

V2529

REPORT NO. MGA-97-N06

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

1997 CHEVROLET MALIBU 4 DOOR
NHTSA NO. MV0120

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: February 6, 1997

Report Date: February 25, 1997

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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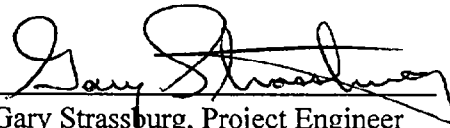
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16. Abstract A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1997 Chevrolet Malibu at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on February 6, 1997. The barrier impact velocity was 56.2 kph (34.95 mph), and the ambient temperature at the time of impact was 20.6°C. The post-test maximum static crush was 375 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 810 and the 3 msec. Clip (Chest g's) was 44.4 g's. The left and right femur loads for the driver were 3178 and 4071 Newtons, respectively. The passenger's HIC was 546 and the 3 msec Clip was 43.7 g's. The left and right femur maximum loads were 4402 and 1899 Newtons respectively.					
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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 Malibu 4 Door at a velocity of 56.2 kph (34.95 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on January 30, 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 16 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 810 and the maximum chest (CLIP) deceleration over 3 milliseconds was 44.4 g's. The maximum chest compression was 33 mm. The left and right femur loads were 3178 and 4071 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 546 and maximum chest (CLIP) deceleration over 3 milliseconds was 43.7 g's. The maximum chest compression was 32 mm. The left and right femur loads were 4402 and 1899 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1997/Chevrolet/Malibu/4 Door

NHTSA No.: MV0120 VIN.: 1G1ND52M3V6113591

Body color: White Date of Manufacture: 1/97

Engine: 6 Cylinders; C.I.D.; 3.1 Liters;
X Gas; Diesel; Turbocharged
 Longitudinal; X Transverse

Transmission: Speed; Manual; X Automatic; Overdrive

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

Odometer Reading: 12 miles

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

Type of Occupant Restraint: 3 point belts with driver and front passenger airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 197 kPa (29 Psi) Rear 177 kPa (26 Psi)

Recommended Tire Size: P215/60R15

Recommended Cold Tire Pressure: Front 197 kPa (29 Psi) Rear 177 kPa (26 Psi)

Tires on Vehicle: P215/60R15 Manufacturer: Firestone

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) = 416.0 kg. (A)

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

Rated Cargo Weight (RCW) A-B = 76.0 kg.

GVWR 1820.8 kg. GAWR: Front 1016.5 kg.; Rear 804.2 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 439.1 kg Right Rear = 252.7 kg
Left Front = 452.2 kg Left Rear = 246.3 kg
TOTAL FRONT WEIGHT = 891.3 kg (64.1 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 499.0 kg (35.9 % of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1390.3 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1390.3 kg
VCW = Vehicle Capacity Weight 416.0 kg
DSC = Designated Seating Capacity 5 RCW = VCW - 68 (DSC) = 76 kg*
Target Test Weight = UDW + RCW + (2 dummies x 78.0 kg/dummy)
Target Test Weight = 1622.3 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 490.3 kg Right Rear = 321.6 kg
Left Front = 491.2 kg Left Rear = 313.9 kg
TOTAL FRONT WEIGHT = 981.5 kg (60.7 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 635.5 kg (39.3 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 1617.0 kg
Weight of ballast secured in vehicle trunk area = 0 kg
Vehicle components removed to meet target weight: back seat and rear deck, spare tire and jack,
both tail lights, both side mirrors, muffler

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 697 LF 698 RR 696 LR 699
Test Attitude: RF 684 LF 682 RR 666 LR 665
Post Test RF 800 LF 799 RR 685 LR 657
Wheel Base: 2720 mm; C.G. = 1069 mm rearward of front wheel C/L
Remarks: None

* 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 6, 1997 Time of Test: 2:58 p.m.
Ambient Temperature: 20.6°C (69°F) (Spec. Range = 18.8 to 25.6°C)
Temperature in Occupant Compartment: 20.6° C
Windshield Molding Temperature: 20.6° C
Required Impact Velocity Range: 55.5 to 57.1 kph
Impact Velocity: primary = 56.2 kph; secondary = 56.6 kph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 1183 mm
Exiting Speed Trap: 183 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length:	Pre-test	= R <u>4687</u>	C _L <u>4834</u>	L <u>4687</u>
	Post-test	= R <u>4383</u>	C _L <u>4459</u>	L <u>4402</u>
	Crush	= R <u>304</u>	C _L <u>375</u>	L <u>285</u>

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

R 395 mm C_L 385 mm L 518 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 instrument panel</u>	<u>to glovebox & dash</u>
Right Knee	<u>to instrument panel</u>	<u>to glovebox & dash</u>

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

	<u>Front</u>		<u>Rear</u>	
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Movement	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>
Seat Shift (mm)	<u>0 mm forward</u>		<u>0 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/Malibu/4 Door

NHTSA No.: MV0120 VIN: 1G1ND52M3V6113591

- A. Number of Vent Holes: Driver 2; Passenger 0
- B. Size of Vent Holes: Driver 10 mm dia.; Passenger N/A
- C. Total Vent Area; Driver 1.6 cm² Passenger 0 cm²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
Driver; Length mm, Width mm, Diameter 655 mm
Passenger; Length 750 mm, Width 510 mm, Diameter mm
- E. Is the Airbag Tethered?
Driver; X Yes; No; If yes, record length of tether 310 mm
Passenger; X Yes; No; If yes, record length of tether 450 mm

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.:

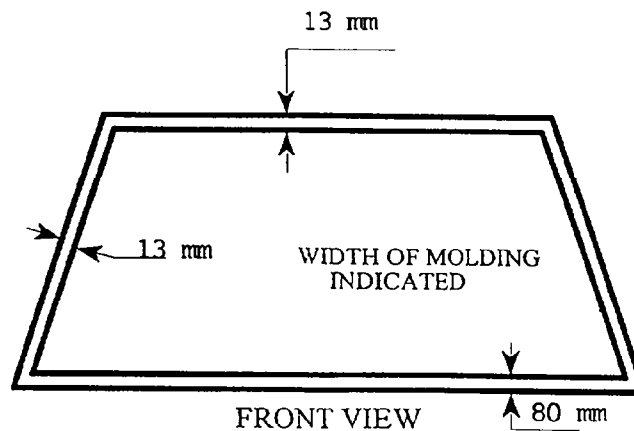
Windshield set in rubber molding with glue

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		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	2119	2119	100%
LEFT SIDE	2119	2119	100%
TOTAL	4238	4238	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= 1148 mm

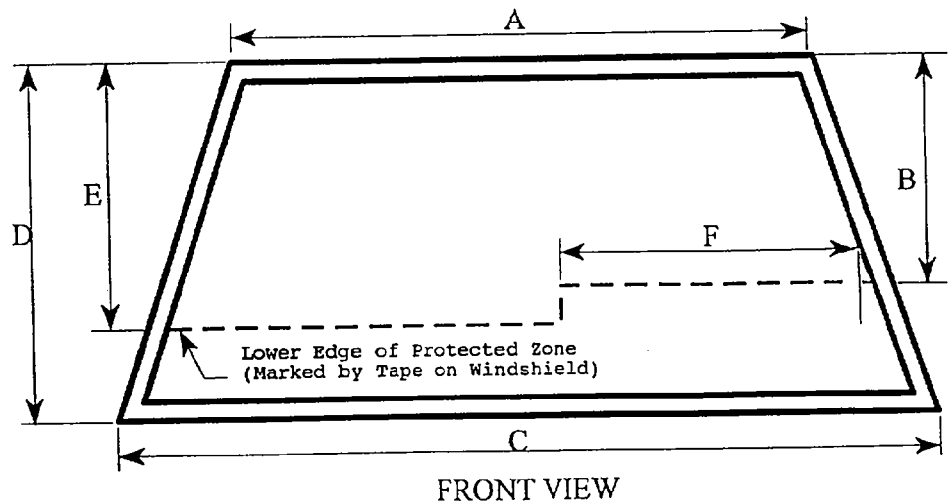
B= 491 mm

C= 1570 mm

D= 760 mm

E= 547 mm

F= 617 mm



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

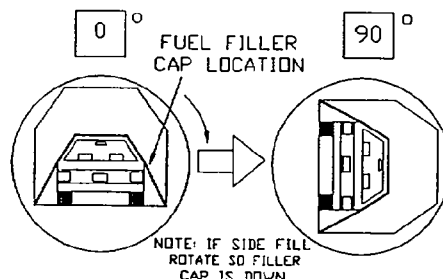
(Show location of penetration)

NONE

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MV0120



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 56 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 56 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
---	---	---	---

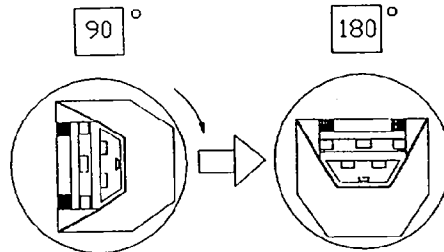
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MV0120



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 28 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 28 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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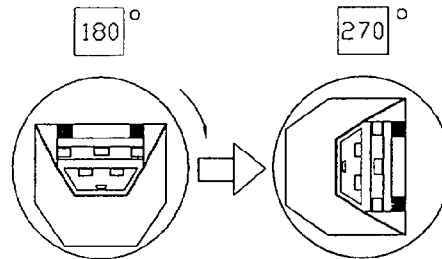
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MV0120



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 18 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 18 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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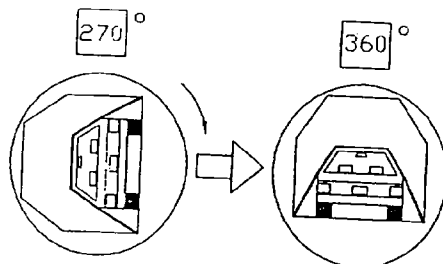
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MV0120



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 39 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 39 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
---	---	---	---

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/Malibu/4 Door

VEH. NHTSA NO.: MV0120 TEST DATE: February 6, 1997

MAX. ACCELERATION VALUES: (g's)	DRIVER # <u>036</u>	PASSENGER # <u>037</u>
Head Channel X	-69.8 @ 76 msec.	-53.3 @ 83 msec.
Head Channel Y	9.9 @ 89 msec.	19.3 @ 91 msec.
Head Channel Z	11.2 @ 92 msec.	-25.1 @ 69 msec.
HEAD RESULTANT	71.3 @ 76 msec.	57.0 @ 83 msec.
Chest Channel X	-47.5 @ 67 msec.	-46.8 @ 69 msec.
Chest Channel Y	9.0 @ 58 msec.	8.8 @ 89 msec.
Chest Channel Z	16.1 @ 90 msec.	12.6 @ 98 msec.
CLIP	44.4	43.7
TIME INTERVAL (msec) [3. msec. minimum]	t ₁ = 65.5 t ₂ = 68.6	t ₁ = 67.2 t ₂ = 70.3

HEAD INJURY CRITERIA (HIC)
VALUES:

HIC	810	546
t ₁ = (msec)	58.8	60.6
t ₂ = (msec)	94.8	96.6
Avg. Accel. t ₁ to t ₂ (g's)	55.1	47.0

[The maximum time interval from t₁ to t₂ is 36 milliseconds.]

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	3178 @ 54 msec.	4402 @ 53 msec.
Right Side (N)	4071 @ 56 msec.	1899 @ 78 msec.

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	5873 @ 56 msec.	5739 @ 57 msec.
Shoulder Belt (N)	5242 @ 73 msec.	5415 @ 66 msec.

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Malibu/4 Door

VEHICLE NHTSA NO.: MV0120 TEST DATE: February 6, 1997

MAXIMUM VALUES	DRIVER DUMMY # 036	PASSENGER DUMMY # 037
Neck Load X (N)	1227 @ 84 msec.	-453 @ 59 msec.
Neck Load Y (N)	355 @ 173 msec.	-295 @ 68 msec.
Neck Load Z (N)	-1945 @ 65 msec.	-1733 @ 69 msec.
Neck Moment X (NM)	-19.7 @ 147 msec.	-14.6 @ 67 msec.
Neck Moment Y (NM)	-78.3 @ 83 msec.	-30.2 @ 143 msec.
Neck Moment Z (NM)	-24.3 @ 180 msec.	-22.9 @ 93 msec.
Chest Deflection X (mm)	33	32
Time of Max. Occurrence	71 msec.	85 msec.
Pelvis X Acceleration (g's)	-58.0 @ 56 msec.	-51.1 @ 58 msec.
Pelvis Y Acceleration (g's)	-16.3 @ 102 msec.	-11.5 @ 53 msec.
Pelvis Z Acceleration (g's)	27.0 @ 81 msec.	24.3 @ 87 msec.
Pelvis Resultant (g's)	61.8 @ 56 msec.	53.0 @ 58 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MV0120 Vehicle: 1997/Chevrolet/Malibu/4 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

 X Fixed
 Adjustable Reclining

DRIVER SEAT POSITION

12th detent rearward out of 25 detents

Seat back angle 27.2°

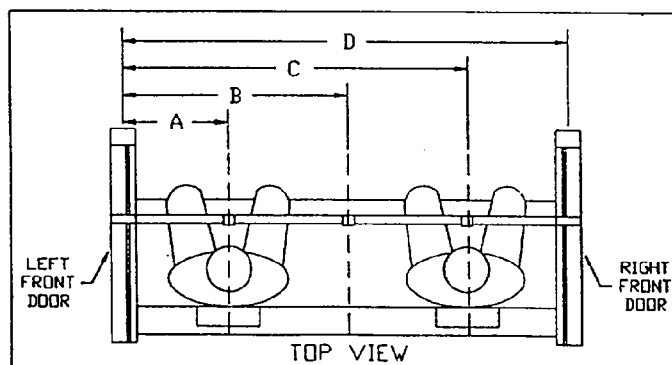
PASSENGER SEAT POSITION

13th detent rearward of 25 detents

Seat back angle 26.7°

Steering column set to mid position. Steering column angle 20.2°

Adjustable seat belt anchor set to 3rd position up out of 4 possible positions



 36 DUMMY ID 37

A = Left Door to Driver Centerline	<u> 402 </u> mm
B = Left Door to Center Passenger Centerline	<u> 764 </u> mm
C = Left Door to Right Passenger Centerline	<u> 1119 </u> mm
D = Left Door to Right Door	<u> 1528 </u> mm

FRONT SEAT MEASUREMENT TABLE

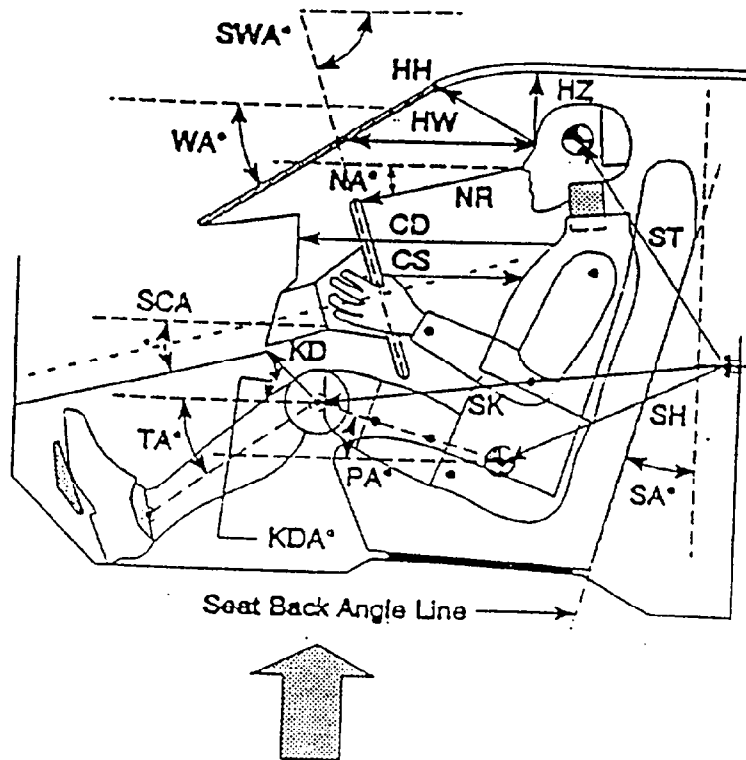
Units (mm)

	DRIVER (Serial # 036)	PASSENGER (Serial # 037)
WA°	28.6°	
SWA°	73.1°	N/A
SCA°	20.2°	N/A
SA°	27.2°	26.8°
HZ	181	185
HH	335	335
HW	592	599
HR	196	200
NR	396 Angle 14.6°	N/A
CD	548	492
CS	345	N/A
RA	221	N/A
KDL	160 Angle (KDA) 23.1°	173
KDR	163	156 Angle 29.1°
PA°	21.9°	24.7°
TA°	44.1°	42.0°
KK	253	267
ST*	573 Angle 6.9°	579 Angle 8.3°
SK*	599 Angle 86.9°	593 Angle 89.0°
SH*	206 Angle 108.3°	222 Angle 122.2°
SHY	260	256
HS	308	306
HD	128	129
AD	105	117

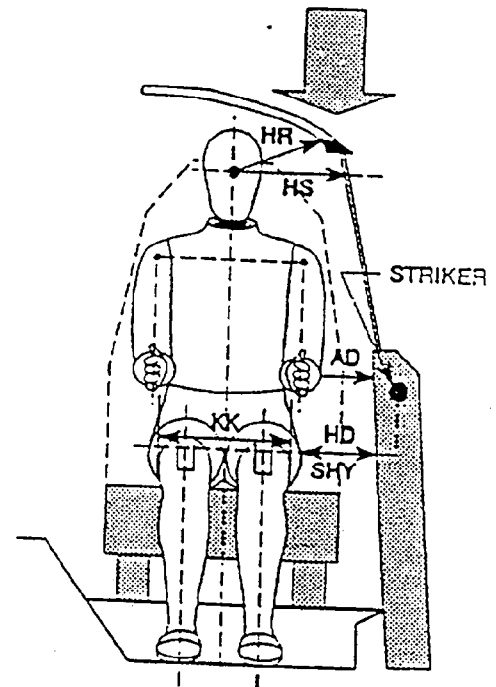
N/A = Not Applicable

* Angles measured from vertical

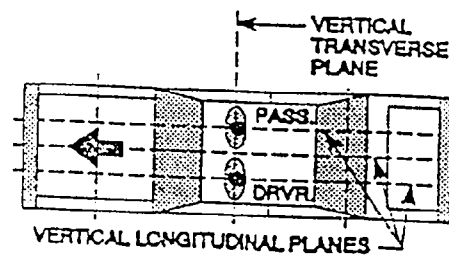
FRONT SEAT MEASUREMENTS



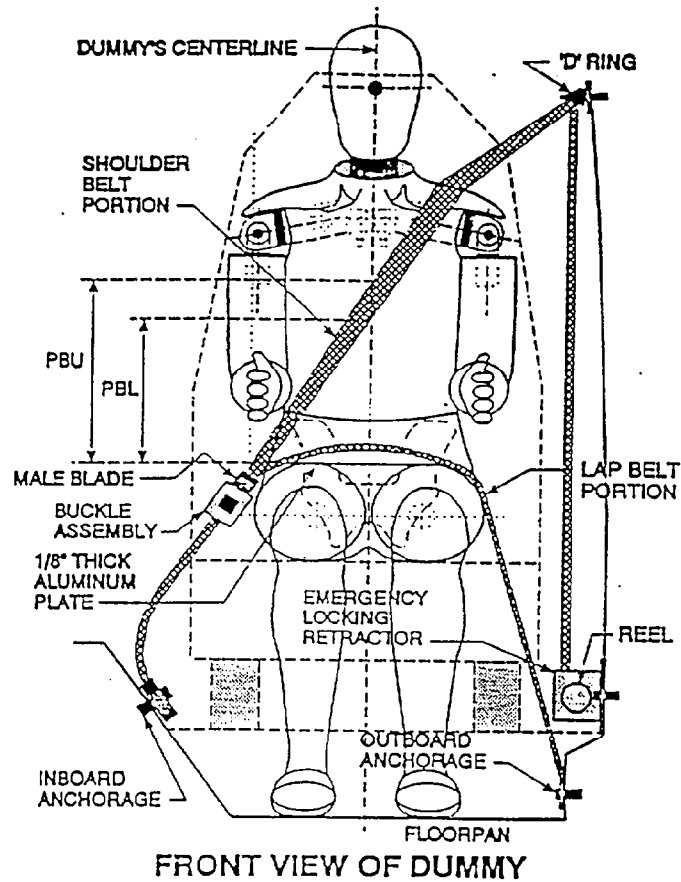
- AD - Arm to Door
- HD - H-Point to Door
- HR - Head to Side Header
- HS - Head to Side Window
- KK - Knee to Knee
- SHY - Striker to H-Point (Y-Direction)



- 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	345	355
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	265	280

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>640 mm</u>	<u>640 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>775 mm</u>	<u>770 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>800 mm</u>	<u>788 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>62 mm</u>	<u>98 mm</u> at shoulder
As determined mechanically	<u>96 mm</u>	<u>136 mm</u> at retractor

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>64 msec.</u>	<u>75 msec.</u>
---	-----------------	-----------------

NR = Not Recorded

CAMERA LOCATIONS

VEH. NHTSA NO.: MV0120; TEST DATE: February 6, 1997

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Malibu/4 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	-1030	-8790	1400	90	8335	25	1015
3	Steering Column Top	-2010	-8080	1540	90	7625	25	1015
4	Steering Column Bottom	-2000	-8070	1005	90	7615	25	1020
5	Driver Close-up	-1410	-10050	1330	90	9595	75	1020
6	Driver Angle	-5150	-5360	1960			50	806
7	Onboard Driver						35	1005
8	Onboard Passenger						35	1005
9	Right Overall	-2280	7610	1175	90	7175	13	1026
10	Right Passenger Half	-1000	8380	1130	90	7945	25	1015
11	Right Close-up	-1460	10200	1215	90	9765	75	962
12	Right Angle	-4800	5590	1950			50	1020
13	Top Overall	380	0	2700			13	1015
14	Top Driver	100	-470	1660			13	948
15	Top Passenger	100	470	1645			13	909
16	Pit Front	-1100	0	-3165			13	1015
17	Pit Rear	-2850	0	-3155			13	1015

*** COORDINATES:**

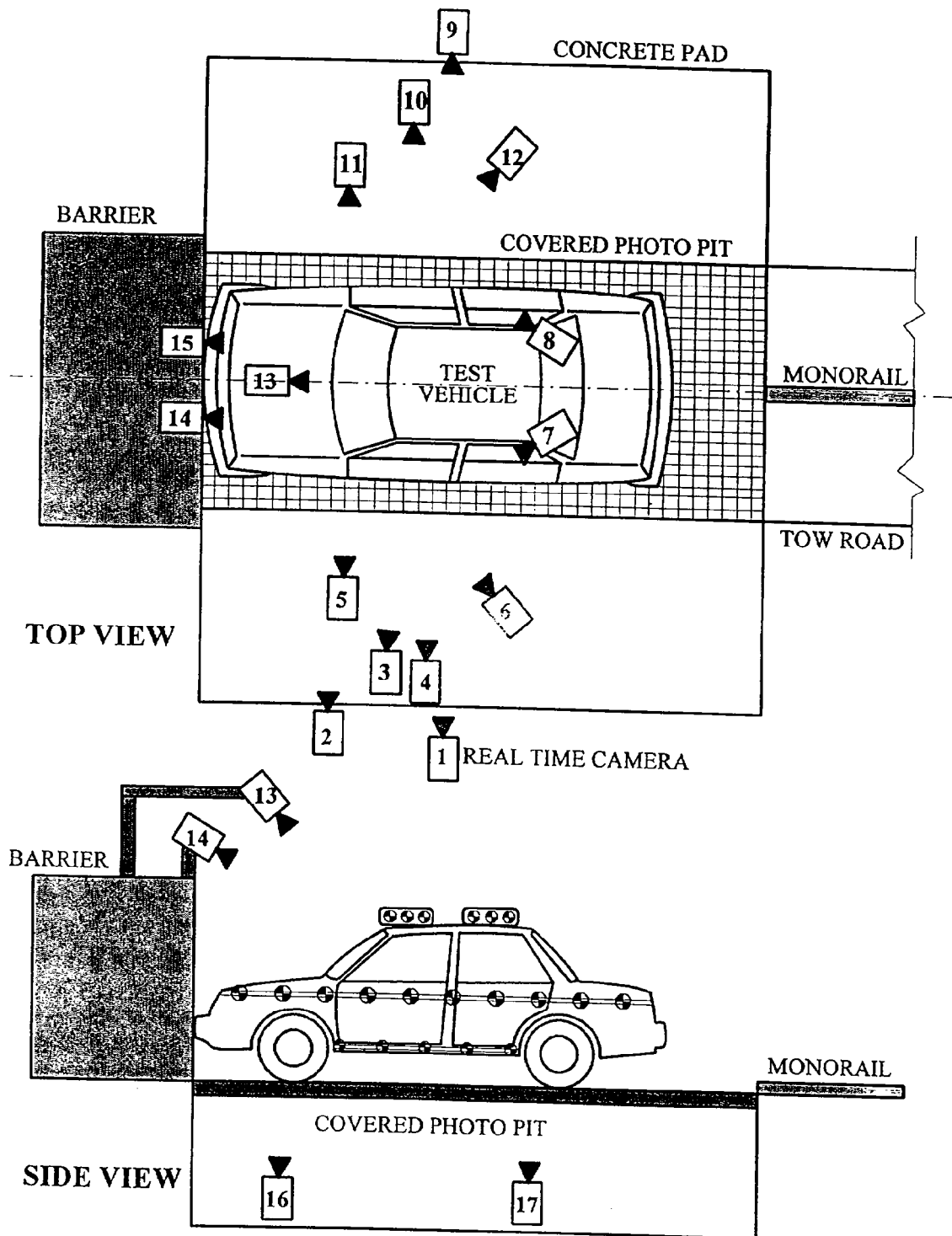
+X = film plane rearward of barrier

+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)



1. **Introduction**

2. **Background**

3. **Method**

4. **Results**

5. **Discussion**

6. **Conclusion**

7. **References**

8. **Appendix**

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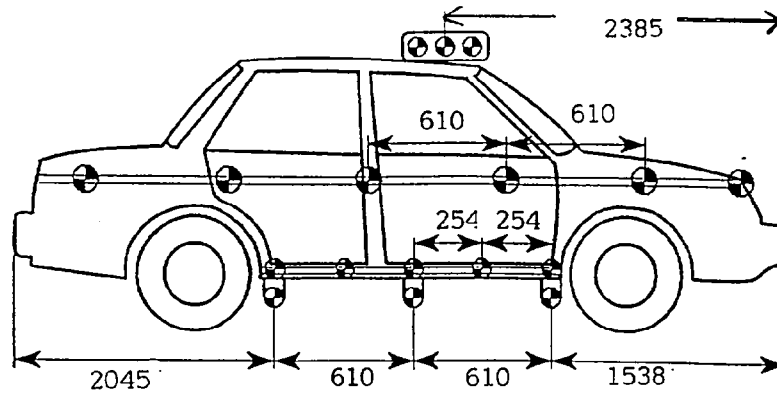
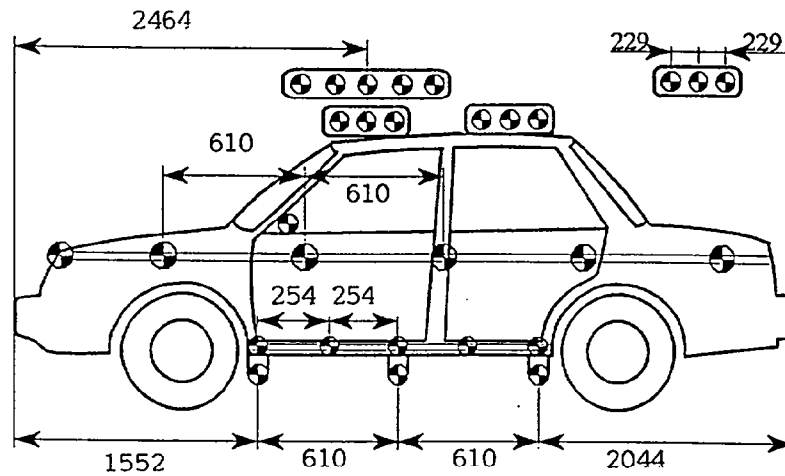
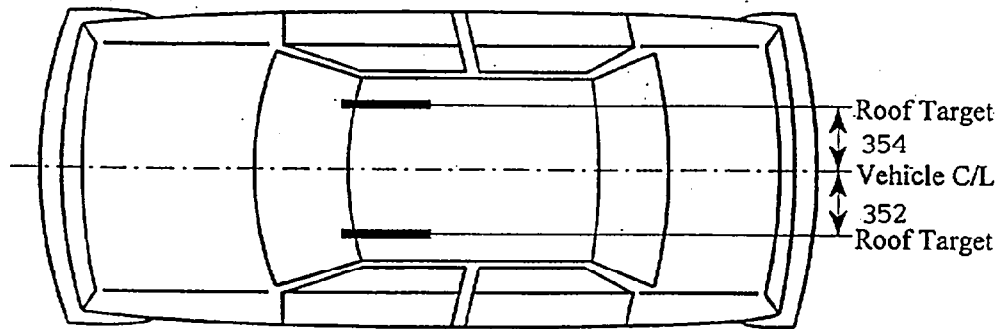
225. **Table 217**

226. **Table 218**

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228. **Table 220**

229. **Table**



(DIMENSIONS IN MM)

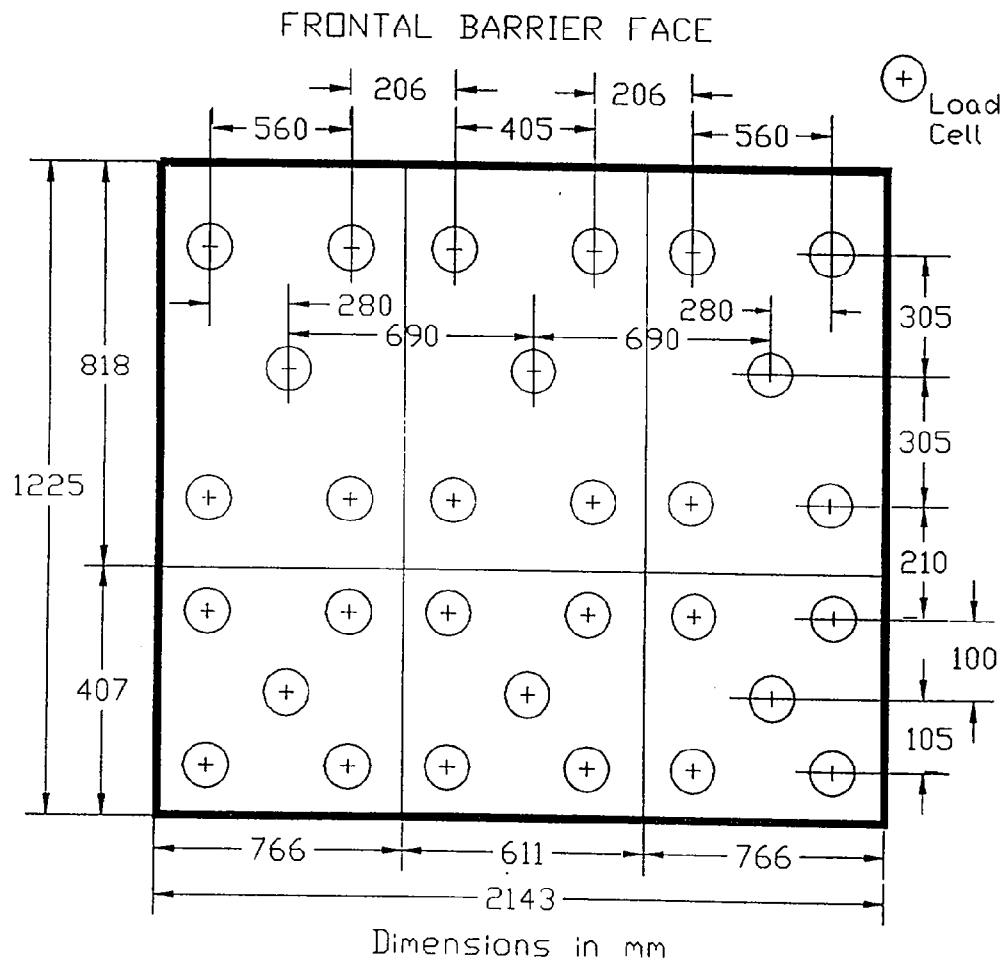
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

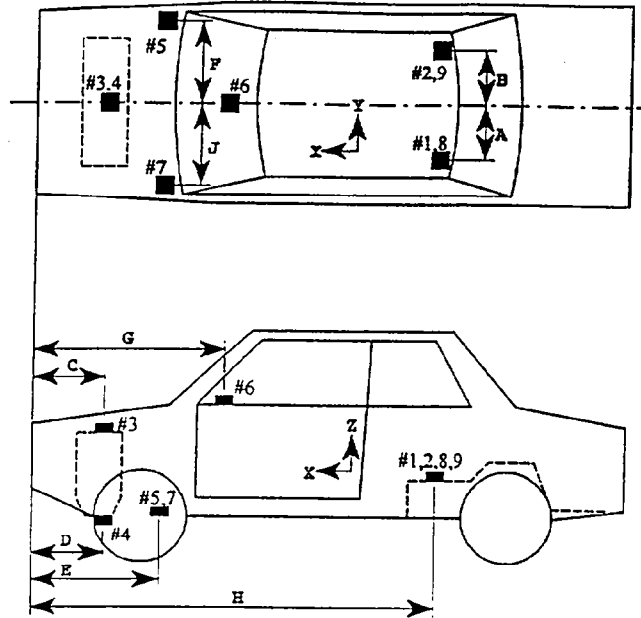
6 Groupings (5 cells/group)



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)

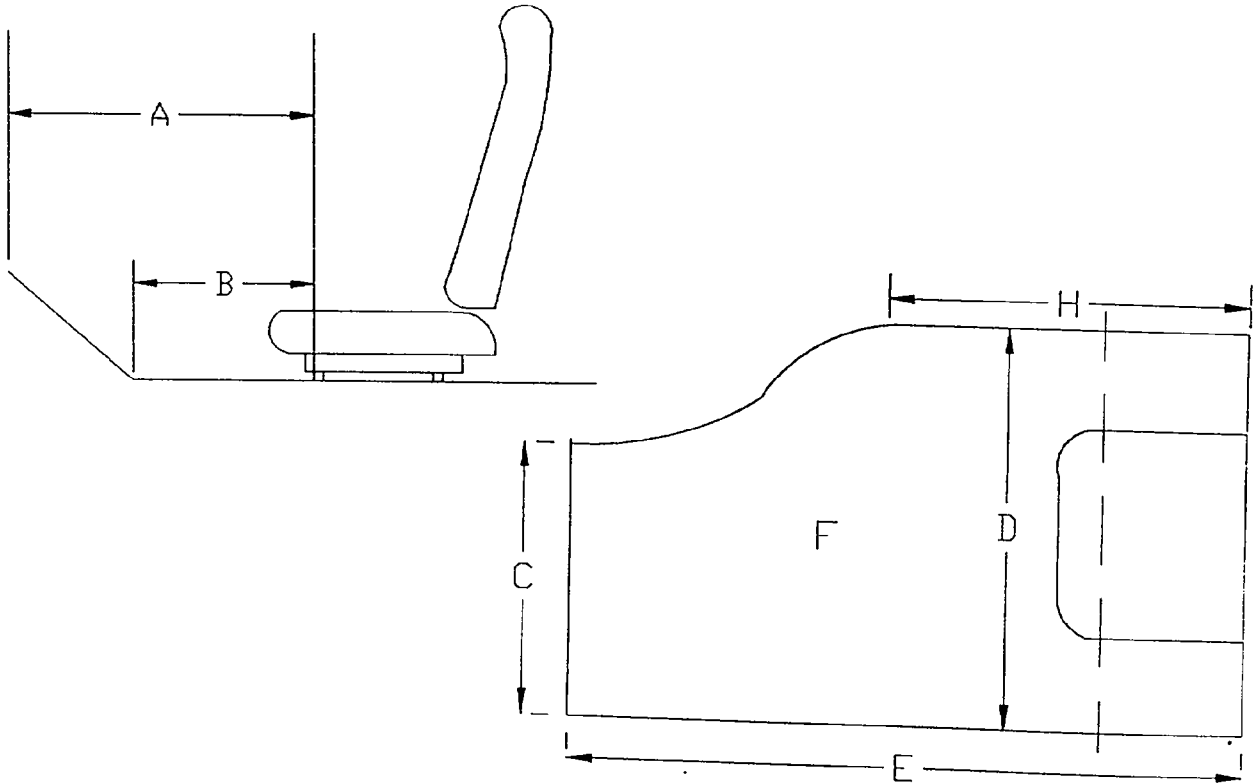
Dimension	Length
A	462
B	462
C	4024
D	4090
E	3970
F	678
G	3142
H	1898
J	678

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



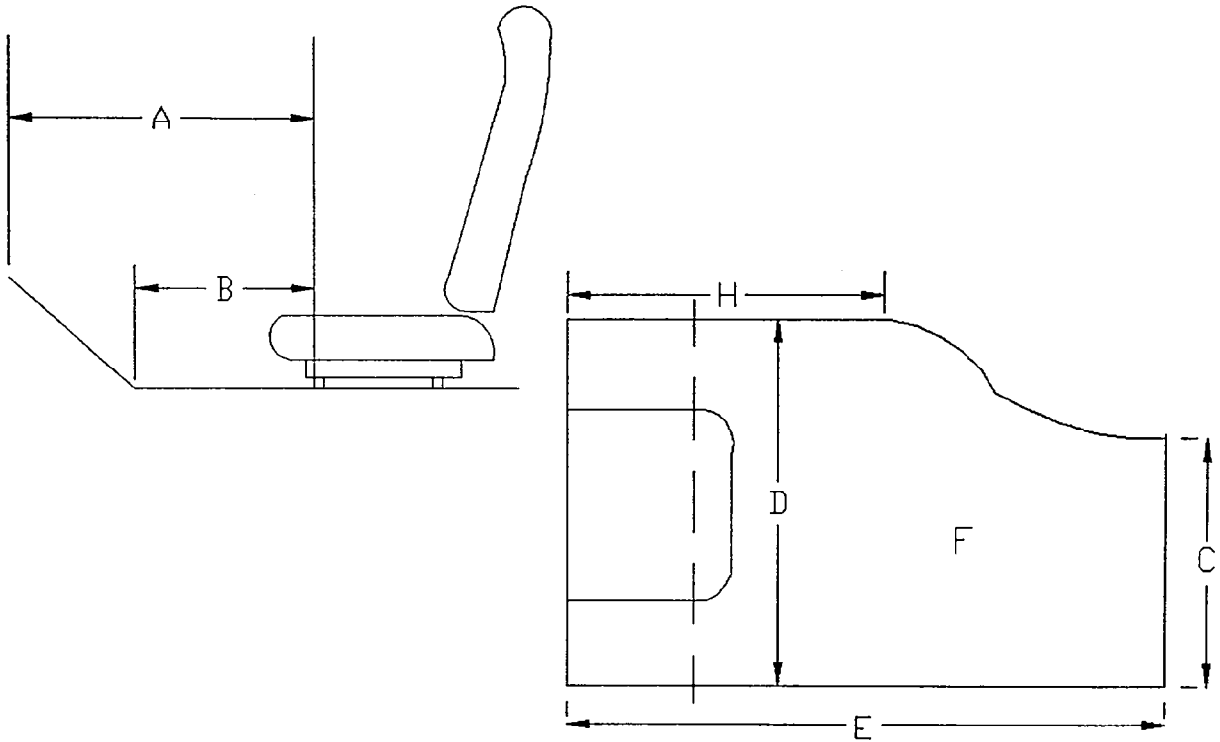
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	768	637	31
B	474	466	8
C	386	376	10
D	337	337	0
E	2160	2139	21
H	1906	1884	22
F(CM ²)	7341.4	7258.1	83.3

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

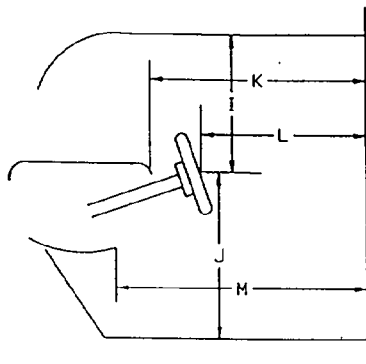
Passenger's Side



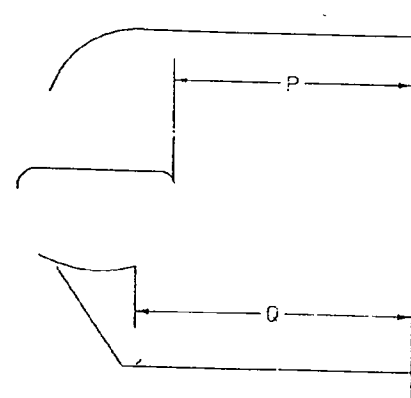
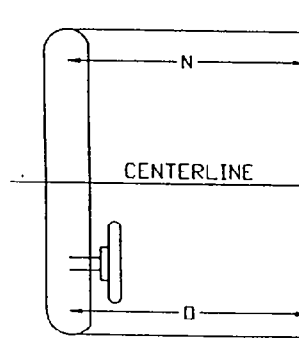
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	764	709	55
B	482	485	3
C	361	369	-8
D	307	337	-30
E	2130	2113	17
H	1911	1914	-3
F(CM ²)	6598.2	7152.6	554.4

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



MEASUREMENTS
 FROM C-PILLAR
 BELT ANCHORAGE



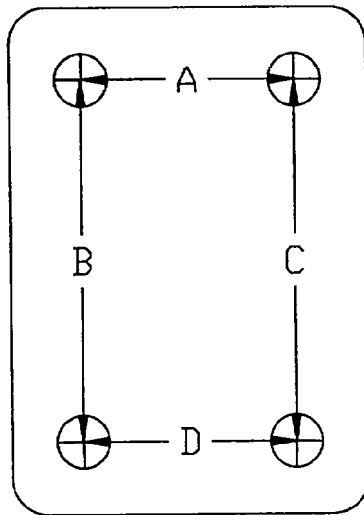
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	477	389	88
J	639	794	-155
K	1889	1891	-2
L	1696	1718	-22
M	2123	2000	123
N	2219	2217	2
O	2205	2203	2
P	1898	1895	3
Q	1995	1994	1

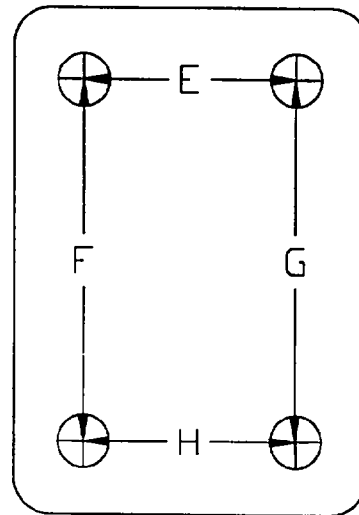
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE

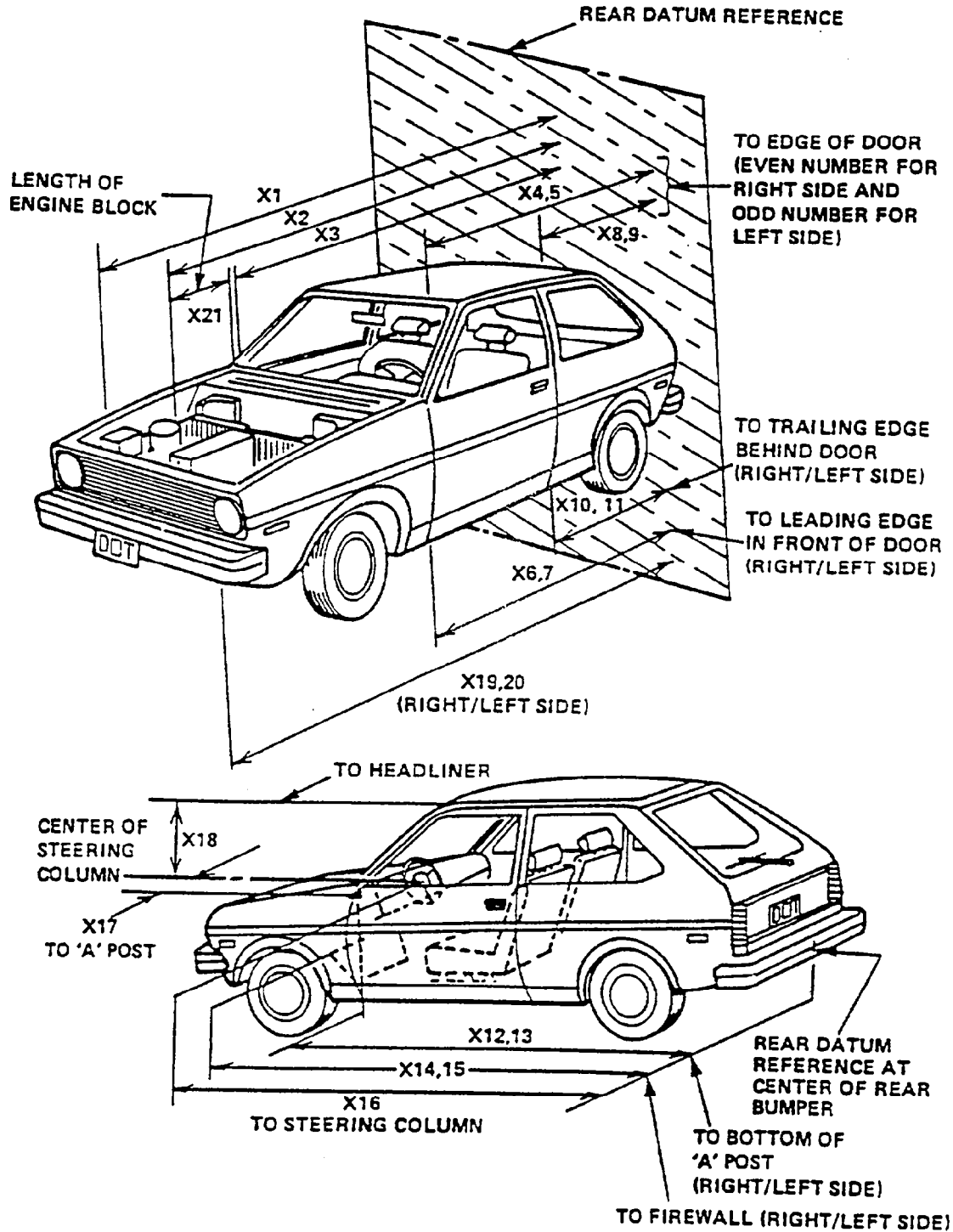


MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	418	384	34
B	340	339	1
C	459	427	32
D	392	390	2
E	390	357	33
F	475	448	27
G	335	335	0
H	386	382	4

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4834	4459	375
X2	Rear Surface of Vehicle to Front of Engine	4224	3984	240
X3	Rear Surface of Vehicle to Firewall	3714	3638	76
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3277	3293	-16
X5	Rear Surface to Upr. Leading Edge of Left Door	3275	3280	-5
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3288	3290	-2
X7	Rear Surface to Lwr. Leading Edge of Left Door	3295	3282	13
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2246	2259	-13
X9	Rear Surface to Upr. Trailing Edge of Left Door	2243	2247	-4
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2249	2251	-2
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2255	2241	14
X12	Rear Surface to Bottom of A-Post on Rt. Side	3294	3296	-2
X13	Rear Surface to Bottom of A-Post on Left Side	3297	3281	16
X14	Rear Surface to Firewall on Right Side	3682	3592	90
X15	Rear Surface to Firewall on Left Side	3732	3629	103
X16	Rear Surface to Steering Column	2850	2850	0
X17	Center of Steering Column to A-Post	392	347	45
X18	Center of Steering Column to Headlining	464	410	54
X19	Rear Surface to Right Side of Front Bumper	4687	4383	304
X20	Rear Surface to Left Side of Front Bumper	4687	4402	285
X21	Length of Engine Block	380	380	0

TEST VEHICLE MEASUREMENTS (Cont'd)



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1997/Chevrolet/Malibu/4 Door

VEH. NHTSA NO.: MV0120; VIN: 1G1ND52M3V6113591

MODEL YEAR: 1997 ; BUILD DATE: 1/97 ; TEST DATE: February 6, 1997

VEH. SIZE CATEGORY: mid size ; TEST WEIGHT: 1617 kg

VEH. WHEELBASE: 2720 mm; FRONT OVERHANG: 964 mm; OVERALL WIDTH: 1590 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: 56.2 kph ; TIME OF SEPARATION: 140 msec

VELOCITY CHANGE: 64.2 kph

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

CRUSH DEPTH C1 = 285 mm

DIMENSIONS: C2 = 359 mm

C3 = 389 mm

C4 = 388 mm

C5 = 368 mm

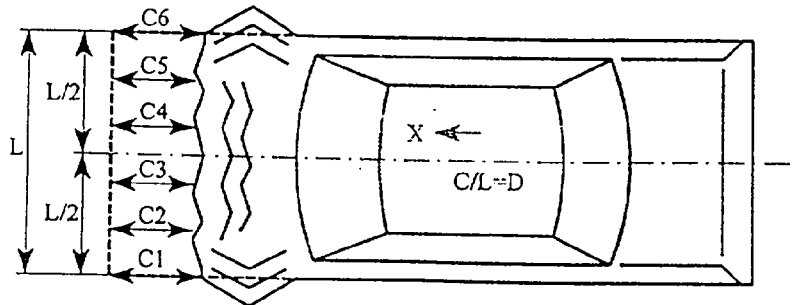
C6 = 304 mm

MIDPOINT OF D = Vehicle Centerline

DAMAGE: (Longitude)

LENGTH OF

DAMAGED REGION: L = 1370 mm



APPENDIX A
PHOTOGRAPHS

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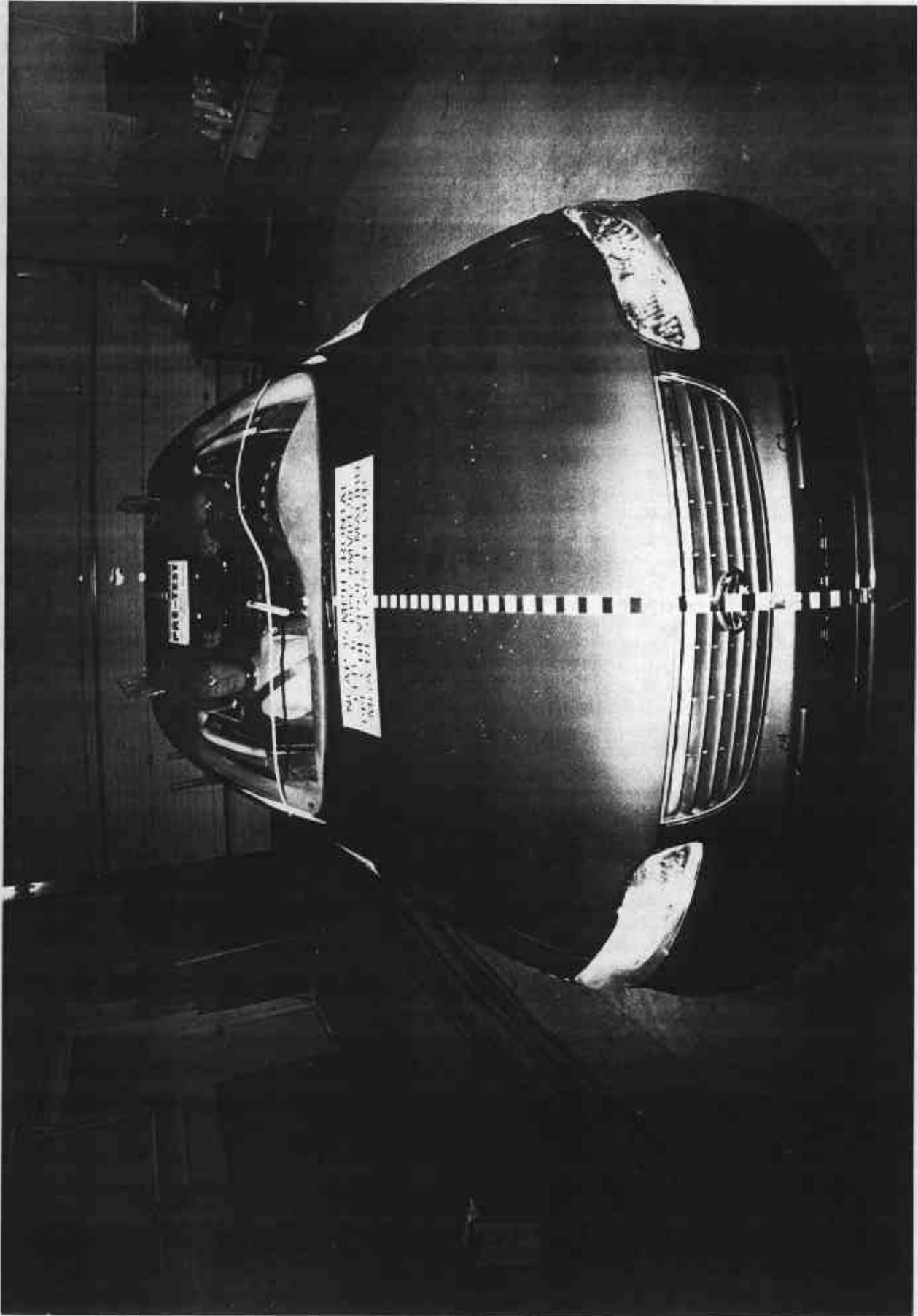


