

V2427

REPORT NUMBER: CAL-96-N08

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**MAZDA MOTOR COMPANY
1996 MAZDA MPV
8-PASSENGER VAN**

NHTSA NUMBER: MT5400

CALSPAN TEST NUMBER: 8313-8

March 21, 1996

CALSPAN SRL CORPORATION
TRANSPORTATION SCIENCE CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Market Incentives
400 Seventh Street, S. W.
Room No. 5313 (NRM-20)
Washington, DC 20590

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared: Michael J. Kilgallon
Michael J. Kilgallon, Project Engineer

Approved: D. J. Trivale
David J. Trivale, Program Manager
Transportation Research/
Physical Sciences Department

FINAL REPORT ACCEPTED BY:

Manager, New Car Assessment Program (NCAP)

Date of Report Acceptance

Contracting Officer's Tech. Rep. (COTR)

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

| | | | |
|---|---|--|------------------|
| 1. <i>Report No.</i> CAL-96-N08 | 2. <i>Government Accession No.</i> | 3. <i>Recipient's Catalog No.</i> | |
| 4. <i>Title and Subtitle</i> NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1996 Mazda MPV 8-Passenger Van | | 5. <i>Report Date</i> March 21, 1996 | |
| 7. <i>Author(s)</i> Michael J. Kilgallon, Project Engineer David J. Travale, Program Manager Report prepared by: Cathryn A. Harrower | | 6. <i>Performing Organization Code</i> CAL | |
| 9. <i>Performing Organization Name and Address</i> Calspan SRL Corporation 4455 Genesee Street Buffalo, New York 14225 | | 10. <i>Work Unit No.</i> X095-080-1604 | |
| 12. <i>Sponsoring Agency Name and Address</i> U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh, S.W. Washington, D.C. 20590 | | 11. <i>Contract or Grant No.</i> DTNH22-90-D-02121 | |
| 15. <i>Supplementary Notes</i> | | 13. <i>Type of Report and Period Covered</i> Final Report March - April | |
| 16. <i>Abstract</i> A frontal load cell barrier test of a 1996 Mazda MPV 8-Passenger Van was performed at Calspan SRL Corporation crash test facility in Buffalo, New York, on March 21, 1996. The impact velocity was 56.5 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 635 mm. The test vehicle was equipped with a 3-point continuous belt system and supplemental airbags at both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appear to comply with head, chest and femur requirements. | | 14. <i>Sponsoring Agency Code</i> DOT/NHTSA/RM/OMI | |
| 17. <i>Key Words</i> | | 18. <i>Distribution Statement</i> <u>Copies of this report are available from:</u> Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590 | |
| 19. <i>Security Classif. (of this report)</i> UNCLASSIFIED | 20. <i>Security Classif. (of this page)</i> UNCLASSIFIED | 21. <i>No. of Pages</i> | 22. <i>Price</i> |

Form DOT F1700.7 (8-69)

TABLE OF CONTENTS

| <u>Section</u> | | <u>Page No.</u> |
|----------------|---|-----------------|
| 1 | PURPOSE AND TEST PROCEDURE | 1-1 |
| 2 | SUMMARY OF TEST | 2-1 |
| 3 | OCCUPANT AND VEHICLE INFORMATION | 3-1 |
| 4 | SUMMARY OF RESULTS FOR: FMVSS 212, "Windshield Mounting" FMVSS 219 (Partial), "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity" | 4-1 |
| APPENDIX A | PHOTOGRAPHS | A-1 |
| APPENDIX B | VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA | B-1 |
| APPENDIX C | PART 572 B/E DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION TESTS | C-1 |
| APPENDIX D | DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION | D-1 |
| APPENDIX E | VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS | E-1 |

LIST OF FIGURES

| <u>Figure No.</u> | | <u>Page No.</u> |
|-------------------|---|-----------------|
| 1 | Dummy Measurements for Front Seat Passengers | 3-4 |
| 2 | Seat Belt Positioning Data | 3-6 |
| 3 | Camera Positions for Frontal Impacts | 3-8 |
| 4 | Vehicle Target Locations | 3-10 |
| 5 | Load Cell Locations on Fixed Barrier | 3-11 |
| 6 | Vehicle Accelerometer Locations | 3-12 |
| 7 | Test Vehicle Measurements | 3-13 |
| 8 | FMVSS No. 212 - "Windshield Mounting" Data | 4-2 |
| 9 | FMVSS No. 219 (Partial) - "Windshield Intrusion" Data | 4-3 |
| 10 | Driver Side Floorboard Deformation | 4-9 |
| 11 | Passenger Side Floorboard Deformation | 4-10 |
| 12 | Interior Deformation | 4-11 |
| 13 | Floorboard Deformation | 4-12 |
| 14 | Dummy Configuration Dimensions | C-3 |

LIST OF TABLES

| <u>Table No.</u> | | <u>Page No.</u> |
|------------------|--|-----------------|
| 1 | General Test and Vehicle Data | 2-2 |
| 2 | Dummy Injury Criteria Values | 3-2 |
| 3 | Hybrid III Neck and Chest Data Sheet | 3-3 |
| 4 | Front Seat Occupant Measurements | 3-5 |
| 5 | Seat Belt Performance Assessment Test Data | 3-7 |
| 6 | High Speed Camera Locations | 3-9 |
| 7 | Vehicle Measurements | 3-14 |
| 8 | Accident Investigation Division Data | 3-15 |
| 9 | FMVSS No. 301-75 "Fuel System Integrity" Post Impact Test Data | 4-4 |
| 10 | FMVSS No. 301 - "Static Rollover" Data | 4-5 |

Section 1

PURPOSE AND TEST PROCEDURE

This 56.5 kph frontal barrier impact test is part of the Composite FY 92 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-02121. 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 48.3 kph requirements.

The 56.5 kph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

Section 2

SUMMARY OF TEST MT5400

A load cell barrier consisting of 36 load cells was impacted by a 1996 Mazda MPV 8-Passenger Van at a velocity of 56.5 kph. The test was performed at the Calspan SRL Corporation on March 21, 1996. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by 1 real-time camera and 16 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572, 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 triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 150) was calibrated prior to the test. The passenger (position 2) ATD (Serial No. 64) was used in one previous test (MT5201). Injury criteria were not exceeded during that test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 133 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. P1 Left Upper Tibia Mx is not available for this report. Position #2 - Belt Elongation did not record accurately. Load Cell B3 sustained an offset after impact.

The driver's HIC was 592.9. The maximum chest deceleration over 3 milliseconds was 46.4 g's and maximum chest deflection was -31.9 mm. Femur loads were -3170.0 newtons on the left and 4041.5 newtons on the right.

The right front passenger's HIC was 409.1. Maximum chest deceleration over 3 milliseconds was 45.7 g's and maximum chest deflection was -37.7 mm. Femur loads were -4402.2 newtons on the left and -5164.6 newtons on the right.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style: 1996 Mazda MPV 8-Passenger Van

NHTSA Test No.: MT5400 VIN.: JM3LV522XT0800147

Body Color: Sand Mica Date of Manufacture: 9/95

Date Received: 3/15/96

Odometer Reading: 00268

Engine: 6 Cylinders; - C.I.D.; 3.0 Liters; - CC
X Gas; - Diesel; - Turbocharged
X Longitudinal; - Transverse

Transmission: 4 Speed; - Manual; X Automatic; X Overdrive

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

Accessories: X A/C; X P/S; X P/B; X P/wdo
X Tilt Wheel; - P/seats; X Cruise Control - Other

Type of Occupant Restraint: 3-point restraint system with dual airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 220 kPa, Rear 240 kPa

Recommended Tire Size: P215/65R15

Recommended Cold Tire Pressure: Front 220 kPa, Rear 240 kPa

Tires on Vehicle: P215/65R15 Manufacturer: Yokohama

Number of Occupants: 2 Front; 2 Rear; 3 3rd Seat; 7 TOTAL

Type of Front Seats: X Bucket; - Bench; - Split Bench

Type of Front Seat Back: - Fixed; X Adj. with X Lever - Rot. Knob

Rated Cargo and Luggage Weight (RCLW) = 136 kgs.

GVWR 2318 kgs. GAWR: Front 1100 kgs. Rear 1218 kgs.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids) = UDW:

| | | | | | | | |
|------------------------|---|--------------|------|-----------------------------------|---|------------|------|
| Right Front | = | <u>482</u> | kgs. | Right Rear | = | <u>411</u> | kgs. |
| Left Front | = | <u>452</u> | kgs. | Left Rear | = | <u>388</u> | kgs. |
| TOTAL FRONT WEIGHT | = | <u>934</u> | kgs. | (53.9 % of Total Vehicle Weight) | | | |
| TOTAL REAR WEIGHT | = | <u>799</u> | kgs. | (46.1 % of Total Vehicle Weight) | | | |
| TOTAL DELIVERED WEIGHT | = | <u>1,733</u> | kgs. | | | | |

CALCULATION FOR TARGET TEST WEIGHT:

| | | |
|--|-------------|------|
| UDW = Unloaded Delivered Weight | <u>1732</u> | kgs. |
| DSC = Designated Seating Capacity | <u>8</u> | |
| RCLW = | <u>136</u> | kgs. |
| Target Test Weight = UDW + RCLW + (2 dummies x 74.4 kgs./ dummy) | | |
| Target Test Weight = | <u>2017</u> | kgs. |

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 132 KGS CARGO:

| | | | | | | | |
|---|-----------|--------------|------|-----------------------------------|---|------------|------|
| Right Front | = | <u>520</u> | kgs. | Right Rear | = | <u>512</u> | kgs. |
| Left Front | = | <u>510</u> | kgs. | Left Rear | = | <u>471</u> | kgs. |
| TOTAL FRONT WEIGHT | = | <u>1,030</u> | kgs. | (51.2 % of Total Vehicle Weight) | | | |
| TOTAL REAR WEIGHT | = | <u>983</u> | kgs. | (48.8 % of Total Vehicle Weight) | | | |
| TOTAL TEST WEIGHT | = | <u>2,013</u> | kgs. | | | | |
| Weight of ballast secured in vehicle trunk area = | <u>55</u> | kgs. | | | | | |

VEHICLE ATTITUDE (all dimensions in mm):

| | | | | | | | | |
|---------------------|-------------|------------|--------|-------------|---------------------------------|------------|----|------------|
| Delivered Attitude: | RF | <u>726</u> | LF | <u>734</u> | RR | <u>724</u> | LR | <u>730</u> |
| Test Attitude: | RF | <u>717</u> | LF | <u>725</u> | RR | <u>797</u> | LR | <u>800</u> |
| Wheel Base: | <u>2805</u> | mm.; | C.G. = | <u>1374</u> | mm. rearward of front wheel C/L | | | |

Remarks: 69 liters of Stoddard solution was placed in the fuel tank.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

POST -IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°
 Date of Test: March 21, 1996 Time of Test: 14:11
 Ambient Temperature: 21 ° C at impact area
 Temperature in Occupant Compartment: 21 ° C
 Windshield Molding Temperature: 21 ° C
 Required Impact Velocity Range: 55.5 to 57.1 kph
 Impact Velocity: primary = 56.5 kph, secondary = 56.5 kph
 Distance From Front Bumper to Barrier Face When
 Entering Speed Trap: 1321 mm
 Exiting Speed Trap: 305 mm

VEHICLE REBOUND AND CRUSH (mm):

| | | | | | | |
|-----------------|---------------|-------------|----------------|-------------|---|-------------|
| Vehicle Length: | Pre-test = R | <u>4570</u> | C _L | <u>4655</u> | L | <u>4565</u> |
| | Post-test = R | <u>4010</u> | C _L | <u>4020</u> | L | <u>4080</u> |
| | Crush = R | <u>560</u> | C _L | <u>635</u> | L | <u>485</u> |

Distance from front of test vehicle to point of impact:
 R 479 C_L 552 L 452

VISIBLE DUMMY CONTACT POINTS:

| | <u>Driver</u> | <u>Passenger</u> |
|------------|-------------------|------------------|
| Head | <u>Airbag</u> | <u>Airbag</u> |
| Chest | <u>Airbag</u> | <u>Airbag</u> |
| Abdomen | <u>None</u> | <u>None</u> |
| Left Knee | <u>Dash panel</u> | <u>Glove box</u> |
| Right Knee | <u>Dash panel</u> | <u>Glove box</u> |

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

| | <u>Front</u> | | <u>Rear</u> | |
|-------------------------------|---|-----------------|-----------------|-----------------|
| | <u>Left</u> | <u>Right</u> | <u>Left</u> | <u>Right</u> |
| Door Opening | <u>Operable</u> | <u>Operable</u> | <u>Operable</u> | <u>Operable</u> |
| <u>Seat Movement</u> | <u>Left</u> | <u>Right</u> | <u>Left</u> | <u>Right</u> |
| Seat Back Failure | <u>None</u> | <u>None</u> | <u>-</u> | <u>-</u> |
| Seat Shift (mm.) | <u>0.0</u> | <u>0.0</u> | <u>-</u> | <u>-</u> |
| <u>Glazing Damage</u> | | | | |
| Backlight/Windshield: | <u>Windshield sustained stress fractures but remained intact.</u> | | | |
| Other Notable Impact Effects: | <u>None</u> | | | |

Section 3

OCCUPANT AND VEHICLE INFORMATION

I.

DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Performance Assessment Data
4. Camera Locations
5. Vehicle Target Locations
6. Load Cell Barrier Data
7. Vehicle Accelerometer Data
8. Test Vehicle Measurements

Table 2

DUMMY INJURY CRITERIA VALUES

NHTSA Test No.: MT5400 Vehicle: 1996 Mazda MPV 8-Passenger Van

| | MAXIMUM HEAD ACCELERATION (g's) | | | |
|-------------------------|---------------------------------|-------|------|------|
| | X | Y | Z | R |
| Position #1 - Driver | -54.8 | 8.3 | 25.6 | 57.4 |
| Position #2 - Passenger | -49.8 | -10.6 | 22.5 | 52.4 |

| | MAXIMUM CHEST ACCELERATION (g's) | | | |
|-------------------------|----------------------------------|-----|-------|------|
| | X | Y | Z | R* |
| Position #1 - Driver | -46.7 | 9.0 | -11.9 | 46.4 |
| Position #2 - Passenger | -47.0 | 5.6 | -14.5 | 45.7 |

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

| | MAXIMUM FORCE - FEMUR LOAD (nwt) | |
|-------------------------|----------------------------------|-------------|
| | LEFT FEMUR | RIGHT FEMUR |
| Position #1 - Driver | -3170.0 | -4041.5 |
| Position #2 - Passenger | -4402.2 | -5164.6 |

| | MAXIMUM FORCE - SEAT BELT LOADS (nwt) | | |
|-------------------------|---------------------------------------|---------------------------|--------------------------|
| | SHOULDER STRAP UPPER BELT LOAD | LAP STRAP RIGHT BELT LOAD | LAP STRAP LEFT BELT LOAD |
| Position #1 - Driver | 7793.0 | - | 3894.5 |
| Position #2 - Passenger | 6733.5 | 3370.3 | - |

| | HEAD INJURY CRITERIA (HIC) | | | |
|-------------------------|----------------------------|-----------------------|-----------------------|---|
| | HIC** | t ₁ (mSec) | t ₂ (mSec) | Average Acceleration t ₁ to t ₂ |
| Position #1 - Driver | 592.9 | 57.96 | 93.84 | 48.67 |
| Position #2 - Passenger | 409.1 | 50.76 | 86.64 | 41.96 |

** HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 36 milliseconds.

Table 3

HYBRID III NECK AND CHEST DATA SHEET

Vehicle Year/Make/Model/Body Style: 1996 Mazda MPV 8-Passenger Van
 NHTSA Test No.: MT5400 Test Date: March 21, 1996

| MAXIMUM VALUES | DRIVER DUMMY ID #150: | PASSENGER DUMMY ID #64: |
|---------------------------------|-----------------------|-------------------------|
| Neck Load X (nwt) | 267.6 | 360.3 |
| Neck Load Y (nwt) | 235.8 | ≅ 200 |
| Neck Load Z (nwt) | 2121.4 | 1851.1 |
| Neck Moment X (nwt-m) | -15.8 | 16.5 |
| Neck Moment Y (nwt-m) | -20.9 | 51.4 |
| Neck Moment Z (nwt-m) | -9.6 | 17.3 |
| Chest Deflection X (mm.) | -31.9 | -37.7 |
| Time of Max. Occurrence (msec) | 73.1 | 69.1 |

Note: All values listed occur during the primary impact event.

Figure 1

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

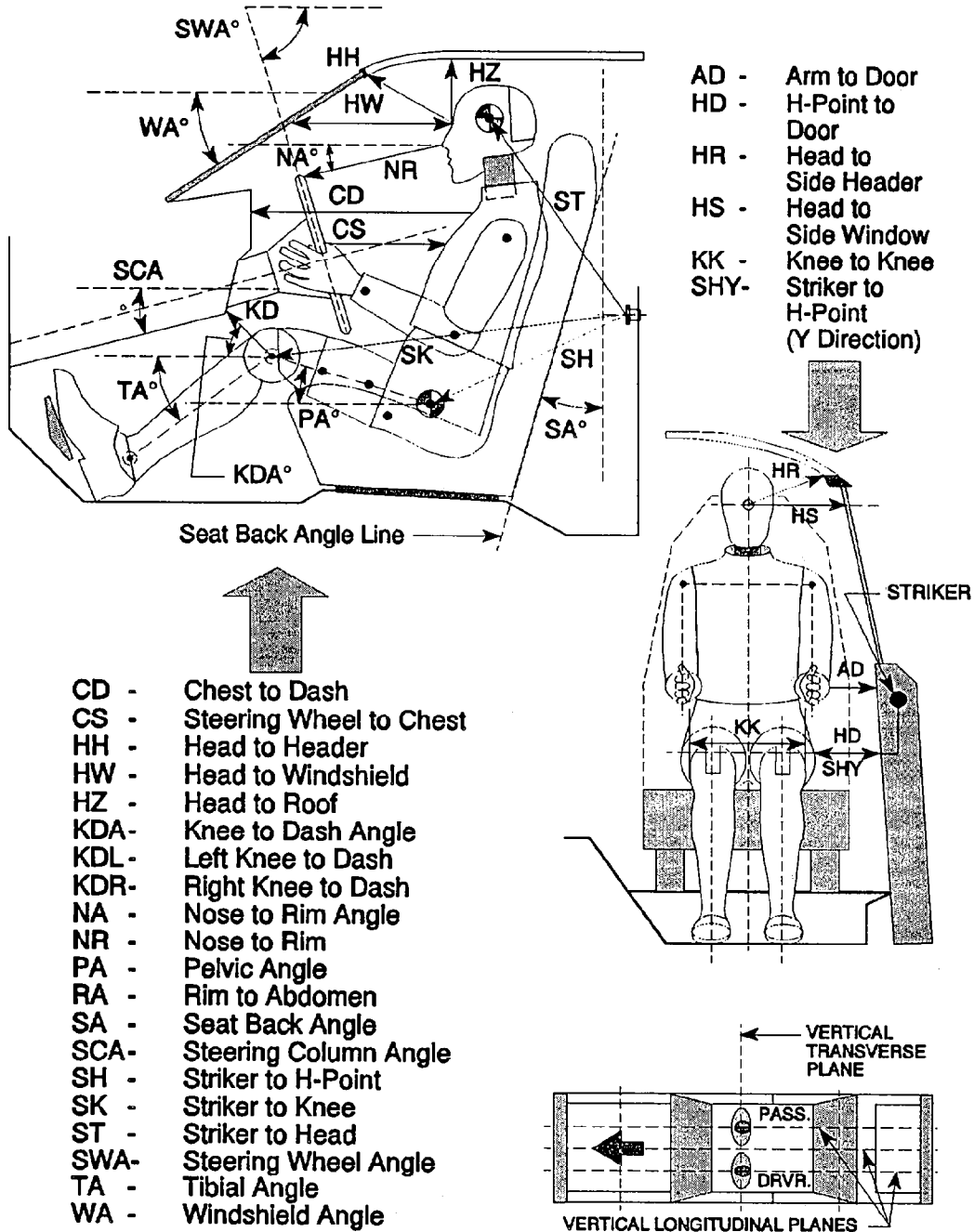


Table 4

FRONT SEAT OCCUPANT MEASUREMENTS

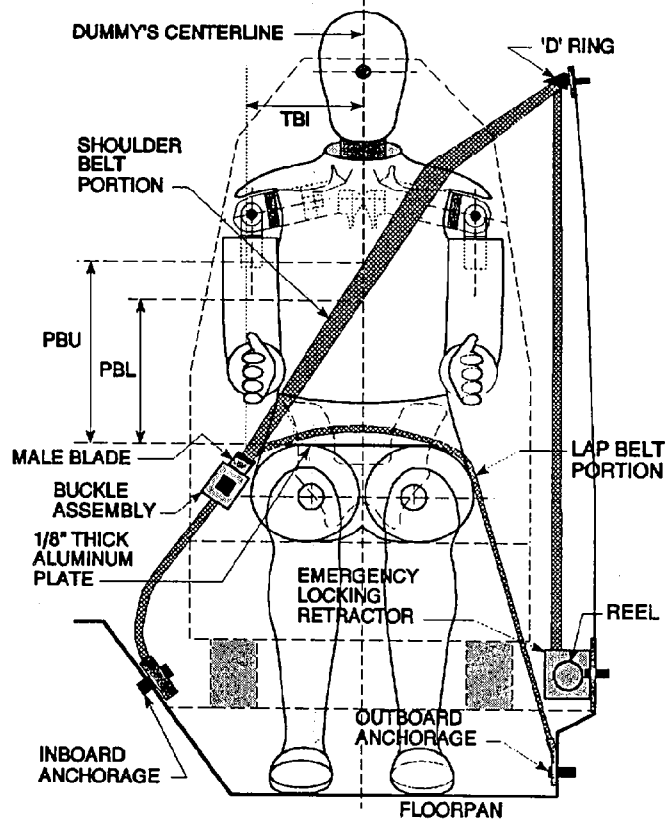
| | DRIVER (Serial #150) | | | PASS. (Serial # 64) | | |
|------|----------------------|-------------|----------|---------------------|-------------|----------|
| WA° | 30 deg. | | | N/A | | |
| SWA° | 58 deg. | | | N/A | | |
| SCA° | 32 deg. | | | N/A | | |
| SA° | 15 deg. | | | 15 deg. | | |
| HZ | 225 | | | 220 | | |
| HH | 352 | | | 340 | | |
| HW | 528 | | | 563 | | |
| HR | 236 | | | 268 | | |
| NR | 368 | Angle | 20 deg. | N/A | | |
| CD | 527 | | | 471 | | |
| CS | 288 | | | N/A | | |
| RA | 155 | | | N/A | | |
| KDL | 158 | Angle (KDA) | 28 deg. | 122 | | |
| KDR | 143 | | | 125 | Angle (KDA) | 35 deg. |
| PA° | 20 deg. | | | 22 deg. | | |
| TA° | 53 deg. | | | 52 deg. | | |
| KK | 275 | | | 240 | | |
| ST | 645 | Angle | 18 deg. | 642 | Angle | 18 deg. |
| SK | 632 | Angle | 90 deg. | 640 | Angle | 88 deg. |
| SH | 241 | Angle | 110 deg. | 234 | Angle | 102 deg. |
| SHY | 220 | | | 205 | | |
| HS | 305 | | | 310 | | |
| HD | 152 | | | 152 | | |
| AD | 90 | | | 92 | | |

Dimensions in millimeters

Figure 2

SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

| | DRIVER DUMMY (mm) | PASSENGER DUMMY (mm) |
|---|----------------------|-------------------------|
| PBU -- Top surface of alum. plate to upper edge | 343 | 343 |
| PBL-- Top surface of alum. plate to belt lower edge | 260 | 260 |
| <u>LAP BELT TENSION</u> | Retractor | Retractor |
| <u>SHOULDER BELT TENSION</u> | 10 nwt | 10 nwt |

Table 5

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.

Driver

Passenger

2220

2190

Shoulder belt length as measured on Part 572 Dummy.

940

940

Lap belt length as measured on Part 572 Dummy.

990

960

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis.

51

51

As determined mechanically.

44

45

As determined electronically.

53.9

218

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.

42.2 mm/M

N/A

Measured mechanically.

15.7 mm/M

0

Dimensions in millimeters

Figure 3

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera information shown in Table 6.

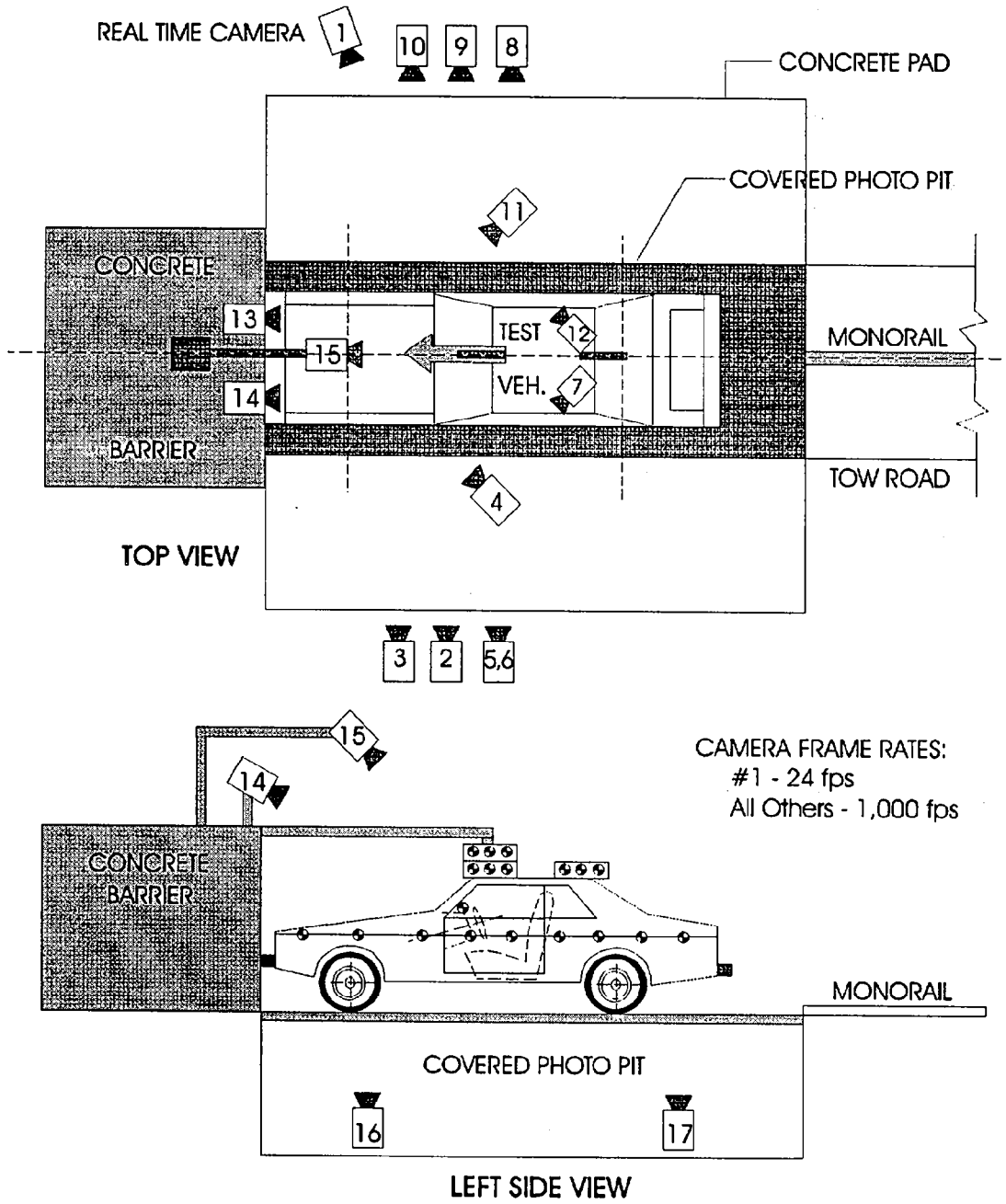


Table 6
HIGH-SPEED CAMERA LOCATIONS

| CAMERA NO. | VIEW | CAMERA POSITIONS (MM.)* | | | ANGLE** (deg) | FILM PLANE TO HEAD TARGET | LENS (mm) | SPEED (fps) |
|------------|-----------------------------|-------------------------|------|------|---------------|---------------------------|-----------|-------------|
| | | X | Y | Z | | | | |
| 1 | Real-Time Camera | - | - | - | - | - | 24 | |
| 2 | Overall Left Side | 10700 | 1010 | 1100 | -3 | 10092 | 1020 | |
| 3 | Left Side View | 8420 | 620 | 1150 | -3 | 7812 | 990 | |
| 4 | Driver and Interior View | 5340 | 2820 | 1870 | -10 | - | 980 | |
| 5 | Steering Column (Bottom) | 9630 | 1260 | 1160 | -1 | 9022 | 820 | |
| 6 | Steering Column (Top) | 9630 | 1260 | 1800 | -6 | 9022 | 880 | |
| 7 | Left Belt | - | - | - | - | - | 610 | |
| 8 | Overall Right Side | 9970 | 1600 | 1160 | -4 | 9362 | 1070 | |
| 9 | Right Side View | 7880 | 1120 | 1140 | -4 | 7272 | 950 | |
| 10 | Right Passenger View | 8620 | 2030 | 1320 | -2 | 8012 | 1030 | |
| 11 | Passenger and Interior View | 5030 | 3020 | 1970 | -9 | - | 1110 | |
| 12 | Right Belt | - | - | - | - | - | 890 | |
| 13 | Passenger Front View | 580 | 0 | -32 | -31 | - | 1010 | |
| 14 | Driver Front View | 580 | 0 | -35 | -31 | - | 1030 | |
| 15 | Windshield View | 0 | -530 | 51 | -51 | - | 1000 | |
| 16 | Pit View of Engine | 0 | 505 | 90 | 90 | - | 990 | |
| 17 | Pit View of Fuel Tank | 0 | 3432 | 90 | 90 | - | 860 | |

NHTSA Test No.: MT5400 Vehicle: 1996 Mazda MPV 8-Passenger Van

*X = film plane to monorail centerline ** = referenced to horizontal plane

Y = film plane to impact location

N.T. indicates No Timing

Z = film plane to ground

Figure 4

VEHICLE TARGET LOCATIONS

(Dimensions in millimeters)

| | |
|---|------|
| A | 379 |
| B | 541 |
| C | 905 |
| D | 2433 |
| E | 200 |
| F | 1690 |
| G | 962 |
| H | 957 |
| I | 95 |
| J | 1324 |
| K | 1052 |
| L | 1317 |
| M | 200 |
| N | 98 |
| O | 960 |
| P | 962 |
| Q | 1317 |
| R | 1058 |
| S | 1318 |

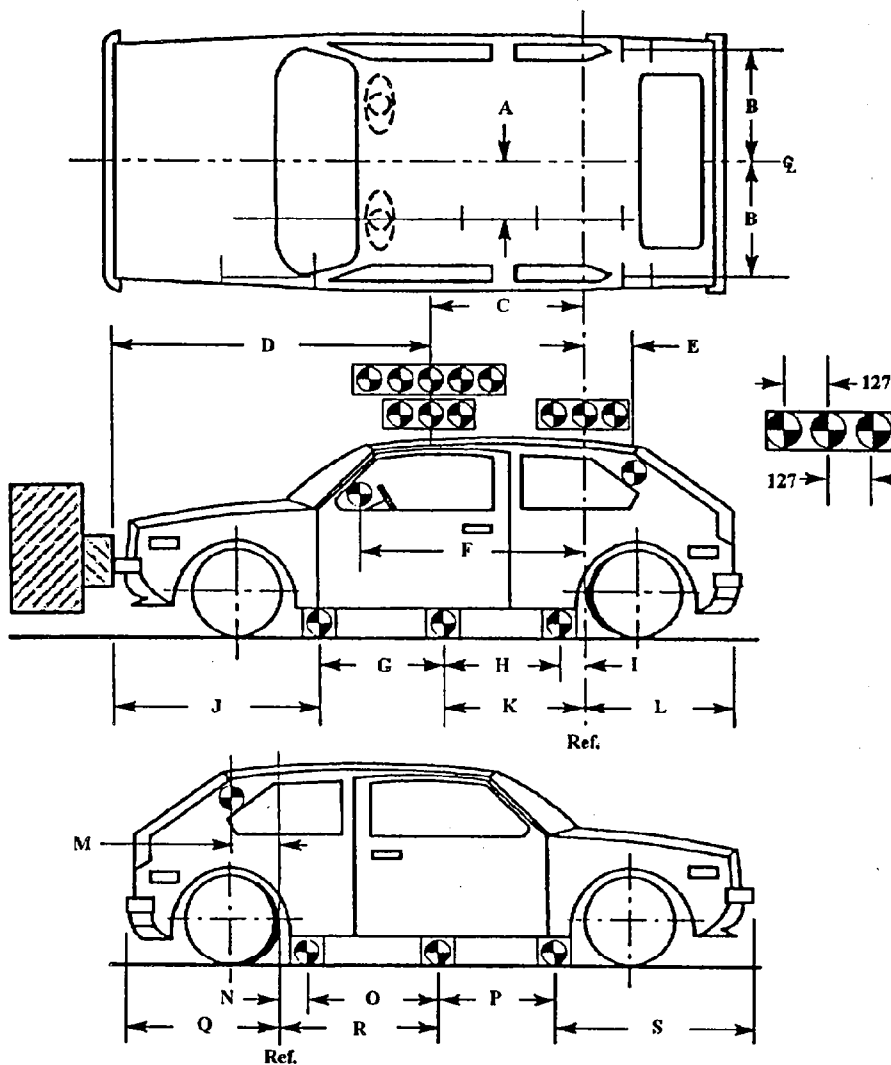
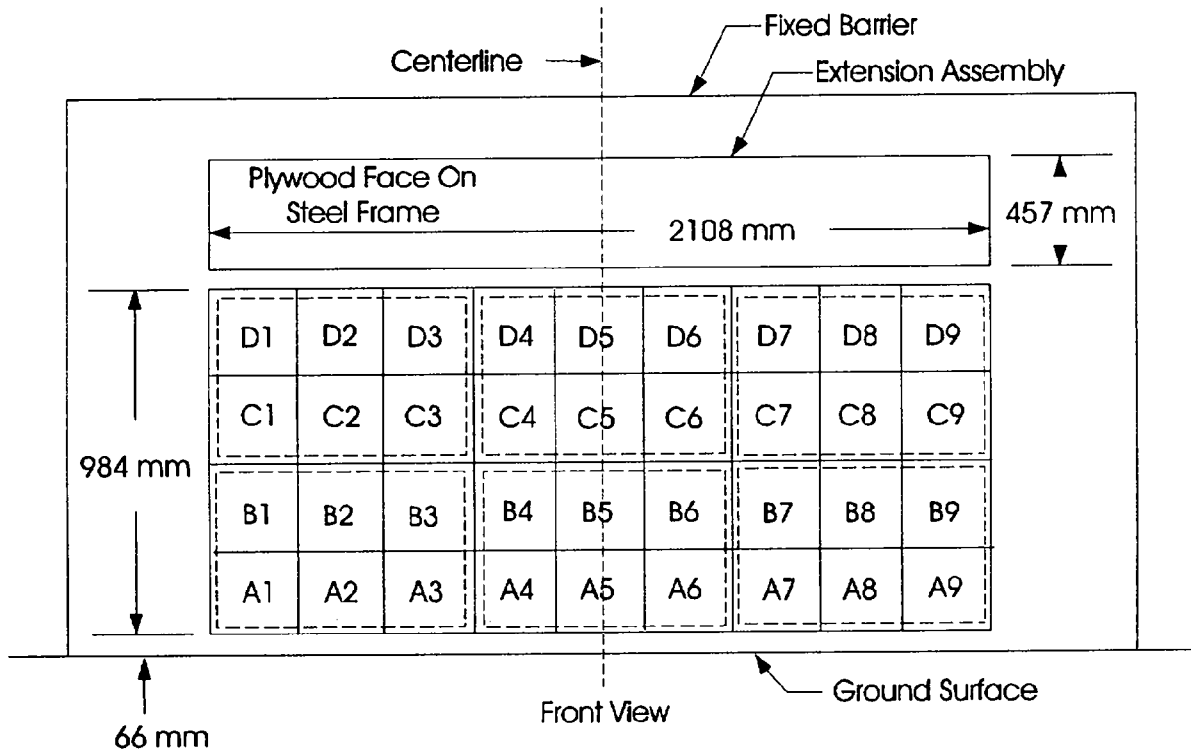


Figure 5

LOAD CELL LOCATIONS ON FIXED BARRIER

- 36 Load Cells
- 4 Rows
- 9 Columns
- 6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

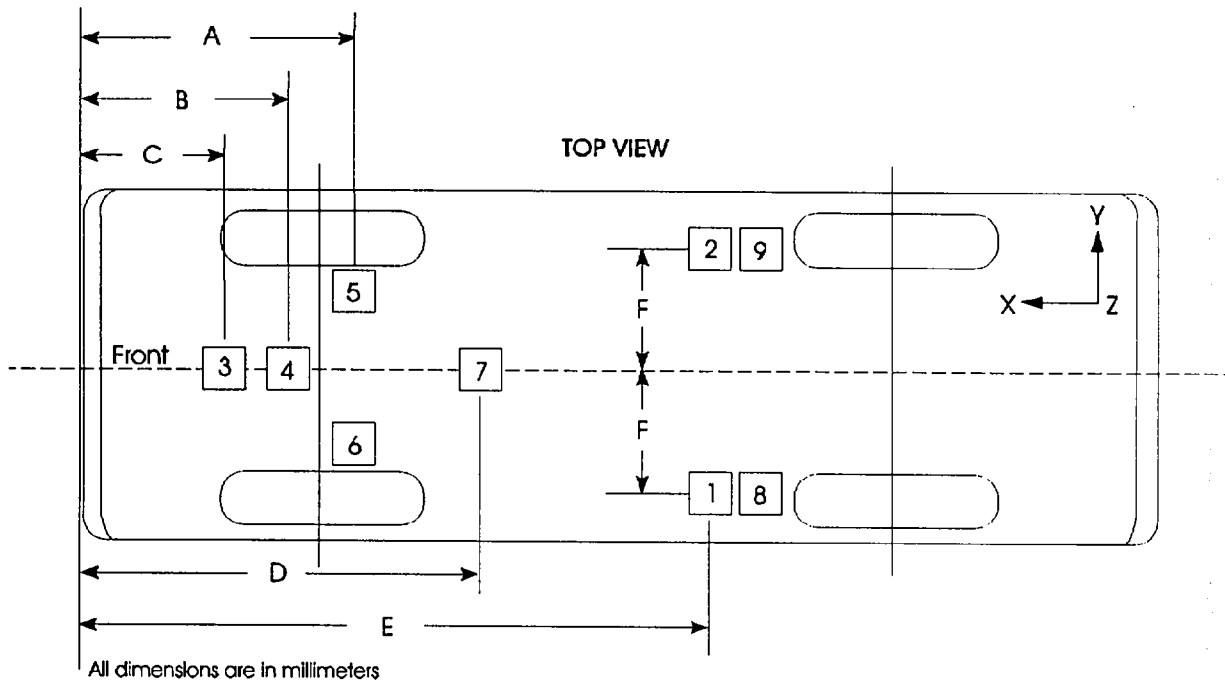
| | | |
|-----------------------|-----------------------|-----------------------|
| Group 4 C1 thru D3 | Group 5 C4 thru D6 | Group 6 C7 thru D9 |
| Group 1 A1 thru B3 | Group 2 A4 thru B6 | Group 3 A7 thru B9 |

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

Figure 6

VEHICLE ACCELEROMETER LOCATIONS



| ACCELEROMETER NUMBER* | ACCELEROMETER LOCATION | Distances From Vehicle Front | |
|-----------------------|-----------------------------------|-------------------------------|---------|
| | | All dimensions in millimeters | |
| 1 | Left Rear Seat Crossmember [E/F] | X = 2548 | Y = 560 |
| 2 | Right Rear Seat Crossmember [E/F] | X = 2548 | Y = 560 |
| 3 | Top of engine [C] | 914 | |
| 4 | Bottom of engine [B] | 1054 | |
| 5 | Right Disc Brake Caliper [A] | 948 | |
| 6 | Left Disc Brake Caliper [A] | 948 | |
| 7 | Instrument Panel [D] | 1695 | |
| 8 | Left Rear Seat Crossmember [E/F] | X = 2548 | Y = 560 |
| 9 | Right Rear Seat Crossmember [E/F] | X = 2598 | Y = 560 |

* The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

Figure 7

TEST VEHICLE MEASUREMENTS

REAR DATUM REFERENCE

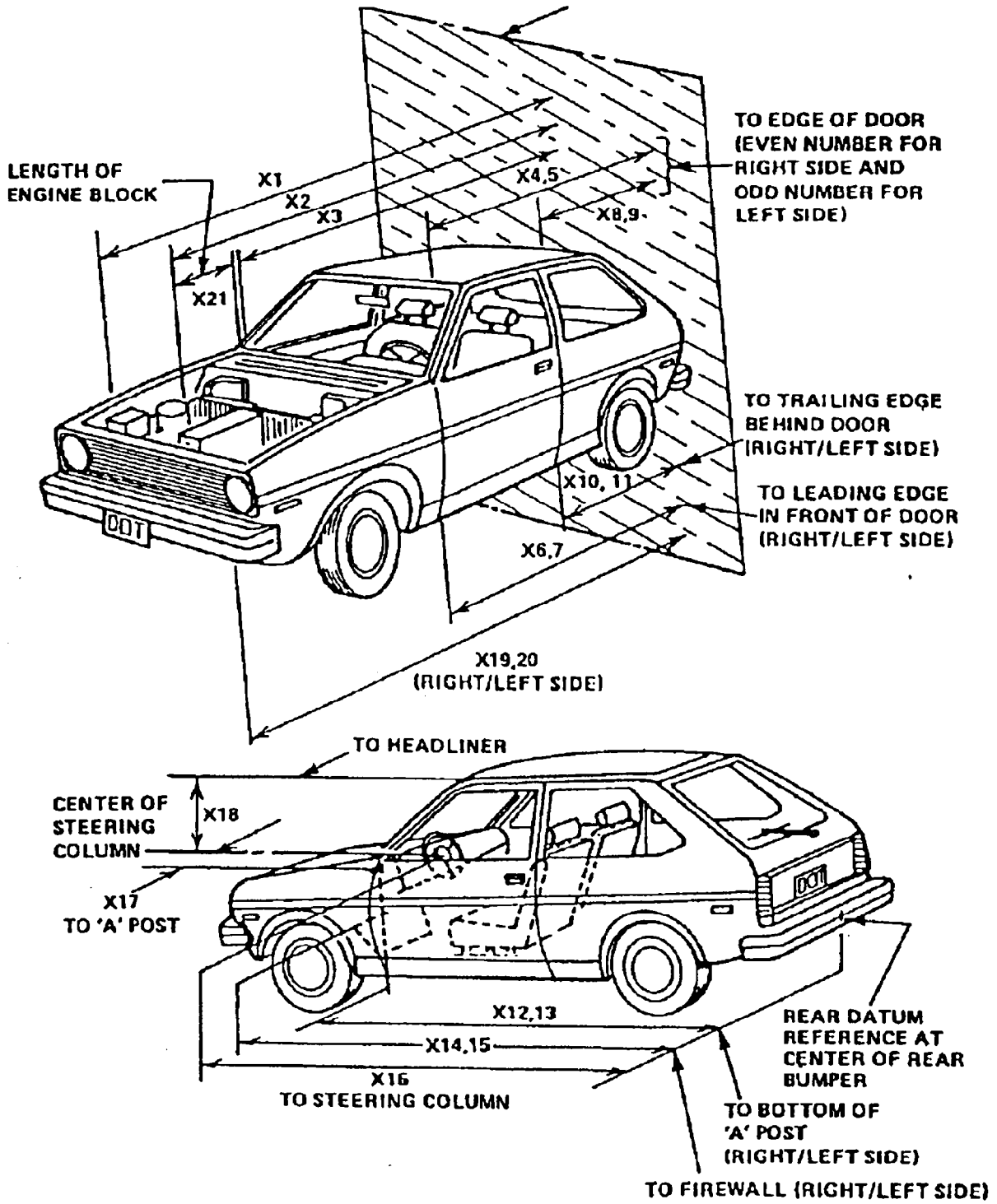


Table 7

VEHICLE MEASUREMENTS

| No. | | All Dimensions in mm | | |
|-----|--|----------------------|-----------|-------------|
| | | Pre-Test | Post-Test | Differences |
| X1 | Total Length of Vehicle at Centerline | 4655 | 4020 | 635 |
| X2 | Rear Surface of Vehicle to Front of Engine | 3865 | 3650 | 215 |
| X3 | Rear Surface of Vehicle to Firewall | 3437 | 3360 | 77 |
| X4 | Rear Surface of Vehicle to Upper Leading Edge of Right Door | 3285 | 3275 | 10 |
| X5 | Rear Surface of Vehicle to Upper Leading Edge of Left Door | 3275 | 3275 | 0 |
| X6 | Rear Surface of Vehicle to Lower Leading Edge of Right Door | 3268 | 3262 | 6 |
| X7 | Rear Surface of Vehicle to Lower Leading Edge of Left Door | 3267 | 3261 | 6 |
| X8 | Rear Surface of Vehicle to Upper Trailing Edge of Right Door | 2205 | 2202 | 3 |
| X9 | Rear Surface of Vehicle to Upper Trailing Edge of Left Door | 2198 | 2200 | -2 |
| X10 | Rear Surface of Vehicle to Lower Trailing Edge of Right Door | 2197 | 2194 | 3 |
| X11 | Rear Surface of Vehicle to Lower Trailing Edge of Left Door | 2197 | 2198 | -1 |
| X12 | Rear Surface of Vehicle to Bottom of "A" Post of Right Side | 3290 | 3280 | 10 |
| X13 | Rear Surface of Vehicle to Bottom of "A" Post of Left Side | 3286 | 3281 | 5 |
| X14 | Rear Surface of Vehicle to Firewall, Right Side | 3445 | 3390 | 55 |
| X15 | Rear Surface of Vehicle to Firewall, Left Side | 3440 | 3435 | 5 |
| X16 | Rear Surface of Vehicle to Steering Column | 2810 | 2835 | -25 |
| X17 | Center of Steering Column to "A" Post | 410 | 400 | 10 |
| X18 | Center of Steering Column to Headliner | 470 | 420 | 50 |
| X19 | Rear Surface of Vehicle to Right Side of Front Bumper | 4570 | 4010 | 560 |
| X20 | Rear Surface of Vehicle to Left Side of Front Bumper | 4565 | 4080 | 485 |
| X21 | Length of Engine Block | 470 | 470 | 0 |
| RD | Rear Surface of Vehicle to Right Side of Dash Panel | 3010 | 3010 | 0 |
| CD | Rear Surface of Vehicle to Center of Dash Panel | 2975 | 2975 | 0 |
| LD | Rear Surface of Vehicle to Left Side of Dash Panel | 3005 | 3005 | 0 |

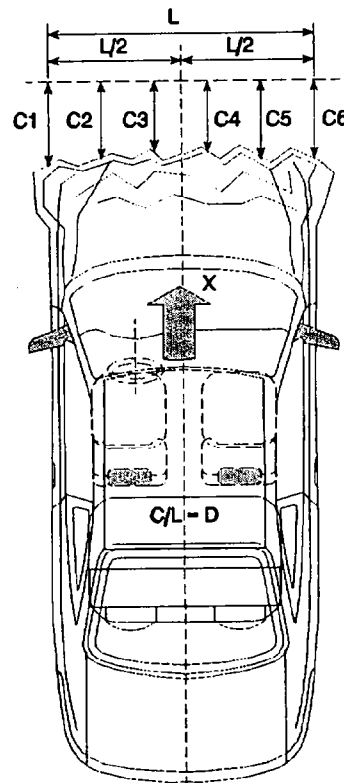
Table 8

ACCIDENT INVESTIGATION DIVISION DATA
FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Mazda MPV 8-Passenger Van
 NHTSA Test No.: MT5400 VIN: JM3LV522XT0800147
 Model Year: 1996 Build Date: 9/95 Test Date: March 21, 1996
 Vehicle Size Category: Mini Van Test Weight: 2013 Kgs
 Vehicle Wheelbase: 2805 mm; Front Overhang: 1324 mm; Overall Width: 1570 mm
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions:

C1 = 430 mm
 C2 = 565 mm
 C3 = 625 mm
 C4 = 620 mm
 C5 = 600 mm
 C6 = 505 mm



Midpoint of Damage: D = Vehicle Centerline
(Longitud.)

Longitude Length of Damaged Region: L = 1570 mm

Section 4

SUMMARY OF RESULTS OF FMVSS 212, 219 (Partial) AND 301

"Windshield Mounting" FMVSS No. 212 Data

"Windshield Zone Intrusion" FMVSS No. 219 Data

"Fuel System Integrity" FMVSS No. 301

Figure 8

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with 17 mm molding.

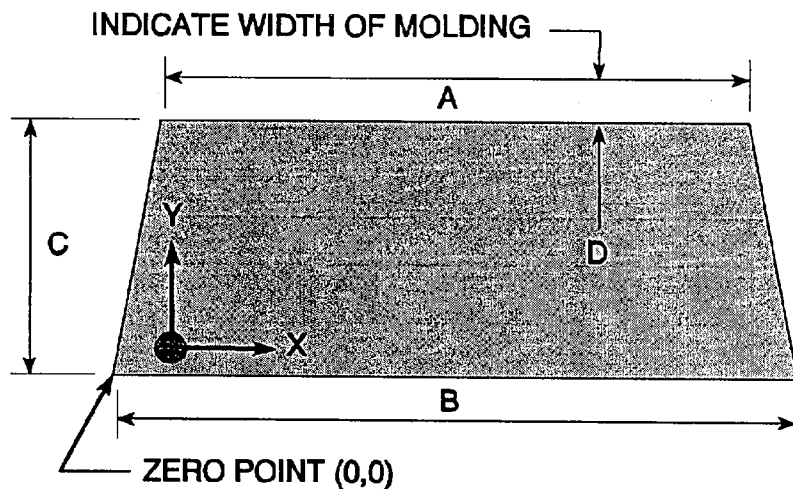
FMVSS 212 REQUIREMENTS:

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 the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

| | WINDSHIELD PERIPHERY | | % OF RETENTION |
|------------|----------------------|---------------|----------------|
| | PRE-TEST (mm) | POST-TEST(mm) | |
| RIGHT SIDE | 2190 | 2190 | 100 |
| LEFT SIDE | 2190 | 2190 | 100 |
| TOTAL | 4,380 | 4,380 | 100 |

AREA OF RETENTION FAILURE:



| DIMENSIONS | |
|------------|------|
| A | 1270 |
| B | 1600 |
| C | 755 |
| D | 17 |

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS: None

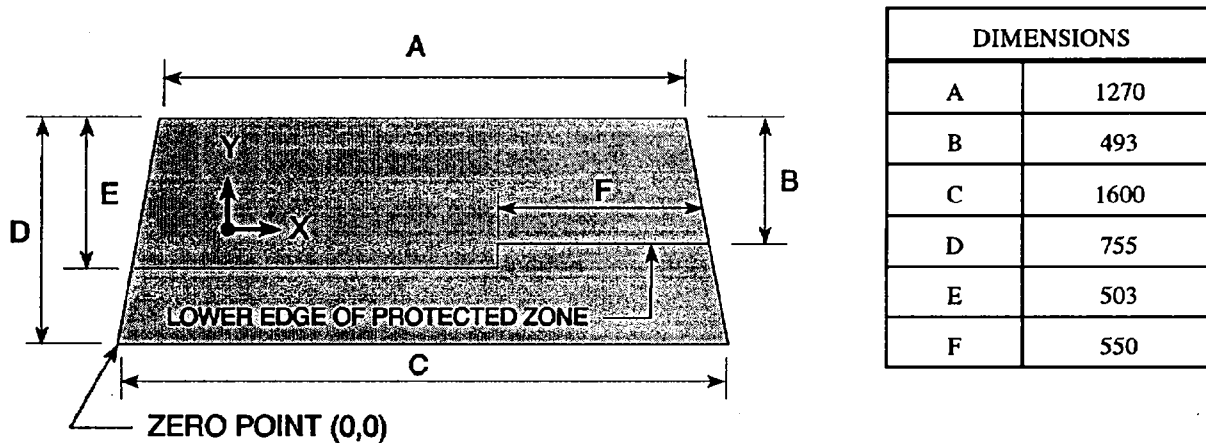
Figure 9

FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in mm)



FRONT VIEW OF WINDSHIELD

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4": None

(Show location of penetration on the above sketch)

| | COORDINATES | |
|----|-------------|---|
| | X | Y |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |

Table 9

FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

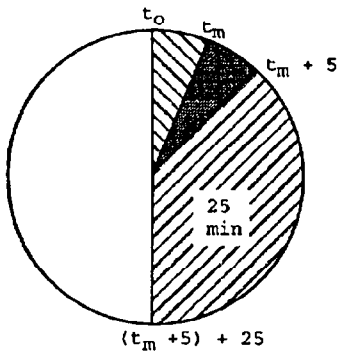
NHTSA TEST No.: MT5400 TEST DATE: March 21, 1996
VEHICLE MAKE/MODEL: 1996 Mazda MPV

The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

=====

TEST VEHICLE IMPACT TYPE: X Frontal (35 mph)
- Oblique (30 mph) with _____ deg. barrier face first contacting _____
 (driver/passenger) side
- Rear Moving Barrier (30 mph)
- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:



1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

| ACTUAL | MAX ALLOWED |
|--------|-------------|
| 0 | 1 oz. |
| 0 | 5 oz. |
| 0 | 1 oz./min. |

SOLVENT SPILLAGE DETAILS:

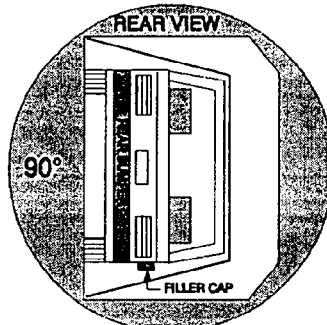
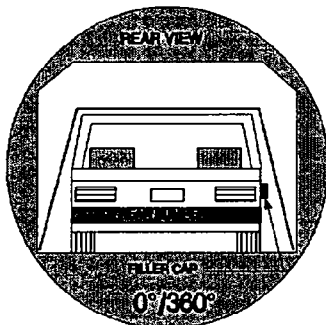
None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5400



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|--|----------|---------|-----------|---------|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | <u>2</u> | minutes | <u>30</u> | seconds |
| FMVSS 301 Position Hold Time + | <u>5</u> | minutes | <u>00</u> | seconds |
| TOTAL | <u>7</u> | minutes | <u>30</u> | seconds |
| Next whole minute interval | <u>8</u> | minutes | <u>00</u> | seconds |

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.

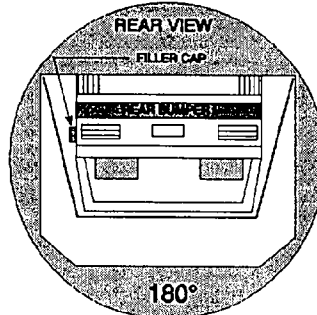
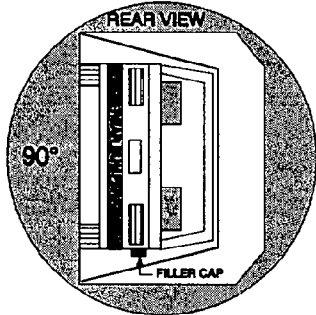
IV. SOLVENT SPILLAGE LOCATION(S): None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5400



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

2 minutes 30 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

7 minutes 30 seconds

Next whole minute interval

8 minutes 00 seconds

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.

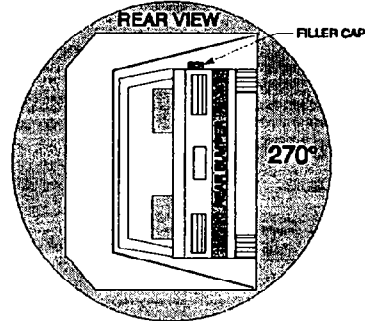
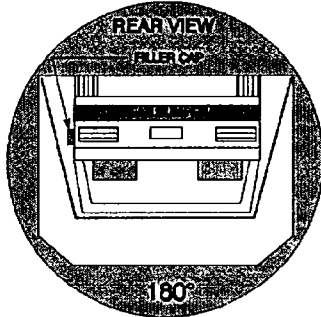
IV. SOLVENT SPILLAGE LOCATION(S): None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5400



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|--|---|---------|----|---------|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | 2 | minutes | 30 | seconds |
| FMVSS 301 Position Hold Time + | 5 | minutes | 00 | seconds |
| TOTAL | 7 | minutes | 30 | seconds |
| Next whole minute interval | 8 | minutes | 00 | seconds |

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.

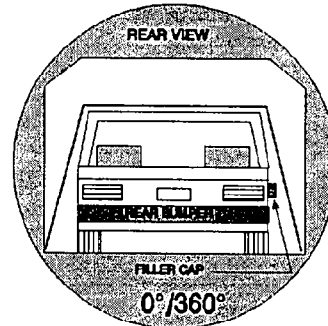
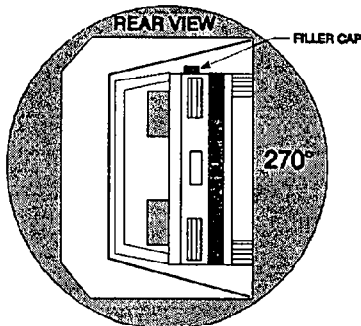
IV. SOLVENT SPILLAGE LOCATION(S): None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5400



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|--|---|---------|----|---------|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | 2 | minutes | 30 | seconds |
| FMVSS 301 Position Hold Time + | 5 | minutes | 00 | seconds |
| TOTAL | 7 | minutes | 30 | seconds |
| Next whole minute interval | 8 | minutes | 00 | seconds |

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 |
|----------|---------|---------|---------|

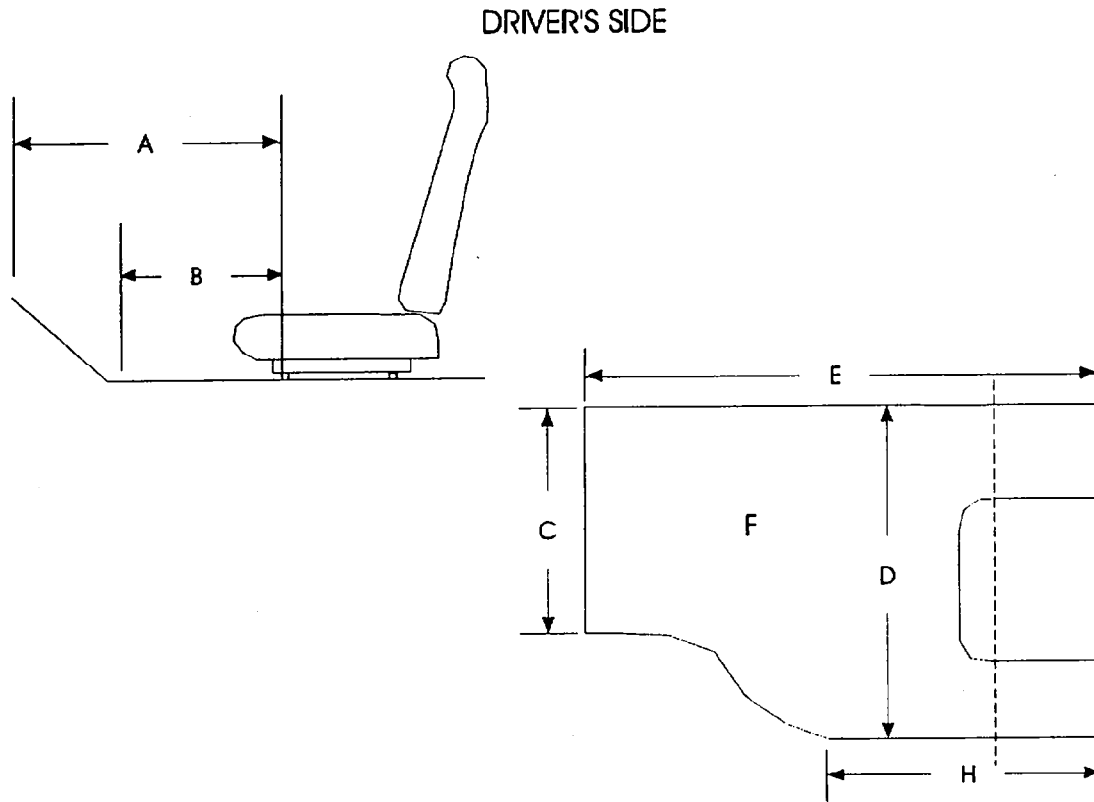
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
|---|---|---|---|

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

IV. SOLVENT SPILLAGE LOCATION(S): None

Figure 10
DRIVER SIDE FLOORBOARD DEFORMATION



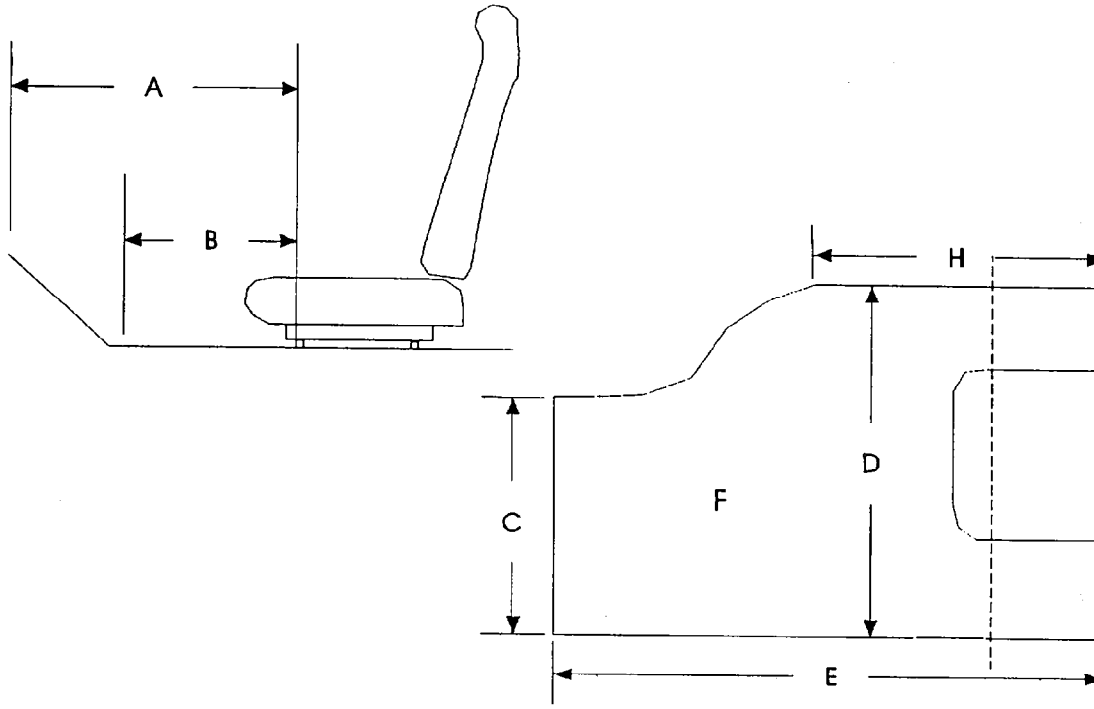
| Measurement | Pre-Test | Post-Test | Difference |
|---------------------|----------|-----------|------------|
| A | 620 | 615 | 5 |
| B | 560 | 555 | 5 |
| C | 420 | 420 | 0 |
| D | 480 | 480 | 0 |
| E | 560 | 555 | 5 |
| H | 310 | 305 | 5 |
| F (cm) ² | 2538 | 2514 | 24 |

Units = mm

$$F = H \times D + (E - H) \times C$$

Figure 11
PASSENGER SIDE FLOORBOARD DEFORMATION

PASSENGER'S SIDE

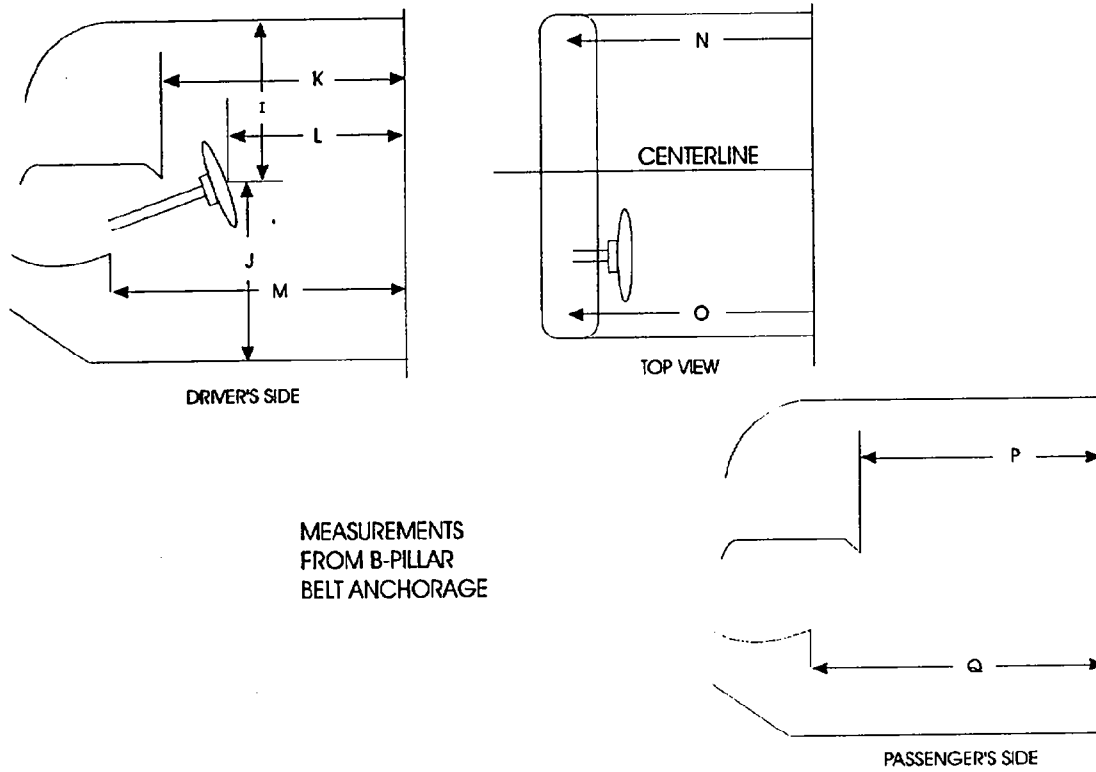


| Measurement | Pre-Test | Post-Test | Difference |
|---------------------|----------|-----------|------------|
| A | 630 | 605 | 25 |
| B | 480 | 480 | 0 |
| C | 385 | 370 | 15 |
| D | 480 | 480 | 0 |
| E | 480 | 480 | 0 |
| H | 290 | 280 | 10 |
| F (cm) ² | 2124 | 2084 | 40 |

Units = mm

$$F = H \times D + (E - H) \times C$$

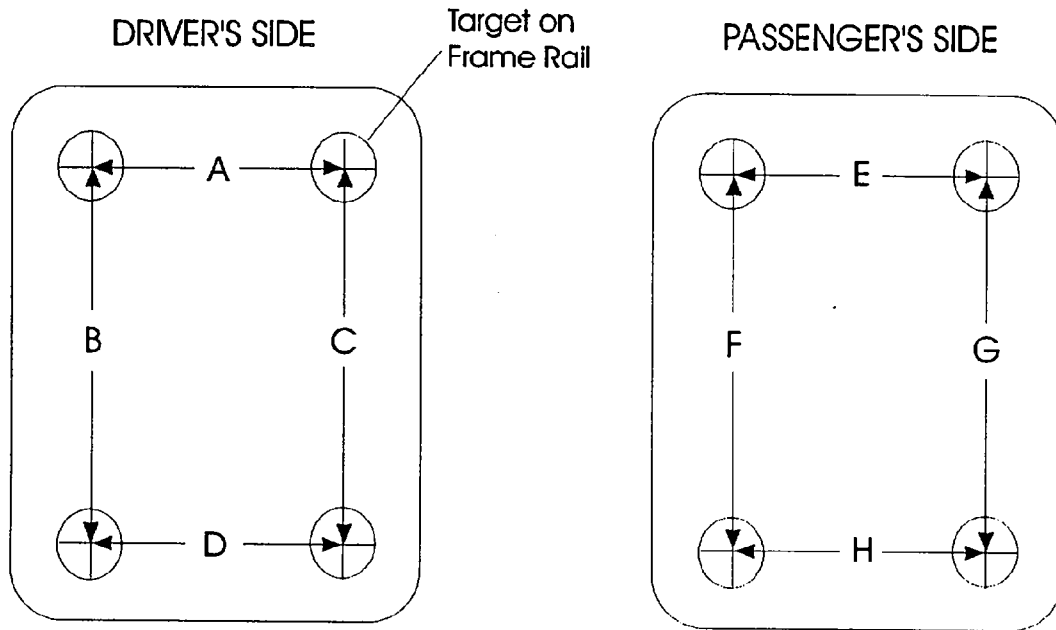
Figure 12
INTERIOR DEFORMATION



| Measurement | Pre-Test | Post-Test | Difference |
|-------------|----------|-----------|------------|
| I | 490 | 450 | 40 |
| J | 695 | 740 | -45 |
| K | 1890 | 1865 | 25 |
| L | 1660 | 1675 | -15 |
| M | 1860 | 1830 | 30 |
| N | 1865 | 1855 | 10 |
| O | 1855 | 1845 | 10 |
| P | 2015 | 2010 | 5 |
| Q | 1835 | 1825 | 10 |

Units = mm

Figure 13
FLOORBOARD DEFORMATION



NOTE = Passenger side is
consealed by Fuel Tank

TOP VIEW THROUGH FLOOR PAN

| Measurement | Pre-Test | Post-Test | Difference |
|-------------|----------|-----------|------------|
| A | 220 | 245 | -25 |
| B | 610 | 593 | 17 |
| C | 640 | 700 | -60 |
| D | 215 | 245 | -30 |
| E | N/A | N/A | N/A |
| F | N/A | N/A | N/A |
| G | N/A | N/A | N/A |
| H | N/A | N/A | N/A |

Units = mm

Appendix A
PHOTOGRAPHS

PHOTOGRAPHS

| <u>Figure</u> | <u>Title</u> | <u>Page</u> |
|---------------|--|-------------|
| A-1 | LOAD CELL LOCATIONS. | A-3 |
| A-2 | PRE-TEST FRONT VIEW. | A-4 |
| A-3 | POST-TEST FRONT VIEW. | A-5 |
| A-4 | PRE-TEST LEFT SIDE VIEW. | A-6 |
| A-5 | POST-TEST LEFT SIDE VIEW. | A-7 |
| A-6 | PRE-TEST RIGHT SIDE VIEW. | A-8 |
| A-7 | POST-TEST RIGHT SIDE VIEW. | A-9 |
| A-8 | PRE-TEST RIGHT FRONT THREE-QUARTER VIEW. | A-10 |
| A-9 | POST-TEST RIGHT FRONT THREE-QUARTER VIEW. | A-11 |
| A-10 | PRE-TEST LEFT REAR THREE-QUARTER VIEW. | A-12 |
| A-11 | POST-TEST LEFT REAR THREE-QUARTER VIEW. | A-13 |
| A-12 | PRE-TEST WINDSHIELD VIEW. | A-14 |
| A-13 | POST-TEST WINDSHIELD VIEW. | A-15 |
| A-14 | PRE-TEST ENGINE COMPARTMENT VIEW. | A-16 |
| A-15 | FUEL CAP VIEW. | A-17 |
| A-16 | PRE-TEST FRONT UNDERBODY VIEW. | A-18 |
| A-17 | POST-TEST FRONT UNDERBODY VIEW. | A-19 |
| A-18 | PRE-TEST FRONT SIDE UNDERBODY VIEW. | A-20 |
| A-19 | POST-TEST FRONT SIDE UNDERBODY VIEW. | A-21 |
| A-20 | PRE-TEST REAR UNDERBODY VIEW. | A-22 |
| A-21 | POST-TEST REAR UNDERBODY VIEW. | A-23 |
| A-22 | PRE-TEST DRIVER POSITION VIEW. | A-24 |
| A-23 | POST-TEST DRIVER POSITION VIEW. | A-25 |
| A-24 | PRE-TEST PASSENGER POSITION VIEW. | A-26 |
| A-25 | POST-TEST PASSENGER POSITION VIEW. | A-27 |
| A-26 | PRE-TEST DRIVER AND INTERIOR VIEW. | A-28 |
| A-27 | POST-TEST DRIVER AND INTERIOR VIEW. | A-29 |
| A-28 | PRE-TEST PASSENGER AND INTERIOR VIEW. | A-30 |
| A-29 | POST-TEST PASSENGER AND INTERIOR VIEW. | A-31 |
| A-30 | PRE-TEST DRIVER HEAD LOCATION. | A-32 |
| A-31 | PRE-TEST PASSENGER HEAD LOCATION. | A-33 |
| A-32 | IMPACT VIEW. | A-34 |

