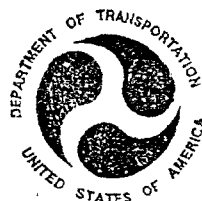


NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

1998 Toyota Lexus ES300
4-DOOR SEDAN
NHTSA NO: MW5112

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: April 2, 1998

Report Date: April 9, 1998

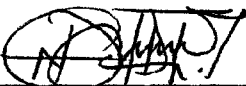
FINAL REPORT

Prepared For:

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

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

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Approval Date: April 30, 1998

FINAL REPORT ACCEPTED BY (OCWS):

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 214D-MGA-98-021		2. Government Accession No.		3. Recipient's Catalog No.																			
4. Title and Subtitle New Car Assessment Program Side Impact Test of a 1998 Toyota Lexus ES300 4-Door Sedan NHTSA No. MW5112				5. Report Date April 9, 1998																			
				6. Performing Organization Code MGA																			
7. Author(s) Enoch Narh, Project Engineer				8. Performing Organization Report No. MGA-DOT-214-0																			
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No.																			
				11. Contract or Grant No. DTNH22-93-C-02047																			
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 400 Seventh St., S.W. Washington, D.C. 20590				13. Type of Report and Period Covered Final Test Report April 2, 1998 to April April 9, 1998																			
				14. Sponsoring Agency Code NPS-10																			
15. Supplementary Notes																							
16. Abstract A 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 1998 Lexus ES300 4 Door to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on April 2, 1998. The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 kph, and the ambient temperature at the struck driver's side of the target vehicle at the time of impact was 20°C. The target vehicle post test maximum crush was 344 mm at level 2. The test vehicle's performance follows: <table border="1"> <thead> <tr> <th></th> <th><u>DRIVER</u></th> <th><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td>53</td> <td>47</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td>54</td> <td>67</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td>61</td> <td>65</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>57</td> <td>66</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td>107</td> <td>87</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	53	47	Left Lower Rib (LLR) Accel., g	54	67	Lower Spine (T ₁₂) Accel., g	61	65	Thoracic Trauma Index (TTI)	57	66	Pelvis (PEV) Accel., g	107	87
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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																			
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 309																			
				22. Price																			

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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 Lexus ES300.

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 Lexus ES300 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 38.4 mph (61.8 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 April 2, 1998. Pre- and post-test photographs of the test vehicle, the Moving Deformable Barrier (MDB) and the side impact dummies (SIDs) are included in Appendix A.

Two (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)	57	66
Pelvis (g)	107	87

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/Lexus/ES300/4-Door
Vehicle NHTSA No.: MW5112 VIN: JT8BF28G5W5035275
Vehicle Body Color: Blue Velvet Build Date: 1/98
Engine Data: 6 Cylinders; CID; 3.0 Liter; cc
Placement Longitudinal; X Lateral
Transmission: 4 Speed; Manual; X Automatic; X Overdrive
Final Drive: Rear Wheel Drive; X Frt. Wheel Drive; Four Wheel Drive

Odometer Reading 147 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): 32 Psi FRONT
32 Psi REAR
Recommended Tire Size: P205/65/R15
Tires on Test Vehicle: P205/65/R15 Manufacturer: Michelin

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 Lever
 Knob or X Power
Vehicle Maximum Capacity Loading = 408.2 kg (A)
No. of Occupants x 68.04 kg. = 340.2 kg (B)
Cargo Capacity (A-B) = 68.0 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>475.4</u> kg	Right Rear	=	<u>298.5</u> kg
Left Front	=	<u>488.1</u> kg	Left Rear	=	<u>291.2</u> kg
TOTAL FRONT	=	<u>963.5</u> kg	TOTAL REAR	=	<u>589.7</u> kg
% of Total Vehicle Weight	=	<u>62.0</u> %;	% of Total Weight	=	<u>38.0</u> %
TOTAL WEIGHT	=	<u>1553.2</u> kg			

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1553.2</u> kg
Cargo Carrying Capacity of Test Vehicle (RCW)	=	<u>68.0</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>1782.6</u> kg

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

Right Front	=	<u>495.8</u> kg	Right Rear	=	<u>358.3</u> kg
Left Front	=	<u>542.0</u> kg	Left Rear	=	<u>379.2</u> kg
TOTAL FRONT	=	<u>1037.8</u> kg	TOTAL REAR	=	<u>737.5</u> kg
% of Total Weight	=	<u>58.5</u> %	% of Total Weight	=	<u>41.5</u> %
TOTAL TEST WEIGHT	=	<u>1775.3</u> kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 692 mm Left Front 690 mm Right Rear 685 mm Left Rear 689 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 689 mm Left Front 673 mm Right Rear 641 mm Left Rear 636 mm

TEST ATTITUDE:

Right Front 685 mm Left Front 679 mm Right Rear 654 mm Left Rear 637 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2662 mm

C.G. = 1106 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4356 mm

Centerline = 4792 mm

Left Side = 4356 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

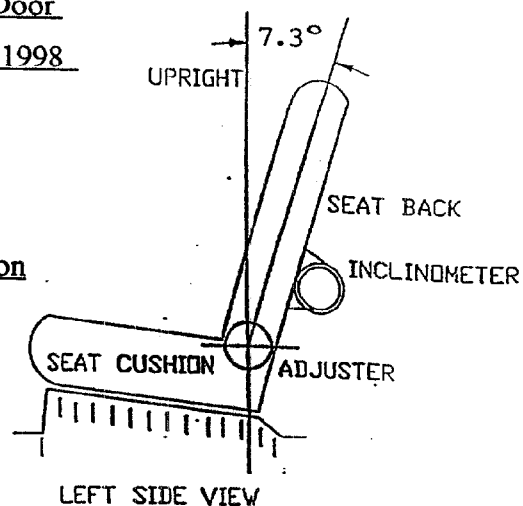
FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 225 mm

Test Position: 112.5 mm from foremost locking position

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 7.3° (measured at headrest)



SECOND POSITION SEAT:

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

Seat Back Adjustment Position: Non-Adjustable

ADJUSTABLE STEERING COLUMN POSITION: 3rd of 4 positions with respect to the top most position.

WINDOW POSITIONS:

Left Front	<u>Fully up</u>	Left Rear	<u>Fully up</u>
Right Front	<u>Fully down</u>	Right Rear	<u>Fully down</u>

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 18.5 gallons

Test Volume: 17.2 gallons 93 % of capacity

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

Wheelbase: = 2662 mm

Impact Point is 391 mm rearward of front axle centerline

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

Overall Length = 4792 mm; Overall Width = 1792 mm

TEST WEIGHT:

Right Front = 495.8 kg Right Rear = 358.3 kg

Left Front = 542.0 kg Left Rear = 379.2 kg

TOTAL FRONT = 1037.8 kg TOTAL REAR = 737.5 kg

% of Total Weight = 58.5 % % of Total Weight = 41.5 %

TOTAL VEHICLE WEIGHT = 1775.3 kg

Wheelbase = 2662 mm

Longitudinal C.G. from Center of Front Axle = 1106 mm

Impact Angle with Respect to Impactor = 90° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (300 mm above ground) = 250 mm

2. LEVEL 2 (440 mm above ground) = 344 mm

3. LEVEL 3 (614 mm above ground) = 325 mm

4. LEVEL 4 (885 mm above ground) = 283 mm

5. LEVEL 5 (1310 mm above ground) = 55 mm

Maximum Post-Test Intrusion = 344 mm

OCCUPANTS:

	<u>Driver (Left Front)</u>	<u>Passenger (Left Rear)</u>
Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>type II belt</u> <u>and frontal/side</u> <u>airbags</u>	<u>type II belt</u>

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION:

Number of Vehicle Data Channels:	=	<u>21</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/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

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: 38.4 mph (61.8 kph) Secondary: 38.2 mph (61.5 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

- | | | |
|----|---------------------------------|-----------------|
| 1. | Row A Top of Stack (813 mm) | = <u>180</u> mm |
| 2. | Row B Mid Stack (686 mm) | = <u>158</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = <u>89</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = <u>163</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 7

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>to headrest</u>	<u>to C-pillar and headrest</u>
Arm	<u>to side airbag</u>	<u>to door (upper rear)</u>
Pelvis	<u>to lower rear of armrest</u>	<u>to rear of armrest</u>
Left Knee	<u>to door panel</u>	<u>to door panel (lower front)</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: 10 mm forward Vertical: 3 mm high

ARM REST LOCATIONS:

Front: 243 mm from bottom of window
Rear: 275 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 126 mm Front Seat Cushion: 116 mm
Left Rear Seat Back: 69 mm Rear Seat Cushion: 148 mm

GLAZING DAMAGE:

Windshield cracked. Both left side door windows shattered

PILLAR PERFORMANCE:

No failure detected

SILL SEPARATION:

None detected

OTHER NOTABLE IMPACT EFFECTS:

Both frontal airbags and driver side airbag deployed.

AIRBAG DEPLOYMENT STATUS:

	<u>DRIVER</u>	<u>PASSENGER</u>
Frontal	<u>Yes</u>	<u>N/A</u>
Side	<u>Yes</u>	<u>N/A</u>

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

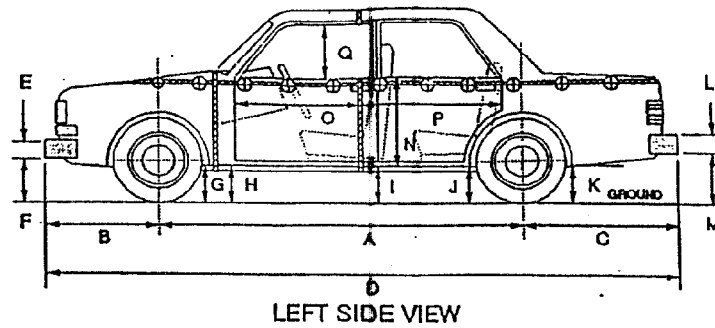
Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

	Front Dummy ID #269				Rear Dummy ID #270			
	Pos. Direct.		Neg. Direct		Pos. Direct.		Neg. Direct	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
RIB ACCELERATIONS								
Left Upper Rib (LUR) Y	53.3	19	-13.5	74	46.9	33	-6.9	118
Left Lower Rib (LLR) Y	53.7	18	-13.6	73	66.8	34	-6.3	197
SPINE ACCELERATIONS								
Lower Lateral Y	61.3	35	-16.3	76	65.1	47	-14.6	68
PELVIS ACCELERATIONS								
Lateral Y	106.8	28	-21.3	50	87.3	40	-8.6	84

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)

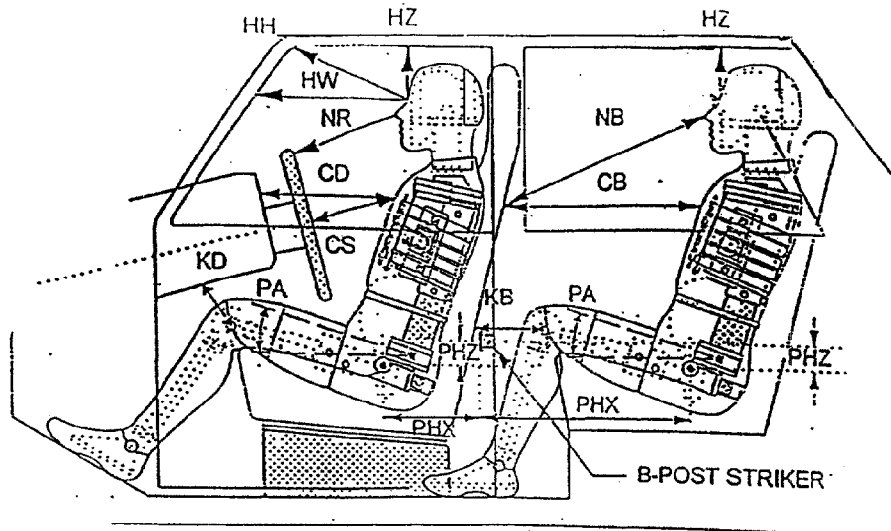
	PRE-TEST	POST-TEST	Δ CHANGE
A	2662	2639	23
B	1010	1028	-18
C	1120	1124	-4
D	4792	4791	1
E	125	125	0
F	403	412	-9
G	198	196	2
H	190	160	30
I	178	168	10
J1/J2	172/175	176/167	-4/8
K	250	250	0
L	148	148	0
M	410	416	-6
N	650	573	77
O	727	715	12
P	1237	1117	120
Q	425	412	13
R	4356	4358	-2
S	4356	4305	51
T	1792	1568	224

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

NHTSA NO.: MW5112 Test Date: April 2, 1998



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

	DRIVER SID ID #269		LEFT REAR PASSENGER SID ID #270
HH	368	HZ	111
HW	618	NB	621
HZ	130	CB	543
NR	435	KBL (KBA)	225 (0.0°)
CD	530	KBR (KBA)	240 (0.0°)
CS	332	PA°	23.4°
KDL(KDA°)	158 (40.4°)	PHX	316
KDR(KDA°)	175 (39.1°)	PHZ	360
PA°	24.0°		
PHX	194		
PHZ	190		

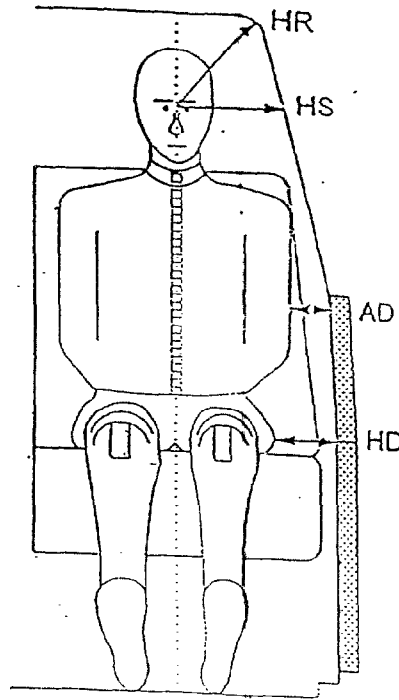
NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

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

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

NHTSA NO.: MW5112

Test Date: April 2, 1998



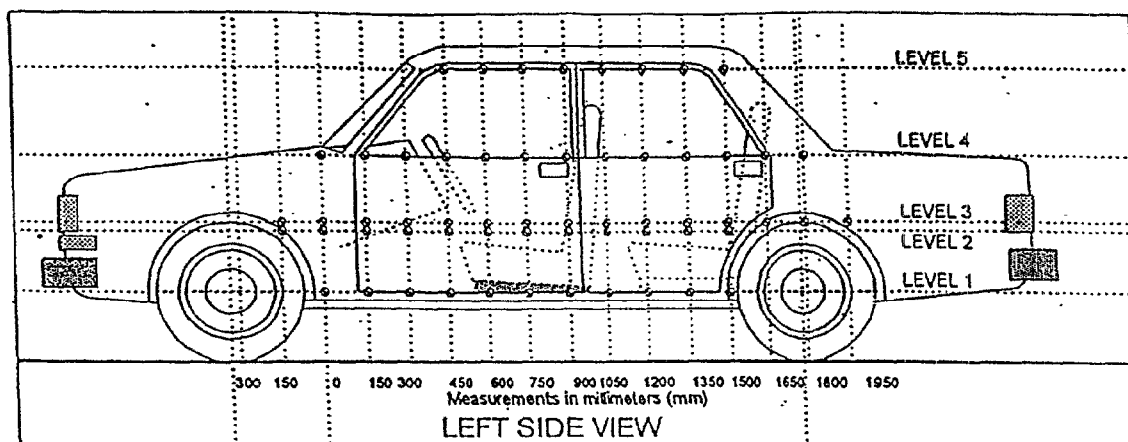
NOTE: All dimensions are in mm

	DRIVER SID ID #269	LEFT REAR PASSENGER SID ID #270
HR	225	132
HS	304	173
AD	101	62
HD	130	139

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

NHTSA NO.: MW5112 Test Date: April 2, 1998



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

MEASUREMENTS ALONG THE VERTICAL 750 mm. LINE SHOWN ABOVE

Level 1 @ Axle Centerline Height (or Sill Top Height)	= <u>300</u> mm
Level 2 @ Occupant H-Point	= <u>440</u> mm
Level 3 @ Mid Door	= <u>614</u> mm
Level 4 @ Window Sill	= <u>885</u> mm
Level 5 @ Window Top	= <u>1310</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)	751	820	69
150	750	881	131
300	750	895	145
450	750	900	150
600	748	911	163
750	747	921	174
900	747	932	185
1050	747	940	193
1200	747	997	250
1350	748	938	190
1500	748	885	137
1650	748	825	77
1800	748	761	13

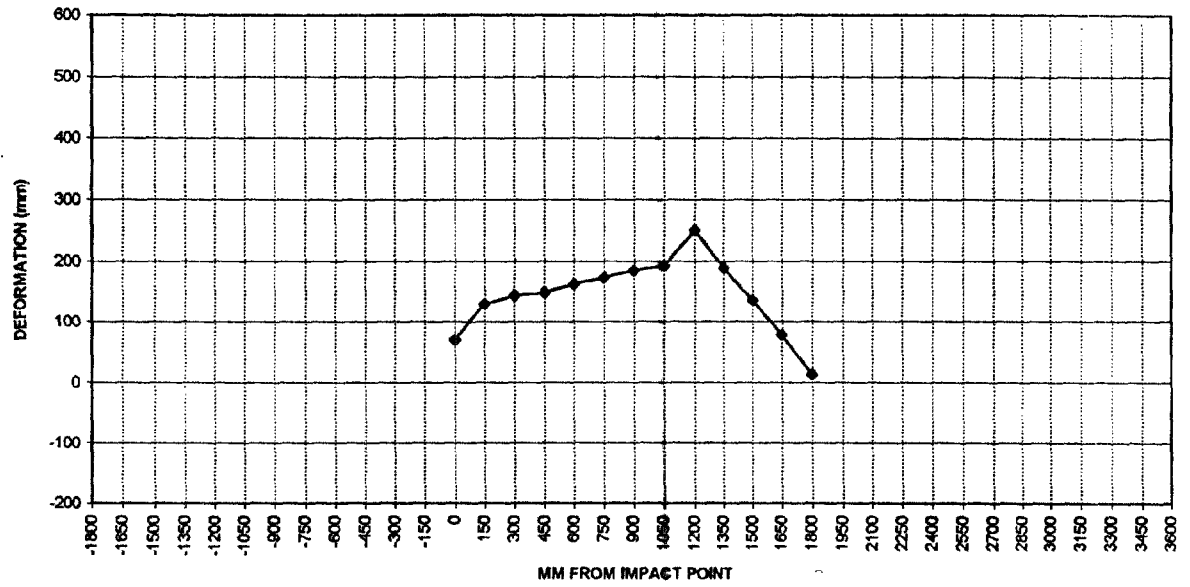
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	768	774	6
-750	740	754	14
-600			
-450			
-300			
-150			
0 (impact point)	728	868	140
150	729	965	236
300	728	988	260
450	728	998	270
600	728	1007	279
750	727	1021	294
900	726	1043	317
1050	725	1063	338
1200	725	1069	344
1350	725	1041	316
1500	726	988	262
1650	727	925	198
1800	727	850	123

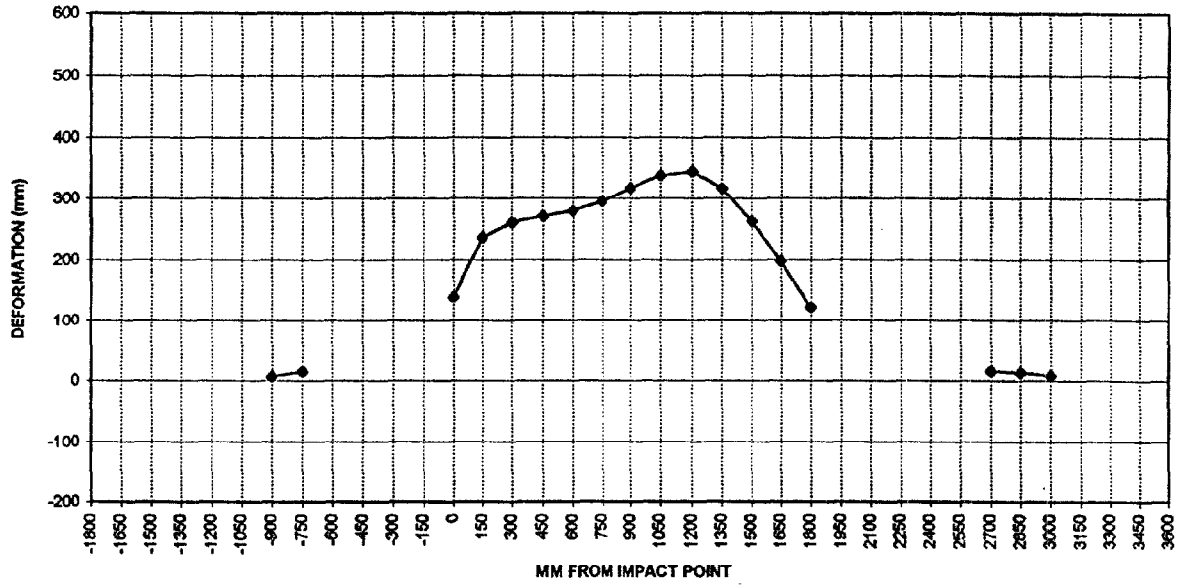
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	753	768	15
2850	769	782	13
3000	788	796	8
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	786	795	9
-750	756	773	17
-600			
-450			
-300			
-150	726	835	109
0 (impact point)	729	854	125
150	728	950	222
300	728	990	262
450	727	1001	274
600	727	1011	284
750	727	1021	294
900	726	1039	313
1050	726	1030	304
1200	725	1038	313
1350	725	1042	317
1500	726	1050	324
1650	726	1051	325
1800	726	989	263

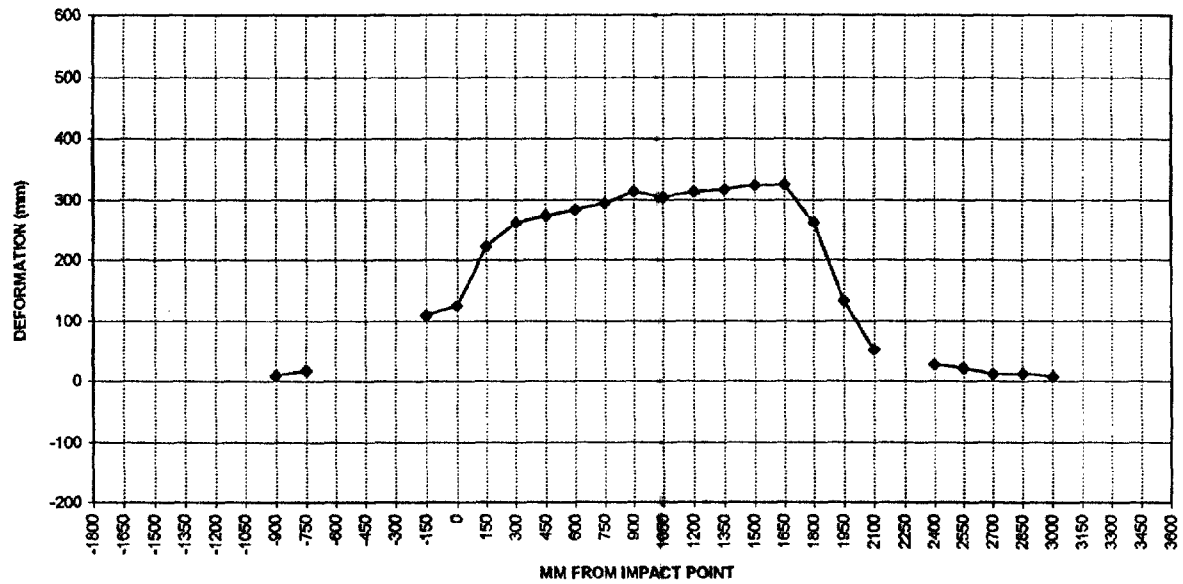
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	725	858	133
2100	719	770	51
2250			
2400	723	749	26
2550	743	764	21
2700	762	773	11
2850	782	794	12
3000	804	811	7
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	868	871	3
-750	845	854	9
-600	832	844	12
-450	822	838	16
-300	813	832	19
-150	808	834	26
0 (impact point)	803	839	36
150	798	874	76
300	798	915	117
450	795	950	155
600	796	972	176
750	796	987	191
900	797	1008	211
1050	800	1030	230
1200	802	1085	283
1350	805	1062	257
1500	809	1049	240
1650	813	1036	223
1800	814	971	157

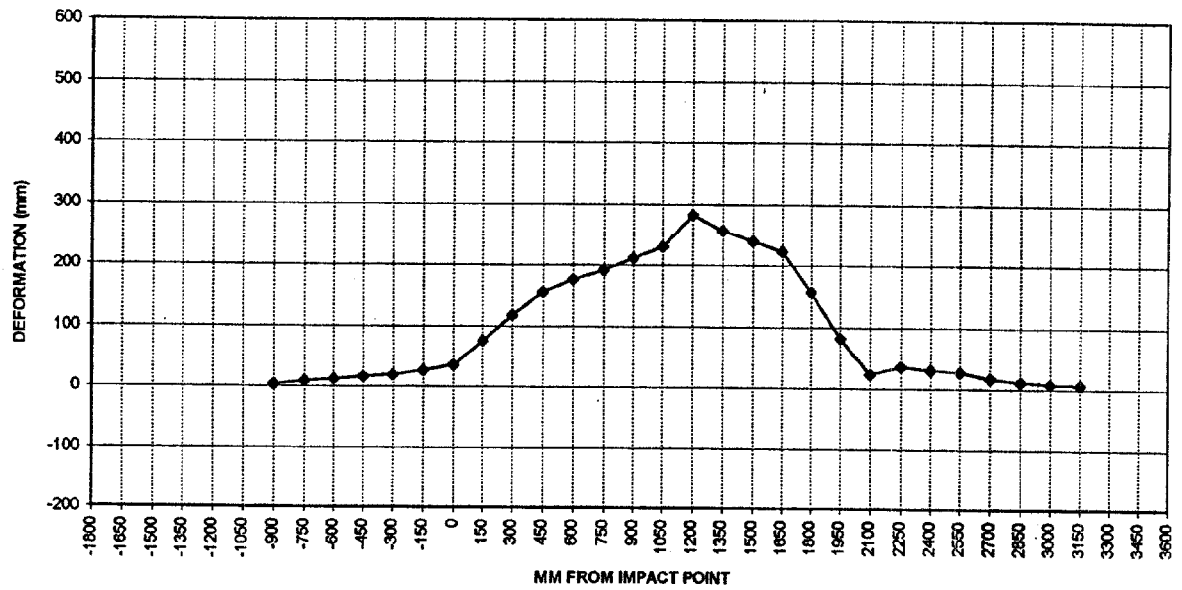
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

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	820	902	82
2100	822	845	23
2250	831	867	36
2400	841	871	30
2550	858	885	27
2700	874	891	17
2850	892	903	11
3000	908	916	8
3150	929	935	6
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	1042	1079	37
900	1042	1085	43
1050	1043	1096	53
1200	1043	1089	46
1350	1045	1094	49
1500	1047	1102	55
1650	1049	1092	43
1800	1054	1087	33

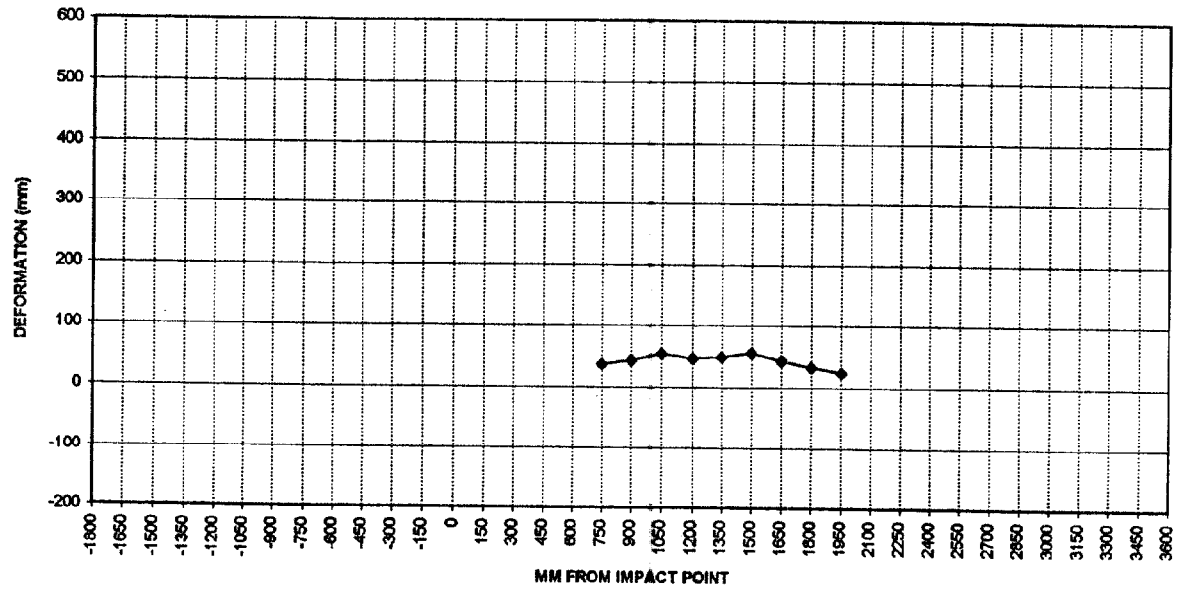
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	1069	1093	24
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



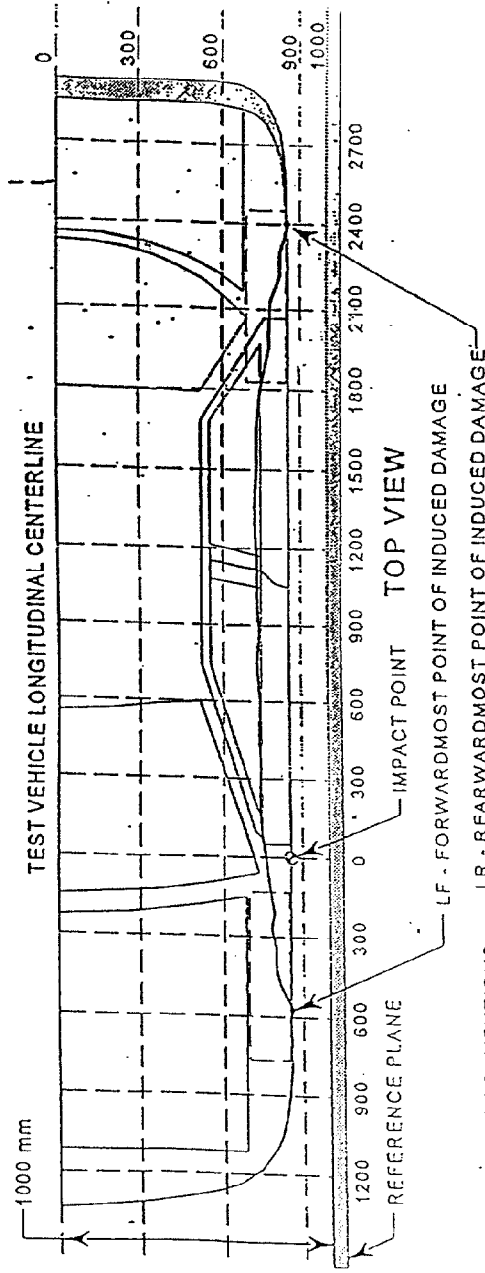
LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

NHTSA NO.: MW5112 Test Date: April 2, 1998



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

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (LF = <u>-900</u> mm)	871	868	3
2. <u>-90</u> mm	845	729	116
3. <u>678</u> mm	1027	727	300
4. <u>1476</u> mm	1050	726	324
5. <u>2347</u> mm	871	839	32
6. (LR = <u>3150</u> mm)	935	929	6

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

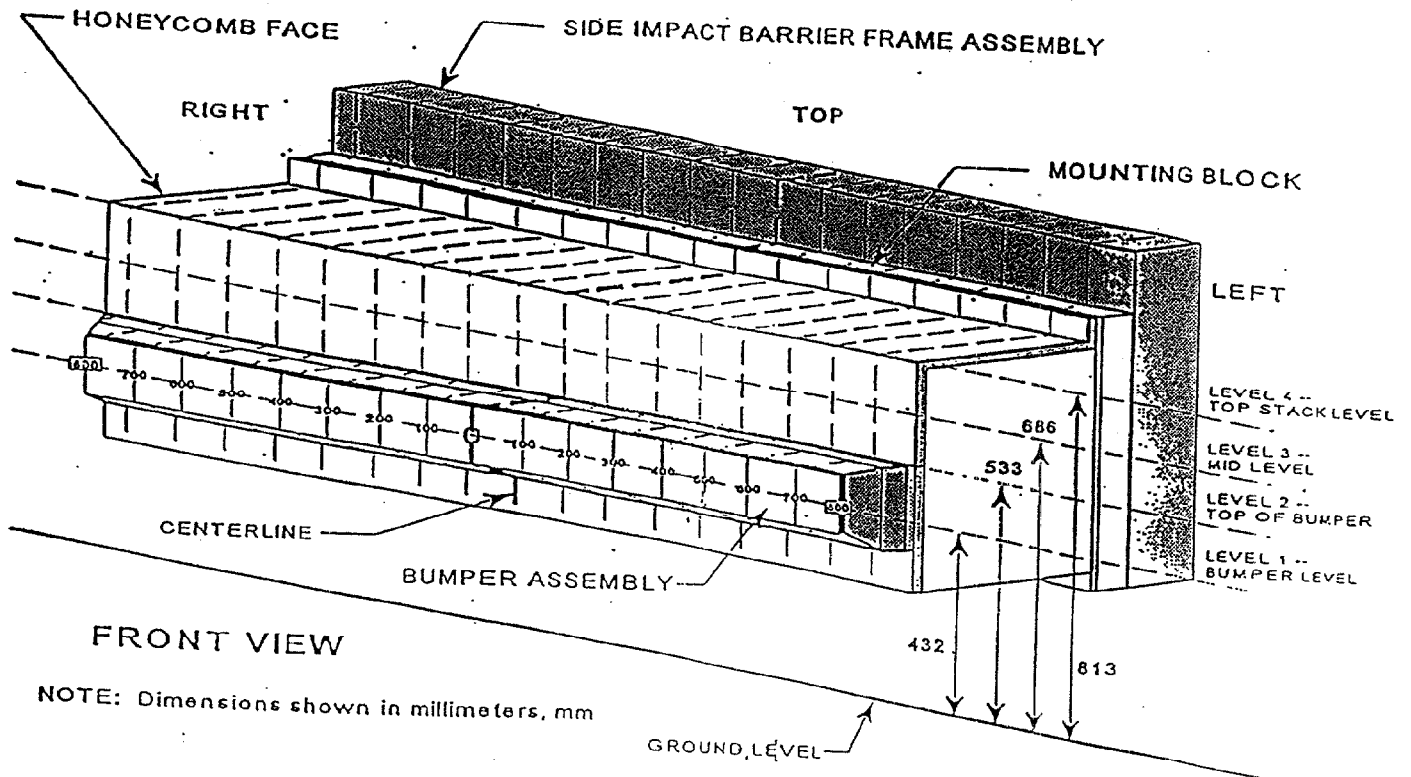
Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

		Distance Right of Center (mm)											Distance Left of Center (mm)									
Location	Height at CL	800	700	600	500	400	300	200	100	0		100	200	300	400	500	600	700	800			
Top Stack Level 4	813 mm	45	10	1	-1	0	2	5	7	9			16	18	33	61	98	140	180			
Mid Level Level 3	686 mm	40	1	0	1	2	10	14	9	9			14	16	19	27	50	98	158			
Top Bumper Level 2	533 mm	71	57	39	31	34	31	33	30	33			37	39	46	58	59	74	89			
Mid Bumper Level 1	432 mm	163	136	122	102	89	89	83	78	81			88	92	98	103	116	144	145			

See next page for Barrier Face Graphic

DATA SHEET NO. 12 (Cont'd)

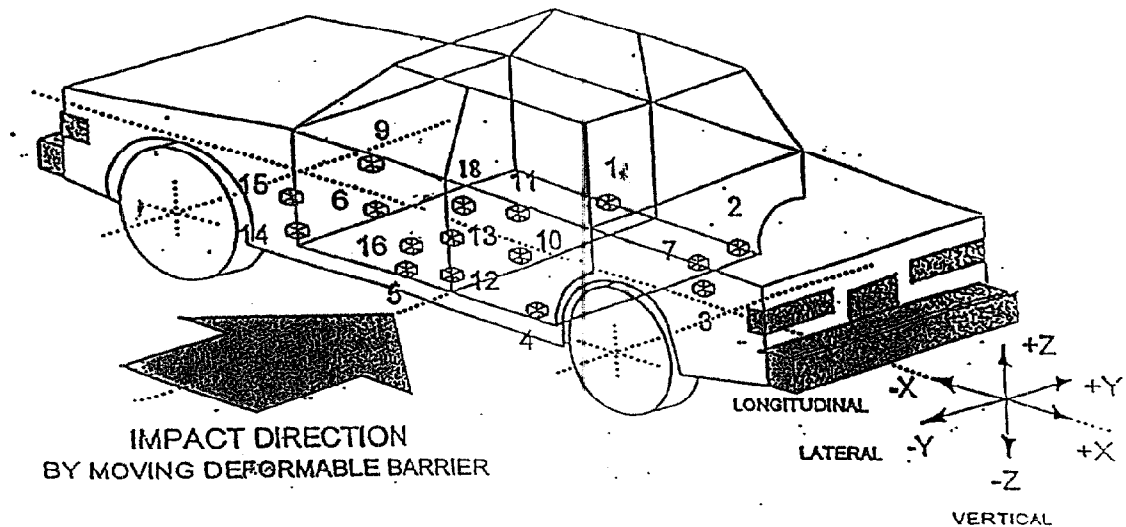


NOTE: Dimensions shown in millimeters, mm

DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998



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
8-Midrear of Left Frt. Door
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/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

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	2370	710	217	4.6	-5.2	27.9	-2.9	5.9	-6.0	
2	Rt. Side Sill @ Rear Seat	1581	720	219	4.2	-8.4	23.4	-2.6	4.1	-8.1	24.8
3	Rr. Floorpan Above Axle	1066	0	502	3.2	-5.8	19.7	-2.2	---	---	---
4	Left Side Sill @ Rr. Seat	1590	-720	216	---	---	33.5	-5.3	---	---	---
5	Left Side Sill @ Frt. Seat	2379	-710	217	---	---	52.4	-6.6	---	---	---
6	Left Front Door Centerline	2775	-777	646	---	---	193.7	-101.3	---	---	---
7	Right Rear Occupant Compartment	1921	523	350	---	---	24.6	-2.6	---	---	---
8	Mid Rear of Left Front Door	2399	-775	697	---	---	192.0	-35.6	---	---	---
9	Left Front Door Upper Centerline	2777	-751	864	---	---	283.5	-71.1	---	---	---
10	Left Rear Door Mid Rear	1454	-740	842	---	---	106.6	-46.7	---	---	---
11	Left Rear Door Upper Centerline	1823	-739	875	---	---	121.3	-36.6	---	---	---
12	Left Lower B-Post	2208	-686	851	---	---	47.7	-11.1	---	---	---
13	Left Mid B-Post**	2182	-726	254	---	---	134.7	-5.6	---	---	---
14	Left Lower A-Post	3263	-741	261	---	---	113.0	-77.8	---	---	---
15	Left Mid A-Post***	3252	-802	894	---	---	***	***	---	---	---
16	Driver Left Seat Track	2378	-550	240	---	---	54.5	-11.4	---	---	---
18	Vehicle CG	2681	35	420	3.6	-9.1	21.5	-2.5	-7.4	12.4	21.8

*Reference: X - Rear Bumper (+ Forward) ** No valid data collected after approximately 13 msec.

Y - Vehicle Centerline (+ To right) *** No valid data

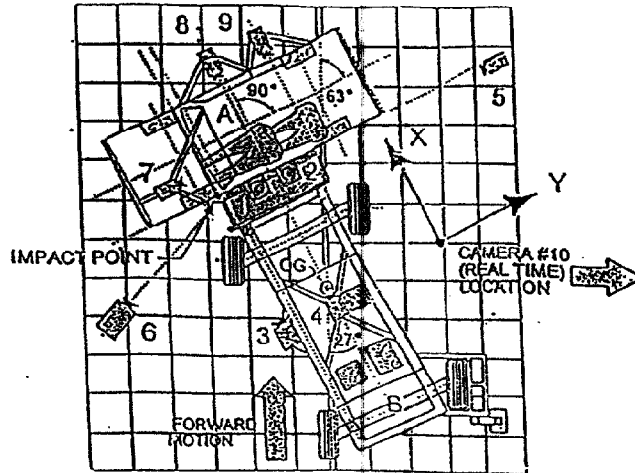
Z - Ground Level (+ Up)

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

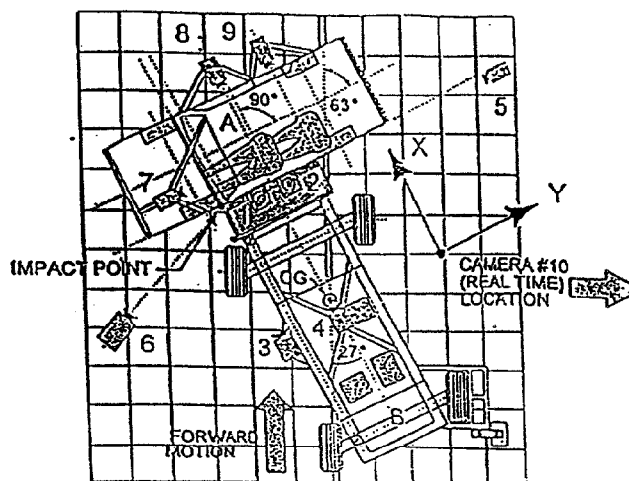


Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	0.6	143	-22.3	36
	Lateral (Y)	---	---	---	0.8	60	-8.5	39
	Vertical (Z)	---	---	---	15.9	50	-18.0	14
	Resultant (R)	---	---	---	24.2	14	---	---
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	1.1	165	-23.5	36
	Lateral (Y)	---	---	---	4.5	29	-0.9	64

*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/Lexus/ES300/4-Door
Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time						
6	Left Impact	-540	-2270	1620		13	1020
8	Onboard Driver					8	893
9	Onboard Passenger					8	1111
7	Onboard Hood					13	800
5	Right Impact	-560	10335	1725		25	877
1	Top Overall	0	1260	5000		8	1020
2	Top Impact	-375	-75	5000		13	893
4	Cart Overall					13	926
3	Cart Pointer					35	1010

* 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/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

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 38.4 mph (61.8 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

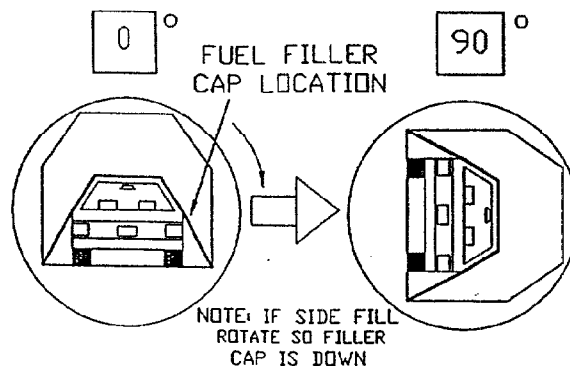
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Lexus/ES300-4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 51 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 51 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

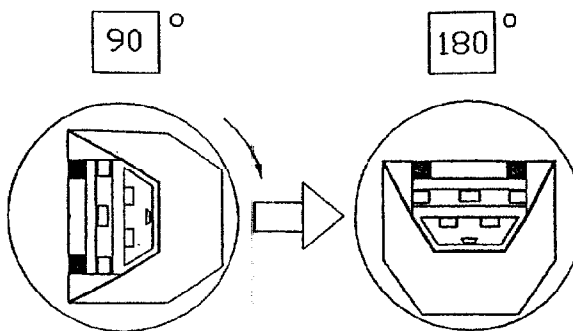
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Lexus/ES300

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

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

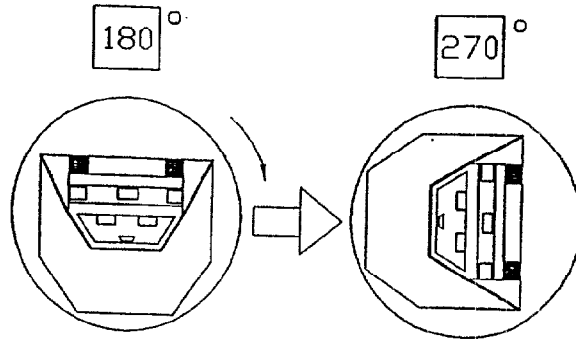
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 16 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 16 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

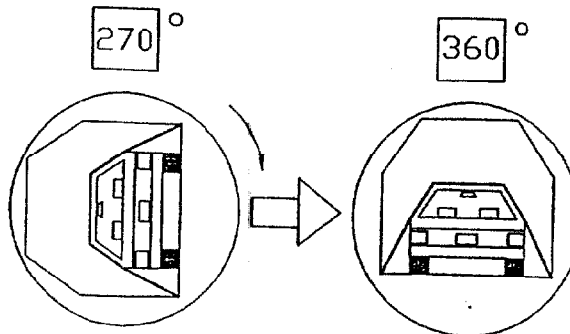
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Lexus/ES300/4-Door

Vehicle NHTSA No.: MW5112 Test Date: April 2, 1998

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 49 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 49 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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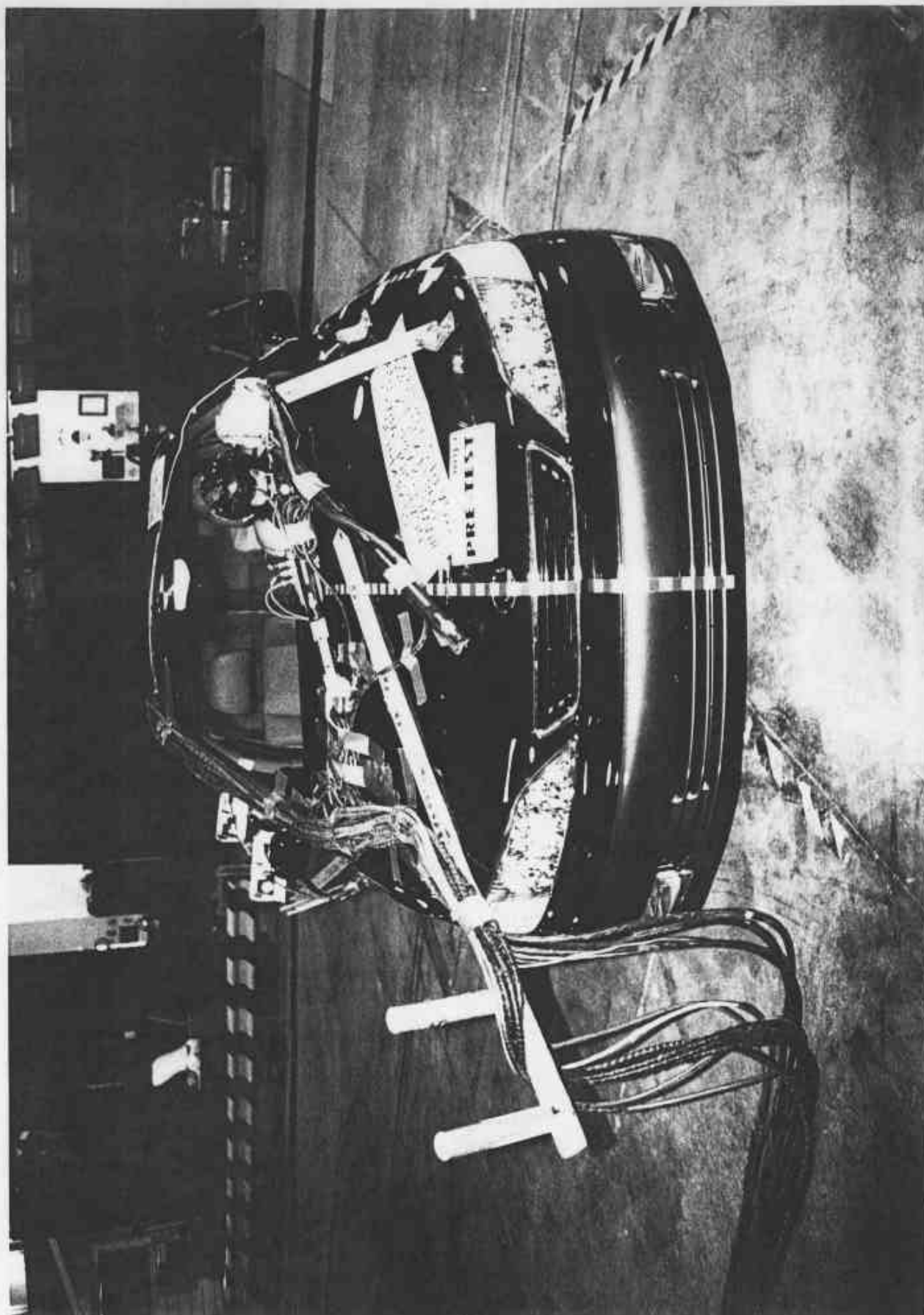


Photo No. A-1 - Pre-Test Front View of Test Vehicle

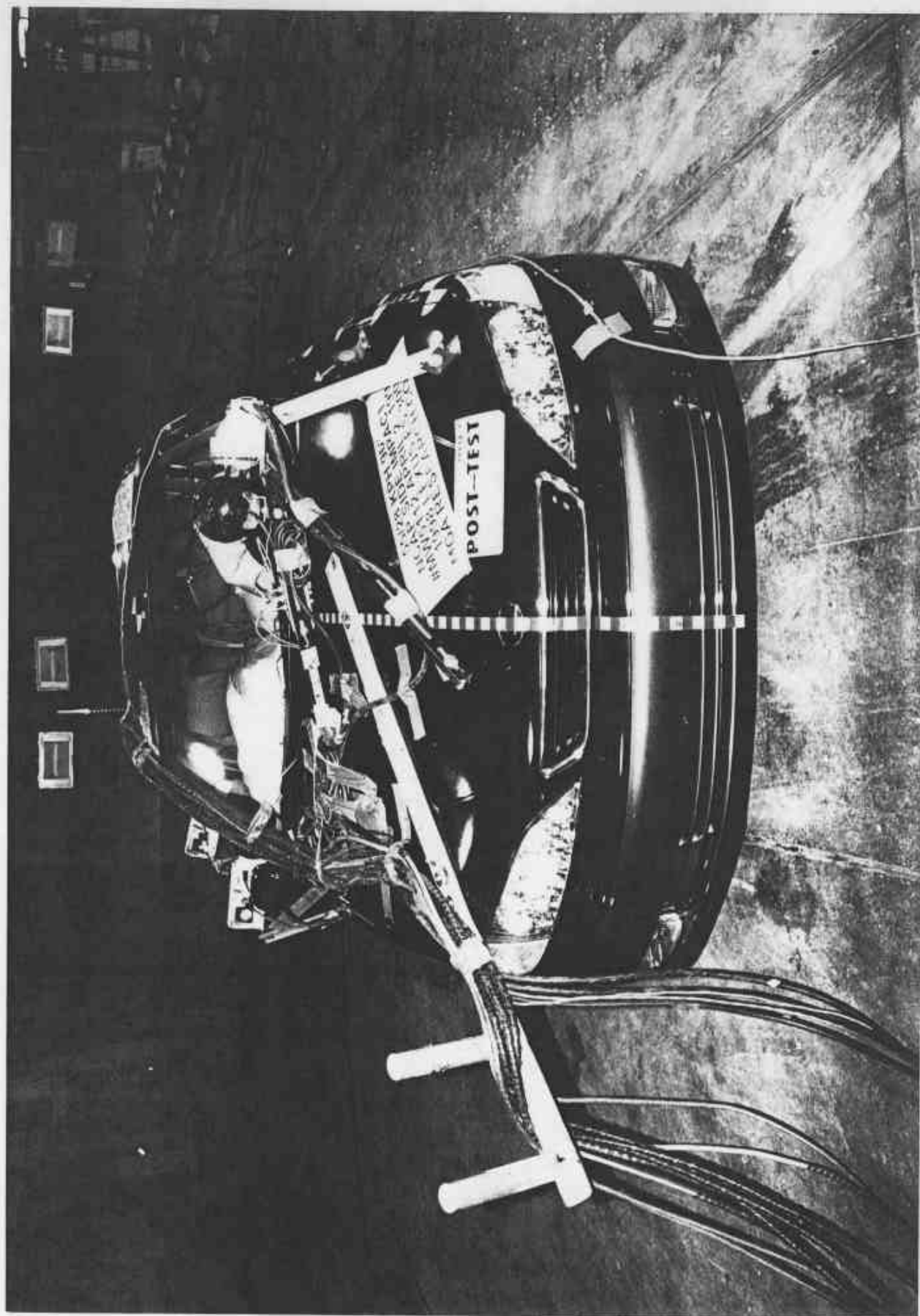


Photo No. A-2 - Post-Test Front View of Test Vehicle

A-2

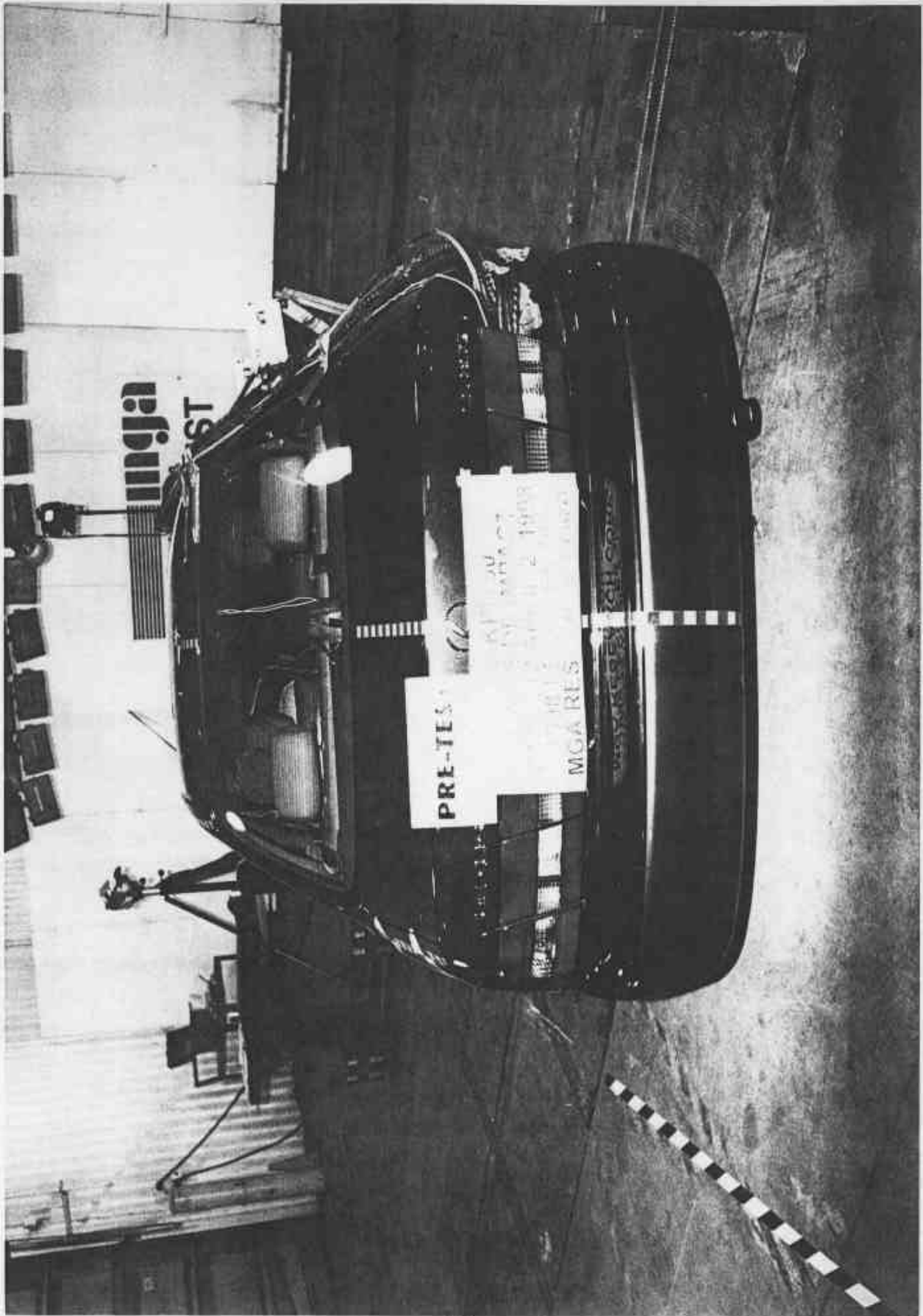


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

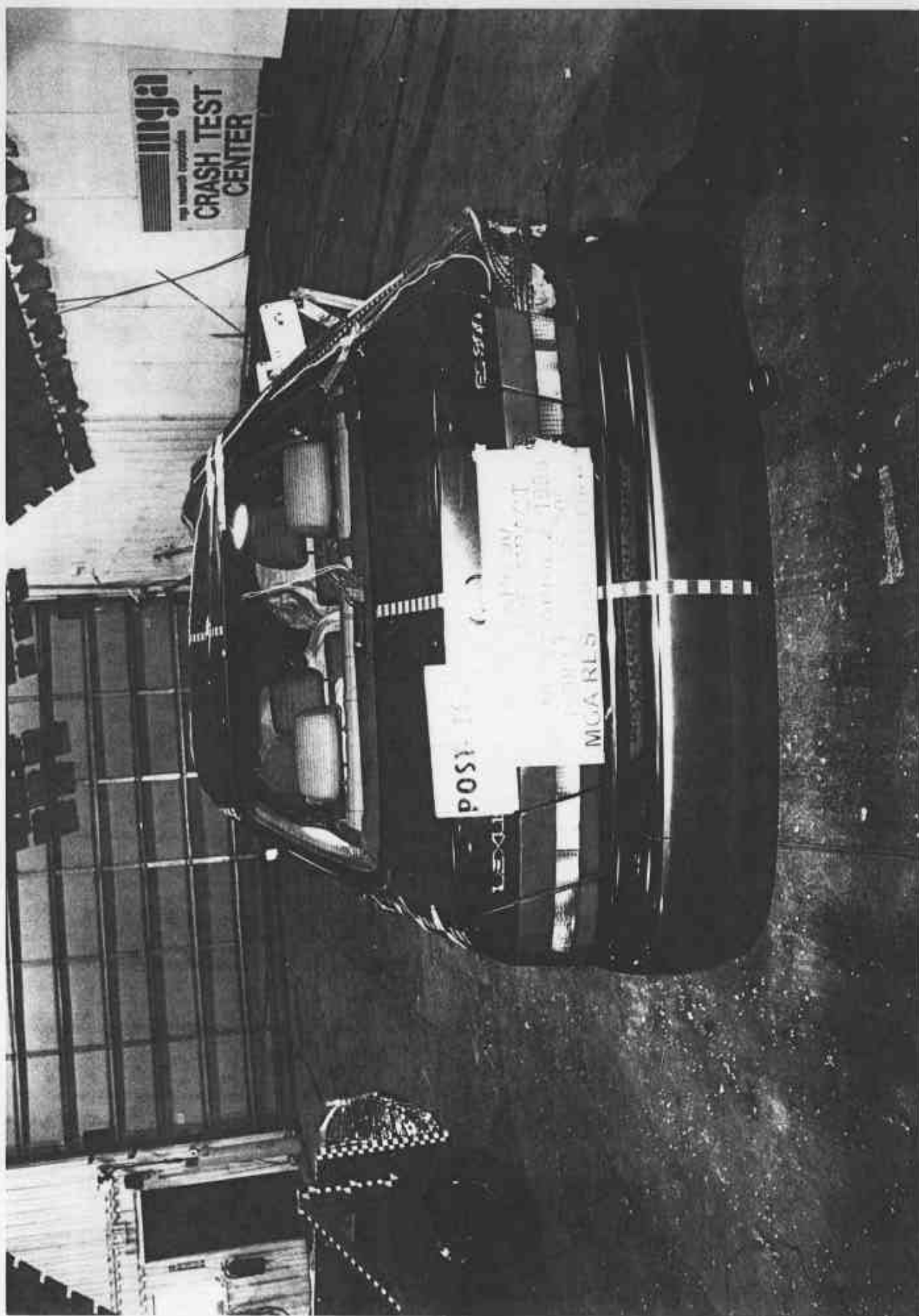


Photo No. A-4 - Post-Test Rear View of Test Vehicle

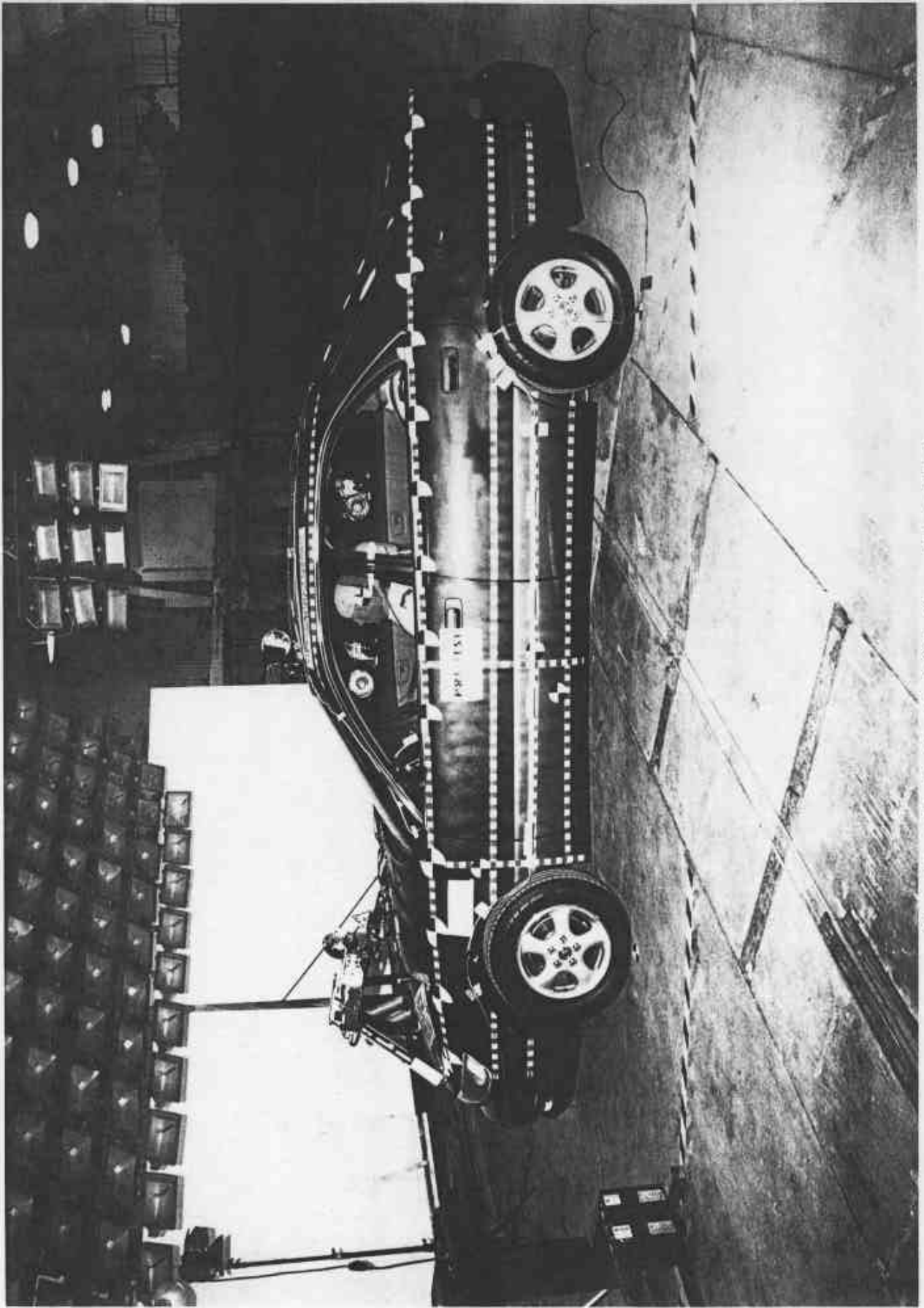


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

A-5

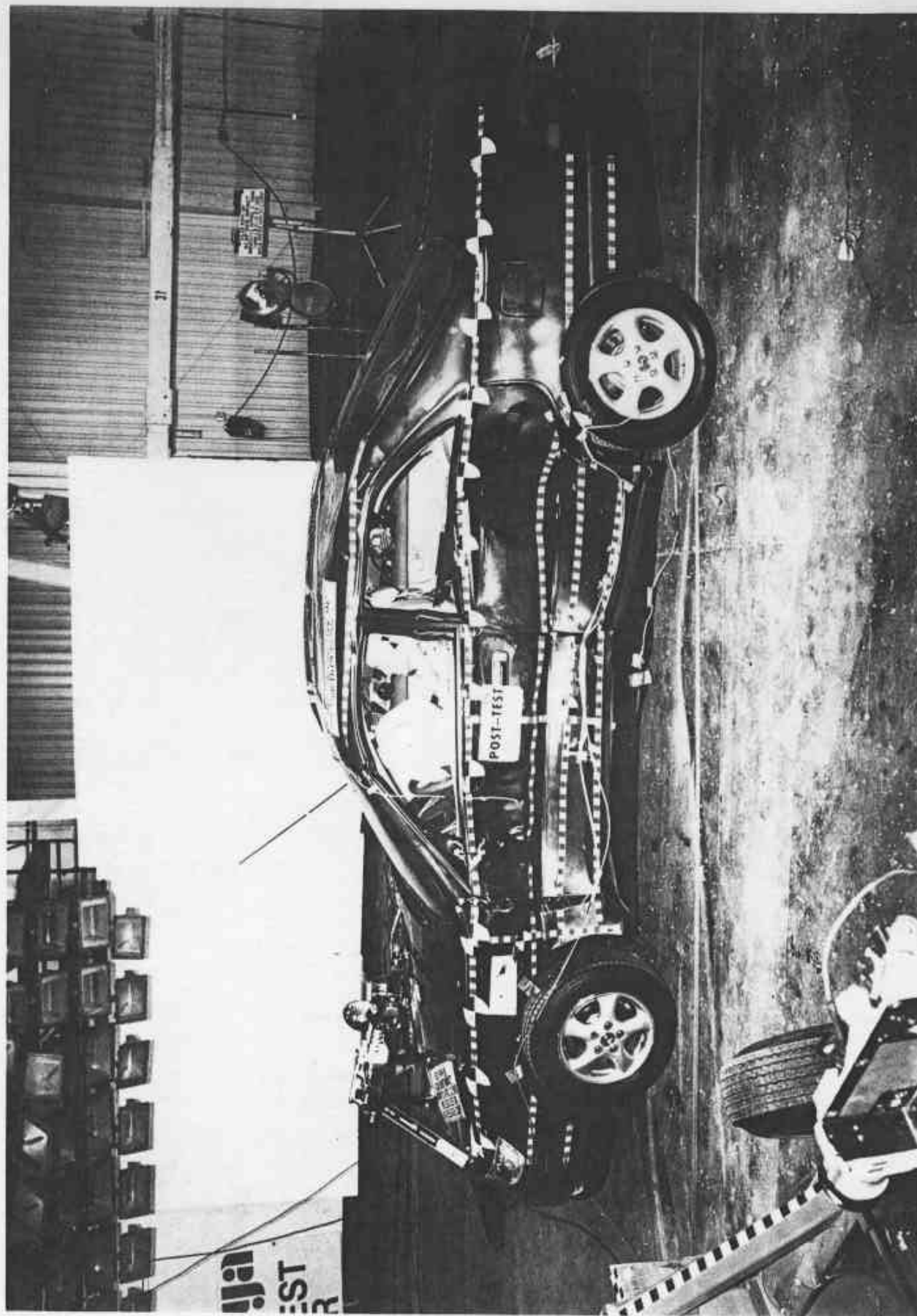


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

A-6

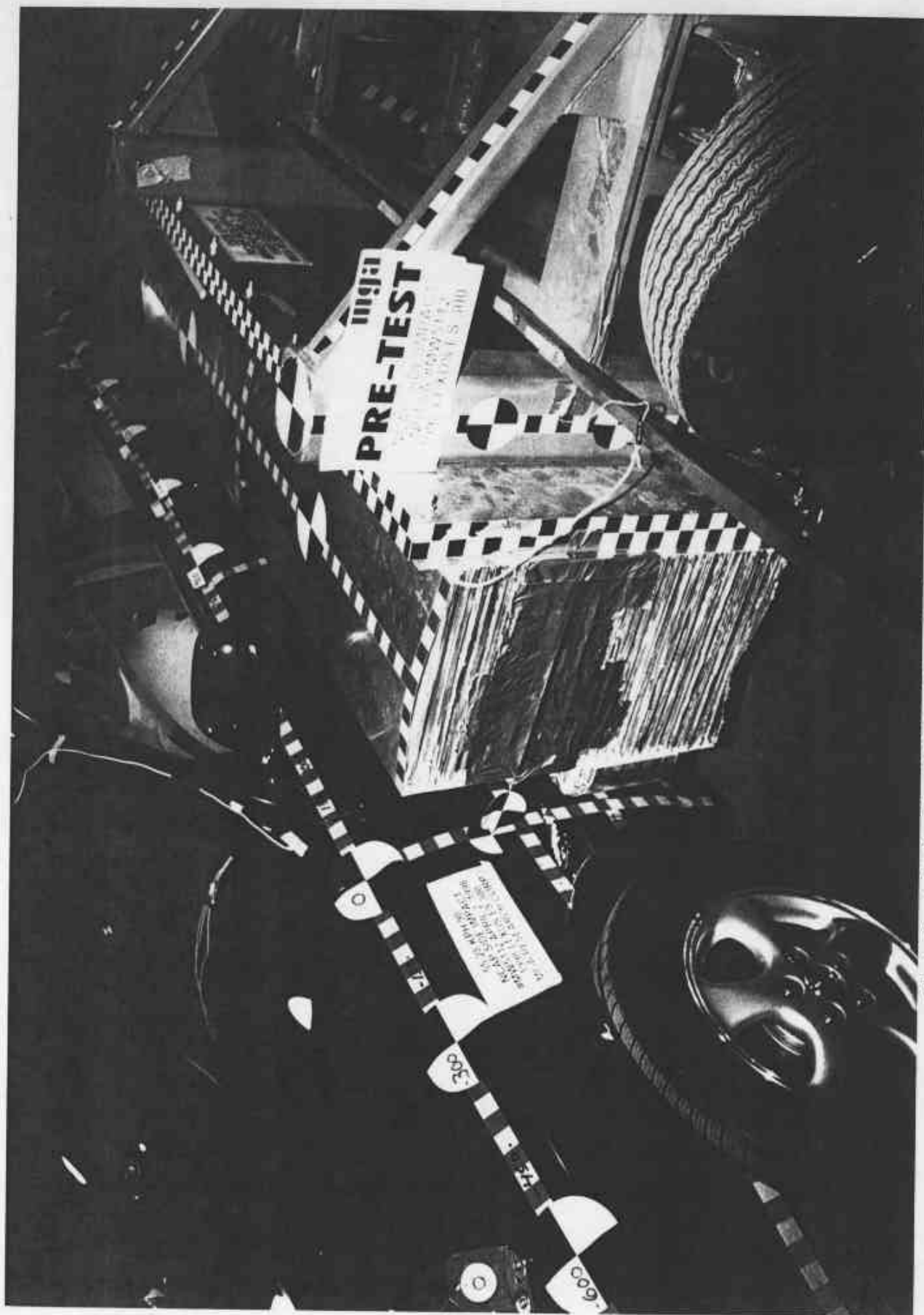


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

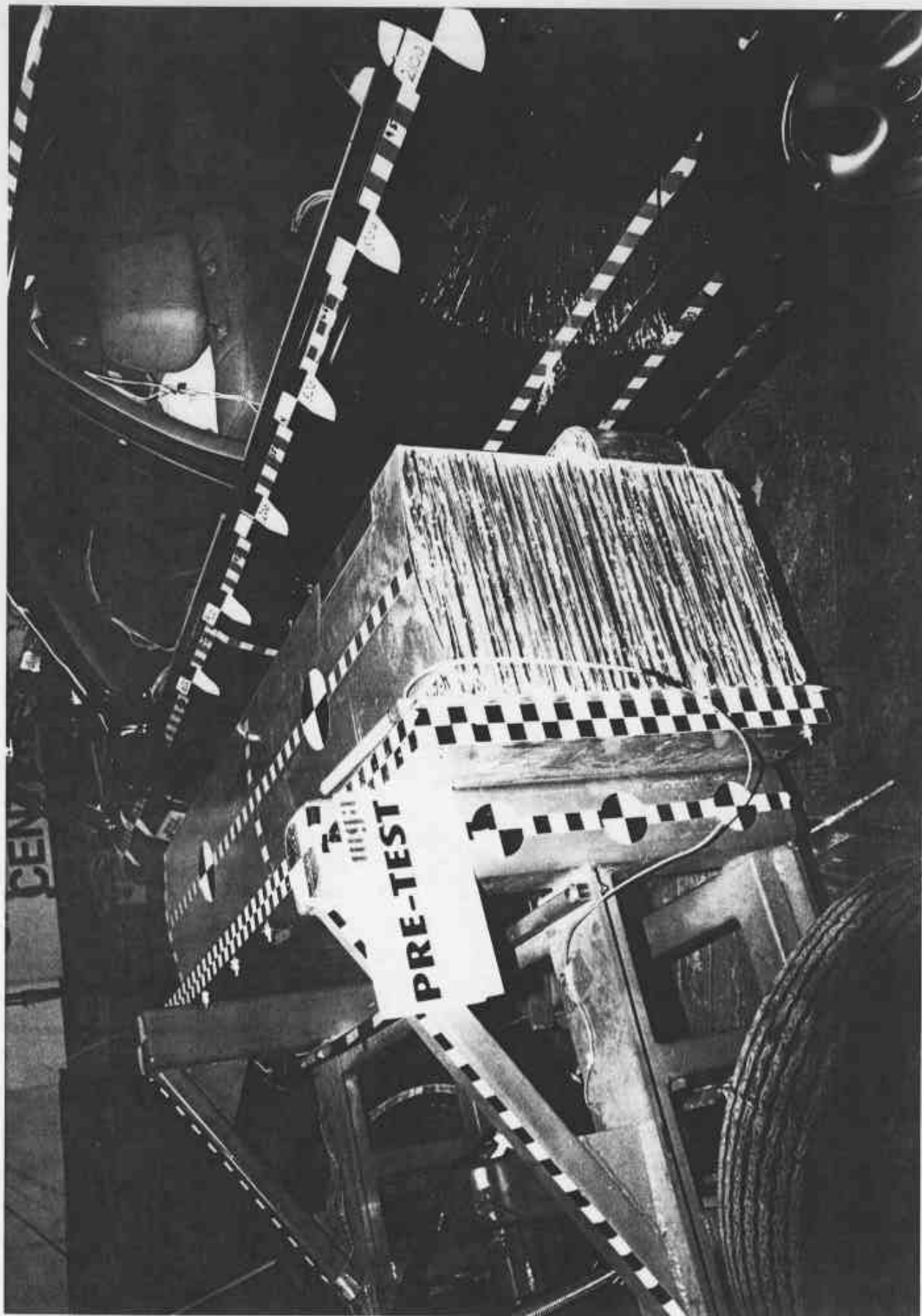


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)



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

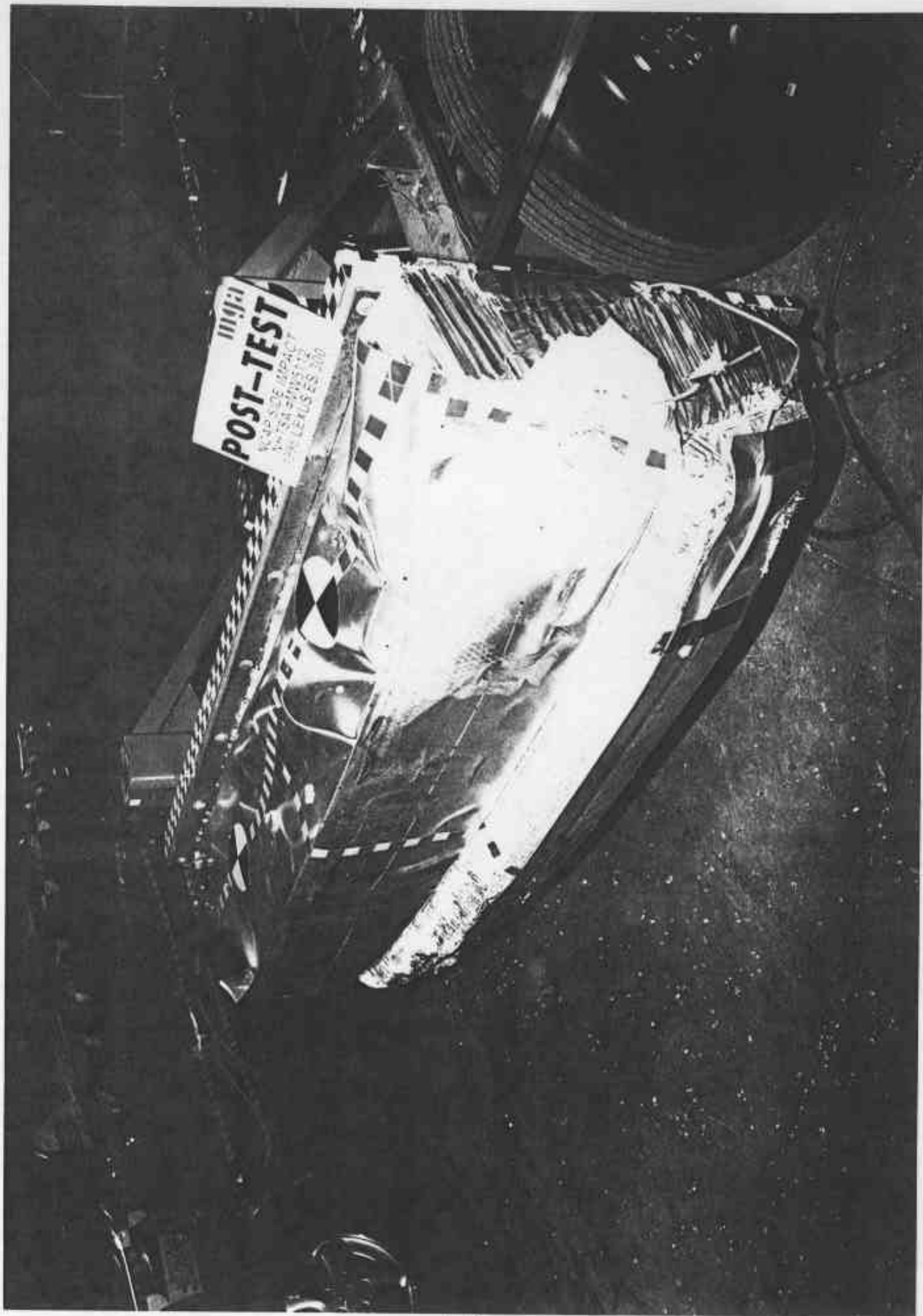
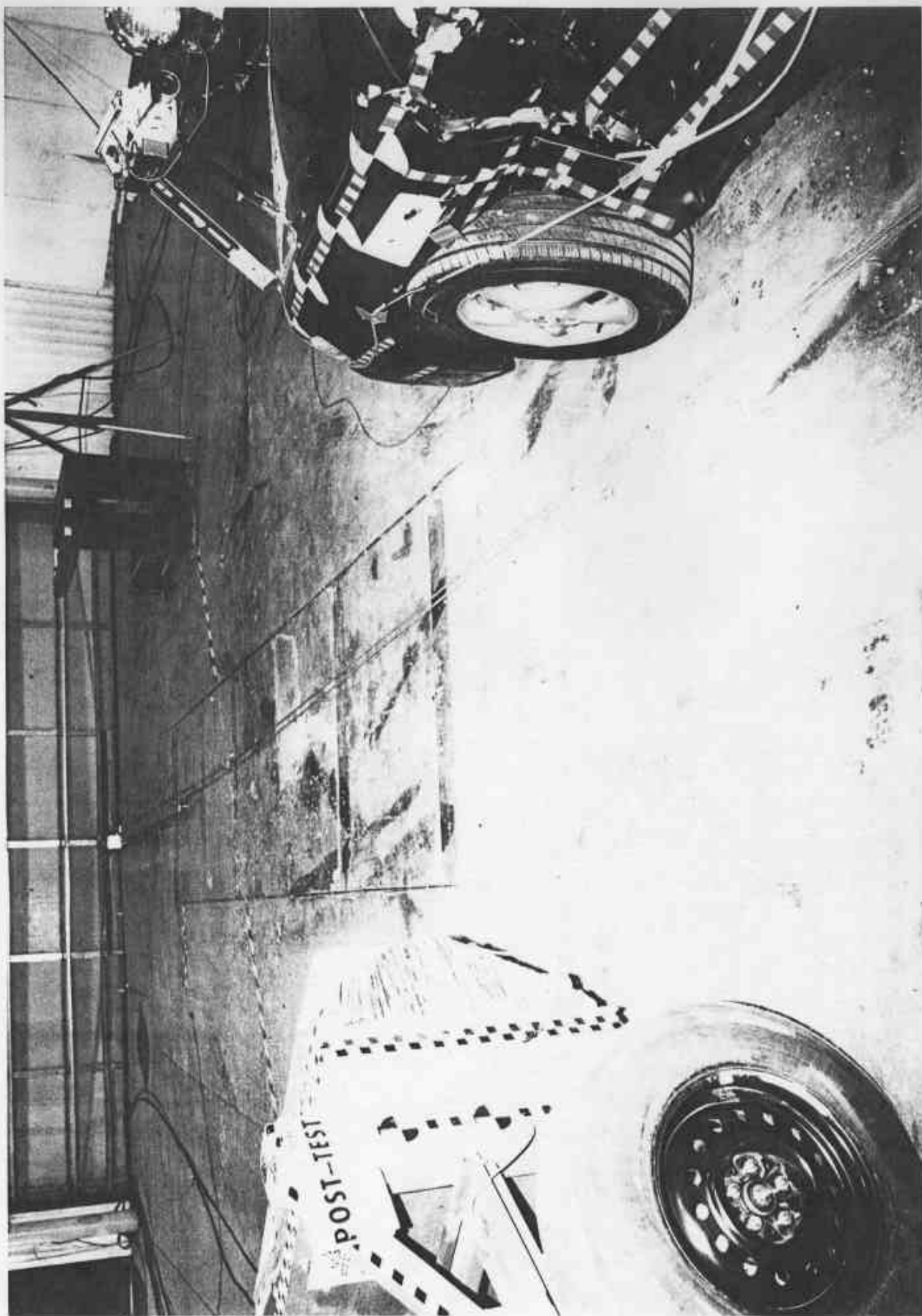


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)



