

2528

REPORT NO. MGA-97-N05

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

1997 CHEVROLET CAVALIER 2 DOOR
NHTSA NO. MV0111

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: February 5, 1997

Report Date: February 17, 1997

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 SEVENTH STREET, S.W.
ROOM NO. 5401 (NPS-10)
WASHINGTON, D.C. 20590

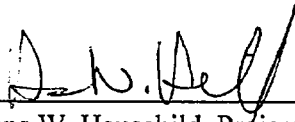
TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. MGA-96-N05		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1997 Chevrolet Cavalier NHTSA No. MT0111 to the requirements of FMVSS No. 208, 212, 219 (partial) and 301.				5. Report Date February 17, 1997	
				6. Performing Organization Code MGA	
7. Author(s) Hans W. Hauschild				8. Performing Organization Report No. MGA-OMI-05	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No. MGA-96-DOT-05	
				11. Contract or Grant No. DTNH22-90-D-12121	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (Mail Code: NEF-30) 400 Seventh St., S.W., Room 6115 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report February 5, 1997 February 17, 1997	
				14. Sponsoring Agency Code DOT/NHTSA/RM/OMI	
15. Supplementary Notes					
16. Abstract A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1997 Chevrolet Cavalier at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on February 5, 1997. The barrier impact velocity was 56.3 kph (35.0 mph), and the ambient temperature at the time of impact was 21.6°C. The post-test maximum static crush was 539 mm. The test vehicle appeared to comply with the requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS 212, "Windshield Mounting" 2. FMVSS 219 (partial), "Windshield Zone Intrusion" 3. FMVSS 301, "Fuel System Integrity" With regard to FMVSS 208, "Occupant Crash Protection" injury criteria, the driver's HIC was 646 and the 3 msec. Clip (Chest g's) was 50.3 g's. The left and right femur loads for the driver were 3225 and 4267 Newtons, respectively. The passenger's HIC was 885 and the 3 msec Clip was 44.5 g's. The left and right femur maximum loads were 3944 and 4207 Newtons respectively.					
17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (partial) Indicant Testing FMVSS 301 Indicant Testing				18. Distribution Statement Copies of this report are available from: Technical Ref. Division, NHTSA, NASSIF Building, Room 5108 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 277	22. Price	

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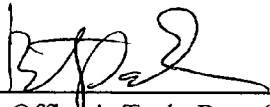
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Hans W. Hauschild, Project Engineer
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FINAL REPORT ACCEPTED BY: _____


Manager, New Car Assess. Program (NCAP)

4/1/92
Date of Report Acceptance


Contracting Officer's Tech. Rep. (COTR)

4/1/92
Date of Report Acceptance

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SECTION 1
PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY'97 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-12121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48 kph (30 mph) FMVSS 208/212/219/301-75 requirements.

The 56 kph (35 mph) frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test Procedure for New Car Assessment Program (NCAP) dated January 1, 1990. Data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

SECTION 2

SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 30 load cells was impacted by a 1997 Chevrolet Cavalier 2 Door at a velocity of 56.3 kph (35.0 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on February 5, 1997. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 18 high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, chest displacement transducer, neck load cell, right/left femur load cells, right/left lower leg sensors, and right/left feet accelerometers. Seat belt load cells were also on the driver and passenger shoulder and lap belts to measure dummy torso and pelvic section loading. Calibrated ATDs, driver (Serial No. 036), and the right front passenger (Serial No. 037), were used for this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 111 channels of data were recorded on 10 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 646 and the maximum chest (CLIP) deceleration over 3 milliseconds was 50.3 g's. The maximum chest displacement was 26 mm. The left and right femur loads were 3225 and 4267 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 885 and maximum chest (CLIP) deceleration over 3 milliseconds was 44.5 g's. The maximum chest displacement was 29 mm. The left and right femur loads were 3944 and 4207 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

NHTSA No.: MV0111 VIN.: 1G1JC1244V7205524

Body color: Black Date of Manufacture: 12/96

Engine: 4 Cylinders; C.I.D.; 2.2 Liters;
X Gas; Diesel; Turbocharged
 Longitudinal; X Transverse

Transmission: 5 Speed; X Manual; Automatic; Overdrive

Final Drive: X Front Wheel; Rear Wheel; Four Wheel

Odometer Reading: 25 miles

X A/C; P/S; X P/B; P/wdo;
 P/seats; Tilt Wheel; Cruise Control; X ABS

Type of Occupant Restraint: Type II with driver and passenger airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 207 kPa (30 Psi) Rear 207 kPa (30 Psi)

Recommended Tire Size: P195/70R14

Recommended Cold Tire Pressure: Front 207 kPa (30 Psi) Rear 207 kPa (30 Psi)

Tires on Vehicle: P195/70R14 Manufacturer: Goodyear

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 Adj. With; Power; X Lever

Vehicle Capacity Weight (VCW) = 400.0 kg. (A)

No. of Occupants x 68.0 kg. = 340.0 kg. (B)

Rated Cargo Weight (RCW) A-B = 60.0 kg.

GVWR 1609.4 kg. GAWR: Front 881.6 kg.; Rear 727.8 kg.

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW:

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1201.7 kg

Target Test Weight = 1417.7 kg

Vehicle components removed to meet target weight: rear seat, rear carpet, rear bumper reinforcement, rear bumper cover, tail lights, muffler, trunklid, side mirrors, spare tire, jack & tool kit, and rear trim panels

* light trucks and MPVs RCW is 136 kgs or manufacturer's value, whichever is less

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST-IMPACT DATA:

Type of Test: 35 mph Frontal Impact Impact Angle: 90°
Date of Test: February 5, 1997 Time of Test: 3:41 p.m.
Ambient Temperature: 21.6°C (69°F) (Spec. Range = 18.8 to 25.6°C)
Temperature in Occupant Compartment: 21.6° C
Windshield Molding Temperature: 21.6° C
Required Impact Velocity Range: 55.5 to 57.1 kph
Impact Velocity: primary = 56.3 kph; secondary = 56.6 kph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 1304 mm
Exiting Speed Trap: 304 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 4026 C_L 4302 L 4026
Post-test = R 3811 C_L 3763 L 3683
Crush = R 215 C_L 539 L 343

Distance from front of test vehicle to point of impact (rebound):

R 340 mm C_L 396 mm L 458 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>to airbag</u>	<u>to airbag</u>
Chest	<u>to airbag</u>	<u>to airbag</u>
Abdomen	<u>none noted</u>	<u>none noted</u>
Left Knee	<u>to kneebolster & steering column</u>	<u>to glovebox & dash</u>
Right Knee	<u>to kneebolster & steering column</u>	<u>to glovebox & dash</u>

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Front

<u>Post-Test Door Opening</u>	<u>Left</u>	<u>Right</u>
(without use of tools)	<u>opened</u>	<u>Opened</u>

Front

<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>
Seat Back Movement	<u>0</u>	<u>0</u>
Seat Shift (mm)	<u>6 mm forward</u>	<u>4 mm forward</u>

Glazing Damage

Backlight/Windshield Windshield cracked

Other Notable Impact Effects: none noted

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST TEST AIRBAG DATA

Vehicle Yr/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

NHTSA No.: MV0111 VIN: 1G1JC1244V7205524

- A. Number of Vent Holes: Driver 2; Passenger 0
- B. Size of Vent Holes: Driver 30 mm dia.; Passenger N/A
- C. Total Vent Area; Driver 7.1 cm² Passenger N/A
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
Driver; Length mm, Width mm, Diameter 635 mm
Passenger; Length 480 mm, Width 490 mm, Diameter mm
- E. Is the Airbag Tethered?
Driver; Yes; X No; If yes, record length of tether mm
Passenger; X Yes; No; If yes, record length of tether 325 mm left
270 mm right

SECTION 3

SUMMARY OF RESULTS FOR-----

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

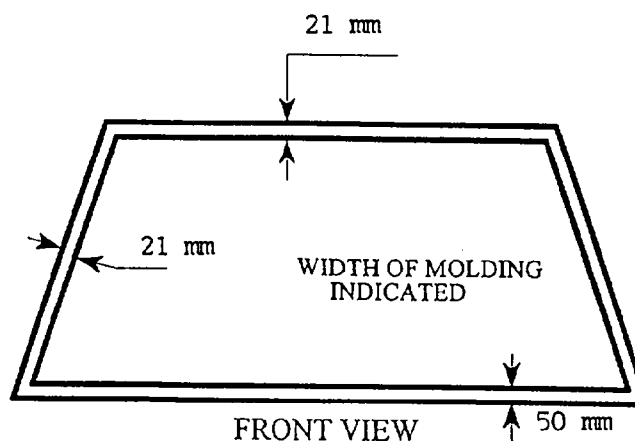
Windshield set in rubber molding with glue

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		PERCENT RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2030	2030	100%
LEFT SIDE	2030	2030	100%
TOTAL	4060	4060	100%

AREA OF RETENTION FAILURE: None



FAILURE DETAILS: None

FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the surface of the instrument panel, including padding, and drawing the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contact points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and $\frac{1}{2}$ " distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:

A= 1082 mm

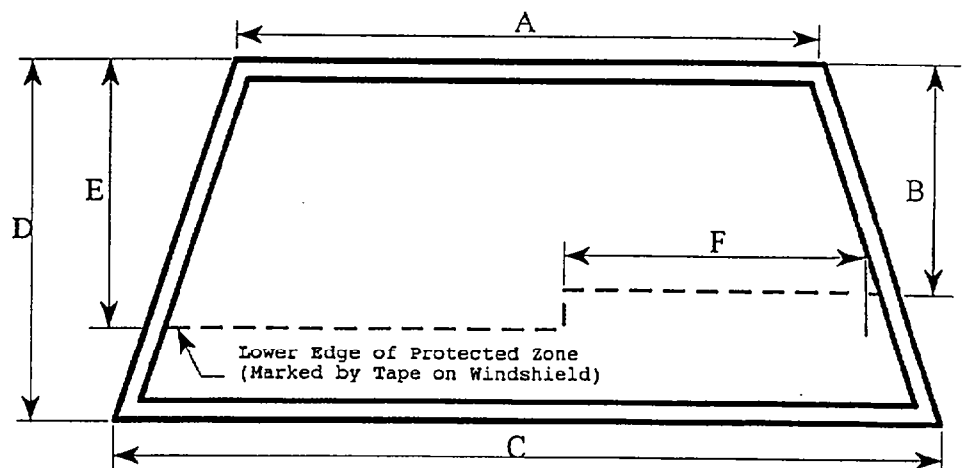
B= 455 mm

C= 1470 mm

D= 754 mm

E= 525 mm

F= 600 mm



FRONT VIEW

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

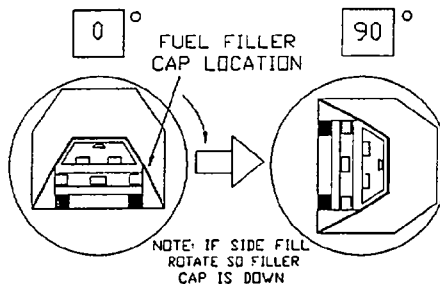
(Show location of penetration)

NONE

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MV0111



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 50 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 50 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
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III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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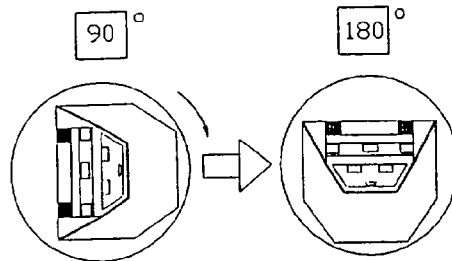
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MV0111



I. 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 7 minutes 31 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
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III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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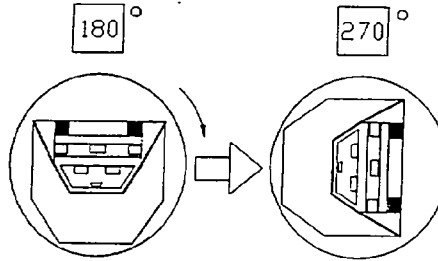
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MV0111



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 17 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 17 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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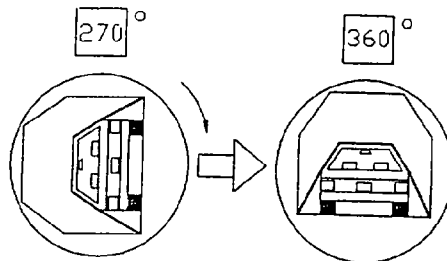
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MV0111



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 38 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 38 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

SECTION 4
OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Camera Locations
6. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

FMVSS NO. 208, "OCCUPANT CRASH PROTECTION", DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Cavalier/2 Door

VEH. NHTSA NO.: MV0111 TEST DATE: February 5, 1997

MAX. ACCELERATION VALUES: (g's)	DRIVER # <u>036</u>	PASSENGER # <u>037</u>
Head Channel X	-66.7 @ 77 msec.	-70.6 @ 76 msec.
Head Channel Y	17.4 @ 84 msec.	24.8 @ 91 msec.
Head Channel Z	19.0 @ 86 msec.	-22.8 @ 58 msec.
HEAD RESULTANT	68.3 @ 79 msec.	71.9 @ 74 msec.
Chest Channel X	-51.2 @ 72 msec.	-46.8 @ 78 msec.
Chest Channel Y	4.8 @ 65 msec.	6.1 @ 88 msec.
Chest Channel Z	9.0 @ 83 msec.	10.3 @ 90 msec.
CLIP	50.3	44.5
TIME INTERVAL (msec) [3. msec. minimum]	$t_1 = 68.8$ $t_2 = 71.8$	$t_1 = 76.6$ $t_2 = 79.7$

HEAD INJURY CRITERIA (HIC)
VALUES:

HIC	646.5	885.4
$t_1 =$ (msec)	57.6	64.0
$t_2 =$ (msec)	93.6	95.7
Avg. Accel. t_1 to t_2 (g's)	50.3	60.0

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	-3224.7 @ 52 msec.	-3944.0 @ 45 msec.
Right Side (N)	-4267.0 @ 57 msec.	-4207.4 @ 62 msec.

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	5835.0 @ 57 msec.	4682.7 @ 57 msec.
Shoulder Belt (N)	5254.2 @ 74 msec.	4829.7 @ 84 msec.

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Cavalier/2 Door

VEHICLE NHTSA NO.: MV0111 TEST DATE: February 5, 1997

MAXIMUM VALUES	DRIVER DUMMY # 036	PASSENGER DUMMY # 037
Neck Load X (N)	1220.8 @ 84 msec.	922.5 @ 80 msec.
Neck Load Y (N)	-240.3 @ 72 msec.	-338.6 @ 121 msec.
Neck Load Z (N)	-1480.2 @ 55 msec.	-1651.2 @ 68 msec.
Neck Moment X (NM)	-16.3 @ 91 msec.	-20.3 @ 122 msec.
Neck Moment Y (NM)	-68.2 @ 84 msec.	-53.6 @ 78 msec.
Neck Moment Z (NM)	-21.9 @ 102 msec.	-34.0 @ 94 msec.
Chest Deflection X (mm)	26	29
Time of Max. Occurrence	79 msec.	85 msec.
Pelvis X Acceleration (g's)	-58.6 @ 57 msec.	-51.6 @ 56 msec.
Pelvis Y Acceleration (g's)	9.6 @ 54 msec.	-9.7 @ 45 msec.
Pelvis Z Acceleration (g's)	33.5 @ 64 msec.	25.1 @ 73 msec.
Pelvis Resultant (g's)	62.5 @ 57 msec.	53.5 @ 56 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MV0111 Vehicle: 1997/Chevrolet/Cavalier/2 Door

SEAT TYPE:

 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

Driver: X Manual
 Power

Passenger: X Manual
 Power

BUCKET SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining

DRIVER SEAT POSITION

12th detent rearward out of 22 detents

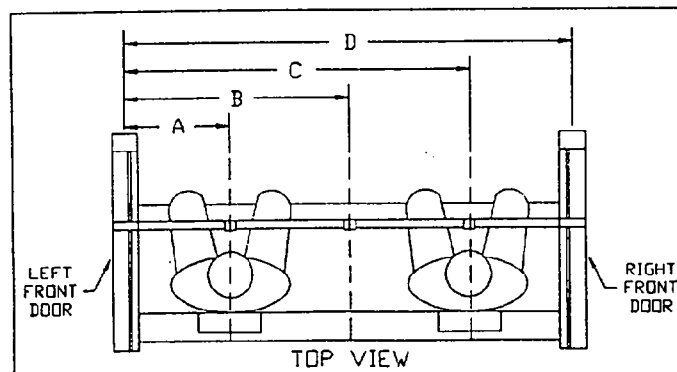
Seat back angle 27.6°

PASSENGER SEAT POSITION

7th detent rearward of 13 detents

Seat back angle 28.0°

Steering column set to mid position steering column angle 21.3°



36 DUMMY ID 37

A = Left Door to Driver Centerline	<u> 410 </u> mm
B = Left Door to Center Passenger Centerline	<u> 752 </u> mm
C = Left Door to Right Passenger Centerline	<u> 1090 </u> mm
D = Left Door to Right Door	<u> 1504 </u> mm

FRONT SEAT MEASUREMENT TABLE

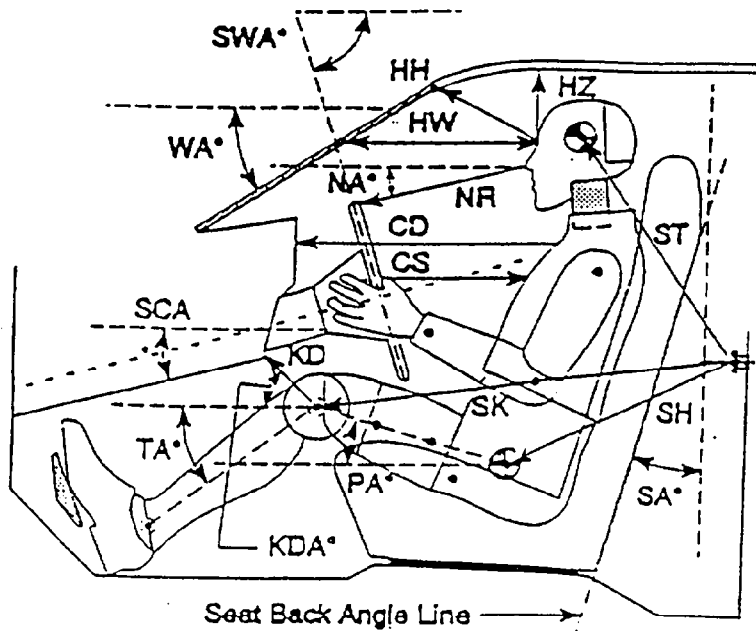
Units (mm)

	DRIVER (Serial # 036)	PASSENGER (Serial # 037)
WA°	25.8°	
SWA°	20.6°	N/A
SCA°	21.3°	N/A
SA°	27.6°	28.0°
HZ	145	145
HH	319	322
HW	563	593
HR	209	207
NR	397 Angle 9.3°	N/A
CD	512	493
CS	319	N/A
RA	204	N/A
KDL	151 Angle (KDA) 35.4°	121
KDR	153	116 Angle 32.8°
PA°	23.5	24.5°
TA°	37.9	37.6°
KK	280	232
ST*	645 Angle 35.1°	628 Angle 35.4°
SK*	909 Angle 89.5°	929 Angle 89.5°
SH*	544 Angle 100.5°	560 Angle 103.2°
SHY	249	266
HS	312	317
HD	110	109
AD	94	111

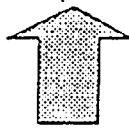
N/A = Not Applicable

* Angles measured from vertical

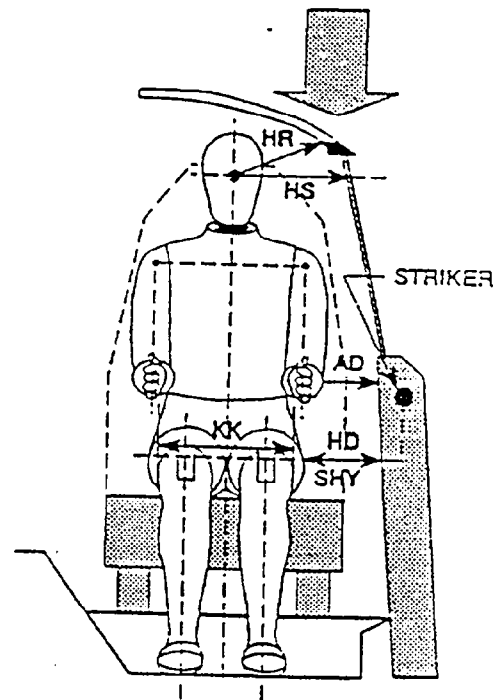
FRONT SEAT MEASUREMENTS



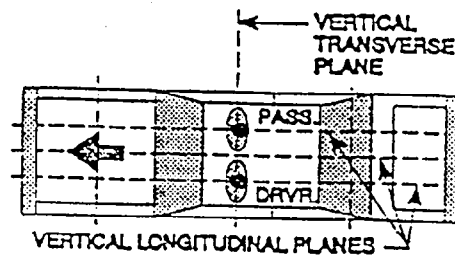
Seat Back Angle Line



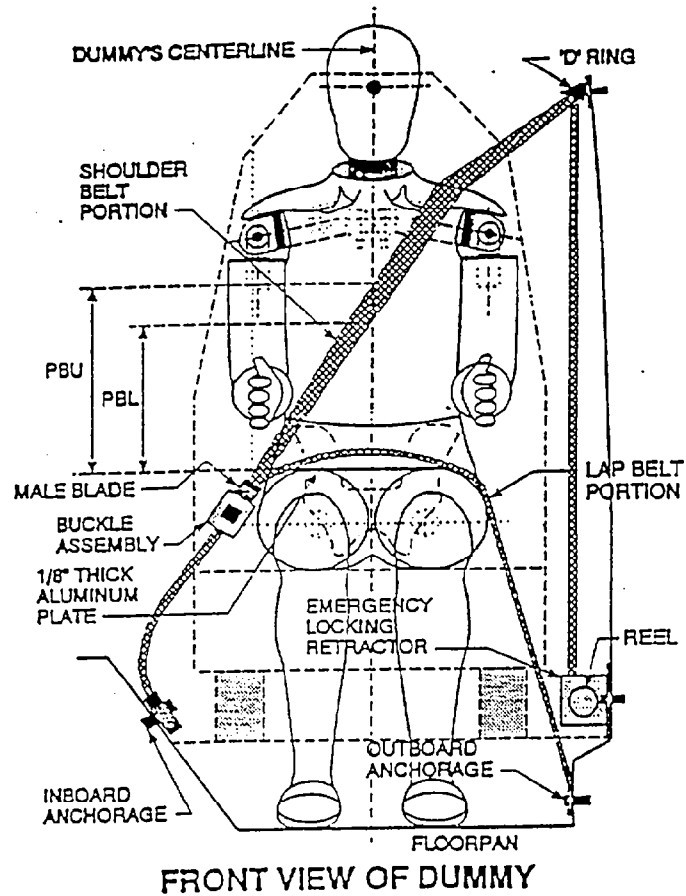
- AD - Arm to Door
- HD - H-Point to Door
- HR - Head to Side Header
- HS - Head to Side Window
- KK - Knee to Knee
- SHY - Striker to H-Point (Y-Direction)



- CD - Chest to Dash
- CS - Steering Wheel to Chest
- HH - Head to Header
- HW - Head to Windshield
- HZ - Head to Roof
- KDA - Knee to Dash Angle
- KDL - Left Knee to Dash
- KDR - Right Knee to Dash
- NA - Nose to Rim Angle
- NR - Nose to Rim
- PA - Pelvic Angle
- RA - Rim to Abdomen
- SA - Seat Back Angle
- SCA - Steering Column Angle
- SH - Striker to H-Point
- SK - Striker to Knee
- ST - Striker to Head
- SWA - Steering Wheel Angle
- TA - Tibial Angle
- WA - Windshield Angle



SEAT BELT POSITIONING DATA



(illustration)

Dimension = mm

	DRIVER DUMMY	PASSENGER DUMMY
<u>PBU</u> -- Top surface of alum. plate to upper edge	285	328
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	205	255

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

	<u>Driver</u>	<u>Passenger</u>
Length from trim above retractor reel to "D" ring as measured on dummy.	<u>625 mm</u>	<u>635 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>995 mm</u>	<u>1028 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>700 mm</u>	<u>764 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>140 mm</u>	<u>114 mm</u> at shoulder
As determined electronically	<u>113 mm</u>	<u>96 mm</u> at retractor
As determined mechanically	<u>154 mm</u>	<u>150 mm</u> at shoulder

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.	<u>NR</u>	<u>NR</u>
Measured mechanically	<u>NR</u>	<u>NR</u>

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>90 msec.</u>	<u>84 msec.</u>
---	-----------------	-----------------

NR = Not Recorded

CAMERA LOCATIONS

VEH. NHTSA NO.: MV0111; TEST DATE: February 5, 1997

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Cavalier/2 Door

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-		
2	Left Front View	-1000	-8820	1380	90	8405	25	1015
3	Steering Column Top	-2010	-7640	1540	90	7225	25	1015
4	Steering Column Bottom	-2000	-7630	1010	90	7215	25	1015
5	Driver Close-up	-1400	-10000	1175	90	9585	75	1156
6	Driver Angle	-5170	-5310	2030			50	1031
7	Onboard Driver						35	1005
8	Onboard Passenger						35	1005
9	Right Overall	-2090	8500	1110	90	8090	13	1156
10	Right Passenger Half	-1090	8430	1125	90	8020	25	1010
11	Right Close-up	-1640	10160	1220	90	9750	75	1075
12	Right Angle	-4750	5580	2040			50	1176
13	Top Overall	380	0	2700			13	1176
14	Top Driver	-120	-470	1595			13	971
15	Top Passenger	-100	470	1615			13	913
16	Pit Front	-1180	0	-3155			13	1010
17	Pit Rear	-2900	0	-3165			13	1010

*** COORDINATES:**

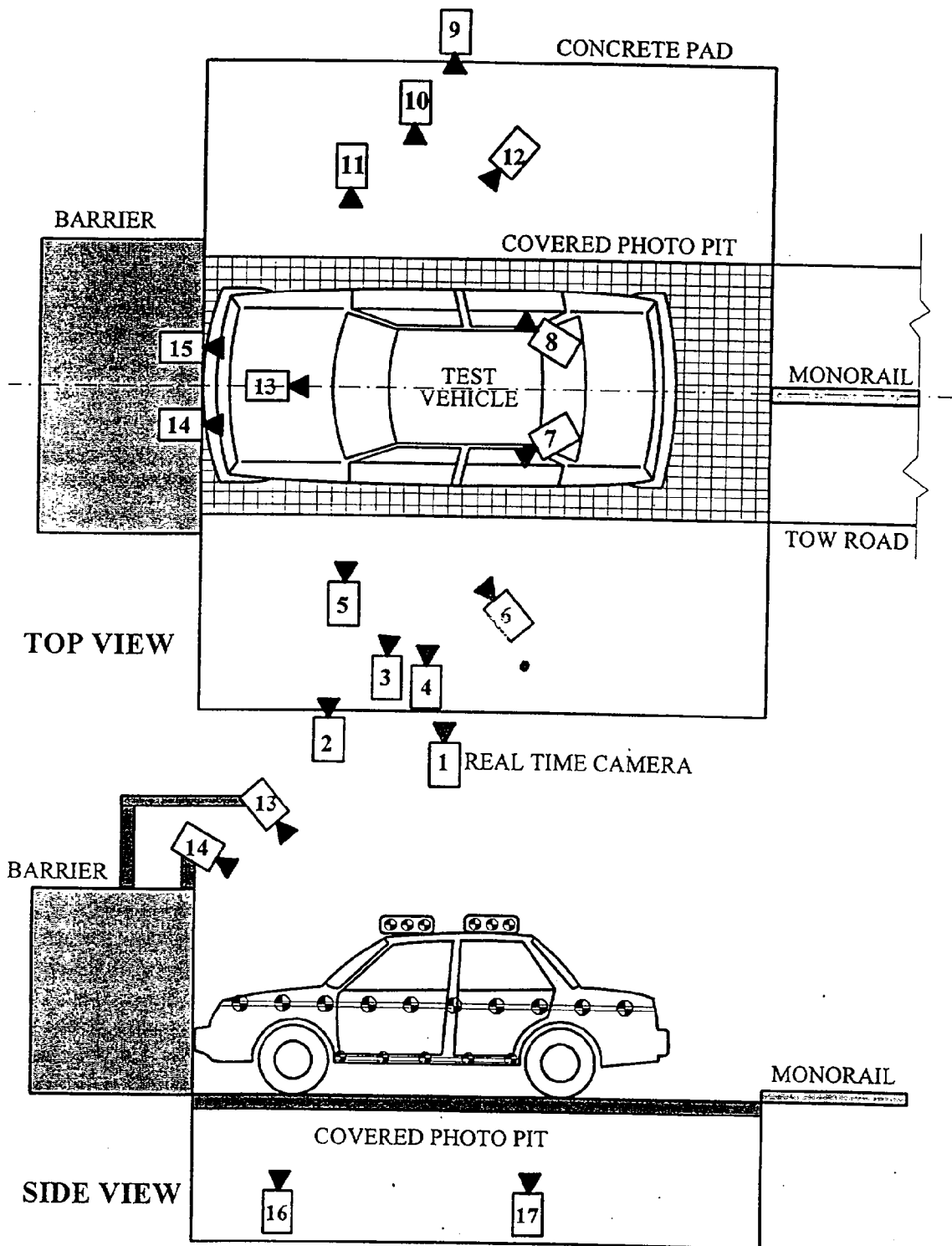
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

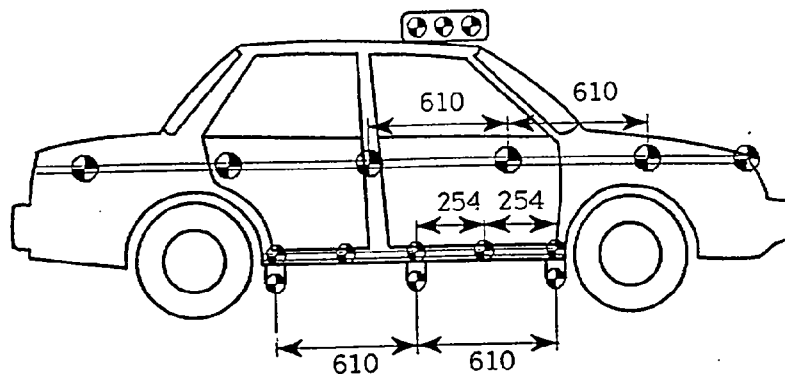
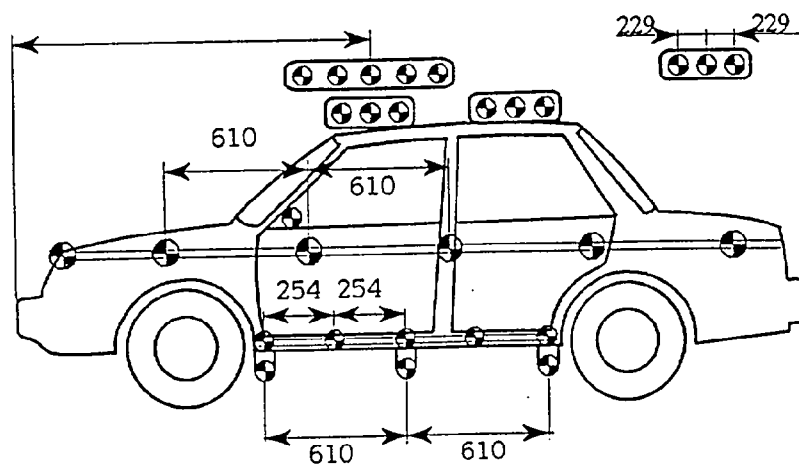
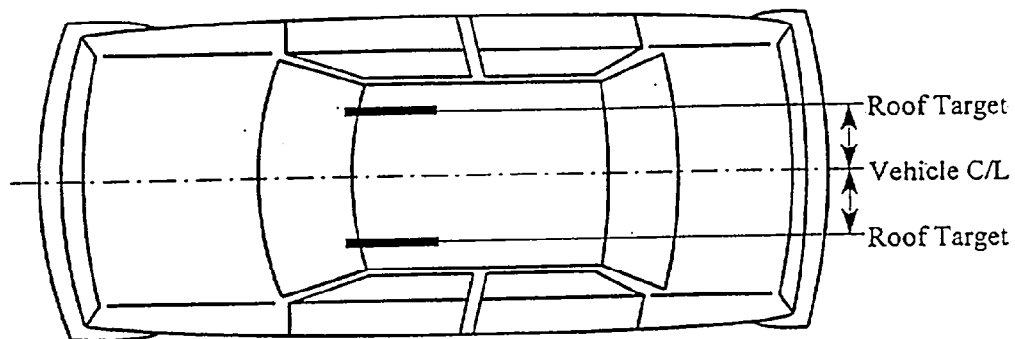
+Z = film plane to above ground level

ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

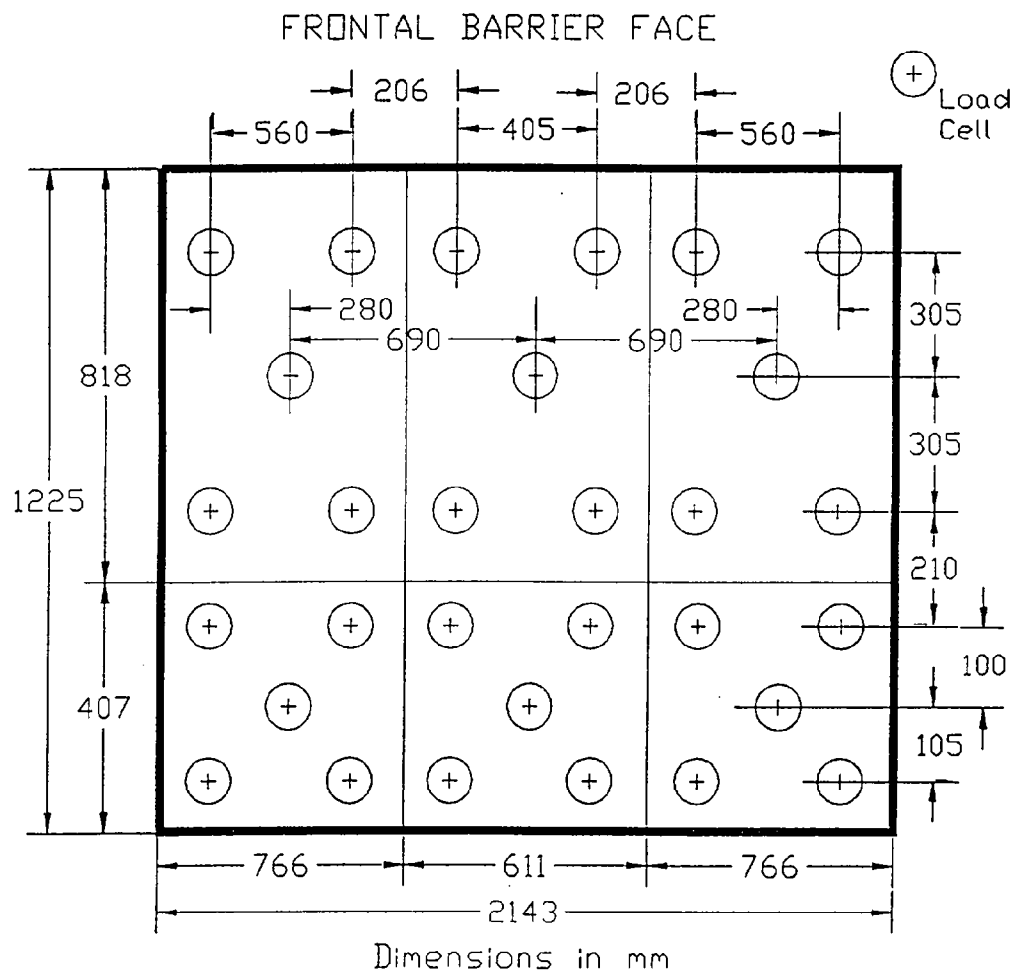
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

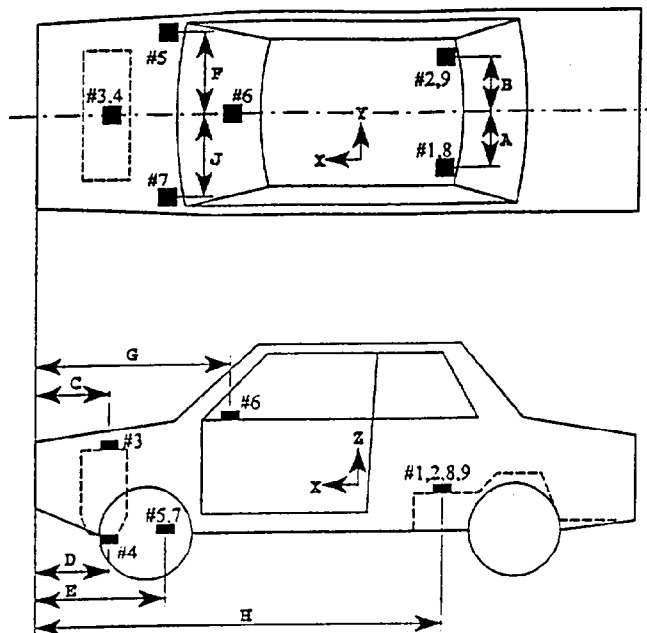
6 Groupings (5 cells/group)



The following data is presented in Appendix B:

- (1) Total or Sum of 30 individual load cells
- (2) Data from 6 Groupings shown above (5 cells/group)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (mm)

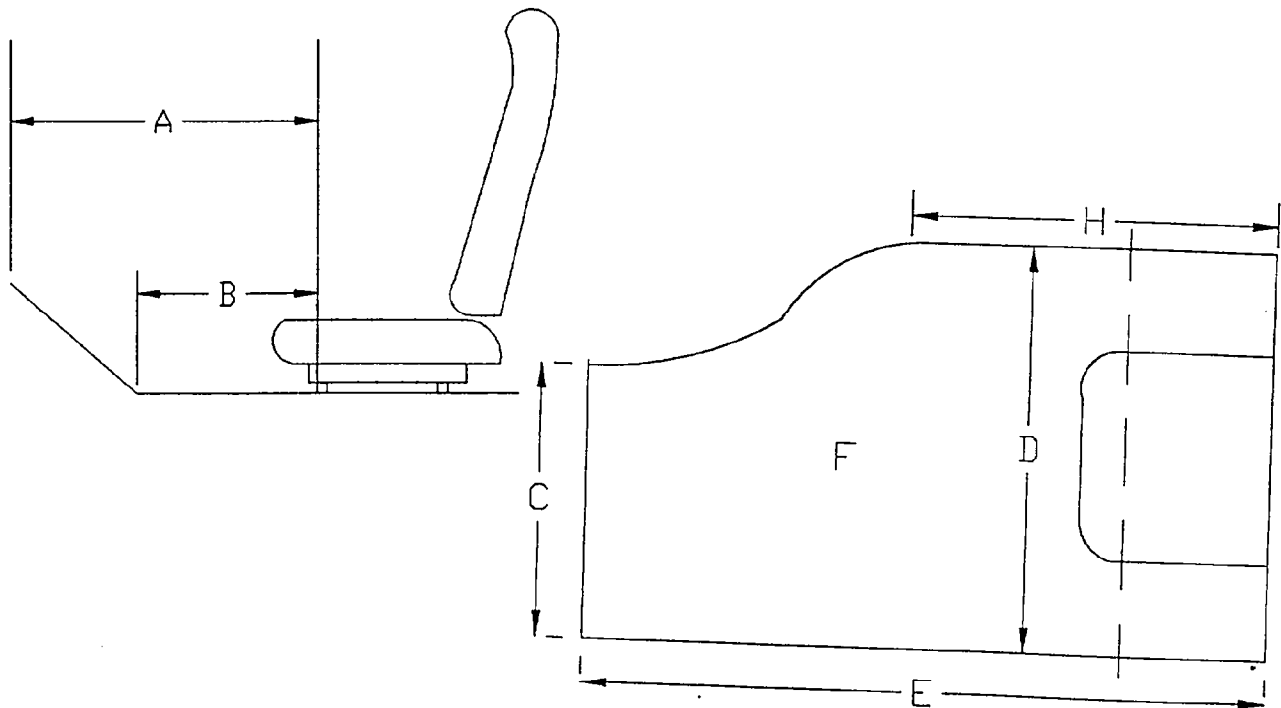
Dimension	Length
A	389
B	389
C	820
D	720
E	808
F	642
G	1694
H	2907
J	642

ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Side Brake Caliper	X

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Driver's Side



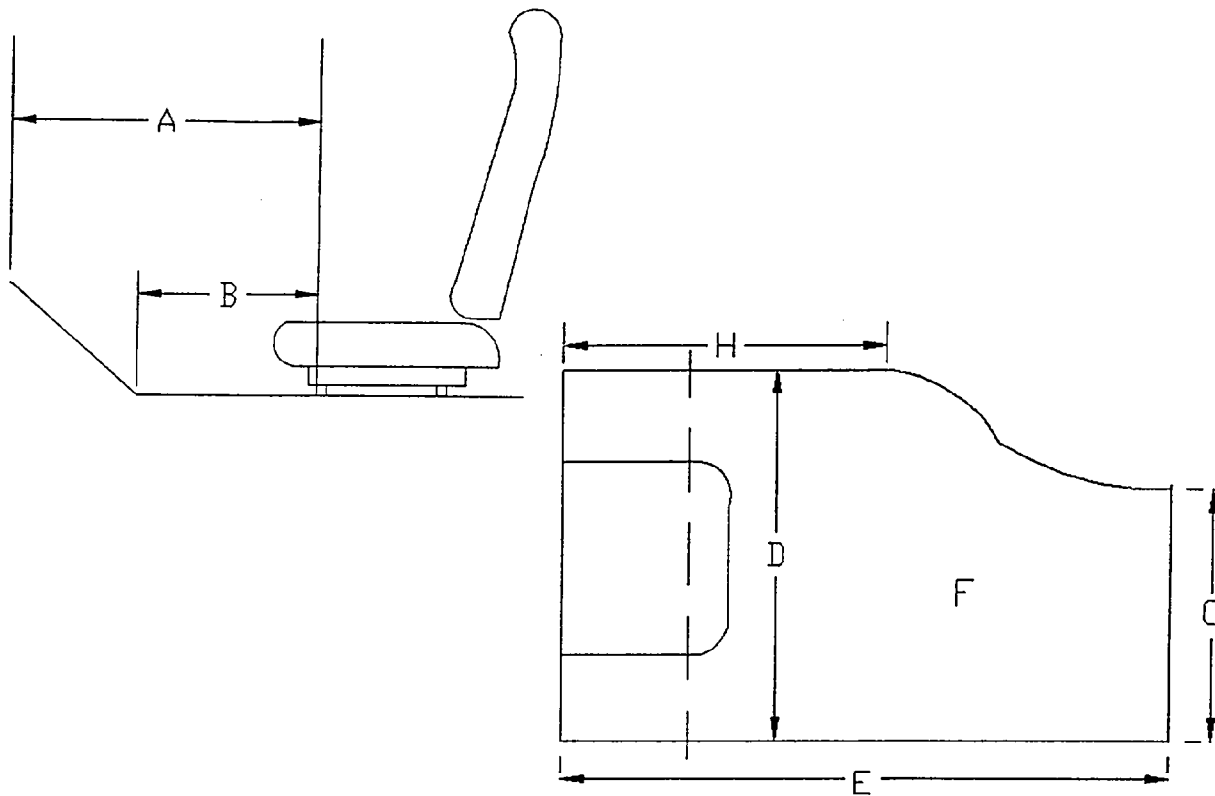
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	714	636	78
B	529	439	90
C	412	420	8
D	326	313	13
E	1809	1664	145
H	1512	1497	15
F(CM ²)	6754.02	6179.88	574.14

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

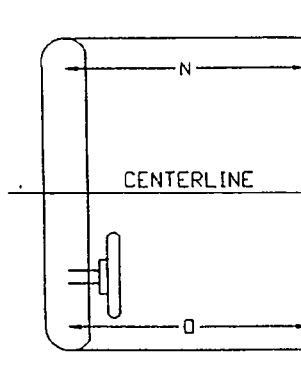
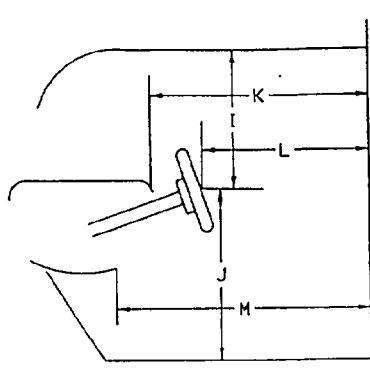
Passenger's Side



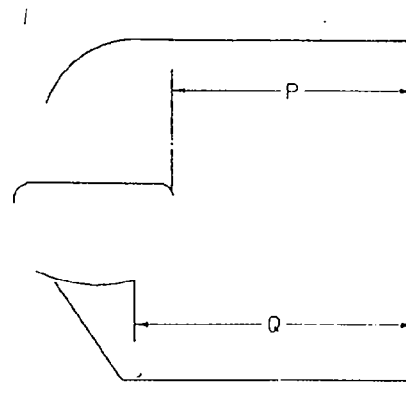
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	759	602	157
B	478	437	41
C	331	293	38
D	302	302	0
E	1739	1689	50
H	1508	1498	10
F(CM ²)	5756.09	5151.00	605.09

TEST VEHICLE MEASUREMENTS (Cont'd)
 STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



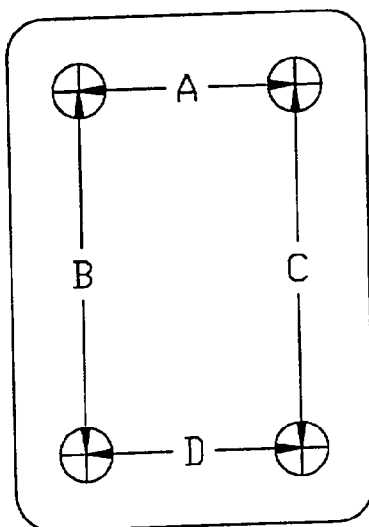
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	432	332	100
J	616	731	-115
K	1438	1410	28
L	1237	1331	94
M	1599	1549	50
N	1772	1749	23
O	1731	1760	29
P	1451	1417	34
Q	1604	1588	16

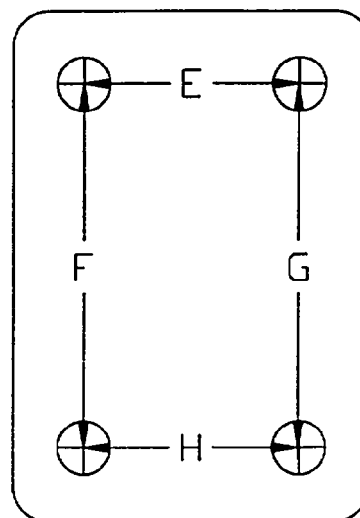
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE

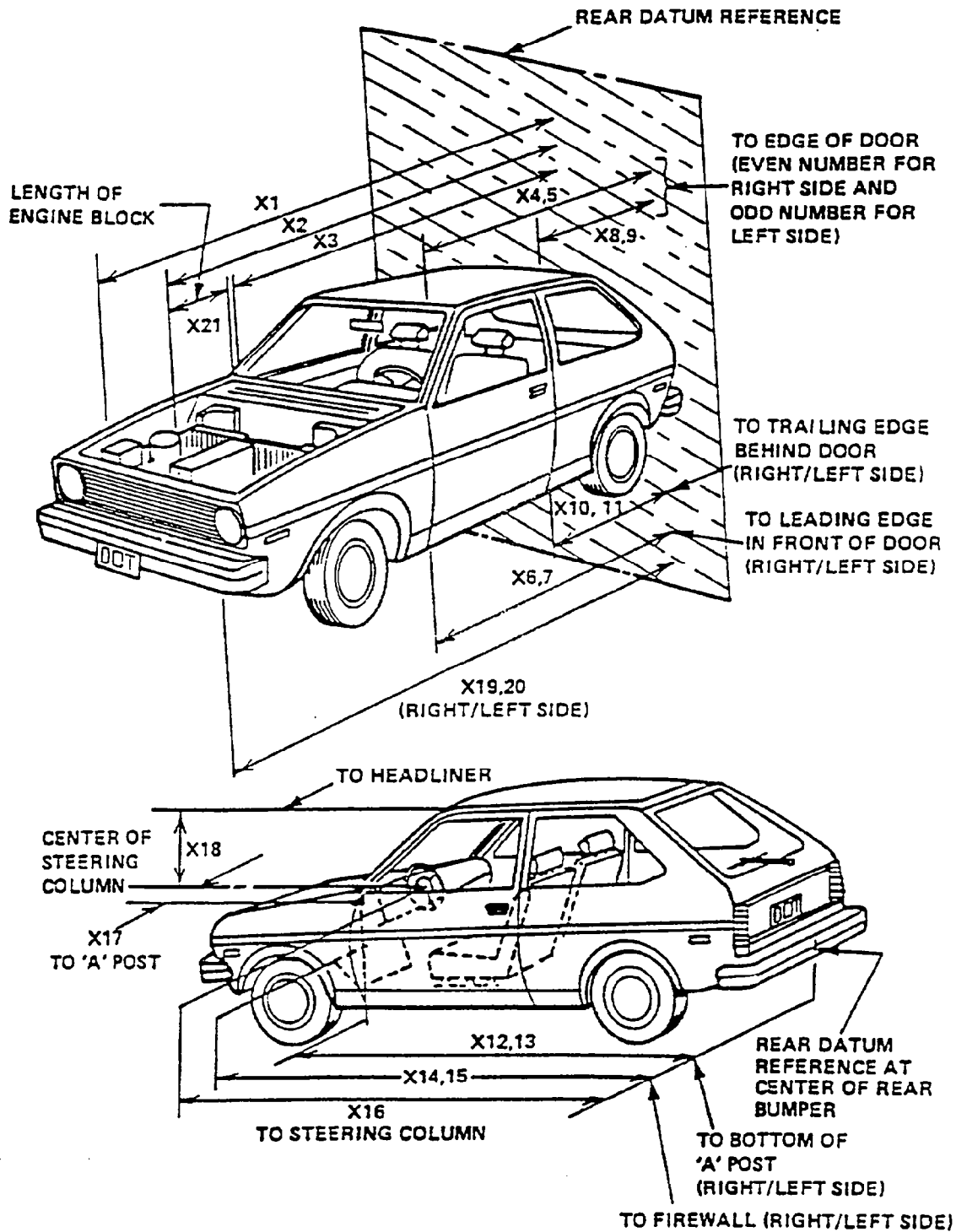


MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	432	447	-15
B	305	294	11
C	332	335	-3
D	419	420	-1
E	430	425	5
F	339	305	34
G	326	327	1
H	414	415	1

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4302	3763	539
X2	Rear Surface of Vehicle to Front of Engine	3558	3337	221
X3	Rear Surface of Vehicle to Firewall	3186	3044	142
X4	Rear Surface to Upr. Leading Edge of Rt. Door	2754	2757	-3
X5	Rear Surface to Upr. Leading Edge of Left Door	2750	2734	16
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	2798	2779	19
X7	Rear Surface to Lwr. Leading Edge of Left Door	2800	2783	17
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	1485	1486	1
X9	Rear Surface to Upr. Trailing Edge of Left Door	1485	1488	-3
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	1463	1455	8
X11	Rear Surface to Lwr. Trailing Edge of Left Door	1464	1456	8
X12	Rear Surface to Bottom of A-Post on Rt. Side	2810	2810	0
X13	Rear Surface to Bottom of A-Post on Left Side	2810	2787	23
X14	Rear Surface to Firewall on Right Side	3198	3022	176
X15	Rear Surface to Firewall on Left Side	3198	3113	85
X16	Rear Surface to Steering Column	2327	2331	-4
X17	Center of Steering Column to A-Post	345	276	69
X18	Center of Steering Column to Headlining	422	332	90
X19	Rear Surface to Right Side of Front Bumper	4026	3811	215
X20	Rear Surface to Left Side of Front Bumper	4026	3683	343
X21	Length of Engine Block	450	450	0

TEST VEHICLE MEASUREMENTS (Cont'd)



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Cavalier/2 Door

VEH. NHTSA NO.: MV0111; VIN: 1G1JC1244V7205524

MODEL YEAR: 1997; BUILD DATE: 12/96; TEST DATE: February 5, 1997

VEH. SIZE CATEGORY: mid size; TEST WEIGHT: 1414.4 kg

VEH. WHEELBASE: 2646 mm; FRONT OVERHANG: 946 mm; OVERALL WIDTH: 1726 mm

ACCELEROMETER DATA:

LOCATION: As per measurements on pages 4-13

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9%; INTEGRATION ALGORITHM: Trapezoidal

VEH. IMPACT SPEED: 56.3 kph; TIME OF SEPARATION: 109 msec

VELOCITY CHANGE: 60.4 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: F (Frontal)

CRUSH DEPTH C1 = 393 mm

DIMENSIONS: C2 = 466 mm

C3 = 519 mm

C4 = 504 mm

C5 = 376 mm

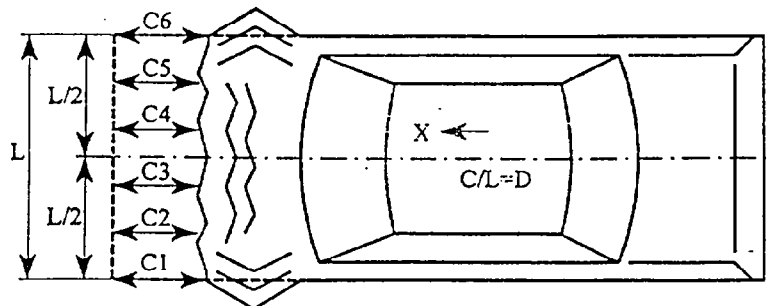
C6 = 215 mm

MIDPOINT OF D = Vehicle Centerline

DAMAGE: (Longitude)

LENGTH OF

DAMAGED REGION: L = 1396 mm



APPENDIX A
PHOTOGRAPHS

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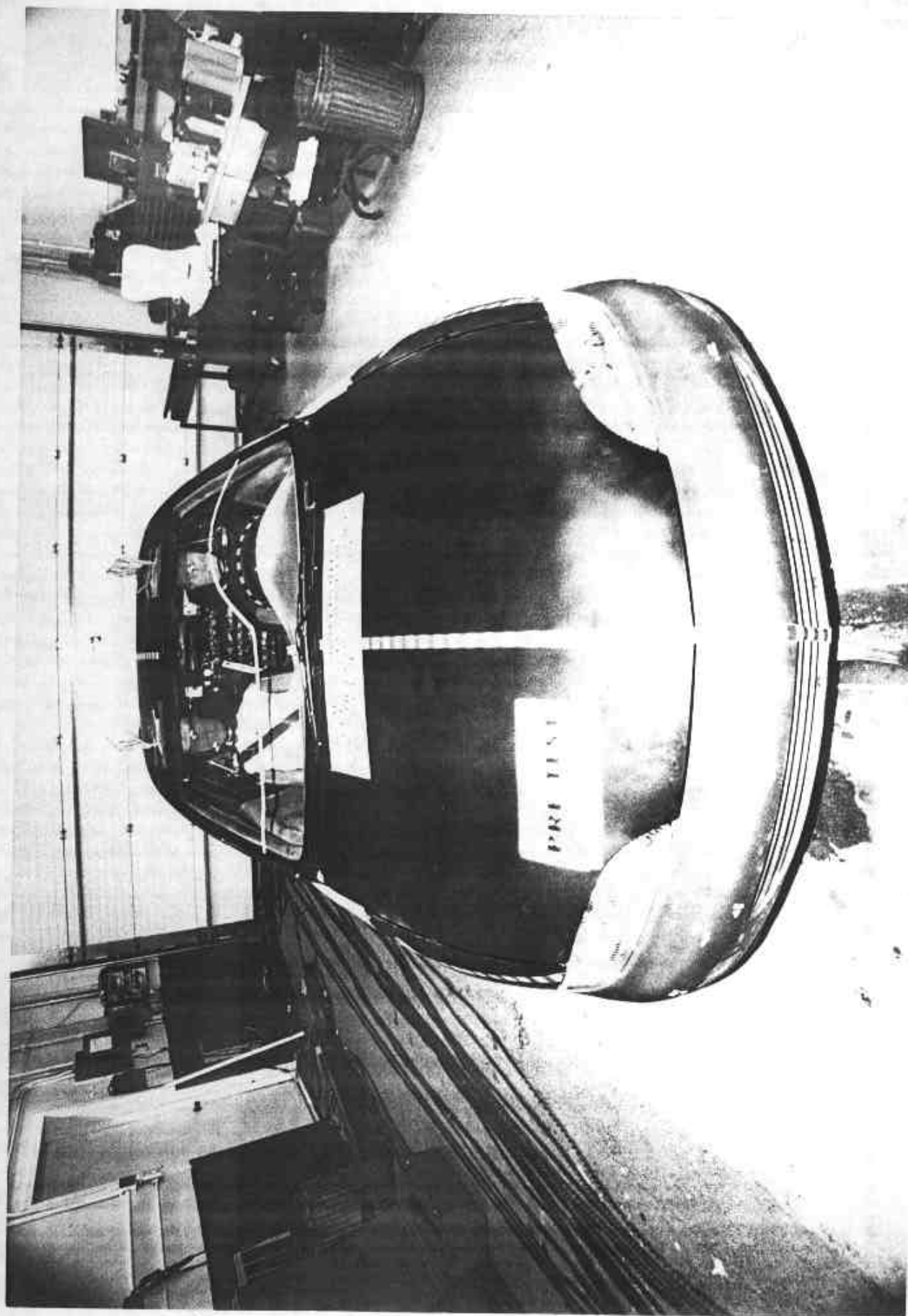


Photo No. A-1 - Pre-Test Front View of Test Vehicle

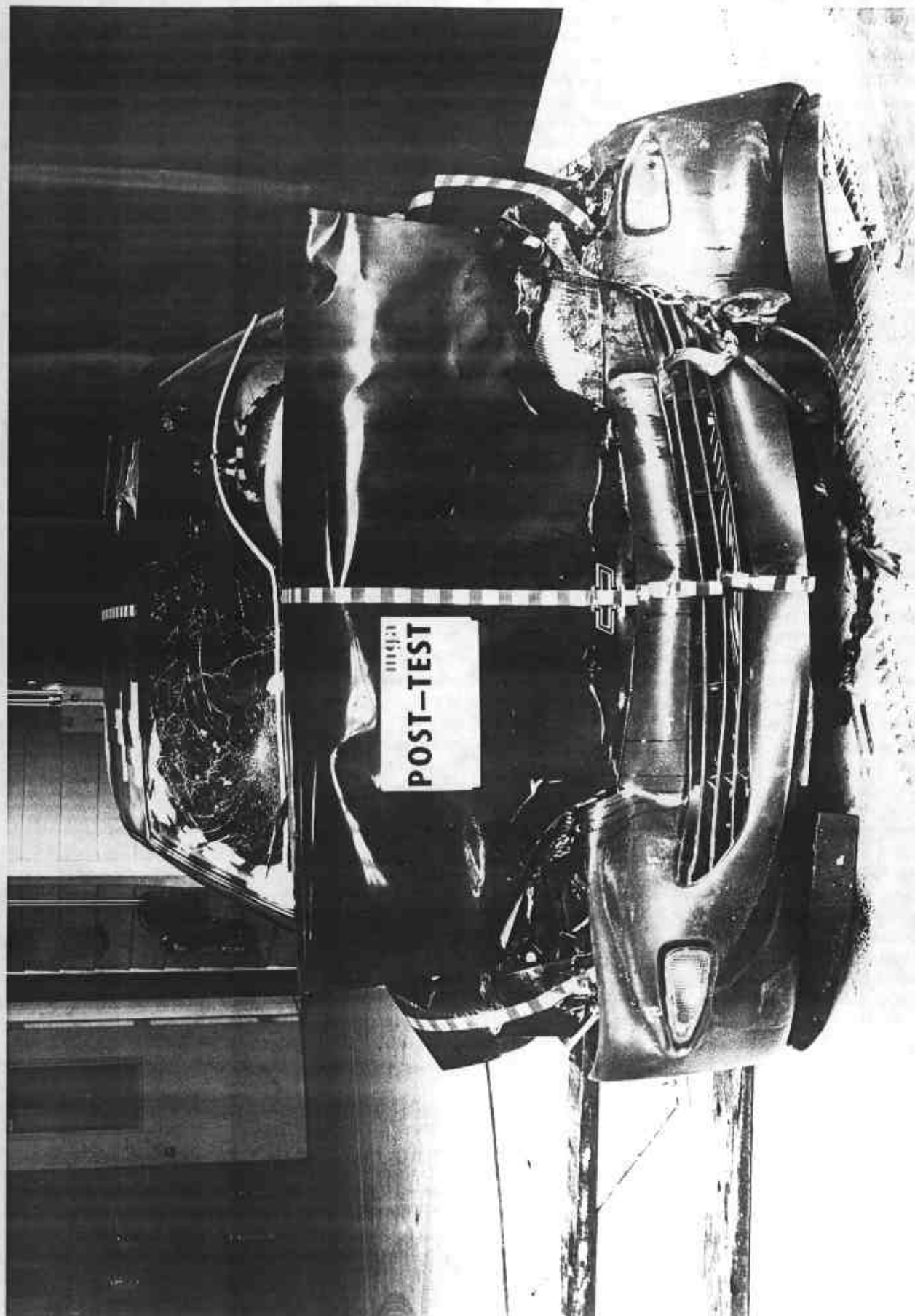


Photo No. A-2 - Post-Test Front View of Test Vehicle

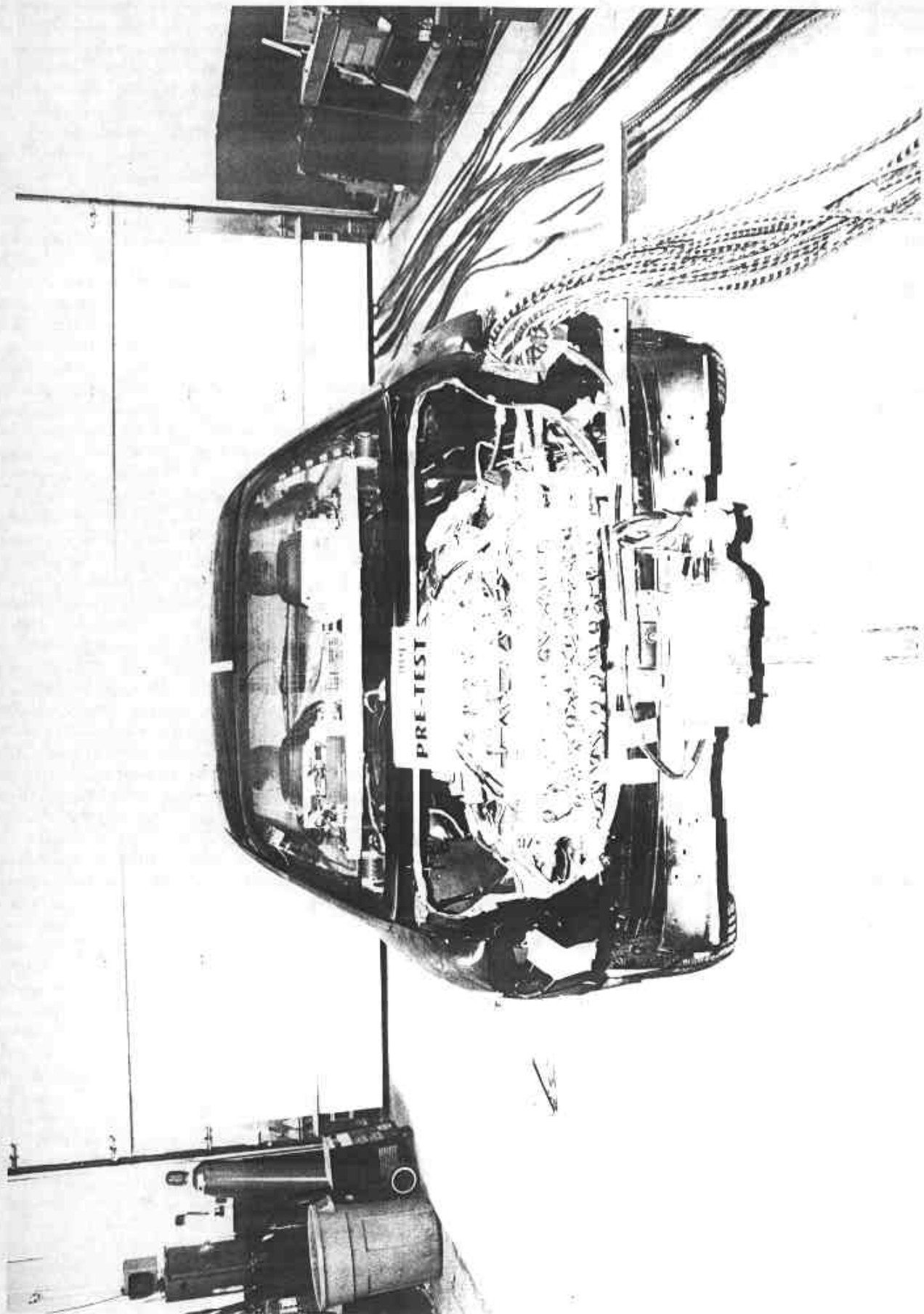


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

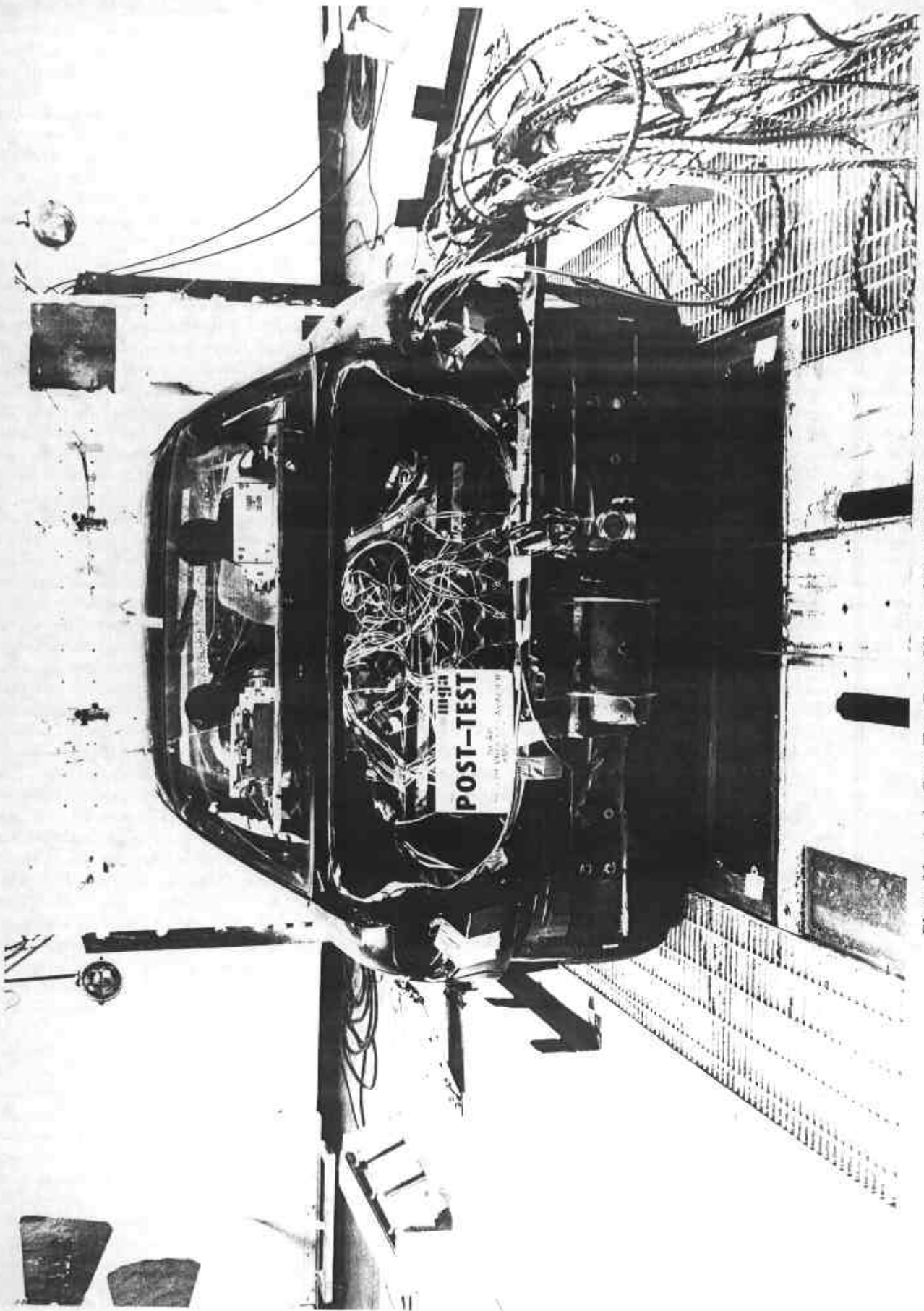


Photo No. A-4 - Post-Test Rear View of Test Vehicle

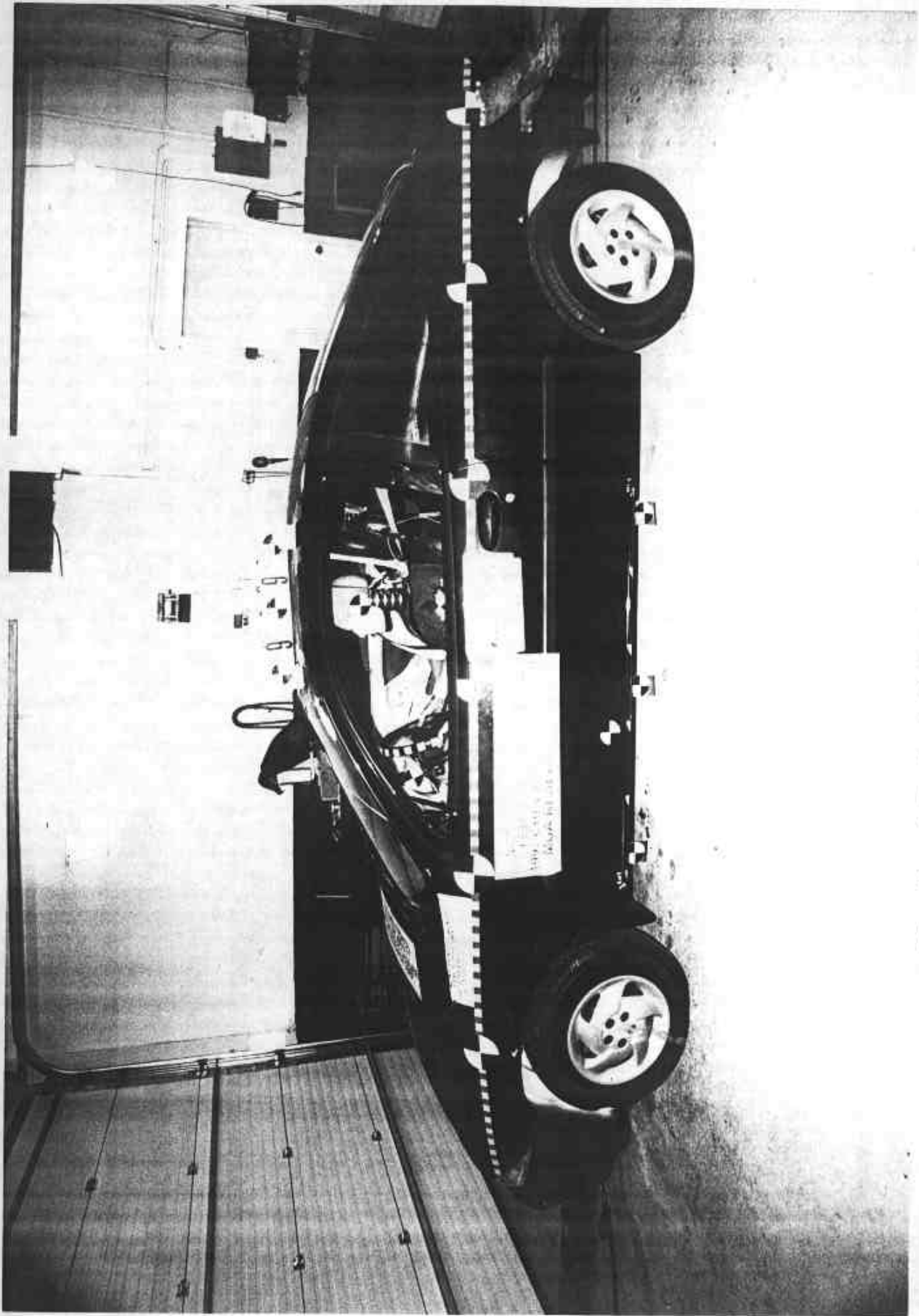


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

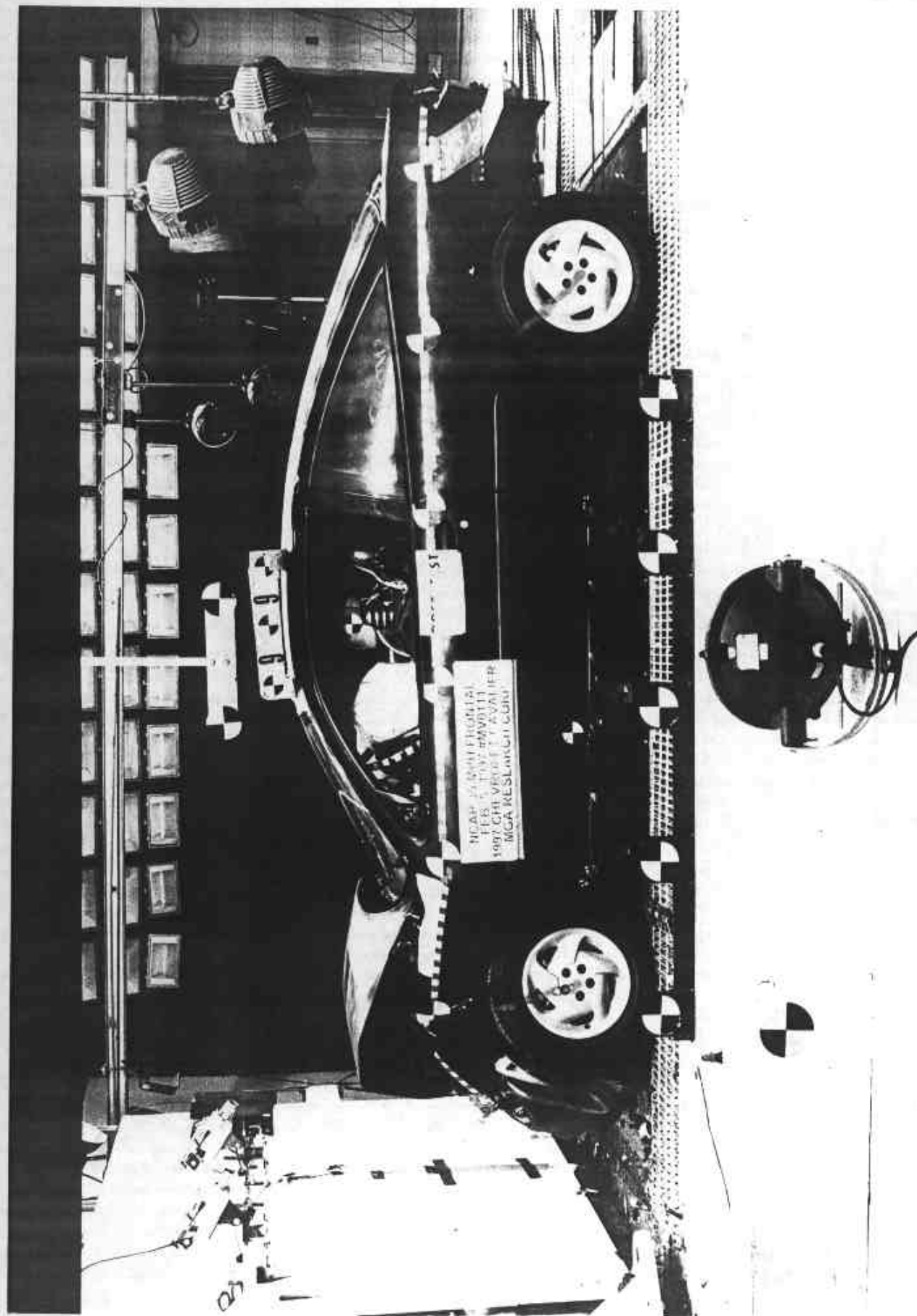
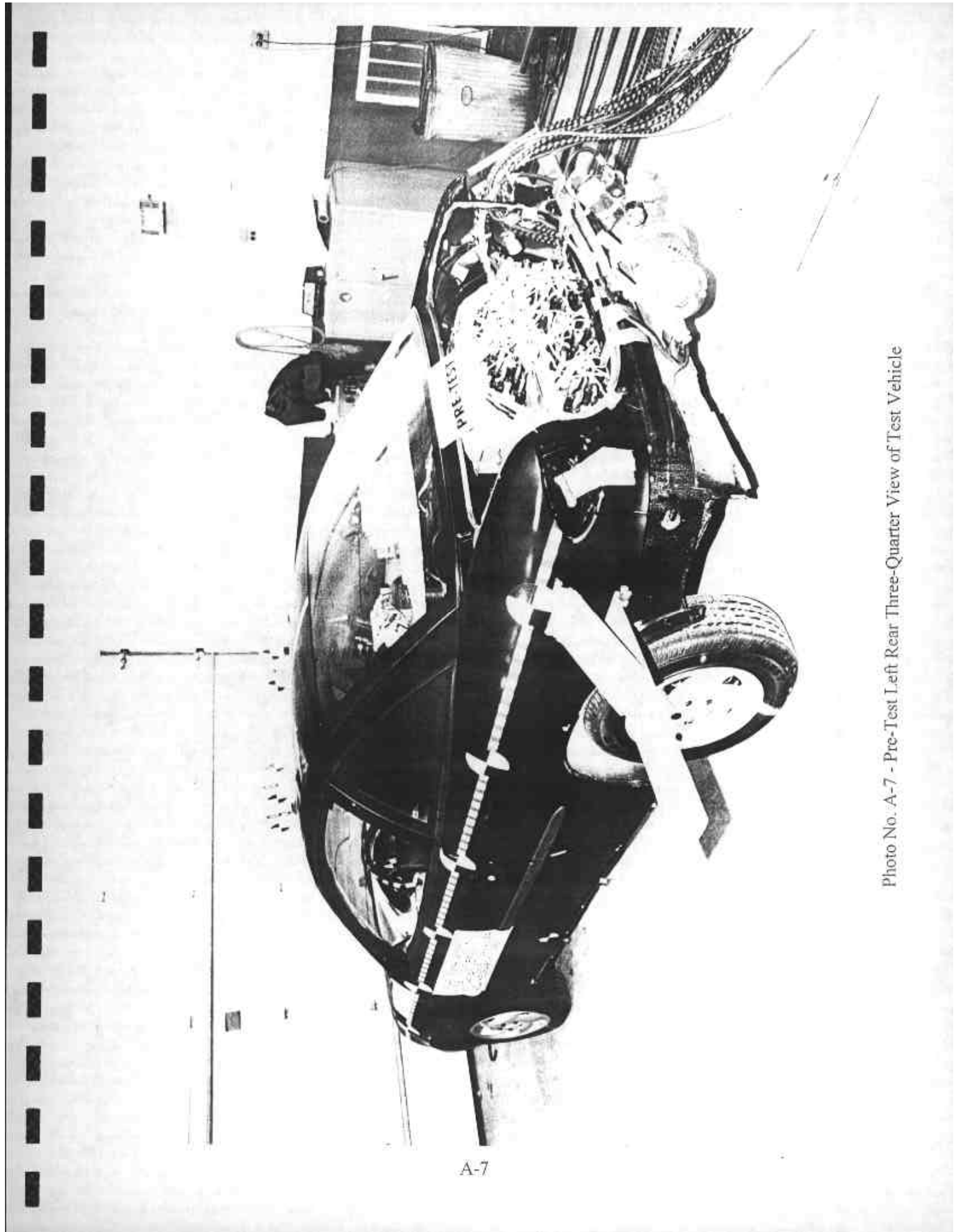