Photo No. A-1 - Pre-Test Front View of Test Vehicle

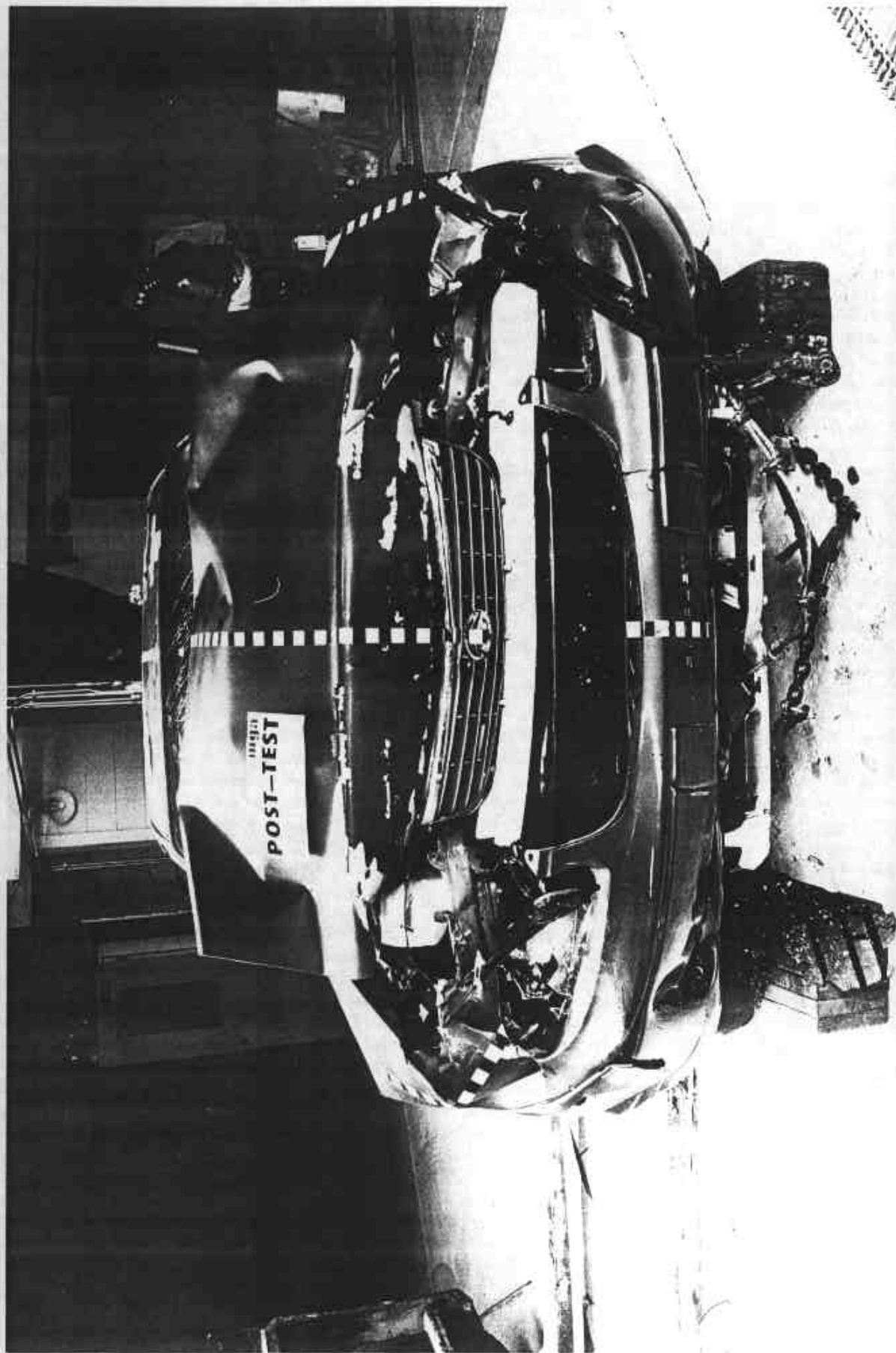


Photo No. A-2 - Post-Test Front View of Test Vehicle

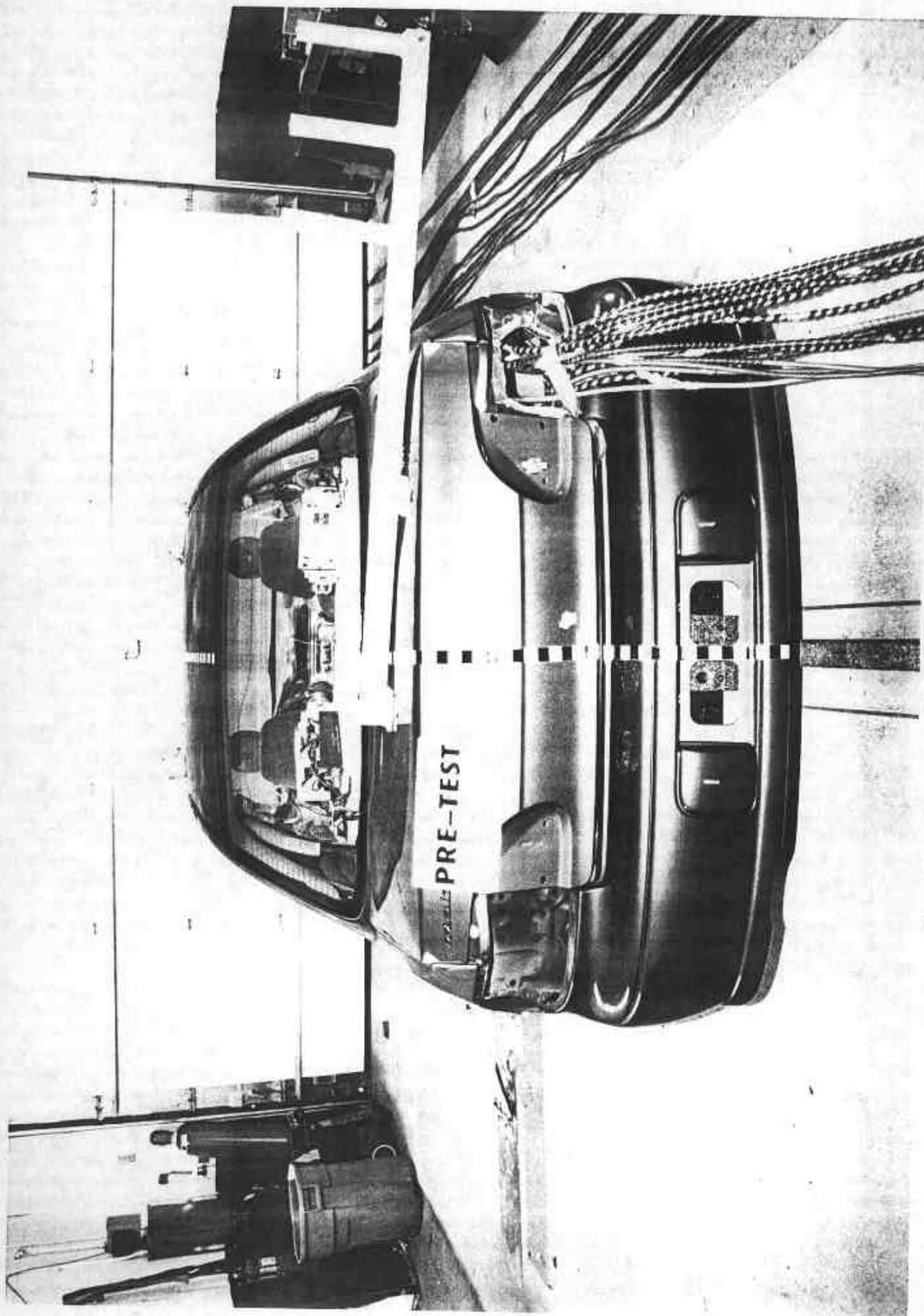


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

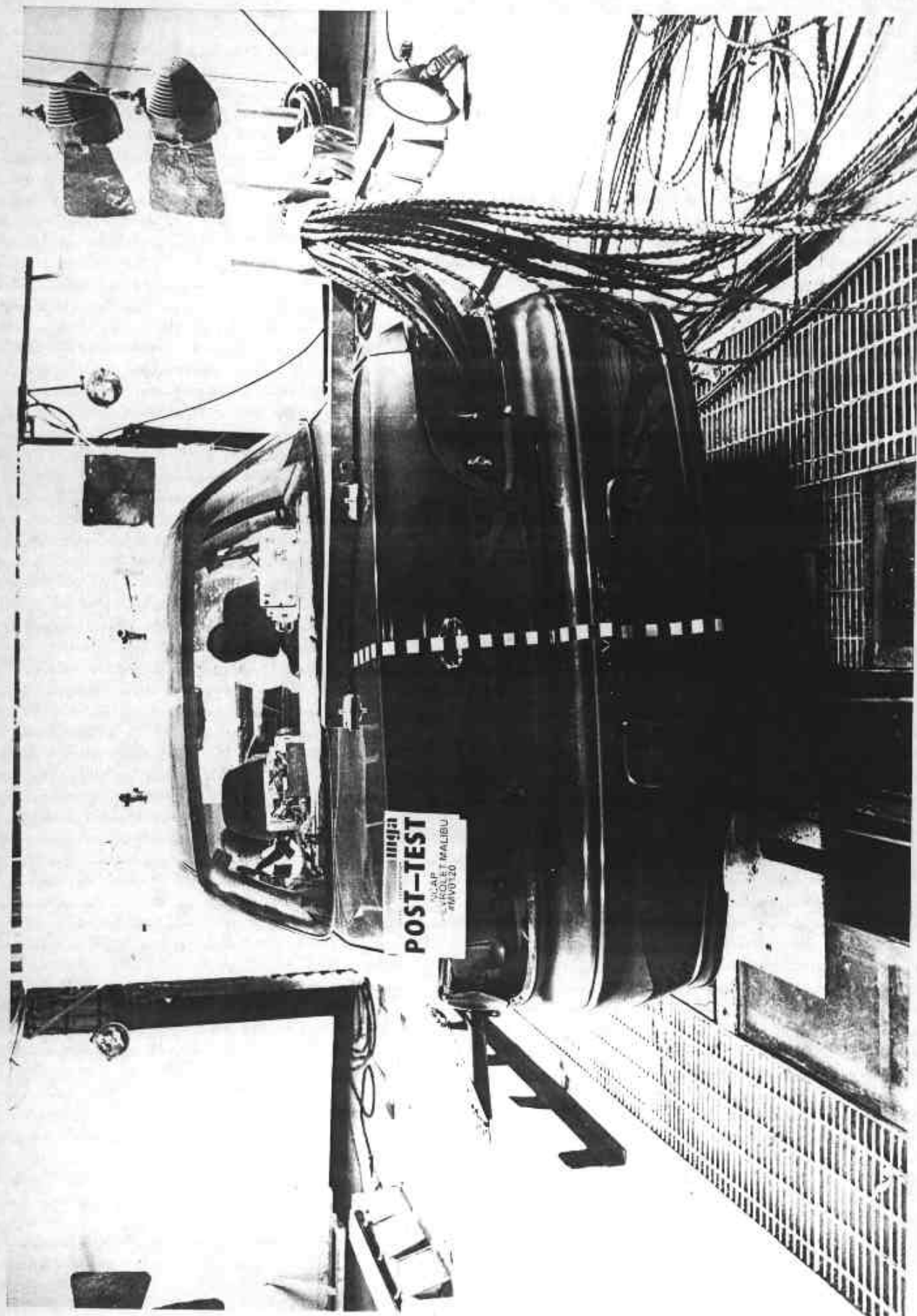


Photo No. A-4 - Post-Test Rear View of Test Vehicle

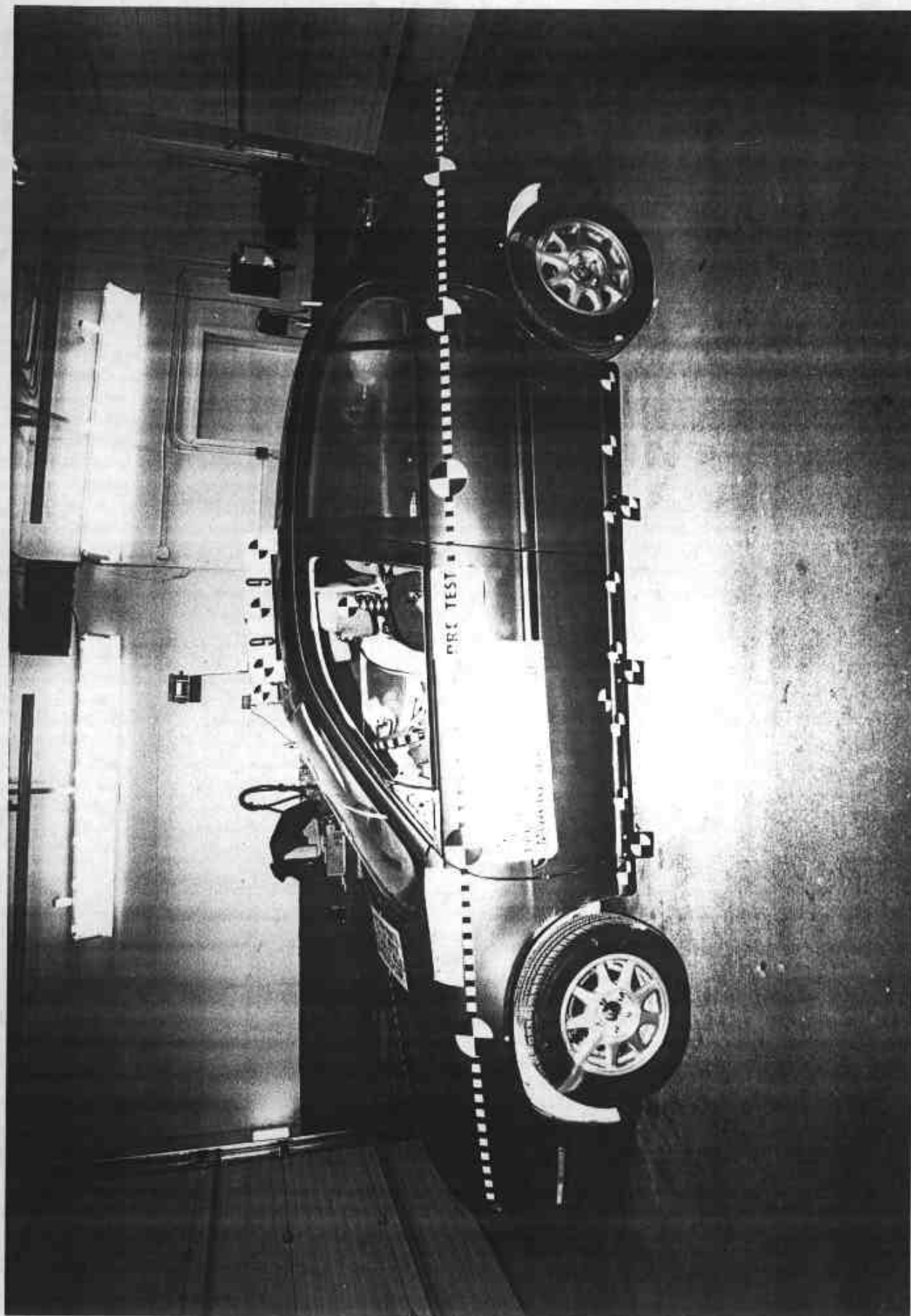


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

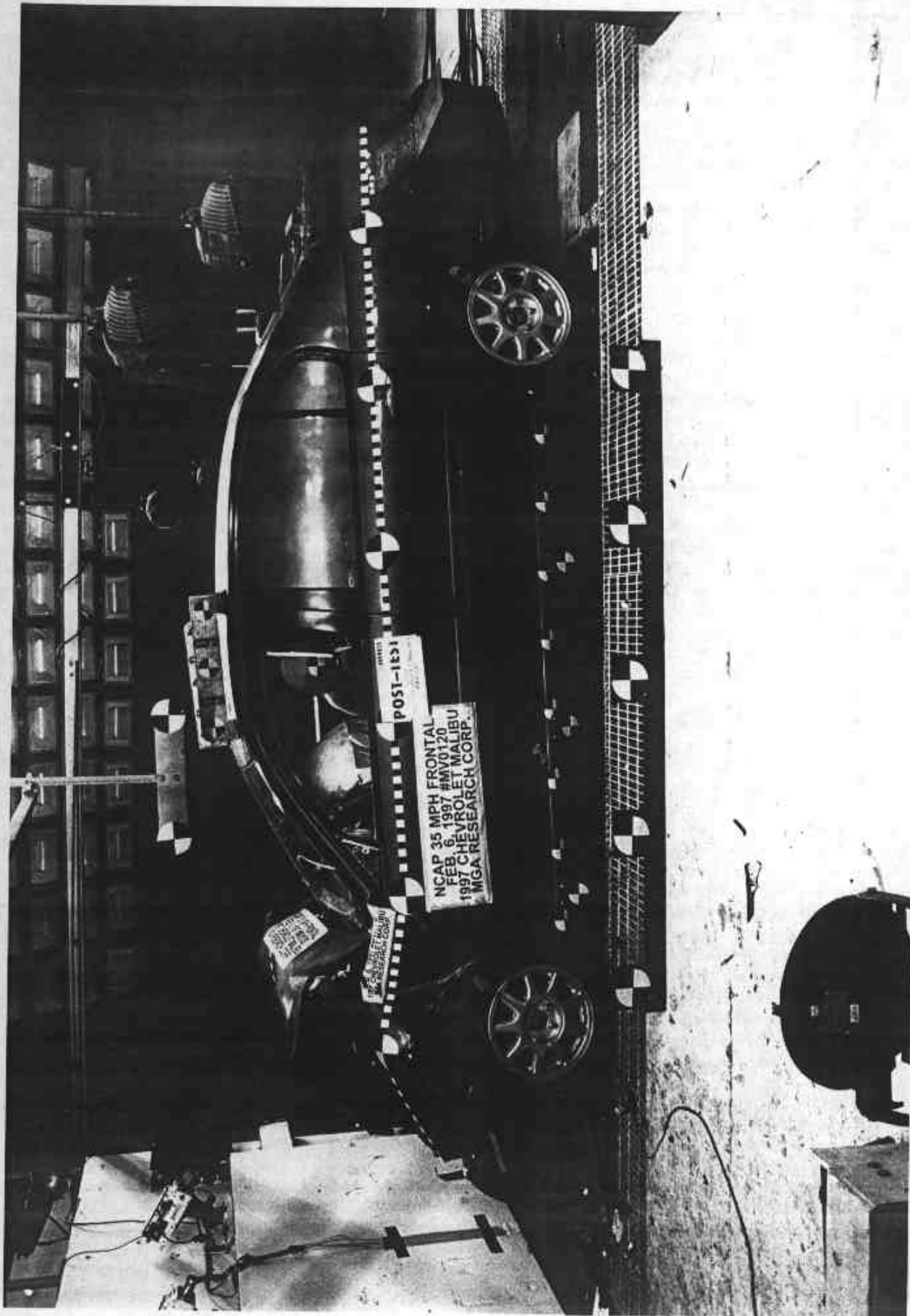


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

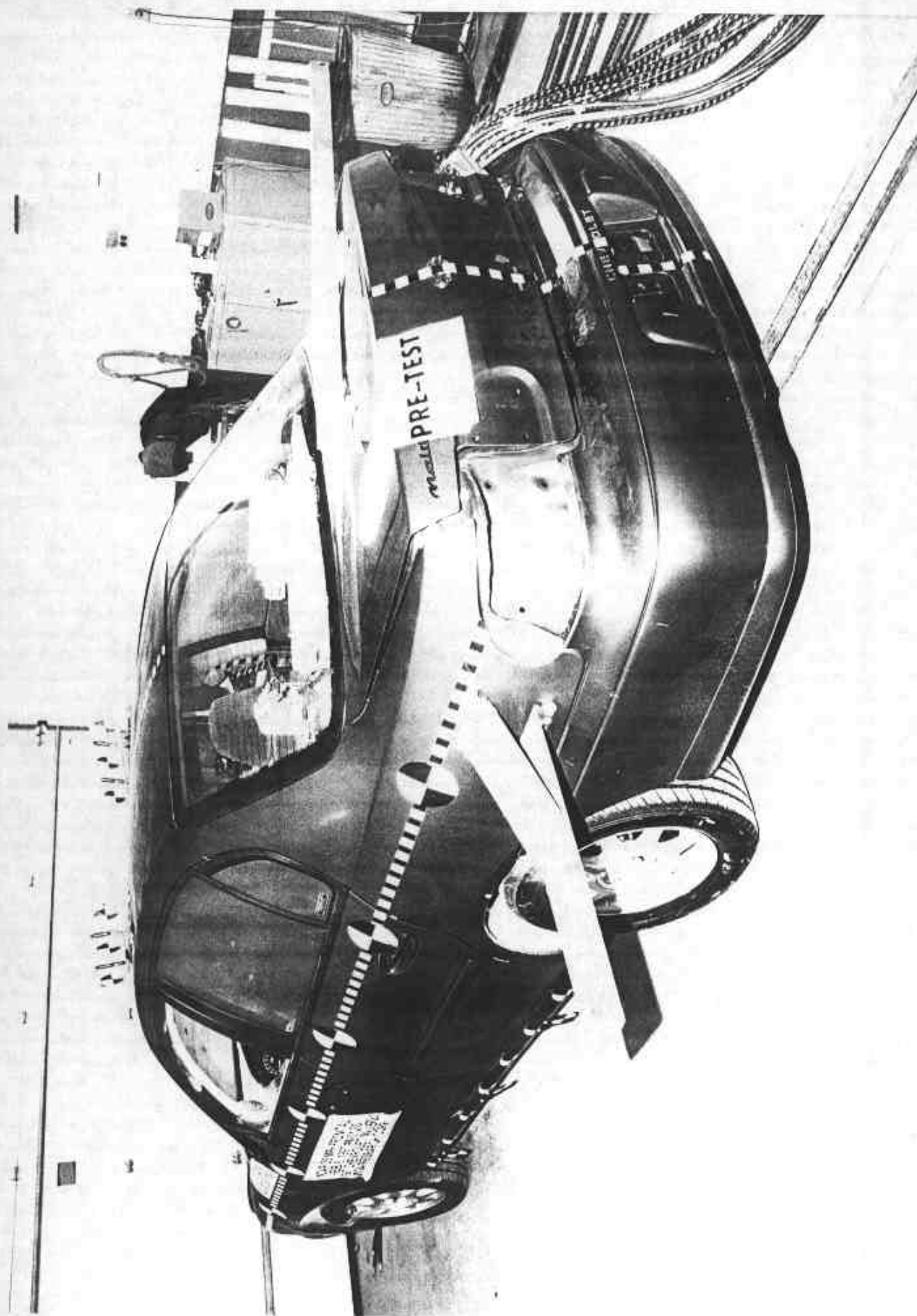


Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

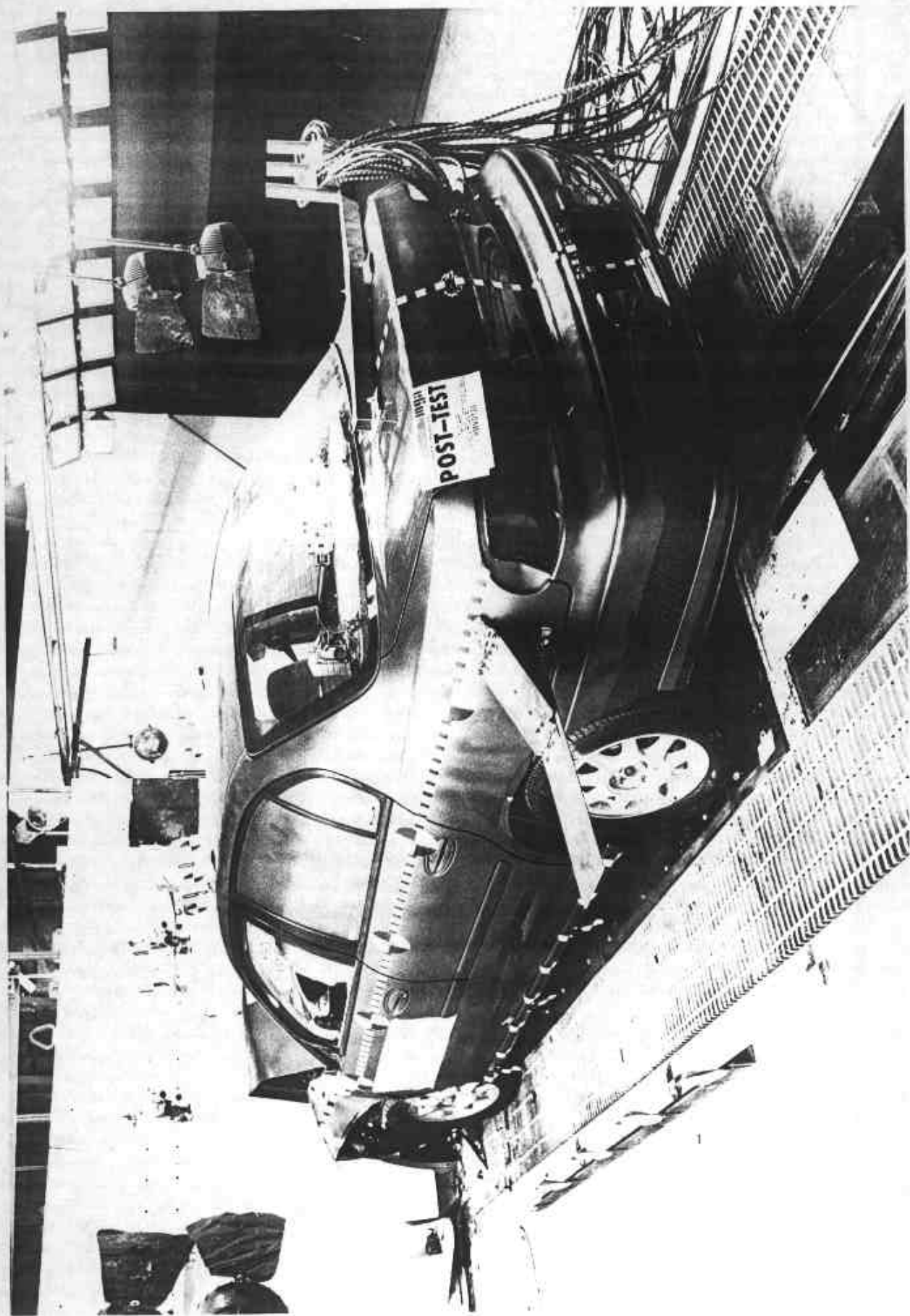


Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle

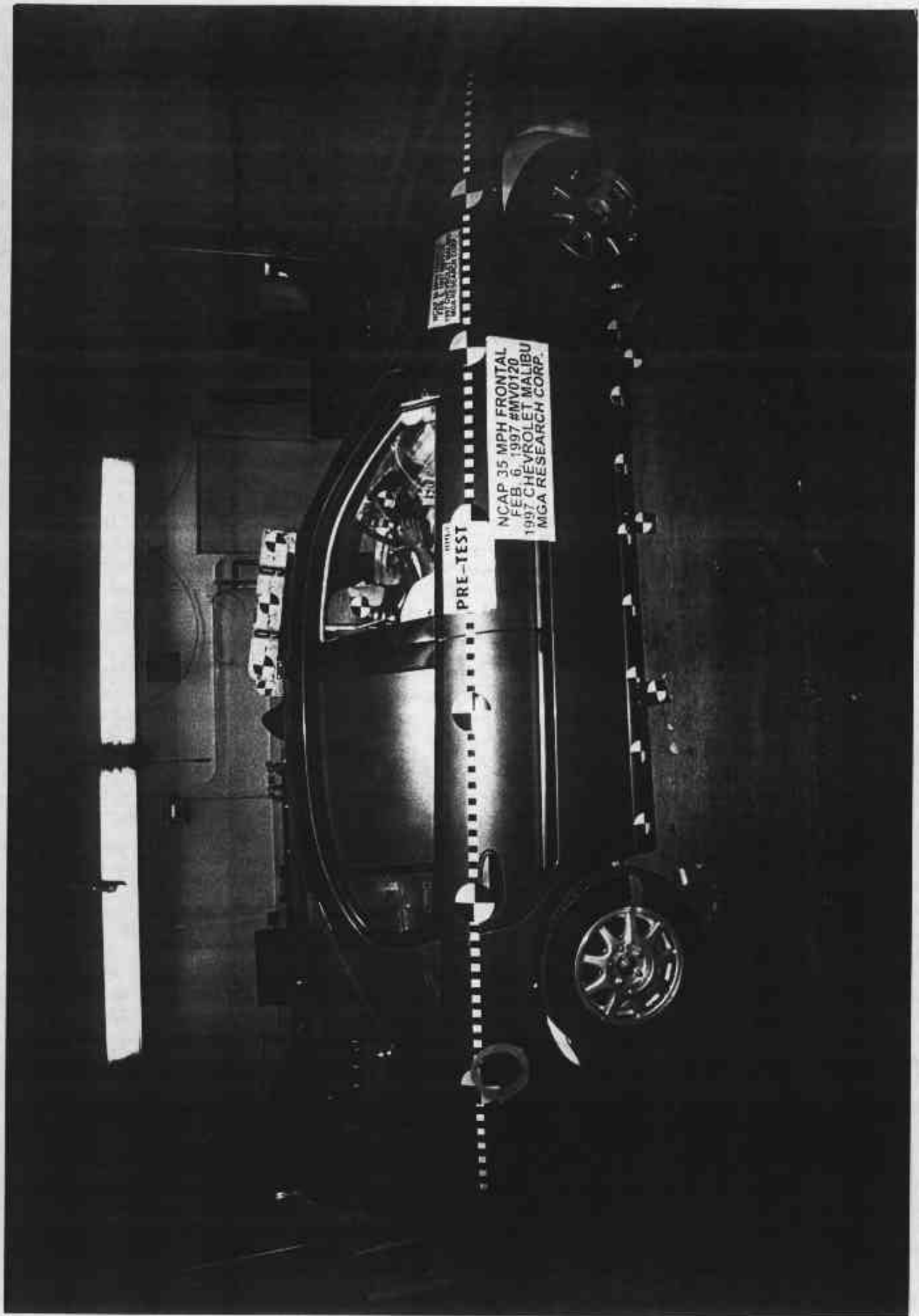


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

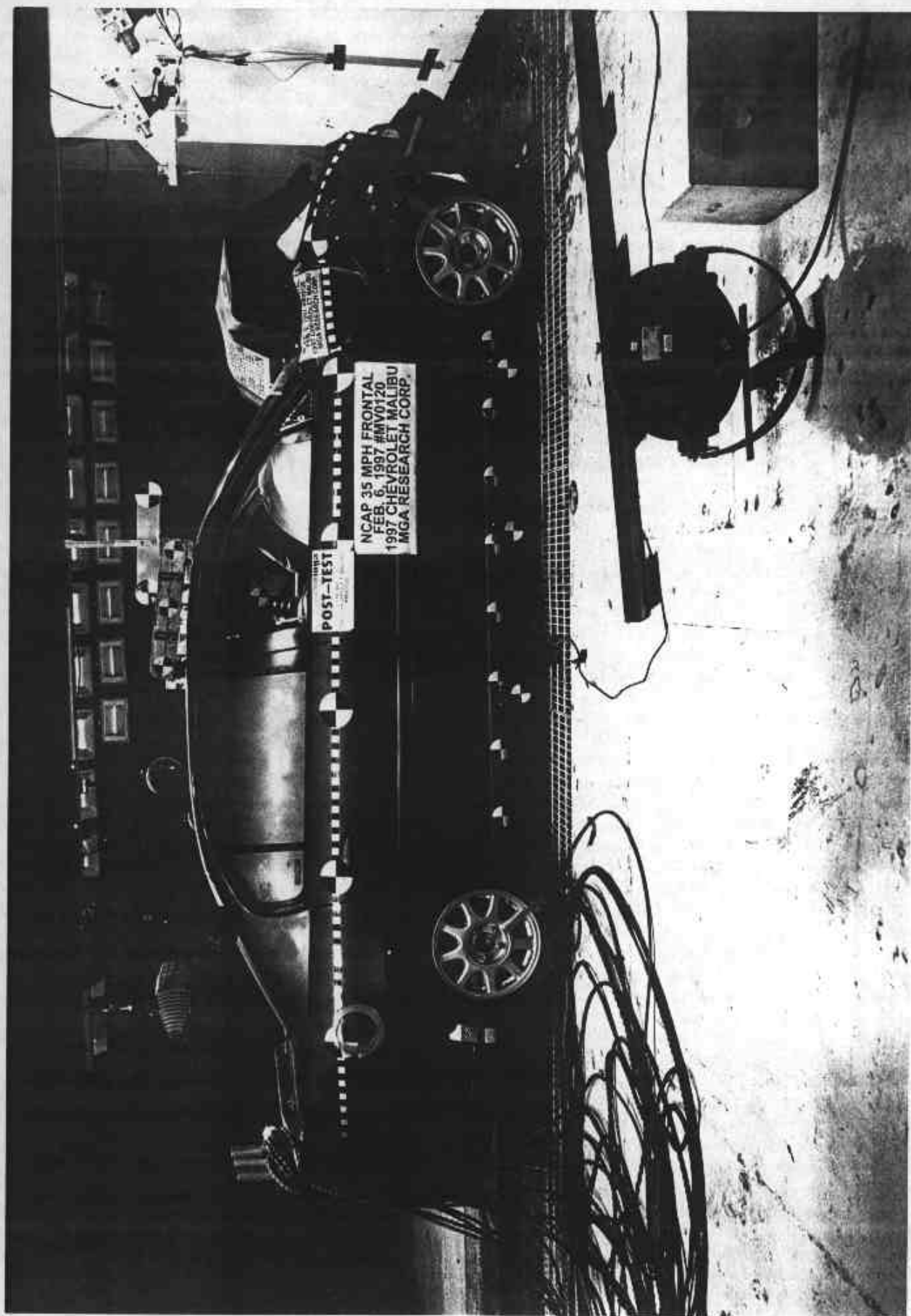


Photo No. A-10 - Post-Test Right Side View of Test Vehicle

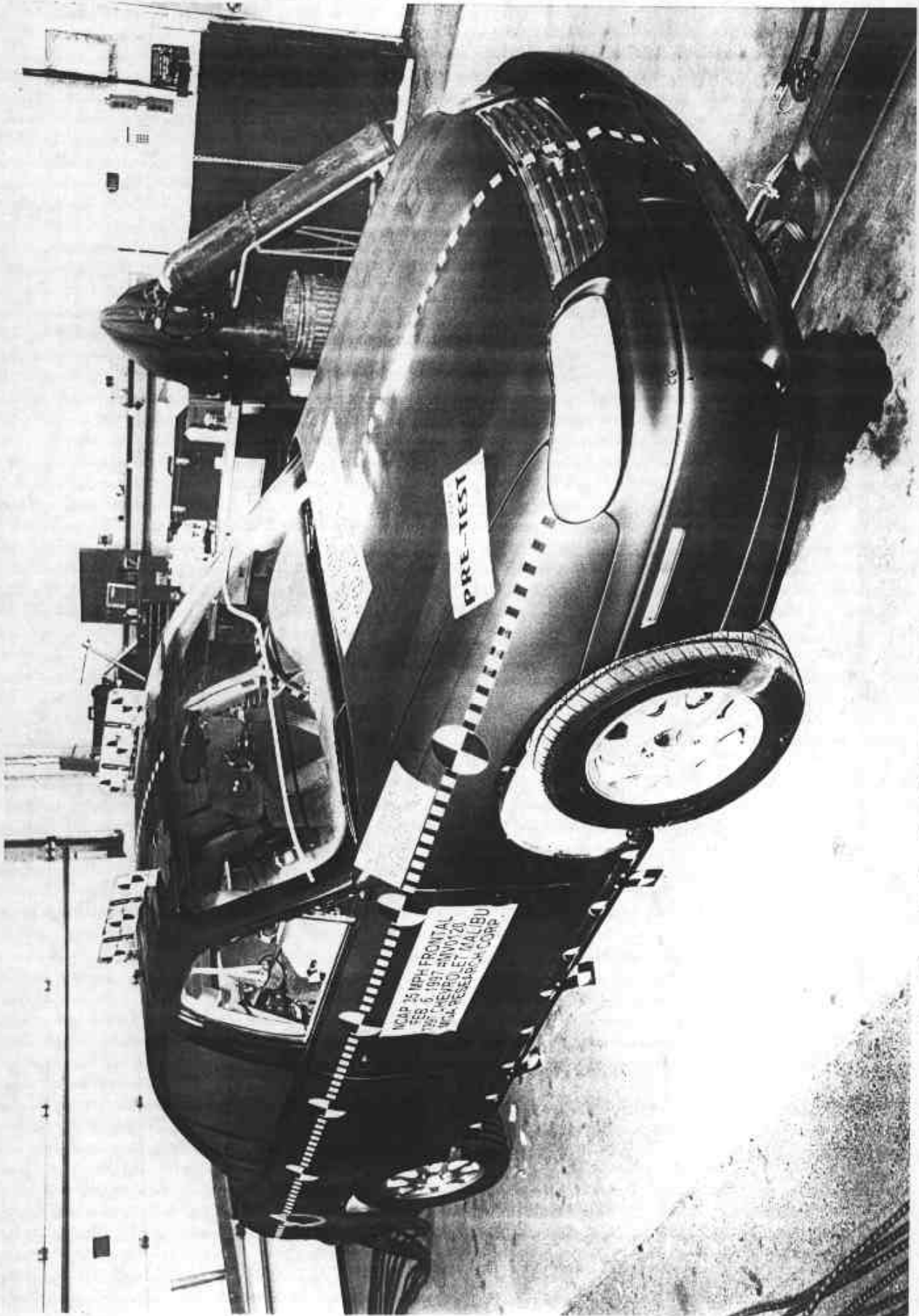


Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle

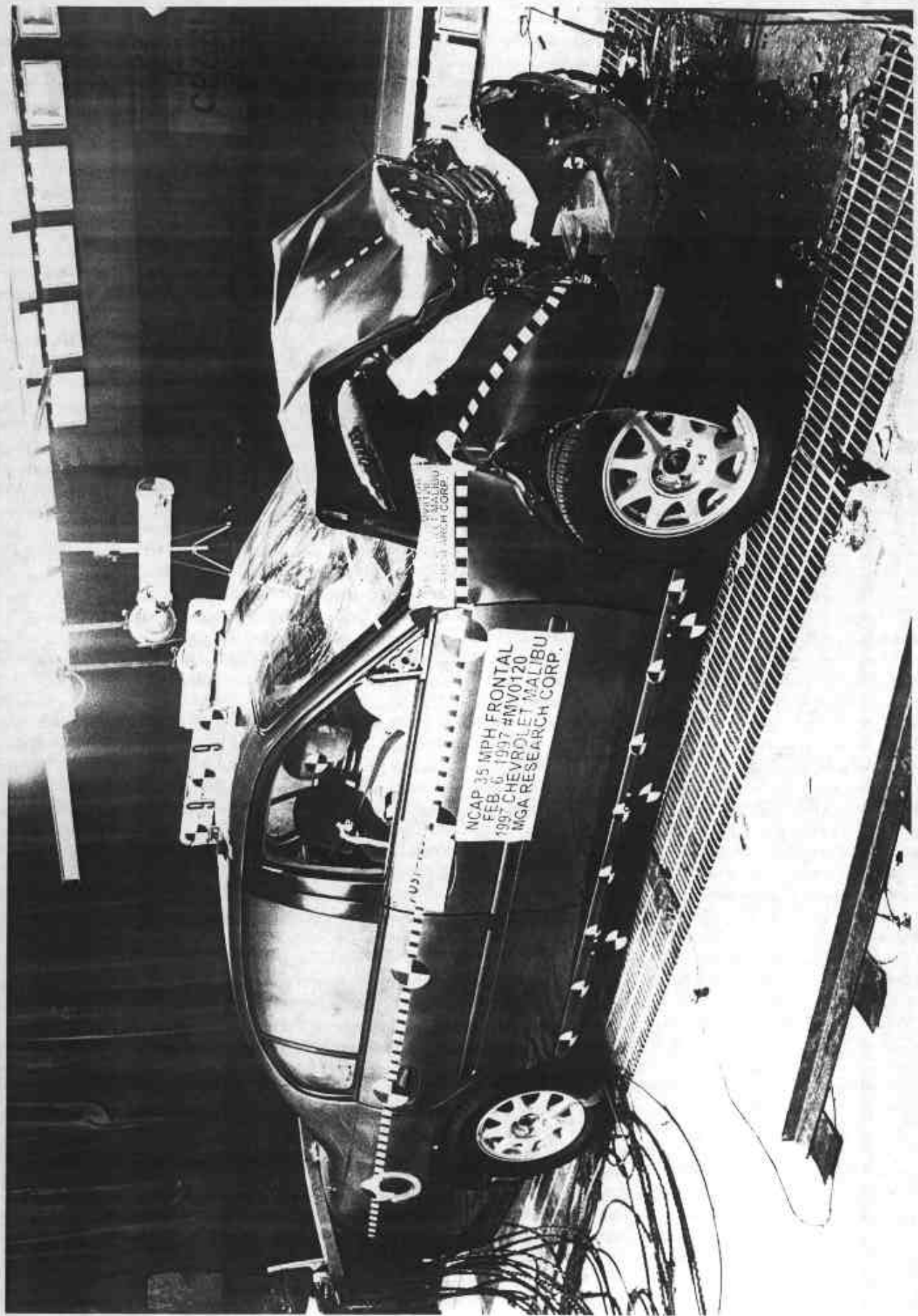


Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle



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

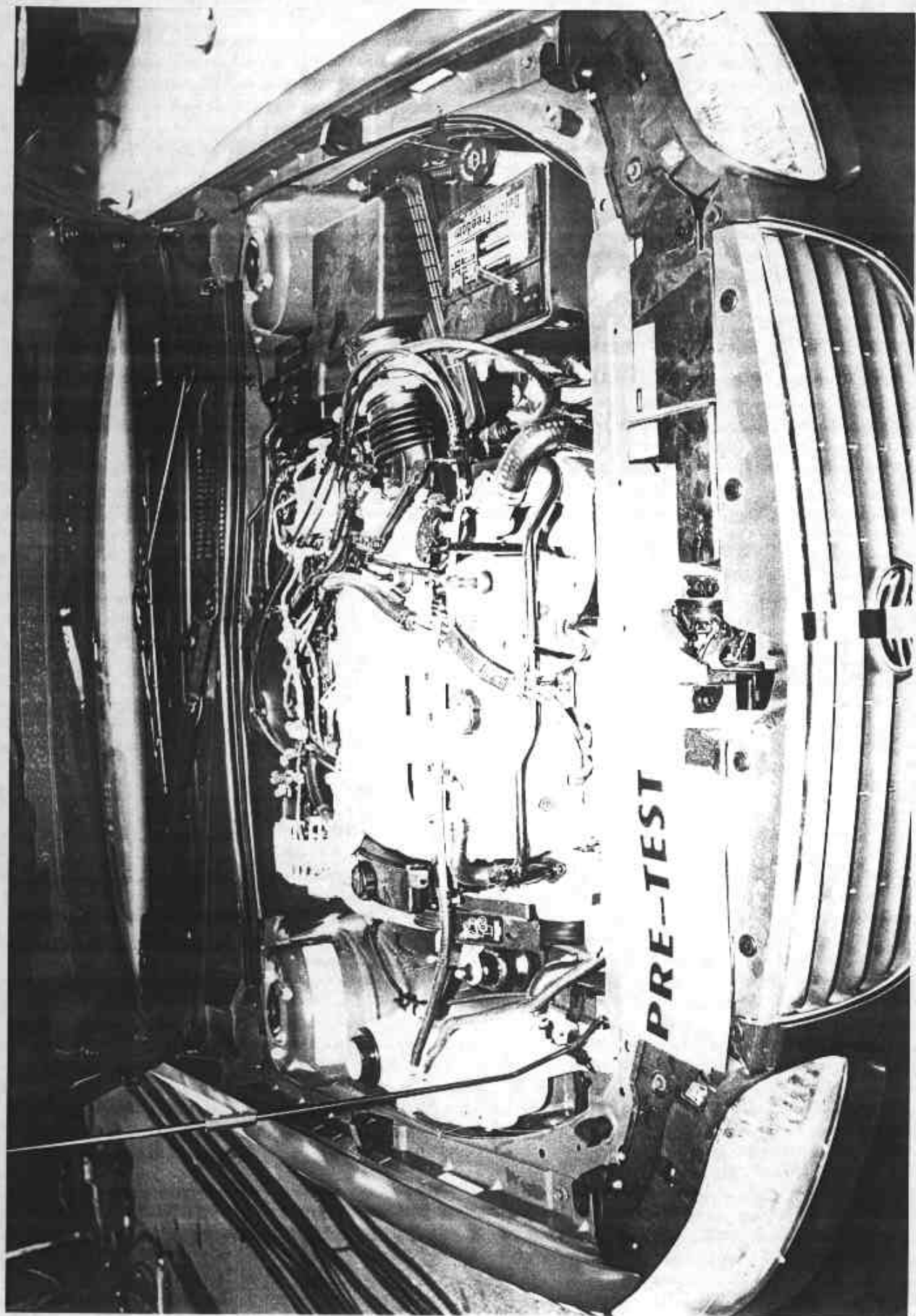


Photo No. A-14 - Pre-Test Engine Compartment View

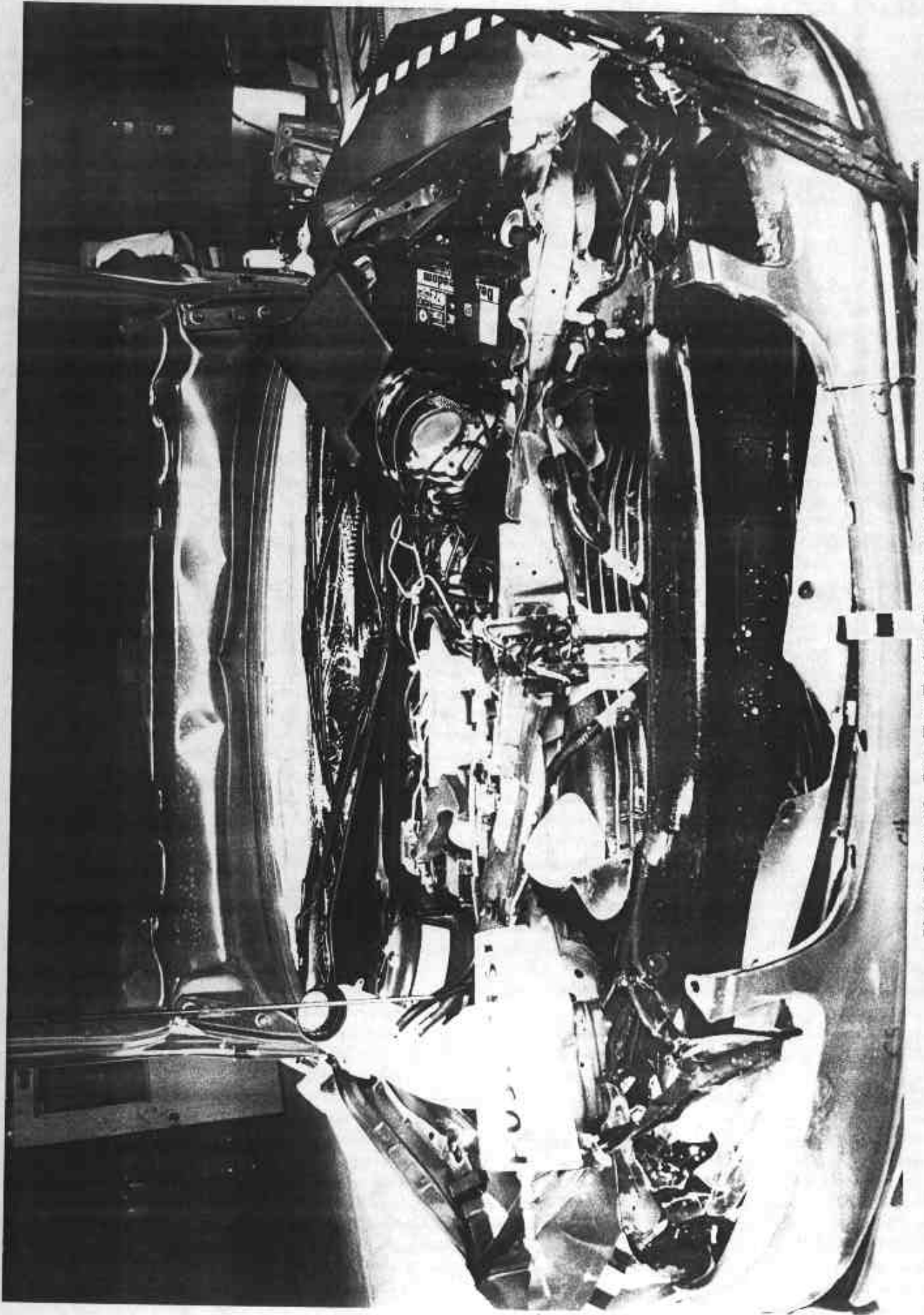


Photo No. A-15 - Post-Test Engine Compartment View

A-15

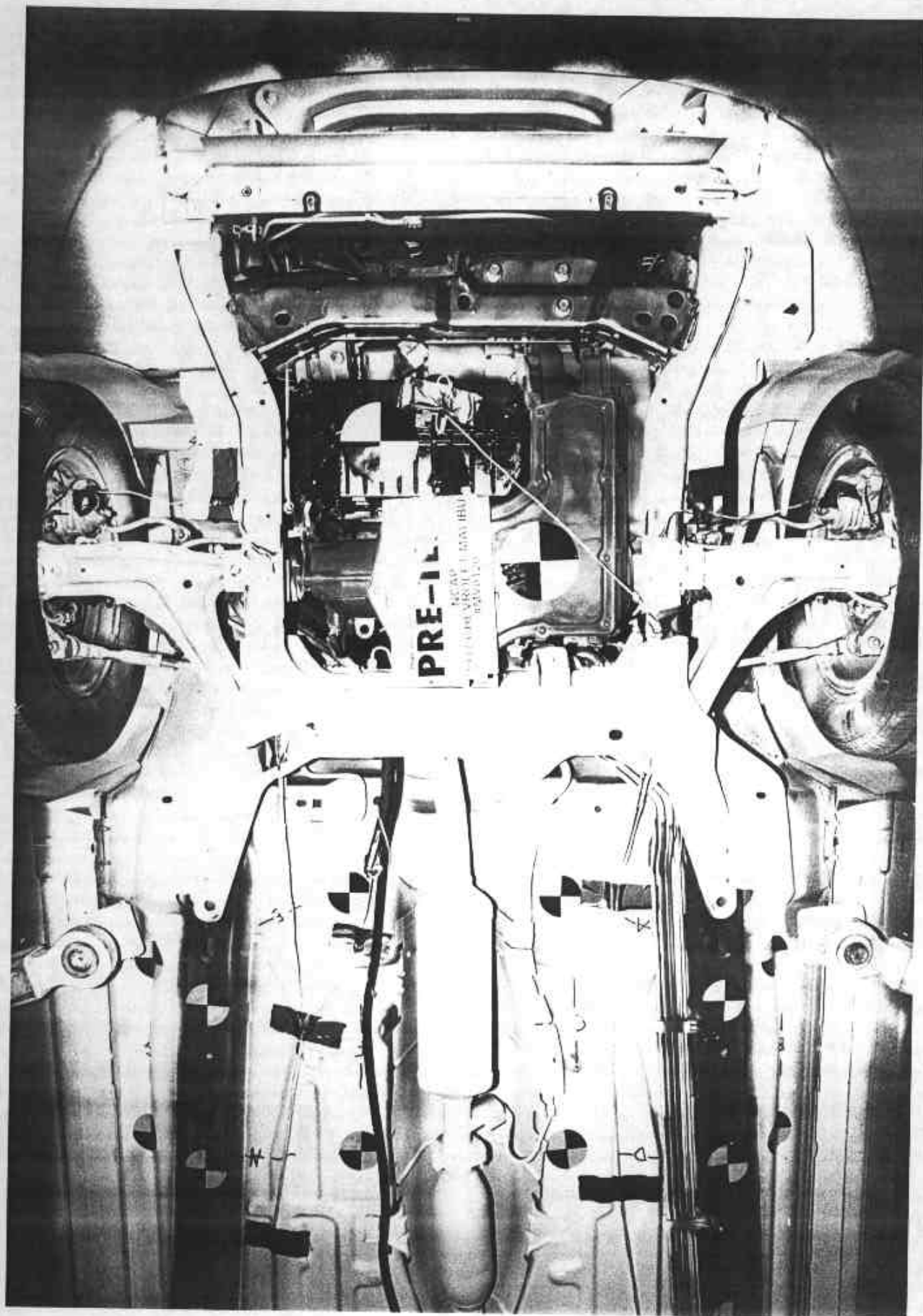


Photo No. A-16 - Pre-Test Front Underbody View

A-16

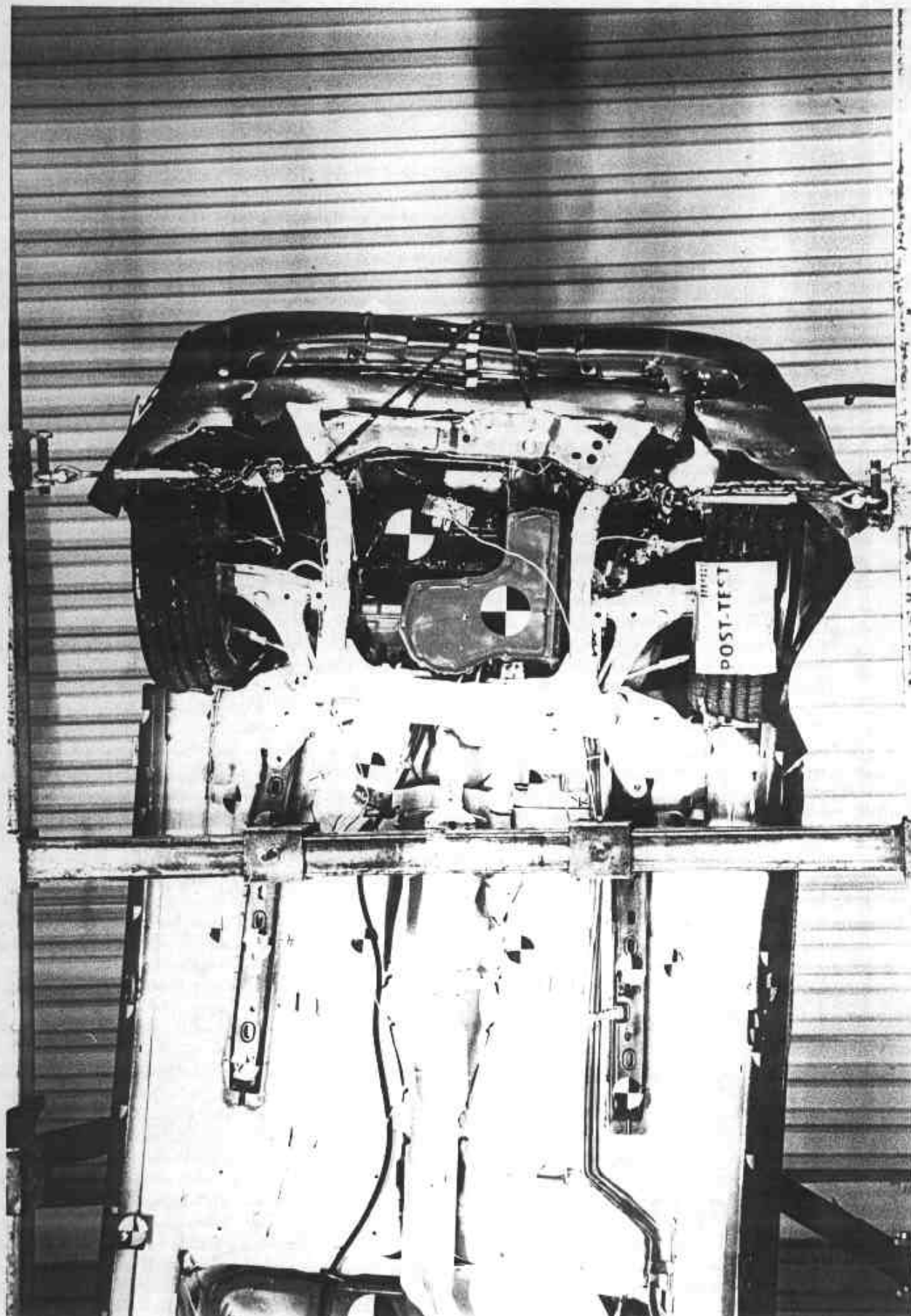


Photo No. A-17 - Post-Test Front Underbody View

A-17

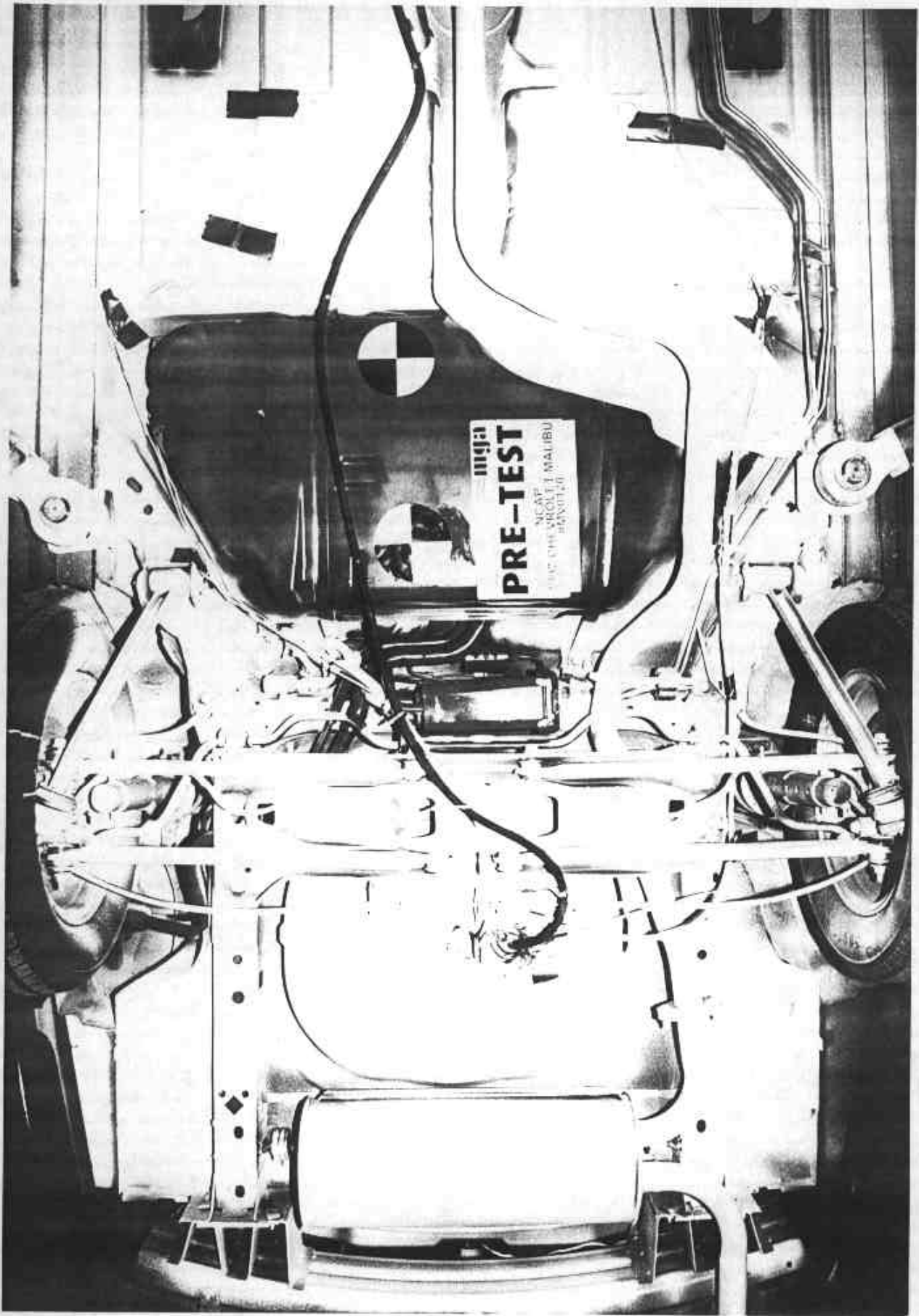


Photo No. A-18 - Pre-Test Rear Underbody View

A-18

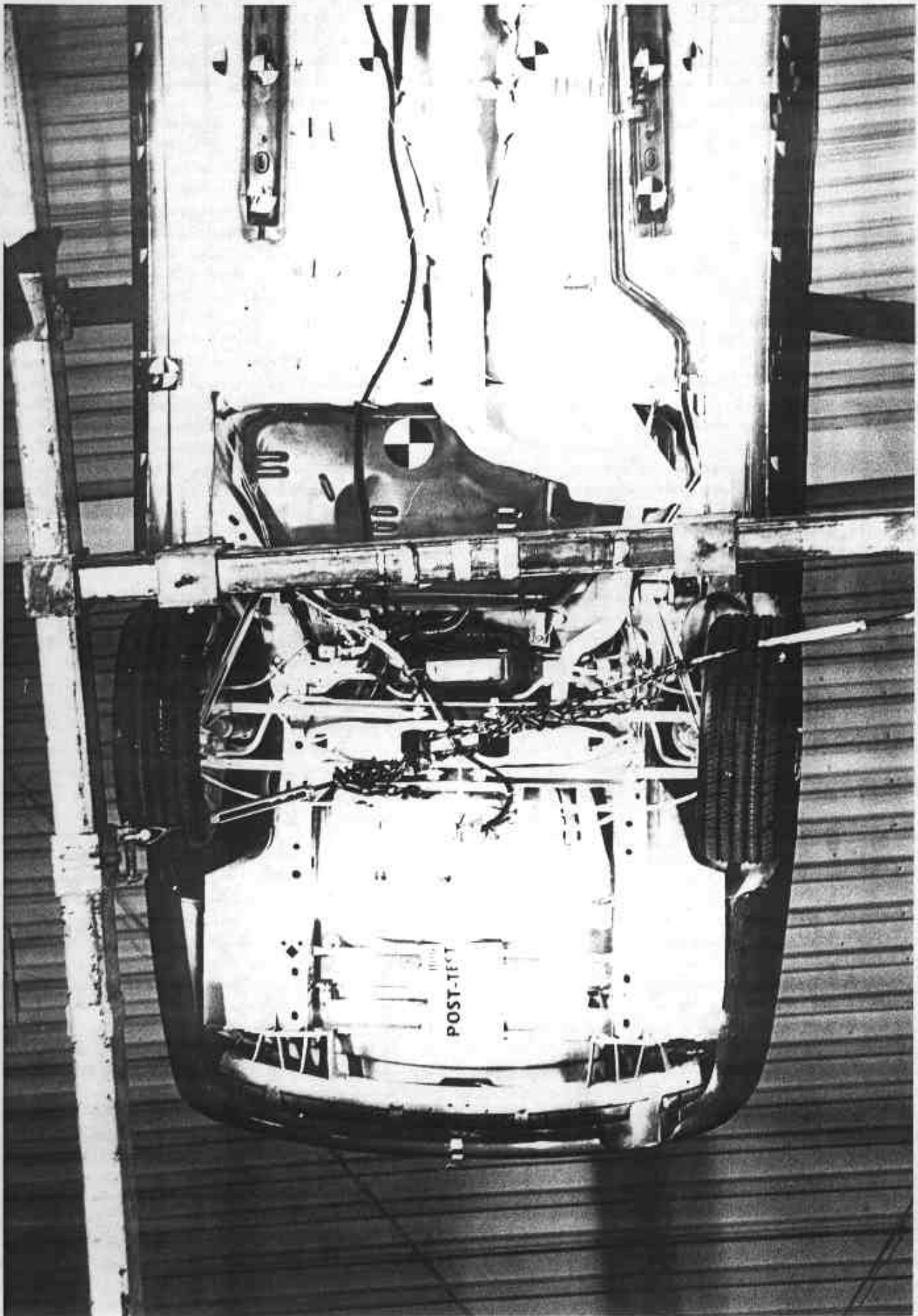


Photo No. A-19 - Post-Test Rear Underbody View

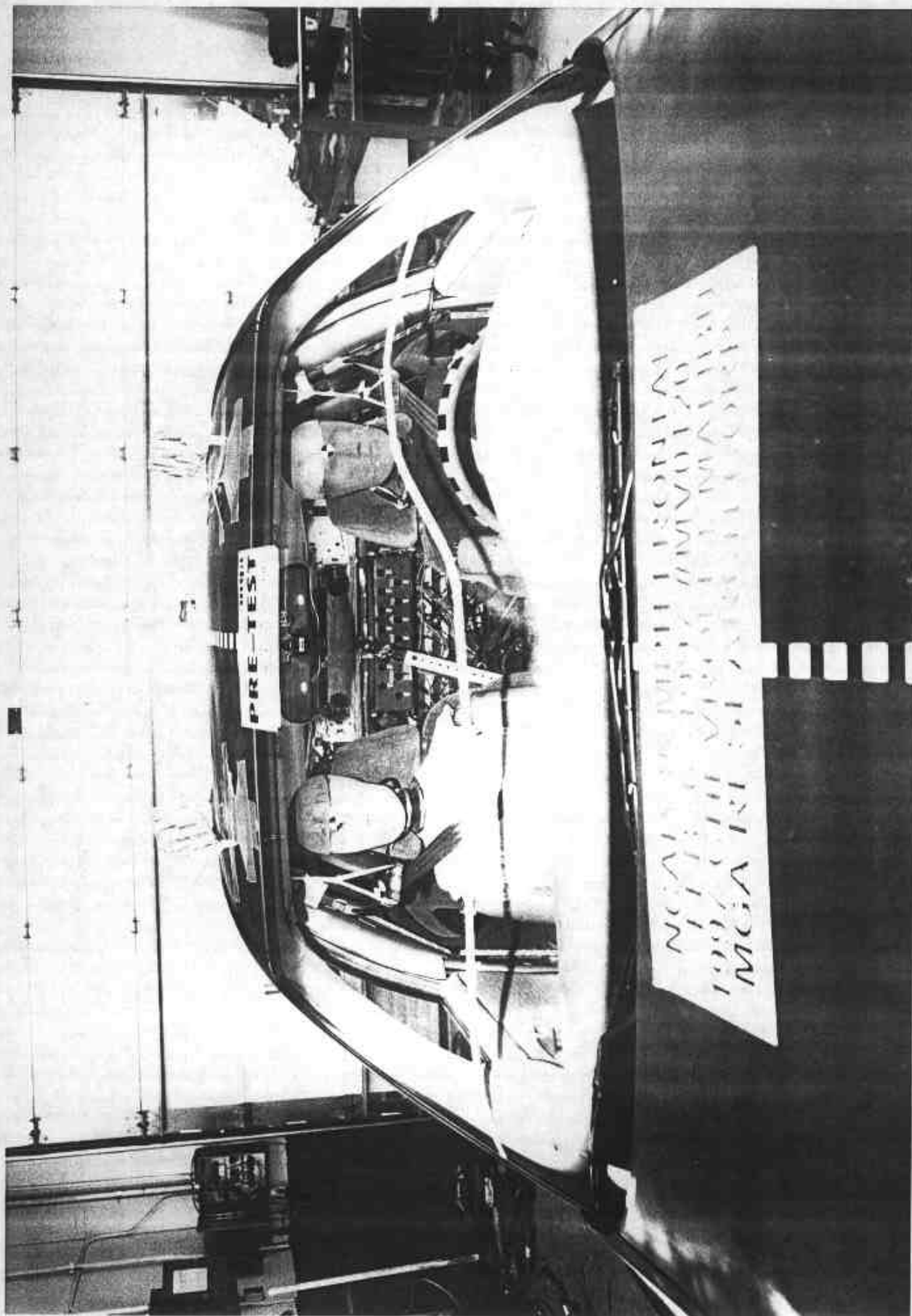


Photo No. A-20 - Pre-Test Windshield View

A-20

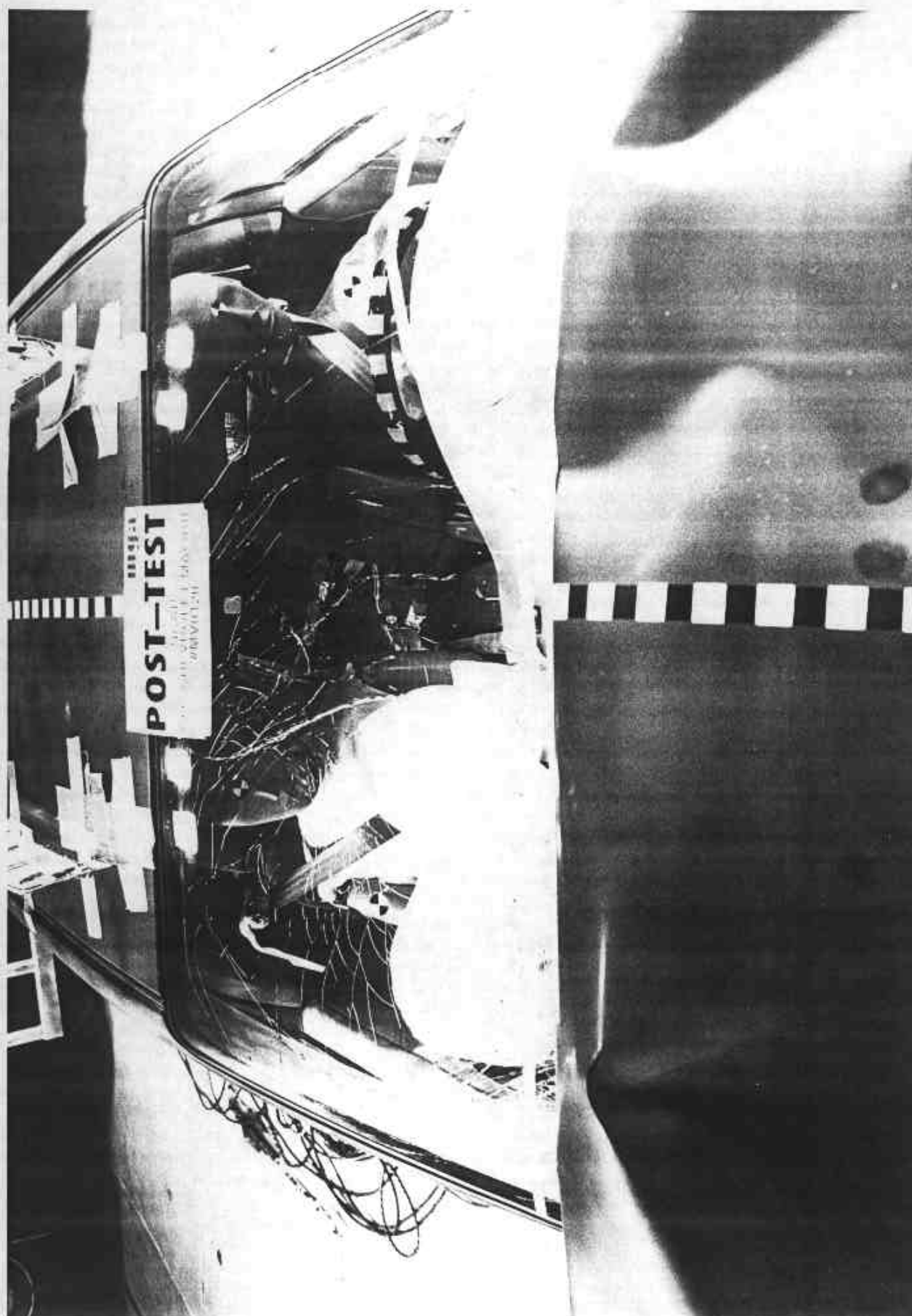


Photo No. A-21 - Post-Test Windshield View

A-21

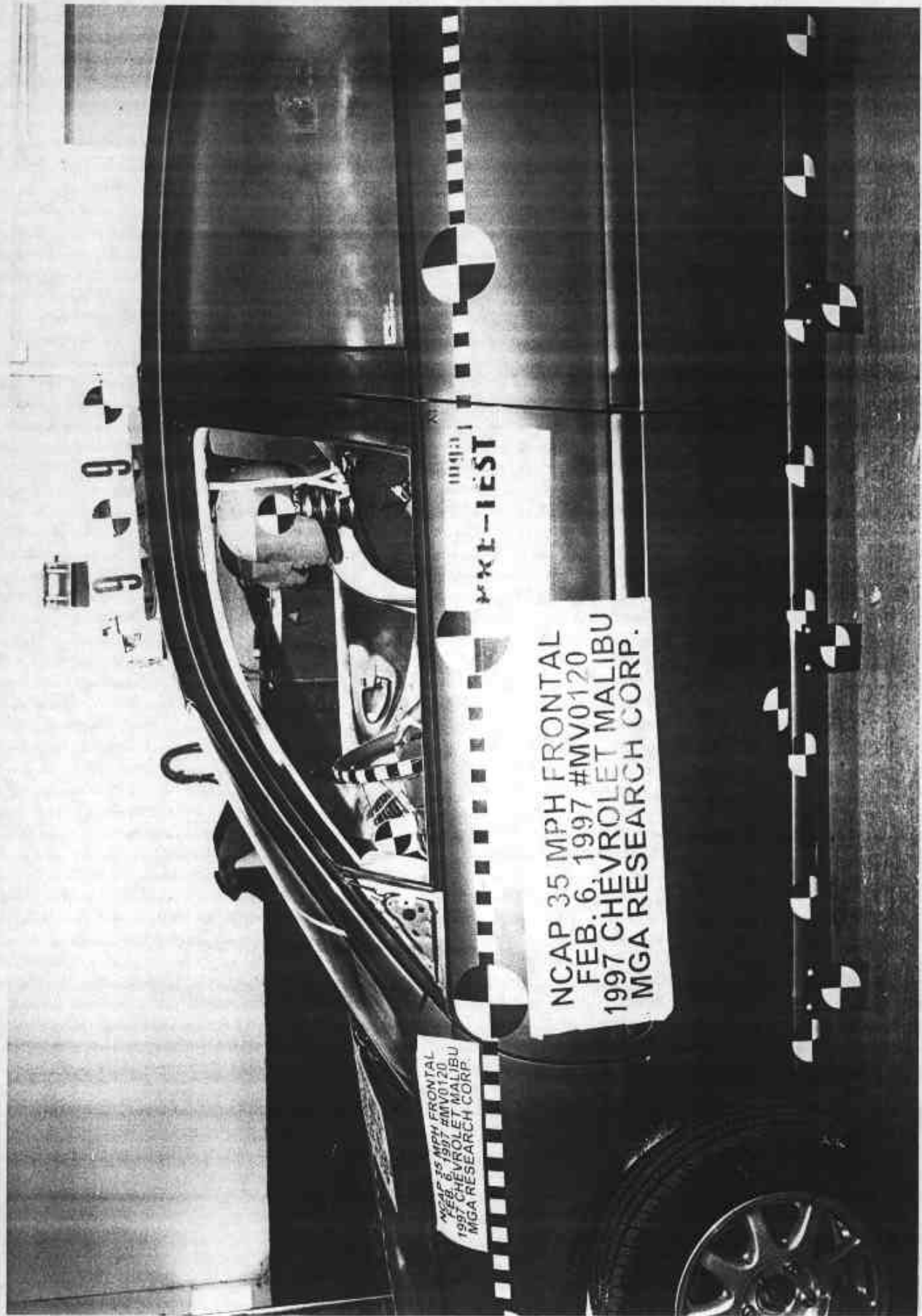


Photo No. A-22 - Pre-Test Driver Dummy Position Left Side View

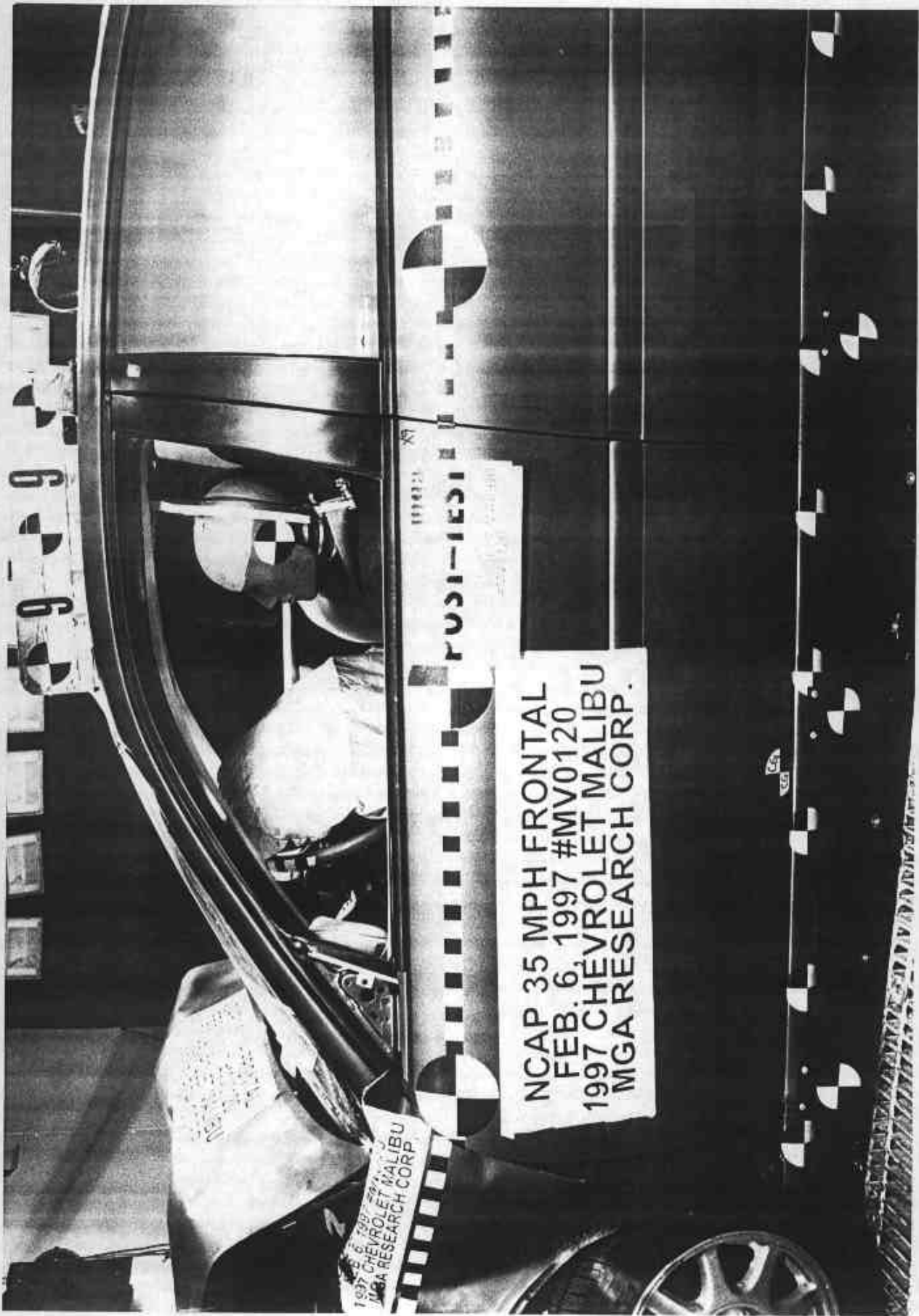


Photo No. A-23 - Post-Test Driver Dummy Position Left Side View

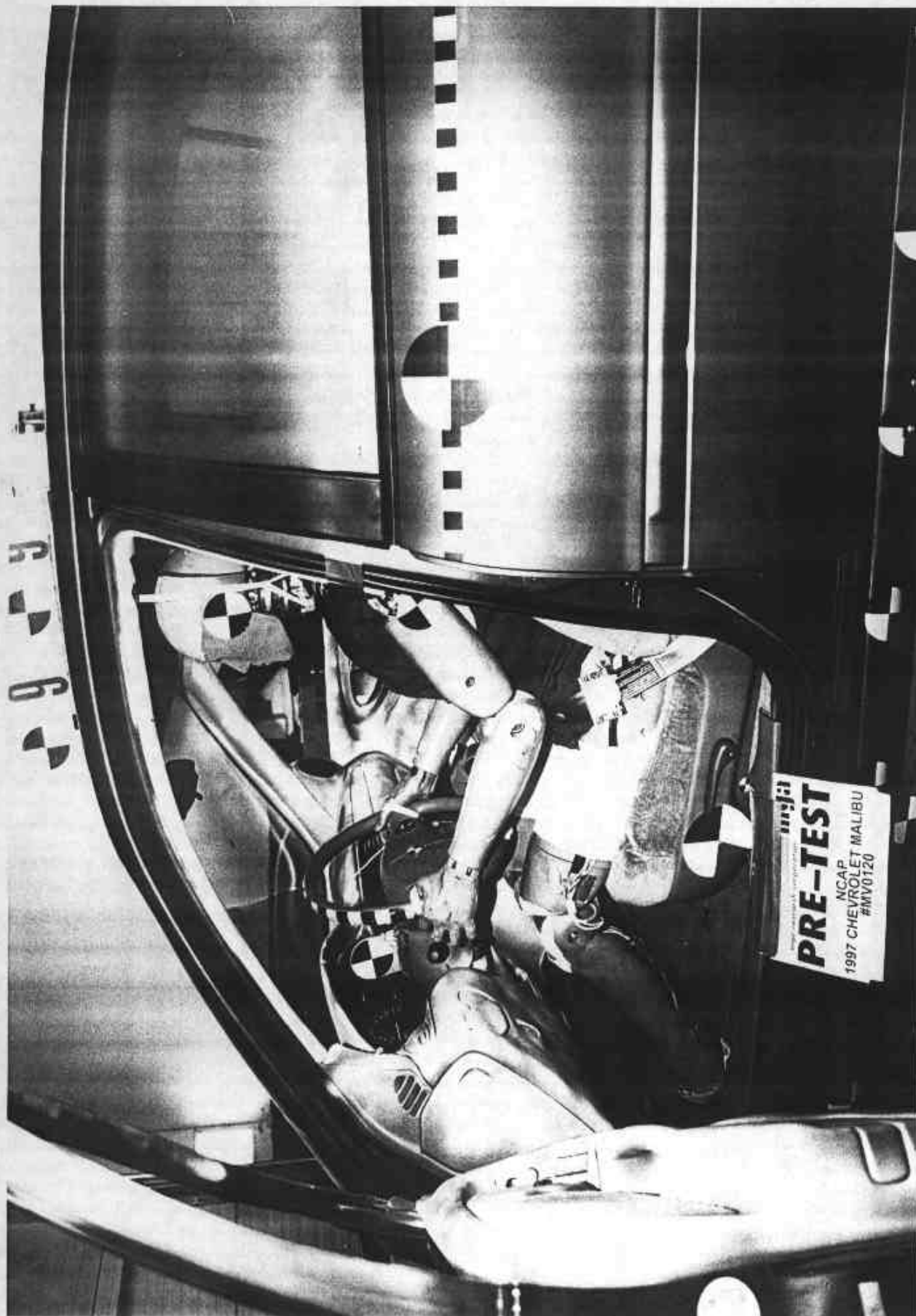


Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)



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

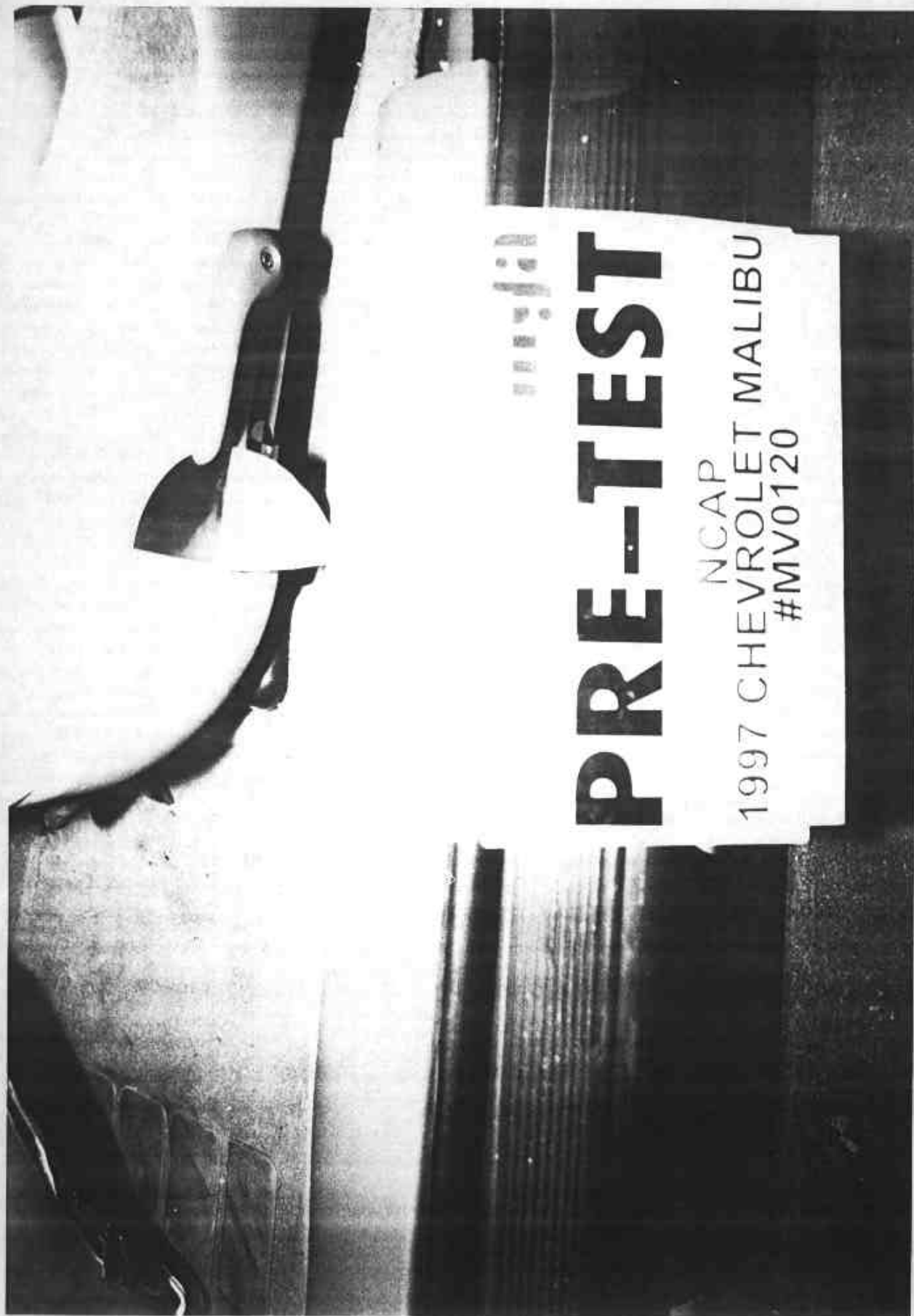


Photo No. A-26 - Pre-Test Driver Seat Position View



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

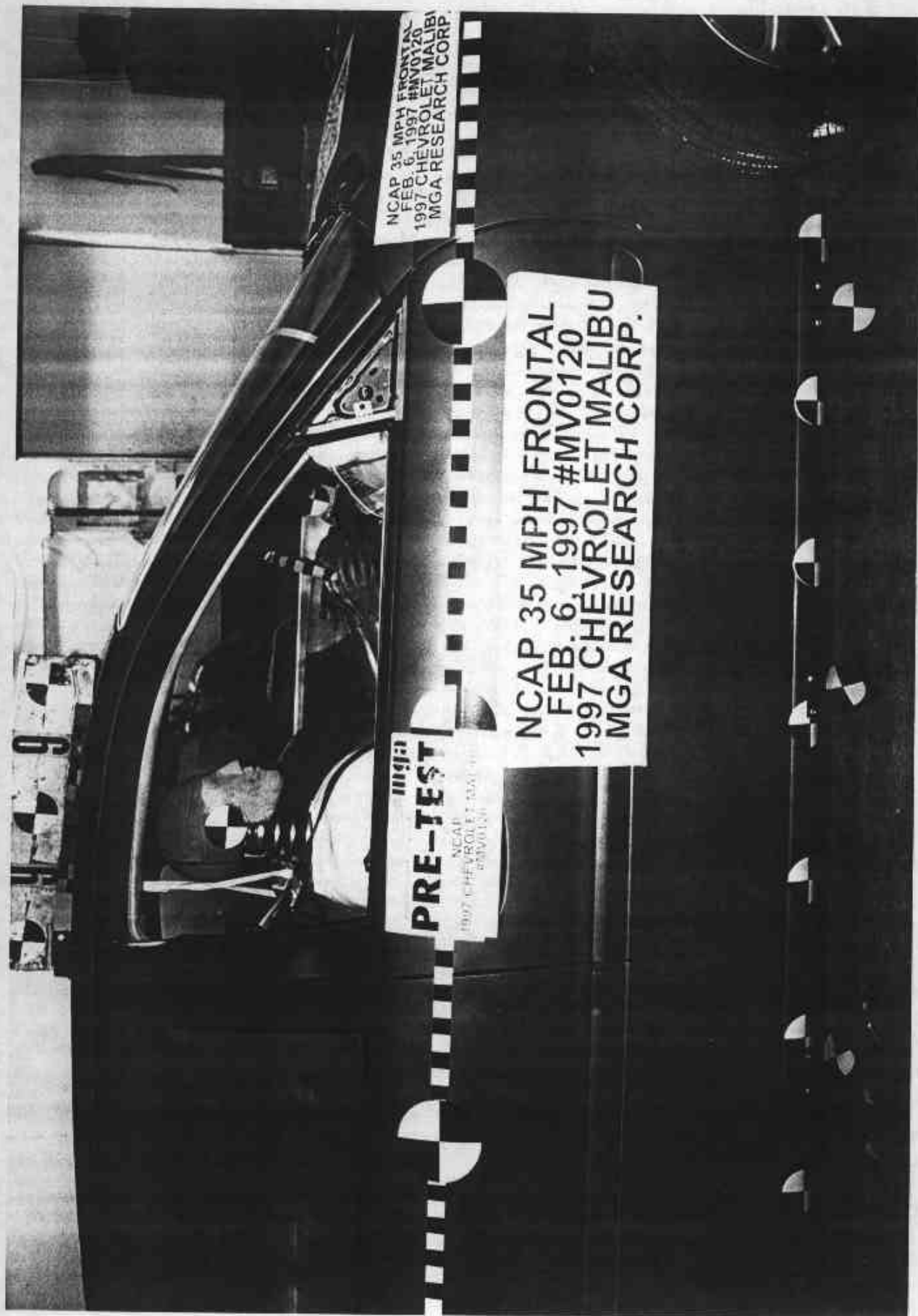


Photo No. A-32 - Pre-Test Passenger Dummy Position Right Side View

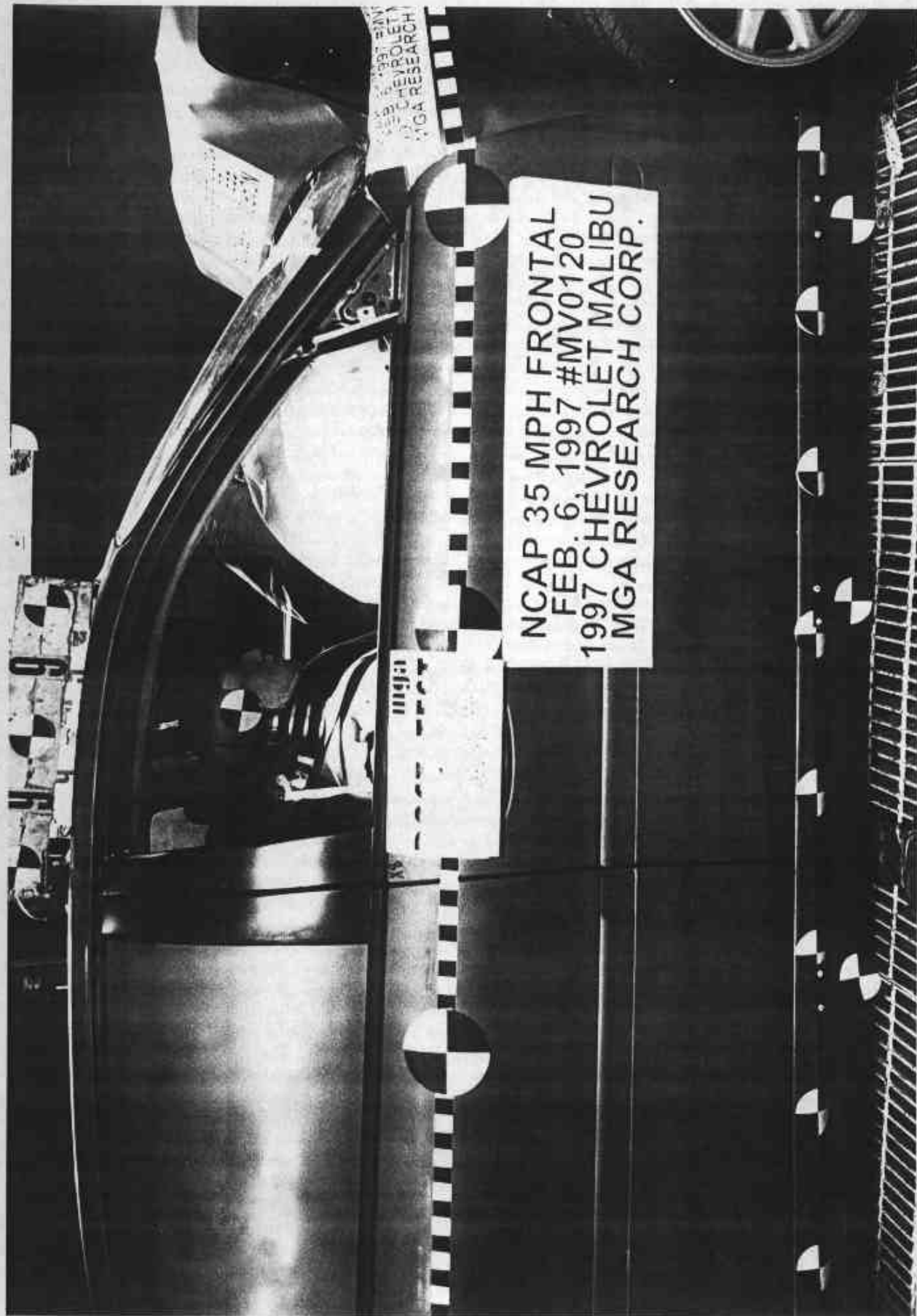


Photo No. A-33 - Post-Test Passenger Dummy Position Right Side View

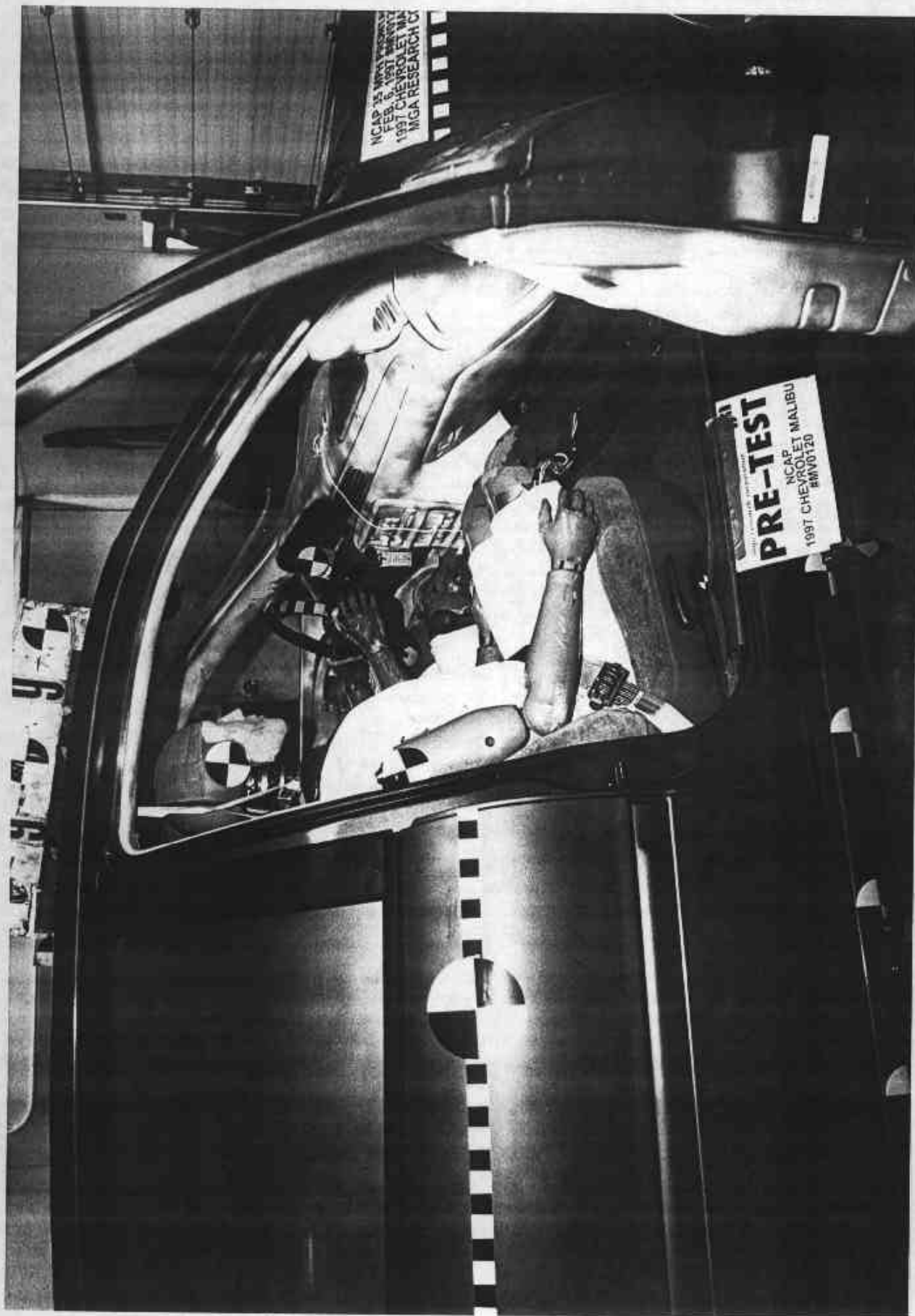


Photo No. A-34 - Pre-Test Passenger Dummy Position Right Side View (Door Open)

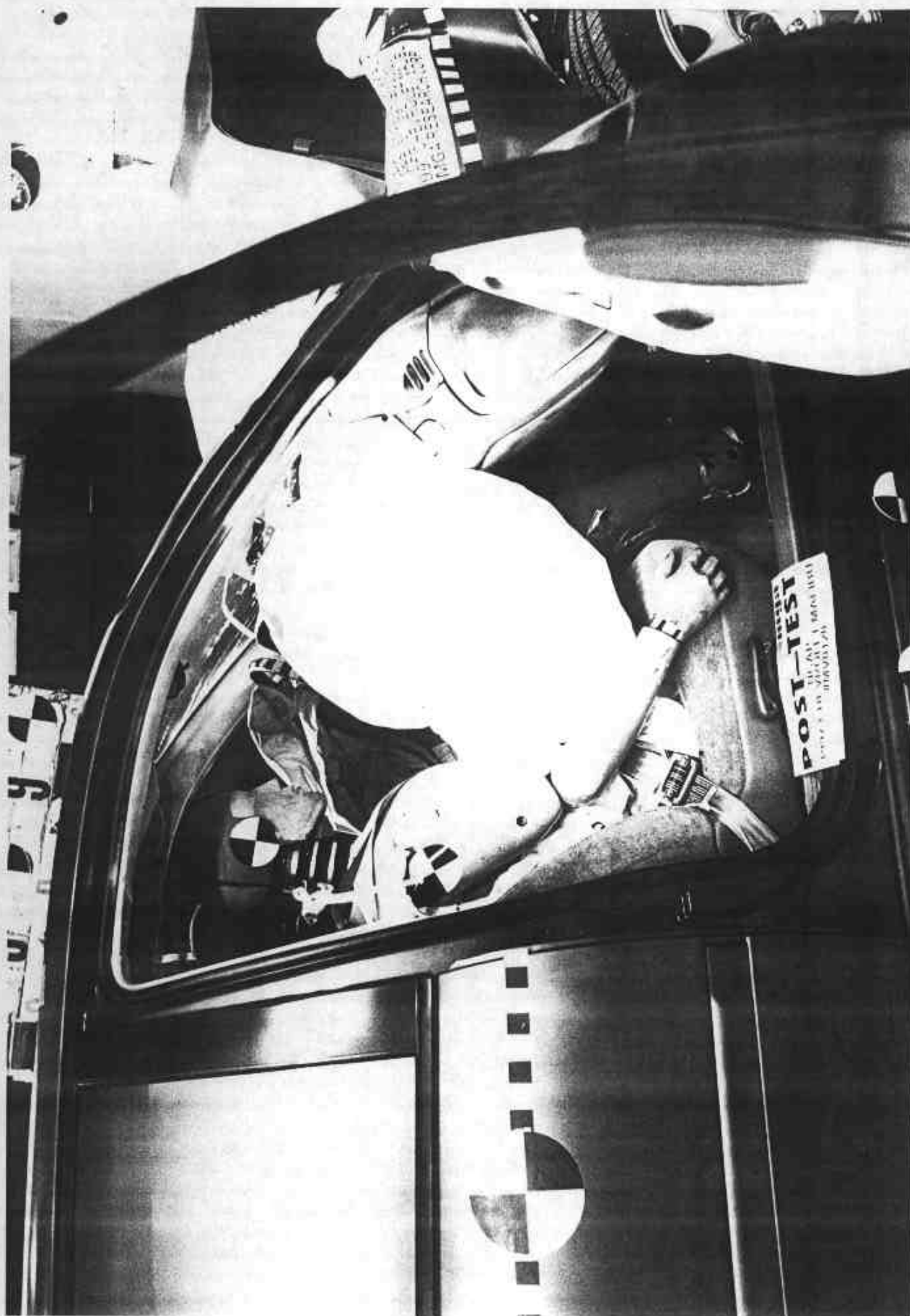


Photo No. A-35 - Post-Test Passenger Dummy Position Right Side View (Door Open)

A-35

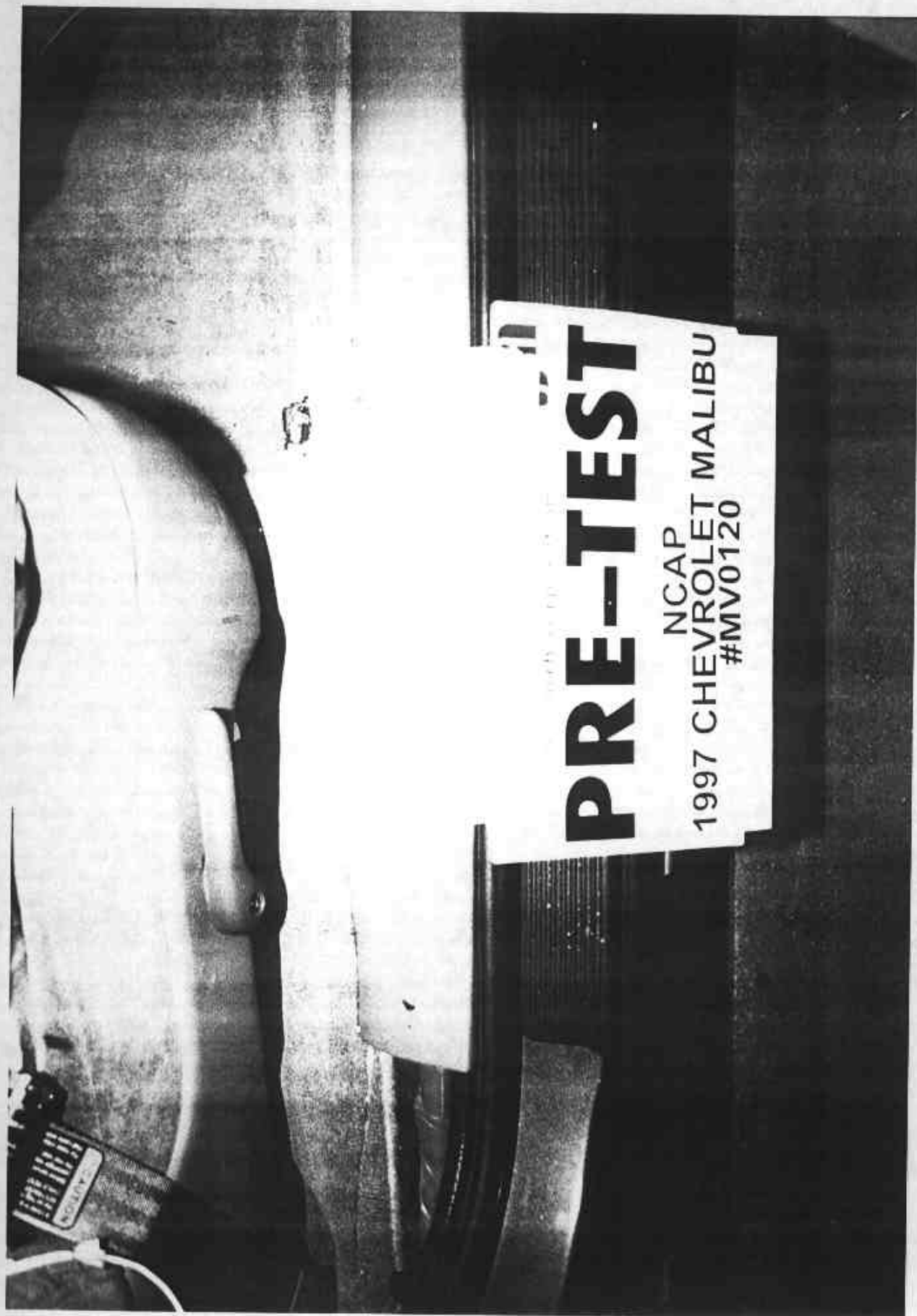


Photo No. A-36 - Pre-Test Passenger Seat Position View



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

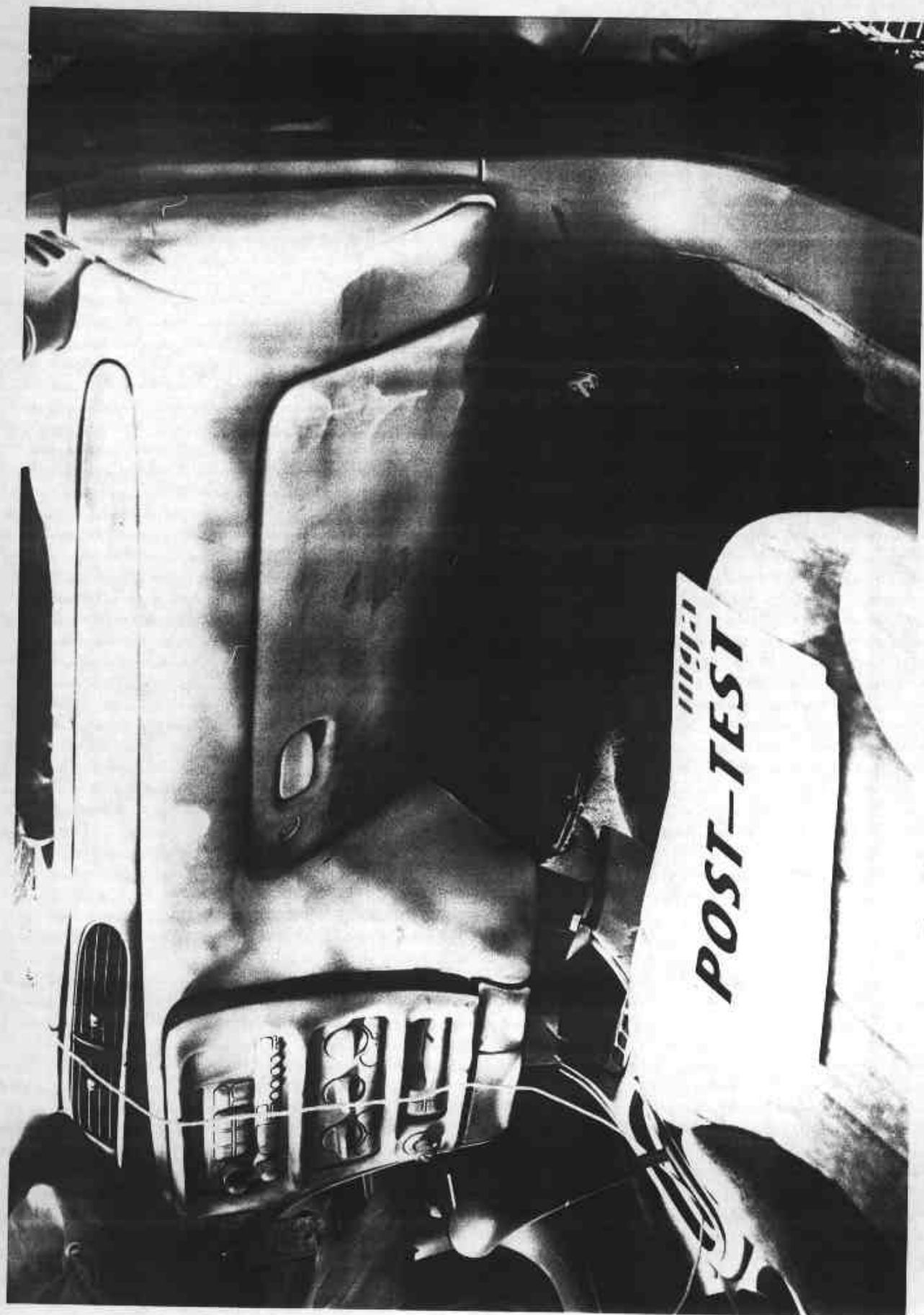
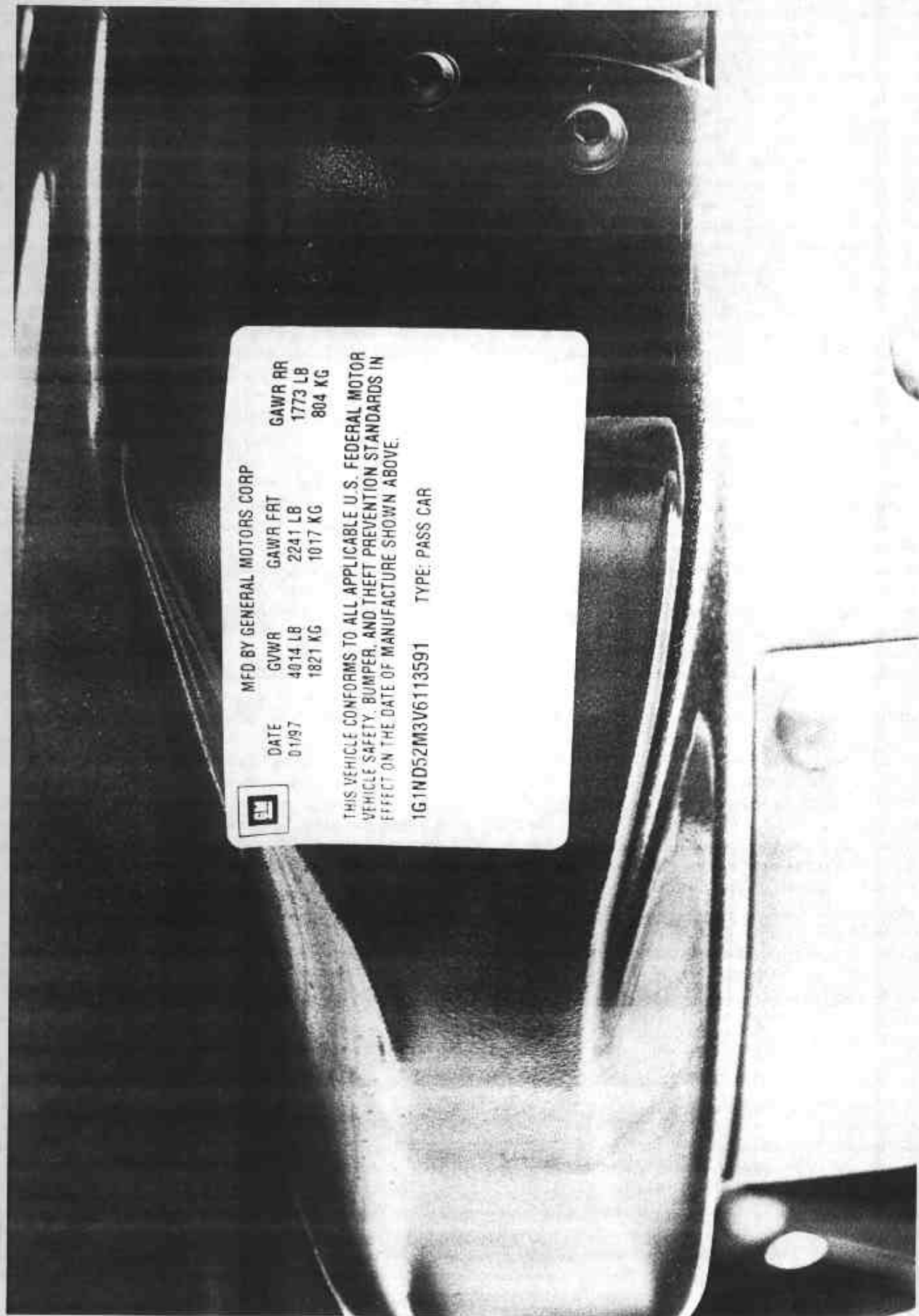


Photo No. A-40 - Post-Test Passenger Airbag Contact



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



MFD BY GENERAL MOTORS CORP.

DATE	GVWR	GAWR FRT	GAWR RR
01/97	4014 LB	2241 LB	1773 LB
	1821 KG	1017 KG	804 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.

1G1ND52M3V6113591 TYPE: PASS CAR

Photo No. A-42 - Vehicle Certification Label

TIRE - LOADING INFORMATION



OCCUPANTS			VEHICLE CAP. WT	
FRT.	CTR.	RR.	TOTAL	LBS
2	0	3	5	917
				416

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT
1G1ND52M3V6113591

MODEL: ND69 NBA

TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT P215/60R15	S	29/200 PSI/KPA
RR P215/60R15	S	26/180 PSI/KPA
SPA T125/70D15	M	60/420 PSI/KPA

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

Photo No. A-43 - Tire Placard

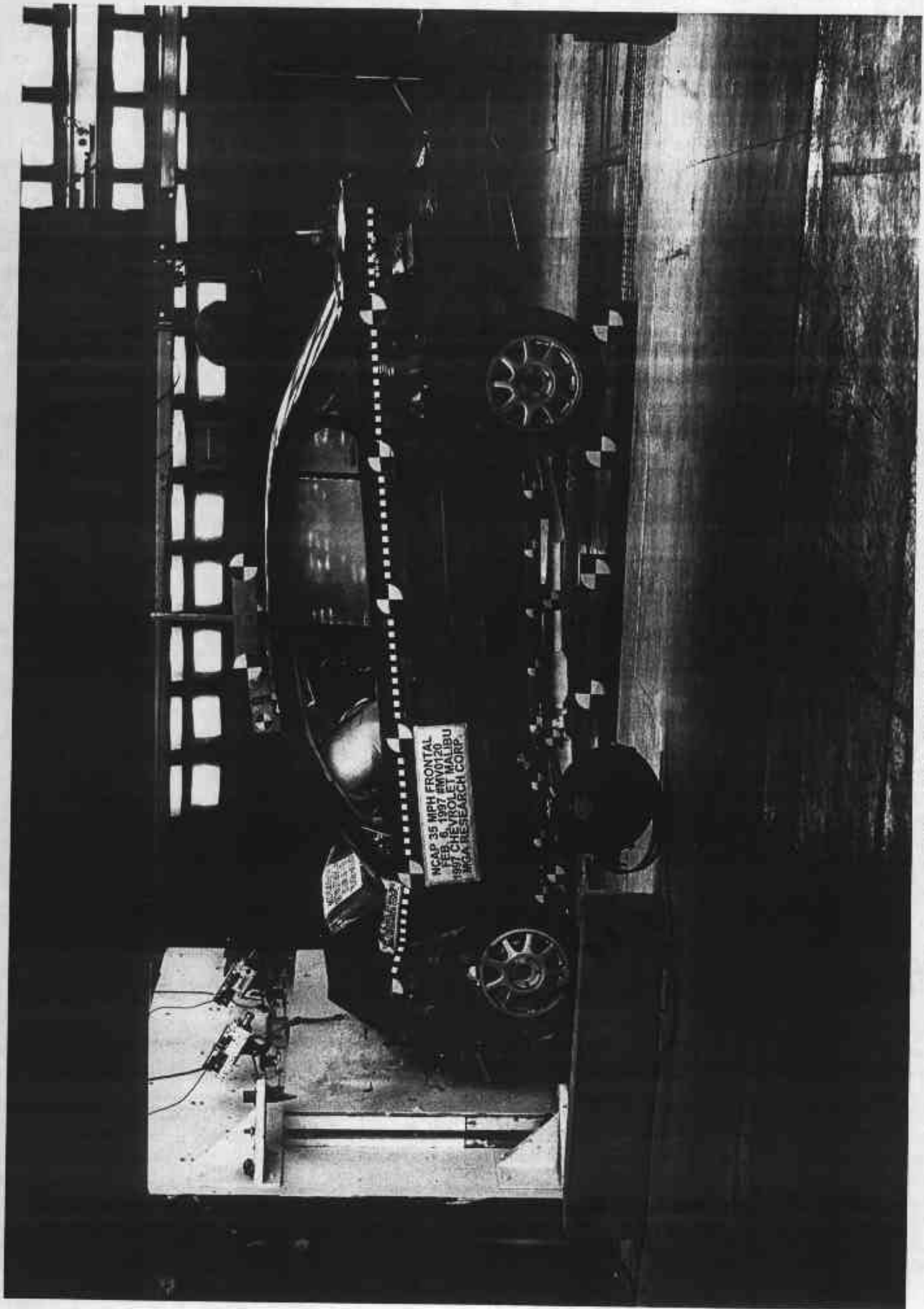


Photo No. A-44 - Vehicle Impact

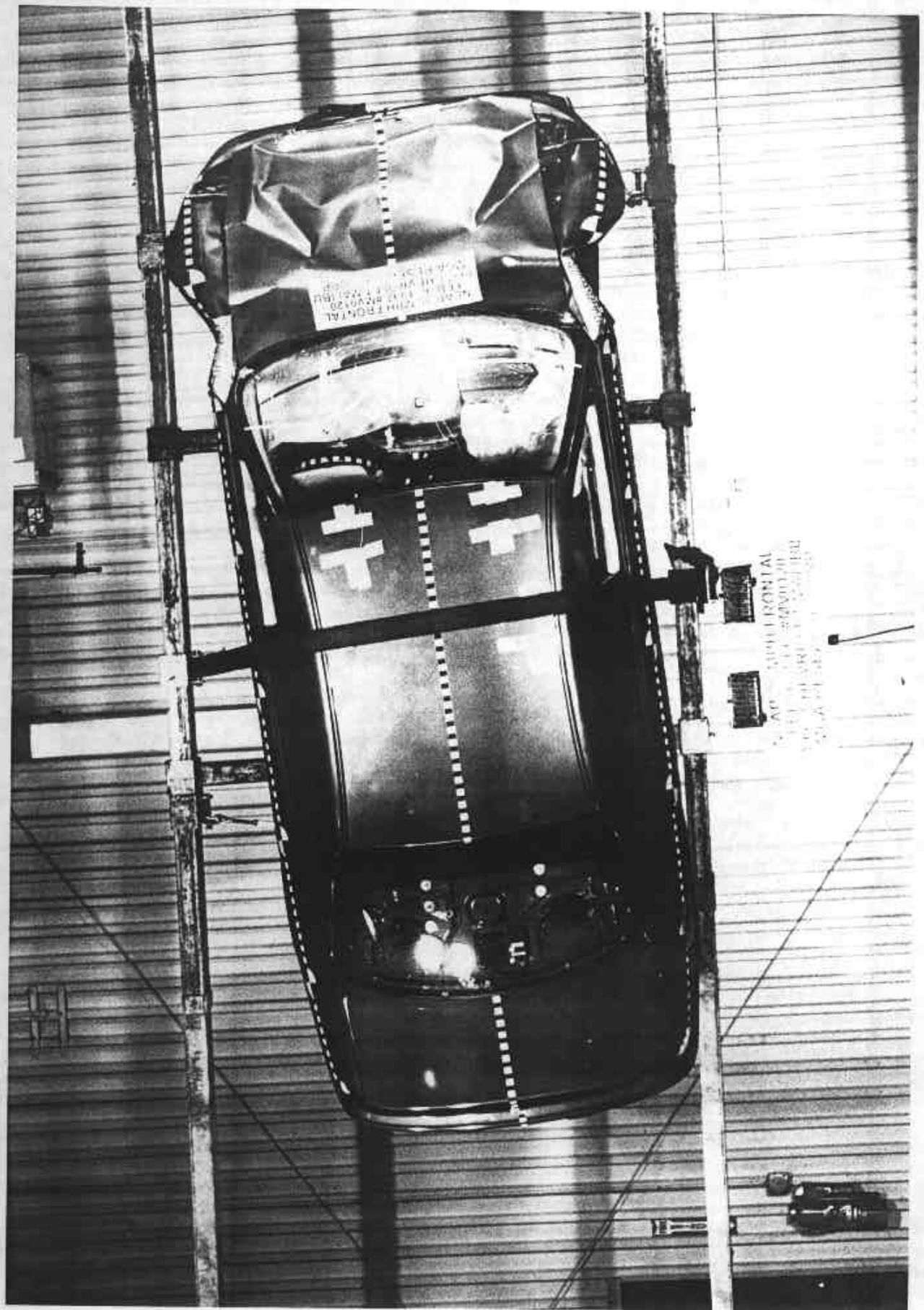


Photo No. A-45 - Rollover 90°

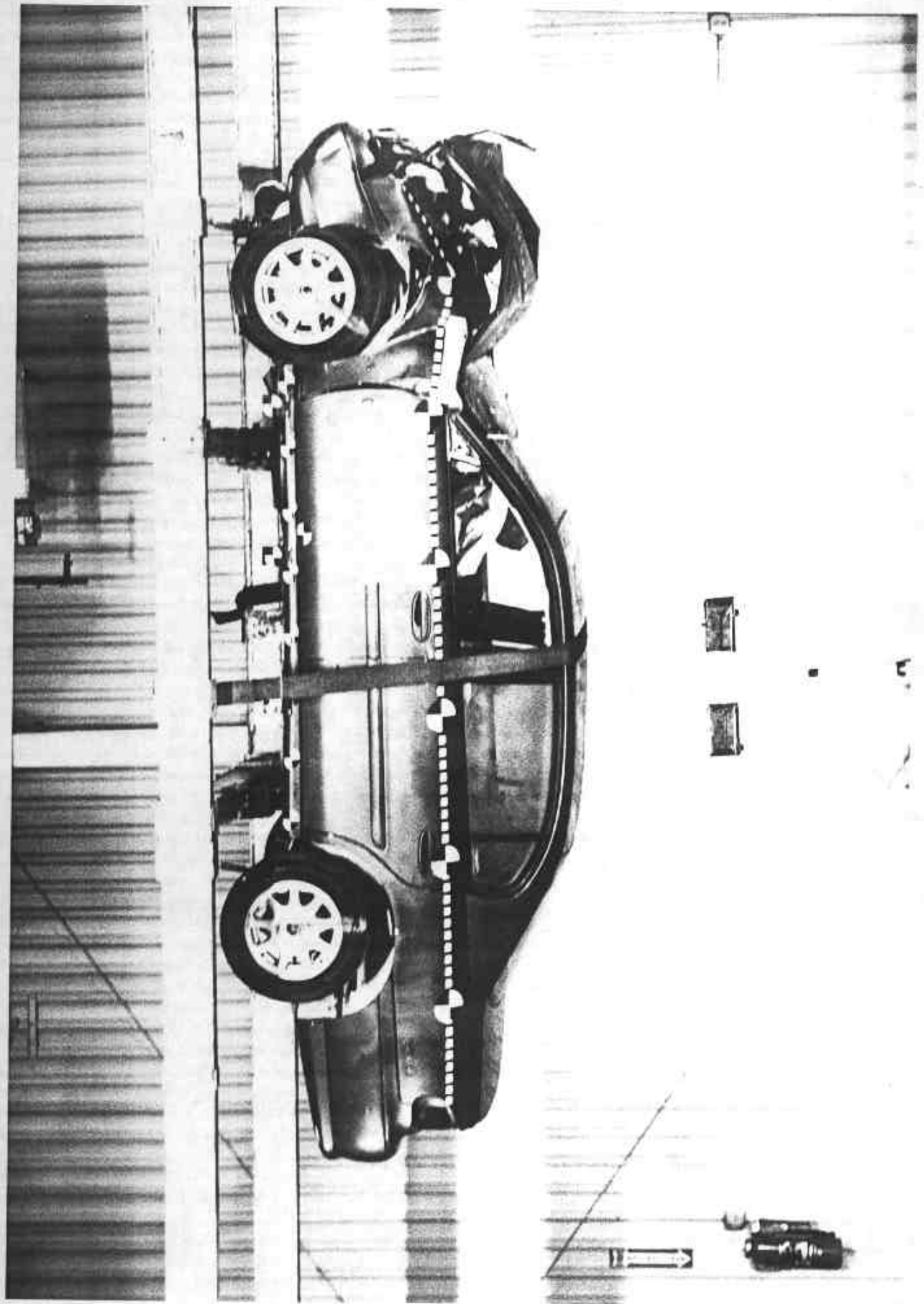


Photo No. A-46 - Rollover 180°

A-46

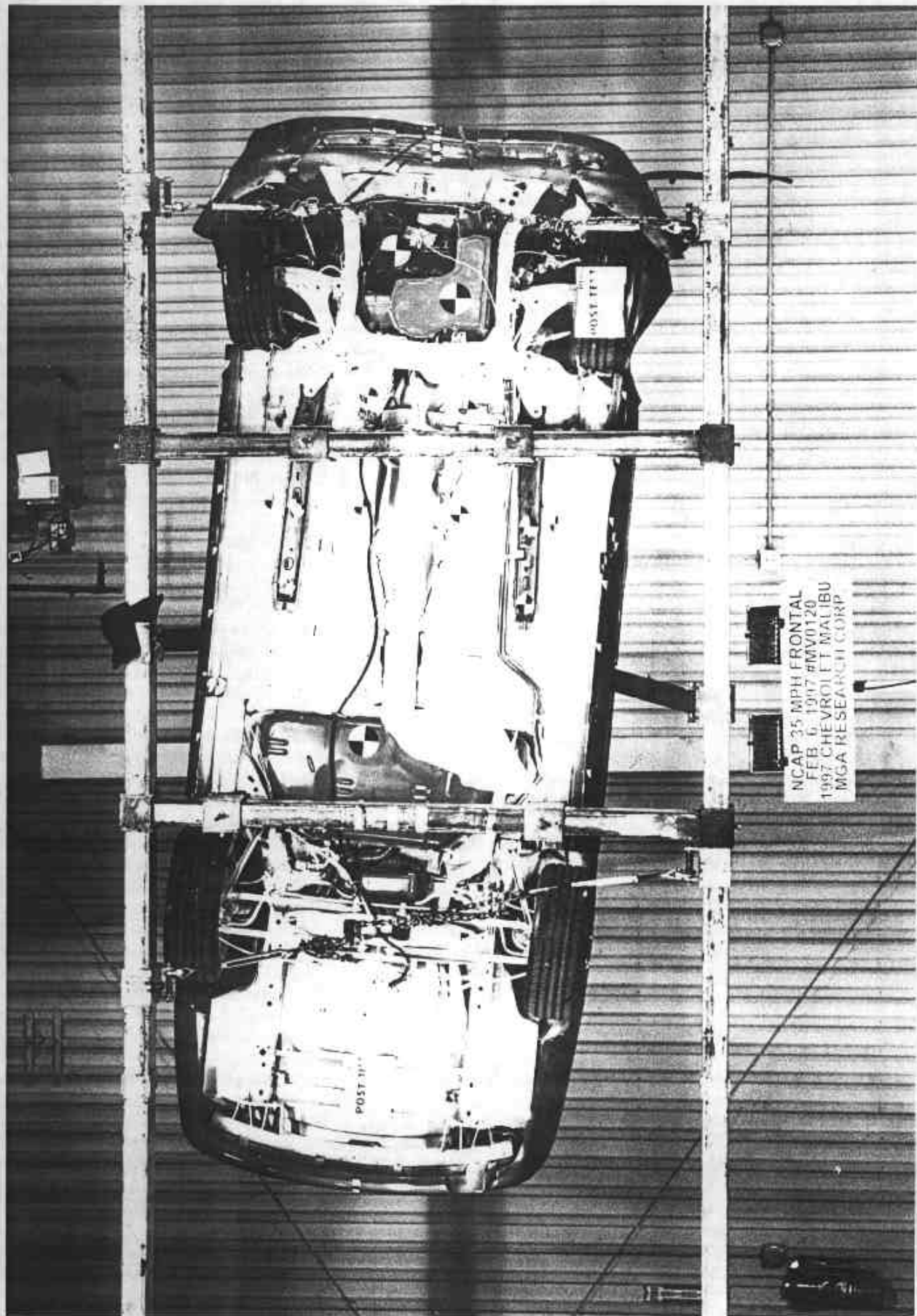


Photo No. A-47 - Rollover 270°

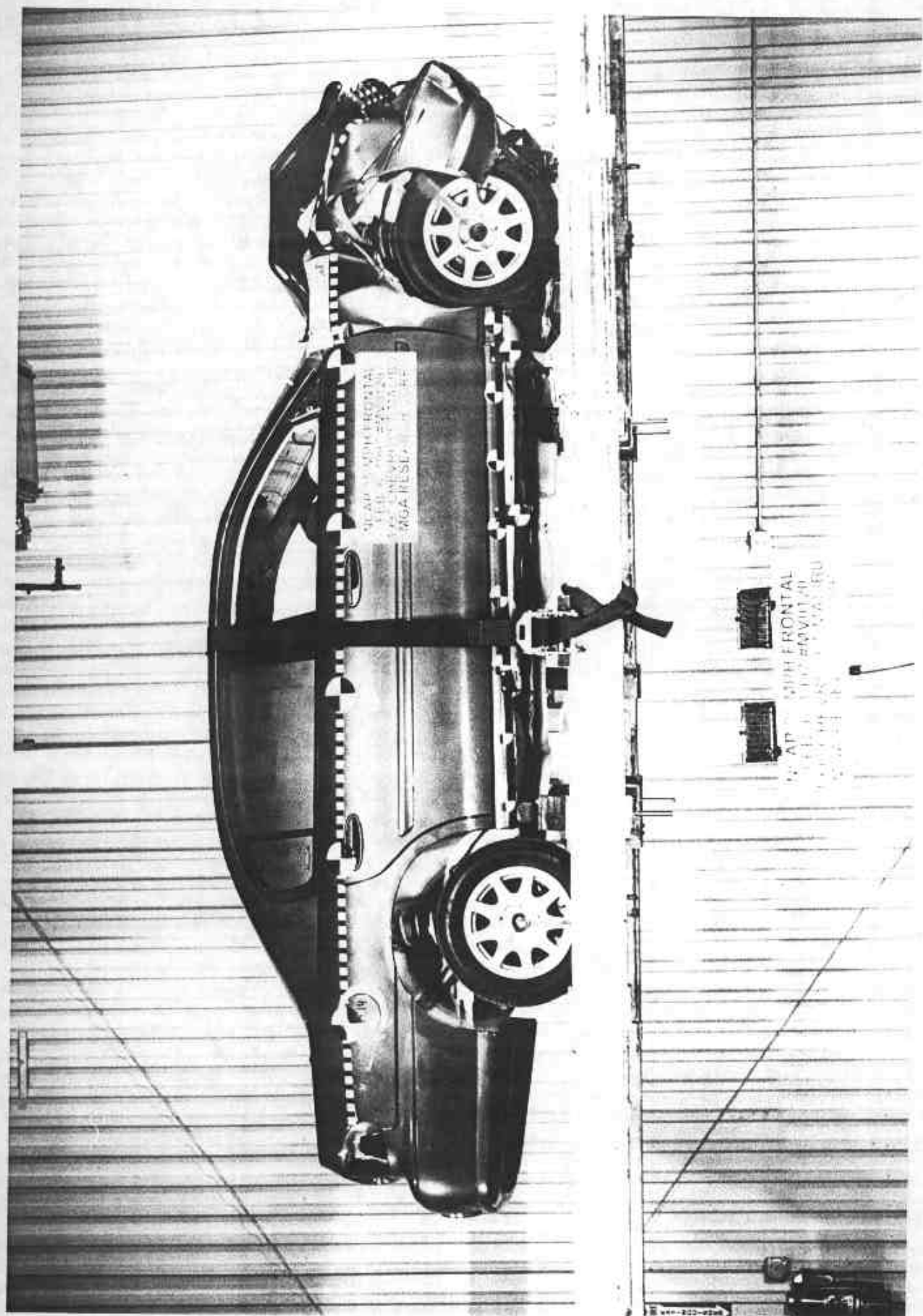


Photo No. A-48 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1997 Chevrolet Malibu 4 Door