A-11

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

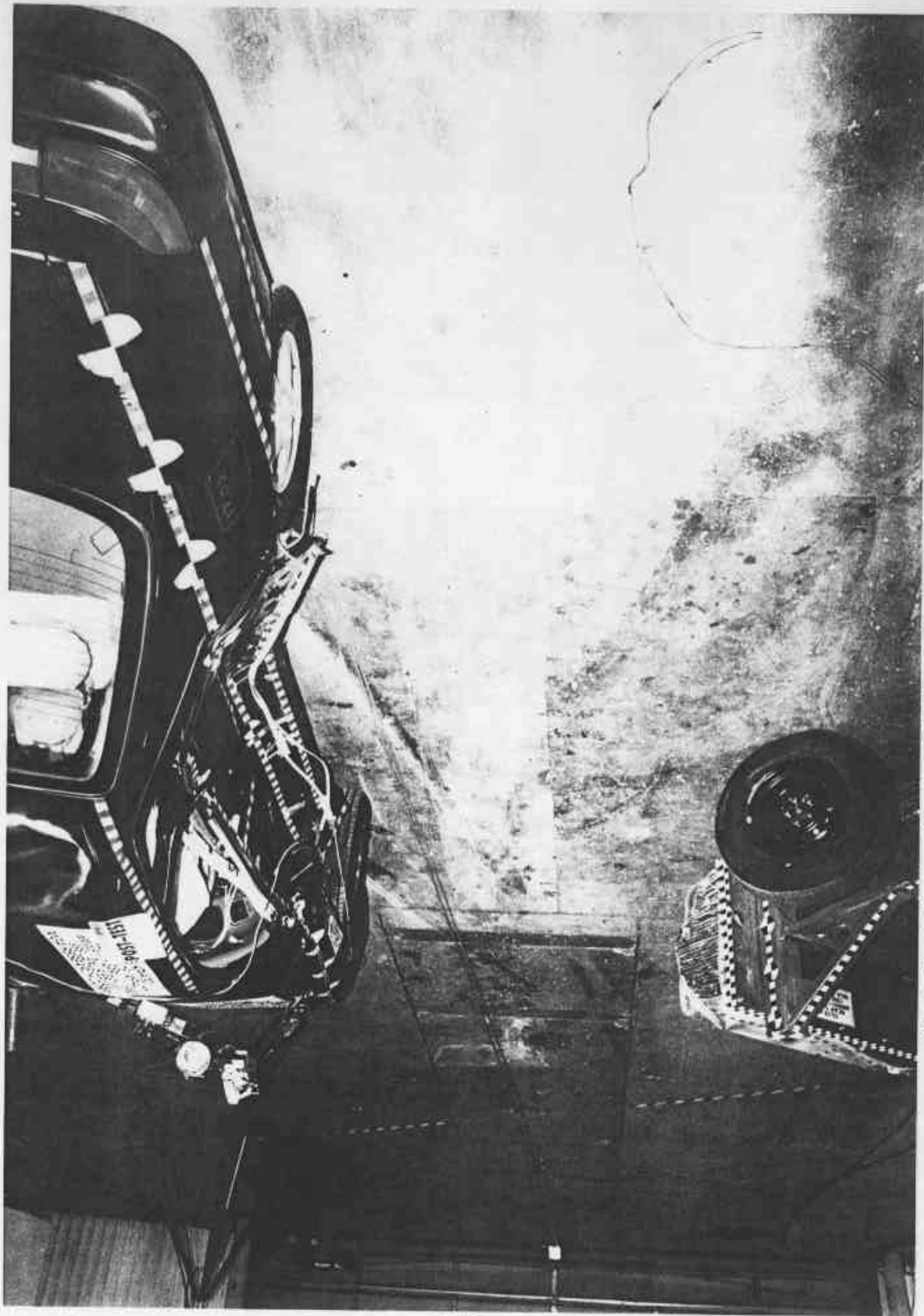


Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

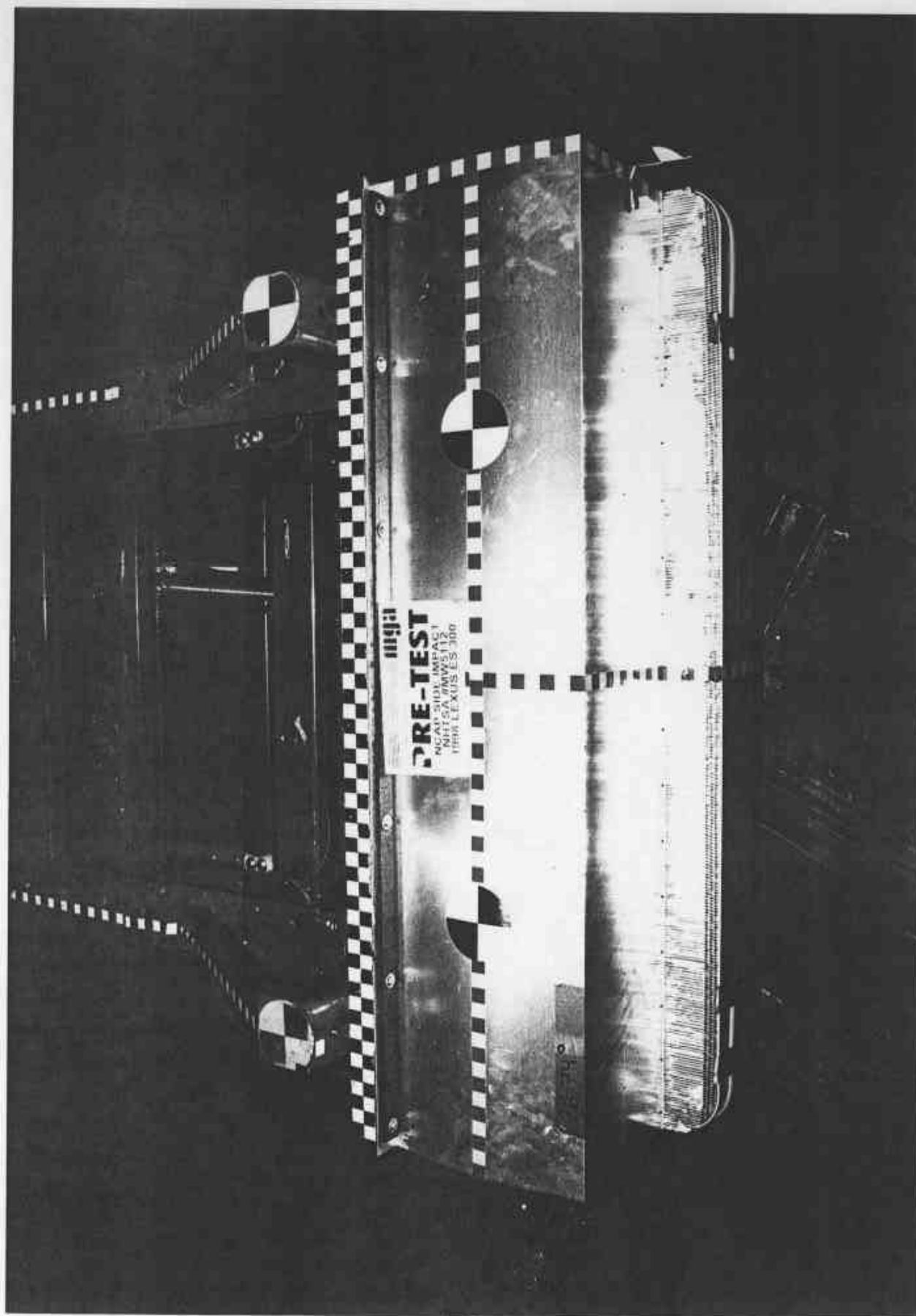


Photo No. A-13 - Pre-Test MDB Top View

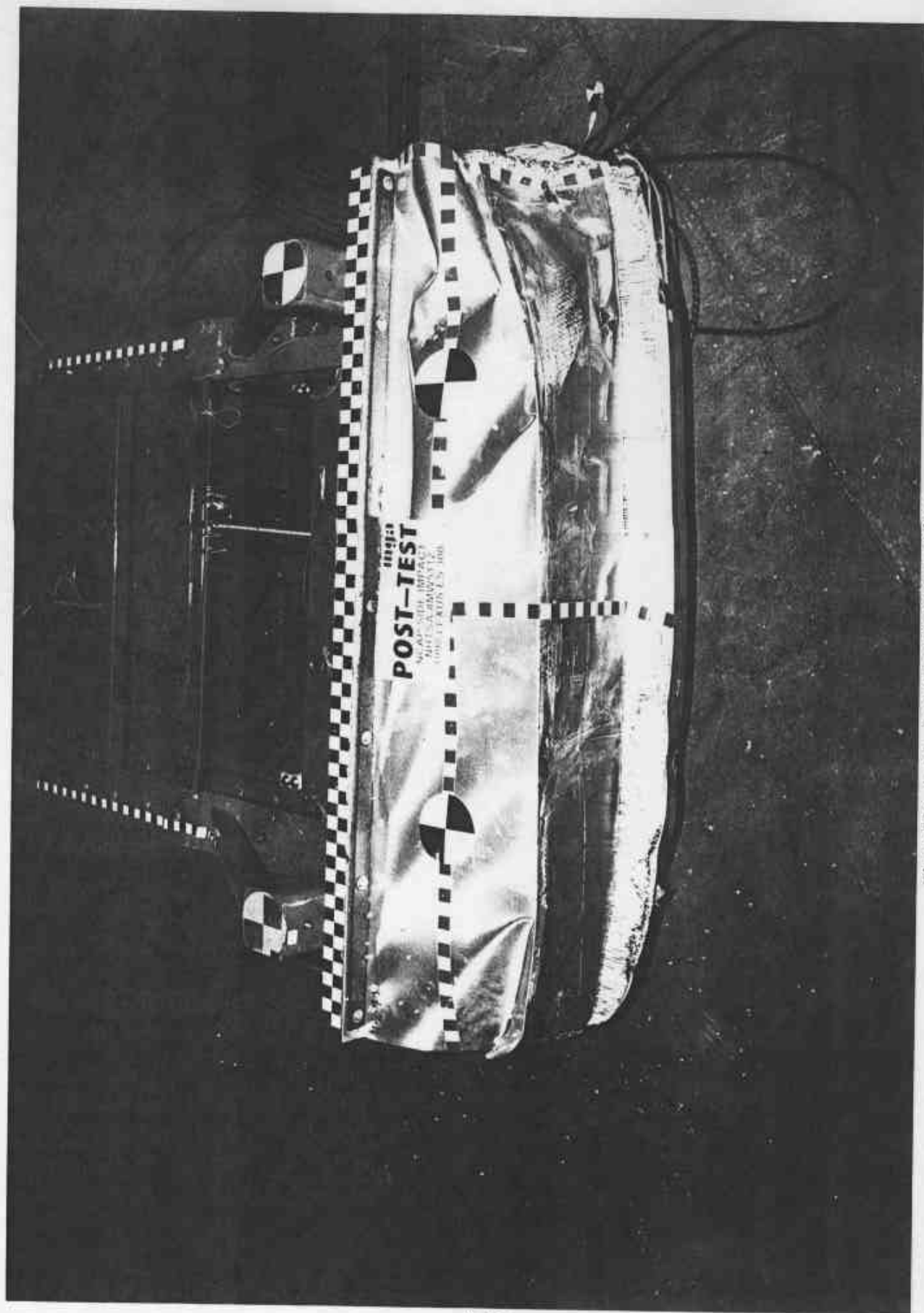


Photo No. A-14 - Post-Test MDB Top View

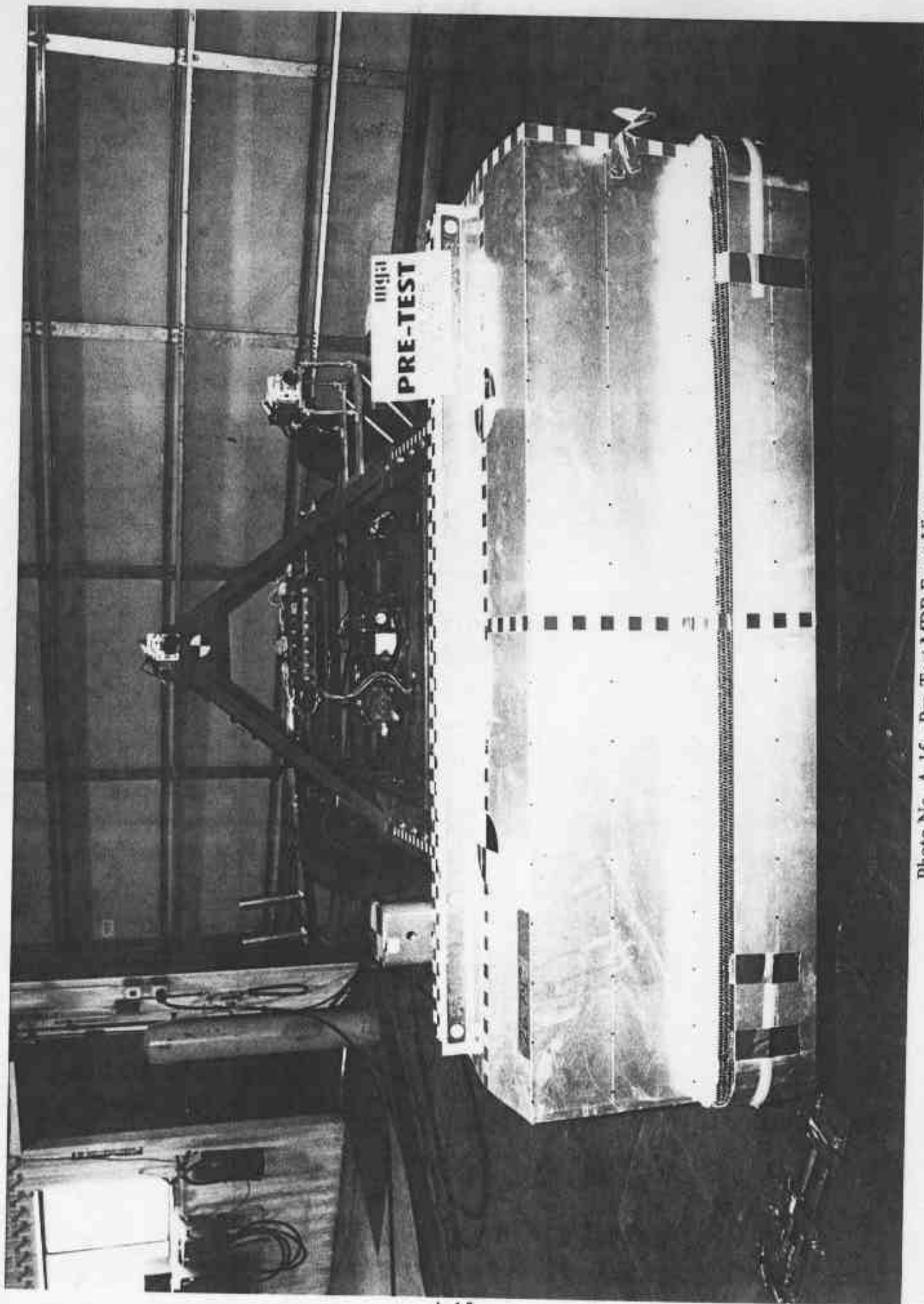


Photo No. A-15 - Pre-Test MDB Front View

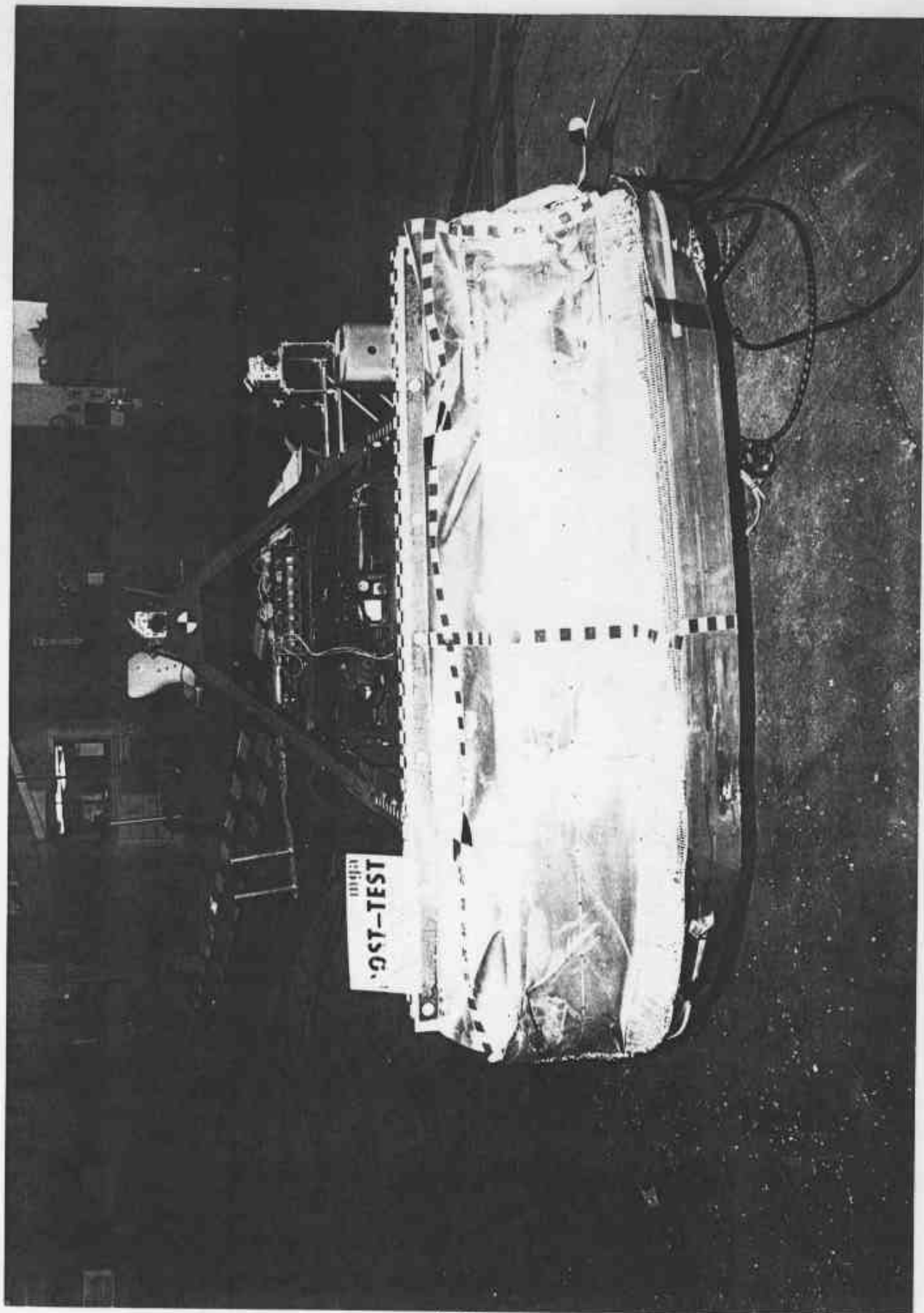


Photo No. A-16 - Post-Test MDB Front View

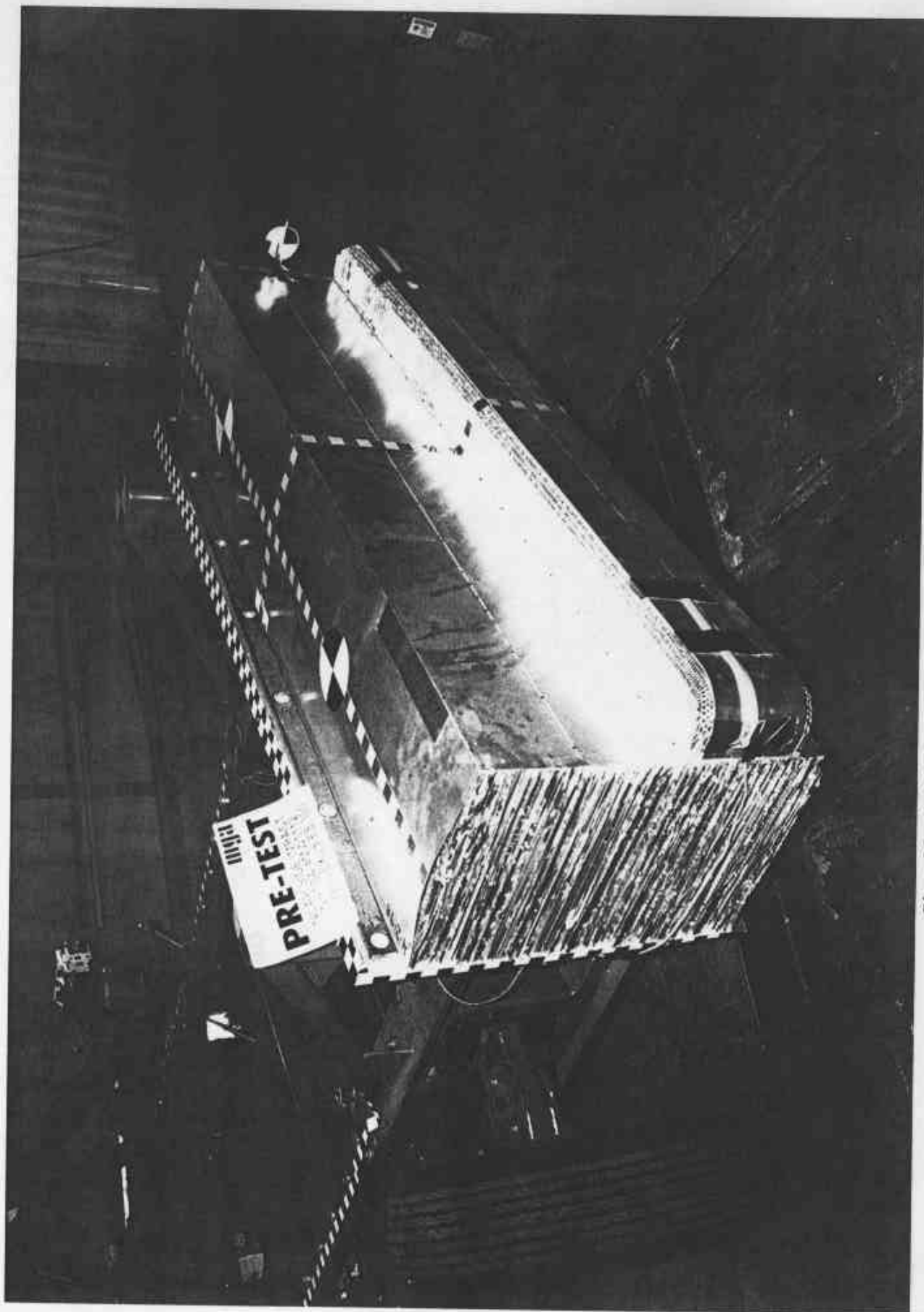


Photo No. A-17 - Pre-Test MDB Right Side View

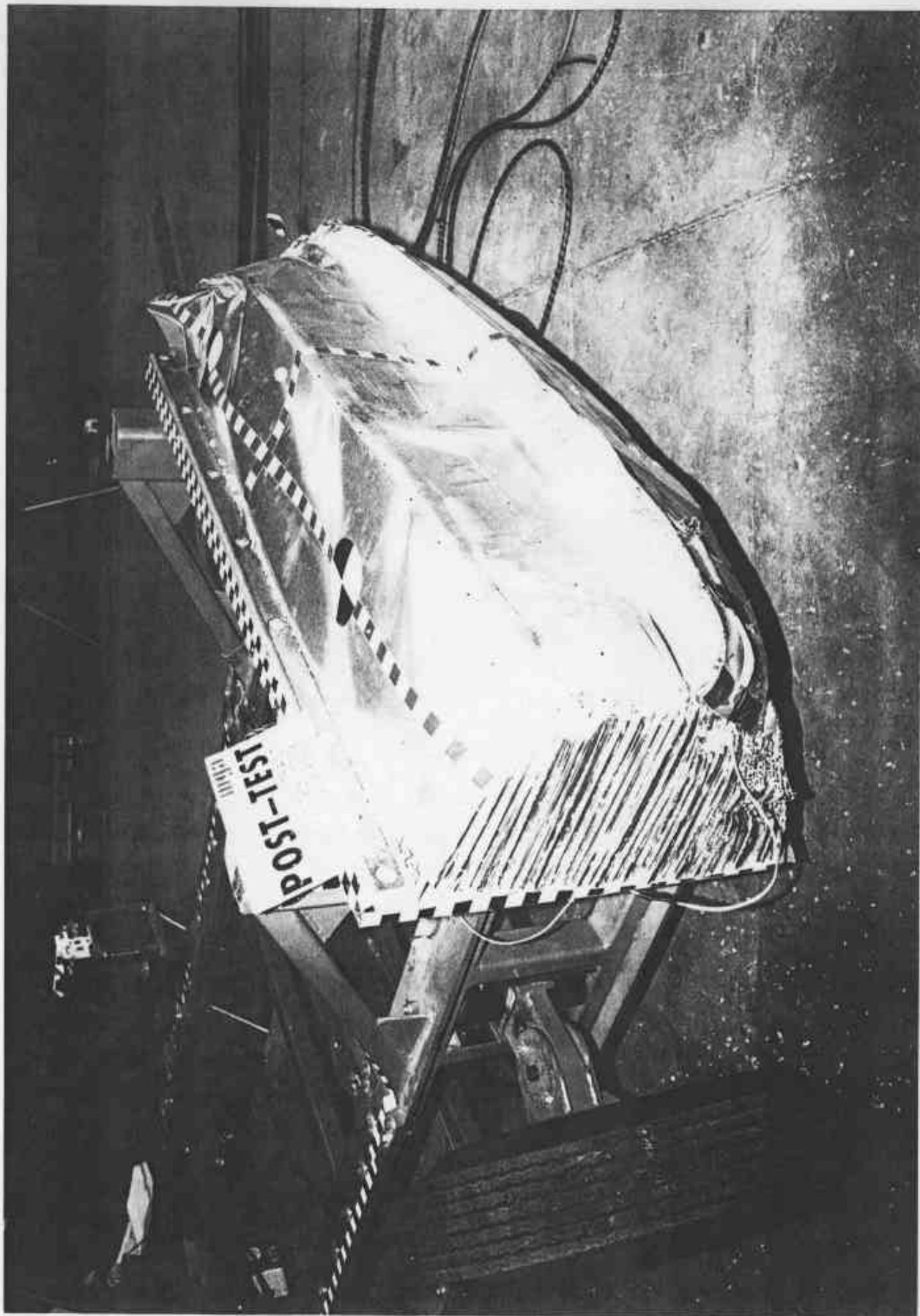


Photo No. A-18 - Post-Test MDB Right Side View

A-18

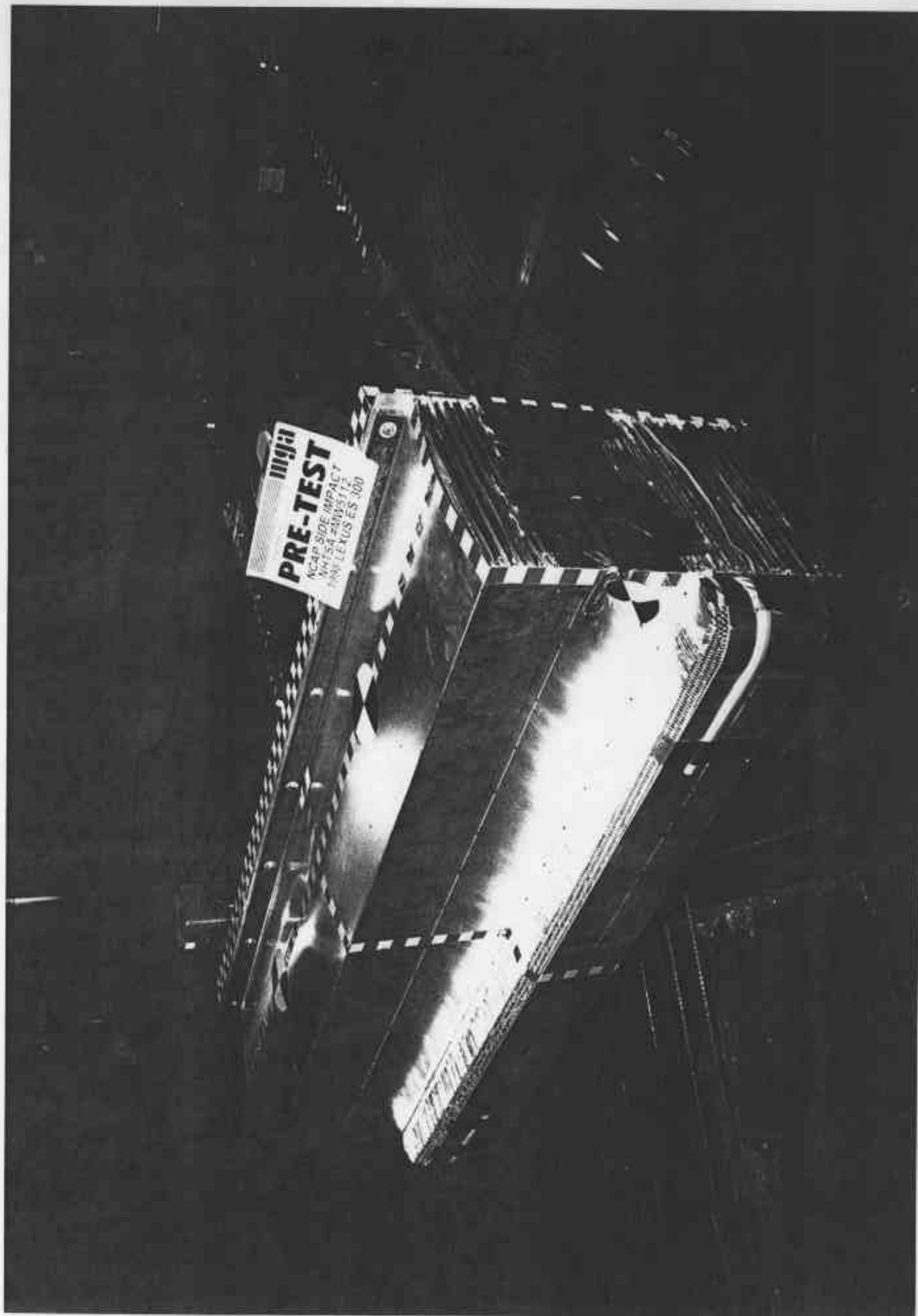


Photo No. A-19 - Pre-Test MDB Left Side View

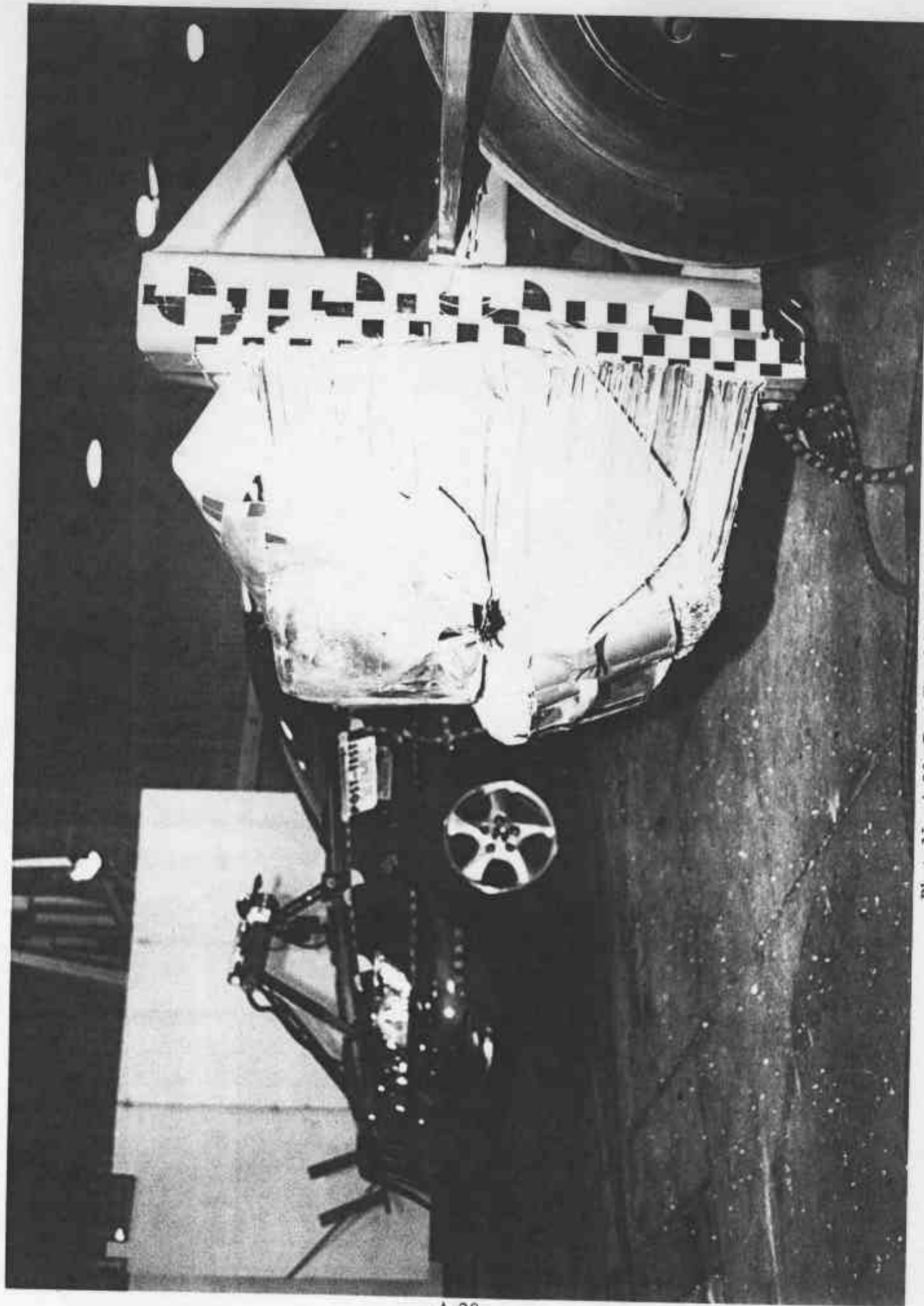


Photo No. A-20 - Post-Test MDB Left Side View

A-20



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



A-22

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

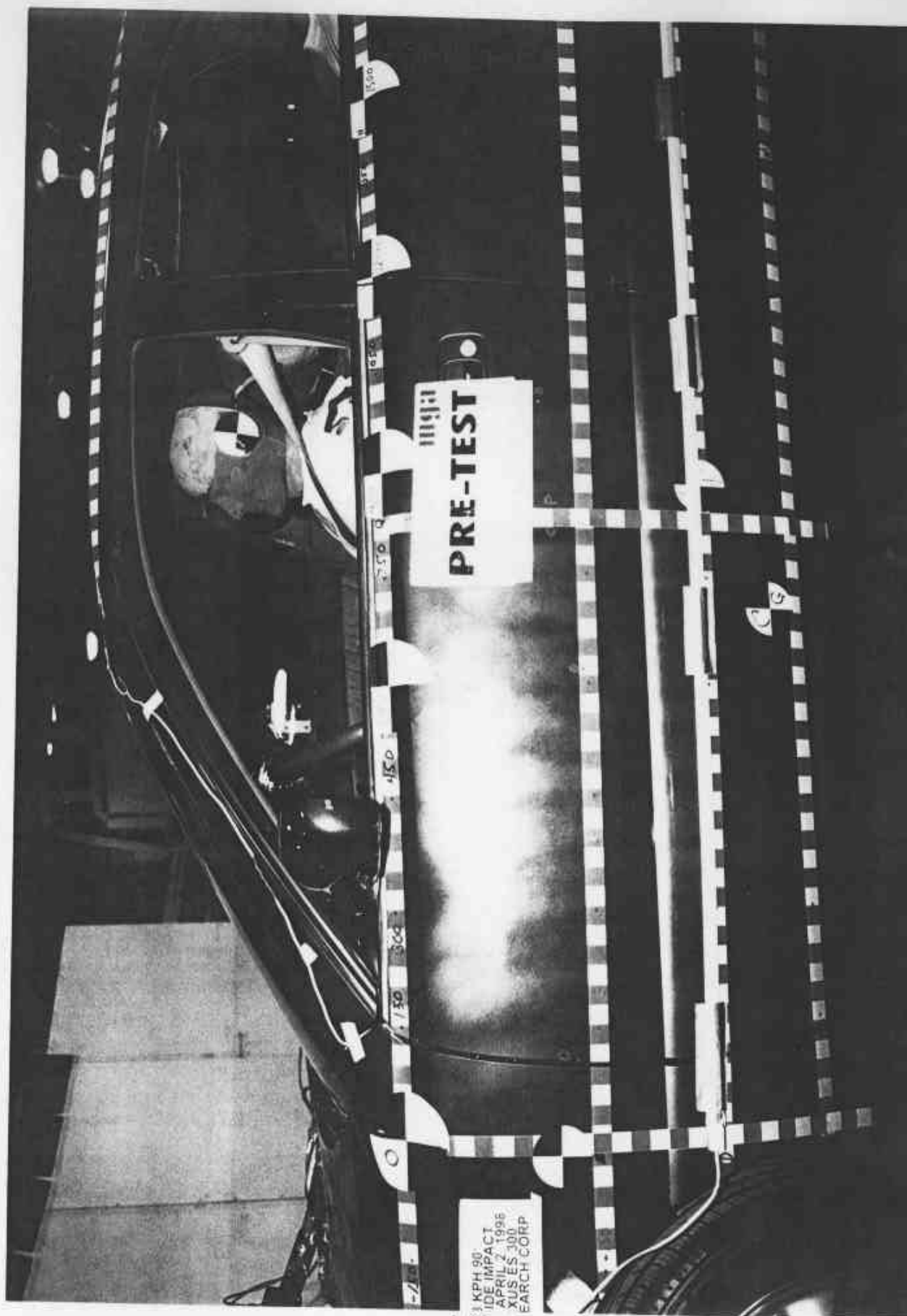


Photo No. A-23 - Pre-Test Driver Dummy Left Side View

A-23



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)

A-25

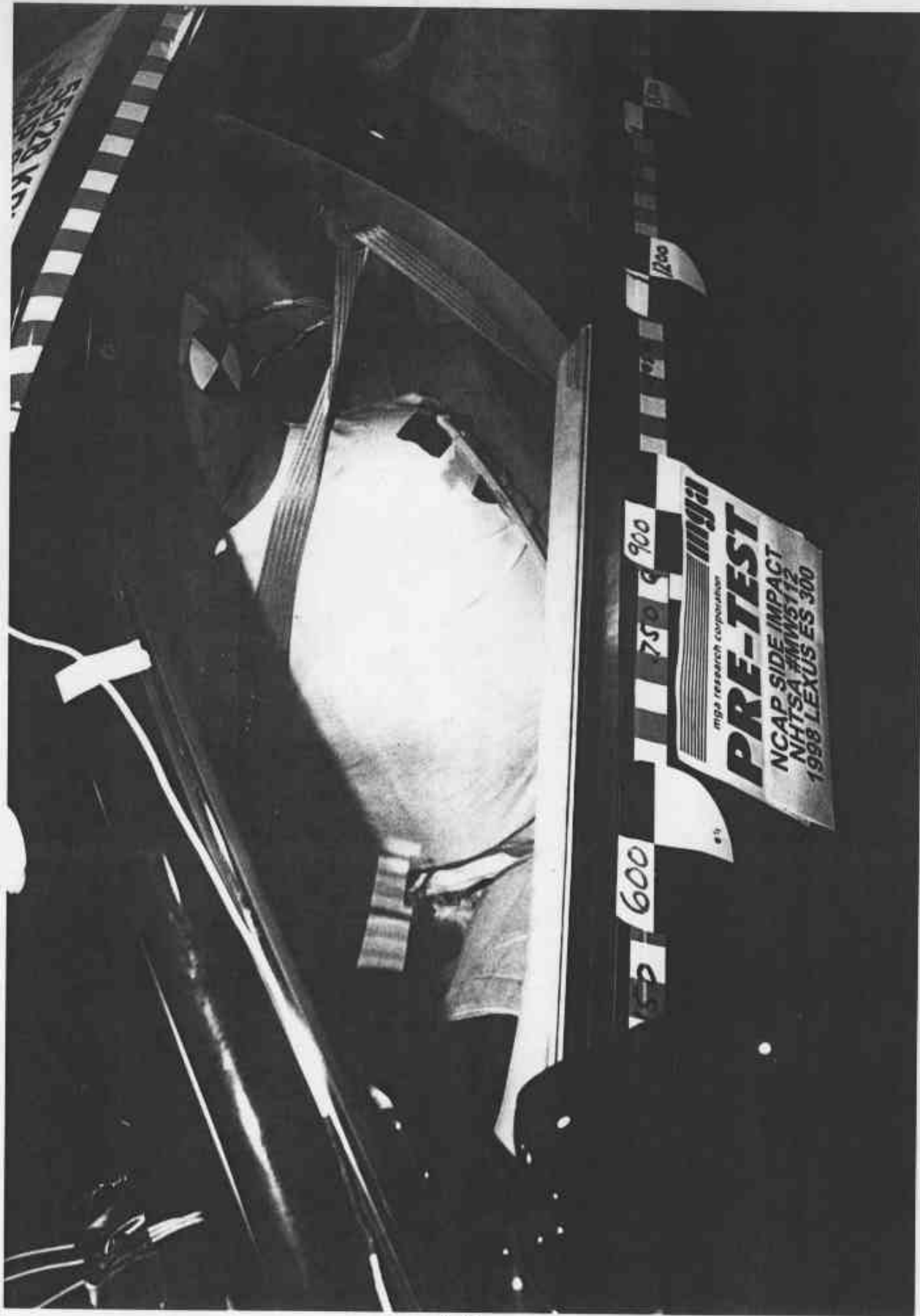
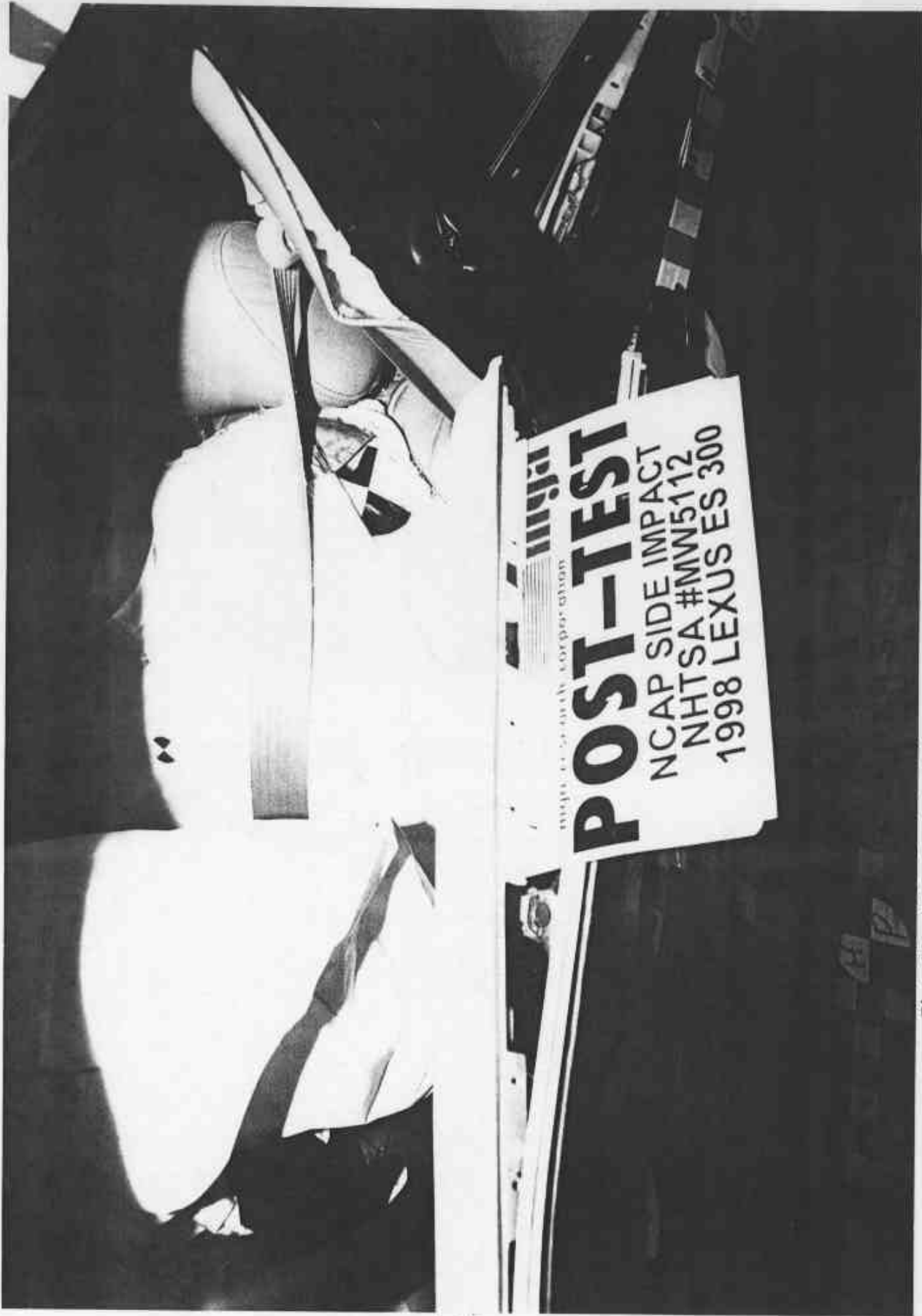


Photo No. A-26 - Pre-Test Driver Dummy Shoulder and Door Top View



A-27

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



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

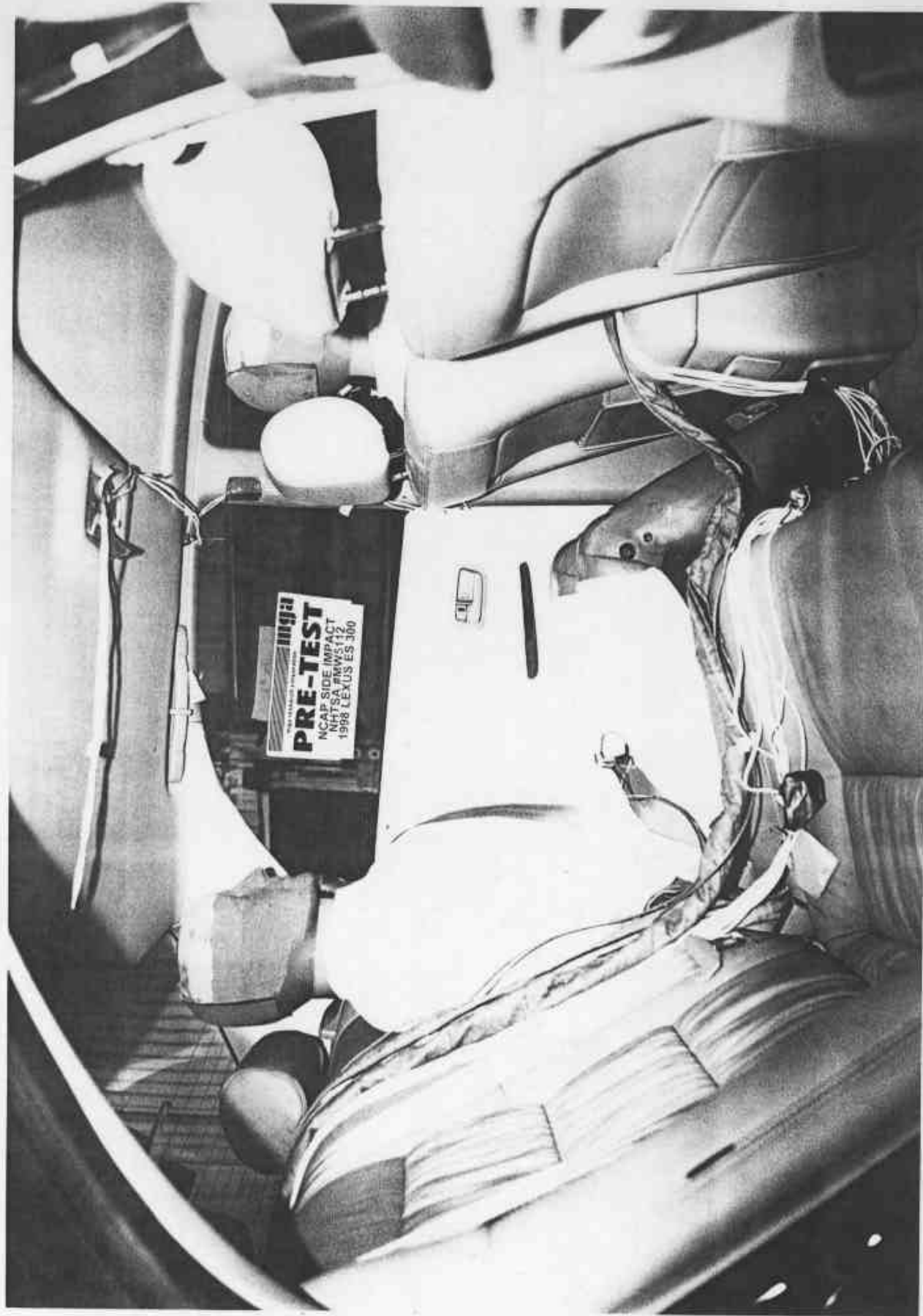


Photo No. A-30 - Pre-Test Passenger Dummy Right Side View

A-30

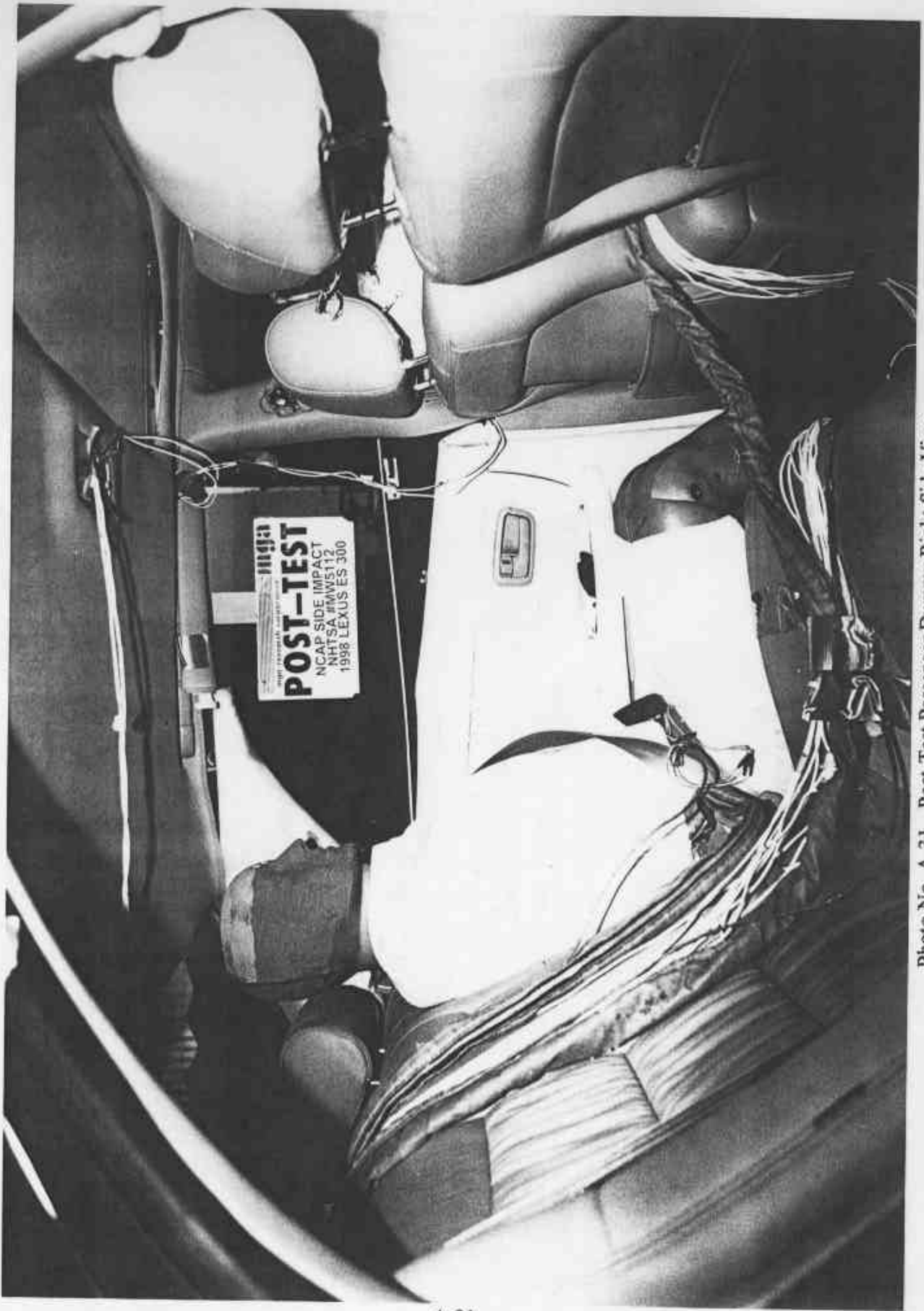


Photo No. A-31 - Post-Test Passenger Dummy Right Side View

A-31

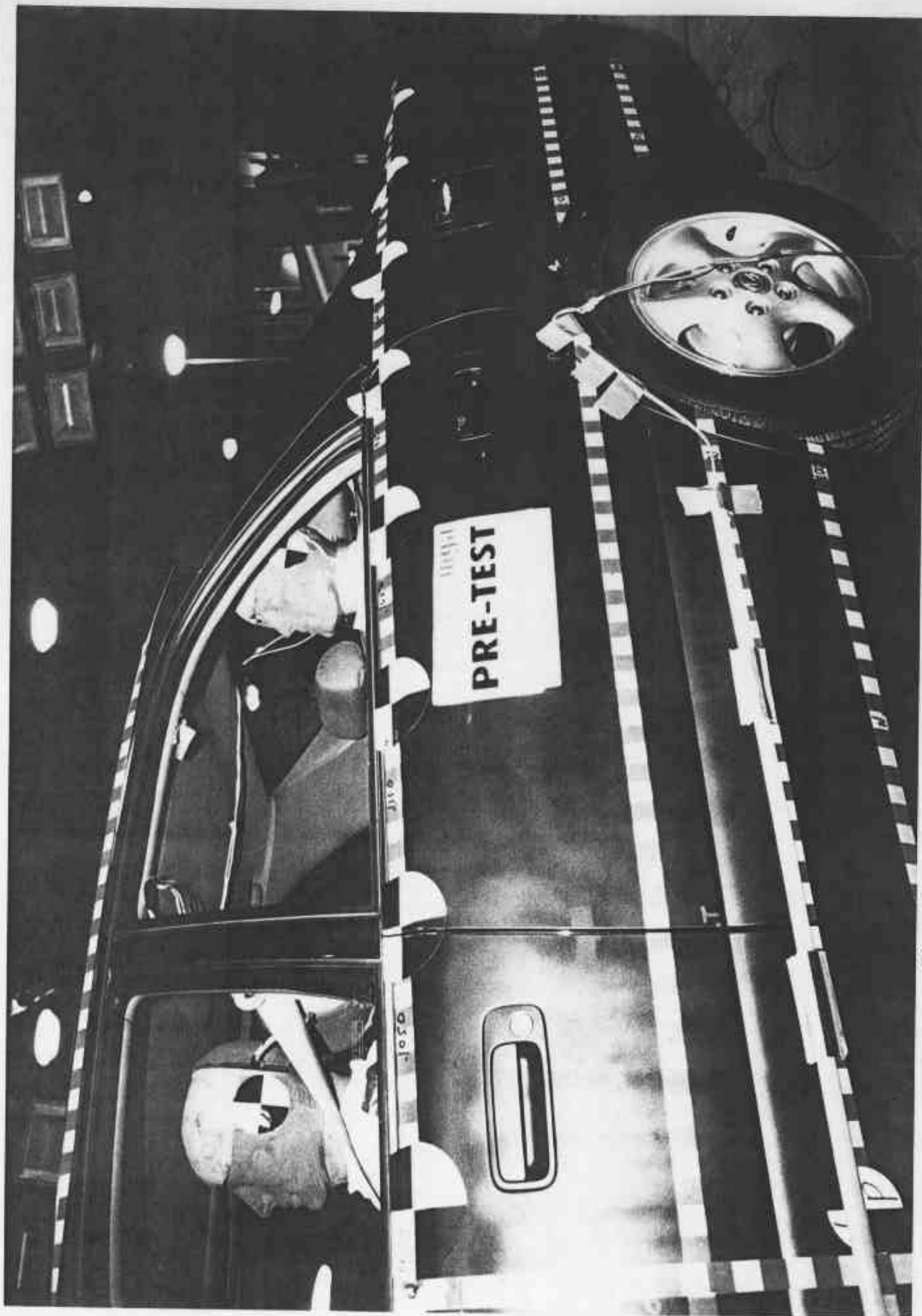


Photo No. A-32 - Pre-Test Passenger Dummy Left Side View

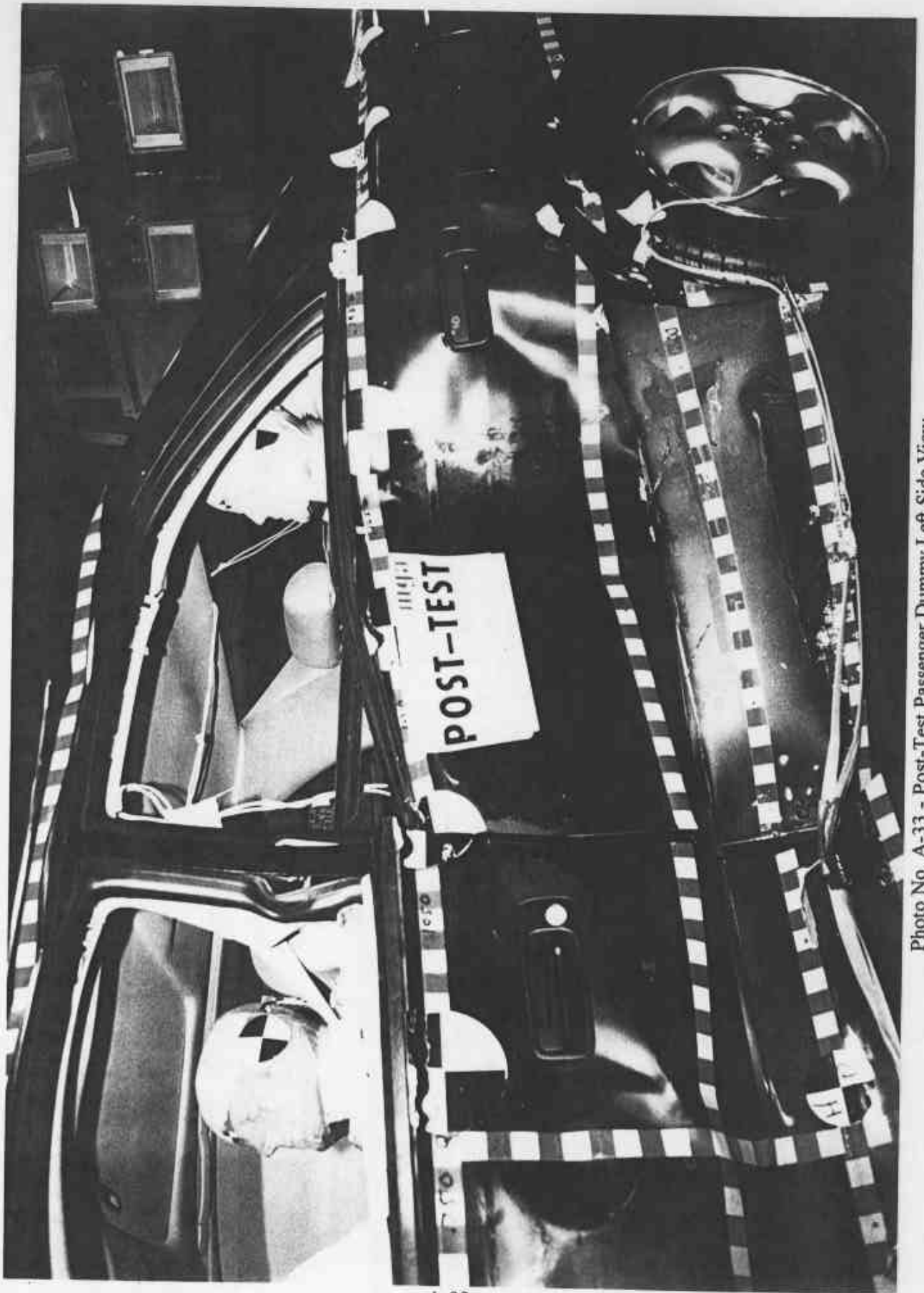


Photo No. A-33 - Post-Test Passenger Dummy Left Side View

A-33



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

A-34



A-35

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

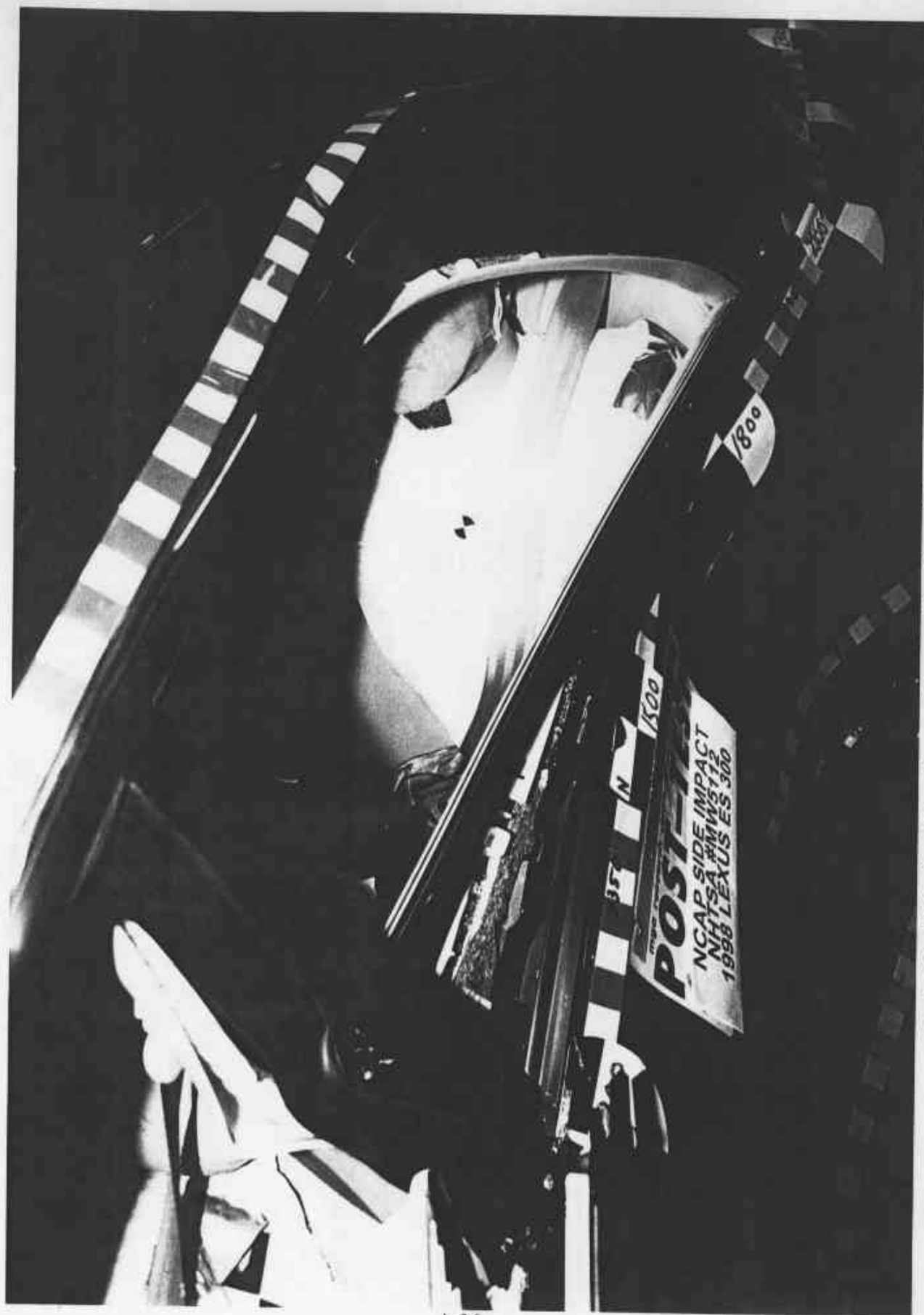
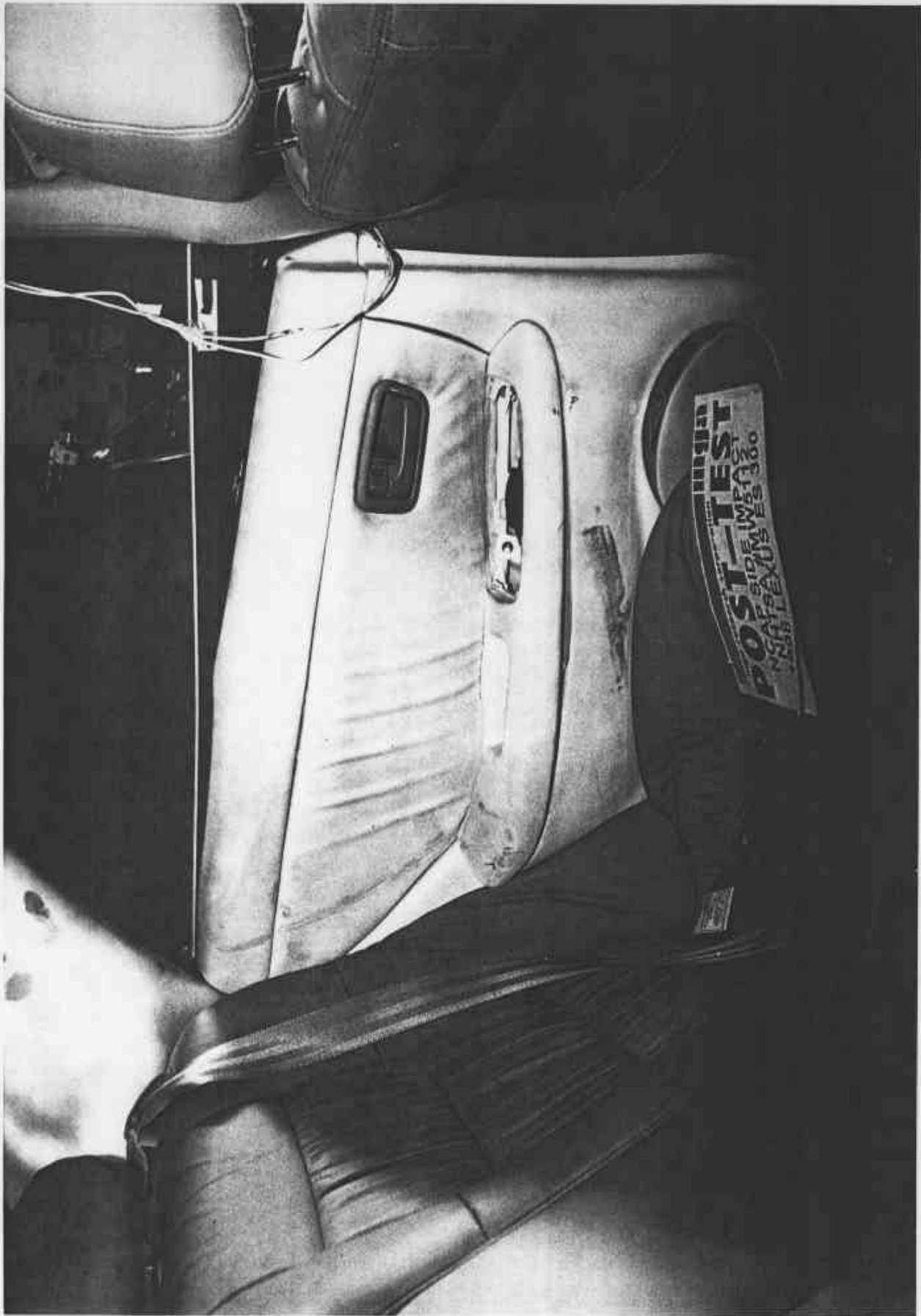


Photo No. A-36 - Post-Test Passenger Dummy Shoulder and Door Top View

A-36



A-37

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



Photo No. A-39 - Post-Test Passenger Dummy Head Contact

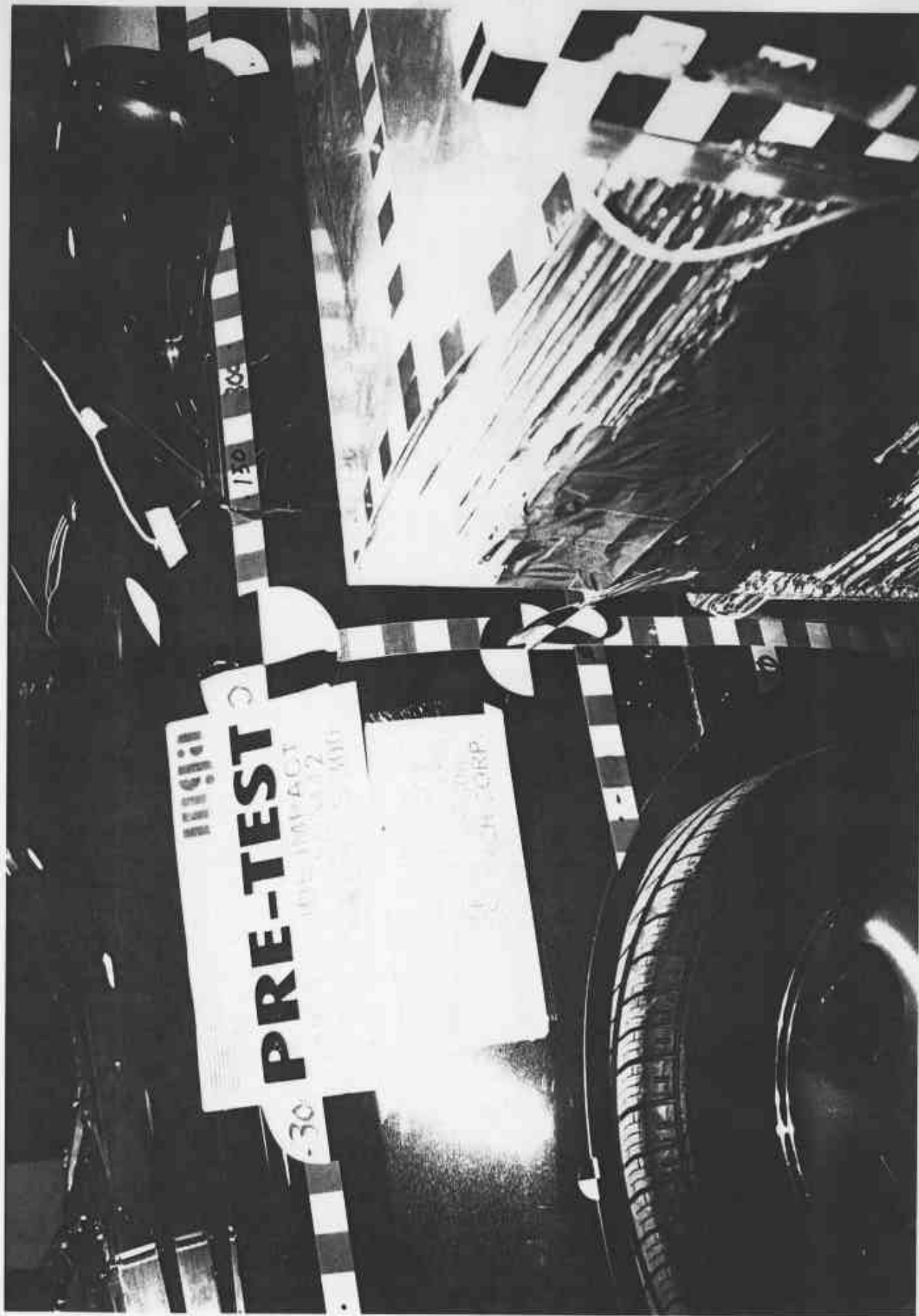
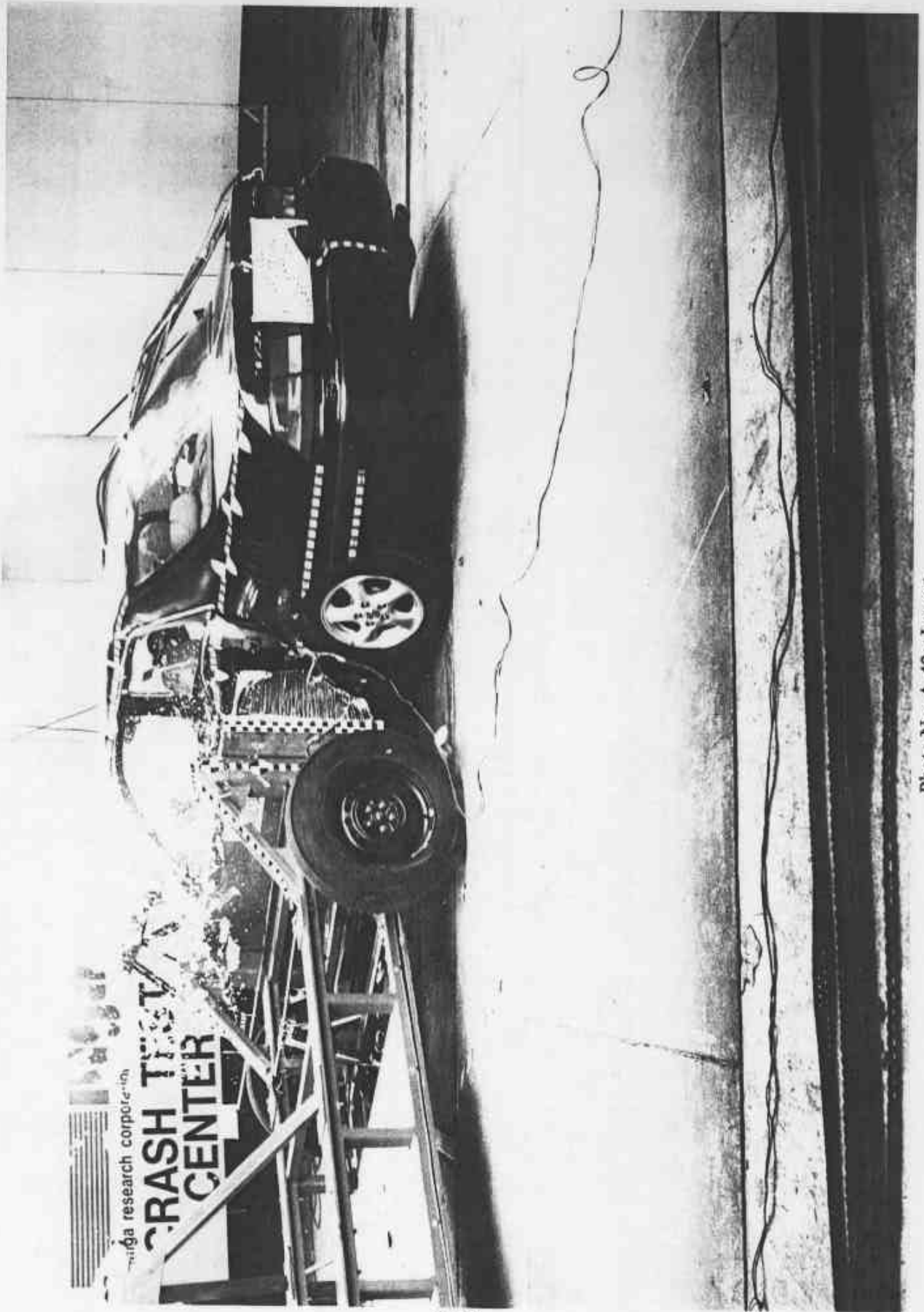


Photo No. A-40 - Pre-Test Left Front Impact Point on Vehicle

A-40



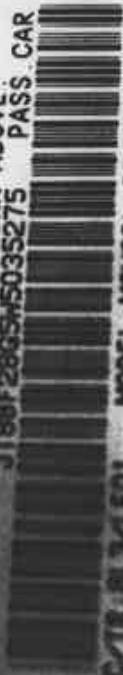
Photo No. A-41 - Post-Test Left Front Impact Point on Vehicle



A-42

Photo No. A-42 - Impact

MFD BY: TOYOTA MOTOR CORPORATION 01/98
 QUANT 4345LB CAR FR 2665LB RR 2665LB
 THIS VEHICLE CONFORMS TO ALL APPLICABLE
 FEDERAL MOTOR VEHICLE SAFETY BUMPER AND
 THEFT PREVENTION STANDARDS IN EFFECT ON
 THE DATE OF MANUFACTURE SHOWN ABOVE
 JT88F28G5W5035275 PASS CAR



C718 813-1F01 MODEL: MCV20L-BTPGKA
 VIN: -01A/A541E MADE IN JAPAN
 NO. 873

*

Photo No. A-43 - Vehicle Certification Label

FOR SERIOUS INJURY.

NEVER ON ANY FRONT SEAT.
NEVER IN THE SUN VISOR AREA.
READ INSTRUCTIONS.

NEVER TOUT RISQUE MORTEL OU BLESSURE GRAVE
D'ÊTRE SUR UN SIÈGE AVANT.
NE GONFLABLE SRS ET DÉCRITES À

NE VOIR LE MANUEL DU PROPRIÉTAIRE.
NE LEBENSGEFÄHRLICHEN VERLETZUNGEN.
NE NICHT AUF

NE IM SONNENBLINDENBEREICH
NE UNDE ERKLÄRUNGEN.

7

TOYOTA

VEHICLE CAPACITY WEIGHT: 4100 (9000 lbs)
OCCUPANT: TOTAL 5 (FRONT 2, REAR 3)
RECOMMENDED COLD TIRE INFLATION PRESSURE: kPa (psi)
•UP TO 4 OCCUPANTS: F1 180/261 R1 180/261
•VEHICLE CAPACITY WEIGHT: F1 220/321 R1 220/321
TIRE SIZE: P205/65R15 92V
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

CHARGE MAXIMALE DU VEHICULE: 4100 kg (9000 livres)
PERSONNES: TOTAL 5 (AVANT 2, ARRIERE 3)
PRESSION DE PNEUS A FROID: kPa (lb/for)
•AVEC 4 PERSONNES A BORD: AVANT 180/261, ARRIERE 180/261
•A CHARGE MAXIMALE: AVANT 220/321, ARRIERE 220/321
DIMENSION DES PNEUS: P205/65R15 92V
POUR DE PLUS AMPLES DETAILS, VOIR LE MANUEL DU PROPRIÉTAIRE

33340

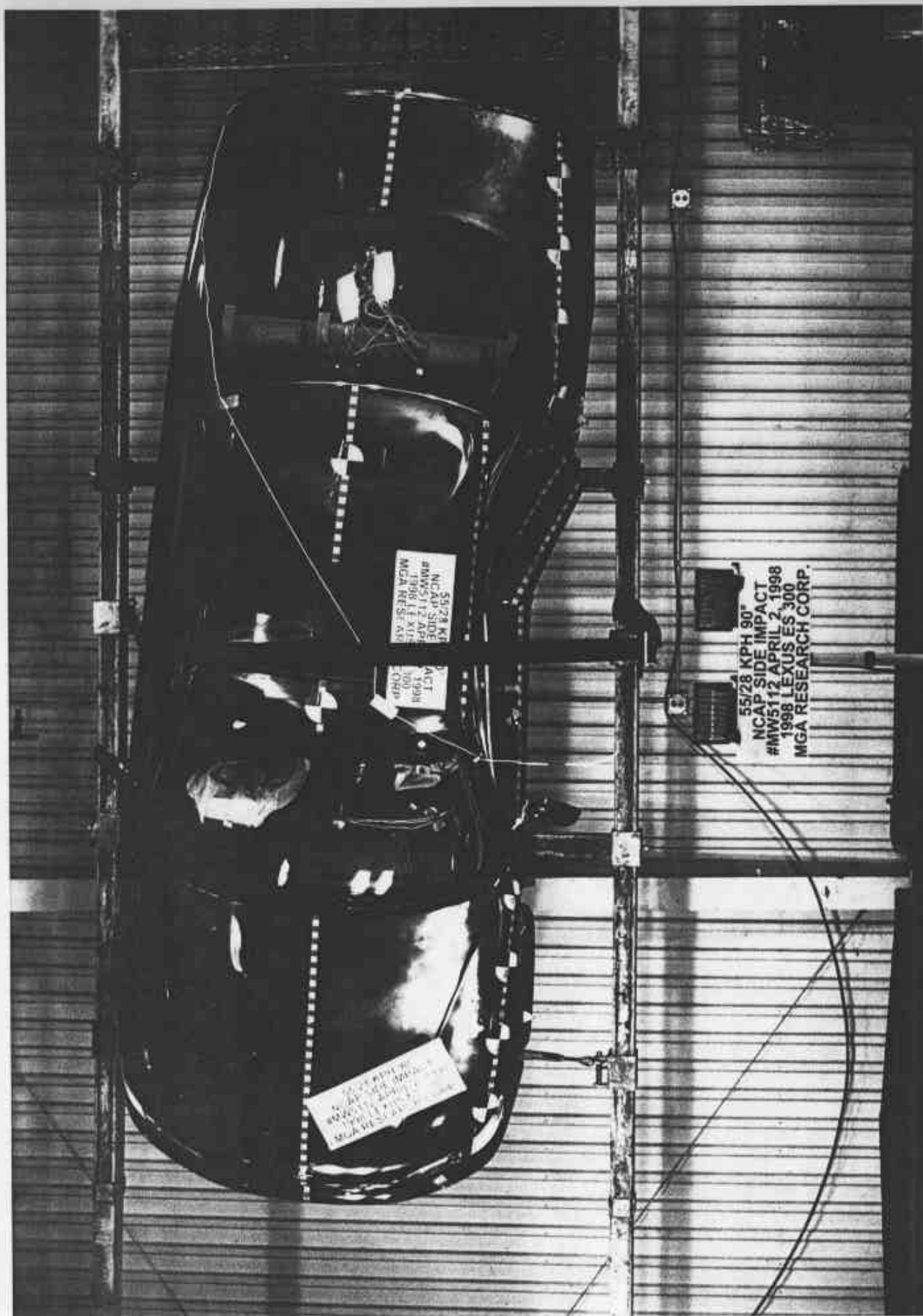
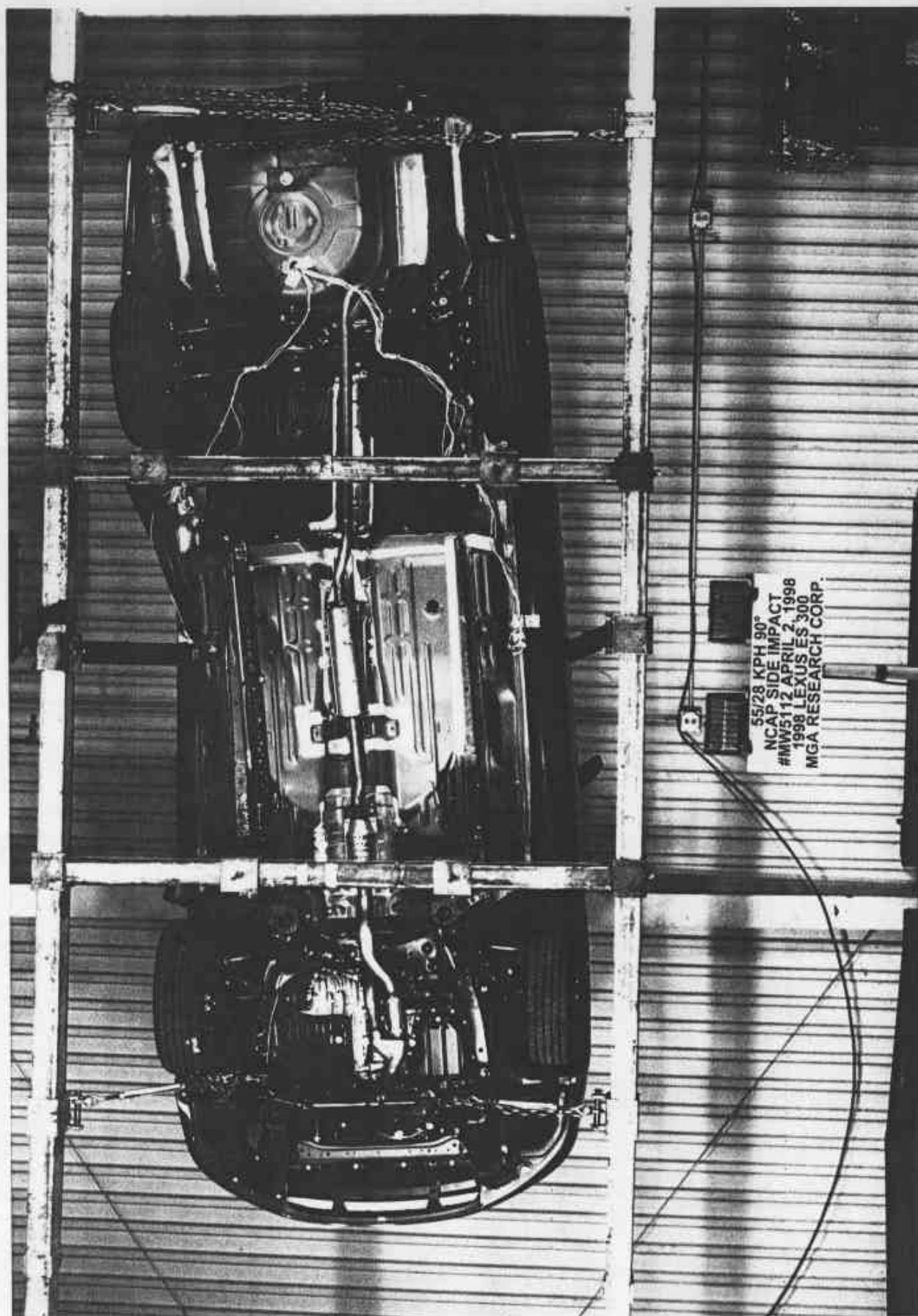


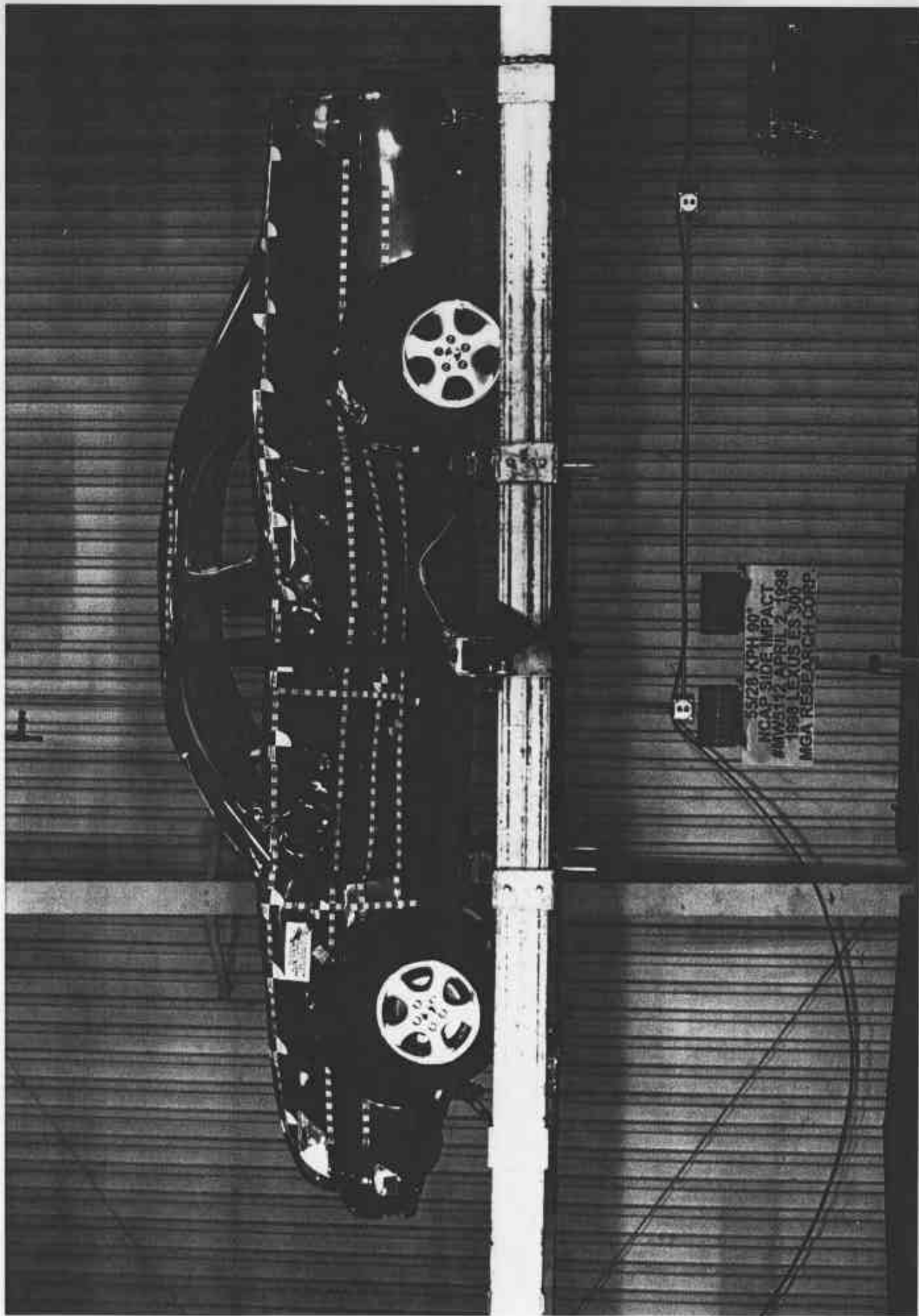
Photo No. A-45 - Rollover 90°



55/28 KPH 90°
NCAP SIDE IMPACT
#MW5112 APRIL 2, 1998
1998 LEXUS ES 300
MGA RESEARCH CORP.

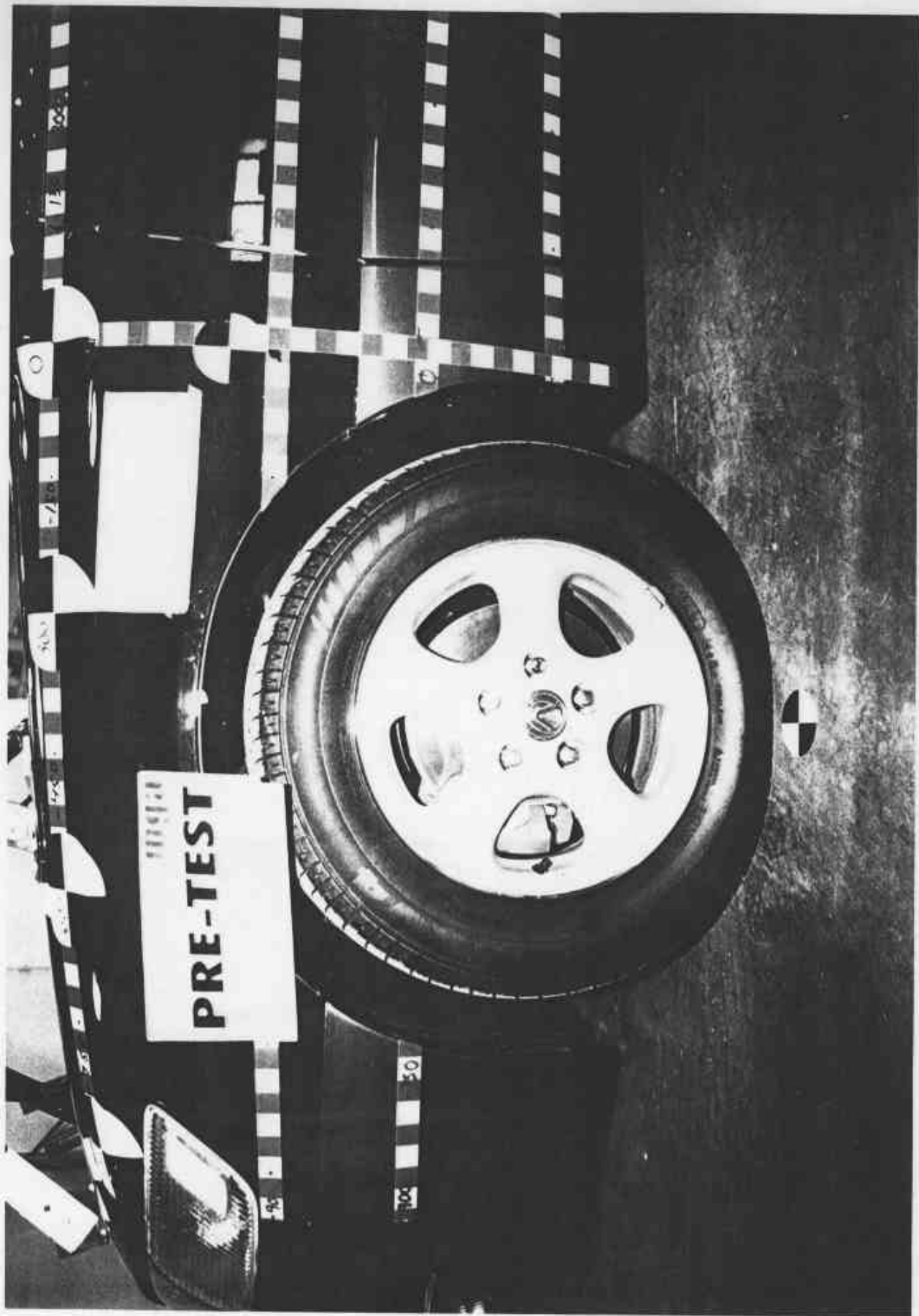
A-47

Photo No. A-47 - Rollover 270°



A-48

Photo No. A-48 - Rollover 360°



A-49

Photo No. A-49 - Left Front Attitude Point

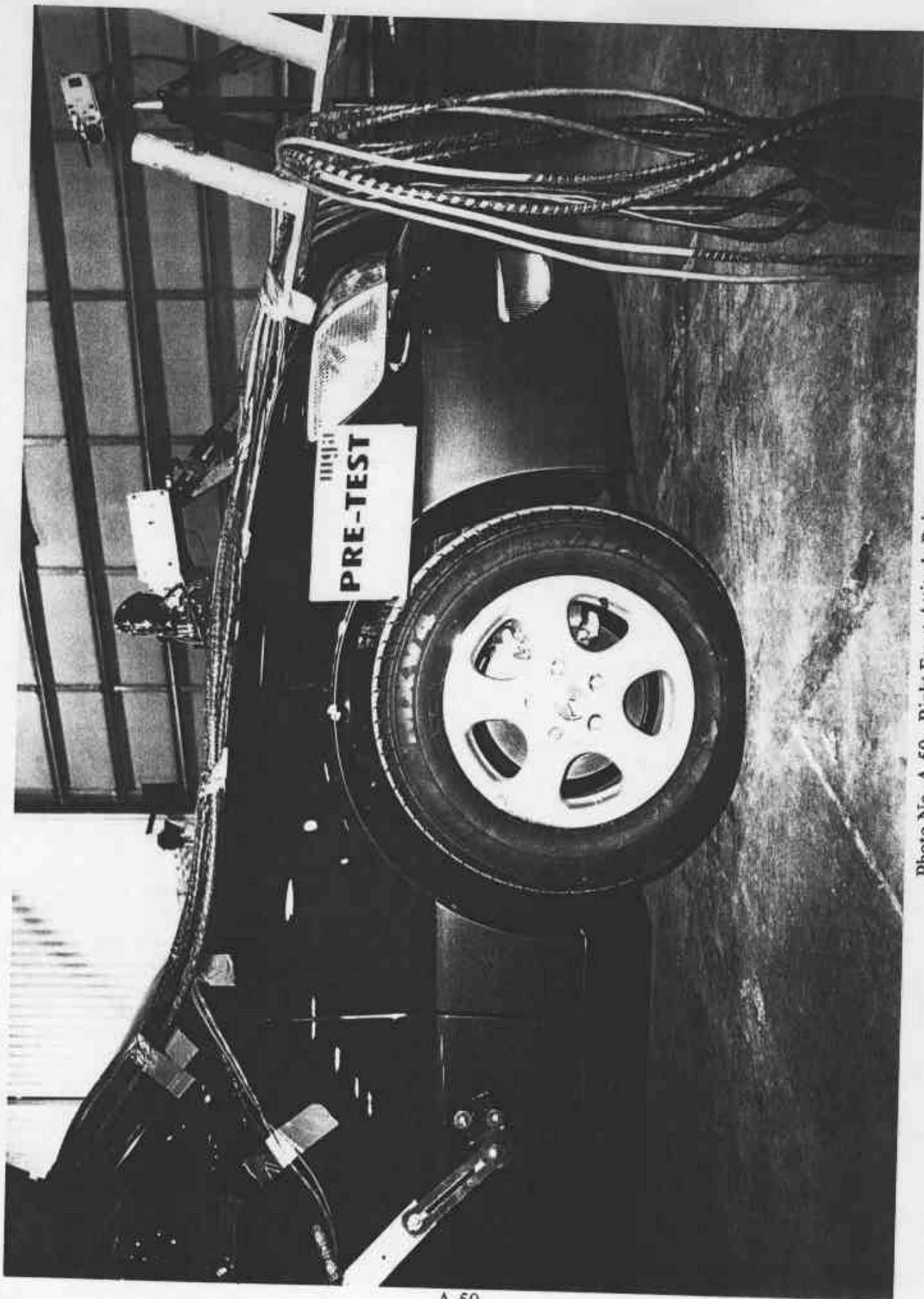


Photo No. A-50 - Right Front Attitude Point

A-50

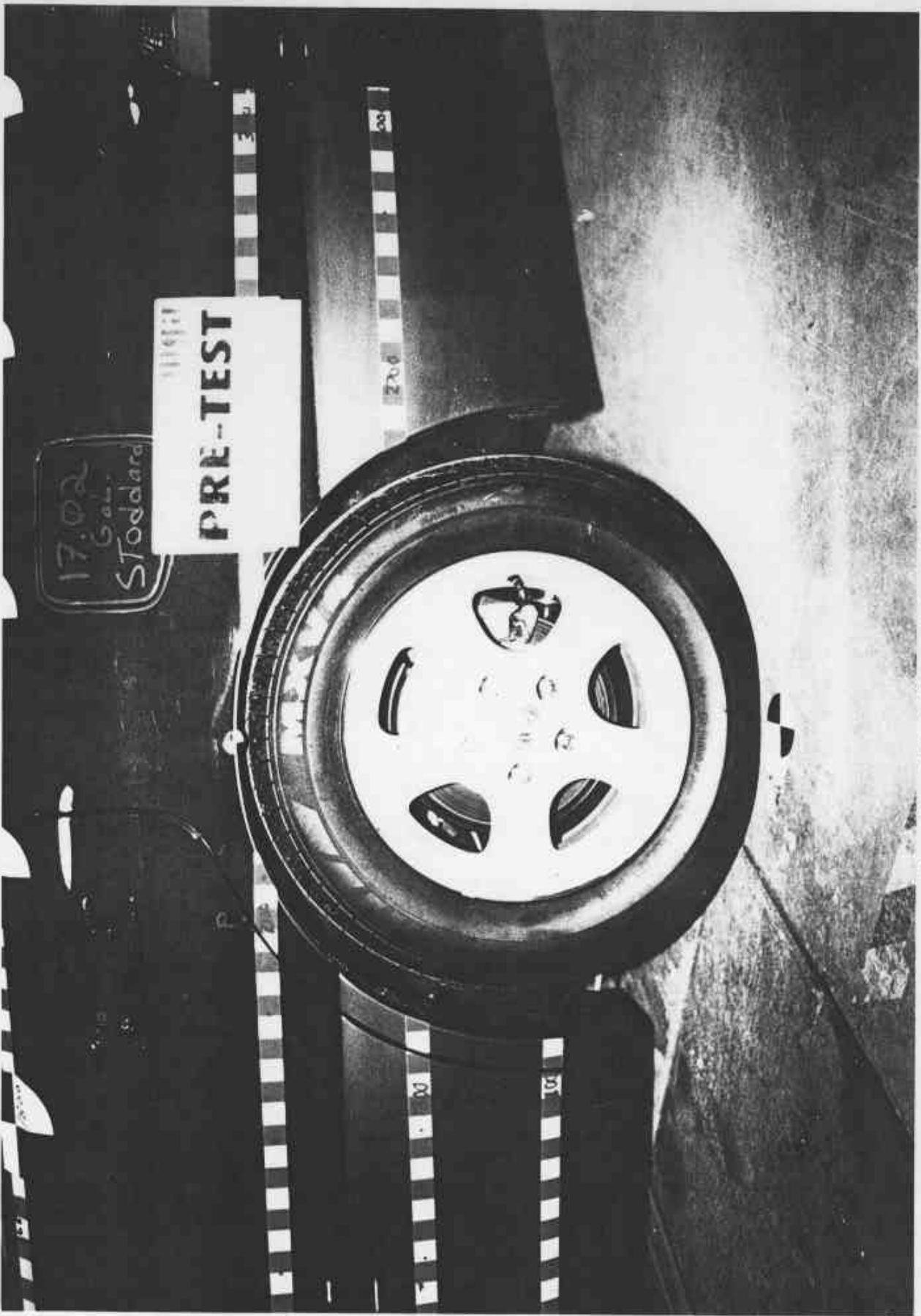


Photo No. A-51 - Left Rear Attitude Point

A-51

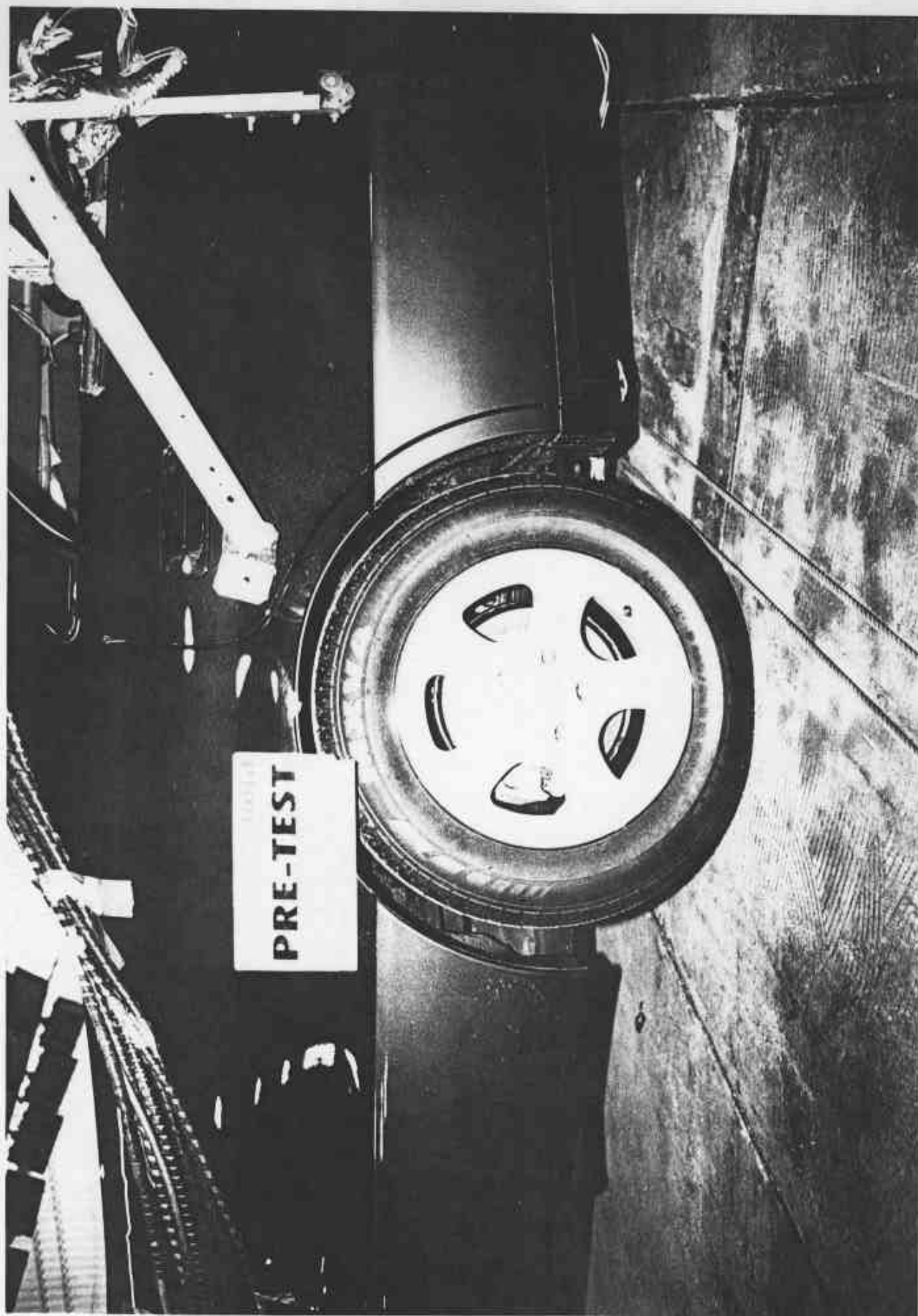


Photo No. A-52 - Right Rear Attitude Point

A-52

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* No valid data collected

** No valid data after approximately 13 msec.

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Barrier:

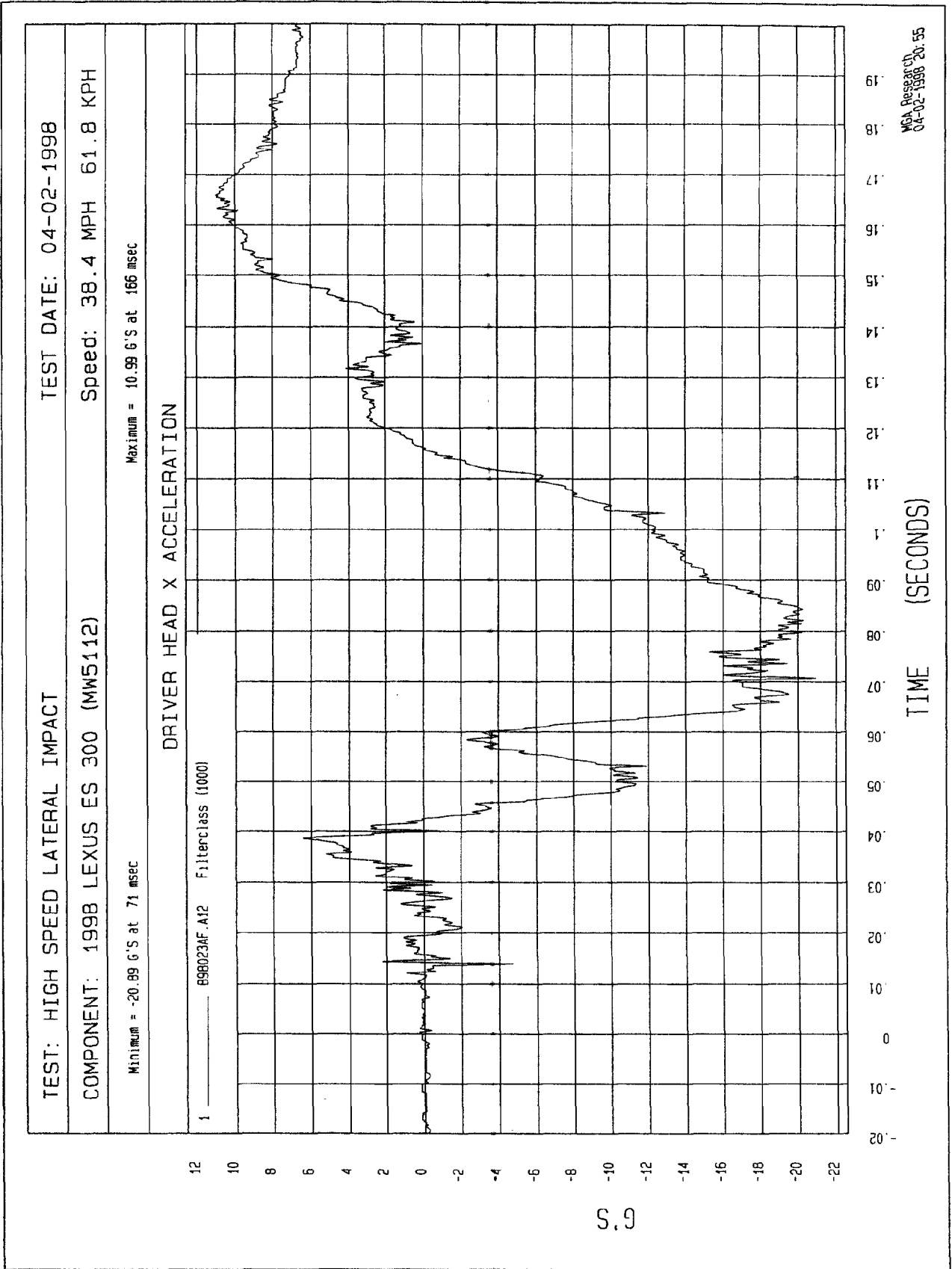
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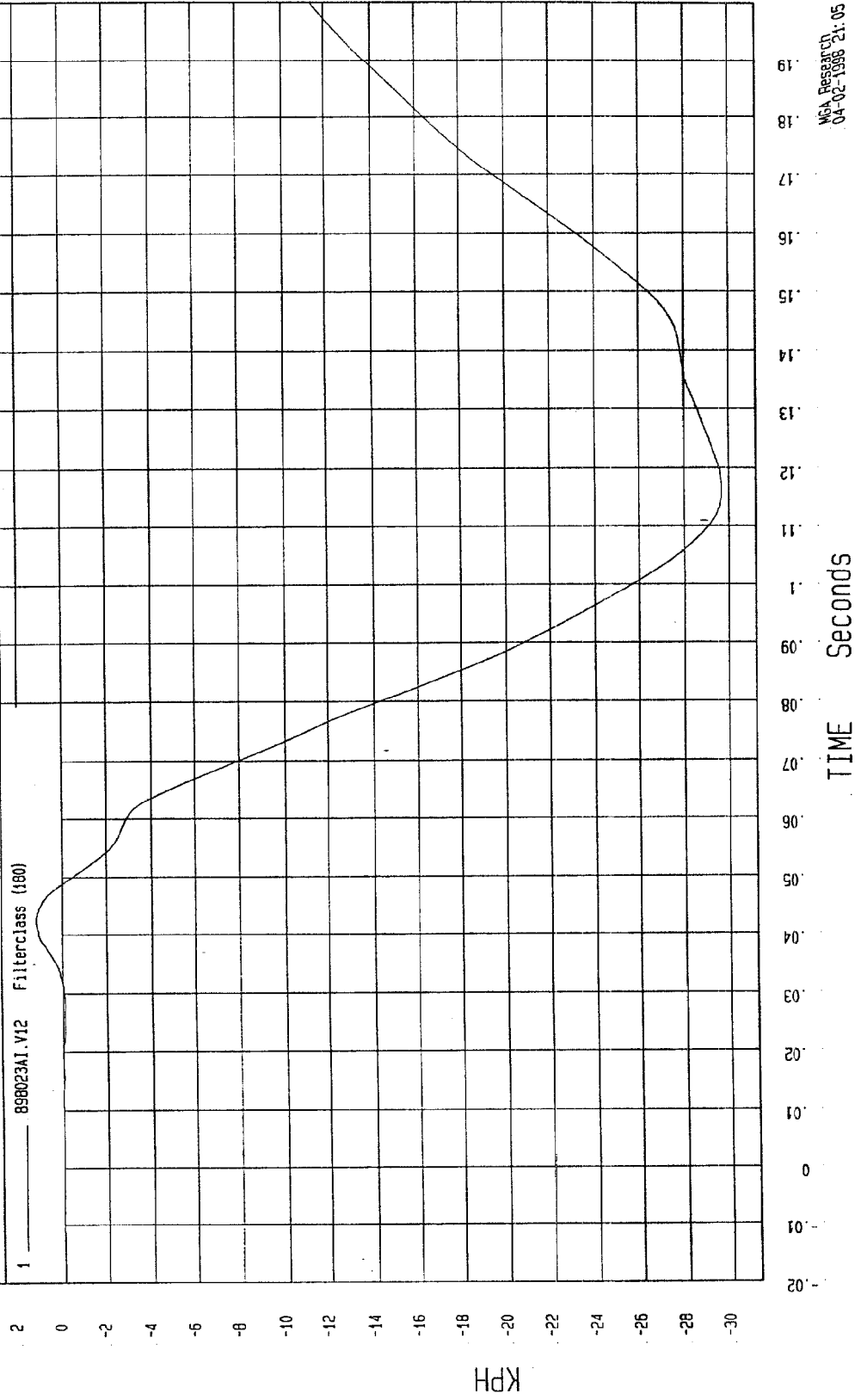


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

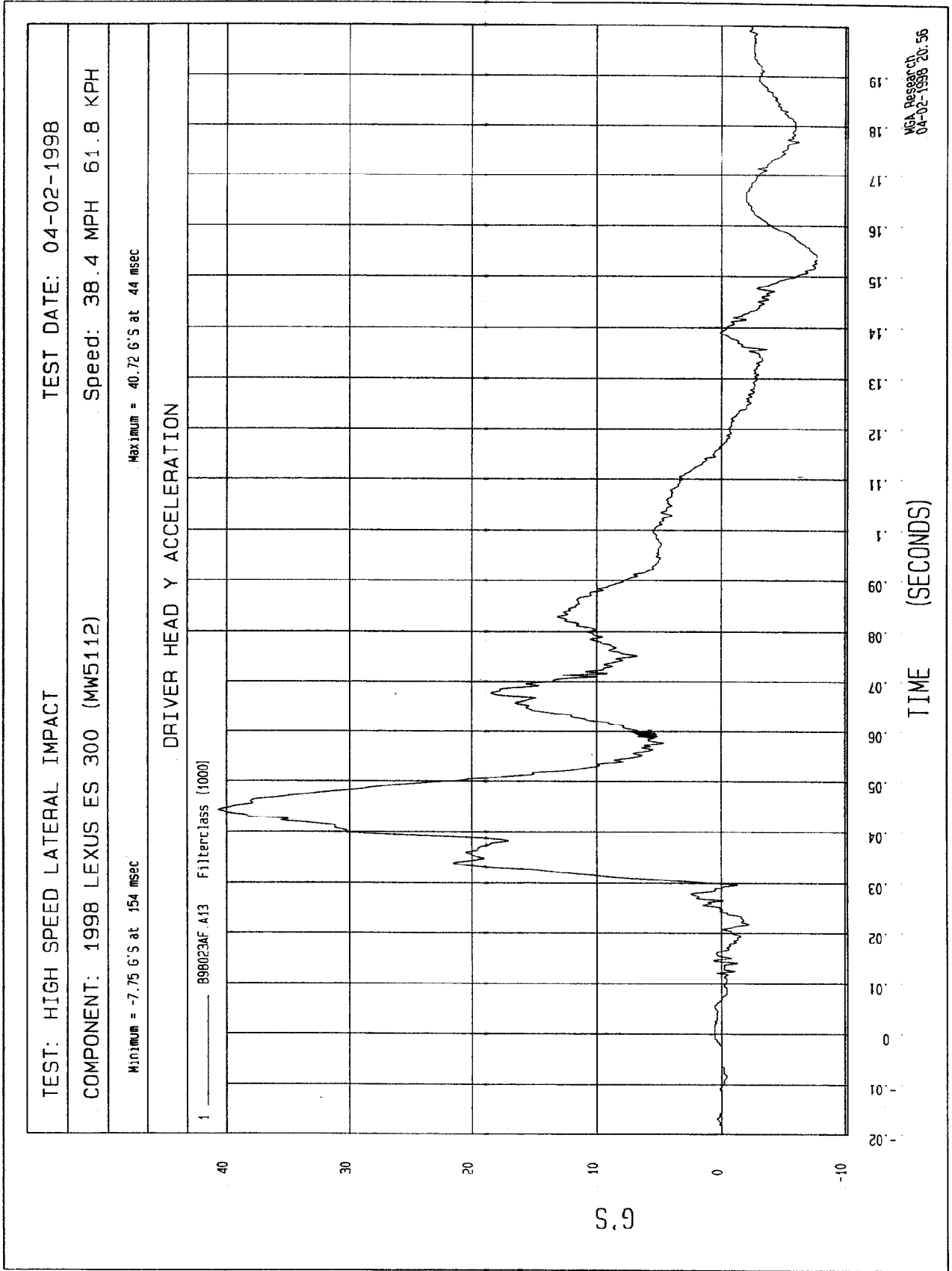
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

