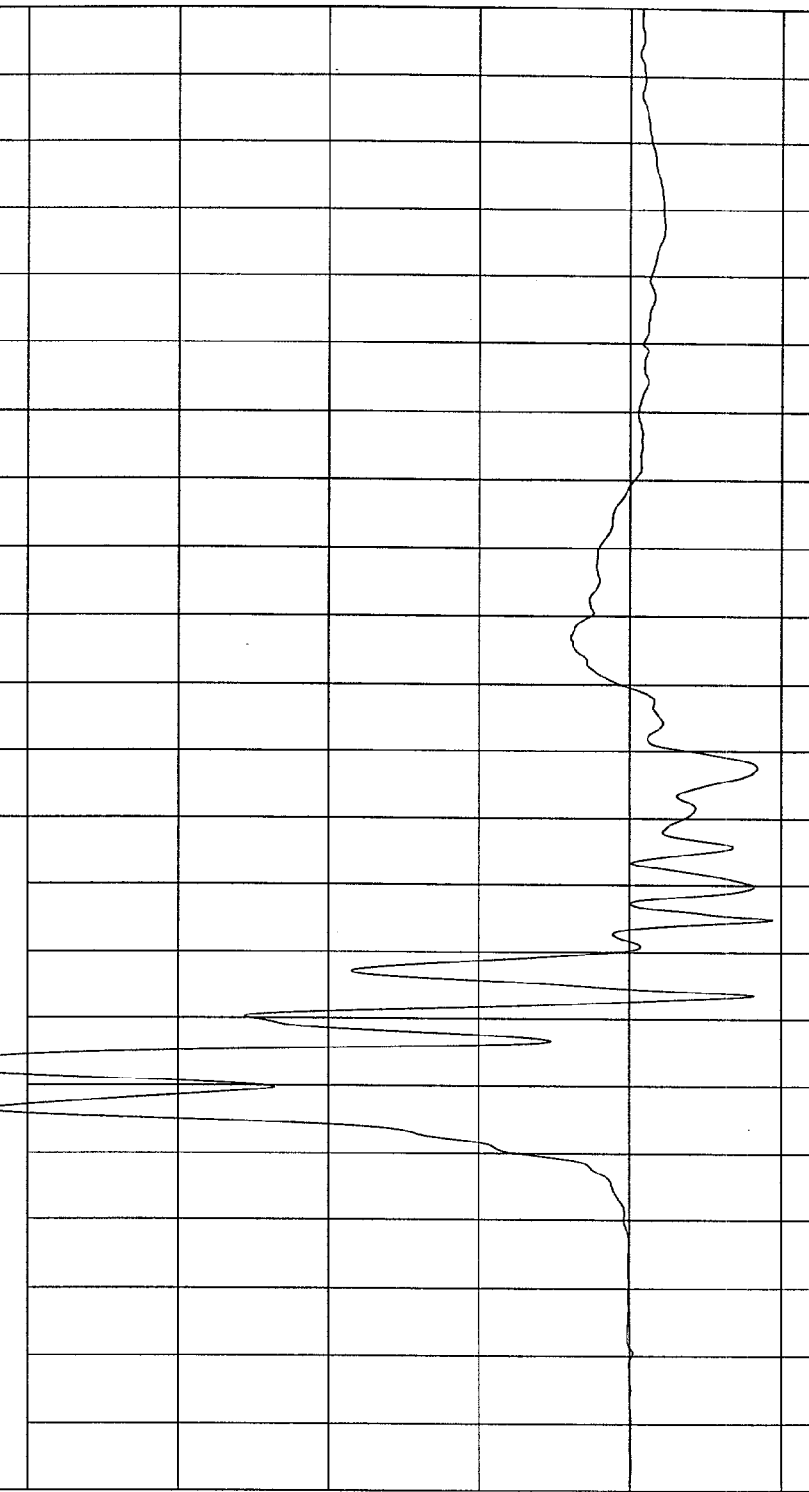
Minimum = -18.84 G'S at 65 msec

Maximum = 87.86 G'S at 42 msec

REAR PASSENGER LOWER RIB Y ACCELERATION

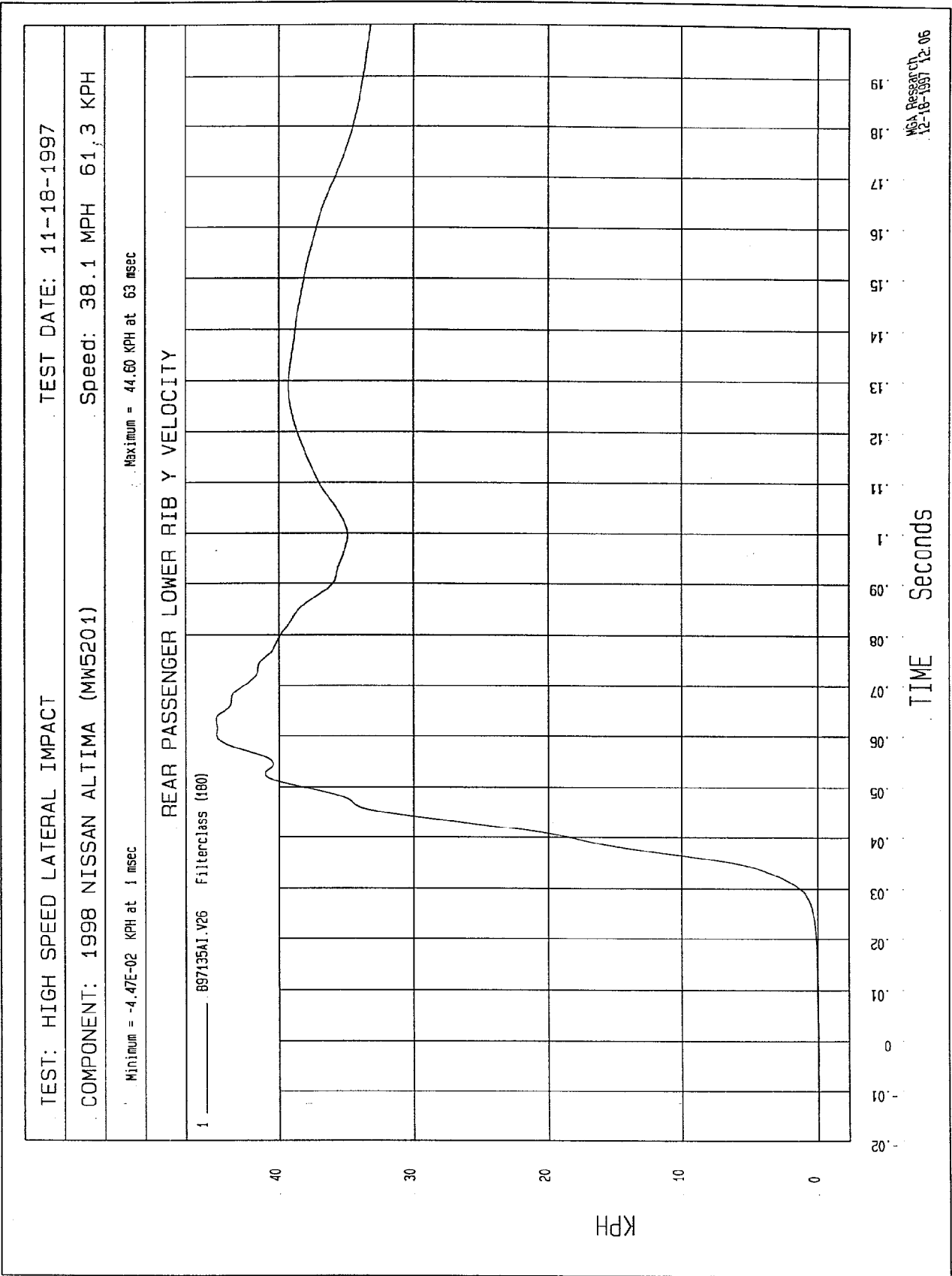
1 _____ 897135AF.A26 FilterClass (180)

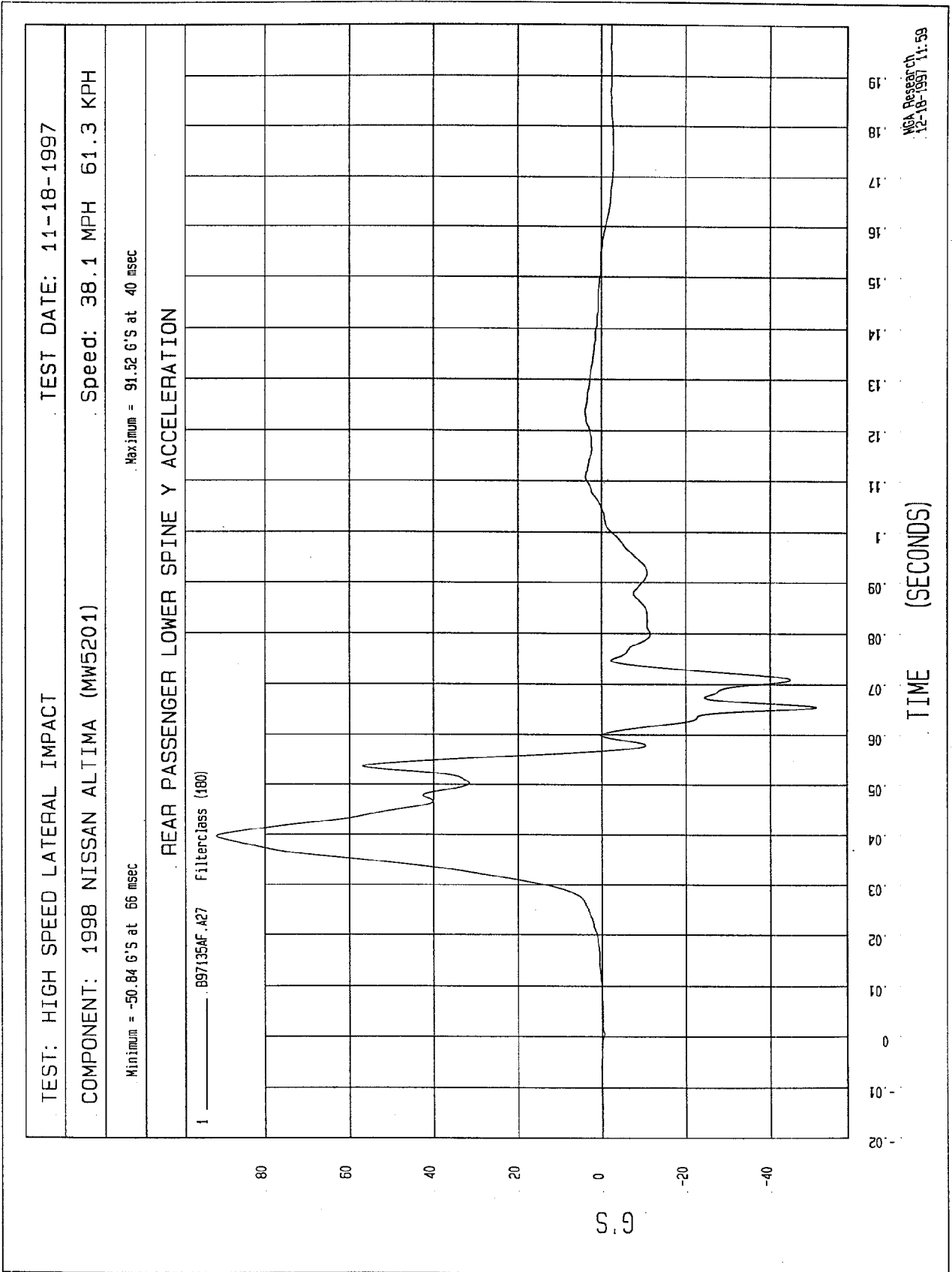
G.S.

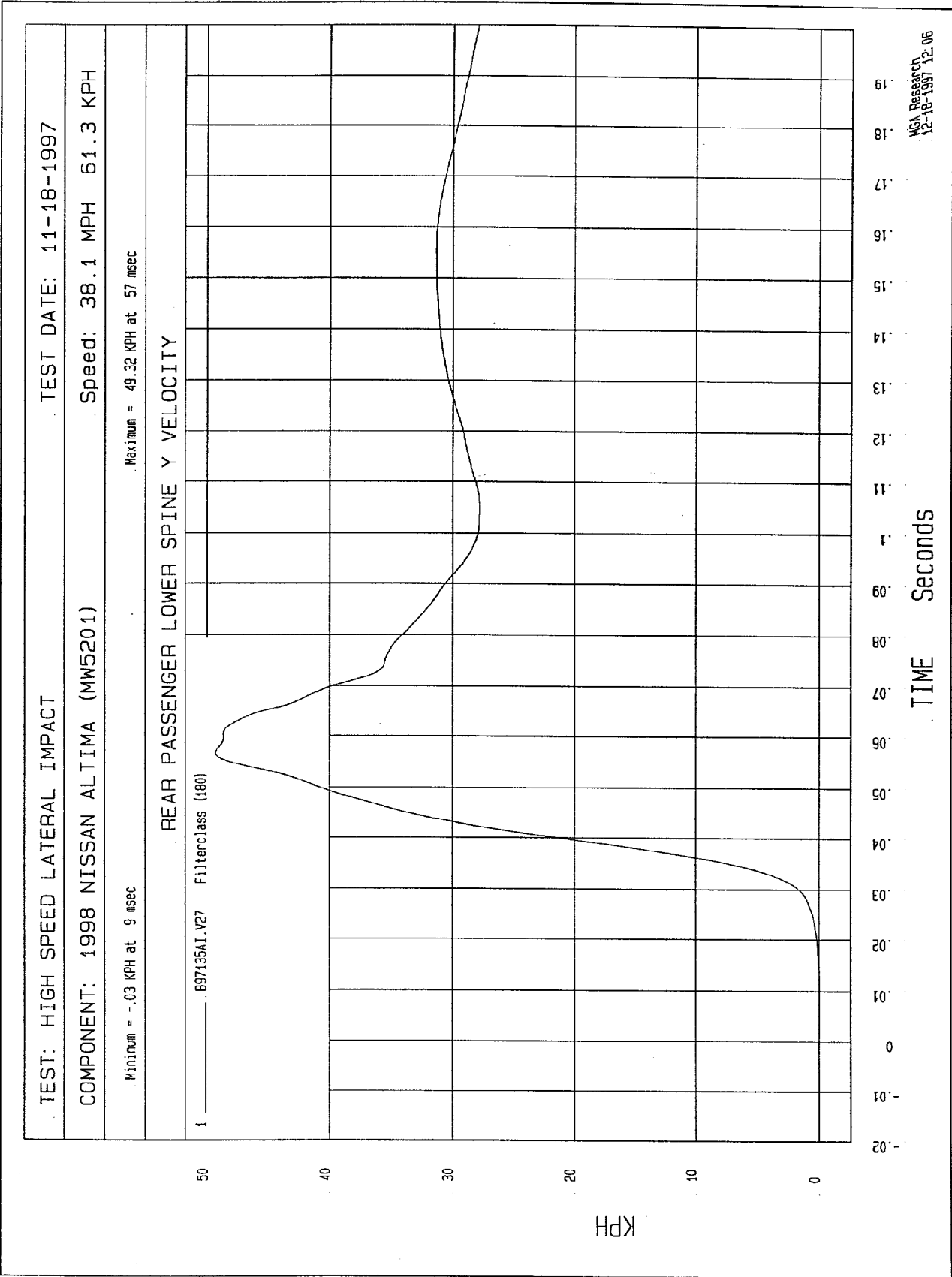


TIME (SECONDS)

NCA Research
12-18-1997 11:59







TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

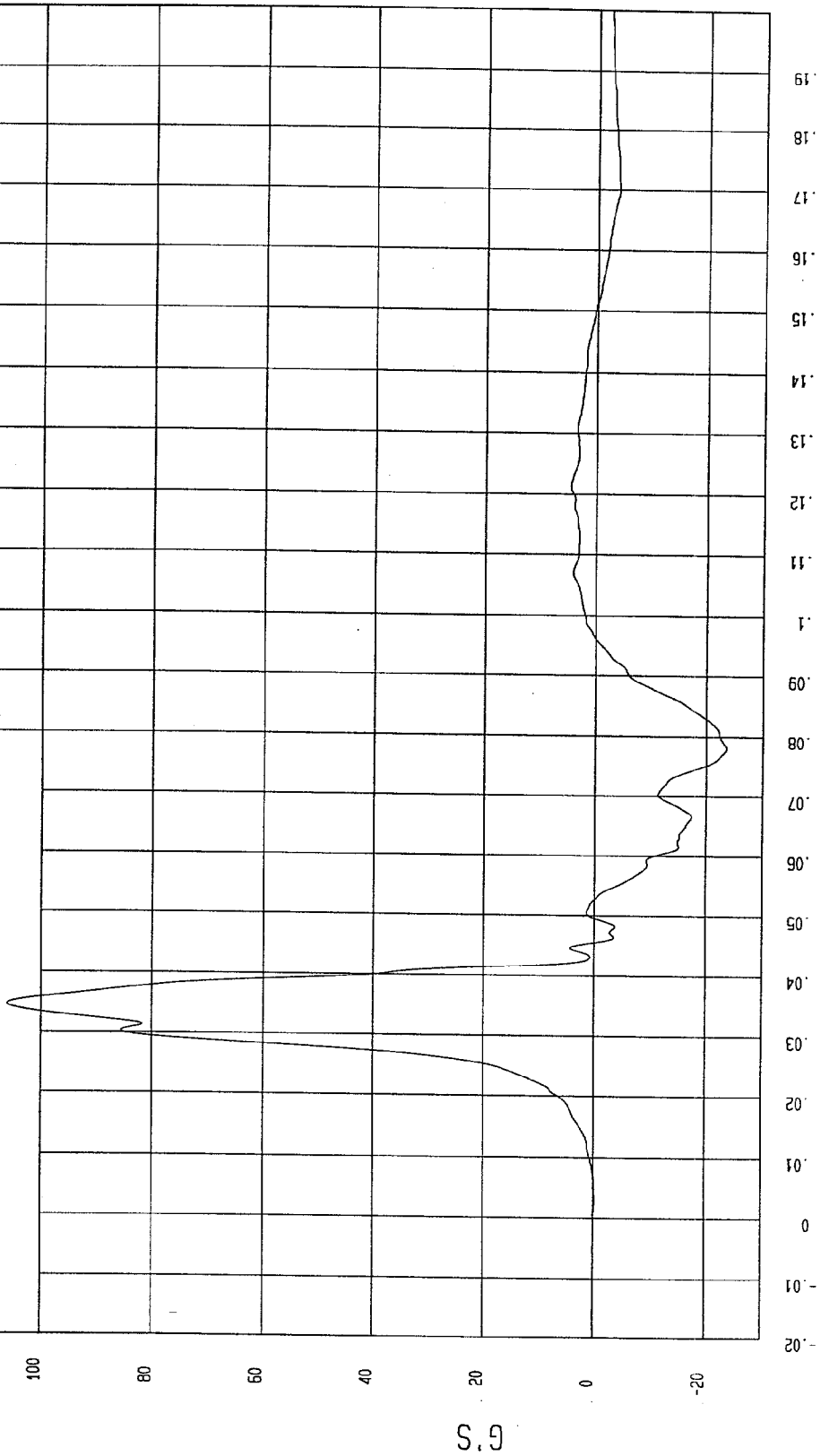
Speed: 38.1 MPH 61.3 KPH

Minimum = -23.62 G's at 78 msec

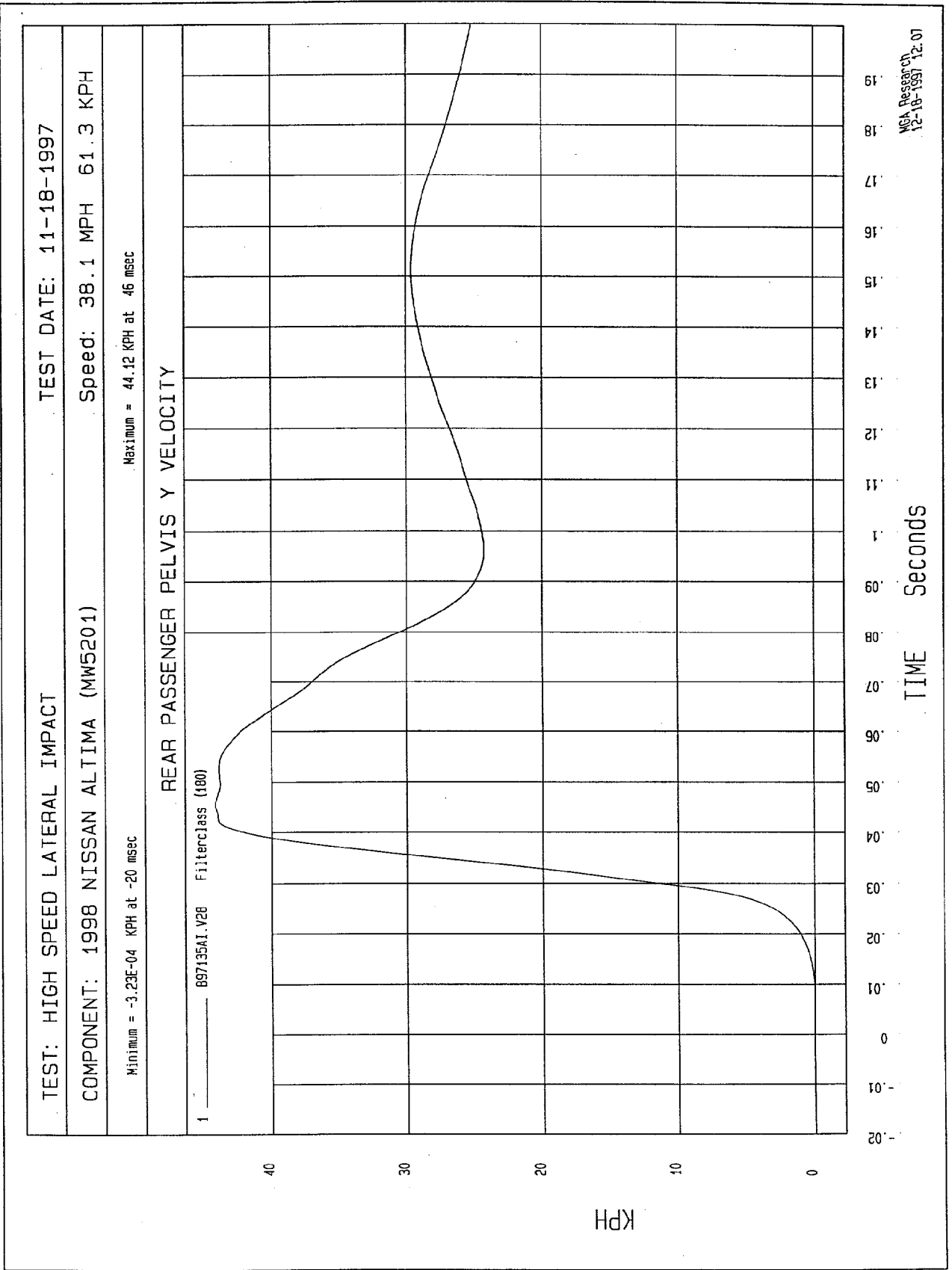
Maximum = 106.14 G's at 35 msec

REAR PASSENGER PELVIS Y ACCELERATION

1 ——— B97135AF.428 Filter: class (180)



MGA Research
12-18-1997 11:59



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

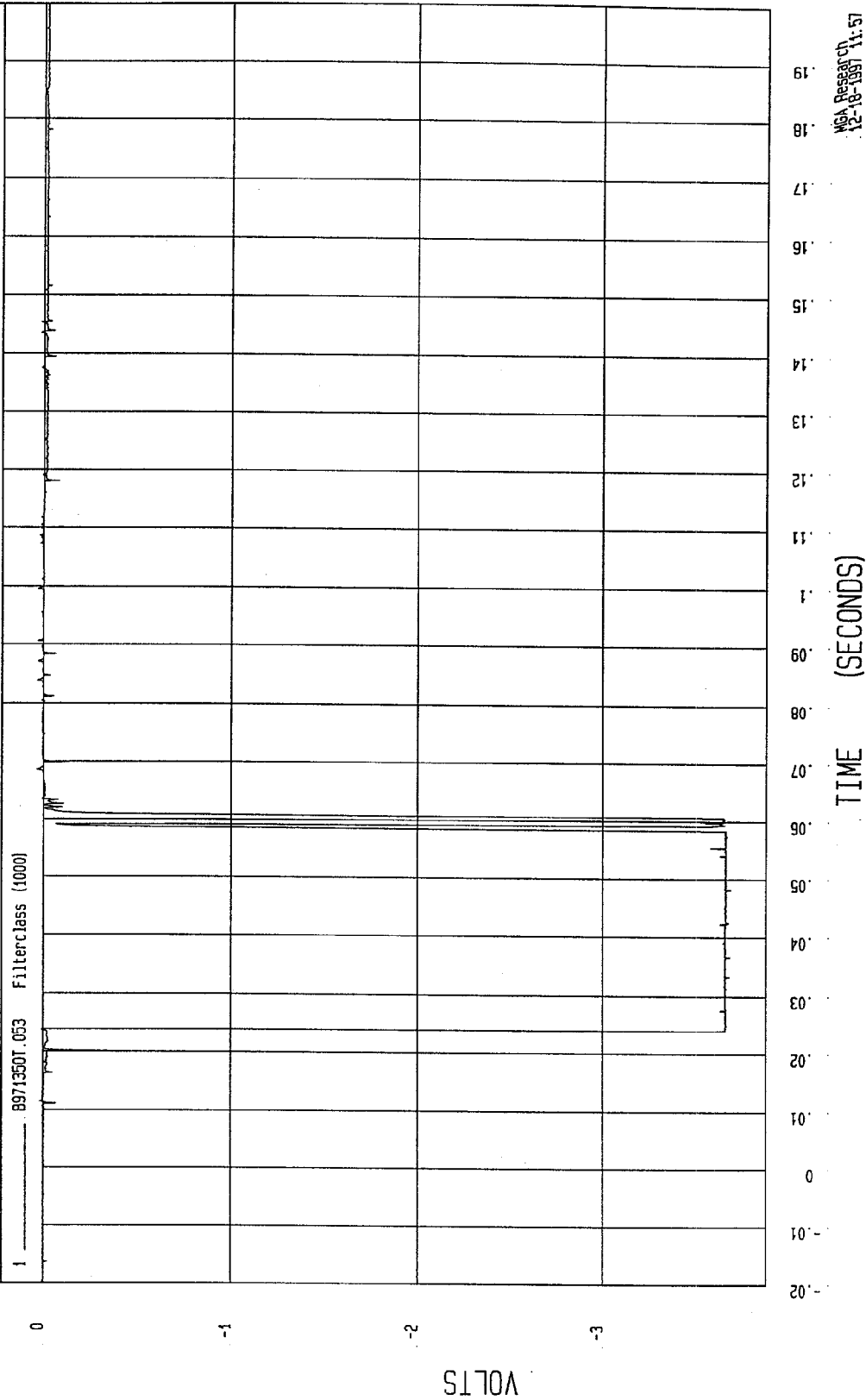
COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Speed: 38.1 MPH 61.3 KPH

Minimum = -3.68 VOLTS at 48 msec

Maximum = 3.29E-02 VOLTS at 69 msec

REAR PASSENGER LEG CONTACT



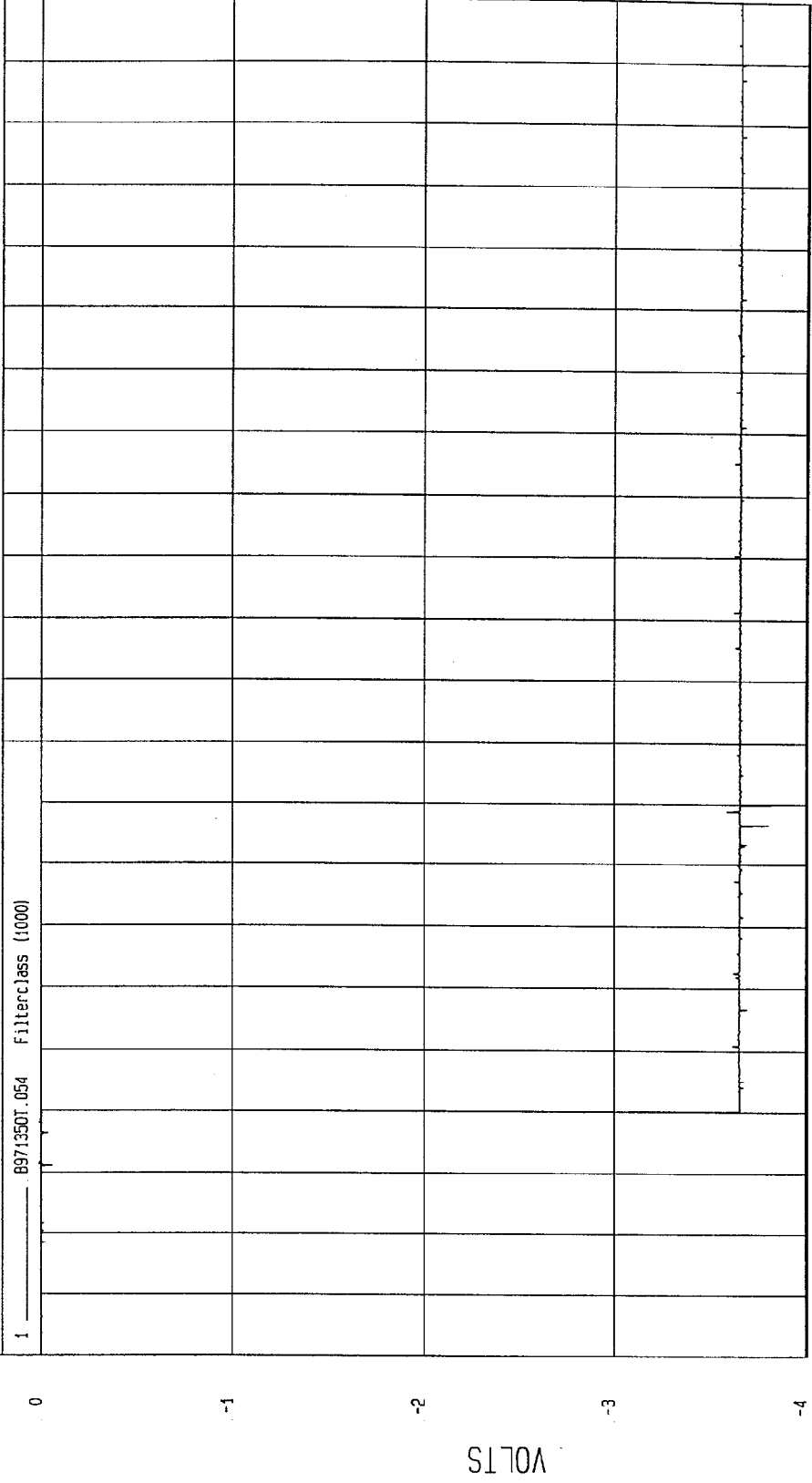
NGA Research
12-18-1997 11:57

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -3.81 VOLTS at 70 msec Maximum = 1.21E-02 VOLTS at 12 msec

REAR PASSENGER SHOULDER CONTACT



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

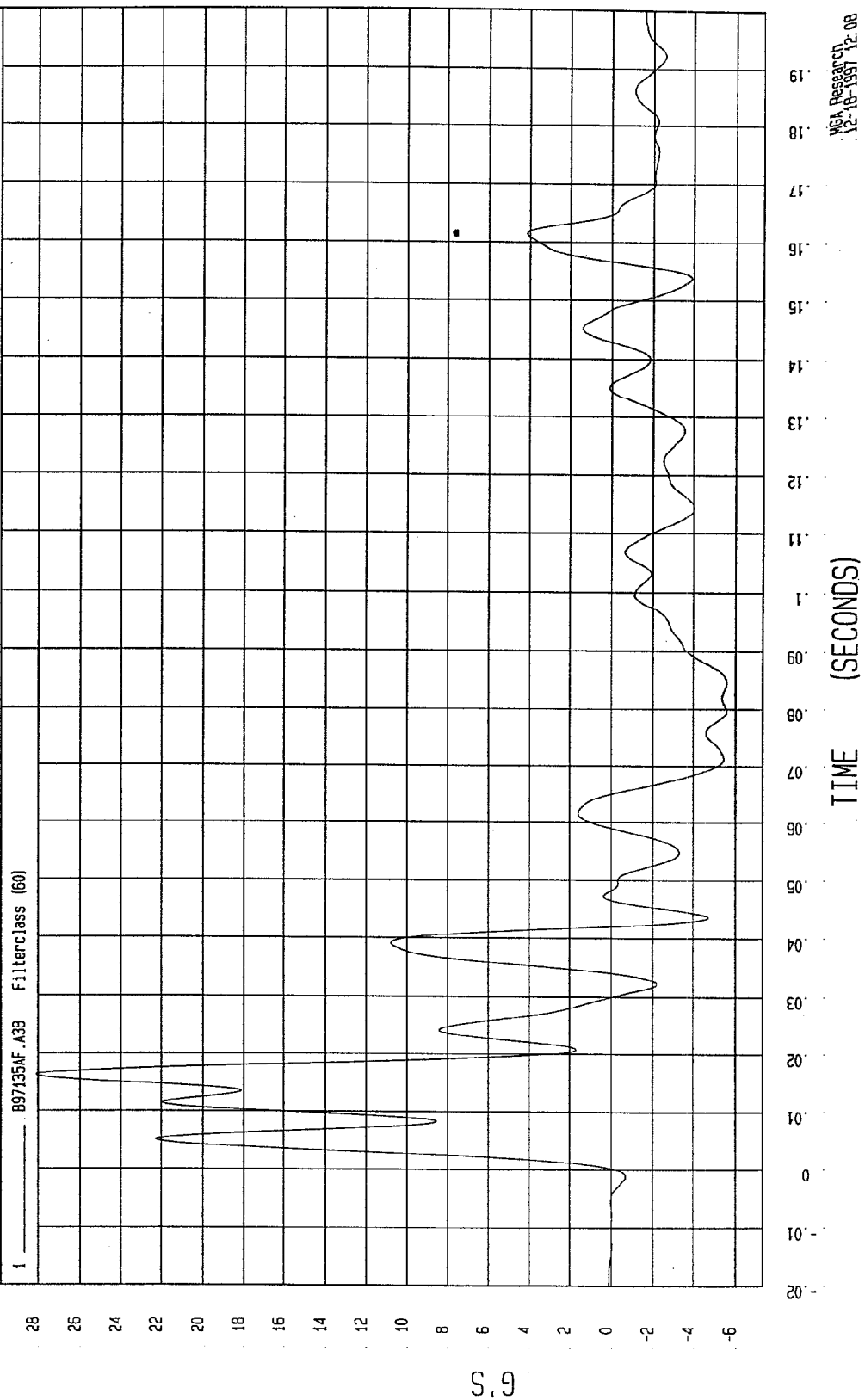
WGA Research
12-18-1997 11:57

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

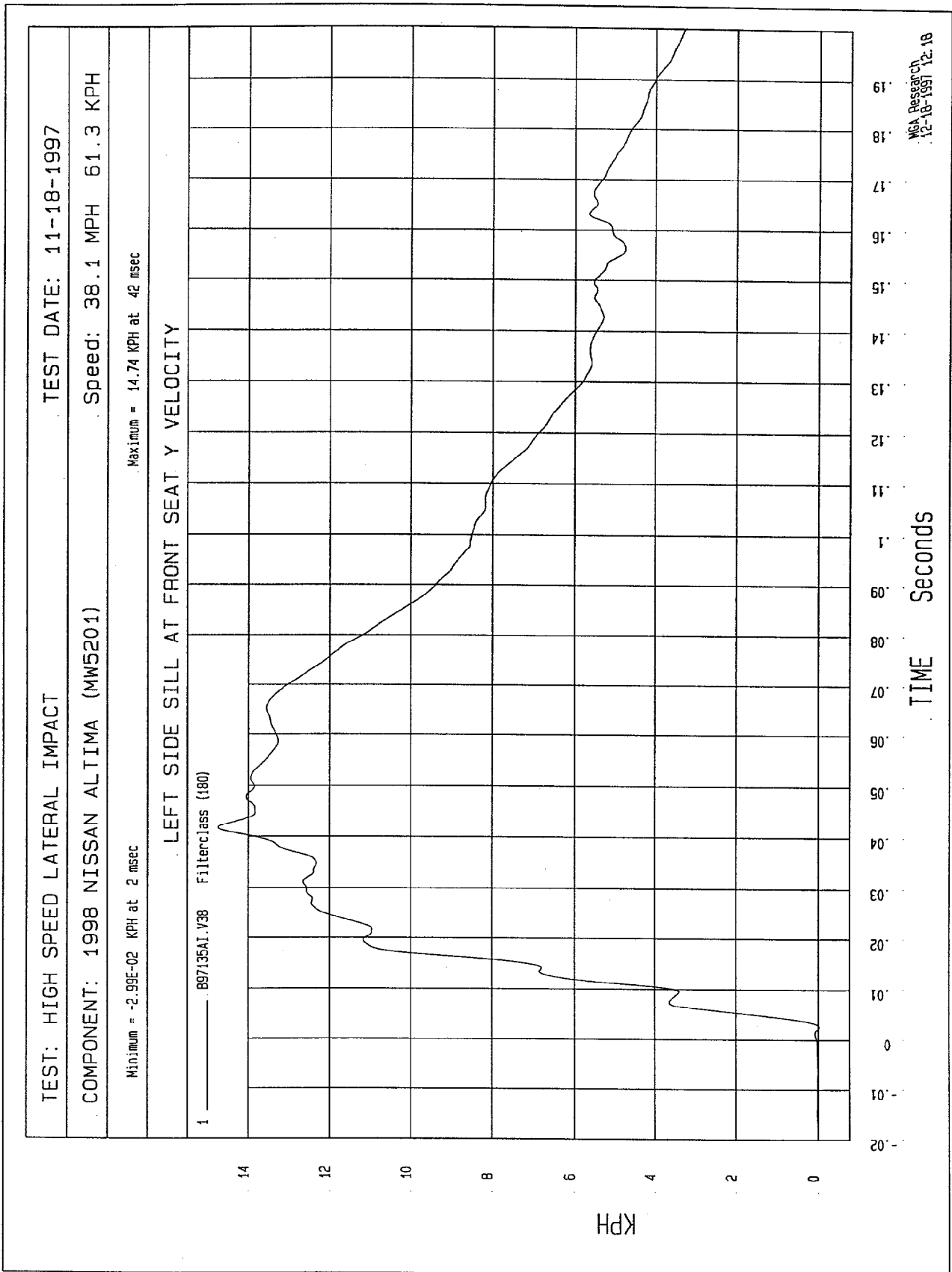
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -5.59 G'S at 85 msec Maximum = 28.11 G'S at 16 msec

LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION



WGA Research
12-18-1997 12:08



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Speed: 38.1 MPH 61.3 KPH

Minimum = -18.20 G'S at 83 msec

Maximum = 56.00 G'S at 16 msec

LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

1 ——— 897135AF.A39 Filterclass (60)

Data not valid after
approx. 30 msec.

G.S

TIME (SECONDS)

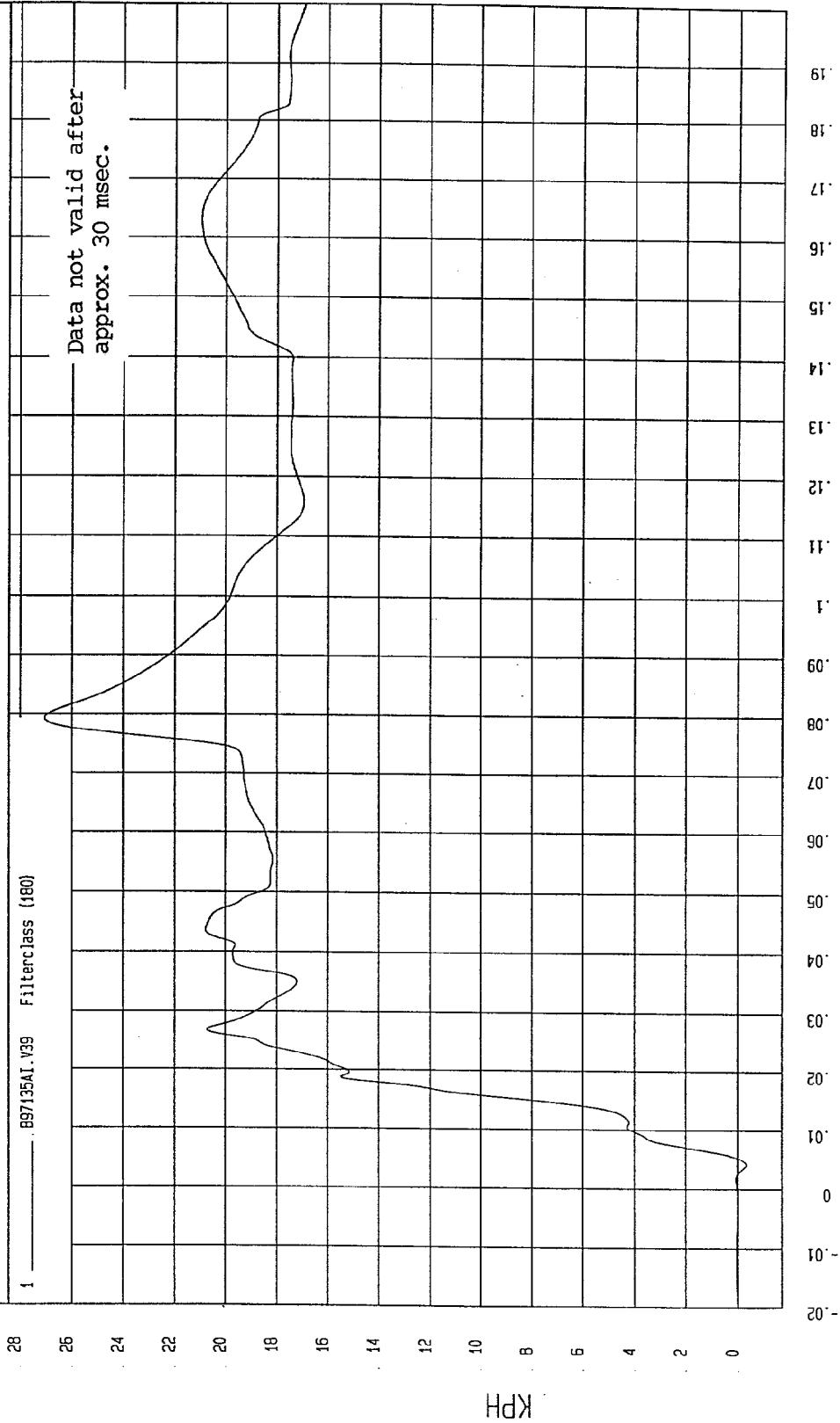
MCA Research
12-18-1997 12:08

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -.32 KPH at 4 msec Maximum = 27.06 KPH at 79 msec

LEFT SIDE SILL AT REAR SEAT Y VELOCITY



WCA Research
12-18-1997 12:18

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

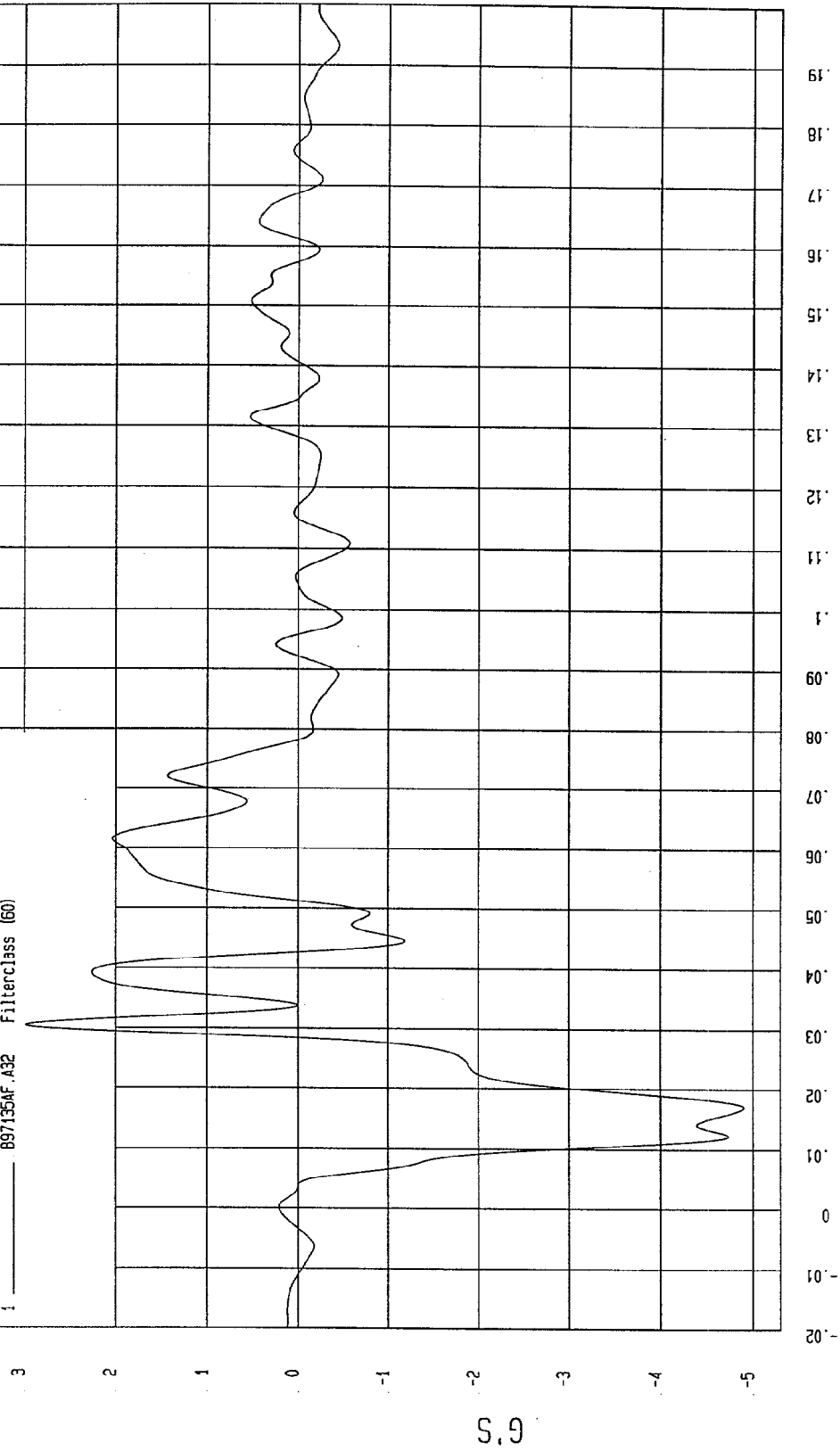
Speed: 38.1 MPH 61.3 KPH

Minimum = -4.90 G'S at 17 msec

Maximum = 2.98 G'S at 30 msec

RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION

1 ——— B971354F.A32 Filterclass (60)



MGA Research
12-18-1997 12:08

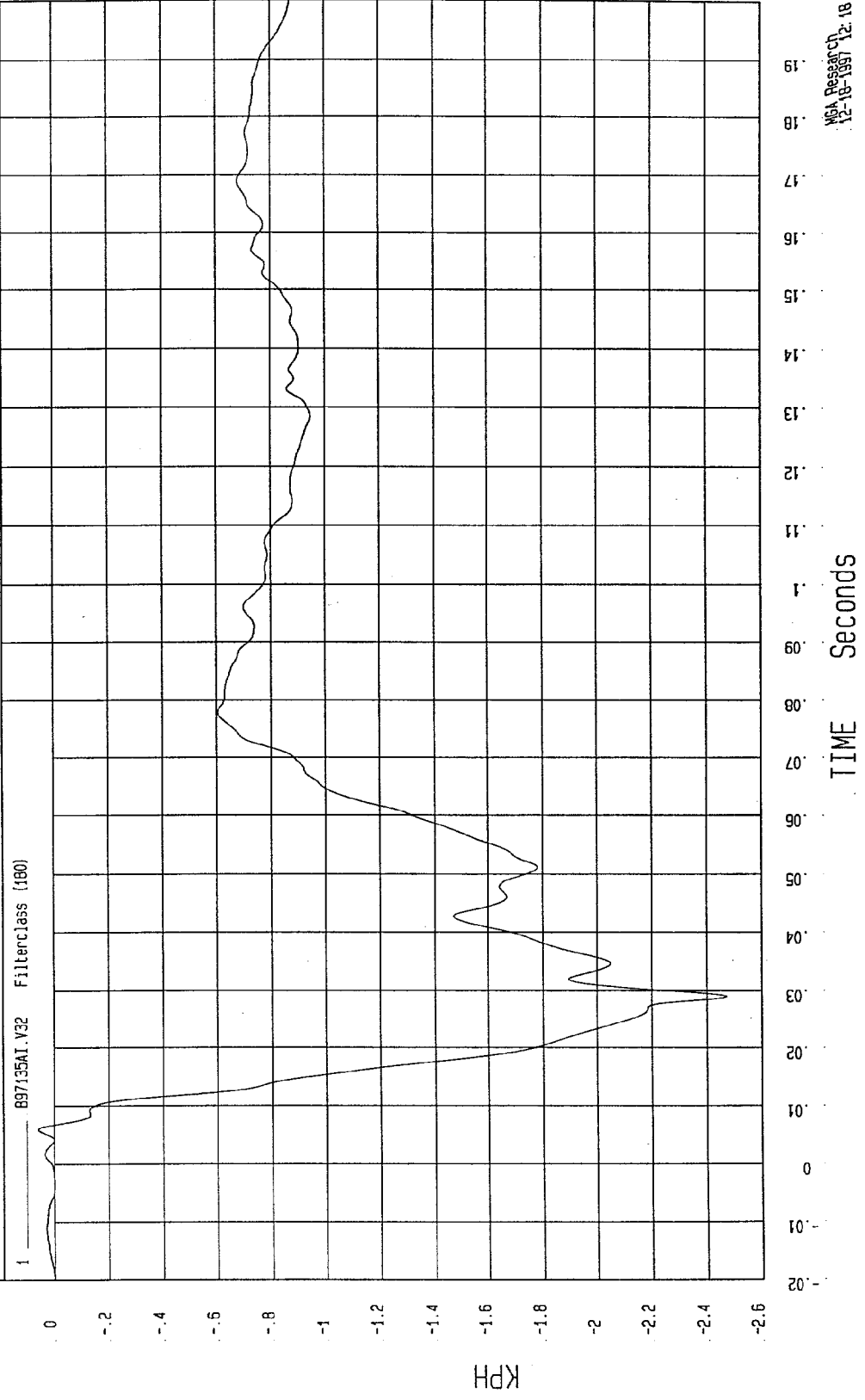
TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -2.47 KPH at 29 msec Maximum = 5.87E-02 KPH at 5 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

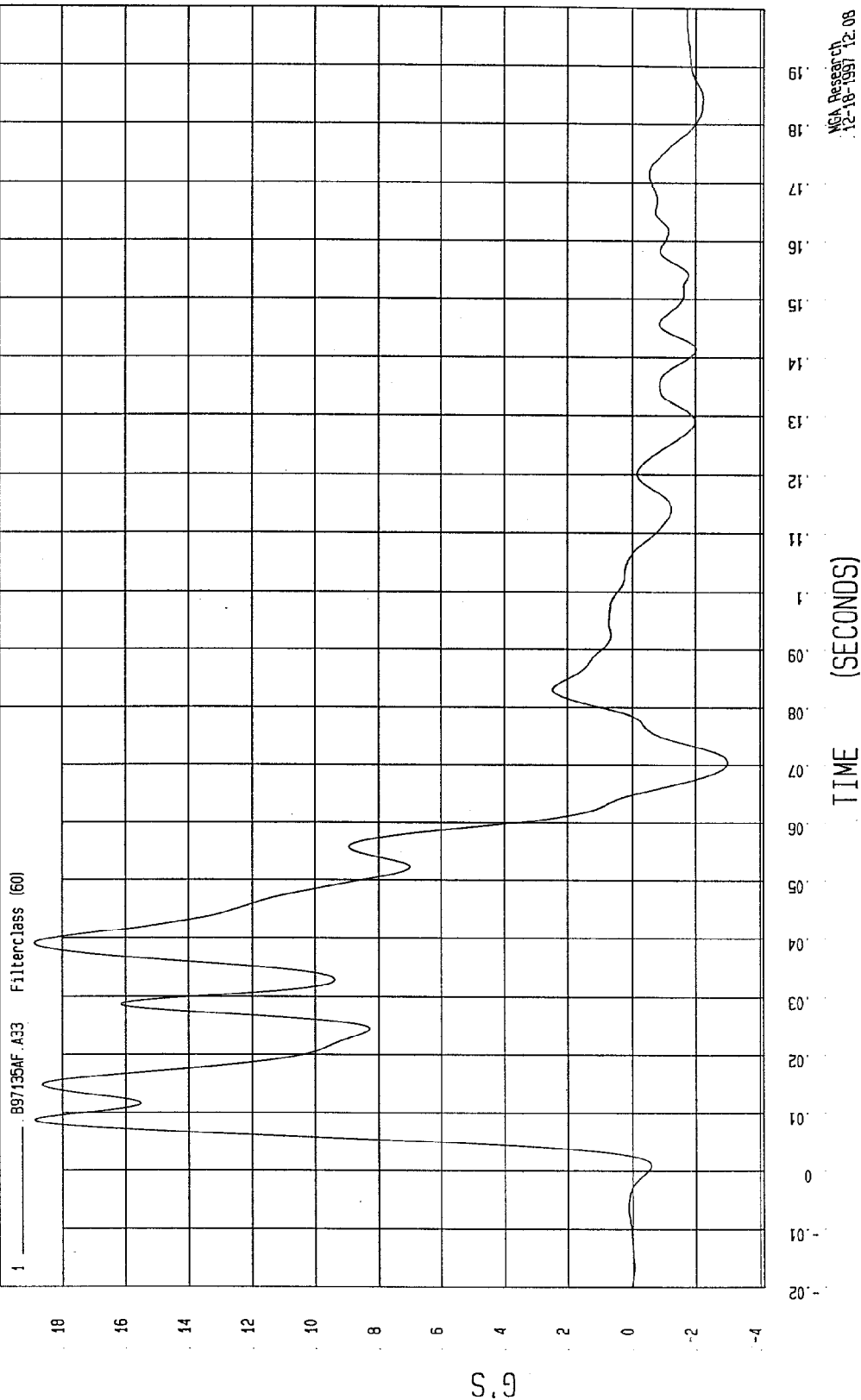
SPEED: 38.1 MPH 61.3 KPH

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Maximum = 18.87 G'S at 39 msec

Minimum = -3.00 G'S at 70 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

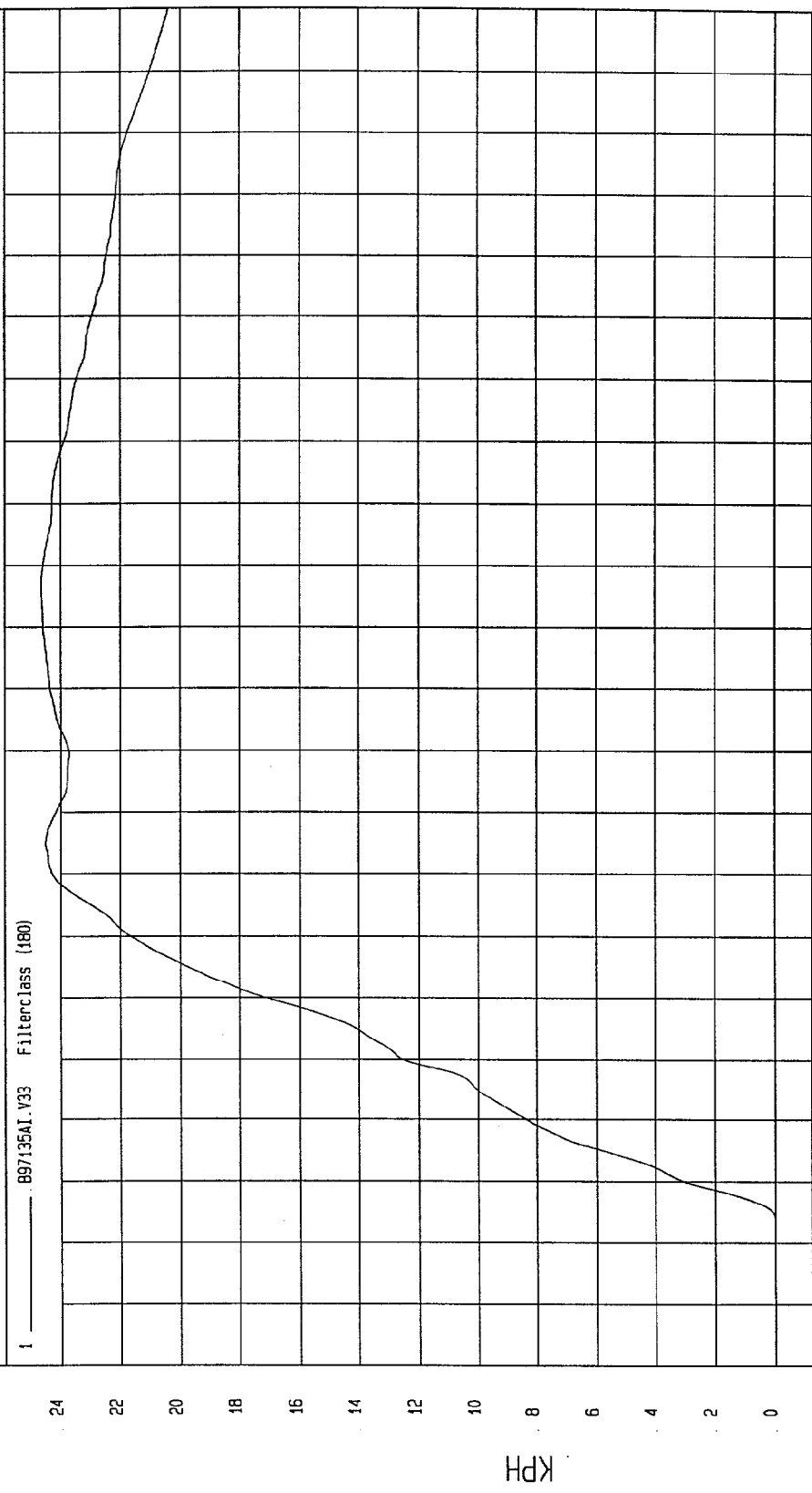


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -9.08E-03 KPH at -14 msec Maximum = 24.63 KPH at 108 msec

RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY



TIME Seconds

19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.19

MGA Research
12-18-1997 12:19

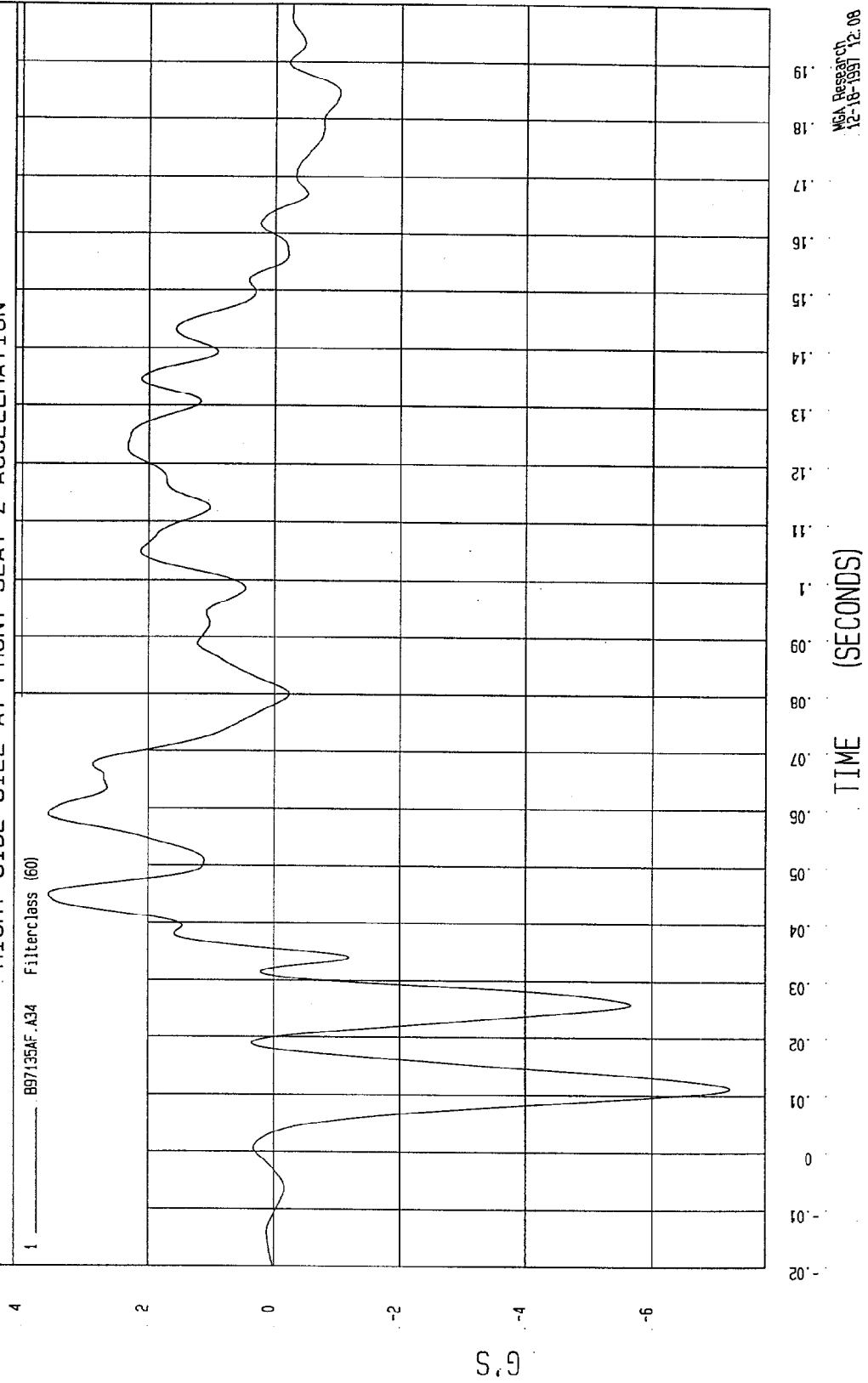
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -7.23 G'S at 11 msec
Maximum = 3.57 G'S at 99 msec

RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

1 _____ B97135AF.A34 Filterclass (60)