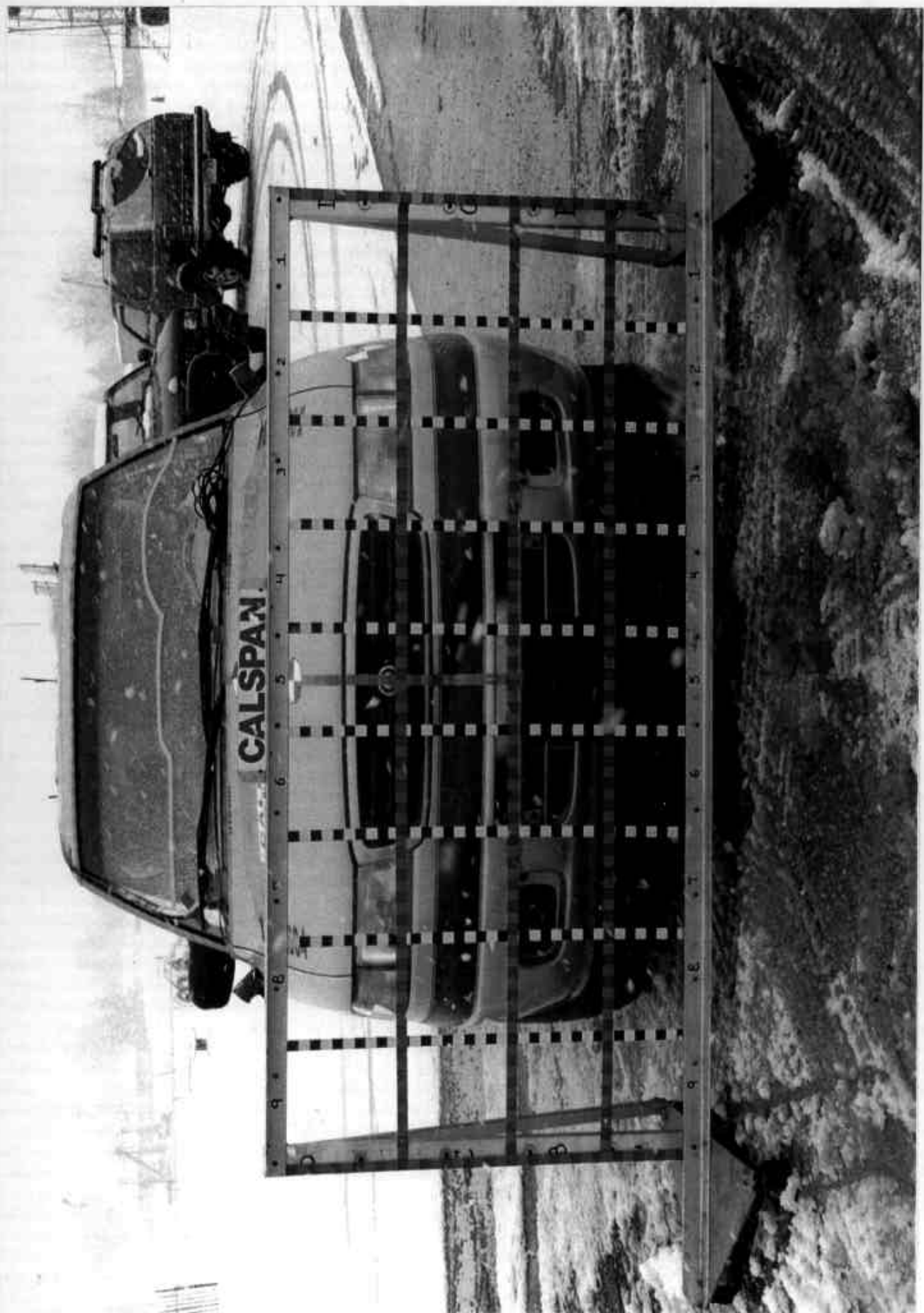


Figure A-1 LOAD CELL LOCATIONS

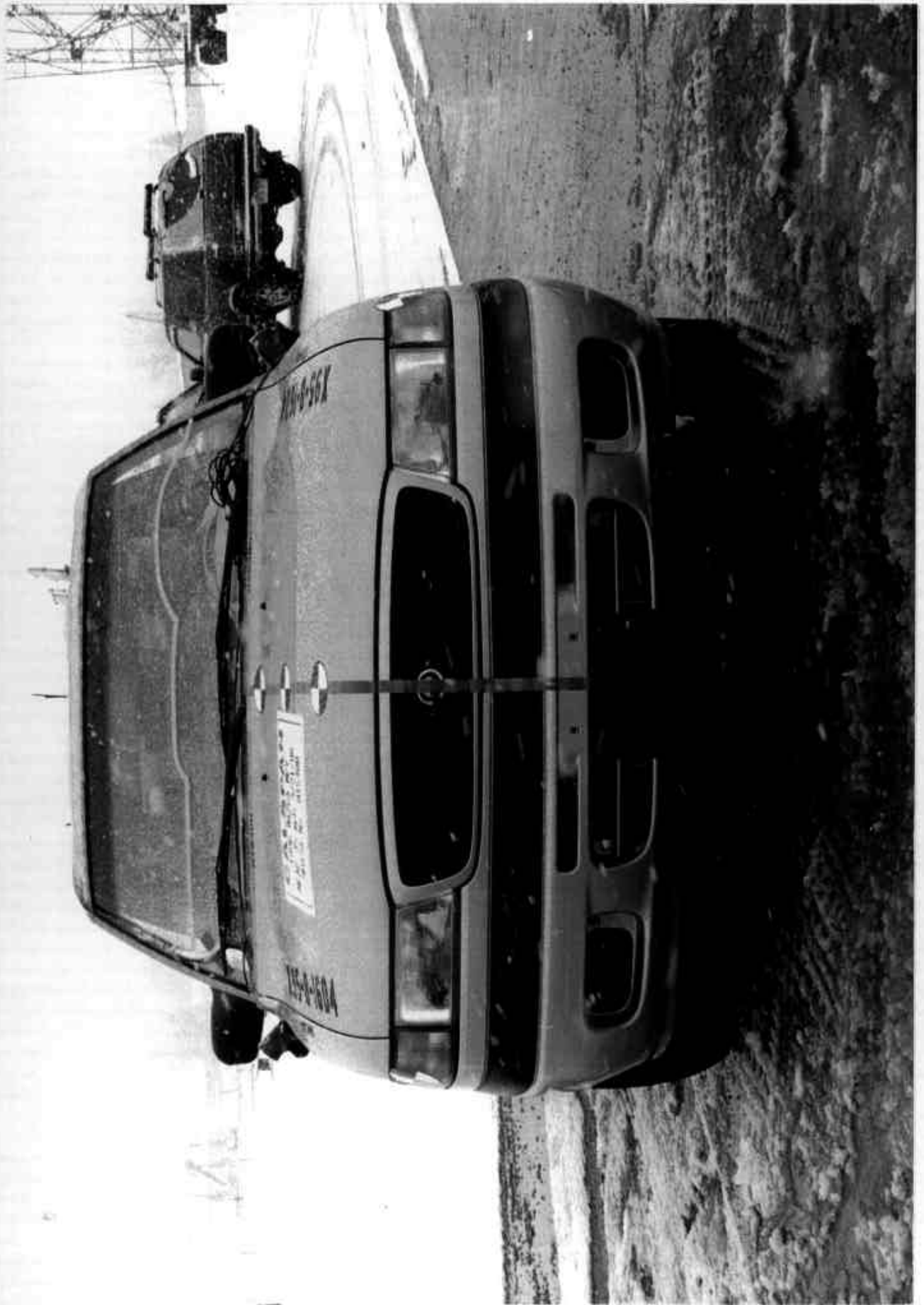


Figure A-2 PRE-TEST FRONT VIEW



A-5

8313-8

Figure A-3 POST-TEST FRONT VIEW

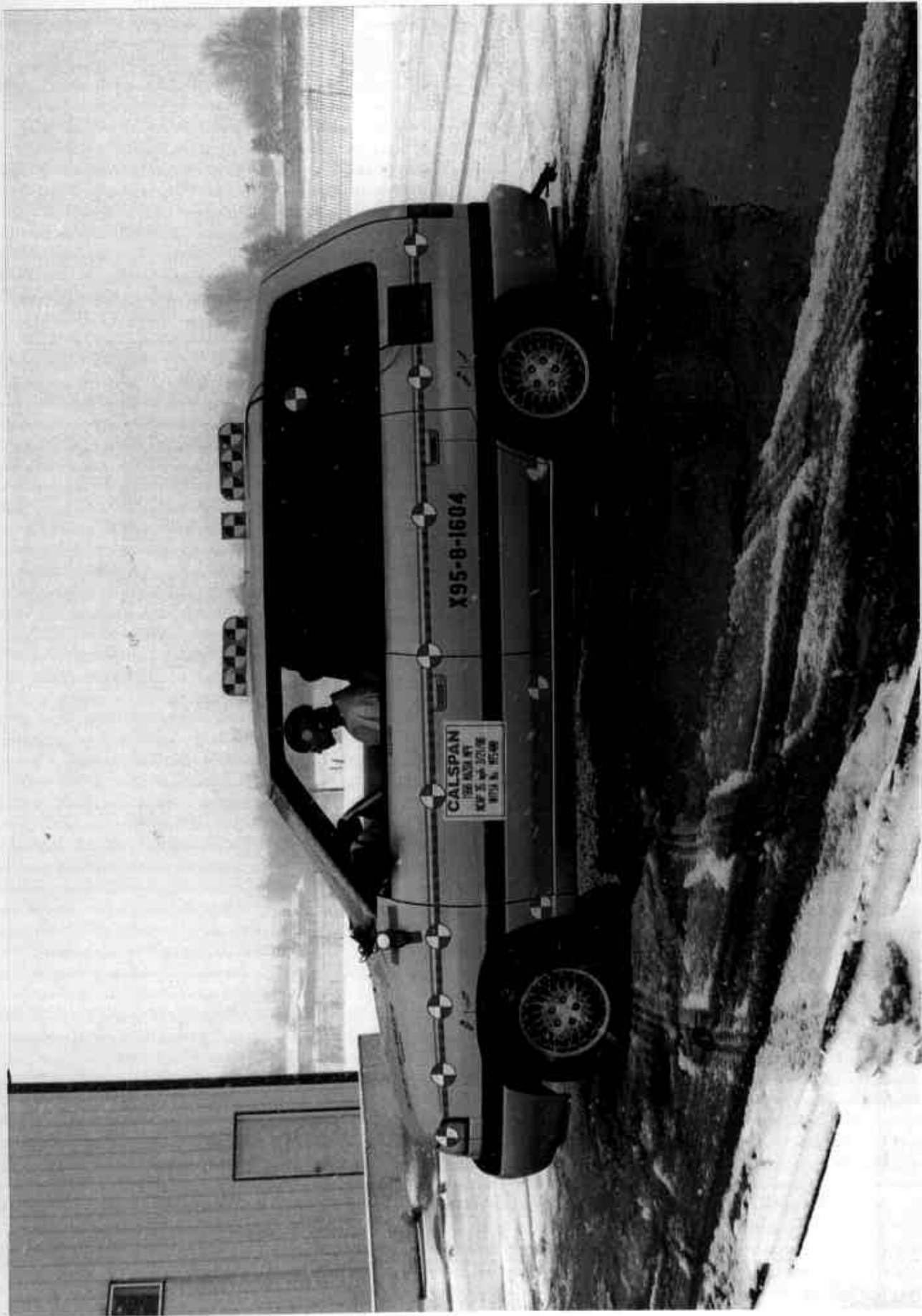


Figure A-4 PRE-TEST LEFT SIDE VIEW



Figure A-5 POST-TEST LEFT SIDE VIEW

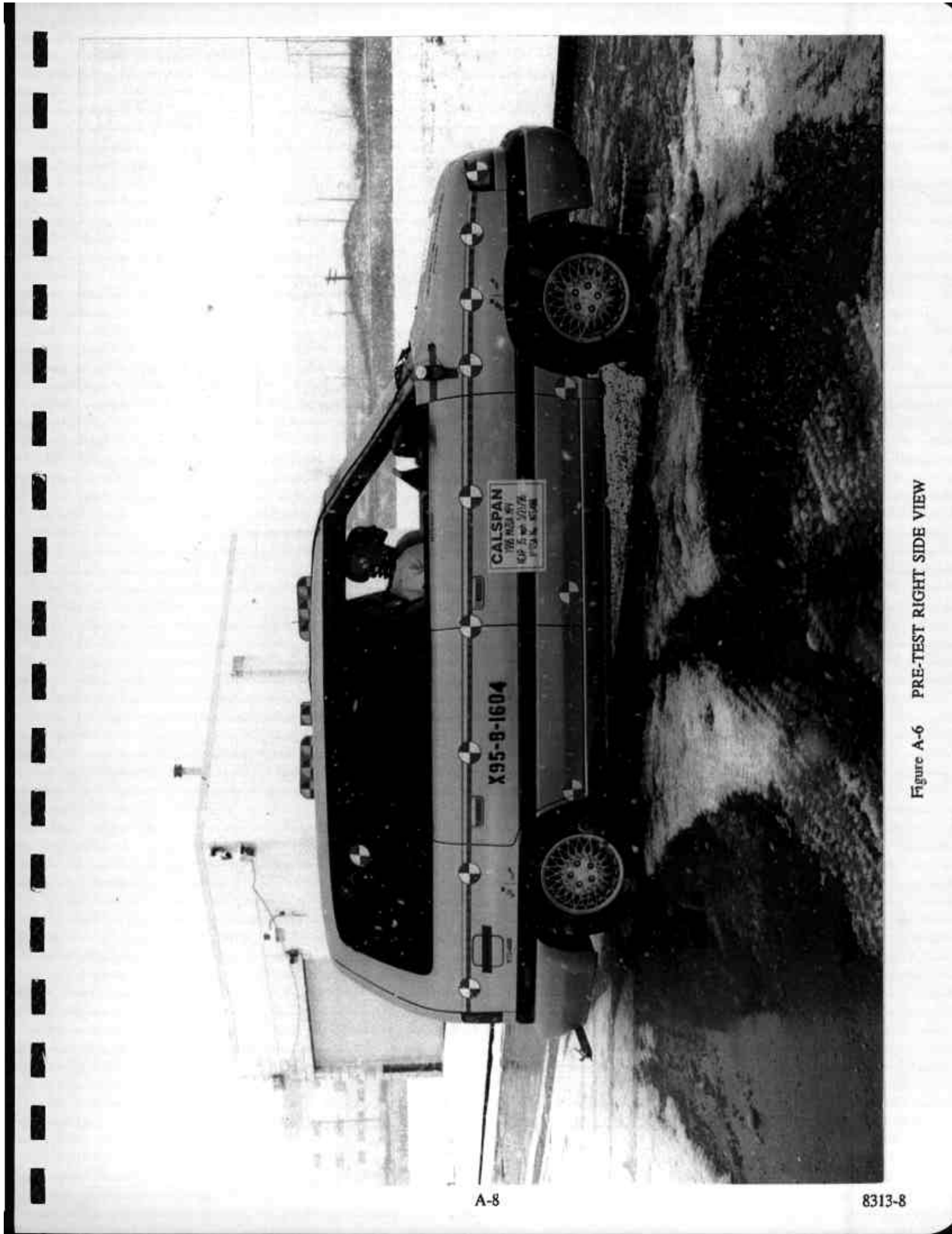


Figure A-6 PRE-TEST RIGHT SIDE VIEW

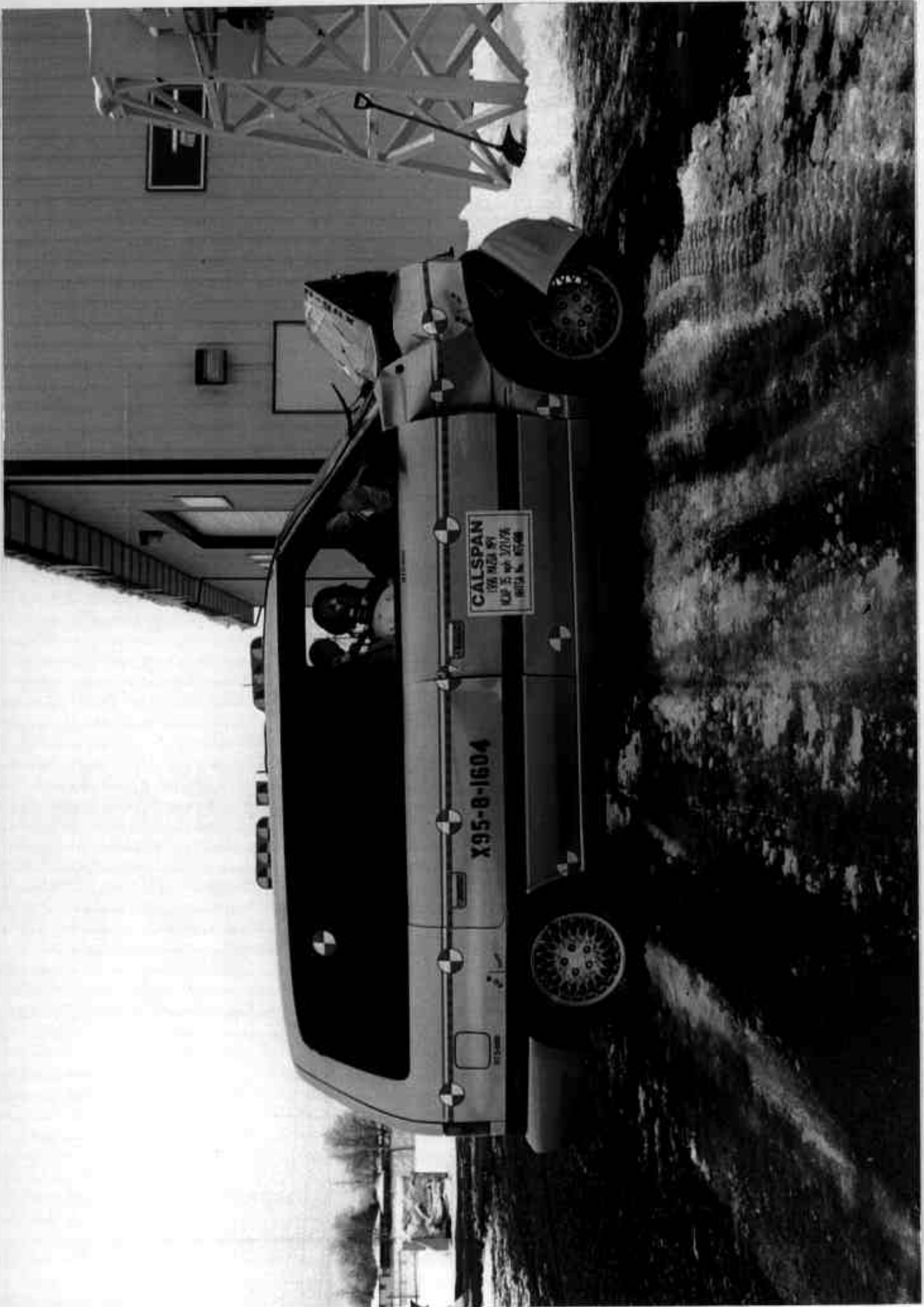


Figure A-7 POST-TEST RIGHT SIDE VIEW



A-10

8313-8

Figure A-8 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW

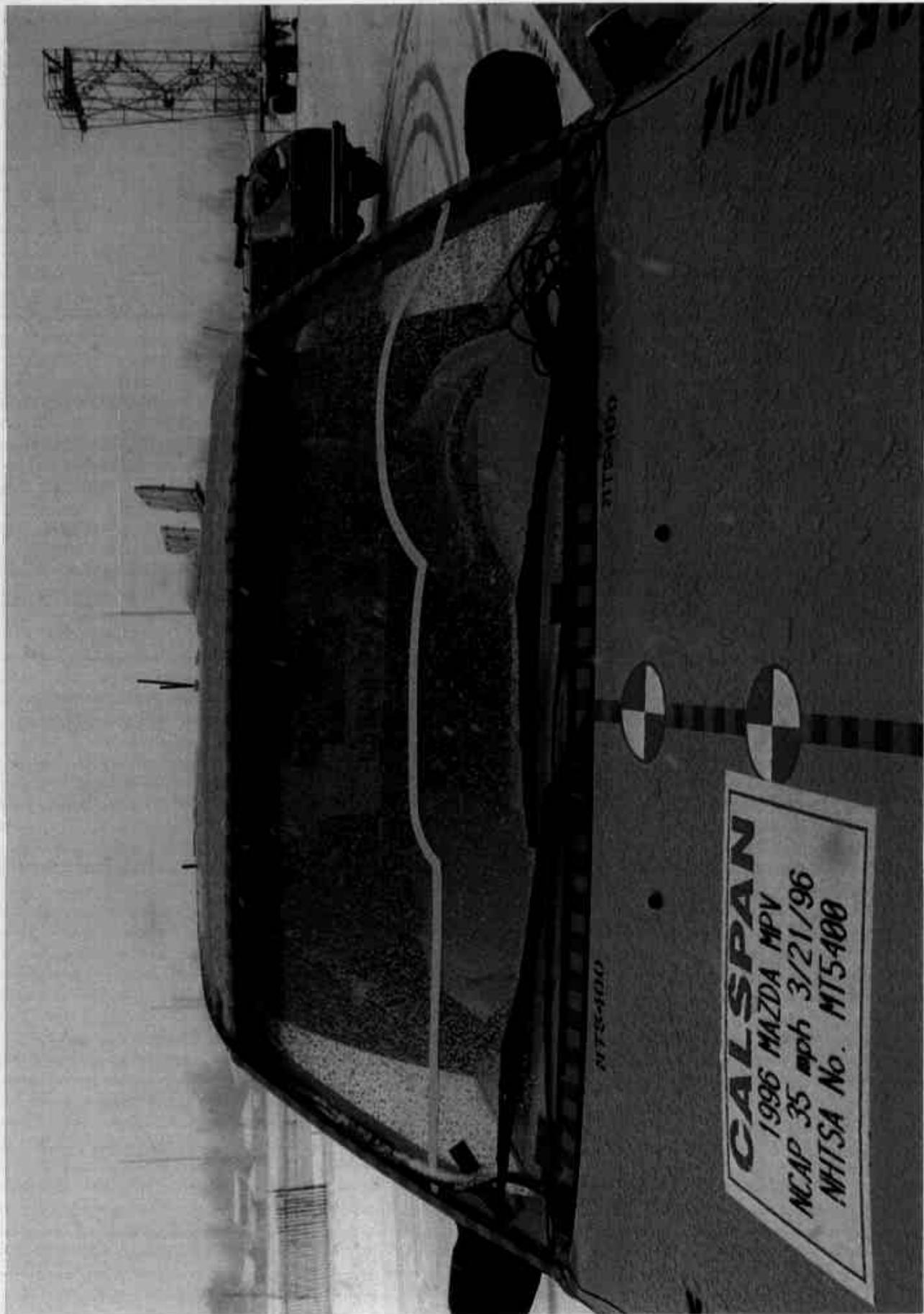


Figure A-12 PRE-TEST WINDSHIELD VIEW



Figure A-13 POST-TEST WINDSHIELD VIEW

A-15

8313-8



Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-16

8313-8



Figure A-15 FUEL CAP VIEW

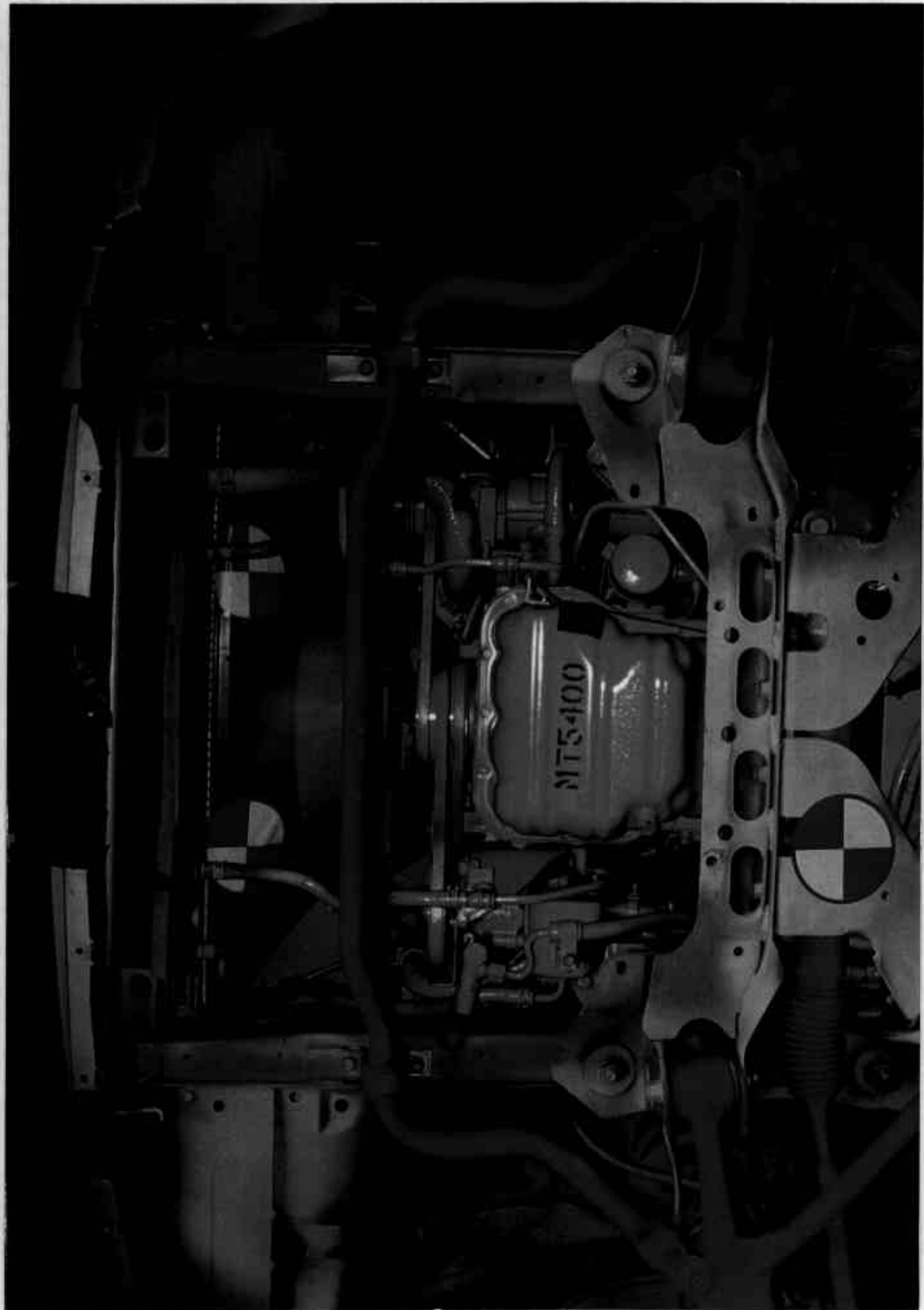


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW



Figure A-17 POST-TEST FRONT UNDERBODY VIEW

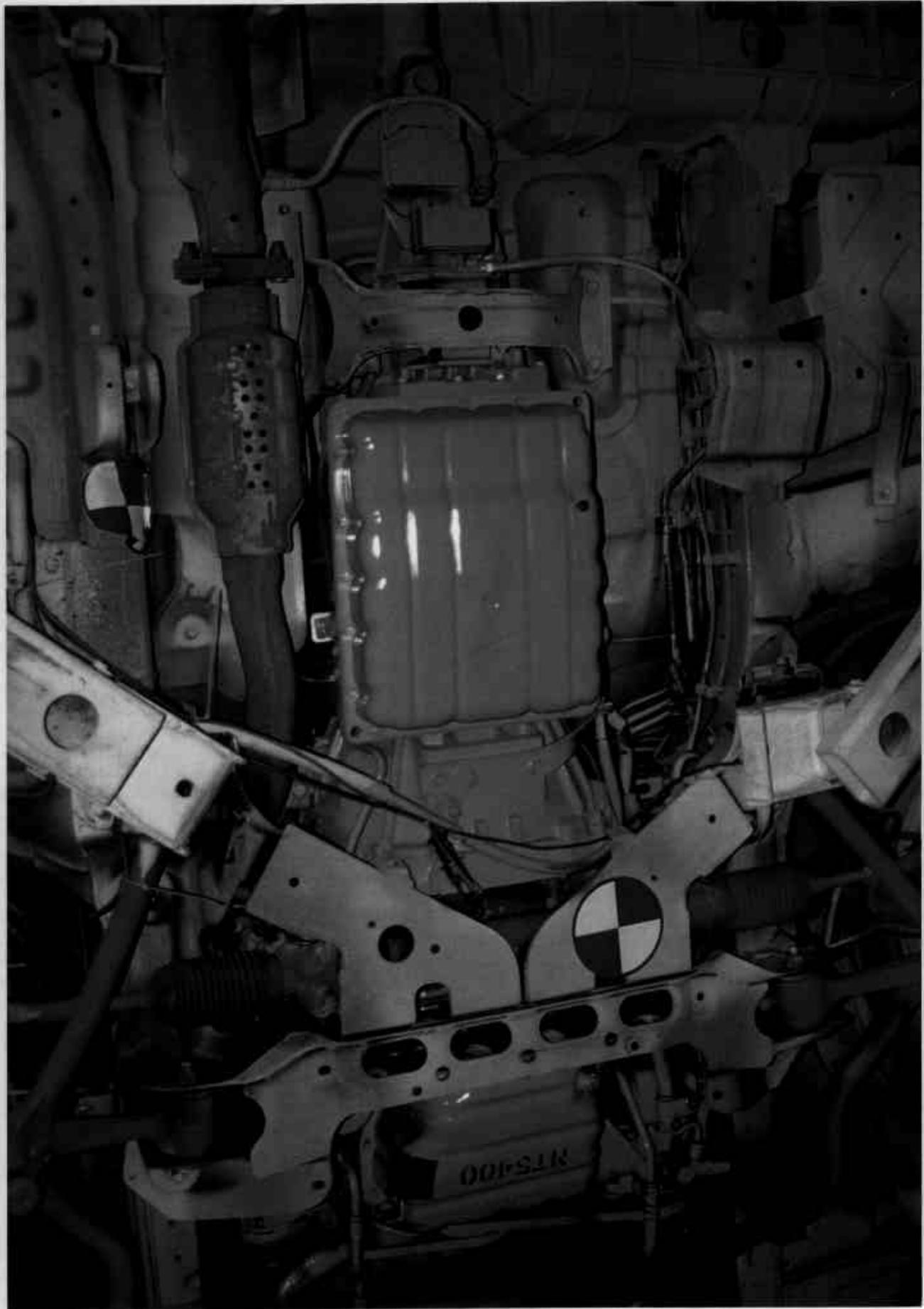


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

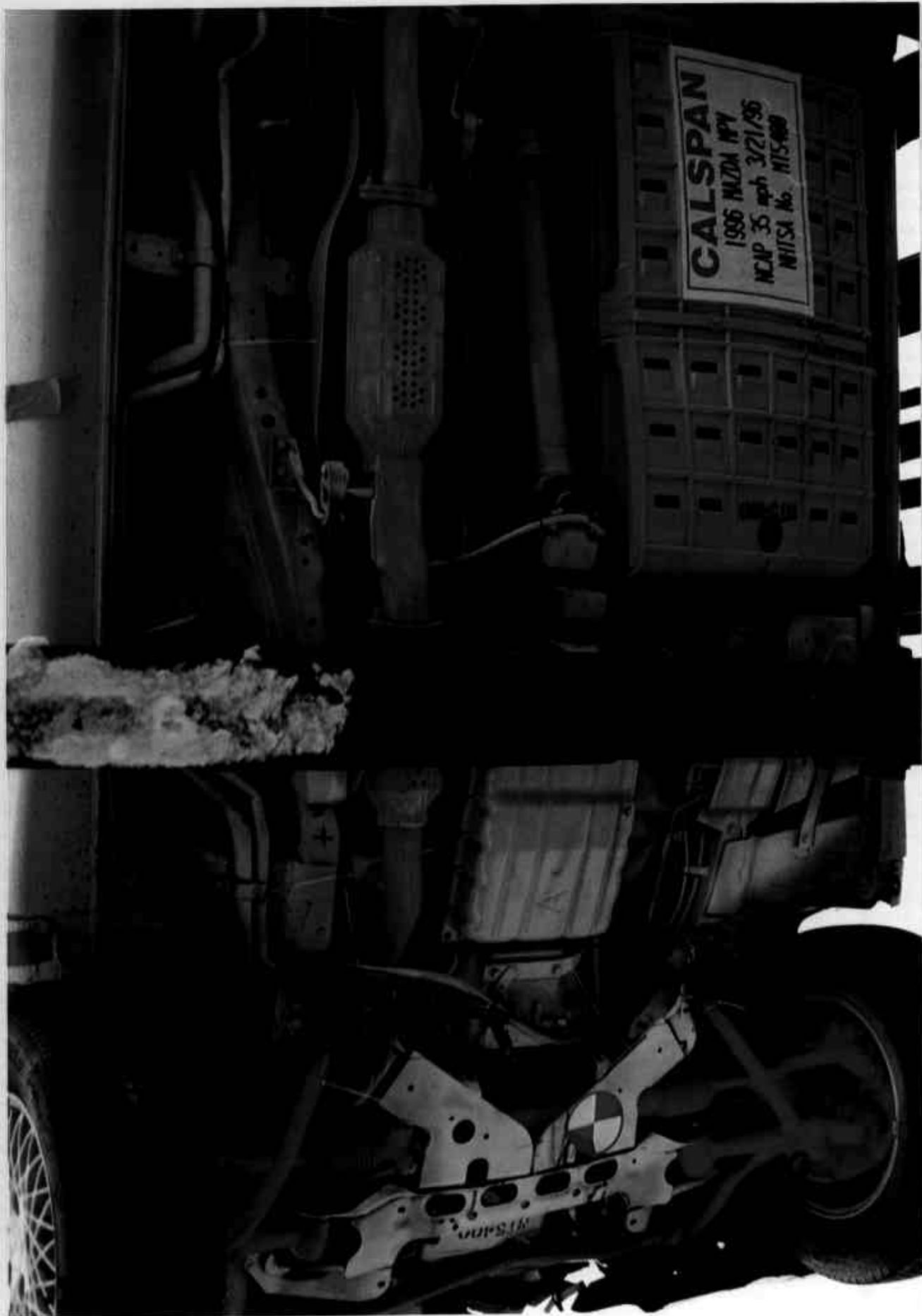


Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW



Figure A-20 PRE-TEST REAR UNDERBODY VIEW

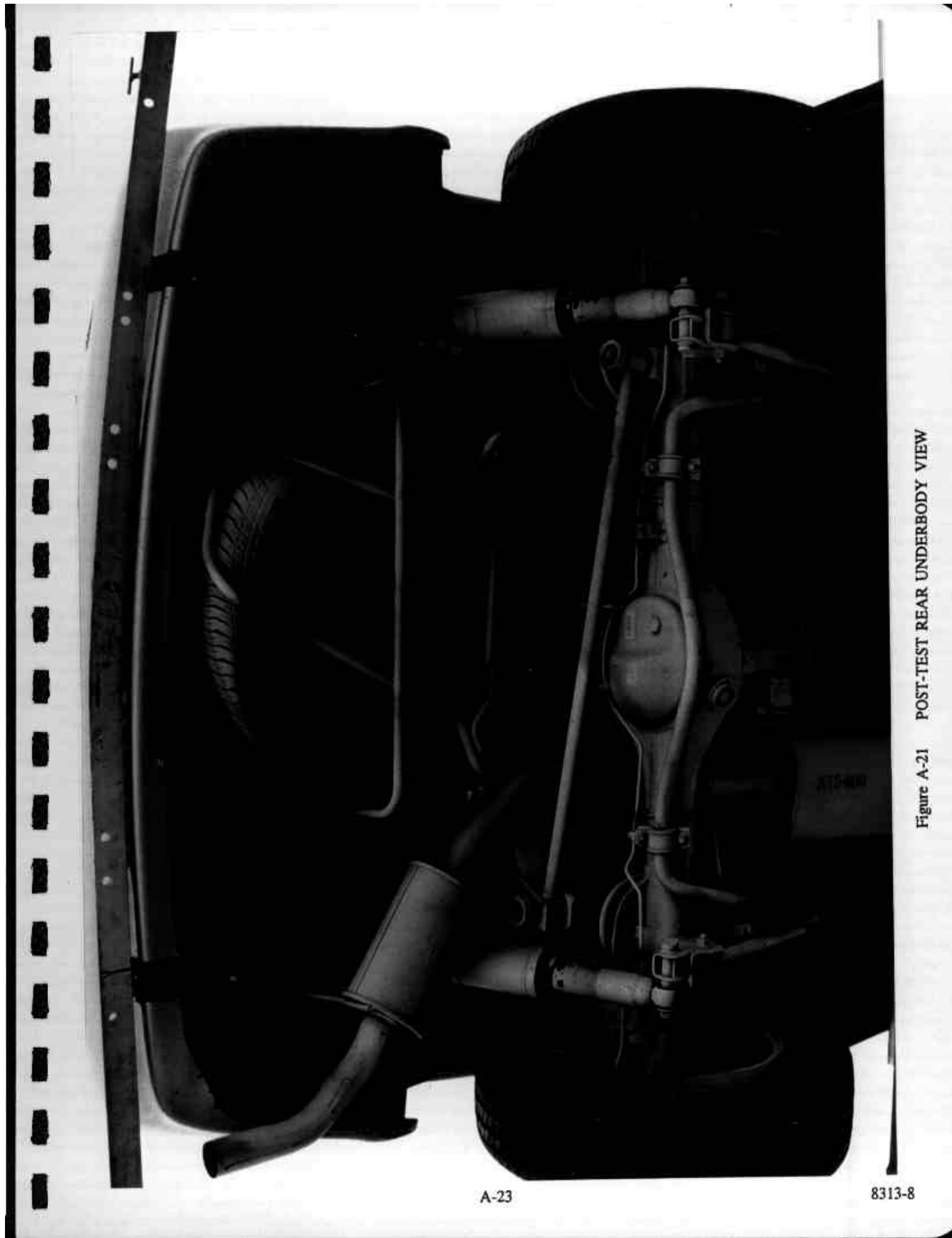


Figure A-21 POST-TEST REAR UNDERBODY VIEW

A-23

8313-8



Figure A-22 PRE-TEST DRIVER POSITION VIEW



Figure A-23 POST-TEST DRIVER POSITION VIEW



Figure A-24 PRE-TEST PASSENGER POSITION VIEW



Figure A-25 POST-TEST PASSENGER POSITION VIEW



Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW

A-28

8313-8



Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW
A-29



Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

A-30

8313-8



Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

A-31

8313-8



Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 PRE-TEST PASSENGER HEAD LOCATION



Figure A-32 IMPACT VIEW

Appendix B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

NHTSA TEST NO. MT5400

DUMMY DATA

| CLASS | FILTER CHANNEL |
|---------------------|----------------|
| Head Accelerations | 1000 |
| Chest Accelerations | 180 |
| Chest Displacements | 60 |
| Femur Forces | 600 |
| Belt Loads | 60 |
| Belt Displacements | 180 |
| Neck Forces | 1000 |
| Neck Moments | 600 |

**Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers**

| Transducer | DOT/NHTSA Sign Convention (positive unless noted) |
|---|---|
| Upper Neck Load Cell | Fx Head forward Fy Head left Fz Neck in tension Mx Right ear to right shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left) |
| Chest Displacement Potentiometer | Compression is negative |
| Pelvic Load Cell (Lower Lumbar) | Fx Chest forward Fy Chest left Fz Spine in tension |
| Femur Load Cell | Compression is negative |
| Upper Tibia Load Cell (right and left leg) | Mx Support tibia, load right side center My Support tibia, load front (shin) center |
| Lower Tibia Load Cell (right and left leg) | Fy Foot right w/r to left Fz Tibia in tension Mx Support tibia, press right side center |

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head X

Max = 17.97 Gs @ 199.19 msec
Min = -54.79 Gs @ 75.72 msec

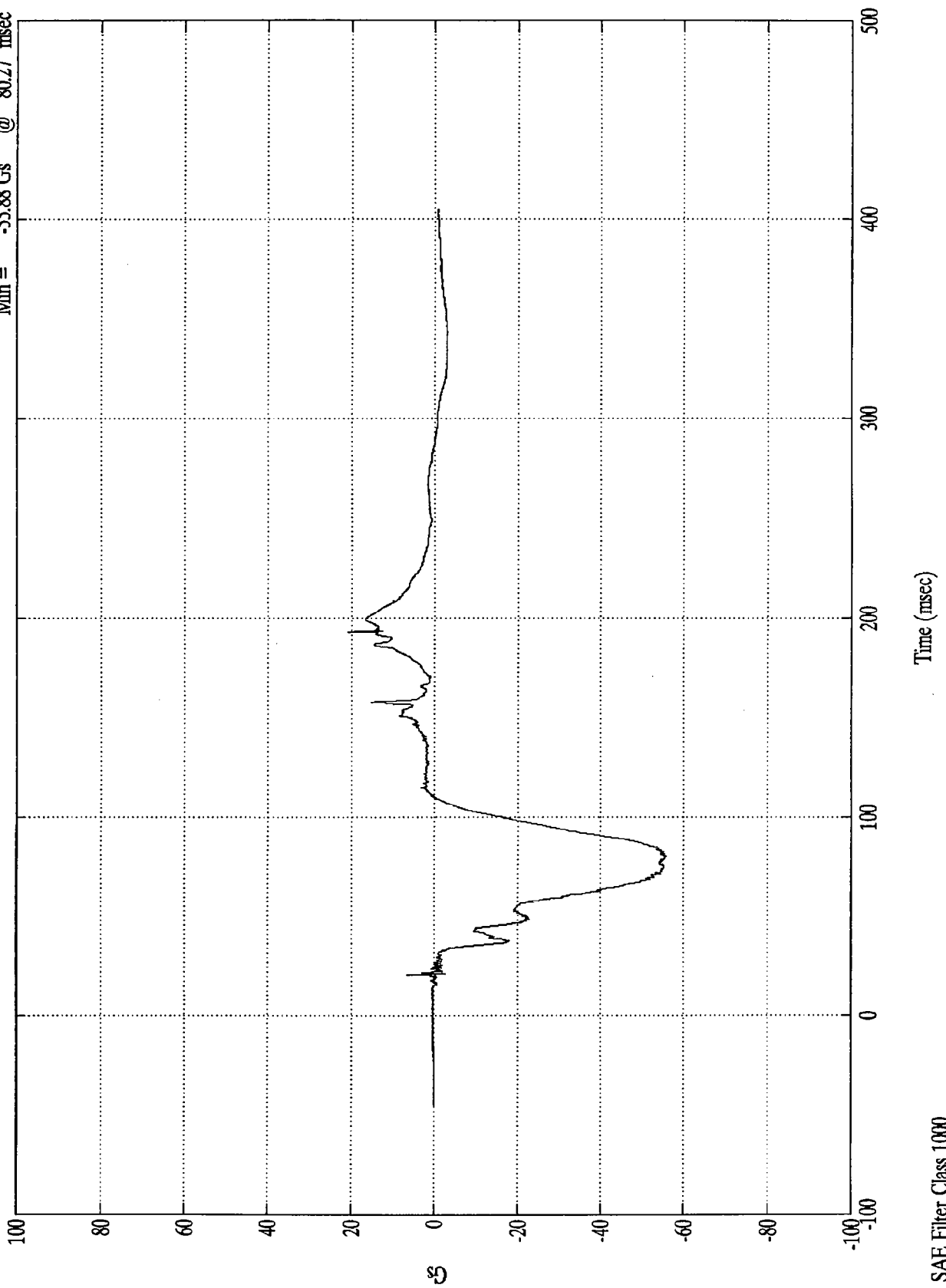


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head X(R)

Max = 20.93 Gs @ 193.20 msec
Min = -55.88 Gs @ 80.27 msec

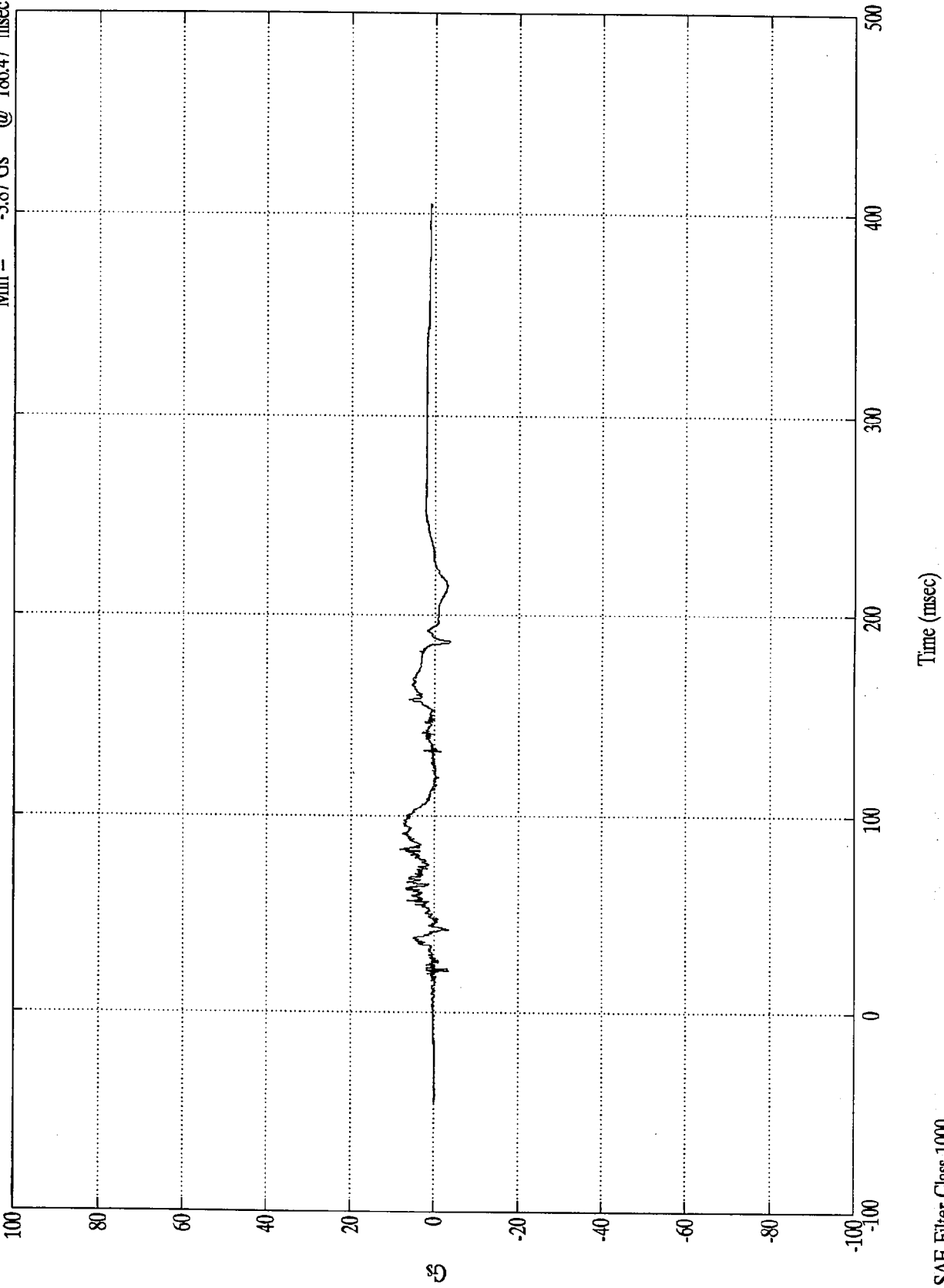


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head Y

Max = 8.26 Gs @ 83.04 msec
Min = -3.87 Gs @ 186.47 msec

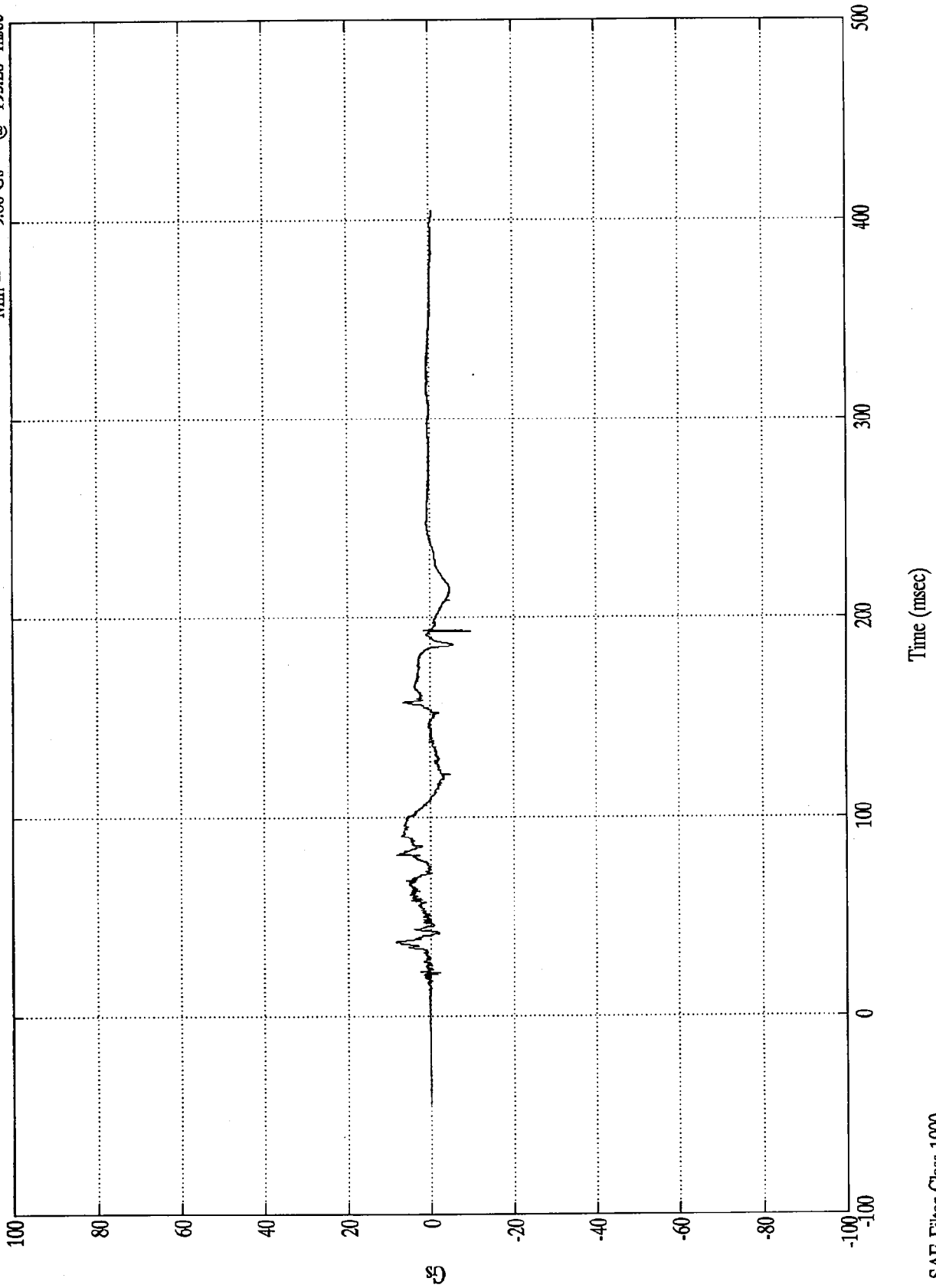


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head Y(R)

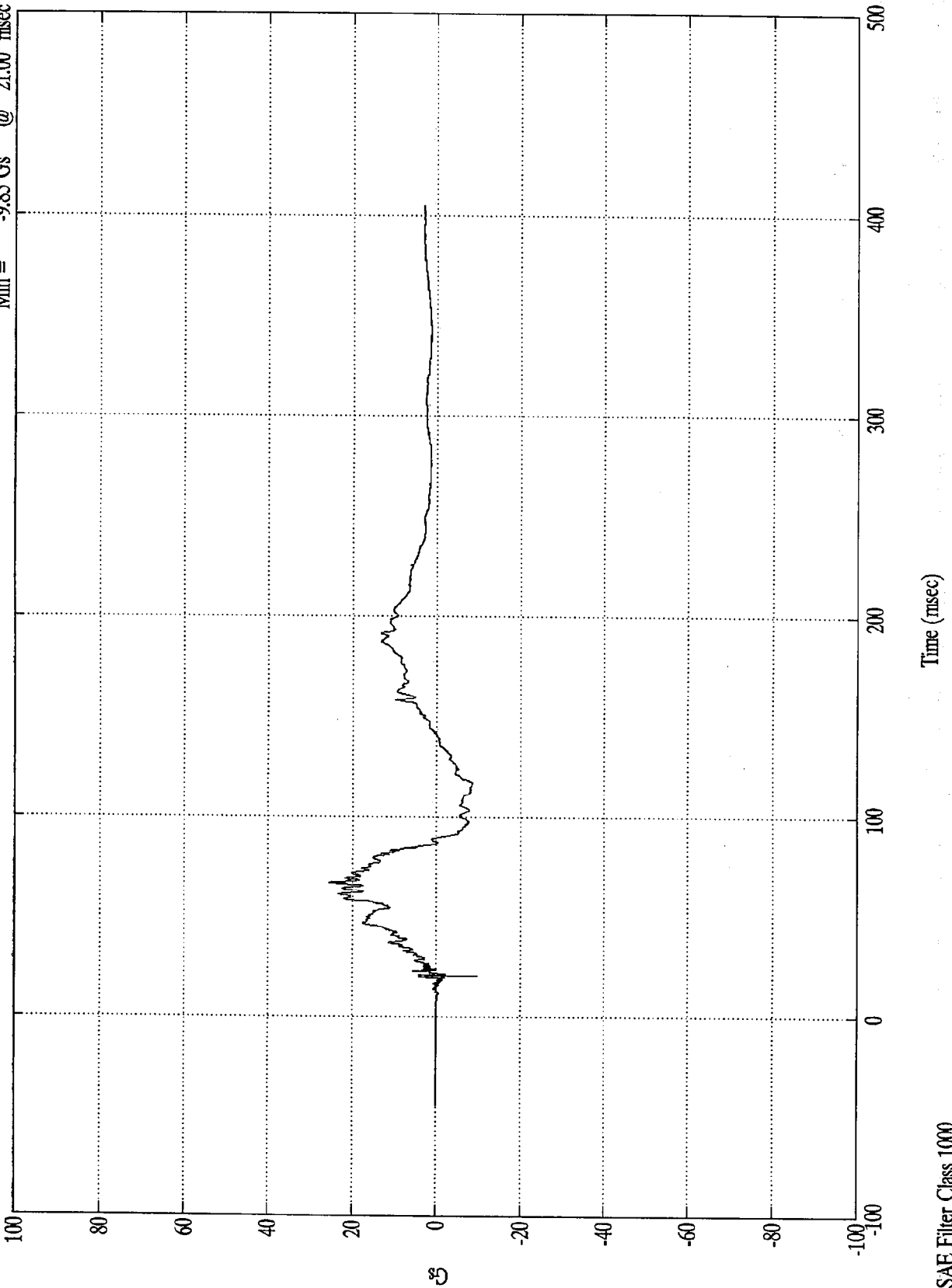
Max = 8.38 Gs @ 37.56 msec
Min = -9.86 Gs @ 193.20 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head Z

Max = 25.58 Gs @ 67.19 msec
Min = -9.85 Gs @ 21.00 msec



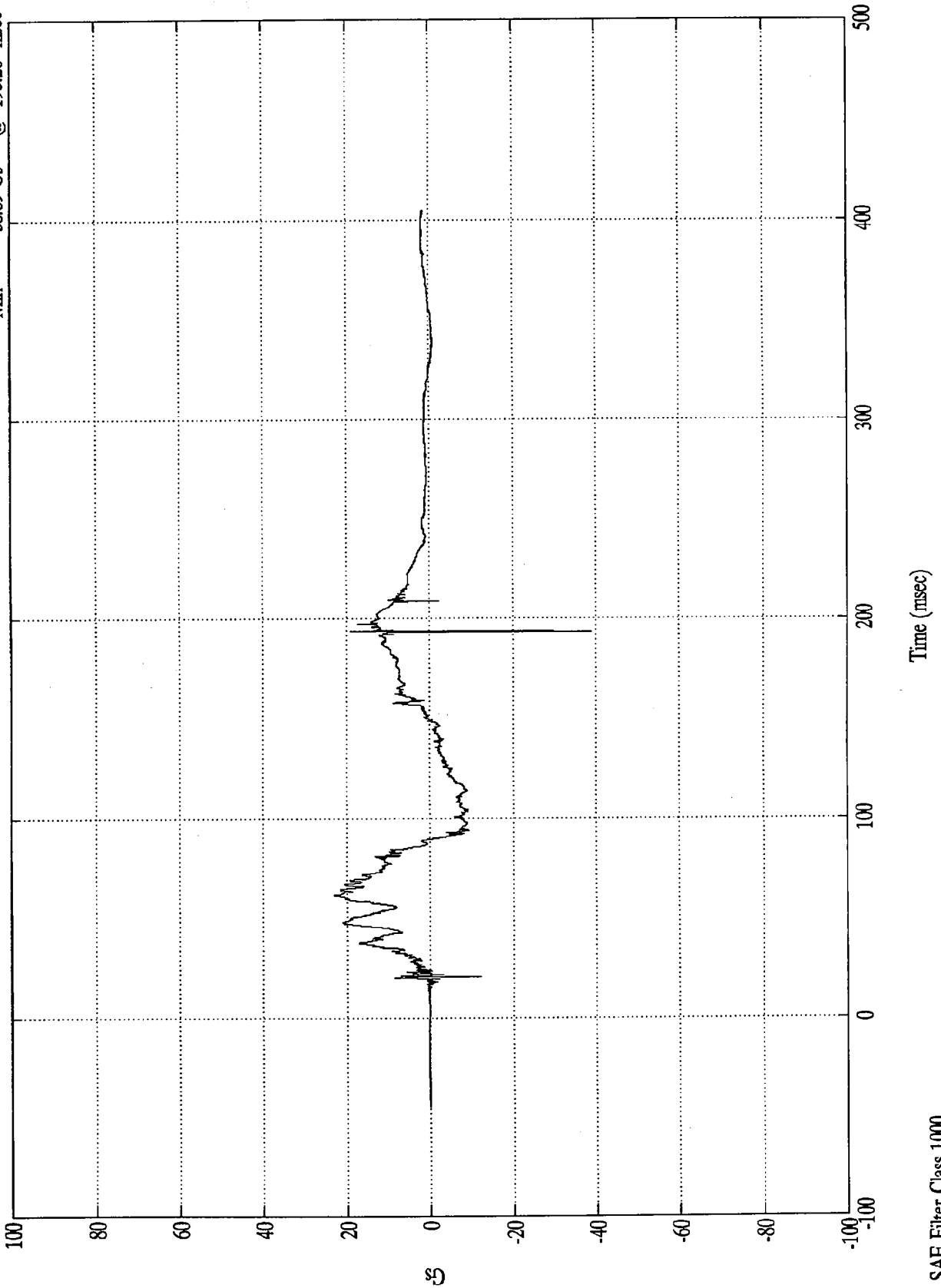
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head Z(R)

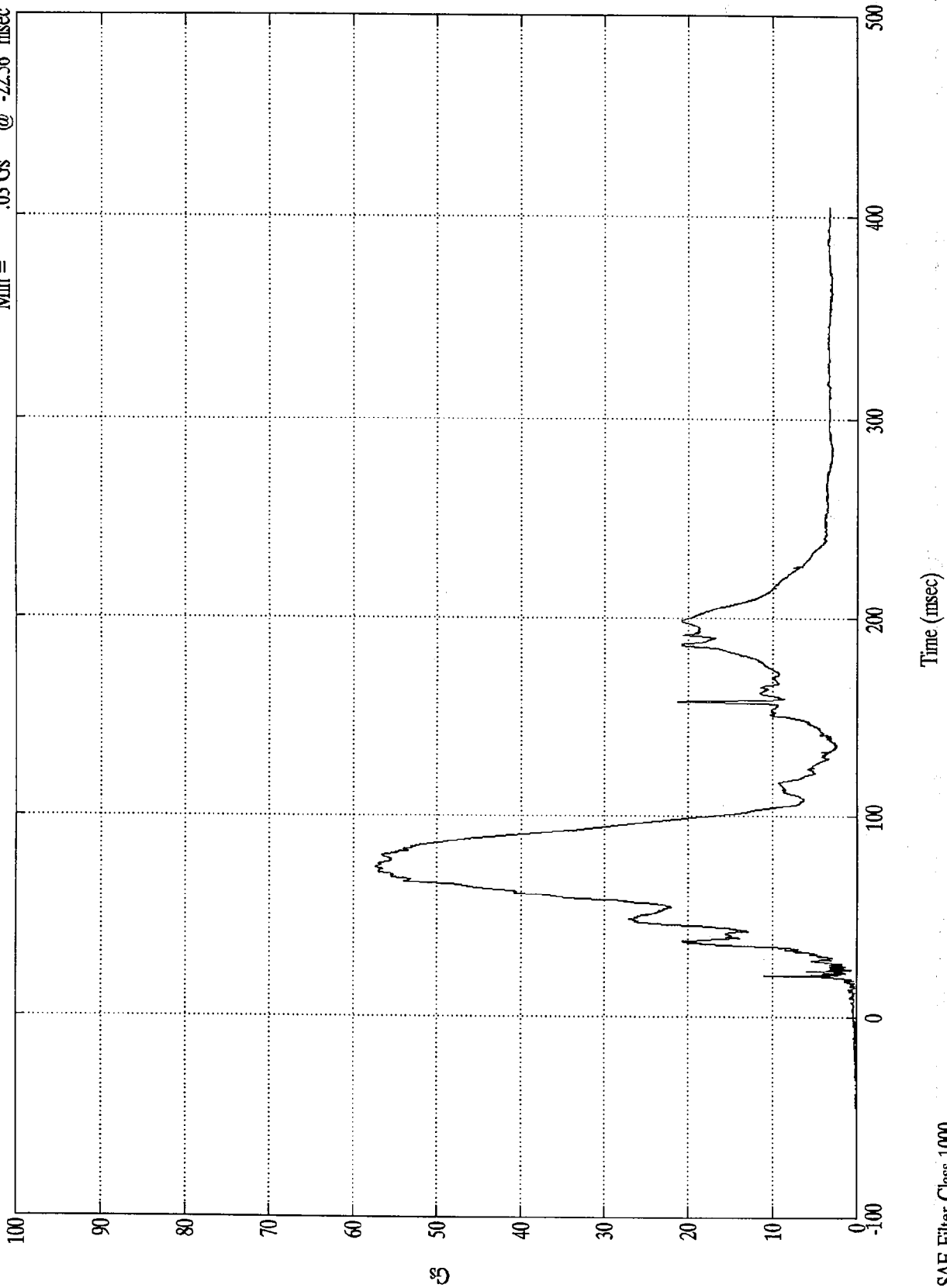
Max = 23.16 Gs @ 61.68 msec
Min = -38.89 Gs @ 193.20 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head Resultant

Max = 57.41 Gs @ 74.27 msec
Min = .03 Gs @ -22.56 msec

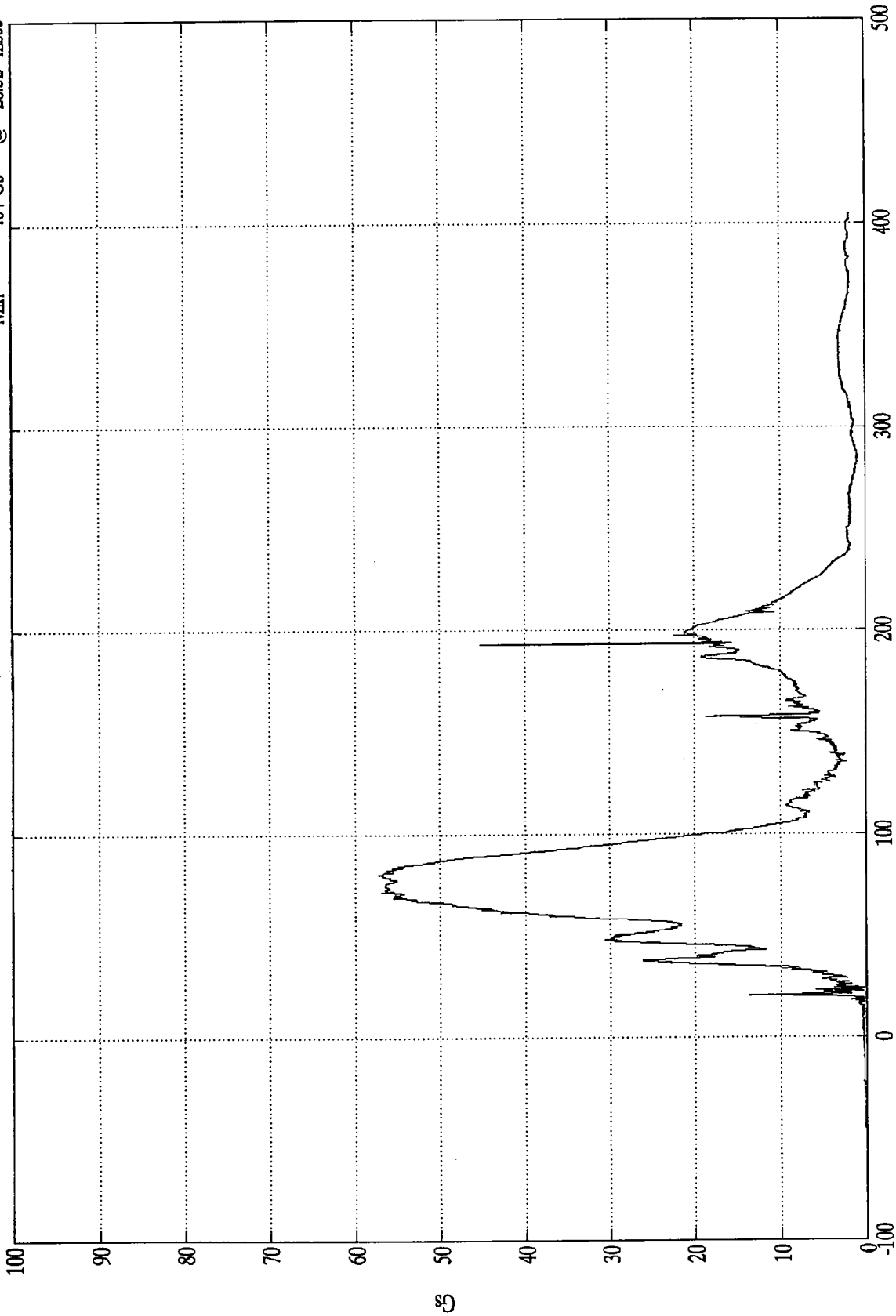


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Head Resultant(RR)

Max = 57.23 Gs @ 80.27 msec
Min = .04 Gs @ -26.52 msec



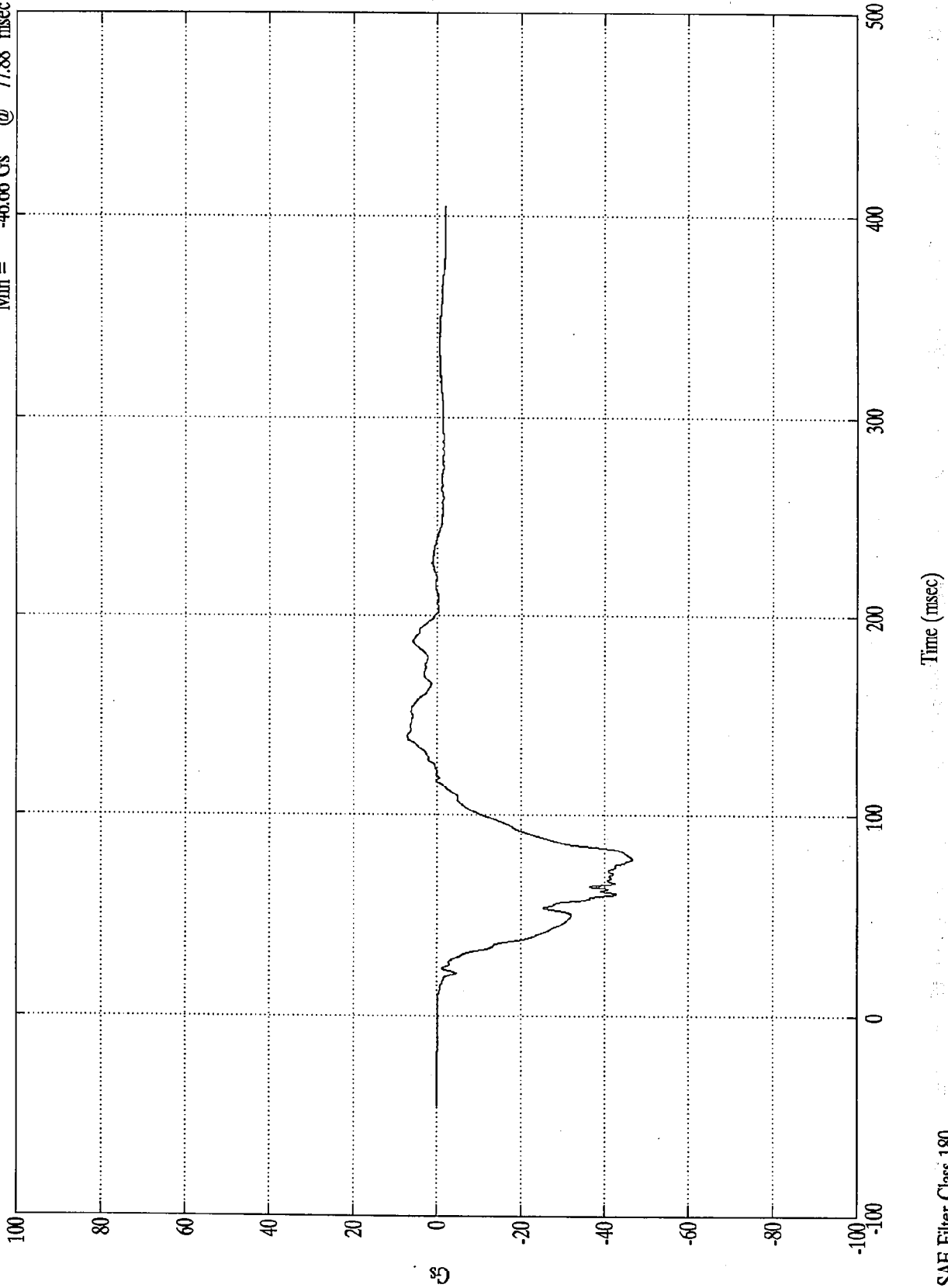
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest X

Max = 7.13 Gs @ 139.32 msec
Min = -46.66 Gs @ 77.88 msec

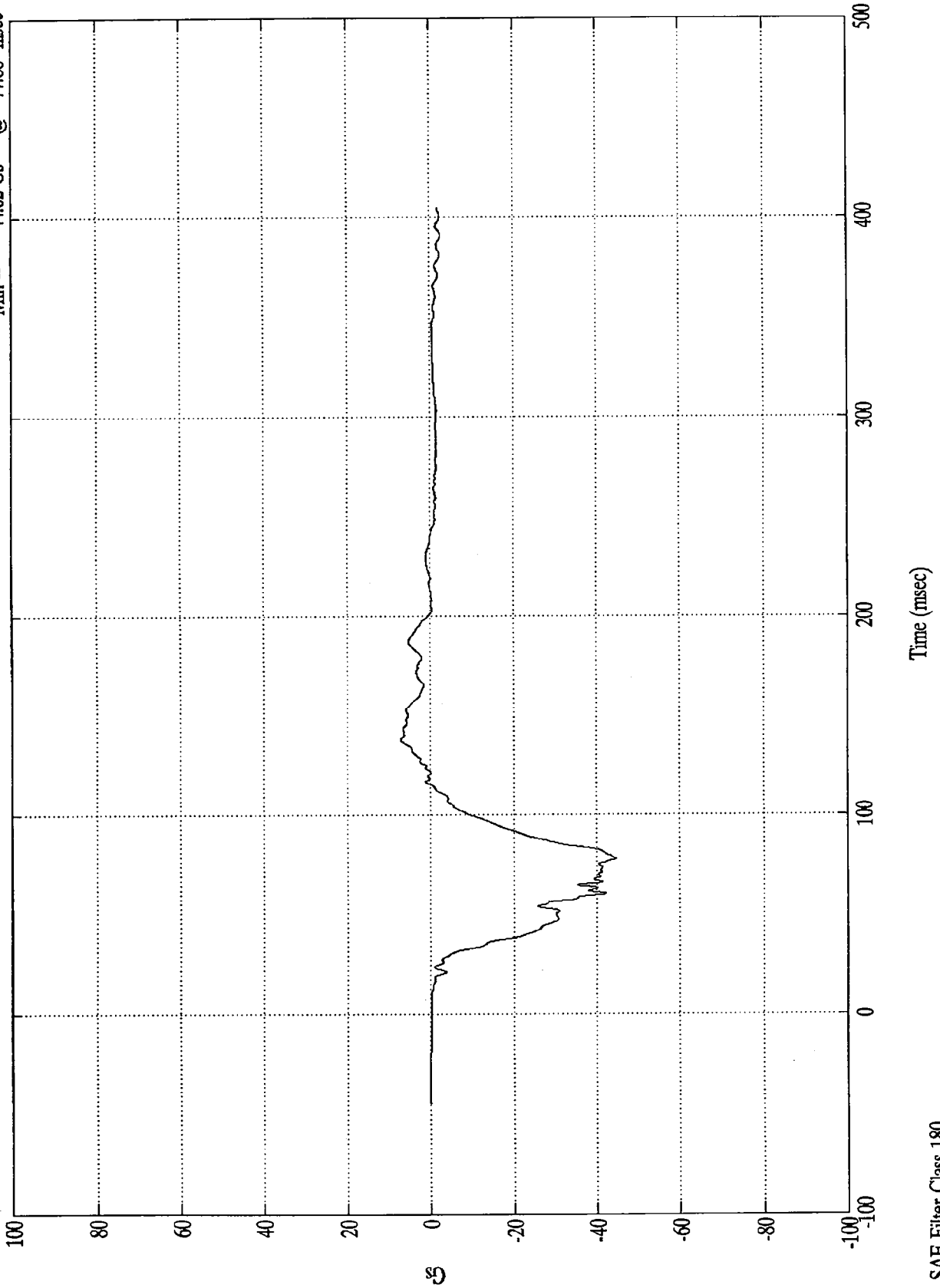


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest X(R)

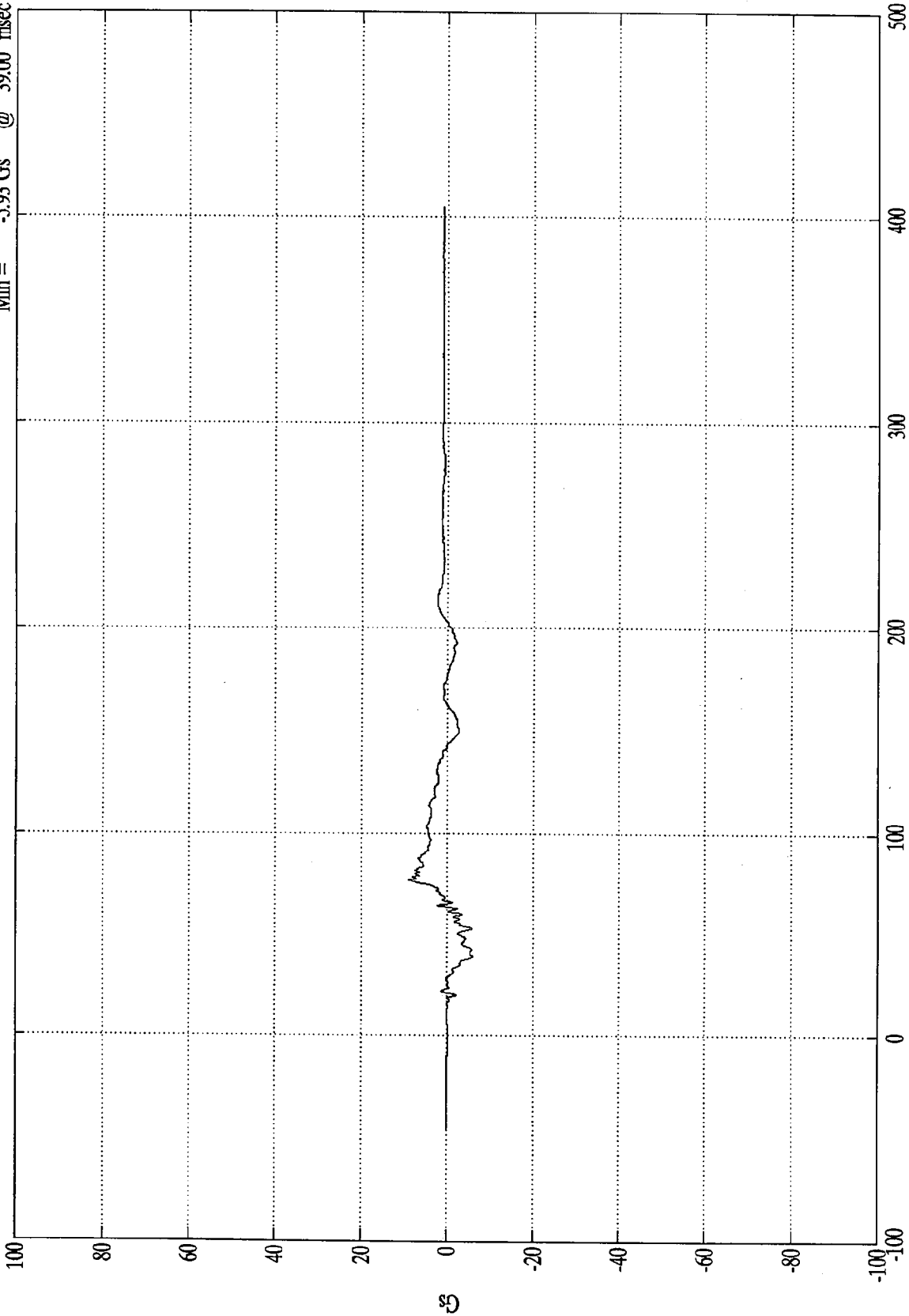
Max = 7.16 Gs @ 138.00 msec
Min = -44.62 Gs @ 77.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Max = 8.98 Gs @ 77.04 msec
Min = -5.93 Gs @ 39.00 msec

Pos. 1 Chest Y



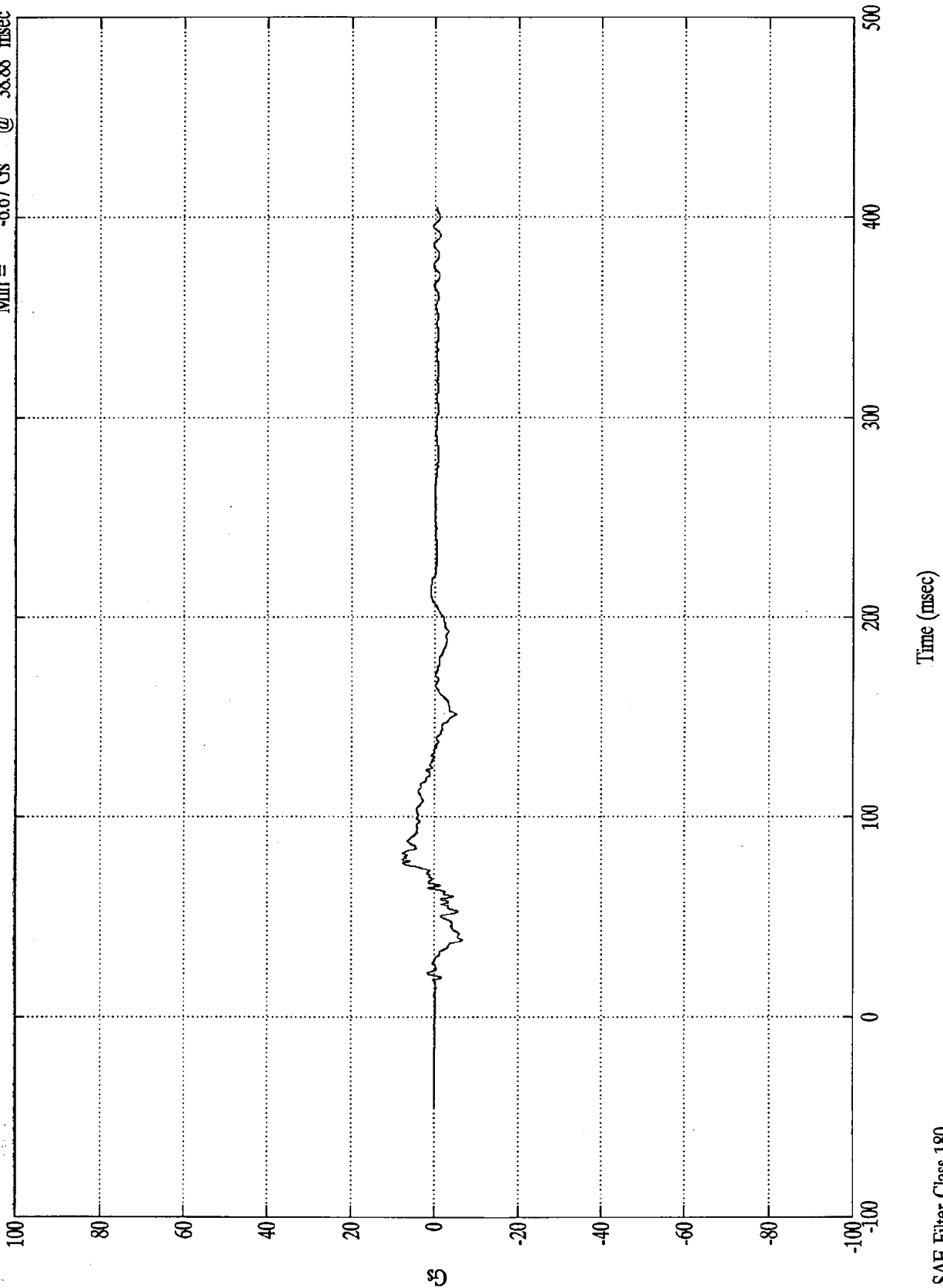
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest Y(R)

Max = 7.94 Gs @ 78.72 msec
Min = -6.67 Gs @ 38.88 msec

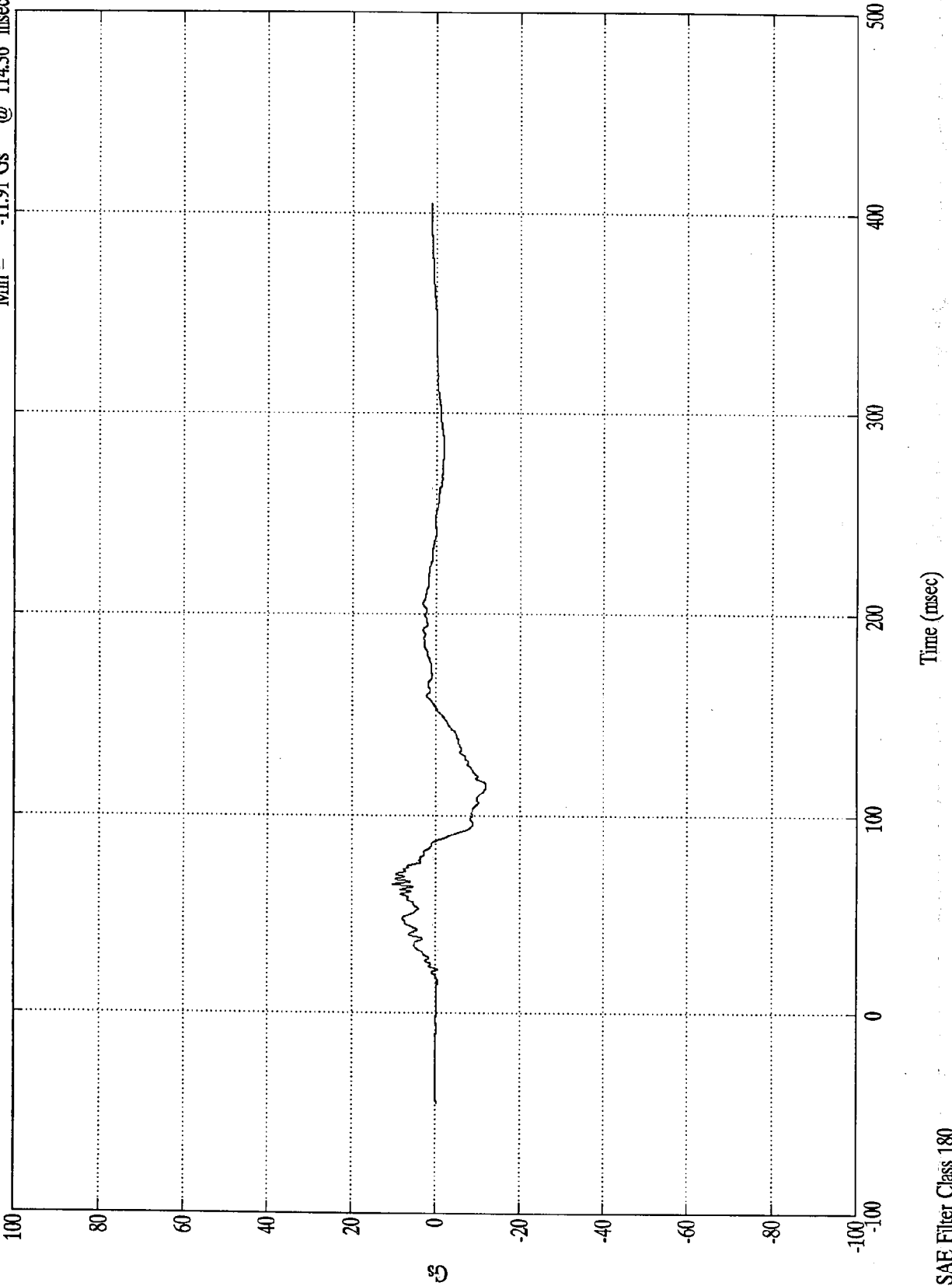


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest Z

Max = 10.28 Gs @ 66.00 msec
Min = -11.91 Gs @ 114.36 msec



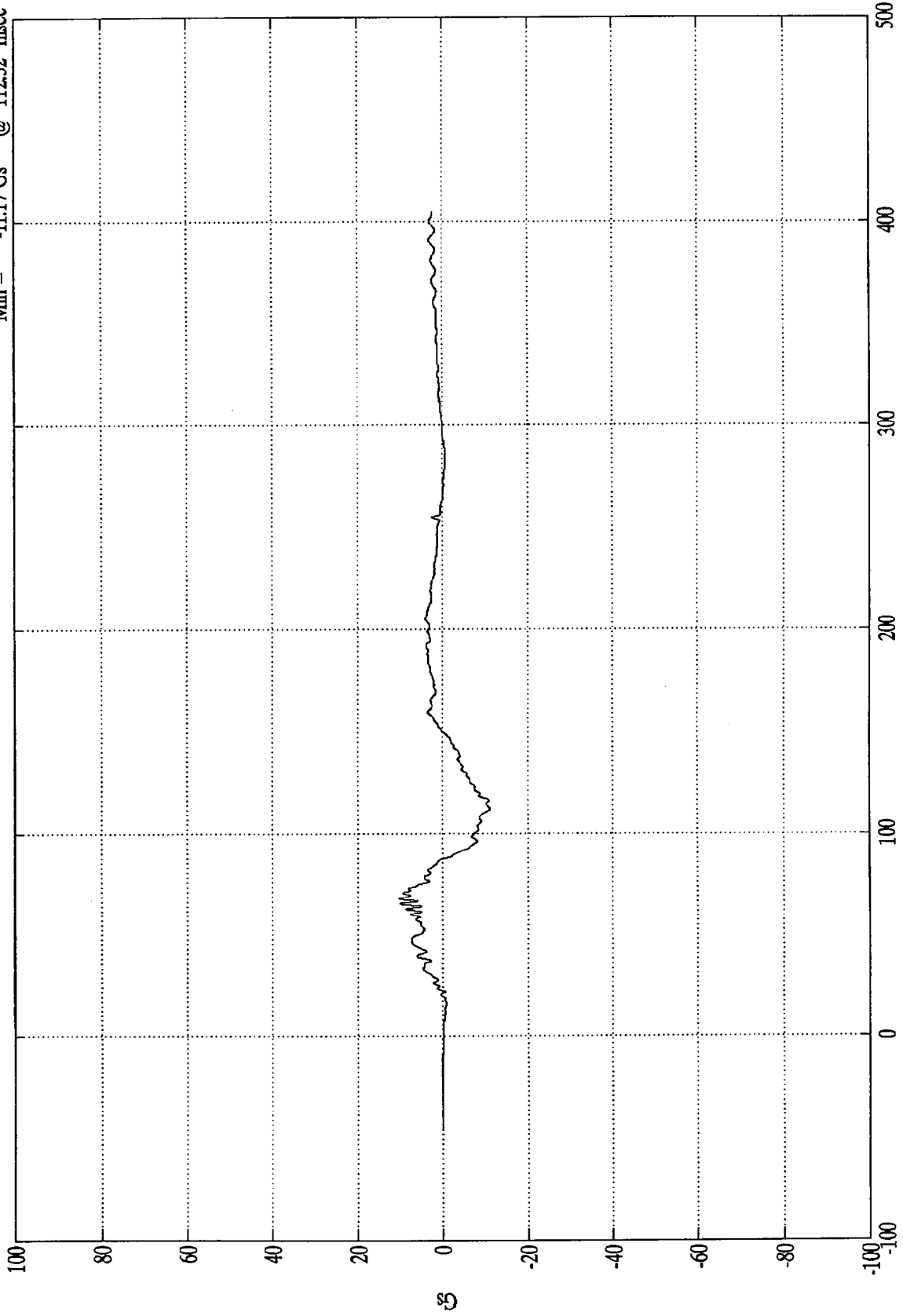
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest Z(R)

Max = 10.25 Gs @ 68.63 msec
Min = -11.17 Gs @ 112.32 msec



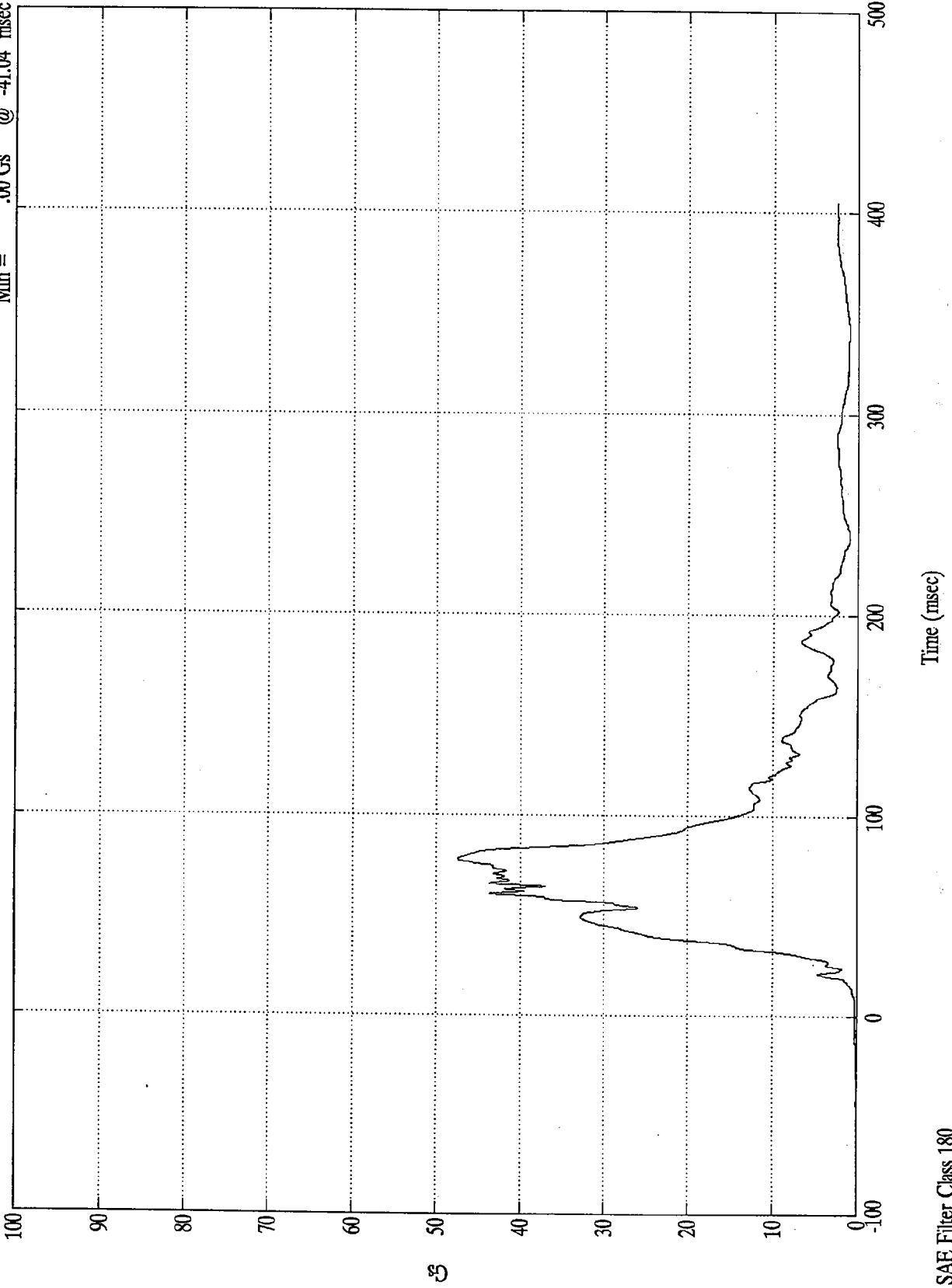
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Max = 47.39 Gs @ 78.48 msec
Min = .00 Gs @ -41.04 msec

Pos. 1 Chest Resultant



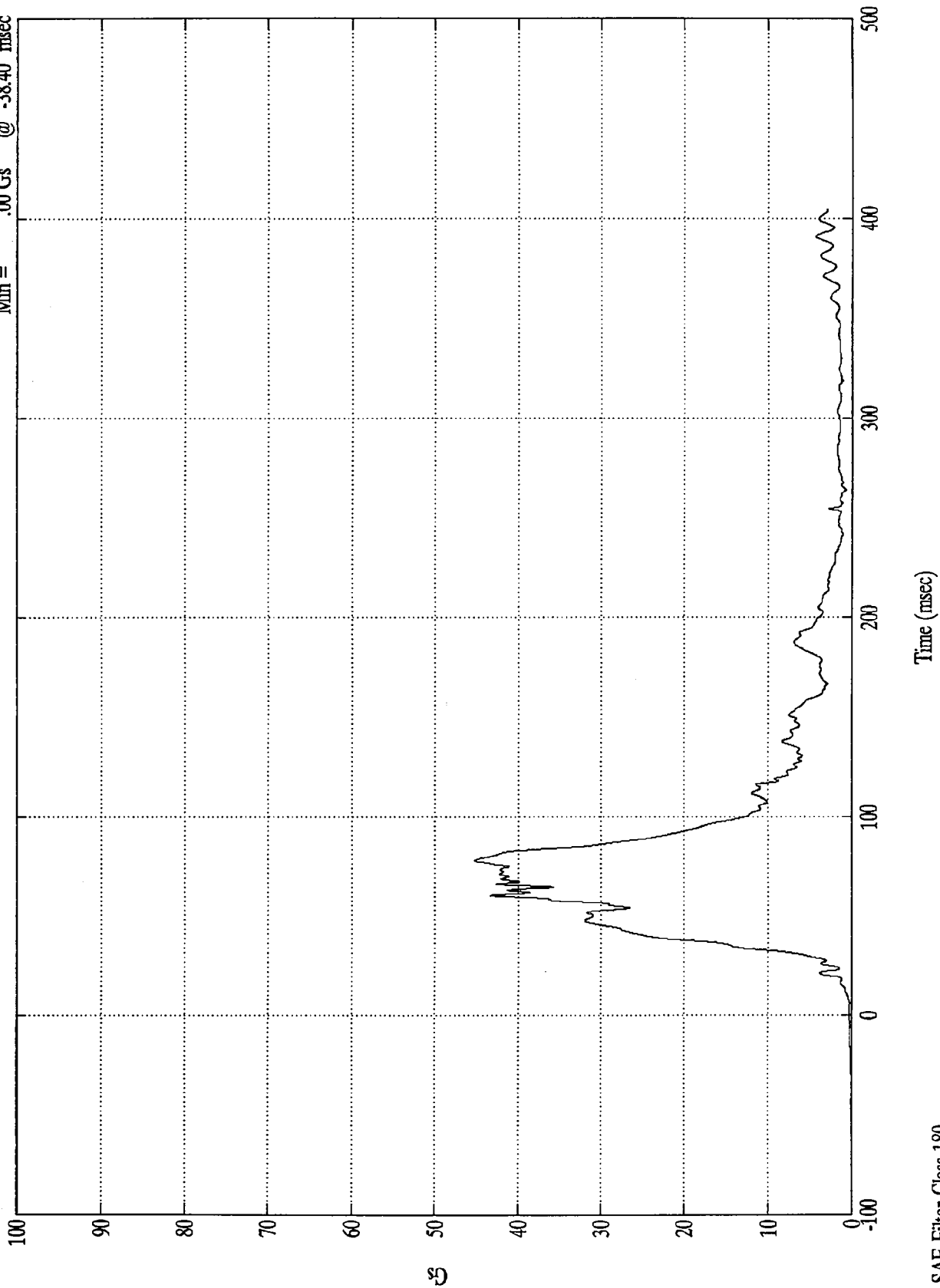
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest Res(RR)

Max = 45.20 Gs @ 78.00 msec
Min = .00 Gs @ -38.40 msec

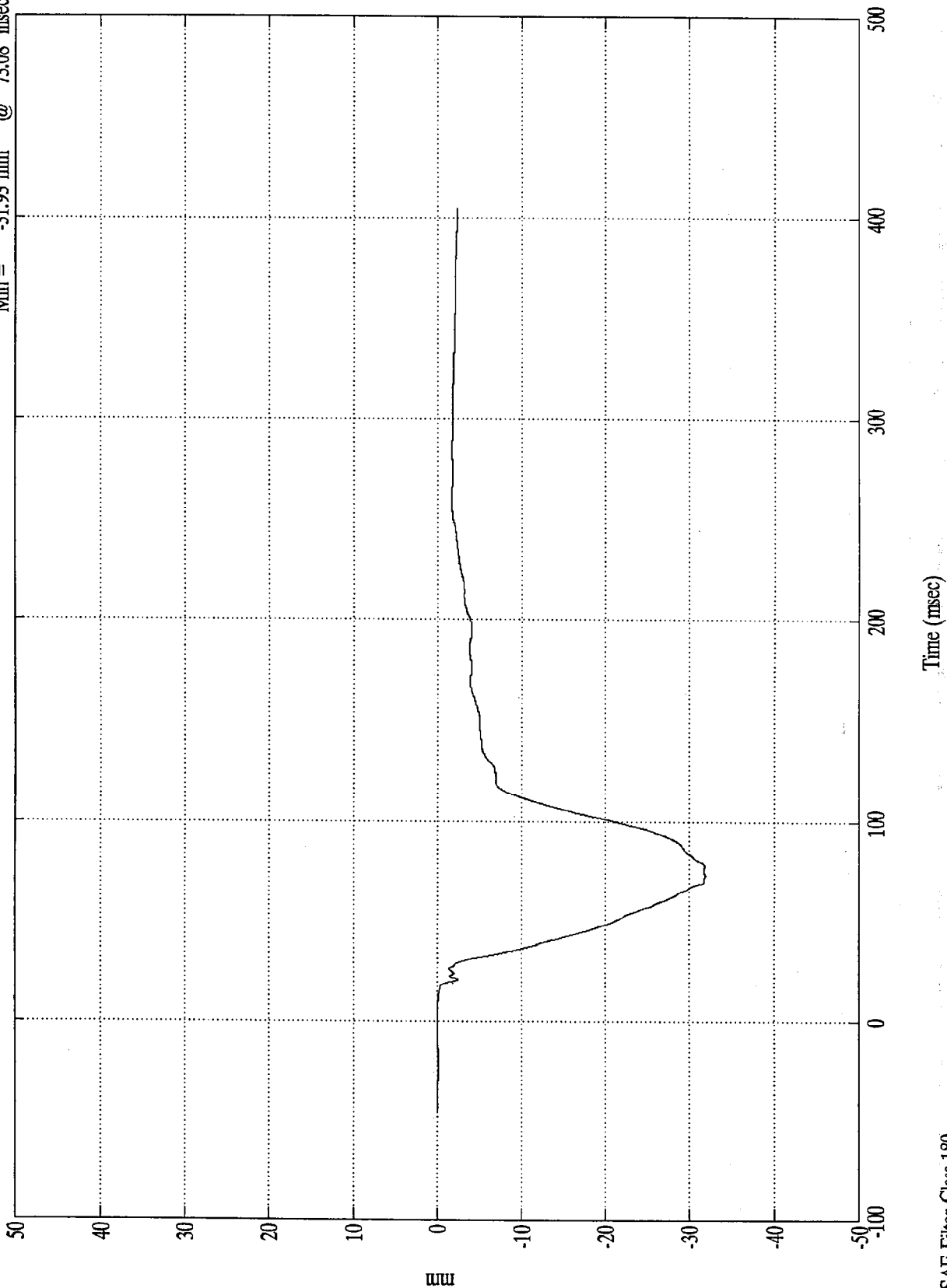


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Chest Disp.

Max = .02 mm @ -44.88 msec
Min = -31.93 mm @ 73.08 msec

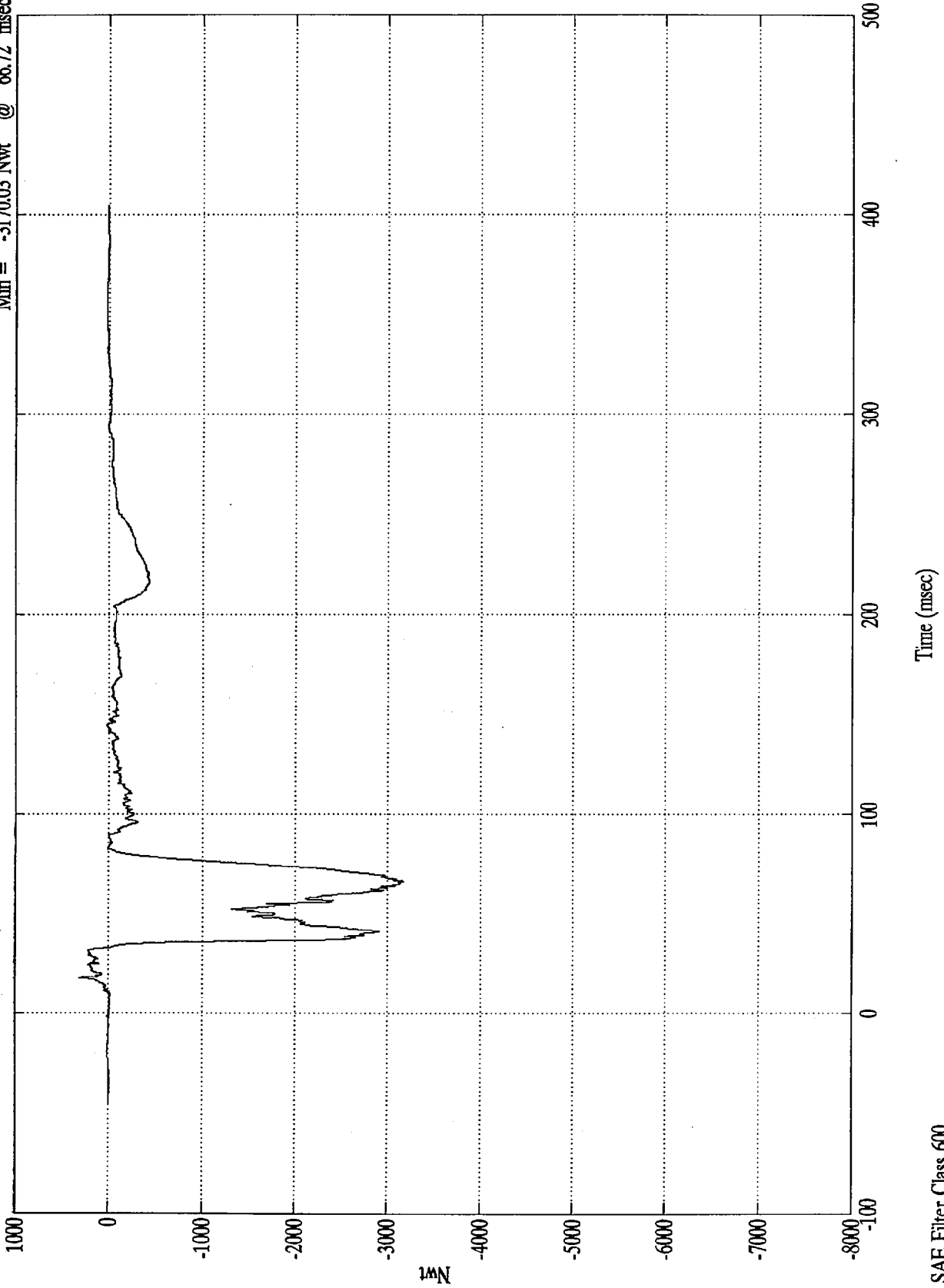


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Left Femur

Max = 312.97 Nwt @ 18.12 msec
Min = -3170.03 Nwt @ 66.72 msec

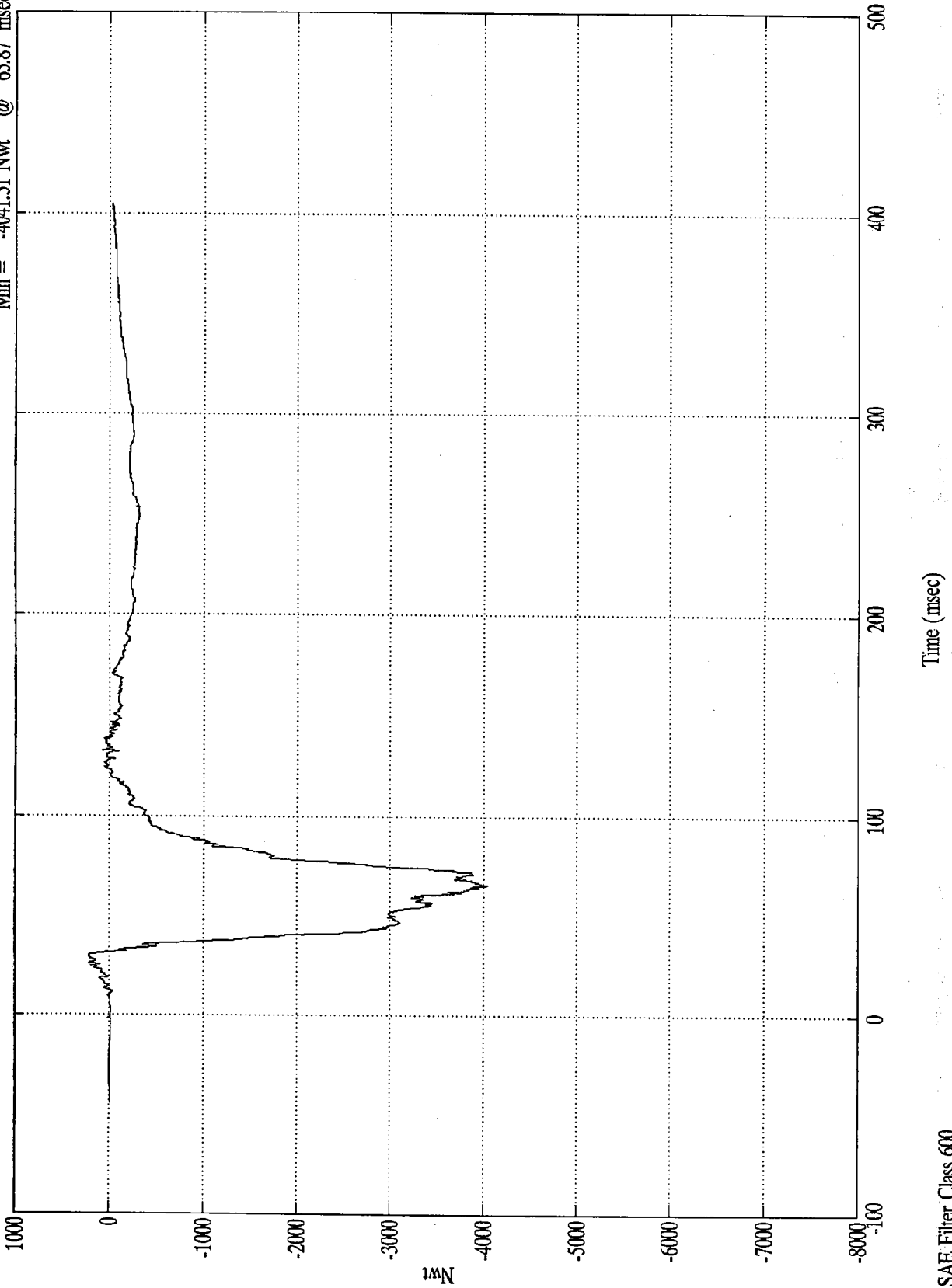


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Right Femur

Max = 221.14 Nwt @ 29.51 msec
Min = -4041.51 Nwt @ 65.87 msec

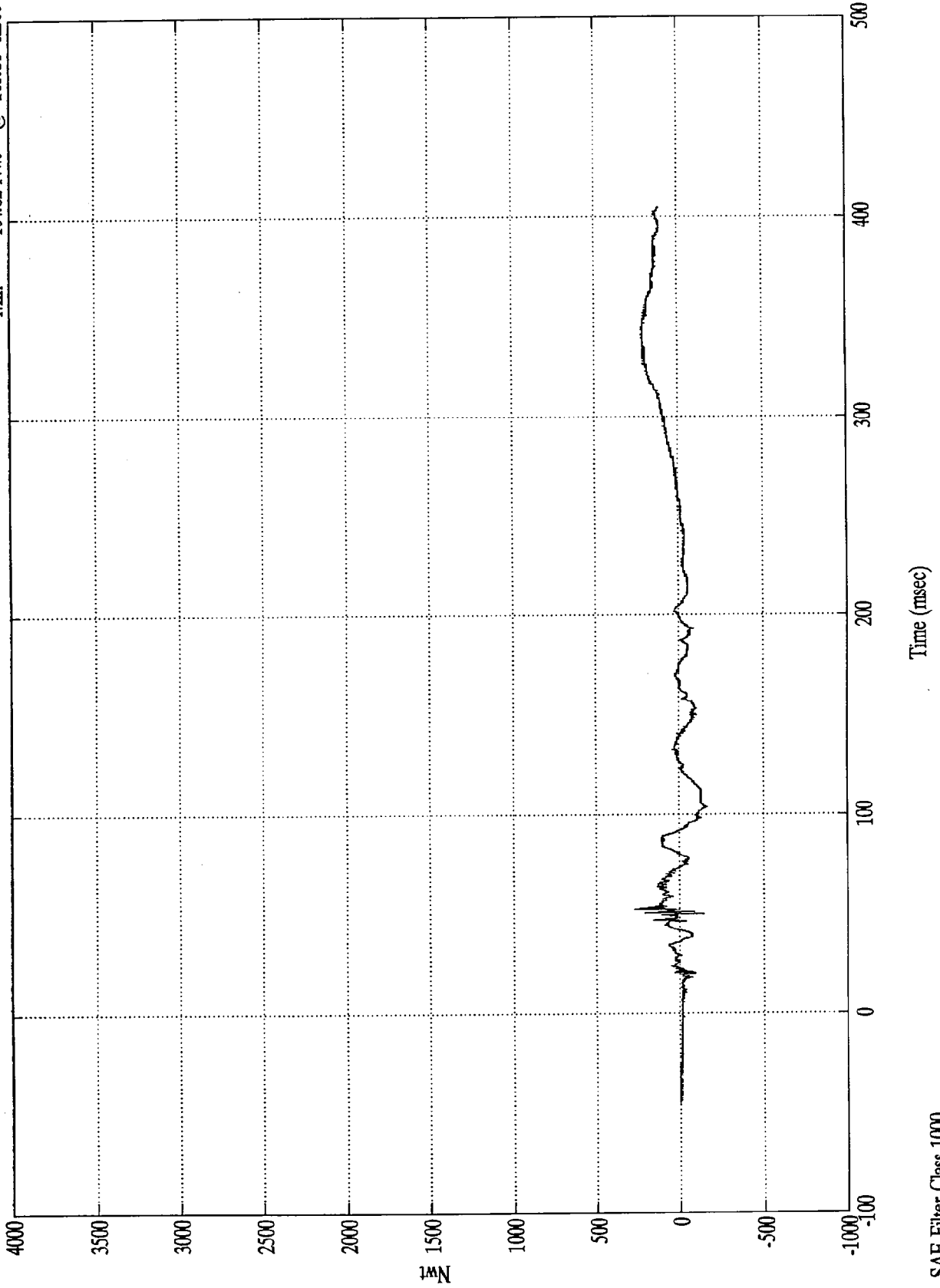


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Upper Neck Fx

Max = 267.61 Nwt @ 52.56 msec
Min = -164.62 Nwt @ 103.80 msec

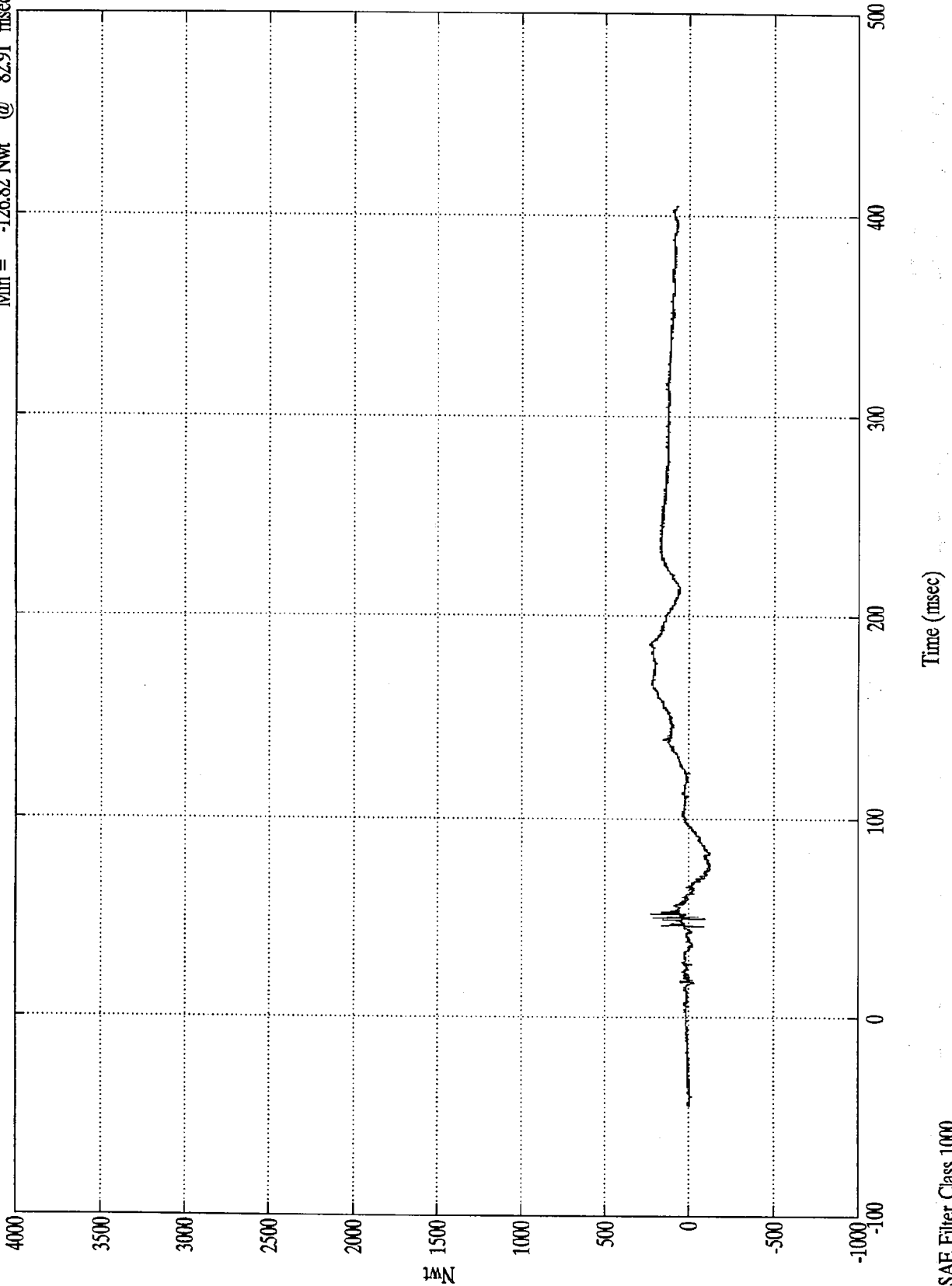


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Upper Neck Fy

Max = 235.77 Nwt @ 186.60 msec
Min = -126.82 Nwt @ 82.91 msec

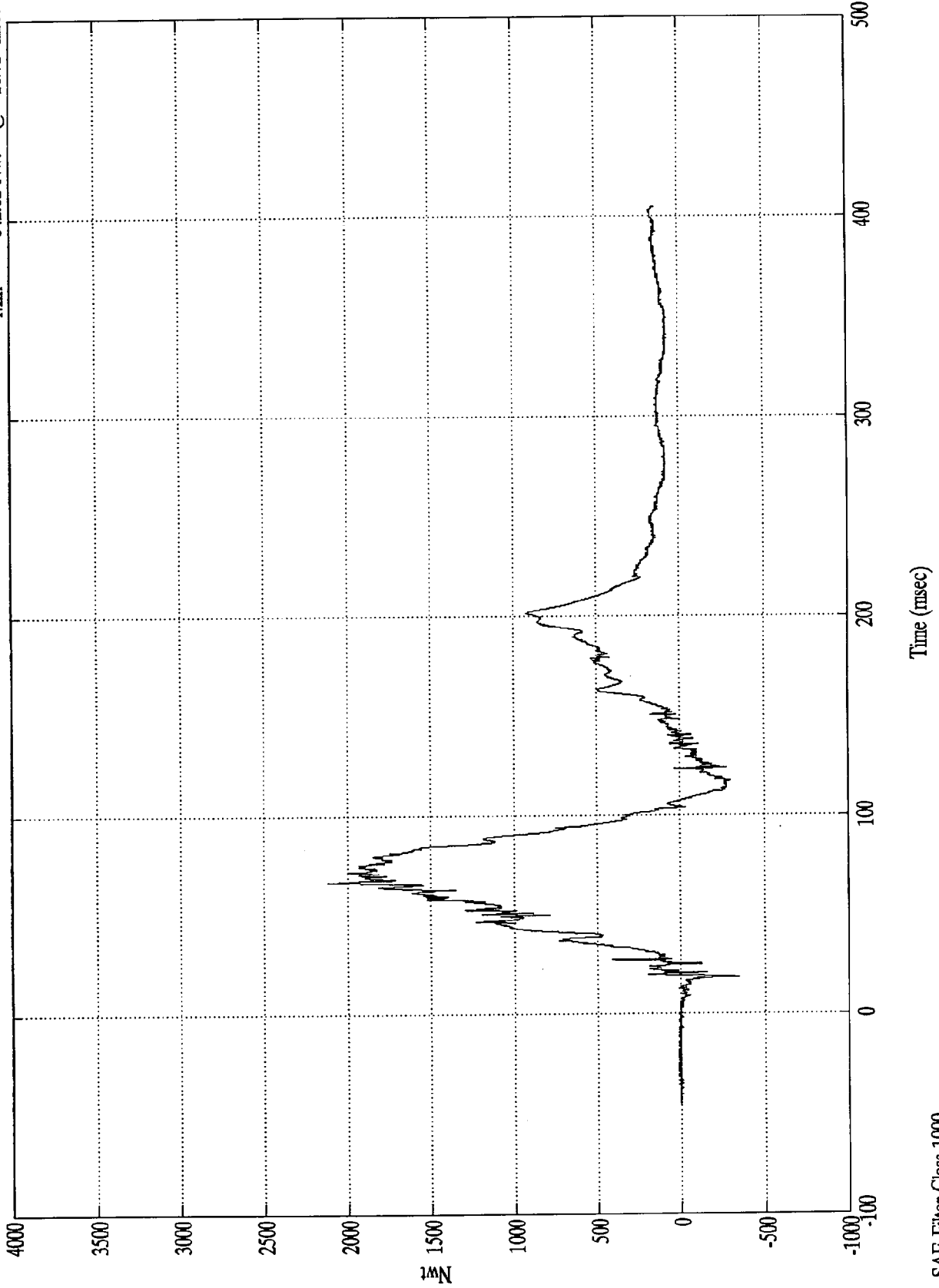


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Upper Neck Fz

Max = 2121.43 Nwt @ 67.08 msec
Min = -342.62 Nwt @ 18.71 msec

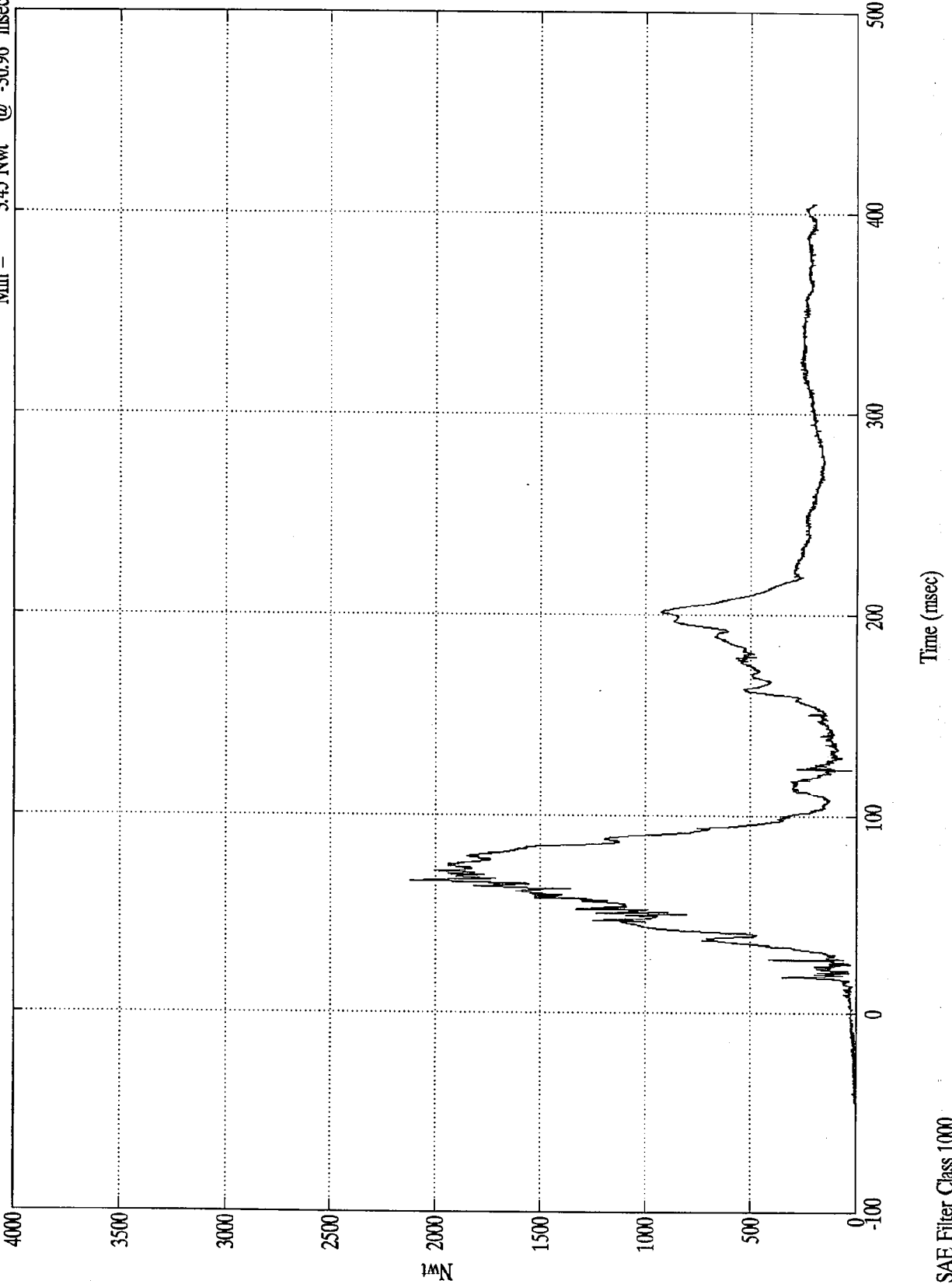


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Neck Force Res.