Photo No. A-6 - Post-Test Left Side View of Test Vehicle



A-7

Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

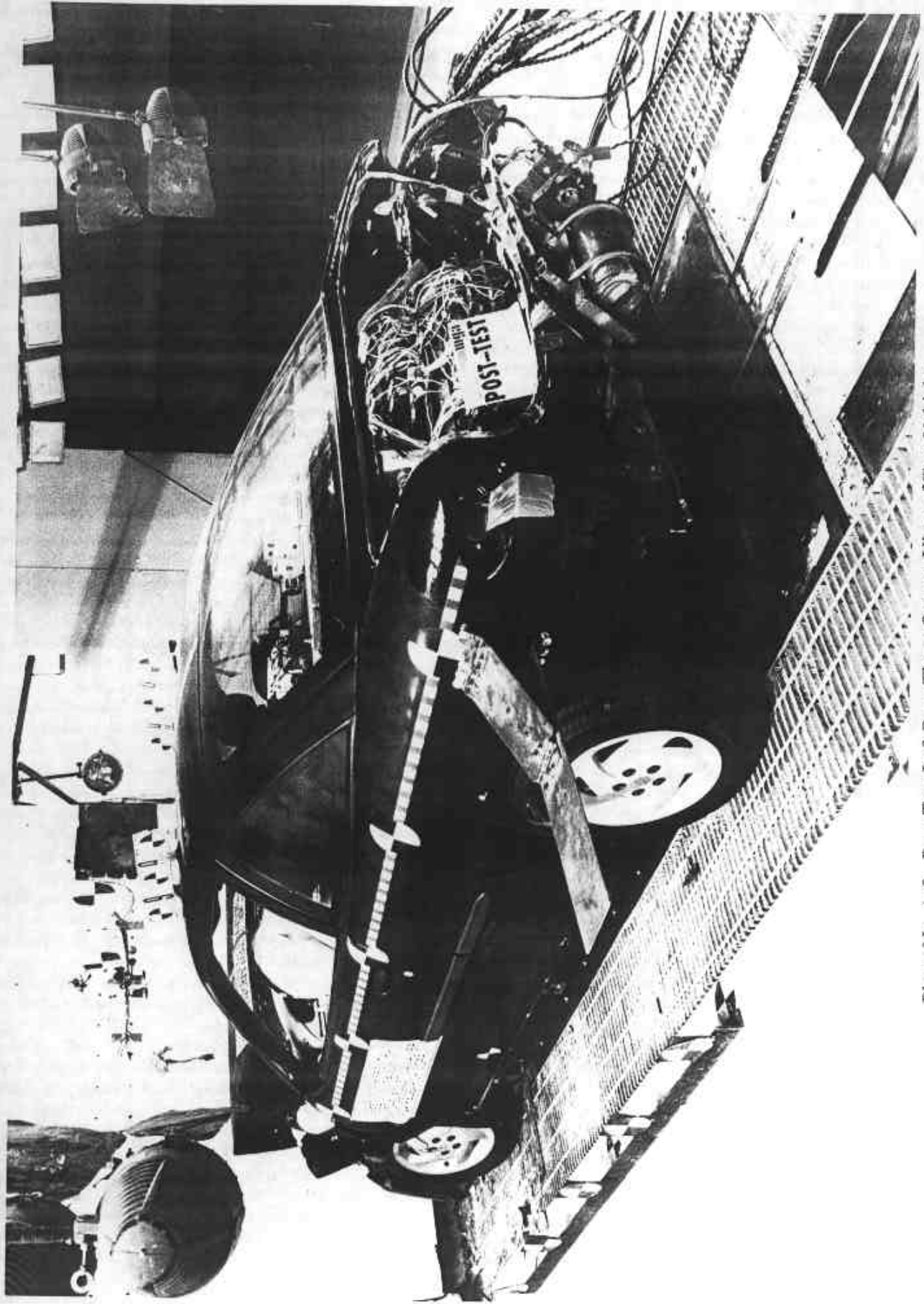


Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle

A-8

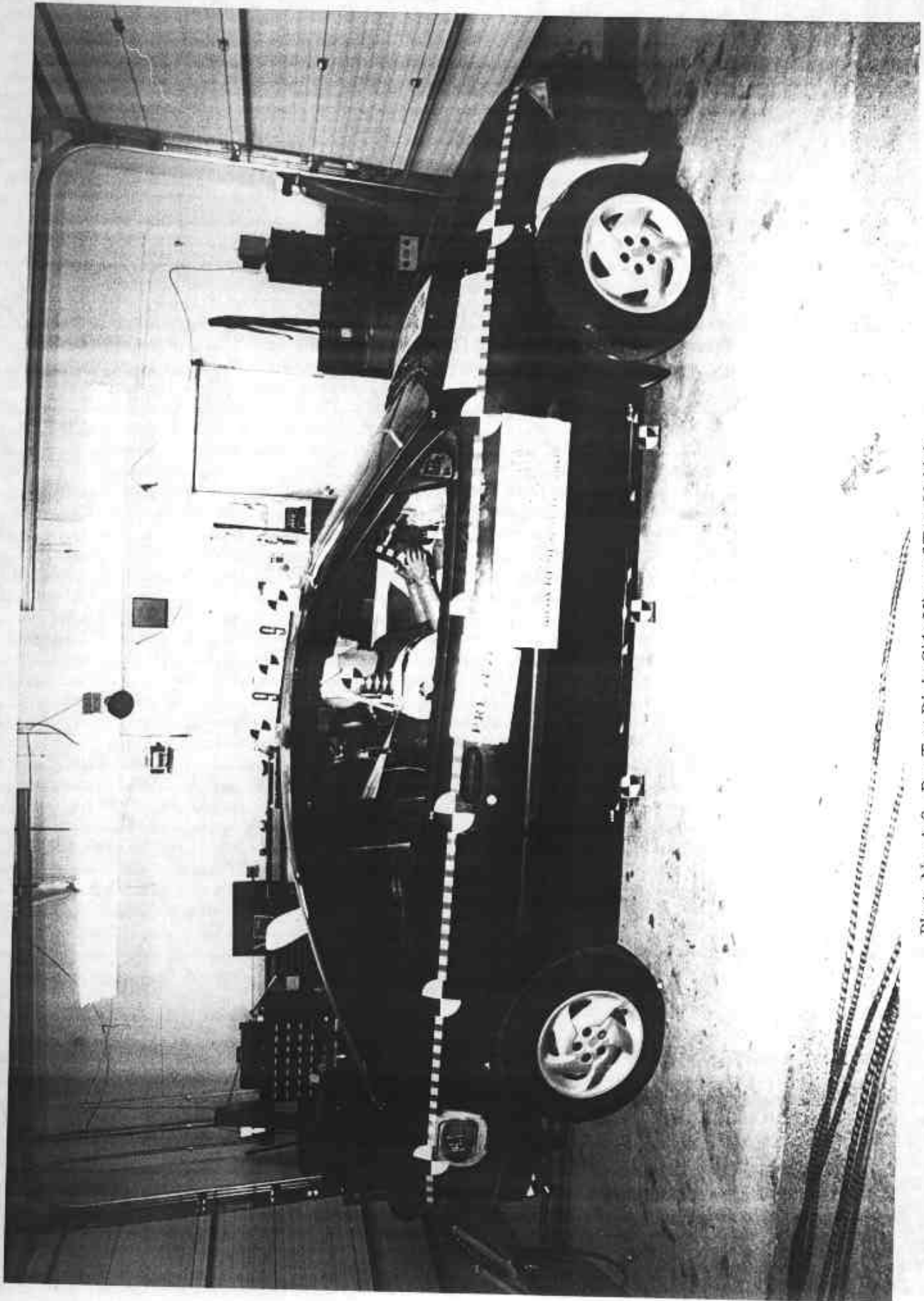


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

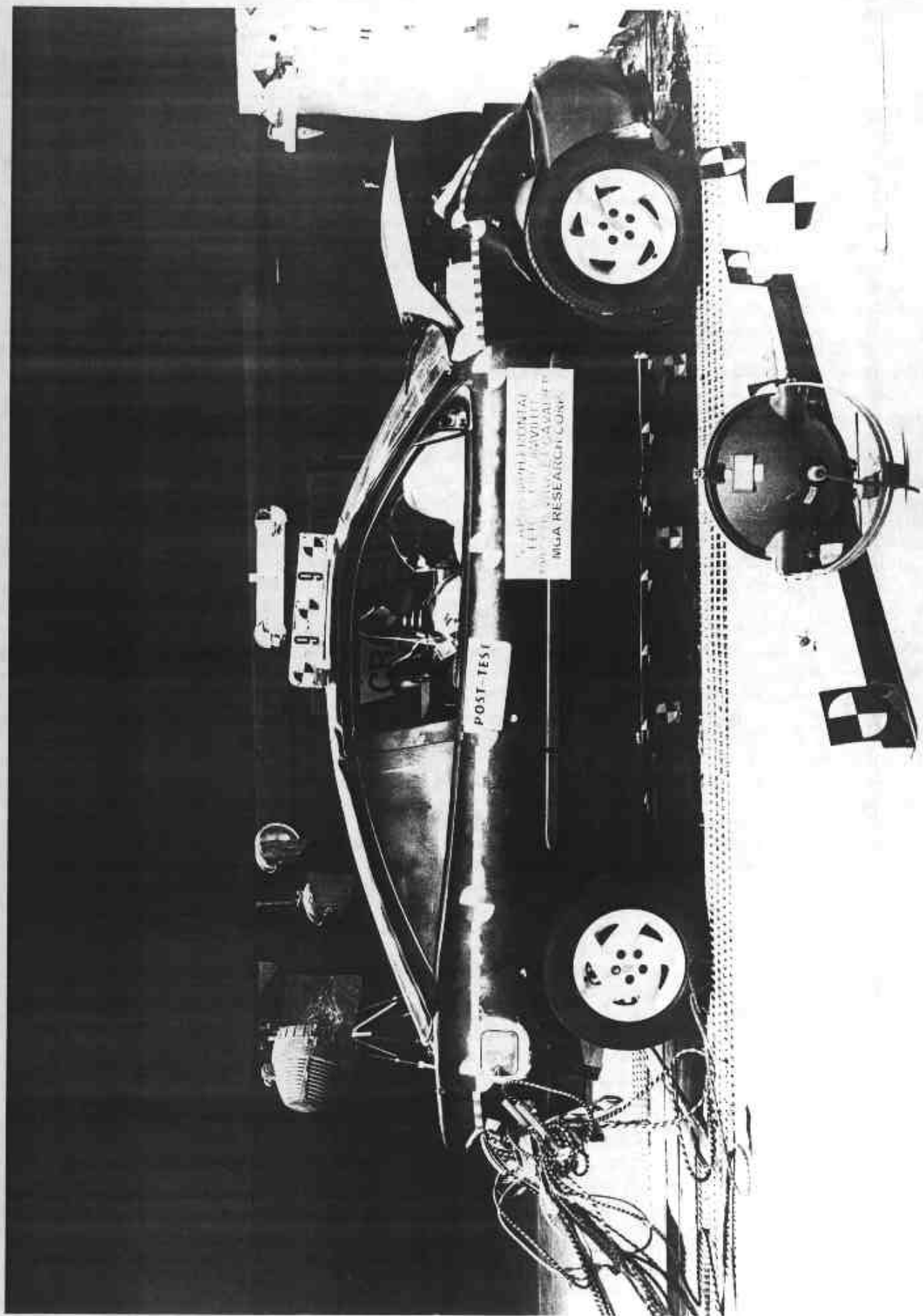


Photo No. A-10 - Post-Test Right Side View of Test Vehicle

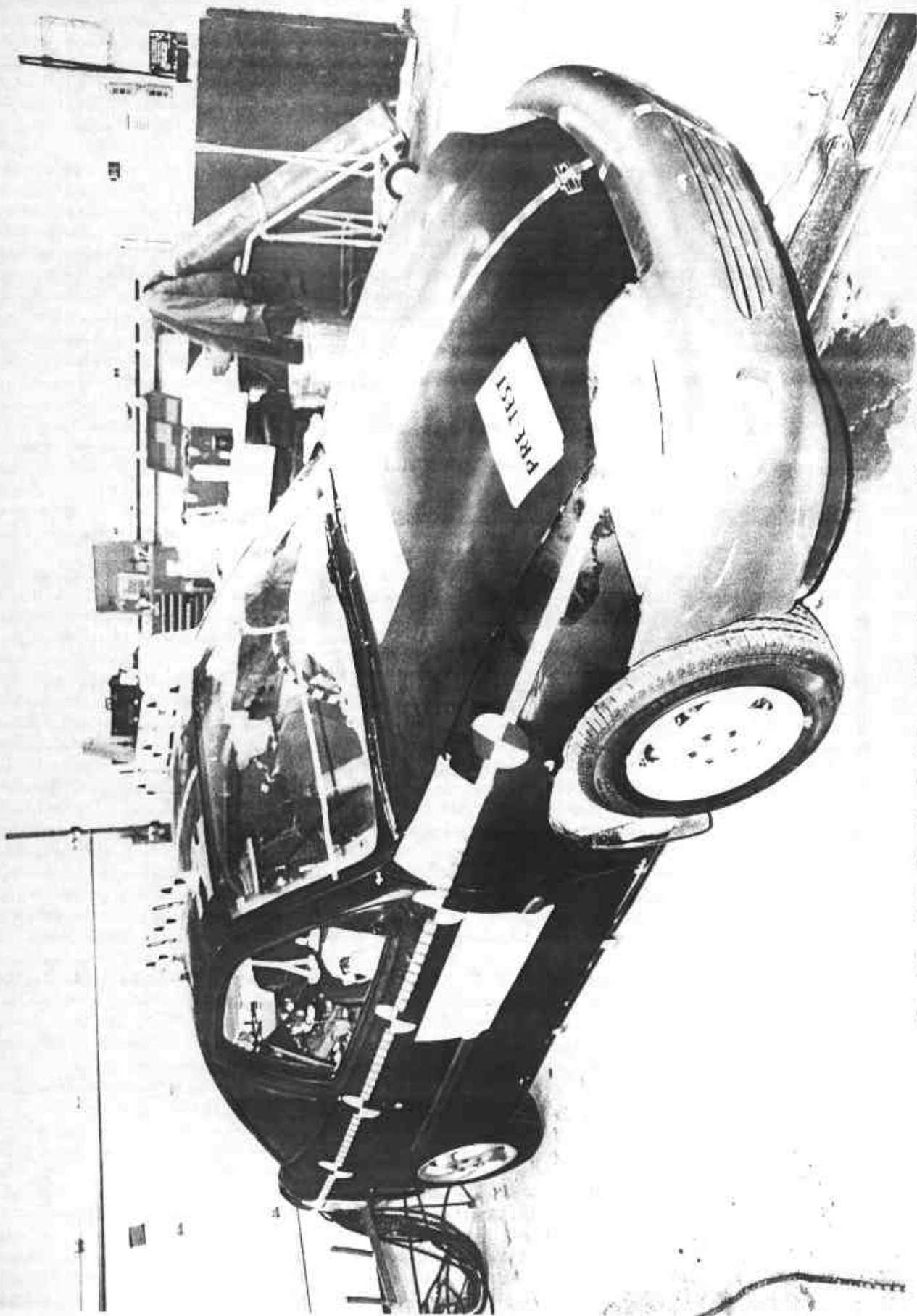


Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle

A-11



Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle



Photo No. A-13 - Pre-Test Fuel Filler Cap View

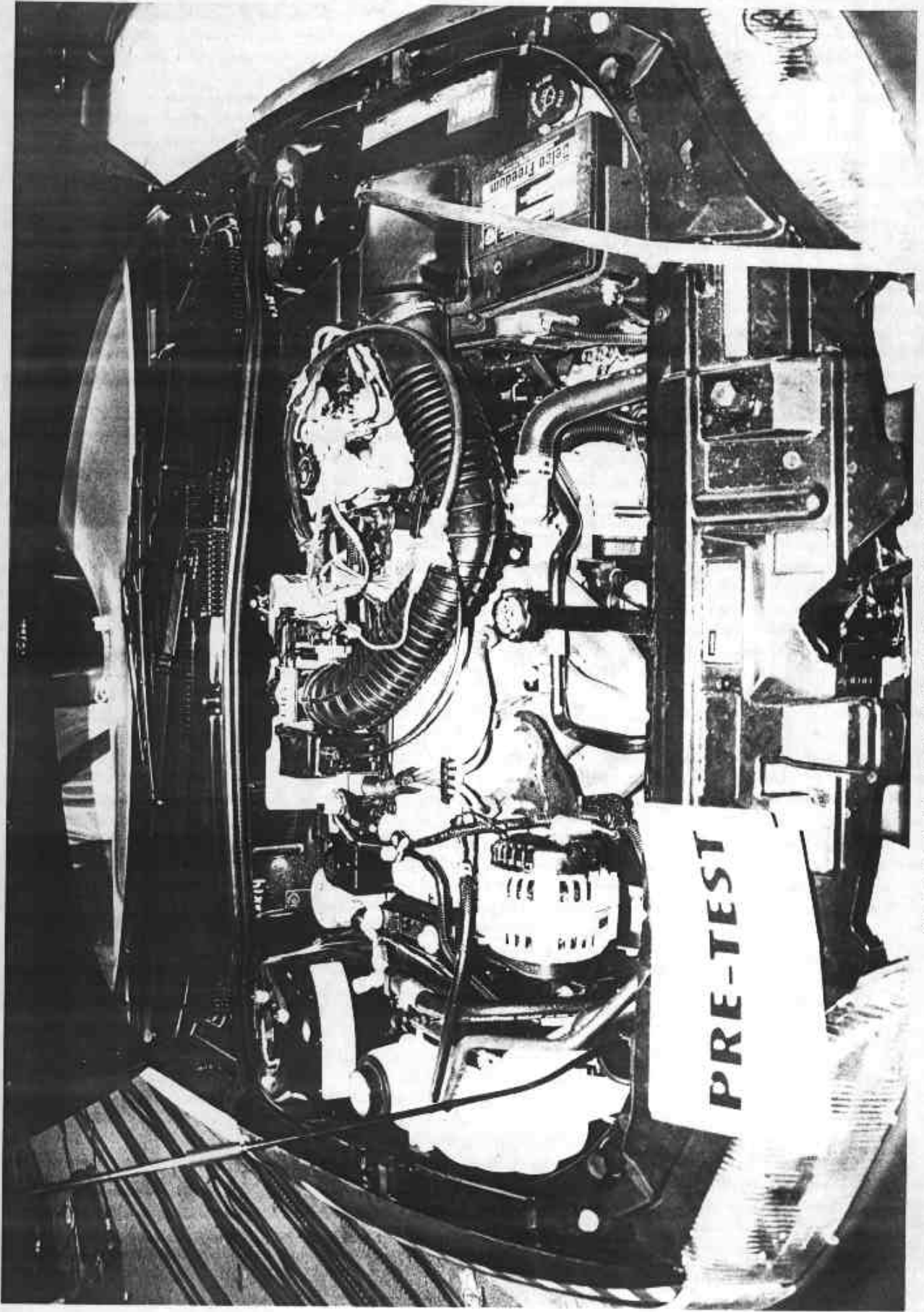


Photo No. A-14 - Pre-Test Engine Compartment View

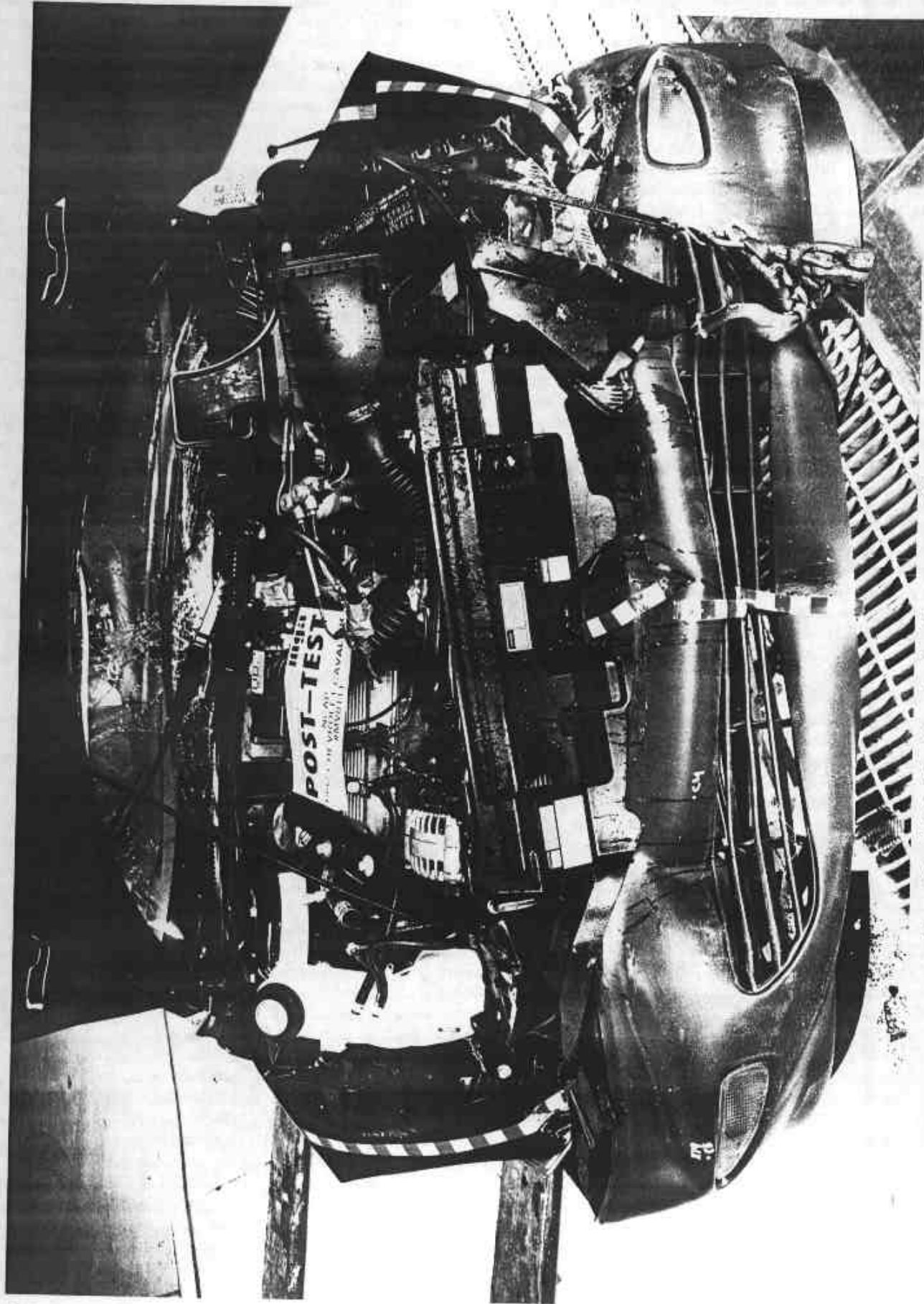


Photo No. A-15 - Post-Test Engine Compartment View

A-15

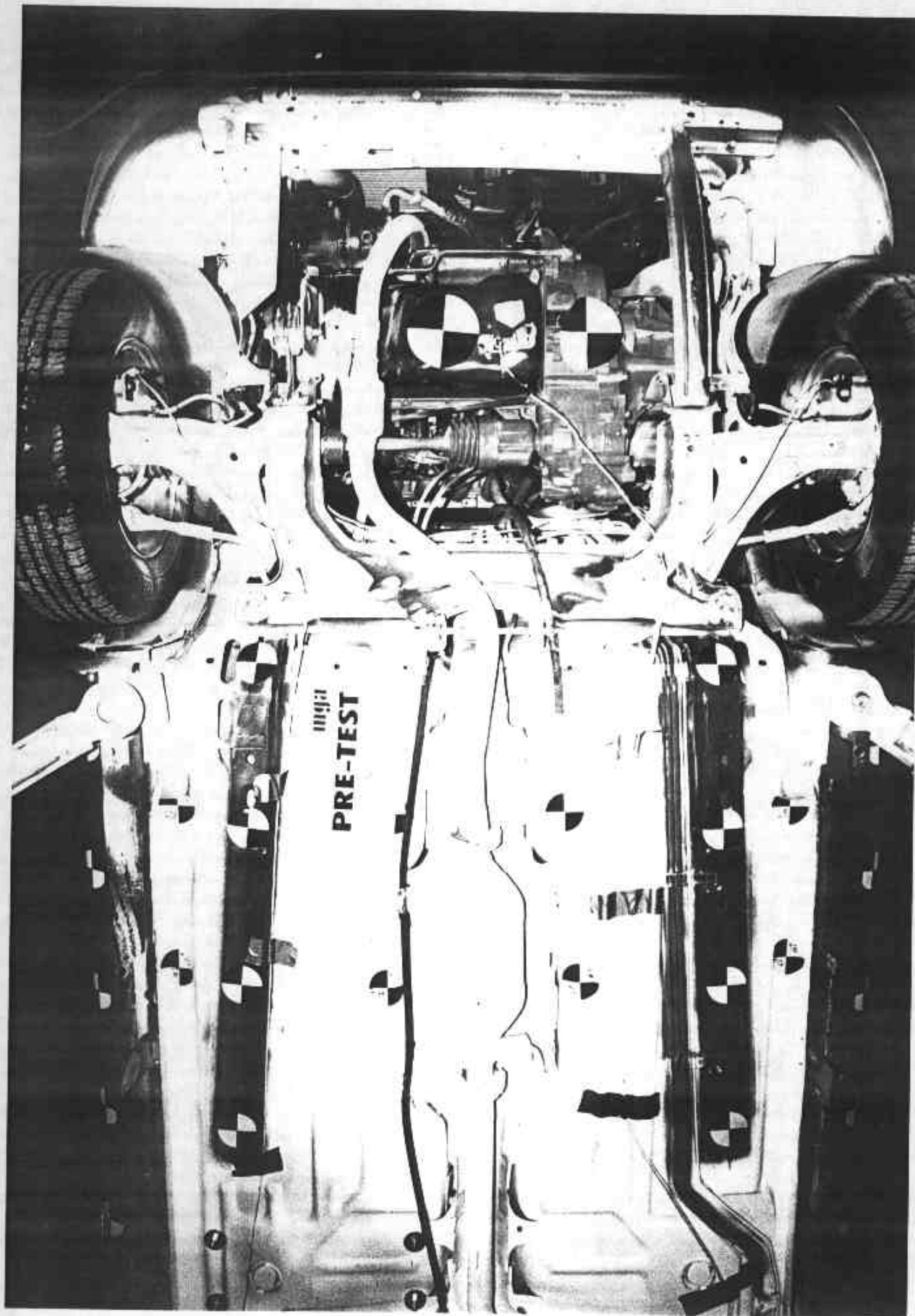


Photo No. A-16 - Pre-Test Front Underbody View

A-16

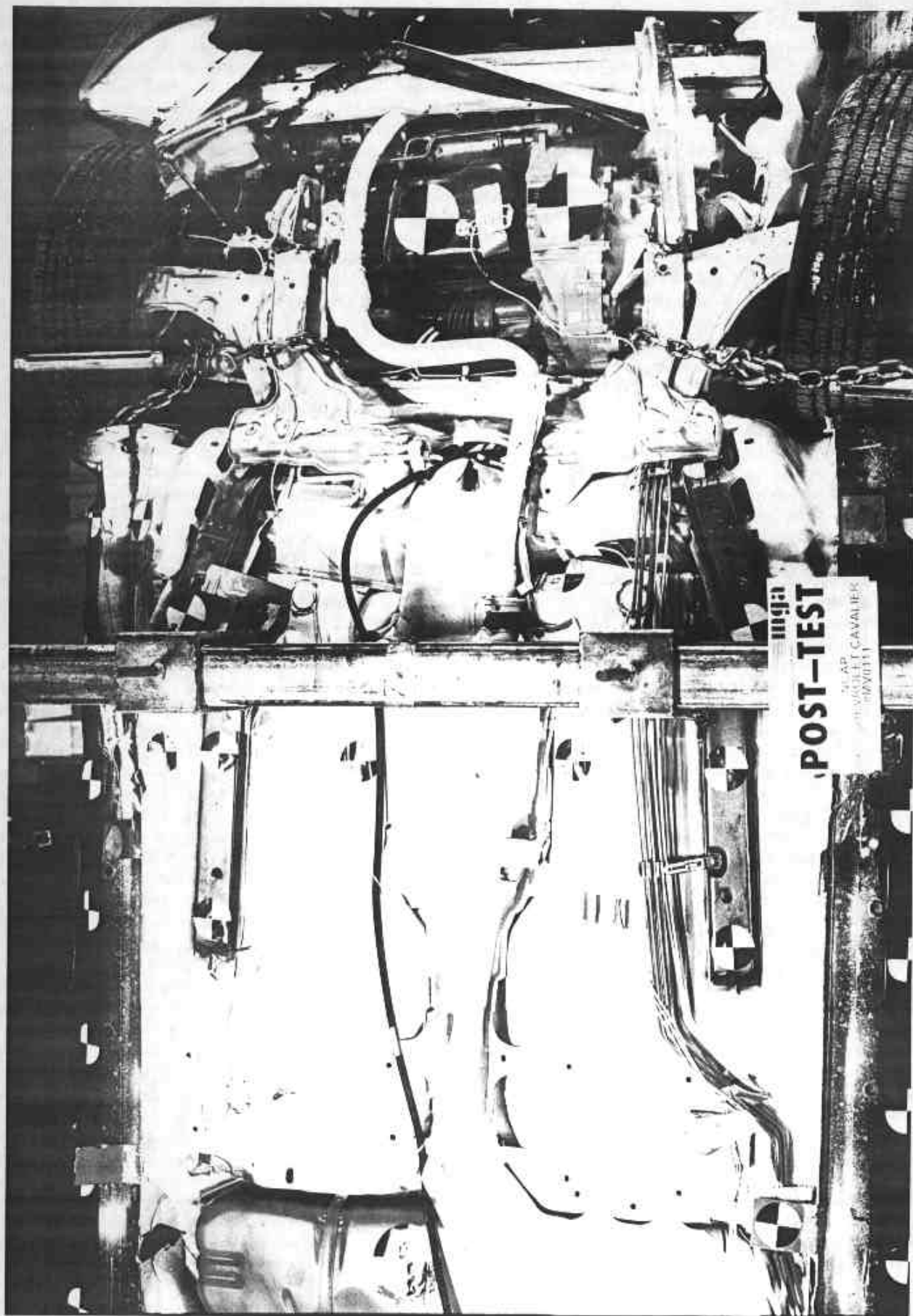


Photo No. A-17 - Post-Test Front Underbody View

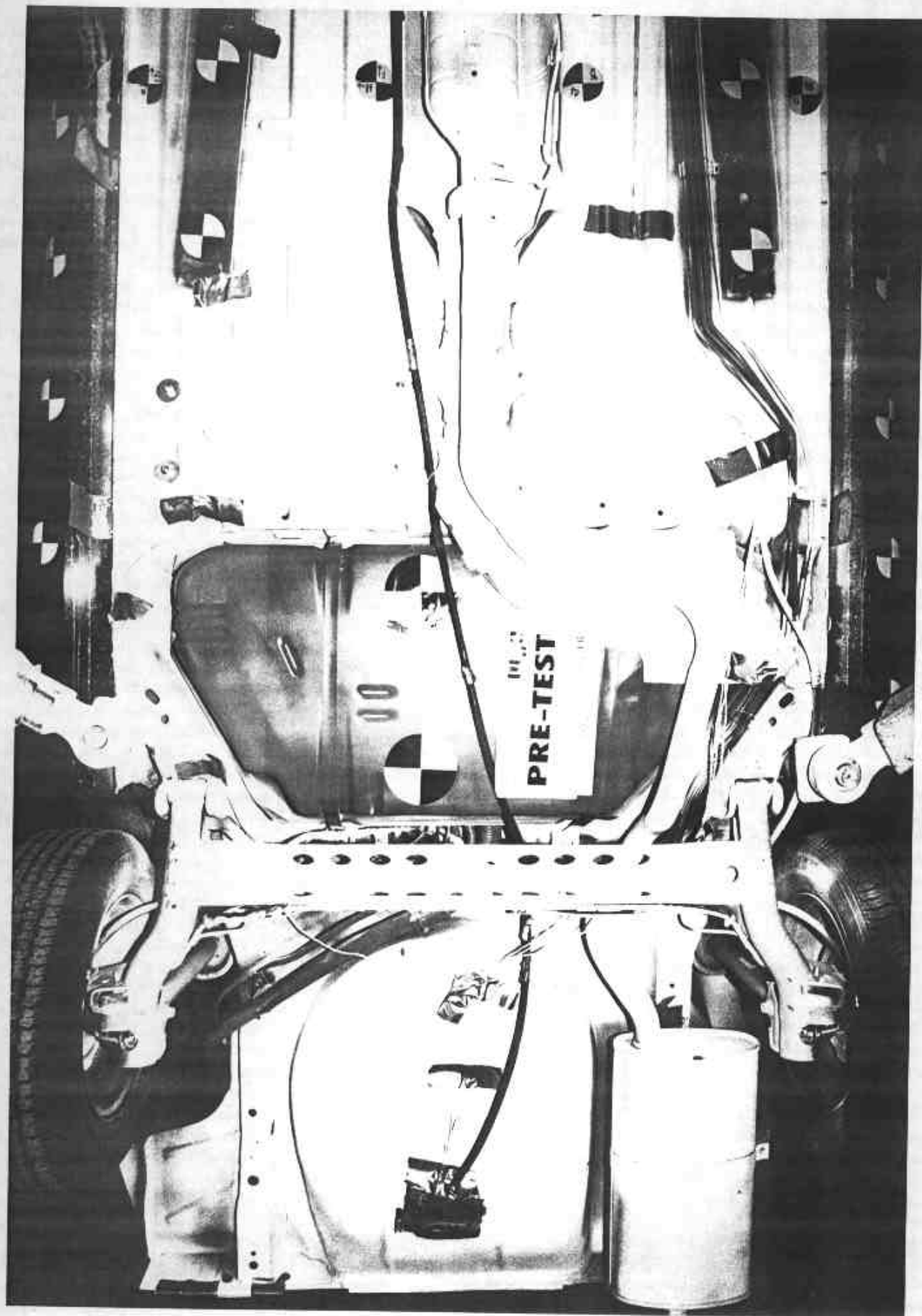


Photo No. A-18 - Pre-Test Rear Underbody View

A-18

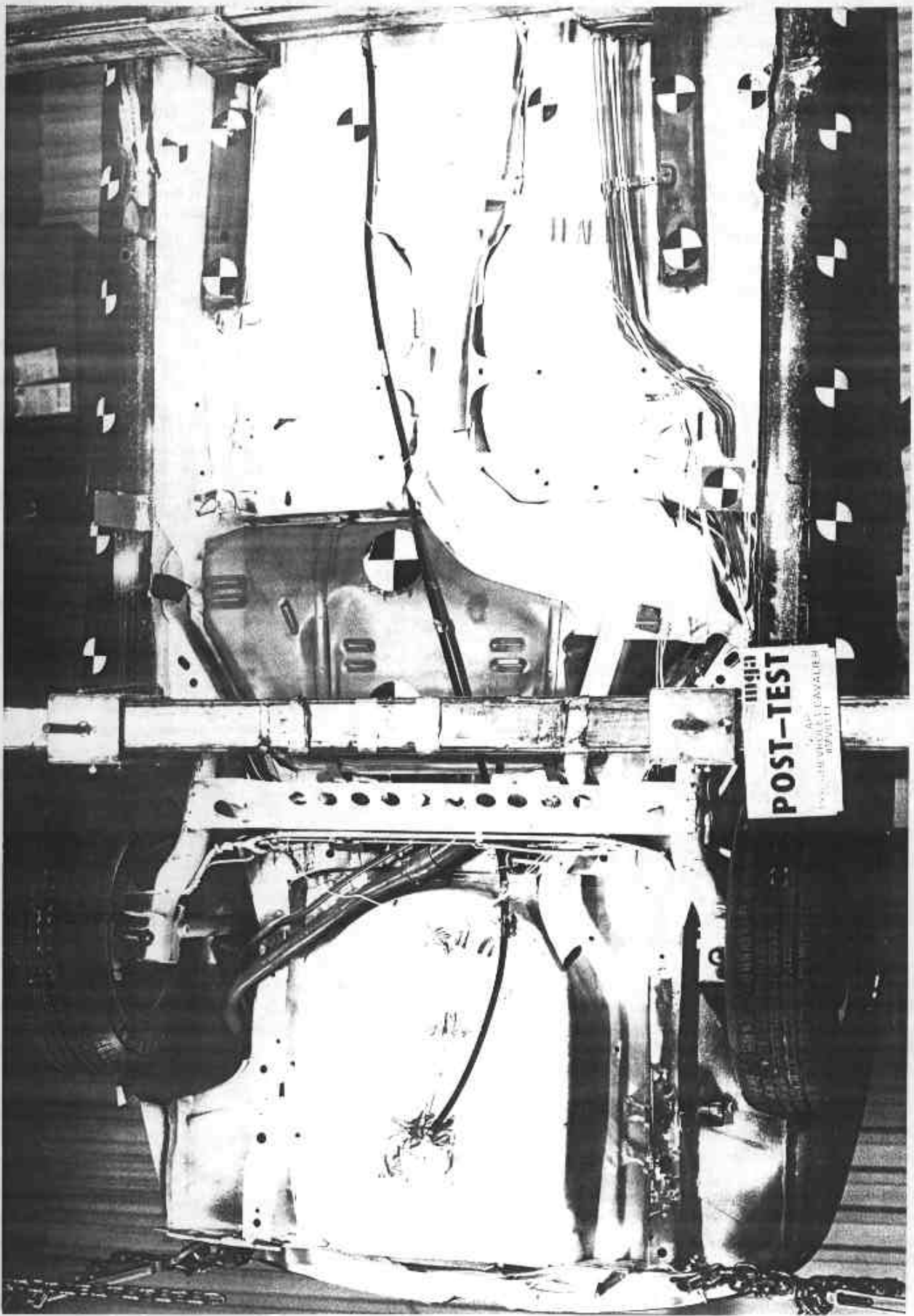


Photo No. A-19 - Post-Test Rear Underbody View

A-19

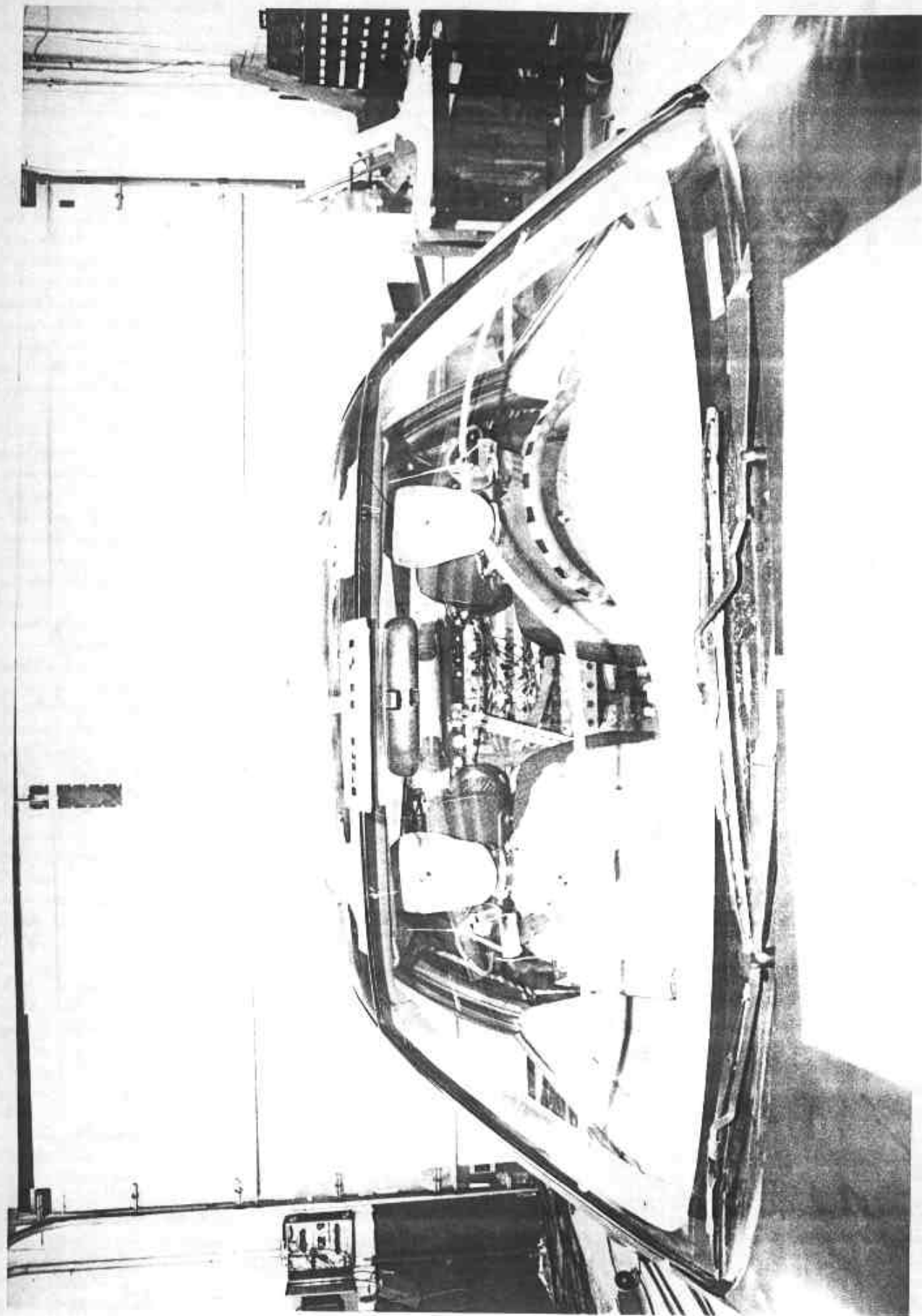


Photo No. A-20 - Pre-Test Windshield View

A-20



Photo No. A-21 - Post-Test Windshield View

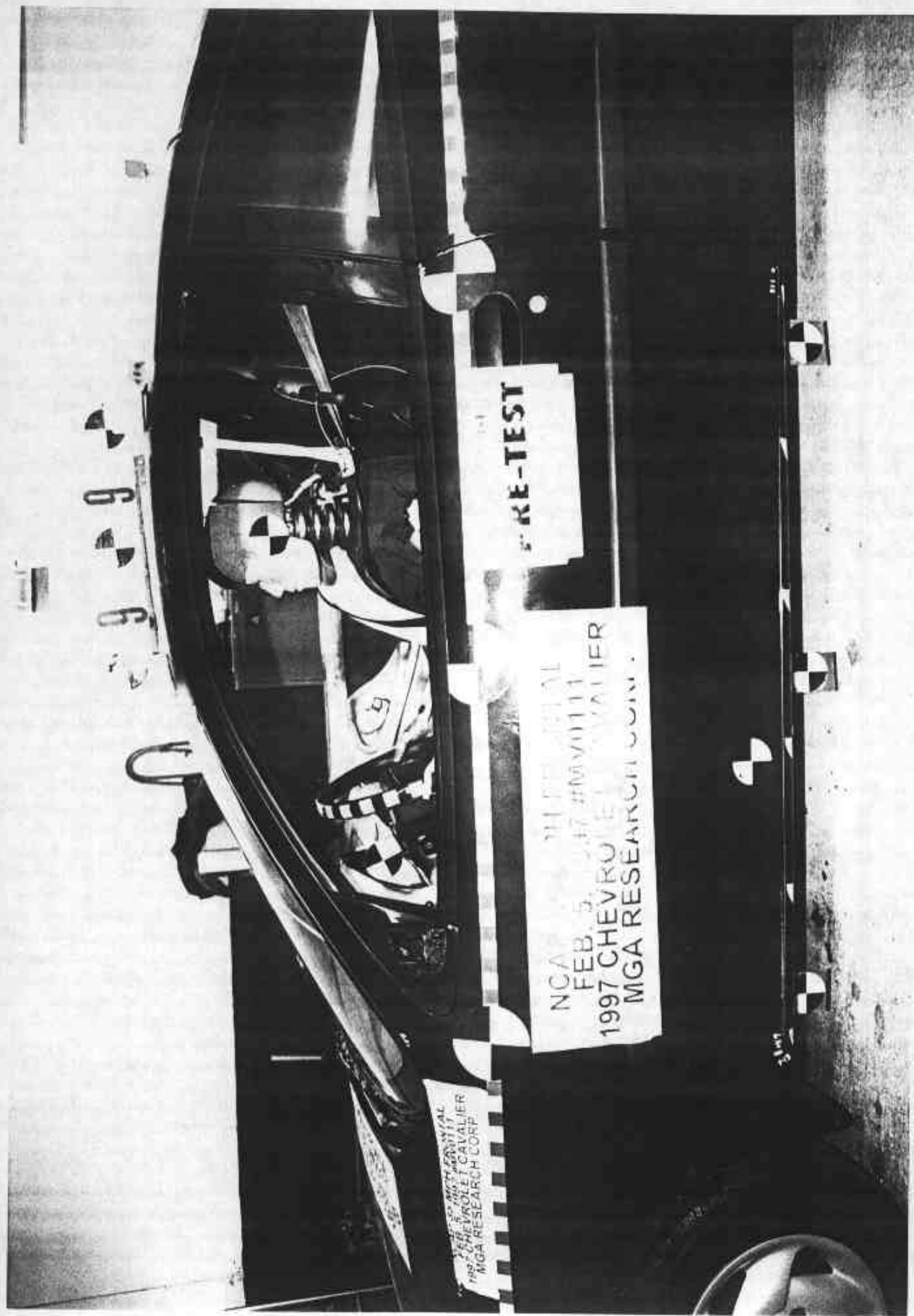
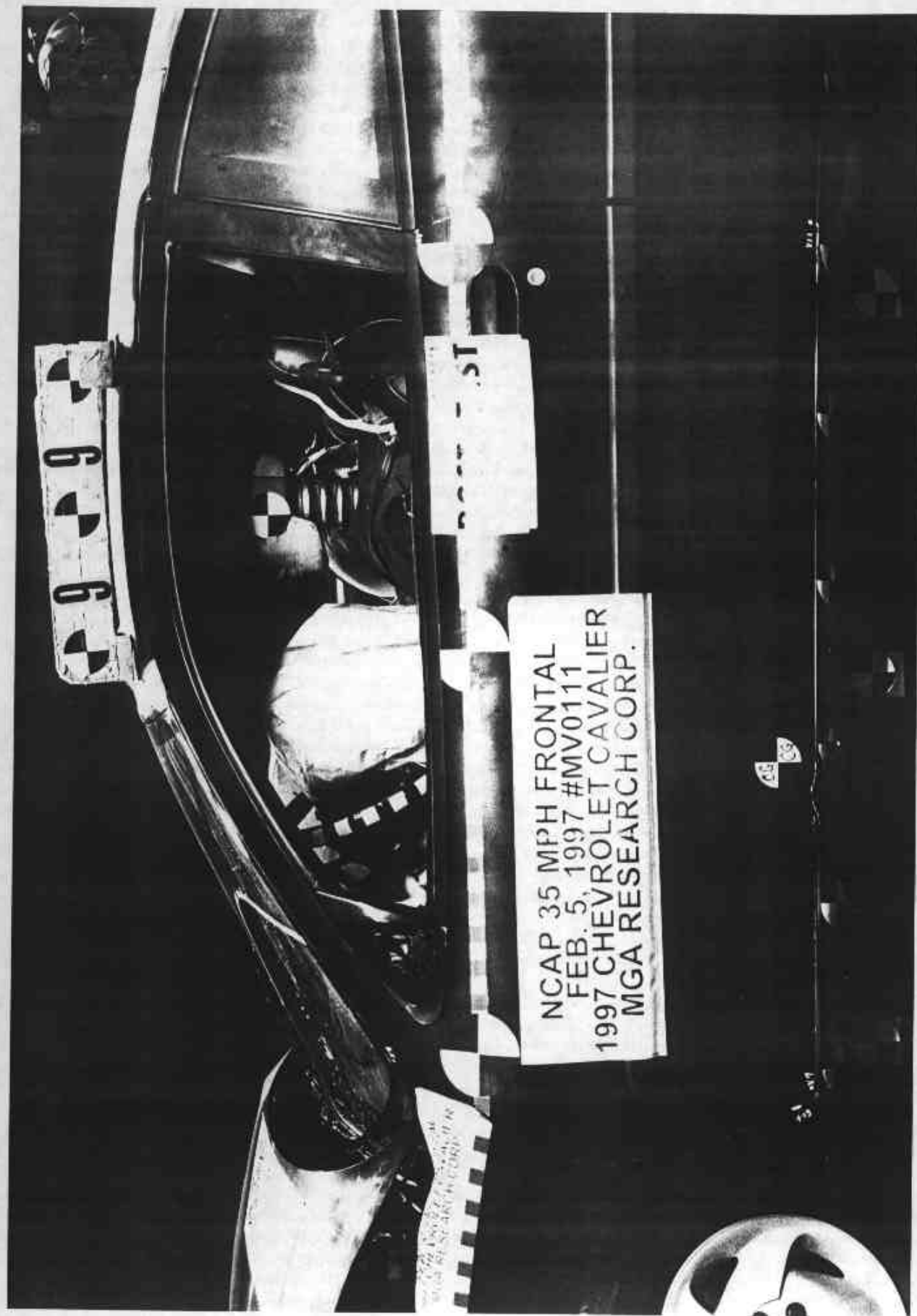


Photo No. A-22 - Pre-Test Driver Dummy Position Left Side View



A-23

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

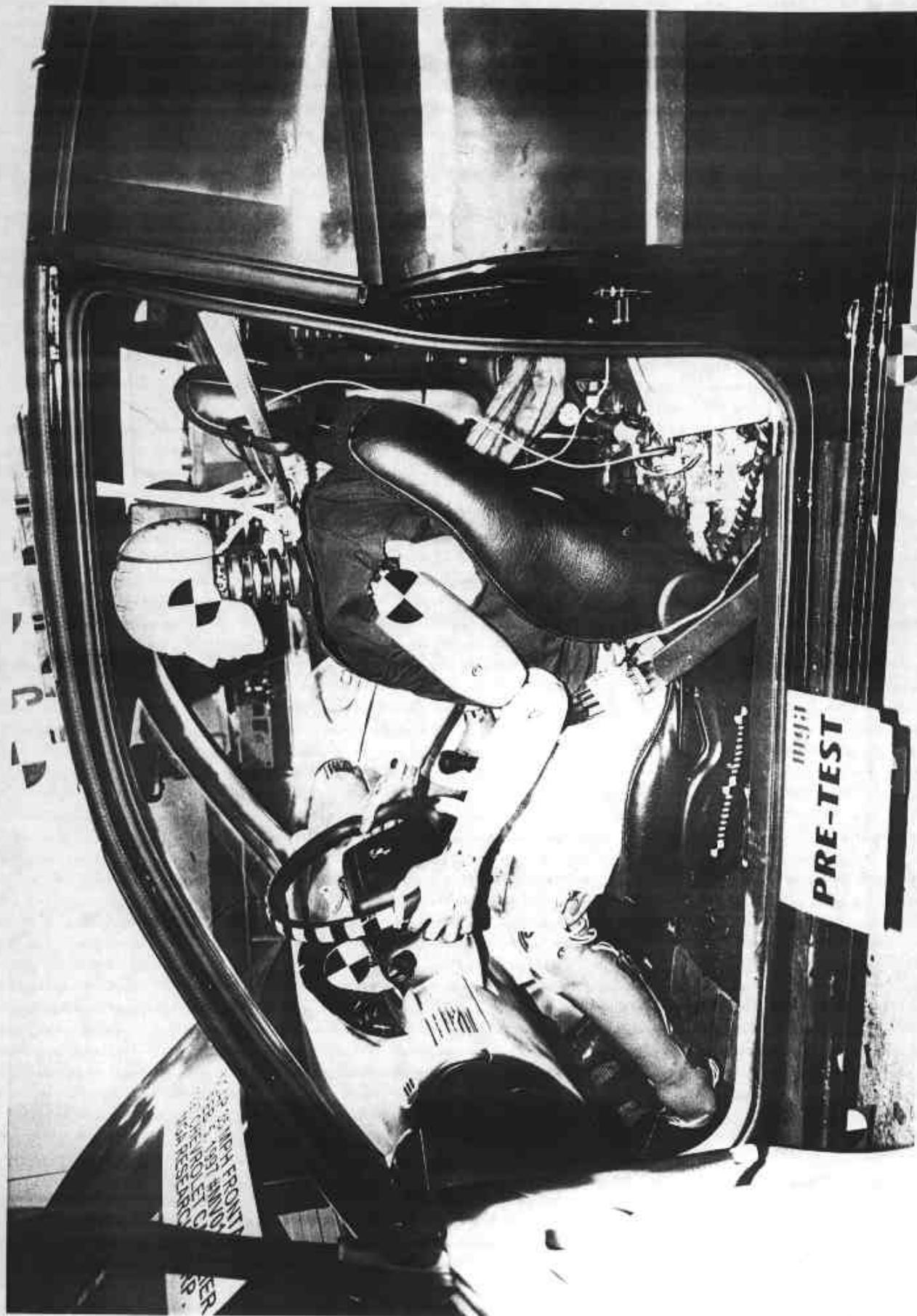


Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)

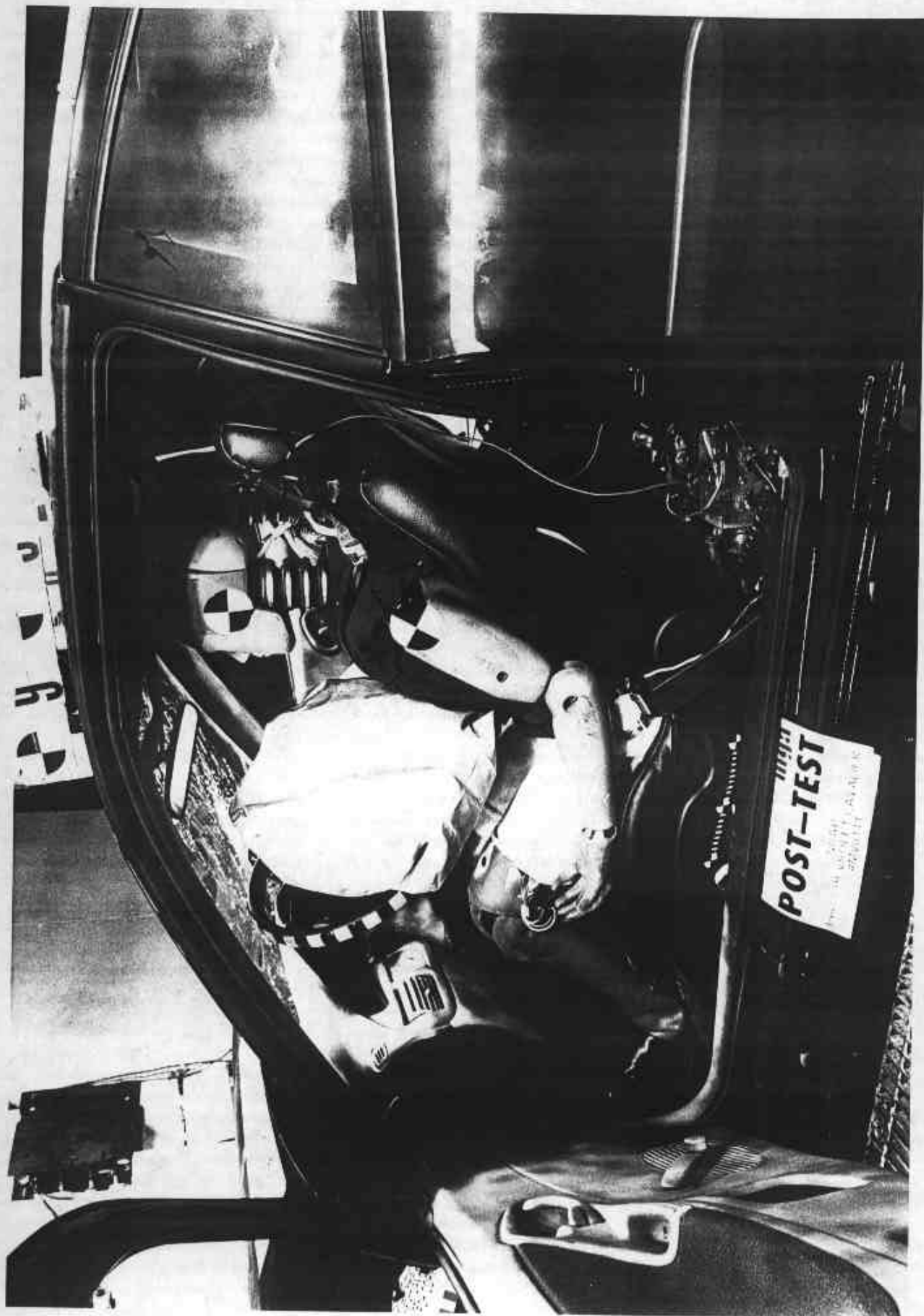


Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)



Photo No. A-26 - Pre-Test Driver Seat Position View



Photo No. A-27 - Post-Test Driver Seat Position View



Photo No. A-28 - Pre-Test Driver Dummy Knee Position



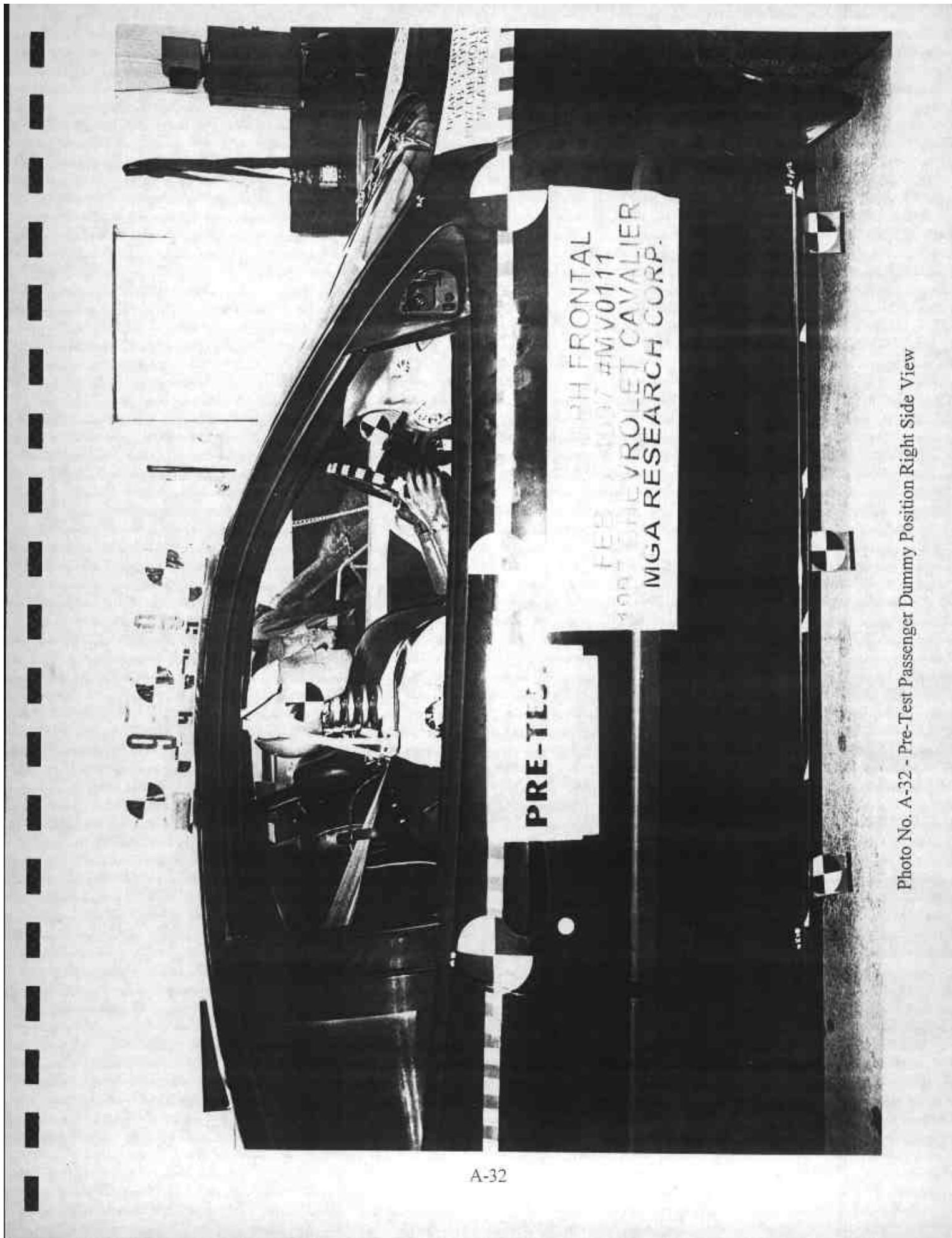
Photo No. A-29 - Post-Test Driver Dummy Knee Position



Photo No. A-30 - Post-Test Driver Airbag Contact



Photo No. A-31 - Post-Test Driver Knee Contact View



PRE-TEST

FRONTAL
FEB 2 1997 #MV0111
CHEVROLET CAVALIER
MGA RESEARCH CORP.

A-32

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

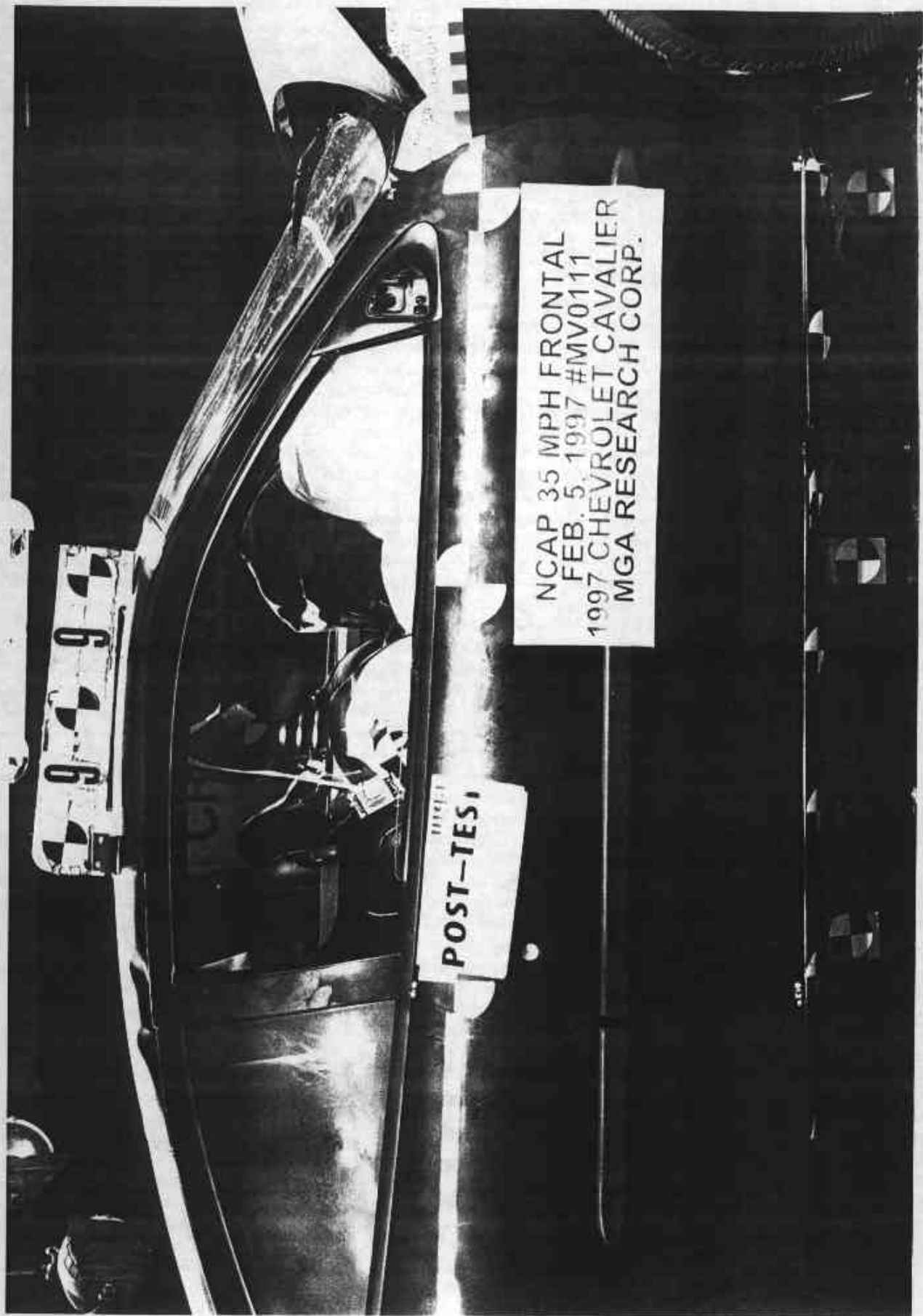


Photo No. A-33 - Post-Test Passenger Dummy Position Right Side View

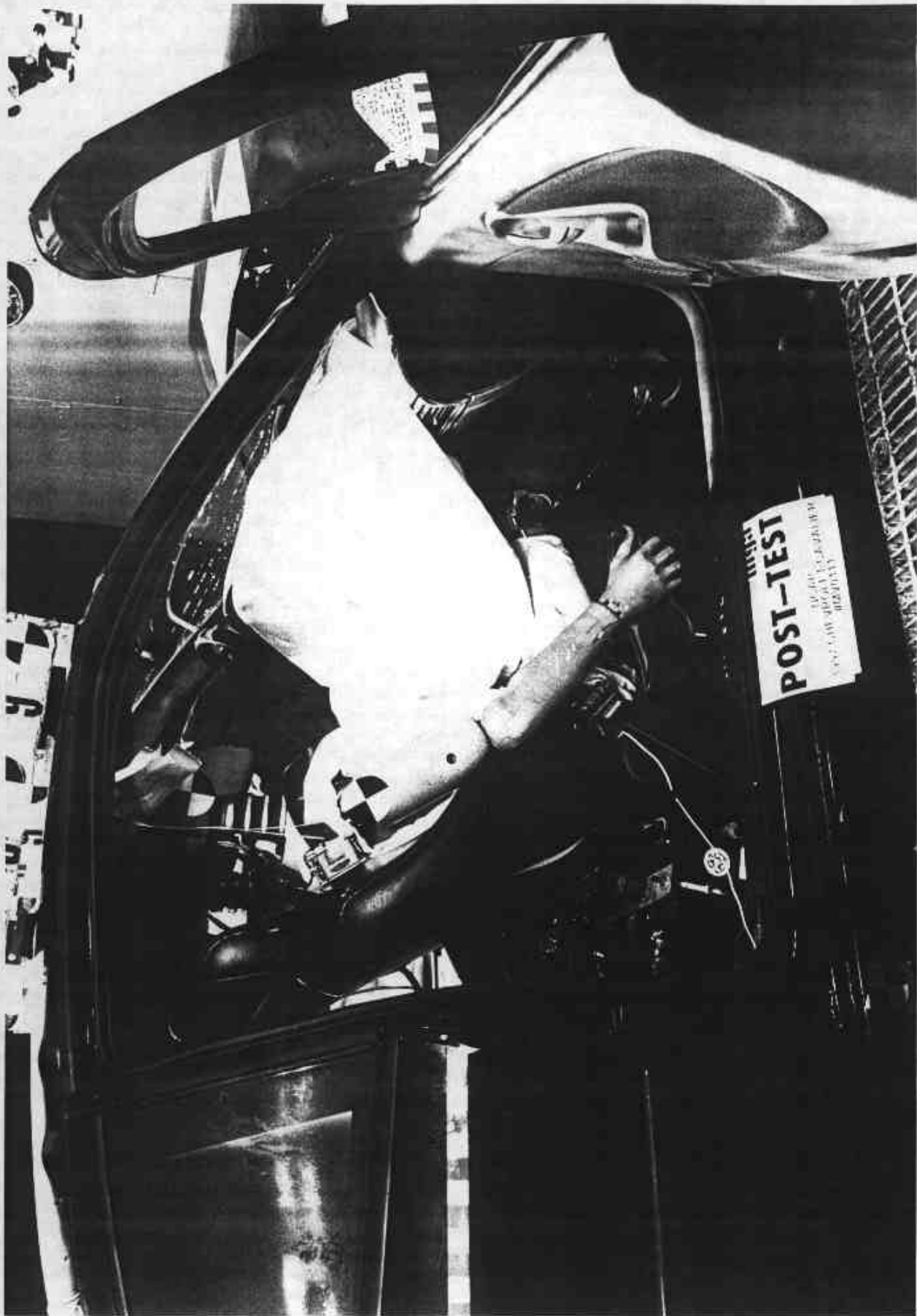


Photo No. A-35 - Post-Test Passenger Dummy Position Right Side View (Door Open)



Photo No. A-36 - Pre-Test Passenger Seat Position View



Photo No. A-37 - Post-Test Passenger Seat Position View



Photo No. A-38 - Pre-Test Passenger Dummy Knee Position



Photo No. A-39 - Post-Test Passenger Dummy Knee Position



Photo No. A-40 - Post-Test Passenger Airbag Contact



A-41

Photo No. A-41 - Post-Test Passenger Knee Contact View



MFD BY GENERAL MOTORS CORP

DATE
12/96

GVWR
3549 LB
1610 KG

GAWR FRT
1944 LB
882 KG

GAWR RR
1605 LB
728 KG

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

1G1JC1244V7205524

TYPE: PASS CAR

Photo No. A-42 - Vehicle Certification Label



TIRE - LOADING INFORMATION

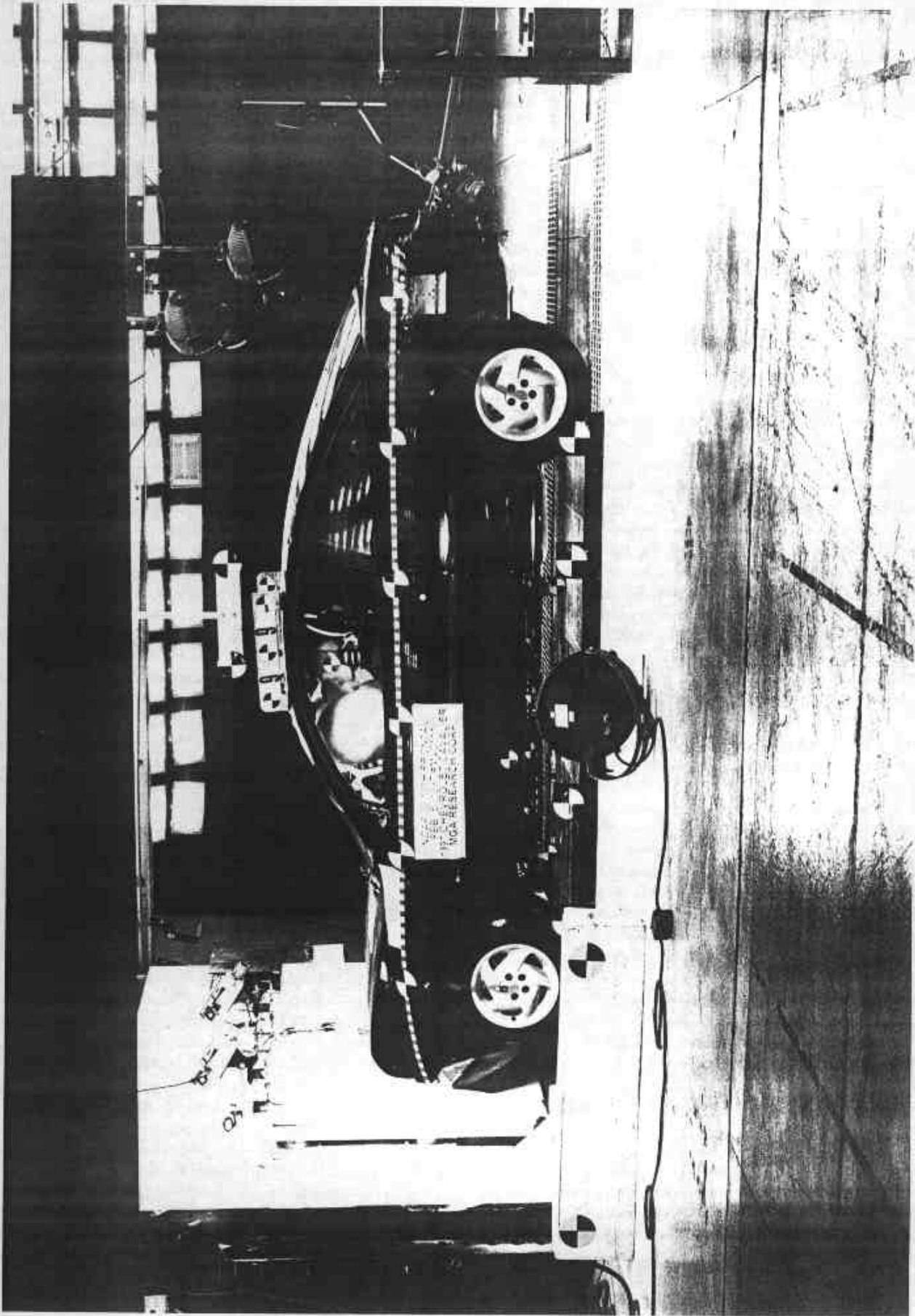
OCCUPANTS			VEHICLE CAP. WT.		
FRT.	CTR.	RR.	TOTAL	LB8	KG
2	0	3	5	882	400

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.
1G1JC1244V7205524

MODEL: JC37 JAA

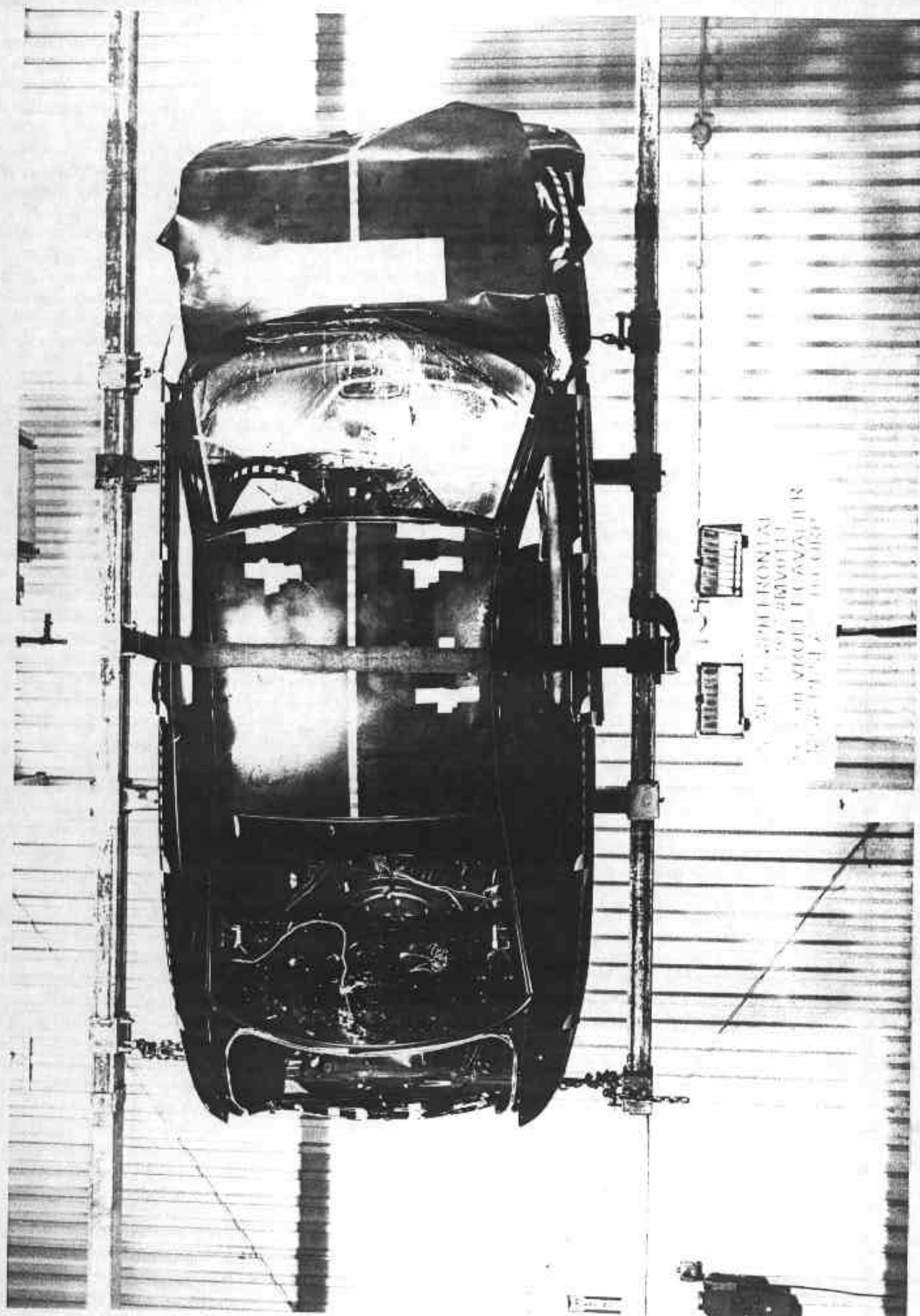
TIRE SIZE		SPEED RTG	COLD TIRE PRESSURE
FRT	P195/70R14	S	30/210 PSI/KPA
RR	P195/70R14	S	30/210 PSI/KPA
SPA	T115/70D14	M	60/420 PSI/KPA

IF TIRES ARE HOT, ADD 4 PSI / 28 KPA
SEE OWNER'S MANUAL FOR MORE INFORMATION



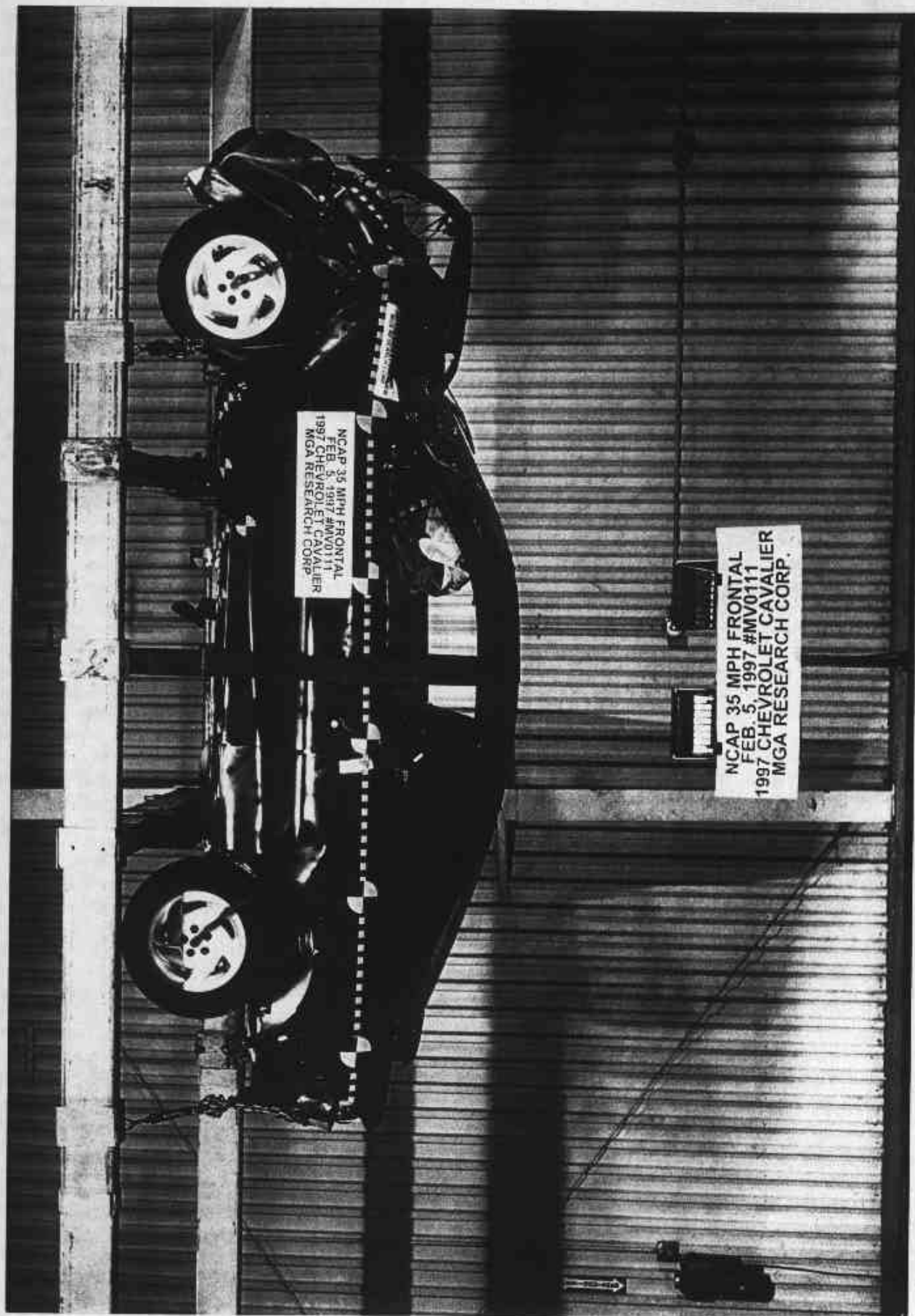
A-44

Photo No. A-44 - Vehicle Impact



A-45

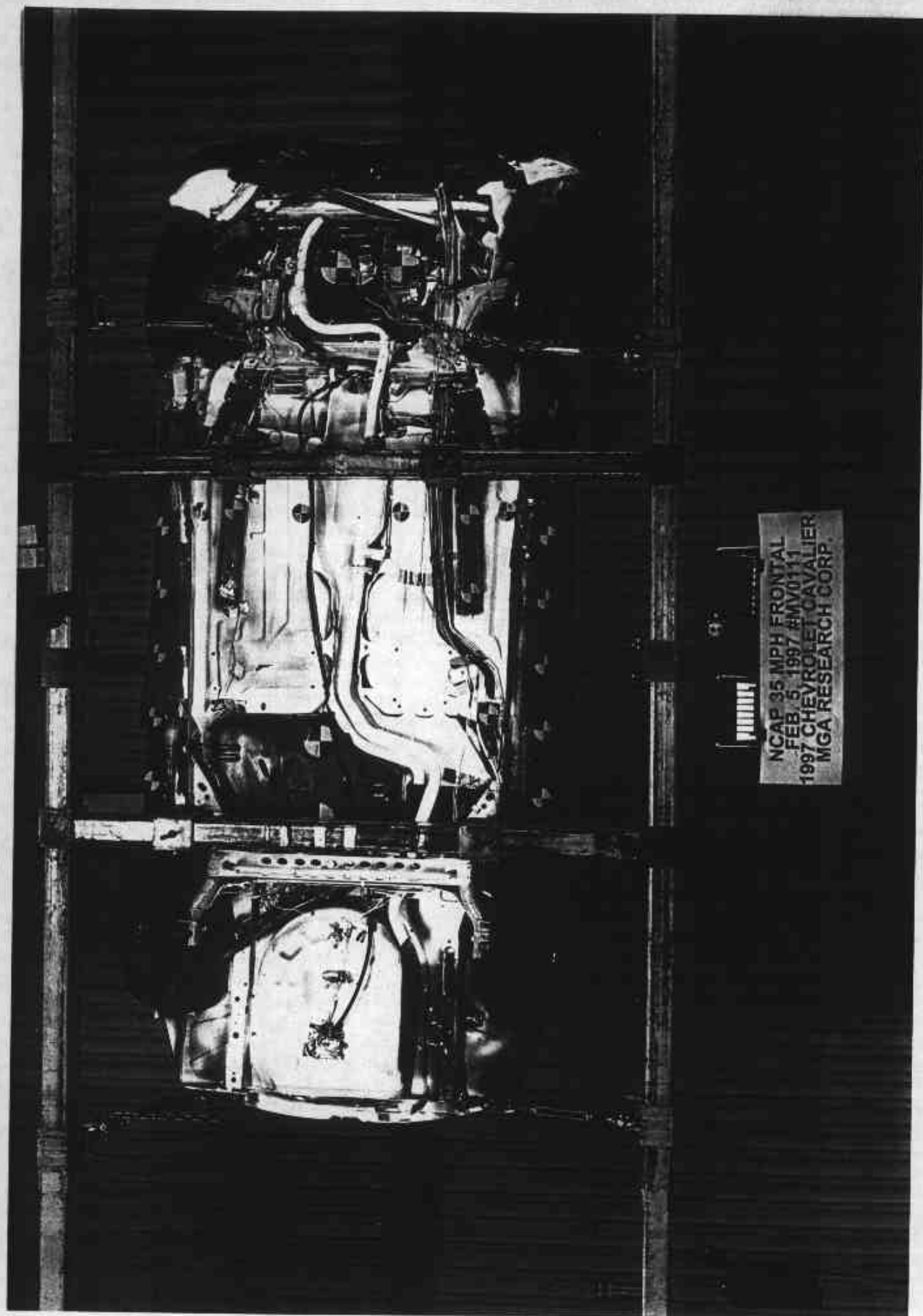
Photo No. A-45 - Rollover 90°



NCAP 35 MPH FRONTAL
FEB. 5, 1997 #MV0111
1997 CHEVROLET CAVALIER
MGA RESEARCH CORP.

NCAP 35 MPH FRONTAL
FEB. 5, 1997 #MV0111
1997 CHEVROLET CAVALIER
MGA RESEARCH CORP.

Photo No. A-46 - Rollover 180°



NCAP 35 MPH FRONTAL
FEB 5 1997 #MV0111
1997 CHEVROLET CAVALIER
MGA RESEARCH CORP.