MCA Research
12-18-1997 12:08

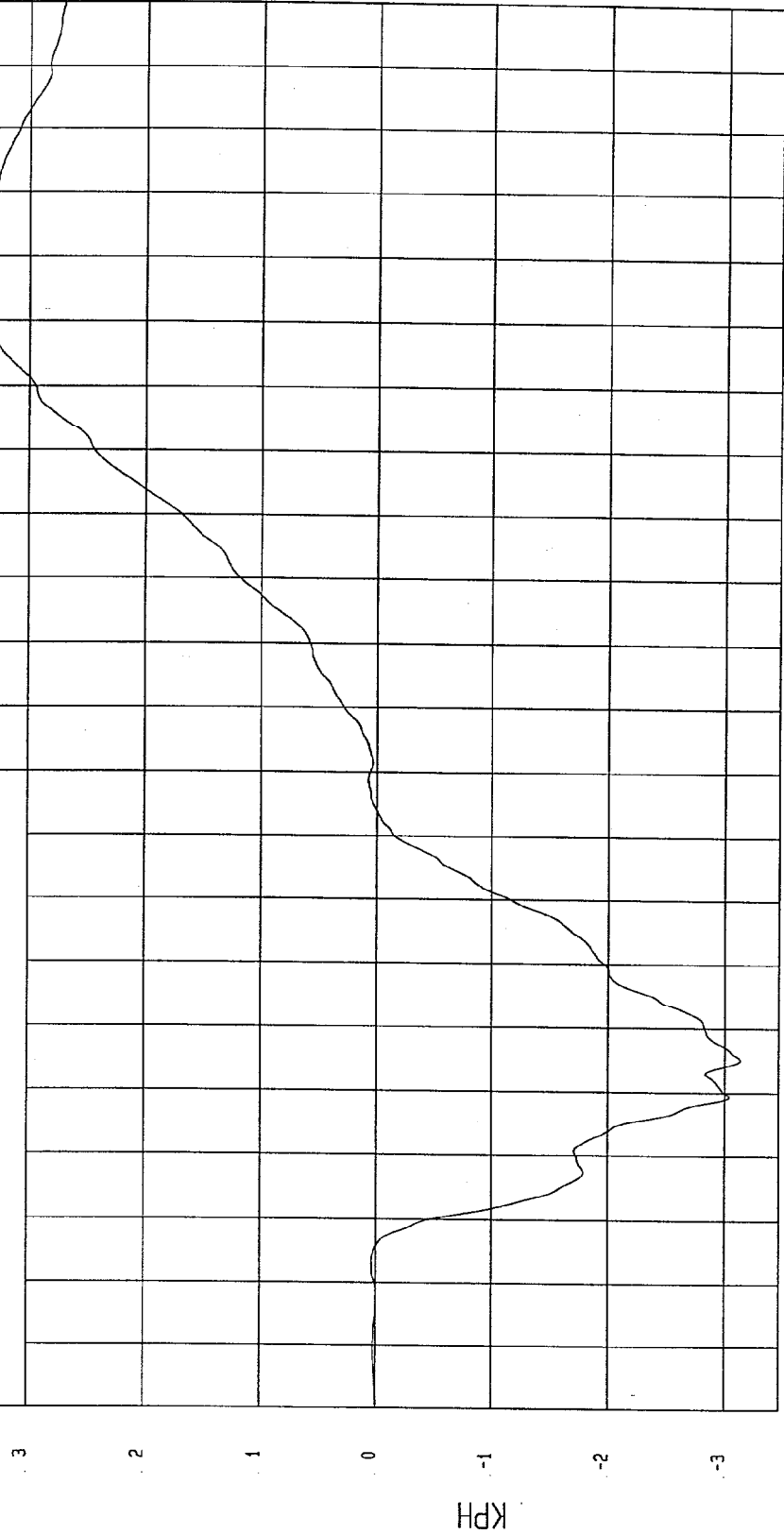
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -3.12 KPH at 35 msec Maximum = 3.39 KPH at 154 msec

RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY

1 ——— 897135A1.V34 Filterclass (180)



TIME Seconds

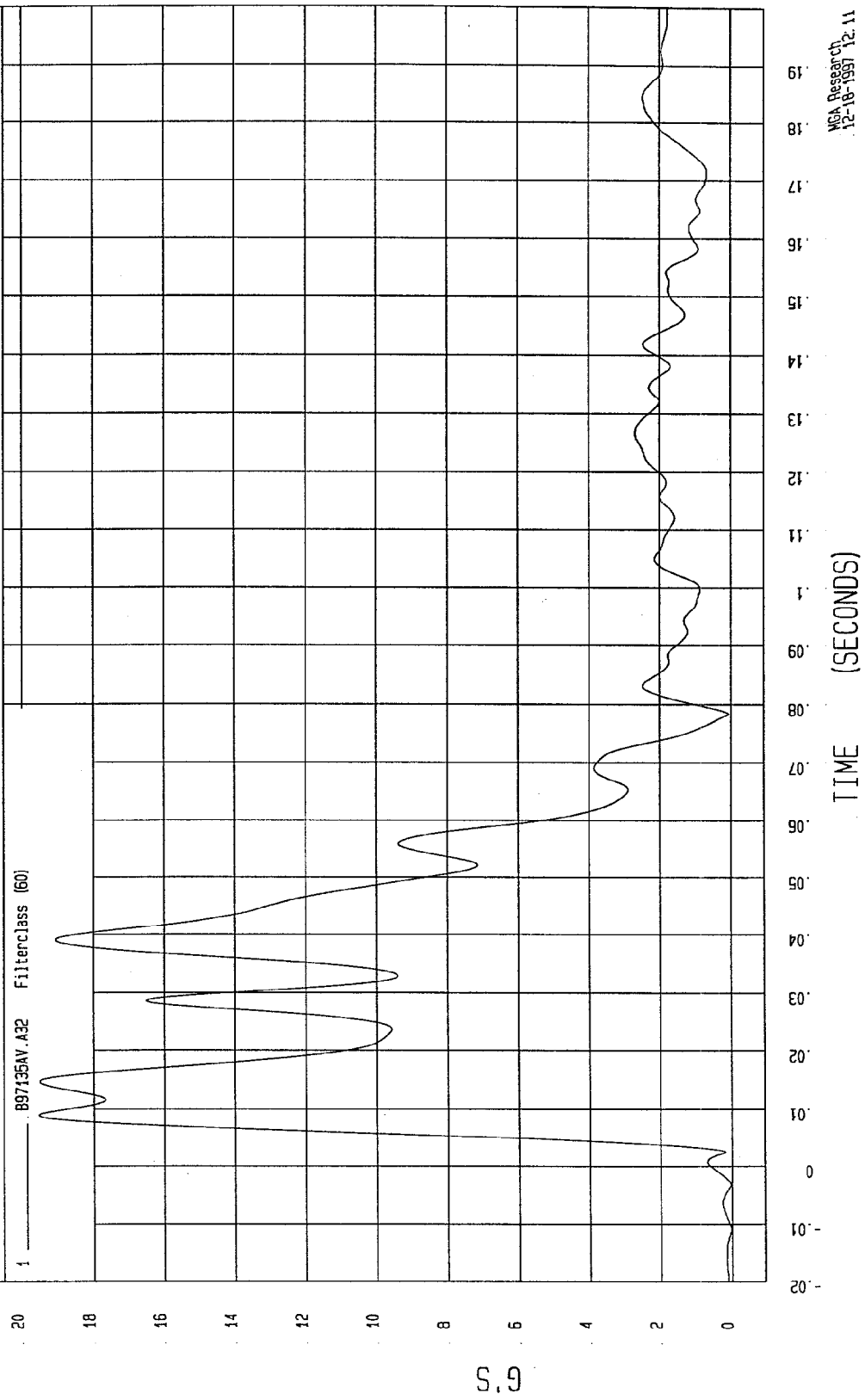
MCA Research
12-18-1997 12:19

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

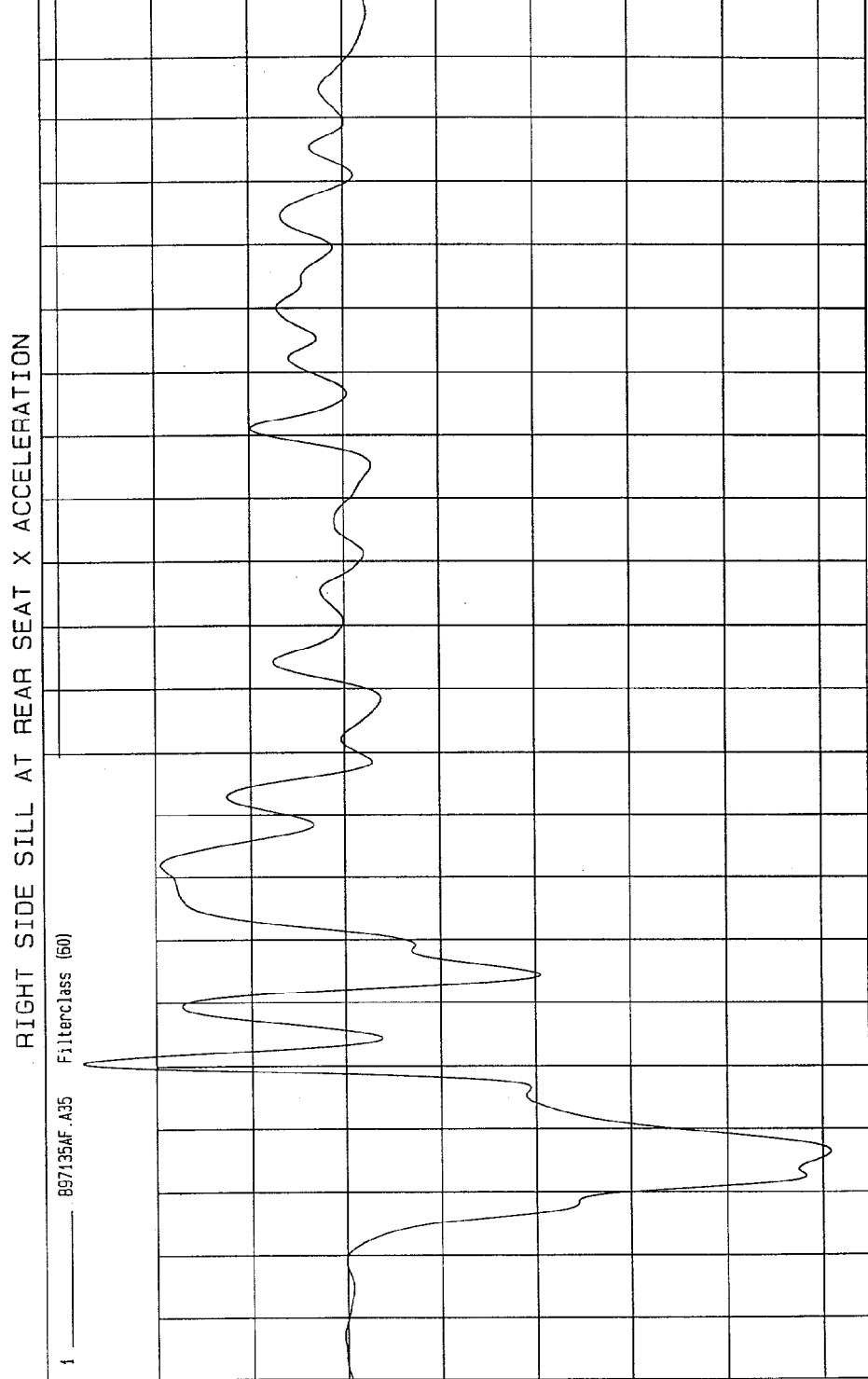
Minimum = 3.12E-02 G'S at -3 msec Maximum = 19.53 G'S at 9 msec

RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION



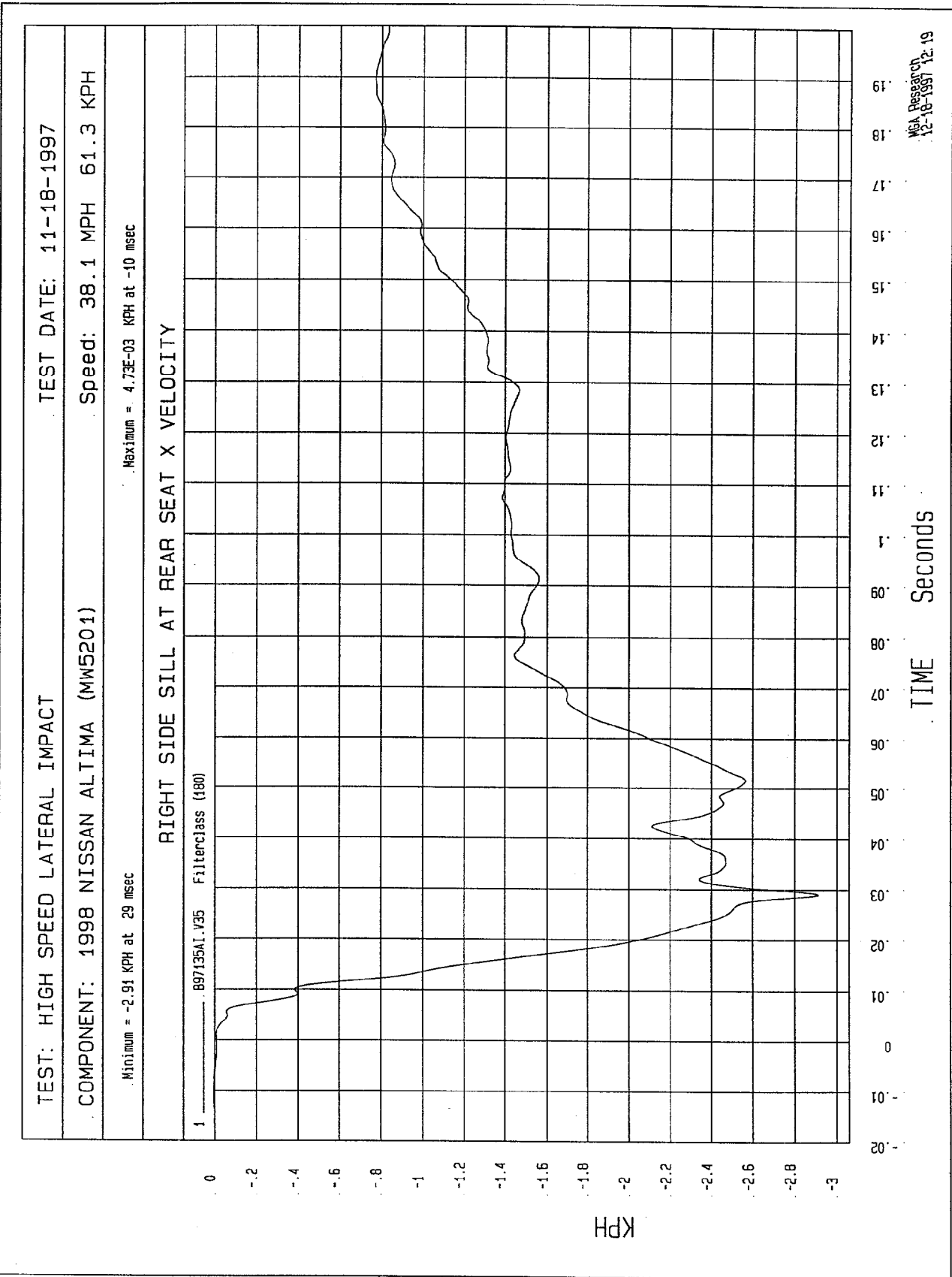
MCA Research
12-18-1997 12.11

TEST: HIGH SPEED LATERAL IMPACT
TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)
Speed: 38.1 MPH 61.3 KPH
Minimum = -5.08 G'S at 16 msec
Maximum = 2.77 G'S at 31 msec



TIME (SECONDS)

WCA Research
12-18-1997 12:08



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

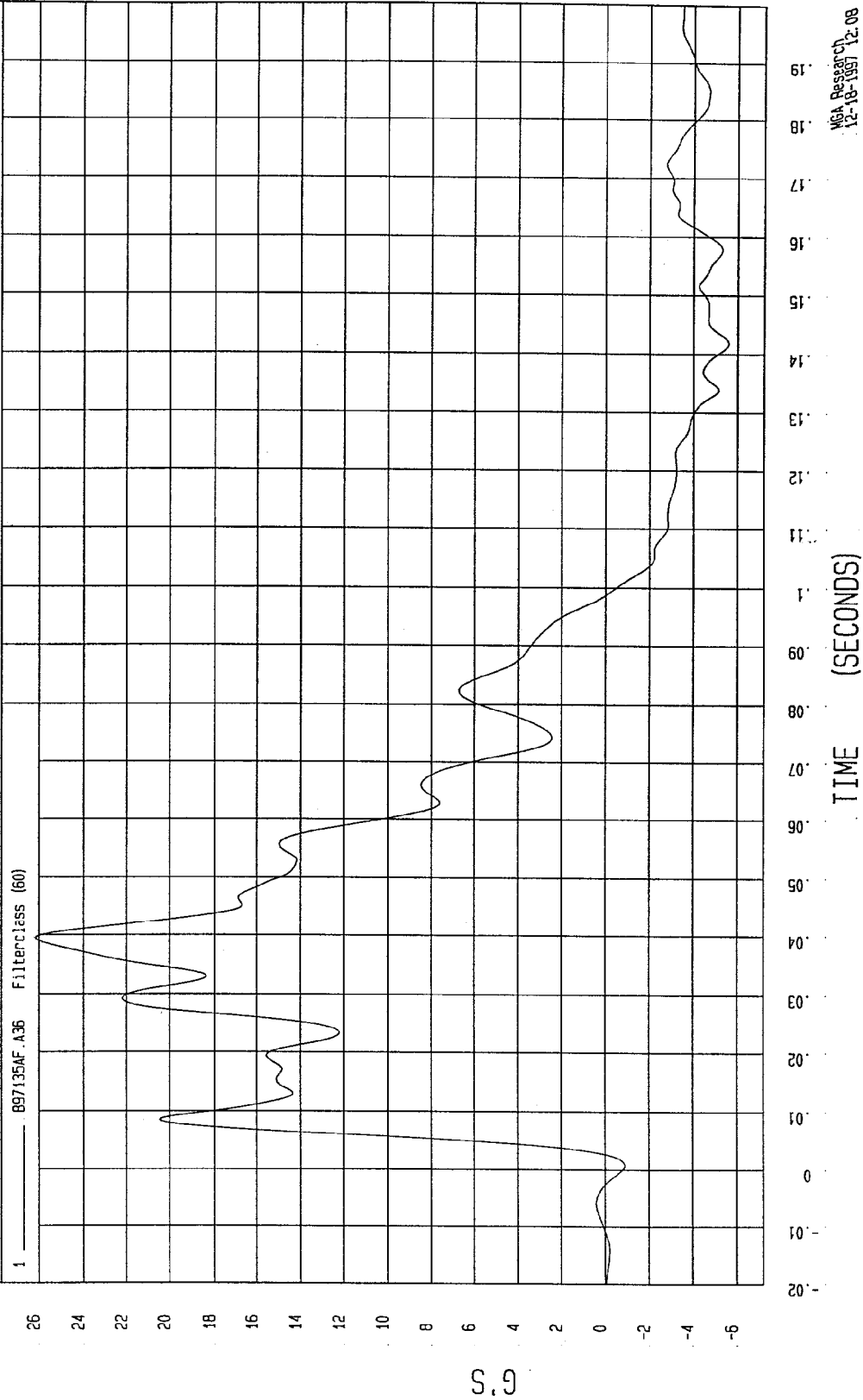
COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Speed: 38.1 MPH 61.3 KPH

Minimum = -5.59 G'S at 142 msec

Maximum = 26.14 G'S at 39 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

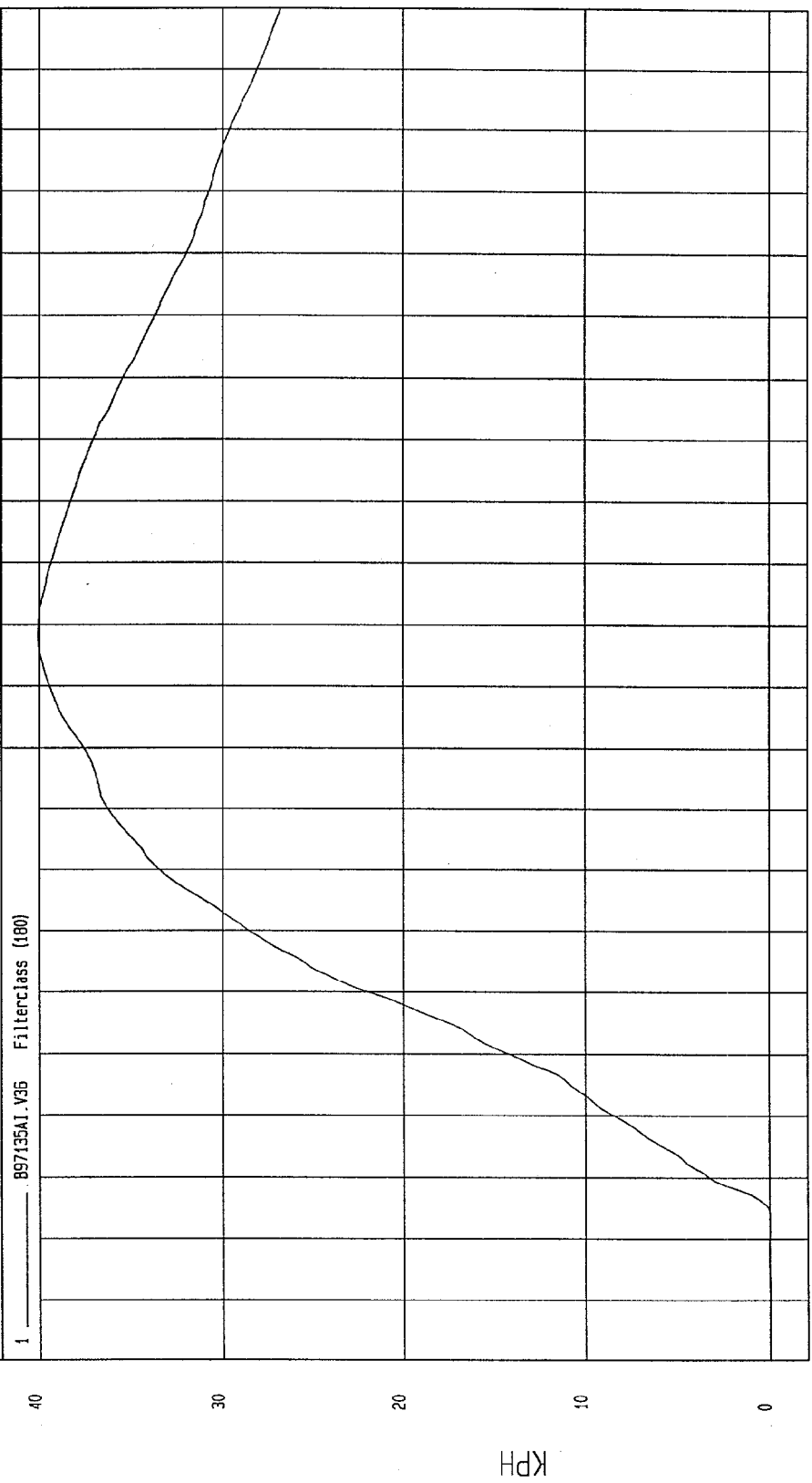


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

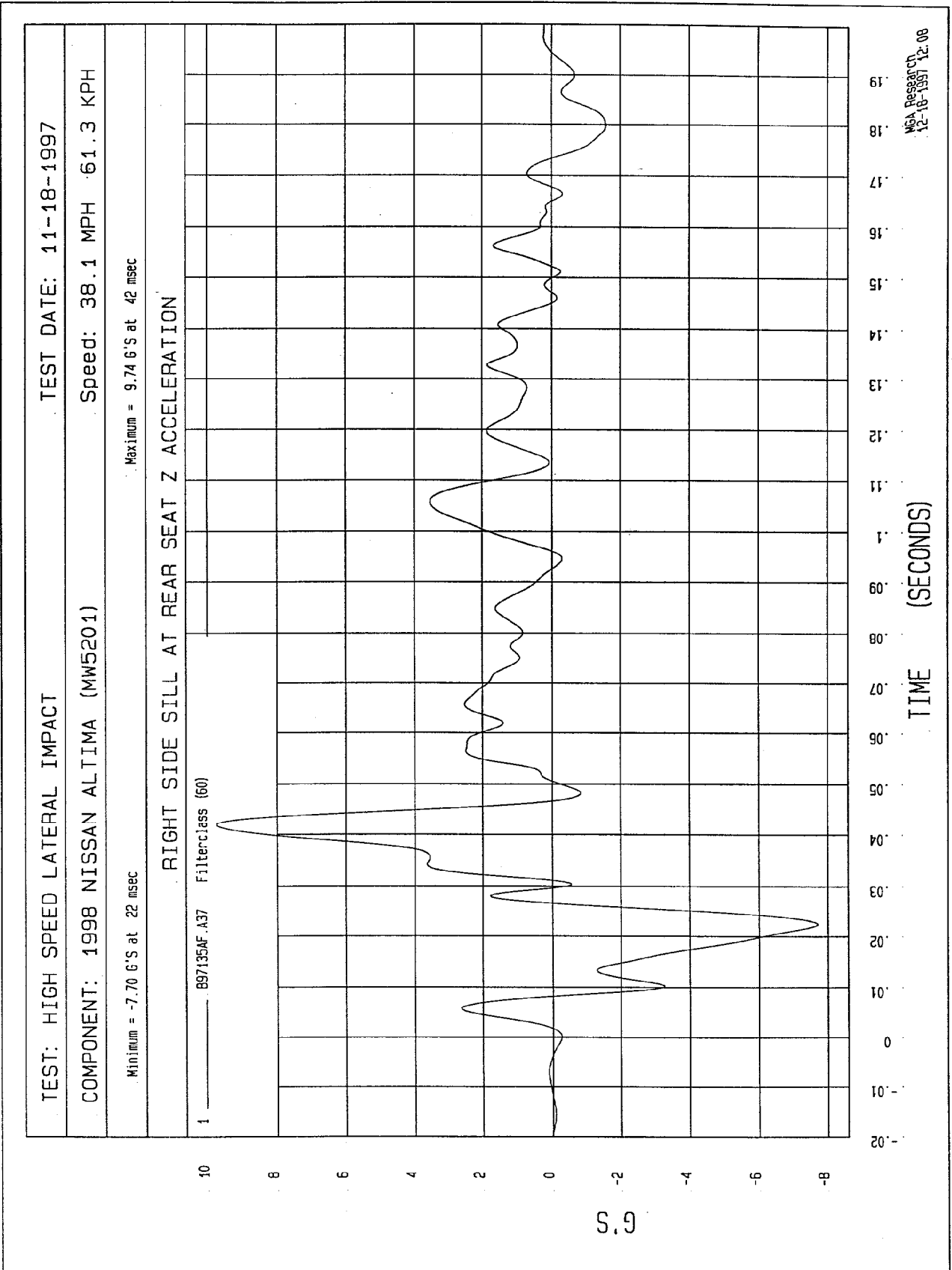
Minimum = -4.37E-02 KPH at -11 msec Maximum = 40.06 KPH at 98 msec

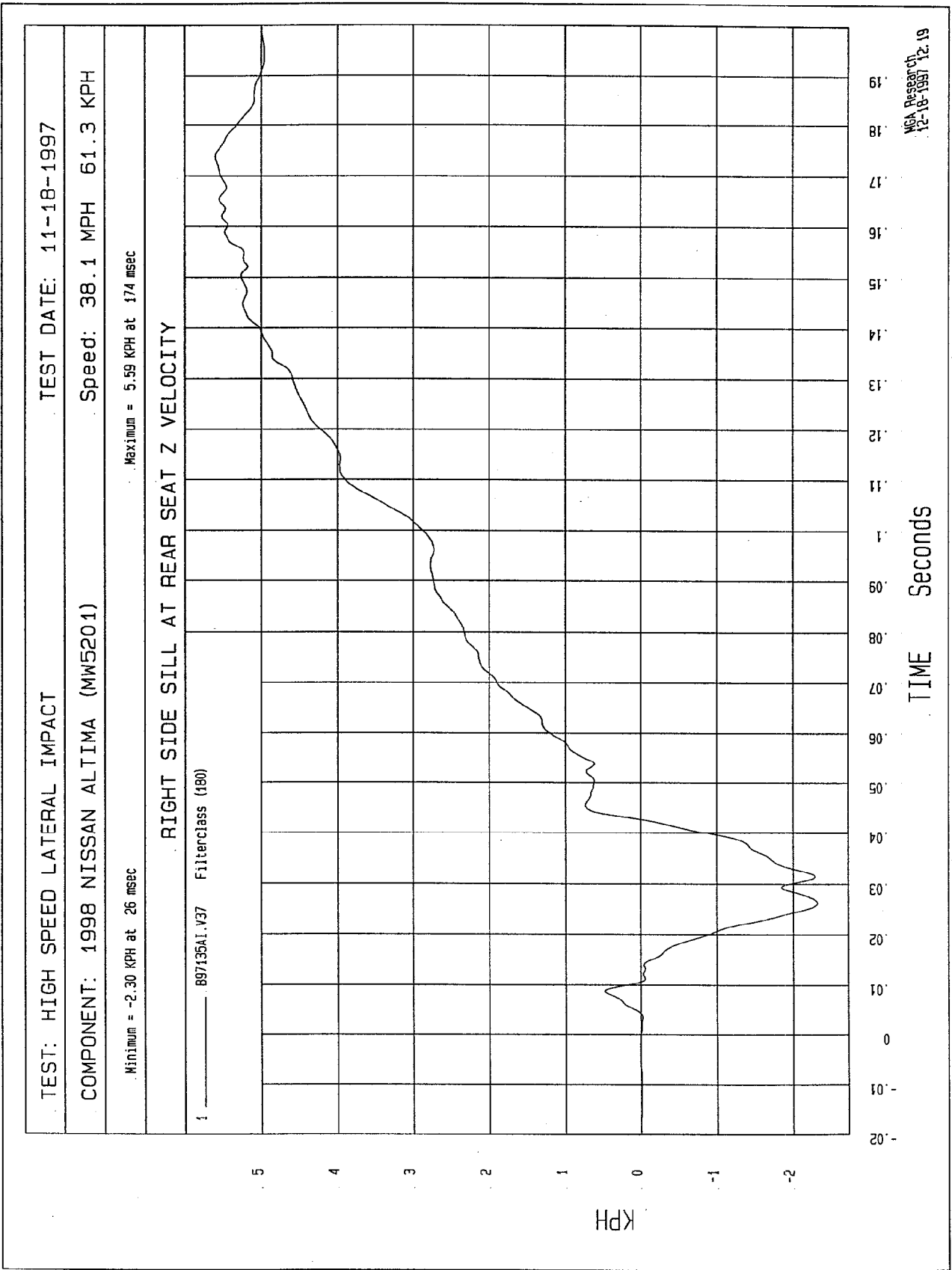
RIGHT SIDE SILL AT REAR SEAT Y VELOCITY



TIME Seconds

NCA Research
12-18-1997 12:19



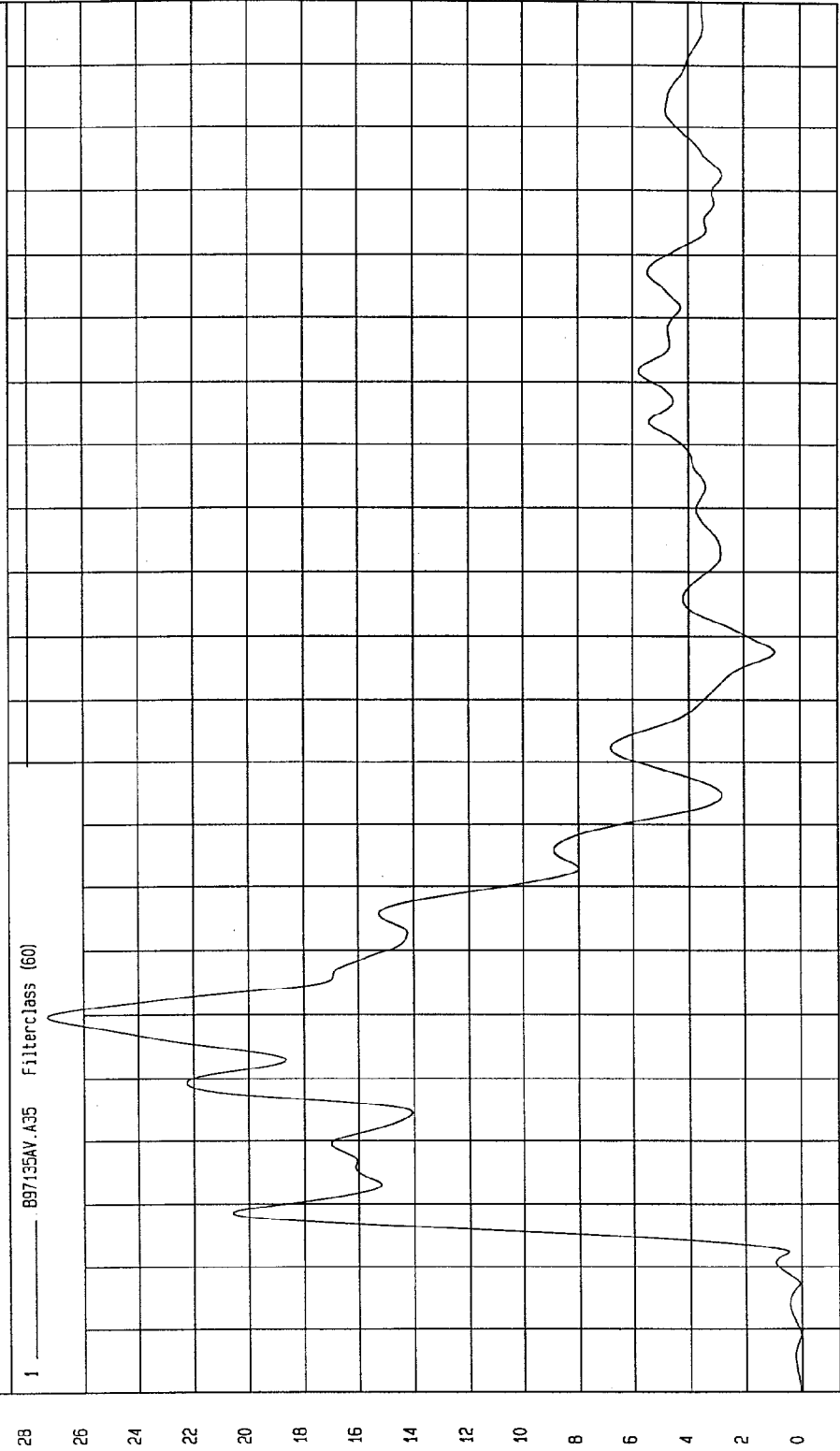


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = .02 G'S at -11 msec Maximum = 27.31 G'S at 40 msec

RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION



TIME (SECONDS)

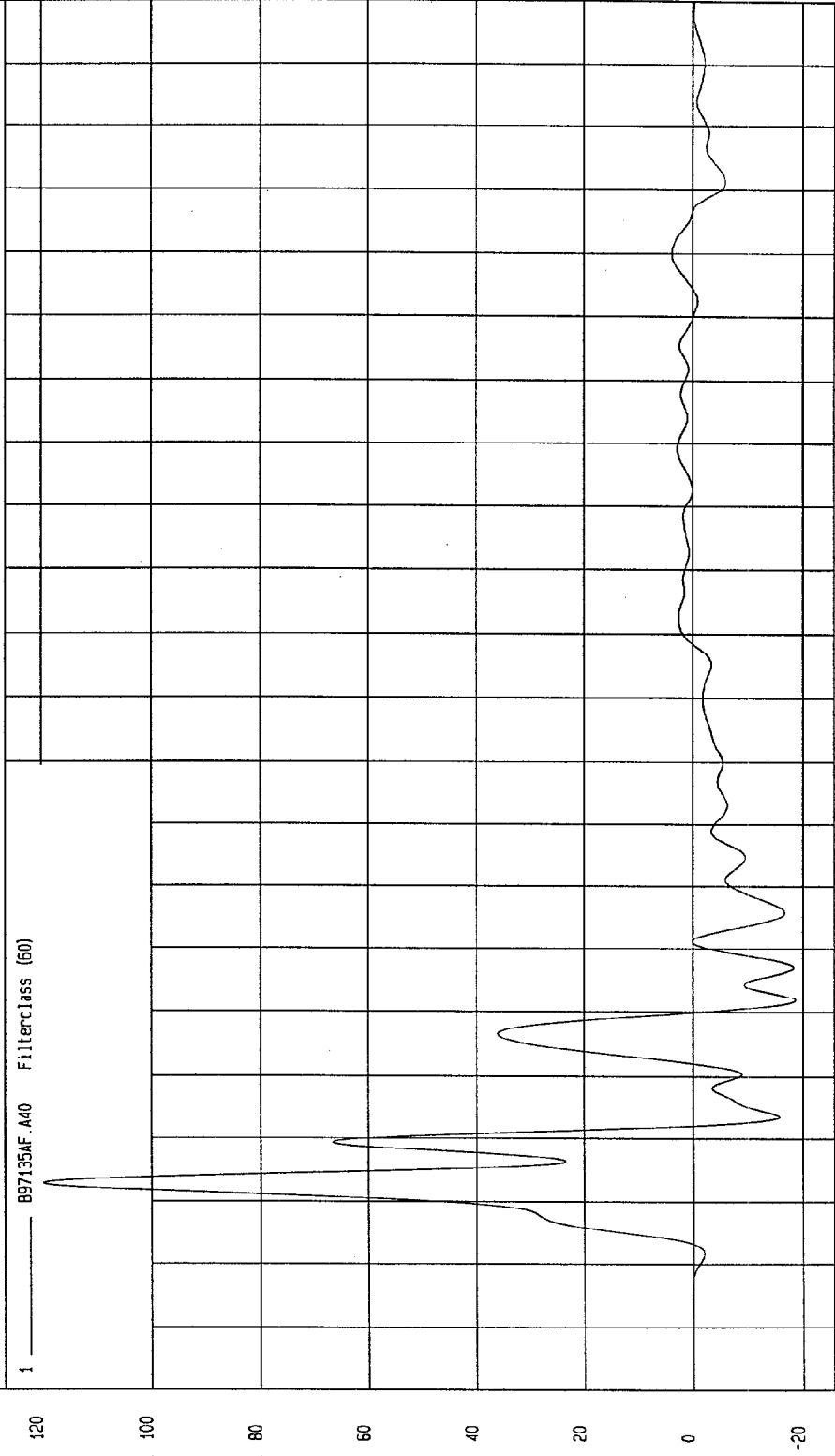
MSA Research
12-18-1997 12:11

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -18.70 G'S at 42 msec Maximum = 119.67 G'S at 13 msec

LEFT FRONT SEAT TRACK Y ACCELERATION



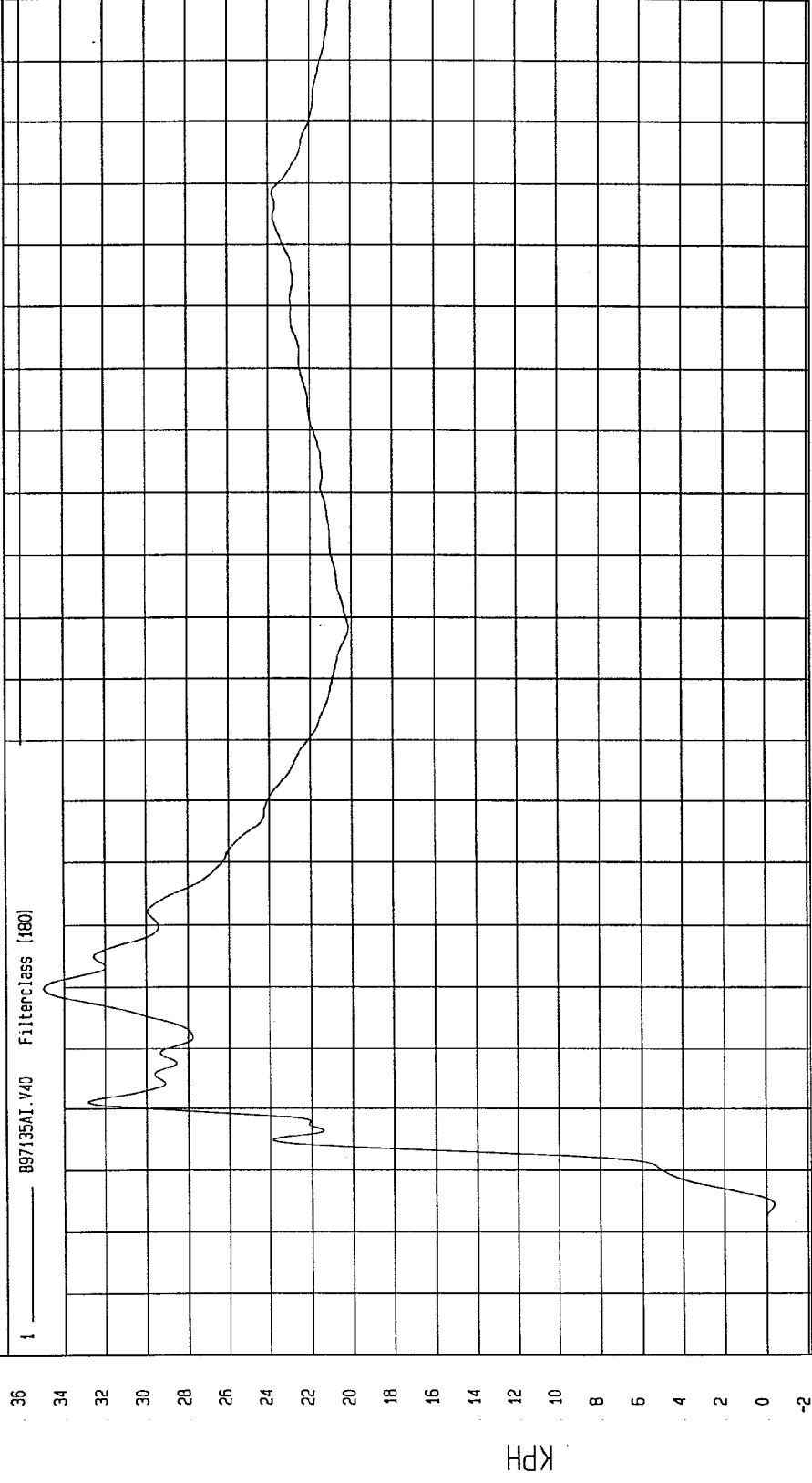
MGA Research
12-18-1997 12:08

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -.39 KPH at 4 msec Maximum = 34.97 KPH at 40 msec

LEFT FRONT SEAT TRACK Y VELOCITY



TIME Seconds

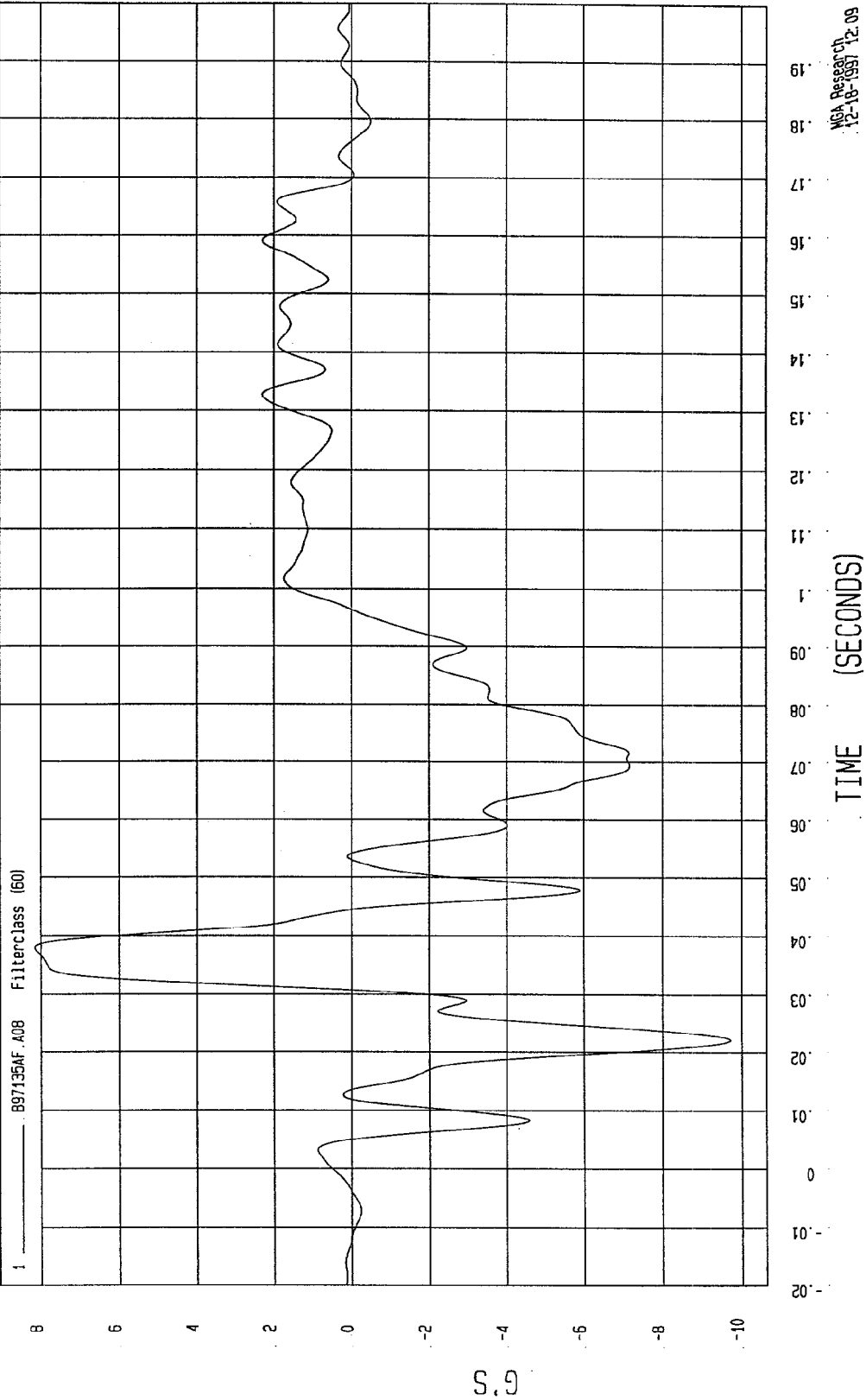
WCA Research
12-18-1997 12:19

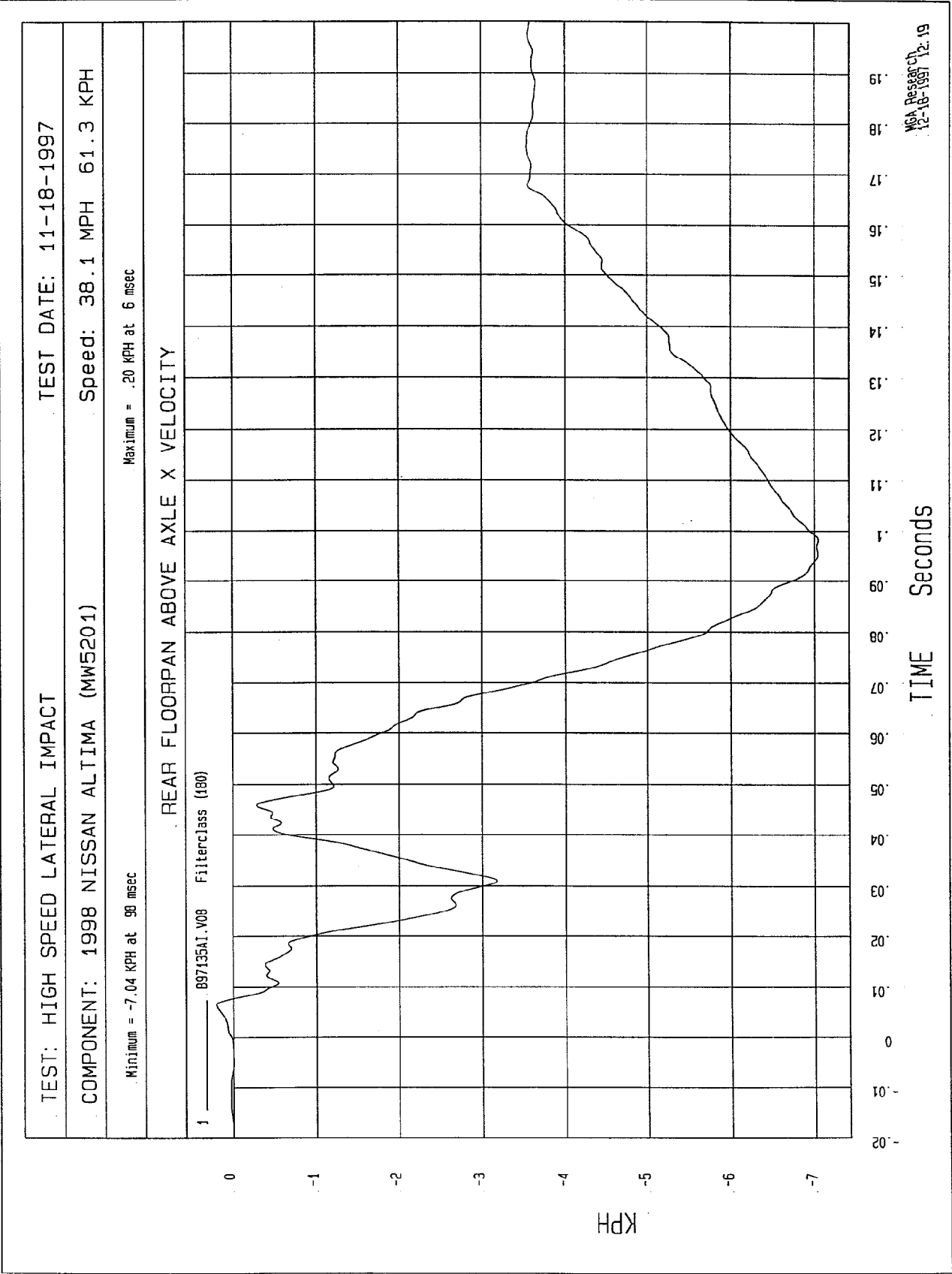
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -9.71 G'S at 22 msec Maximum = 8.15 G'S at 38 msec

REAR FLOORPAN ABOVE AXLE X ACCELERATION



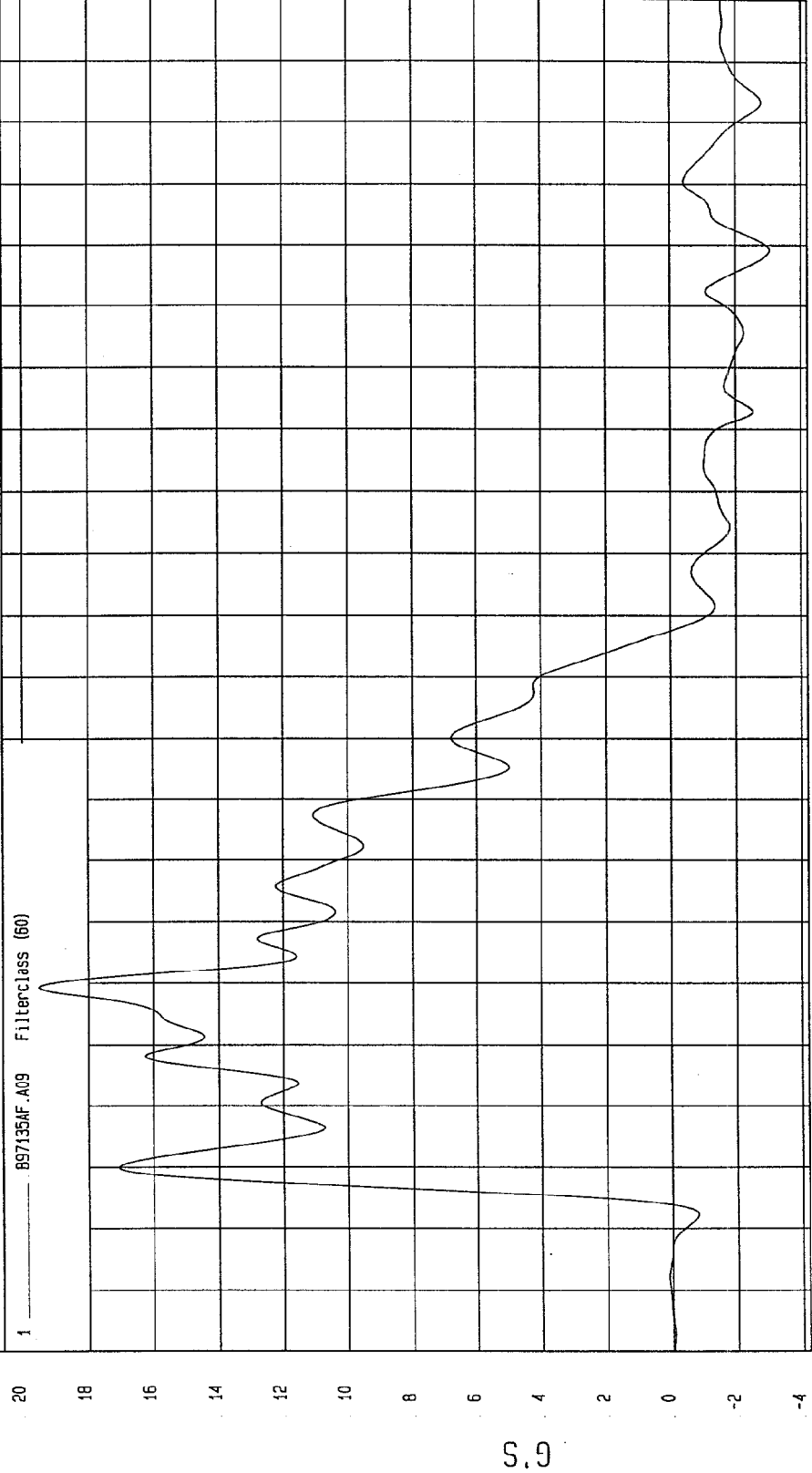


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -3.05 G'S at 159 msec Maximum = 19.48 G'S at 39 msec

REAR FLOORPAN ABOVE AXLE Y ACCELERATION



TIME (SECONDS)

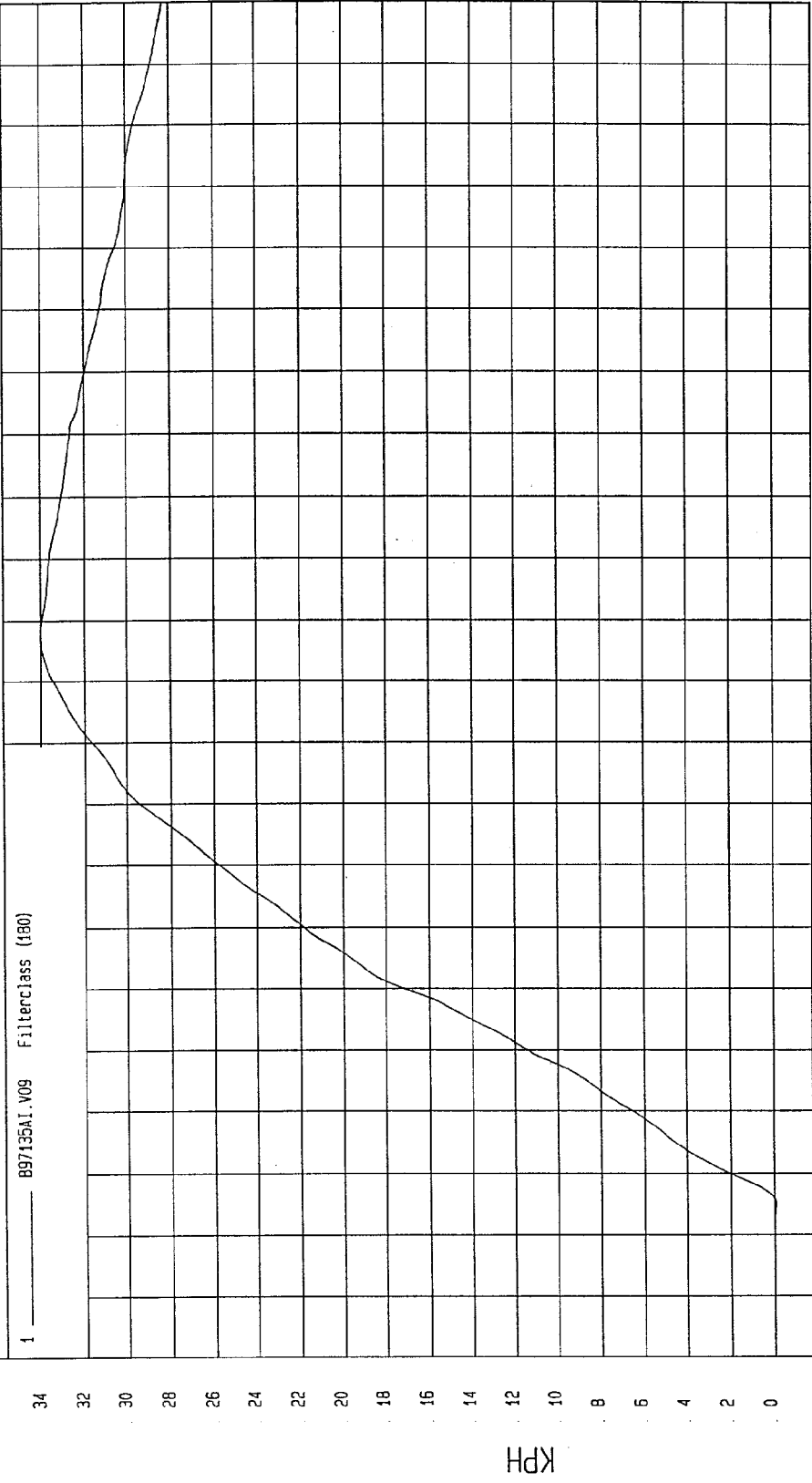
NCA Research
12-18-1997 12:09

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -7.83E-02 KPH at 5 msec Maximum = 34.00 KPH at 98 msec

REAR FLOORPAN ABOVE AXLE Y VELOCITY



TIME Seconds

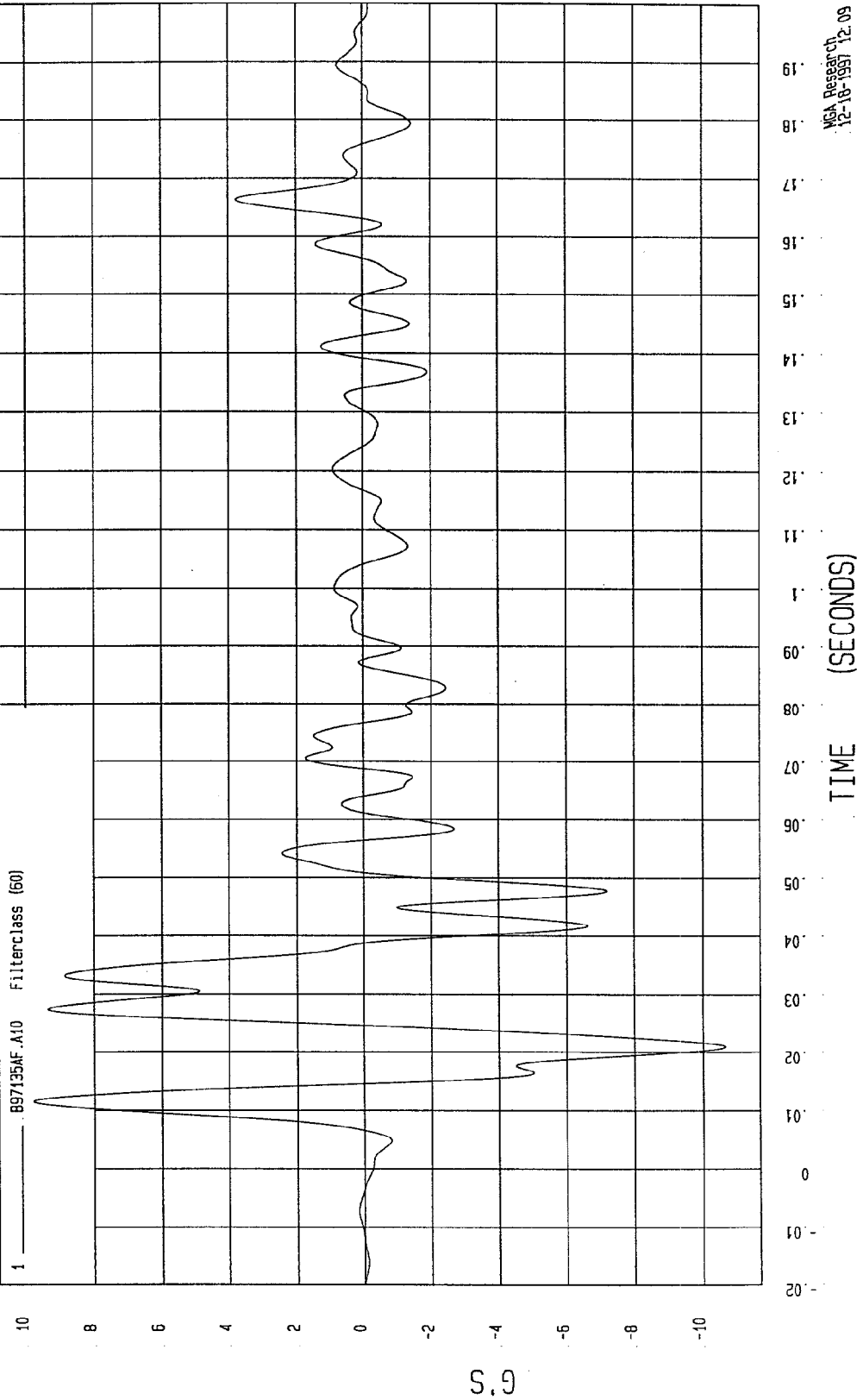
WGA Research
12-18-1997 12:19

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -10.65 G'S at 21 msec Maximum = 9.78 G'S at 12 msec