Max = 2122.75 Nwt @ 67.08 msec
Min = 3.45 Nwt @ -30.96 msec

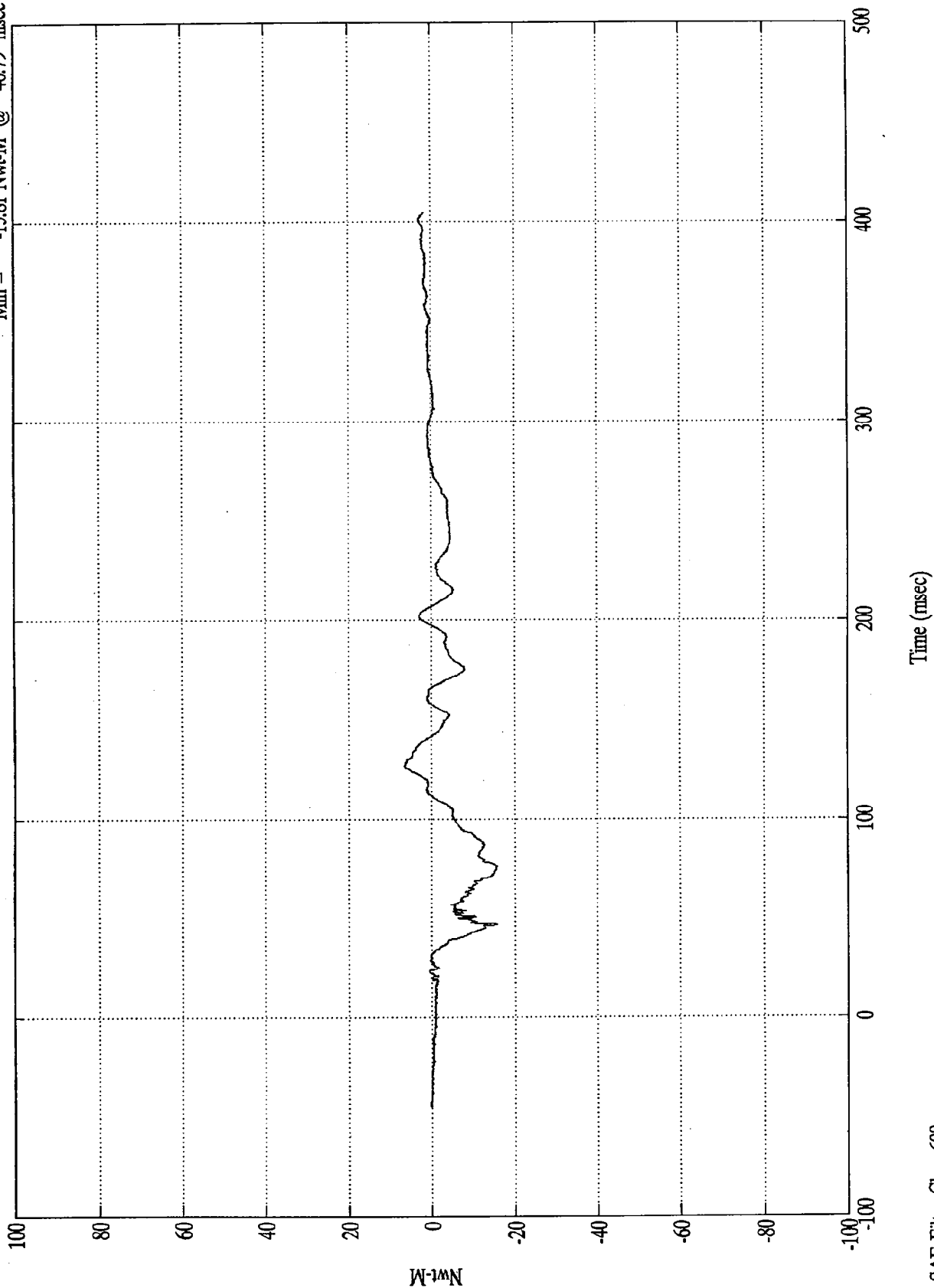


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Upper Neck Mx

Max = 6.55 Nwt-M @ 126.84 msec
Min = -15.81 Nwt-M @ 46.79 msec

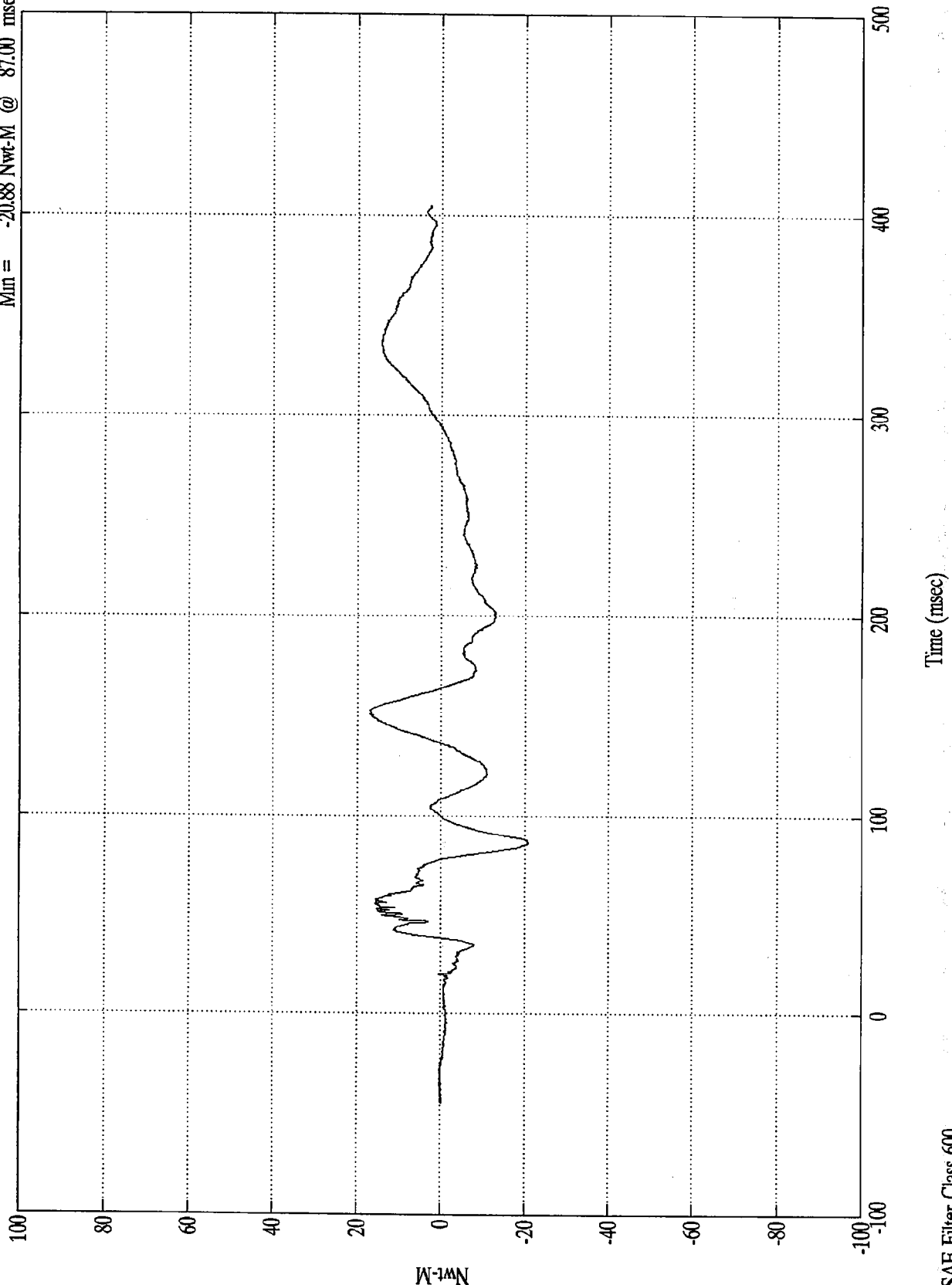


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Upper Neck My

Max = 16.96 Nwt-M @ 150.72 msec
Min = -20.88 Nwt-M @ 87.00 msec

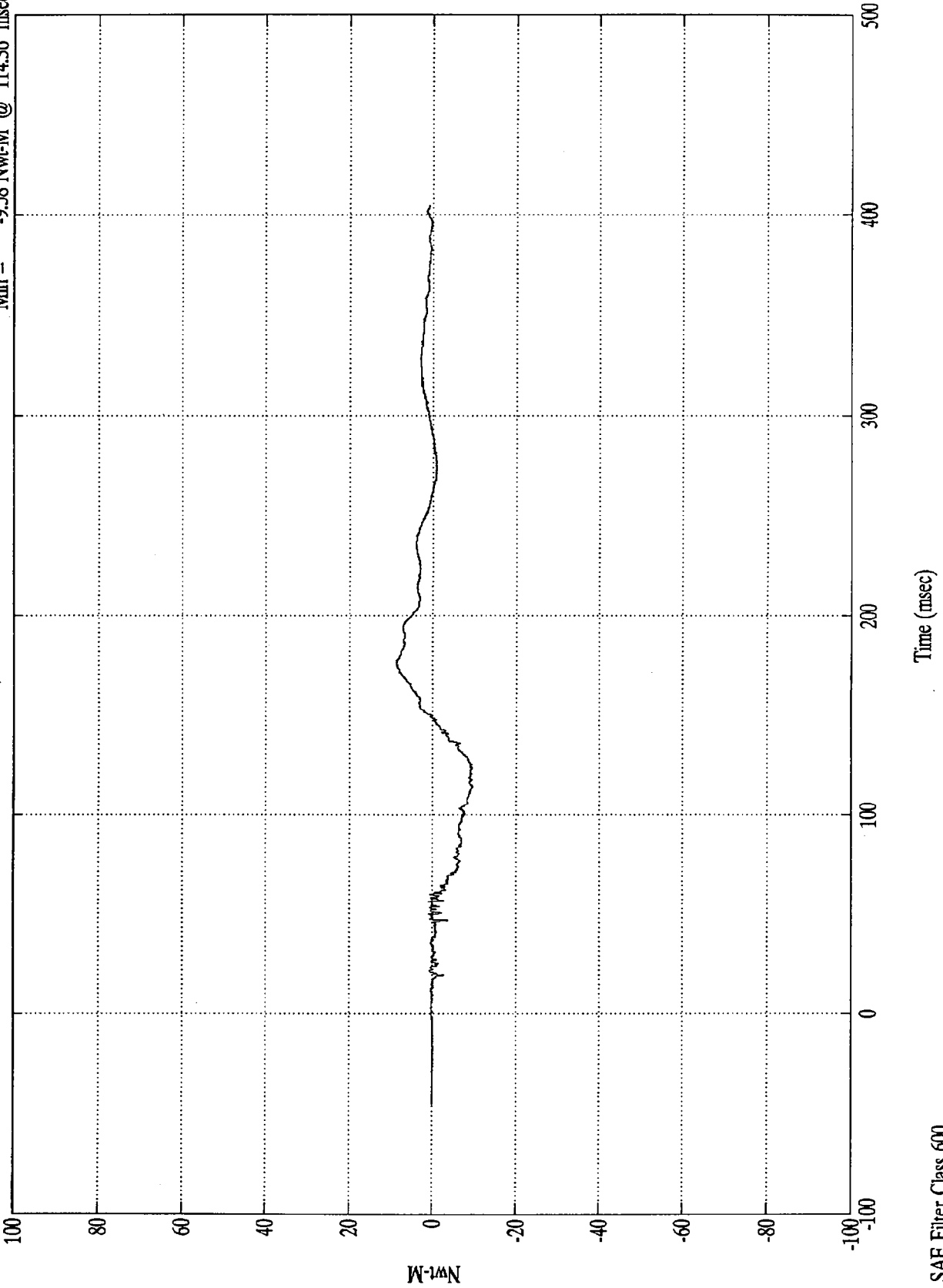


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Upper Neck Mz

Max = 8.73 Nwt-M @ 175.80 msec
Min = -9.58 Nwt-M @ 114.36 msec

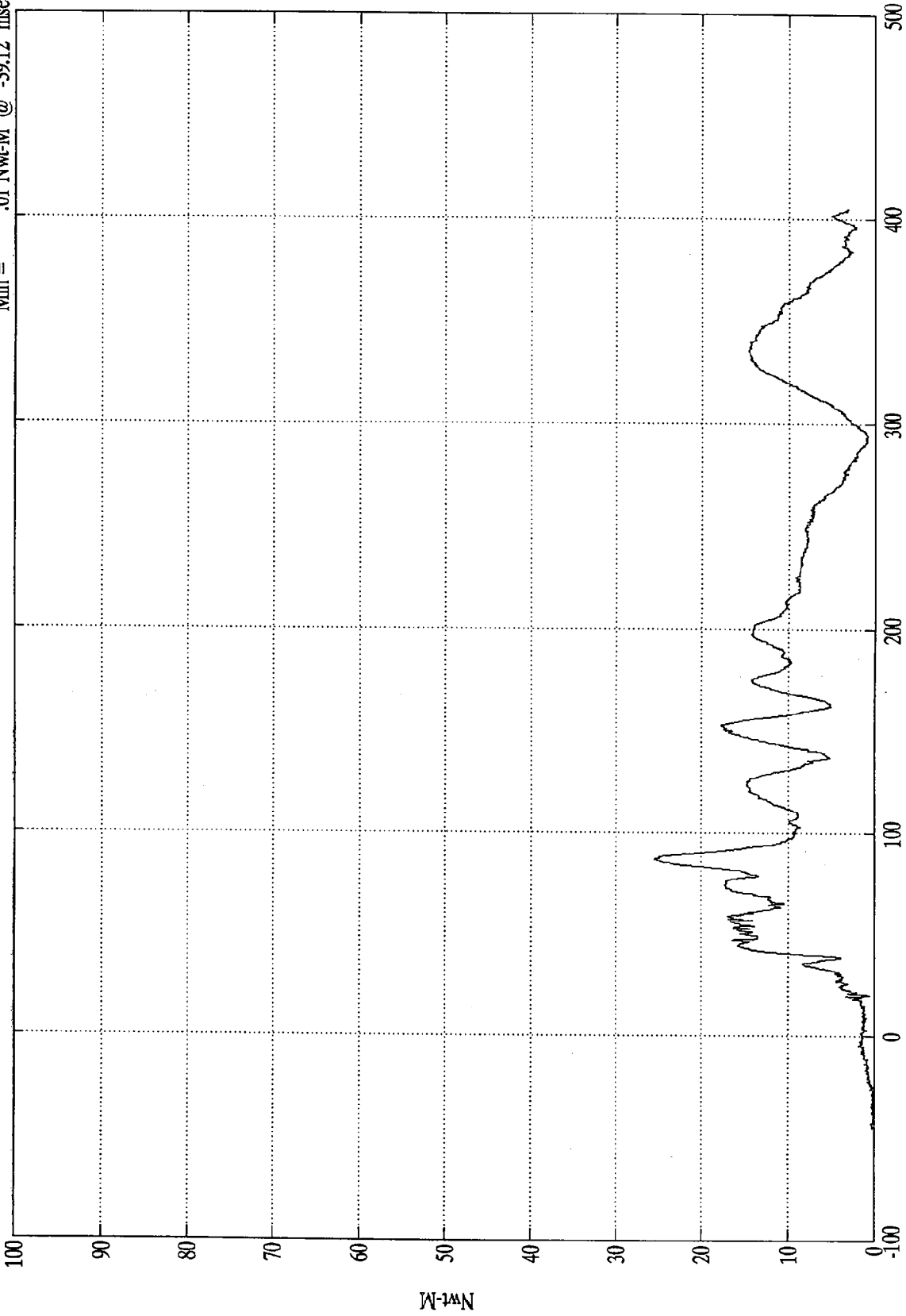


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Neck Moment Res.

Max = 25.46 Nwt-M @ 86.87 msec
Min = .01 Nwt-M @ -39.12 msec



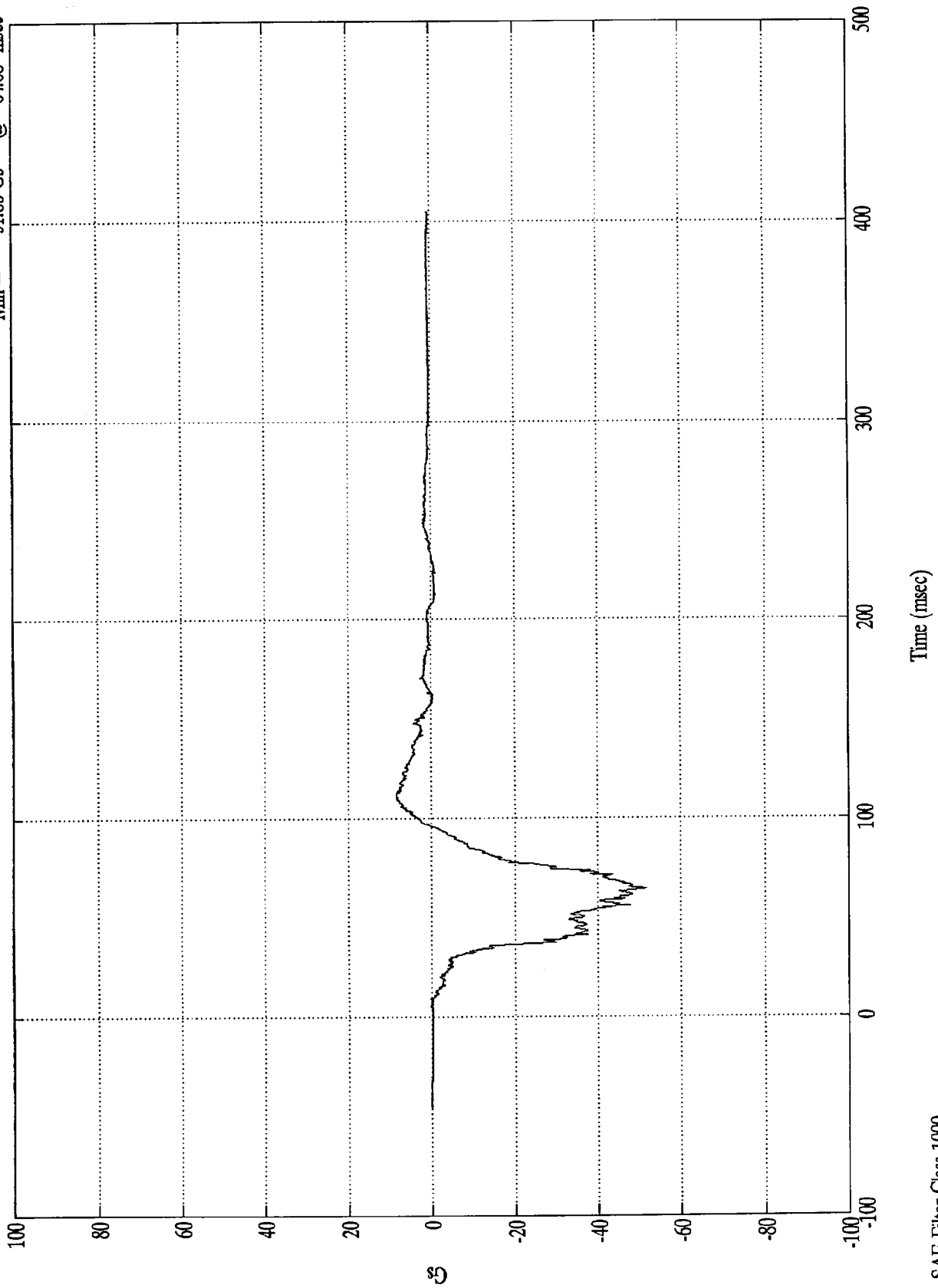
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Pelvic (X)

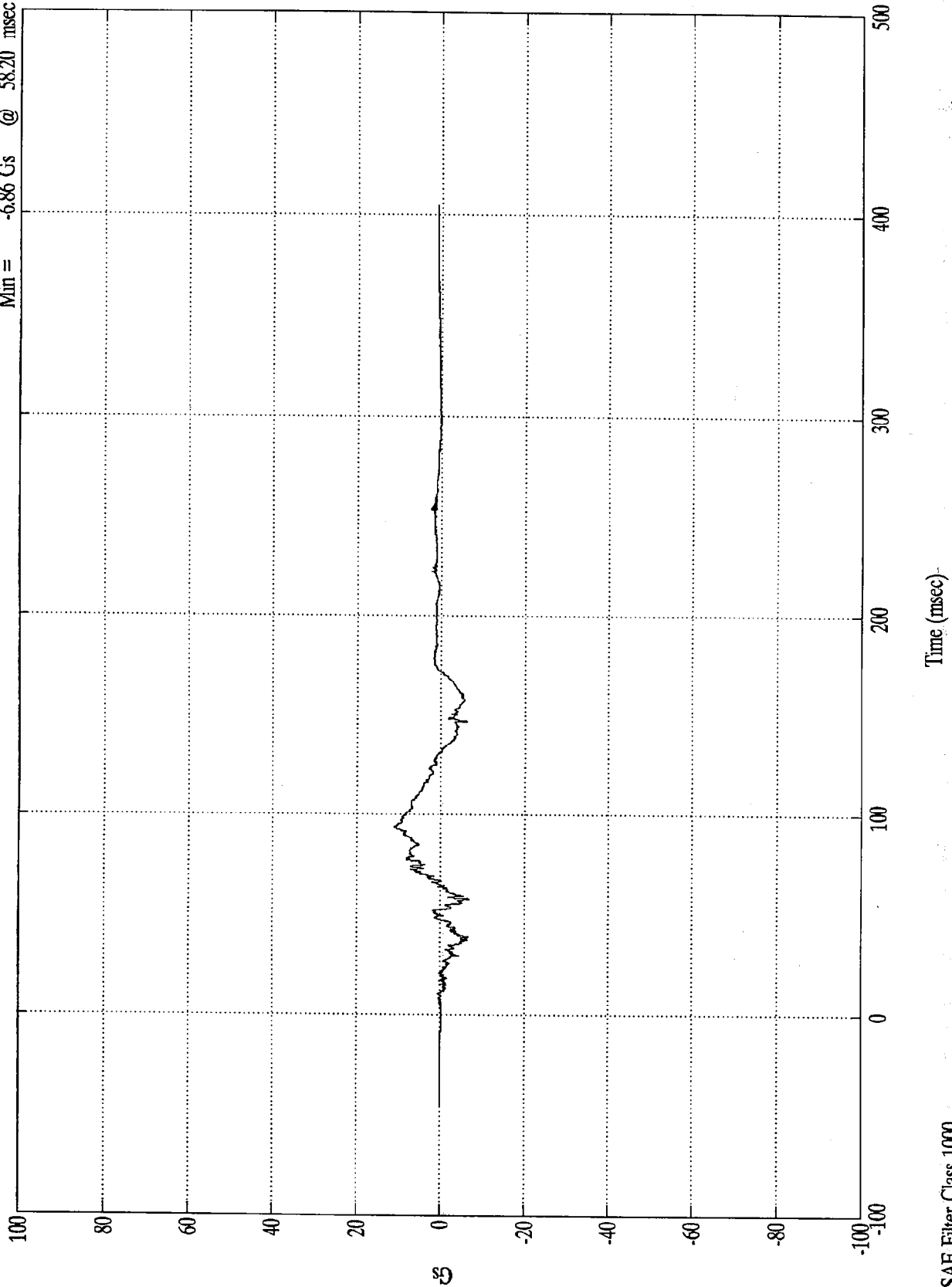
Max = 8.31 Gs @ 112.80 msec
Min = -51.66 Gs @ 64.68 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Pelvic (Y)

Max = 11.08 Gs @ 93.48 msec
Min = -6.86 Gs @ 58.20 msec

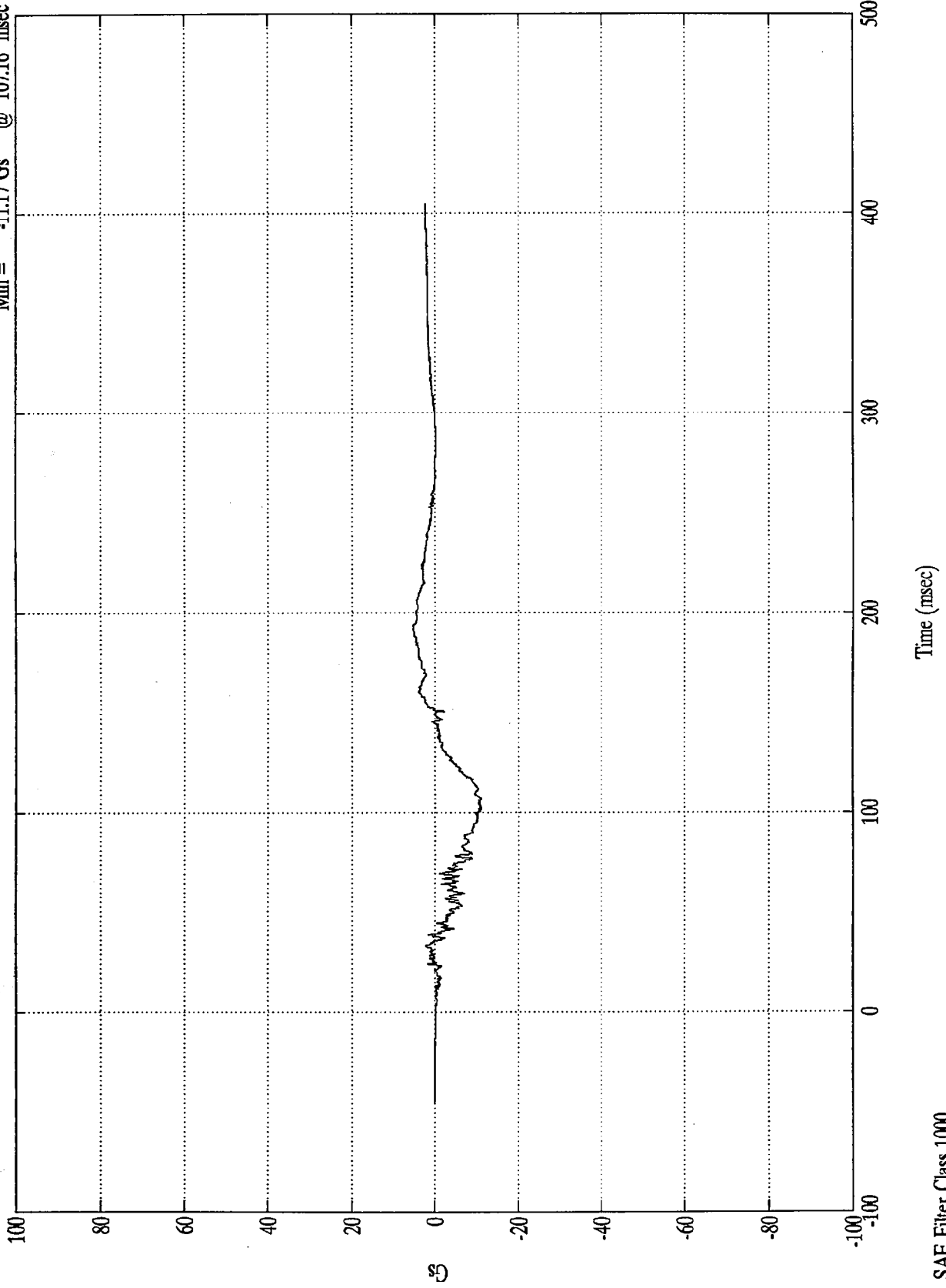


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Pelvic (Z)

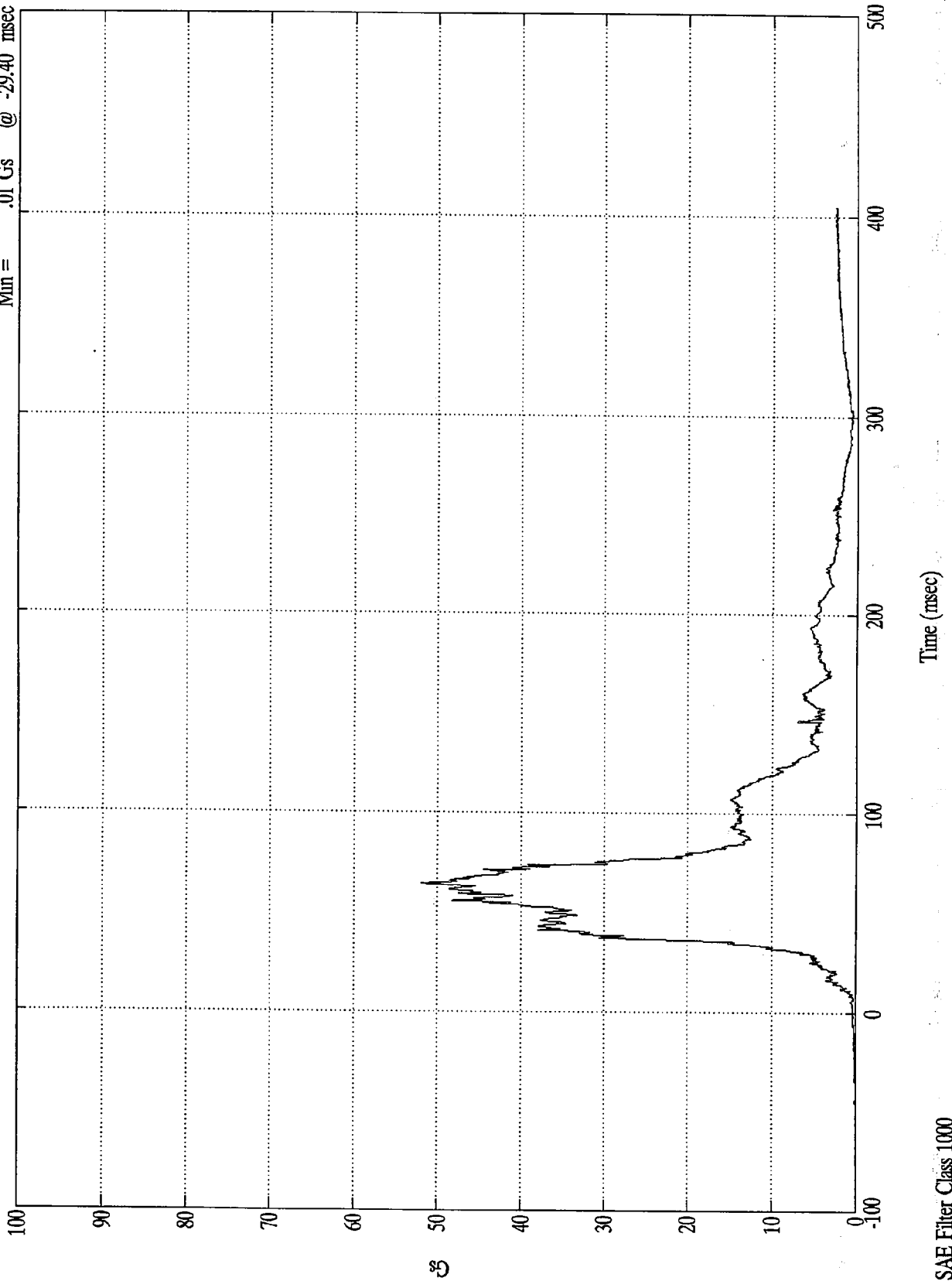
Max = 5.28 Gs @ 193.32 msec
Min = -1.17 Gs @ 107.16 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Pelvic (R)

Max = 51.89 Gs @ 64.68 msec
Min = .01 Gs @ -29.40 msec

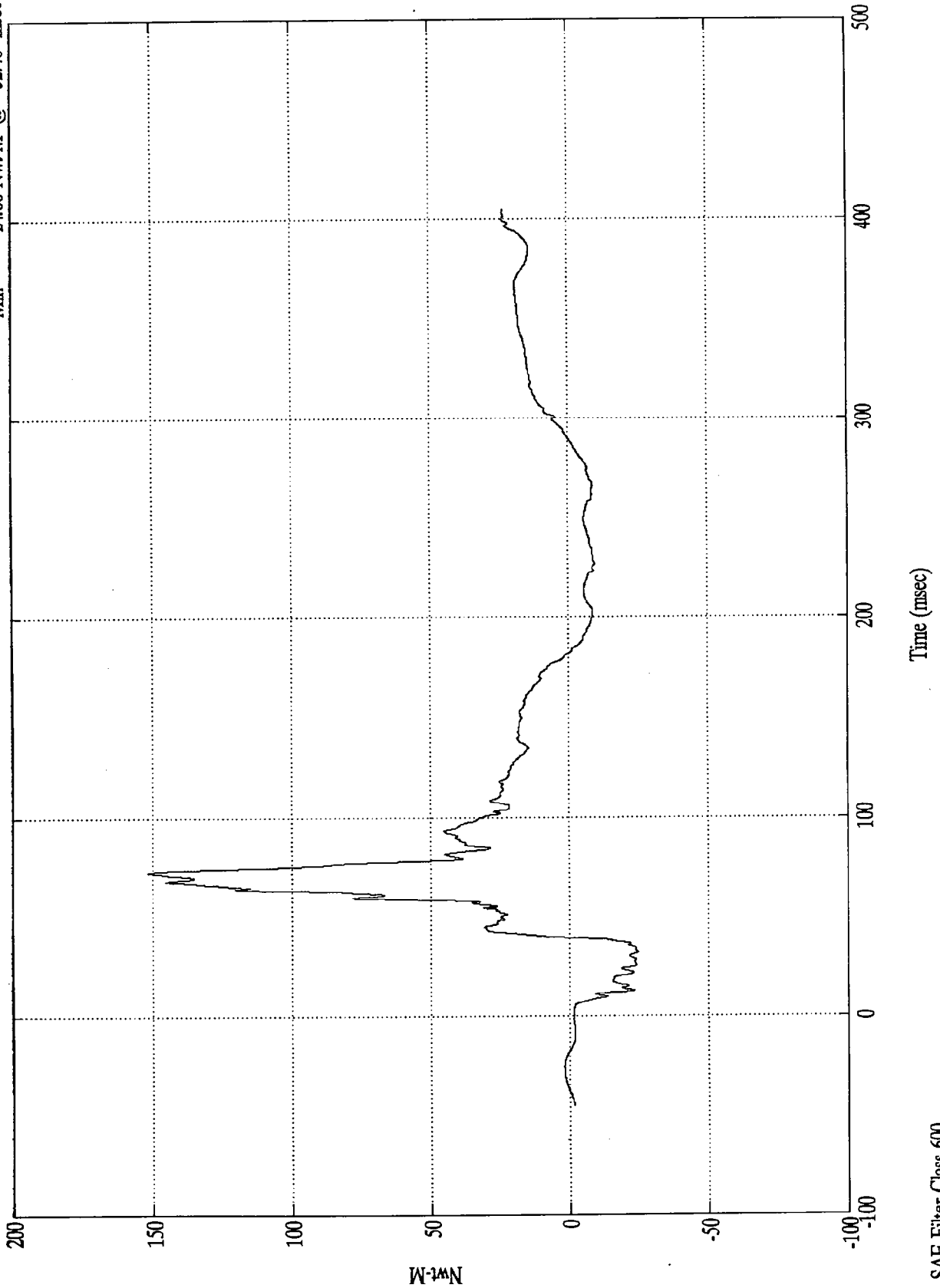


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

P1 Lt Upper Tibia My

Max = 151.81 Nwt-M @ 72.48 msec
Min = -24.66 Nwt-M @ 32.40 msec

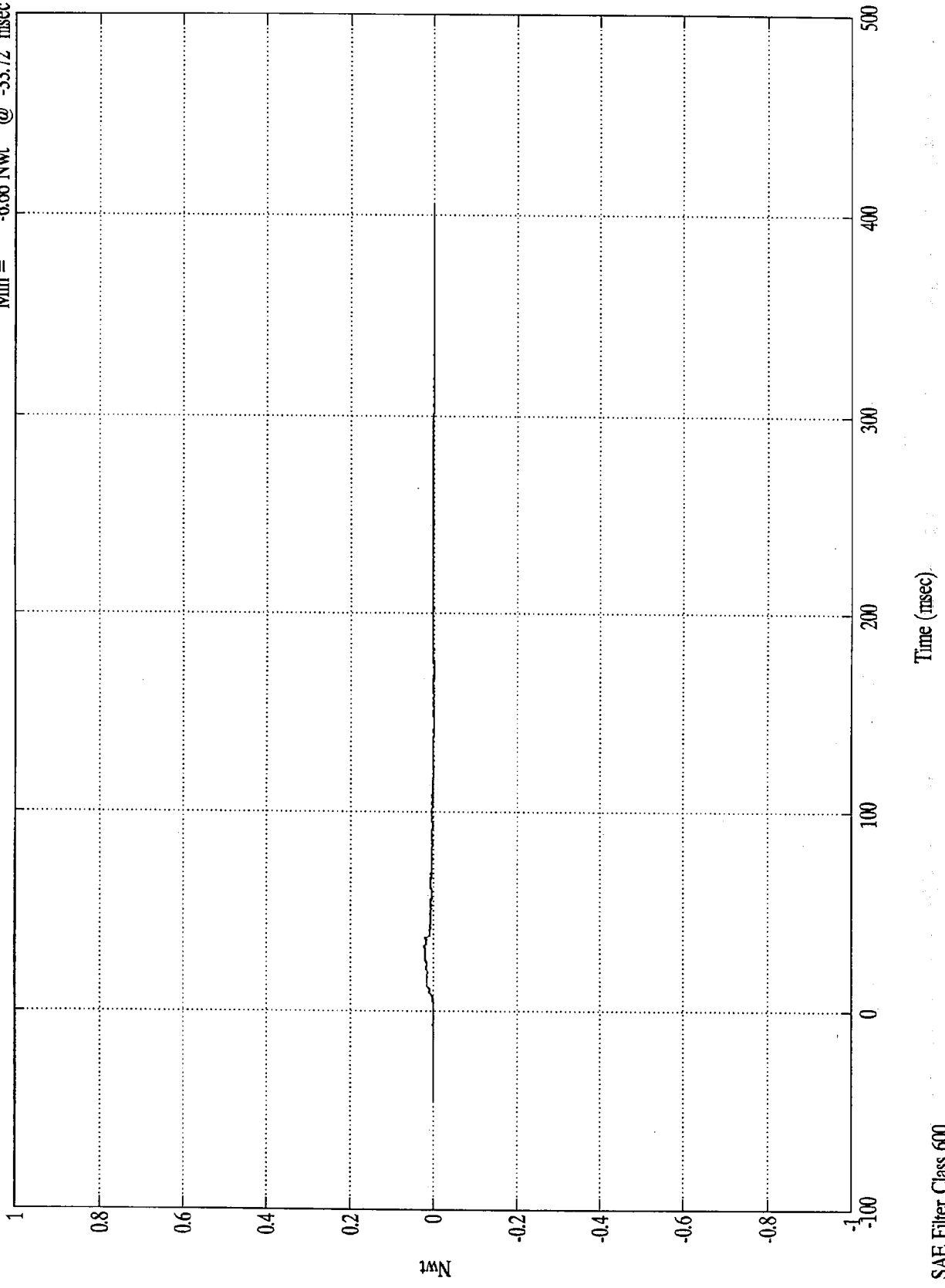


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

P1 Lt Lower Tibia Fx

Max = 227.63 Nwt @ 32.63 msec
Min = -6.66 Nwt @ -33.72 msec



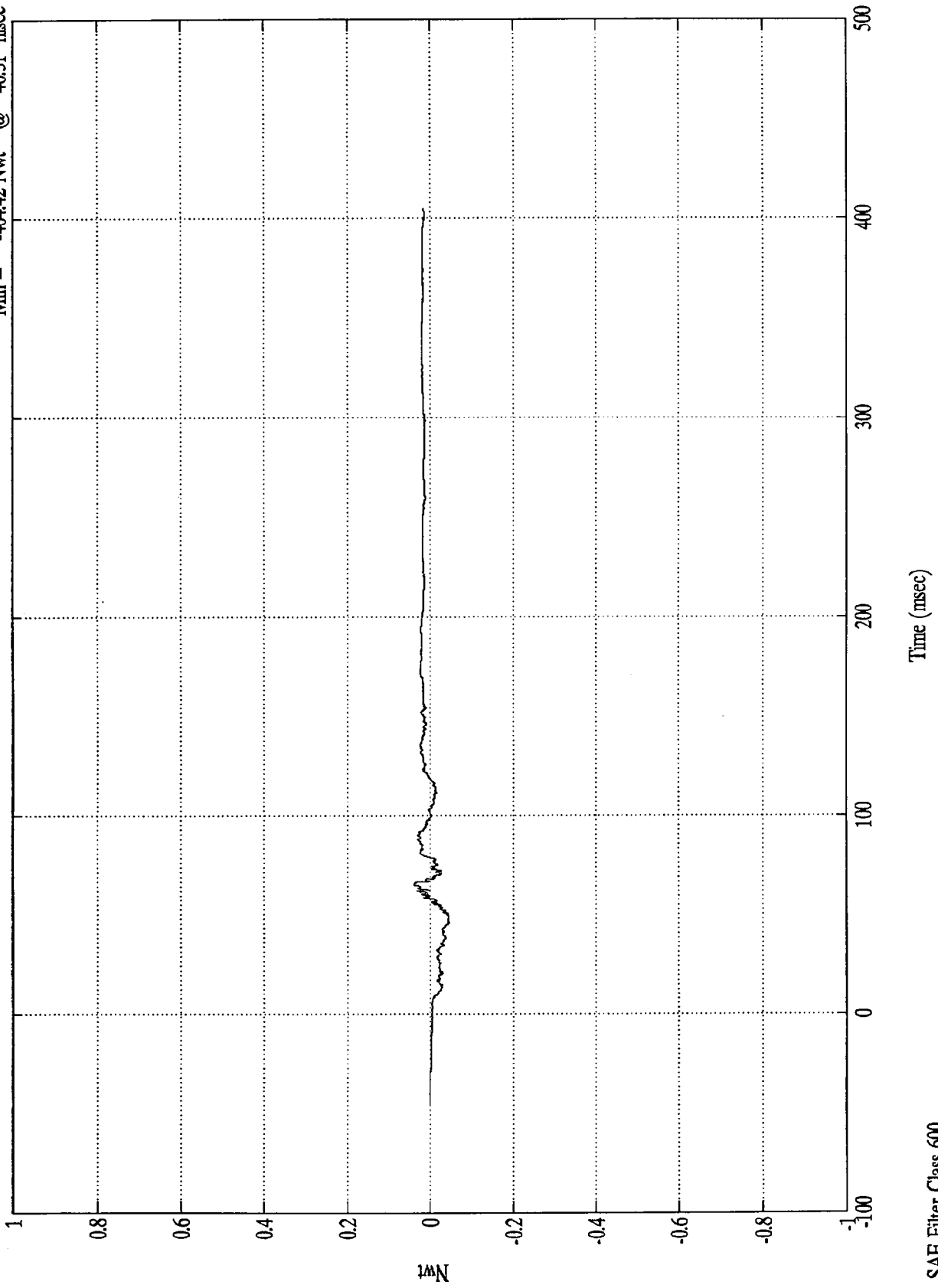
SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Pl Lt Lower Tibia Fz

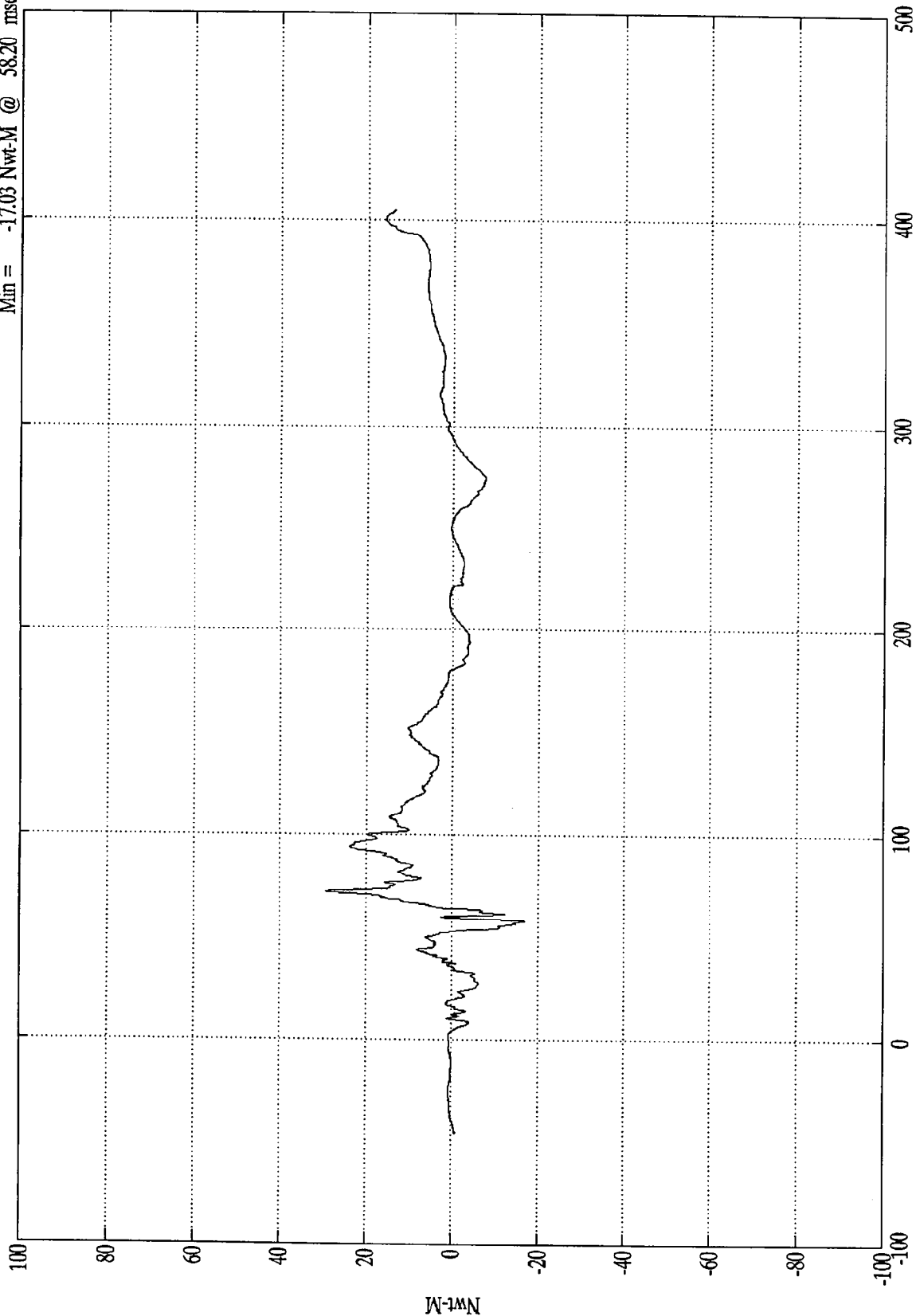
Max = 385.41 Nwt @ 65.52 msec
Min = -464.42 Nwt @ 46.31 msec



NCAP TEST #8 - 1996 MAZDA MPV

P1 Lt Lower Tibia Mx

Max = 29.39 Nwt-M @ 72.59 msec
Min = -17.03 Nwt-M @ 58.20 msec



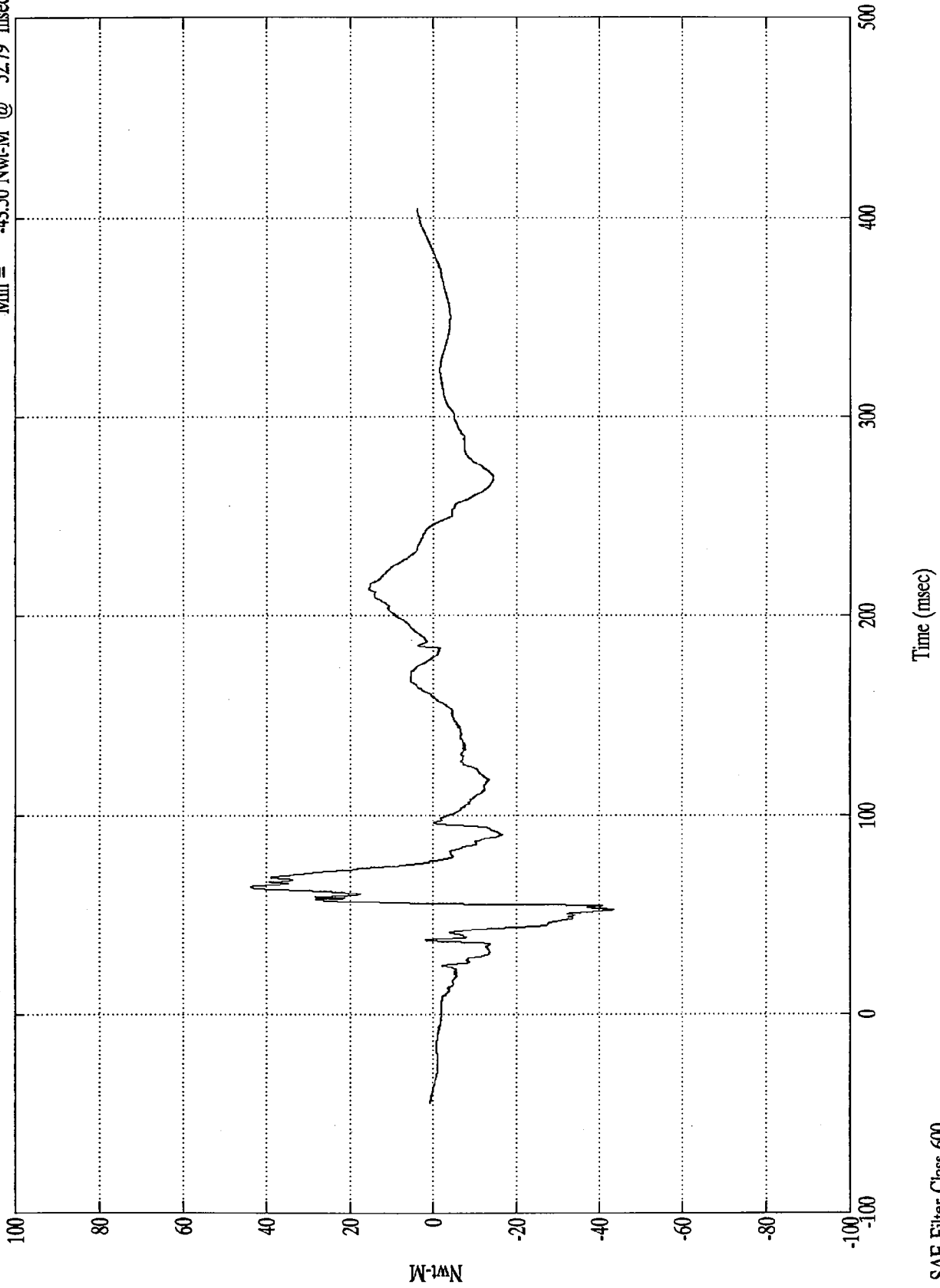
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

P1 Rt Upper Tibia Mx

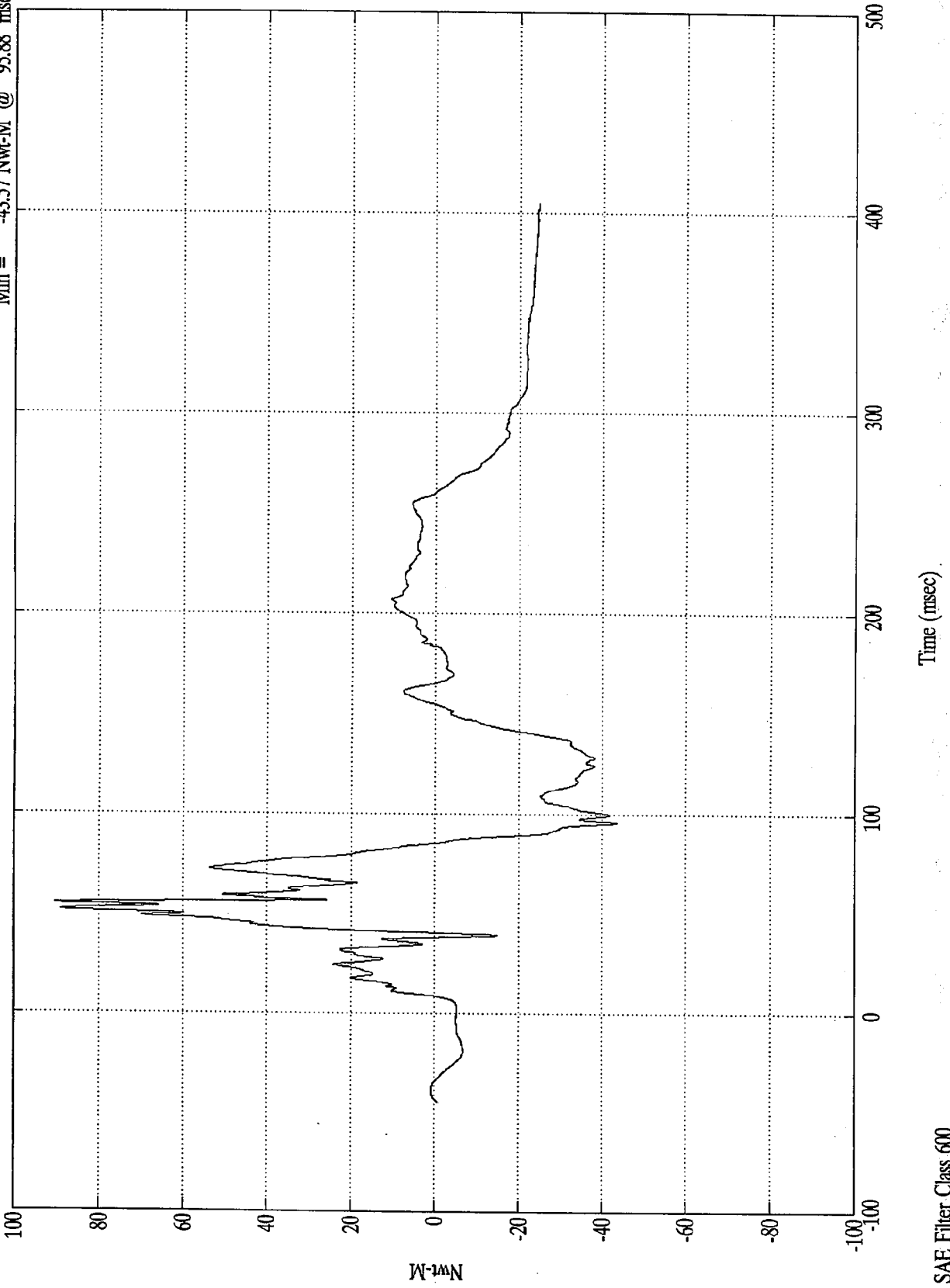
Max = 43.90 Nwt-M @ 64.68 msec
Min = -43.50 Nwt-M @ 52.79 msec



NCAP TEST #8 - 1996 MAZDA MPV

P1 Rt Upper Tibia My

Max = 90.14 Nwt-M @ 54.72 msec
Min = -43.57 Nwt-M @ 95.88 msec



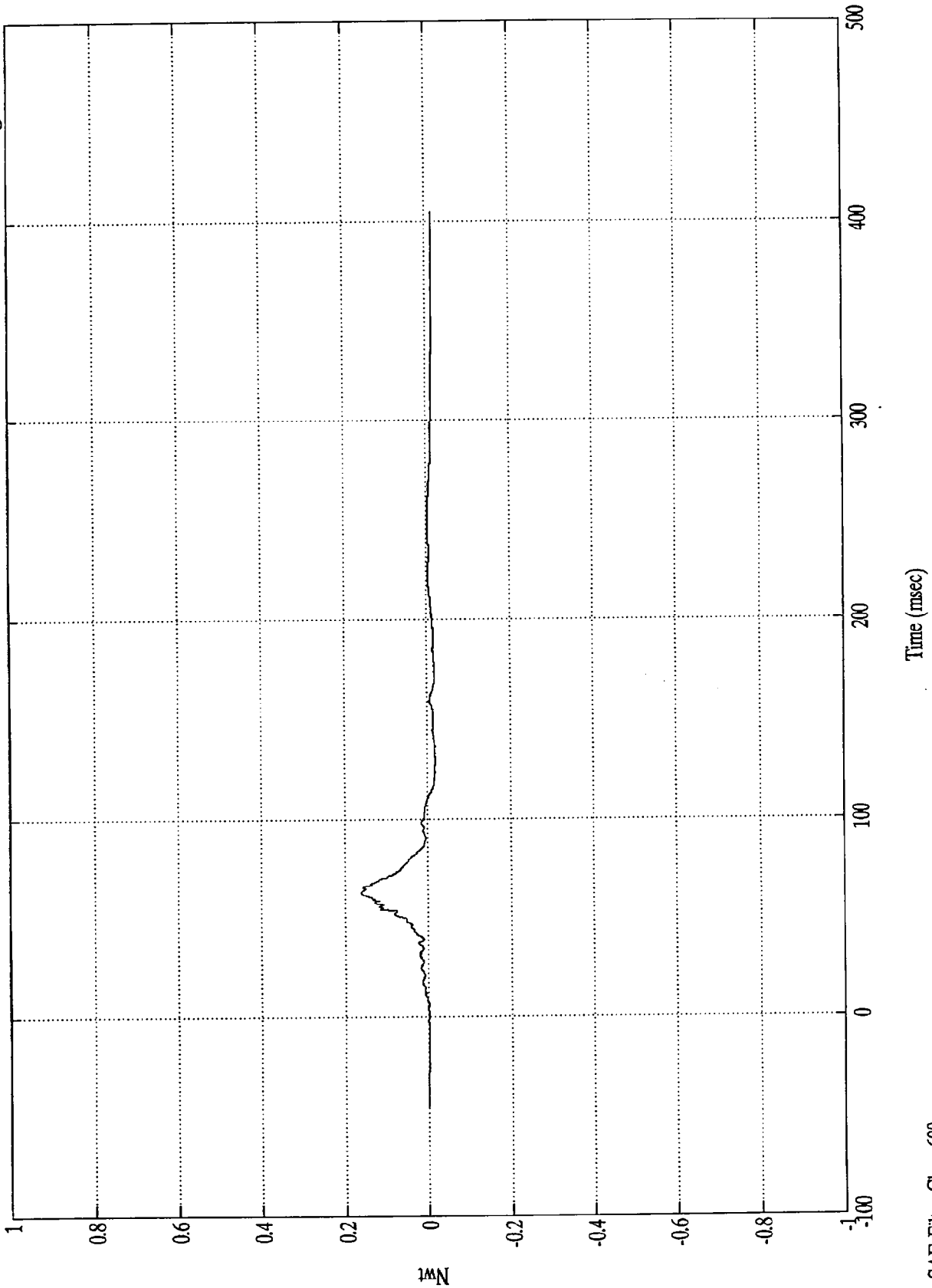
SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

P1 Rt Lower Tibia Fx

Max = 1614.04 Nwt @ 63.23 msec
Min = -200.43 Nwt @ 128.52 msec



Nwt

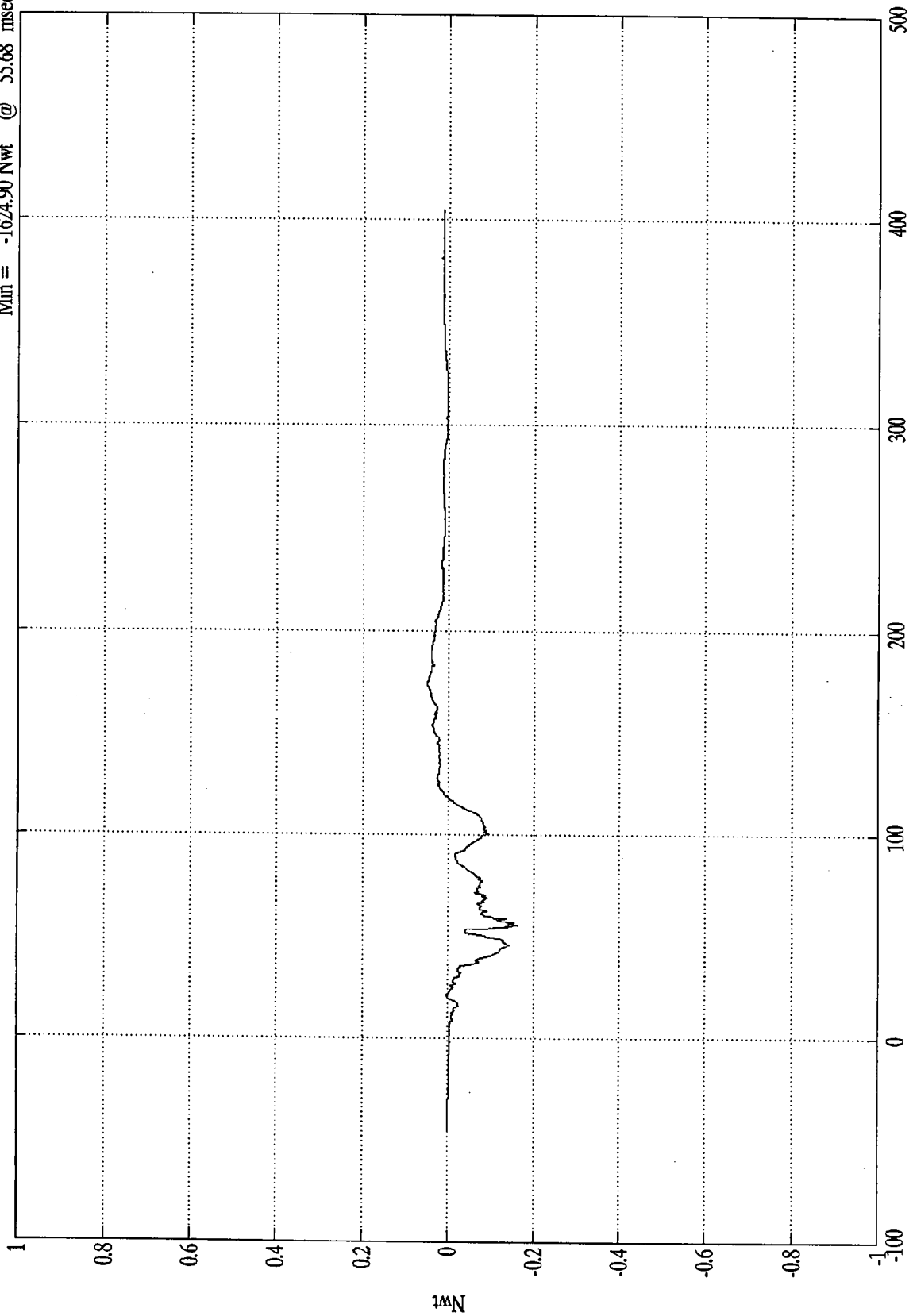
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Max = 495.05 Nwt @ 173.76 msec
Min = -1624.90 Nwt @ 55.68 msec

P1 Rt Lower Tibia Fz



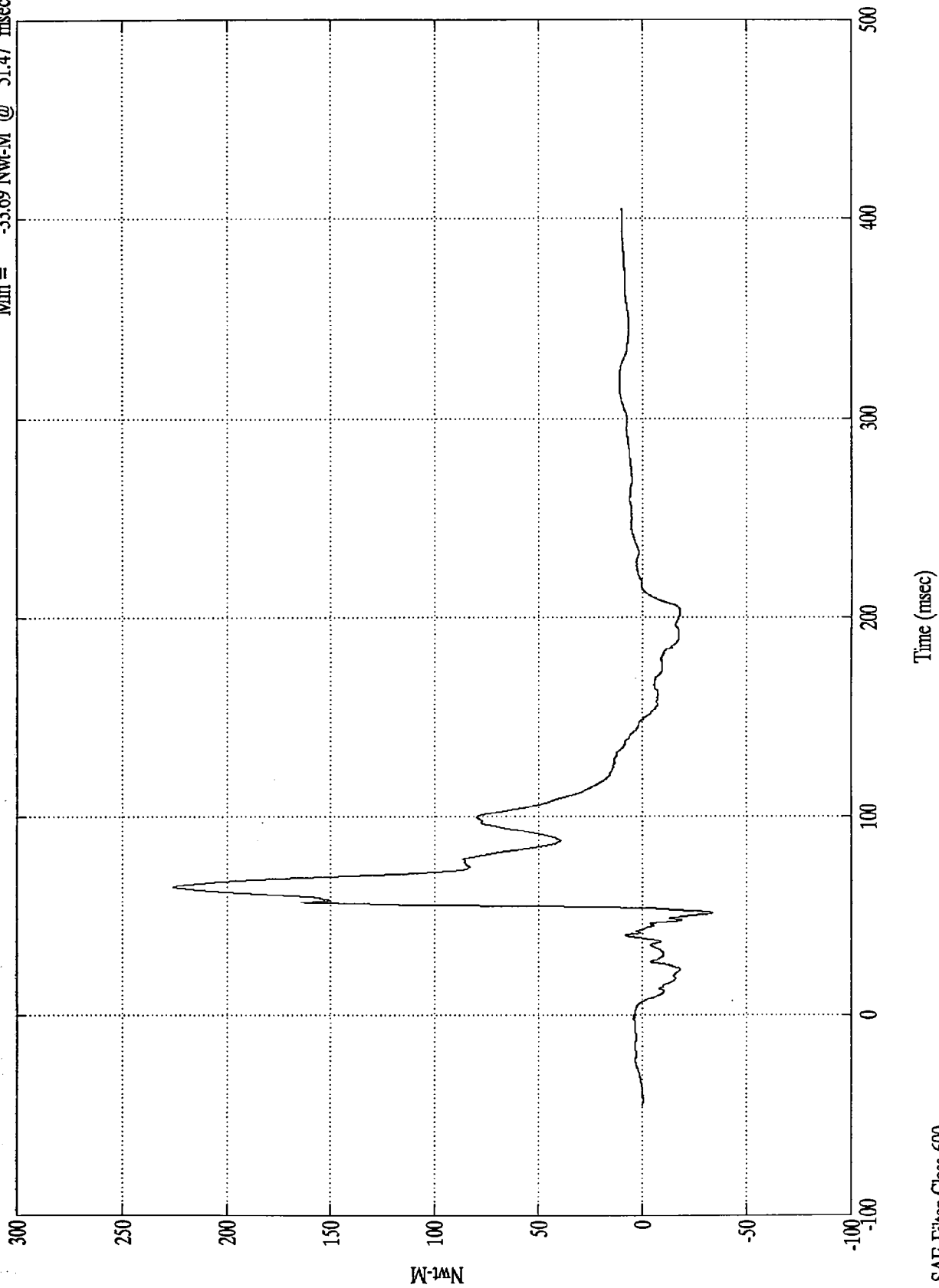
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

P1 Rt Lower Tibia My

Max = 225.68 Nwt-M @ 64.80 msec
Min = -33.69 Nwt-M @ 51.47 msec

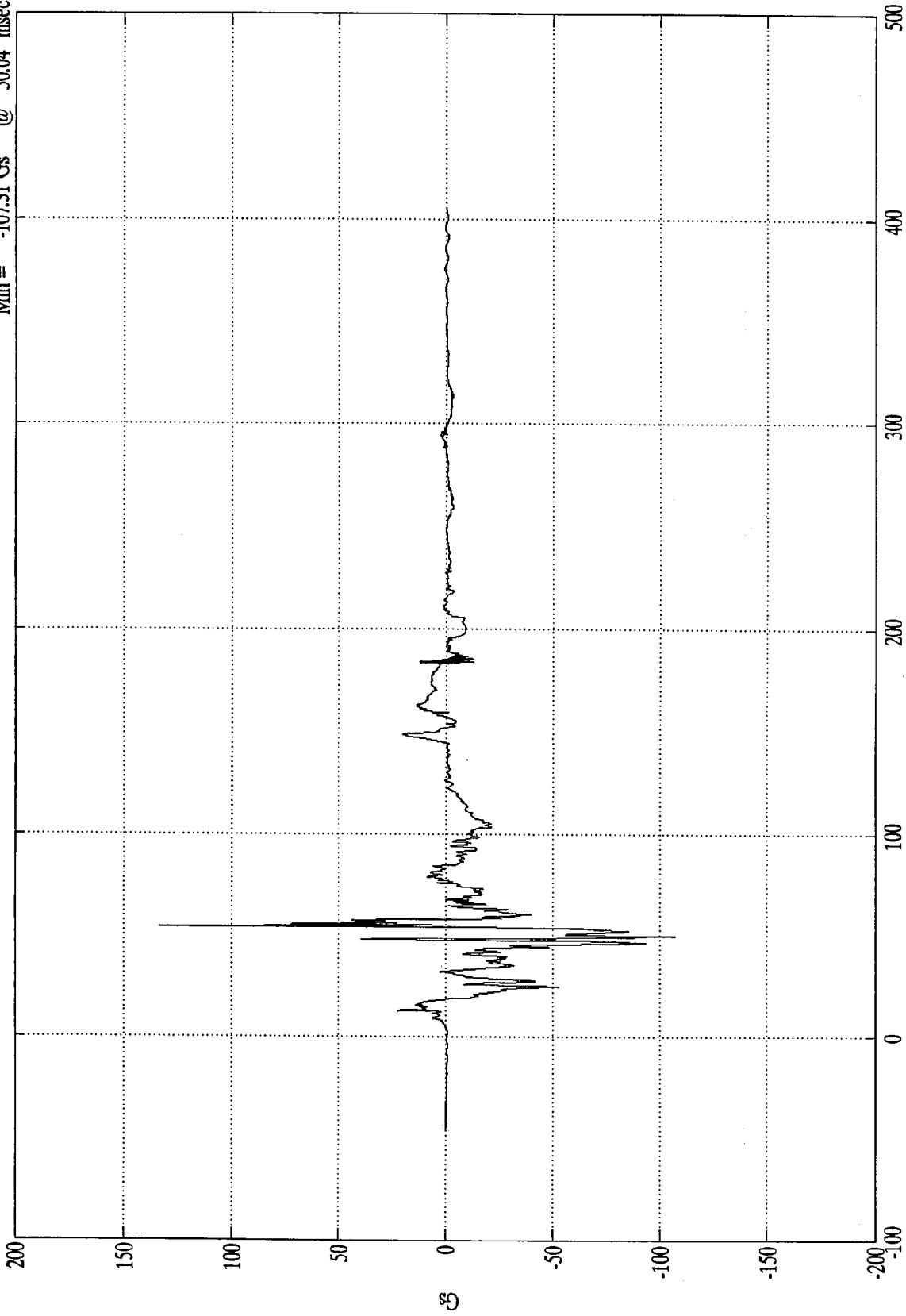


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 R. Foot Front Z

Max = 133.51 Gs @ 54.36 msec
Min = -107.31 Gs @ 50.04 msec



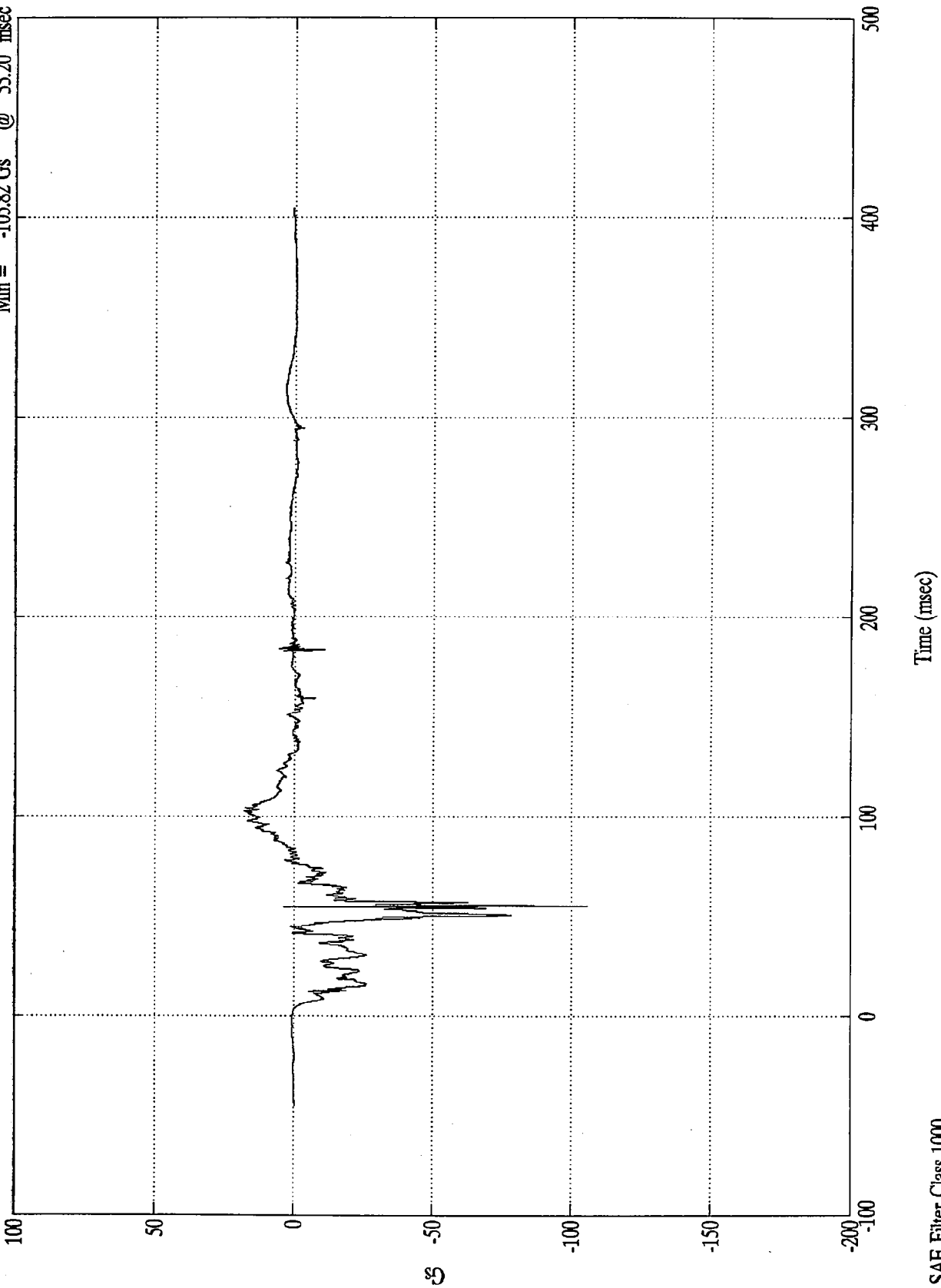
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 R.Foot Rear X

Max = 18.20 Gs @ 102.59 msec
Min = -105.82 Gs @ 55.20 msec

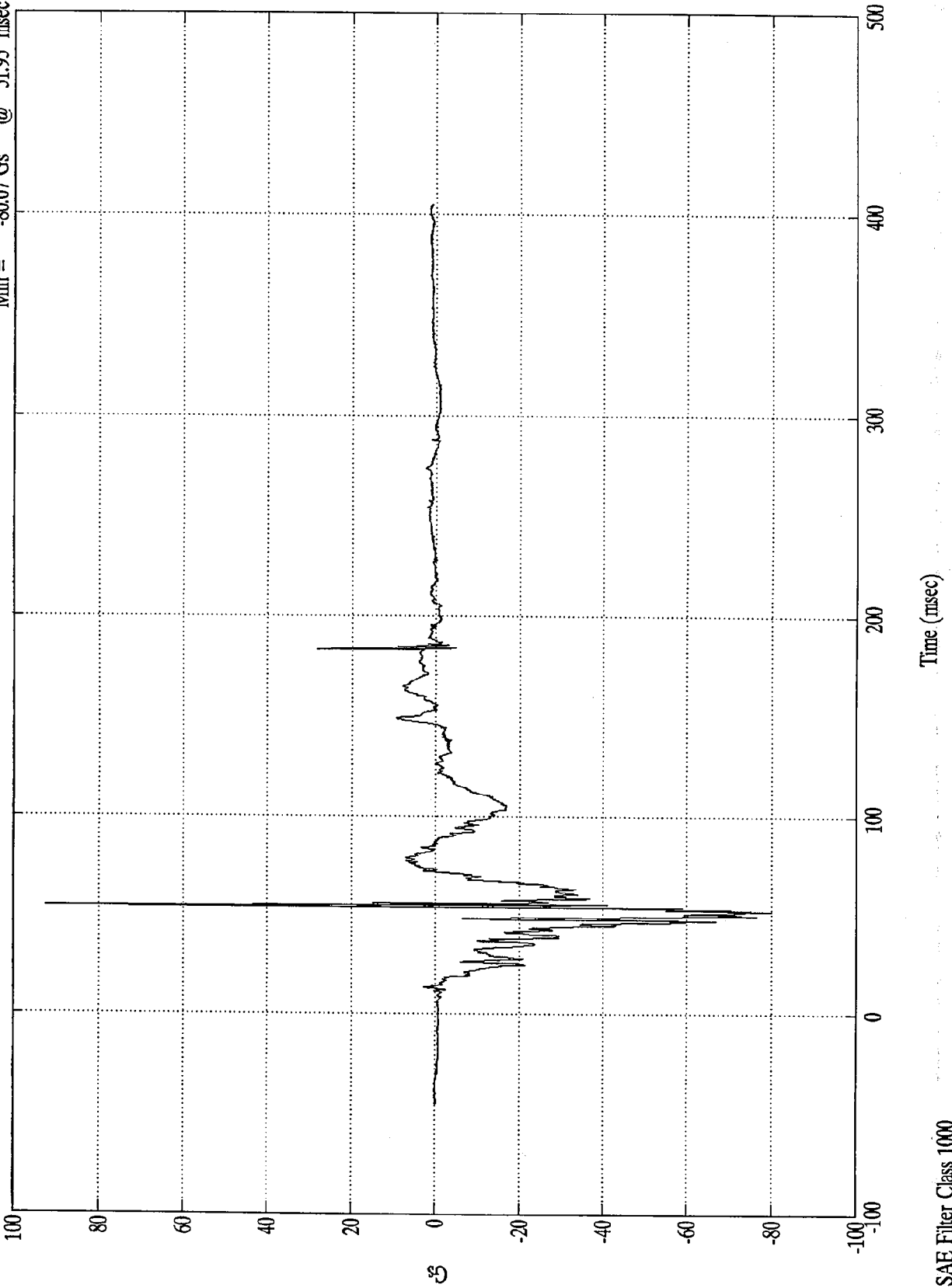


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 R.Foot Rear Z

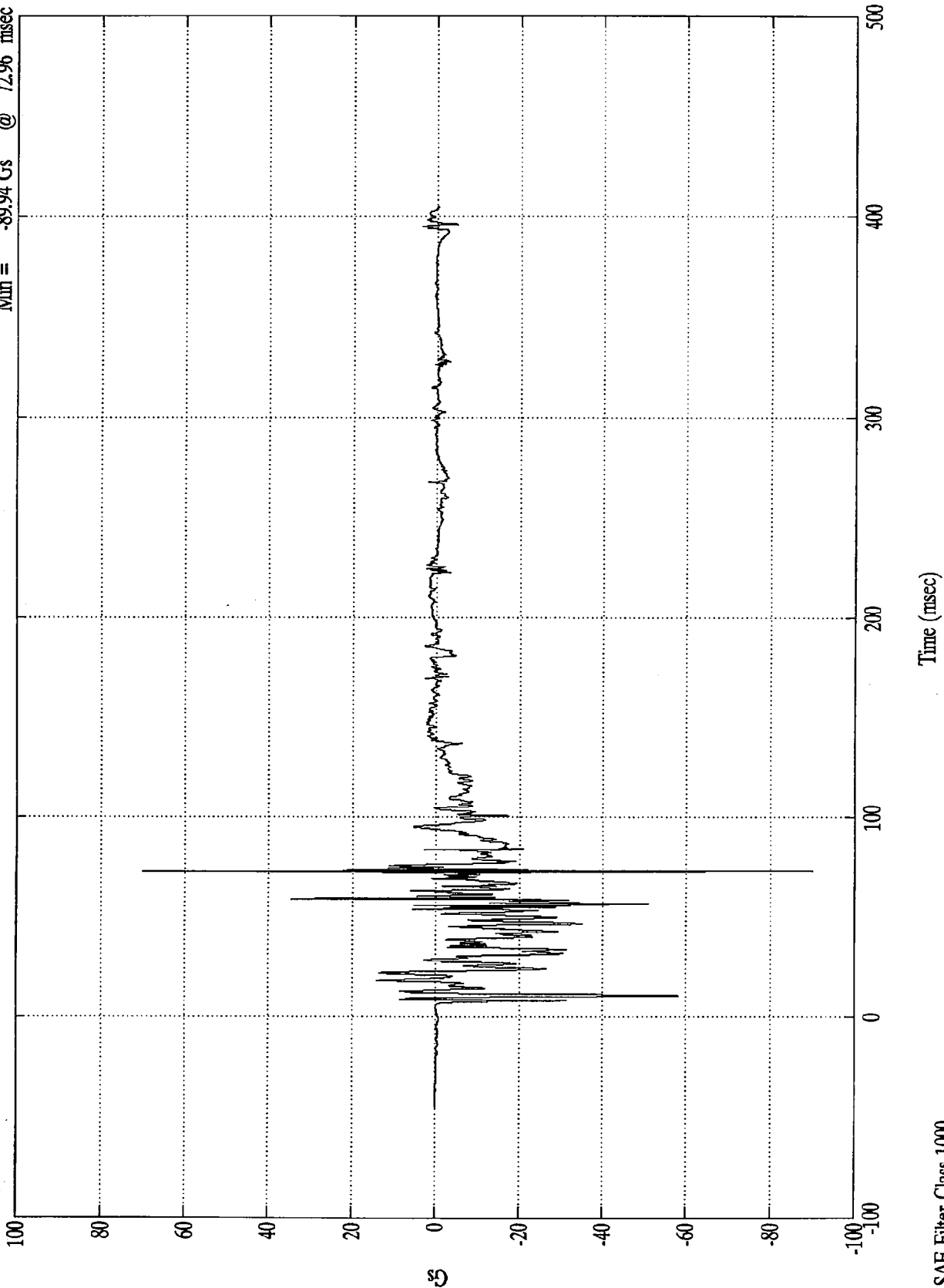
Max = 92.35 Gs @ 54.23 msec
Min = -80.07 Gs @ 51.95 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 L Foot Front Z

Max = 70.06 Gs @ 72.59 msec
Min = -89.94 Gs @ 72.96 msec

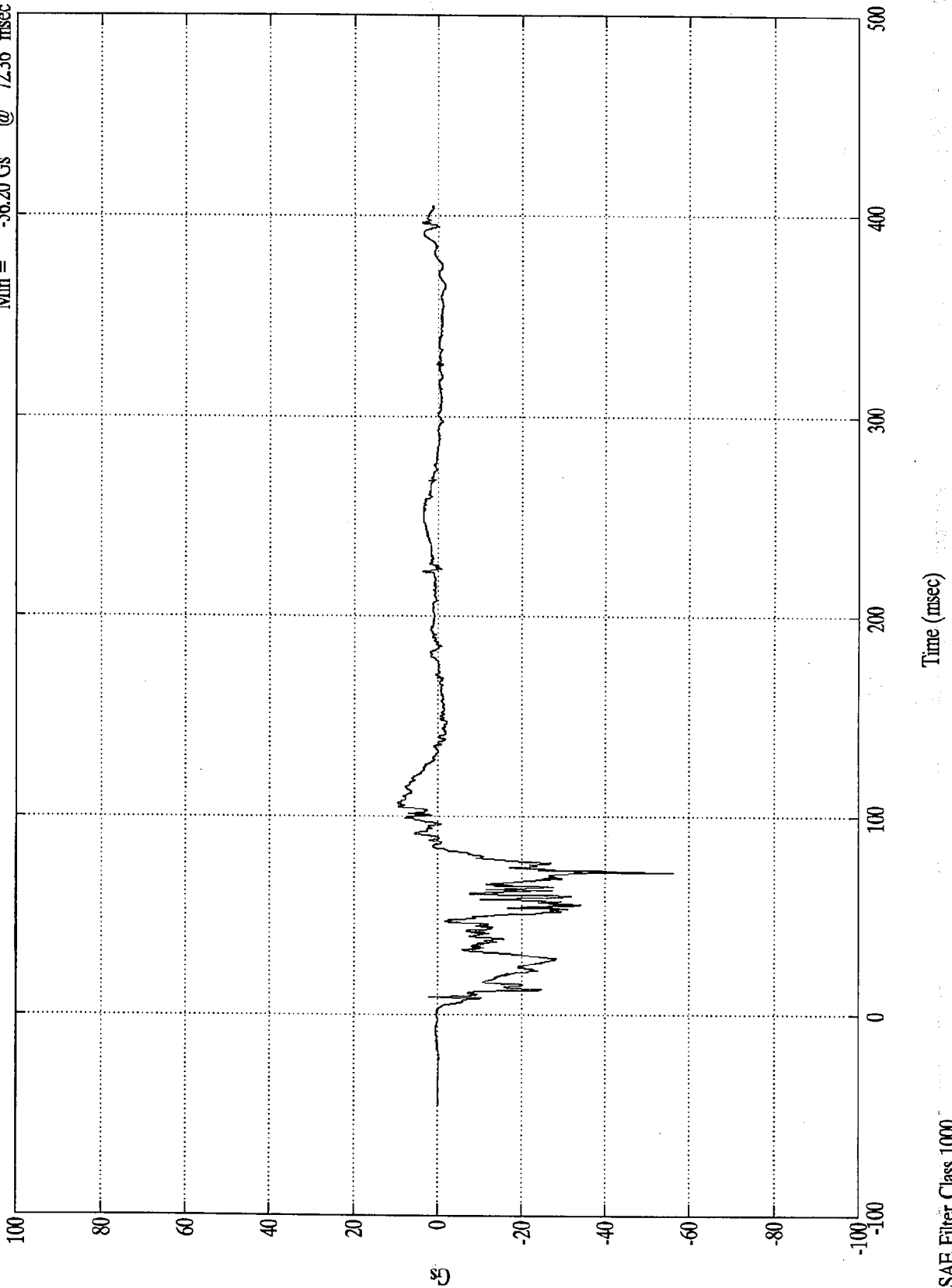


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 L. Foot Rear X

Max = 9.61 Gs @ 106.55 msec
Min = -56.20 Gs @ 72.36 msec

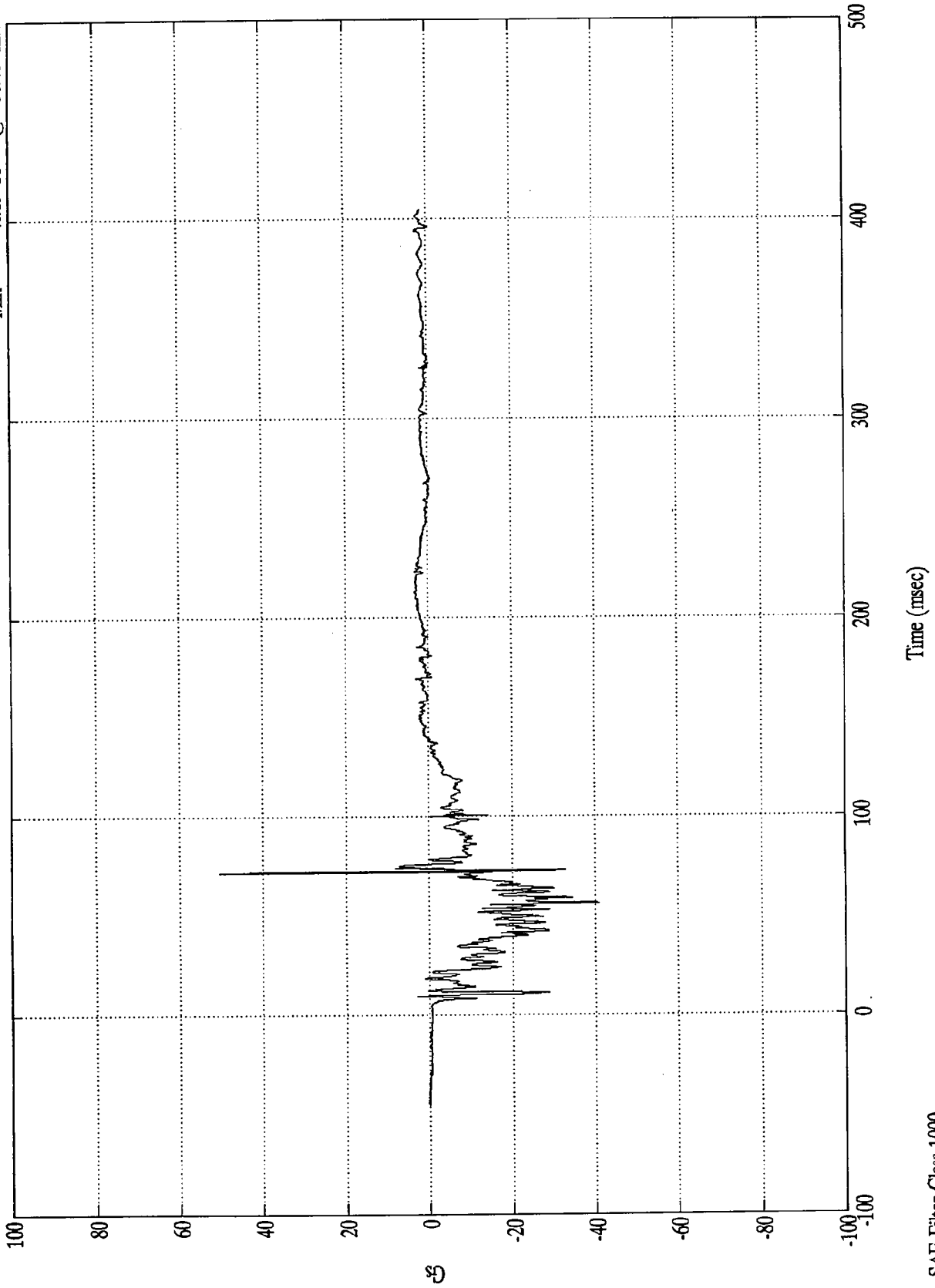


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 L. Foot Rear Z

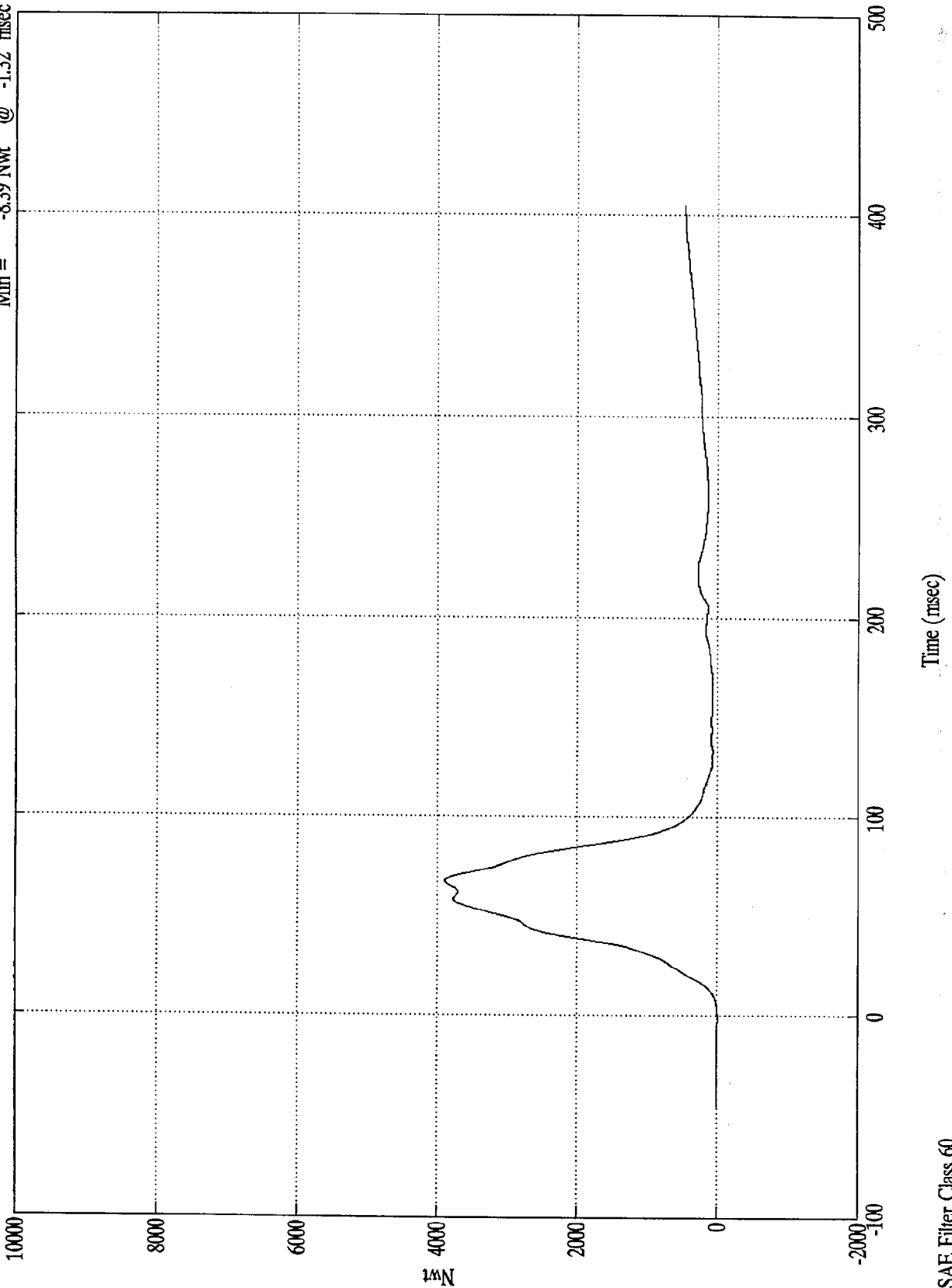
Max = 50.44 Gs @ 72.36 msec
Min = -40.89 Gs @ 56.40 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Left Belt Load