NHTSA NO.: MV0120

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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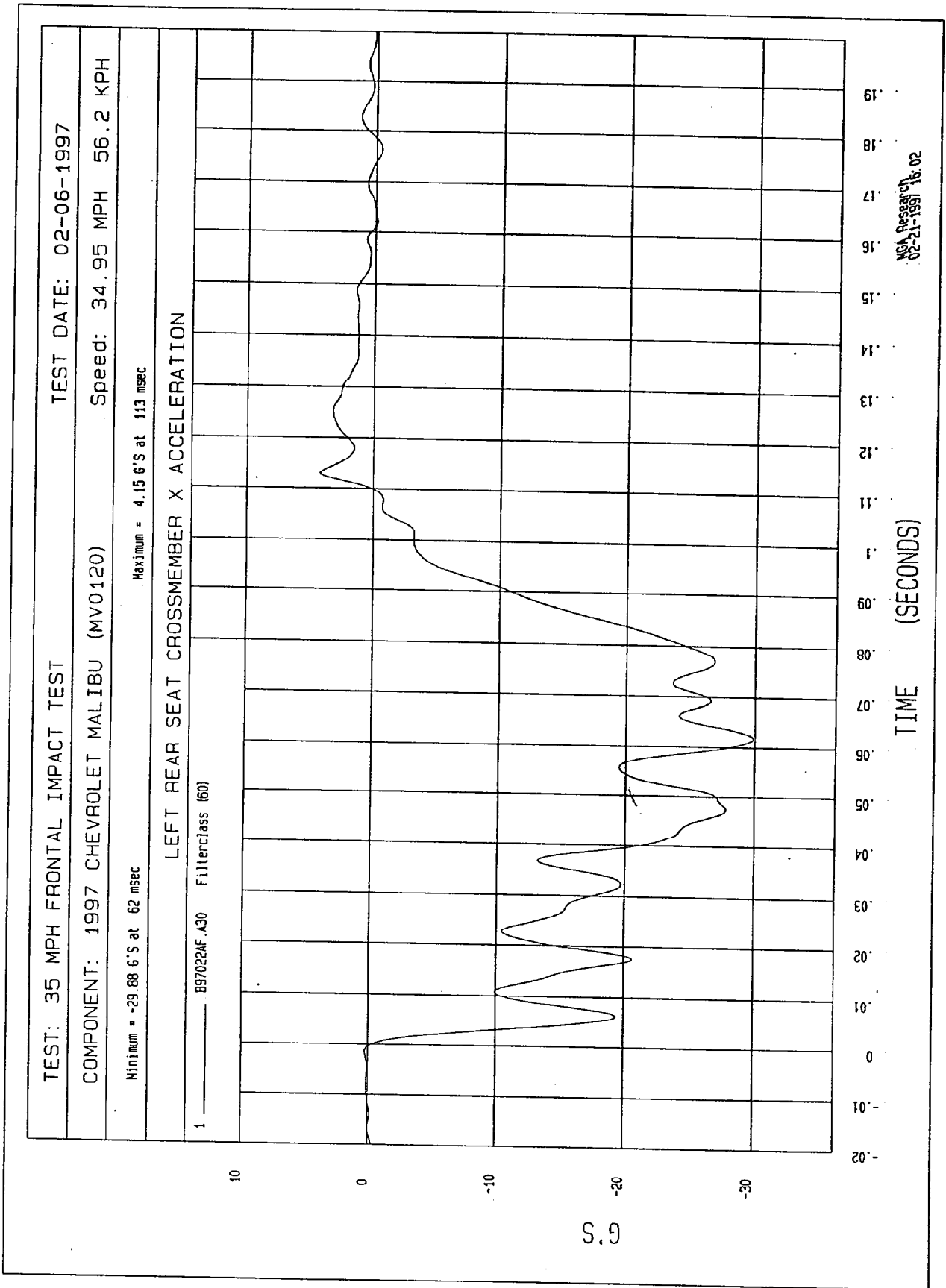
* No valid data collected

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TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

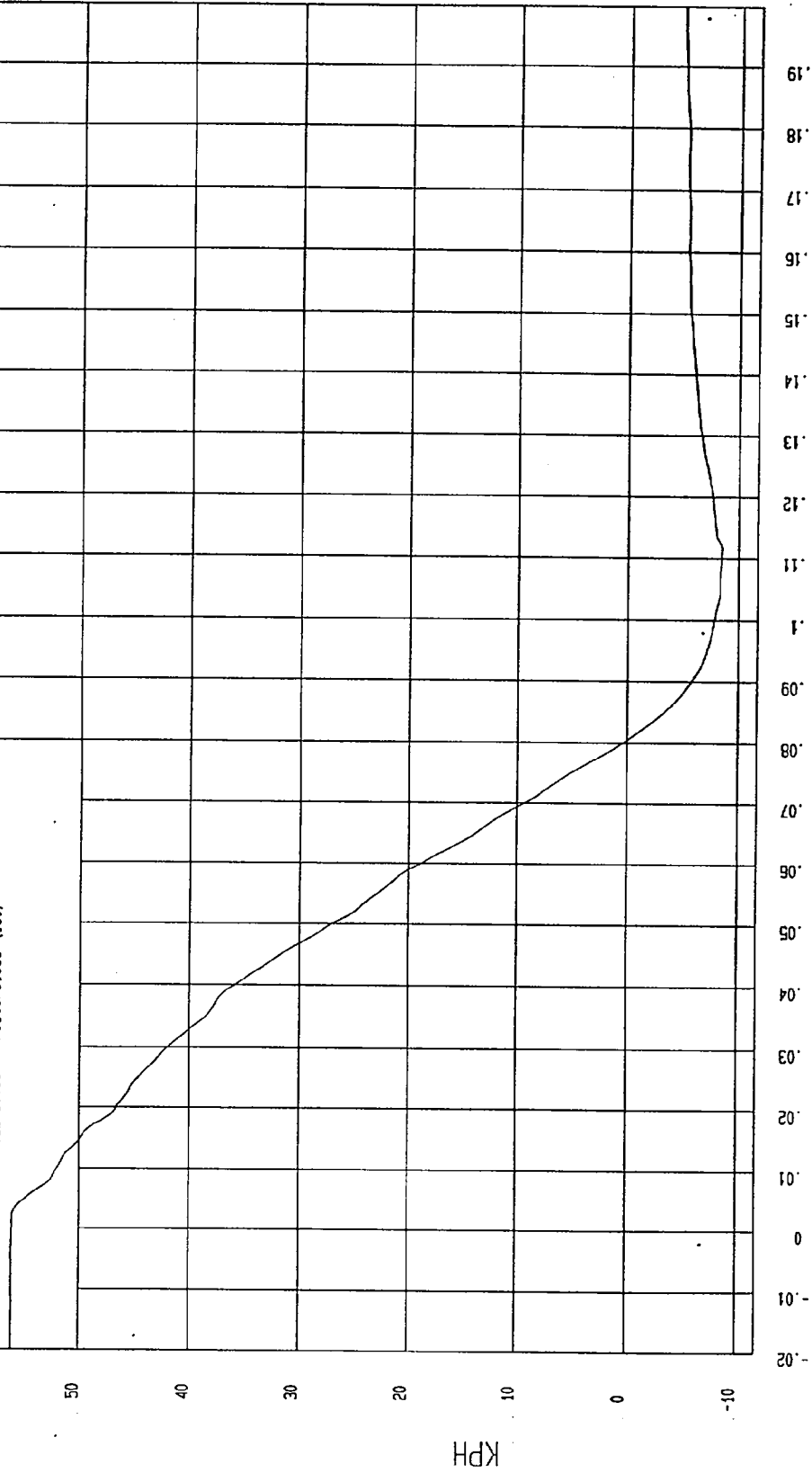
Speed: 34.95 MPH 56.2 KPH

Minimum = -8.50 KPH at 112 msec

Maximum = 56.20 KPH at -4 msec

LEFT REAR SEAT CROSSMEMBER X VELOCITY

1 — 897022A1.V30 Filterclass (180)



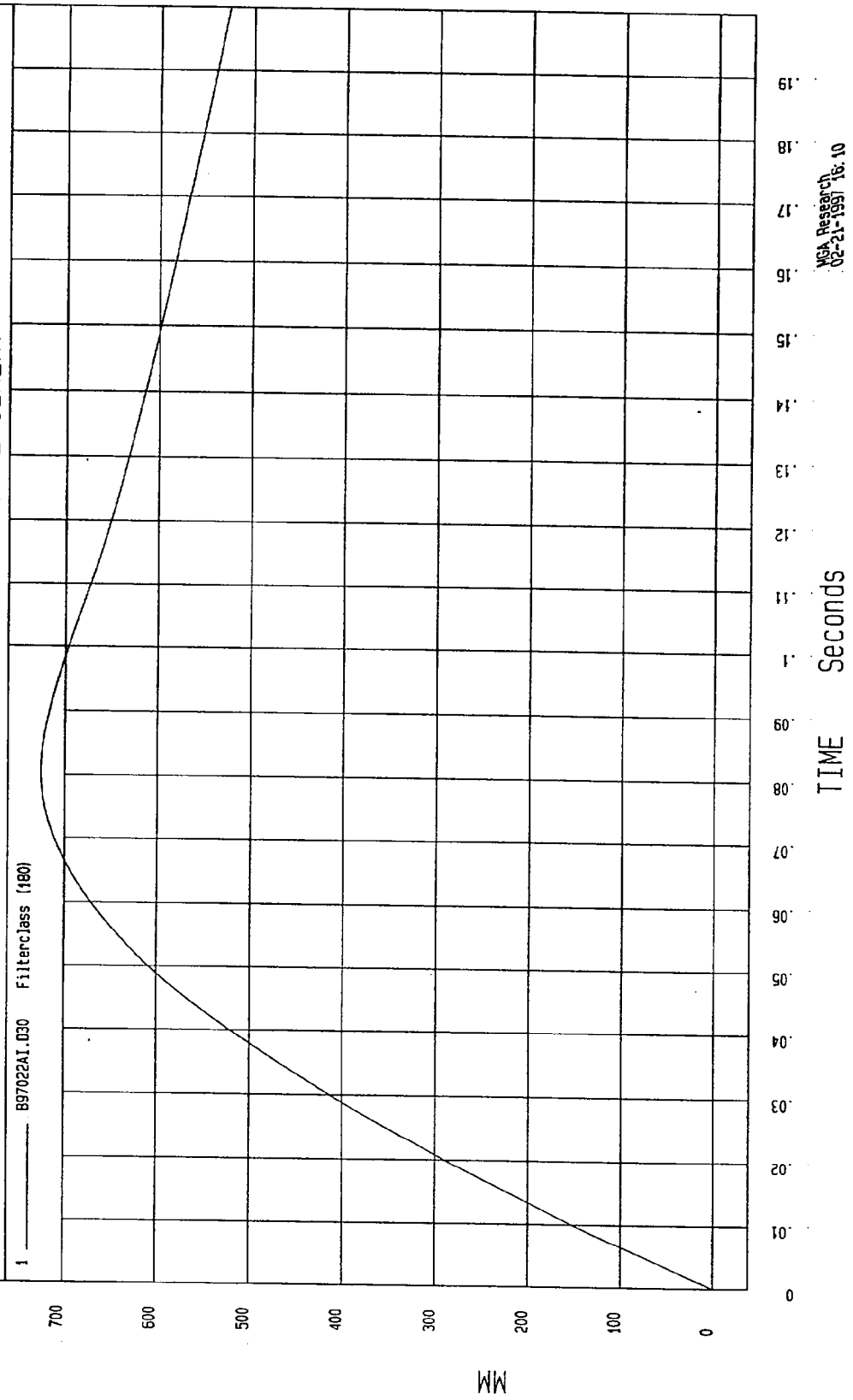
MSA Research
02-13-1997 16:33

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = 0 MM at 0 msec Maximum = 724.77 MM at 80 msec

LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT



VCA Research
02-21-1997 16.10

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

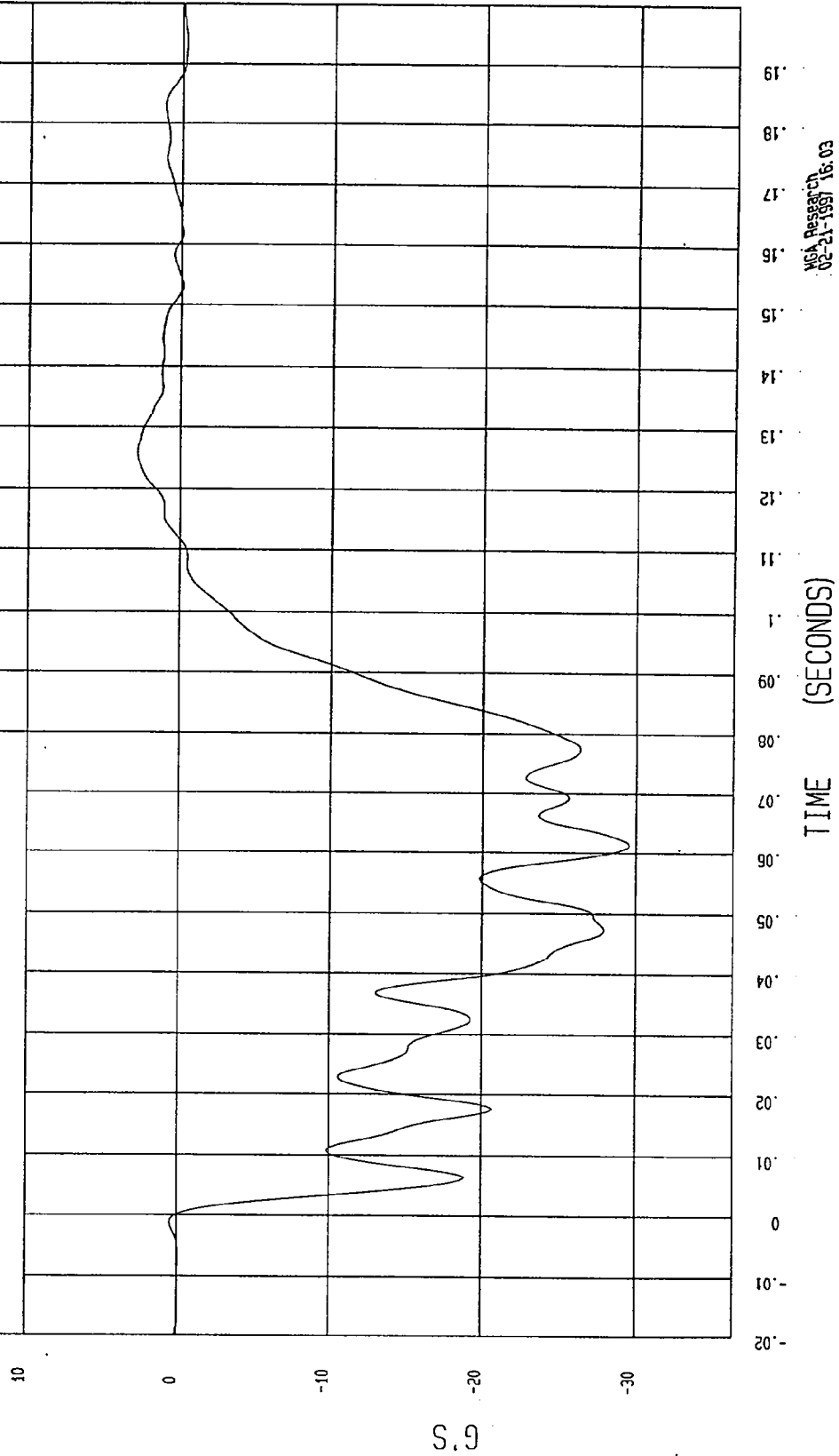
Speed: 34.95 MPH 56.2 KPH

Minimum = -29.57 G'S at 61 msec

Maximum = 2.87 G'S at 126 msec

LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

1 ——— B97022AF.A92 Filterclass (60)

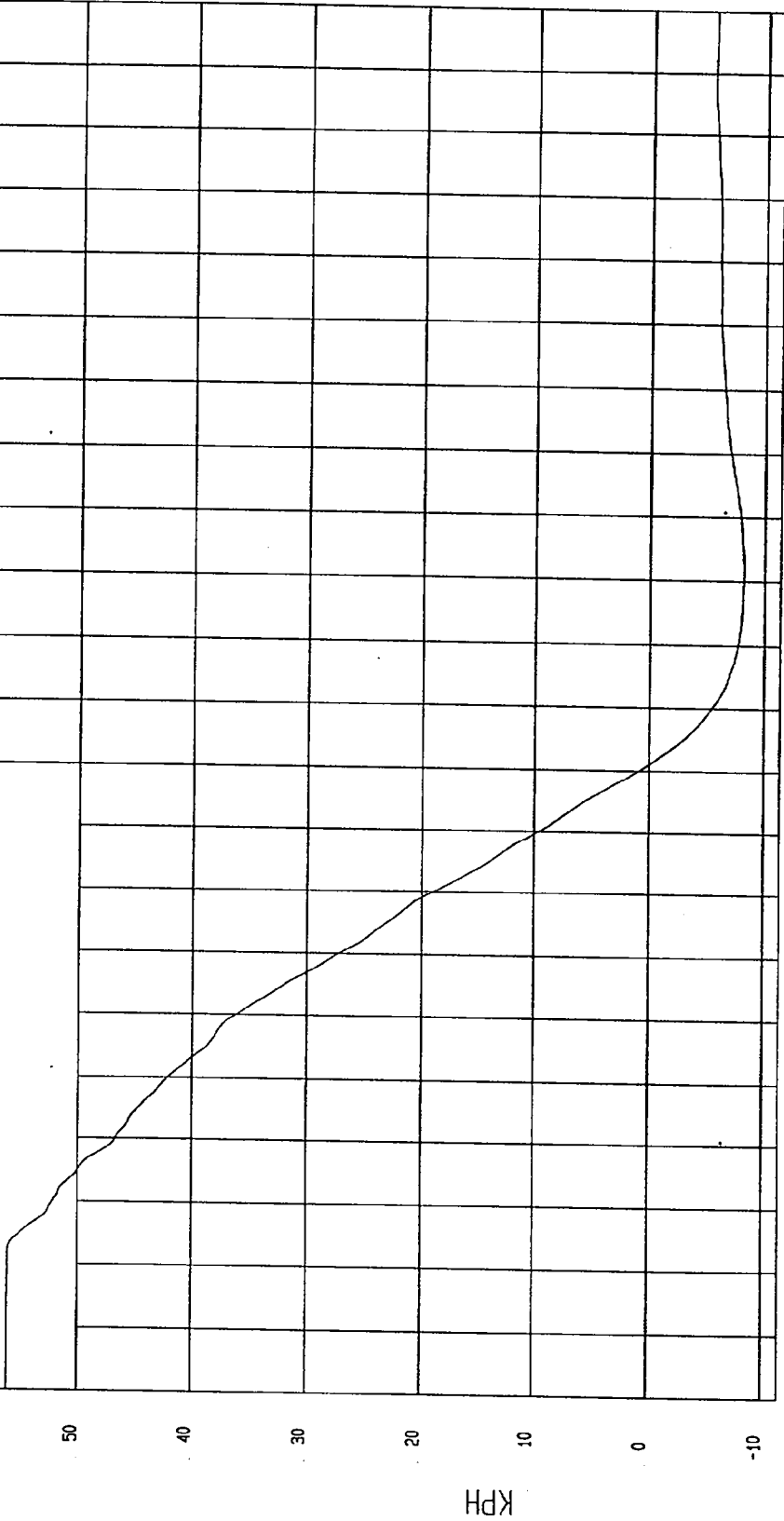


NCA Research
02-21-1997 16:03

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH
Minimum = -8.18 KPH at 112 msec Maximum = 56.20 KPH at -19 msec

LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY

1 ——— 897022A1.V92 Filterclass (180)



MCA Research
02-13-1997 16:33

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Speed: 34.95 MPH 56.2 KPH

Minimum = 0 MM at 0 msec

Maximum = 728.91 MM at 81 msec

LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

1 — 897022A1.092 Filterclass (180)

700

600

500

400

300

200

100

0

MM

0

.01

.02

.03

.04

.05

.06

.07

.08

.09

.1

.11

.12

.13

.14

.15

.16

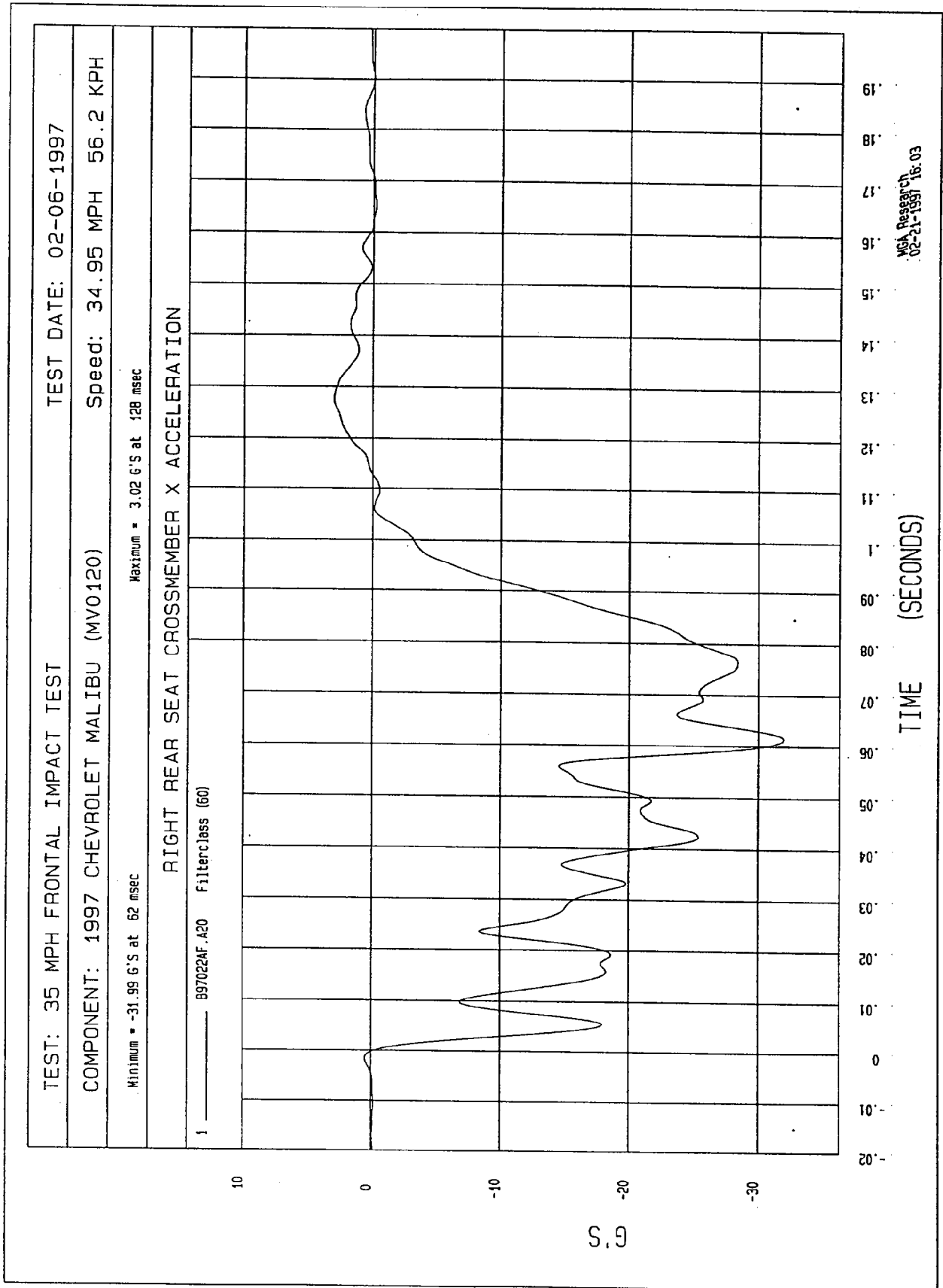
.17

.18

.19

TIME Seconds

MGA Research
02-21-1997 16:10



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

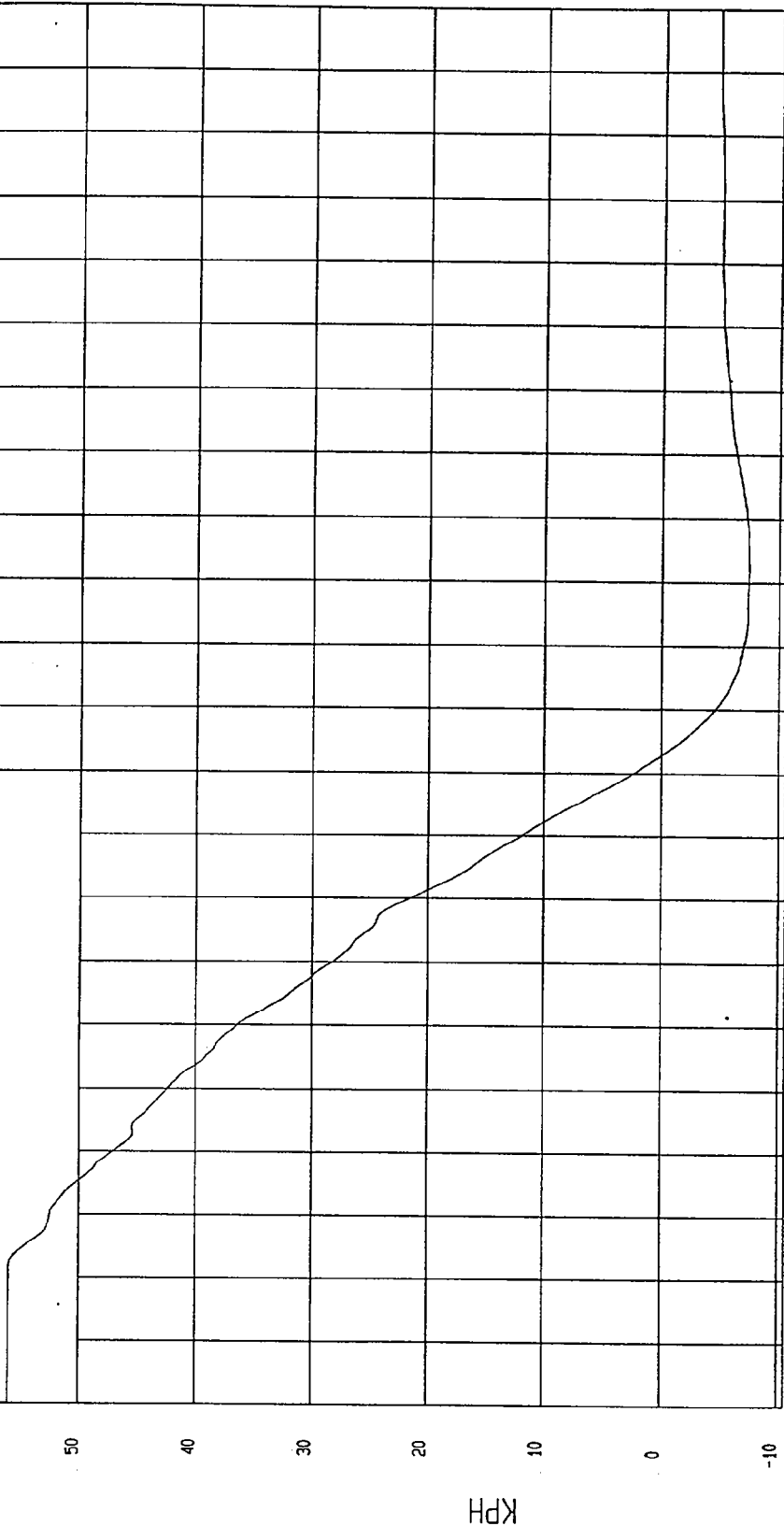
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -7.40 KPH at 112 msec

Maximum = 56.20 KPH at -18 msec

RIGHT REAR SEAT CROSSMEMBER X VELOCITY

1 B97022A1.V20 Filterclass (180)



MGA Research
02-13-1997 16:33

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

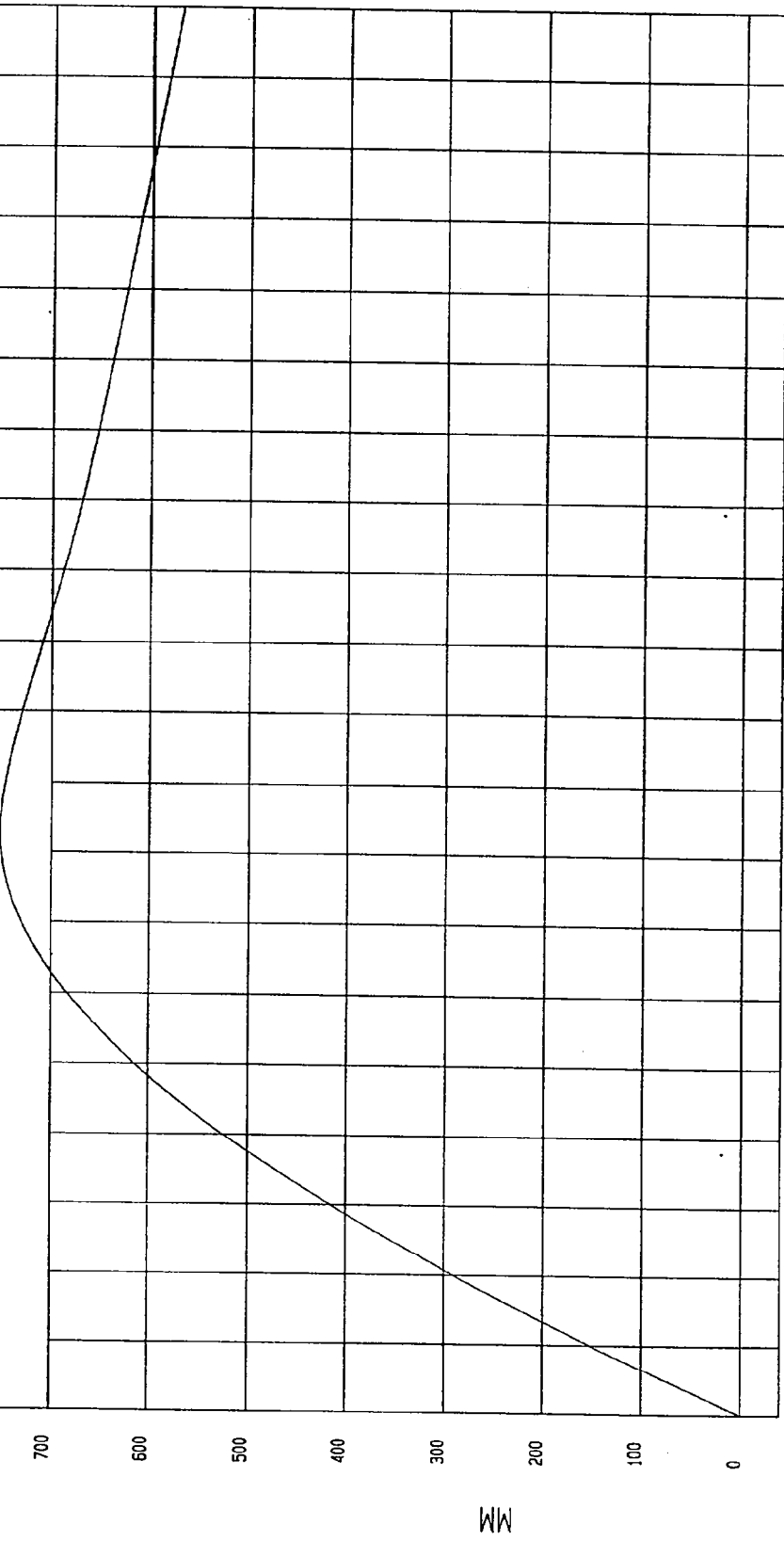
Speed: 34.95 MPH 56.2 KPH

Minimum = 0 MM at 0 msec

Maximum = 750.69 MM at 83 msec

RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT

1 ——— BS7022AI.D20 Filterclass (160)



TIME Seconds

MSA Research
02-21-1997 16:10

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Speed: 34.95 MPH 56.2 KPH

Minimum = -32.08 G'S at 61 msec

Maximum = 3.12 G'S at 128 msec

RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

1 B97022AF.A66 Filterclass (60)

10

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

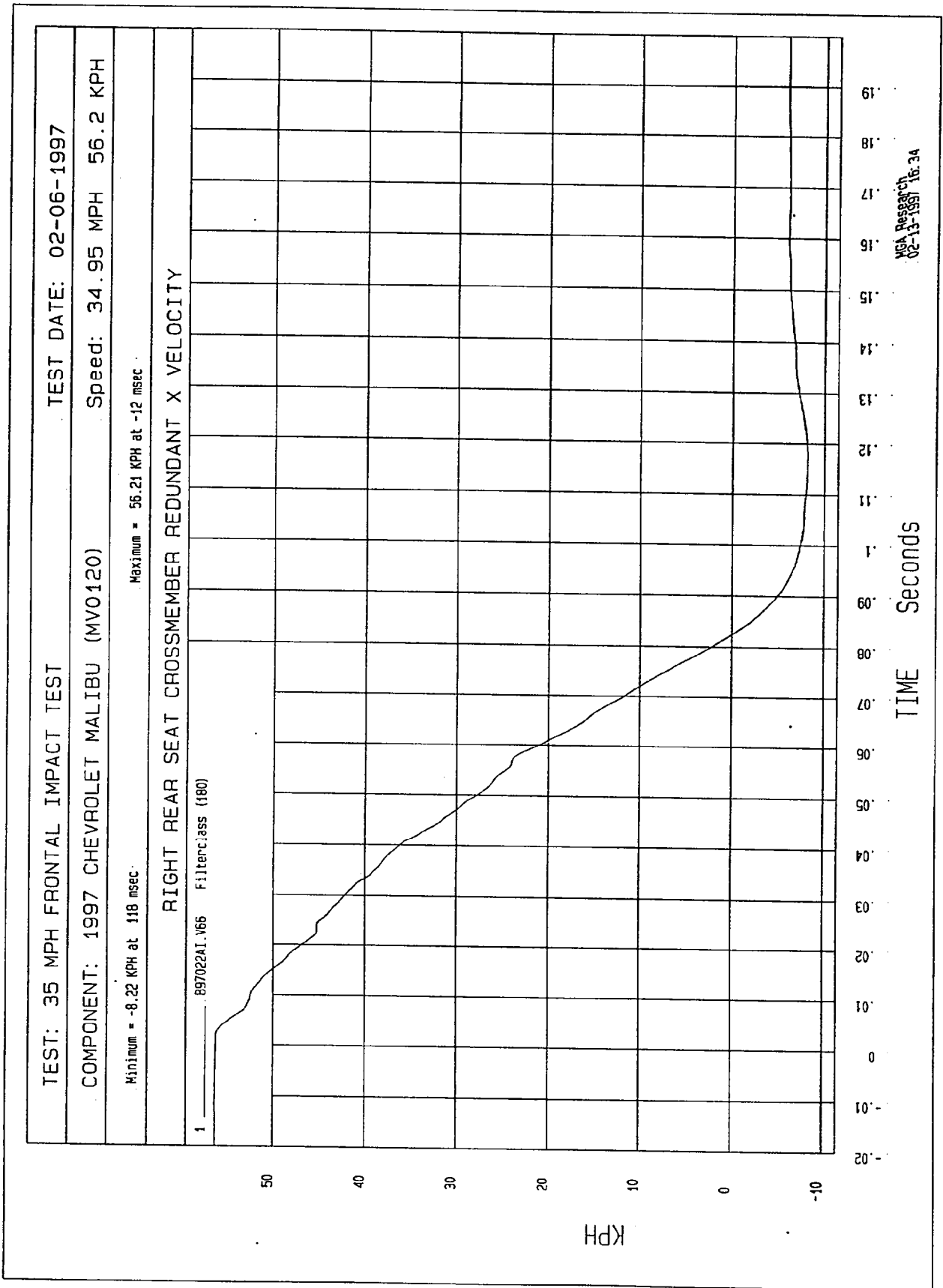
.17

.18

.19

TIME (SECONDS)

MGA Research
02-21-1997 16.03



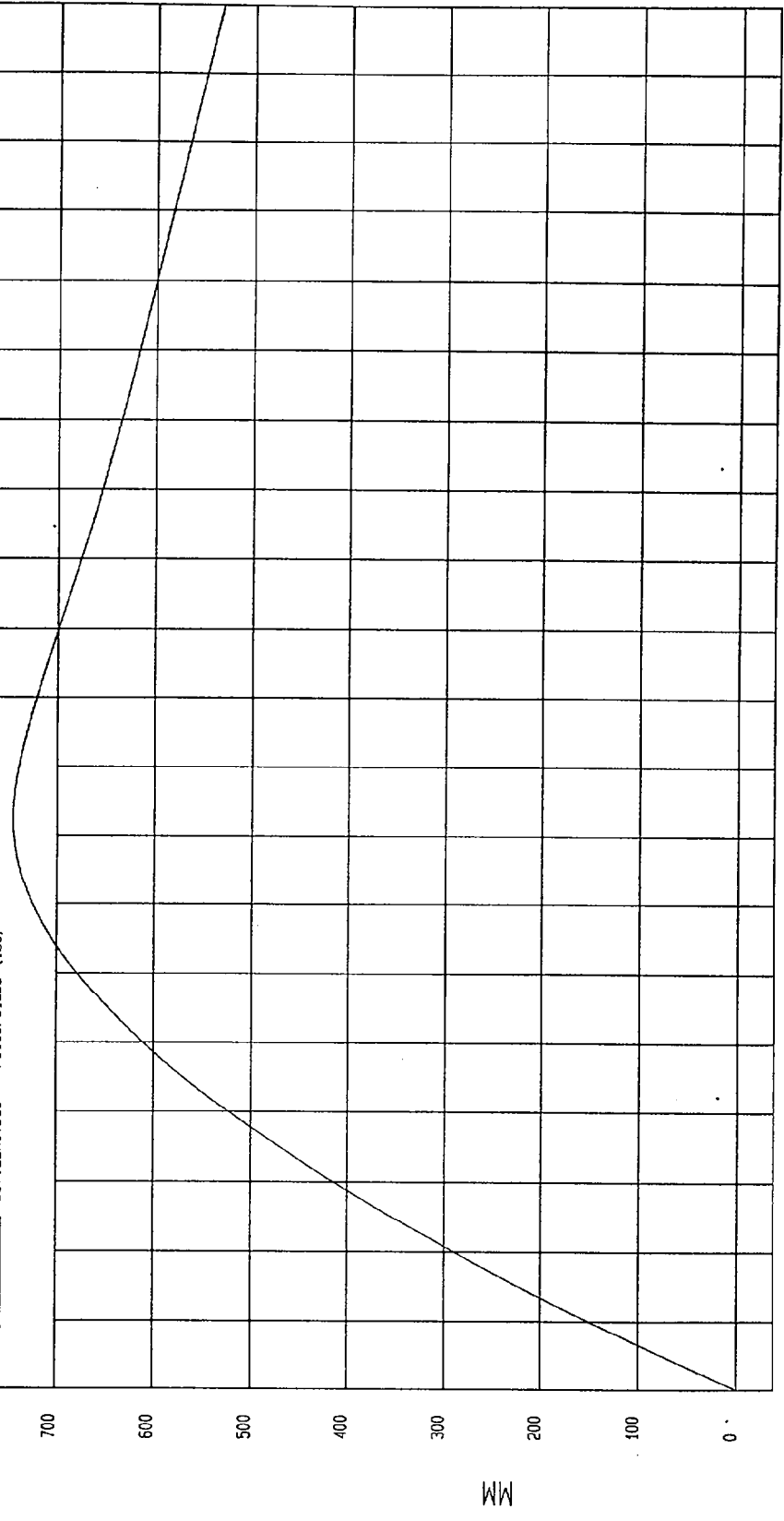
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

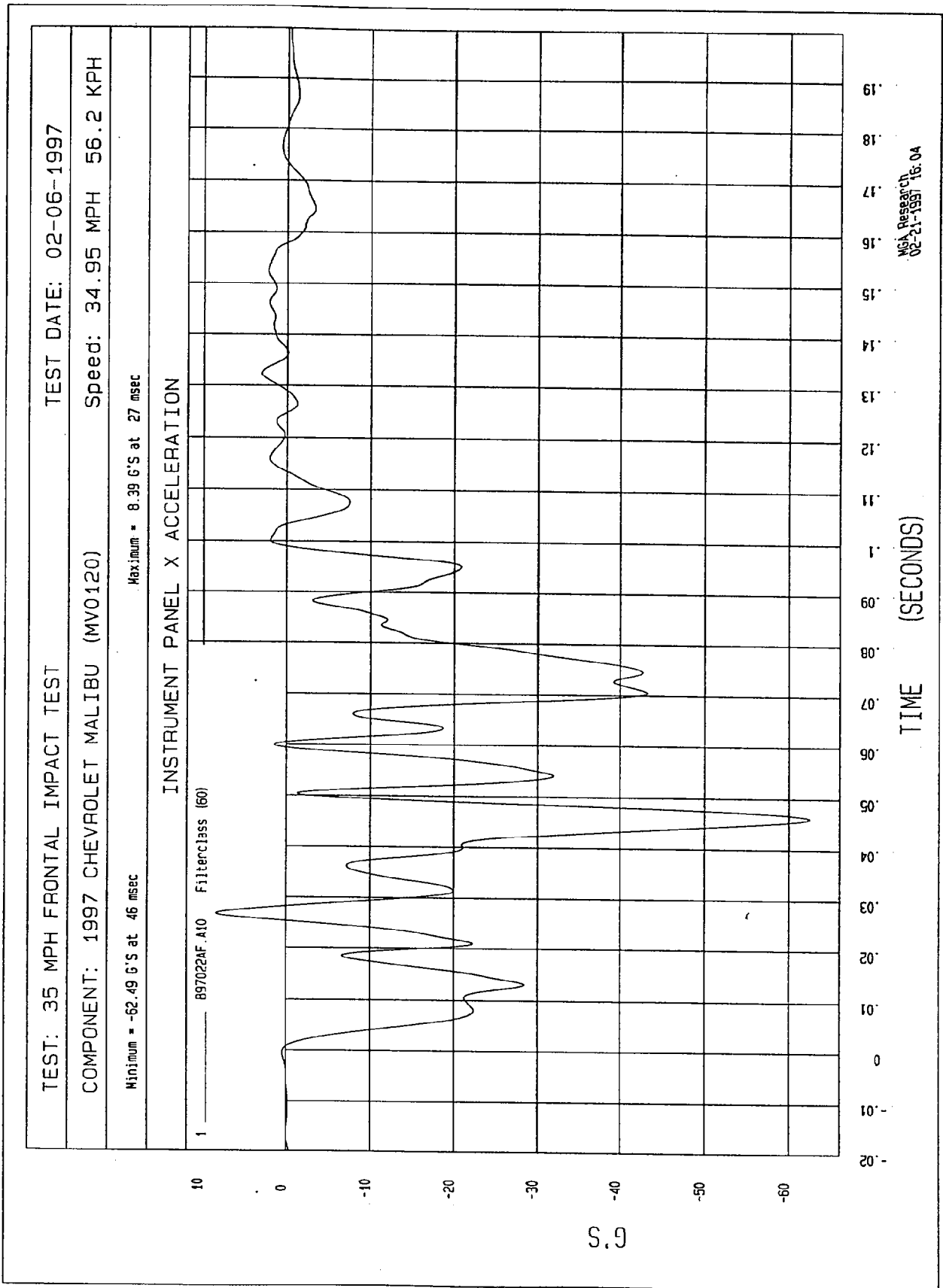
Minimum = 0 MM at 0 msec Maximum = 744.75 MM at 82 msec

RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

1 897022A1.066 Filterclass (180)



TIME Seconds
WSA Research
02-21-1997 16:10

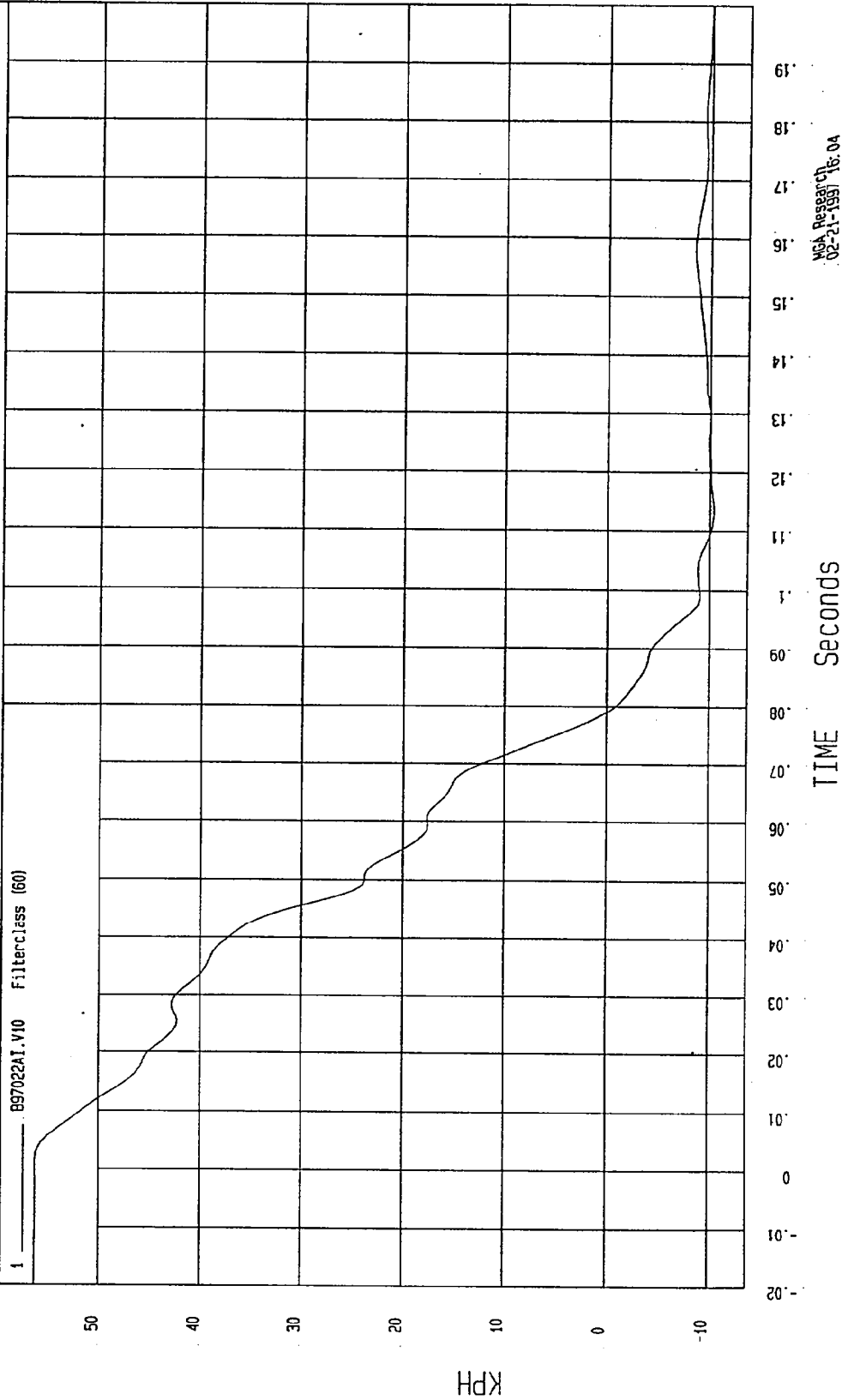


TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -10.36 KPH at 113 msec Maximum = 56.2 KPH at -20 msec

INSTRUMENT PANEL X VELOCITY



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

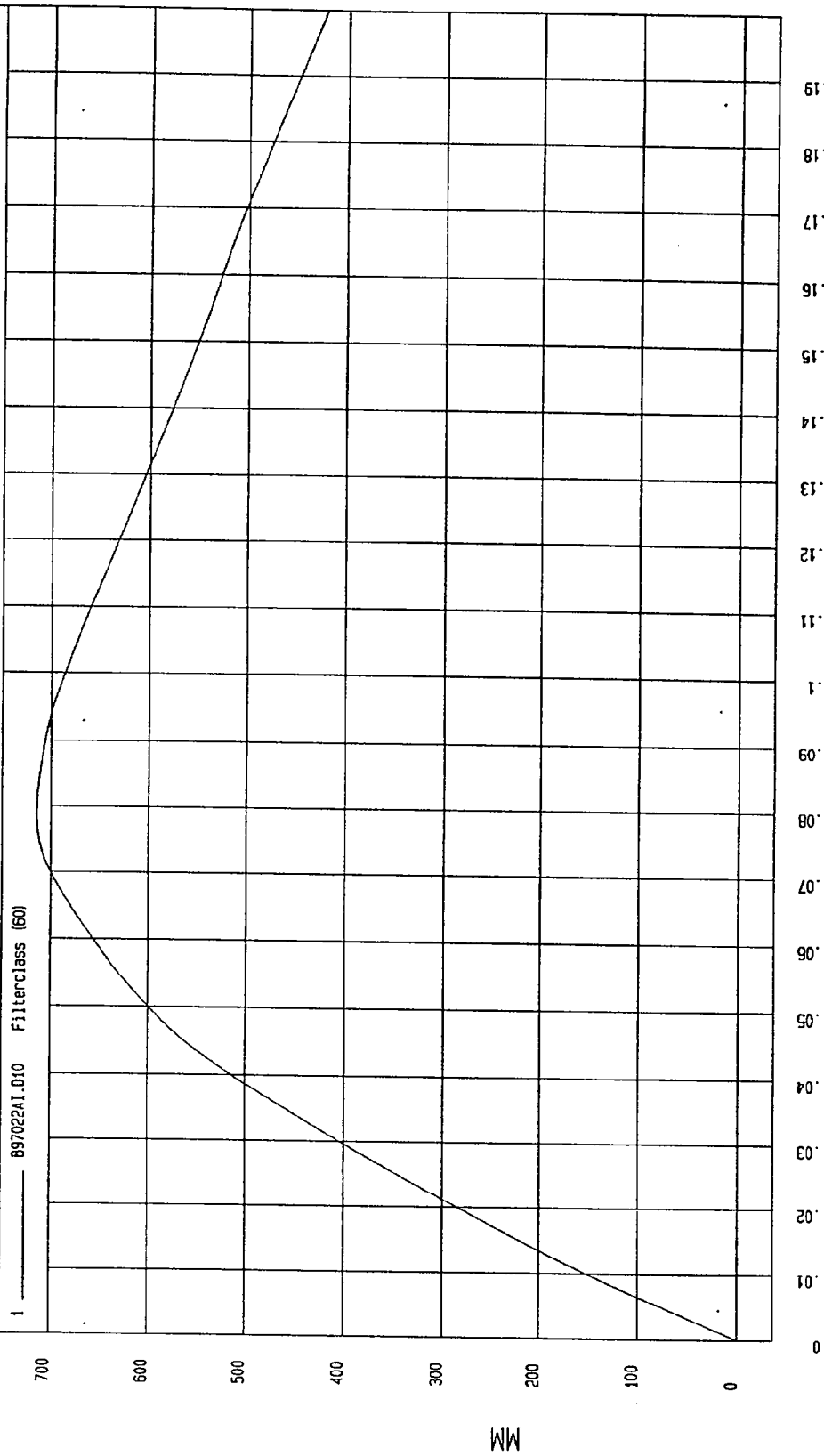
Speed: 34.95 MPH 56.2 KPH

Minimum = 0 MM at 0 msec

Maximum = 714.41 MM at 79 msec

INSTRUMENT PANEL X DISPLACEMENT

1 — B97022A1.010 Filterclass (60)



MSA Research
02-21-1997 16:04

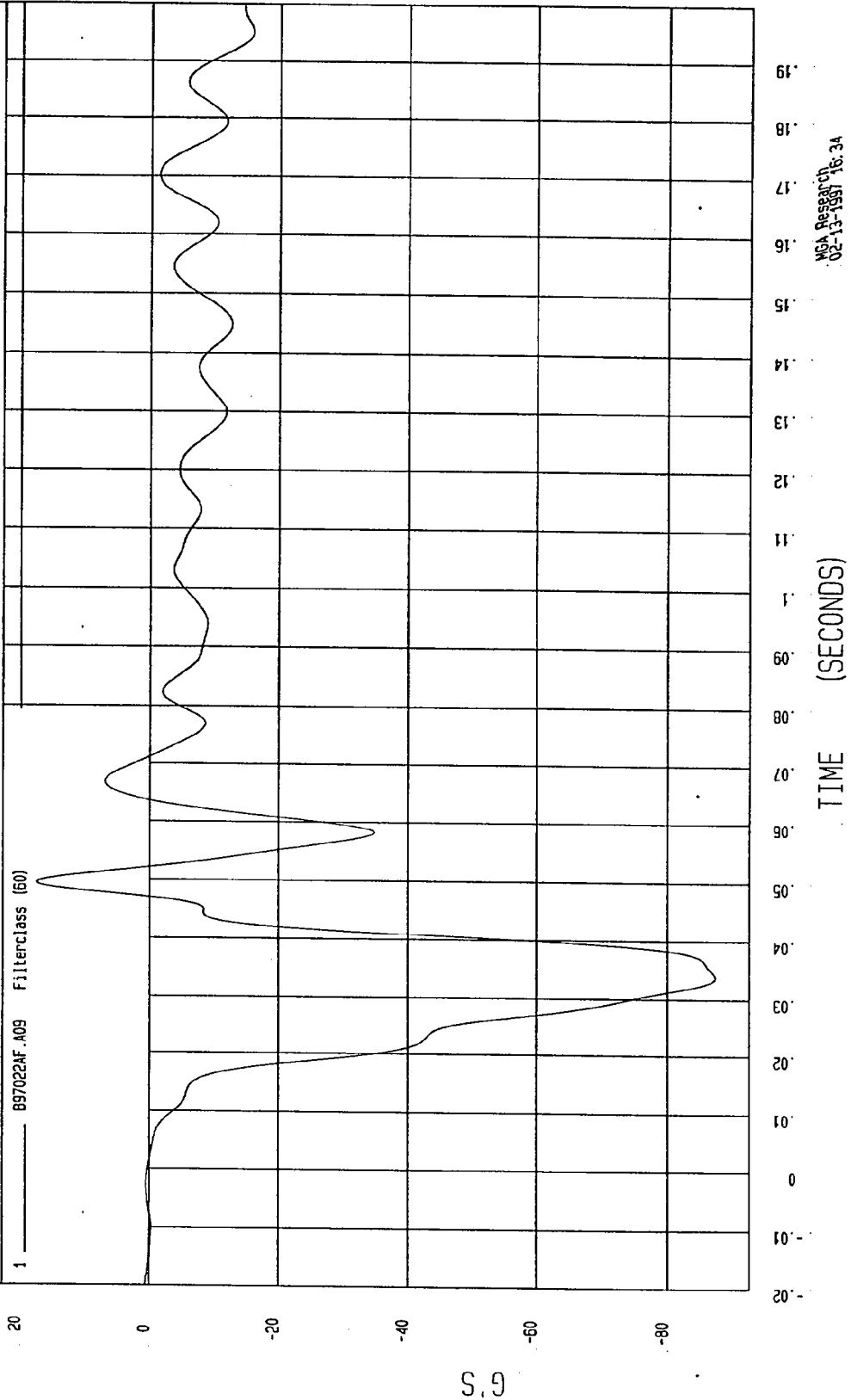
TIME Seconds

TOP OF ENGINE BLOCK X ACCELERATION VS. TIME

NO VALID DATA COLLECTED

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH
Minimum = -87.36 G'S at 34 msec Maximum = 17.50 G'S at 50 msec

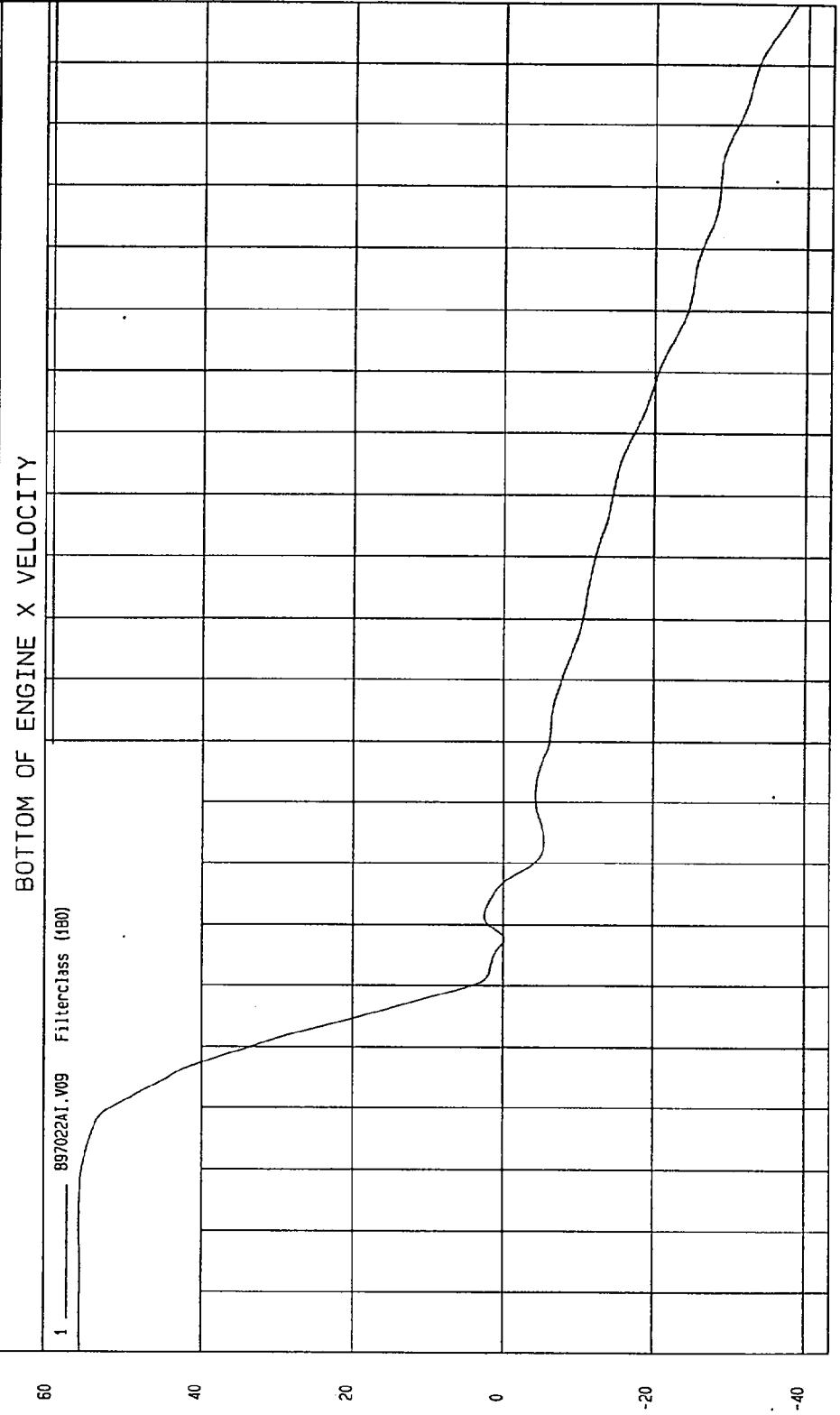
BOTTOM OF ENGINE X ACCELERATION



TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

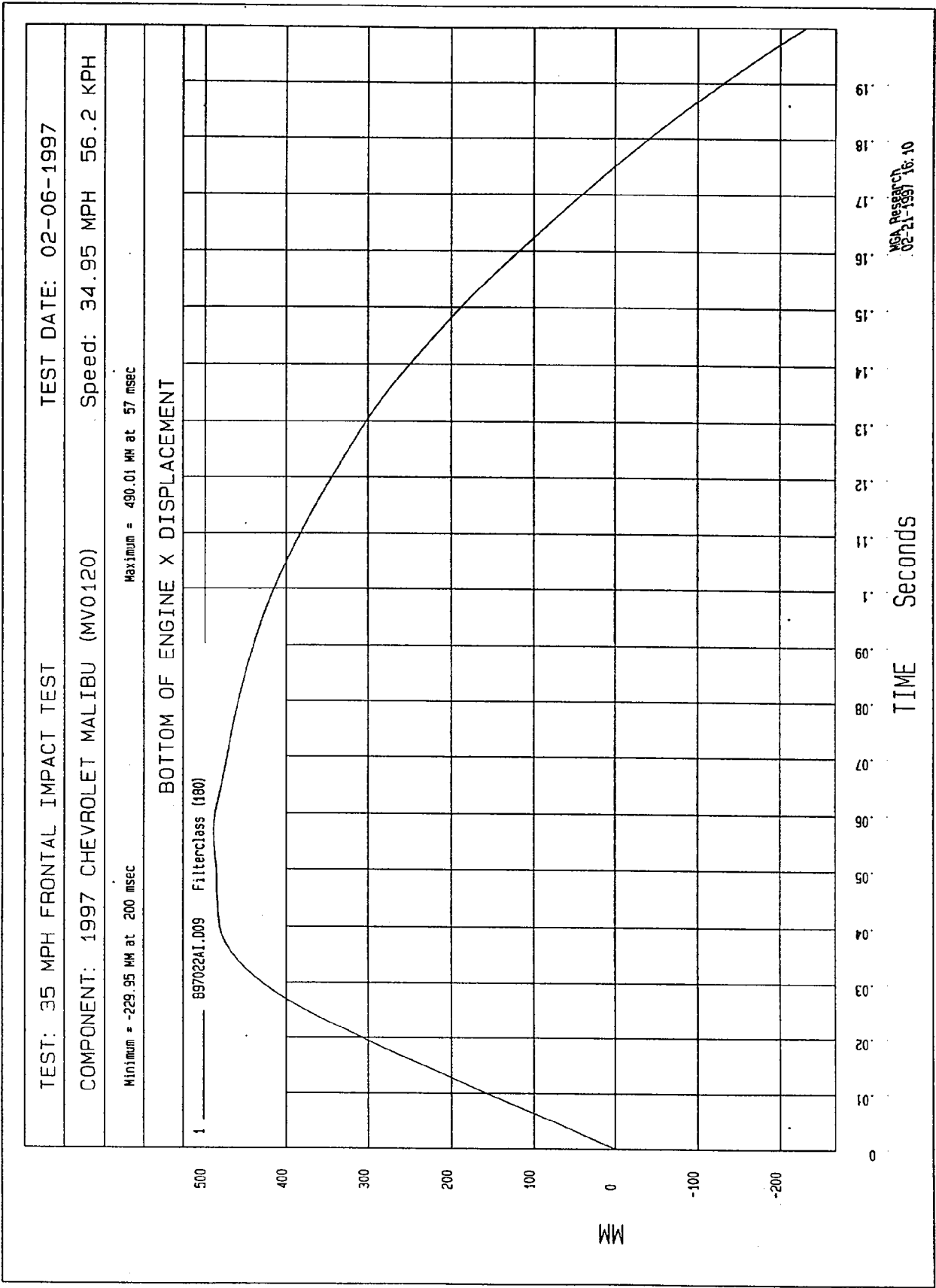
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -38.44 KPH at 200 msec Maximum = 56.32 KPH at 1 msec



TIME Seconds

MGA Research
02-13-1997 16:34



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

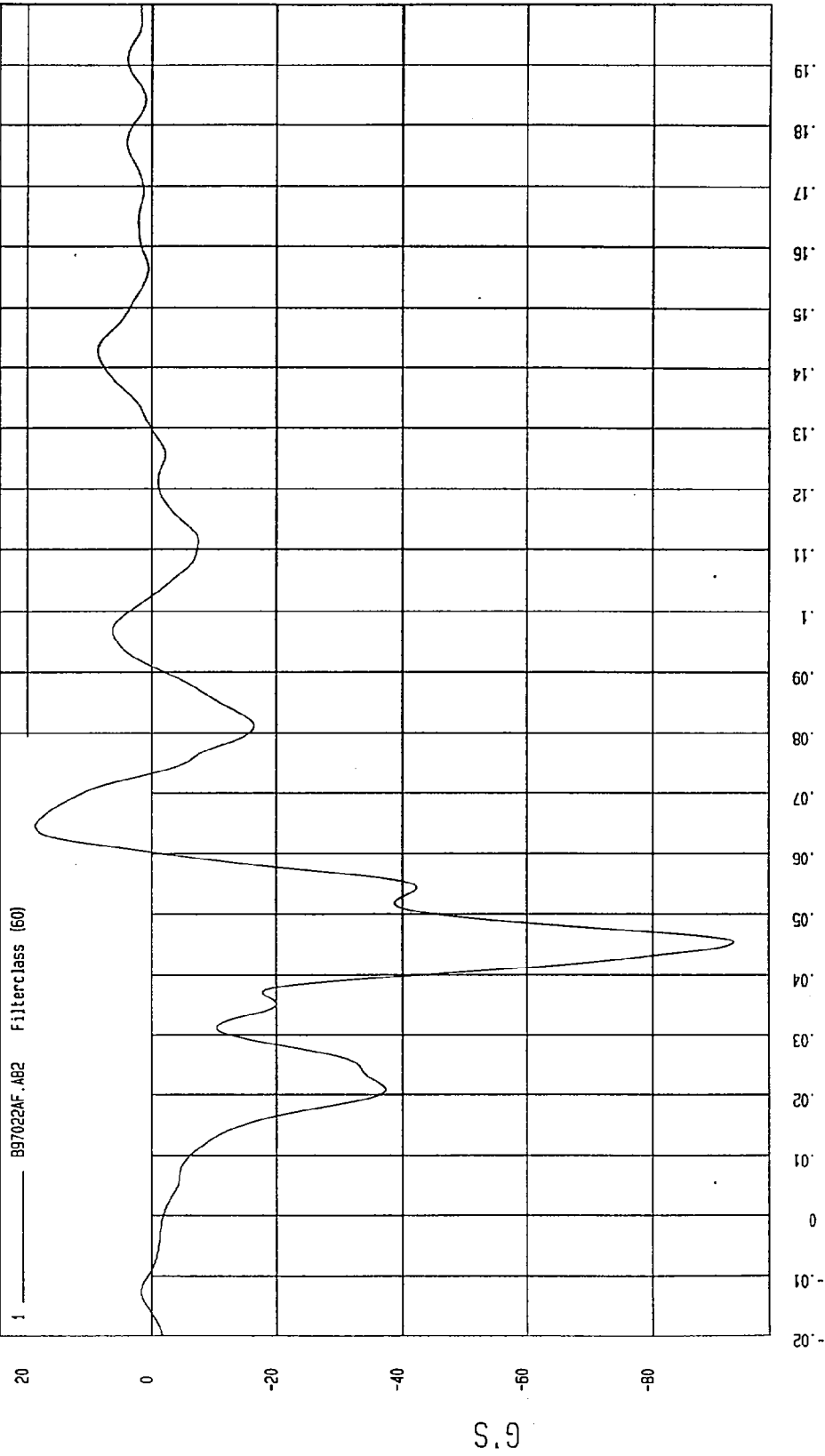
Speed: 34.95 MPH 56.2 KPH

Minimum = -92.85 G'S at 46 msec

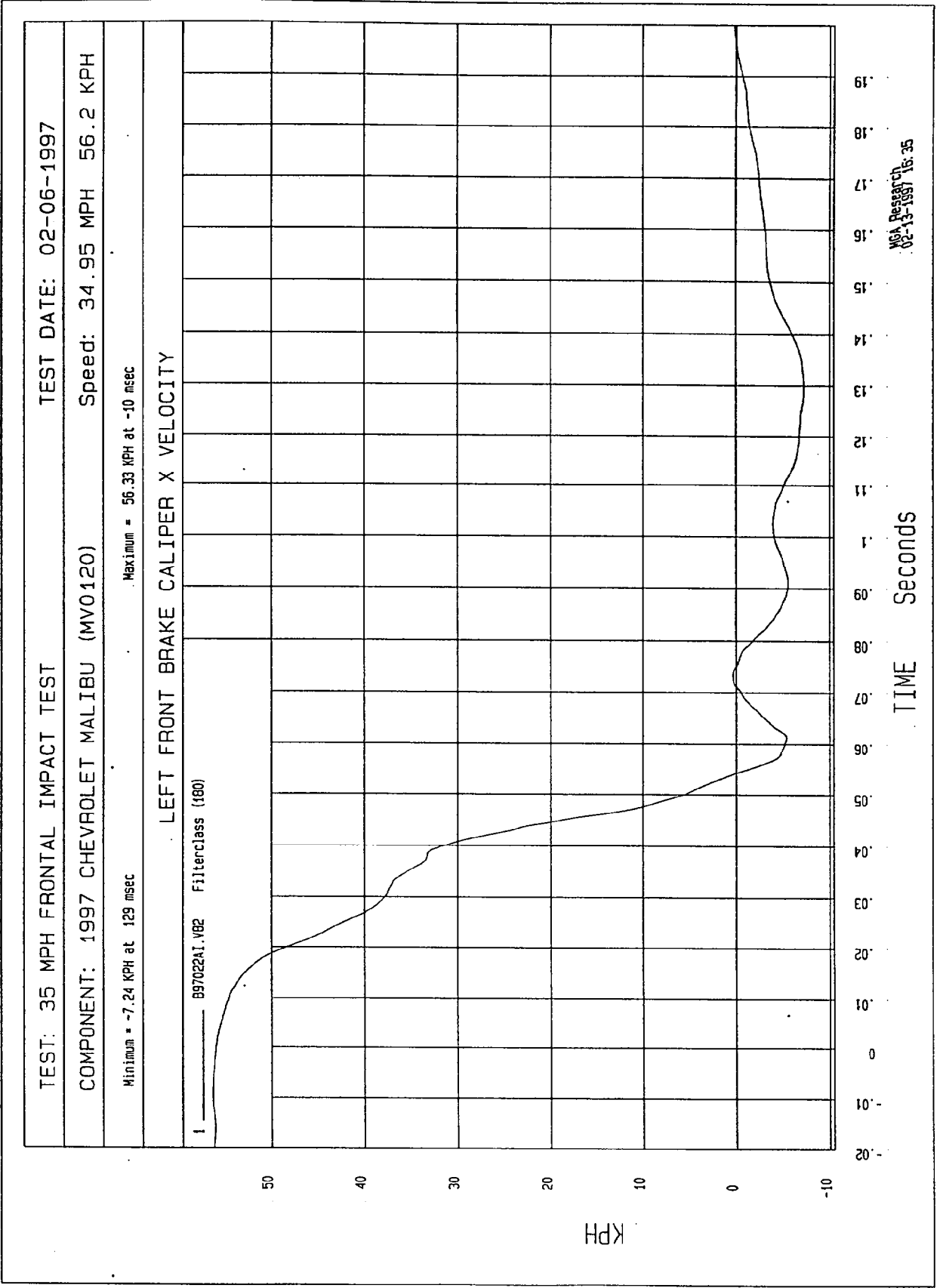
Maximum = 18.75 G'S at 65 msec

LEFT FRONT BRAKE CALIPER X ACCELERATION

1 ——— B97022AF.AB2 Filterclass (60)



NGA Report CH
02-13-1997 16:35



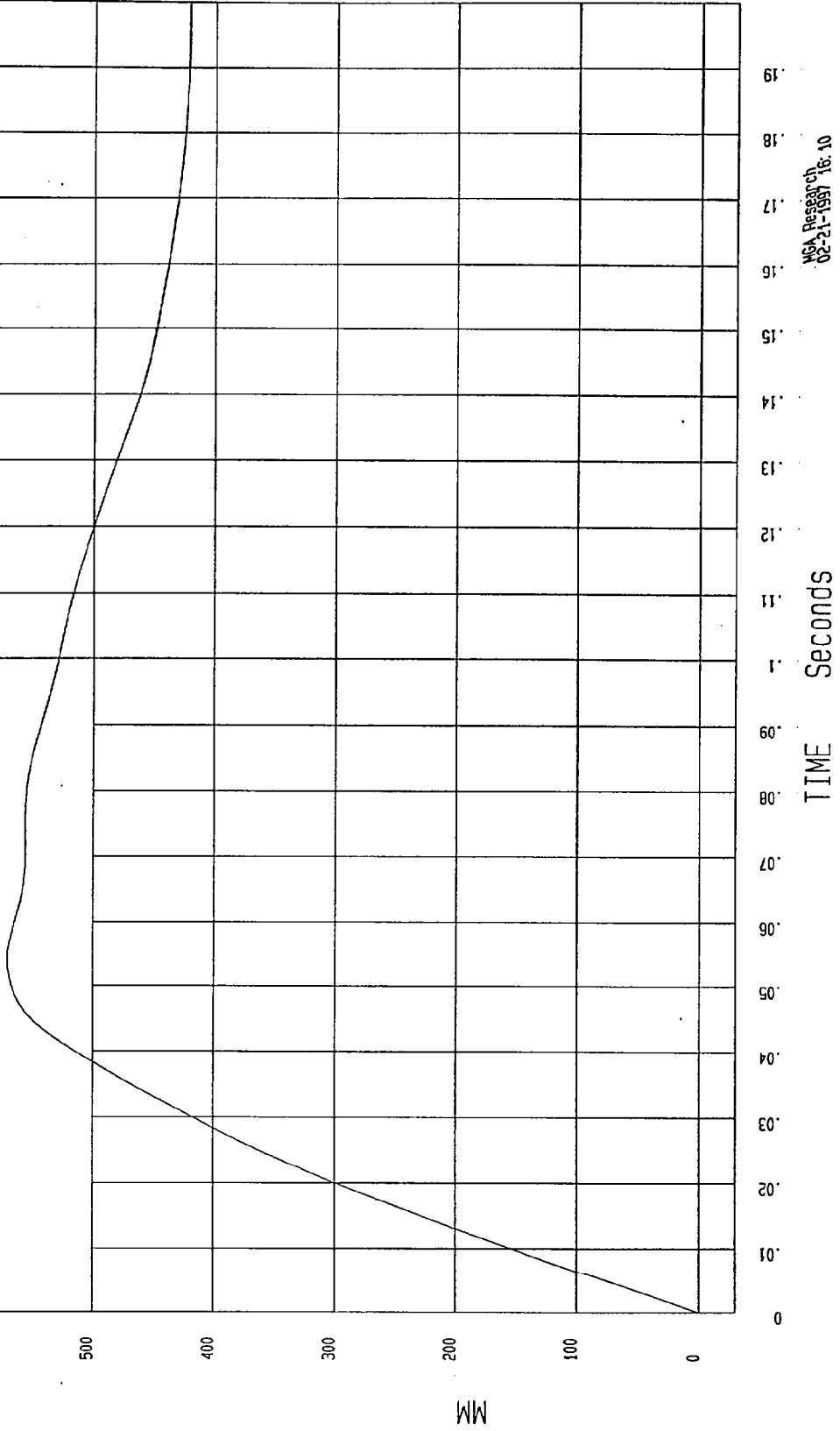
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

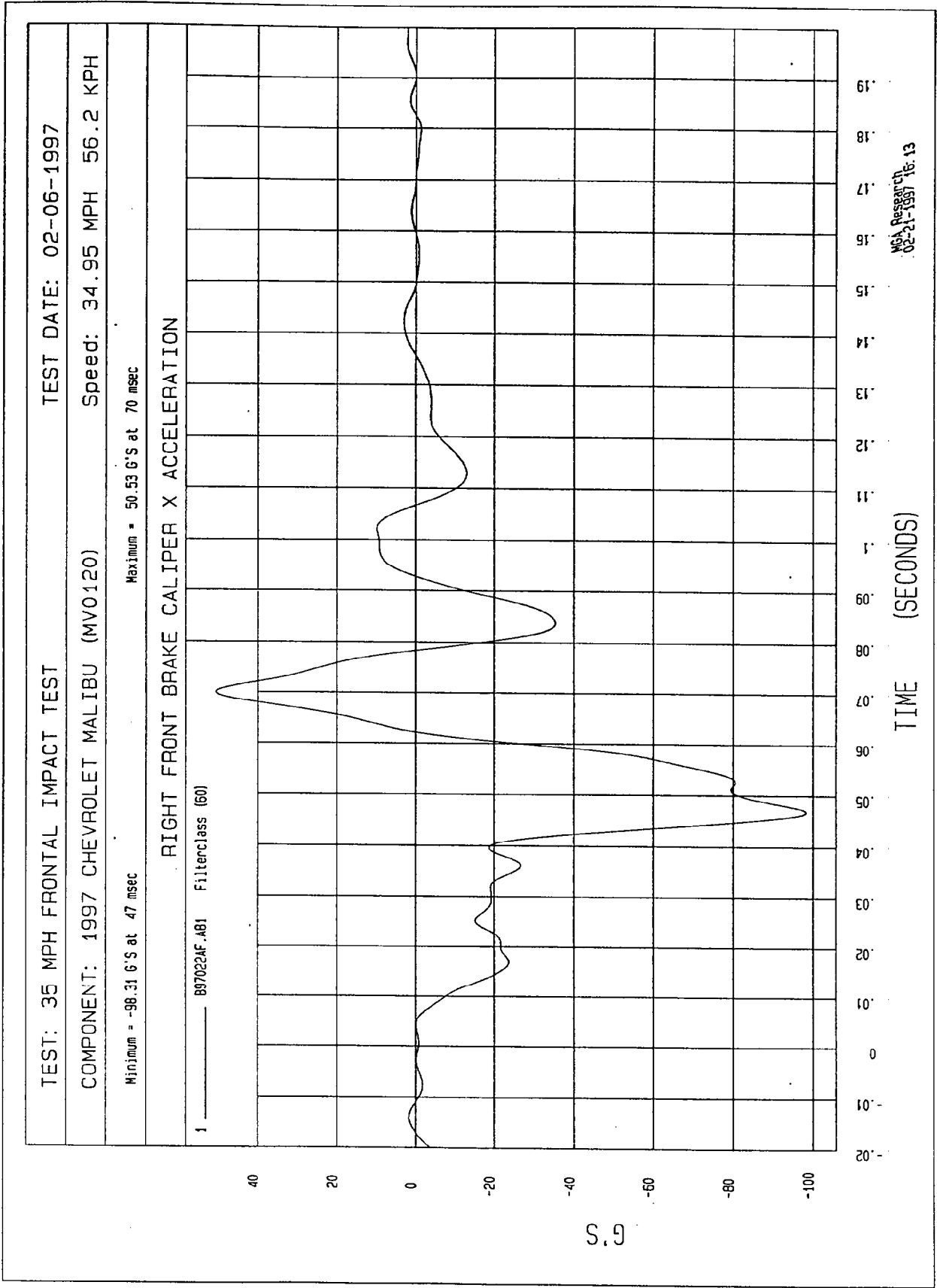
Minimum = 0 MM at 0 msec Maximum = 569.81 MM at 54 msec

LEFT FRONT BRAKE CALIPER X DISPLACEMENT

1 _____ B97022AI.D82 Filterclass (180)



MSA Research
02-21-1997 16:10



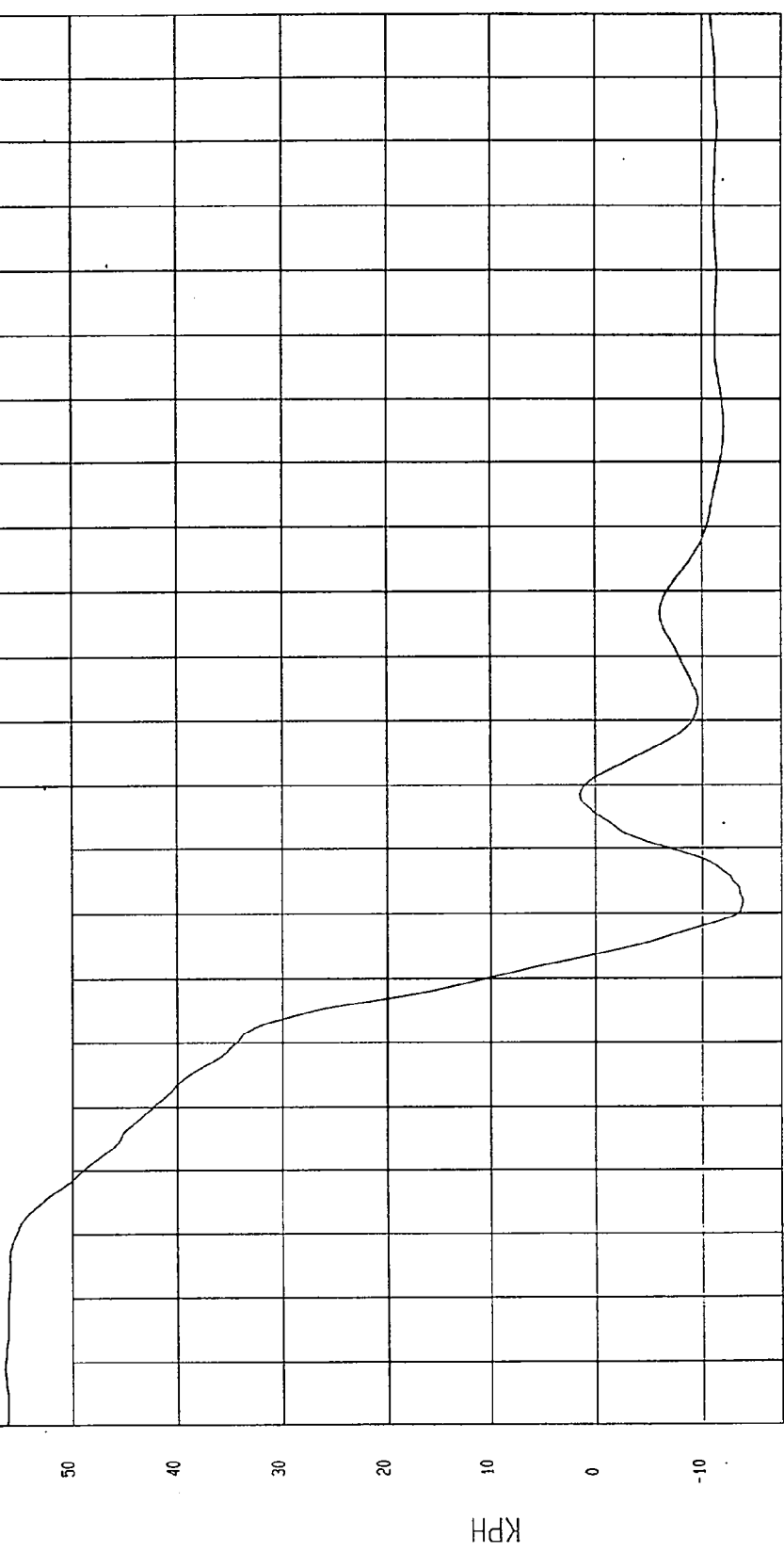
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -13.92 KPH at 62 msec
Maximum = 56.34 KPH at -11 msec

RIGHT FRONT BRAKE CALIPER X VELOCITY

1 897022A1.V81 Filterclass (180)



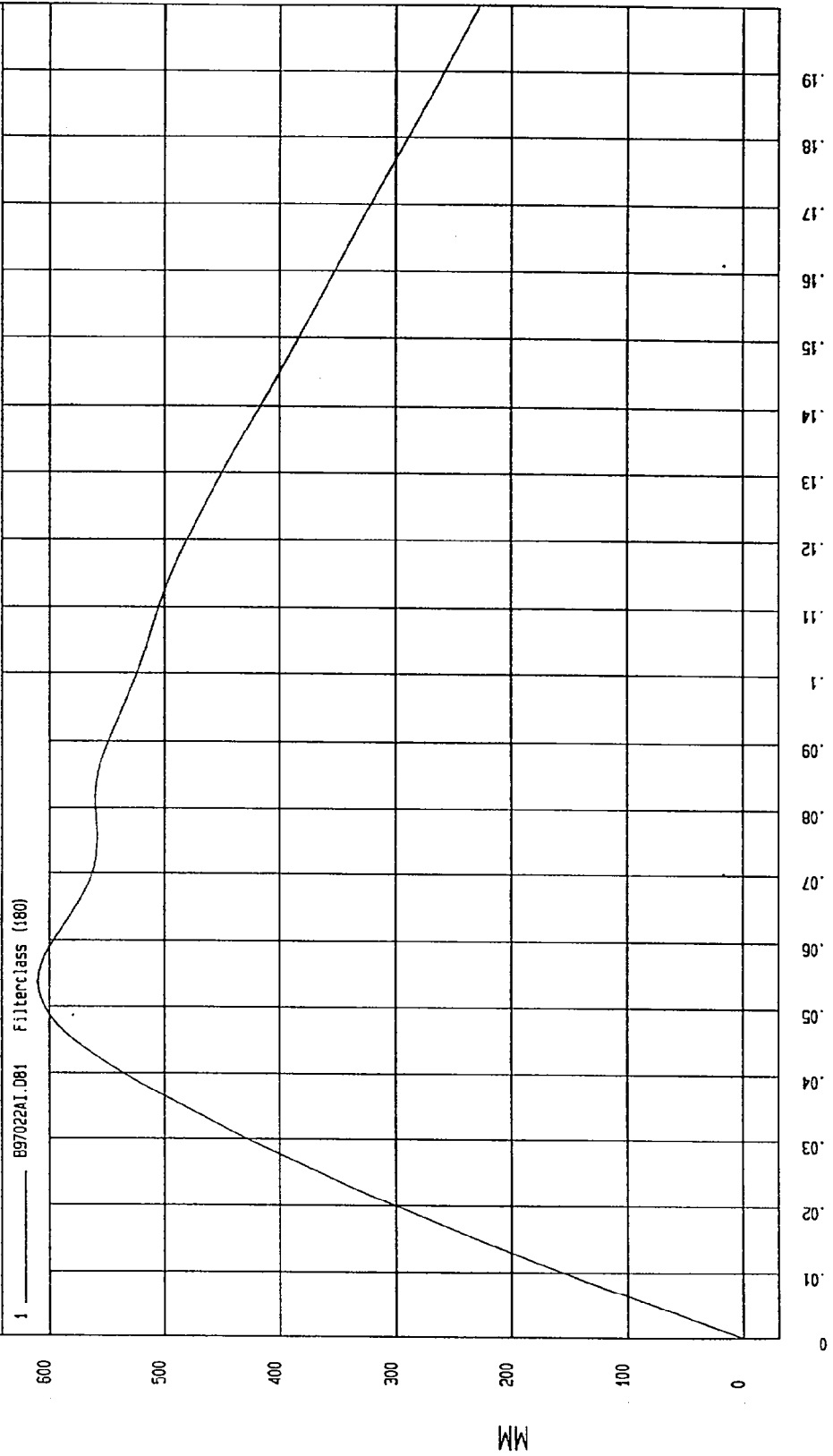
TIME Seconds
MSA Research
02-21-1997 16:11

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = 0 MM at 0 msec Maximum = 609.40 MM at 54 msec

RIGHT FRONT BRAKE CALIPER X DISPLACEMENT



MSA Research
02-21-1997 16:11

TIME Seconds

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

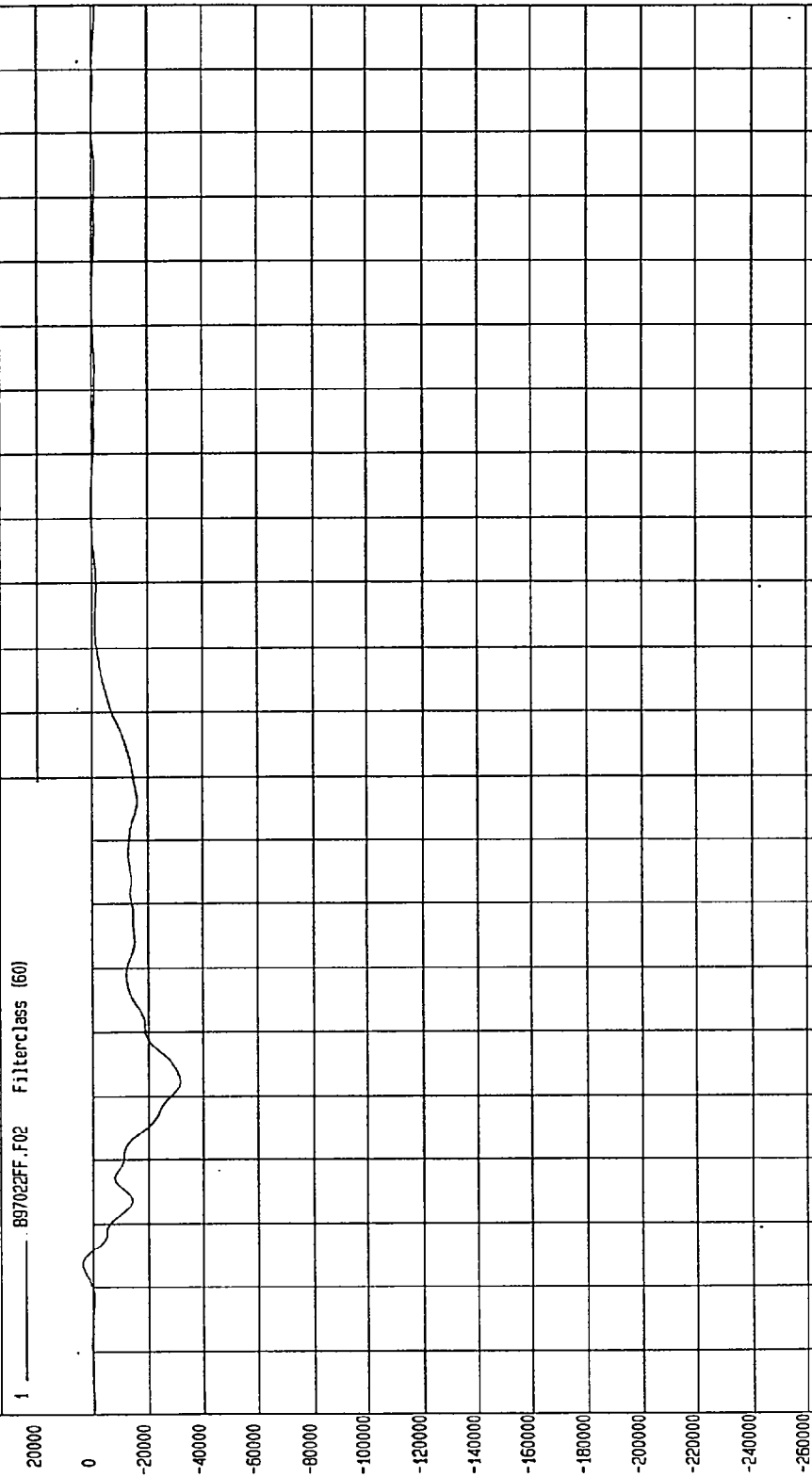
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -31506.91 N at 32 msec

Maximum = 3822.79 N at 4 msec

UPPER LEFT BARRIER FORCE

1 — 89702FF.F02 Filterclass (60)



MSA Research
02-13-1997 16:36

TIME (SECONDS)