A-47

Photo No. A-47 - Rollover 270°

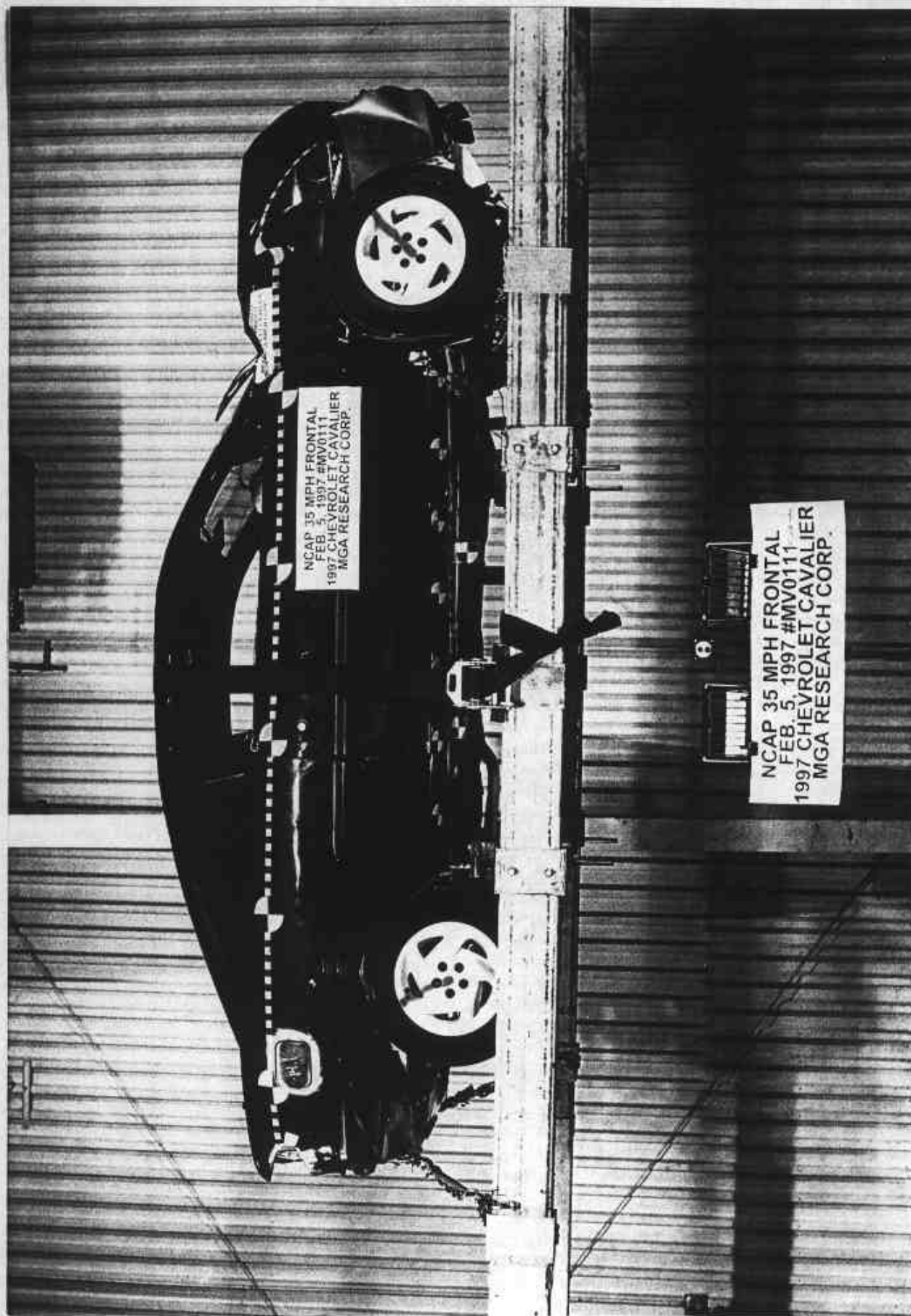


Photo No. A-48 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1997 Chevrolet Cavalier 2 Door

NHTSA NO.: MV0111

VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000 (1650 Hz)

Chest Accelerations 180 (300 Hz)

Vehicle Accelerations 60 (100 Hz)

Barrier Load Cells 60 (100 Hz)

Femur Load Cells 600 (1000 Hz)

Lap and Torso Belts 60 (100 Hz)

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TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -33.69 G'S at 47 msec

Maximum = 3.27 G'S at 121 msec

LEFT REAR SEAT CROSSMEMBER X ACCELERATION

1 ——— B97021AF.A30 Filterclass (60)

0

-10

-20

-30

G.S

-02

-01

0

01

02

03

04

05

06

07

08

09

1

11

12

13

14

15

16

17

18

19

TIME (SECONDS)

HCA Research
02-12-1997 14:17

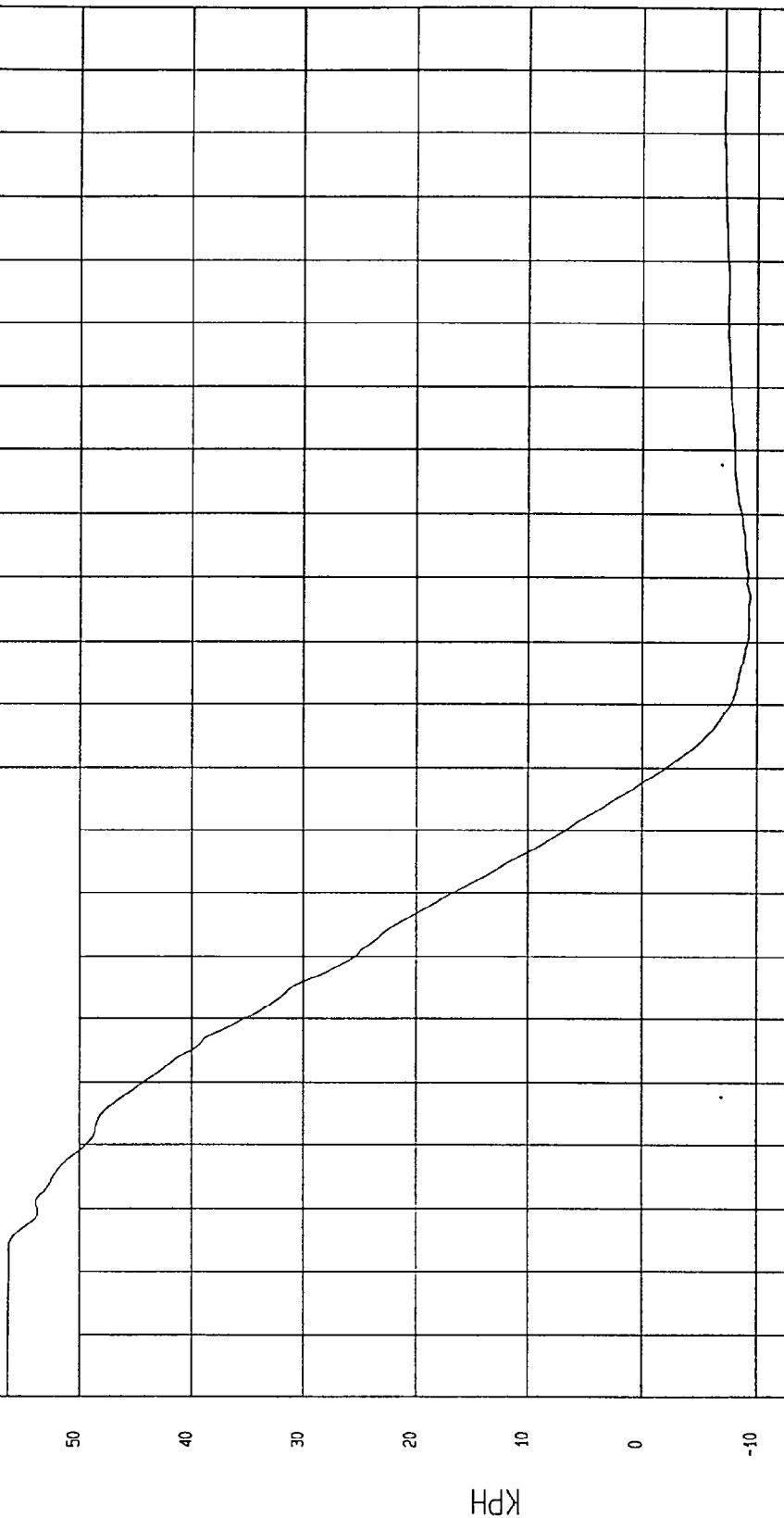
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

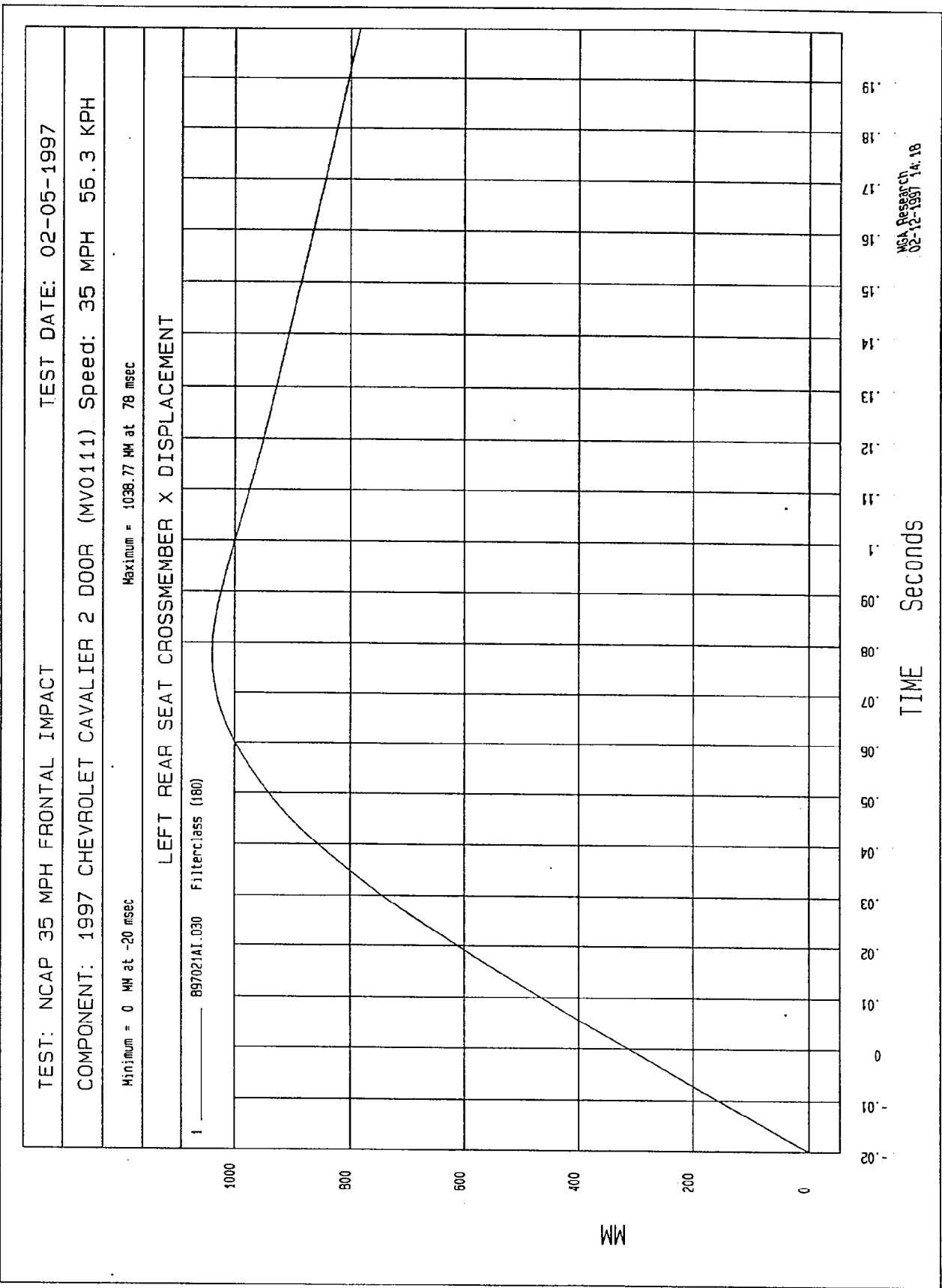
Minimum = -9.36 KPH at 107 msec Maximum = 56.30 KPH at -16 msec

LEFT REAR SEAT CROSSMEMBER X VELOCITY

1 B97021A1.V30 Filterclass (180)



MOA Research
02-12-1997 14:18



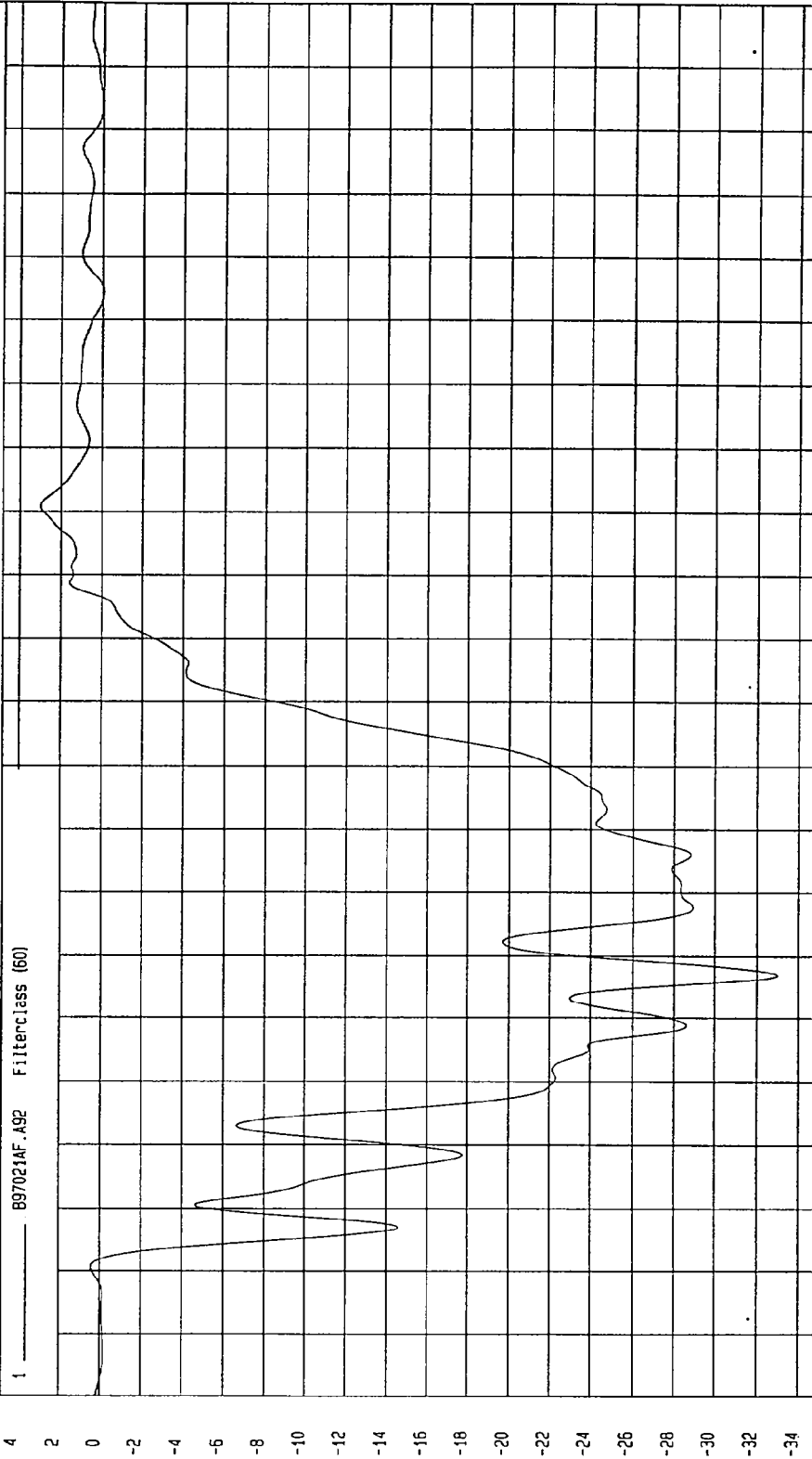
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -32.98 G'S at 47 msec Maximum = 3.00 G'S at 121 msec

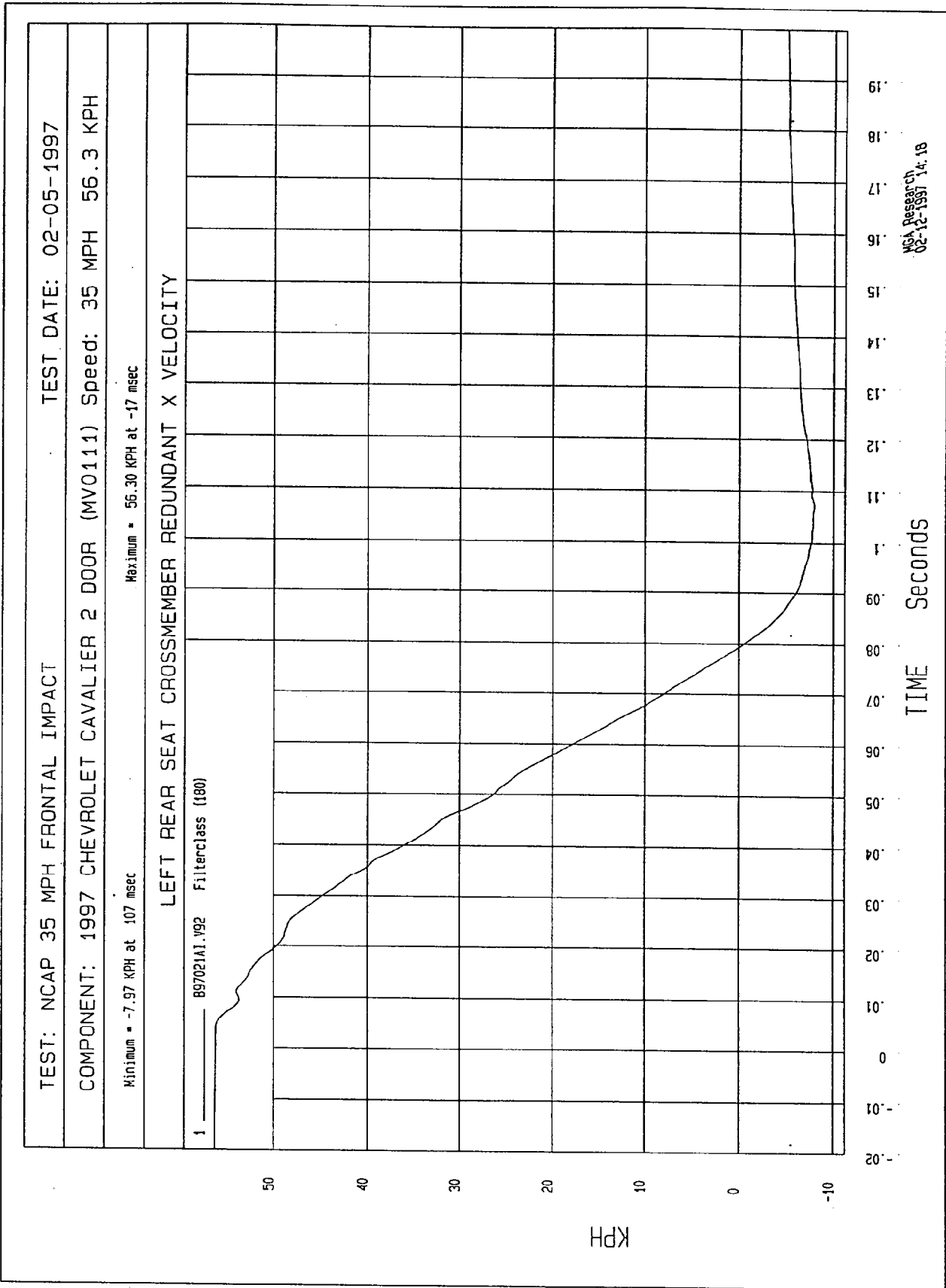
LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

1 ——— B97021AF.A92 Filterclass (60)



TIME (SECONDS)

NGA Research
02-12-1997 14:18



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

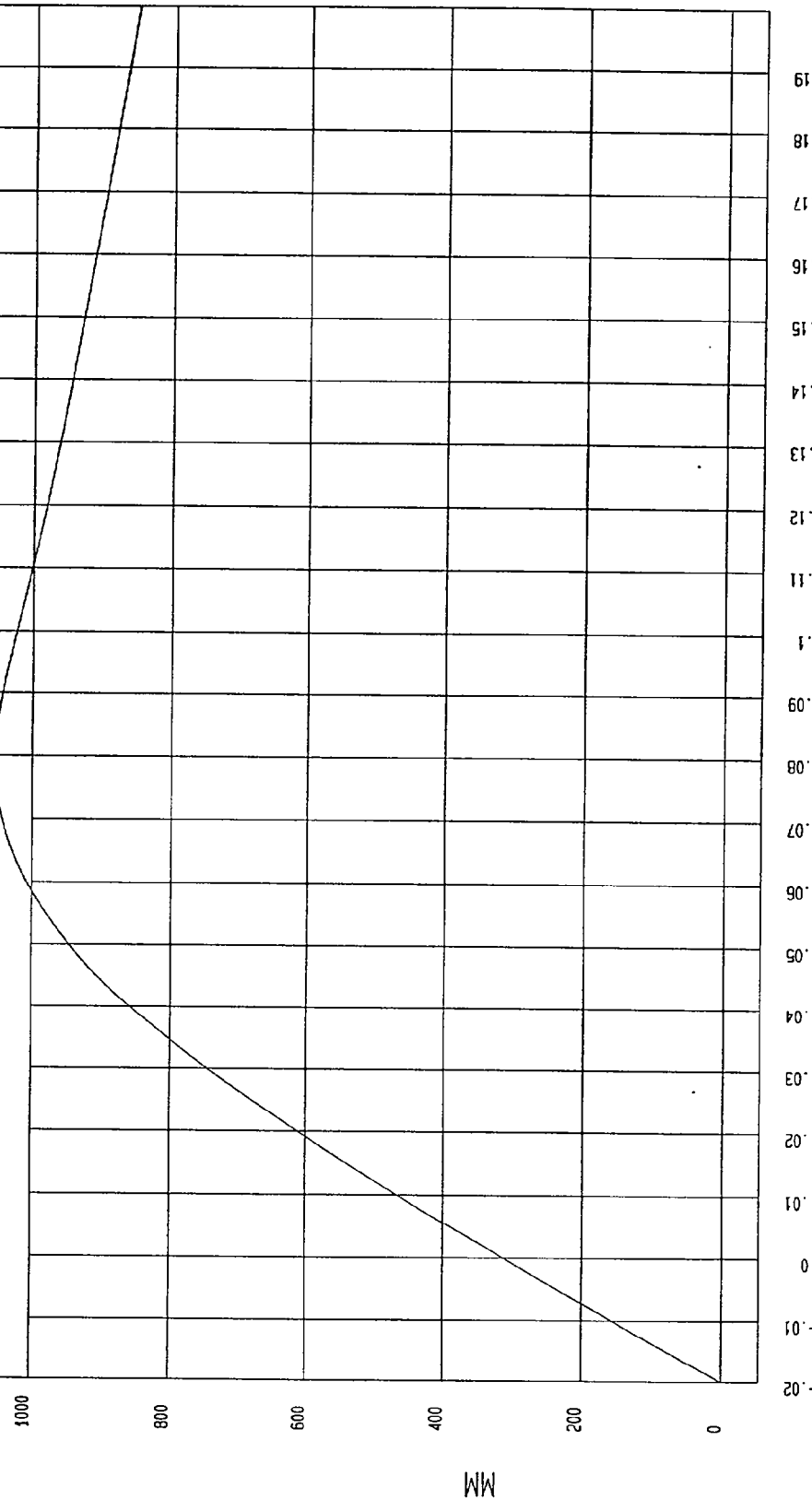
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec

Maximum = 1053.36 MM at 79 msec

LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

f 897021A1.092 Filterclass (180)



MSA Research
02-12-1997 14:18

TIME Seconds

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

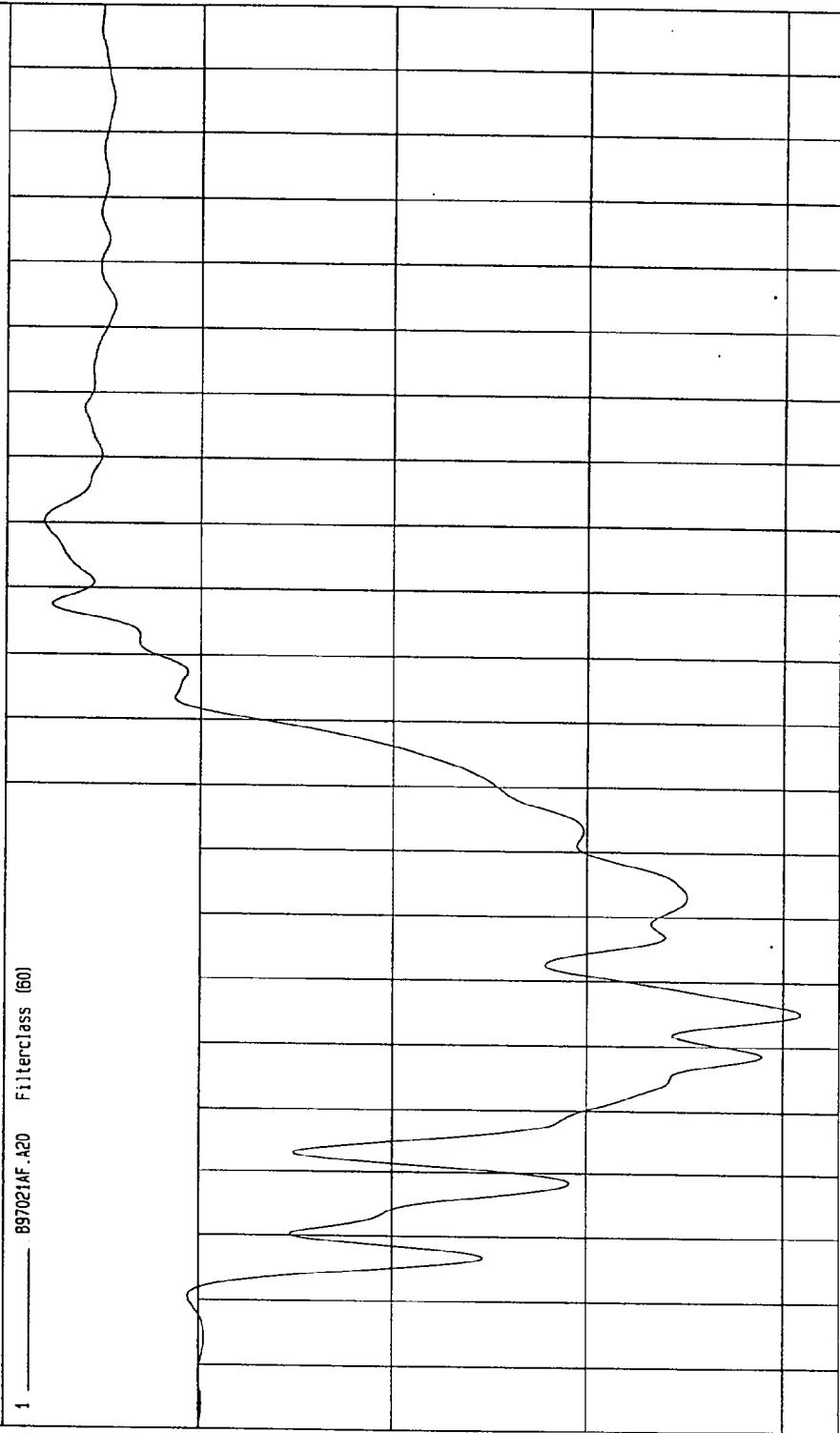
Minimum = -30.88 G'S at .45 msec

Maximum = 7.97 G'S at 120 msec

RIGHT REAR SEAT CROSSMEMBER X ACCELERATION

1 ——— B97021AF.A20 Filterclass (60)

G'S



TIME (SECONDS)

MSA Research
02-12-1997 14:18

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

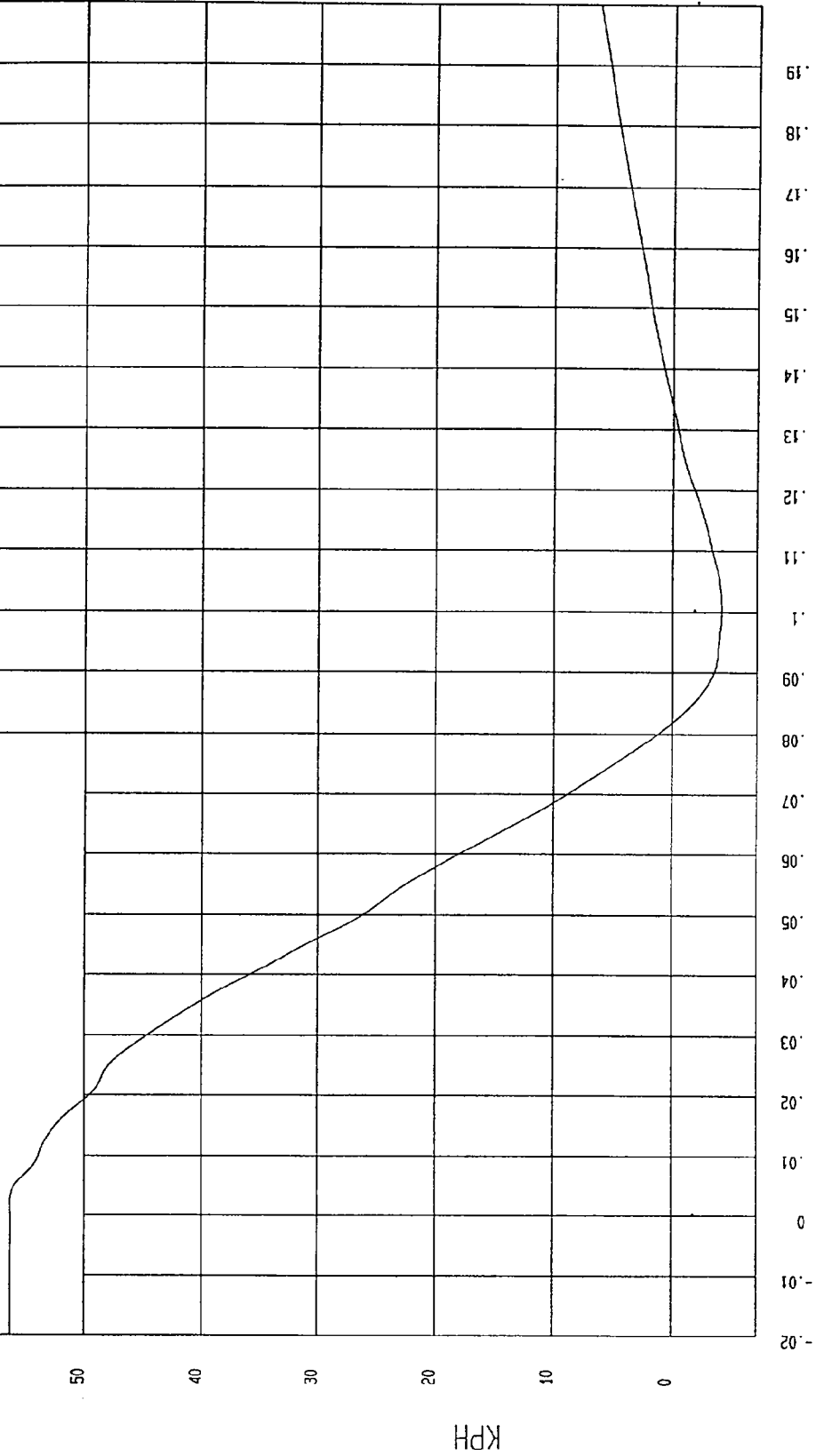
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -4.11 KPH at 100 msec

Maximum = 56.3 KPH at -20 msec

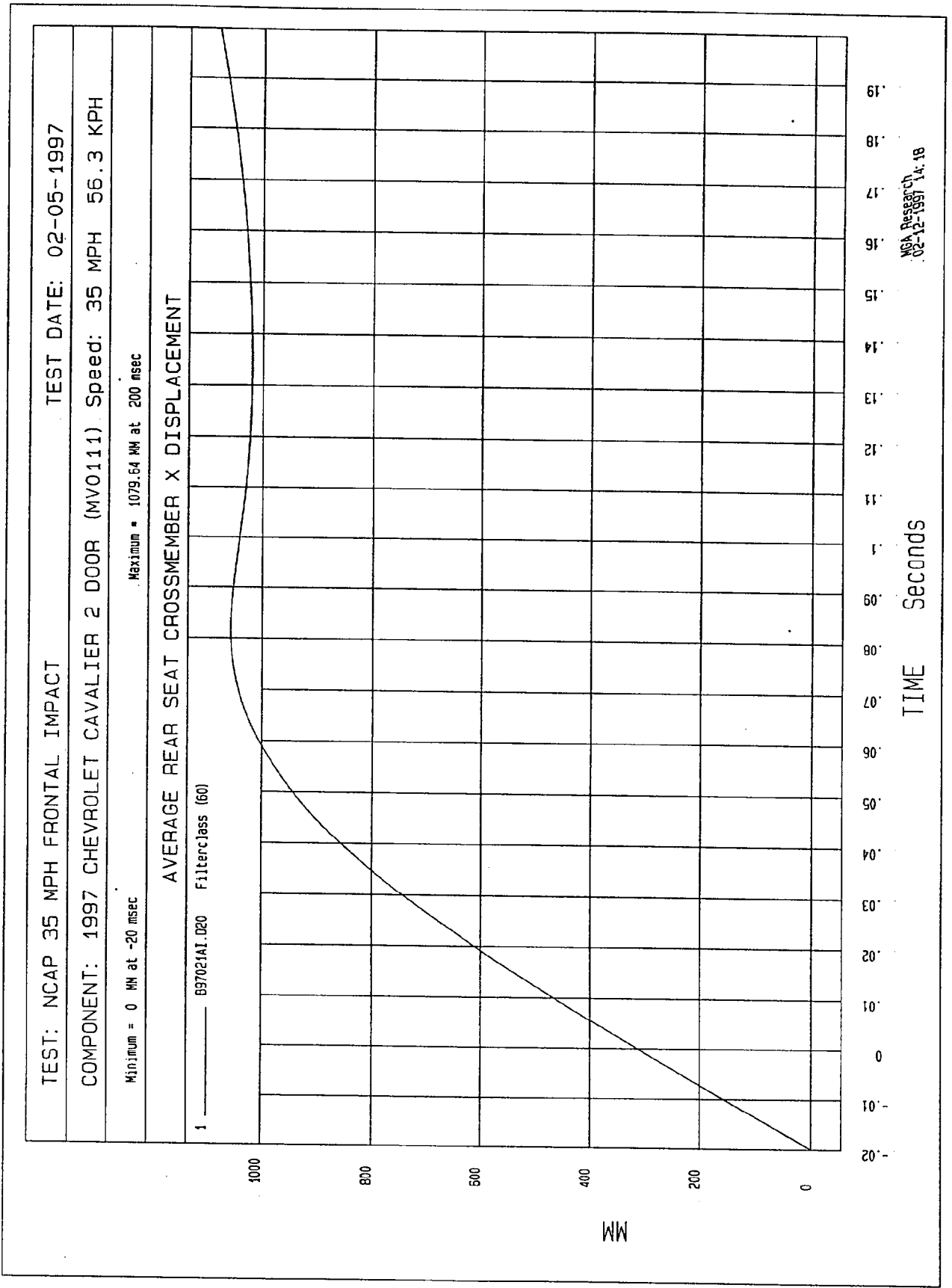
AVERAGE REAR SEAT CROSSMEMBER X VELOCITY

1 — B97021A1.V20 Filterclass (60)



MCA Research
02-12-1997 14:18

TIME Seconds

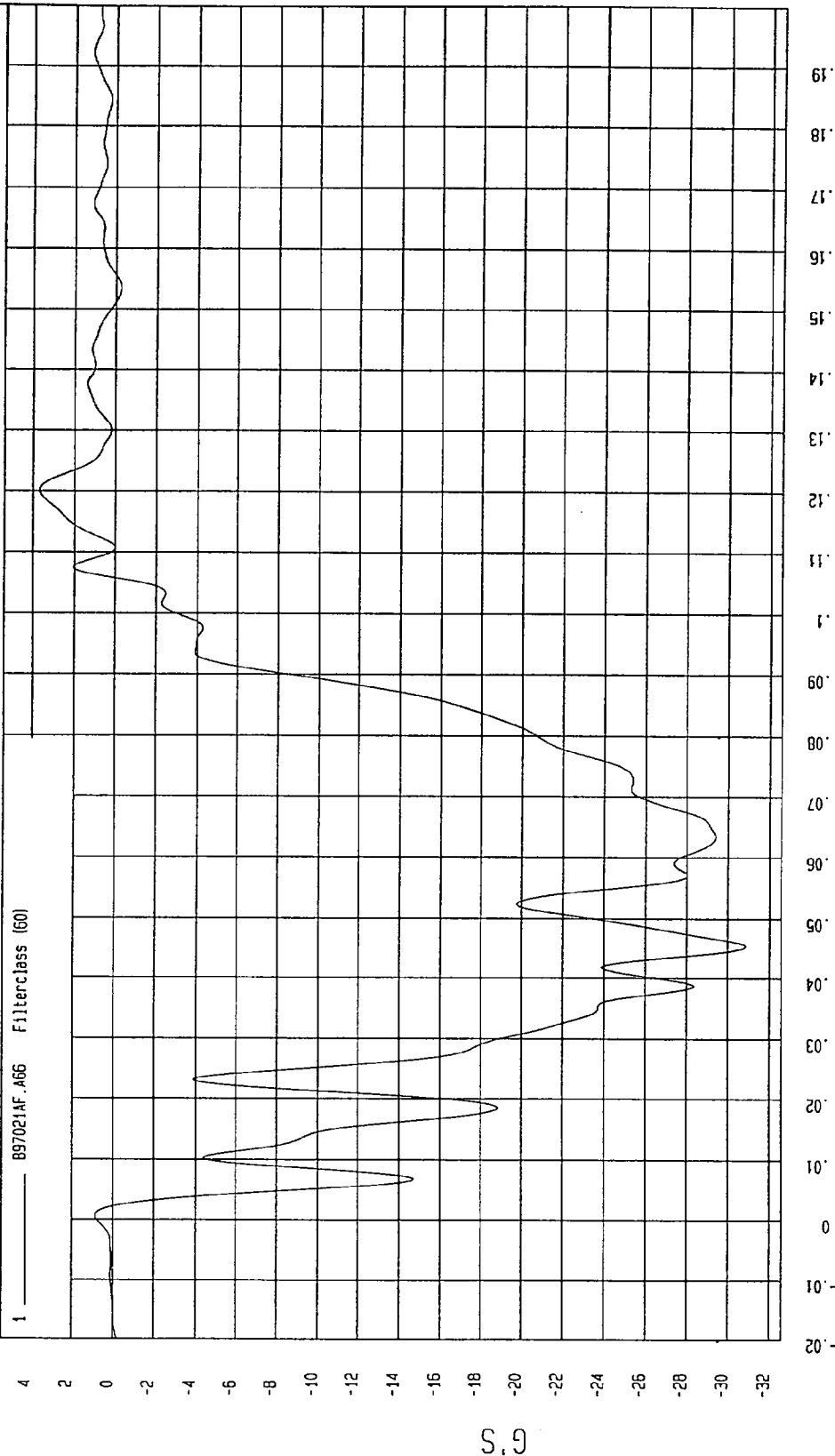


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

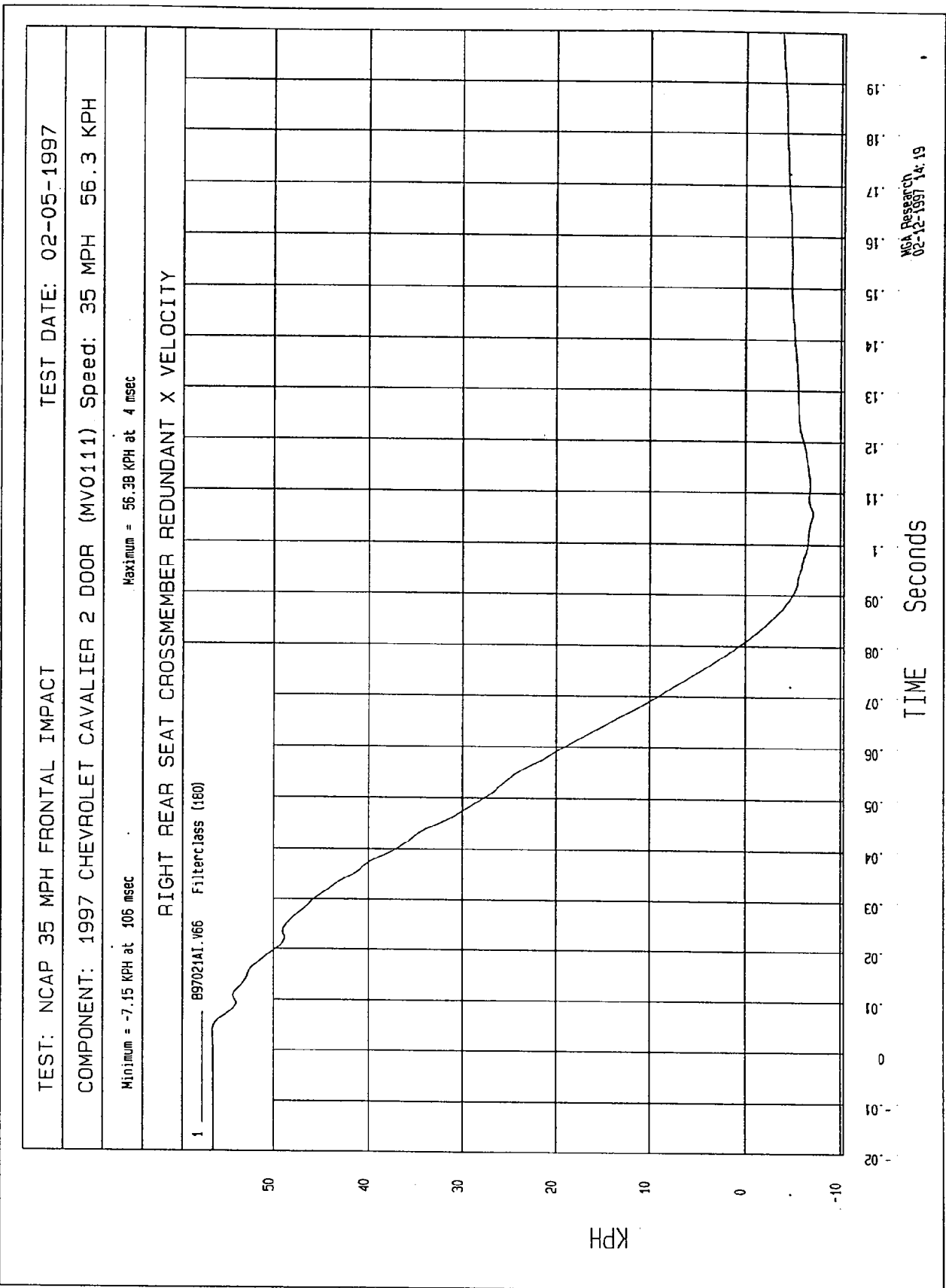
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -30.84 G'S at 45 msec Maximum = 3.68 G'S at 120 msec

RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION



MSA Research
02-12-1997 14:19

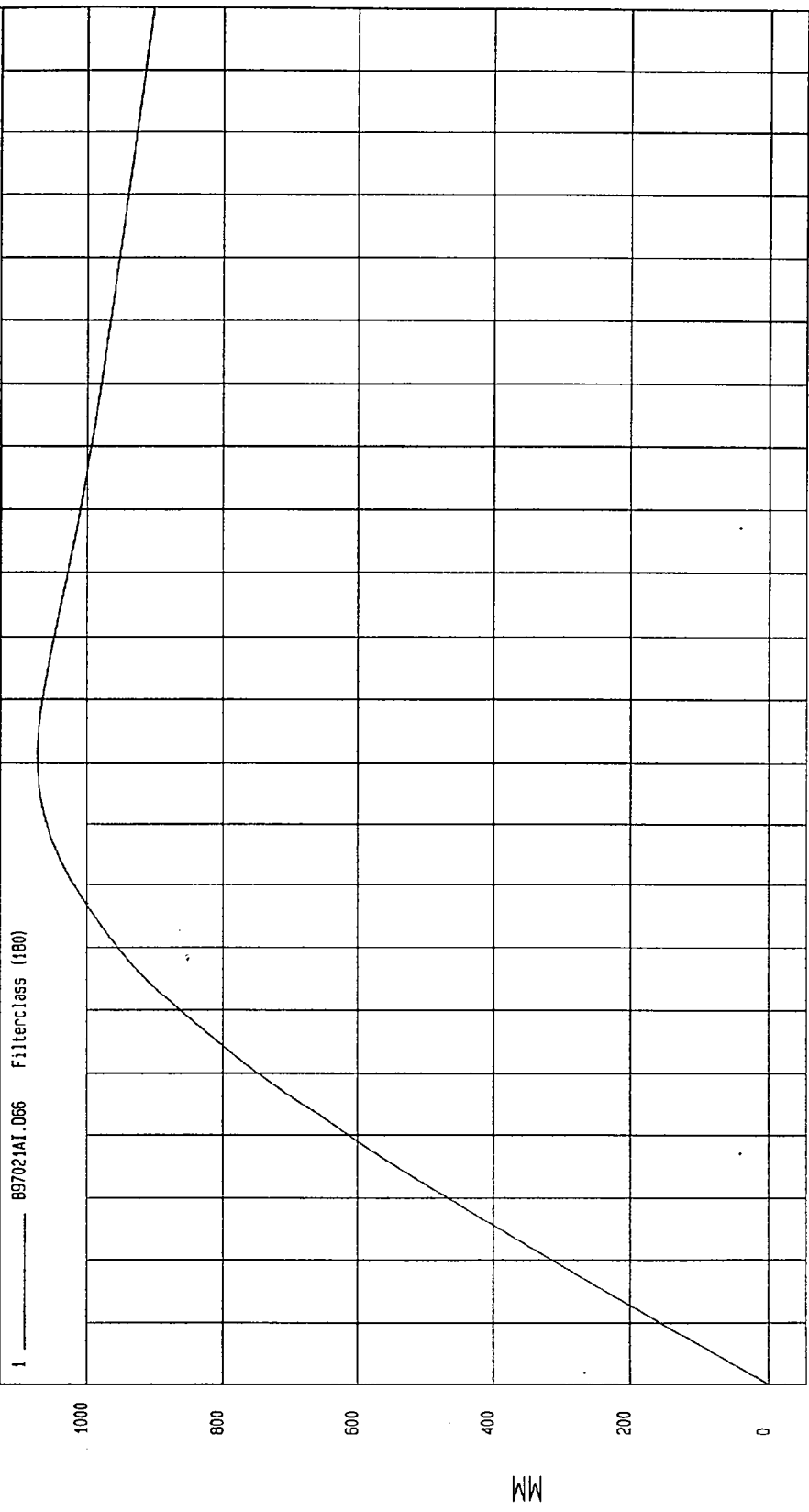


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec Maximum = 1071.19 MM at 81 msec

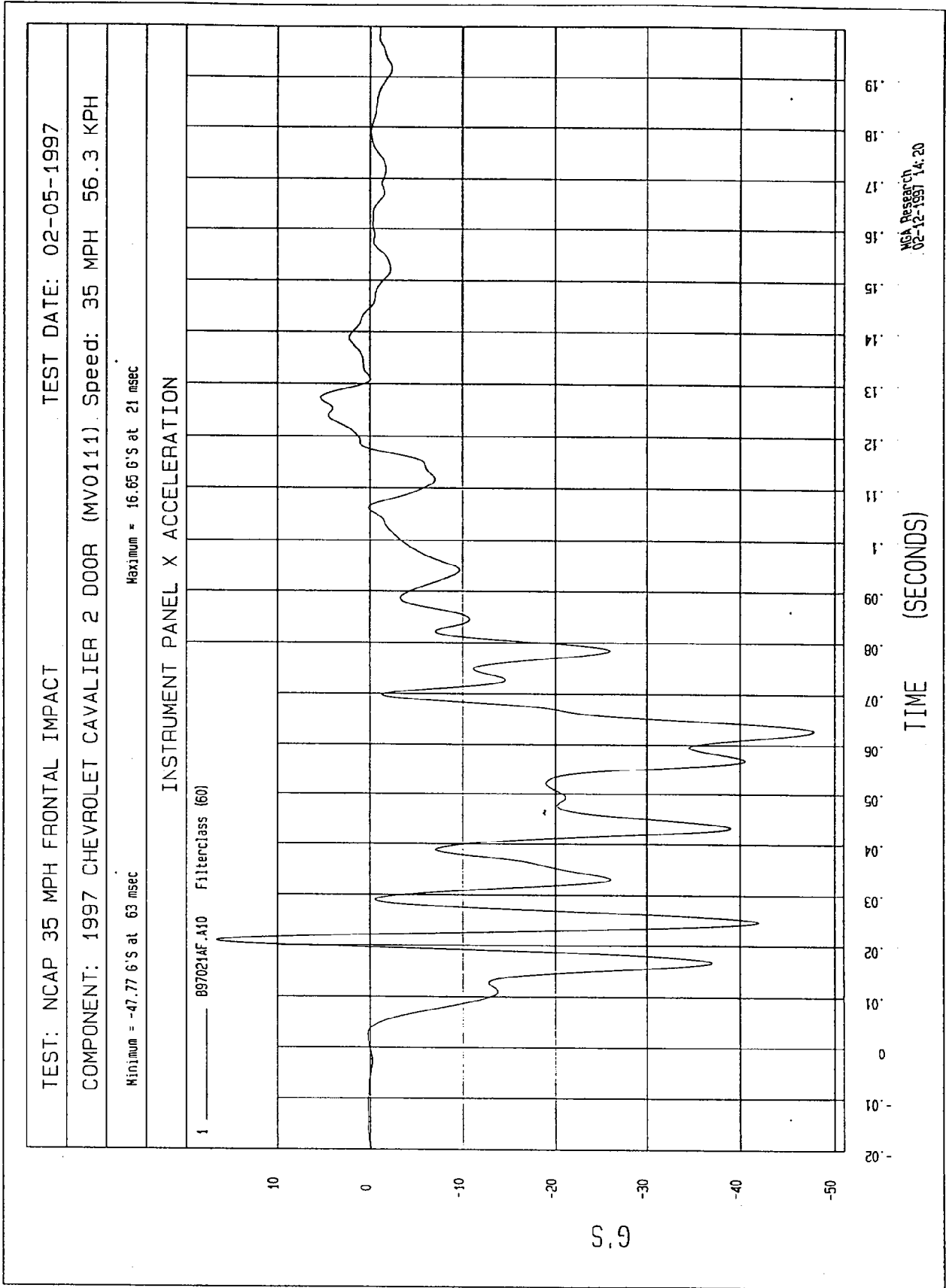
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT



TIME Seconds

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

MSA Research
02-12-1997 14:19



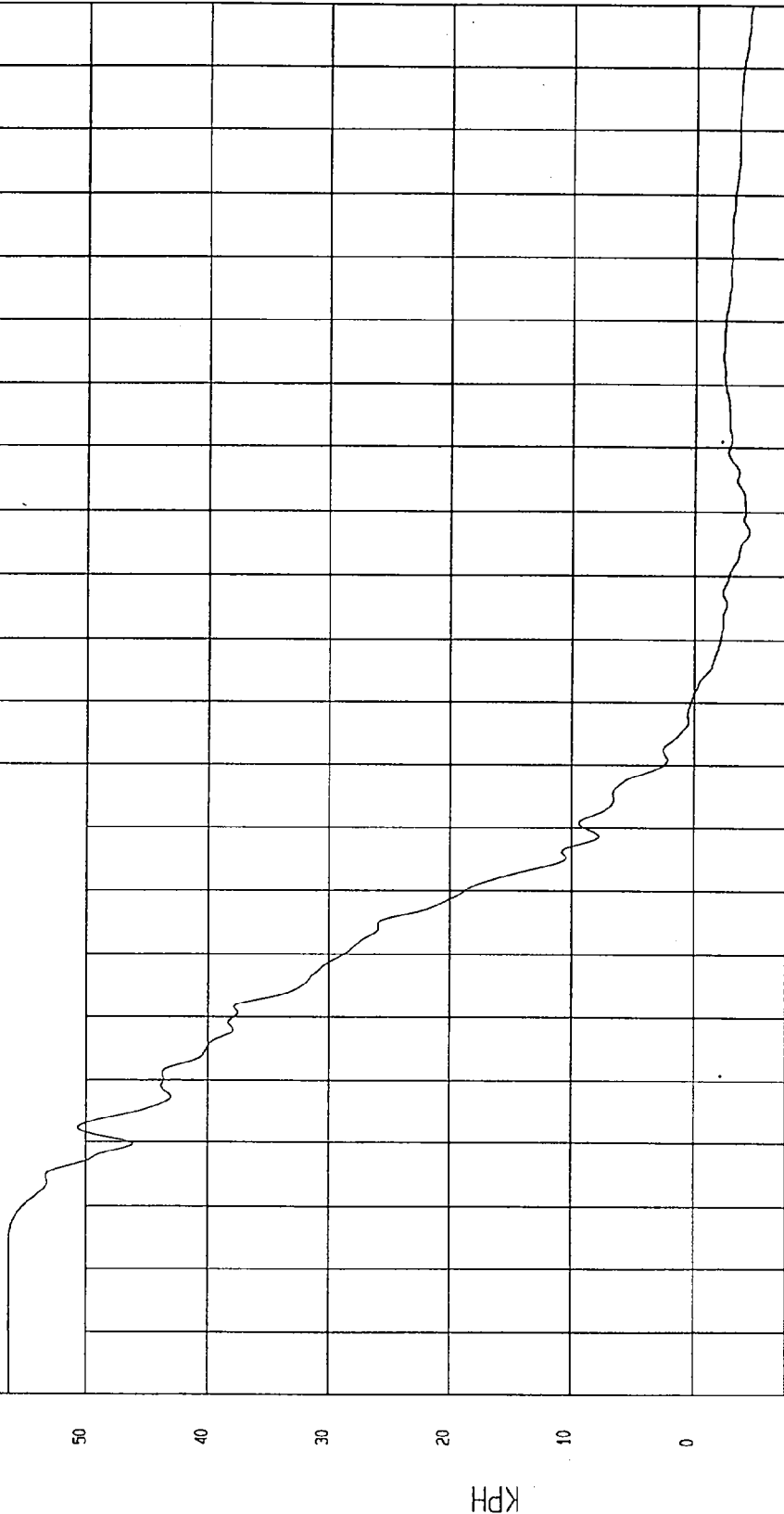
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -4.45 KPH at 200 msec Maximum = 56.37 KPH at -5 msec

INSTRUMENT PANEL X VELOCITY

1 ——— B97021A1.V10 Filterclass (180)



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

NGA Research
02-12-1997 14:20

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

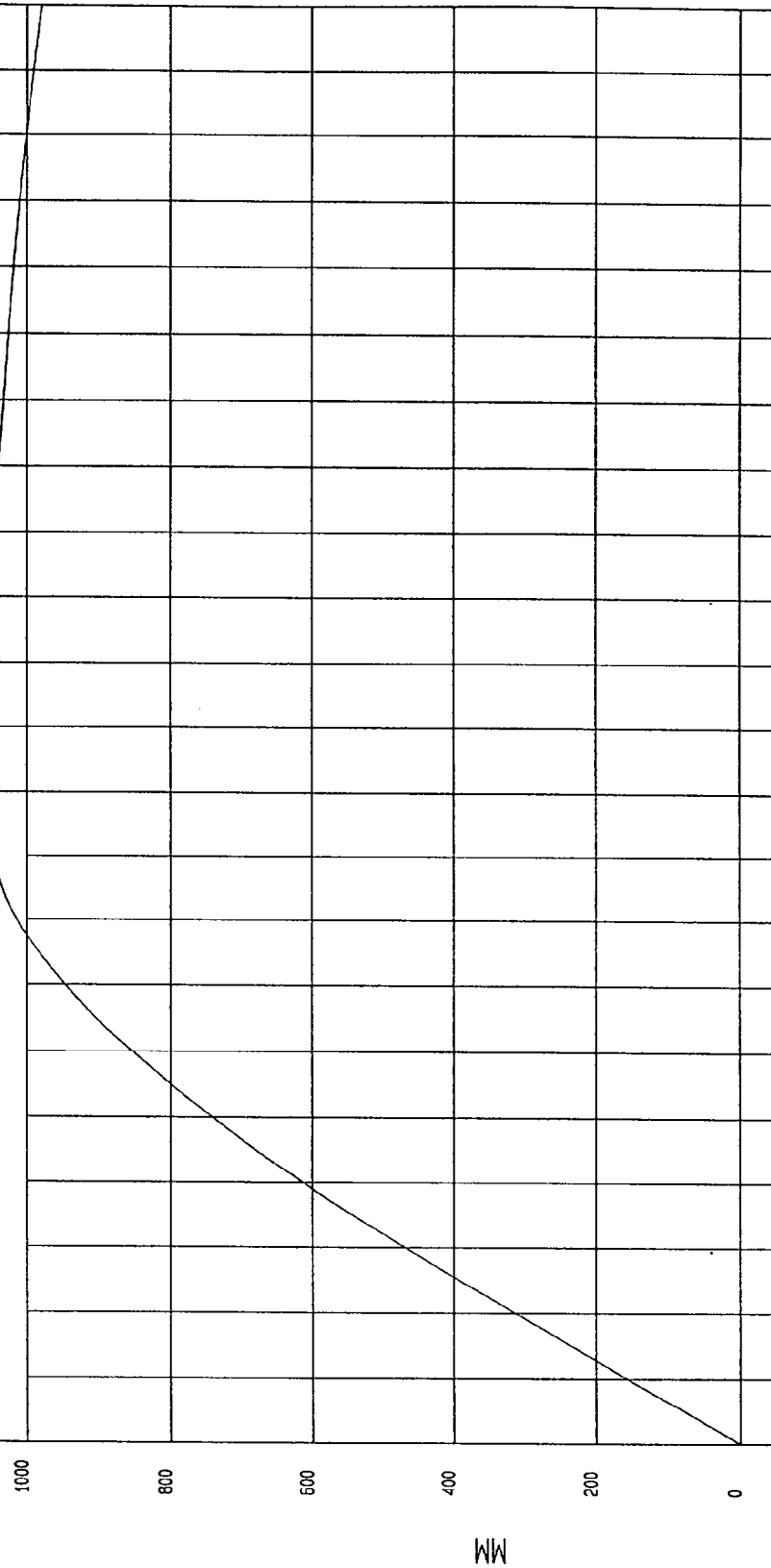
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV01111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec

Maximum = 1069.88 MM at 92 msec

INSTRUMENT PANEL X DISPLACEMENT

1 — 897021A1.010 Filterclass (180)



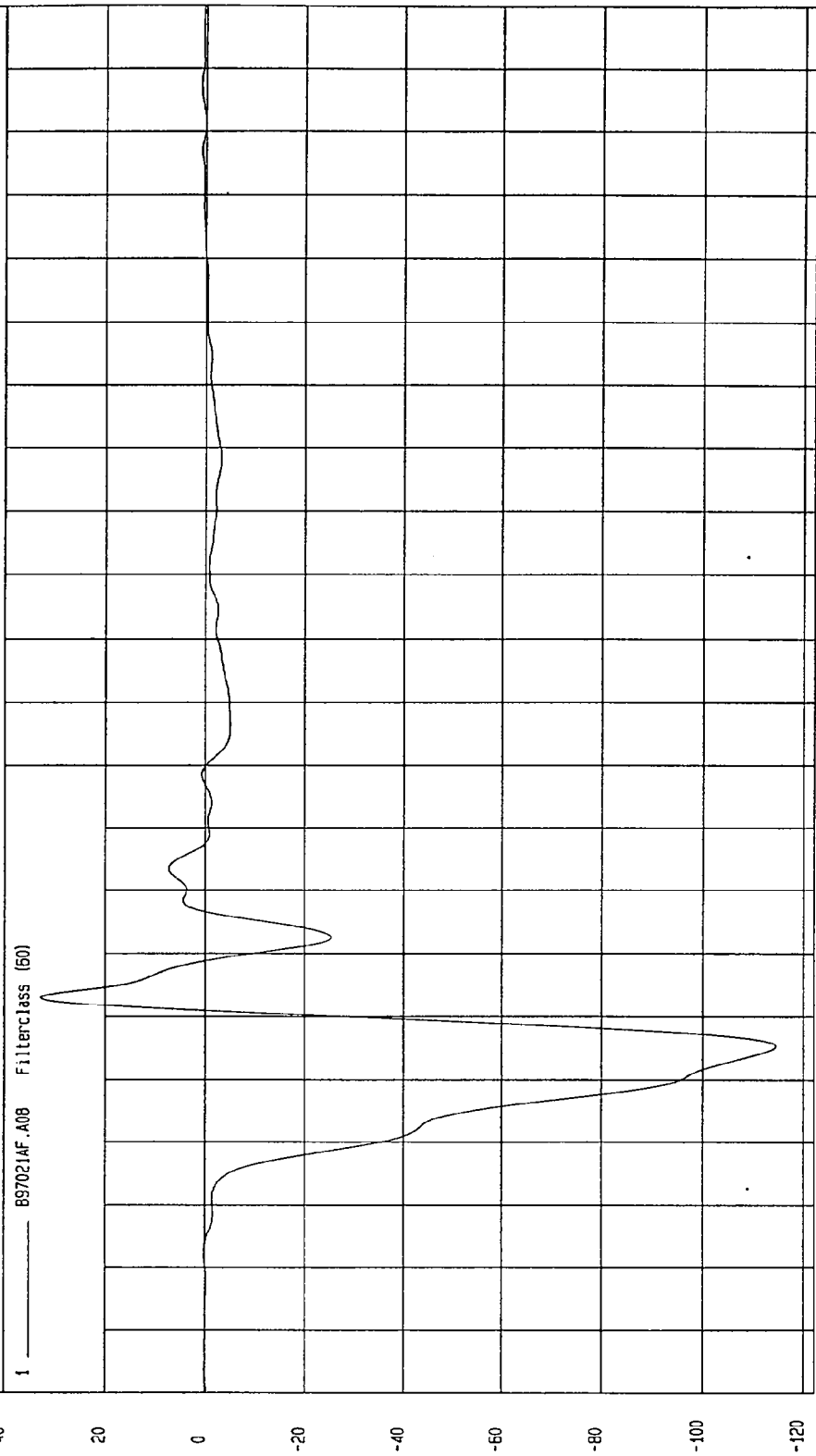
MSA Research
02-12-1997 14:20

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -114.76 G'S at 35 msec Maximum = 32.66 G'S at 43 msec

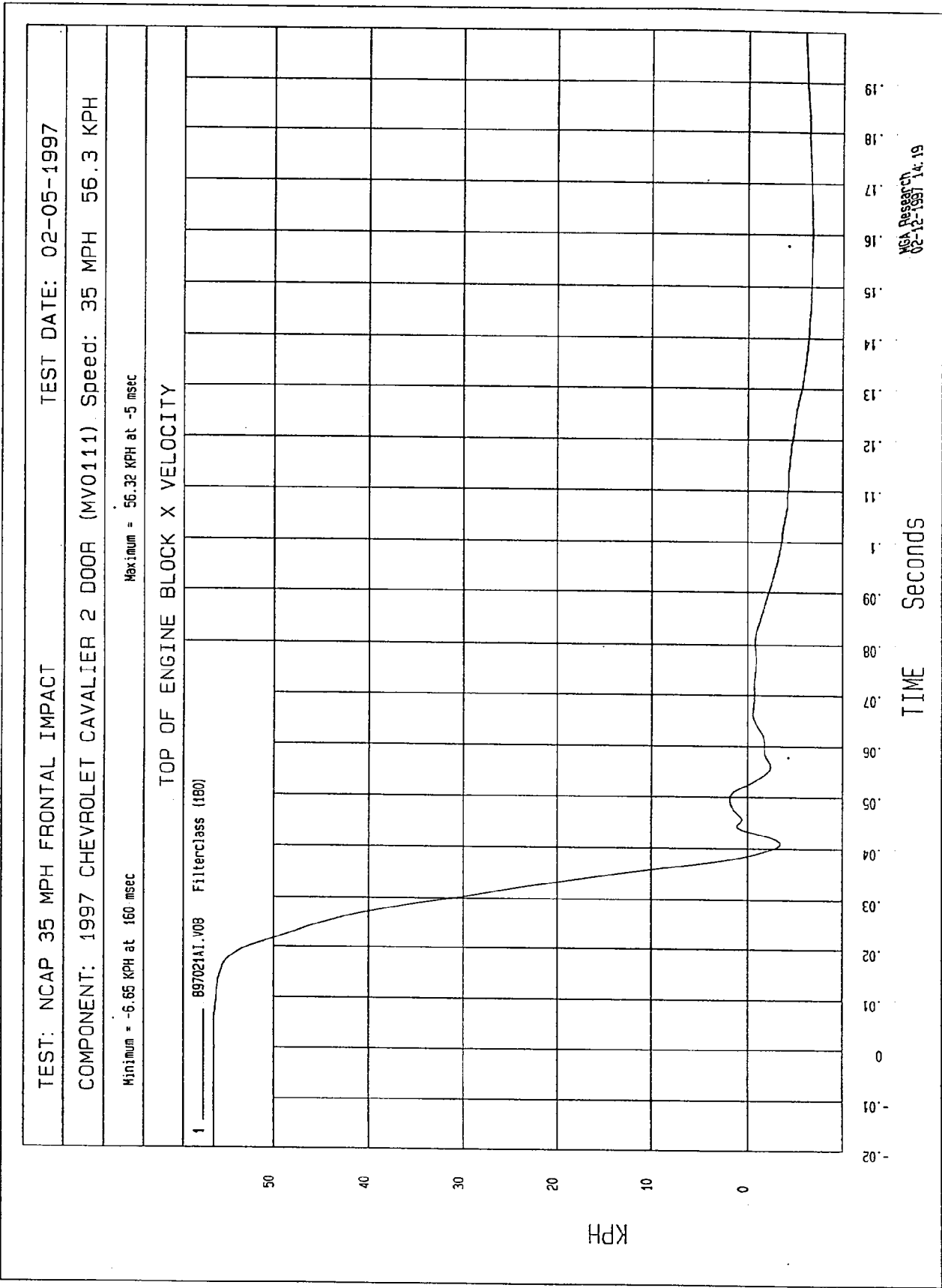
TOP OF ENGINE BLOCK X ACCELERATION



TIME (SECONDS)

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

NSA Research
02-12-1997 14:19

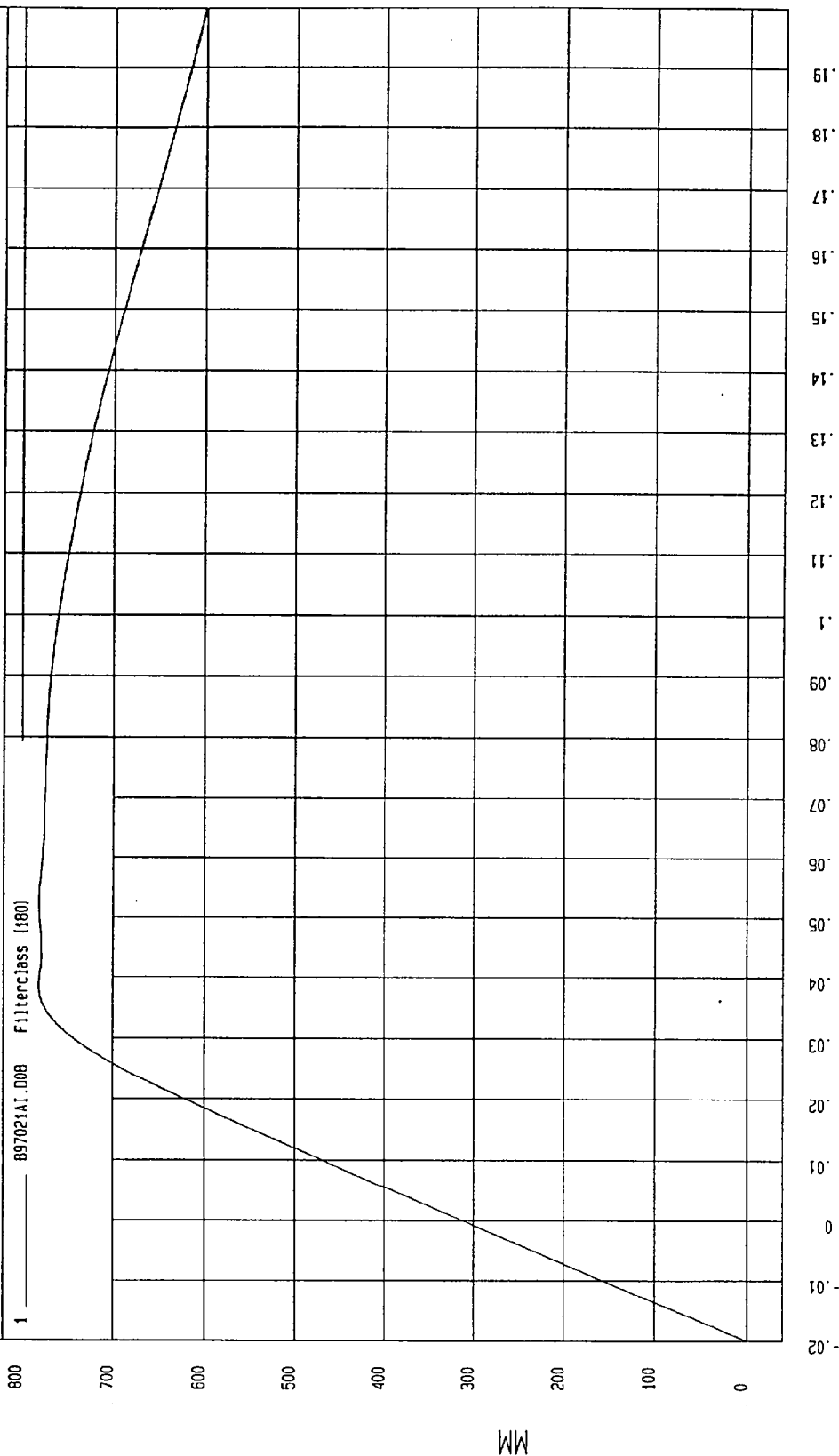


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

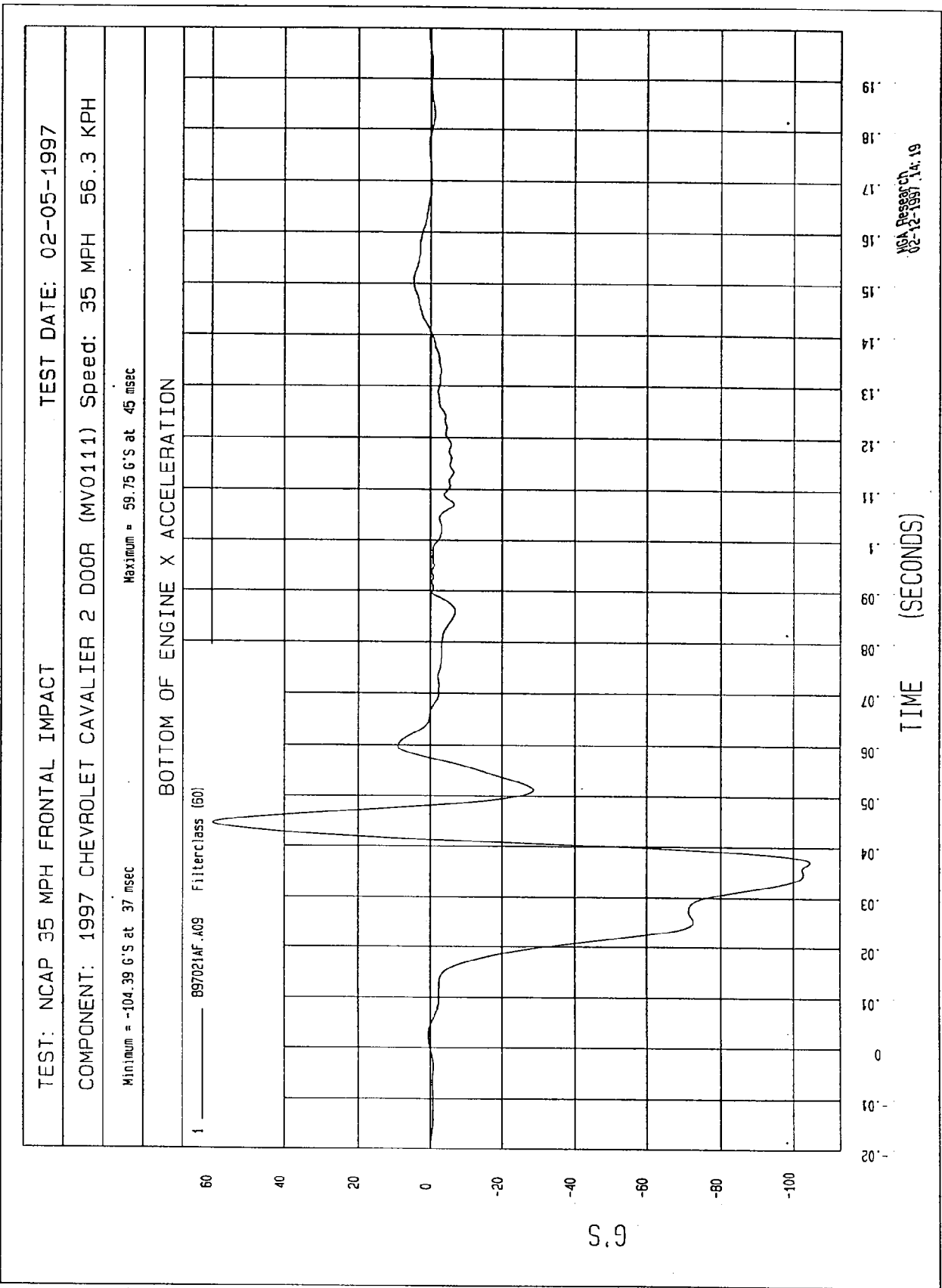
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec Maximum = 781.54 MM at 52 msec

TOP OF ENGINE BLOCK X DISPLACEMENT



NSA Research
02-12-1997 14:19



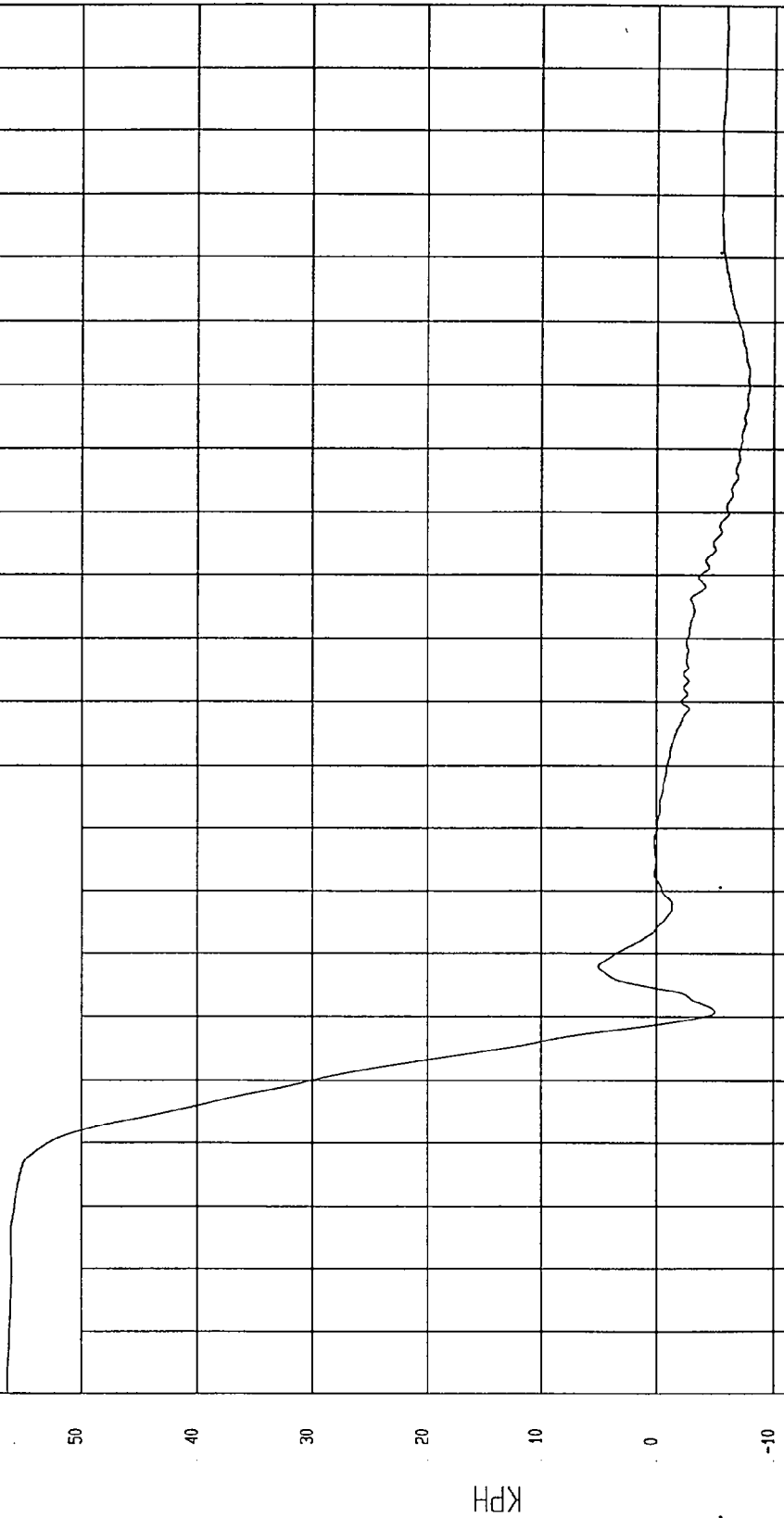
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -7.88 KPH at 140 msec Maximum = 56.30 KPH at -19 msec

BOTTOM OF ENGINE X VELOCITY

1 B97021A1.V09 Filterclass (180)



NGA Research
02-12-1997 14:19

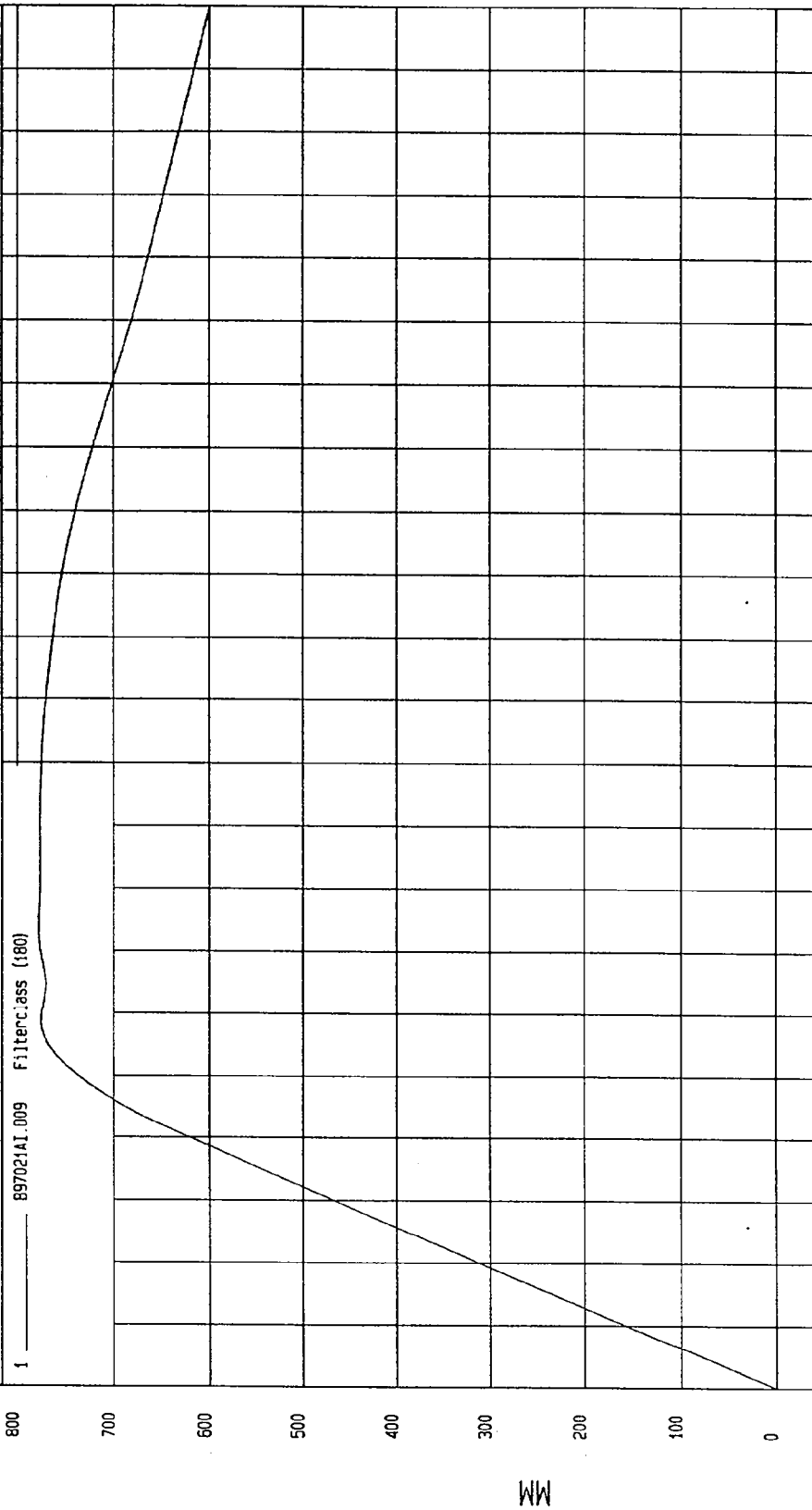
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec Maximum = 778.27 MM at 54 msec

BOTTOM OF ENGINE X DISPLACEMENT

1 897021AI.009 Filter: class (180)



TIME Seconds

MCA Research
02-12-1997 14:19

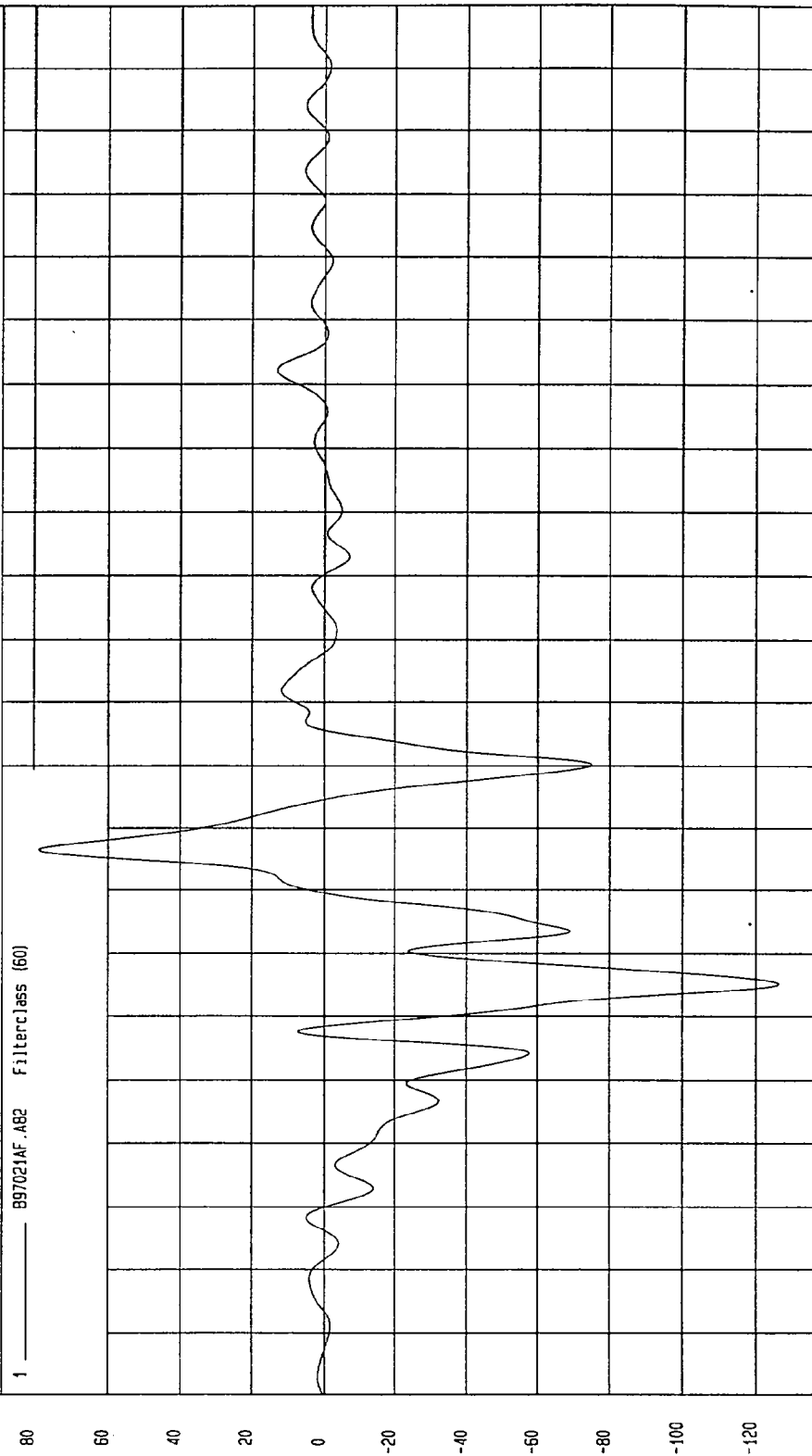
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -125.28 G'S at 45 msec Maximum = 78.69 G'S at 66 msec

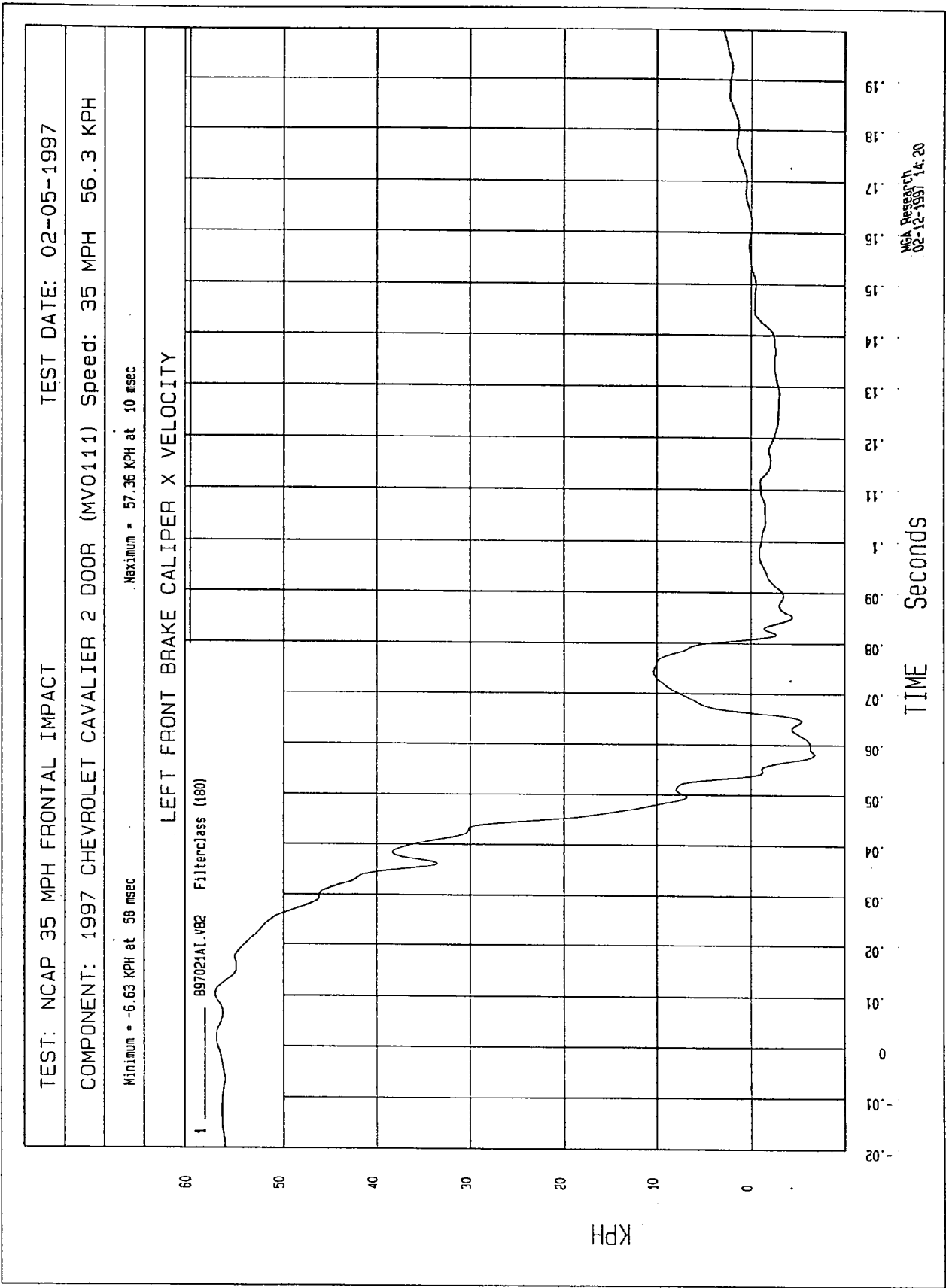
LEFT FRONT BRAKE CALIPER X ACCELERATION

1 ——— B97021AF AB2 Filterclass (60)



TIME (SECONDS)

MCA Research
02-12-1997 14:20



TEST: NCAP 35 MPH FRONTAL IMPACT

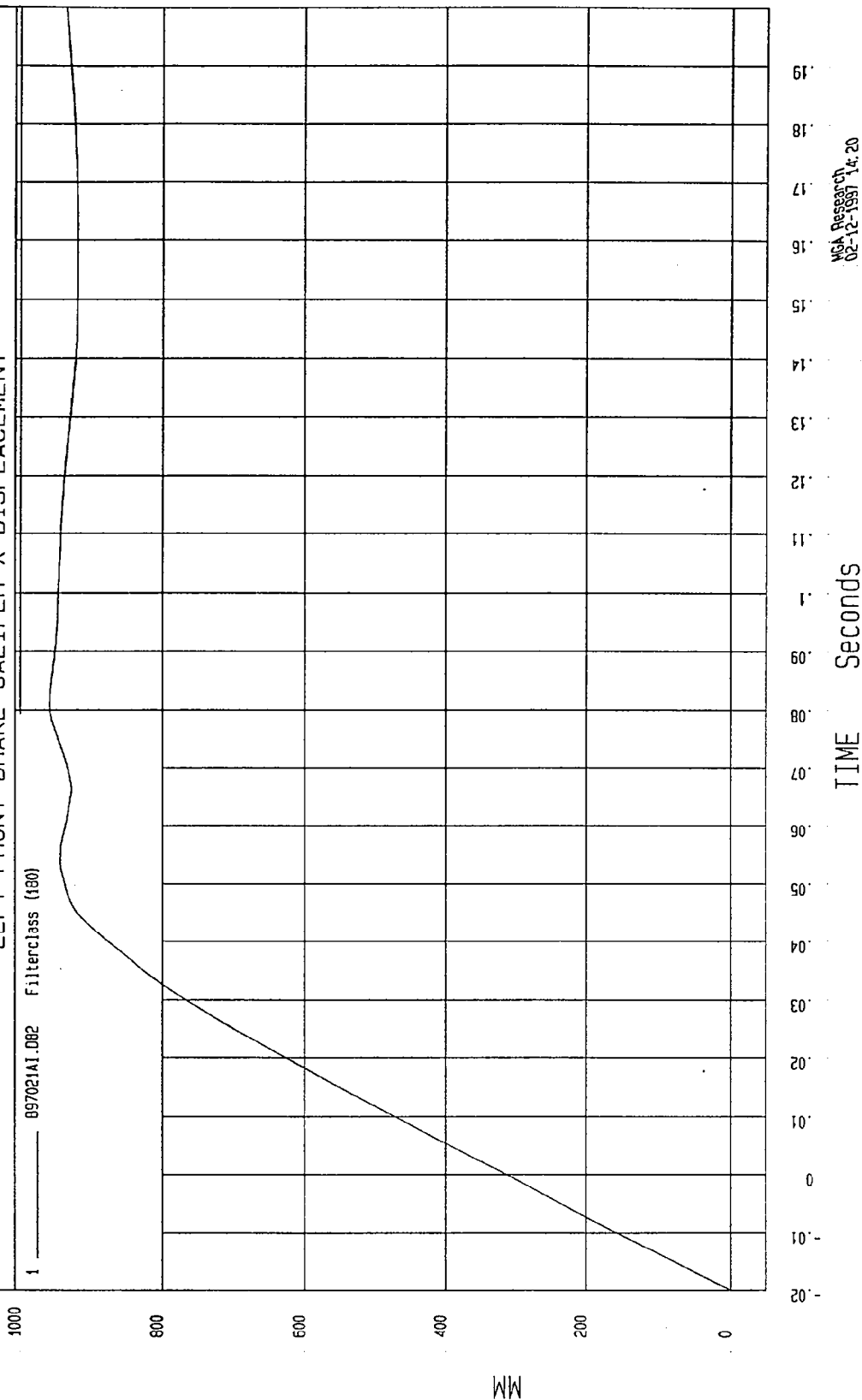
TEST DATE: 02-05-1997

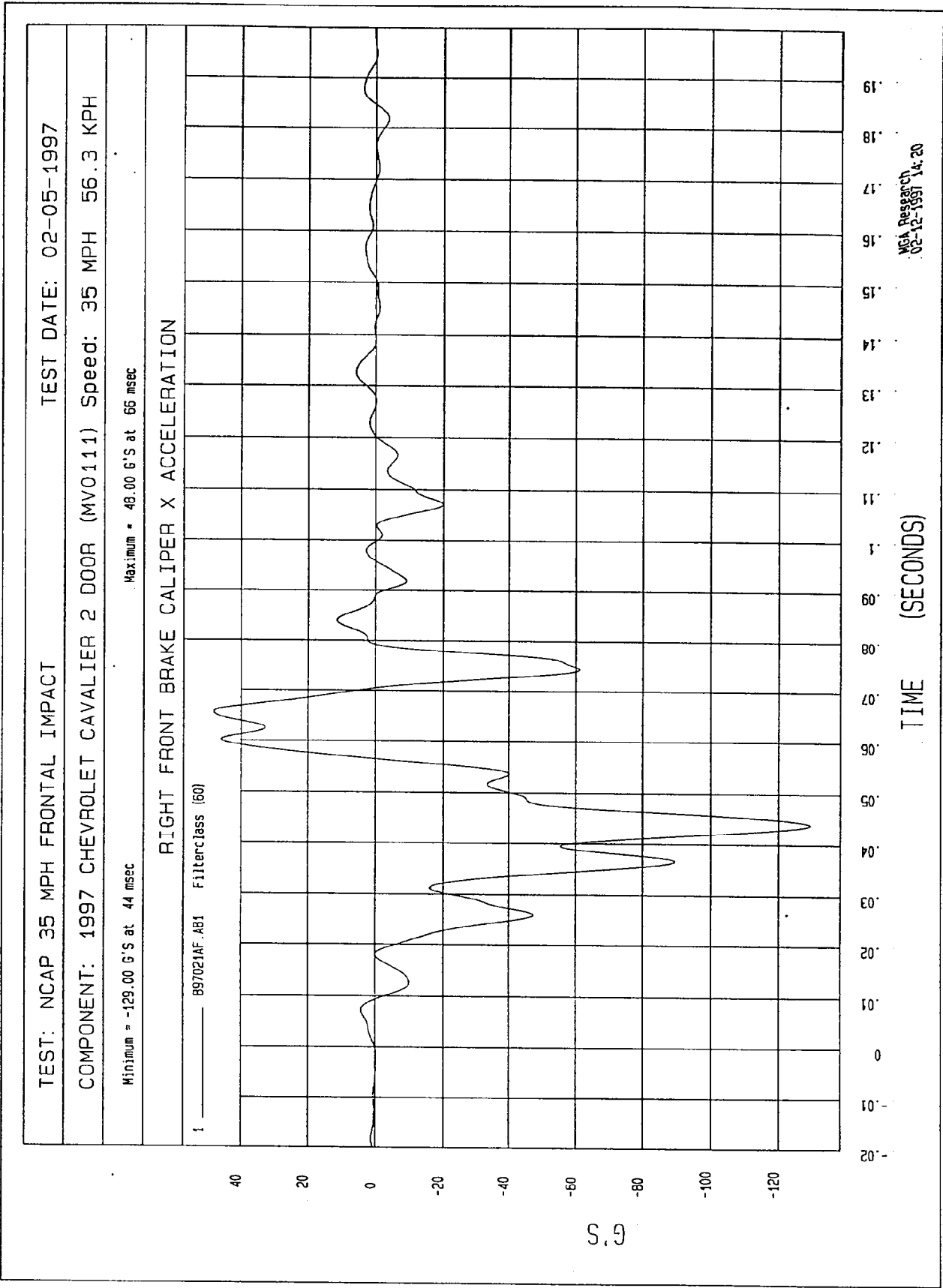
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec