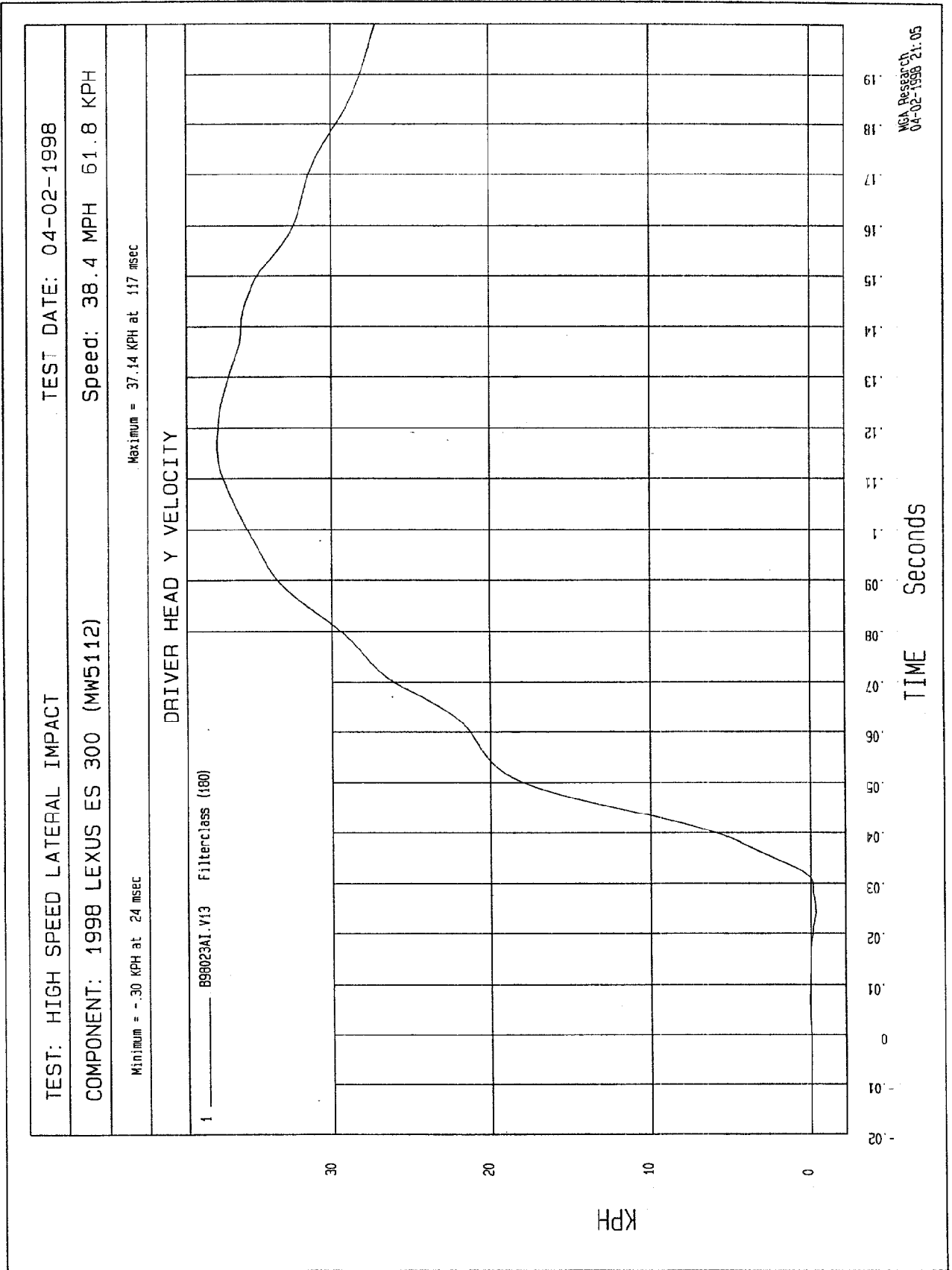
Minimum = -29.67 KPH at 116 msec Maximum = 1.18 KPH at 42 msec

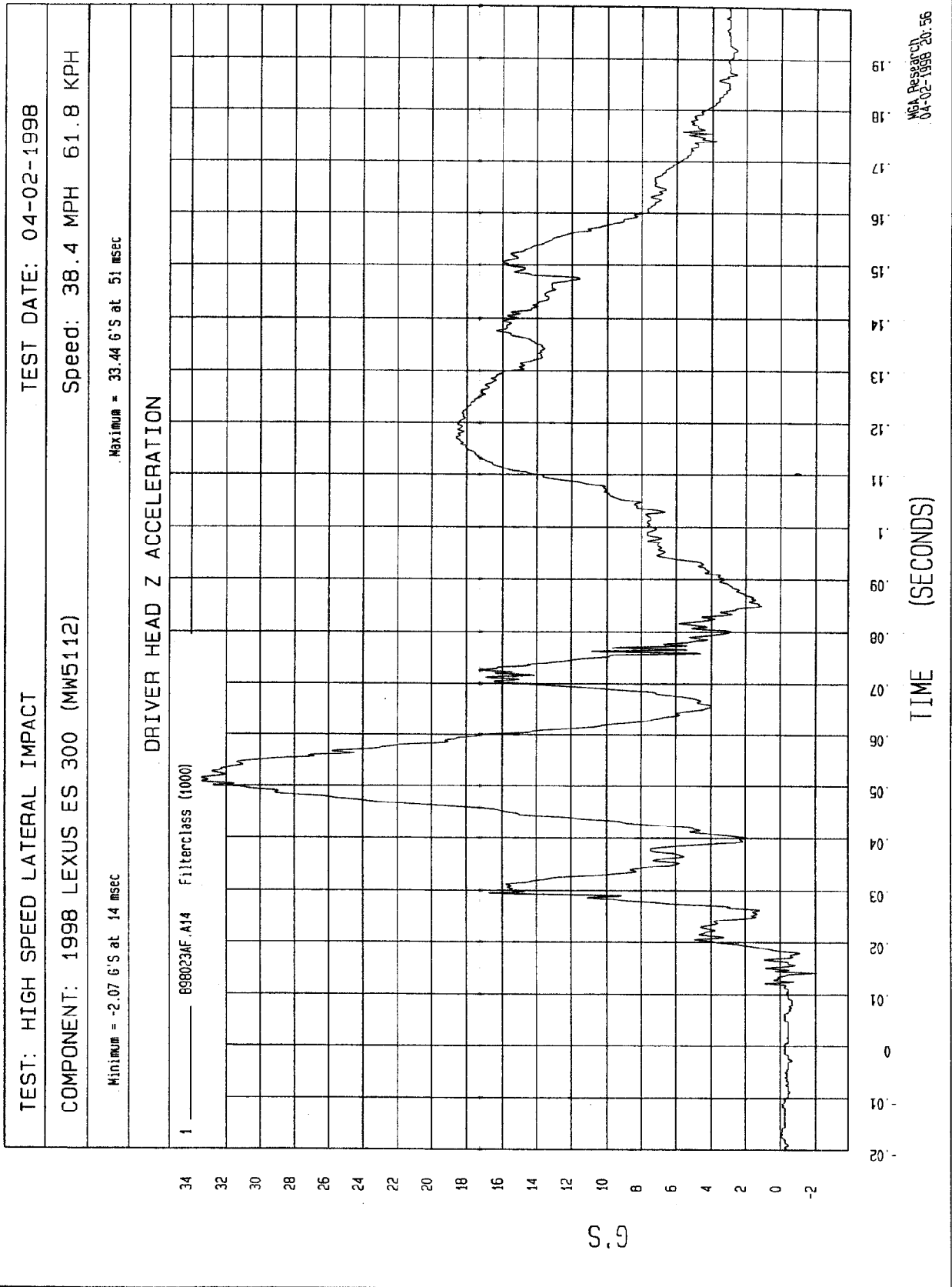
DRIVER HEAD X VELOCITY

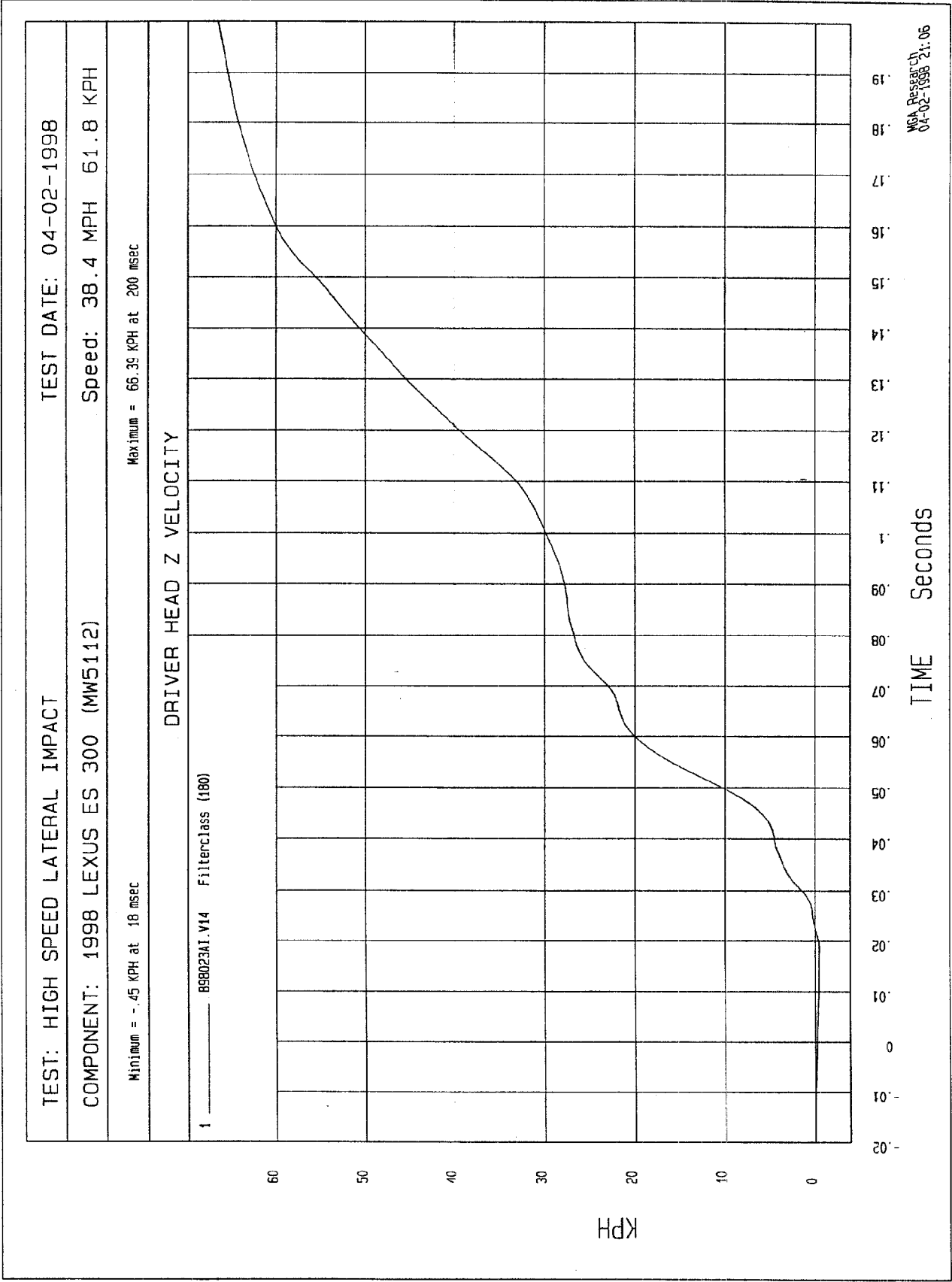


MCA Research
04-02-1998 21:05





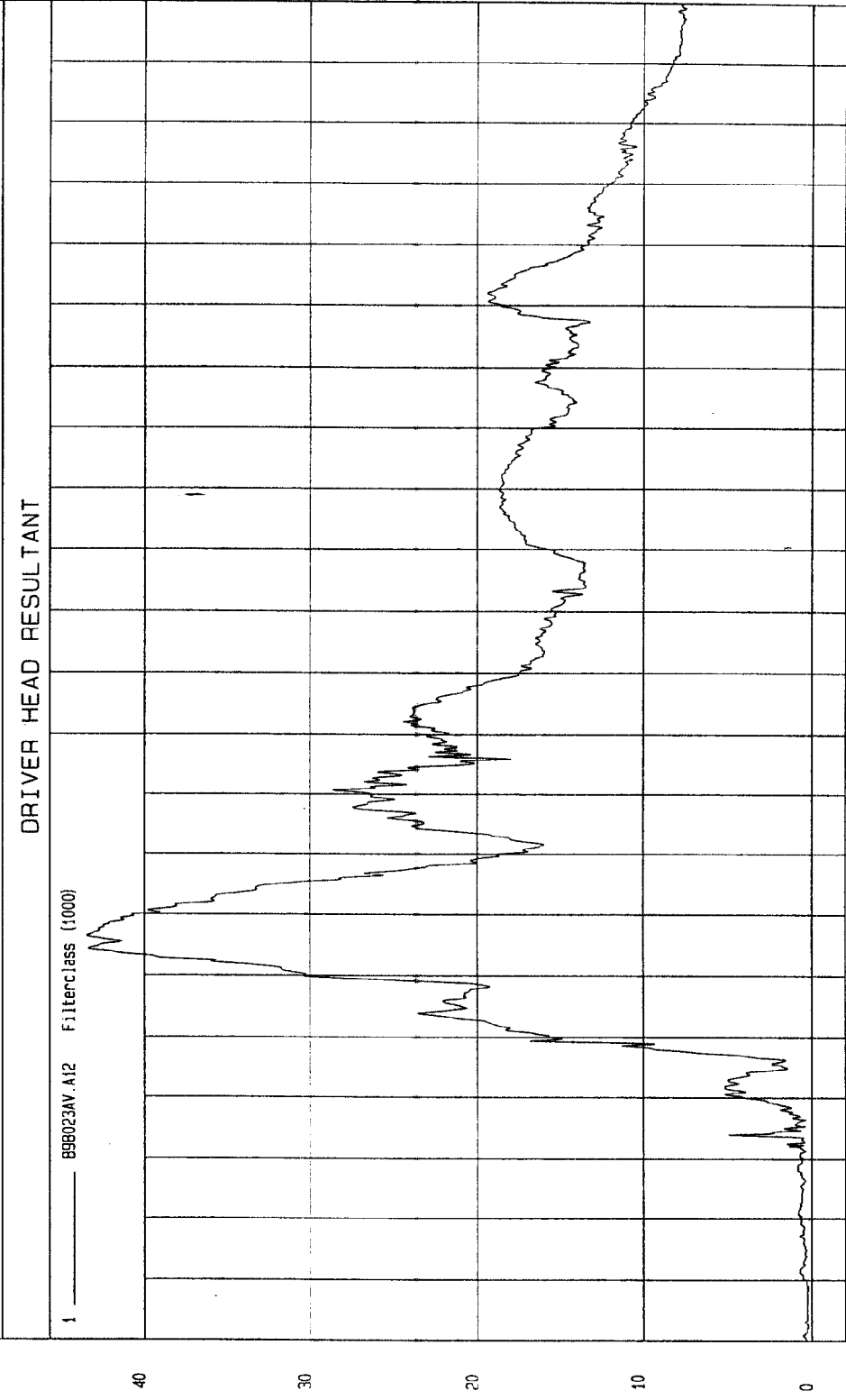




TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

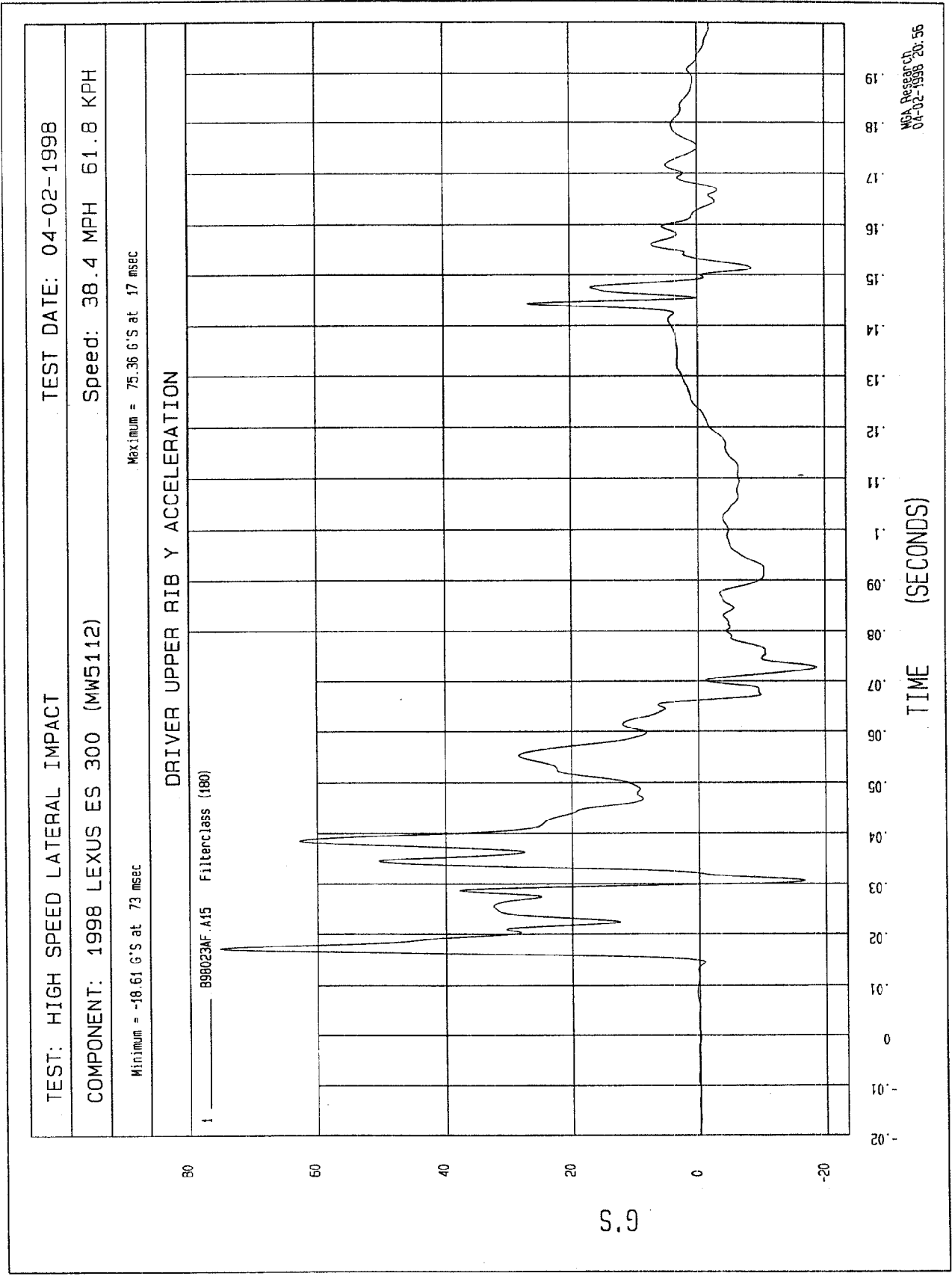
Minimum = .16 G'S at .48 msec Maximum = 43.46 G'S at 47 msec

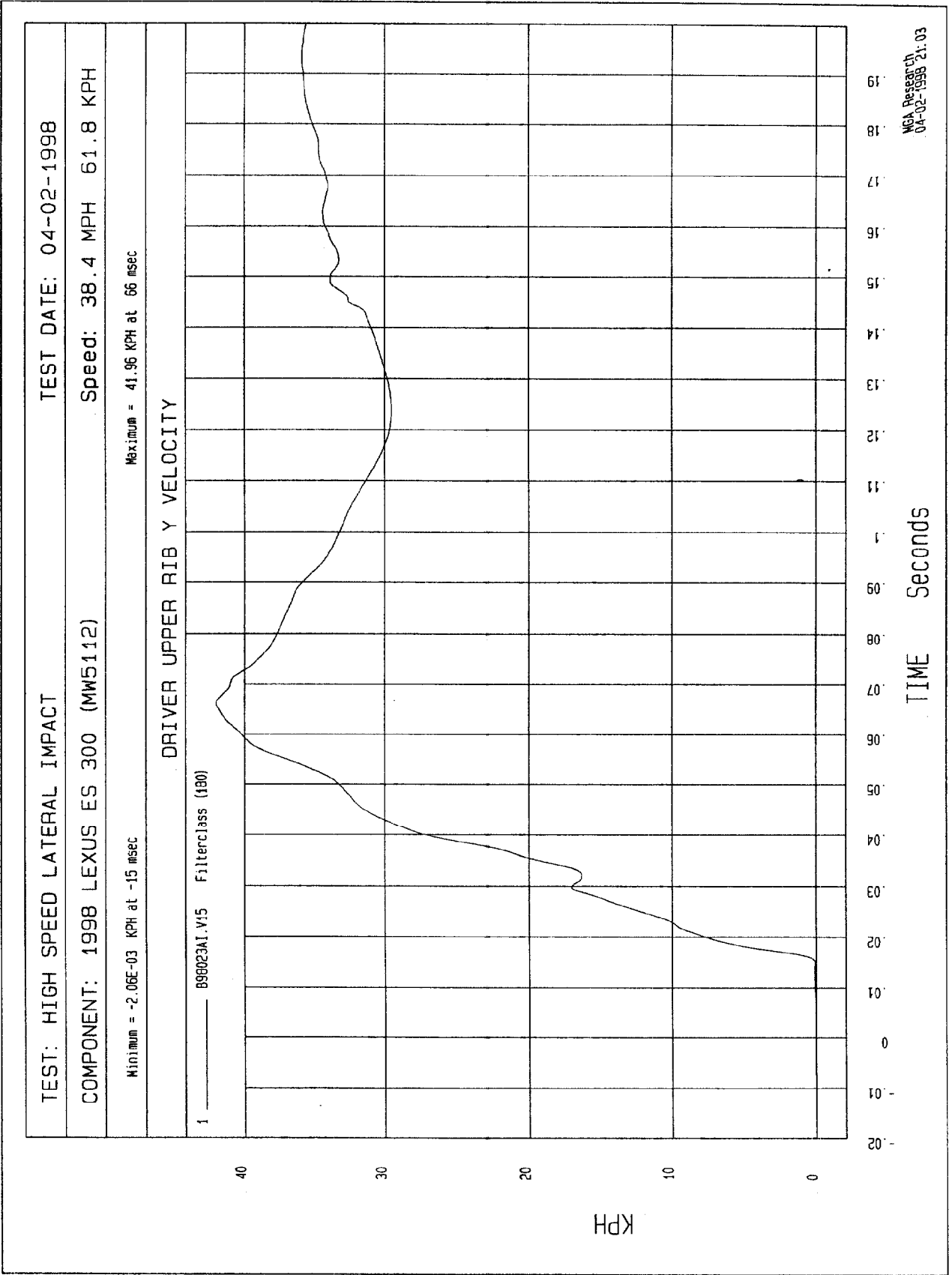


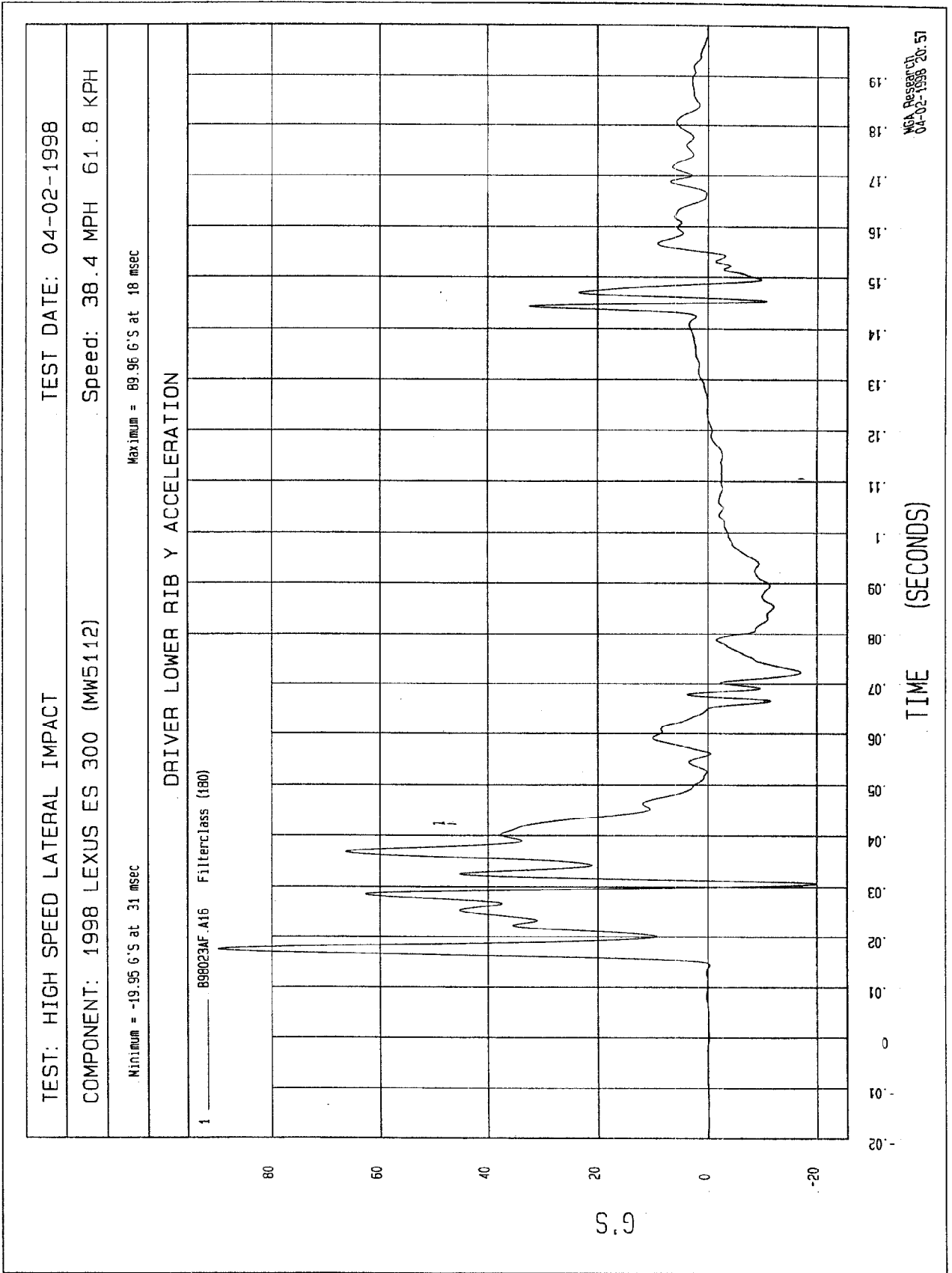
TIME (SECONDS)

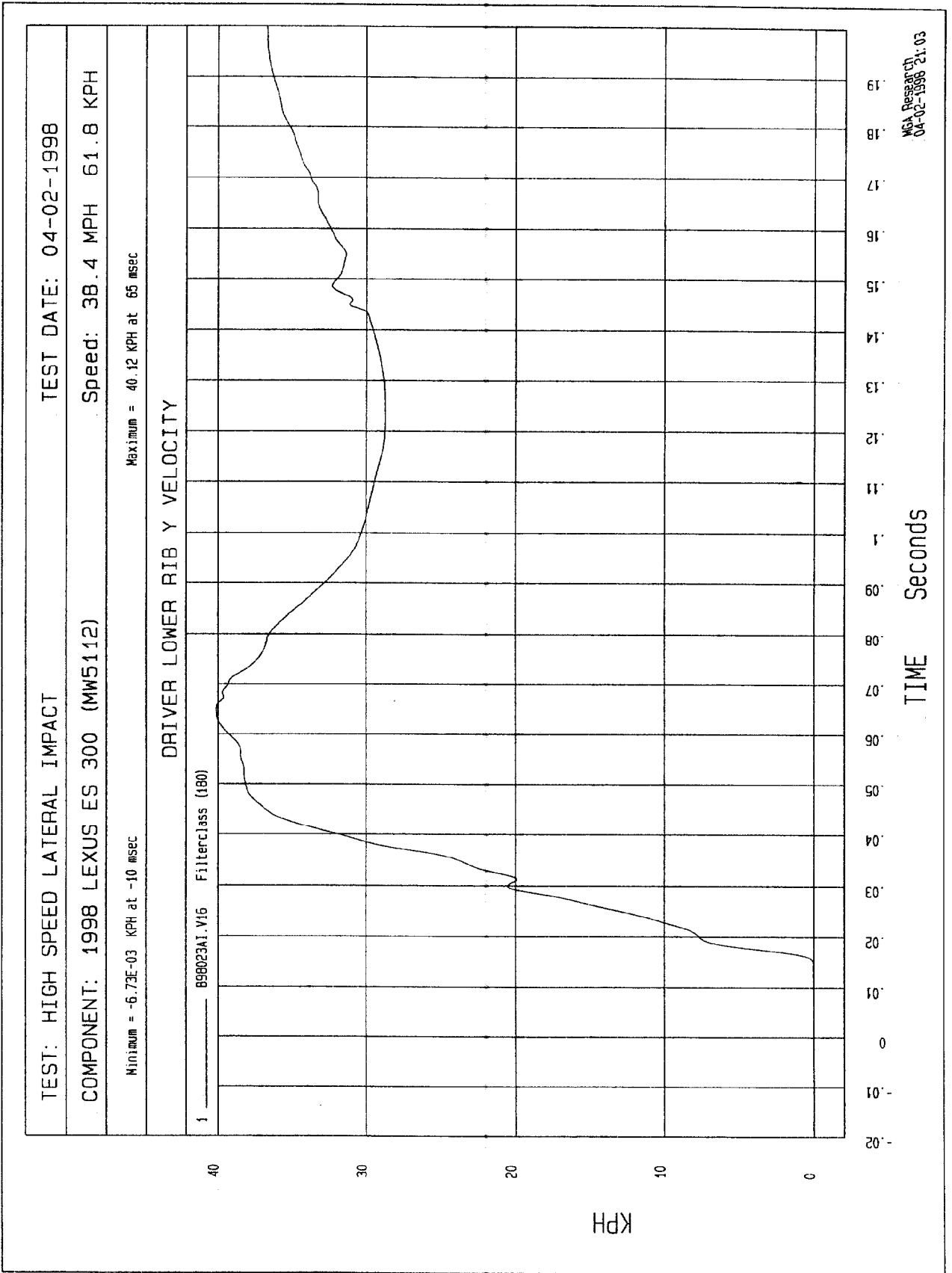
0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

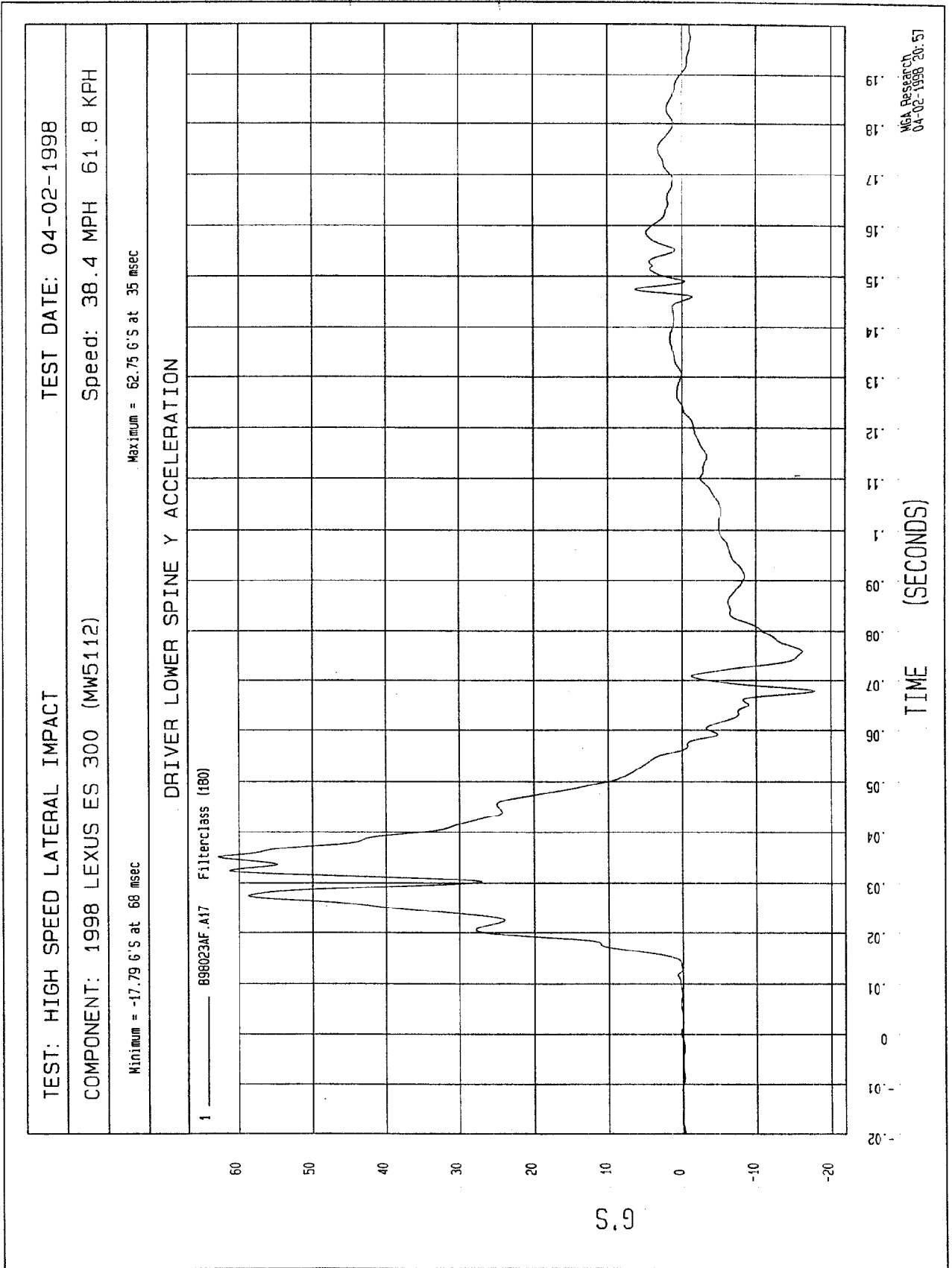
WCA Research
04-02-1998 20:59







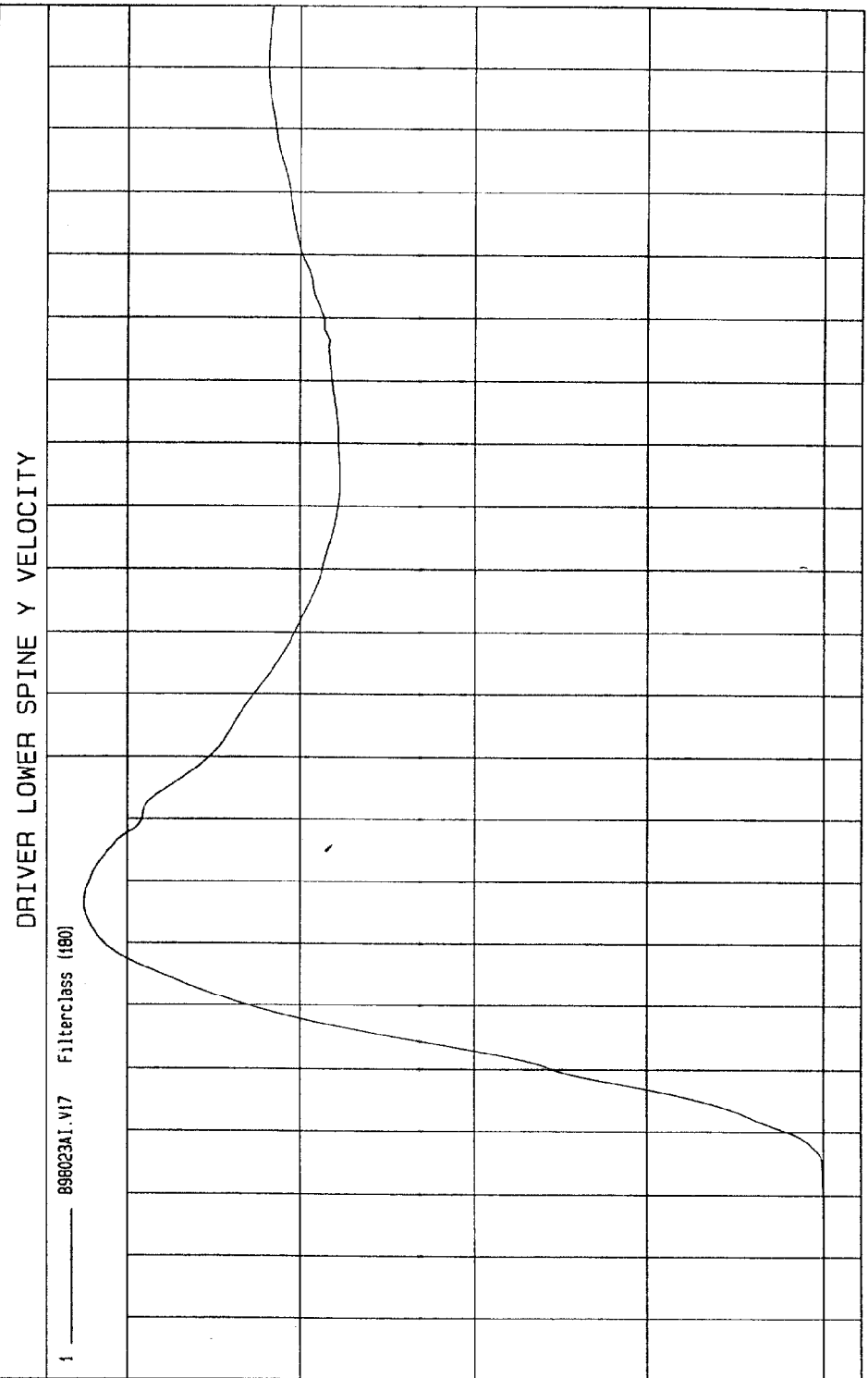




TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW51112) Speed: 38.4 MPH 61.8 KPH

Minimum = -4.18E-02 KPH at -1 msec Maximum = 42.46 KPH at 56 msec



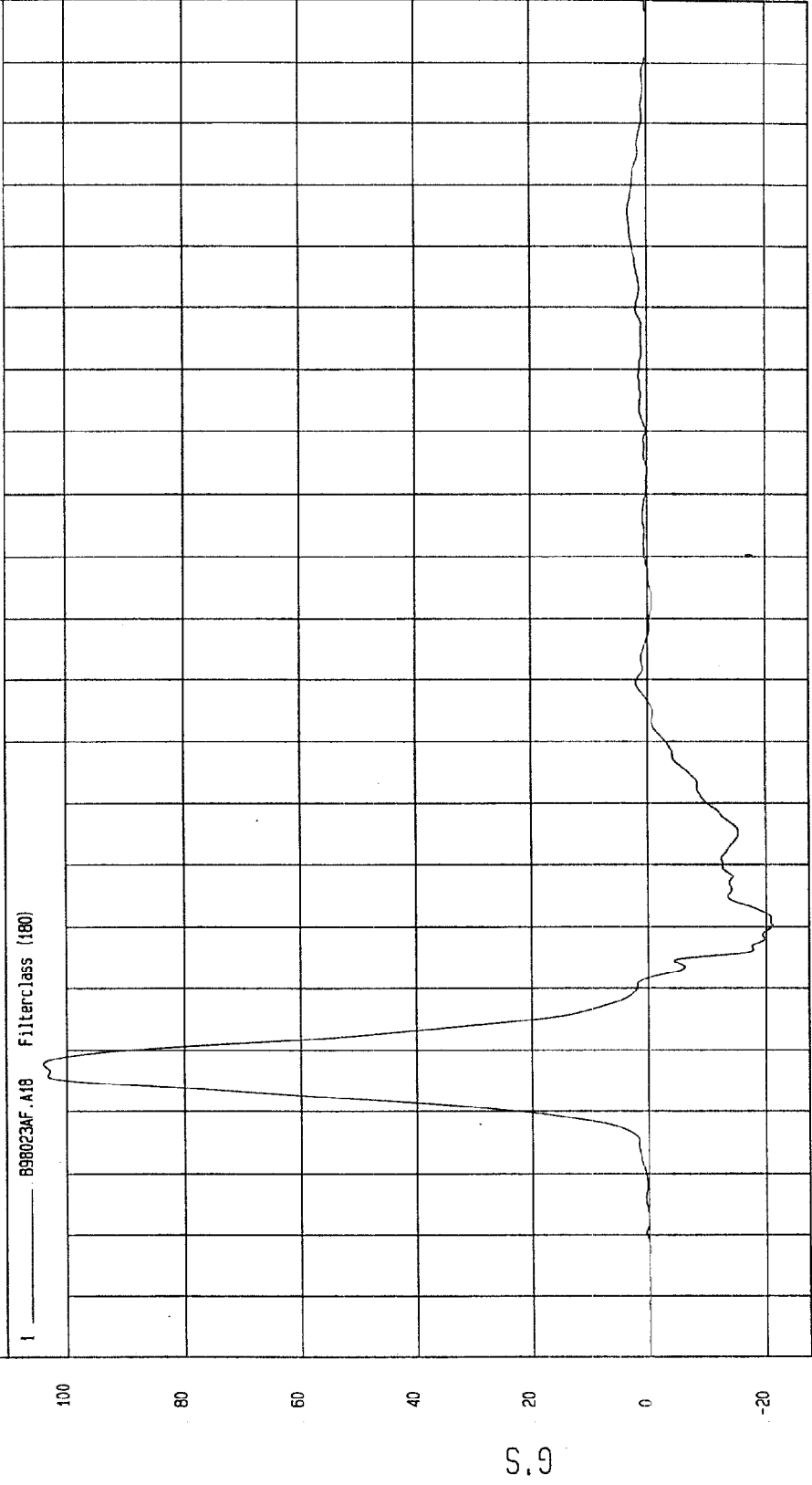
TIME Seconds

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.10 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

MCA Research
04-02-1998 21.03

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)	Speed: 38.4 MPH 61.8 KPH
Minimum = -21.14 G'S at 50 msec	Maximum = 103.99 G'S at 28 msec

DRIVER PELVIS Y ACCELERATION



TIME (SECONDS)

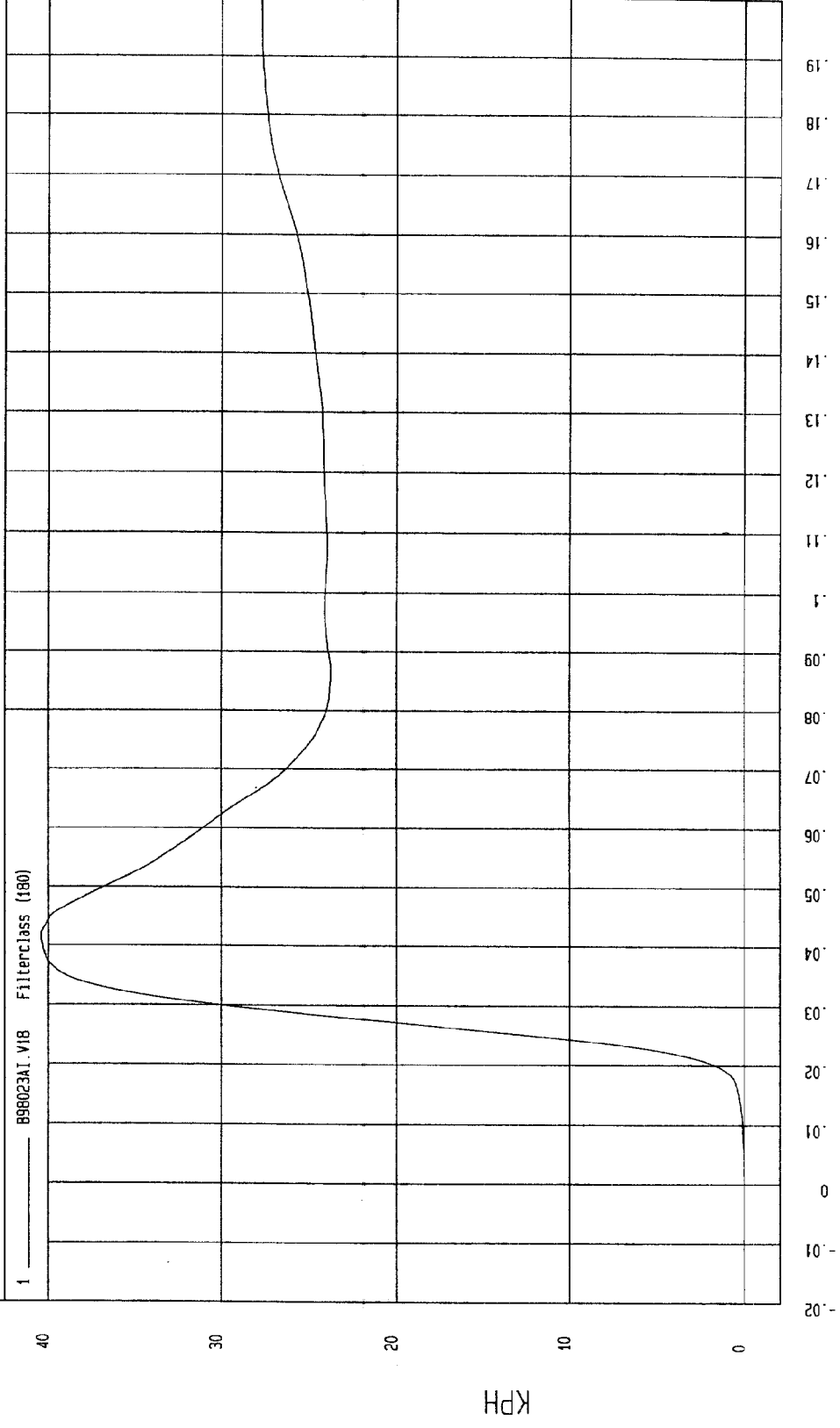
19
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NSA Research
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TEST: HIGH SPEED LATERAL IMPACT
TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)
Speed: 38.4 MPH 61.8 KPH

Minimum = -4.76E-03 KPH at -18 msec
Maximum = 40.42 KPH at 42 msec

DRIVER PELVIS Y VELOCITY



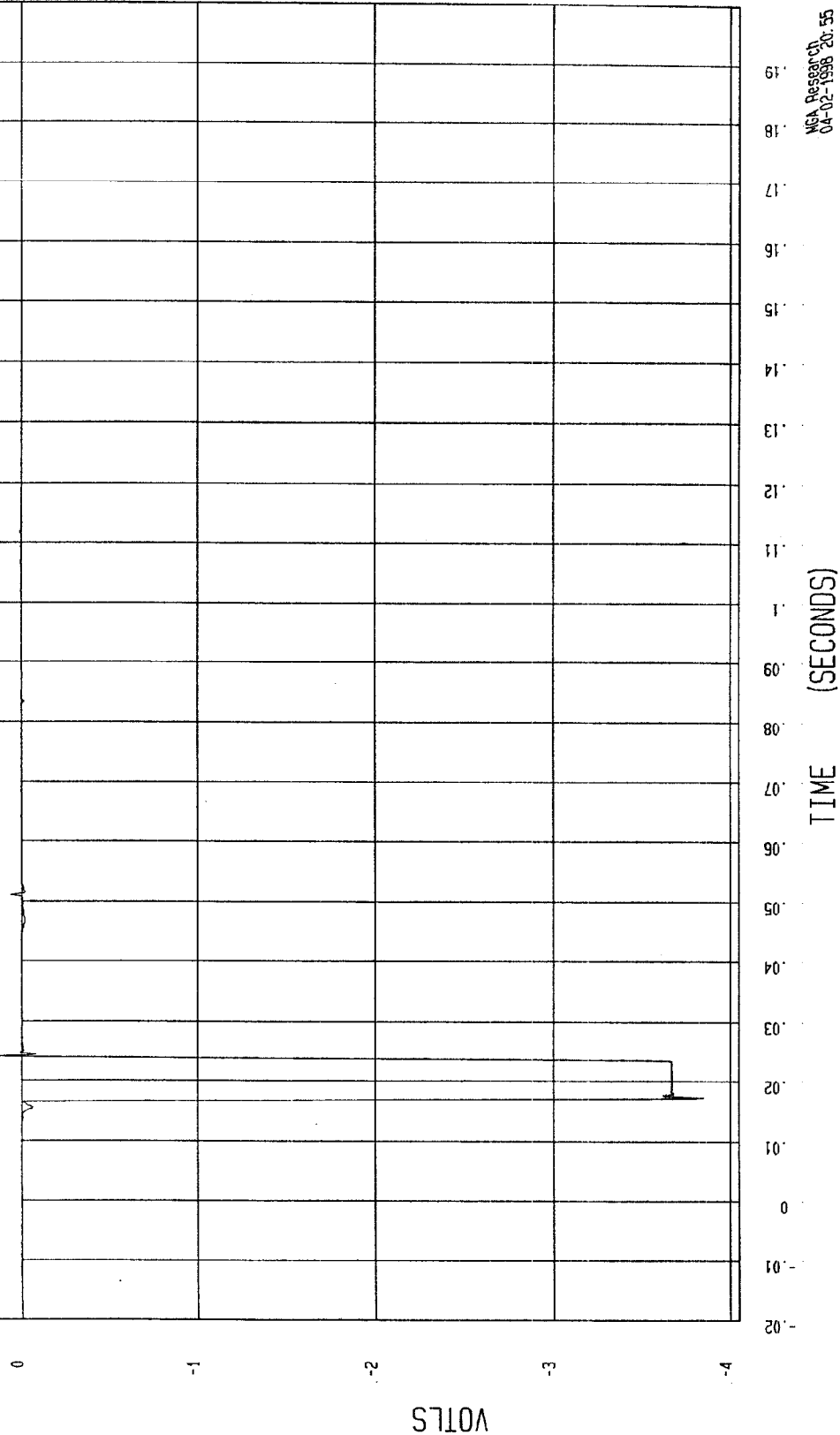
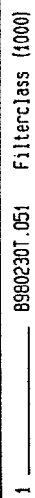
MOA Research
04-02-1998 21:03

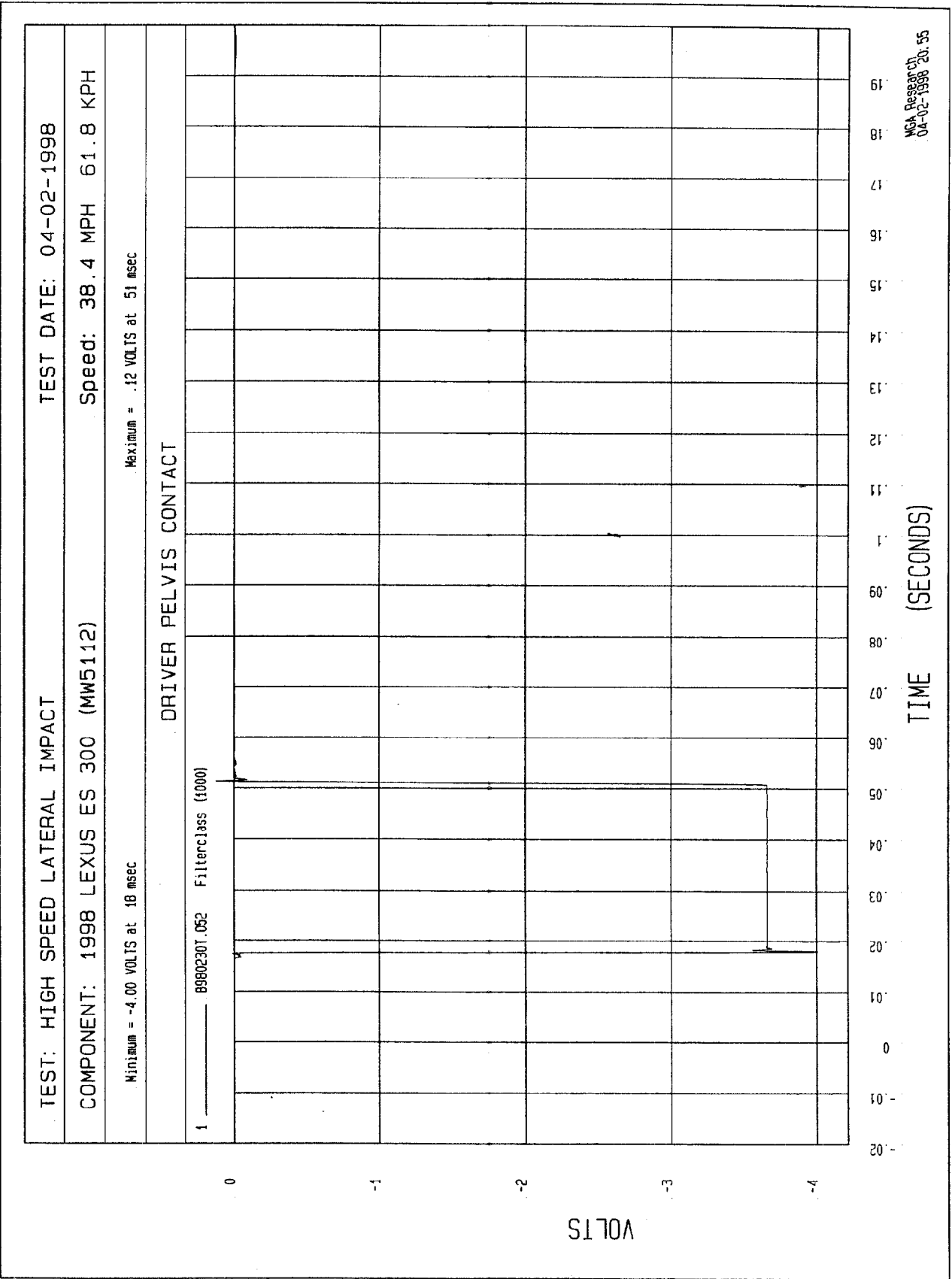
TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

Maximum = .12 VOLTS at 24 msec

DRIVER SHOULD CONTACT



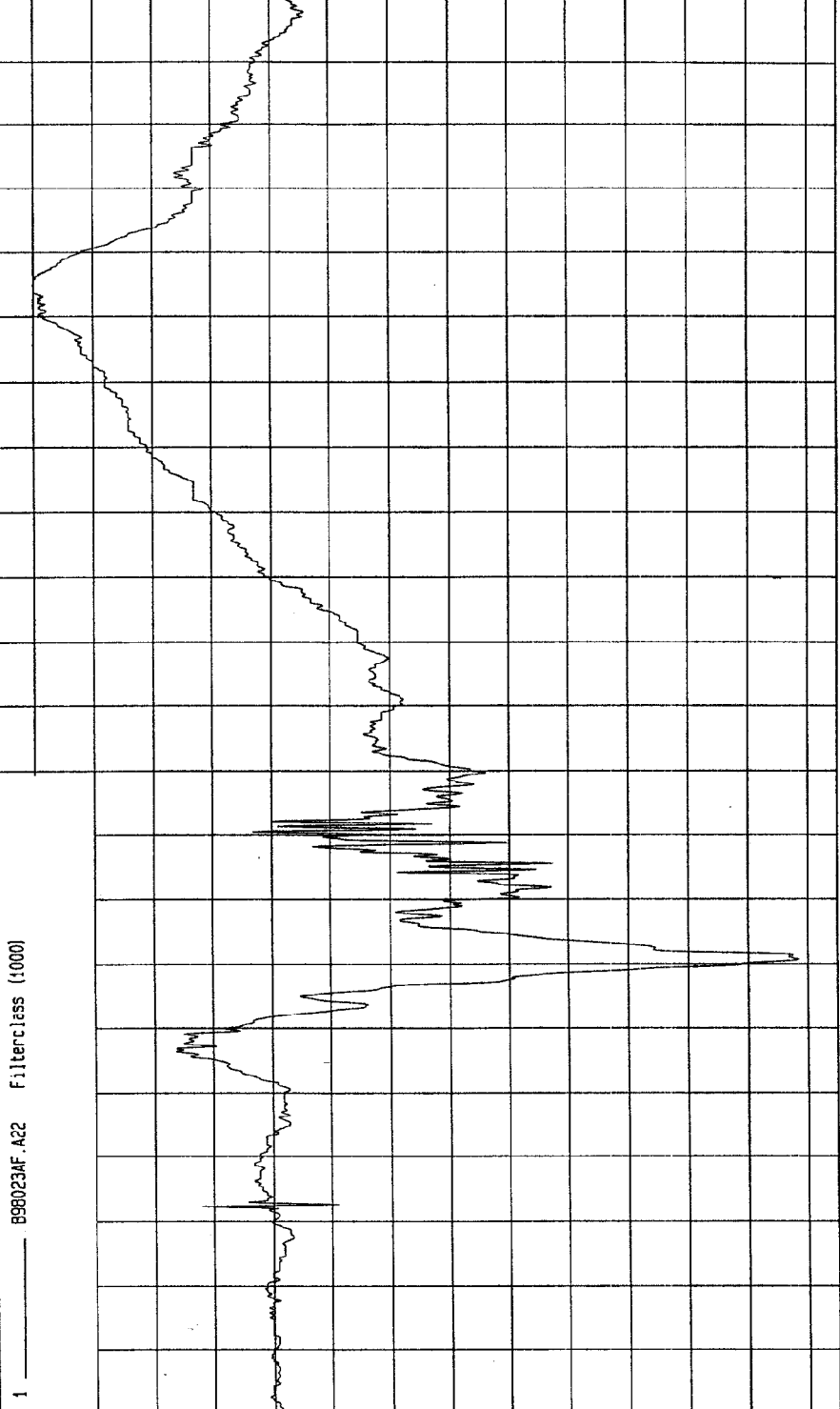


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -17.69 G'S at 51 msec Maximum = 8.00 G'S at 154 msec

REAR PASSENGER HEAD X ACCELERATION



TIME (SECONDS)

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TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW51112)

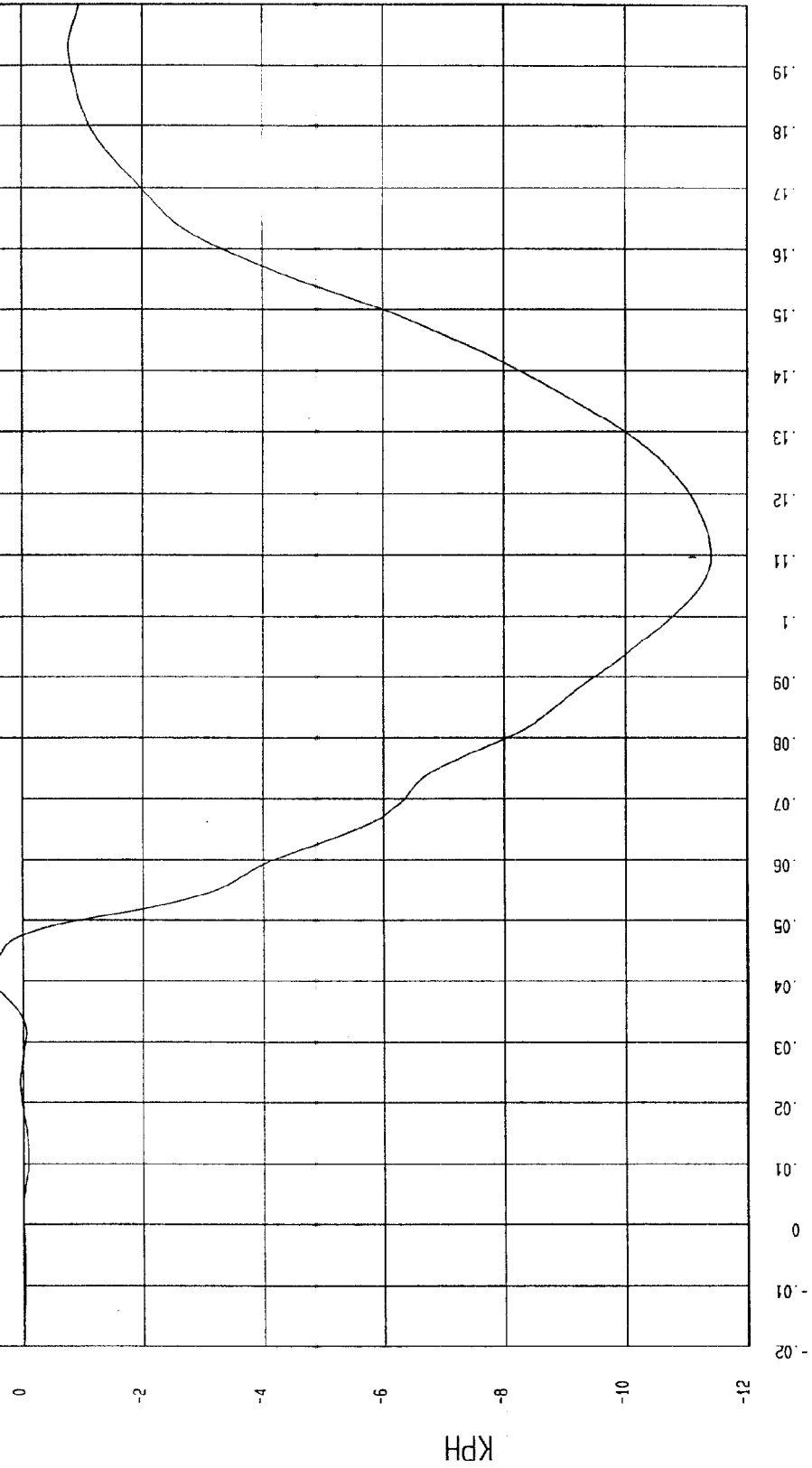
Speed: 38.4 MPH 61.8 KPH

Minimum = -11.41 KPH at 110 msec

Maximum = .56 KPH at 42 msec

REAR PASSENGER HEAD X VELOCITY

1 898023A1.V22 Filterclass (180)



MCA Research
04-02-1998 21:06

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

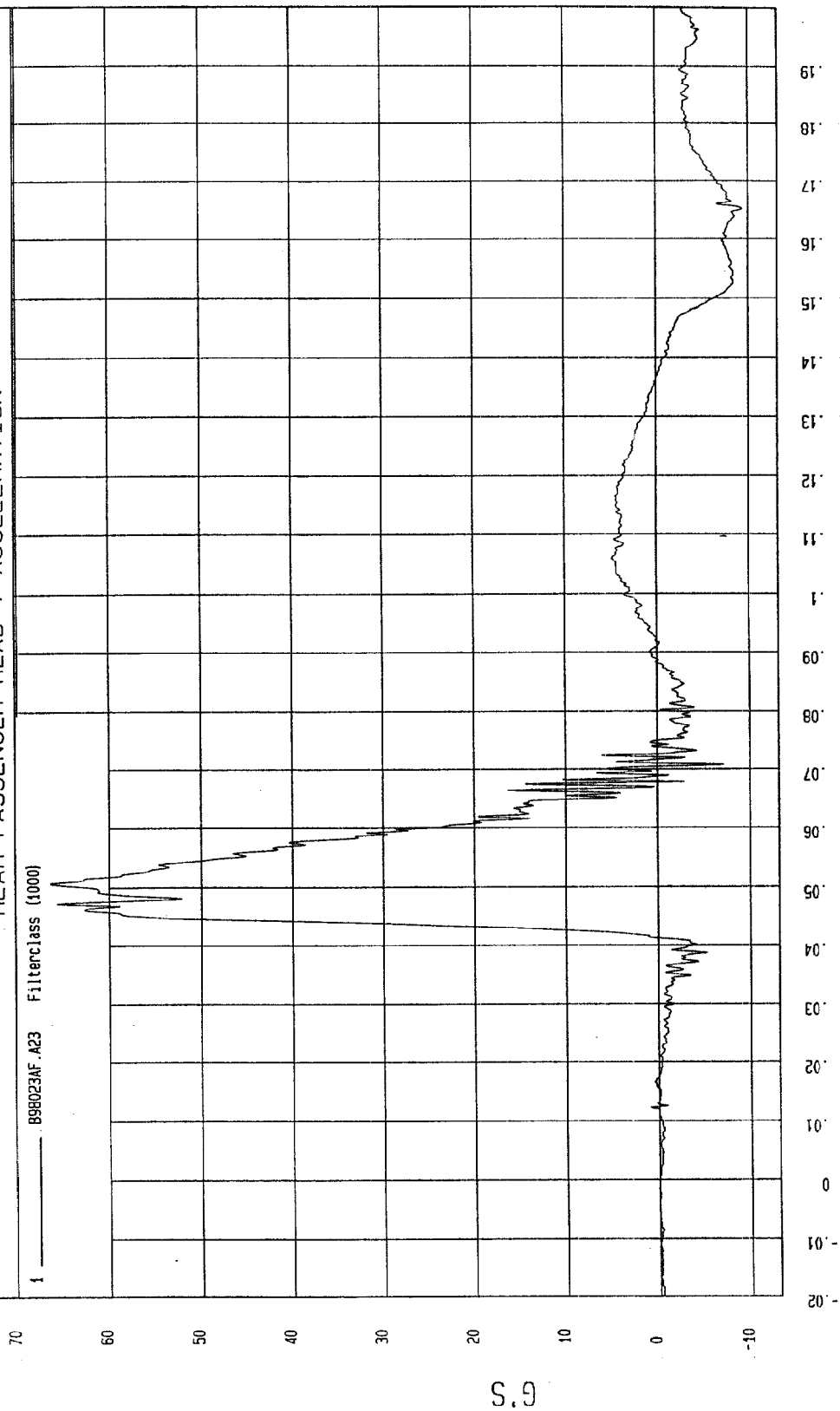
Speed: 38.4 MPH 61.8 KPH

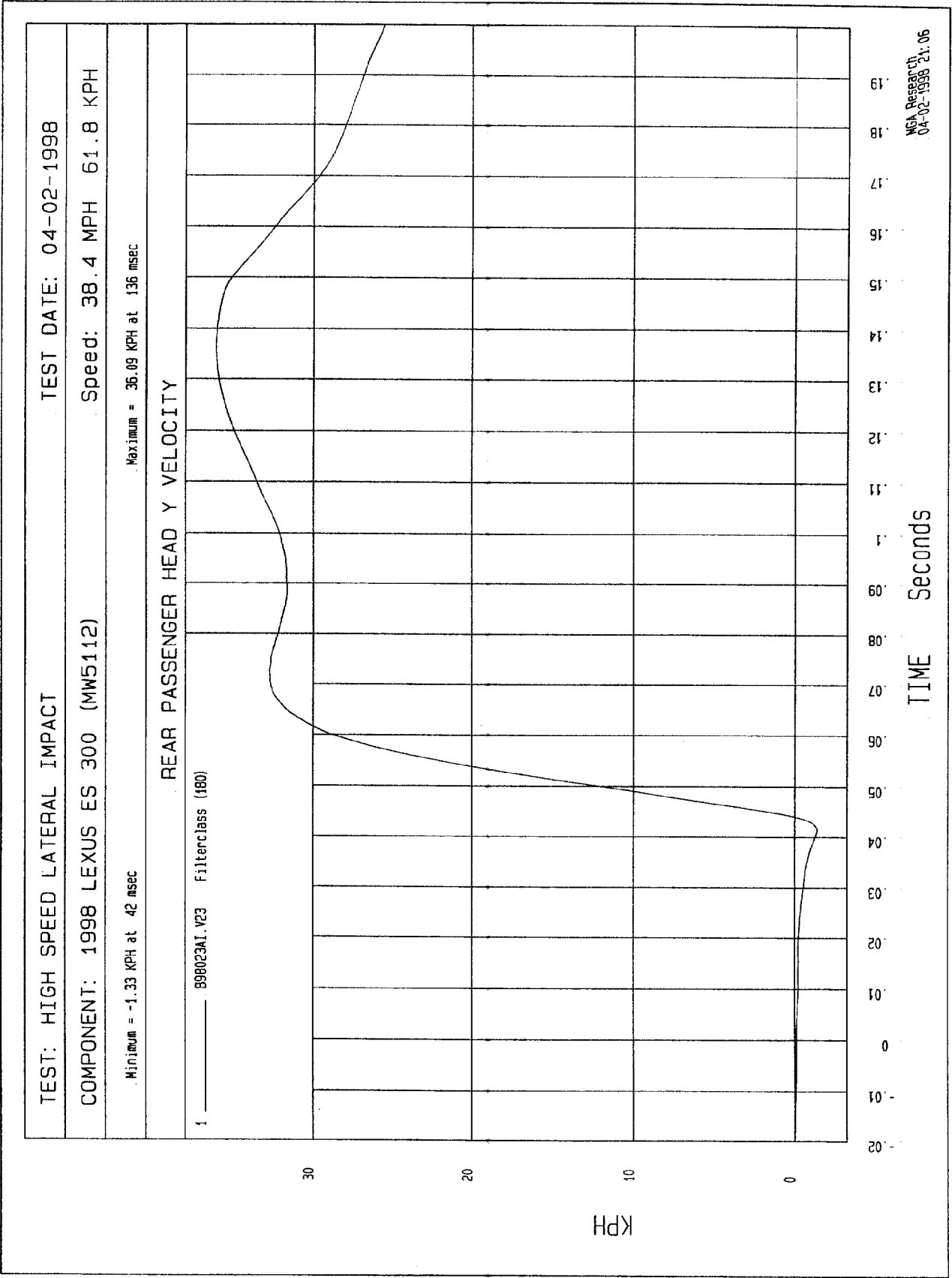
COMPONENT: 1998 LEXUS ES 300 (MW5112)

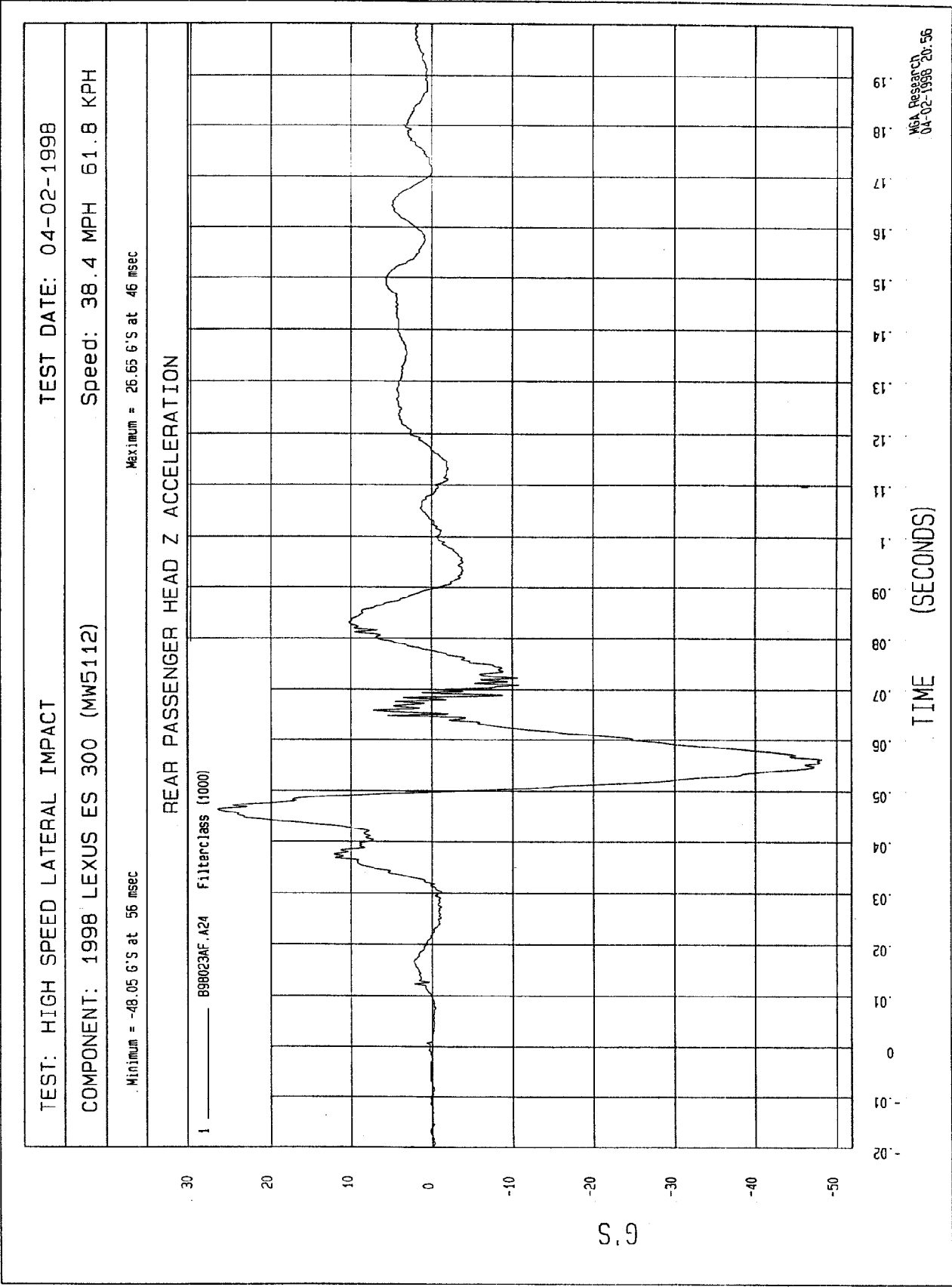
Maximum = 66.43 G'S at 51 msec

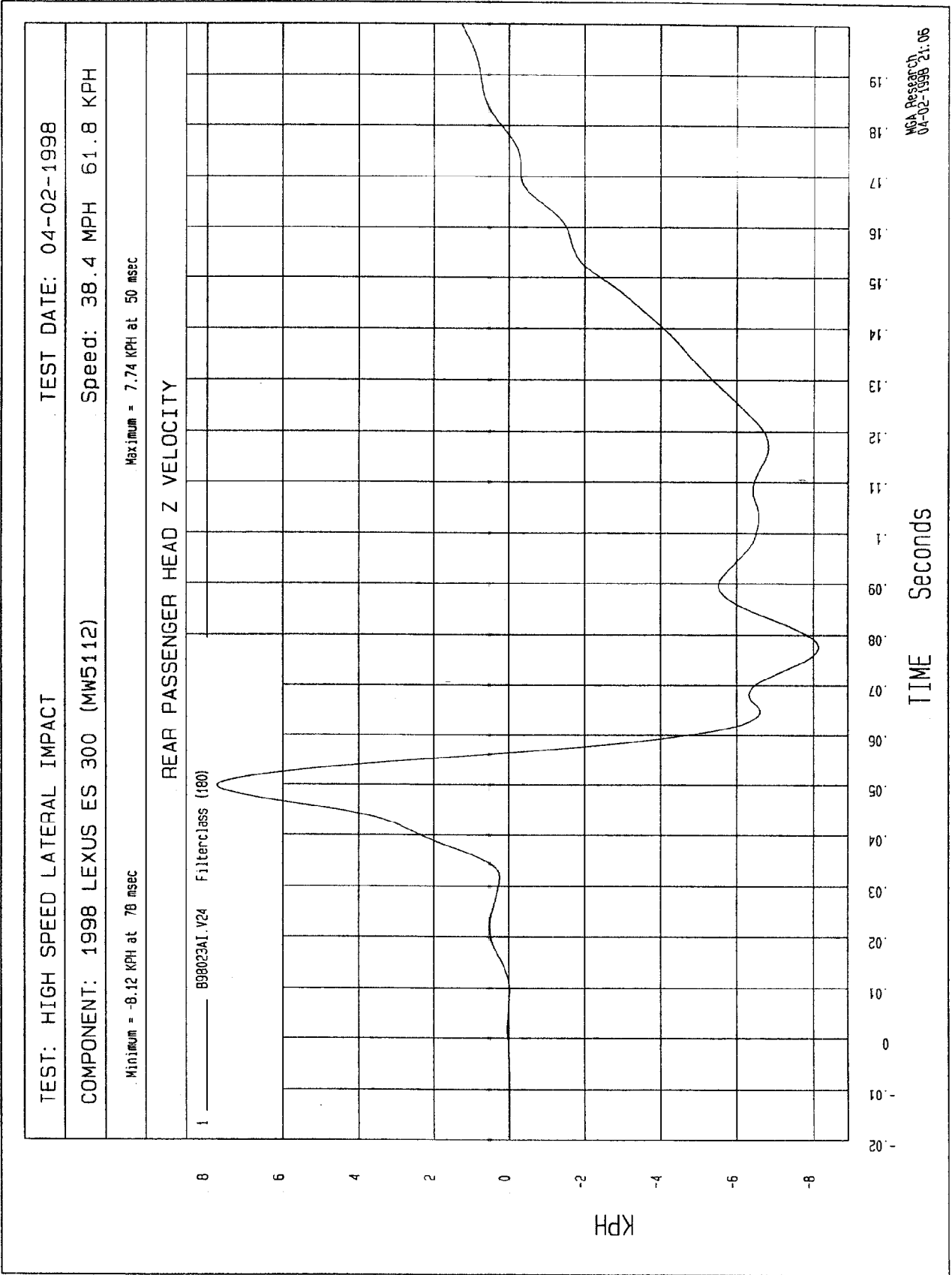
Minimum = -9.35 G'S at 165 msec

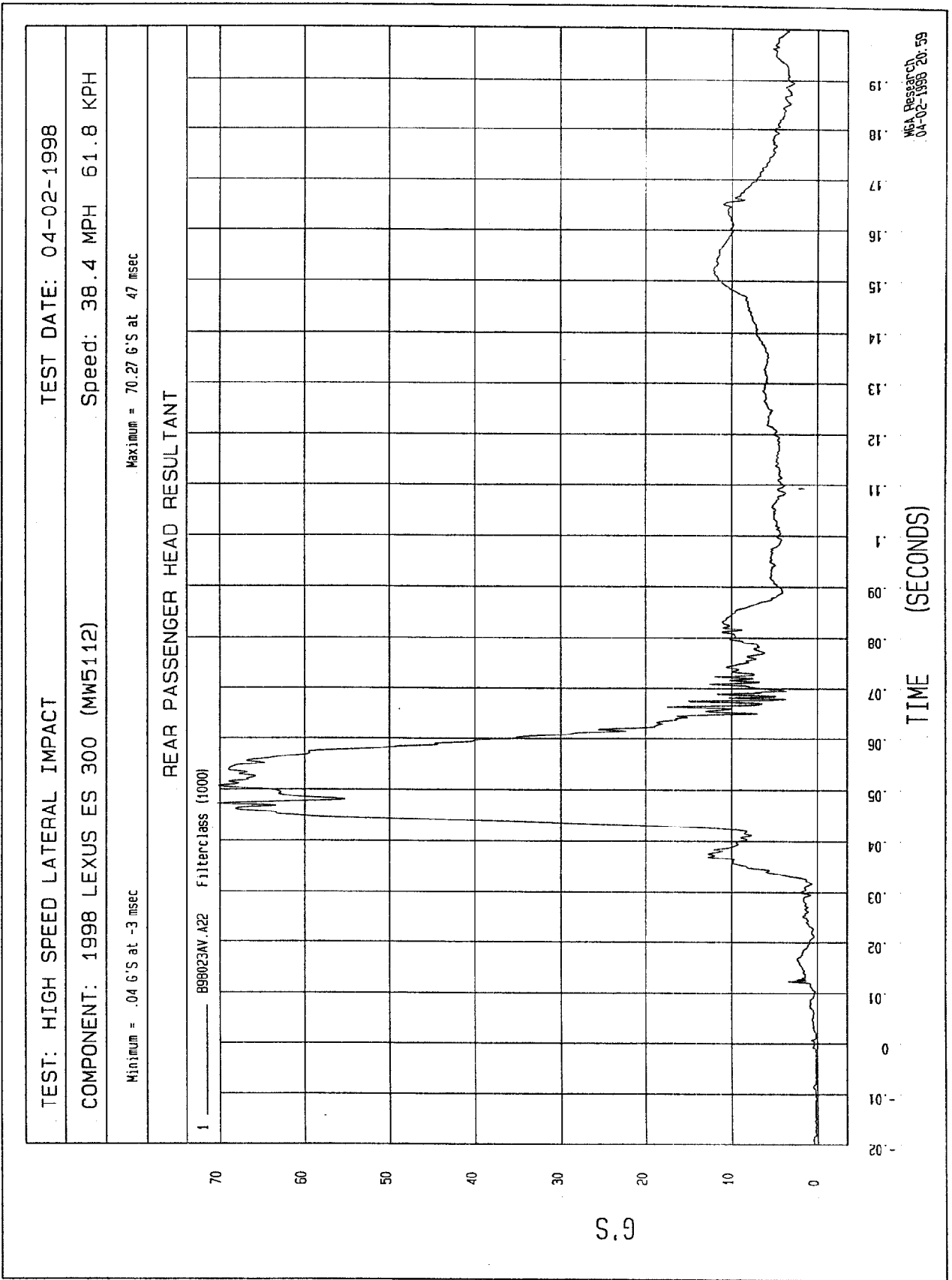
REAR PASSENGER HEAD Y ACCELERATION

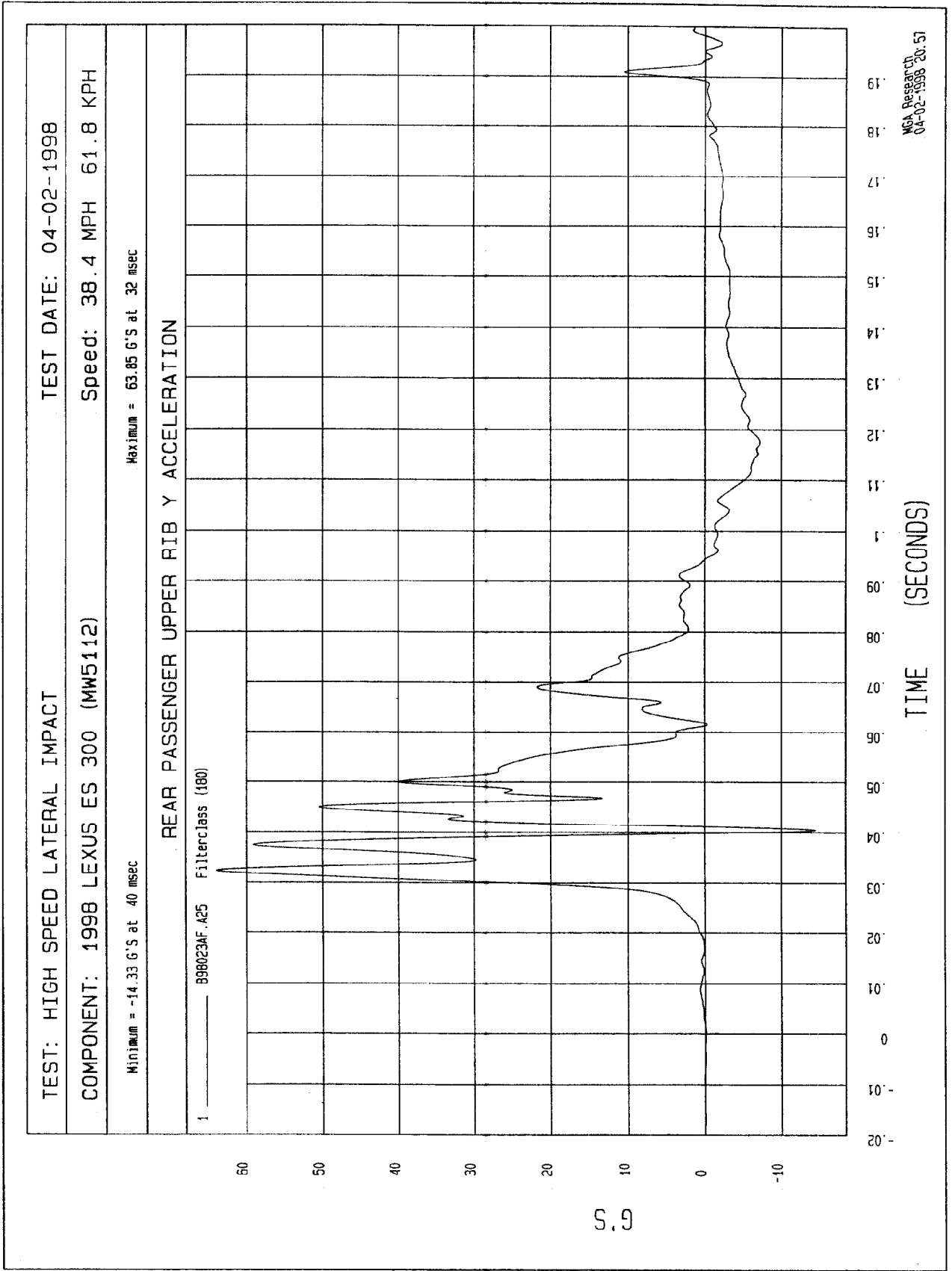




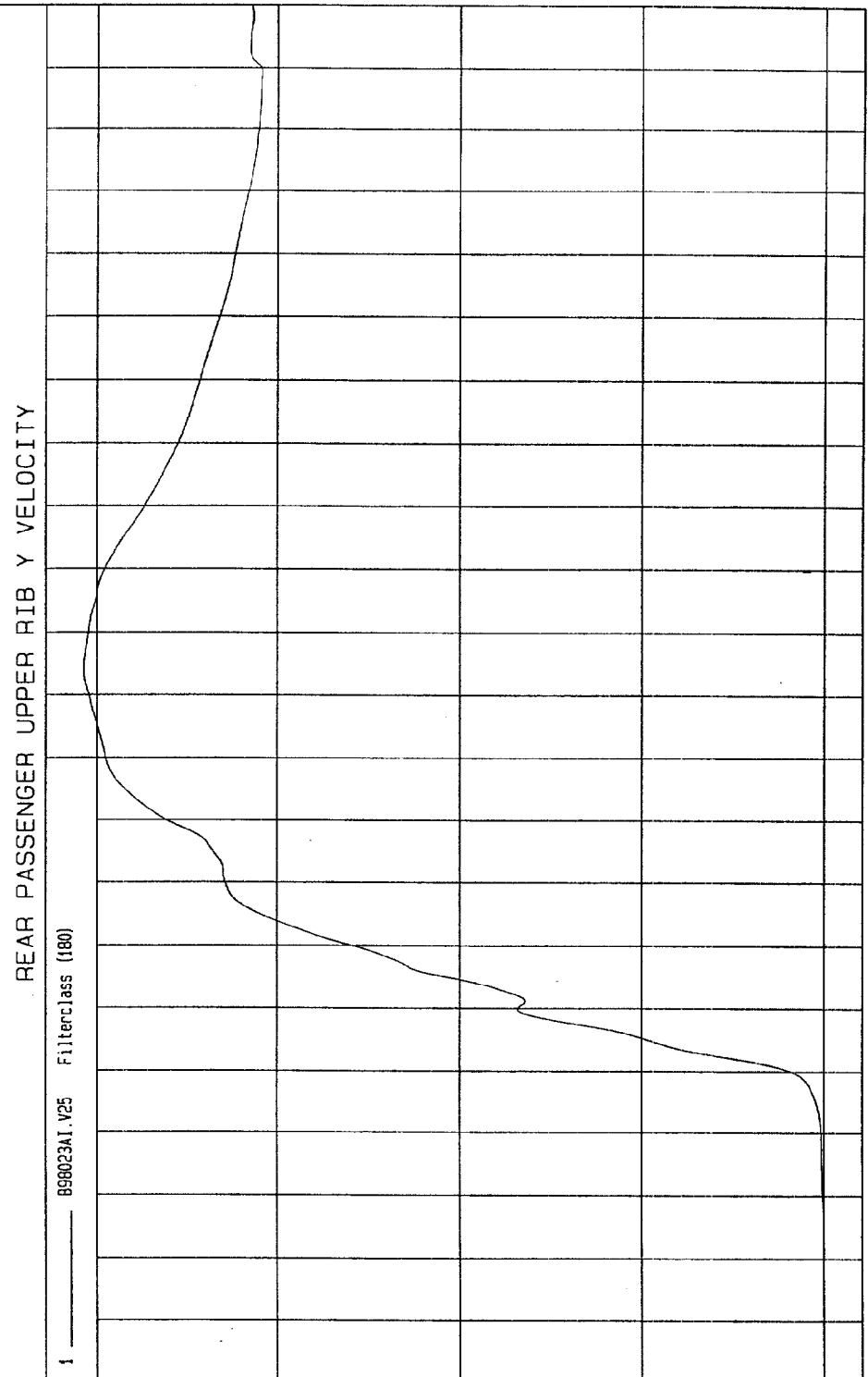






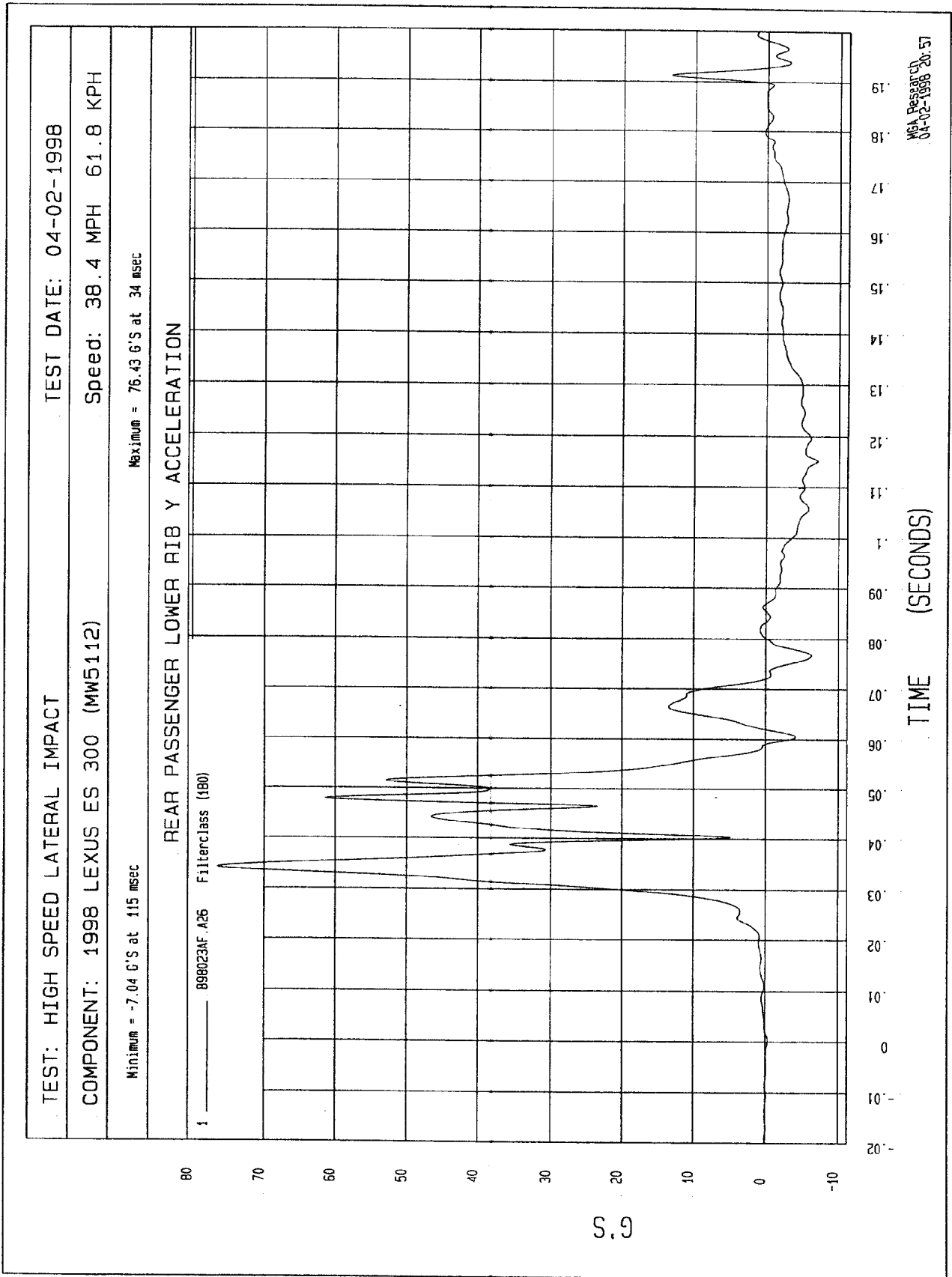


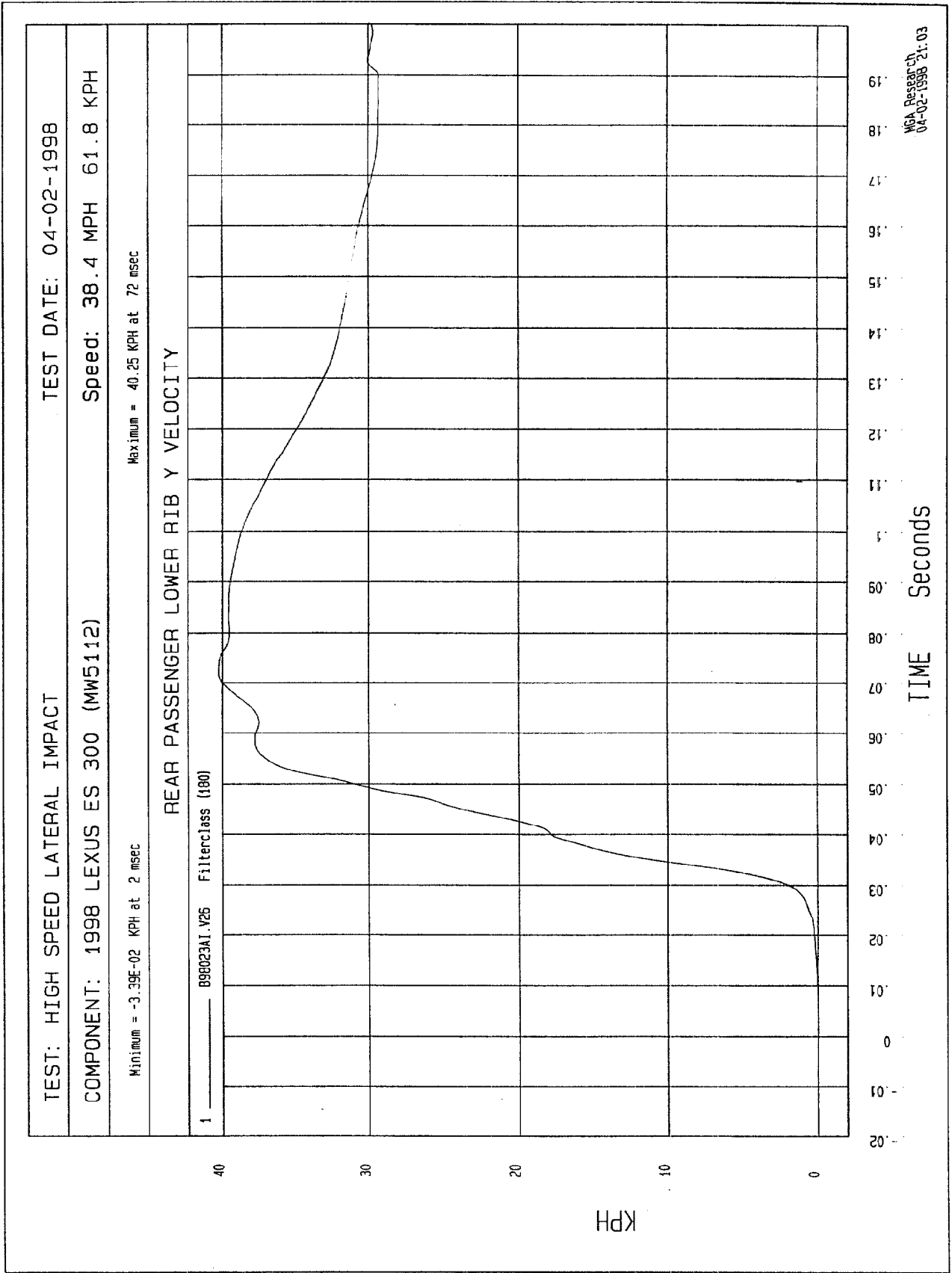
TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)	Speed: 38.4 MPH 61.8 KPH
Minimum = -2.36E-02 KPH at 2 msec	
Maximum = 40.76 KPH at 94 msec	