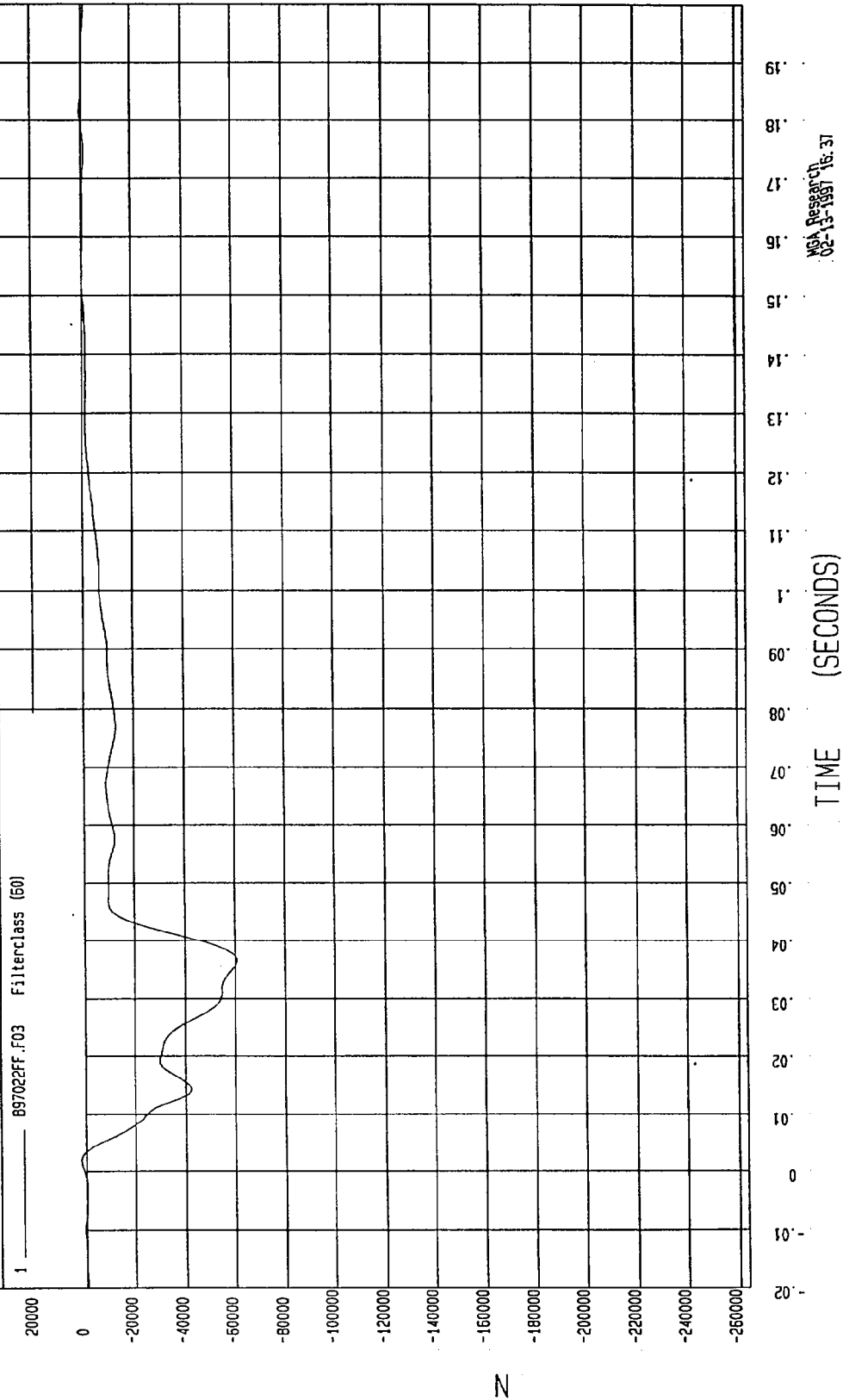
N

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -60831.15 N at 35 msec Maximum = 1902.57 N at 2 msec

UPPER CENTER BARRIER FORCE



TEST: 35 MPH FRONTAL IMPACT TEST

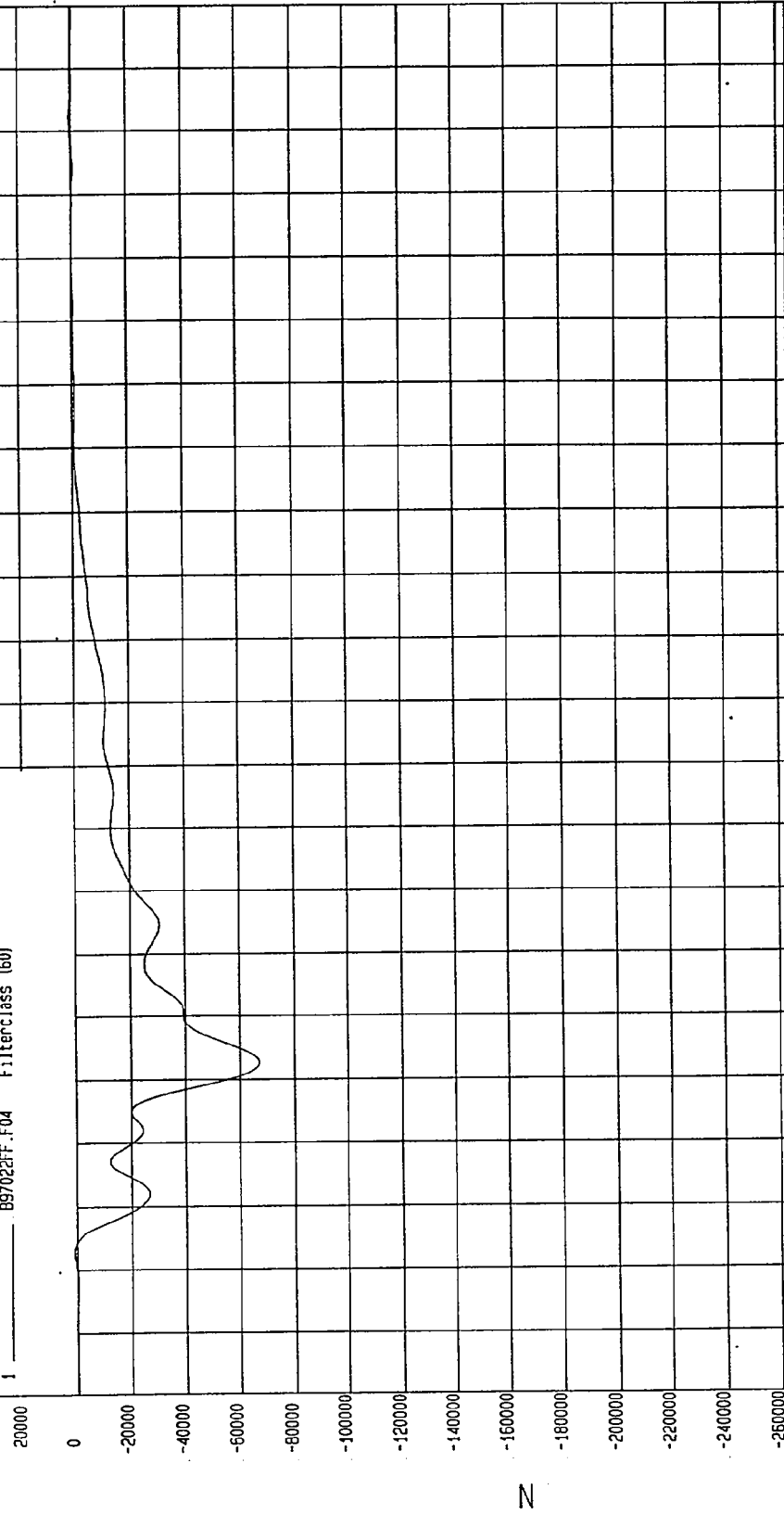
TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -67168.45 N at 33 msec Maximum = 973.46 N at 3 msec

UPPER RIGHT BARRIER FORCE

1 B9702FF.F04 Filterclass (60)



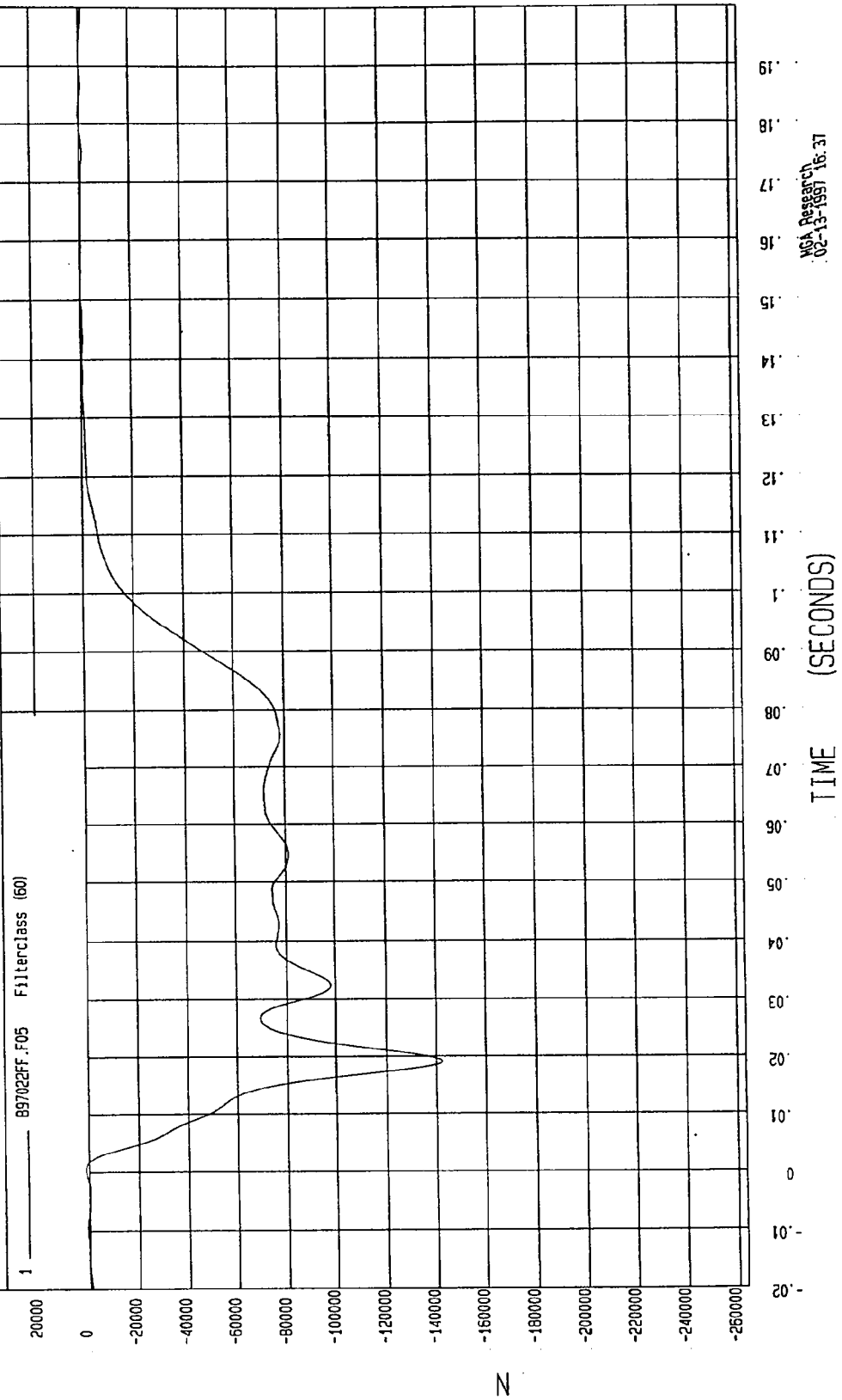
MCA Research
02-13-1997 16:37

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -142504.4 N at 19 msec Maximum = 1382.57 N at 0 msec

LOWER LEFT BARRIER FORCE

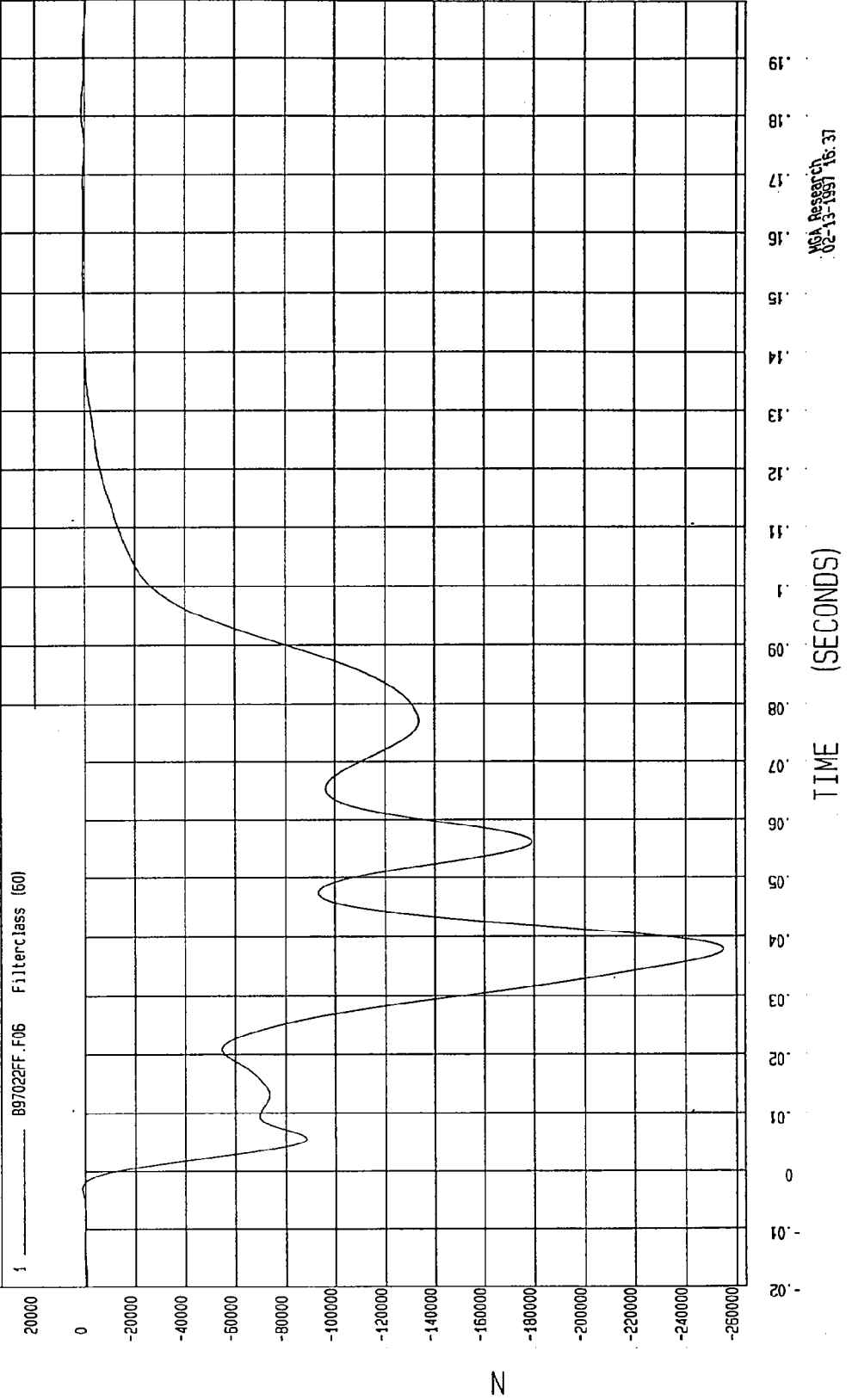


TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -254923.8 N at 38 msec Maximum = 1525.05 N at 181 msec

LOWER CENTER BARRIER FORCE



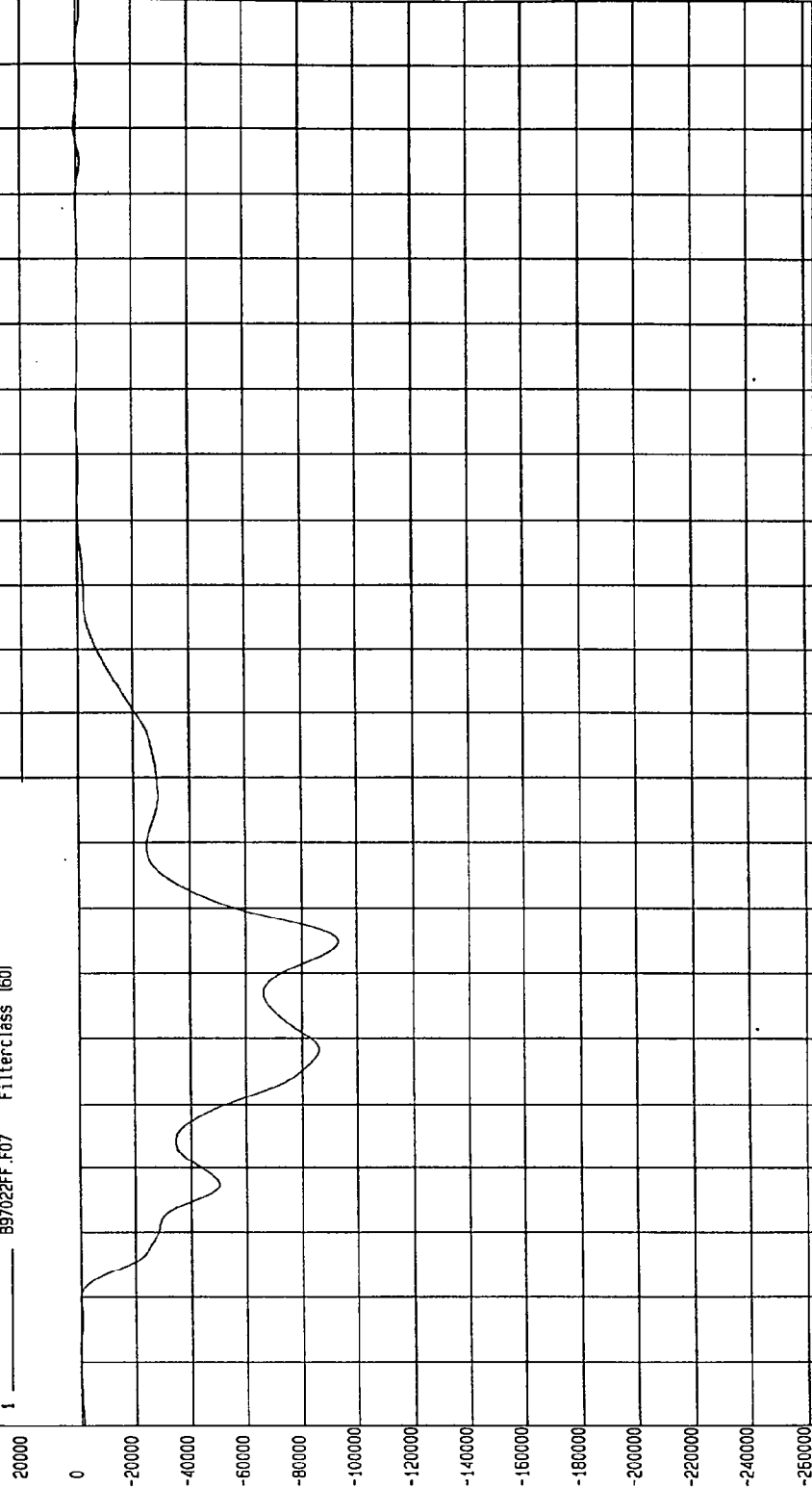
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -93212.23 N at 55 msec Maximum = 761.31 N at 180 msec

LOWER RIGHT BARRIER FORCE

1 ——— B97022FF.F07 Filterclass (60)



MCA Research
02-13-1997 16:37

TIME (SECONDS)

N

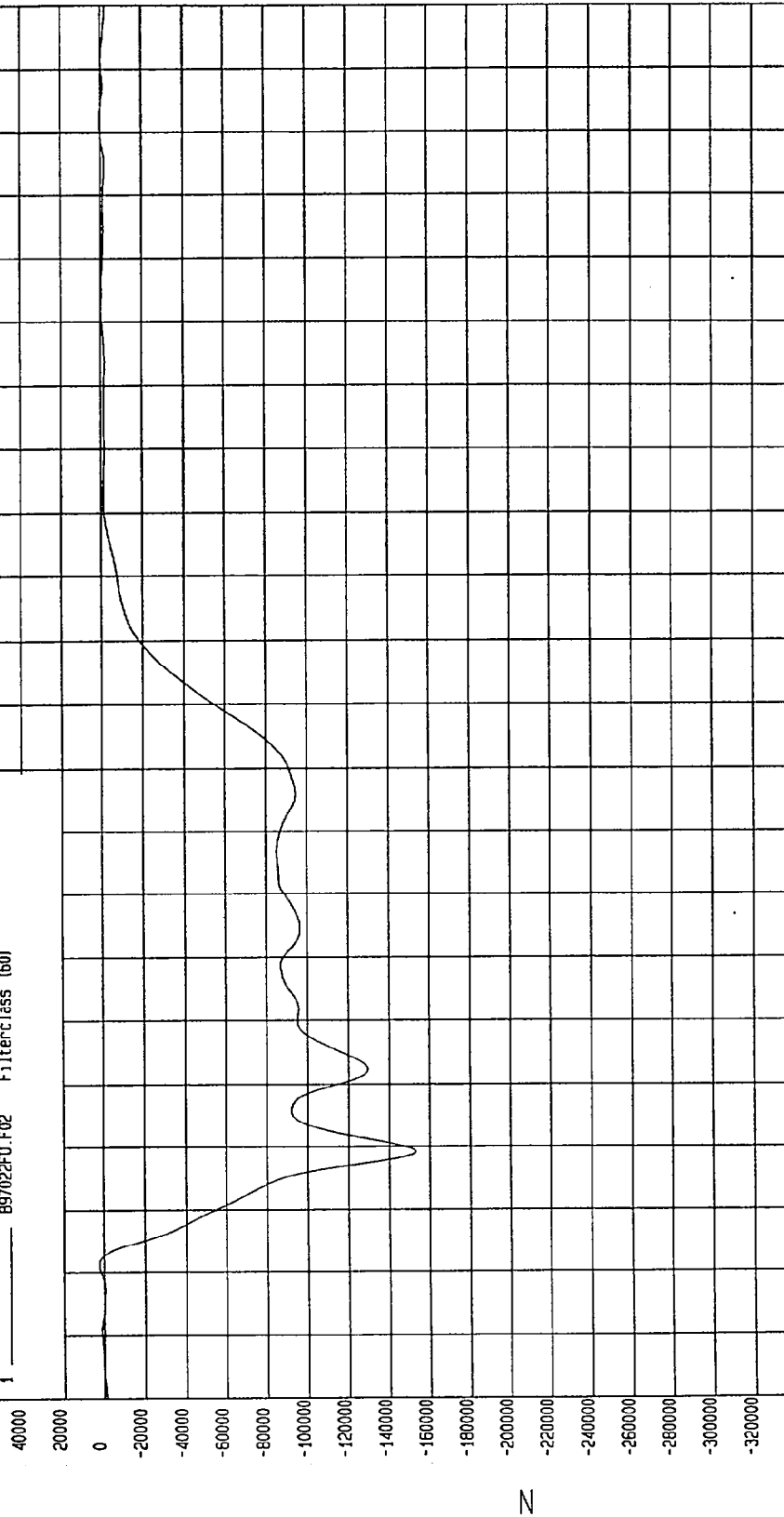
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -153100.5 N at .19 msec Maximum = 2384.29 N at 1 msec

SUM OF LEFT BARRIER FORCES

1 B97022FU.F02 Filterclass (60)



WGA Research Co.
02-21-1997 16:05

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

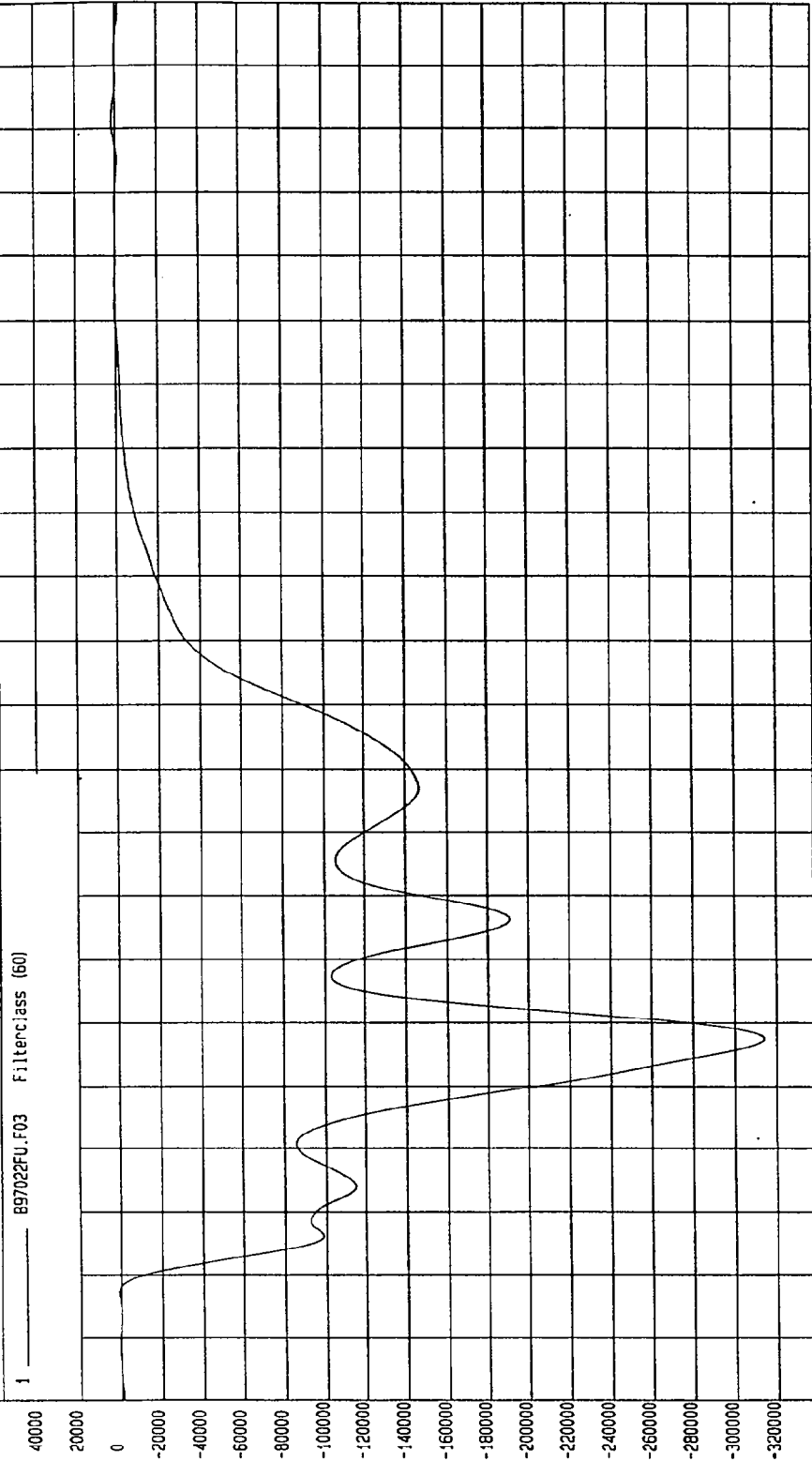
COMPONENT: 1997 CHEVROLET MALIBU (MVO120) Speed: 34.95 MPH 56.2 KPH

Minimum = -314182.4 N at 38 msec

Maximum = 2007.41 N at 181 msec

SUM OF CENTER BARRIER FORCES

1 — 89702FU.F03 Filterclass (60)



MCA Research
02-21-1997 16:05

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

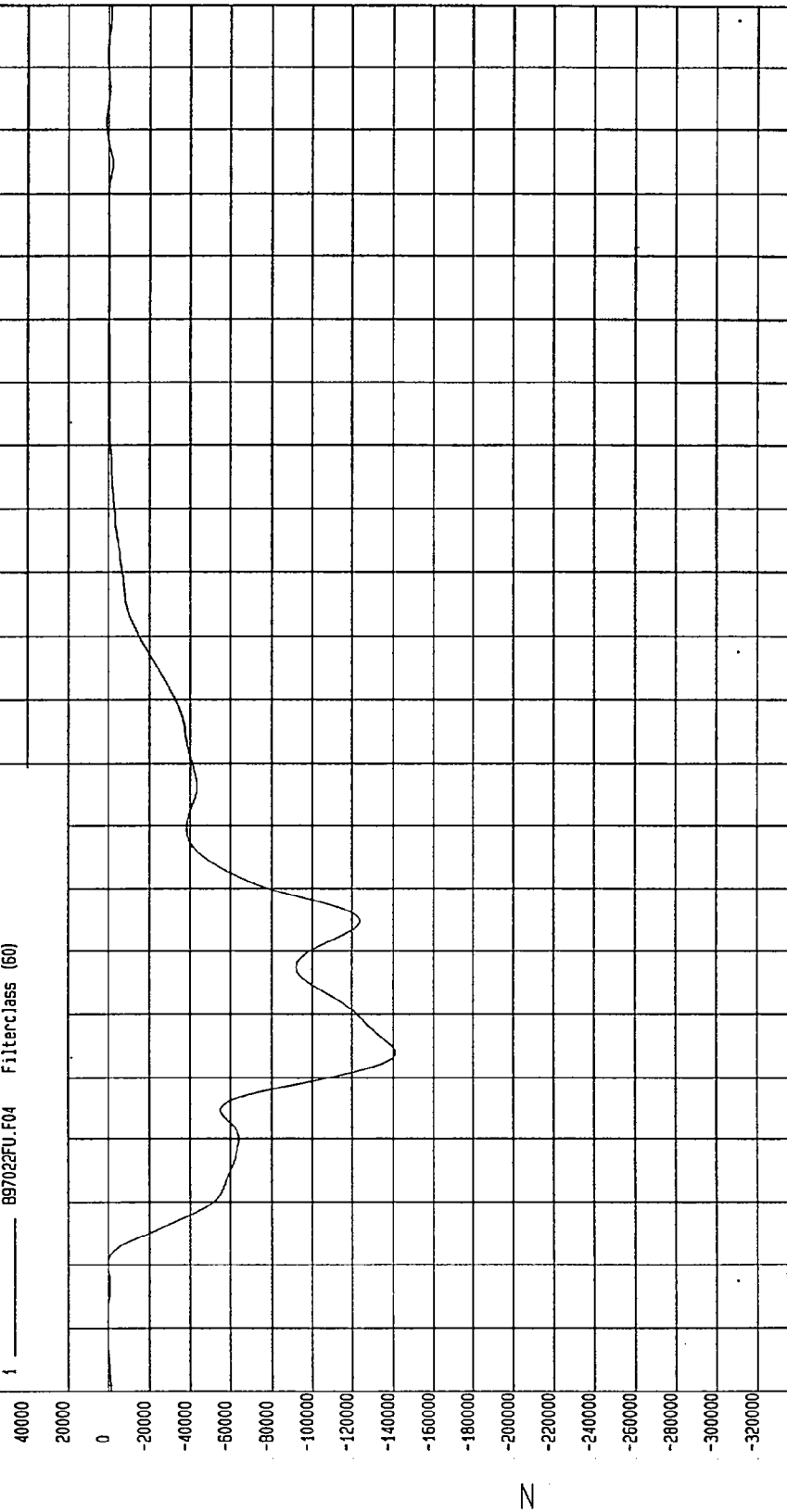
Speed: 34.95 MPH 56.2 KPH

Minimum = -141107.9 N at 34 msec

Maximum = 1178.51 N at 181 msec

SUM OF RIGHT BARRIER FORCES

1 _____ B97022FU.F04 Filterclass (50)



MSA Research
02-21-1997 16:05

TIME (SECONDS)

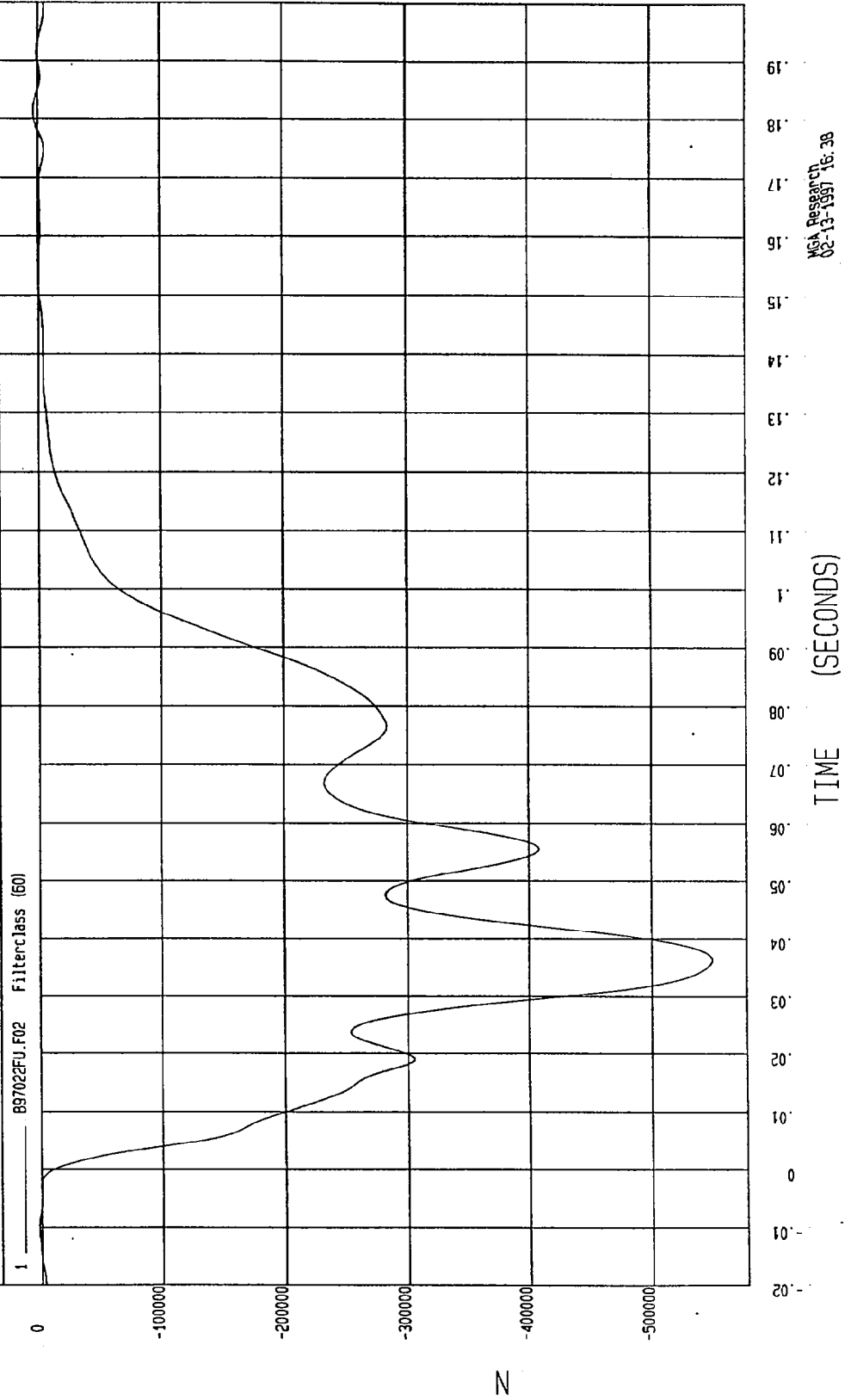
N

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -5 N at 35 msec Maximum = 3693.64 N at 181 msec

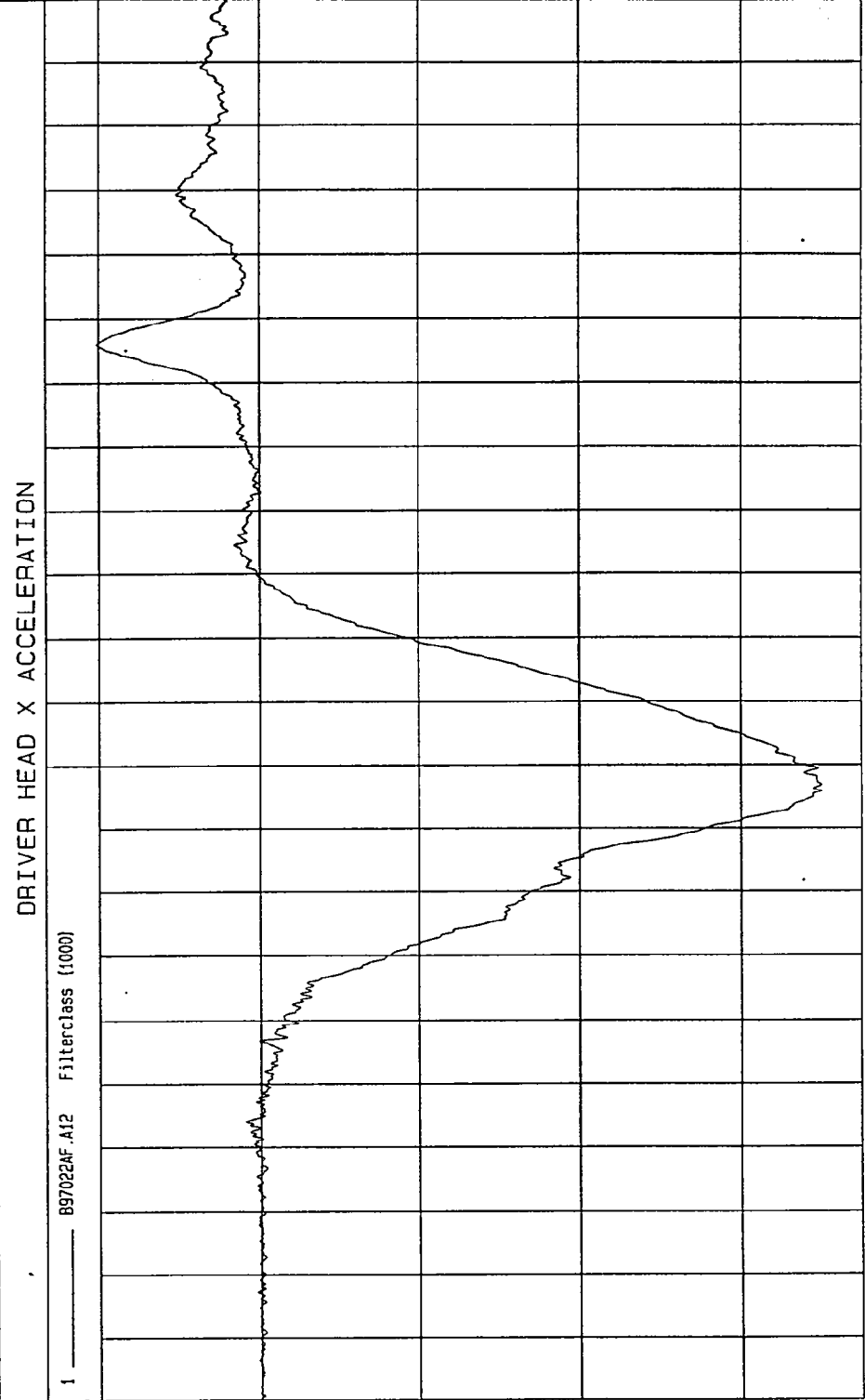
SUM OF BARRIER FORCES



TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -69.75 G's at 76 msec Maximum = 20.29 G's at 146 msec



TIME (SECONDS)

NSA Research
02-13-1997 16:17

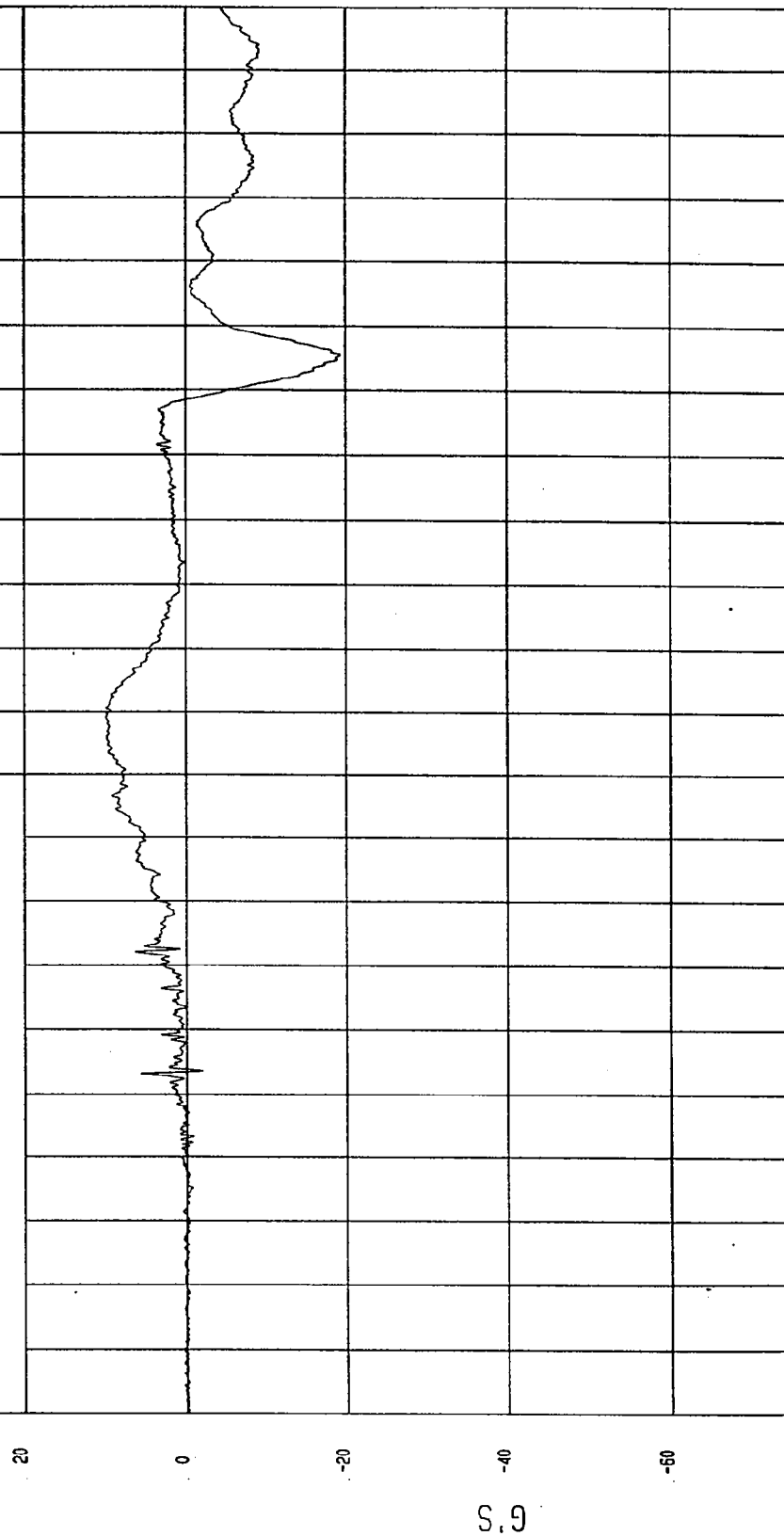
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -19.38 G'S at 145 msec
Maximum = 9.88 G'S at 89 msec

DRIVER HEAD Y ACCELERATION

1 897022AF.A13 Filterclass (1000)



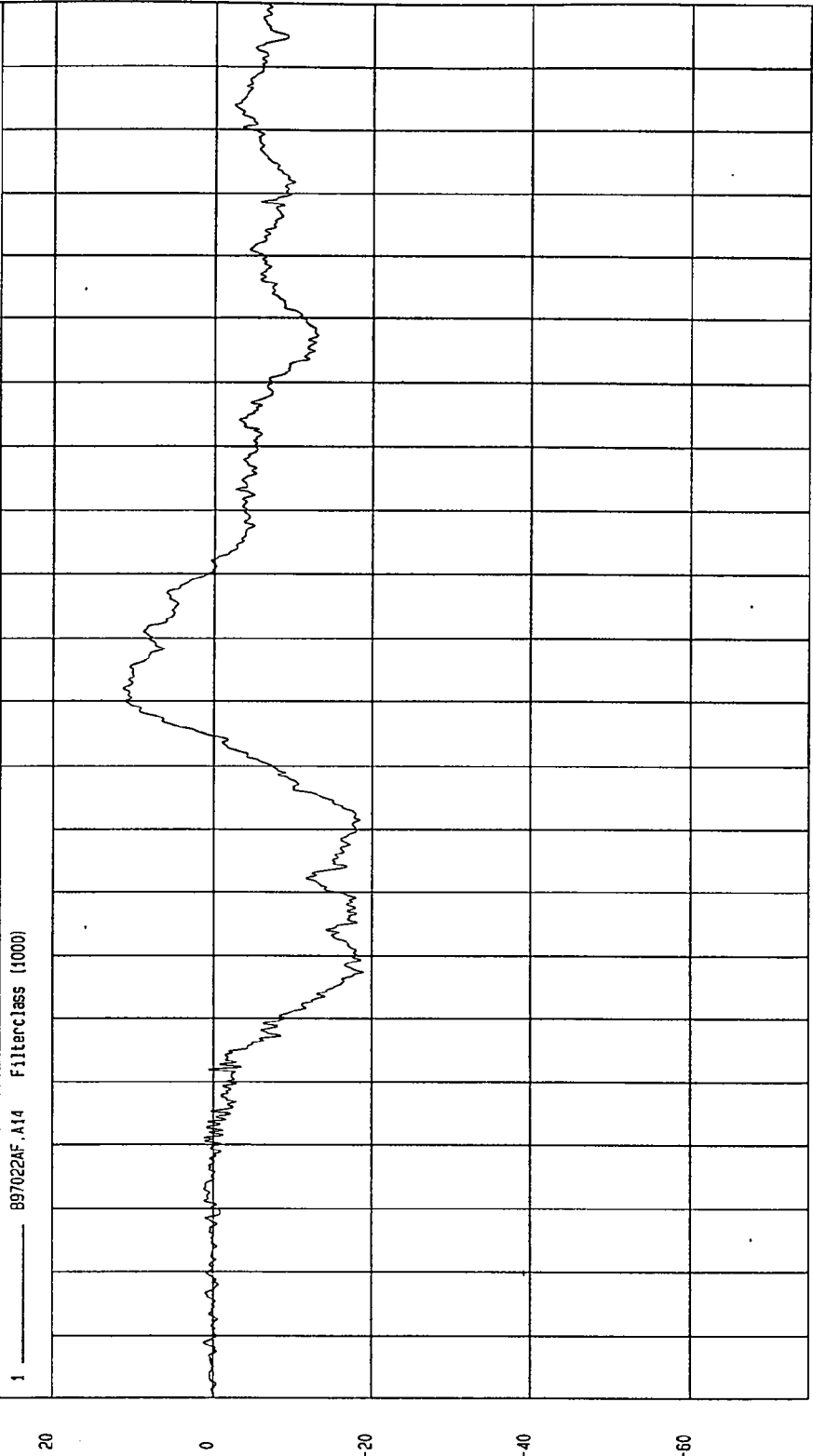
NSA Research Corp
02-13-1997 16:17

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -18.97 G'S at 48 msec Maximum = 11.24 G'S at 92 msec

DRIVER HEAD Z ACCELERATION



TIME (SECONDS)

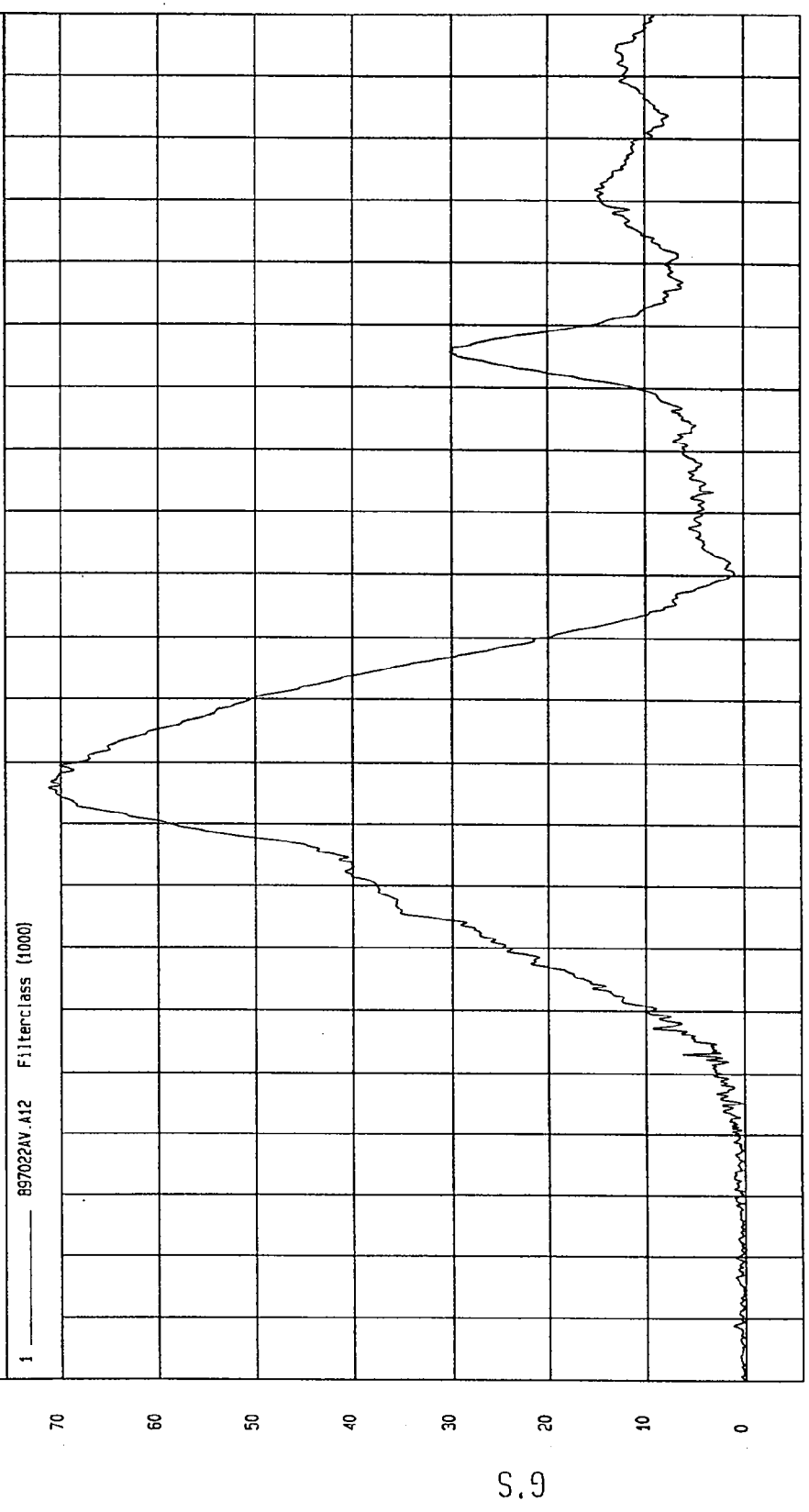
MGA Research
02-21-1997 16:02

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = .02 G'S at -13 msec Maximum = 71.30 G'S at 76 msec

DRIVER HEAD RESULTANT ACCELERATION



TIME (SECONDS)

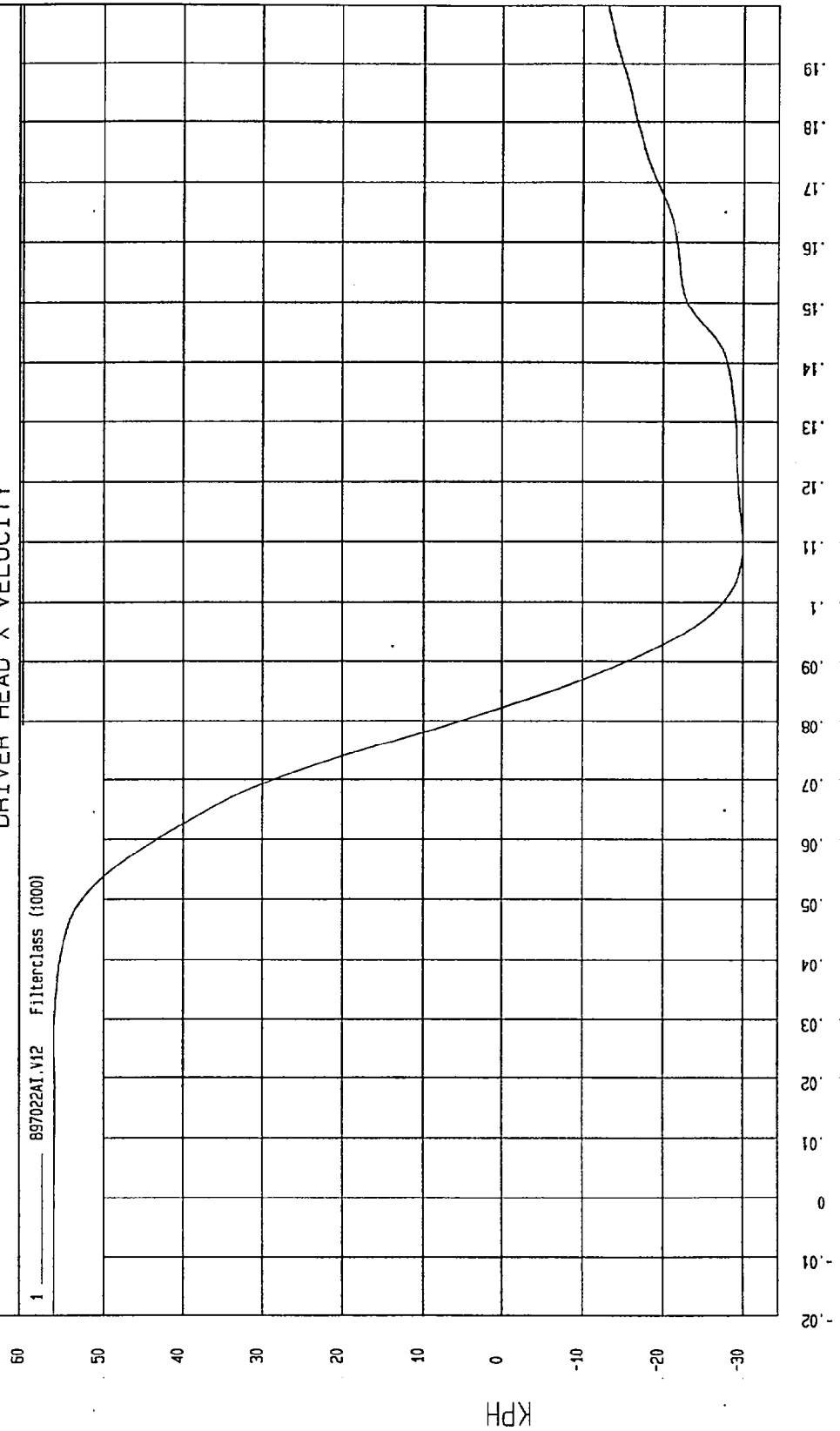
WCA Research
02-13-1997 16:17

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

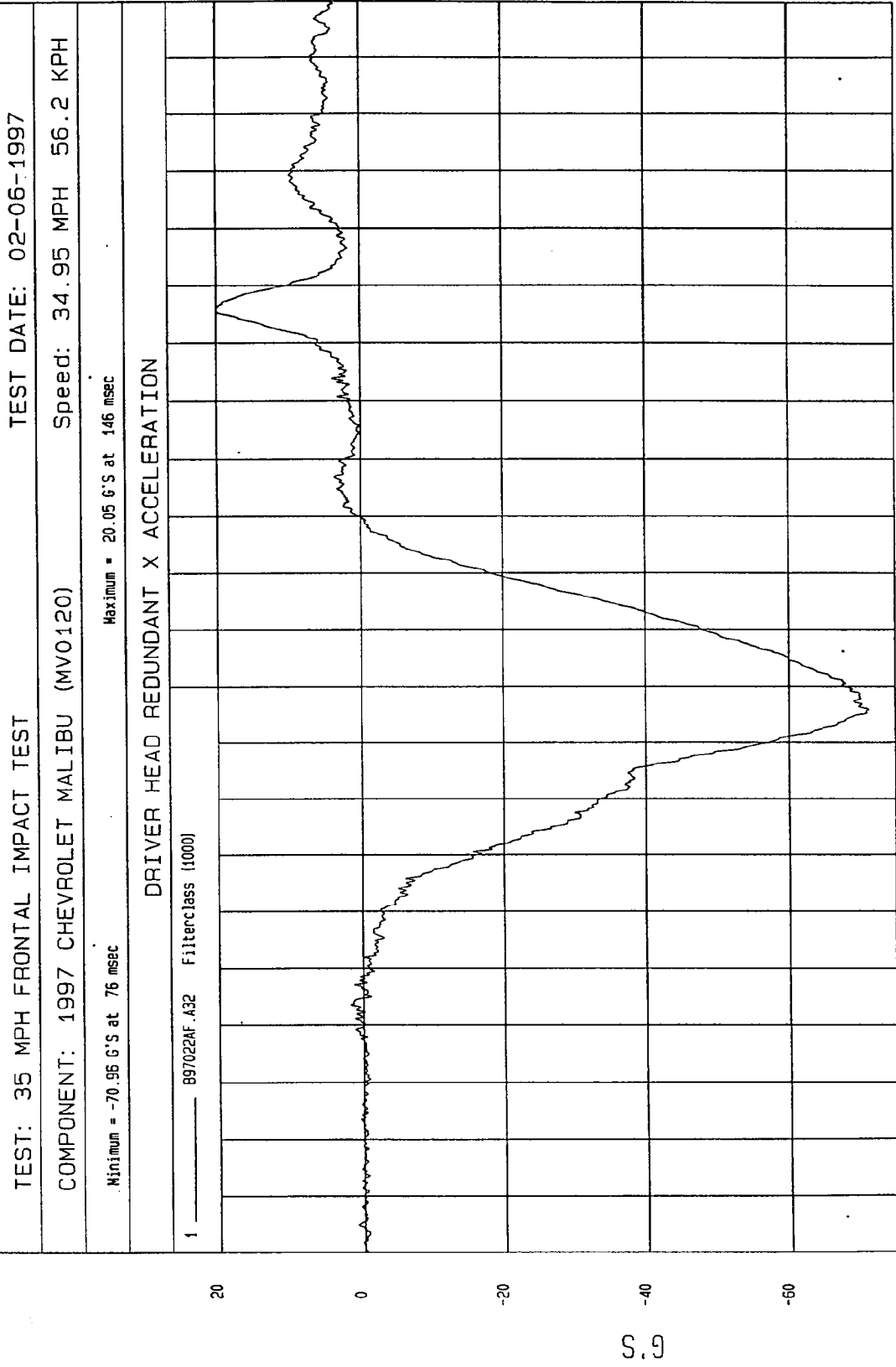
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -29.99 KPH at 110 msec Maximum = 56.2 KPH at -20 msec

DRIVER HEAD X VELOCITY



NCA Research
02-13-1997 16:30



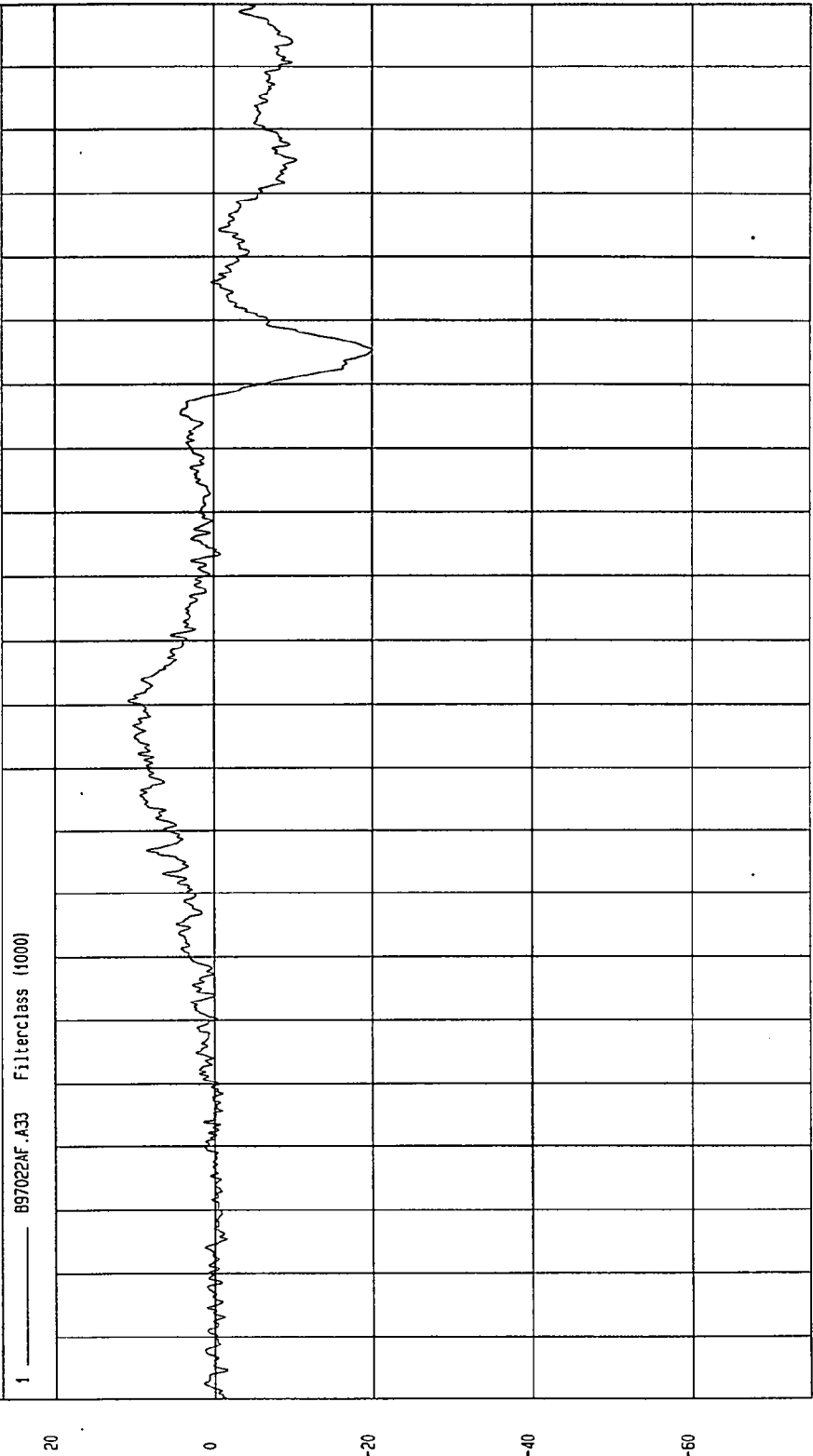
MCA Research
02-13-1997 16:22

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MVO120) Speed: 34.95 MPH 56.2 KPH

Minimum = -20.08 G'S at 145 msec Maximum = 10.80 G'S at 91 msec

DRIVER HEAD REDUNDANT Y ACCELERATION



TIME (SECONDS)

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

MGA Research
02-13-1997 16:22

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

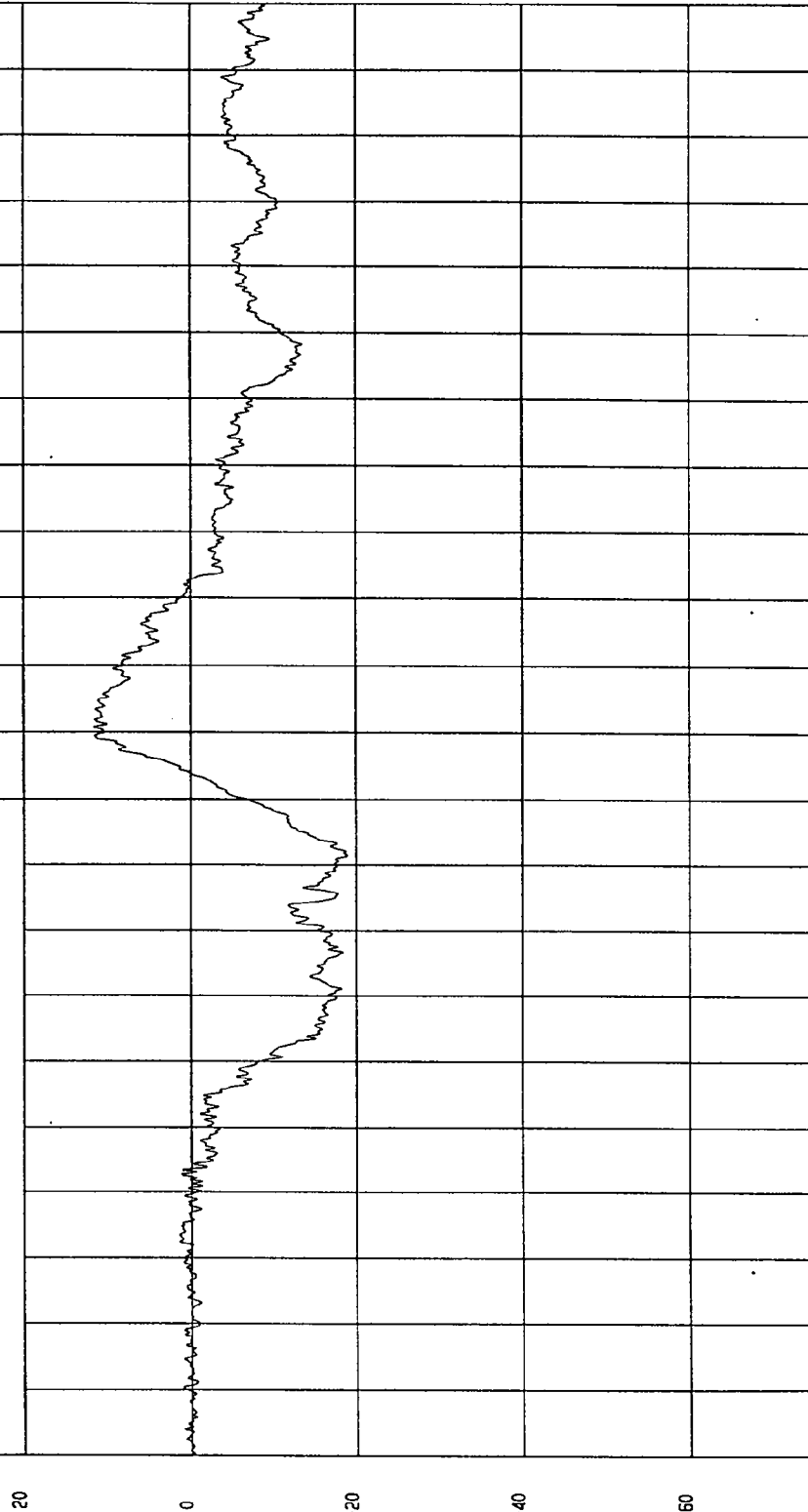
SPEED: 34.95 MPH 56.2 KPH

Minimum = -18.94 G'S at 71 msec

Maximum = 11.61 G'S at 91 msec

DRIVER HEAD REDUNDANT Z ACCELERATION

1 897022AF.A34 Filterclass (1000)



WGA Research
02-13-1997 16:22

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

Speed: 34.95 MPH 56.2 KPH

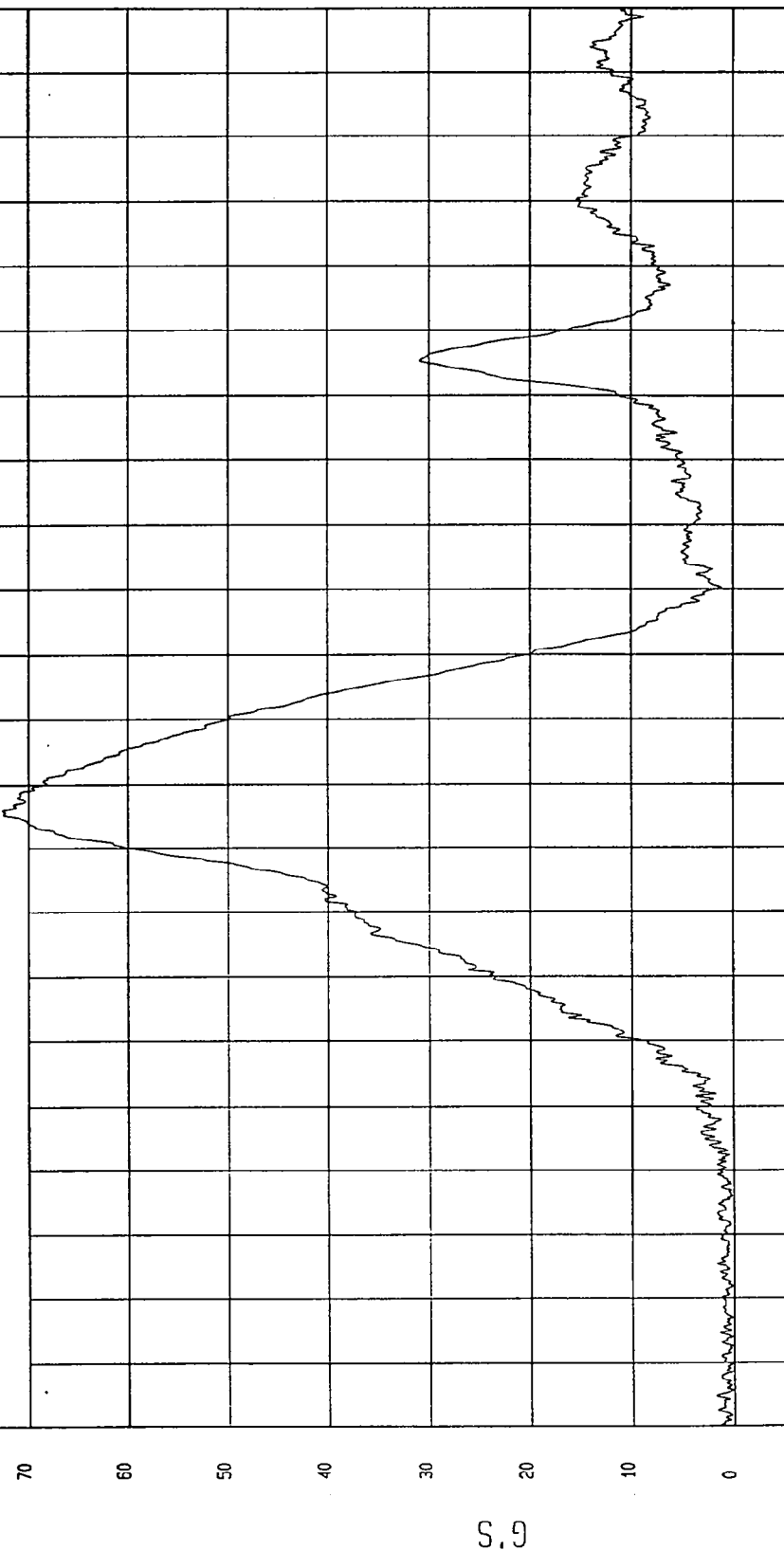
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Minimum = .08 G's at 2 msec

Maximum = 72.52 G's at 76 msec

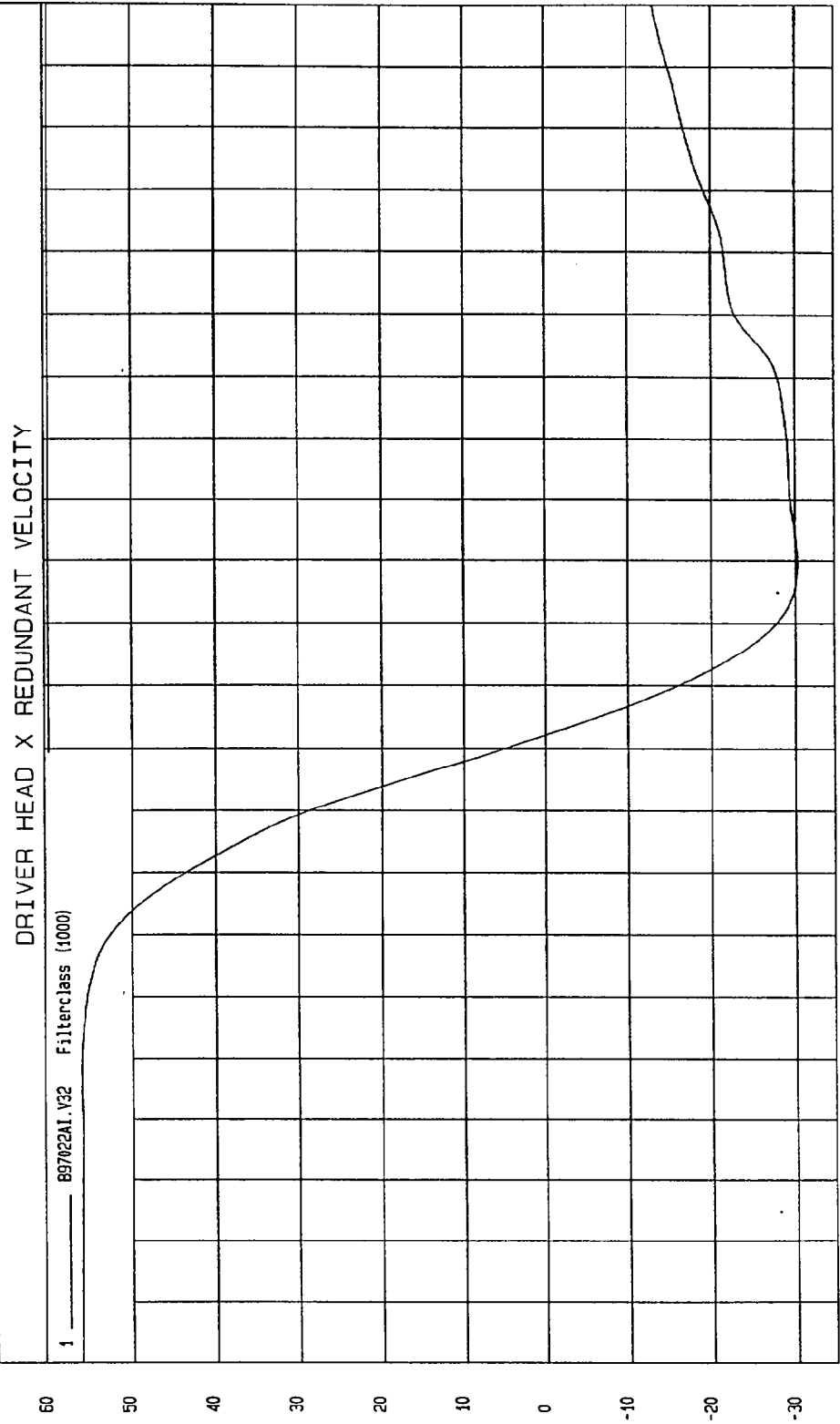
DRIVER HEAD REDUNDANT RESULTANT ACCELERATION

1 — B97022AV.A32 Filterclass (1000)



MOA Research
02-13-1997 16:22

TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -30.25 KPH at 110 msec	Maximum = 56.2 KPH at -20 msec



TIME Seconds

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

MOA Research
02-13-1997 16:31

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

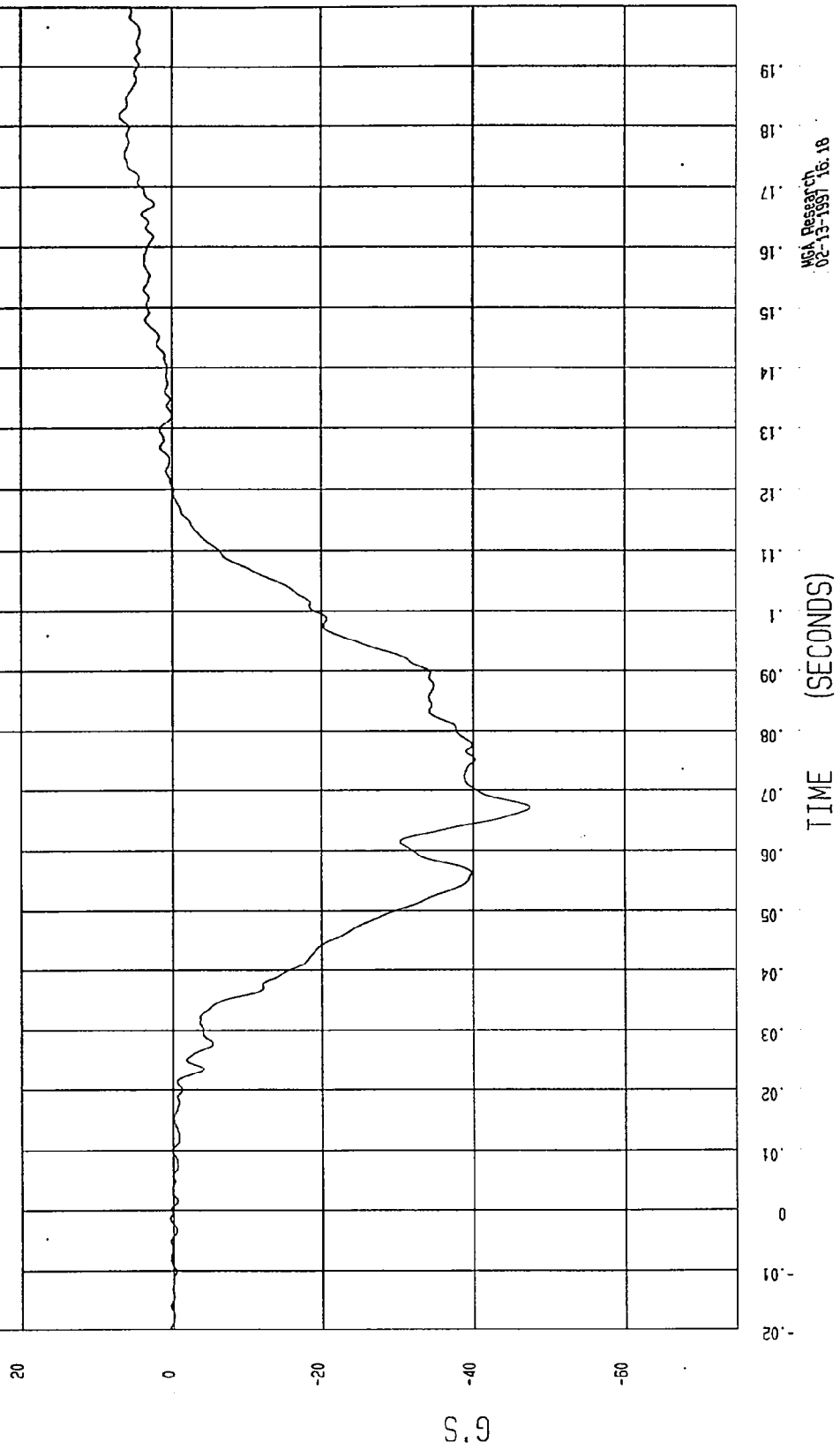
Speed: 34.95 MPH 56.2 KPH

Minimum = -47.46 G'S at 67 msec

Maximum = 6.92 G'S at 182 msec

DRIVER CHEST X ACCELERATION

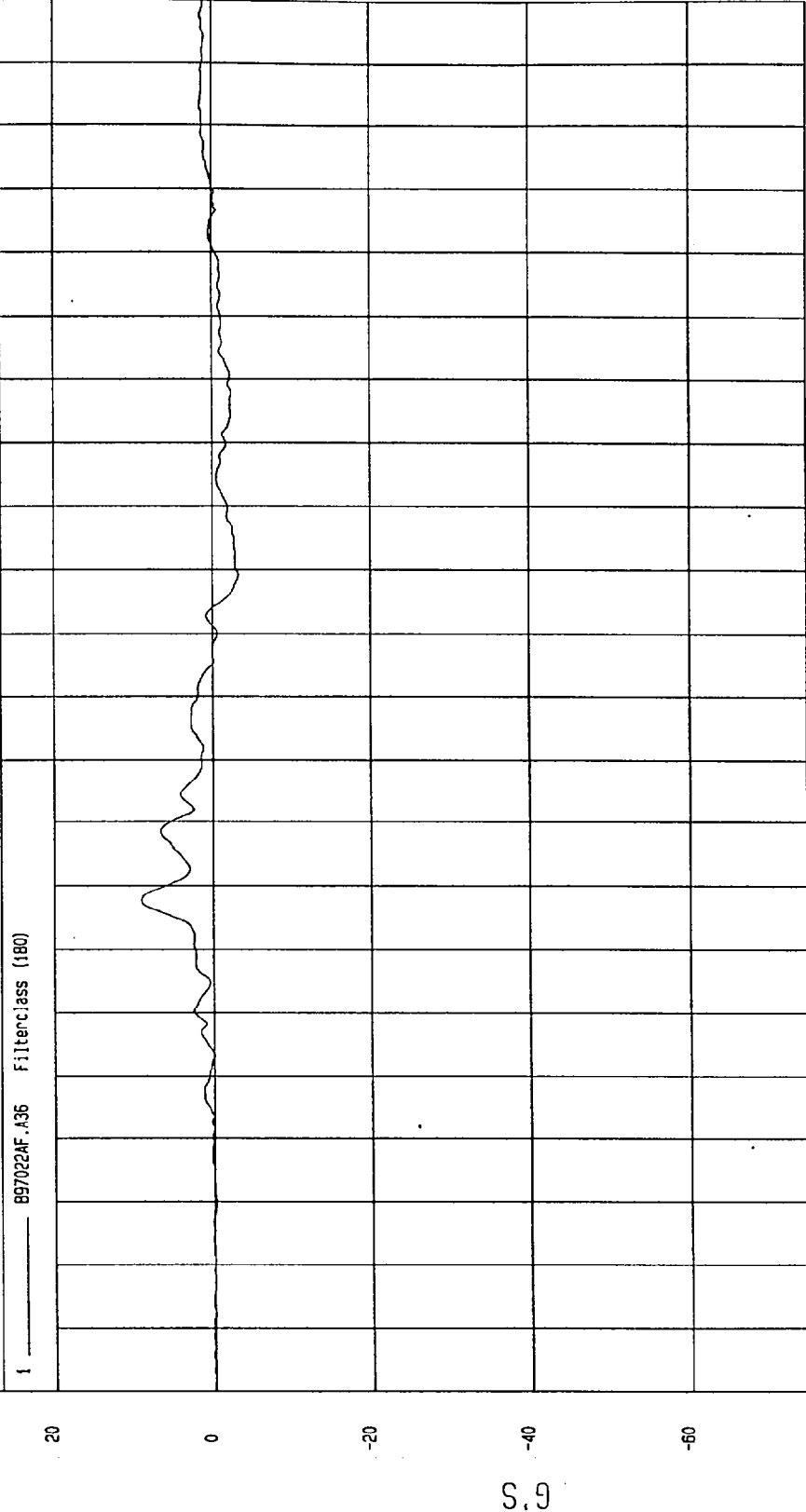
1 B97022AF.A15 Filterclass (180)



MCA Research
02-13-1997 16.18

TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -3.37 G'S at 109 msec	Maximum = 9.01 G'S at 58 msec

DRIVER CHEST Y ACCELERATION



TIME (SECONDS)

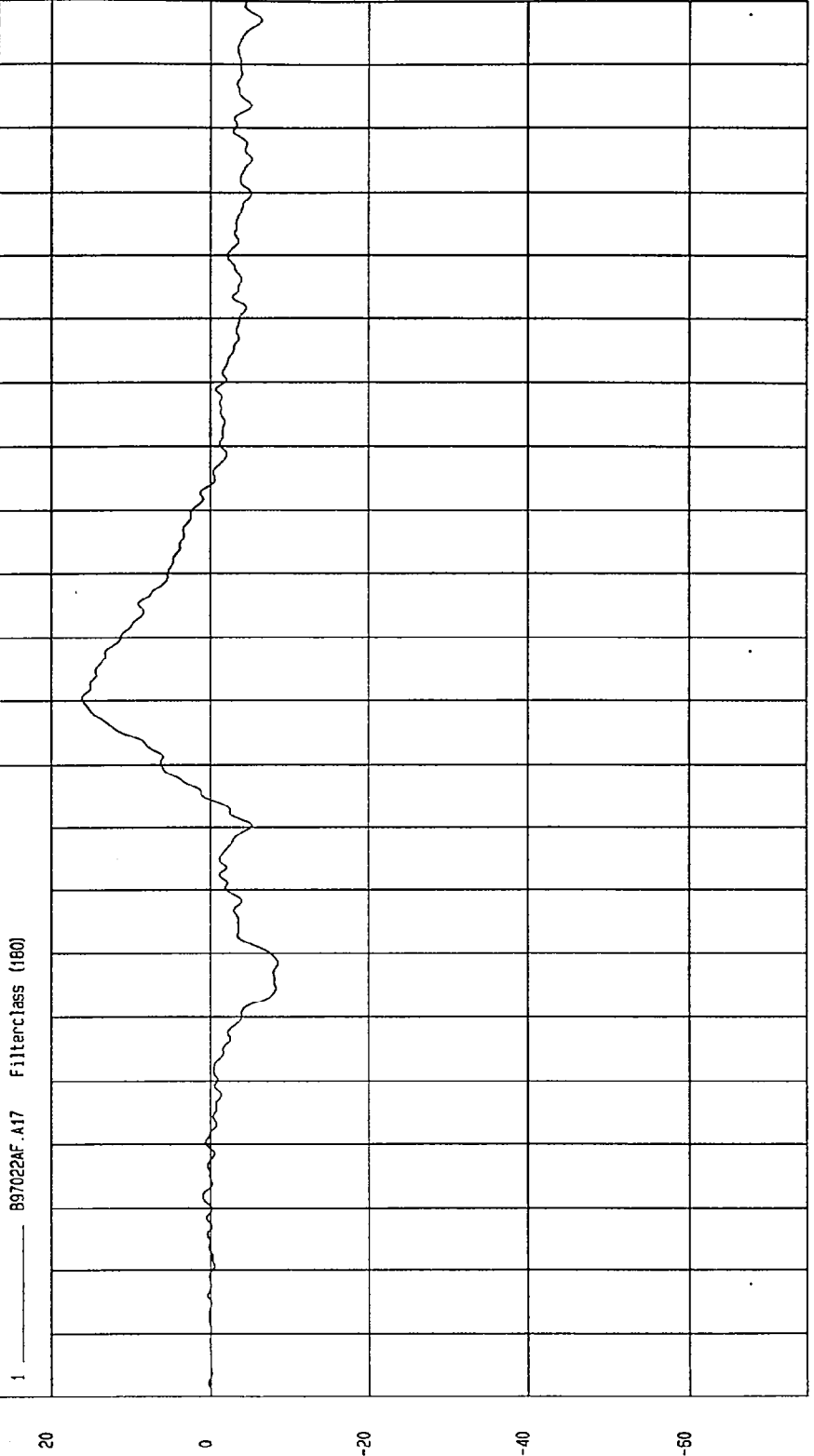
WCA Research
02-13-1997 16.18

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -8.45 G'S at 48 msec Maximum = 16.14 G'S at 90 msec

DRIVER CHEST Z 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

MCA Research
02-13-1997 16:18

TEST DATE: 02-06-1997

TEST: 35 MPH FRONTAL IMPACT TEST

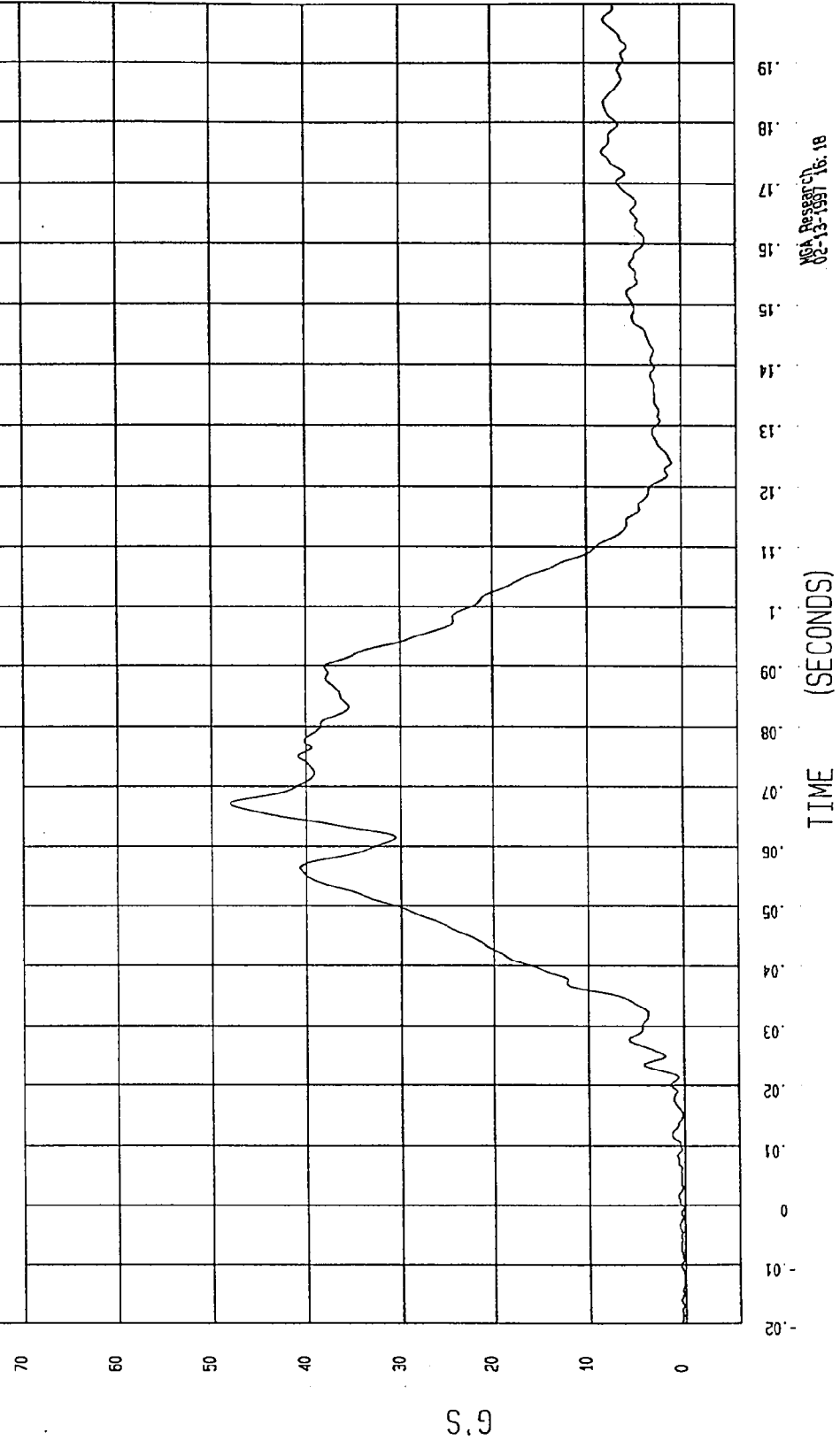
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = 6.10E-02 G'S at -13 msec

Maximum = 48.04 G's at 67 msec

DRIVER CHEST RESULTANT ACCELERATION

1	897022AV.A15	Filterclass (180)



WGA Research
02-13-1997 16:18

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

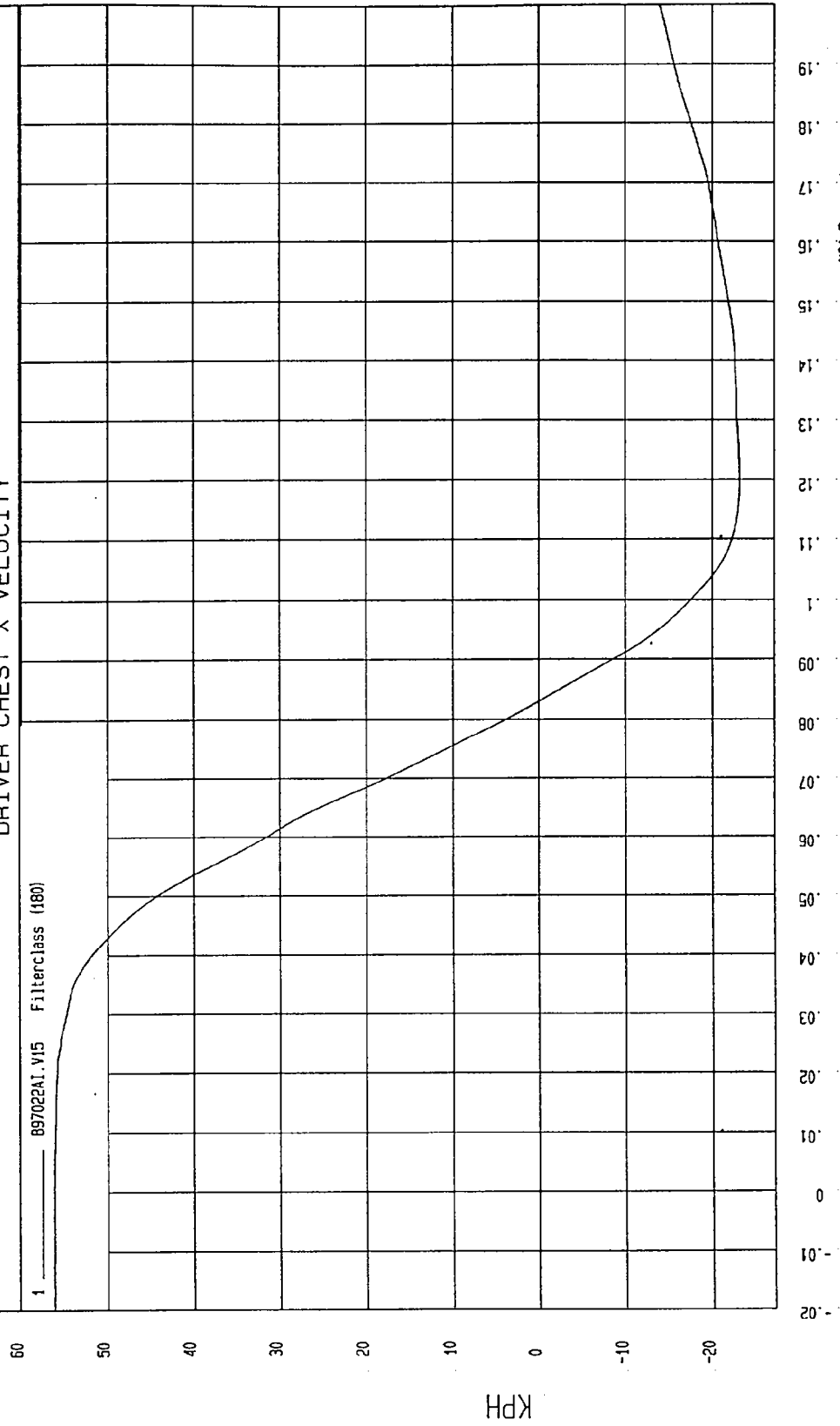
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Speed: 34.95 MPH 56.2 KPH