Maximum = 959.21 MM at 81 msec

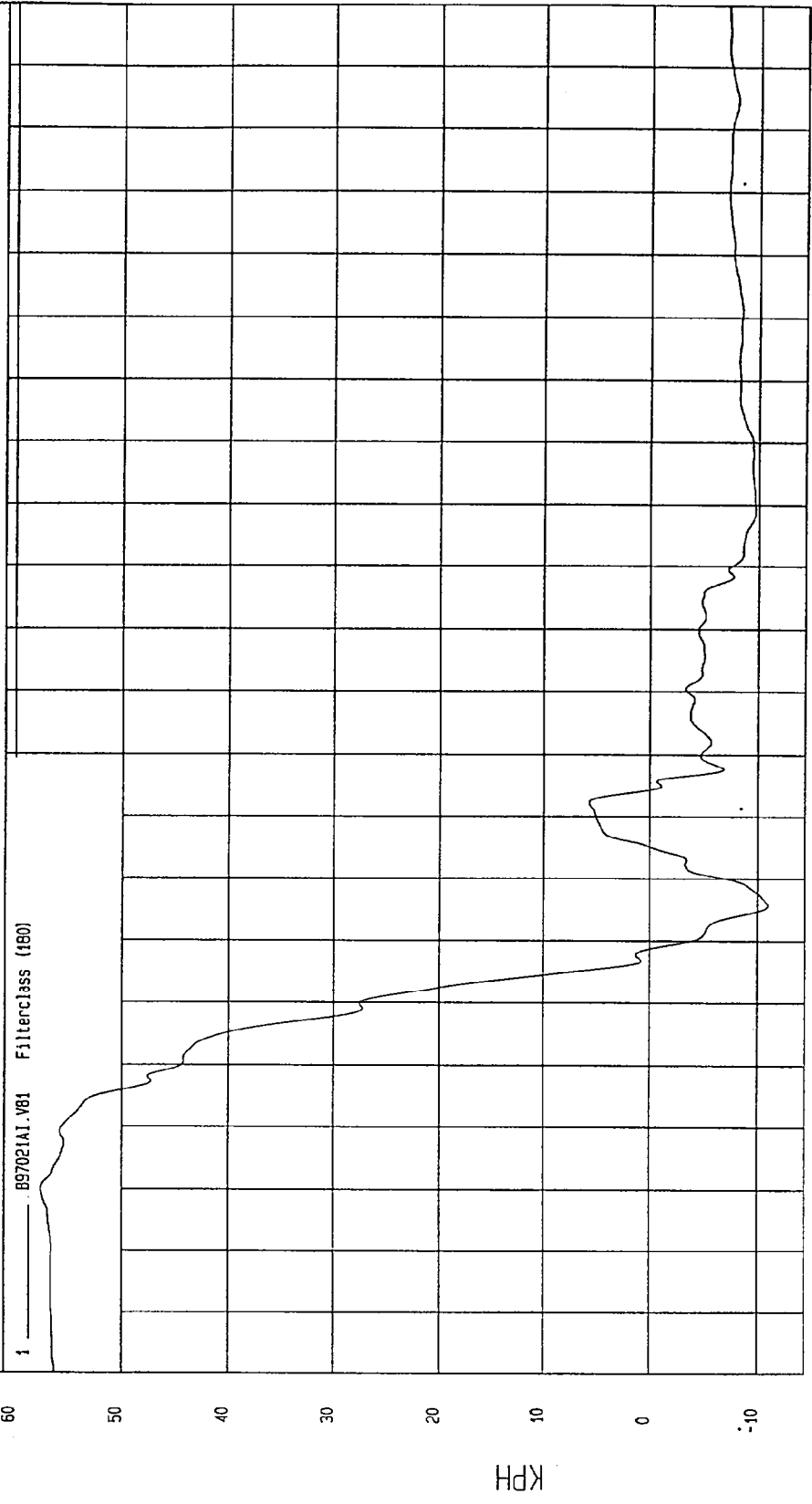
LEFT FRONT BRAKE CALIPER X DISPLACEMENT





TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH
Minimum = -11.00 KPH at 56 msec Maximum = 57.56 KPH at 10 msec

RIGHT FRONT BRAKE CALIPER X VELOCITY



1 B97021A1.V81 Filterclass (180)

TIME Seconds

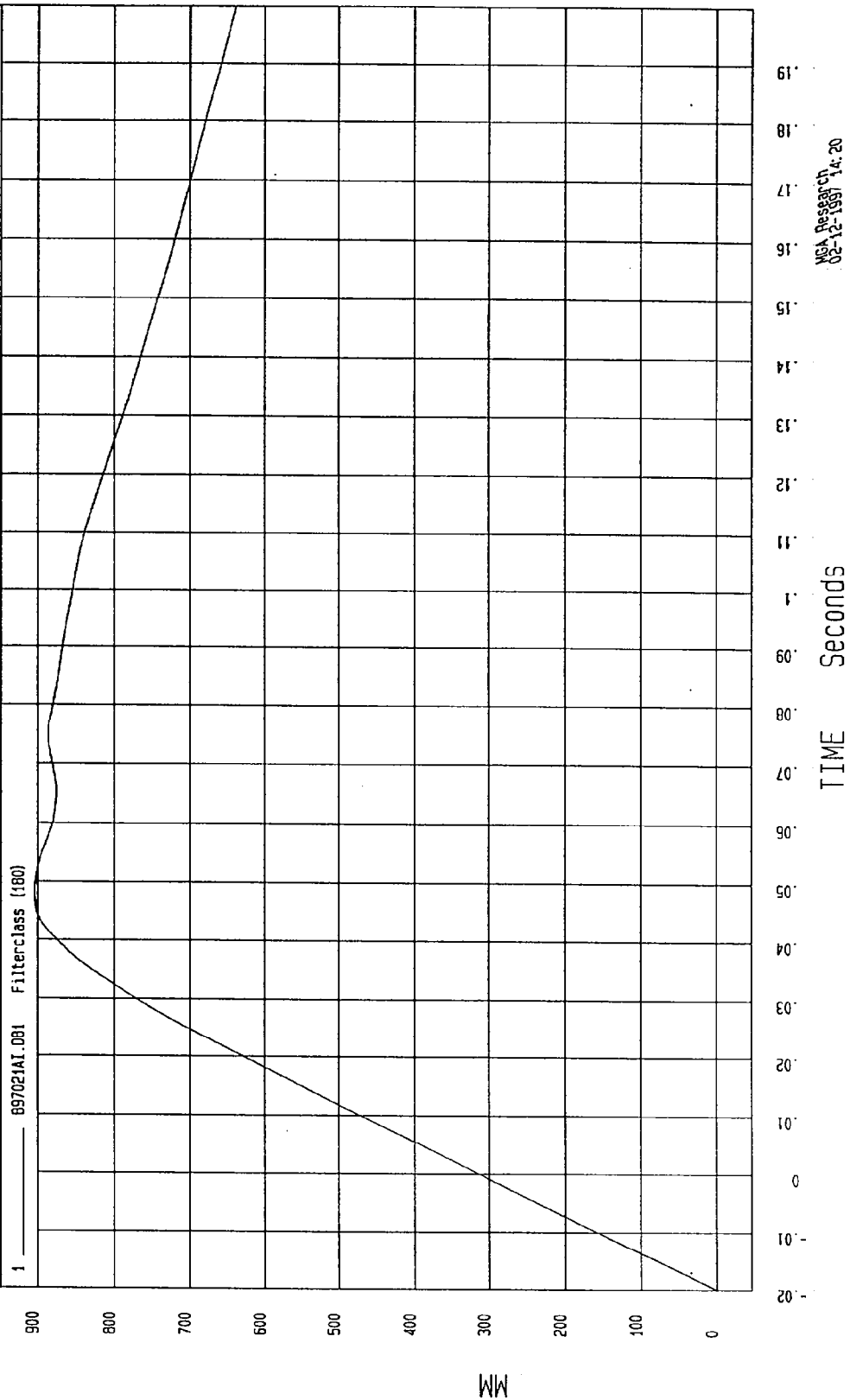
MGA Research
02-12-1997 14:20

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 0 MM at -20 msec Maximum = 903.81 MM at 49 msec

RIGHT FRONT BRAKE CALIPER X DISPLACEMENT

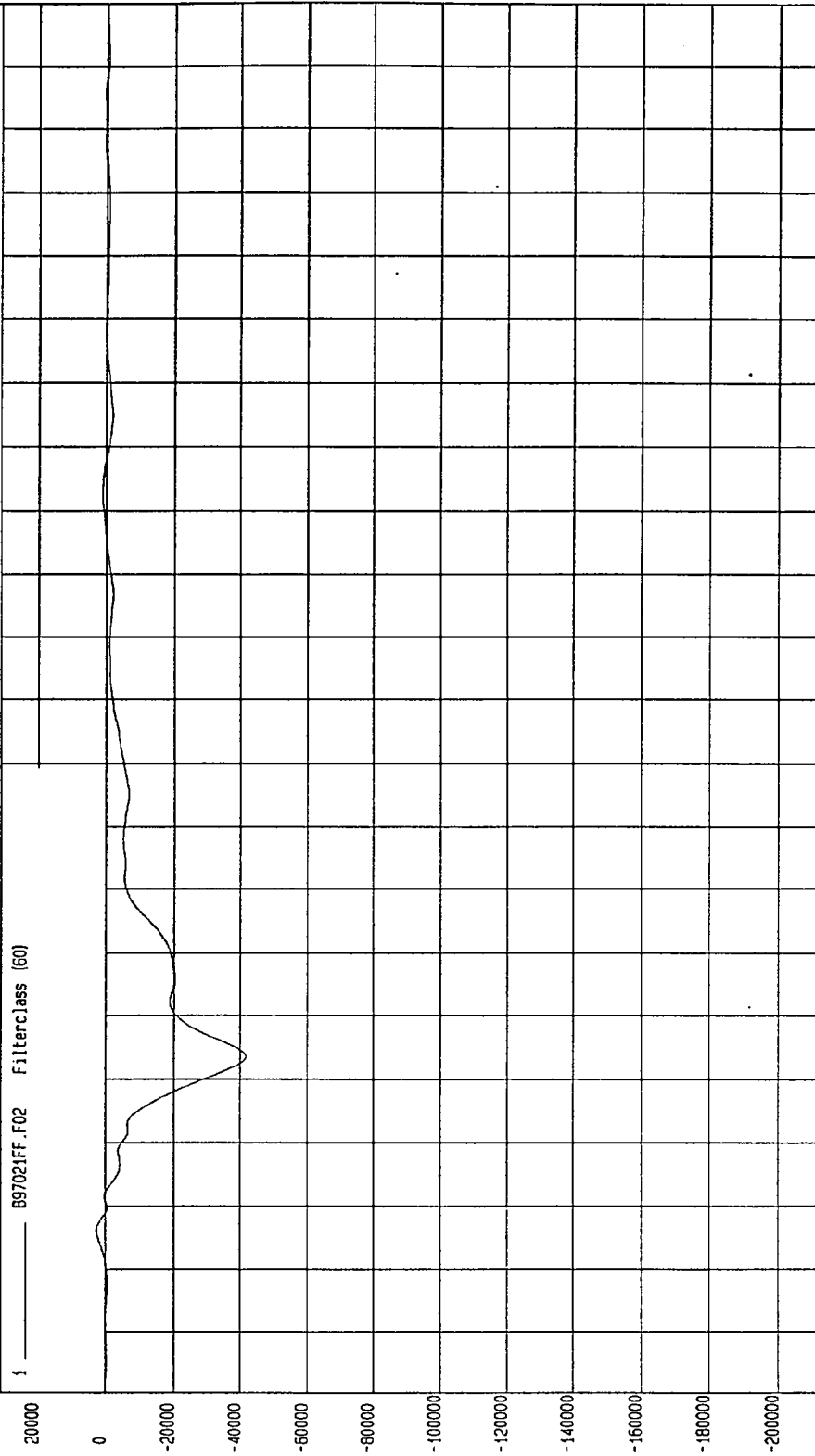


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -41654.37 N at 34 msec Maximum = 2749.07 N at 6 msec

UPPER LEFT BARRIER FORCE

1 897021FF.F02 Filterclass (60)



TIME (SECONDS)

NGA Research
02-12-1997 14:21

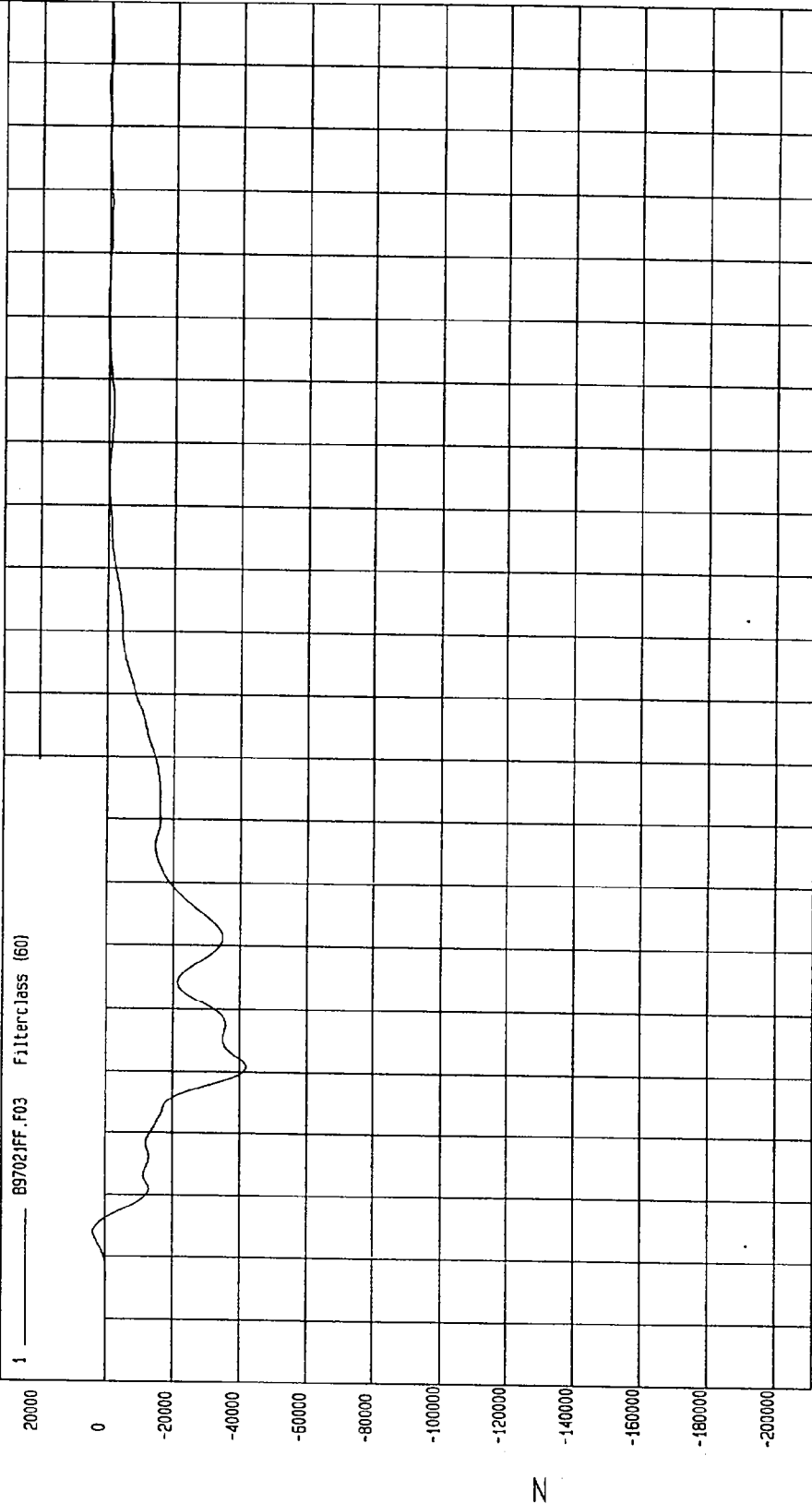
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -41926.46 N at 31 msec Maximum = 3620.26 N at 4 msec

UPPER CENTER BARRIER FORCE

1 ——— 897021FF.F03 Filterclass (60)



NGA Research
02-12-1997 14:21

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -74554.52 N at 34 msec

Maximum = 3865.60 N at 6 msec

UPPER RIGHT BARRIER FORCE

1 ——— B97021FF.F04 Filterclass (60)

20000
0
-20000
-40000
-60000
-80000
-100000
-120000
-140000
-160000
-180000
-200000

N

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

TIME (SECONDS)

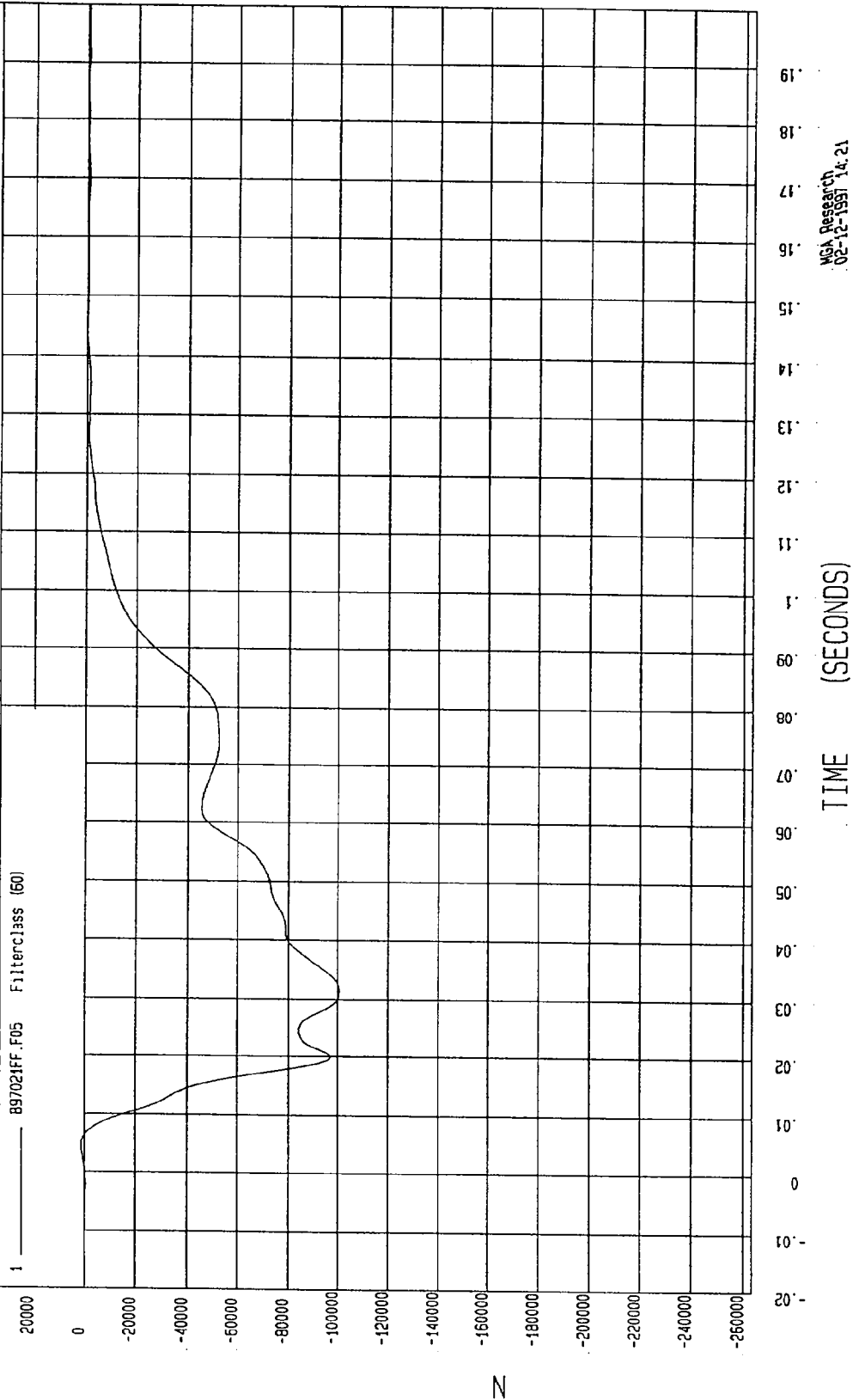
MCA Research
02-12-1997 14:21

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -100808.6 N at 31 msec Maximum = 1328.16 N at 4 msec

LOWER LEFT BARRIER FORCE



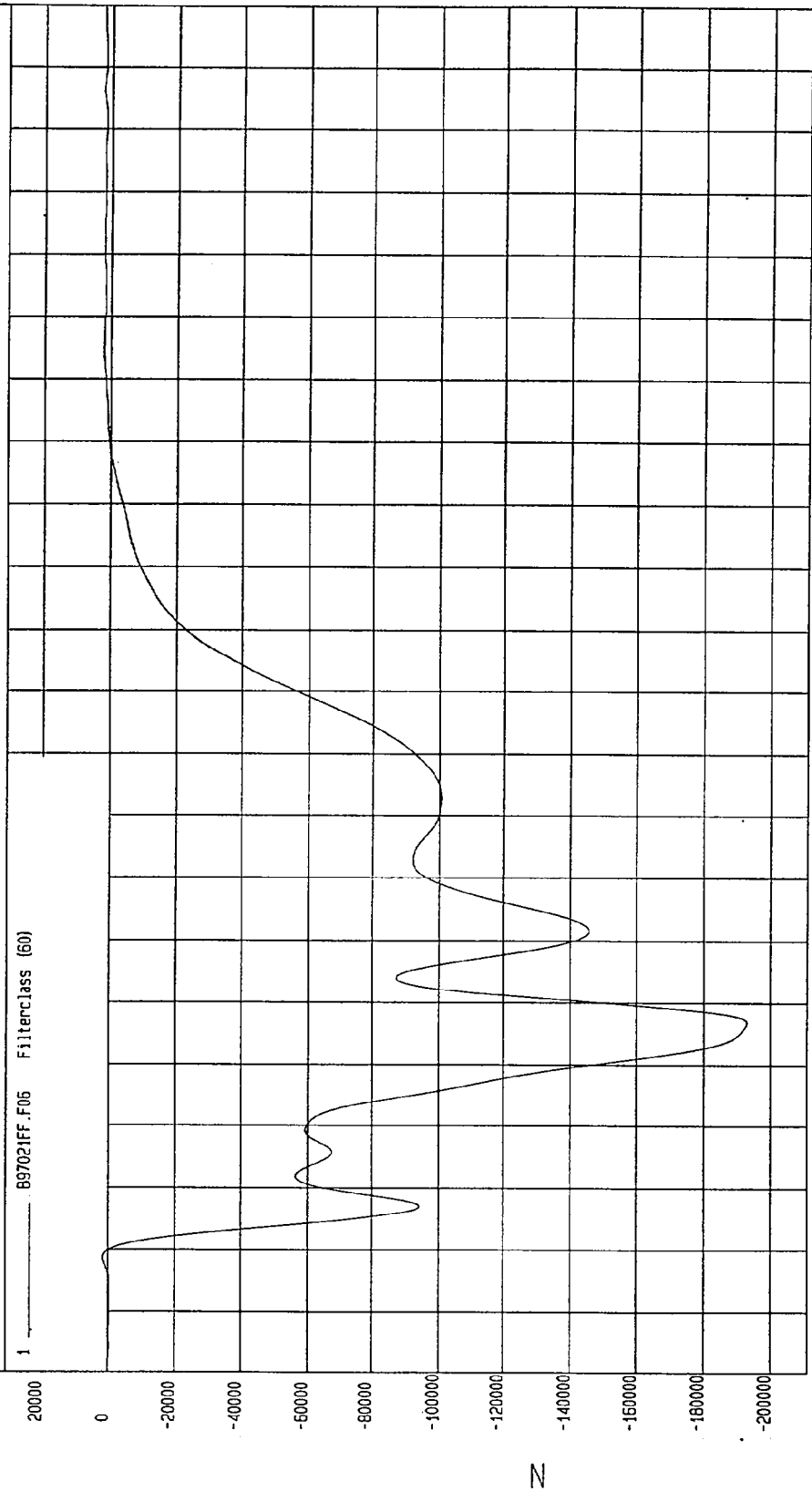
MSA Research
02-12-1997 14:21

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -193119.5 N at 37 msec Maximum = 2443.78 N at 185 msec

LOWER CENTER BARRIER FORCE



TIME (SECONDS)

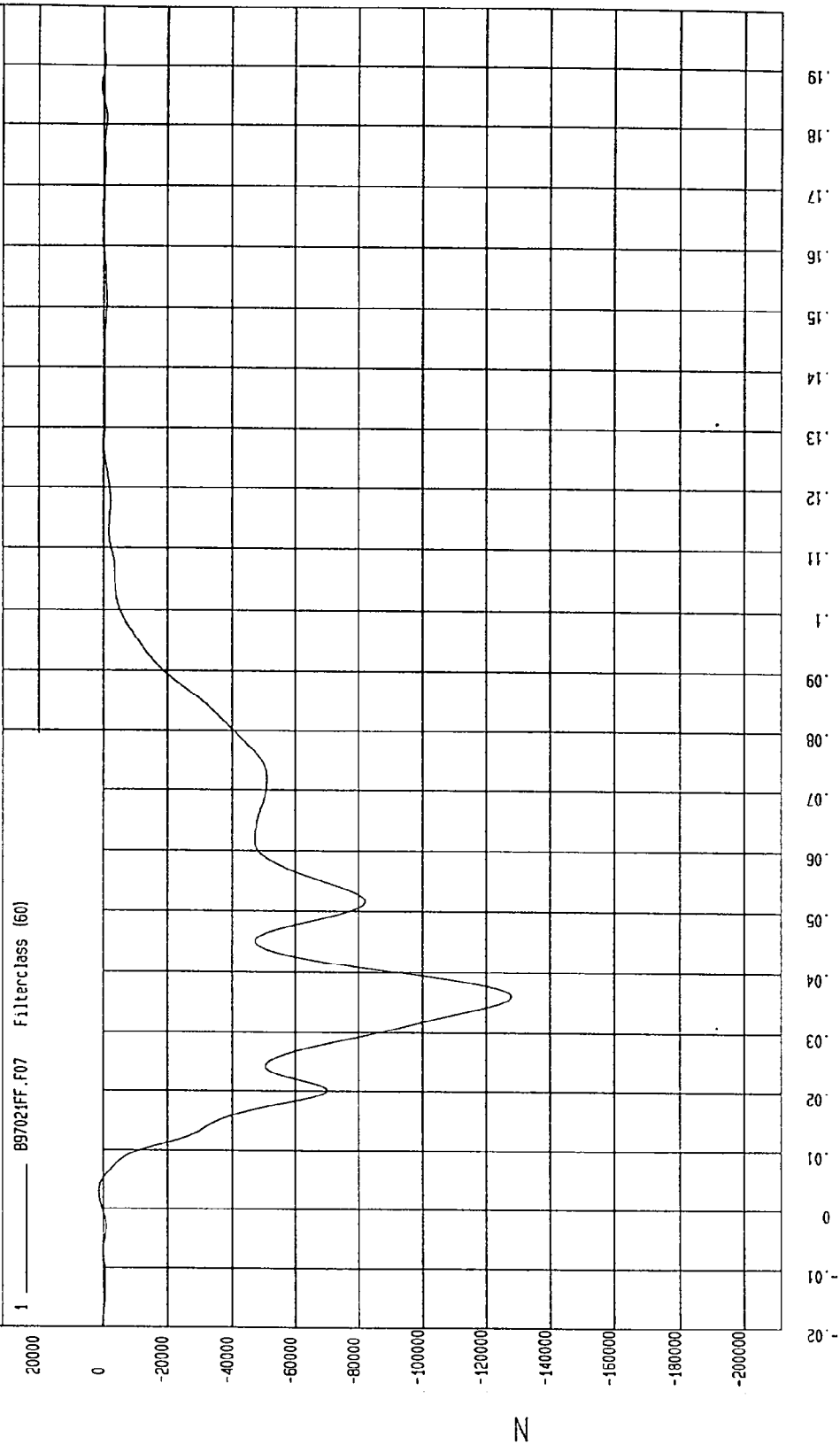
MOA Research
02-12-1997 14: 21

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -127889.2 N at 36 msec Maximum = 1443.93 N at 3 msec

LOWER RIGHT BARRIER FORCE



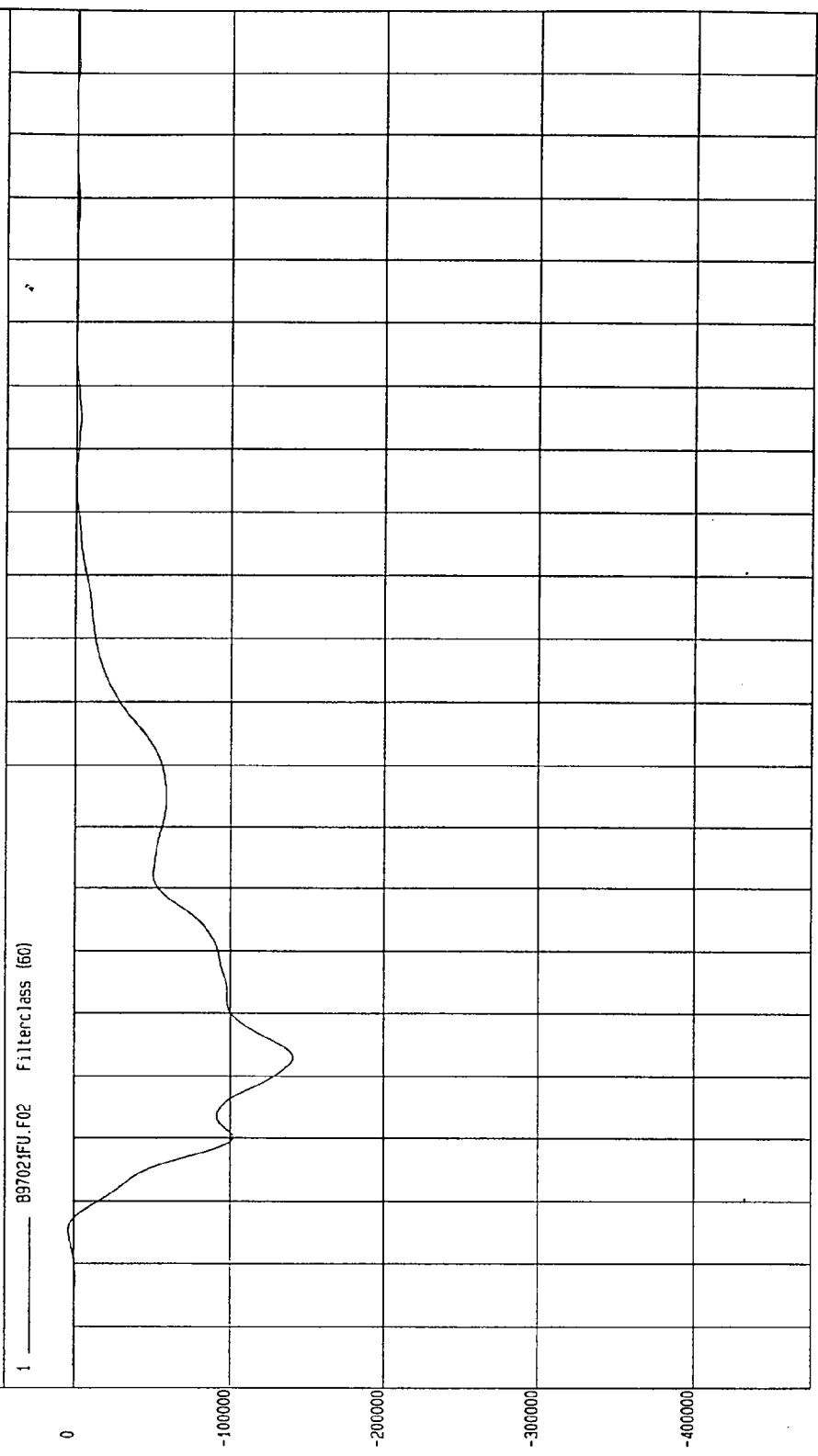
MCA Research
02-12-1997 14: 21

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -140744.8 N at 33 msec Maximum = 3687.73 N at 5 msec

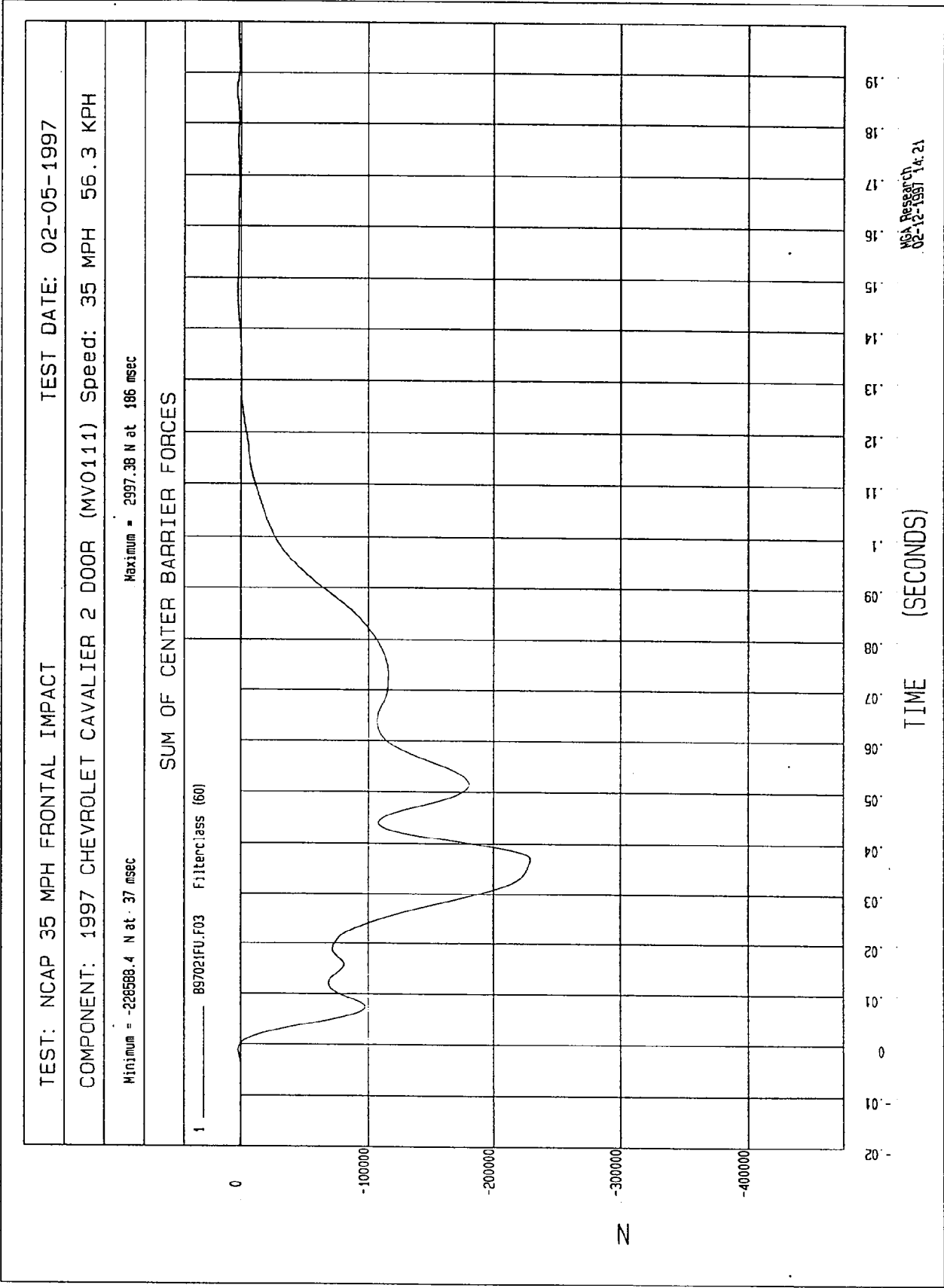
SUM OF LEFT BARRIER FORCES



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

NGA Research
02-12-1997 14:21



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

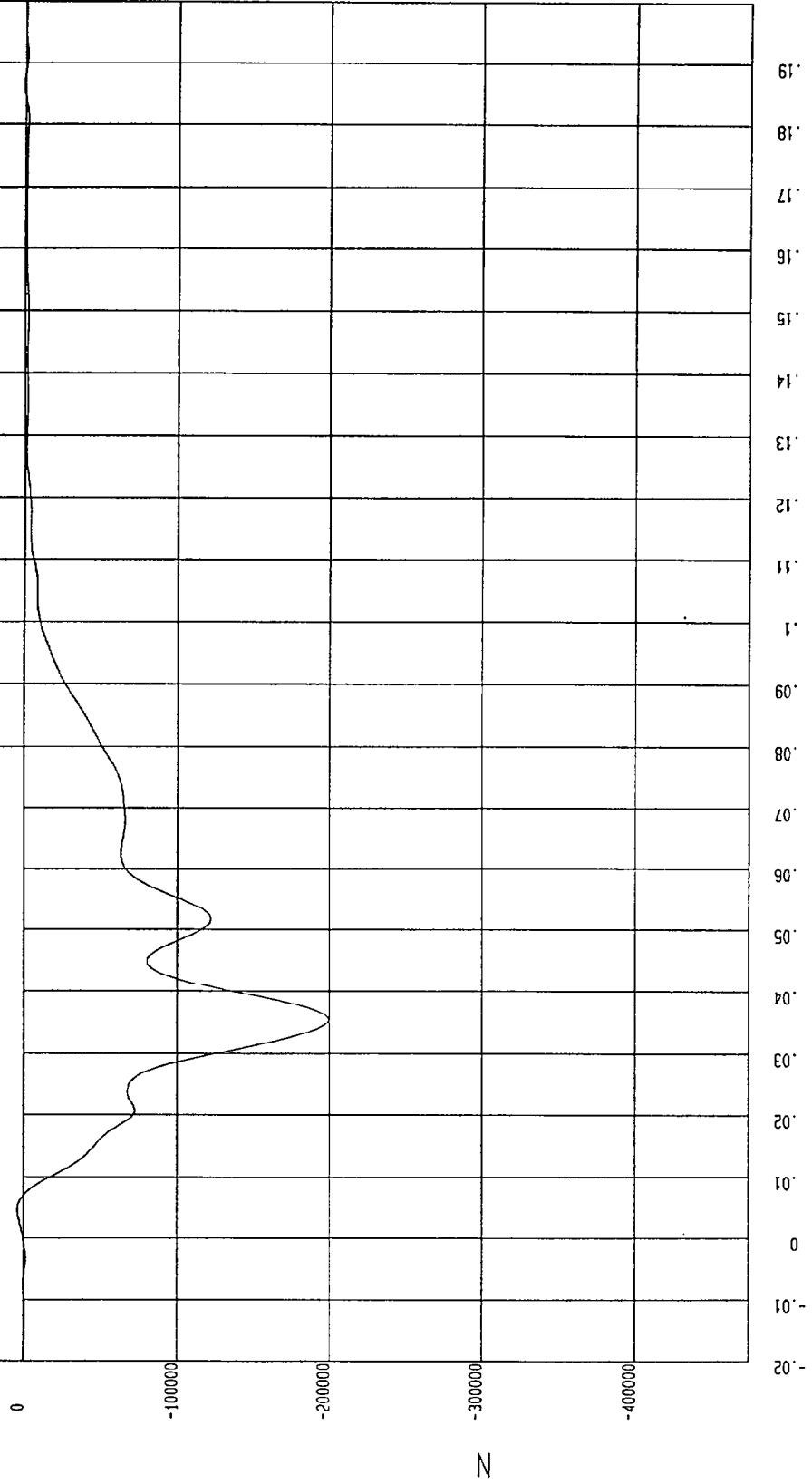
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -199569.2 N at 35 msec

Maximum = 4097.94 N at 5 msec

SUM OF RIGHT BARRIER FORCES

1 ——— 897021FU.F04 Filterclass (60)



NSA Research
02-12-1997 14:22

TEST: NCAP 35 MPH FRONTAL IMPACT

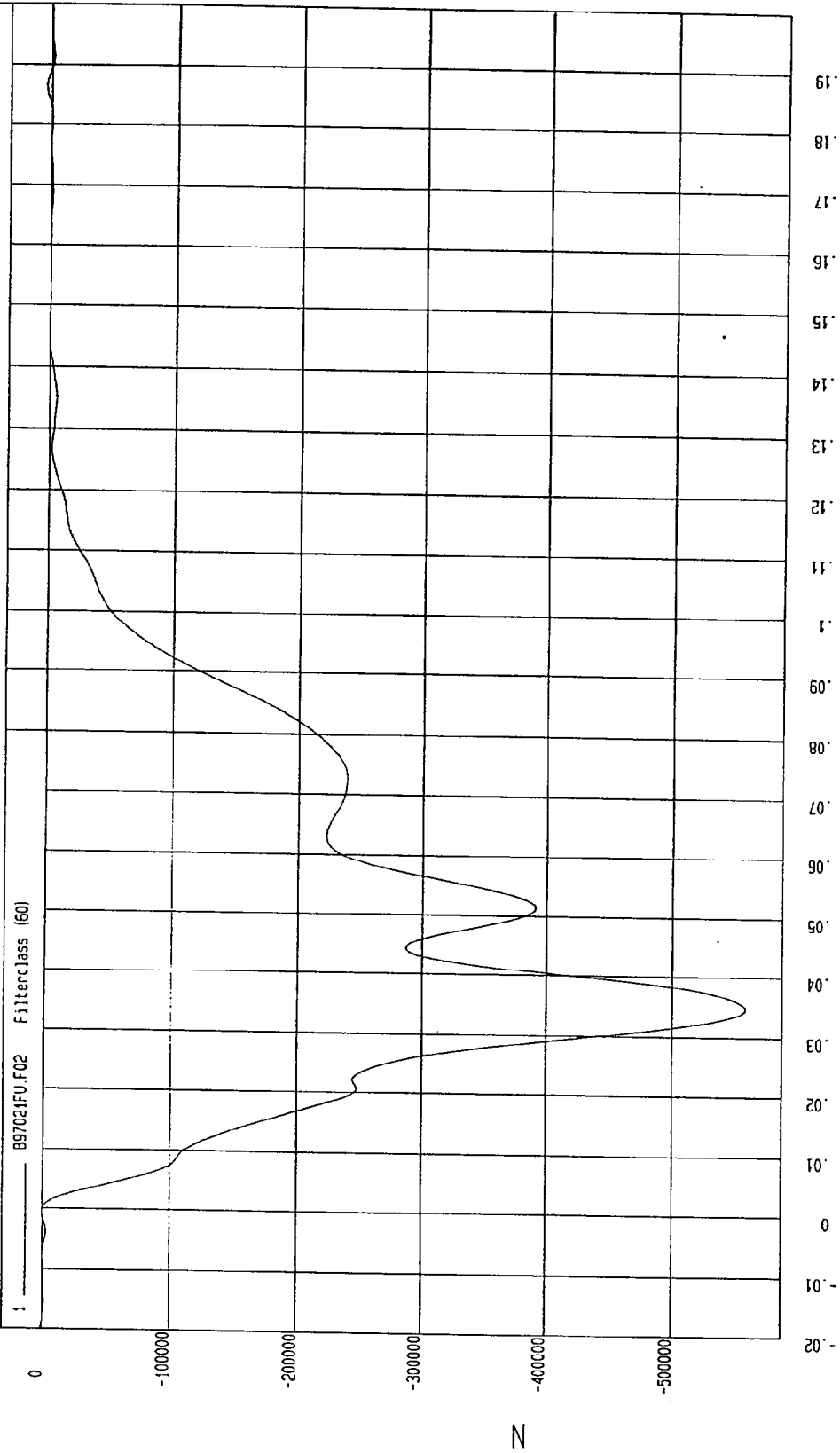
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -557524.7 N at 35 msec

Maximum = 4143.82 N at 186 msec

SUM OF BARRIER FORCES



MSA Research
02-12-1997 14:22

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -66.68 G'S at 77 msec

Maximum = 8.46 G'S at 184 msec

DRIVER HEAD X ACCELERATION

1 ——— B97021AF.A12 Filterclass (1000)

20

0

-20

-40

-60

G'S

-0.02

-0.01

0

0.01

0.02

0.03

0.04

0.05

0.06

0.07

0.08

0.09

0.1

0.11

0.12

0.13

0.14

0.15

0.16

0.17

0.18

0.19

TIME (SECONDS)

MCA Research
02-12-1997 14:05

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -2.68 G'S at 194 msec Maximum = 17.42 G'S at 84 msec

DRIVER HEAD Y ACCELERATION

1 ——— 897021AF.A13 Filterclass (1000)

20

0

-20

-40

-60

G

TIME (SECONDS)

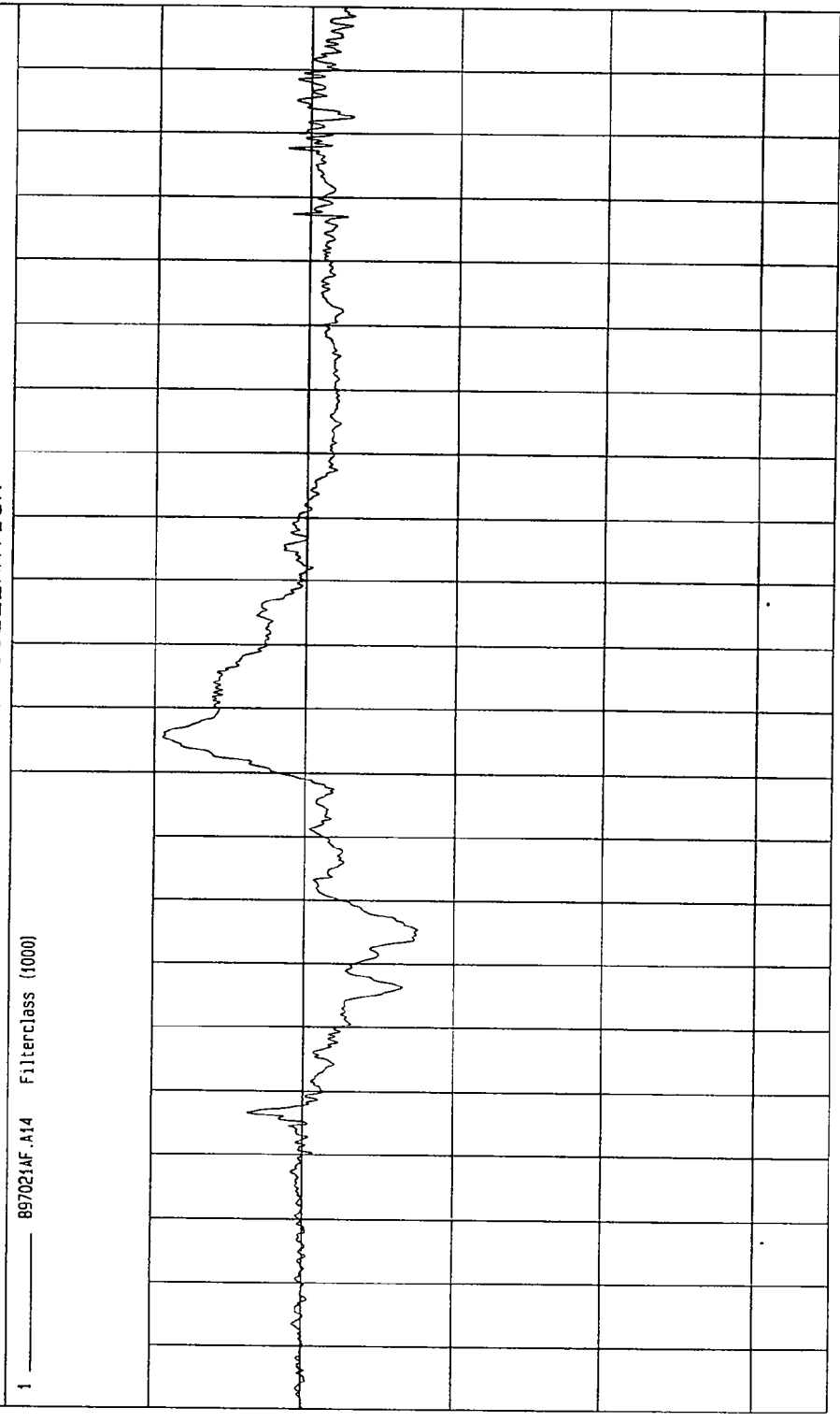
MCA Research
02-12-1997 14:05

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -15.22 G'S at 55 msec Maximum = 18.97 G'S at 86 msec

DRIVER HEAD Z ACCELERATION

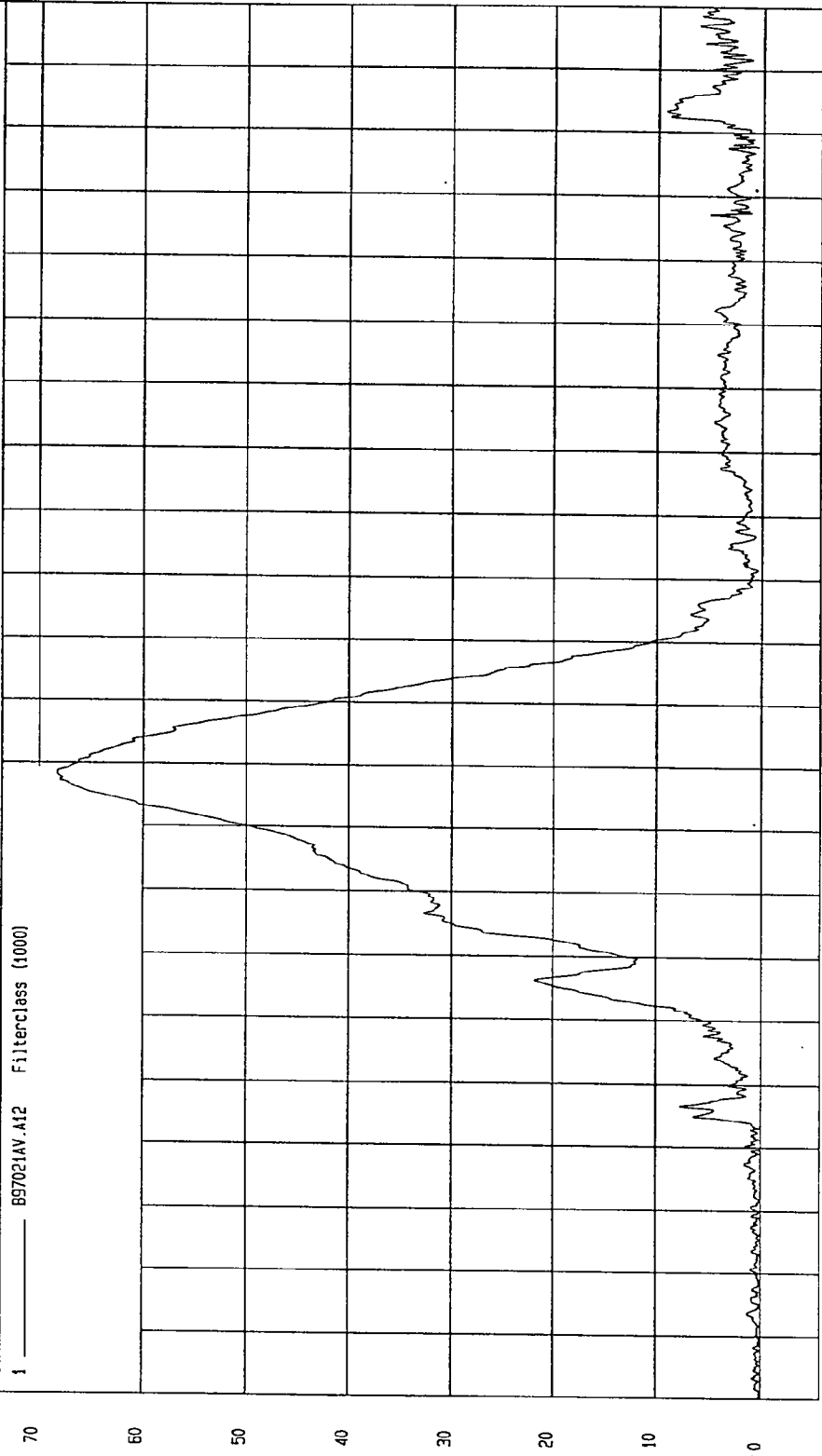


TIME (SECONDS)

MSA Research
02-12-1997 14:05

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = 3.22E-02 G'S at 20 msec Maximum = 58.29 G'S at 79 msec

DRIVER HEAD RESULTANT ACCELERATION



TIME (SECONDS)

MECA Research
02-12-1997 14:05

TEST: NCAP 35 MPH FRONTAL IMPACT

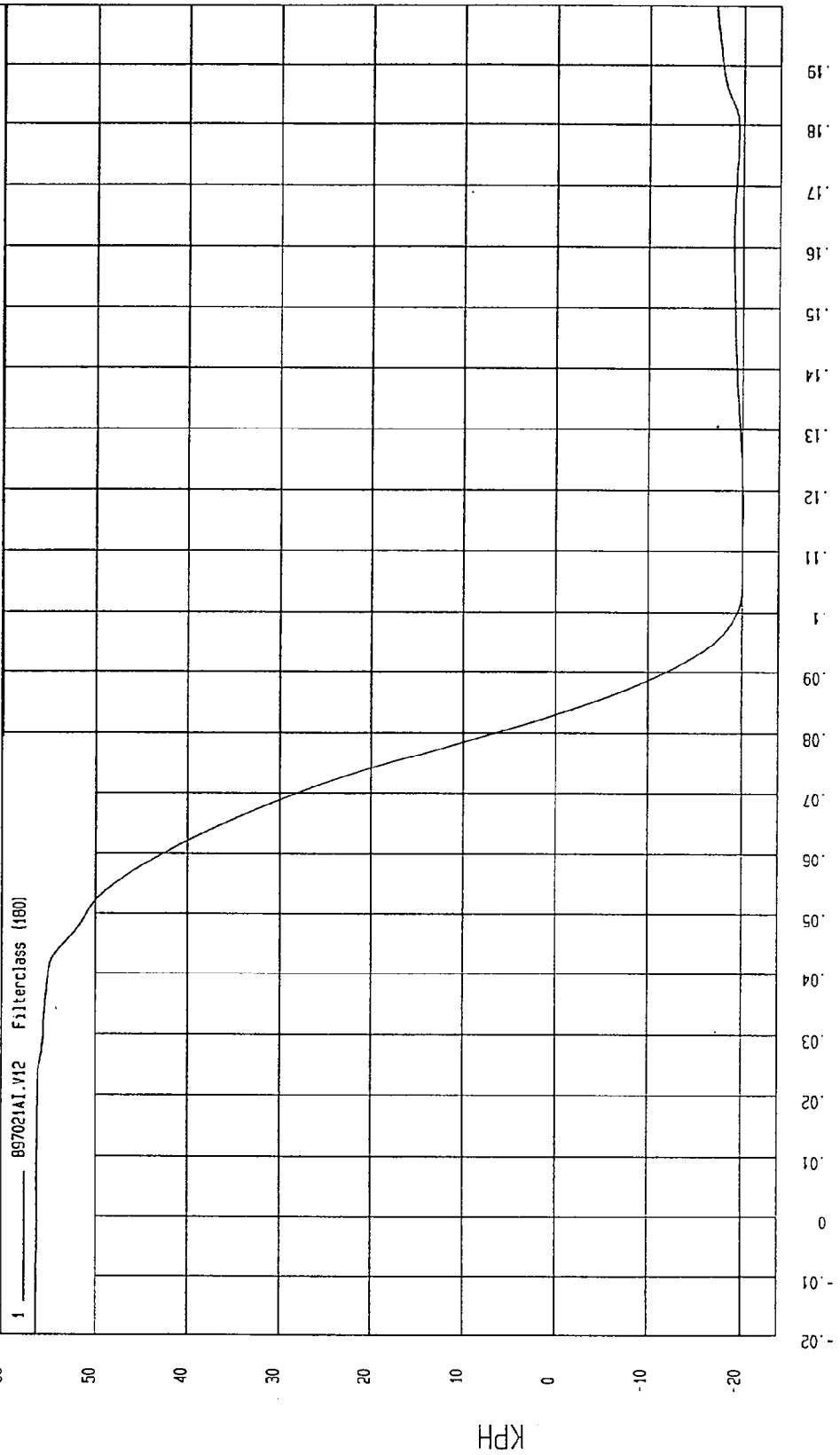
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -20.17 KPH at 117 msec

Maximum = 56.3 KPH at -20 msec

DRIVER HEAD X VELOCITY



MOA Research
02-12-1997 14:16

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -67.81 G'S at .77 msec

Maximum = 8.35 G'S at 184 msec

DRIVER HEAD REDUNDANT X ACCELERATION

1 ——— B97021AF.A32 Filterclass (1000)

20

0

-20

-40

-60

G

-20

-10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

TIME (SECONDS)

MSA Research
02-12-1997 14:08

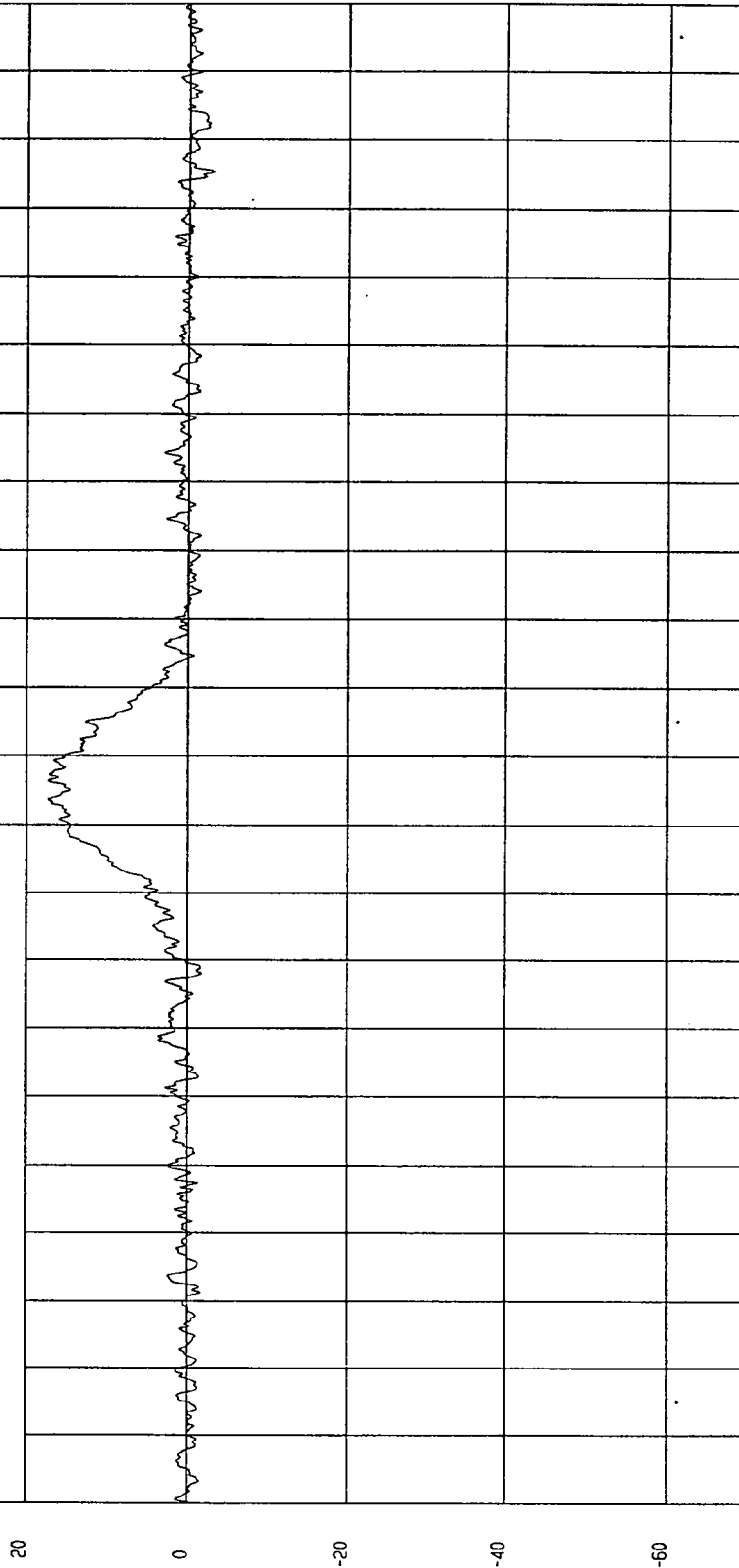
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -3.07 G'S at 175 msec Maximum = 17.29 G'S at 84 msec

DRIVER HEAD REDUNDANT Y ACCELERATION

1 B97021AF.A33 Filterclass (1000)

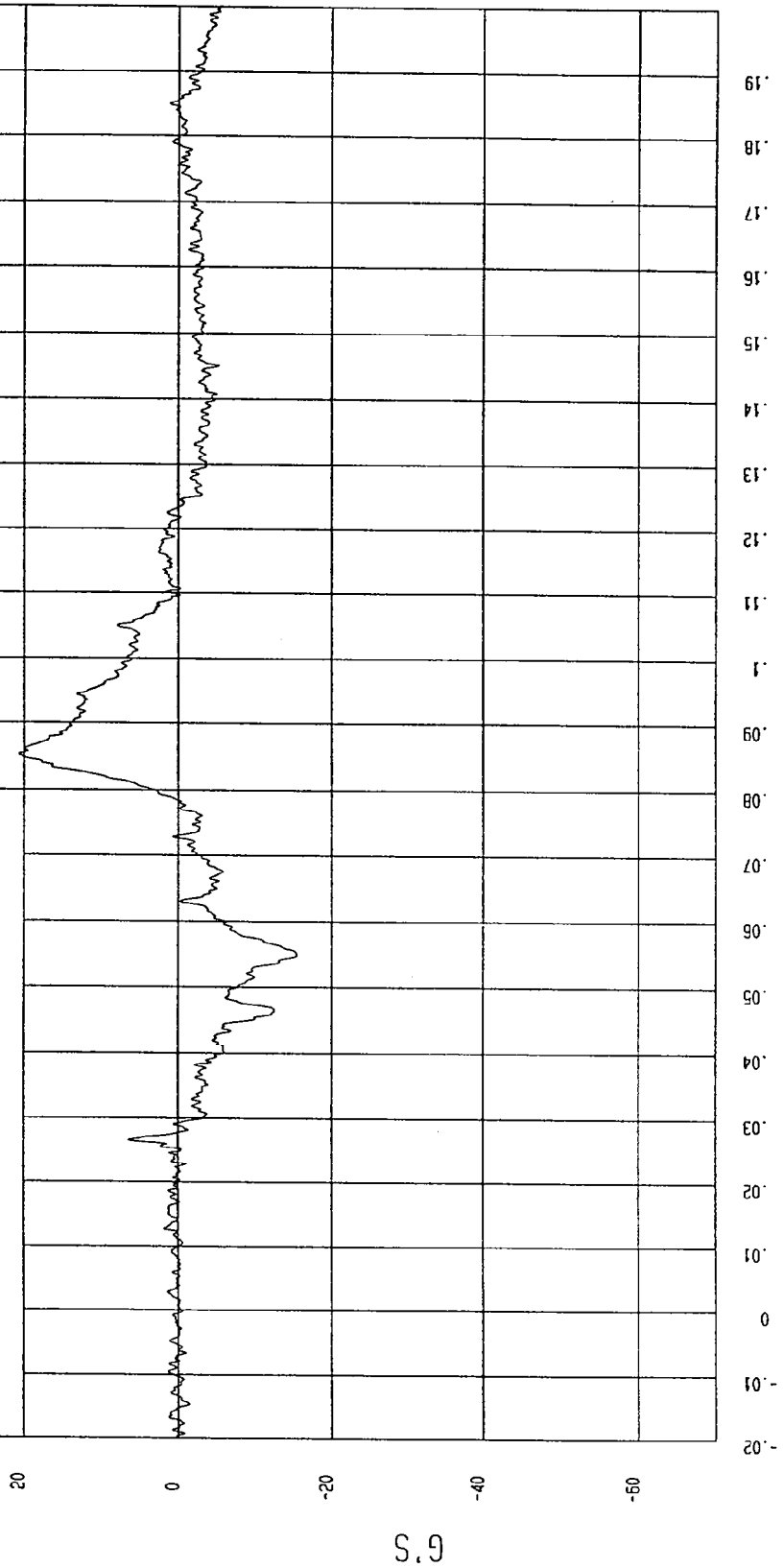


MSA Research
02-12-1997 14:09

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -15.51 G's at 55 msec Maximum = 20.59 G's at 85 msec

DRIVER HEAD REDUNDANT Z ACCELERATION

1 _____ B97021AF.A34 Filterclass (1000)



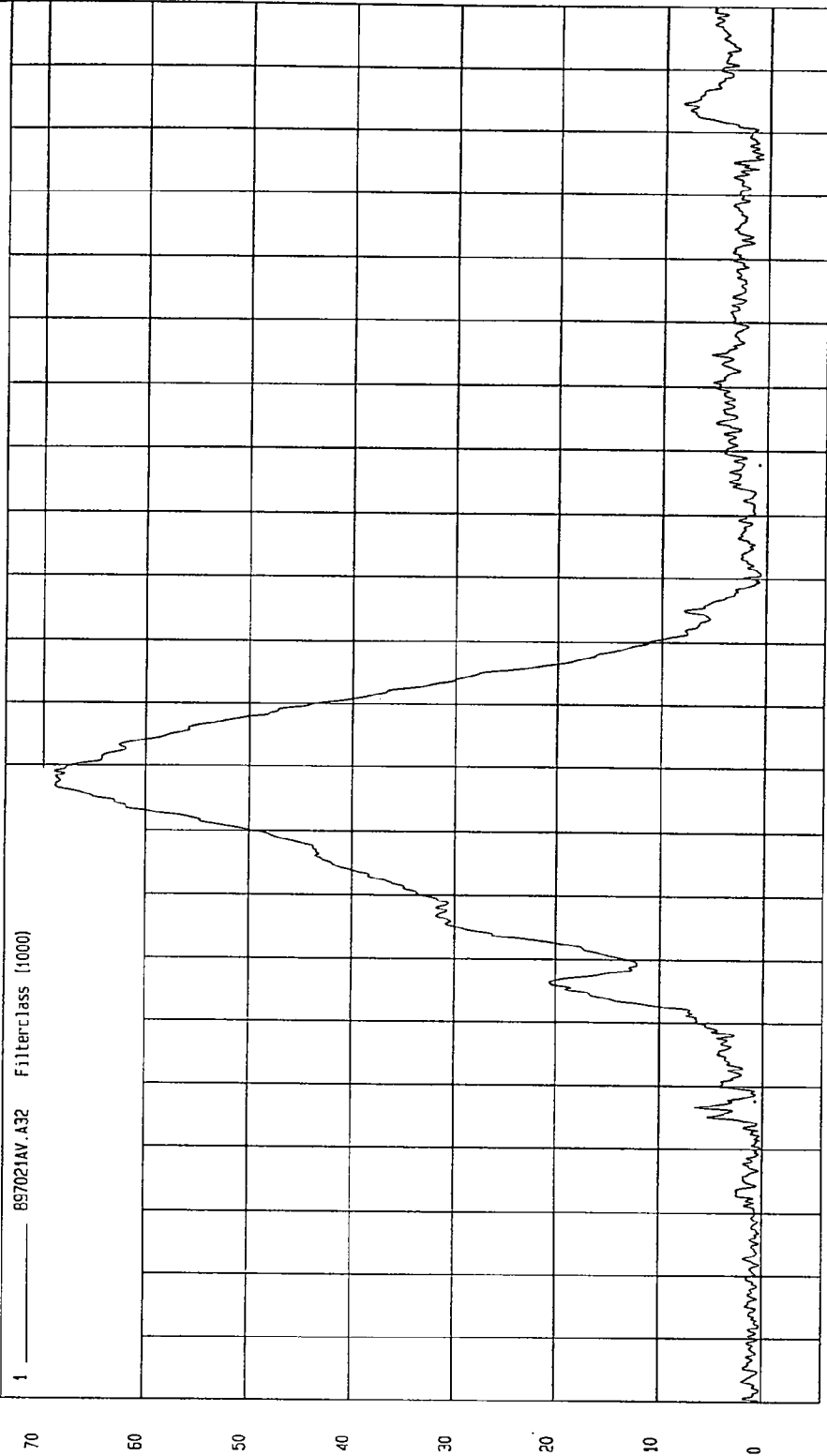
NSA Research
02-12-1997 14:09

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = .19 G'S at -18 msec Maximum = 68.96 G'S at 79 msec

DRIVER HEAD REDUNDANT RESULTANT ACCELERATION



TIME (SECONDS)

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

NCAP Research
02-12-1997 14:09

G

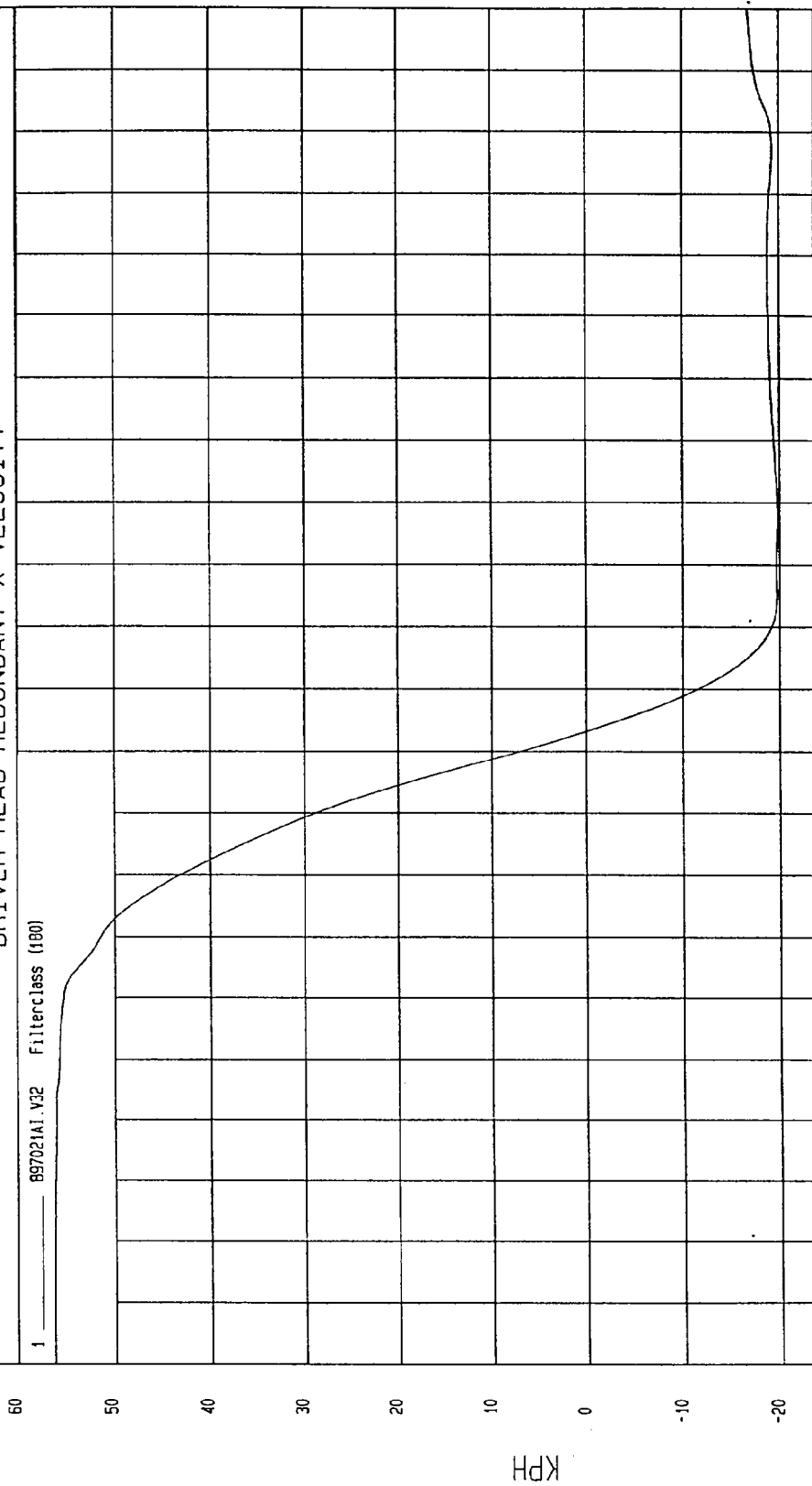
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -19.86 KPH at 118 msec Maximum = 56.30 KPH at -16 msec

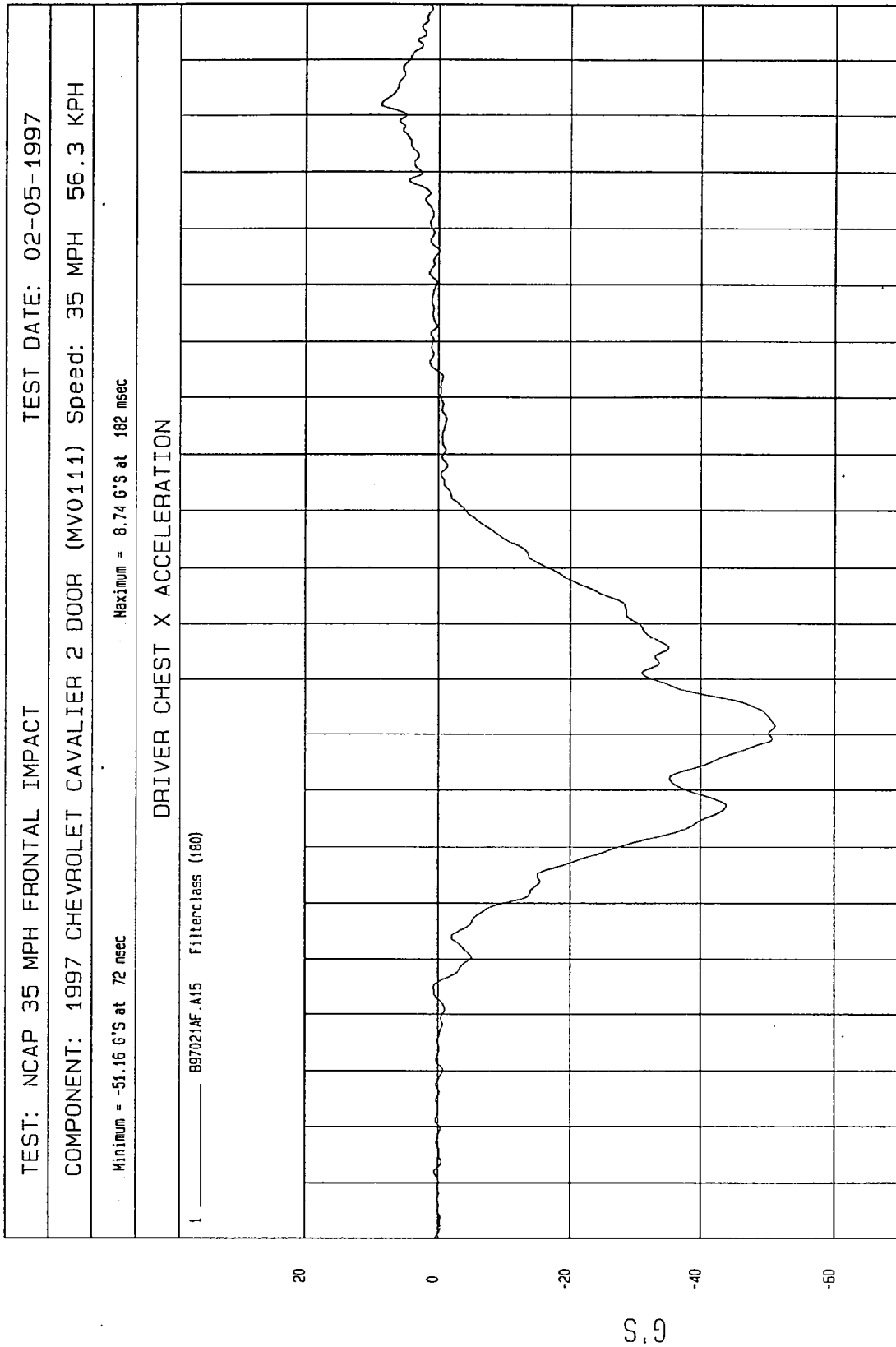
DRIVER HEAD REDUNDANT X VELOCITY

1 897021A1.V32 Filterclass (100)



MSA Research
02-12-1997 14:17

TIME Seconds



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -3.73 G'S at 48 msec

Maximum = 4.84 G'S at 65 msec

DRIVER CHEST Y ACCELERATION

1 ——— B97021AF.A16 Filterclass (180)

20

0

-20

-40

-60

S.G

20

10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

TIME (SECONDS)

MSA Research
02-12-1997 14:06

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -6.06 G'S at 49 msec

Maximum = 8.98 G'S at 83 msec

DRIVER CHEST Z ACCELERATION

1 ——— B97021AF.A17 Filterclass (180)

20

0

-20

-40

-60

G.S

-20

-10

0

10

20

30

40

50

60

70

80

TIME (SECONDS)

.19

.18

.17

.16

.15

.14

.13

.12

.11

.1

.09

.08

.07

.06

.05

.04

.03

.02

.01

MGA Research
02-12-1997 14:06

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

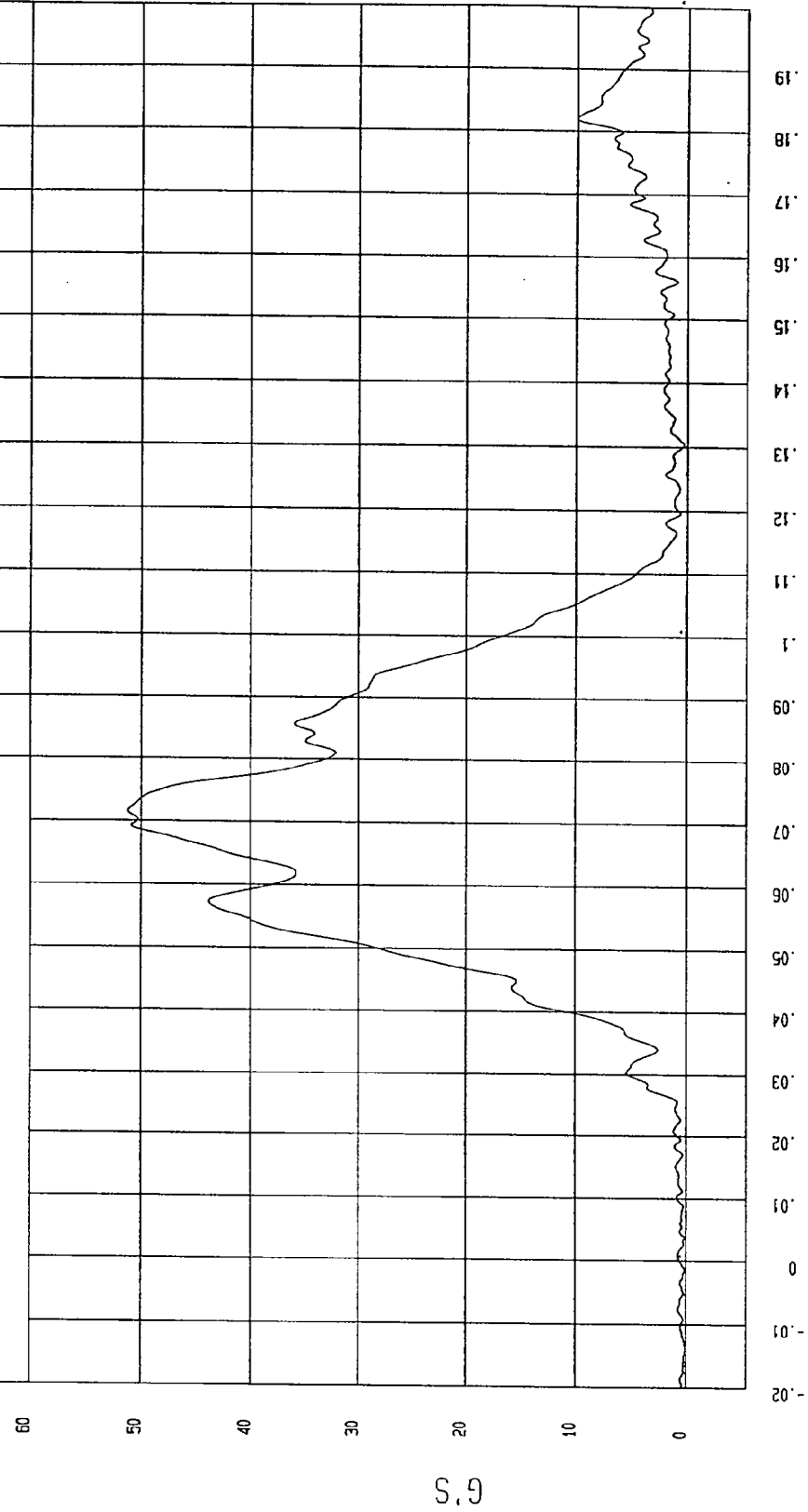
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 4.27E-02 G'S at 4 msec

Maximum = 51.20 G'S at 72 msec

DRIVER CHEST RESULTANT ACCELERATION

1 — 897021AV.A15 Filterclass (180)



MGA Research
02-12-1997 14.05

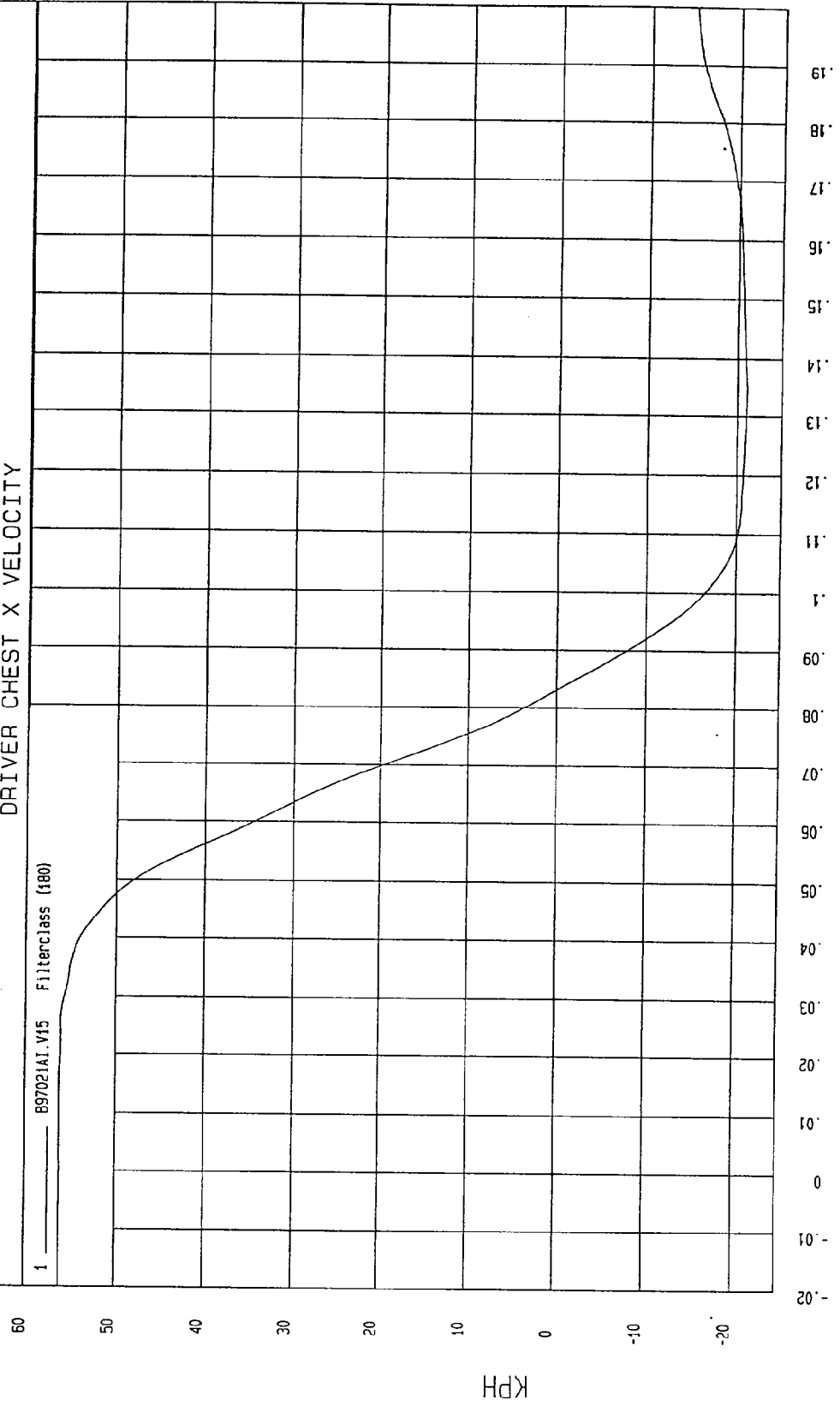
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV01111) Speed: 35 MPH 56.3 KPH

Minimum = -21.04 KPH at 135 msec Maximum = 55.31 KPH at 8 msec

DRIVER CHEST X VELOCITY

1 ——— B97021A1.V15 Filterclass (180)



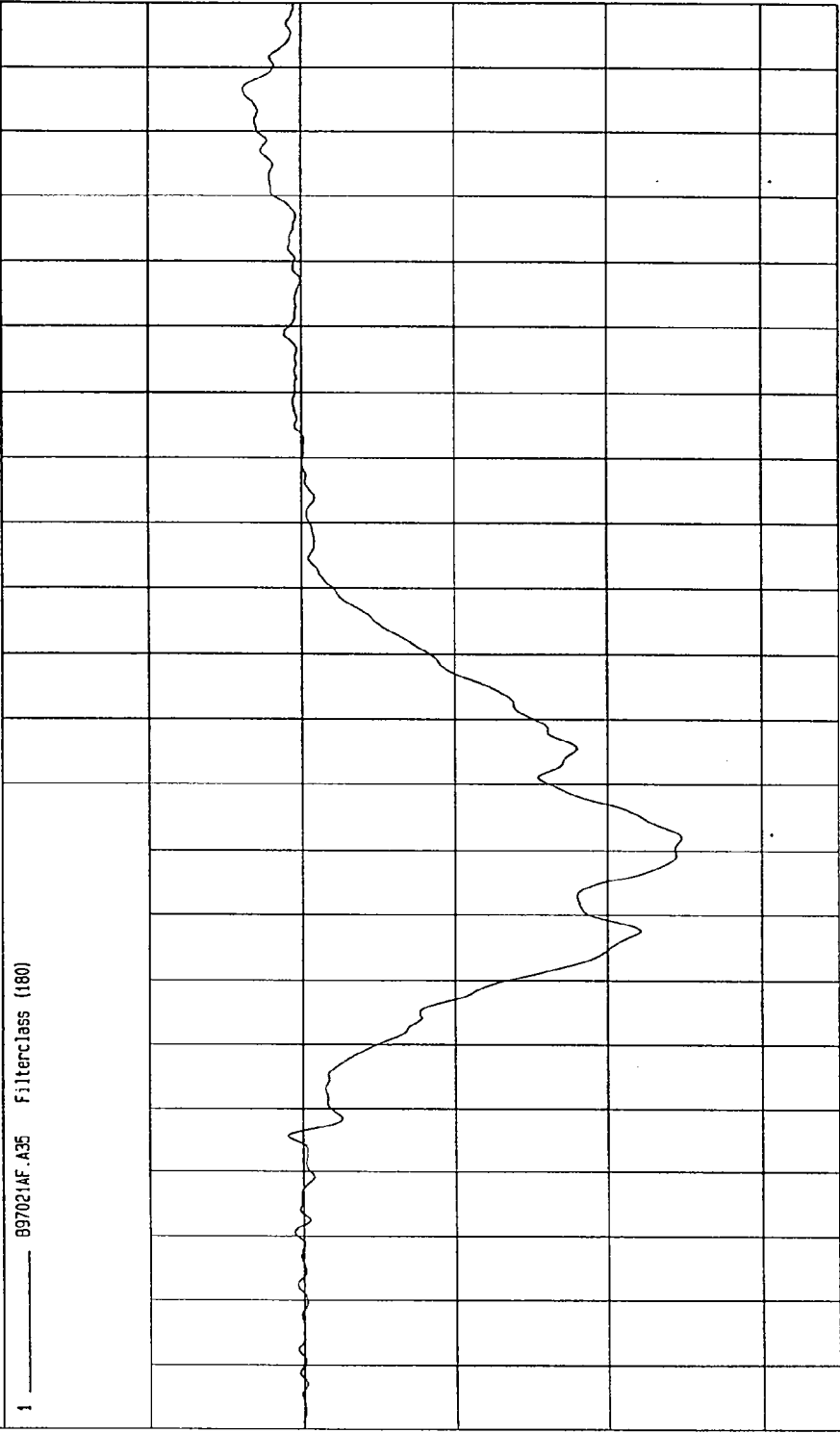
NSA Research
02-12-1997 14: 16

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV01111) Speed: 35 MPH 56.3 KPH