Max = 3894.47 Nwt @ 67.56 msec
Min = -8.39 Nwt @ -1.32 msec

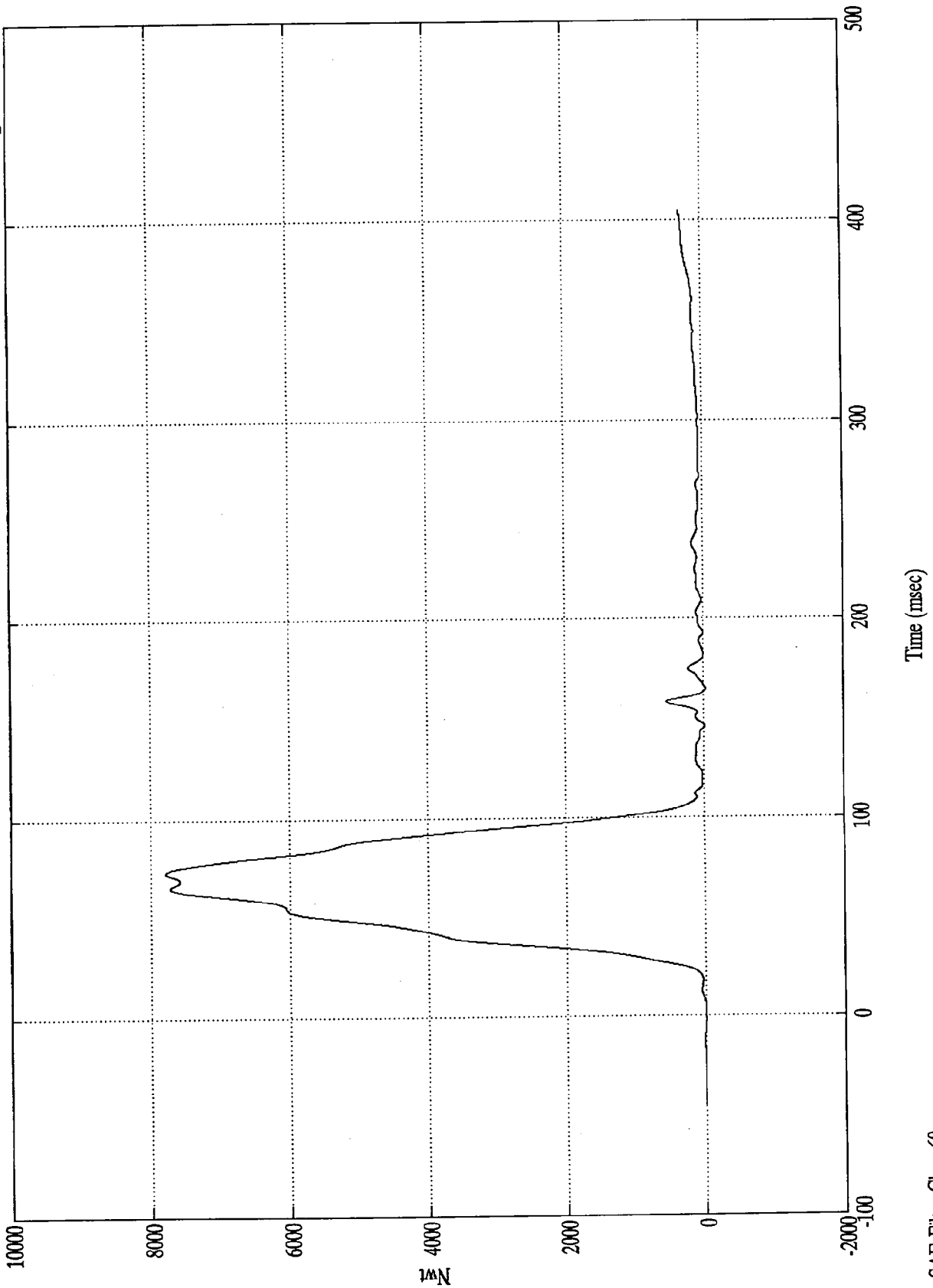


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Torso Belt Load

Max = 7793.02 Nwt @ 73.68 msec
Min = -22.46 Nwt @ 164.27 msec

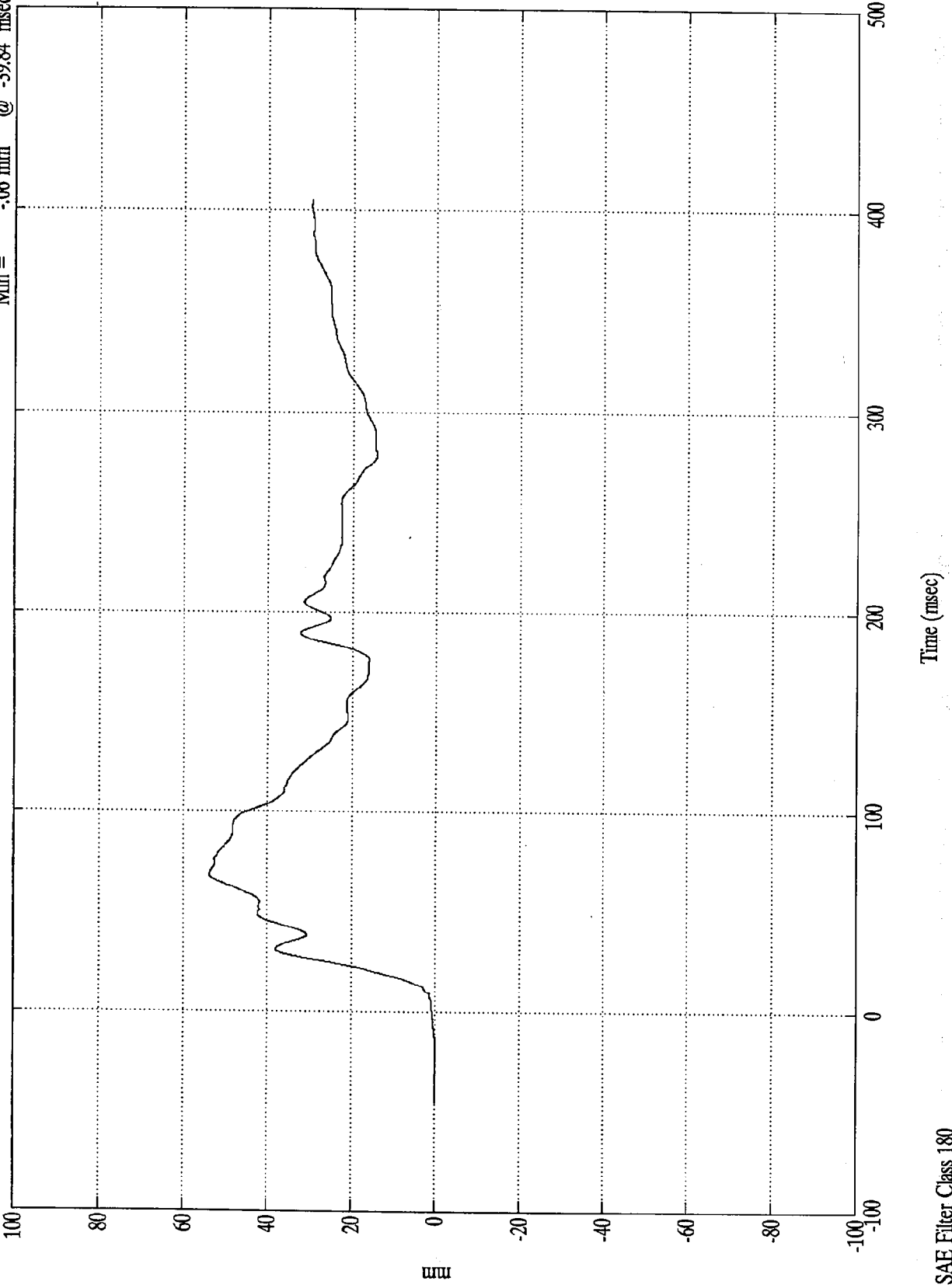


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Belt Spool Out

Max = 53.87 mm @ 68.28 msec
Min = -0.06 mm @ -39.84 msec

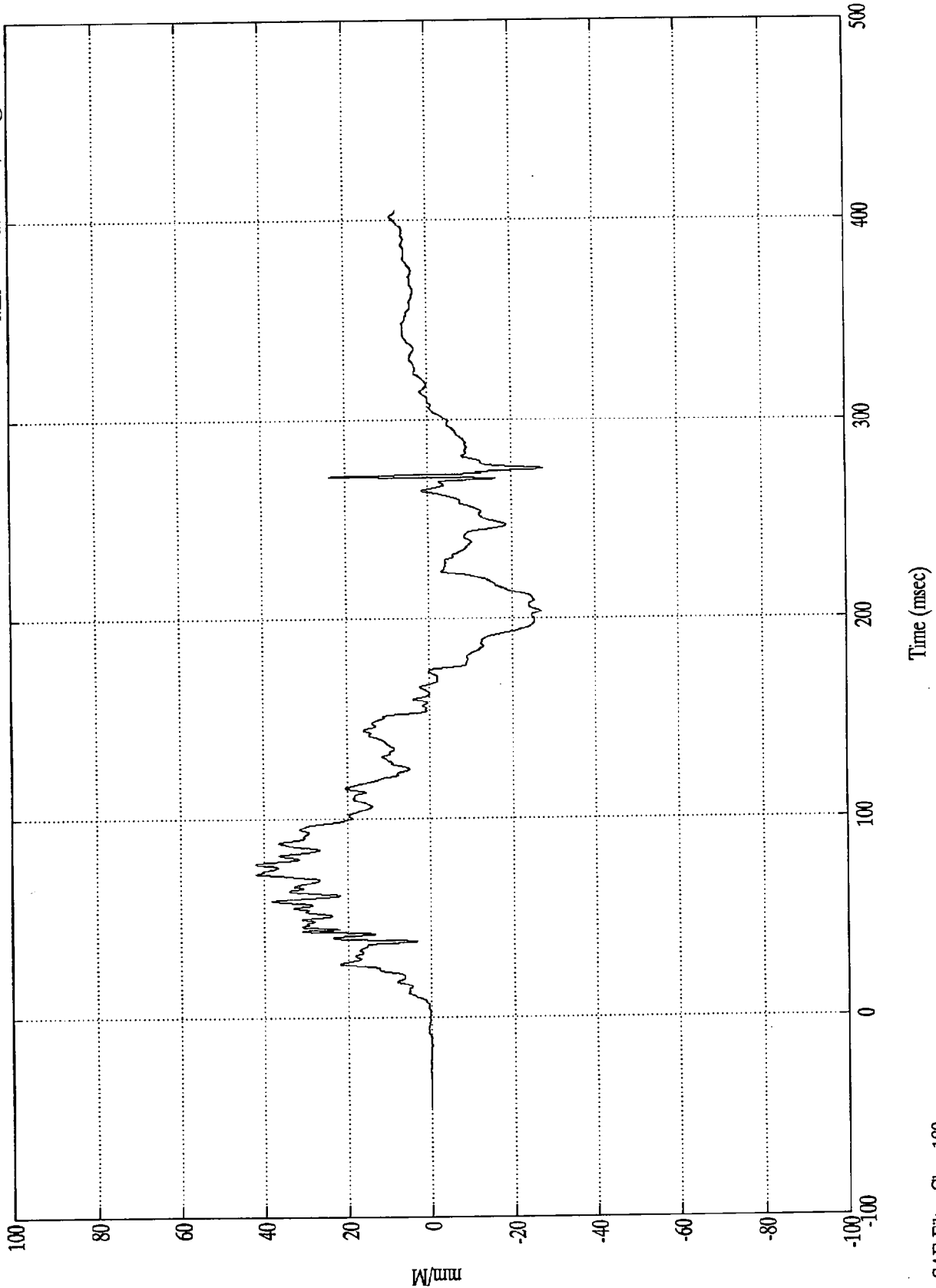


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 1 Belt Elongation

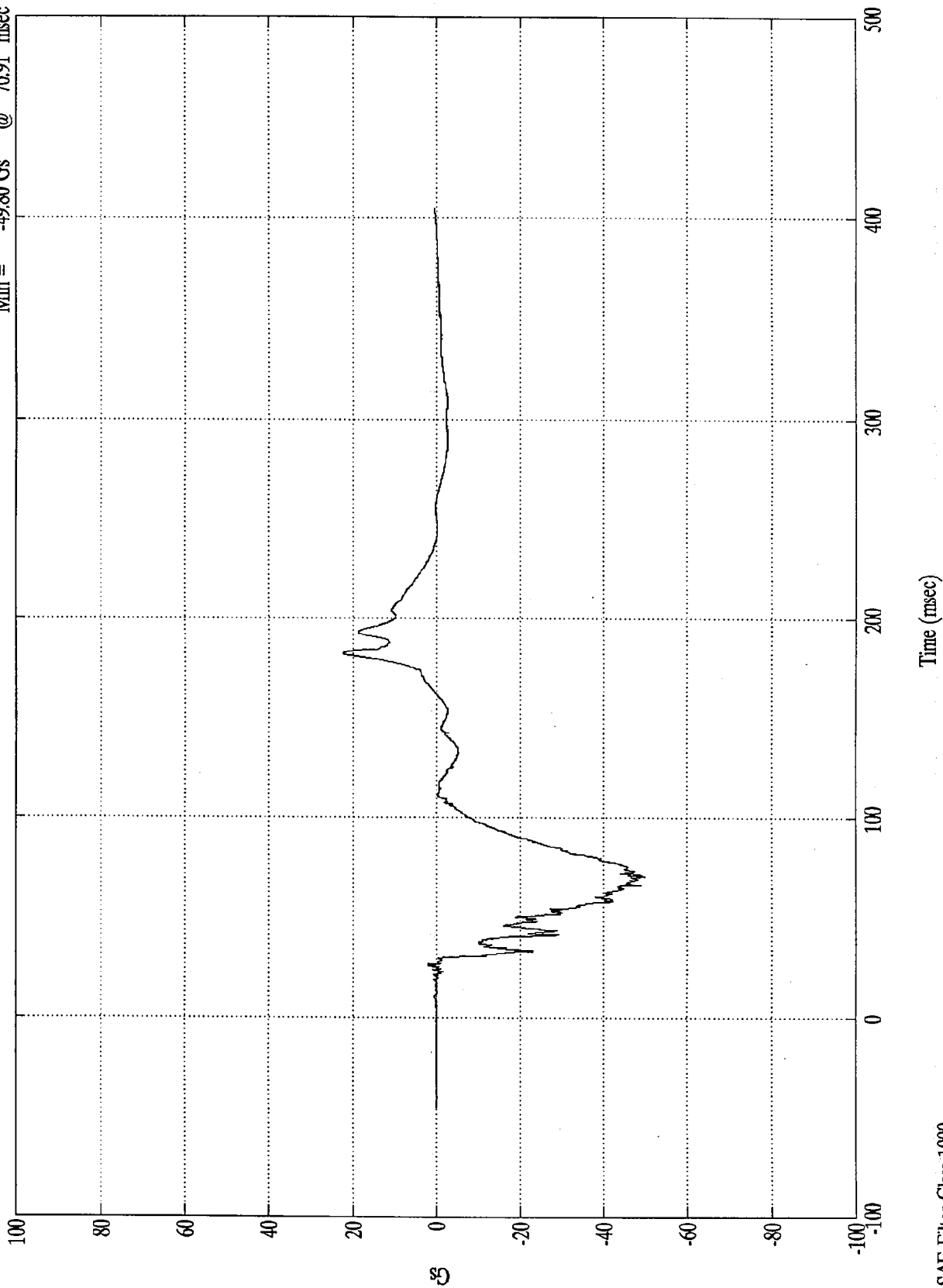
Max = 42.19 mm/M @ 72.12 msec
Min = -27.72 mm/M @ 275.40 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head X

Max = 22.37 Gs @ 182.27 msec
Min = -49.80 Gs @ 70.91 msec

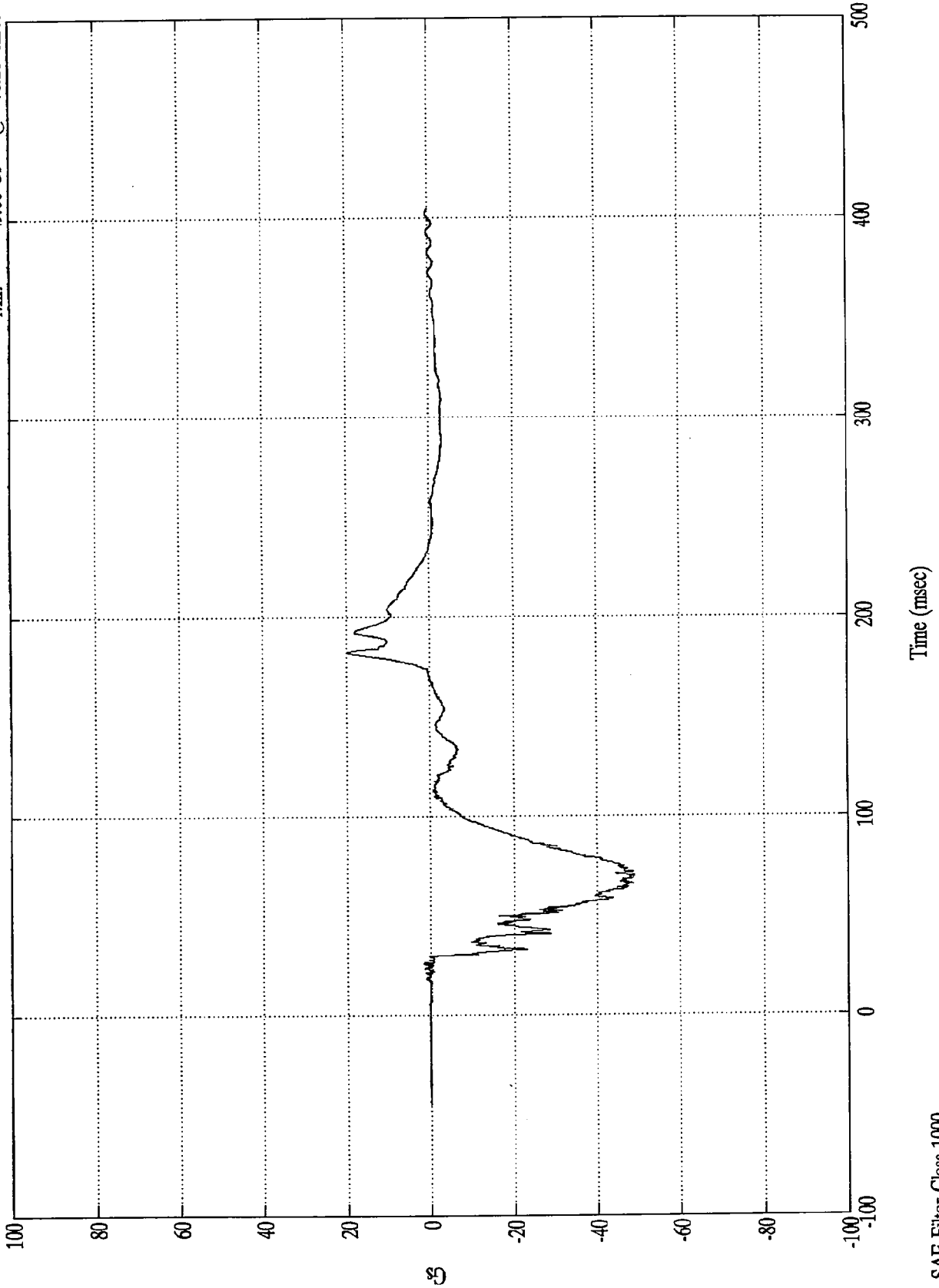


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head X(R)

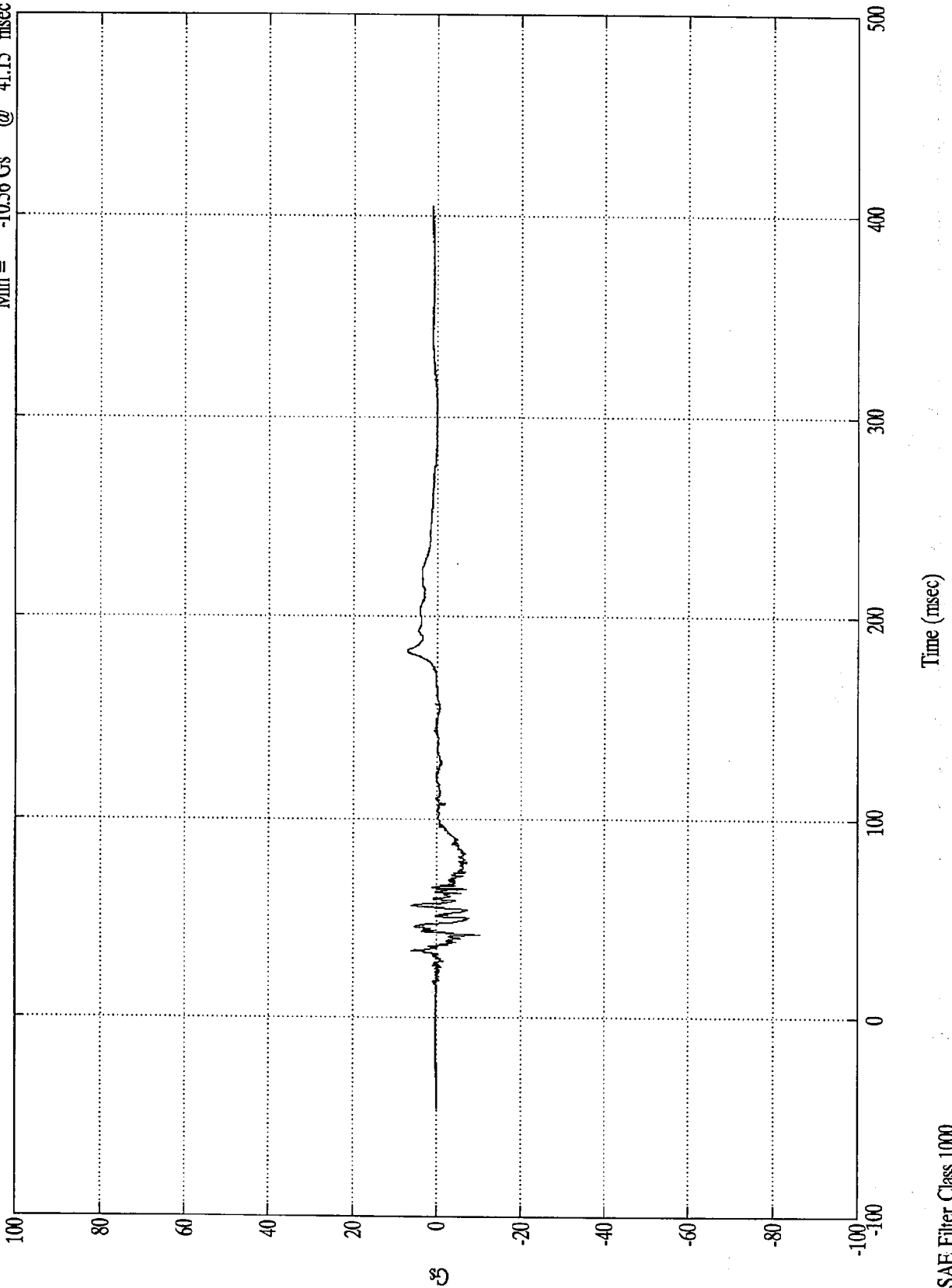
Max = 19.74 Gs @ 182.40 msec.
Min = -49.00 Gs @ 70.20 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head Y

Max = 7.06 Gs @ 183.12 msec
Min = -10.56 Gs @ 41.15 msec

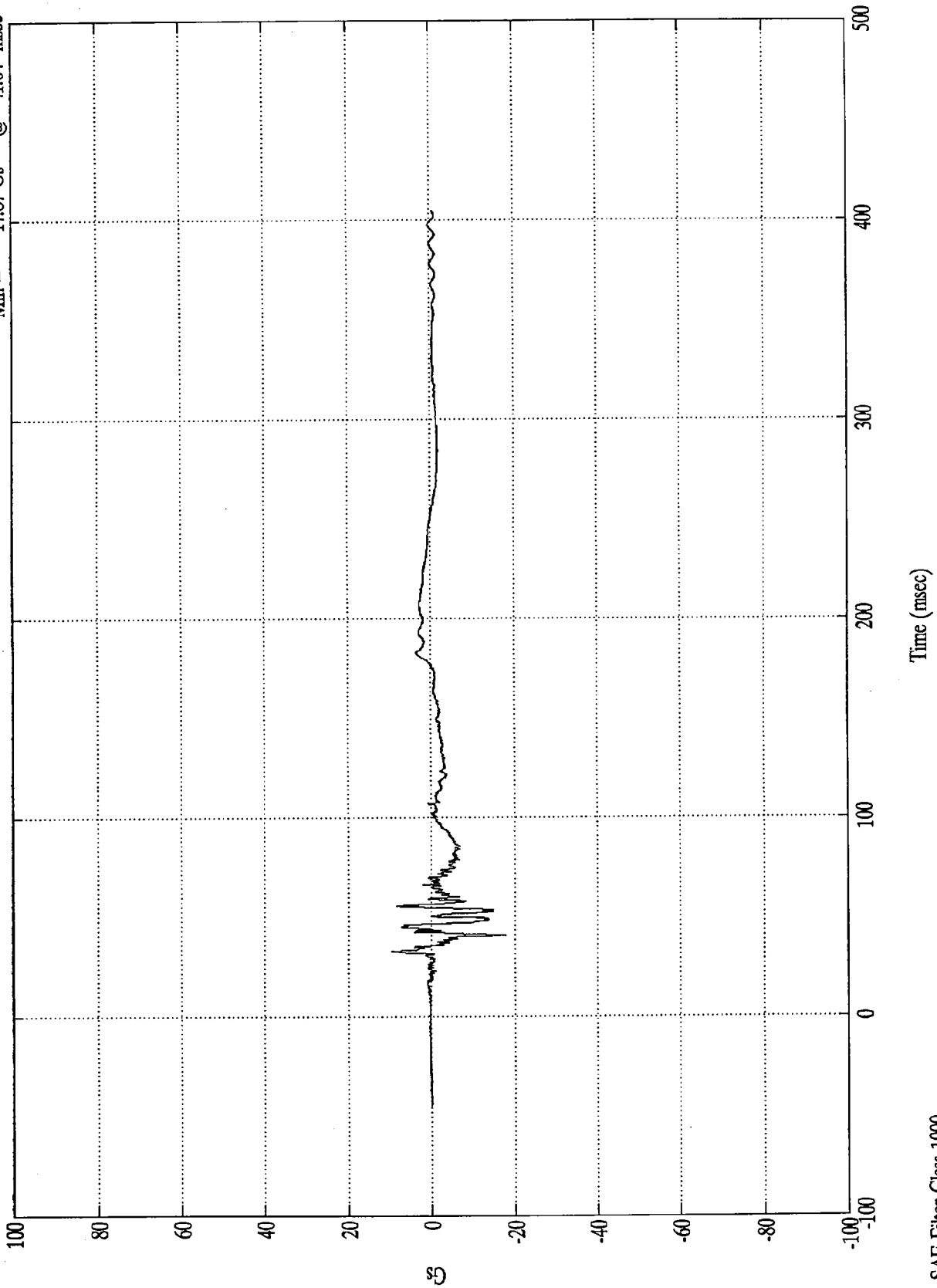


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head Y(R)

Max = 9.67 Gs @ 33.24 msec
Min = -17.87 Gs @ 41.04 msec

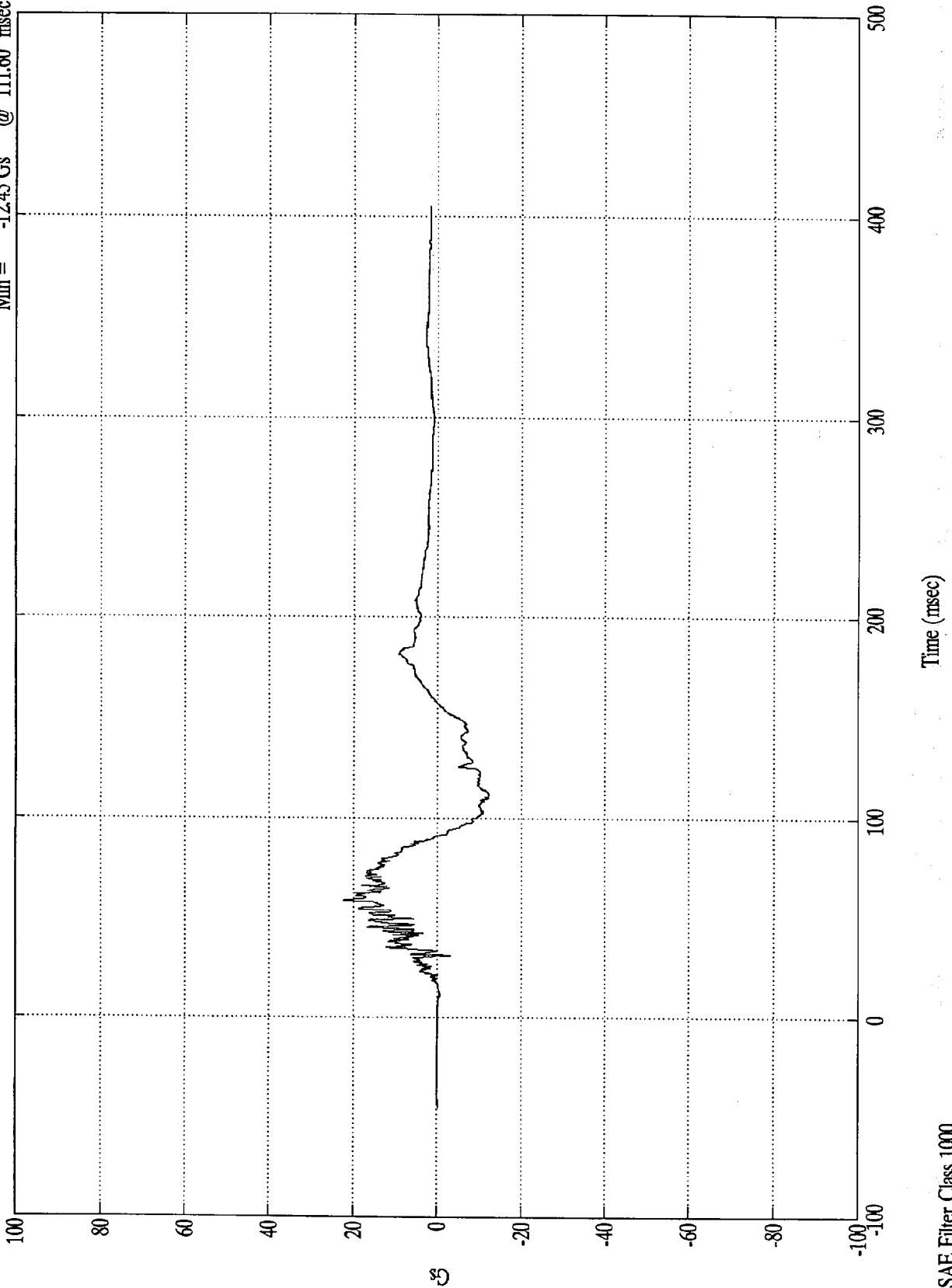


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head Z

Max = 22.46 Gs @ 58.68 msec
Min = -12.45 Gs @ 111.60 msec

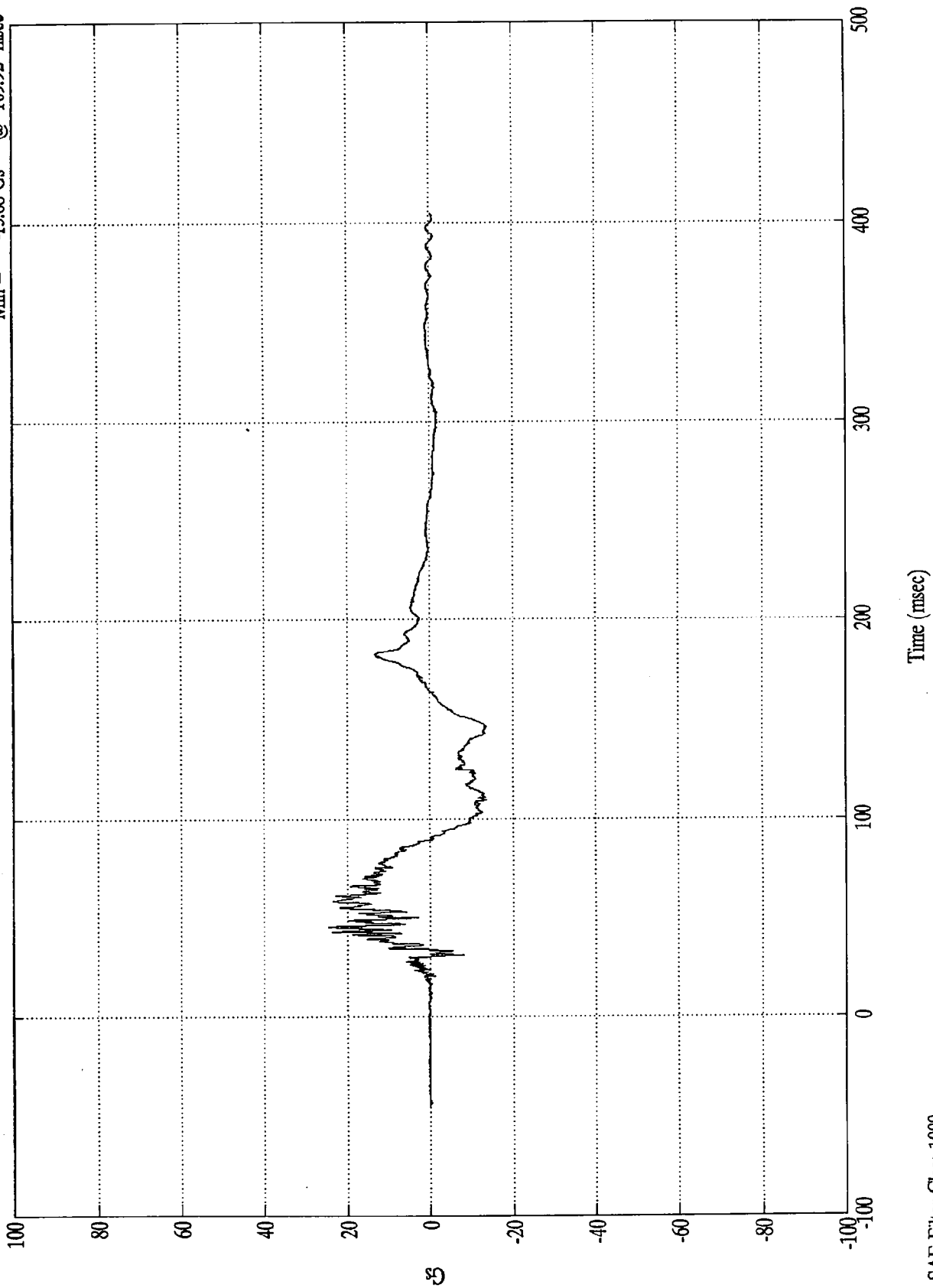


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head Z(R)

Max = 24.65 Gs @ 45.36 msec
Min = -13.68 Gs @ 109.92 msec

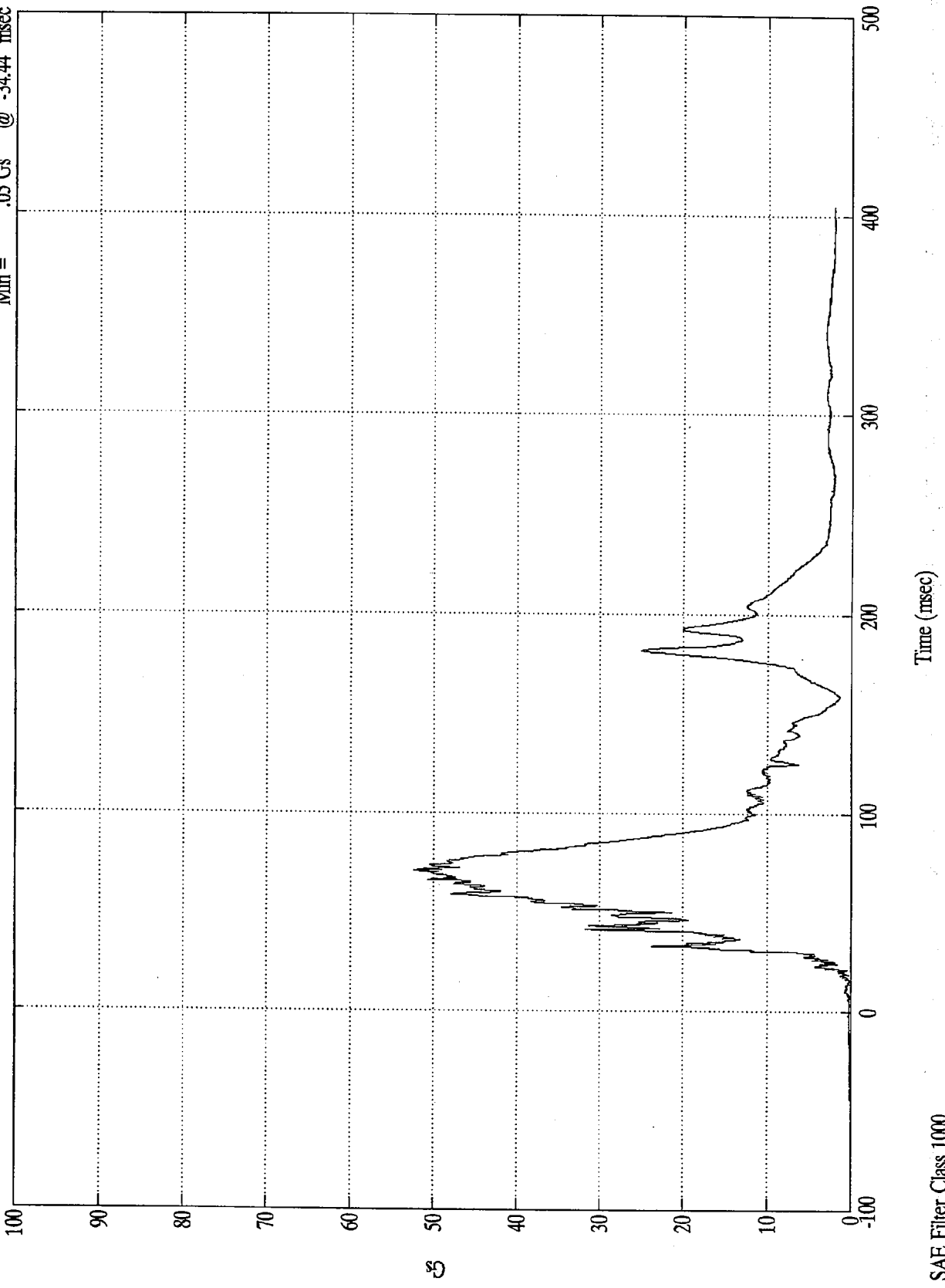


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head Resultant

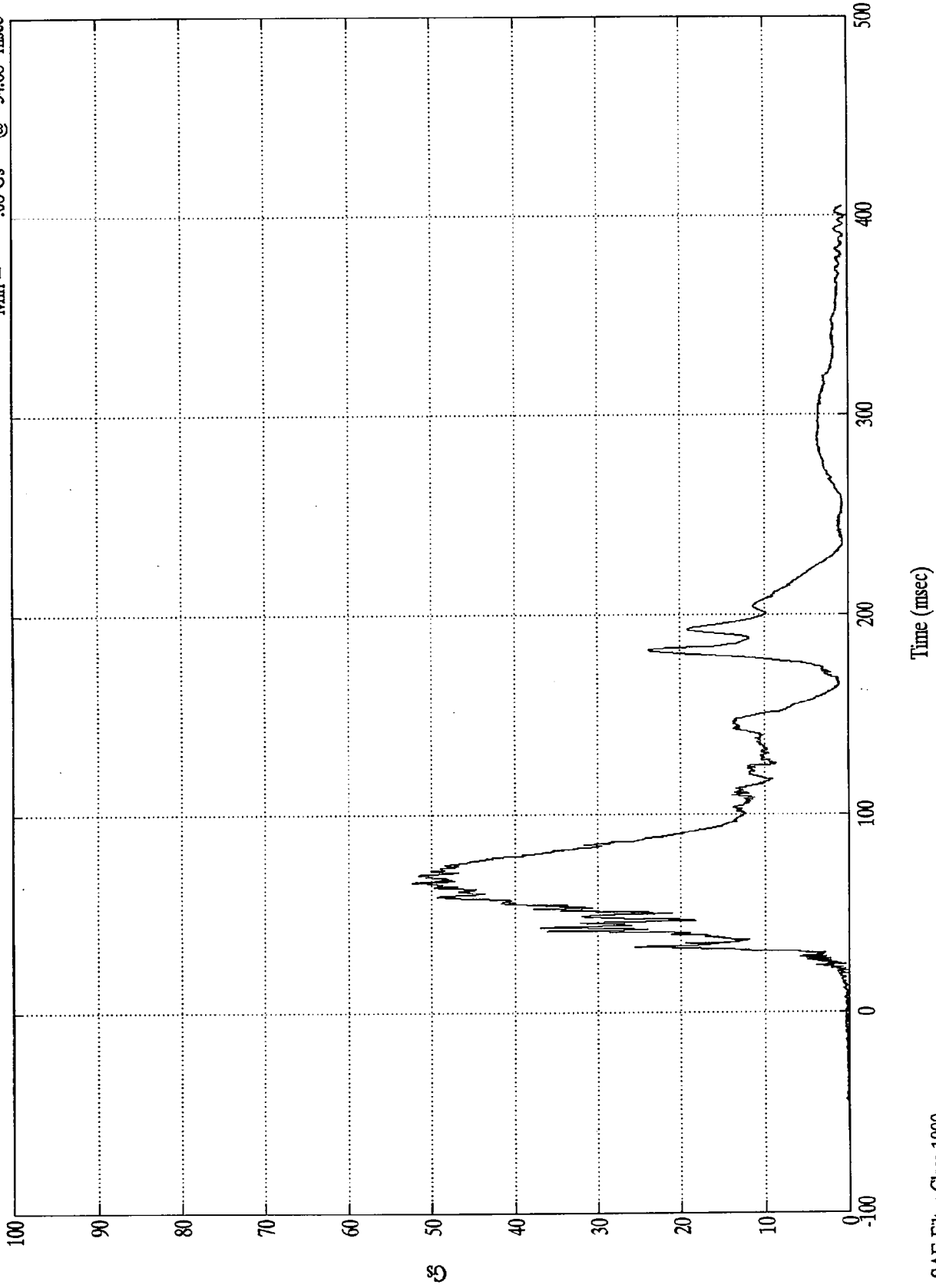
Max = 52.38 Gs @ 70.91 msec
Min = .05 Gs @ -34.44 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Head Resultant(RR)

Max = 52.40 Gs @ 66.23 msec
Min = .08 Gs @ -34.68 msec

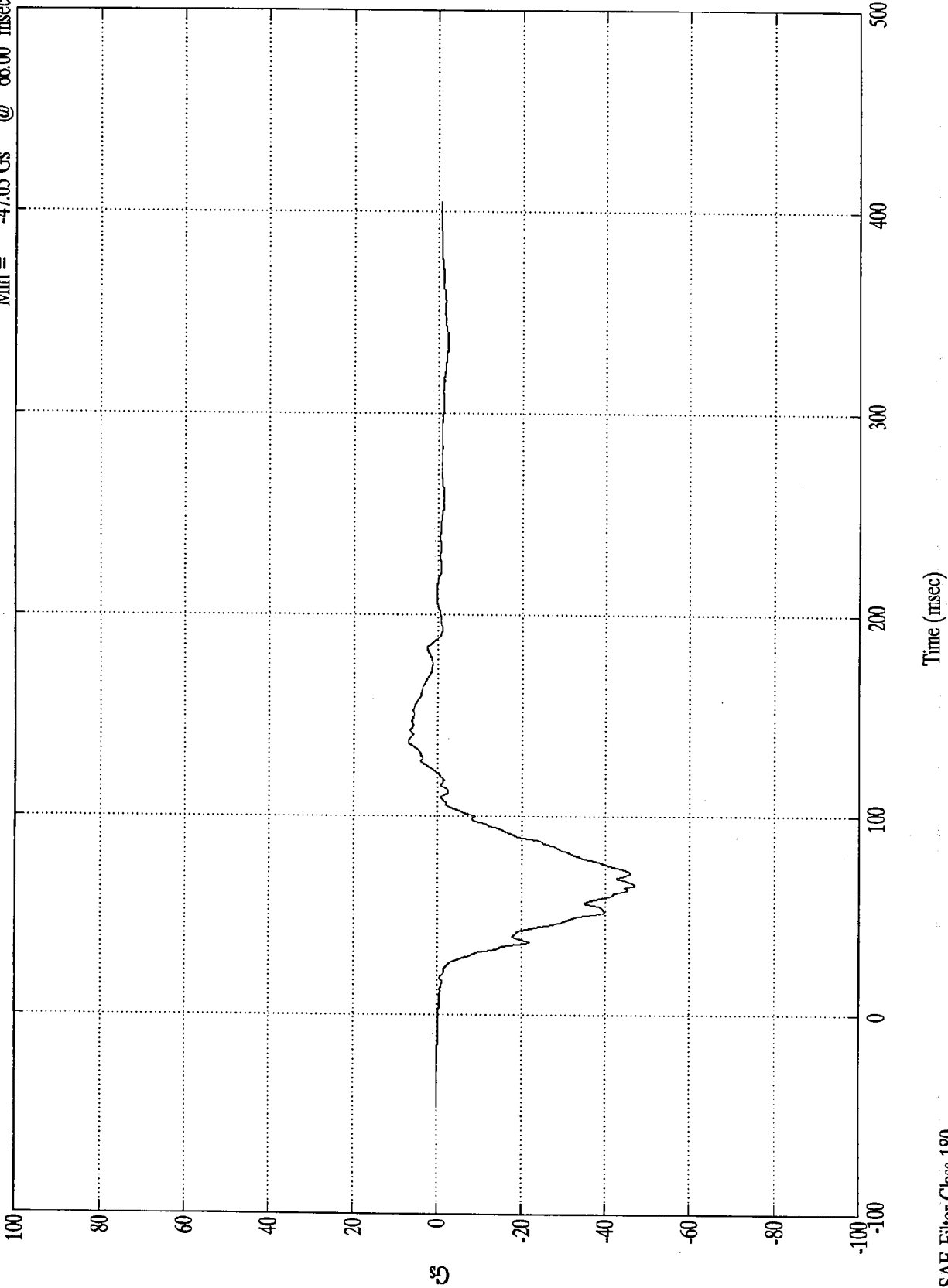


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest X

Max = 7.06 Gs @ 136.44 msec
Min = -47.05 Gs @ 66.00 msec

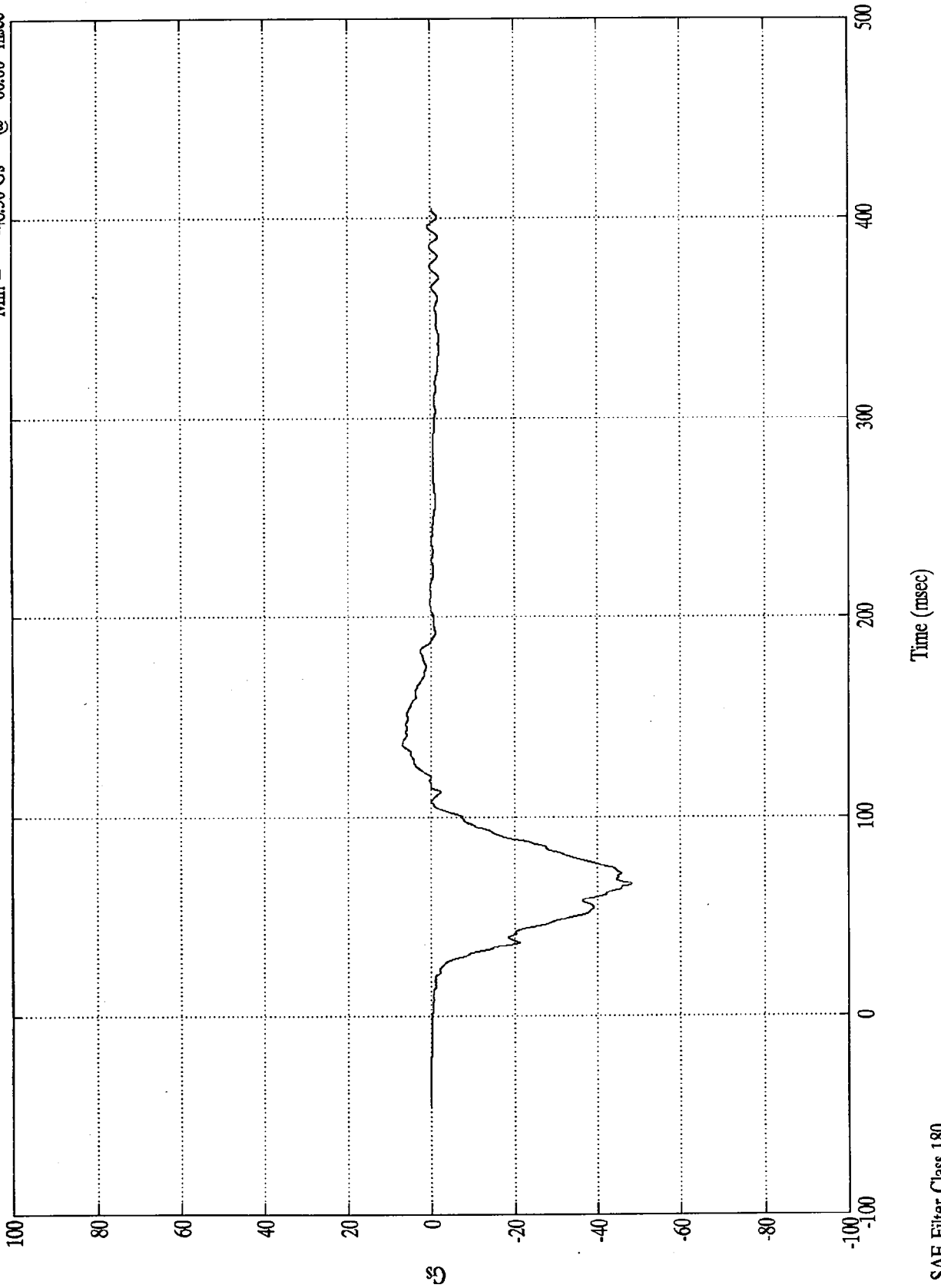


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest X(R)

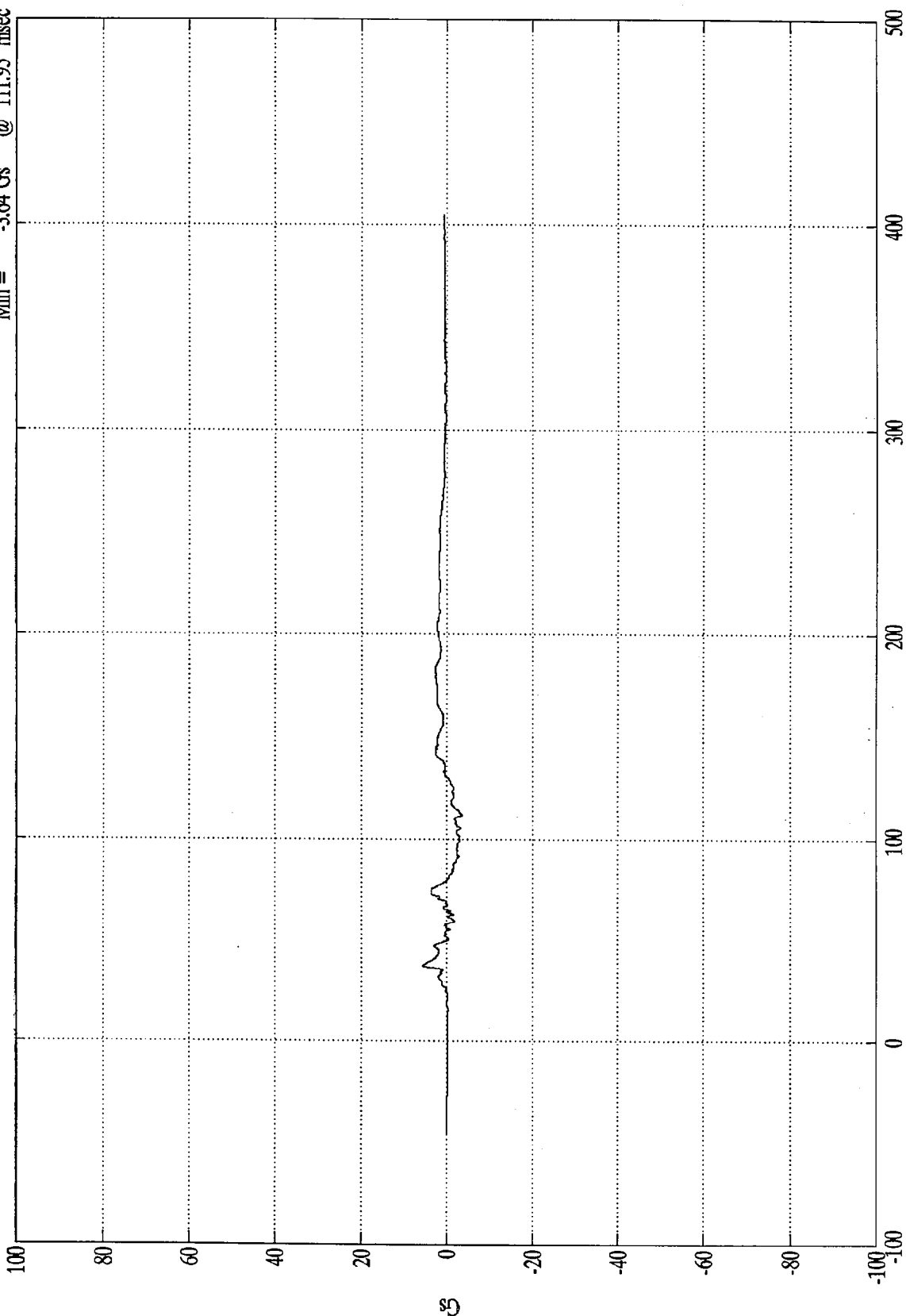
Max = 7.00 Gs @ 136.32 msec
Min = -48.30 Gs @ 66.00 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Y

Max = 5.56 Gs @ 37.20 msec
Min = -3.64 Gs @ 111.95 msec



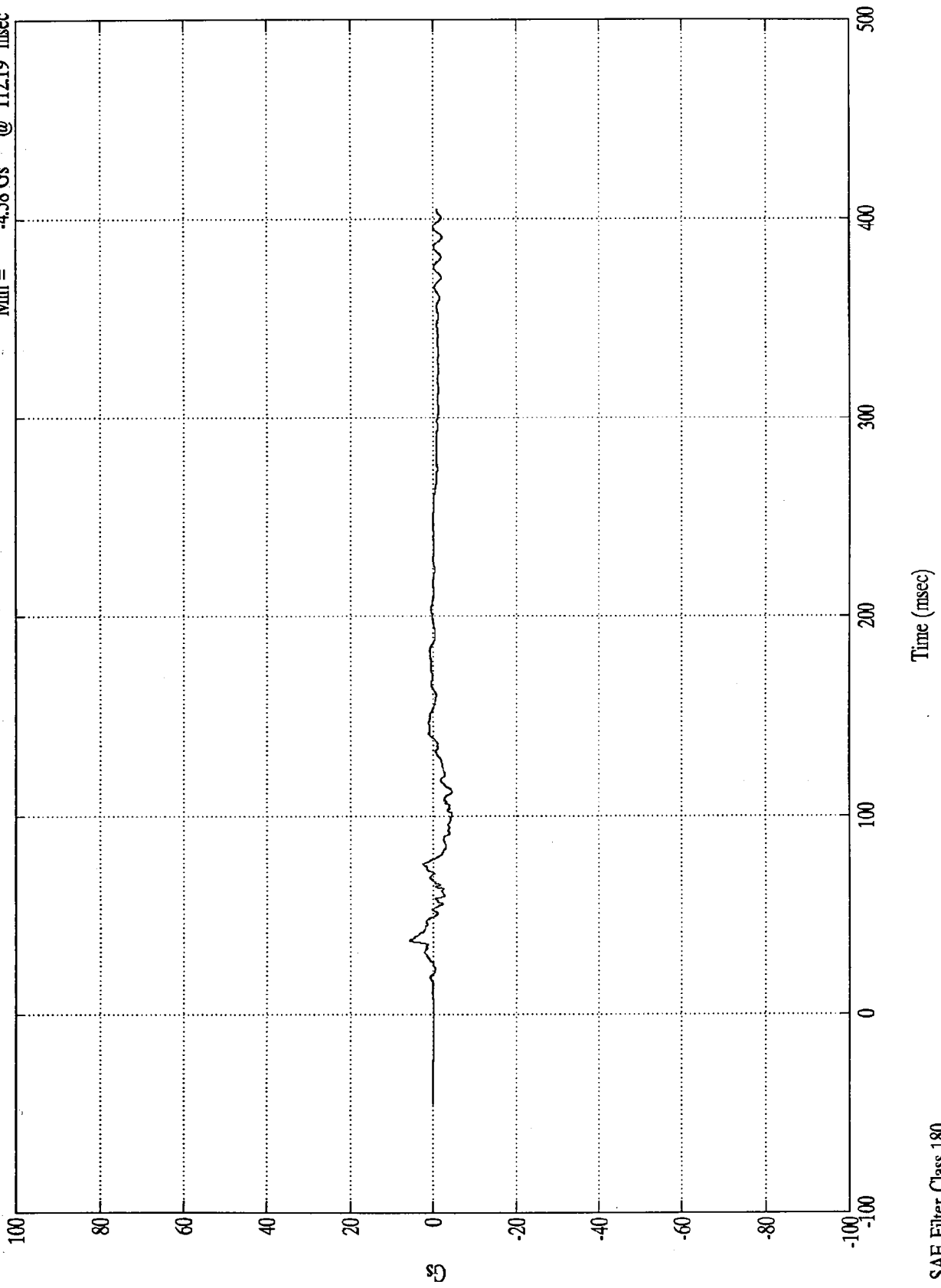
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Y(R)

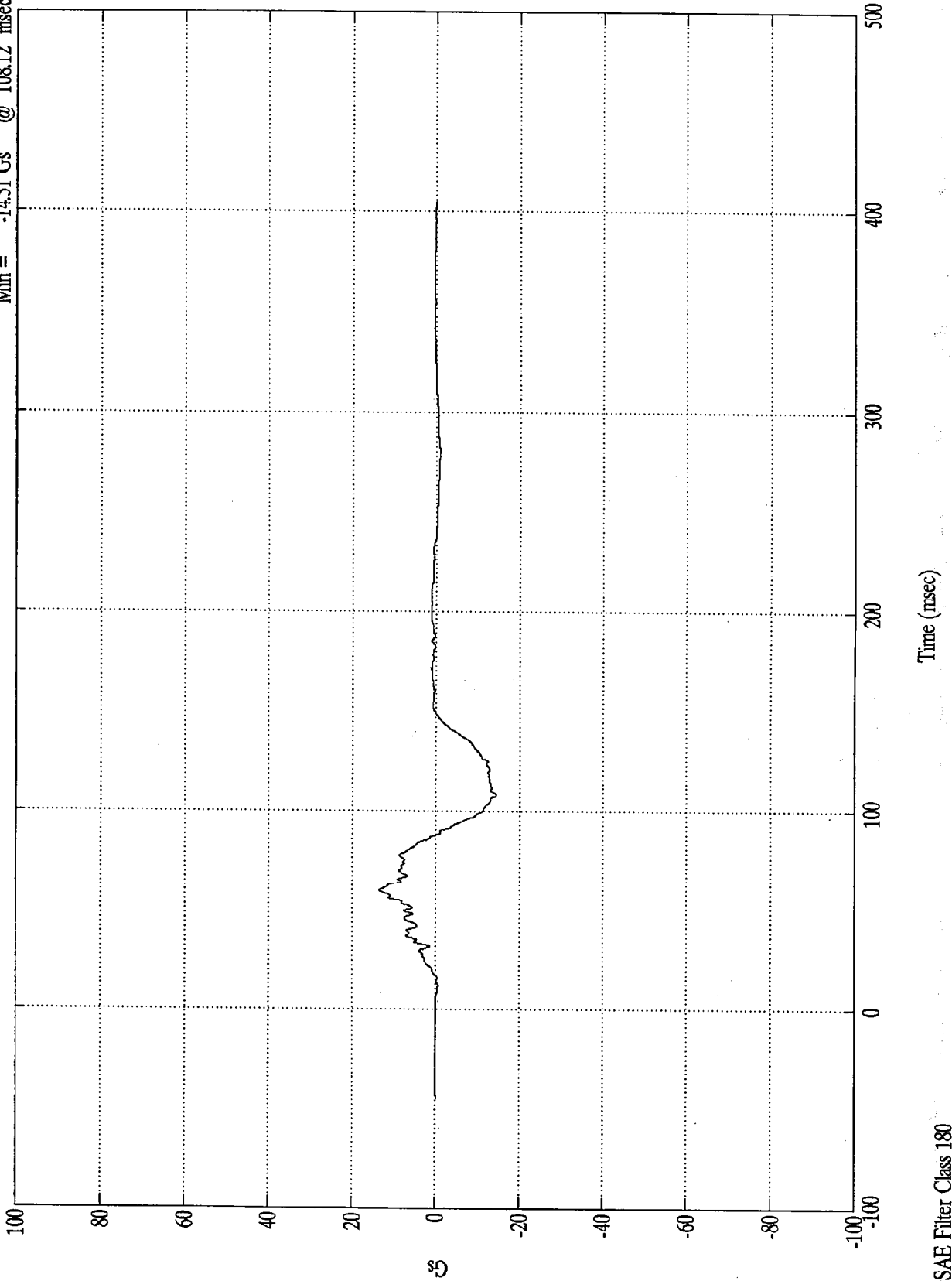
Max = 5.66 Gs @ 37.20 msec
Min = -4.58 Gs @ 112.19 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Z

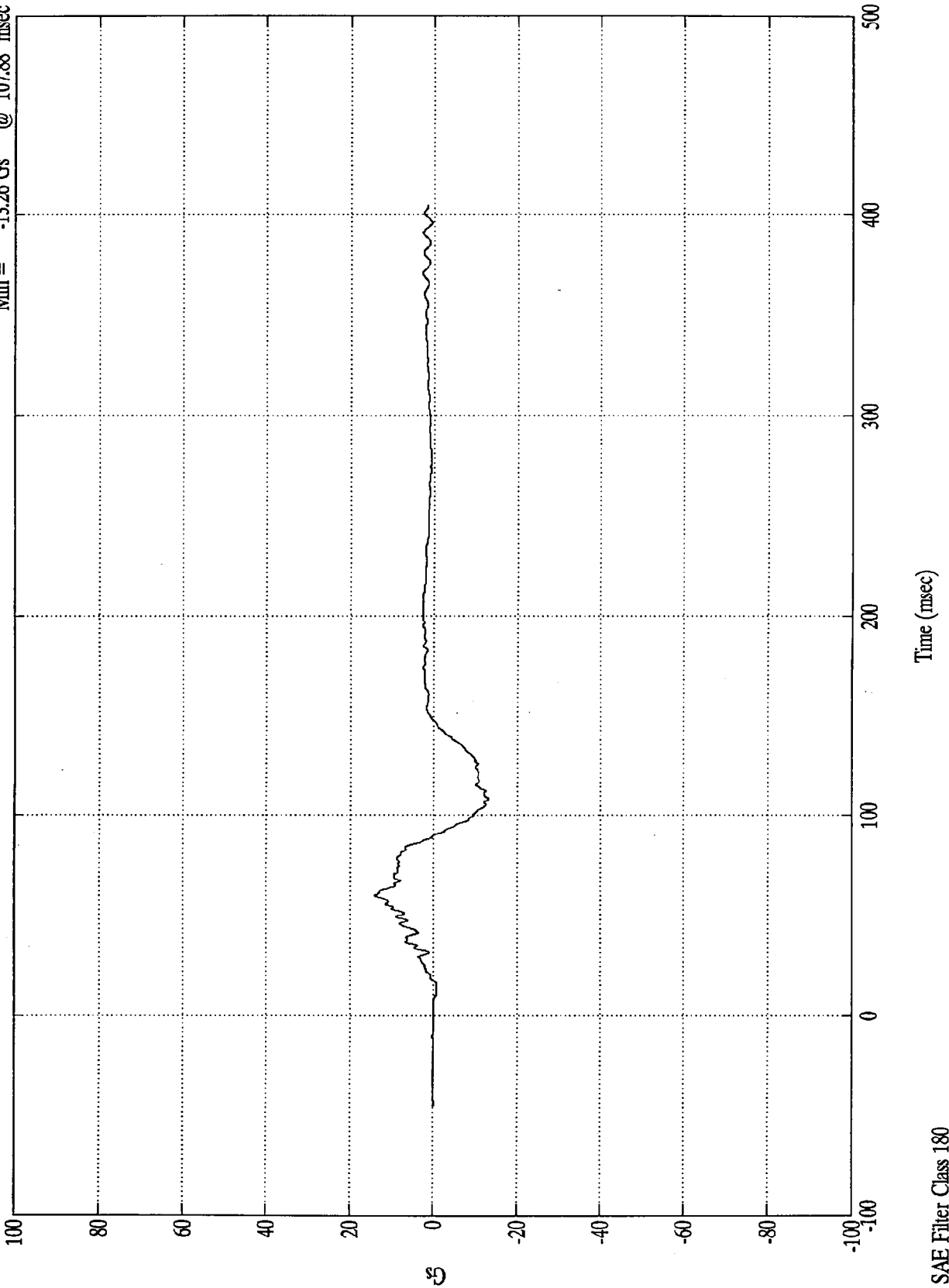
Max = 13.50 Gs @ 59.52 msec
Min = -14.51 Gs @ 108.12 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Z(R)

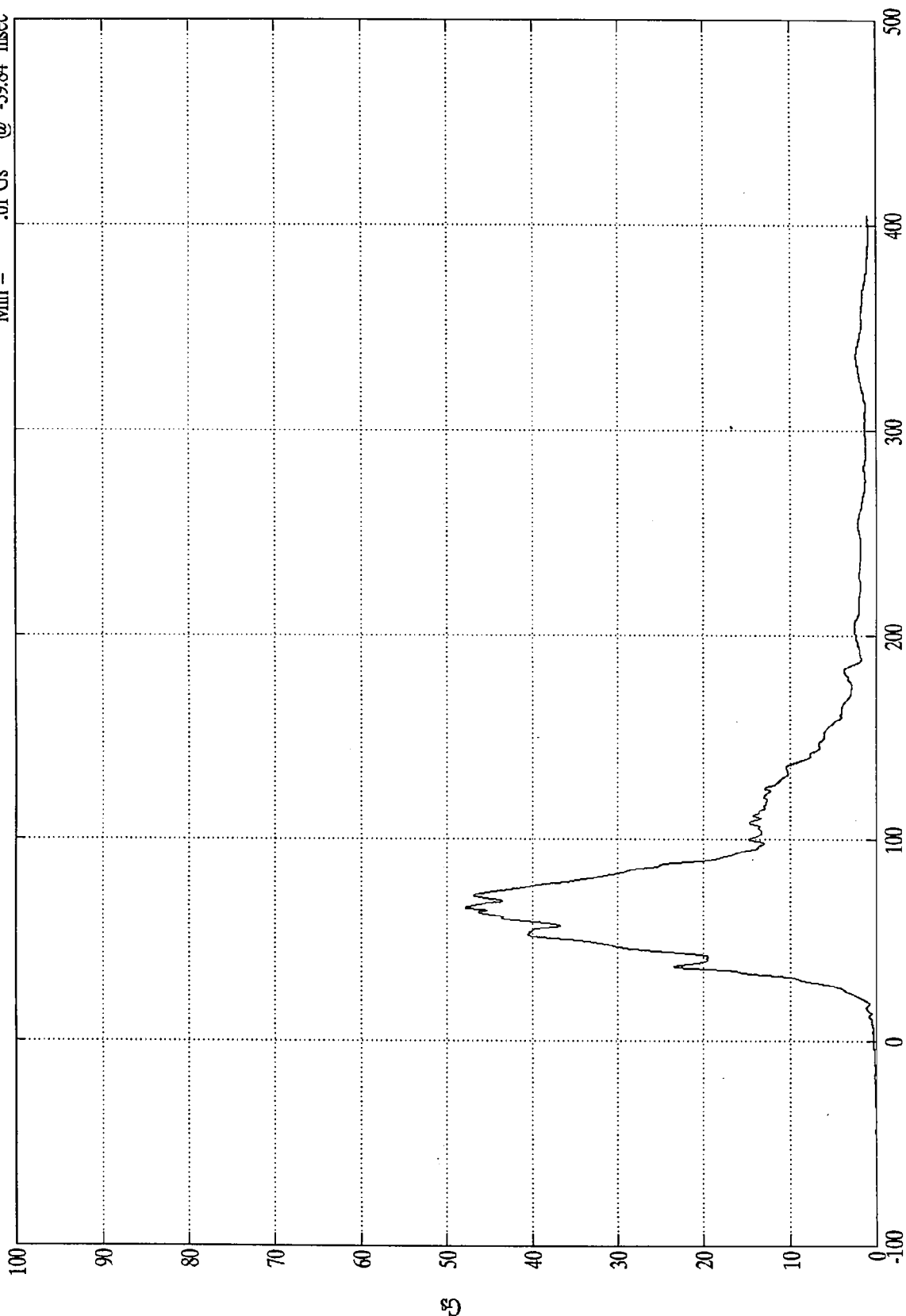
Max = 14.07 Gs @ 59.88 msec
Min = -13.26 Gs @ 107.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Resultant

Max = 47.82 Gs @ 66.00 msec
Min = .01 Gs @ -39.84 msec



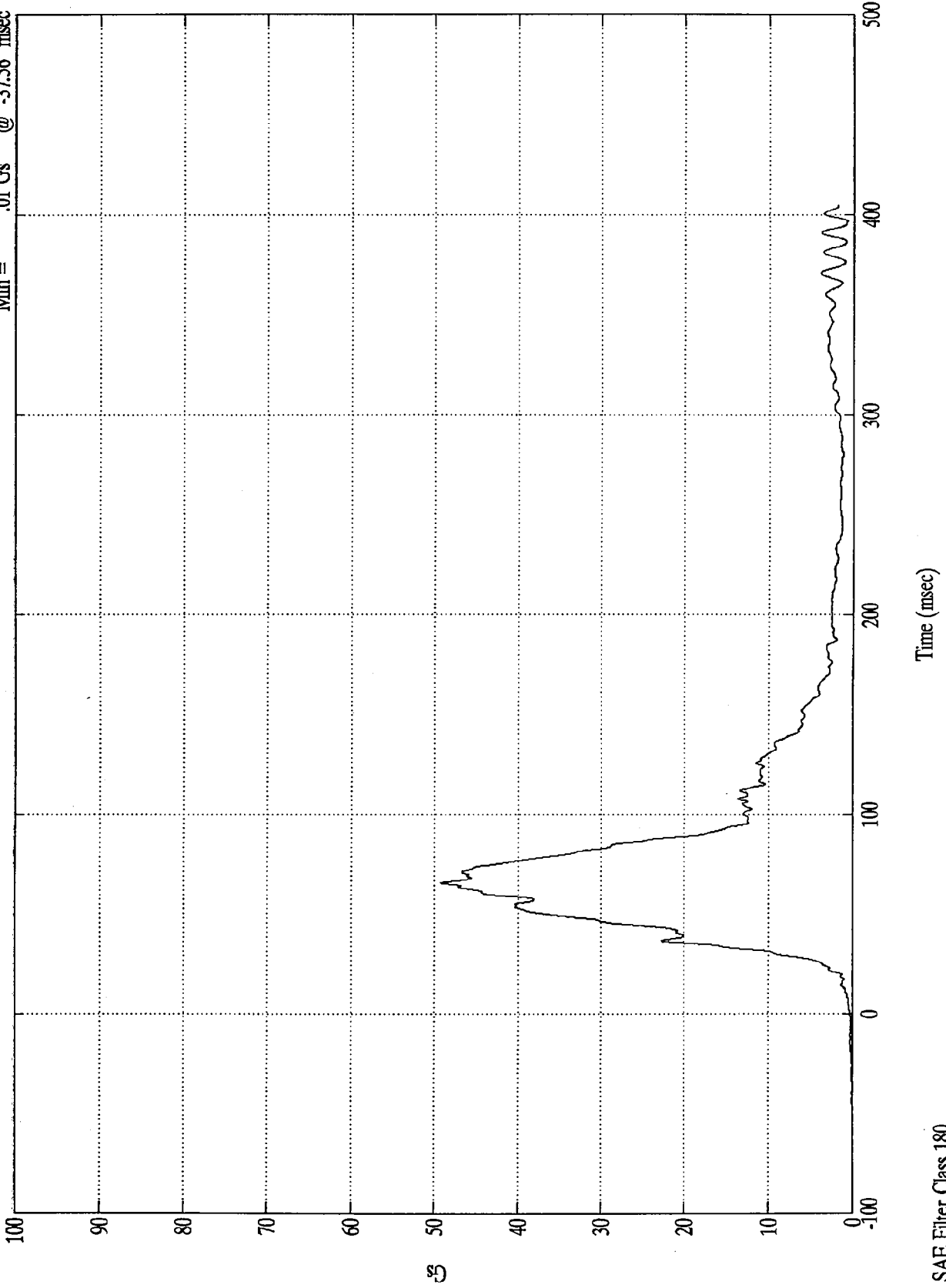
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Res(RR)

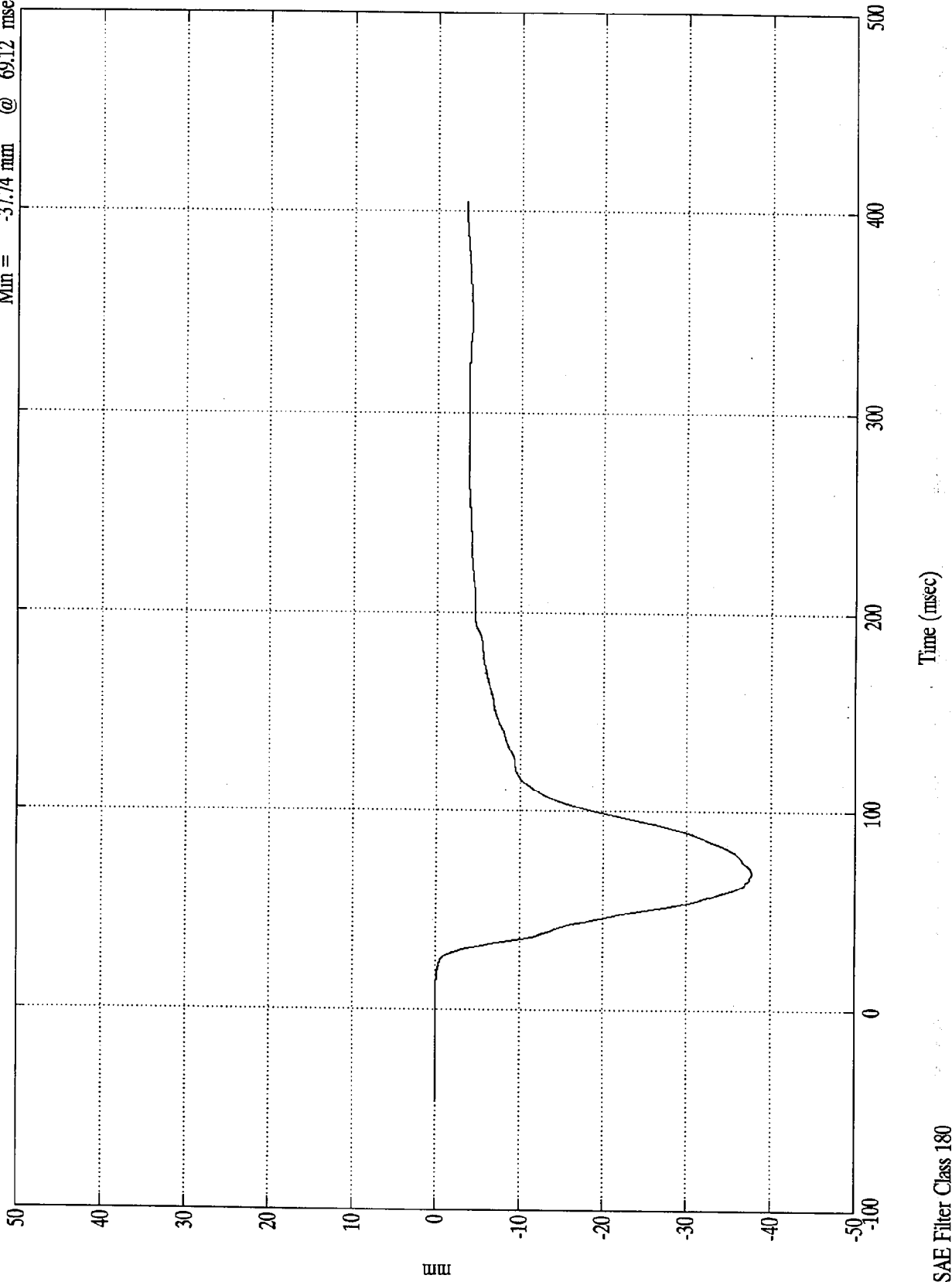
Max = 49.20 Gs @ 66.00 msec
Min = .01 Gs @ -37.56 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Chest Disp.

Max = .01 mm @ 5.27 msec
Min = -37.74 mm @ 69.12 msec



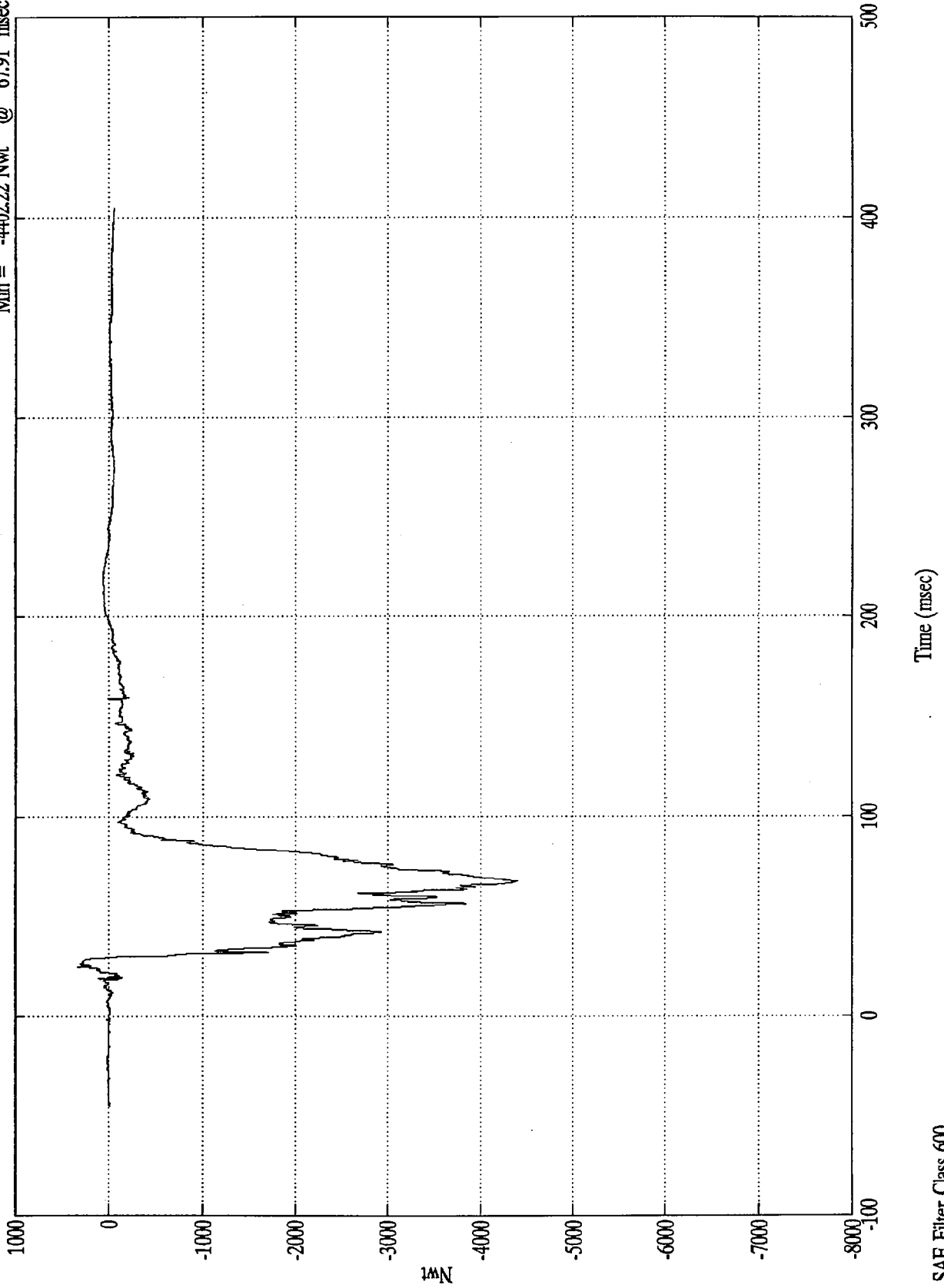
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Left Femur

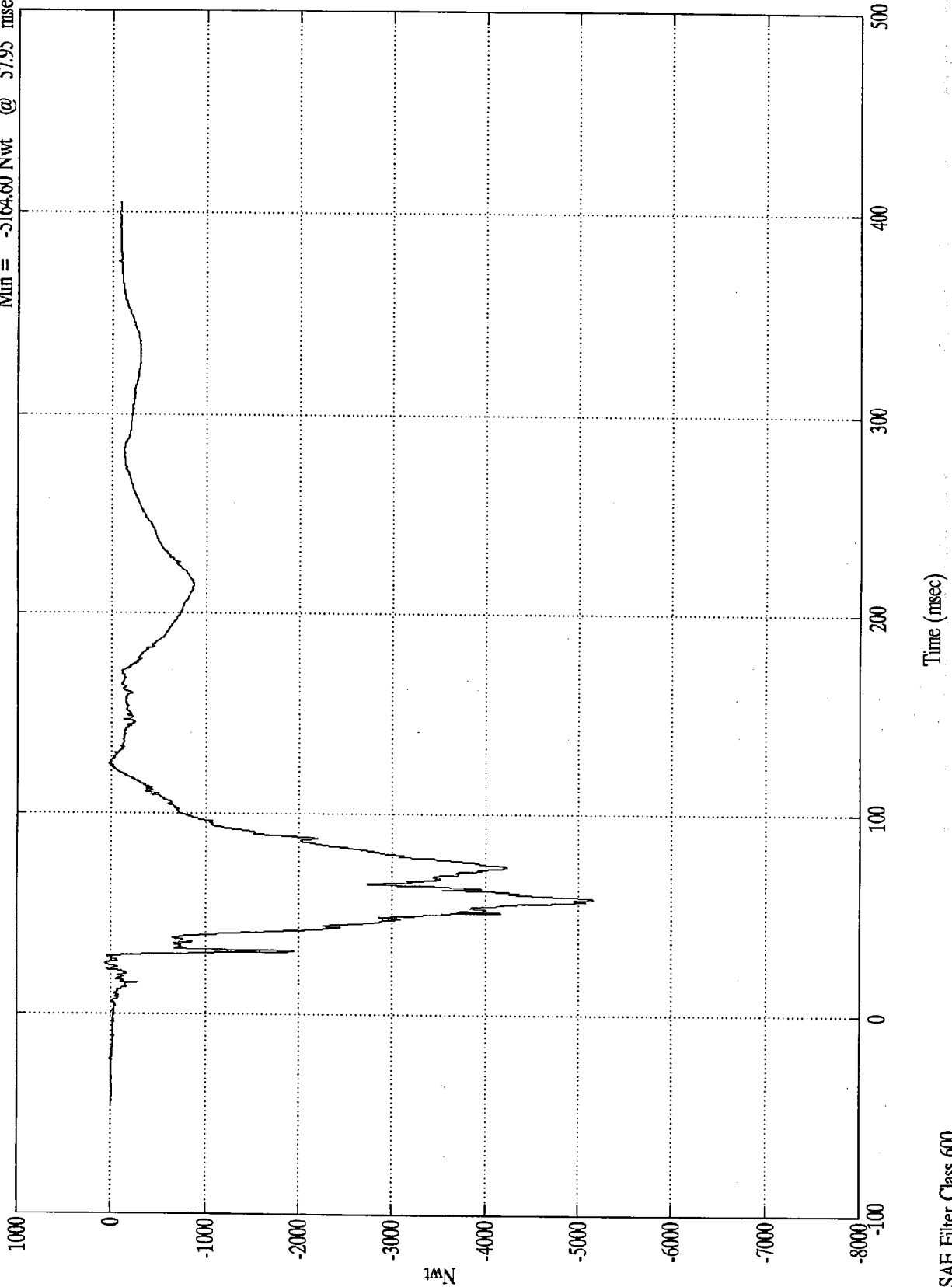
Max = 335.72 Nwt @ 25.20 msec
Min = -4402.22 Nwt @ 67.91 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Right Femur

Max = 64.82 Nwt @ 25.68 msec
Min = -5164.60 Nwt @ 57.95 msec

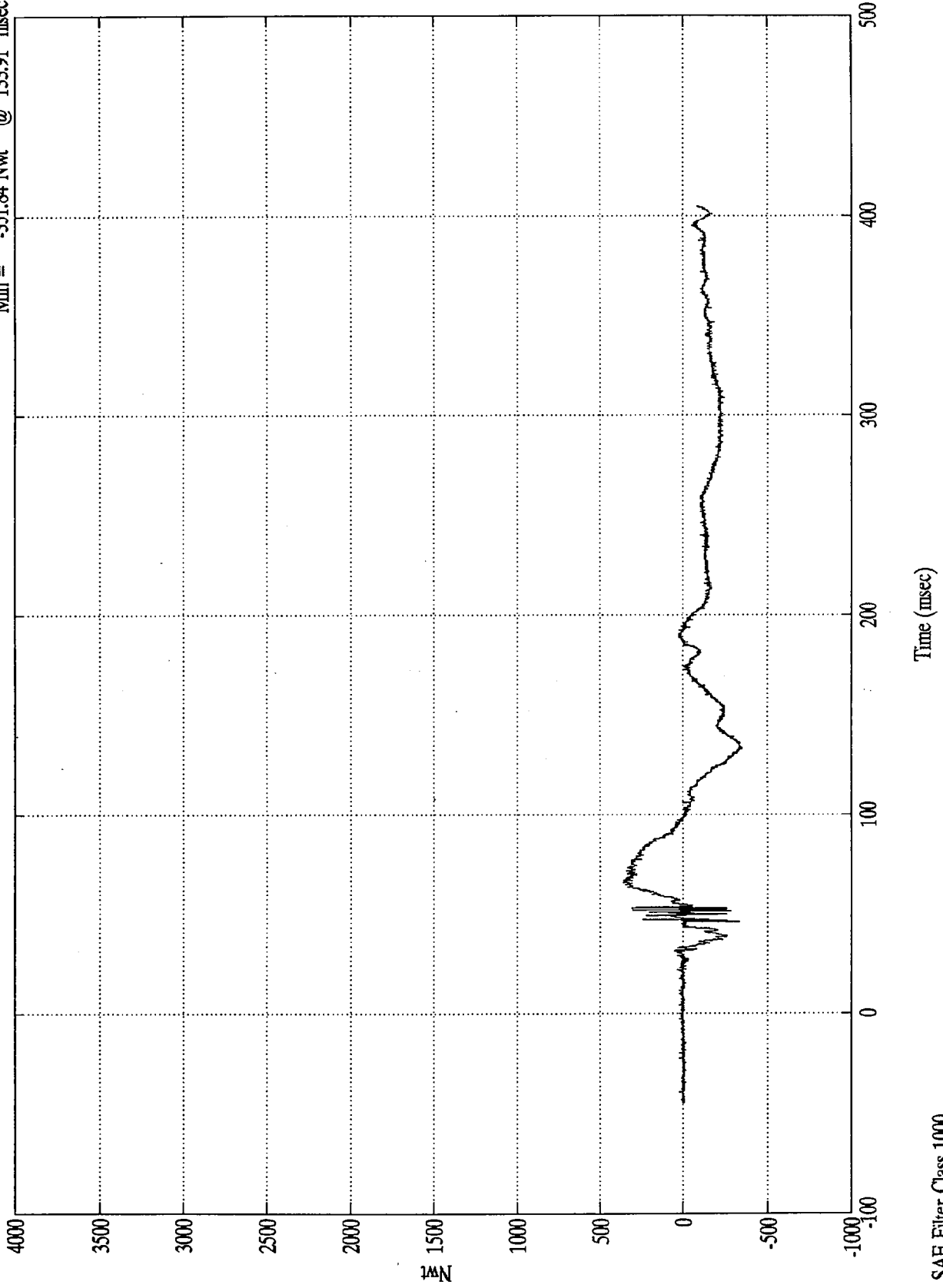


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Upper Neck Fx

Max = 360.30 Nwt @ 66.84 msec
Min = -351.84 Nwt @ 133.91 msec

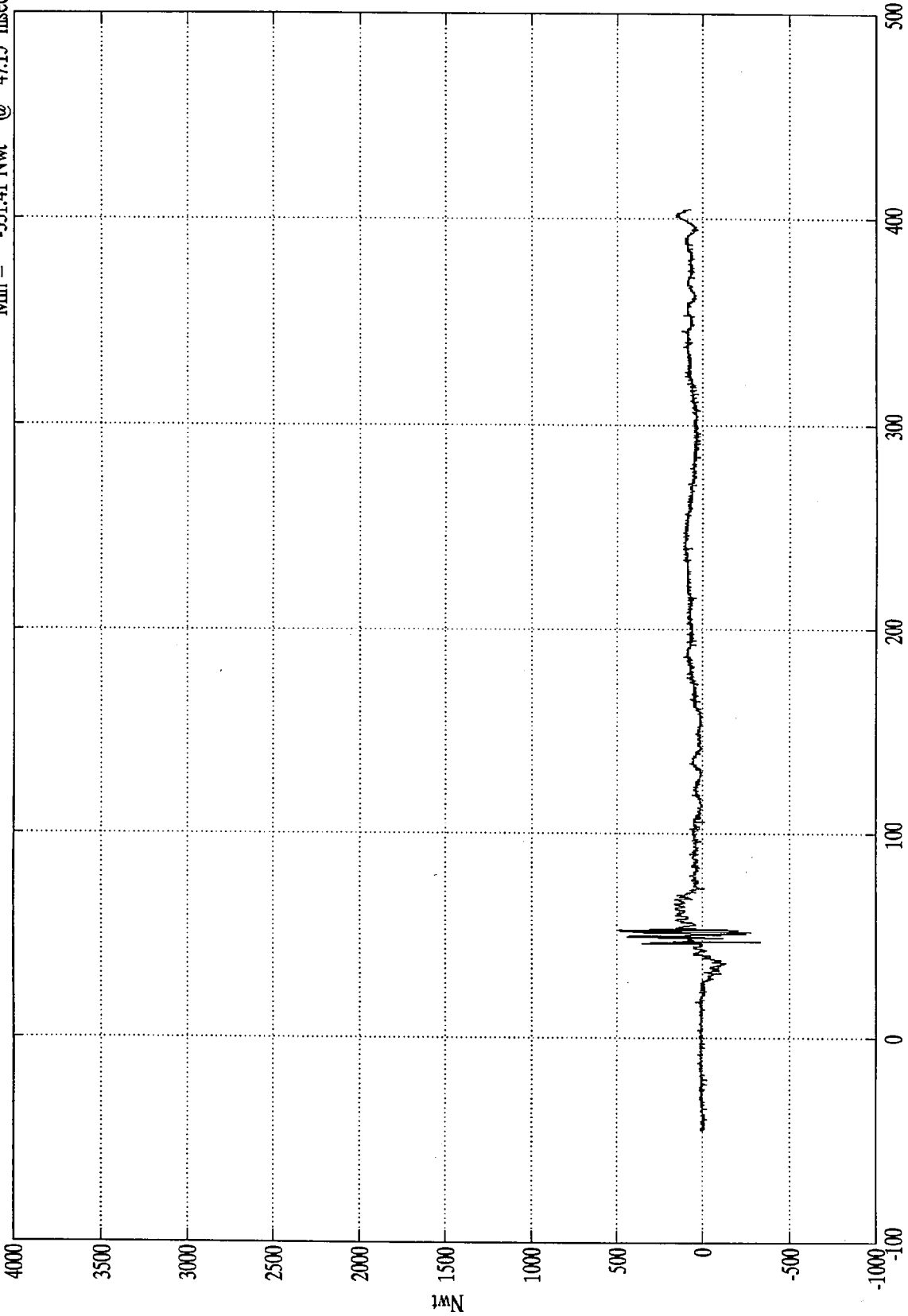


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Upper Neck Fy

Max = 487.59 Nwt @ 52.68 msec
Min = -331.41 Nwt @ 47.15 msec



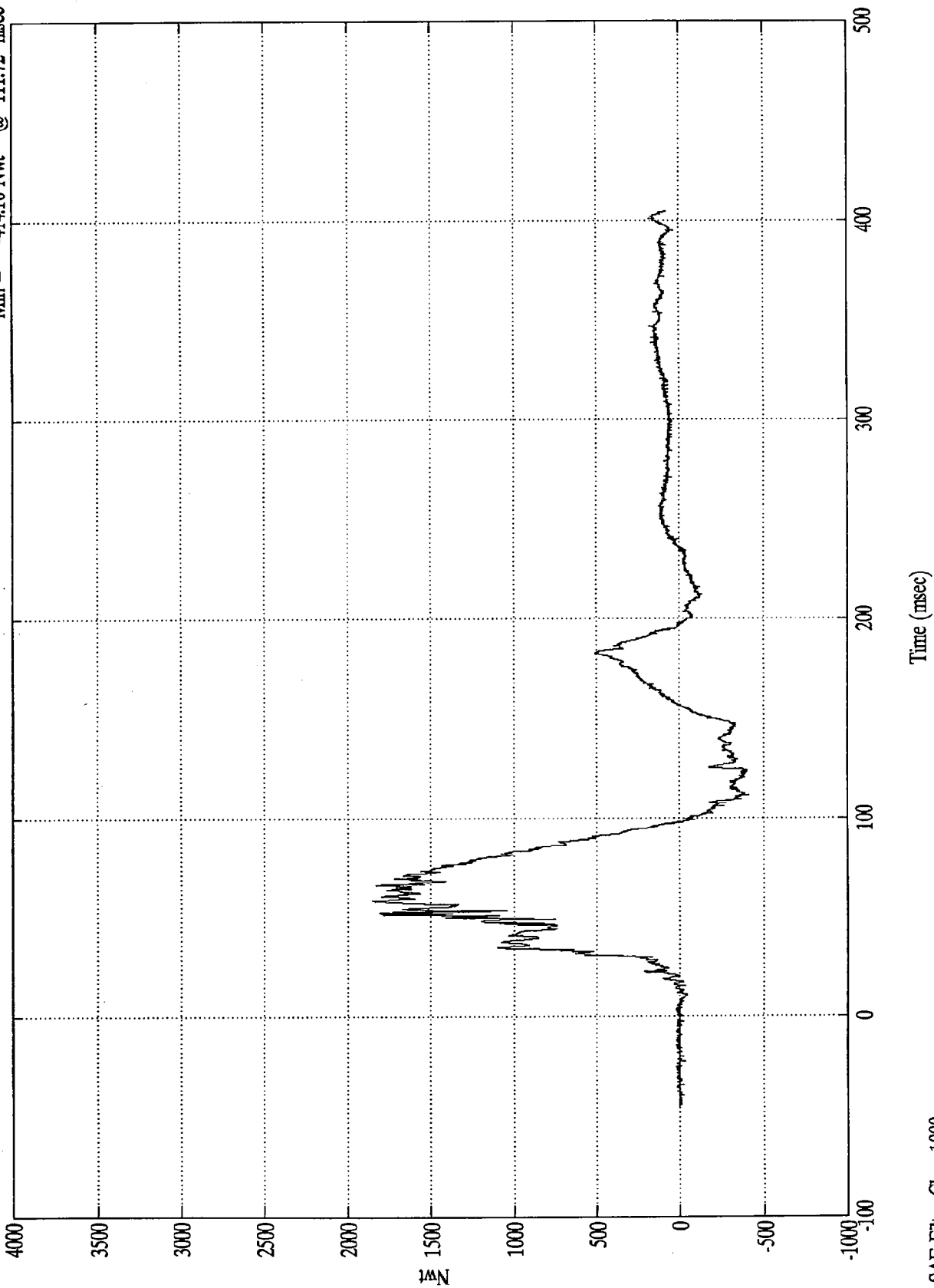
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Upper Neck Fz

Max = 1851.12 Nwt @ 58.31 msec
Min = -414.10 Nwt @ 111.72 msec

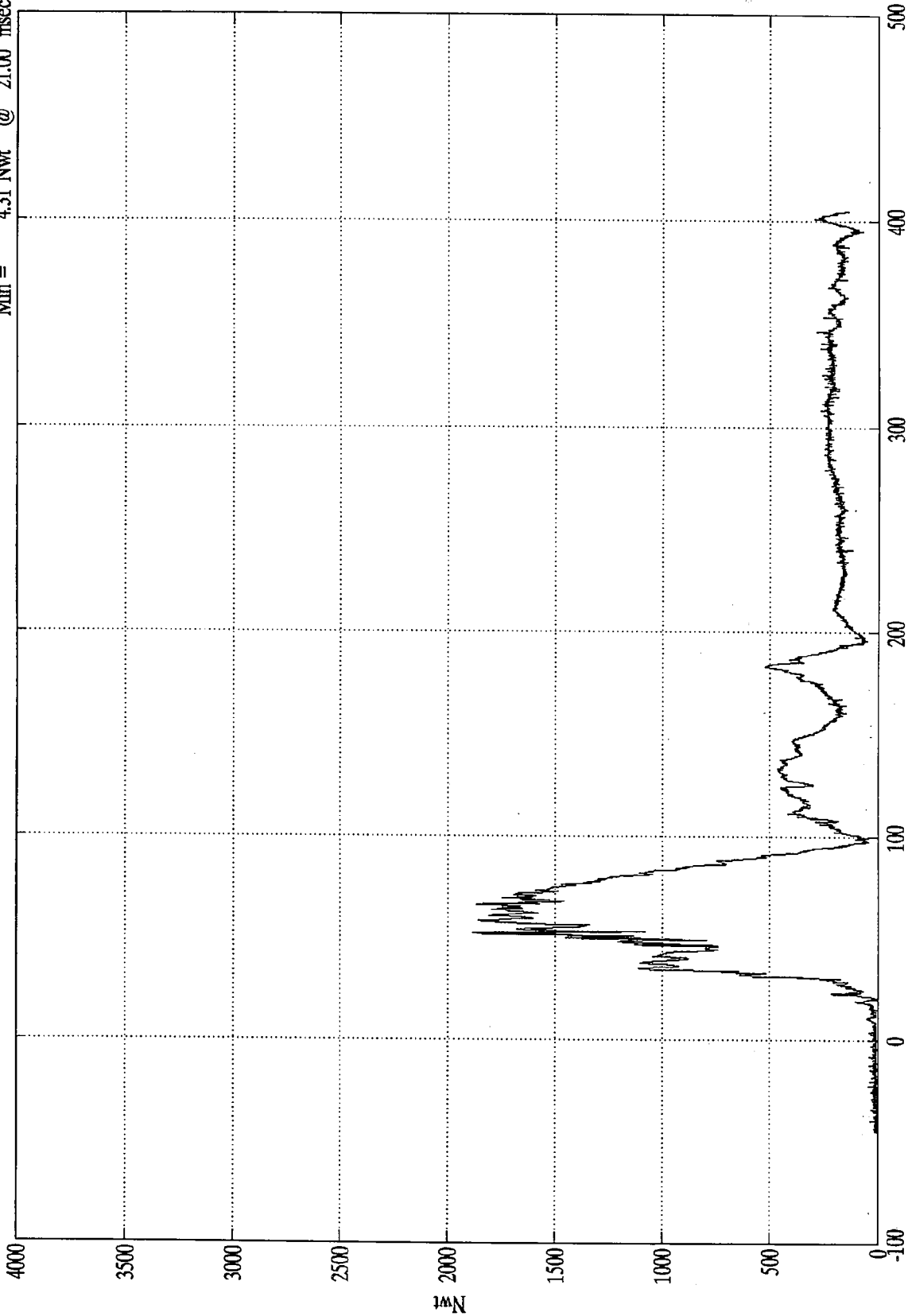


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Neck Force Res.