Minimum = -23.06 KPH at 120 msec

Maximum = 56.21 KPH at -15 msec

DRIVER CHEST X VELOCITY



MCA Research
02-13-1997 16:30

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

SPEED: 34.95 MPH 56.2 KPH

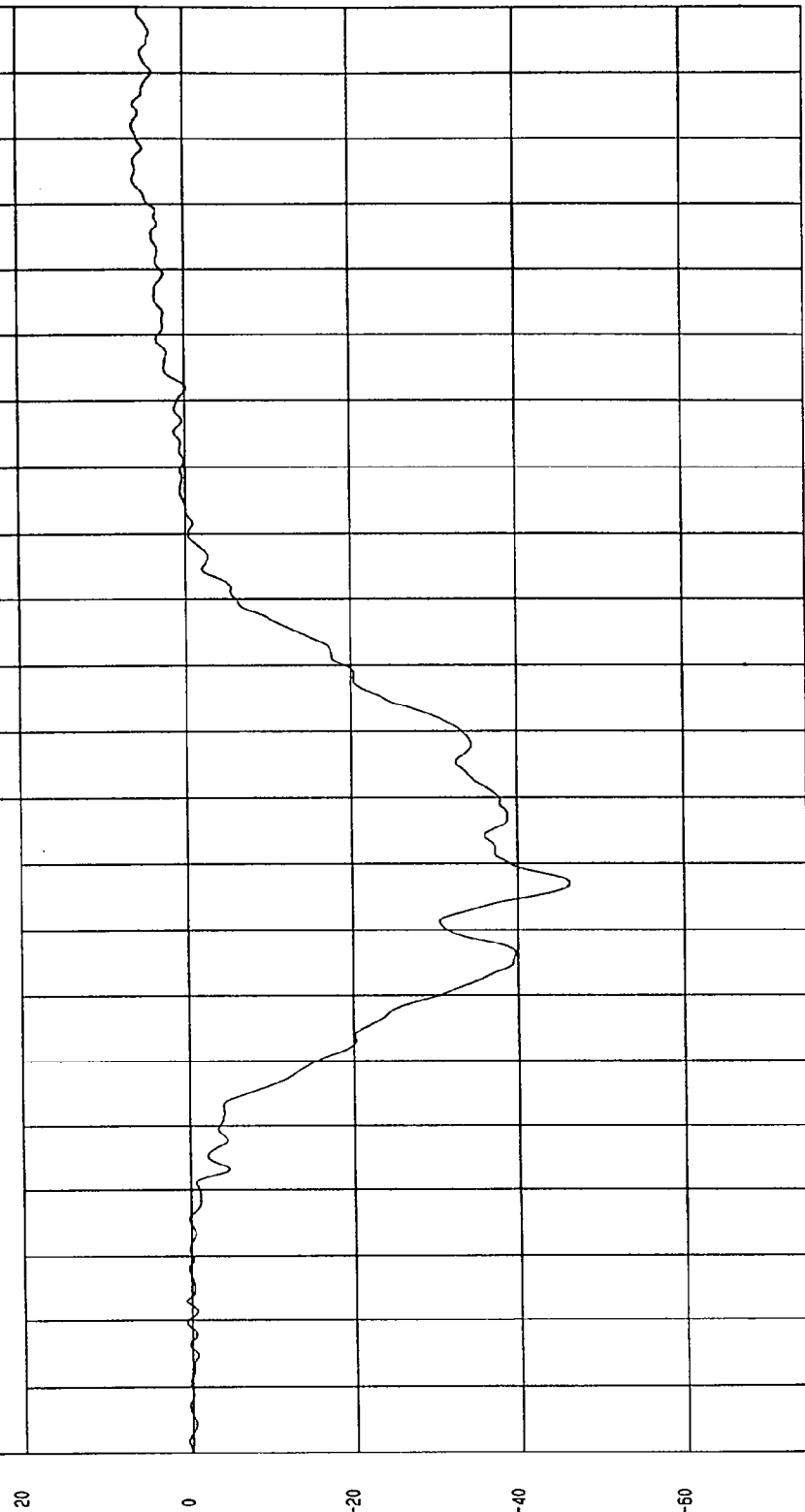
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Maximum = 6.05 G'S at 182 msec

Minimum = -46.36 G'S at 67 msec

DRIVER CHEST REDUNDANT X ACCELERATION

1 897022AF.A35 Filterclass (180)



MOA Research
02-13-1997 16:23

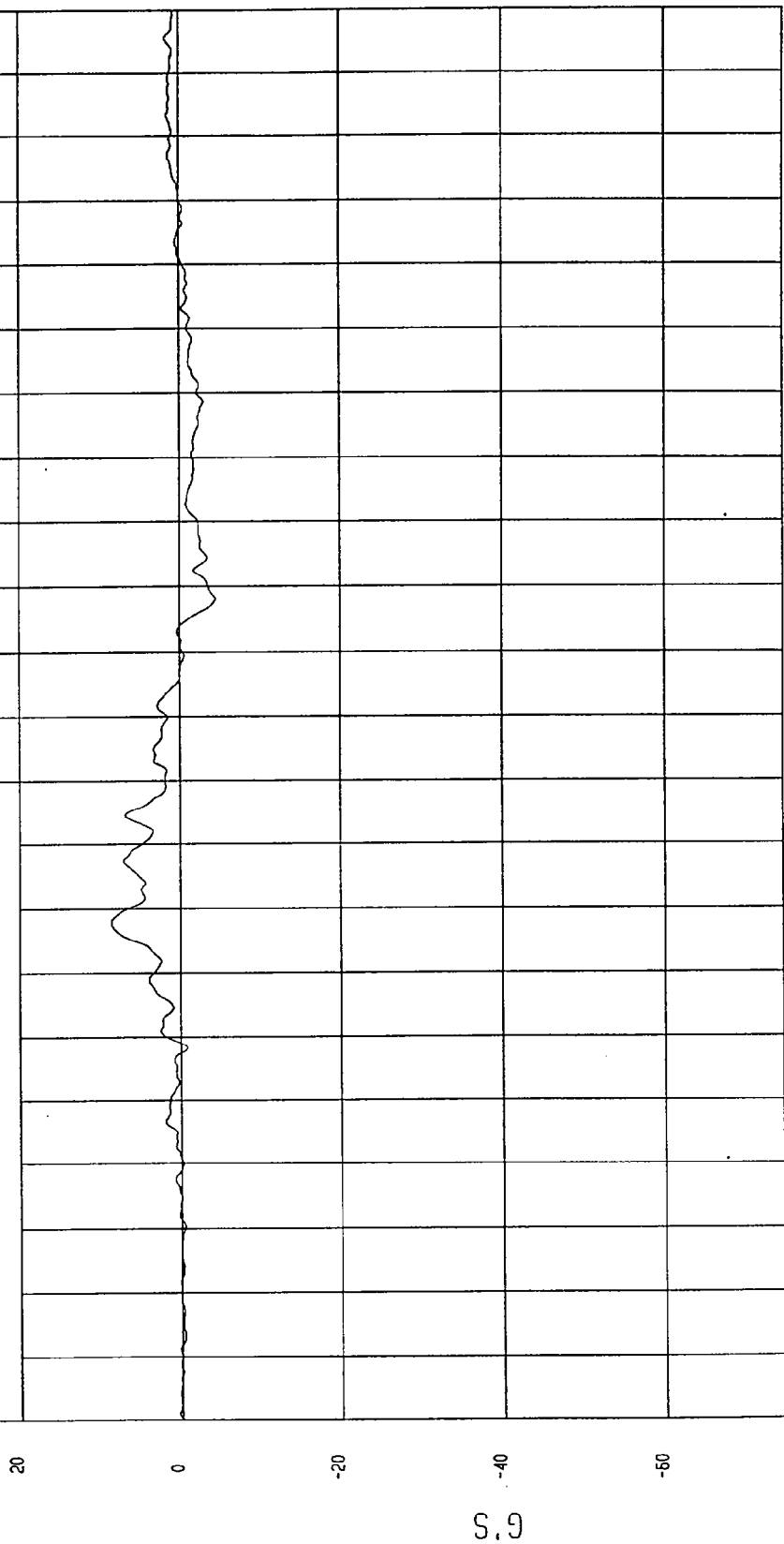
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

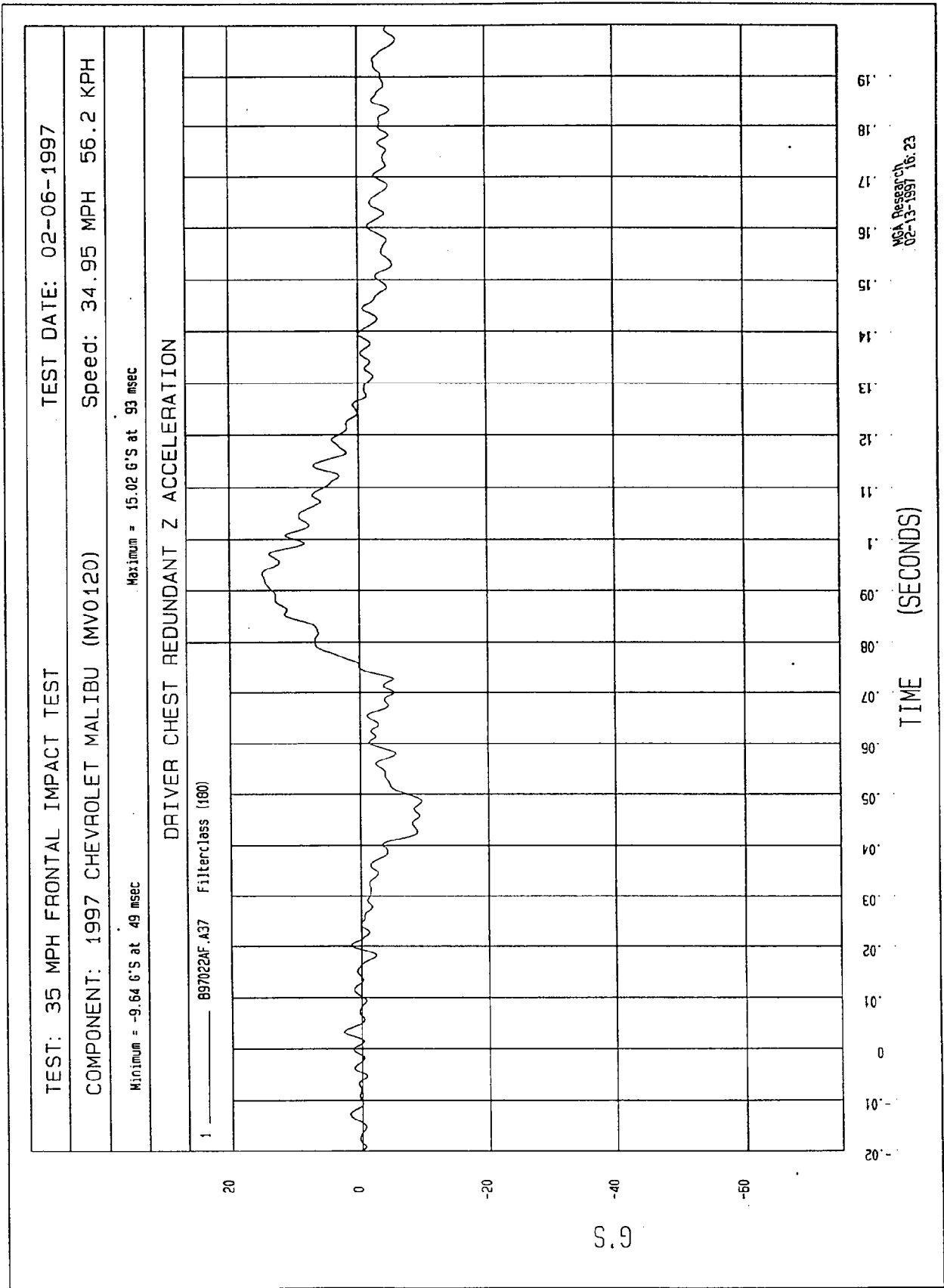
Minimum = -4.46 G'S at 108 msec Maximum = 8.61 G'S at 58 msec

DRIVER CHEST REDUNDANT Y ACCELERATION

1 _____ BS7022AF A16 Filterclass (180)



WGA Research
02-13-1997 16:23



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

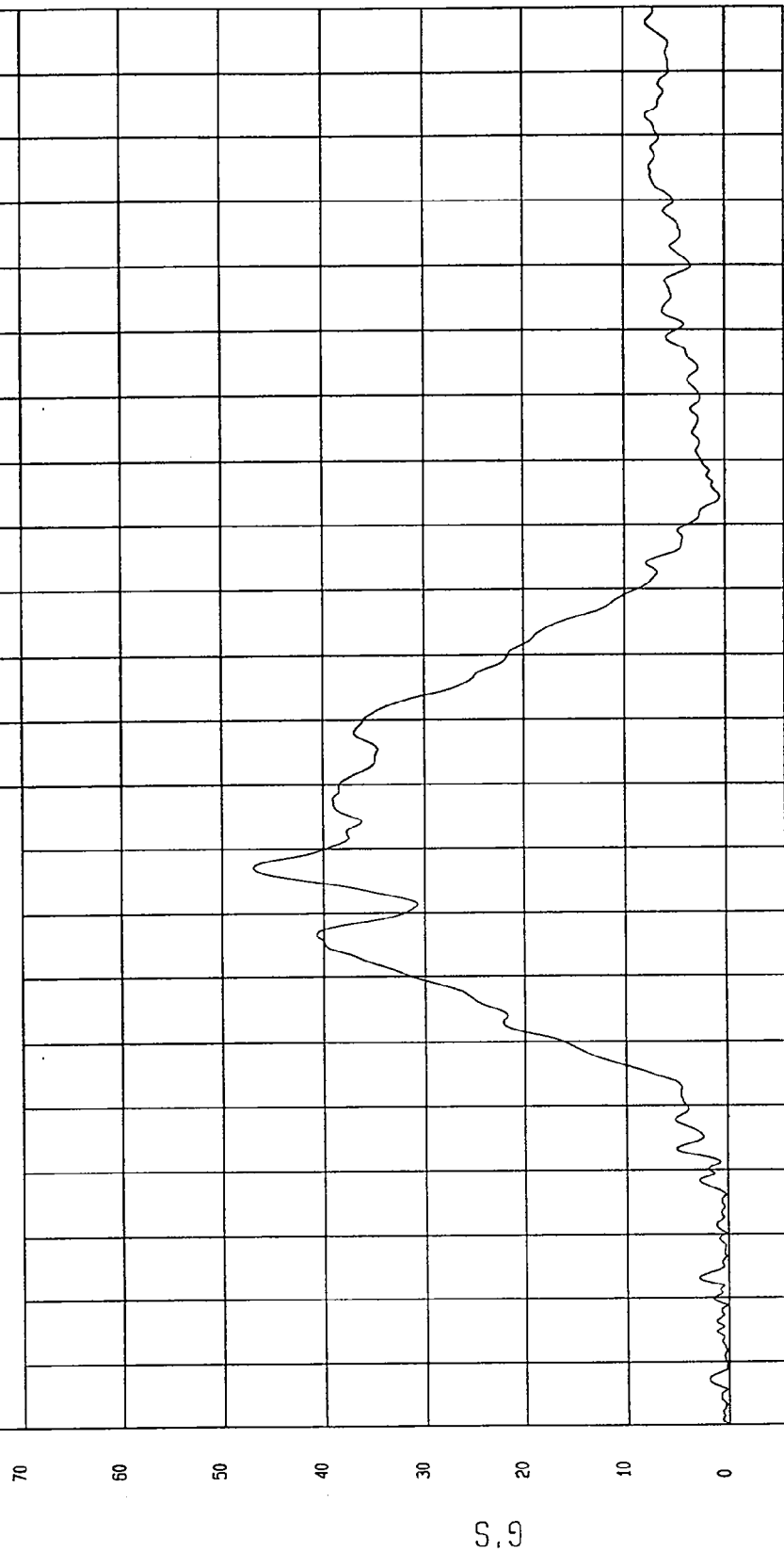
Speed: 34.95 MPH 56.2 KPH

Minimum = 8.46E-02 g's at -1 msec

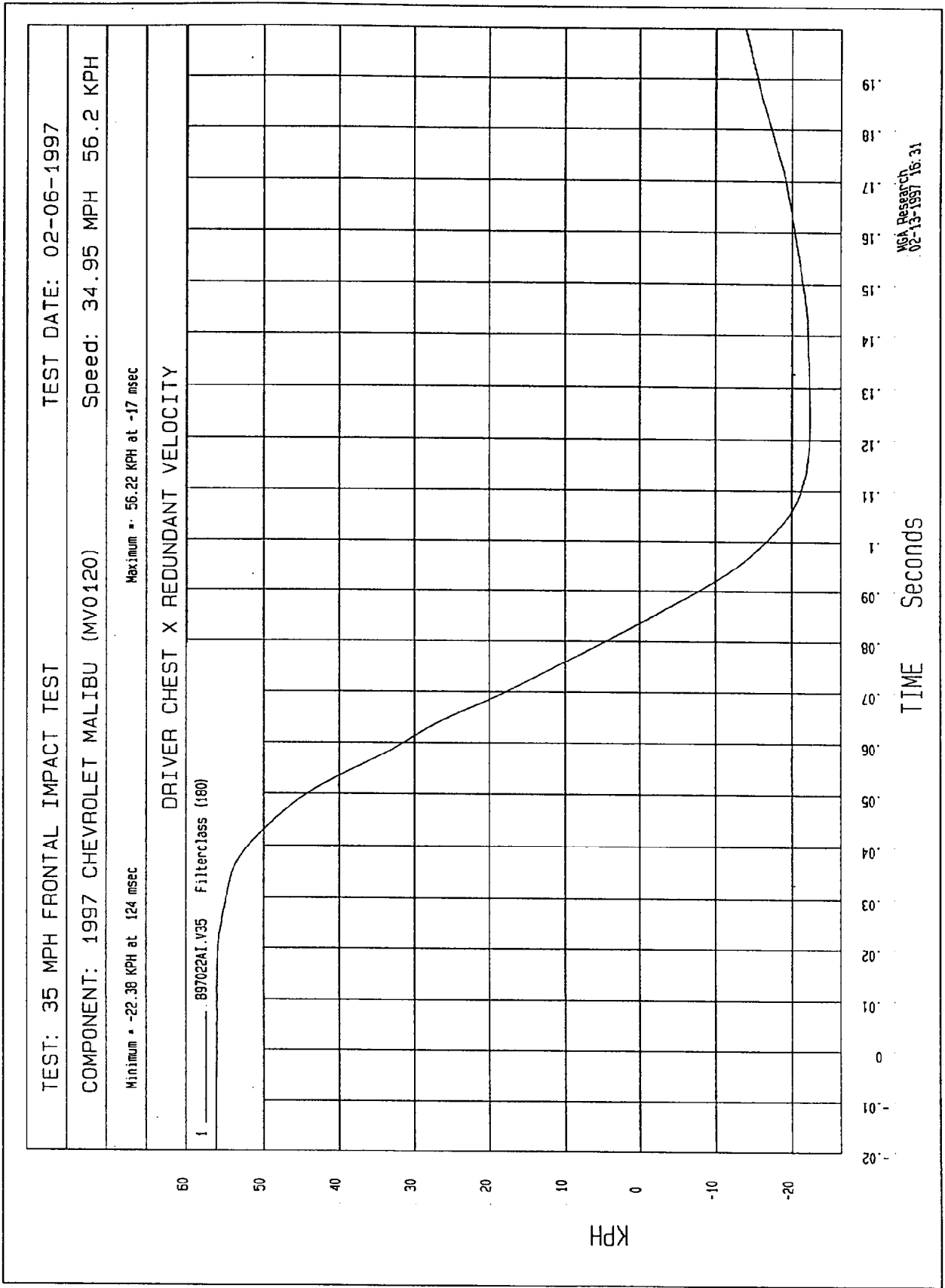
Maximum = 46.90 g's at 67 msec

DRIVER CHEST REDUNDANT RESULTANT ACCELERATION

1 B97022AV.A35 Filterclass (180)



MGA Research
02-13-1997 16:23

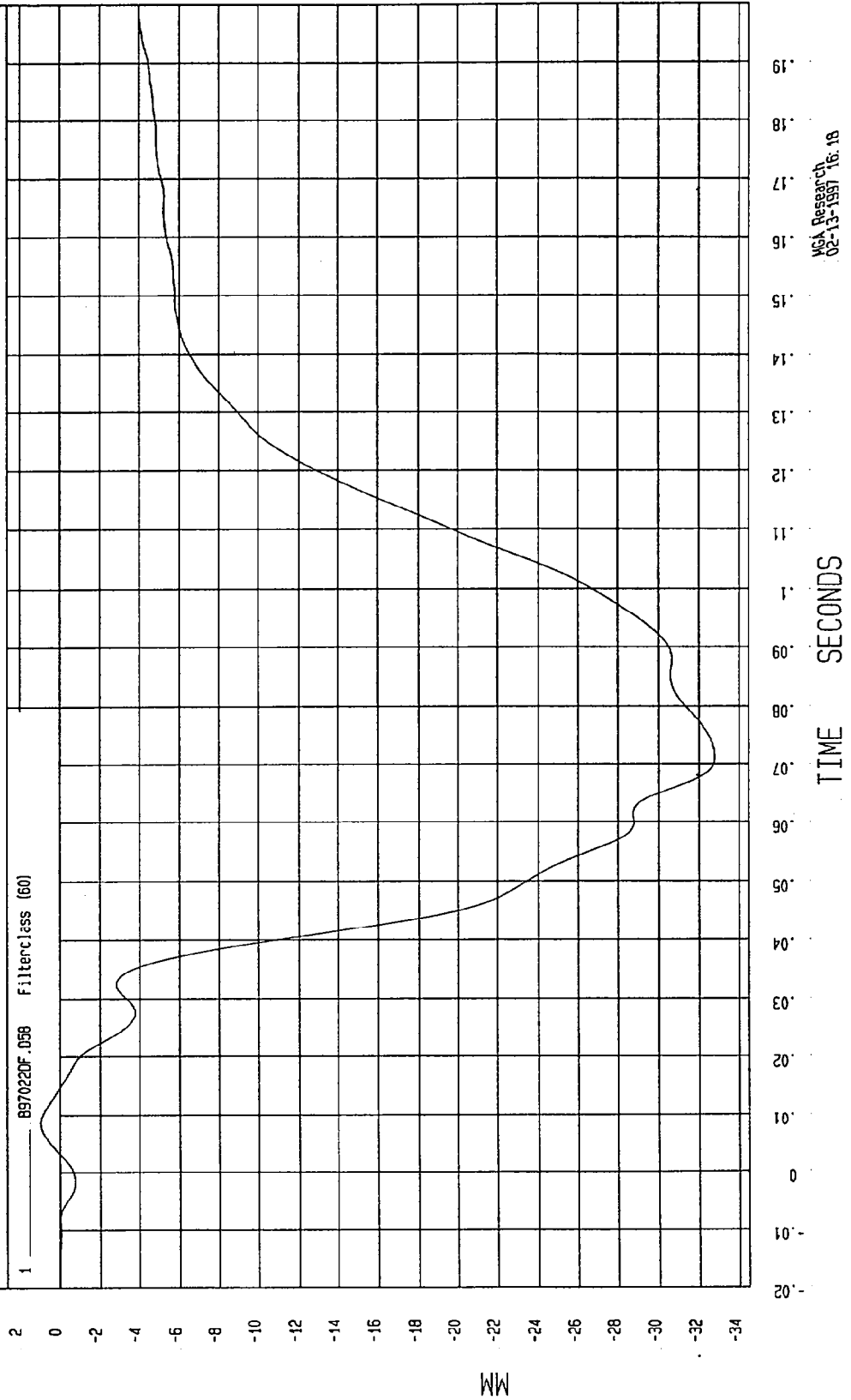


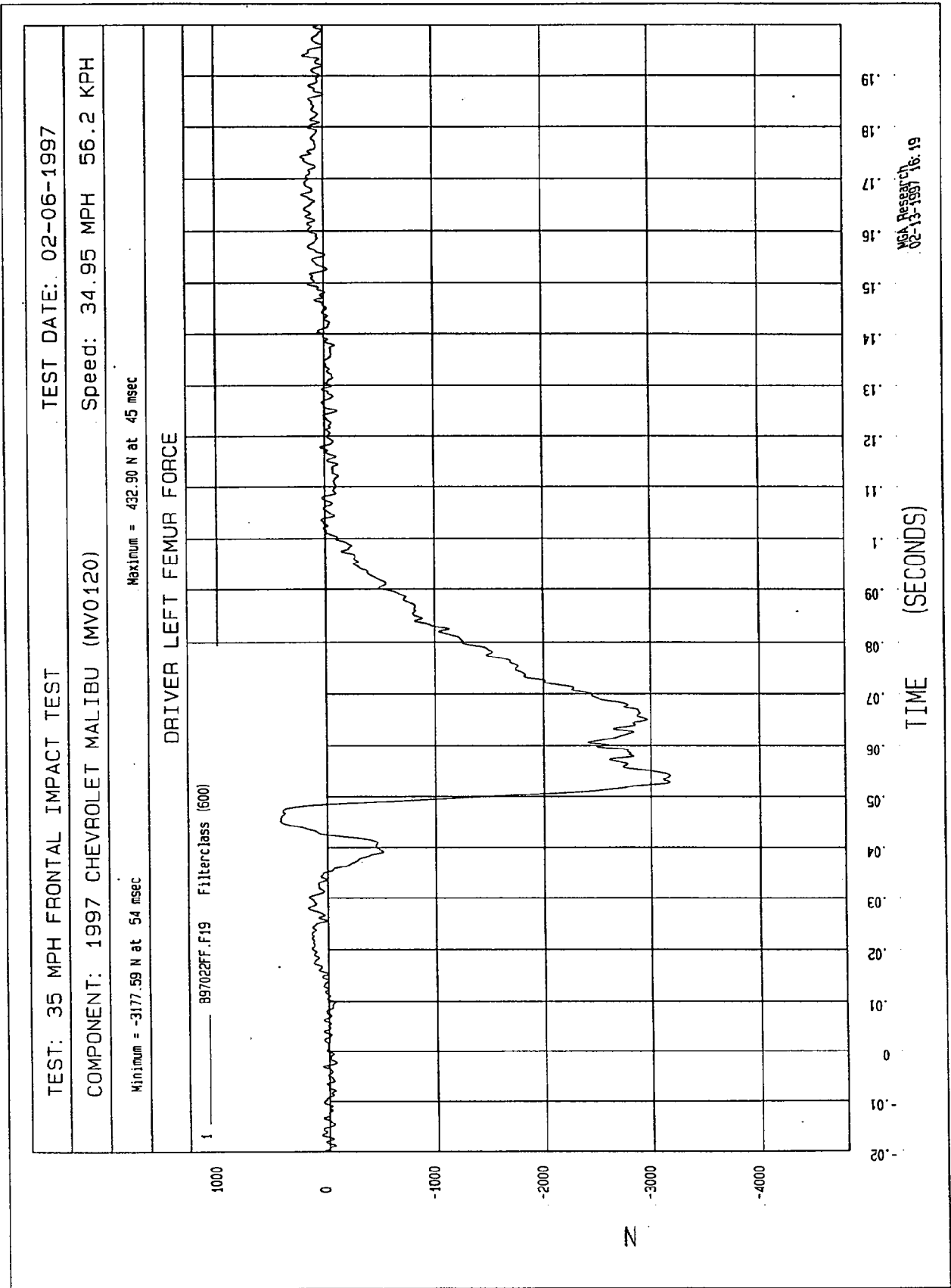
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -32.78 MM at 71 msec Maximum = .95 MM at 8 msec

DRIVER CHEST COMPRESSION





TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MVO120) Speed: 34.95 MPH 56.2 KPH

Minimum = -4070.54 N at 56 msec

Maximum = 231.66 N at 173 msec

DRIVER RIGHT FEMUR FORCE

1 897022FF.F18 Filterclass (600)

1000

0

-1000

-2000

-3000

-4000

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)

MCA Research
02-13-1997 16:20

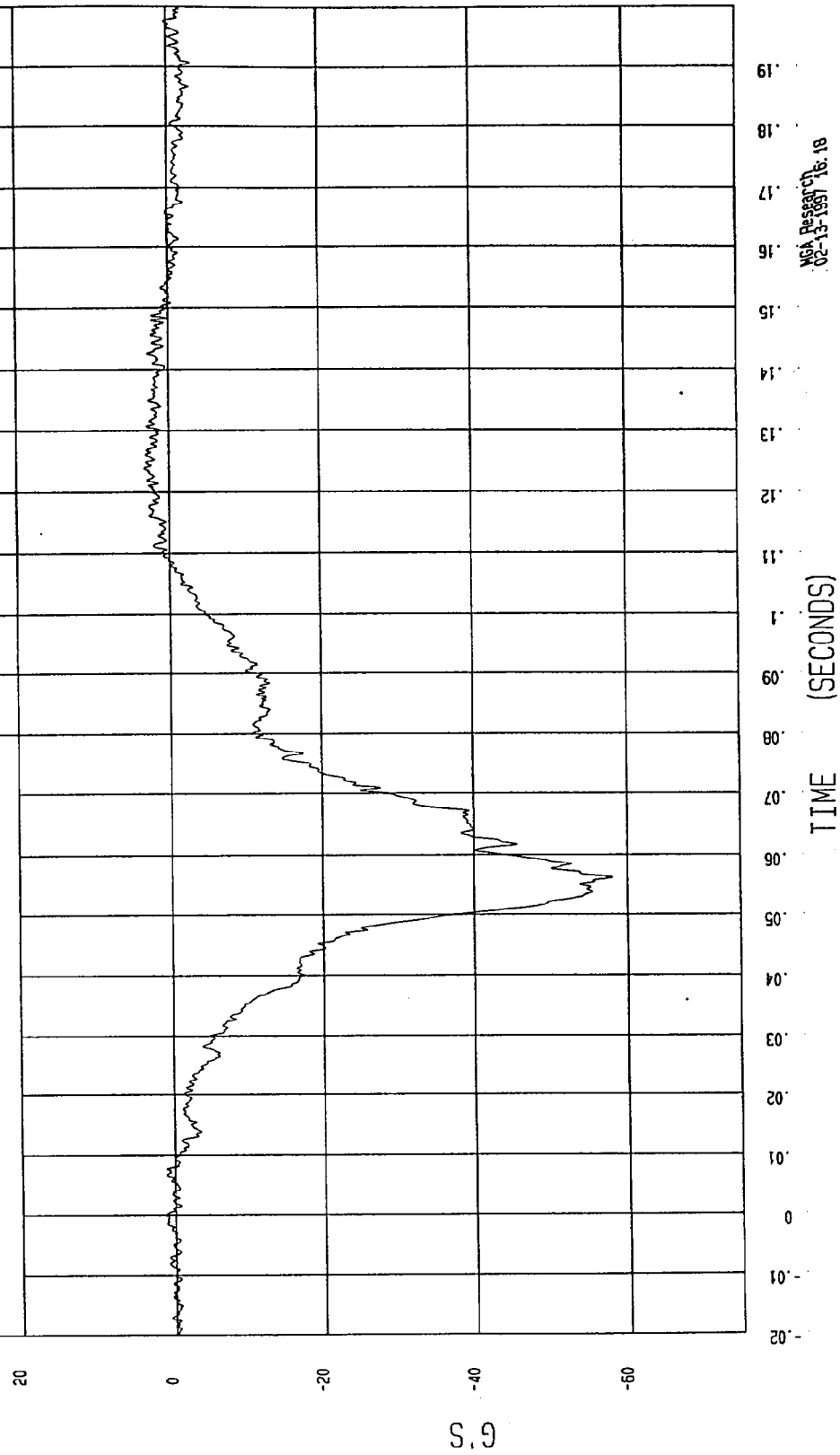
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -57.99 G'S at 56 msec Maximum = 3.27 G'S at 124 msec

DRIVER PELVIS X ACCELERATION

1 897022AF.A60 Filterclass (1000)



NGA Research
02-13-1997 16.18

TEST: 35 MPH FRONTAL IMPACT TEST

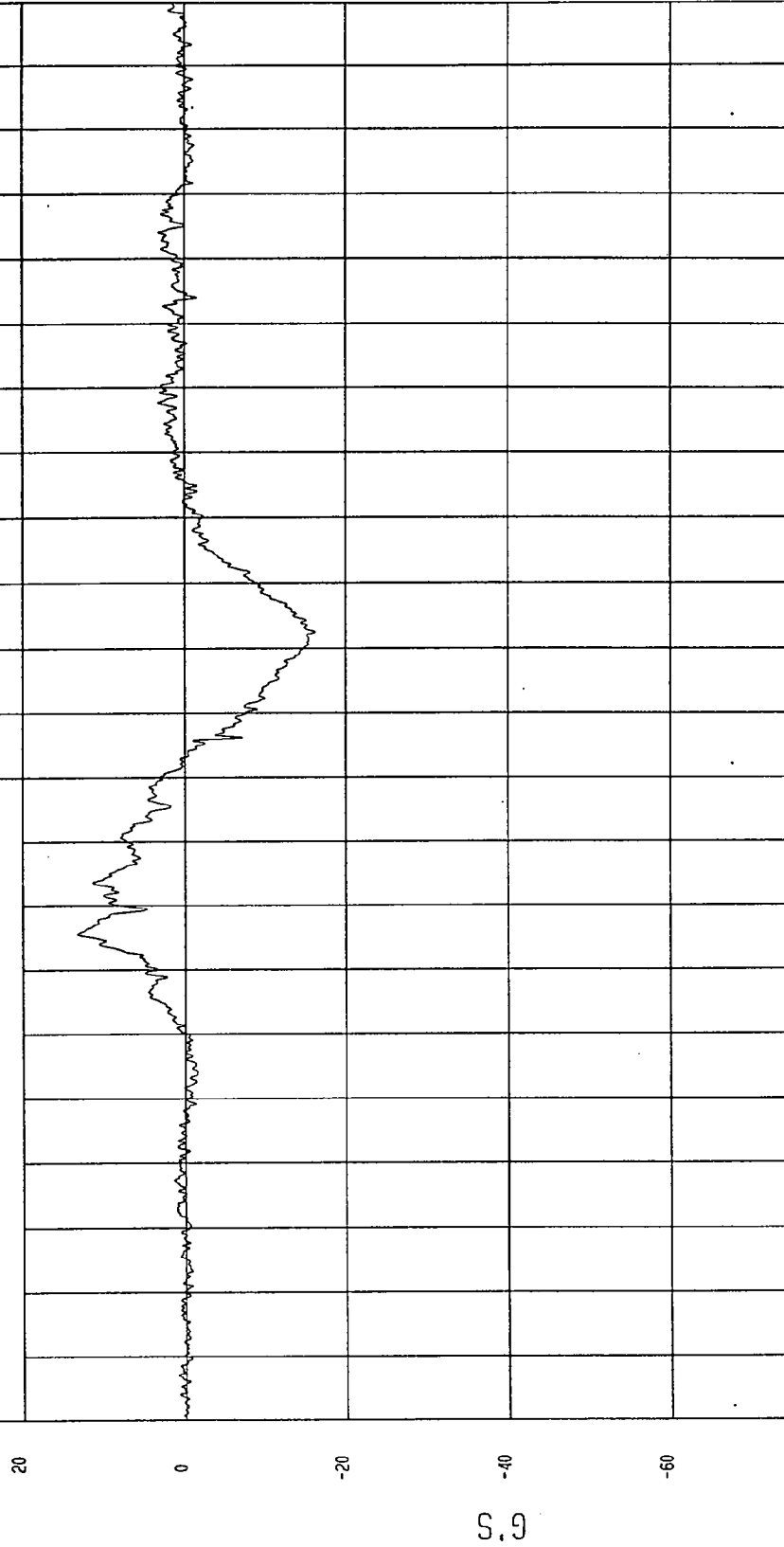
TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -16.28 G'S at 102 msec Maximum = 13.21 G'S at 56 msec

DRIVER PELVIS Y ACCELERATION

1 897022AF.A61 Filterclass (1000)



TIME (SECONDS)

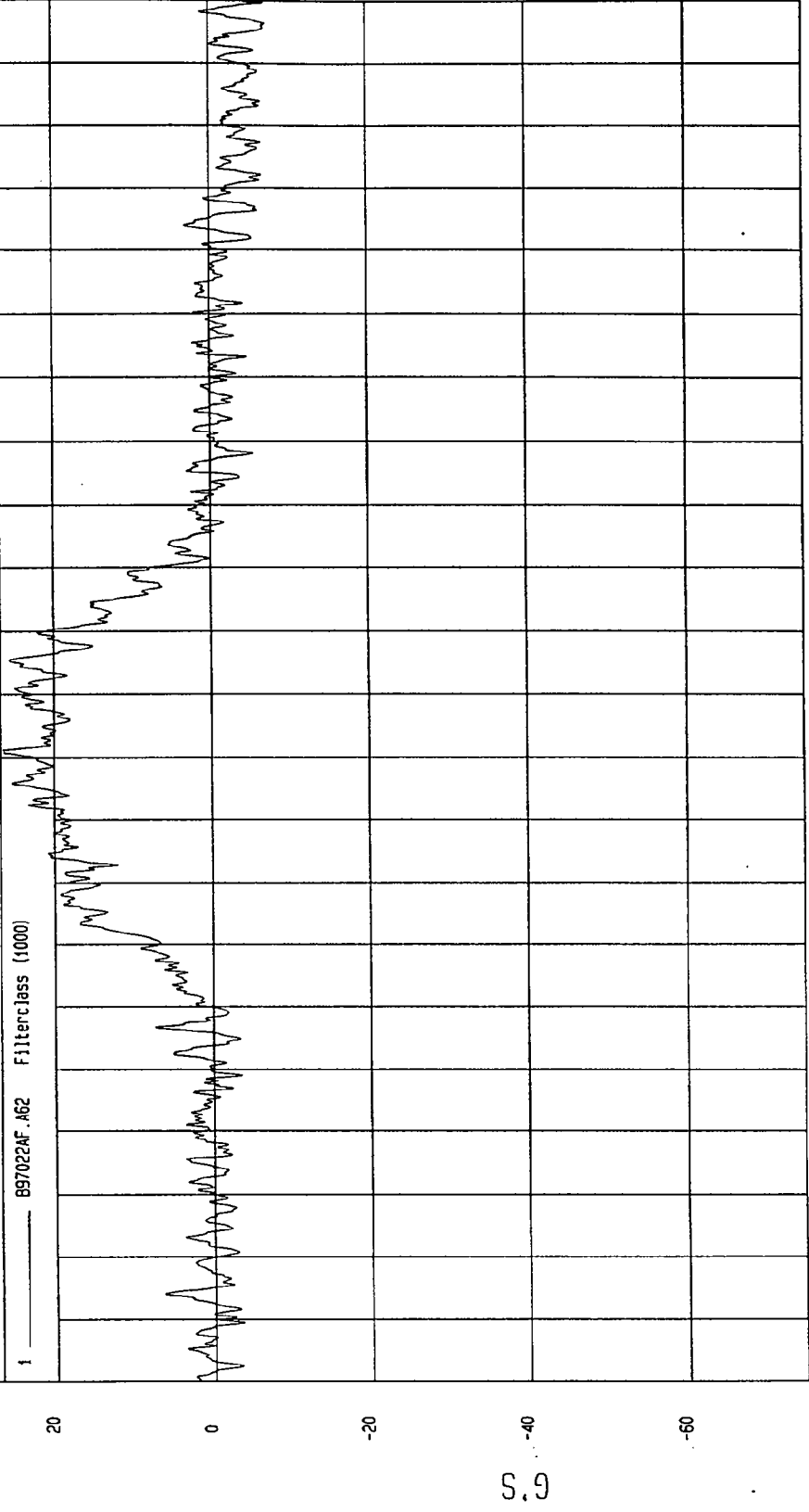
WCA Research
02-13-1997 16:18

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -7.20 G'S at 196 msec Maximum = 26.95 G'S at 81 msec

DRIVER PELVIS Z ACCELERATION



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

TIME (SECONDS)

NSA Research
02-13-1997 16:19

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

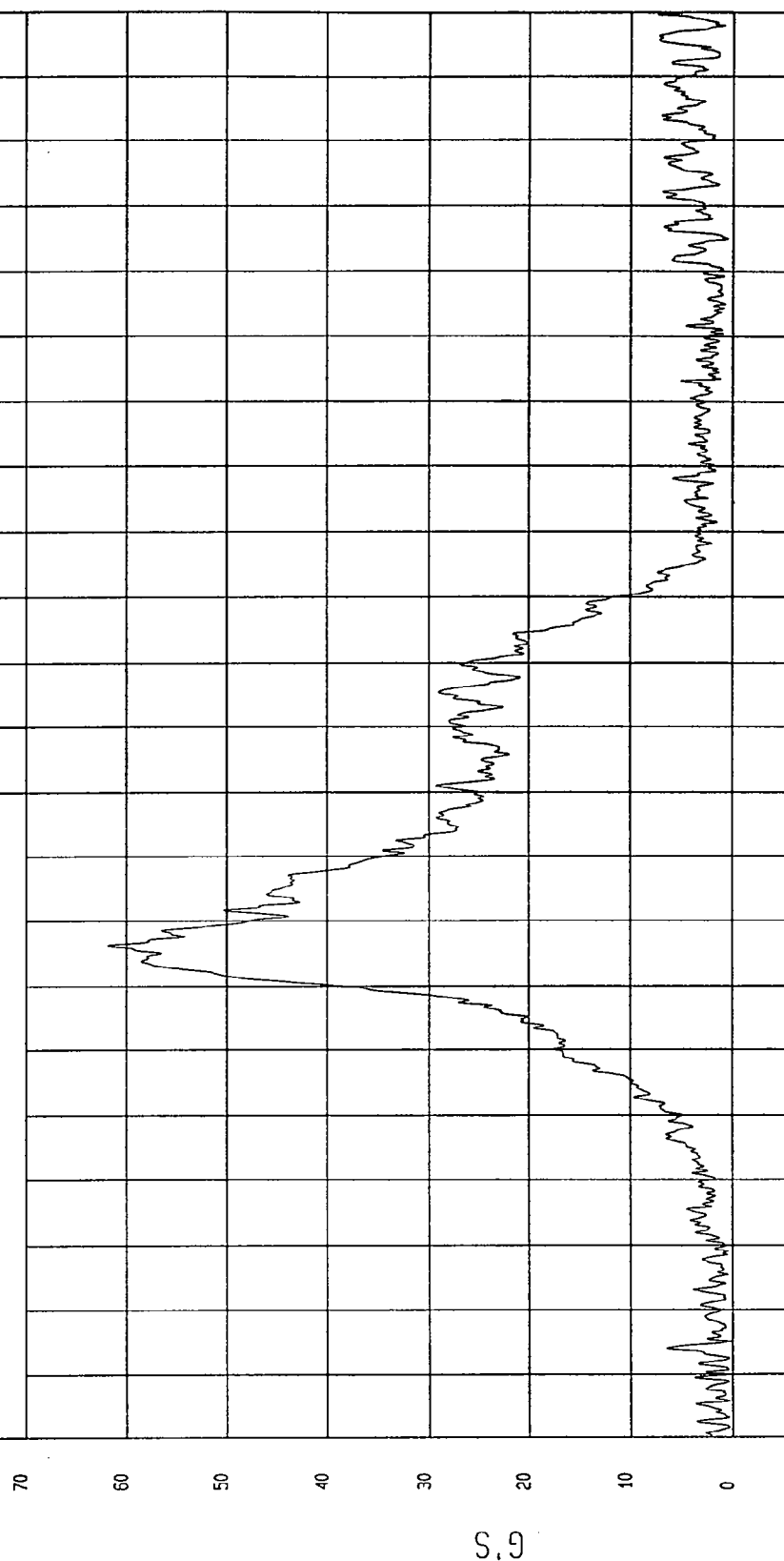
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = .10 G'S at -5 msec

Maximum = 61.80 G'S at 56 msec

DRIVER PELVIS RESULTANT ACCELERATION

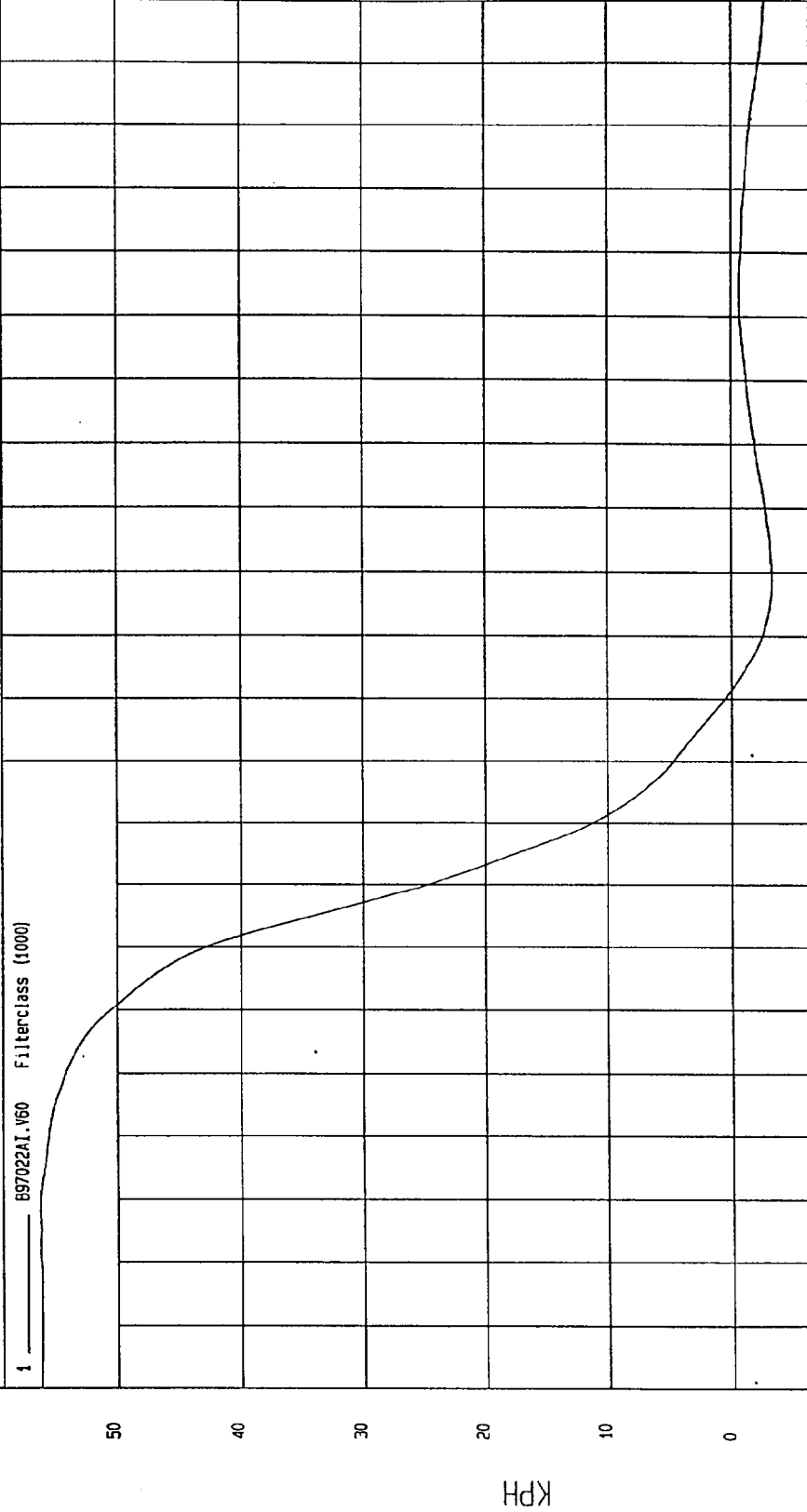
1 ——— B97022AV.A60 Filterclass (1000)



MPA Research
02-13-1997 16:19

TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -3.16 KPH at 109 msec	Maximum = 56.27 KPH at 8 msec

DRIVER PELVIS X VELOCITY



TIME Seconds

NCA Research
02-13-1997 16:30

TEST: 35 MPH FRONTAL IMPACT TEST

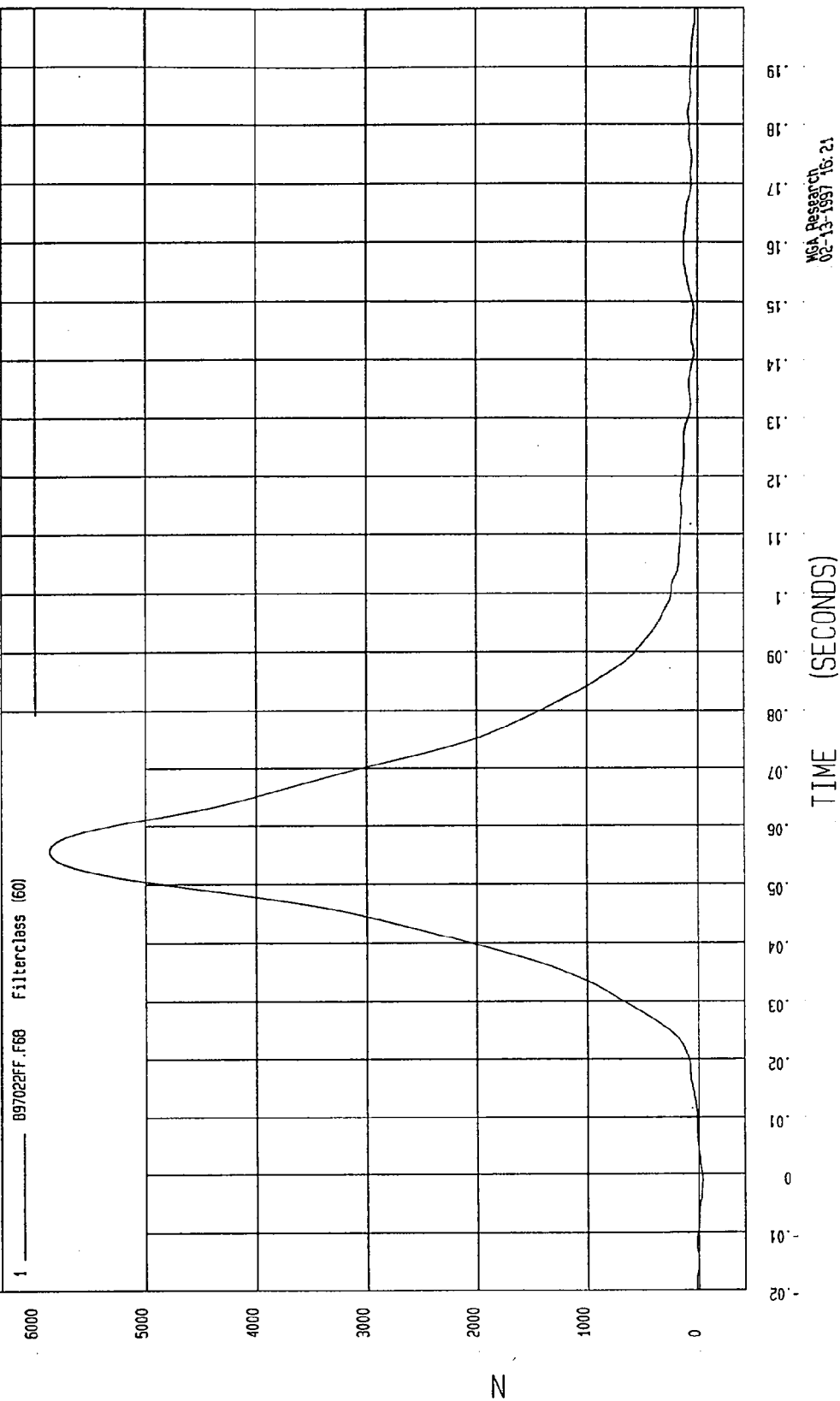
TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -31.75 N at -1 msec

Maximum = 5873.03 N at 56 msec

DRIVER LAP BELT FORCE



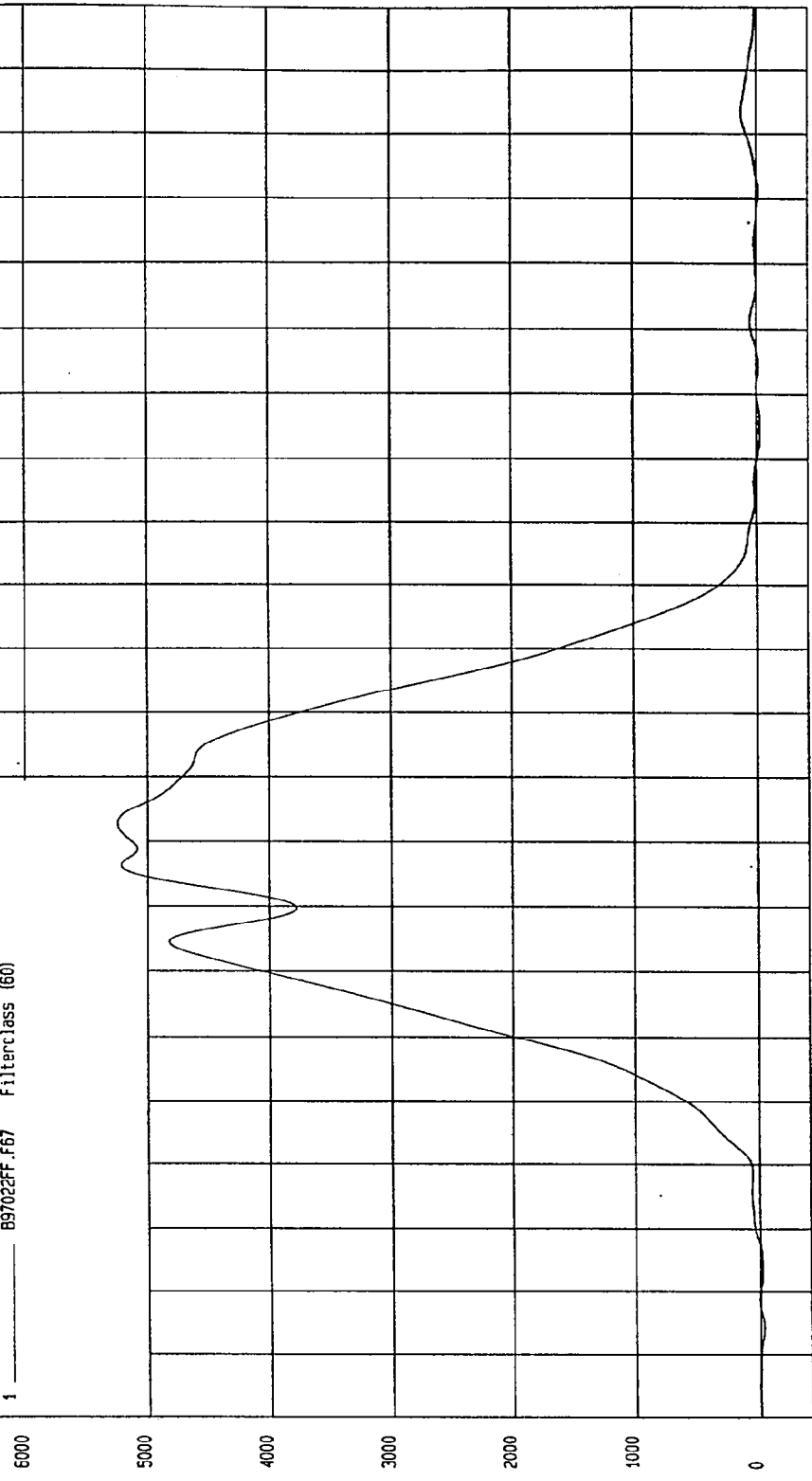
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -29.10 N at -6 msec Maximum = 5241.98 N at 73 msec

DRIVER SHOULDER BELT FORCE

1 B97022FF.F67 Filterclass (60)



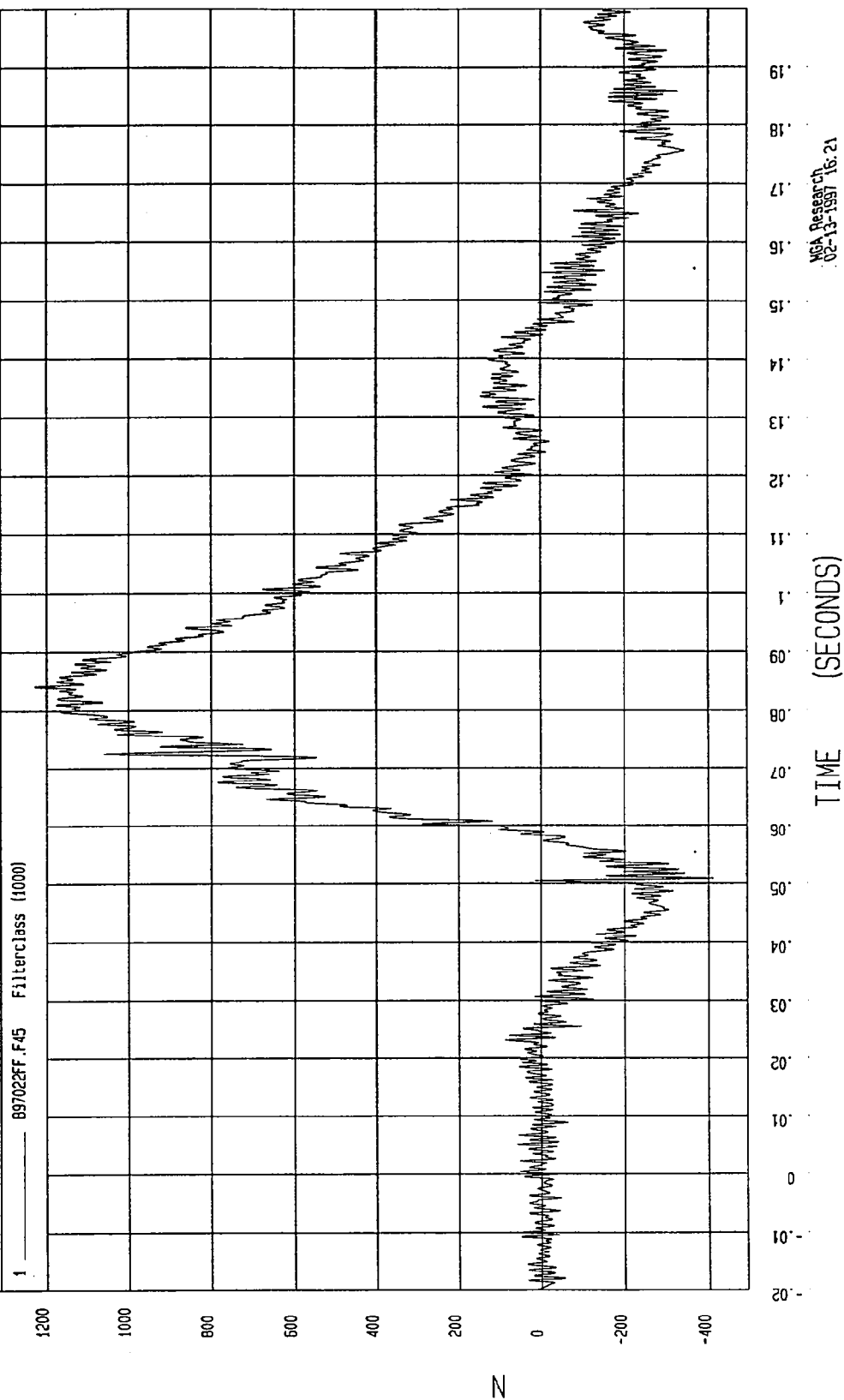
MCA Research
02-13-1997 18:21

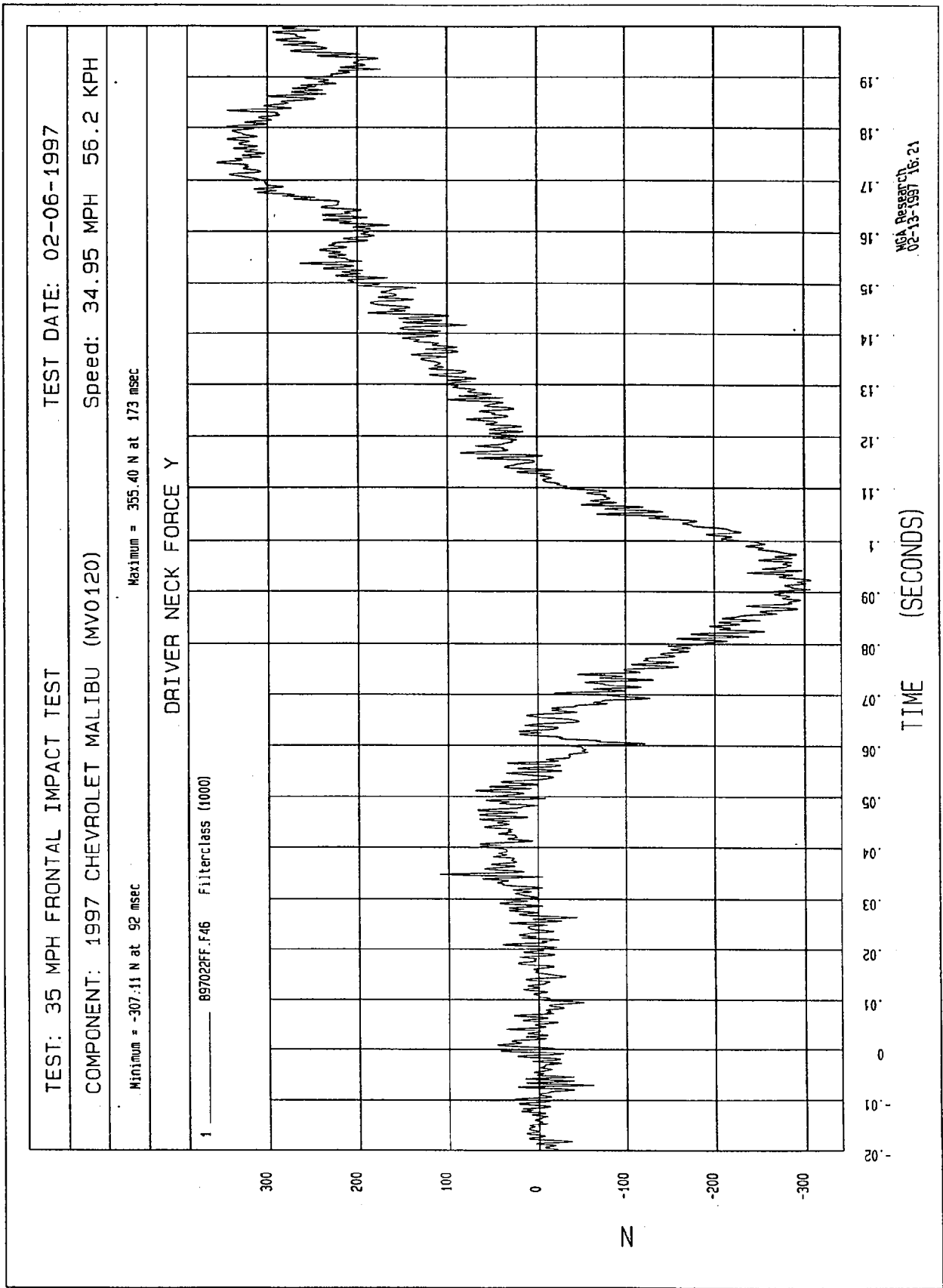
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -409.80 N at 51 msec
Maximum = 1226.86 N at 84 msec

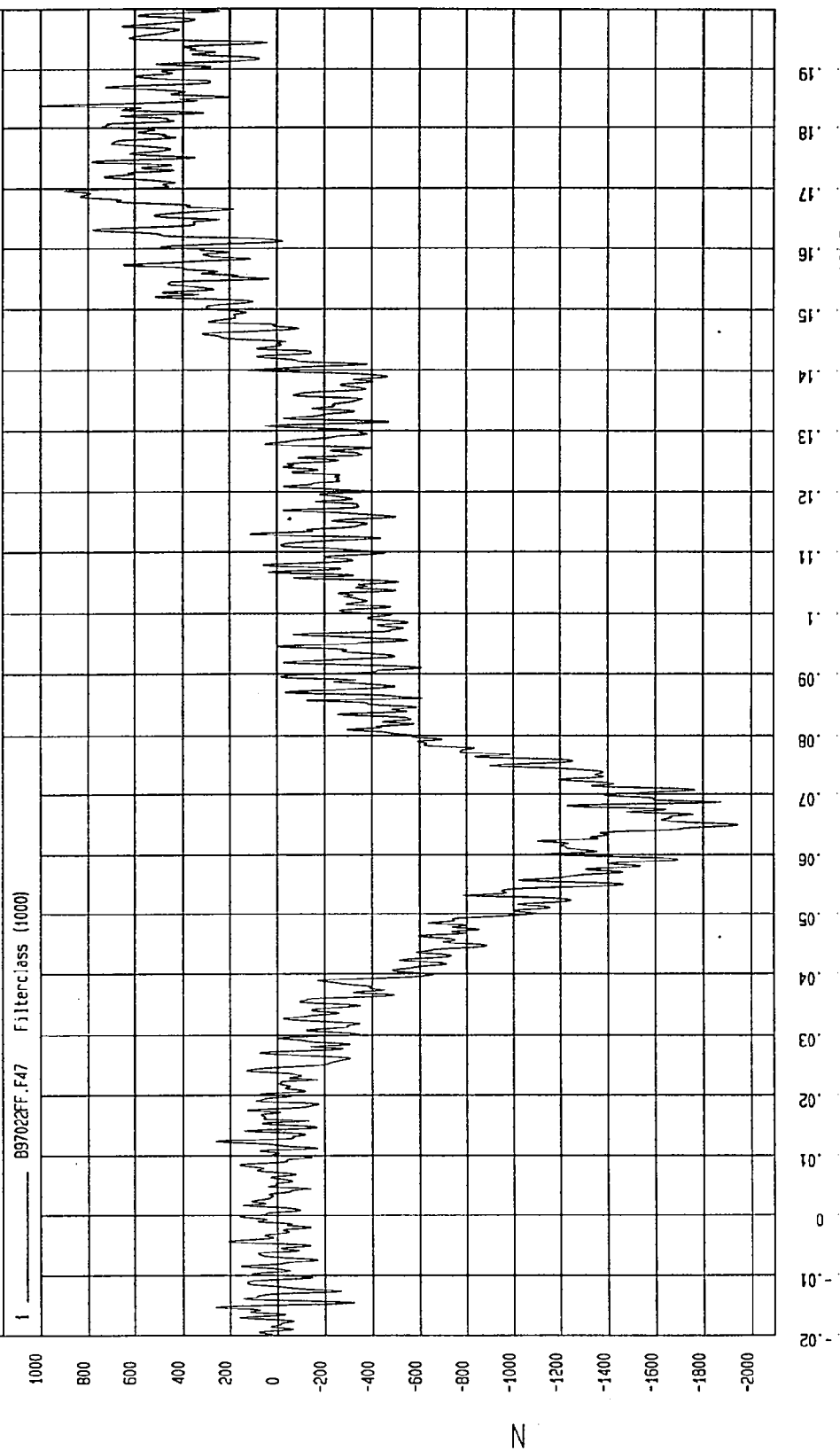
DRIVER NECK FORCE X





TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -1944.68 N at 65 msec	
Maximum = 1007.46 N at 184 msec	

DRIVER NECK FORCE Z



MSA Research
02-13-1997 16:21

TEST: 35 MPH FRONTAL IMPACT TEST

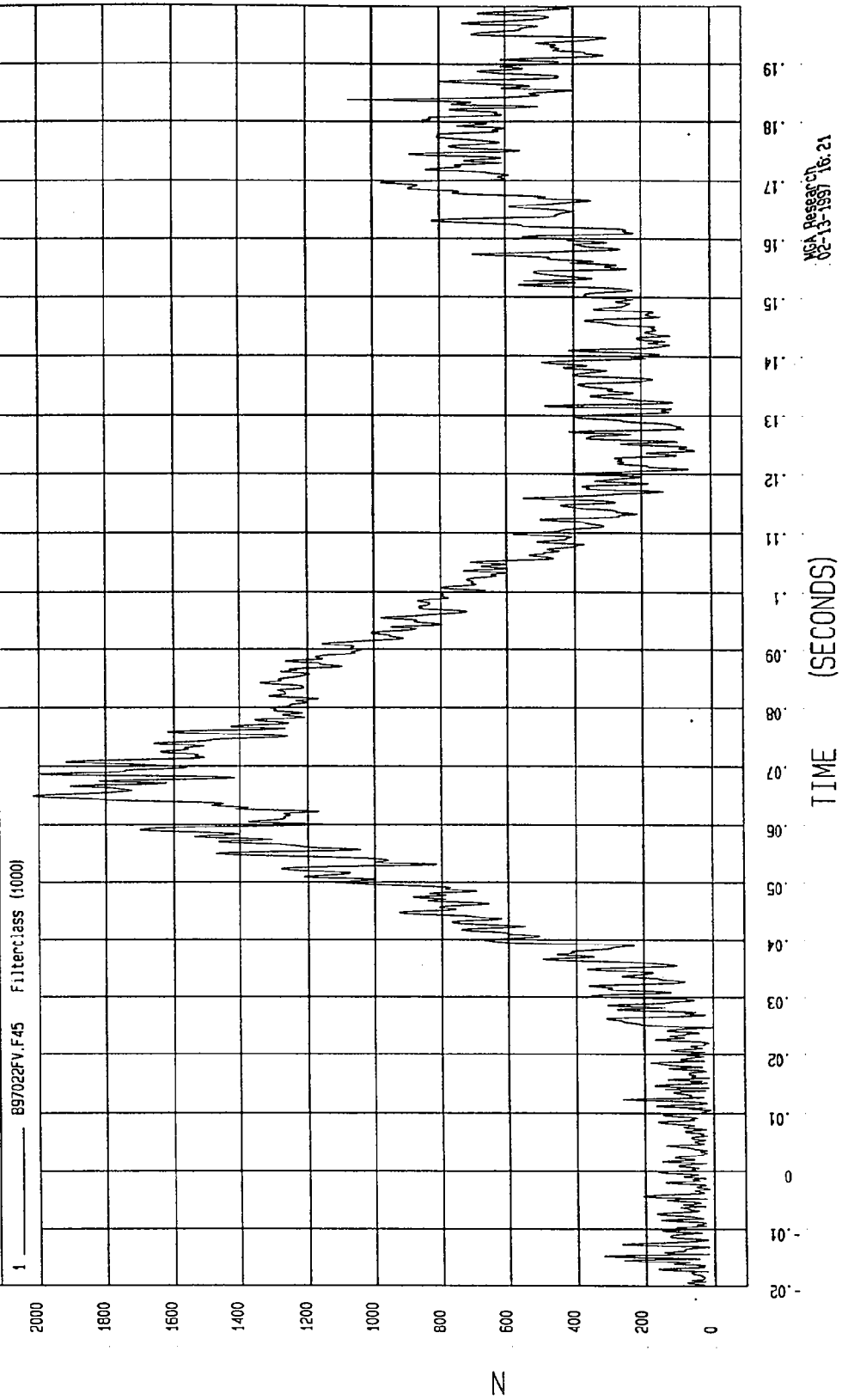
TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = 6.54 N at 25 msec

Maximum = 2016.35 N at 65 msec

DRIVER NECK FORCE RESULTANT



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

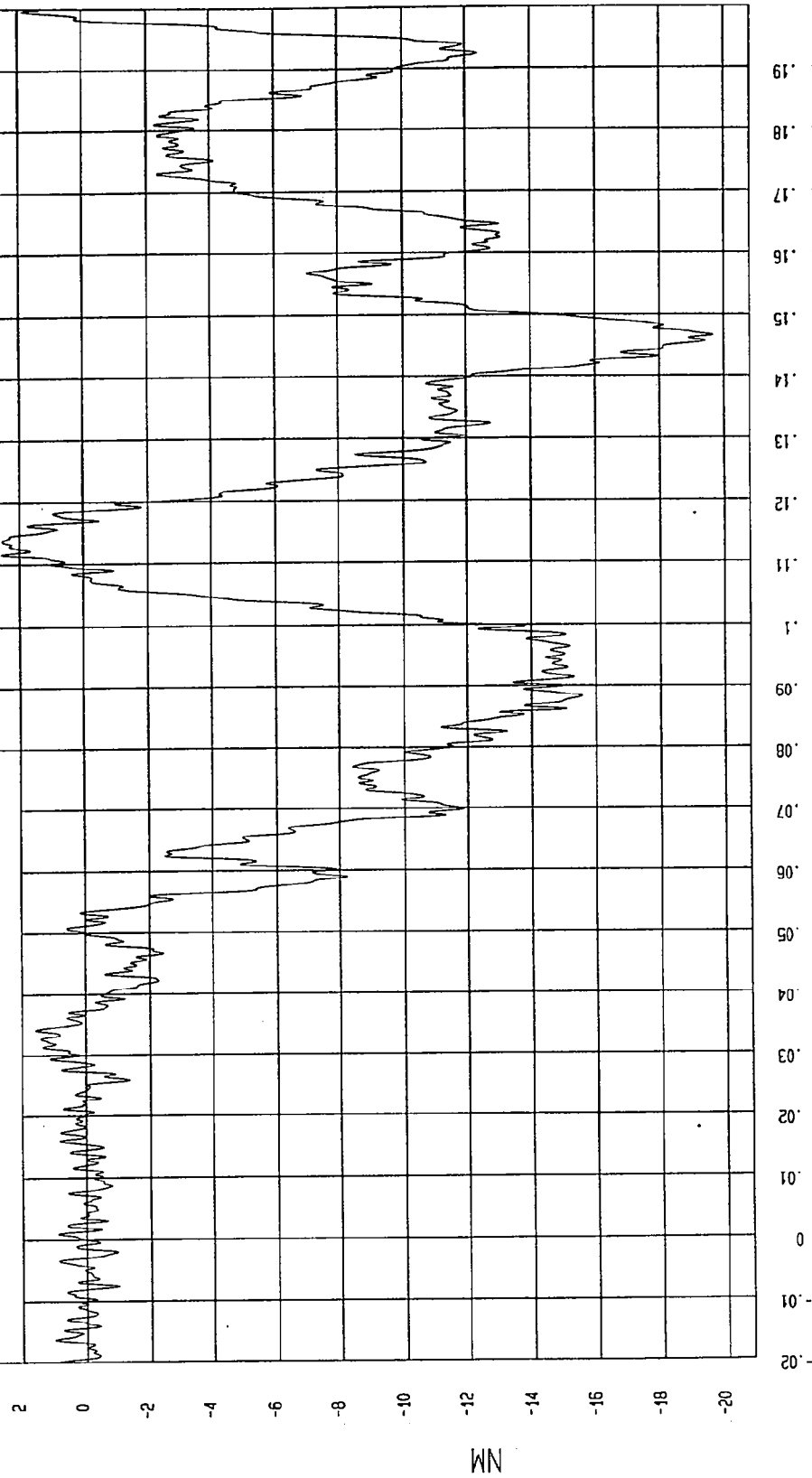
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -19.67 NM at 147 msec

Maximum = 2.54 NM at 112 msec

DRIVER NECK MOMENT X

1 B97022NF.M48 FilterClass (500)



MCA Research
02-13-1997 16:21

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

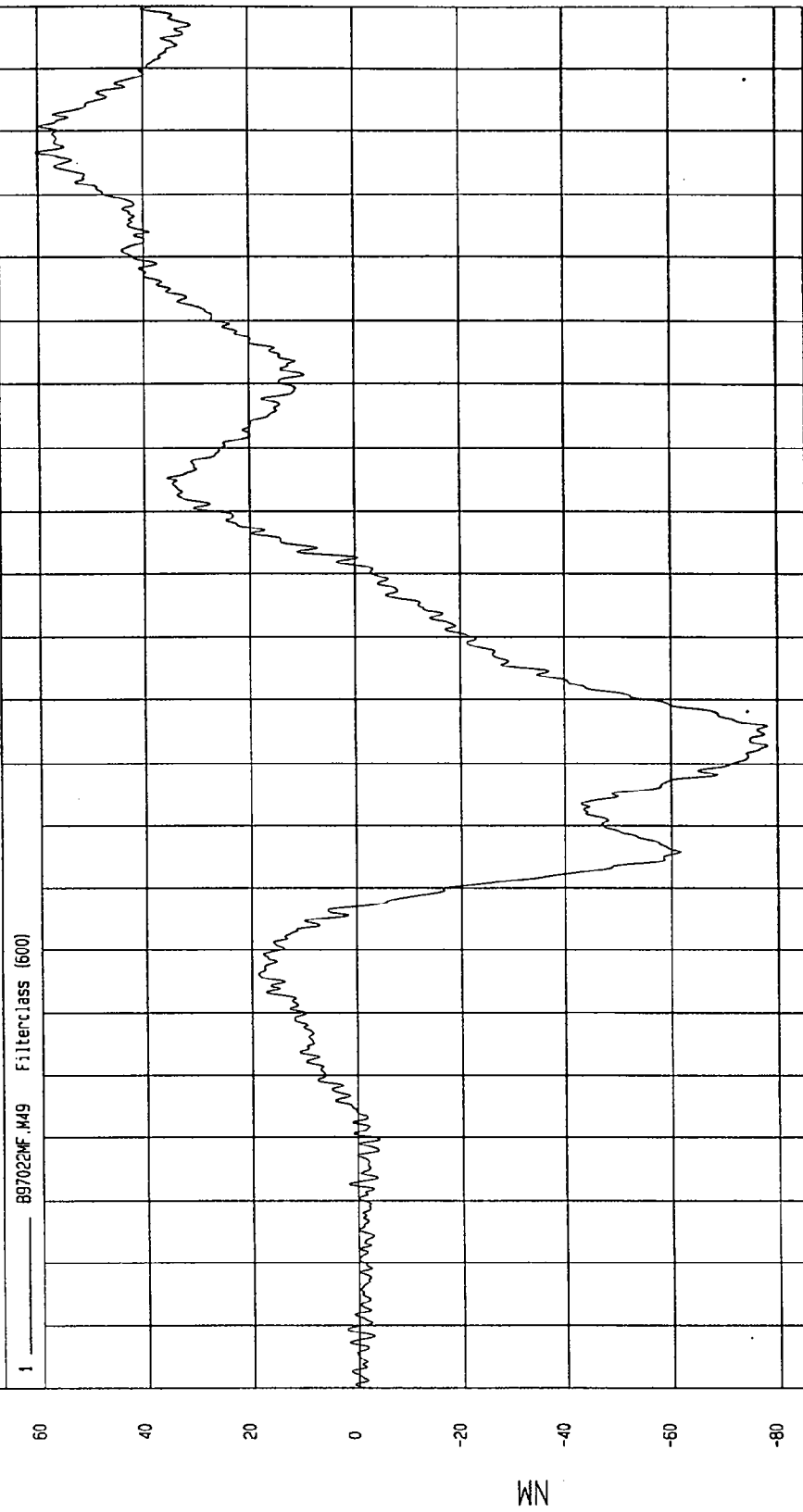
SPEED: 34.95 MPH 56.2 KPH

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Minimum = -78.25 NM at 83 msec

Maximum = 60.37 NM at 177 msec

DRIVER NECK MOMENT Y



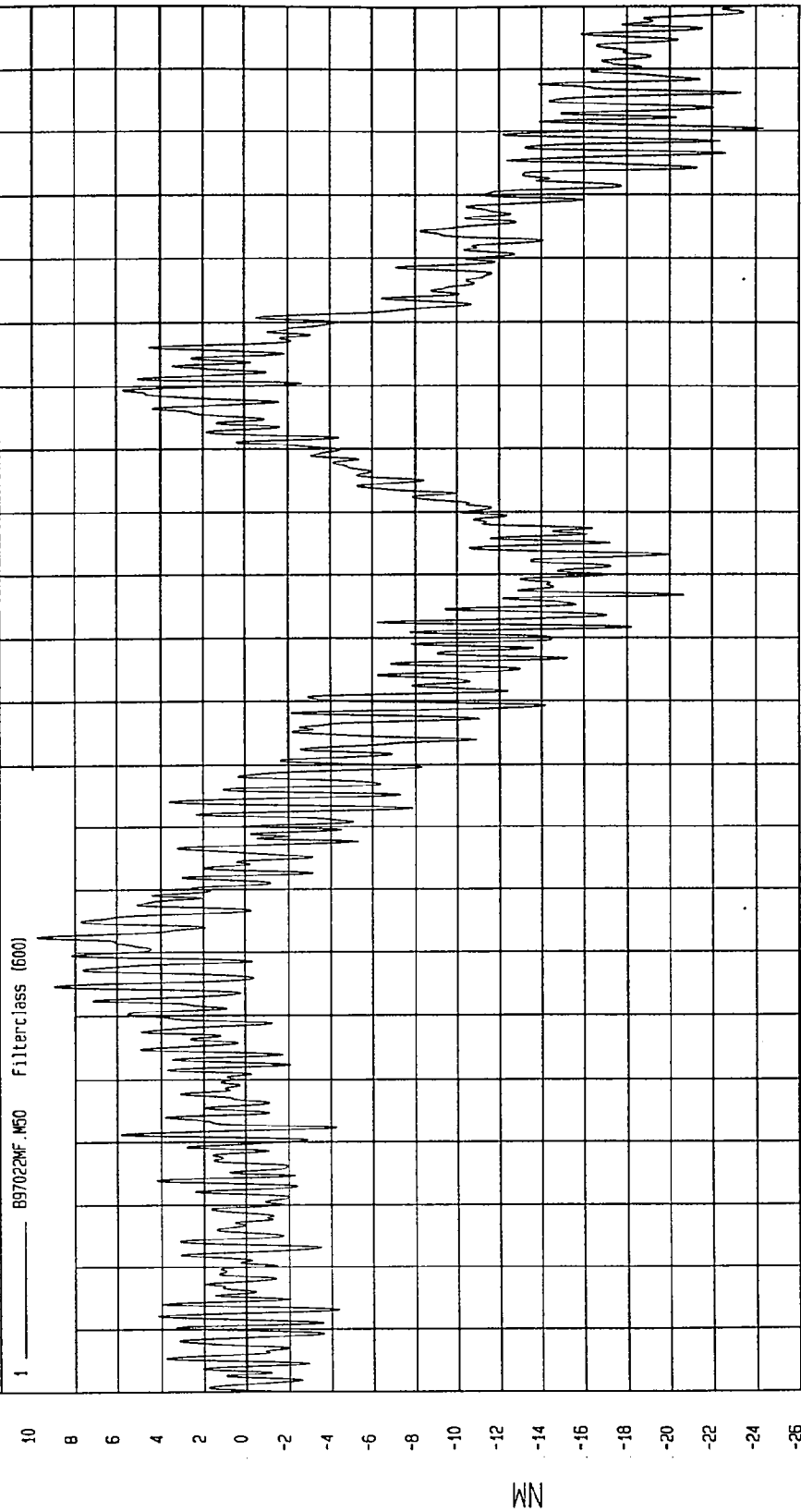
MCA Research
02-13-1997 16:21

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -24.34 NM at 180 msec Maximum = 9.78 NM at 52 msec

DRIVER NECK MOMENT Z



MGA Research
02-13-1997 16:22

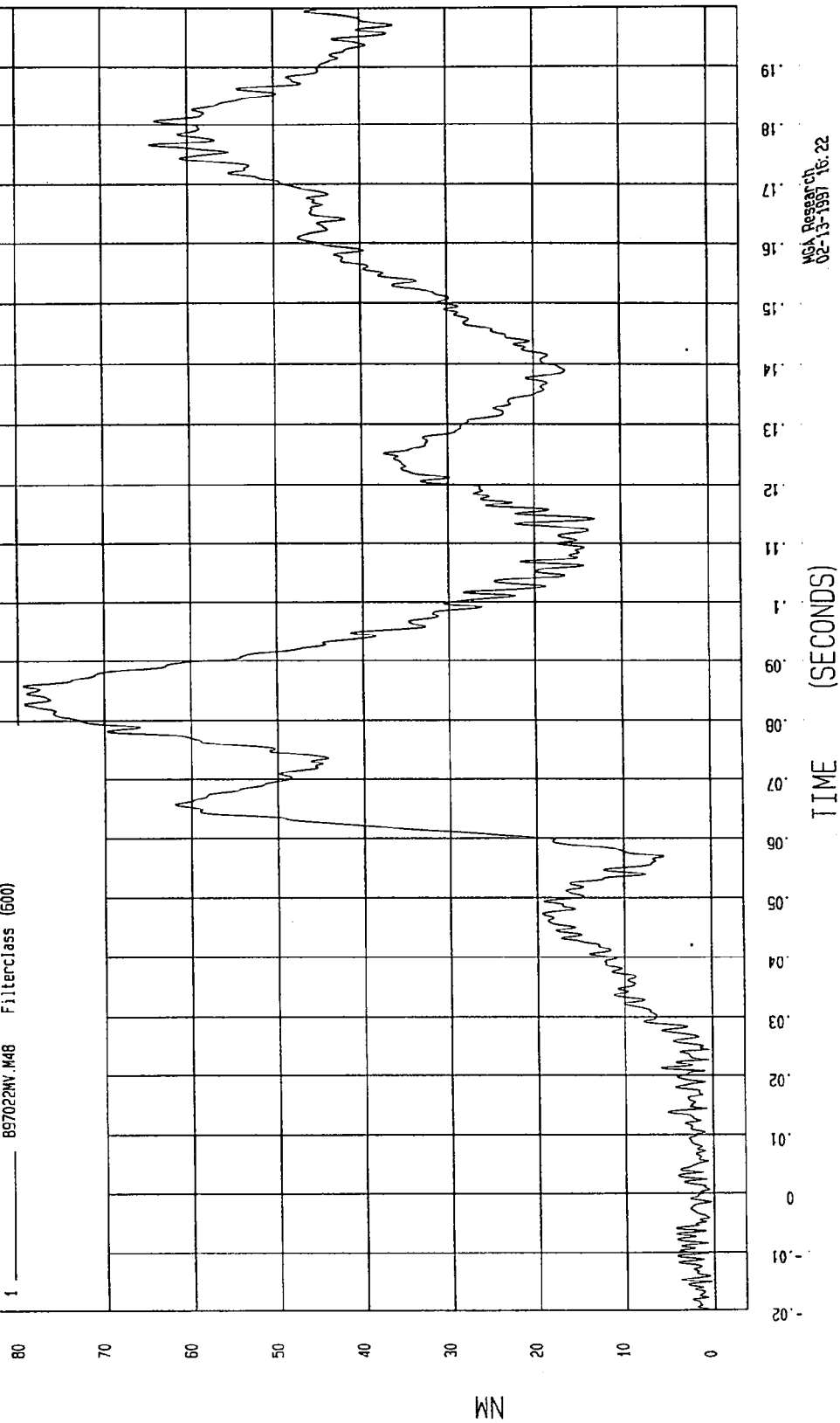
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = .25 NM at -2 msec

Maximum = 79.46 NM at 86 msec

DRIVER NECK MOMENT RESULTANT

1 ——— B97022NV M48 Filterclass (500)



MCA Research
02-13-1997 16:22

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

Speed: 34.95 MPH 56.2 KPH

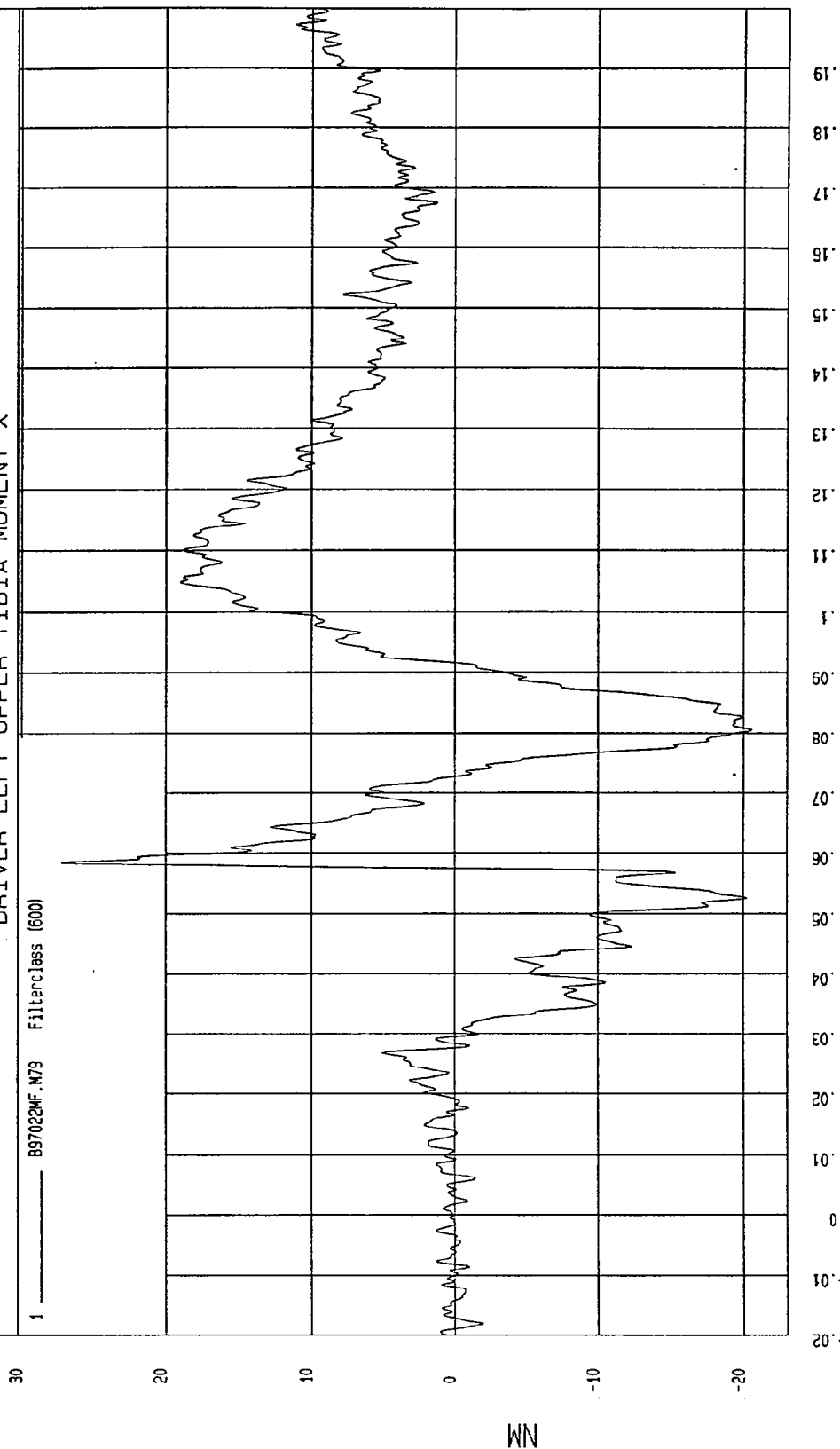
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Maximum = 27.84 NM at 58 msec