REAR FLOORPAN ABOVE AXLE Z ACCELERATION

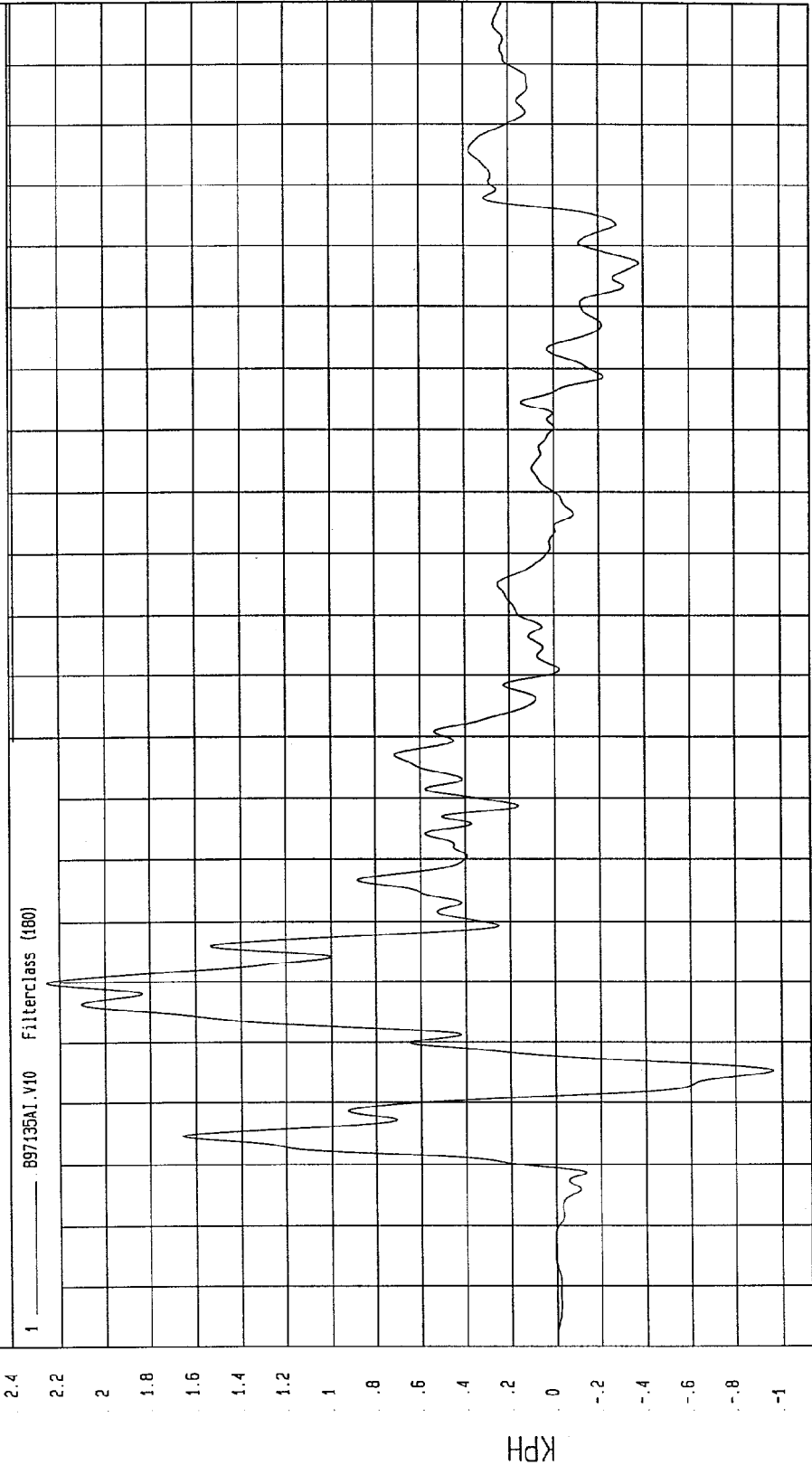


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

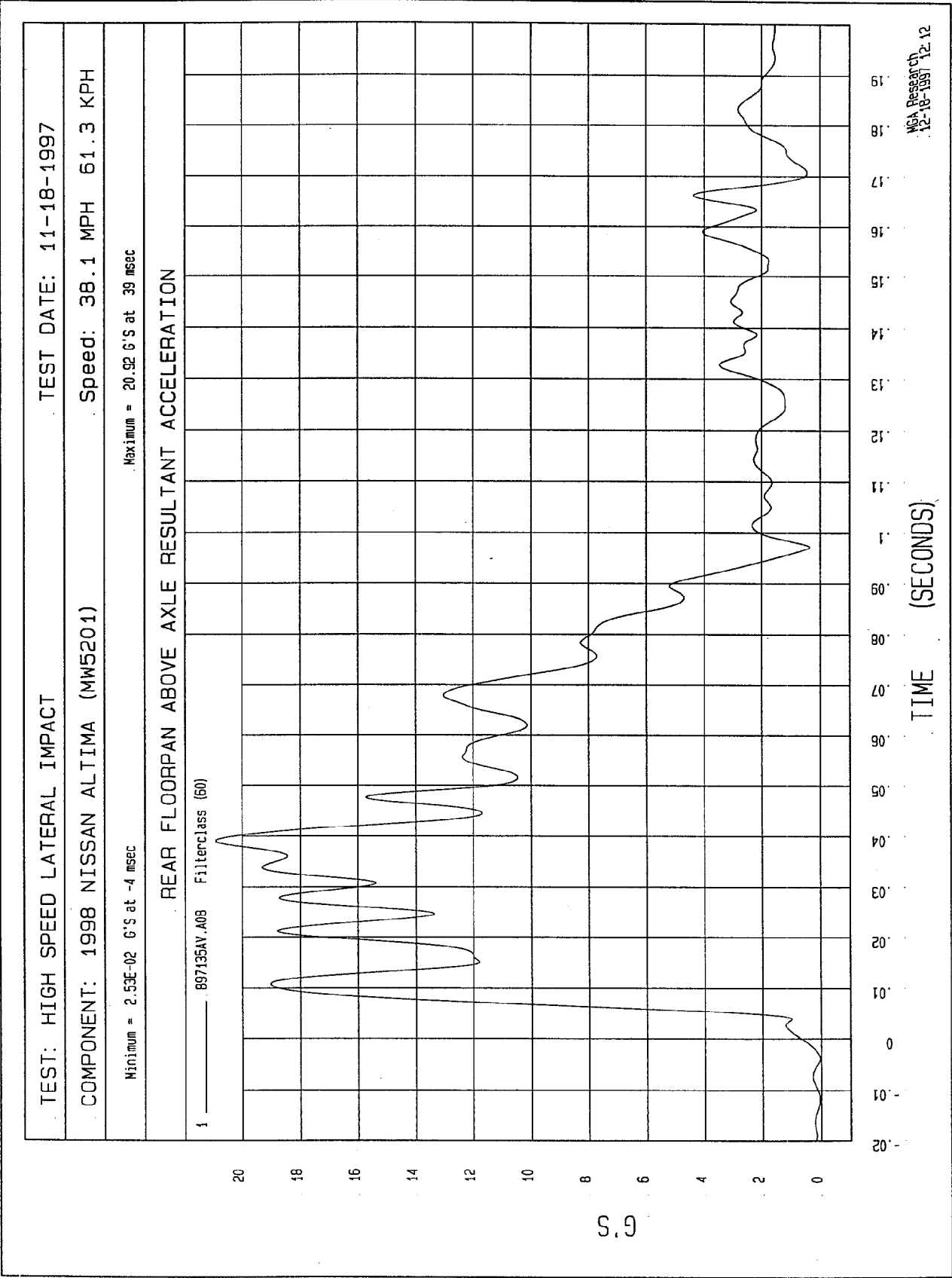
Minimum = -.96 KPH at 25 msec Maximum = 2.25 KPH at 40 msec

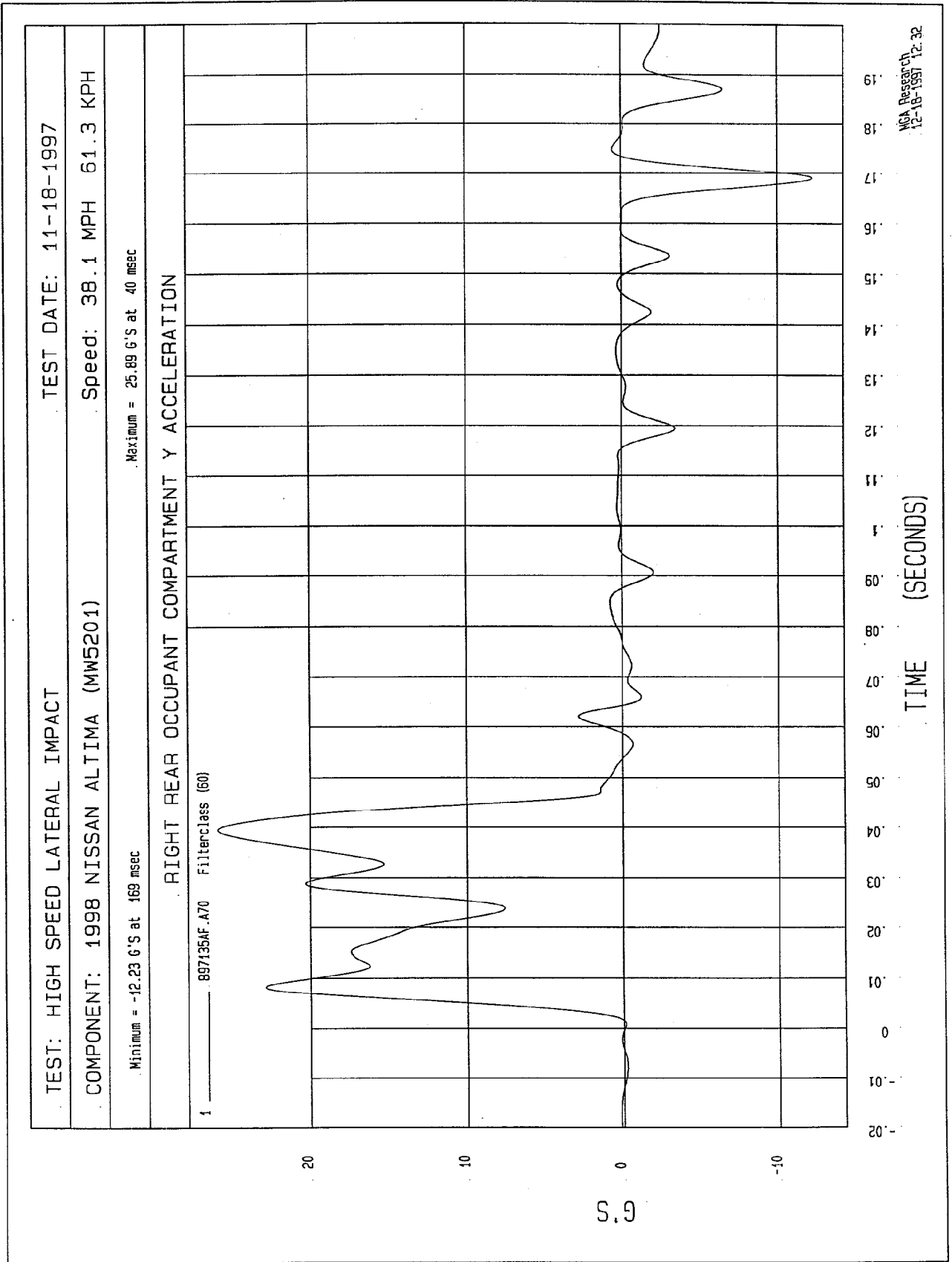
REAR FLOORPAN ABOVE AXLE Z VELOCITY



TIME Seconds

WCA Research
11-18-1997 12:19



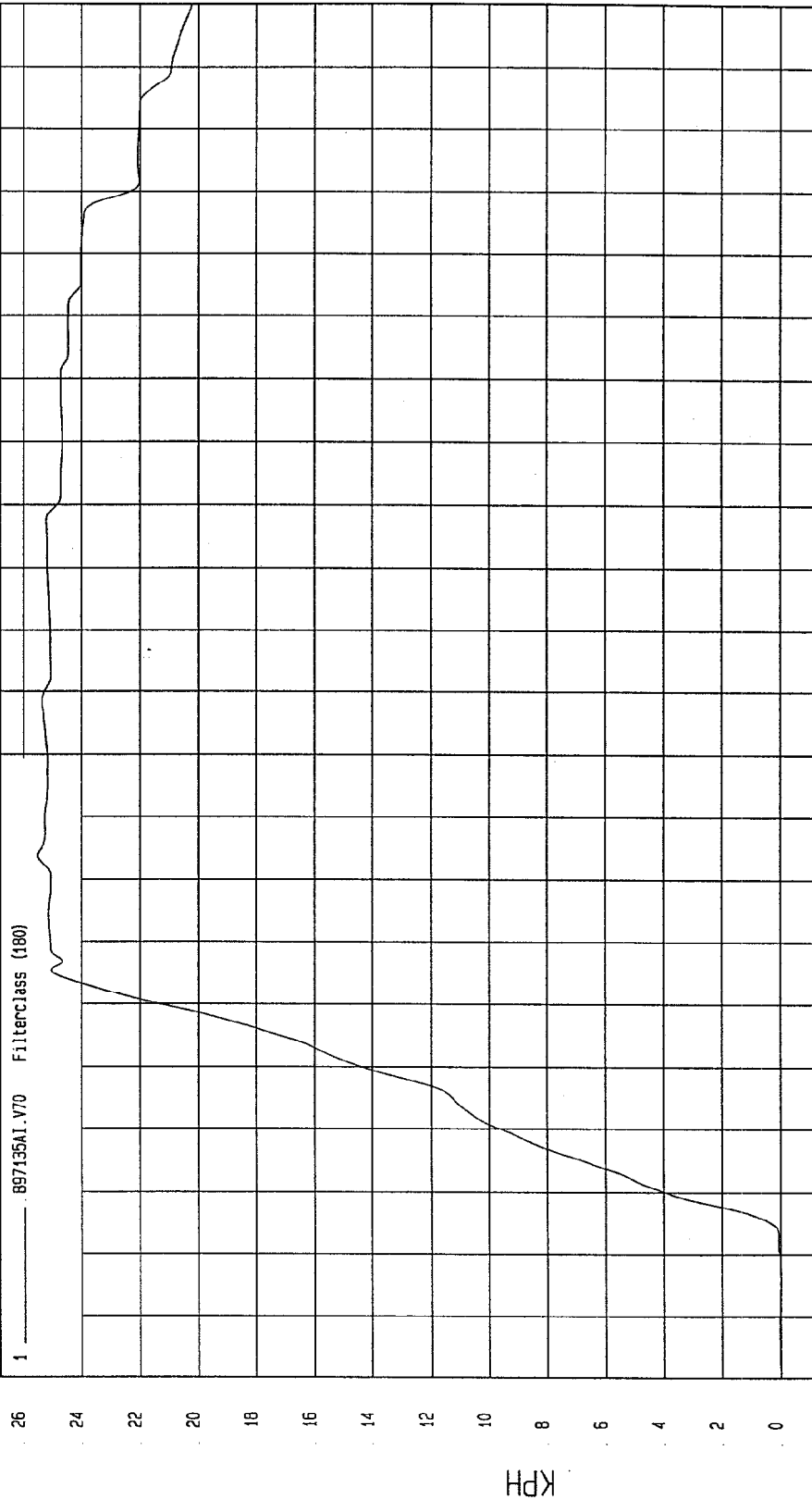


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = 0 KPH at -20 msec Maximum = 25.52 KPH at 64 msec

RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY

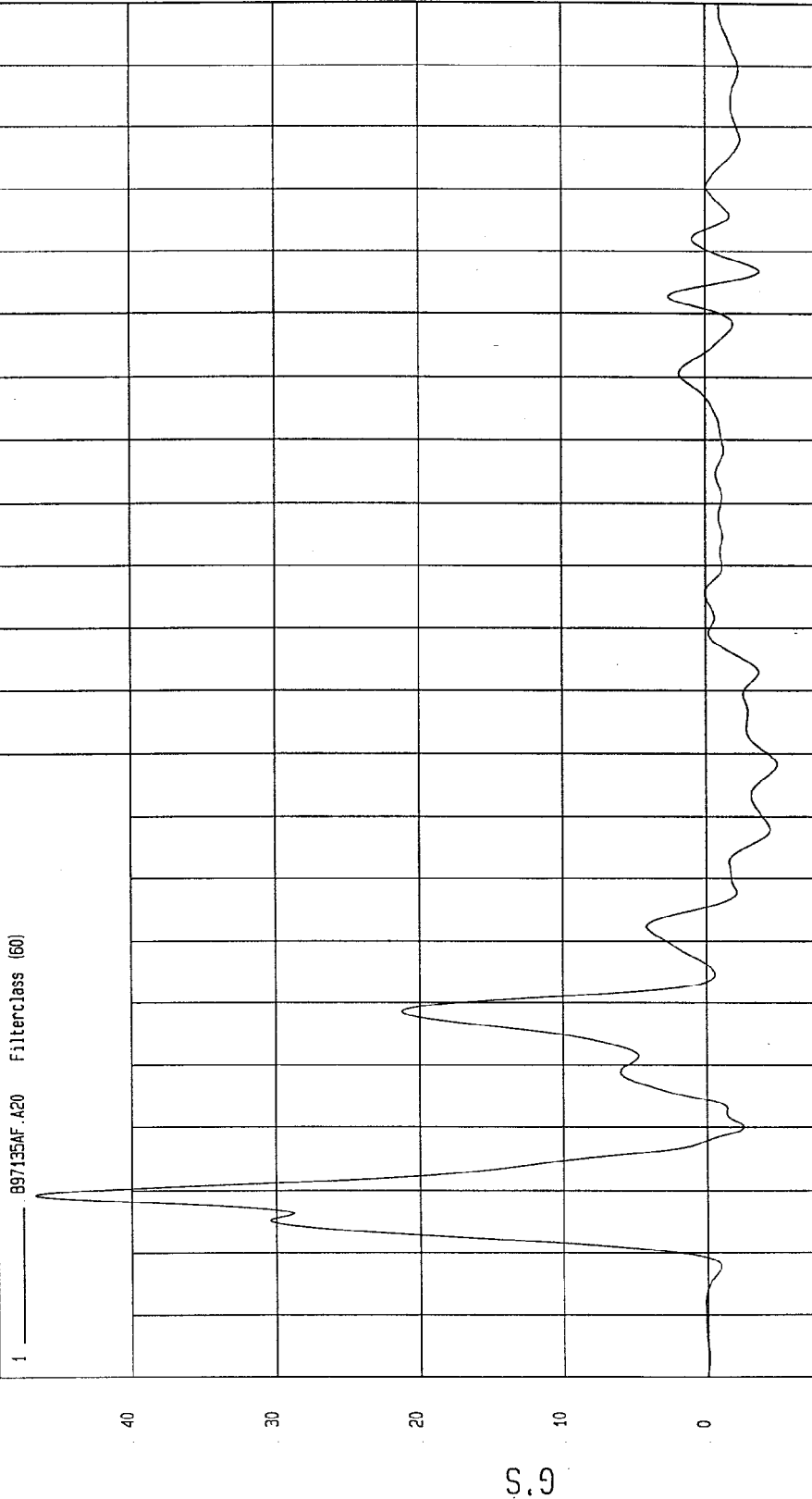


TIME Seconds

MGA Research
12-18-1997 12:32

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -4.89 G'S at 78 msec	Maximum = 46.58 G'S at 9 msec

LEFT LOWER A-POST Y ACCELERATION

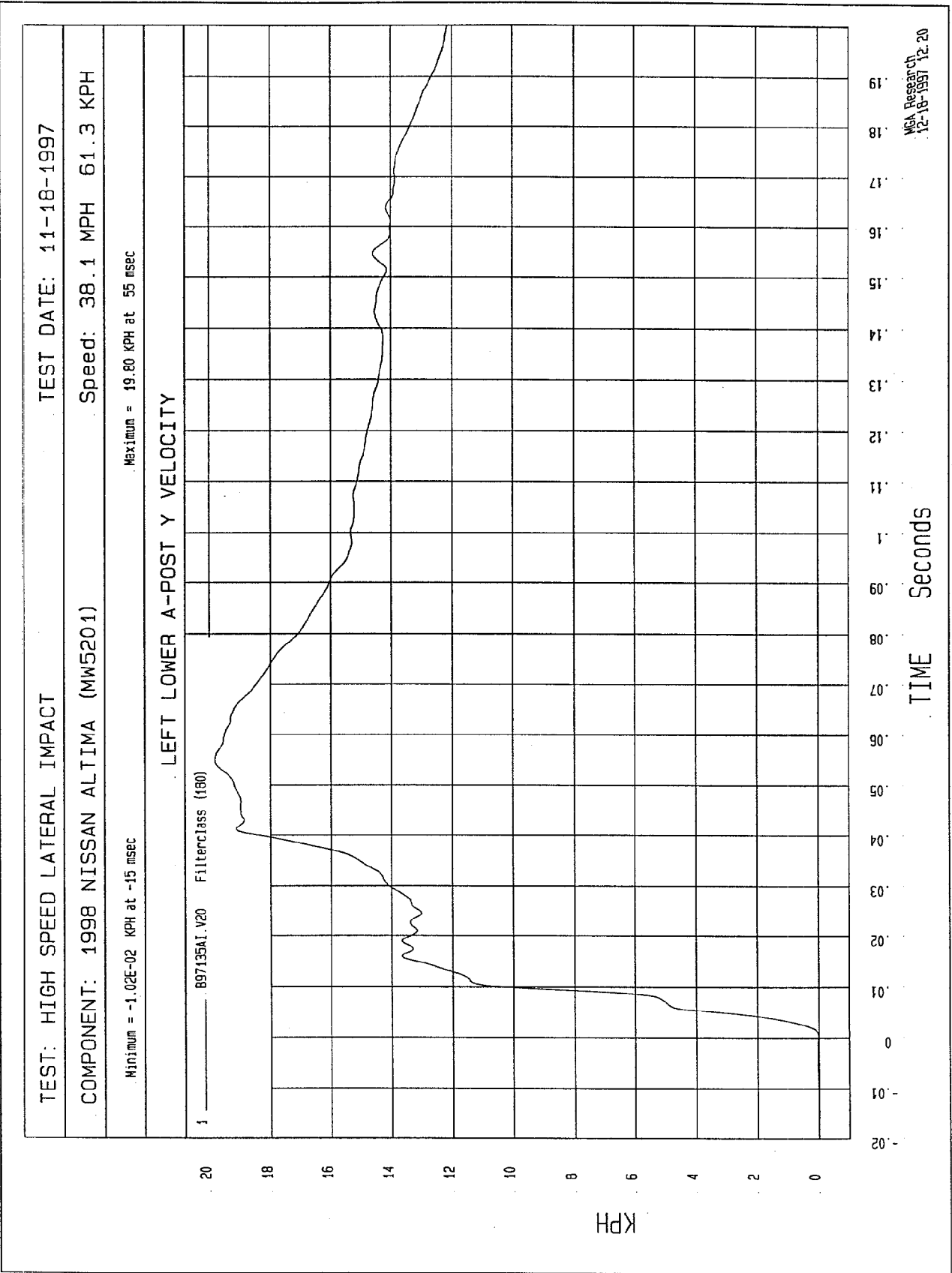


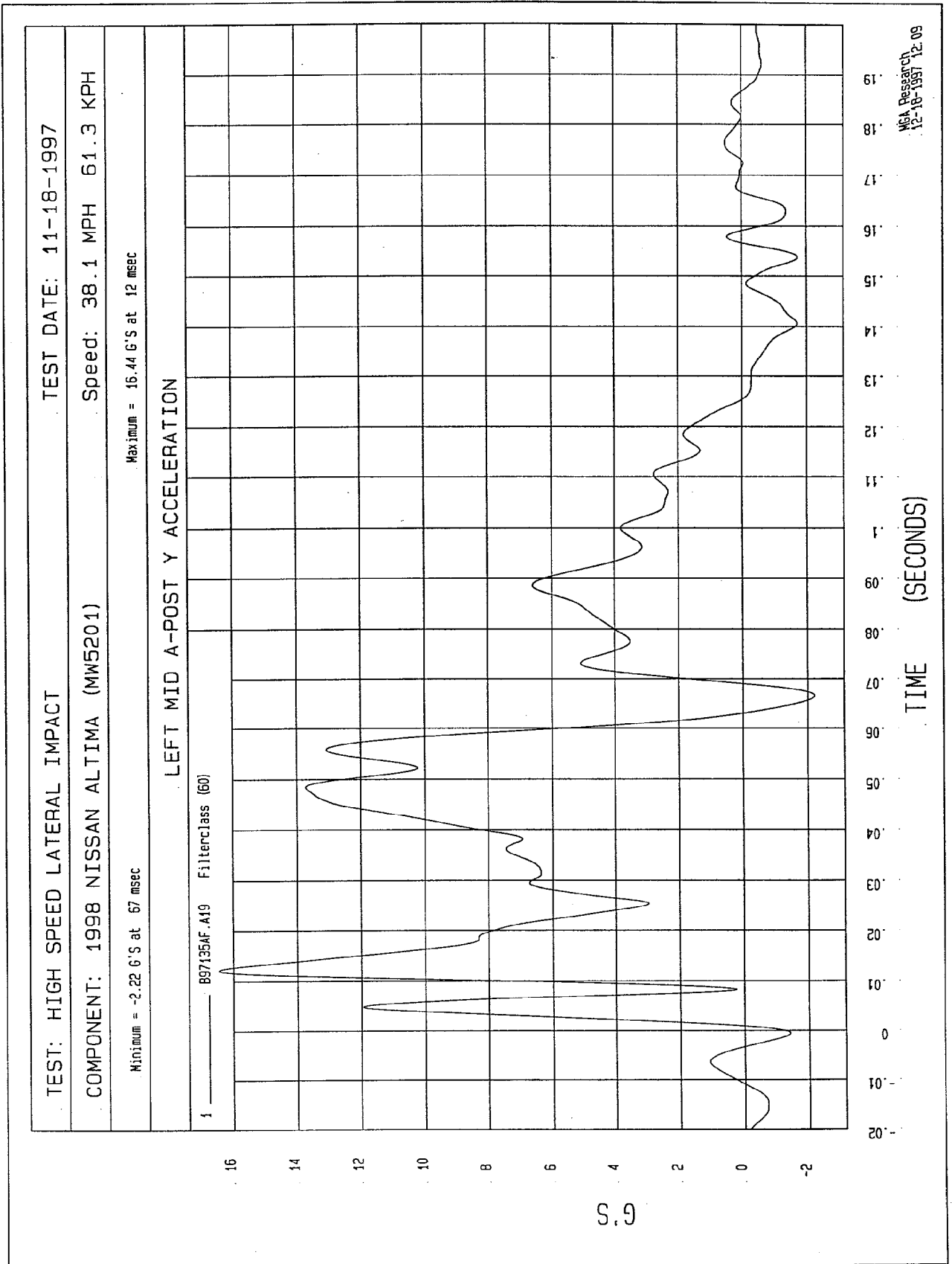
TIME (SECONDS)

19
18
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10
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6
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4
3
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1
0
-1
-2

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

NGA Research
11-18-1997 12:09





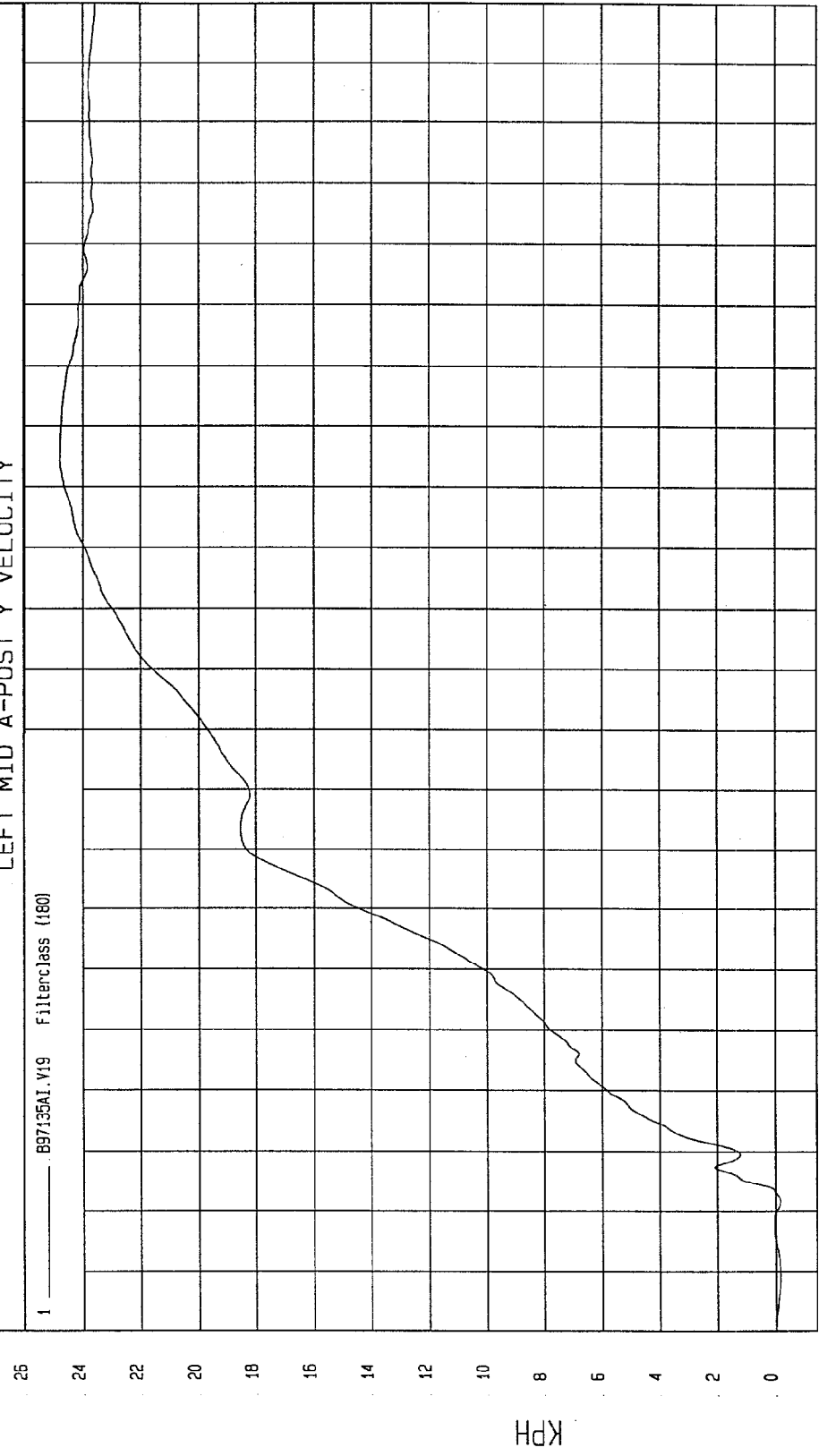
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -16 KPH at -11 msec Maximum = 24.79 KPH at 125 msec

LEFT MID A-POST Y VELOCITY

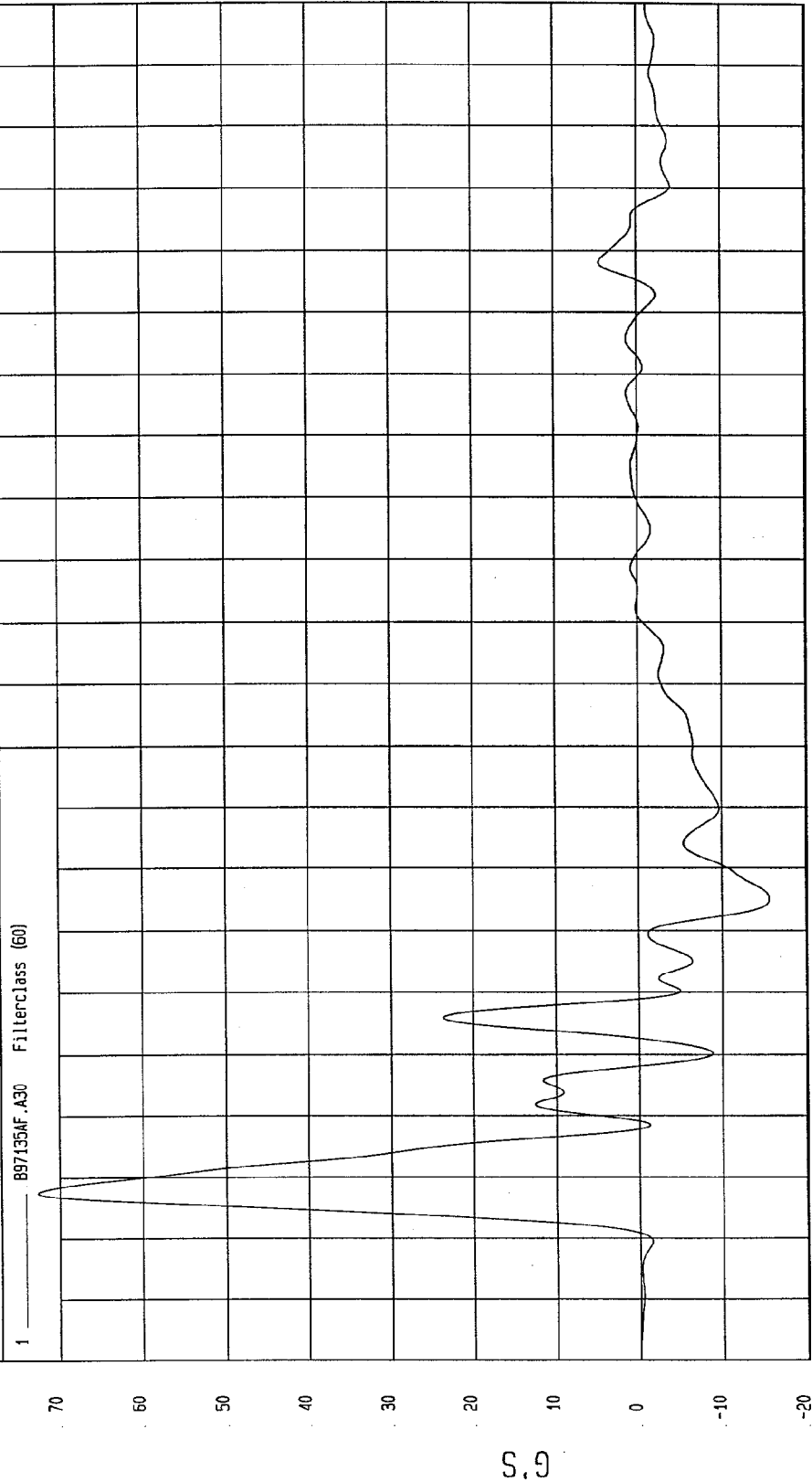
1 B97135AI.V19 Filterclass (180)



TIME Seconds
NSA Research
12-18-1997 12:20

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -15.73 G'S at 55 msec	Maximum = 72.57 G'S at 8 msec

LEFT LOWER B-POST Y ACCELERATION



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

WGA Research
12-18-1997 12:09

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

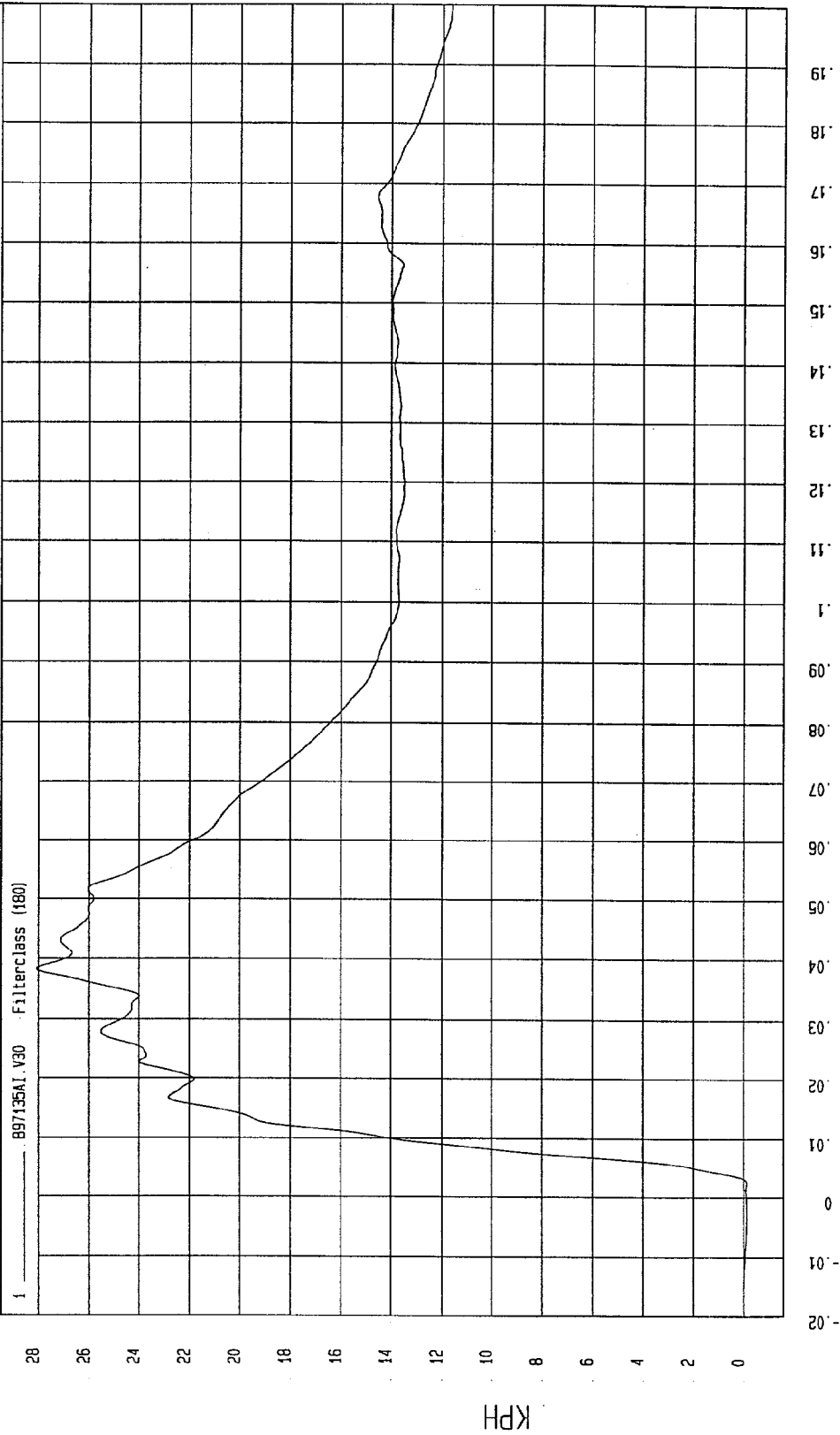
COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Speed: 38.1 MPH 61.3 KPH

Minimum = -12 KPH at -3 msec

Maximum = 28.07 KPH at 38 msec

LEFT LOWER B-POST Y VELOCITY

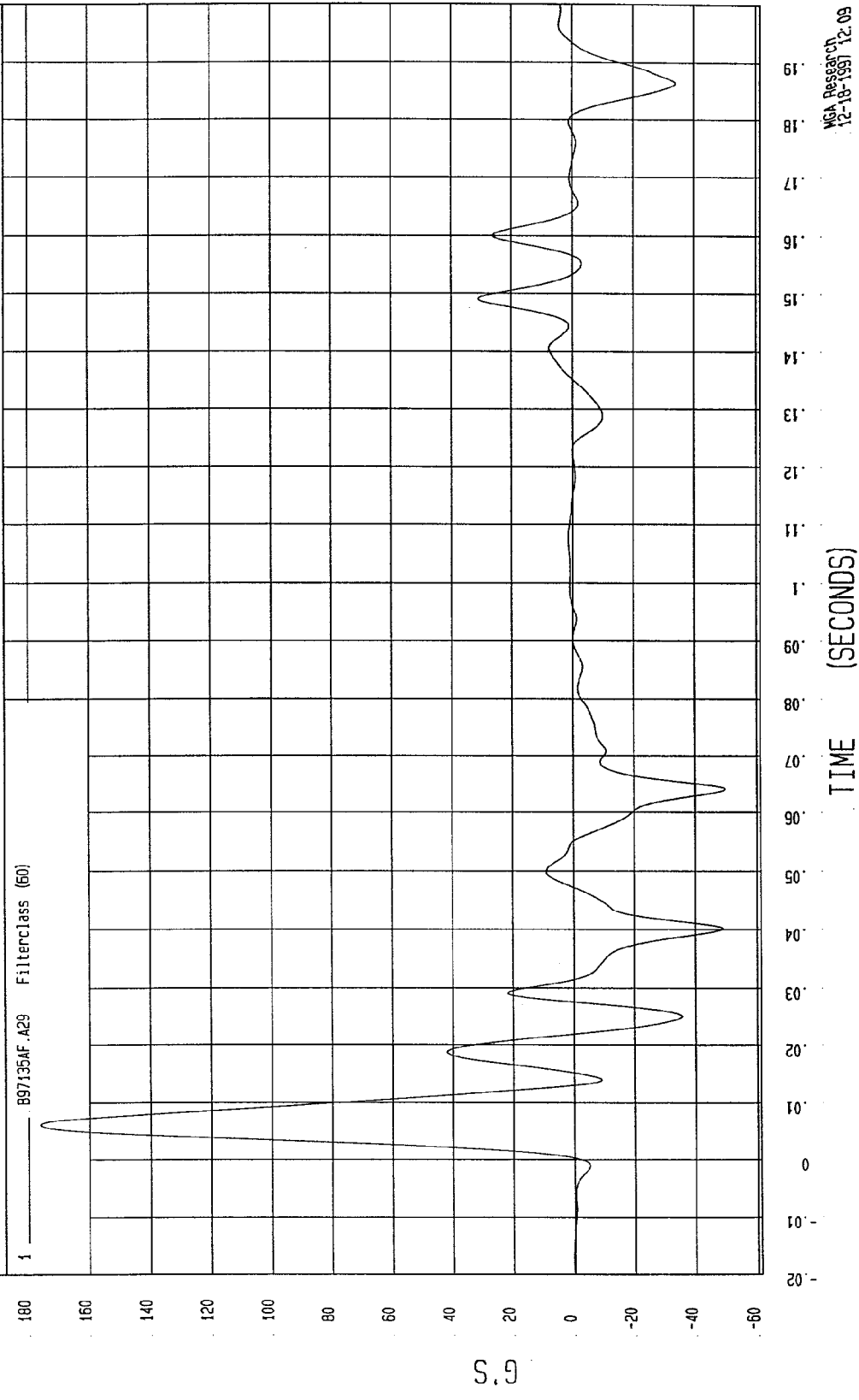


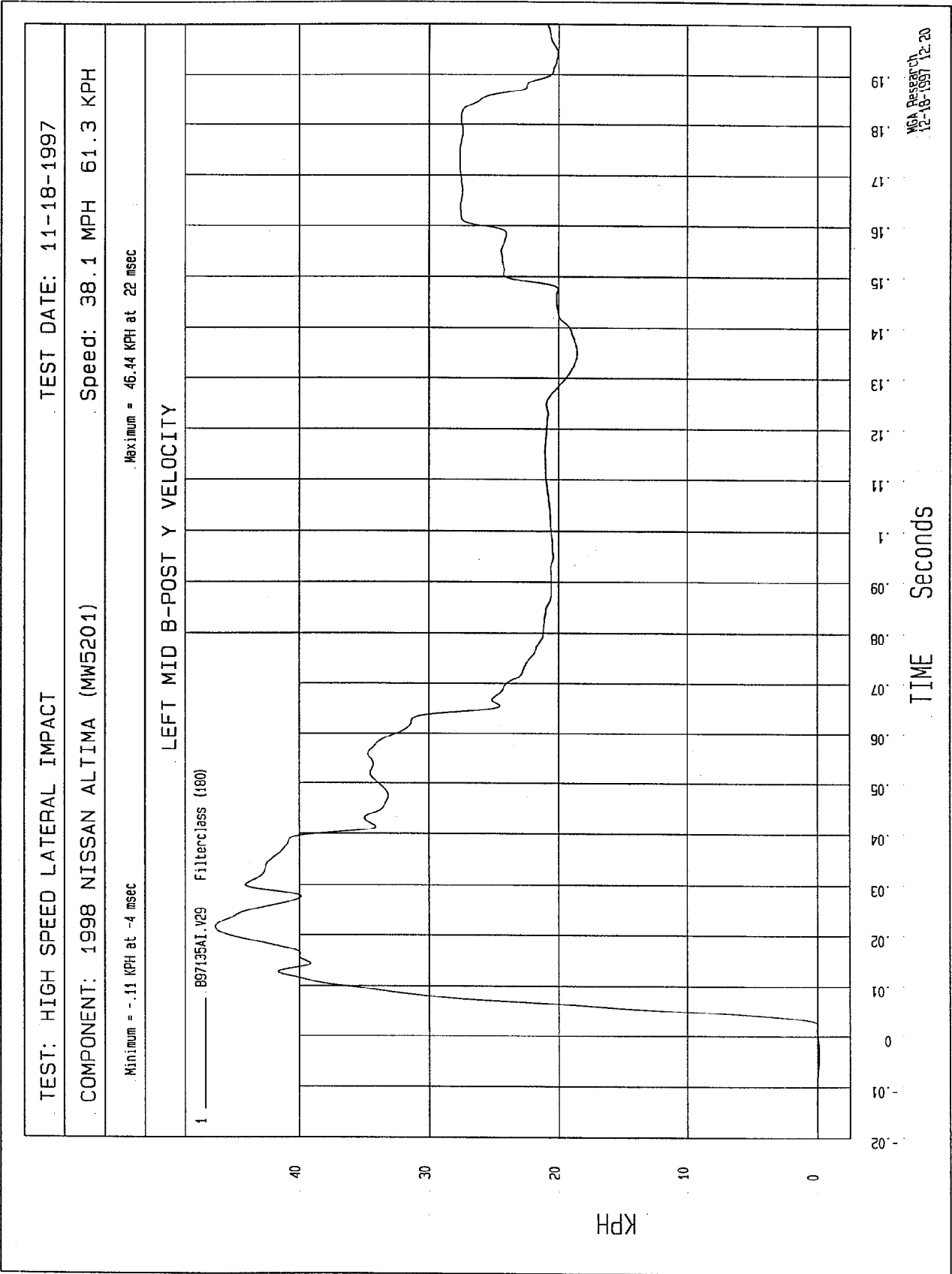
M&A Research
12-18-1997 12:20

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -49.90 G'S at 64 msec	
Maximum = 176.27 G'S at 6 msec	

LEFT MID B-POST Y ACCELERATION



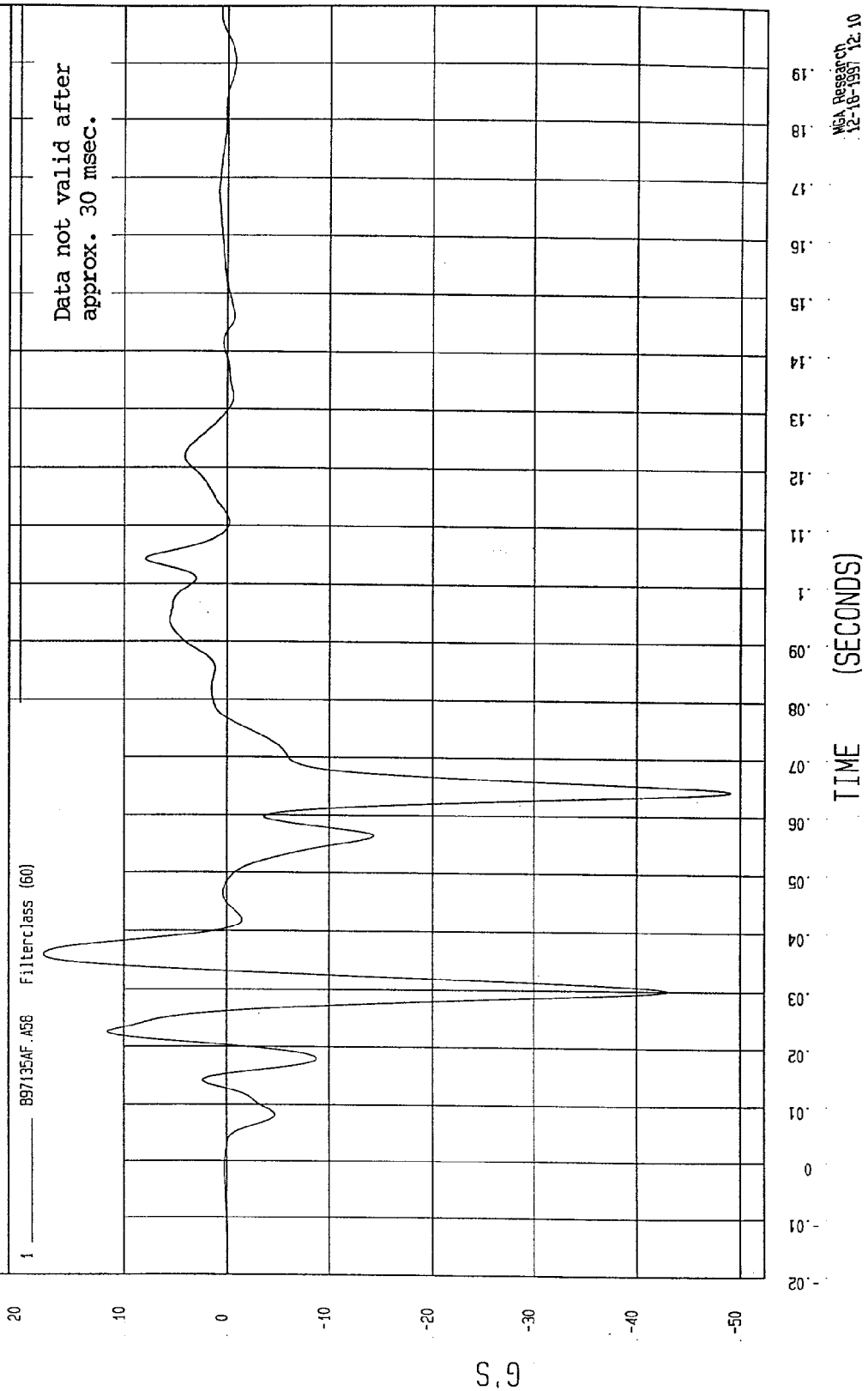


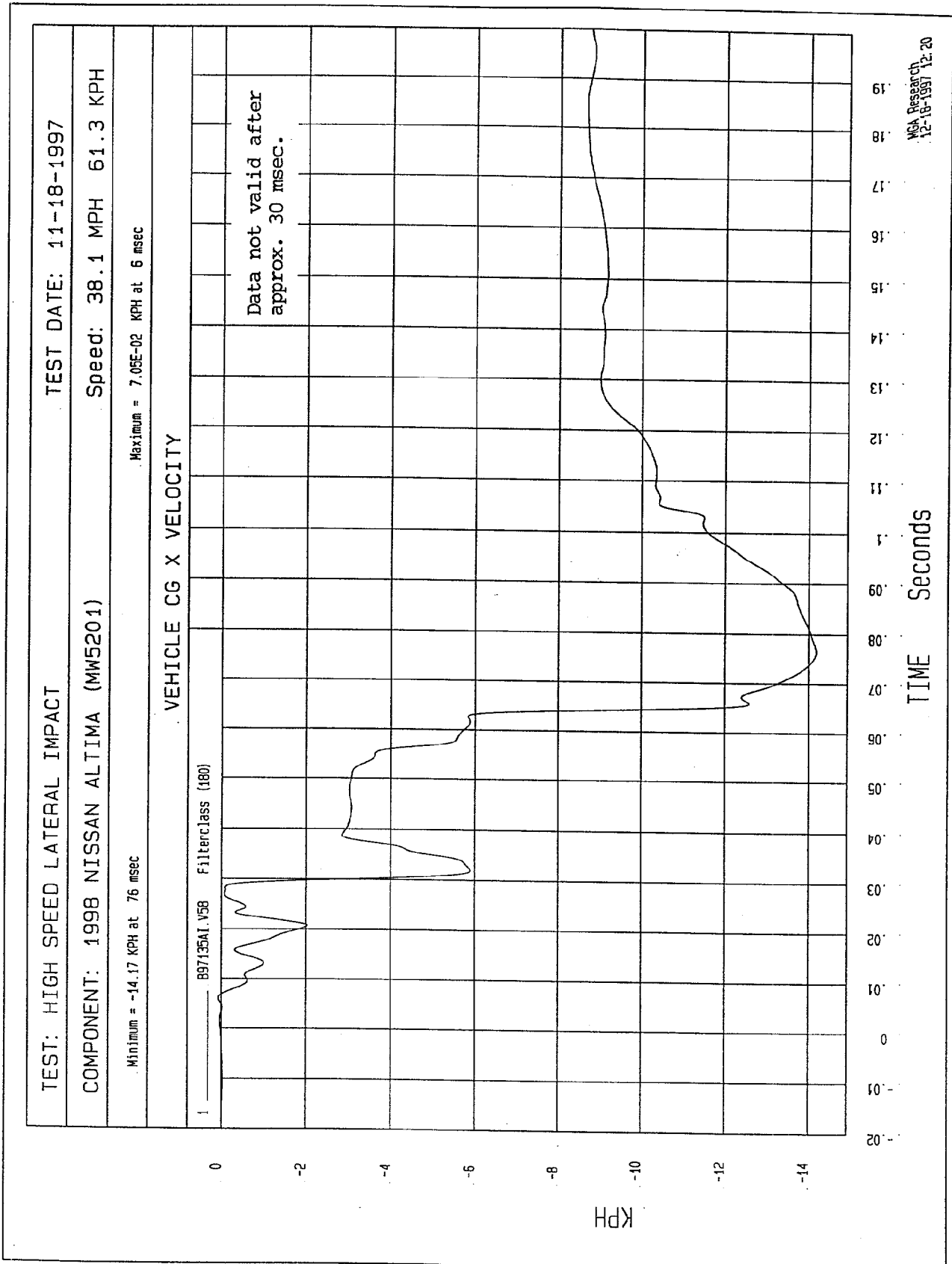
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

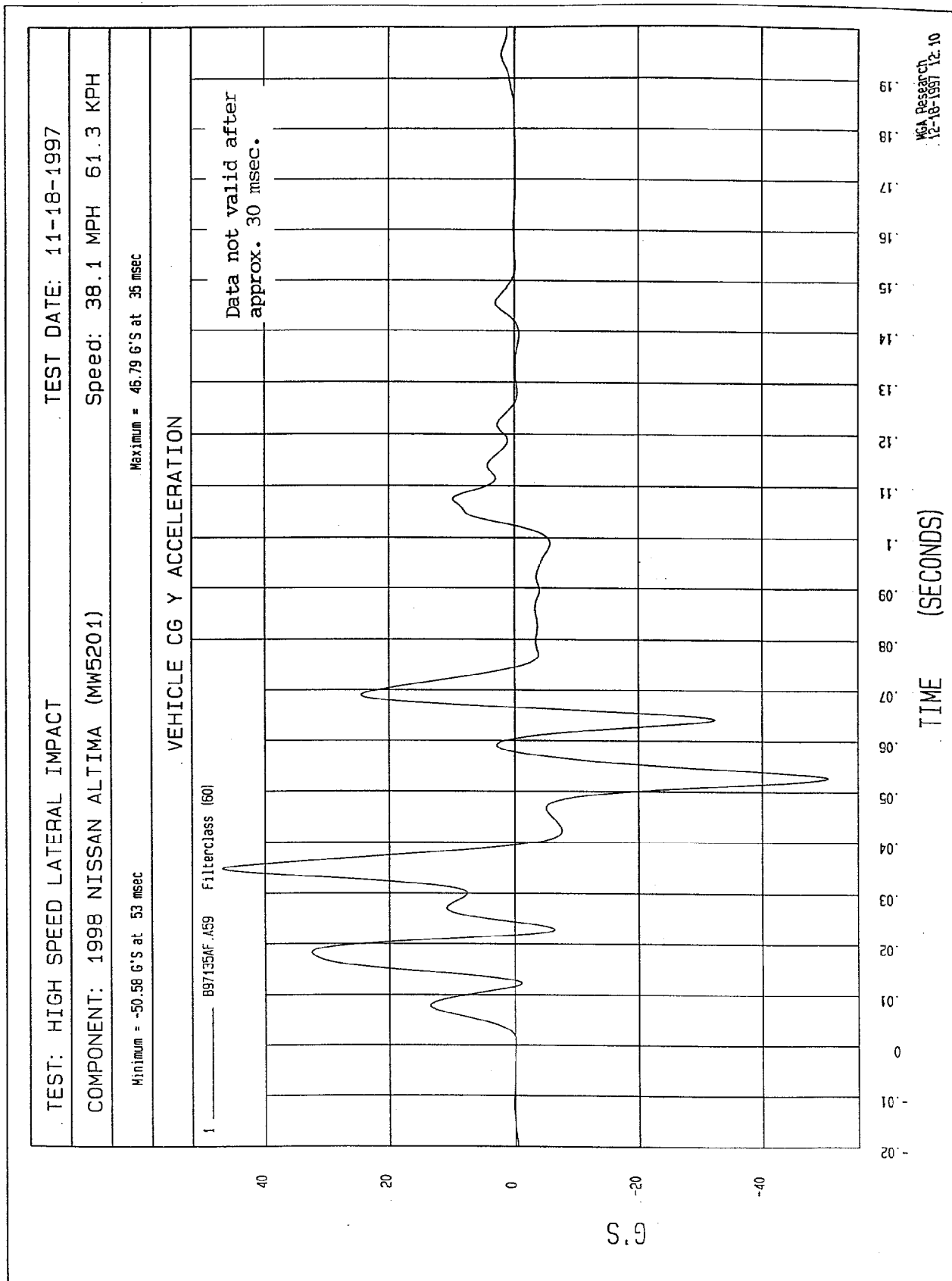
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -49.02 G'S at 64 msec Maximum = 17.71 G'S at 36 msec

VEHICLE CG X ACCELERATION







TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

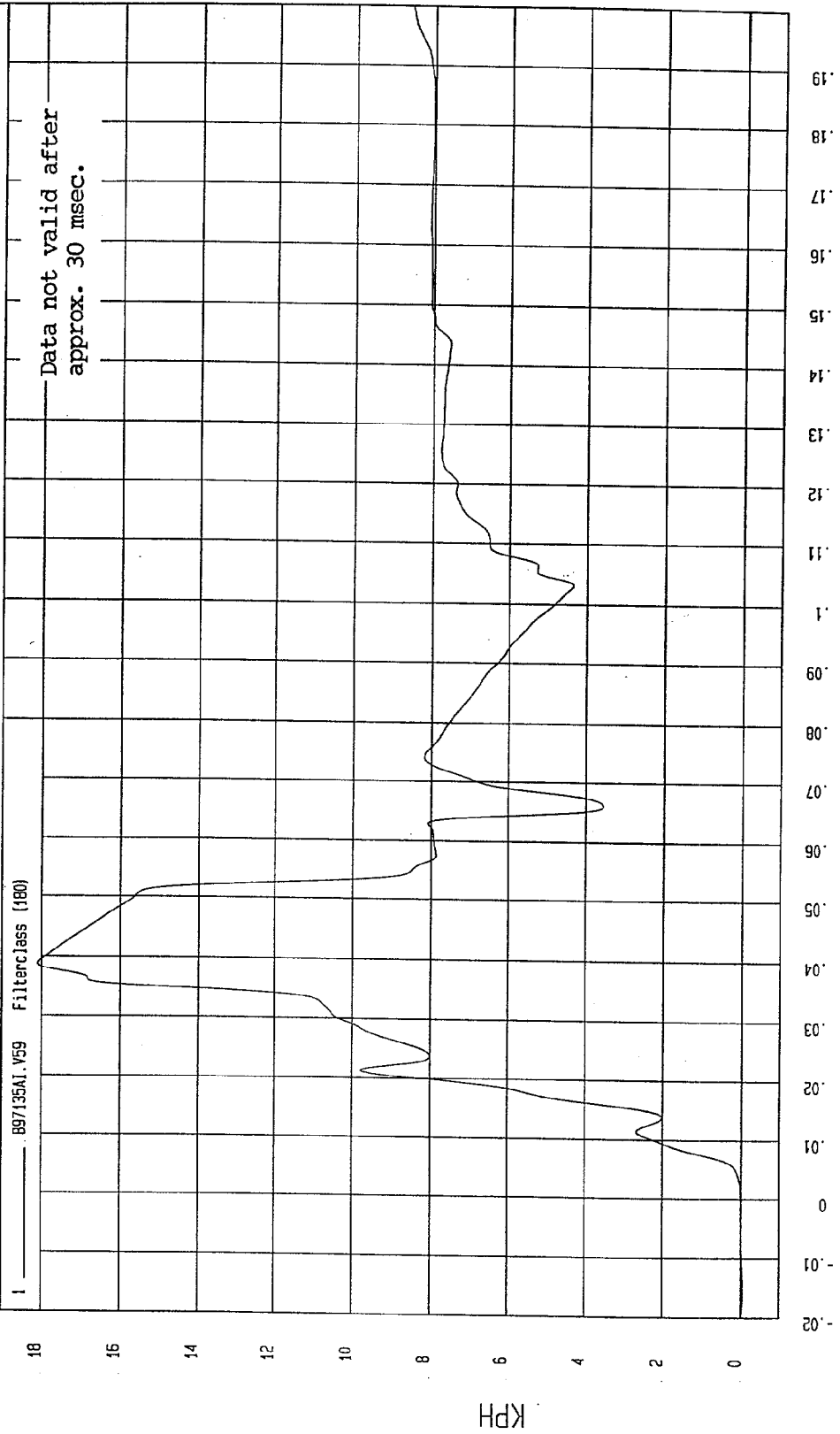
COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Speed: 38.1 MPH 61.3 KPH

Minimum = -3.62E-02 KPH at -16 msec

Maximum = 18.10 KPH at 39 msec

VEHICLE CG Y VELOCITY



MGA Research
12-10-1997 12:20

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

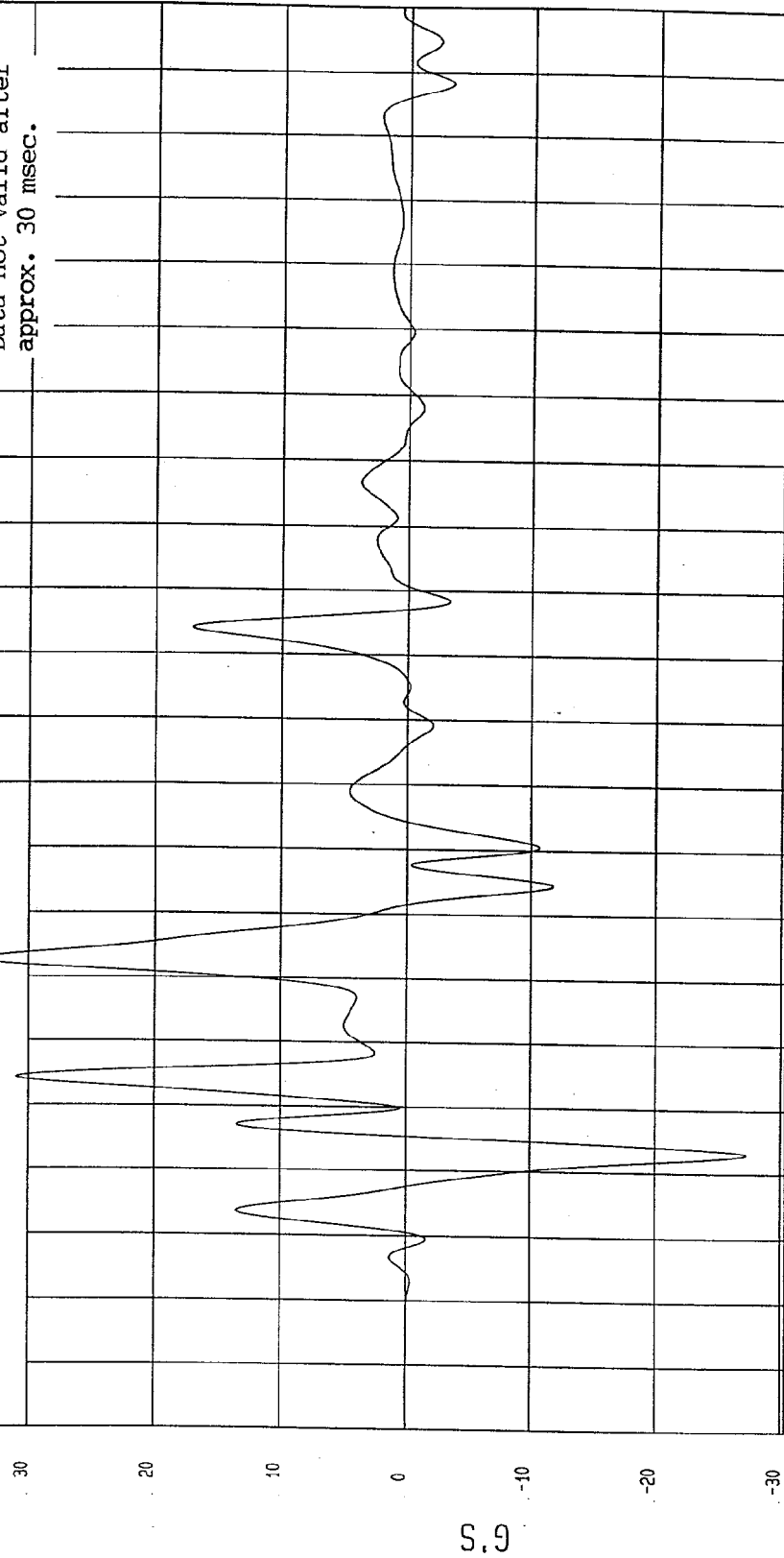
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -27.24 G's at 23 msec
Maximum = 34.07 G's at 53 msec

VEHICLE CG Z ACCELERATION

1 897135AF.A60 Filterclass (60)

Data not valid after
approx. 30 msec.