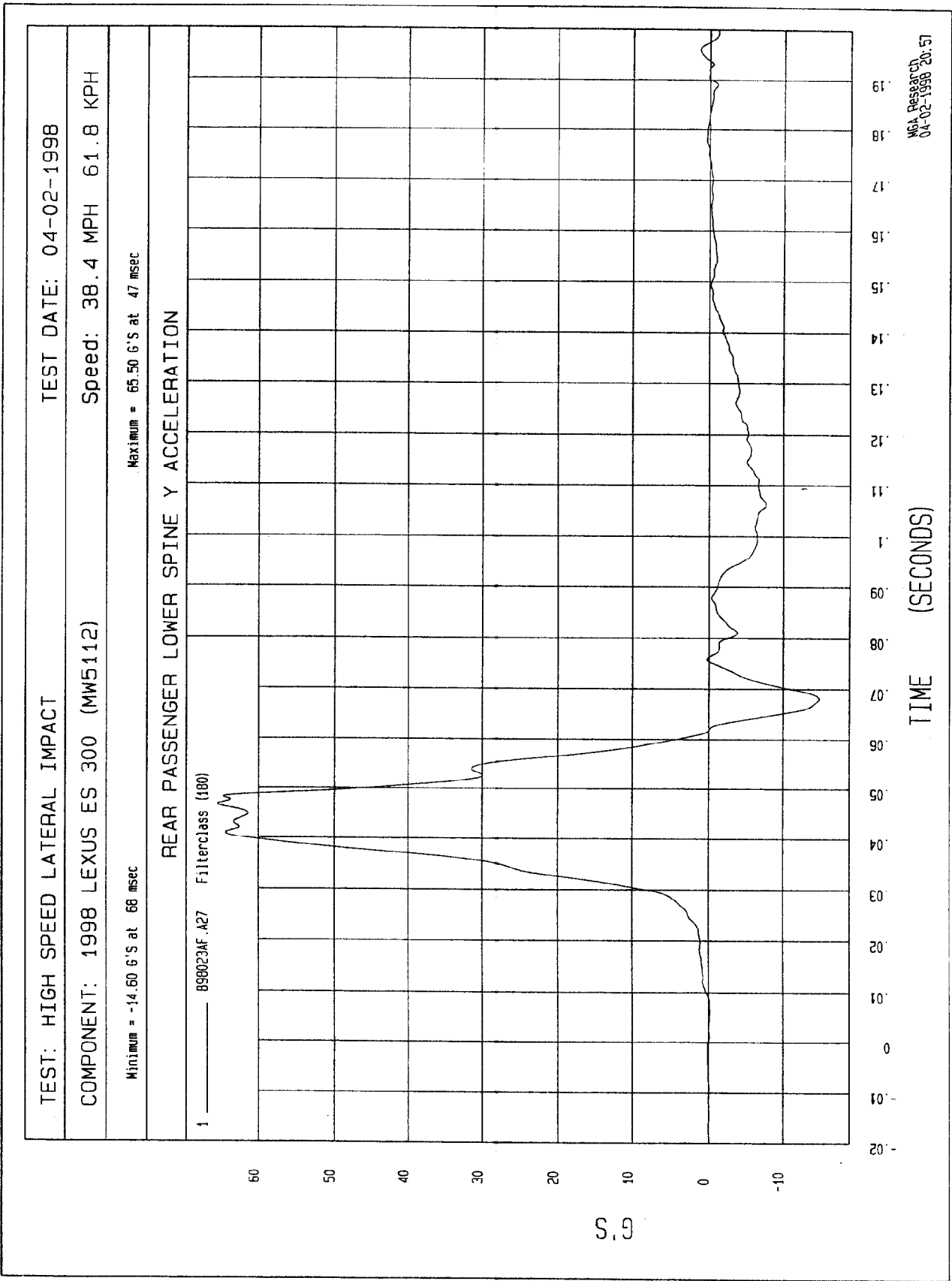


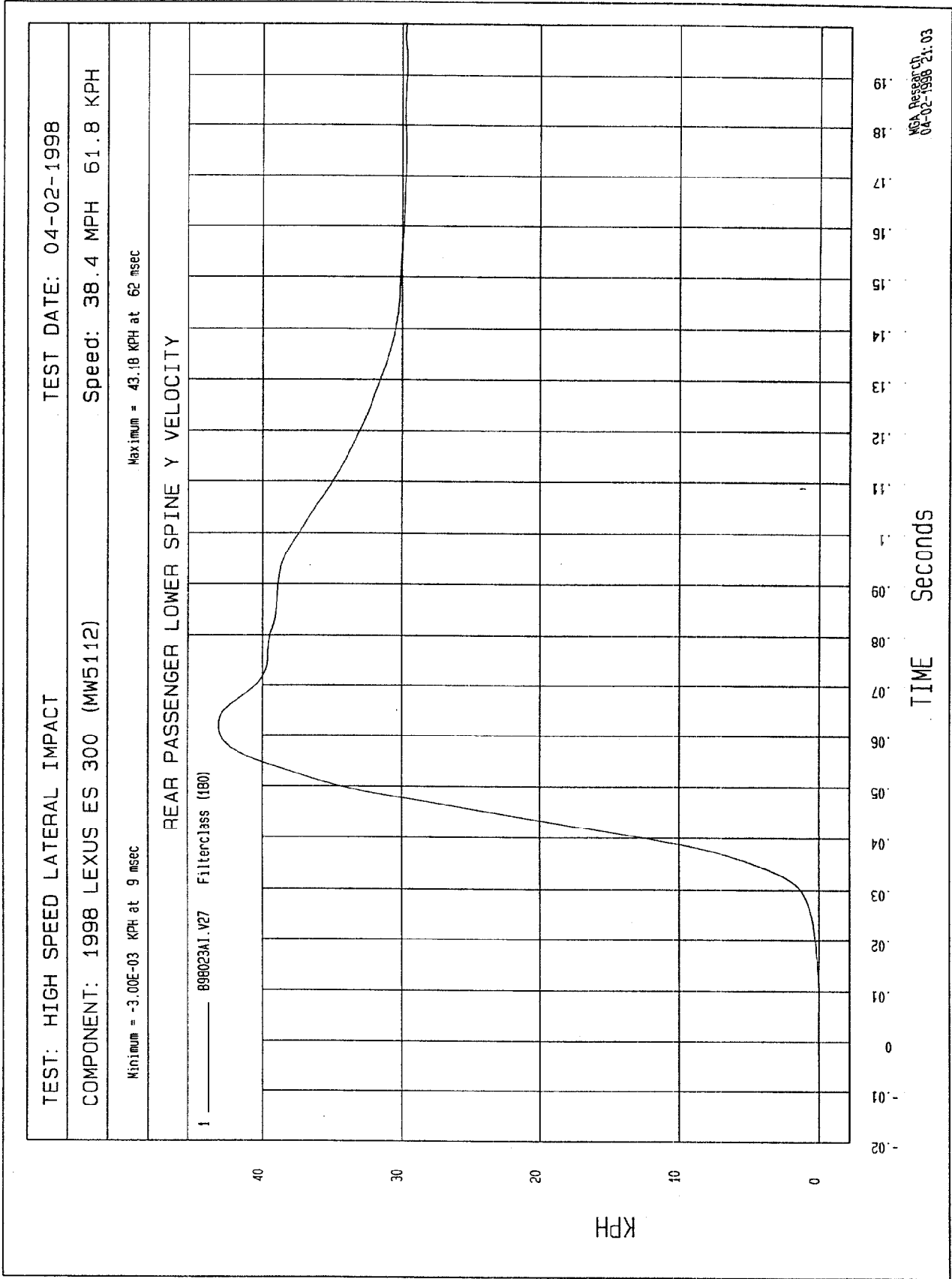
TIME Seconds

WCA Research
04-02-1998 21:03









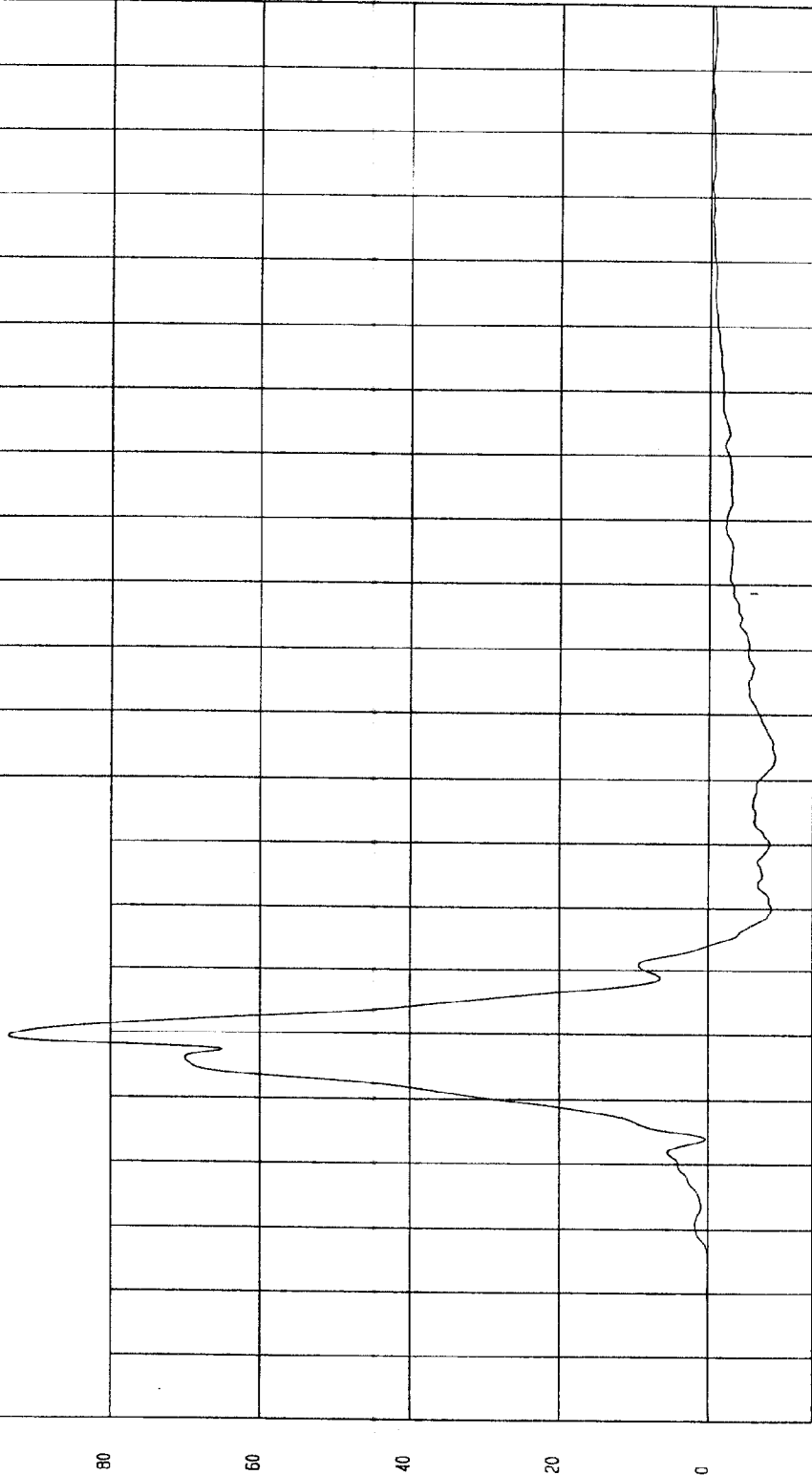
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

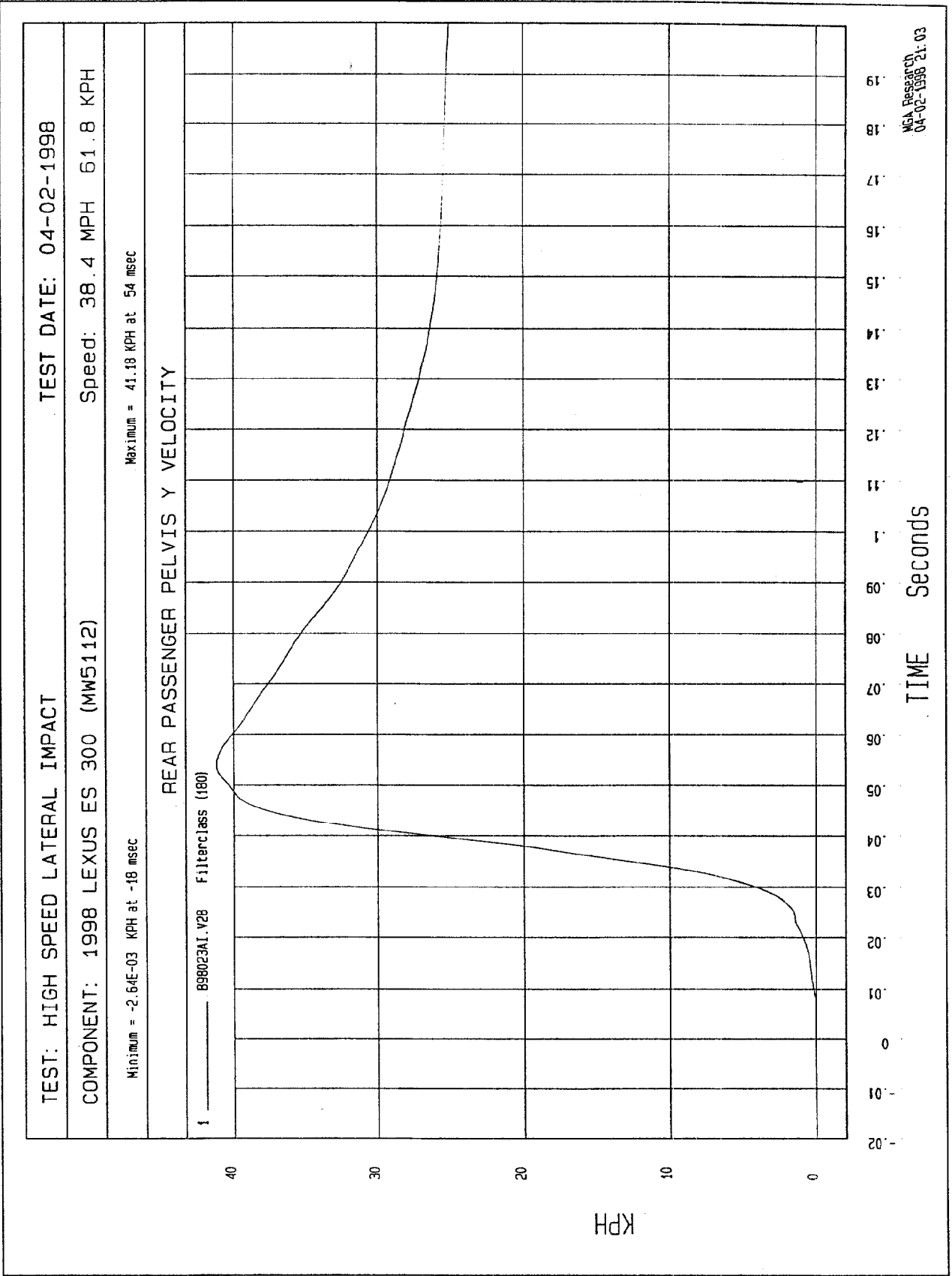
Minimum = -8.63 G's at 84 msec Maximum = 93.70 G's at 39 msec

REAR PASSENGER PELVIS Y ACCELERATION

1 ——— 890023AF.A28 FilterClass (180)



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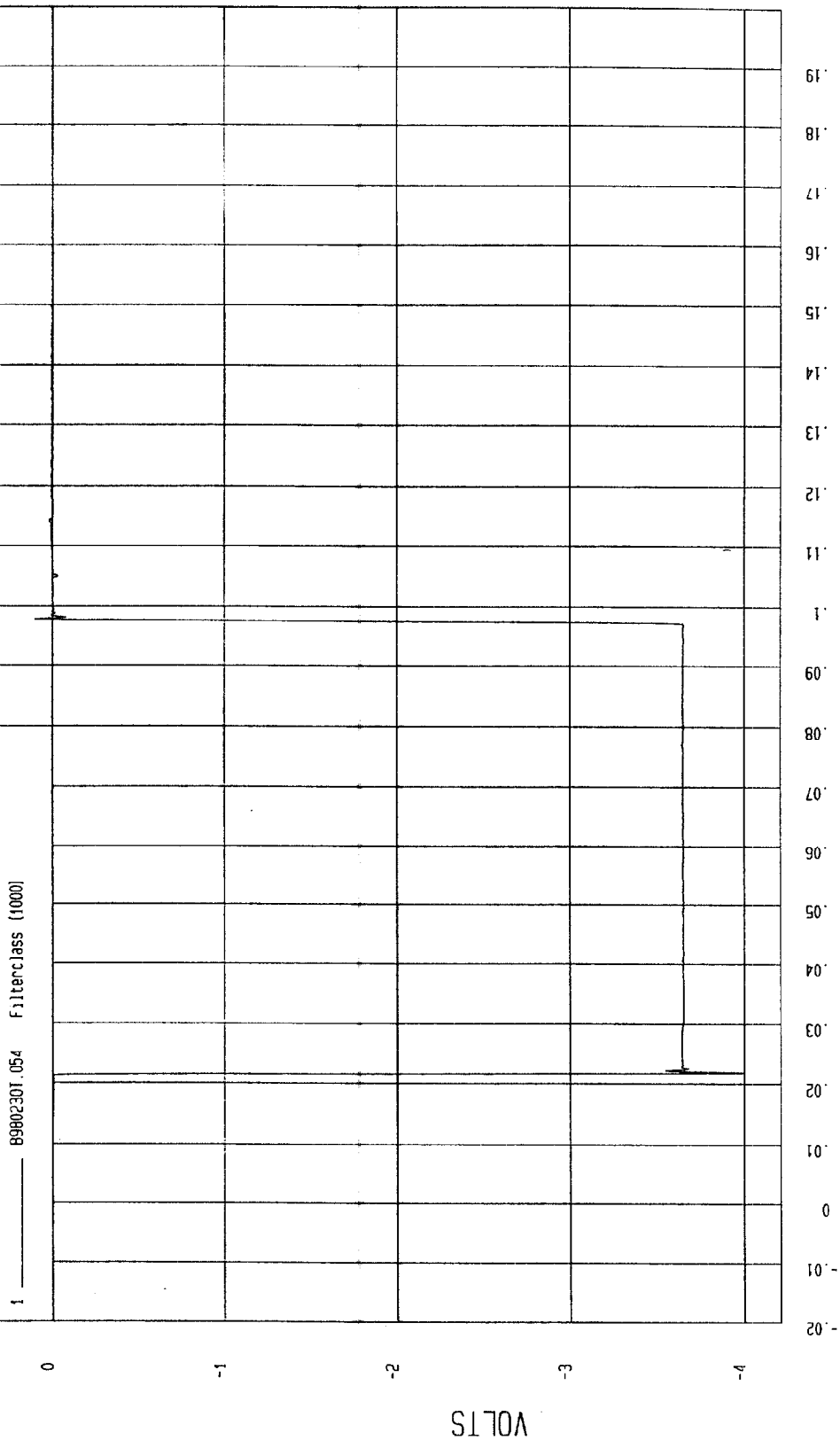


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

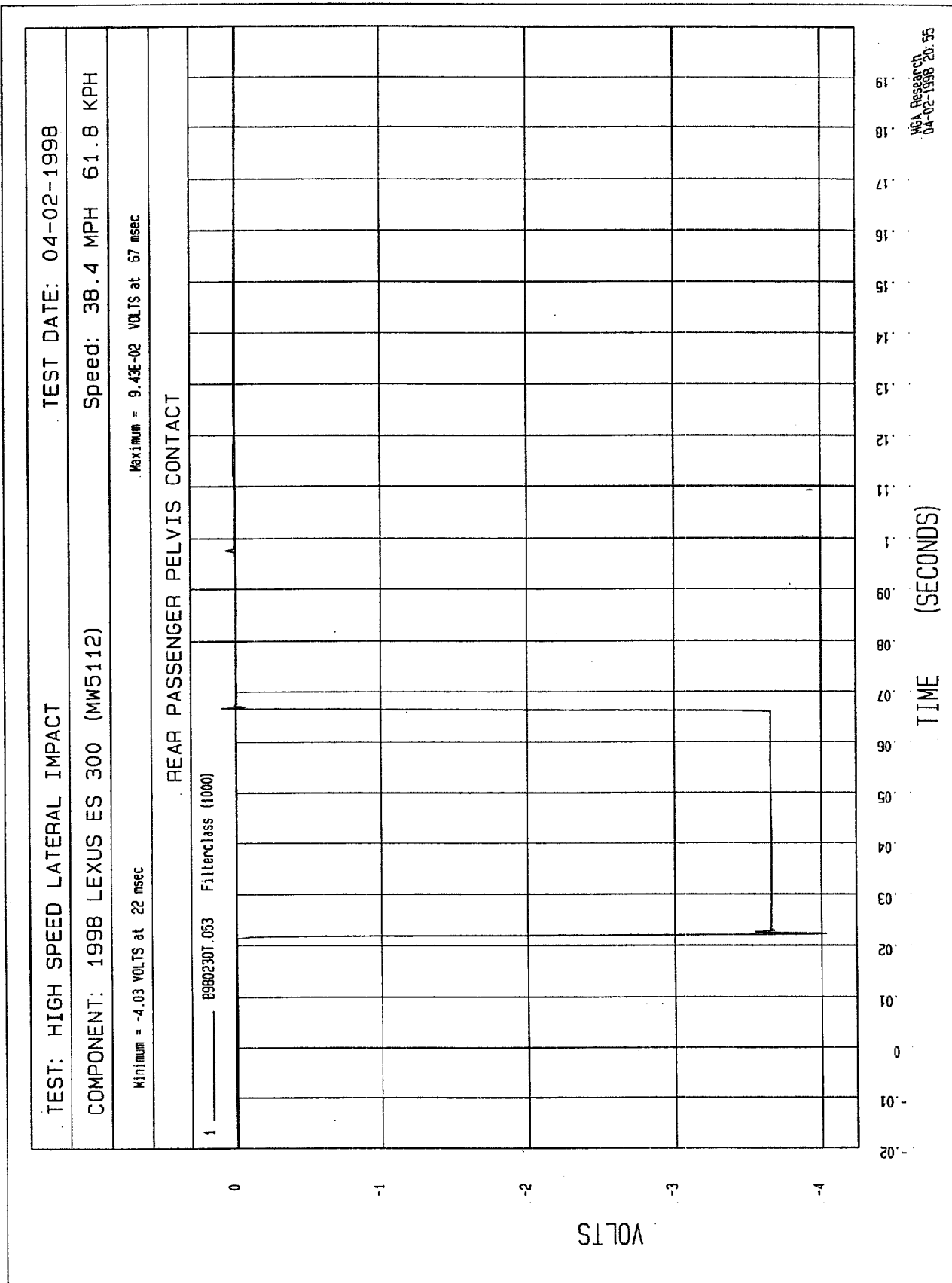
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -4.00 VOLTS at 22 msec
Maximum = .10 VOLTS at 98 msec

REAR PASSENGER SHOULDER CONTACT

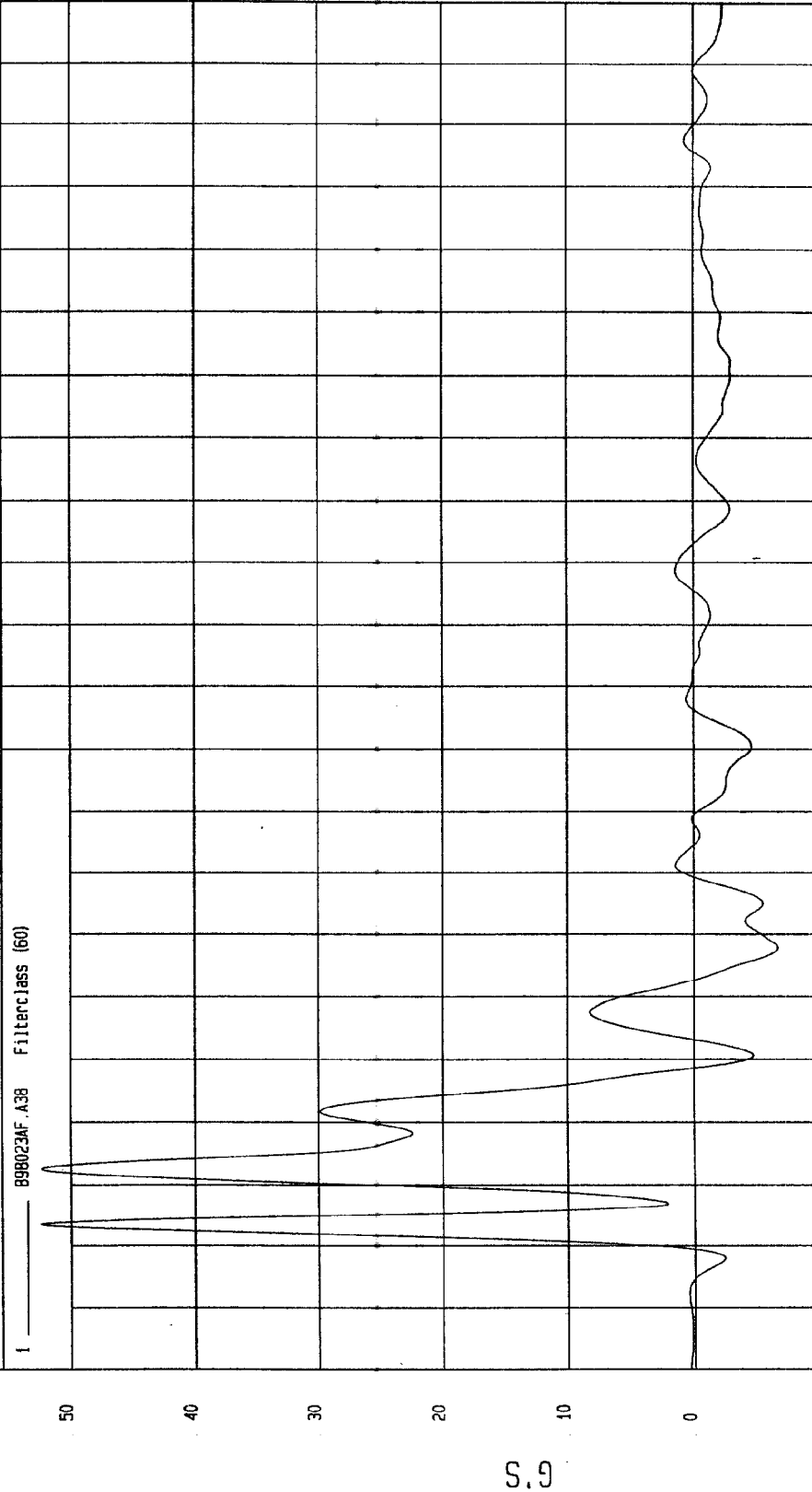


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04-02-1998 20:55



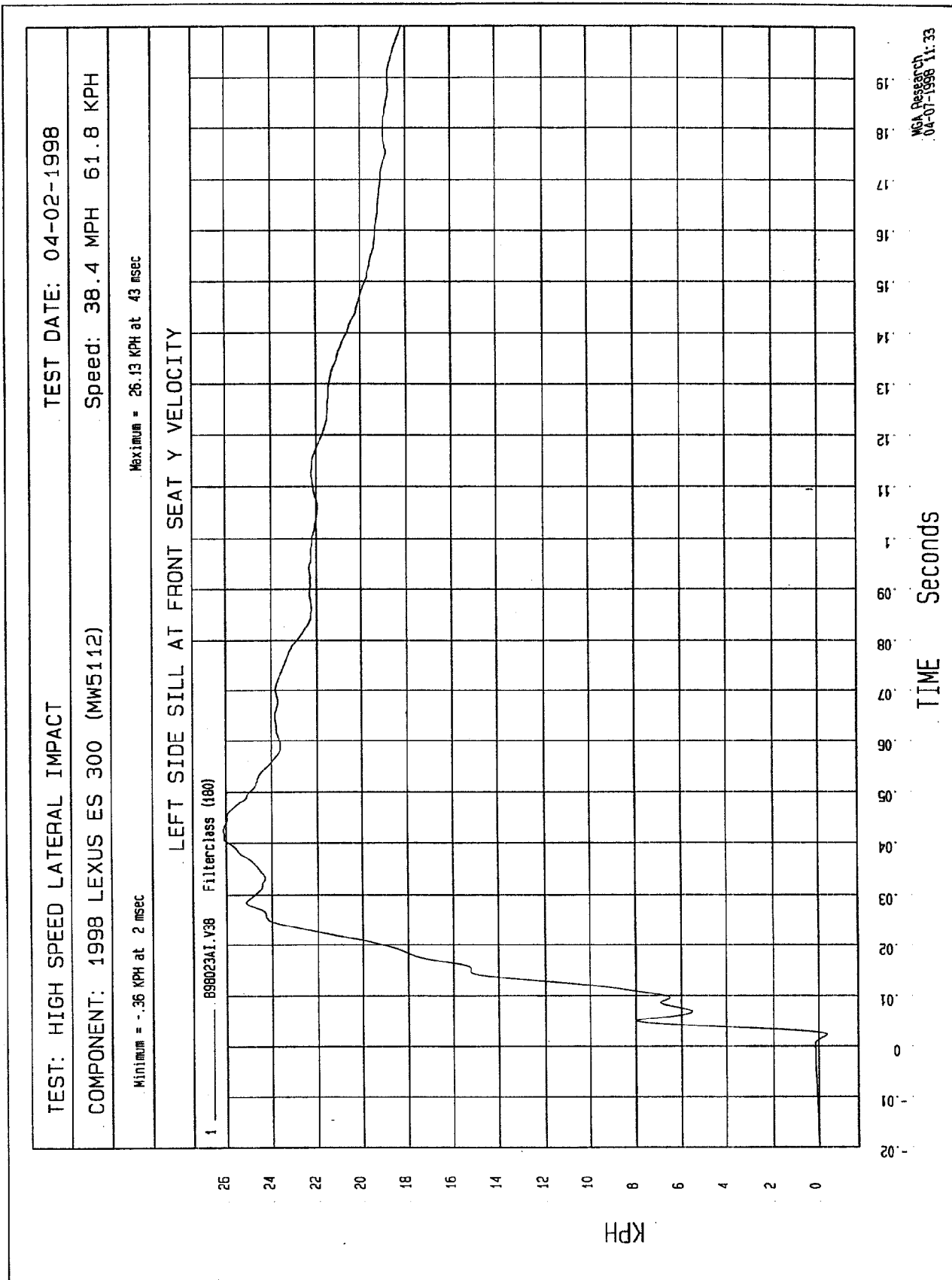
TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)	Speed: 38.4 MPH 61.8 KPH
Minimum = -6.63 G'S at 48 msec	

LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION



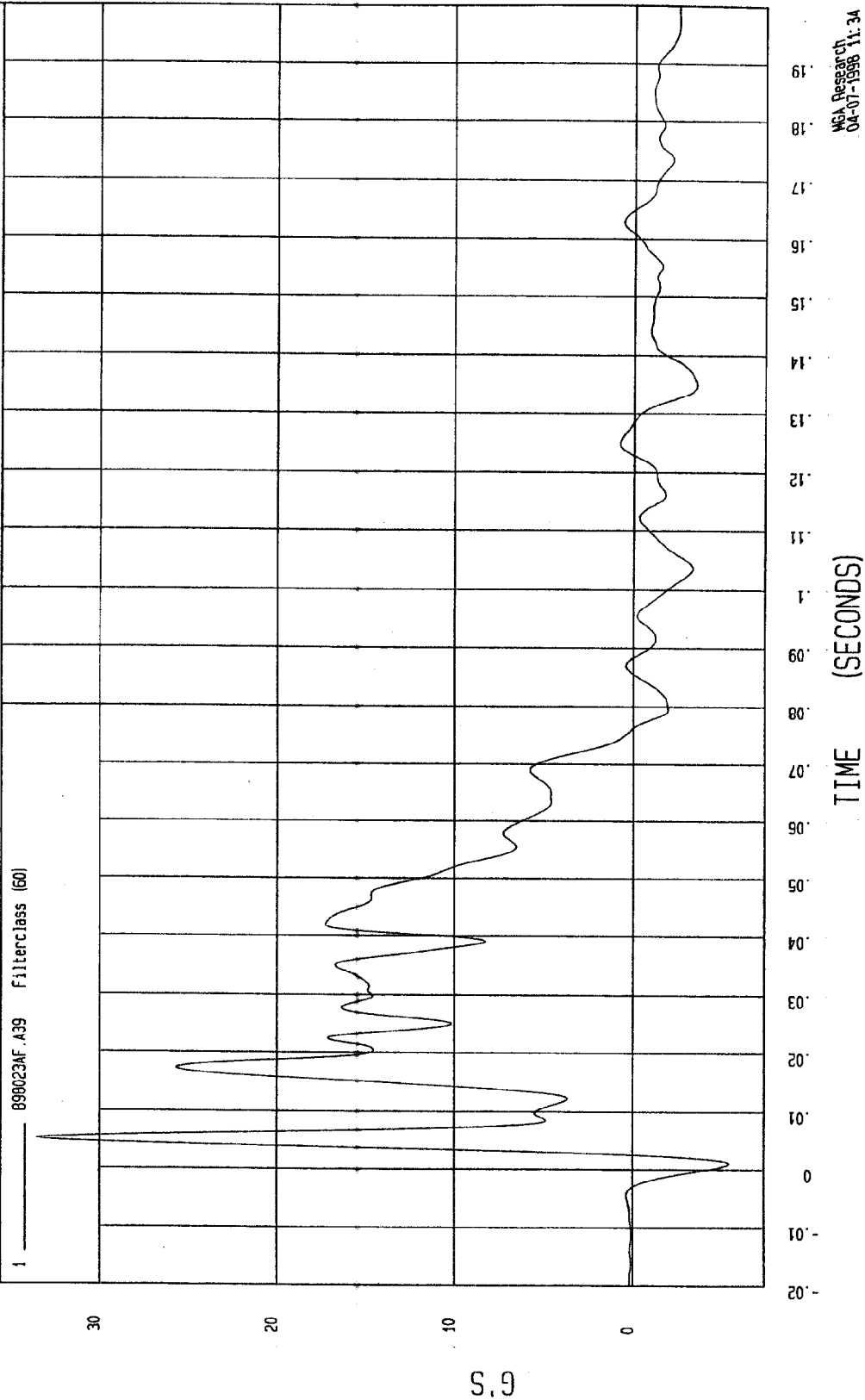
TIME (SECONDS)

MOA Research Co.
04-07-1998 11:30



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH
Minimum = -5.28 G'S at 1 msec Maximum = 33.54 G'S at 5 msec

LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

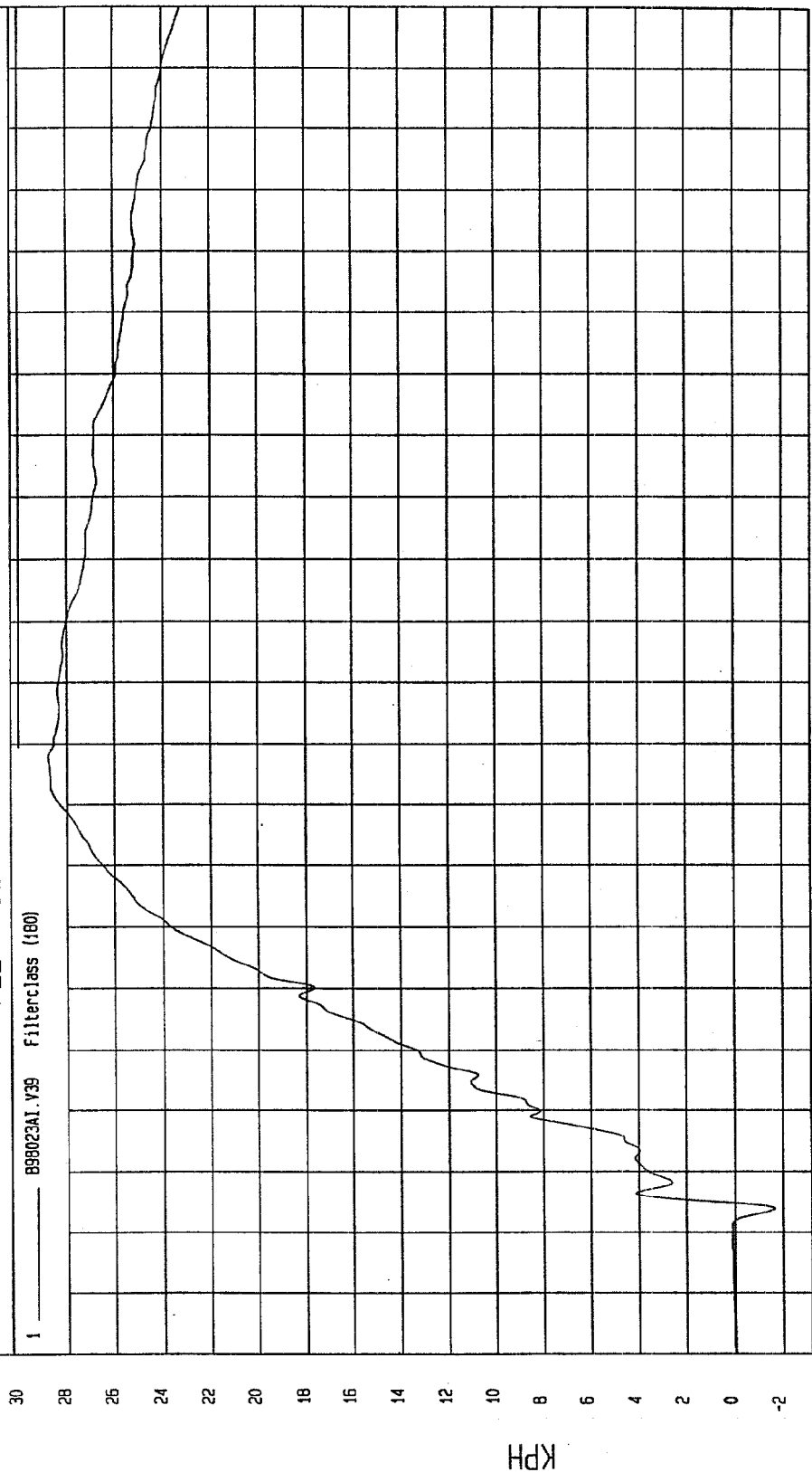


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

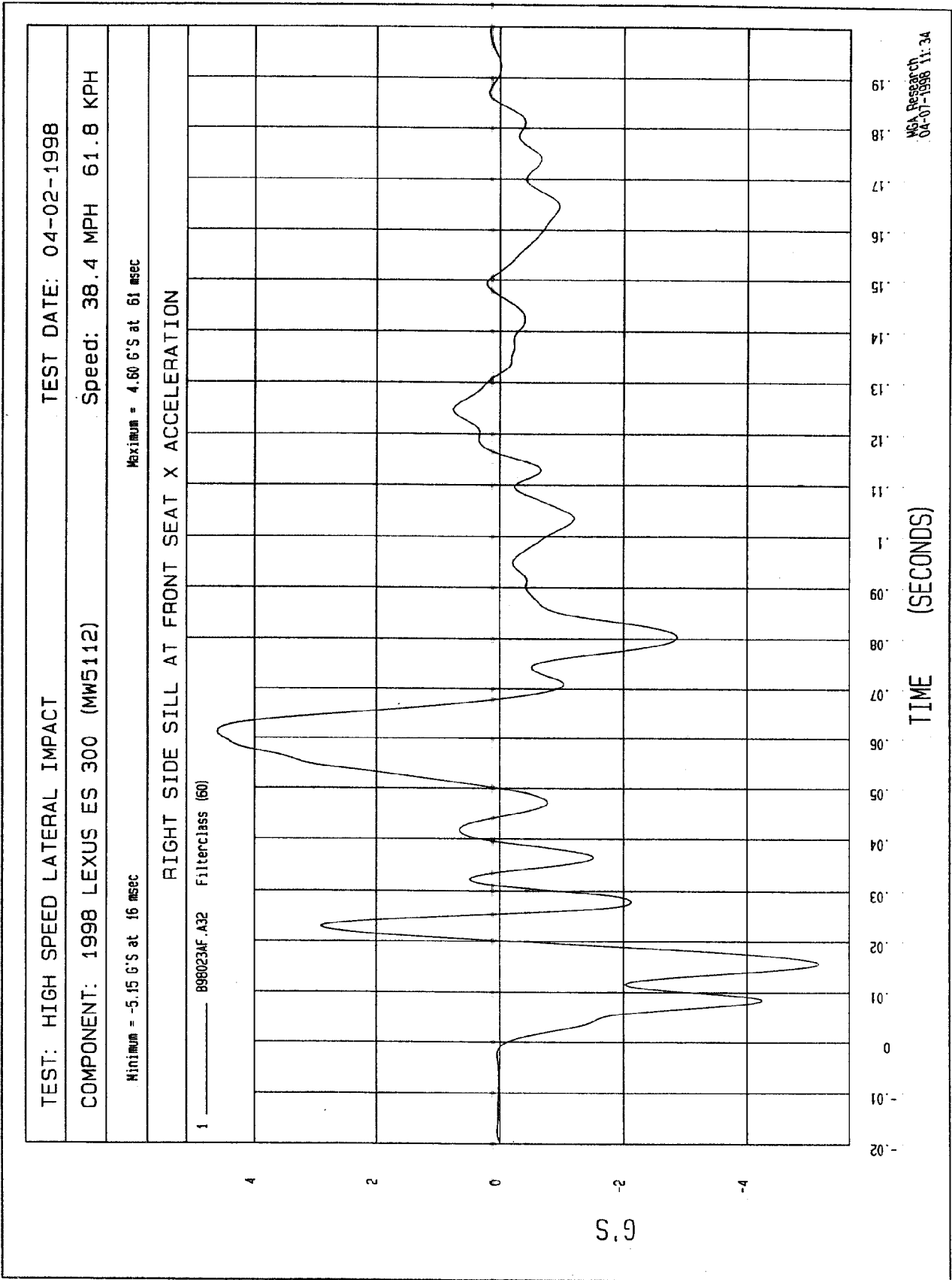
Minimum = -1.65 KPH at 4 msec Maximum = 28.78 KPH at 78 msec

LEFT SIDE SILL AT REAR SEAT Y VELOCITY



TIME Seconds

NCA Research
04-07-1998 11:34

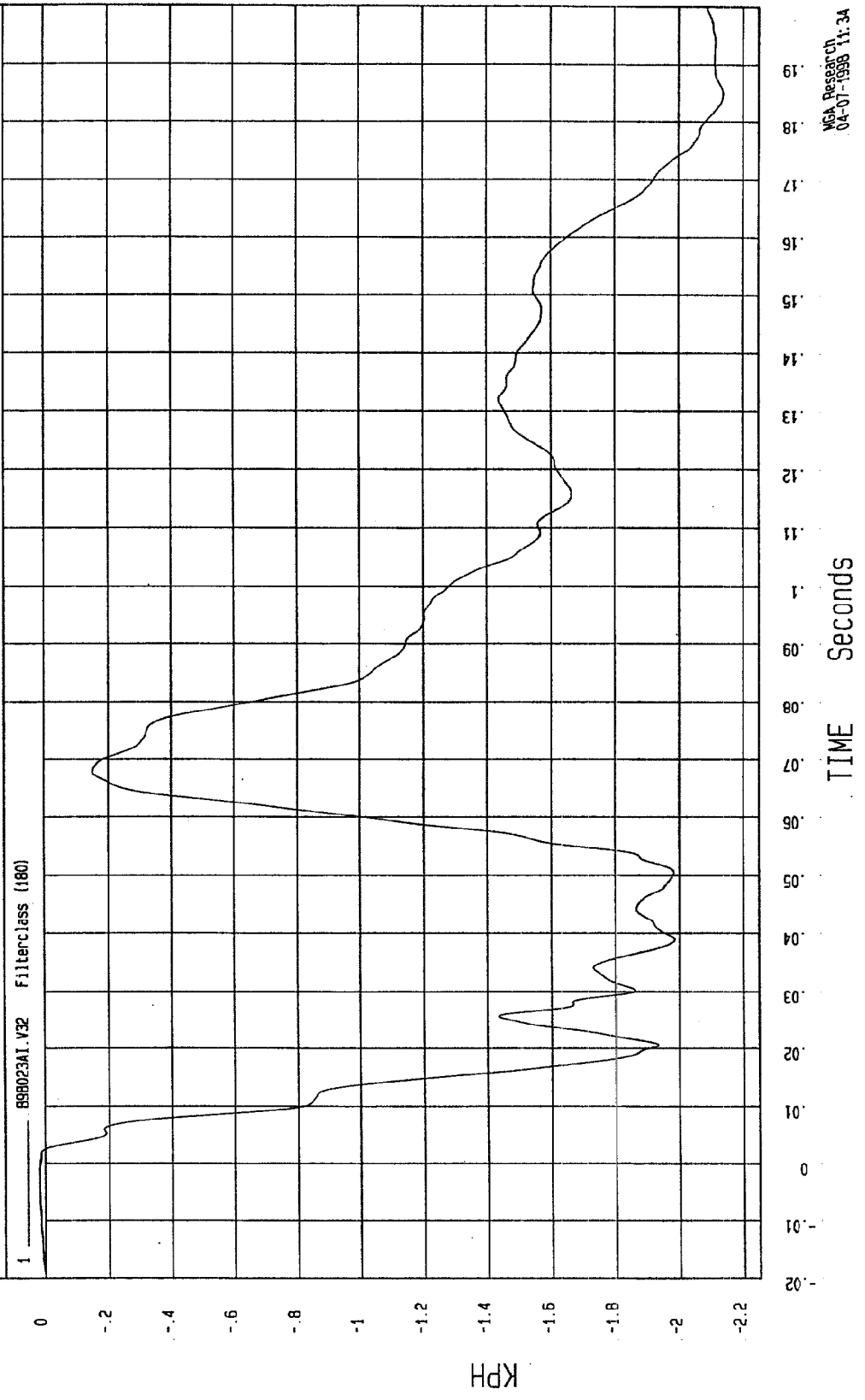


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -2.14 KPH at 185 msec Maximum = 1.76E-02 KPH at -1 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

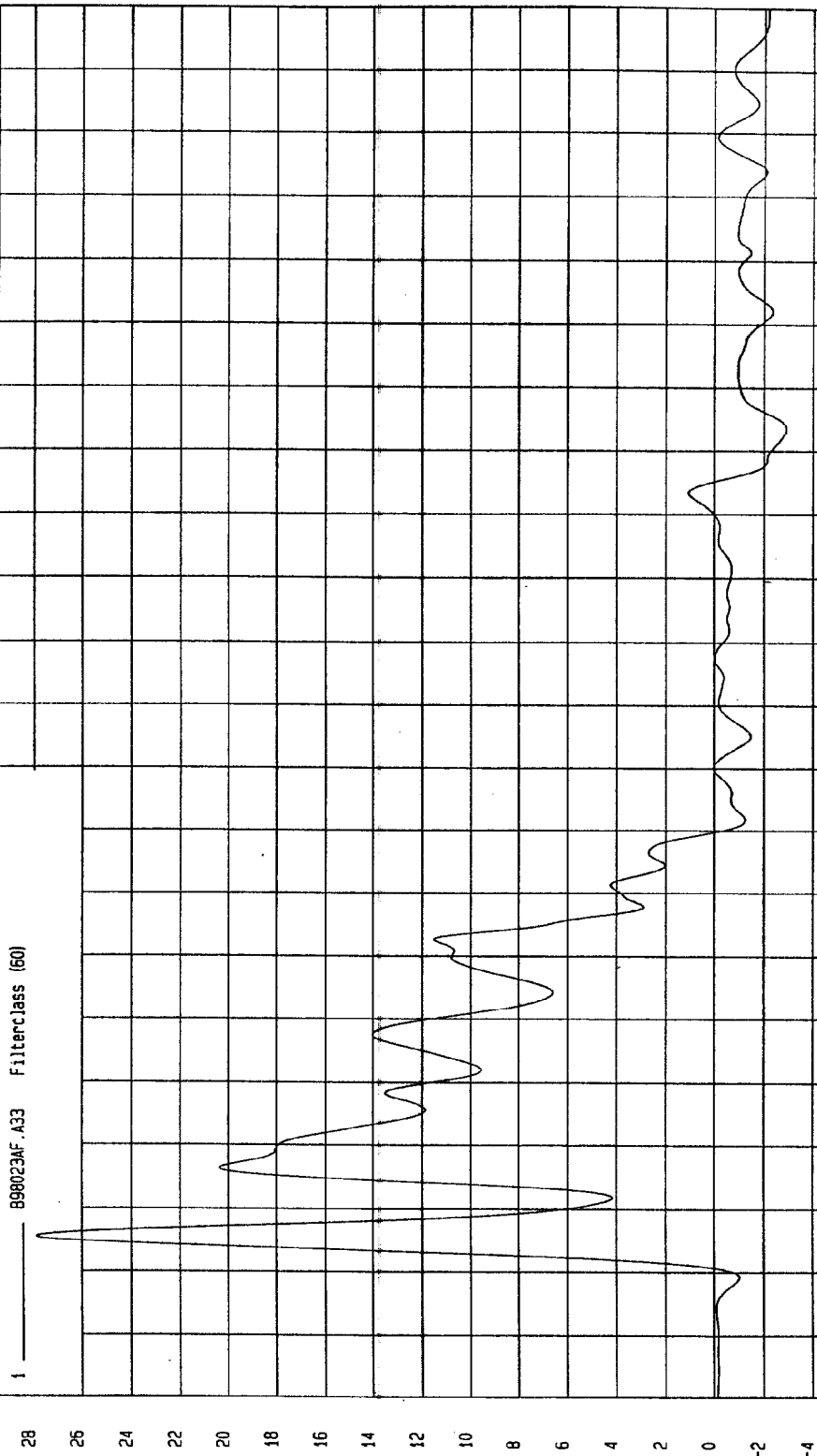
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 27.92 G'S at 6 msec

Minimum = -2.89 G'S at 134 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

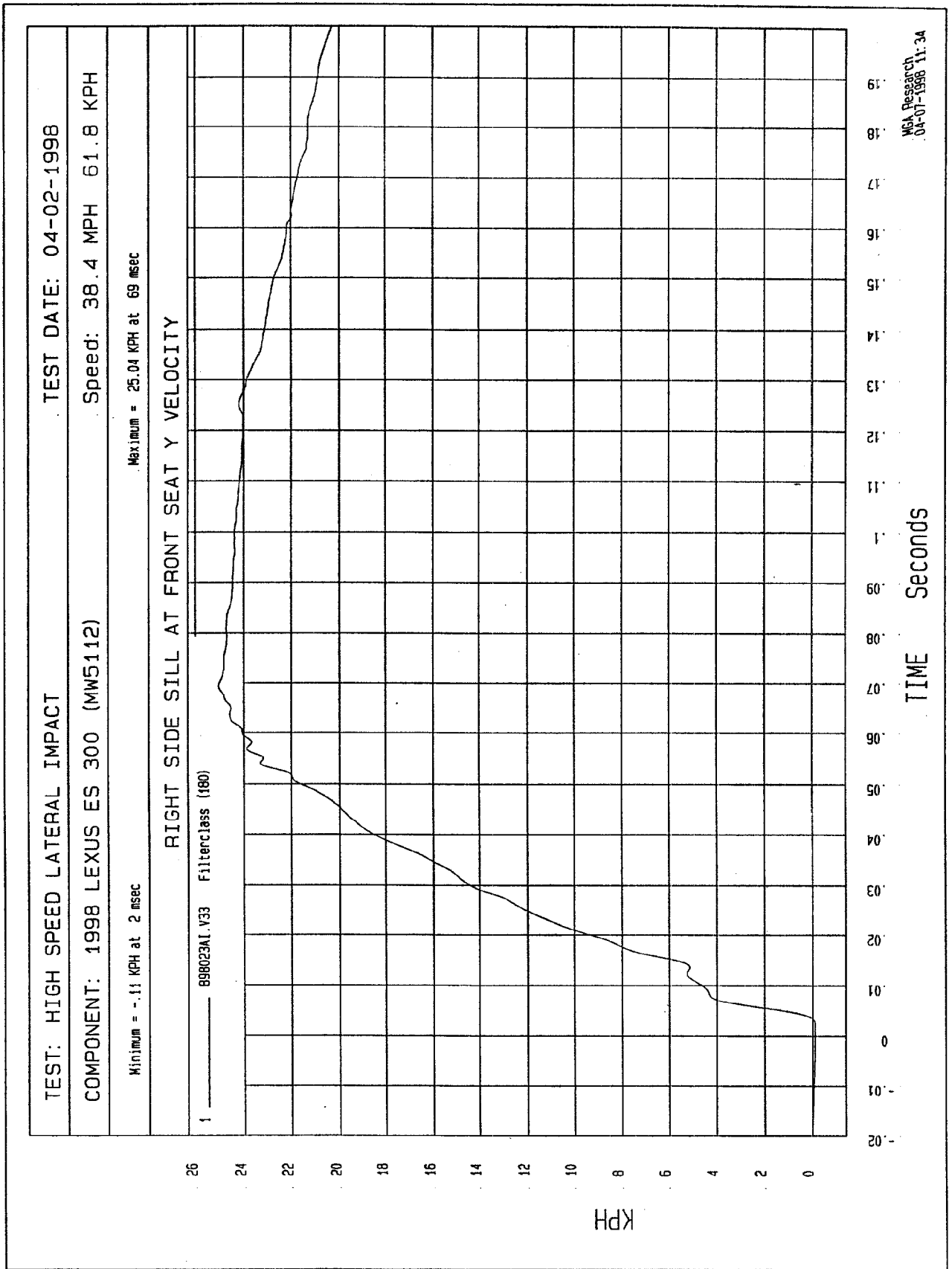
1 B98023AF.A33 Filterclass (60)



NSA Research
04-07-1998 11:34

TIME (SECONDS)

G's



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 5.87 G'S at 29 msec

Minimum = -5.99 G'S at 8 msec

RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

1 _____ B98023AF.A34 Filterclass (60)

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TIME (SECONDS)

MGA Research
04-07-1998 11:34

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

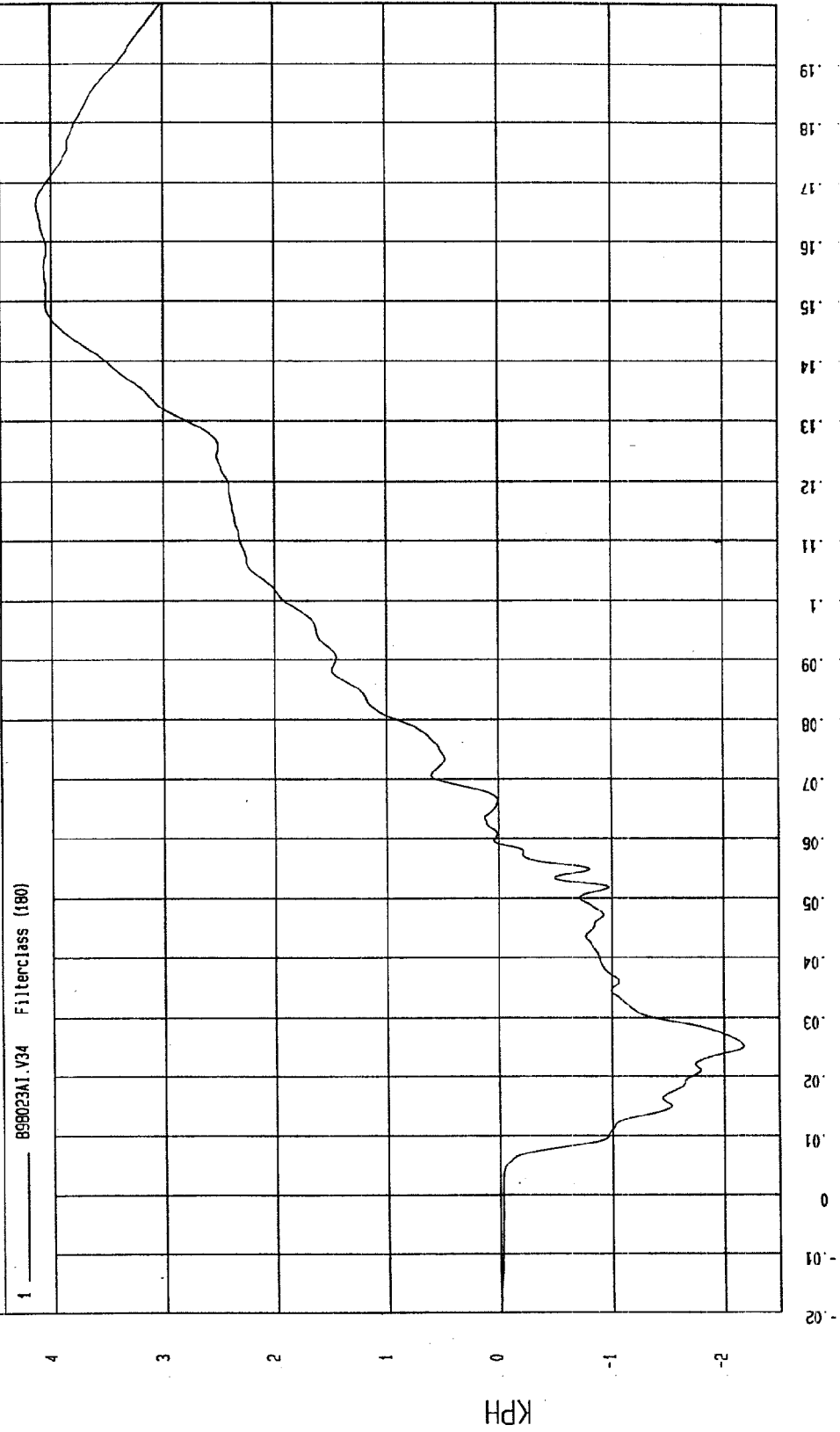
Speed: 38.4 MPH 61.8 KPH

COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 4.12 KPH at 156 msec

Minimum = -2.17 KPH at 25 msec

RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY



MCA Research
04-07-1998 11:34

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

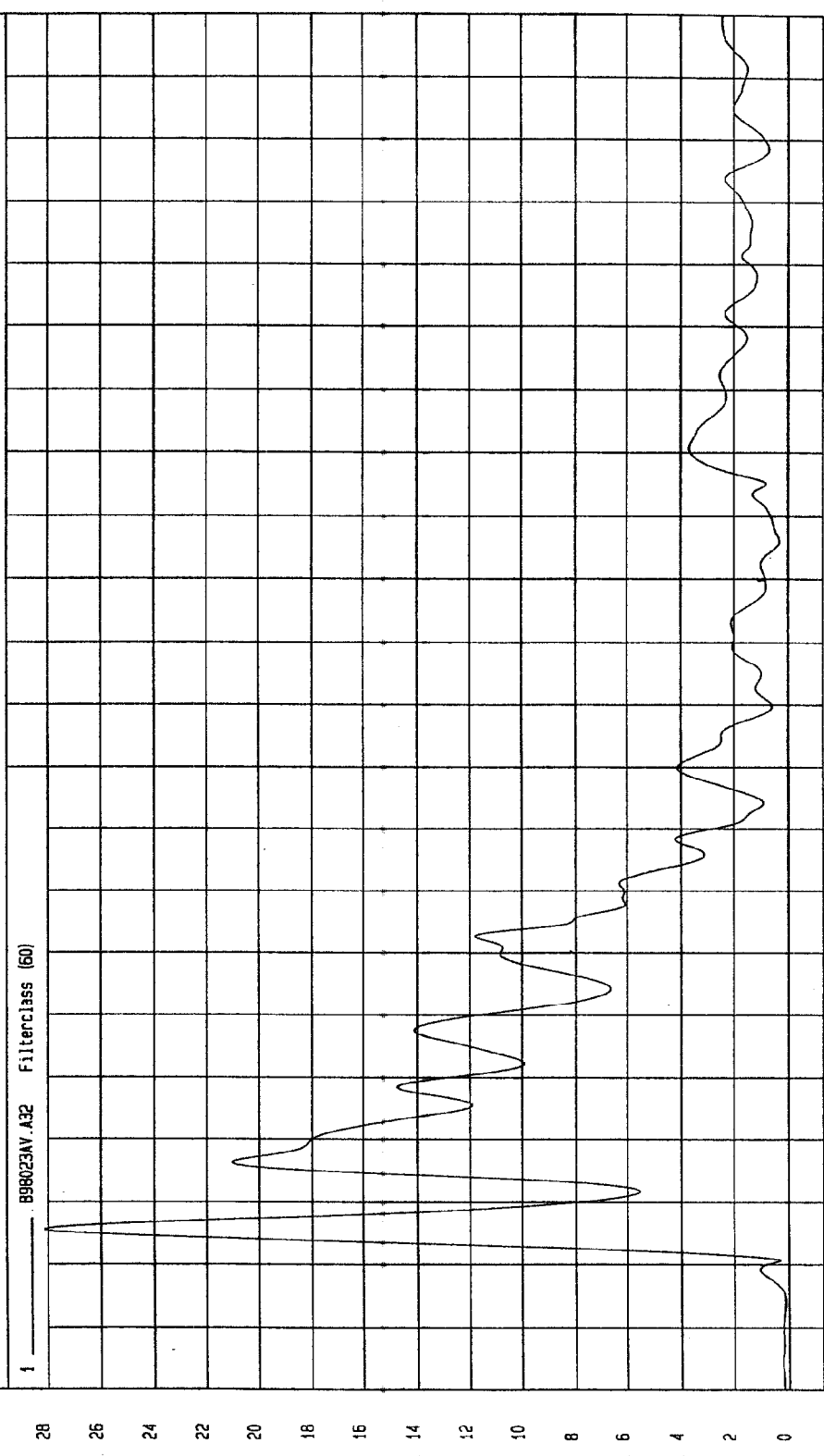
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Speed: 38.4 MPH 61.8 KPH

Minimum = .11 G'S at -6 msec

Maximum = 28.12 G'S at 6 msec

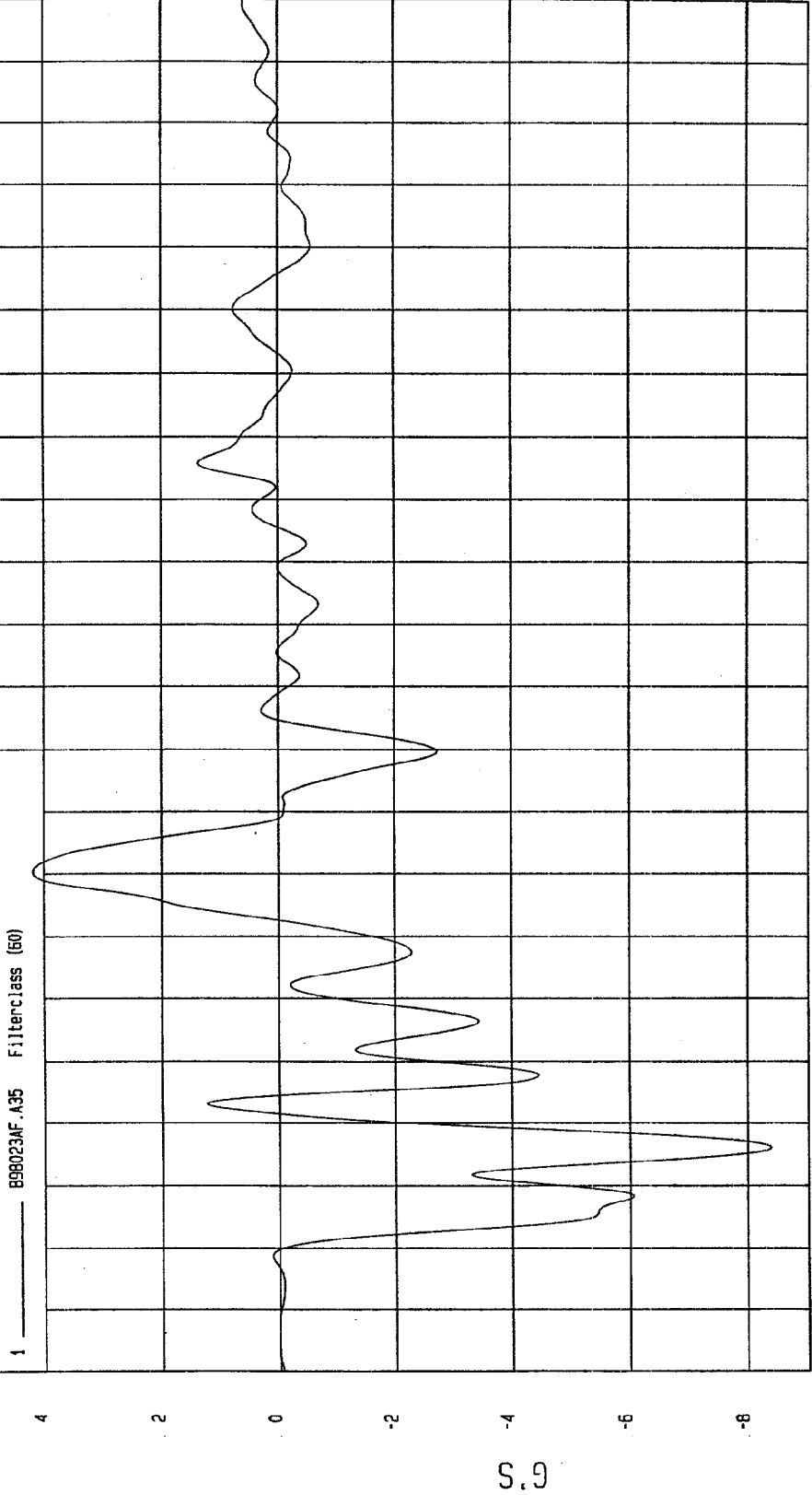
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION



NCA Research
04-07-1998 11:34

TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)	Speed: 38.4 MPH 61.8 KPH
Minimum = -8.39 G'S at 16 msec	Maximum = 4.18 G'S at 50 msec

RIGHT SIDE SILL AT REAR SEAT X ACCELERATION



TIME (SECONDS)

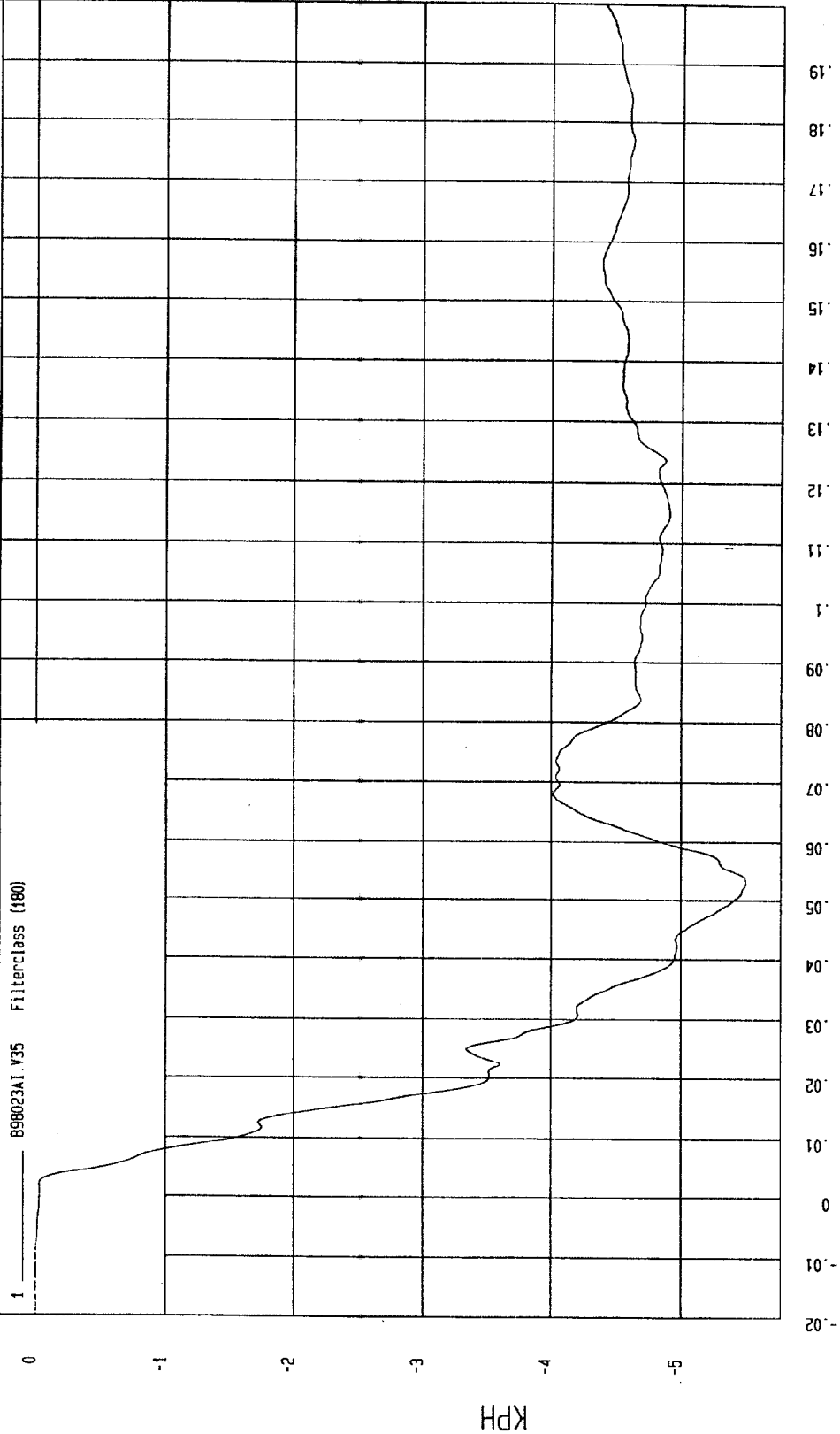
WCA Research
04-07-1998 11:35

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -5.48 KPH at 53 msec Maximum = 0 KPH at -20 msec

RIGHT SIDE SILL AT REAR SEAT X VELOCITY



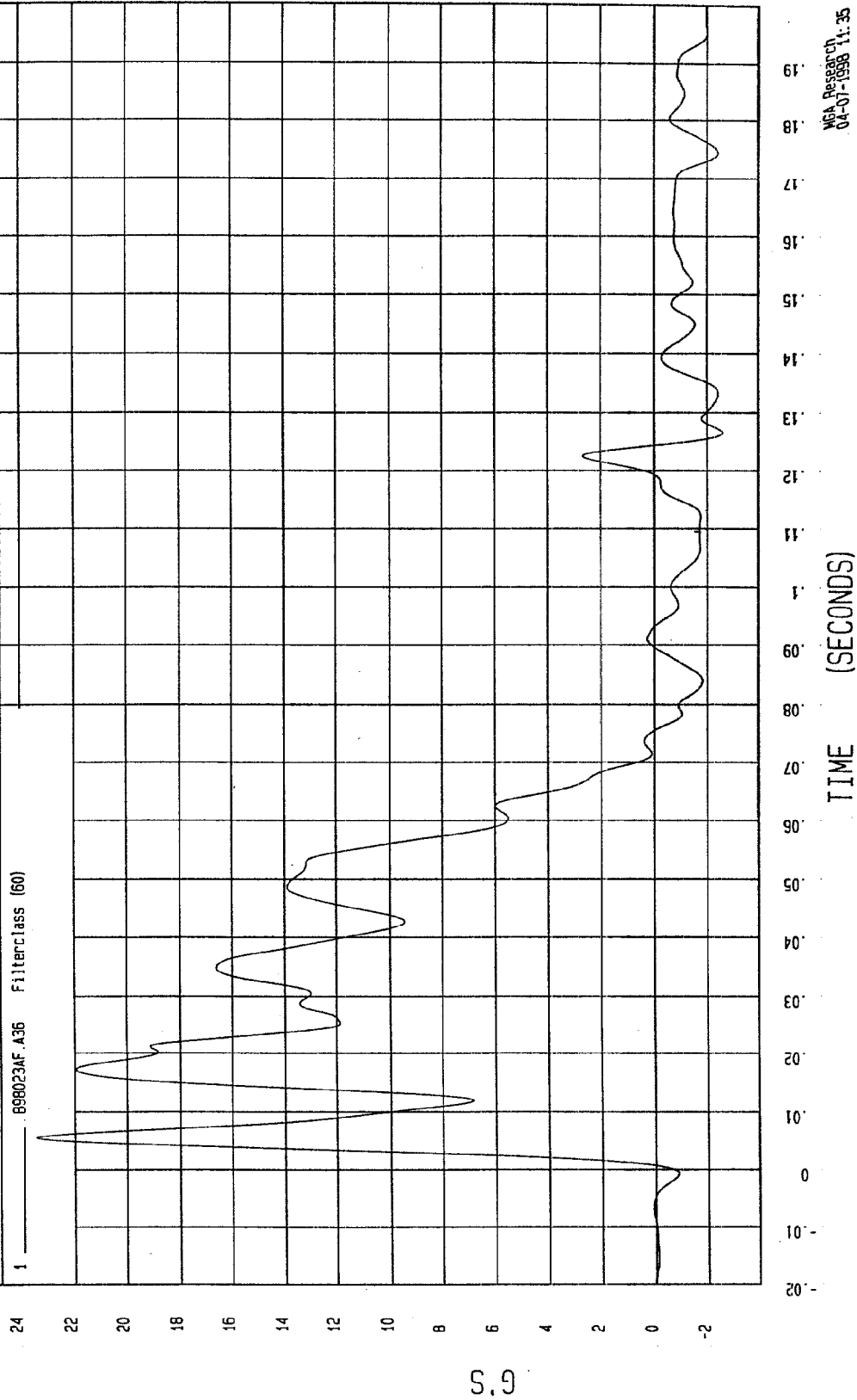
MGA Research
04-07-1998 11:35

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -2.57 G'S at 126 msec Maximum = 23.43 G'S at 6 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION



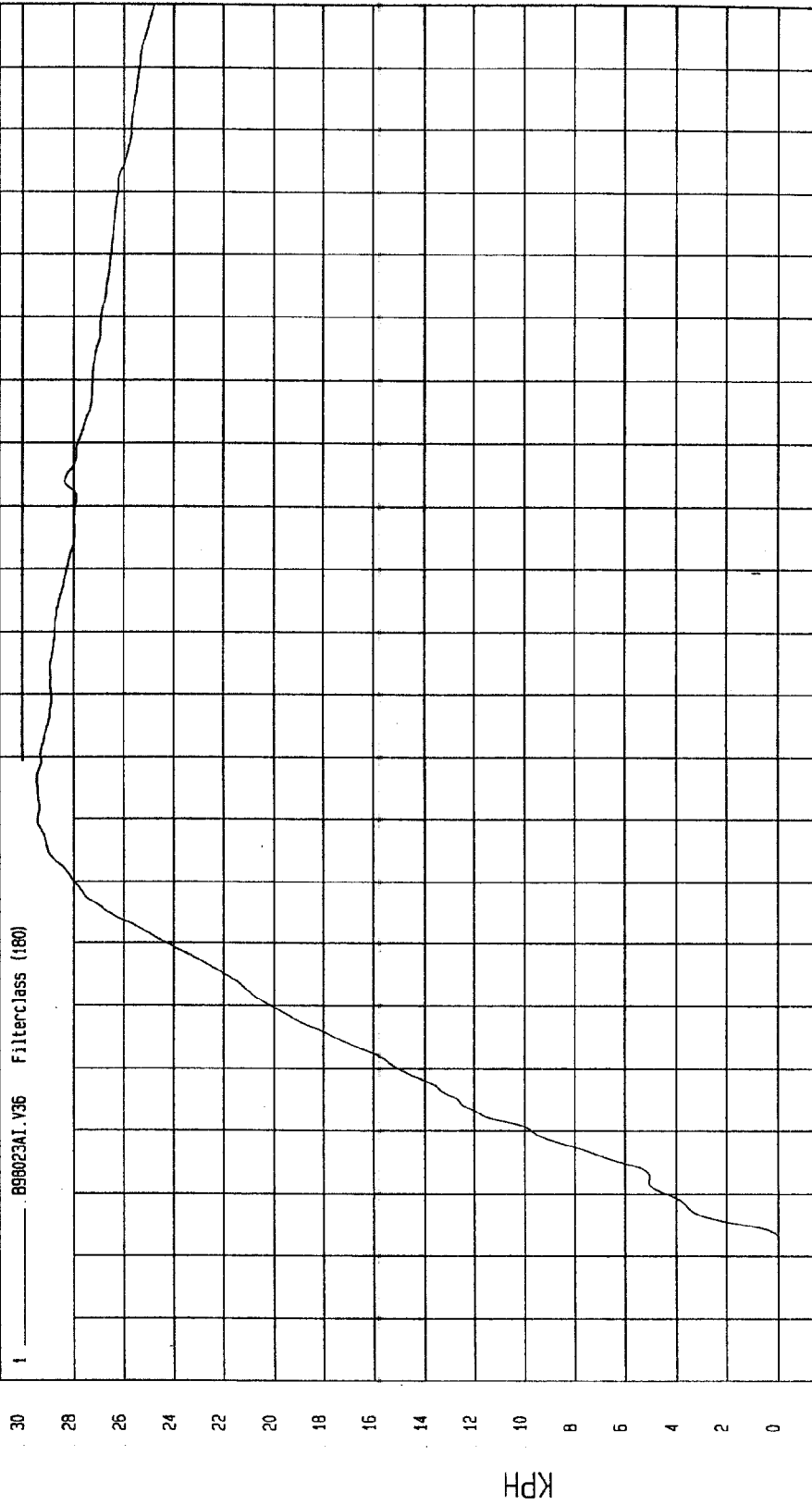
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

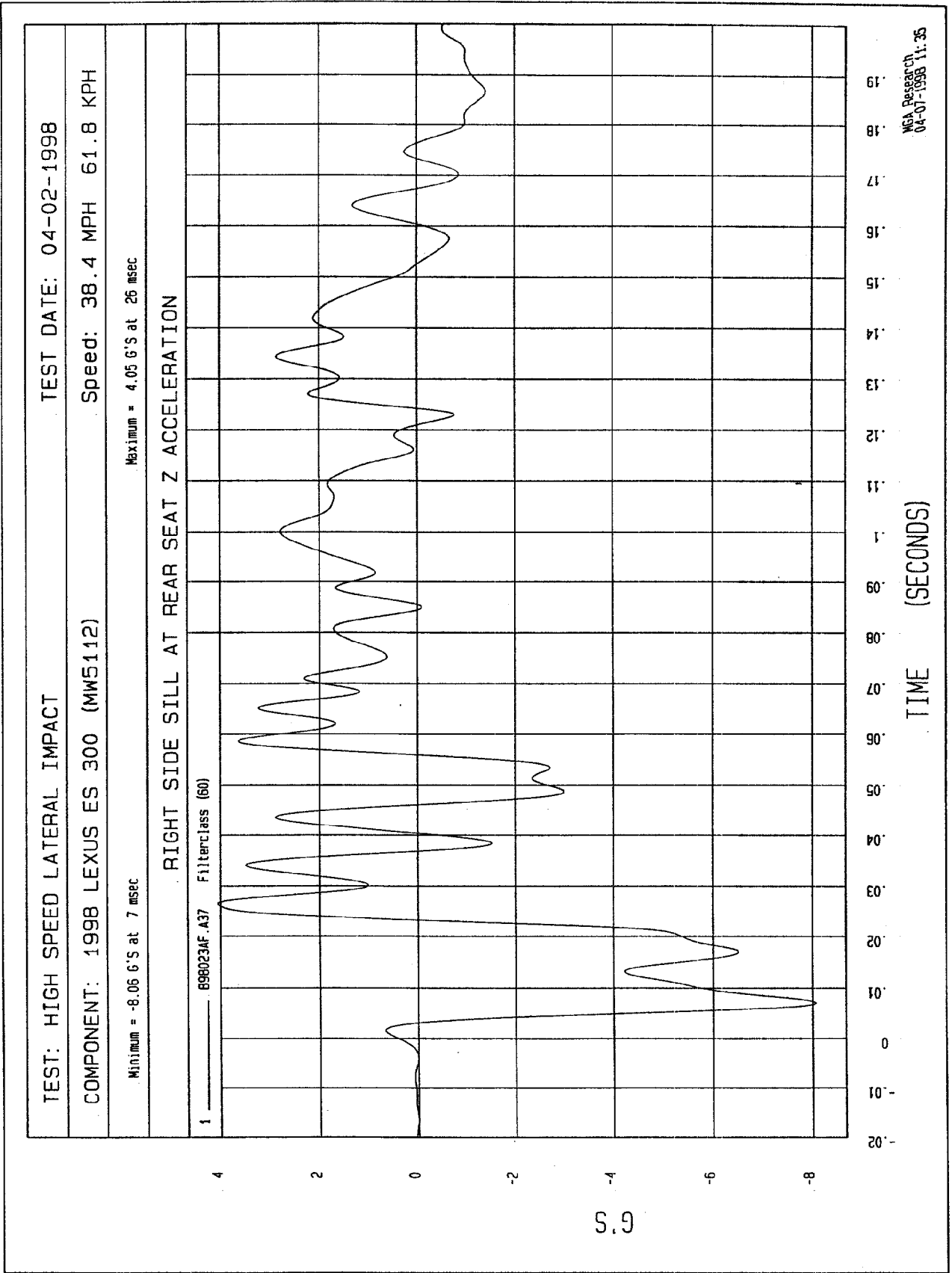
Minimum = -2.12E-02 KPH at -9 msec Maximum = 29.42 KPH at 76 msec

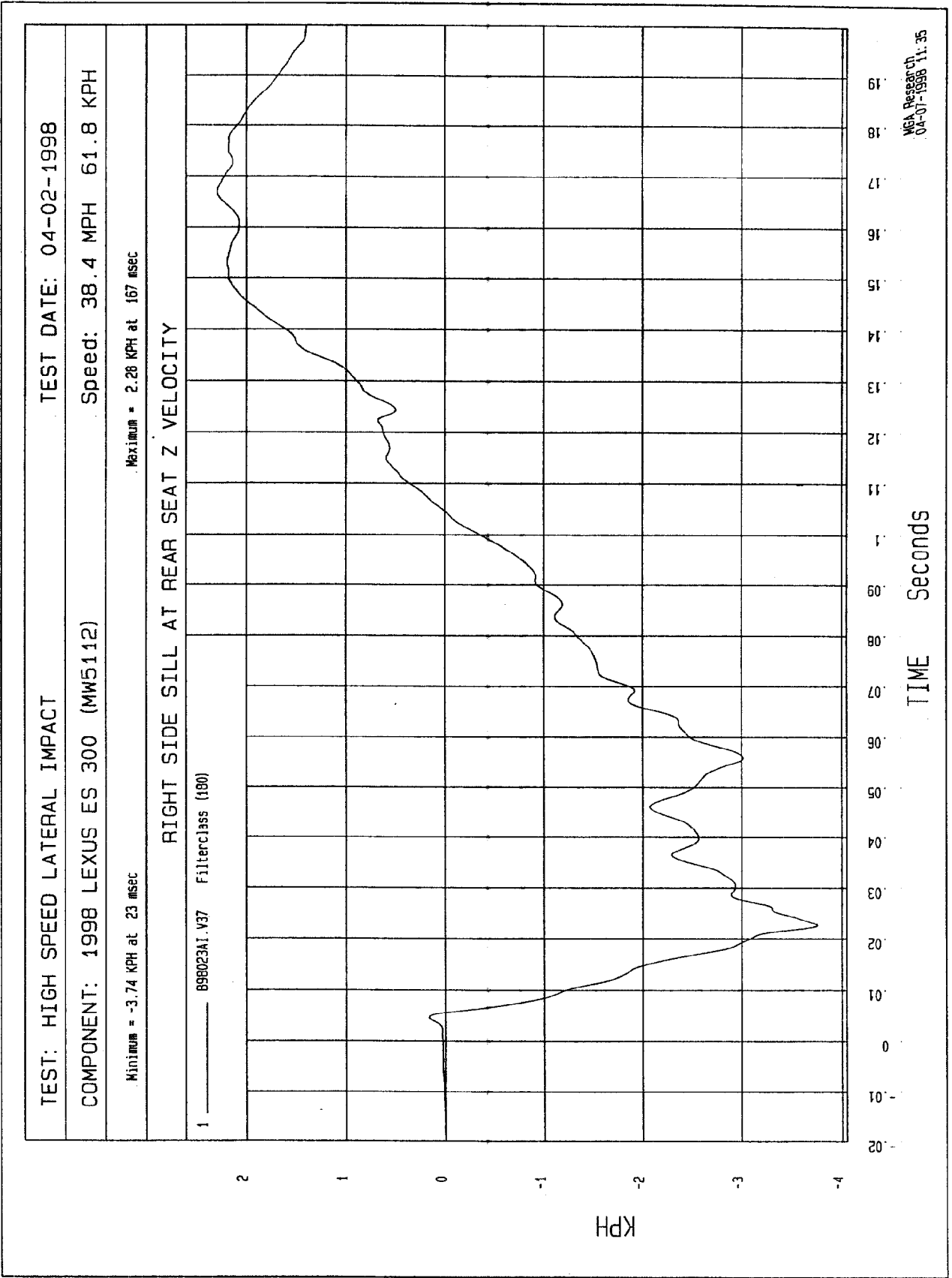
RIGHT SIDE SILL AT REAR SEAT Y VELOCITY

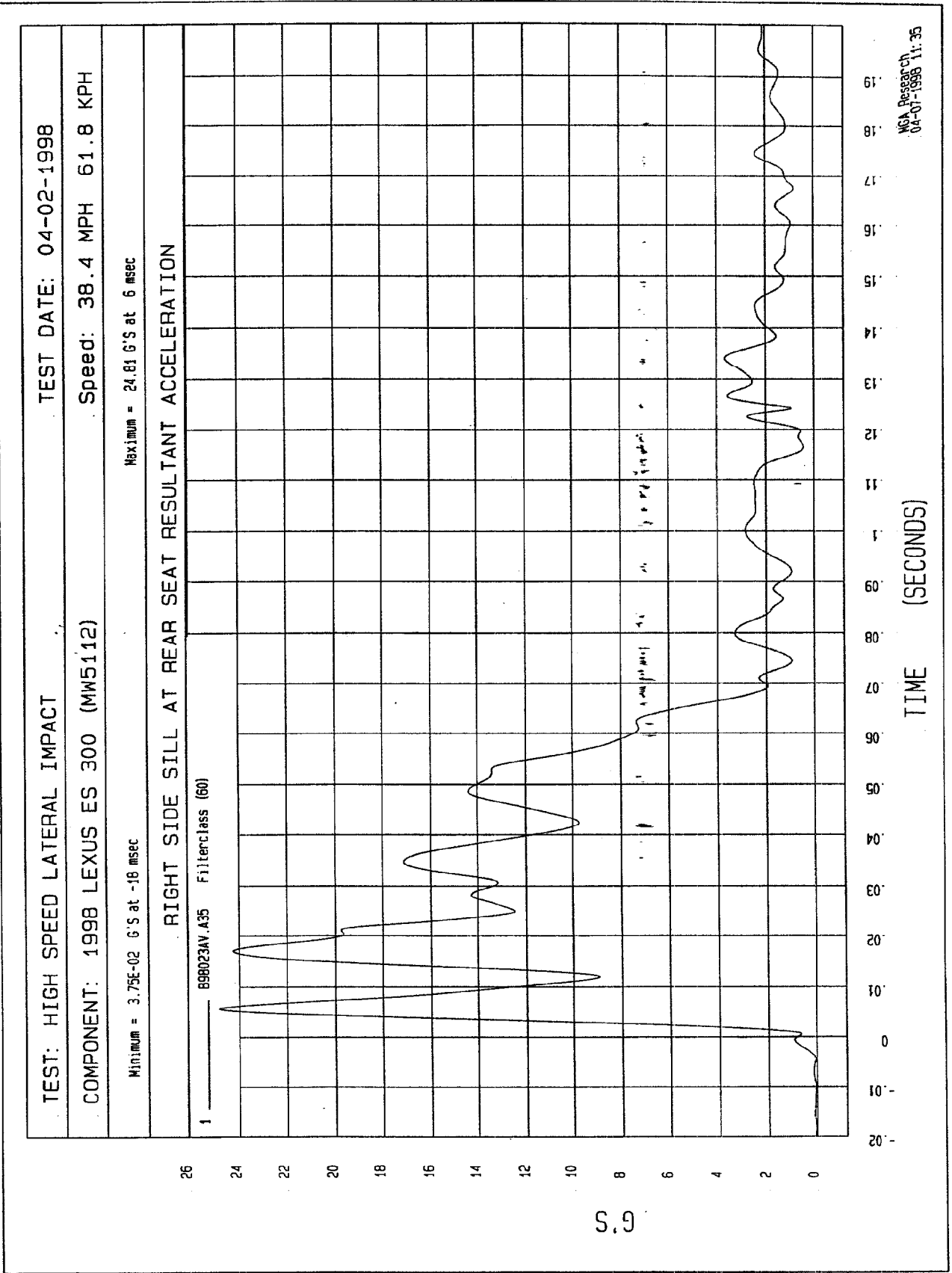
1 B98023AI.V36 Filterclass (180)



TIME Seconds
WCA Research
04-07-1998 11:35







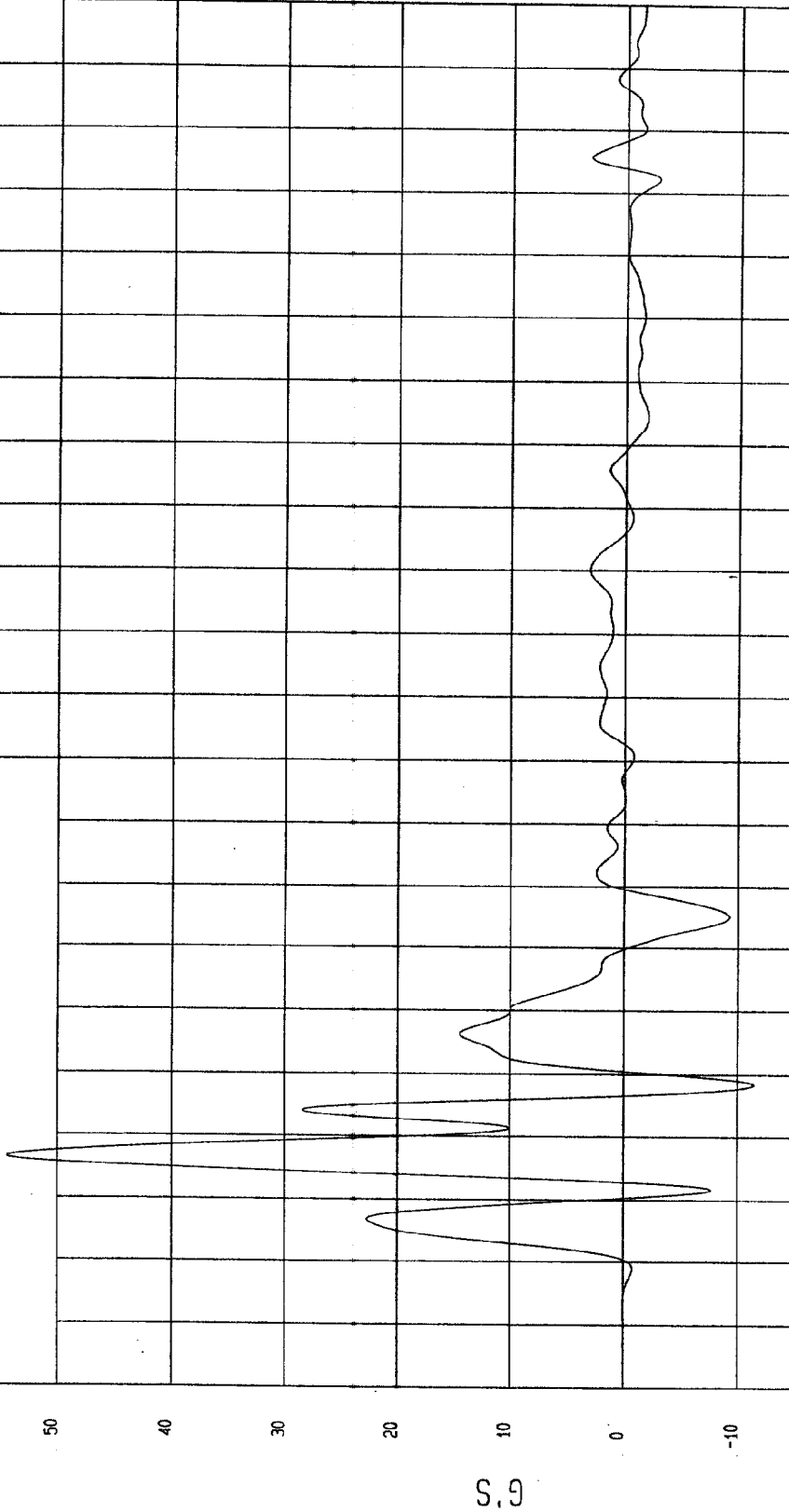
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

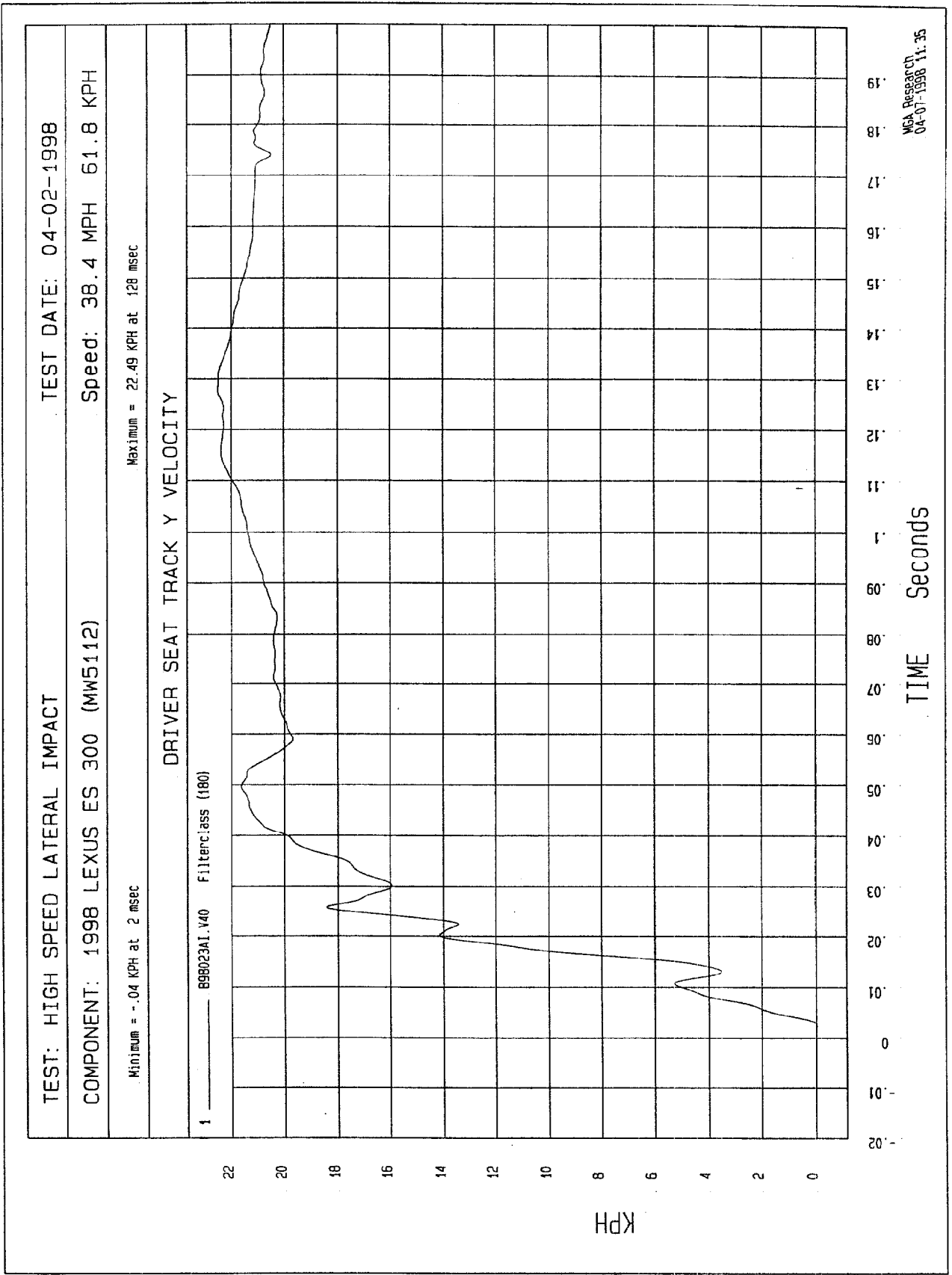
Minimum = -11.38 G'S at 28 msec Maximum = 54.47 G'S at 16 msec

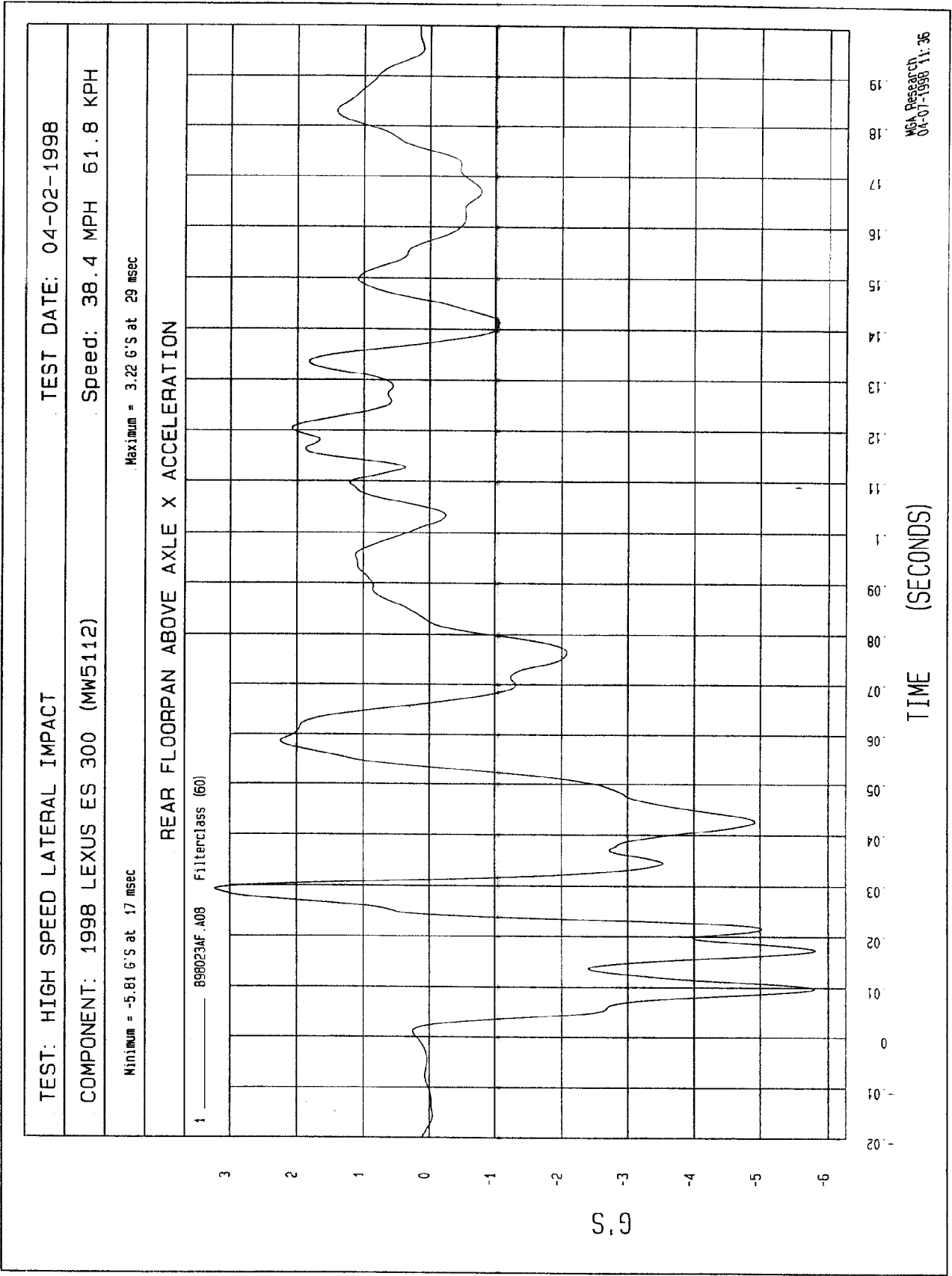
DRIVER SEAT TRACK Y ACCELERATION

1 ——— B98023AF.A40 Filterclass (50)