Minimum = -49.53 G'S at 72 msec Maximum = 7.65 G'S at 185 msec

DRIVER CHEST REDUNDANT X ACCELERATION



TIME (SECONDS)

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

NGA Research
02-12-1997 14:09

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -4.81 G'S at 50 msec

Maximum = 3.29 G'S at 65 msec

DRIVER CHEST REDUNDANT Y ACCELERATION

1 _____ B97021AF.A36 Filterclass (180)

20

0

-20

-40

-60

G

20

10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

TIME (SECONDS)

MGA Research
02-12-1997 14:09

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -8.42 G'S at 54 msec

Maximum = 8.95 G'S at 83 msec

DRIVER CHEST REDUNDANT Z ACCELERATION

1 _____ 897021AF.A37 Filterclass (180)

20

0

-20

-40

-60

G'S

.19

.18

.17

.16

.15

.14

.13

.12

.11

.1

.09

.08

.07

.06

.05

.04

.03

.02

.01

0

-.01

-.02

WCA Research
02-12-1997 14:09

TIME (SECONDS)

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

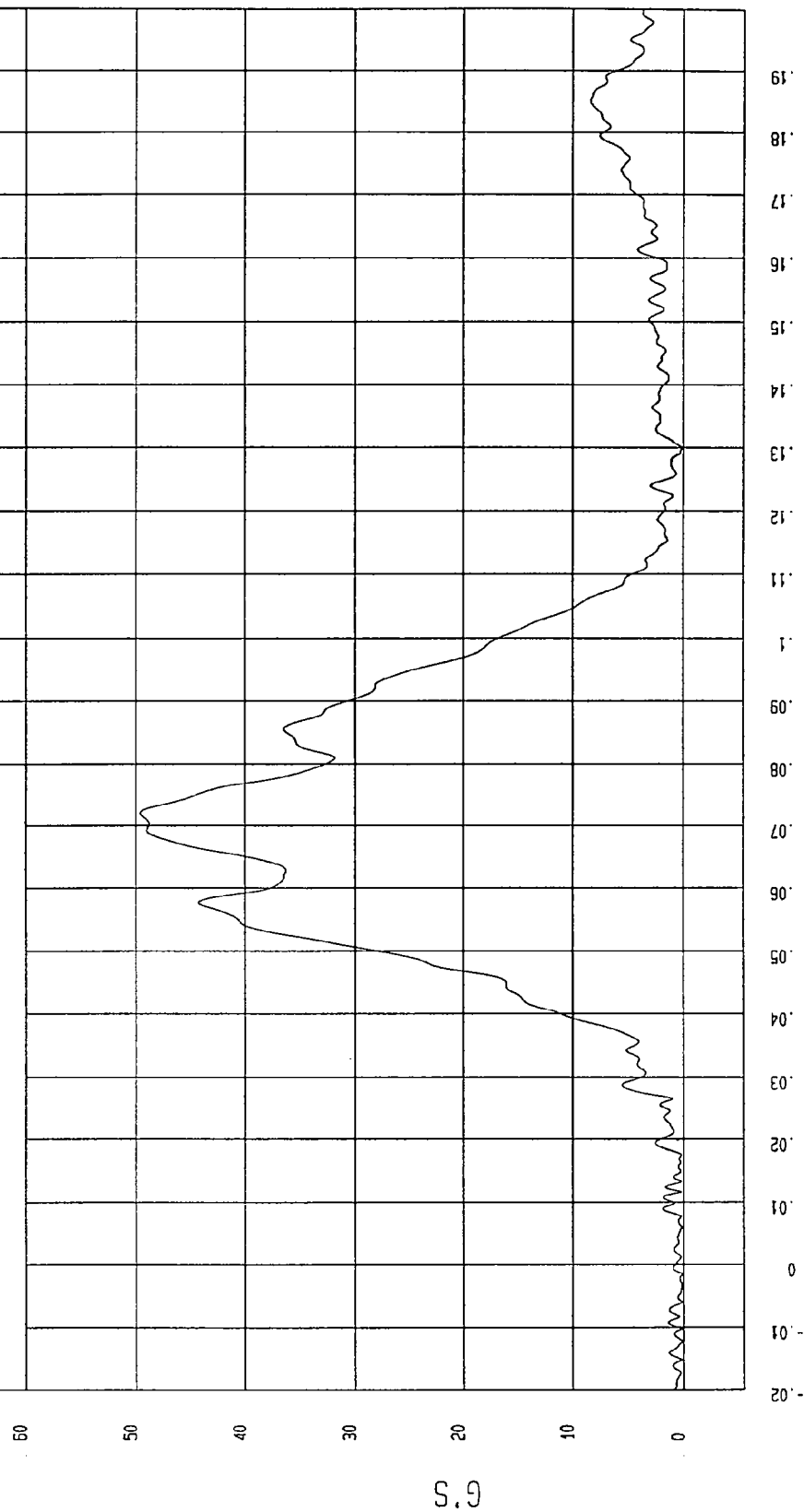
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = 6.35E-02 G's at -2 msec

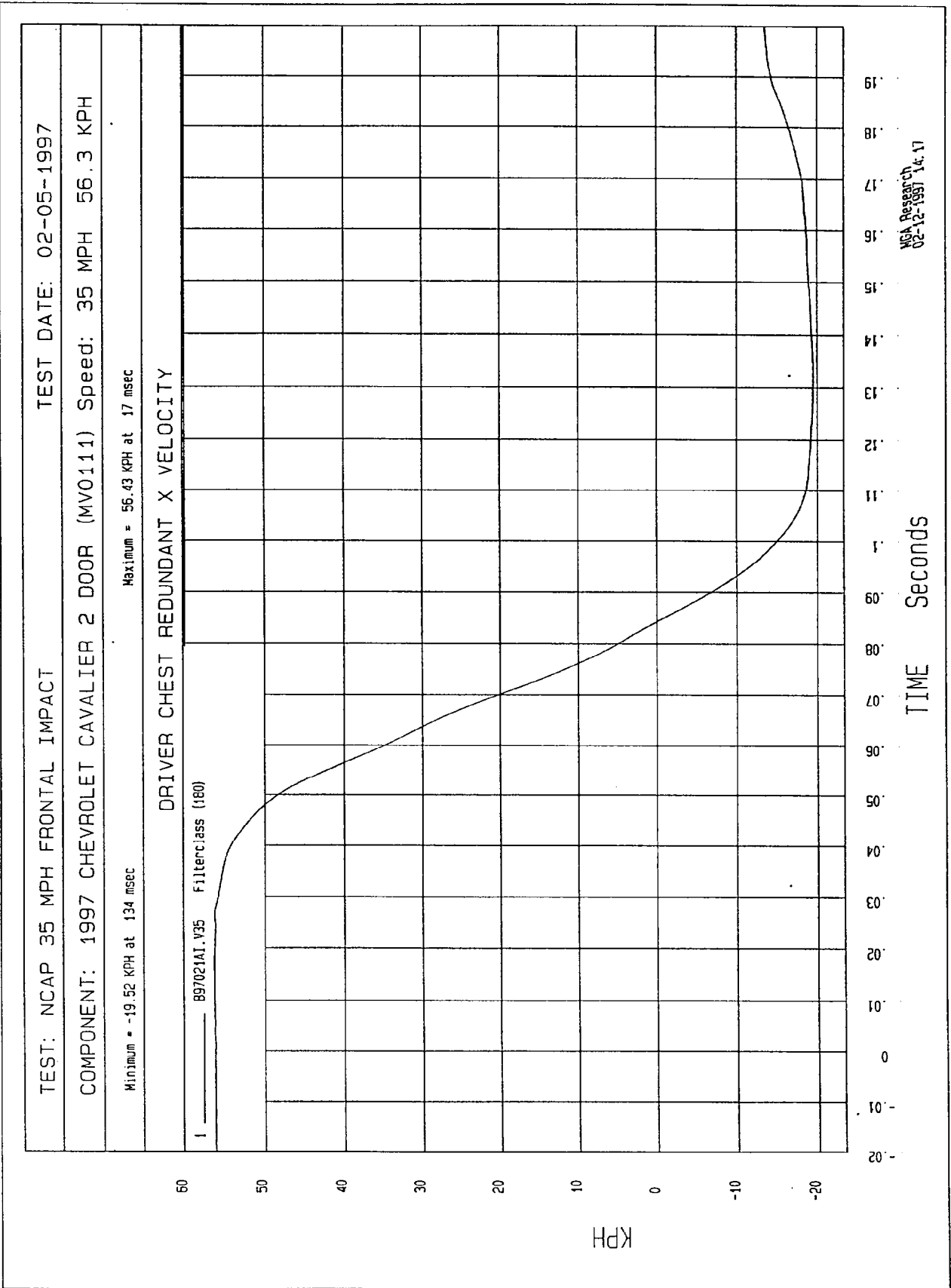
Maximum = 49.60 G's at 72 msec

DRIVER CHEST REDUNDANT RESULTANT ACCELERATION

1 097021AV.A35 Filterclass (180)



MGA Research
02-12-1997 14:09



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

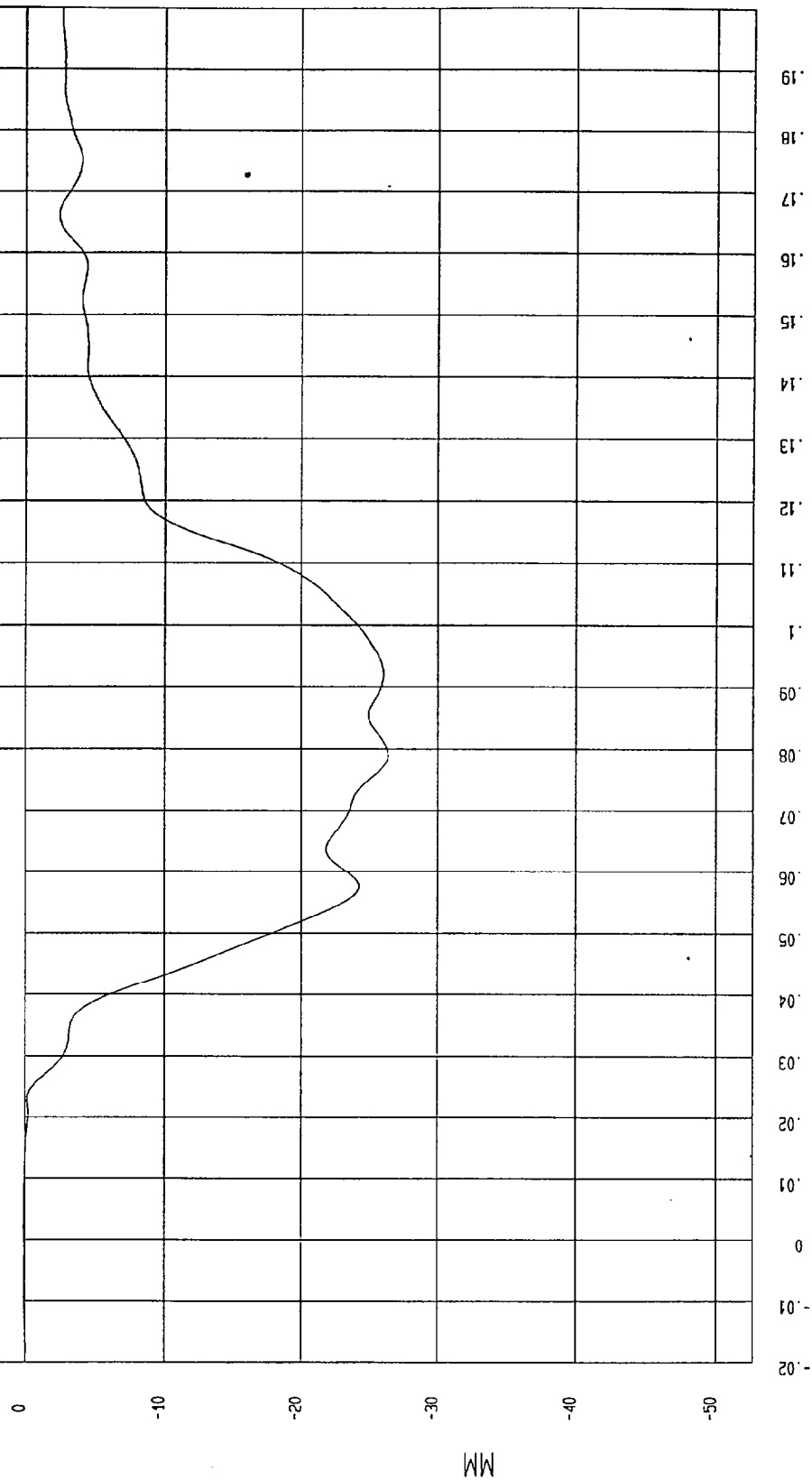
COMPONENT: 1997 CHEVROLET CAVALIER 2 D00R (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -26.27 MM at 79 msec

Maximum = .11 MM at 2 msec

DRIVER CHEST COMPRESSION

1 ——— 8970210F.D58 Filterclass (60)



MGA Research
02-12-1997 14:06

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -3224.69 N at 52 msec

Maximum = 352.80 N at 46 msec

DRIVER LEFT FEMUR FORCE

1 ——— B9702IFF.F19 Filterclass (600)

1000

0

-1000

-2000

-3000

-4000

-5000

N

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

TIME (SECONDS)

MGA Research
02-12-1997 14:07

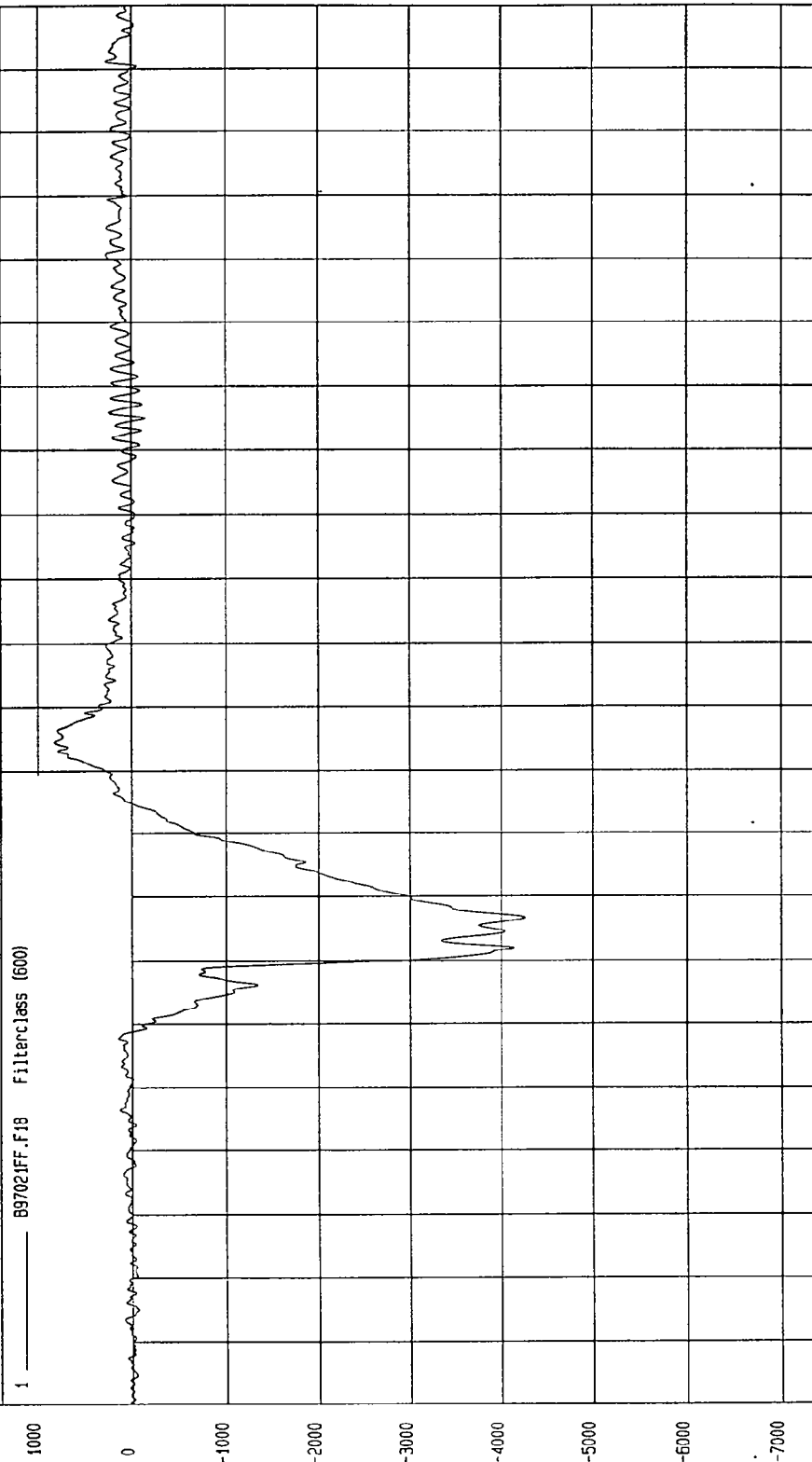
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -4266.97 N at 57 msec Maximum = 827.67 N at 84 msec

DRIVER RIGHT FEMUR FORCE

1 ——— B9702IFF.F18 Filterclass (600)



TIME (SECONDS)

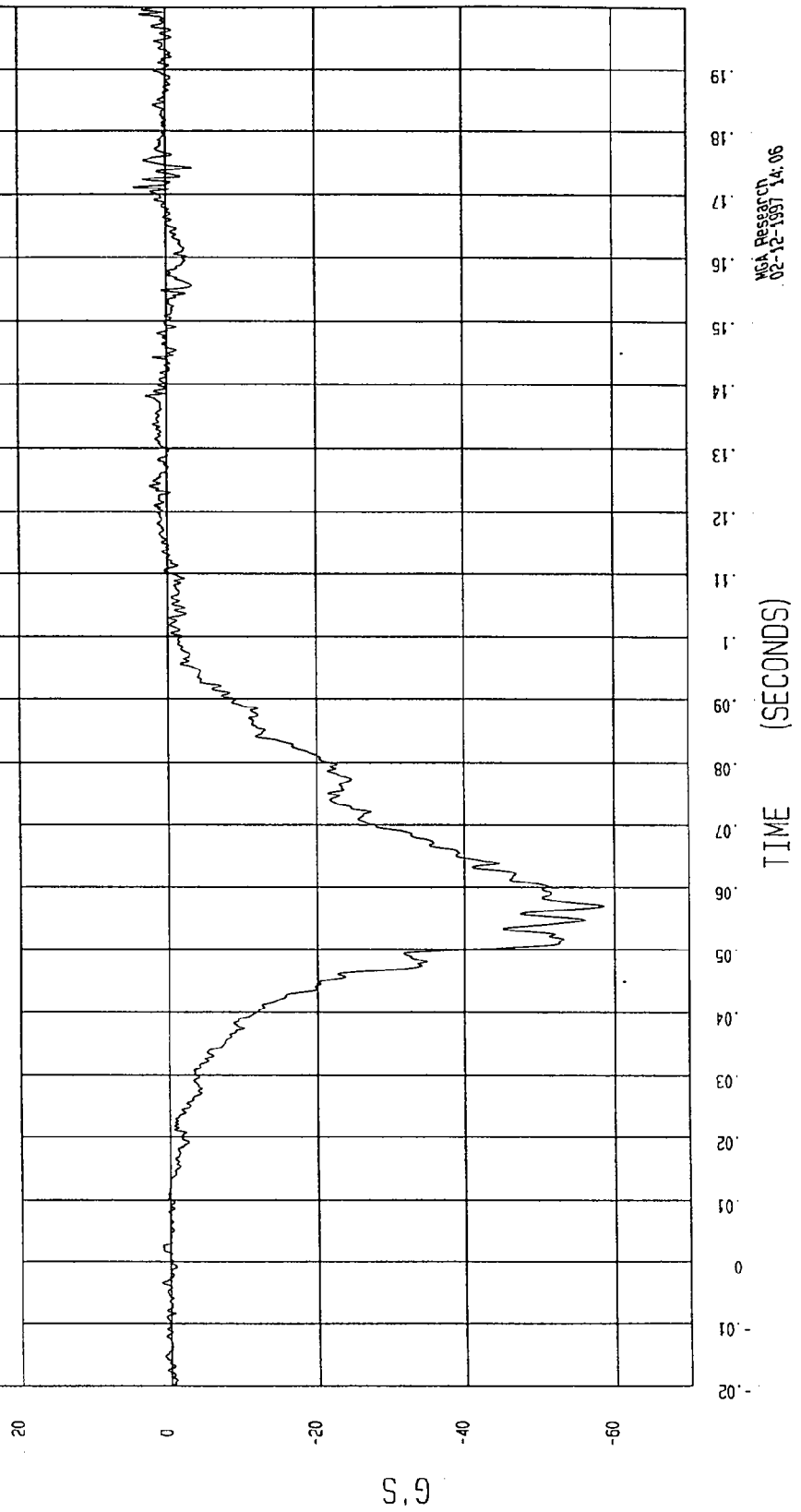
0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

MCA Research
02-12-1997 14:07

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -58.58 G'S at 57 msec Maximum = 4.26 G'S at 171 msec

DRIVER PELVIS X ACCELERATION

1 897021AF.A60 Filterclass (1000)



NGA Research
02-12-1997 14.06

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -8.51 G'S at 173 msec

Maximum = 9.62 G'S at 54 msec

DRIVER PELVIS Y ACCELERATION

1 B97021AF.A61 Filterclass (1000)

20
0
-20
-40
-60

G'S

-0.02
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9

TIME (SECONDS)

MGA Research
02-12-1997 14:06

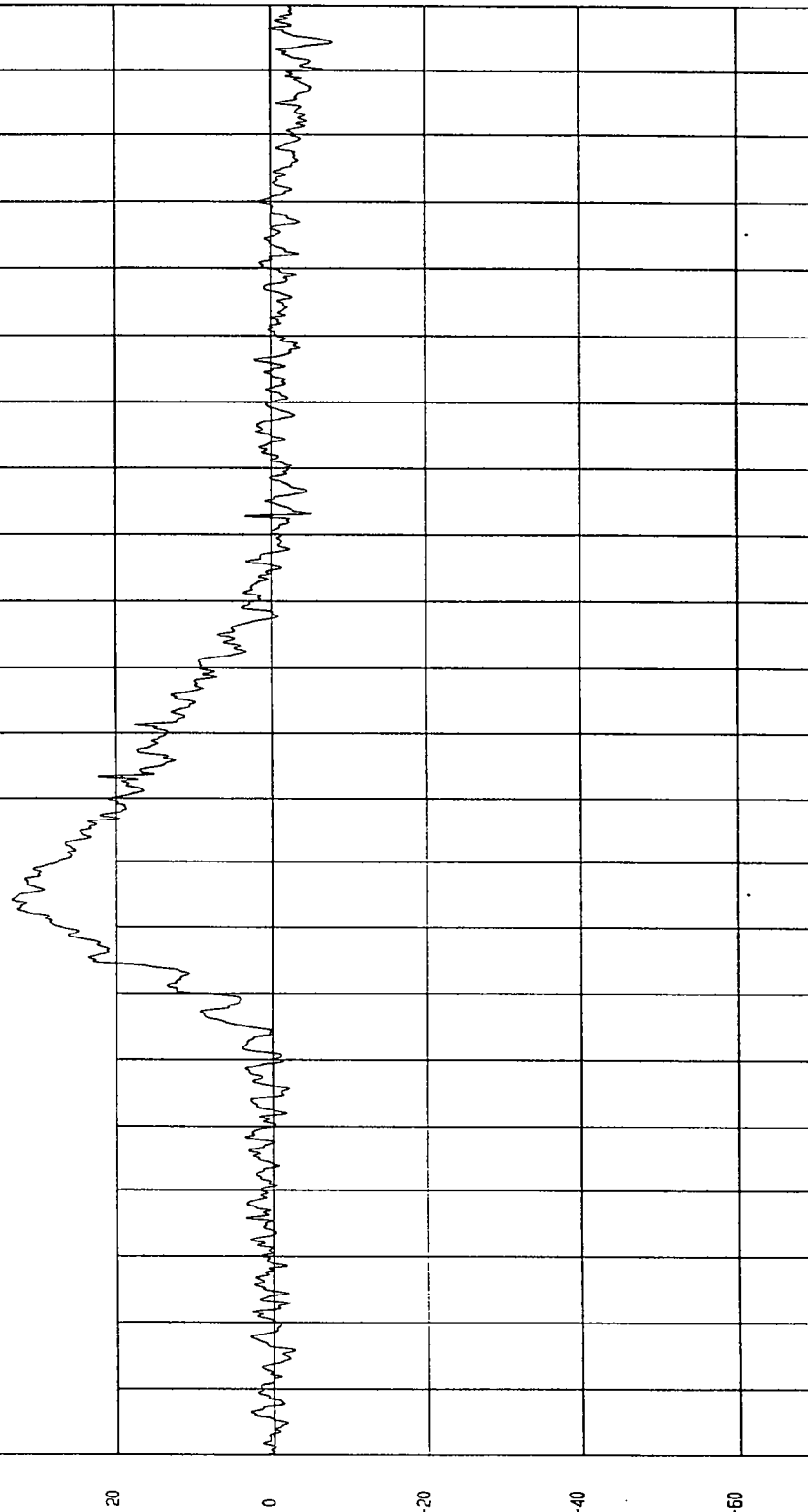
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -8.23 G'S at 194 msec Maximum = 33.49 G'S at 64 msec

DRIVER PELVIS Z ACCELERATION

1 ——— 897021AF.A62 Filterclass (1000)



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

NSA Research
02-12-1997 14:06

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

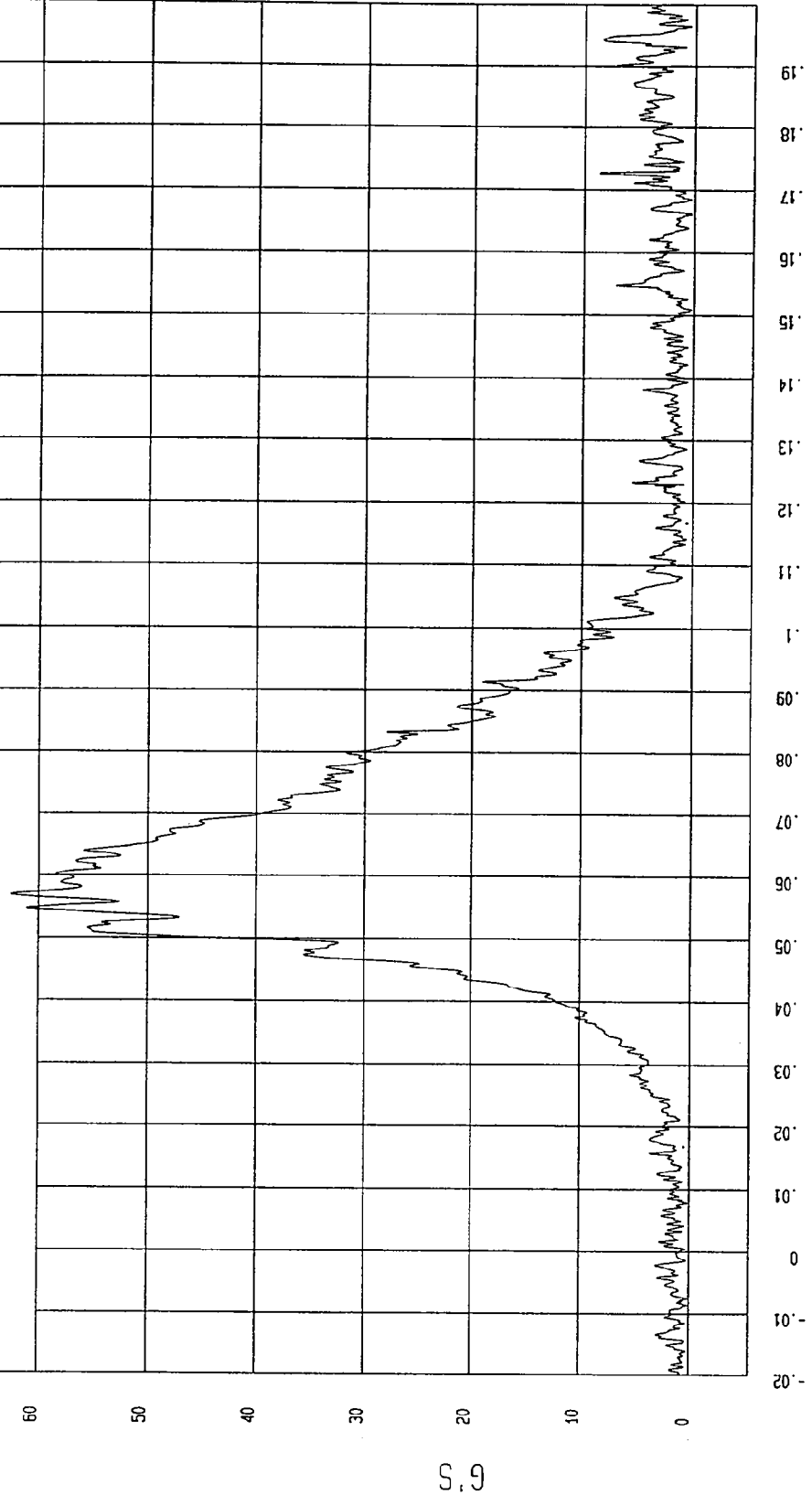
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = .12 G'S at -9 msec

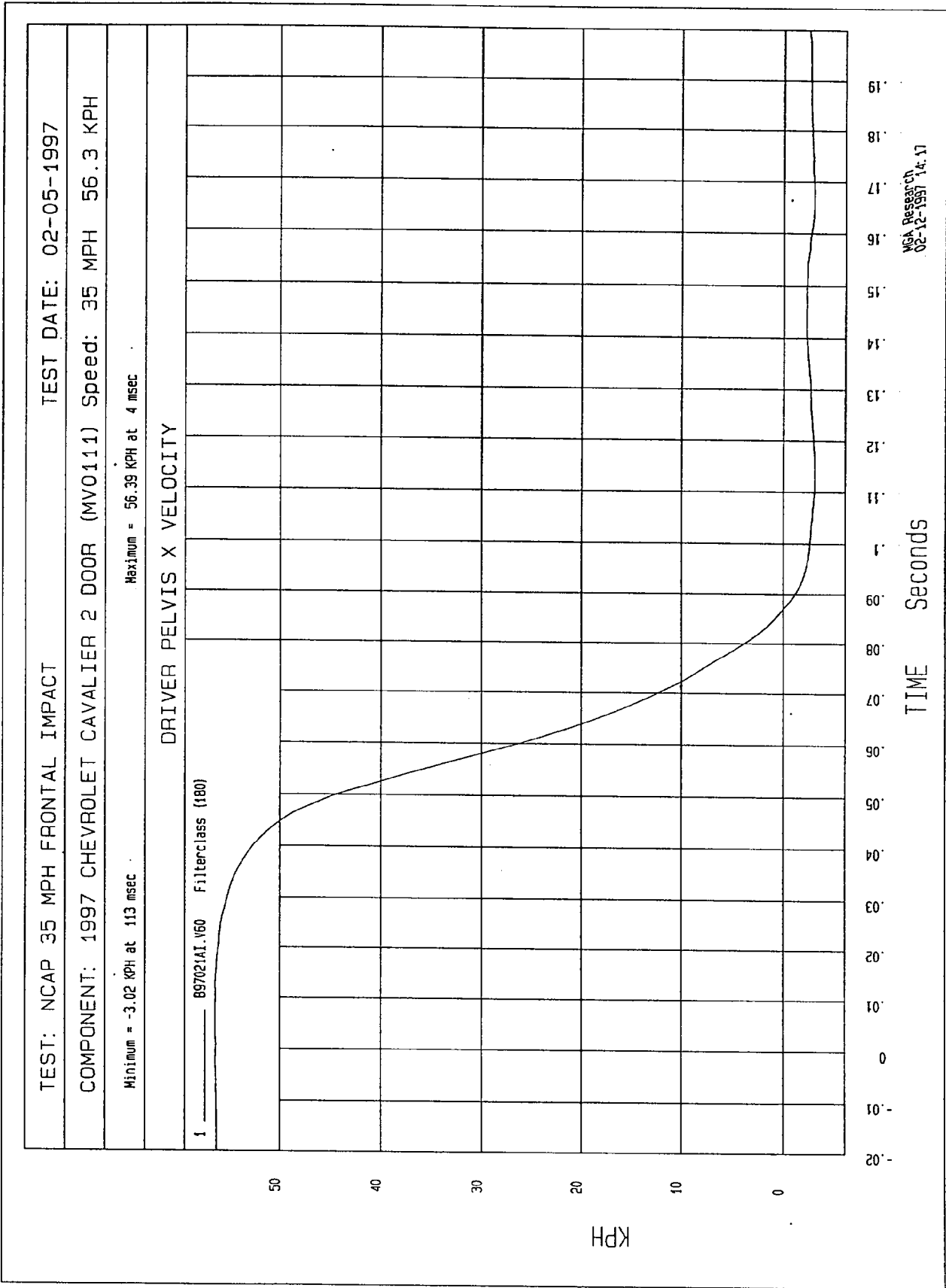
Maximum = 62.52 G'S at 57 msec

DRIVER PELVIS RESULTANT ACCELERATION

1 — B97021V.A60 FilterClass (1000)



MOA Research
02-12-1997 14:07

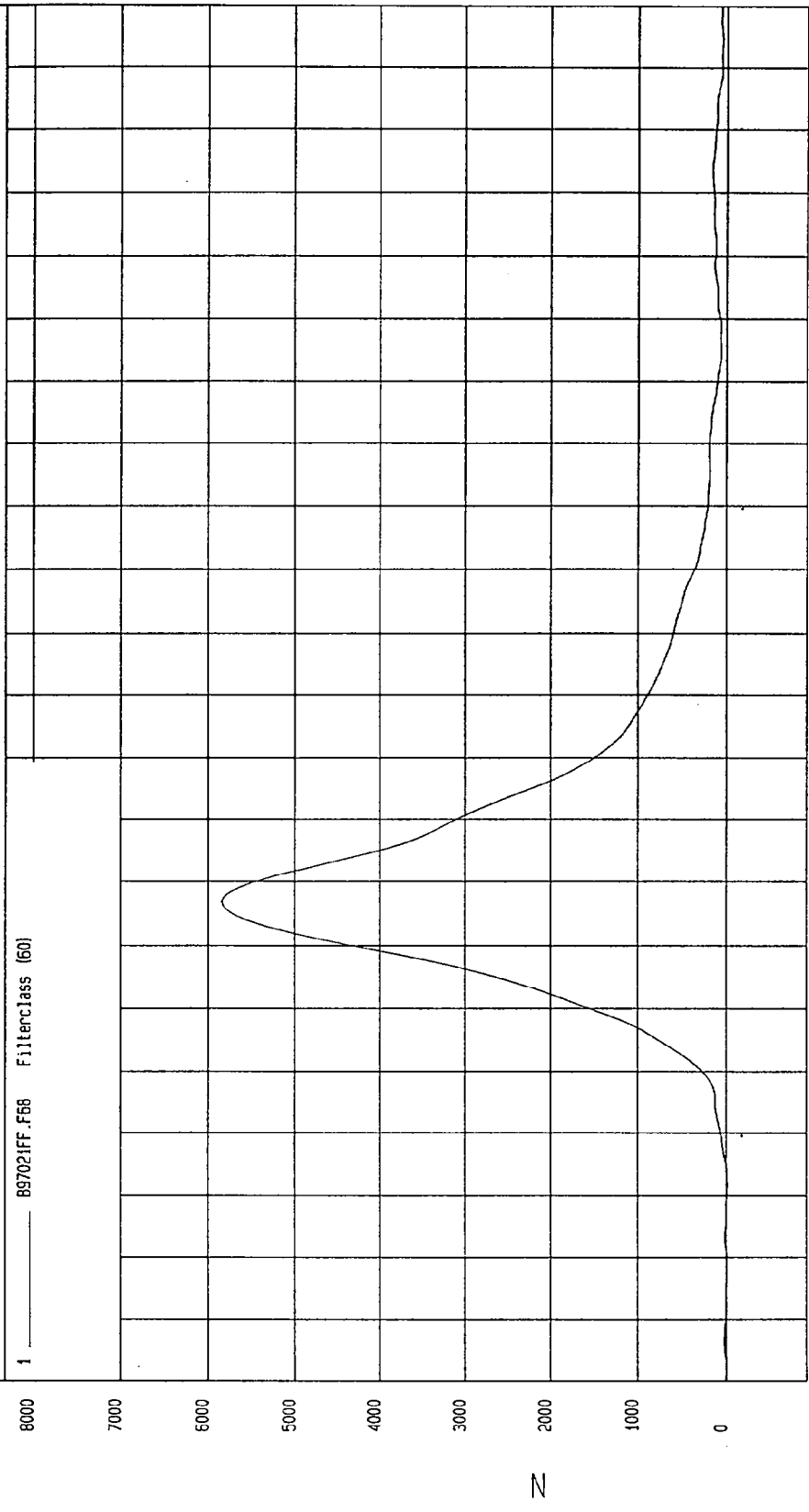


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 D00R (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -15.93 N at 12 msec Maximum = 5834.97 N at 57 msec

DRIVER LAP BELT FORCE



TIME (SECONDS)

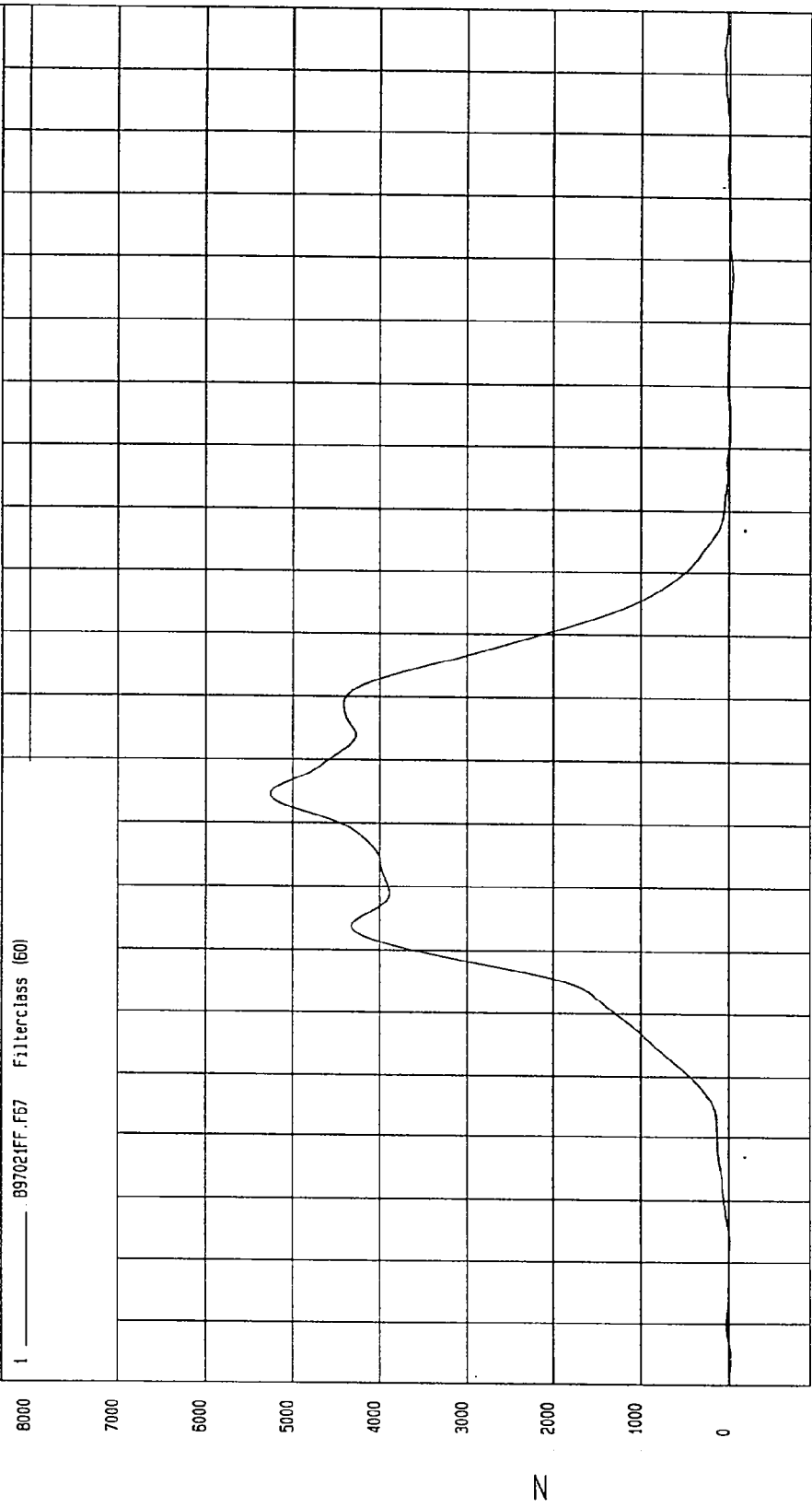
NGA Research
02-12-1997 14.07

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -40.85 N at 157 msec Maximum = 5254.17 N at 74 msec

DRIVER SHOULDER BELT FORCE



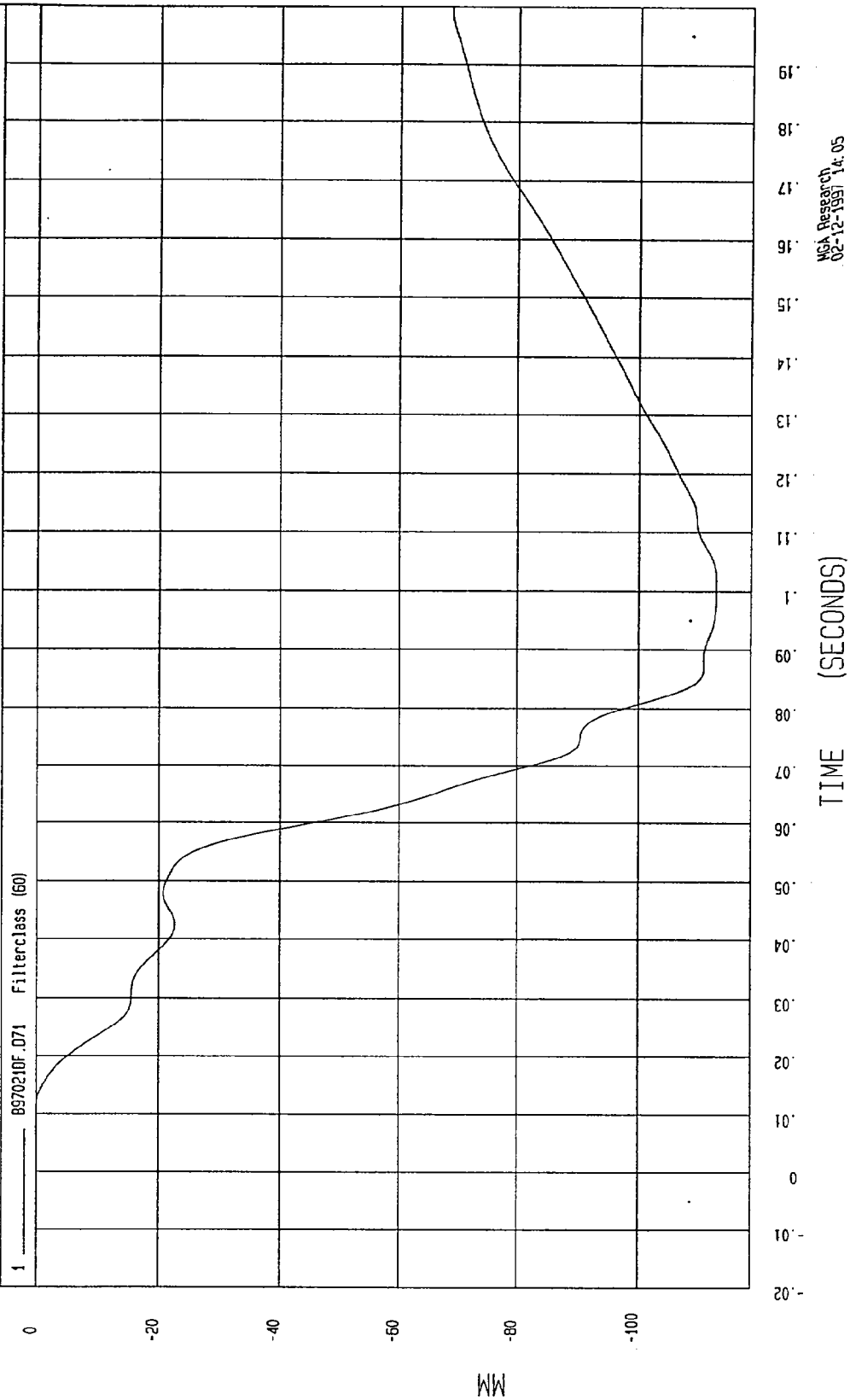
MCA Research
02-12-1997 14:07

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -112.69 MM at 100 msec Maximum = 4.71E-02 MM at 10 msec

DRIVER BELT SPOOLOUT DISP



TEST: NCAP 35 MPH FRONTAL IMPACT

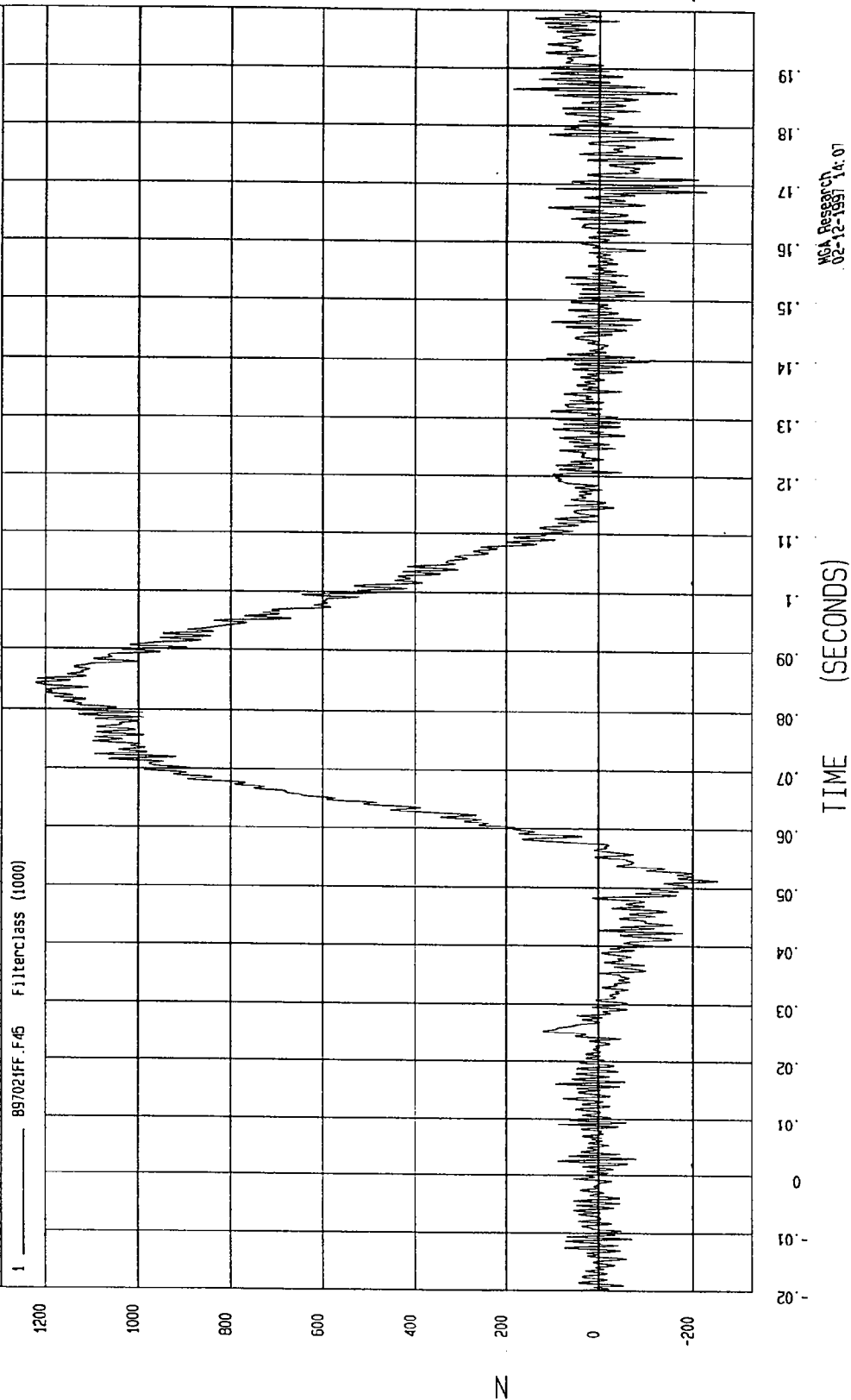
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -253.39 N at 51 msec

Maximum = 1220.76 N at 84 msec

DRIVER NECK FORCE X

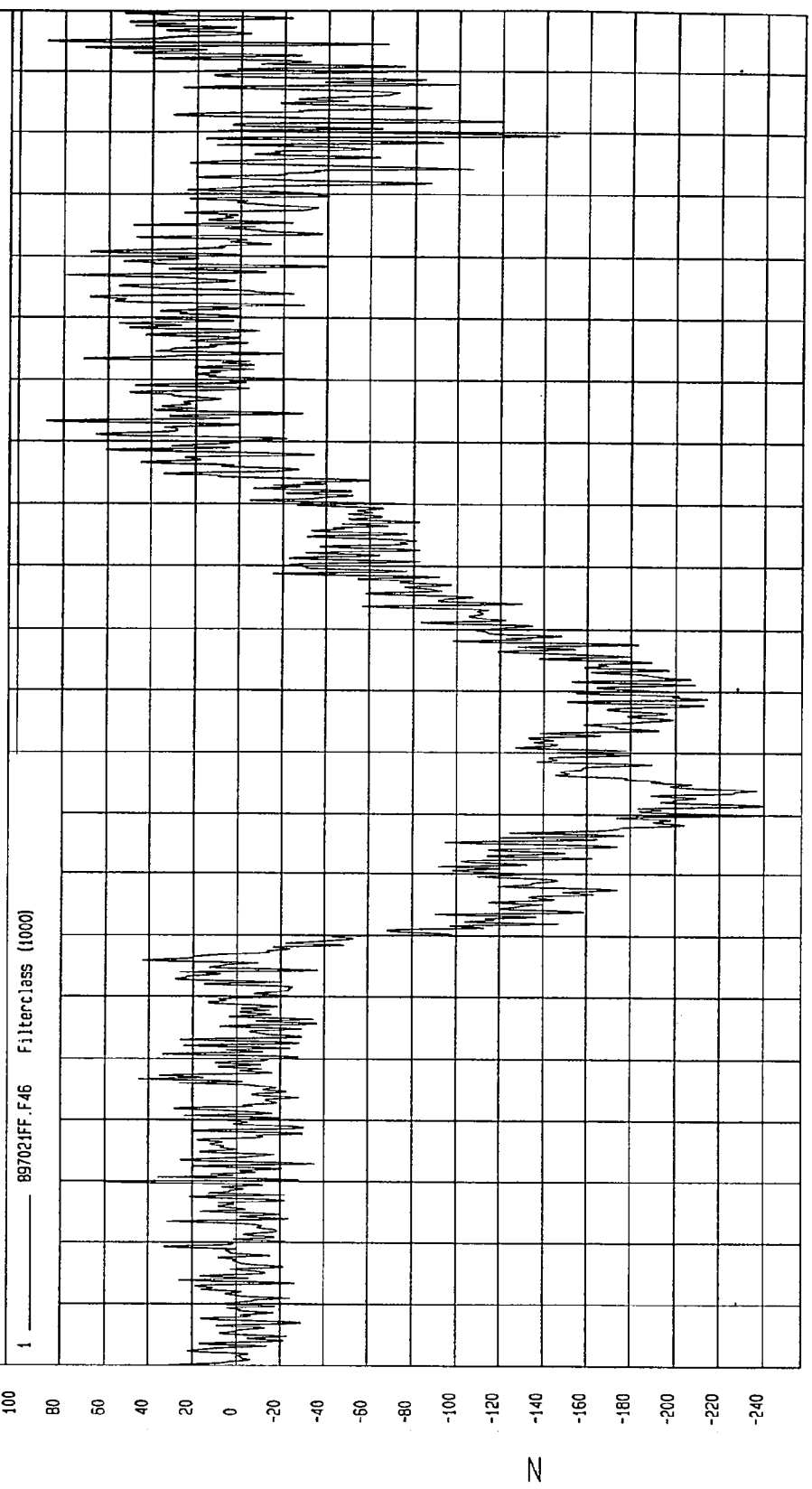


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -240.33 N at 72 msec Maximum = 87.74 N at 195 msec

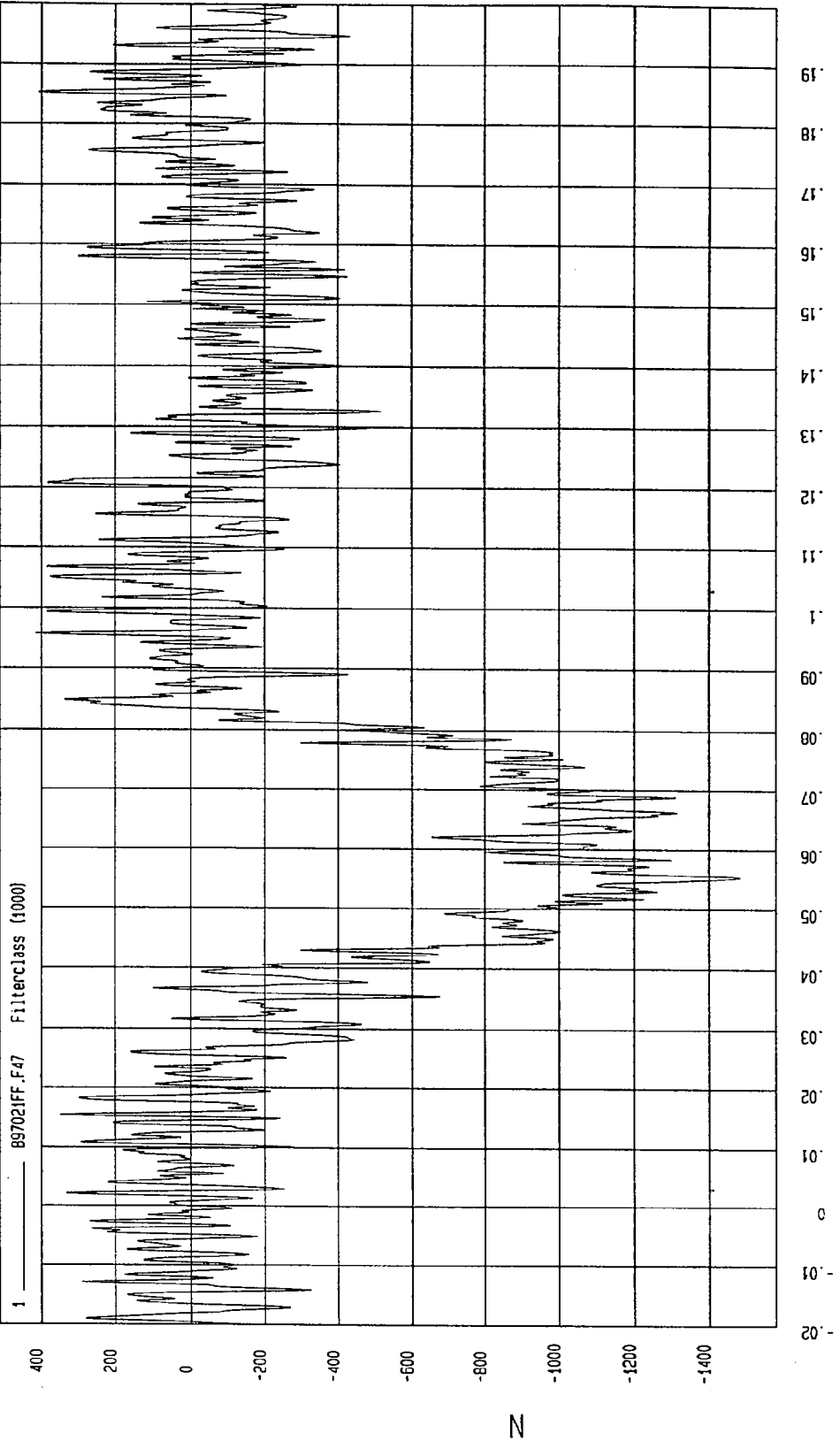
DRIVER NECK FORCE Y



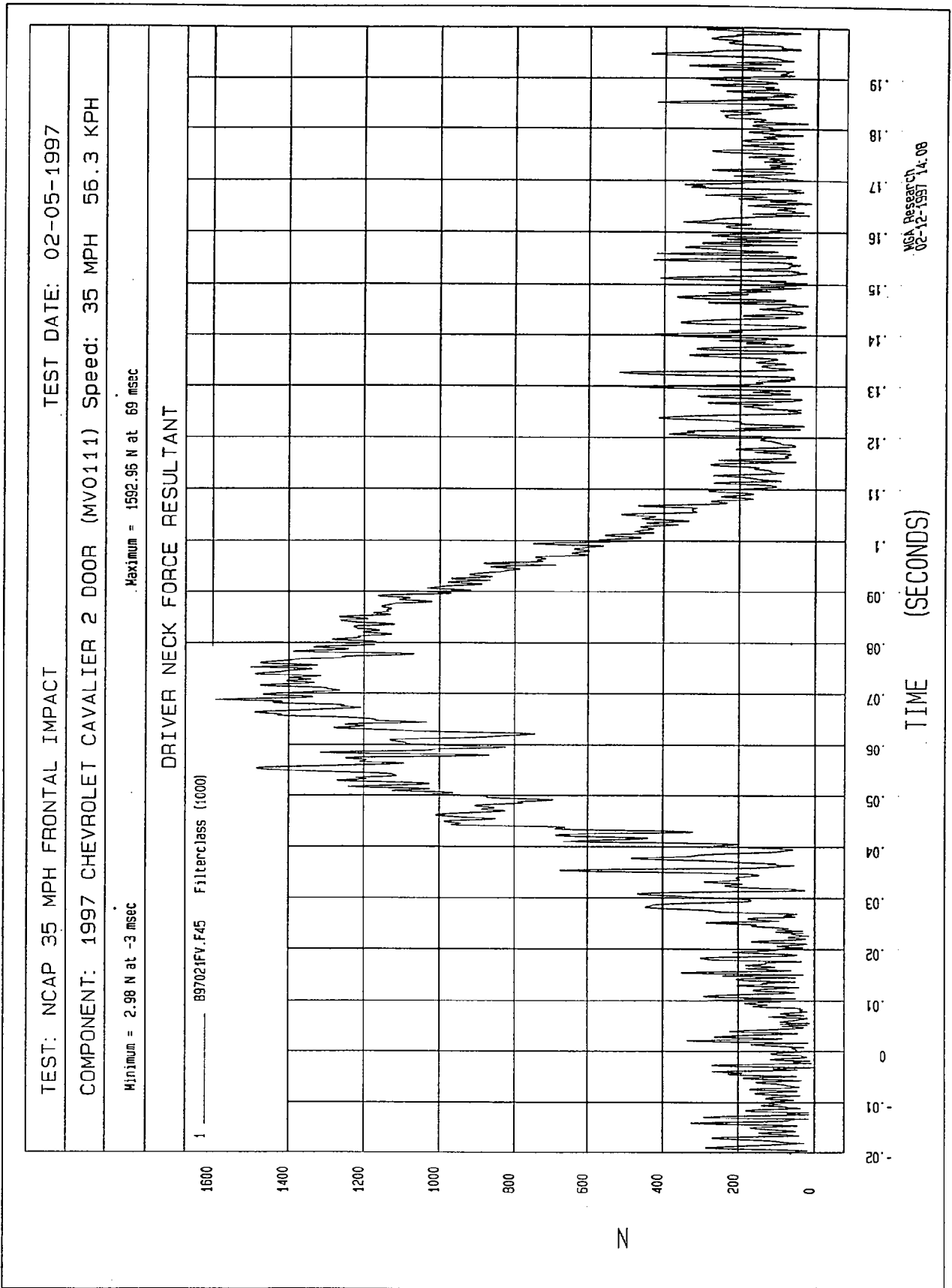
NGA Research
02-12-1997 14:07

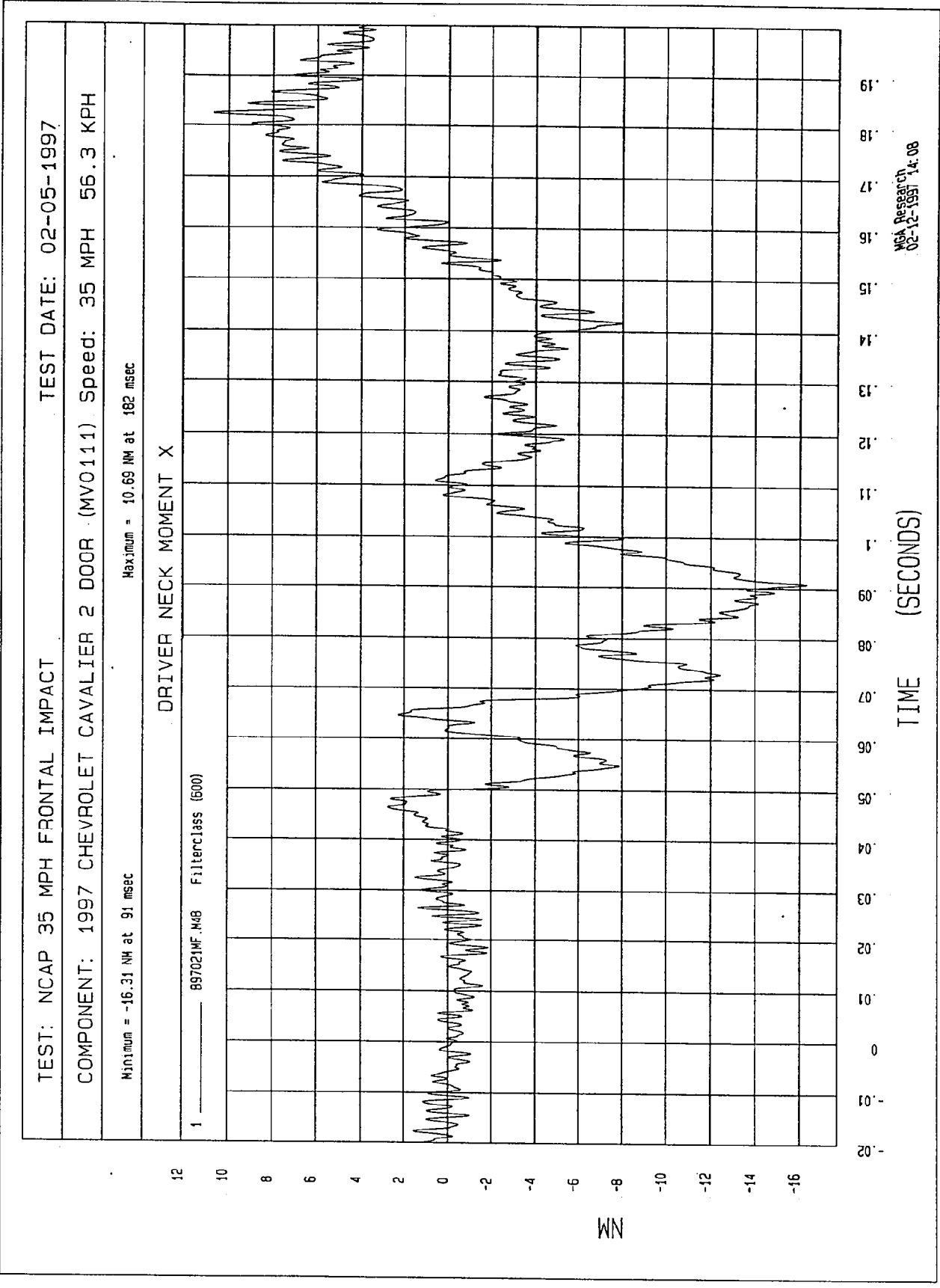
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -1480.15 N at 55 msec Maximum = 415.02 N at 96 msec

DRIVER NECK FORCE Z



NCA Research
02-12-1997 14.07

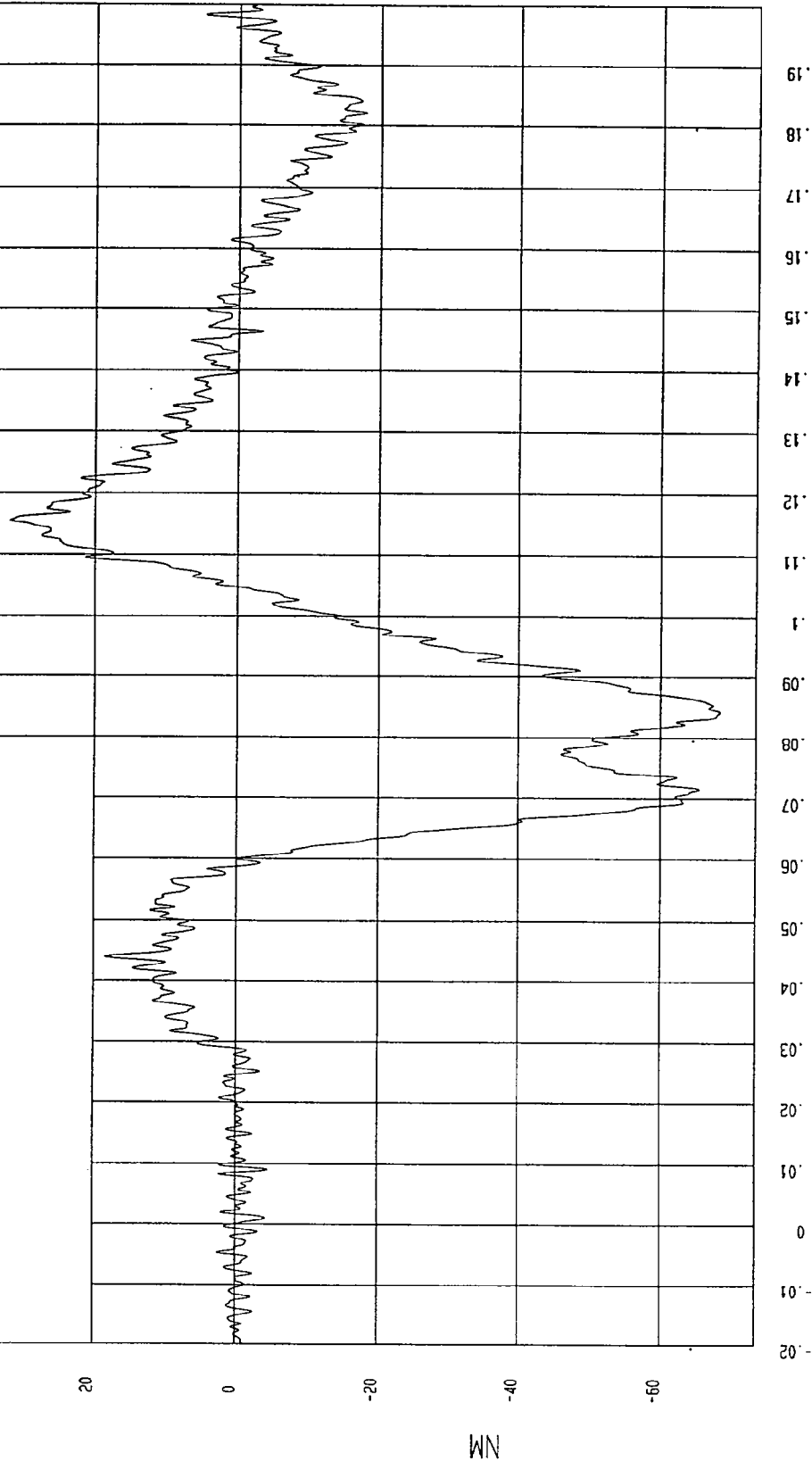




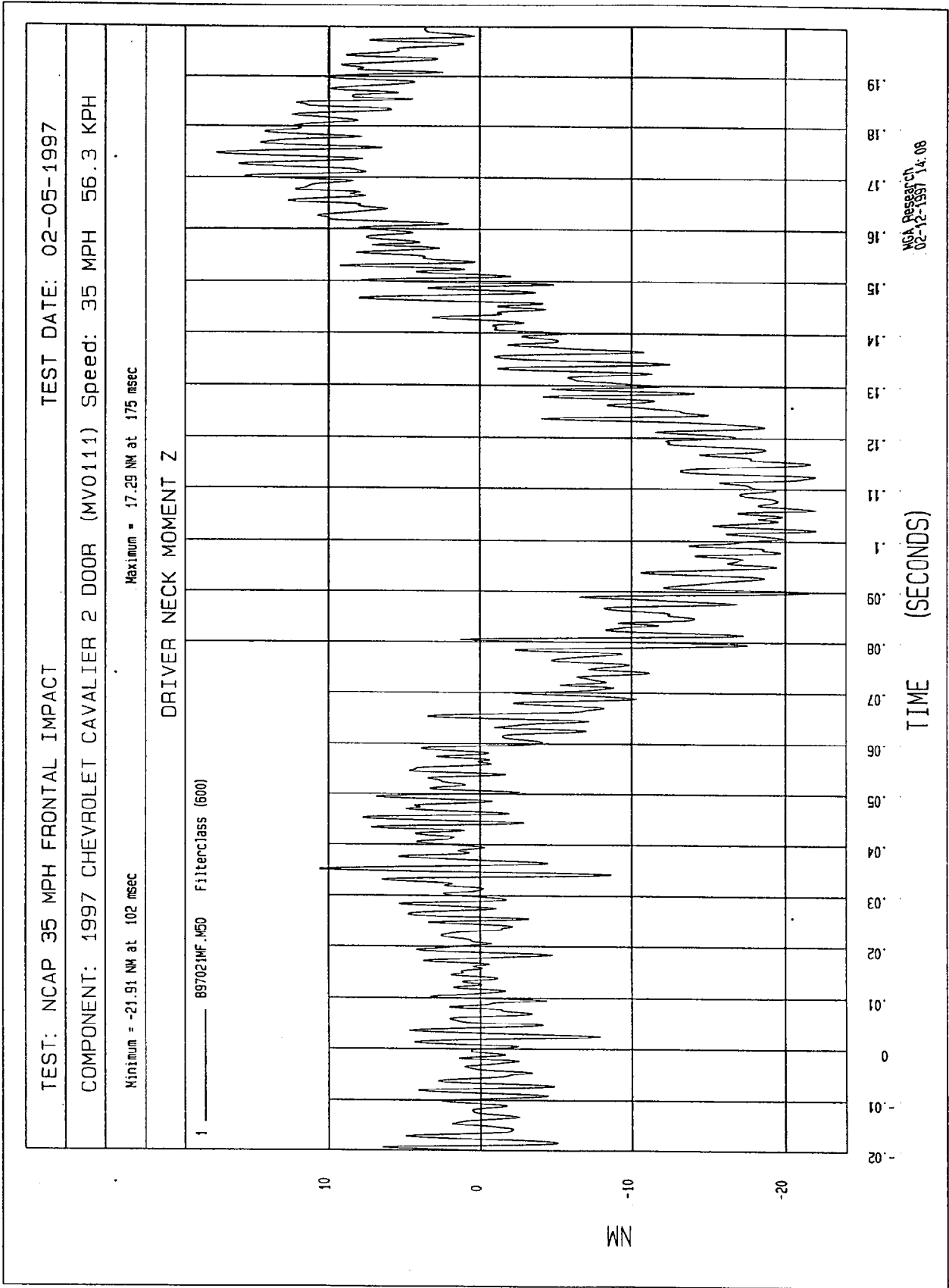
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO1111) Speed: 35 MPH 56.3 KPH
Minimum = -68.22 NM at 84 msec Maximum = 31.73 NM at 116 msec

DRIVER NECK MOMENT Y

1 ——— 897021MF.M43 Filterclass (600)



MCA Research
02-12-1997 14.08



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

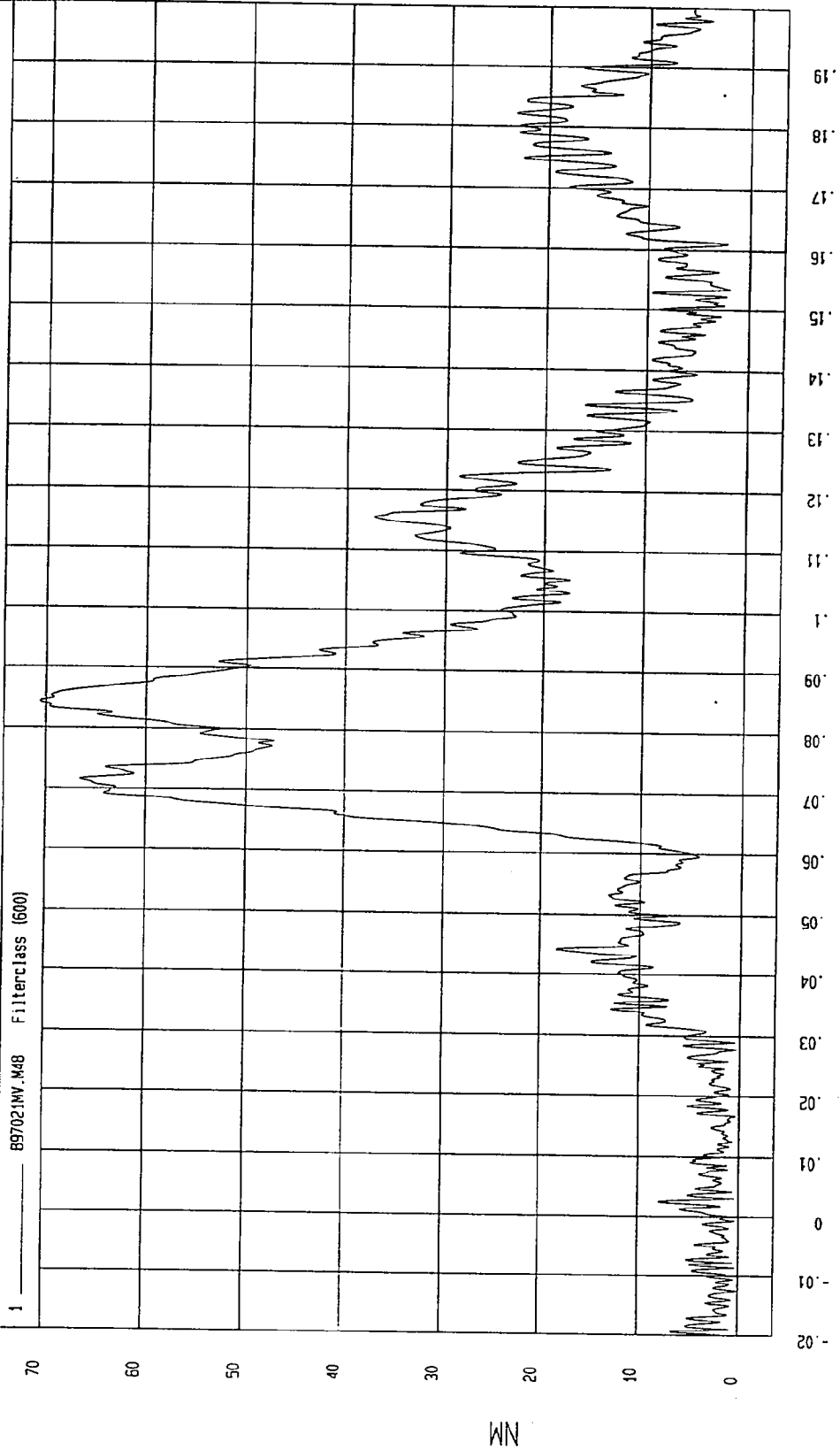
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 6.51E-02 NM at -13 msec

Maximum = 70.62 NM at 84 msec

DRIVER NECK MOMENT RESULTANT

1 897021MV.M48 Filterclass (600)



MCA Research
02-12-1997 14:08

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

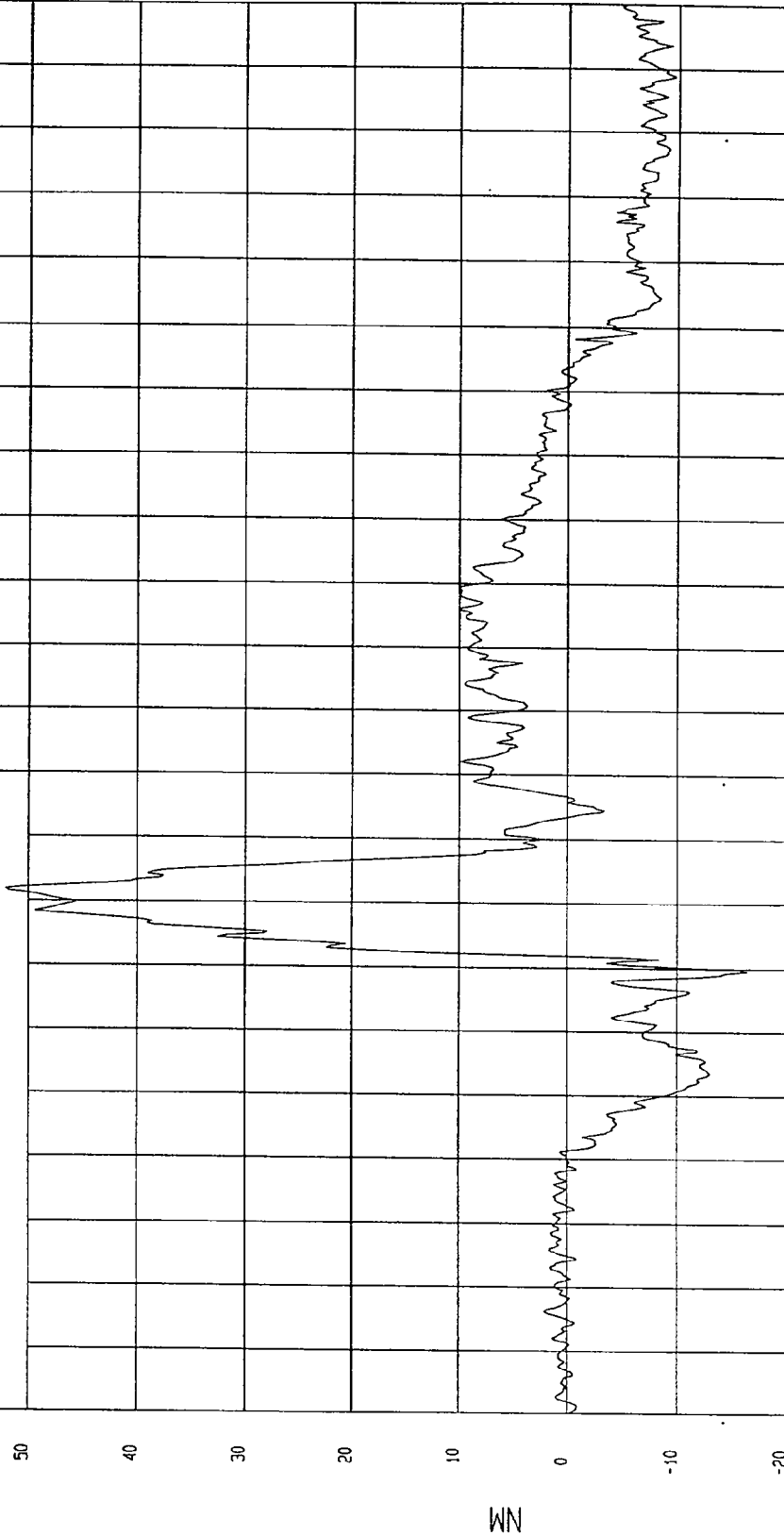
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -16.93 NM at 50 msec

Maximum = 52.23 NM at 62 msec

DRIVER LEFT UPPER TIBIA MOMENT X

1 ——— B97021MF.M79 Filterclass (600)



MGA Research
02-12-1997 14:14

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -27.86 NM at 138 msec

Maximum = 133.74 NM at 60 msec

DRIVER LEFT UPPER TIBIA MOMENT Y

140

1 — 897021HF .M80 Filterclass (600)

120

100

80

60

40

20

0

-20

NM

-0.02

-0.01

0

0.01

0.02

0.03

0.04

0.05

0.06

0.07

0.08

0.09

0.1

0.11

0.12

0.13

0.14

0.15

0.16

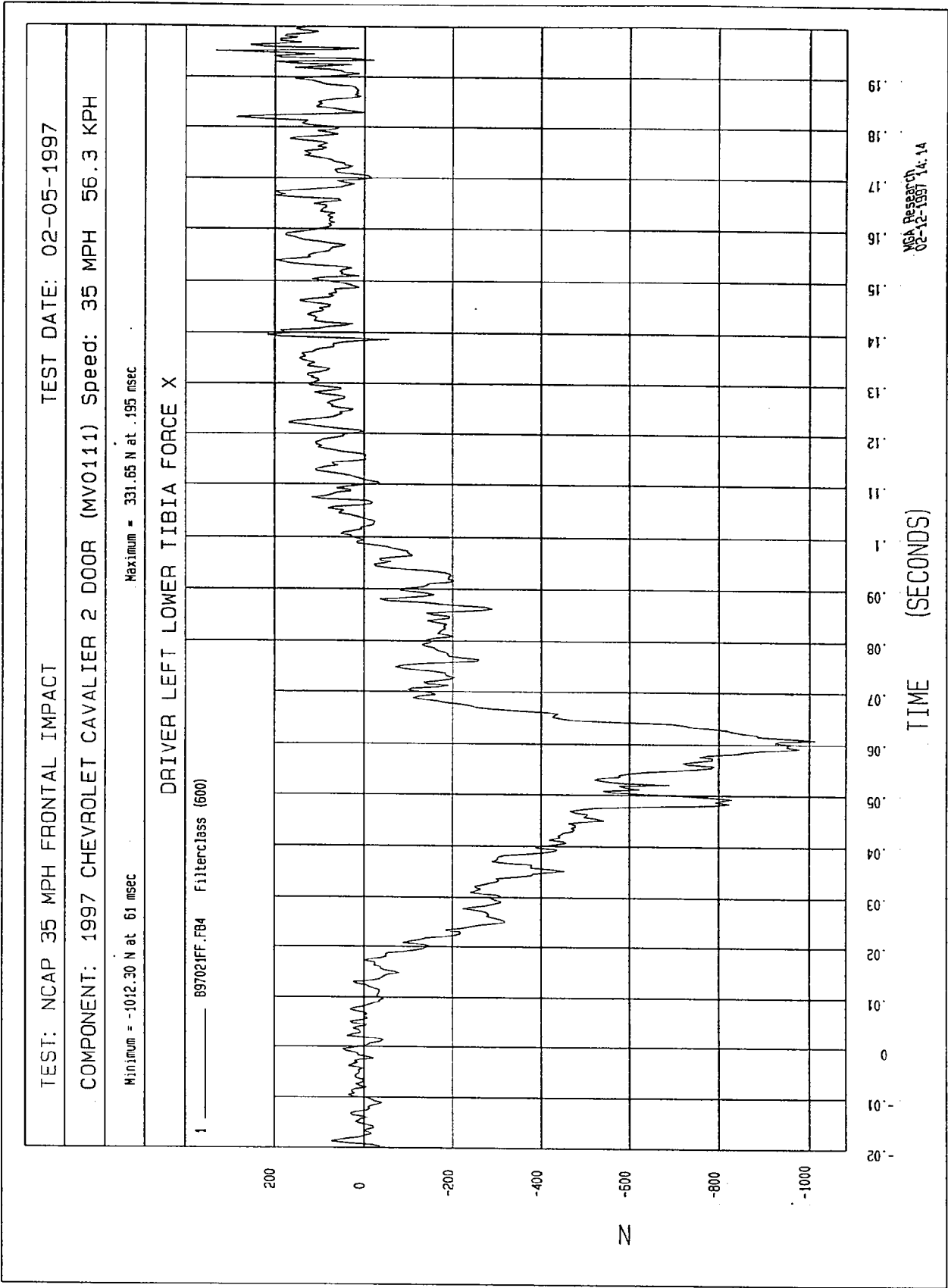
0.17

0.18

0.19

TIME (SECONDS)

MGA Research
02-12-1997 14:14



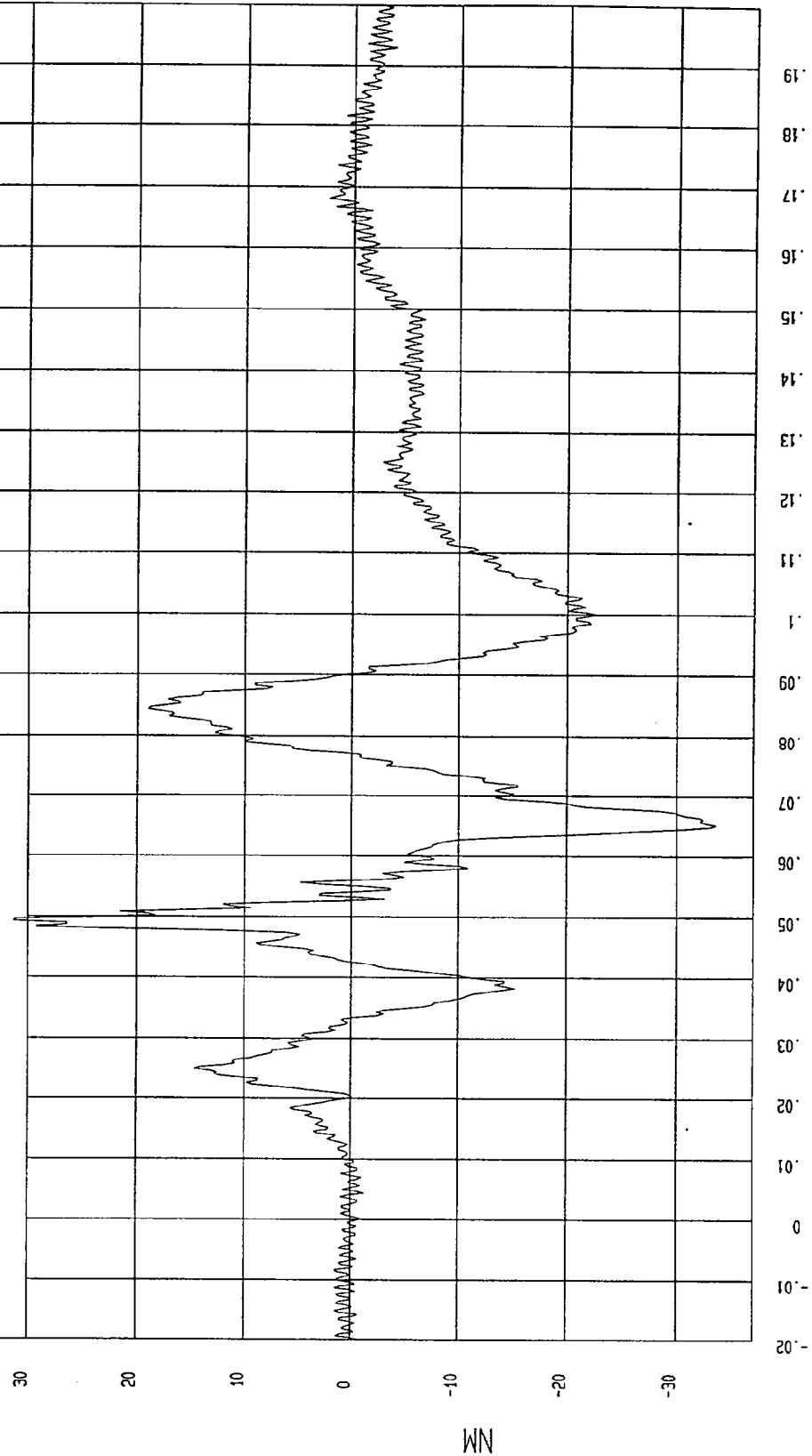
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -33.52 NM at 65 msec Maximum = 32.17 NM at 49 msec