M&A Research
12-18-1997 12:10

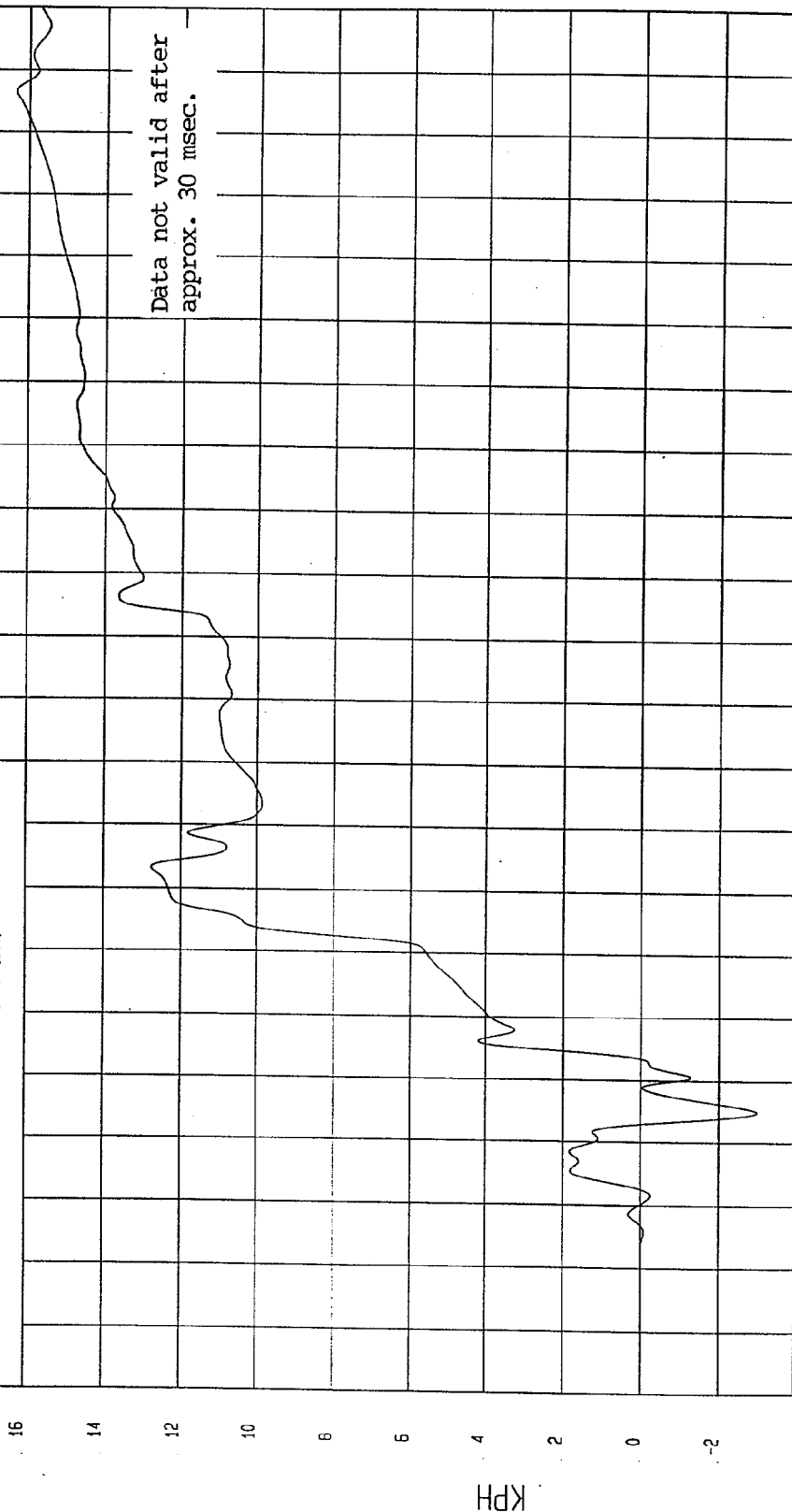
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -2.98 KPH at 25 msec
Maximum = 16.33 KPH at 107 msec

VEHICLE CG Z VELOCITY

1 897135A1.V60 Filterclass (180)



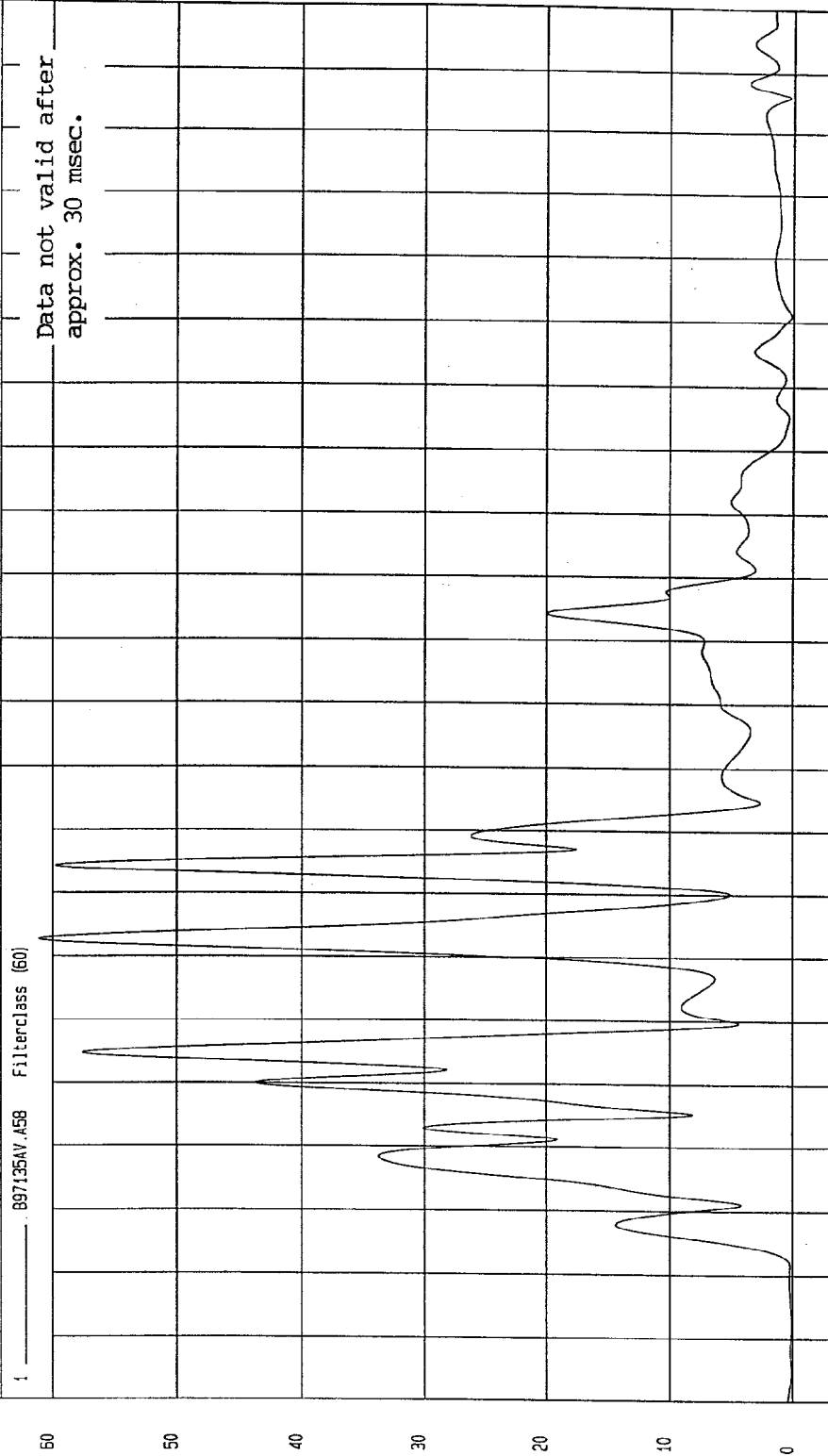
WGA Research
12-18-1997 12:20

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = 8.25E-02 G'S at -8 msec Maximum = 61.16 G'S at 53 msec

VEHICLE CG RESULTANT ACCELERATION



MGA Research
12-18-1997 12:12

TIME (SECONDS)

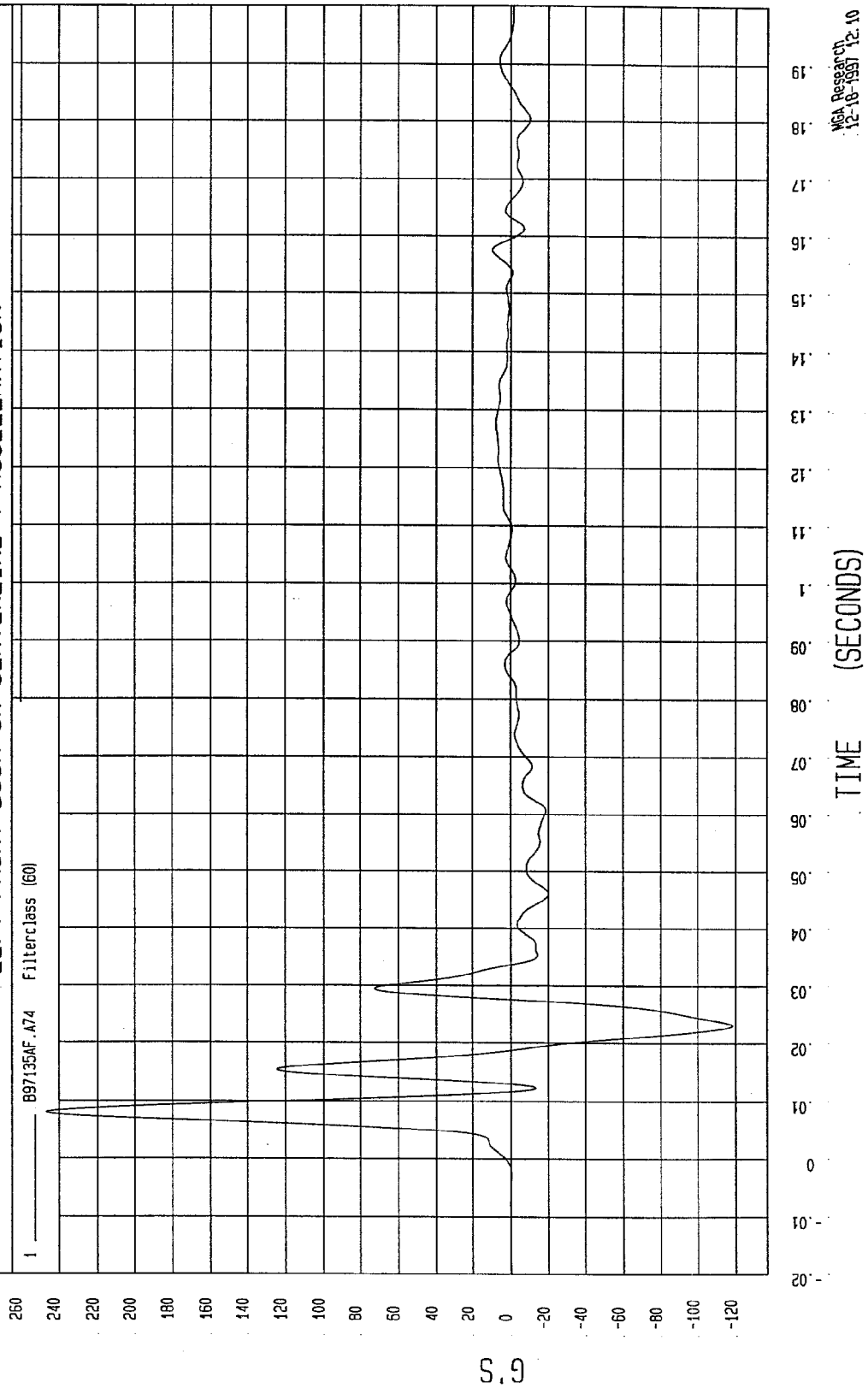
G's

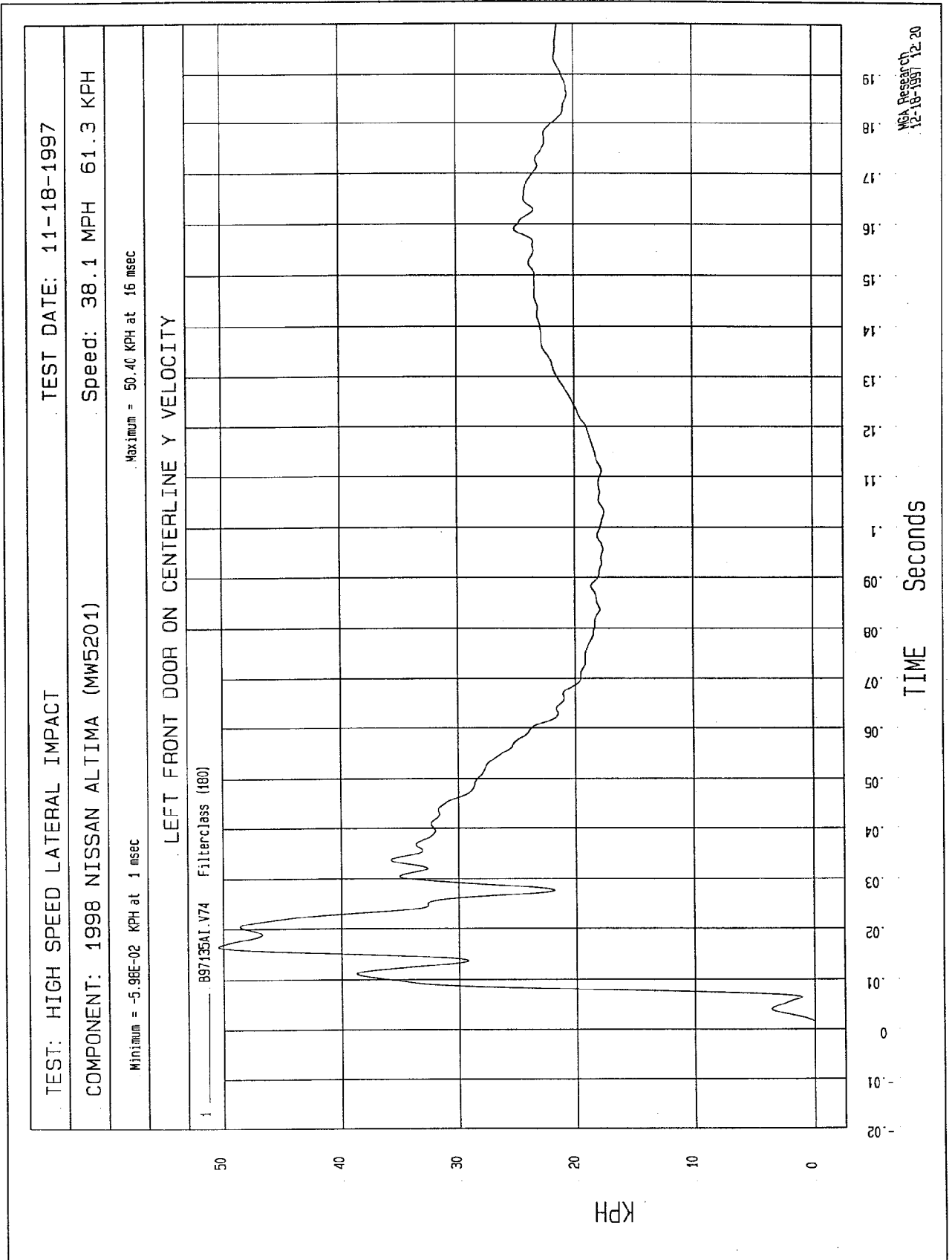
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -118.10 G'S at 23 msec Maximum = 246.57 G'S at 8 msec

LEFT FRONT DOOR ON CENTERLINE Y ACCELERATION



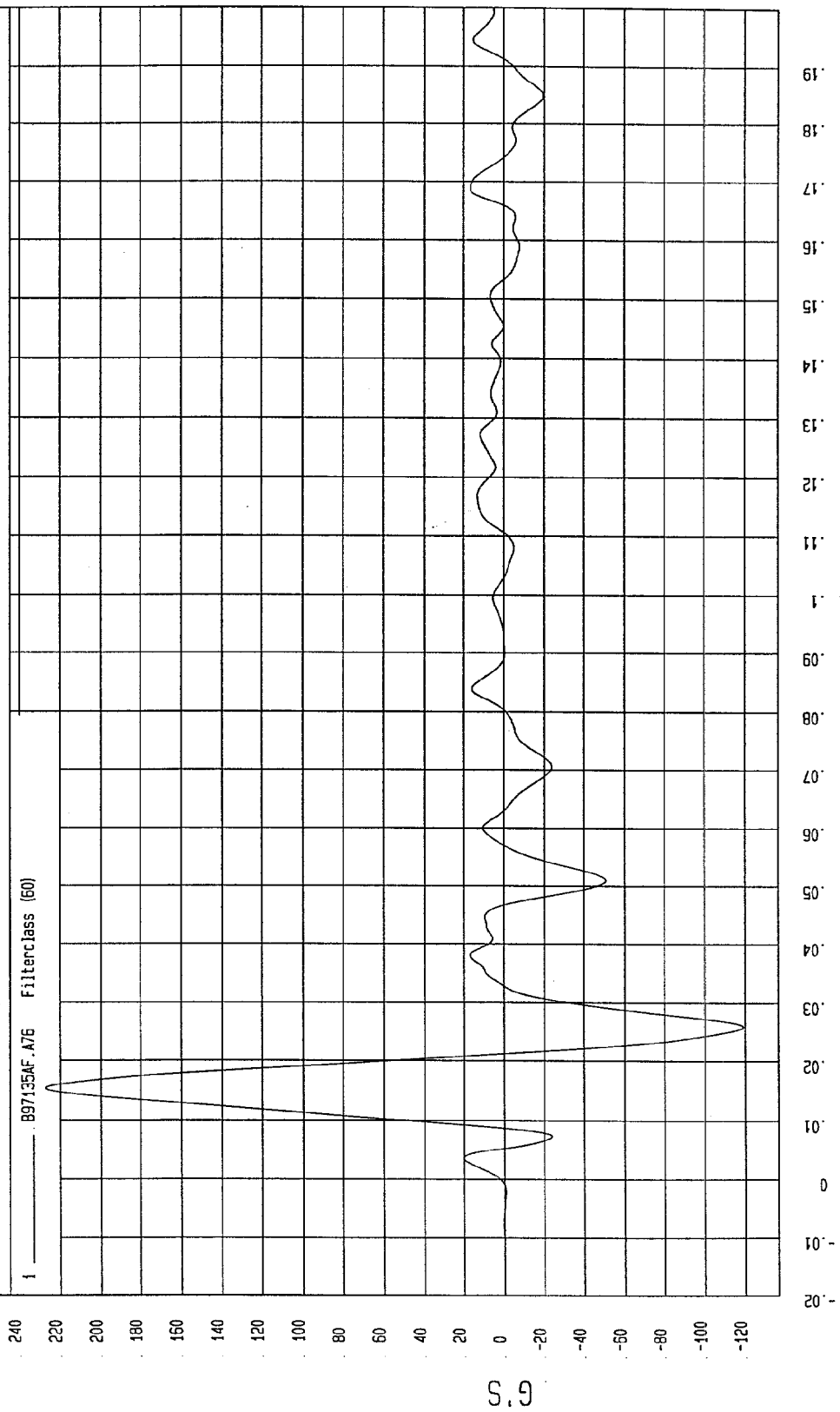


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -119.16 G'S at 26 msec Maximum = 227.40 G'S at 15 msec

LEFT FRONT DOOR UPPER CENTERLINE Y ACCELERATION



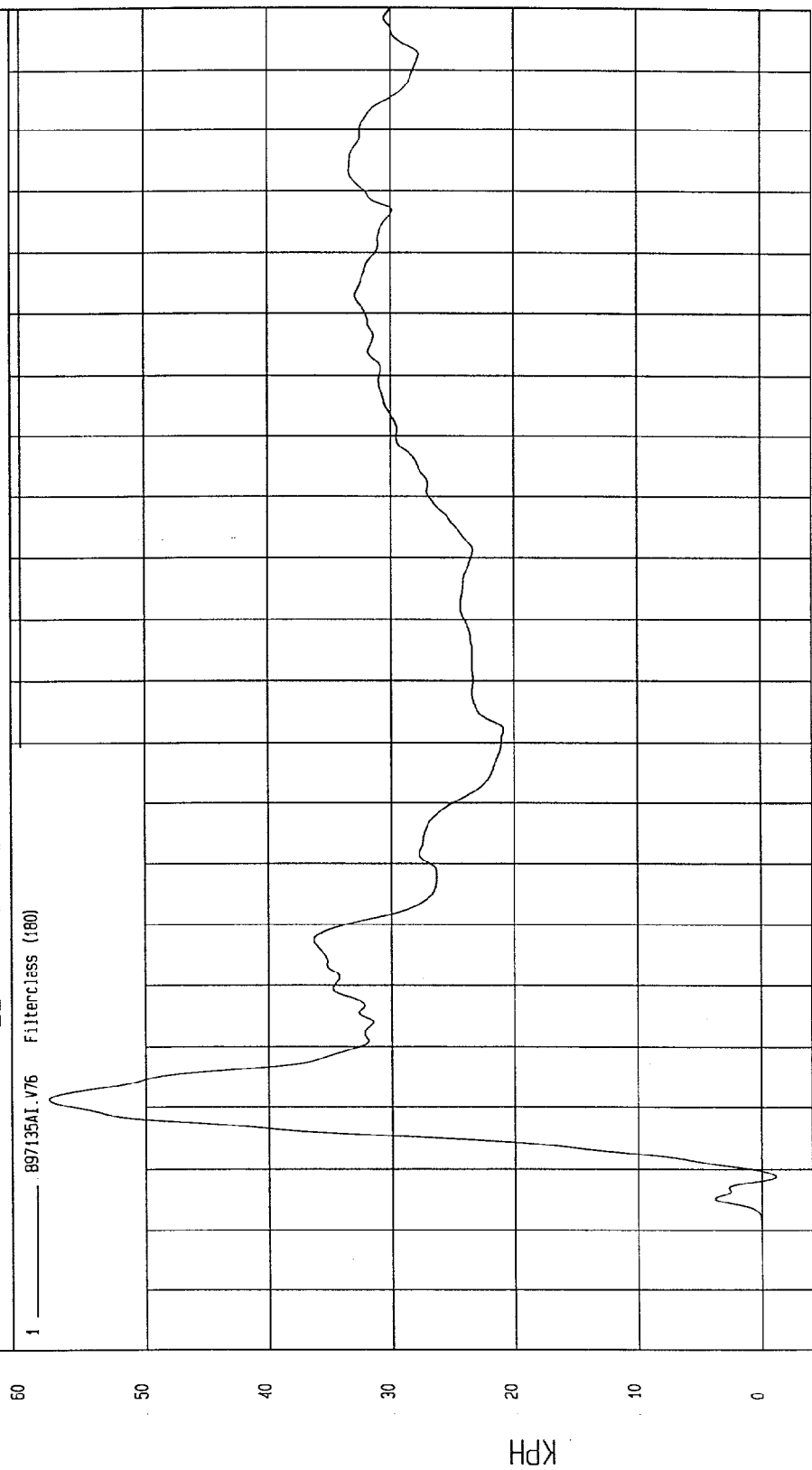
MEA Research
12-18-1997 12:10

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -1.17 KPH at 9 msec Maximum = 57.81 KPH at 21 msec

LEFT FRONT DOOR UPPER CENTERLINE Y VELOCITY



TIME Seconds

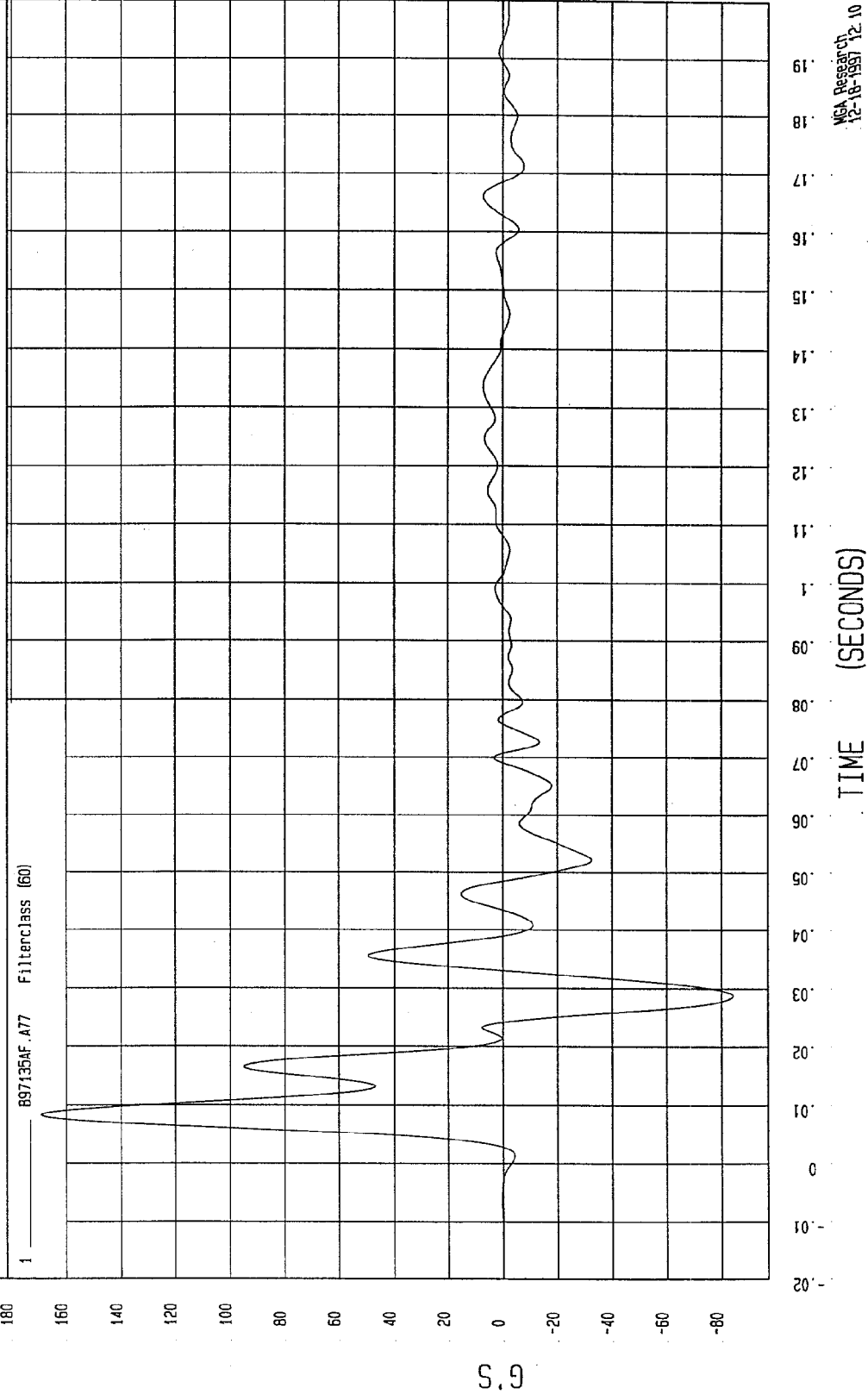
MOA Research
12-18-1997 12:20

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -84.25 G'S at 29 msec Maximum = 168.95 G'S at 8 msec

MIDREAR OF LEFT REAR DOOR Y ACCELERATION



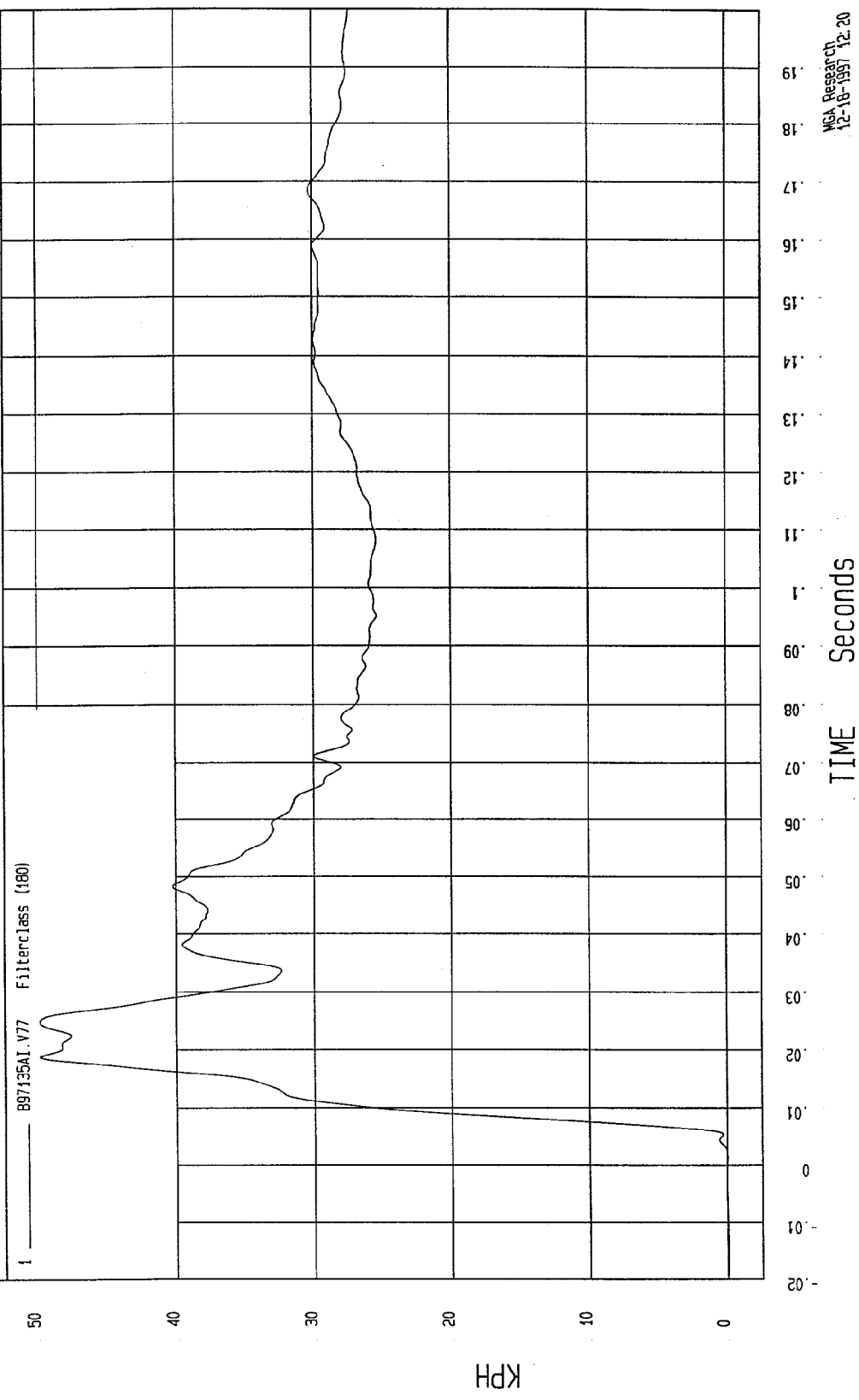
NSA Research
12-18-1997 12:10

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -3.41E-02 KPH at -14 msec Maximum = 49.85 KPH at 19 msec

MIDREAR OF LEFT REAR DOOR Y VELOCITY



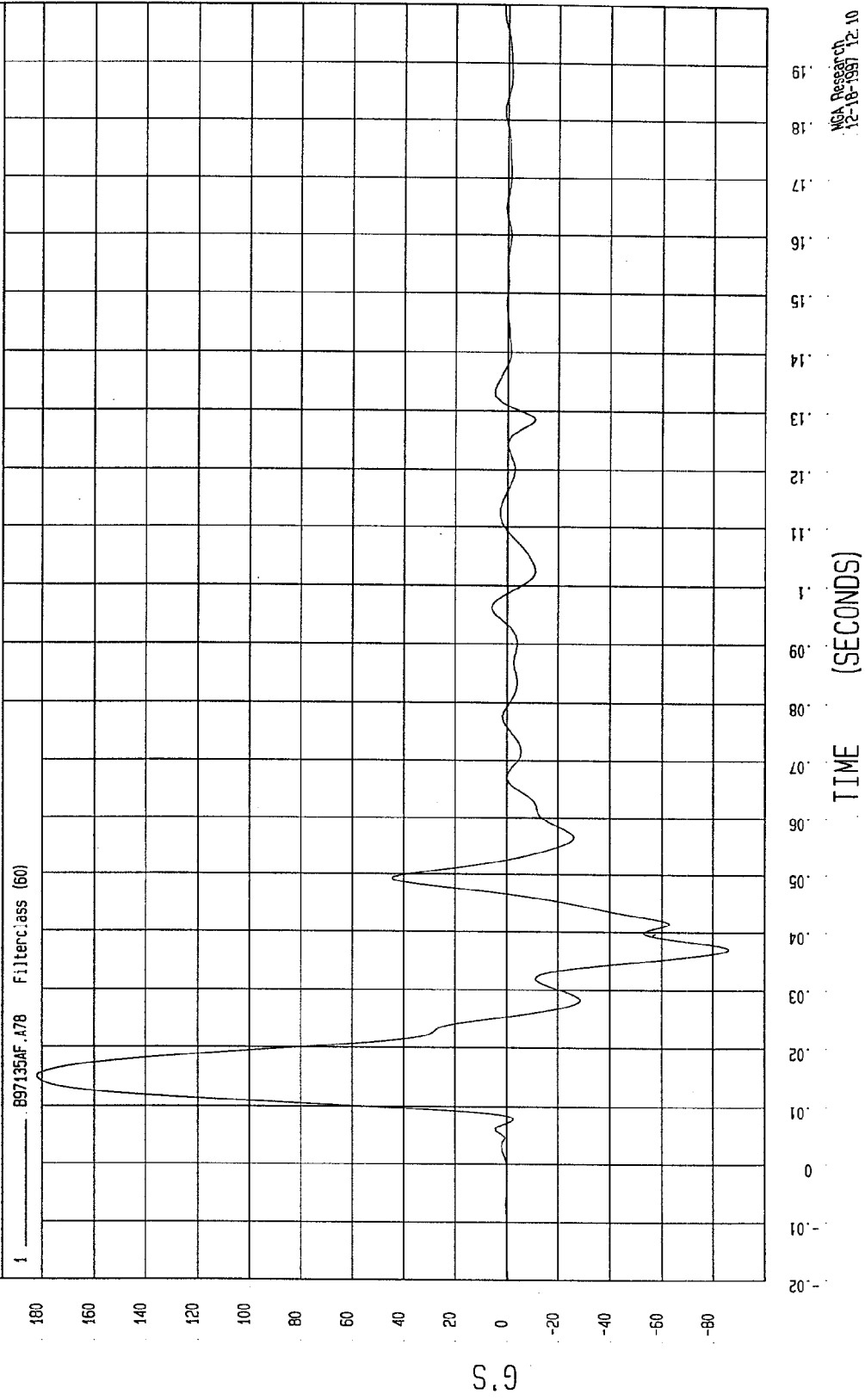
MCA Research
12-18-1997 12:20

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -85.71 G'S at 37 msec Maximum = 181.75 G'S at 15 msec

LEFT REAR DOOR UPPER CENTERLINE Y ACCELERATION



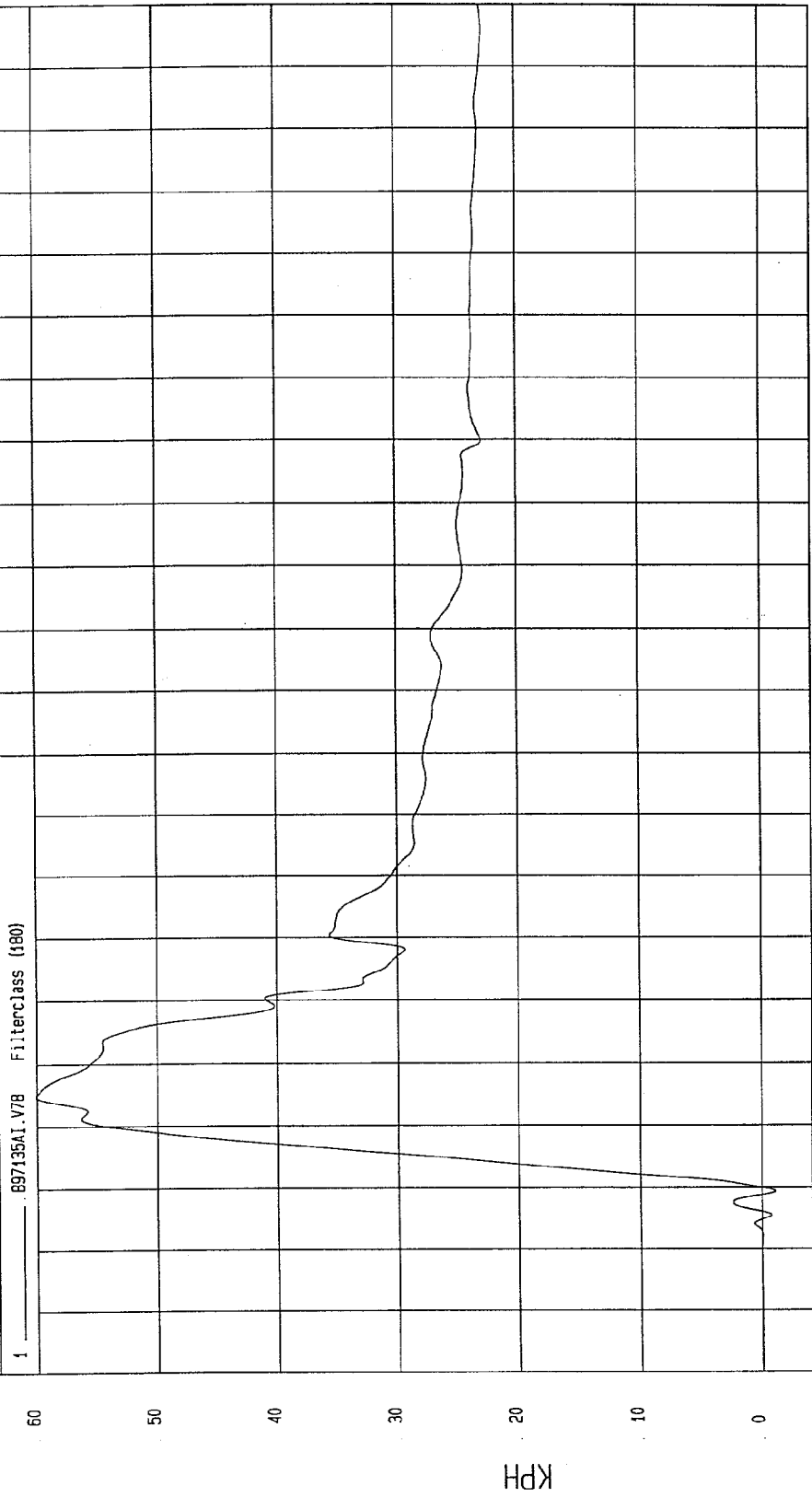
NSA Research
12-18-1997 12:10

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -1.10 KPH at 9 msec Maximum = 60.10 KPH at 25 msec

LEFT REAR DOOR UPPER CENTERLINE Y VELOCITY



TIME Seconds

WCA Research
12-10-1997 12:20

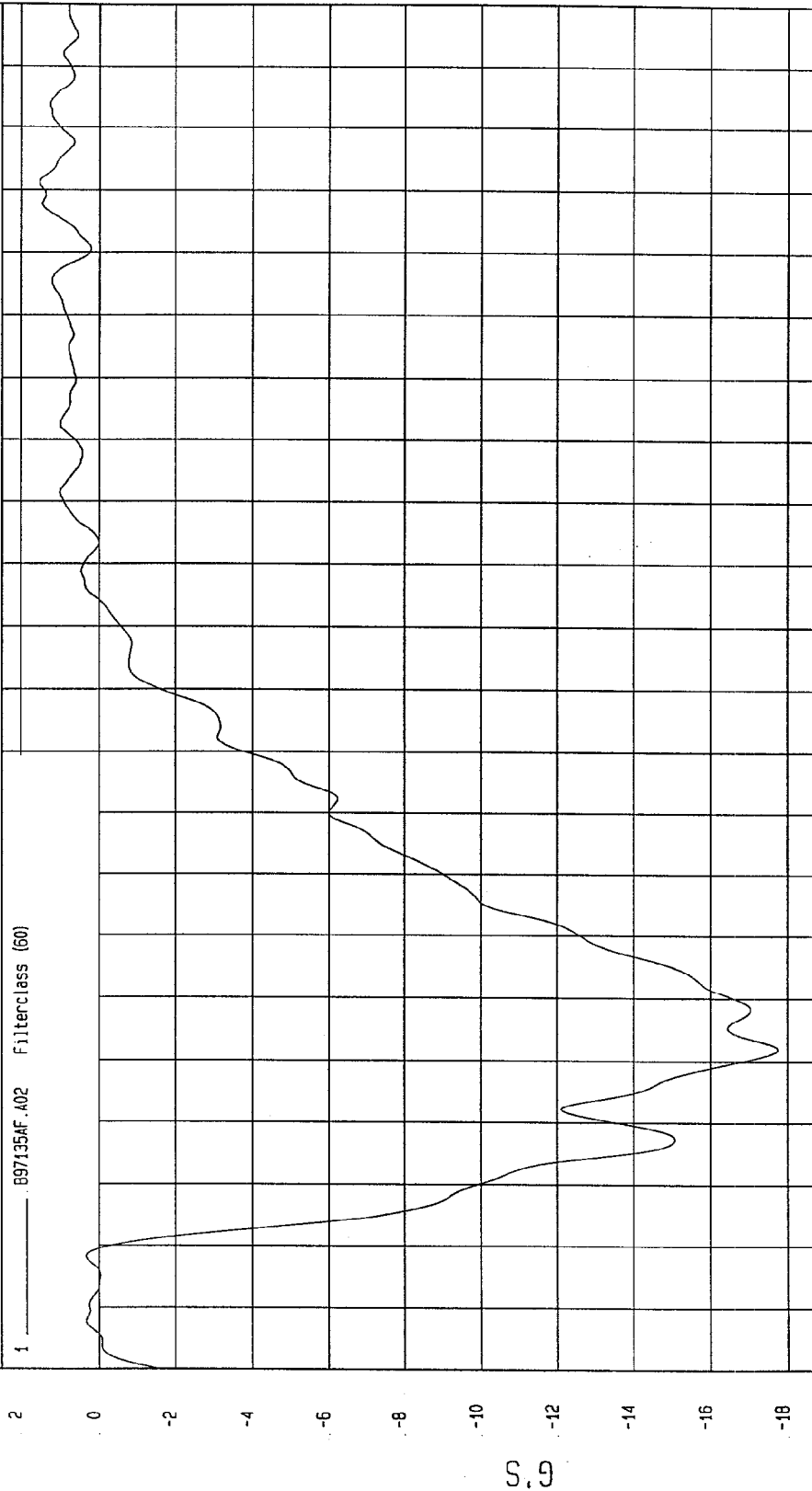
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -17.75 G'S at 32 msec Maximum = 1.53 G'S at 171 msec

MOVING BARRIER CG X ACCELERATION

1 _____ 897135AF.A02 Filterclass (60)



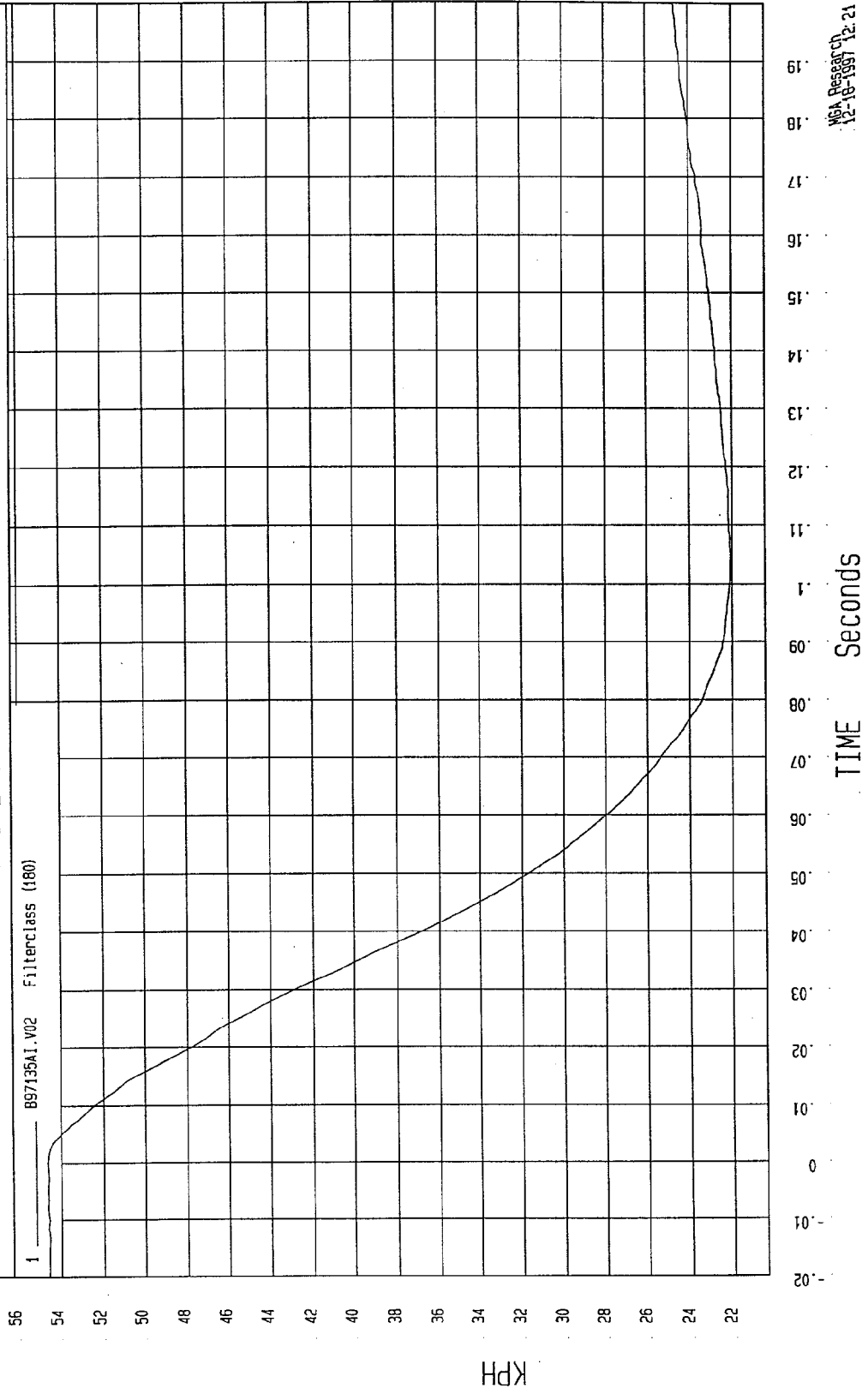
W&A Research
12-18-1997 12:10

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

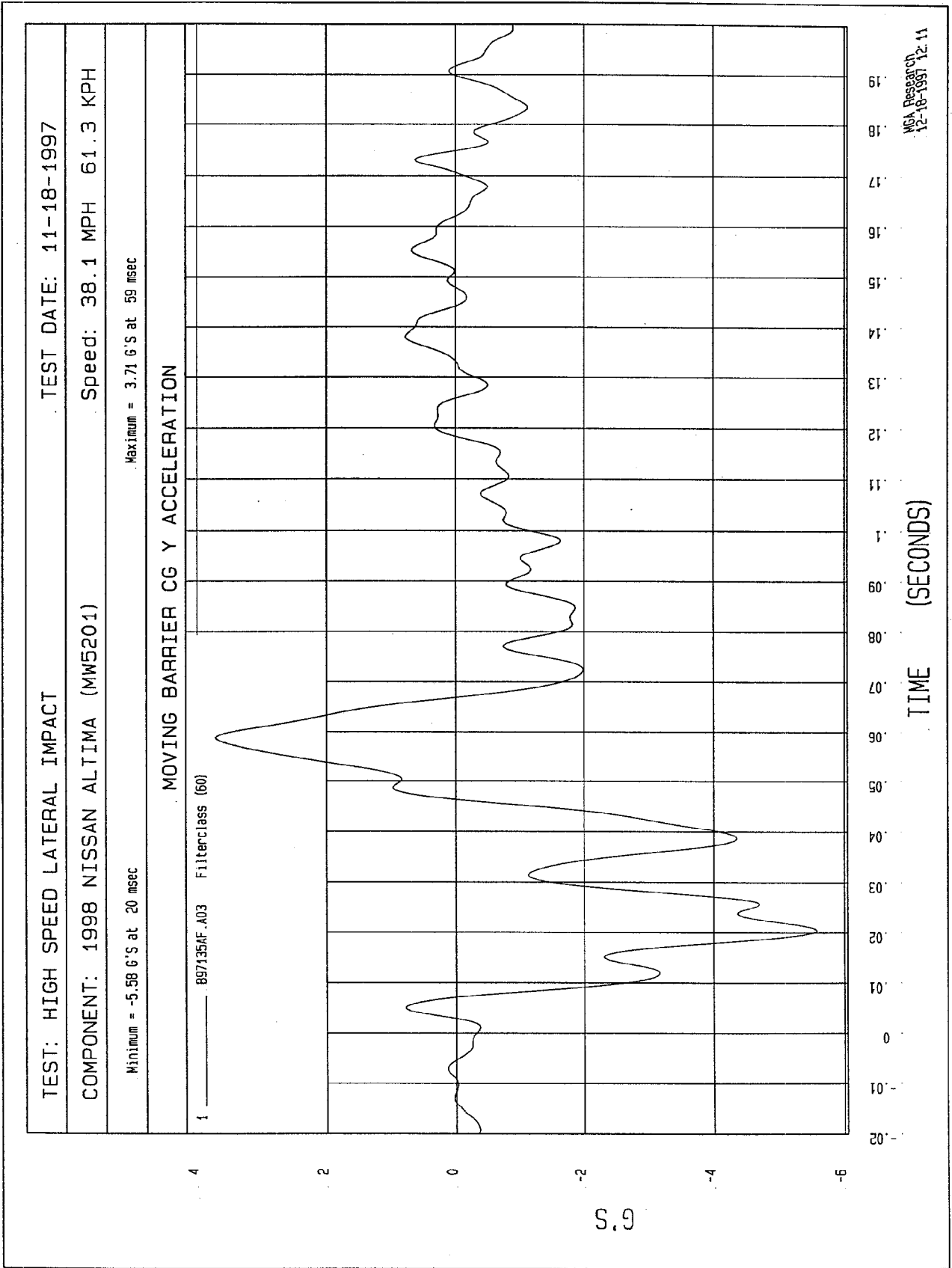
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = 22.06 KPH at 105 msec Maximum = 54.64 KPH at 0 msec

MOVING BARRIER CG X VELOCITY

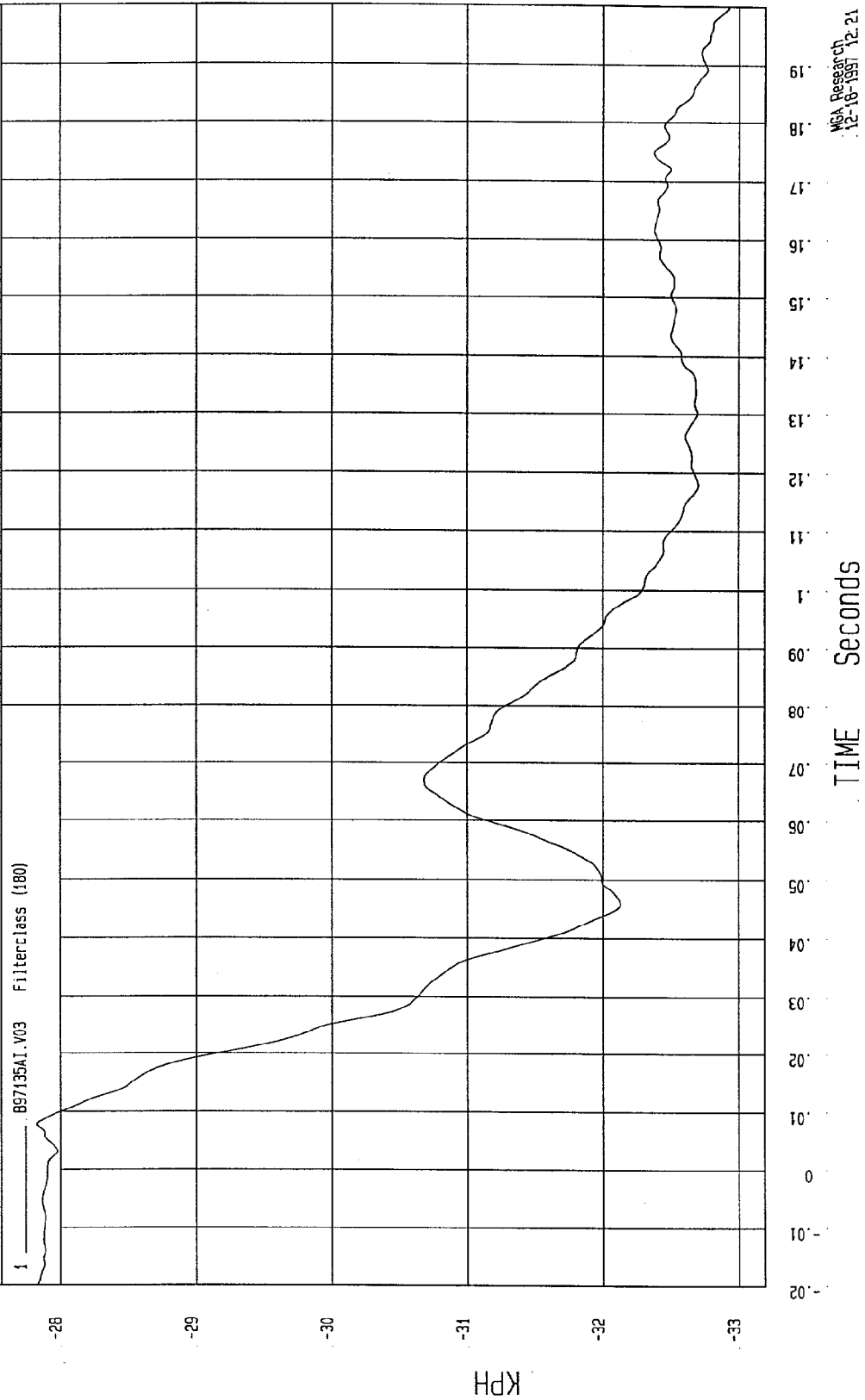


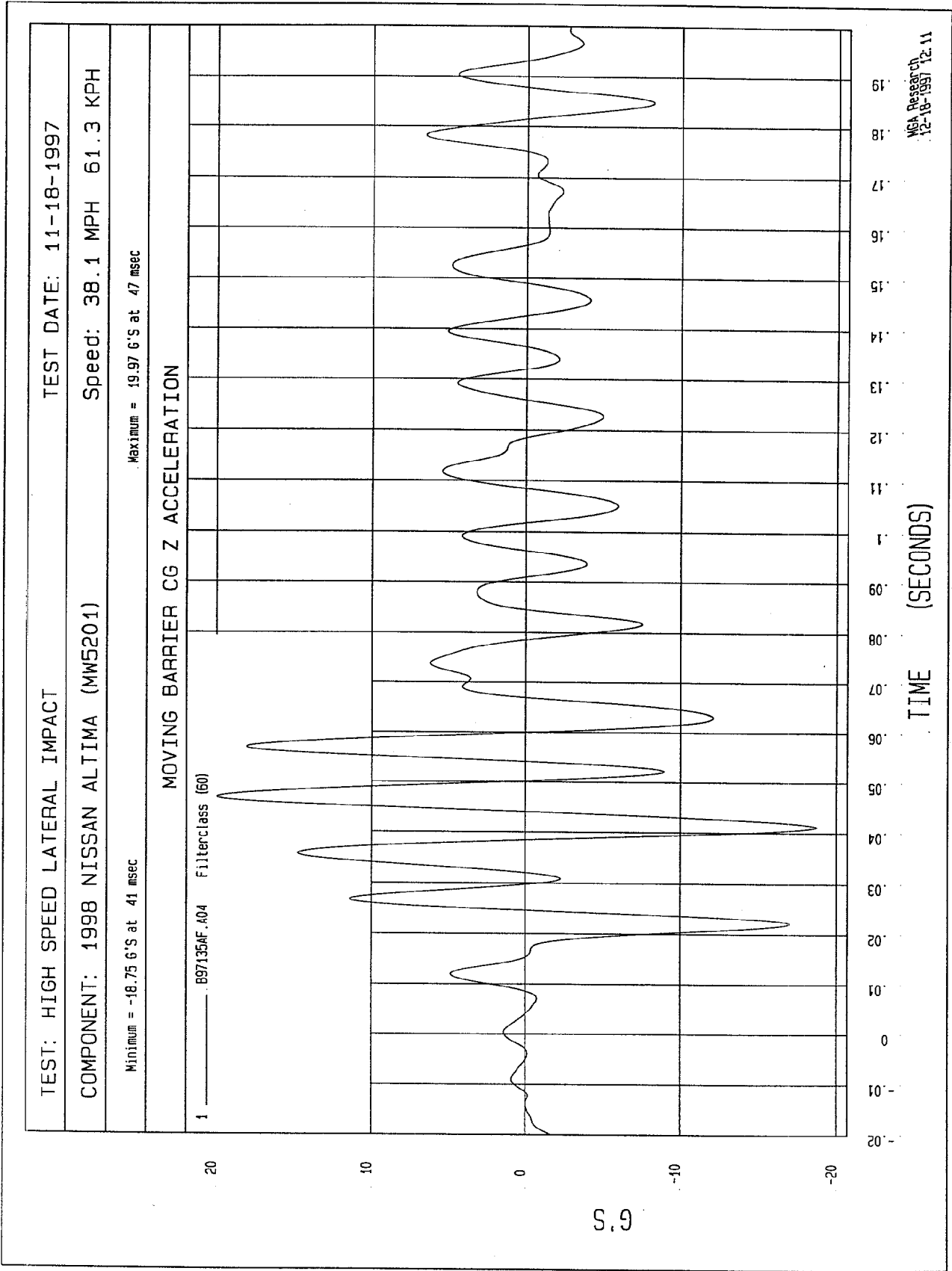
NSA Research
12-18-1997 12:21



TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -32.93 KPH at 200 msec	Maximum = -27.82 KPH at 8 msec

MOVING BARRIER CG Y VELOCITY





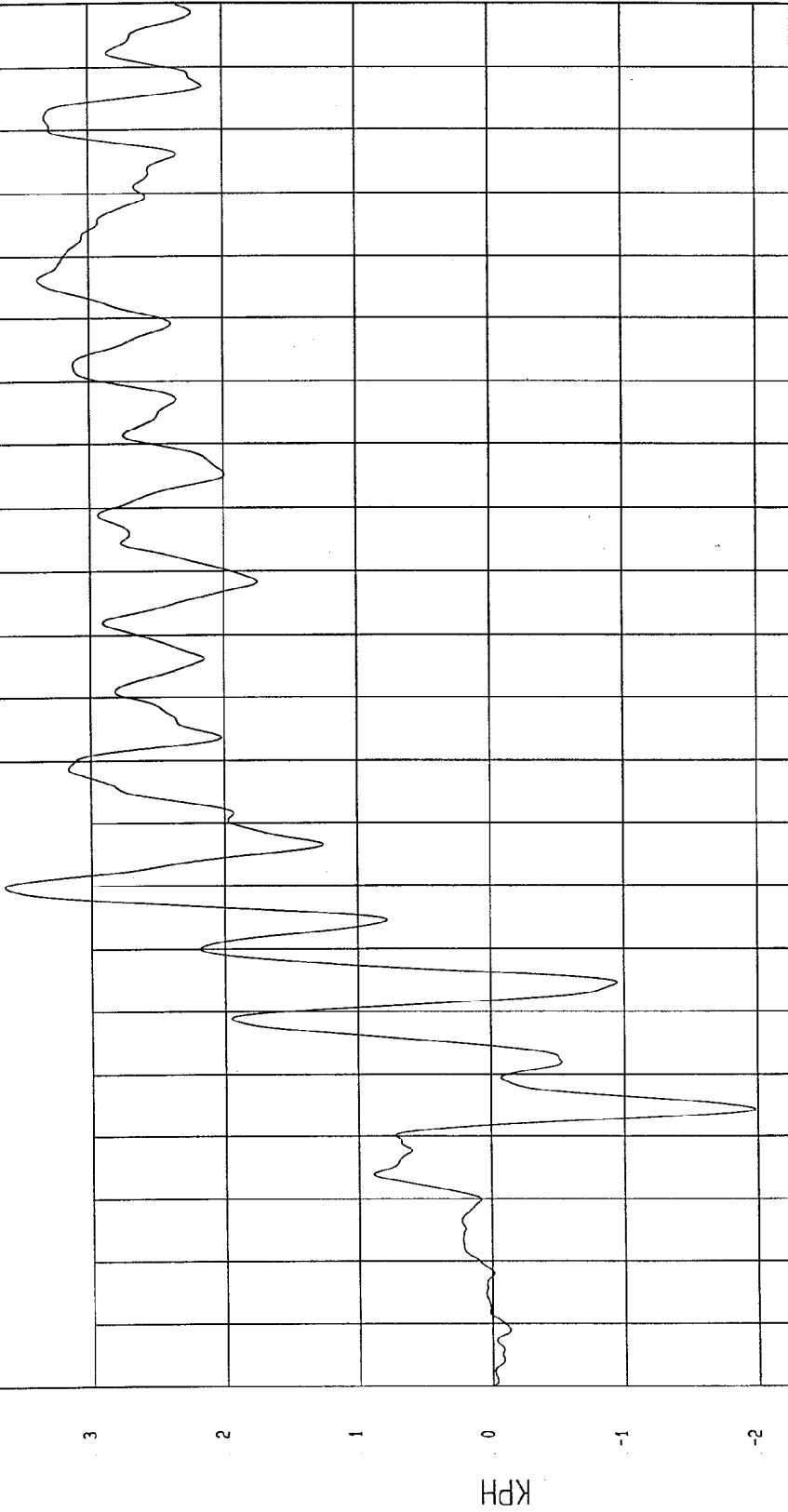
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -1.98 KPH at 24 msec Maximum = 3.65 KPH at 60 msec

MOVING BARRIER CG Z VELOCITY

1 ——— 897135A1.V04 Filterclass (180)



19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1 -2

TIME Seconds

WCA Research
12-18-1997 12:21

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

Speed: 38.1 MPH 61.3 KPH

COMPONENT: 1998 NISSAN ALTIMA (MW5201)