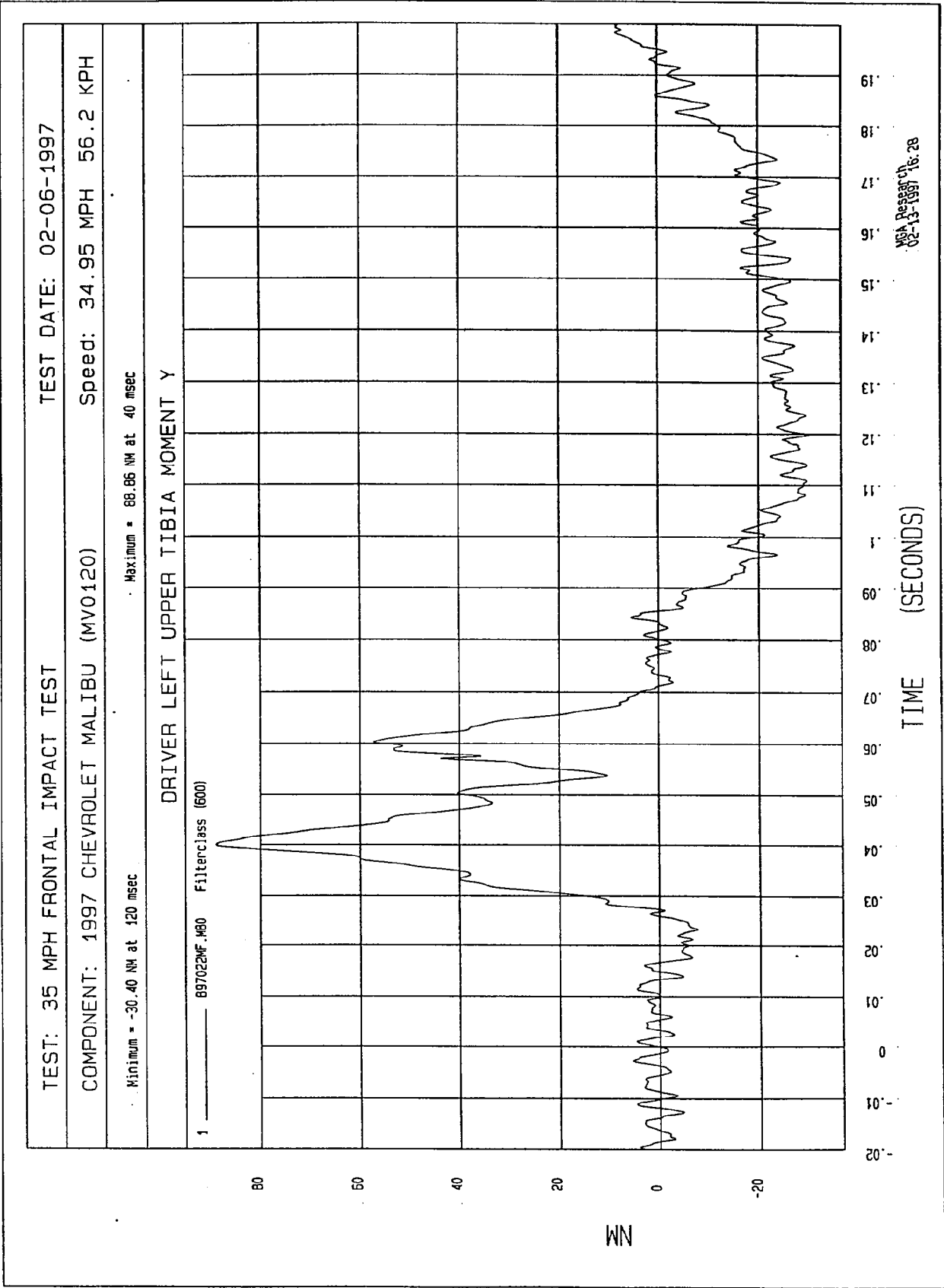
Minimum = -20.63 NM at 80 msec

DRIVER LEFT UPPER TIBIA MOMENT X

1 ——— B97022NF.N79 Filterclass (600)



NSA Research
02-13-1997 16:28



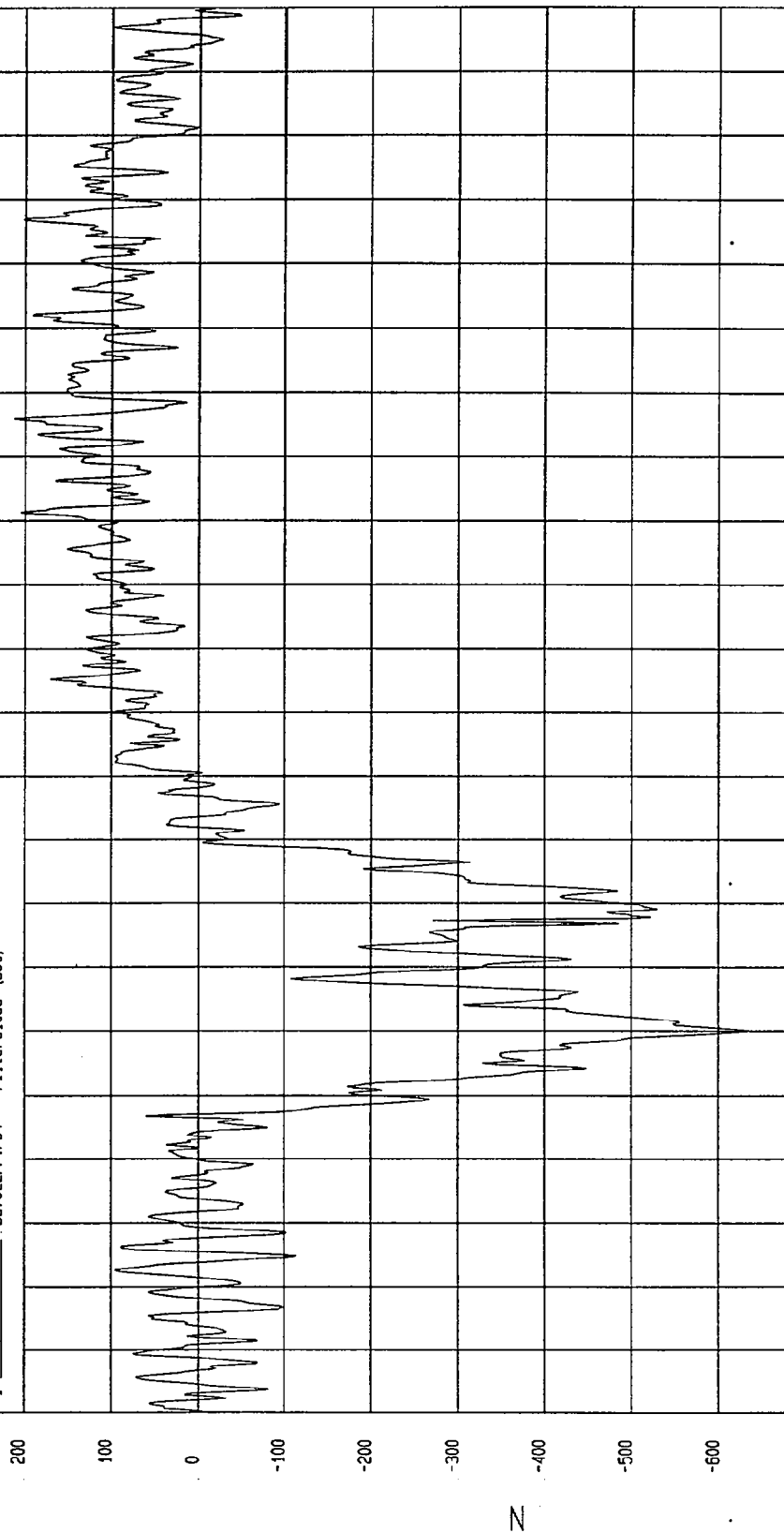
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -636.09 N at 40 msec
Maximum = 211.70 N at 136 msec

DRIVER LEFT LOWER TIBIA FORCE X

1 897022FF.F84 Filterclass (600)



TIME (SECONDS)

NSA Research
02-13-1997 16:28

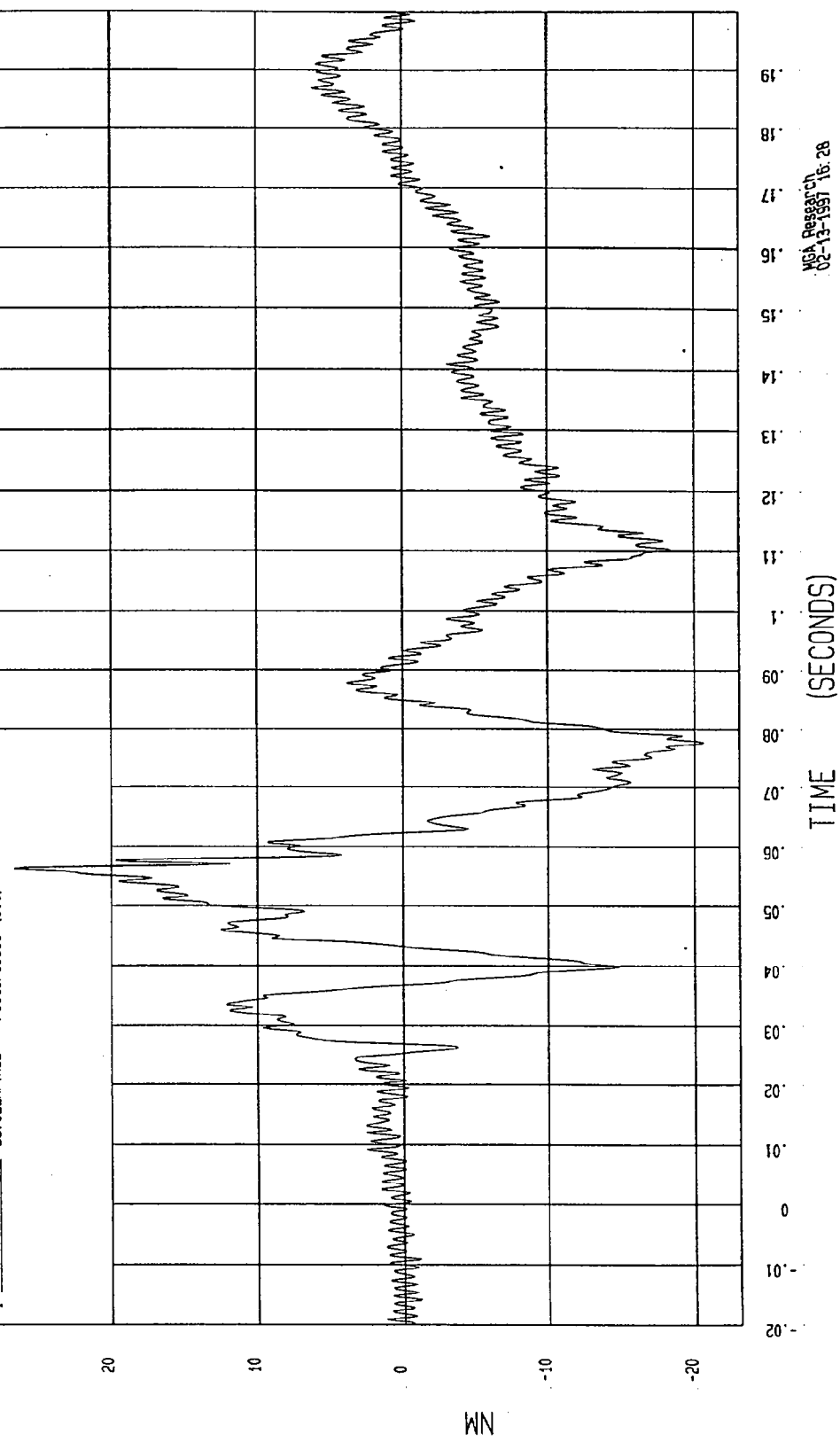
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -20.62 NM at 78 msec Maximum = 26.90 NM at 56 msec

DRIVER LEFT LOWER TIBIA MOMENT Y

1 _____ B9702MF.M05 Filterclass (600)



NCA Research
02-13-1997 16:28

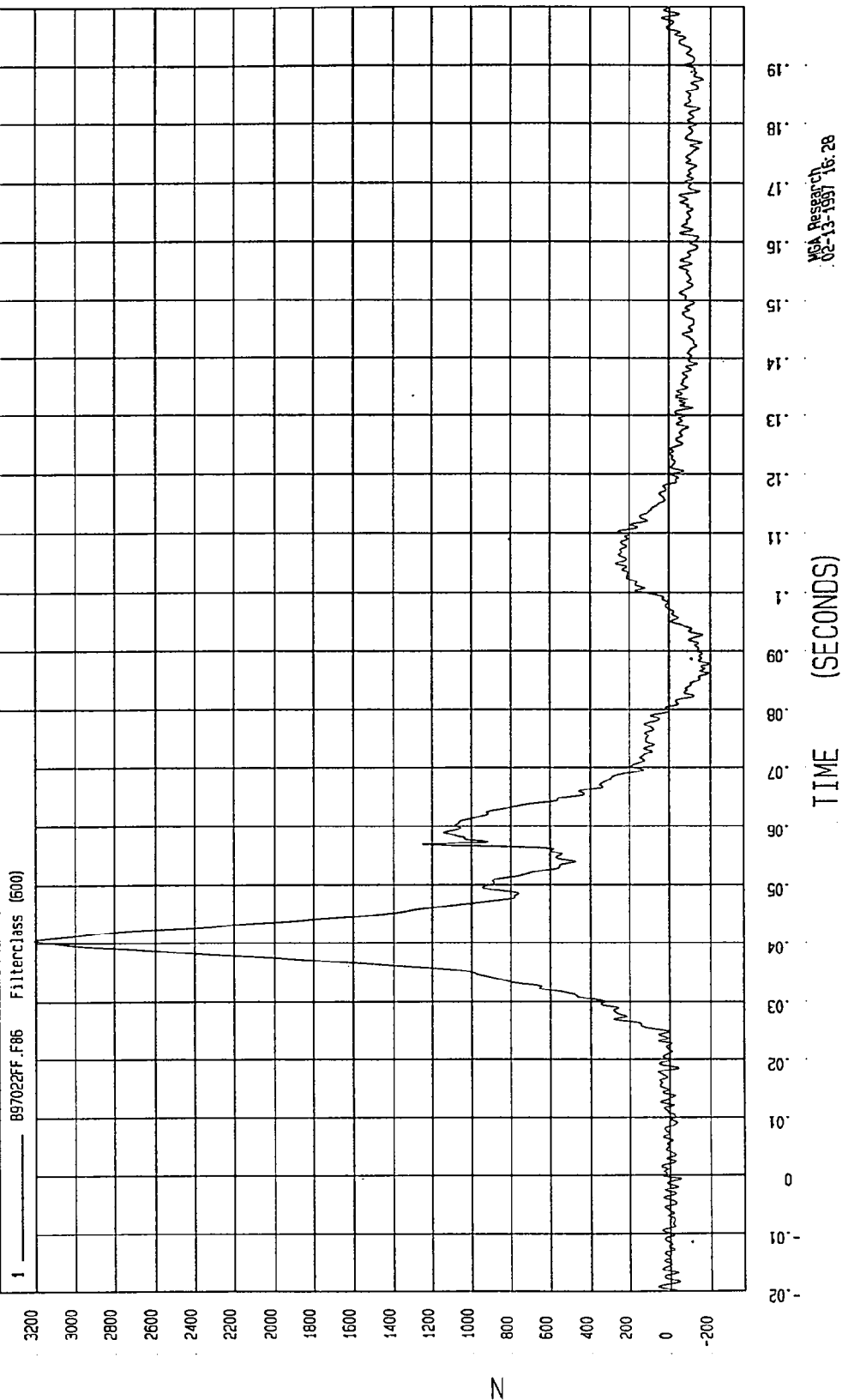
TEST: 35 MPH FRONTAL IMPACT TEST

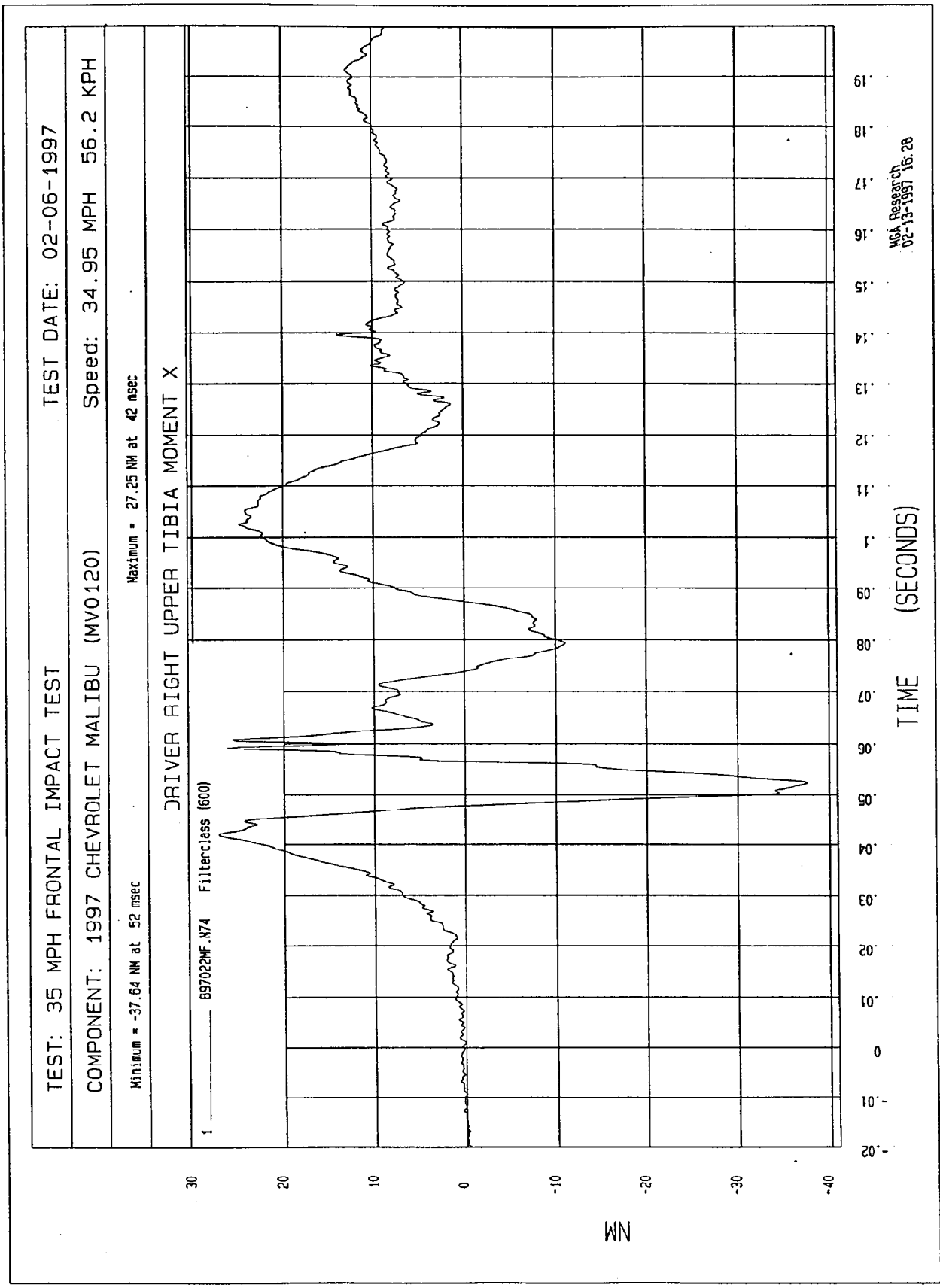
TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -196.79 N at 88 msec Maximum = 3209.83 N at 40 msec

DRIVER LEFT LOWER TIBIA FORCE Z

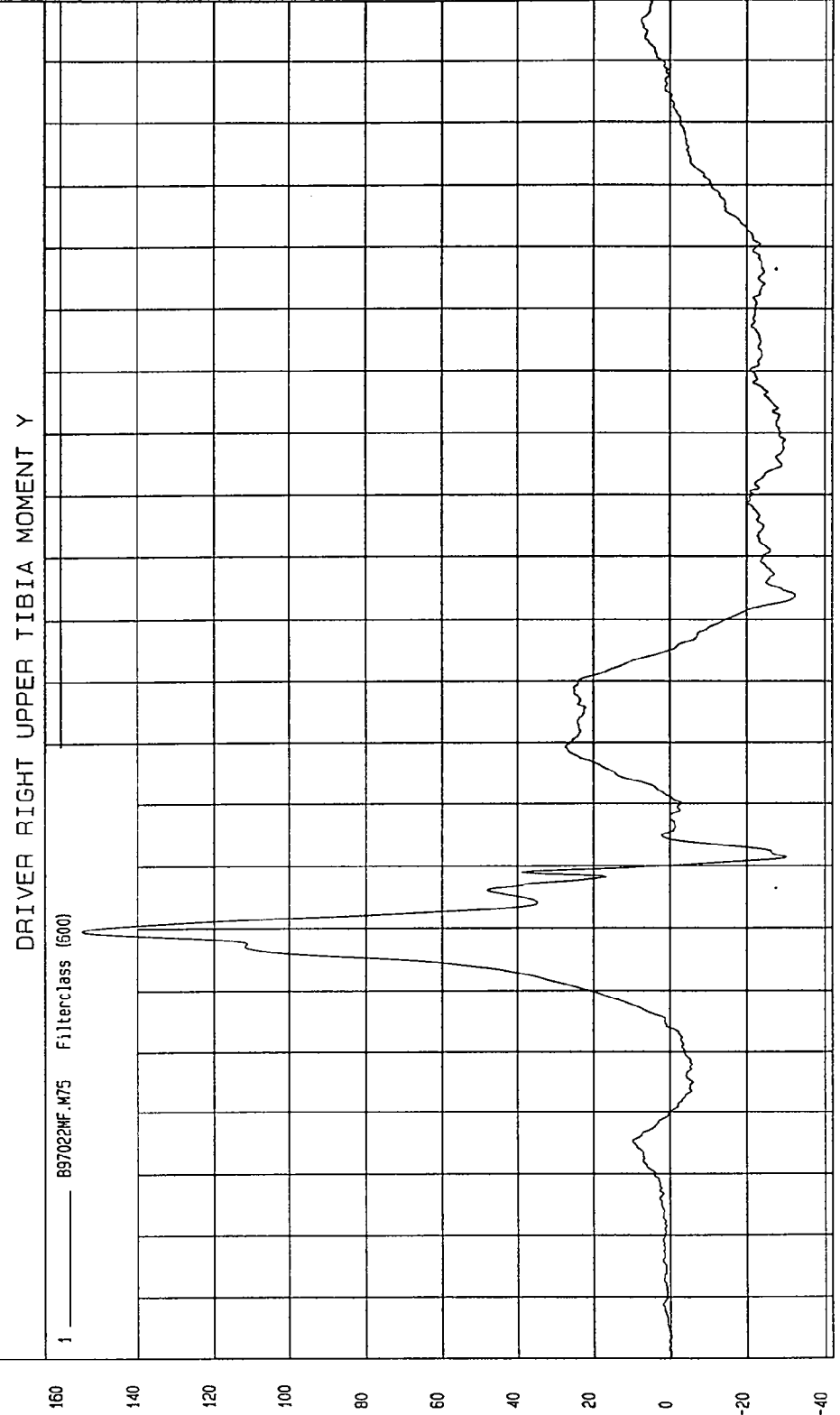




TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -32.46 NM at 104 msec Maximum = 154.71 NM at 50 msec



TIME (SECONDS)

MCA Research
02-13-1997 16:28

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

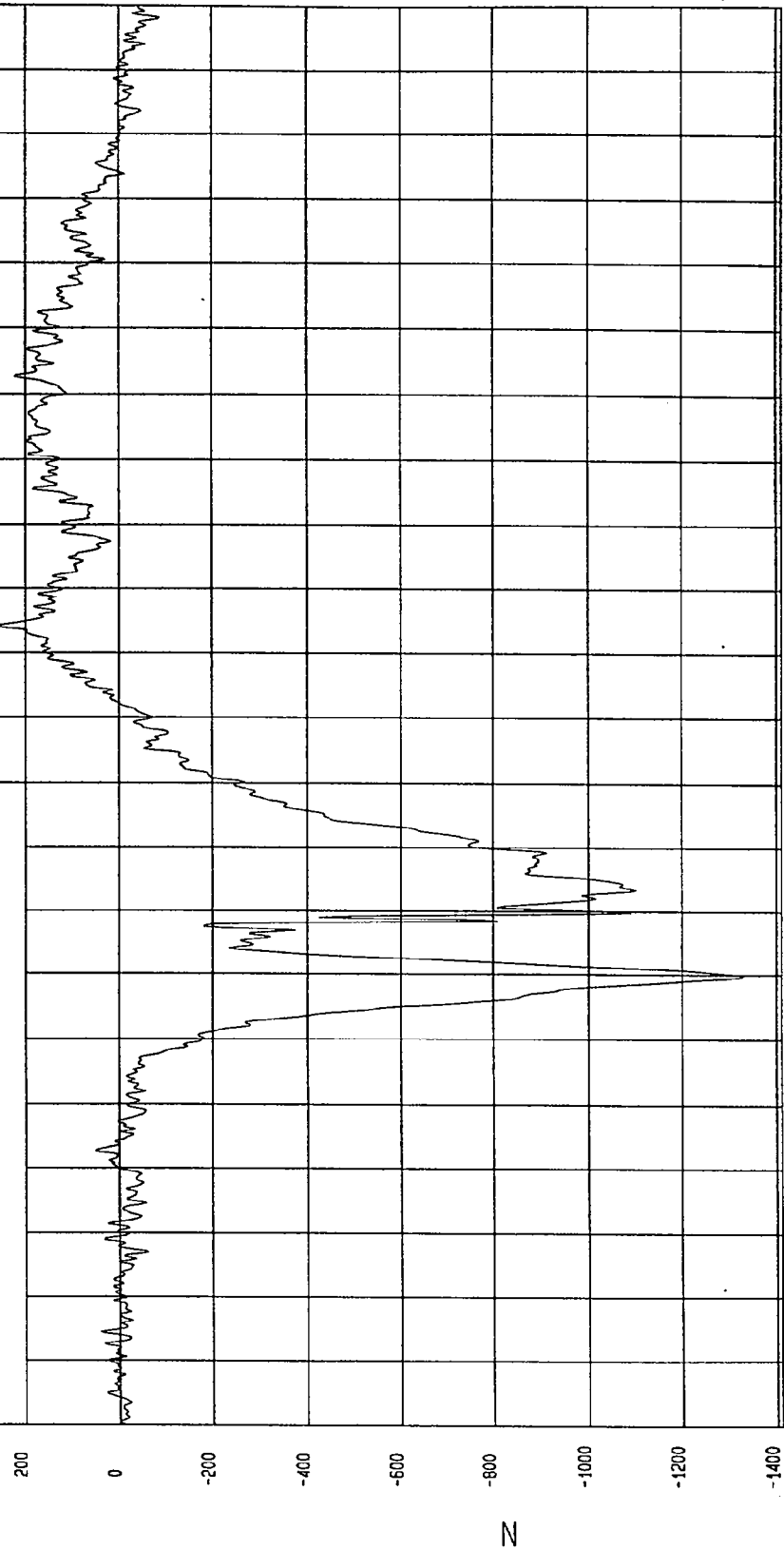
Speed: 34.95 MPH 56.2 KPH

Minimum = -1330.88 N at 50 msec

Maximum = 261.68 N at 104 msec

DRIVER RIGHT LOWER TIBIA FORCE X

1 897022FF.F76 Filterclass (600)

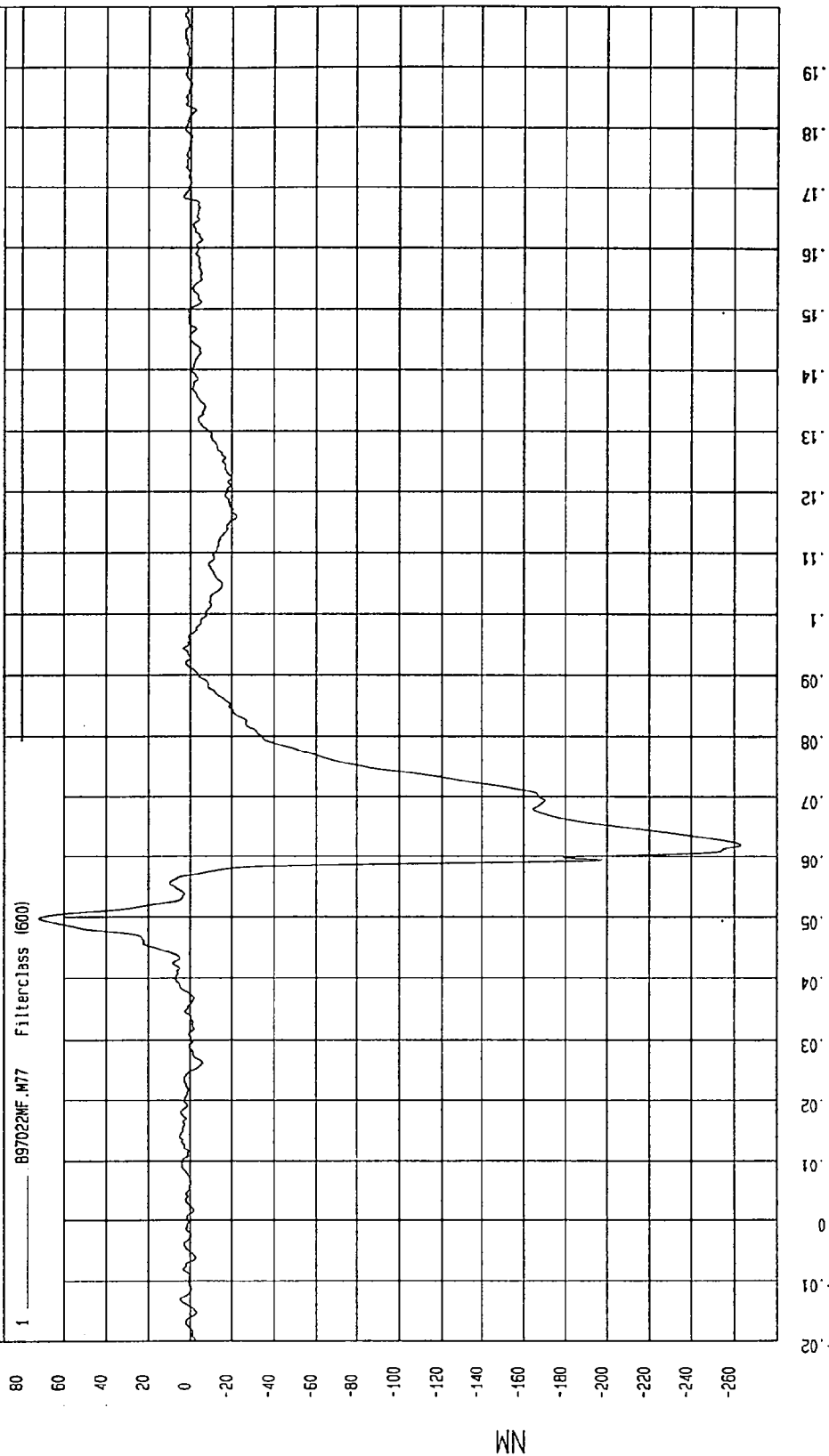


MOA Research
02-13-1997 16:28

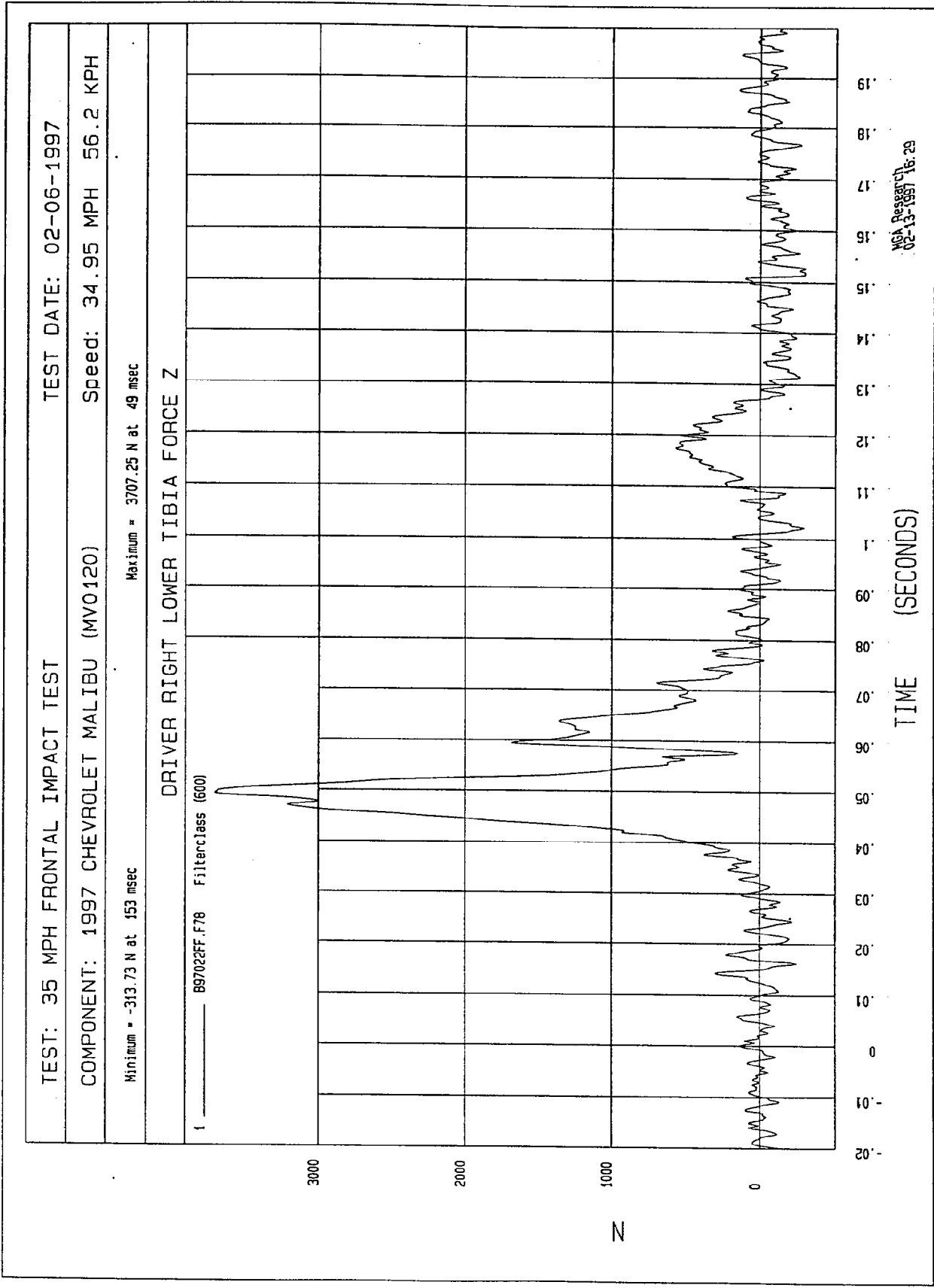
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -263.21 NM at 62 msec Maximum = 71.82 NM at 50 msec

DRIVER RIGHT LOWER TIBIA MOMENT Y



MSA Research
02-21-1997 16:02



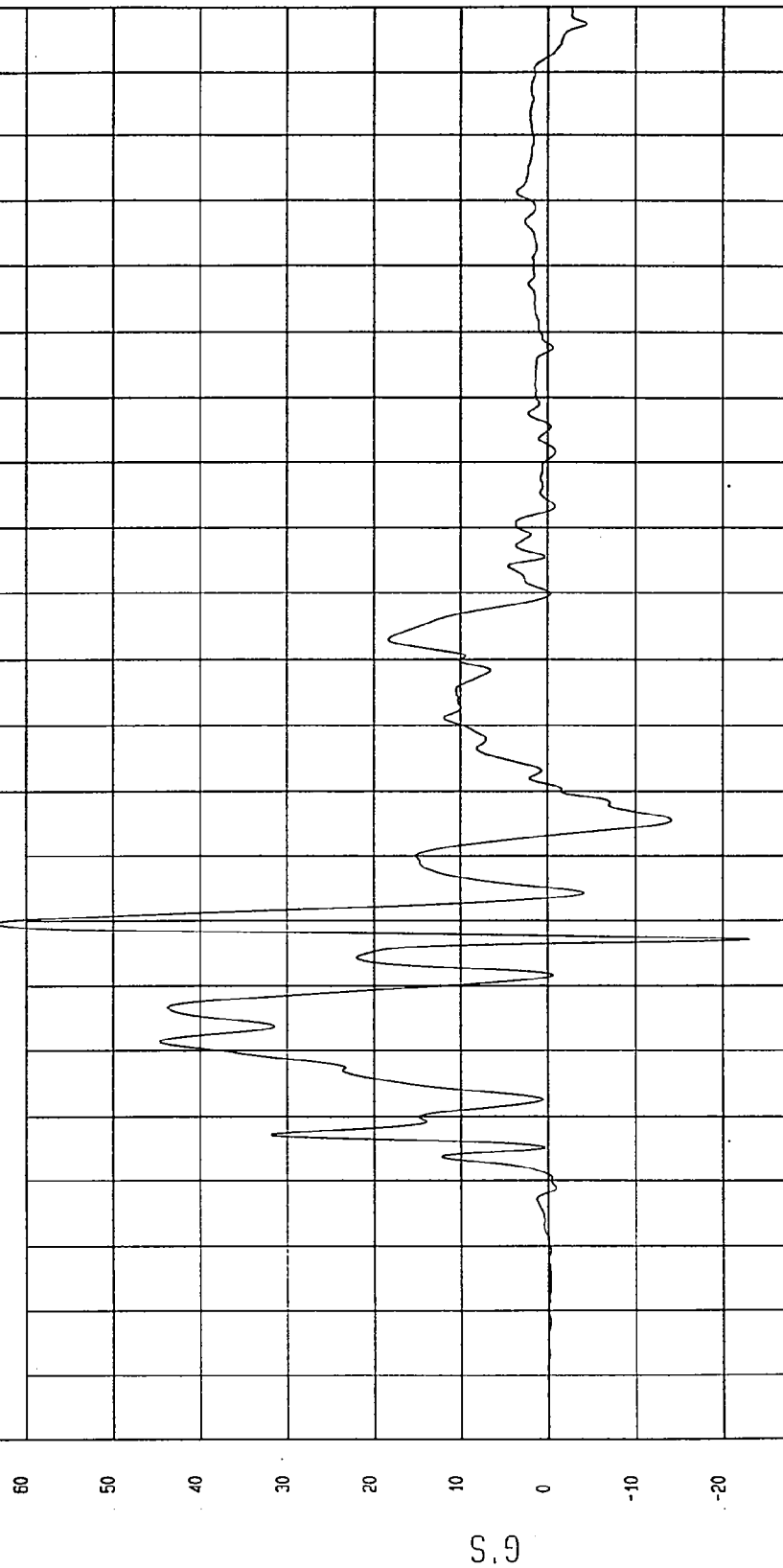
TEST: 35 MPH FRONTAL IMPACT TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU MV0120 Speed: 34.95 MPH 56.2 KPH

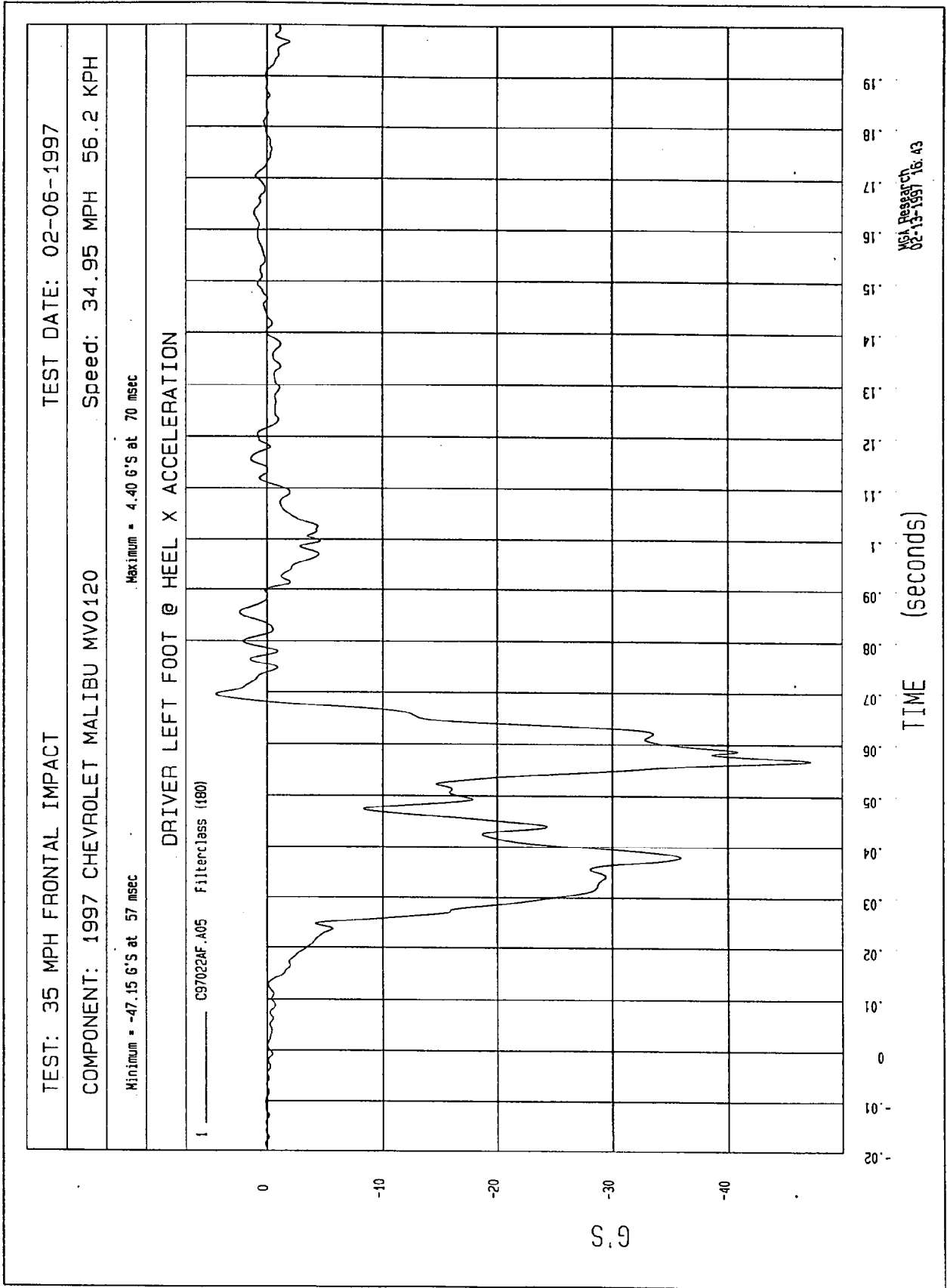
Minimum = -23.02 G'S at 57 msec Maximum = 63.62 G'S at 60 msec

DRIVER LEFT FOOT @ BALL Z ACCELERATION

1 C97022AF.A04 Filterclass (180)



MGA Research
02-13-1997 16:43



TEST: 35 MPH FRONTAL IMPACT

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU MV0120

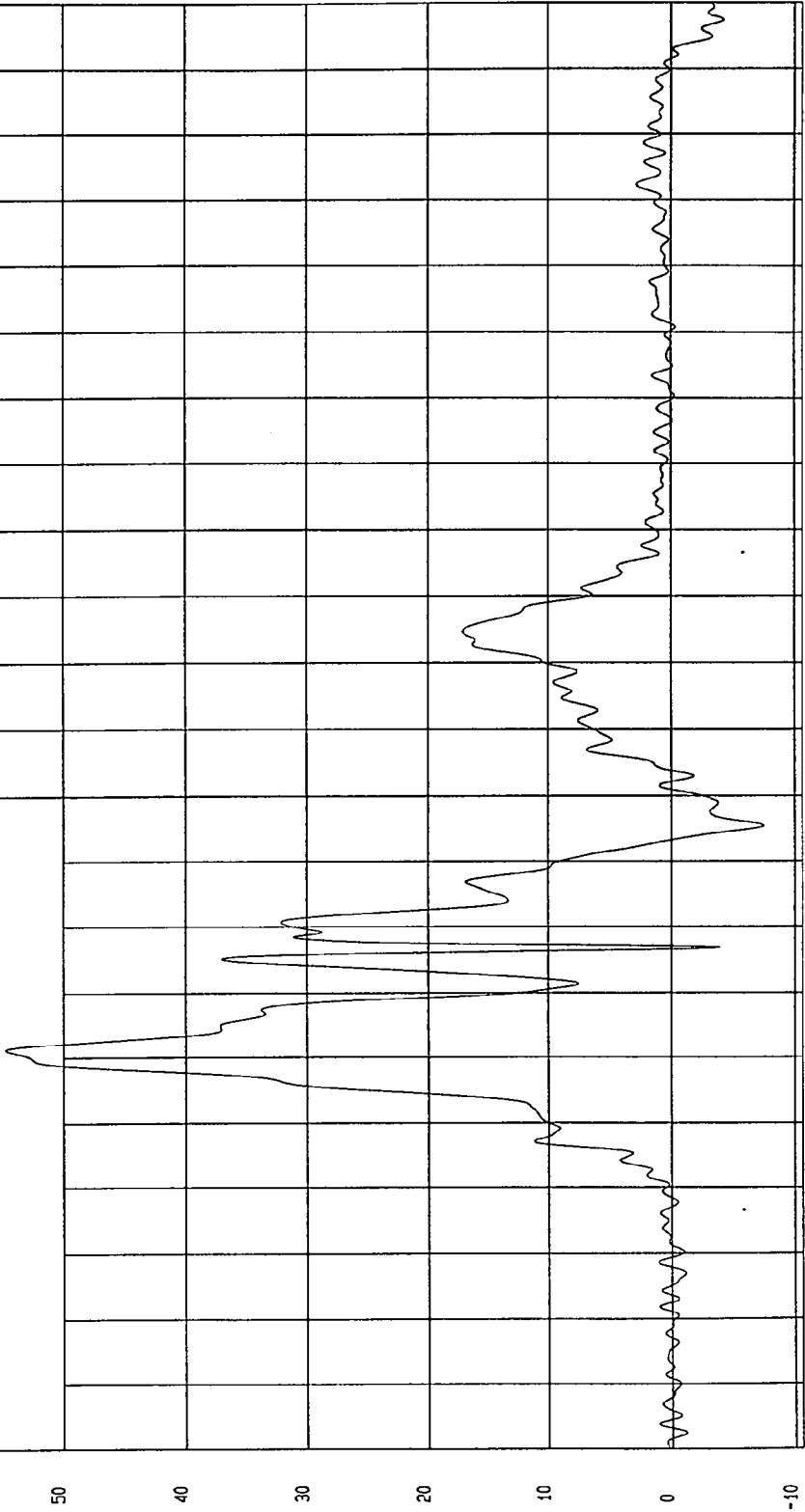
Speed: 34.95 MPH 56.2 KPH

Minimum = -7.51 G'S at 75 msec

Maximum = 54.69 G'S at 41 msec

DRIVER LEFT FOOT @ HEEL Z ACCELERATION

1 C97022AF.A06 Filterclass (180)



MSA Research
02-13-1997 16:43

TEST DATE: 02-06-1997

Speed: 34.95 MPH 56.2 KPH

Maximum = 175.87 G'S at 50 msec

1	C97022AF.A13	Filterclass (180)



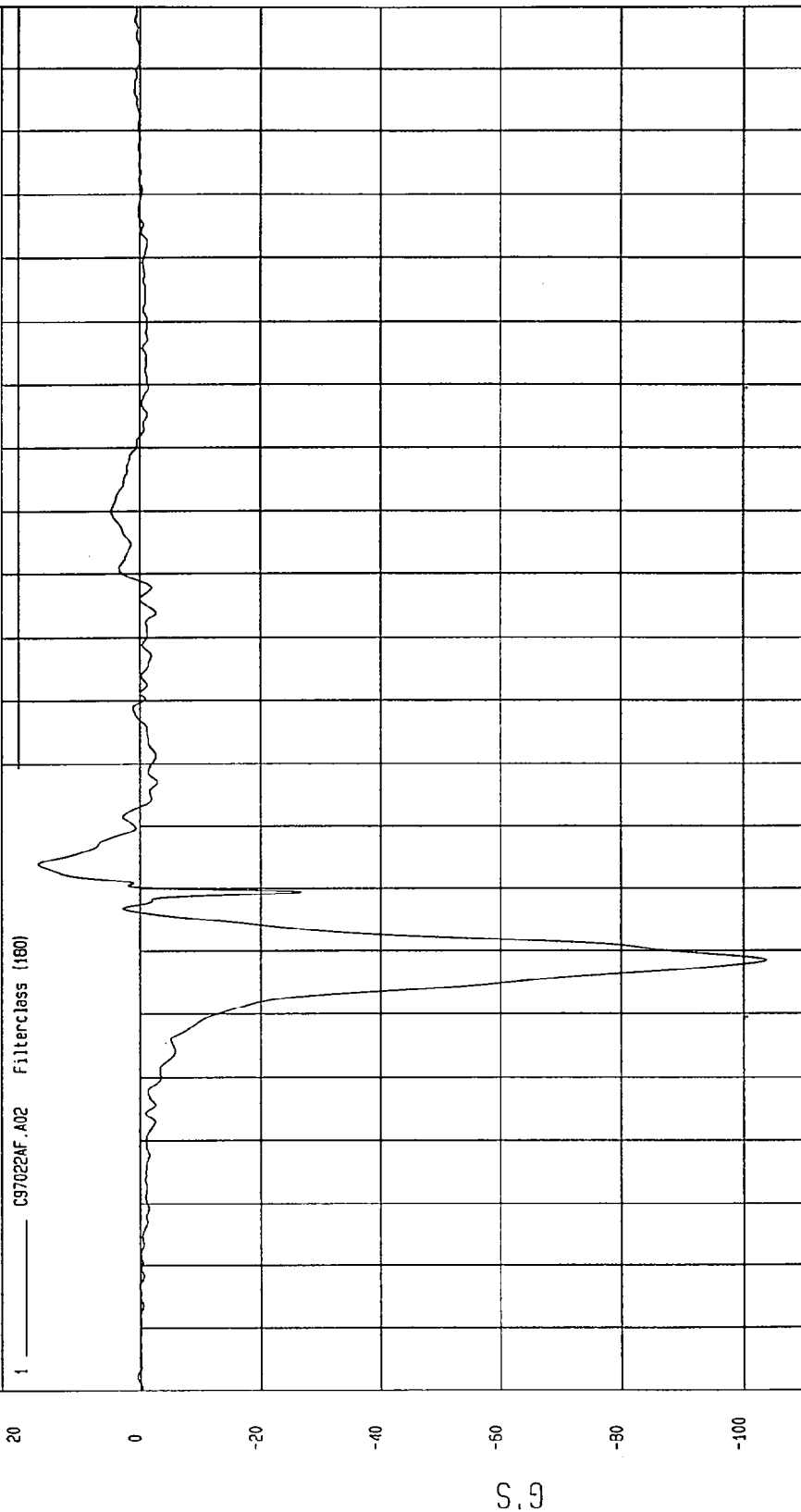
TEST: 35 MPH FRONTAL IMPACT TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU MV0120 Speed: 34.95 MPH 56.2 KPH

Minimum = -103.77 G'S at 48 msec Maximum = 16.76 G'S at 64 msec

DRIVER RIGHT FOOT @ HEEL X ACCELERATION

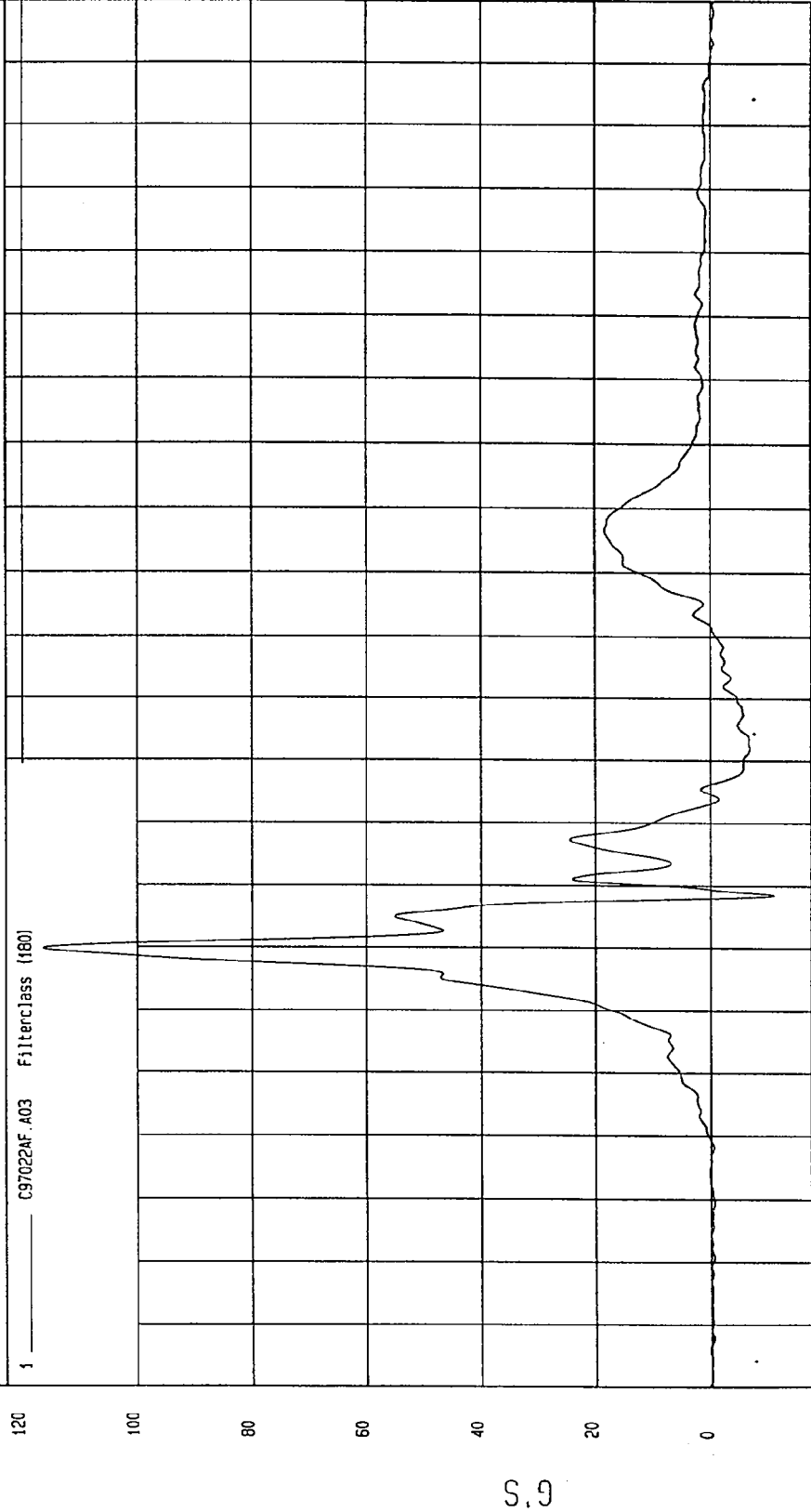
1 C97022AF.A02 Filterclass (160)



MCA Research
02-13-1997 15:43

TEST: 35 MPH FRONTAL IMPACT	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU MVO120	Speed: 34.95 MPH 56.2 KPH
Minimum = -11.01 G'S at 58 msec	Maximum = 116.55 G'S at 50 msec

DRIVER RIGHT FOOT @ HEEL Z ACCELERATION

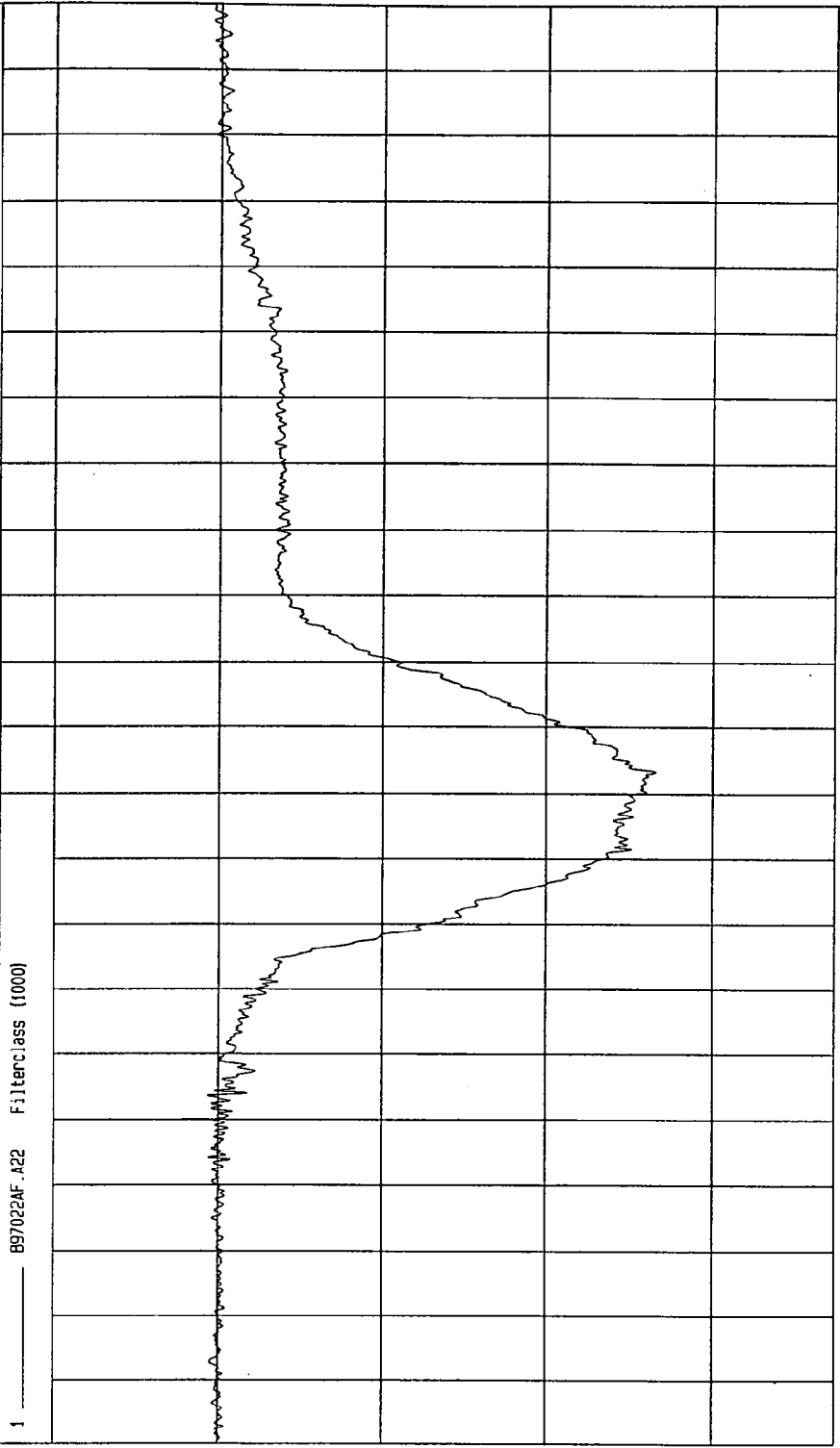


TIME (seconds)

WCA Research
02-13-1997 16:43

TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -53.29 G'S at 83 msec	Maximum = 1.27 G'S at 34 msec

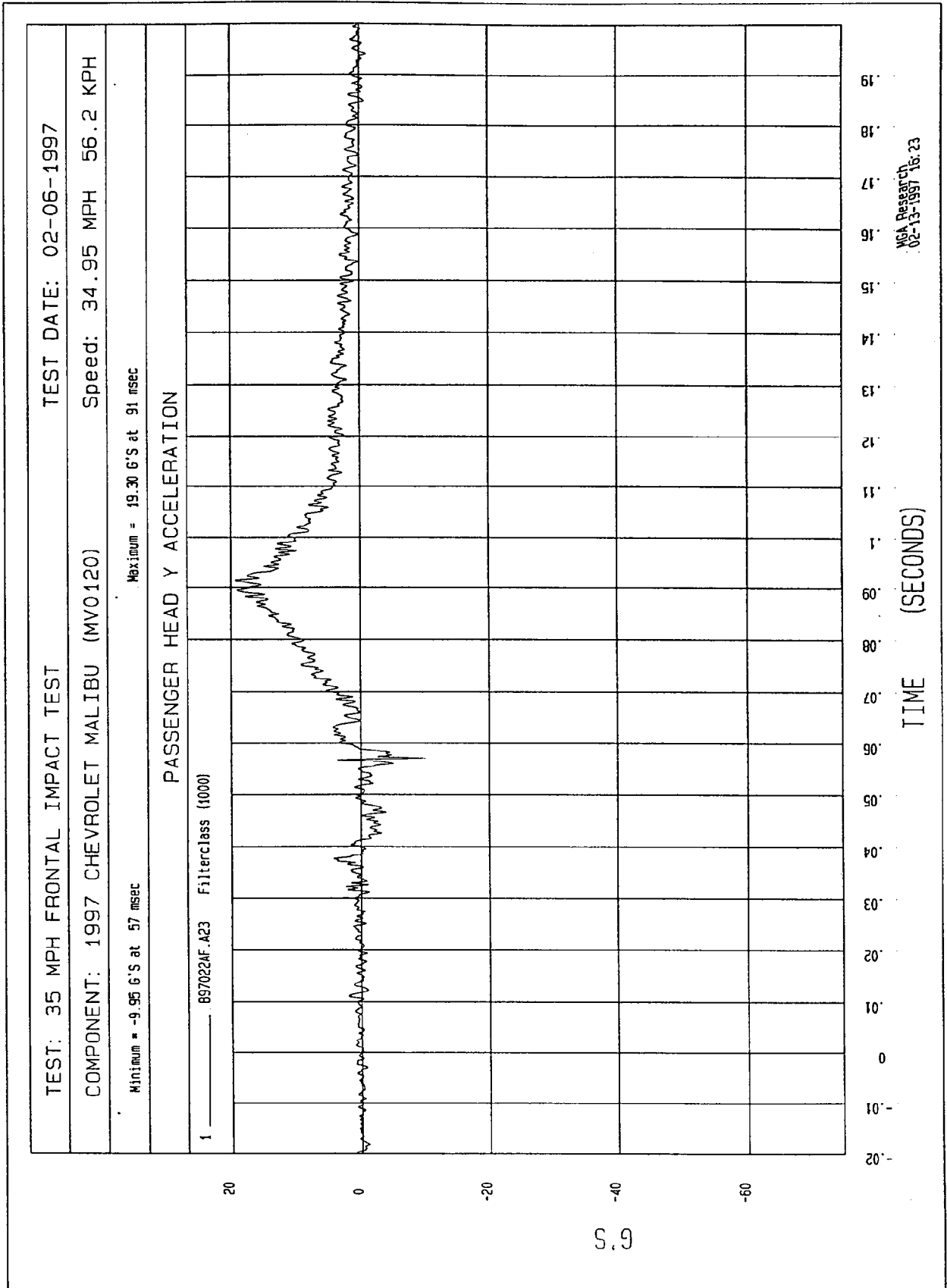
PASSENGER HEAD X ACCELERATION



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

WCA Research
02-13-1997 16:23



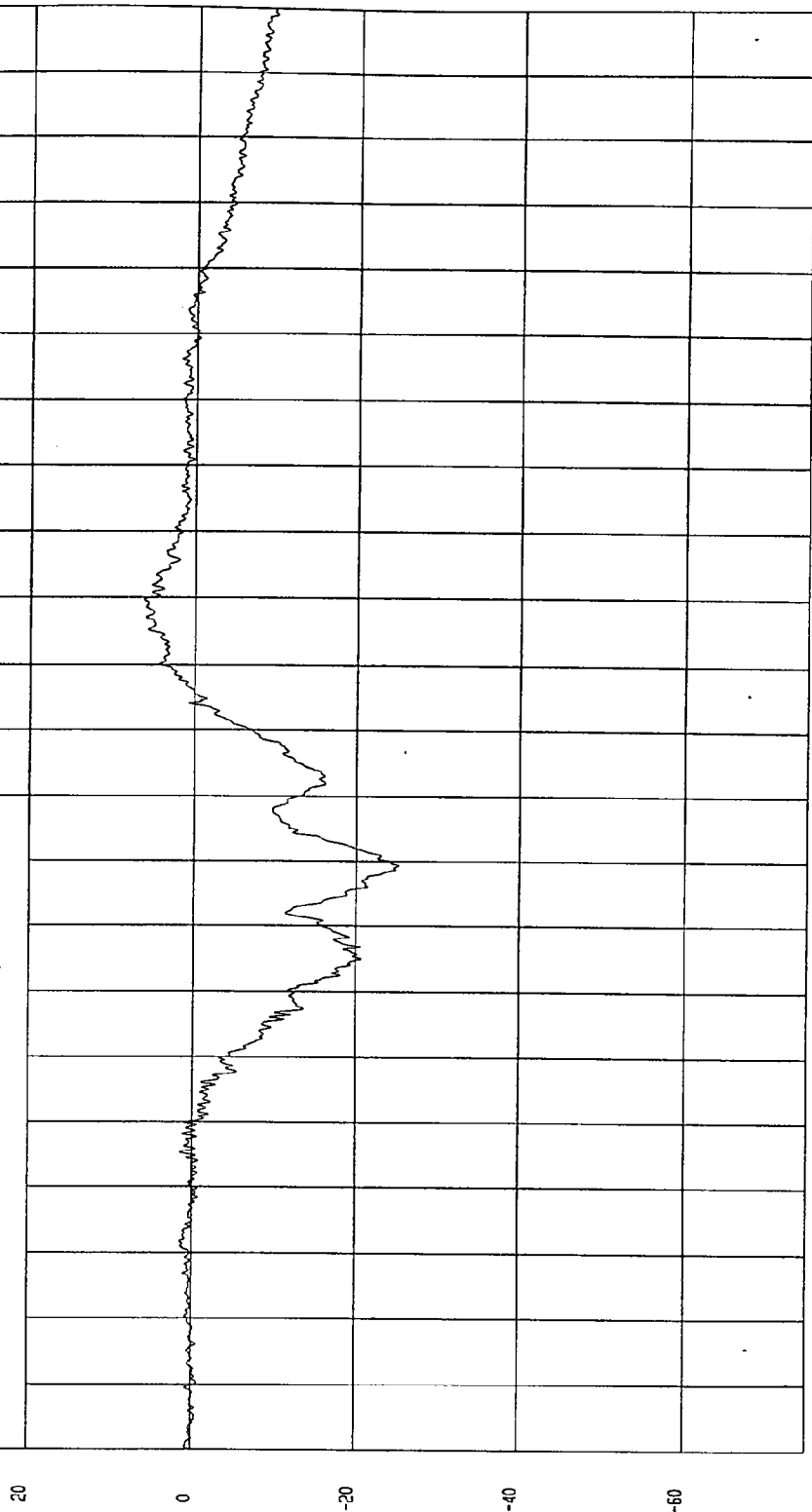
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -25.14 G'S at 69 msec Maximum = 6.27 G'S at 110 msec

PASSENGER HEAD Z ACCELERATION

1 897022AF.A24 Filterclass (1000)



TIME (SECONDS)

MOA Research
02-13-1997 16:23

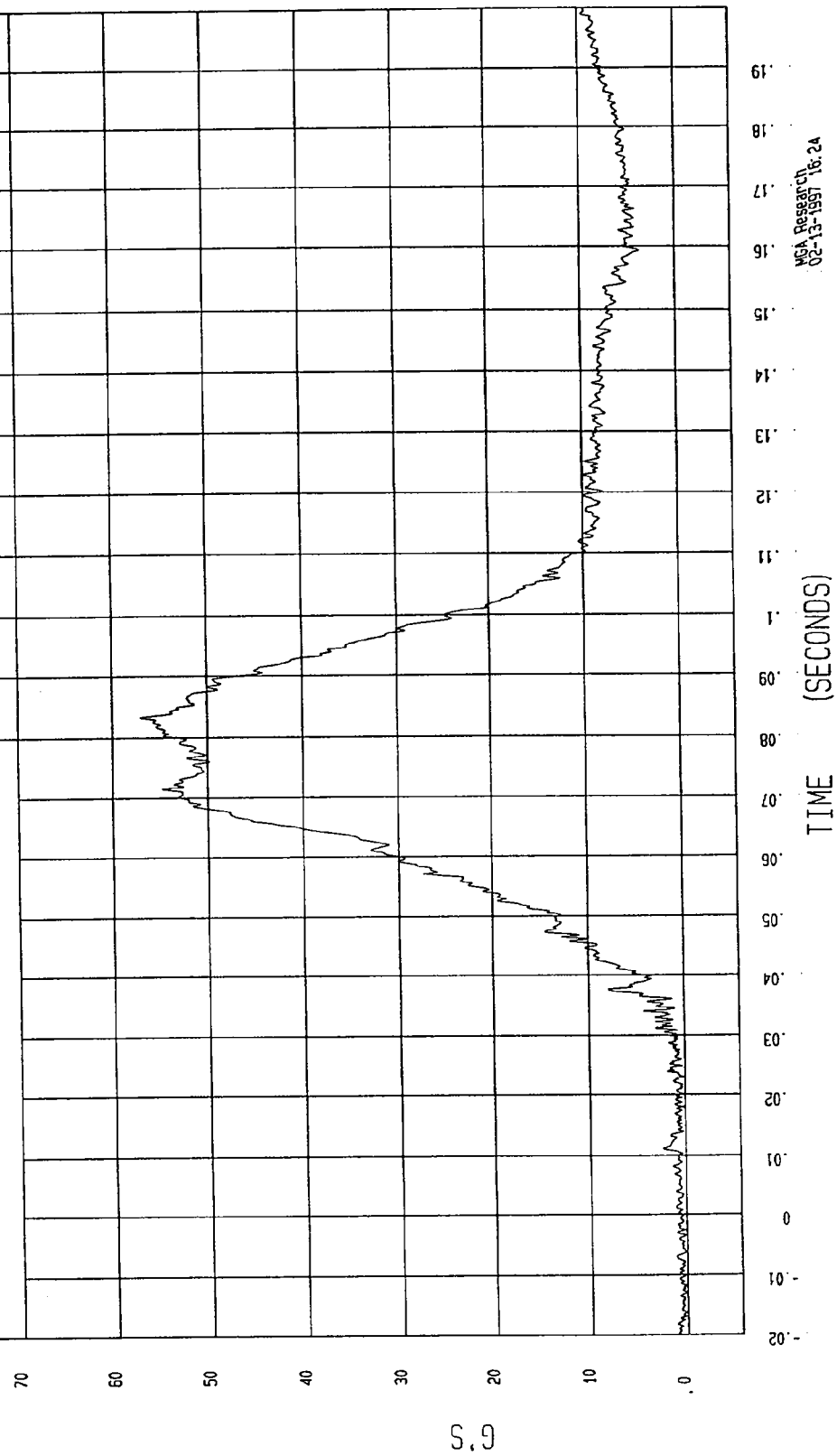
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = 8.03E-02 G'S at 18 msec Maximum = 57.01 G'S at 83 msec

PASSENGER HEAD RESULTANT ACCELERATION

1 B97022AV.A22 Filterclass (1000)



MCA Research
02-13-1997 16:24

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -27.72 KPH at 196 msec
Maximum = 56.23 KPH at -3 msec

PASSENGER HEAD X VELOCITY

1 ——— B97022A1.V22 Filterclass (1000)

60

50

40

30

20

10

0

-10

-20

-30

KPH

-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

MSA Research
02-13-1997 16:30

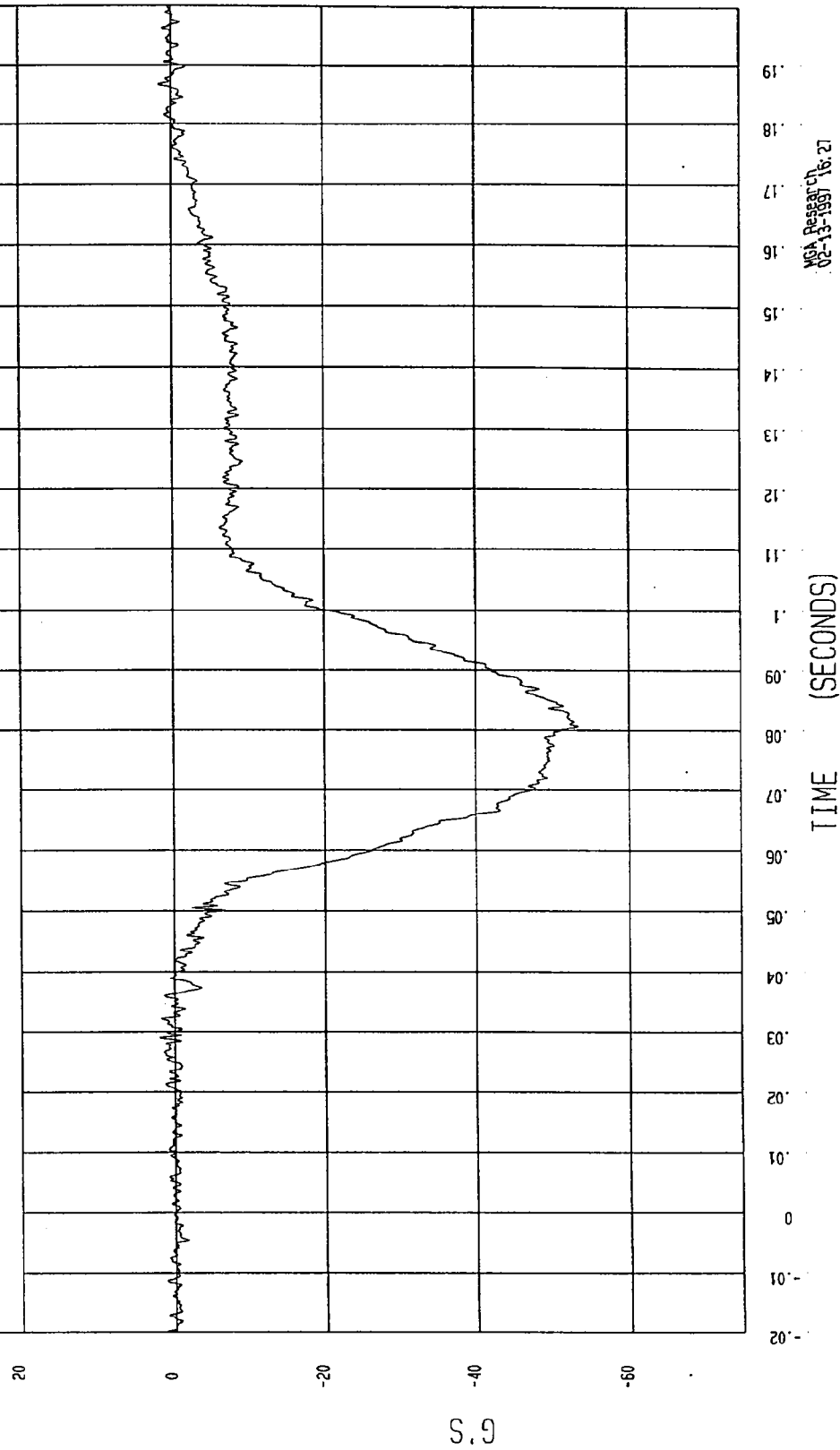
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -53.49 G's at 81 msec Maximum = 1.94 G's at 29 msec

PASSENGER HEAD REDUNDANT X ACCELERATION

1 897022AF.A36 Filterclass (1000)



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

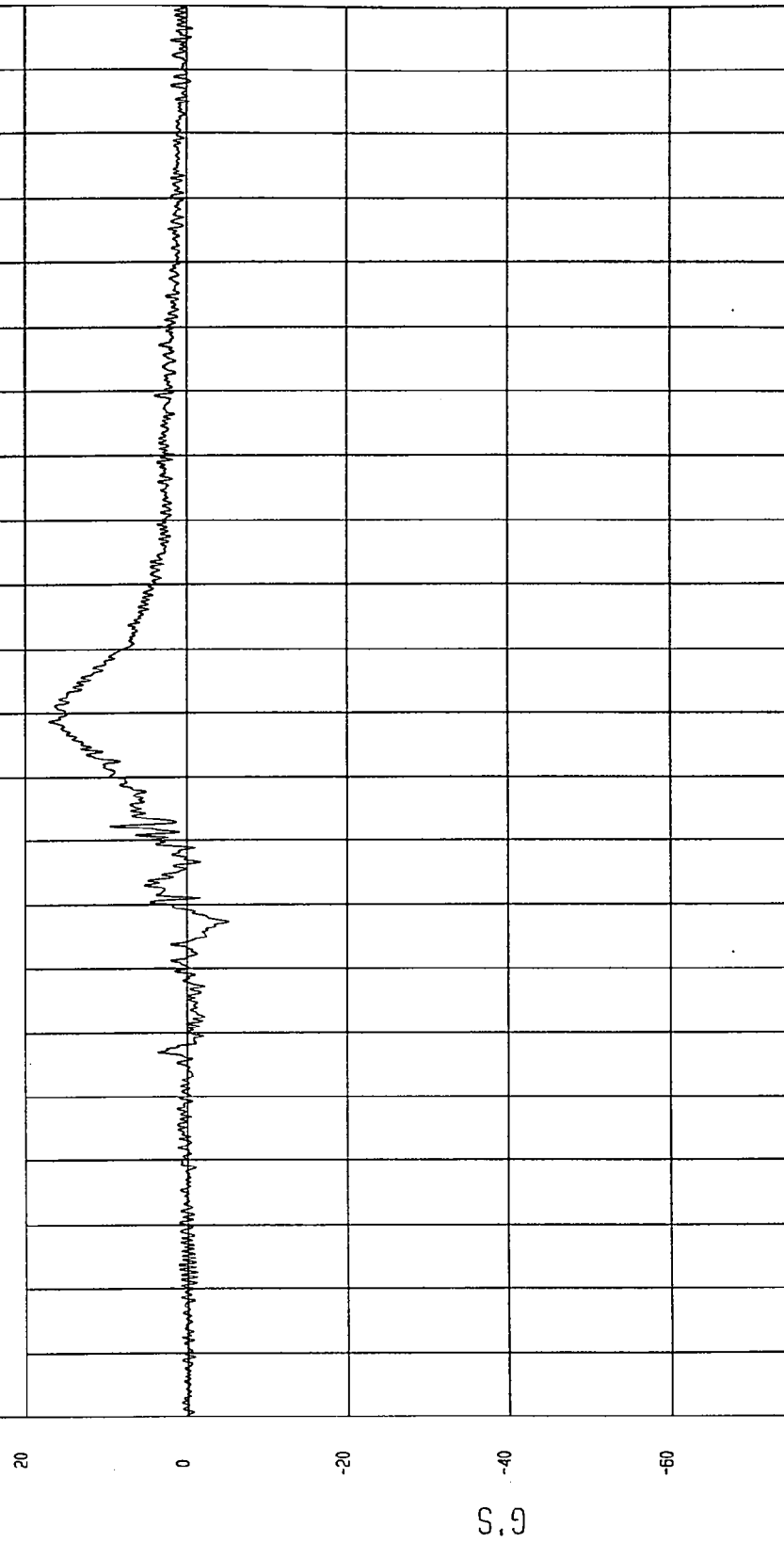
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -5.28 G'S at .57 msec

Maximum = 17.06 G'S at .89 msec

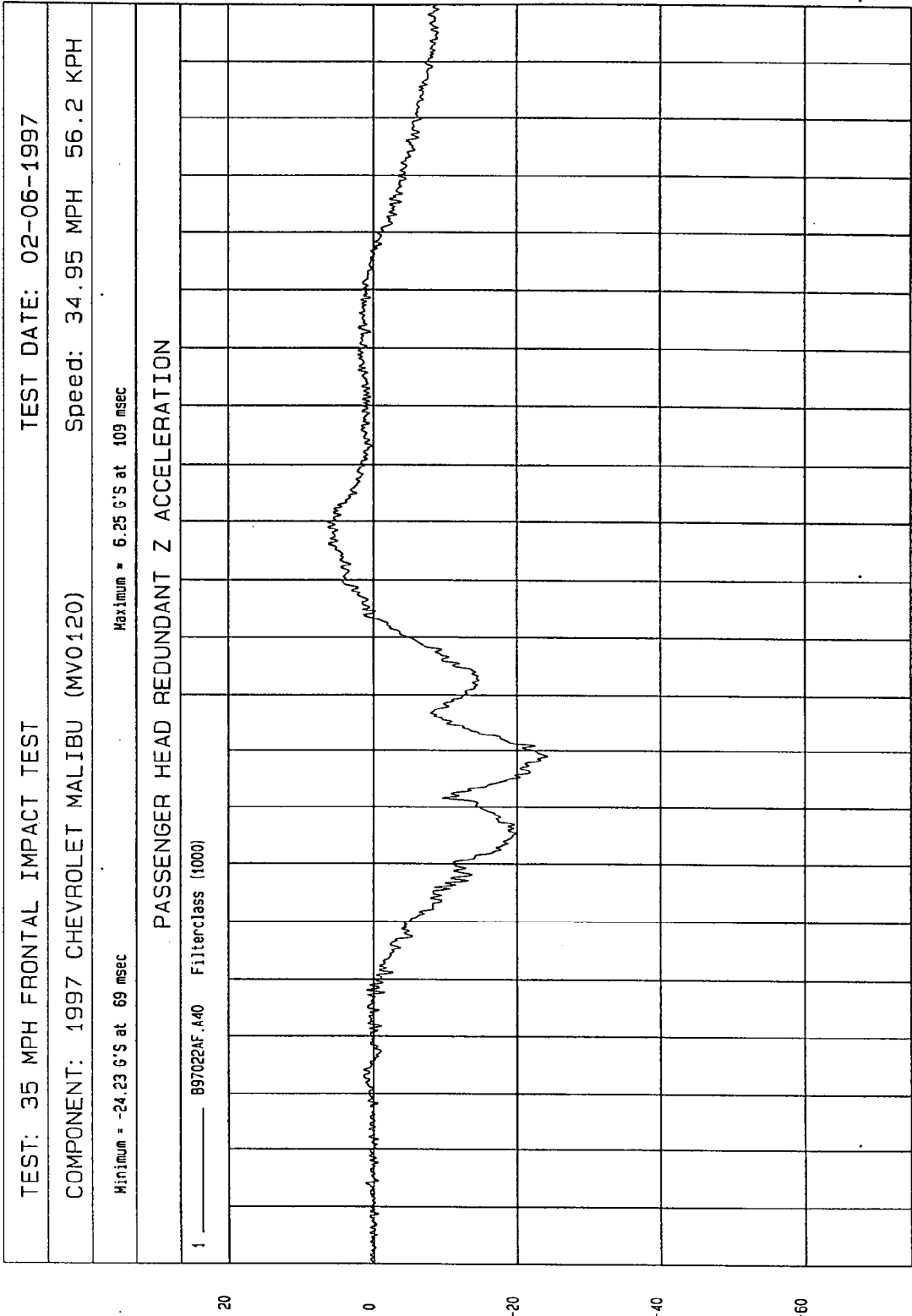
PASSENGER HEAD REDUNDANT Y ACCELERATION

1 ——— B97022AF.A39 Filterclass (1000)



TIME (SECONDS)

MGA Research
02-13-1997 16:27



TIME (SECONDS)

NSA Research
02-13-1997 16:27

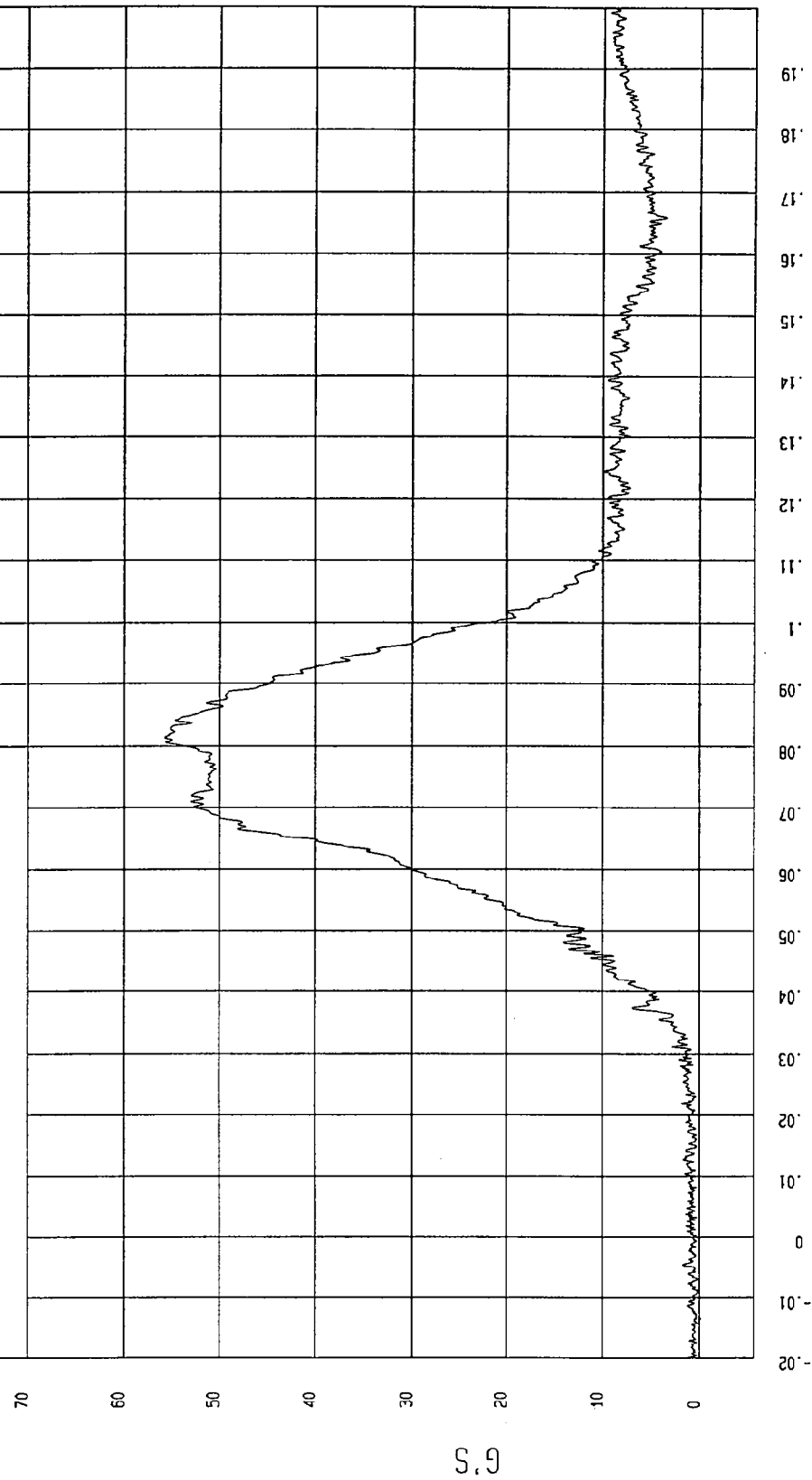
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

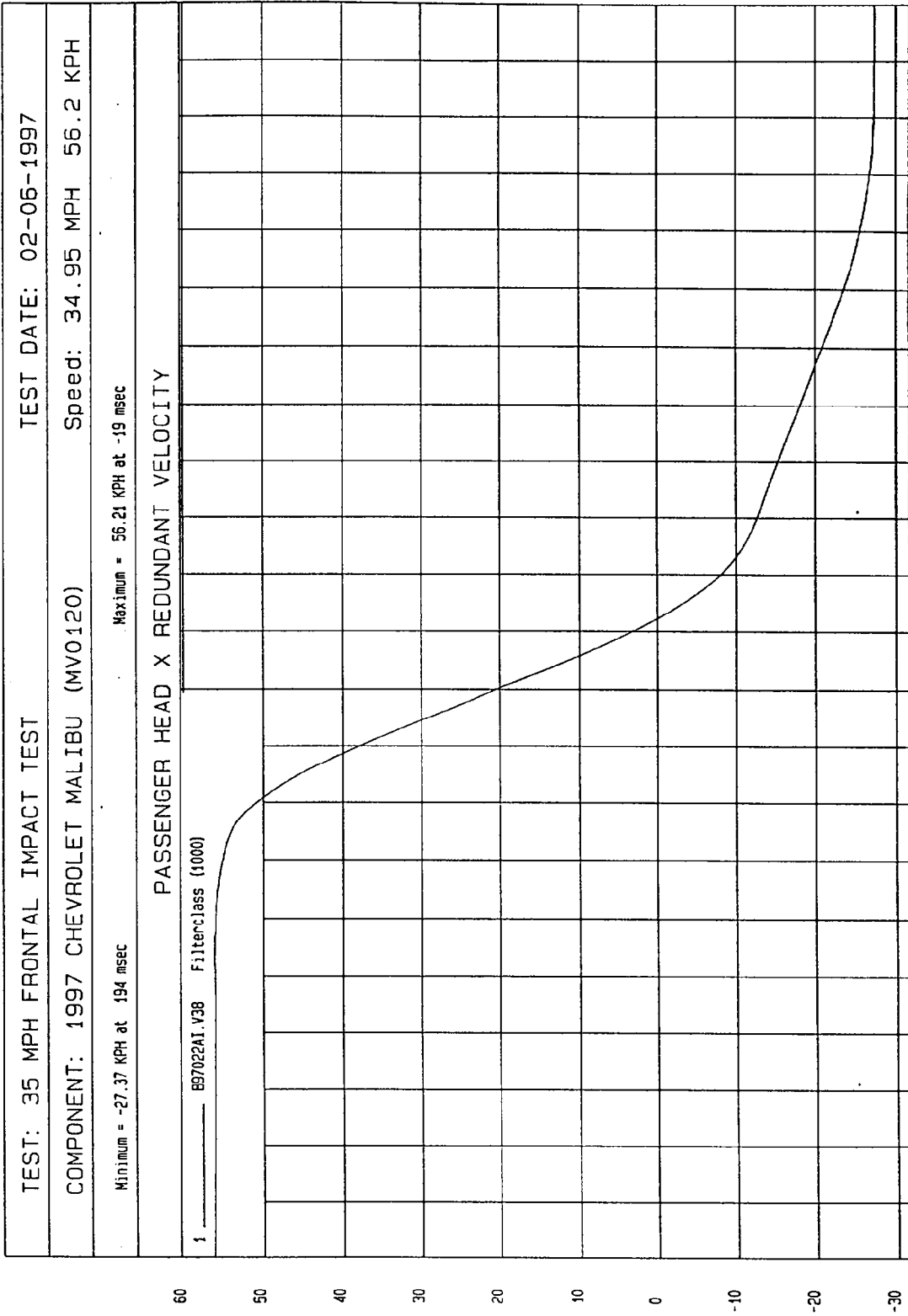
Minimum = .11 G'S at -7 msec Maximum = 55.79 G'S at 81 msec

PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION

1 897022AV.A38 Filterclass (1000)