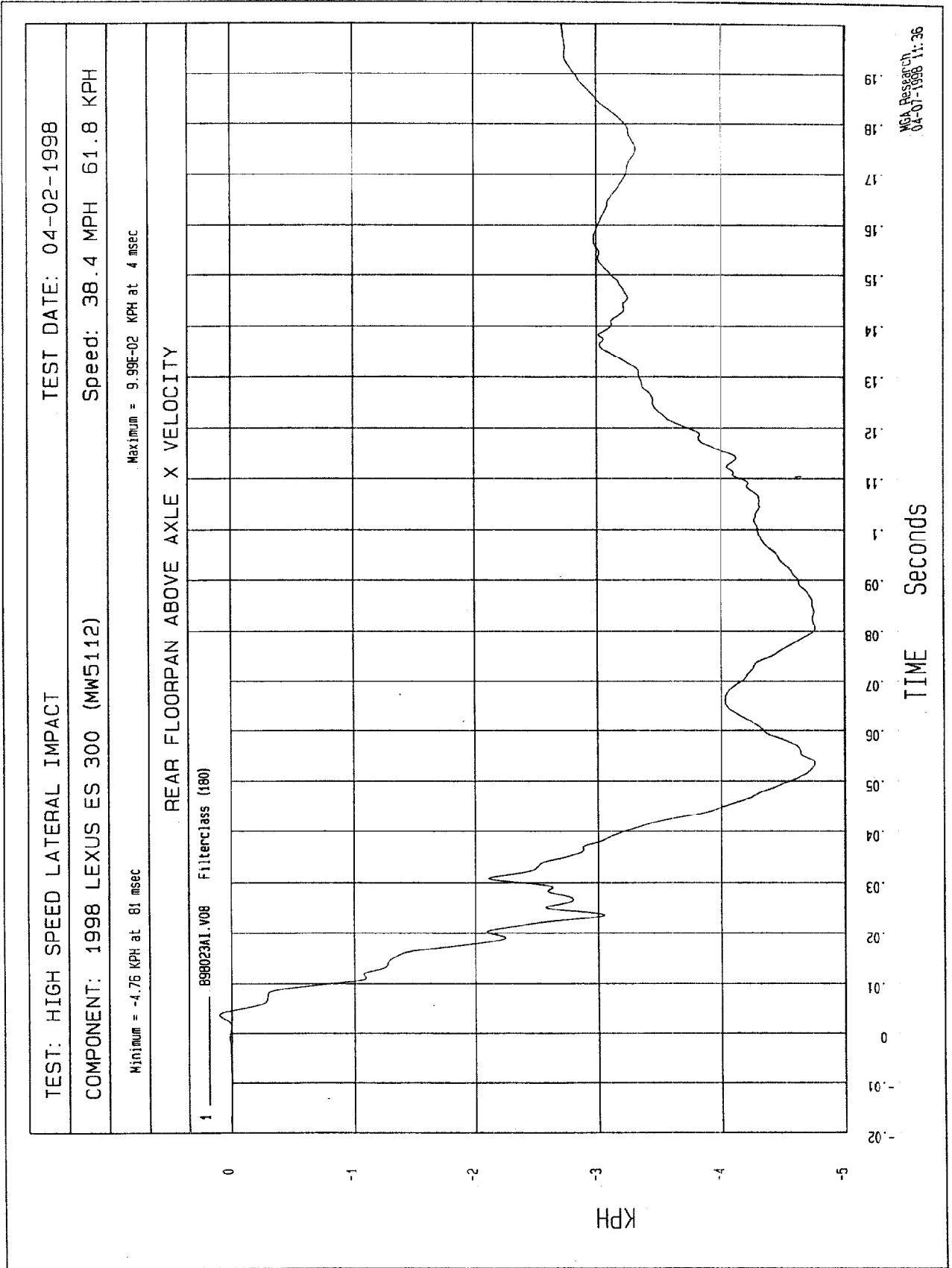


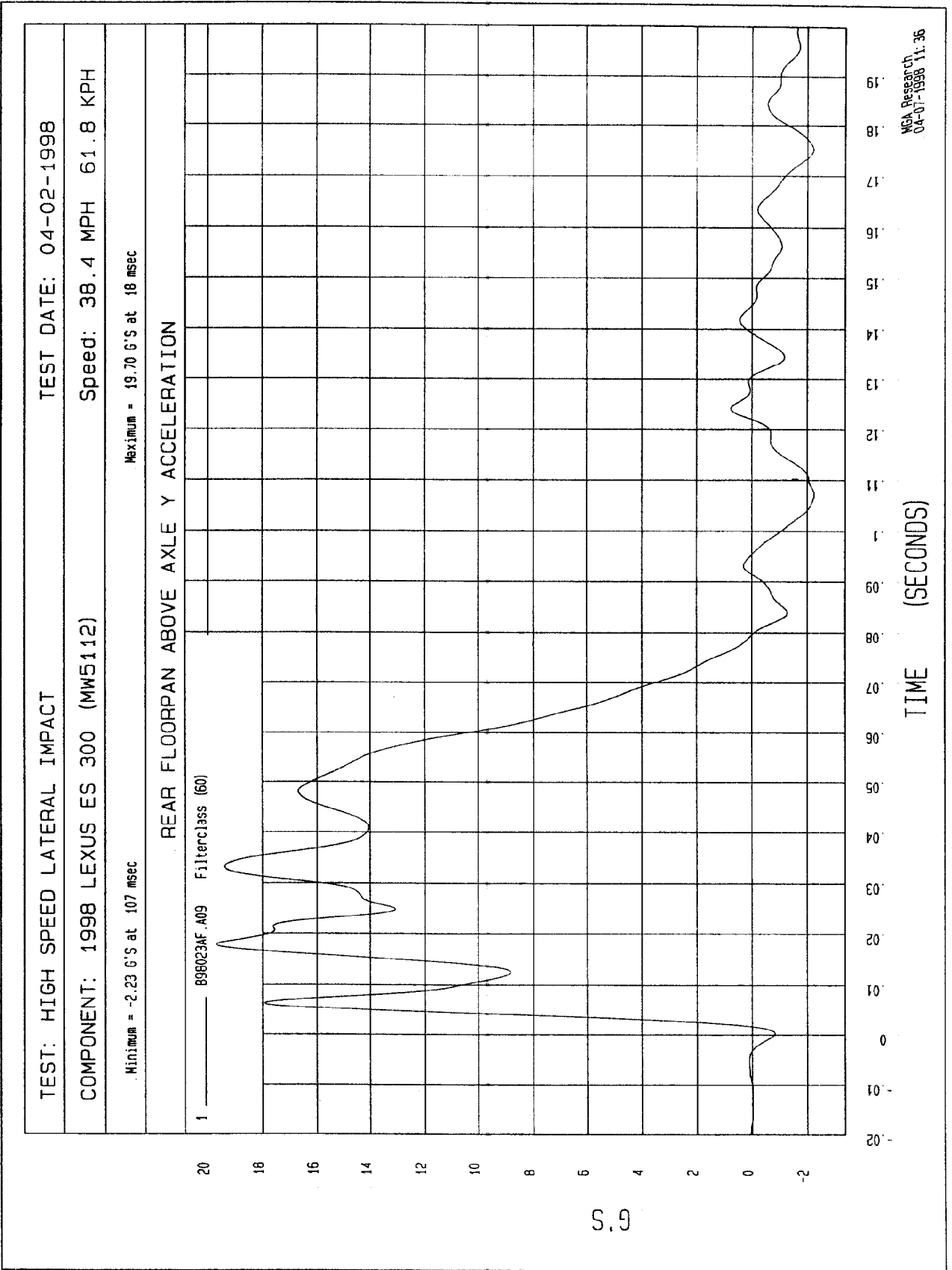
NCA Research
04-07-1998 11:35





MCA Research
04-07-1998 11:36



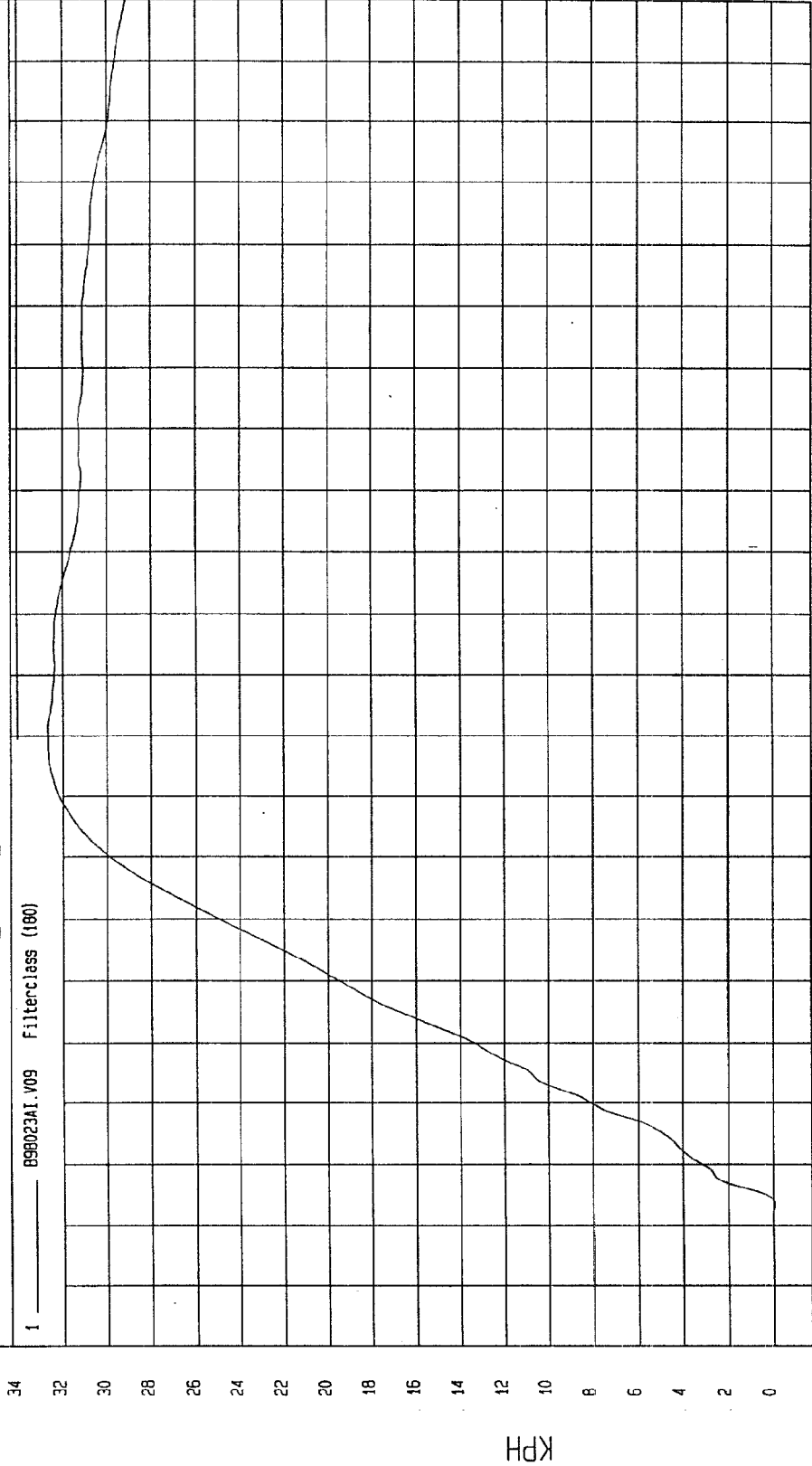


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 51.8 KPH

Minimum = -5.09E-02 KPH at 4 msec Maximum = 32.66 KPH at 81 msec

REAR FLOORPAN ABOVE AXLE Y VELOCITY



TIME Seconds

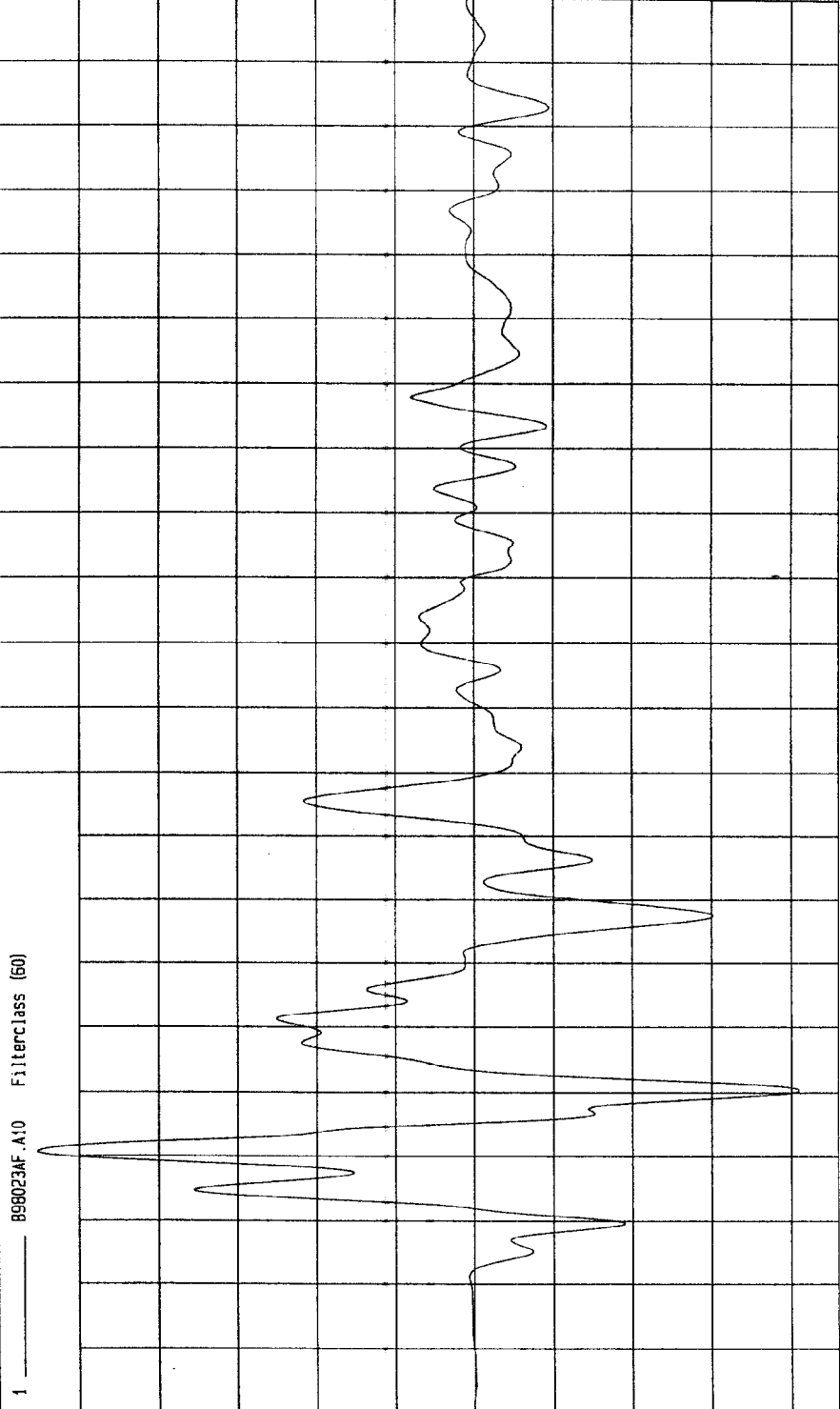
WGA Research
04-01-1998 11:36

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

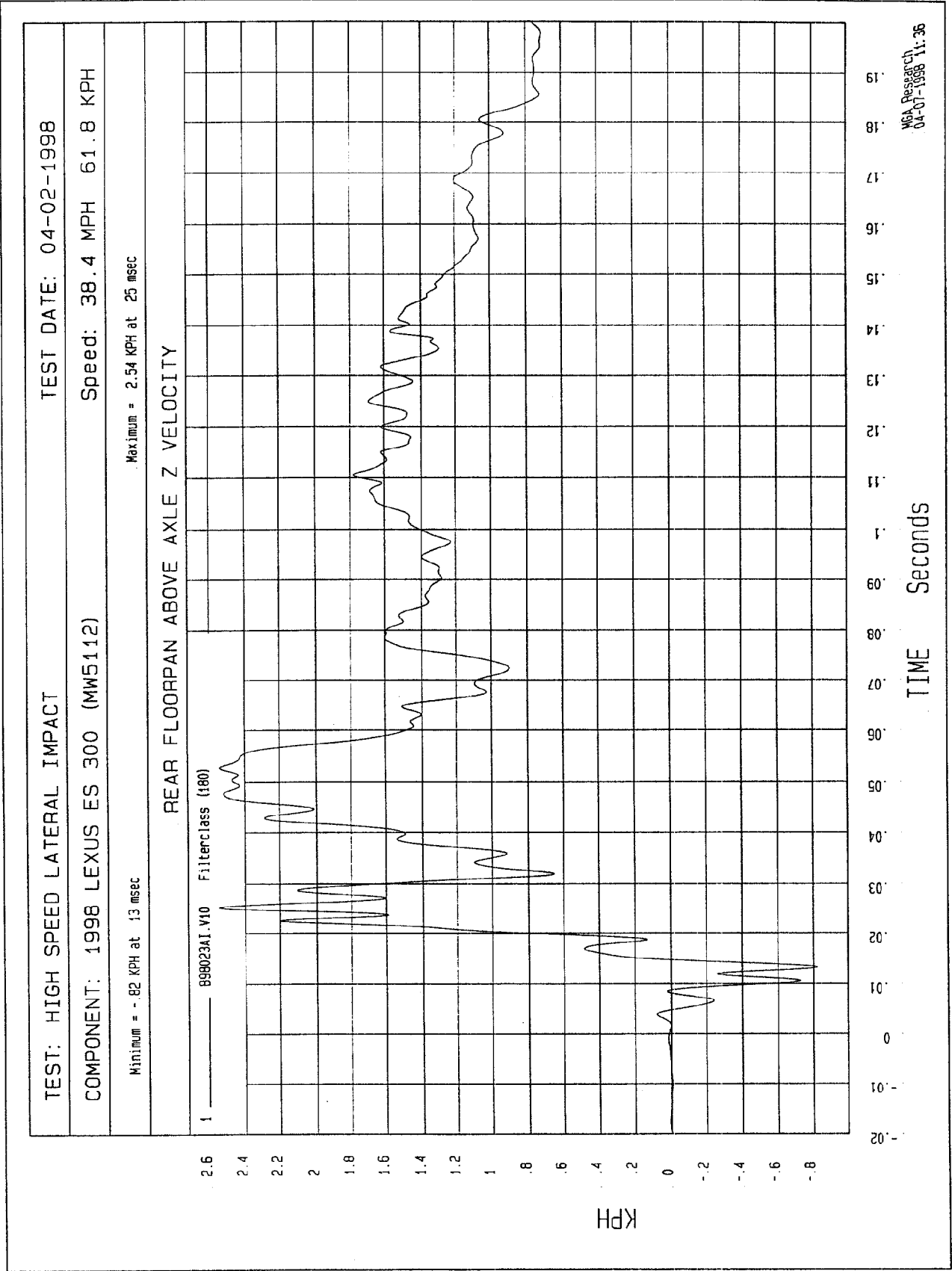
Minimum = -8.19 G'S at 30 msec Maximum = 11.04 G'S at 21 msec

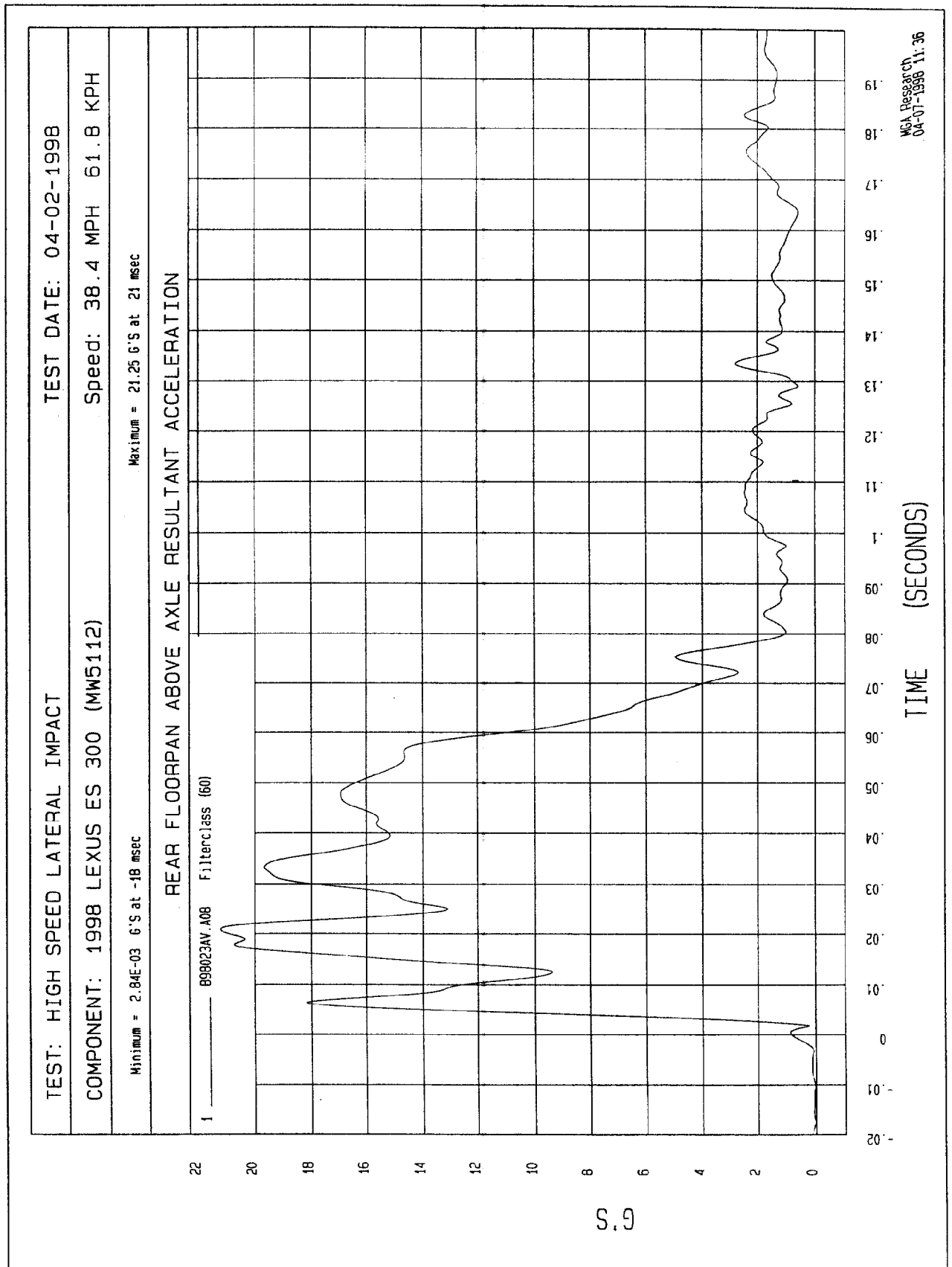
REAR FLOORPAN ABOVE AXLE Z ACCELERATION

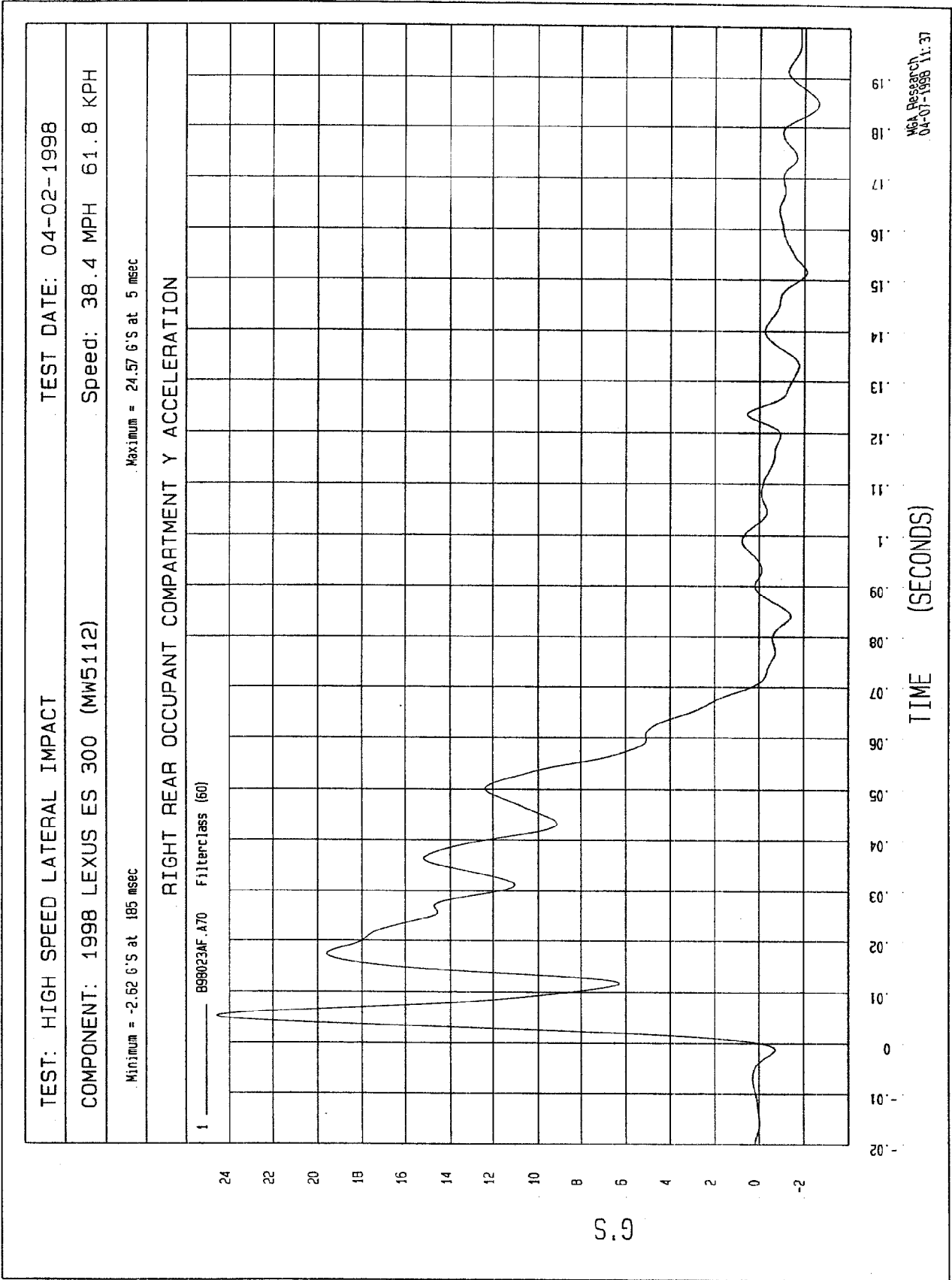


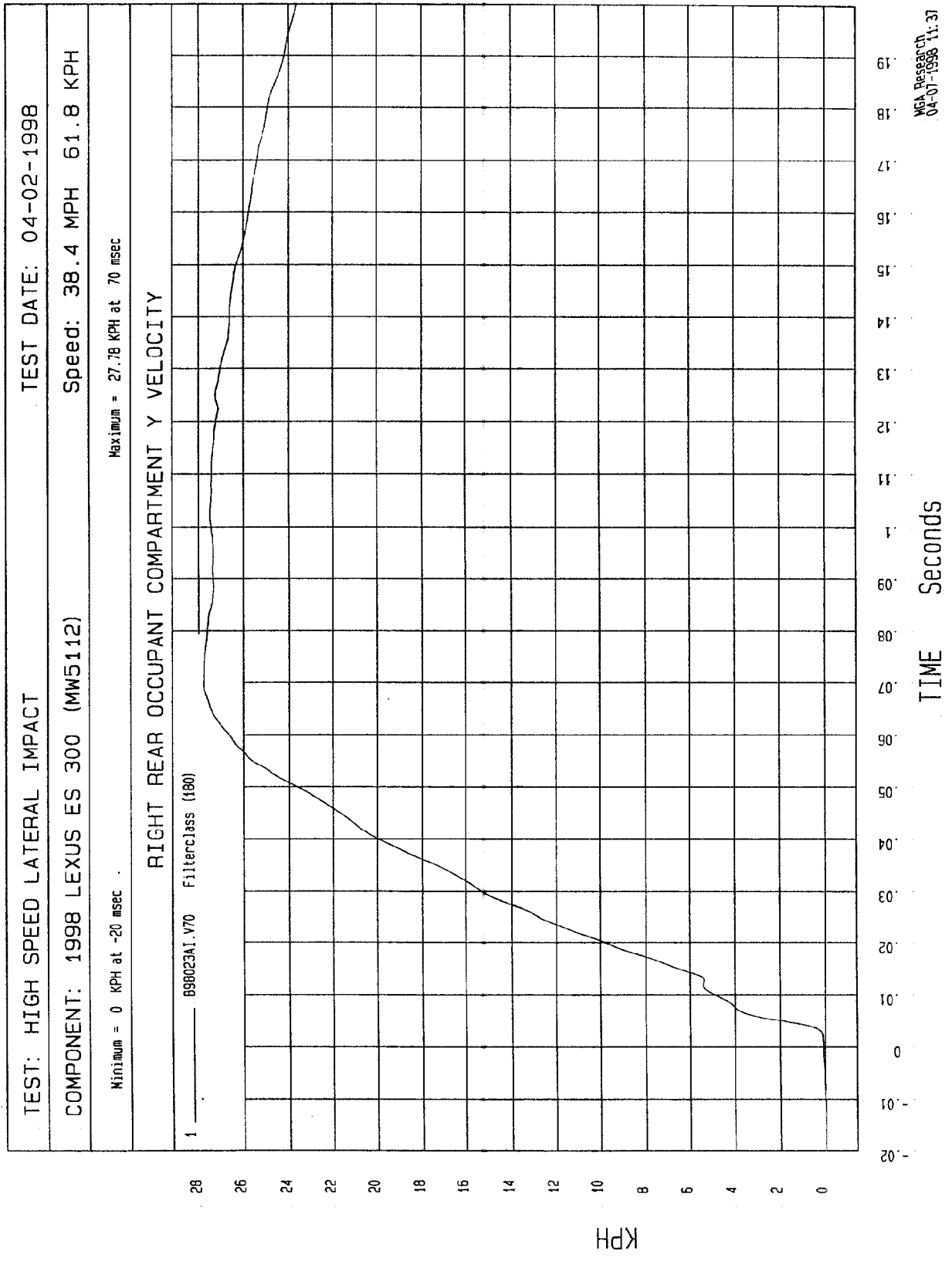
TIME (SECONDS)

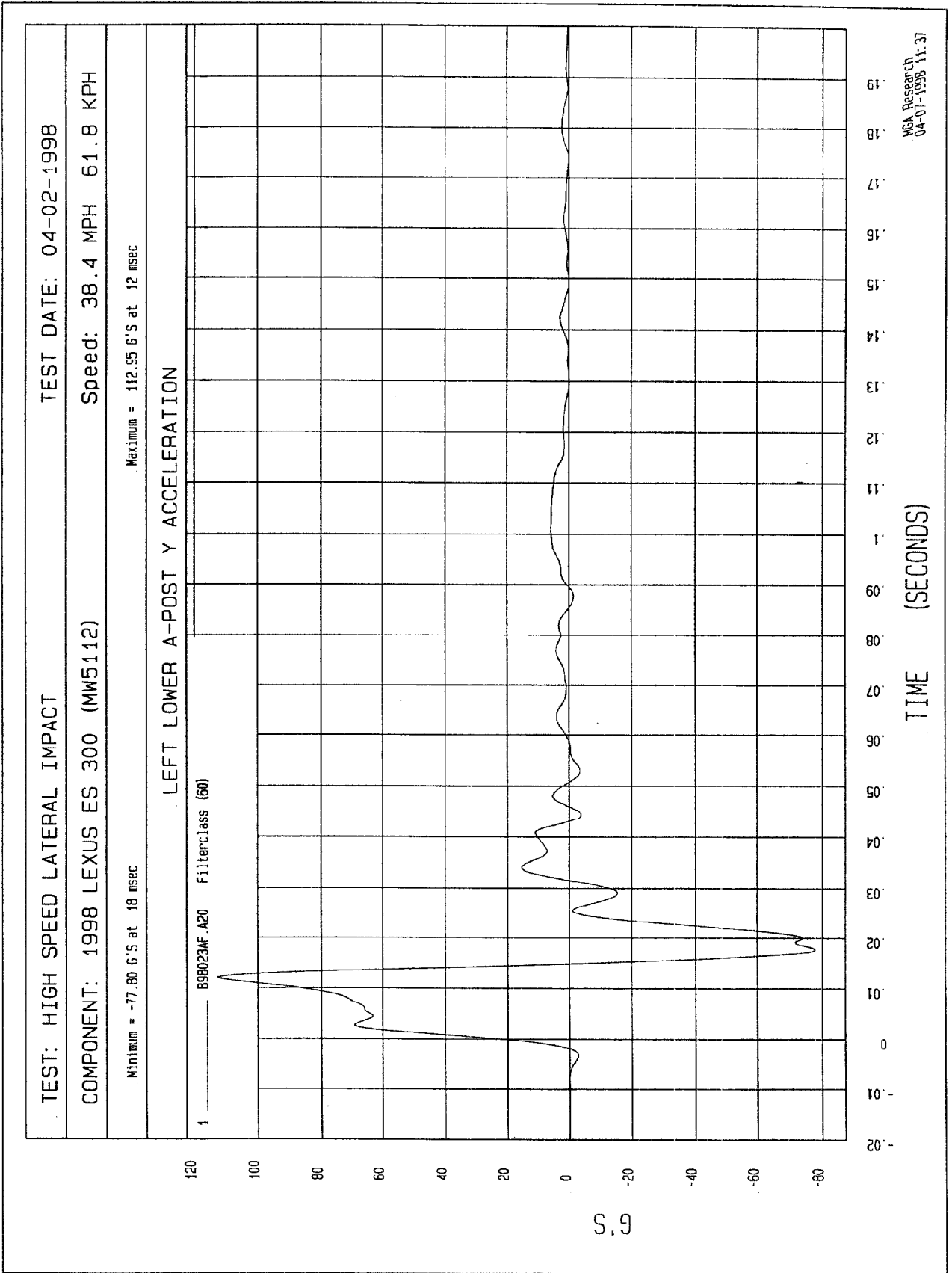
NQA Research
04-01-1998 11:36

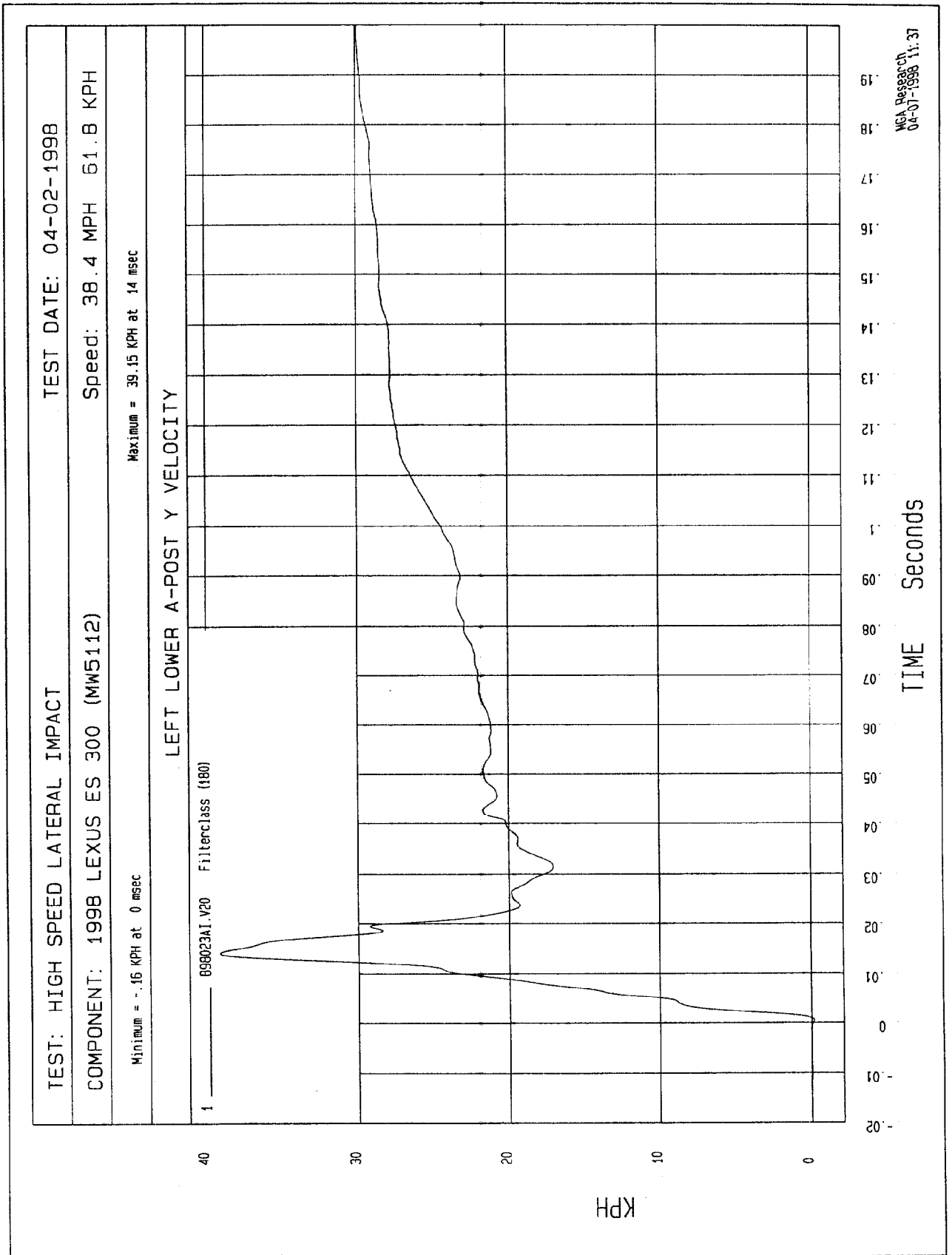






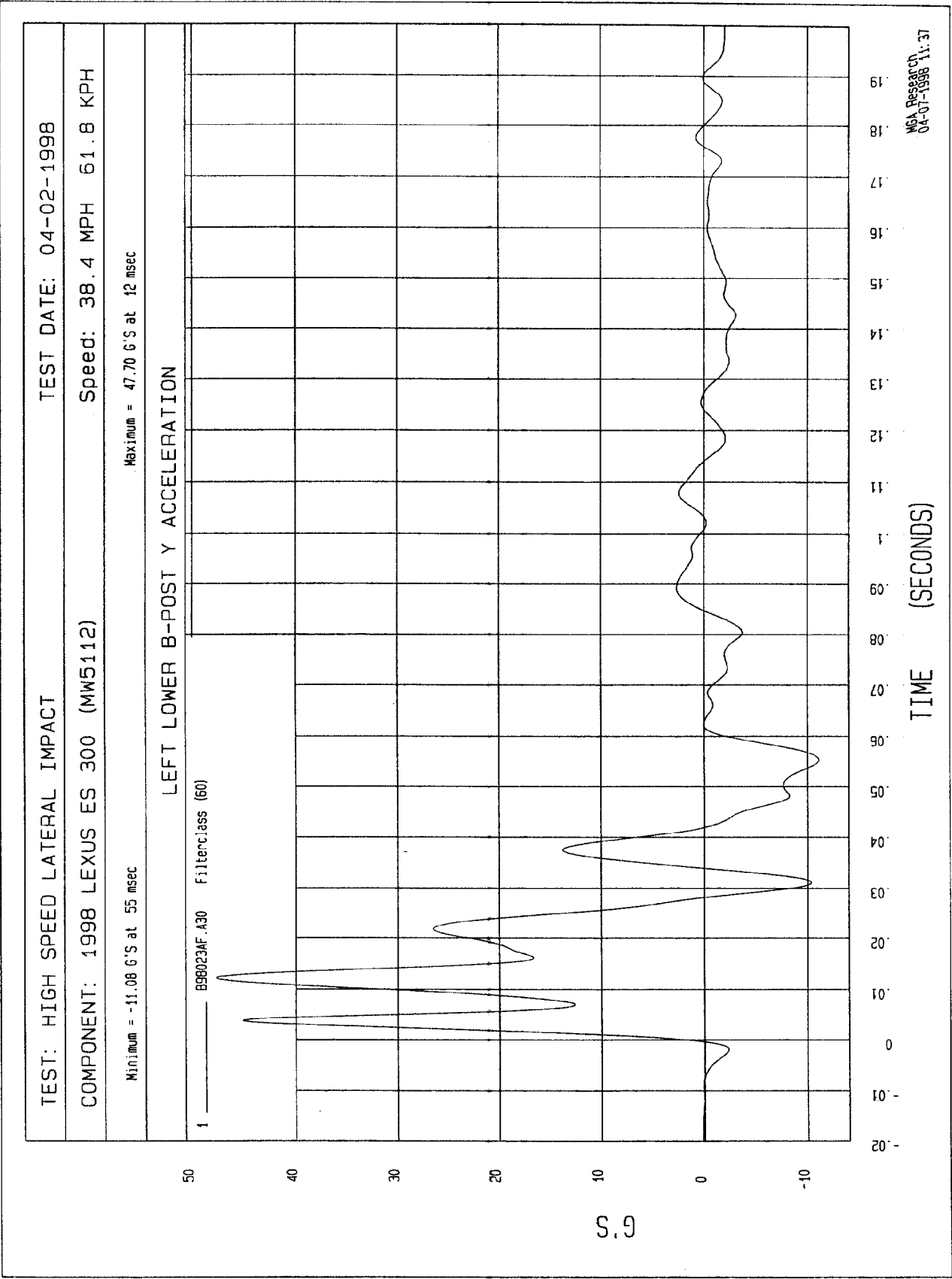






LEFT MID A-POST Y ACCELERATION VS. TIME

NO VALID DATA COLLECTED

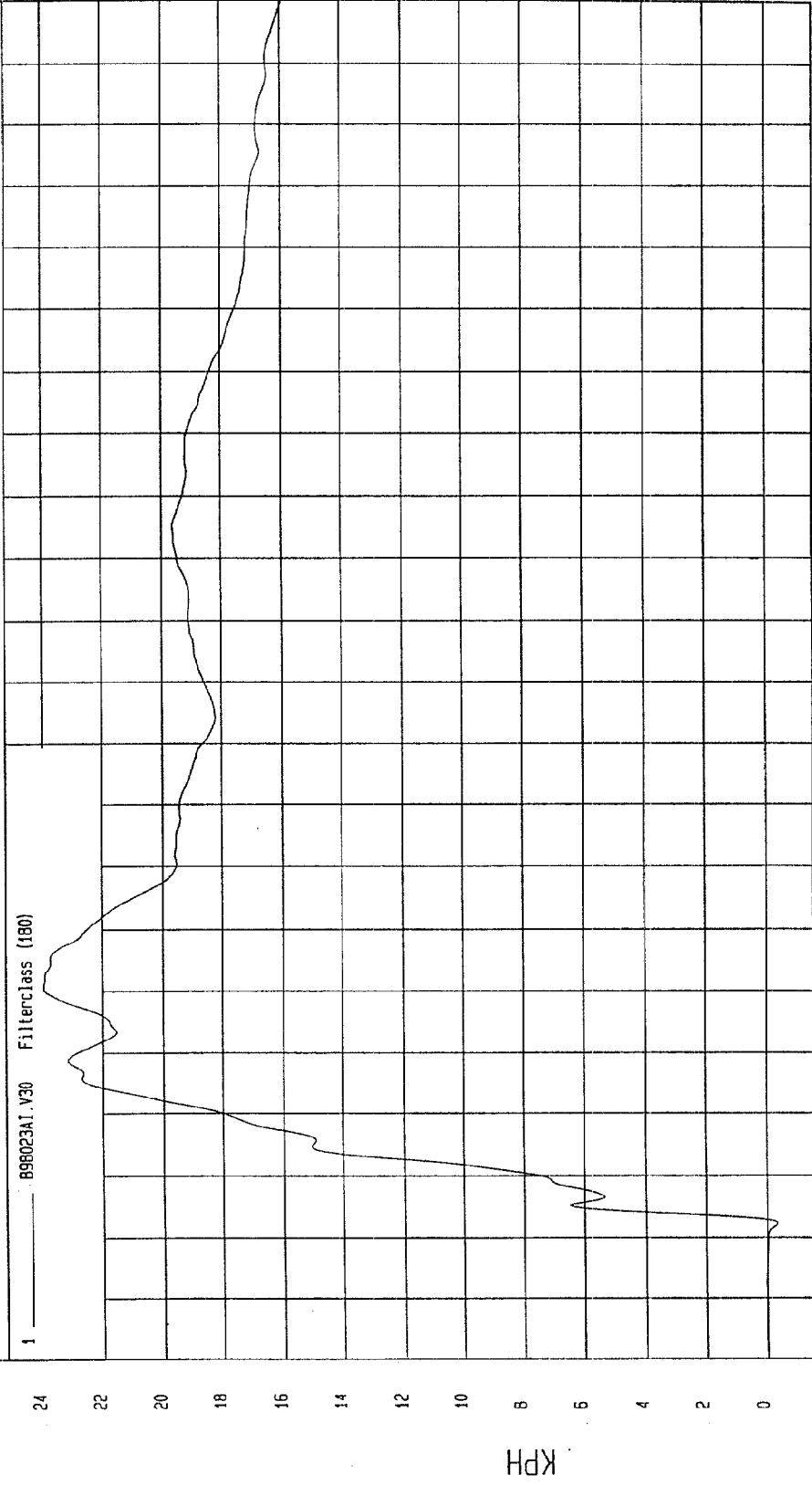


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -34 KPH at 2 msec Maximum = 23.98 KPH at 40 msec

LEFT LOWER B-POST Y VELOCITY



TIME Seconds

WGA Research
04-07-1998 11:37

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

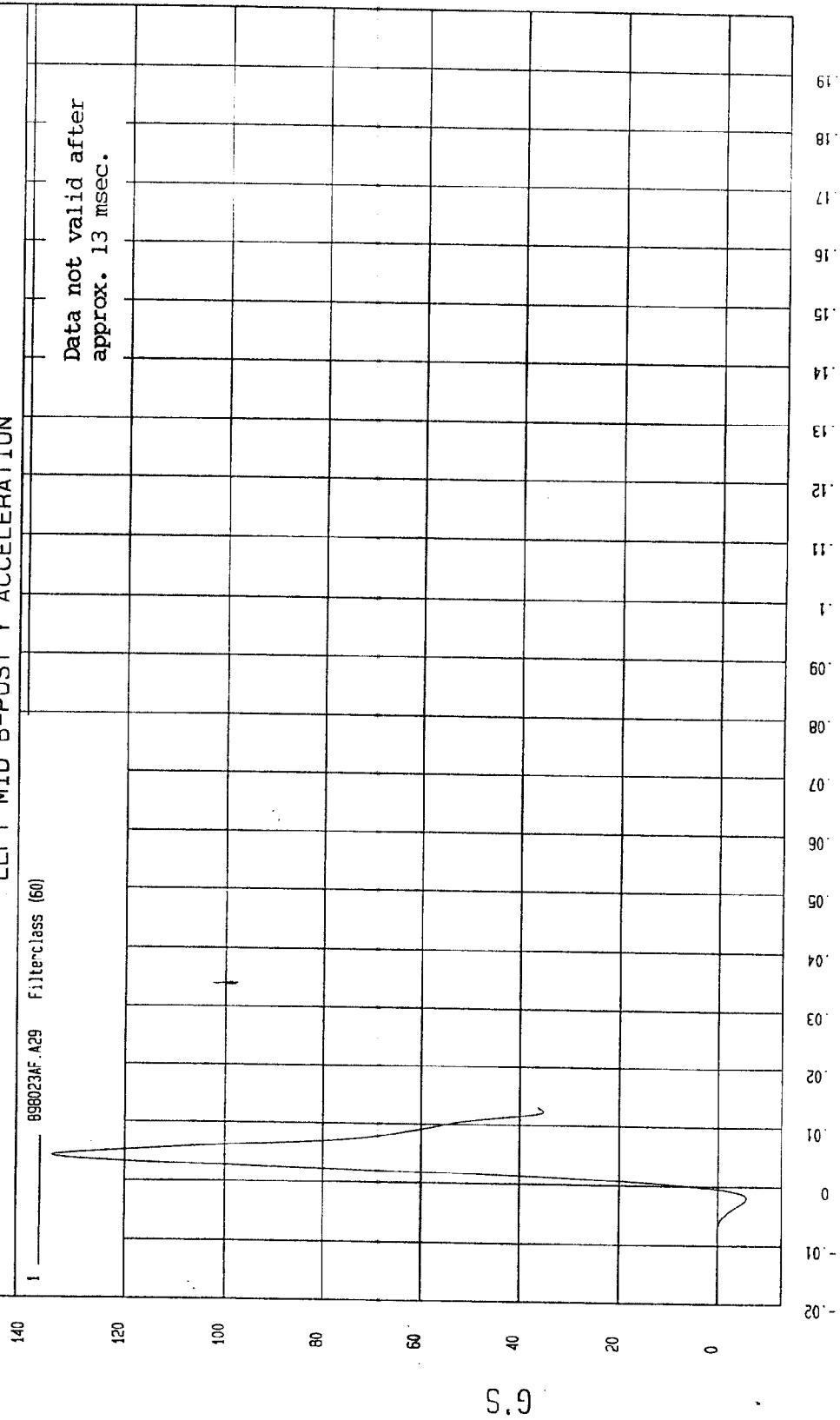
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Speed: 38.4 MPH 61.8 KPH

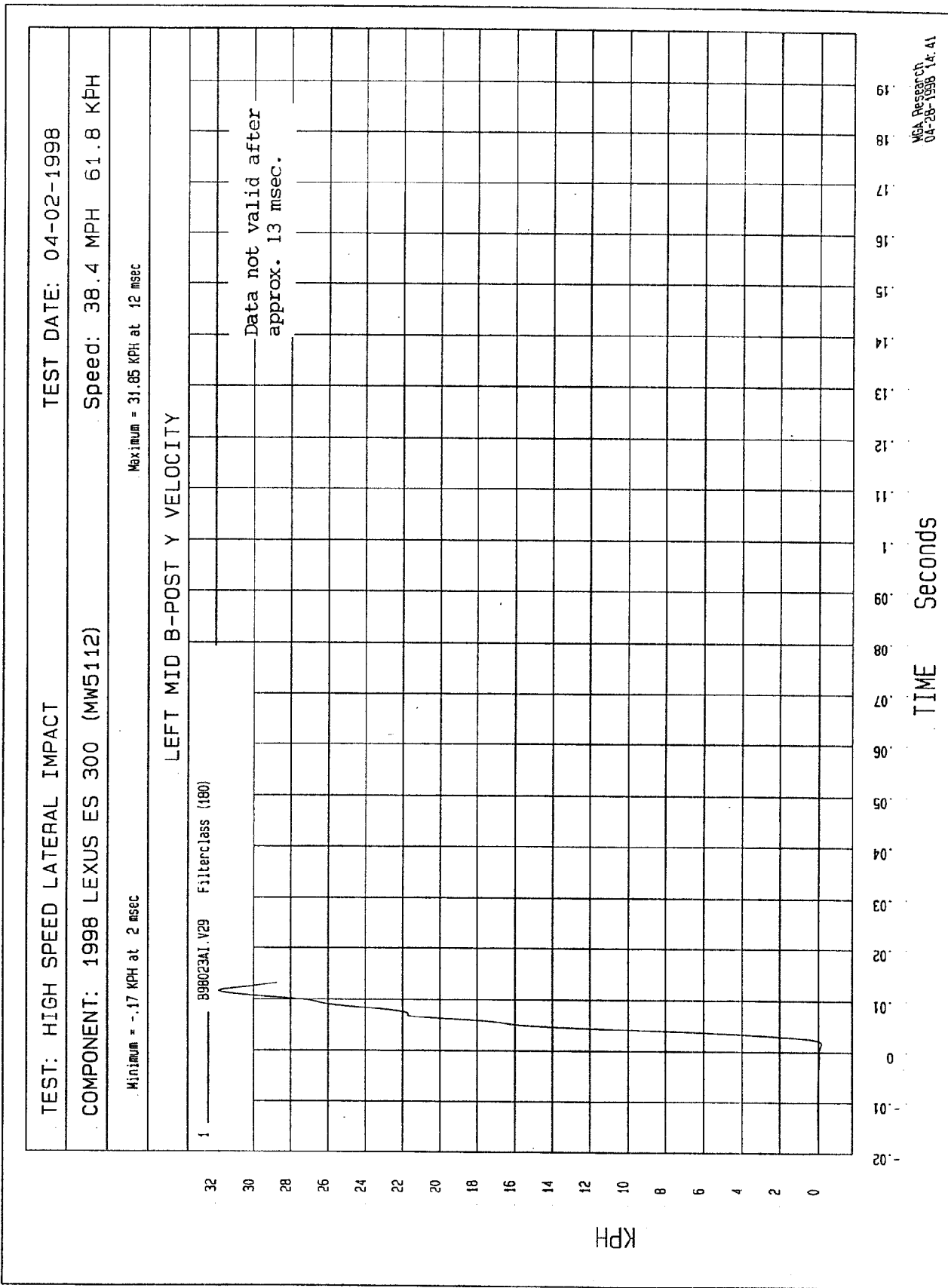
Minimum = -5.55 G'S at -2 msec

Maximum = 134.71 G'S at 4 msec

LEFT MID B-POST Y ACCELERATION



MGA Research
04-28-1998 14:36

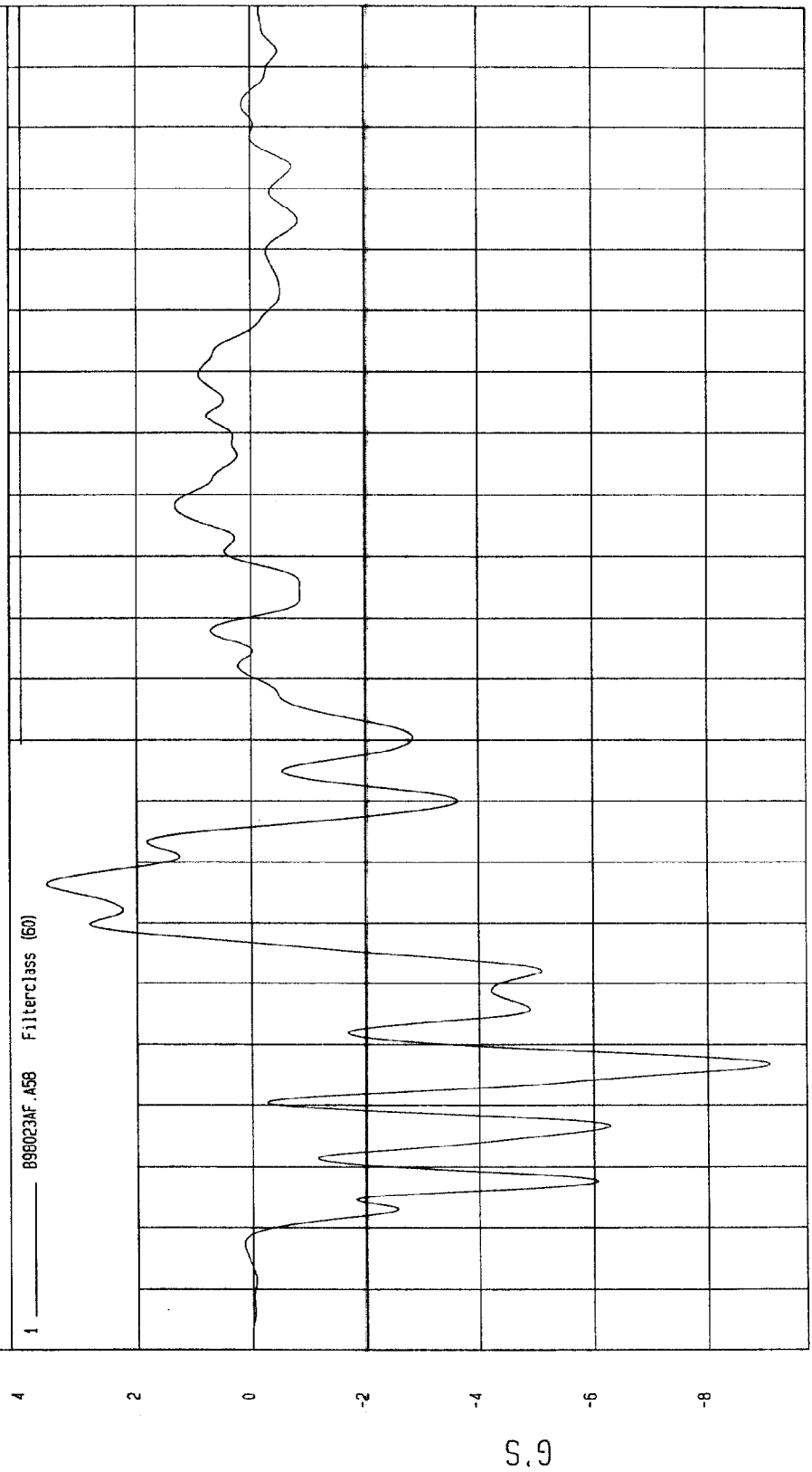


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -9.07 G'S at 27 msec Maximum = 3.56 G'S at 56 msec

VEHICLE CG X ACCELERATION



TIME (SECONDS)

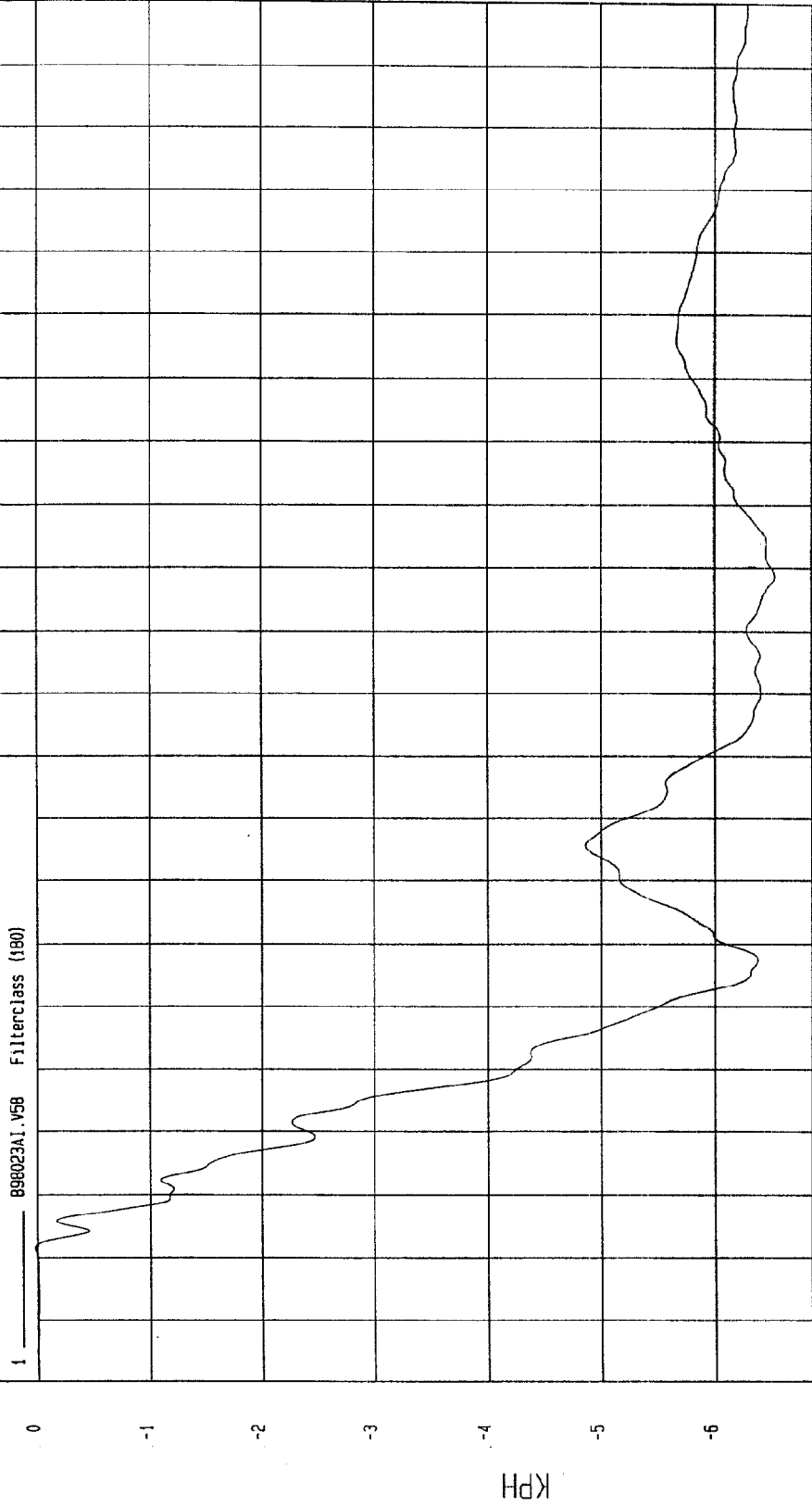
NGA Research
04-07-1998 11:38

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -6.52 KPH at 109 msec Maximum = 1.84E-02 KPH at 2 msec

VEHICLE CG X VELOCITY



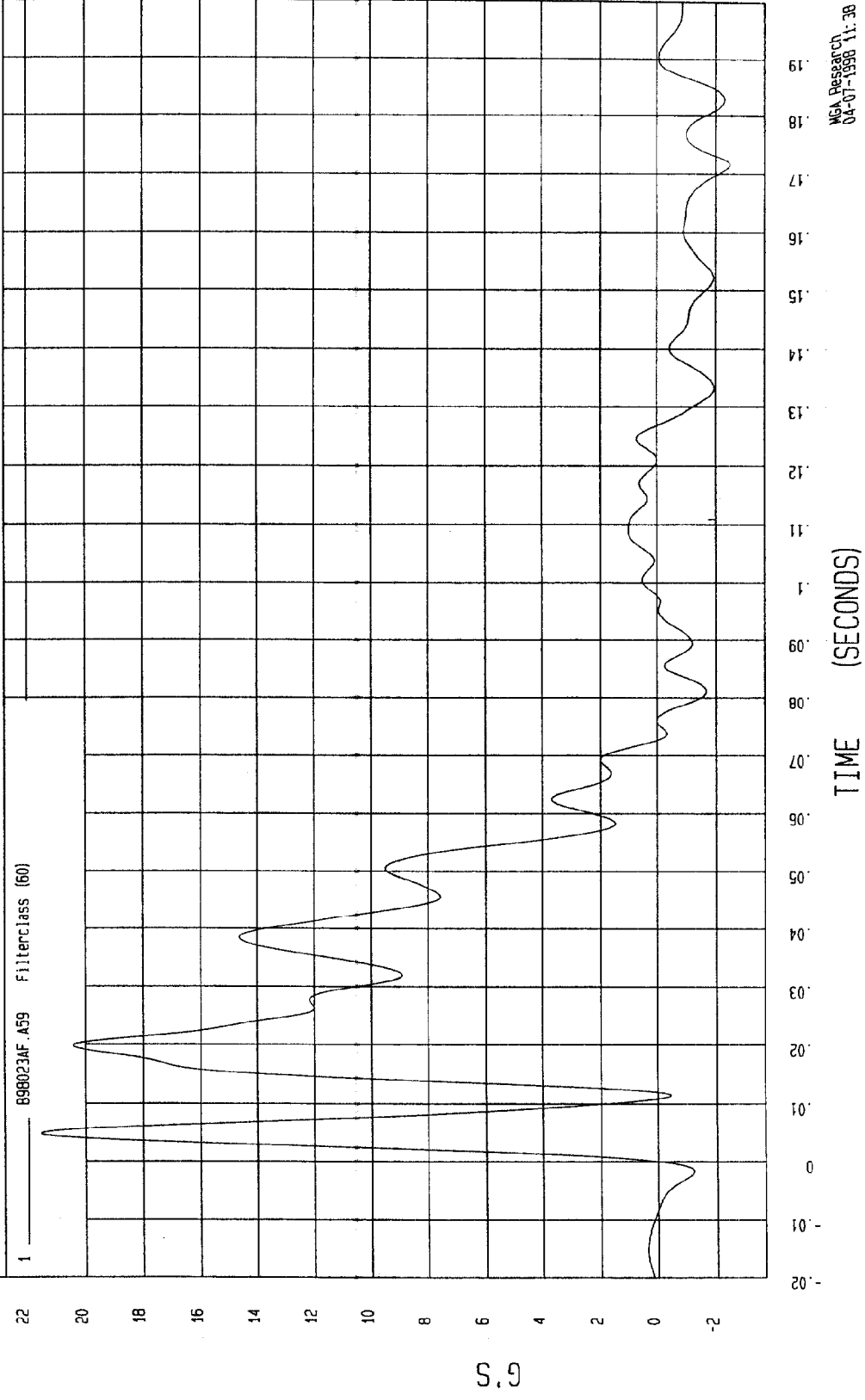
TIME Seconds
MCA Research
04-07-1998 11:38

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

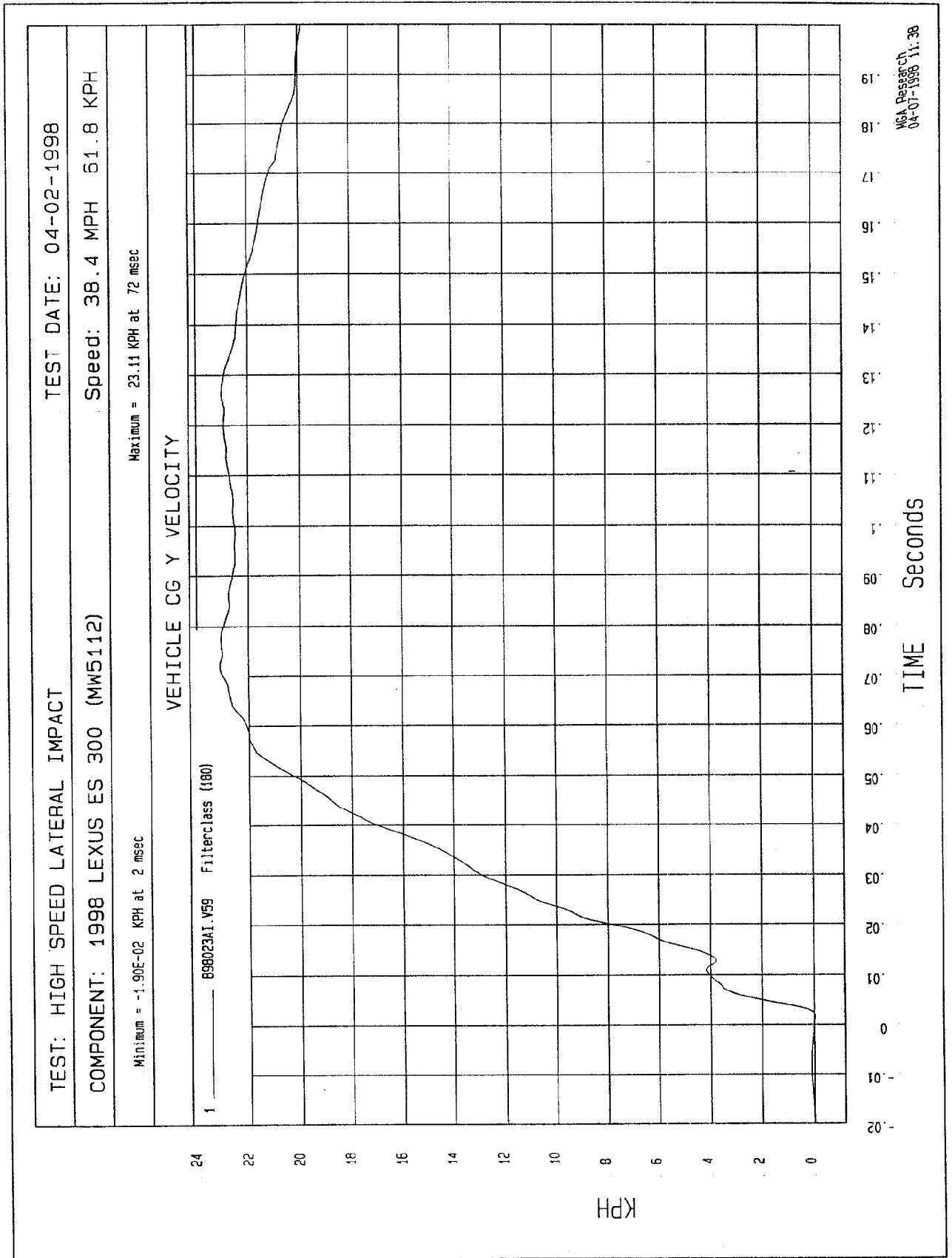
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -2.47 G's at 172 msec Maximum = 21.54 G's at 5 msec

VEHICLE CG Y ACCELERATION



NSA Research
04-07-1998 11:38



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

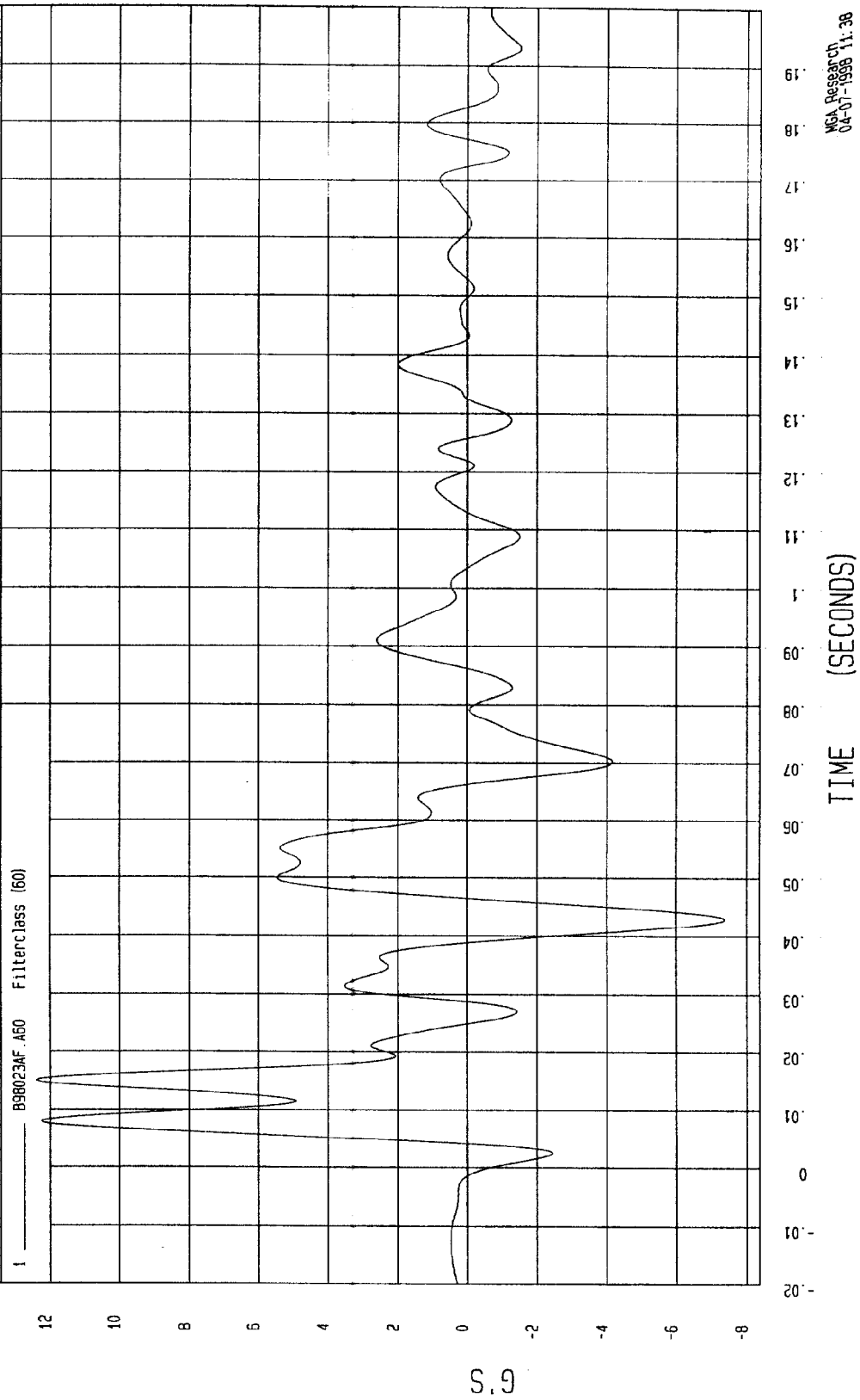
Speed: 38.4 MPH 61.8 KPH

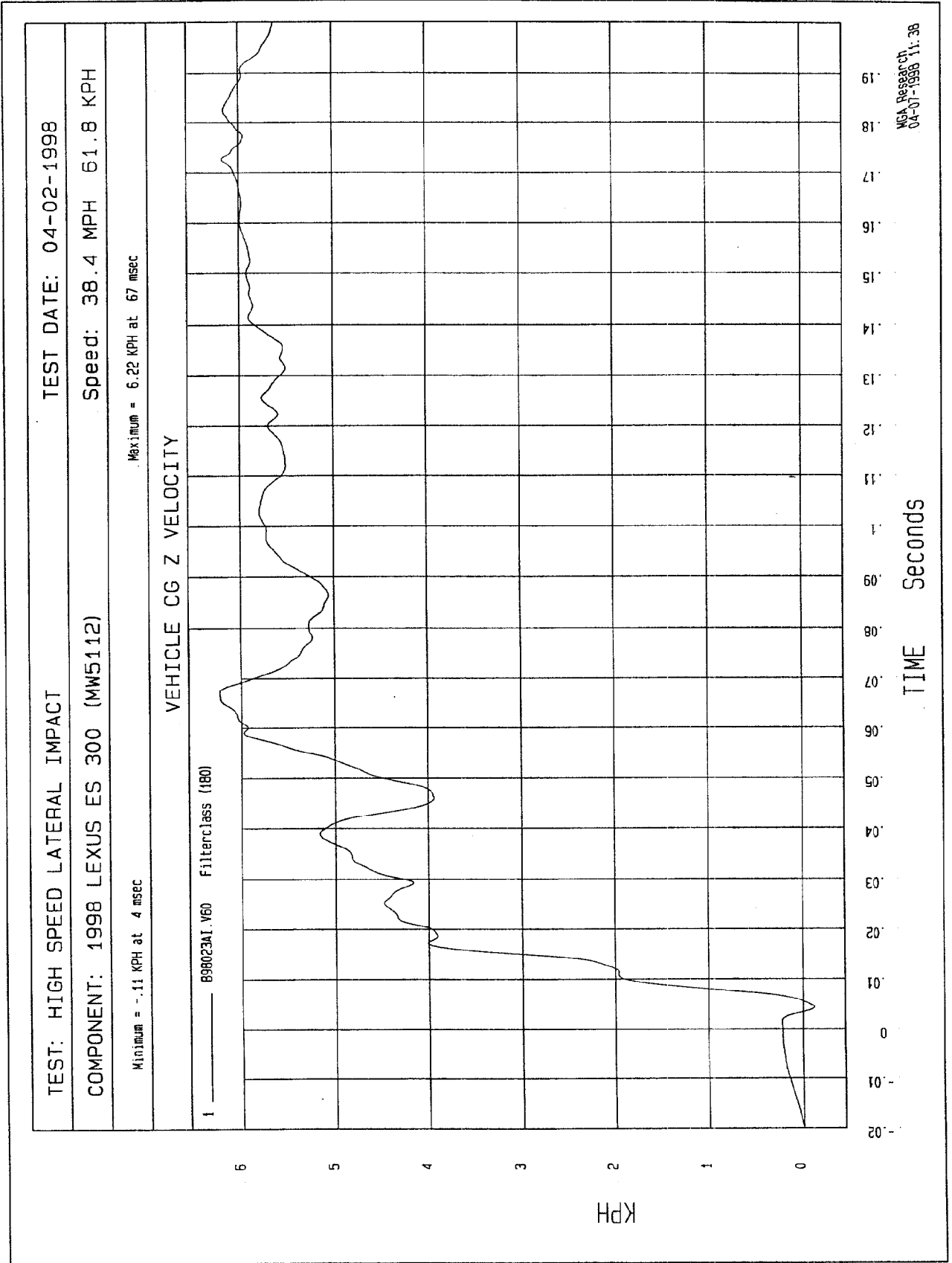
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 12.38 G'S at 15 msec

Minimum = -7.37 G'S at 43 msec

VEHICLE CG Z ACCELERATION



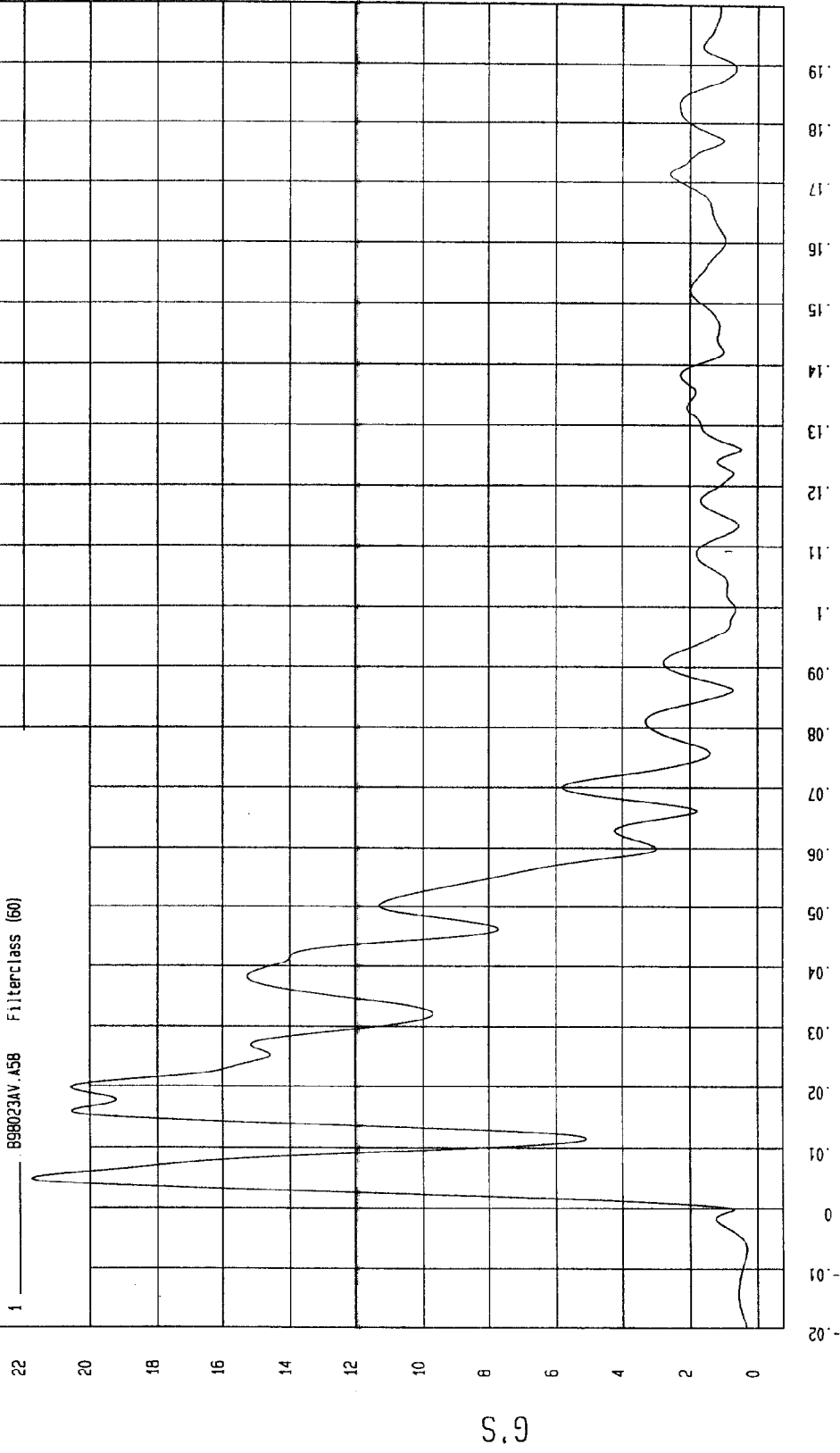


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

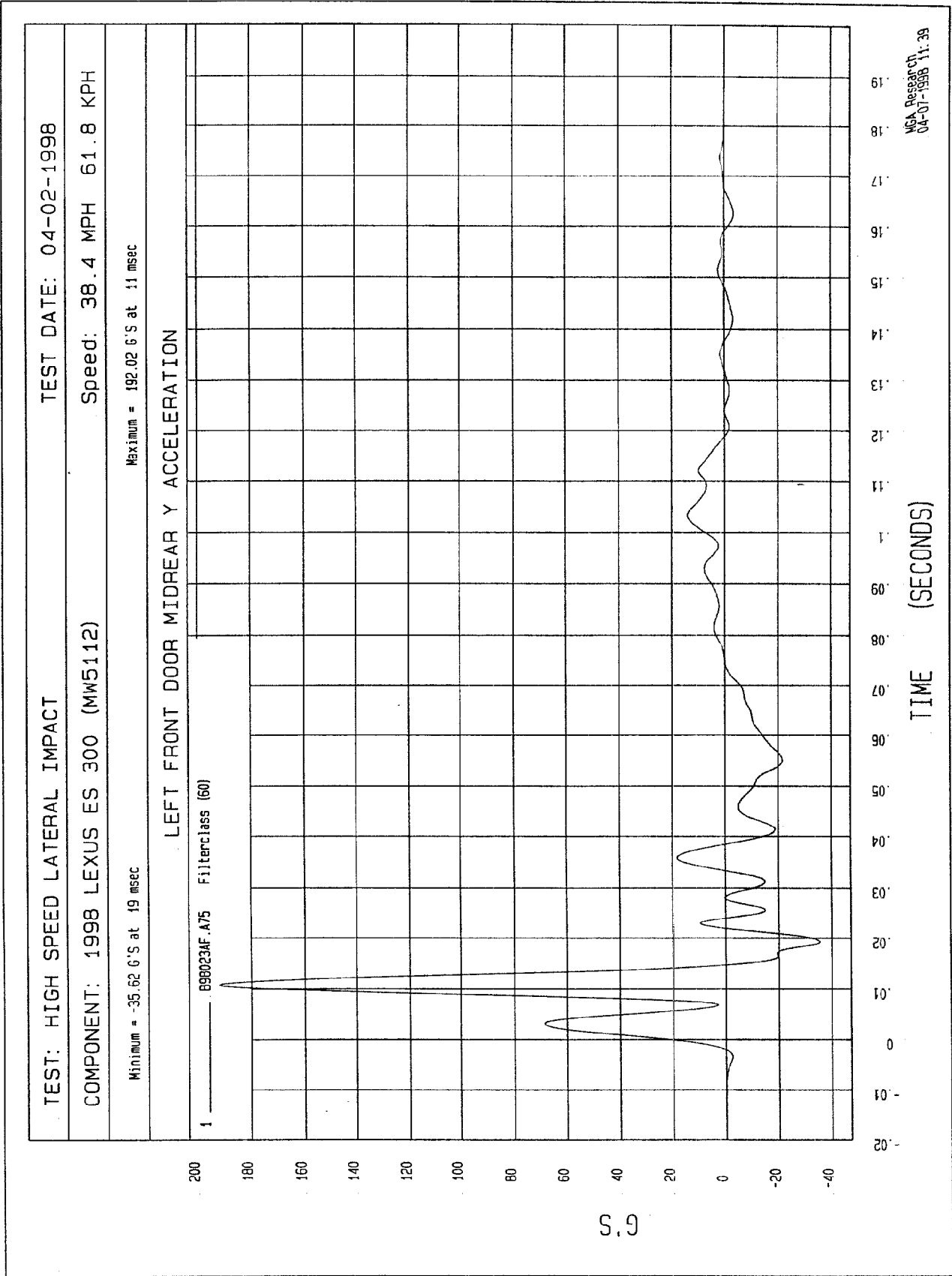
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = .32 G's at .7 msec Maximum = 21.76 G's at 5 msec

VEHICLE CG RESULTANT ACCELERATION



WGA Research
04-07-1998 11:39



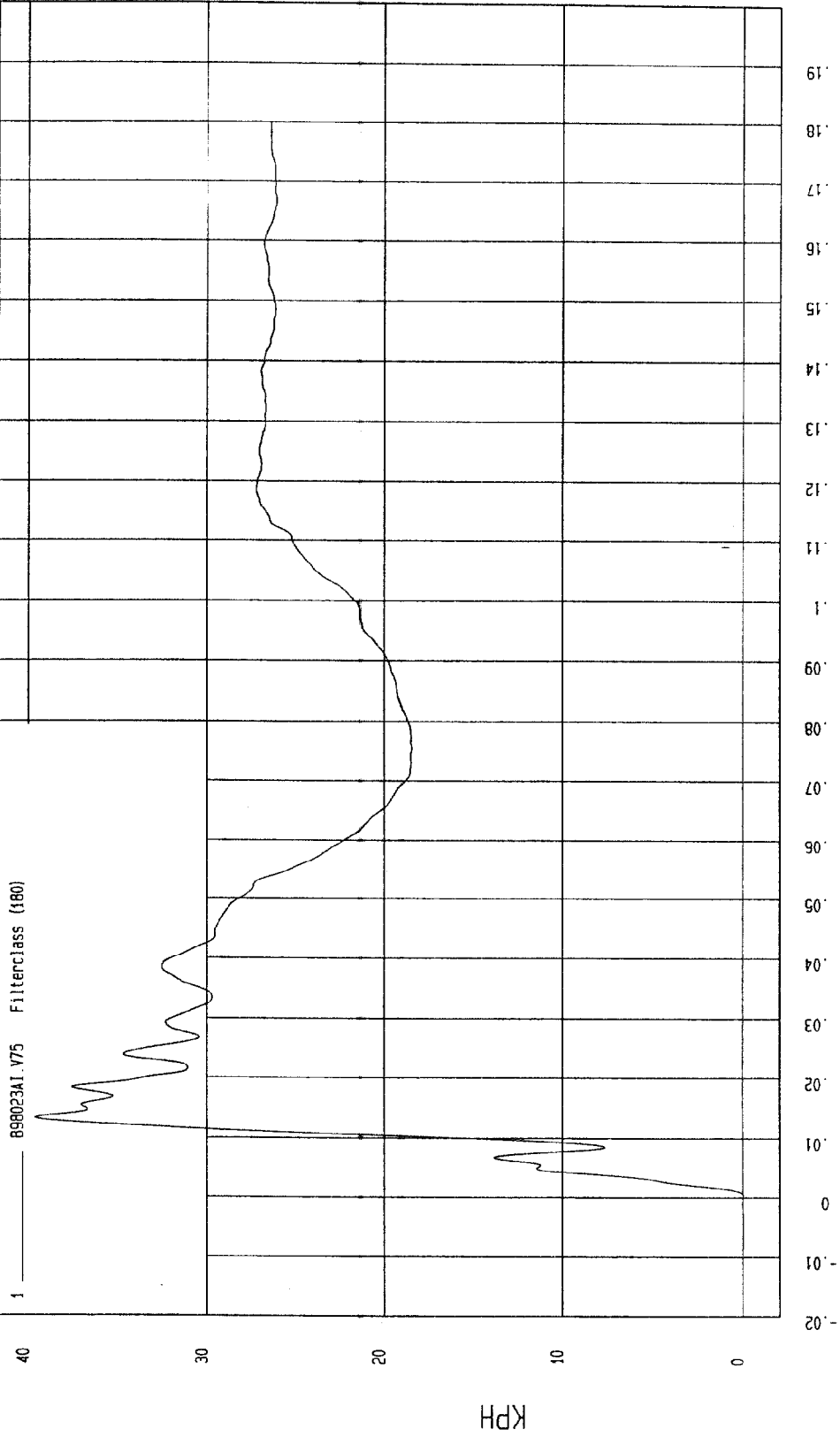
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -6.33E-02 KPH at 0 msec Maximum = 39.64 KPH at 13 msec

LEFT FRONT DOOR MIDREAR Y VELOCITY

1 898023A1.V75 Filterclass (180)

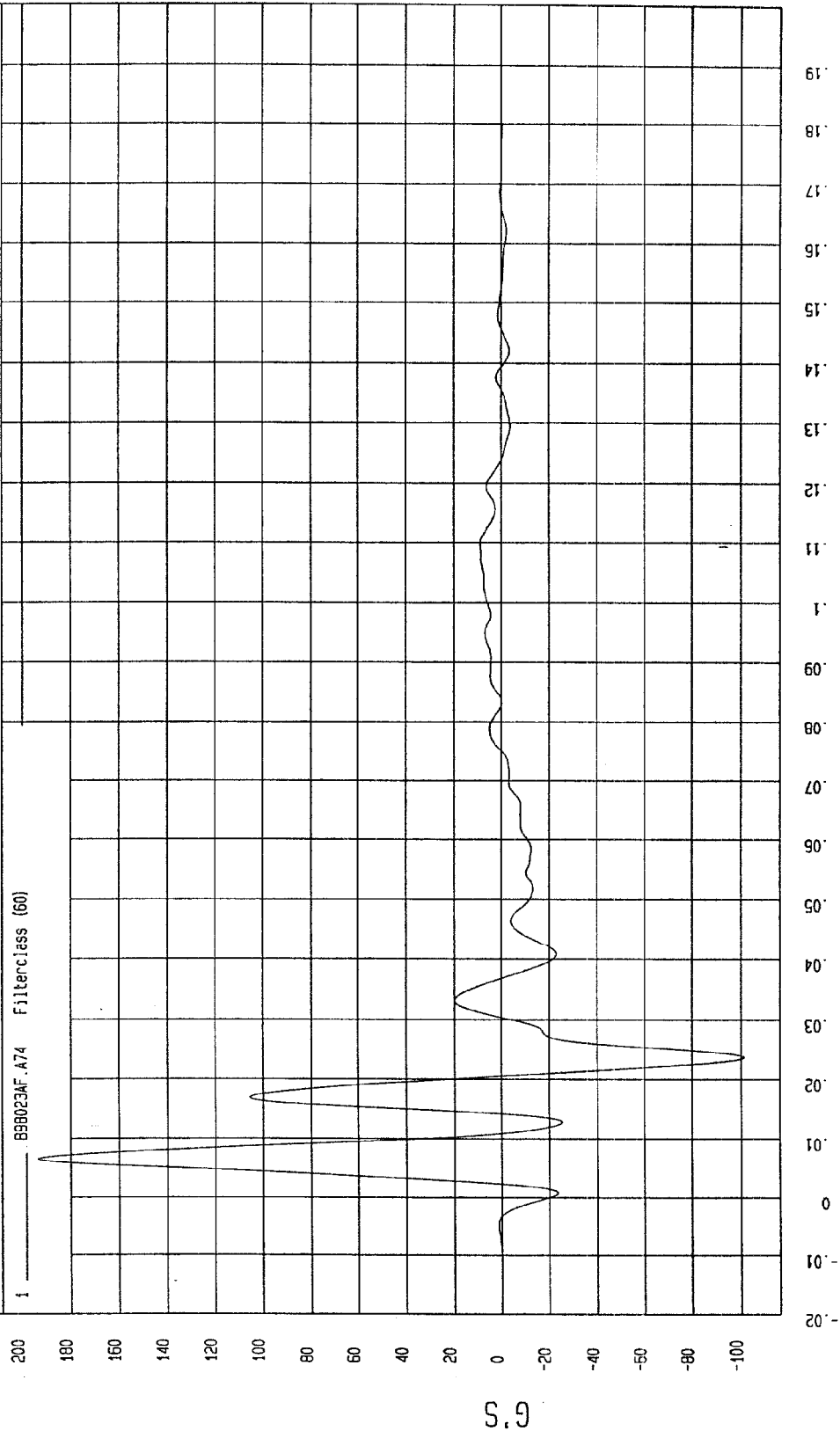


WGA Research
04-07-1998 11:39

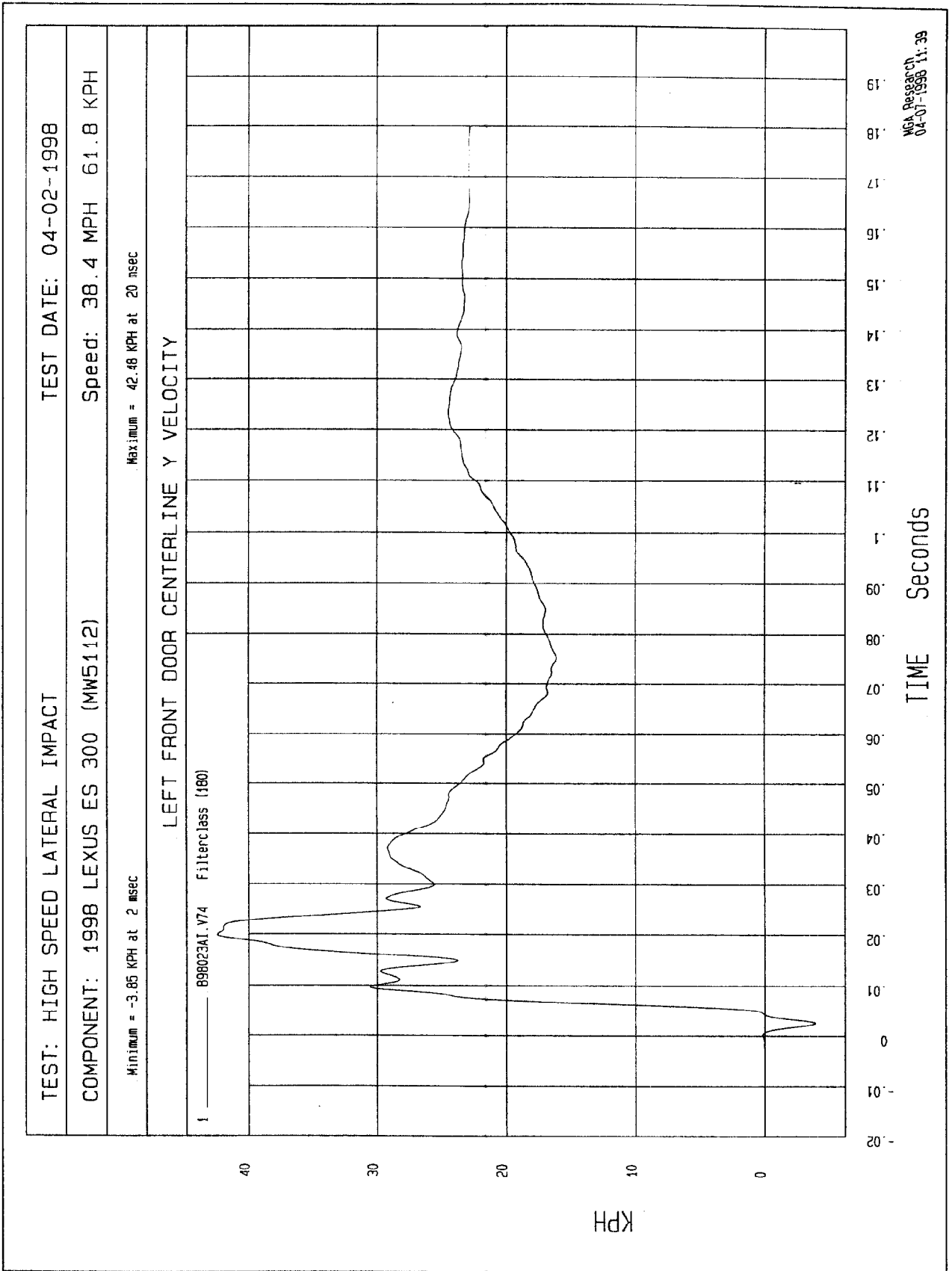
TEST: HIGH SPEED LATERAL IMPACT
TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)
Speed: 38.4 MPH 61.8 KPH

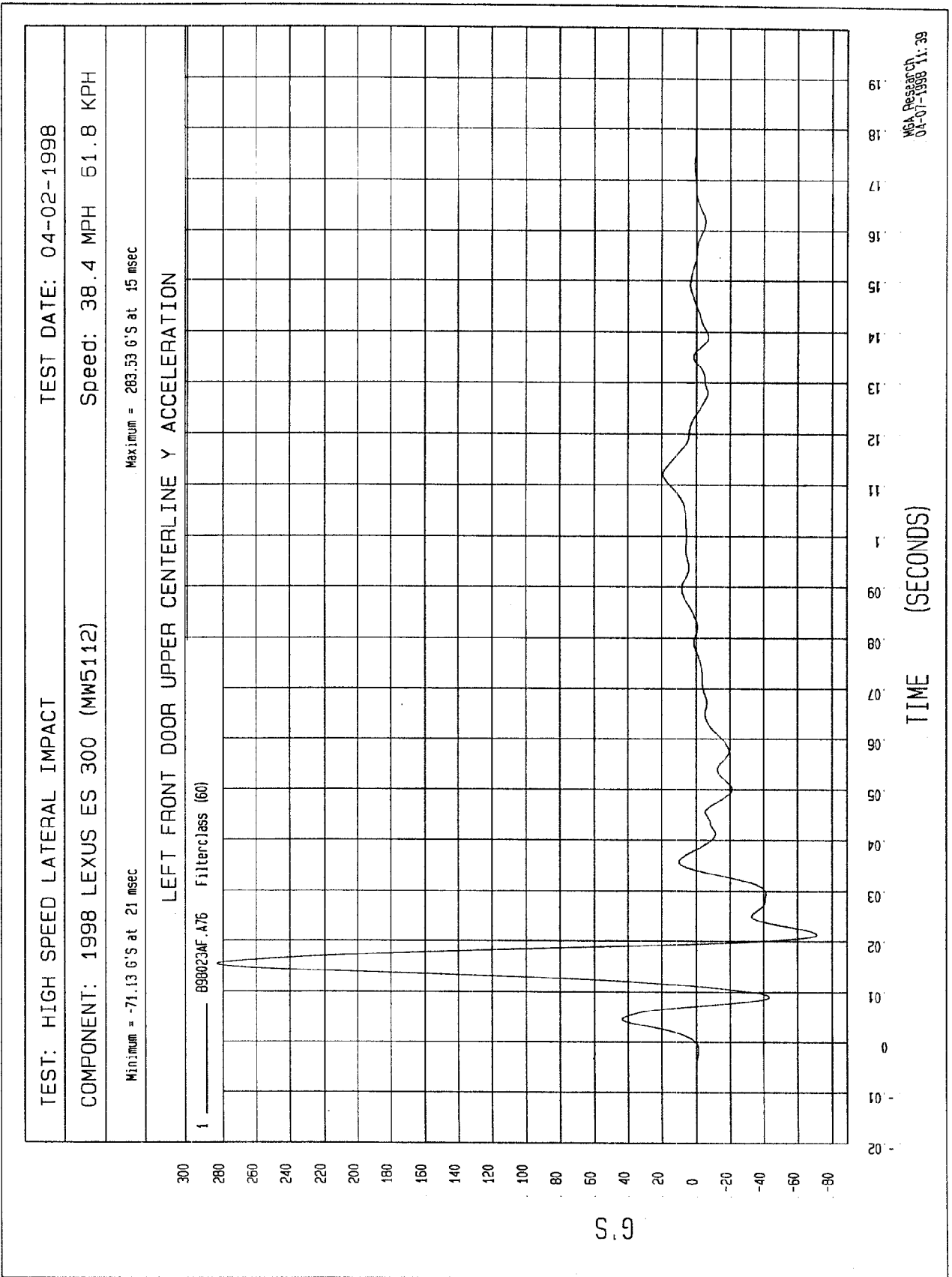
Minimum = -101.30 G'S at 24 msec
Maximum = 193.72 G'S at 6 msec