DRIVER LEFT LOWER TIBIA MOMENT Y

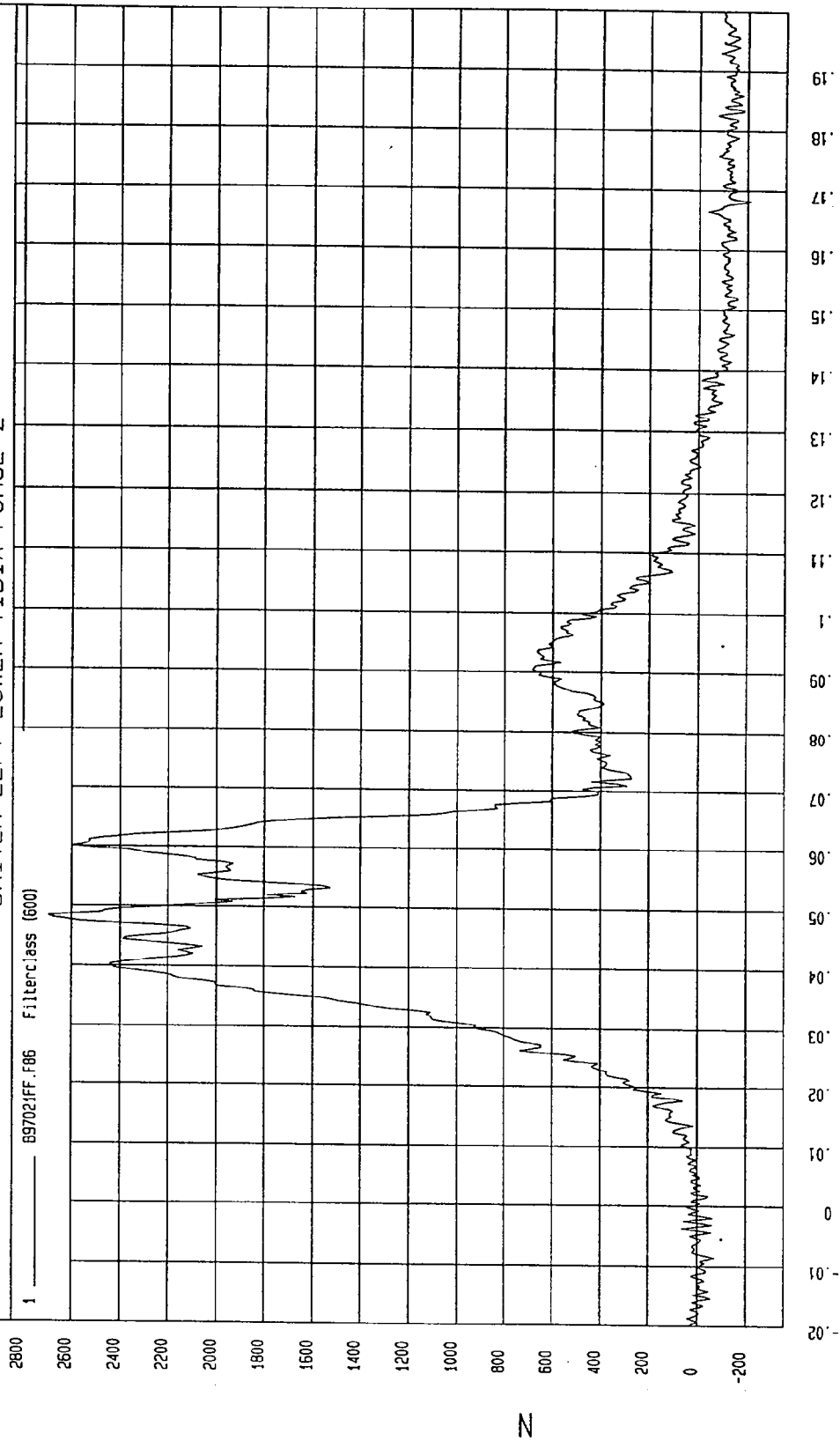
1 897021NF.M85 Filterclass (600)



MGA Research
02-12-1997 14: 14

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -212.11 N at 168 msec Maximum = 2699.12 N at 48 msec

DRIVER LEFT LOWER TIBIA FORCE Z



MCA Research
02-12-1997 14:15

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

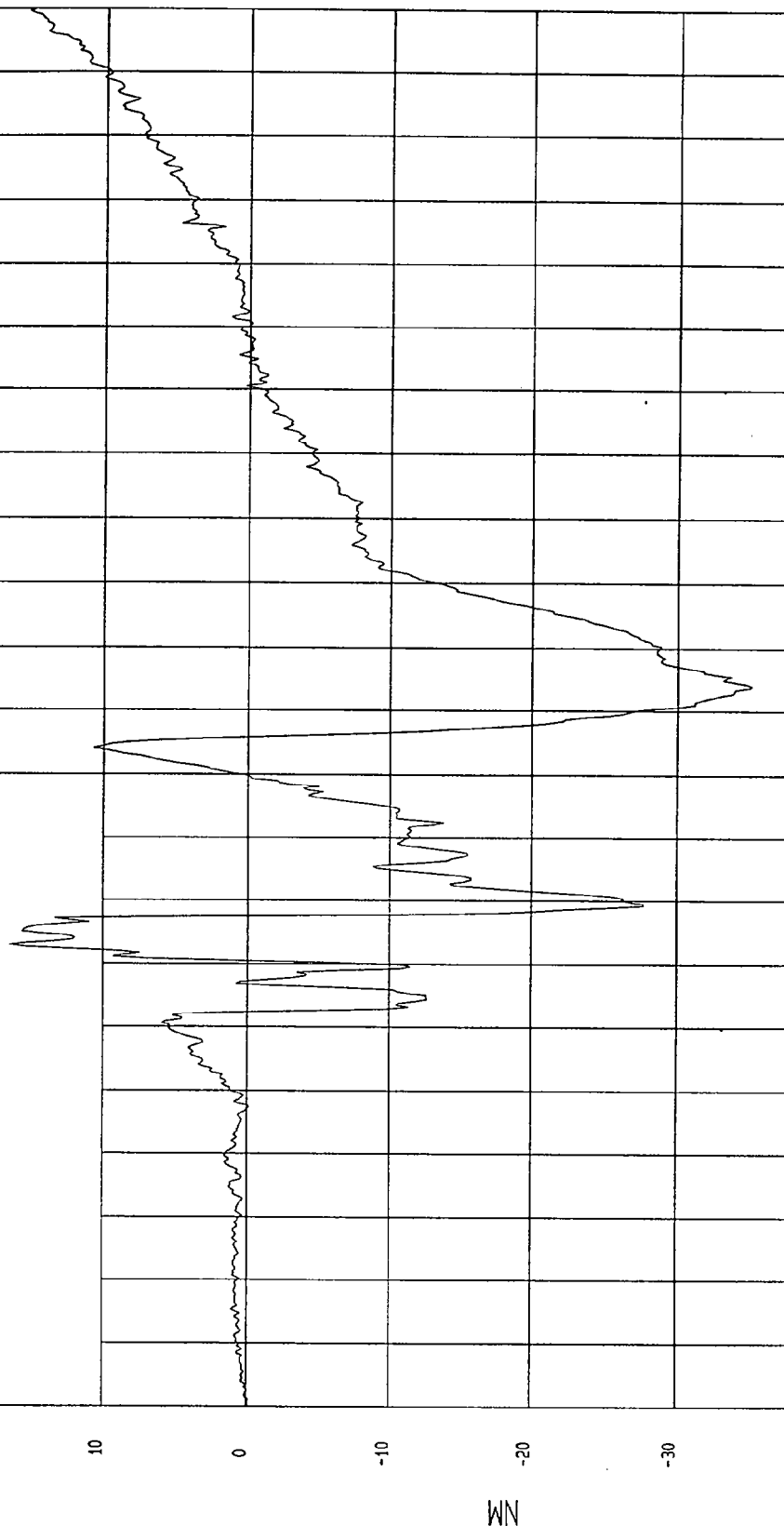
COMPONENT: 1997 CHEVROLET CAVALIER 2 D00R (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -35.02 NM at 94 msec

Maximum = 16.48 NM at 53 msec

DRIVER RIGHT UPPER TIBIA MOMENT X

1 ——— B97021NF.M74 Filterclass (500)



MGA Research
02-12-1997 1A: 15

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

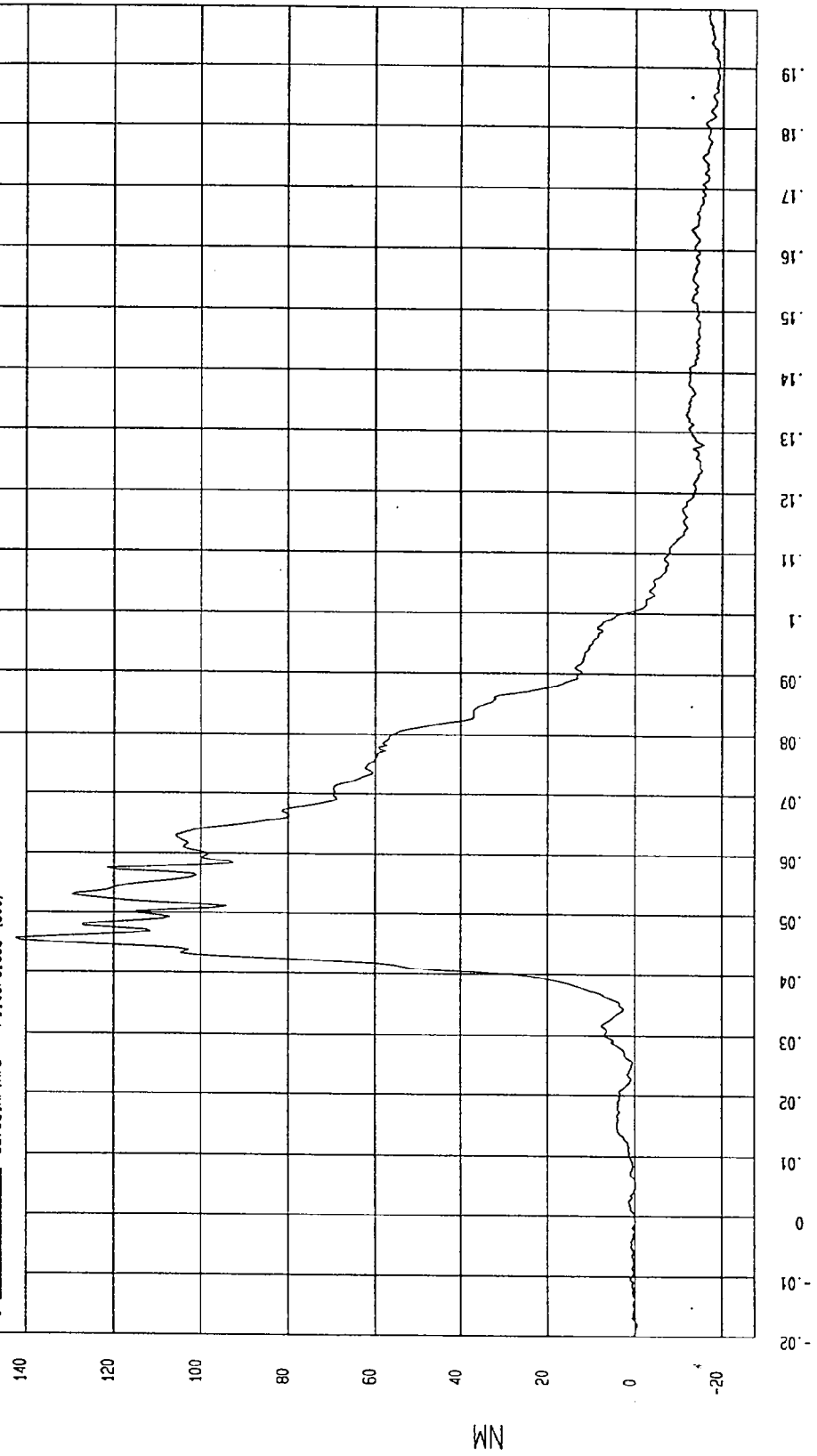
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -19.21 NM at 190 msec

Maximum = 143.00 NM at 46 msec

DRIVER RIGHT UPPER TIBIA MOMENT Y

1 ——— B9702INF.M75 Filterclass (600)

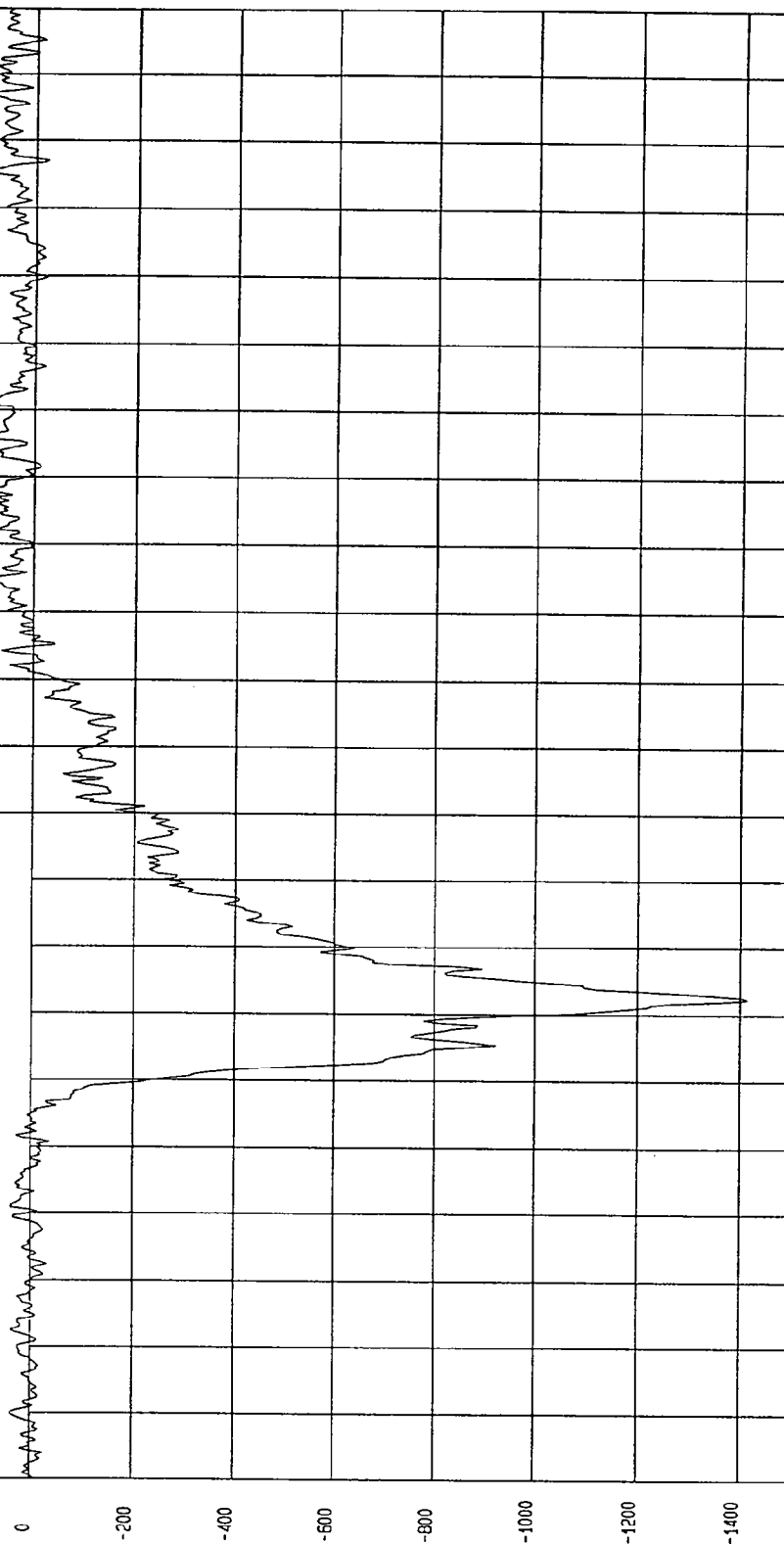


NSA Research
02-12-1997 14:15

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH
Minimum = -1417.23 N at 52 msec Maximum = 120.77 N at 136 msec

DRIVER RIGHT LOWER TIBIA FORCE X

1 ——— 897021FF.F76 Filterclass (600)



NSA Research
02-12-1997 14:15

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

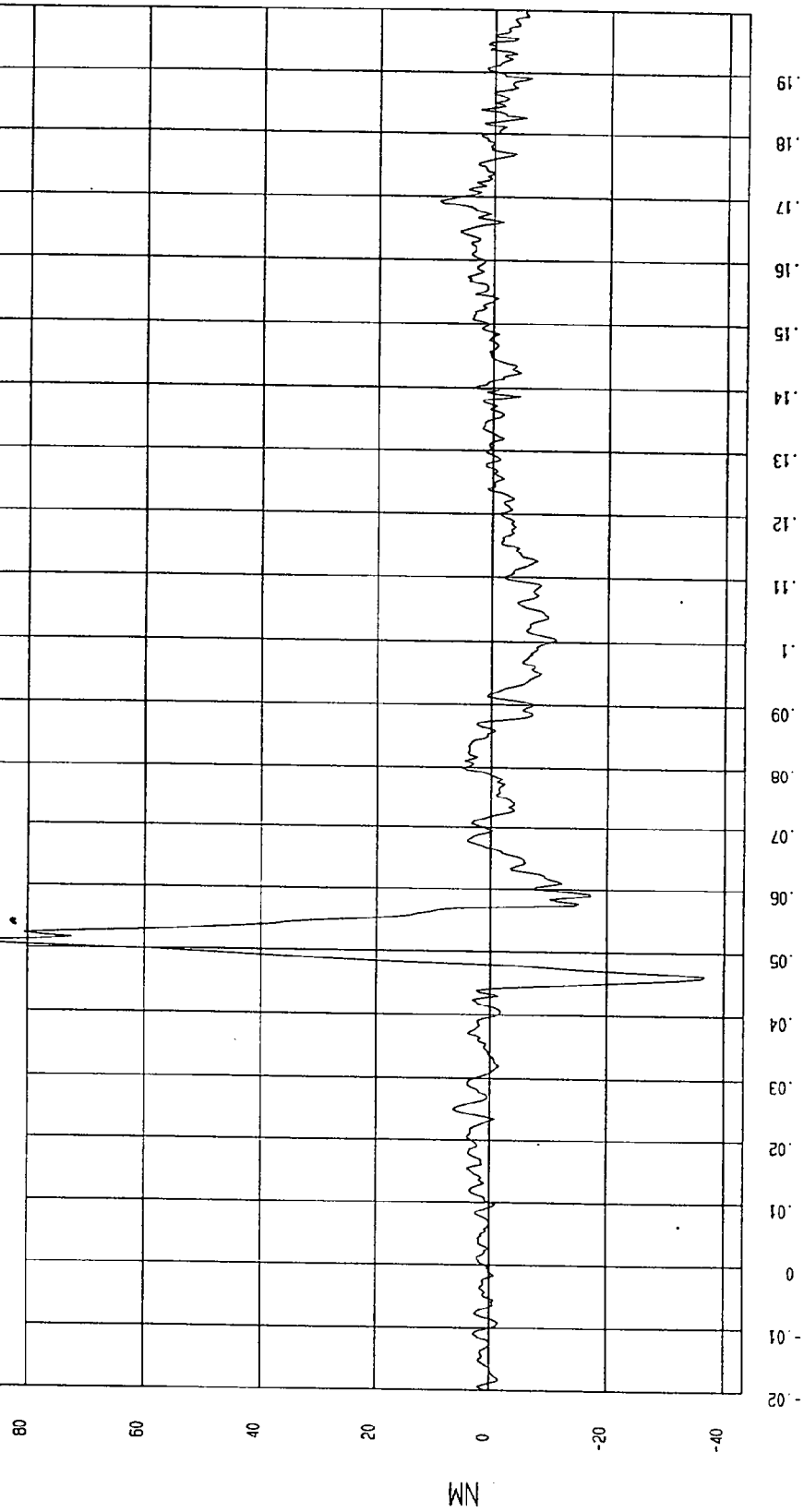
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -37.02 NM at 46 msec

Maximum = 89.30 NM at 51 msec

DRIVER RIGHT LOWER TIBIA MOMENT Y

1 ——— 89702IMF.N77 Filterclass (600)



MOA Research
02-12-1997 14:15

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

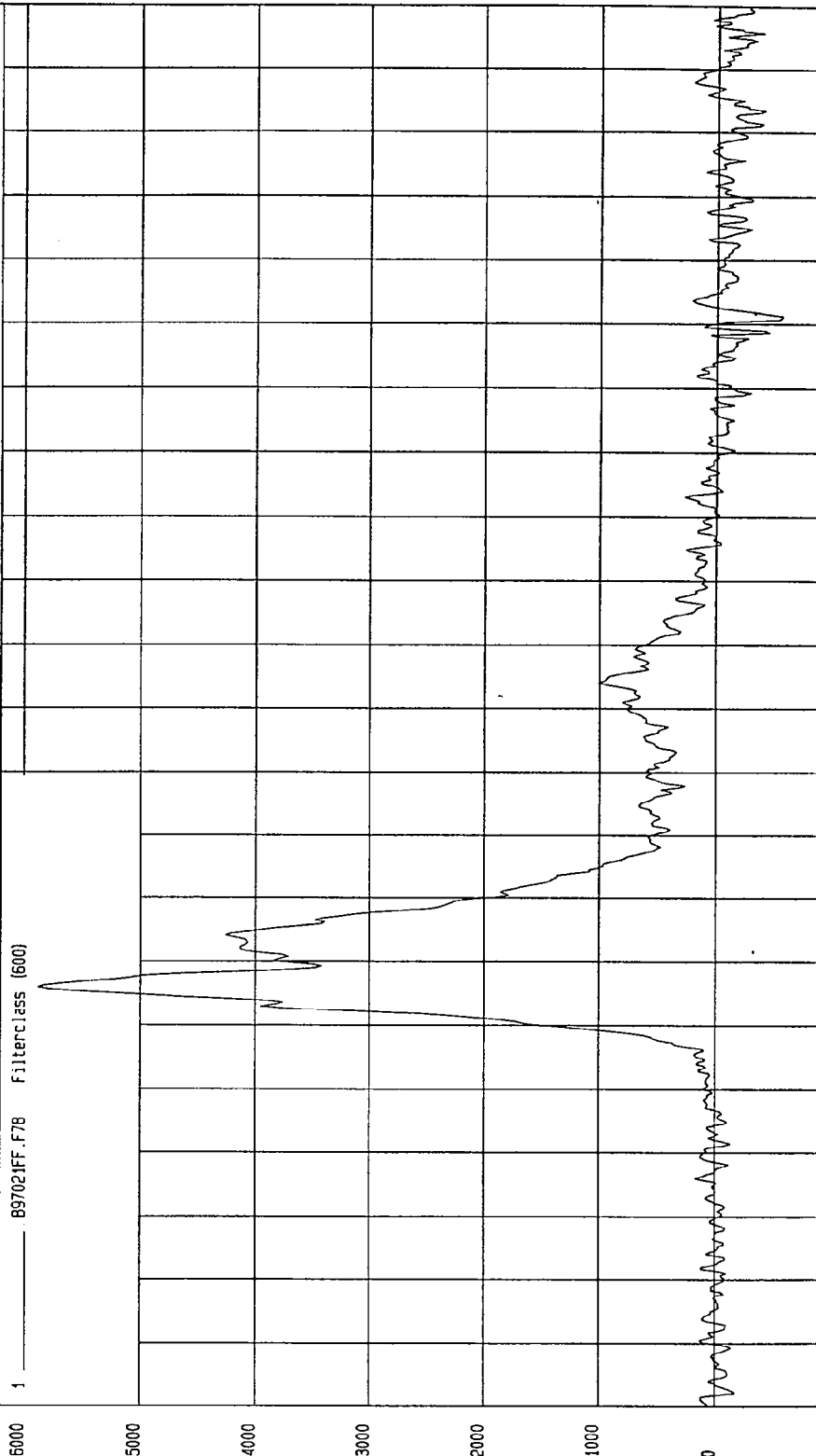
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -560.74 N at .151 msec

Maximum = 5884.12 N at .46 msec

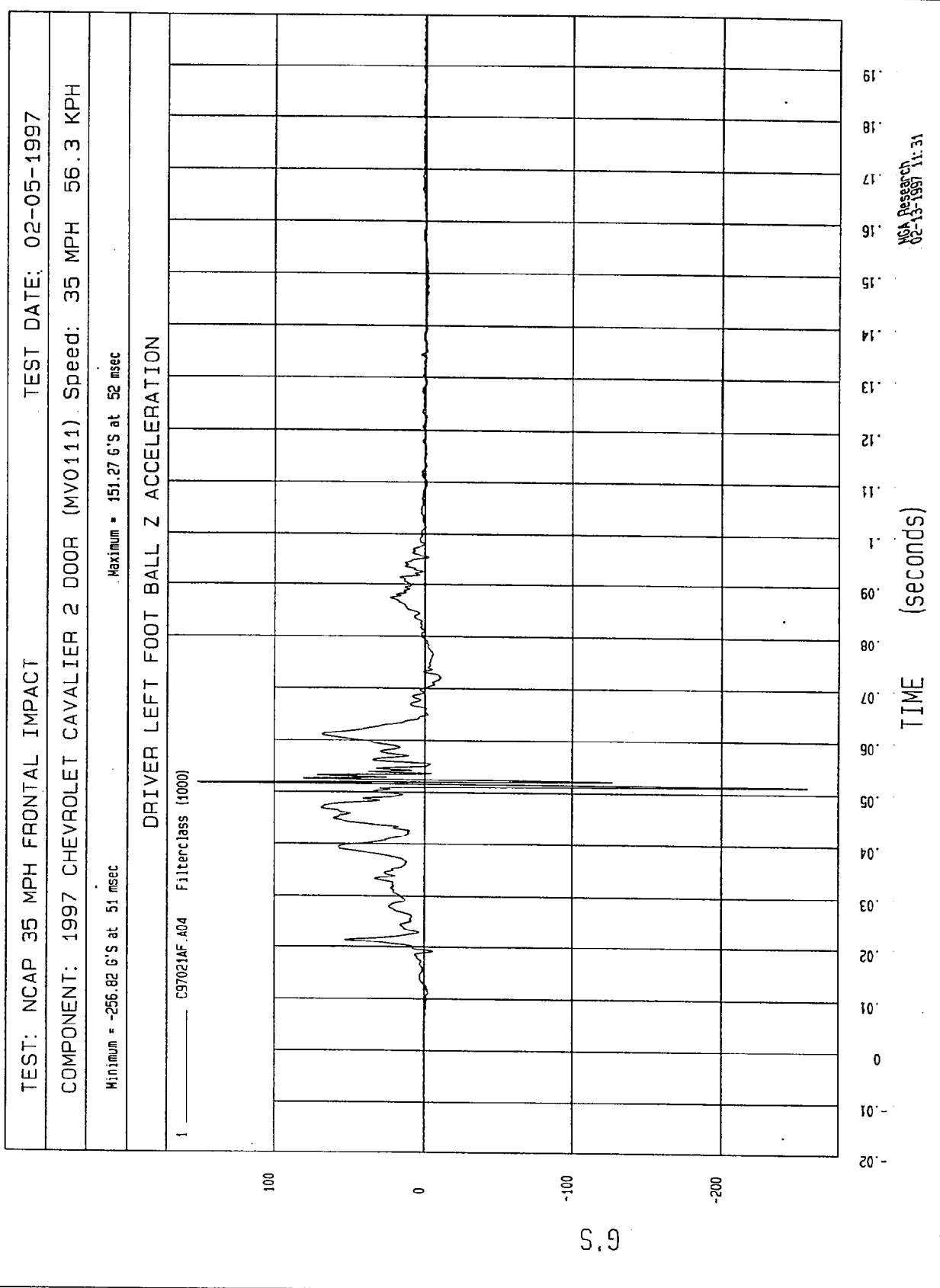
DRIVER RIGHT LOWER TIBIA FORCE Z

1 89702IFF.F78 Filterclass (600)



MOA Research
02-12-1997 14:15

TIME (SECONDS)



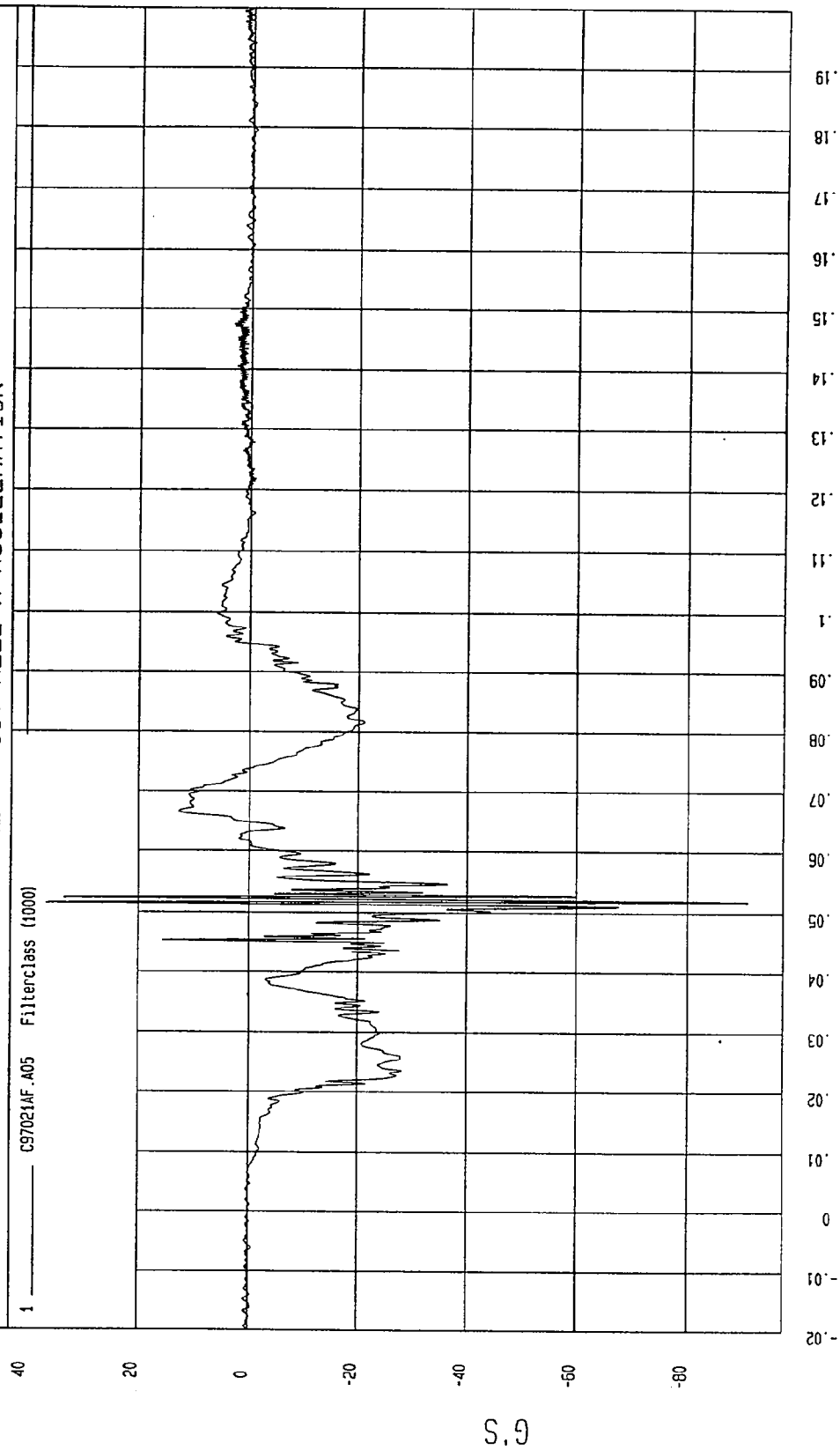
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -90.87 G'S at 52 msec Maximum = 36.52 G'S at 52 msec

DRIVER LEFT FOOT HEEL X ACCELERATION

1 C97021AF.A05 Filterclass (1000)

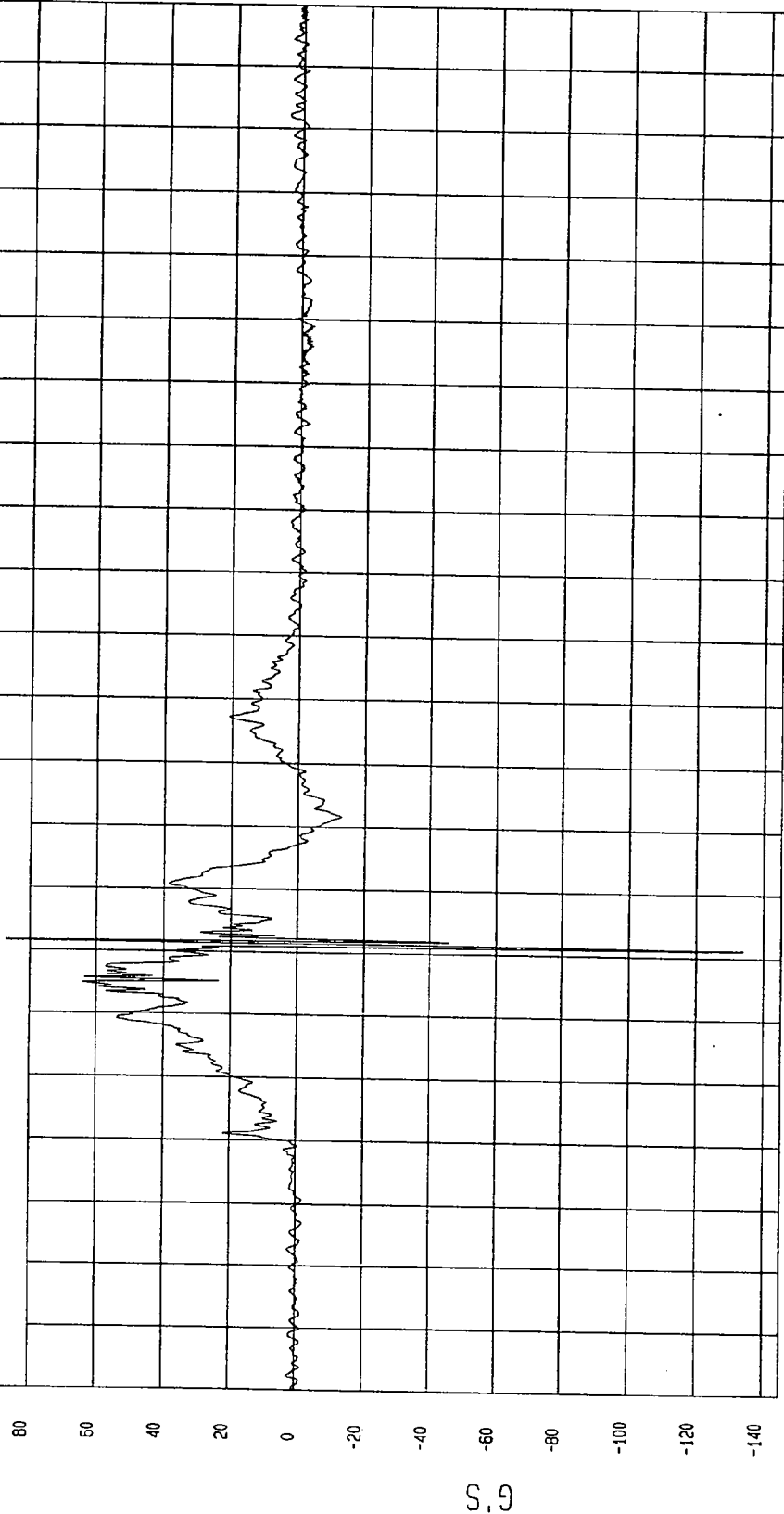


W&A Research
02-13-1997 11:31

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -133.91 G'S at 51 msec Maximum = 87.05 G'S at 52 msec

DRIVER LEFT FOOT HEEL Z ACCELERATION

1 C97021AF.A06 Filterclass (1000)



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

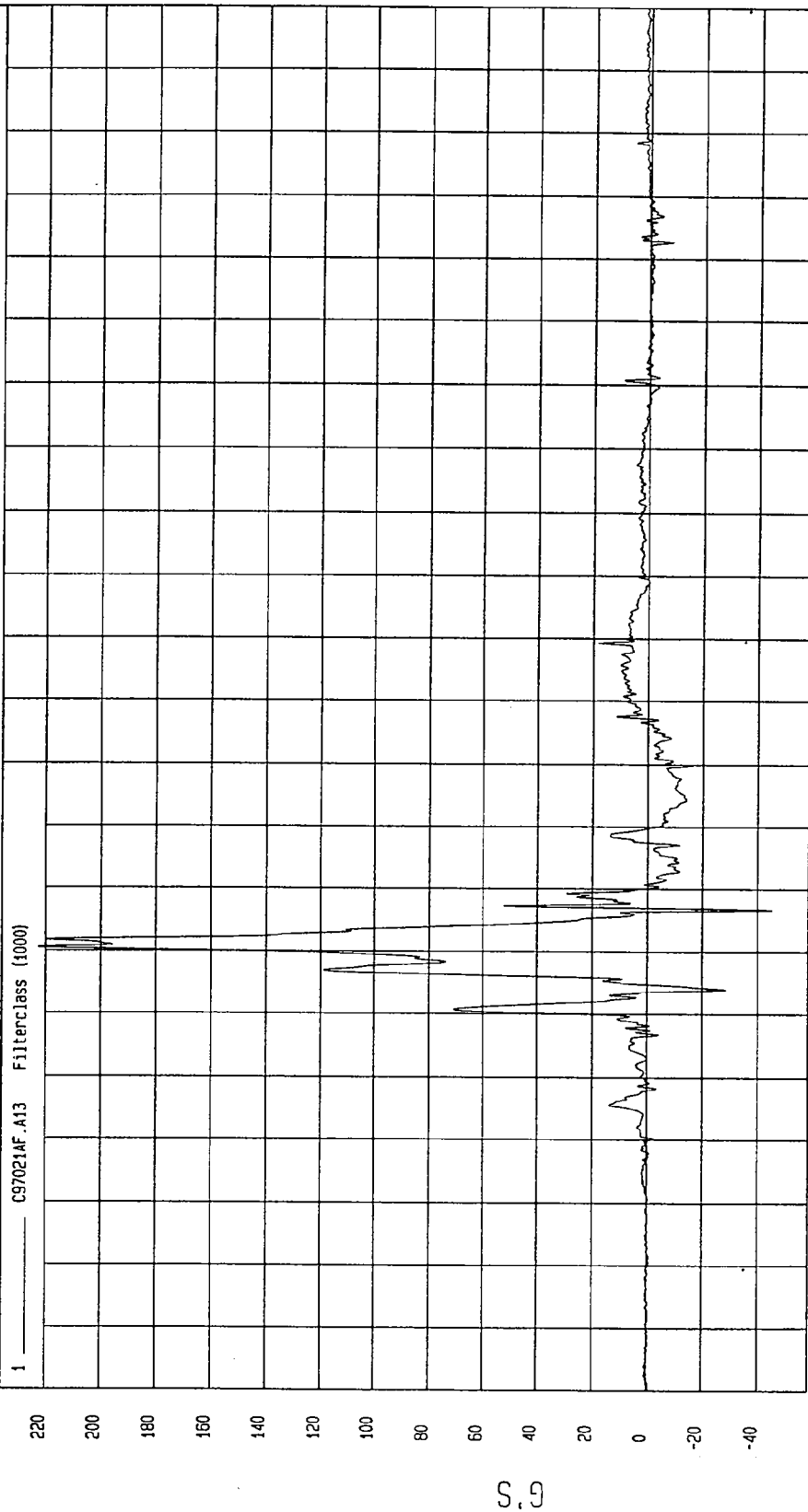
NGA Research
02-13-1997 11:32

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV01111) Speed: 35 MPH 56.3 KPH

Minimum = -45.25 G'S at 57 msec Maximum = 222.65 G'S at 50 msec

DRIVER RIGHT FOOT BALL Z ACCELERATION



TIME (seconds)

NSA Research
02-13-1997 11:32

TEST: NCAP 35 MPH FRONTAL IMPACT

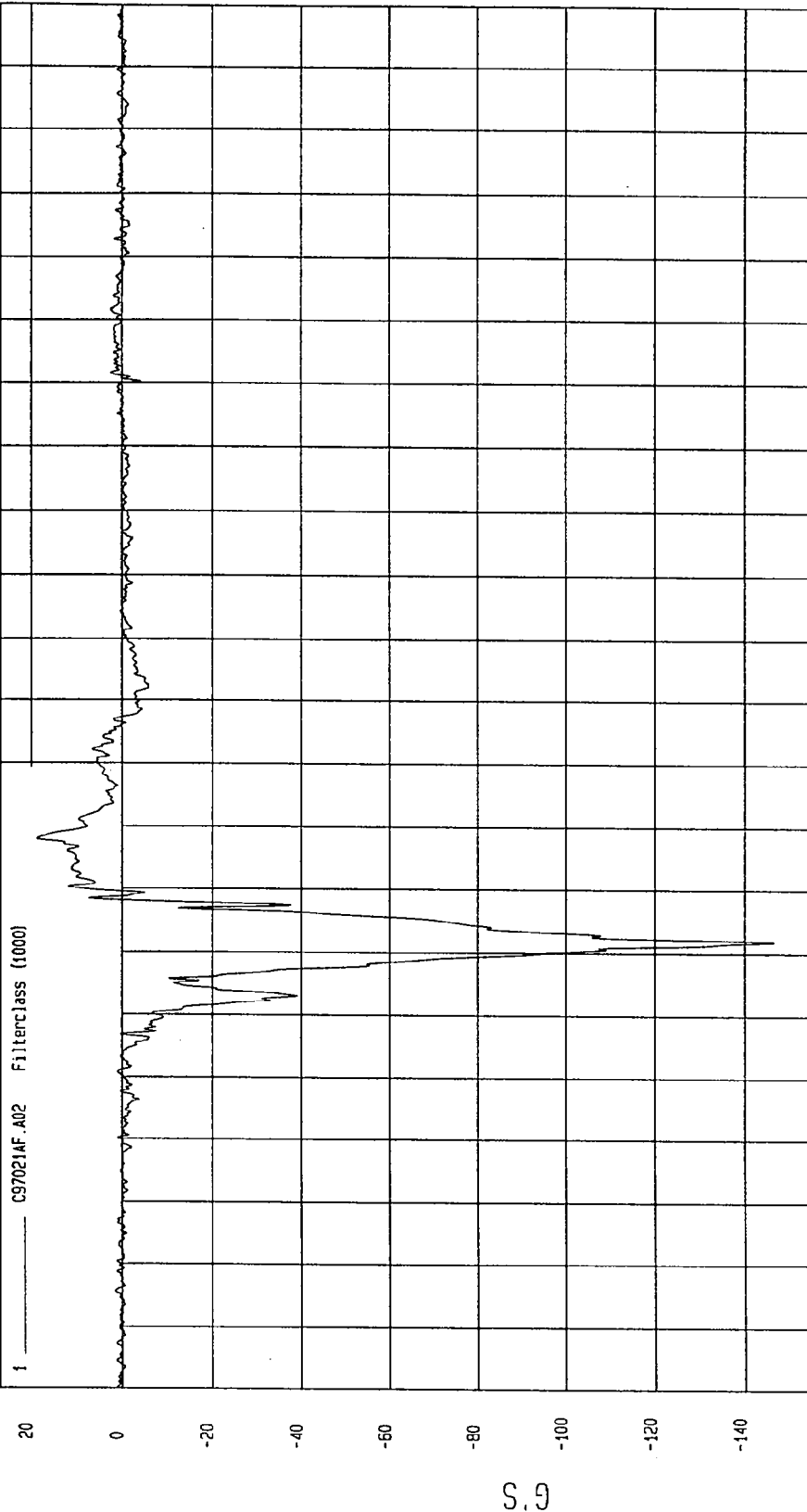
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -146.40 G'S at 52 msec

Maximum = 18.69 G'S at 68 msec

DRIVER RIGHT FOOT HEEL X ACCELERATION



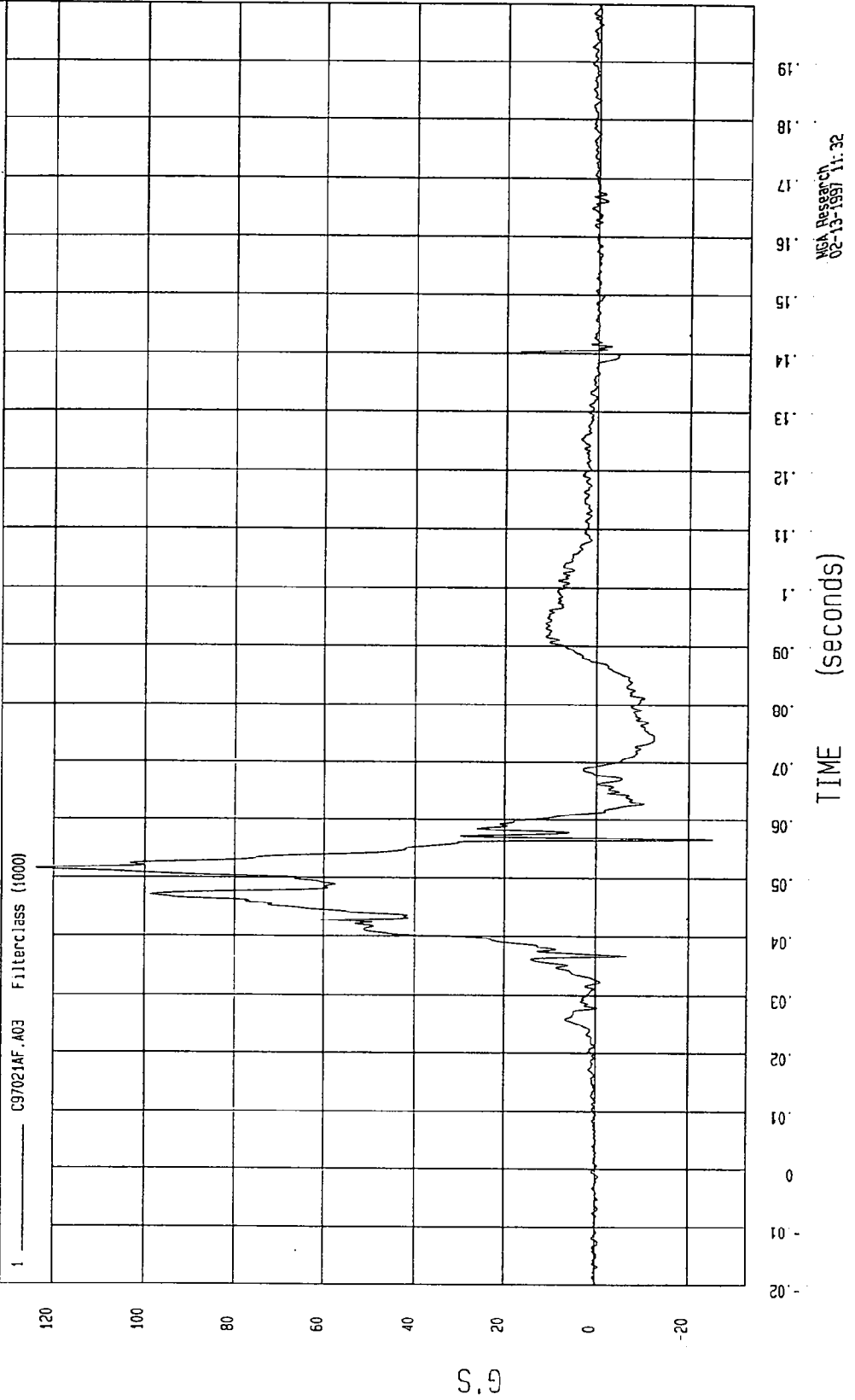
MCA Research
02-13-1997 11:32

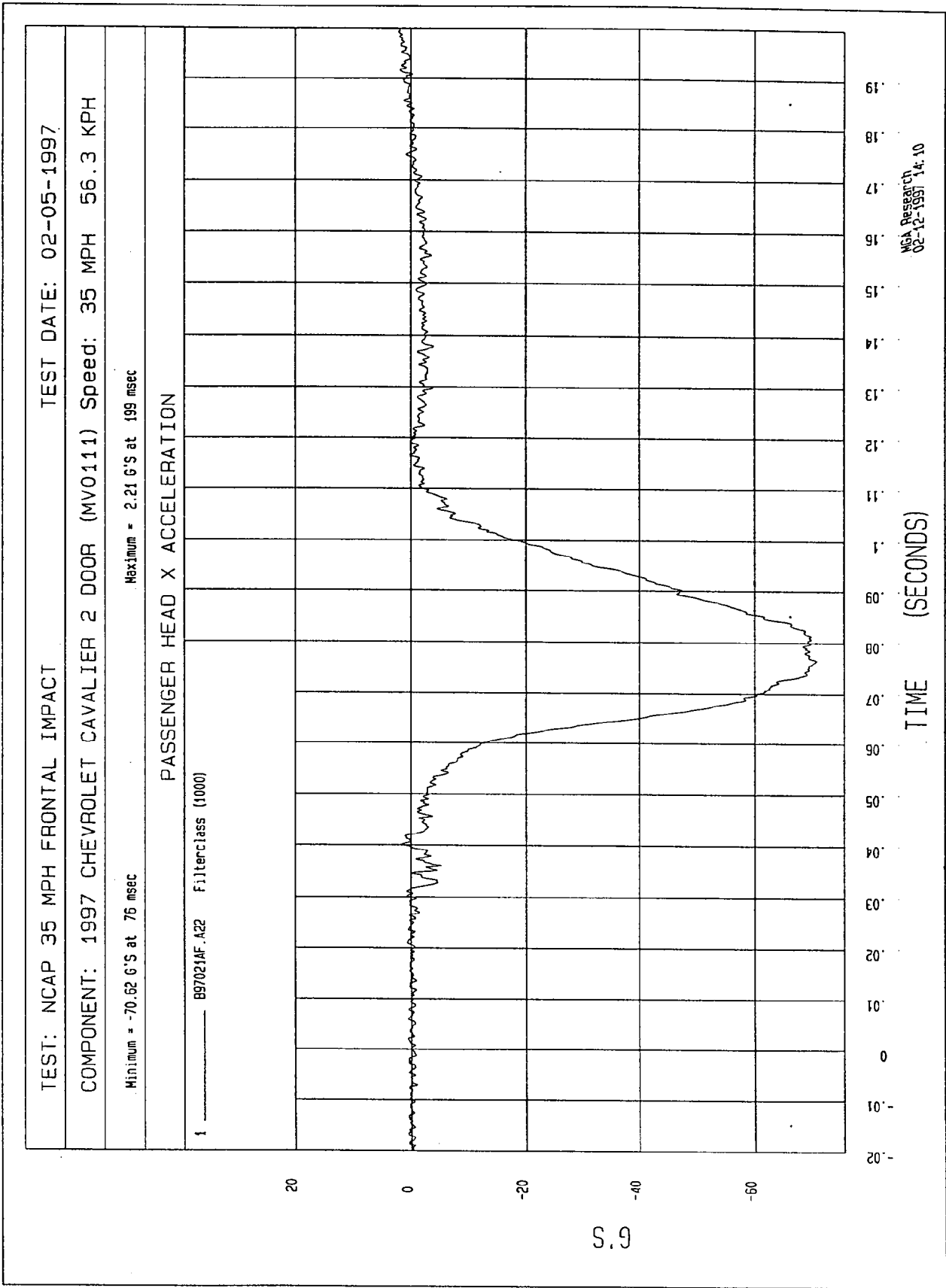
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -25.37 G's at 57 msec Maximum = 123.88 G's at 52 msec

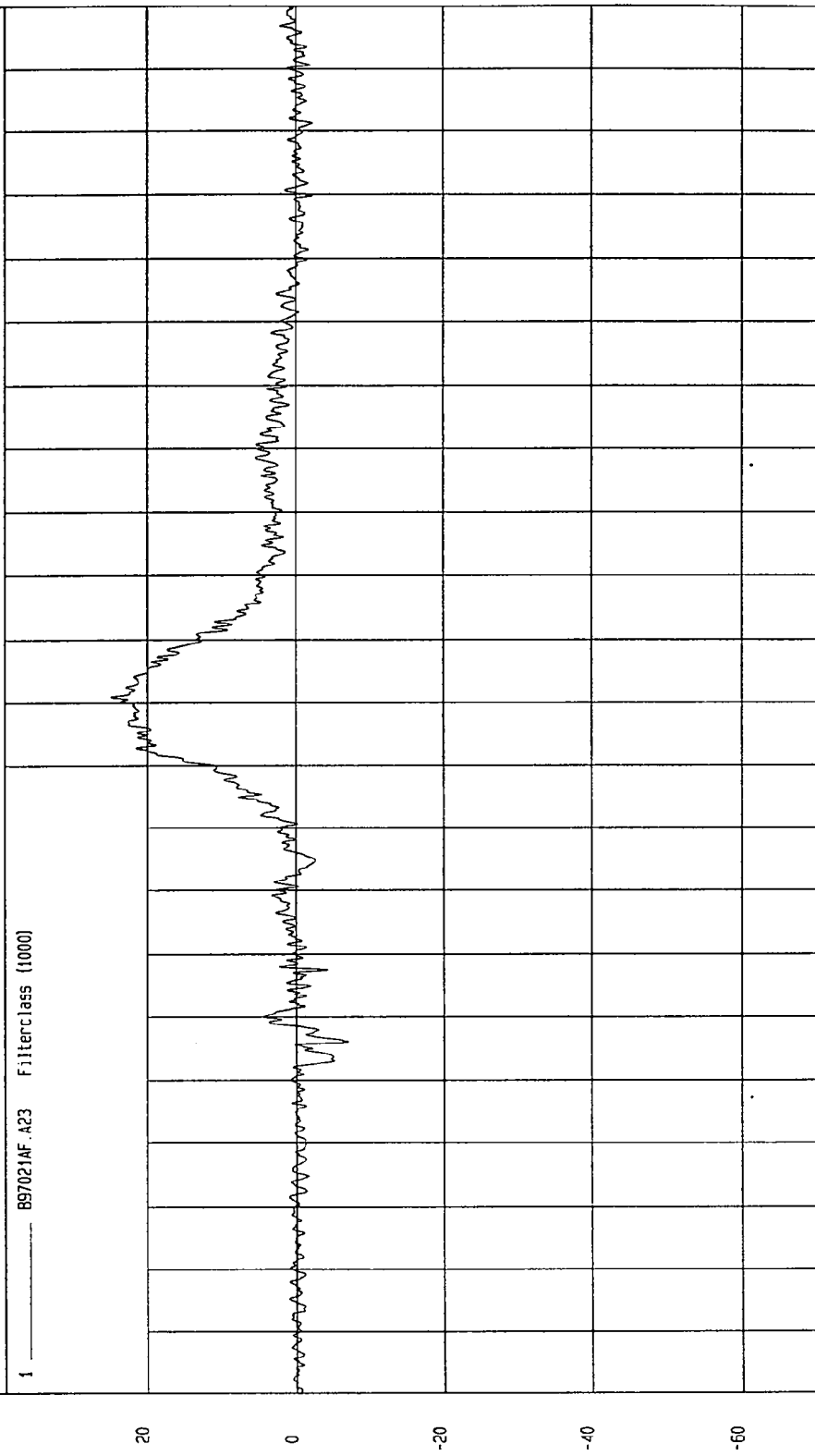
DRIVER RIGHT FOOT HEEL Z ACCELERATION





TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH
Minimum = -7.12 G'S at 36 msec Maximum = 24.81 G'S at 91 msec

PASSENGER HEAD Y ACCELERATION



MGA Research
02-12-1997 14.10

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 D00R (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -22.79 G'S at 58 msec

Maximum = 9.96 G'S at 104 msec

PASSENGER HEAD Z ACCELERATION

1 ——— 897021AF.A24 Filterclass (1000)

20

0

-20

-40

-60

G

TIME (SECONDS)

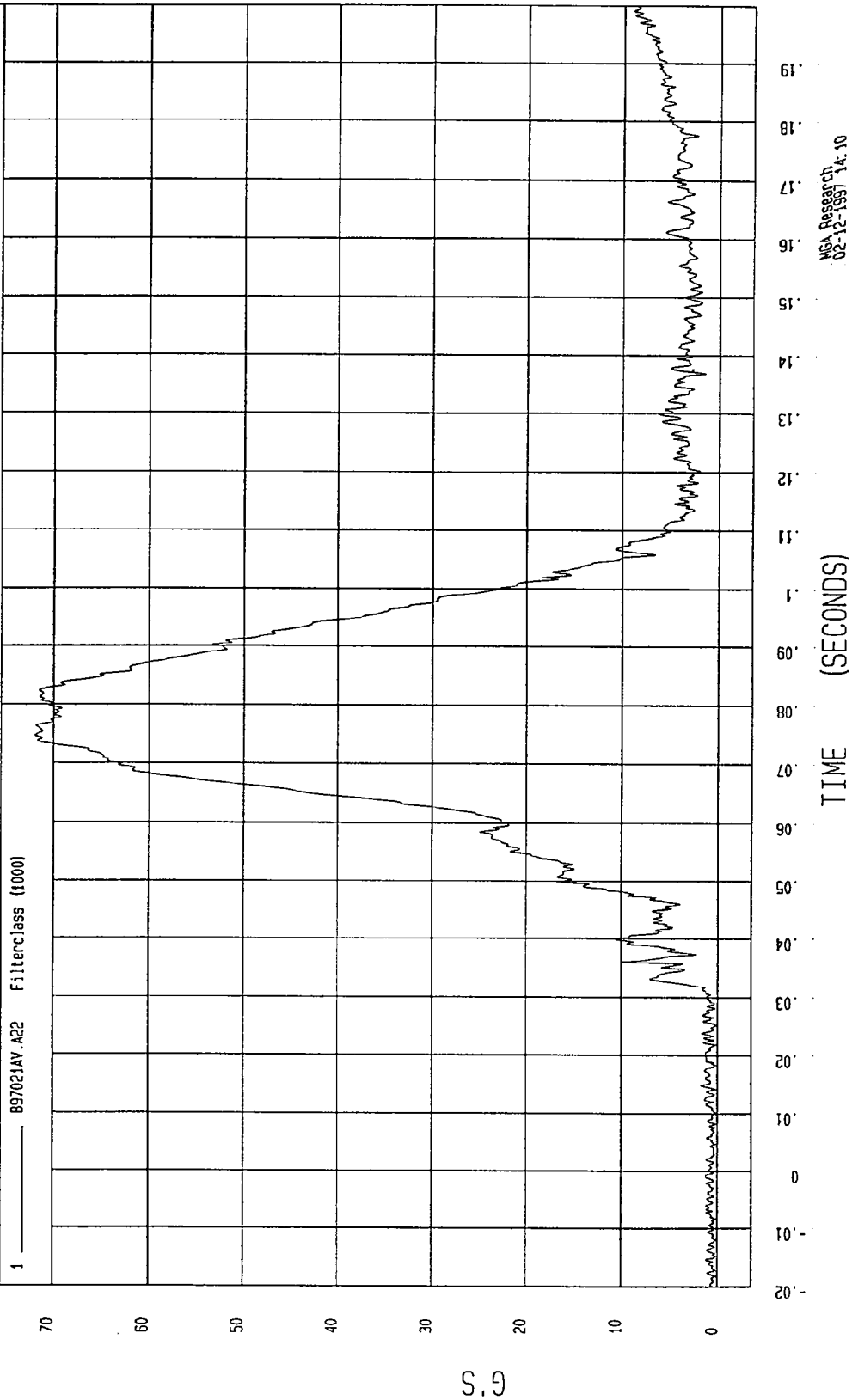
NGA Research
02-12-1997 14:10

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = .11 G'S at -8 msec Maximum = 71.93 G'S at 74 msec

PASSENGER HEAD RESULTANT ACCELERATION

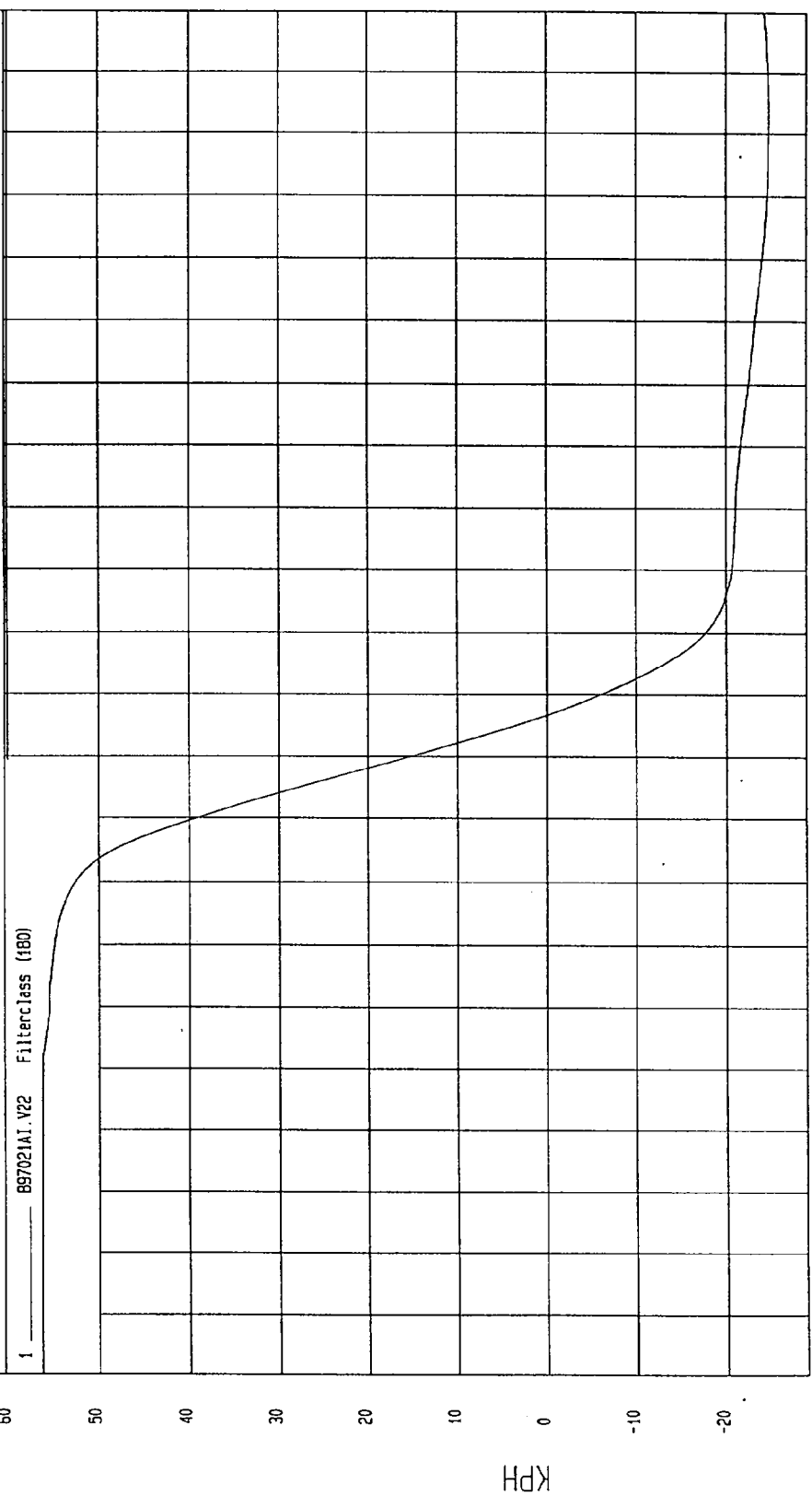


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -24.70 KPH at 184 msec Maximum = 56.30 KPH at -8 msec

PASSENGER HEAD X VELOCITY



TIME Seconds

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

MSA Research
02-12-1997 14: 17

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -70.34 G'S at 76 msec

Maximum = 2.76 G'S at 199 msec

PASSENGER HEAD REDUNDANT X ACCELERATION

1 B97021AF.A36 Filterclass (1000)

20 0 -20 -40 -60

G

TIME (SECONDS)

WCA Research
02-12-1997 14:13

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

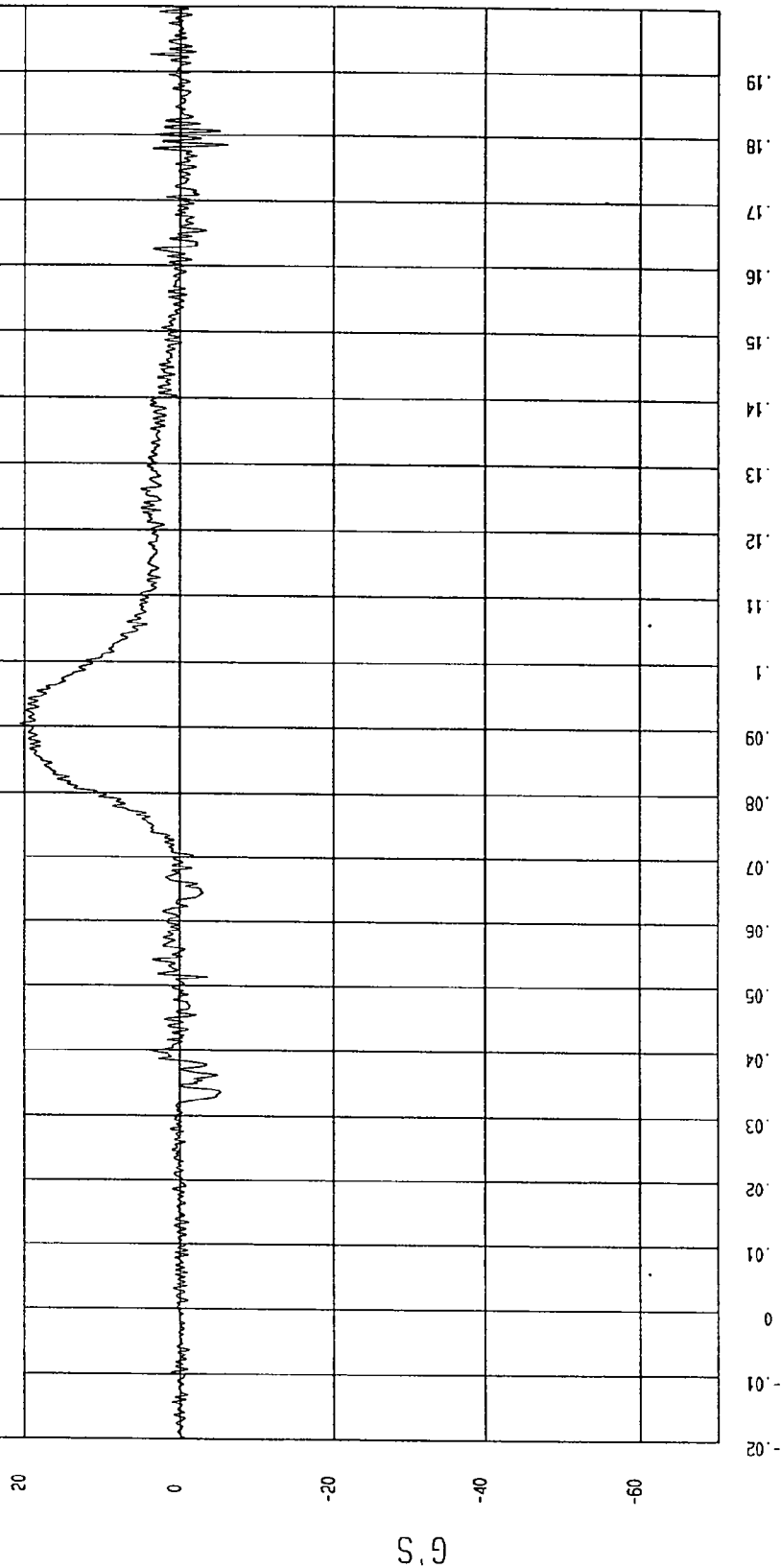
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -5.27 G'S at 178 msec

Maximum = 20.55 G'S at 90 msec

PASSENGER HEAD REDUNDANT Y ACCELERATION

1 _____ B97021AF.A39 Filterclass (f000)



MCA Research
02-12-1997 14:13

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -21.78 G'S at 58 msec
Maximum = 10.57 G'S at 104 msec

PASSENGER HEAD REDUNDANT Z ACCELERATION

1 ——— 897021AF.A40 Filterclass (1000)

20

0

-20

-40

-60

G'S

TIME (SECONDS)

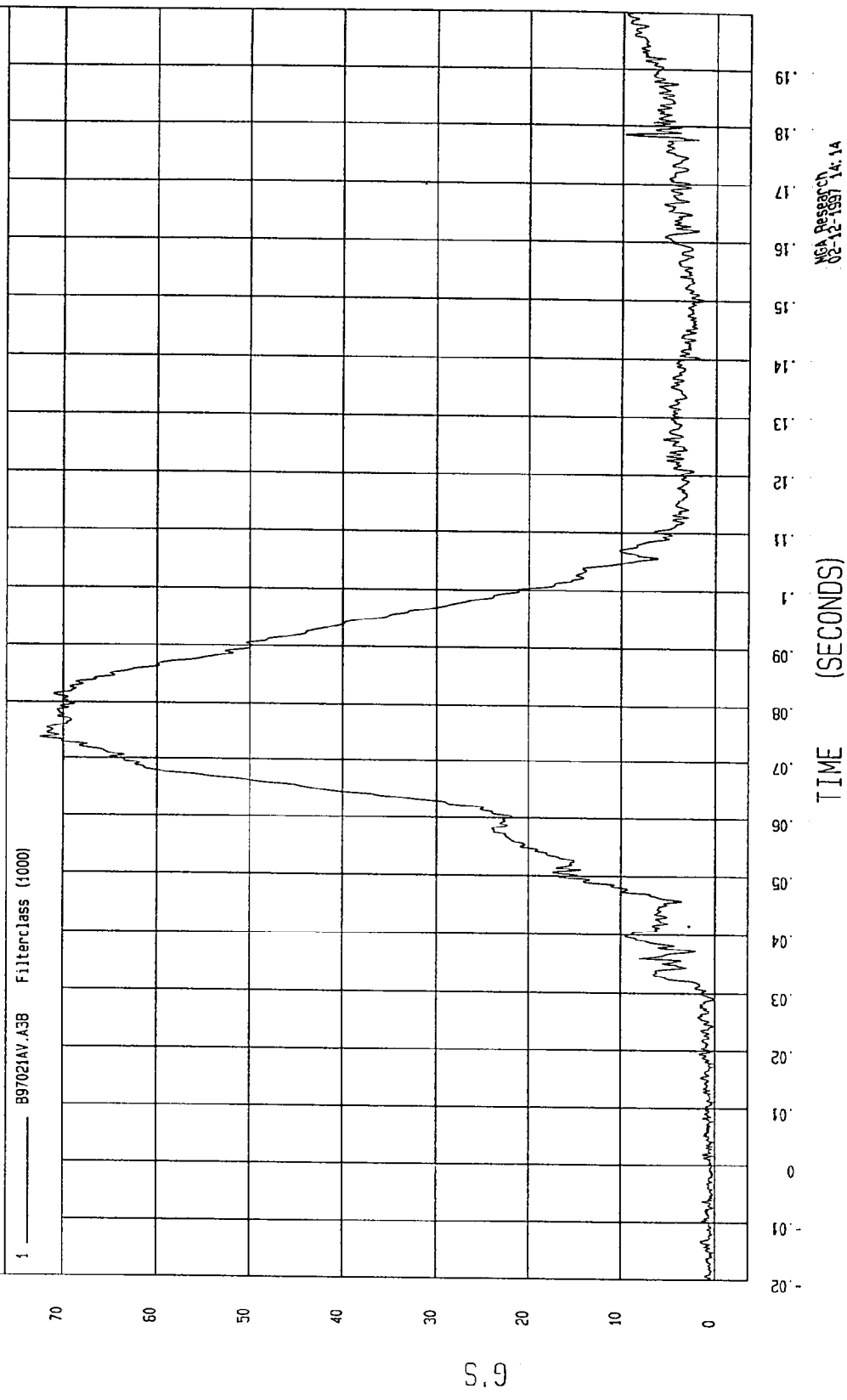
MCA Research
02-12-1997 14:13

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 3.94E-02 G'S at 4 msec Maximum = 72.48 G'S at 74 msec

PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION

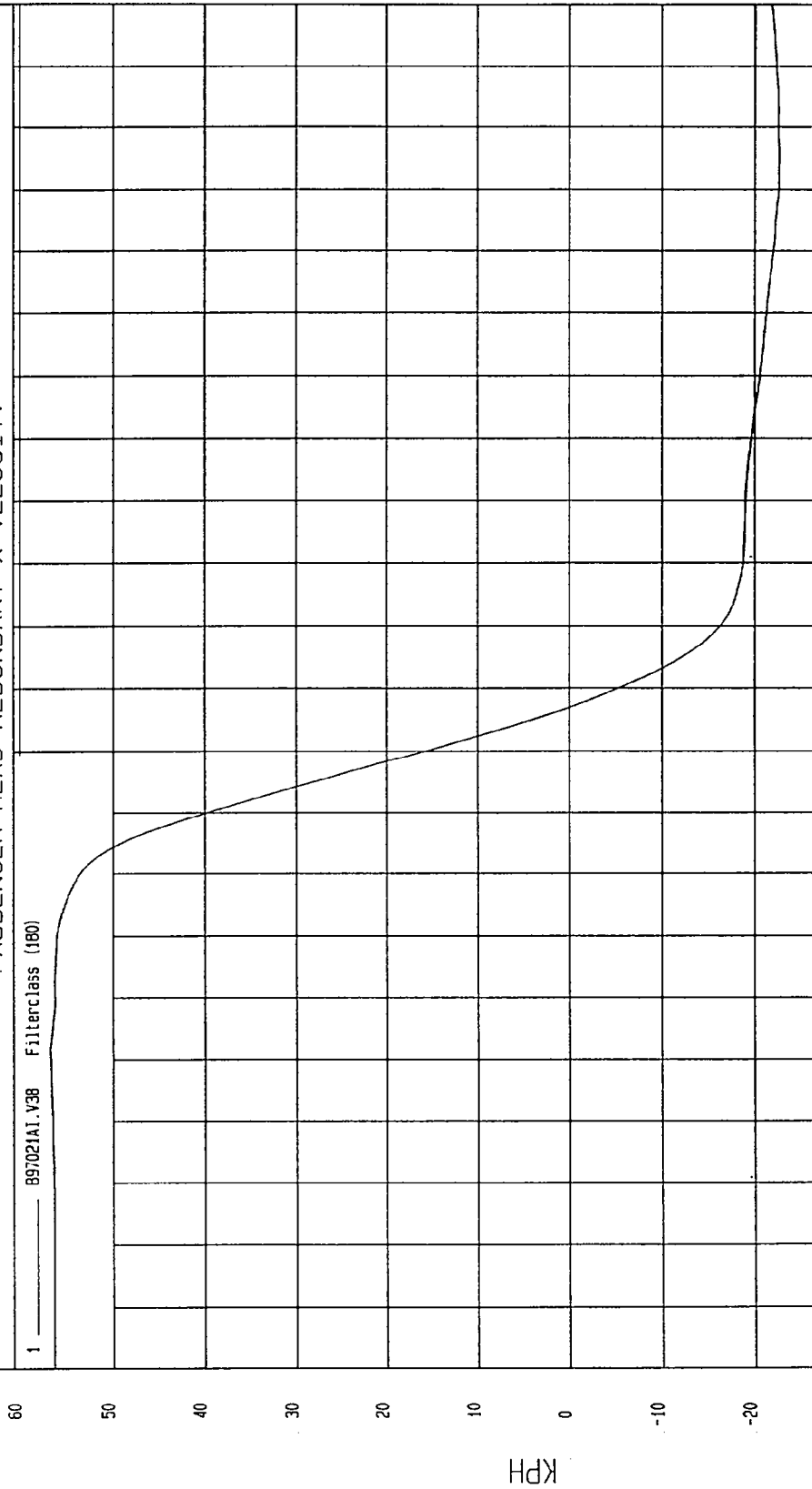


TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

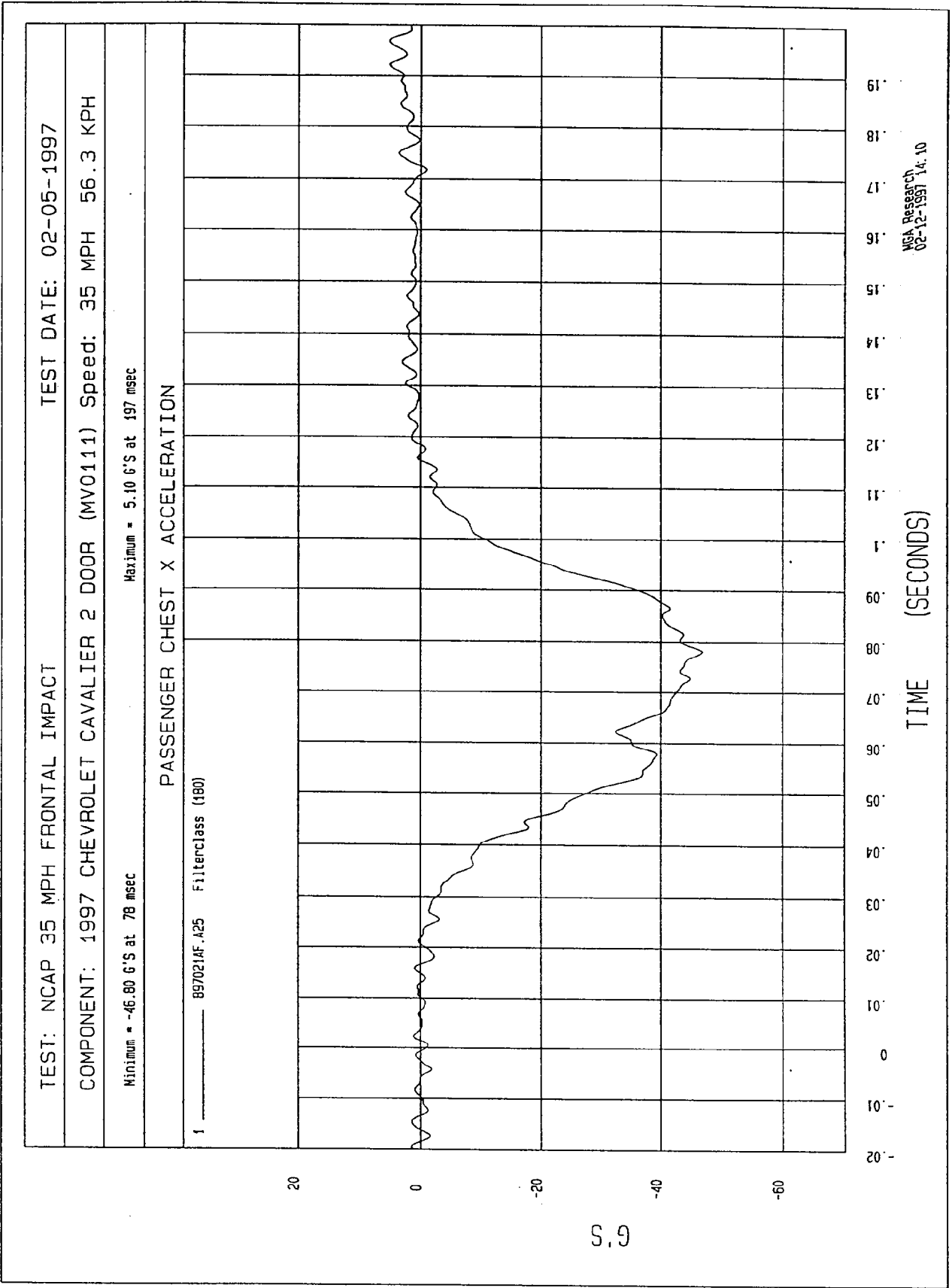
Minimum = -22.57 KPH at 176 msec Maximum = 56.71 KPH at 32 msec

PASSENGER HEAD REDUNDANT X VELOCITY



TIME Seconds

NGA Research
02-12-1997 14:17



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -2.03 G'S at 58 msec

Maximum = 6.14 G'S at 88 msec

PASSENGER CHEST Y ACCELERATION

1 ——— B97021AF.A26 Filterclass (180)

20

0

-20

-40

-60

G.S

-20

-10

0

10

20

30

40

50

60

70

80

90

1

11

12

13

14

15

16

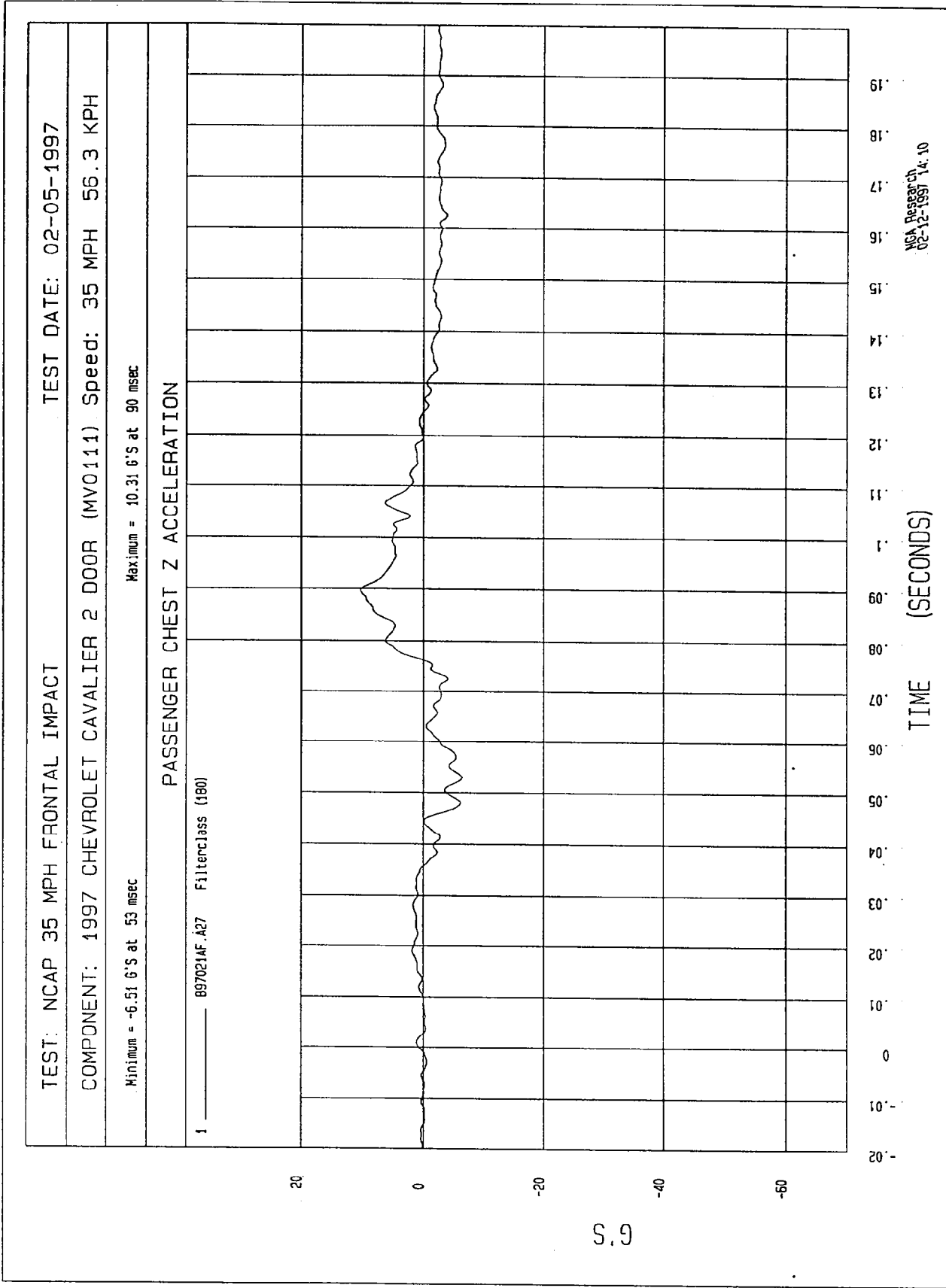
17

18

19

TIME (SECONDS)

MOA Research
02-12-1997 14: 10



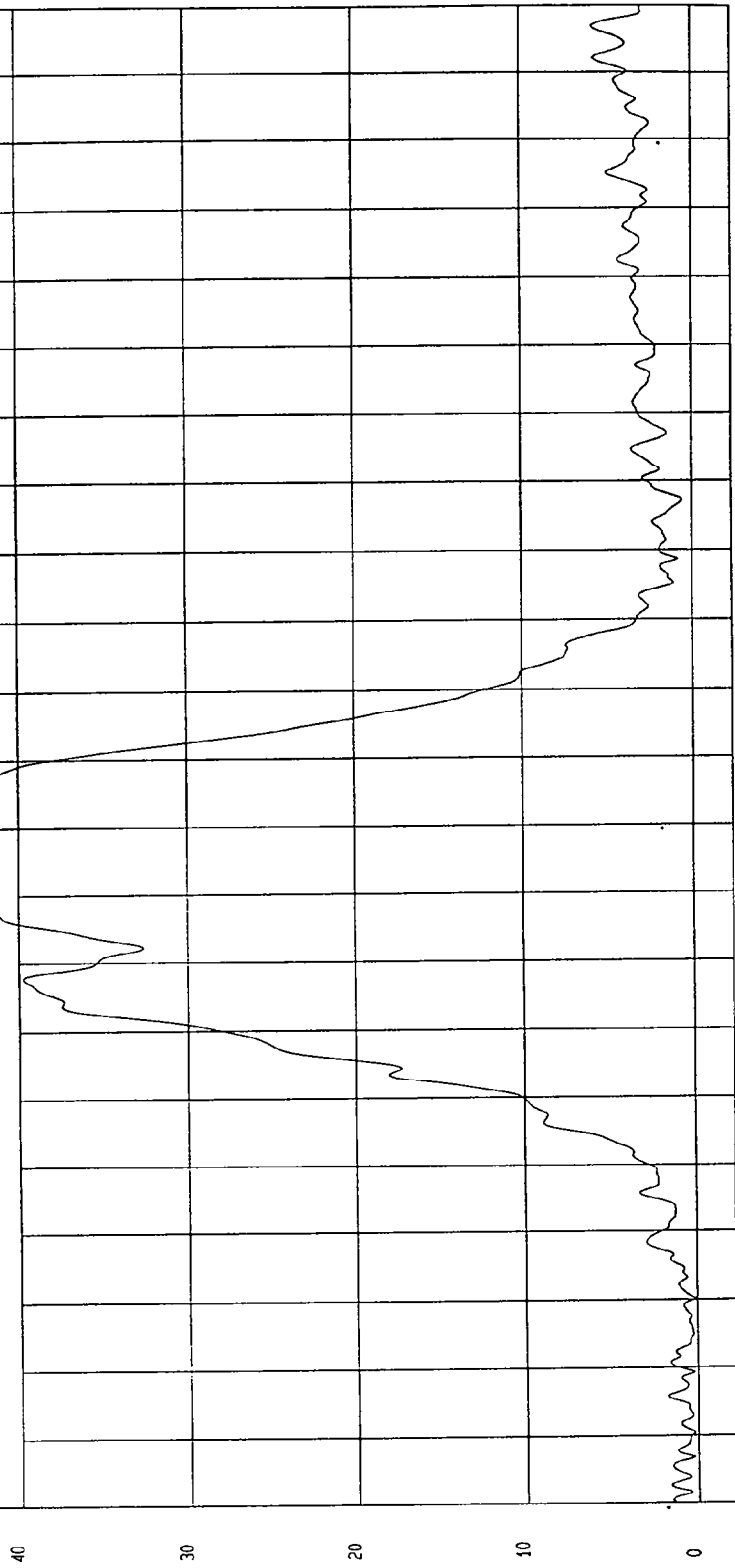
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = 4.64E-02 G'S at 10 msec Maximum = 47.01 G'S at 78 msec