Max = 1885.29 Nwt @ 52.20 msec
Min = 4.31 Nwt @ 21.00 msec



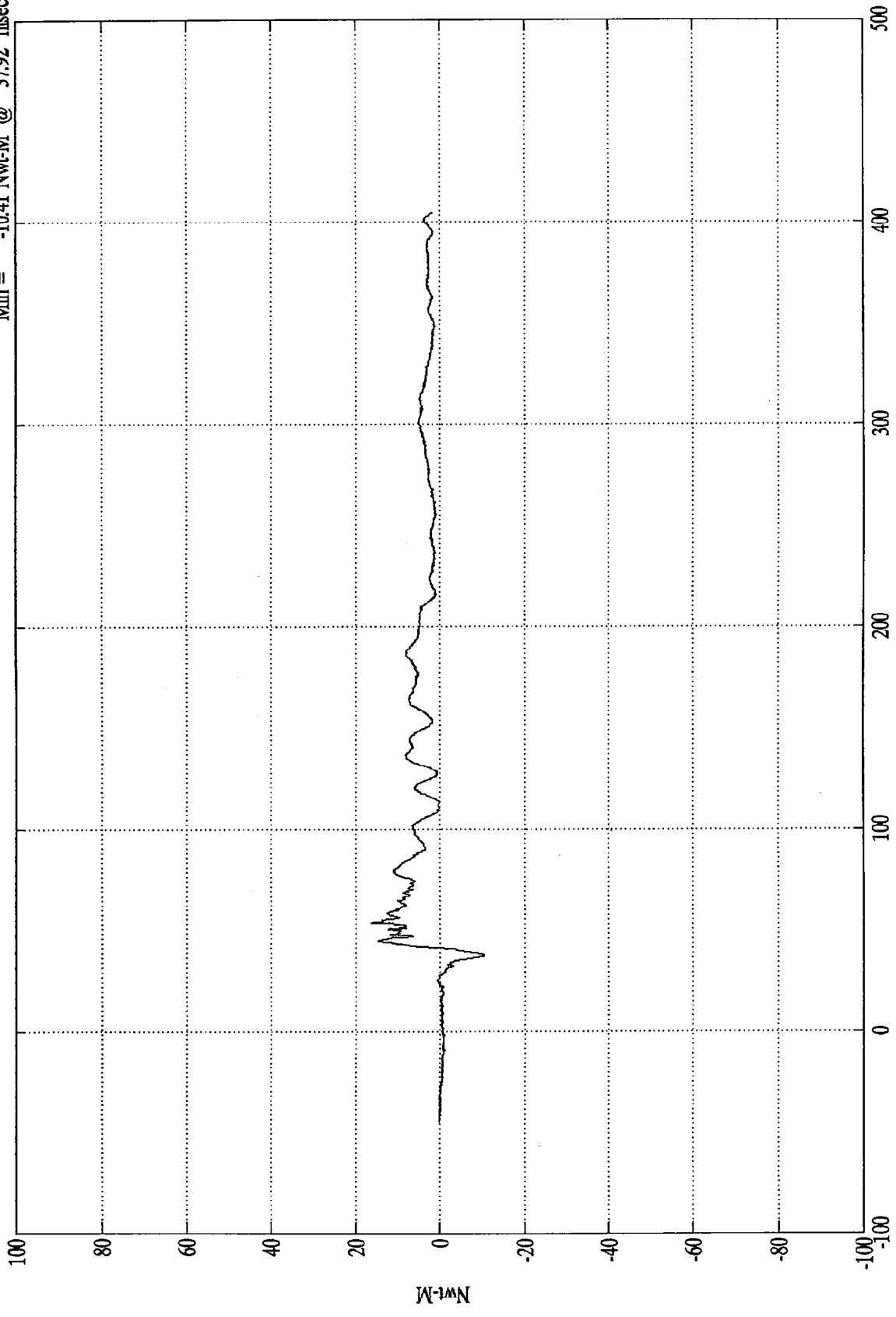
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Upper Neck Mx

Max = 16.42 Nwt-M @ 53.52 msec
Min = -10.41 Nwt-M @ 37.92 msec



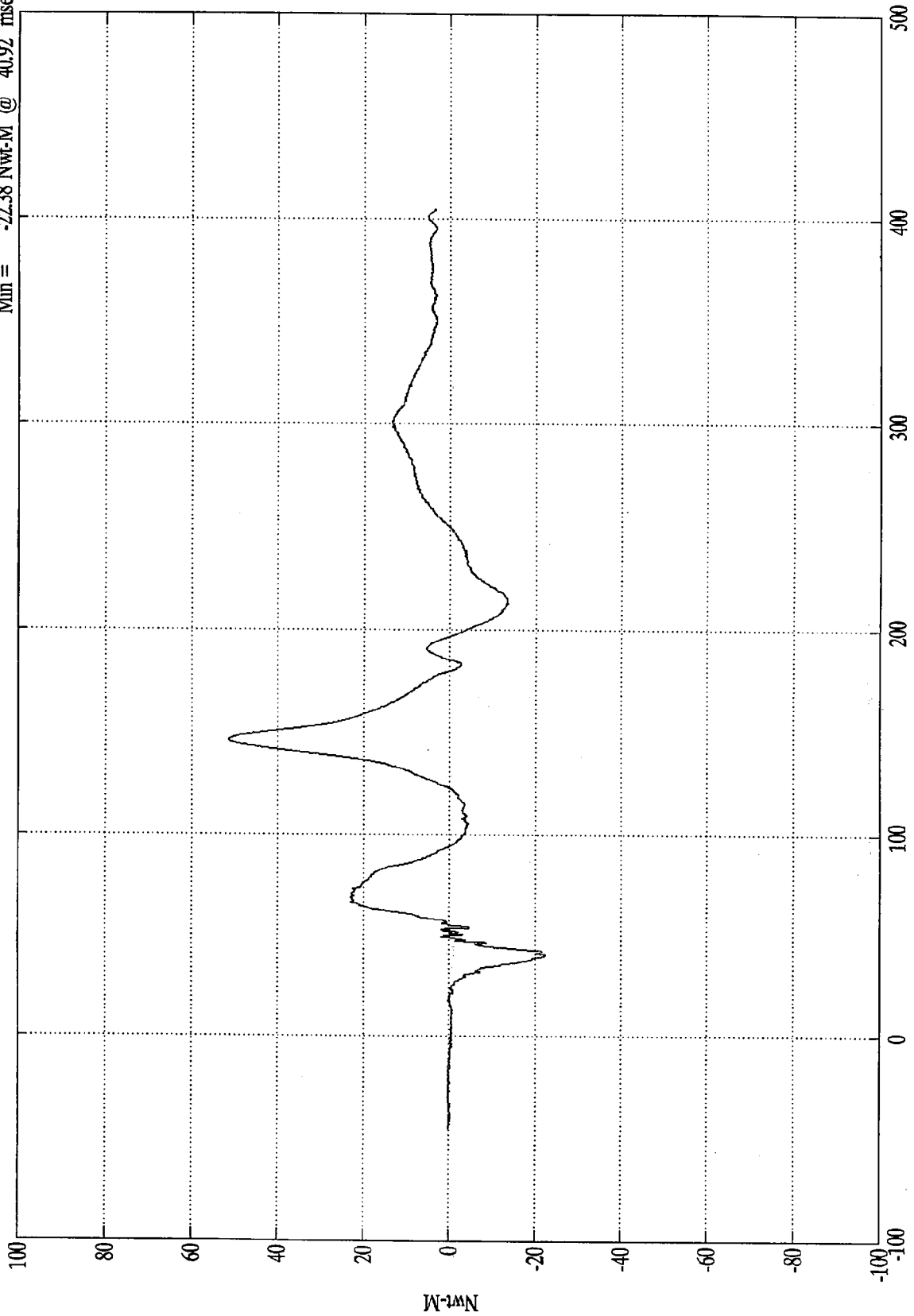
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Upper Neck My

Max = 51.45 Nwt-M @ 145.56 msec
Min = -22.38 Nwt-M @ 40.92 msec



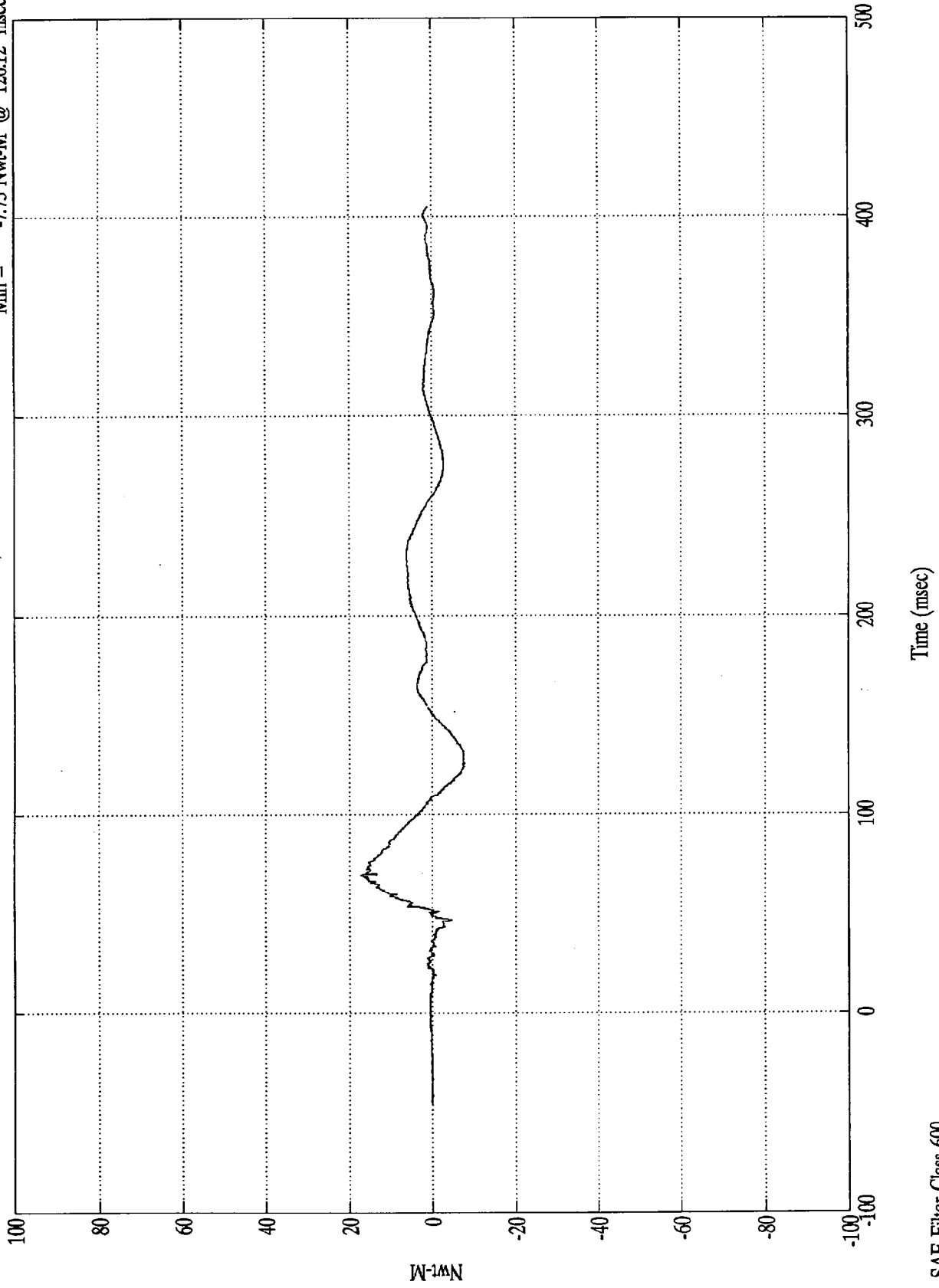
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Upper Neck Mz

Max = 17.30 Nwt-M @ 69.48 msec
Min = -7.73 Nwt-M @ 126.12 msec

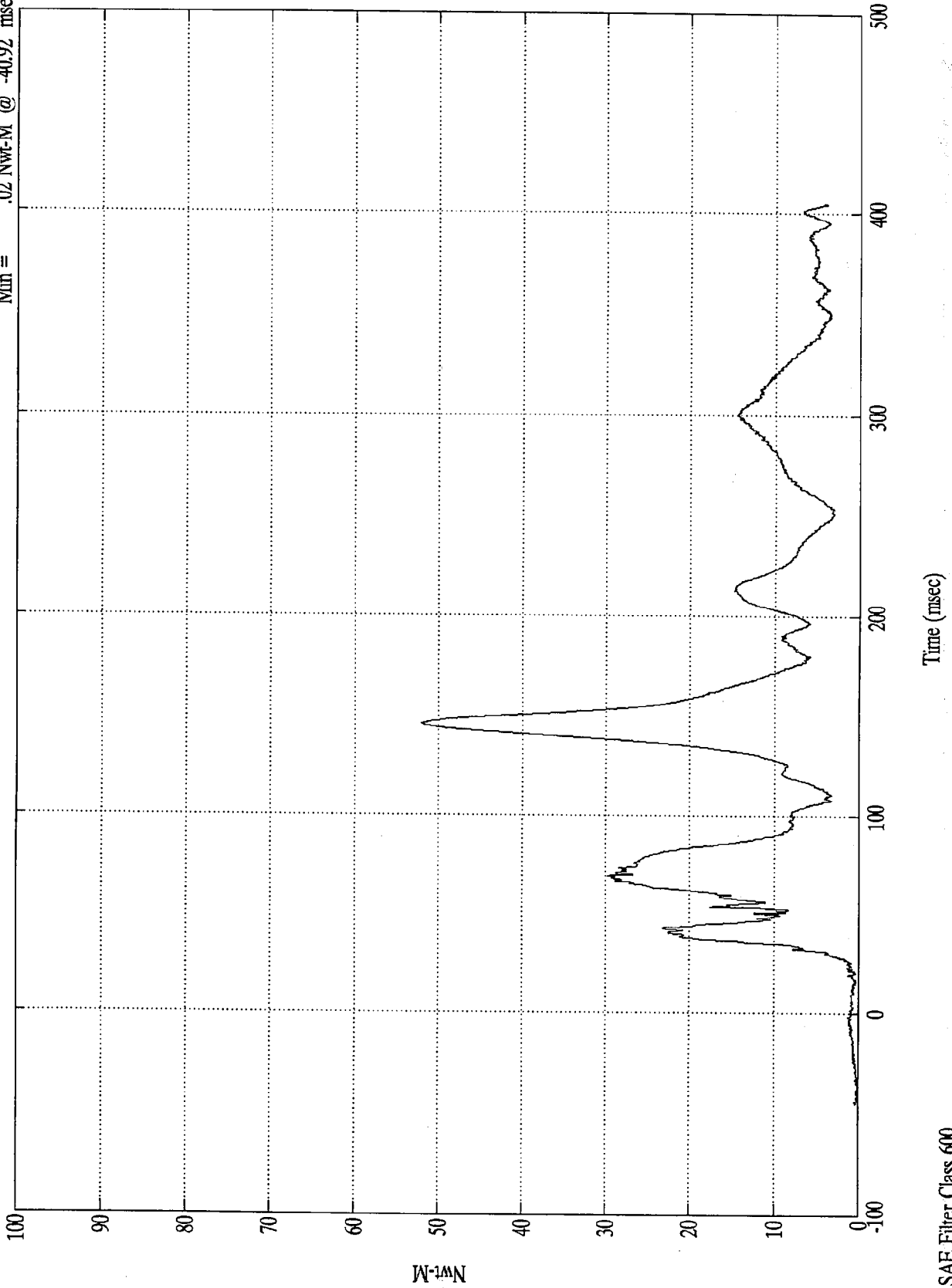


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Neck Moment Res.

Max = 51.99 Nwt-M @ 145.56 msec
Min = .02 Nwt-M @ -40.92 msec

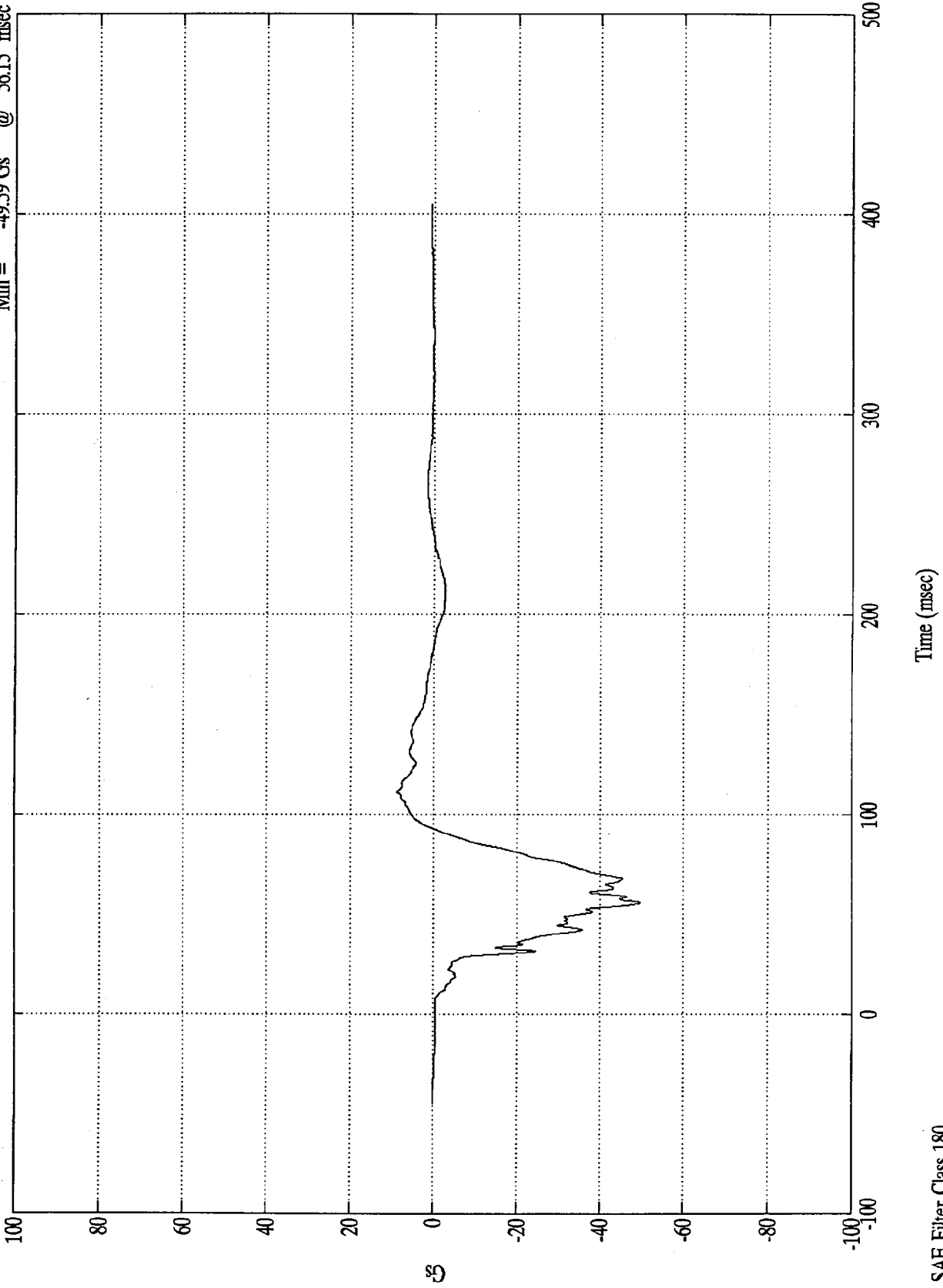


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Pelvic (X)

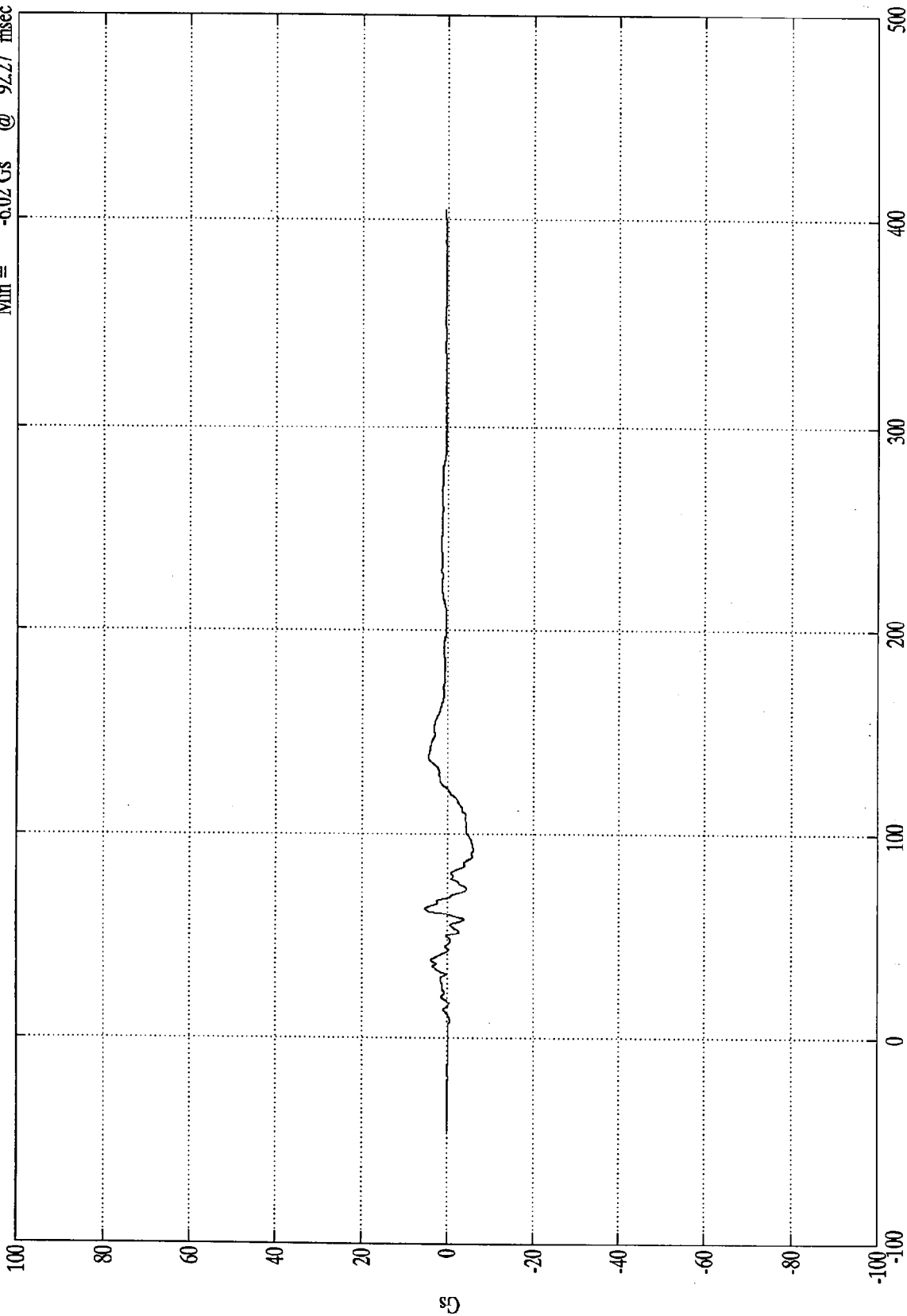
Max = 8.82 Gs @ 111.12 msec
Min = -49.59 Gs @ 56.15 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Pelvic (Y)

Max = 5.07 Gs @ 63.95 msec
Min = -6.02 Gs @ 92.27 msec



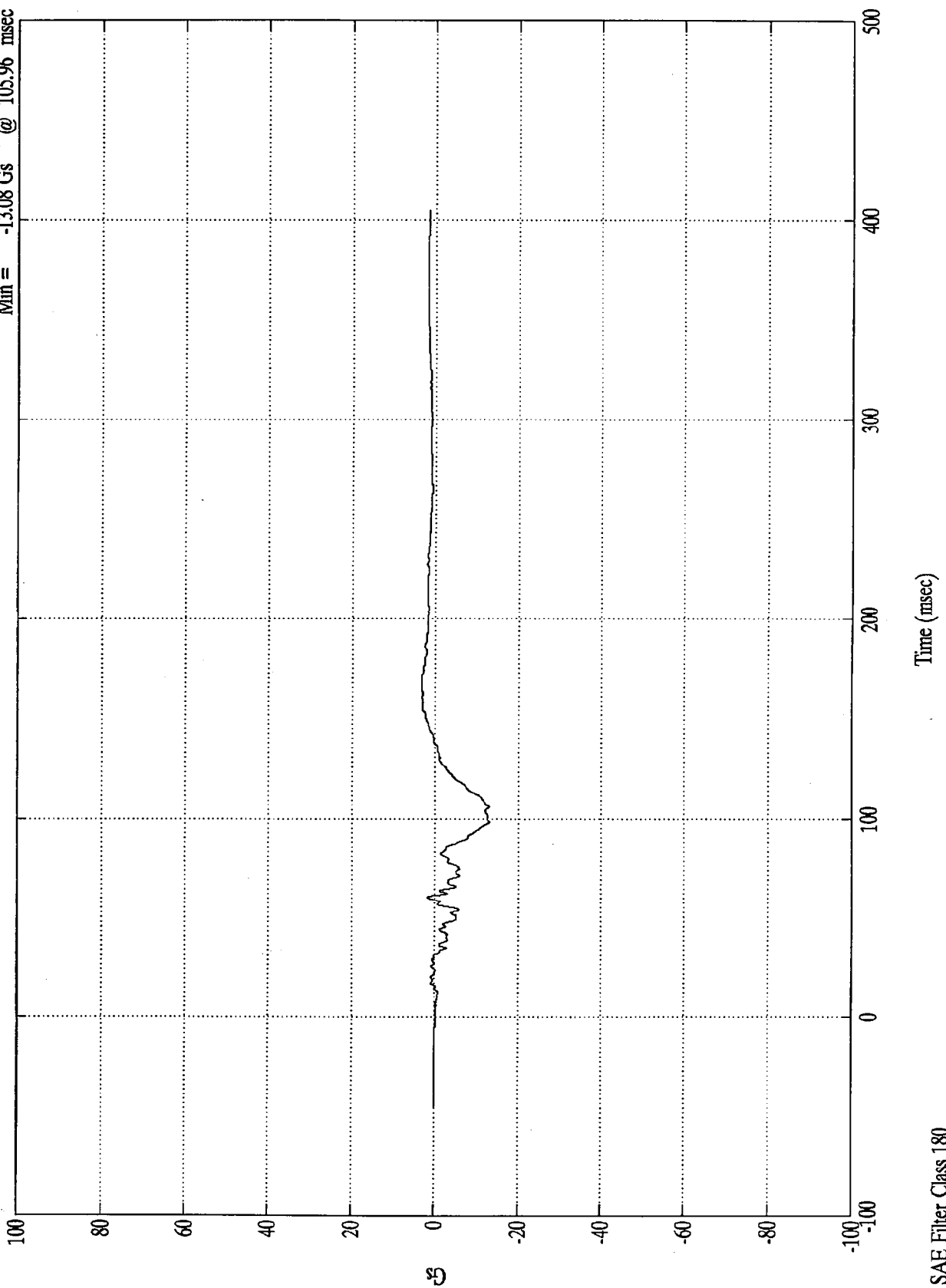
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Pelvic (Z)

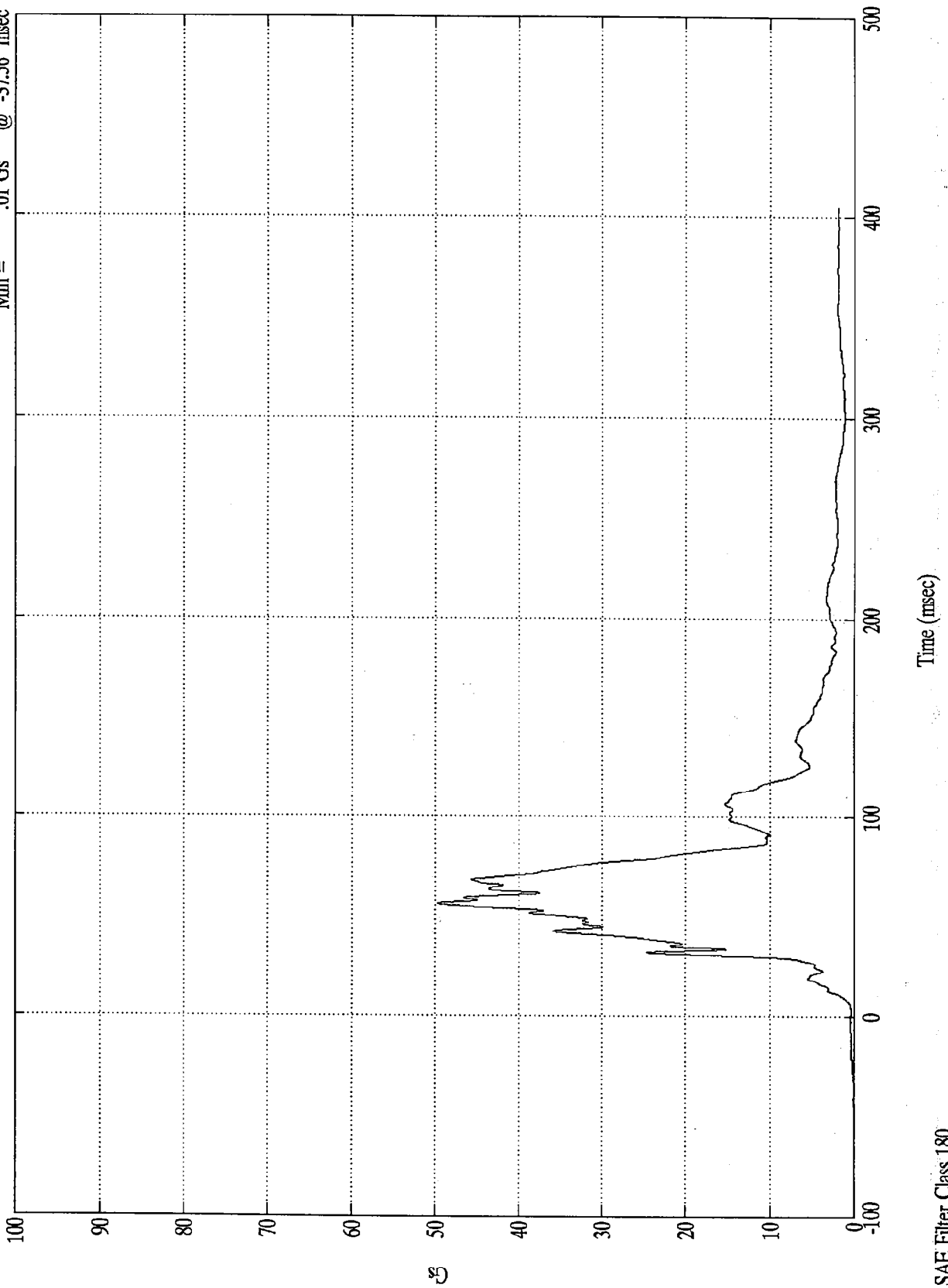
Max = 3.18 Gs @ 170.04 msec
Min = -13.08 Gs @ 105.96 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Pelvic (R)

Max = 49.63 Gs @ 56.15 msec
Min = .01 Gs @ -37.56 msec

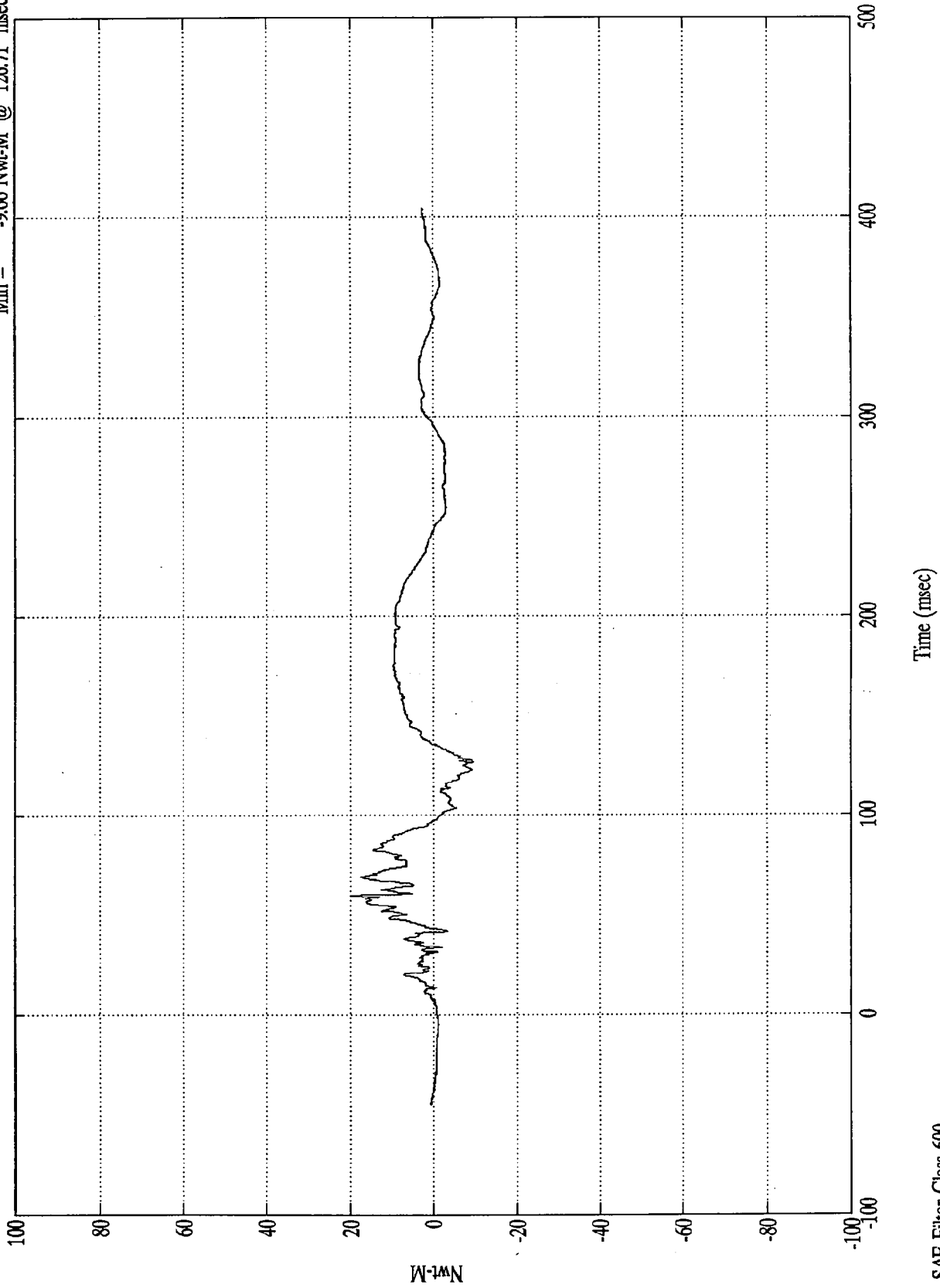


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Lt Upper Tibia Mx

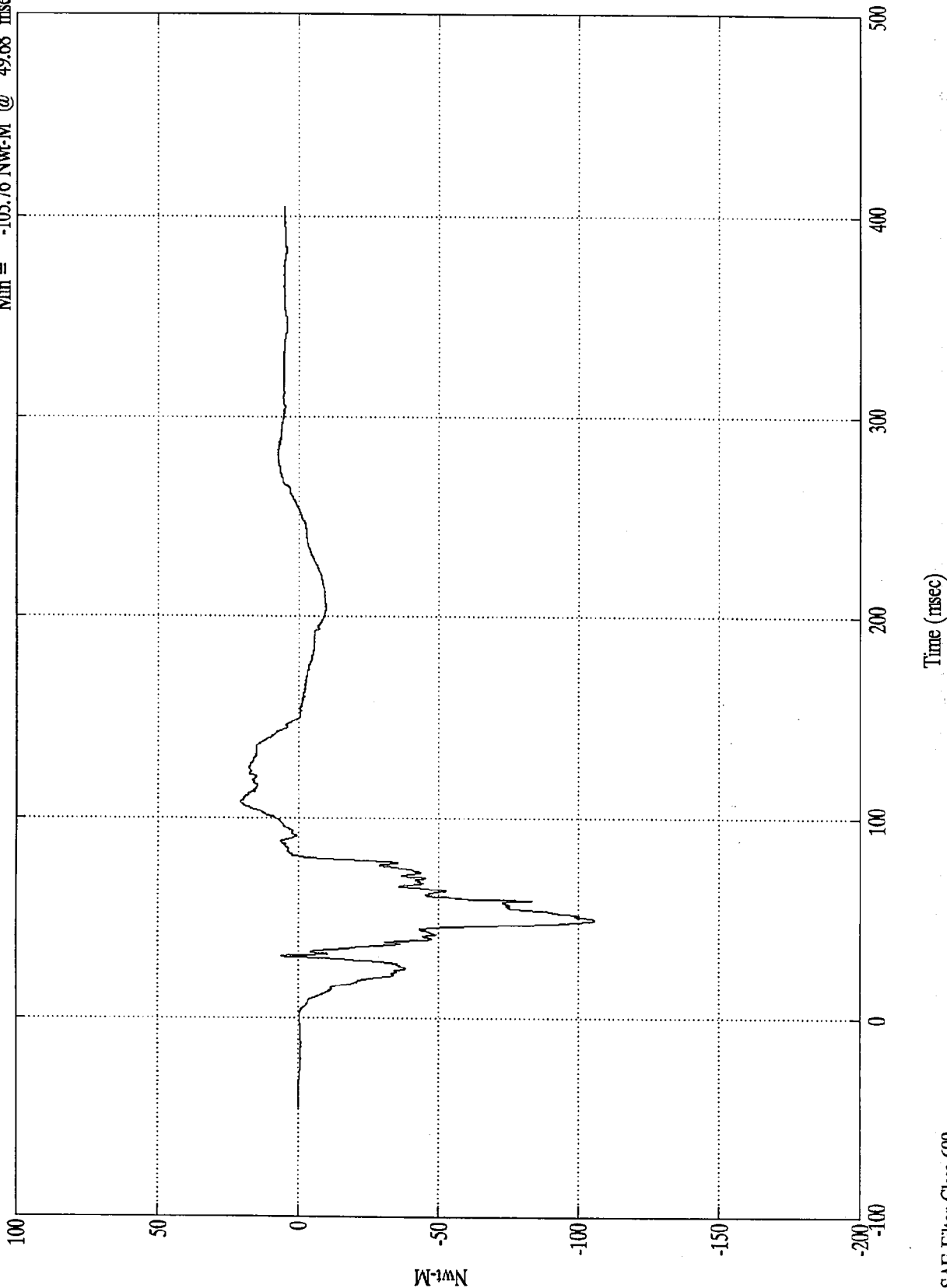
Max = 19.70 Nwt-M @ 60.00 msec
Min = -9.66 Nwt-M @ 126.71 msec



NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Lt Upper Tibia My

Max = 20.82 Nwt-M @ 107.76 msec
Min = -105.76 Nwt-M @ 49.68 msec



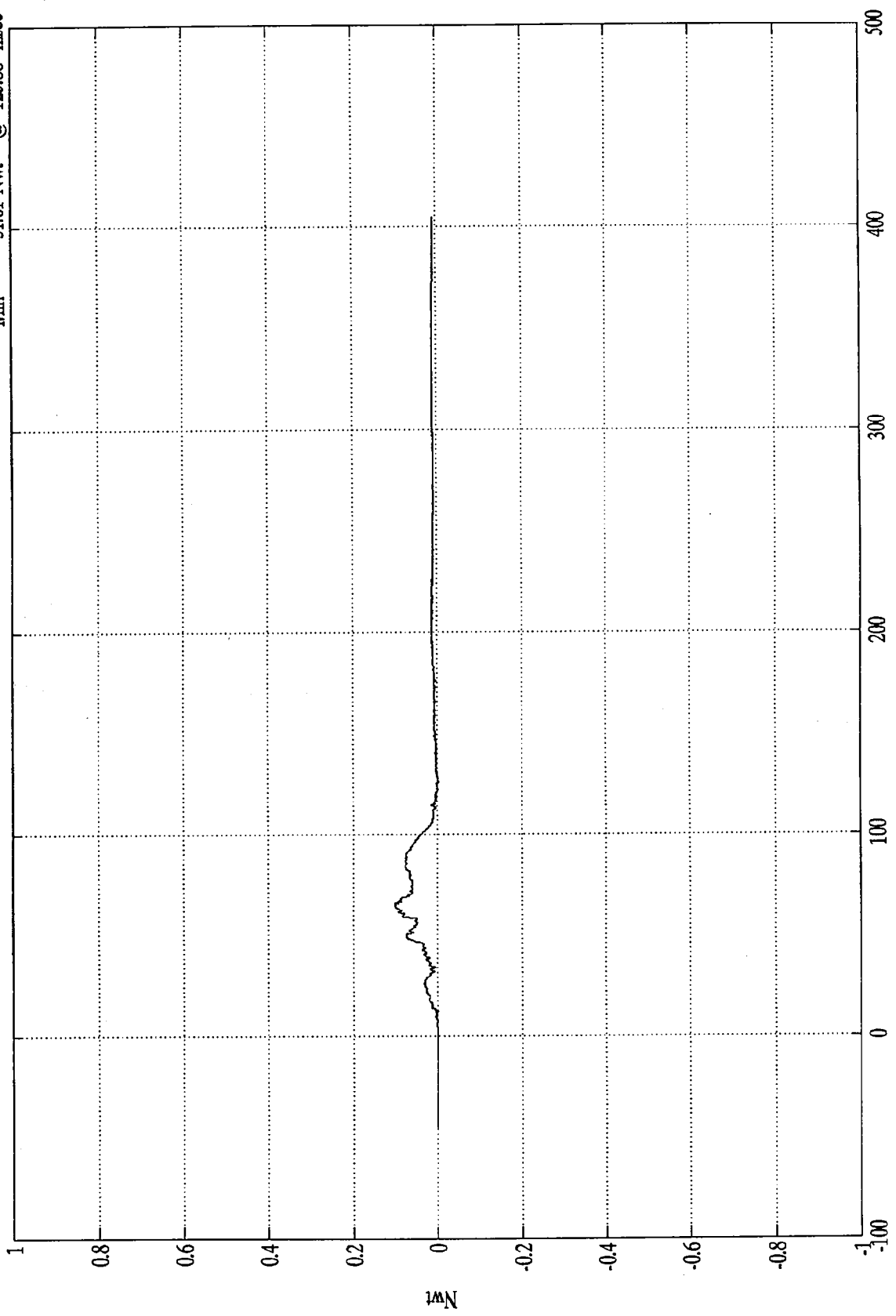
SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Pos. 2 Lt Lower Tibia Fx

Max = 1017.56 Nwt @ 65.27 msec
Min = -51.61 Nwt @ 125.88 msec



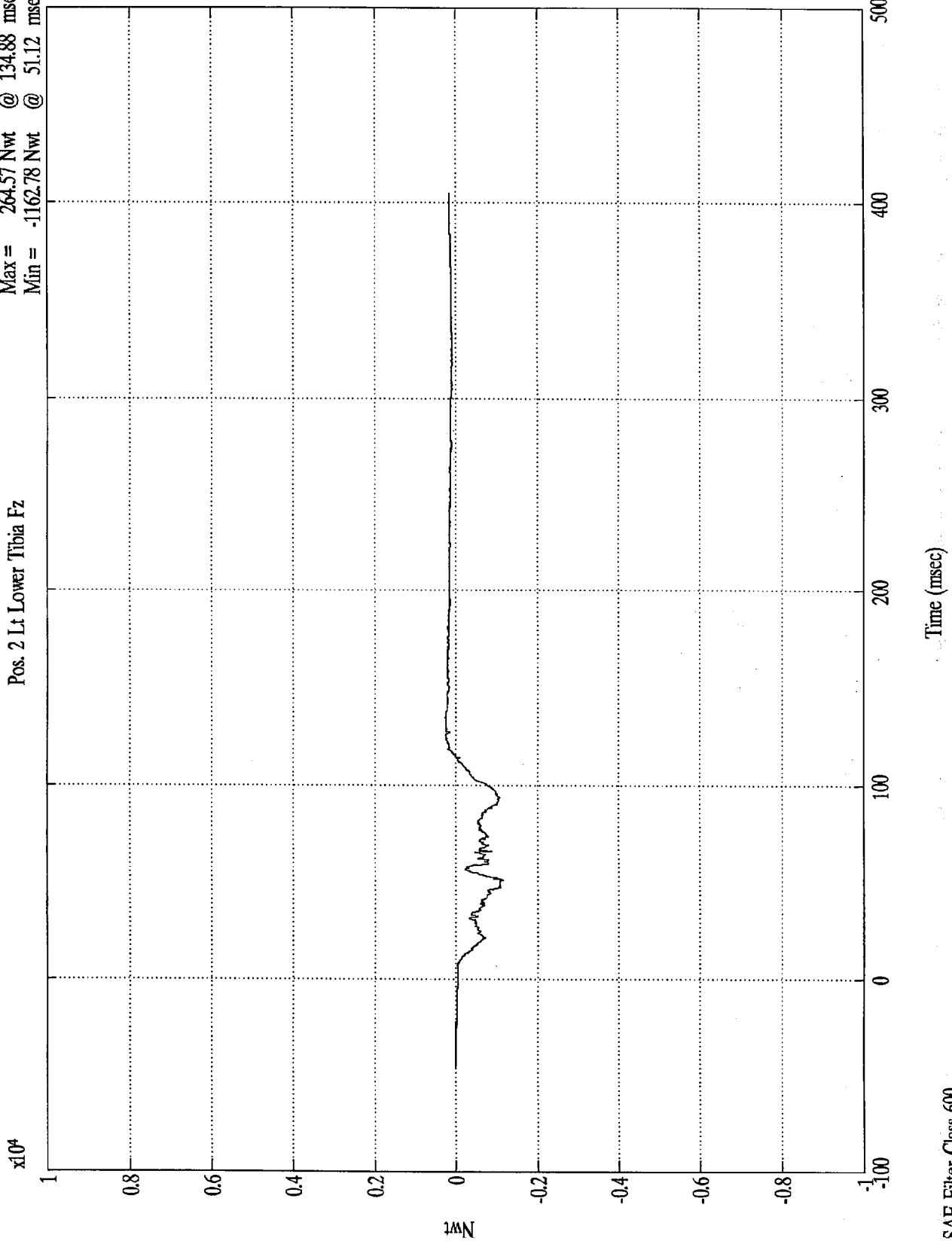
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Lt Lower Tibia Fz

Max = 264.57 Nwt @ 134.88 msec
Min = -1162.78 Nwt @ 51.12 msec

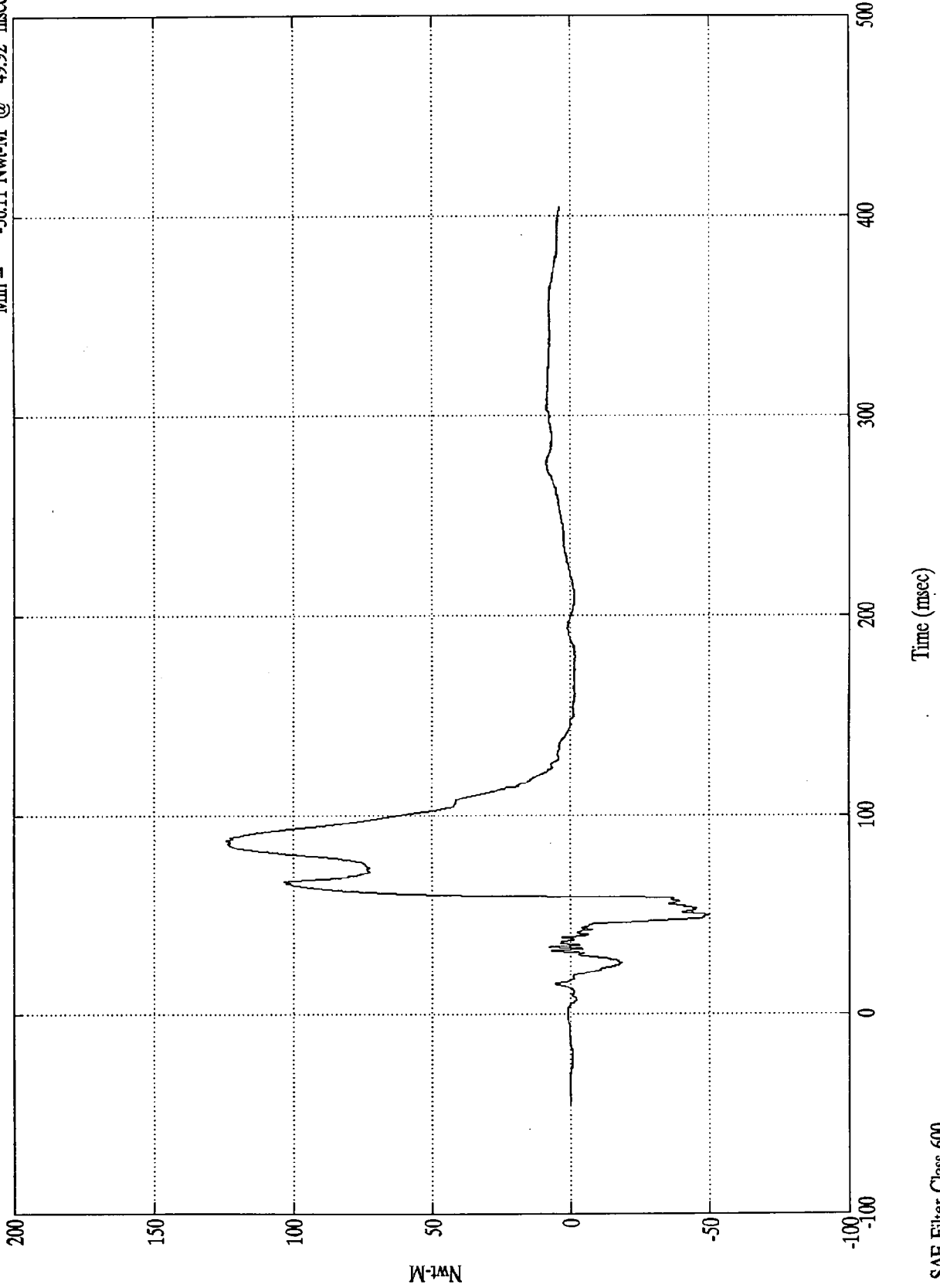


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Lt Lower Tibia My

Max = 124.34 Nwt-M @ 87.36 msec
Min = -50.11 Nwt-M @ 49.92 msec

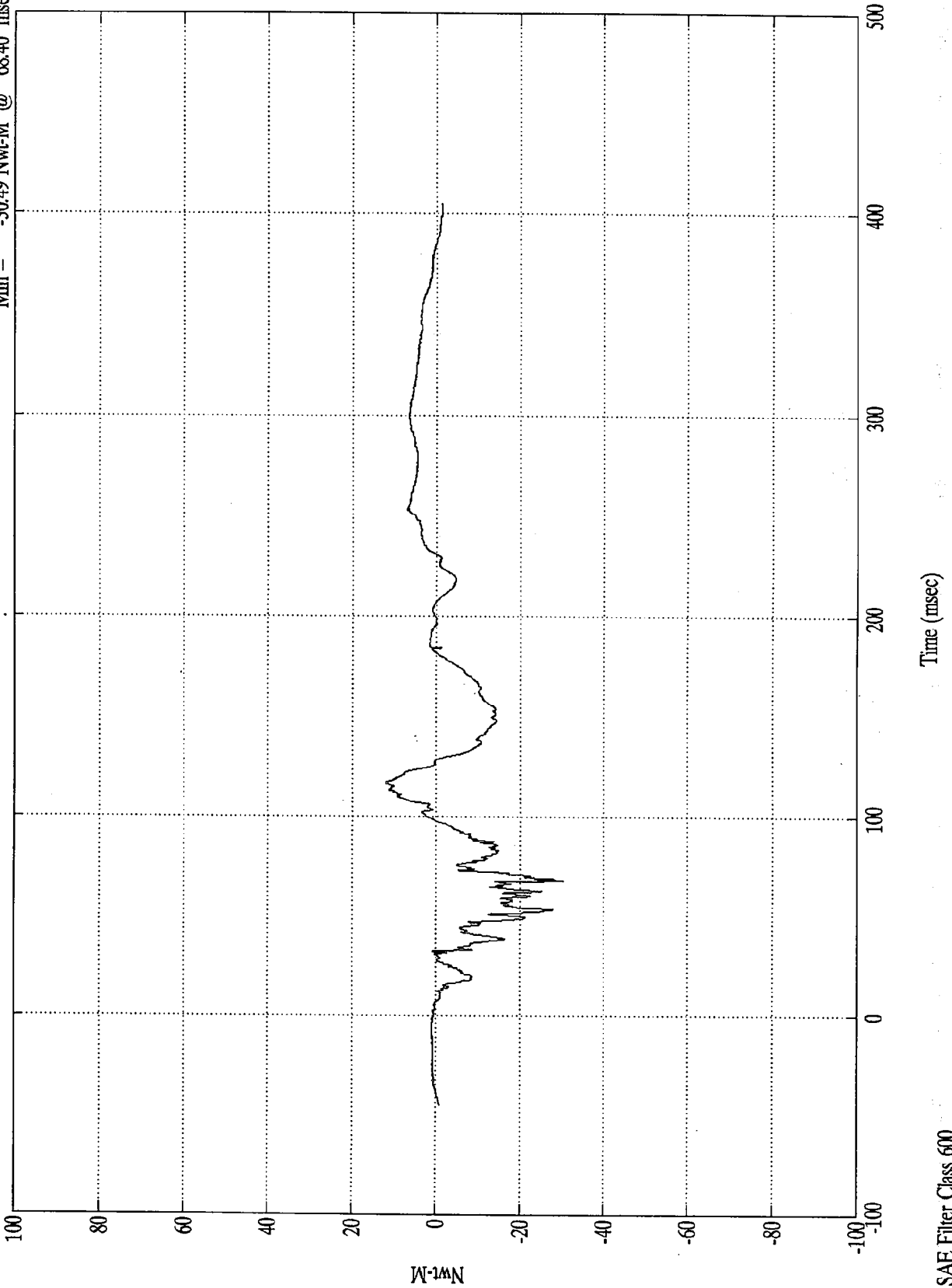


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Rt Upper Tibia Mx

Max = 11.94 Nwt-M @ 117.24 msec
Min = -30.49 Nwt-M @ 68.40 msec

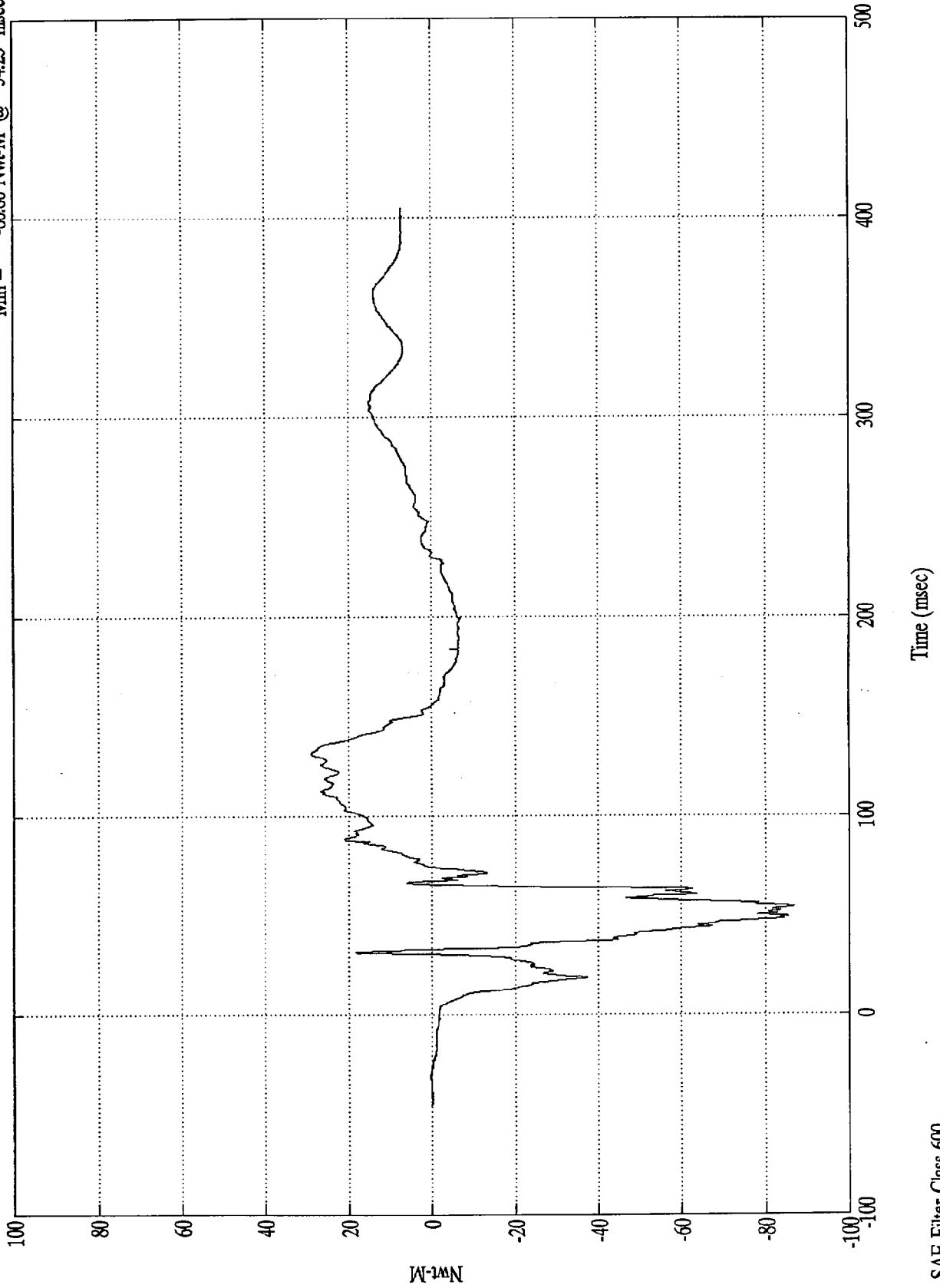


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Rt Upper Tibia My

Max = 29.01 Nwt-M @ 131.52 msec
Min = -86.80 Nwt-M @ 54.23 msec



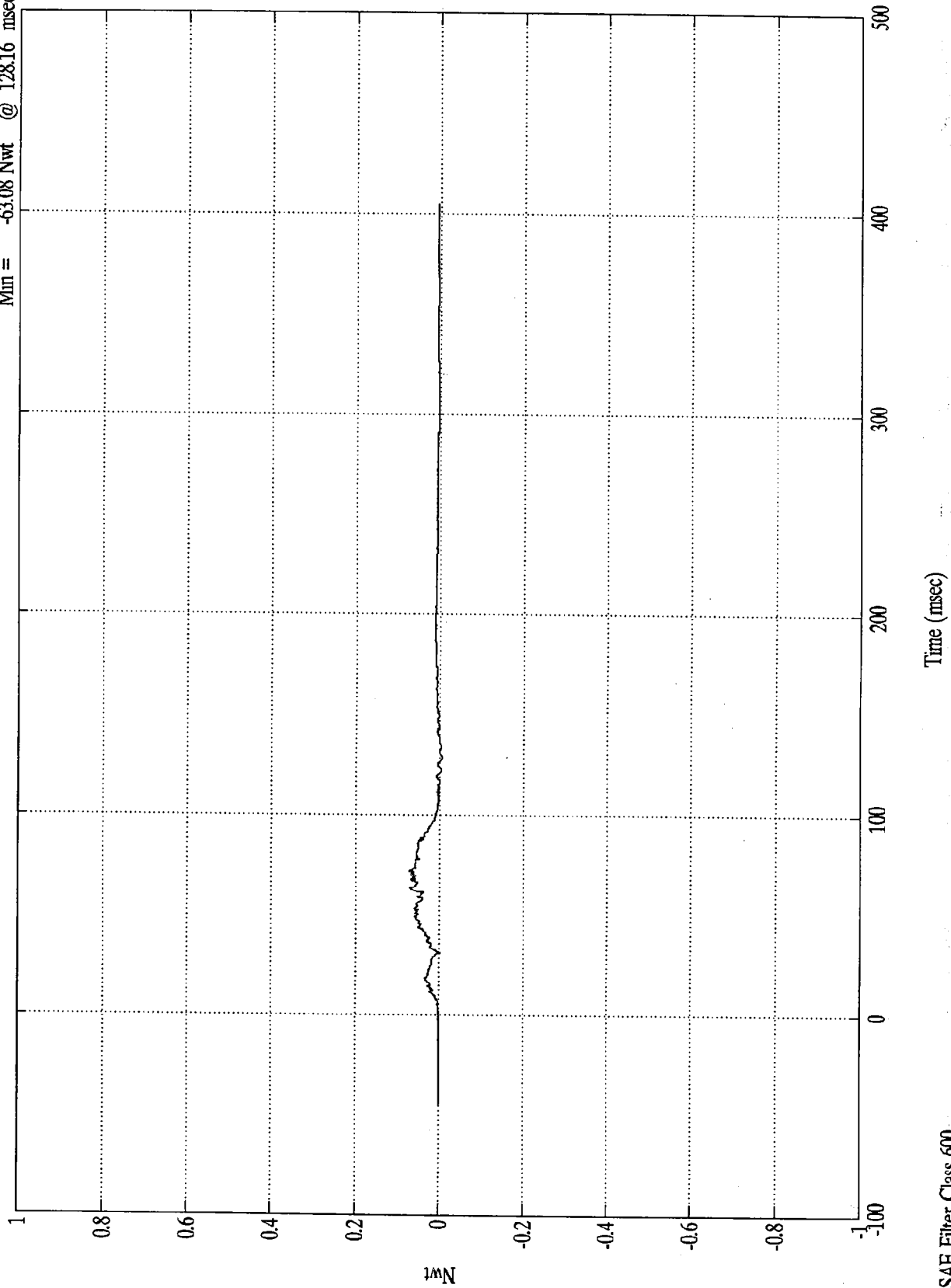
SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Pos. 2 Rt Lower Tibia Fx

Max = 713.16 Nwt @ 72.83 msec
Min = -63.08 Nwt @ 128.16 msec



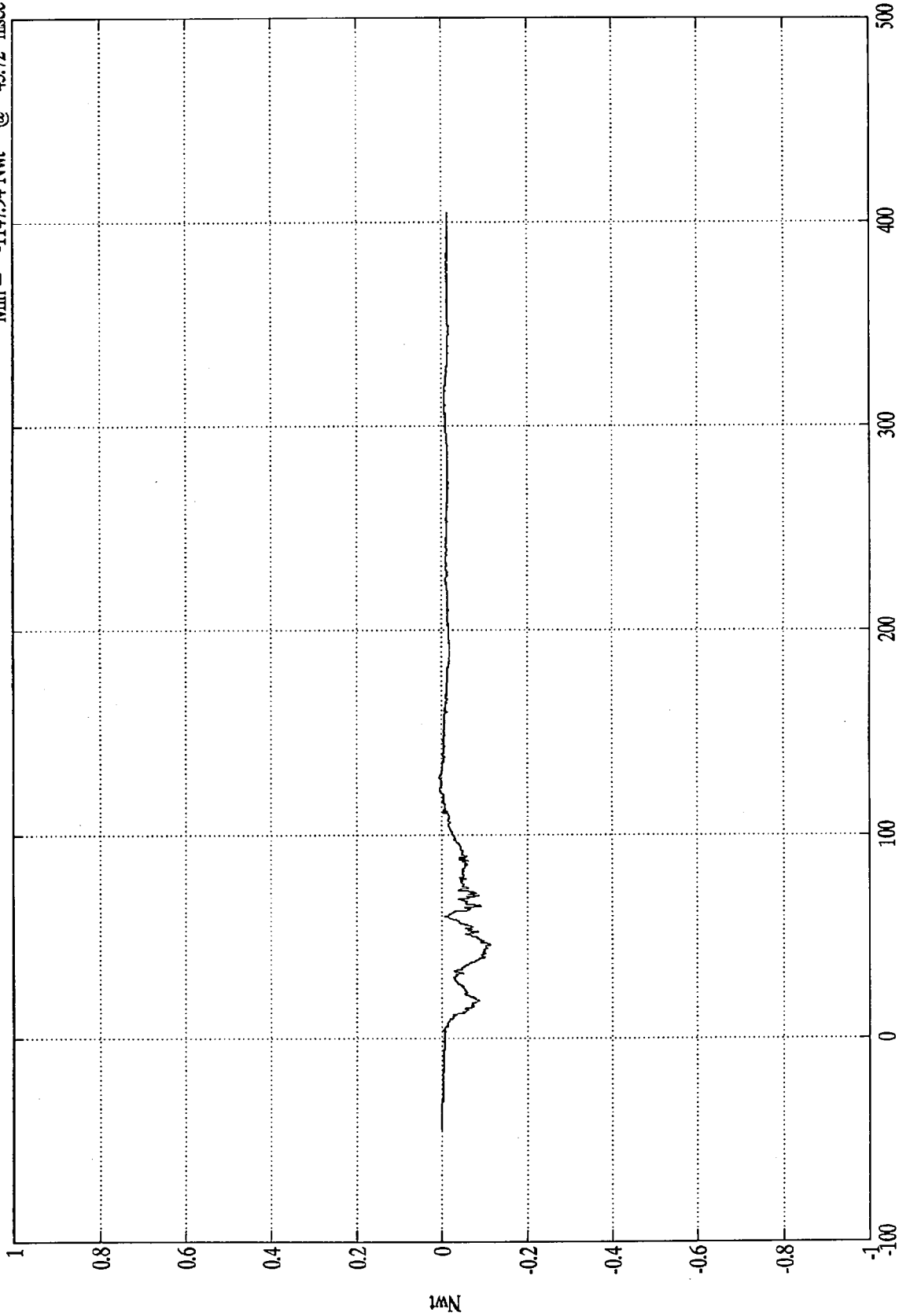
SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Pos. 2 Rt Lower Tibia Fz

Max = 61.33 Nwt @ 128.52 msec
Min = -1147.94 Nwt @ 45.72 msec



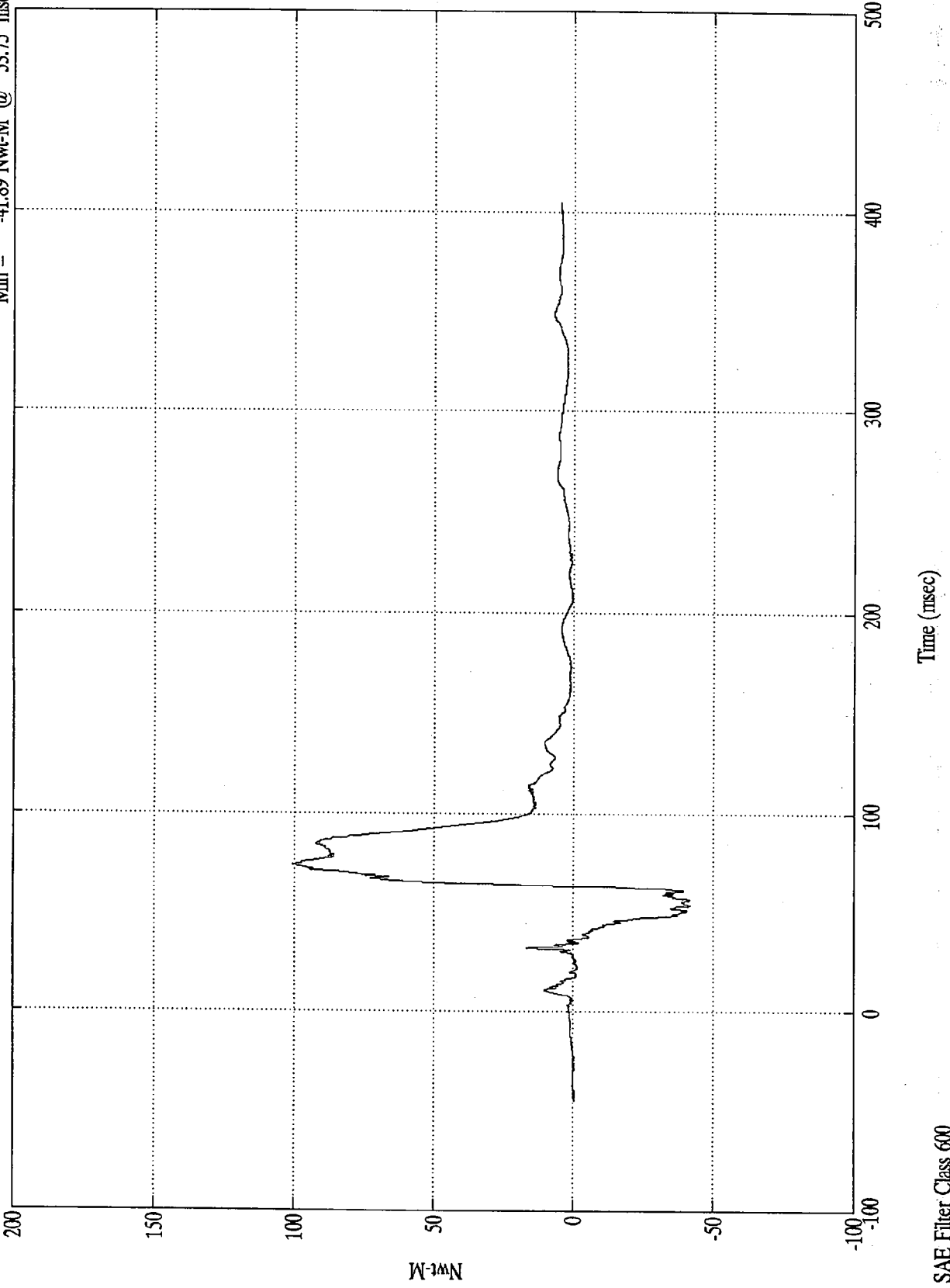
Time (msec)

SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Rt Lower Tibia My

Max = 100.55 Nwt-M @ 74.04 msec
Min = -41.89 Nwt-M @ 53.75 msec

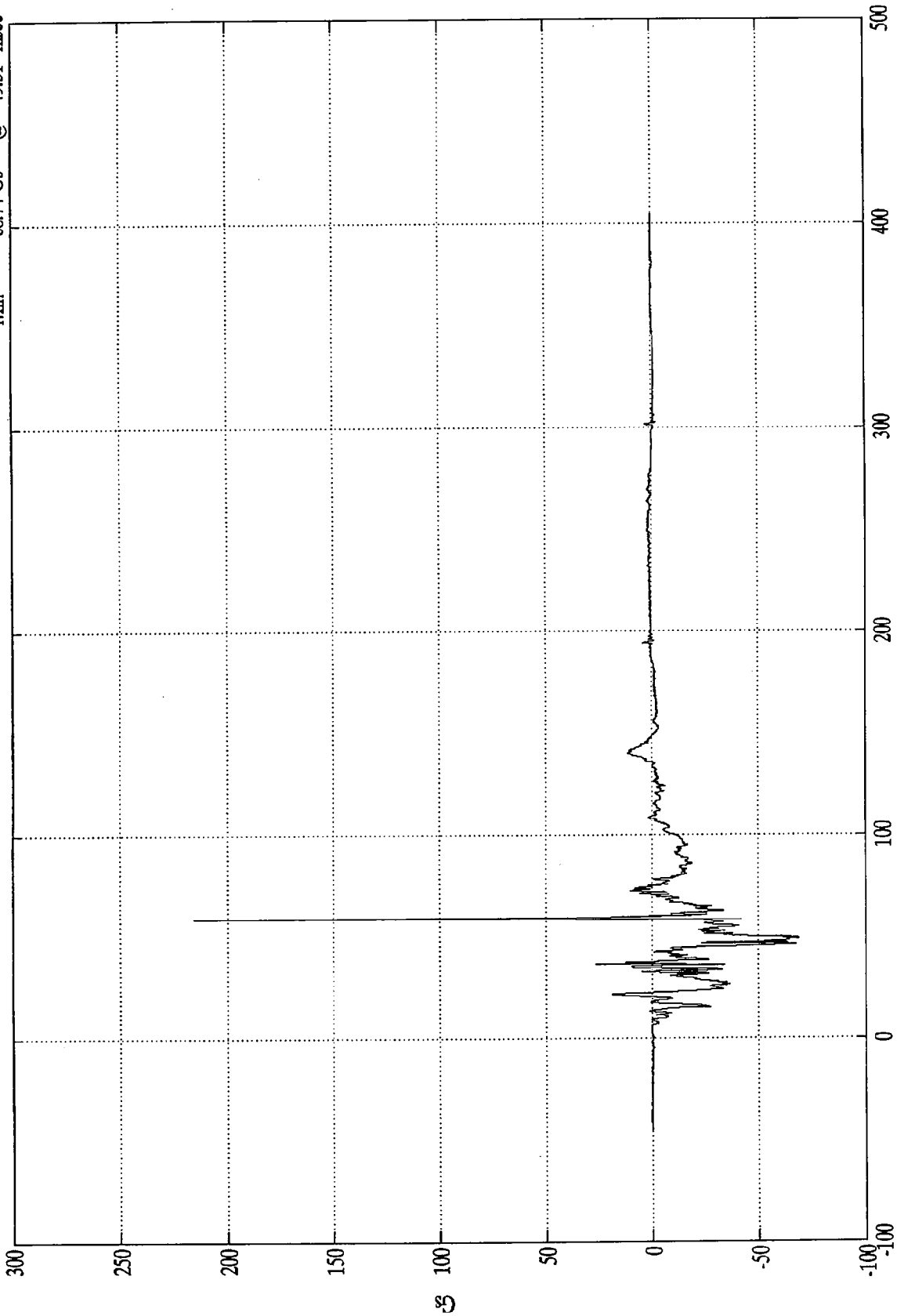


SAE Filter Class 600

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 L.Foot Front Z

Max = 215.30 Gs @ 59.04 msec
Min = -68.74 Gs @ 49.31 msec



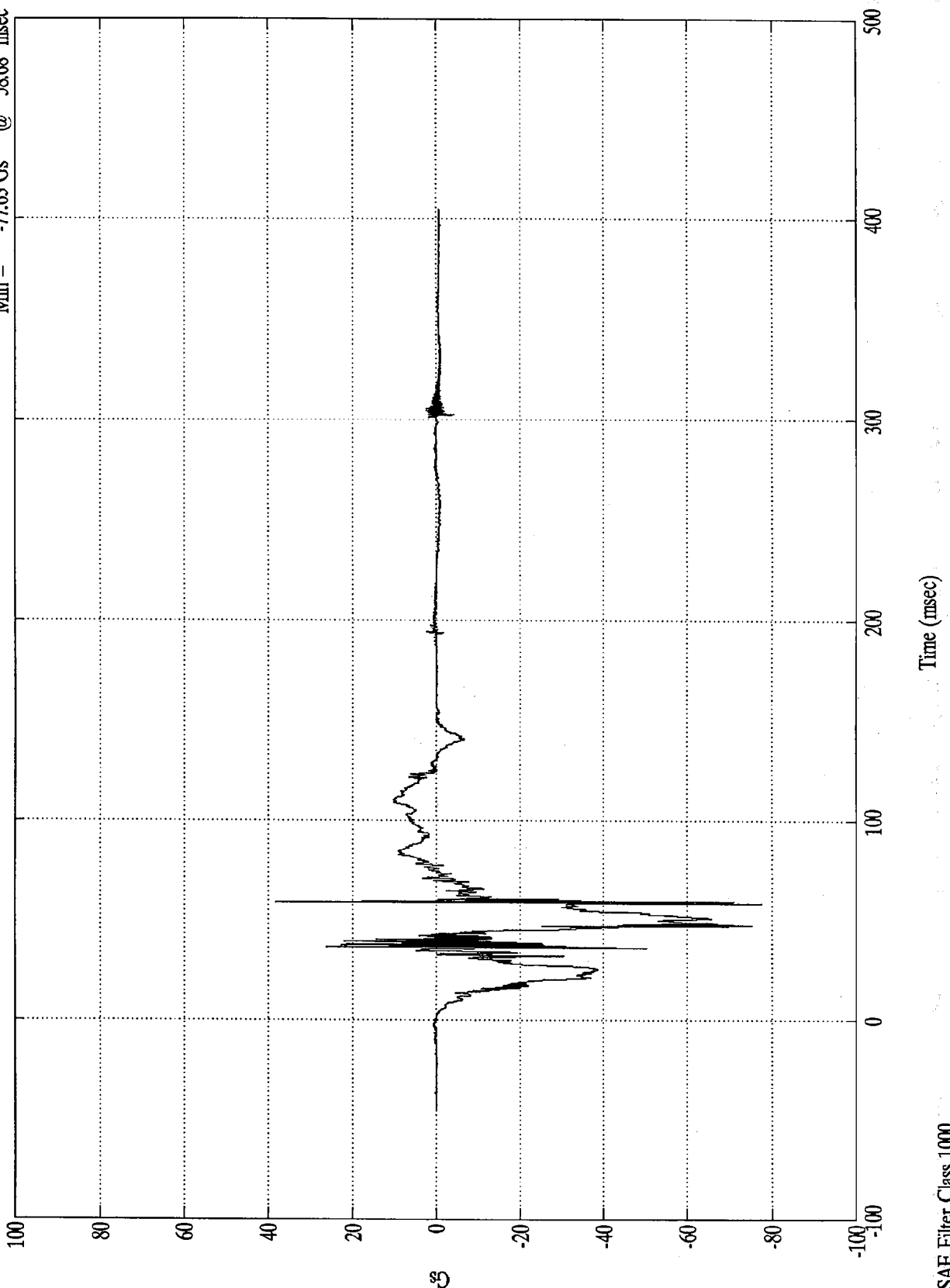
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 L.Foot Rear X

Max = 38.31 Gs @ 59.15 msec
Min = -77.63 Gs @ 58.68 msec



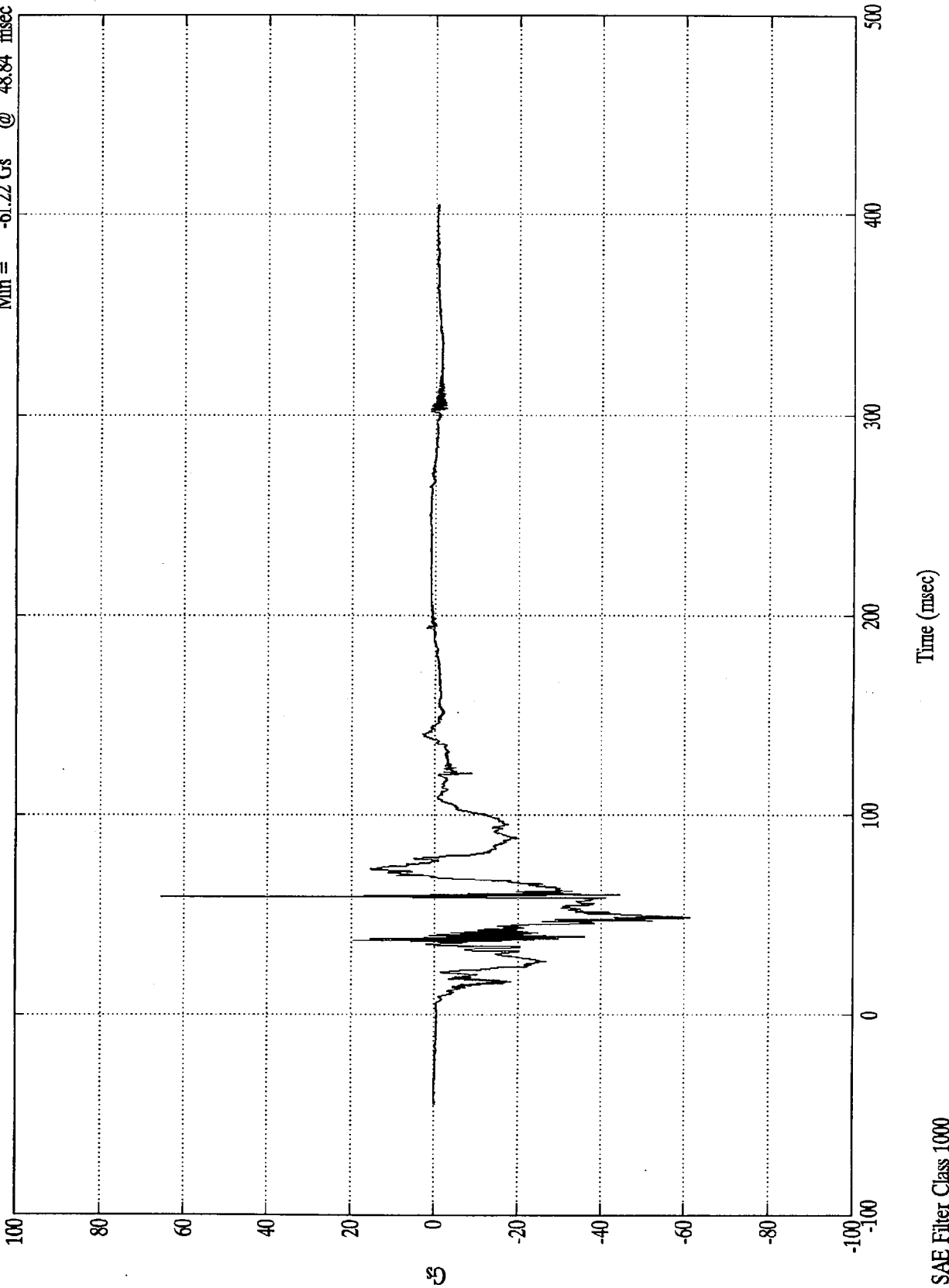
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 LFoot Rear Z

Max = 65.39 Gs @ 58.91 msec
Min = -61.22 Gs @ 48.84 msec

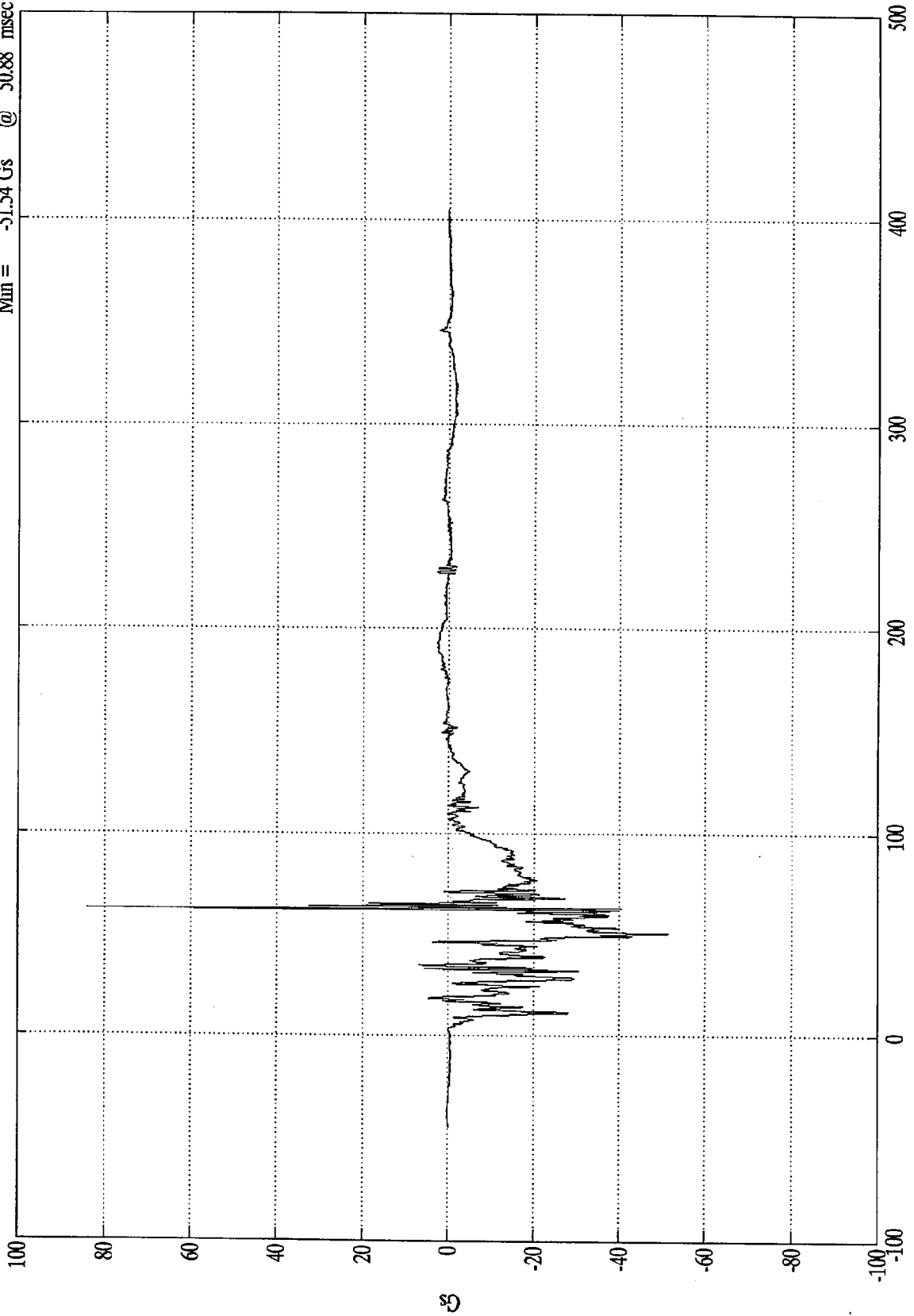


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 R.Foot Front Z

Max = 83.94 Gs @ 62.76 msec
Min = -51.54 Gs @ 50.88 msec



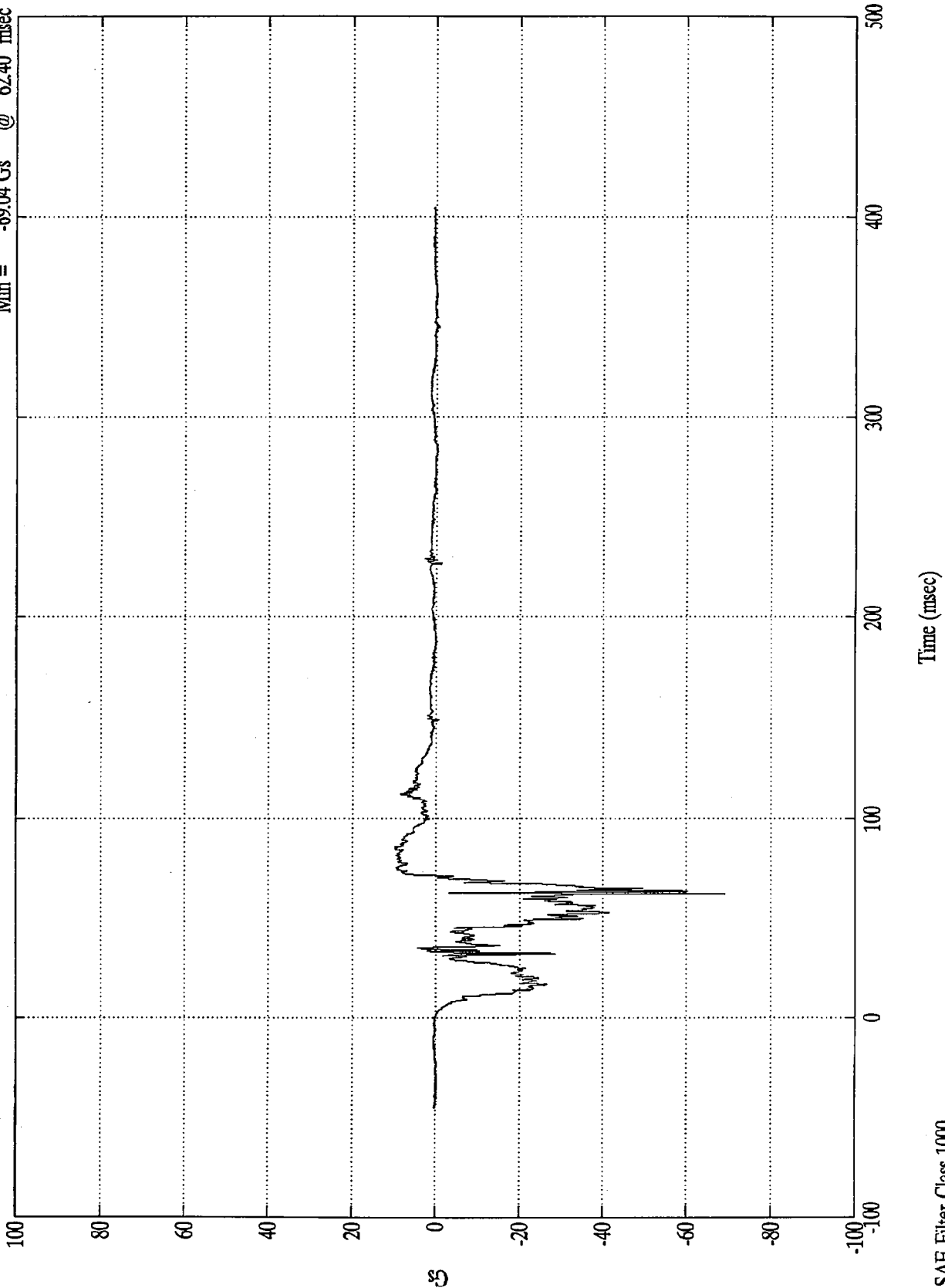
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 RFoot Rear X