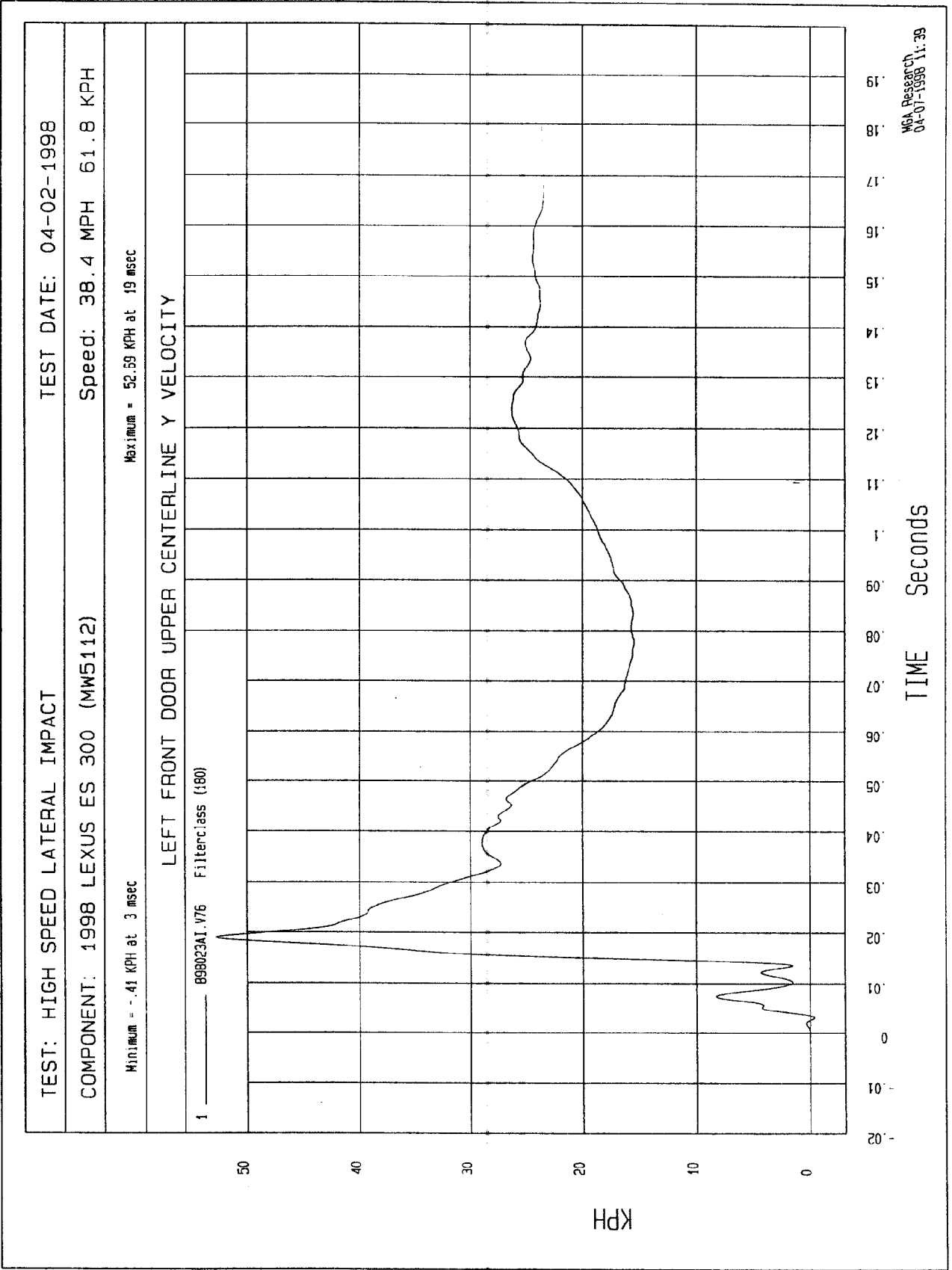
LEFT FRONT DOOR CENTERLINE Y ACCELERATION

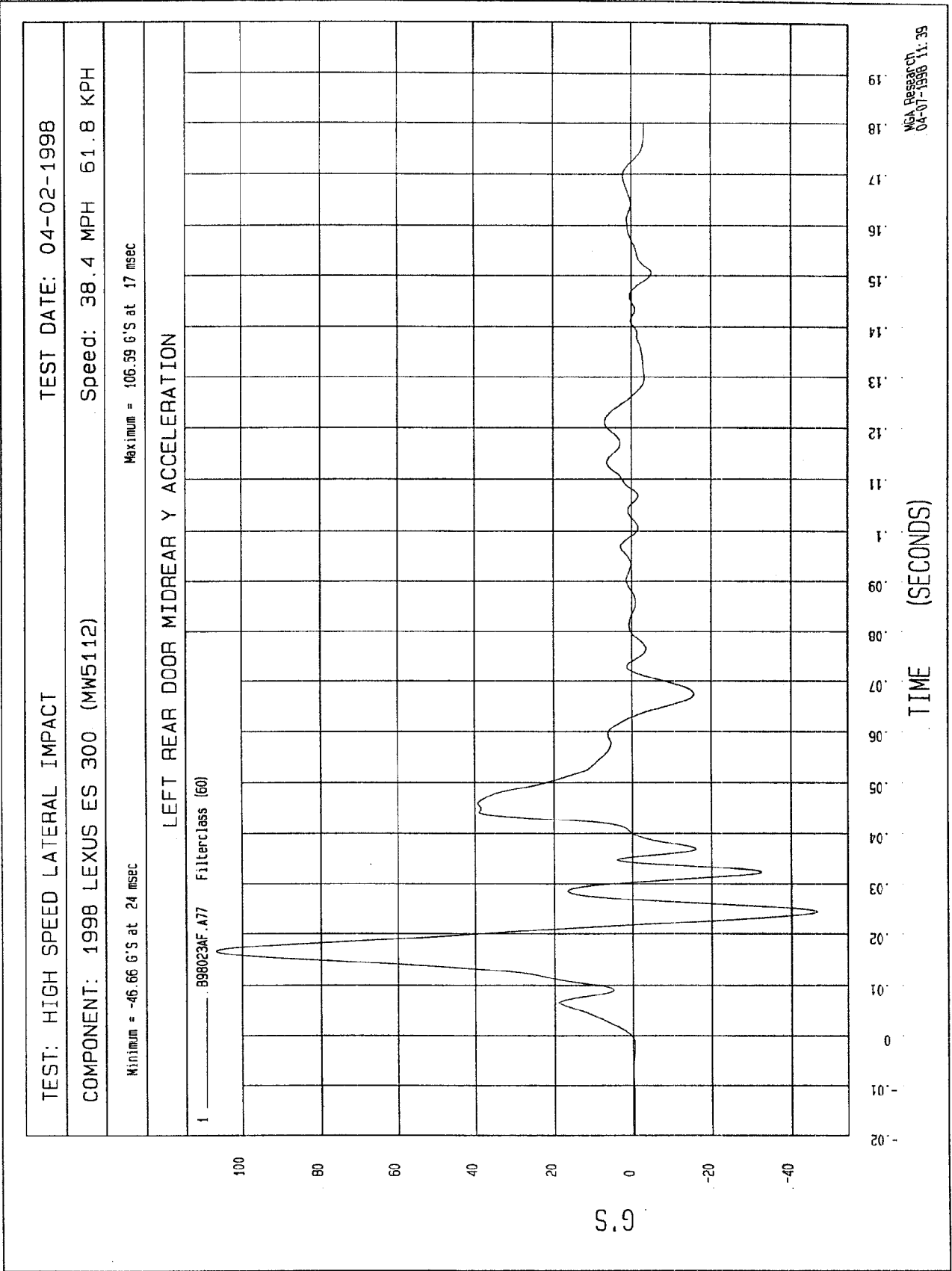


WCA Research
04-01-1998 11:39









TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

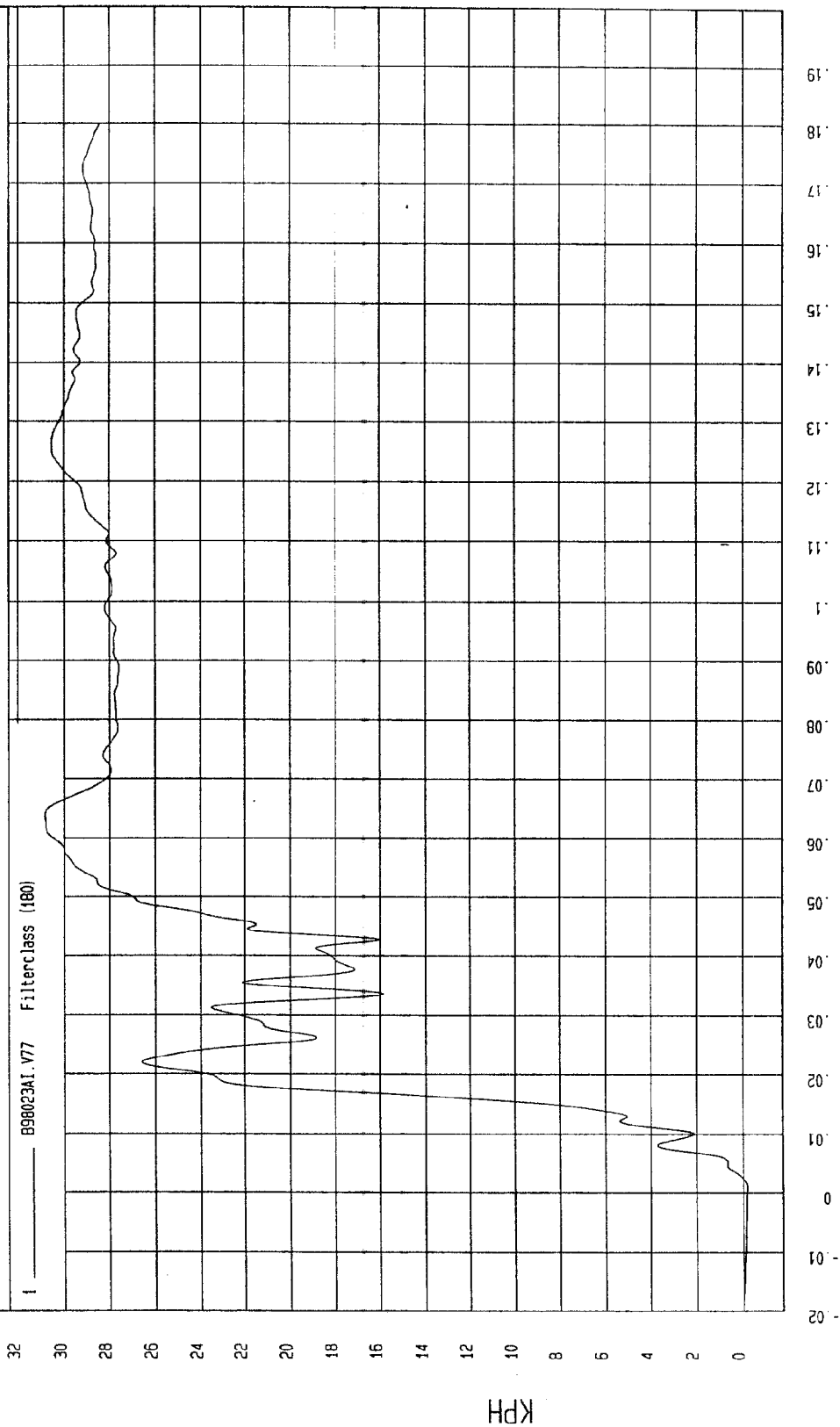
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Speed: 38.4 MPH 61.8 KPH

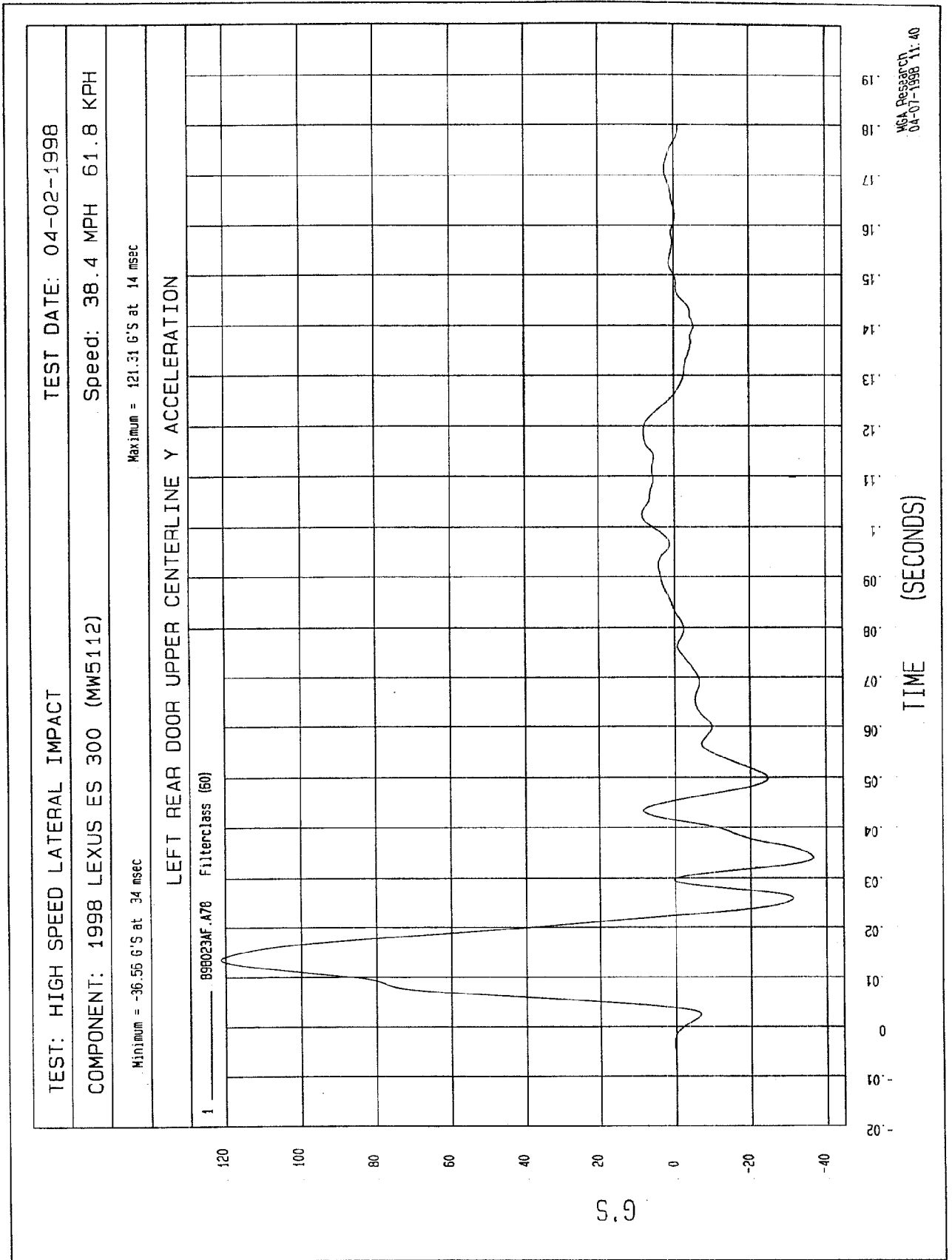
Minimum = -.19 KPH at 1 msec

Maximum = 30.84 KPH at 64 msec

LEFT REAR DOOR MIDREAR Y VELOCITY



WGA Research
04-07-1998 11:39



MCA Research
04-01-1998 11:40

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

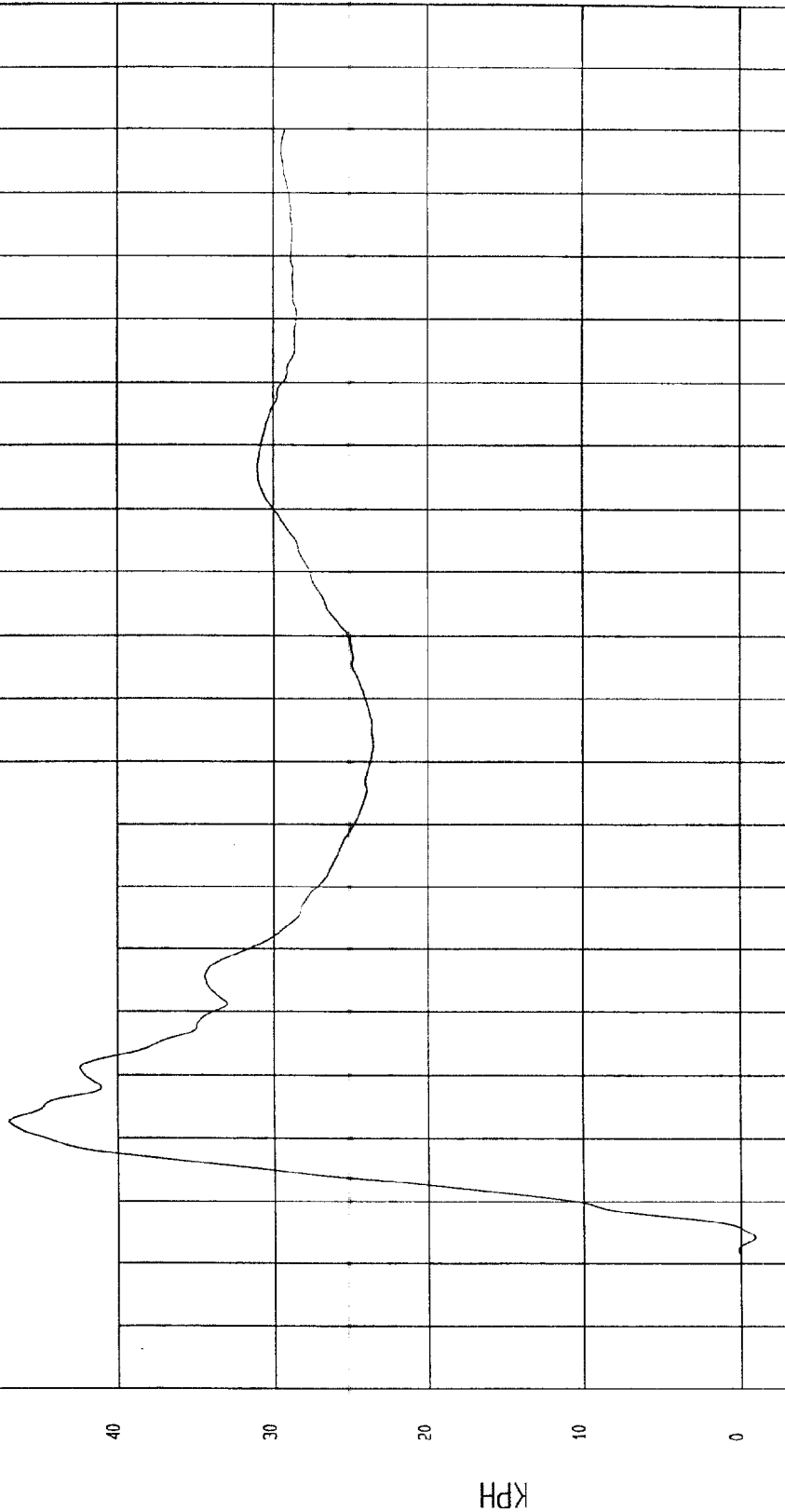
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 47.00 KPH at 23 msec

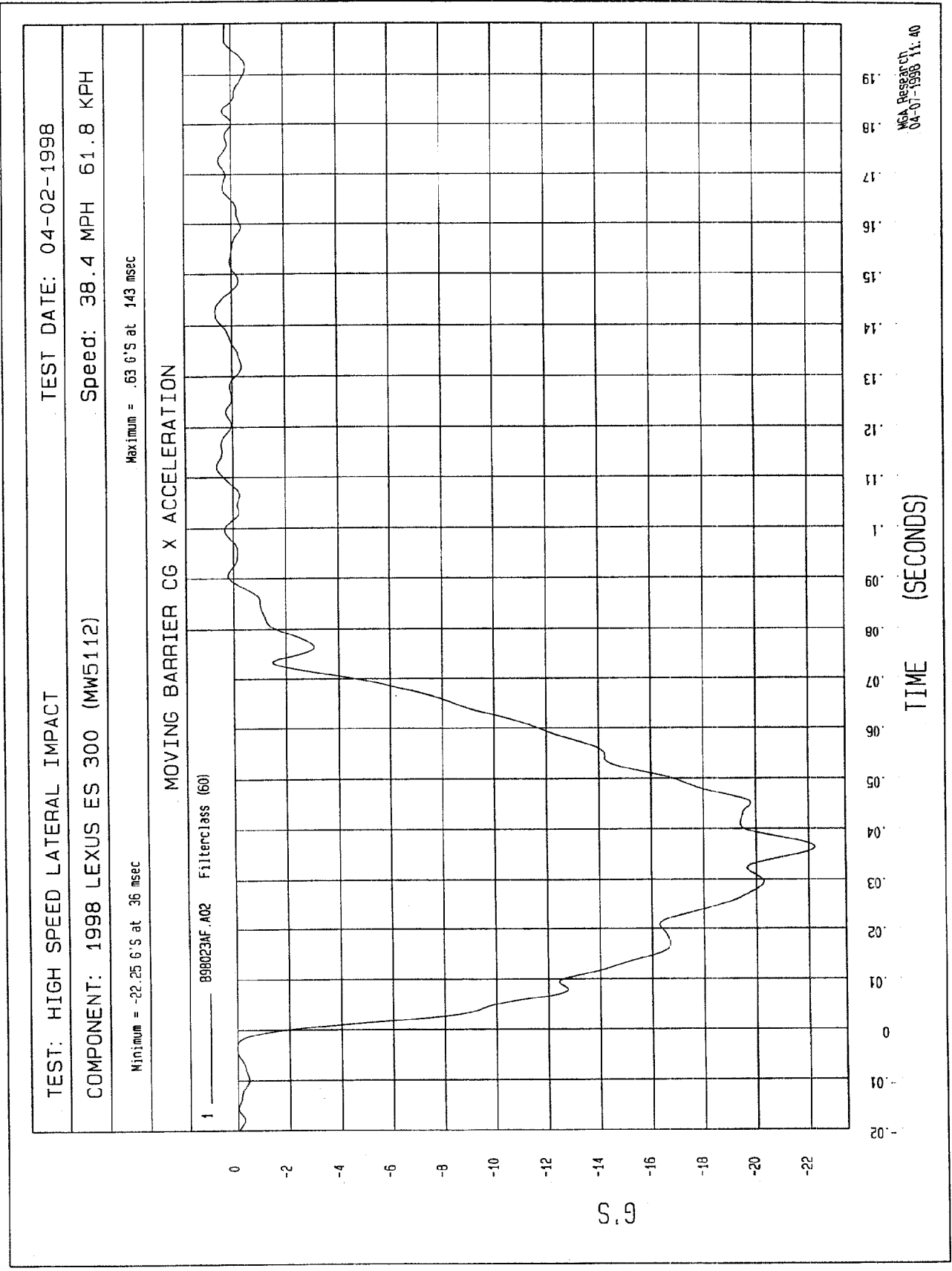
Minimum = -.95 KPH at 4 msec

LEFT REAR DOOR UPPER CENTERLINE Y VELOCITY

1 ——— 998023A1.V78 Filterclass (180)



WGA Research
04-01-1998 11:40



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

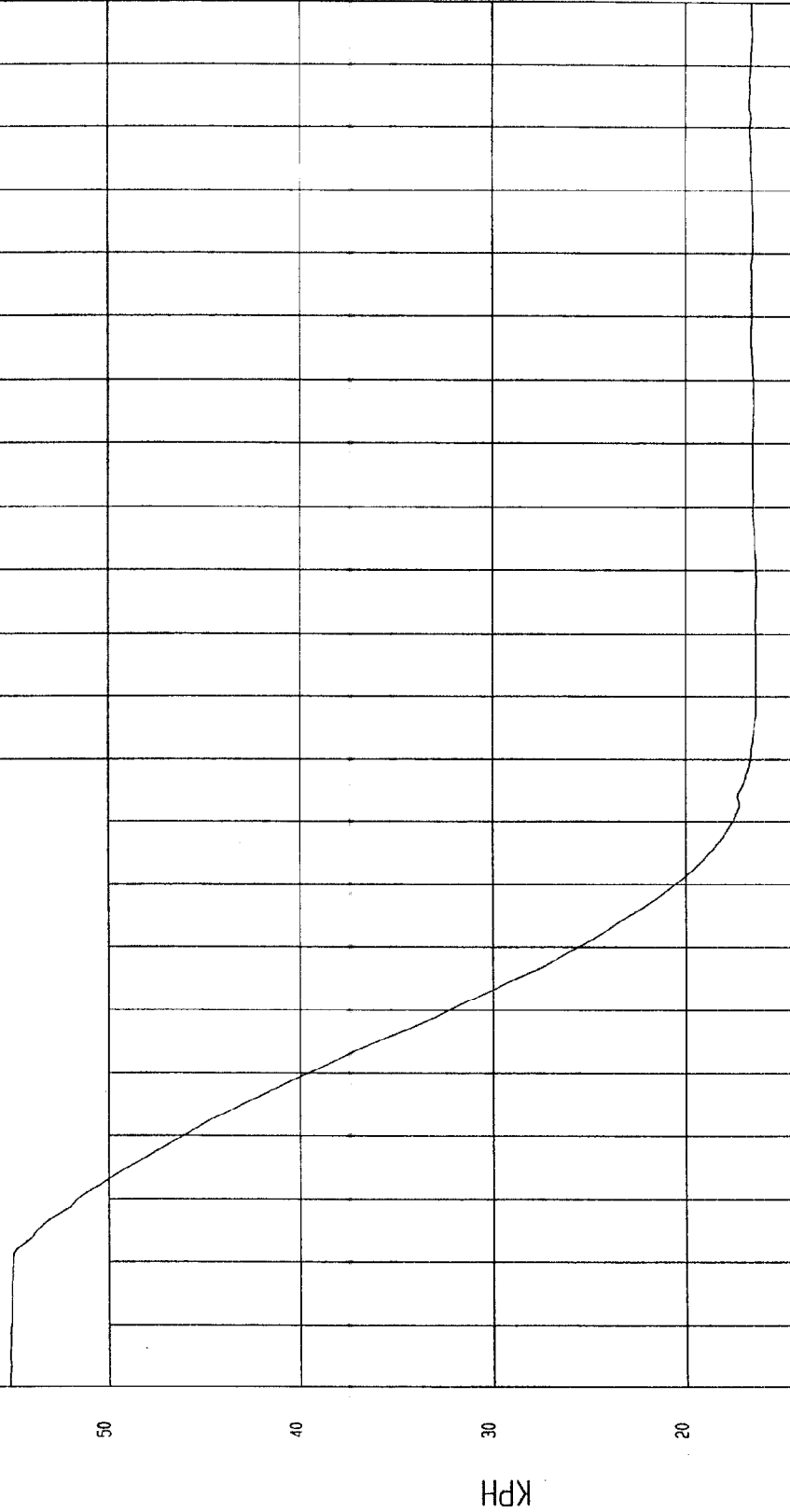
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 55.11 KPH at -19 msec

Minimum = 16.35 KPH at 108 msec

MOVING BARRIER CG X VELOCITY

1 — 898023A1.V02 Filterclass (480)



NCA Research
04-07-1998 11: 40

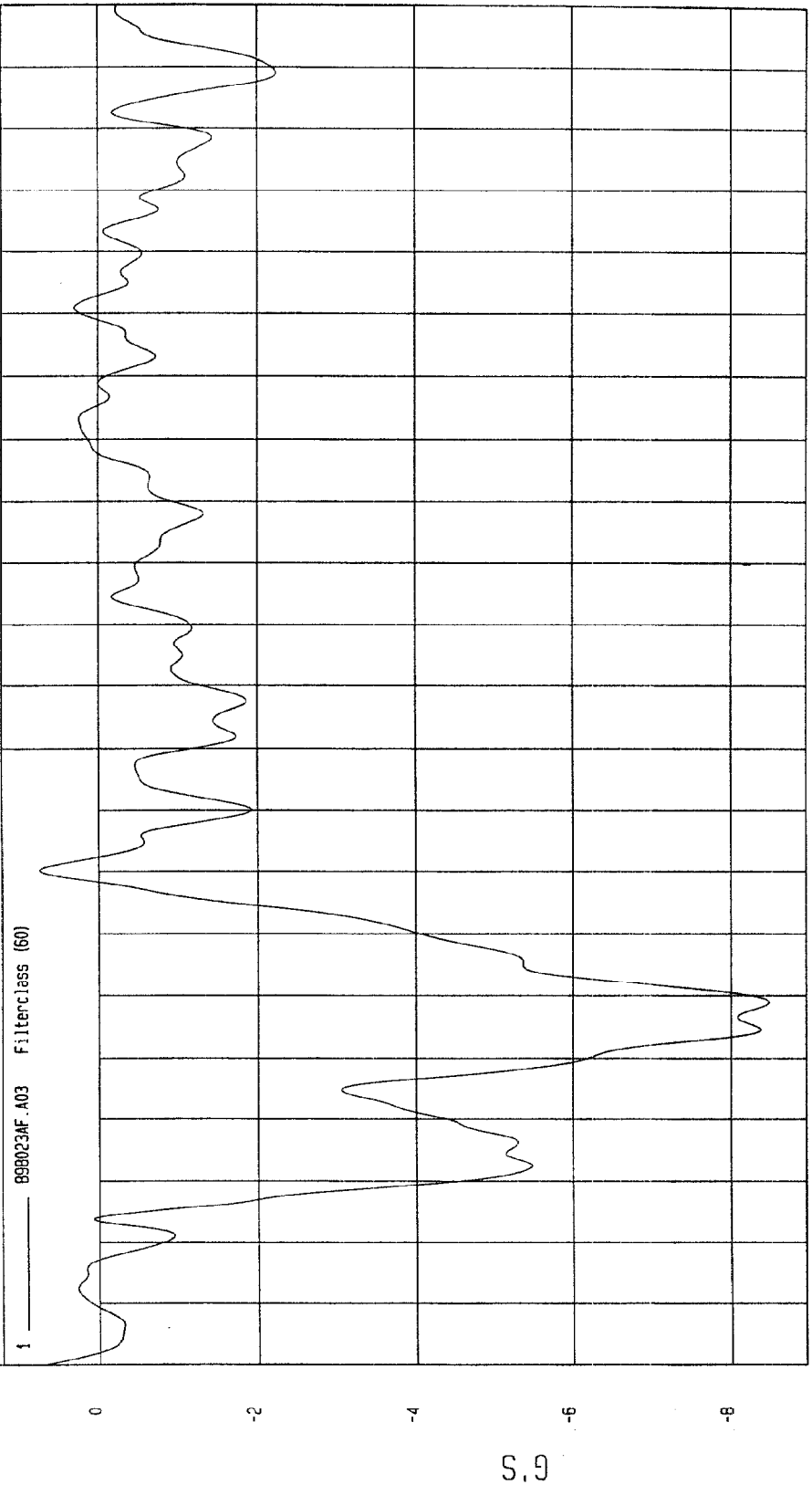
TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -8.48 G'S at 39 msec Maximum = .75 G'S at 60 msec

MOVING BARRIER CG Y ACCELERATION



TIME (SECONDS)

NCA Research
04-01-1998 11:40

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

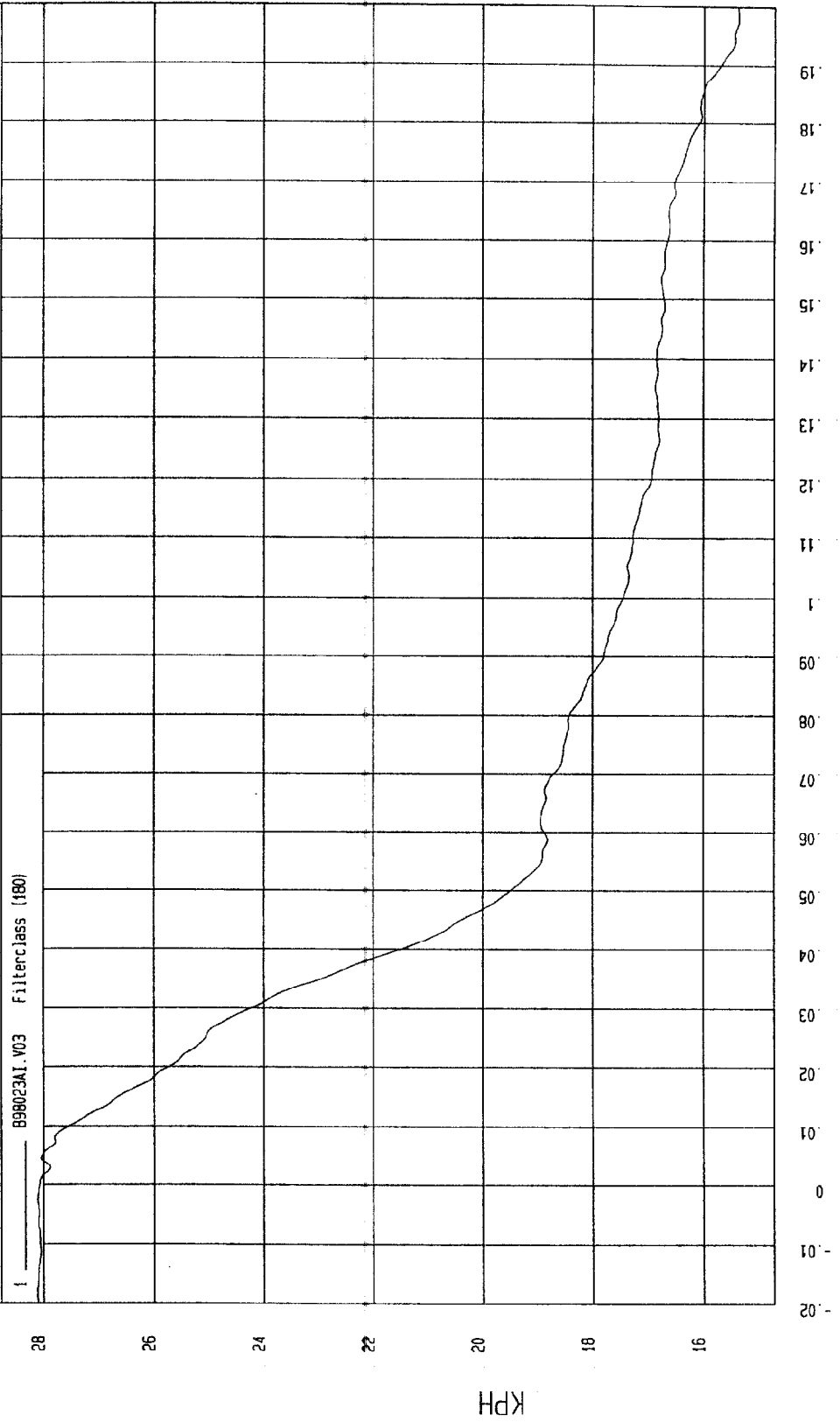
Speed: 38.4 MPH 61.8 KPH

COMPONENT: 1998 LEXUS ES 300 (MW5112)

Minimum = 15.37 KPH at 198 msec

Maximum = 28.11 KPH at -18 msec

MOVING BARRIER CG Y VELOCITY



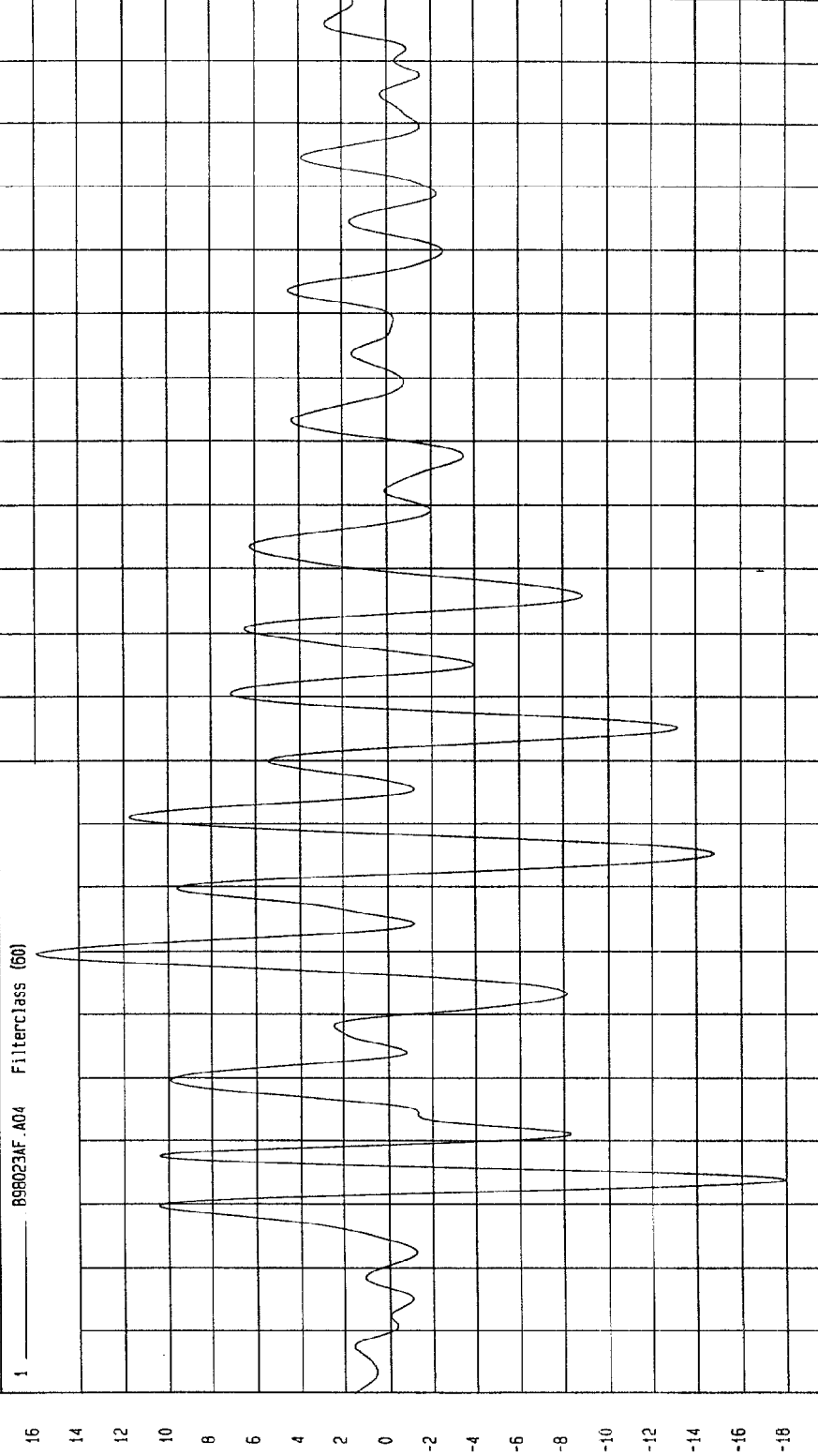
MEA Research
04-07-1998 11:40

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -17.97 G'S at 14 msec Maximum = 15.95 G'S at 50 msec

MOVING BARRIER CG Z ACCELERATION



NSA Research
04-01-1998 11:40

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

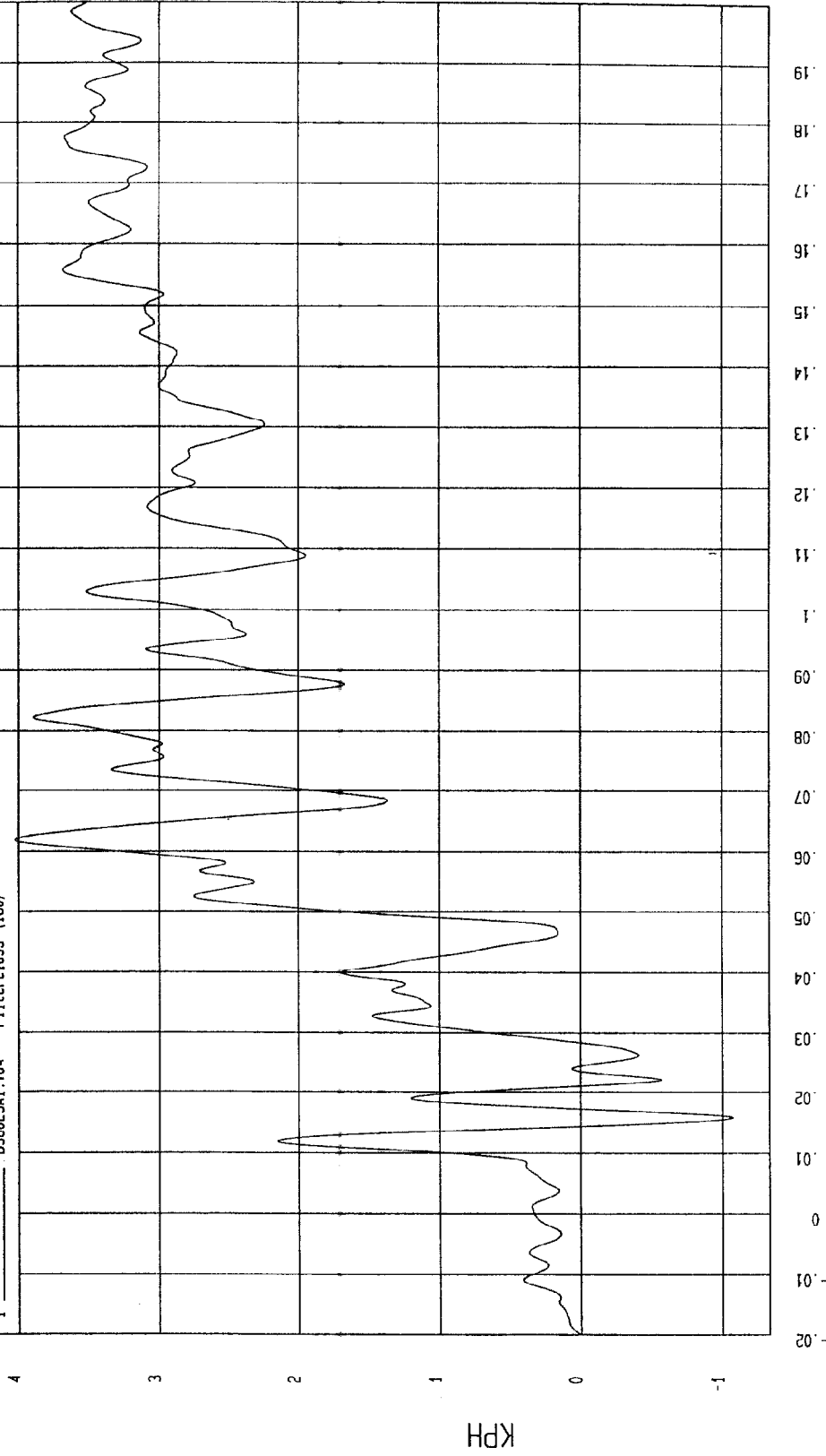
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 4.02 KPH at 62 msec

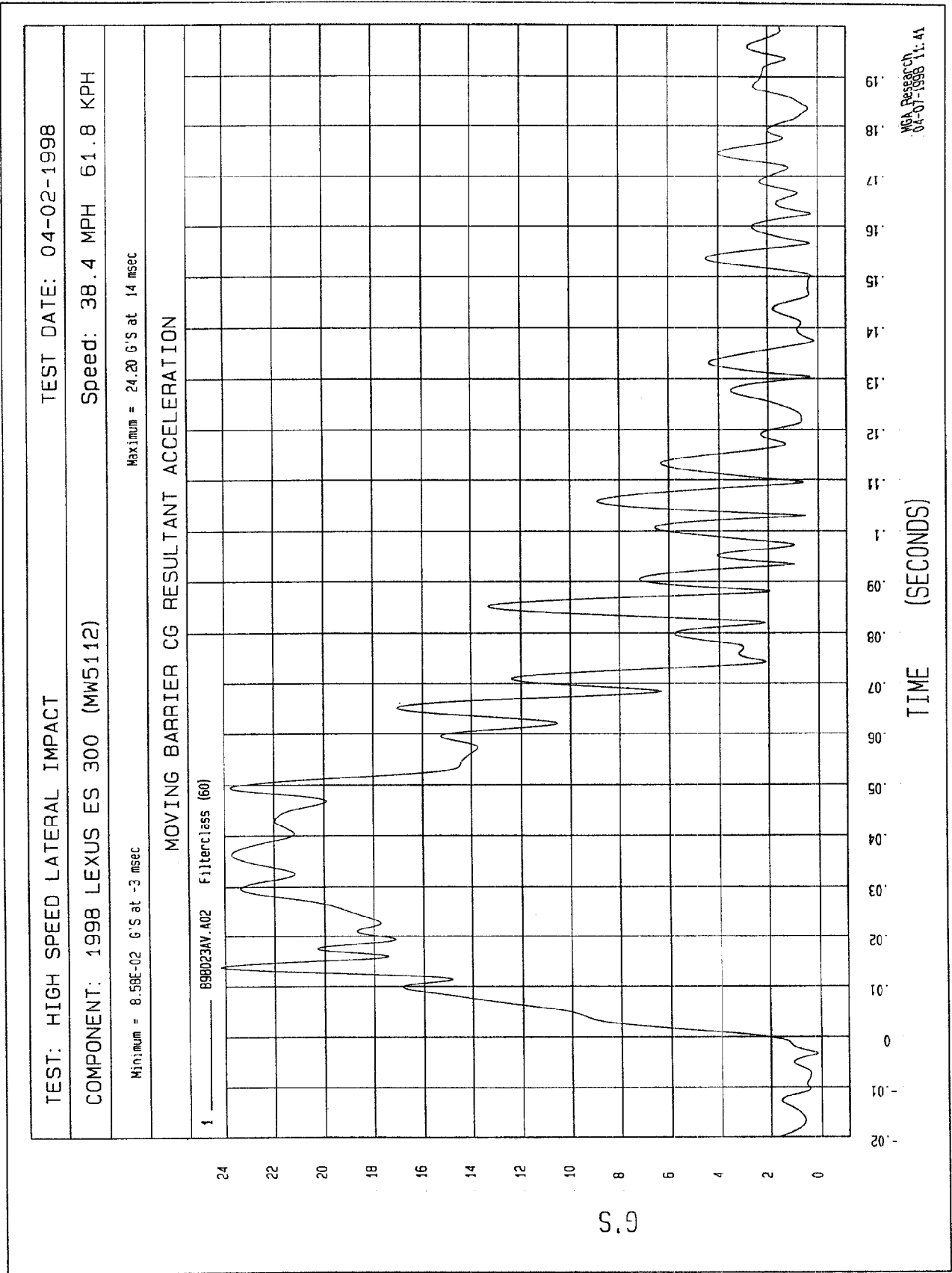
Minimum = -1.07 KPH at 16 msec

MOVING BARRIER CG Z VELOCITY

1 ——— B98023A1.V04 Filterclass (180)



W&A Research
04-07-1998 11:40

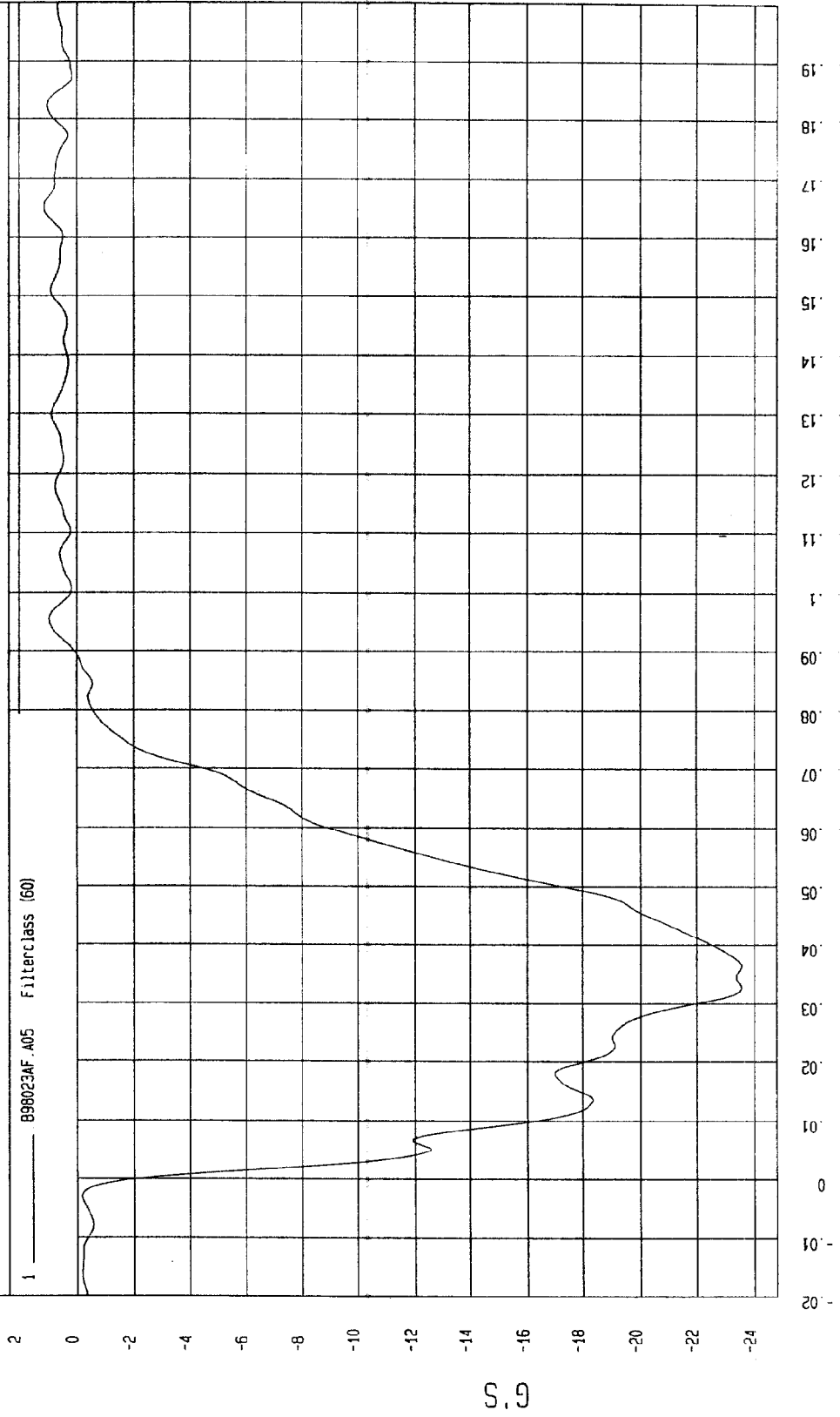


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

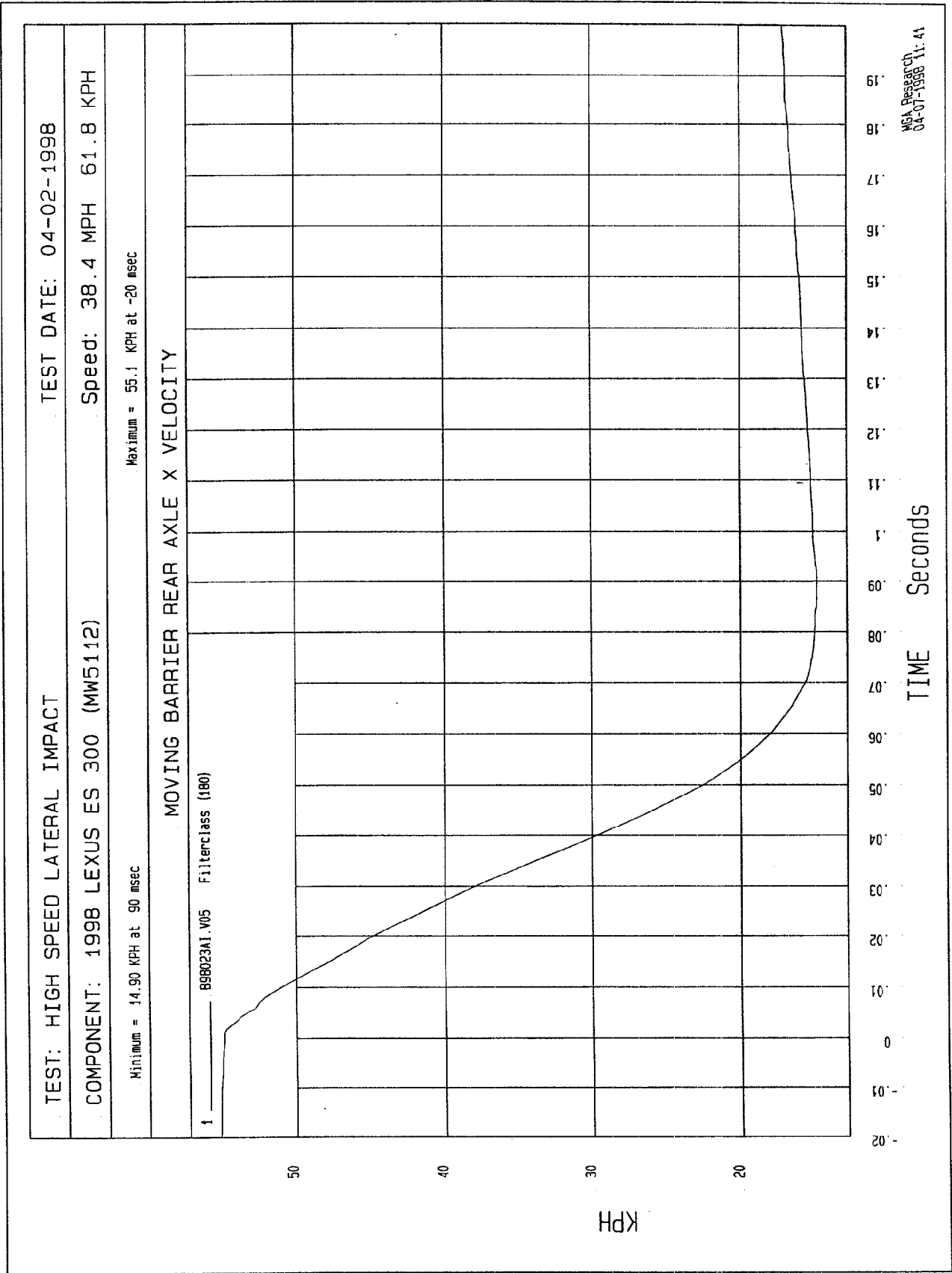
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

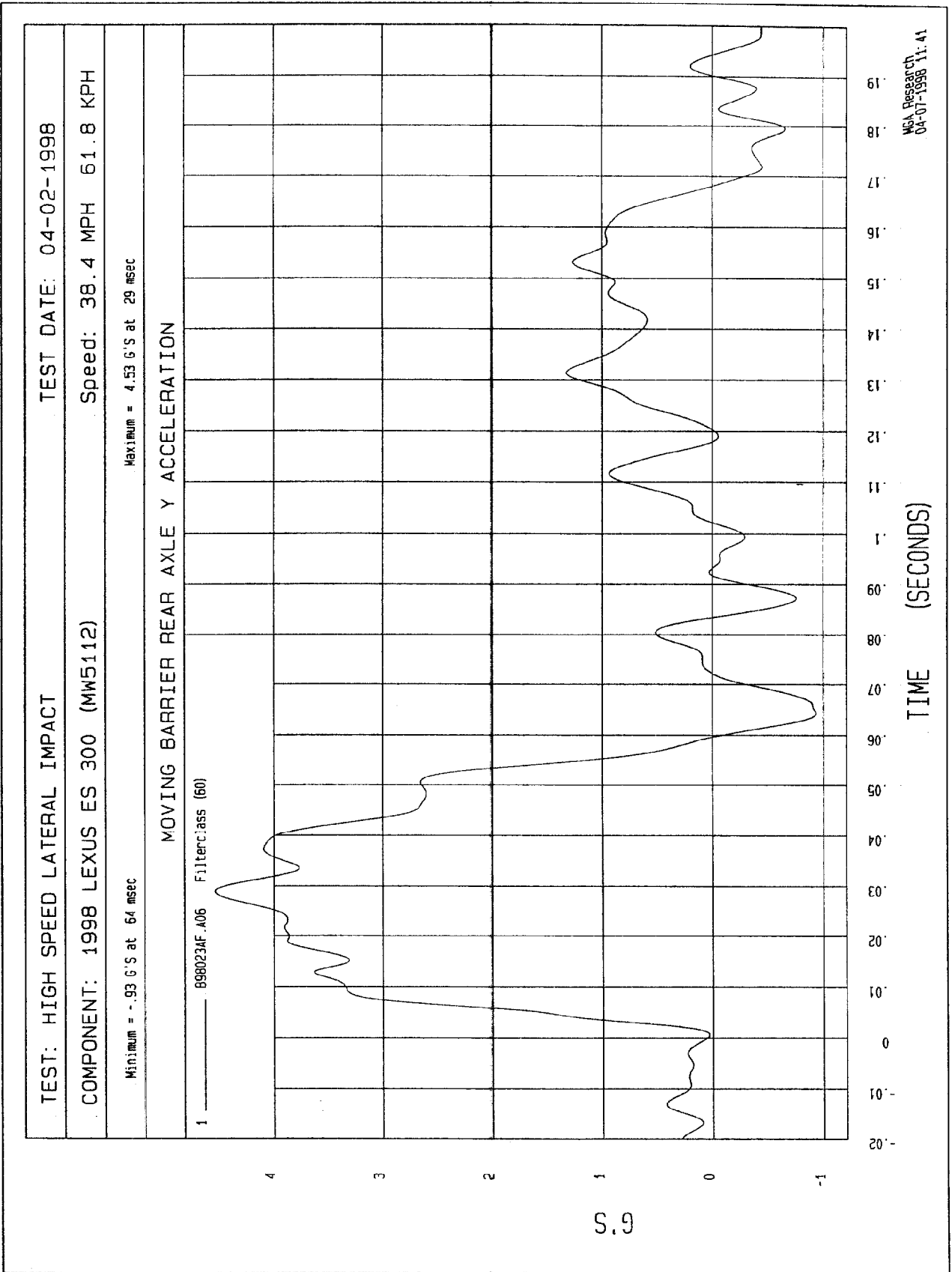
Minimum = -23.54 G'S at 36 msec Maximum = 1.11 G'S at 165 msec

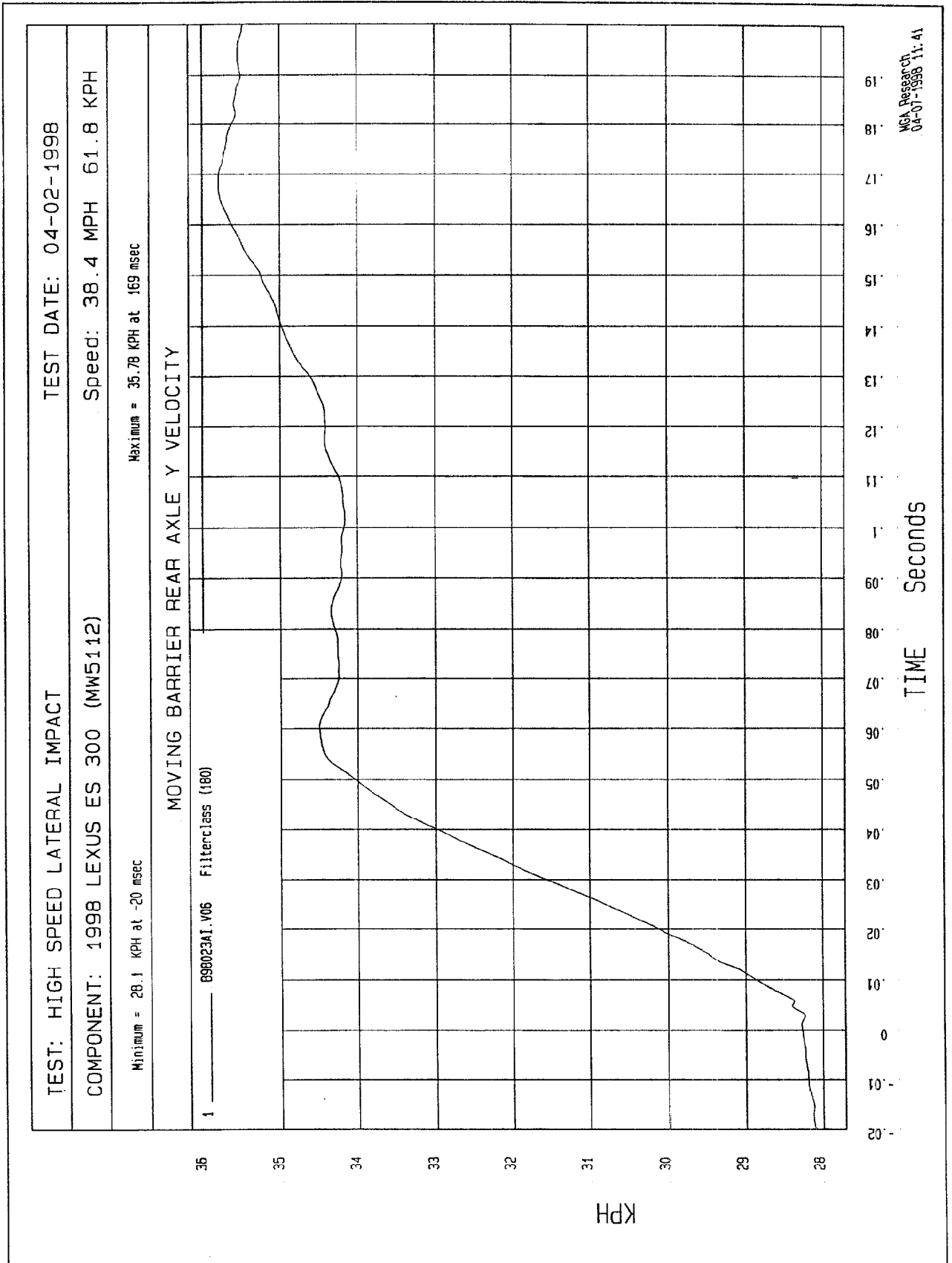
MOVING BARRIER REAR AXLE X ACCELERATION

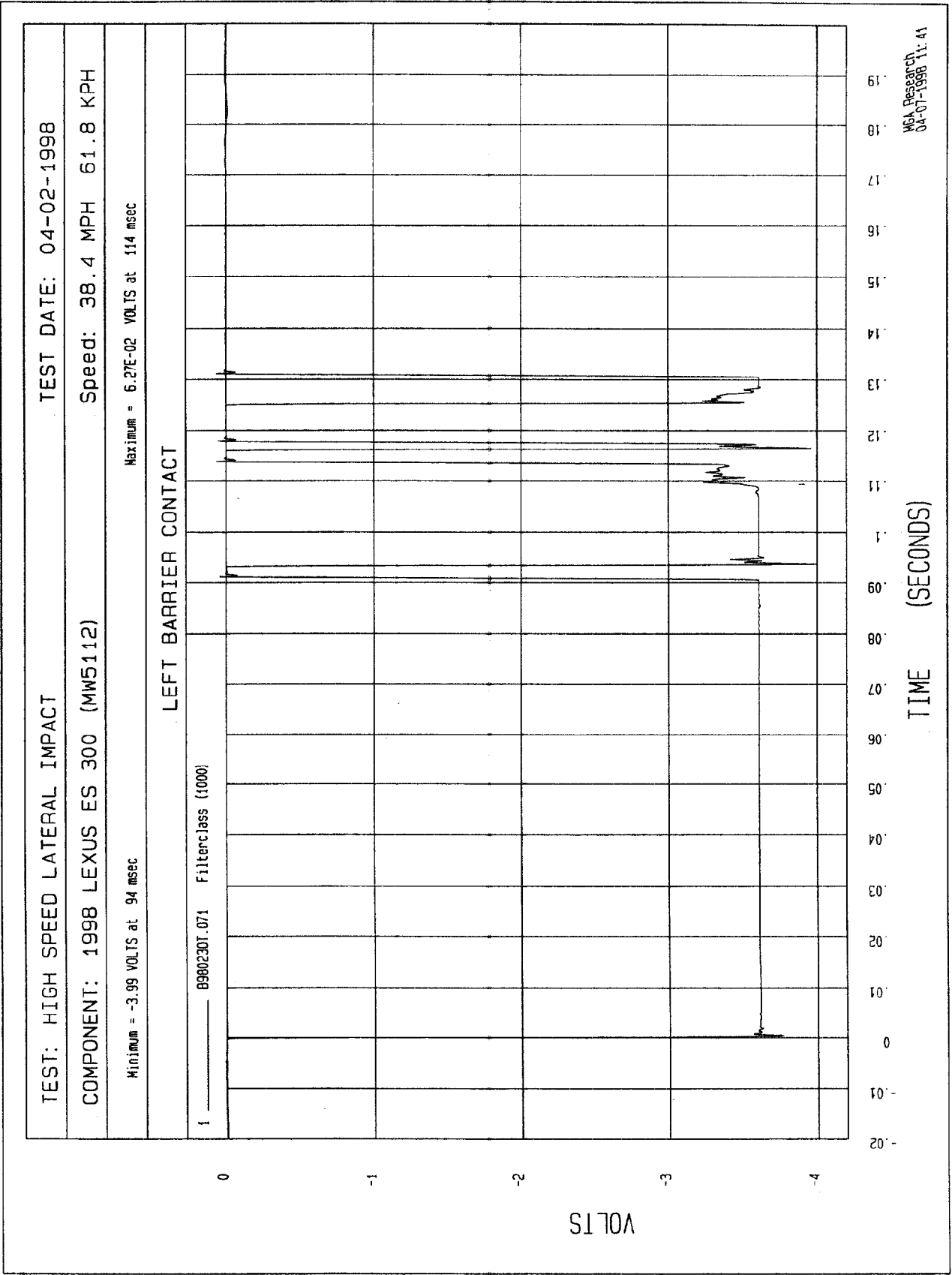


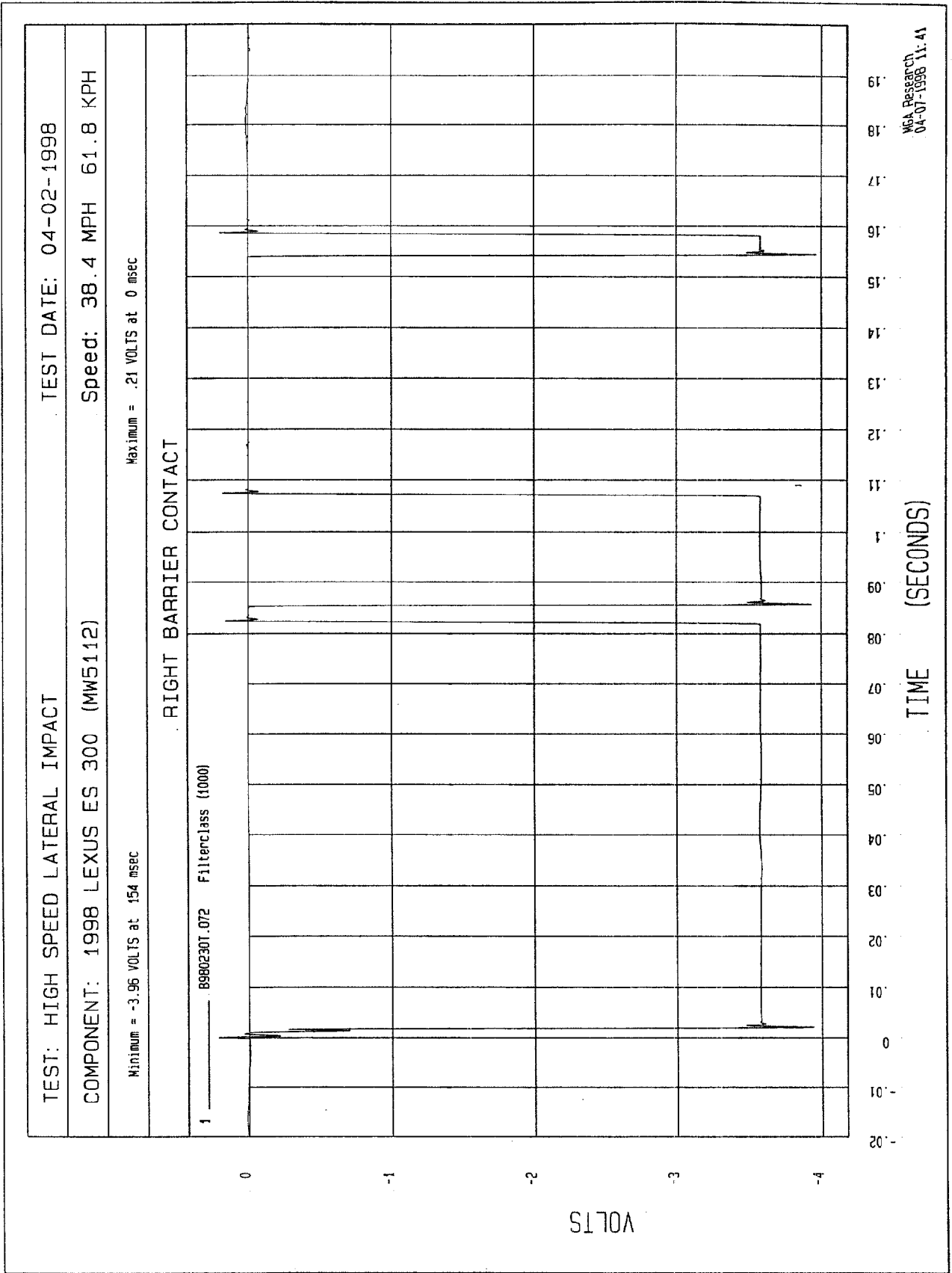
MCA Research
04-02-1998 11:41











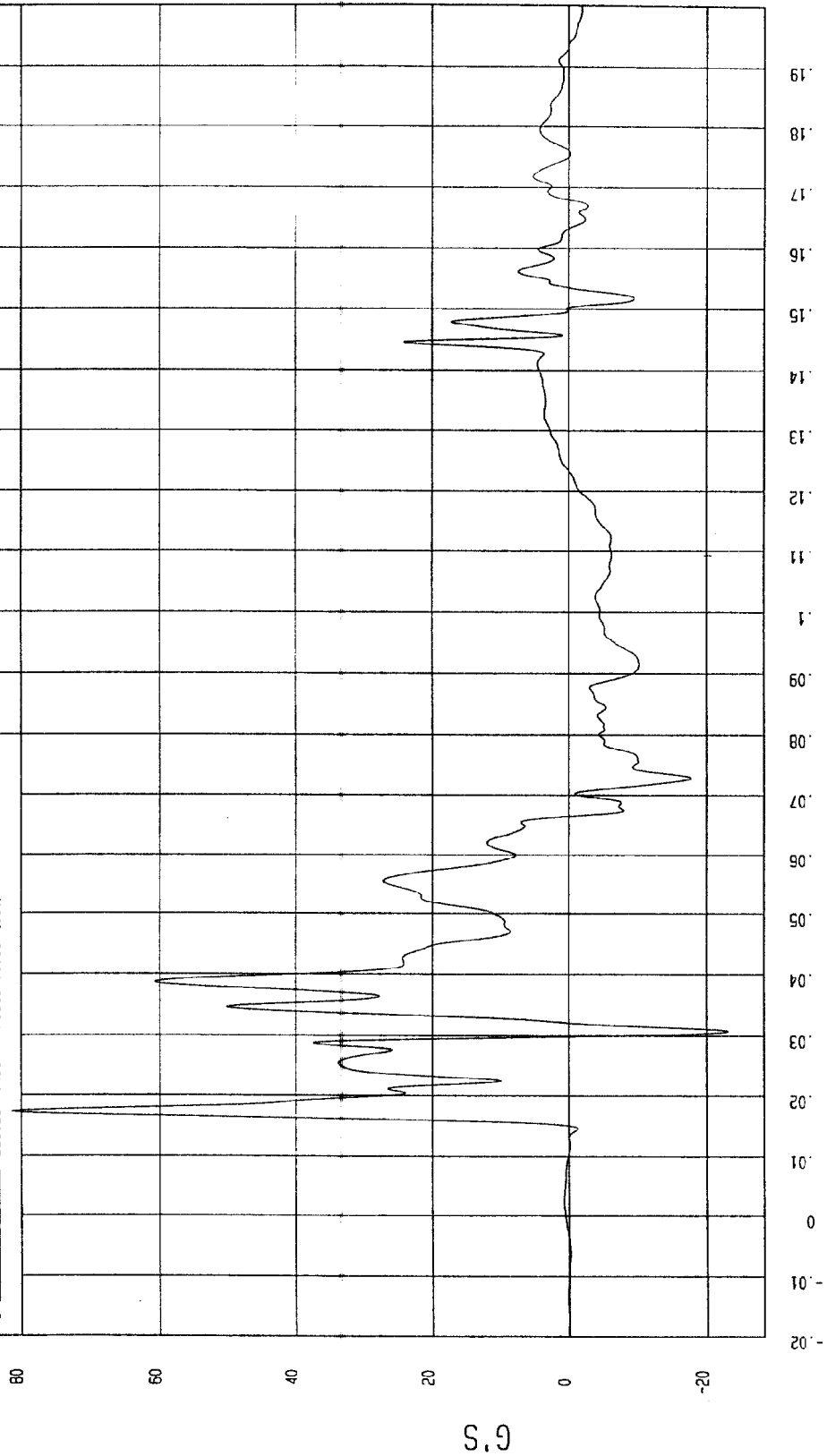
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

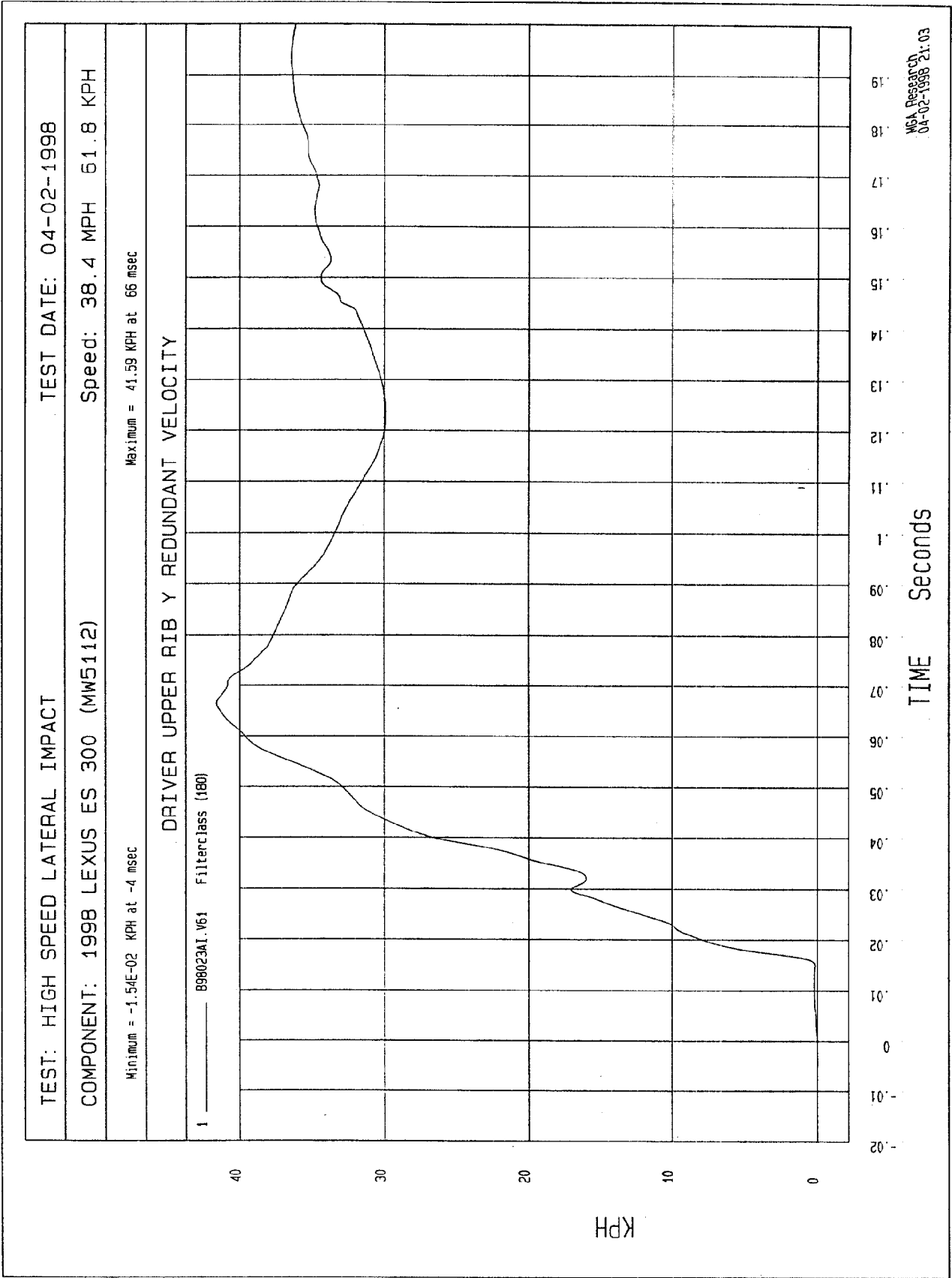
Minimum = -23.06 G'S at 31 msec Maximum = 81.41 G'S at 17 msec

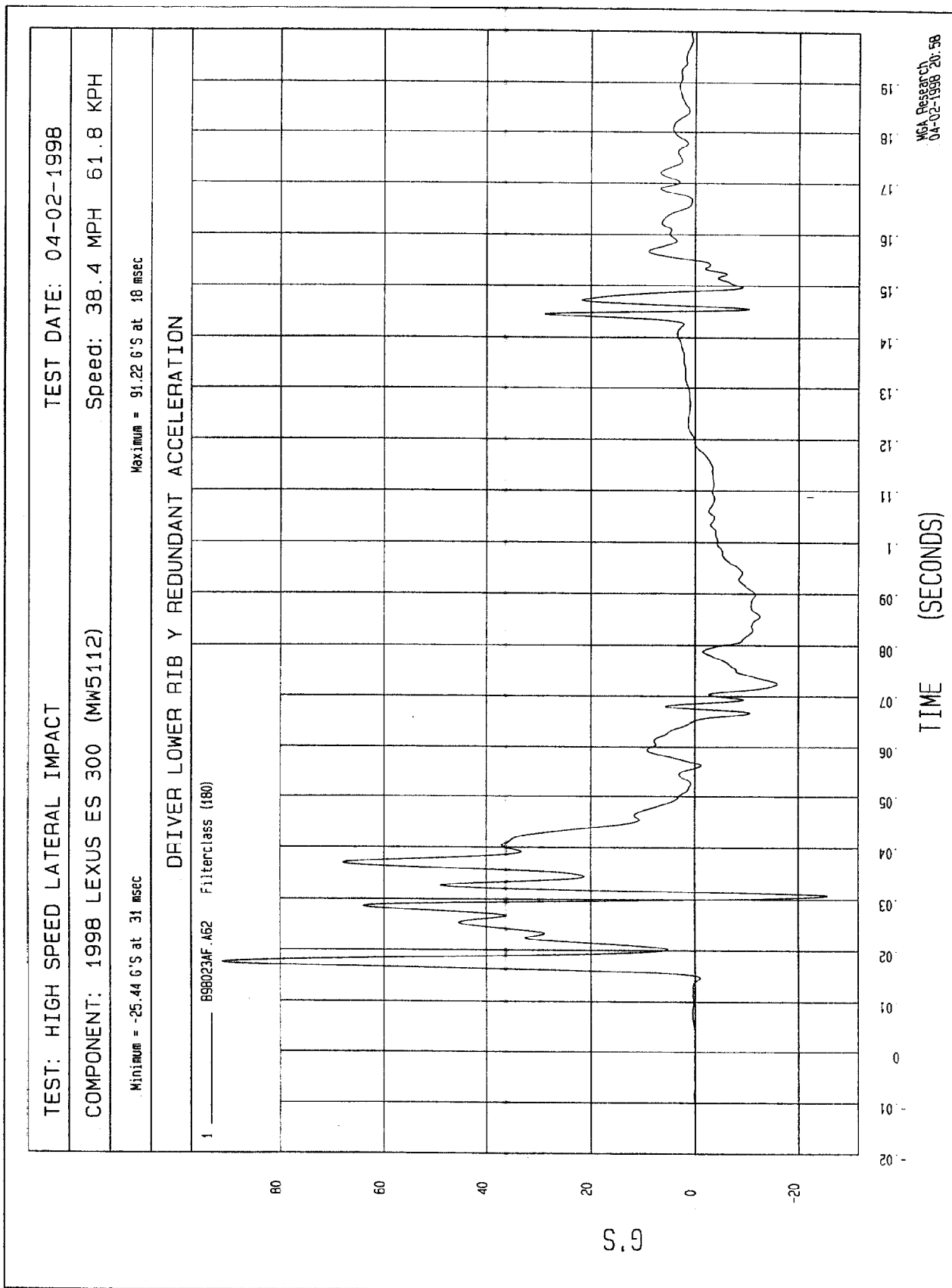
DRIVER UPPER RIB Y REDUNDANT ACCELERATION

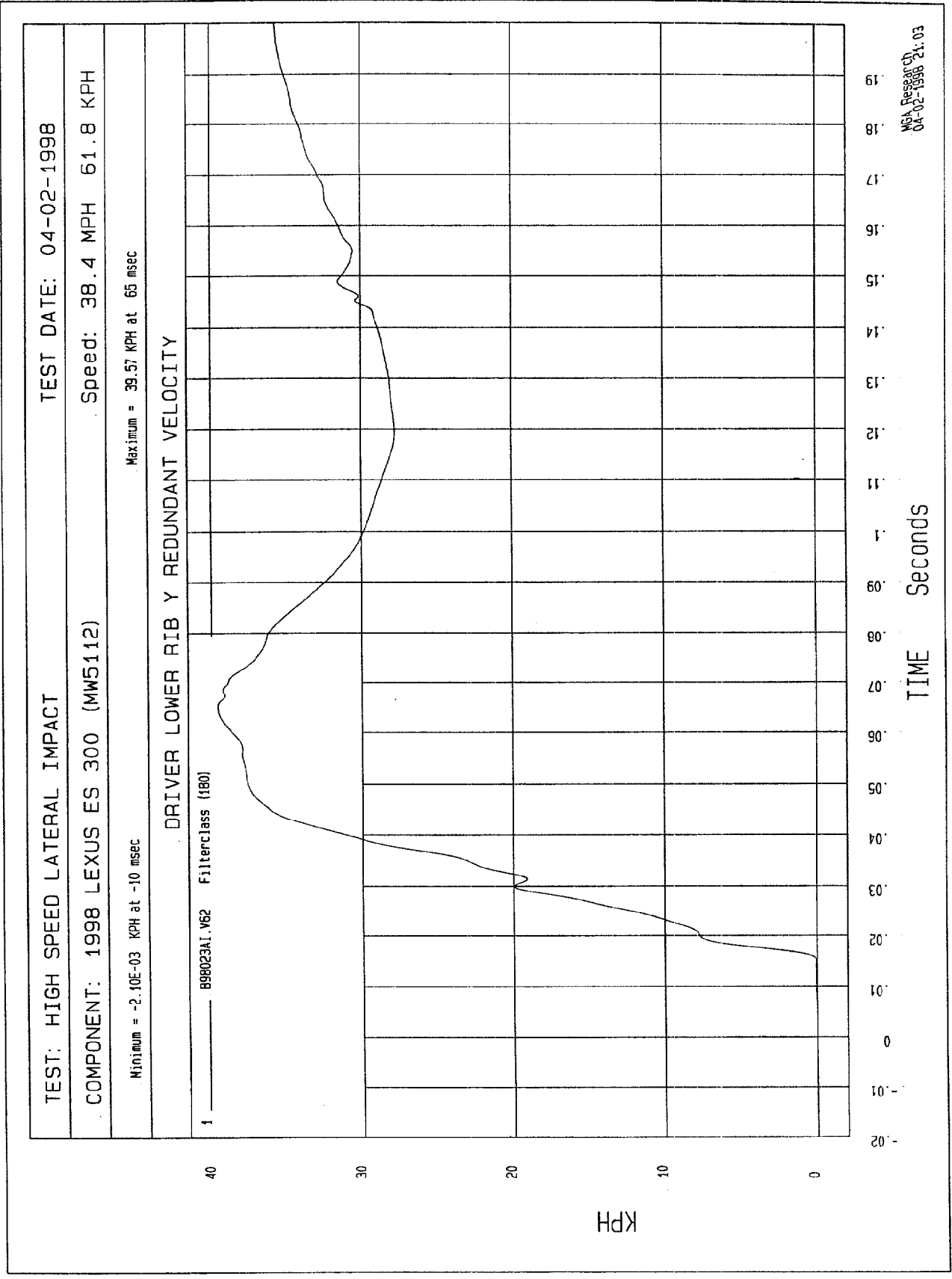
1 898023AF.A61 Filterclass (180)



WGA Research
04-02-1998 20:57





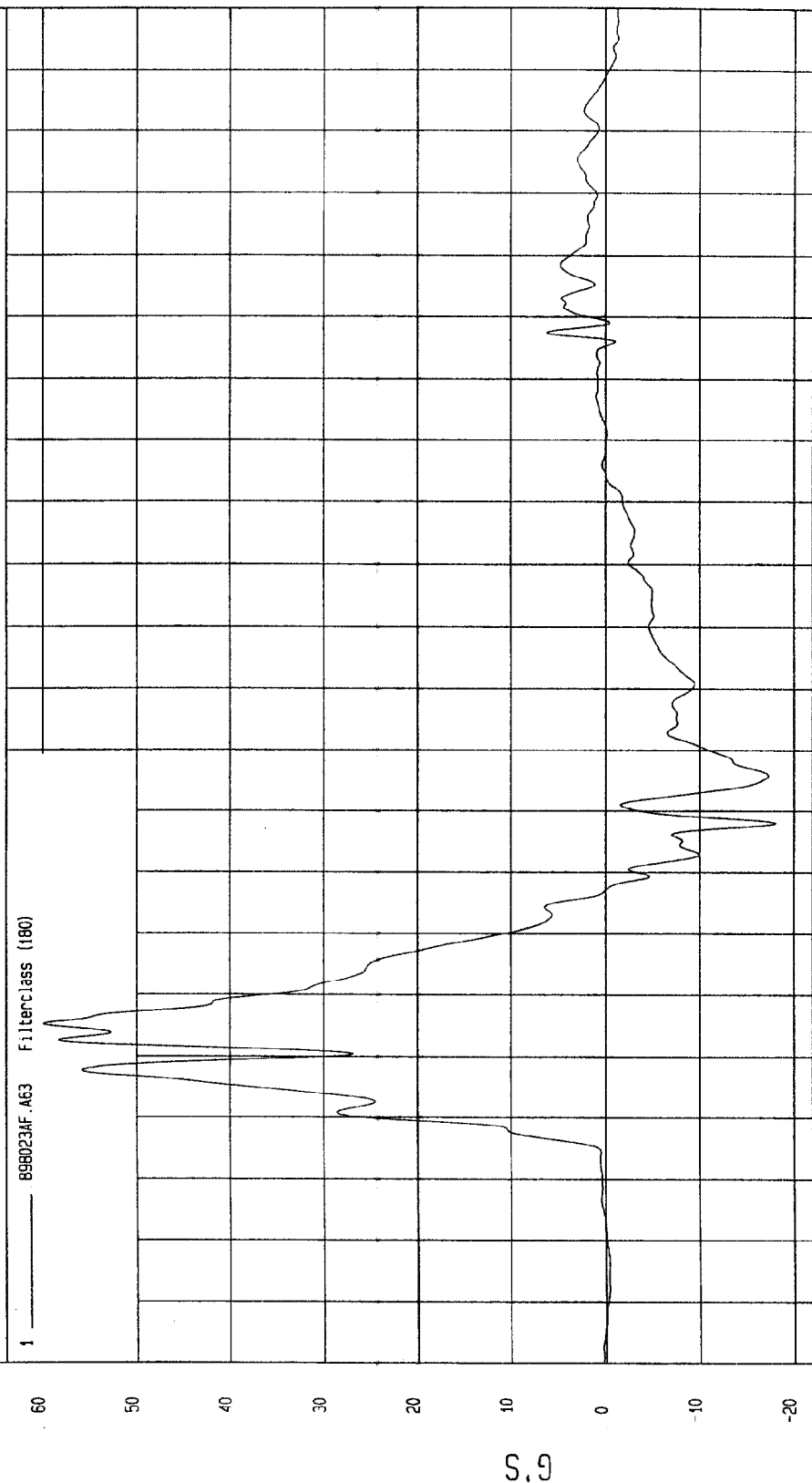


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

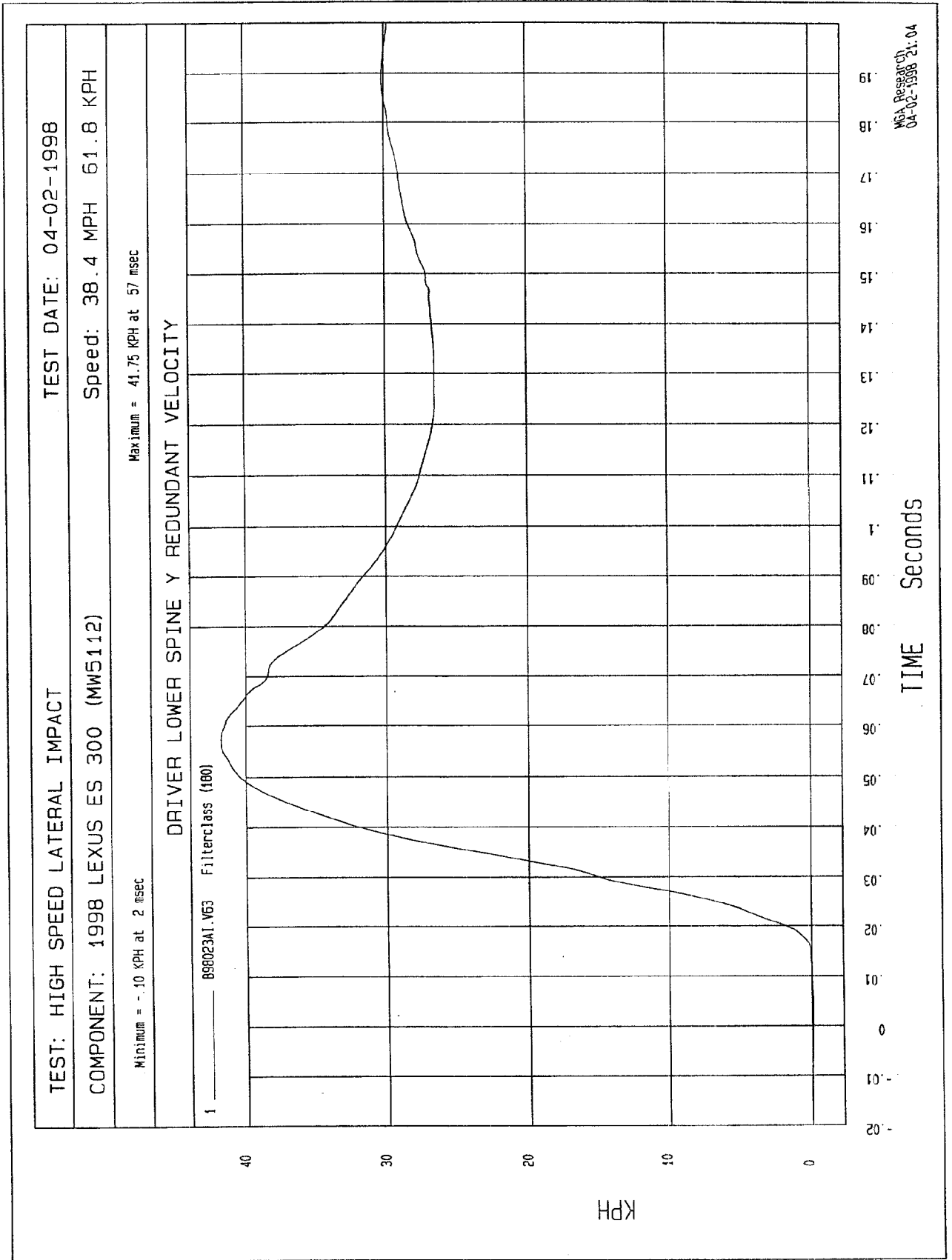
COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -18.05 G'S at 68 msec Maximum = 59.95 G'S at 35 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION



MGA Research
04-02-1998 20:58



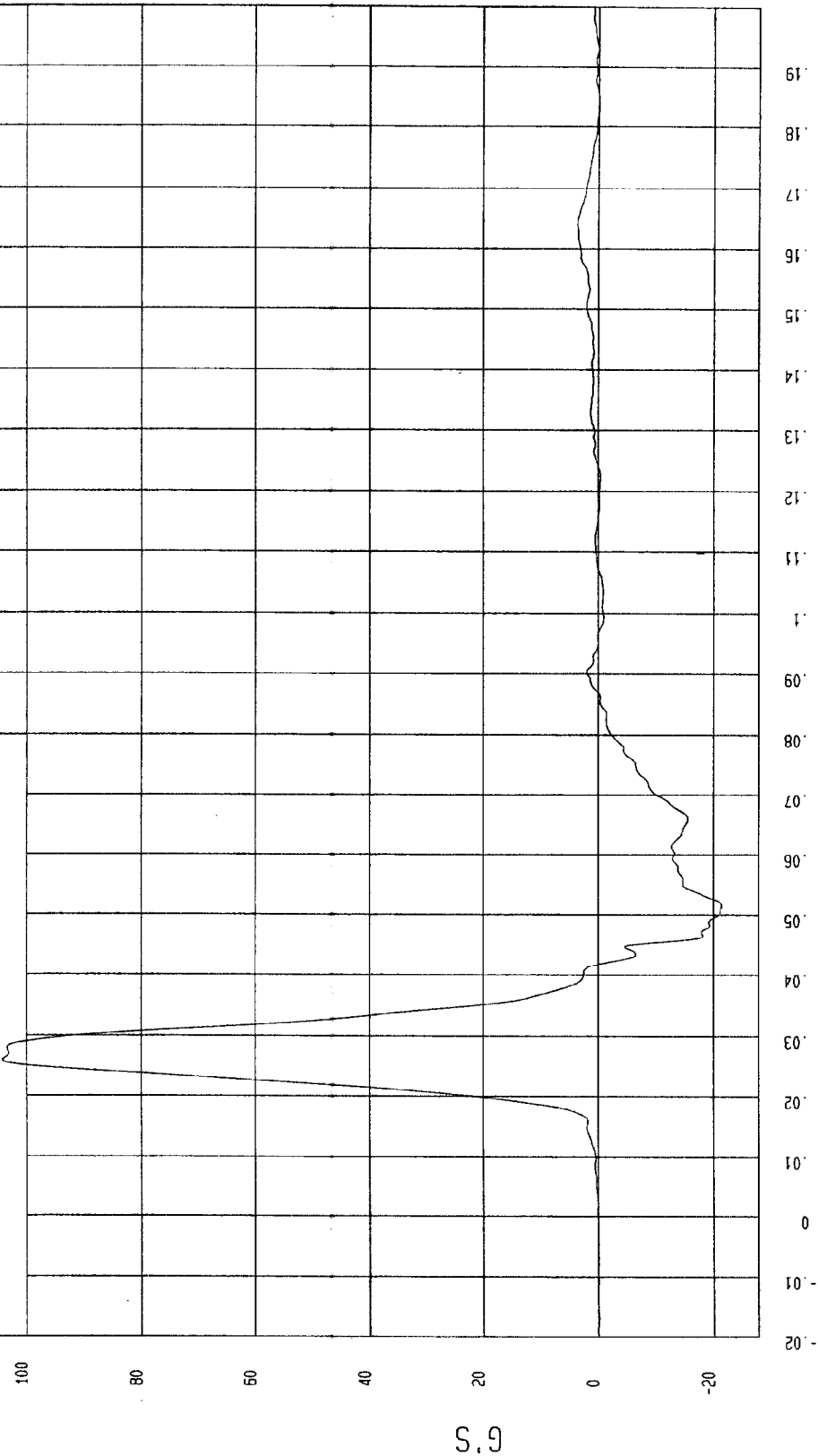
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