PASSENGER CHEST RESULTANT ACCELERATION

1 _____ B97021AV.A25 FilterClass (180)



TIME (SECONDS)

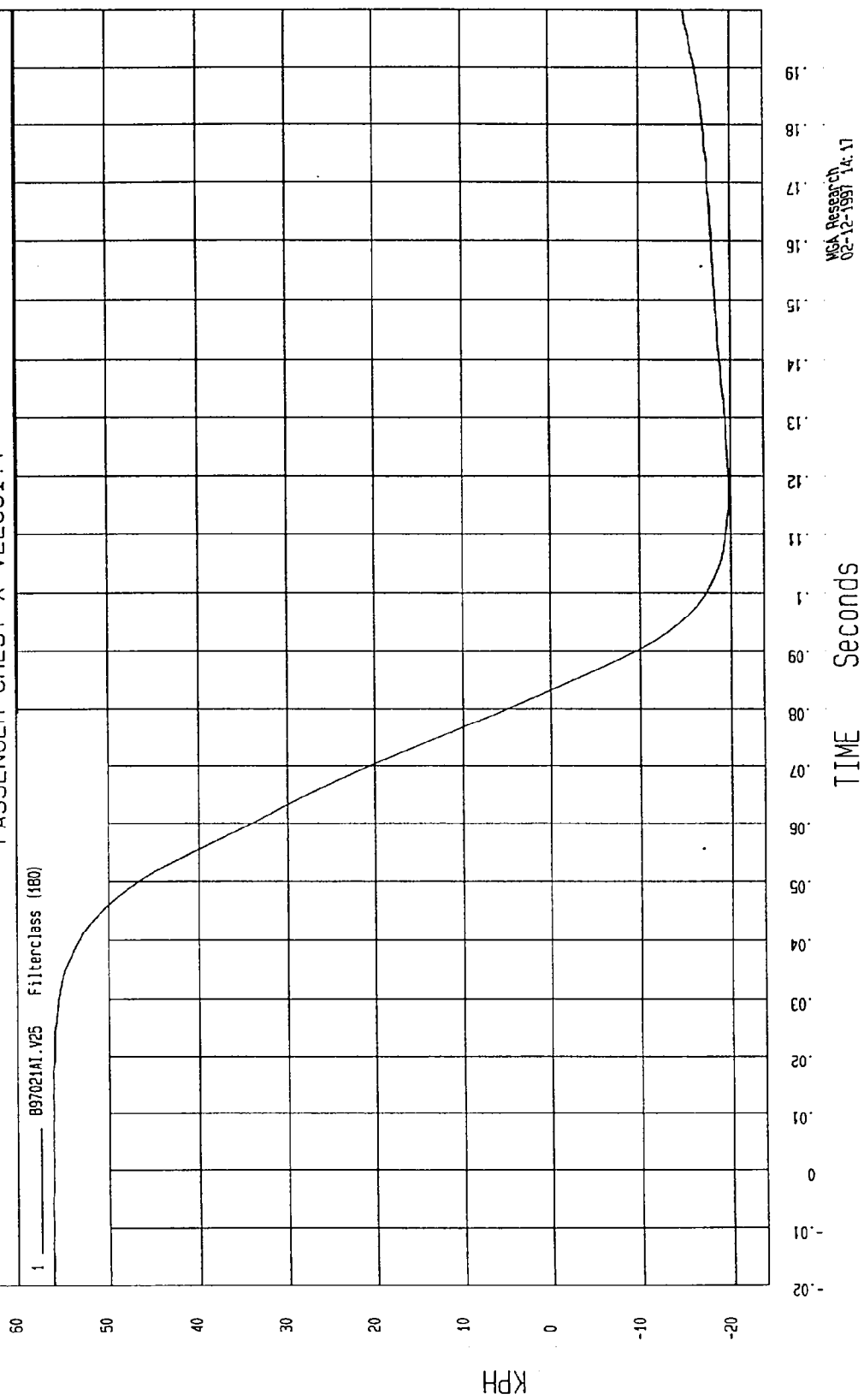
NSA Research
02-12-1997 14:10

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -19.82 KPH at 118 msec Maximum = 56.38 KPH at -13 msec

PASSENGER CHEST X VELOCITY



TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -46.71 G'S at 78 msec Maximum = 3.86 G'S at 193 msec

PASSENGER CHEST REDUNDANT X ACCELERATION

1 B97021AF.A42 Filterclass (180)

G.S

20

0

-20

-40

-60

TIME (SECONDS)

61

58

57

56

55

54

53

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47

46

45

44

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41

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4

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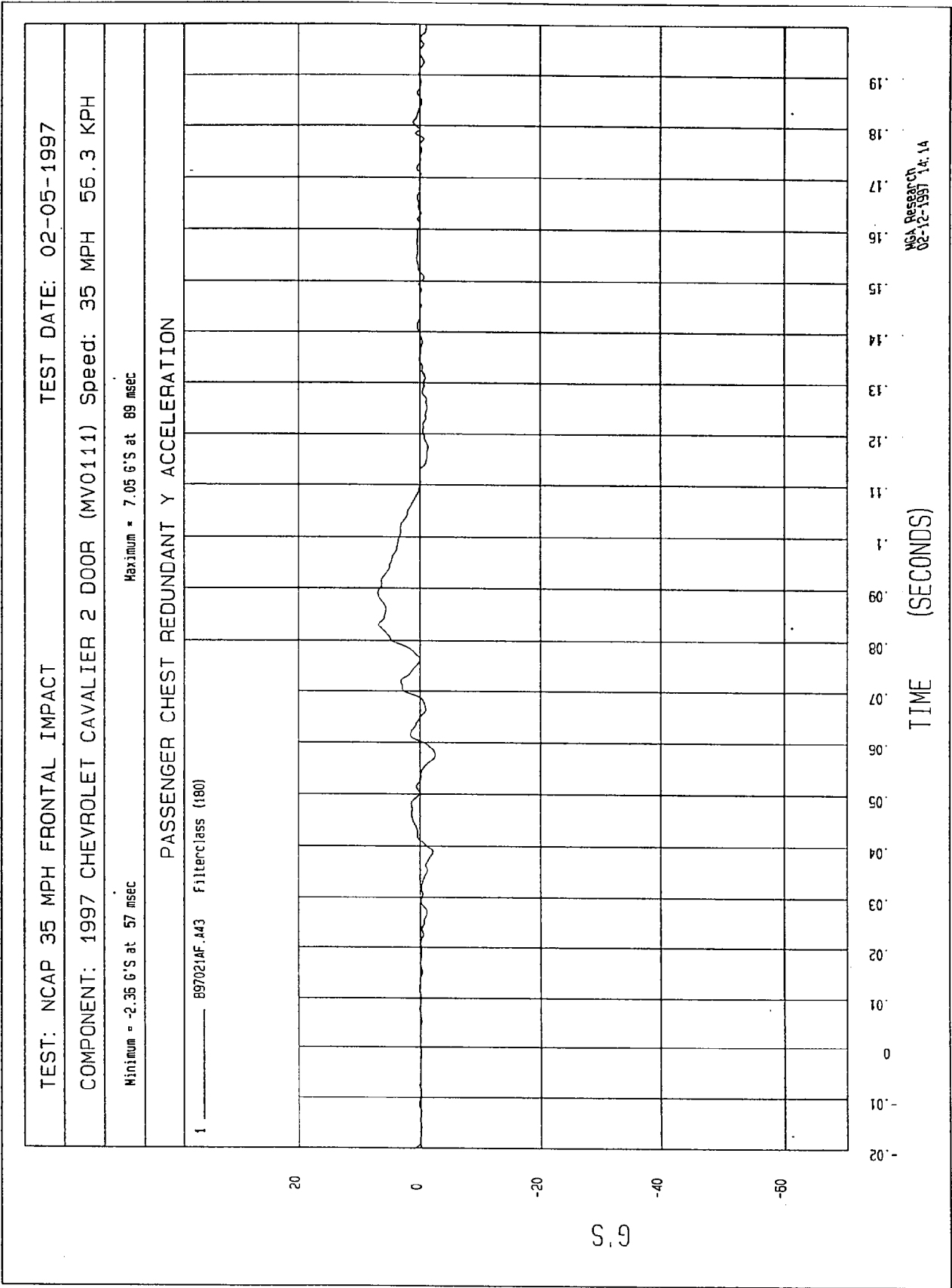
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MOA Research
02-12-1997 14: 14



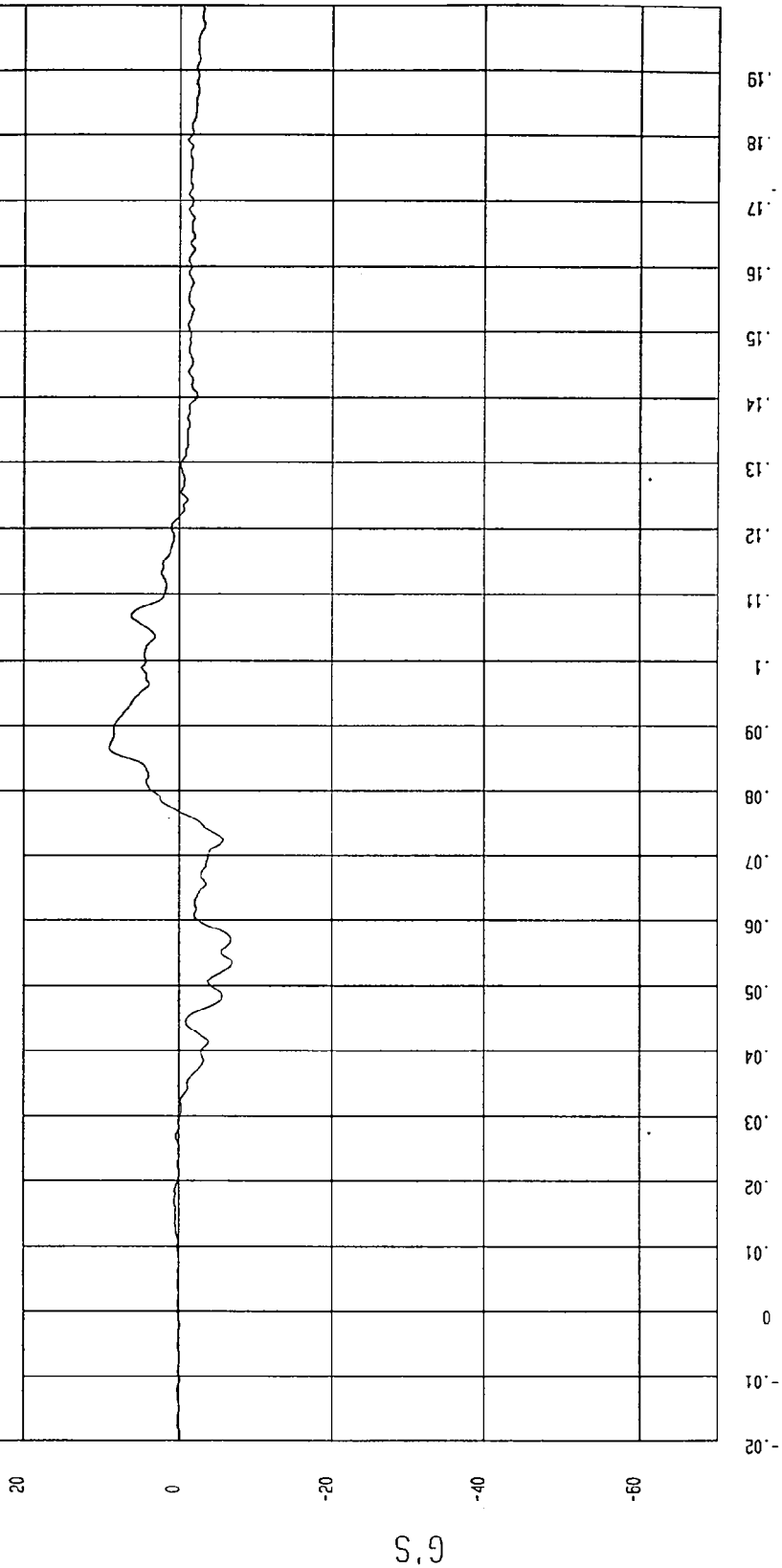
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

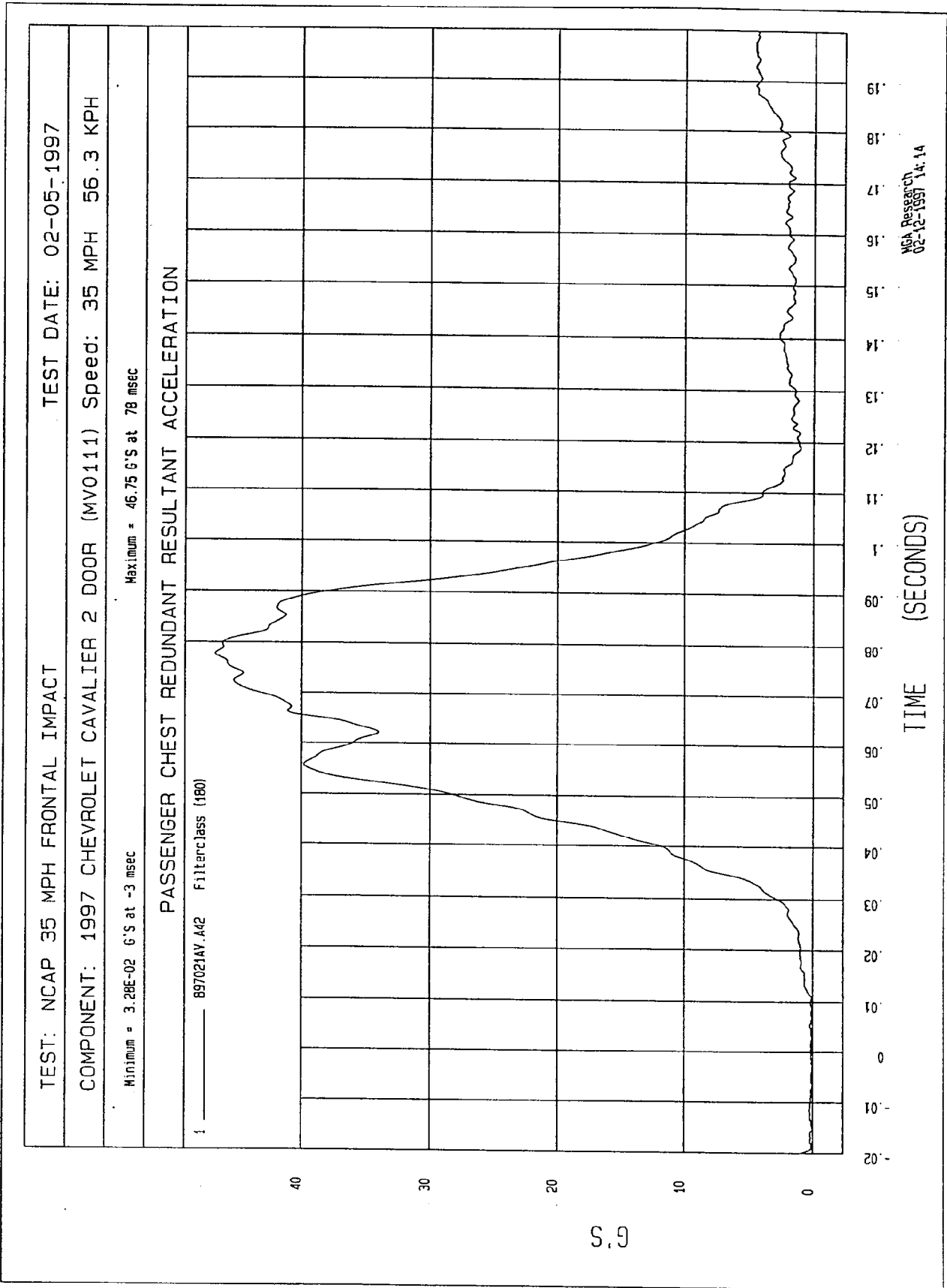
Minimum = -6.99 G'S at 54 msec Maximum = 8.98 G'S at 87 msec

PASSENGER CHEST REDUNDANT Z ACCELERATION

1 _____ 897021AF.A44 Filterclass (180)



MGA Research
02-12-1997 14:14



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -20.84 KPH at 116 msec

Maximum = 56.30 KPH at 4 msec

PASSENGER CHEST REDUNDANT X VELOCITY

1 B97021A1.V42 Filterclass (180)

60

50

40

30

20

10

0

-10

-20

KPH

19

18

17

16

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TIME Seconds

NSA Research
02-12-1997 14:17

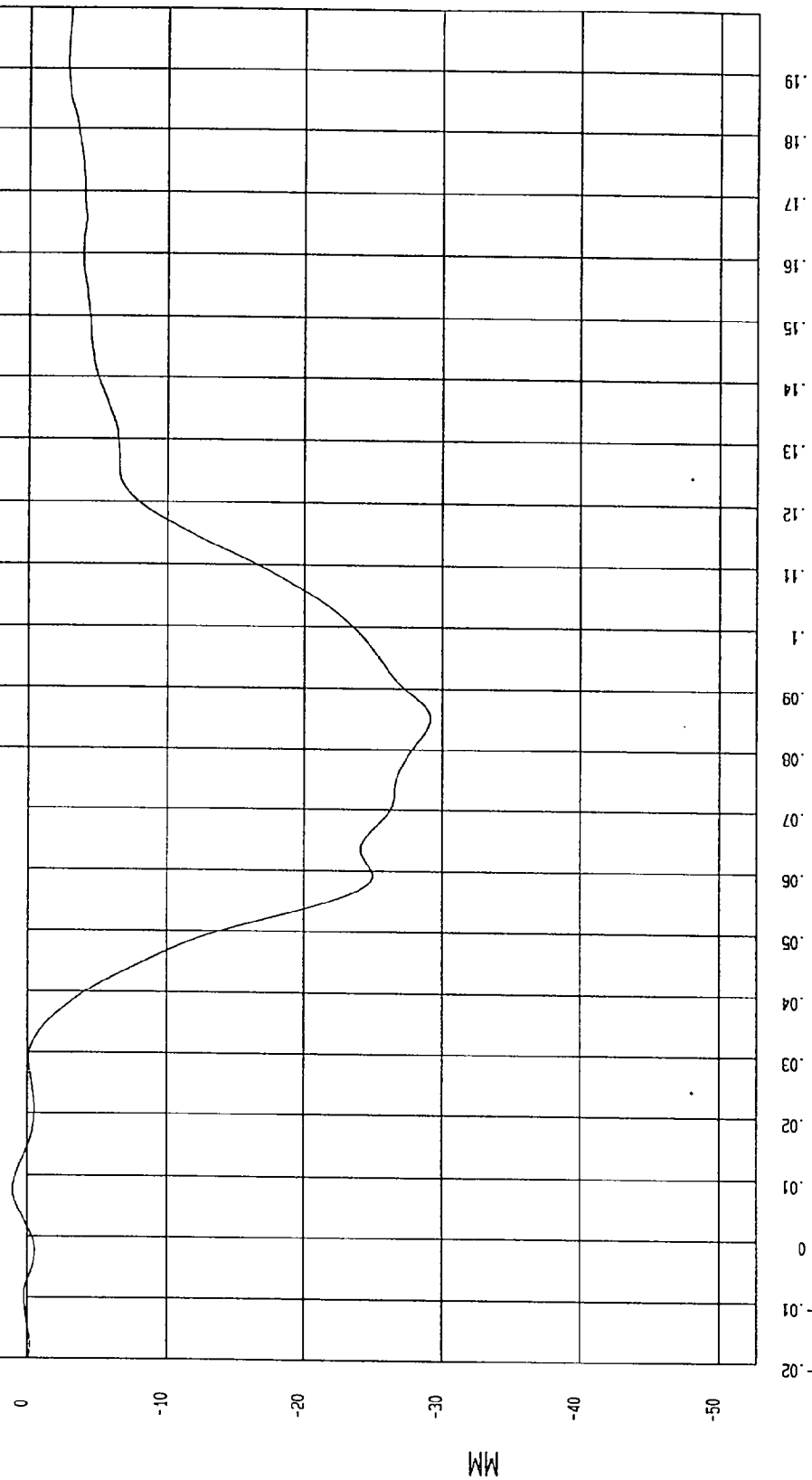
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -29.16 MM at 85 msec Maximum = 1.04 MM at 8 msec

PASSENGER CHEST COMPRESSION

1 ——— 8970210F.059 Filterclass (60)



NSA Research
02-12-1997 14:11

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -3943.99 N at 45 msec

Maximum = 555.09 N at 93 msec

PASSENGER LEFT FEMUR FORCE

1 ——— 89702iff.f29 Filterclass (600)

1000

0

-1000

-2000

-3000

-4000

-5000

N

61

18

17

16

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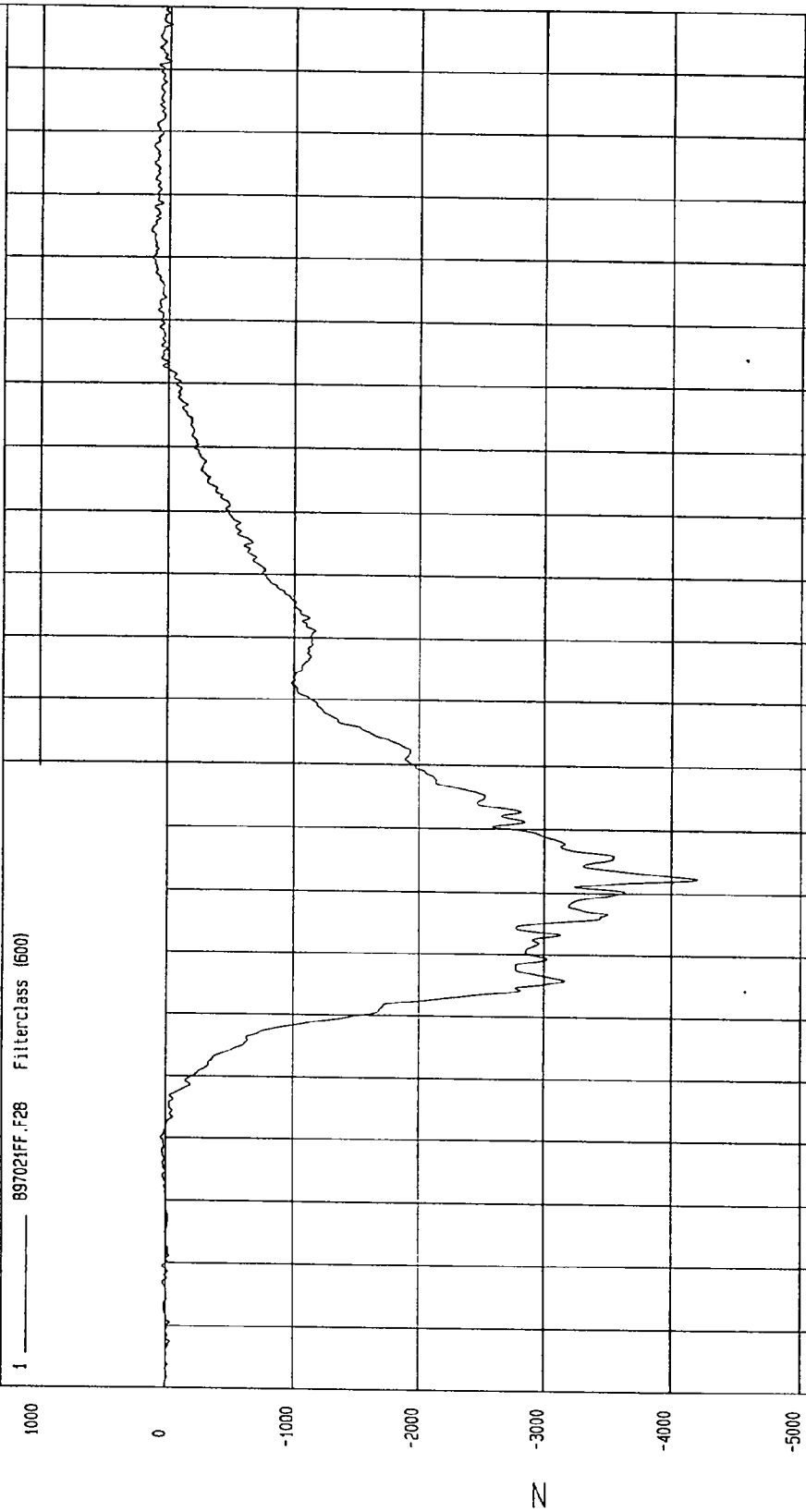
MCA Research
02-12-1997 14:11

TIME (SECONDS)

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -4207.38 N at 62 msec Maximum = 141.17 N at 184 msec

PASSENGER RIGHT FEMUR FORCE

1 897021FF.F28 Filterclass (600)



MCA Research
02-12-1997 14:12

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -51.60 G'S at 56 msec Maximum = 6.76 G'S at 108 msec

PASSENGER PELVIS X ACCELERATION

1 ——— 897021AF.A63 Filterclass (1000)

20

0

-20

-40

-60

G'S

-0.02 -0.01 0 .01 .02 .03 .04 .05 .06 .07 .08 .09 .1 .11 .12 .13 .14 .15 .16 .17 .18 .19

TIME (SECONDS)

MSA Research
02-12-1997 14:11

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -9.72 G'S at 45 msec

Maximum = 5.81 G'S at 75 msec

PASSENGER PELVIS Y ACCELERATION

1 ——— B97021AF.A64 Filterclass (1000)

20

0

-20

-40

-60

G.S

TIME (SECONDS)

NGA Research
02-12-1997 14:11

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

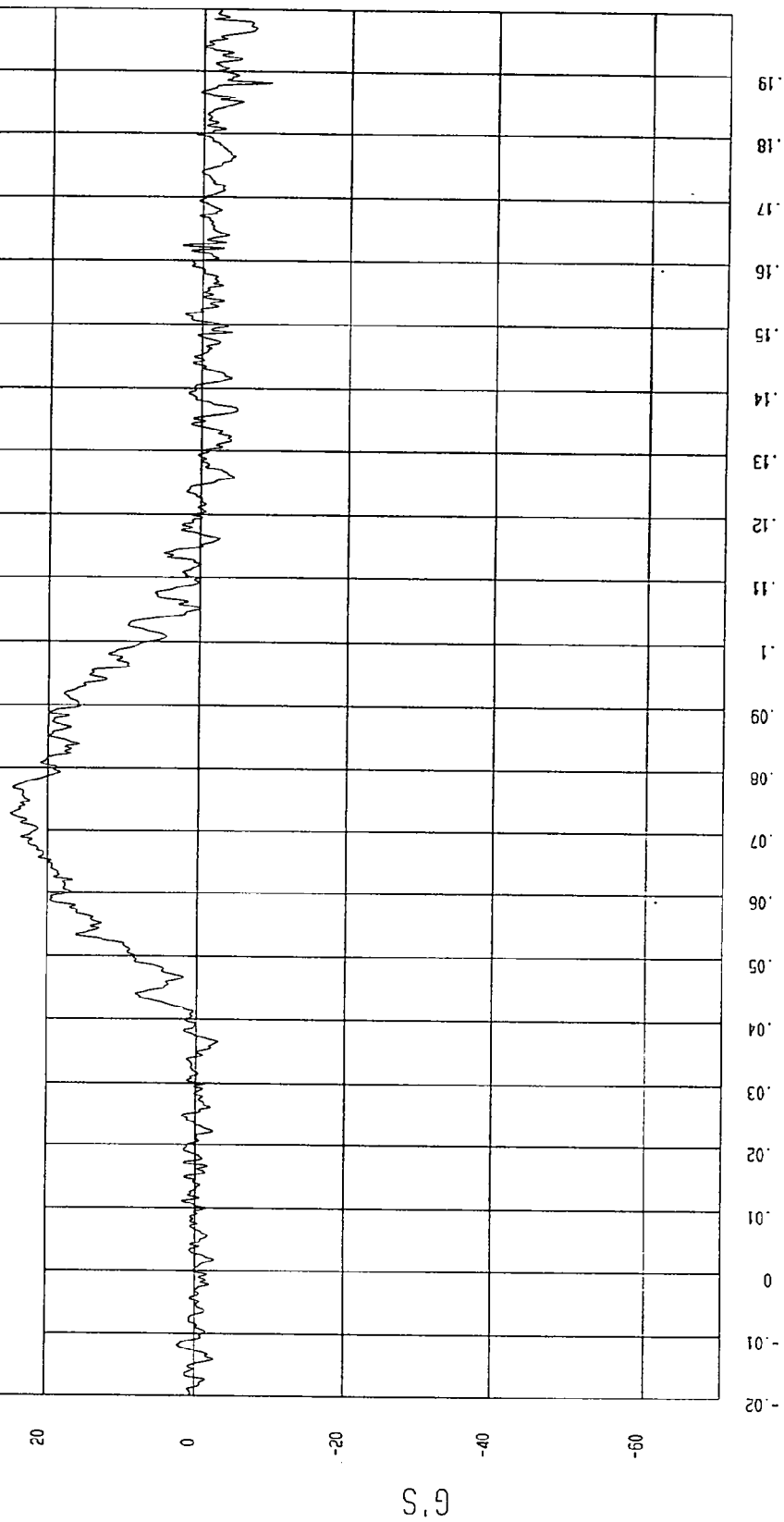
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -9.24 G'S at 188 msec

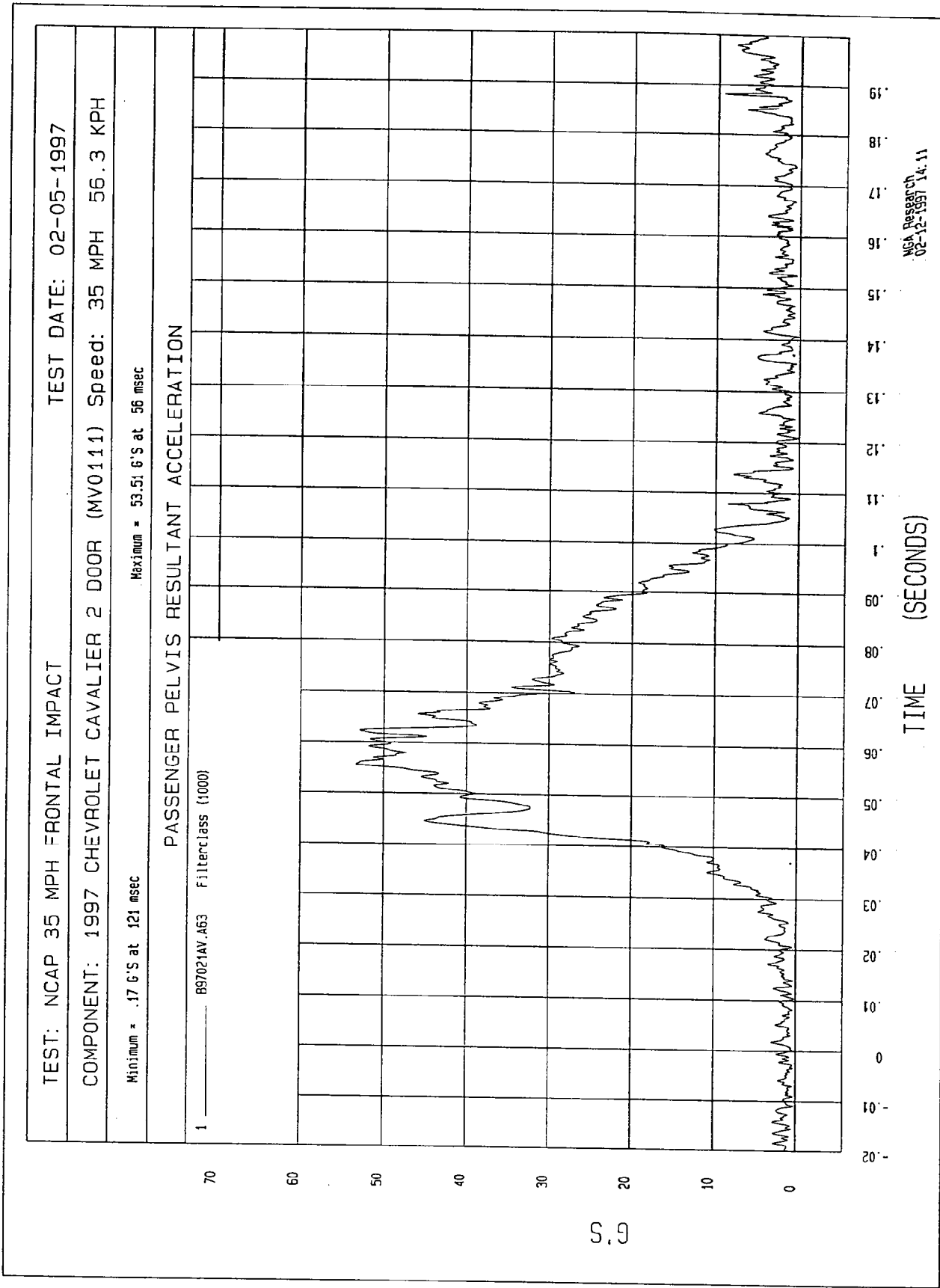
Maximum = 25.09 G'S at 73 msec

PASSENGER PELVIS Z ACCELERATION

1 ——— 897021AF.A65 Filterclass (1000)



MCA Research
02-12-1997 14:11



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

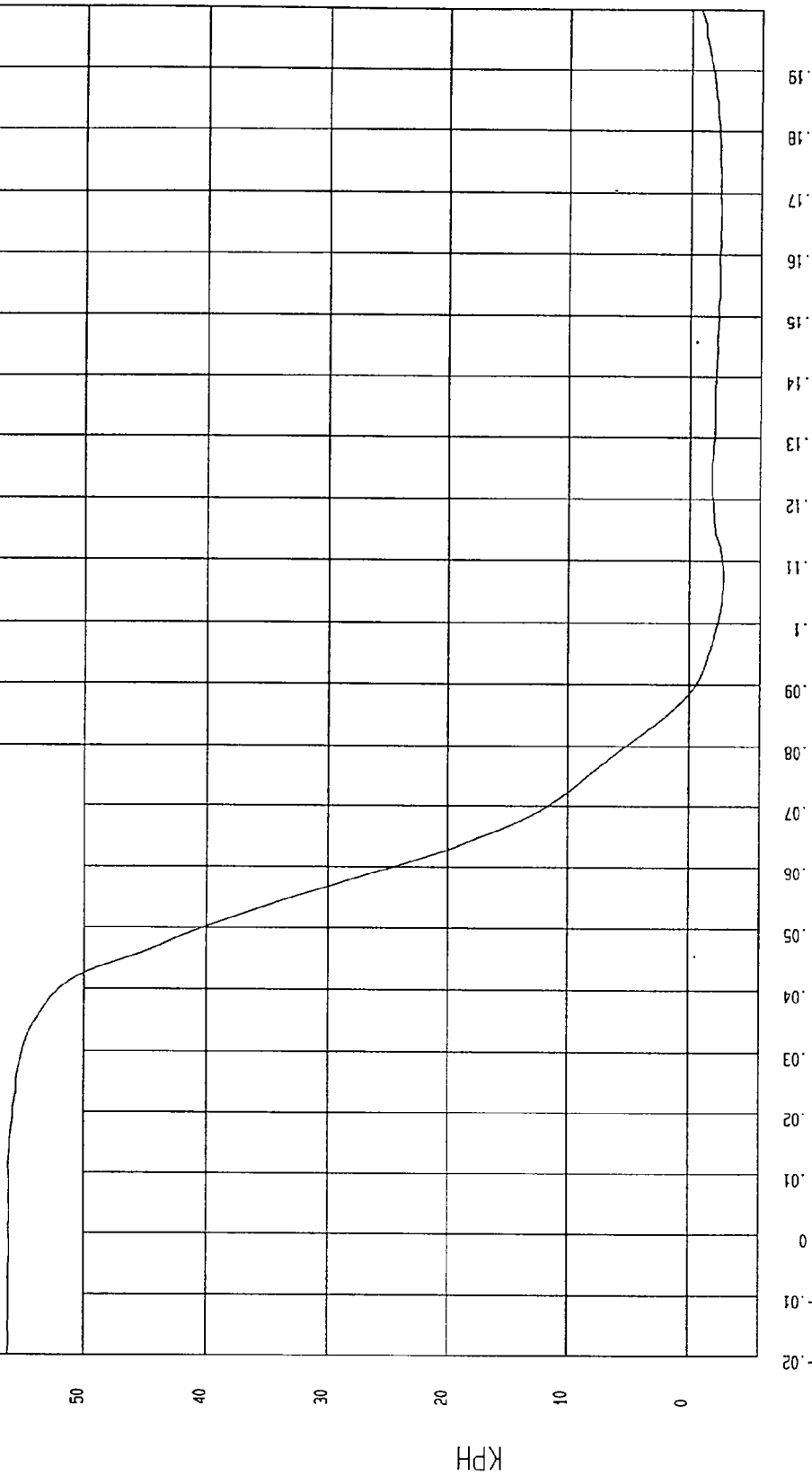
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -2.75 KPH at 107 msec

Maximum = 56.3 KPH at -20 msec

PASSENGER PELVIS X VELOCITY

1 897021A1.V63 Filterclass (180)



WCA Research
02-12-1997 14:17

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

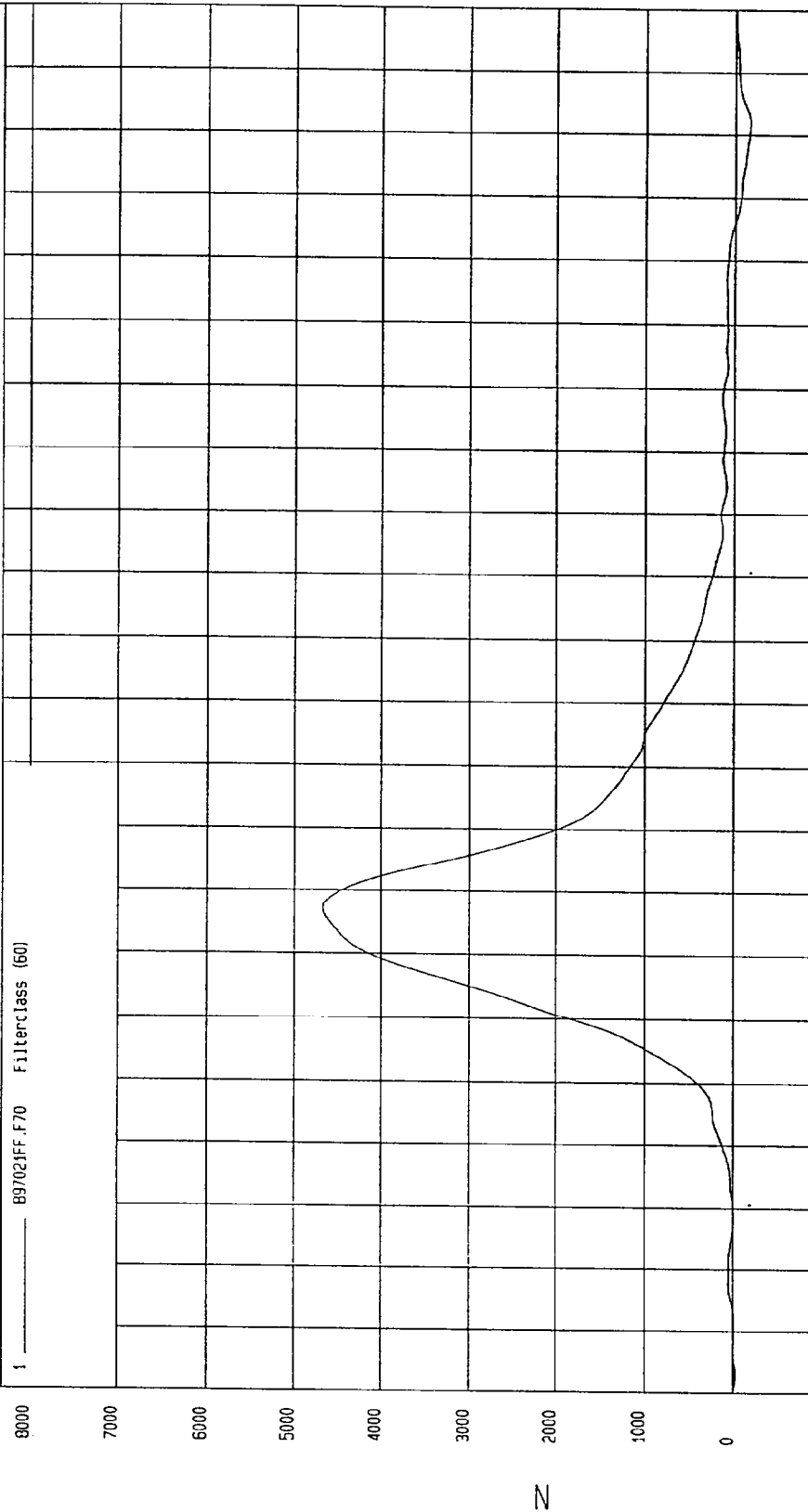
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -163.44 N at 182 msec

Maximum = 4682.68 N at 57 msec

PASSENGER LAP BELT FORCE

1 ——— B97021FF.F70 Filter(class 60)



TIME (SECONDS)

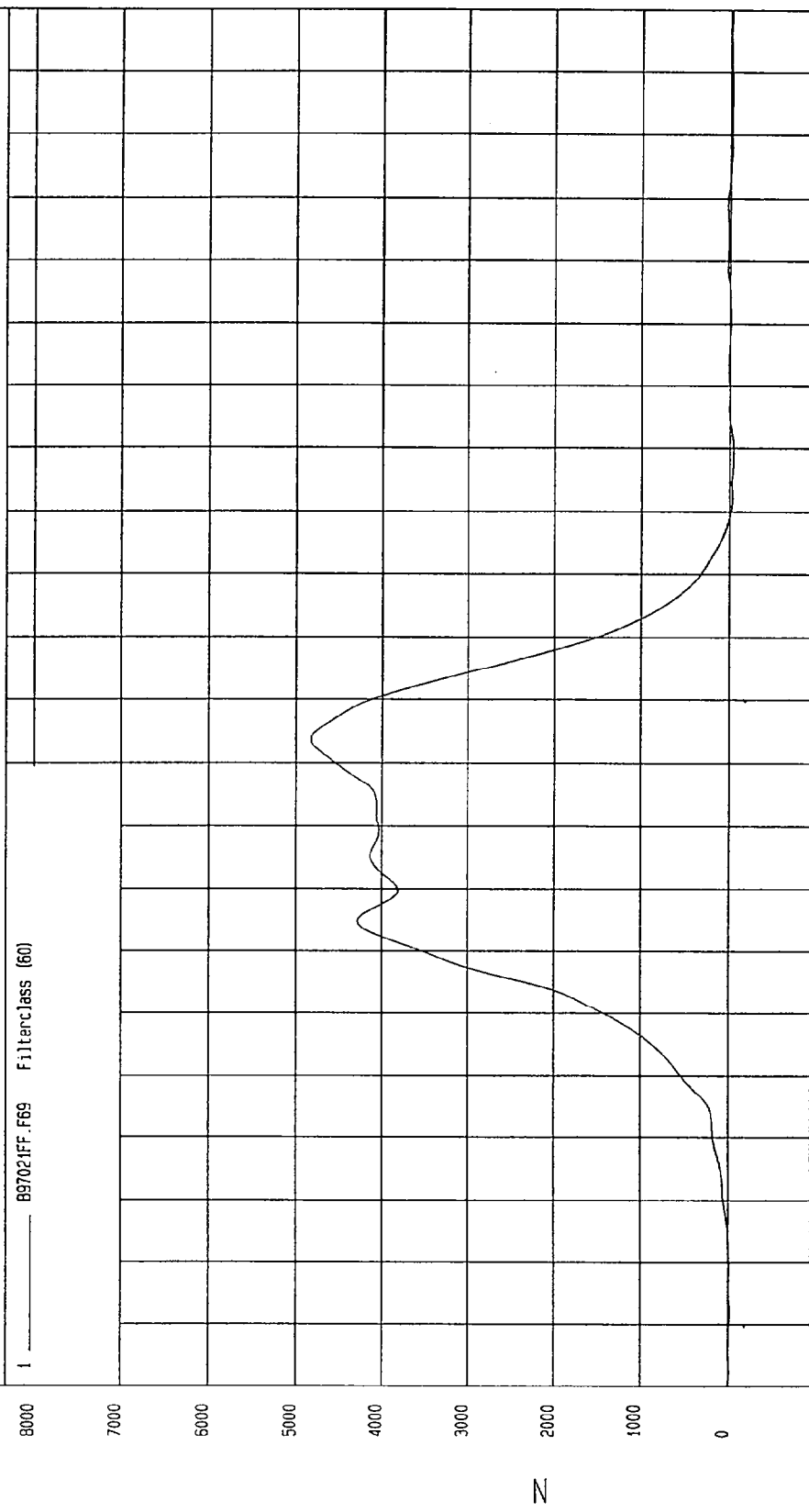
MGA Research
02-12-1997 14:12

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

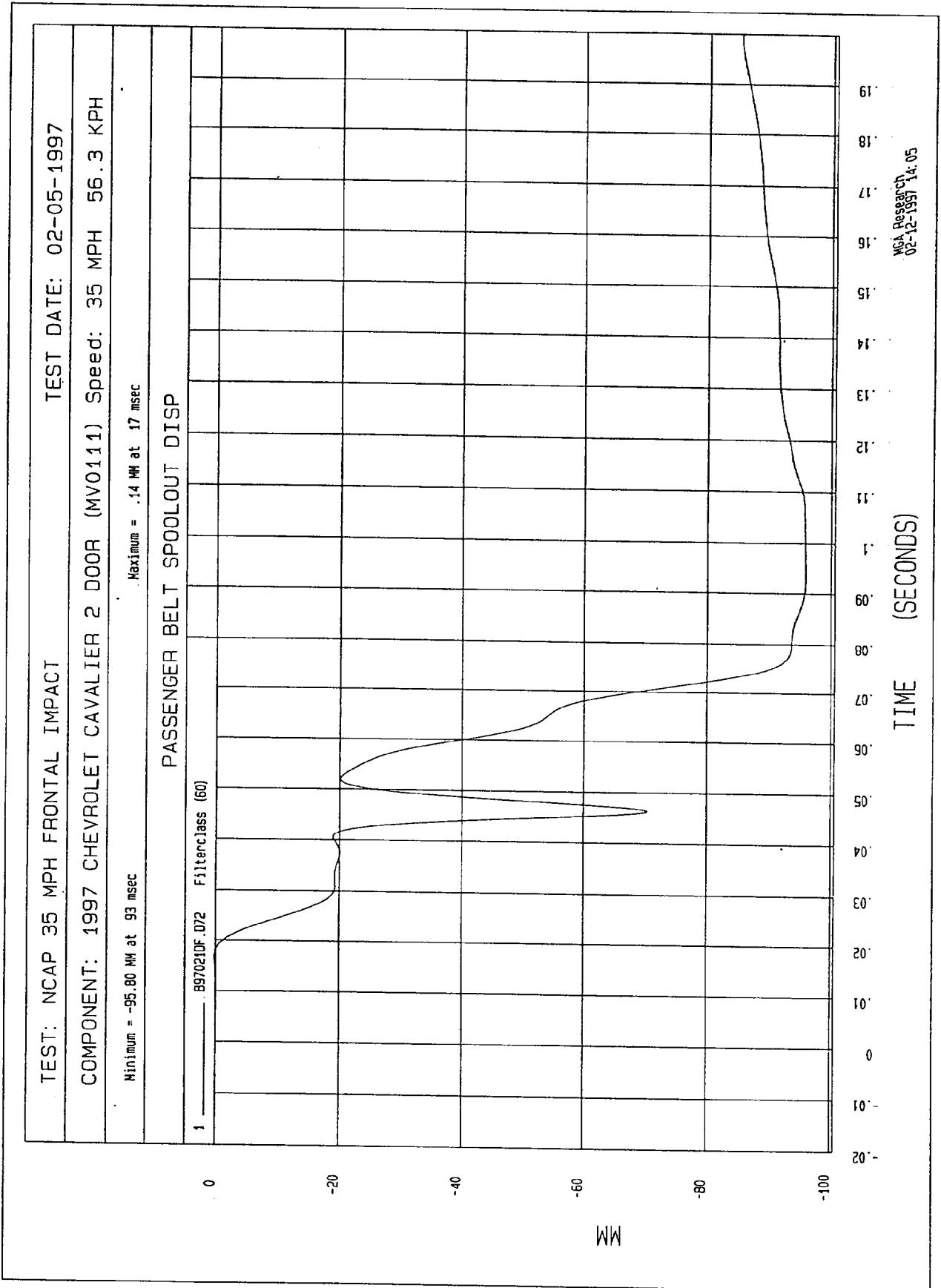
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -47.73 N at 129 msec Maximum = 4829.70 N at 84 msec

PASSENGER SHOULDER BELT FORCE



MGA Research
02-12-1997 14.12



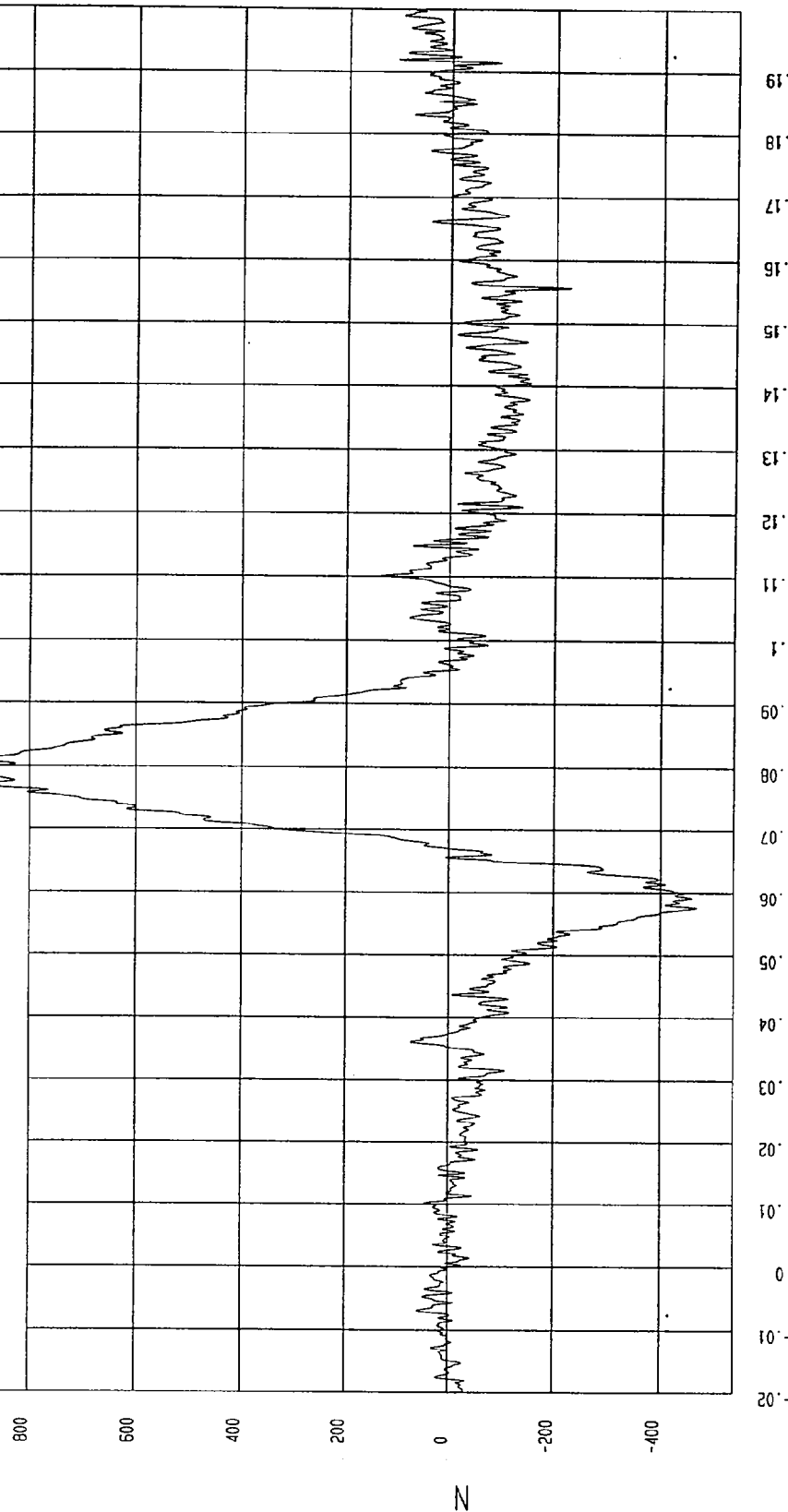
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO1111) Speed: 35 MPH 56.3 KPH

Minimum = -468.32 N at 58 msec Maximum = 922.51 N at 80 msec

PASSENGER NECK FORCE X

1 89702JFF.F51 Filterclass (1000)

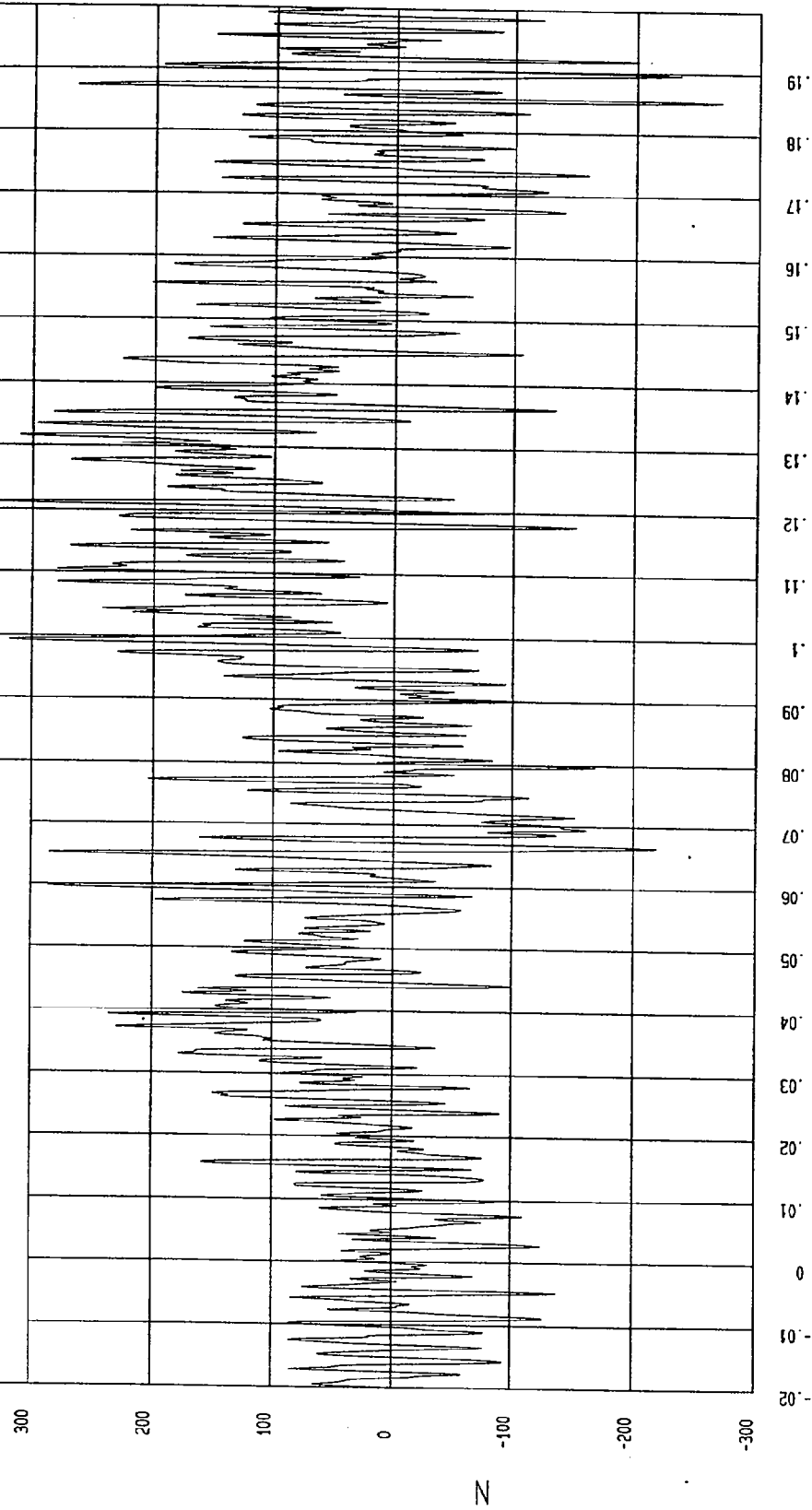


NSA Research
02-12-1997 14:12

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -269.90 N at 185 msec
Maximum = 339.63 N at 121 msec

PASSENGER NECK FORCE Y

1 897021FF.F52 Filterclass (1000)



MSA Research
02-12-1997 14:12

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -1651.20 N at 68 msec

Maximum = 560.42 N at 105 msec

PASSENGER NECK FORCE Z

1 ——— B97021FF.F53 Filterclass (1000)

600

400

200

0

-200

-400

-600

-800

-1000

-1200

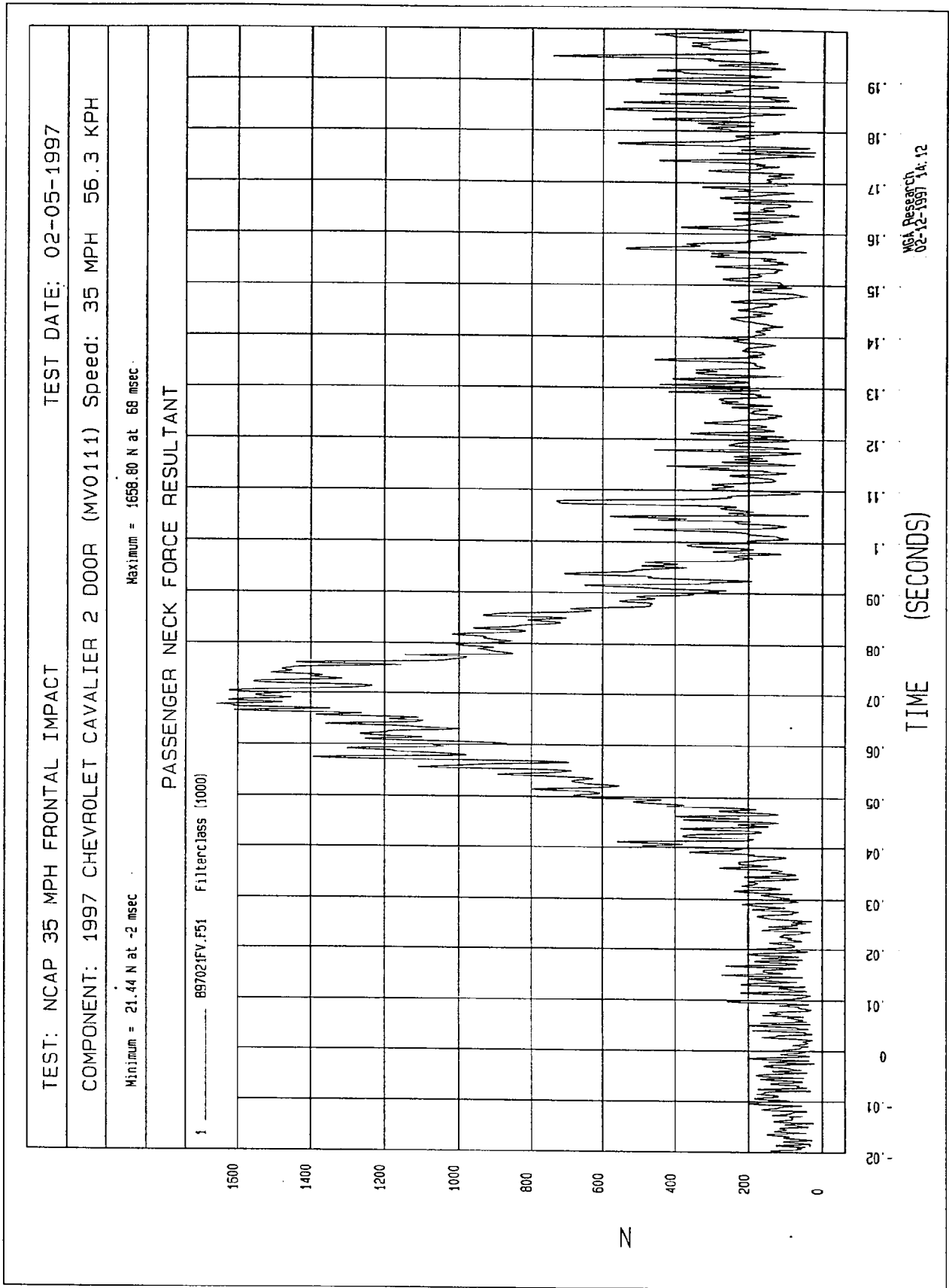
-1400

-1600

N

TIME (SECONDS)

MGA Research
02-12-1997 14:12



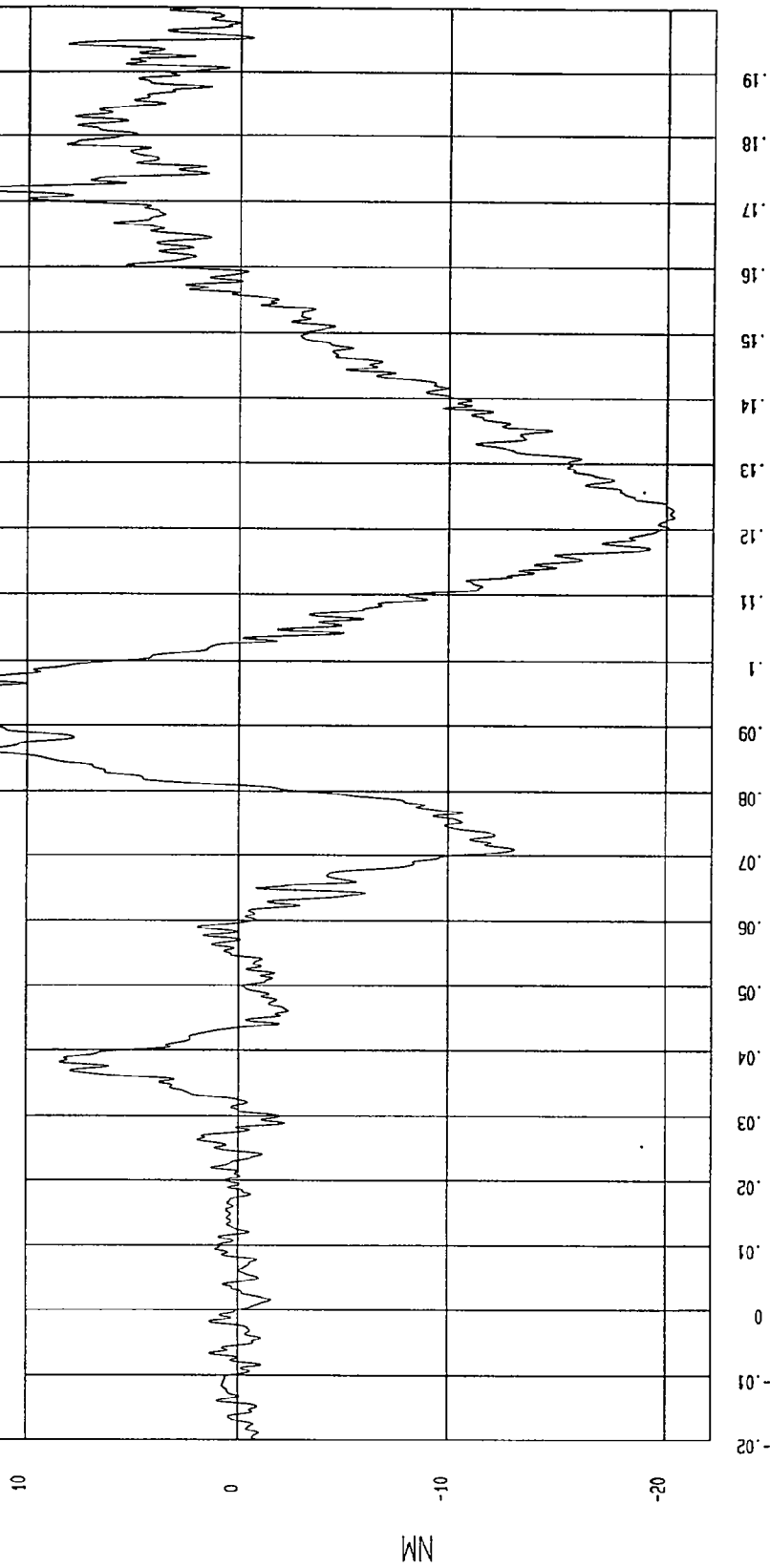
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -20.32 NM at 122 msec Maximum = 15.62 NM at 94 msec

PASSENGER NECK MOMENT X

1 897021MF.M54 Filter: class (600)



MSA Research
02-12-1997 14.12

TEST: NCAP 35 MPH FRONTAL IMPACT

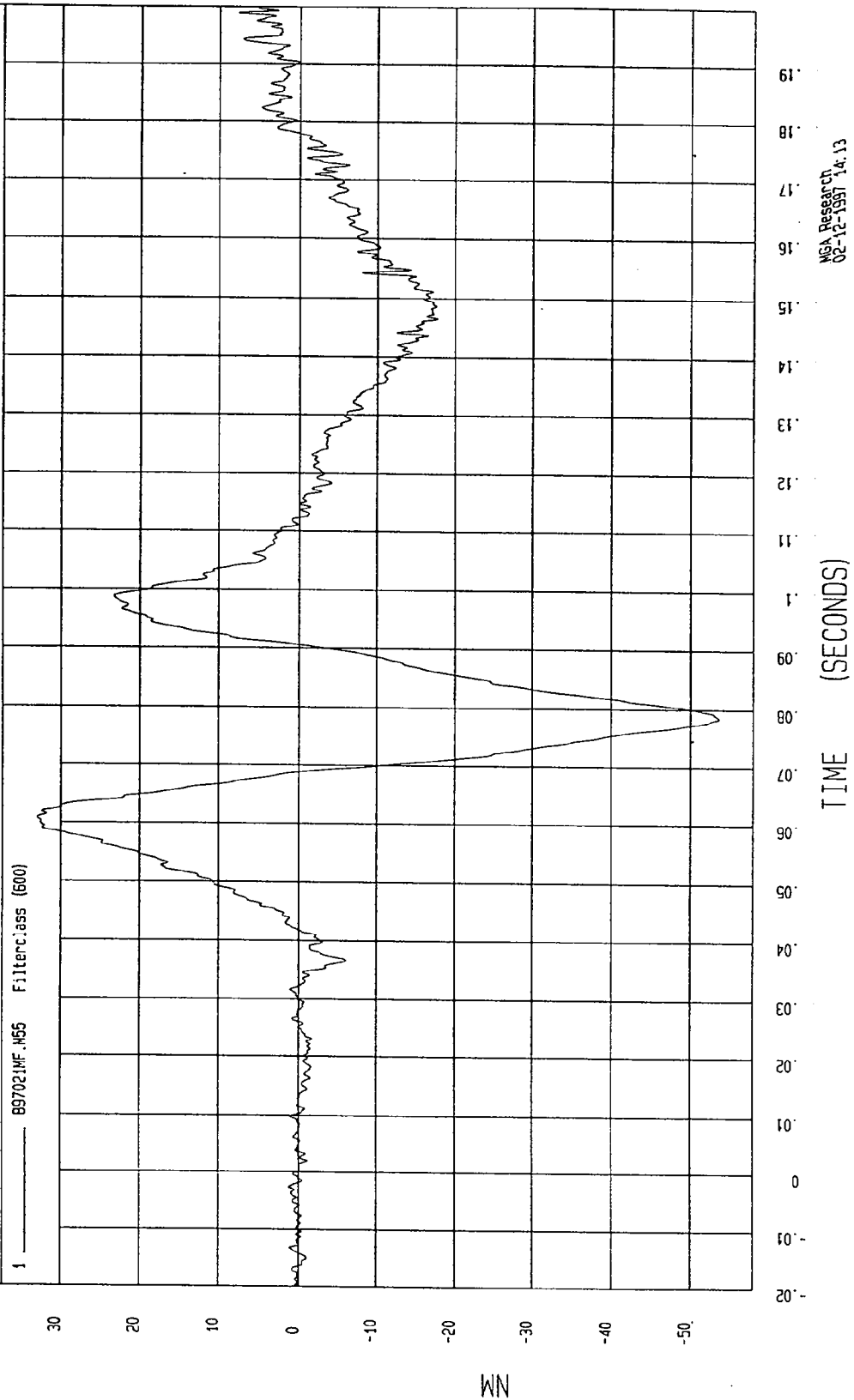
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -53.58 NM at 78 msec

Maximum = 33.01 NM at 61 msec

PASSENGER NECK MOMENT Y



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

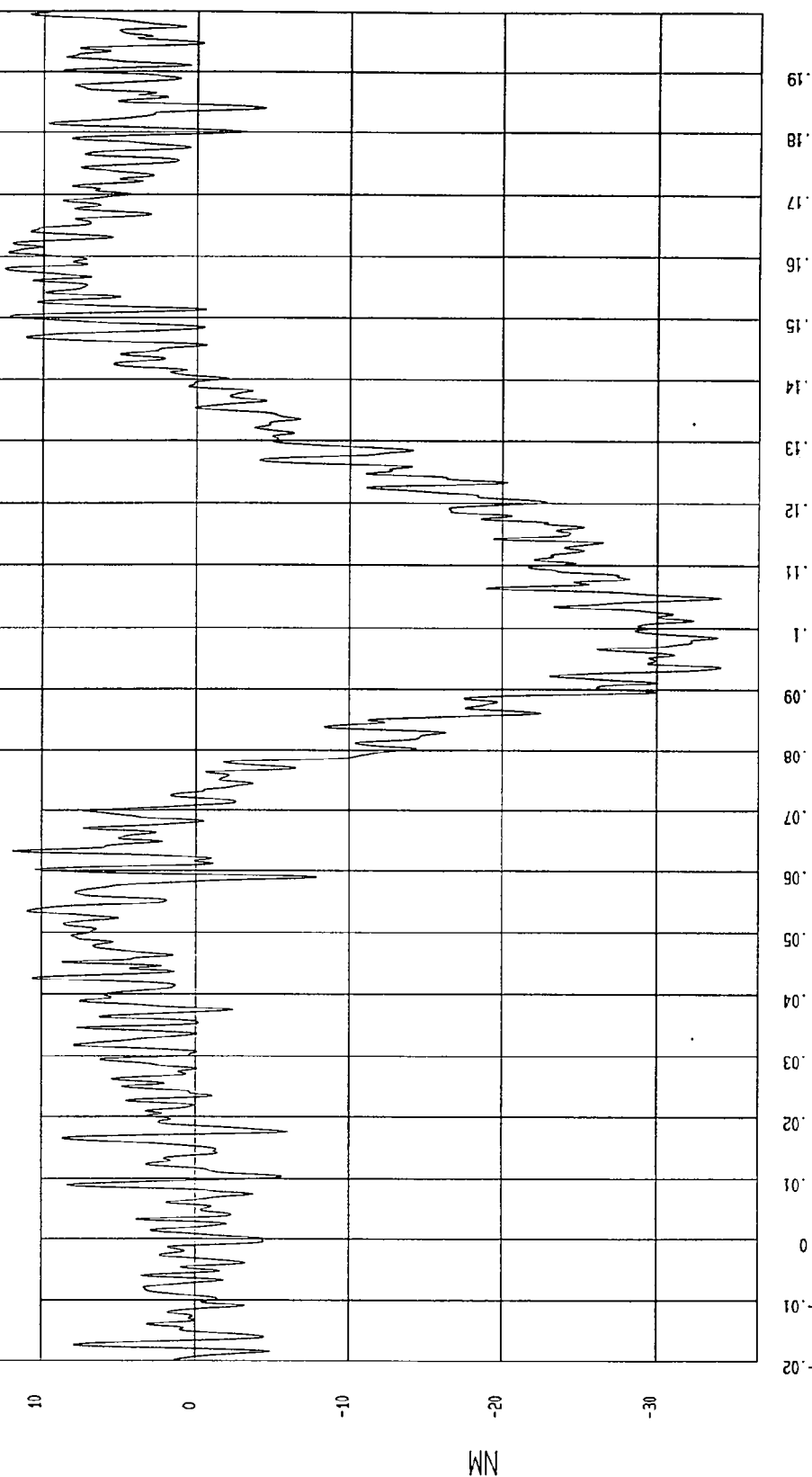
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -34.02 NM at 94 msec

Maximum = 12.44 NM at 158 msec

PASSENGER NECK MOMENT Z

1 ——— B97021MF.M56 Filterclass (600)

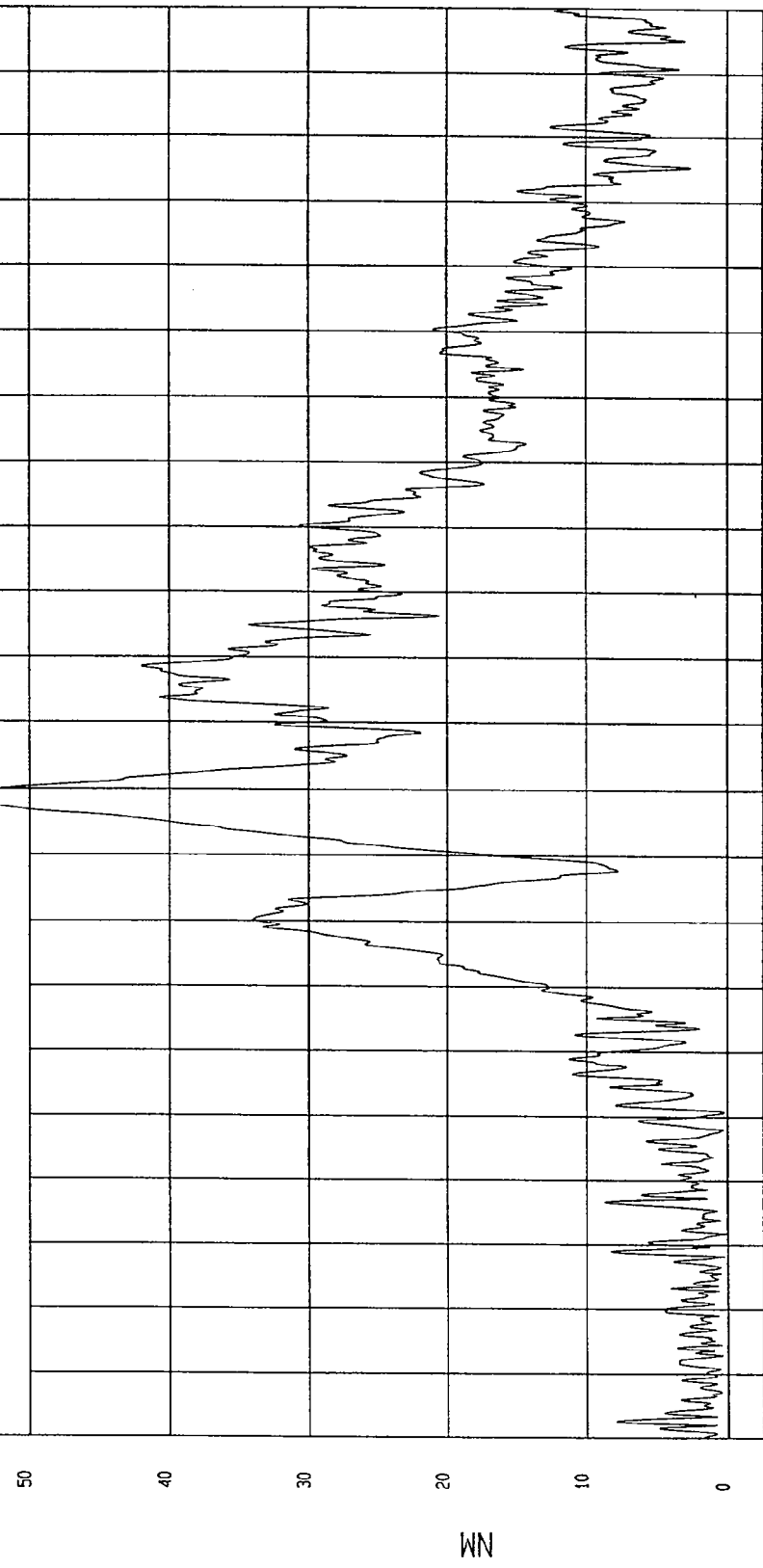


MCA Research
02-12-1997 14:13

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = .15 NM at 12 msec Maximum = 54.82 NM at 79 msec

PASSENGER NECK MOMENT RESULTANT

1 897021MV.M54 Filterclass (600)



MOA Research
02-12-1997 14:13

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -57.46 NM at 58 msec

Maximum = 54.73 NM at 81 msec

PASSENGER LEFT UPPER TIBIA MOMENT X

1 ——— B97021NF.M94 Filterclass (500)

60

40

20

0

-20

-40

-60

NM

TIME (SECONDS)

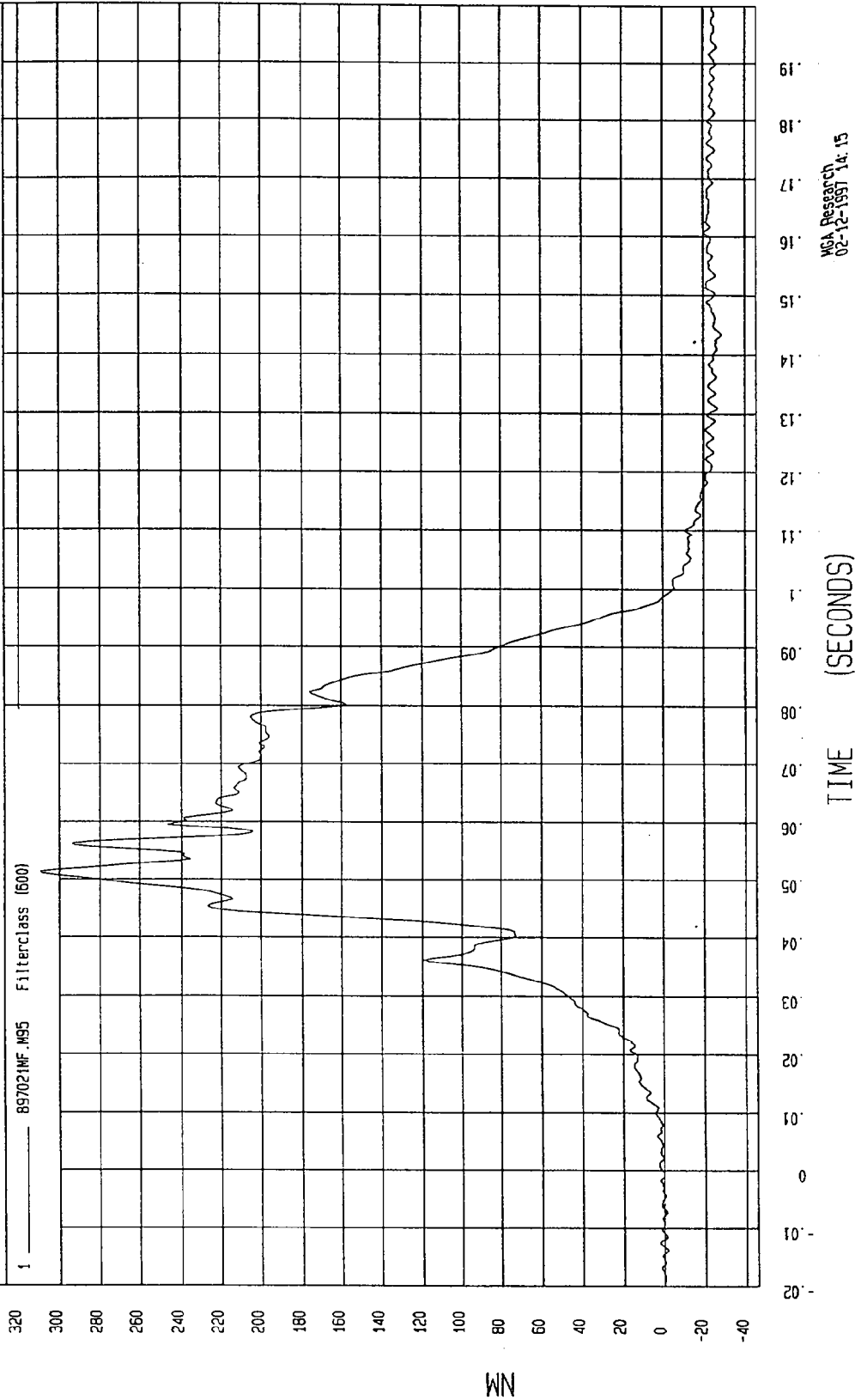
WGA Research
02-12-1997 14:15

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -28.75 NM at 143 msec Maximum = 310.15 NM at 51 msec

PASSENGER LEFT UPPER TIBIA MOMENT Y



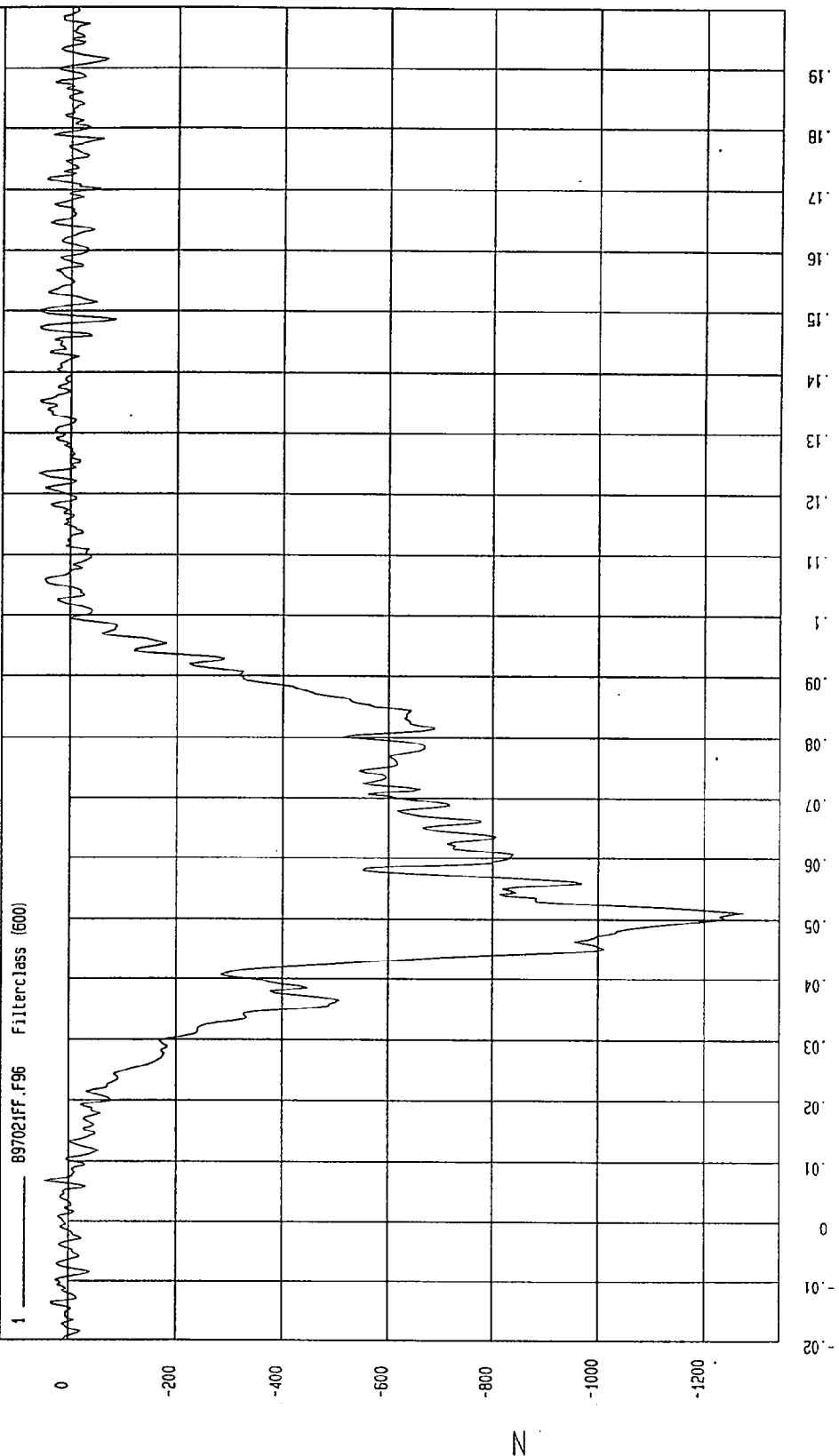
MGA Research
02-12-1997 14:15

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -1273.25 N at 51 msec Maximum = 60.51 N at 135 msec