MGA Research
02-13-1997 16:27



NSA Research
02-13-1997 16:31

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

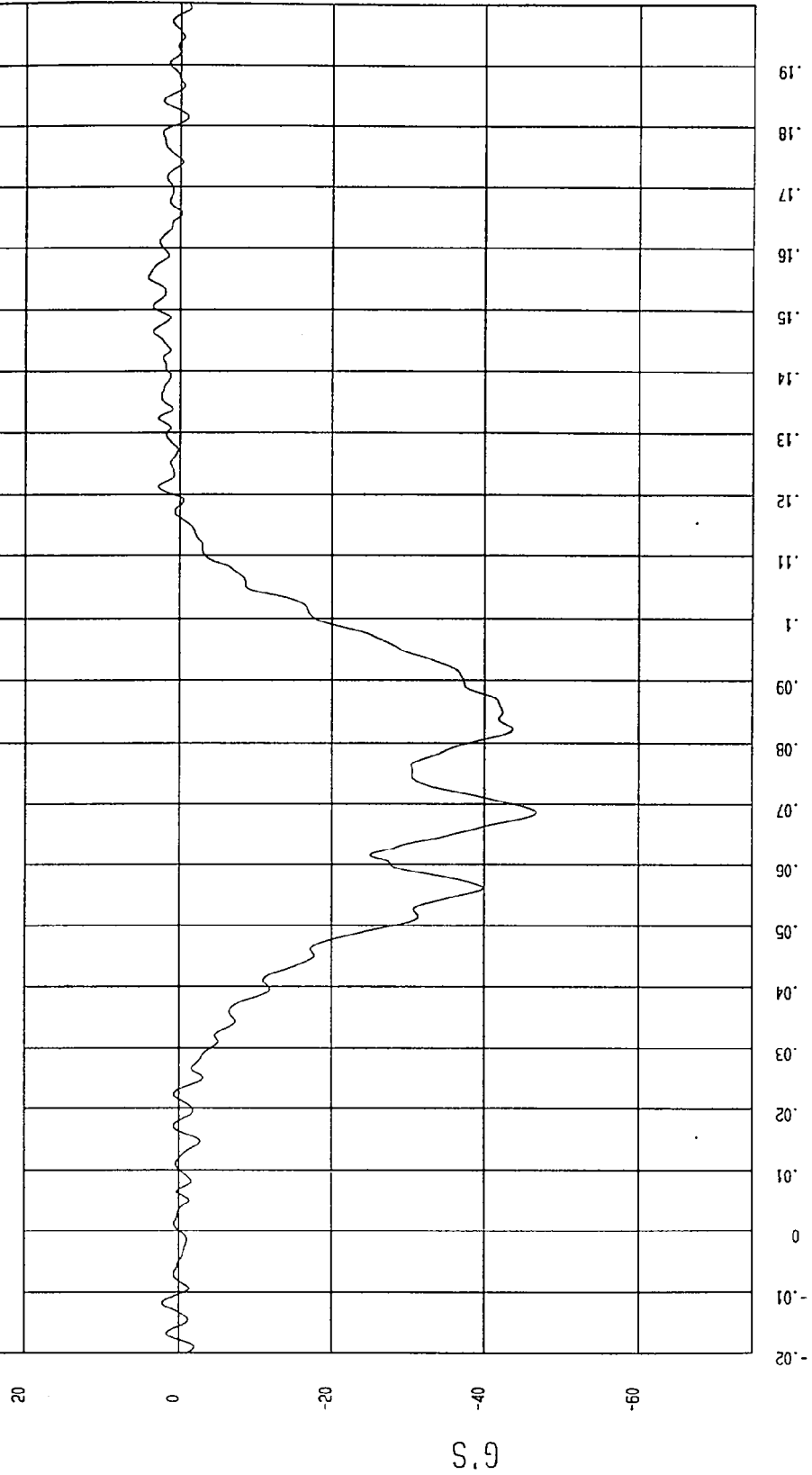
Speed: 34.95 MPH 56.2 KPH

Minimum = -46.81 G'S at 69 msec

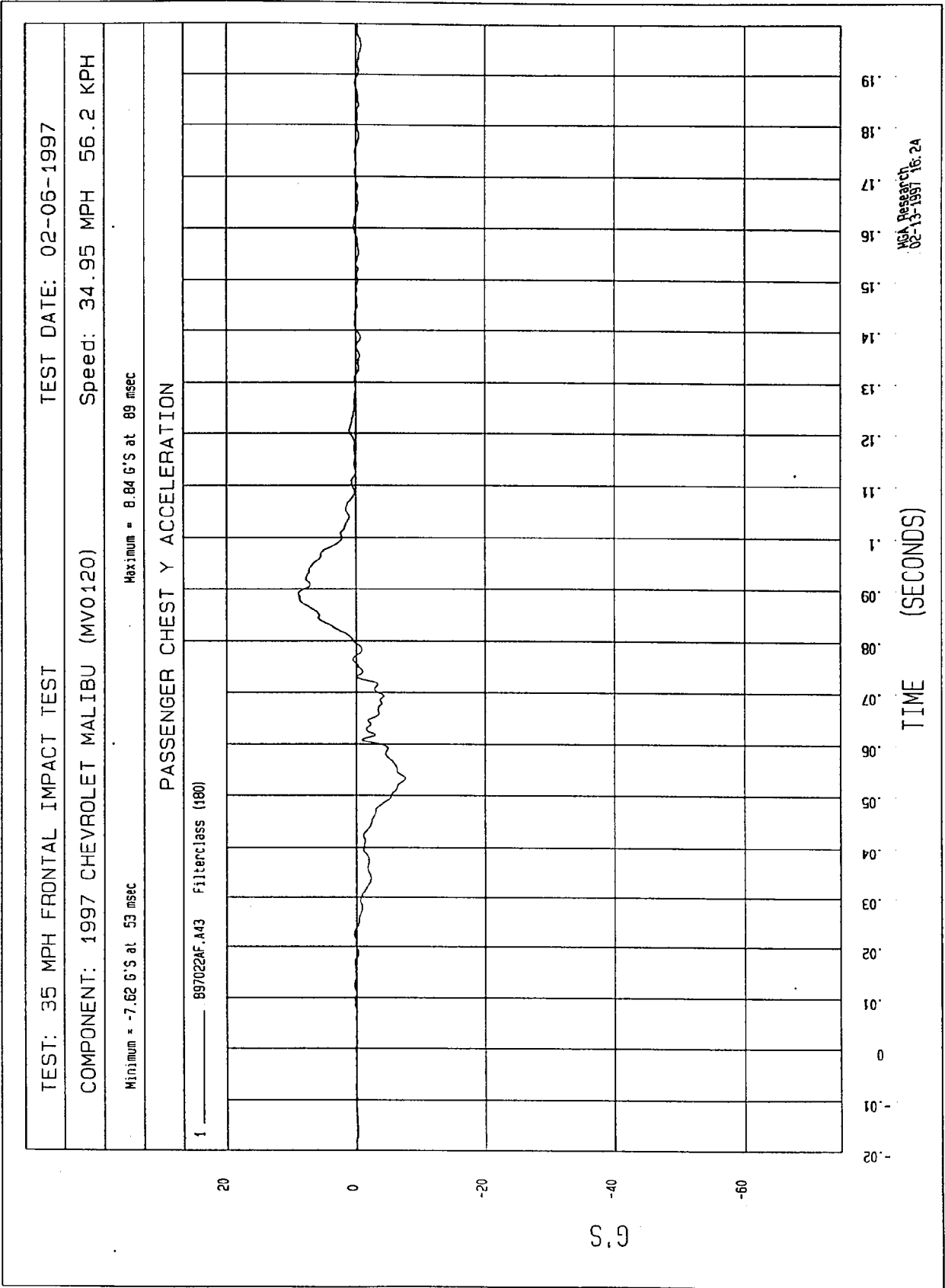
Maximum = 4.19 G'S at 155 msec

PASSENGER CHEST X ACCELERATION

1 _____ B97022AF.A25 Filterclass (180)



MGA Research
02-13-1997 16:24



TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MVO120) Speed: 34.95 MPH 56.2 KPH

Minimum = -7.56 G'S at 72 msec Maximum = 12.59 G'S at 98 msec

PASSENGER CHEST Z ACCELERATION

1 ——— B97022AF.A27 Filterclass (180)

20

0

-20

-40

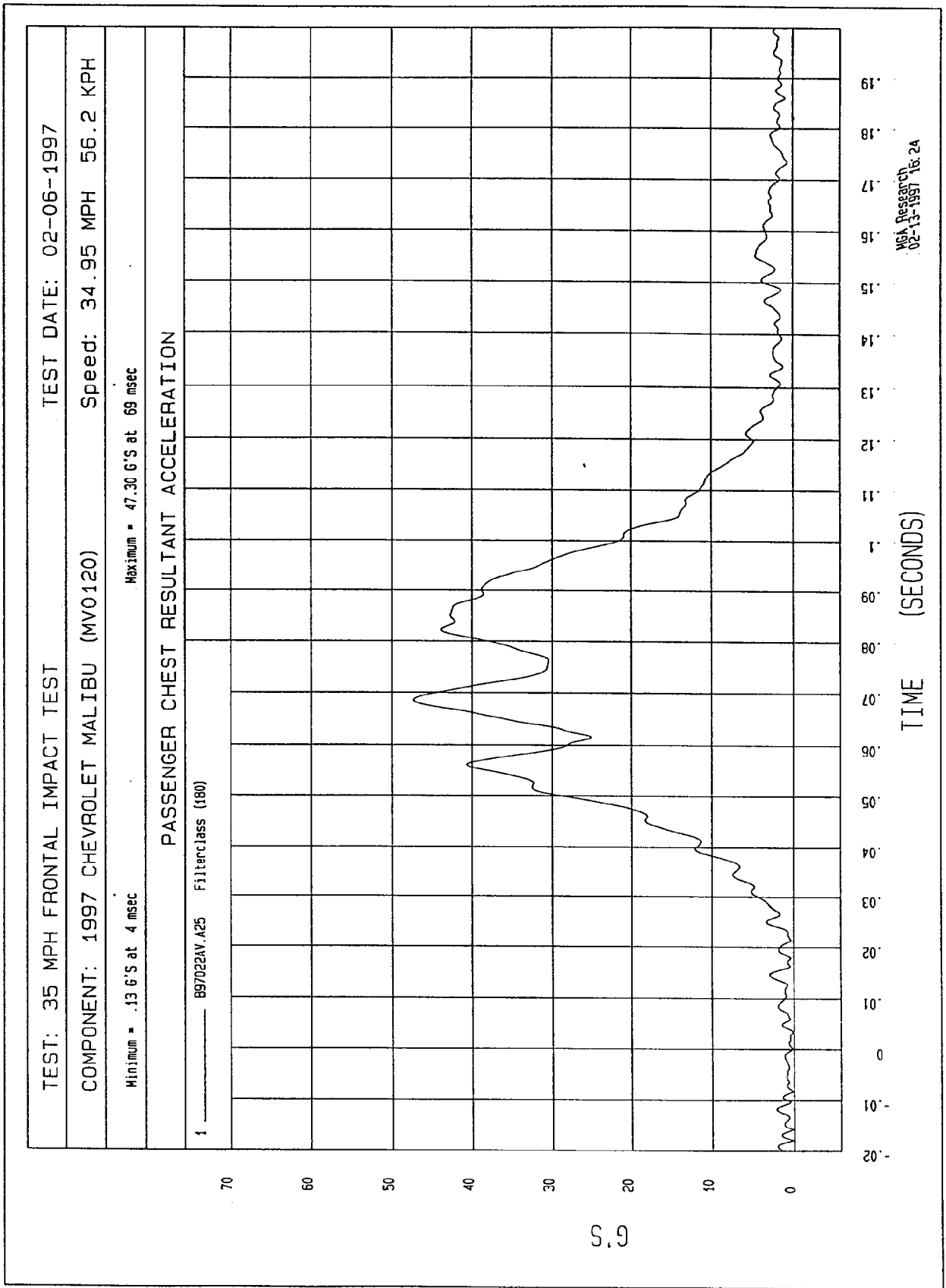
-60

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
02-13-1997 16:24



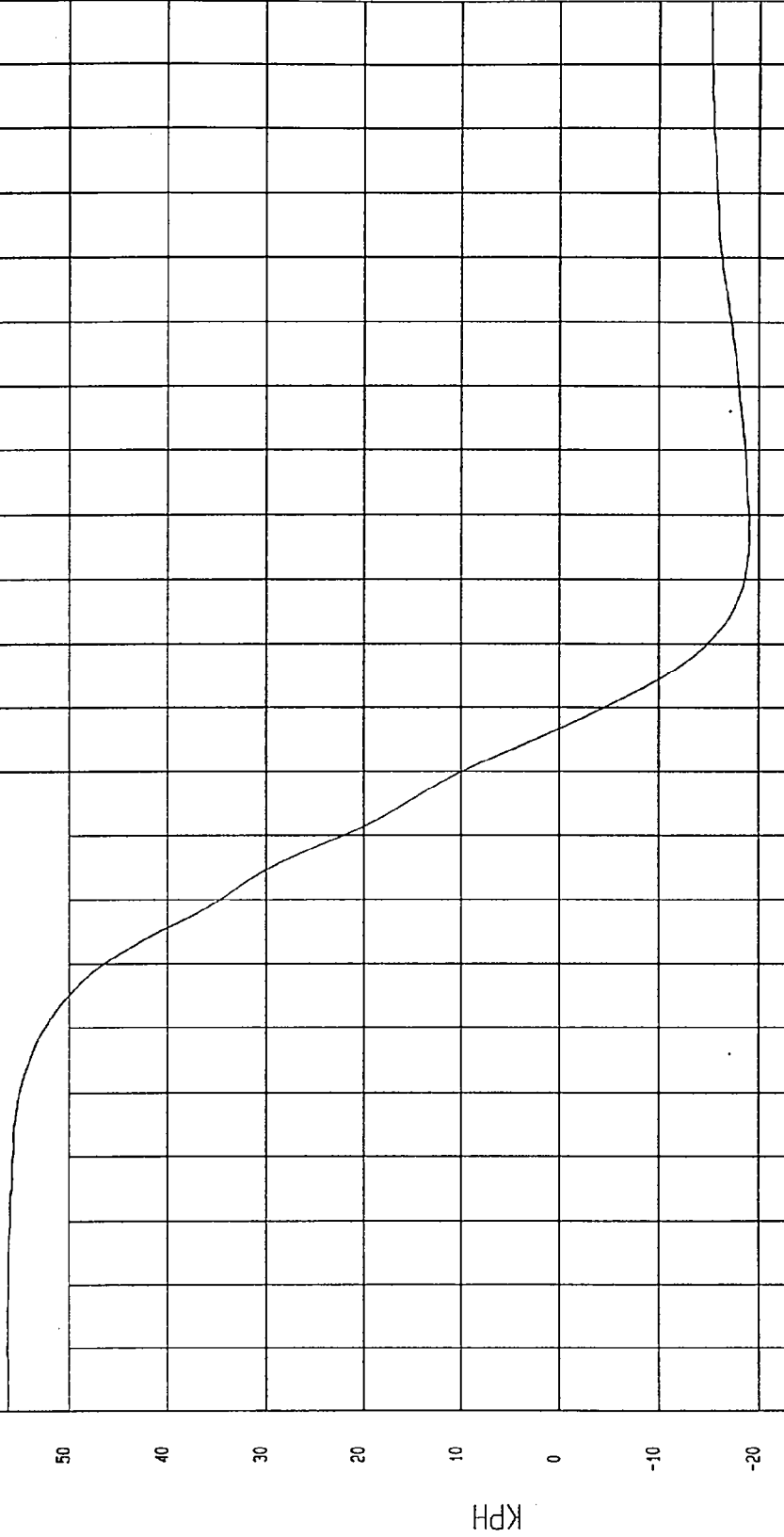
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

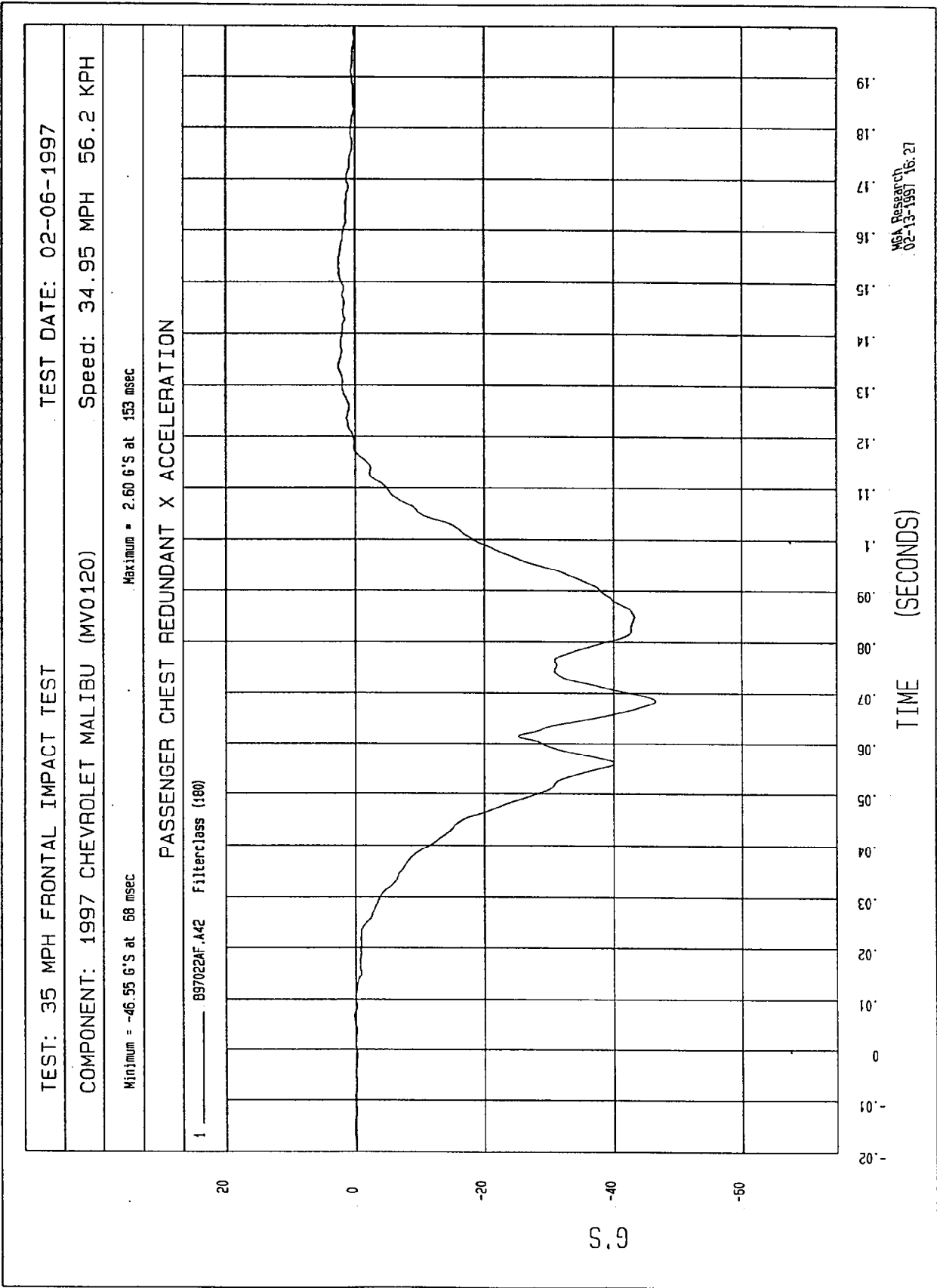
Minimum = -19.09 KPH at 116 msec Maximum = 56.23 KPH at -10 msec

PASSENGER CHEST X VELOCITY

1 897022A1.V25 FilterClass (180)



WCA Research
02-13-1997 16:30



TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -7.46 G'S at 53 msec

Maximum = 8.86 G'S at 90 msec

PASSENGER CHEST REDUNDANT Y ACCELERATION

1 B97022AF.A26 Filterclass (480)

20

0

-20

-40

-60

G'S

-0.02

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)

NSA Research
02-13-1997 16:27

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

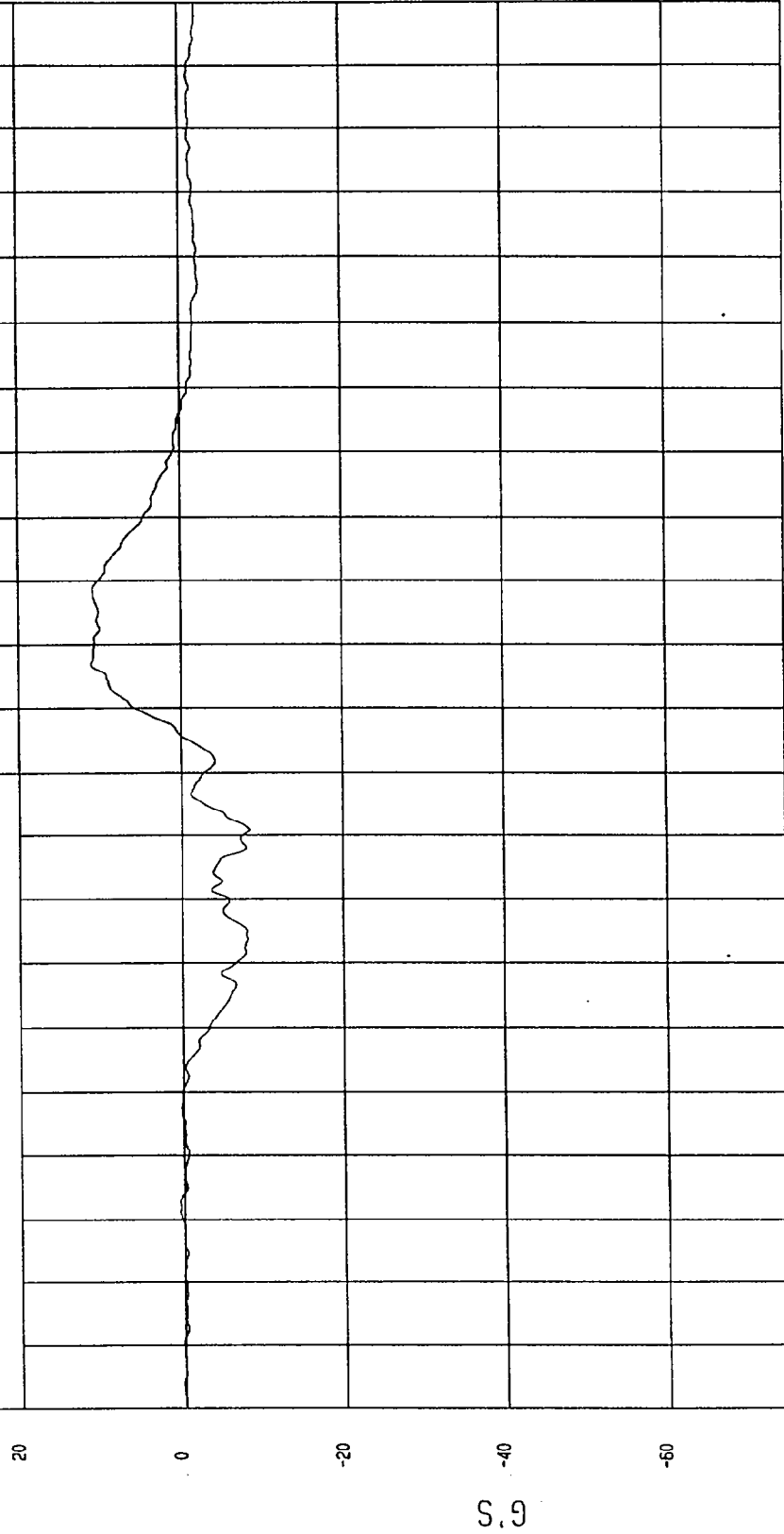
Speed: 34.95 MPH 56.2 KPH

Minimum = -8.37 G'S at 71 msec

Maximum = 10.97 G'S at 97 msec

PASSENGER CHEST REDUNDANT Z ACCELERATION

1 ——— B97022AF.A44 Filterclass (180)



MCA Research
02-13-1997 16:27

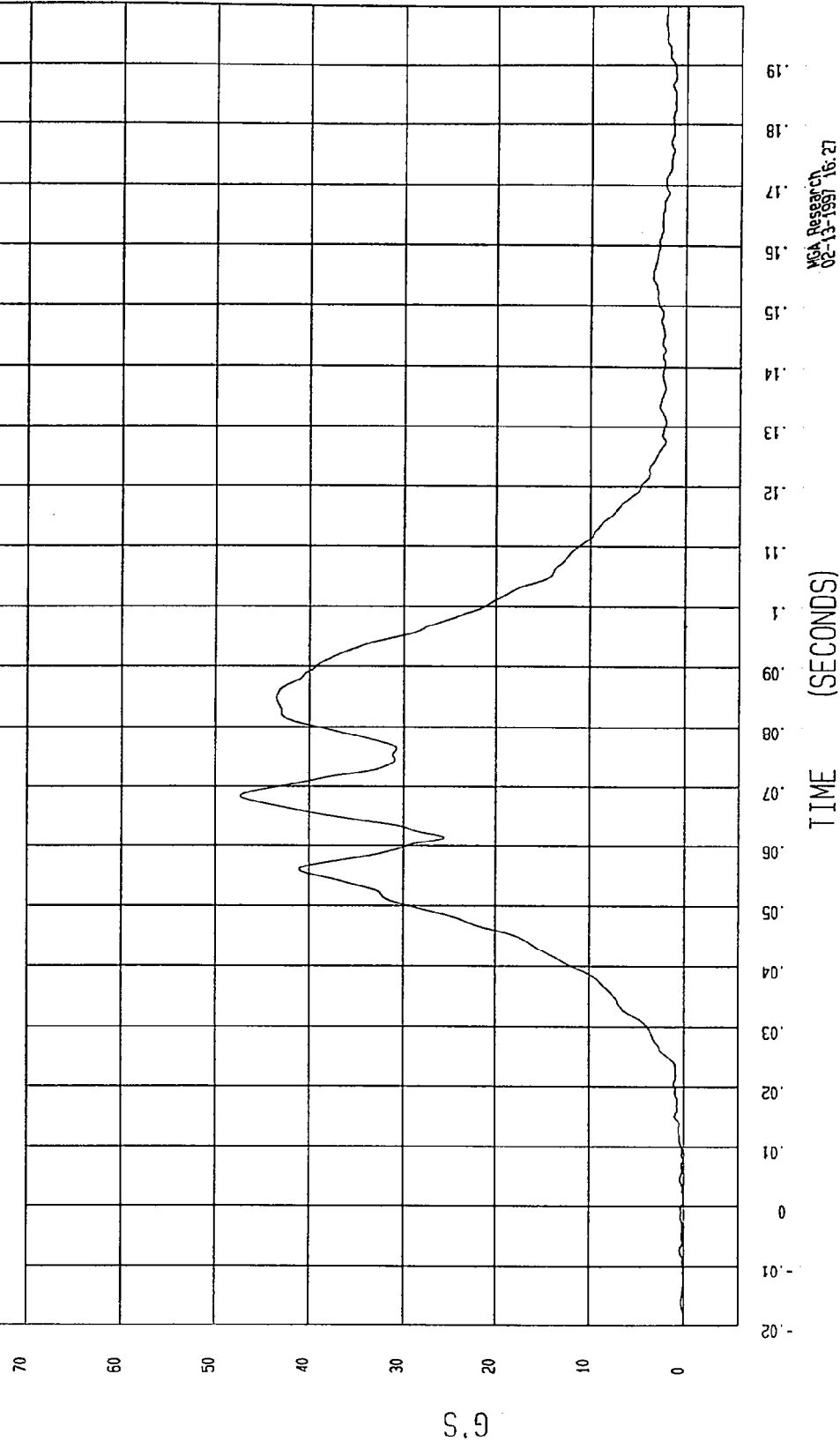
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = 2.64E-02 G'S at -12 msec Maximum = 47.35 G'S at 68 msec

PASSENGER CHEST REDUNDANT RESULTANT ACCELERATION

1 ——— B97022AV.A42 Filterclass (180)



MGA Research
02-13-1997 16:27

TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -19.49 KPH at 117 msec
Maximum = 56.22 KPH at -9 msec

PASSENGER CHEST X REDUNDANT VELOCITY

1 ——— B97022A1.V42 Filterclass (180)

60

50

40

30

20

10

0

-10

-20

KPH

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 16:31

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

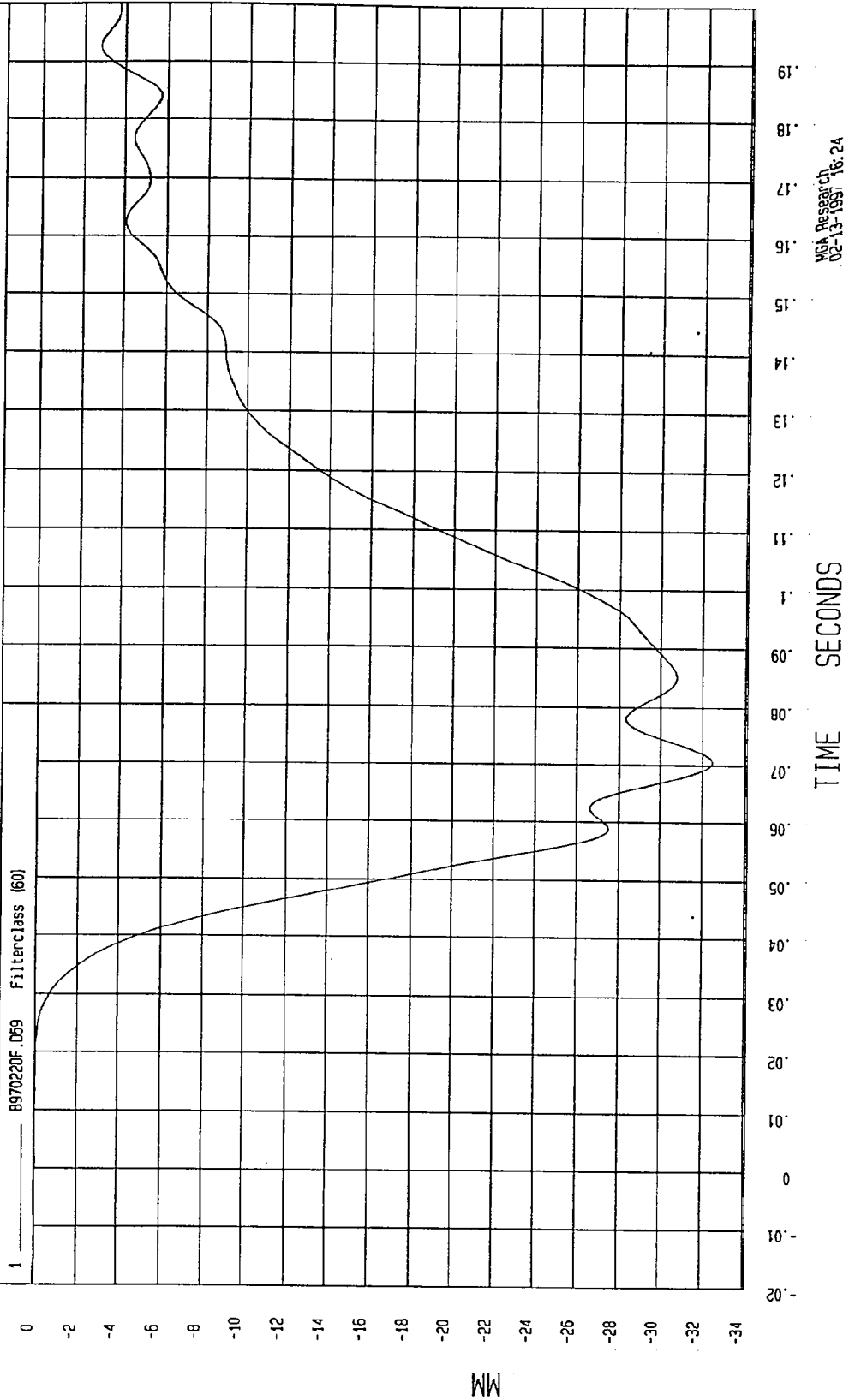
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

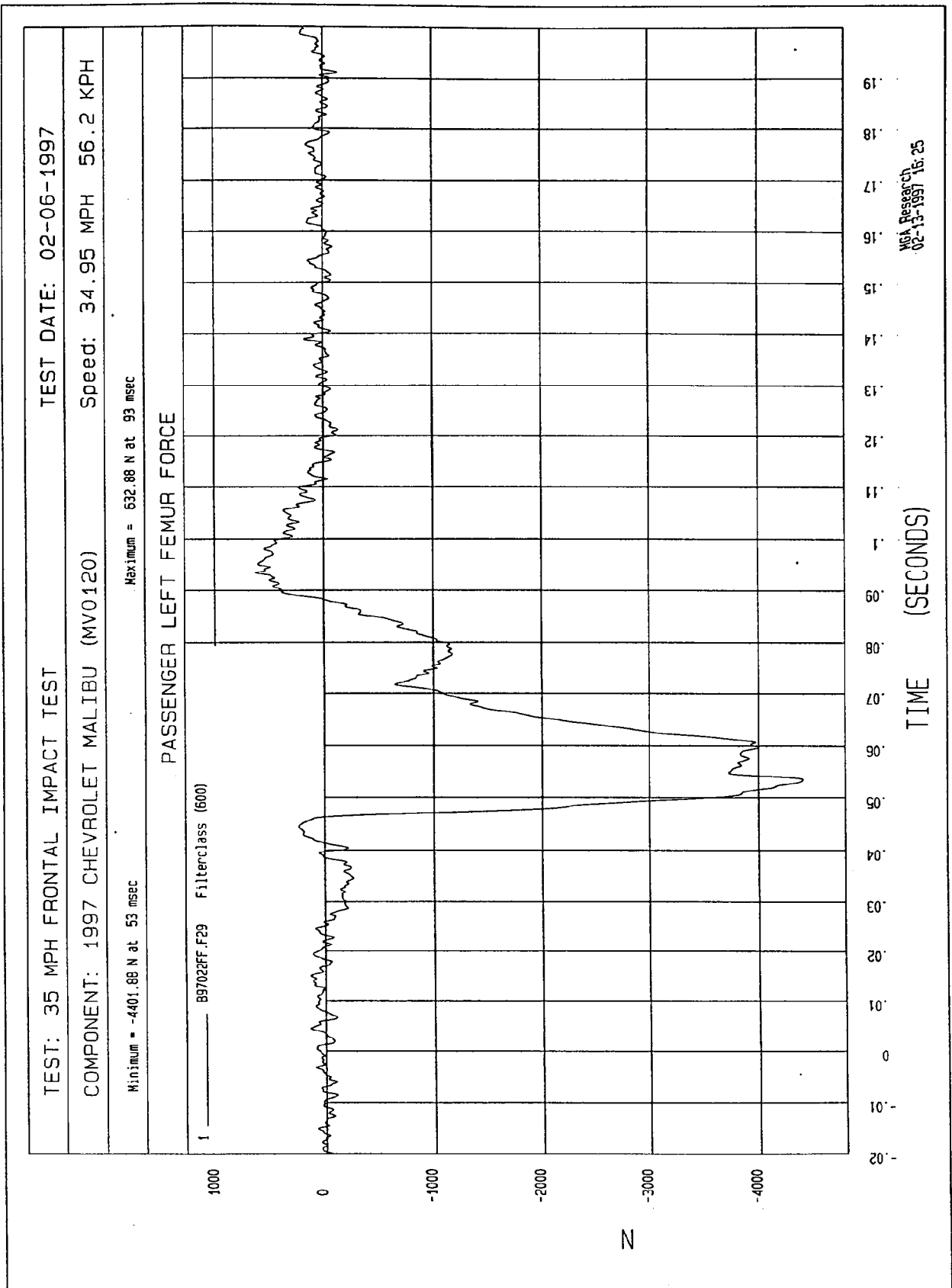
Speed: 34.95 MPH 56.2 KPH

Minimum = -32.46 MM at 70 msec

Maximum = 4.35E-02 MM at -19 msec

PASSENGER CHEST COMPRESSION



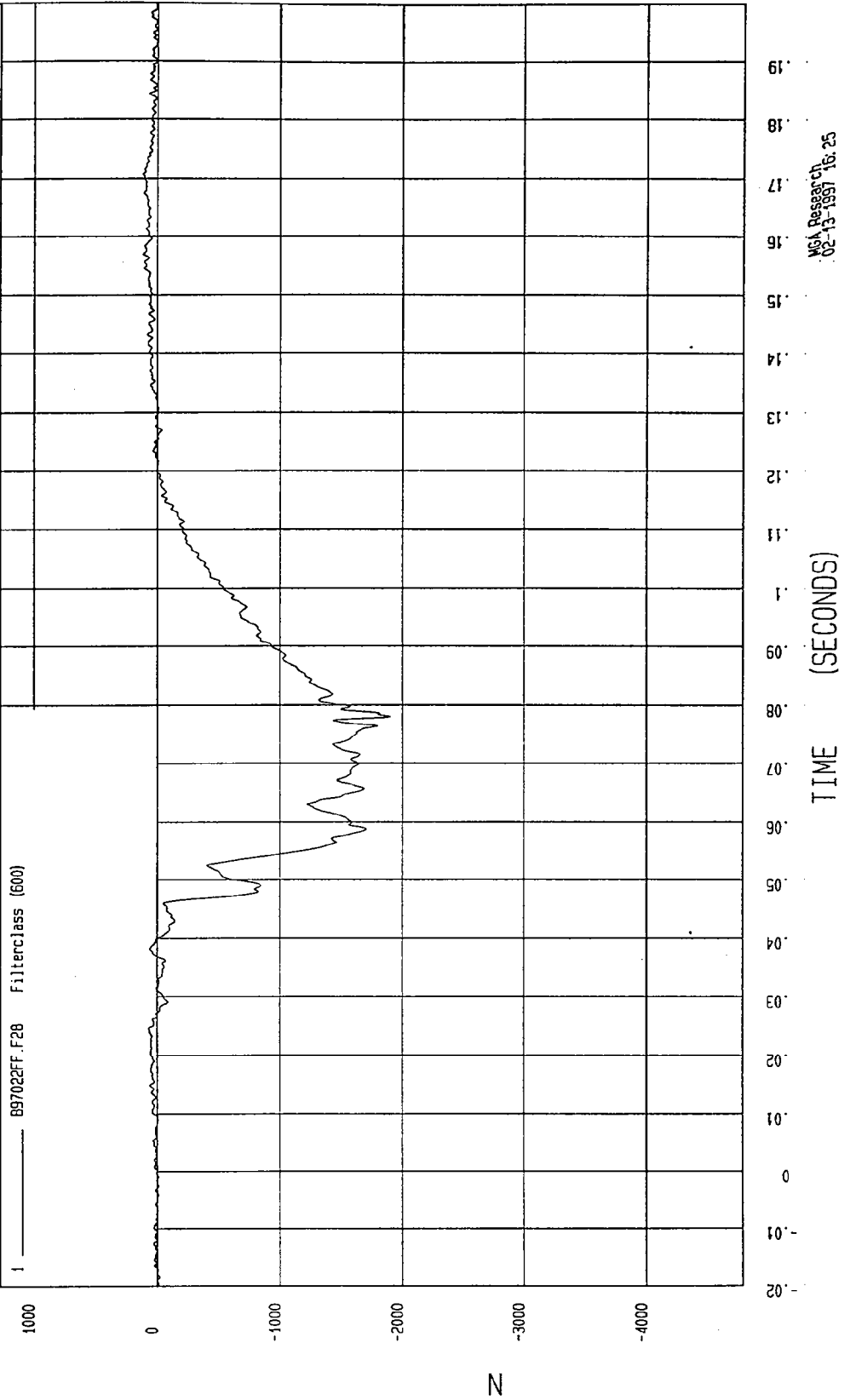


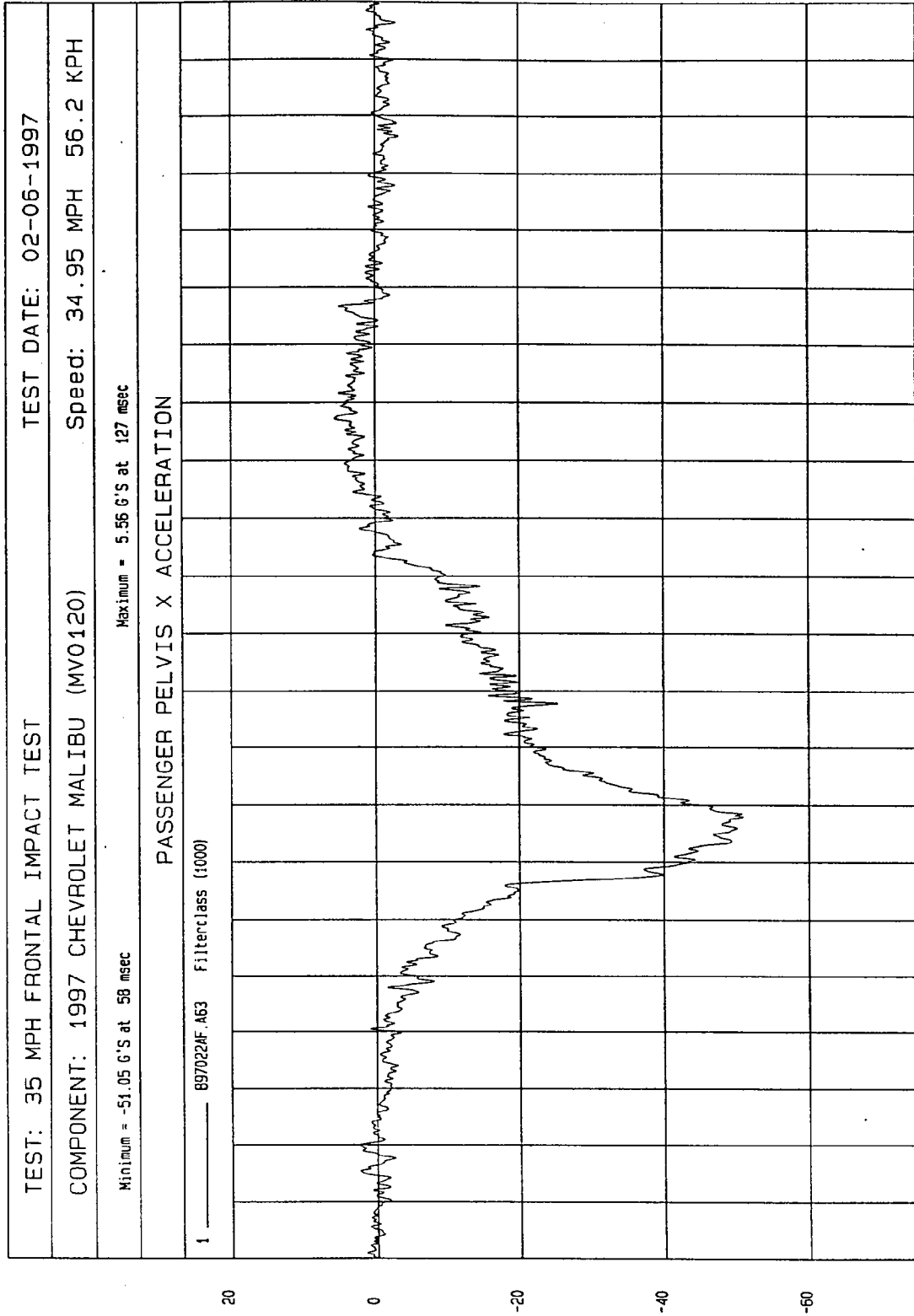
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -1899.15 N at 78 msec Maximum = 118.45 N at 171 msec

PASSENGER RIGHT FEMUR FORCE





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 16:24

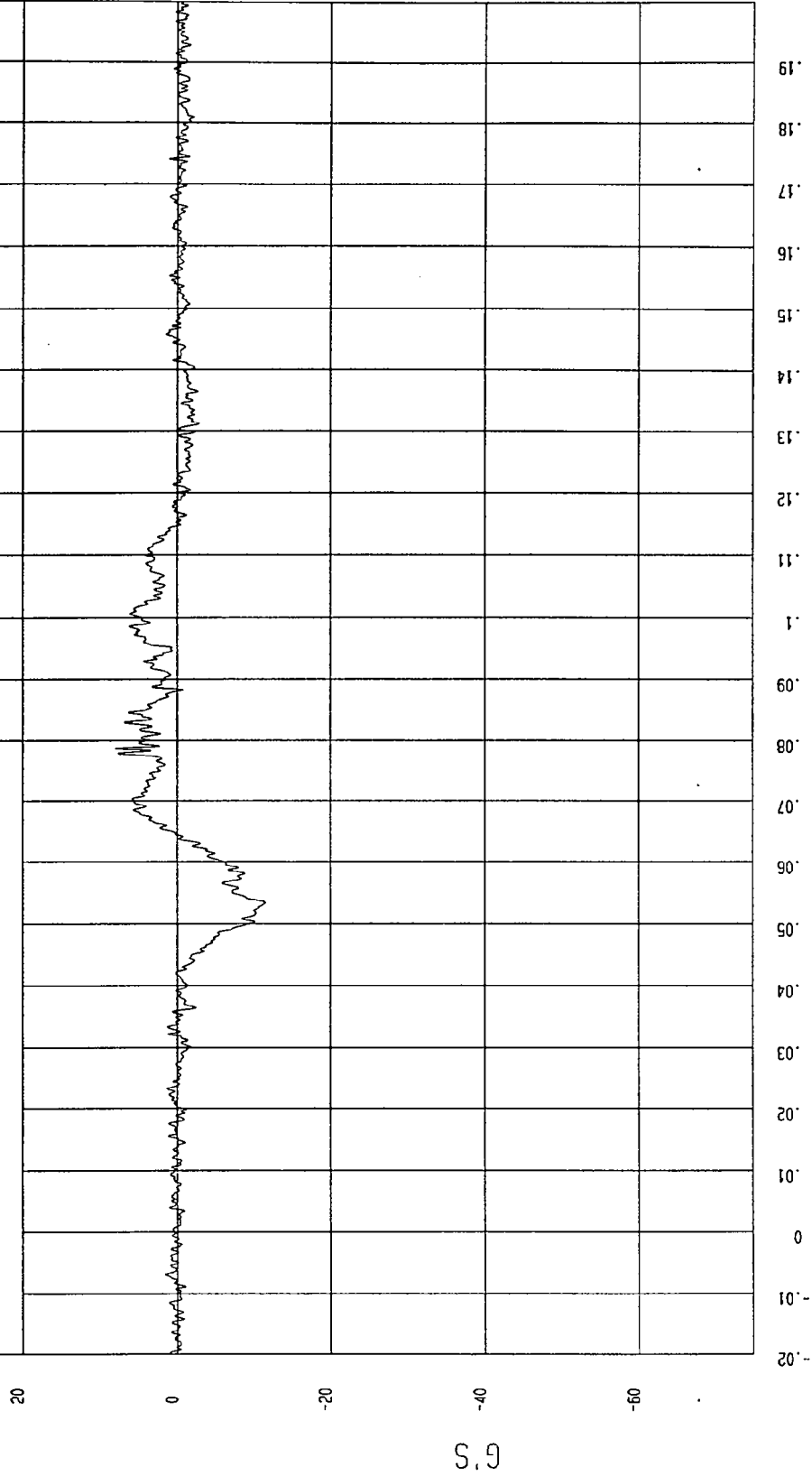
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

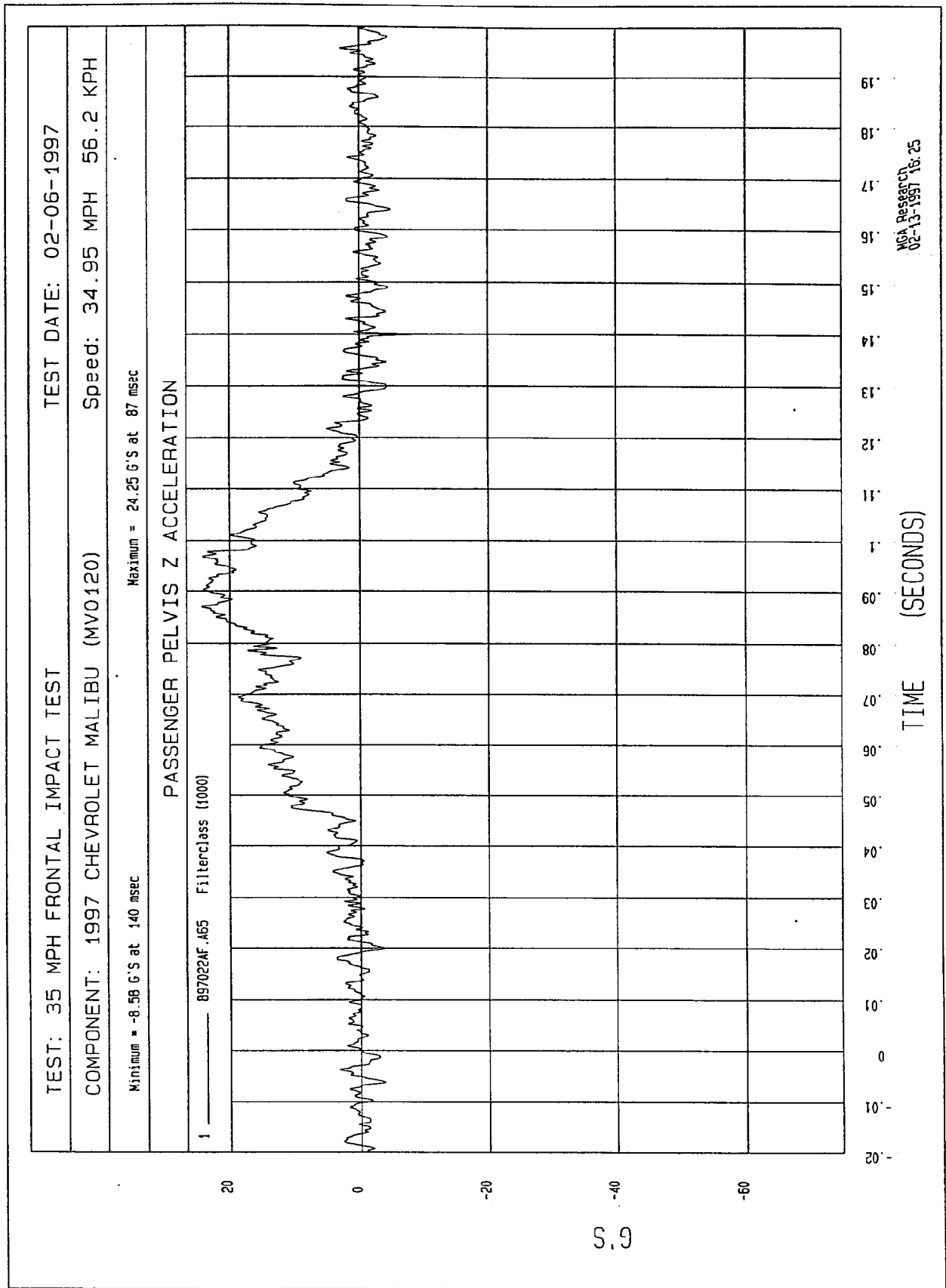
Minimum = -11.45 G'S at 53 msec
Maximum = 7.96 G'S at 79 msec

PASSENGER PELVIS Y ACCELERATION

1 897022AF.A64 Filterclass (4000)



WCA Research
02-13-1997 16:24



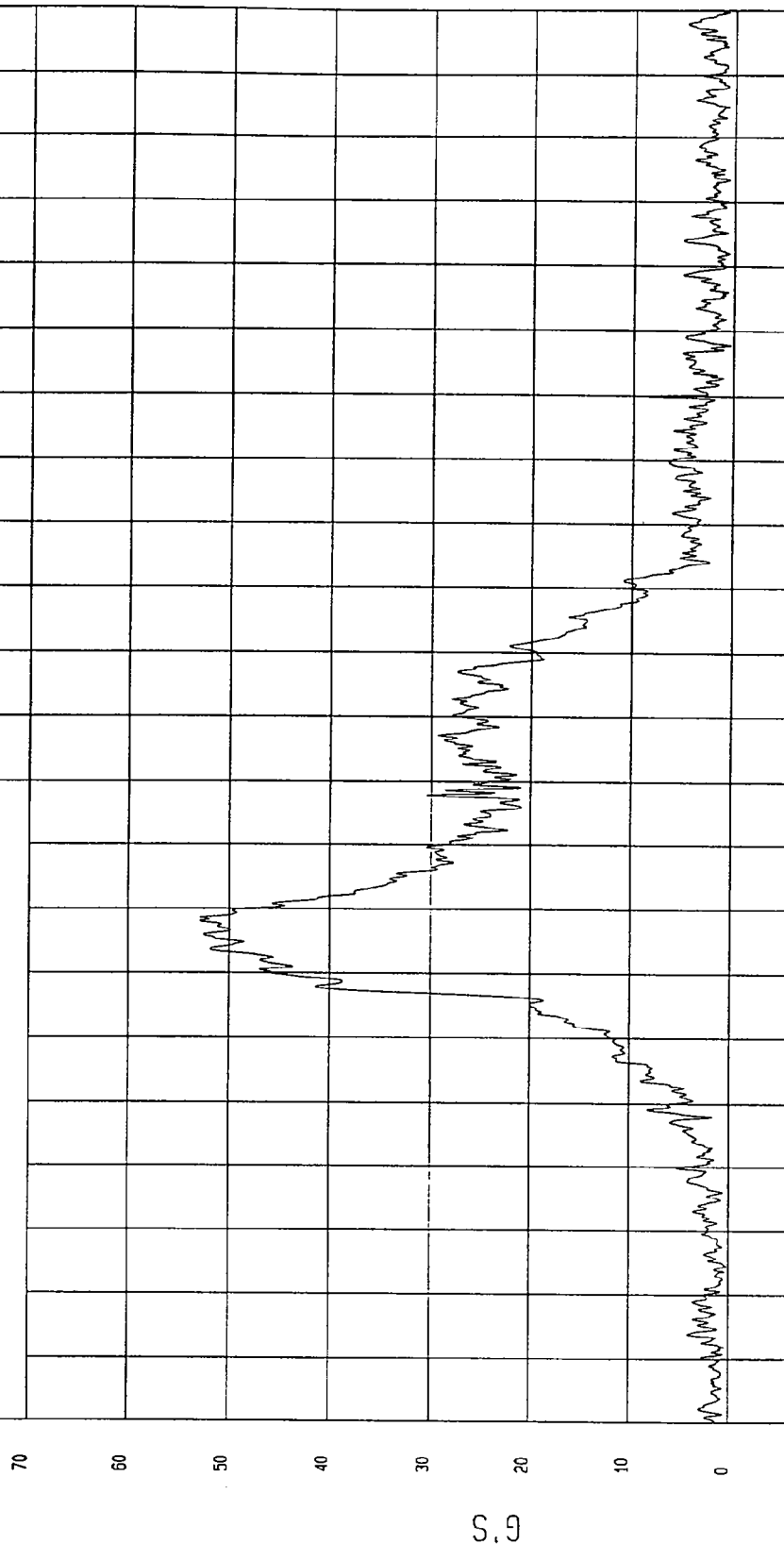
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = .20 G'S at 4 msec Maximum = 52.98 G'S at 58 msec

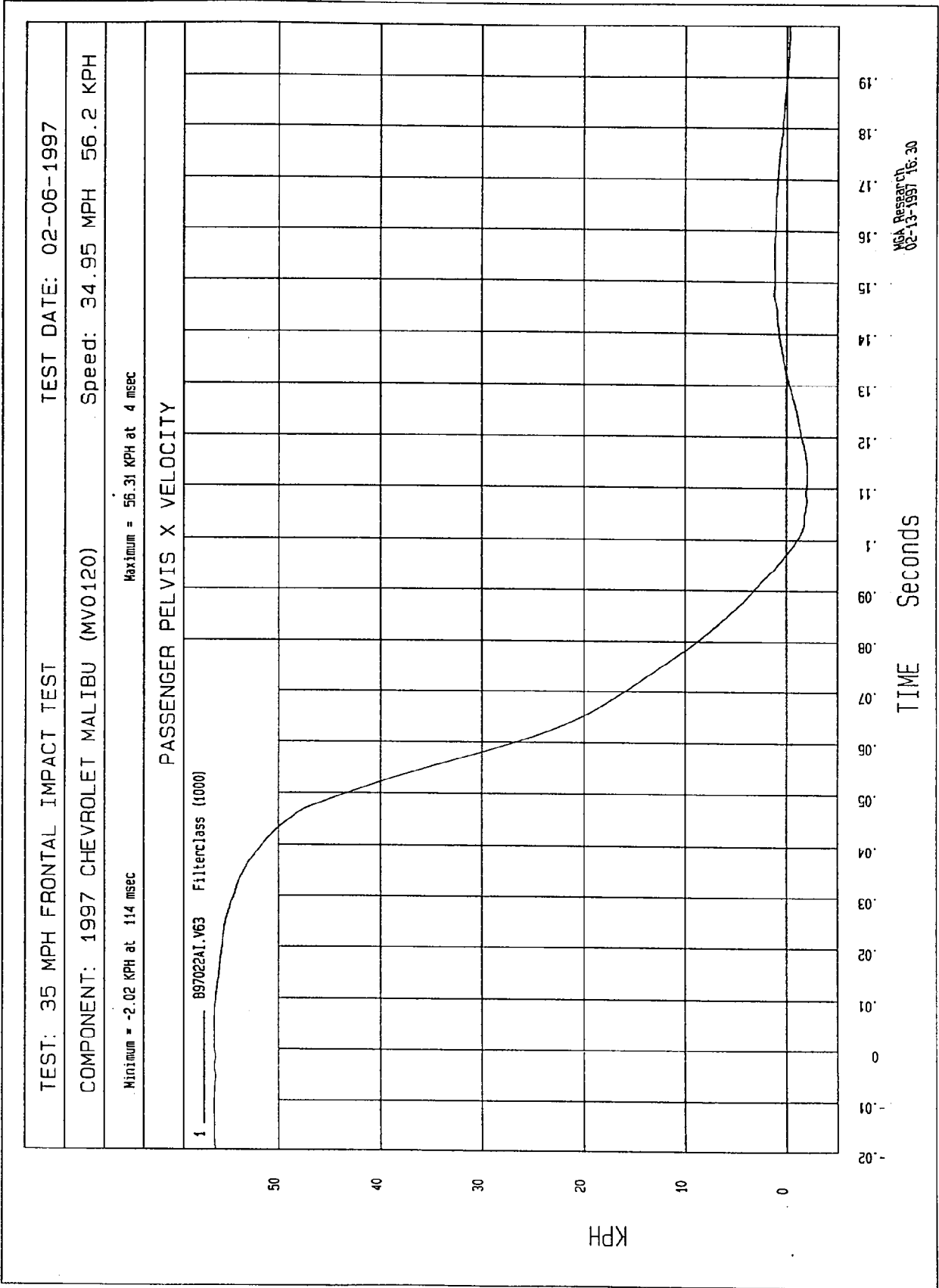
PASSENGER PELVIS RESULTANT ACCELERATION

1 ——— B97022AV.A53 Filterclass (1000)



TIME (SECONDS)

WCA Research
02-13-1997 16:25



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

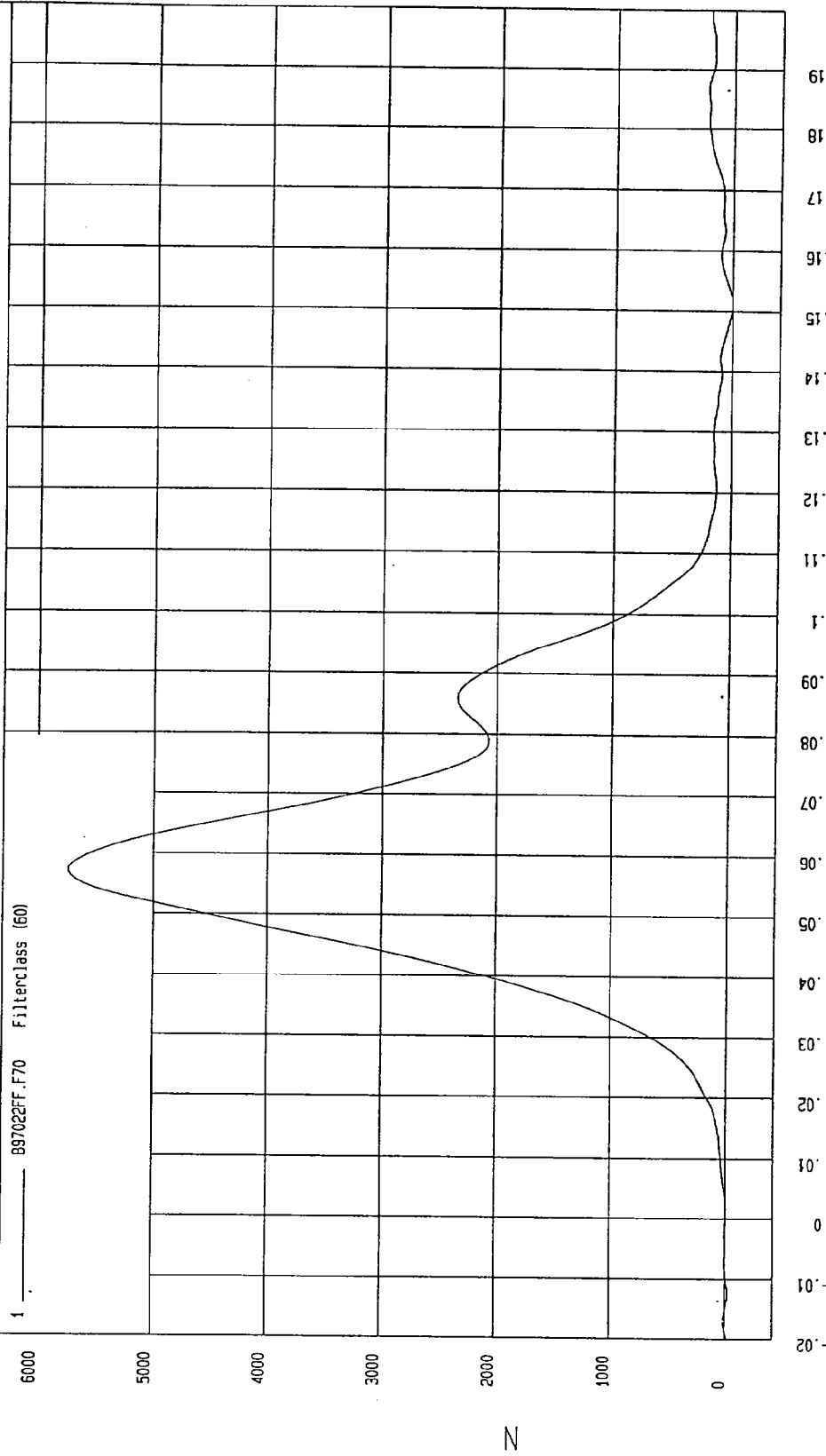
Speed: 34.95 MPH 56.2 KPH

Minimum = -20.53 N at -12 msec

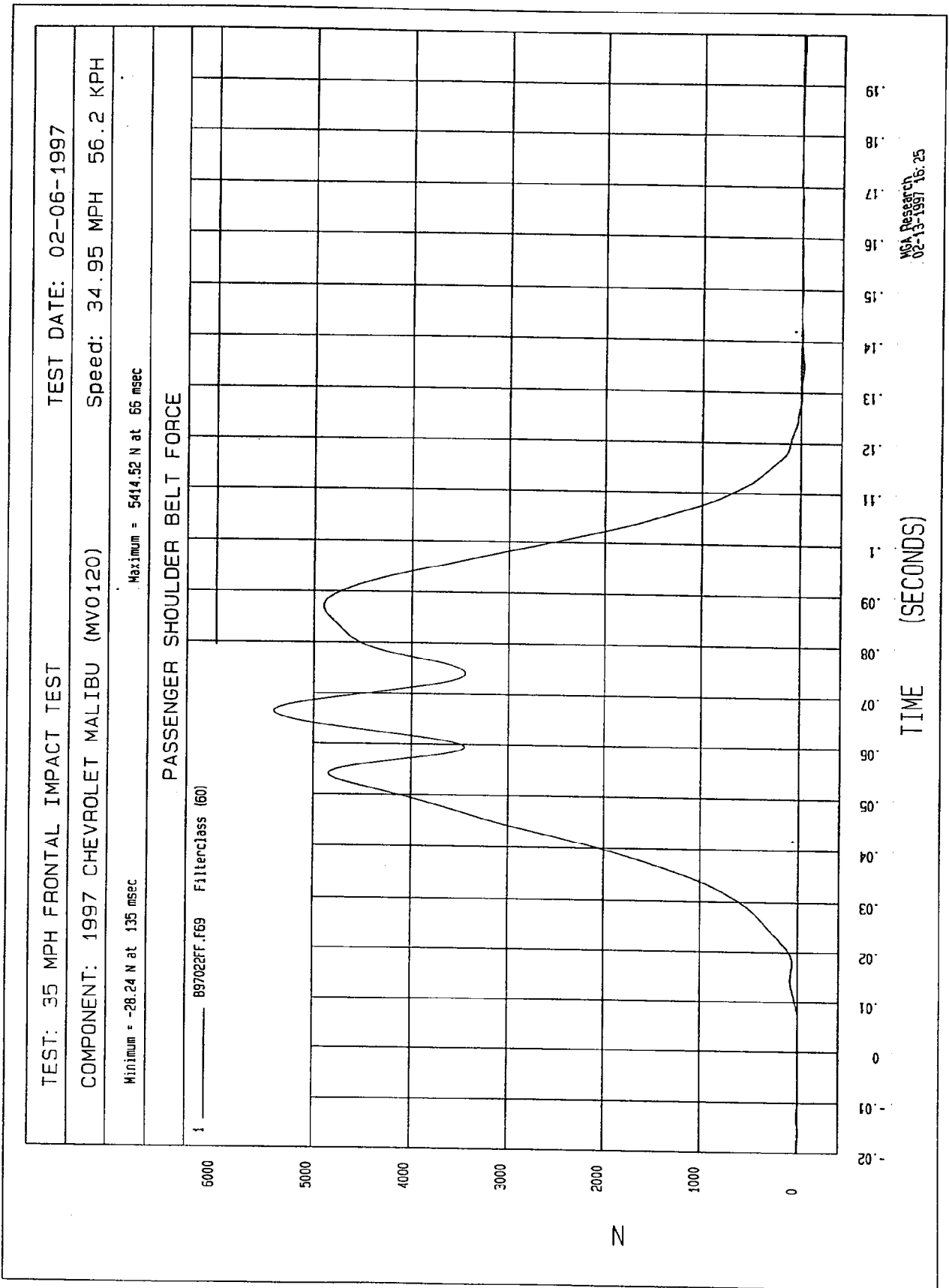
Maximum = 5738.79 N at 57 msec

PASSENGER LAP BELT FORCE

1 — 89702FF.F70 Filterclass (60)



NGA Research
02-13-1997 16:25



TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

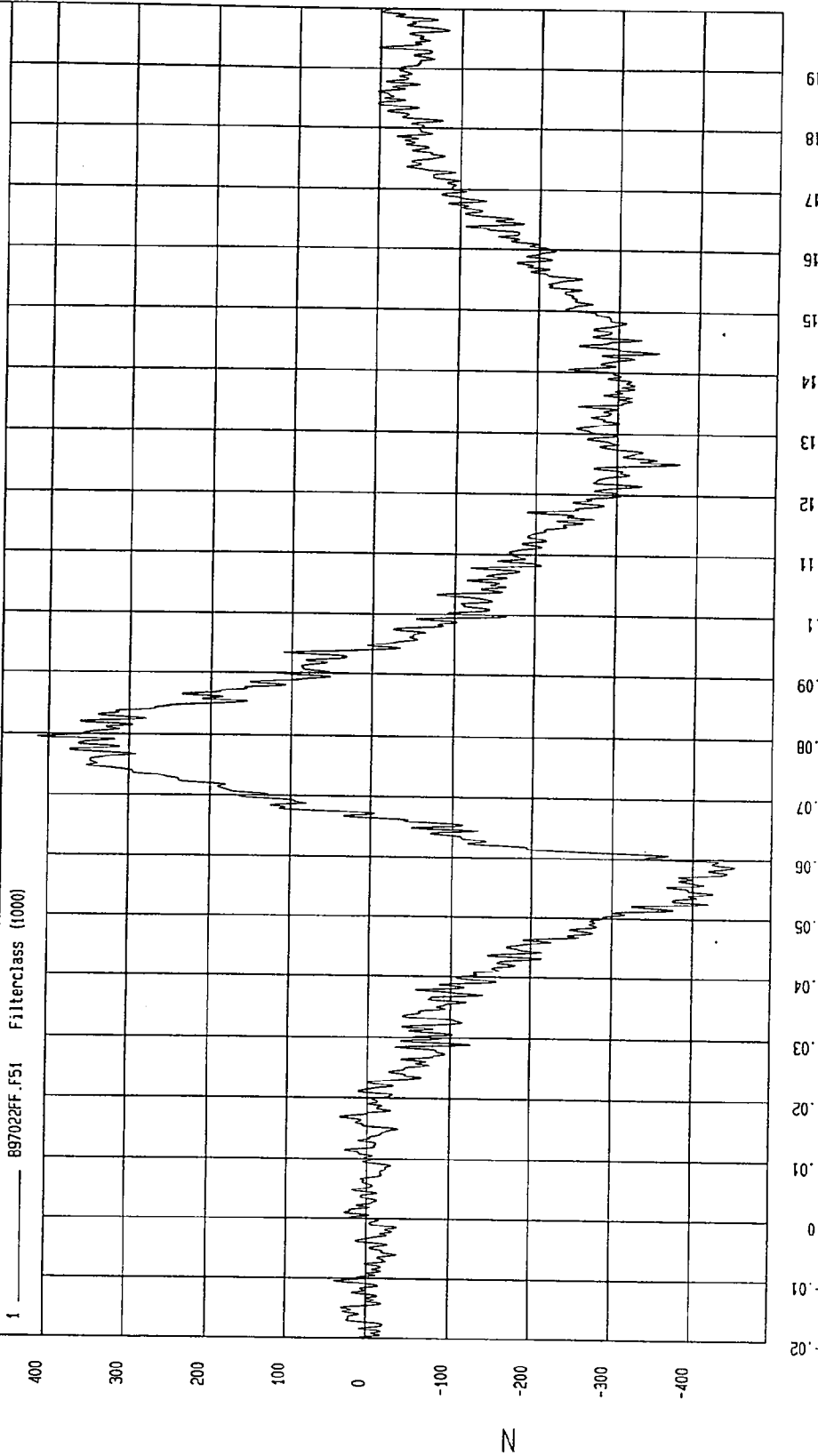
Speed: 34.95 MPH 56.2 KPH

Minimum = -452.57 N at 59 msec

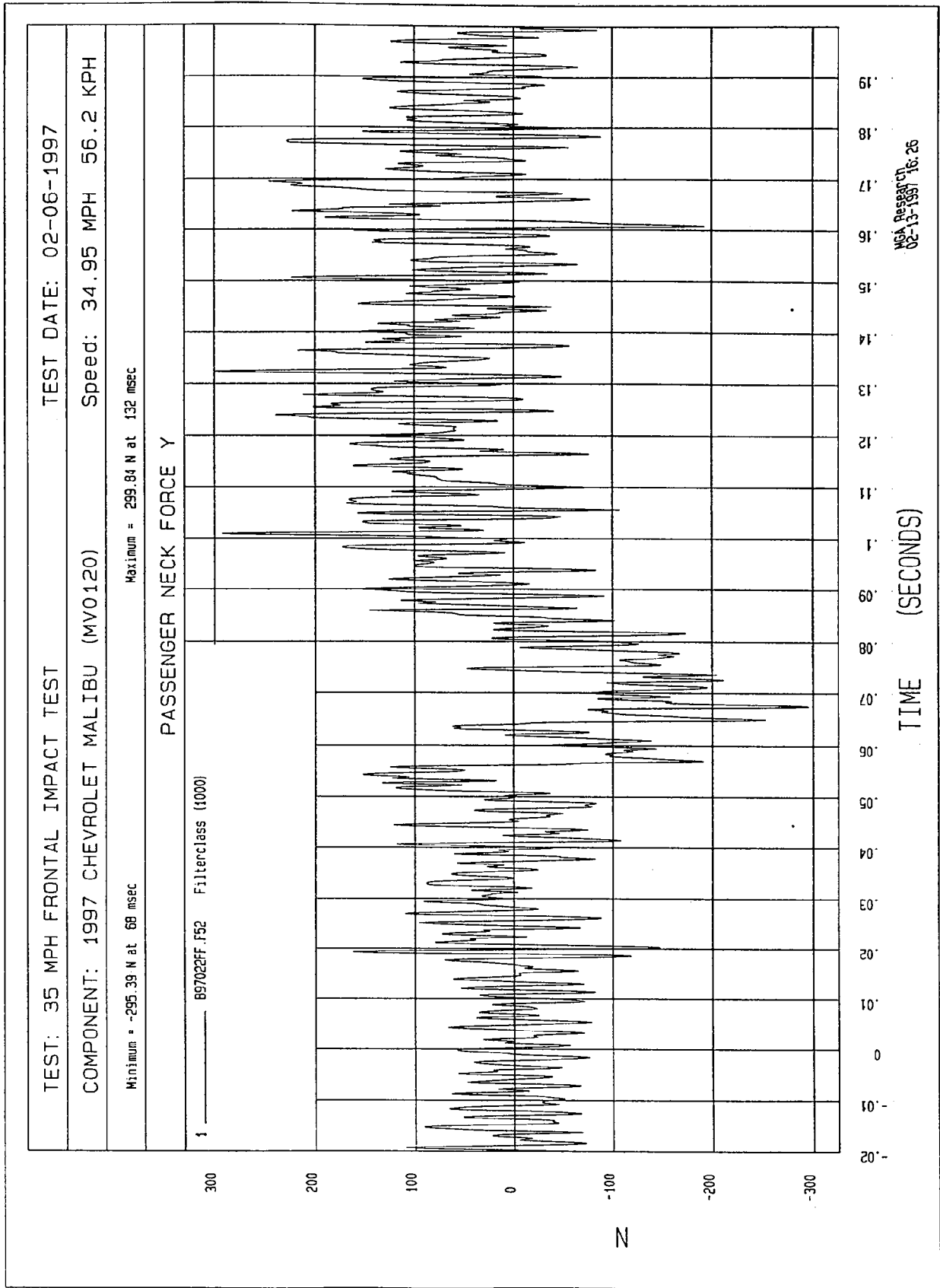
Maximum = 414.15 N at 80 msec

PASSENGER NECK FORCE X

1 — 897022FF.F51 Filterclass (1000)

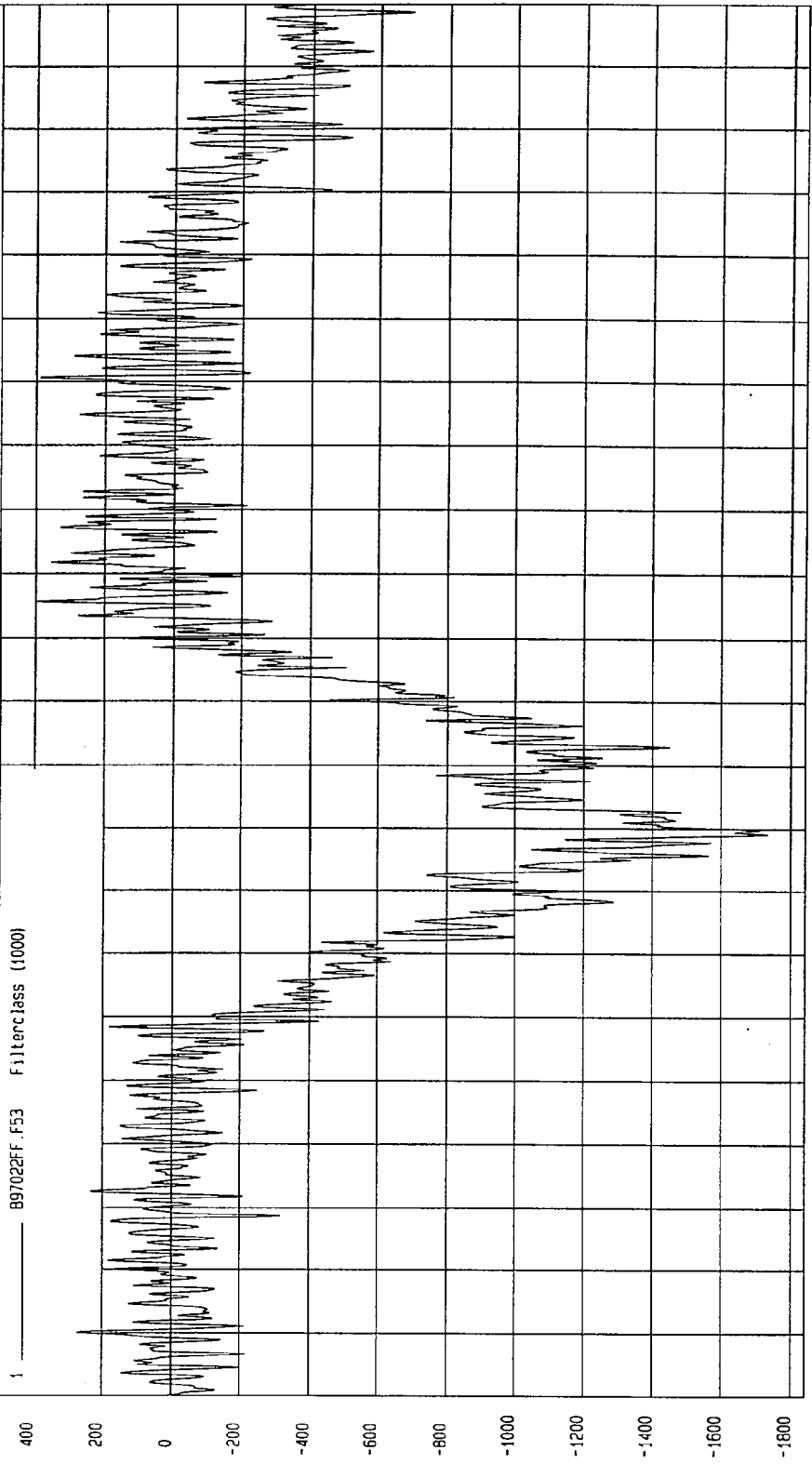


WCA Research
02-13-1997 16:25



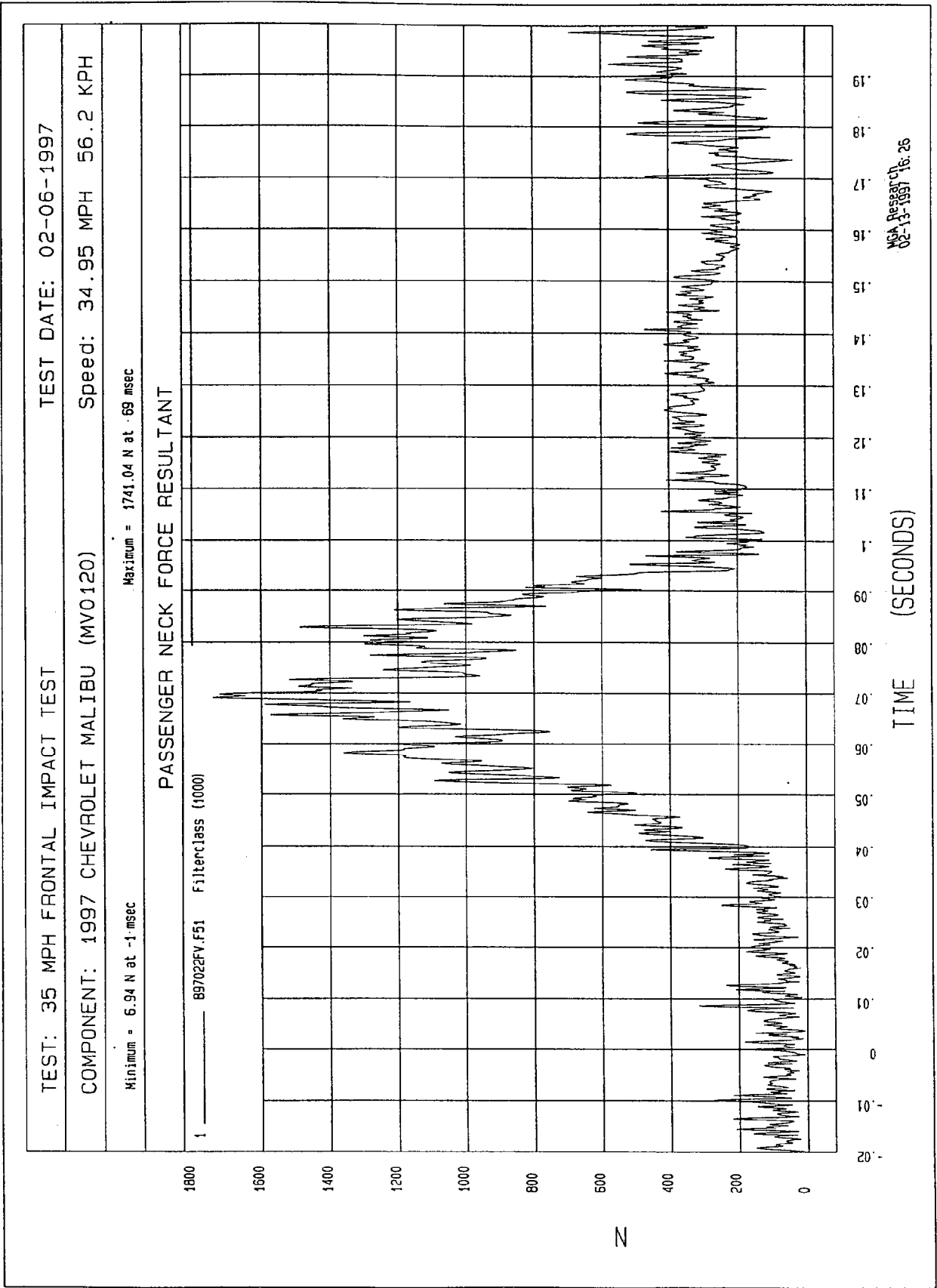
TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -1733.47 N at 69 msec	
Maximum = 394.59 N at 106 msec	

PASSENGER NECK FORCE Z



TIME (SECONDS)

WCA Research
02-13-1997 16:26

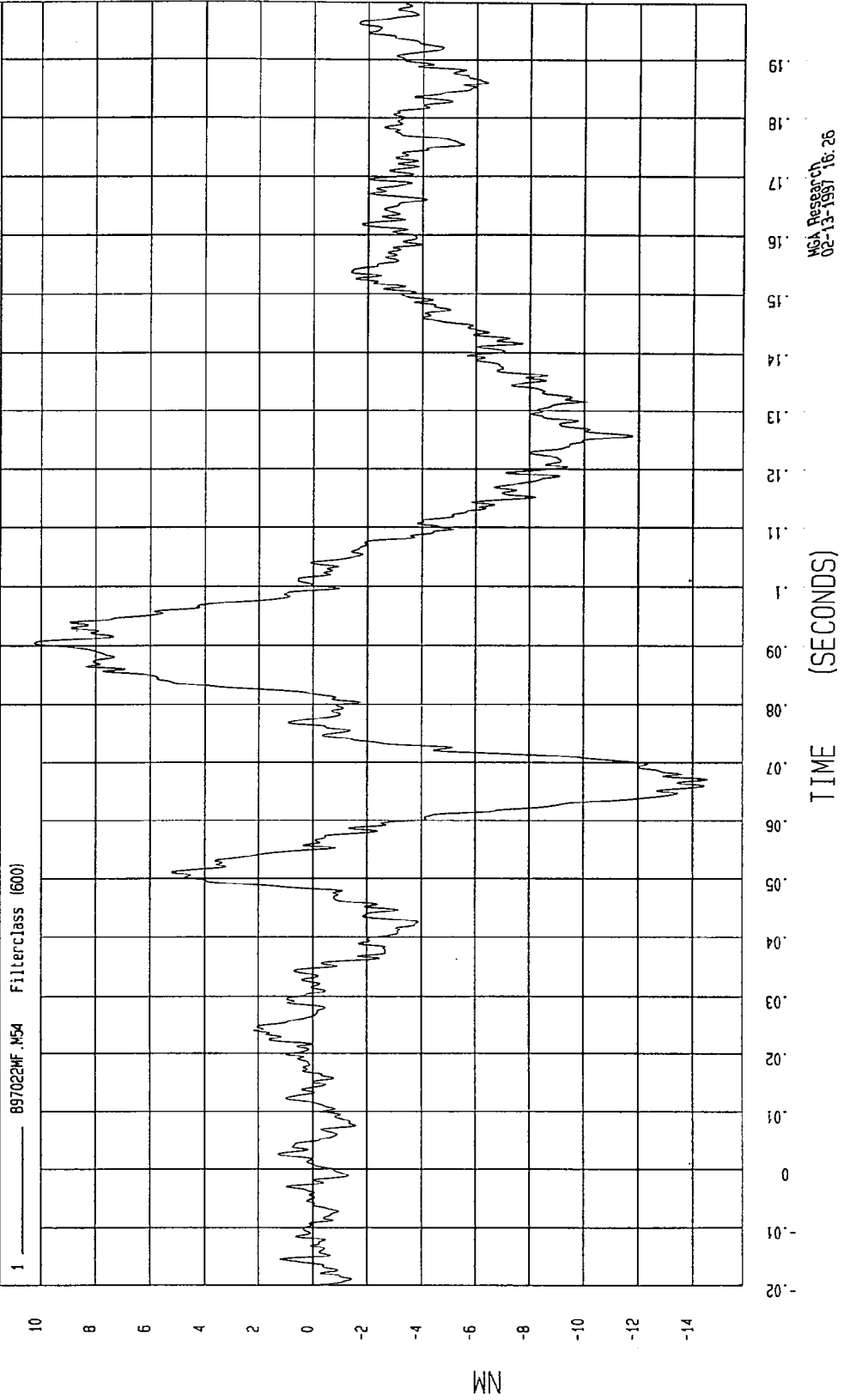


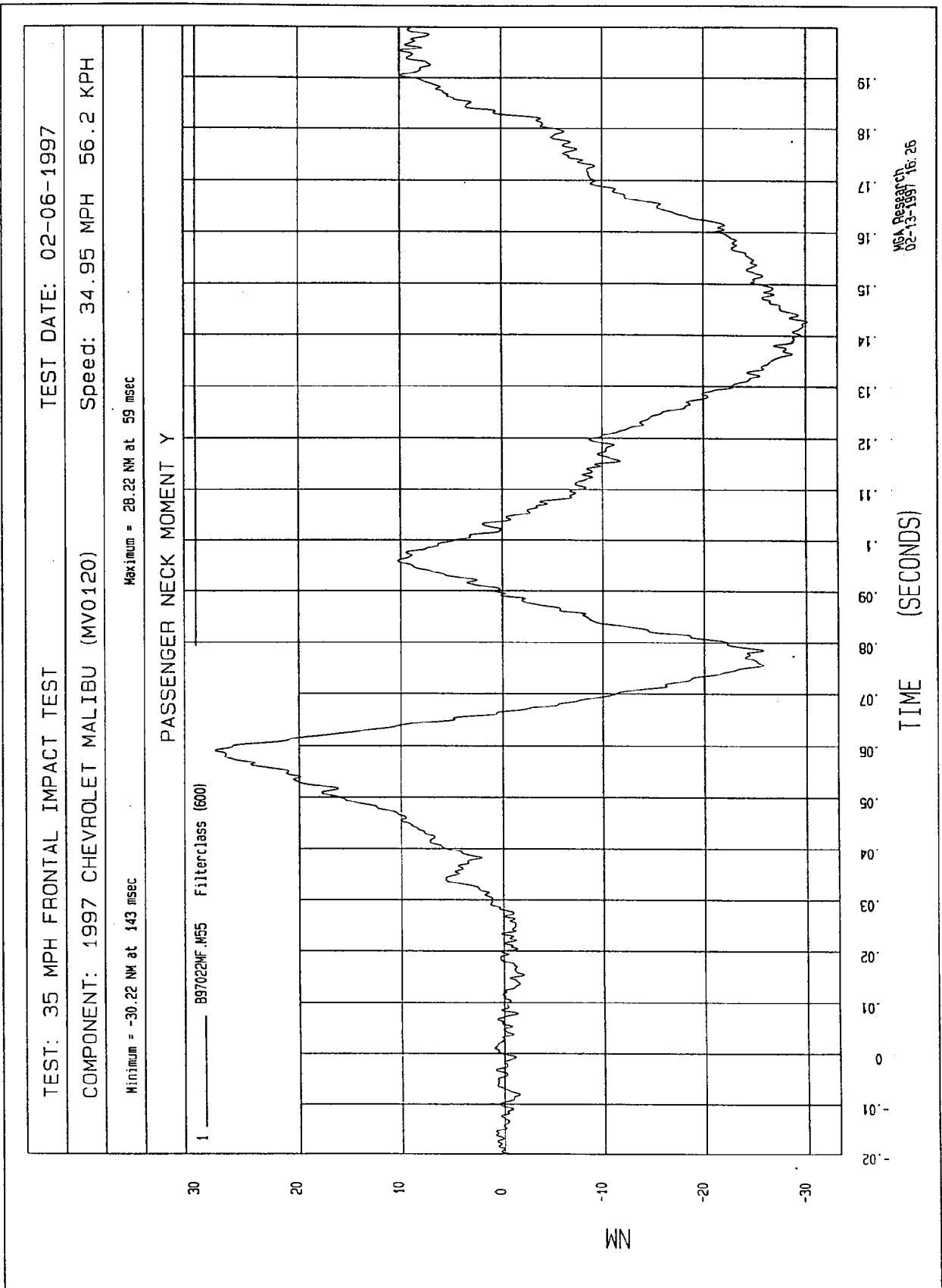
TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

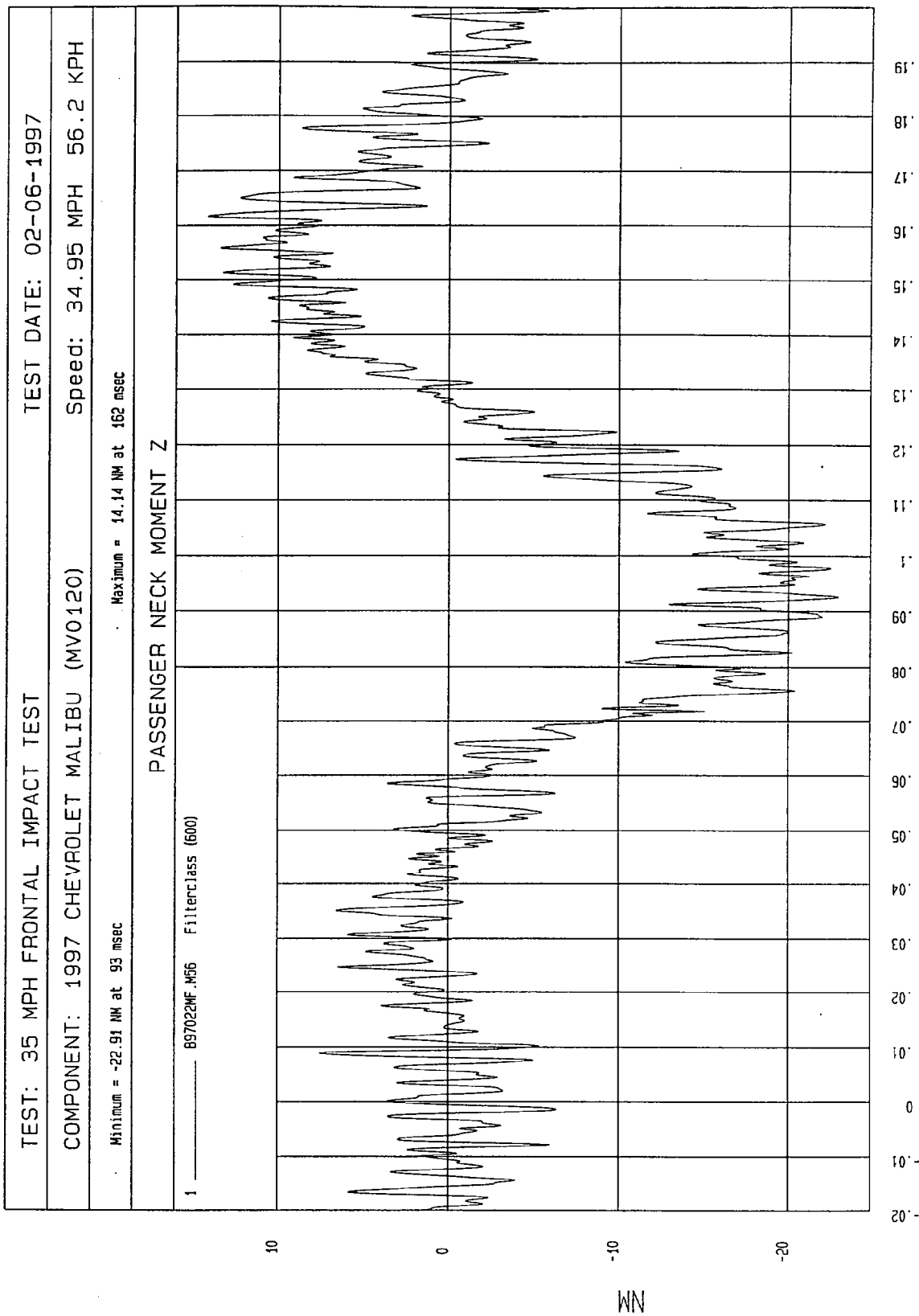
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