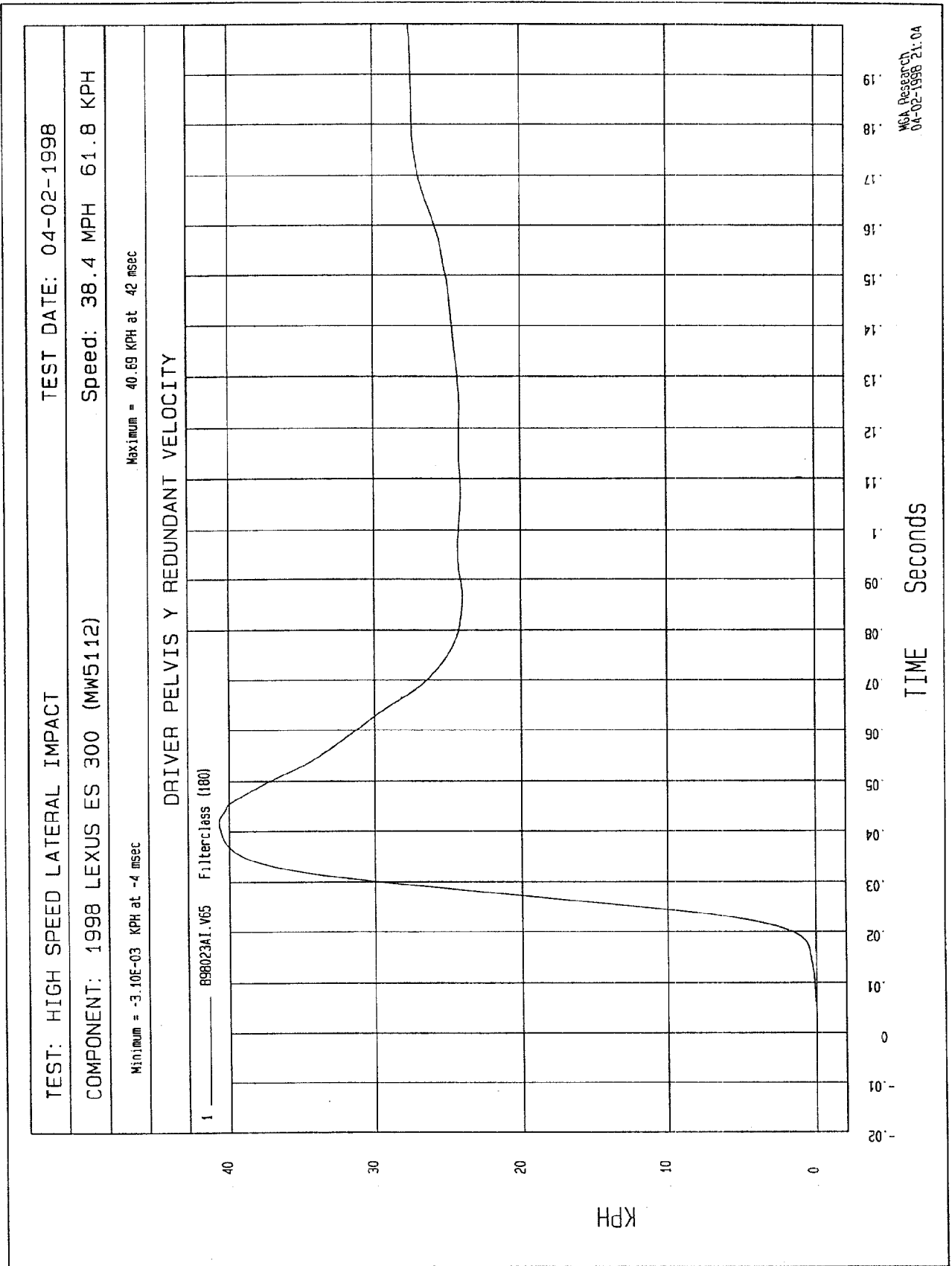
Minimum = -21.46 G'S at 52 msec Maximum = 104.15 G'S at 26 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION

1 998023AF A65 Filterclass (180)



WGA Research
04-02-1998 20:58

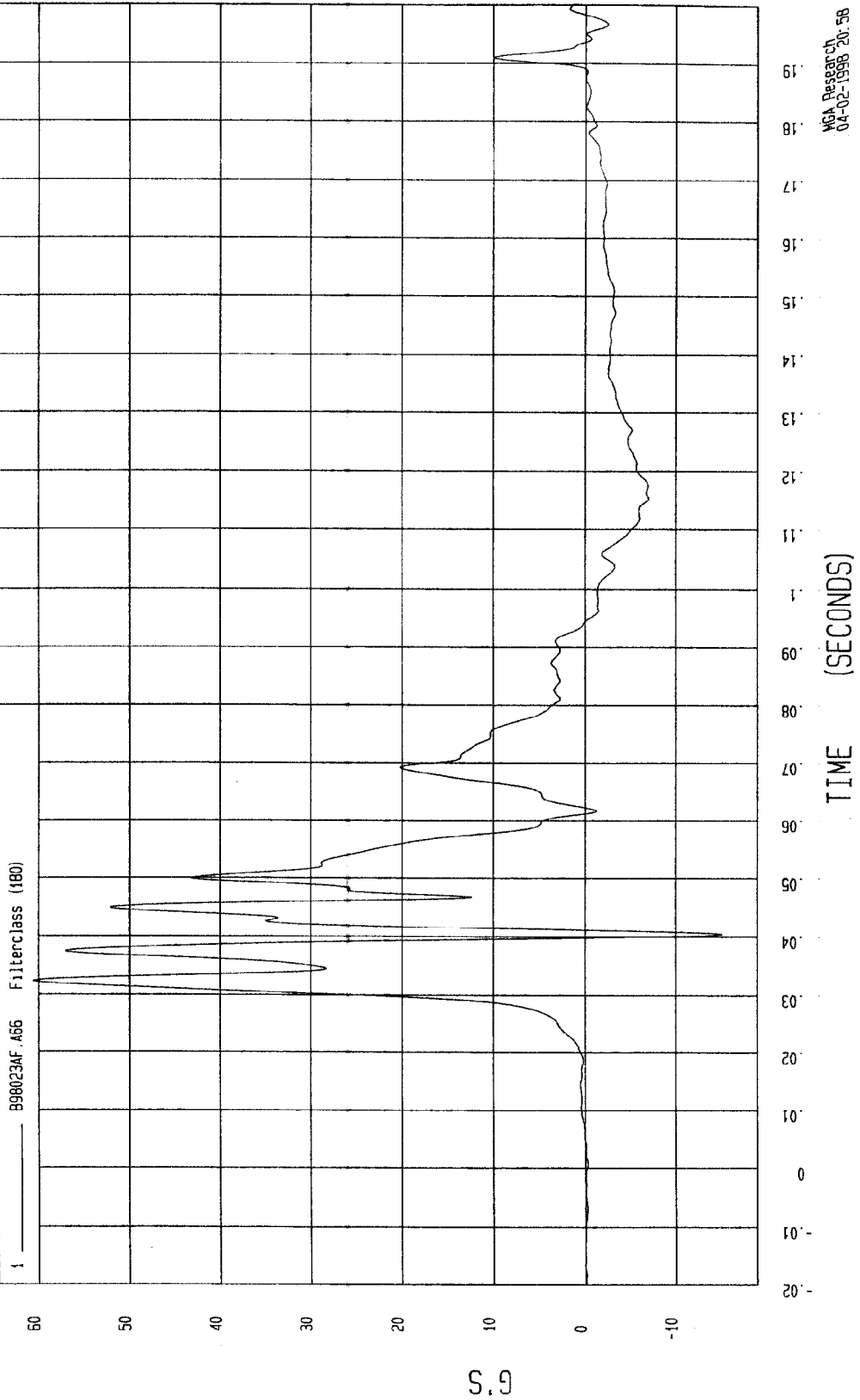


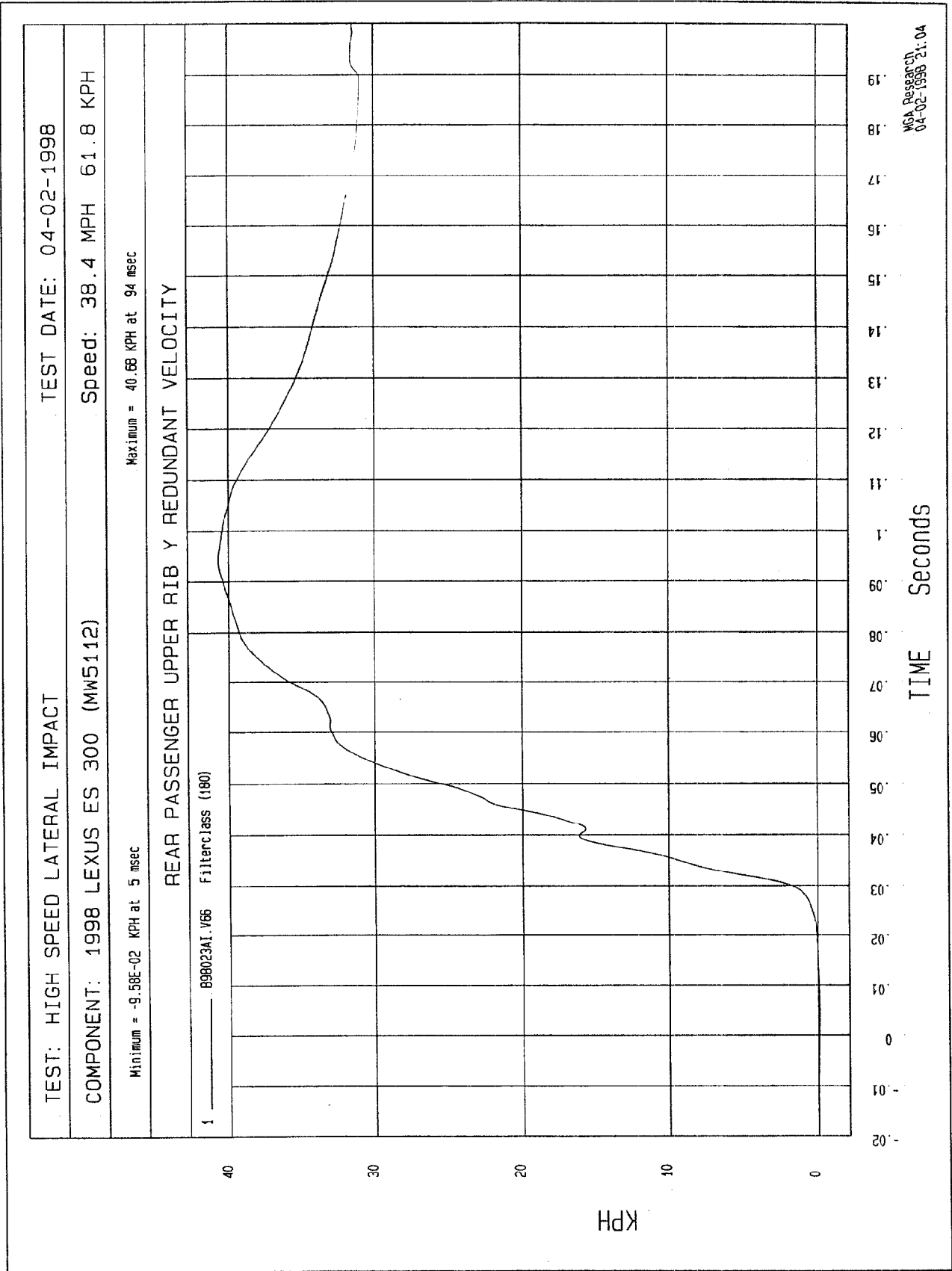
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

Minimum = -15.03 G'S at 40 msec Maximum = 60.60 G'S at 32 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION





TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 04-02-1998

Speed: 38.4 MPH 61.8 KPH

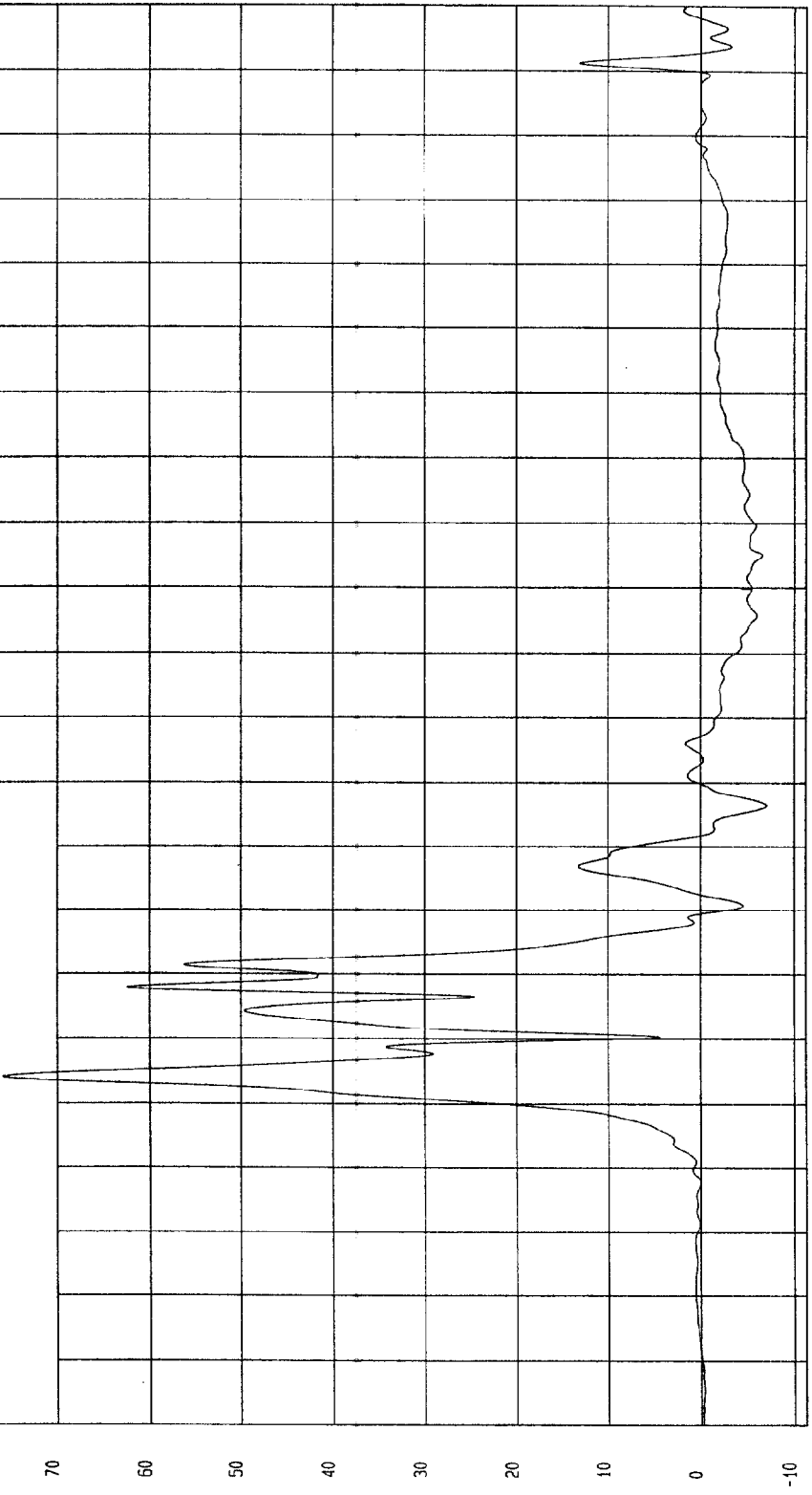
COMPONENT: 1998 LEXUS ES 300 (MW5112)

Maximum = 75.79 G'S at 34 msec

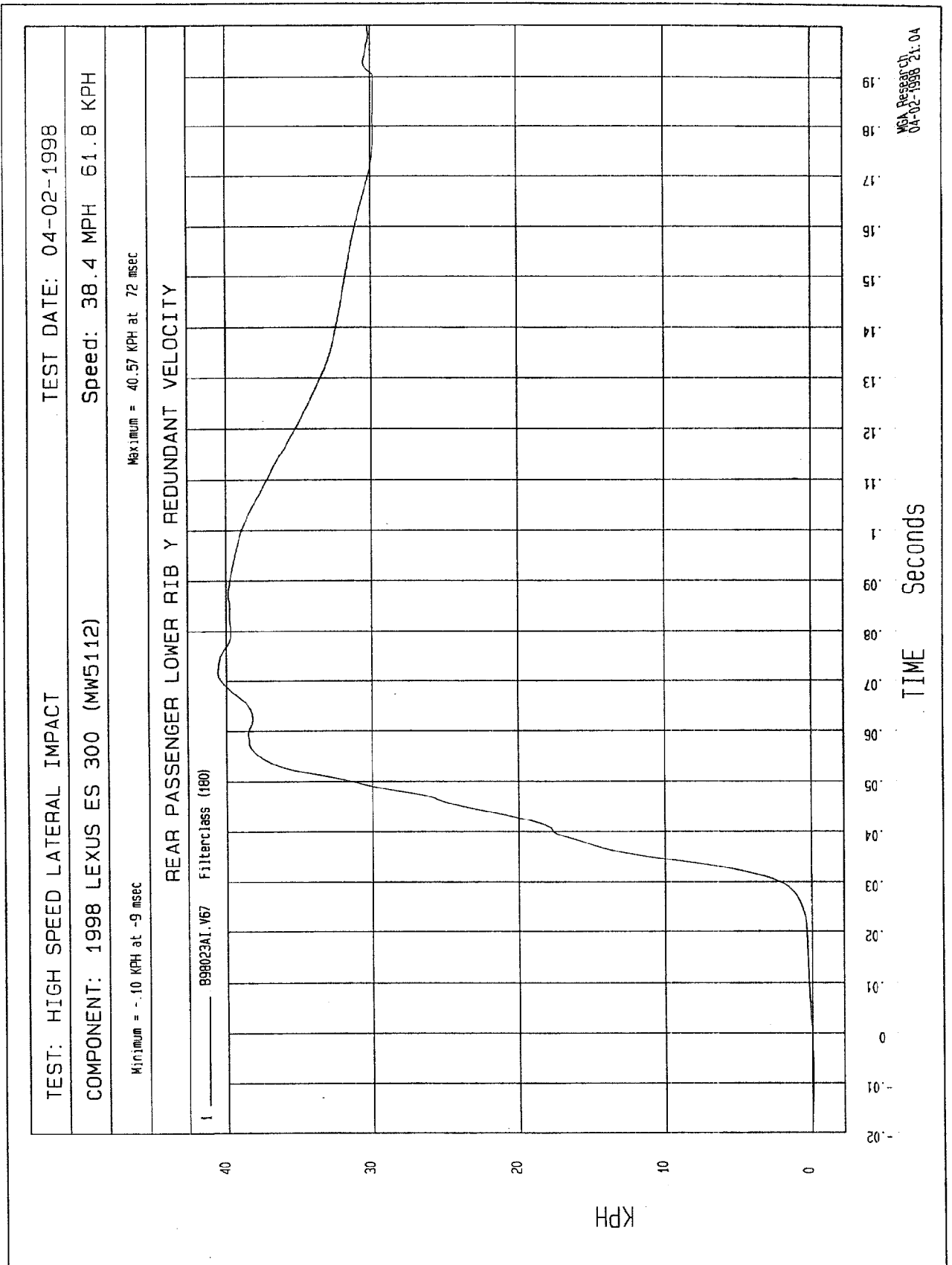
Minimum = -7.06 G'S at 76 msec

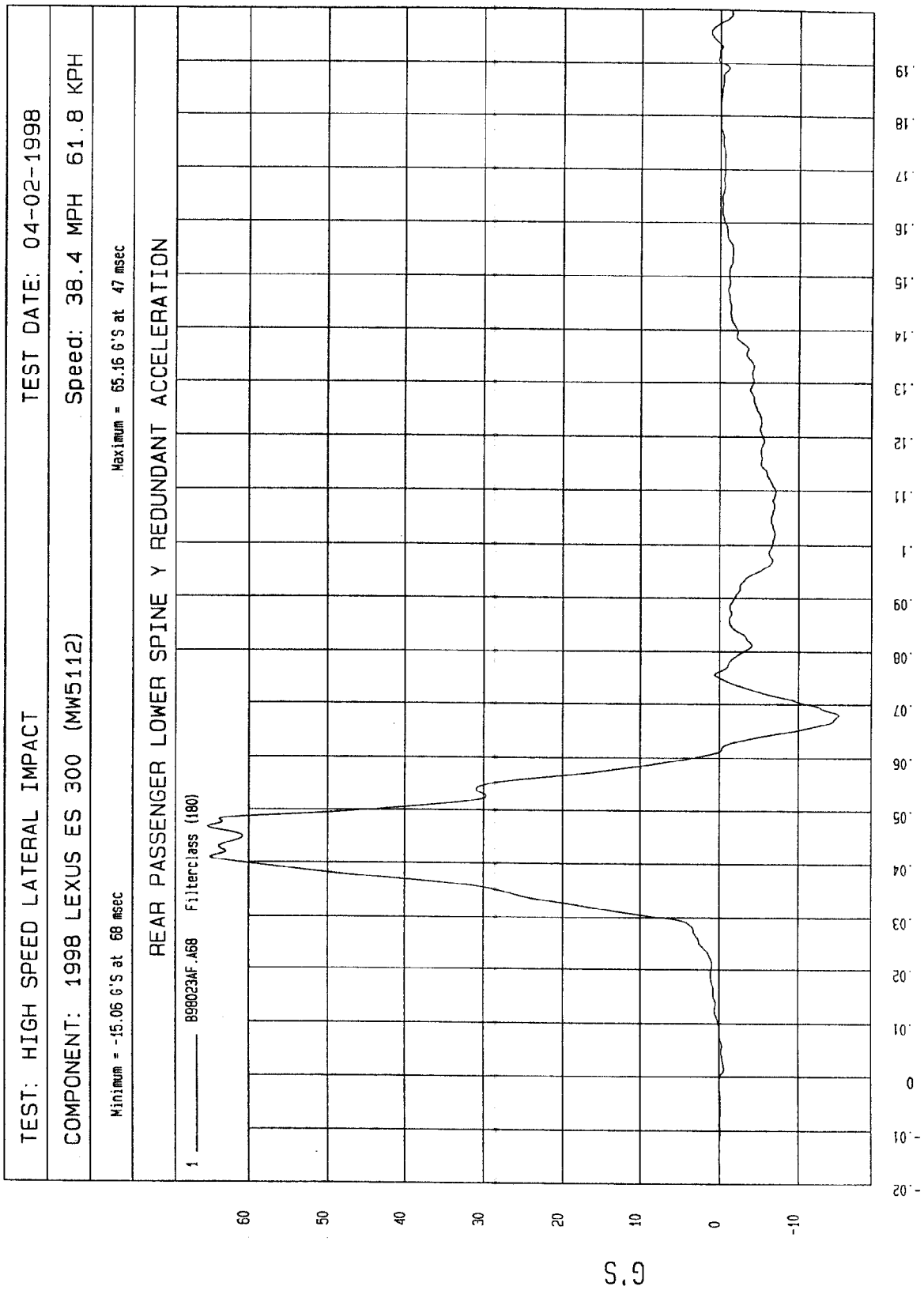
REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 898023AF.A57 Filterclass (180)

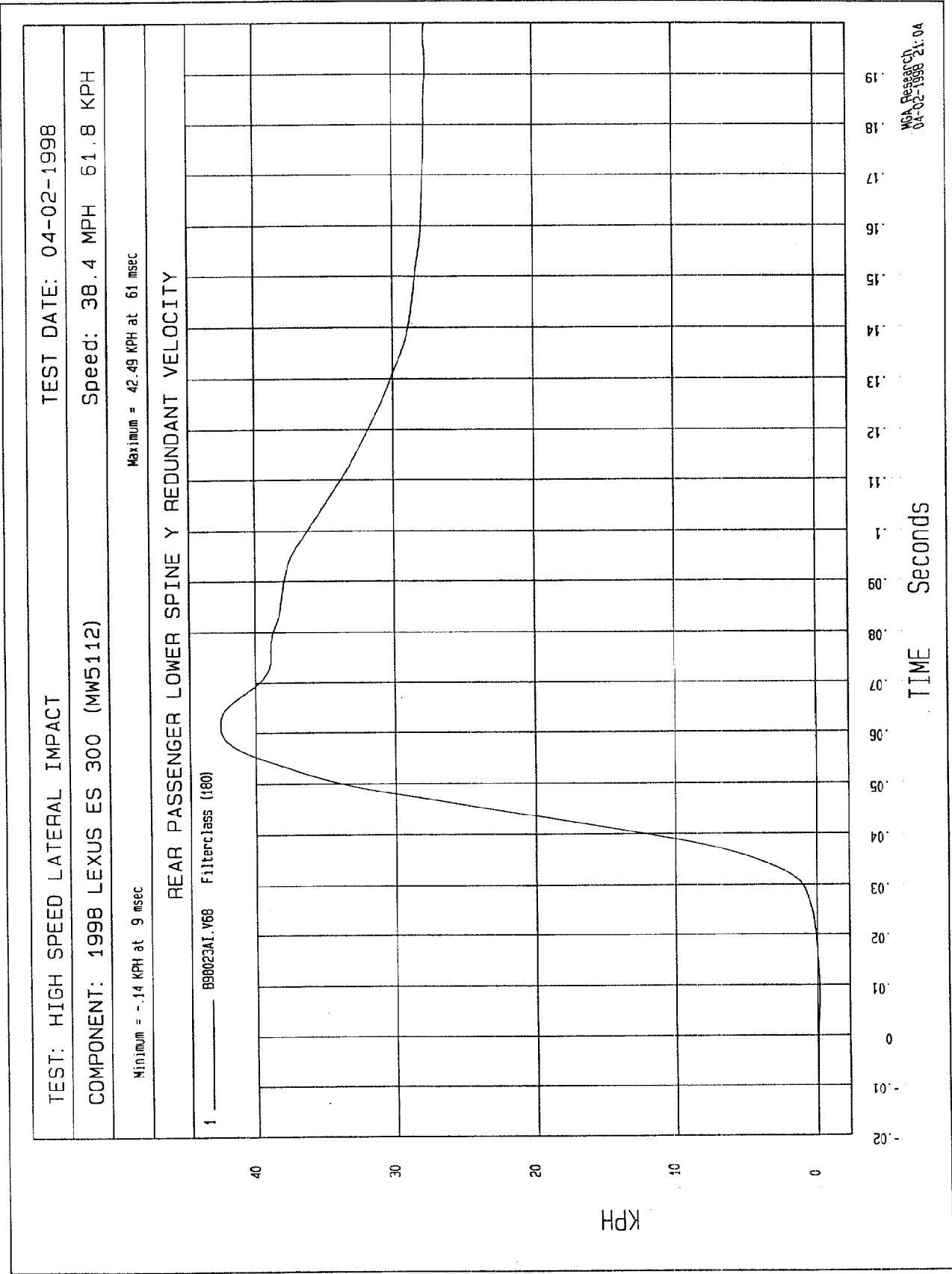


NCA Research
04-02-1998 20:58



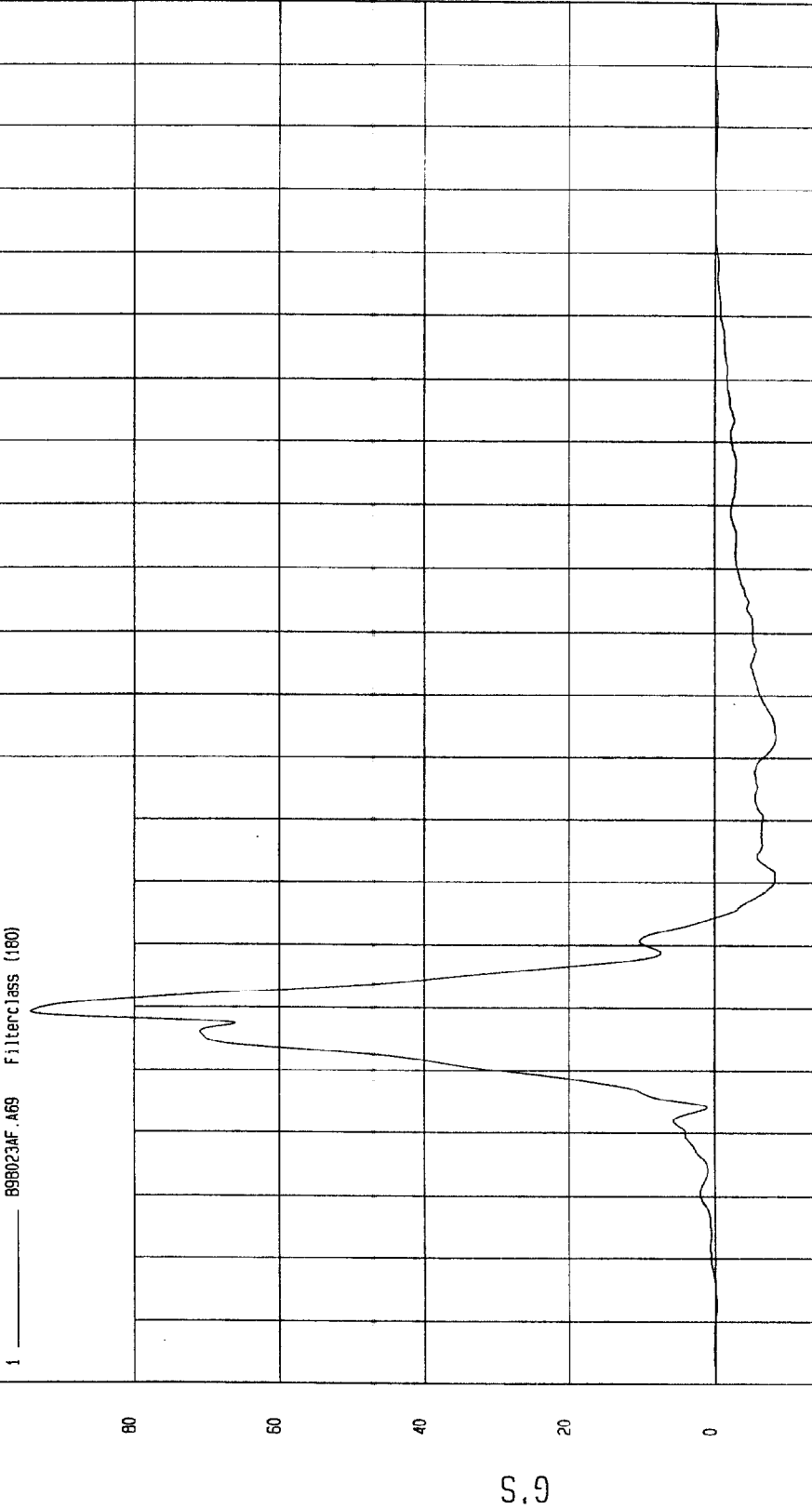


MCA Research
04-02-1998 20:58



TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)	Speed: 38.4 MPH 61.8 KPH
Minimum = -8.33 G'S at 83 msec	
Maximum = 94.14 G'S at 39 msec	

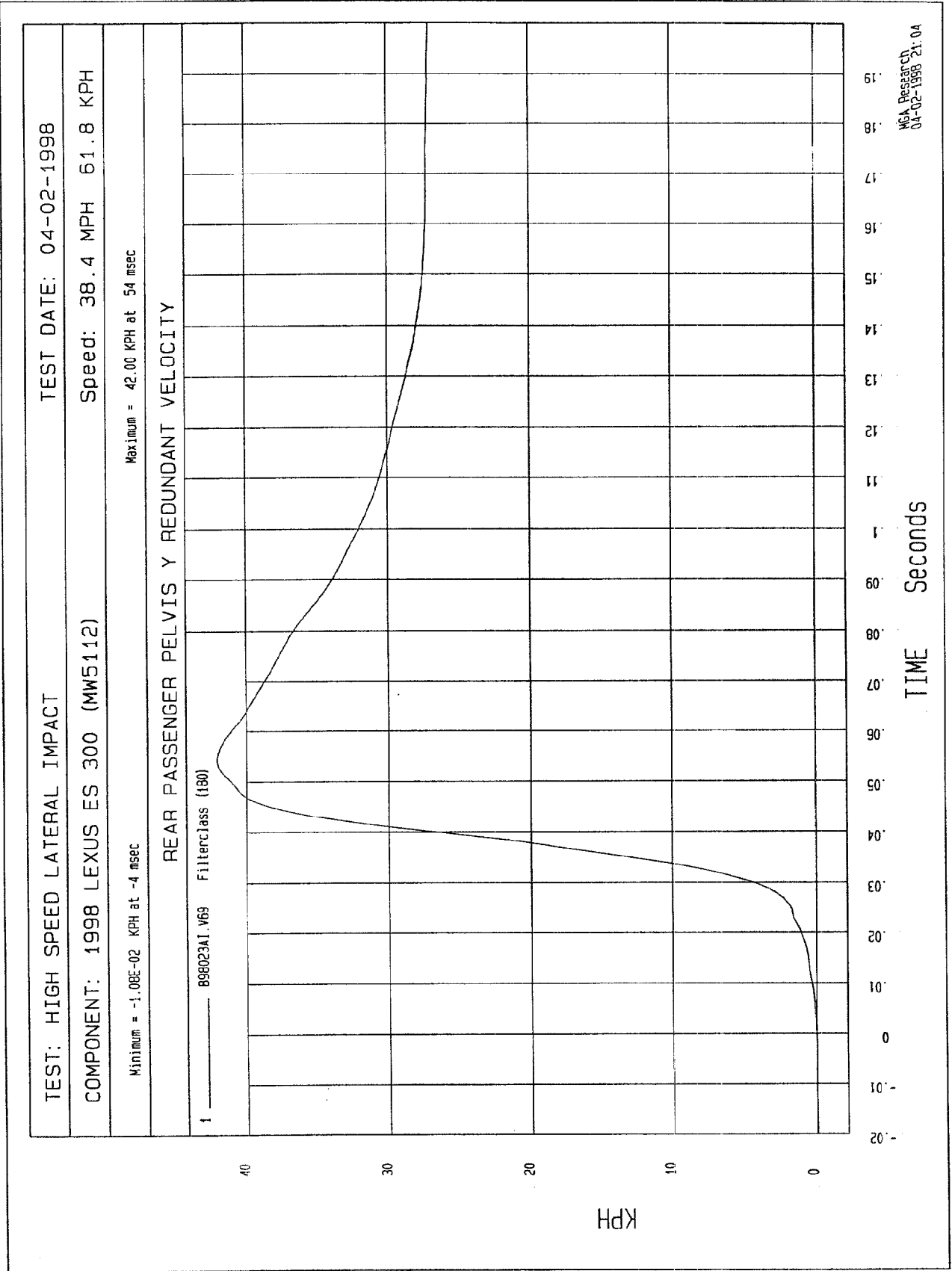
REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION



TIME (SECONDS)

0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.10 0.11 0.12 0.13 0.14 0.15 0.16 0.17 0.18 0.19

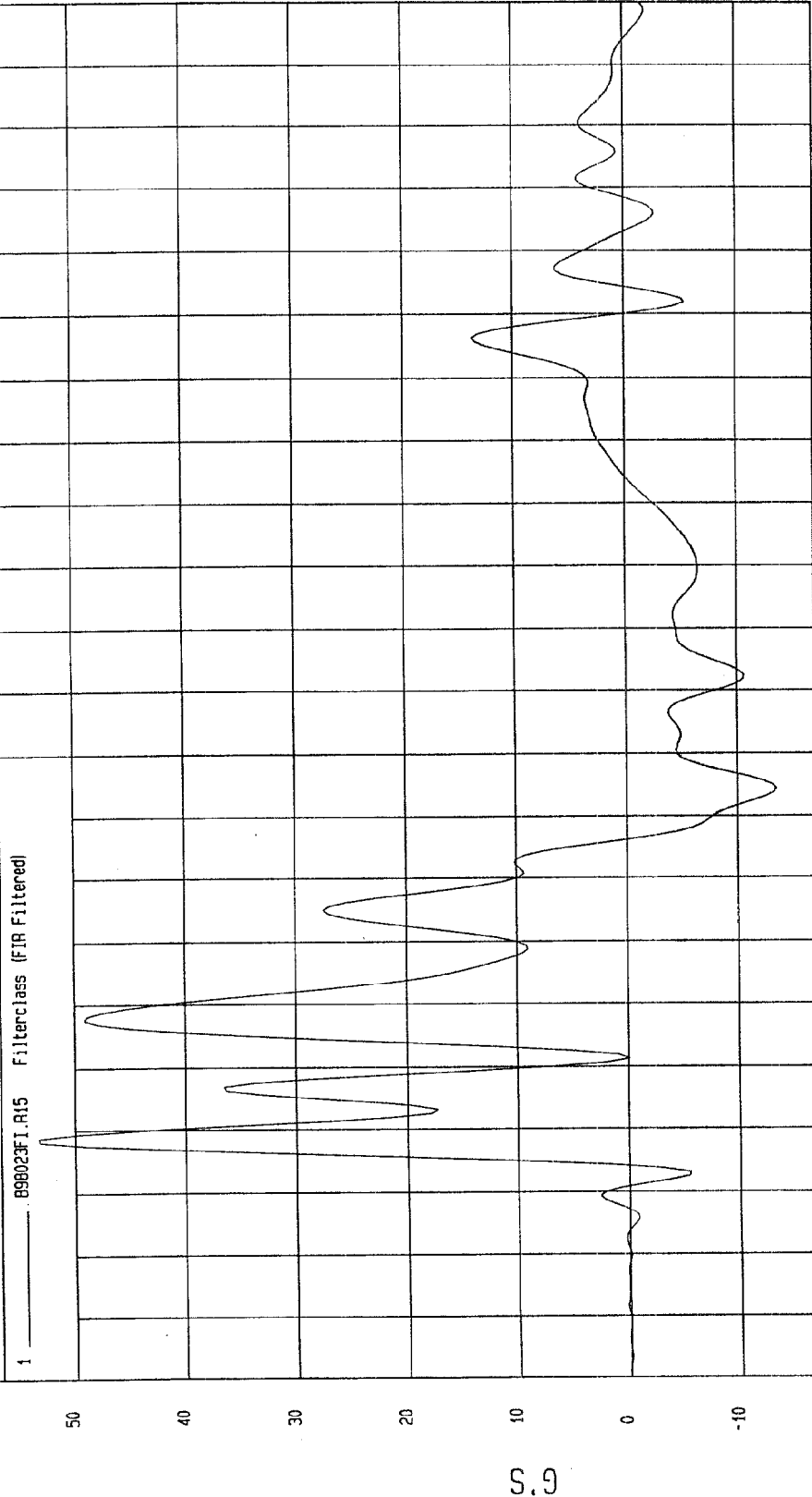
NGA Research
04-02-1998 20:58



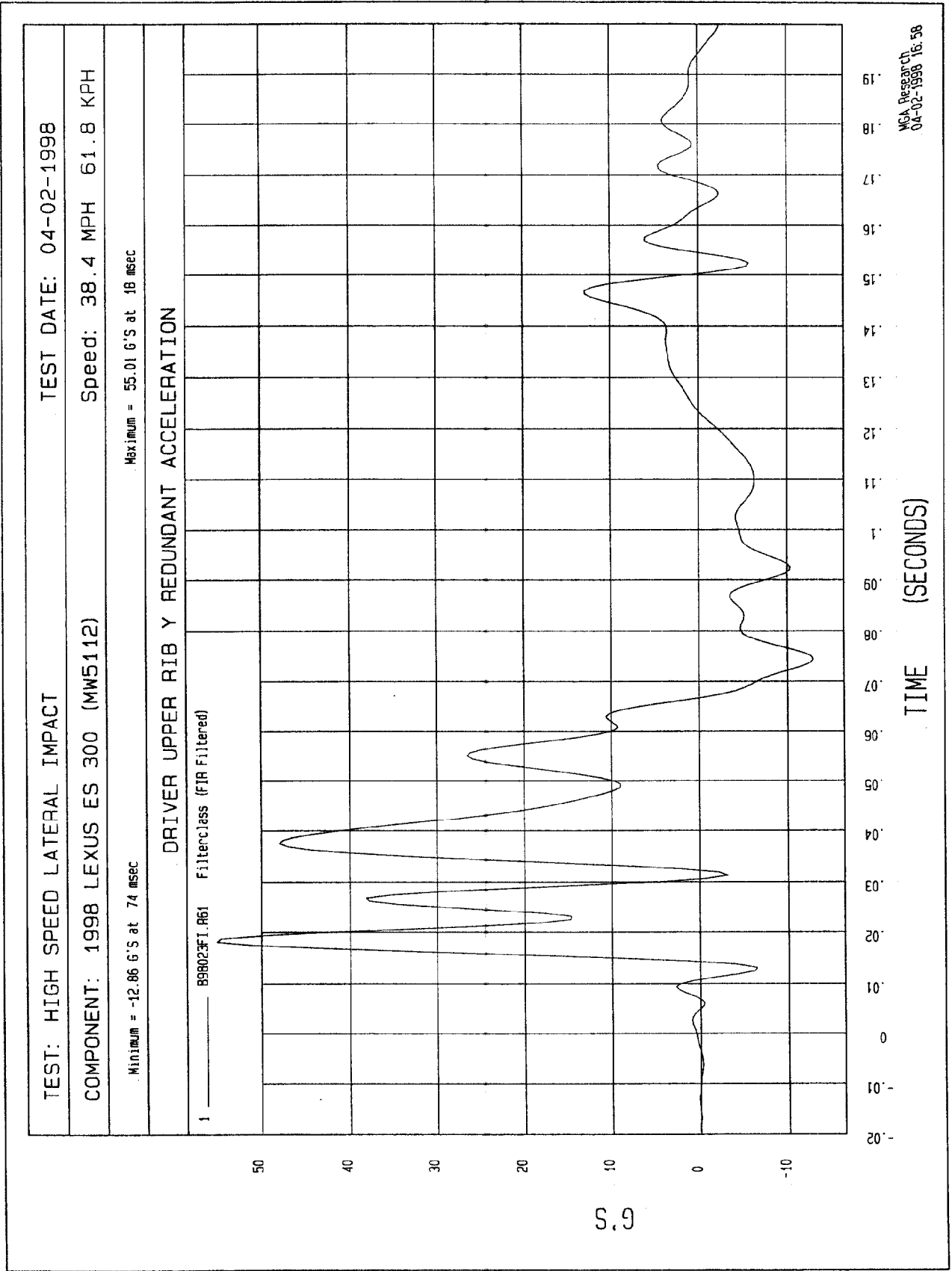
FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

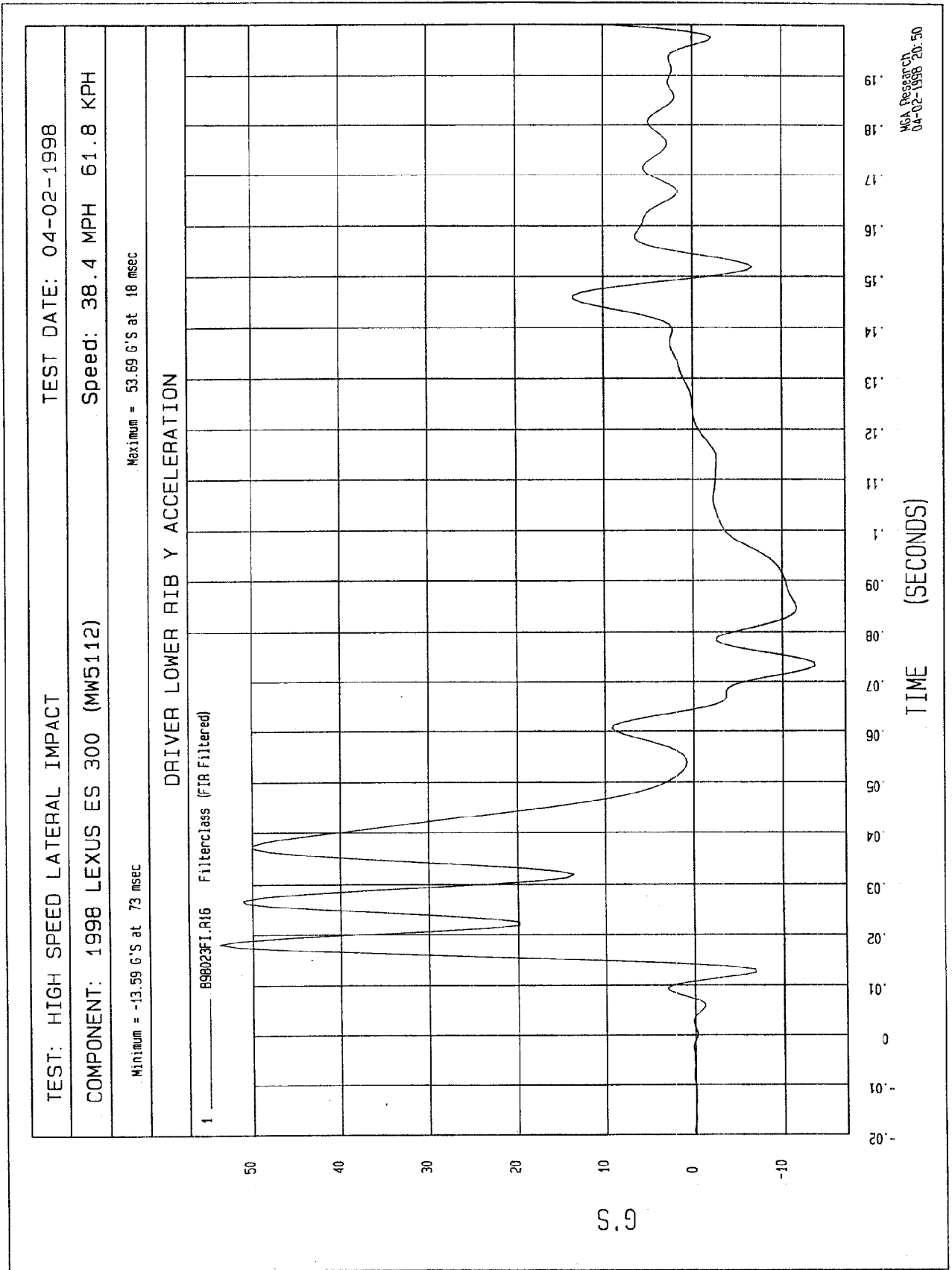
TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 04-02-1998
COMPONENT: 1998 LEXUS ES 300 (MW5112)	Speed: 38.4 MPH 61.8 KPH
Minimum = -13.51 G'S at 74 msec	Maximum = 53.28 G'S at 19 msec

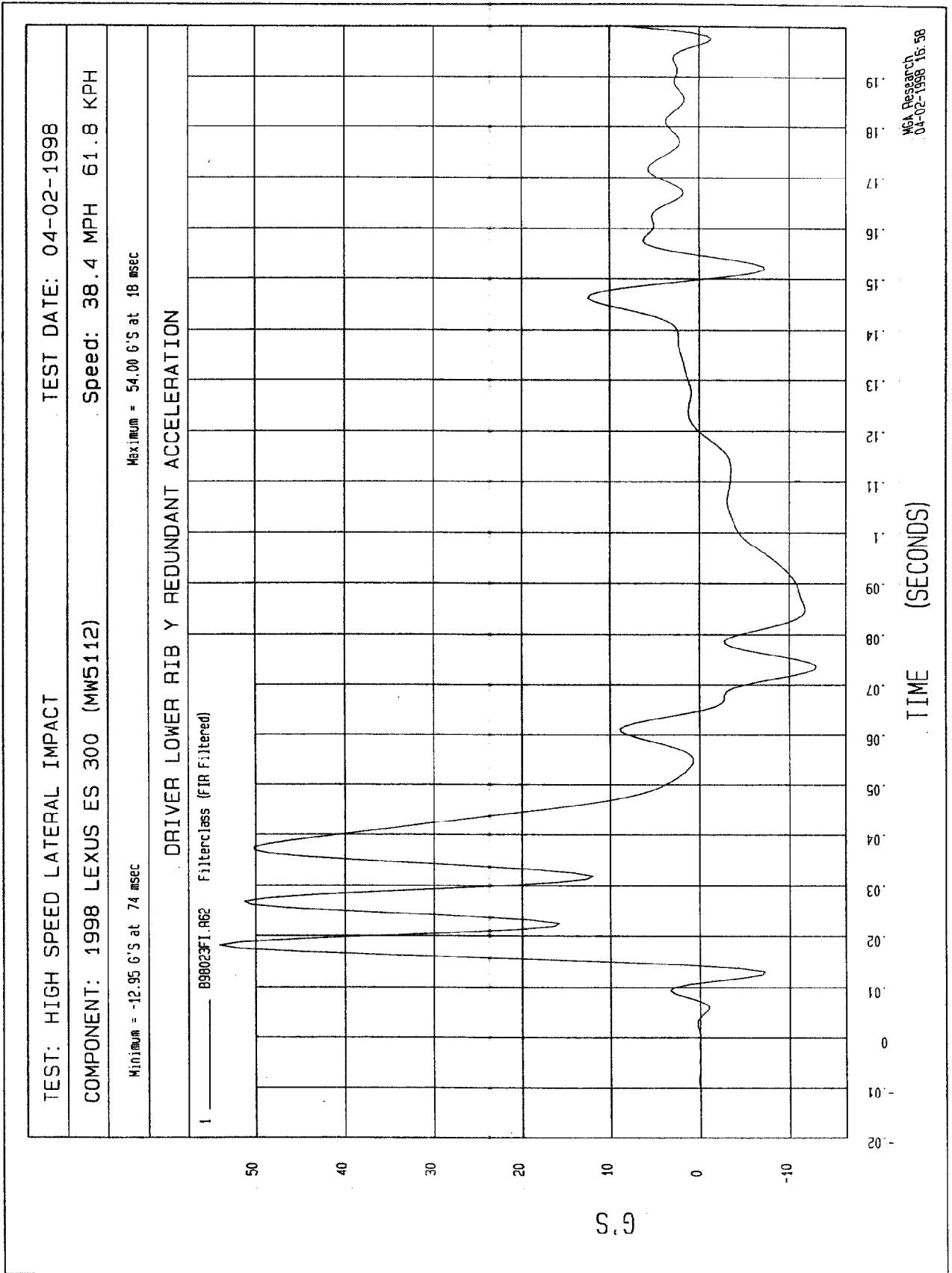
DRIVER UPPER RIB Y ACCELERATION

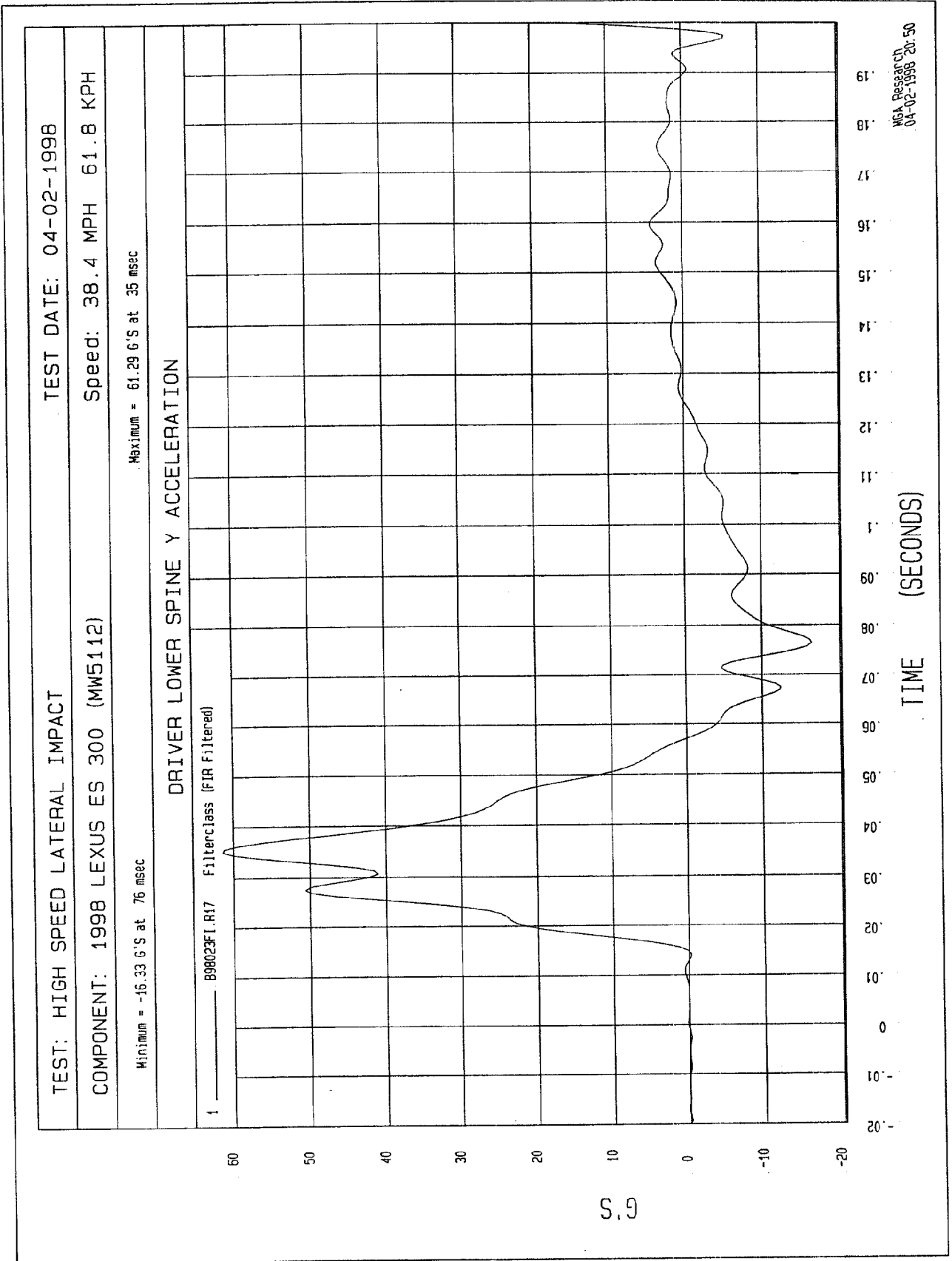


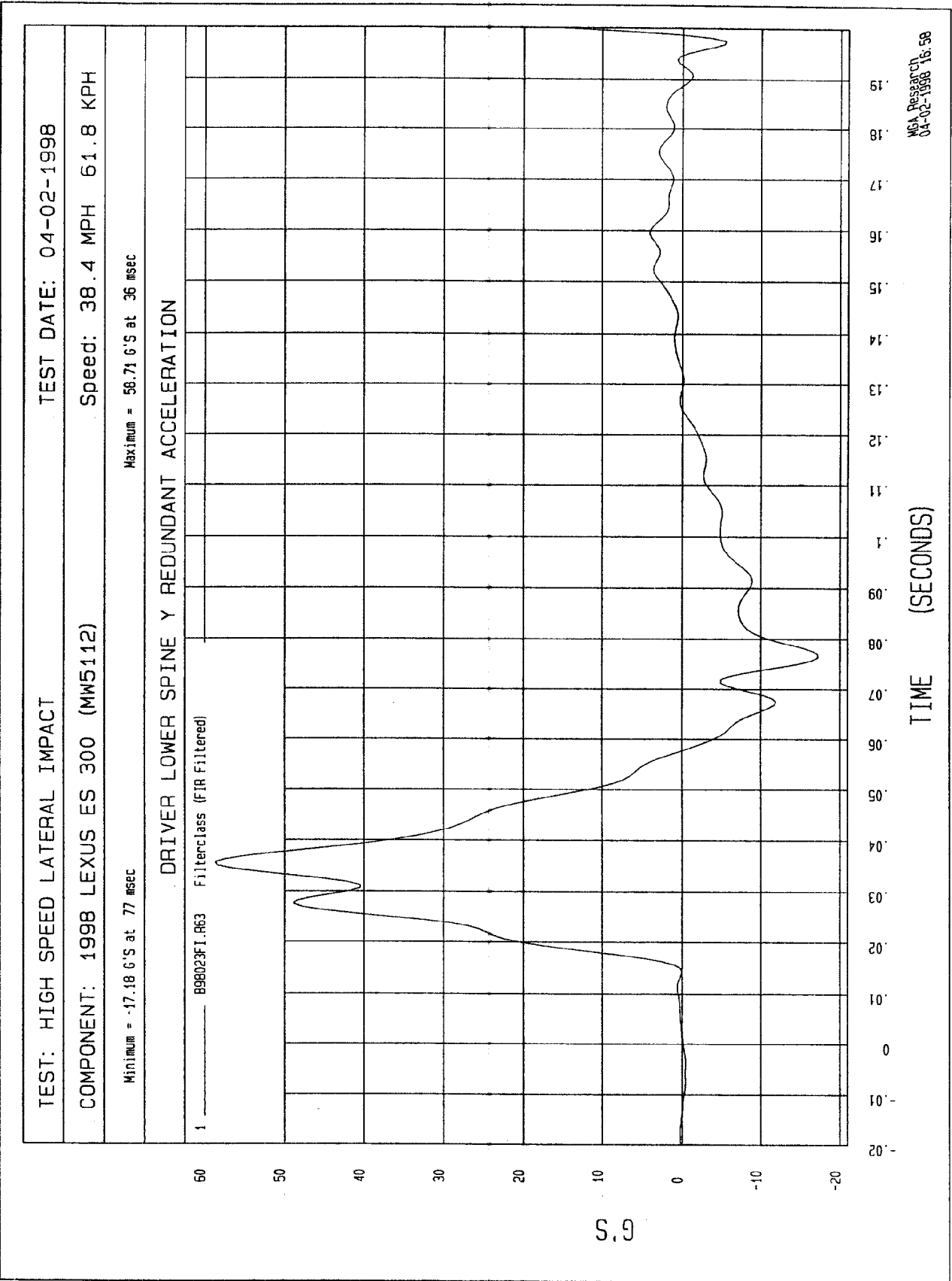
MCA Research
04-02-1998 20.49

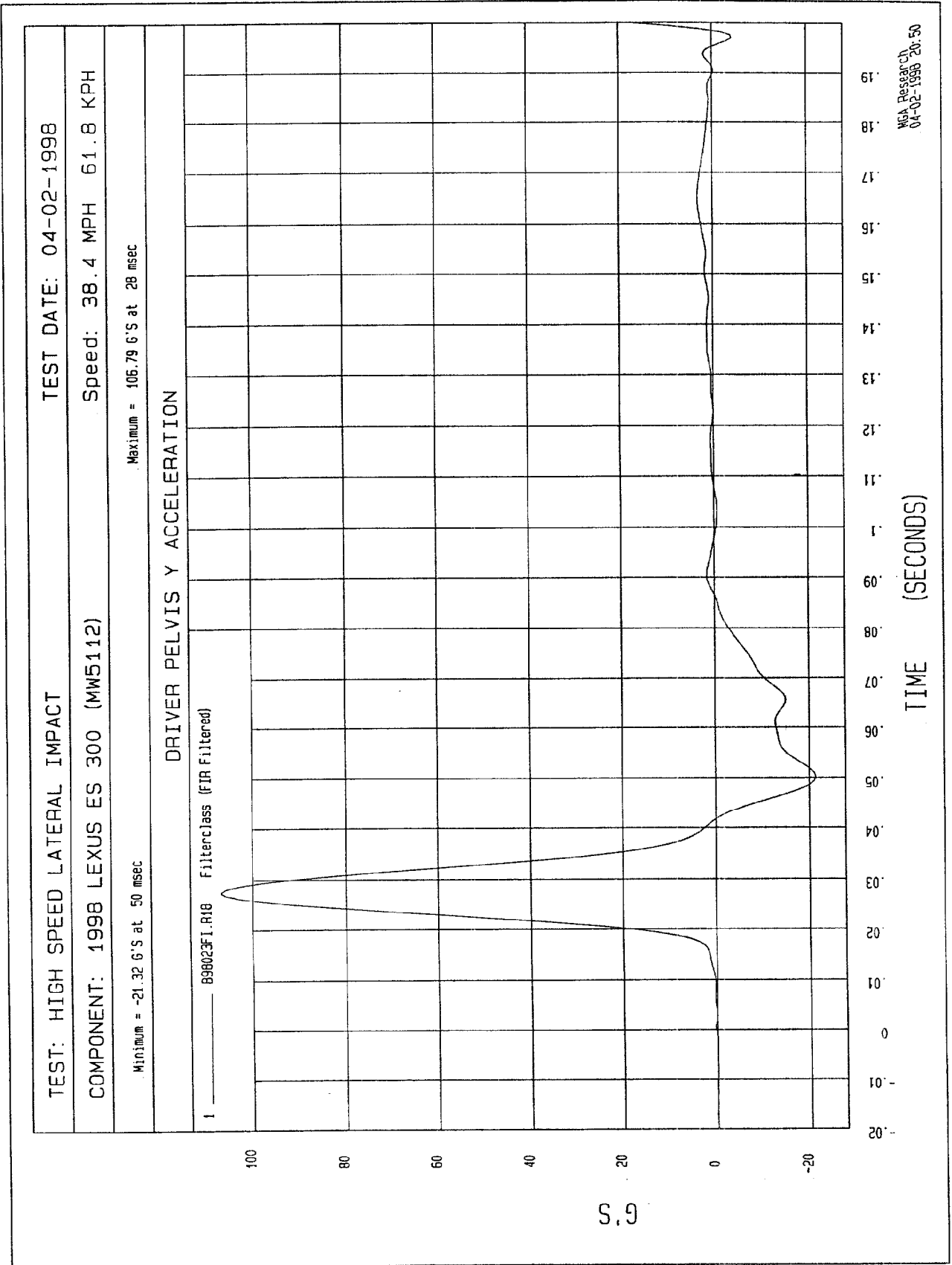


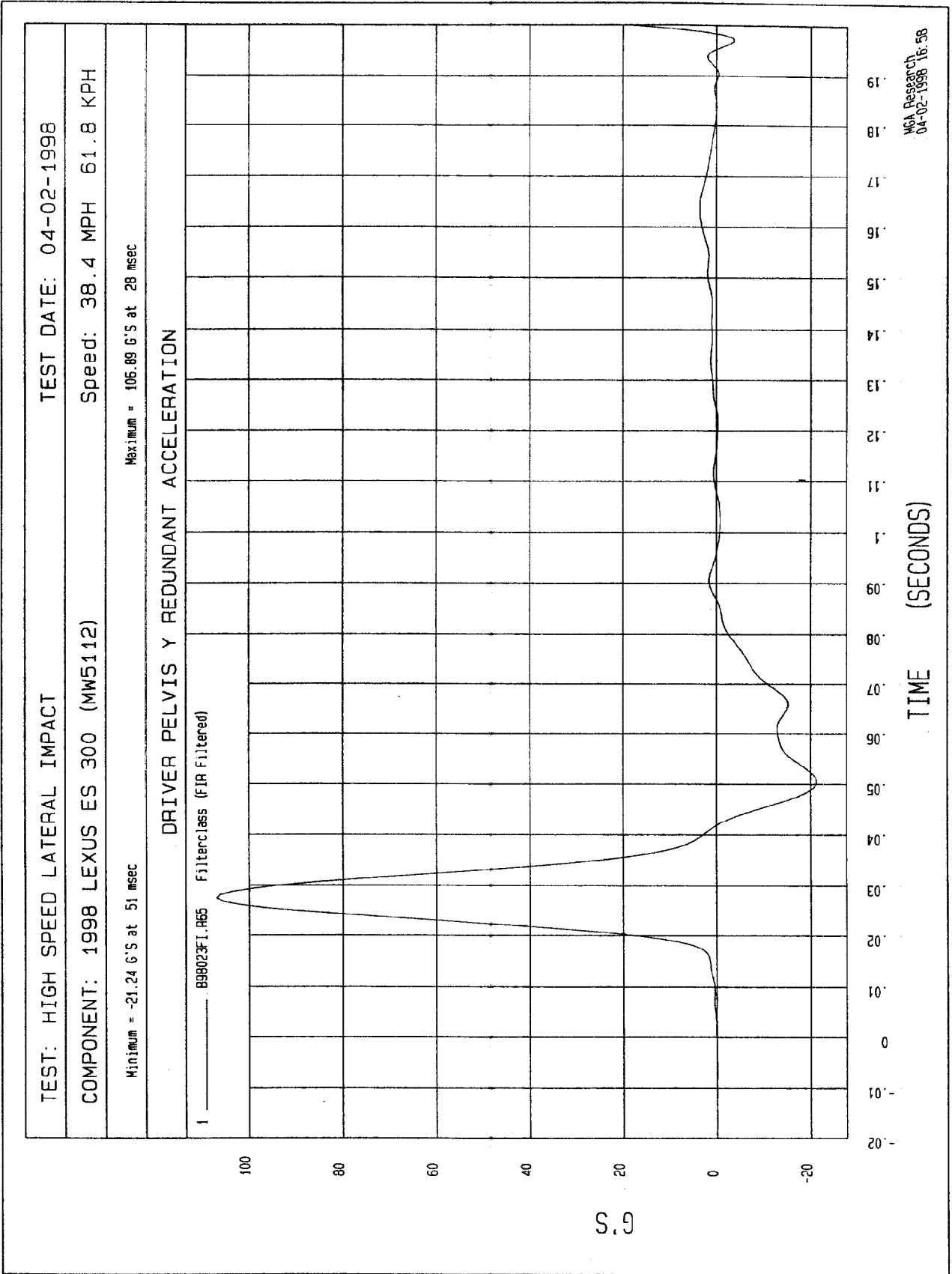


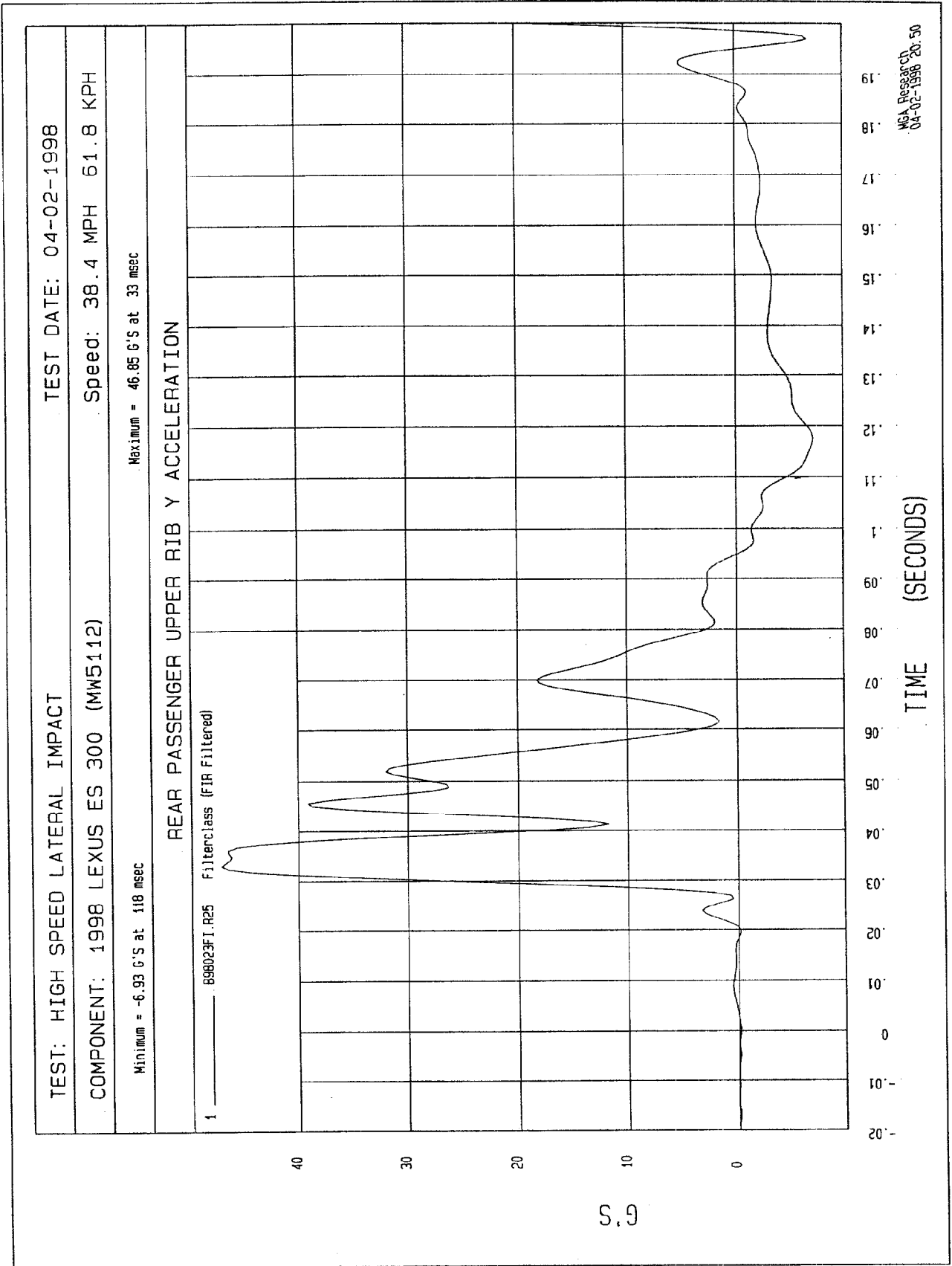


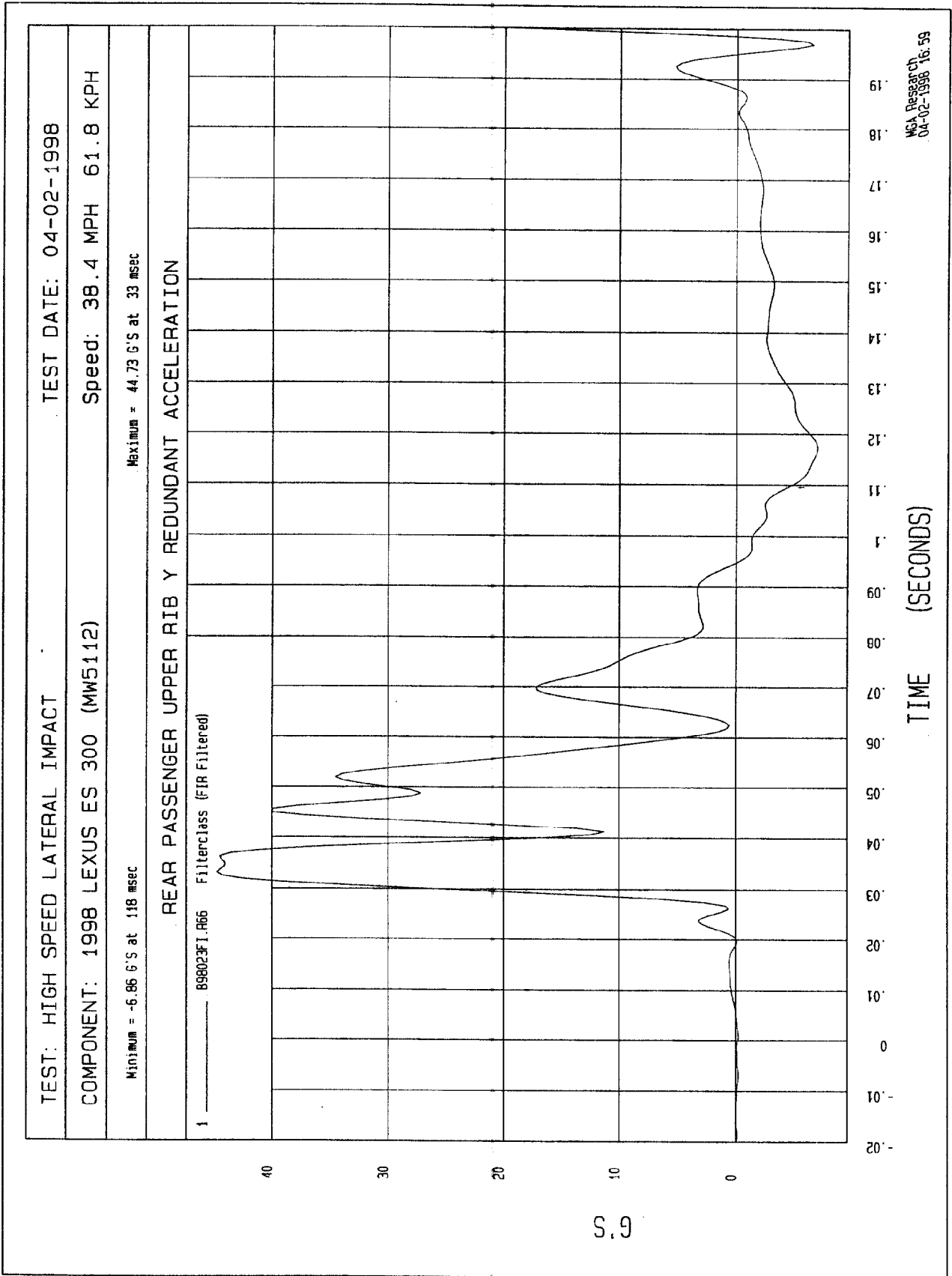


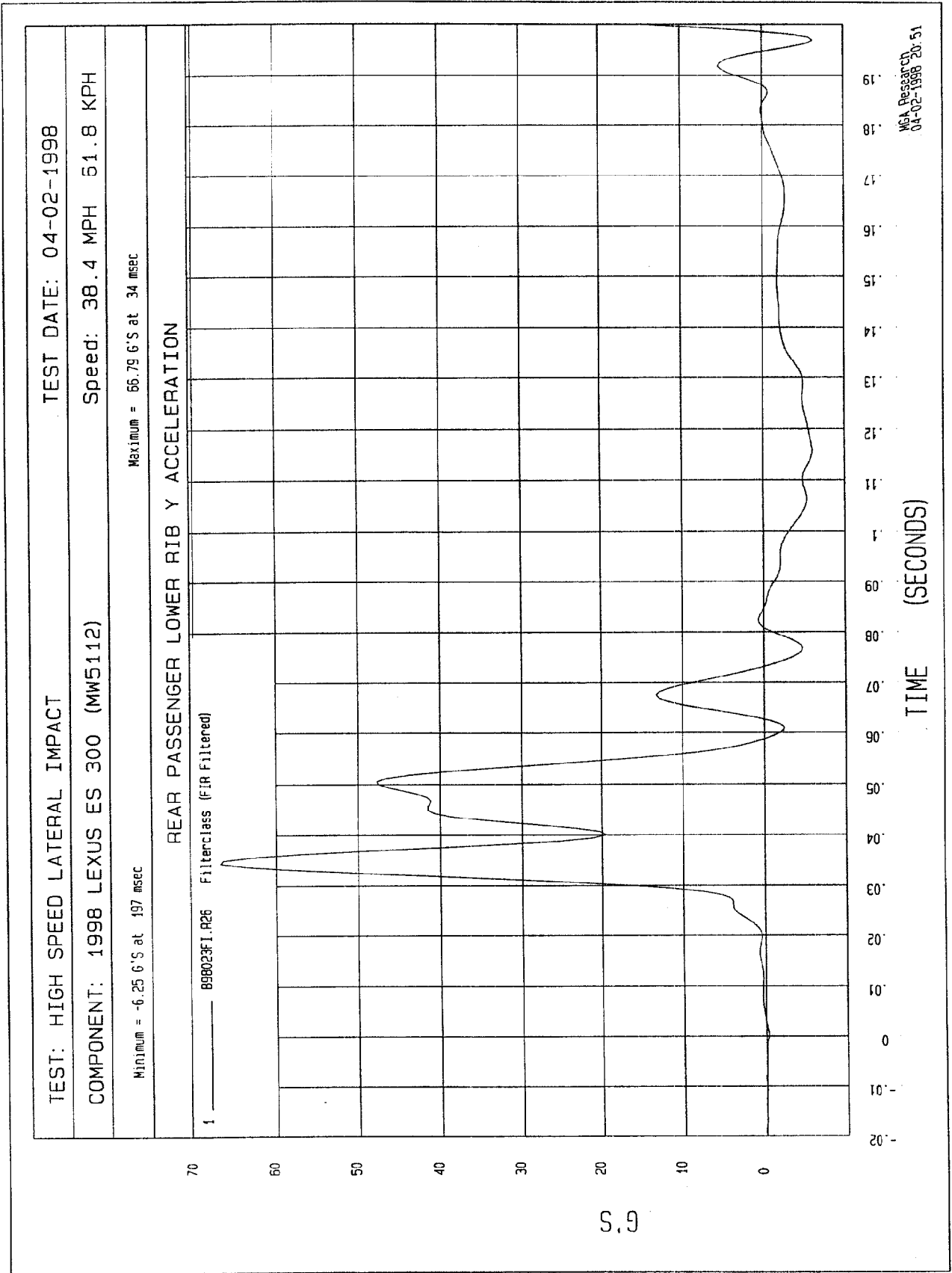












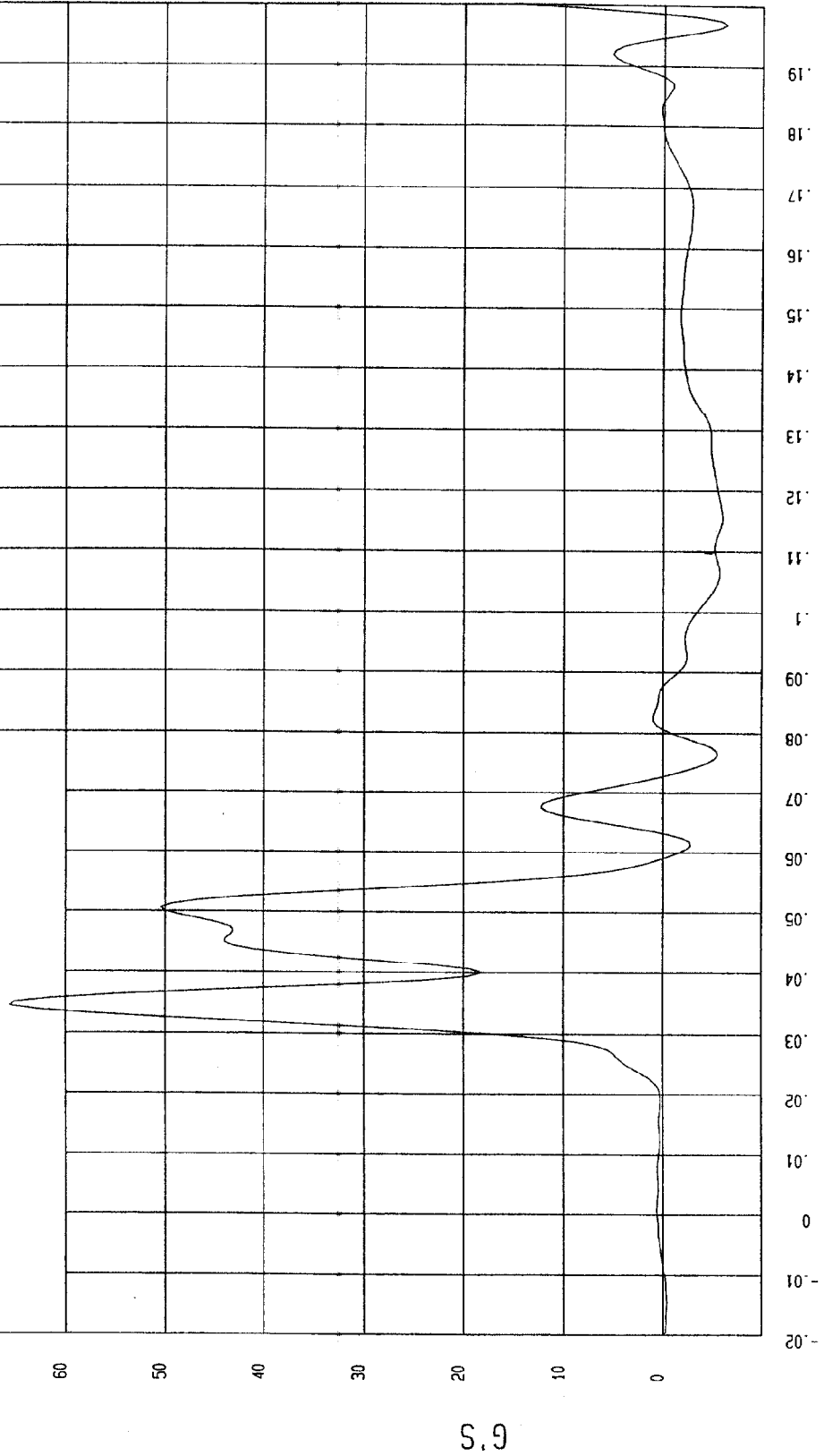
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

COMPONENT: 1998 LEXUS ES 300 (MW5112) Speed: 38.4 MPH 61.8 KPH

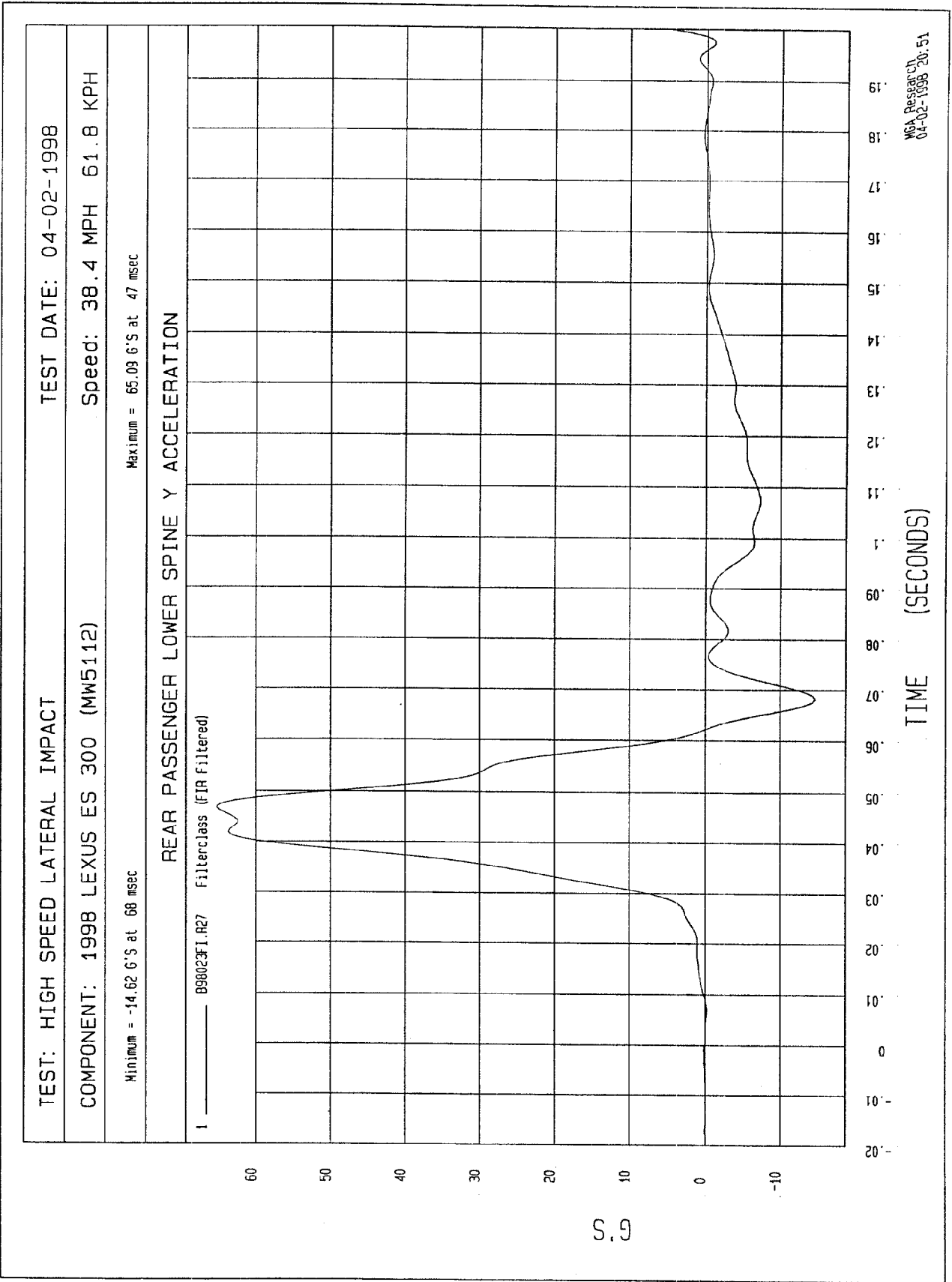
Minimum = -6.14 G'S at 197 msec Maximum = 65.45 G'S at 34 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 898023FI R67 Filterclass (FIR Filtered)



MCA Research
04-02-1998 16:59



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 04-02-1998

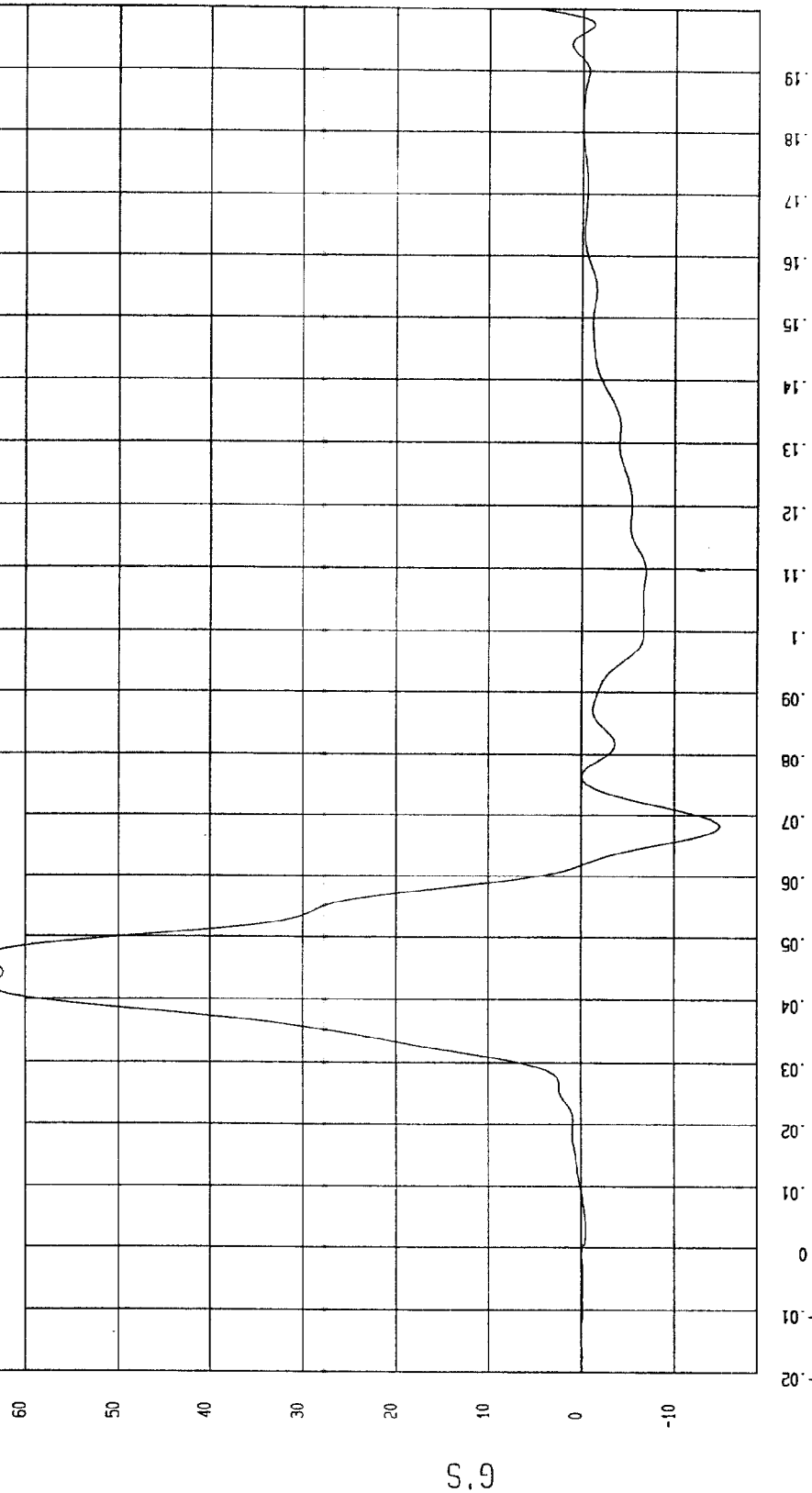
SPEED: 38.4 MPH 61.8 KPH

Maximum = 64.32 G'S at 47 msec

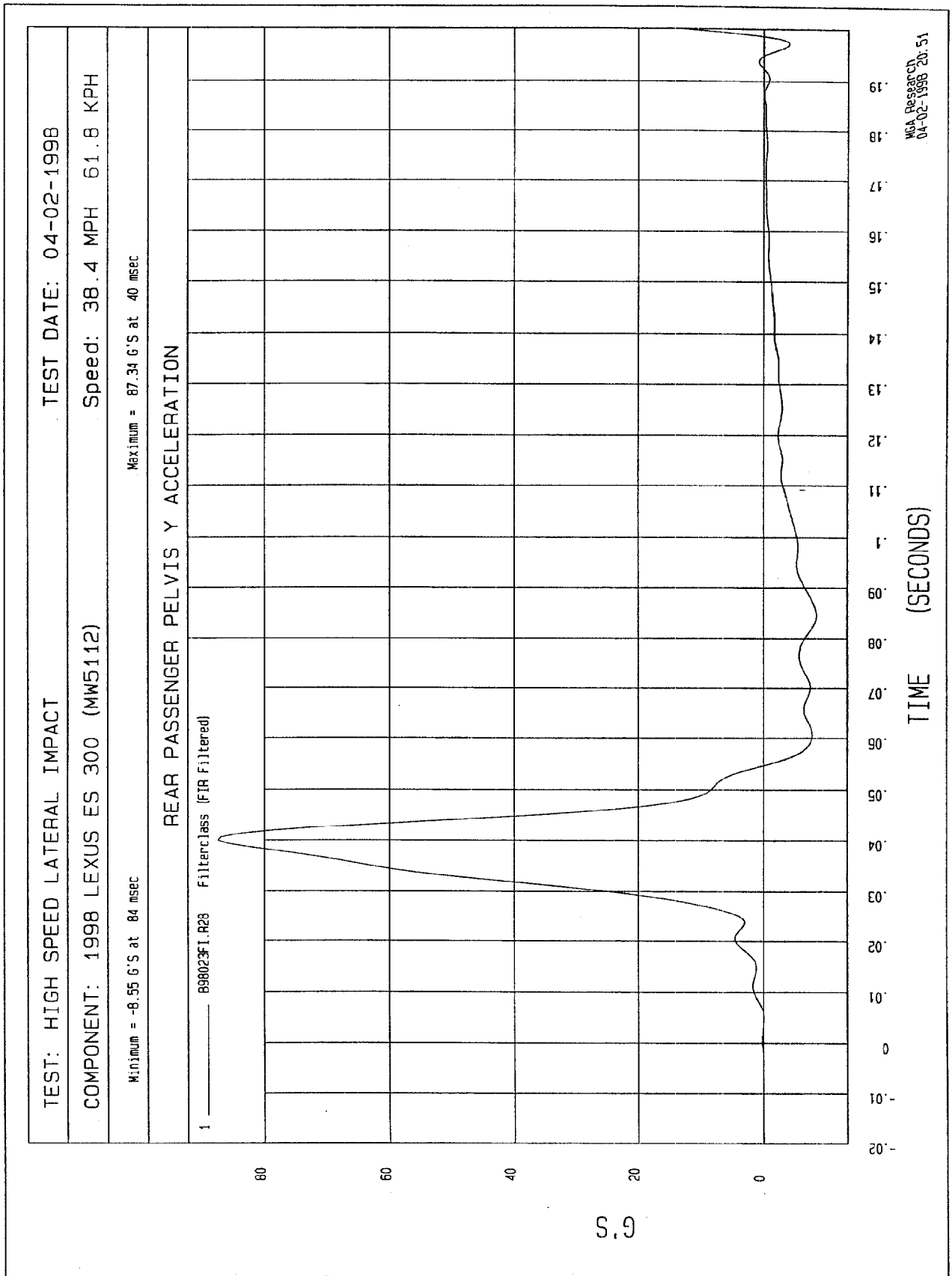
Minimum = -14.76 G'S at 68 msec

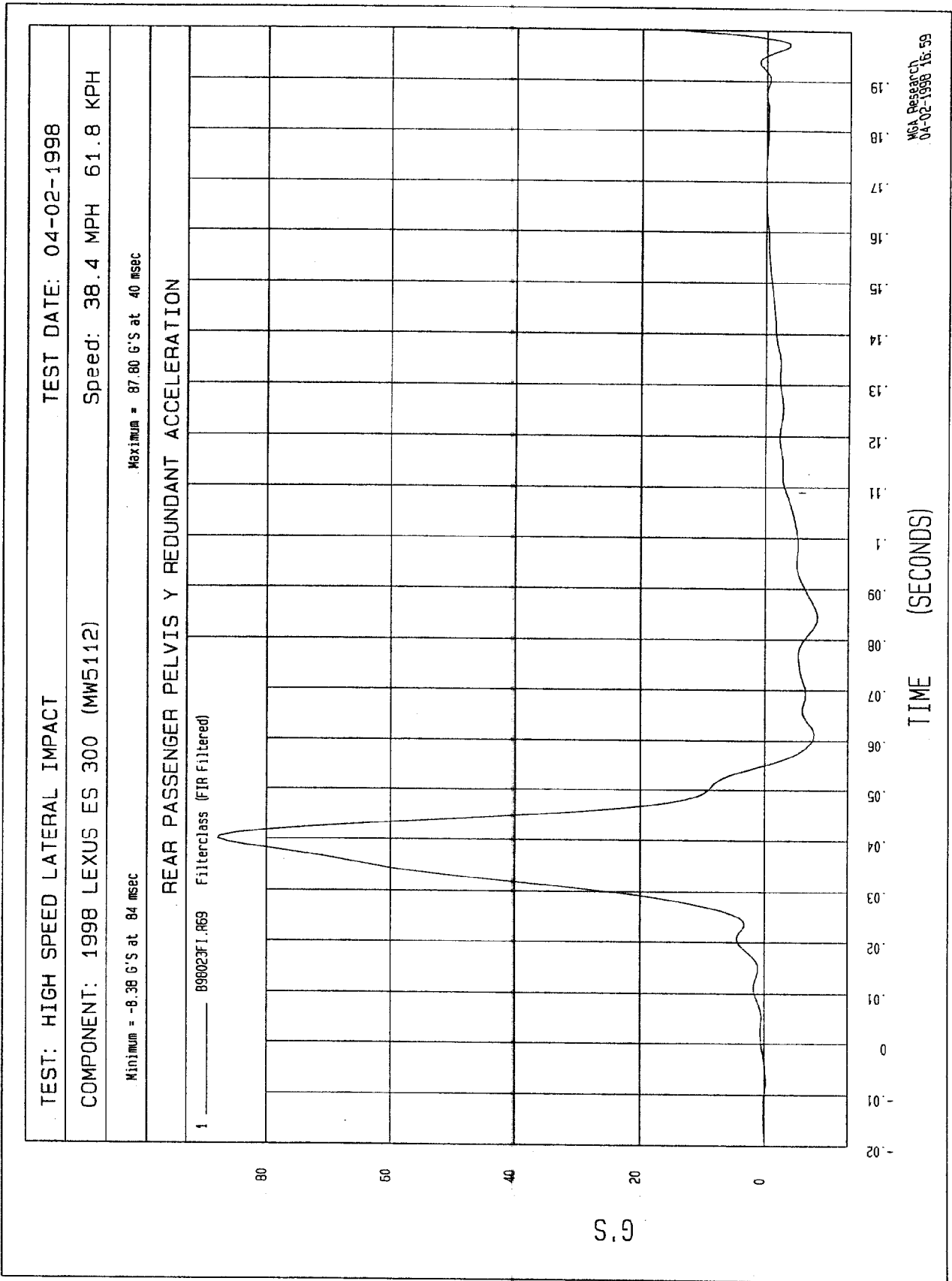
REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION

1 ——— B98023FI.R68 Filterclass (FIR Filtered)



MOA Research
04-02-1998 16:59





APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-98-DC021

DUMMY PERFORMANCE CALIBRATIONS

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

1998 TOYOTA LEXUS ES300 4-DOOR
NHTSA NO. MV5112

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: April 2, 1998

Report Date: April 27, 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: 269	PRE-TEST CERTIFICATION DATA	1-1
DUMMY S/N: 270	PRE-TEST CERTIFICATION DATA	2-1
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DUMMY S/N: 270	POST-TEST CERTIFICATION DATA	4-1
DUMMY S/N: 269	POST-TEST INSPECTION CHECKLIST	5-1
DUMMY S/N: 270	POST-TEST INSPECTION CHECKLIST	6-1
	VEHICLE AND DUMMY TEMPERATURE	7-1

PRE-TEST CERTIFICATION DATA

Front Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

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.