Maximum = 24.96 G'S at 41 msec

Minimum = 3.89E-02 G'S at -5 msec

MOVING BARRIER CG RESULTANT ACCELERATION

1 B97135AV.A02 FilterClass (60)

26

24

22

20

18

16

14

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8

6

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2

0

G.S

19

18

17

16

15

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05

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03

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01

0

-01

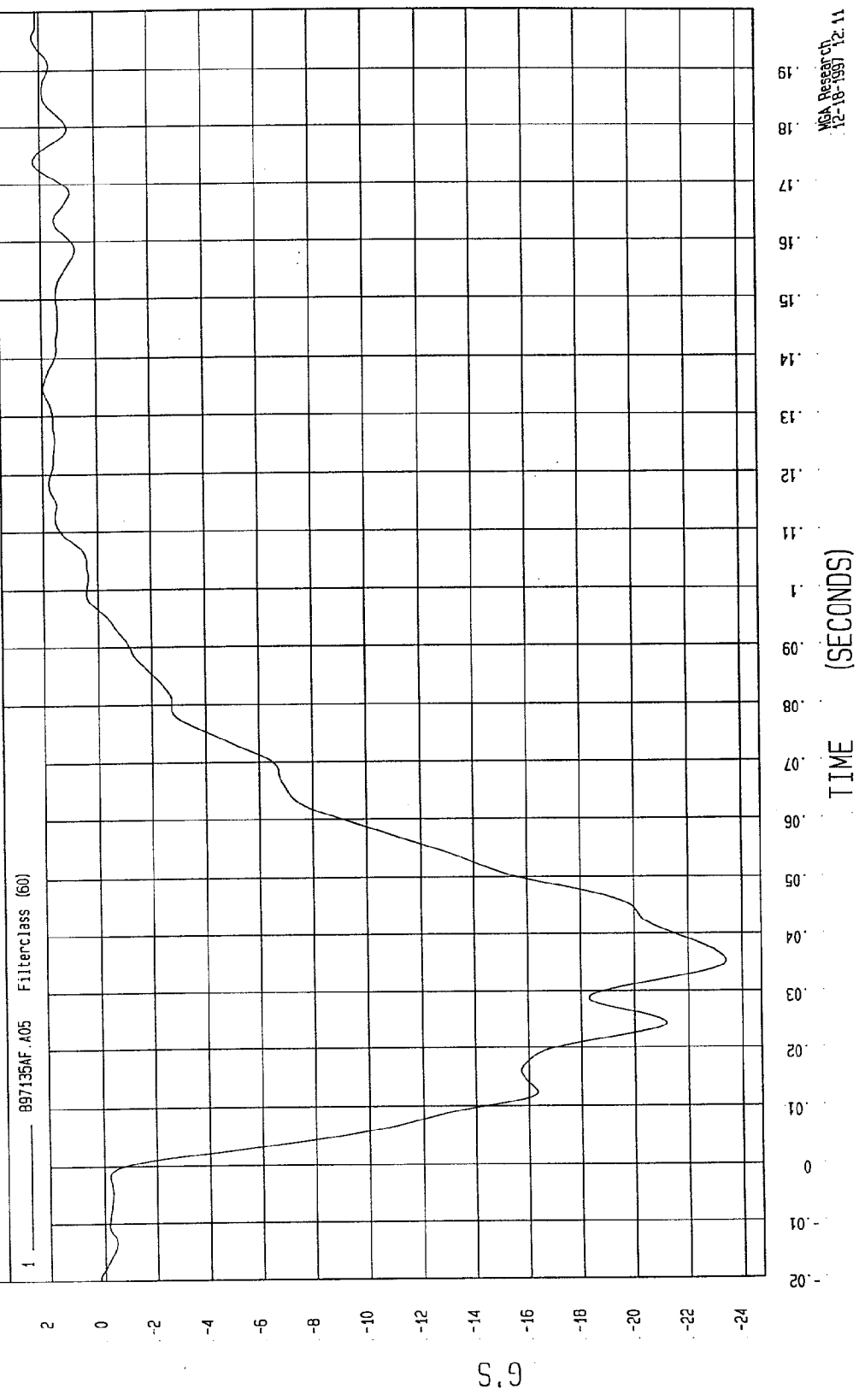
-02

TIME (SECONDS)

NSA Research
12-18-1997 12:12

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -23.41 G'S at 35 msec	
Maximum = 2.27 G'S at 174 msec	

MOVING BARRIER REAR AXLE X ACCELERATION



MEA Research
12-18-1997 12:11

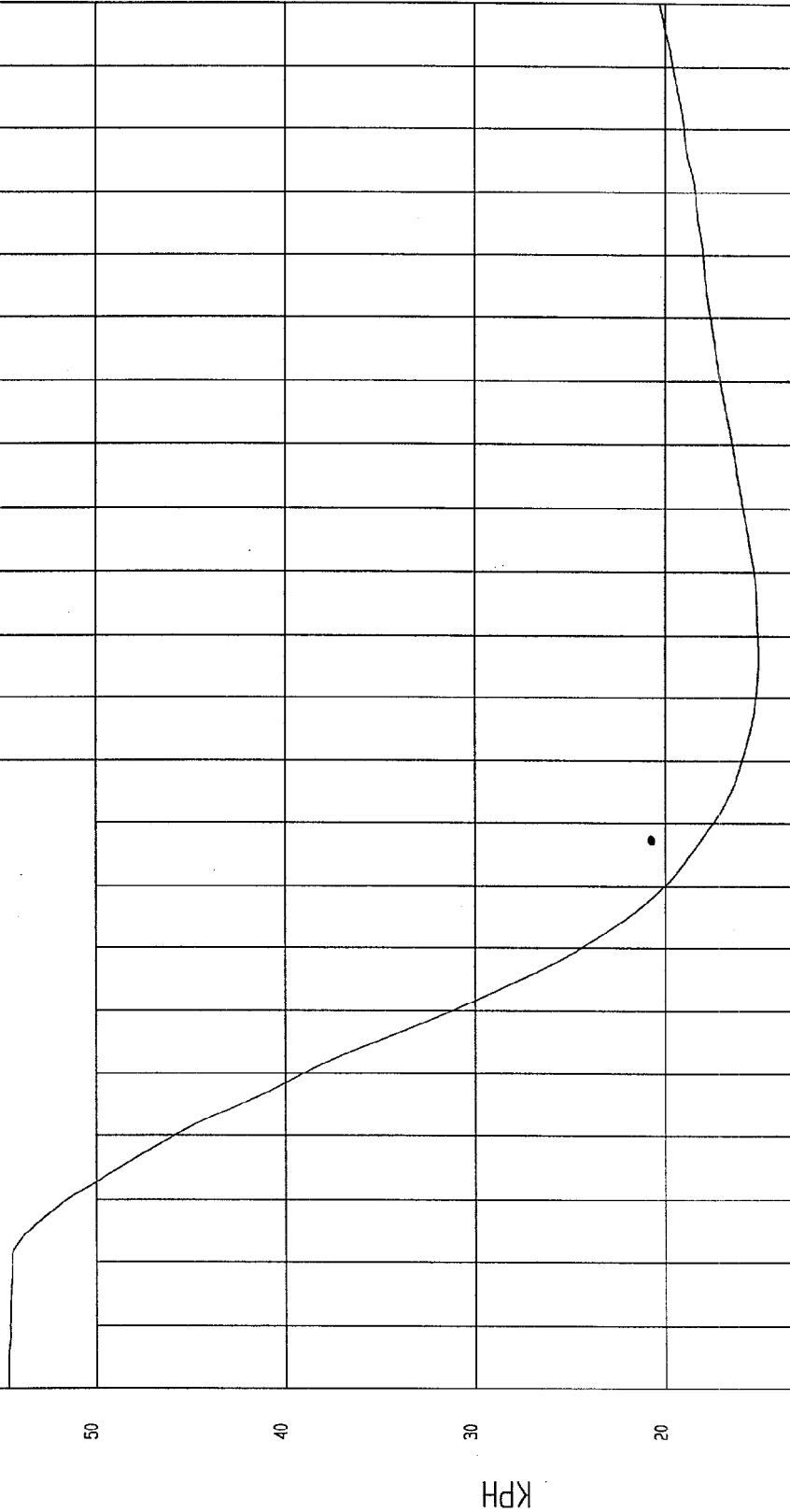
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = 15.09 KPH at 97 msec Maximum = 54.64 KPH at -18 msec

MOVING BARRIER REAR AXLE X VELOCITY

1 ——— B97135AI.V05 Filterclass (180)



TIME Seconds

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KPH

50
40
30
20

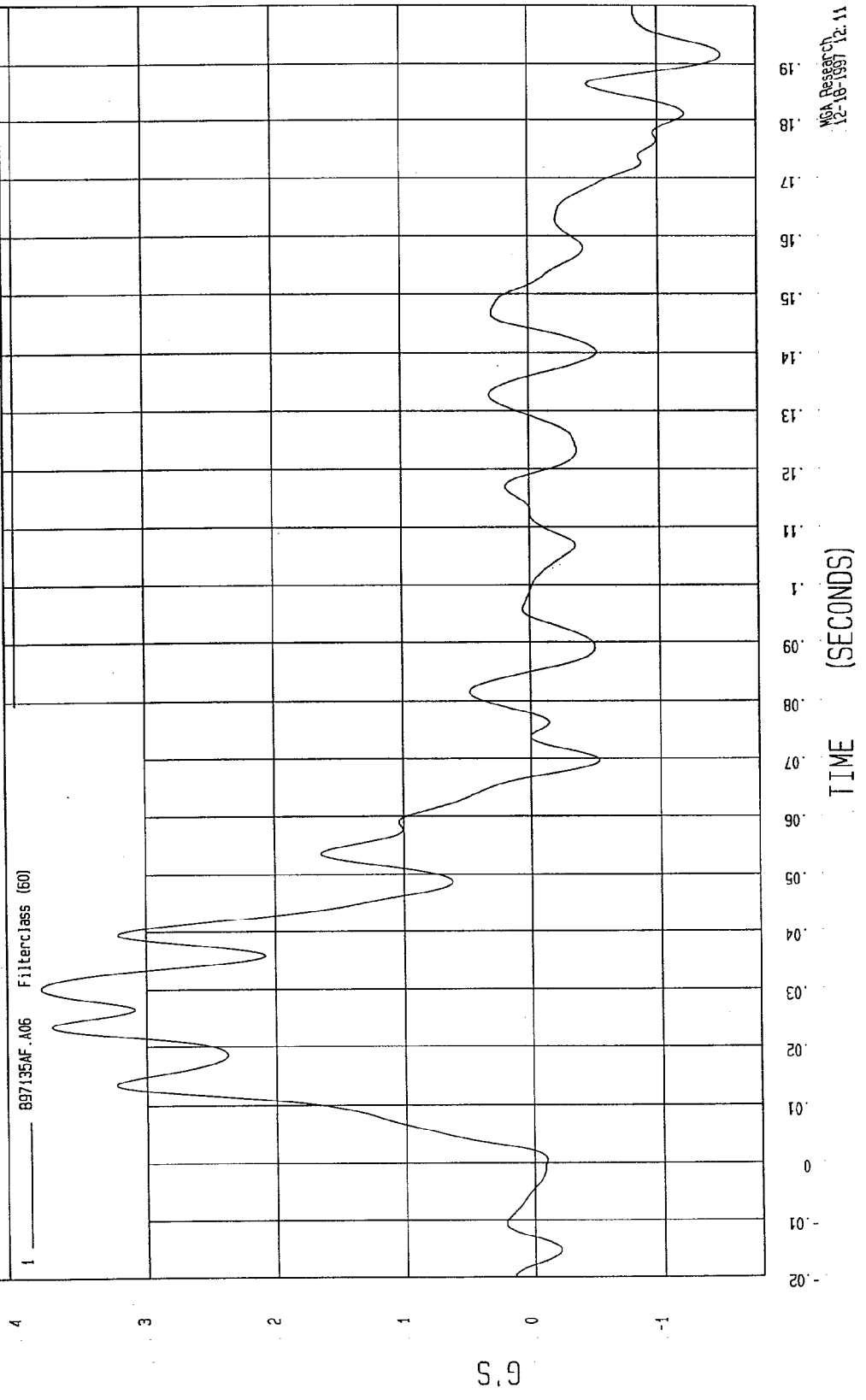
MOA Research
12-18-1997 12:21

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

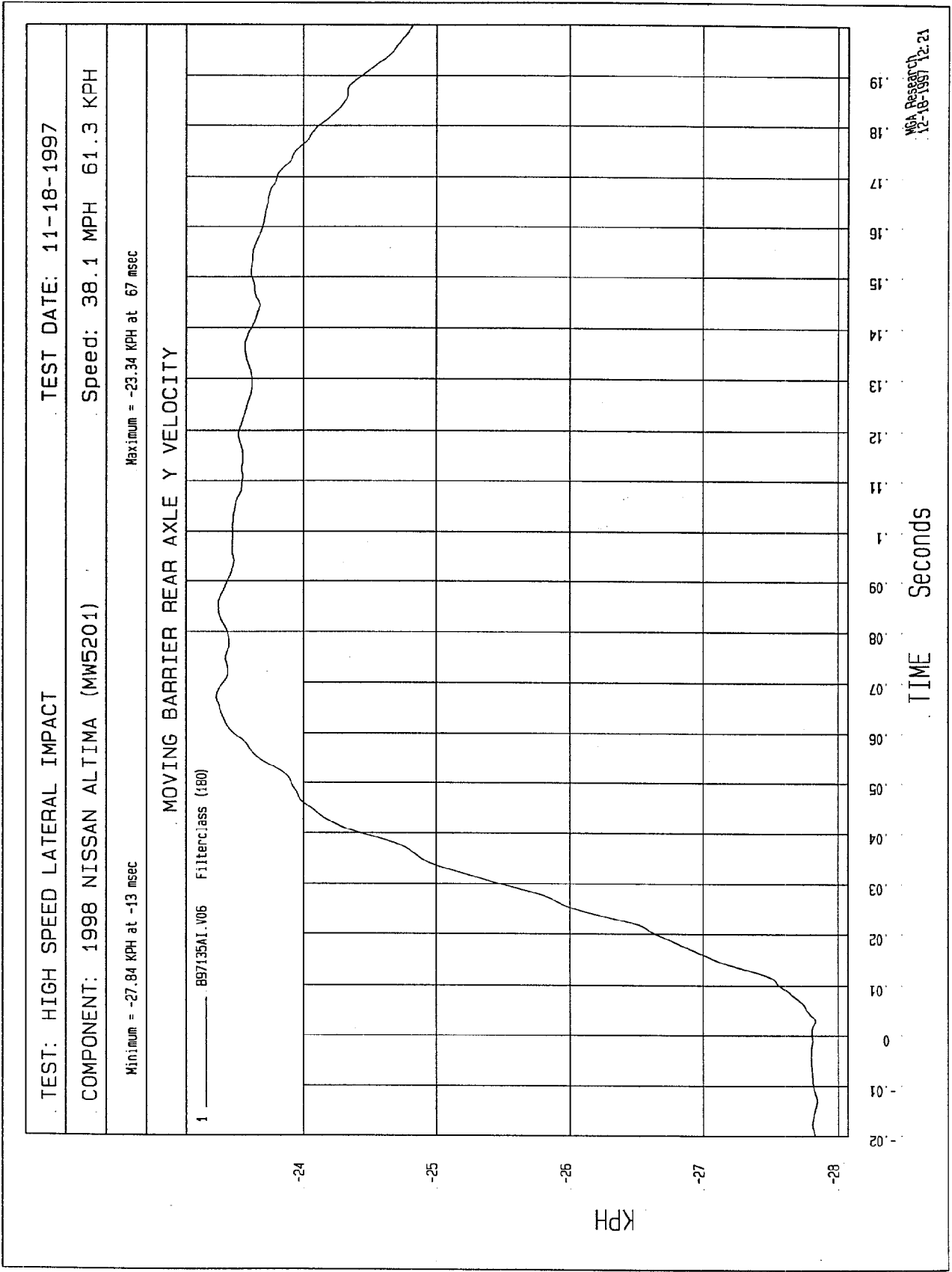
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

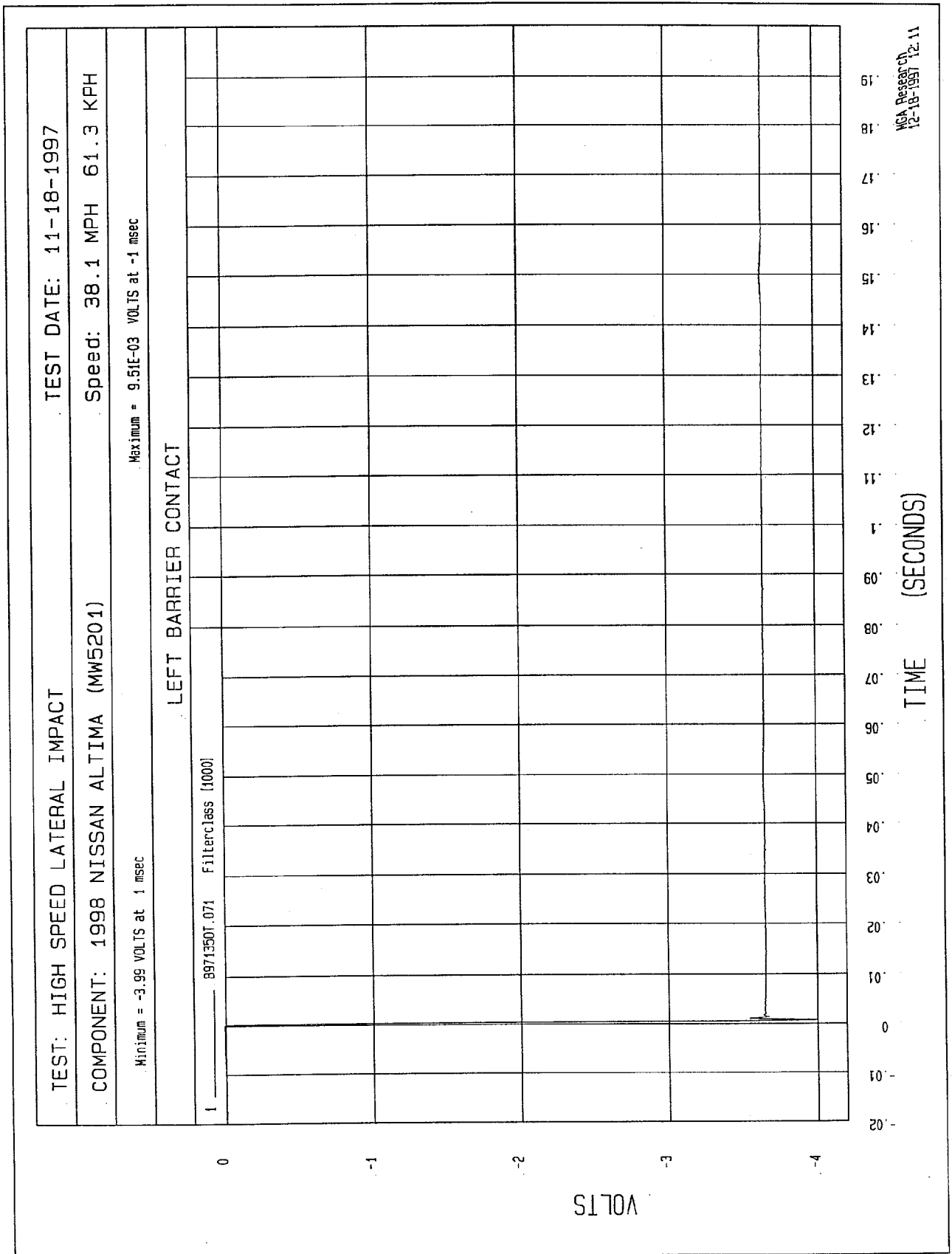
Minimum = -1.49 G'S at 192 msec Maximum = 3.81 G'S at 30 msec

MOVING BARRIER REAR AXLE Y ACCELERATION



MSA Research
12-18-1997 12:11



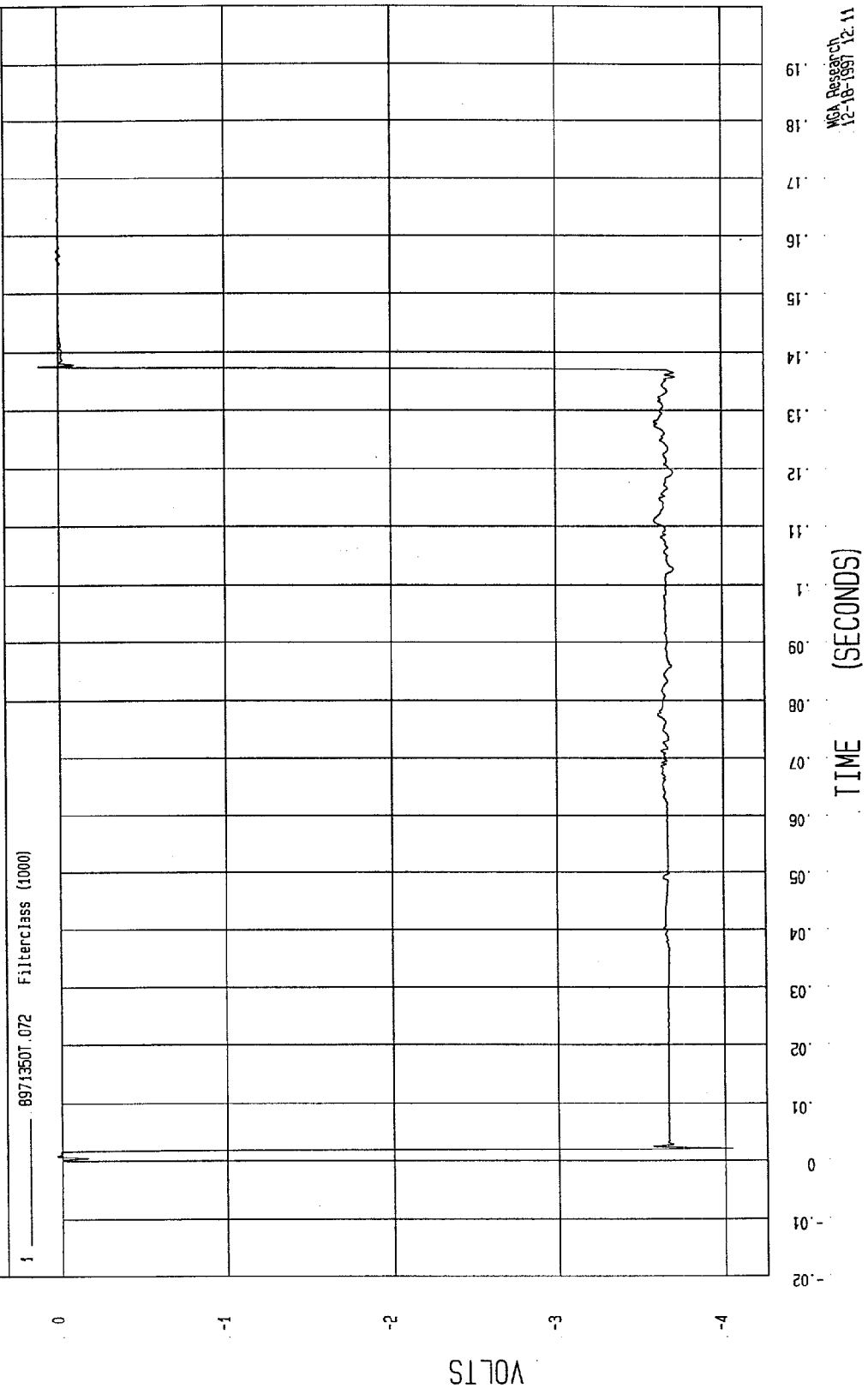


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -4.04 VOLTS at 2 msec Maximum = .12 VOLTS at 138 msec

RIGHT BARRIER CONTACT

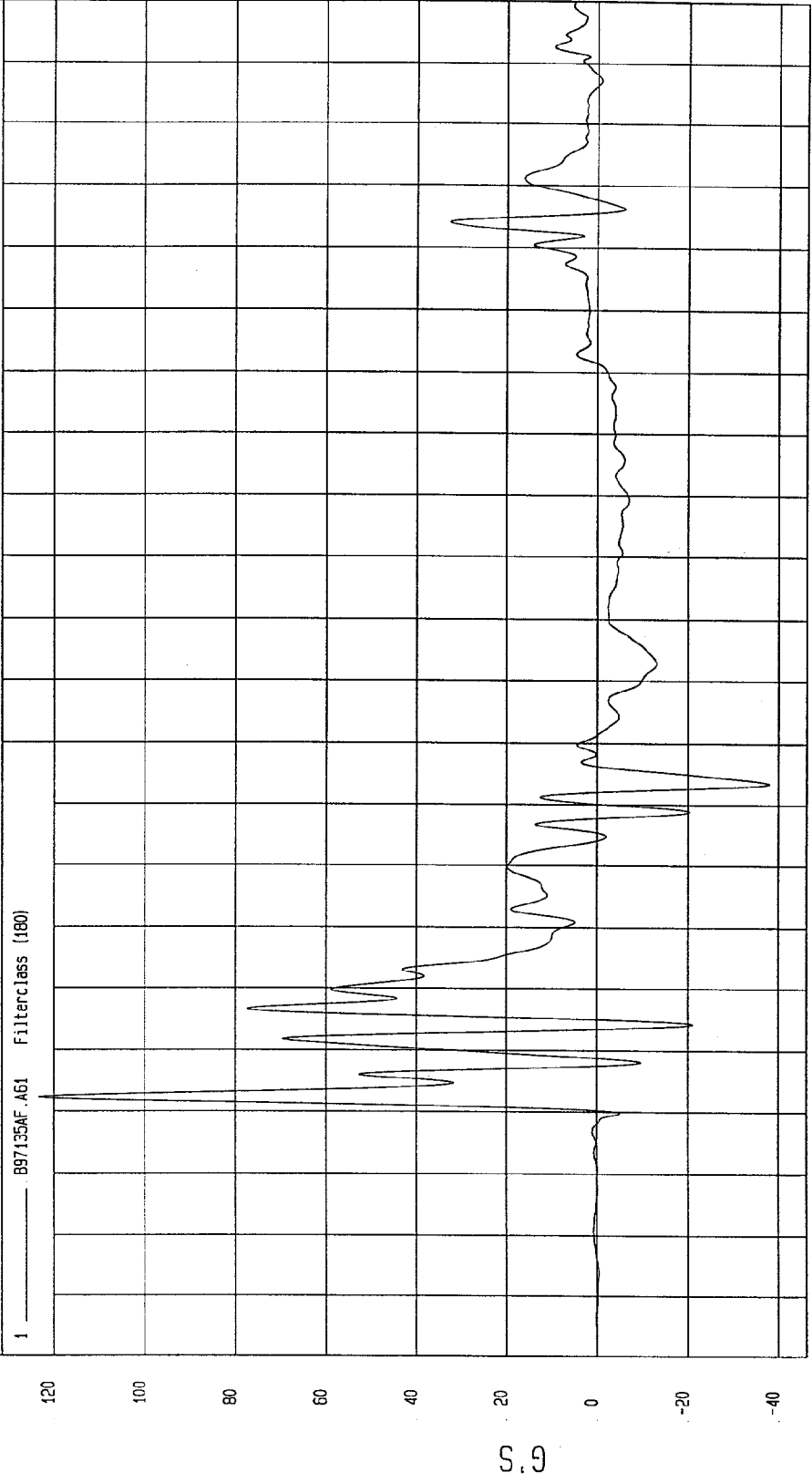


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -38.00 G'S at 73 msec Maximum = 123.33 G'S at 22 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION



TIME (SECONDS)

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18
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-2

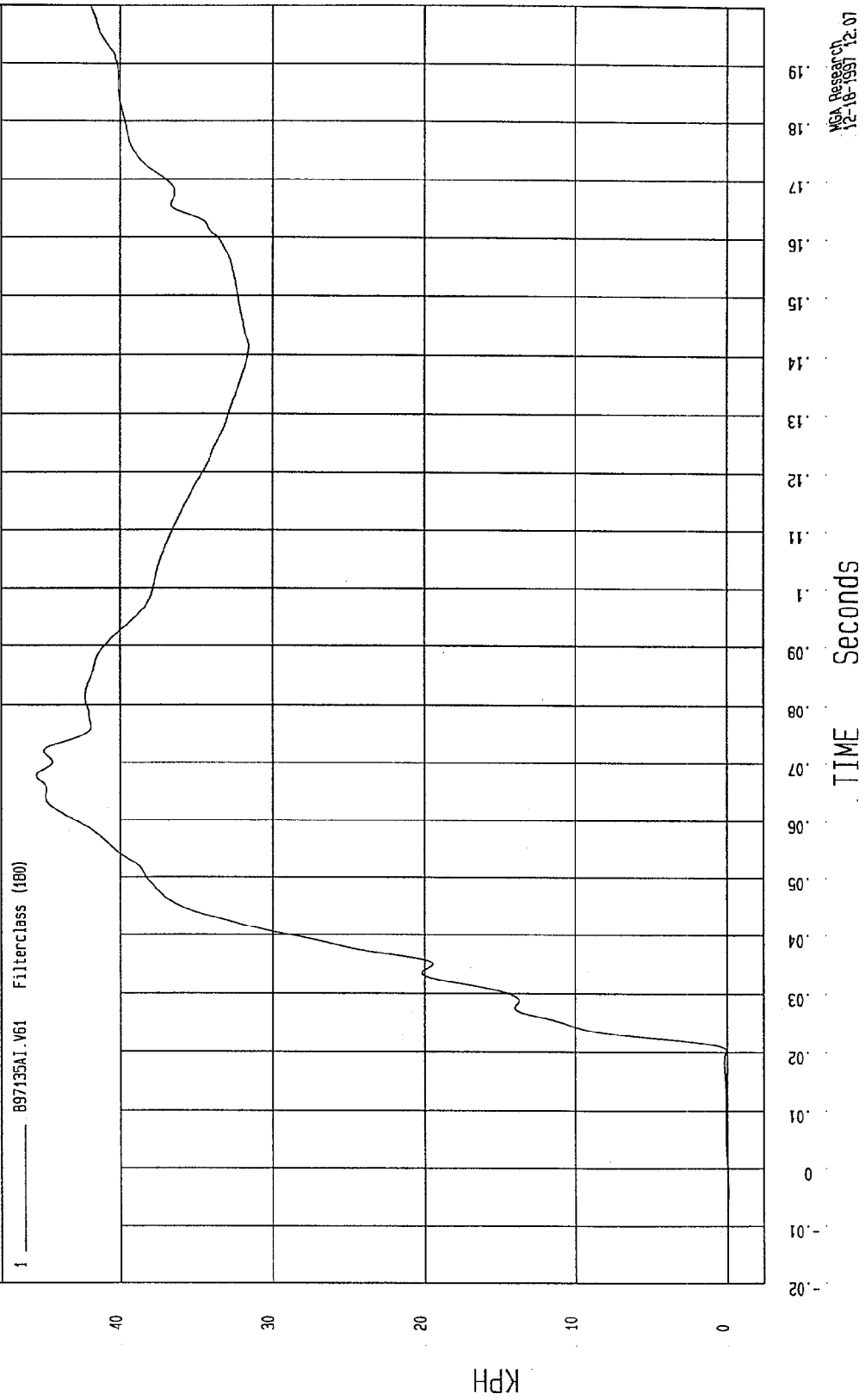
MsA Research
12-18-1997 11:59

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -7.02E-02 KPH at -4 msec Maximum = 45.54 KPH at 58 msec

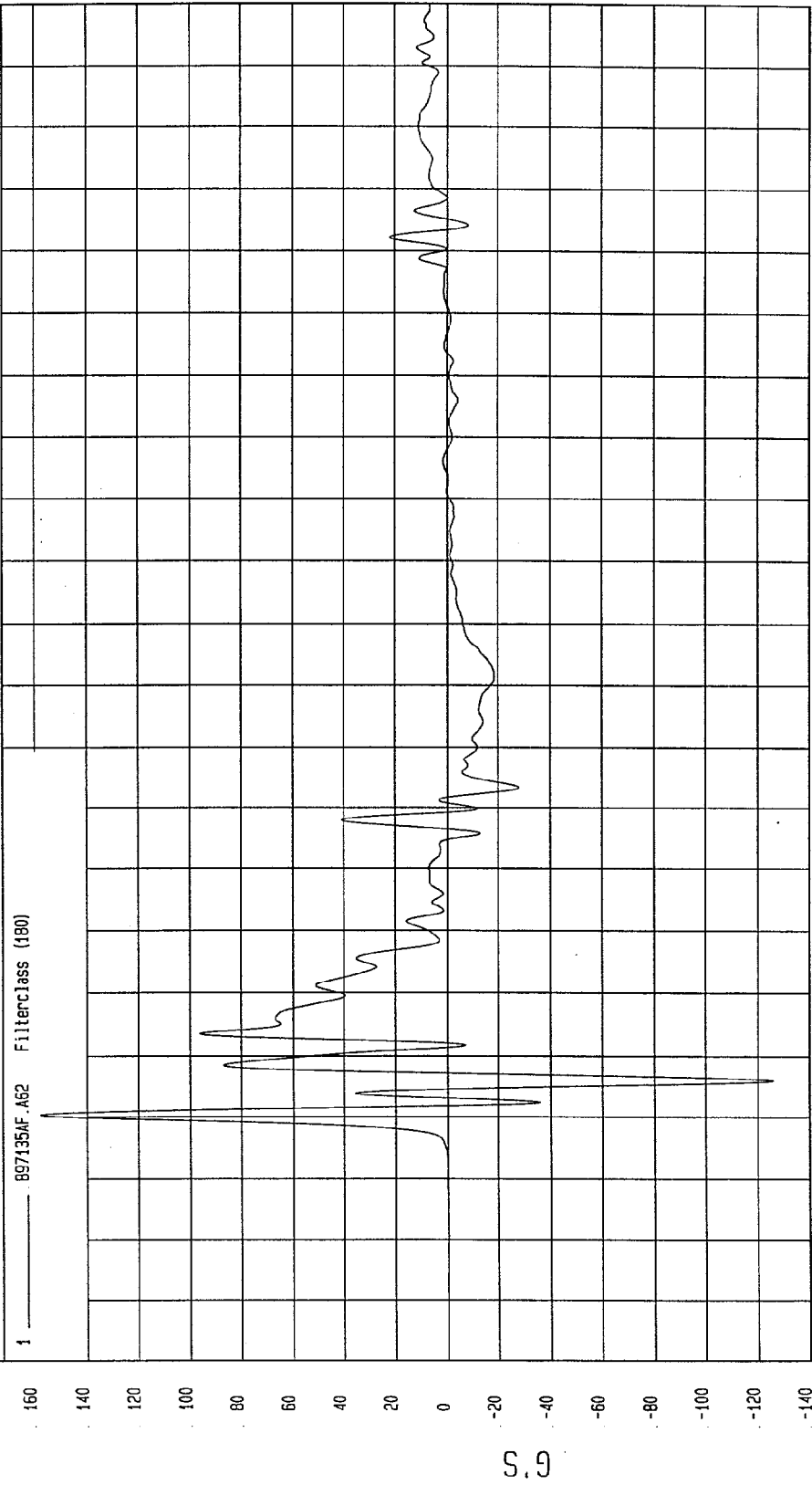
DRIVER UPPER RIB Y REDUNDANT VELOCITY



TEST: HIGH SPEED LATERAL IMPACT
TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)
Speed: 38.1 MPH 61.3 KPH

Minimum = -125.94 G'S at 26 msec
Maximum = 157.95 G'S at 20 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION



TIME (SECONDS)

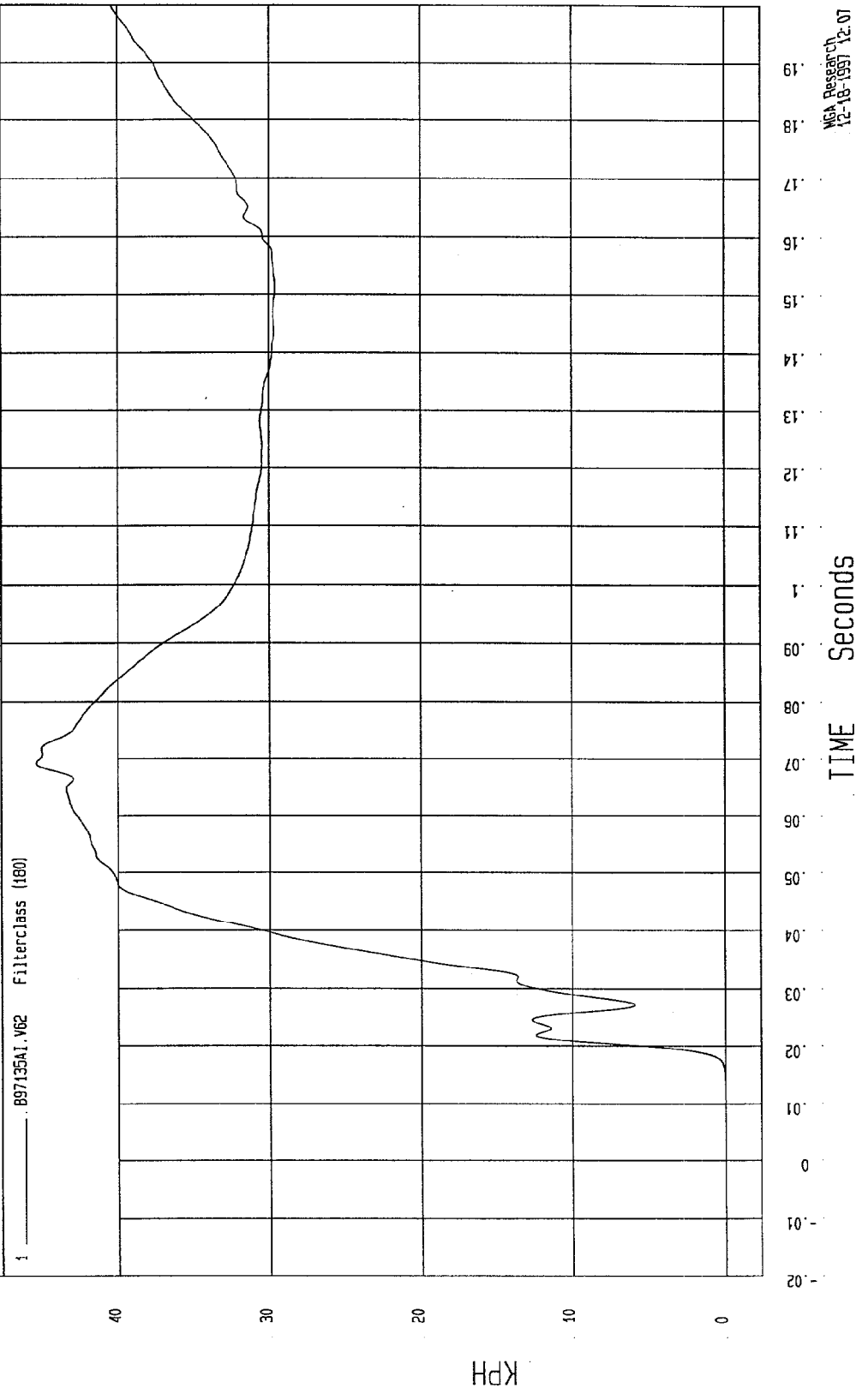
NSA Research
12-18-1997 11:59

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -1.55E-02 KPH at 2 msec Maximum = 45.37 KPH at 69 msec

DRIVER LOWER RIB Y REDUNDANT VELOCITY

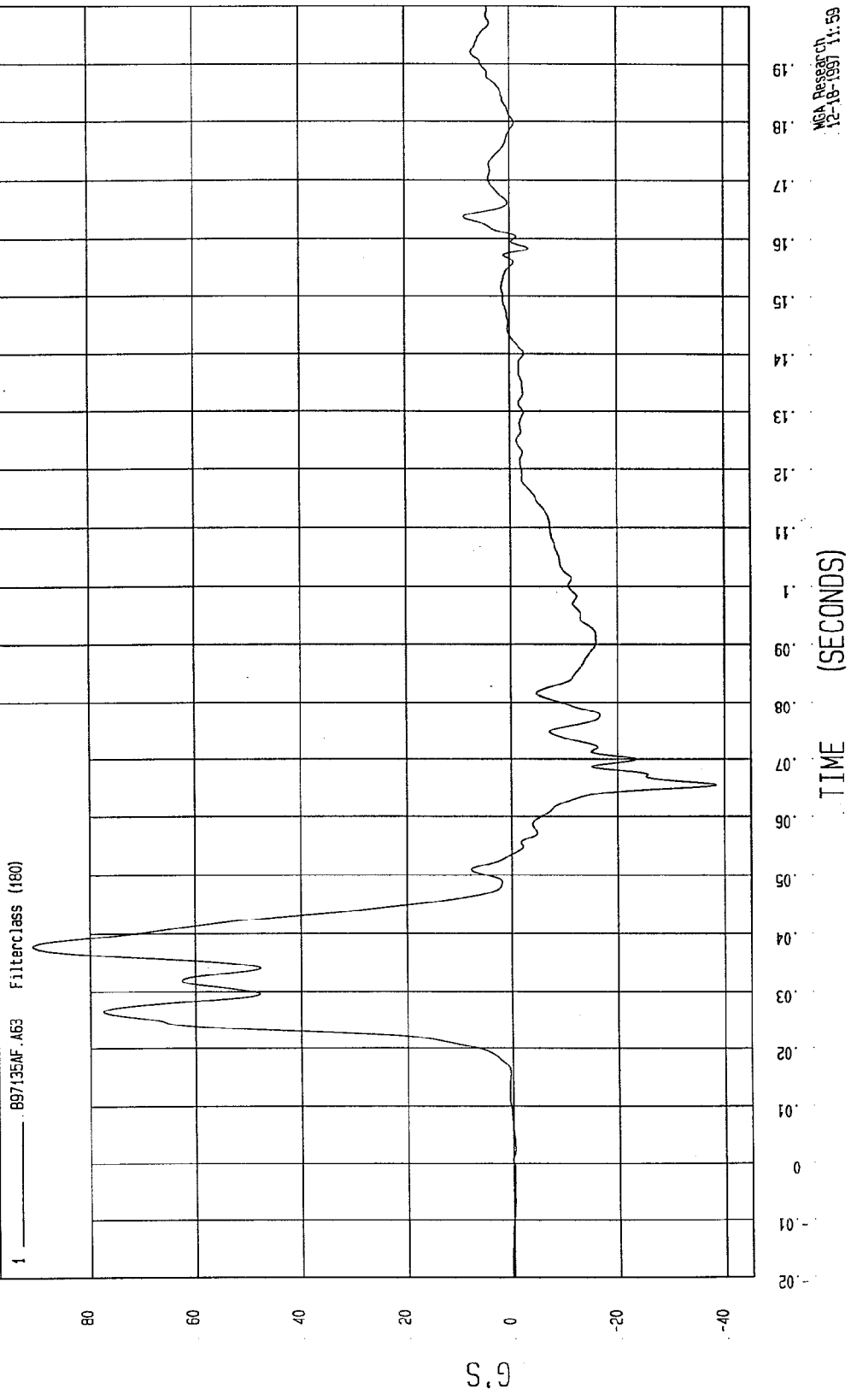


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

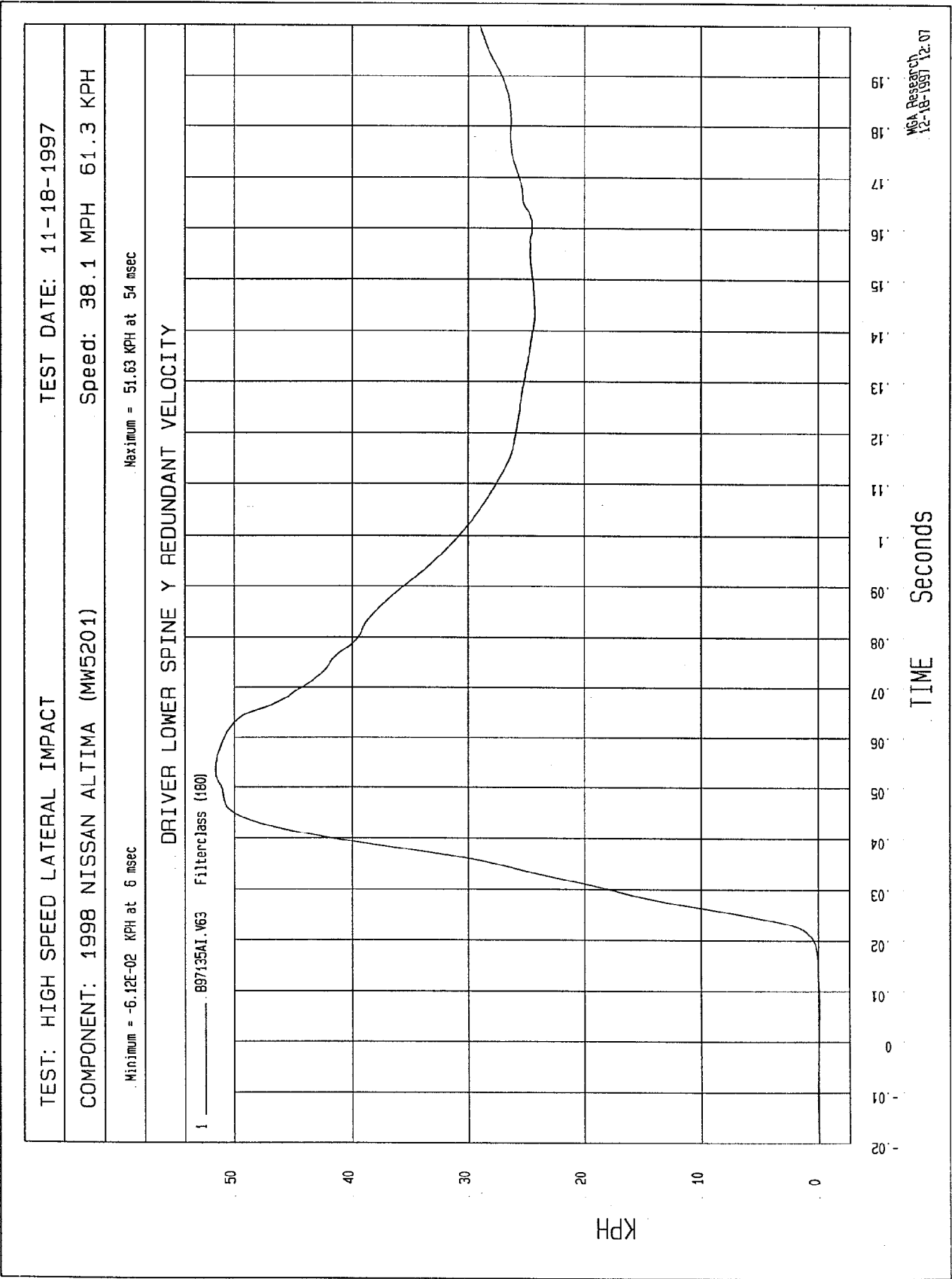
COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

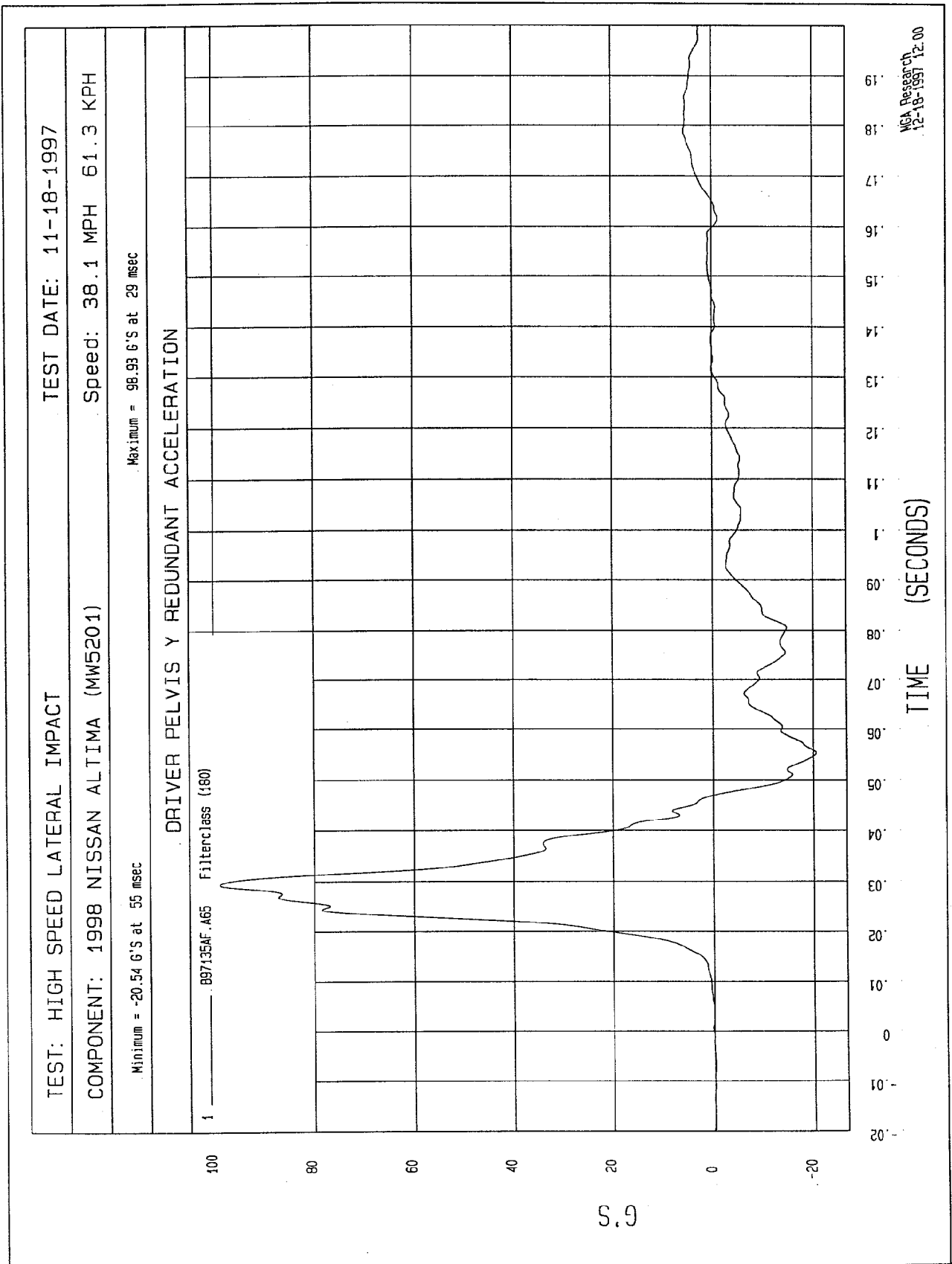
Minimum = -38.44 G'S at 56 msec Maximum = 90.82 G'S at 38 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION



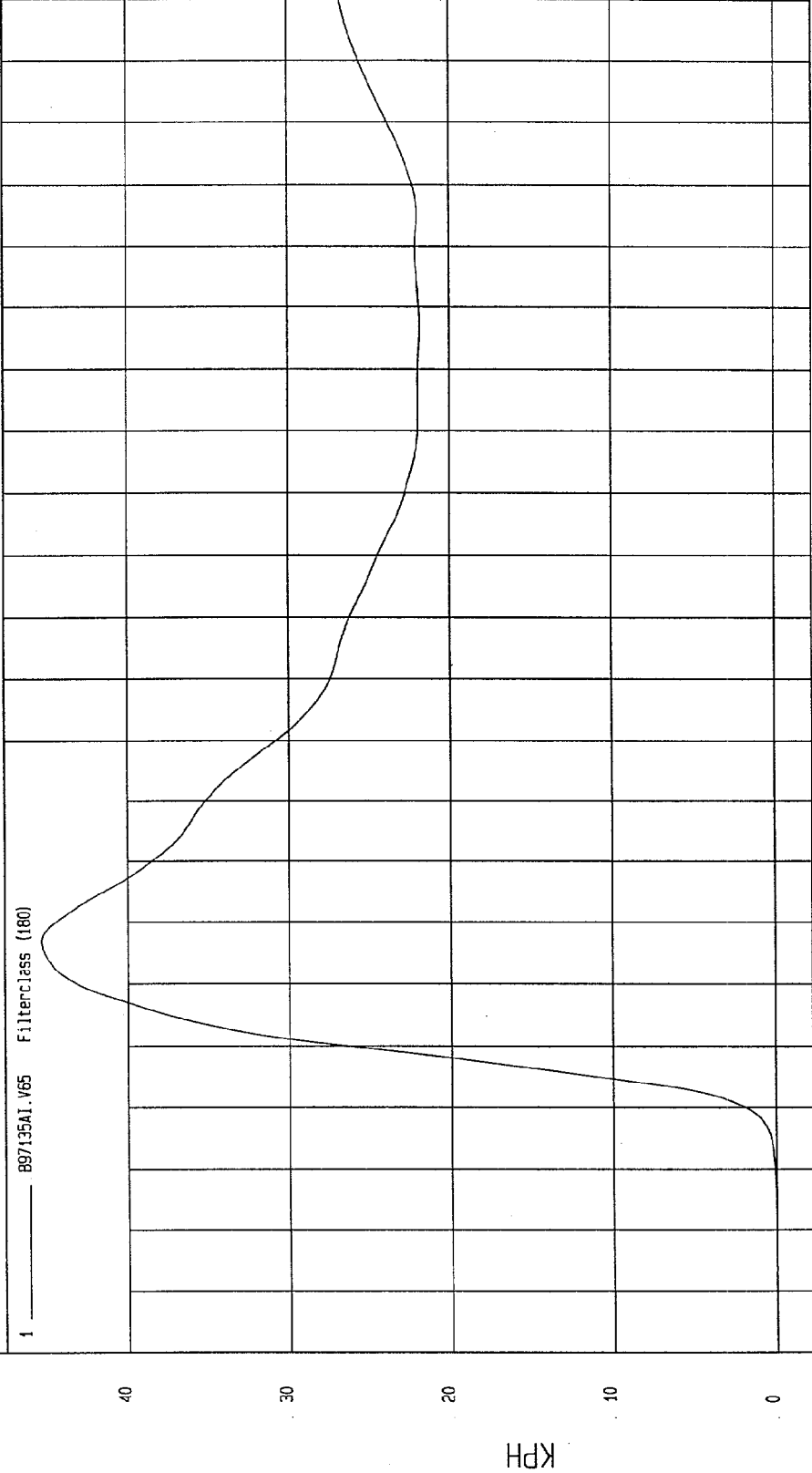
MCA Research
12-18-1997 11:59





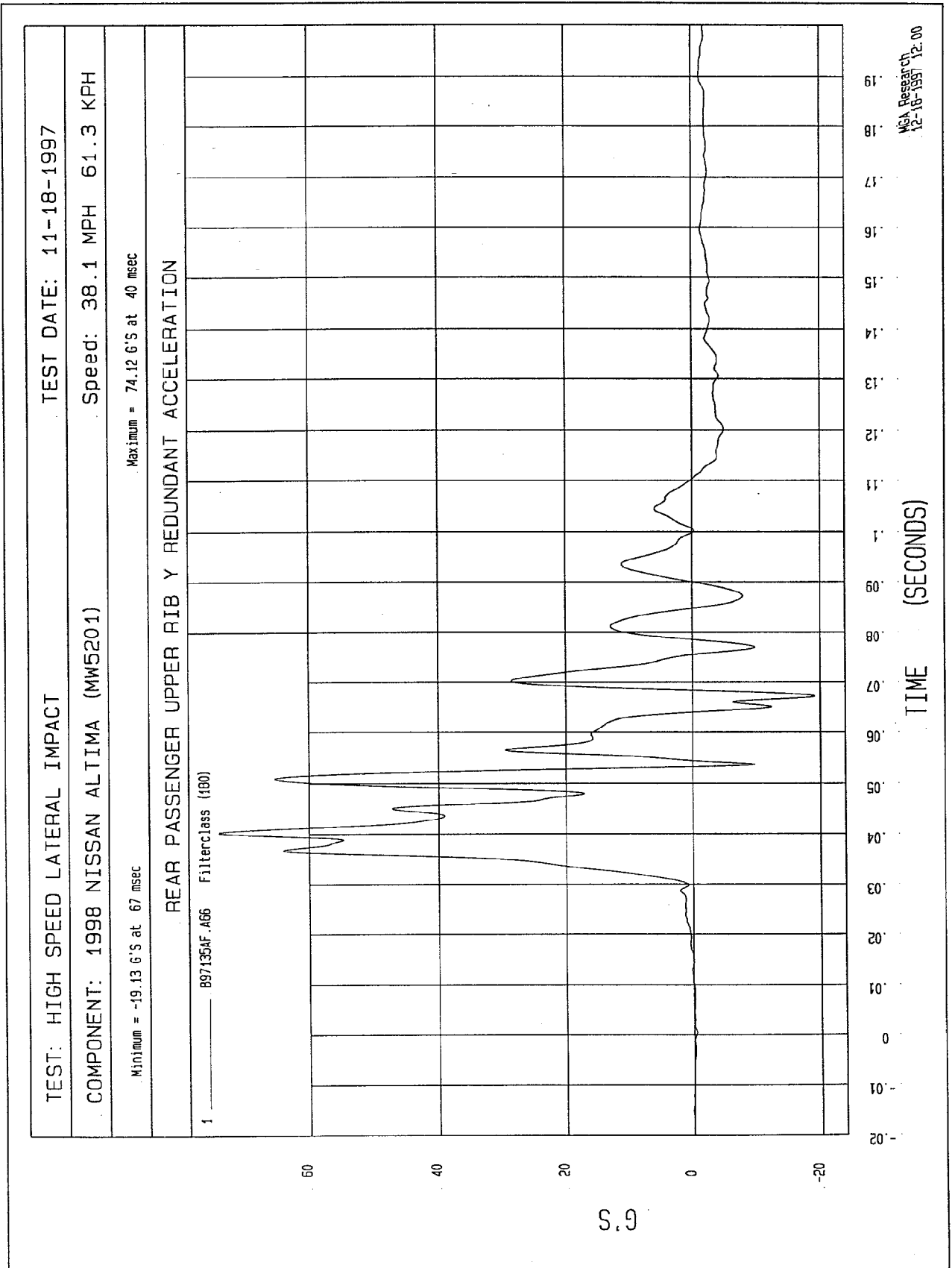
TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -8.43E-03 KPH at -3 msec	
Maximum = 45.33 KPH at 47 msec	