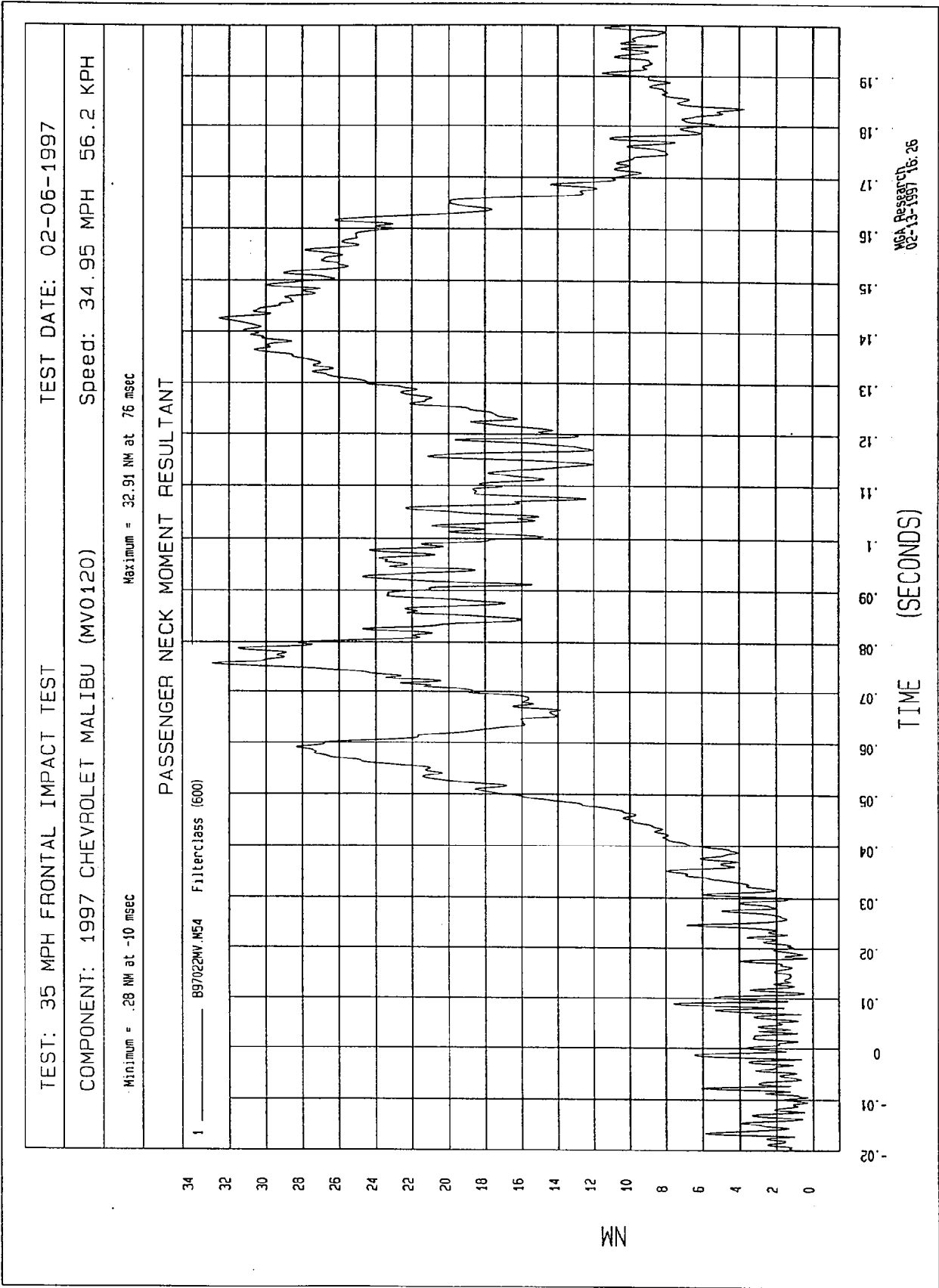
Minimum = -14.55 NM at 67 msec
Maximum = 10.24 NM at 90 msec

PASSENGER NECK MOMENT X









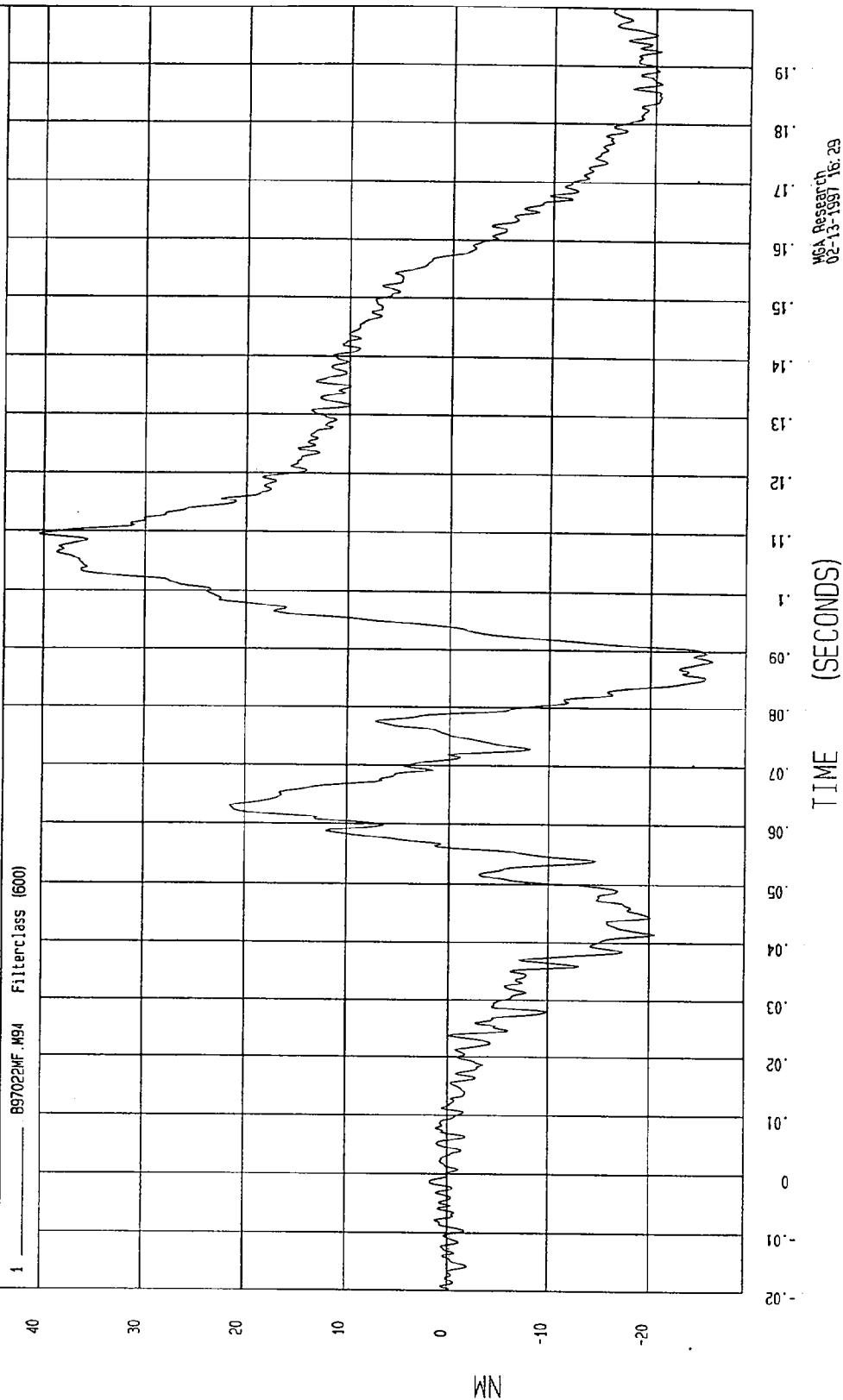
TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -25.95 NM at 88 msec Maximum = 40.50 NM at 110 msec

PASSENGER LEFT UPPER TIBIA MOMENT X



TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

SPEED: 34.95 MPH 56.2 KPH

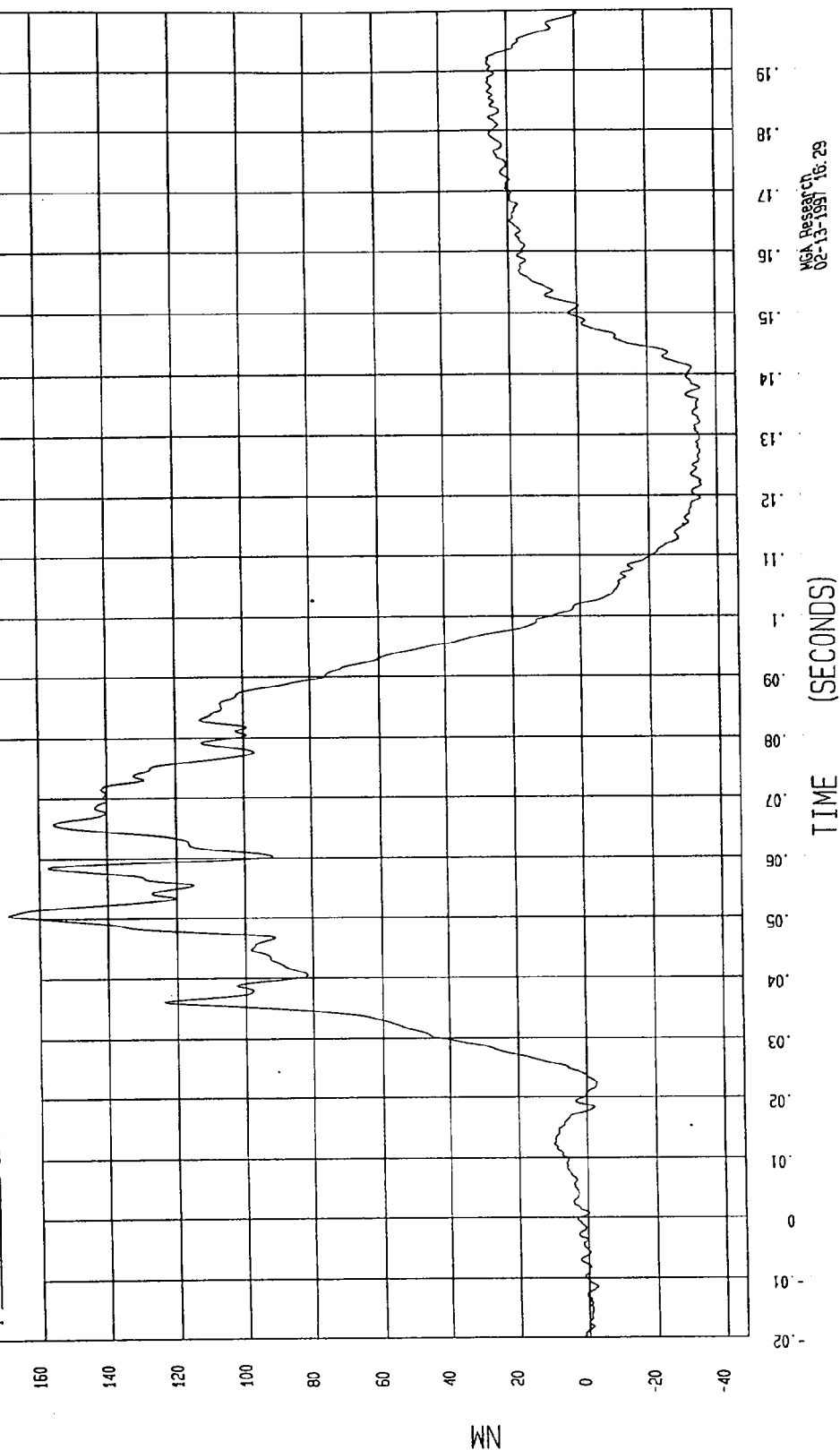
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Maximum = 168.87 NM at 51 msec

Minimum = -35.51 NM at 138 msec

PASSENGER LEFT UPPER TIBIA MOMENT Y

1 897022MF.M05 FilterClass (600)



MGA Research
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TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

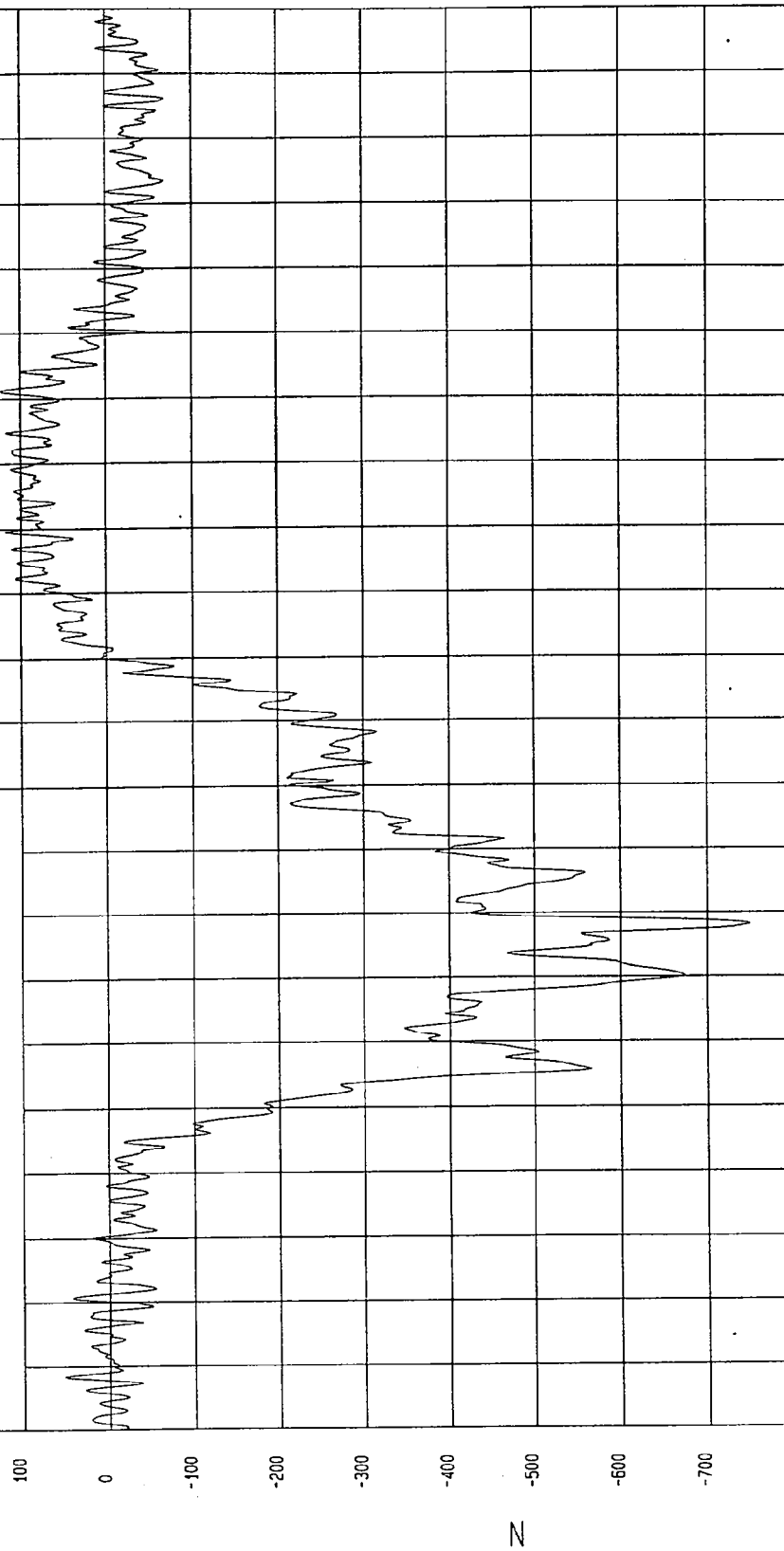
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH

Minimum = -750.17 N at 58 msec

Maximum = 123.07 N at 141 msec

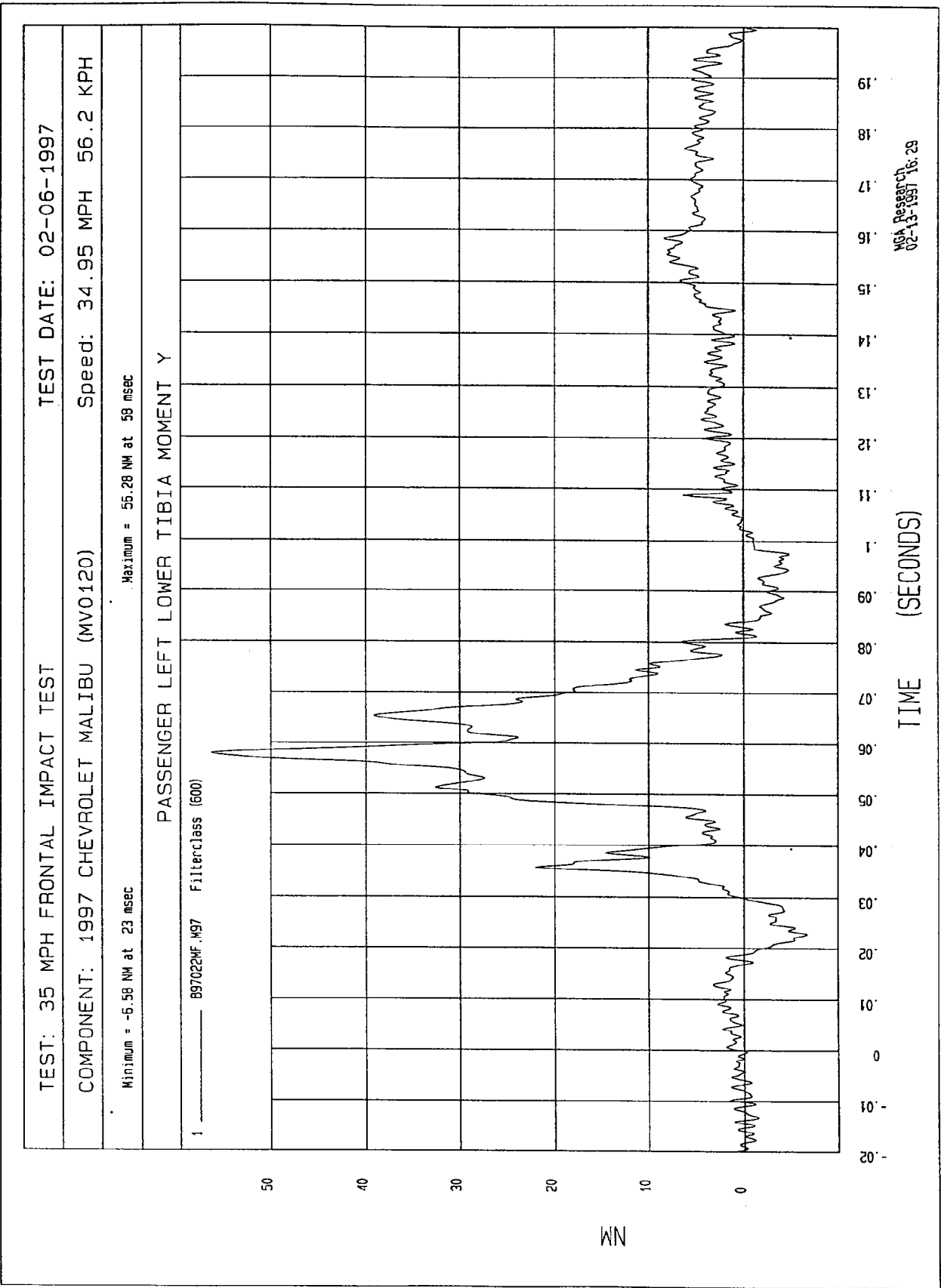
PASSENGER LEFT LOWER TIBIA FORCE X

1 897022FF.F96 Filterclass (600)



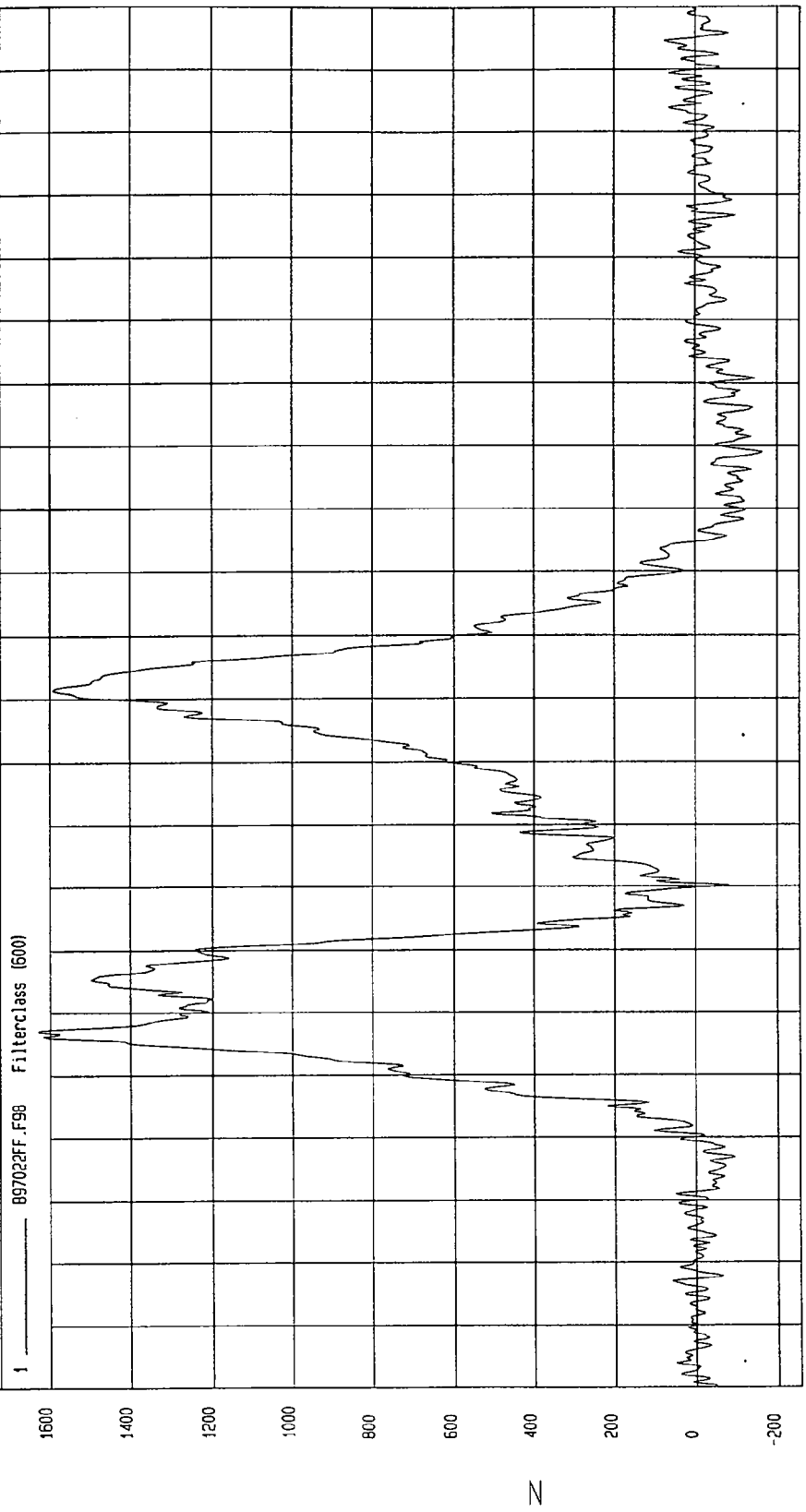
MCA Research
02-13-1997 16:29

TIME (SECONDS)



TEST: 35 MPH FRONTAL IMPACT TEST	TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120)	Speed: 34.95 MPH 56.2 KPH
Minimum = -163.94 N at 129 msec	
Maximum = 1631.28 N at 37 msec	

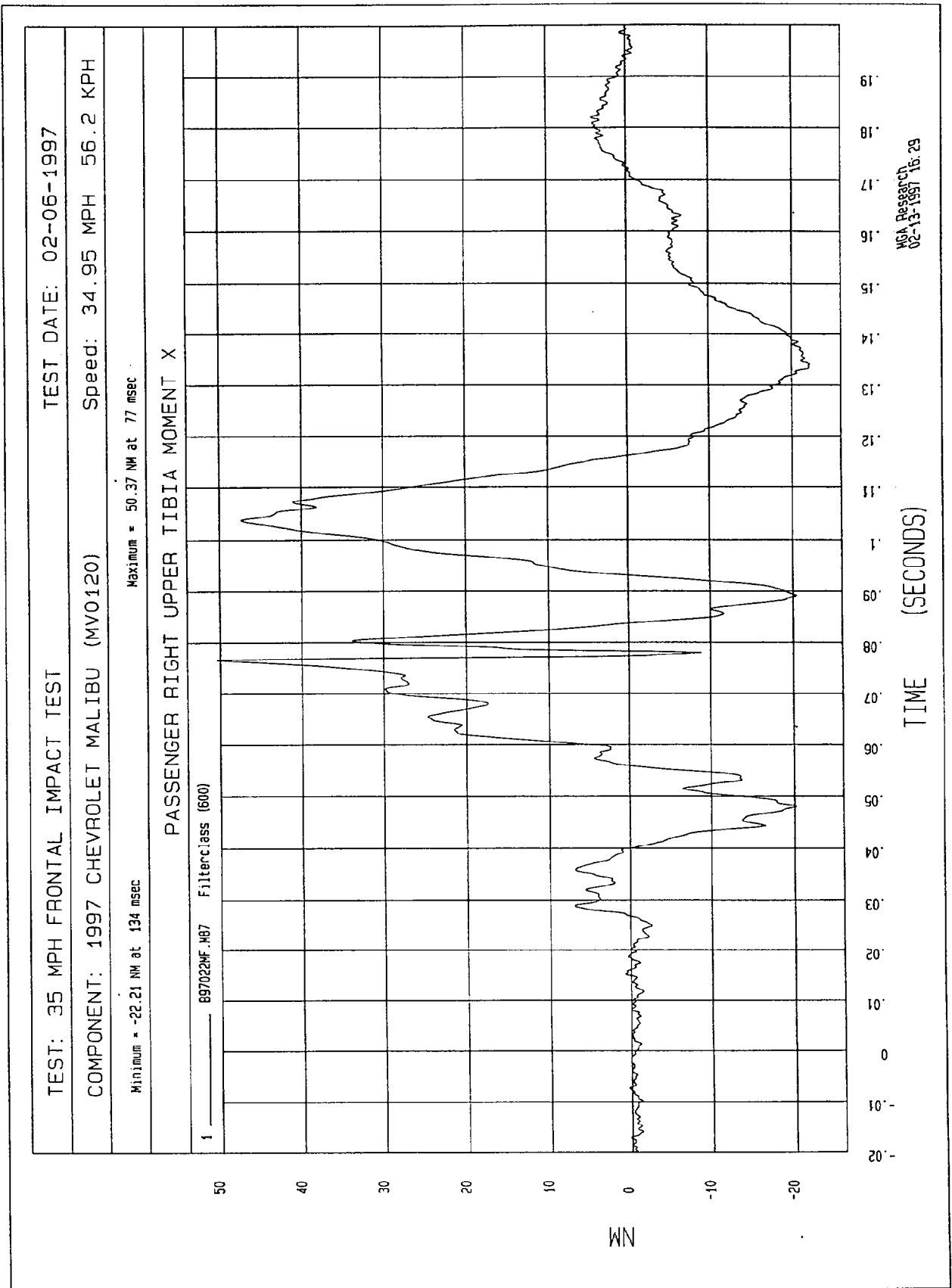
PASSENGER LEFT LOWER TIBIA FORCE Z



TIME (SECONDS)

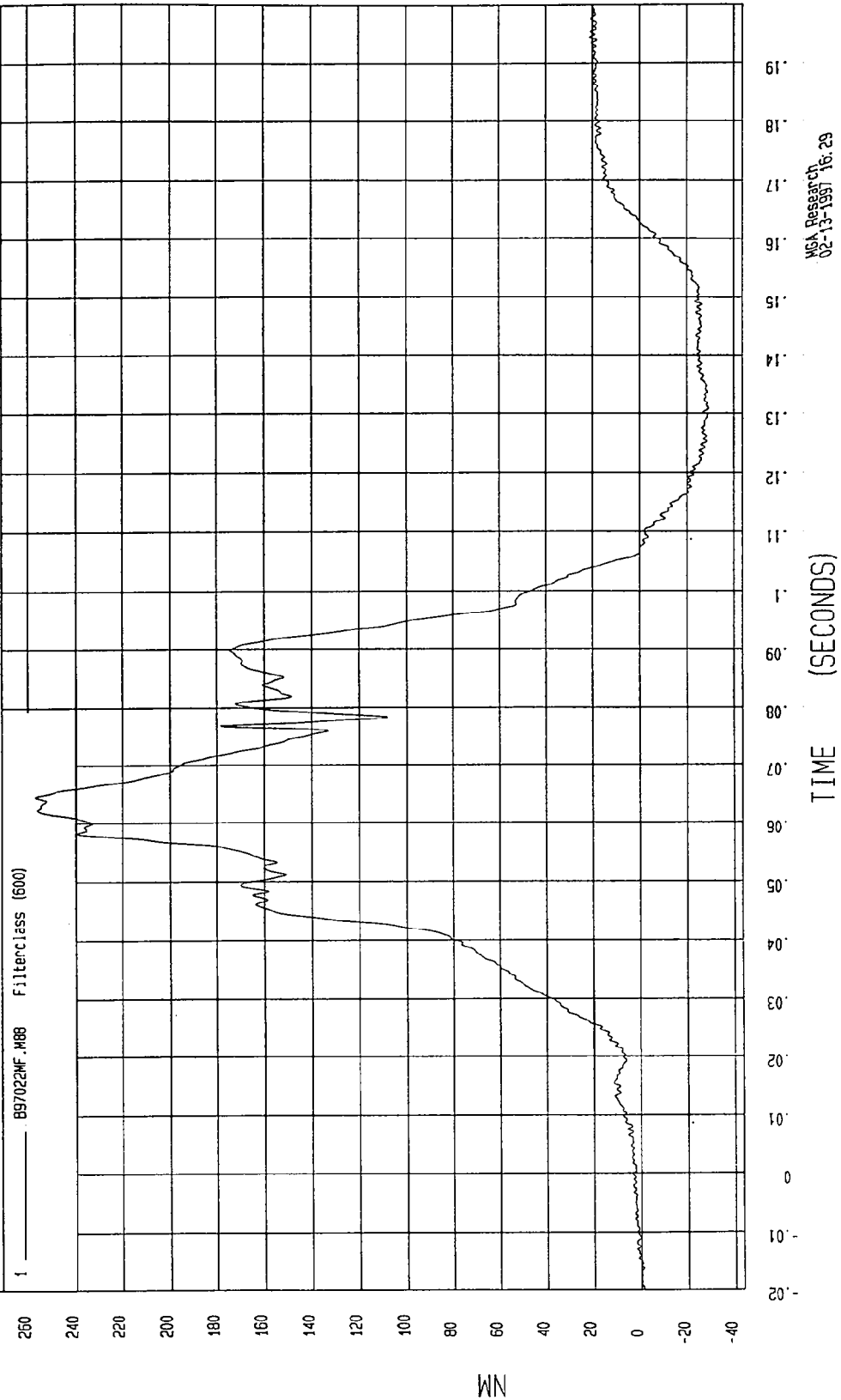
61.
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-1.
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-3.
-4.
-5.
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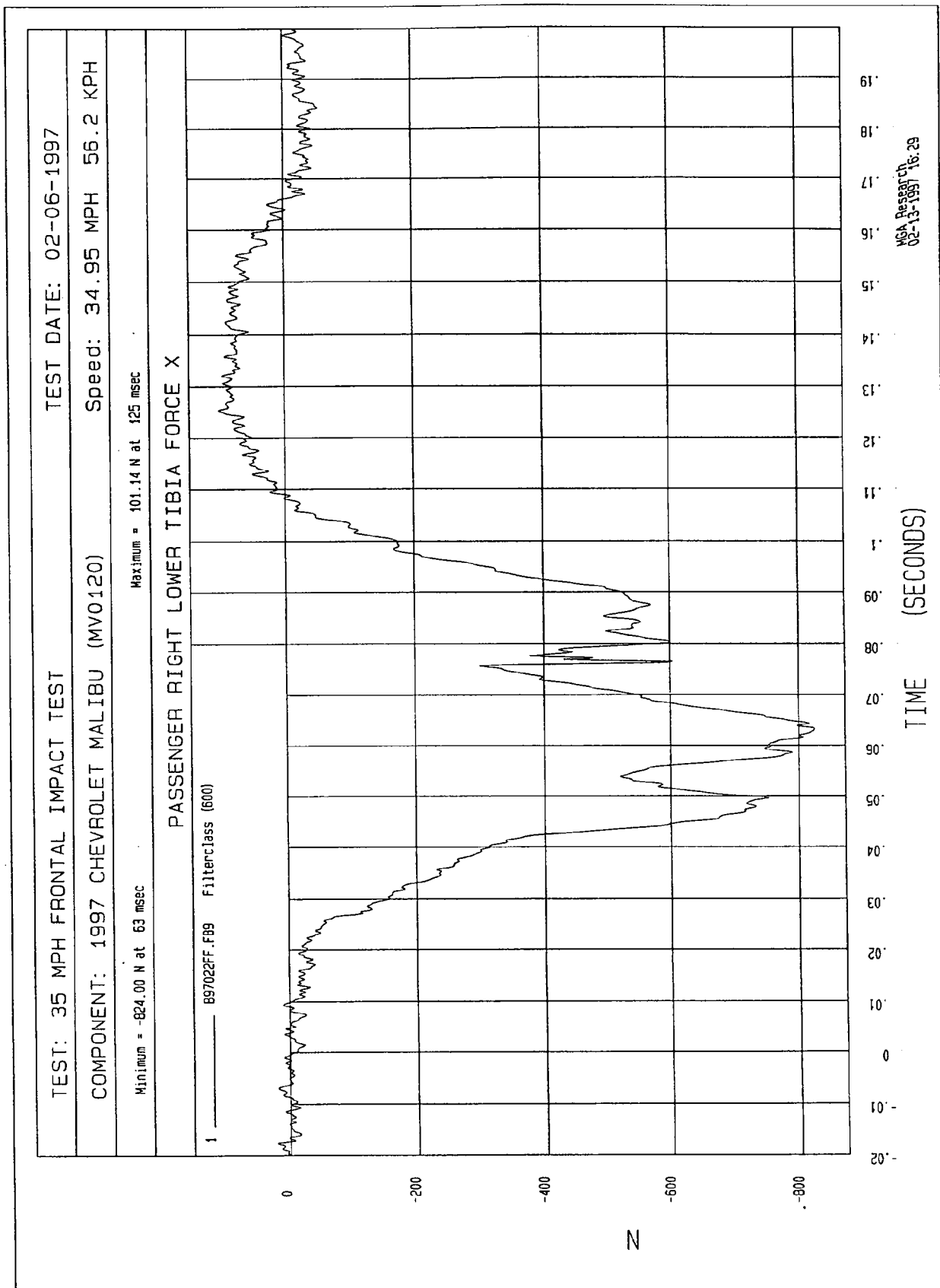
NGA Research
02-13-1997 16:29



TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU (MV0120) Speed: 34.95 MPH 56.2 KPH
Minimum = -29.20 NM at 131 msec Maximum = 256.87 NM at 65 msec

PASSENGER RIGHT UPPER TIBIA MOMENT Y



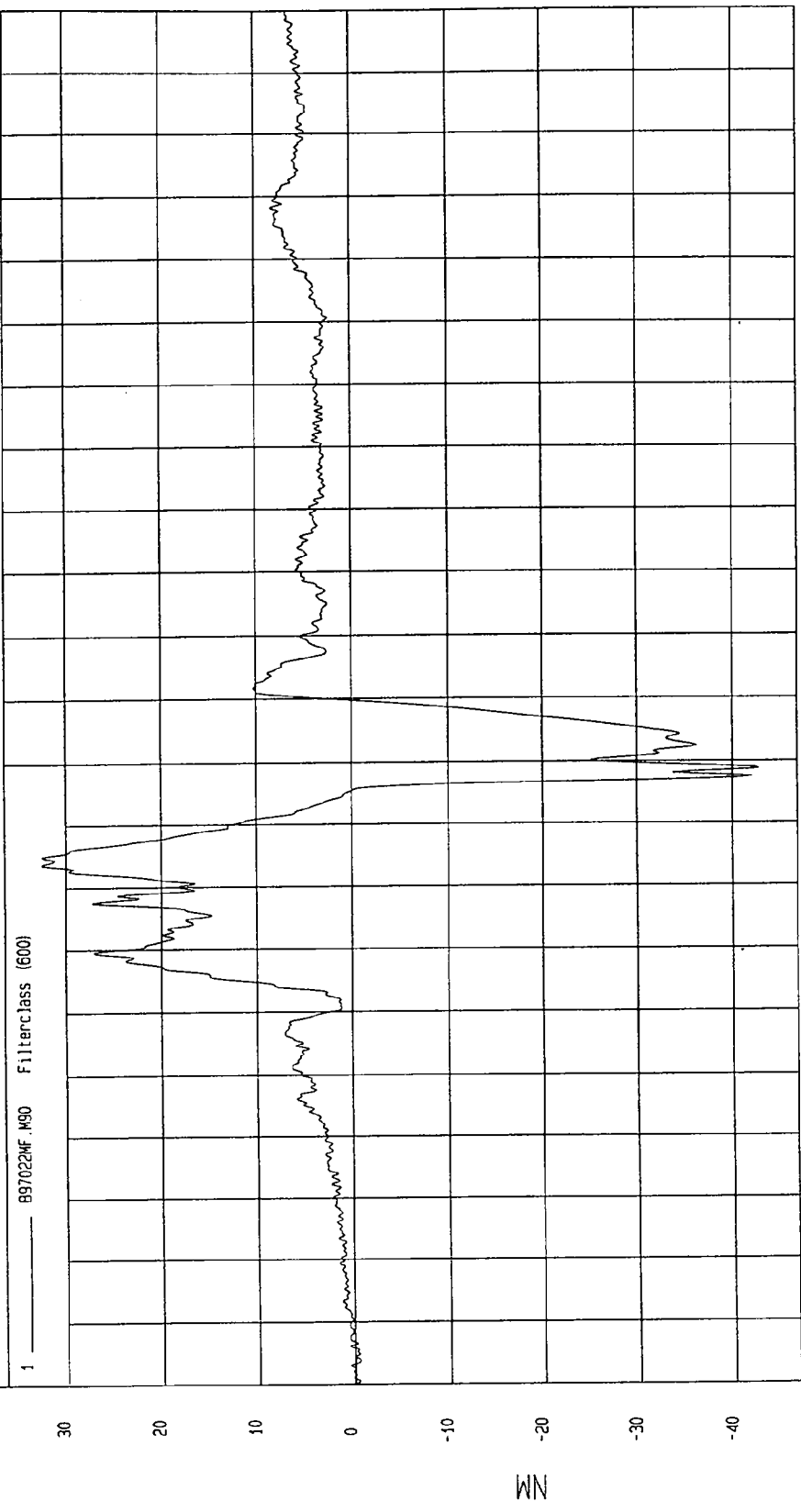


TEST: 35 MPH FRONTAL IMPACT TEST TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU (MVO120) Speed: 34.95 MPH 56.2 KPH

Minimum = -42.95 NM at 79 msec Maximum = 32.54 NM at 64 msec

PASSENGER RIGHT LOWER TIBIA MOMENT Y



TIME (SECONDS)

NCA Research
02-13-1997 16:30

TEST: 35 MPH FRONTAL IMPACT TEST

TEST DATE: 02-06-1997

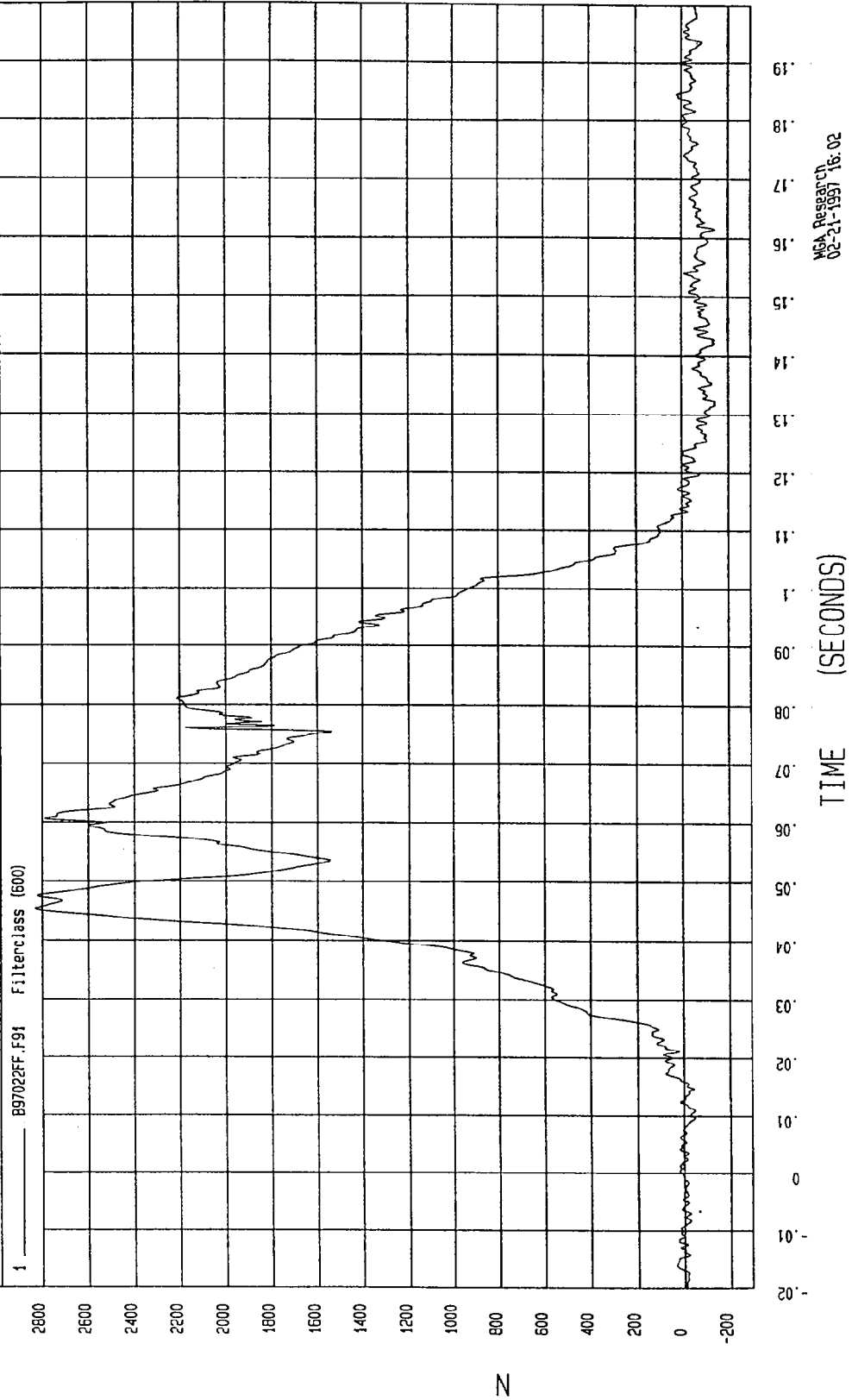
Speed: 34.95 MPH 56.2 KPH

COMPONENT: 1997 CHEVROLET MALIBU (MV0120)

Minimum = -144.58 N at 132 msec

Maximum = 2833.68 N at 45 msec

PASSENGER RIGHT LOWER TIBIA FORCE Z



TEST: 35 MPH FRONTAL IMPACT

TEST DATE: 02-06-1997

Speed: 34.95 MPH 56.2 KPH

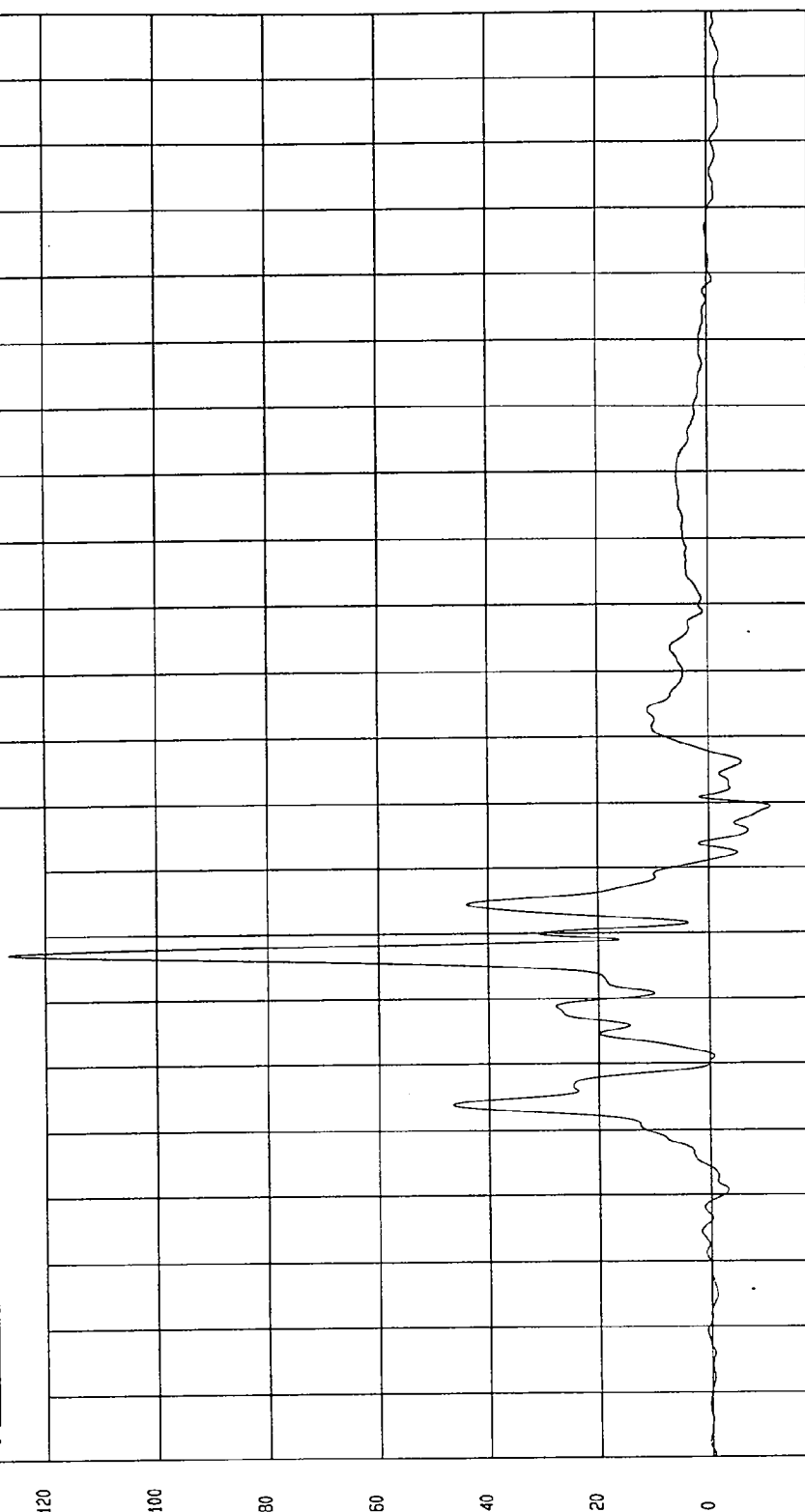
COMPONENT: 1997 CHEVROLET MALIBU MV0120

Minimum = -10.97 G'S at 79 msec

Maximum = 126.63 G'S at 57 msec

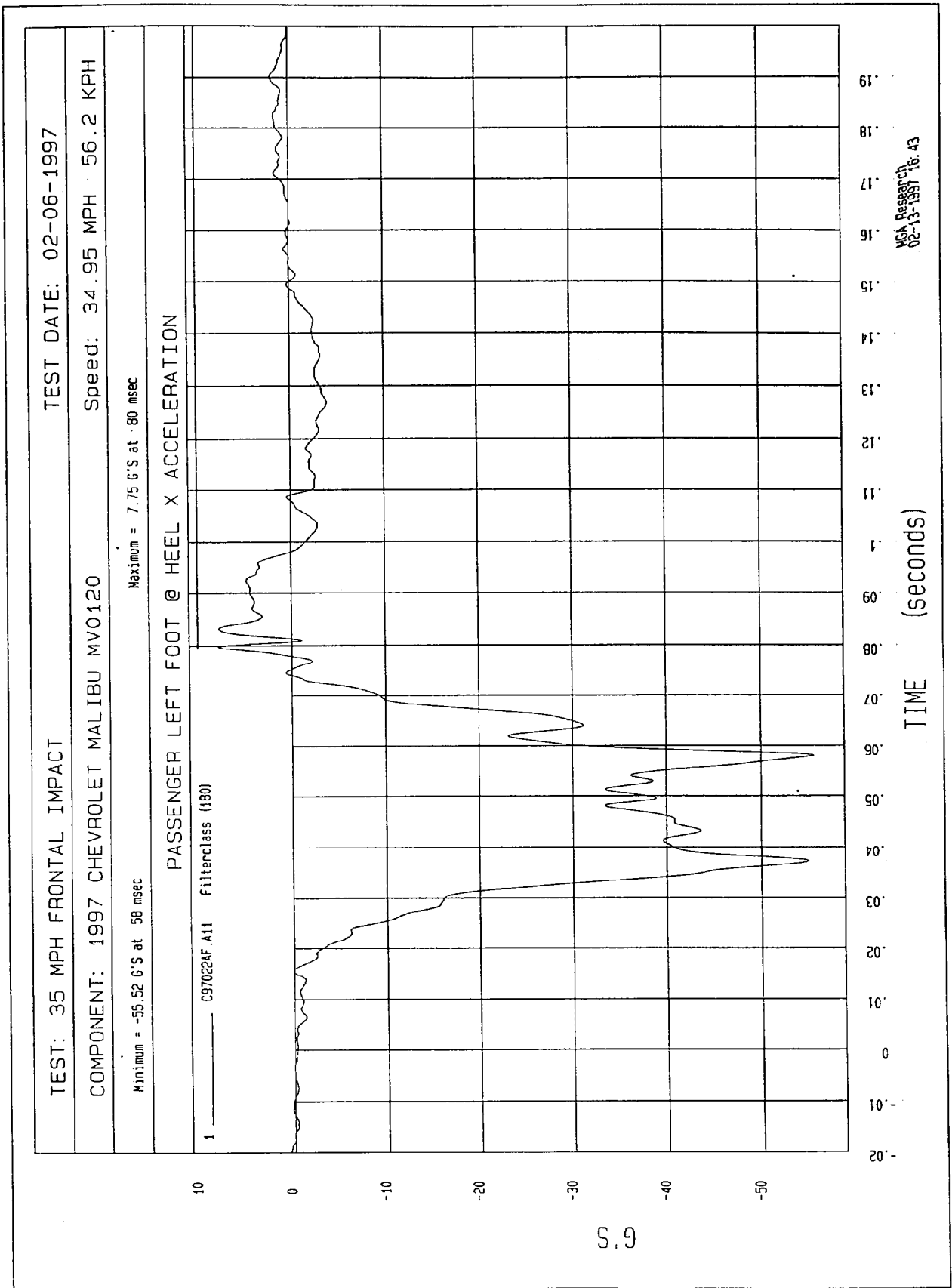
PASSENGER LEFT FOOT @ BALL Z ACCELERATION

1 C97022AF.A10 Filterclass (480)



TIME (seconds)

MCA Research
02-13-1997 16:43



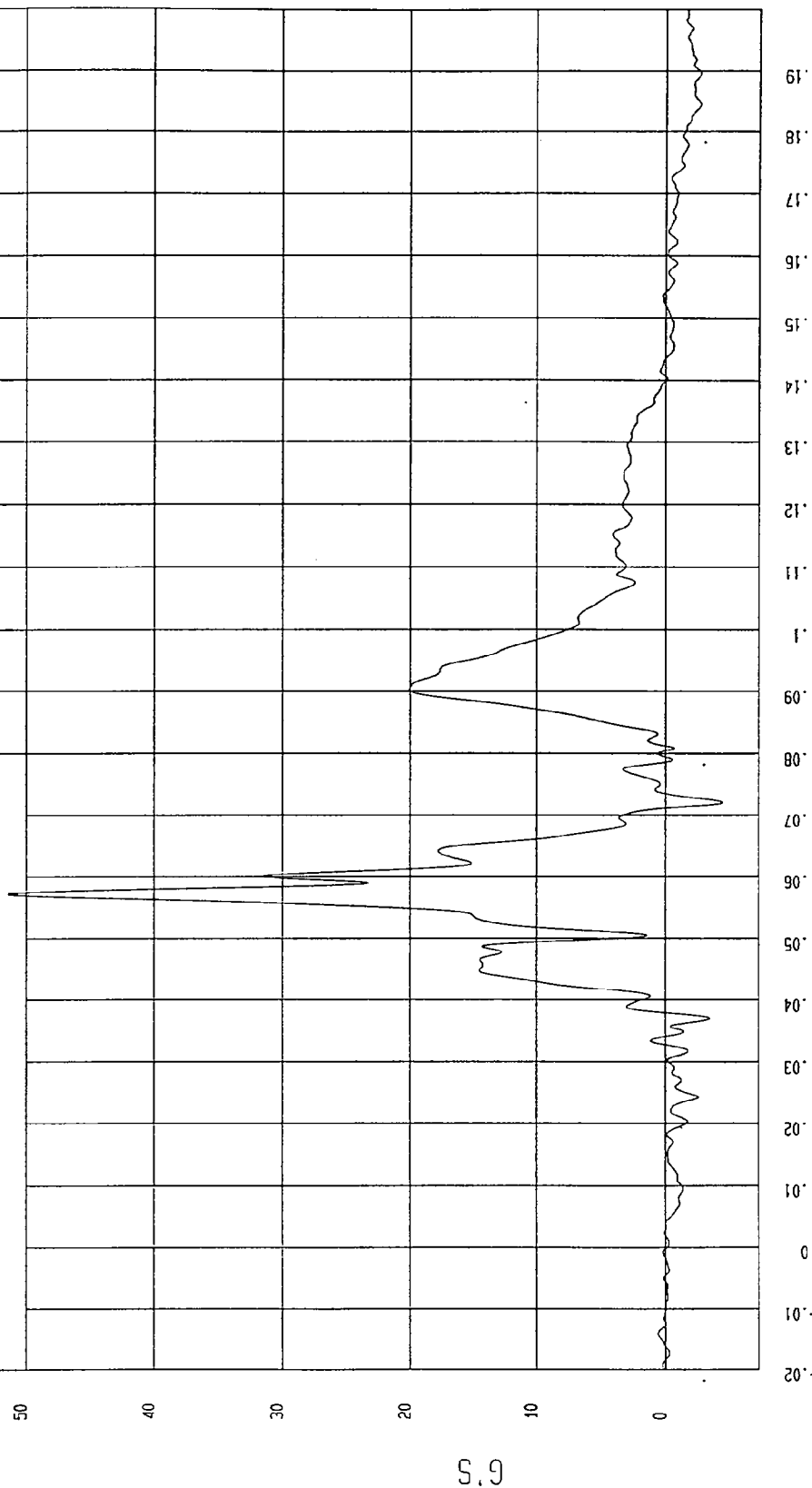
TEST: 35 MPH FRONTAL IMPACT TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU MV0120 Speed: 34.95 MPH 56.2 KPH

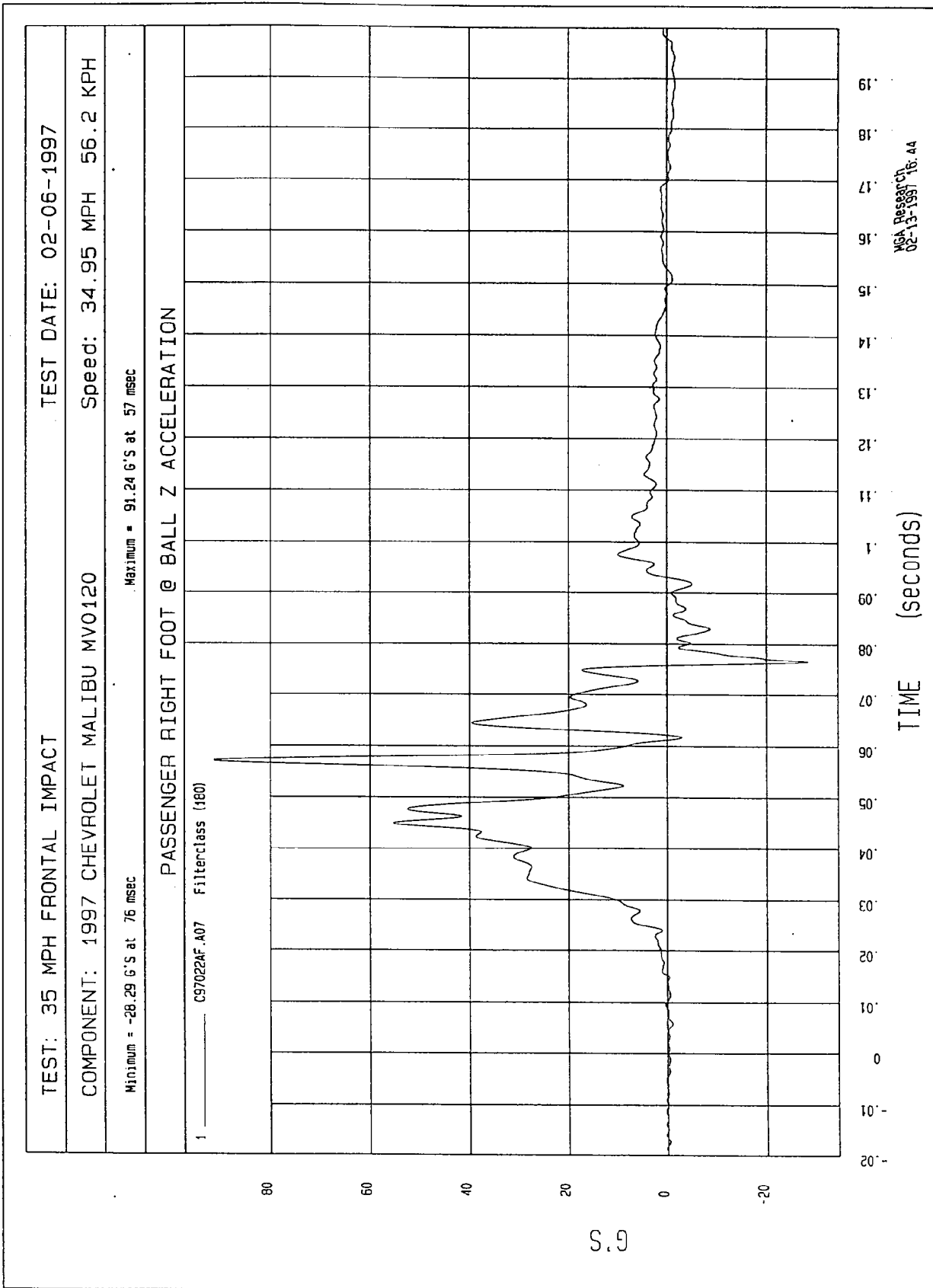
Minimum = -4.43 G'S at 72 msec Maximum = 51.41 G'S at 57 msec

PASSENGER LEFT FOOT @ HEEL Z ACCELERATION

1 C97022AF.A12 Filterclass (180)



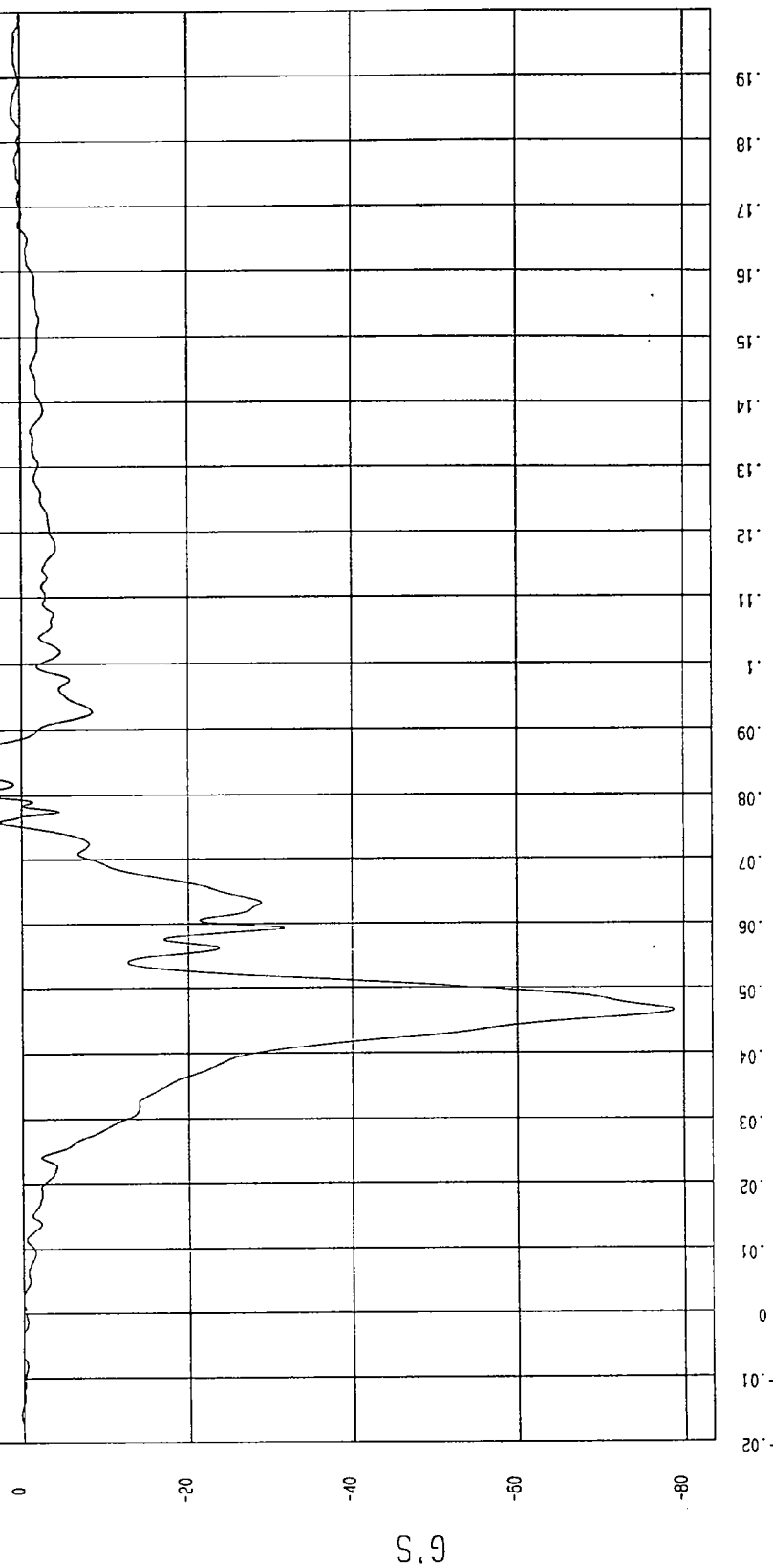
MCA Research
02-13-1997 16:44



TEST: 35 MPH FRONTAL IMPACT TEST DATE: 02-06-1997
COMPONENT: 1997 CHEVROLET MALIBU MV0120 Speed: 34.95 MPH 56.2 KPH
Minimum = -78.86 G'S at 46 msec Maximum = 12.55 G'S at 84 msec

PASSENGER RIGHT FOOT @ HEEL X ACCELERATION

1 C97022AF.A08 Filterclass (180)



NGA Research
02-13-1997 16:44

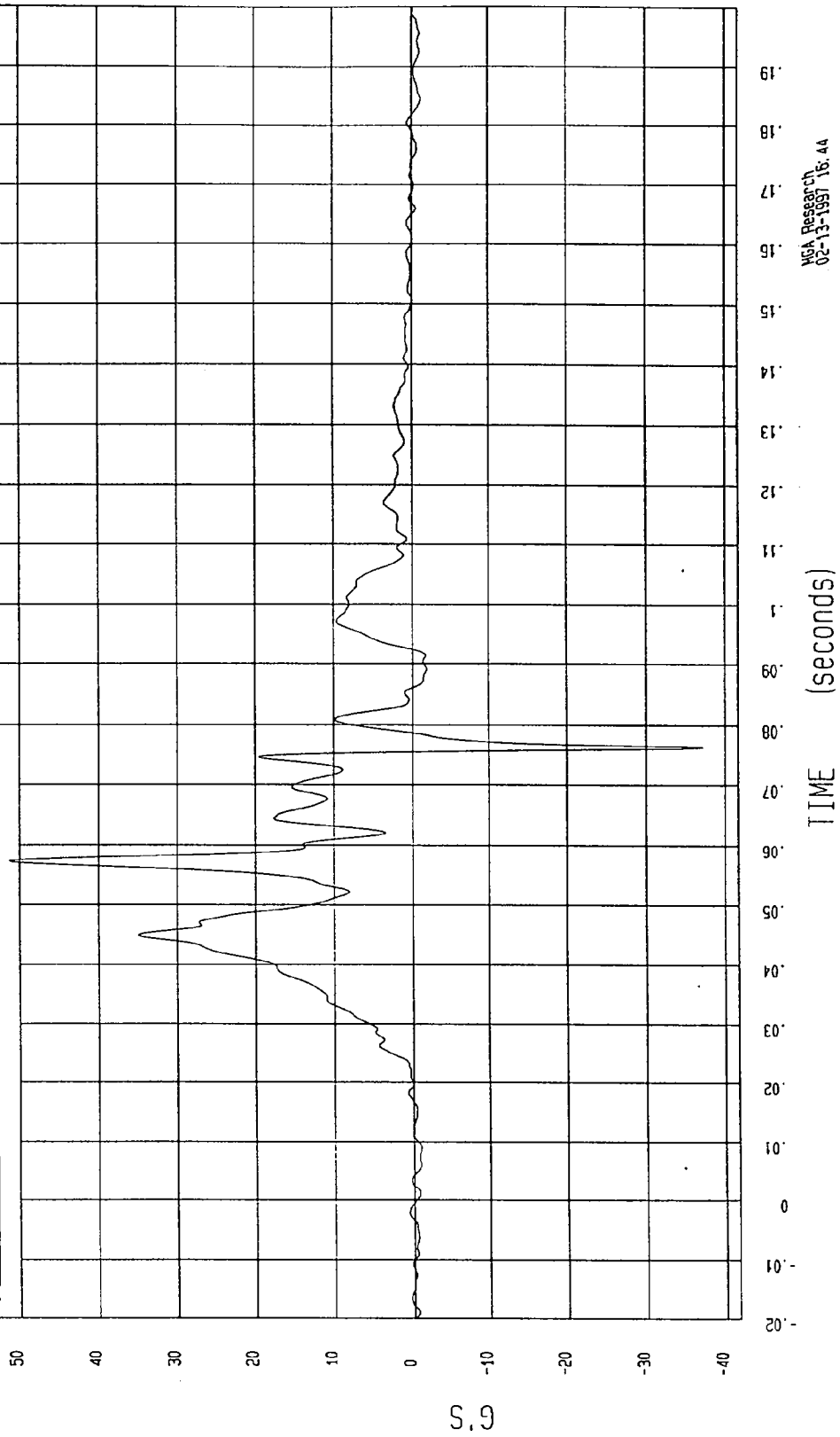
TEST: 35 MPH FRONTAL IMPACT TEST DATE: 02-06-1997

COMPONENT: 1997 CHEVROLET MALIBU MV0120 Speed: 34.95 MPH 56.2 KPH

Minimum = -37.21 G'S at 76 msec Maximum = 51.31 G'S at 57 msec

PASSENGER RIGHT FOOT @ HEEL Z ACCELERATION

1 _____ C97022AF.A09 Filterclass (180)



APPENDIX C
Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 036 DUMMY CALIBRATION BY: Tim Michnay

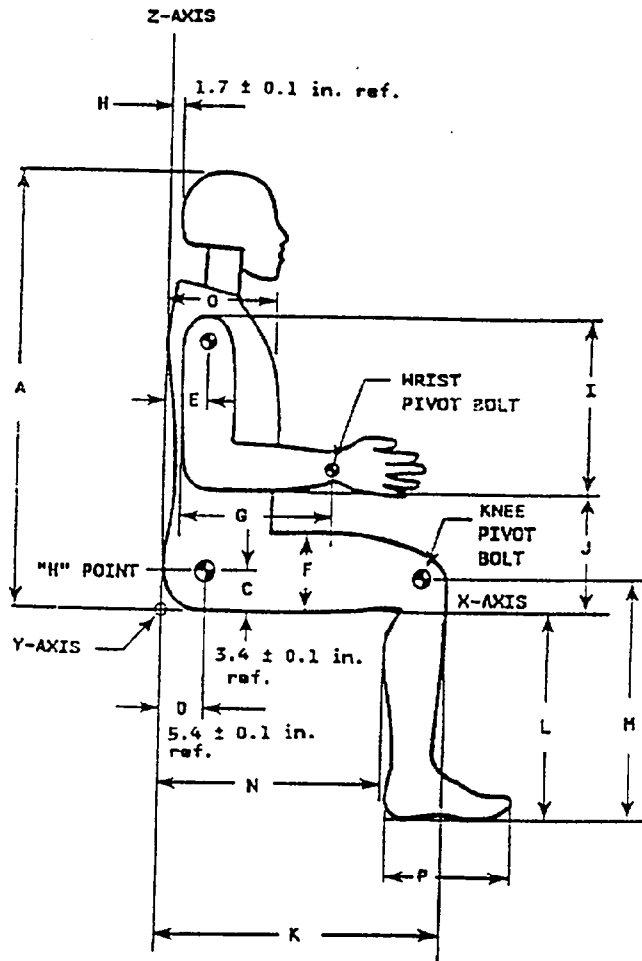
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 2-4-97

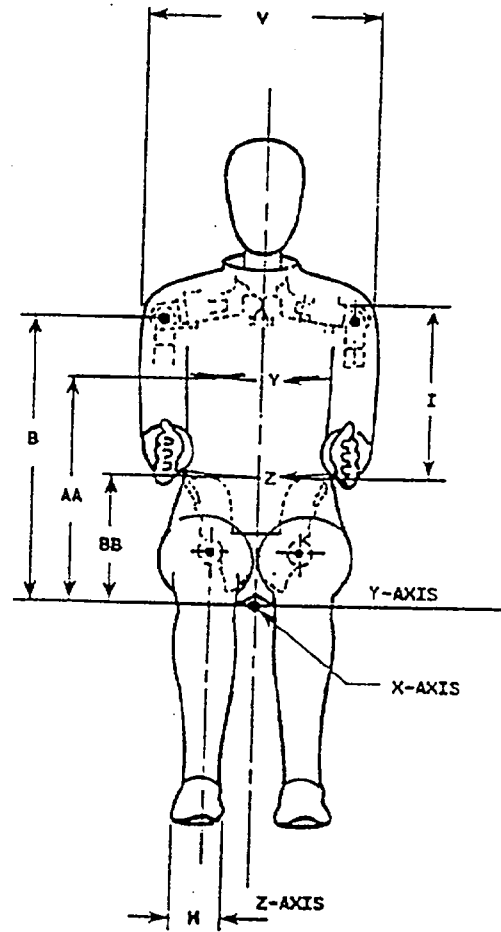
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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

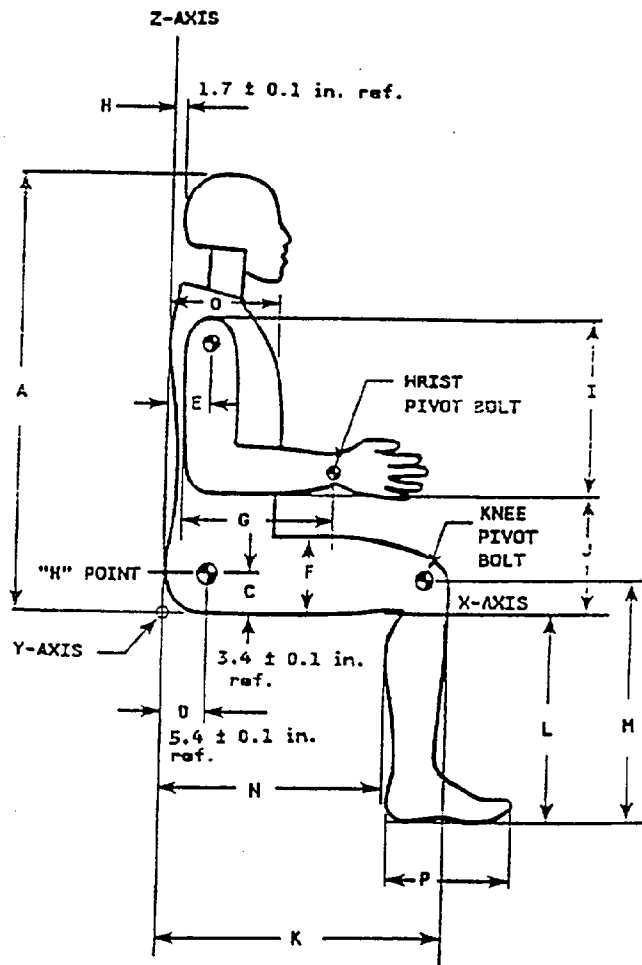
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: February 4, 1997

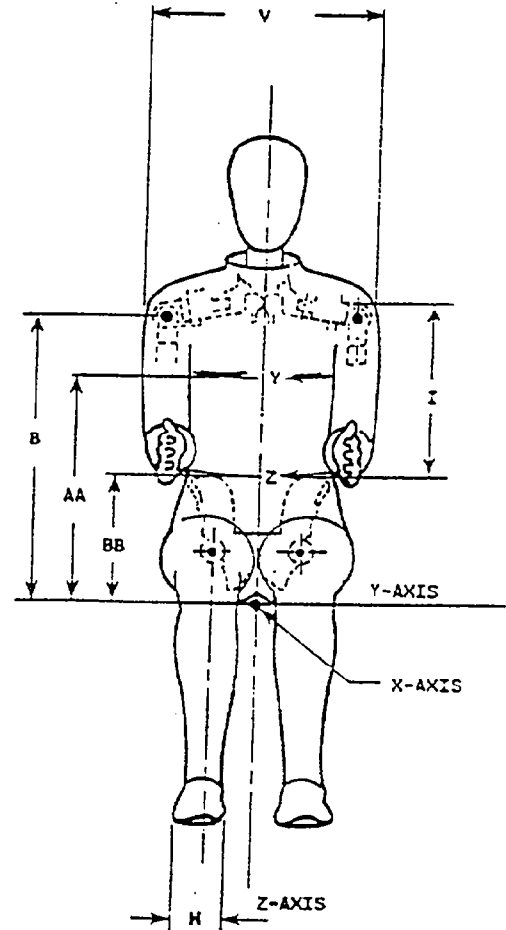
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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



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 (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

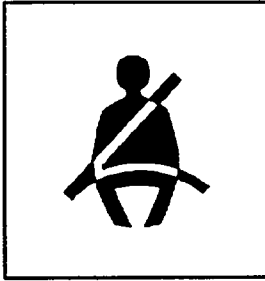
DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	C05-Z13	Entran	12/4/97
Right Rear Seat Crossmember X	E24-G04	Entran	1/3/97
Top of Engine Block X	E24-G07	Entran	1/7/97
Bottom of Engine X	E24-G08	Entran	1/6/97
Left Brake Caliper X	J06-D23	Entran	1/8/97
Right Brake Caliper X	H16-X15	Entran	1/2/97
Instrument Panel X	MGA144	Entran	1/6/97
Redundant Left Rear Seat Crossmember X	B02-G09	Entran	12/3/96
Redundant Right Rear Seat Crossmember X	E25-G11	Entran	1/8/97

LABORATORY INSTRUMENTS		
	SERIAL NO.	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AH5N9	Endevco
Neck Bending Head Rotary Potentiometer	018	Spectrol
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol
Chest Probe Accelerometer	AN8A4	Endevco
Knee Impact Accelerometer	MGA001	Entran

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions



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.*

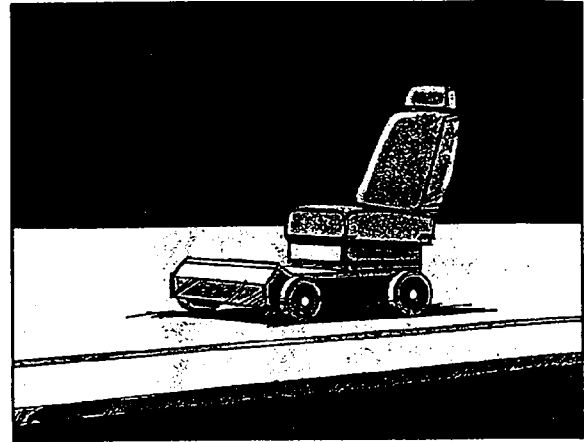
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

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.

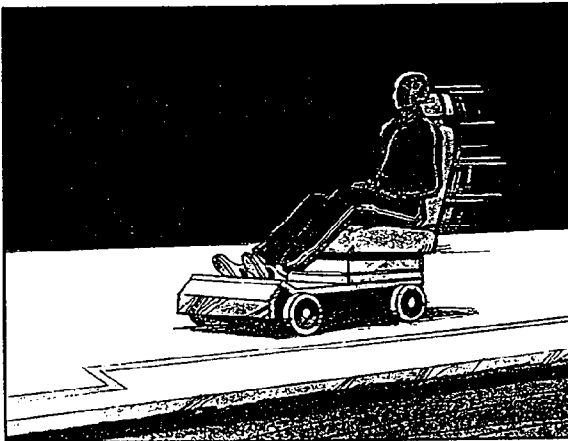
After more than 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

Why Safety Belts Work

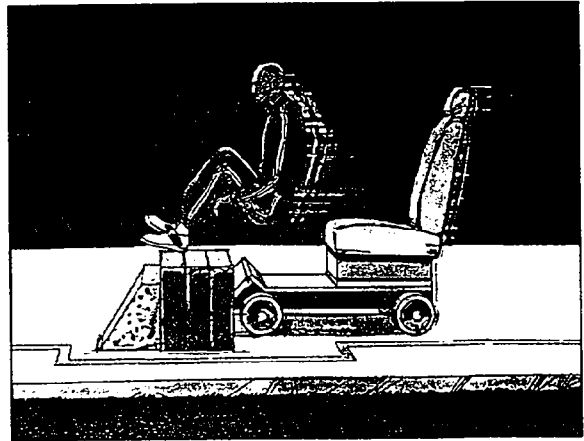
When you ride in or on anything, you go as fast as it goes.



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.

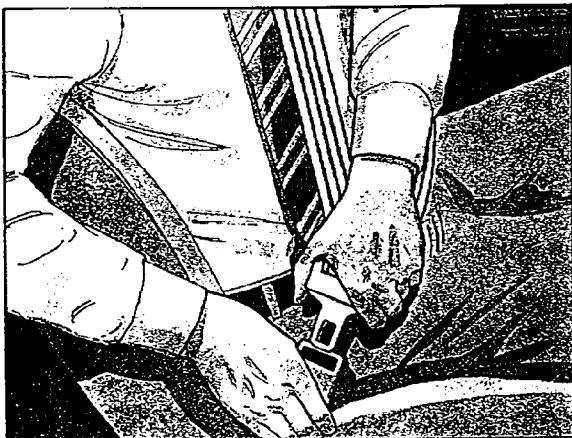
Driver Position

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.

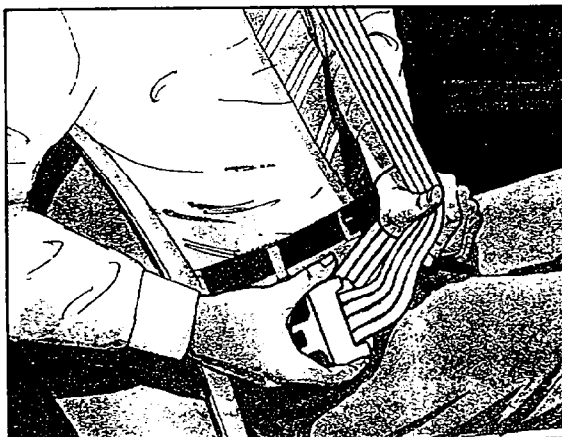
1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats" in the Index) so you can sit up straight.



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.



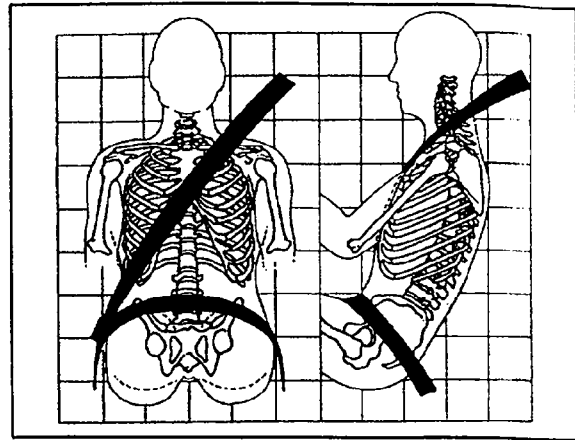
If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle the belt.

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.



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

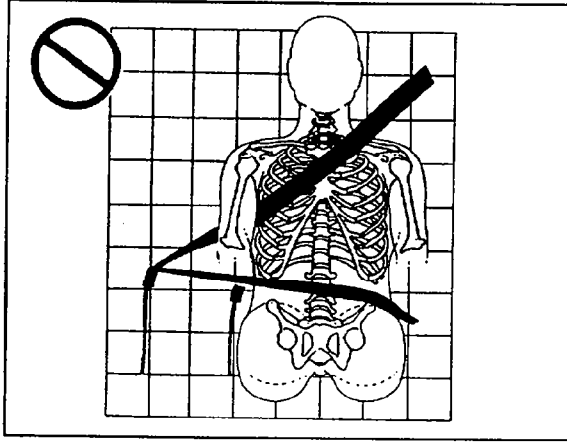
Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.



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?

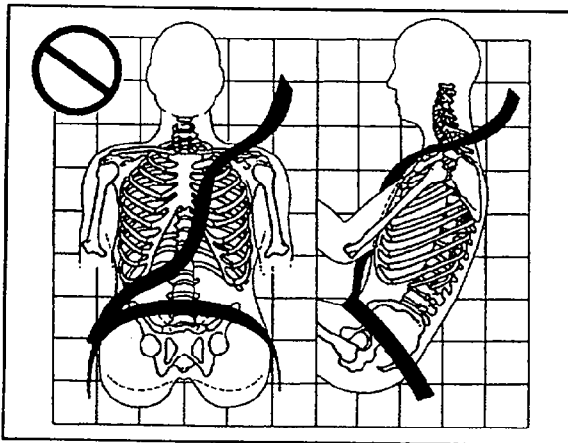


A: The belt is buckled in the wrong place.

⚠ 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?

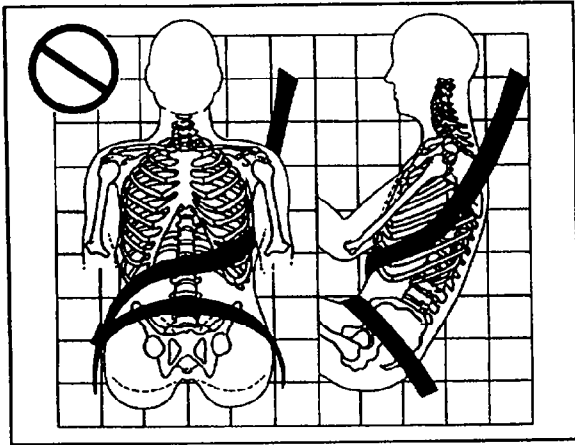


A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ 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?

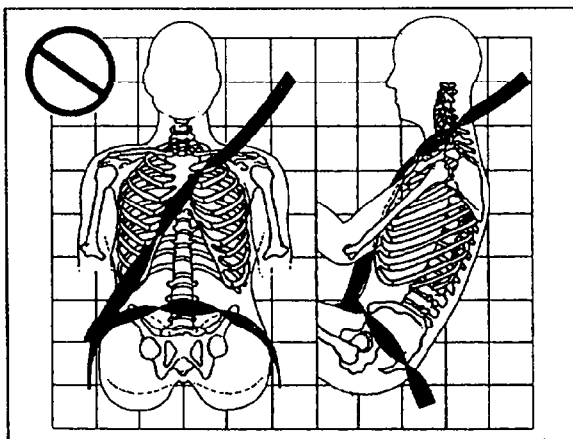


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ 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.

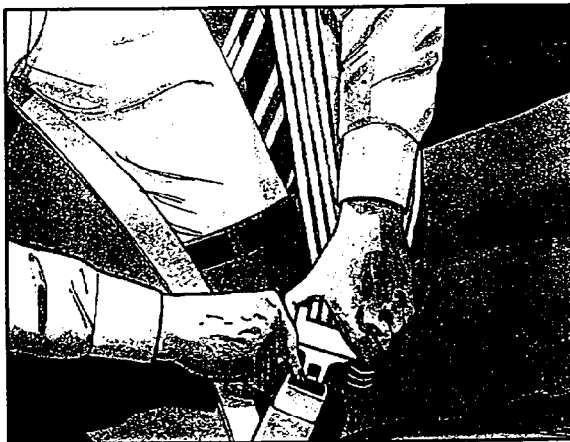
Q: What's wrong with this?



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.

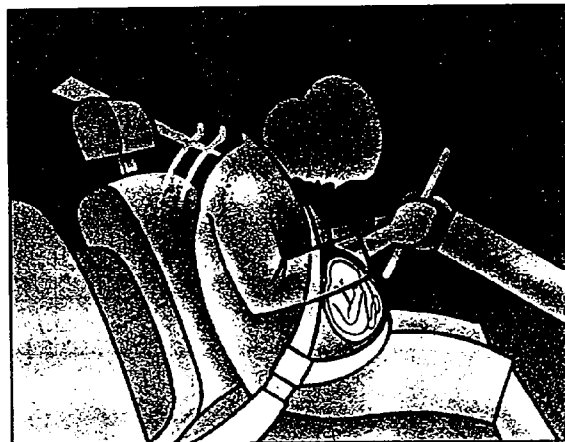


To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

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.



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

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:

If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into that person. The path of an inflating air bag must be kept clear. Don't put anything between an occupant and an air bag, and don't attach or put anything on the steering wheel hub or on or near any other 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 16 mph (14 to 26 km/h). The threshold level can vary, however, with specific vehicle design, so that 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.

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 -- 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.

⚠ 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 Malibu 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 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.

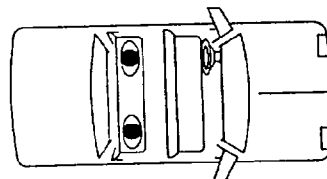
The air bag system does not need regular maintenance.

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.

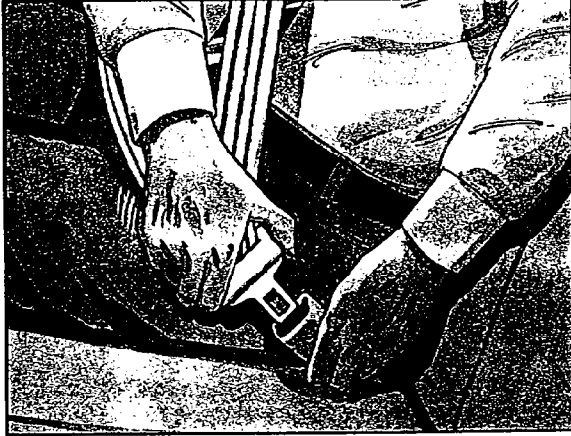
Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Outside Passenger Positions



Lap-Shoulder Belt

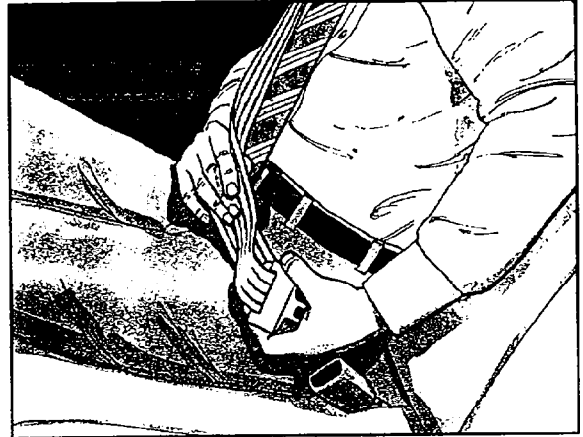
The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.



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.



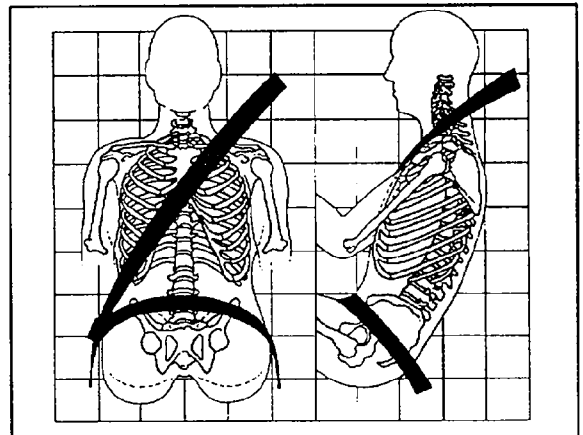
If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.

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.

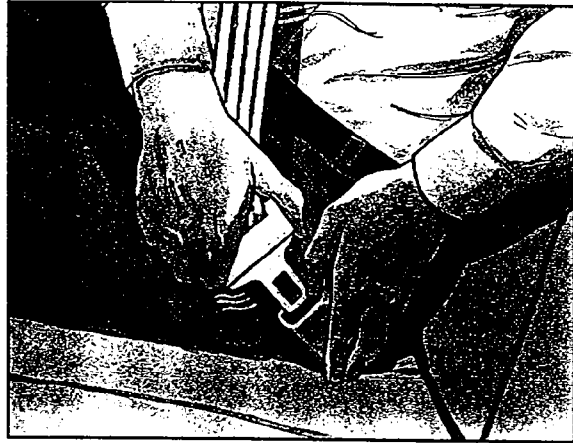


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even 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.

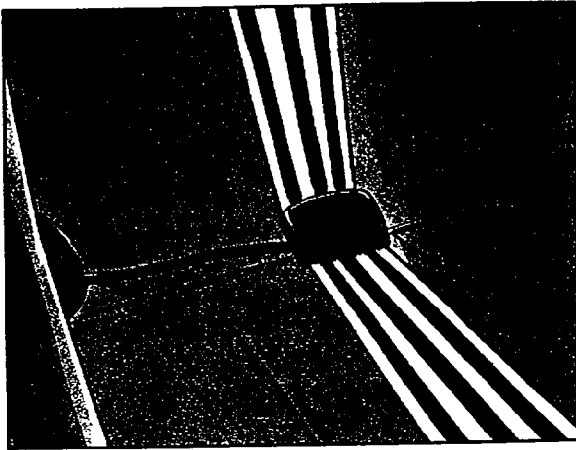
There is one guide for each outside passenger position in the rear seat. To provide added safety belt comfort for children who have outgrown child restraints and for smaller adults, the comfort guides may be installed on the shoulder belts. Here's how to install a comfort guide and use the safety belt:



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.



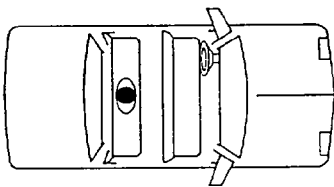
3. Be sure that the belt is not twisted and it lies flat. The elastic cord must be under the belt and the guide on top.



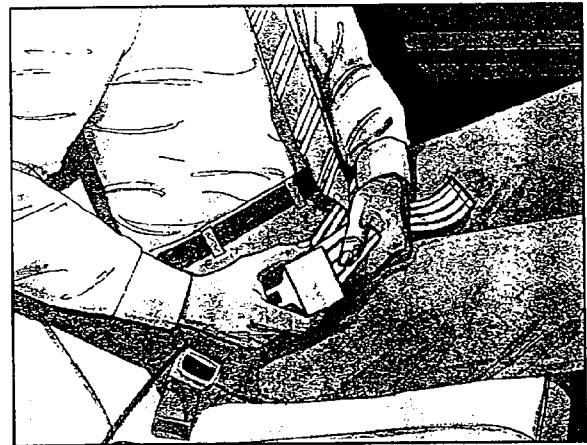
4. Buckle, position and release the safety belt as described in "Rear Seat Outside Passenger Positions" earlier in this section. Make sure that the shoulder belt crosses the shoulder.

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.

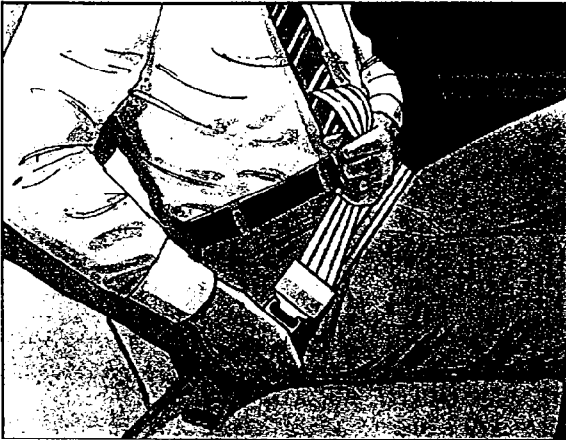
Center Passenger Position



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.

Children

Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

Smaller Children and Babies

CAUTION:

Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt might not stay low on the hips, as it should. Instead, the belt will likely be over the child's abdomen. In a crash, the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.



CAUTION:

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much -- until a crash. During a crash a baby will become so heavy you can't hold it. For example, in a crash

CAUTION: (Continued)

CAUTION: (Continued)

at only 25 mph (40 km/h), a 12-lb. (5.5 kg) baby will suddenly become a 240-lb. (110 kg) force on your arms. The baby would be almost impossible to hold.

Secure the baby in an infant restraint.