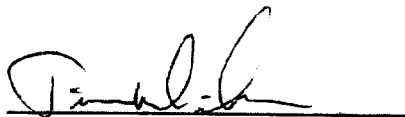
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 269

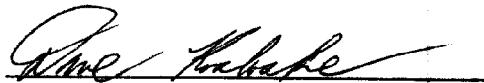
DATE OF VERIFICATION: January 30, 1998

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"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

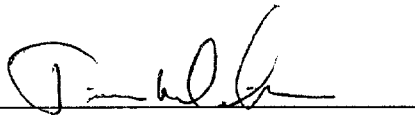
DUMMY NUMBER: 269

TEST NUMBER: D98192

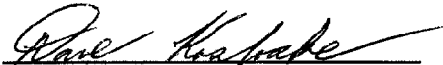
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	42
LOWER RIB	37 - 46 g's	41
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY



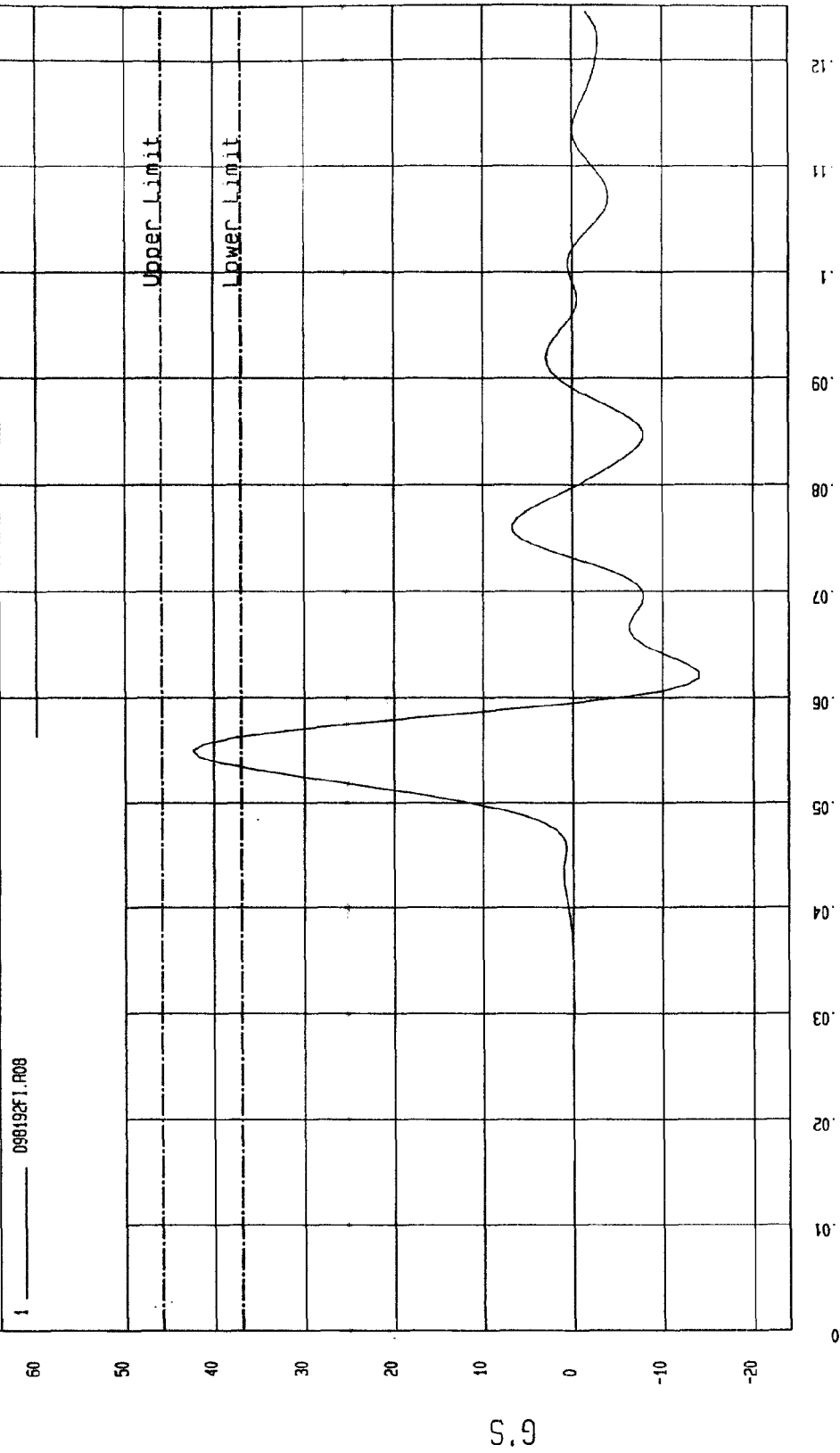
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-29-1998 - 09:31

COMPONENT: DUMMY # 269 Velocity: 14.04 FT/SEC 4.28 M/SEC

Minimum = -14.04 G'S at 61.8 msec

Maximum = 42.37 G'S at 55 msec

UPPER RIB ACCELERATION



NSA Research
01-29-1998 10:02

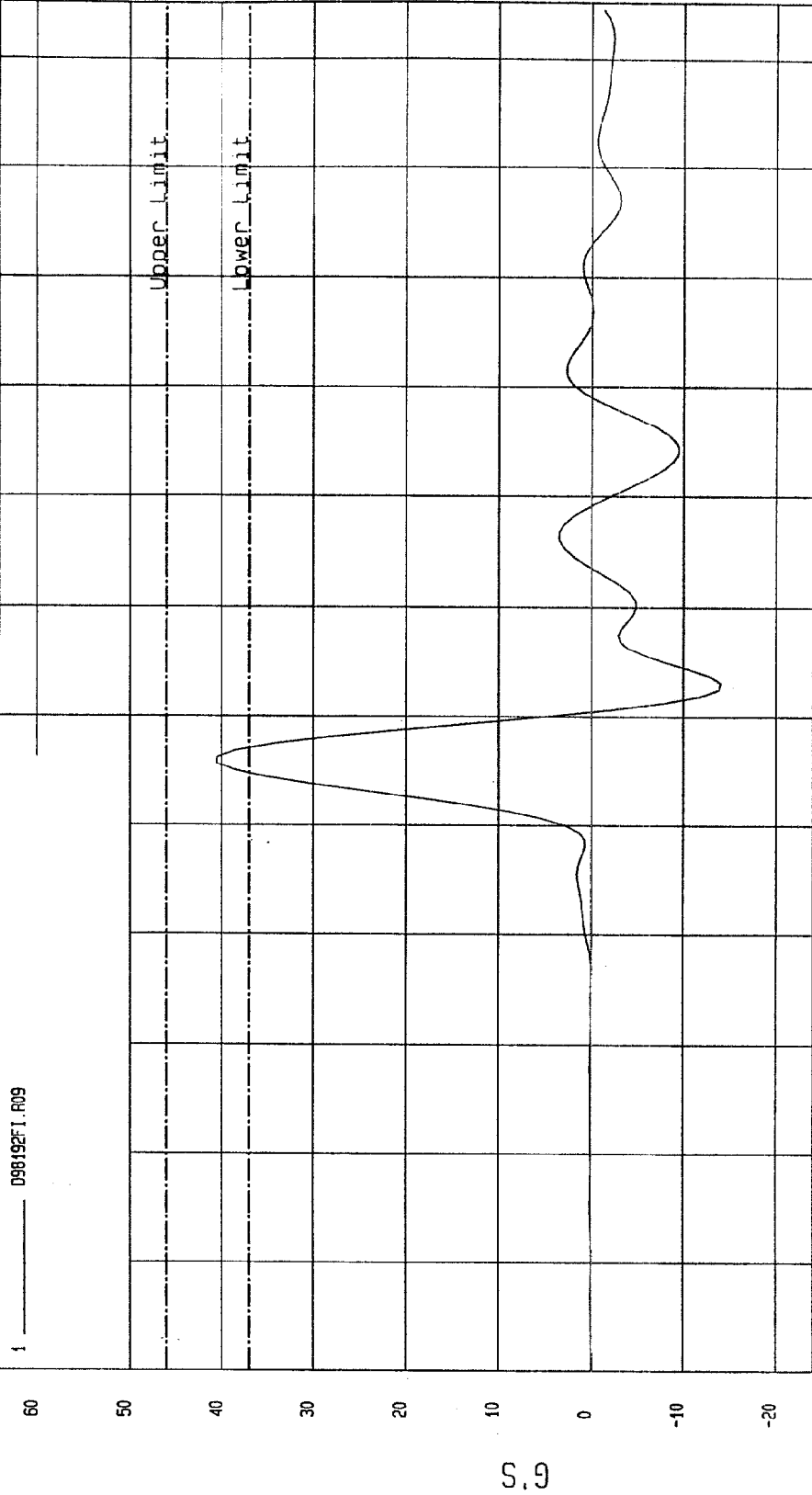
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-29-1998 - 09:31

COMPONENT: DUMMY # 269 Velocity: 14.04 FT/SEC 4.28 M/SEC

Minimum = -14.01 G'S at 63.1 msec

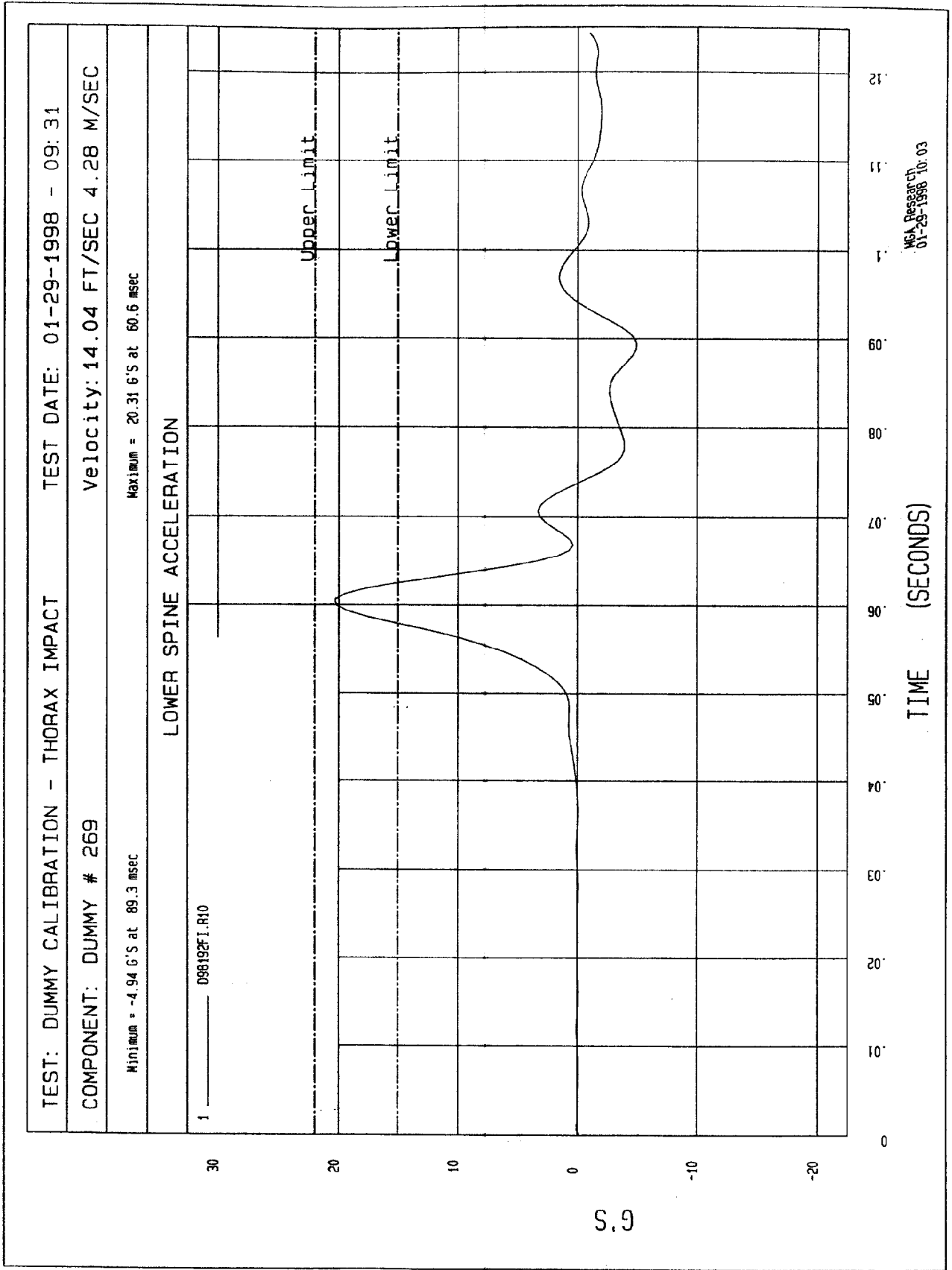
Maximum = 40.51 G'S at 55.6 msec

LOWER RIB ACCELERATION



TIME (SECONDS)

MCA Research
01-29-1998 10:03



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

DUMMY NUMBER: 269

TEST NUMBER: D98193

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	41

TEST MEETS SPECIFICATIONS

TECHNICIAN

Jim Walsh

APPROVED BY

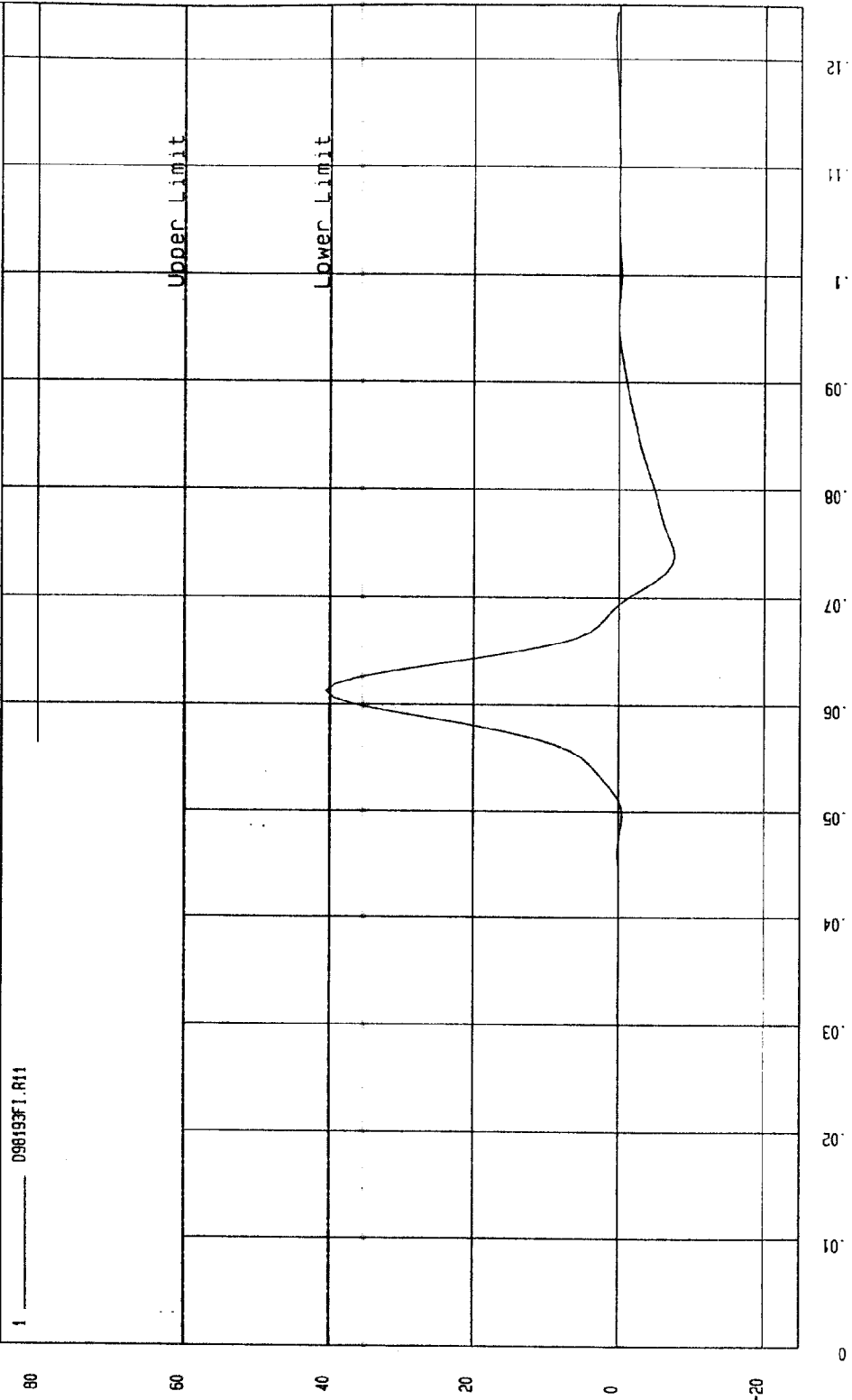
Paul Kishake

TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-29-1998 - 10:02:16

COMPONENT: DUMMY # 269 Velocity: 14.116 FT/SEC 4.3 M/SEC

Minimum = -7.64 G'S at 73.7 msec Maximum = 40.55 G'S at 61.2 msec

PELVIS ACCELERATION



NCA Research
01-29-1998 10:03

TIME (SECONDS)

G'S

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

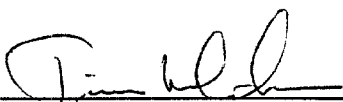
DATE: January 30, 1998

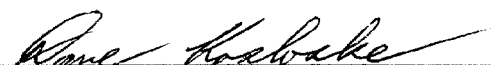
DUMMY NUMBER: 269

TEST NUMBER: D98194

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0.5 in	23.3 - 36.5 lbs	34.8
FORCE @ 0.75 in	36.7 - 49.8 lbs	47.6
FORCE @ 1.0 in	50 - 63 lbs	62
FORCE @ 1.3 in	73 - 88 lbs	84

TEST MEETS SPECIFICATIONS

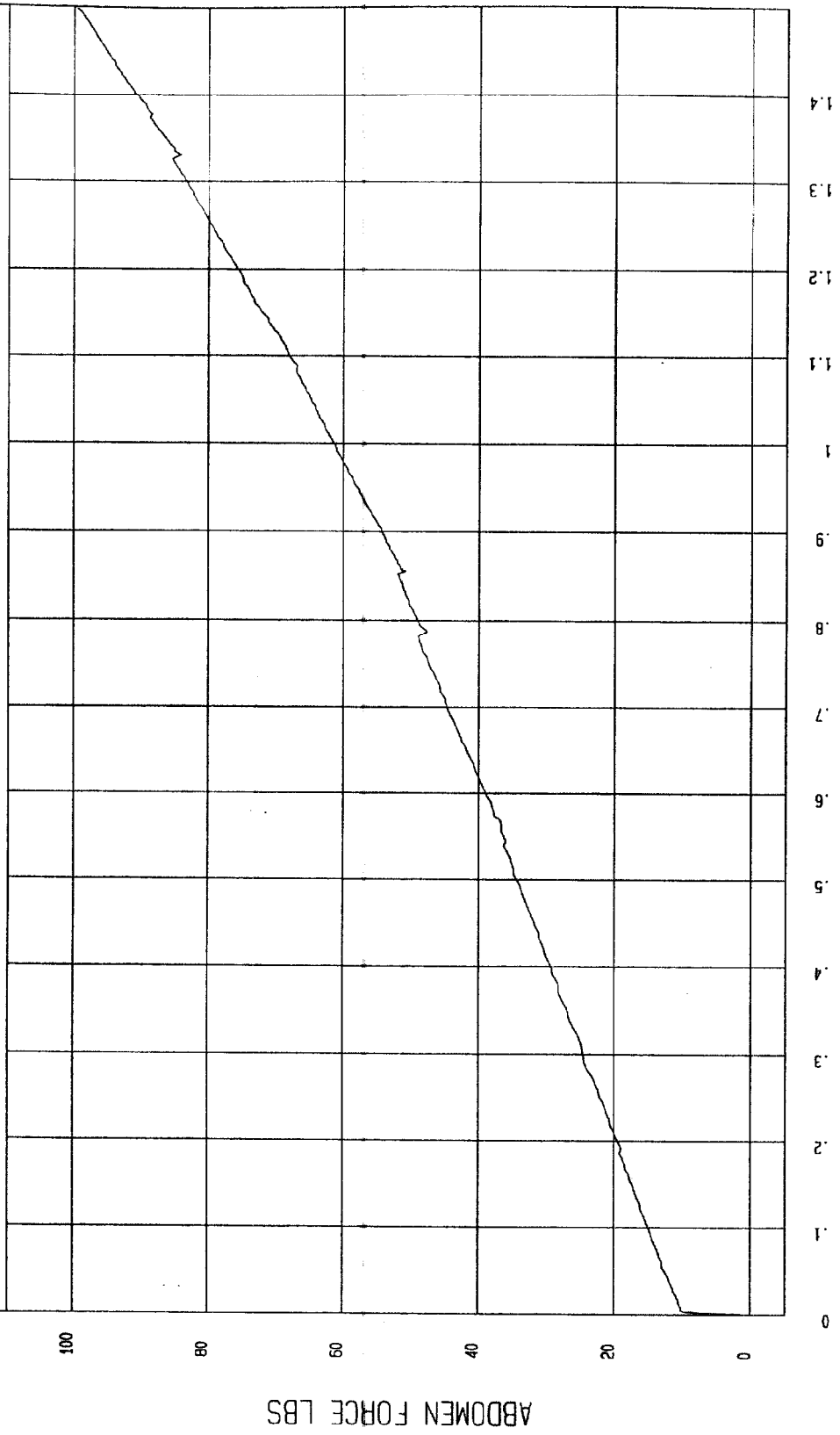
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-30-1998 - 17:40

COMPONENT: DUMMY # 269

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MCA Research
01-30-1998 18:03

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 30, 1998

DUMMY NUMBER: 269

TEST NUMBER: D98195

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	41
FORCE @ 40°	46 - 58 lbs	54
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Walsh

APPROVED BY Rene Kosloske

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-30-1998 - 18:18

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION

50

40

30

20

10

0

-10

FORCE LBS

0

10

20

30

40

TORSO ROTATION DEGREES

NSA Research
01-30-1998 19:04

PRE-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

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.: 270

DATE OF VERIFICATION: January 30, 1998

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75" - 20.50"	20.50
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"	20.6
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: Tim White

APPROVED BY: Rene Kishabe

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

DUMMY NUMBER: 270

TEST NUMBER: D98202

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	40
LOWER SPINE	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

TECHNICIAN

Jim W. L.

APPROVED BY

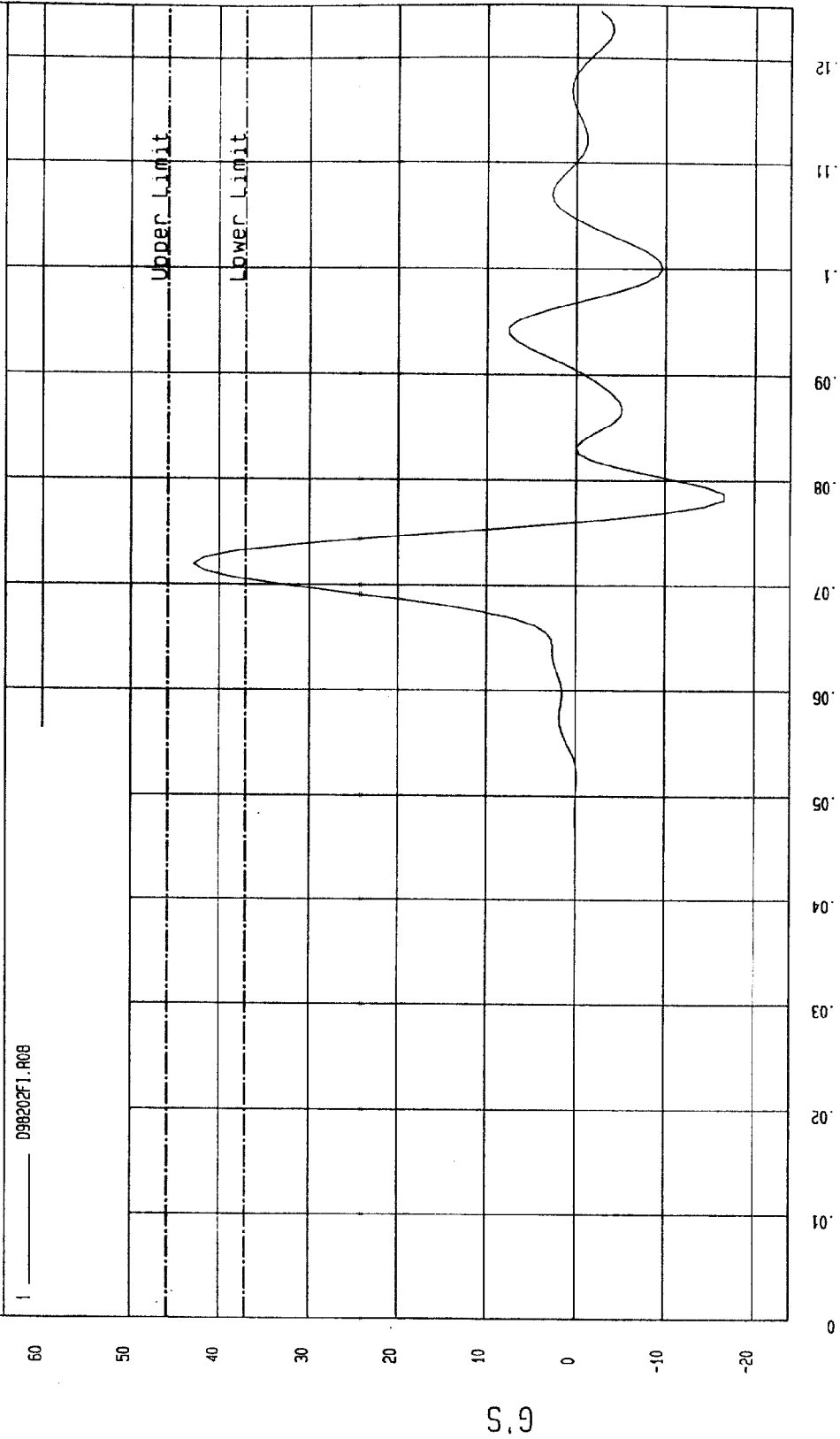
Dave Korbake

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-29-1998 - 11:01

COMPONENT: DUMMY # 270 Velocity: 14.074 FT/SEC 4.29 M/SEC

Minimum = -15.56 G'S at 78.1 msec Maximum = 43.06 G'S at 71.8 msec

UPPER RIB ACCELERATION



NCA Research
01-29-1998 11:28

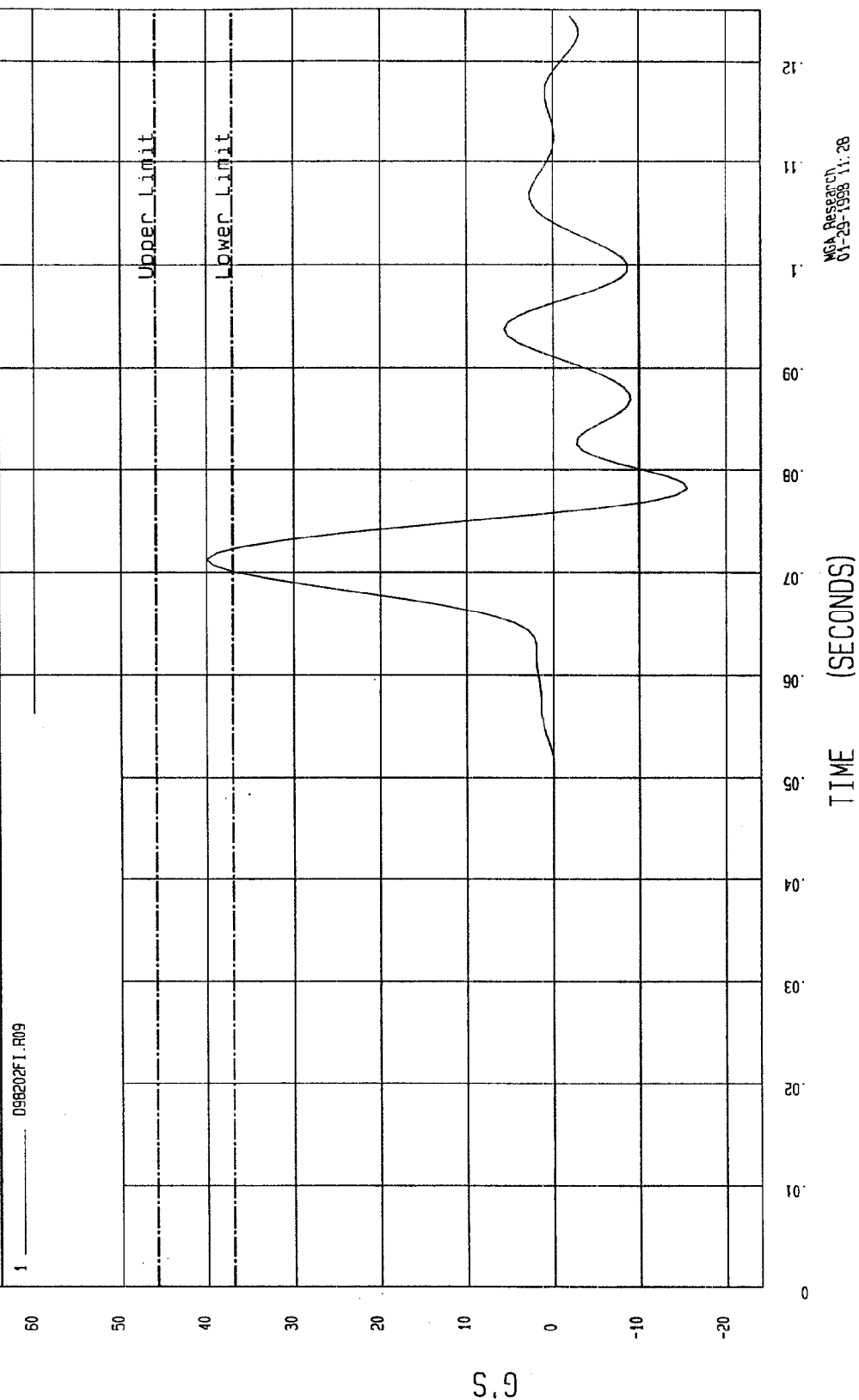
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-29-1998 - 11:07:45

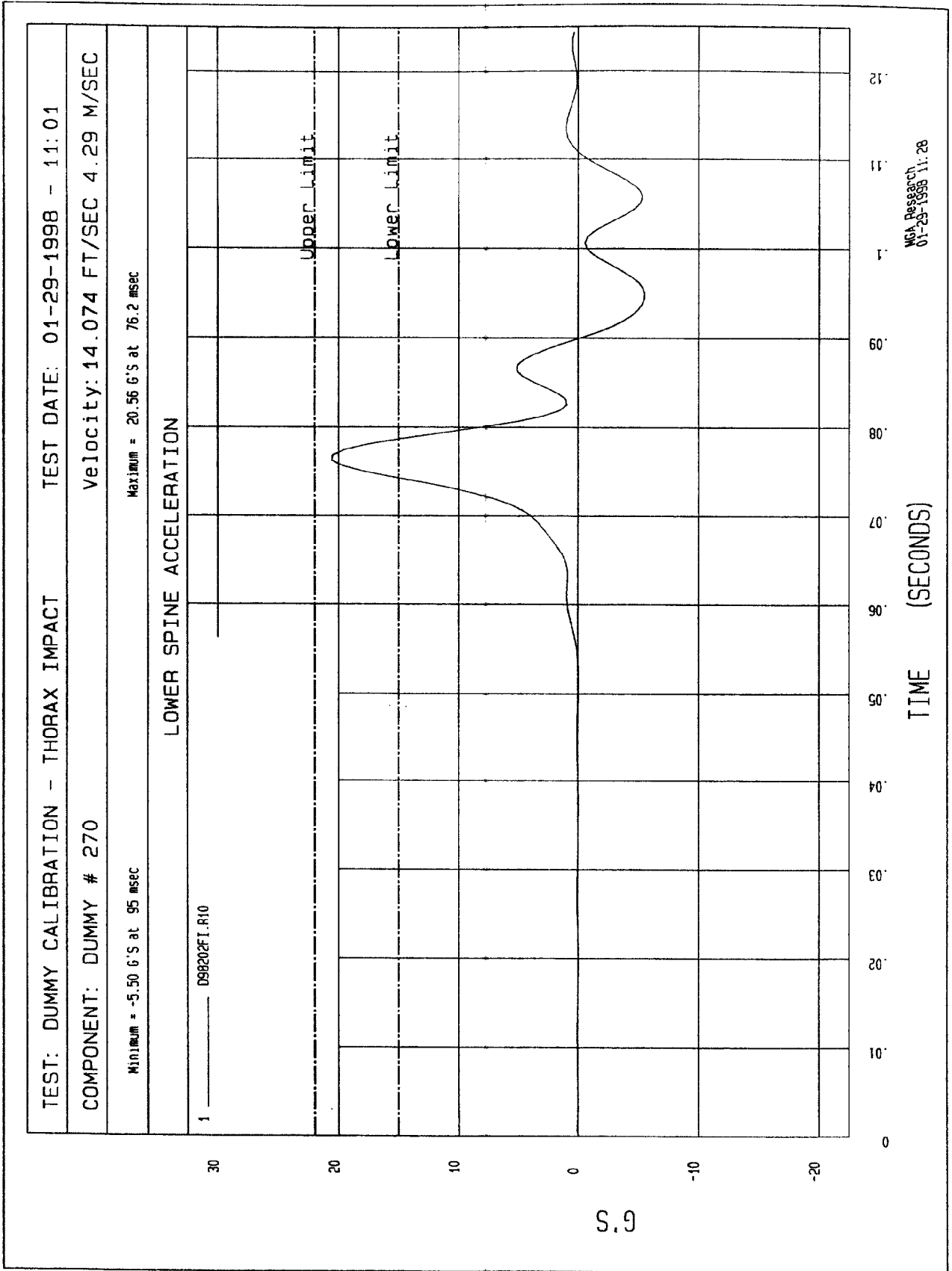
COMPONENT: DUMMY # 270 Velocity: 14.074 FT/SEC 4.29 M/SEC

Minimum = -15.49 G'S at 78.1 msec

Maximum = 39.94 G'S at 71.2 msec

LOWER RIB ACCELERATION





MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

DUMMY NUMBER: 270

TEST NUMBER: D98203

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	46

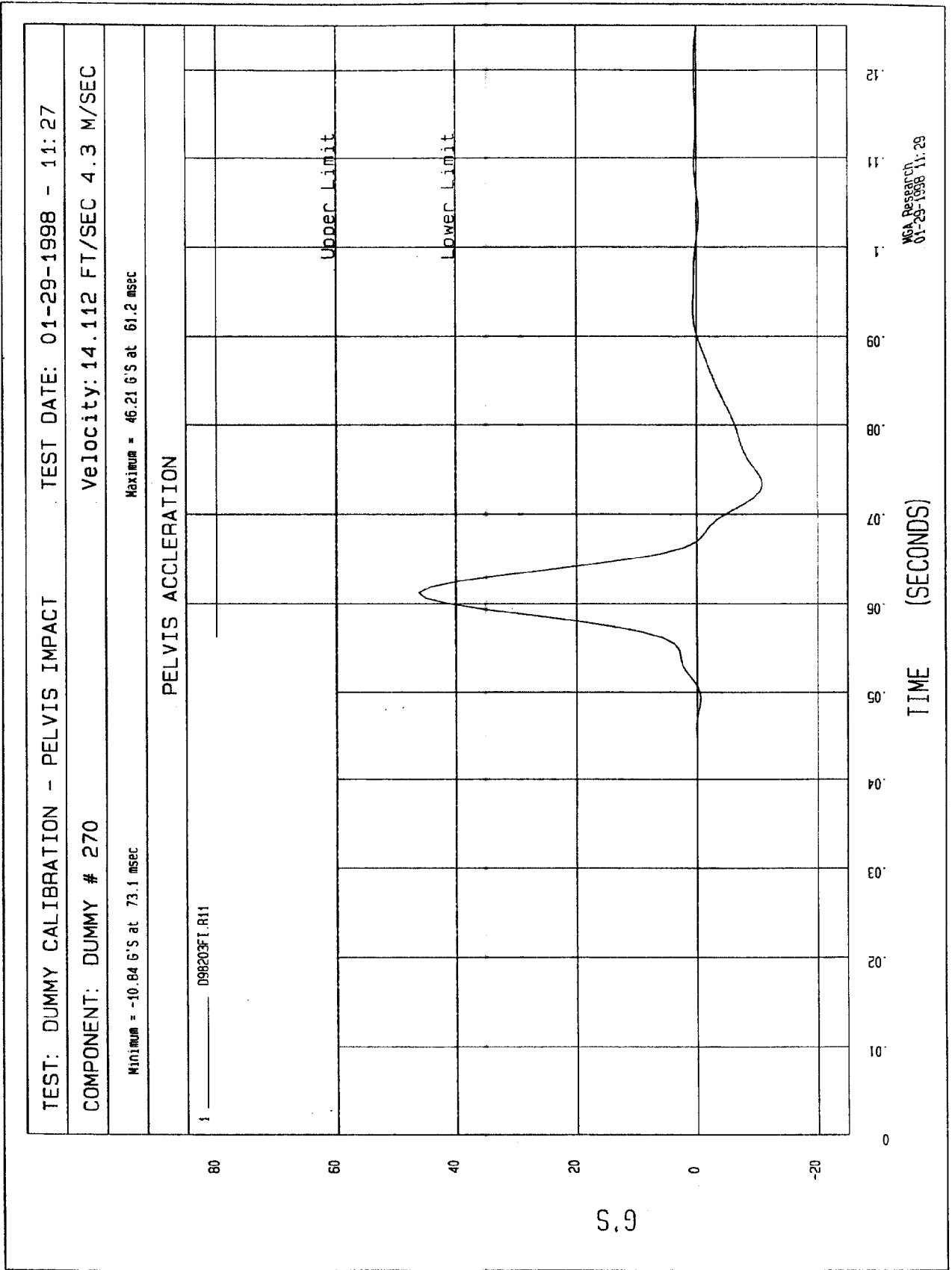
TEST MEETS SPECIFICATIONS

TECHNICIAN

Tim Hill

APPROVED BY

Steve Kishibe



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 30, 1998

DUMMY NUMBER: 270

TEST NUMBER: D98204

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0.5 in	23.3 - 36.5 lbs	29.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	40.9
FORCE @ 1.0 in	50 - 63 lbs	55
FORCE @ 1.3 in	73 - 88 lbs	73

TEST MEETS SPECIFICATIONS

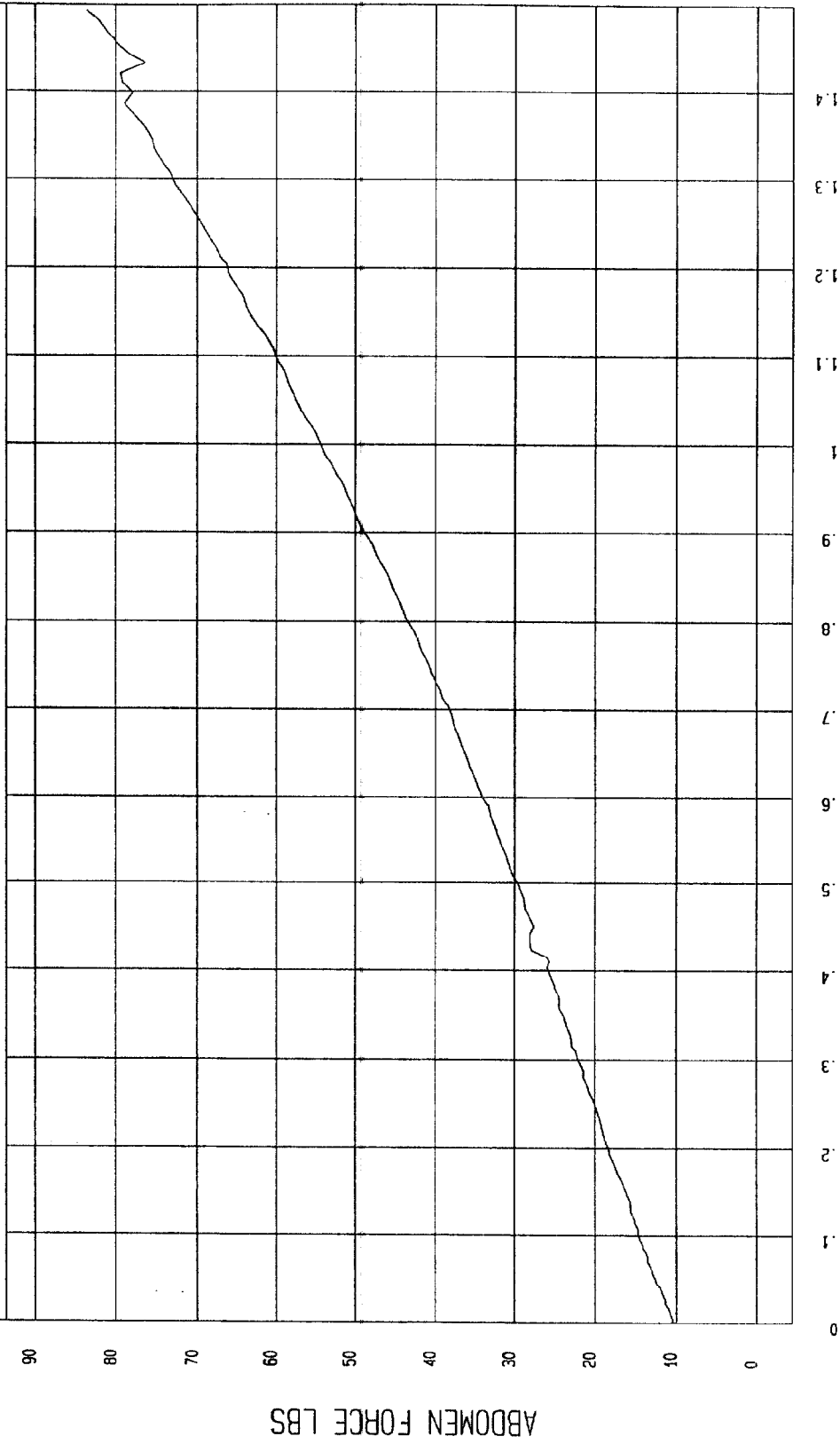
TECHNICIAN Tim Walsh

APPROVED BY Rene Kishake

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-30-1998 - 17:44

COMPONENT: DUMMY # 270

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MCA Research
01-30-1998 18:04

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 30, 1998

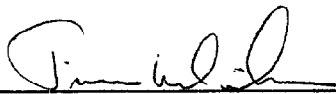
DUMMY NUMBER: 270

TEST NUMBER: D98205

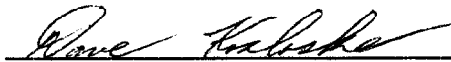
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	37
FORCE @ 40°	46 - 58 lbs	53
RETURN ANGLE	12° maximum	2°

TEST MEETS SPECIFICATIONS

TECHNICIAN



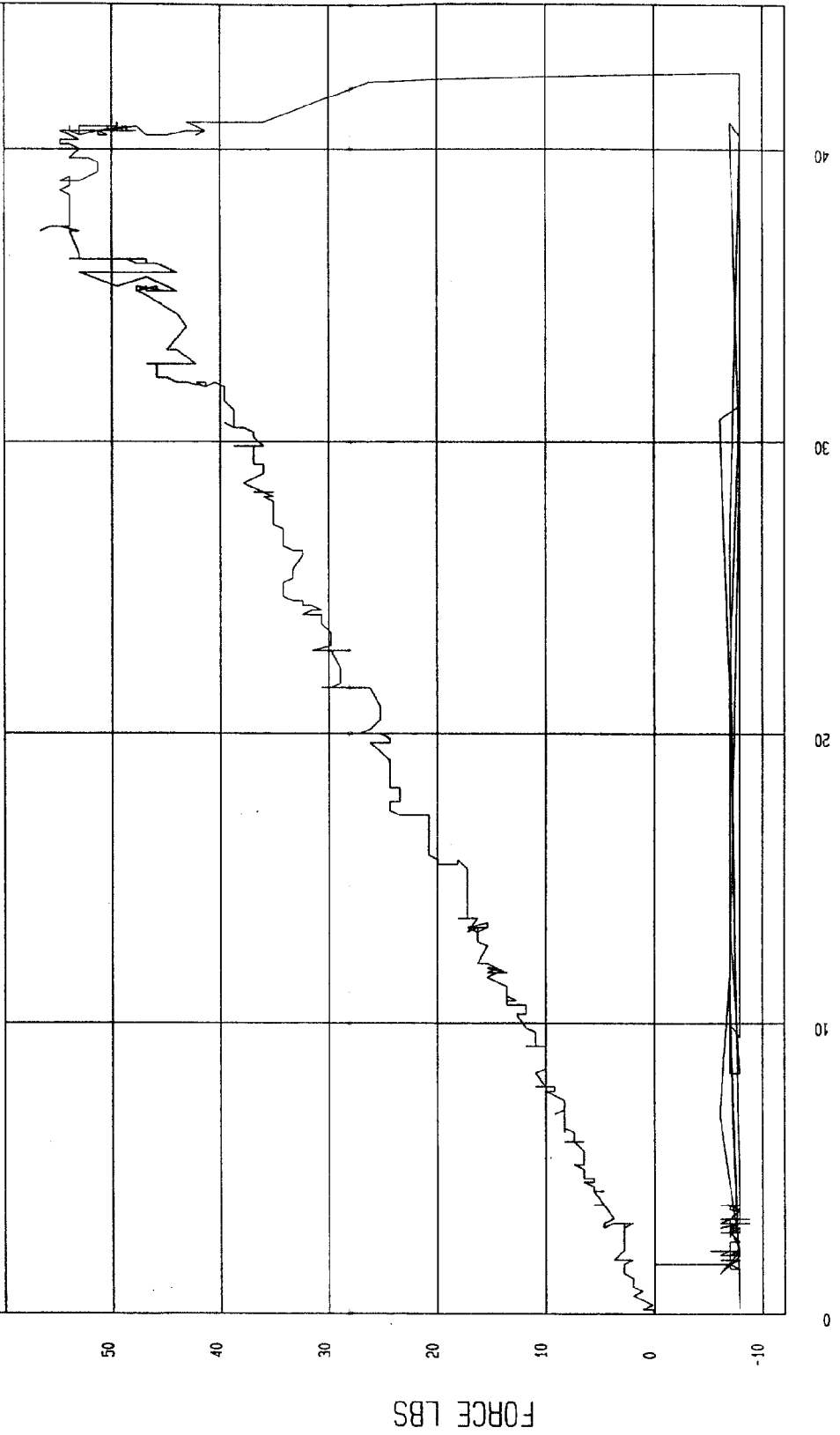
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-30-1998 - 18:29

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



MOA Research
01-30-1998 19:04

POST-TEST CERTIFICATION DATA

Front Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

Post-Test Calibration

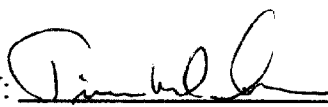
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax did not pass impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

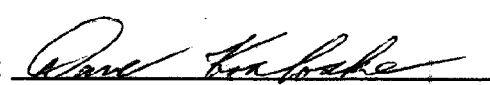
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 269

DATE OF VERIFICATION: April 27, 1998

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"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: 

APPROVED BY: 

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 27, 1998

DUMMY NUMBER: 269

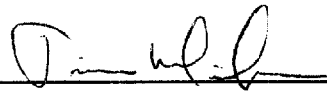
TEST NUMBER: D98672

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	26%
PROBE SPEED	14.0 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	49*
LOWER SPINE	15 - 22 g's	23*

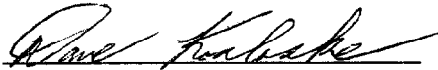
TEST MEETS SPECIFICATIONS

* Failed--Does not meet specifications.

TECHNICIAN



APPROVED BY



TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-27-1998 - 14:45

COMPONENT: DUMMY # 269 Velocity: 14.019 FT/SEC 4.27 M/SEC

Minimum = -14.22 G'S at 75.6 msec

Maximum = 45.37 G'S at 68.7 msec

UPPER RIB ACCELERATION

1 ——— 098672FT.R08

60
50
40
30
20
10
0
-10
-20

Upper Limit
Lower Limit

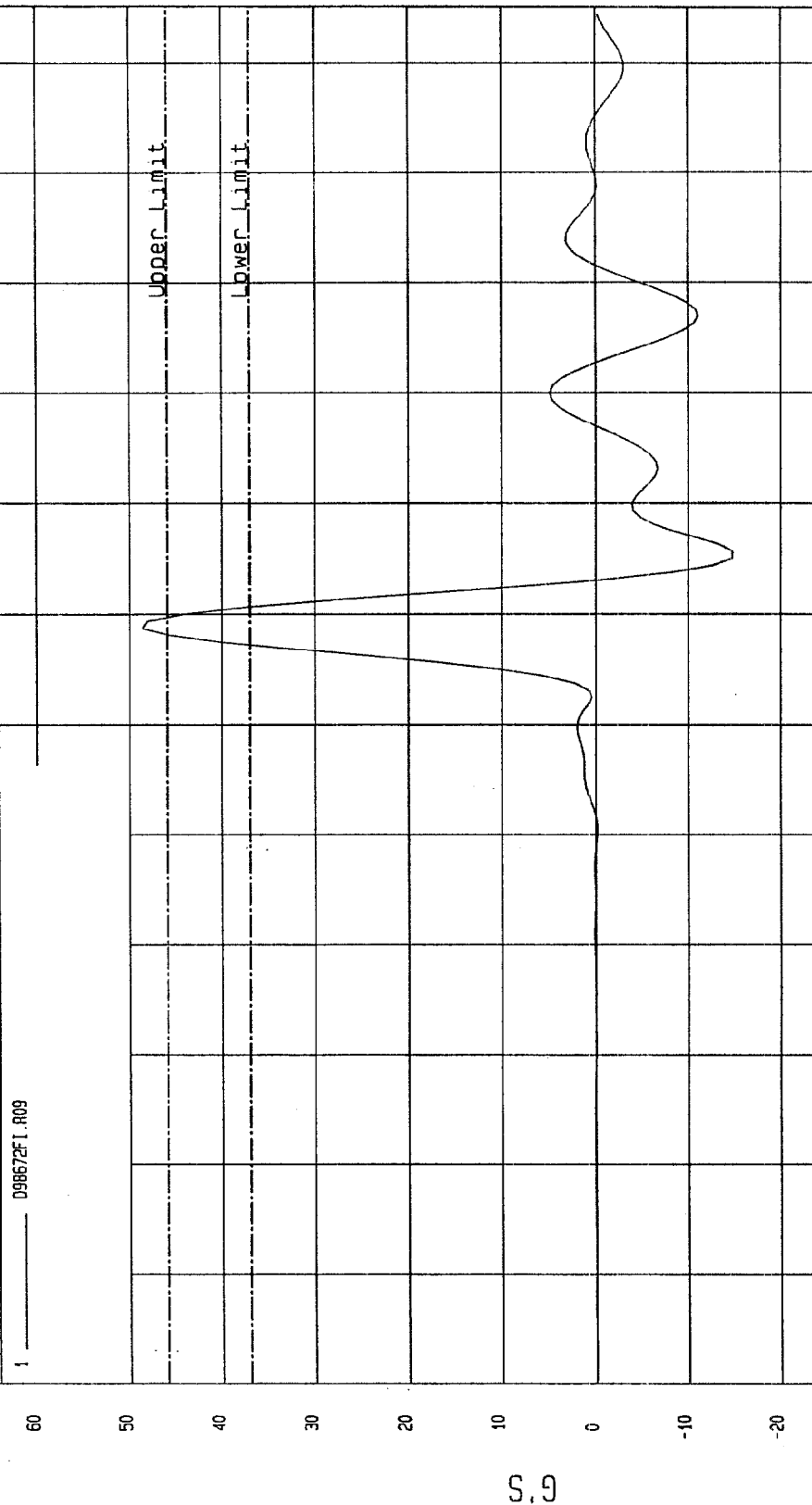
S.9

TIME (SECONDS) 0 10 20 30 40 50 60 70 80 90 100 110 120
M&A Research
04-27-1998 15:16

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-27-1998 - 14:45
 COMPONENT: DUMMY # 269 Velocity: 14.019 FT/SEC 4.27 M/SEC

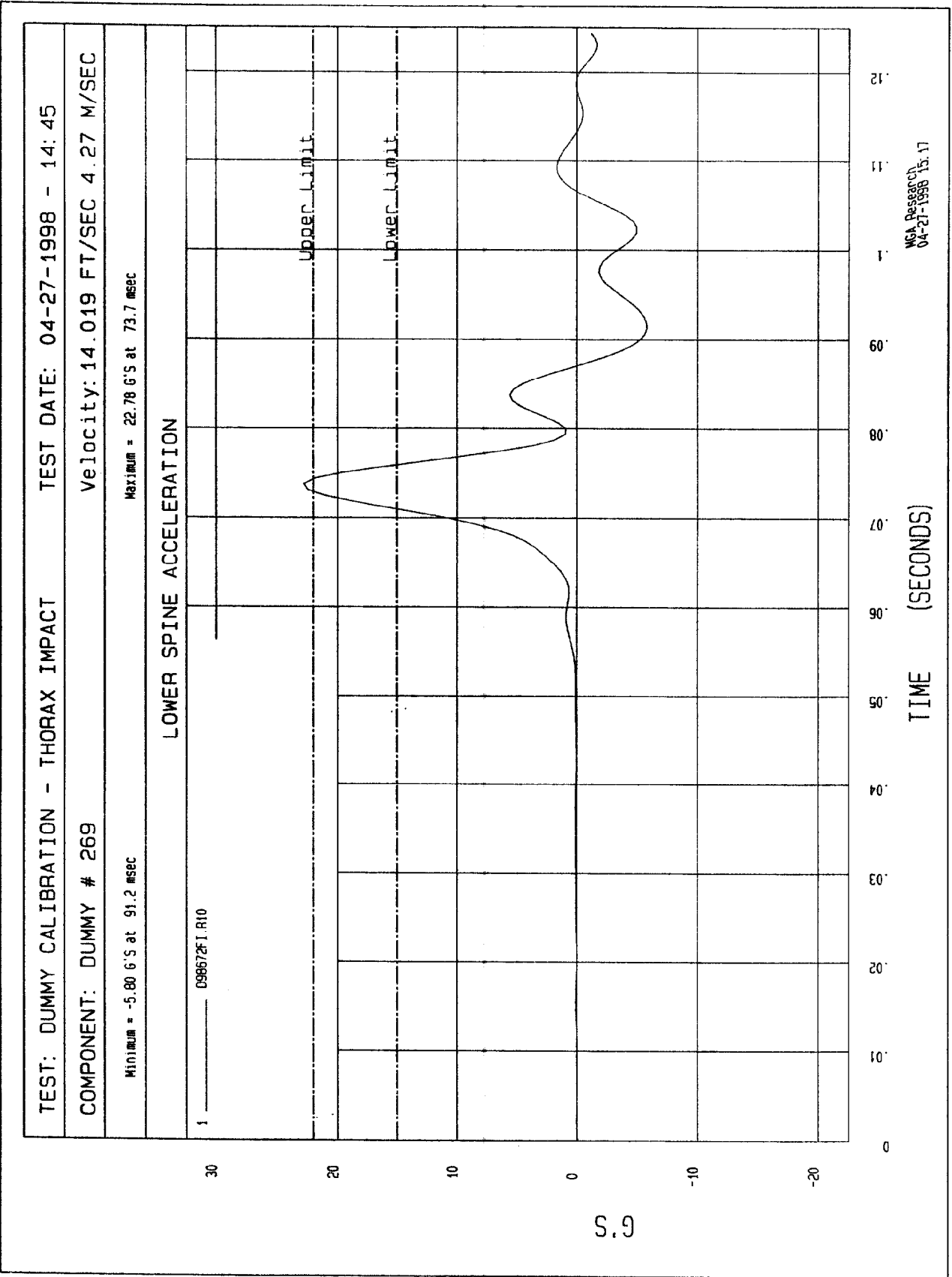
Minimum = -14.75 G'S at 75.6 msec Maximum = 48.61 G'S at 68.7 msec

LOWER RIB ACCELERATION



TIME (SECONDS)

WCA Research
 04-27-1998 15:17



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 27, 1998

DUMMY NUMBER: 269

TEST NUMBER: D98673

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	26%
PROBE SPEED	14.0 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	43

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

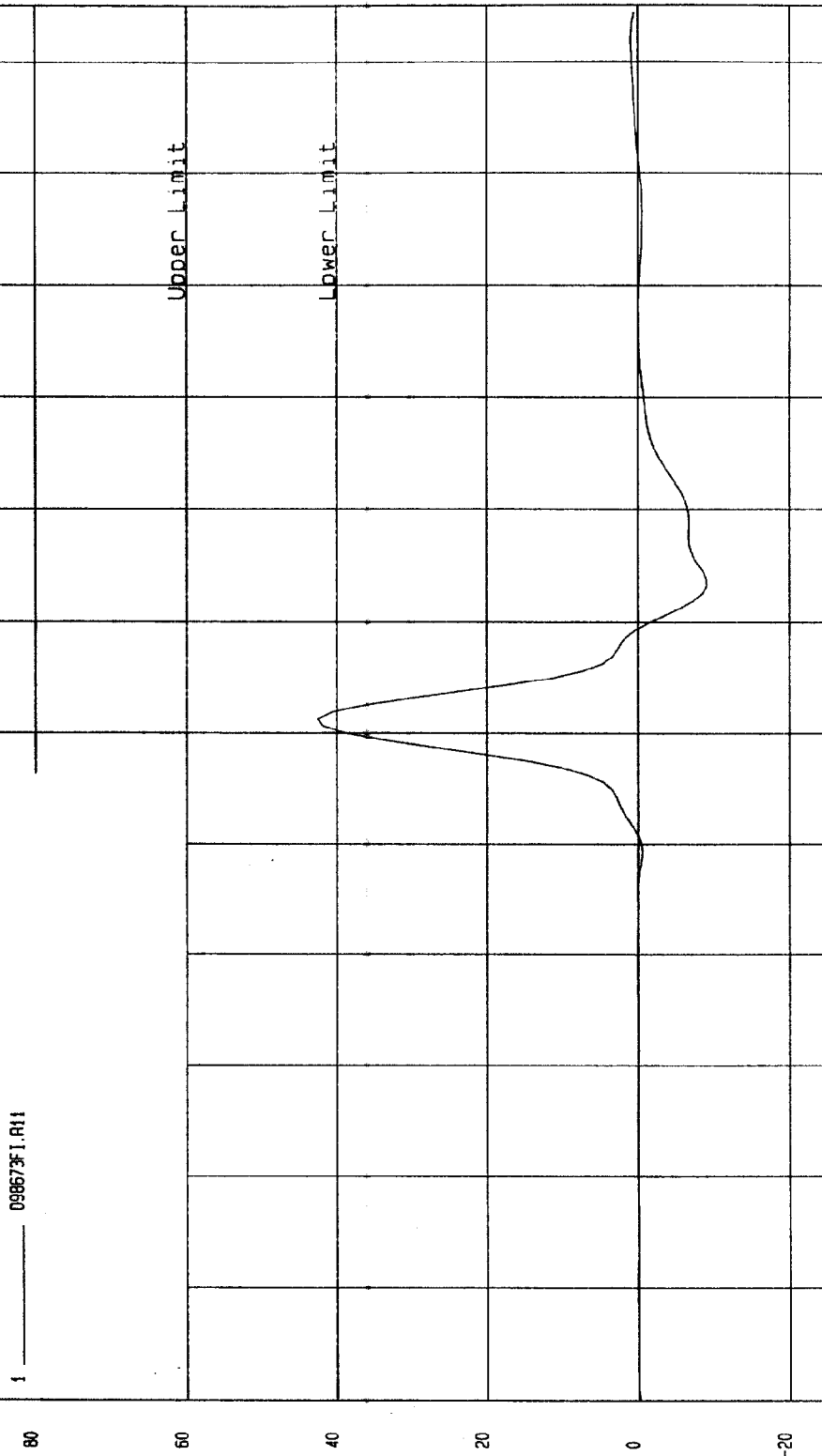


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 04-27-1998 - 15:16:07

COMPONENT: DUMMY # 269 Velocity: 14.03 FT/SEC 4.28 M/SEC

Minimum = -9.06 G'S at 73.7 msec Maximum = 42.53 G'S at 51.2 msec

PELVIS ACCELERATION



NSA Research
04-27-1998 15:17

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

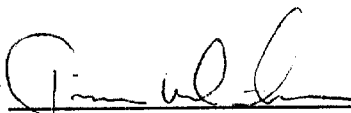
DATE: April 27, 1998

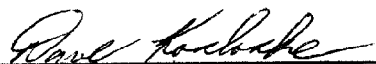
DUMMY NUMBER: 269

TEST NUMBER: D98674

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0.5 in	23.3 - 36.5 lbs	34.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	46.5
FORCE @ 1.0 in	50 - 63 lbs	60
FORCE @ 1.3 in	73 - 88 lbs	80

TEST MEETS SPECIFICATIONS

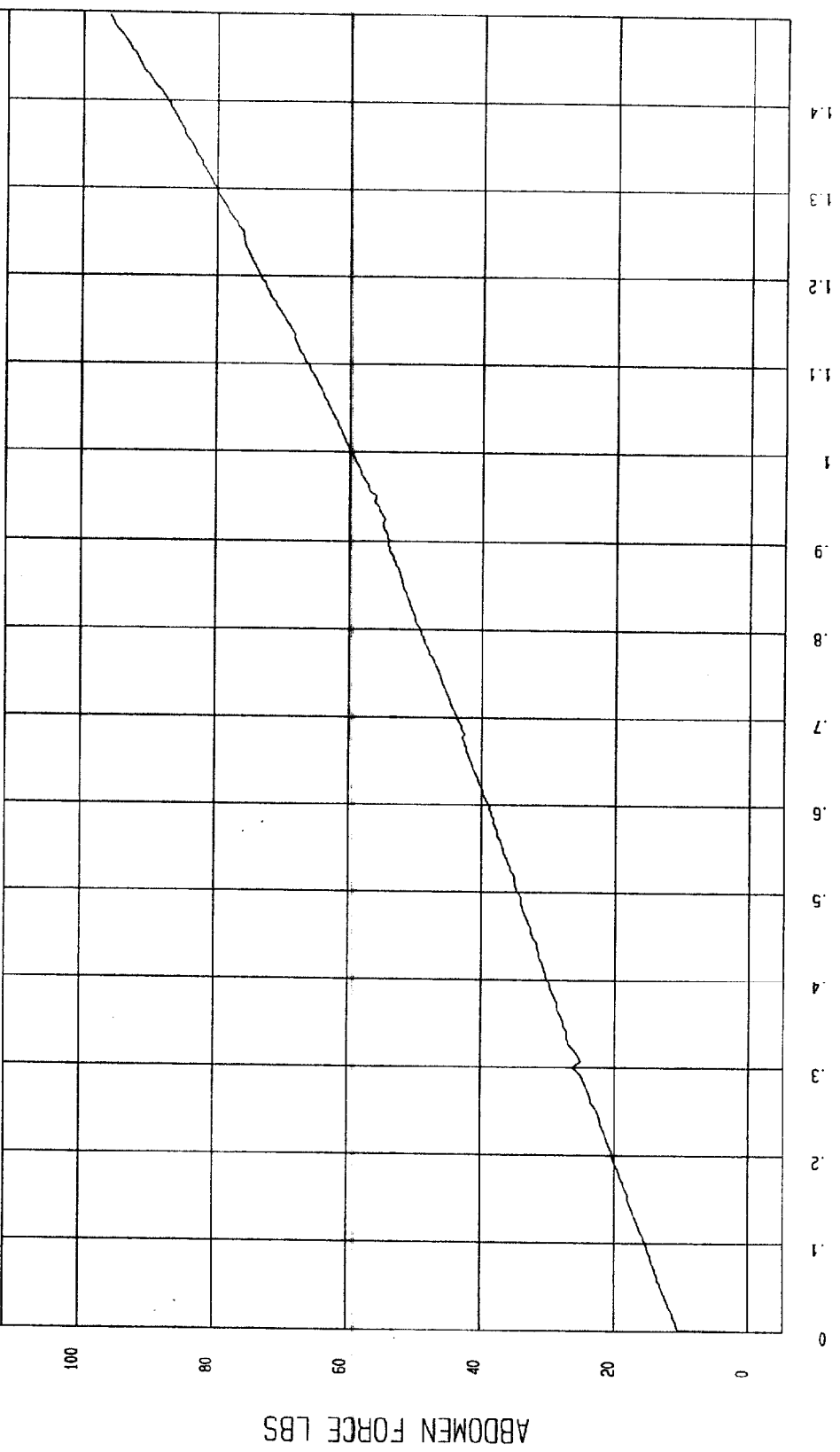
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 04-27-1998 - 17:48

COMPONENT: DUMMY # 269

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



NSA Research
04-27-1998 18:34

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: April 27, 1998

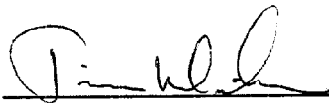
DUMMY NUMBER: 269

TEST NUMBER: D98675

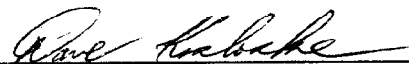
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	24
FORCE @ 30°	34 - 46 lbs	36
FORCE @ 40°	46 - 58 lbs	49
RETURN ANGLE	12° maximum	5°

TEST MEETS SPECIFICATIONS

TECHNICIAN



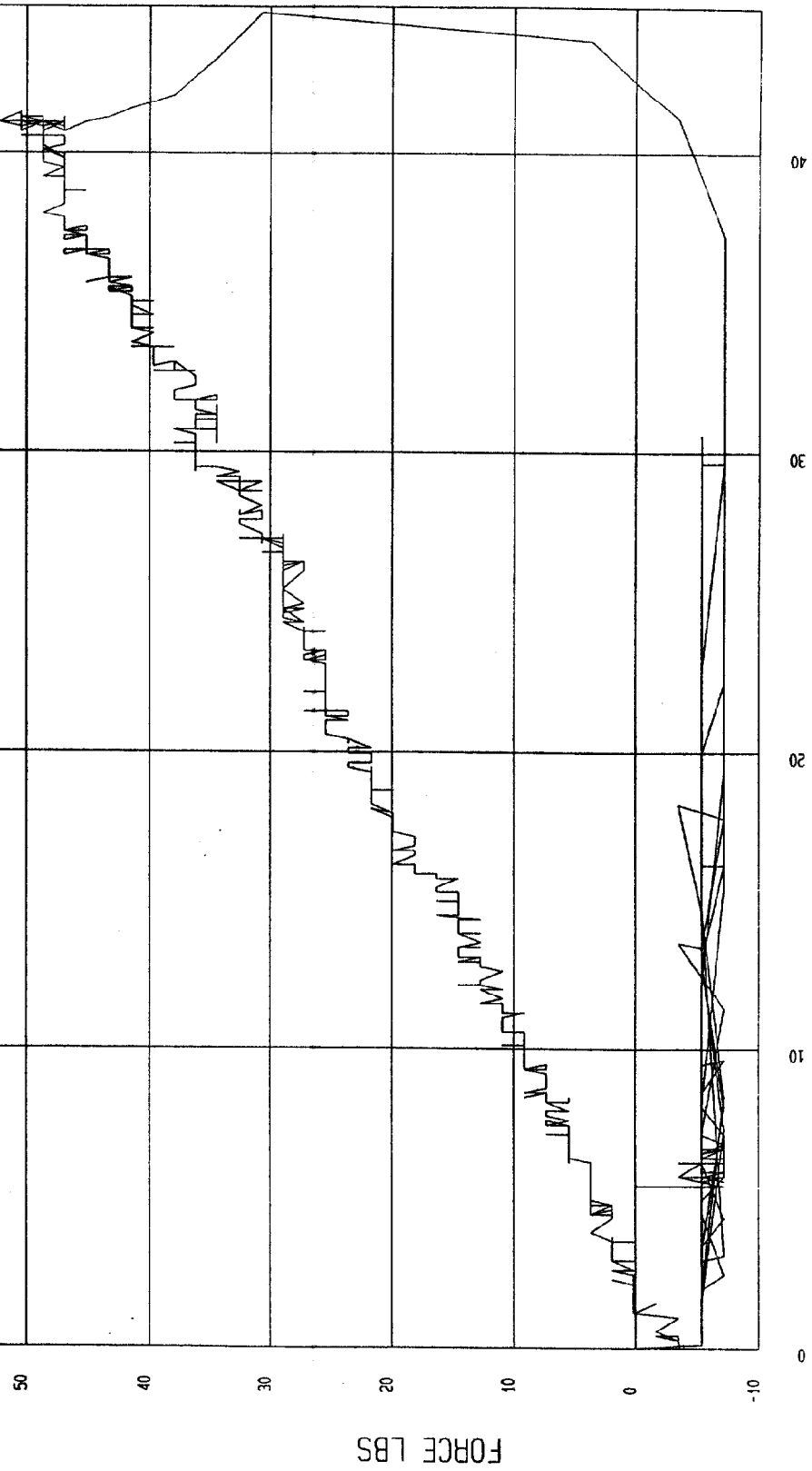
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 04-27-1998 - 18:30

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION



NSA Research
04-27-1998 18:33

POST-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

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.: 270

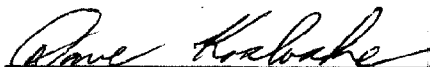
DATE OF VERIFICATION: April 27, 1998

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75" - 20.50"	20.50
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"	20.6
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 27, 1998

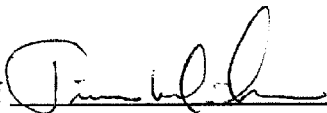
DUMMY NUMBER: 270

TEST NUMBER: D98682

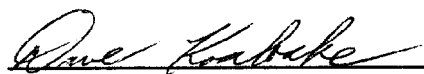
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	27%
PROBE SPEED	14.0 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	39
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

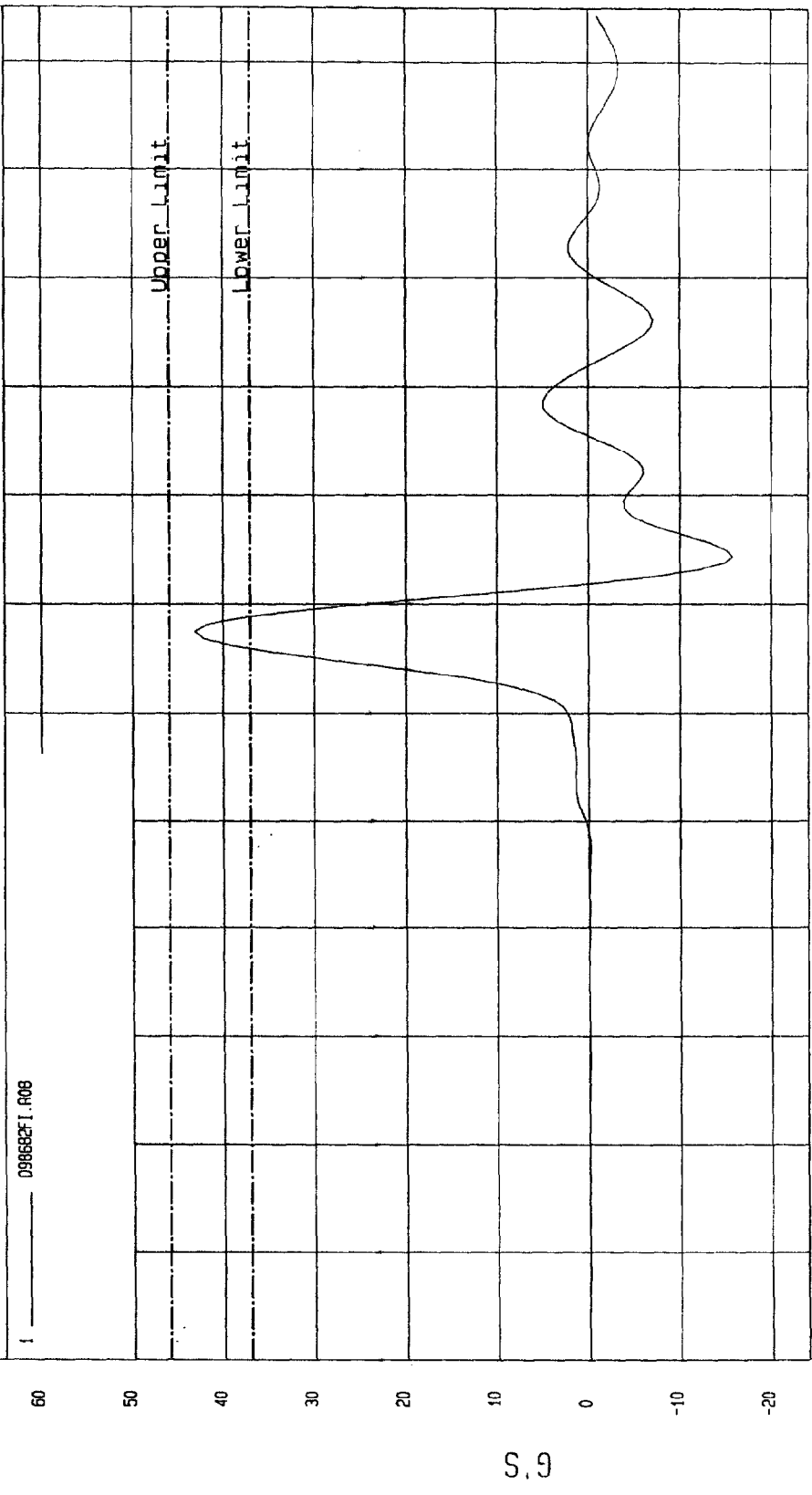


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-27-1998 - 16:19

COMPONENT: DUMMY # 270 Velocity: 14.017 FT/SEC 4.27 M/SEC

Minimum = -15.69 G'S at 74.3 msec Maximum = 43.19 G'S at 67.5 msec

UPPER RIB ACCELERATION



MCA Research
04-27-1998 16:26

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-27-1998 - 16:19

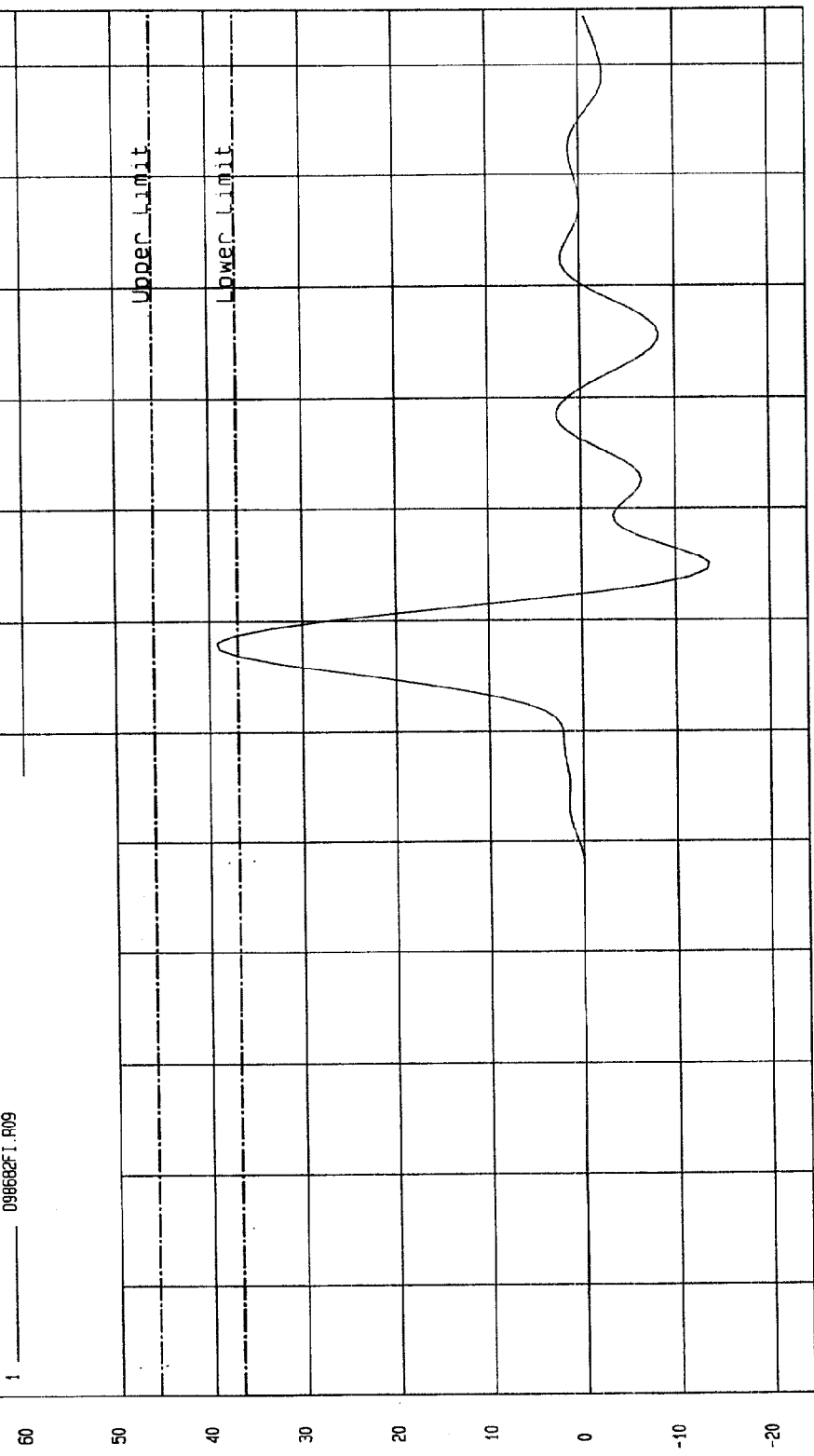
COMPONENT: DUMMY # 270 Velocity: 14.017 FT/SEC 4.27 M/SEC

Minimum = -13.66 G'S at 75 msec

Maximum = 39.16 G'S at 68.1 msec

LOWER RIB ACCELERATION

1 _____ D98682FI.R09



WCA Research
04-27-1998 16:26

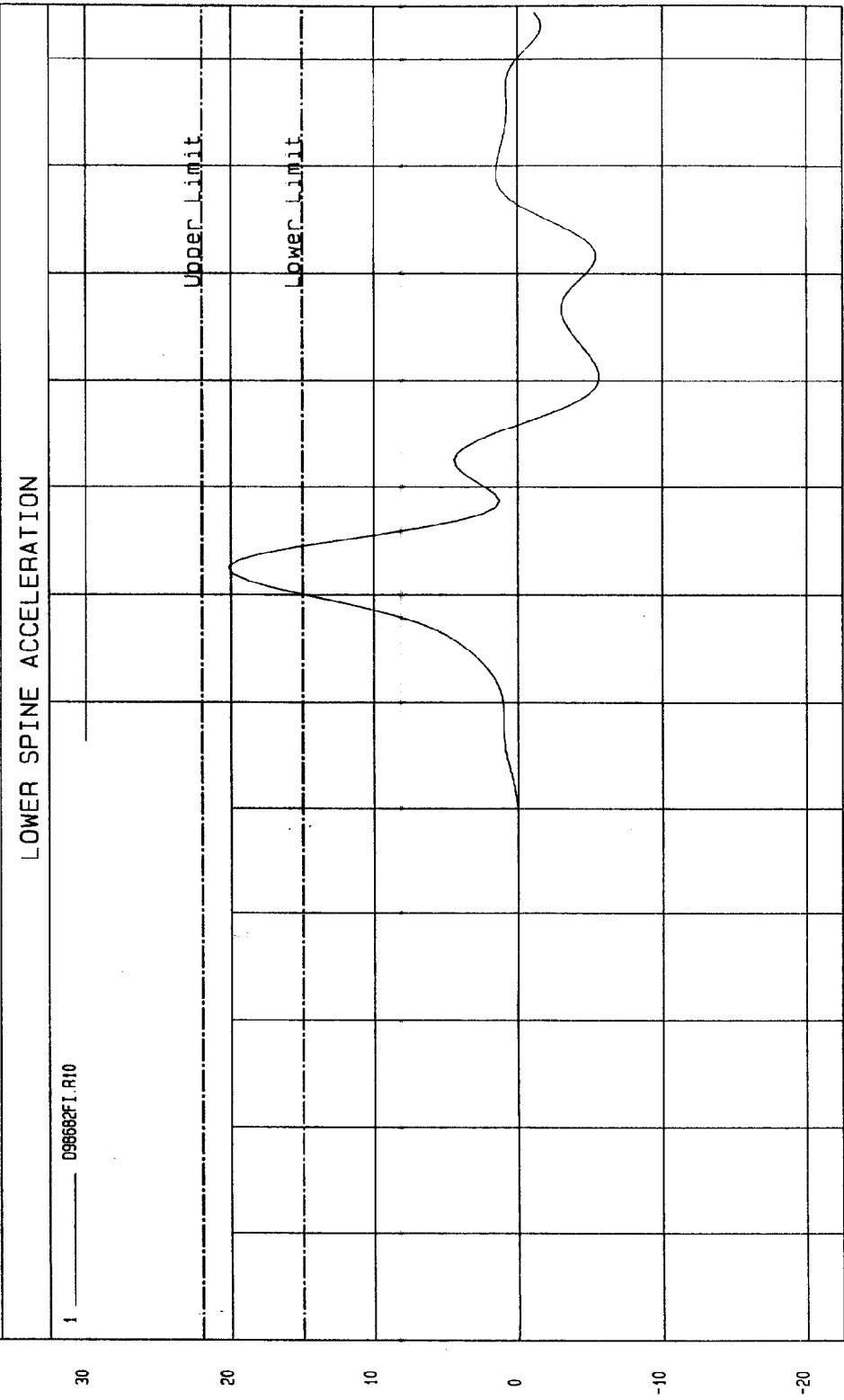
TIME (SECONDS)

S.9

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-27-1998 - 16:20

COMPONENT: DUMMY # 270 Velocity: 14.017 FT/SEC 4.27 M/SEC

Minimum = -5.61 G'S at 90.6 msec Maximum = 20.18 G'S at 72.5 msec



NSA Research
04-27-1998 16:27

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 27, 1998

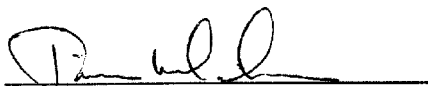
DUMMY NUMBER: 270

TEST NUMBER: D98683

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	27%
PROBE SPEED	14.0 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	41

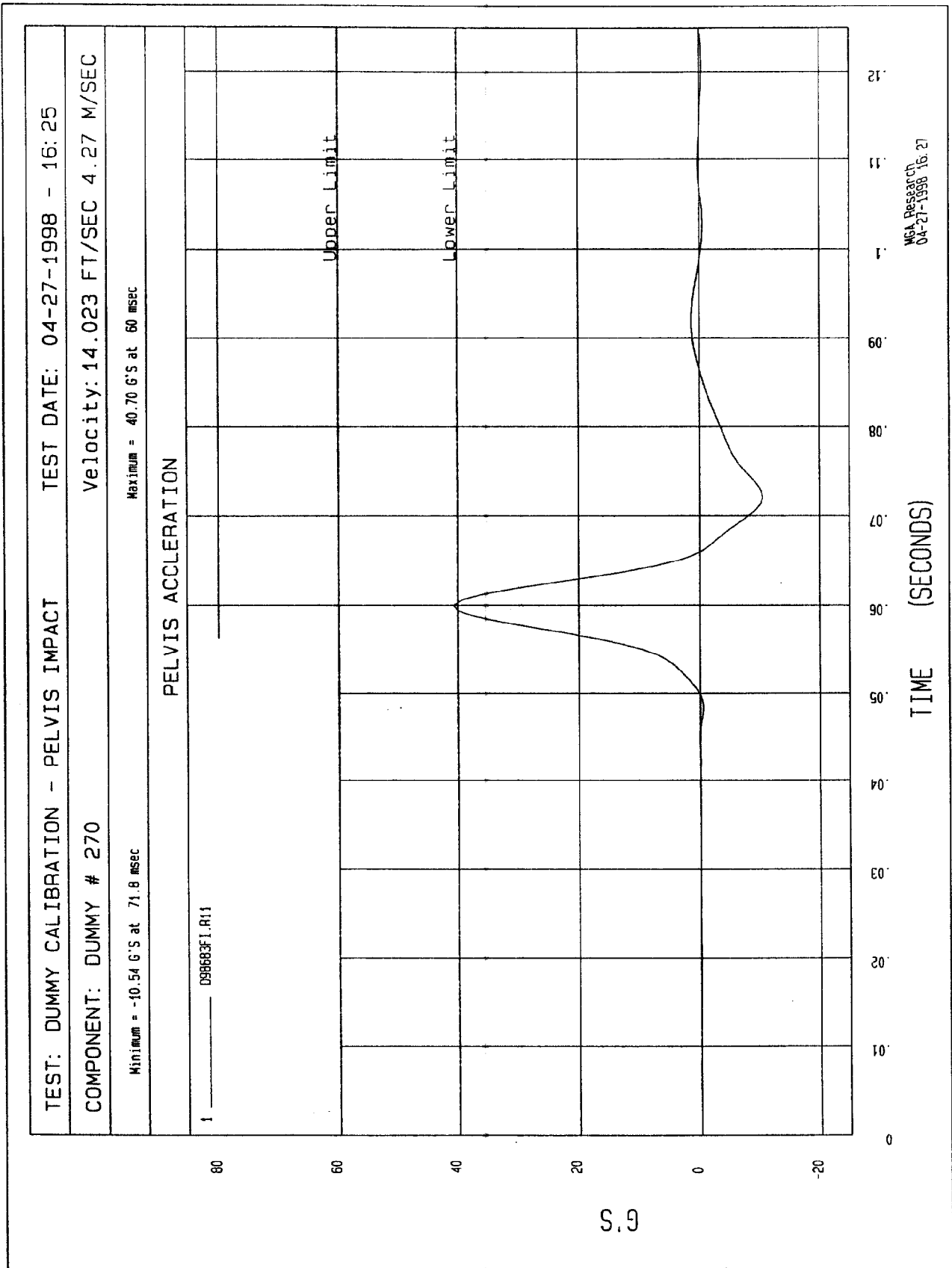
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





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

DATE: April 27, 1998

DUMMY NUMBER: 270
8

TEST NUMBER: D98684

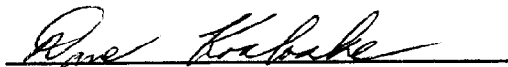
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.3
FORCE @ 0.75 in	36.7 - 49.8 lbs	42.5
FORCE @ 1.0 in	50 - 63 lbs	56
FORCE @ 1.3 in	73 - 88 lbs	75

TEST MEETS SPECIFICATIONS

TECHNICIAN



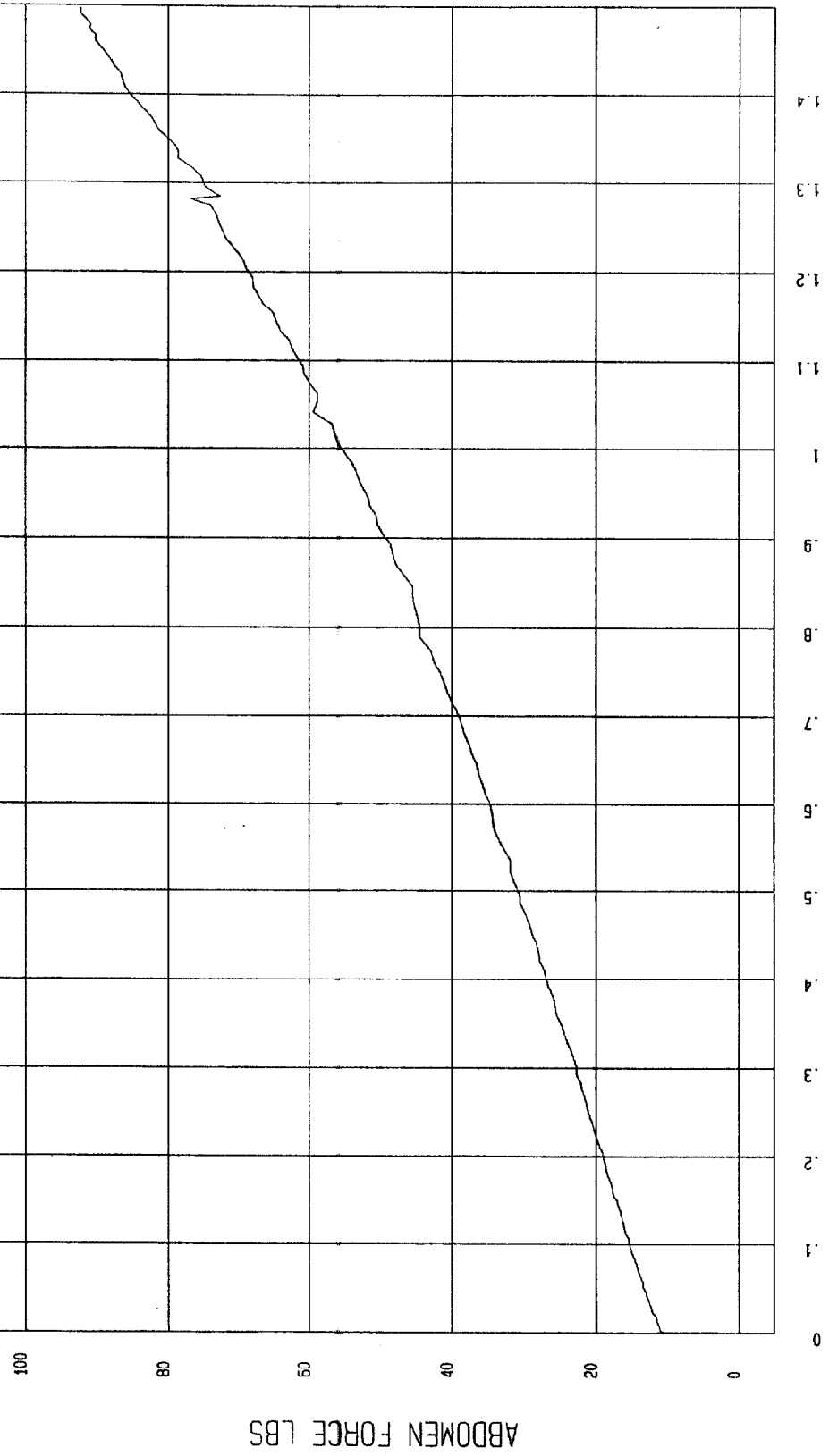
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 04-27-1998 - 17:52

COMPONENT: DUMMY # 270

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



NCA Research
04-27-1998 17:54

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: April 27, 1998

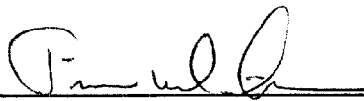
DUMMY NUMBER: 270

TEST NUMBER: D98684

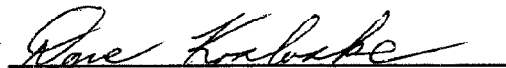
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	34
FORCE @ 40°	46 - 58 lbs	52
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN



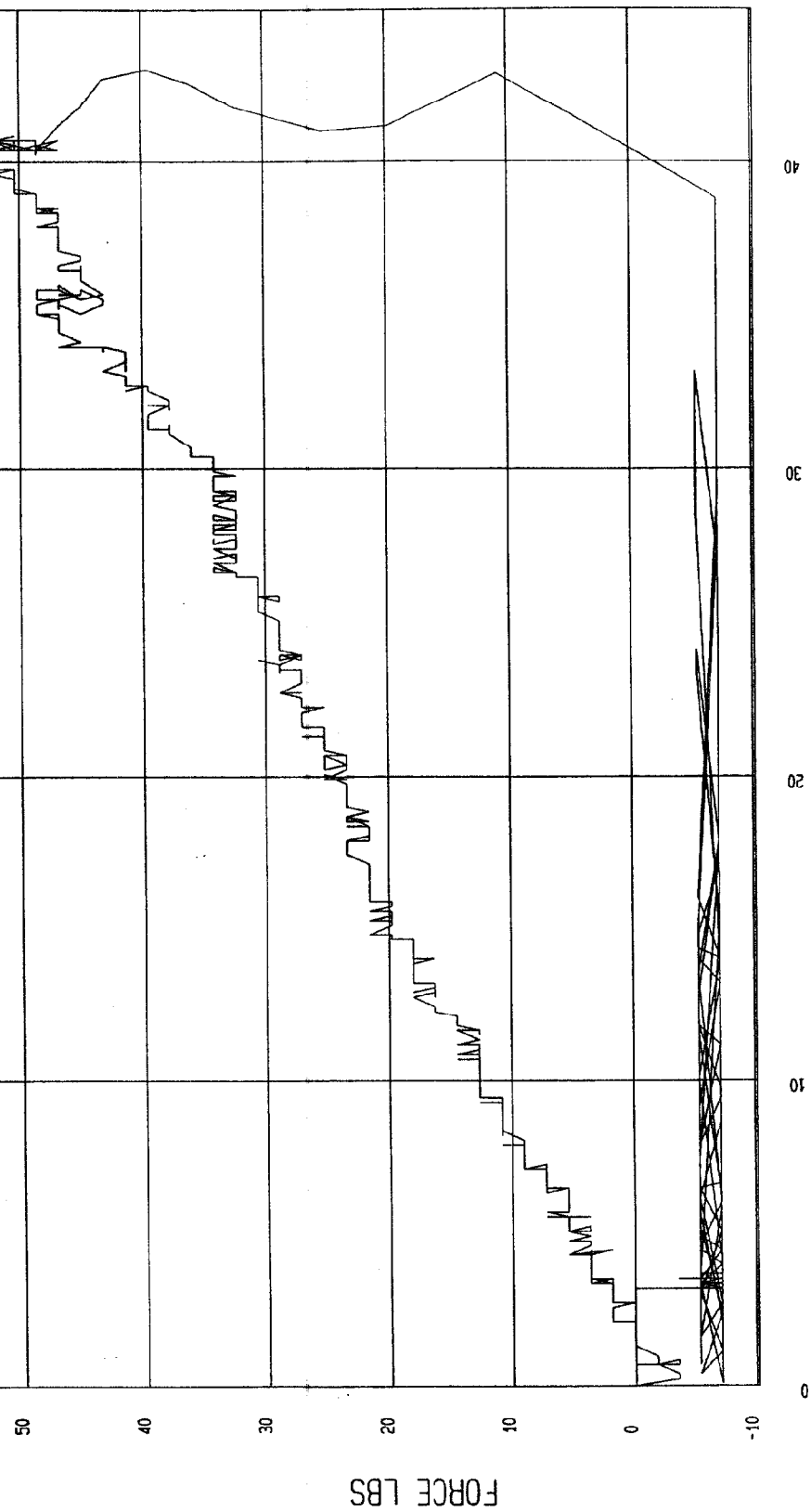
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 04-27-1998 - 18:22

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



MGA Research
04-27-1998 18:33

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 269

Inspected By: Tim Michnay

Date: April 27, 1998

<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: 270

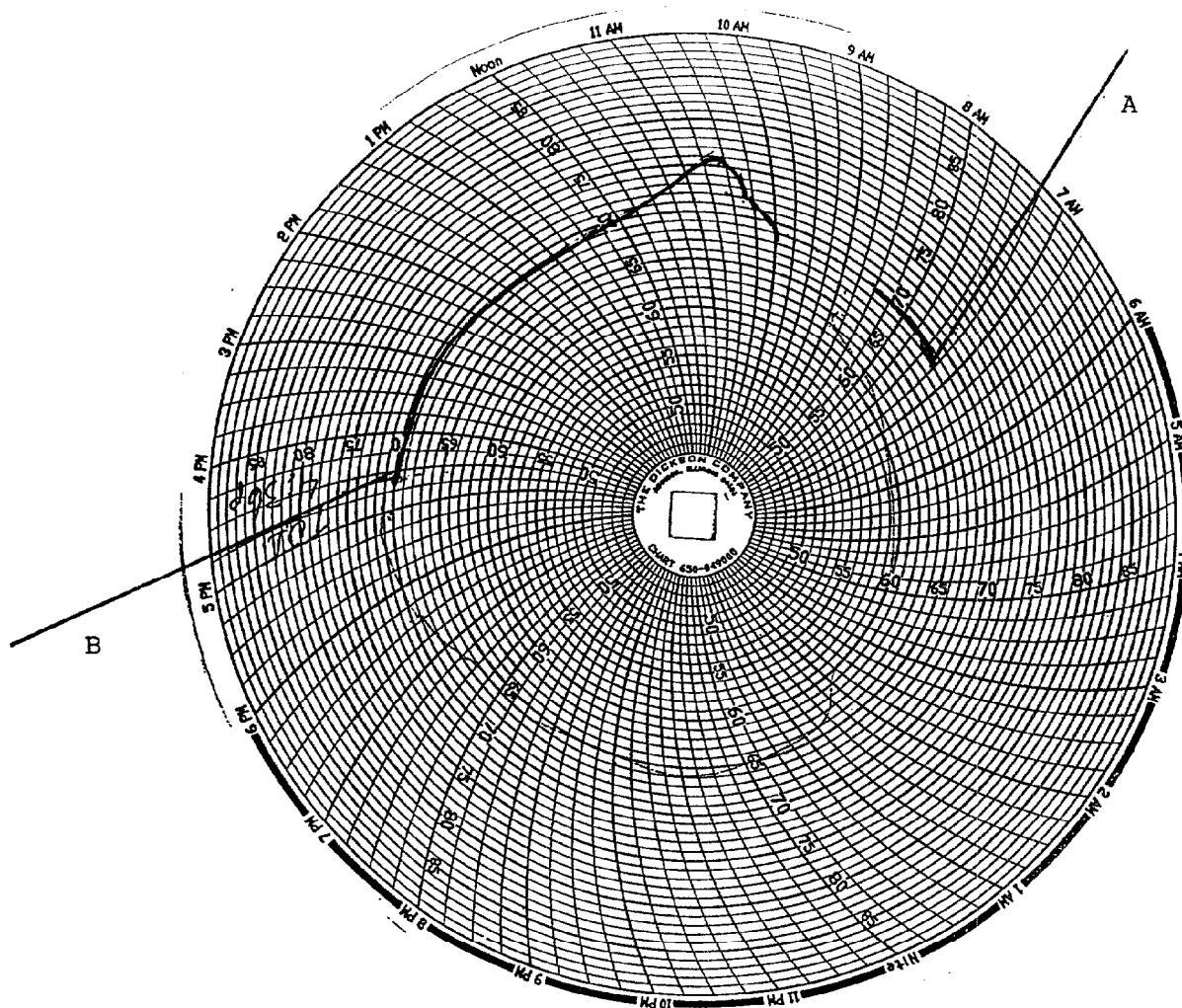
Inspected By: Tim Michnay

Date: April 27, 1998

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

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

VEHICLE AND DUMMY TEMPERATURE



A = dummies installed in vehicle
B = test conducted

APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR DRIVER DUMMY NO. 269

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AKAC4	Endevco	April 1, 1998
Lower Rib Y	J10431	Endevco	April 1, 1998
Lower Spine Y	AGP28	Endevco	April 1, 1998
Pelvis Y	AJ9P7	Endevco	April 1, 1998
Upper Rib Redundant Y	J13642	Endevco	April 1, 1998
Lower Rib Redundant Y	AN9E3	Endevco	April 1, 1998
Lower Spine Redundant Y	AJ8T5	Endevco	April 1, 1998
Pelvis Redundant Y	AJ462	Endevco	April 1, 1998
Head Center of Gravity X	AJ9E5	Endevco	April 1, 1998
Head Center of Gravity Y	ALFA7	Endevco	April 1, 1998
Head Center of Gravity Z	AHTT3	Endevco	April 1, 1998

INSTRUMENTS FOR PASSENGER DUMMY NO. 270

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AKAF3	Endevco	April 1, 1998
Lower Rib Y	ALEC1	Endevco	April 1, 1998
Lower Spine Y	ALCH7	Endevco	April 1, 1998
Pelvis Y	AKAD6	Endevco	April 1, 1998
Upper Rib Redundant Y	ALCN9	Endevco	April 1, 1998
Lower Rib Redundant Y	J10411	Endevco	April 1, 1998
Lower Spine Redundant Y	AJ420	Endevco	April 1, 1998
Pelvis Redundant Y	AJ9A7	Endevco	April 1, 1998
Head Center of Gravity X	AN8R0	Endevco	April 1, 1998
Head Center of Gravity Y	AN8P8	Endevco	April 1, 1998
Head Center of Gravity Z	AN8M5	Endevco	April 1, 1998

VEHICLE INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	F11-G07	Entran	January 8, 1998
Moving Barrier CG Y	G13-B03	Entran	January 8, 1998
Moving Barrier CG Z	E10-F19	Entran	January 8, 1998
Moving Barrier Rear Axle X	H02-J05	Entran	January 30, 1998
Moving Barrier Rear Axle Y	G13-B14	Entran	January 12, 1998
Left Mid A-Post Y	A10-G05	Entran	March 27, 1998
Left Lower A-Post Y	E10-F03	Entran	March 27, 1998
Left Mid B-Post Y	D05-R19	Entran	January 29, 1998
Left Lower B-Post Y	G01-J14	Entran	March 25, 1998
Rear Floorpan Above Axle X	F11-G10	Entran	January 29, 1998
Rear Floorpan Above Axle Y	E10-F17	Entran	January 29, 1998
Rear Floorpan Above Axle Z	I25-J12	Entran	January 29, 1998
Driver Seat Track Y	E10-F16	Entran	February 13, 1998
Right Side Sill at Front Seat X	E24-G10	Entran	March 25, 1998
Right Side Sill at Front Seat Y	F07-A21	Entran	March 25, 1998
Right Side Sill at Front Seat Z	H07-A25	Entran	March 25, 1998
Right Side Sill at Rear Seat X	E23-R10	Entran	January 29, 1998
Right Side Sill at Rear Seat Y	H02-J14	Entran	January 30, 1998
Right Side Sill at Rear Seat Z	H02-J08	Entran	January 30, 1998
Left Side Sill at Front Seat Y	I25-J15	Entran	February 13, 1998

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	DO5-R09	Entran	February 13, 1998
Right Rear Occupant Compartment Y	F20-G07	Entran	March 27, 1998
Vehicle CG X	F12-G02	Entran	March 25, 1998
Vehicle CG Y	F20-G09	Entran	January 12, 1998
Vehicle CG Z	G08-B03	Entran	January 12, 1998
Left Front Door on Centerline	F12-G07	Entran	January 30, 1998
Midrear of Left Front Door	J04-F15	Entran	January 29, 1998
Left Front Door Upper Centerline	H02-J06	Entran	January 29, 1998
Midrear of Left Rear Door	B13-Z05	Entran	January 12, 1998
Left Rear Door Upper Centerline	H02-J01	Entran	August 6, 1997

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