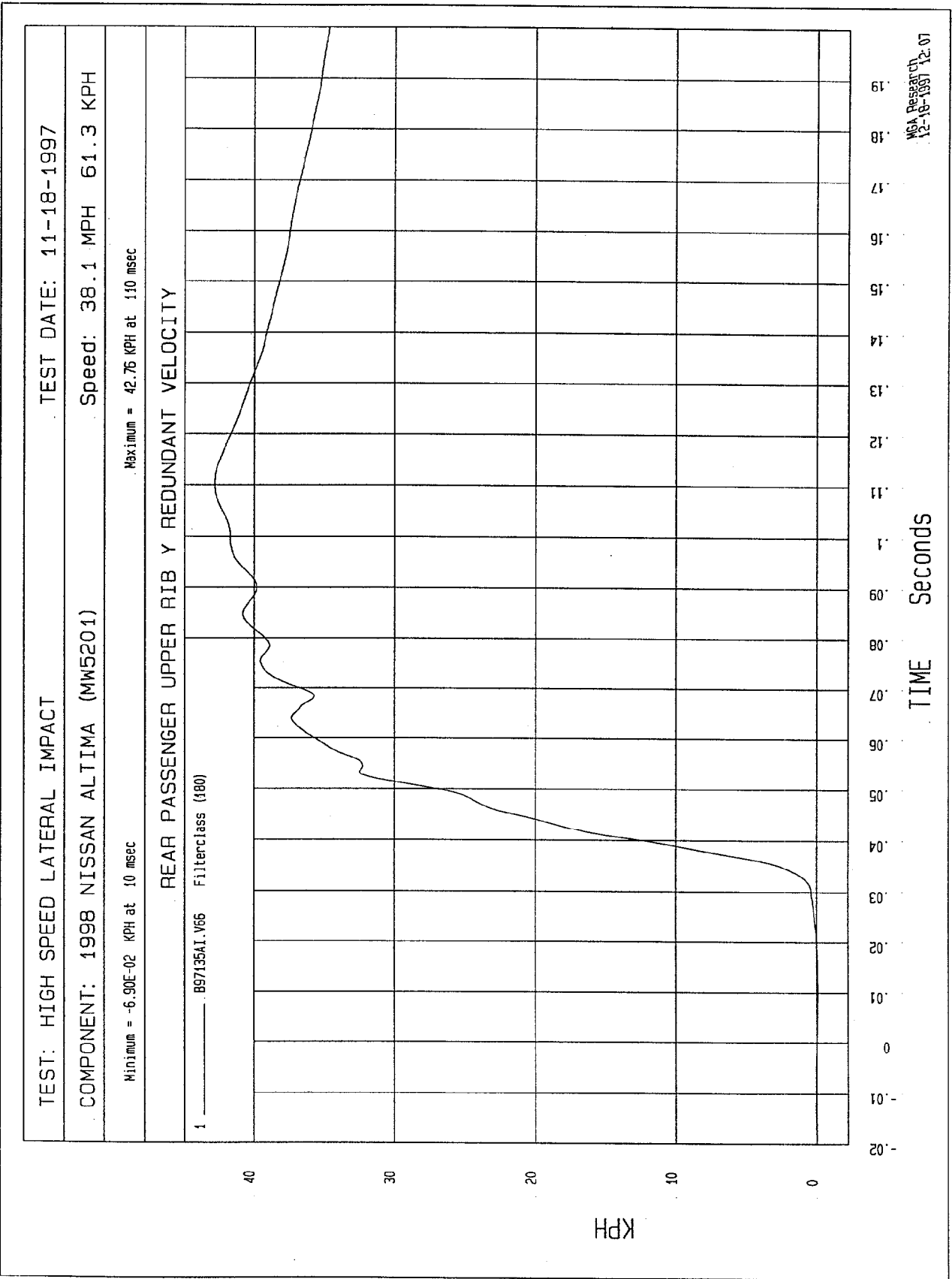
DRIVER PELVIS Y REDUNDANT VELOCITY

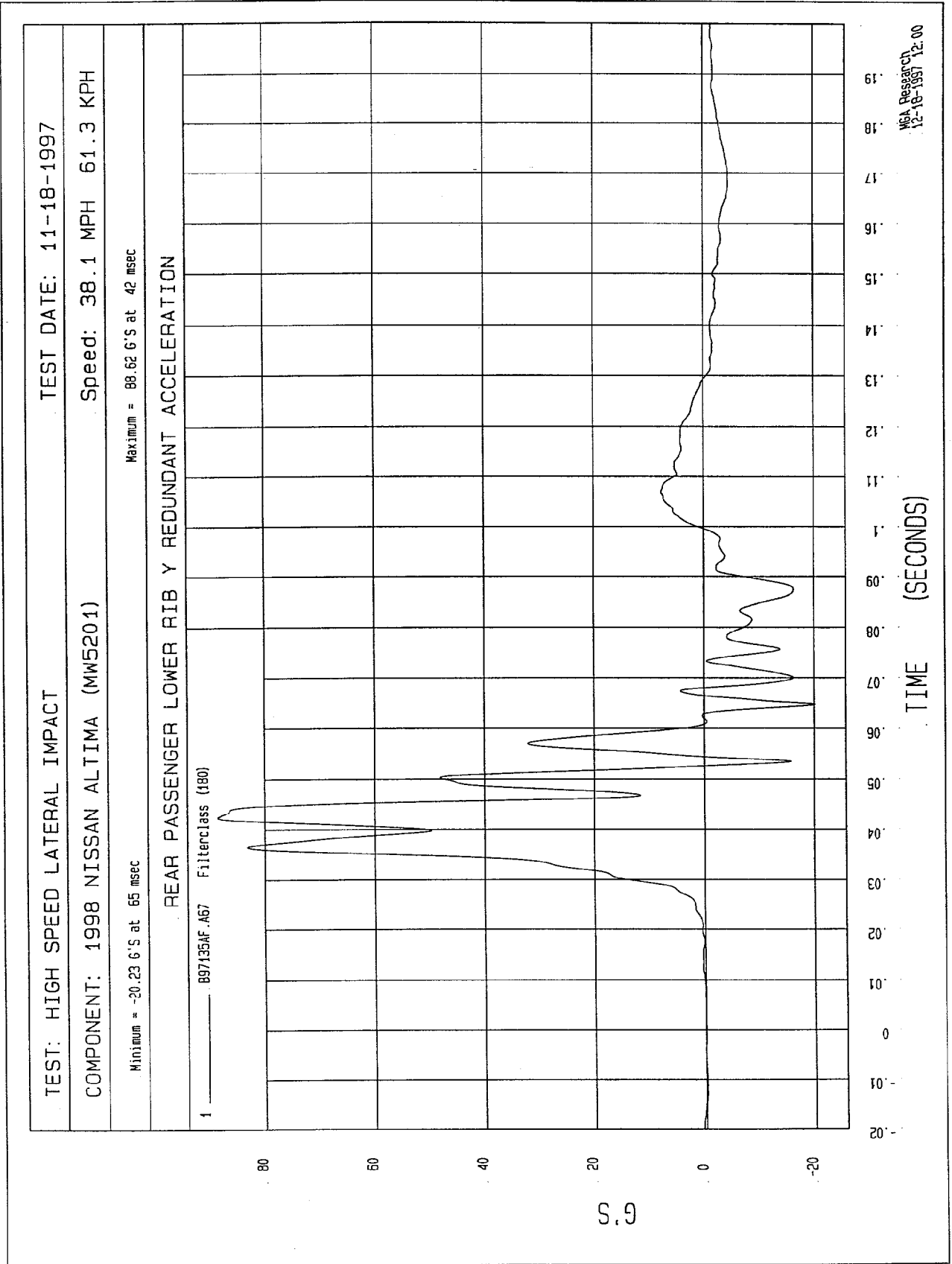


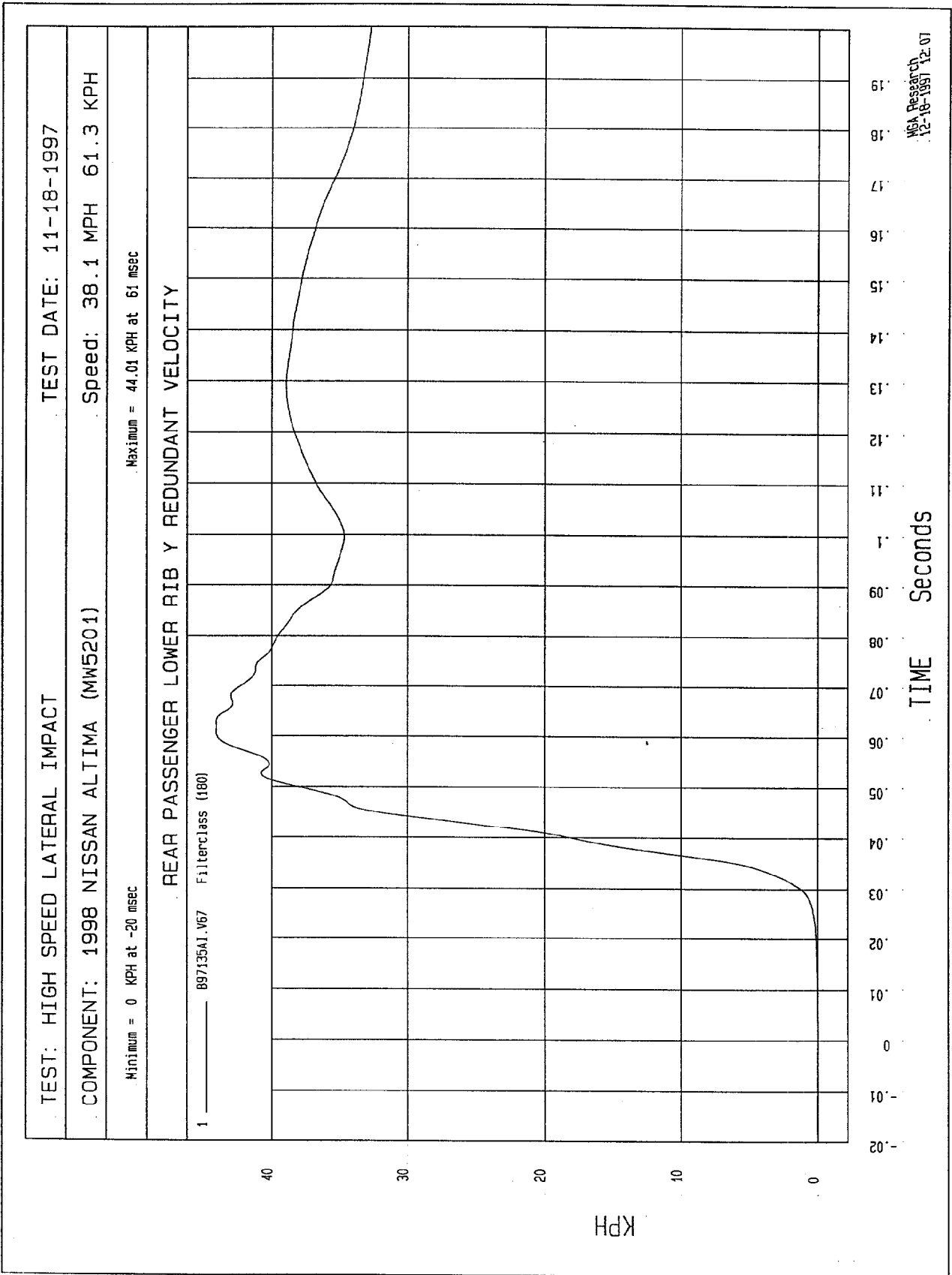
TIME Seconds

WGA Research
12-18-1997 12:07



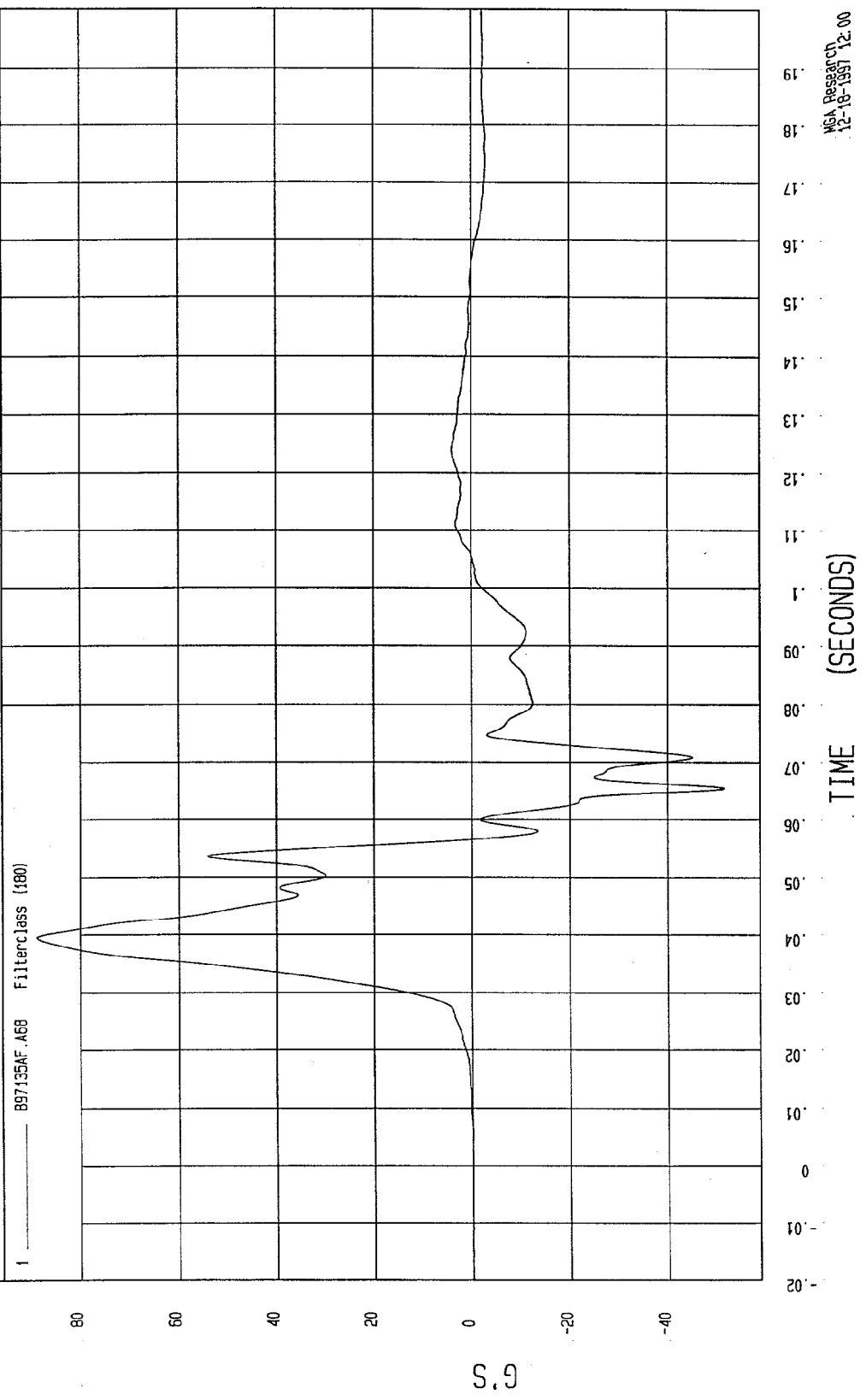






TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -51.55 G's at 66 msec	Maximum = 88.90 G's at 40 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION

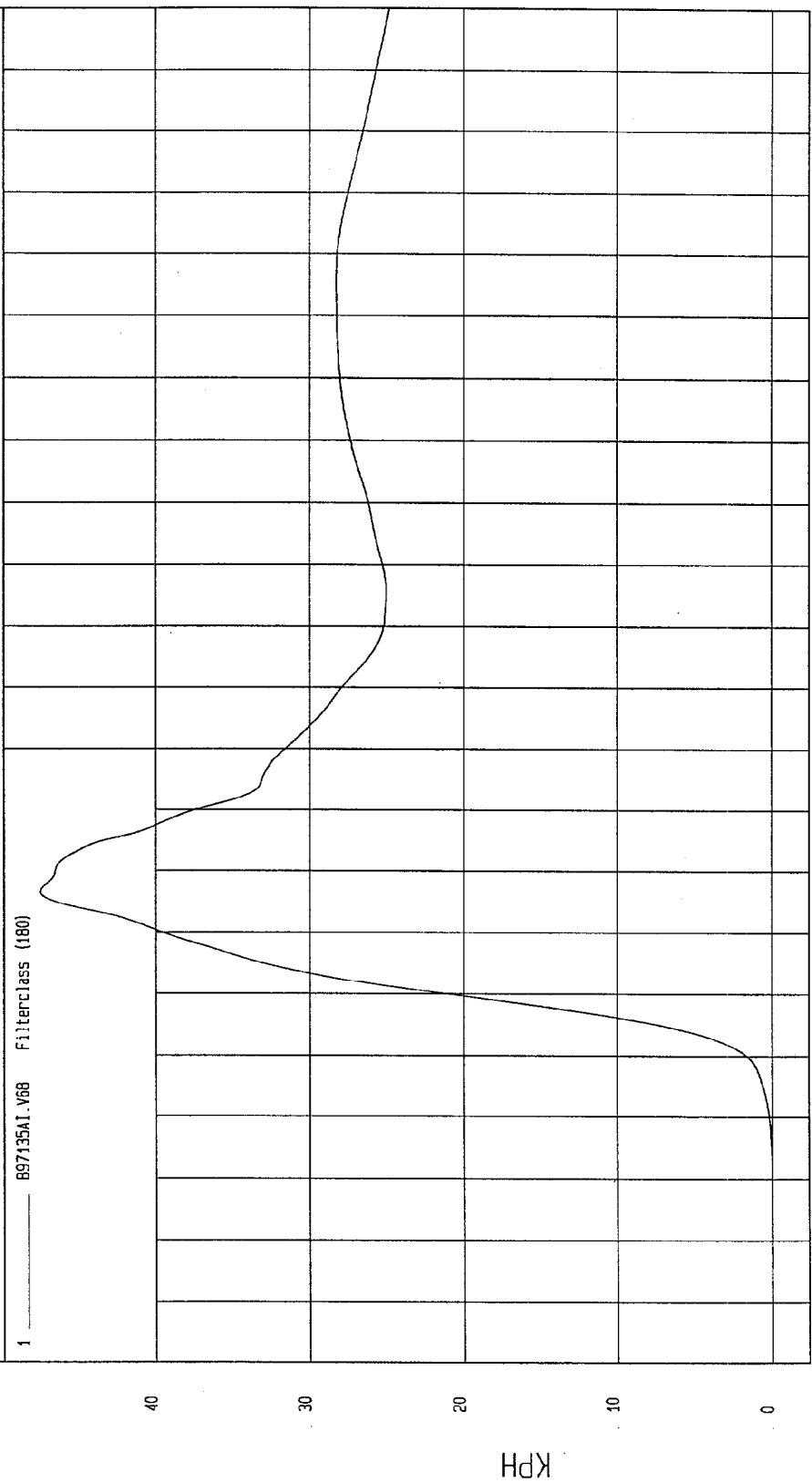


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

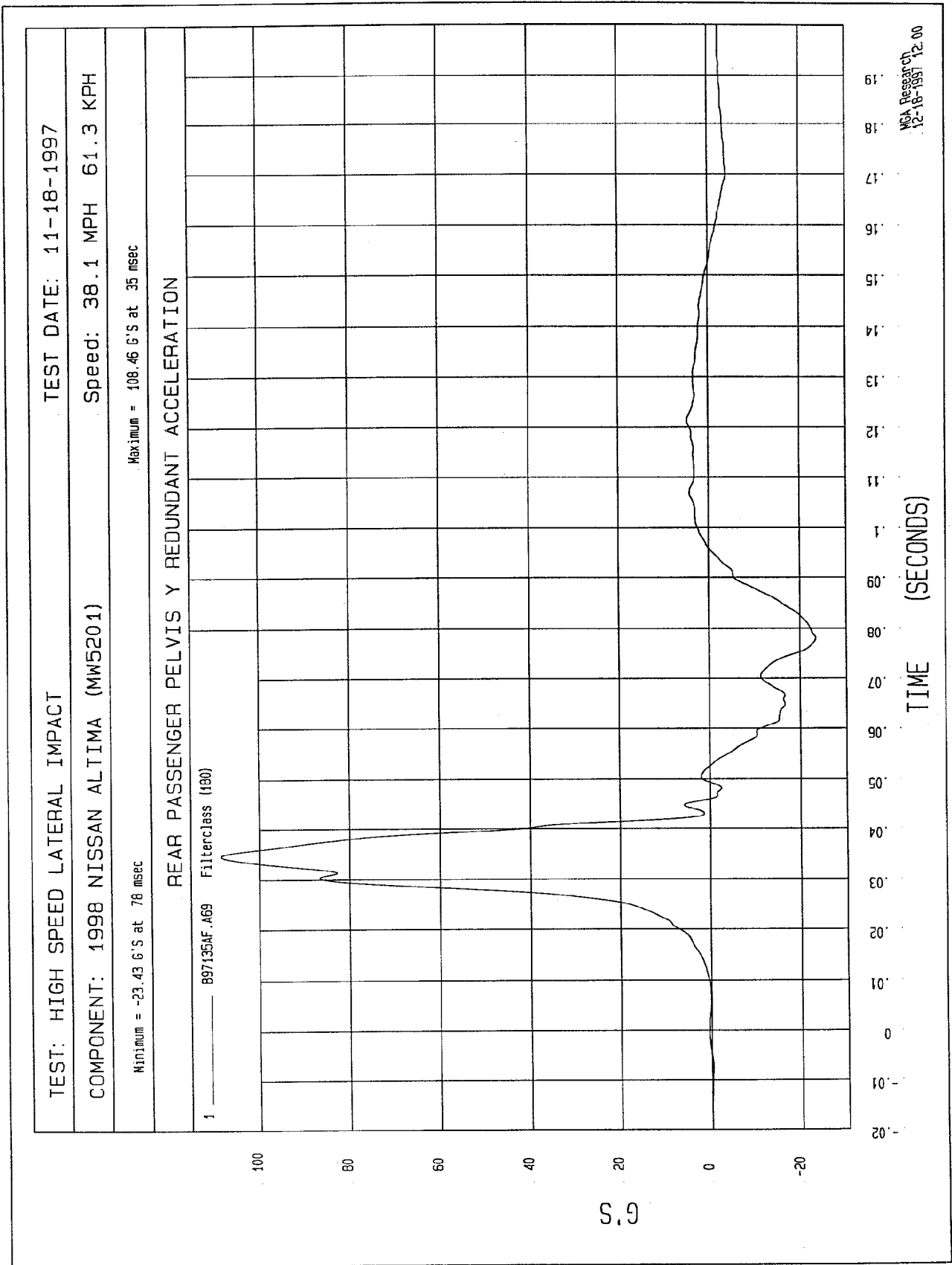
Minimum = -2.59E-02 KPH at 7 msec Maximum = 47.50 KPH at 57 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY



TIME Seconds

NGA Research
12-18-1997 12:07

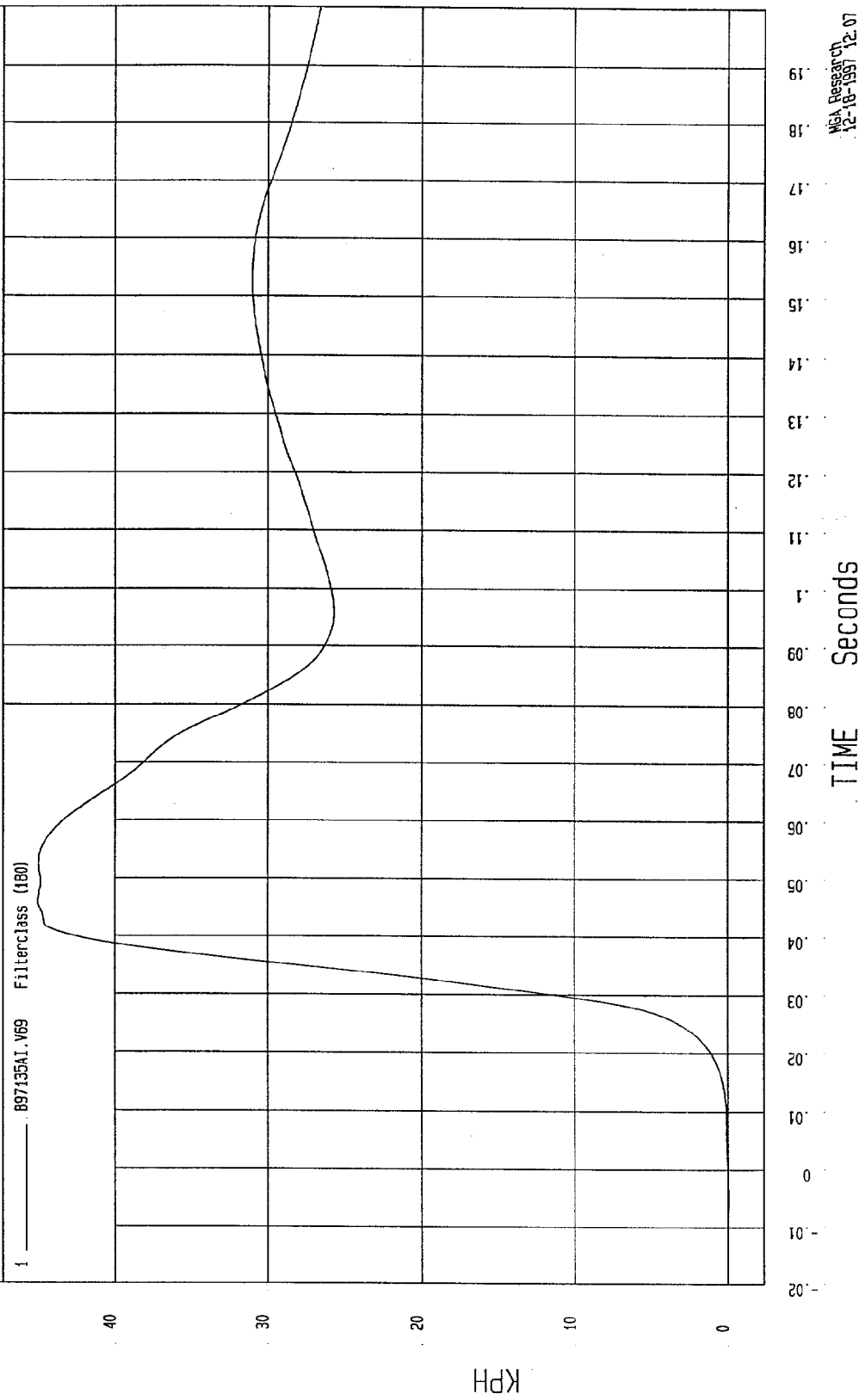


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -5.99E-02 KPH at -5 msec Maximum = 45.01 KPH at 46 msec

REAR PASSENGER PELVIS Y REDUNDANT VELOCITY



NSA Research
12-18-1997 12:07

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

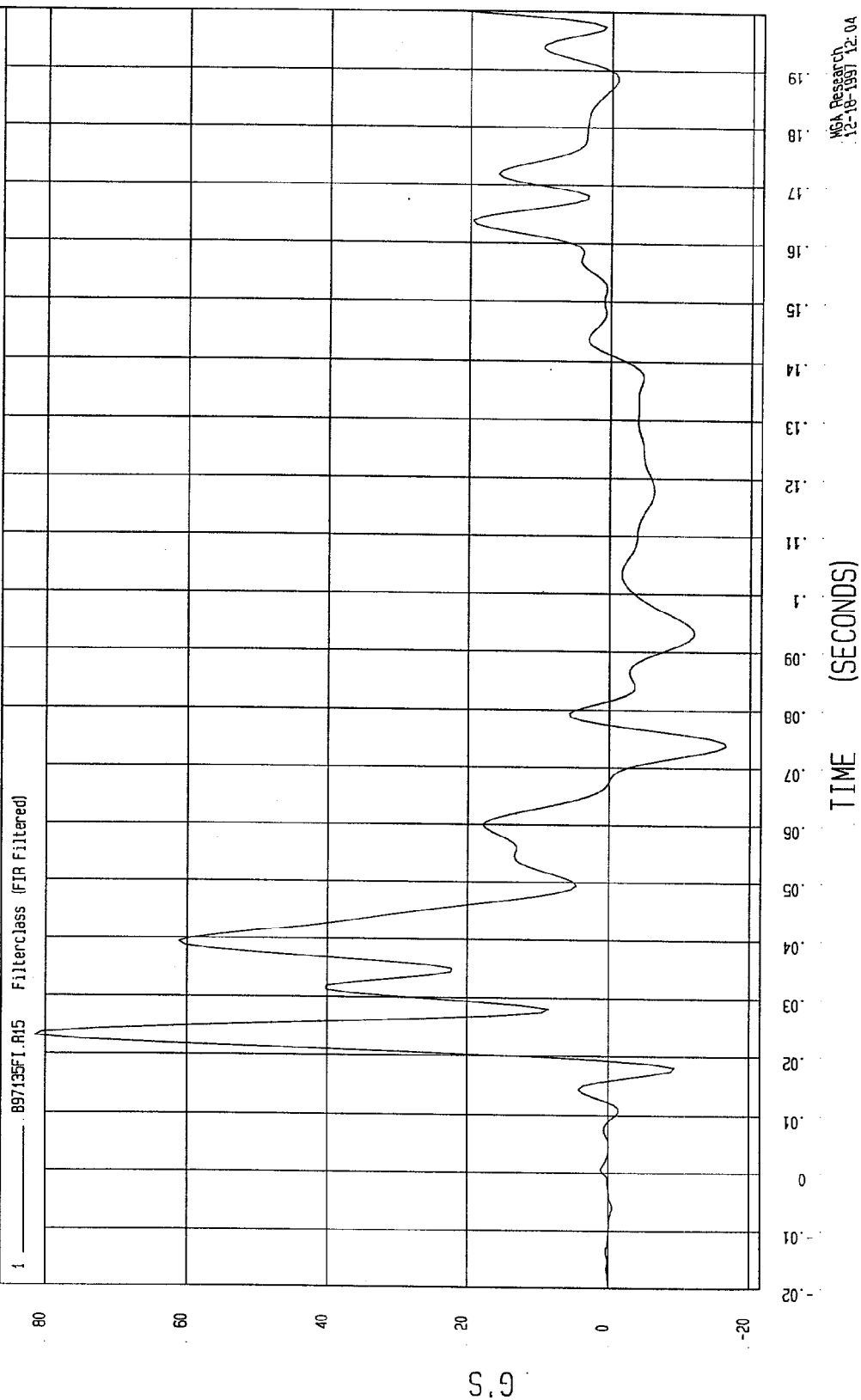
Speed: 38.1 MPH 61.3 KPH

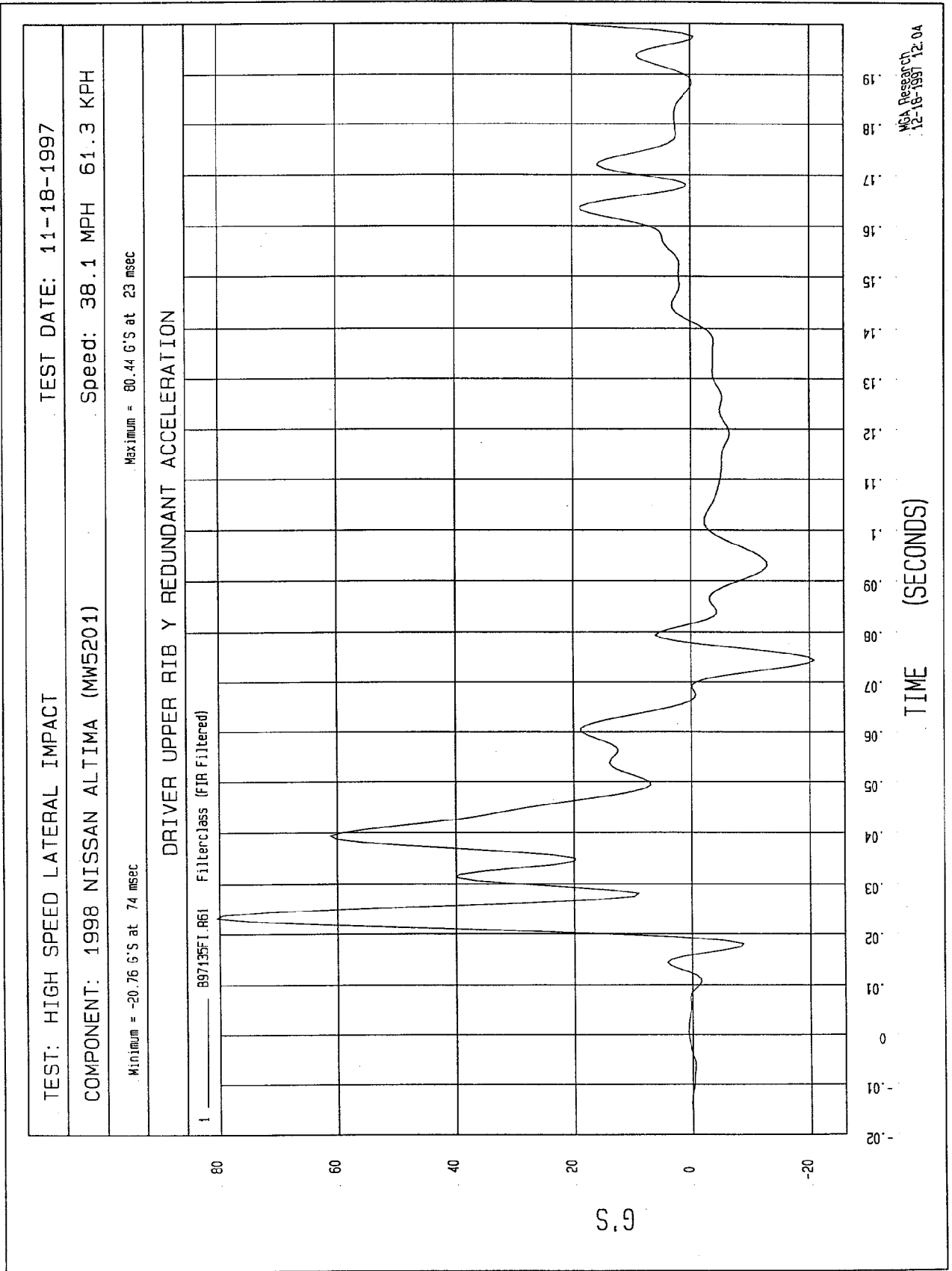
COMPONENT: 1998 NISSAN ALTIMA (MW5201)

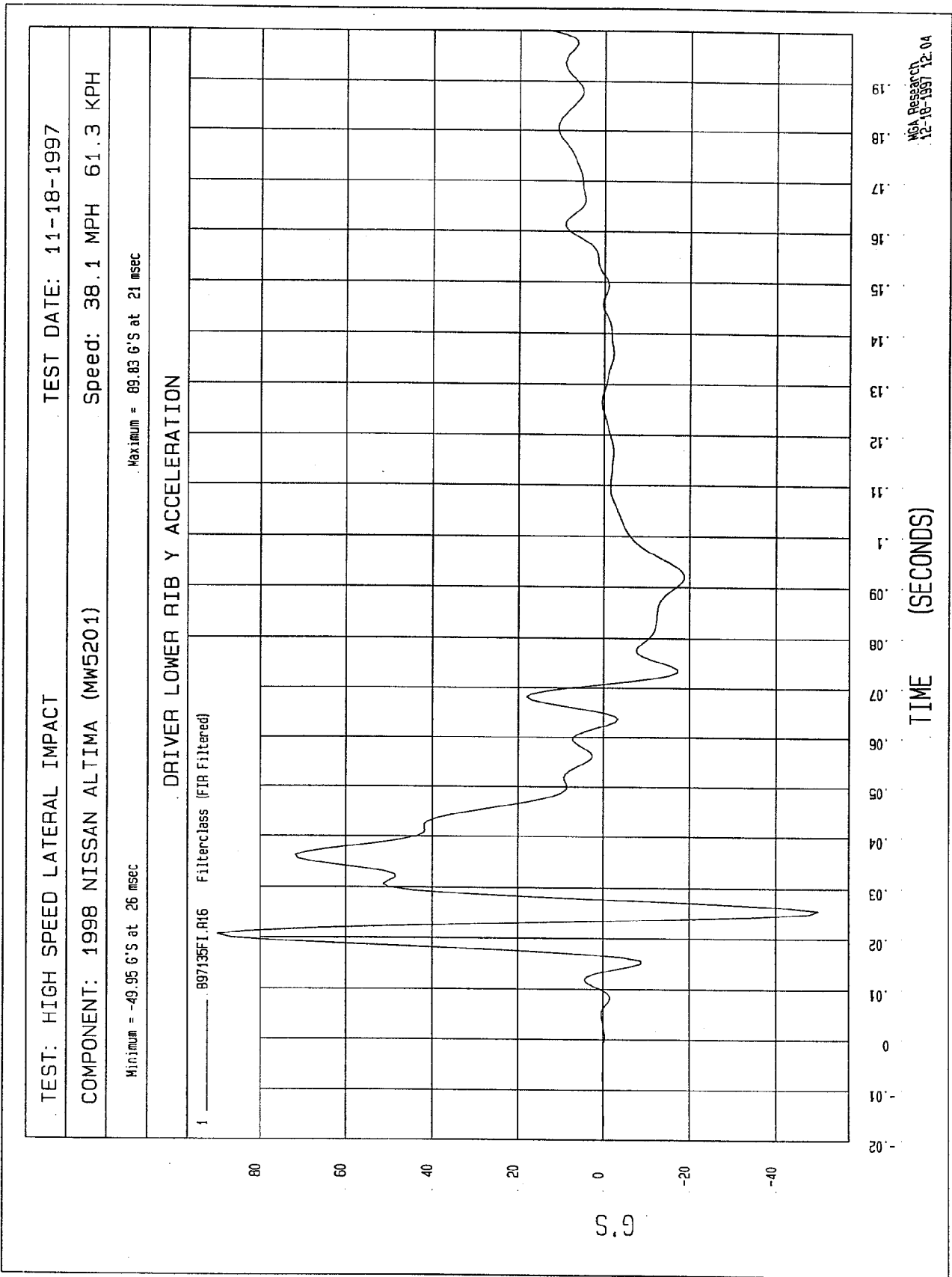
Maximum = 81.45 G'S at 23 msec

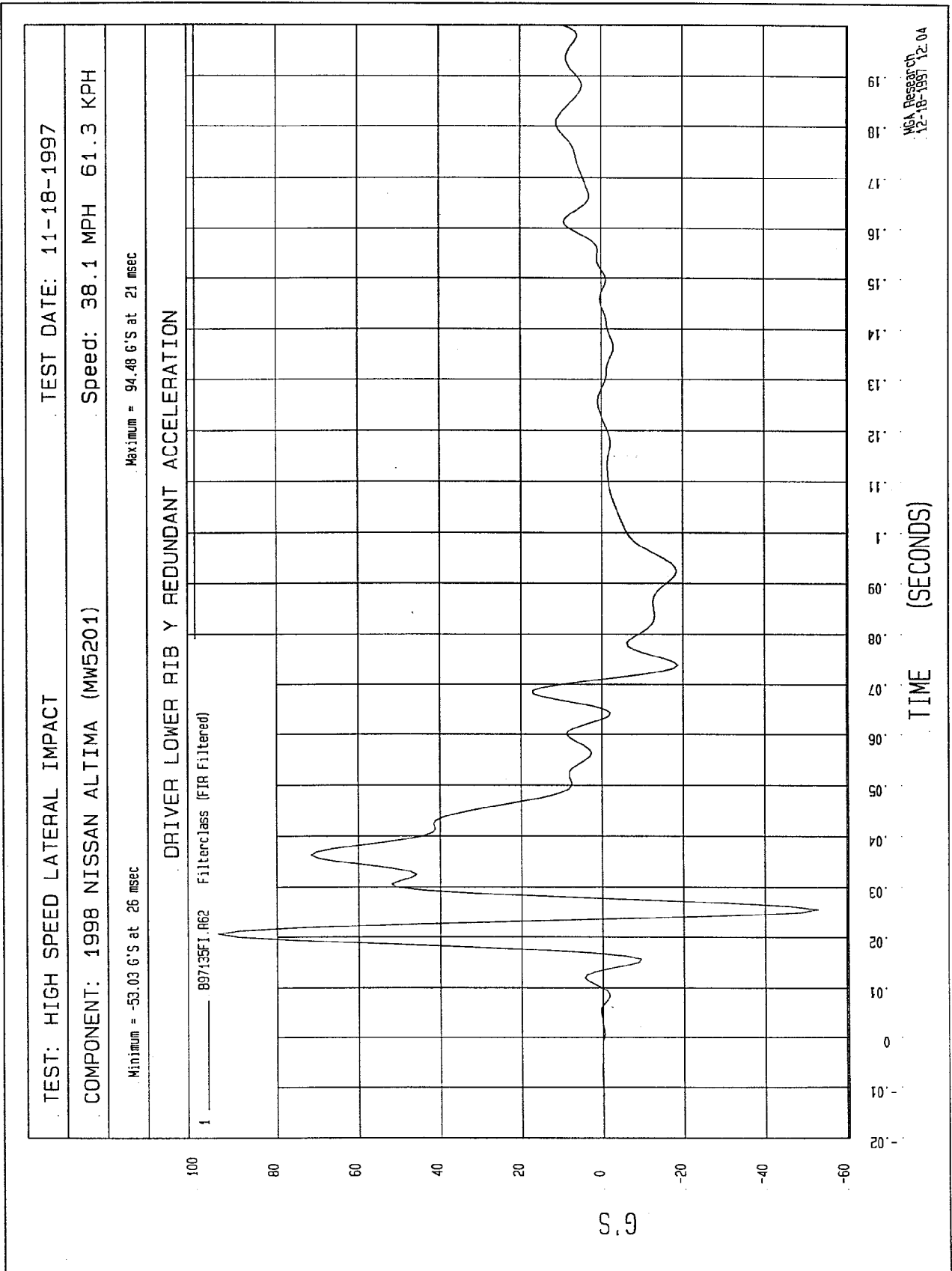
Minimum = -16.59 G'S at 74 msec

DRIVER UPPER RIB Y ACCELERATION







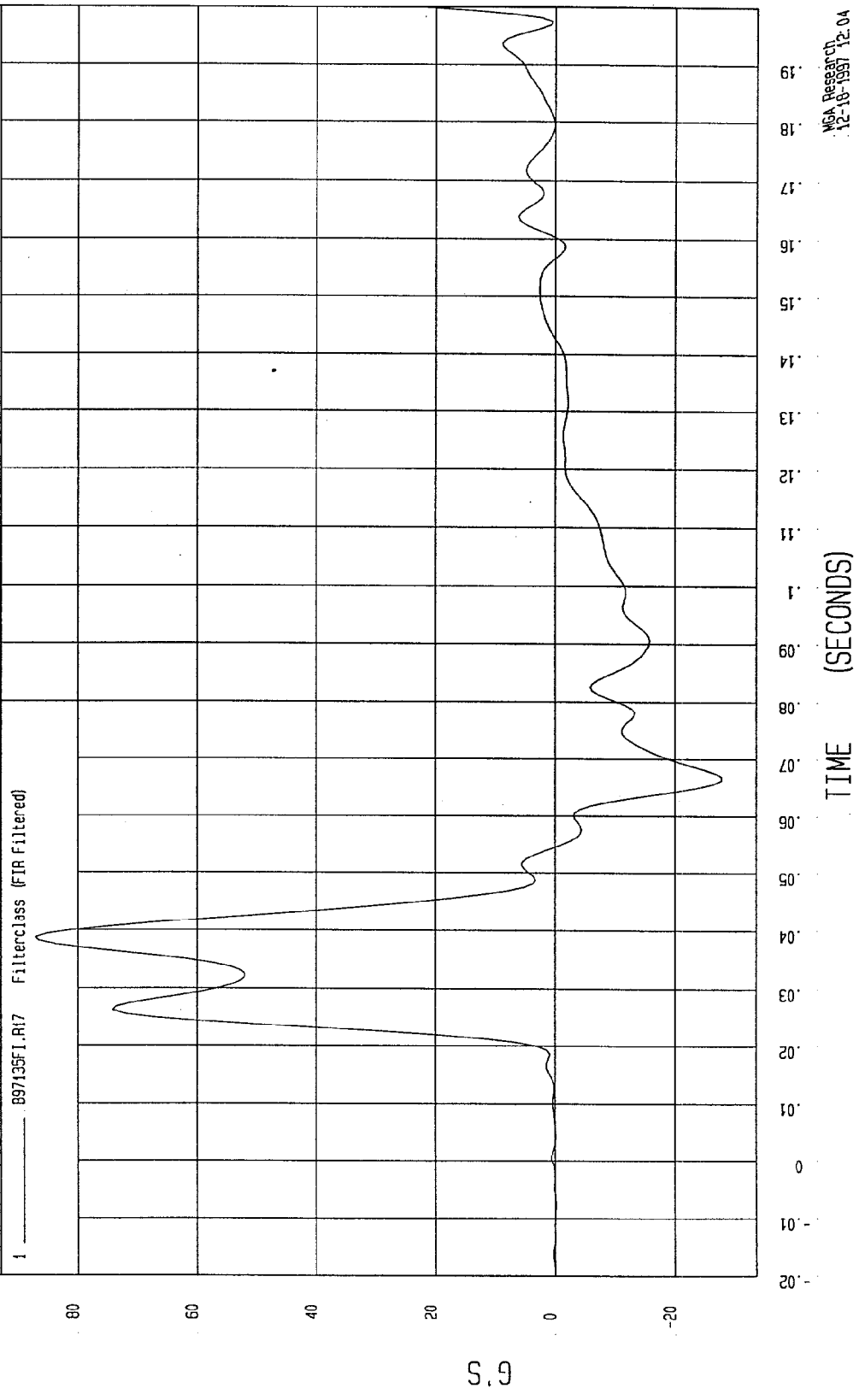


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -27.70 G'S at 67 msec Maximum = 87.09 G'S at 39 msec

DRIVER LOWER SPINE Y ACCELERATION



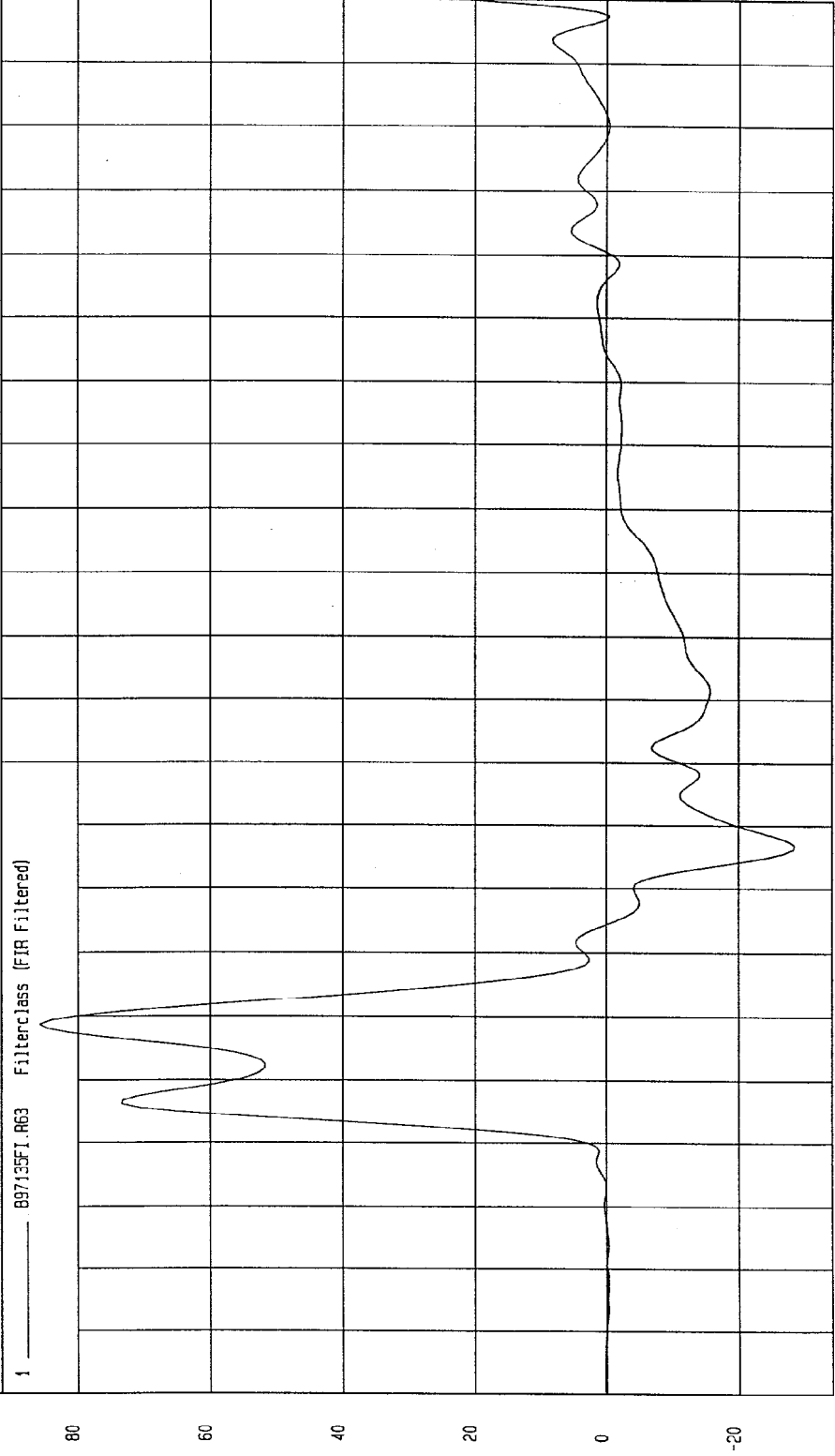
NCA Research
12-18-1997 12.04

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

Minimum = -28.29 G'S at 67 msec Maximum = 85.65 G'S at 39 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION

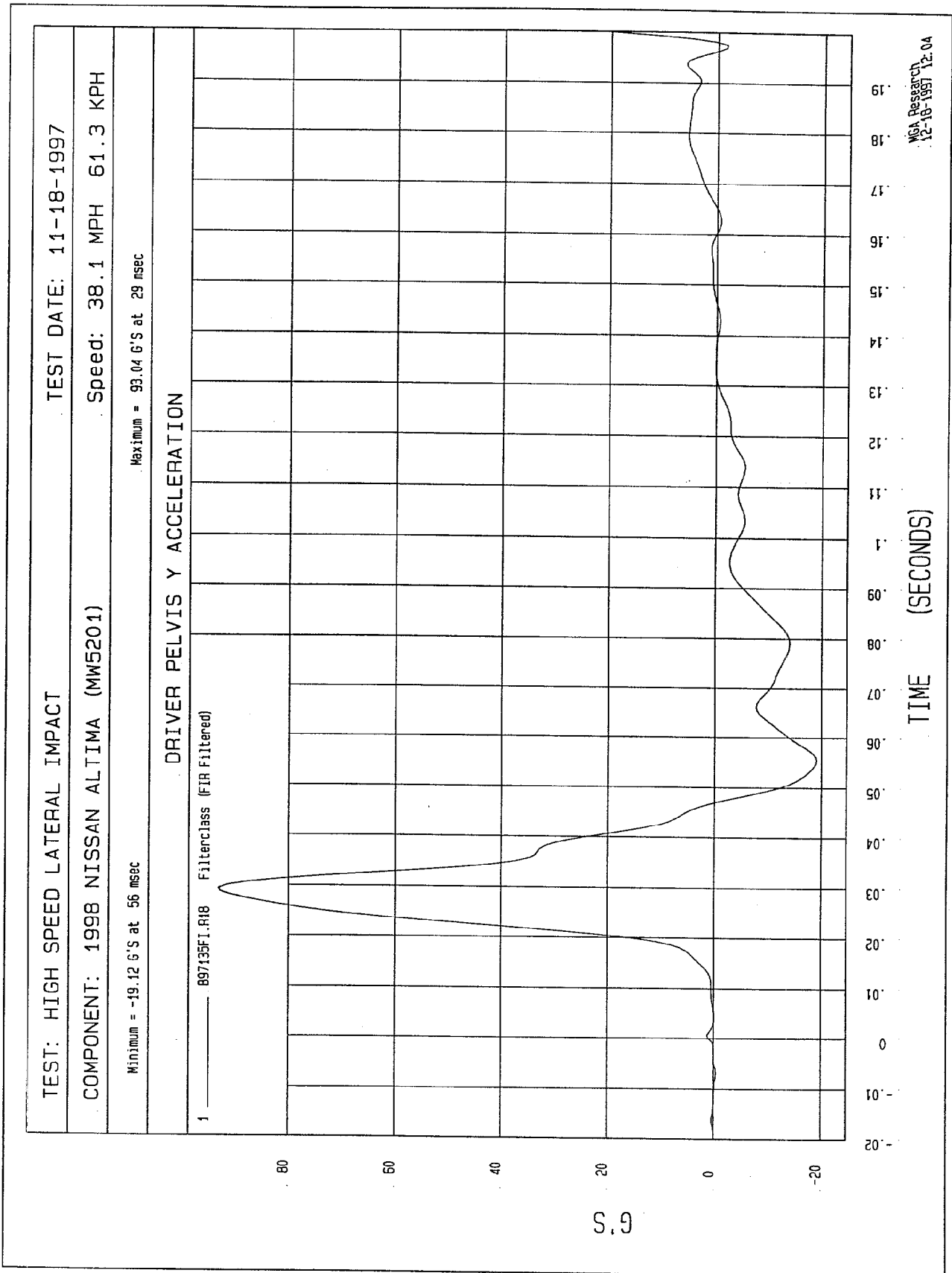


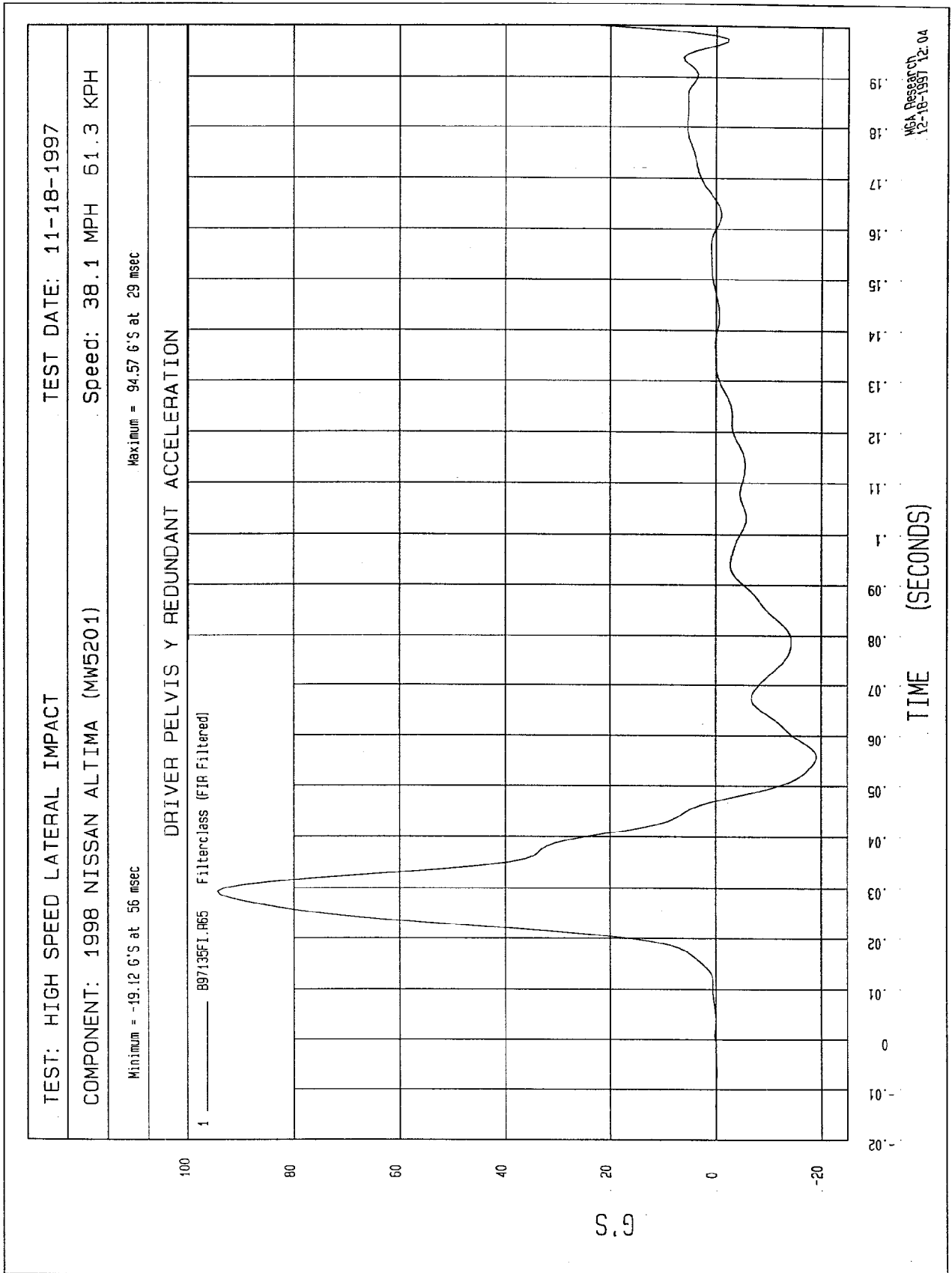
TIME (SECONDS)

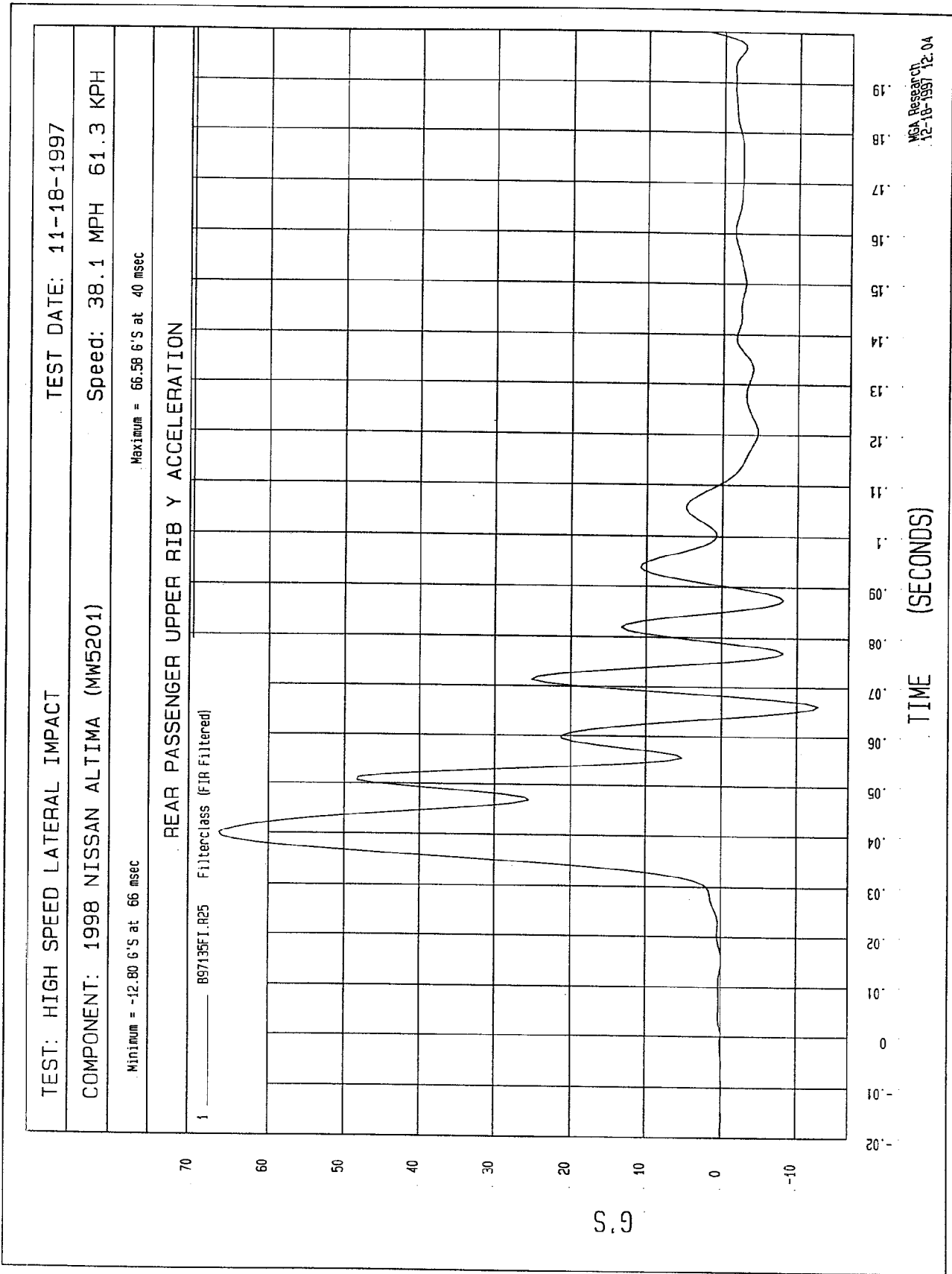
80
60
40
20
0
-20

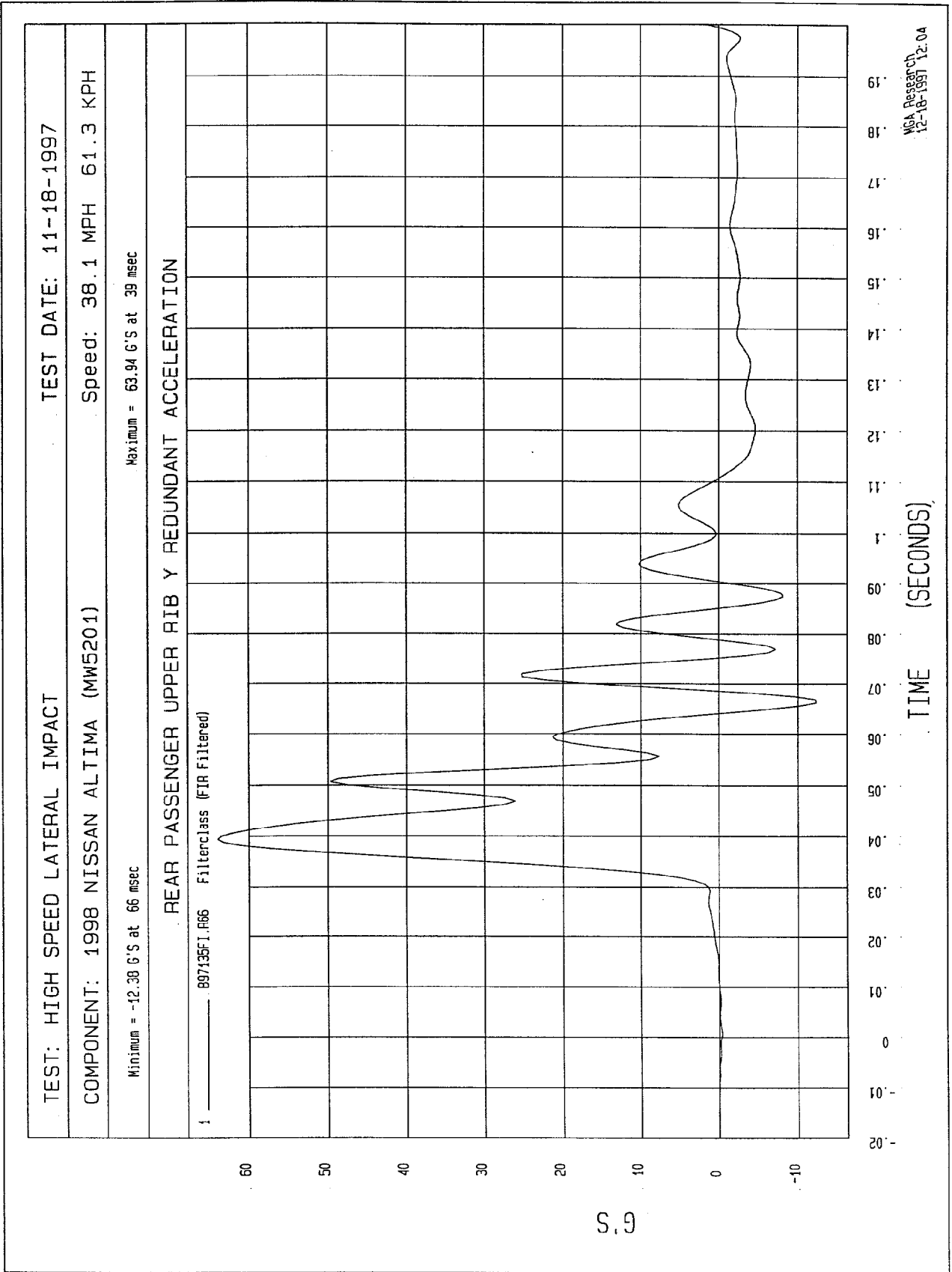
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

MGA Research
12-18-1997 12:04







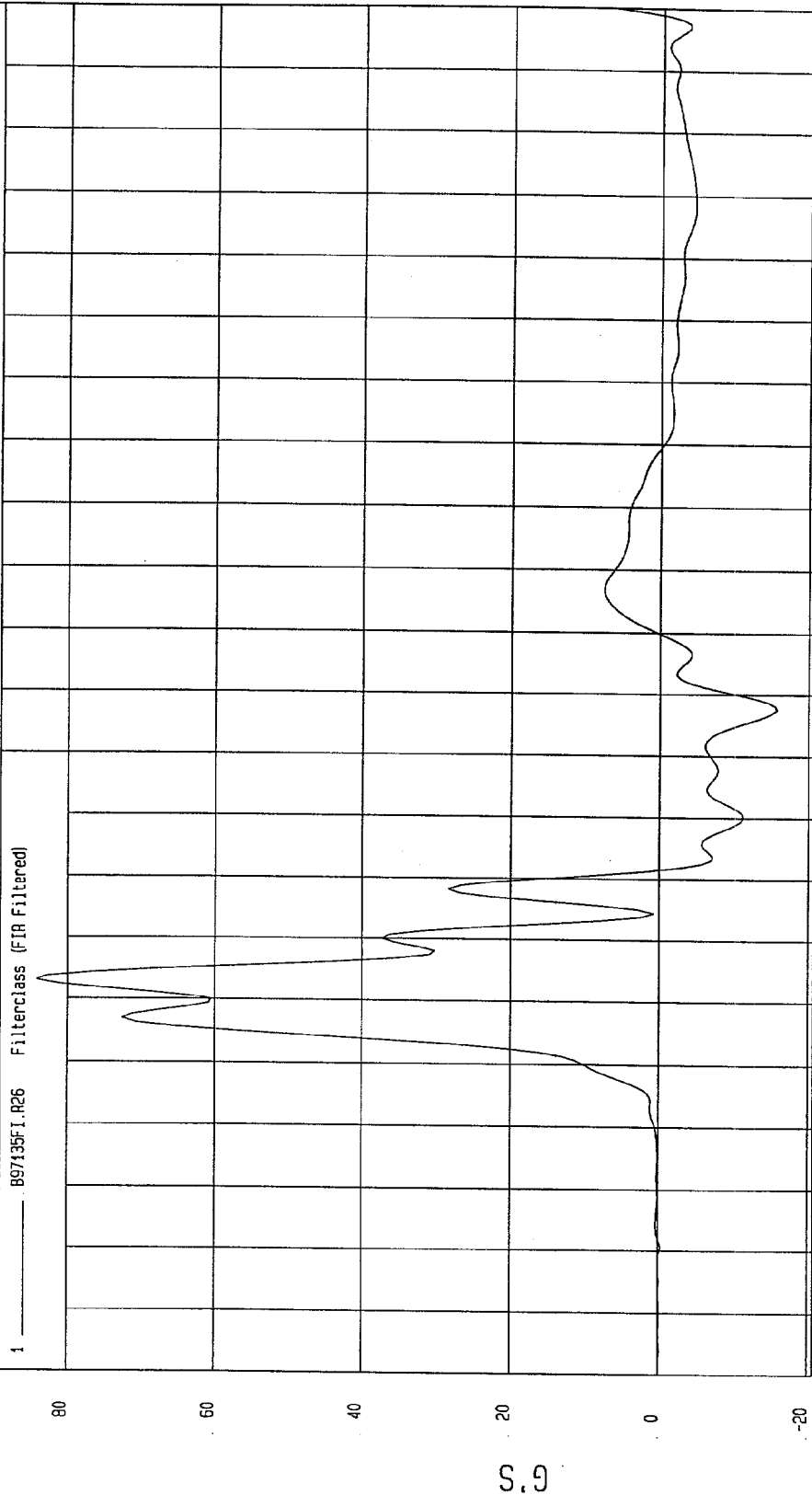


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 11-18-1997

COMPONENT: 1998 NISSAN ALTIMA (MW5201) Speed: 38.1 MPH 61.3 KPH

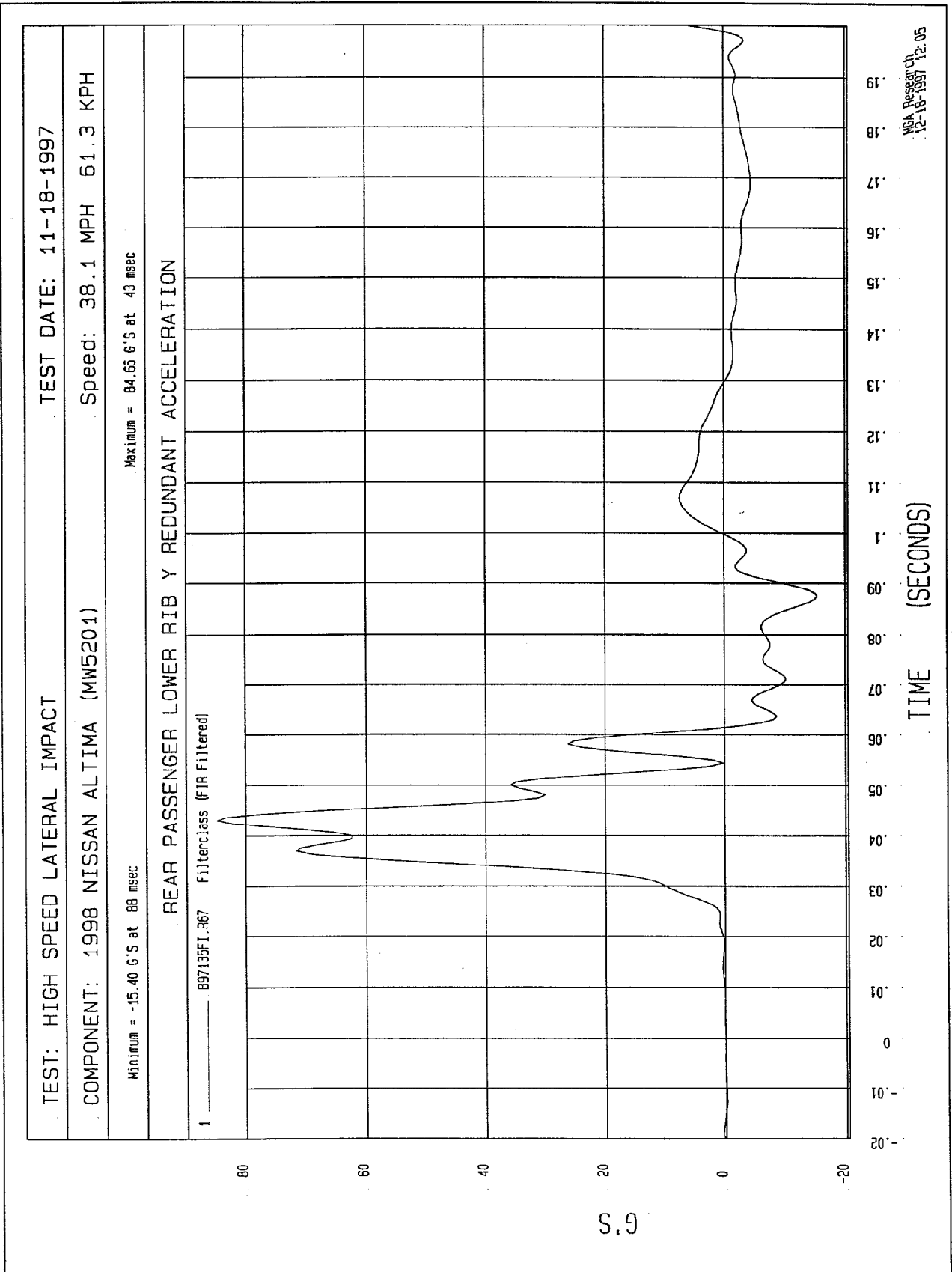
Minimum = -15.72 G'S at 88 msec Maximum = 84.08 G'S at 43 msec