Max = 9.97 Gs @ 84.83 msec
Min = -69.04 Gs @ 62.40 msec

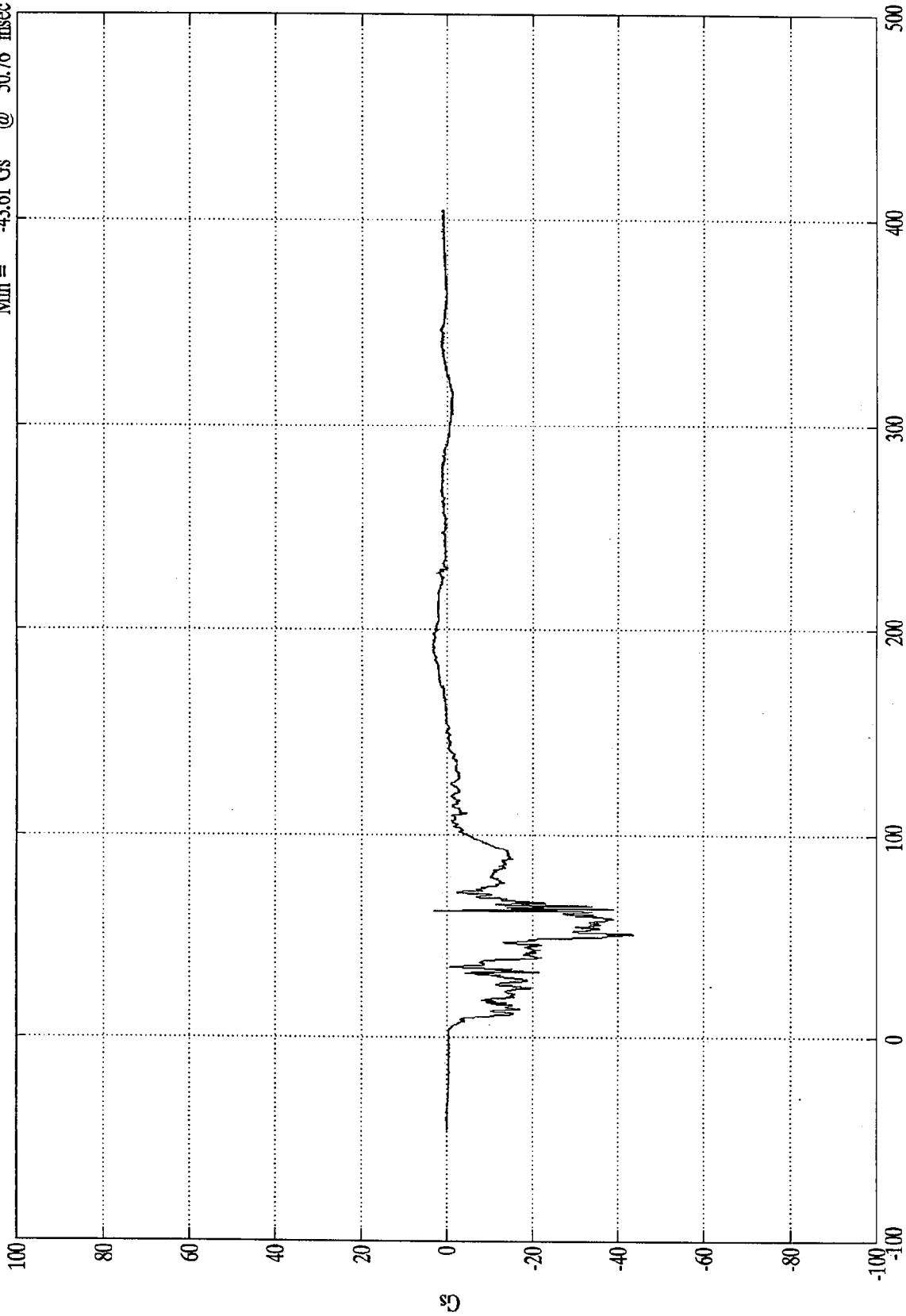


SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 R.Foot Rear Z

Max = 3.36 Gs @ 192.72 msec
Min = -43.61 Gs @ 50.76 msec



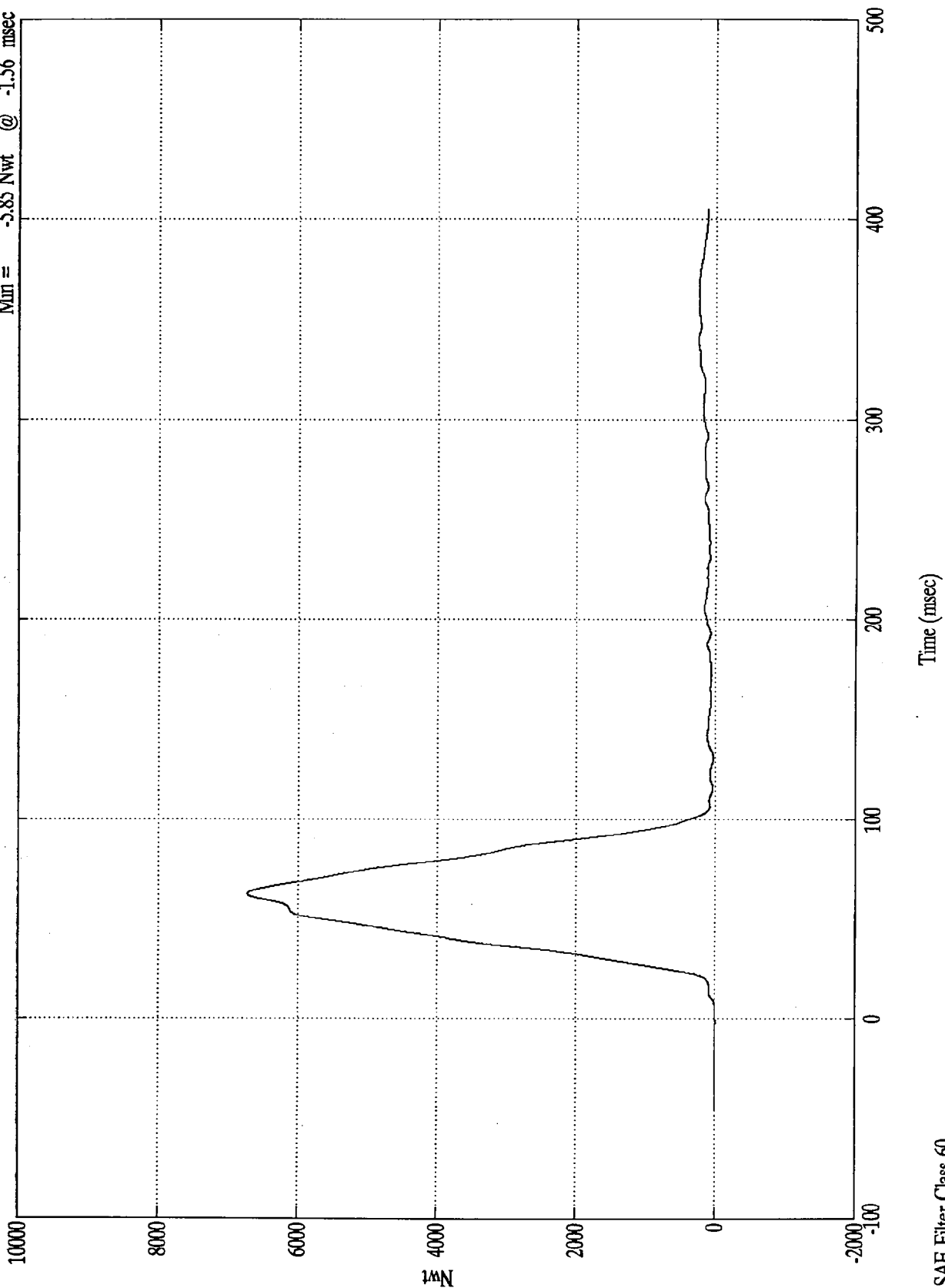
Time (msec)

SAE Filter Class 1000

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Torso Belt Load

Max = 6733.49 Nwt @ 62.76 msec
Min = -5.85 Nwt @ -1.56 msec

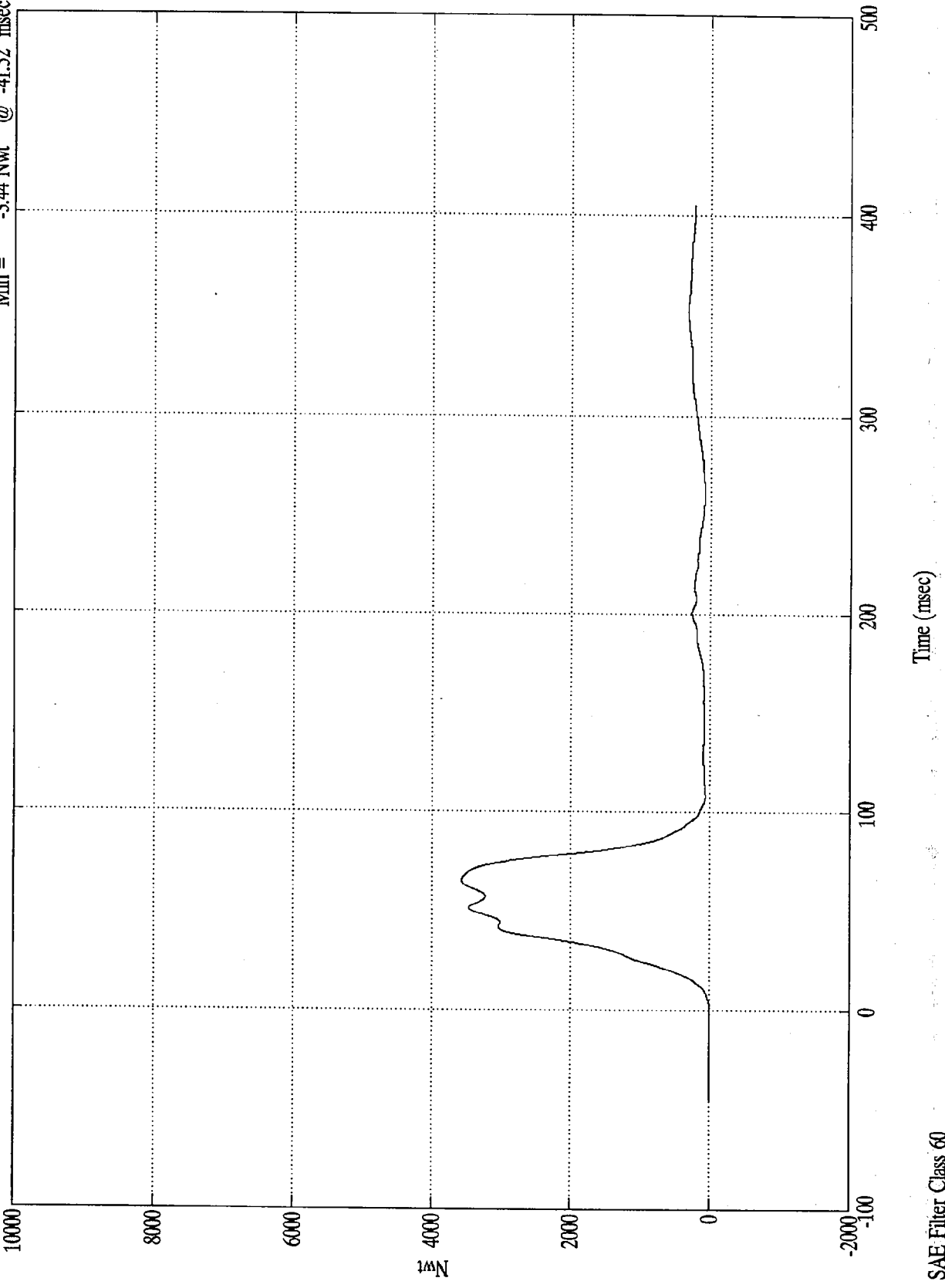


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Right Belt Load

Max = 3570.32 Nwt @ 65.40 msec
Min = -3.44 Nwt @ -41.52 msec

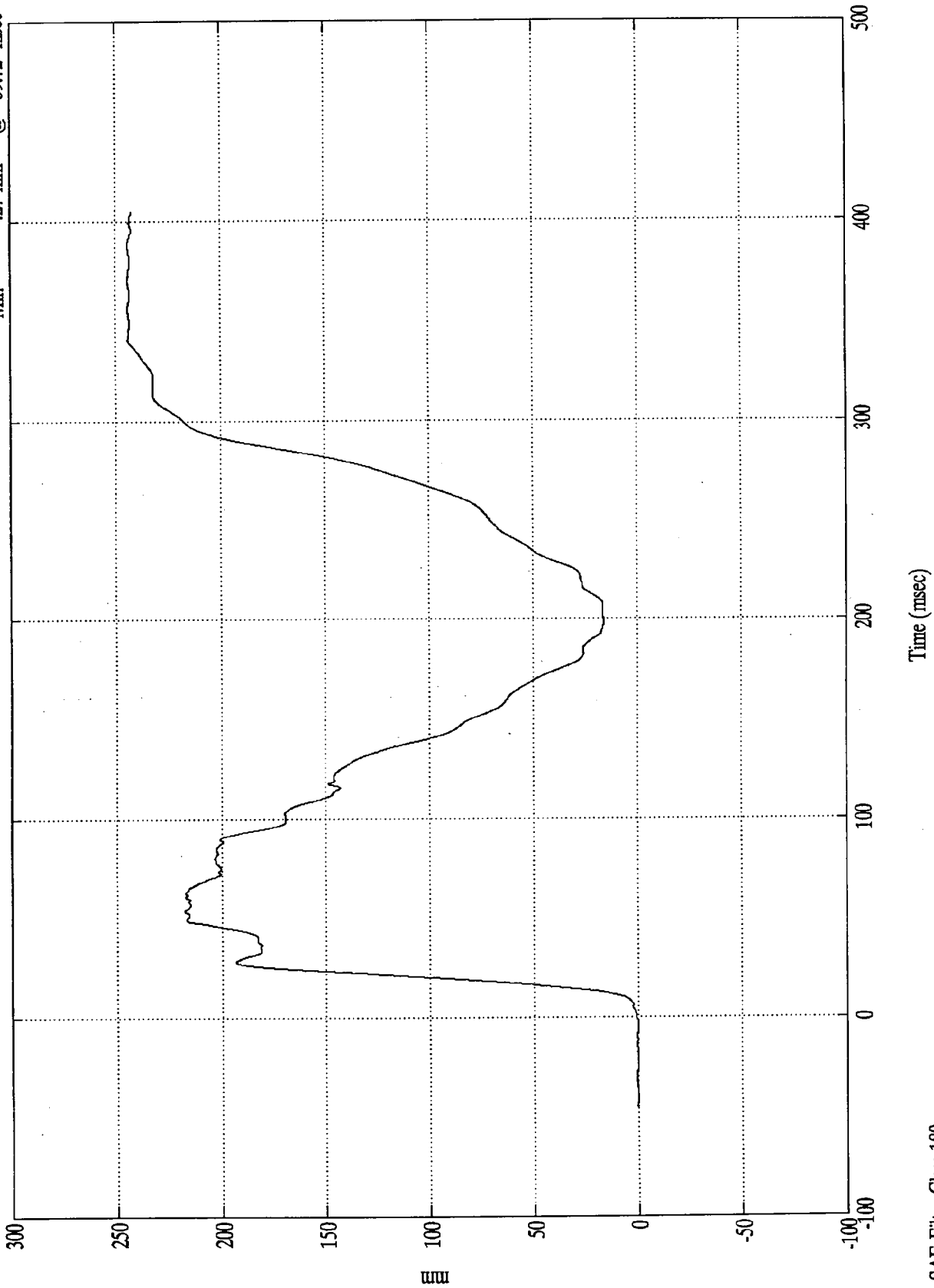


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Pos. 2 Belt Spool Out

Max = 244.09 mm @ 388.68 msec
Min = -27 mm @ -39.72 msec



SAE Filter Class 180

NHTSA TEST NO. MT5400

VEHICLE DATA

FILTER CHANNEL CLASS

Acceleration

60

Velocity

180

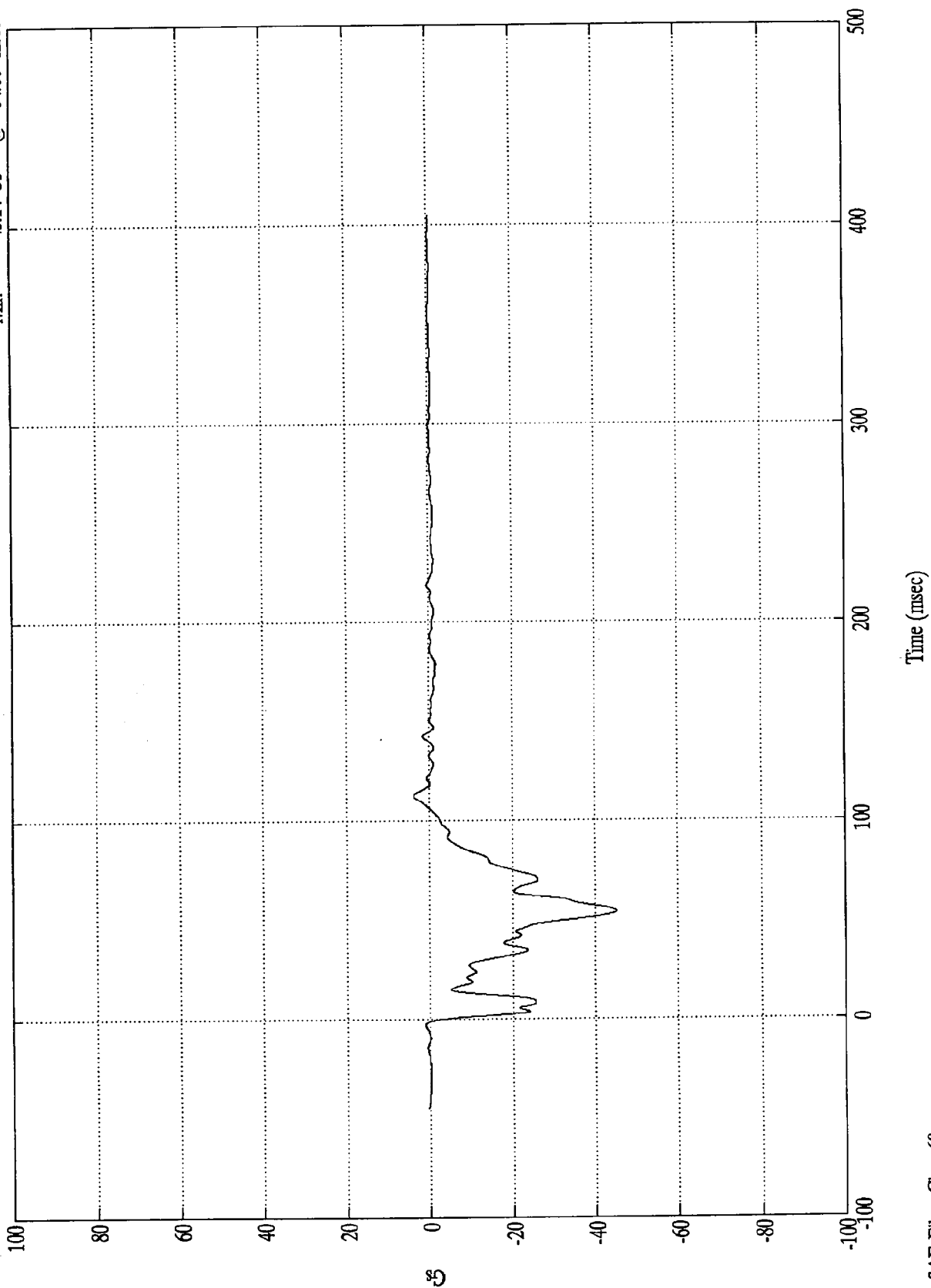
Displacement

180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #1(x)

Max = 3.69 Gs @ 112.68 msec
Min = -45.14 Gs @ 54.00 msec

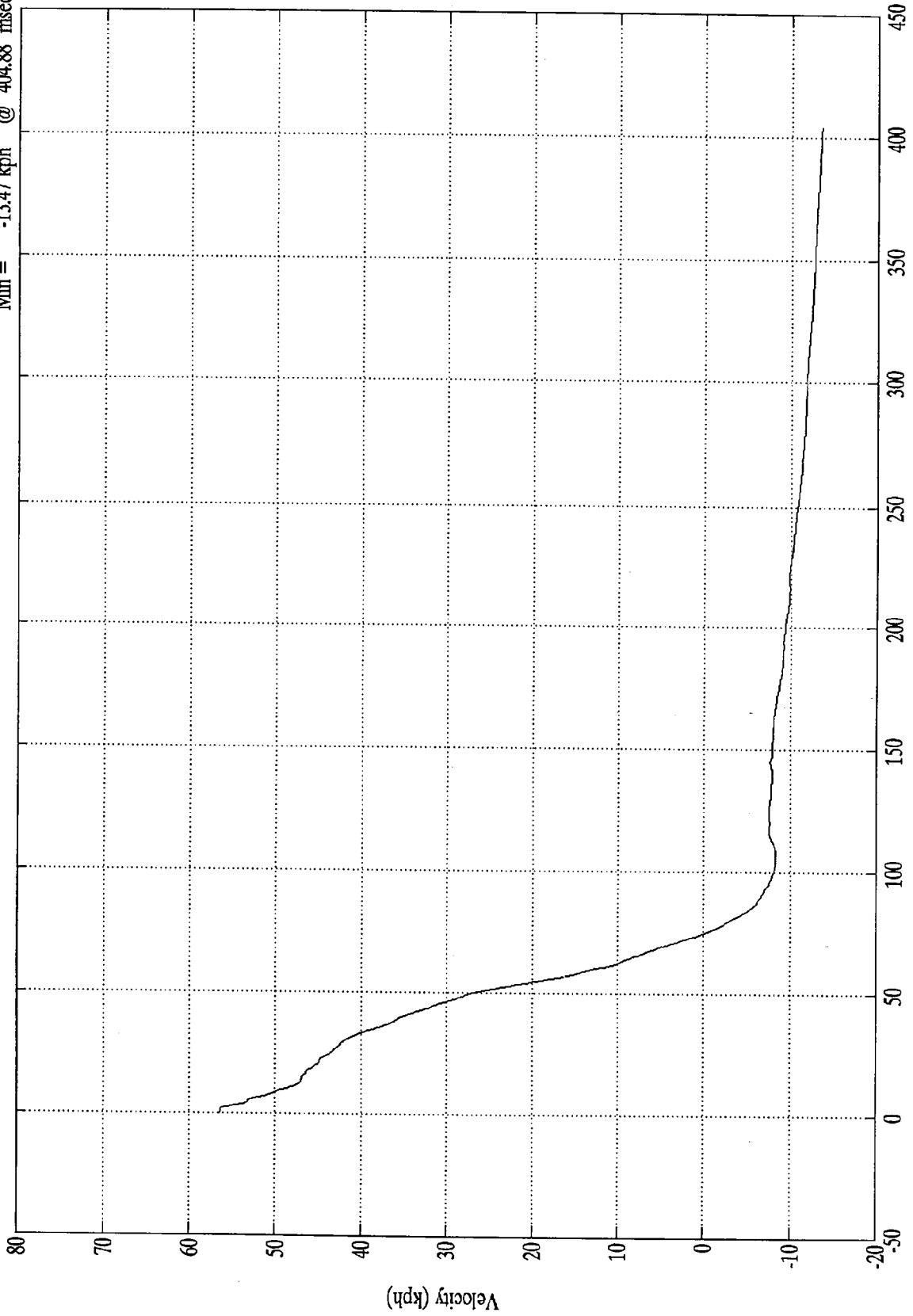


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Max = 56.49 kph @ -0.00 msec
Min = -13.47 kph @ 404.88 msec

Acc. #1(x)



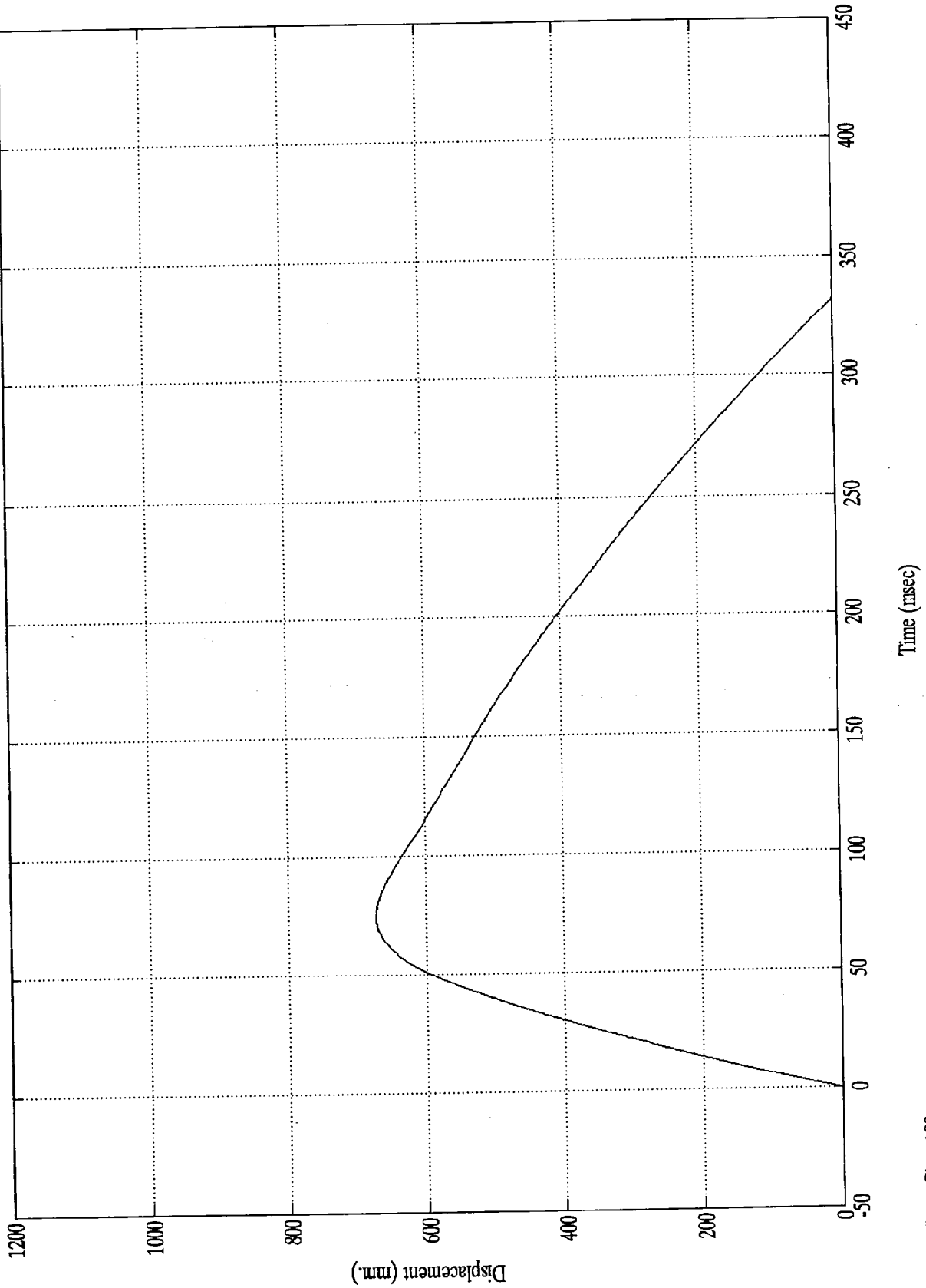
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Max = 672.98 mm @ 74.51 msec
Min = -262.05 mm @ 404.88 msec

Acc. #1(x)

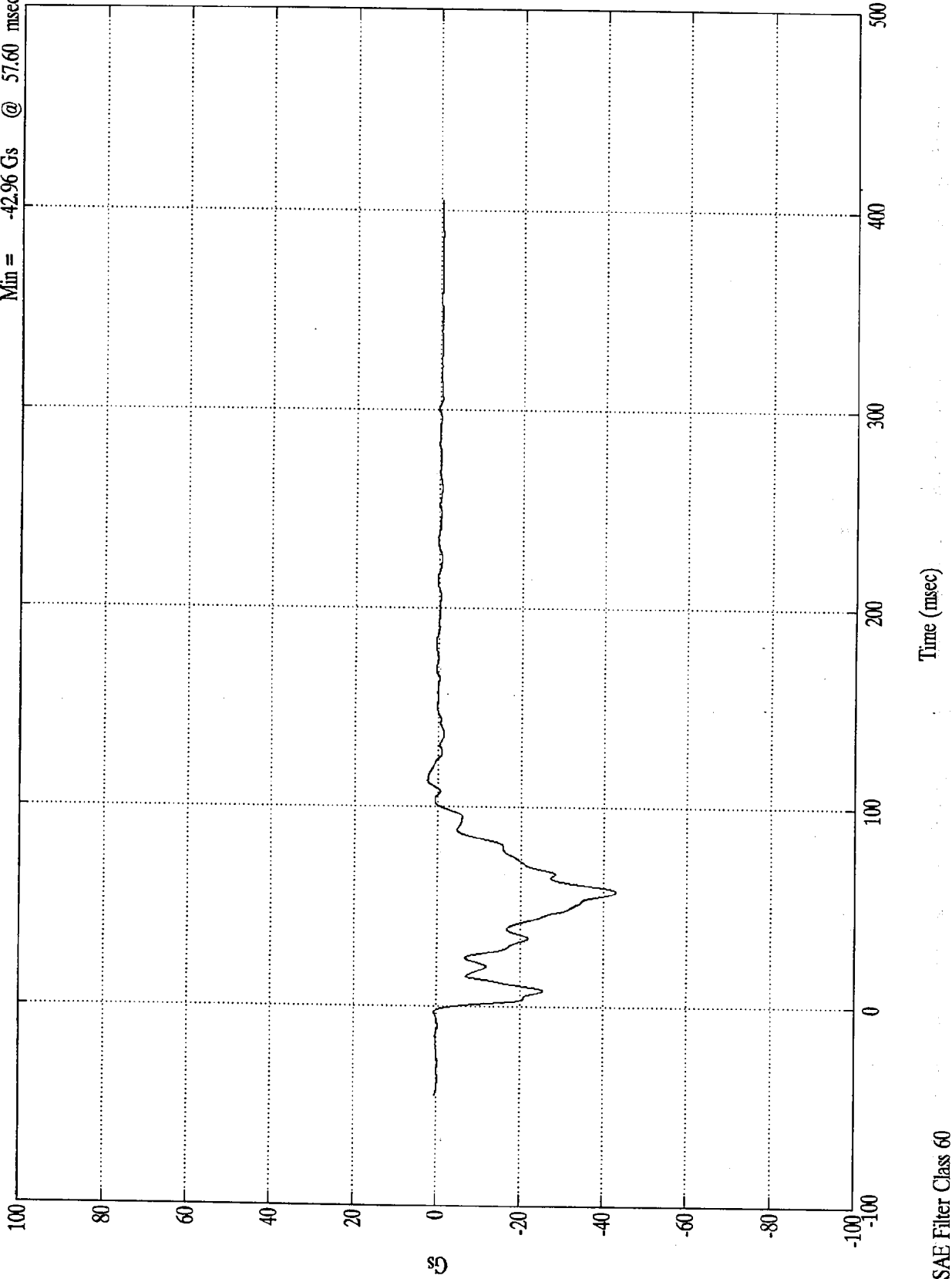


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

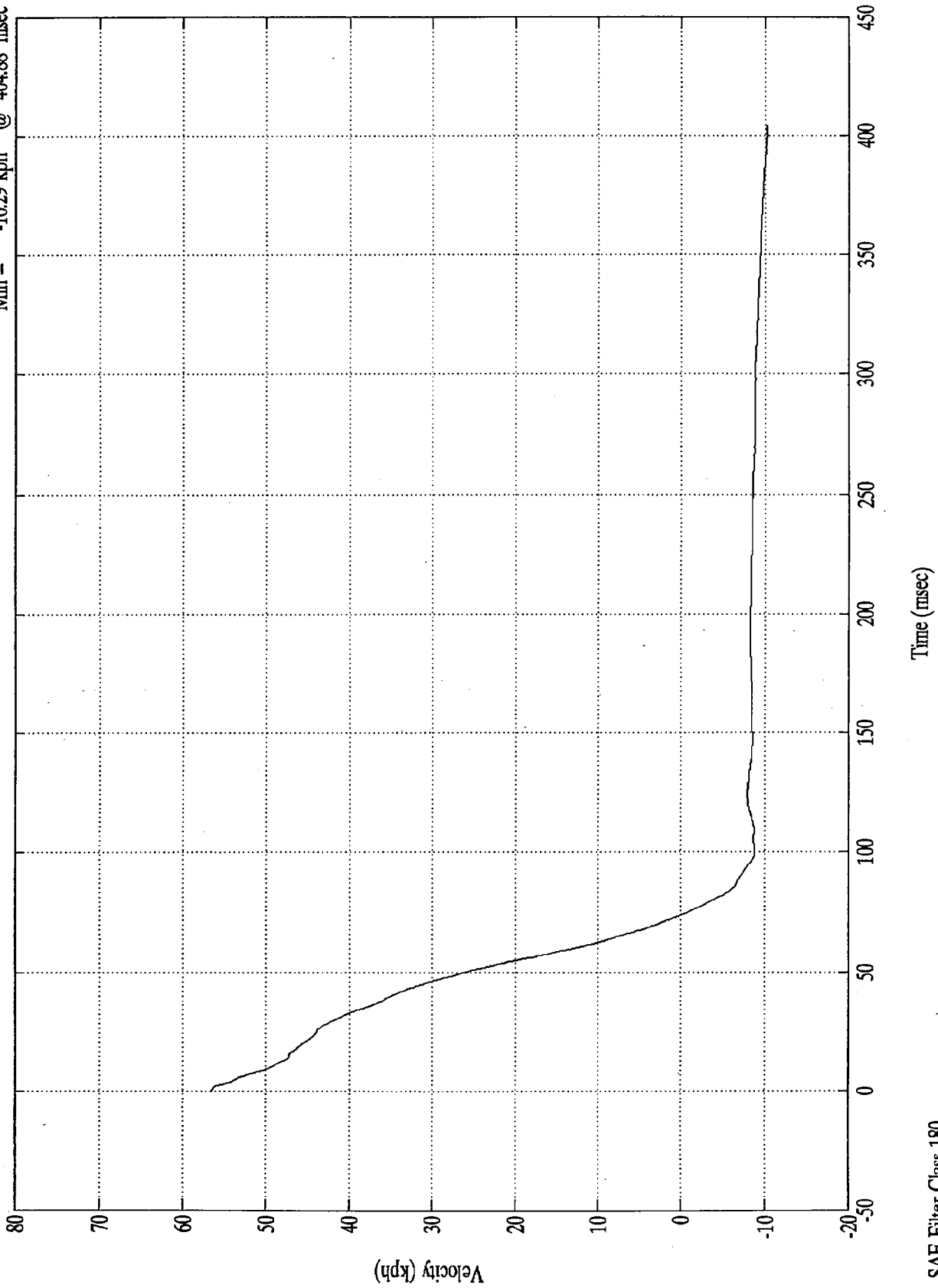
Acc. #2(x)

Max = 2.38 Gs @ 113.04 msec
Min = -42.96 Gs @ 57.60 msec



NCAP TEST #8 - 1996 MAZDA MPV

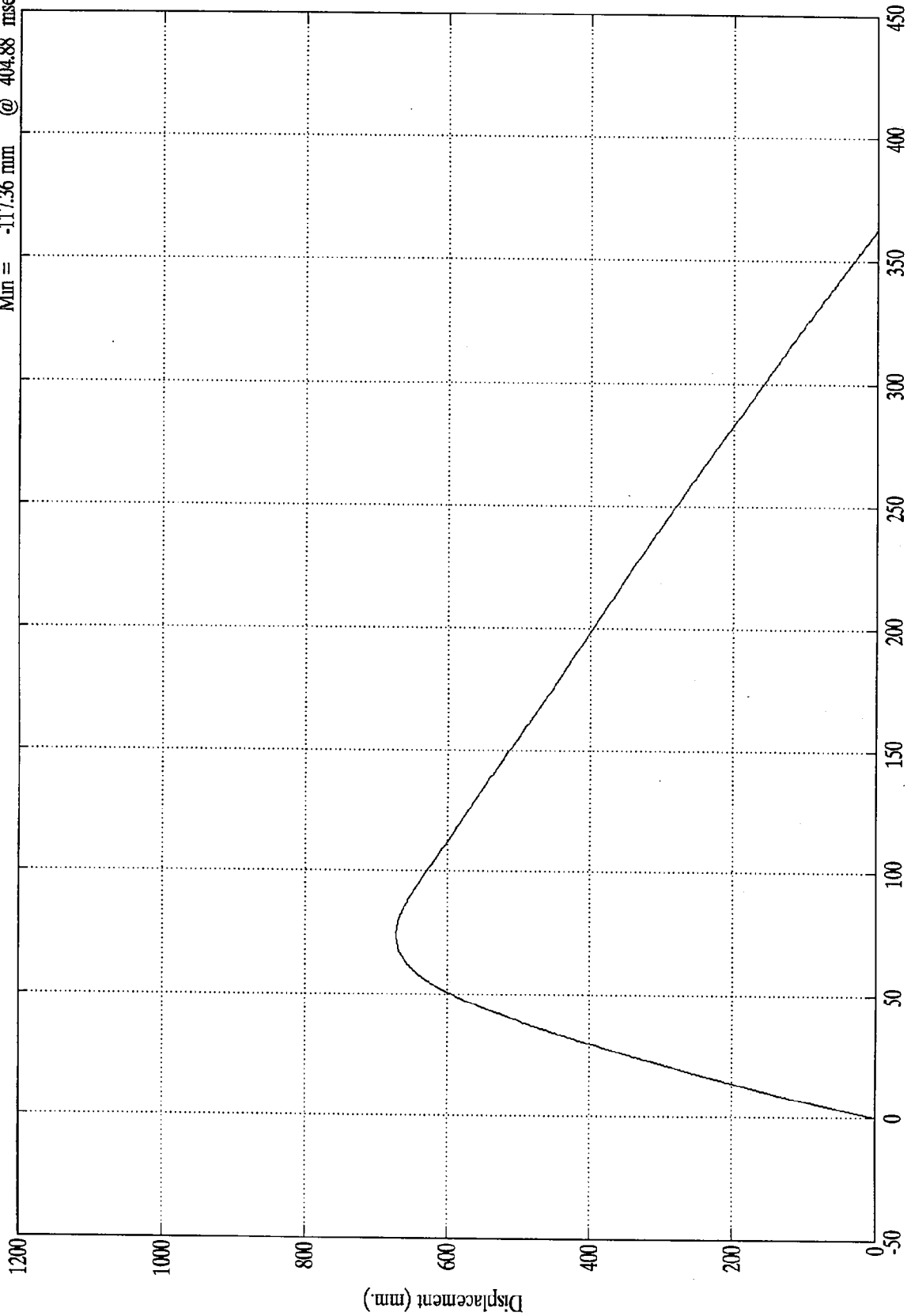
Acc. #2(x)
Max = 56.49 kph @ -0.00 msec
Min = -10.29 kph @ 404.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #2(x)

Max = 672.28 mm @ 73.67 msec
Min = -117.36 mm @ 404.88 msec



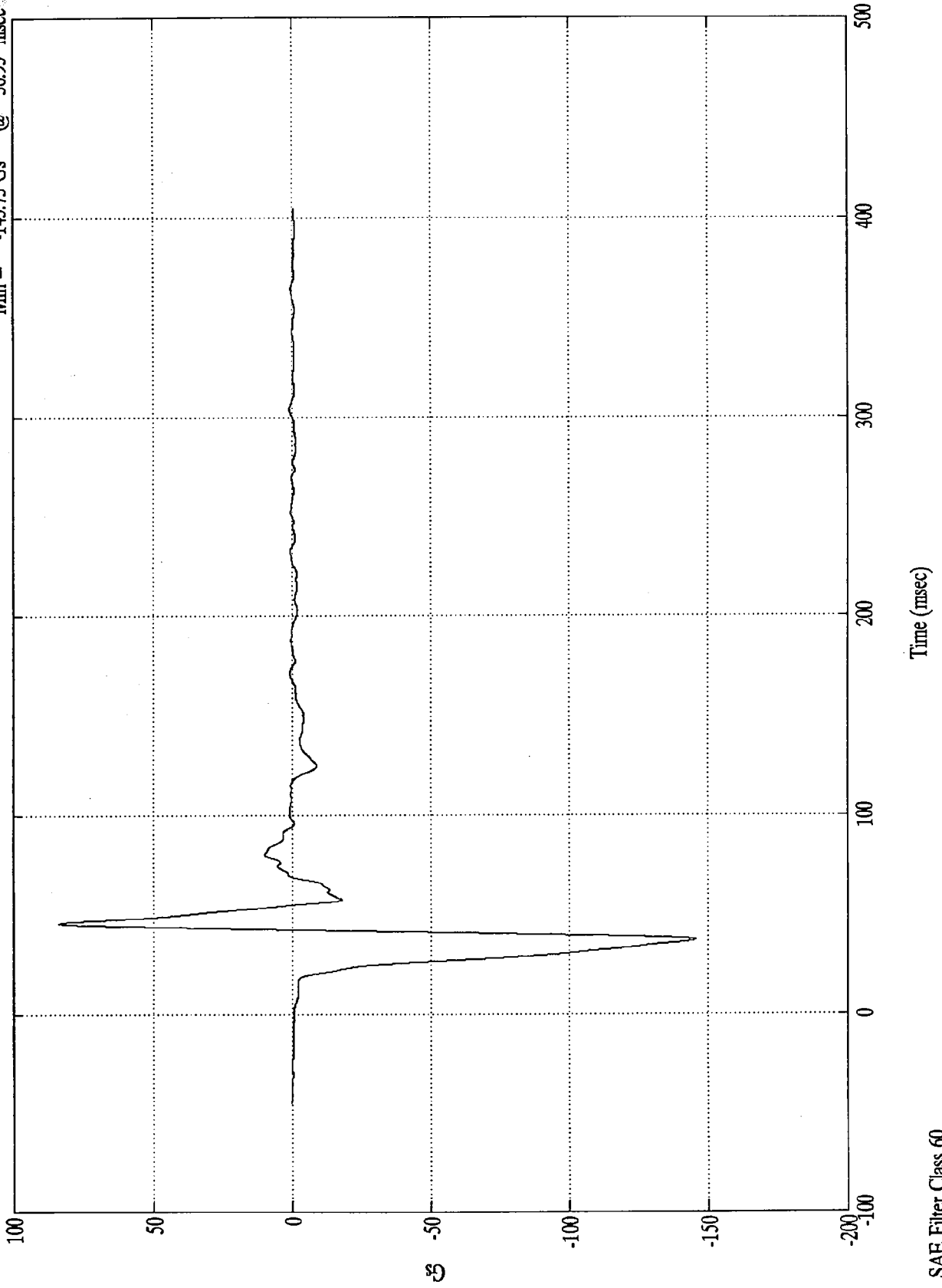
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #3(x)

Max = 83.95 Gs @ 45.48 msec
Min = -145.73 Gs @ 36.95 msec

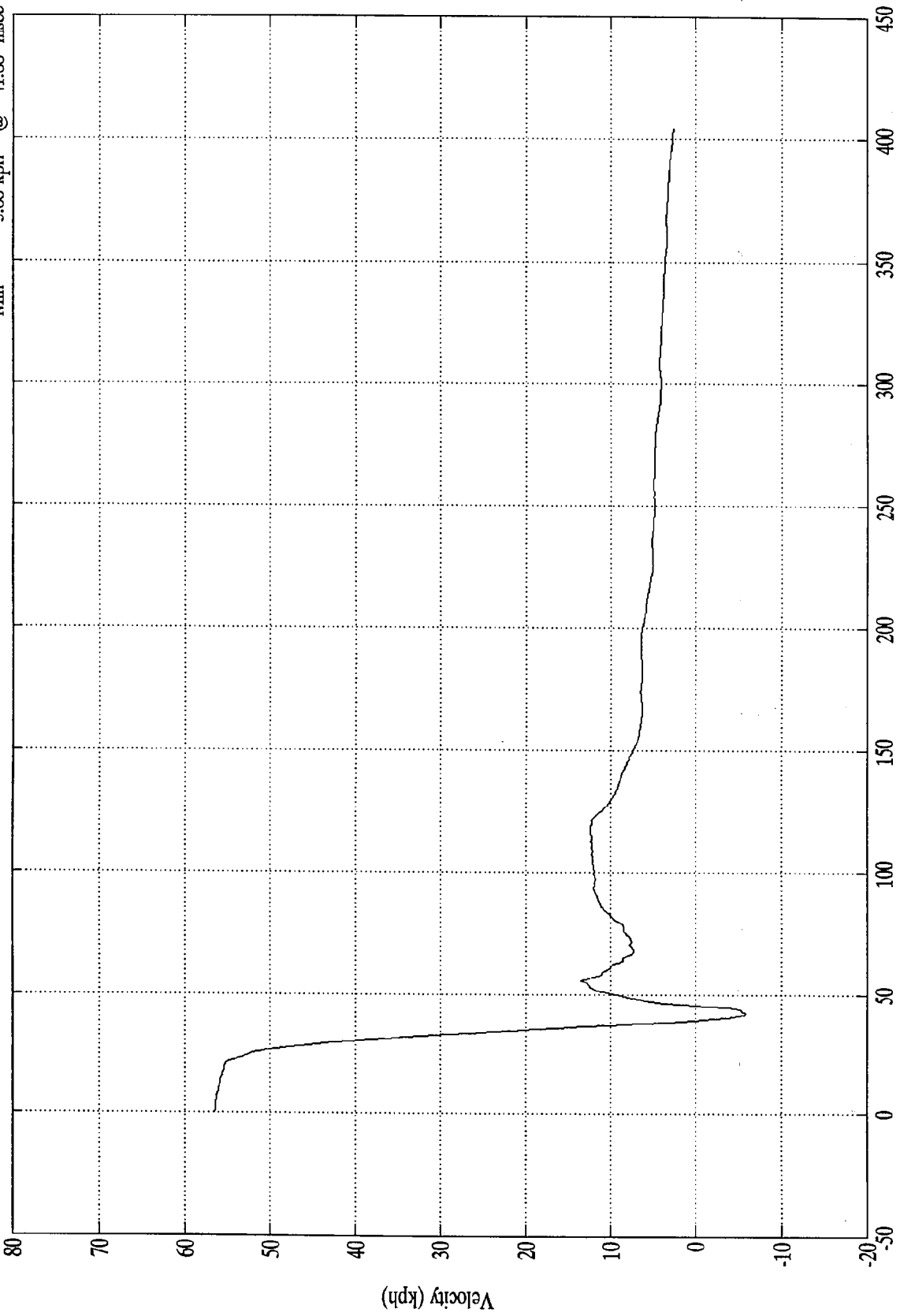


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #3(x)

Max = 56.49 kph @ -0.00 msec
Min = -5.88 kph @ 41.88 msec



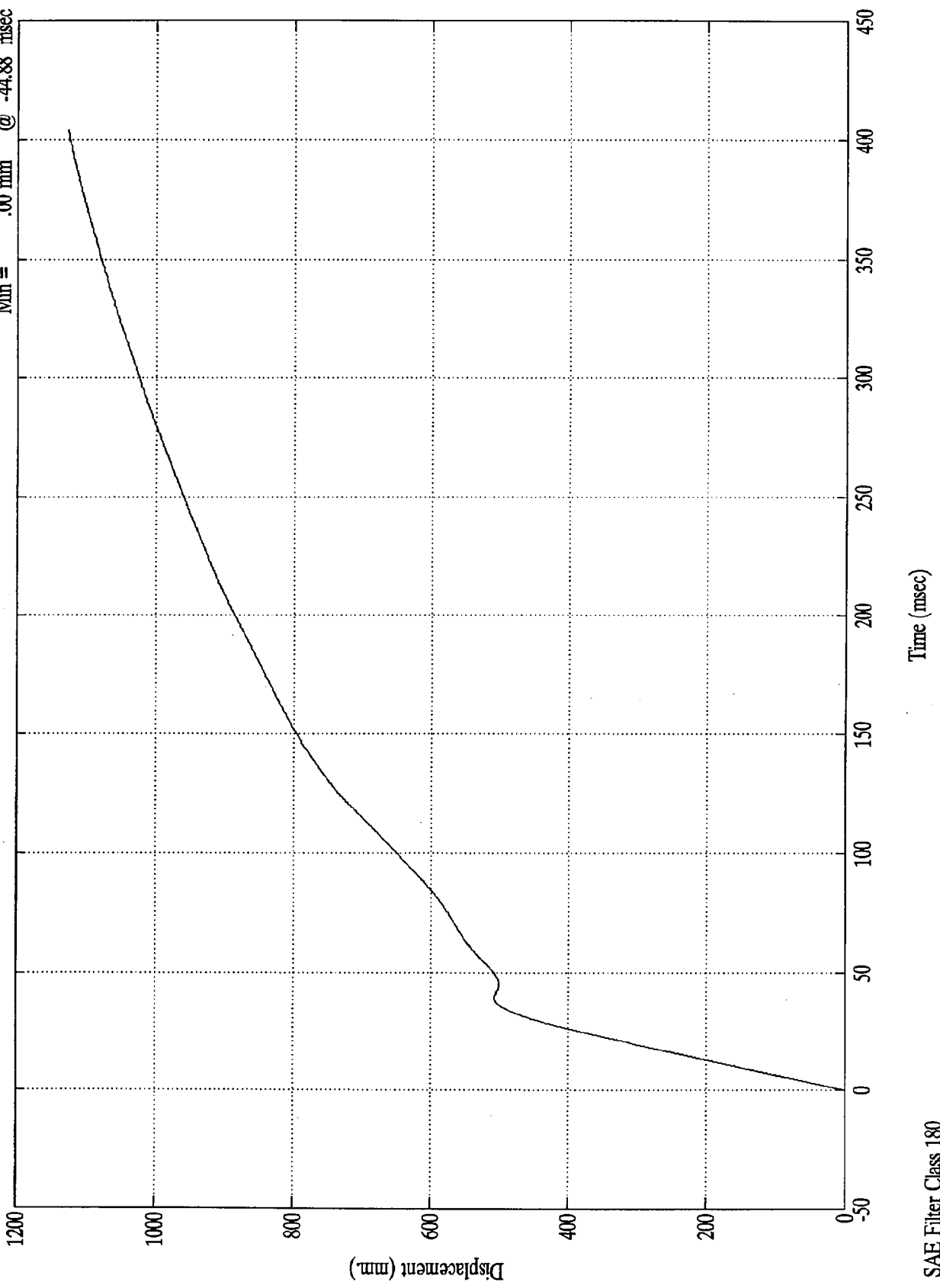
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #3(x)

Max = 1128.53 mm @ 404.88 msec
Min = .00 mm @ -44.88 msec

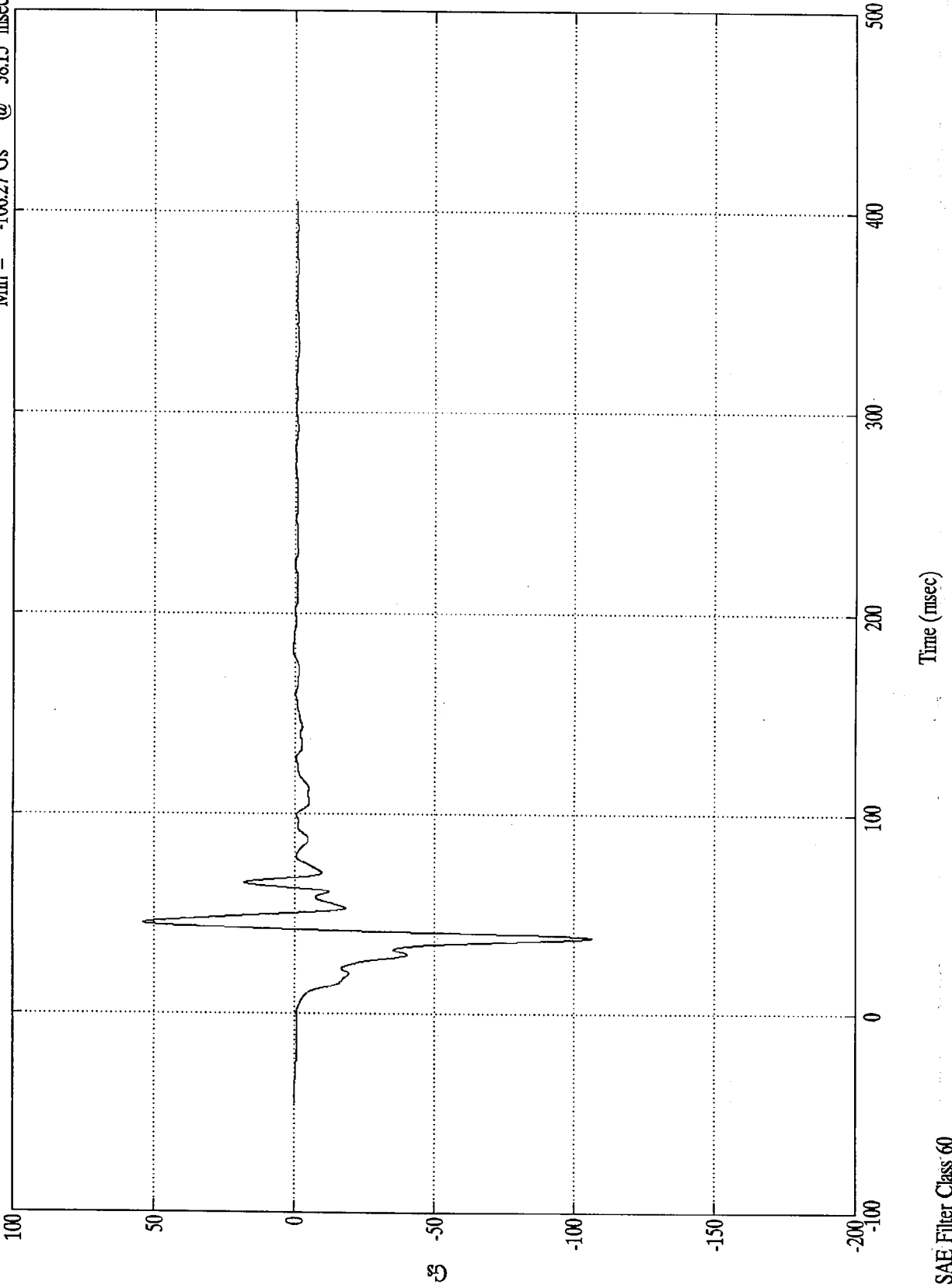


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #4(x)

Max = 54.08 Gs @ 45.60 msec
Min = -106.27 Gs @ 38.15 msec

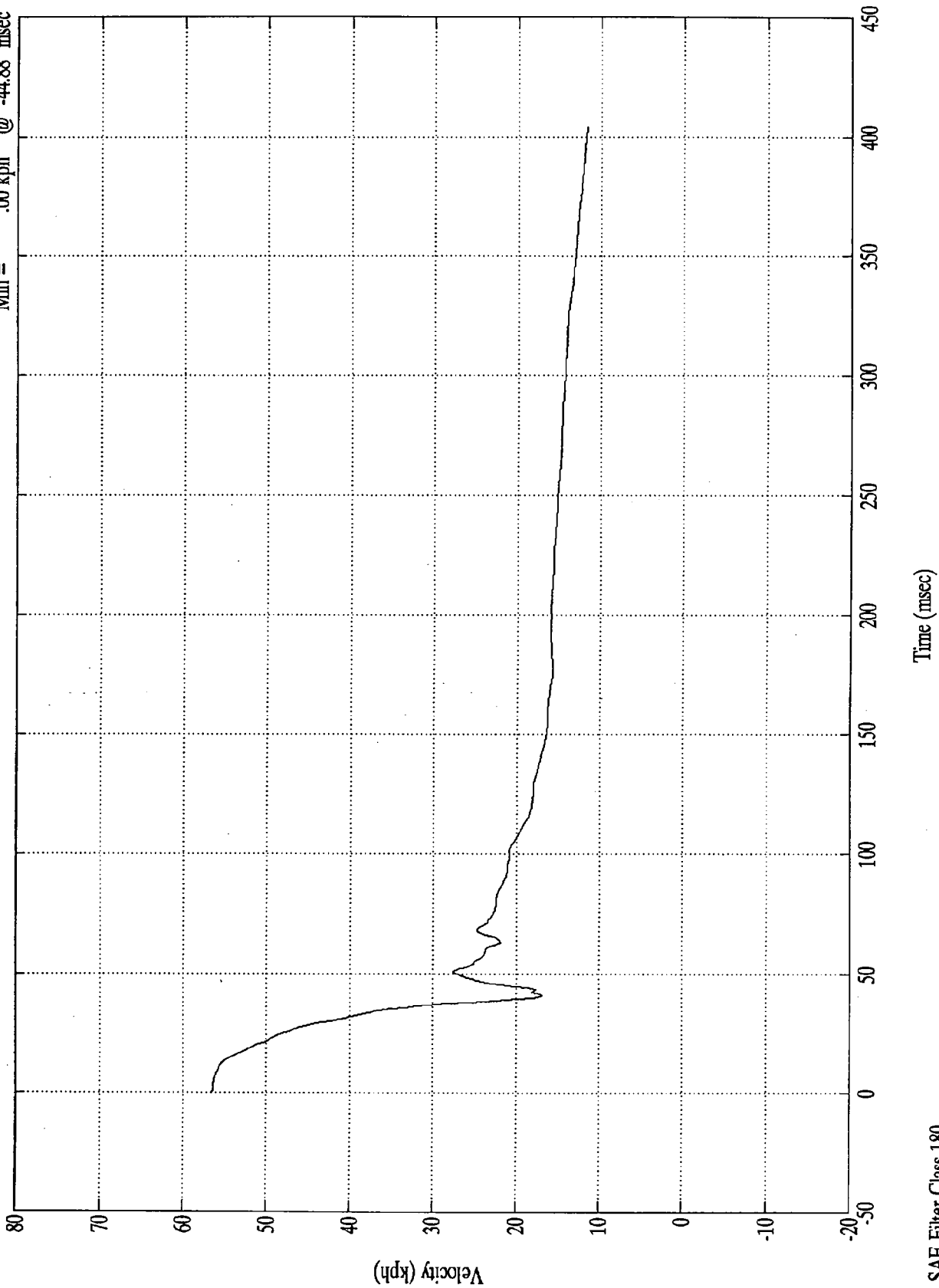


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #4(x)

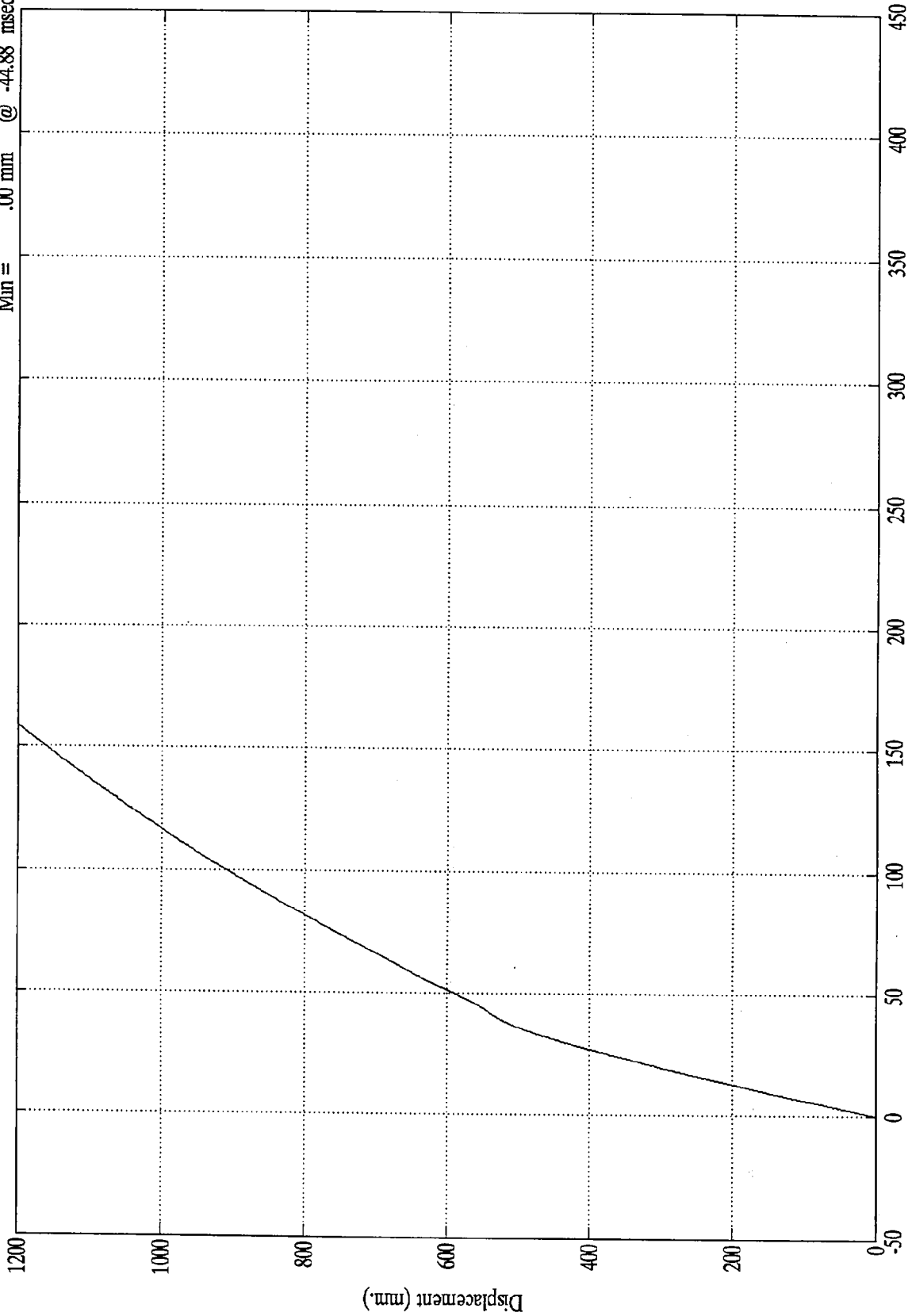
Max = 56.49 kph @ -0.00 msec
Min = .00 kph @ -44.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #4(x)

Max = 2183.47 mm @ 404.88 msec
Min = .00 mm @ -44.88 msec



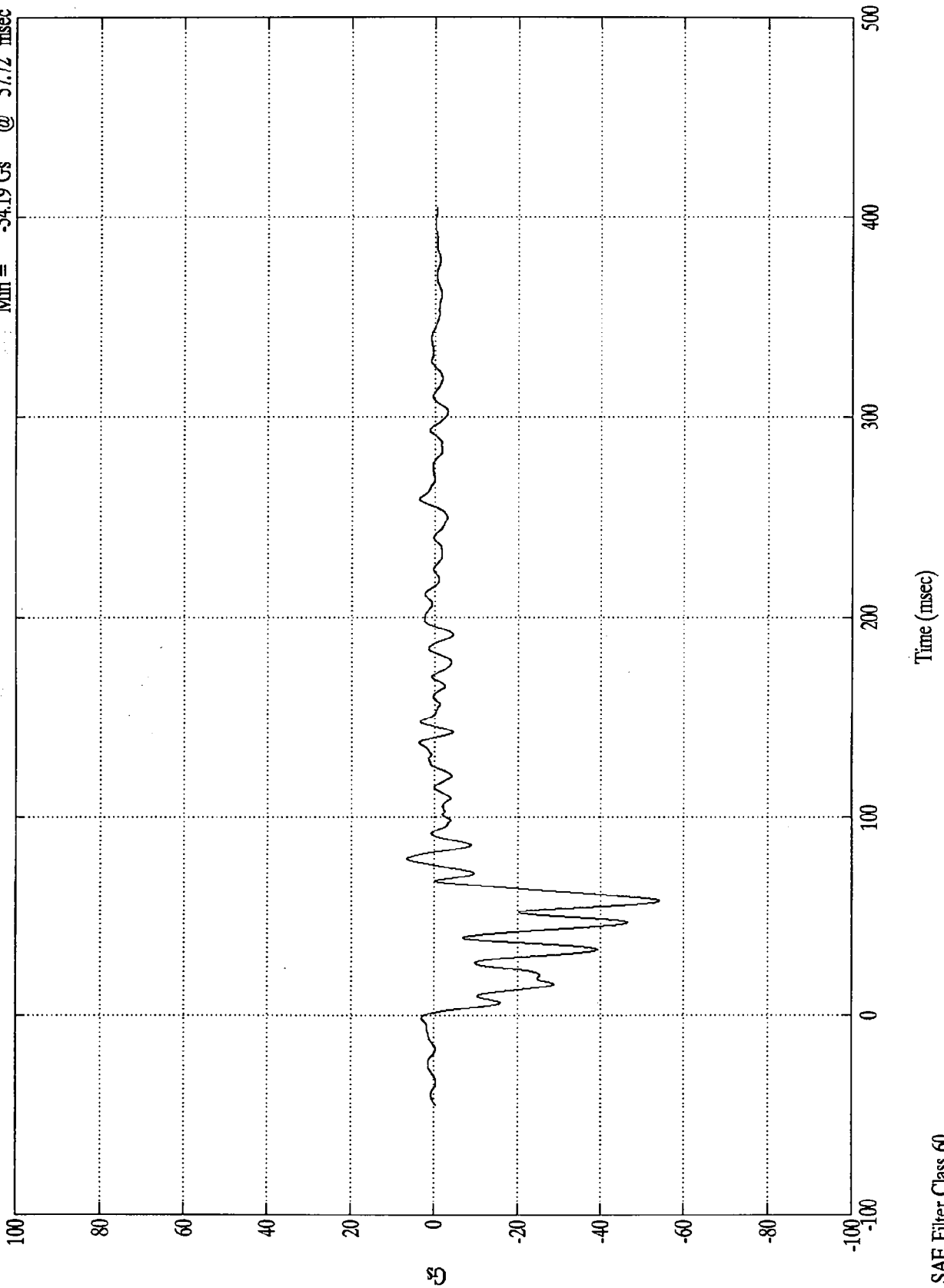
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #5(x)

Max = 6.62 Gs @ 78.84 msec
Min = -54.19 Gs @ 57.72 msec

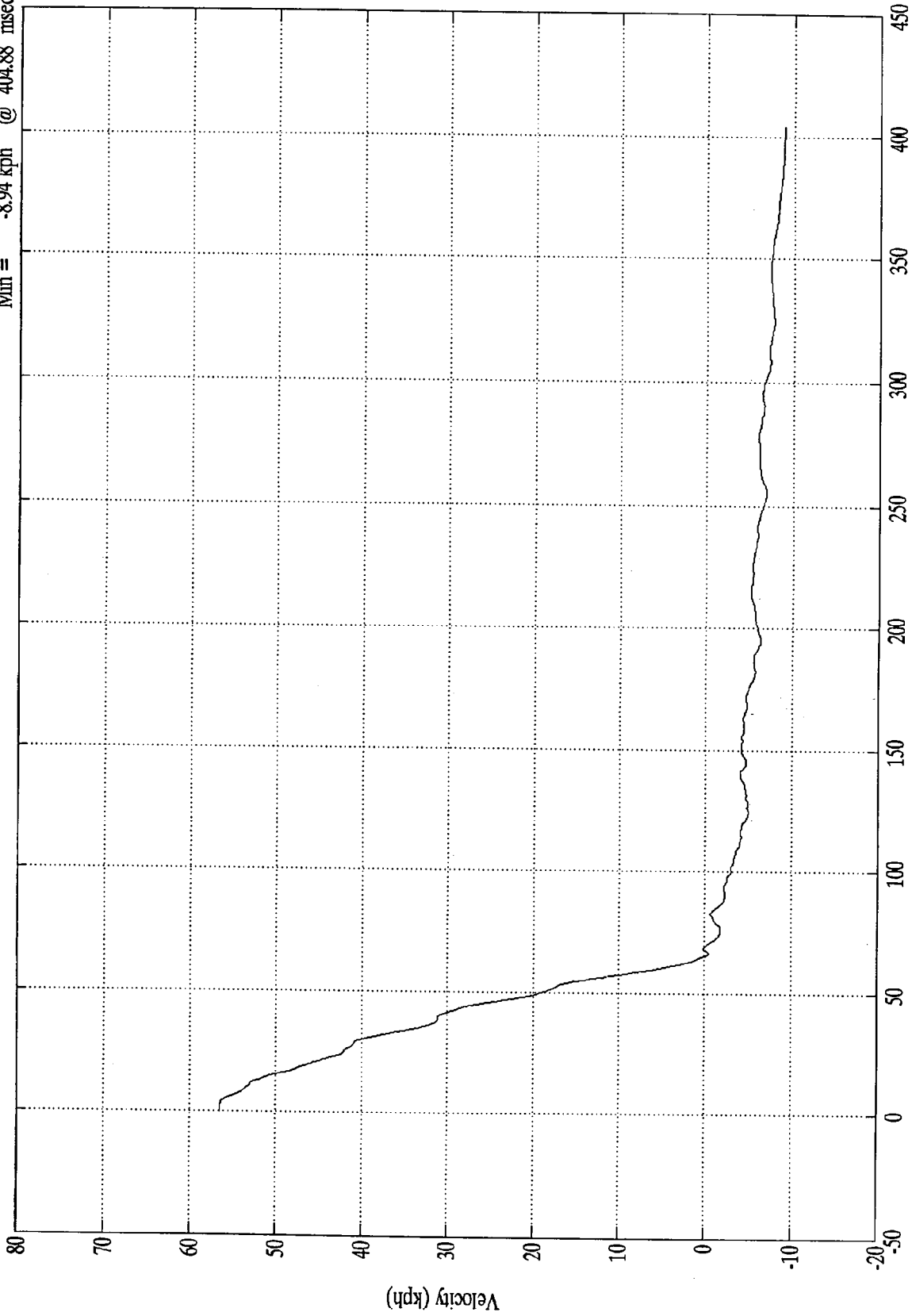


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #5(x)

Max = 56.57 kph @ 1.19 msec
Min = -8.94 kph @ 404.88 msec

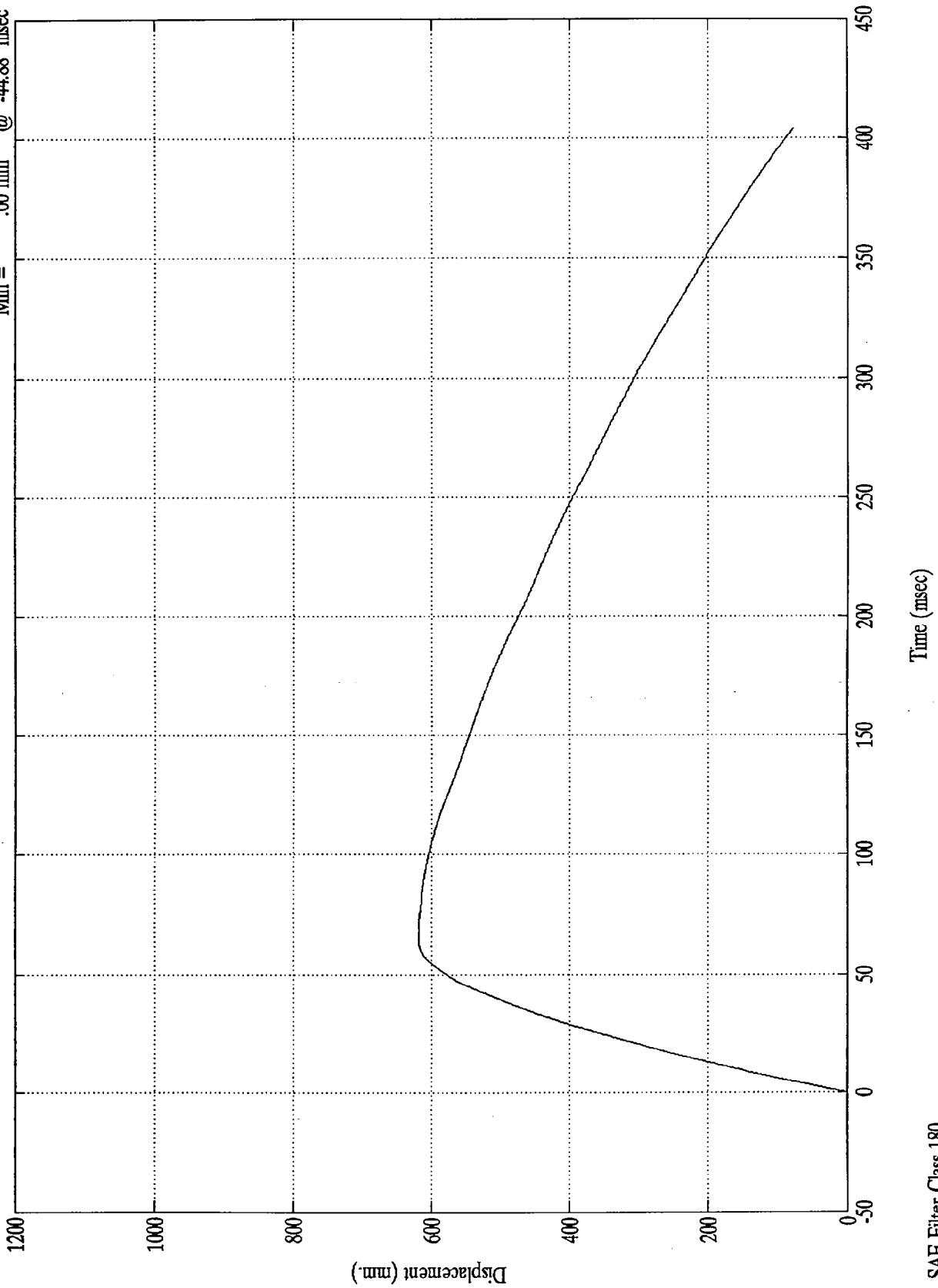


Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

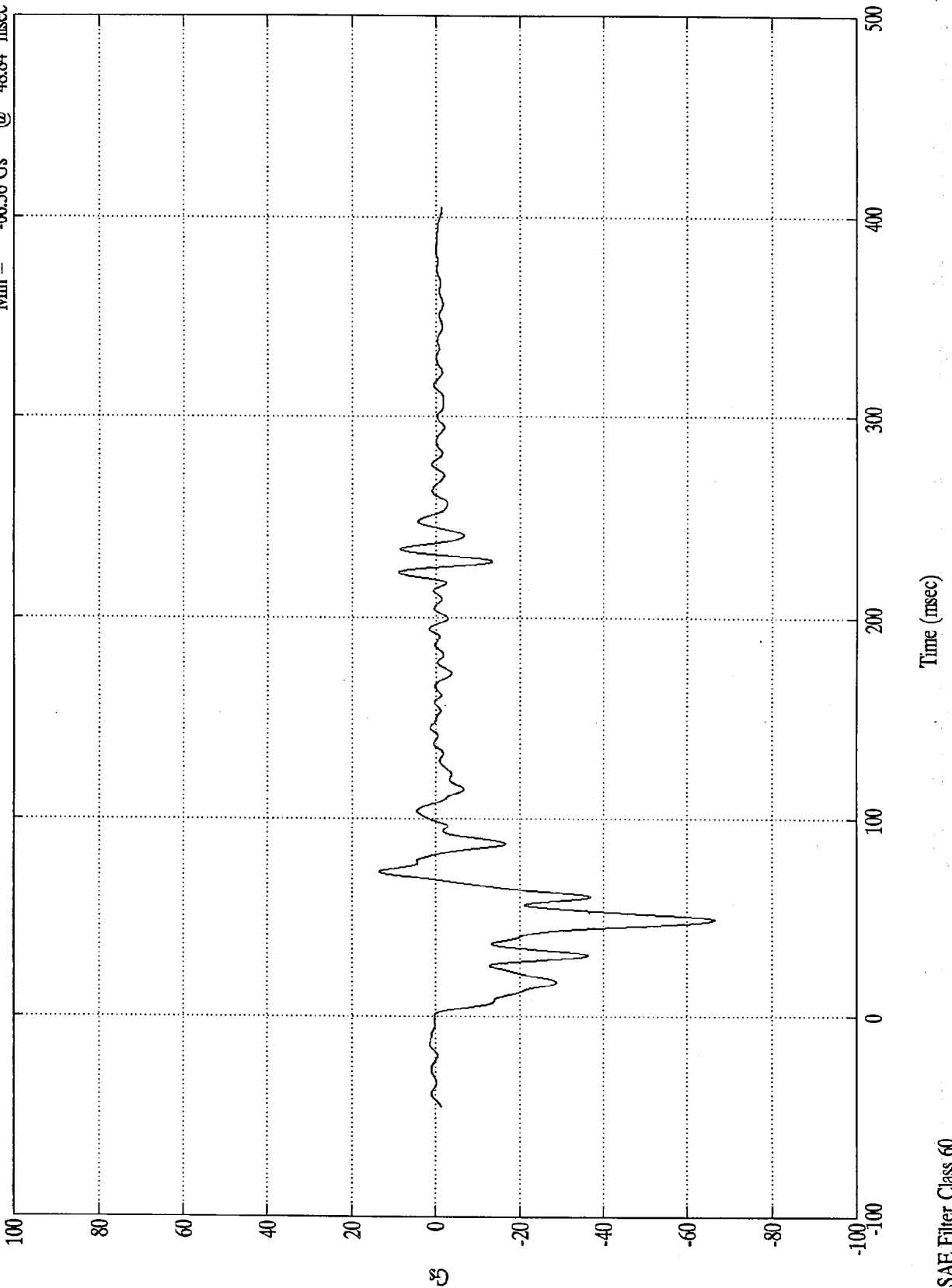
Acc. #5(x)
Max = 619.32 mm @ 65.40 msec
Min = .00 mm @ -44.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #6(x)

Max = 13.47 Gs @ 72.96 msec
Min = -66.36 Gs @ 48.84 msec



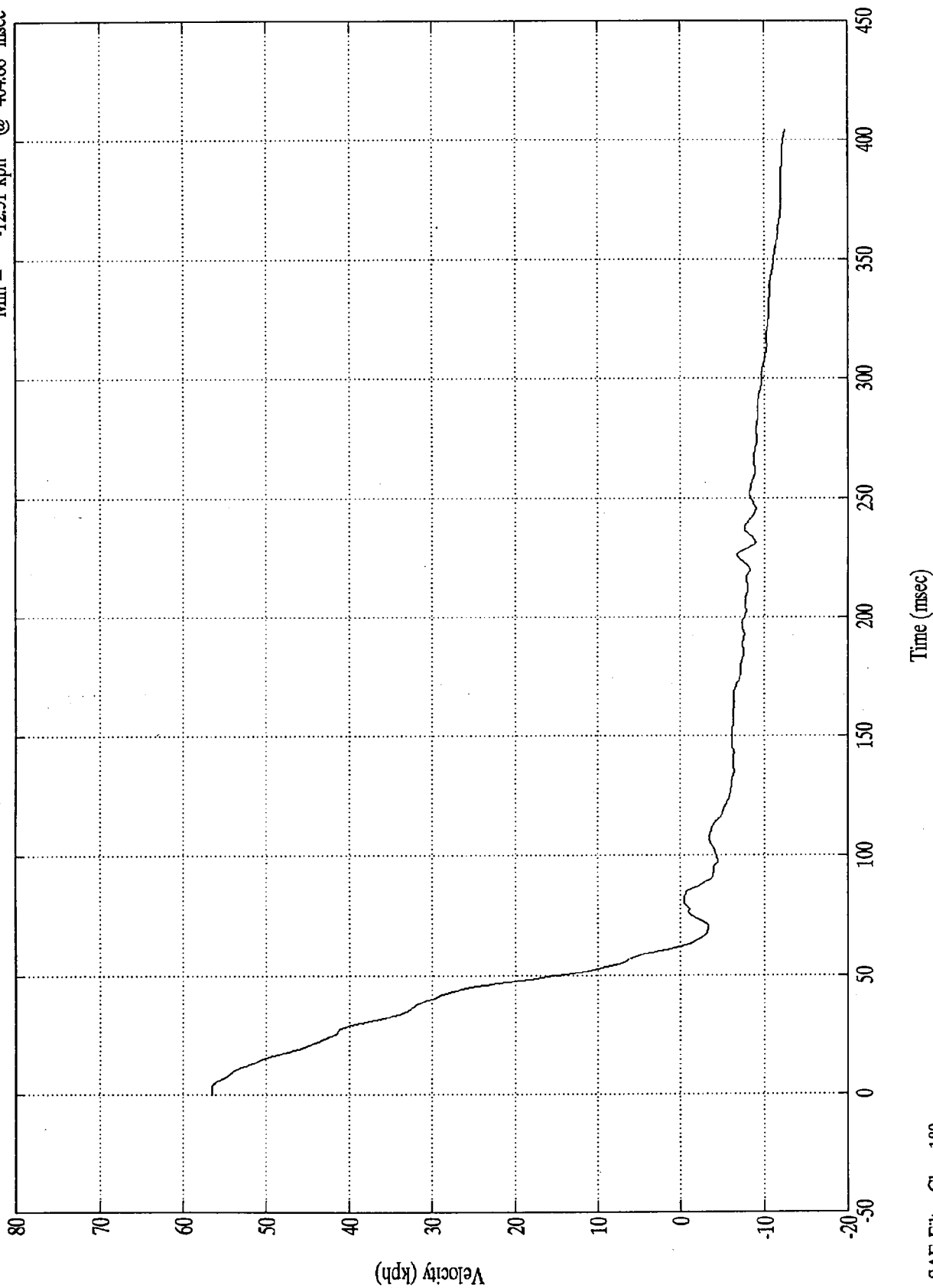
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #6(x)

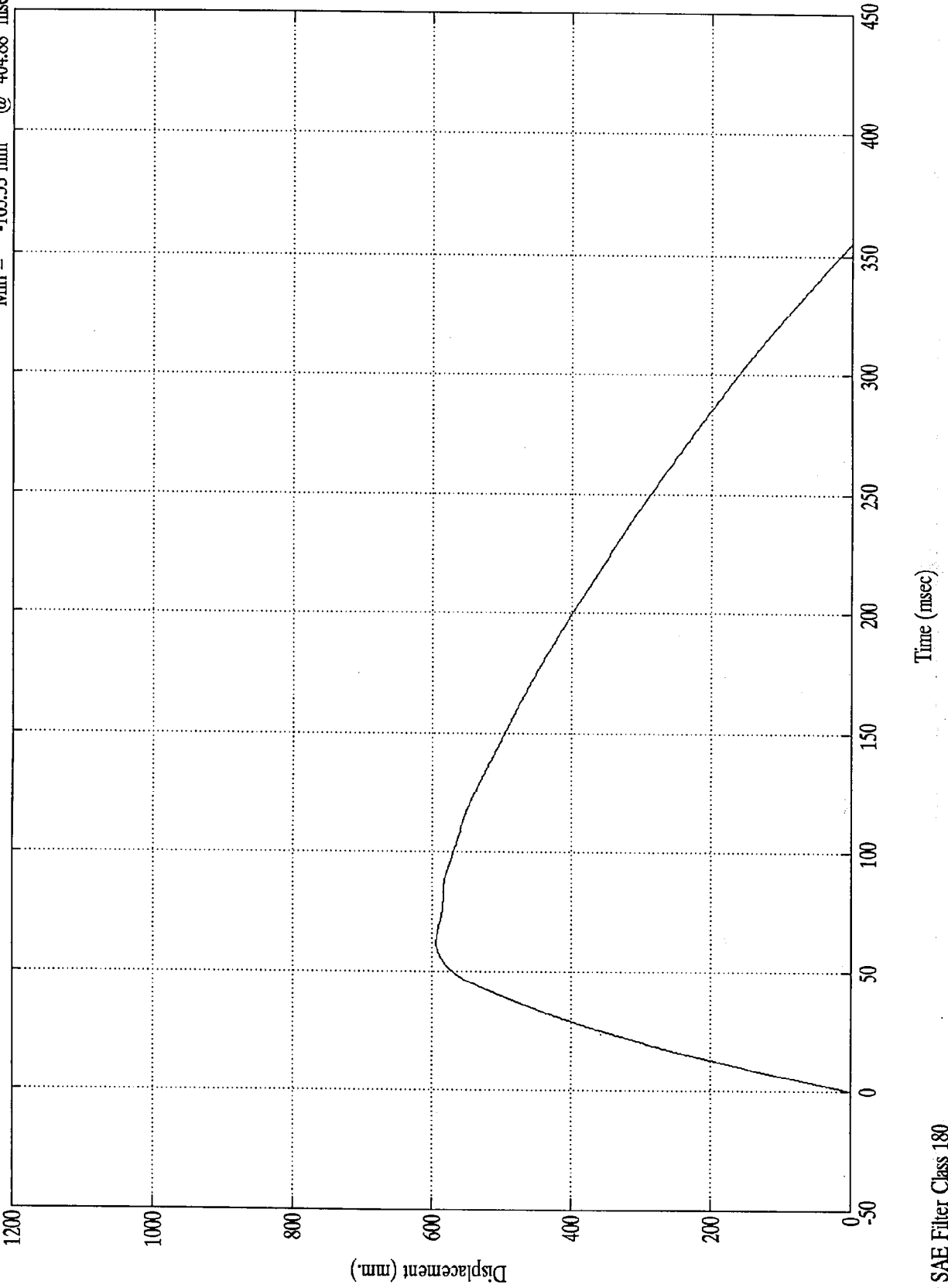
Max = 56.50 kph @ 2.99 msec
Min = -12.51 kph @ 404.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #6(x)

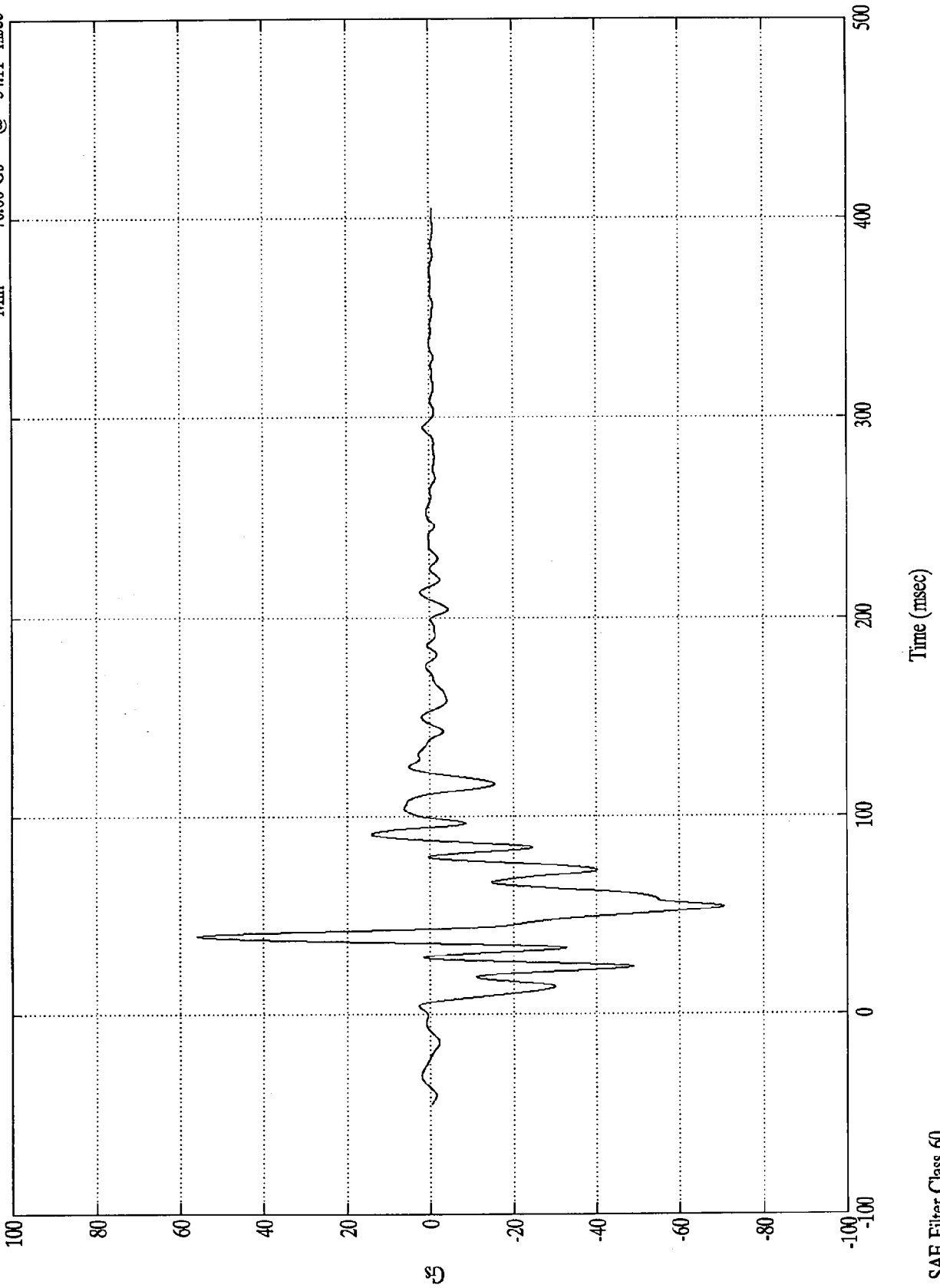
Max = 594.49 mm @ 61.92 msec
Min = -165.53 mm @ 404.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #7(x)

Max = 56.05 Gs @ 39.47 msec
Min = -70.60 Gs @ 54.11 msec

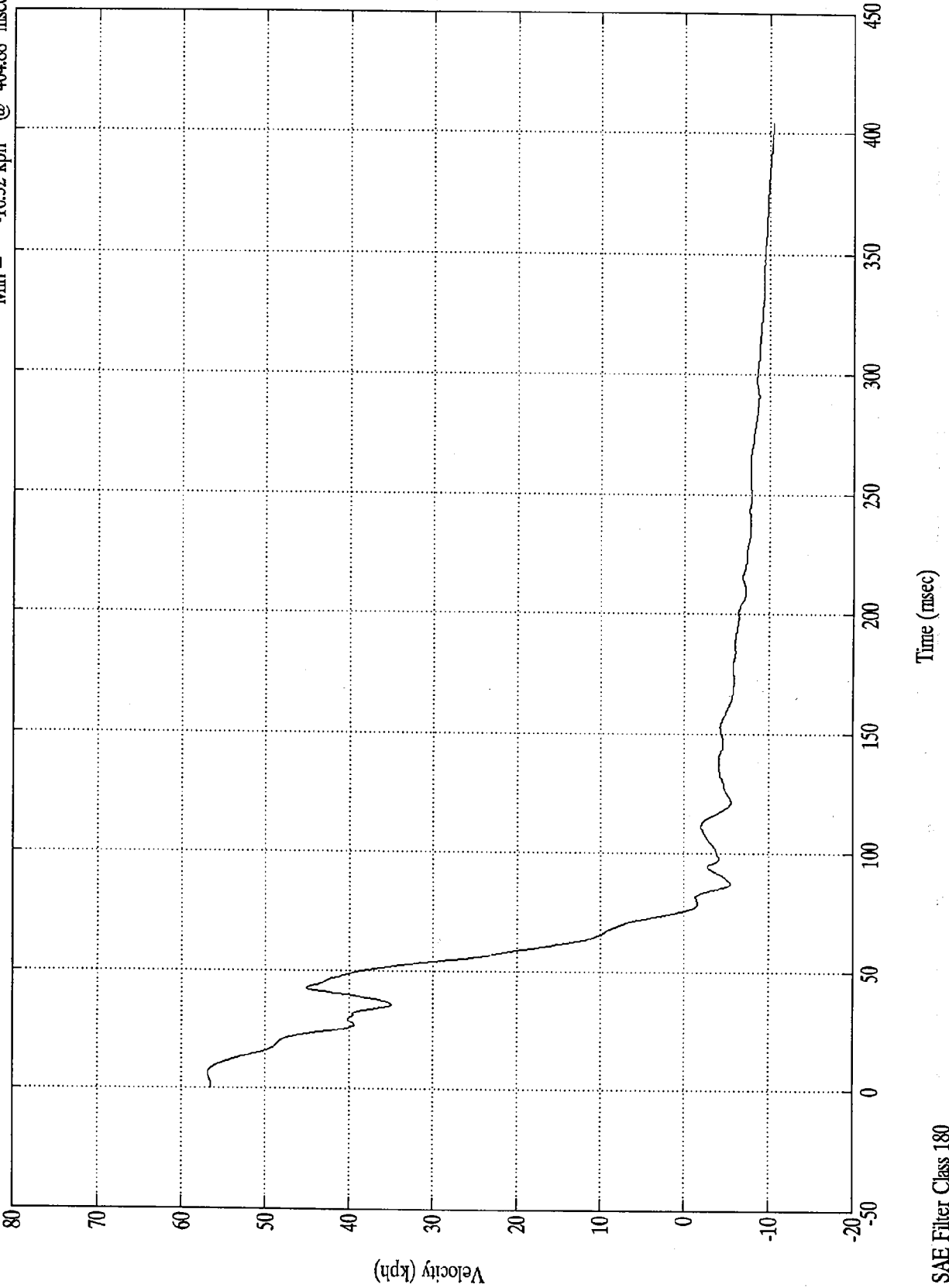


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #7(x)

Max = 56.88 kph @ 6.83 msec
Min = -10.52 kph @ 404.88 msec



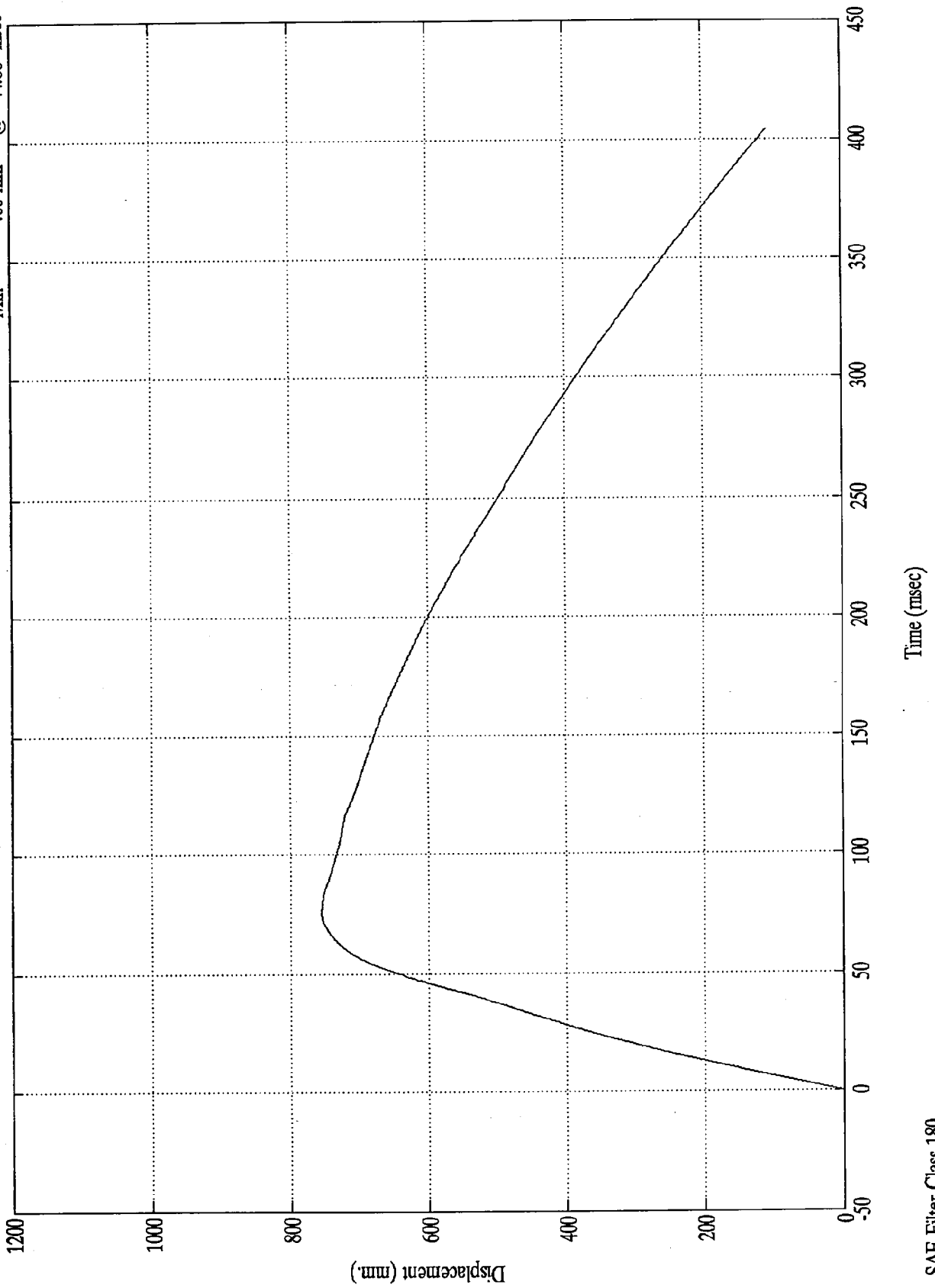
Time (msec)

SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #7(x)

Max = 755.68 mm @ 75.47 msec
Min = .00 mm @ -44.88 msec

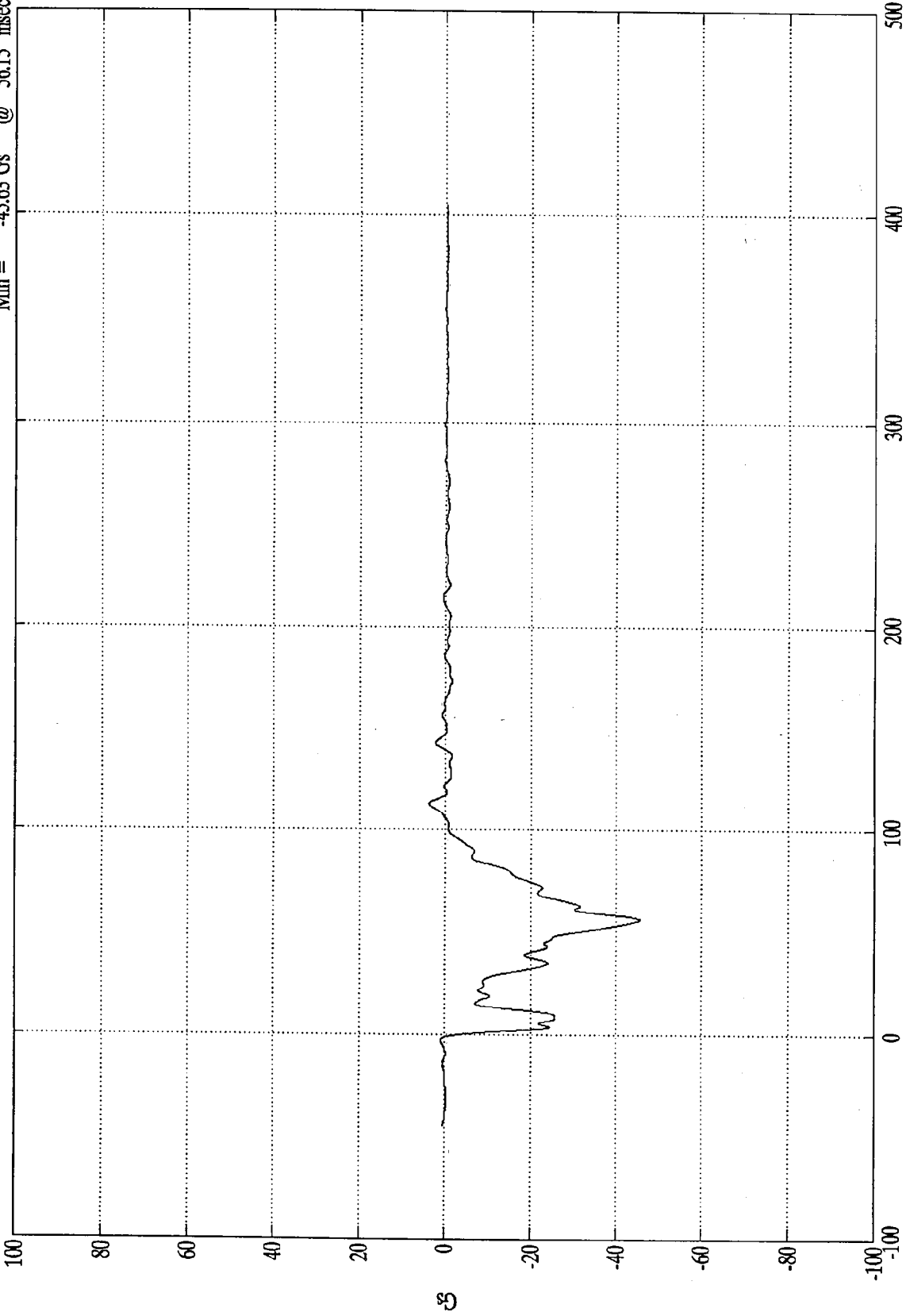


SAE Filter Class 180

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #8(x)