PASSENGER LEFT LOWER TIBIA FORCE X



MGA Research
02-12-1997 14:16

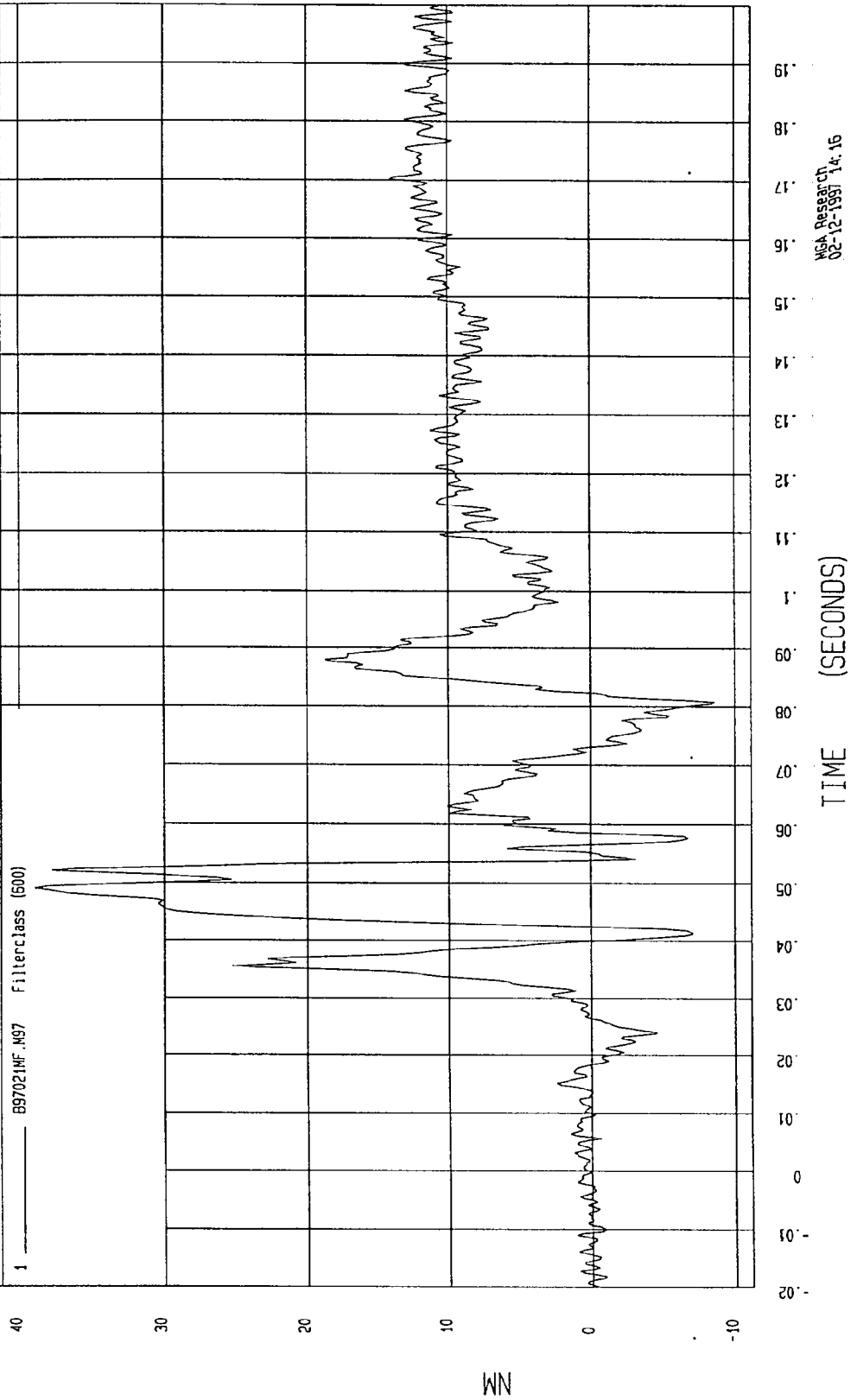
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -8.75 NM at 81 msec

Maximum = 38.92 NM at 49 msec

PASSENGER LEFT LOWER TIBIA MOMENT Y



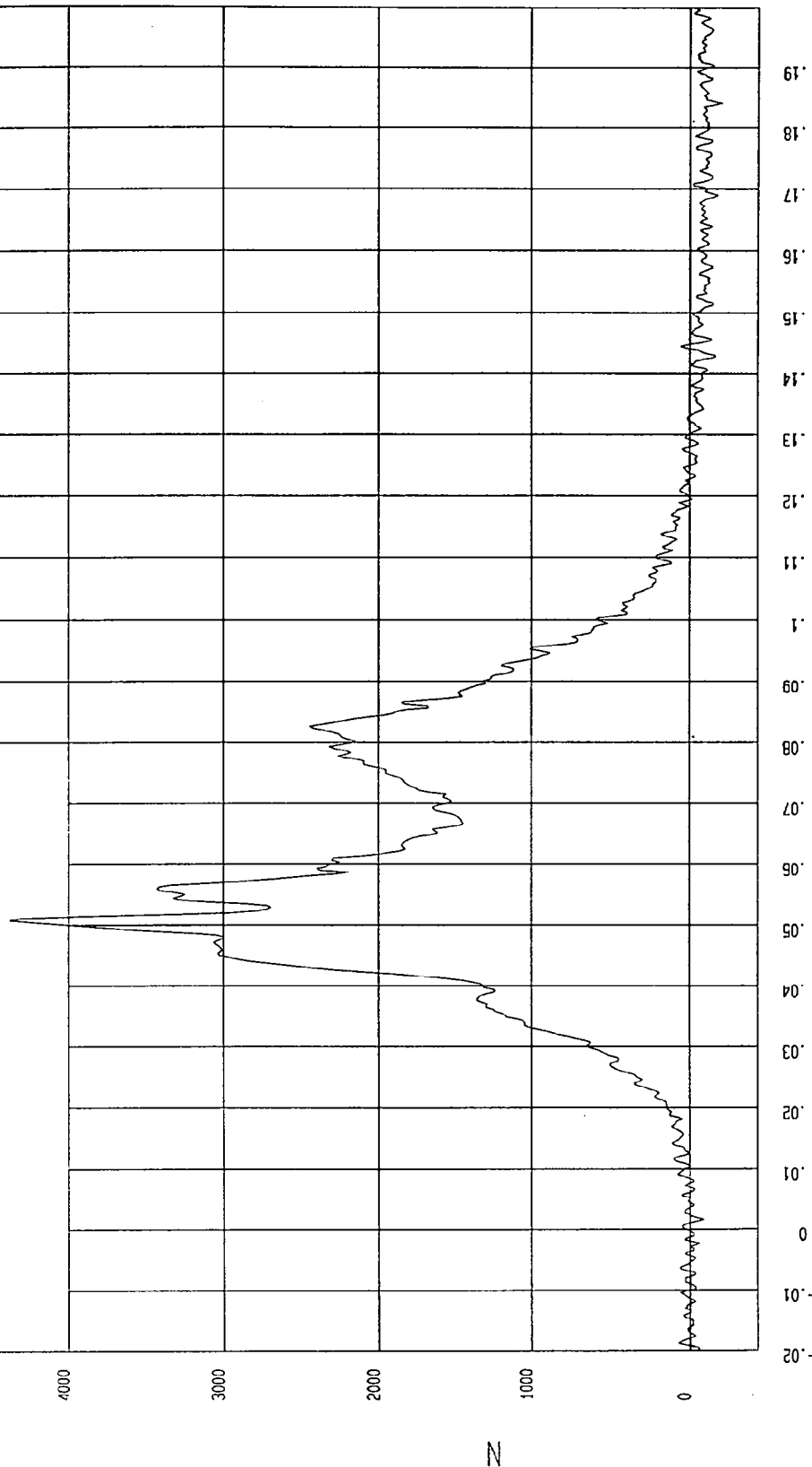
TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

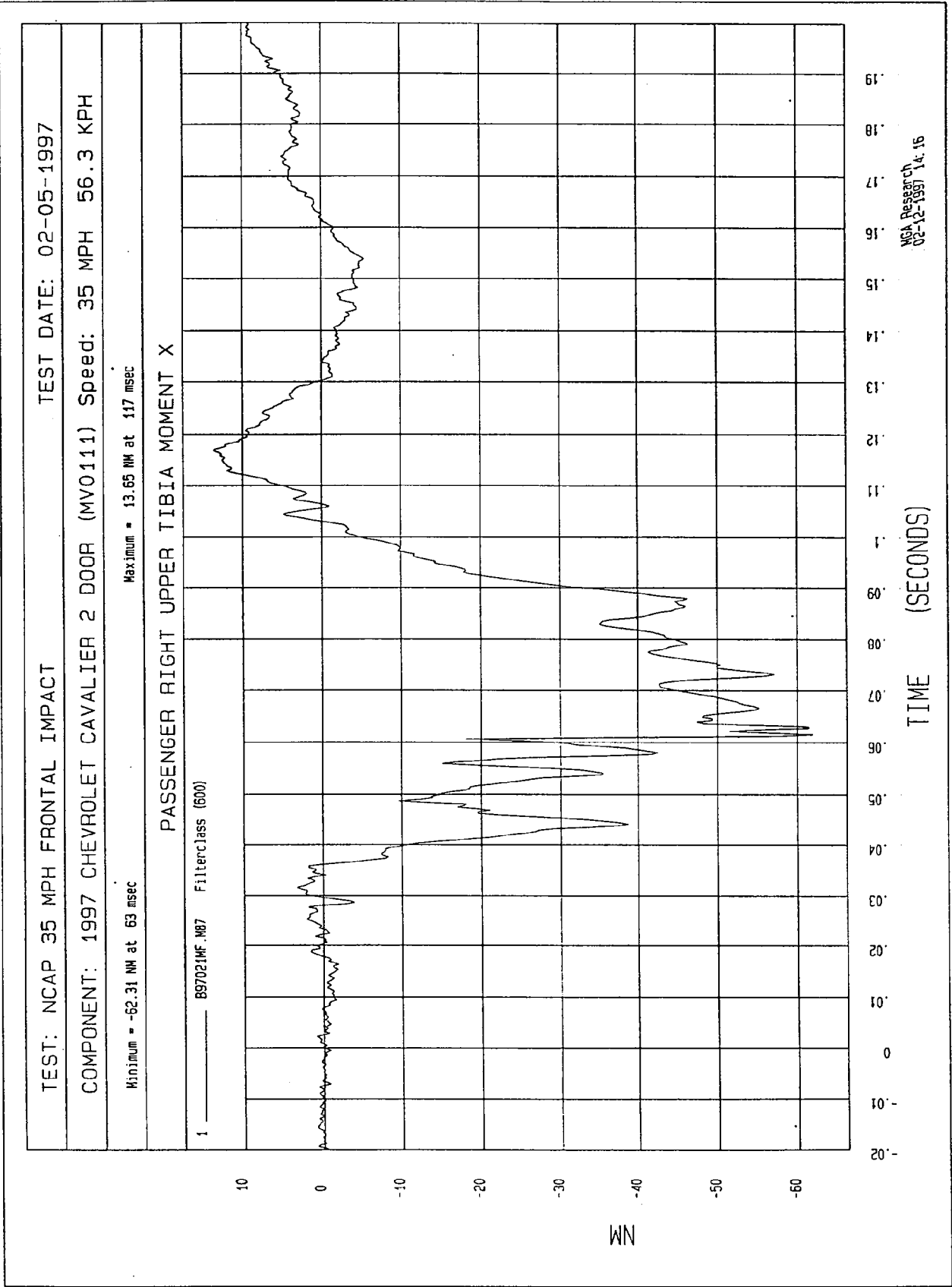
Minimum = -195.71 N at 104 msec Maximum = 4388.83 N at 51 msec

PASSENGER LEFT LOWER TIBIA FORCE Z

1 897021FF.F98 Filterclass (600)

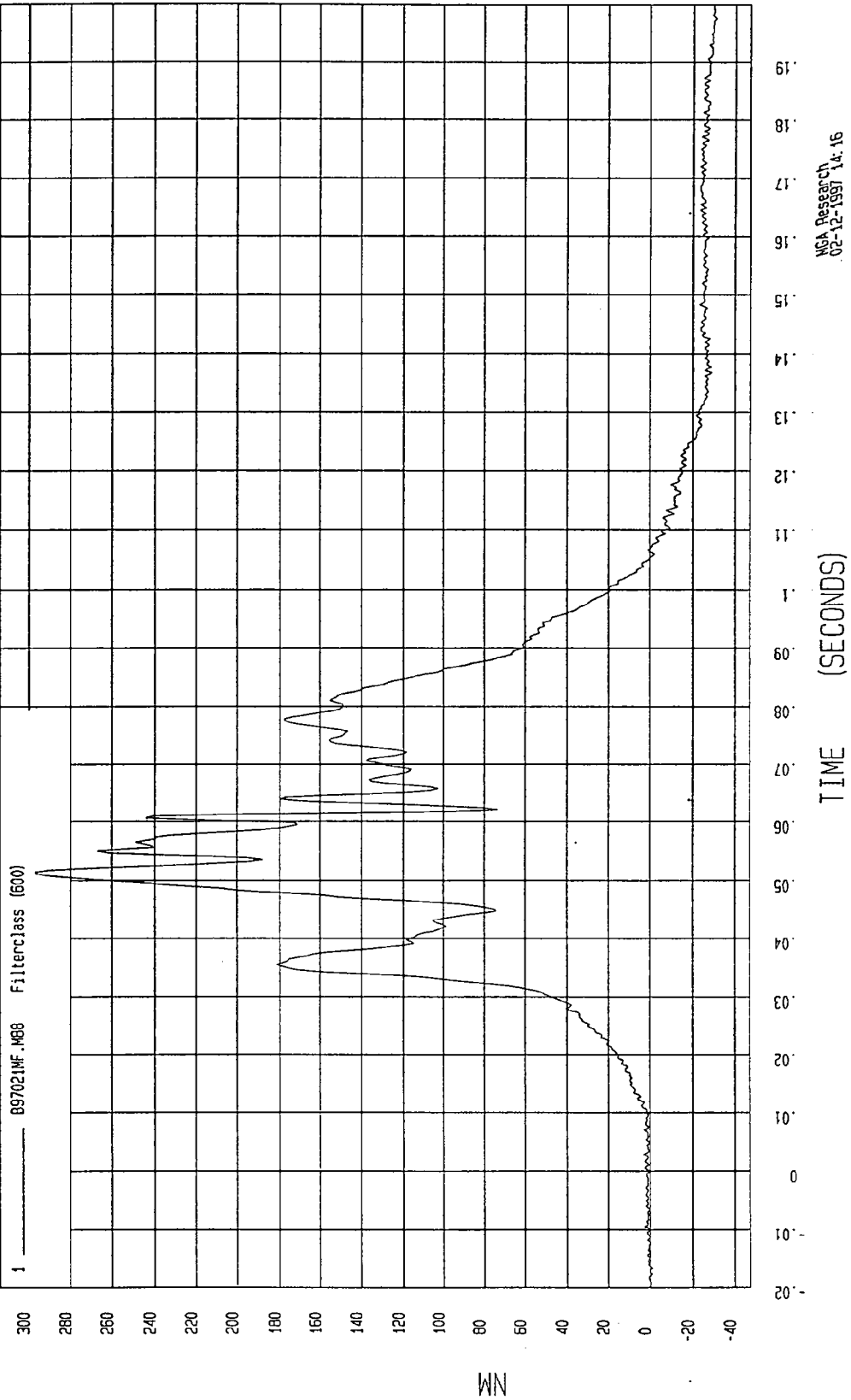


NSA Research
02-12-1997 14:16



TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -30.83 NM at 198 msec Maximum = 297.40 NM at 51 msec

PASSENGER RIGHT UPPER TIBIA MOMENT Y



TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

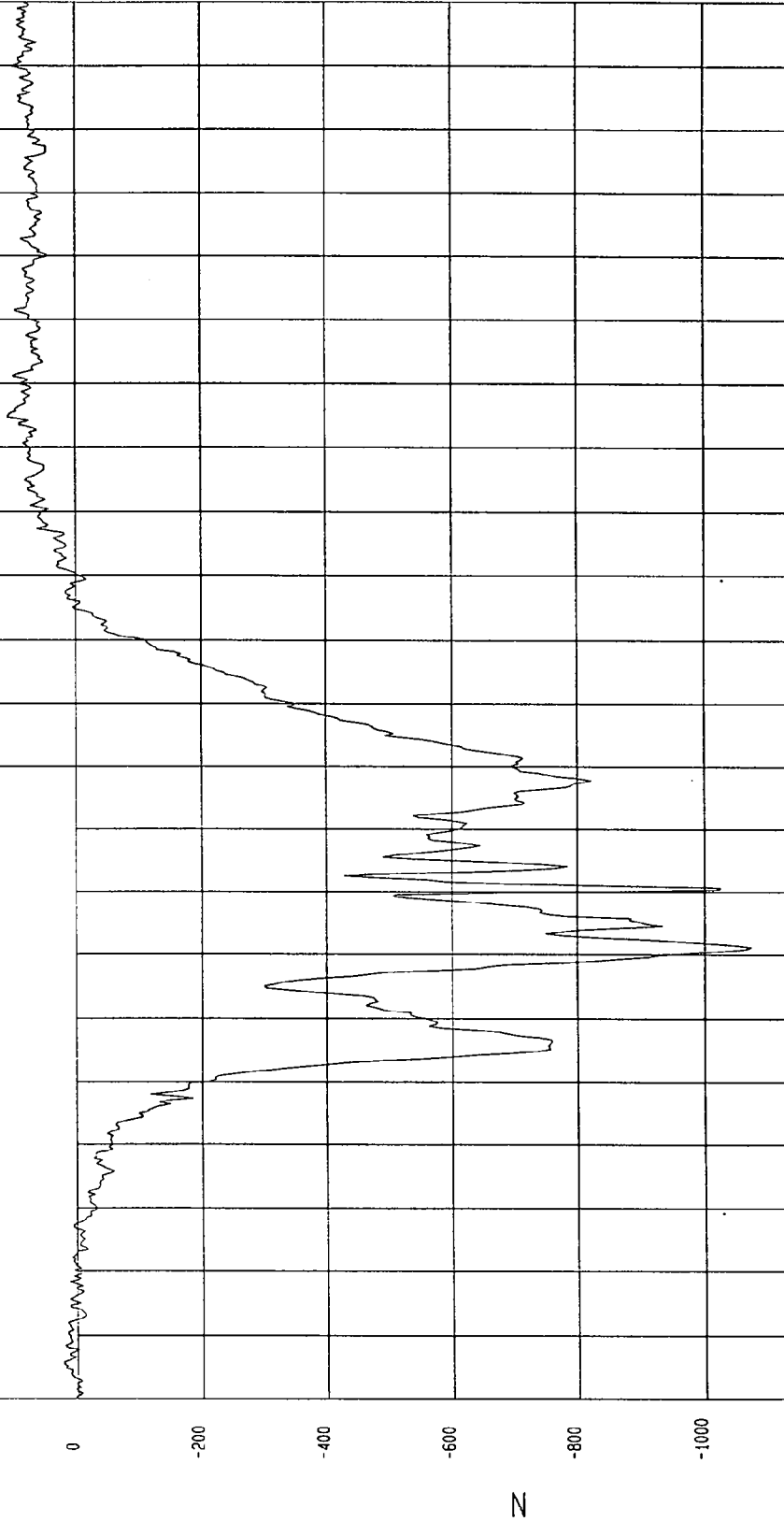
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -1072.92 N at 51 msec

Maximum = 106.08 N at 135 msec

PASSENGER RIGHT LOWER TIBIA FORCE X

1 ——— B97021FF.F89 Filterclass (600)



TIME (SECONDS)

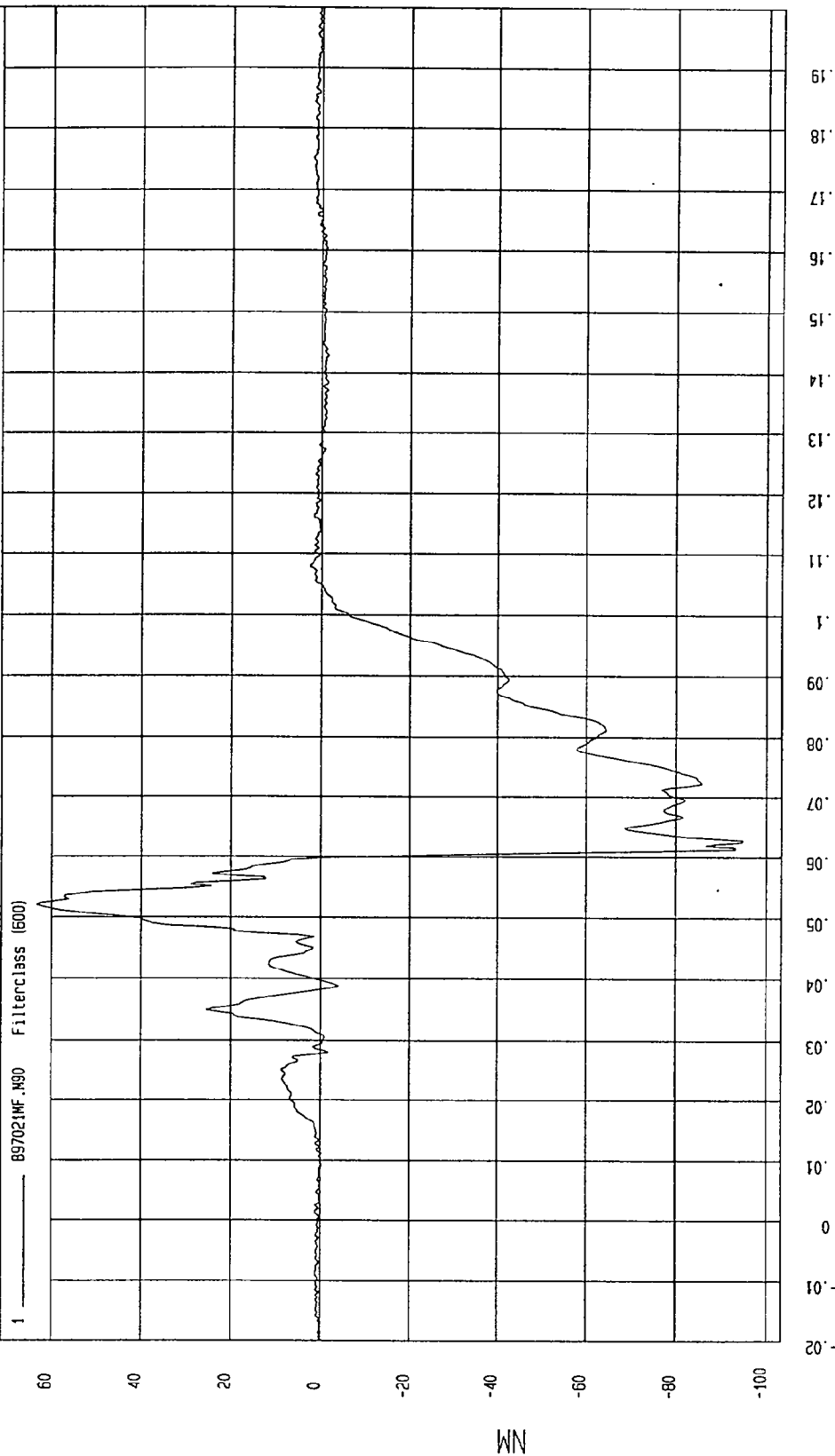
MGA Research
02-12-1997 14:16

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -95.34 NM at 63 msec Maximum = 63.25 NM at 52 msec

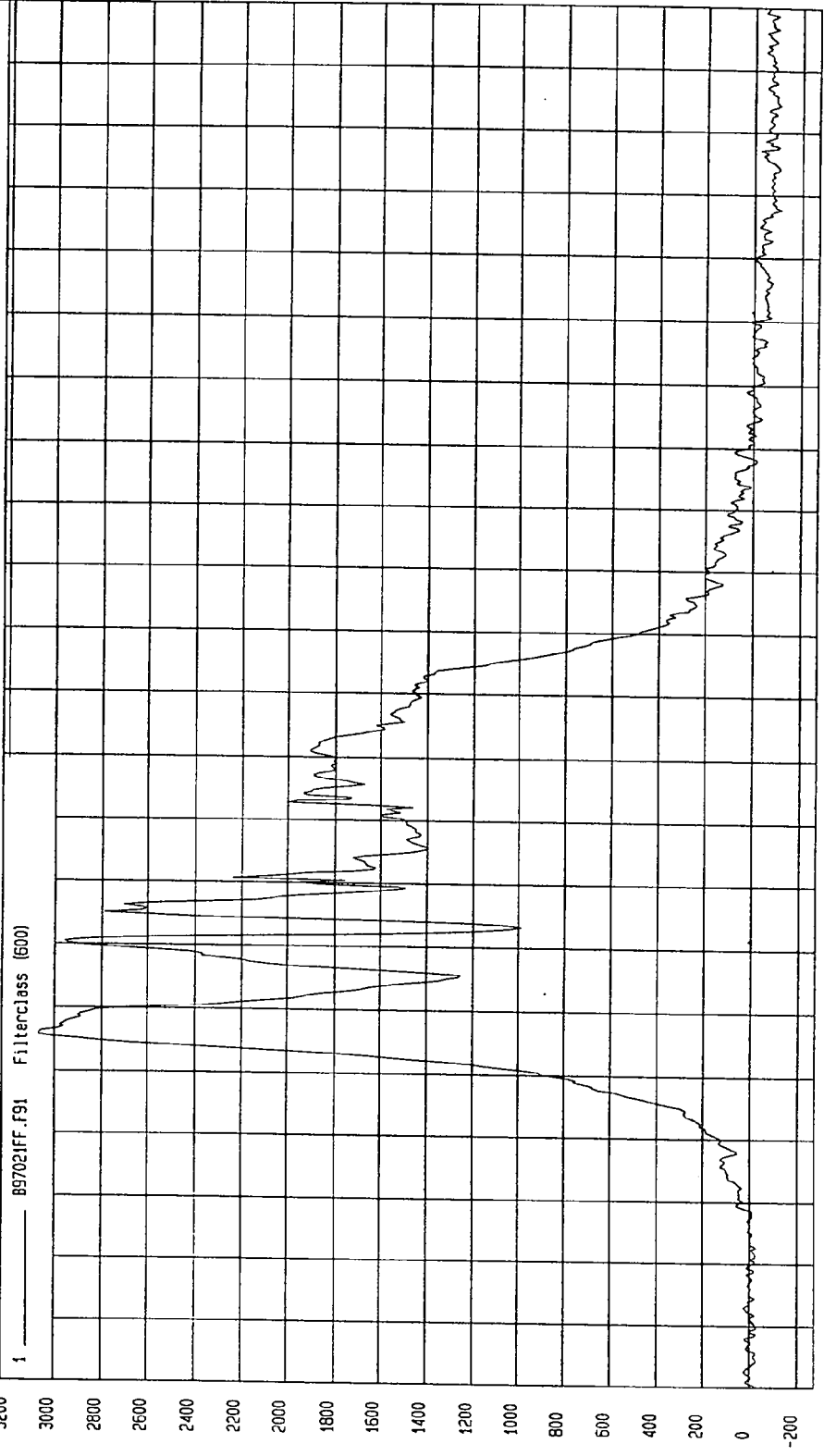
PASSENGER RIGHT LOWER TIBIA MOMENT Y



MGA Research
02-12-1997 14:16

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -112.47 N at 178 msec Maximum = 3067.26 N at 36 msec

PASSENGER RIGHT LOWER TIBIA FORCE Z



TIME (SECONDS)

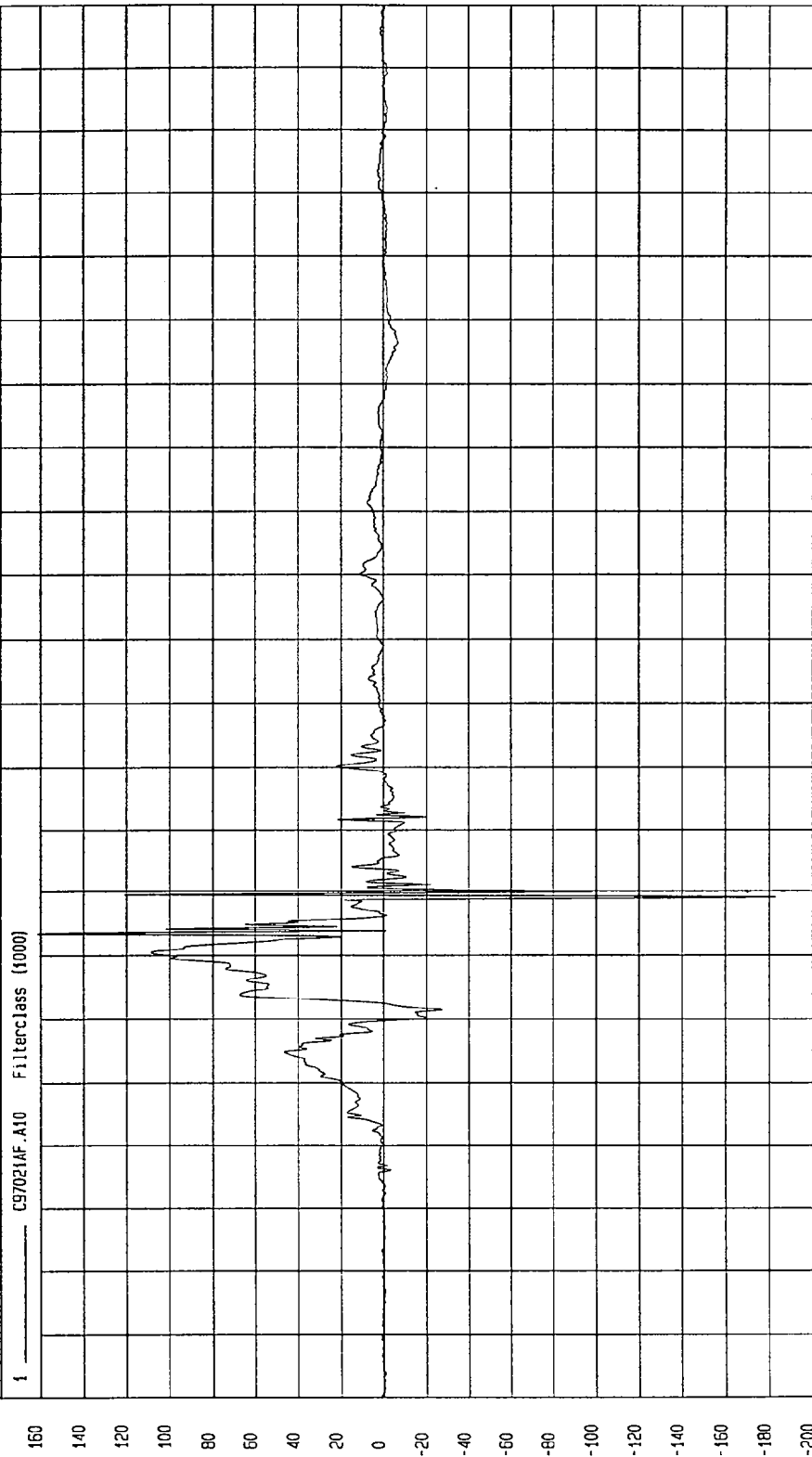
NSA Research
02-12-1997 14:16

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO1111) Speed: 35 MPH 56.3 KPH

Minimum = -183.09 G'S at 59 msec Maximum = 161.19 G'S at 53 msec

PASSENGER LEFT FOOT BALL Z ACCELERATION



TIME (seconds)

NGA Research
02-13-1997 11:32

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MVO111) Speed: 35 MPH 56.3 KPH

Minimum = -102.87 G'S at 47 msec

Maximum = 35.18 G'S at 59 msec

PASSENGER LEFT FOOT HEEL X ACCELERATION

1 _____ C97021AF.A11 Filterclass (1000)

40

20

0

-20

-40

-60

-80

-100

G.S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

TIME (seconds)

MCA Research
02-13-1997 11:32

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -102.26 G'S at 59 msec

Maximum = 73.20 G'S at 50 msec

PASSENGER LEFT FOOT HEEL Z ACCELERATION

1 — C97021AF.A12 Filterclass (1000)

80

60

40

20

0

-20

-40

-60

-80

-100

G

-20

-10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

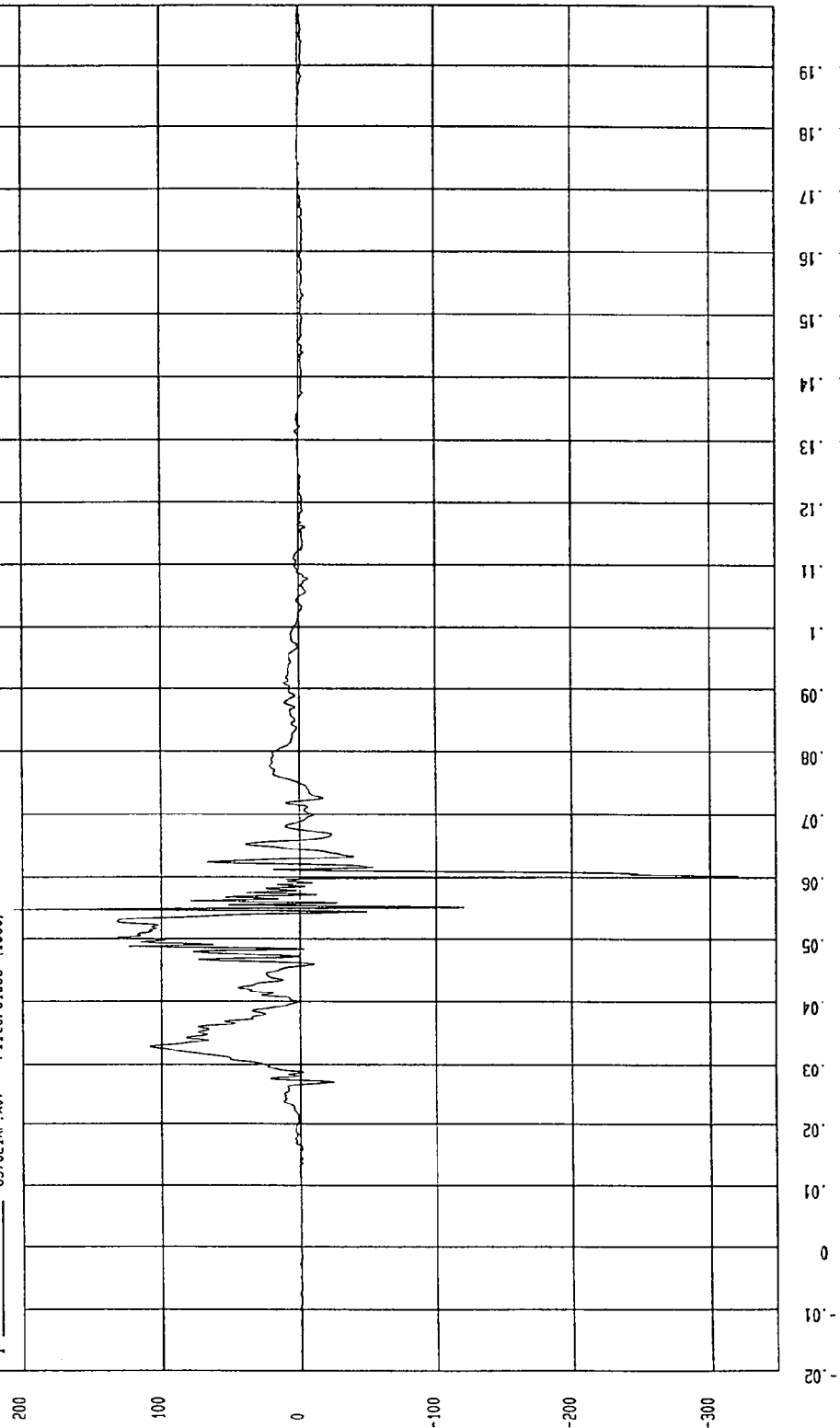
TIME (seconds)

MSA Research
02-13-1997 11:32

TEST: NCAP 35 MPH FRONTAL IMPACT TEST DATE: 02-05-1997
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH
Minimum = -320.22 G'S at 60 msec Maximum = 206.27 G'S at 55 msec

PASSENGER RIGHT FOOT BALL Z ACCELERATION

1 C97021AF.A07 Filterclass (1000)



NCA Research
02-13-1997 11:32

TEST: NCAP 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1997

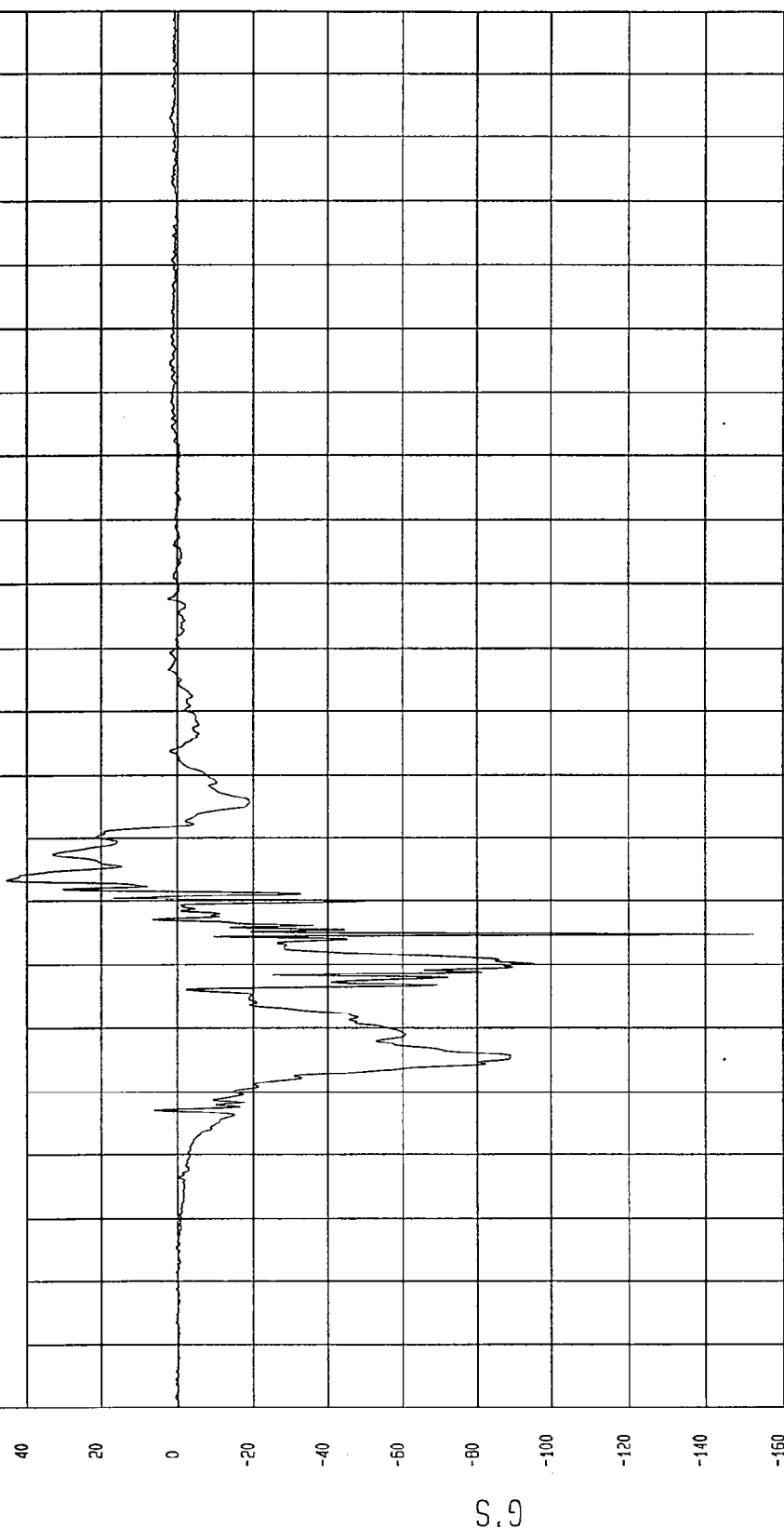
COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -152.30 G'S at 55 msec

Maximum = 45.45 G'S at 63 msec

PASSENGER RIGHT FOOT HEEL X ACCELERATION

1 C97021AF.A08 FilterClass (1000)



MOA Research
02-13-1997 11:33

TEST: NCAP 35 MPH FRONTAL IMPACT

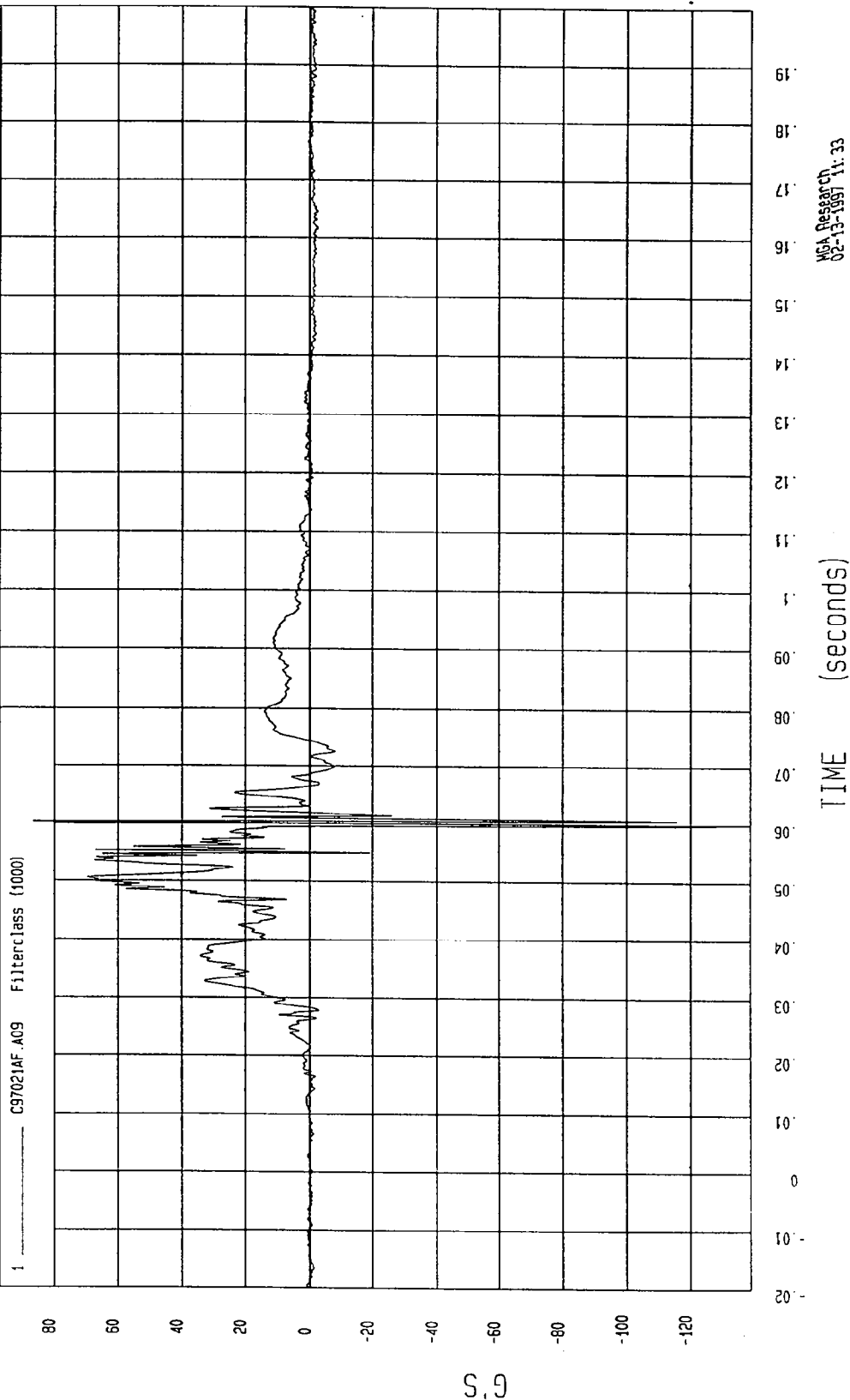
TEST DATE: 02-05-1997

COMPONENT: 1997 CHEVROLET CAVALIER 2 DOOR (MV0111) Speed: 35 MPH 56.3 KPH

Minimum = -127.72 G's at 60 msec

Maximum = 86.43 G's at 60 msec

PASSENGER RIGHT FOOT HEEL Z ACCELERATION



APPENDIX C
Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 036 DUMMY CALIBRATION BY: Tim Michnay

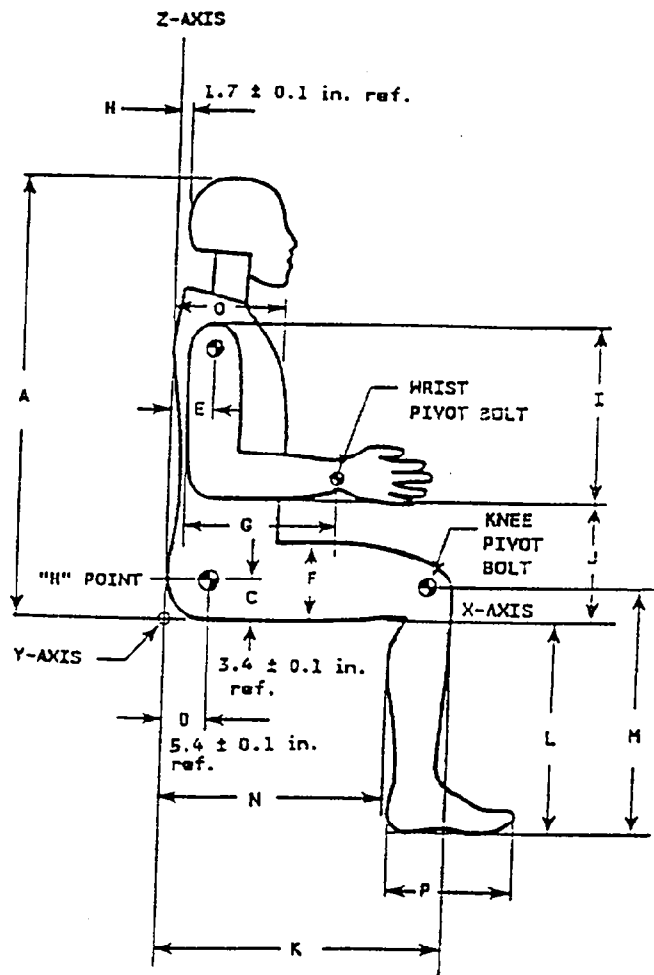
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 2-4-97

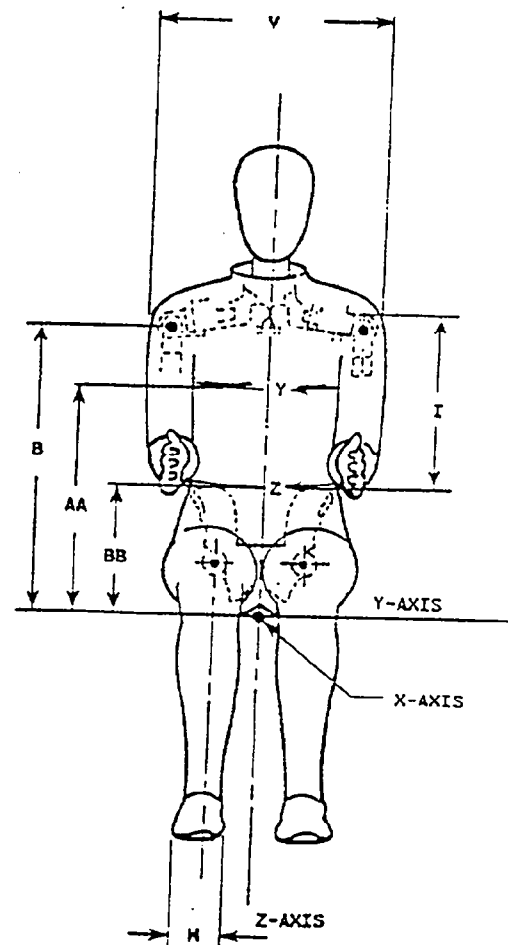
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 036 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: February 4, 1997

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	236
Peak Lateral Acceleration	15 G. MAX	15
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	22.62
	20 MS	17.60 - 22.60 G	19.72
	30 MS	12.50 - 18.50 G	15.09
Max. Pendulum G Above 30 MS		29.0 G MAX	15.00
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	37
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	116
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	74
	TIME	47 - 58 MS	49
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	104

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.05
Pendulum Deceleration	10 MS	17.20 - 21.20 G	18.22
	20 MS	14.00 - 19.00 G	16.11
	30 MS	11.00 - 16.00 G	13.17
Max. Pendulum G Above 30 MS		22 G Max	13.35
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	39
D Plane Rotation	MAX	81 - 106 DEG.	100
	TIME	72 - 82 MS	76
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	156
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-57
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	144

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	22.0
Peak Deflection	2.50 to 2.86 IN.	2.78
Peak Resistive Force	1160 to 1325 LBS.	1187
Internal Hysteresis	69 to 85%	69%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1252

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1159

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 037 DUMMY CALIBRATION BY: Tim Michnay

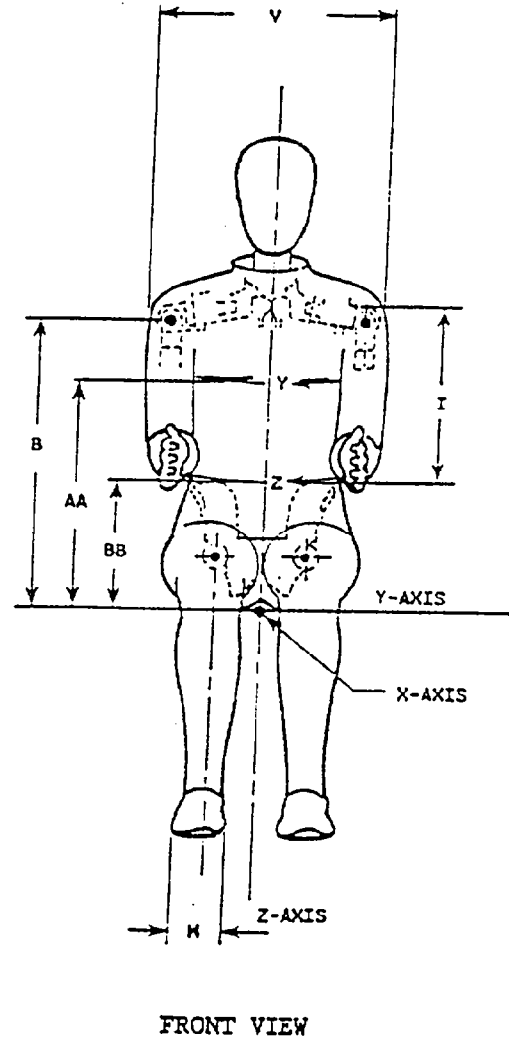
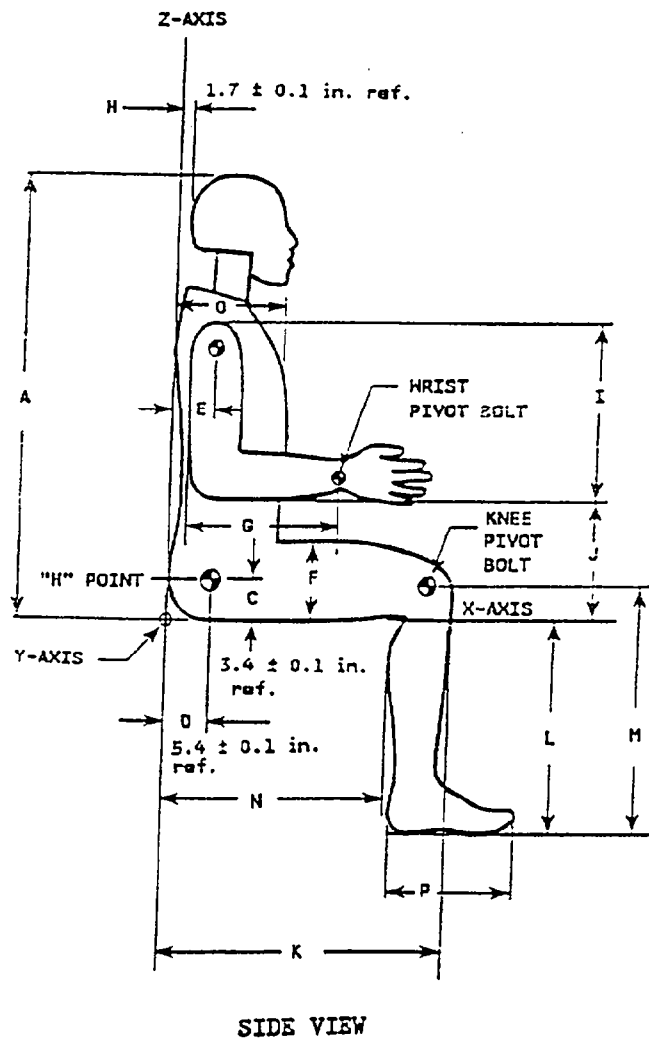
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: February 4, 1997

DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder - Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock to Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.6 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 037 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: February 4, 1997

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	273
Peak Lateral Acceleration	15 G. MAX	13
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.23
	20 MS	17.60 - 22.60 G	20.78
	30 MS	12.50 - 18.50 G	15.77
Max. Pendulum G Above 30 MS		29.0 G MAX	15.70
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	35
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	60
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	120
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	72
	TIME	47 - 58 MS	47
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	101

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.01
Pendulum Deceleration	10 MS	17.20 - 21.20 G	17.48
	20 MS	14.00 - 19.00 G	16.49
	30 MS	11.00 - 16.00 G	14.11
Max. Pendulum G Above 30 MS		22 G Max	14.05
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	39
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	77
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	160
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-53
	TIME	65 - 79 MS	70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	141

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.9
Peak Deflection	2.50 to 2.86 IN.	2.56
Peak Resistive Force	1160 to 1325 LBS.	1314
Internal Hysteresis	69 to 85%	70%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1134

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1292

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 036

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	12/4/96
Head Y	ACCG1	Endevco	12/4/96
Head Z	ACCW9	Endevco	12/4/96
Head X Redundant	AJ621	Endevco	12/4/96
Head Y Redundant	AJ619	Endevco	12/4/96
Head Z Redundant	AHY54	Endevco	12/4/96
Chest X	ACC78	Endevco	12/4/96
Chest Y	ACCE6	Endevco	12/4/96
Chest Z	ACCY3	Endevco	12/4/96
Chest X Redundant	AJ9J7	Endevco	12/4/96
Chest Y Redundant	AJ7A2	Endevco	12/4/96
Chest Z Redundant	AJ819	Endevco	12/4/96
Right Femur Load Cell	259	Denton	8/28/96
Left Femur Load Cell	260	Denton	8/28/96
Pelvis X	ALB87	Endevco	12/4/96
Pelvis Y	AHRP5	Endevco	12/4/96
Pelvis Z	AJ9T6	Endevco	12/4/96

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 036

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	1/10/97
Neck Load Cell Y	442	Denton	1/10/97
Neck Load Cell Z	442	Denton	1/10/97
Neck Moment X	442	Denton	1/10/97
Neck Moment Y	442	Denton	1/10/97
Neck Moment Z	442	Denton	1/10/97
Chest Deflection Gauge	036	Servo	12/05/96
Lap Belt Load Cell	624	Lebow	11/06/96
Torso Belt Load Cell	657	Lebow	11/15/96

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 036

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	11/5/96
Upper Right Tibia Moment Y	040	Denton	11/5/96
Lower Right Tibia Moment Y	034	Denton	11/5/96
Lower Right Tibia Force X	034	Denton	11/5/96
Lower Right Tibia Force Z	034	Denton	11/5/96
Upper Left Tibia Moment X	023	Denton	11/5/96
Upper Left Tibia Moment Y	023	Denton	11/5/96
Lower Left Tibia Moment Y	019	Denton	11/5/96
Lower Left Tibia Force X	019	Denton	11/5/96
Lower Left Tibia Force Z	019	Denton	11/5/96
Right Foot Ball Z	J11047	Endevco	12/2/96
Right Foot Heel X	J11784	Endevco	12/2/96
Right Foot Heel Z	J11046	Endevco	12/2/96
Left Foot Ball Z	J11014	Endevco	12/2/96
Left Foot Heel X	J10730	Endevco	12/2/96
Left Foot Heel Z	J11625	Endevco	12/2/96

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 037

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	12/4/96
Head Y	ACCH1	Endevco	12/4/96
Head Z	AAMW5	Endevco	12/4/96
Head X Redundant	AJ9D2	Endevco	12/4/96
Head Y Redundant	AH1R2	Endevco	12/4/96
Head Z Redundant	AJ7K3	Endevco	12/4/96
Chest X	ACCY1	Endevco	12/3/96
Chest Y	ACCC8	Endevco	12/3/96
Chest Z	ACCT7	Endevco	12/3/96
Chest X Redundant	AJ9D4	Endevco	12/3/96
Chest Y Redundant	AJ9F3	Endevco	12/3/96
Chest Z Redundant	AJ9D9	Endevco	12/3/96
Right Femur Load Cell	261	Denton	8/28/96
Left Femur Load Cell	262	Denton	8/28/96
Pelvis X	ALDY8	Endevco	12/3/96
Pelvis Y	ALEK9	Endevco	12/3/96
Pelvis Z	ALE80	Endevco	12/3/96

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 037

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	1/10/97
Neck Load Cell Y	443	Denton	1/10/97
Neck Load Cell Z	443	Denton	1/10/97
Neck Moment X	443	Denton	1/10/97
Neck Moment Y	443	Denton	1/10/97
Neck Moment Z	443	Denton	1/10/97
Chest Deflection Gauge	037	Servo	1/16/97
Lap Belt Load Cell	312	GSE	11/04/96
Torso Belt Load Cell	625	Lebow	11/06/96

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 037

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	036	Denton	10/1/96
Upper Right Tibia Moment Y	036	Denton	10/1/96
Lower Right Tibia Moment Y	040	Denton	9/24/96
Lower Right Tibia Force X	040	Denton	9/24/96
Lower Right Tibia Force Z	040	Denton	9/24/96
Upper Left Tibia Moment X	039	Denton	10/1/96
Upper Left Tibia Moment Y	039	Denton	10/1/96
Lower Left Tibia Moment Y	033	Denton	9/24/96
Lower Left Tibia Force X	033	Denton	9/24/96
Lower Left Tibia Force Z	033	Denton	9/24/96
Right Foot Ball Z	J14006	Endevco	12/5/96
Right Foot Heel X	J13628	Endevco	12/5/96
Right Foot Heel Z	J13652	Endevco	1/13/97
Left Foot Ball Z	J14007	Endevco	12/5/96
Left Foot Heel X	J13424	Endevco	12/5/96
Left Foot Heel Z	J13650	Endevco	12/5/96

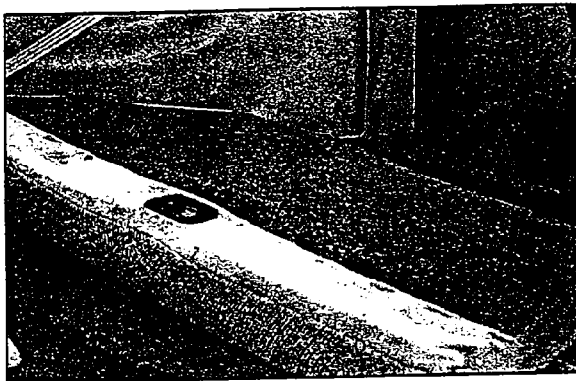
DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	H07-A05	Entran	1/3/97
Right Rear Seat Crossmember X	B02-G06	Entran	1/7/97
Top of Engine Block X	A10-G04	Entran	1/2/97
Bottom of Engine X	J23-E06	Entran	1/3/97
Left Brake Caliper X	H16-X11	Entran	12/4/97
Right Brake Caliper X	B14-R04	Entran	12/4/97
Instrument Panel X	E13-D01	Entran	1/3/97
Redundant Left Rear Seat Crossmember X	C14-Z08	Entran	1/8/97
Redundant Right Rear Seat Crossmember X	B14-R11	Entran	1/3/97

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AH5N9	Endevco	5/08/95
Neck Bending Head Rotary Potentiometer	018	Spectrol	3/13/95
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	3/13/95
Chest Probe Accelerometer	AN8A4	Endevco	6/12/95
Knee Impact Accelerometer	MGA001	Entran	4/21/95

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions



To close the seat, push the seatback up to its original position.

Check to ensure the seatback is in its original position and securely latched by pulling forward on the top of the seatback. Move any obstructions in the trunk compartment.

Safety Belts: They're for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

And it explains the Supplemental Restraint System (SRS), or air bag system.

CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

CAUTION:

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.



Your vehicle has a light that comes on as a reminder to buckle up. (See "Safety Belt Reminder Light" in the Index.)

In most states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

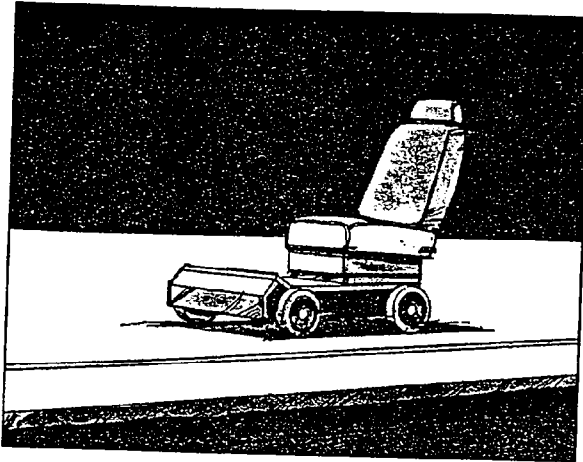
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

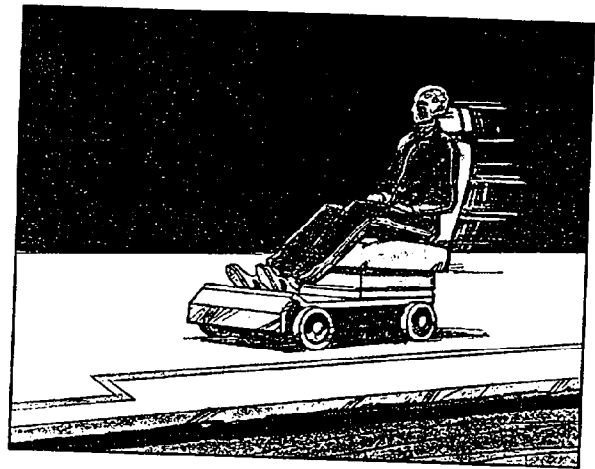
After more than 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

Why Safety Belts Work

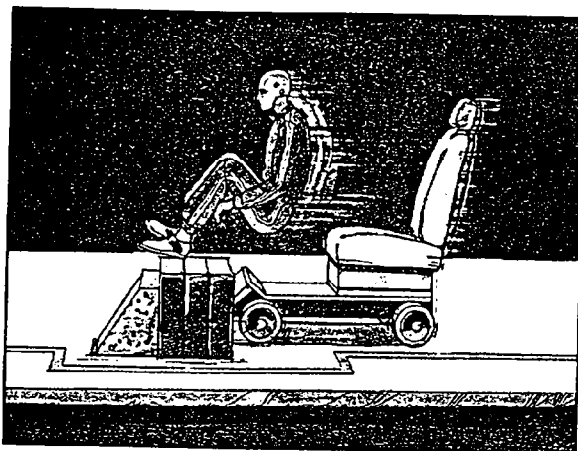
When you ride in or on anything, you go as fast as it goes.



Take the simplest vehicle. Suppose it's just a seat on wheels.



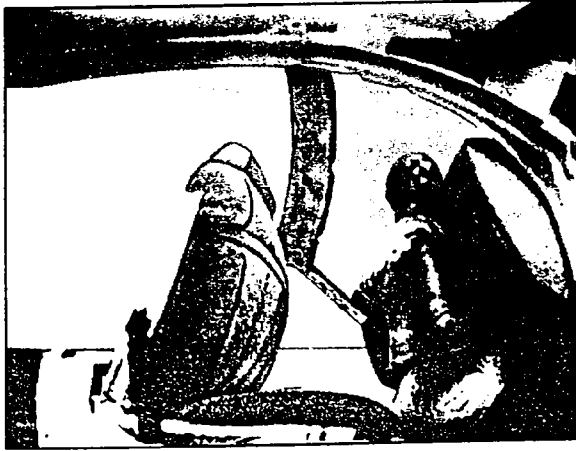
Put someone on it.



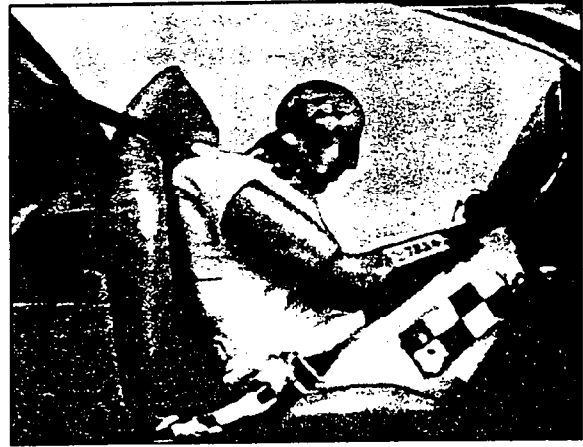
Get it up to speed. Then stop the vehicle. The rider doesn't stop.



The person keeps going until stopped by something. In a real vehicle, it could be the windshield ...



or the instrument panel ...



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Here Are Questions Many People Ask About Safety Belts -- and the Answers

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You *could* be -- whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If my vehicle has air bags, why should I have to wear safety belts?

A: Air bags are in many vehicles today and will be in most of them in the future. But they are supplemental systems only; so they work *with* safety belts -- not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident -- even one that isn't your fault -- you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your Chevrolet, see the part of this manual called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

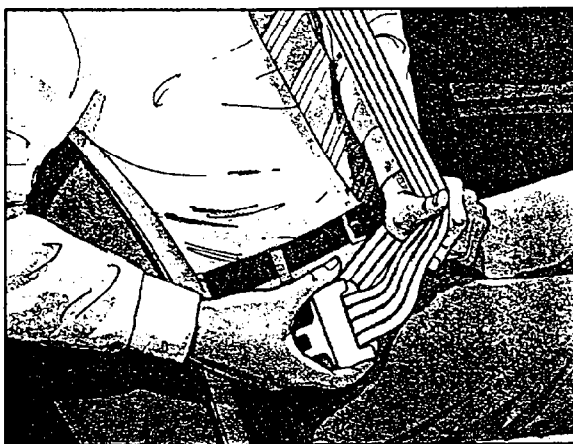
Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats" in the Index) so you can sit up straight.



If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle the belt.

Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



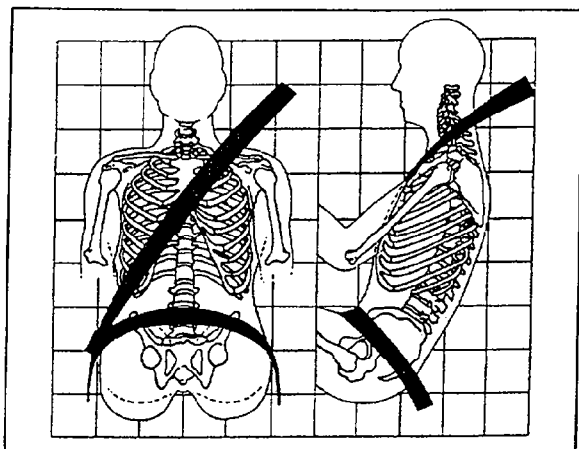
3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

4. Push the latch plate into the buckle until it clicks.



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.

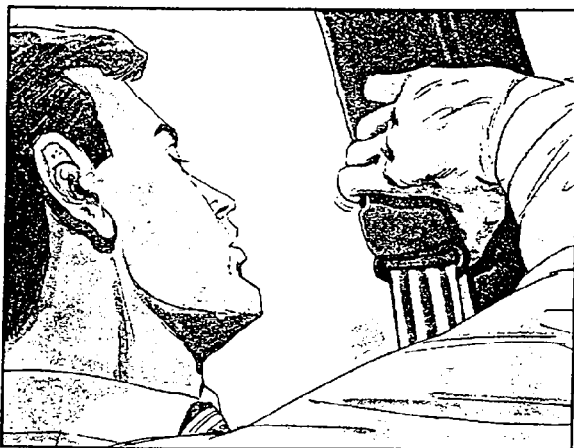


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

Shoulder Belt Height Adjuster (4-Door Models)

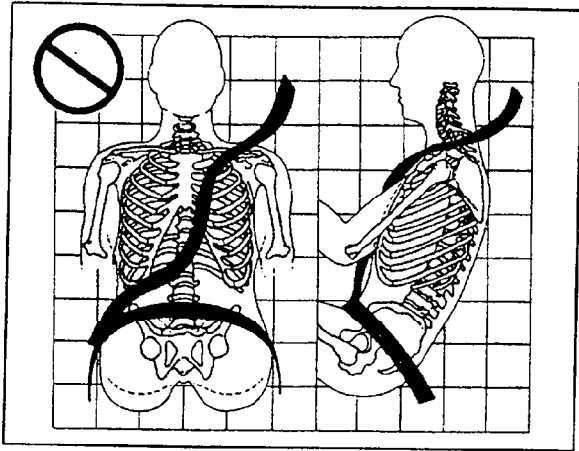
Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.



To move it down, squeeze the release button and move the adjuster to the desired position. You can move the adjuster up just by pushing up on the shoulder belt guide. After you move the adjuster to where you want it, try to move it down without squeezing the release button to make sure it has locked into position.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.

Q: What's wrong with this?

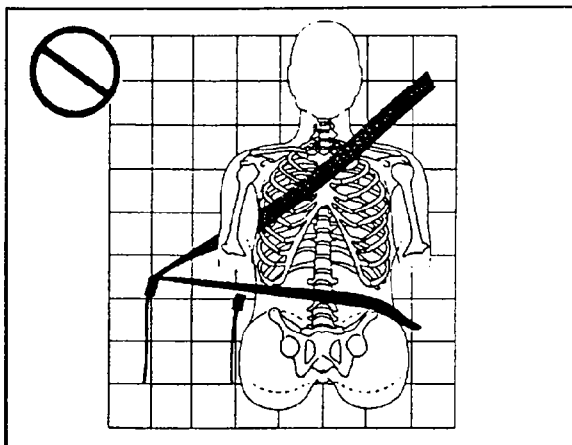


A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

Q: What's wrong with this?

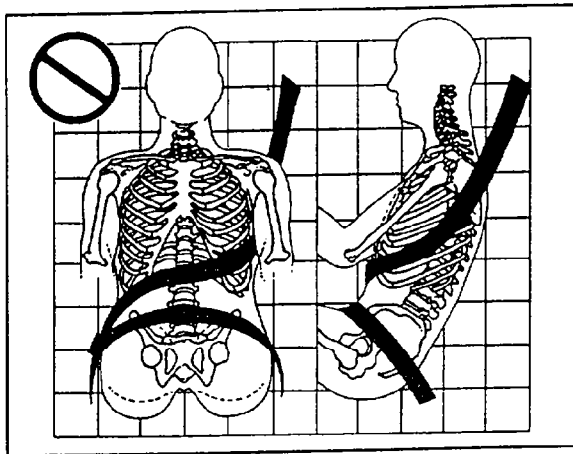


A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

Q: What's wrong with this?

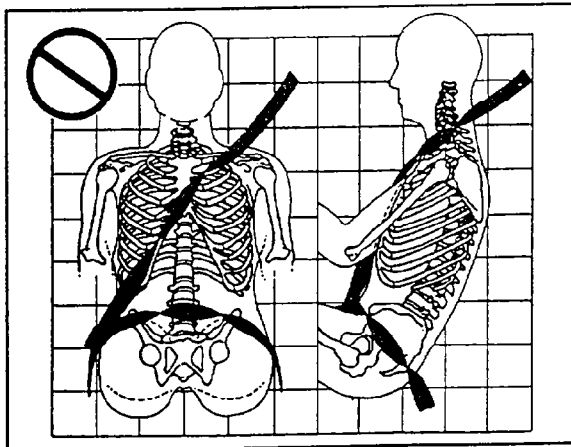


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

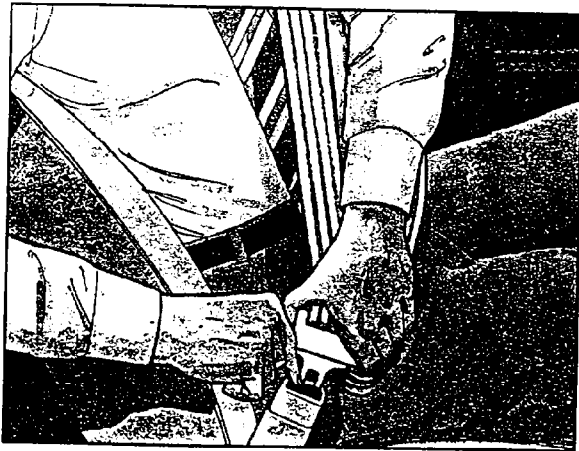
Q: What's wrong with this?



A: The belt is twisted across the body.

⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.

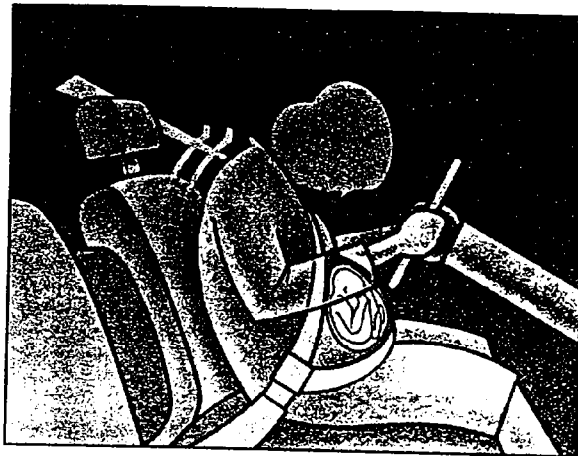


To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.



A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position

The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this section.

Supplemental Restraint System (SRS)

This part explains the Supplemental Restraint System (SRS) or air bag system.

Your Chevrolet has two air bags -- one air bag for the driver and another air bag for the right front passenger.

Here are the most important things to know about the air bag system:

CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt -- even if you have air bags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Air bags are "supplemental restraints" to the safety belts. All air bags are designed to work with safety belts, but don't replace them. Air bags are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate at all in rollover, rear, side or low-speed frontal crashes. Everyone in your vehicle should wear a safety belt properly -- whether or not there's an air bag for that person.

⚠ CAUTION:

Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Safety belts help keep you in position before and during a crash. Always wear your safety belt, even with air bags. The driver should sit as far back as possible while still maintaining control of the vehicle.

⚠ CAUTION:

An inflating air bag can seriously injure small children. Always secure children properly in your vehicle. To read how, see the part of this manual called "Children" and the caution label on the right front passenger's safety belt.

**AIR
BAG**

There is an air bag readiness light on the instrument panel, which shows AIR BAG.

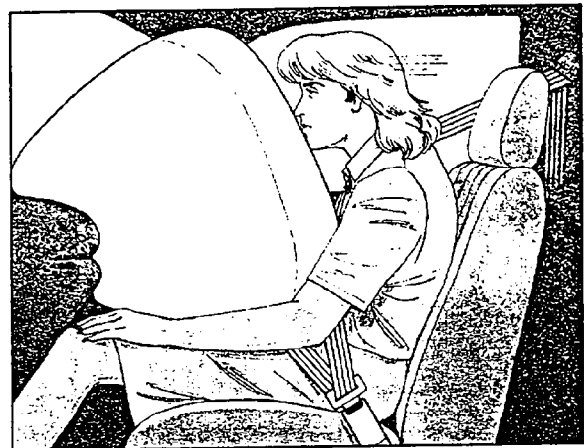
The system checks the air bag electrical system for malfunctions. The light tells you if there is an electrical problem. See "Air Bag Readiness Light" in the Index for more information.

How the Air Bag System Works



Where are the air bags?

The driver's air bag is in the middle of the steering wheel.



The right front passenger's air bag is in the instrument panel on the passenger's side.

CAUTION:

Don't attach anything to, or put anything between, an occupant and an air bag. If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into you and cause injury. The path of an inflating air bag must be kept clear, so don't attach or put anything on the steering wheel hub or on or near any air bag covering.

When should an air bag inflate?

An air bag is designed to inflate in a moderate to severe frontal or near-frontal crash. The air bag will inflate only if the impact speed is above the system's designed "threshold level." If your vehicle goes straight into a wall that doesn't move or deform, the threshold level is about 9 to 15 mph (14 to 24 km/h). The threshold level can vary, however, with specific vehicle design, so that

How does an air bag restrain?

In moderate to severe frontal or near-frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. Air bags supplement the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But air bags would not help you in many types of collisions, including rollovers, rear impacts and side impacts, primarily because an occupant's motion is not toward those air bags. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions.

What will you see after an air bag inflates?

After an air bag inflates, it quickly deflates, so quickly that some people may not even realize the air bag inflated. Some components of the air bag module in the steering wheel hub for the driver's air bag, or the instrument panel for the right front passenger's bag, will be hot for a short time. The parts of the bag that come into contact with you may be warm, but not too hot to touch. There will be some smoke and dust coming from vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or from being able to steer the vehicle, nor does it stop people from leaving the vehicle.

it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher. The air bag is not designed to inflate in rollovers, side impacts or rear impacts, because inflation would not help the occupant.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal or near-frontal impacts.

What makes an air bag inflate?

In an impact of sufficient severity, the air bag sensing system detects that the vehicle is in a crash. The sensing system triggers a release of gas from the inflator, which inflates the air bag. The inflator, air bag and related hardware are all part of the air bag modules inside the steering wheel and in the instrument panel in front of the right front passenger.

CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- Air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.

- Your vehicle is equipped with a crash sensing and diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the sensors are activated and driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

NOTICE:

If you damage the covering for the driver's or the right front passenger's air bag, the bag may not work properly. You may have to replace the air bag module in the steering wheel or both the air bag module and the instrument panel for the right front passenger's air bag. Do not open or break the air bag coverings.

Servicing Your Air Bag-Equipped Chevrolet

Air bags affect how your Chevrolet should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your Chevrolet dealer and the Cavalier Service Manual have information about servicing your vehicle and the air bag system. To purchase a service manual, see "Service and Owner Publications" in the Index.

⚠ CAUTION:

For up to 10 minutes after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape or yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

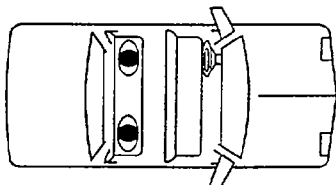
The air bag system does not need regular maintenance.

Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

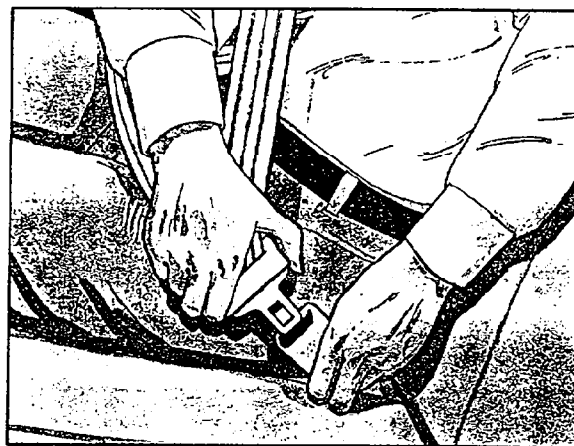
Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Outside Passenger Positions



Lap-Shoulder Belt

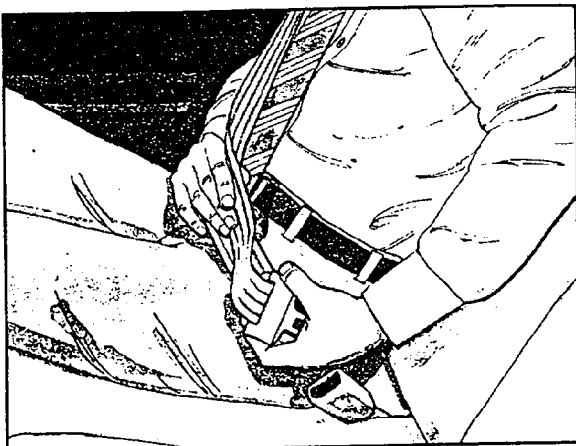
The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.



1. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

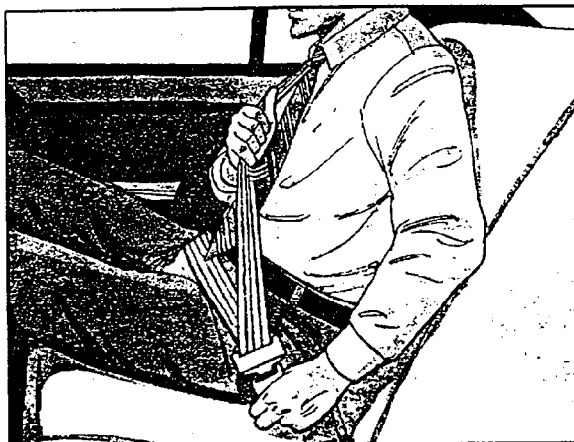
2. Push the latch plate into the buckle until it clicks.



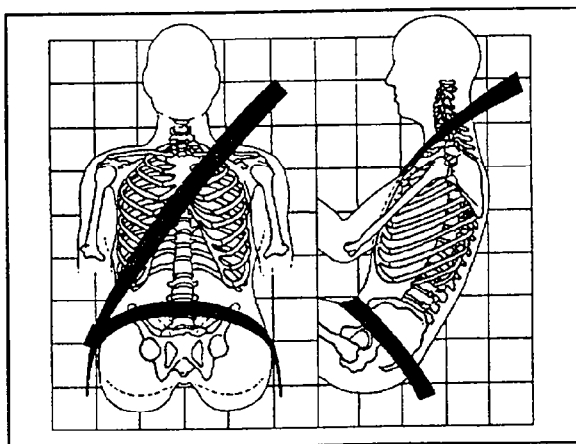
If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.

Pull up on the latch plate to make sure it is secure.

If the belt is not long enough, see "Safety Belt Extender" at the end of this section. Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.



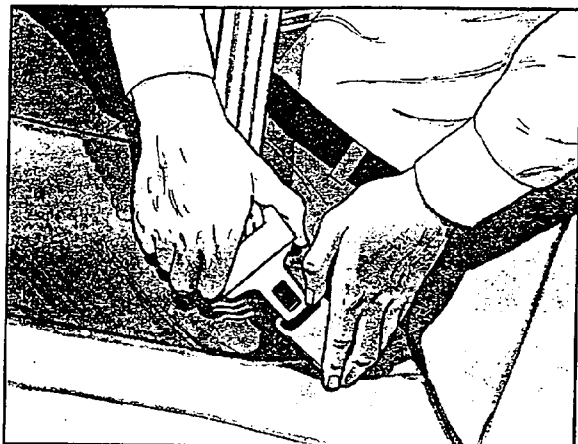
The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies

force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or a crash, or if you pull the belt very quickly out of the retractor.

CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



To unlatch the belt, just push the button on the buckle.

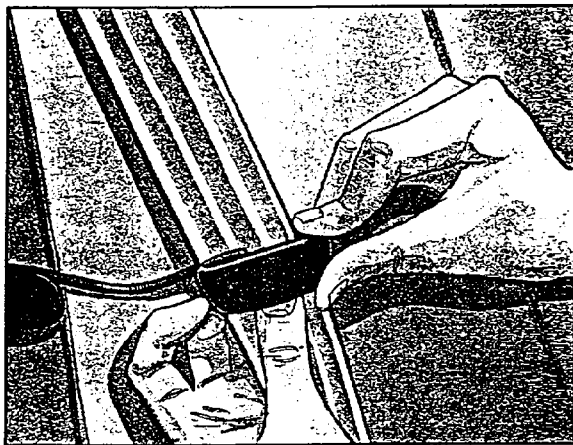
Rear Safety Belt Comfort Guides for Children and Small Adults

Rear shoulder belt comfort guides will provide added safety belt comfort for children who have outgrown child restraints and for small adults. When installed on a shoulder belt, the comfort guide pulls the belt away from the neck and head.

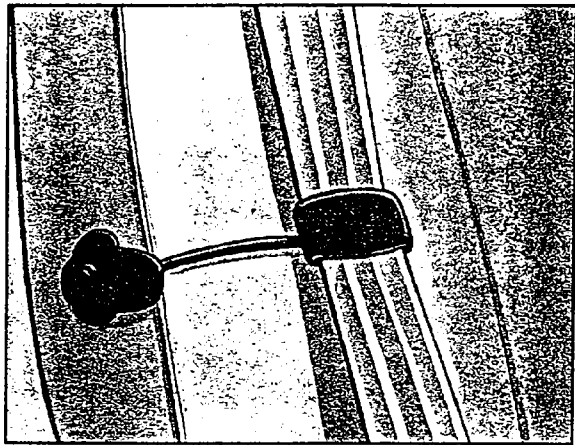
There is one guide for each outside passenger position in the rear seat. To provide added safety belt comfort for children who have outgrown child restraints and for smaller adults, the comfort guides may be installed on the shoulder belts. Here's how to install a comfort guide and use the safety belt:



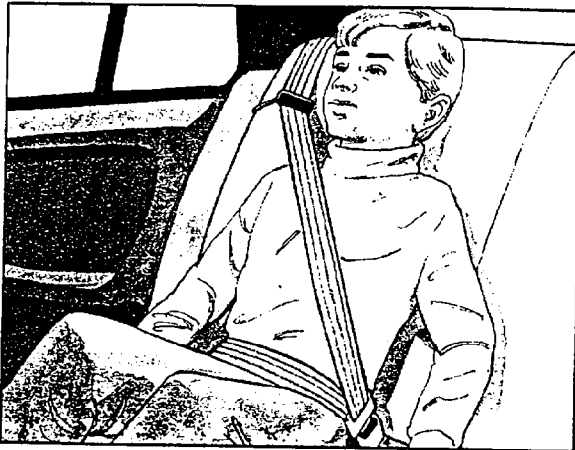
1. Pull the elastic cord out from between the edge of the seatback and the interior body to remove the guide from its storage clip.



2. Slide the guide under and past the belt. The elastic cord must be under the belt. Then, place the guide over the belt, and insert the two edges of the belt into the slots of the guide.



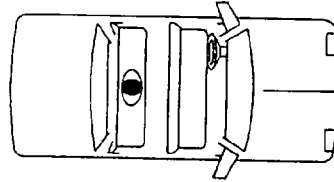
3. Be sure that the belt is not twisted and it lies flat. The elastic cord must be under the belt and the guide on top.



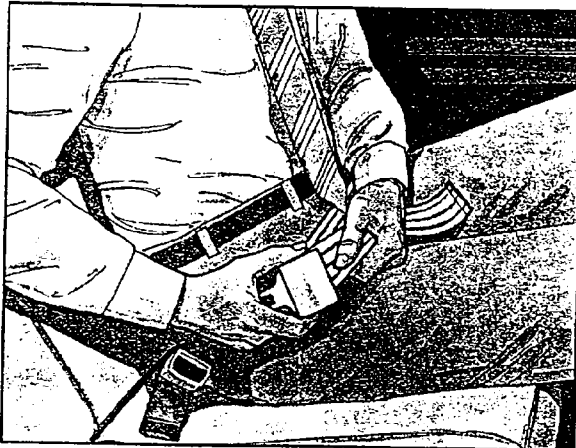
4. Buckle, position and release the safety belt as described in "Rear Seat Outside Passenger Positions" earlier in this section. Make sure that the shoulder belt crosses the shoulder.

To remove and store the comfort guides, squeeze the belt edges together so that you can take them out from the guides. Pull the guide upward to expose its storage clip, and then slide the guide onto the clip. Rotate the guide and clip inward and in between the seatback and the interior body, leaving only the loop of elastic cord exposed.

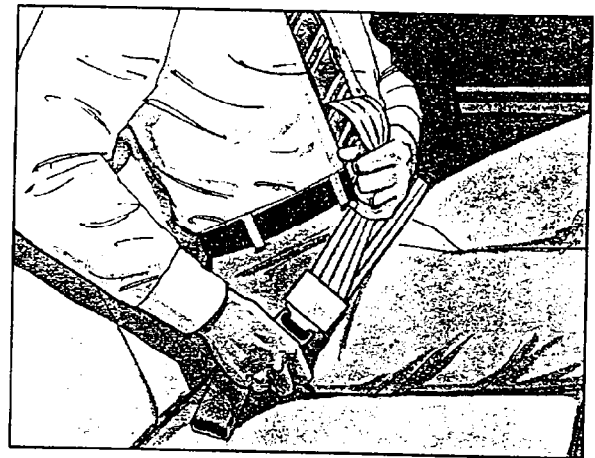
Center Passenger Position



Lap Belt



When you sit in the center seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.



To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release it the same way as the lap part of a lap-shoulder belt. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.