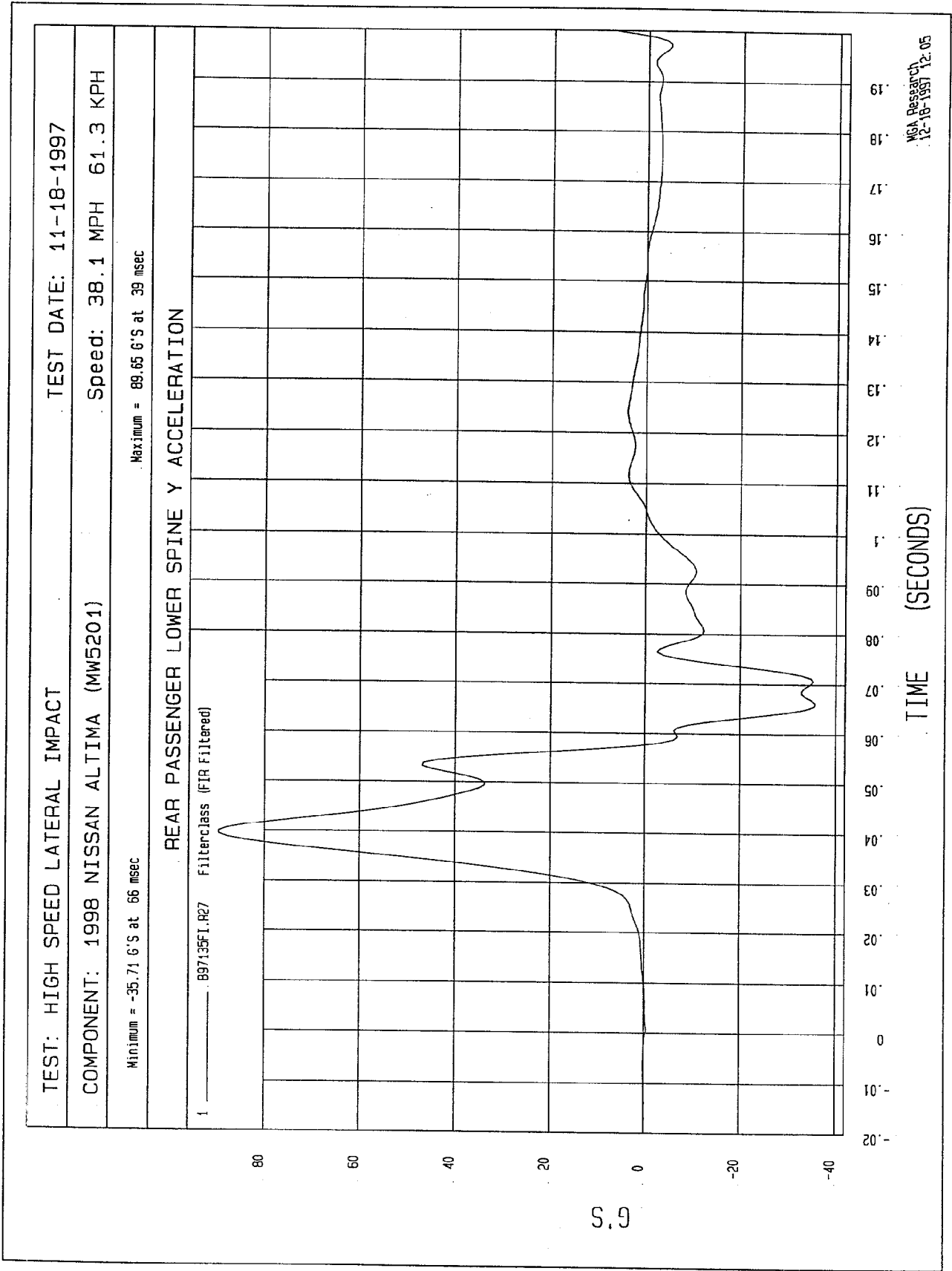
REAR PASSENGER LOWER RIB Y ACCELERATION



NCA Research
12-18-1997 12:04

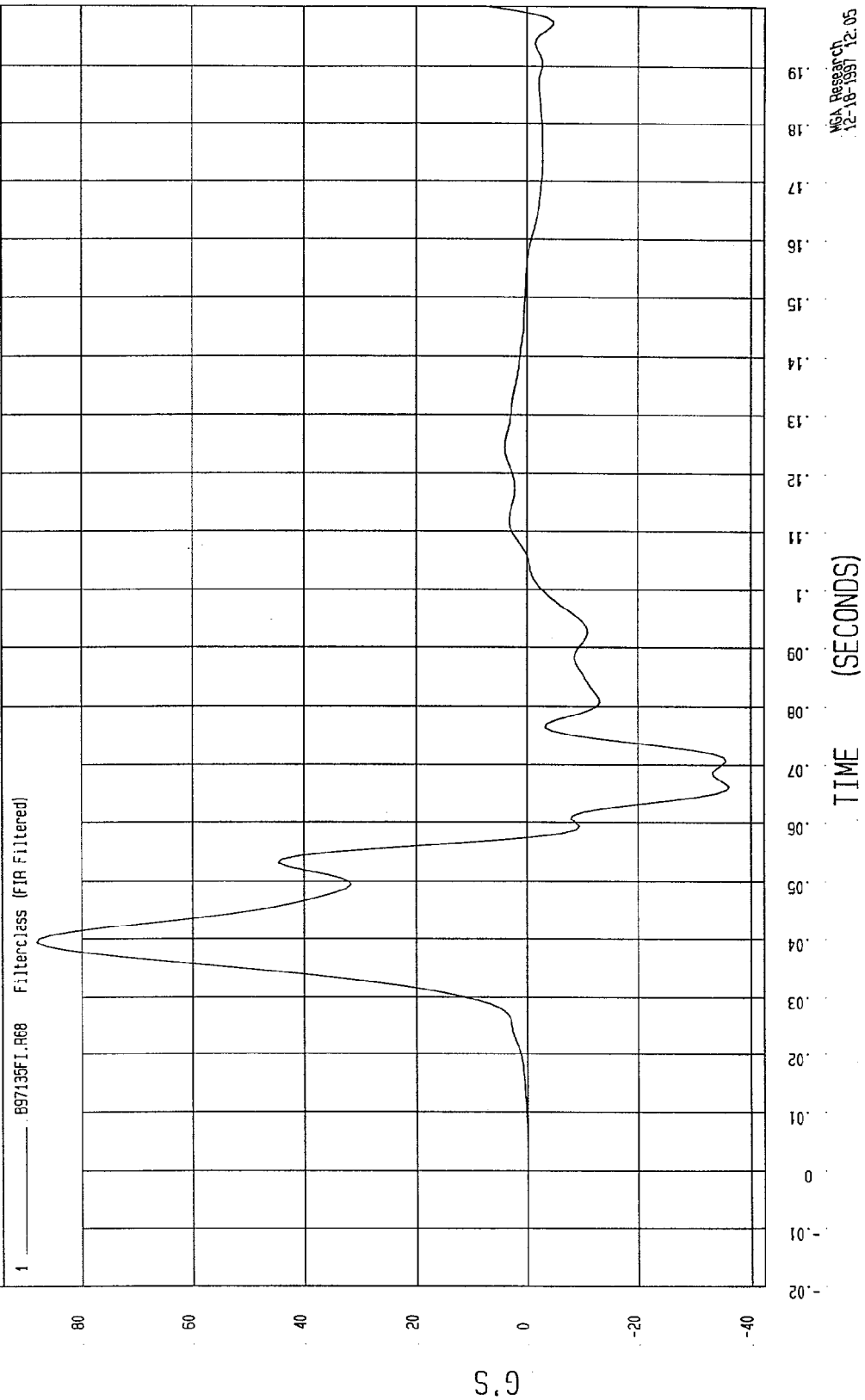
TIME (SECONDS)





TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 11-18-1997
COMPONENT: 1998 NISSAN ALTIMA (MW5201)	Speed: 38.1 MPH 61.3 KPH
Minimum = -36.08 G'S at 66 msec	Maximum = 87.91 G'S at 39 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 11-18-1997

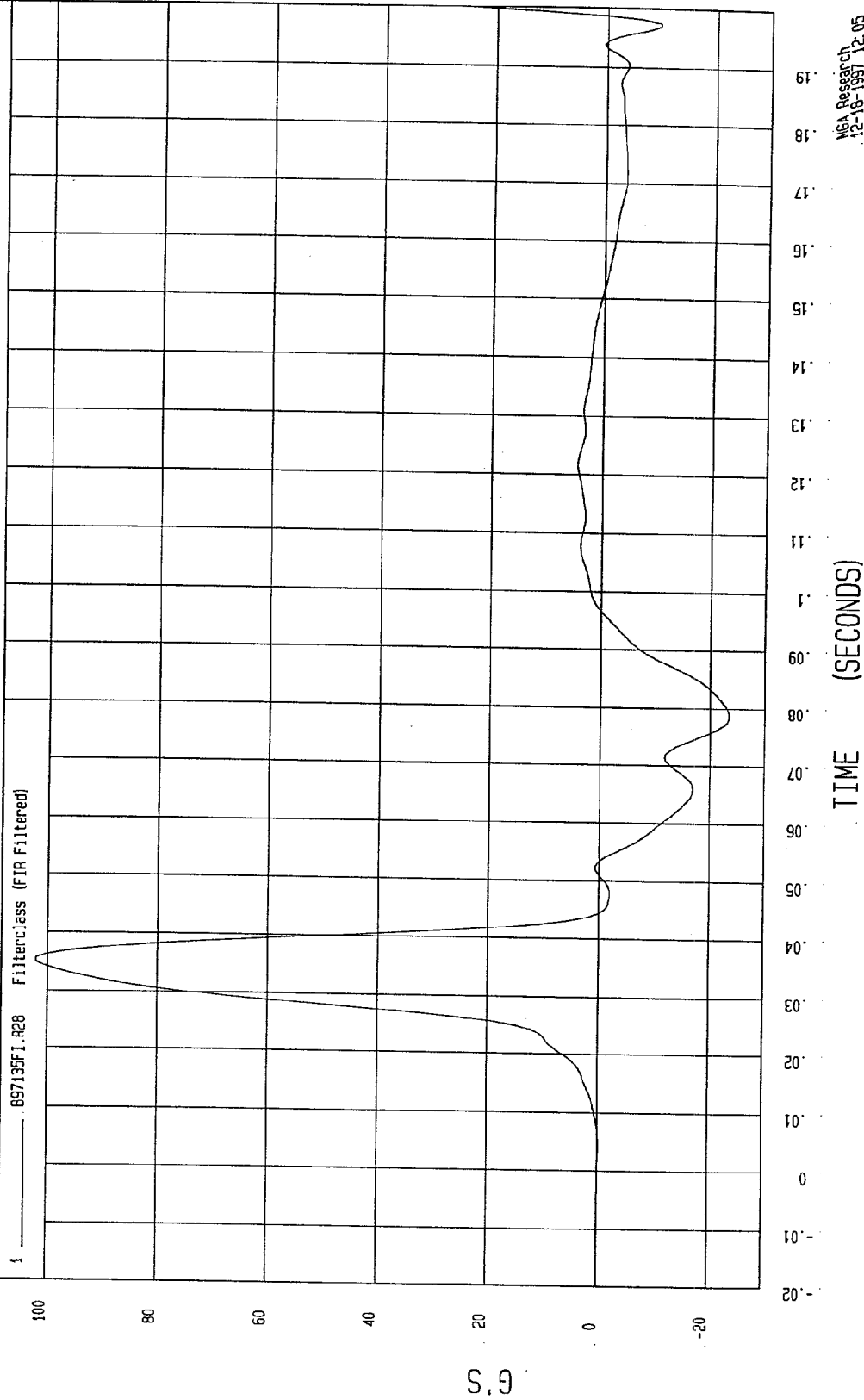
COMPONENT: 1998 NISSAN ALTIMA (MW5201)

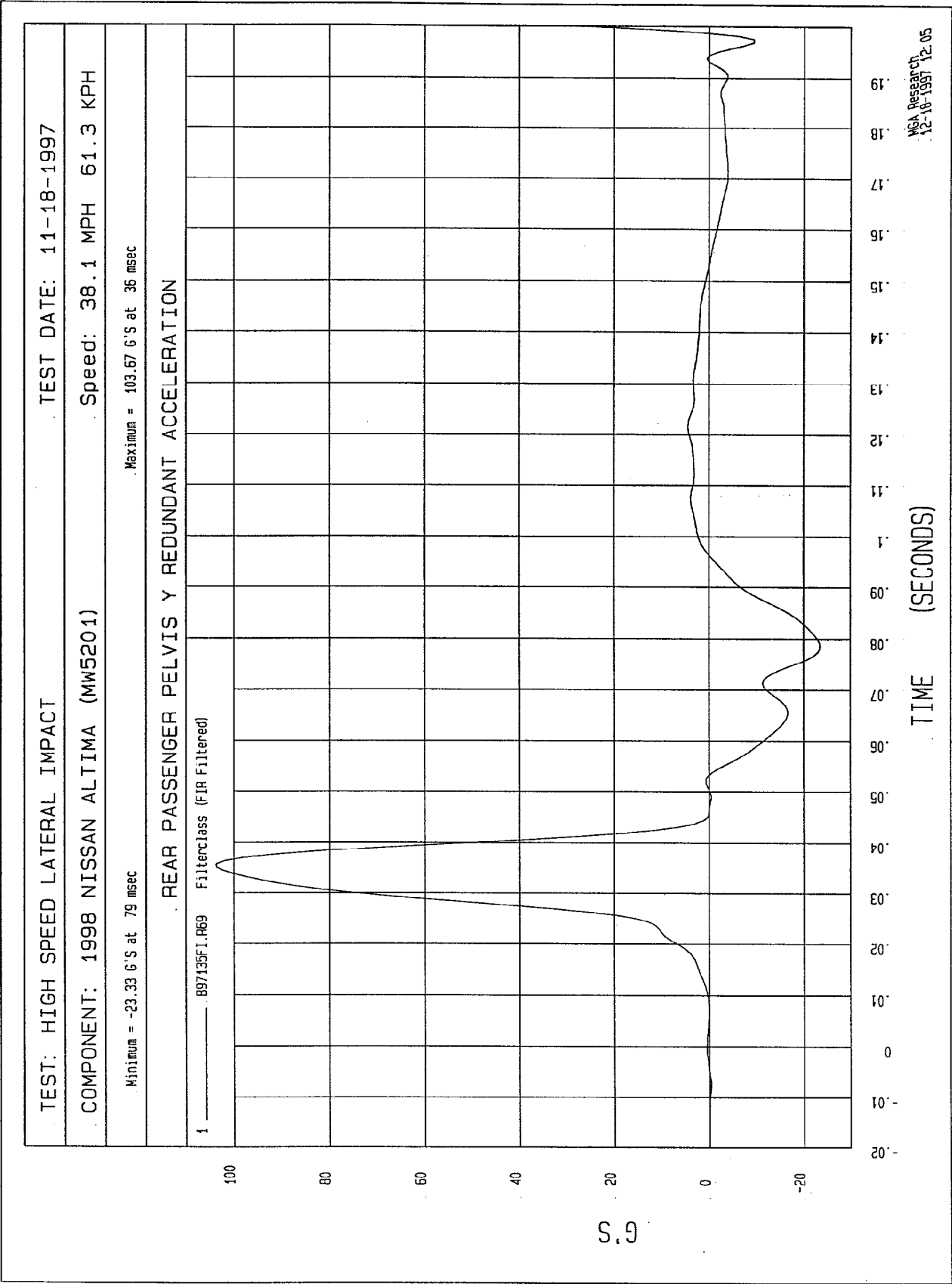
Speed: 38.1 MPH 61.3 KPH

Minimum = -23.45 G'S at 79 msec

Maximum = 102.07 G'S at 35 msec

REAR PASSENGER PELVIS Y ACCELERATION





APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-97-DC011

DUMMY PERFORMANCE CALIBRATIONS

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

1997 NISSAN ALTIMA 4-DOOR SEDAN
NHTSA NO. MV5201

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: November 18, 1997

Report Date: January 2, 1998

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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DUMMY S/N: 272	POST-TEST CERTIFICATION DATA	4-1
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	VEHICLE AND DUMMY TEMPERATURE	7-1

PRE-TEST CERTIFICATION DATA

Front 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: November 17, 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:

Tim M. L.

APPROVED BY:

Rene Kahake

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 14, 1997

DUMMY NUMBER: 271

TEST NUMBER: D972132

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	41
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Mahan

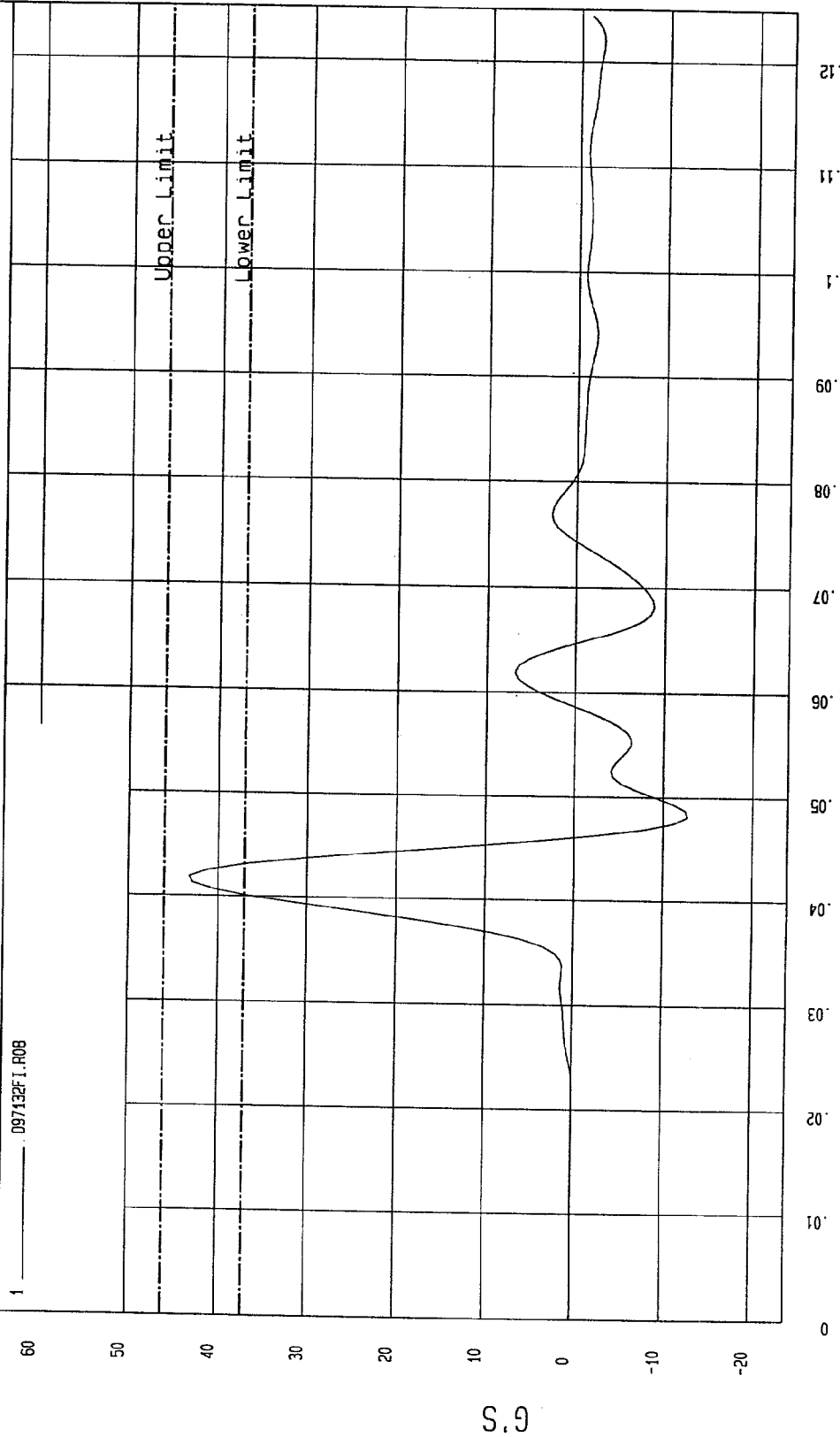
APPROVED BY Rene Kabahe

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 11-14-1997 - 15:01

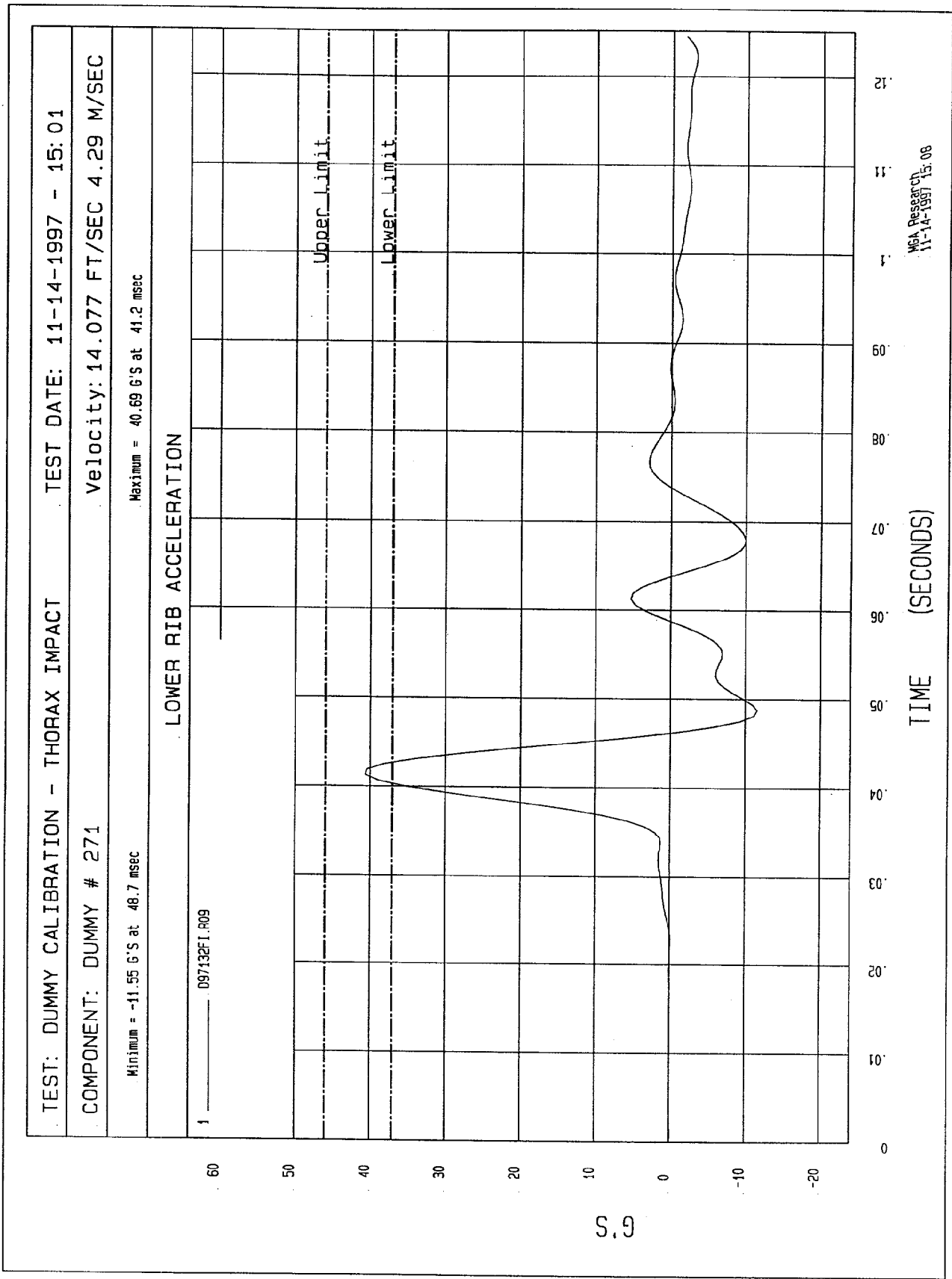
COMPONENT: DUMMY # 271 Velocity: 14.077 FT/SEC 4.29 M/SEC

Minimum = -12.72 G'S at 48.1 msec Maximum = 43.25 G'S at 41.8 msec

UPPER RIB ACCELERATION



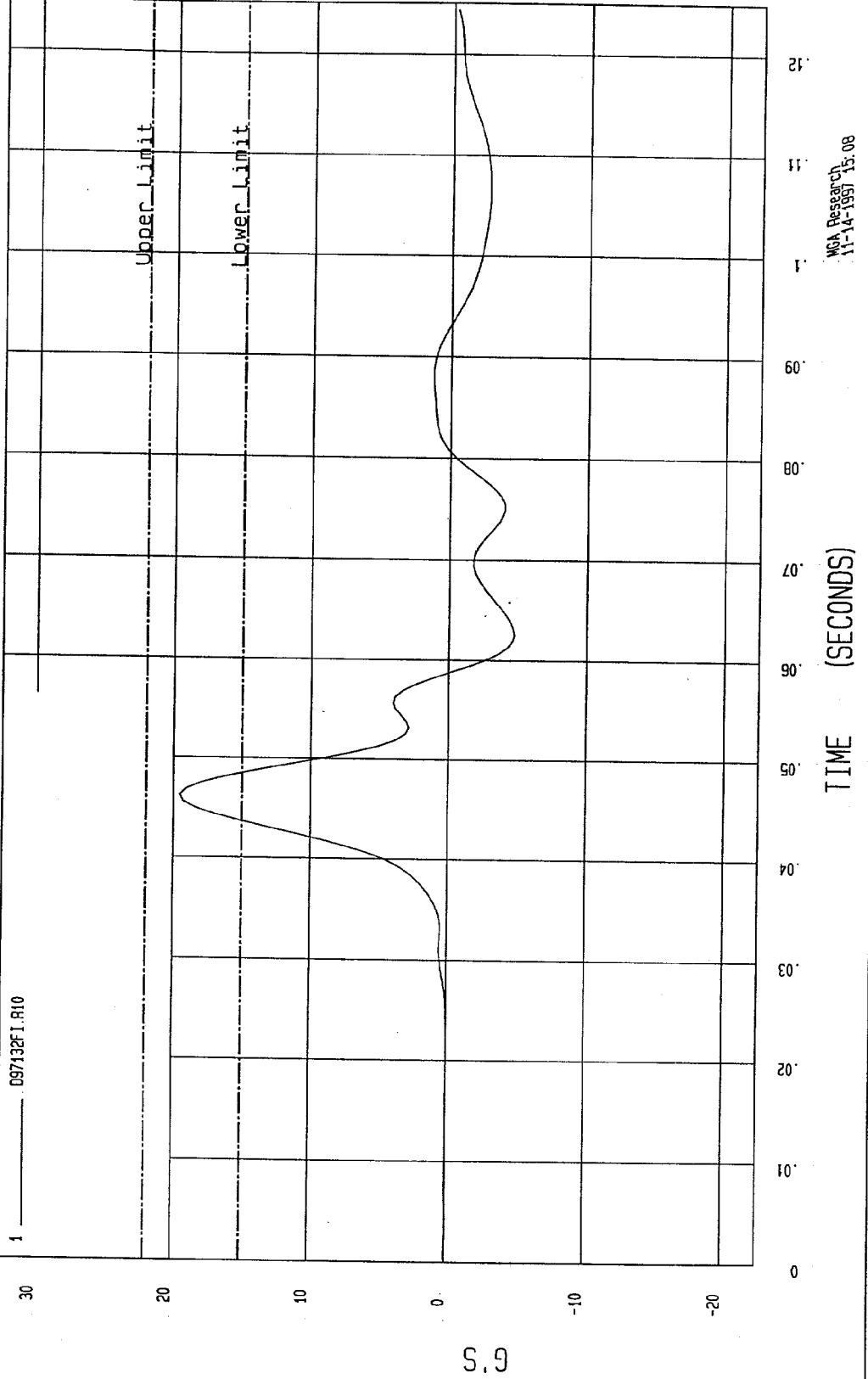
MOA Research
11-14-1997 15:07



TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 11-14-1997 - 15:02:23
COMPONENT: DUMMY # 271 Velocity: 14.077 FT/SEC 4.29 M/SEC

Minimum = -4.68 G'S at 52.5 msec Maximum = 19.54 G'S at 46.2 msec

LOWER SPINE ACCELERATION



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 14, 1997

DUMMY NUMBER: 271

TEST NUMBER: D972133

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	50

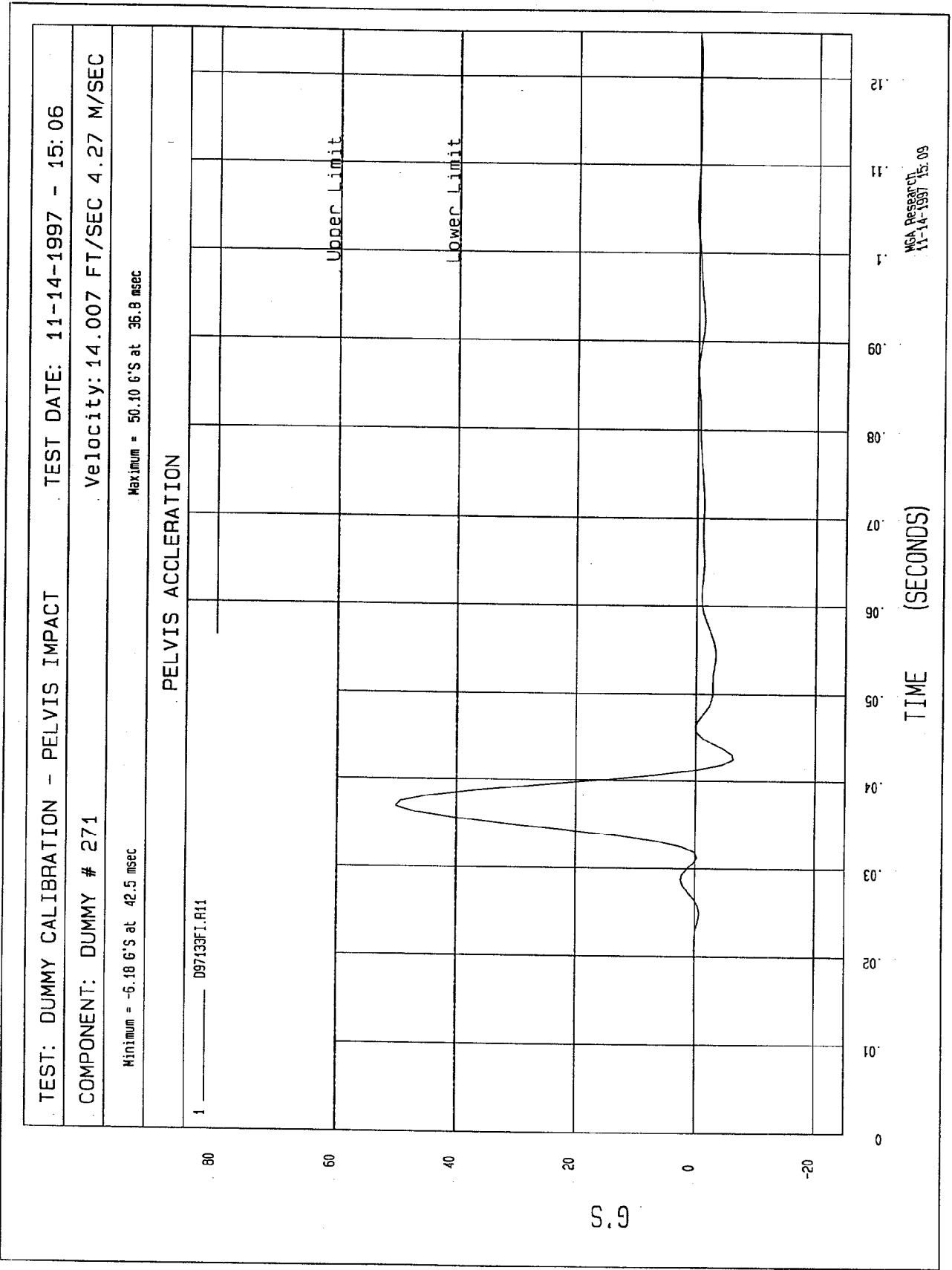
TEST MEETS SPECIFICATIONS

TECHNICIAN

Jim Melillo

APPROVED BY

Dave Kabiske



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: November 14, 1997

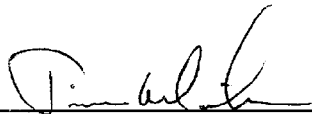
DUMMY NUMBER: 271

TEST NUMBER: D972134

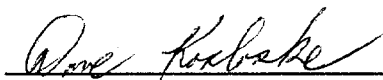
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	30.6
FORCE @ 0.75 in	36.7 - 49.8 lbs	41.7
FORCE @ 1.0 in	50 - 63 lbs	55
FORCE @ 1.3 in	73 - 88 lbs	75

TEST MEETS SPECIFICATIONS

TECHNICIAN



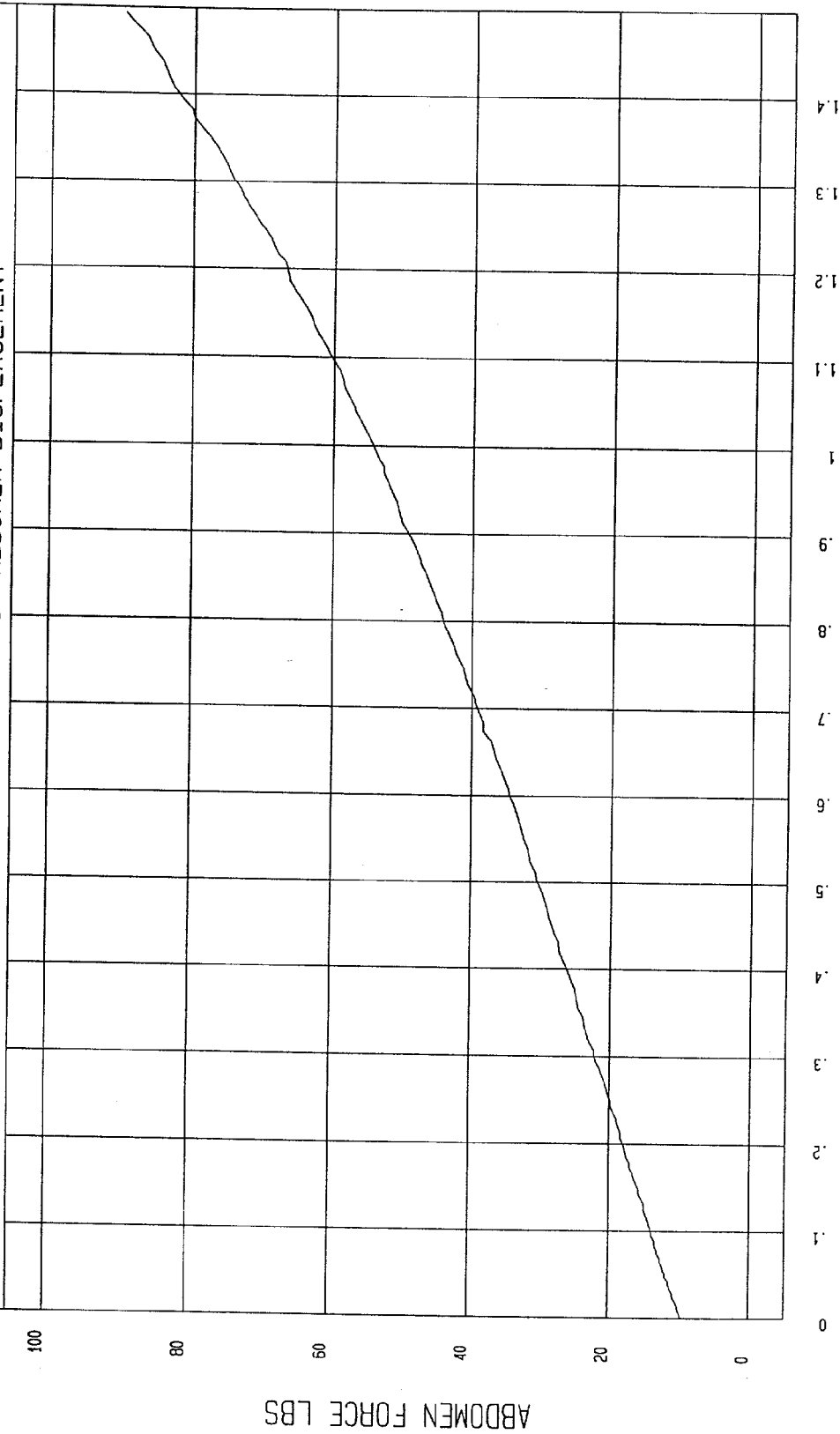
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 11-14-1997 - 16:27

COMPONENT: DUMMY # 271

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



WCA Research
11-14-1997 16:35

ABDOMEN DISPLACEMENT INCHES

ABDOMEN FORCE LBS

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: November 17, 1997

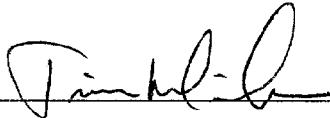
DUMMY NUMBER: 271

TEST NUMBER: D972135

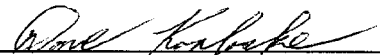
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	30
FORCE @ 30°	34 - 46 lbs	39
FORCE @ 40°	46 - 58 lbs	56
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN



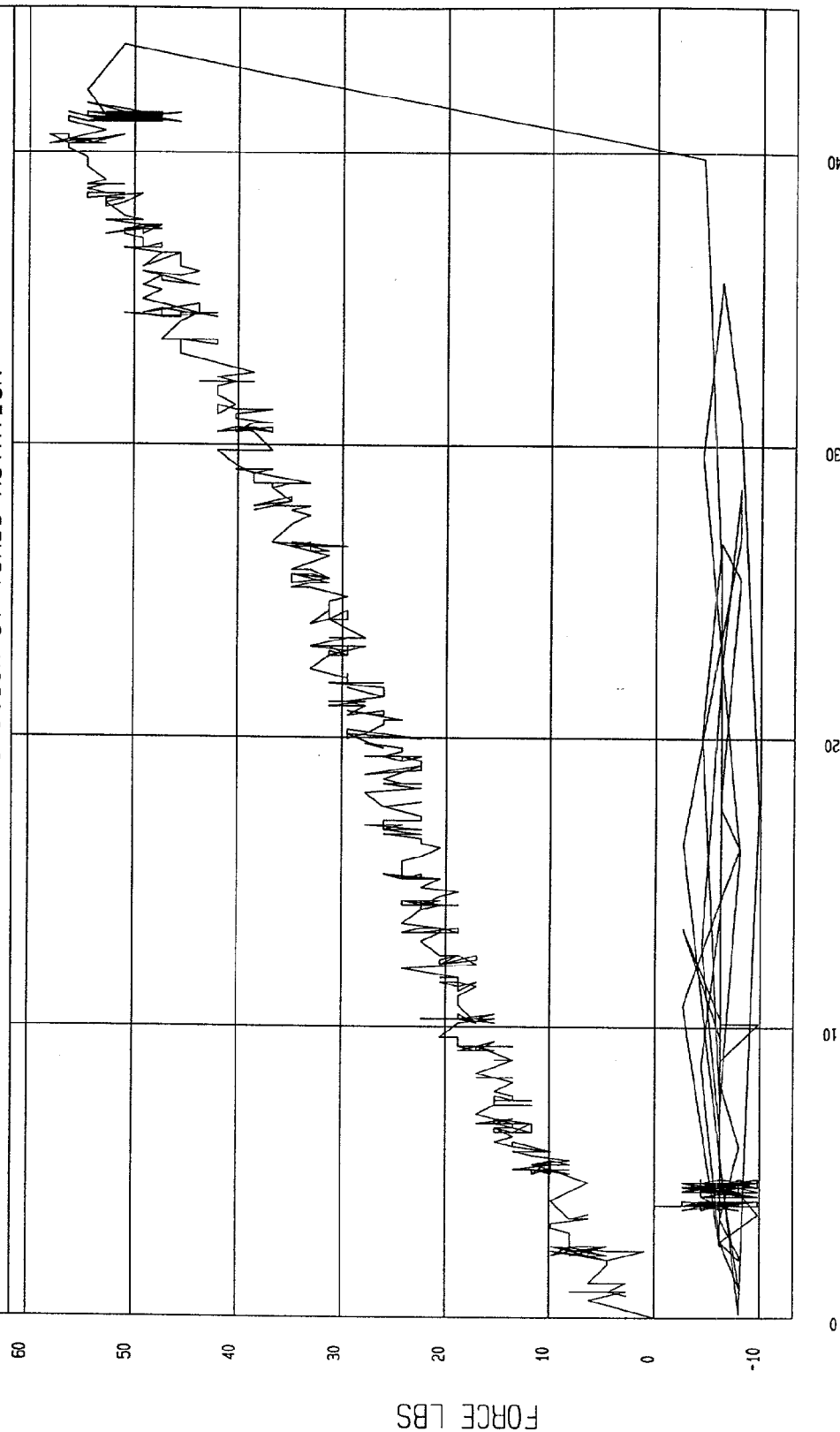
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 11-17-1997 - 09:13

COMPONENT: DUMMY # 271

FORCE as a function of TORSO ROTATION



MCA Research
11-17-1997 09:34

PRE-TEST CERTIFICATION DATA

Rear 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.

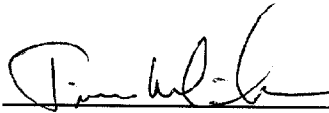
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: November 17, 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

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

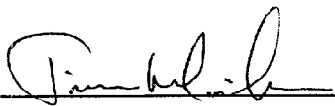
DATE: November 17, 1997

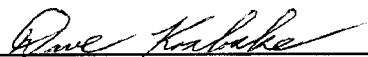
DUMMY NUMBER: 272

TEST NUMBER: D972152

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	20%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	44
LOWER RIB	37 - 46 g's	45
LOWER SPINE	15 - 22 g's	22

TEST MEETS SPECIFICATIONS

TECHNICIAN 

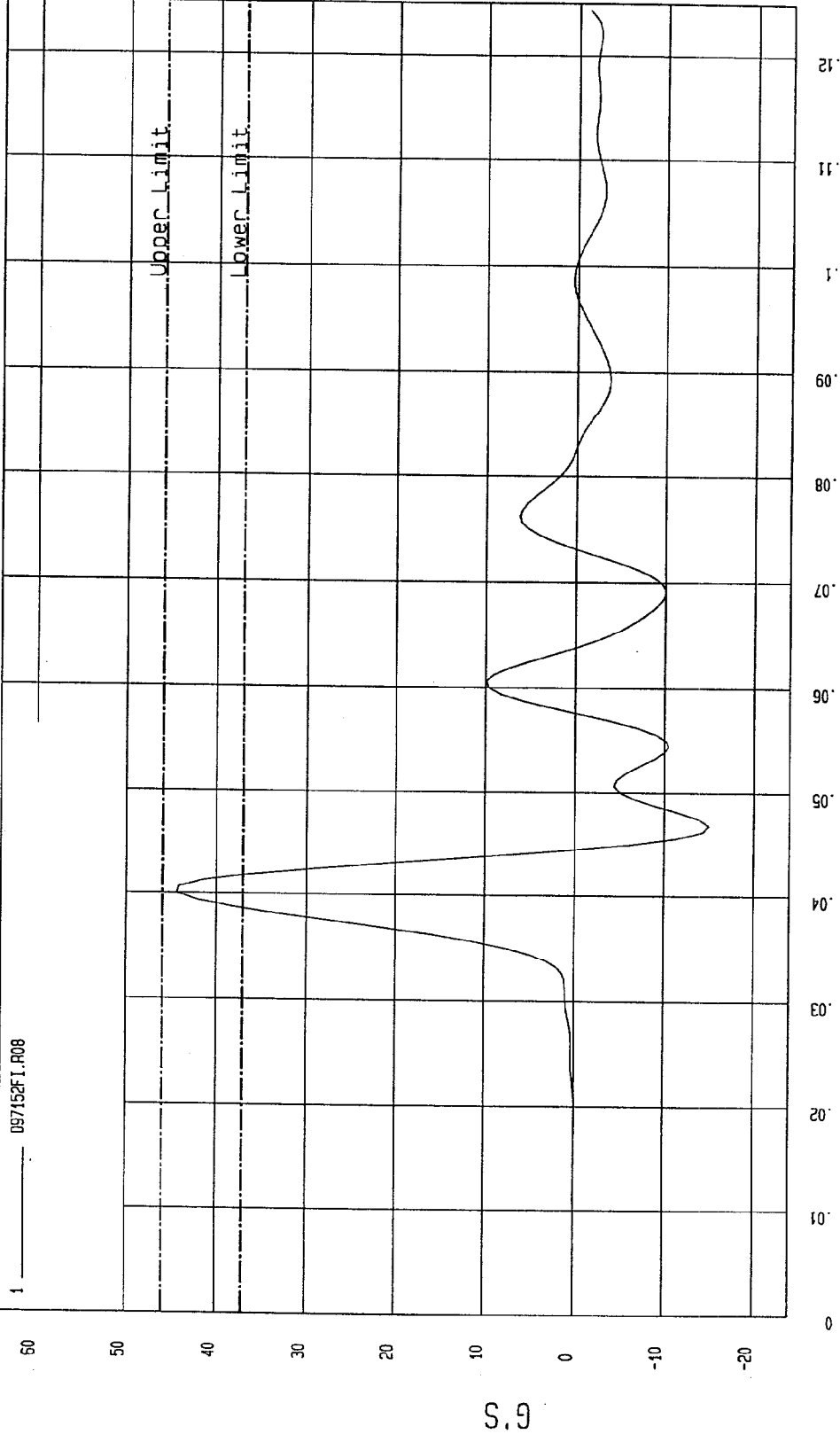
APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 11-17-1997 - 23:36

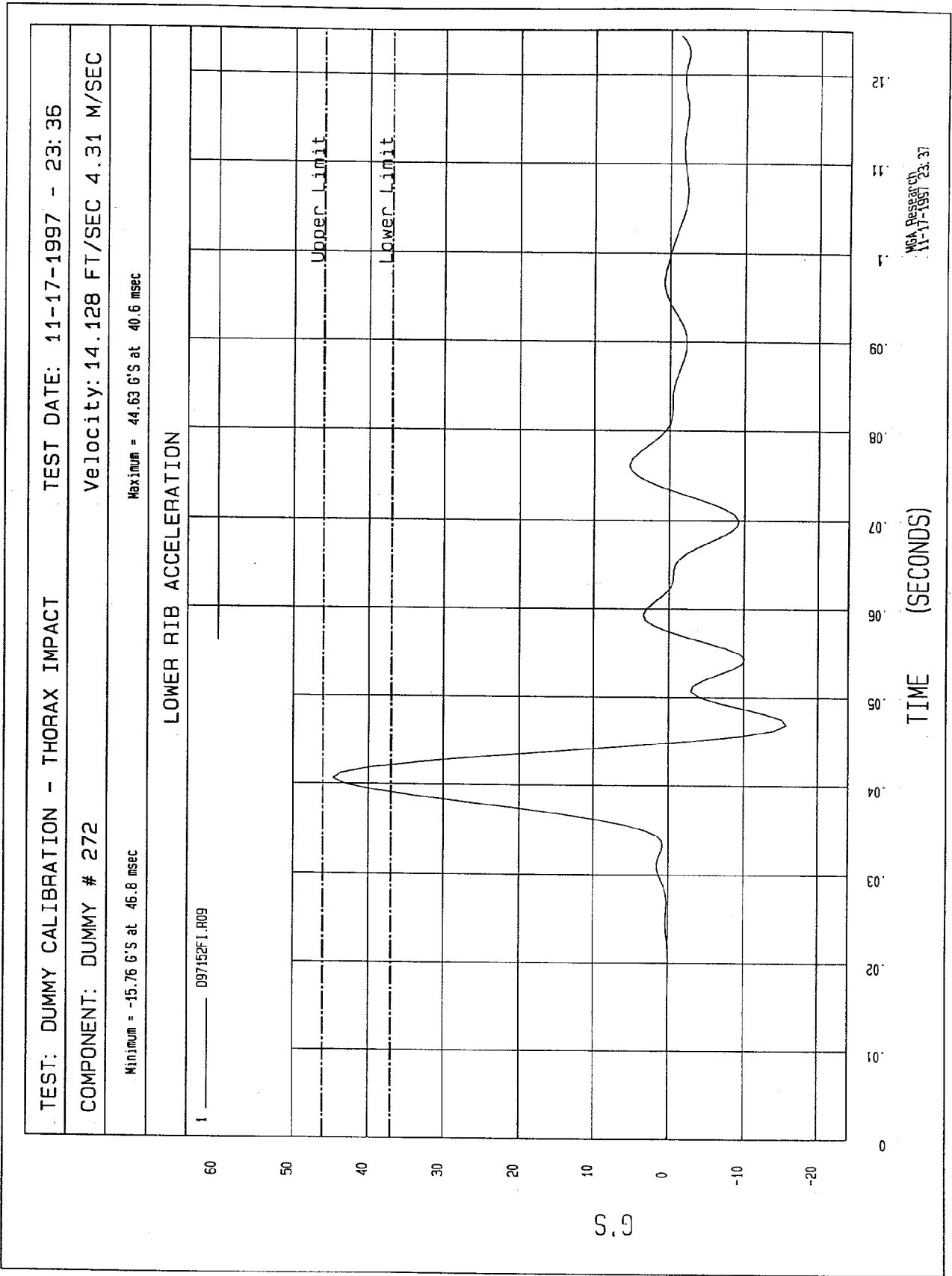
COMPONENT: DUMMY # 272 Velocity: 14.128 FT/SEC 4.31 M/SEC

Minimum = -15.00 G'S at 46.8 msec Maximum = 44.46 G'S at 40 msec

UPPER RIB ACCELERATION



NSA Research
11-17-1997 23:37



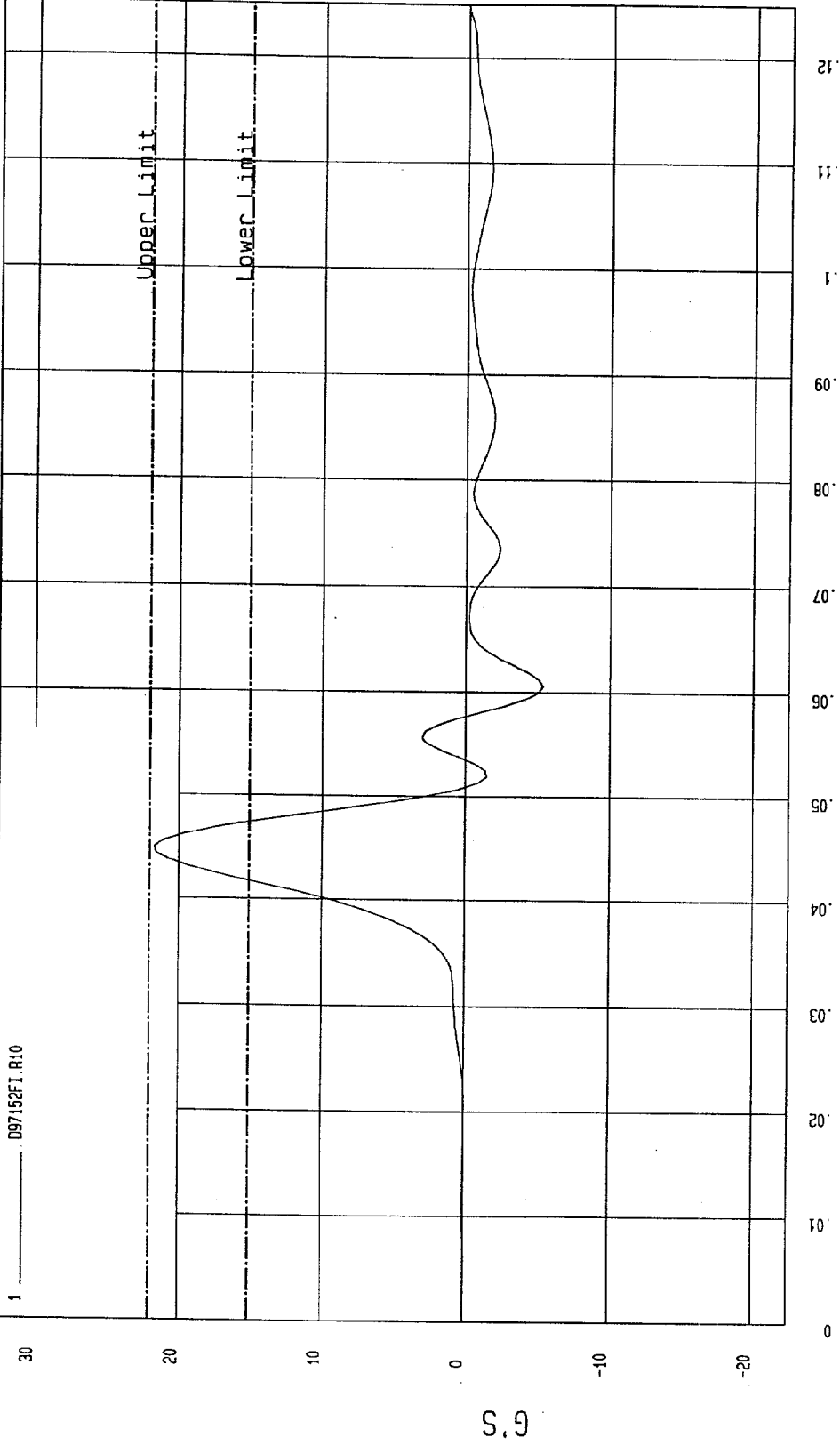
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 11-17-1997 - 23:36

COMPONENT: DUMMY # 272 Velocity: 14.128 FT/SEC 4.31 M/SEC

Minimum = -5.36 G'S at 60.6 msec

Maximum = 21.69 G'S at 45 msec

LOWER SPINE ACCELERATION



NCA Research
11-17-1997 23:36

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 14, 1997

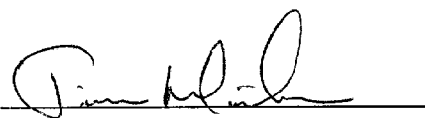
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TEST NUMBER: D972153

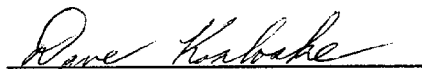
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	44

TEST MEETS SPECIFICATIONS

TECHNICIAN



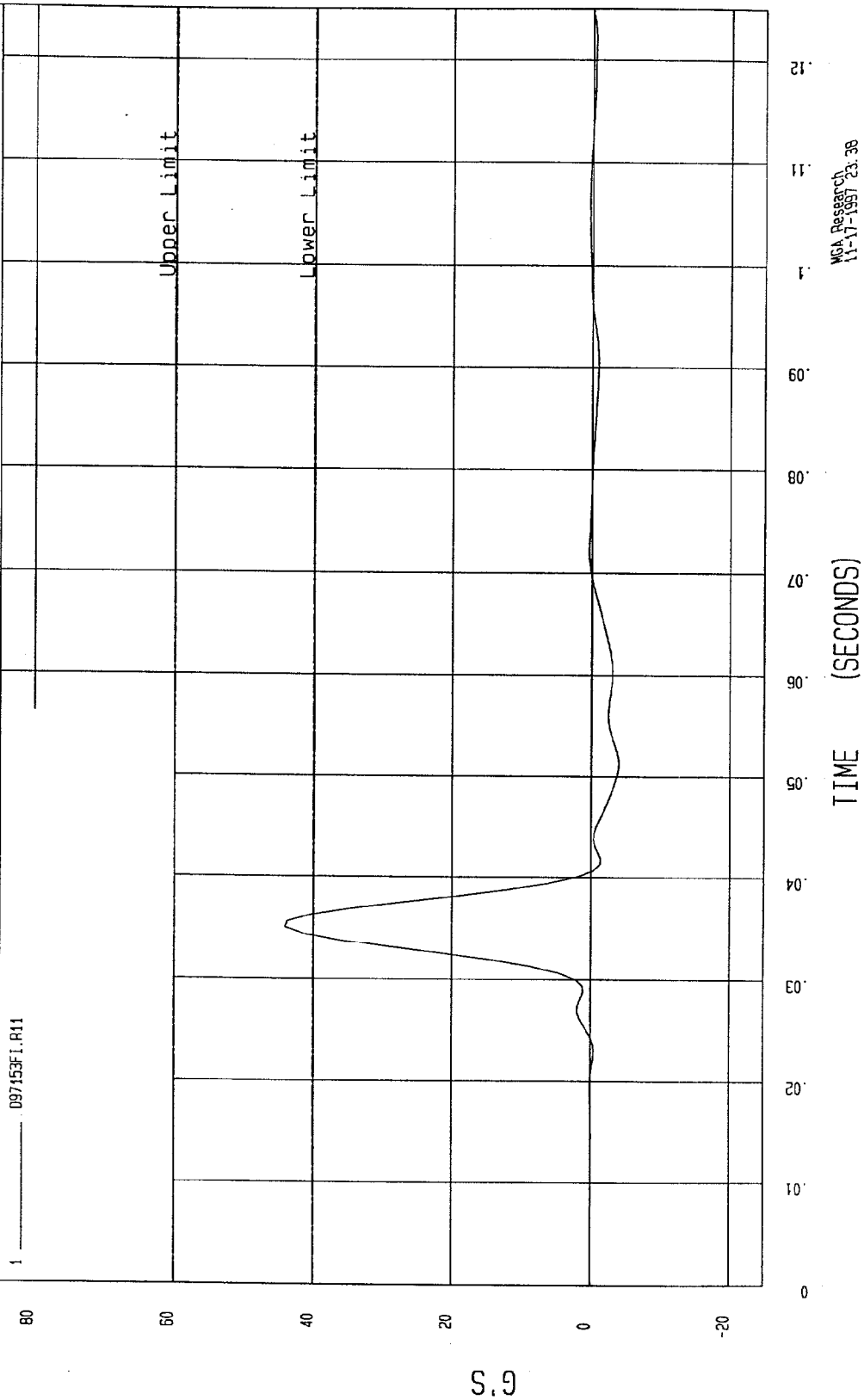
APPROVED BY



TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 11-14-1997 - 15:41:22
COMPONENT: DUMMY # 272 Velocity: 14.078 FT/SEC 4.29 M/SEC

Minimum = -3.92 G'S at 51.2 msec Maximum = 44.08 G'S at 35 msec

PELVIS ACCELERATION



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

DATE: November 14, 1997

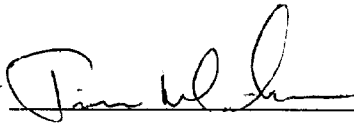
DUMMY NUMBER: 272

TEST NUMBER: D972154

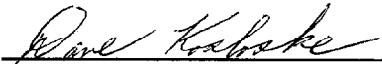
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.3
FORCE @ 0.75 in	36.7 - 49.8 lbs	42.9
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	81

TEST MEETS SPECIFICATIONS

TECHNICIAN

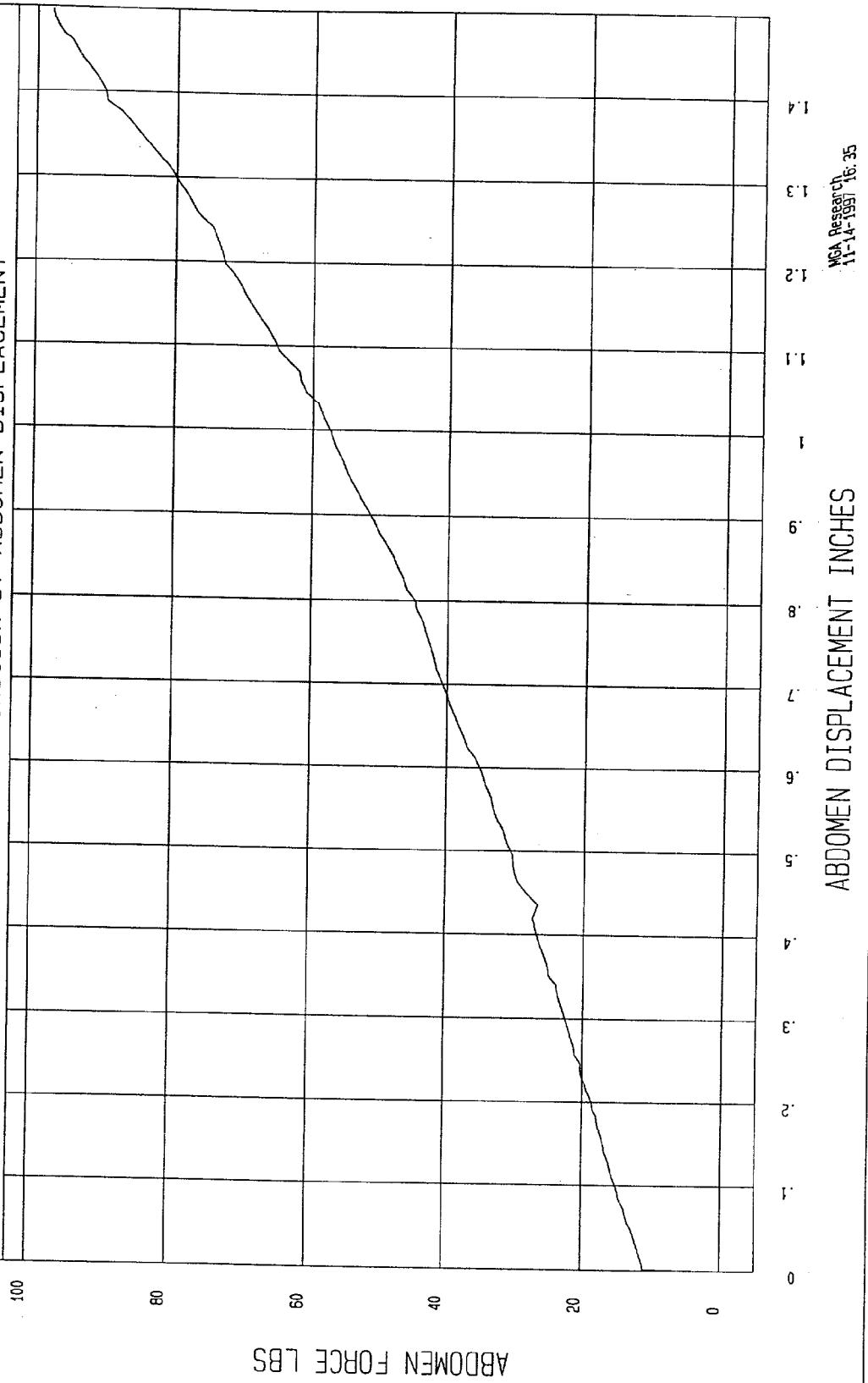


APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 11-14-1997 - 16:33
COMPONENT: DUMMY # 272

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



WCA Research
11-14-1997 16:35

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: November 17, 1997

DUMMY NUMBER: 272

TEST NUMBER: D972155

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	38
FORCE @ 40°	46 - 58 lbs52	52
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

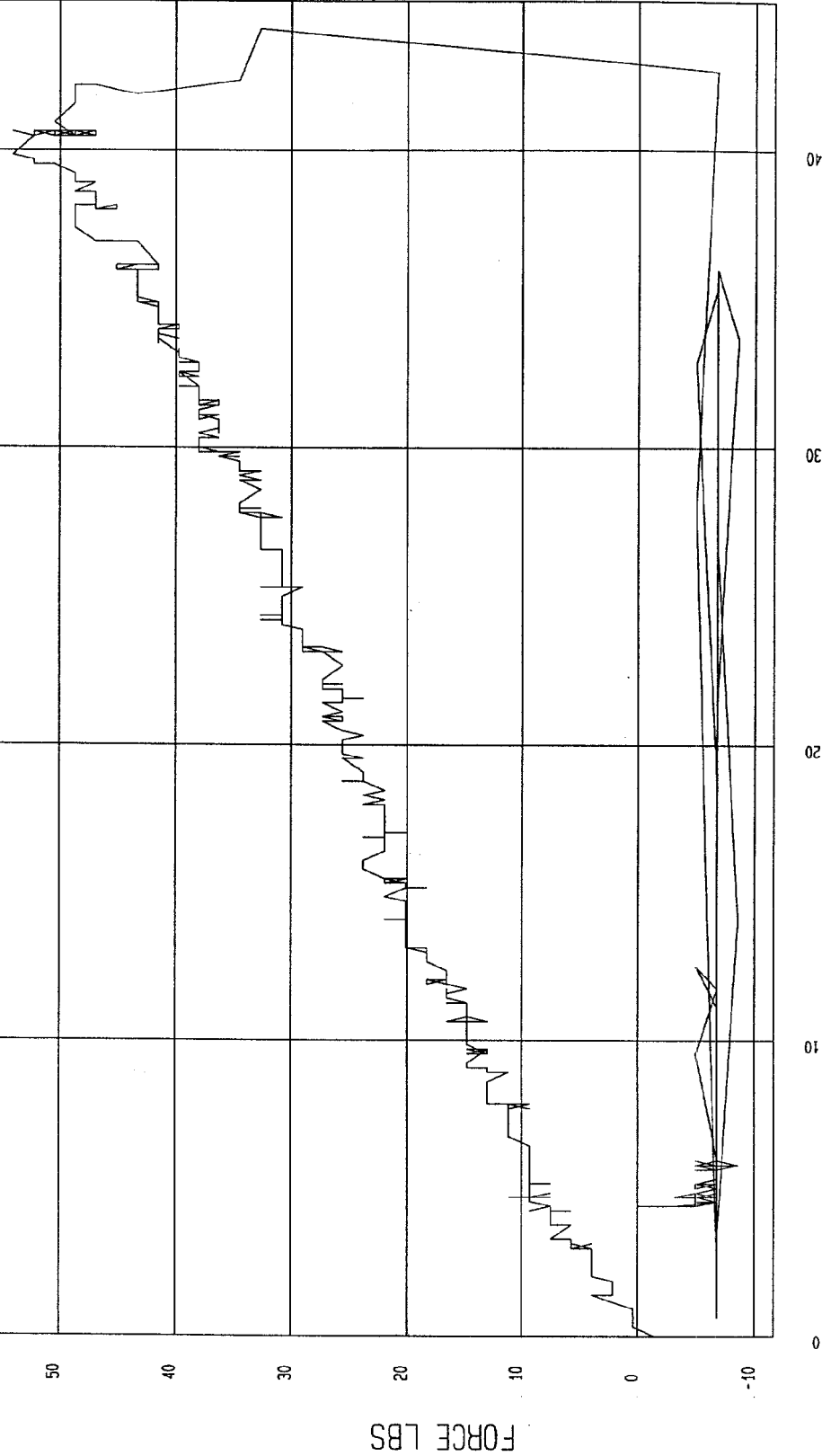
TECHNICIAN Jim White

APPROVED BY Rene Kabake

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 11-17-1997 - 09:30

COMPONENT: DUMMY # 272

FORCE as a function of TORSO ROTATION



WGL Research
11-17-1997 09:35

POST-TEST CERTIFICATION DATA

Front 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.