Max = 3.75 Gs @ 112.68 msec
Min = -45.63 Gs @ 56.15 msec



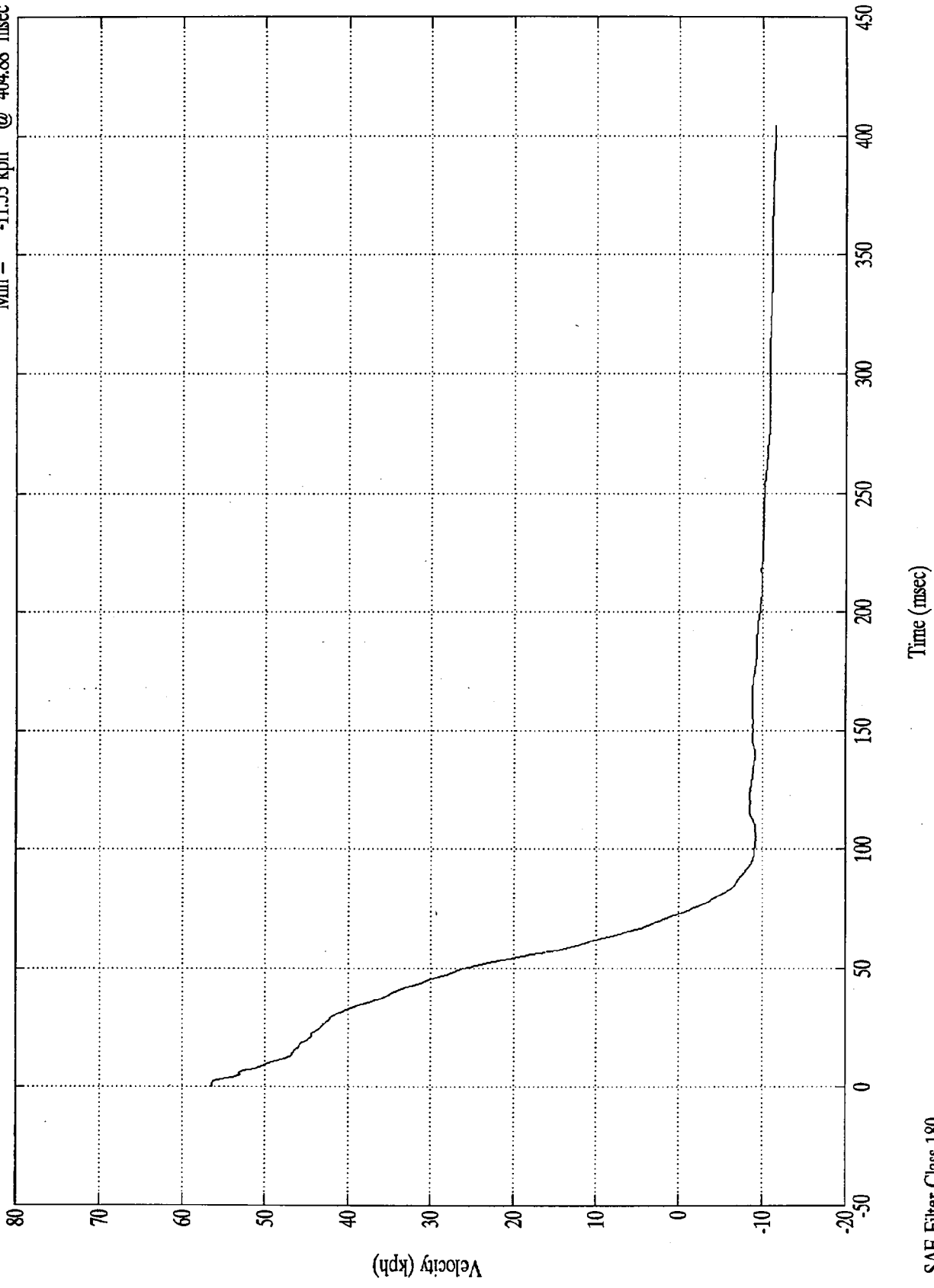
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc. #8(x)

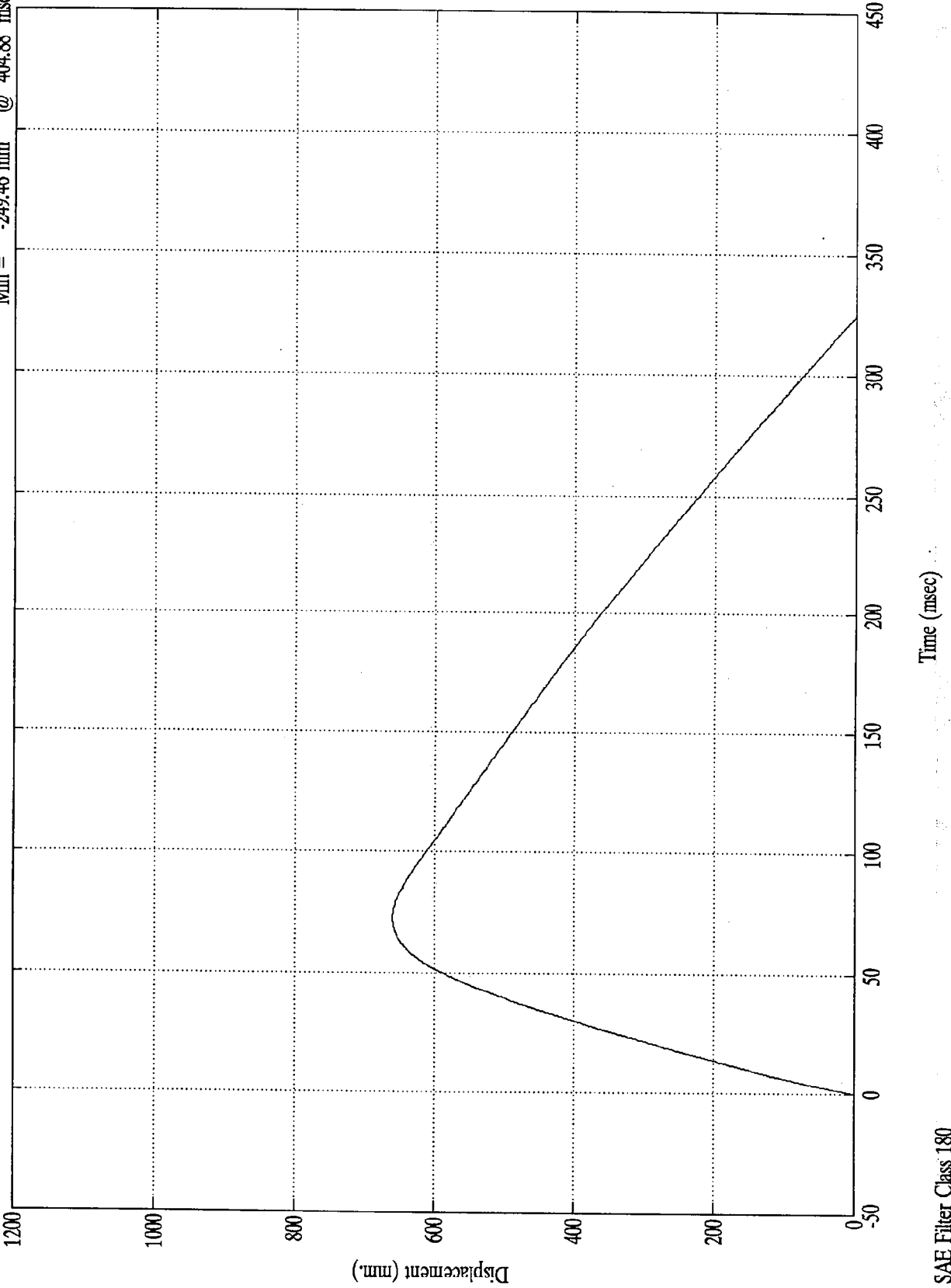
Max = 56.49 kph @ -0.00 msec
Min = -11.53 kph @ 404.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #8(x)

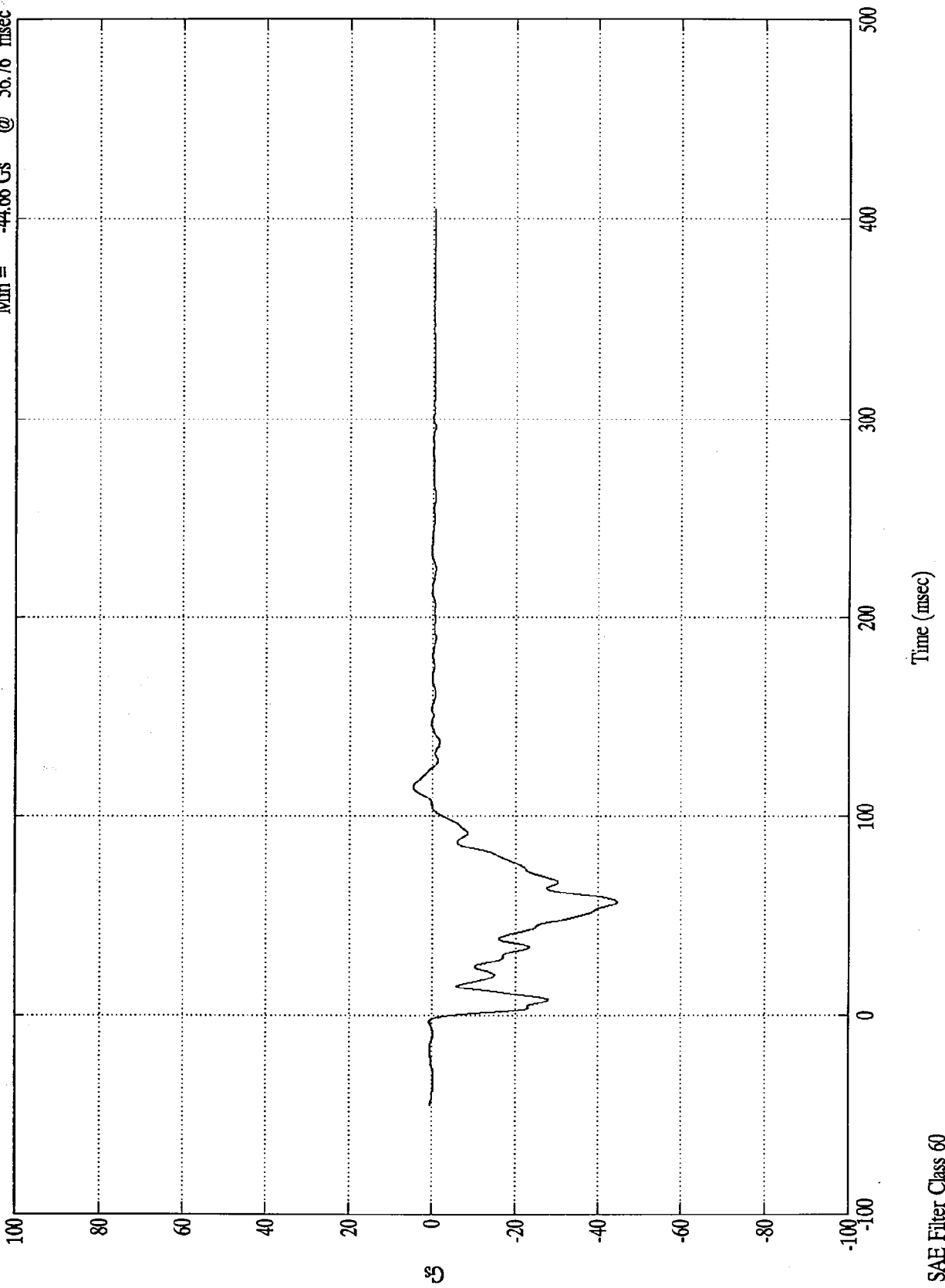
Max = 660.12 mm @ 72.48 msec
Min = -249.46 mm @ 404.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #9(x)

Max = 4.57 Gs @ 114.72 msec
Min = -44.66 Gs @ 56.76 msec

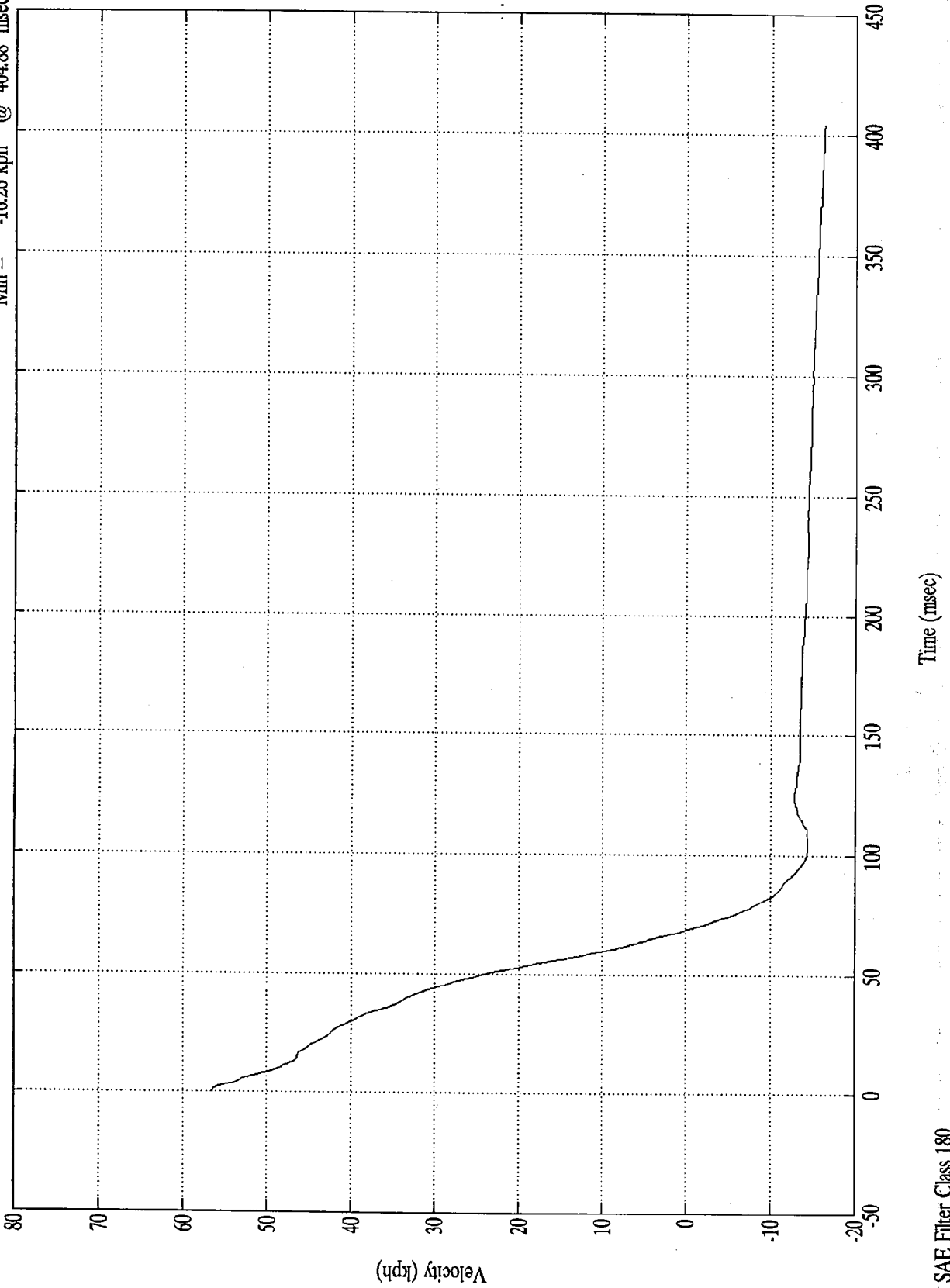


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Acc #9(x)

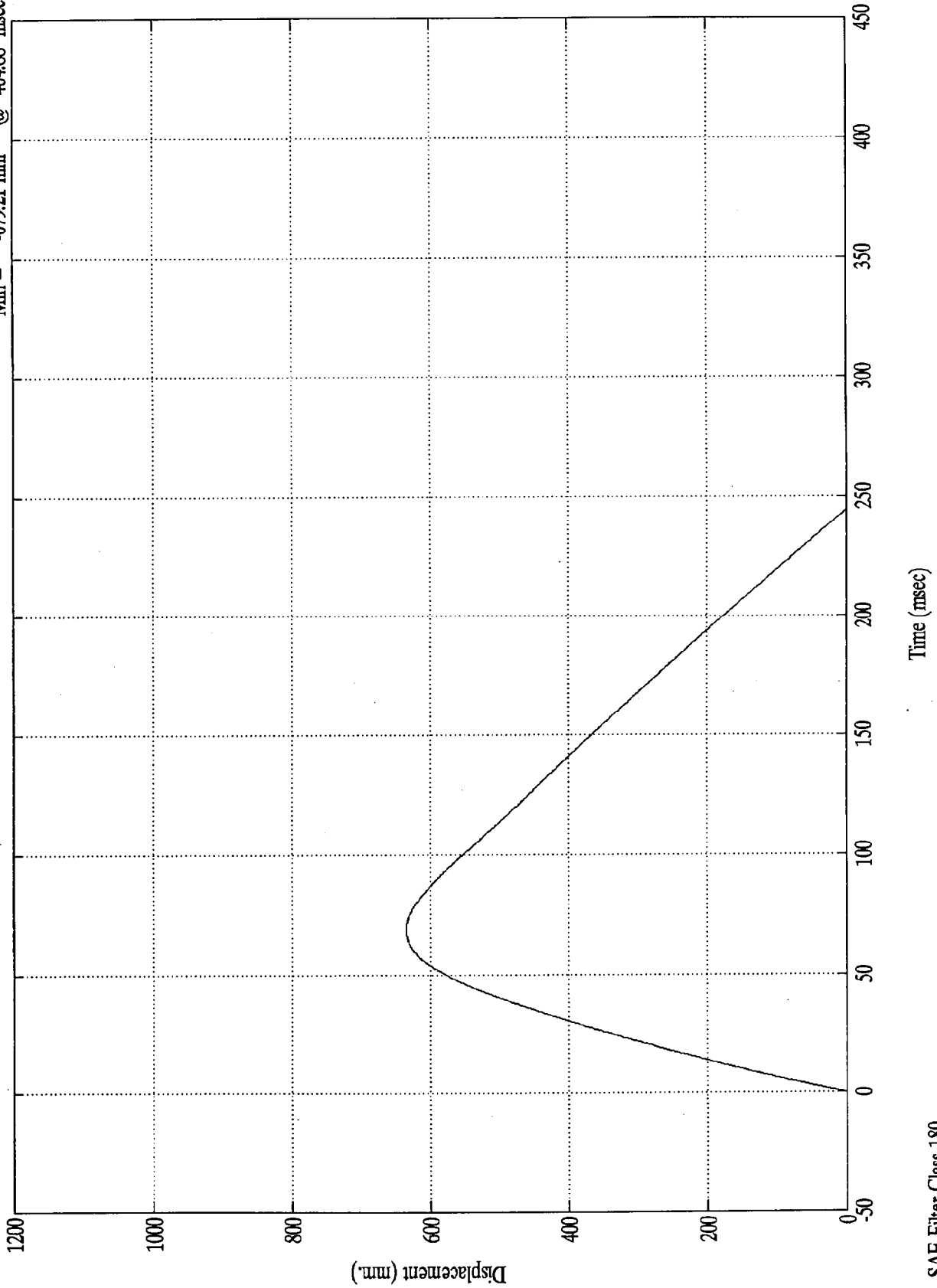
Max = 56.49 kph @ -0.00 msec
Min = -16.26 kph @ 404.88 msec



NCAP TEST #8 - 1996 MAZDA MPV

Acc. #9(x)

Max = 635.30 mm @ 68.76 msec
Min = -679.21 mm @ 404.88 msec



NHTSA TEST NO. MT5400

LOAD CELL BARRIER DATA

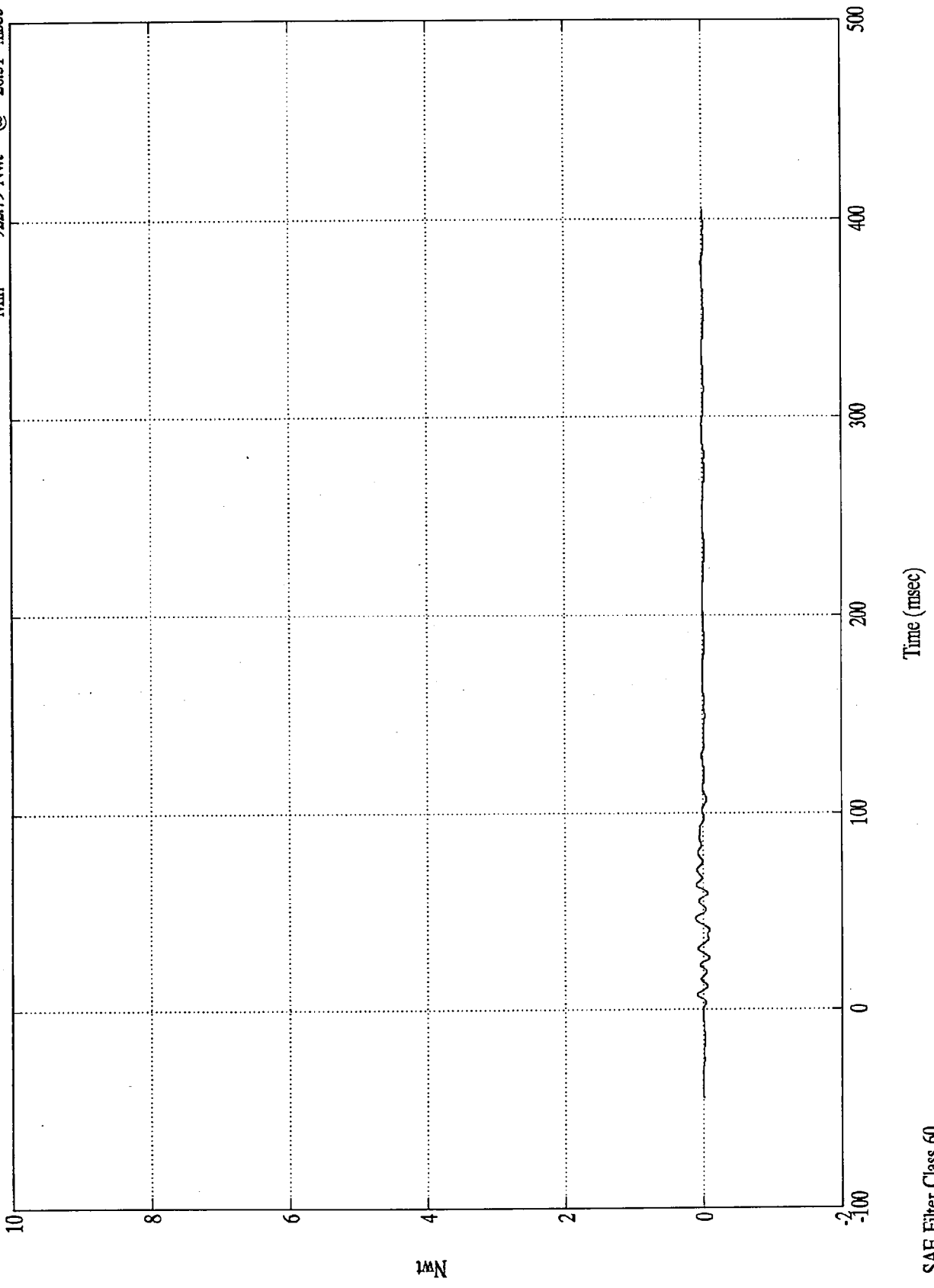
FILTER CHANNEL CLASS

60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell A1

Max = 1056.97 Nwt @ 46.08 msec
Min = -922.79 Nwt @ 26.51 msec



Nwt

Time (msec)

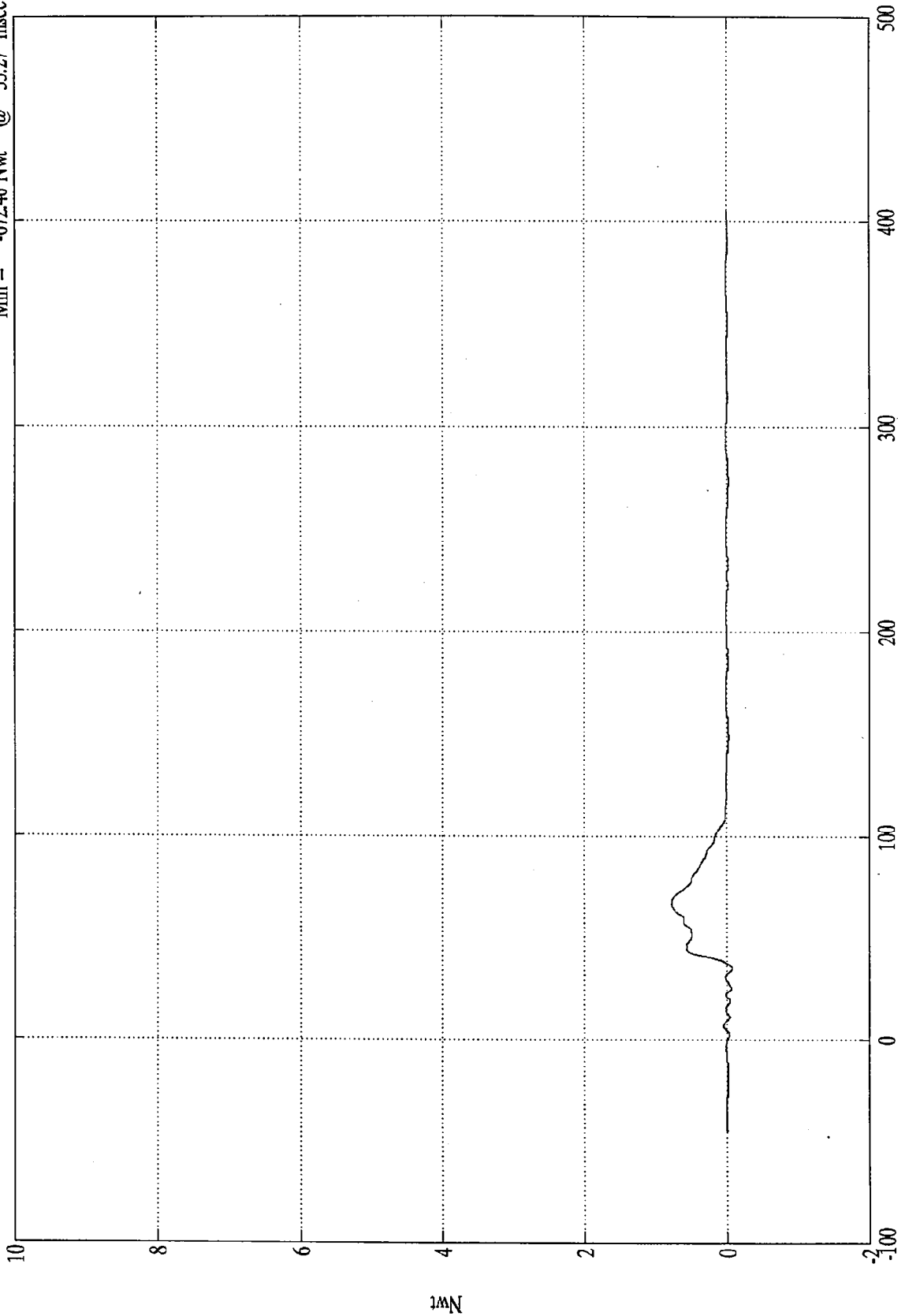
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell A2

Max = 7844.78 Nwt @ 67.32 msec
Min = -672.46 Nwt @ 35.27 msec



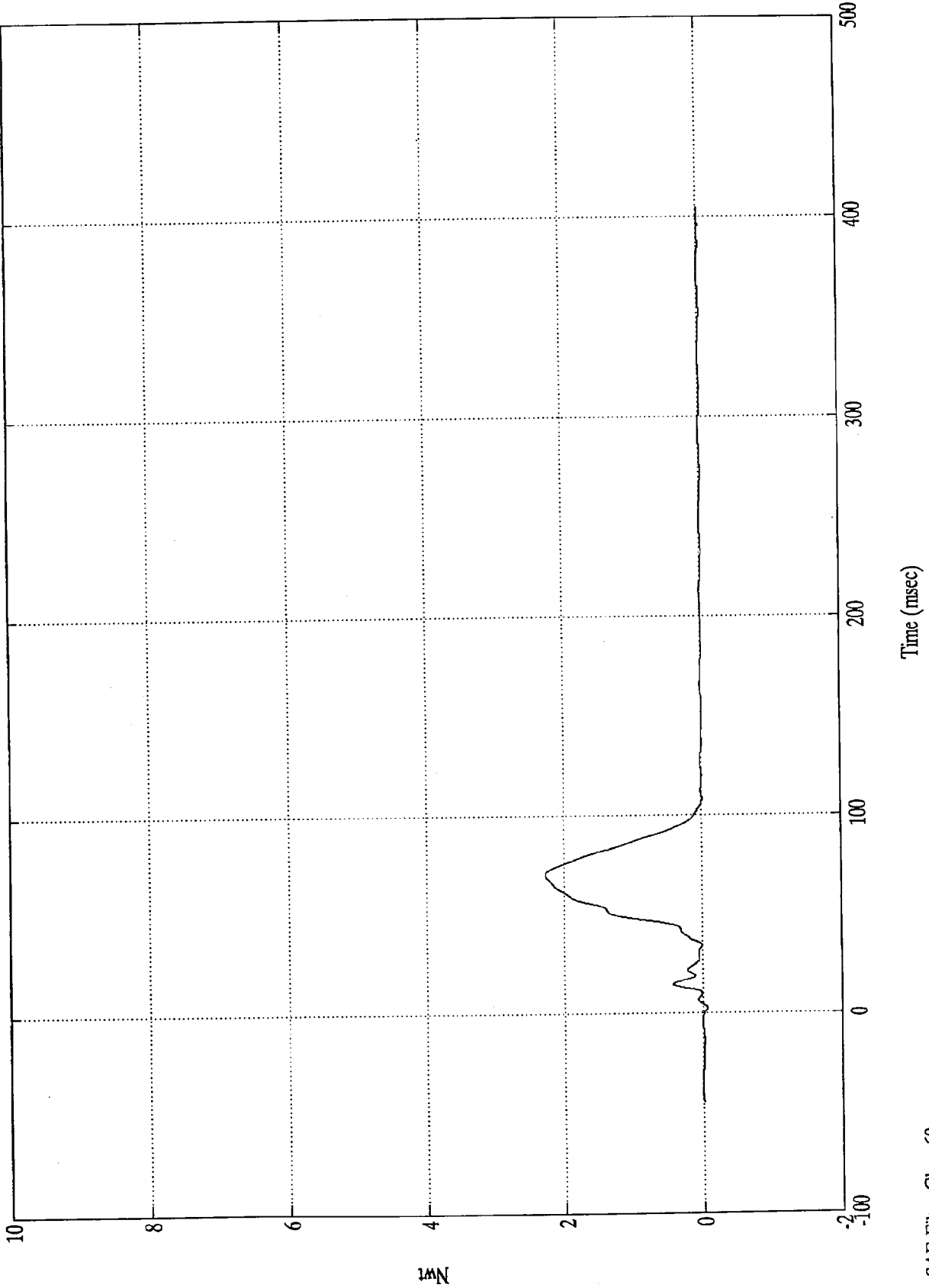
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell A3

Max = 22720.14 Nwt @ 70.44 msec
Min = -601.81 Nwt @ 2.87 msec

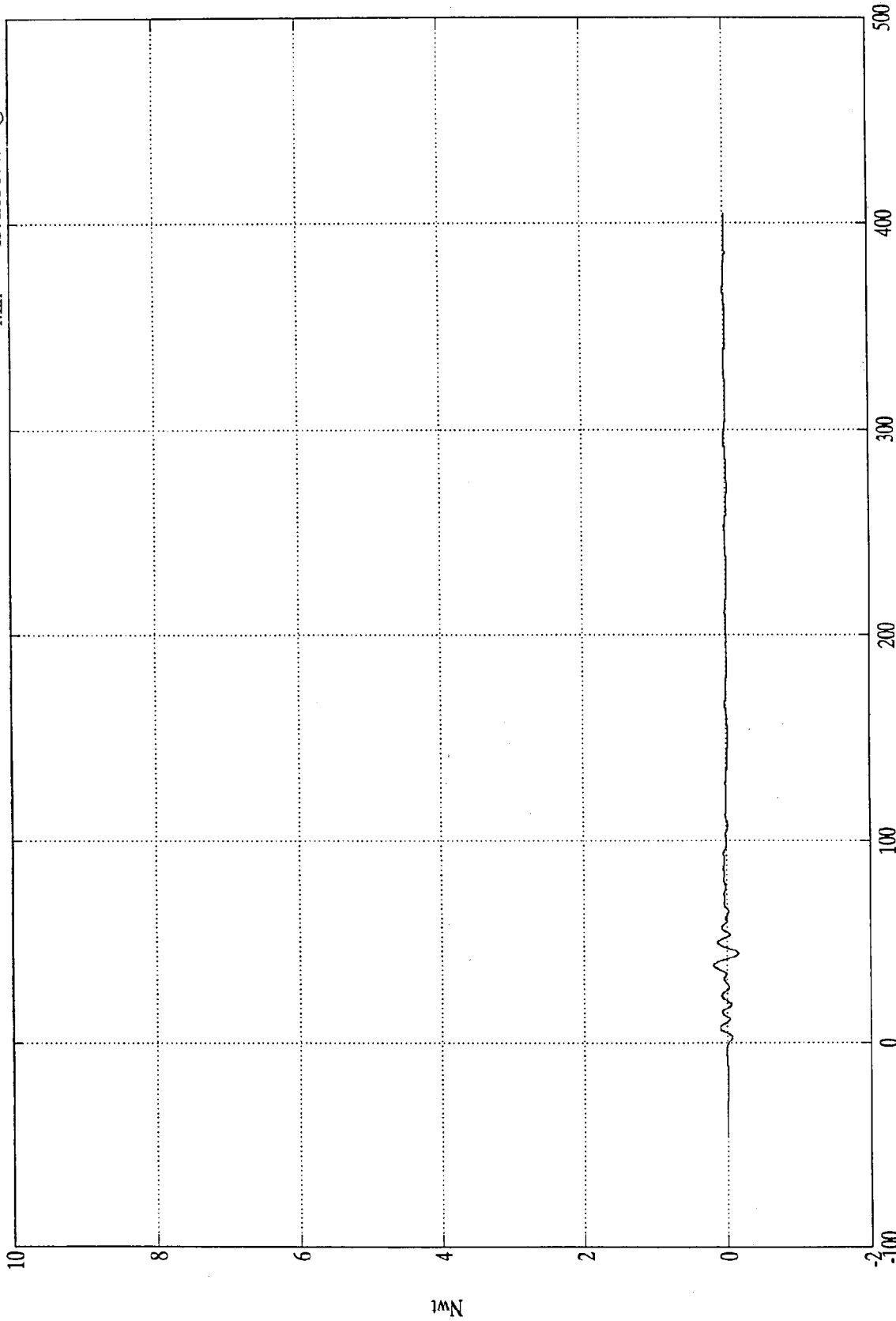


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell A4

Max = 1861.09 Nwt @ 38.88 msec
Min = -1576.08 Nwt @ 44.75 msec



Time (msec)

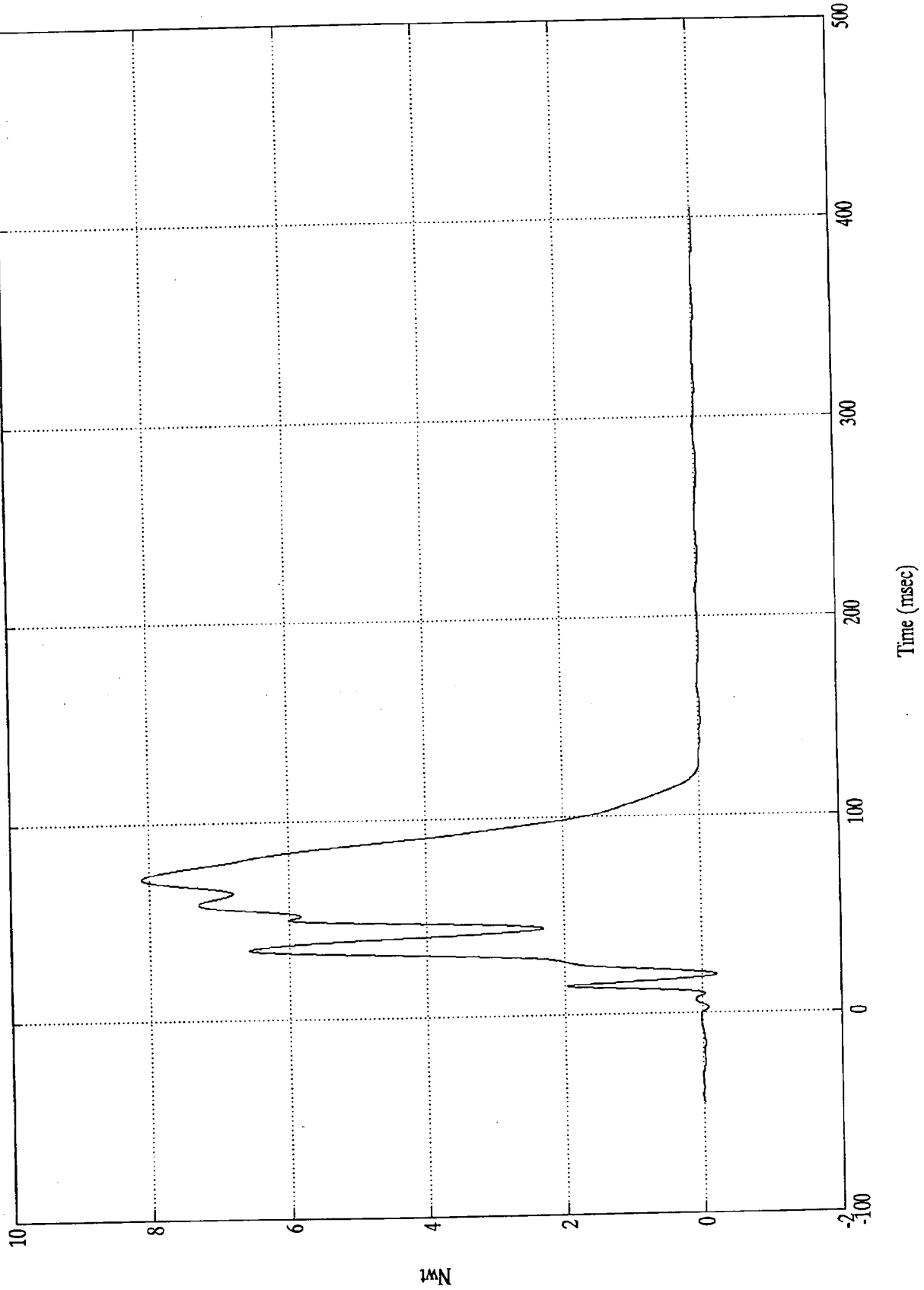
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell A5

Max = 81131.00 Nwt @ 72.36 msec
Min = -2152.18 Nwt @ 20.03 msec



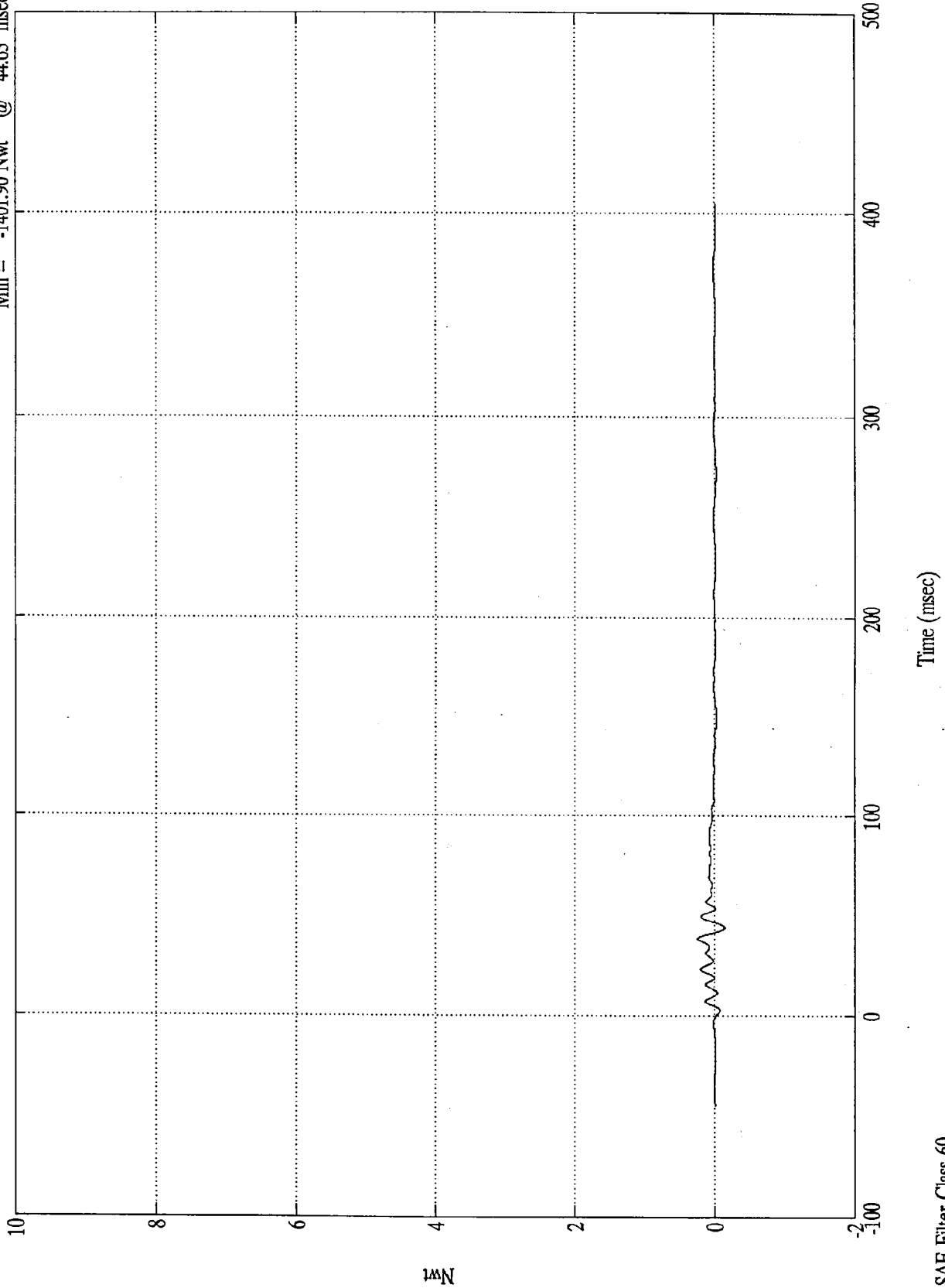
Nwt

Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell A6
Max = 2401.97 Nwt @ 39.23 msec
Min = -1401.90 Nwt @ 44.63 msec



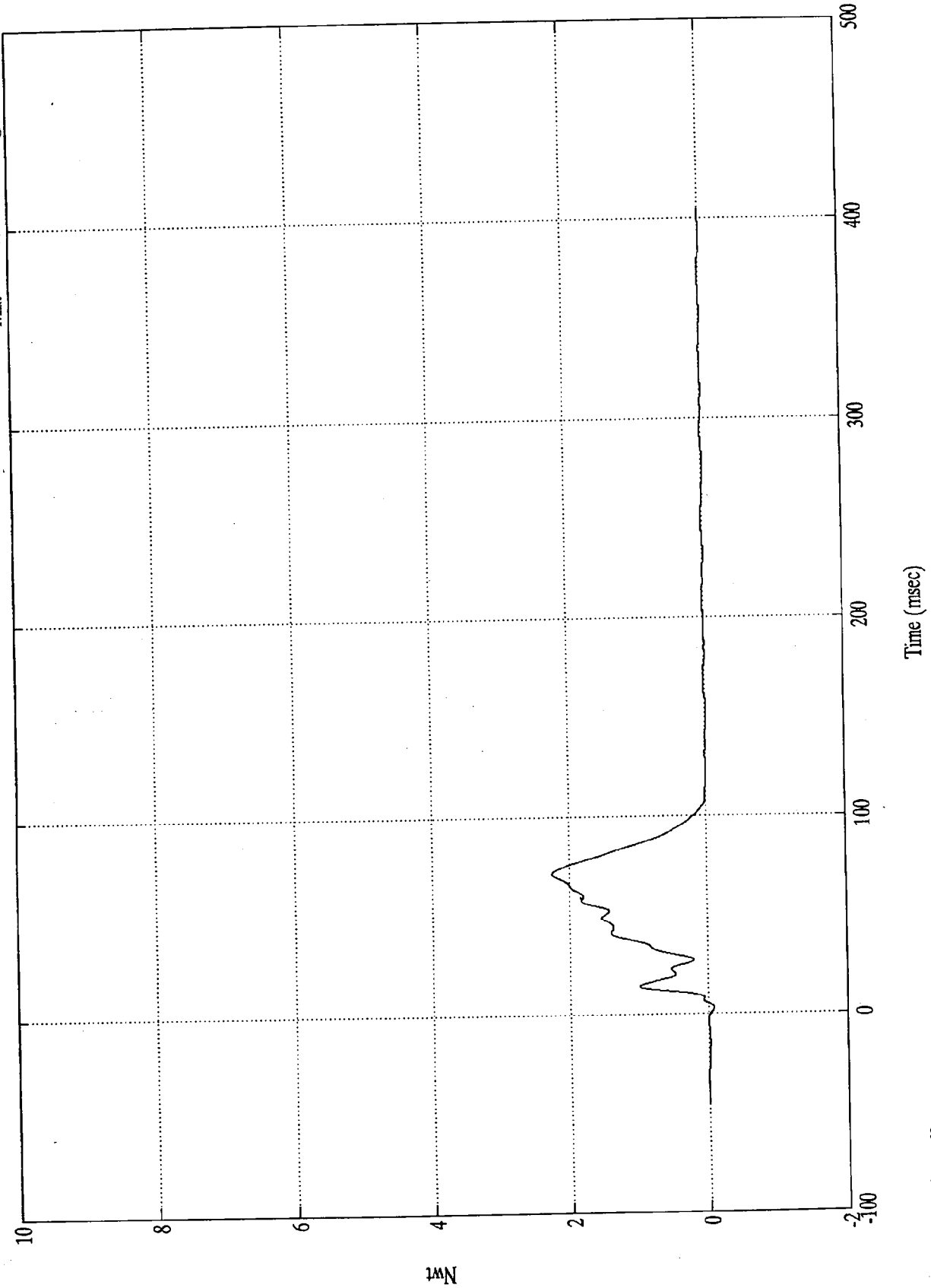
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell A7

Max = 22528.79 Nwt @ 71.40 msec
Min = -783.35 Nwt @ 3.23 msec



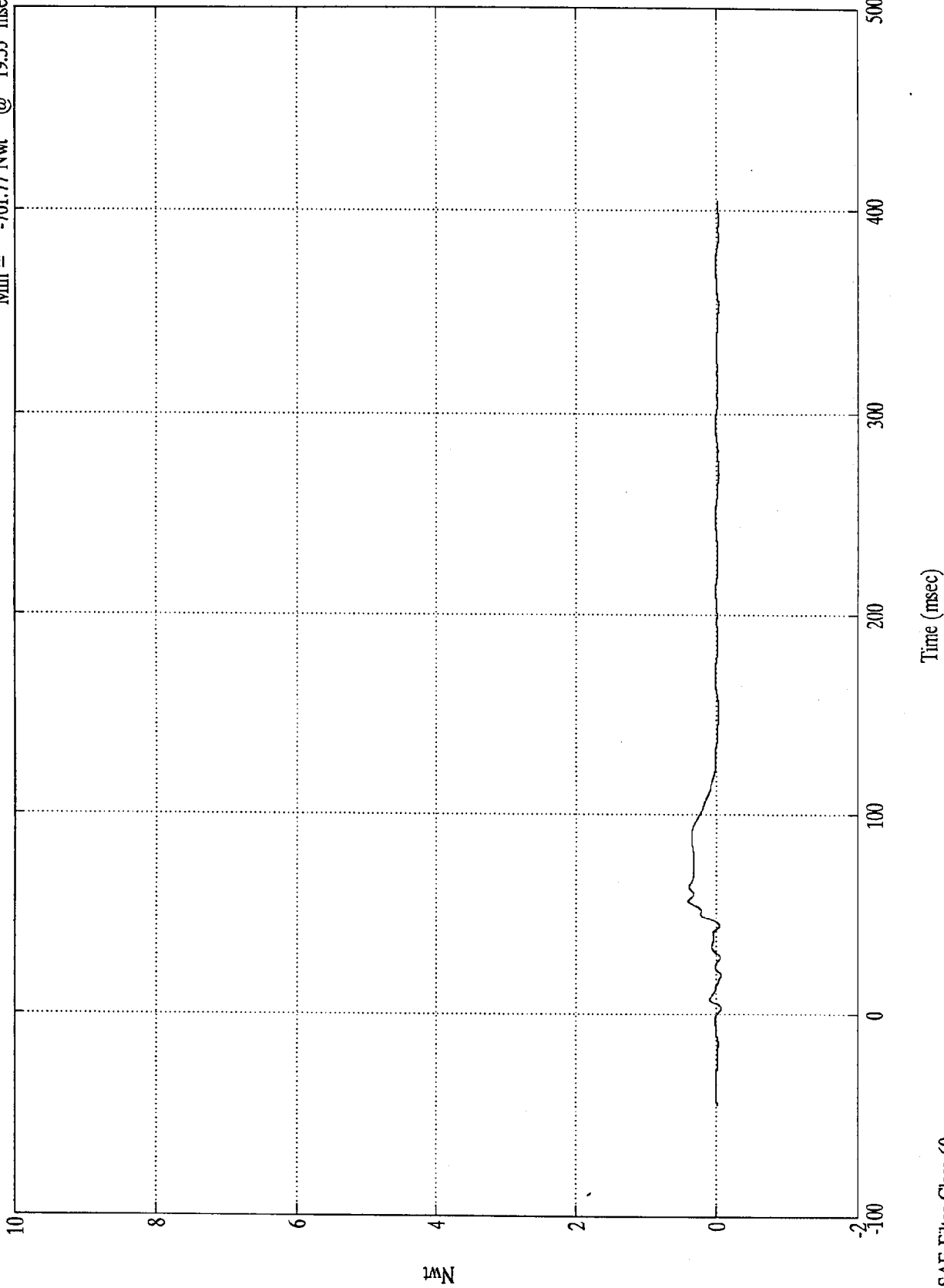
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell A8

Max = 4064.35 Nwt @ 56.76 msec
Min = -701.77 Nwt @ 19.55 msec

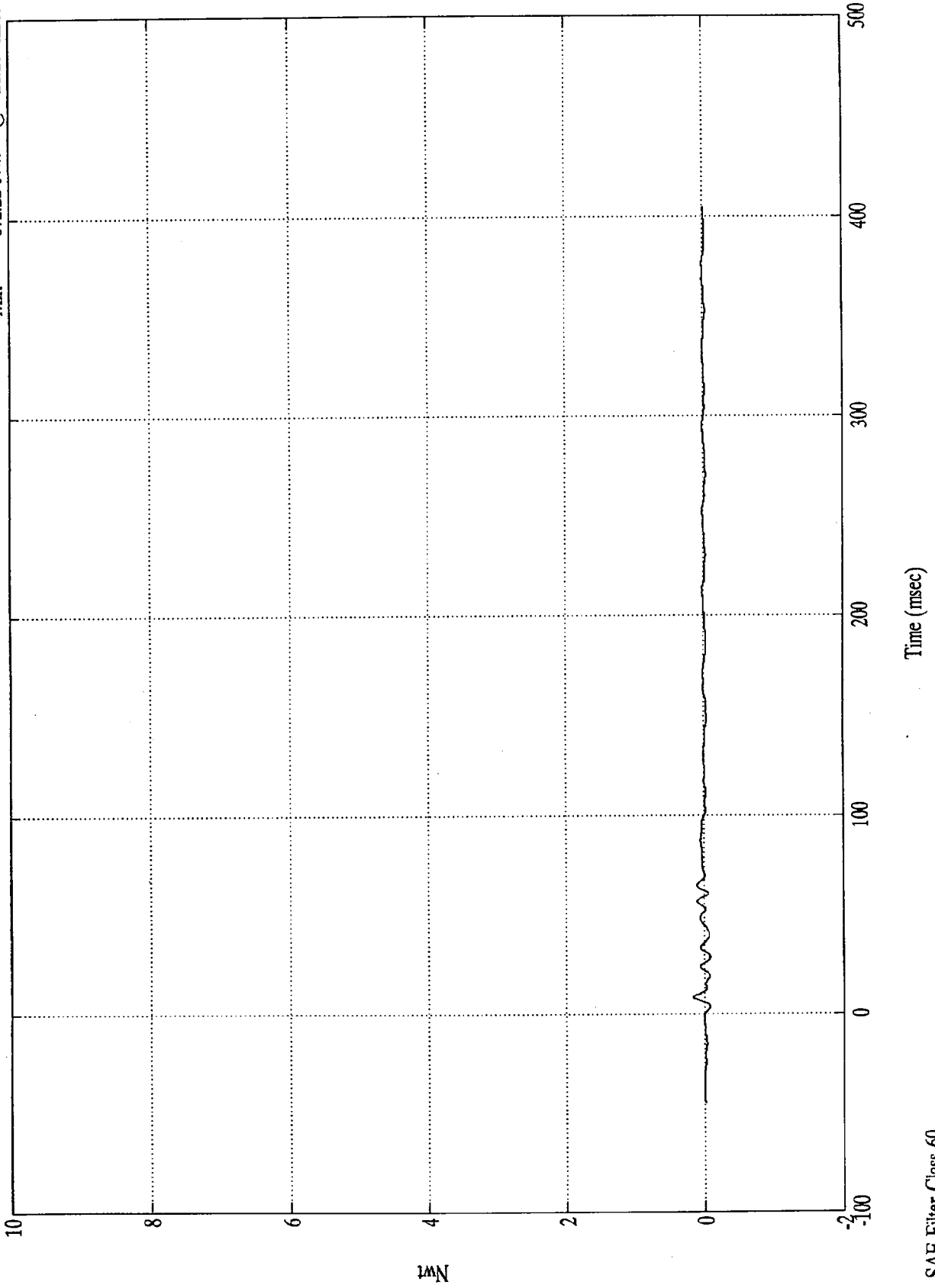


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell A9

Max = 1637.38 Nwt @ 8.51 msec
Min = -872.22 Nwt @ 28.20 msec

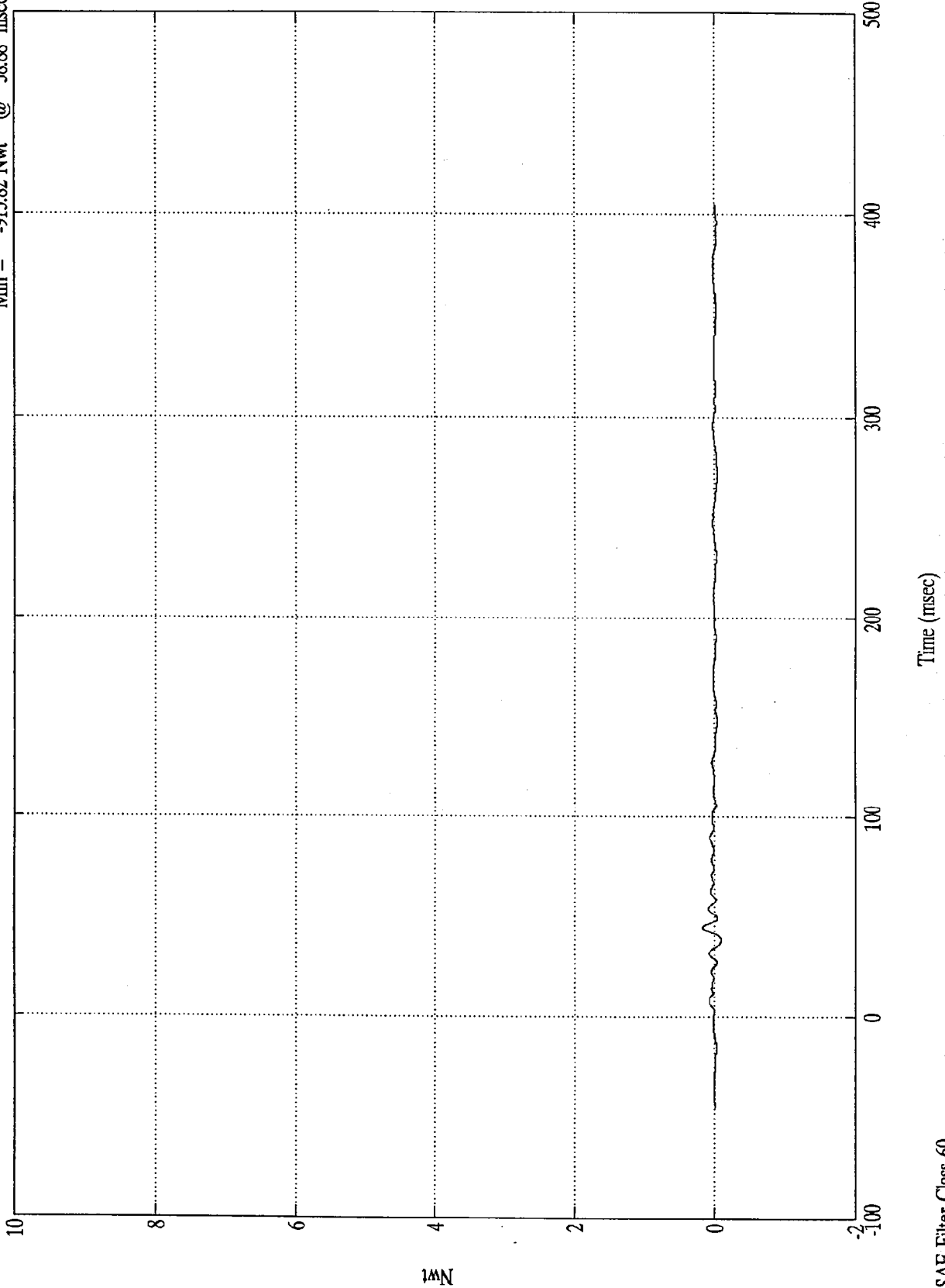


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell B1

Max = 1705.50 Nwt @ 45.12 msec
Min = -915.82 Nwt @ 38.88 msec

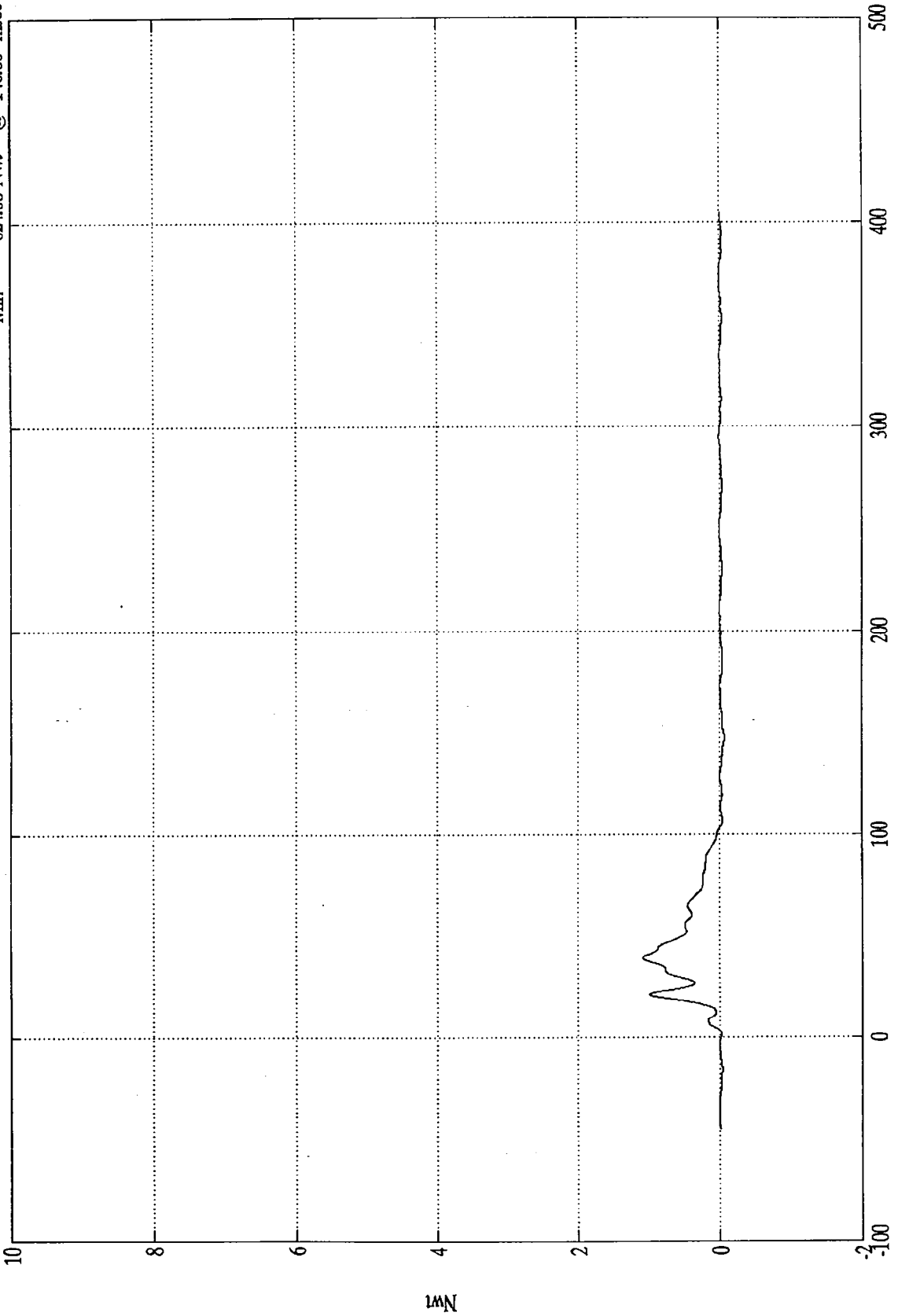


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell B2

Max = 10907.04 Nwt @ 39.47 msec
Min = -624.08 Nwt @ 146.88 msec



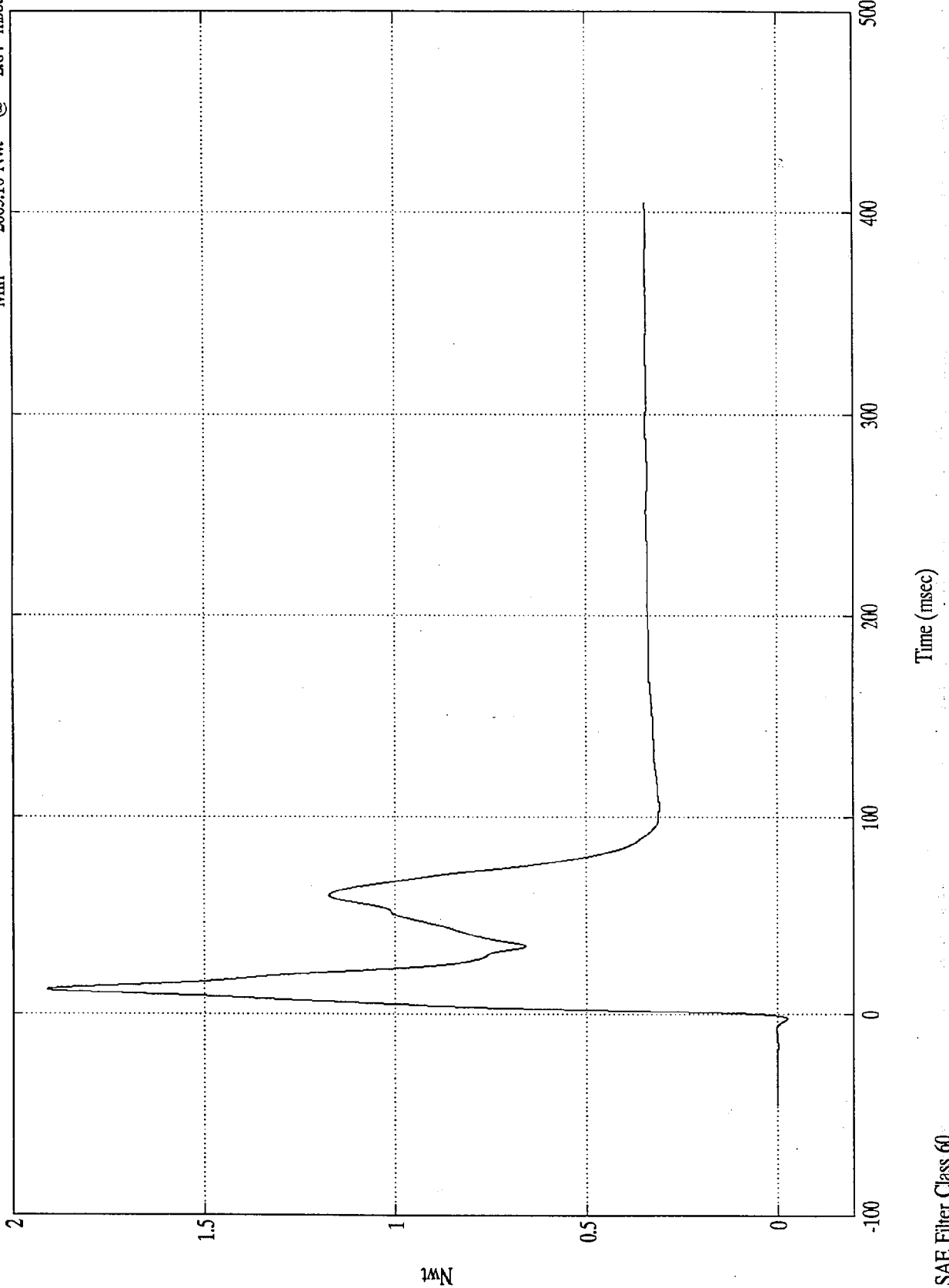
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁵

Barrier Load Cell B3

Max = 191077.98 Nwt @ 12.59 msec
Min = -2663.16 Nwt @ -2.04 msec



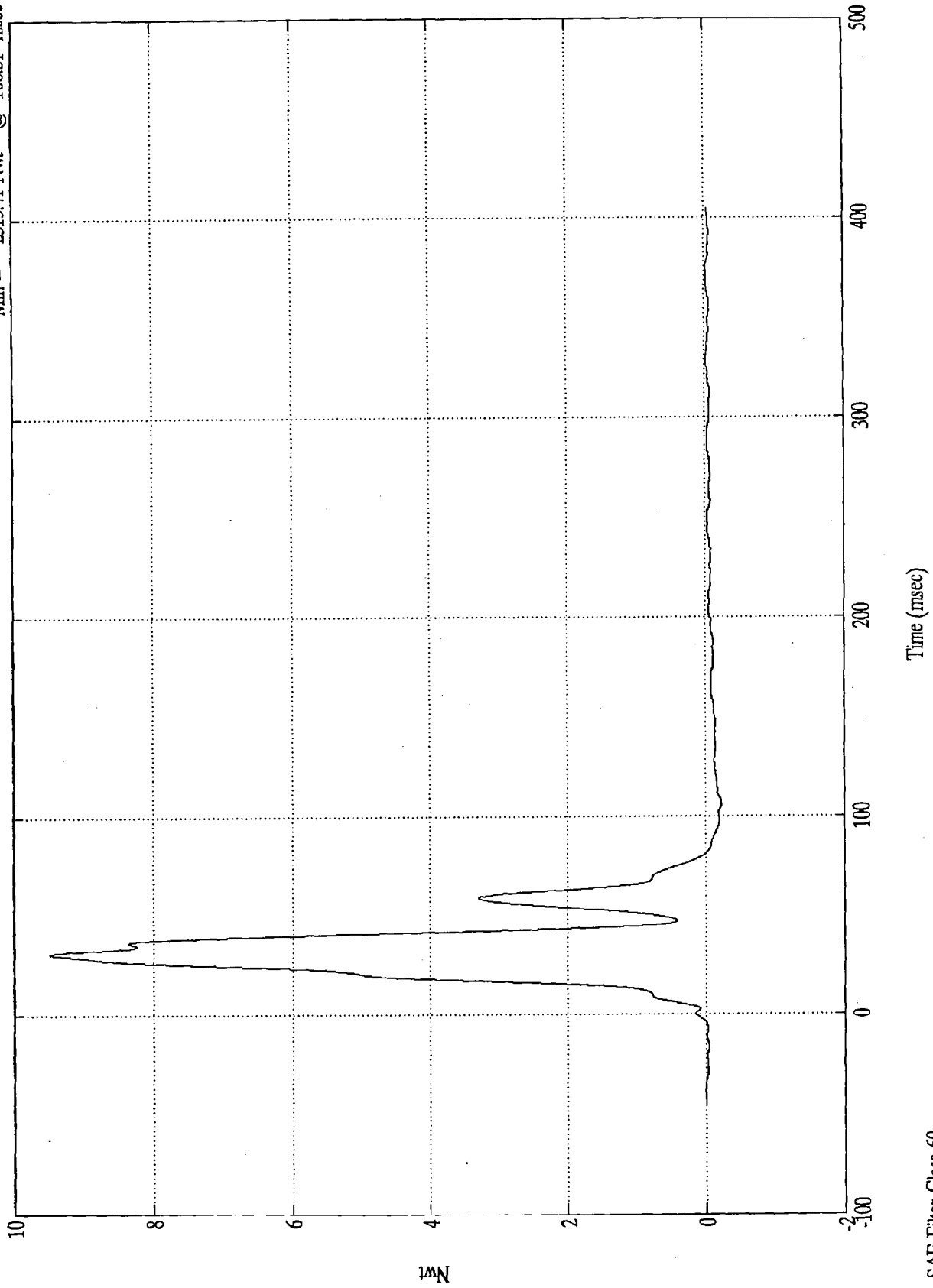
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell B4

Max = 94967.74 Nwt @ 30.95 msec
Min = -2313.41 Nwt @ 106.31 msec

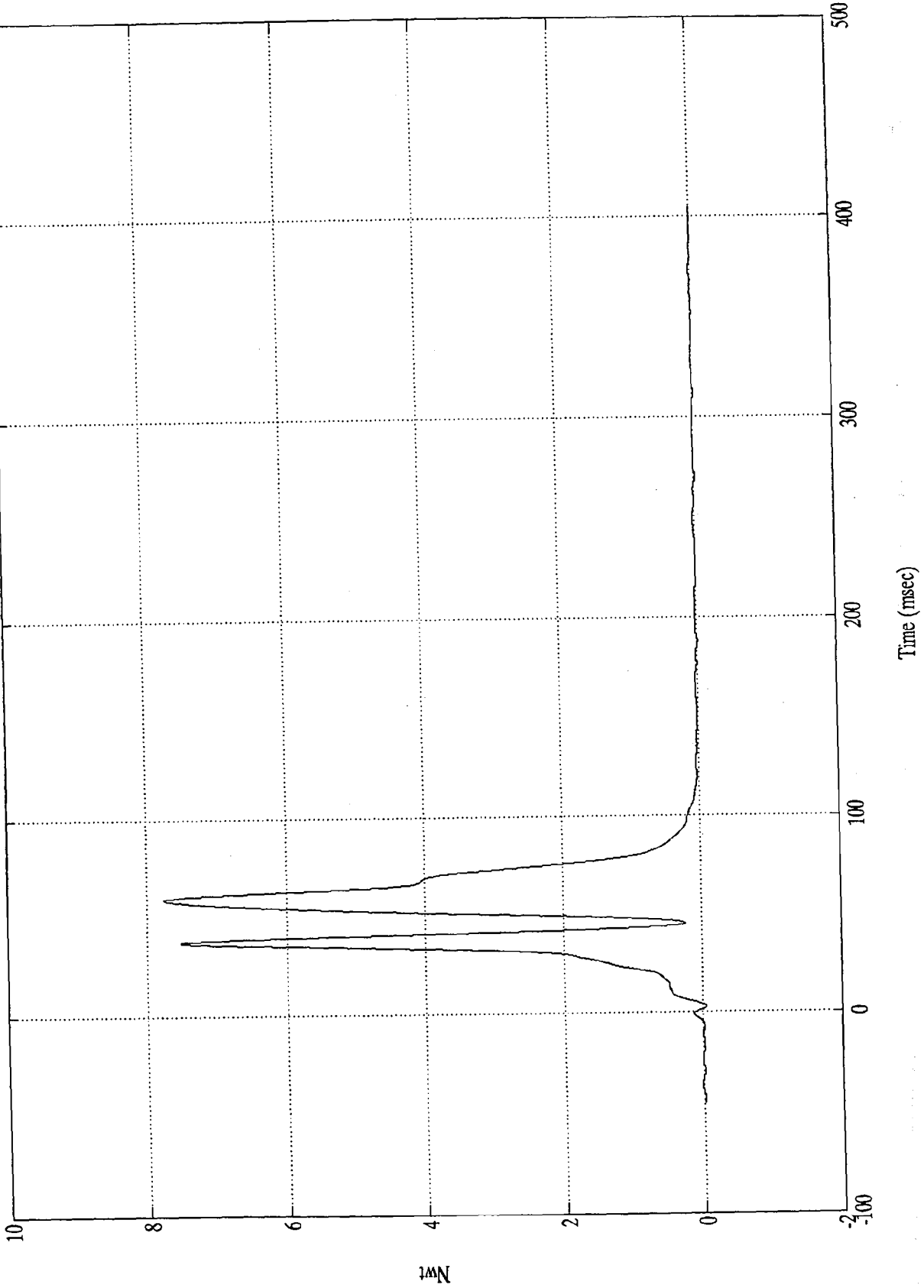


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell B5

Max = 77542.78 Nwt @ 59.27 msec
Min = -418.57 Nwt @ 2.87 msec

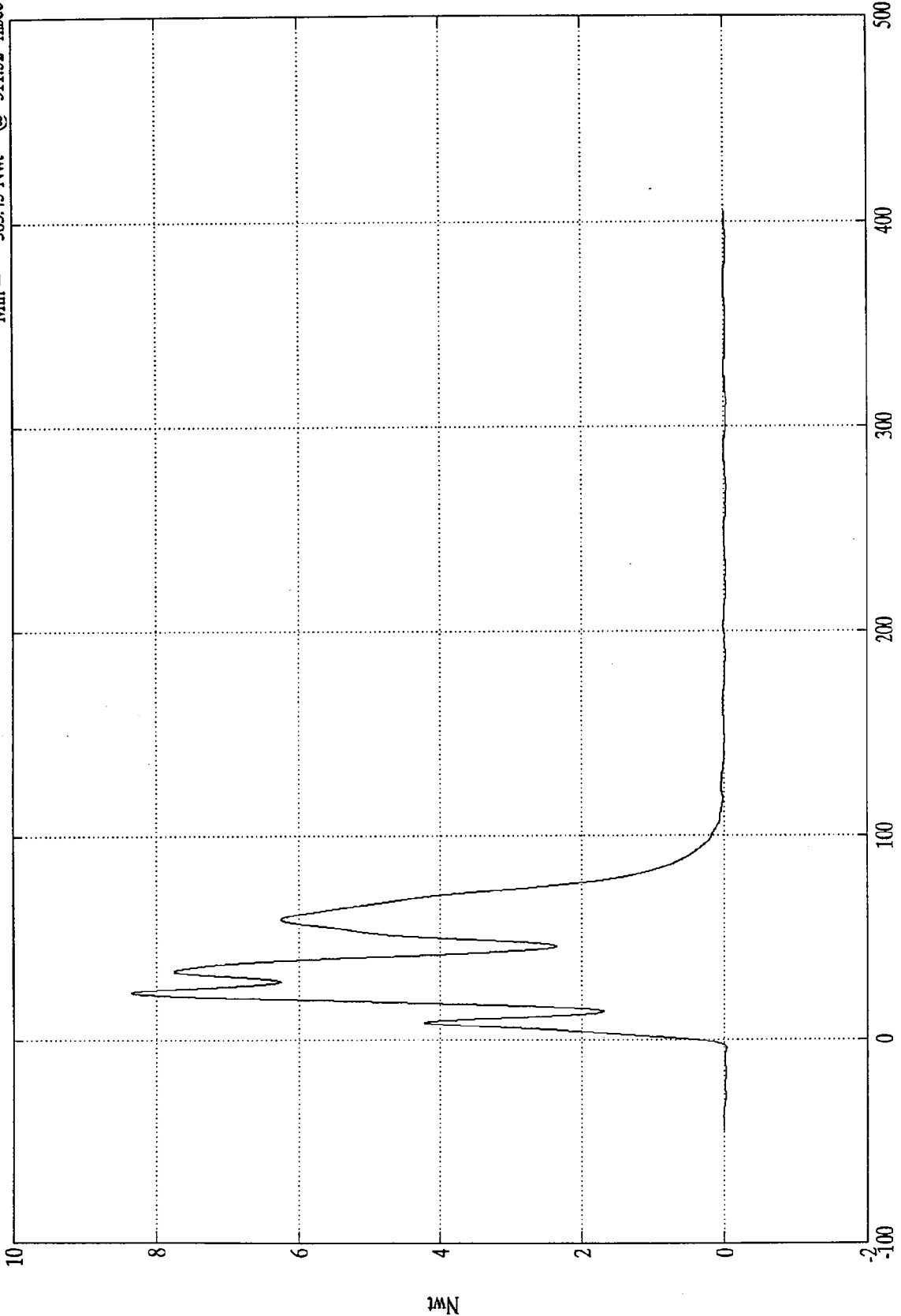


NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell B6

Max = 83450.70 Nwt @ 23.63 msec
Min = -363.45 Nwt @ 311.52 msec



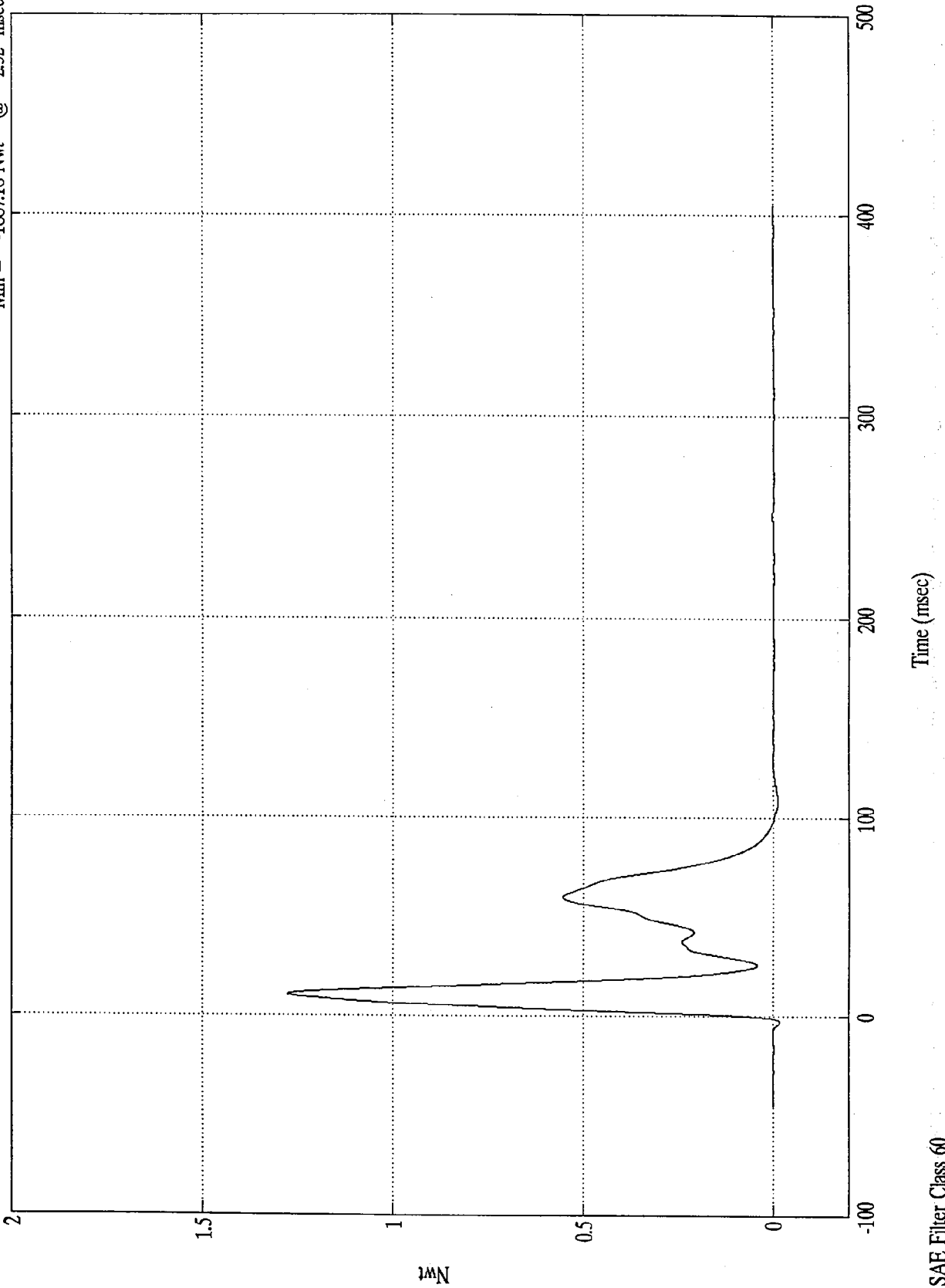
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁵

Barrier Load Cell B7

Max = 128046.45 Nwt @ 11.39 msec
Min = -1887.18 Nwt @ -2.52 msec



Nwt

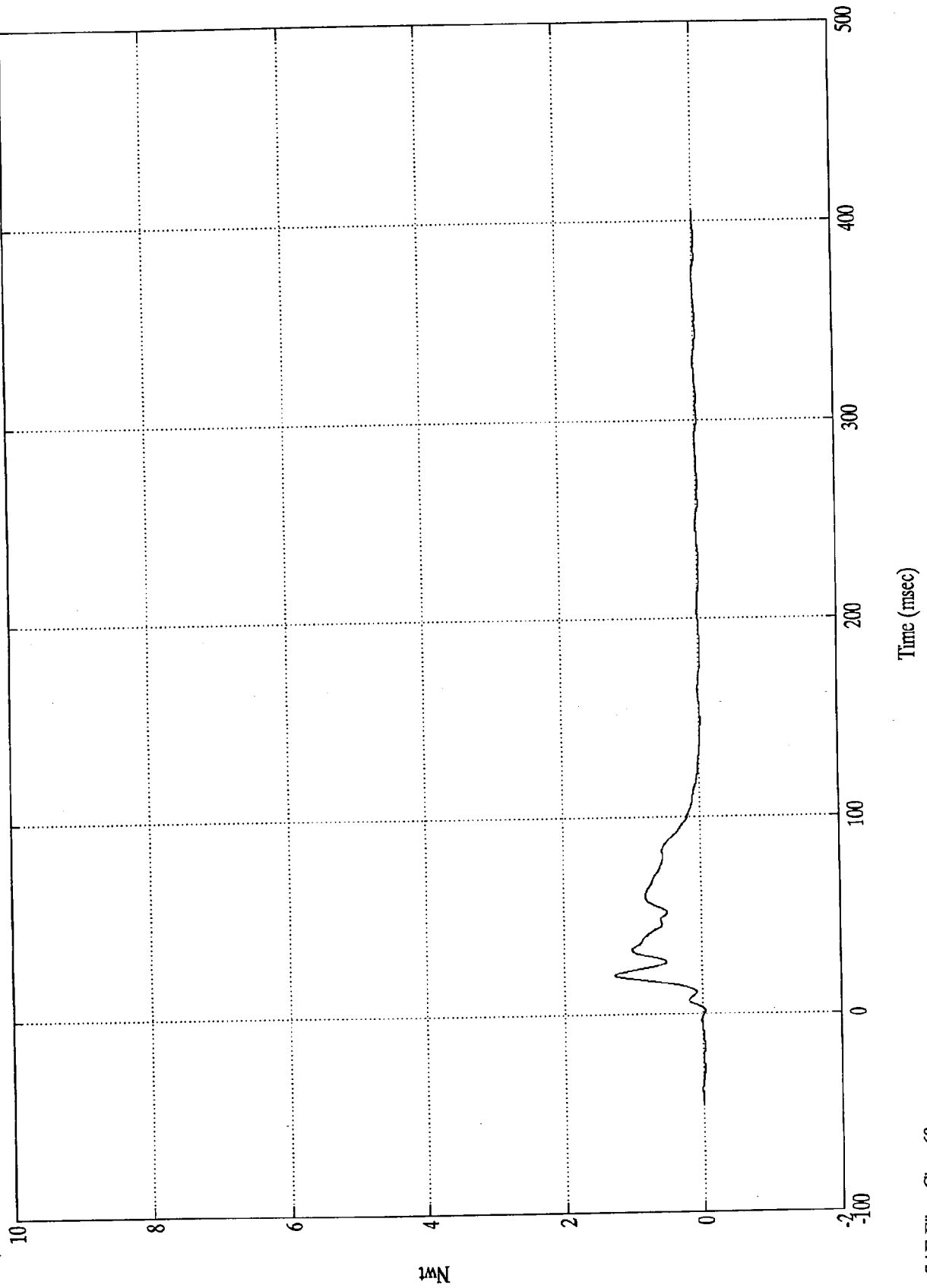
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell B8

Max = 12672.22 Nwt @ 20.28 msec
Min = -360.14 Nwt @ 1.91 msec



Nwt

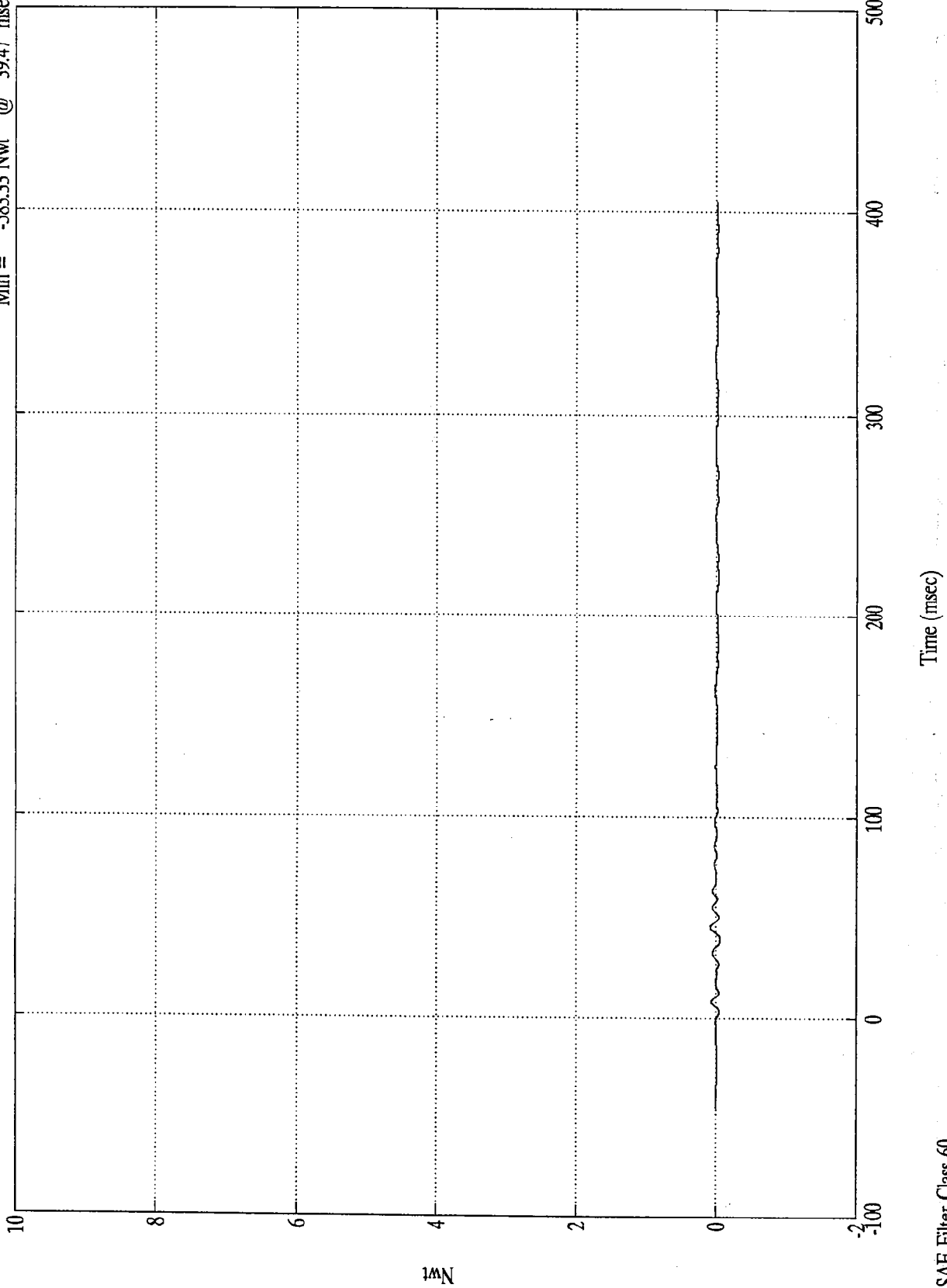
Time (msec)

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell B9

Max = 874.89 Nwt @ 45.48 msec
Min = -583.33 Nwt @ 39.47 msec



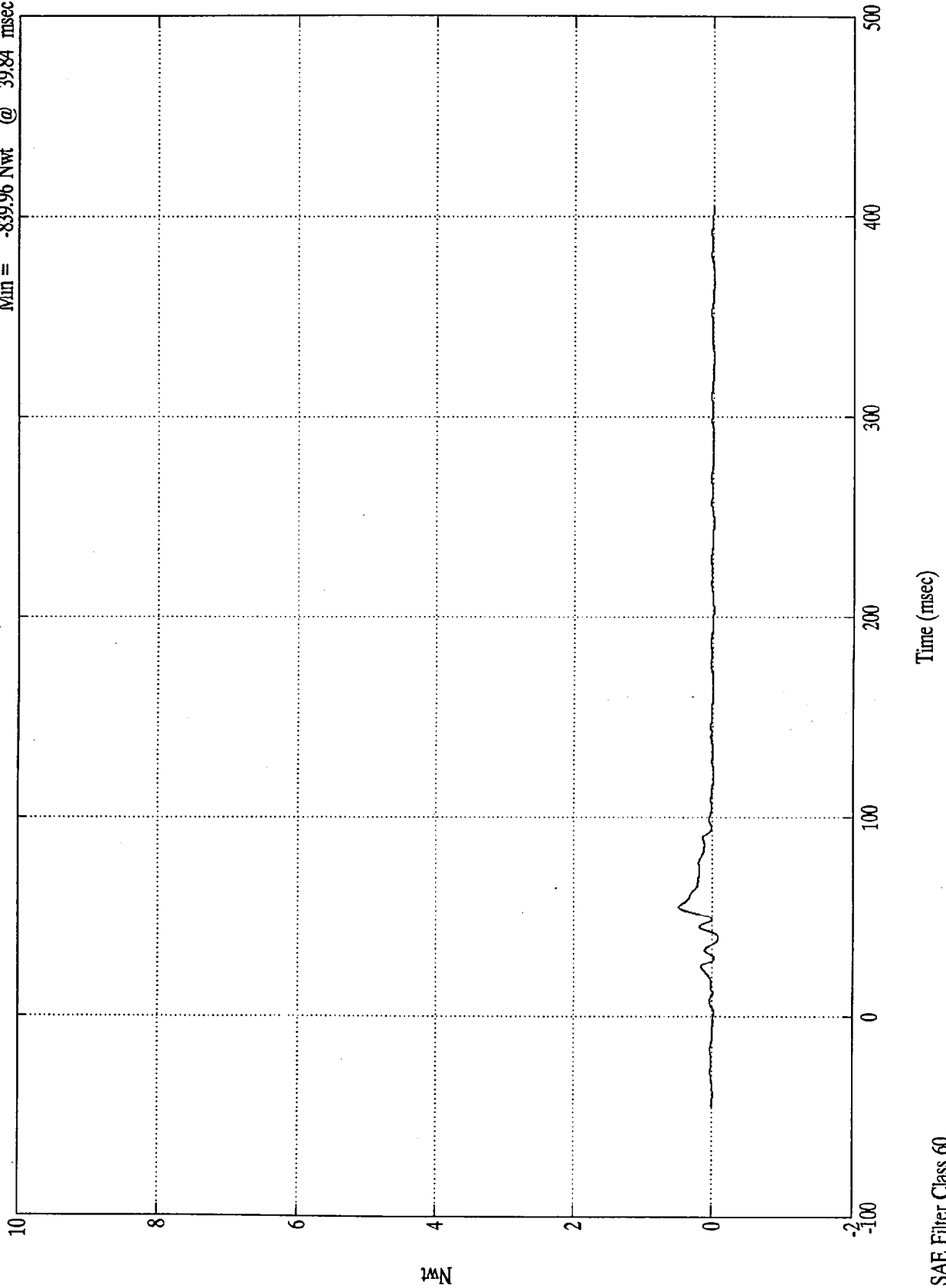
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell C1