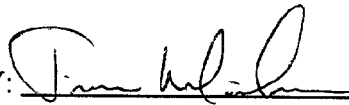
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

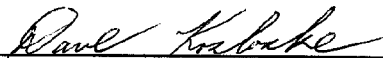
DATE OF VERIFICATION: December 4, 1997

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:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

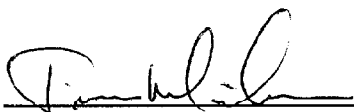
DATE: December 4, 1997

DUMMY NUMBER: 271

TEST NUMBER: D972292

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	44
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN 

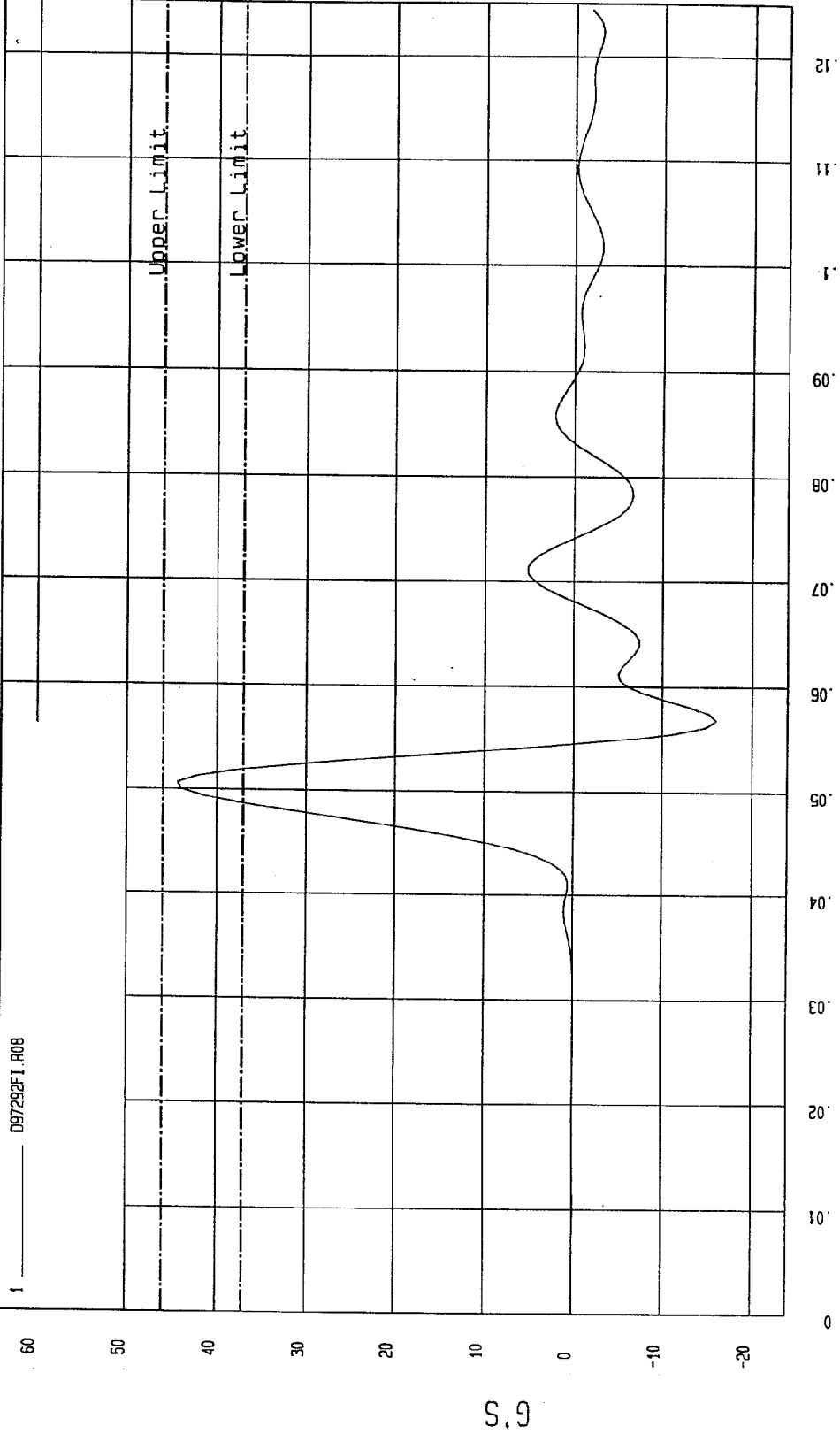
APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 14:20

COMPONENT: DUMMY # 271 Velocity: 14.098 FT/SEC 4.3 M/SEC

Minimum = -16.03 G'S at 56.8 msec Maximum = 44.41 G'S at 50.6 msec

UPPER RIB ACCELERATION



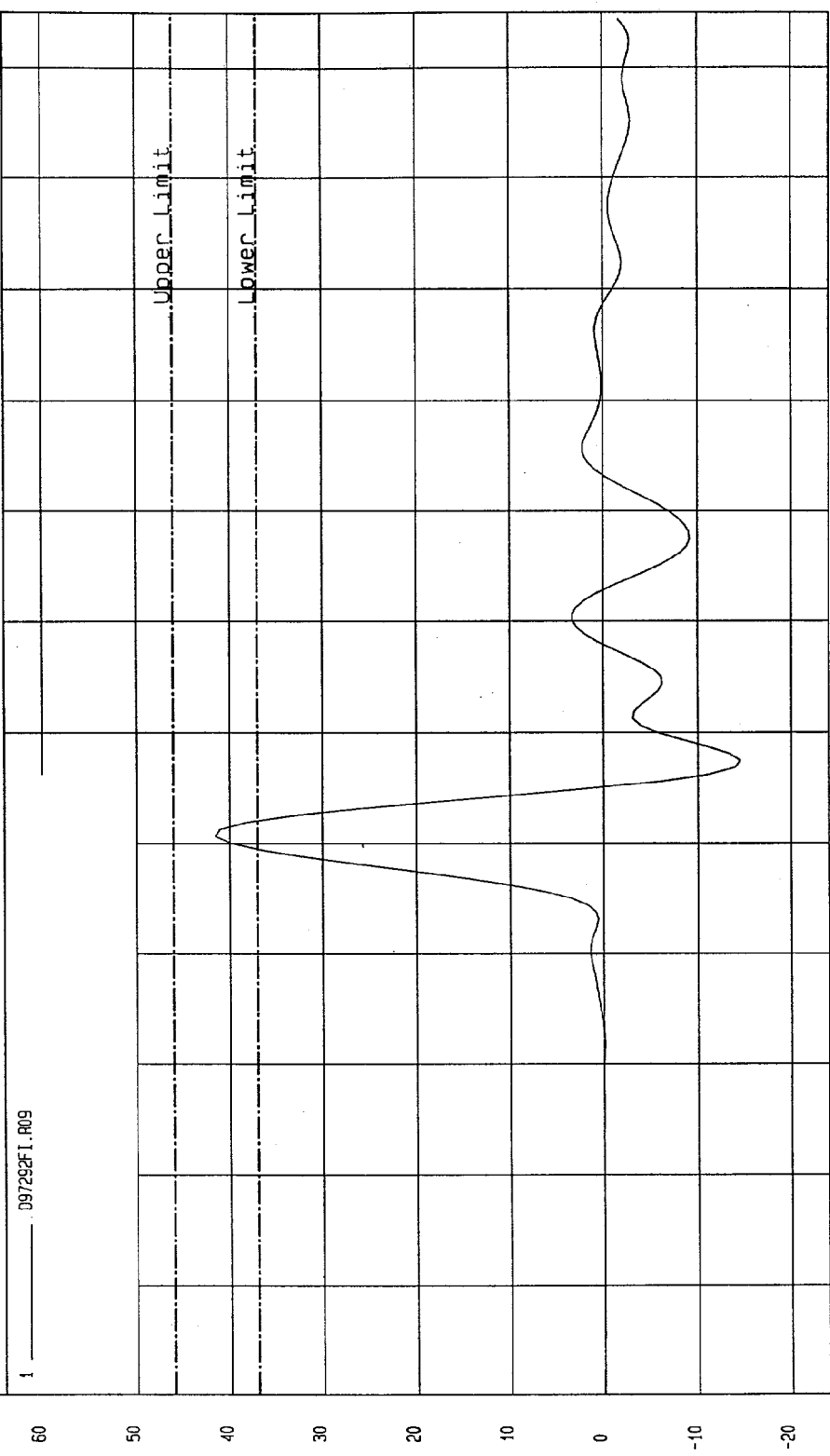
NSA Research
12-04-1997 14:25

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 14:20

COMPONENT: DUMMY # 271 Velocity: 14.098 FT/SEC 4.3 M/SEC

Minimum = -14.55 G'S at 57.5 msec Maximum = 41.57 G'S at 50.6 msec

LOWER RIB ACCELERATION



TIME (SECONDS)

NSA Research
12-04-1997 14:25

S.9

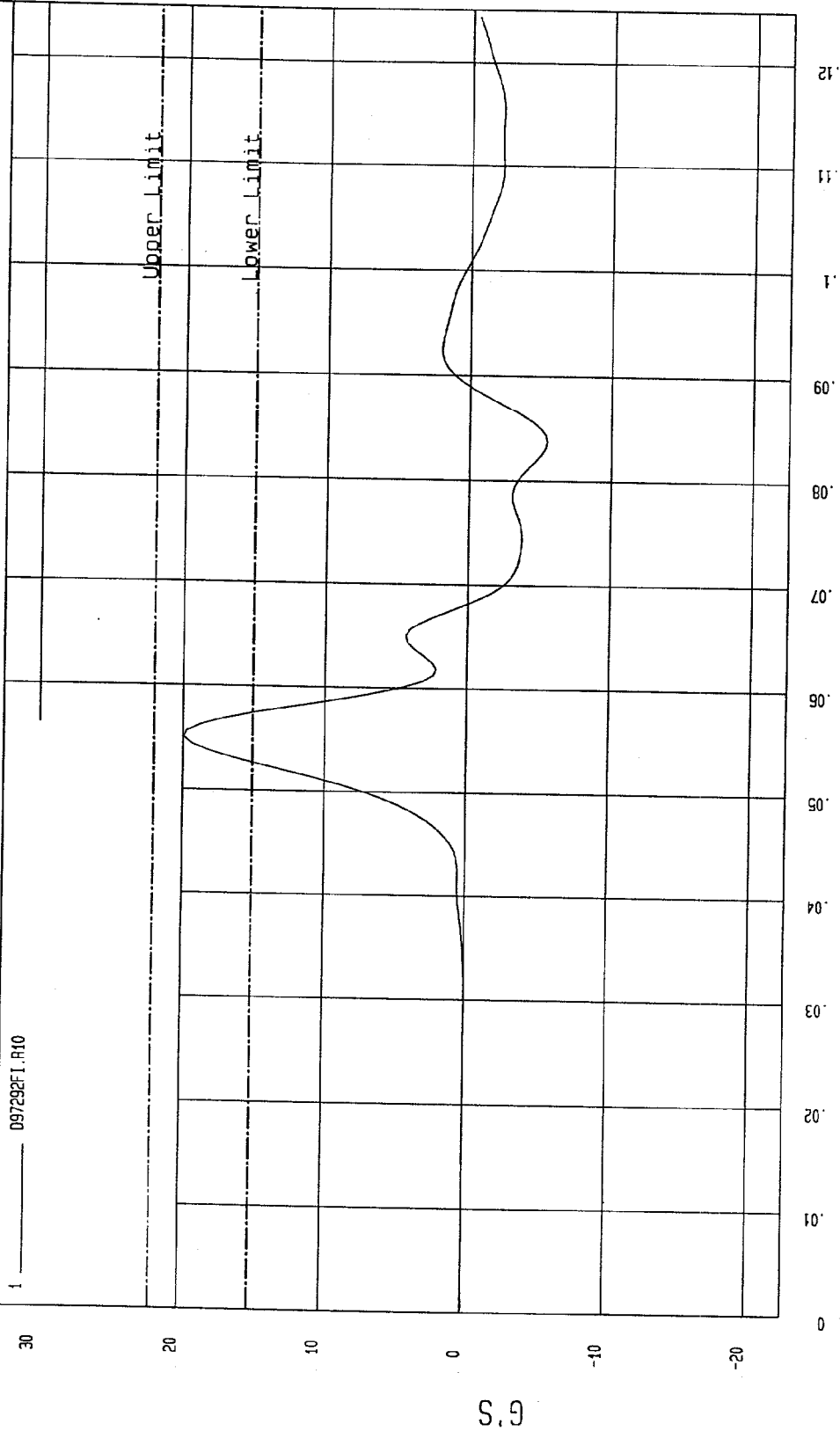
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 14:21:00
COMPONENT: DUMMY # 271 Velocity: 14.098 FT/SEC 4.3 M/SEC

Minimum = -5.51 G'S at 83.7 msec

Maximum = 19.94 G'S at 55 msec

LOWER SPINE ACCELERATION

1 _____ 097292FL.R10



NSA Research
12-04-1997 14:26

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

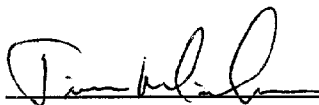
DUMMY NUMBER: 271

TEST NUMBER: D972293

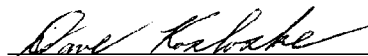
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	52

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

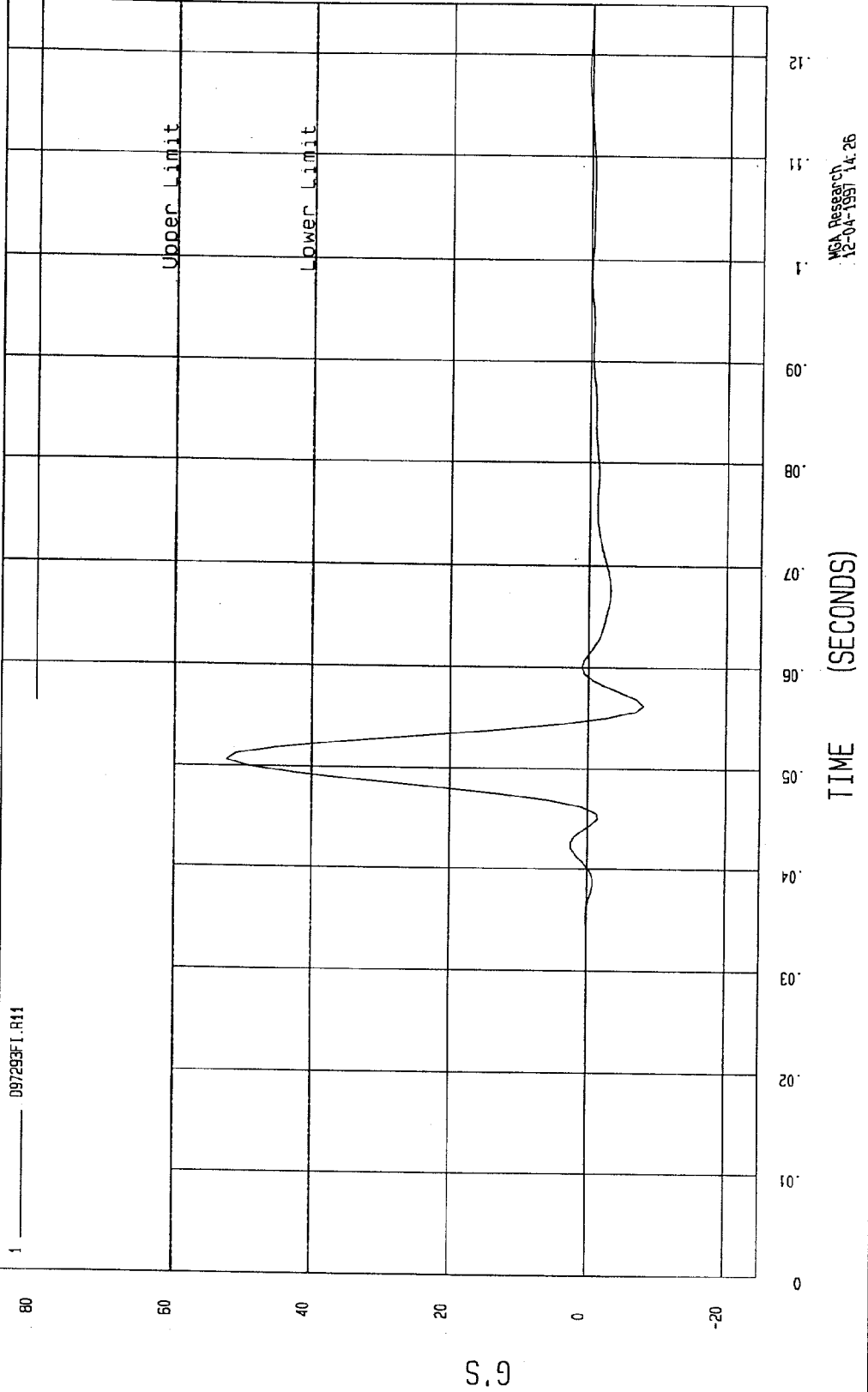


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 12-04-1997 - 14:25

COMPONENT: DUMMY # 271 Velocity: 14.09 FT/SEC 4.29 M/SEC

Minimum = -8.03 G'S at 56.2 msec Maximum = 52.37 G'S at 50.6 msec

PELVIS ACCELERATION



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

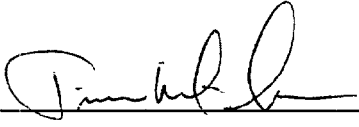
DATE: December 4, 1997

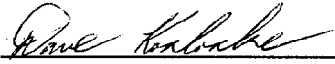
DUMMY NUMBER: 271

TEST NUMBER: D972294

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.5
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.1
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	79

TEST MEETS SPECIFICATIONS

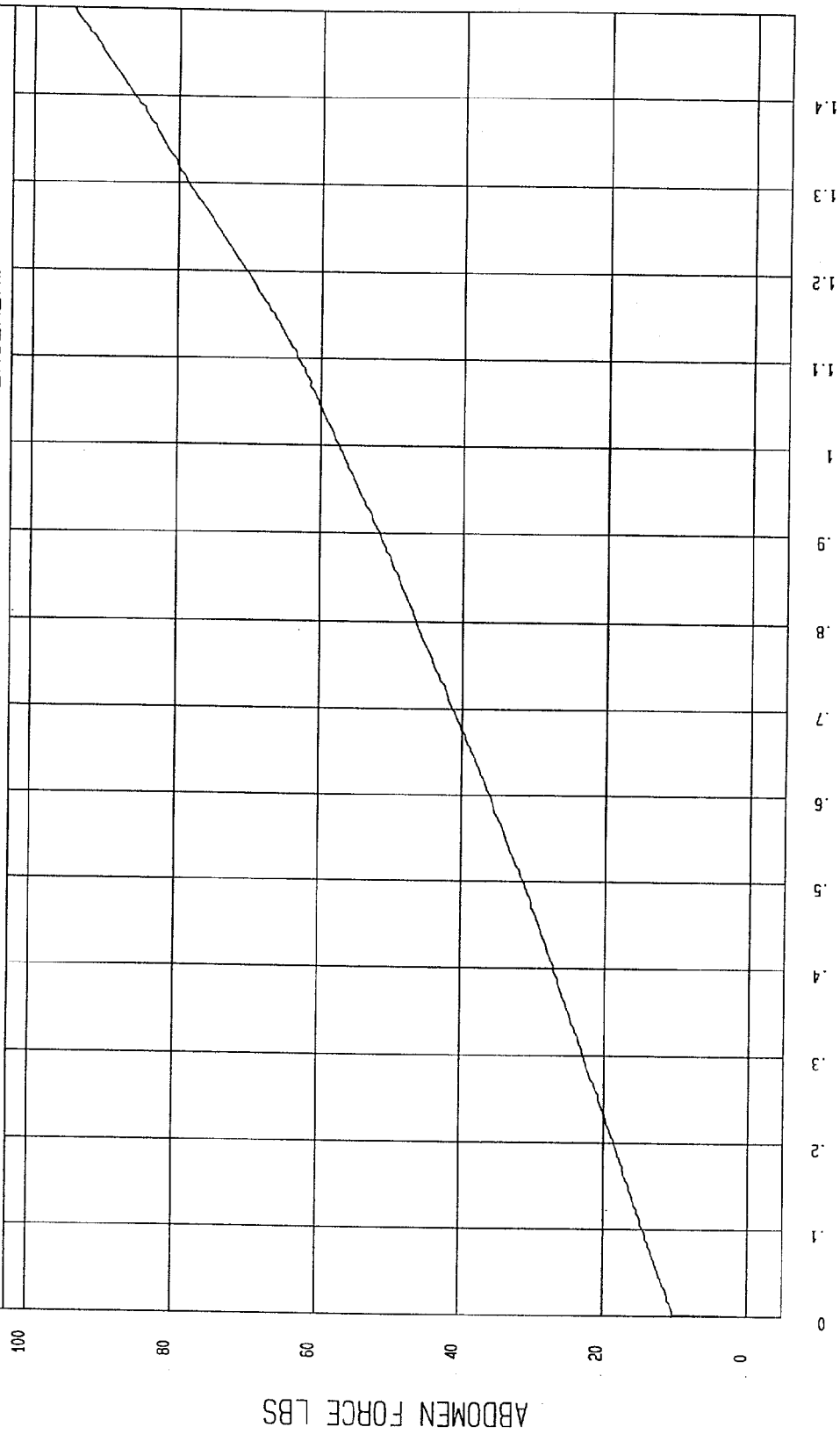
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 12-04-1997 - 22:36

COMPONENT: DUMMY # 271

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



NSA Research
12-04-1997 22:56

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

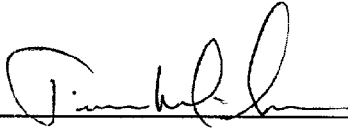
DATE: December 4, 1997

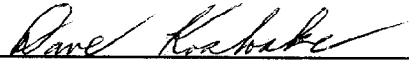
DUMMY NUMBER: 271

TEST NUMBER: D972295

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	28
FORCE @ 30°	34 - 46 lbs	37
FORCE @ 40°	46 - 58 lbs	51
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

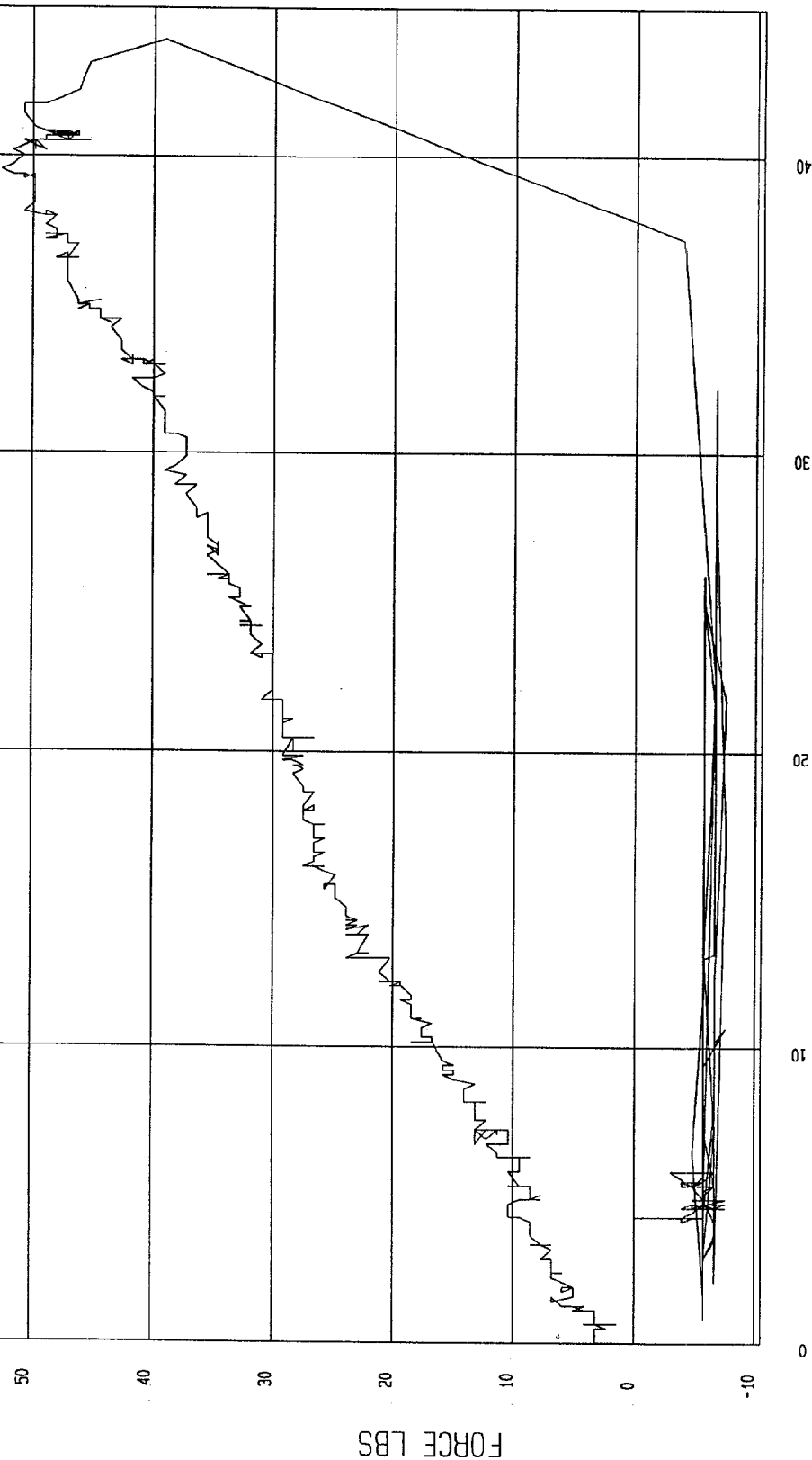
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 12-04-1997 - 21:54

COMPONENT: DUMMY # 271

FORCE as a function of TORSO ROTATION



WCA Research
12-04-1997 22:17

POST-TEST CERTIFICATION DATA

Rear 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.

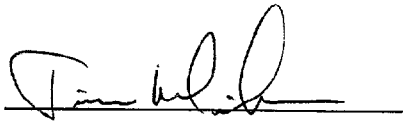
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: December 4, 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

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

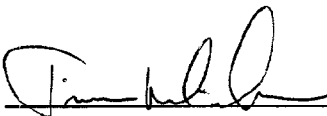
DATE: December 4, 1997

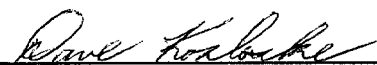
DUMMY NUMBER: 272

TEST NUMBER: D972302

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	41
LOWER RIB	37 - 46 g's	41
LOWER SPINE	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

TECHNICIAN 

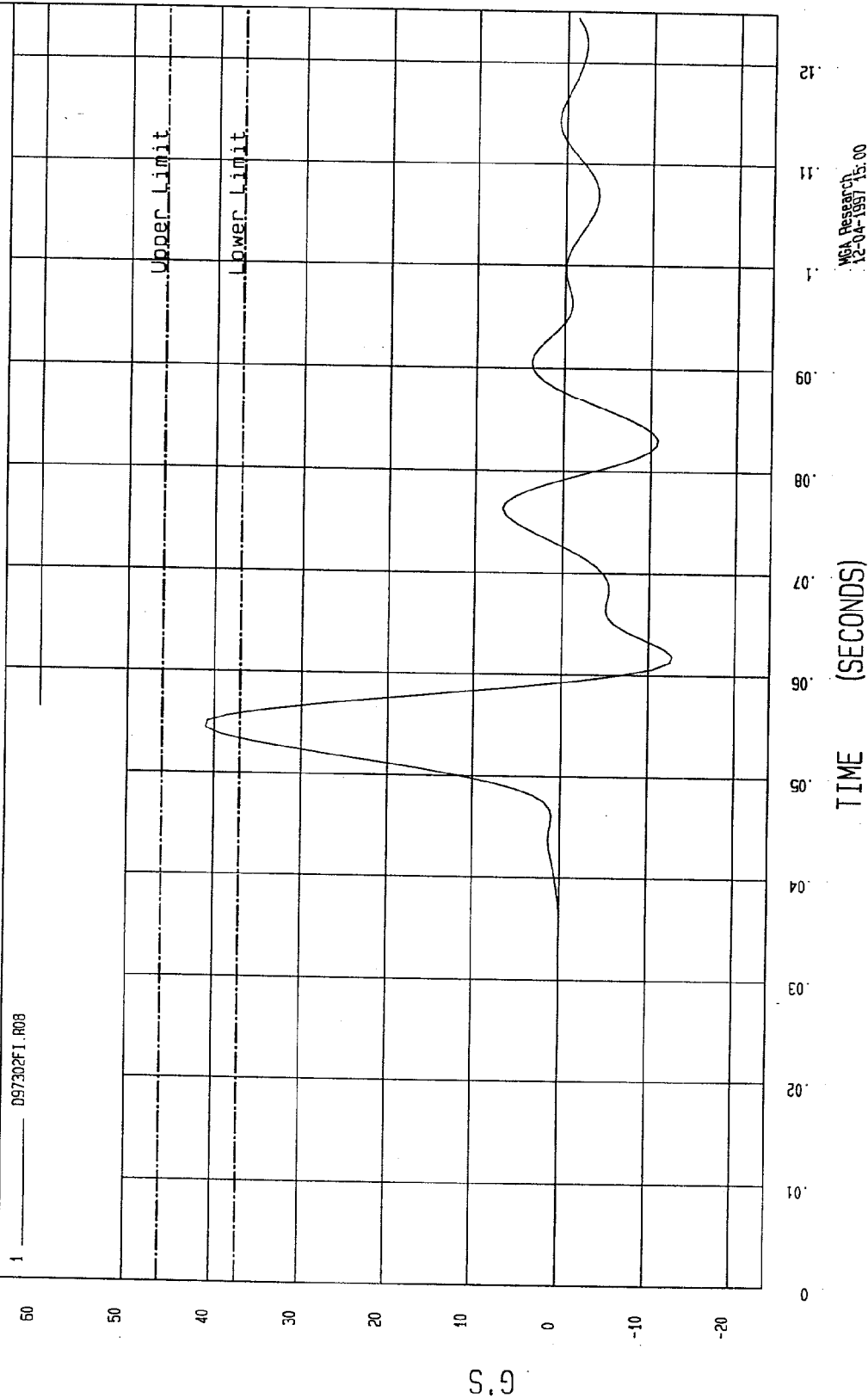
APPROVED BY 

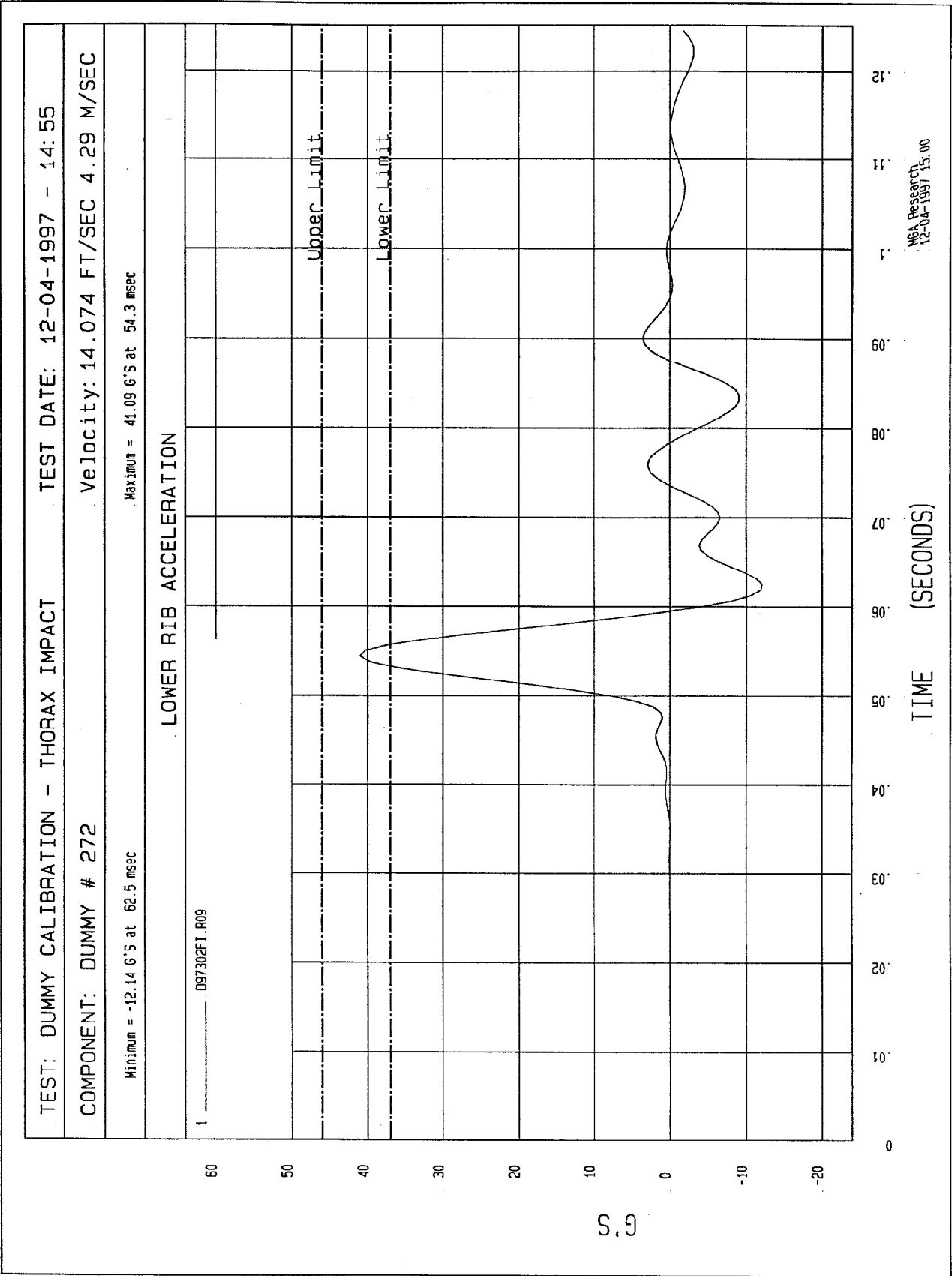
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 14:55

COMPONENT: DUMMY # 272 Velocity: 14.074 FT/SEC 4.29 M/SEC

Minimum = -12.70 G'S at 61.8 msec Maximum = 40.99 G'S at 54.3 msec

UPPER RIB ACCELERATION



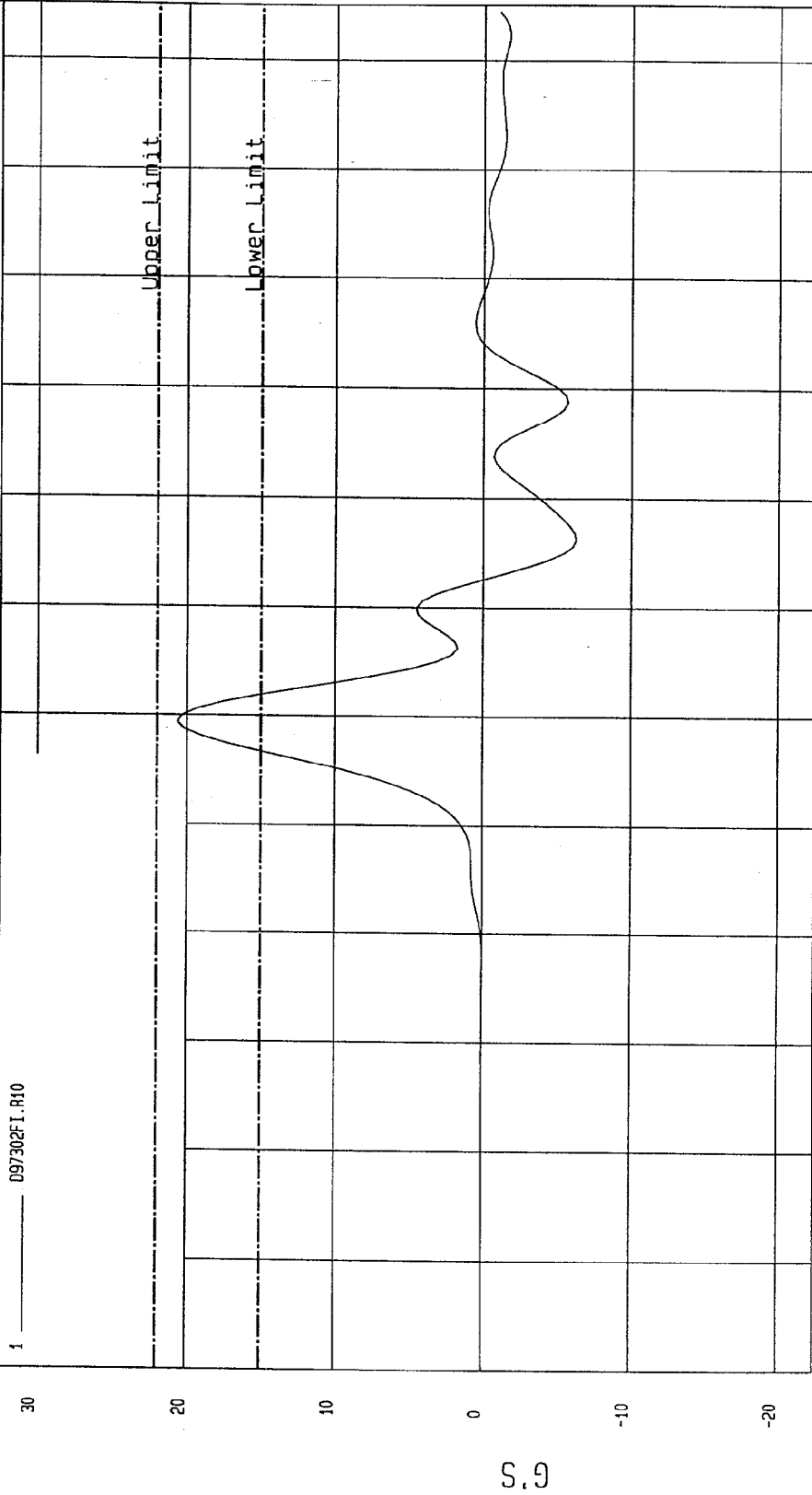


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 14:55

COMPONENT: DUMMY # 272 Velocity: 14.074 FT/SEC 4.29 M/SEC

Minimum = -6.30 G's at 76.2 msec Maximum = 20.64 G's at 59.3 msec

LOWER SPINE ACCELERATION



MCA Research
12-04-1997 15:01

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

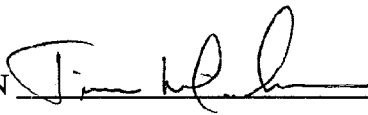
DUMMY NUMBER: 272

TEST NUMBER: D972303

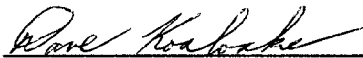
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	45

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

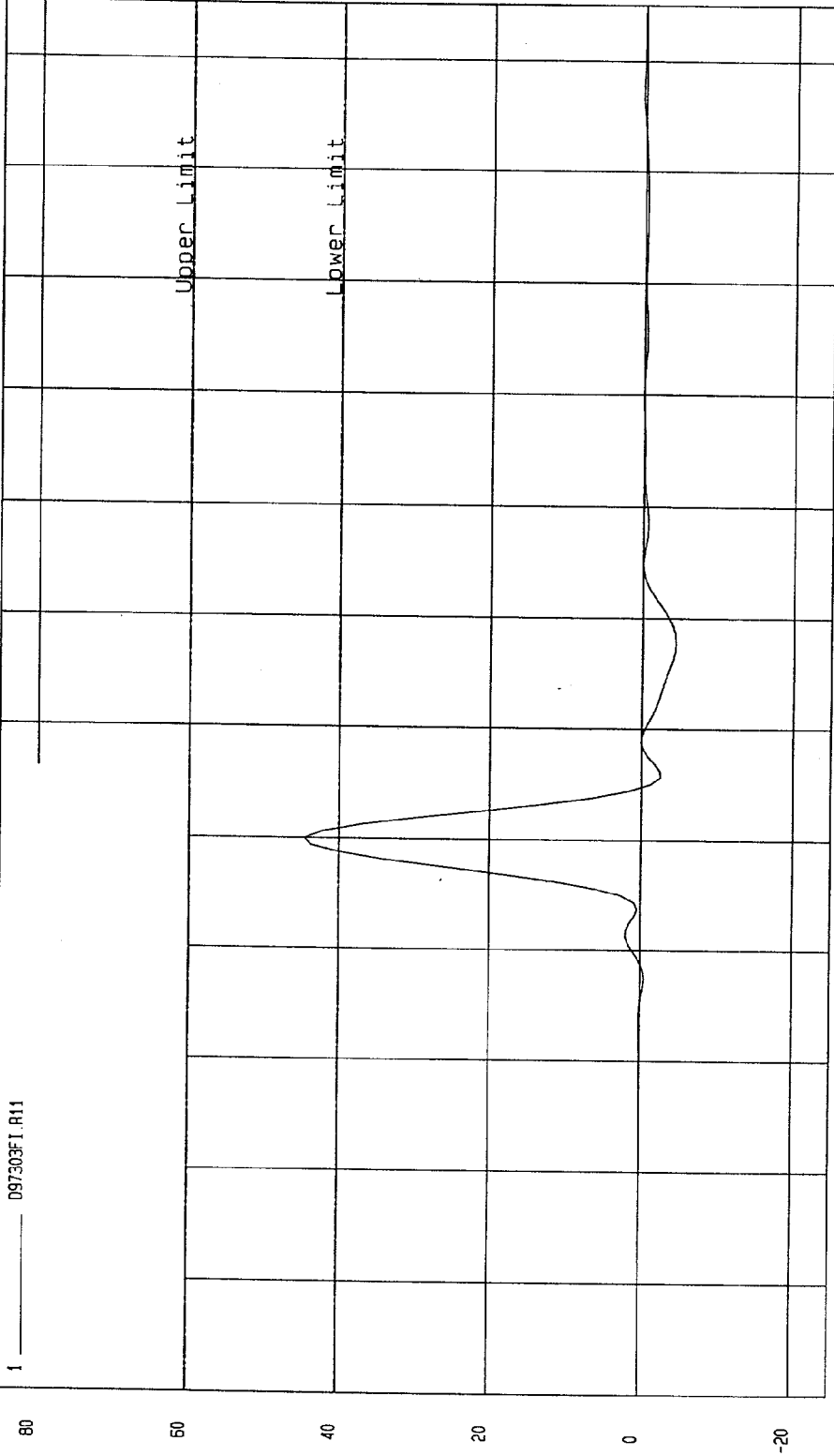


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 12-04-1997 - 15:00:09
 COMPONENT: DUMMY # 272 Velocity: 14.115 FT/SEC 4.3 M/SEC

Minimum = -4.37 G'S at 67.5 msec Maximum = 44.54 G'S at 50 msec

PELVIS ACCELERATION

1 ——— 097303FLR11



TIME (SECONDS) MGA Research 12-04-1997 15.01

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

DUMMY NUMBER: 272

TEST NUMBER: D972304

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
FORCE @ 0.5 in	23.3 - 36.5 lbs	29.2
FORCE @ 0.75 in	36.7 - 49.8 lbs	40.6
FORCE @ 1.0 in	50 - 63 lbs	54
FORCE @ 1.3 in	73 - 88 lbs	73

TEST MEETS SPECIFICATIONS

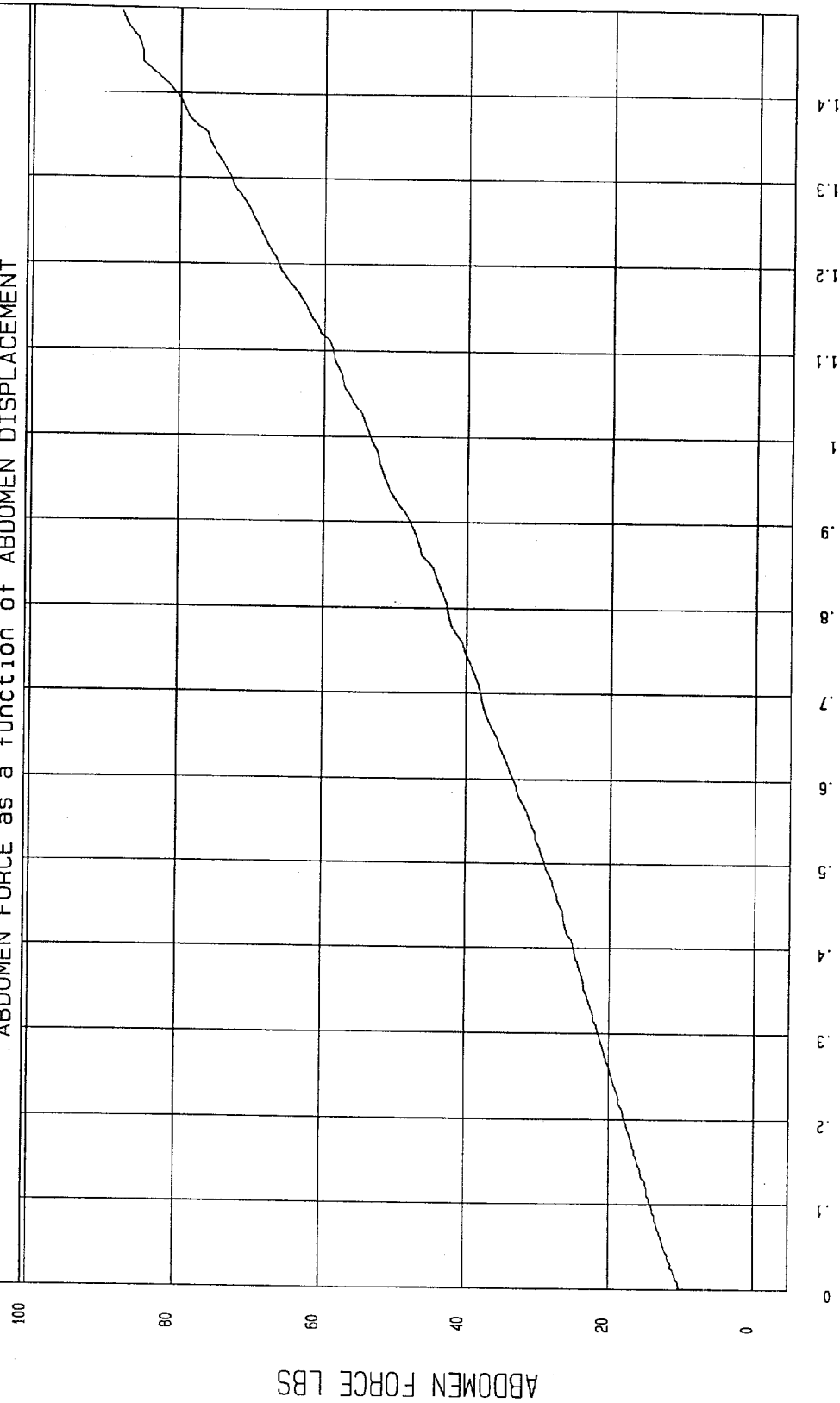
TECHNICIAN Tim Blah

APPROVED BY Dave Korbake

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 12-04-1997 - 22:40

COMPONENT: DUMMY # 272

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MCA Research
12-04-1997 22:57

ABDOMEN DISPLACEMENT INCHES

ABDOMEN FORCE LBS

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

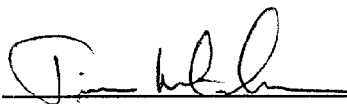
DUMMY NUMBER: 272

TEST NUMBER: D972305

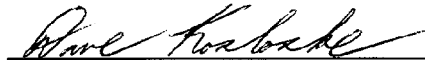
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	32%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	37
FORCE @ 40°	46 - 58 lbs	51
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

TECHNICIAN



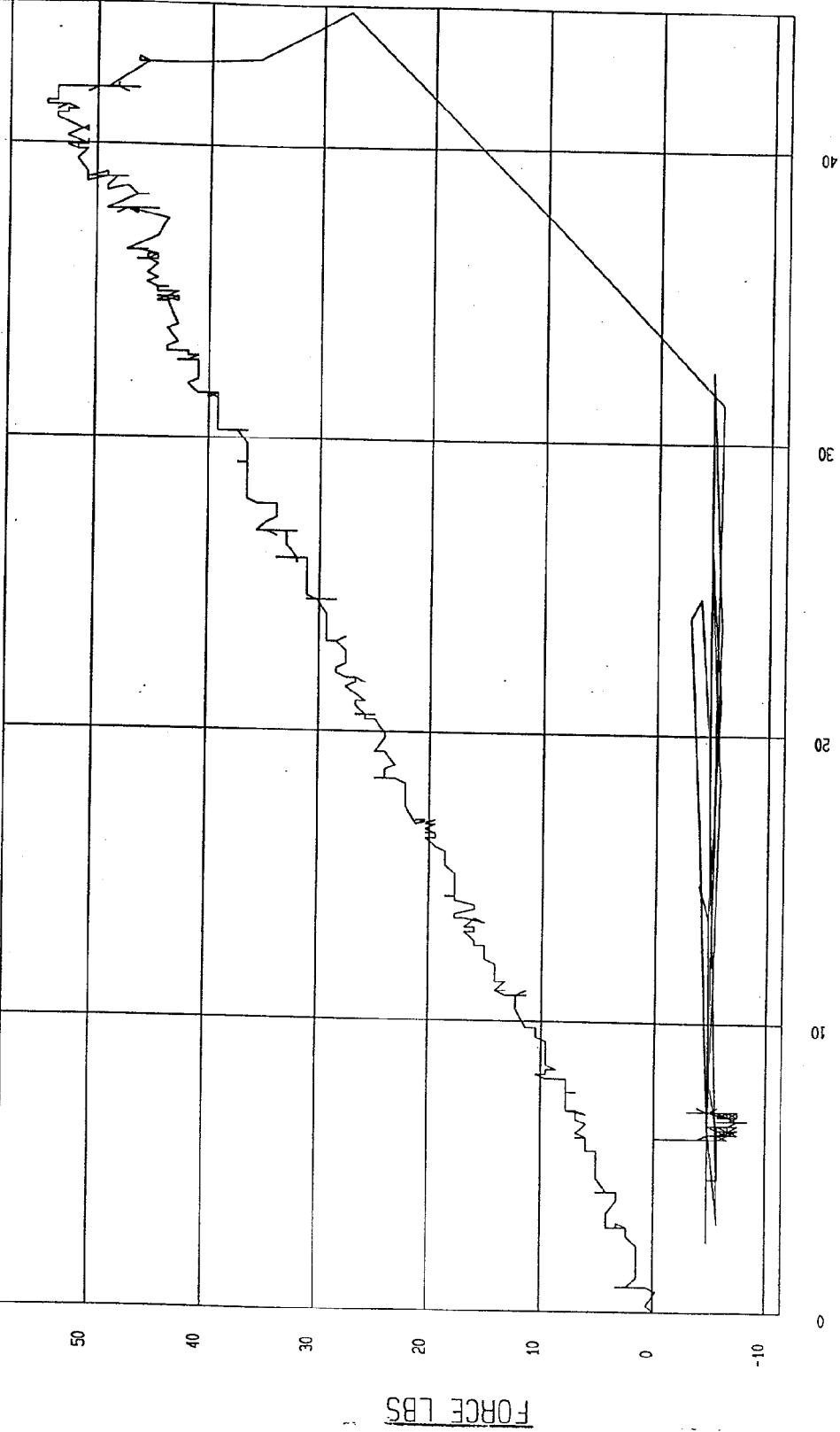
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 12-04-1997 - 22:14

COMPONENT: DUMMY # 272

FORCE as a function of TORSO ROTATION



MSA Research
12-04-1997 22:17

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 271

Inspected By: Tim Michnay

Date: December 4, 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		

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

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 272

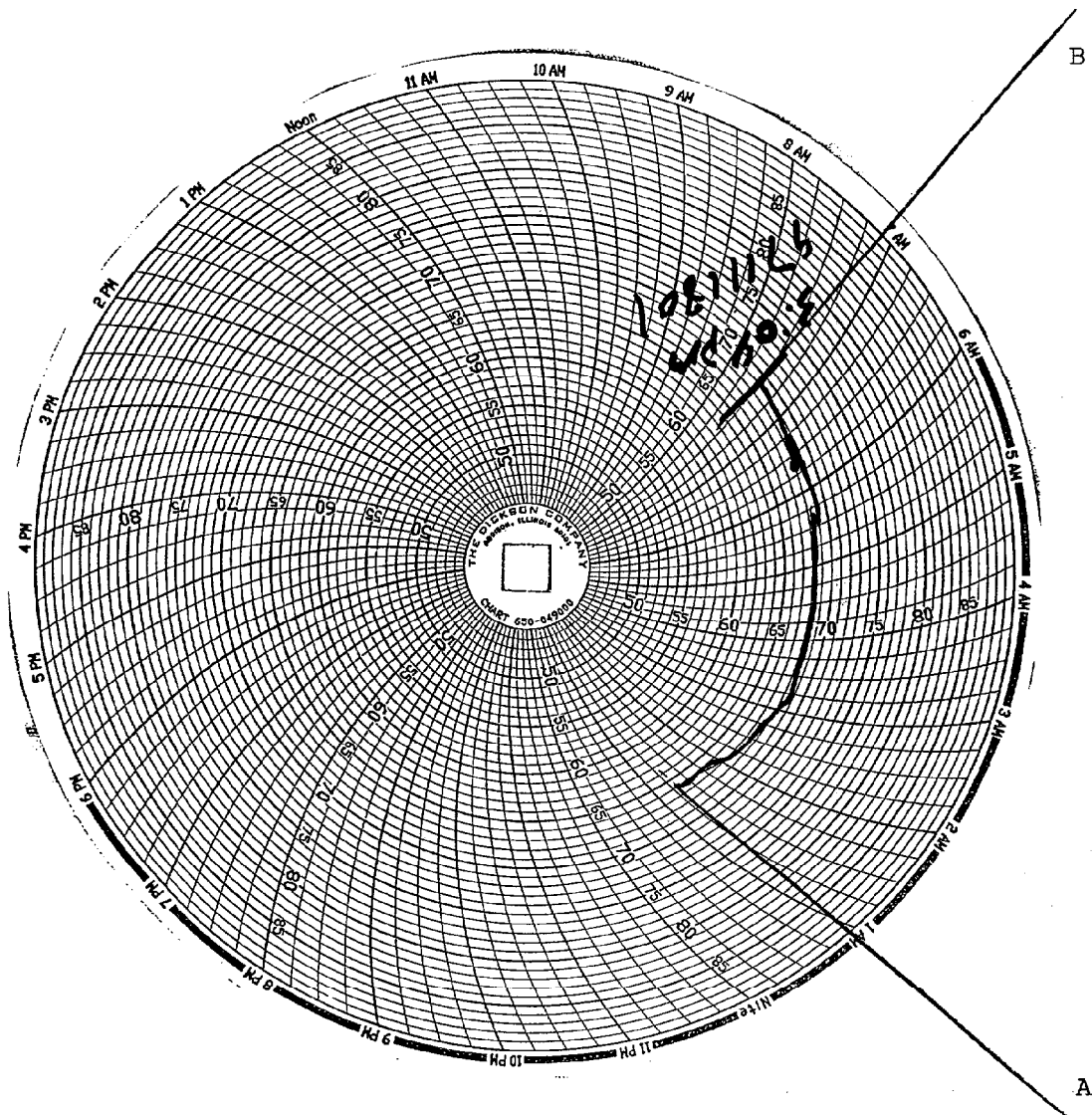
Inspected By: Tim Michnay

Date: December 4, 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		

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

VEHICLE AND DUMMY TEMPERATURE



A = dummies installed in vehicle at 8:45 a.m.

B = test conducted at 3:05 p.m.

It should be noted that the temperature chart was incorrectly installed in the recorder.

APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR DRIVER DUMMY NO. 271

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AP2A4	Endevco	September 11, 1997
Lower Rib Y	APIB3	Endevco	September 11, 1997
Lower Spine Y	ANAP1	Endevco	September 11, 1997
Pelvis Y	AHTC3	Endevco	September 11, 1997
Upper Rib Redundant Y	AP2D8	Endevco	September 11, 1997
Lower Rib Redundant Y	APIC6	Endevco	September 11, 1997
Lower Spine Redundant Y	ANAT6	Endevco	September 11, 1997
Pelvis Redundant Y	AGP53	Endevco	September 11, 1997

INSTRUMENTS FOR PASSENGER DUMMY NO. 272

LEFT REAR PASSENGER			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	ALFJ7	Endevco	September 11, 1997
Lower Rib Y	APYN0	Endevco	September 11, 1997
Lower Spine Y	AP0G2	Endevco	September 11, 1997
Pelvis Y	APY15	Endevco	September 11, 1997
Upper Rib Redundant Y	ALDD6	Endevco	September 11, 1997
Lower Rib Redundant Y	APYN3	Endevco	September 11, 1997
Lower Spine Redundant Y	AP138	Endevco	September 11, 1997
Pelvis Redundant Y	APY16	Endevco	September 11, 1997

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	J04-F10	Entran	August 7, 1997
Moving Barrier CG Y	F11-G04	Entran	August 7, 1997
Moving Barrier CG Z	J04-F12	Entran	August 7, 1997
Moving Barrier Rear Axle X	G13-B07	Entran	August 6, 1997
Moving Barrier Rear Axle Y	L14-D04	Entran	August 4, 1997
Left Mid A-Post Y	D05-R05	Entran	July 2, 1997
Left Lower A-Post Y	A15-Z16	Entran	August 4, 1997
Left Mid B-Post Y	F20-G12	Entran	August 7, 1997
Left Lower B-Post Y	I26-D06	Entran	August 5, 1997
Rear Floorpan Above Axle X	I25-J09	Entran	August 7, 1997
Rear Floorpan Above Axle Y	F20-G05	Entran	August 7, 1997
Rear Floorpan Above Axle Z	F10-D04	Entran	August 10, 1997
Driver Seat Track Y	G01-J14	Entran	August 7, 1997
Right Side Sill at Front Seat X	F12-G03	Entran	July 11, 1997
Right Side Sill at Front Seat Y	D05-R20	Entran	July 7, 1997
Right Side Sill at Front Seat Z	D05-R16	Entran	July 7, 1997
Right Side Sill at Rear Seat X	F11-G05	Entran	August 7, 1997
Right Side Sill at Rear Seat Y	I26-D19	Entran	July 16, 1997
Right Side Sill at Rear Seat Z	G13-B09	Entran	August 5, 1997
Left Side Sill at Front Seat Y	G01-J10	Entran	August 7, 1997

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	H02-J14	Entran	August 7, 1997
Right Rear Occupant Compartment Y	E10-F10	Entran	August 5, 1997
Vehicle CG X	E10-F06	Entran	August 6, 1997
Vehicle CG Y	F11-G07	Entran	July 16, 1997
Vehicle CG Z	F12-G05	Entran	August 7, 1997
Left Front Door on Centerline	E10-F11	Entran	August 5, 1997
Left Front Door Upper Centerline	G13-B14	Entran	July 16, 1997
Midrear of Left Rear Door	C20-J10	Entran	August 6, 1997
Left Rear Door Upper Centerline	J06-D22	Entran	June 12, 1997

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