Max = 4840.60 Nwt @ 54.96 msec
Min = -839.96 Nwt @ 39.84 msec

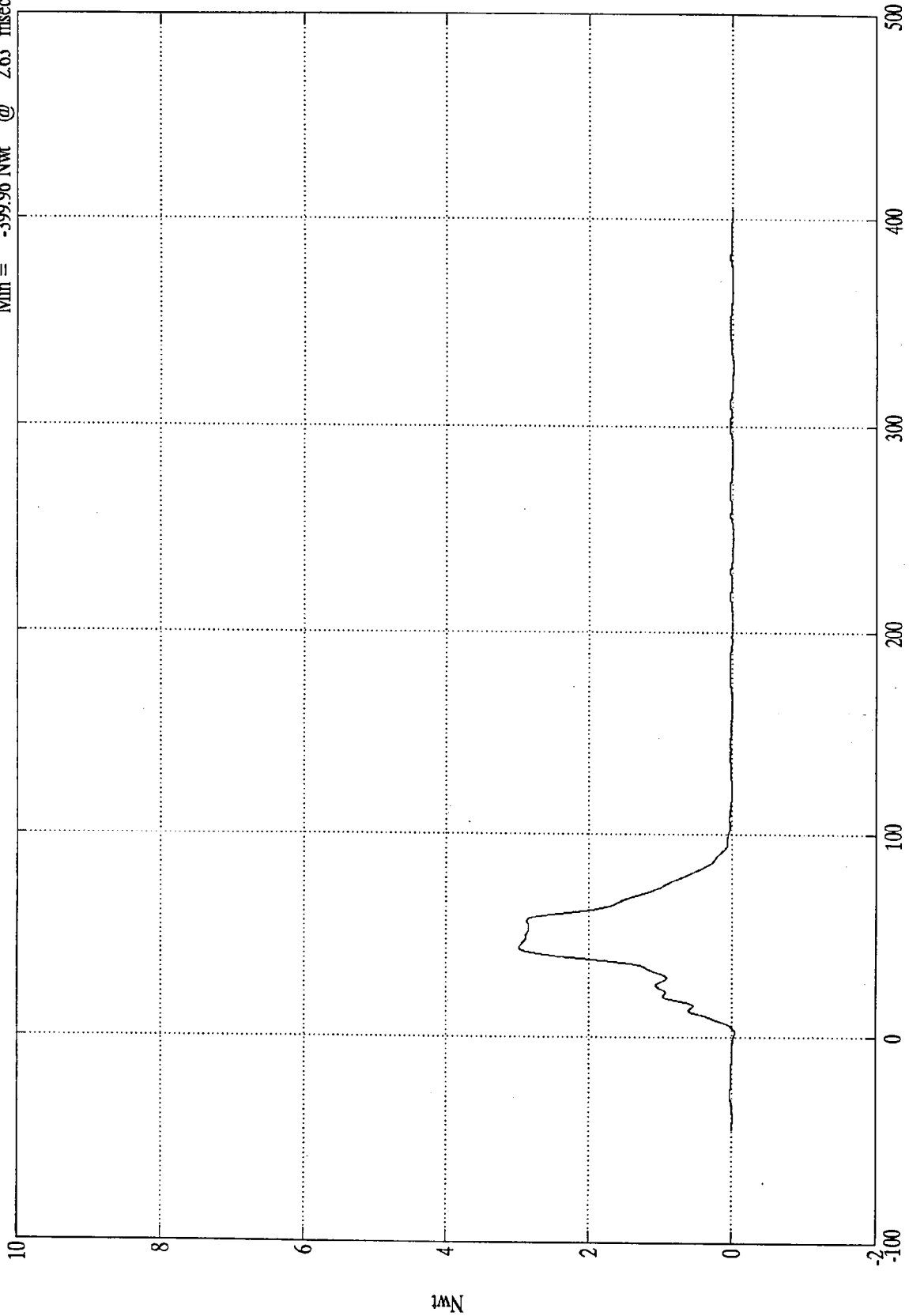


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell C2

Max = 29861.46 Nwt @ 43.91 msec
Min = -399.96 Nwt @ 2.63 msec



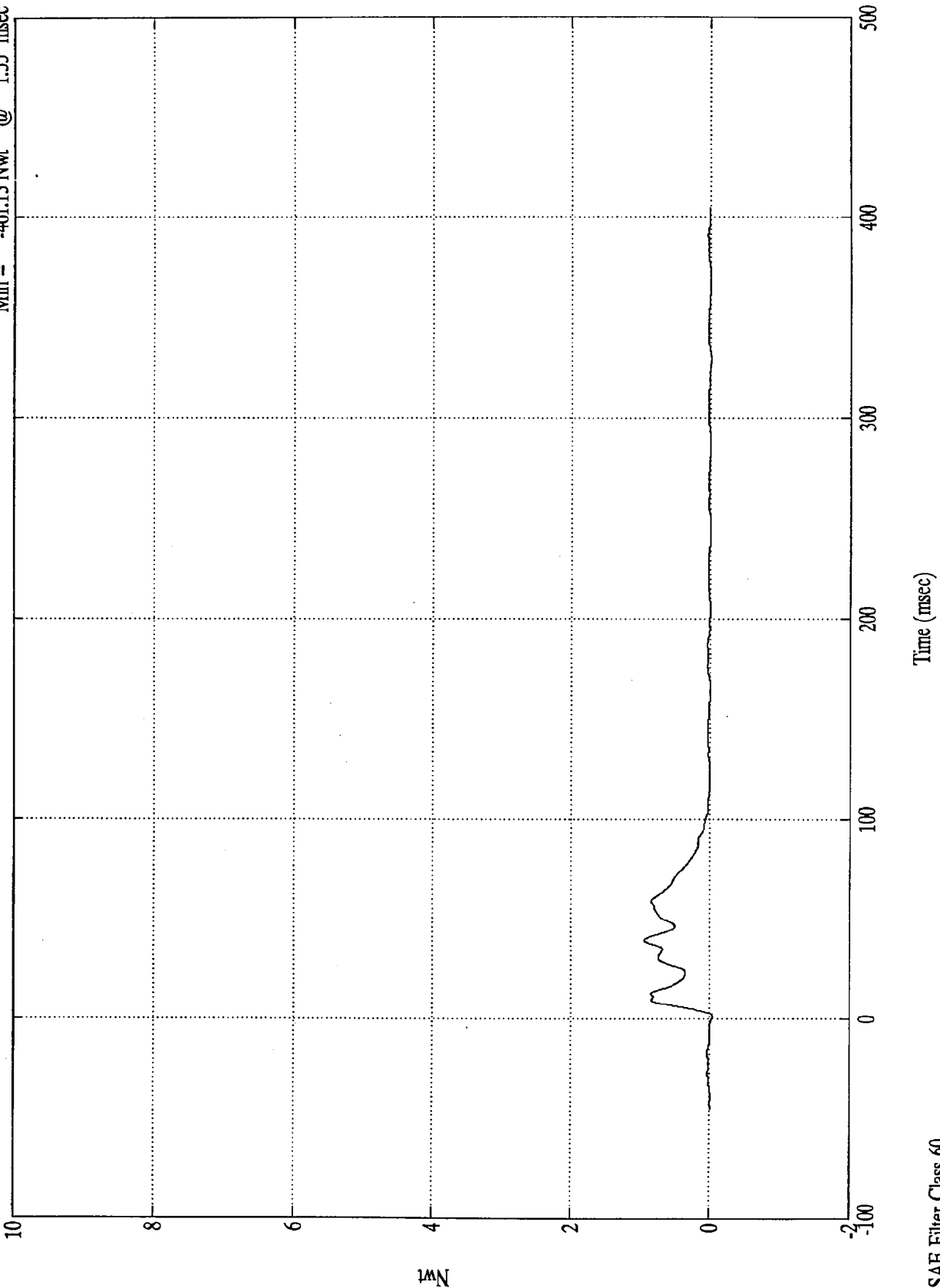
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell C3

Max = 9412.72 Nwt @ 39.23 msec
Min = -461.13 Nwt @ 1.55 msec

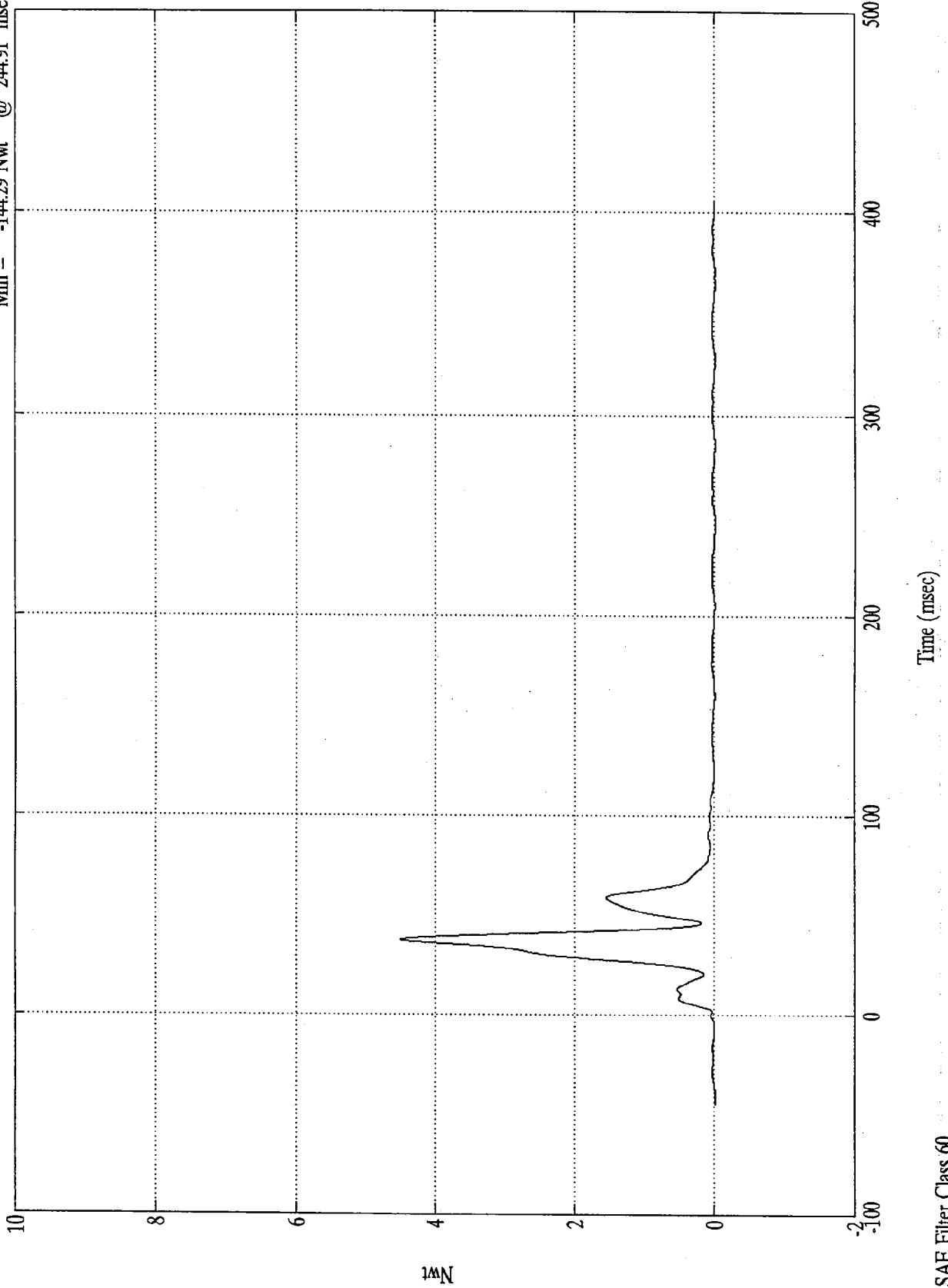


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell C4

Max = 45110.50 Nwt @ 37.44 msec
Min = -144.29 Nwt @ 244.91 msec

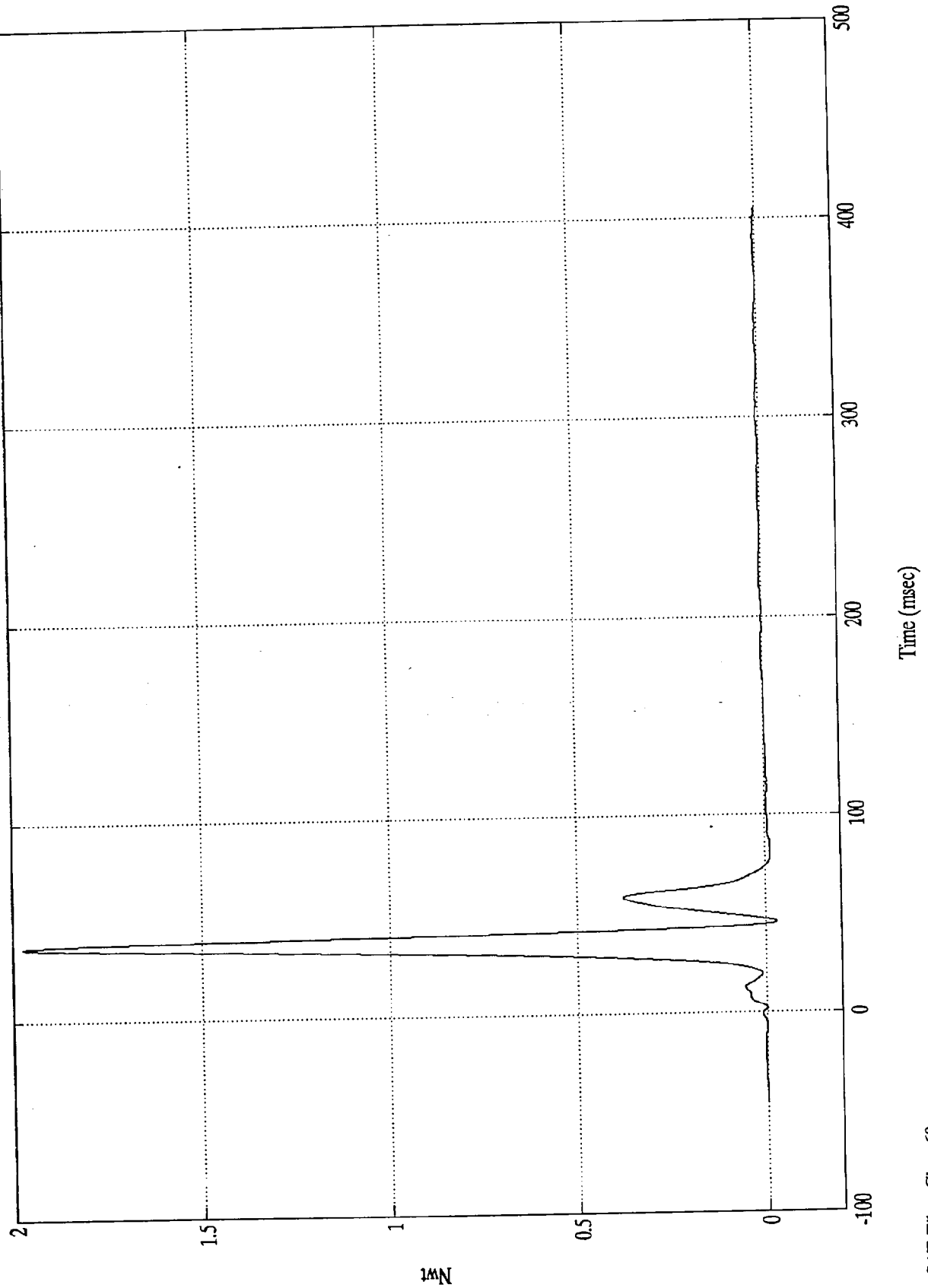


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁵

Barrier Load Cell C5

Max = 197418.39 Nwt @ 37.31 msec
Min = -2821.39 Nwt @ 45.84 msec



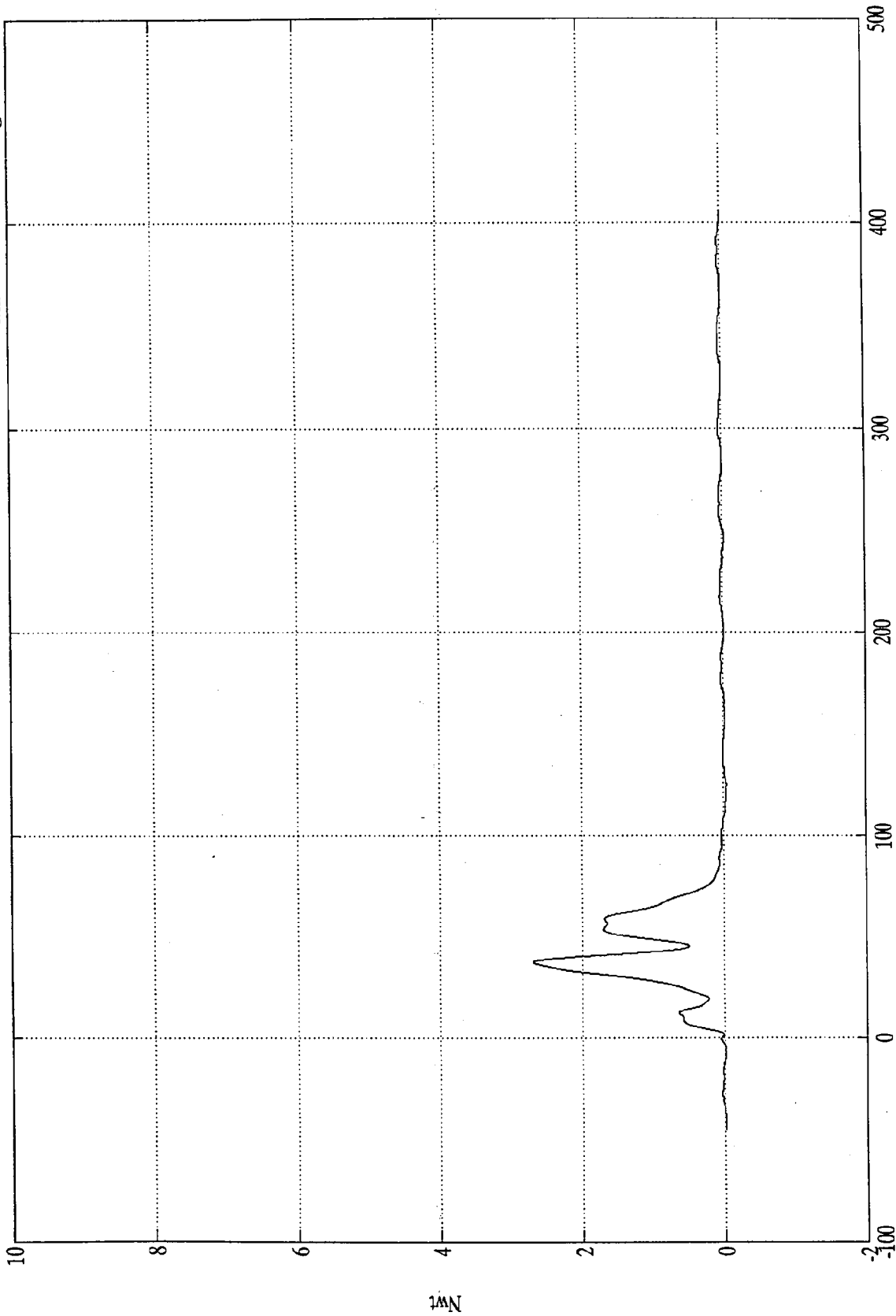
Nwt

Time (msec)

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell C6

Max = 26901.47 Nwt @ 37.79 msec
Min = -462.24 Nwt @ 124.80 msec



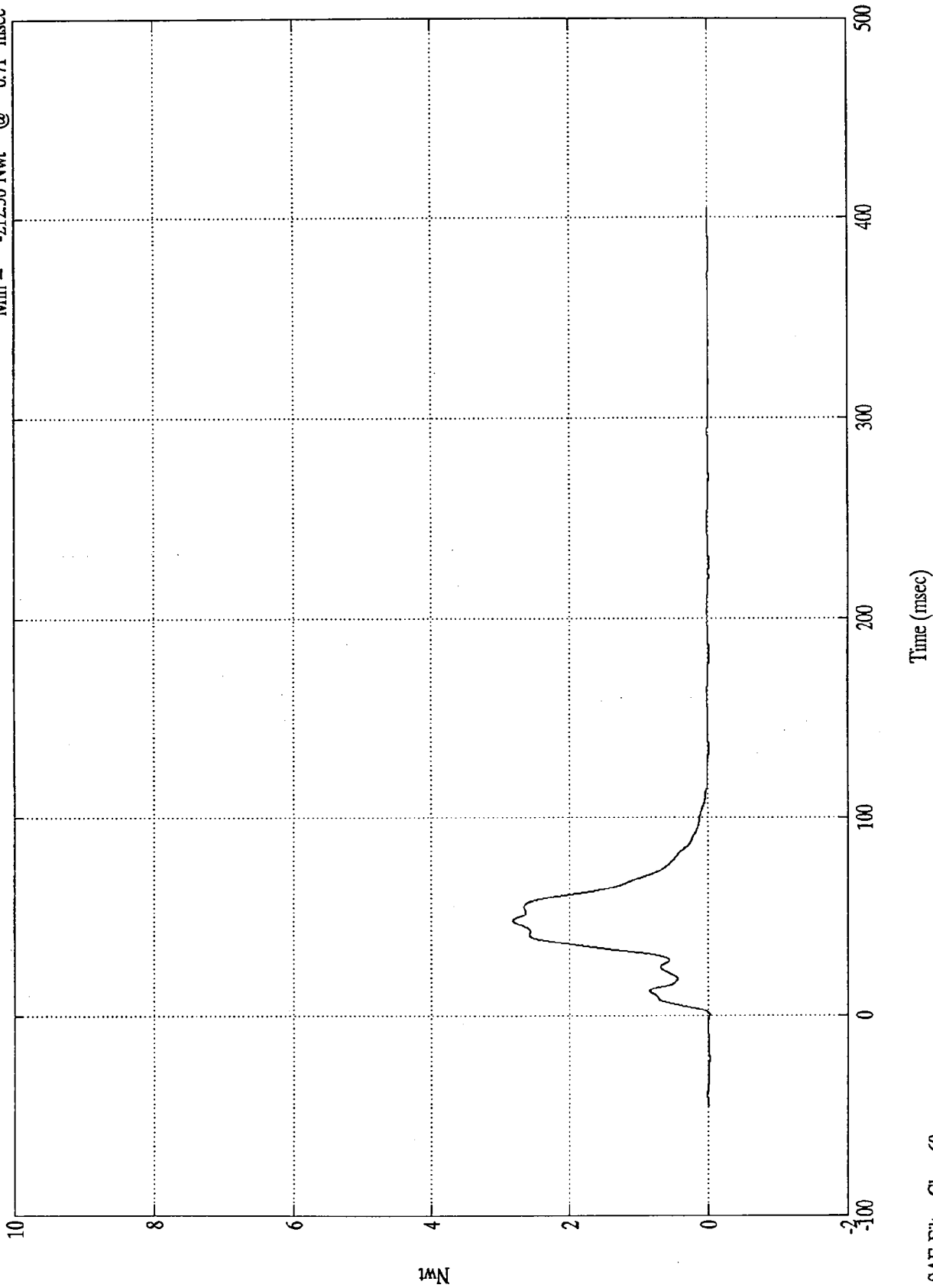
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Max = 28224.39 Nwt @ 48.36 msec
Min = -212.50 Nwt @ 0.71 msec

Barrier Load Cell C7

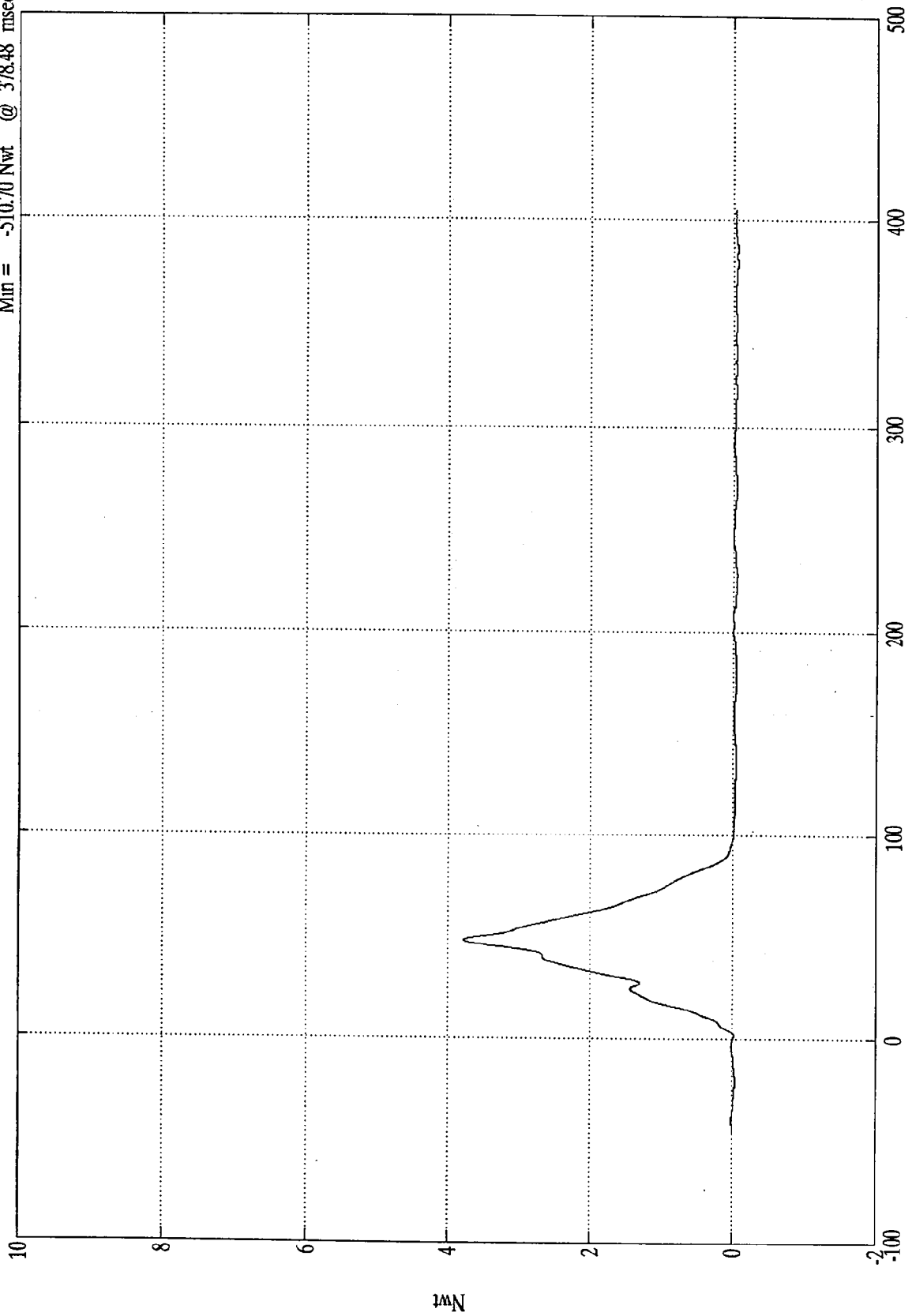


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell C8

Max = 37809.99 Nwt @ 48.00 msec
Min = -510.70 Nwt @ 378.48 msec



Time (msec)

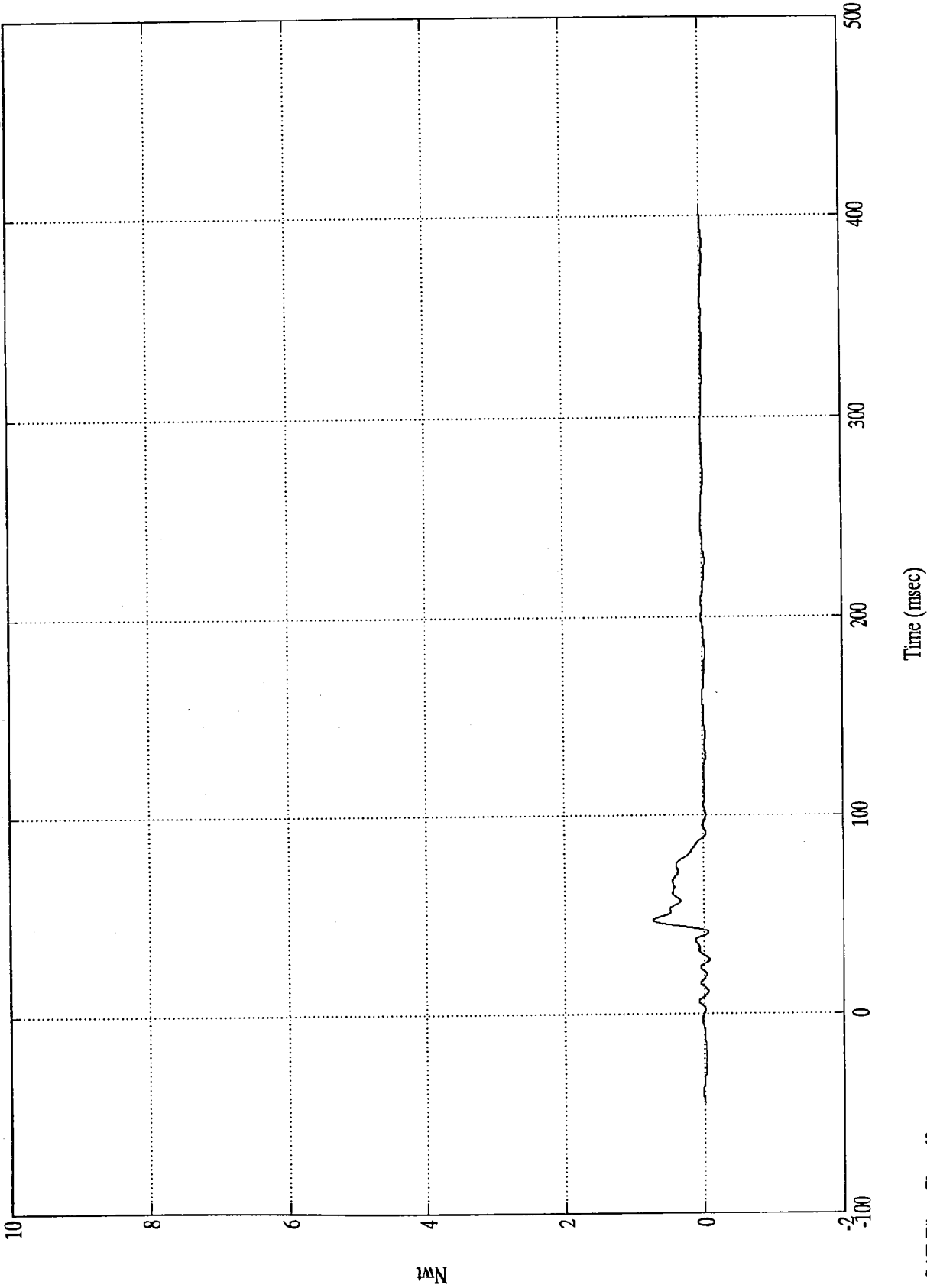
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell C9

Max = 7291.67 Nwt @ 47.04 msec
Min = -774.30 Nwt @ 27.60 msec

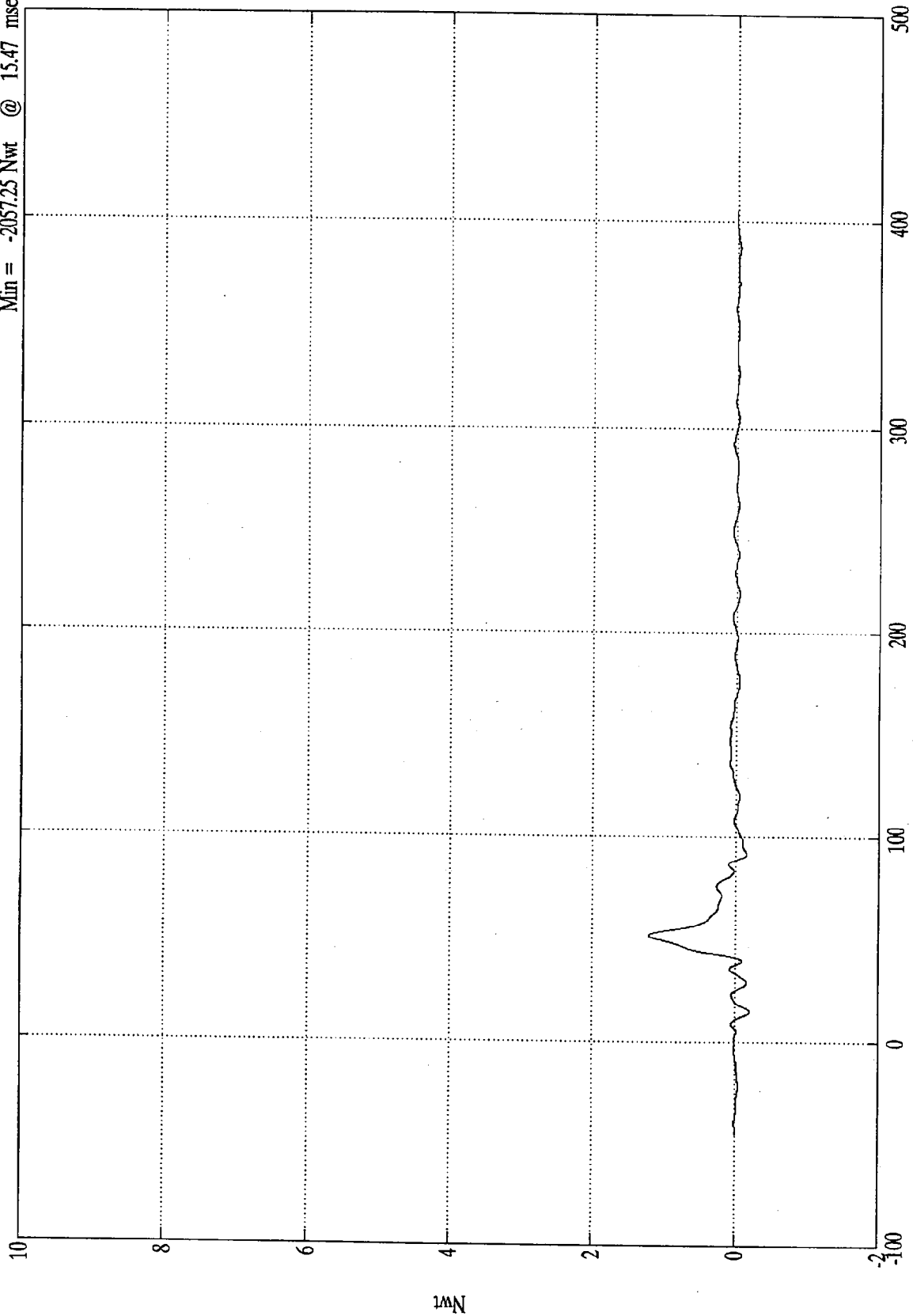


NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell DI

Max = 12157.86 Nwt @ 51.95 msec
Min = -2057.25 Nwt @ 15.47 msec



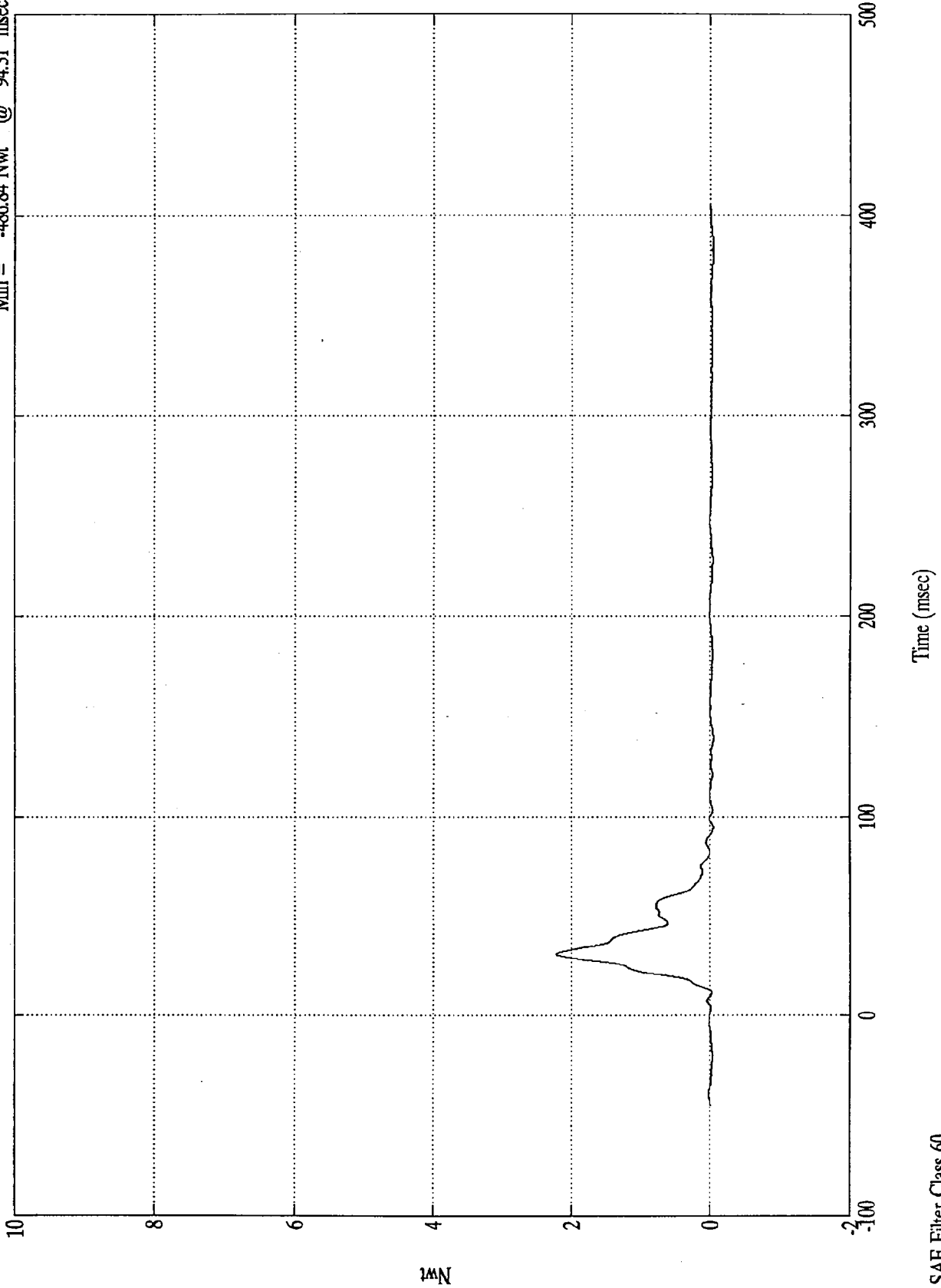
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell D2

Max = 22216.59 Nwt @ 31.07 msec
Min = -486.84 Nwt @ 94.31 msec



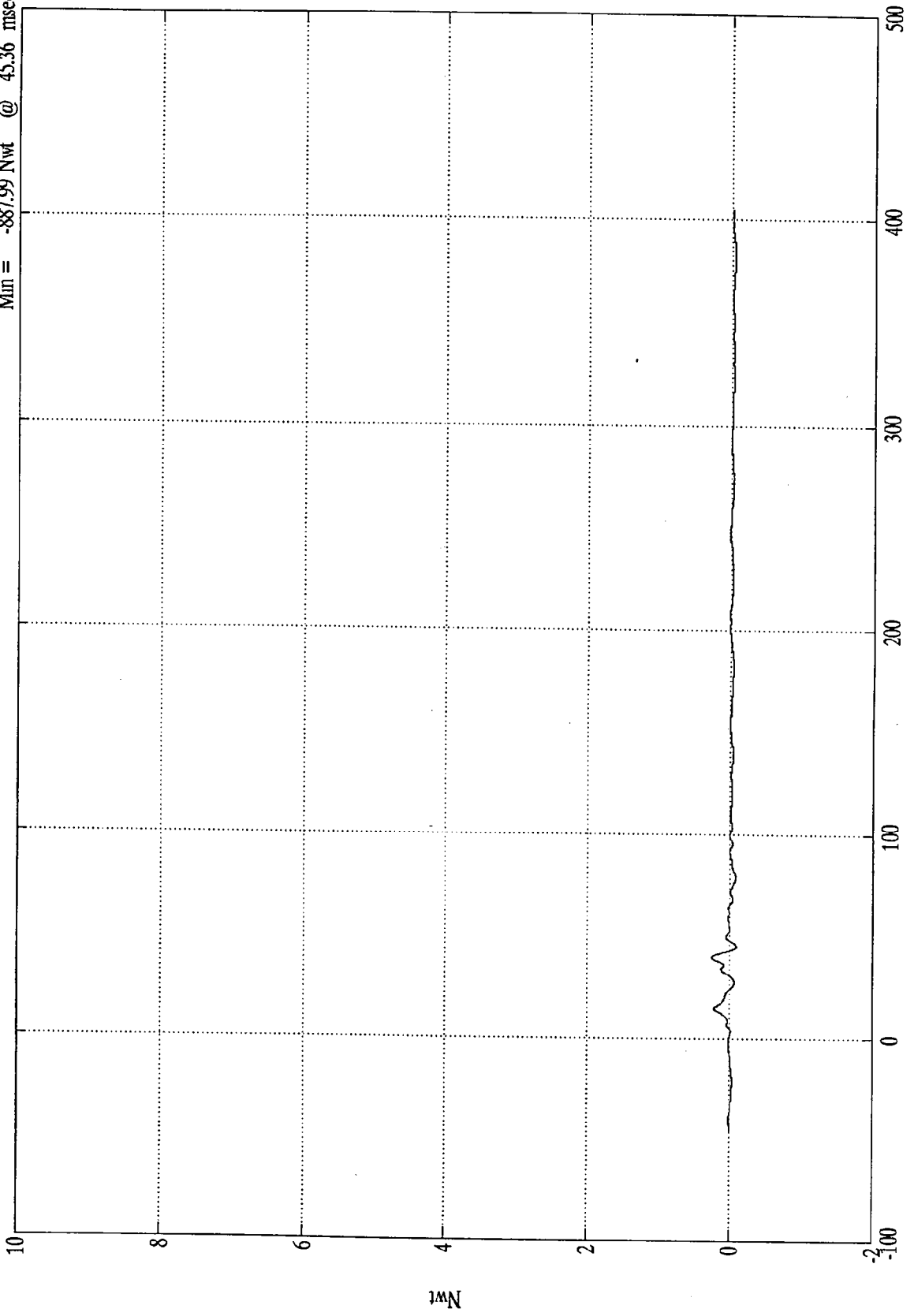
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell D3

Max = 2529.19 Nwt @ 39.95 msec
Min = -887.99 Nwt @ 45.36 msec



Time (msec)

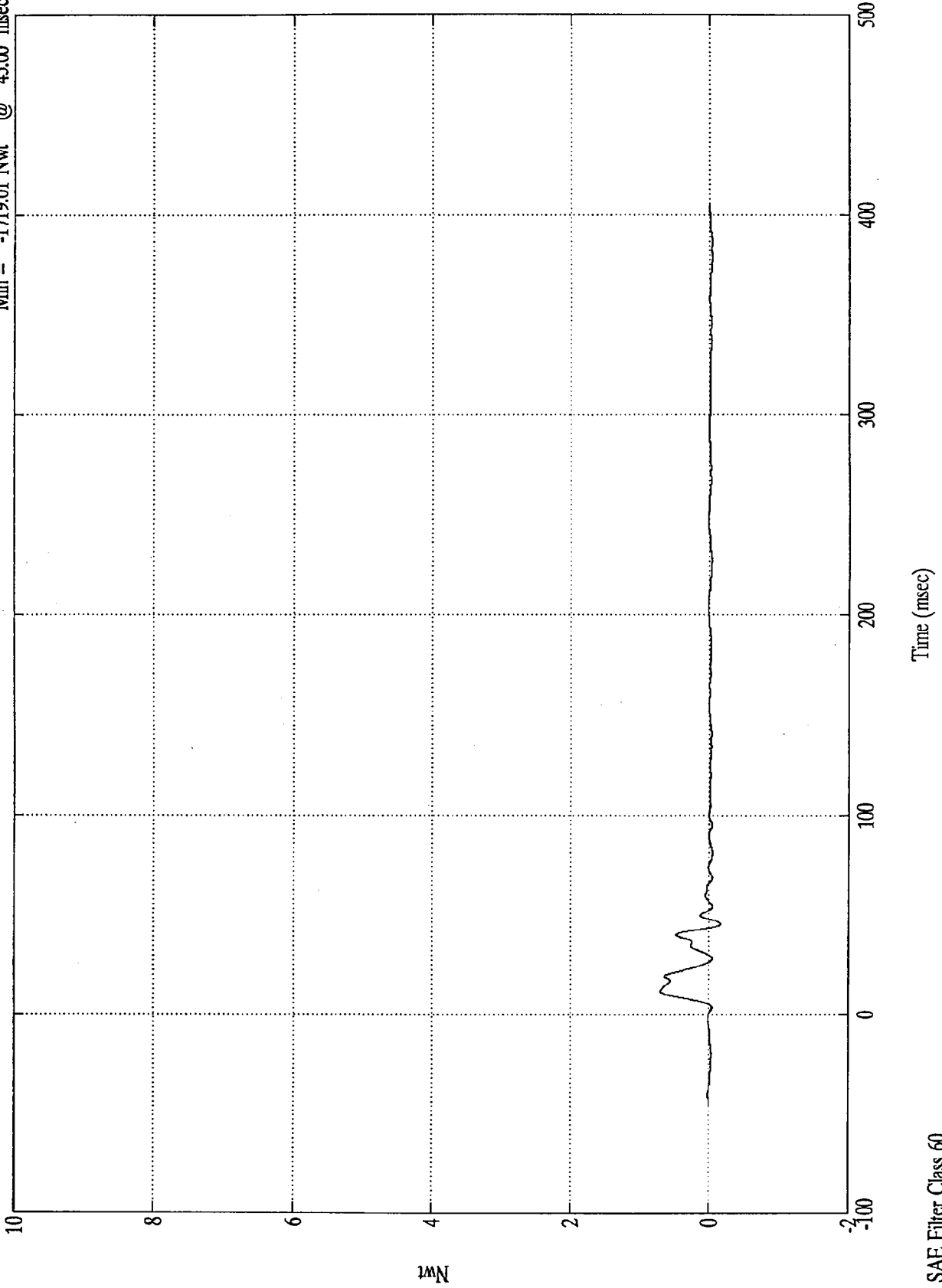
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell D4

Max = 6955.54 Nwt @ 11.87 msec
Min = -1719.01 Nwt @ 45.00 msec



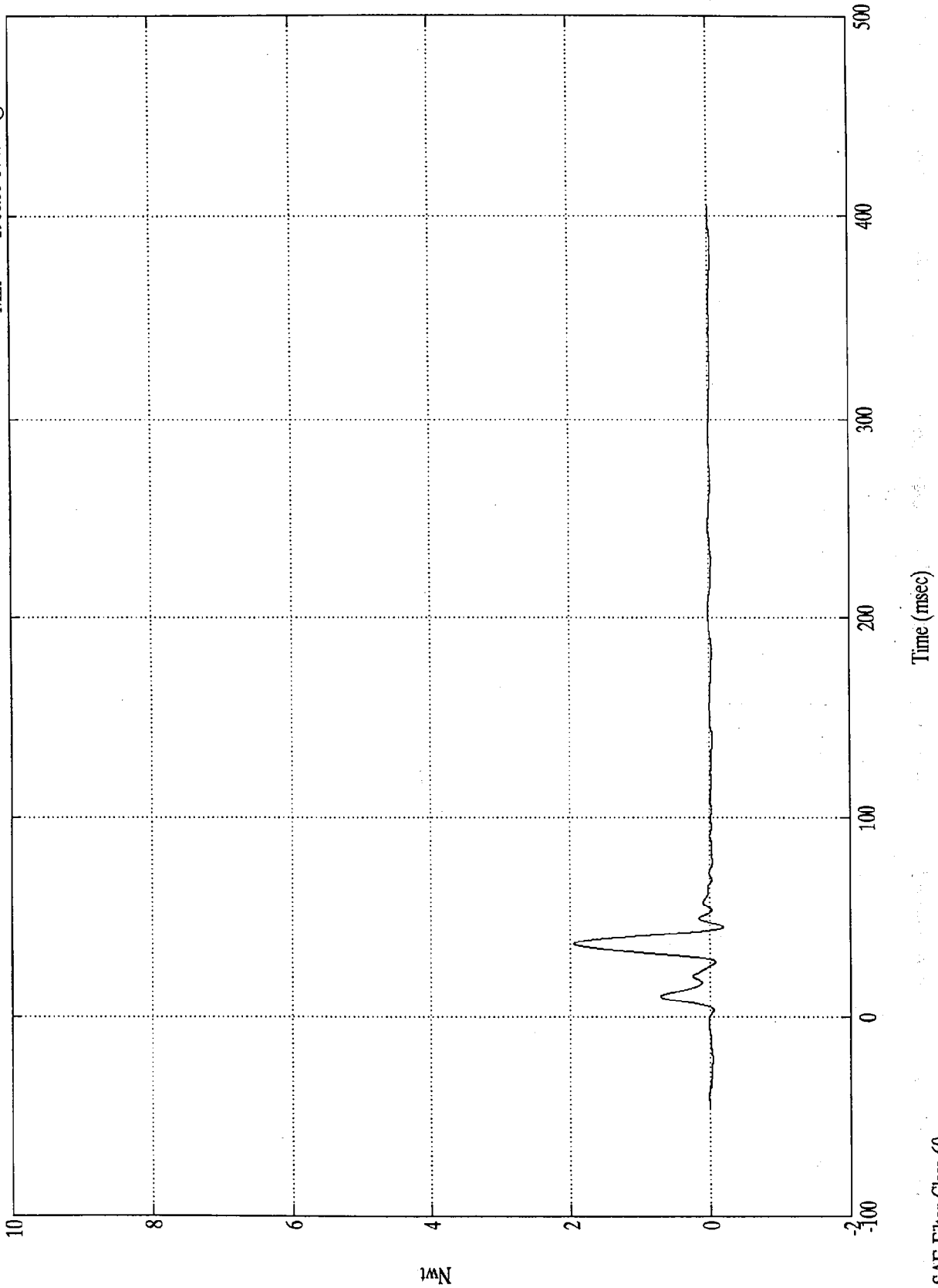
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell D5

Max = 19516.84 Nwt @ 36.72 msec
Min = -1900.53 Nwt @ 45.00 msec

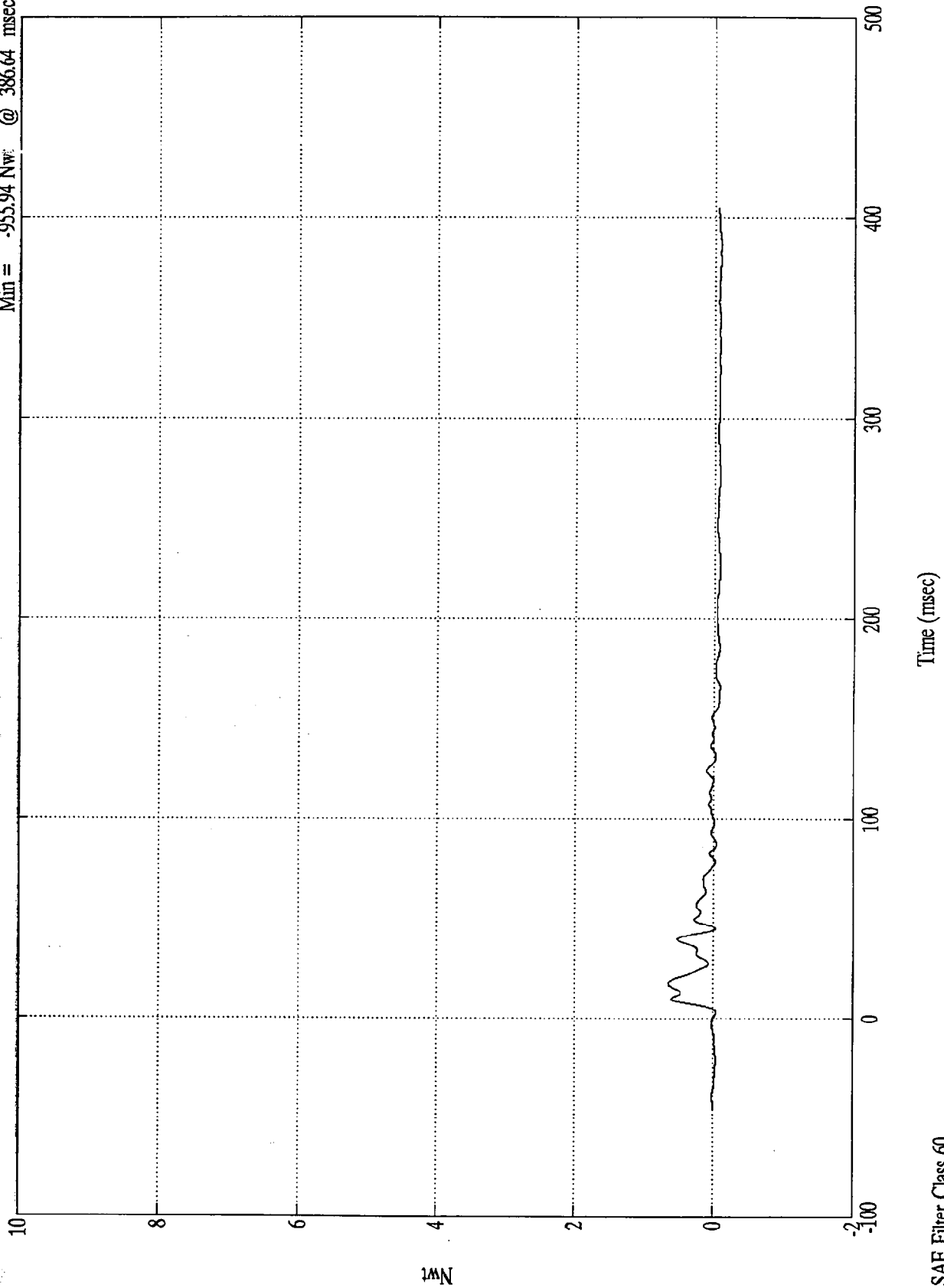


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell D6

Max = 6508.32 Nwt @ 17.51 msec
Min = -955.94 Nwt @ 386.64 msec

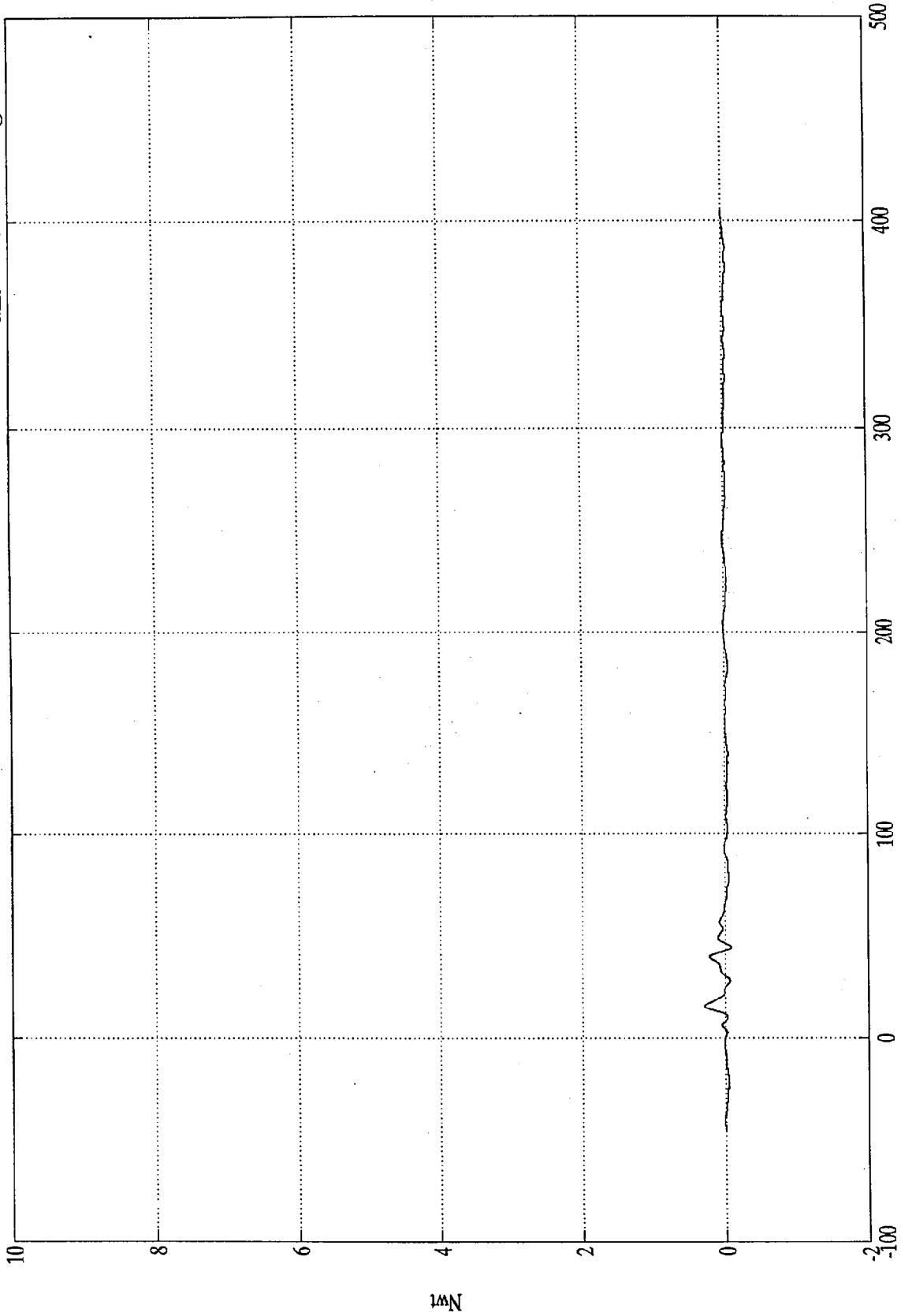


SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Barrier Load Cell D7

Max = 2961.27 Nwt @ 15.88 msec
Min = -807.18 Nwt @ 44.39 msec



Time (msec)

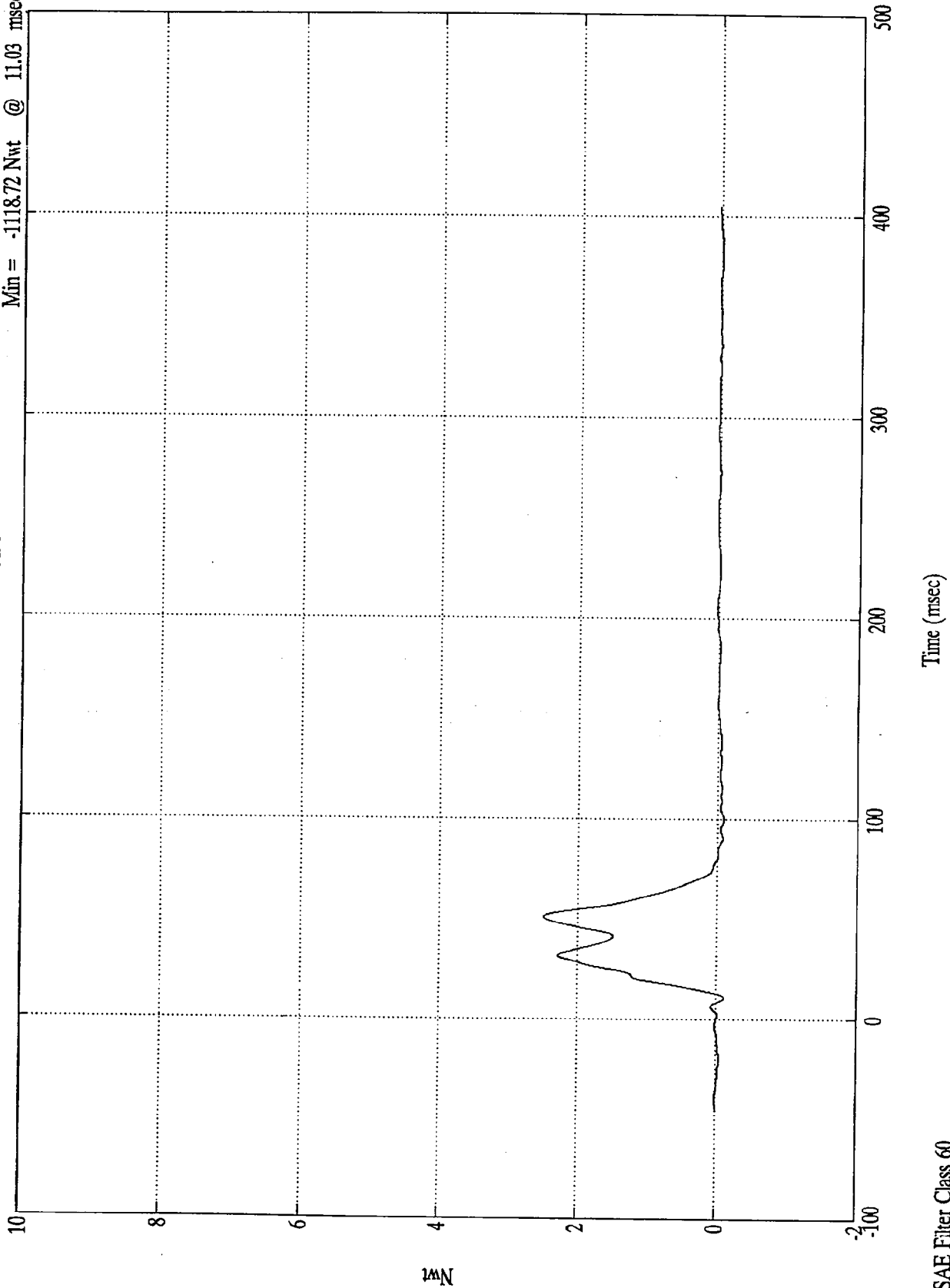
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

x10⁴

Barrier Load Cell D8

Max = 24964.83 Nwt @ 51.12 msec
Min = -1118.72 Nwt @ 11.03 msec



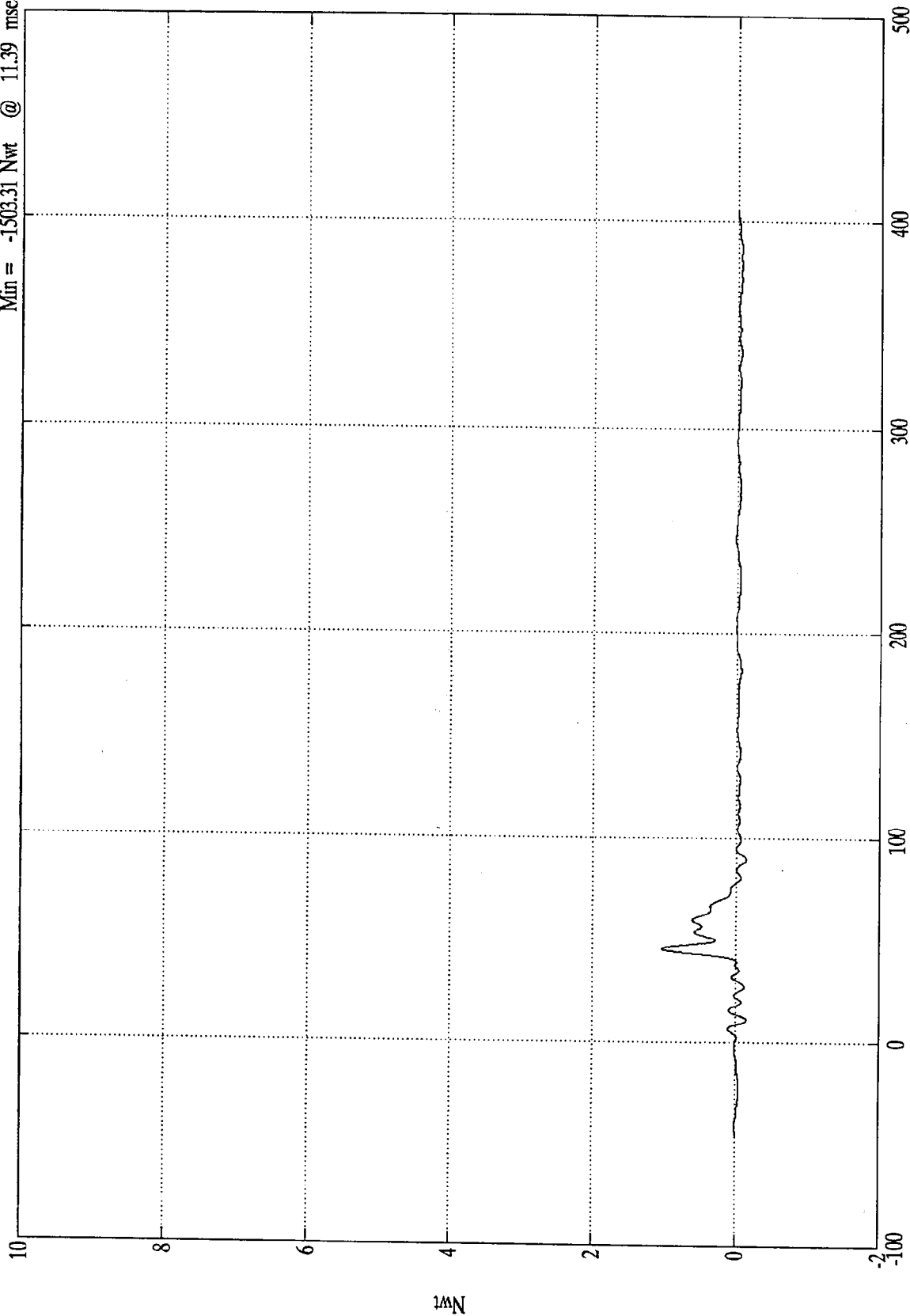
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^4$

Barrier Load Cell D9

Max = 10289.85 Nwt @ 45.96 msec
Min = -1503.31 Nwt @ 11.39 msec



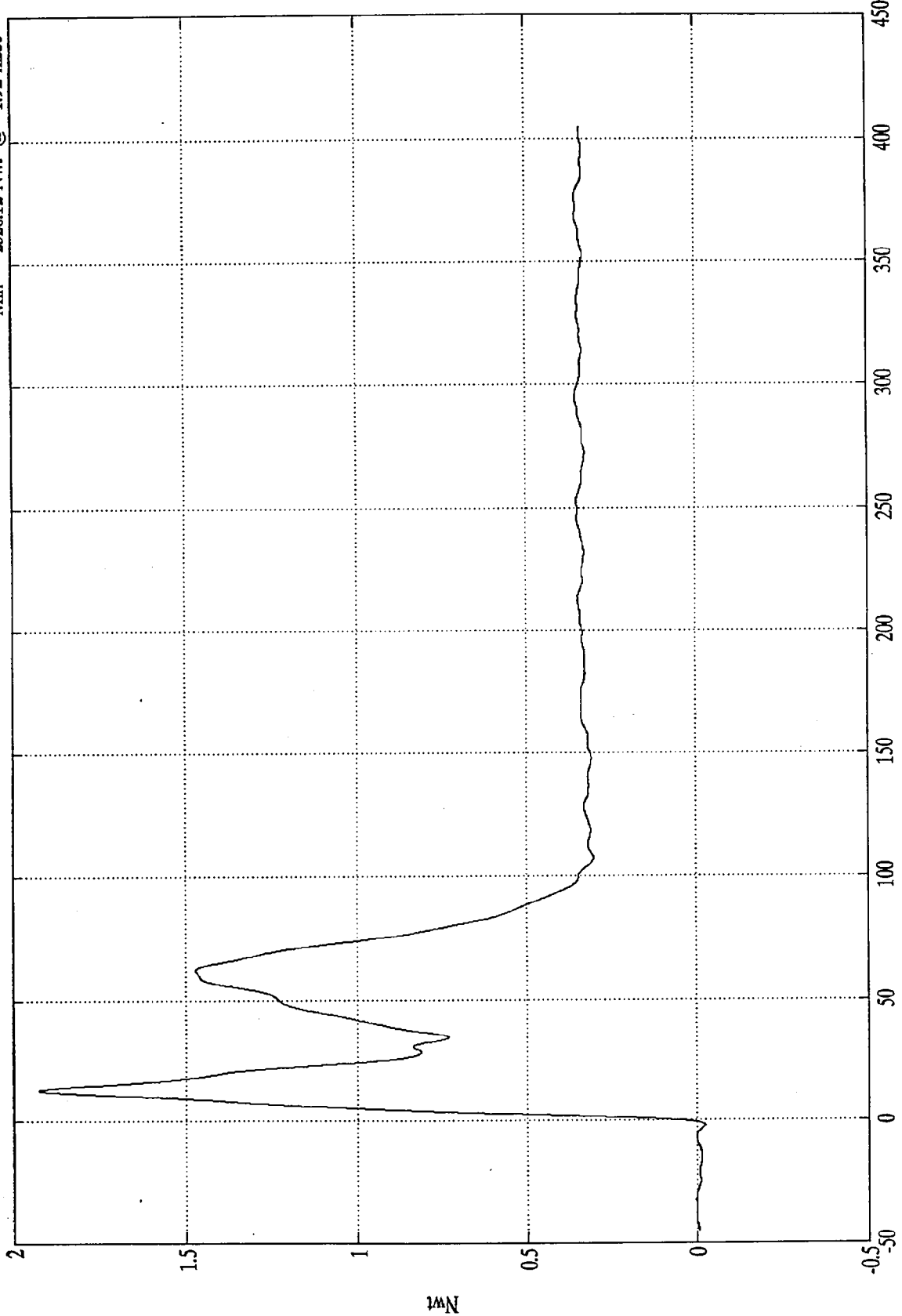
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁵

Group 1 Load Cell Sum

Max = 192765.21 Nwt @ 12.72 msec
Min = -2326.12 Nwt @ -1.92 msec



Load Cells (A1,A2,A3,B1,B2,B3)

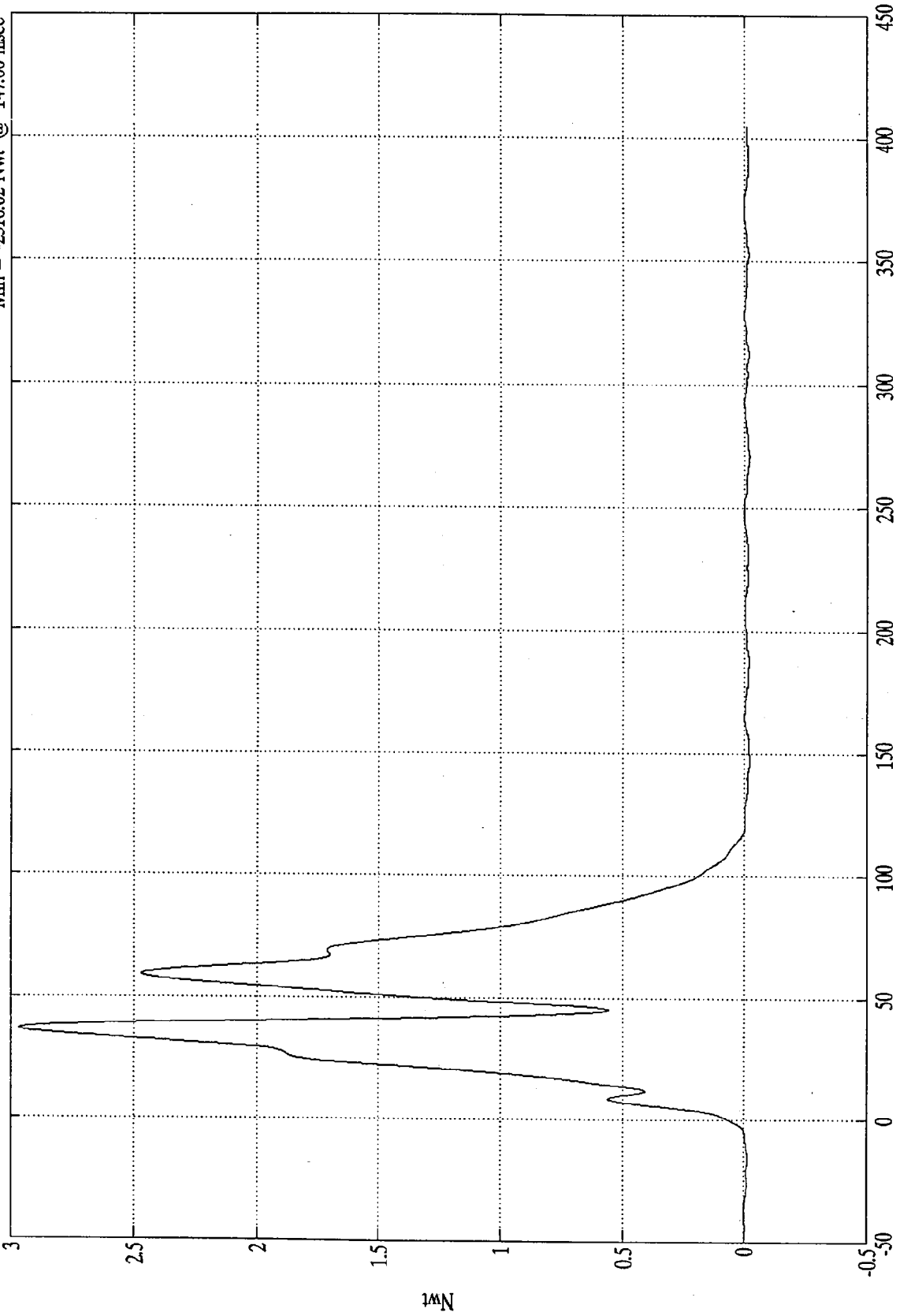
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁵

Group 2 Load Cell Sum

Max = 297029.00 Nwt @ 36.60 msec
Min = -2310.02 Nwt @ 147.00 msec



Time (msec)

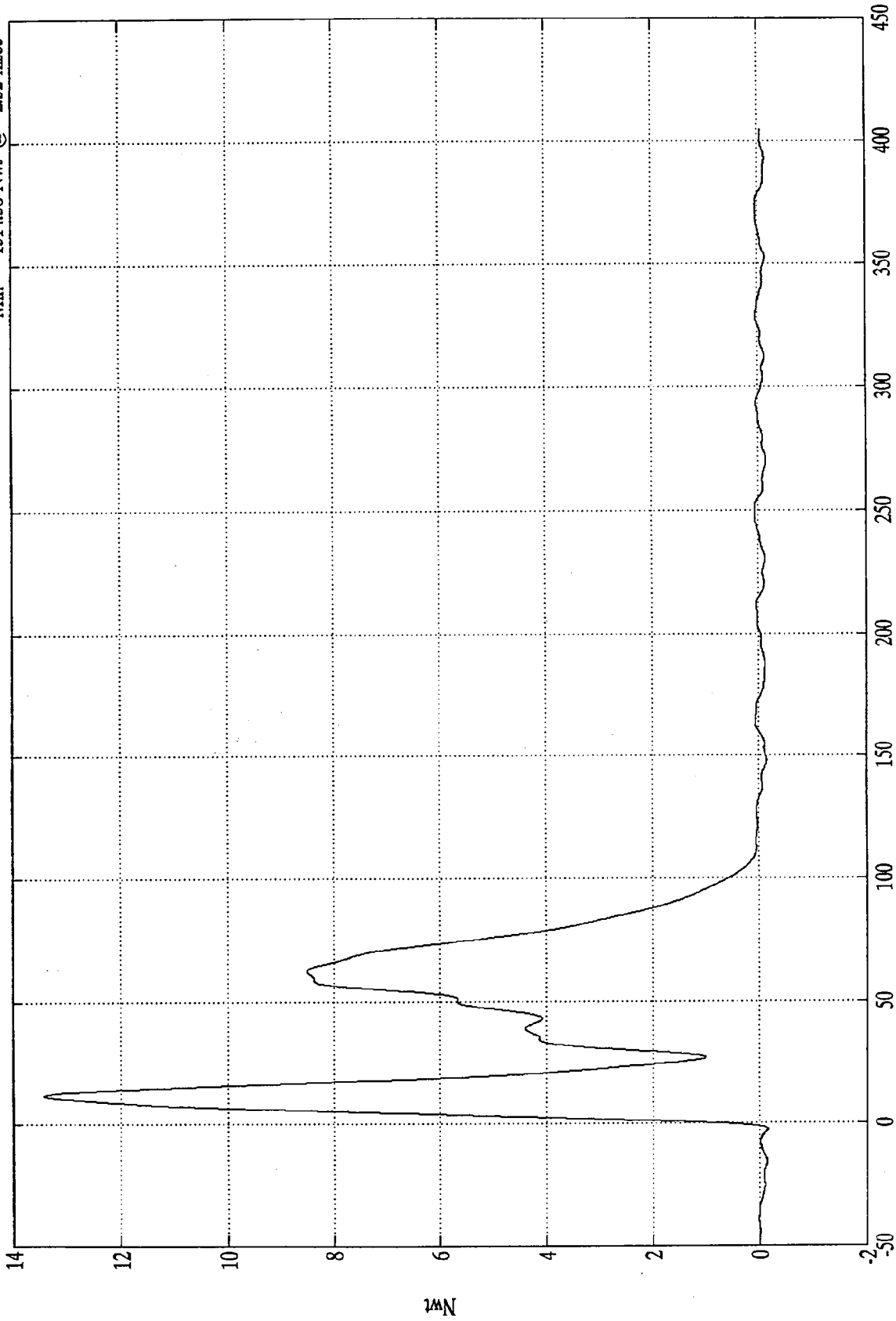
SAE Filter Class 60

Load Cells (A4,A5,A6,B4,B5,B6)

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Group 3 Load Cell Sum

Max = 134364.40 Nwt @ 11.88 msec
Min = -1514.58 Nwt @ -2.52 msec



Load Cells (A7,A8,A9,B7,B8,B9)

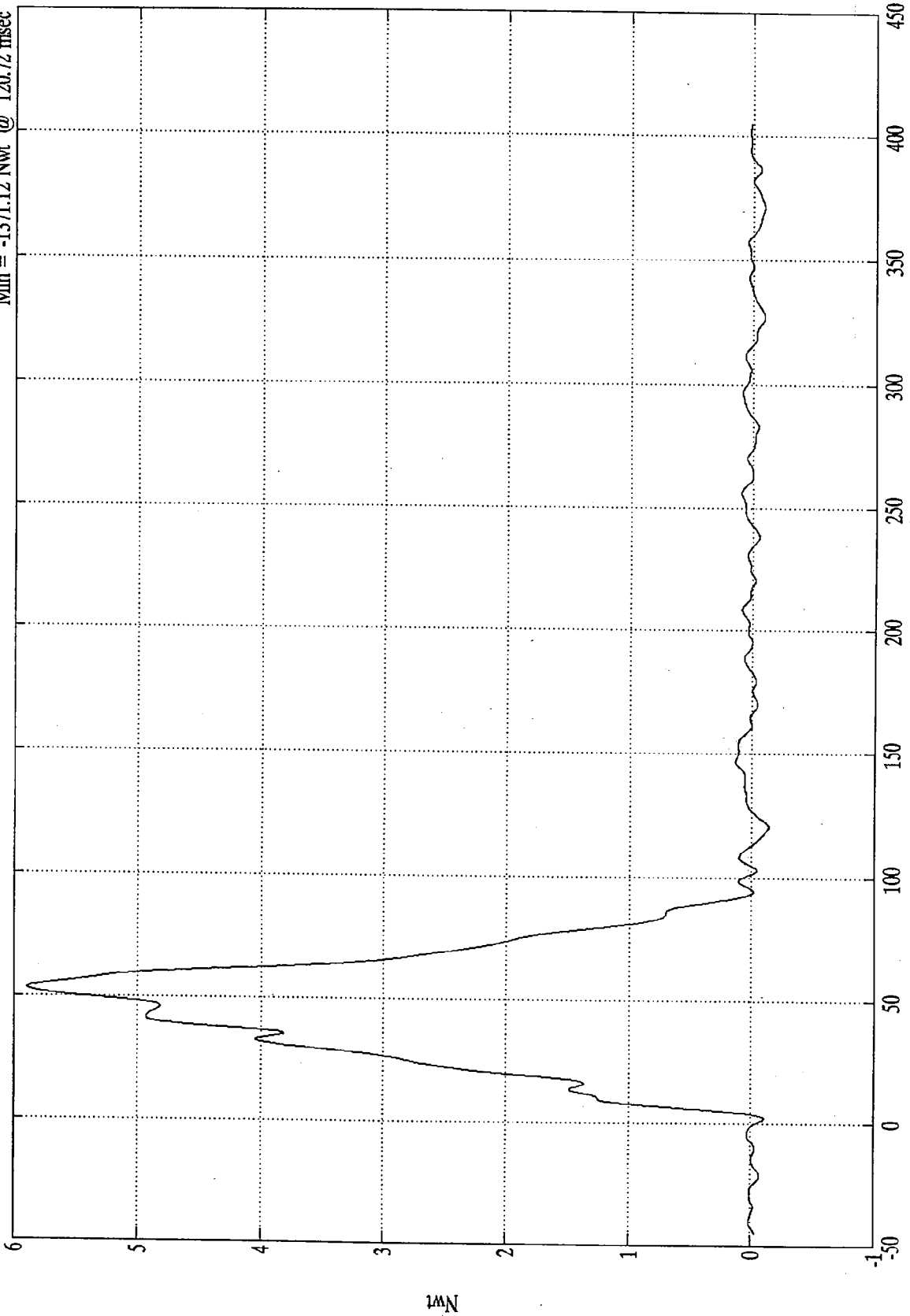
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV
x10⁴

Group 4 Load Cell Sum

Max = 58880.22 Nwt @ 53.28 msec
Min = -1371.12 Nwt @ 120.72 msec



Load Cells (C1,C2,C3,D1,D2,D3)

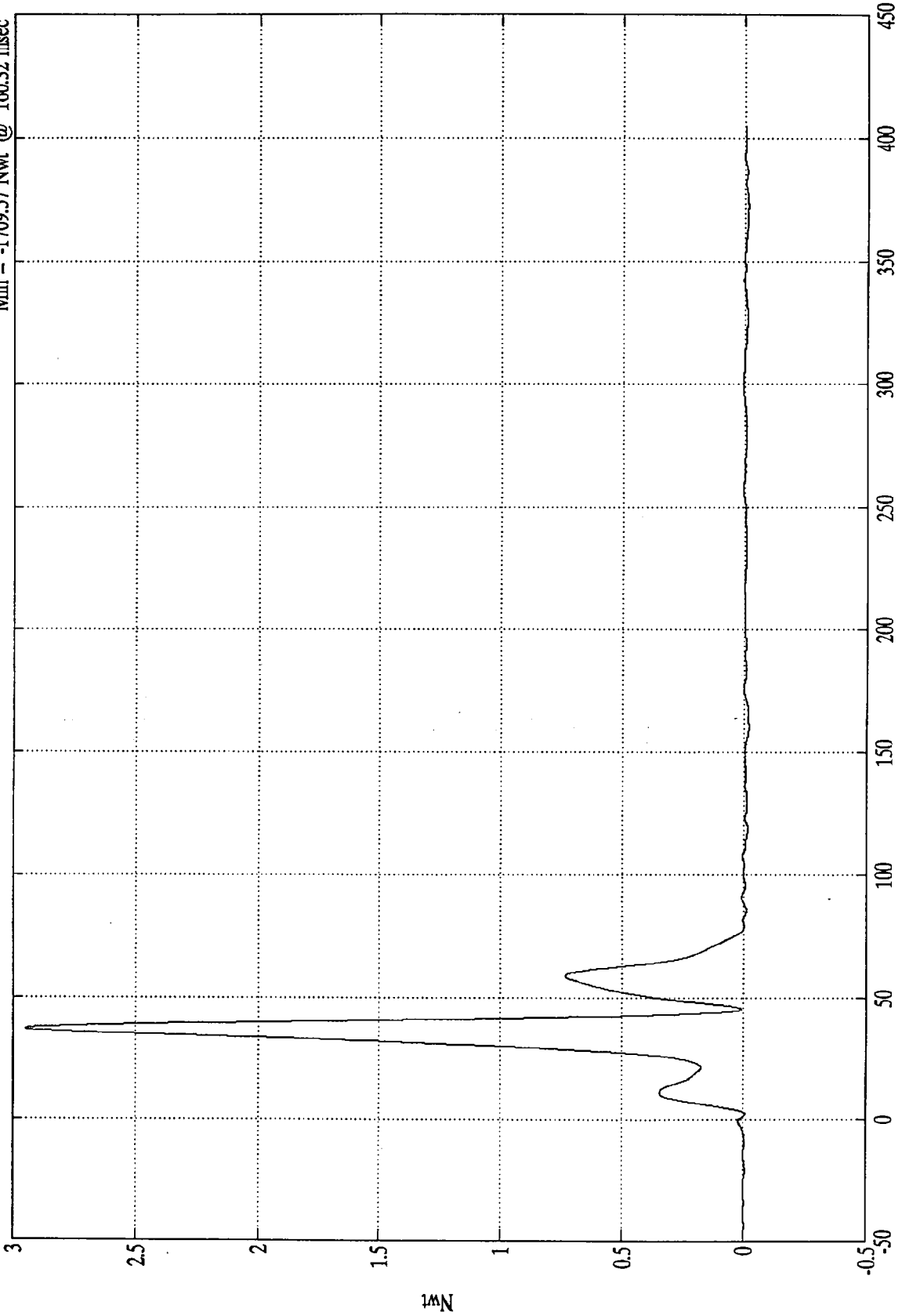
Time (msec)

SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

Group 5 Load Cell Sum

Max = 295123.60 Nwt @ 37.44 msec
Min = -1709.57 Nwt @ 160.32 msec



Load Cells (C4,C5,C6,D4,D5,D6)

Time (msec)

SAE Filter Class 60

Nwt

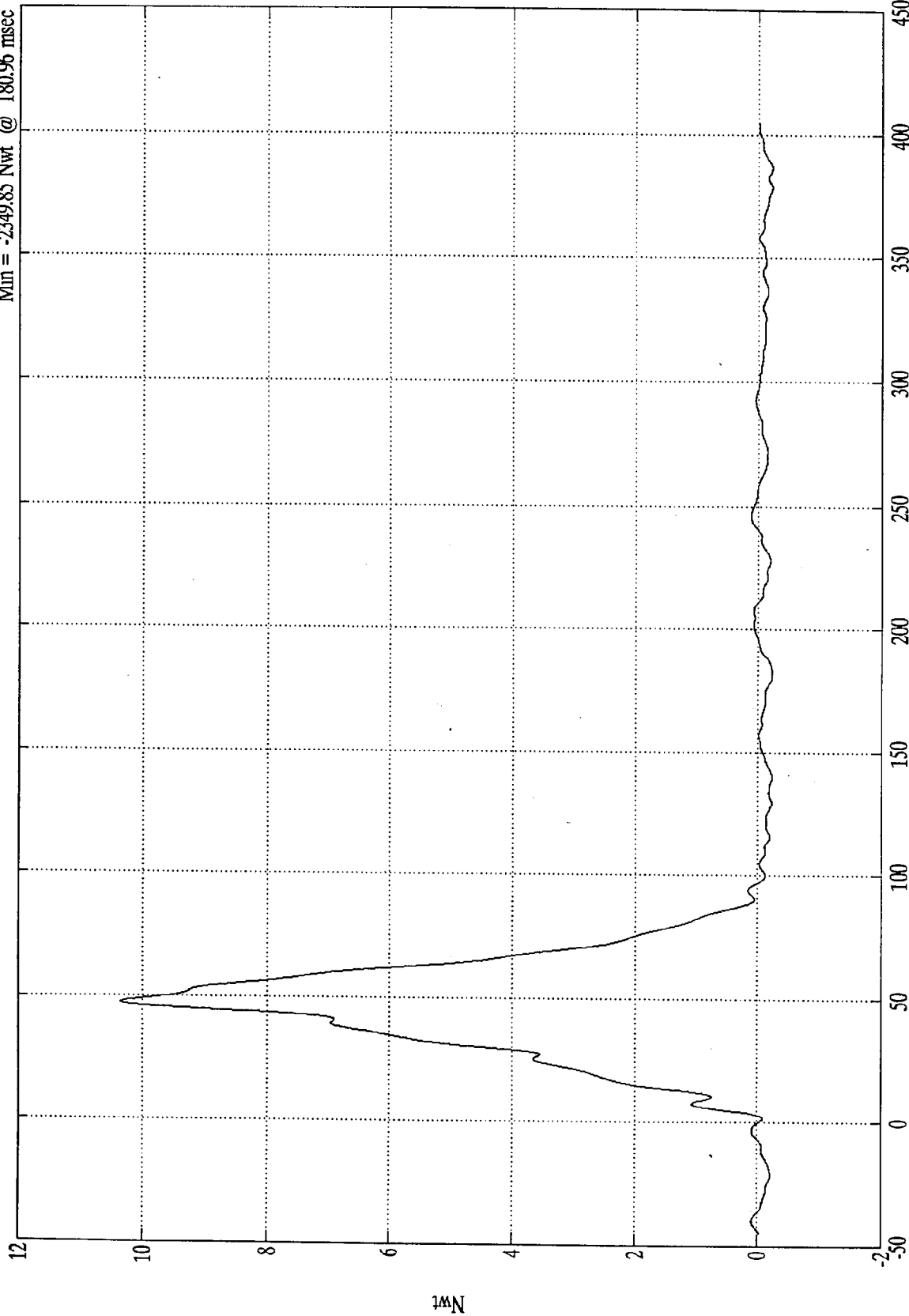
B-173

8313-8

NCAP TEST #8 - 1996 MAZDA MPV

Group 6 Load Cell Sum

Max = 103559.99 Nwt @ 47.40 msec
Min = -2349.85 Nwt @ 180.96 msec



Load Cells (C7,C8,C9,D7,D8,D9)

Time (msec)

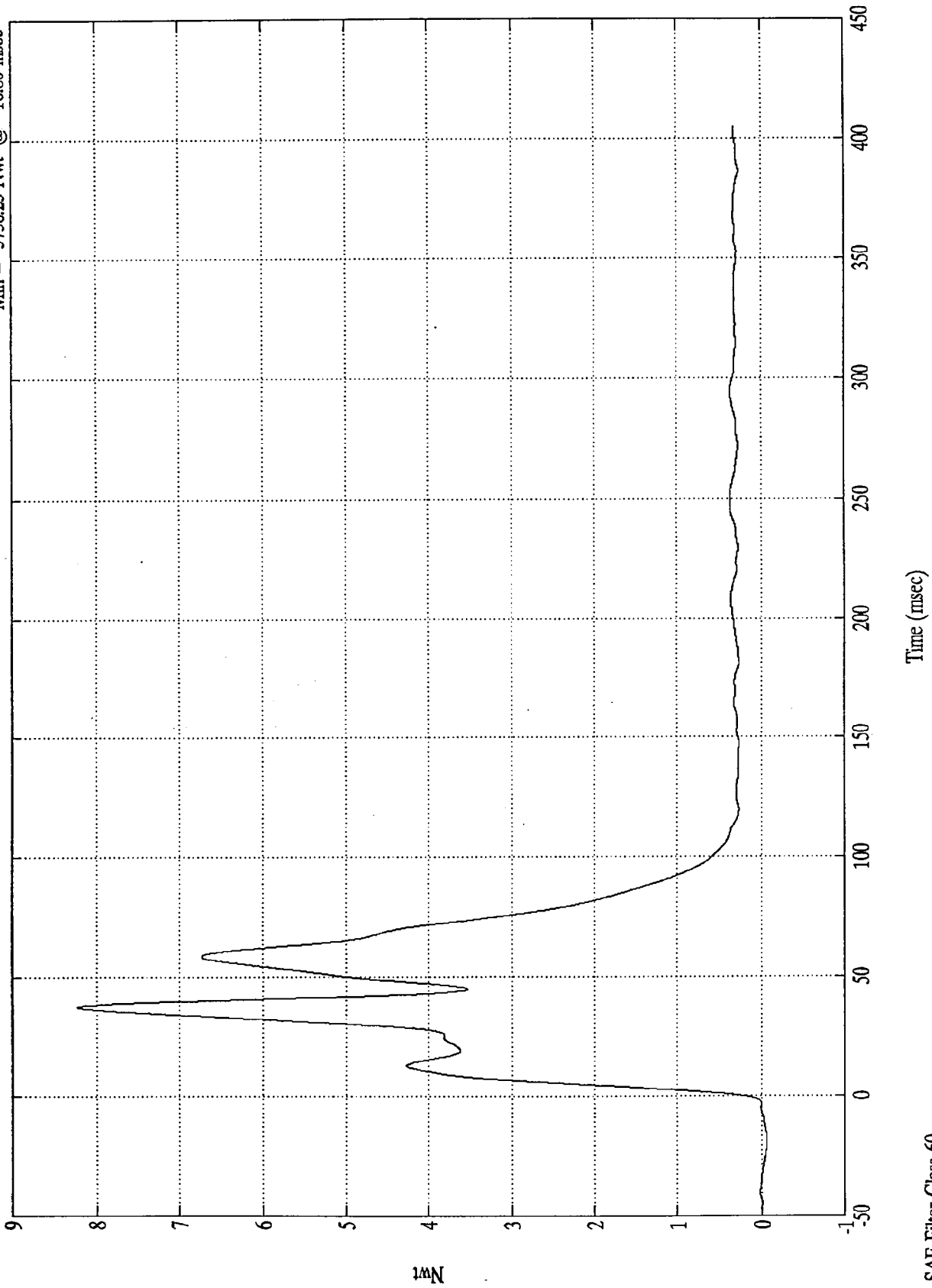
SAE Filter Class 60

NCAP TEST #8 - 1996 MAZDA MPV

$\times 10^5$

Total Load Cell Sum

Max = 823086.22 Nwt @ 37.44 msec
Min = -5736.23 Nwt @ -16.80 msec



SAE Filter Class 60

Appendix C
PART 572B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan SRL Corporation. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

| <u>Position No./Location</u> | <u>Serial No.</u> | <u>Completion Date</u> |
|------------------------------|-------------------|------------------------|
| #1/Driver | 150 | 3/19/96 |
| #2/Right Front Passenger | 64 | 3/6/96 |

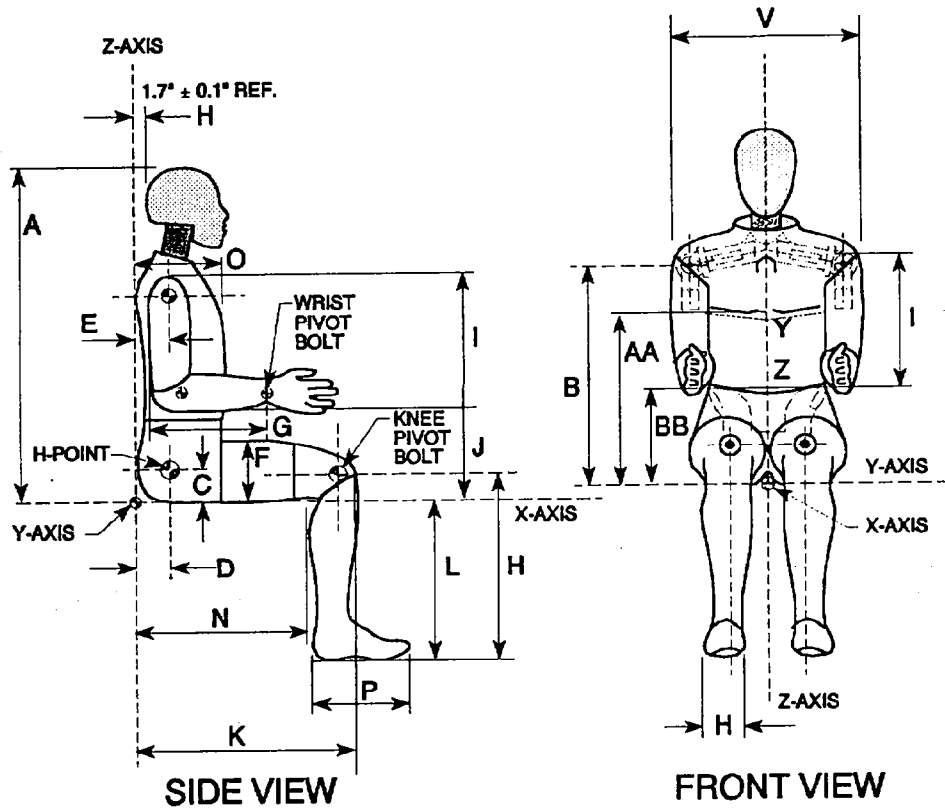
Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

Figure 14

DUMMY CONFIGURATION DIMENSIONS

**EXTERNAL DIMENSIONS
SPECIFICATIONS**



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. (REF: S572.31(A)(6))

HYBRID III EXTERNAL DIMENSIONS

S/N HUMANOID

DUMMY SERIAL NO. 150

DATE: 3/19/96

| | | |
|---------------------------------------|-------------|-----------|
| TEMPERATURE | | 21 DEG. C |
| RELATIVE HUMIDITY | | 30 % |
| LOCATION FOR CHEST CIRCUMFERENCE (AA) | 429-434 mm | 432 mm |
| LOCATION FOR WAIST CIRCUMFERENCE (BB) | 226-231 mm | 229 mm |
| CHEST CIRCUMFERENCE (Y) | 970-1001 mm | 996 mm |
| WAIST CIRCUMFERENCE (Z) | 836-866 mm | 864 mm |
| CHEST DEPTH (O) | 213-229 mm | 213 mm |
| H-POINT HEIGHT (C) | 84-89 mm | 86 mm |
| H-POINT FROM SEAT BACK (D) | 135-140 mm | 137 mm |
| SKULL CAP TO BACKLINE (H) | 41-46 mm | 45.7 mm |
| TOTAL SITTING HEIGHT (A) | 879-889 mm | 881 mm |
| THIGH CLEARANCE (F) | 140-155 mm | 145 mm |
| BUTTOCK KNEE LENGTH (K) | 580-605 mm | 594 mm |
| BUTTOCK POPLITAL LENGTH (N) | 452-477 mm | 472 mm |
| POPLITEAL LENGTH (L) | 430-455 mm | 452 mm |
| KNEE PIVOT HEIGHT (M) | 485-501 mm | 498 mm |
| FOOT LENGTH (P) | 252-267 mm | 259 mm |
| FOOT BREADTH (W) | 91-107 mm | 96.5 mm |
| SHOULDER PIVOT FROM BACKLINE (E) | 84-94 mm | 94 mm |
| SHOULDER BREADTH (V) | 422-437 mm | 429 mm |
| SHOULDER PIVOT HEIGHT (B) | 505-521 mm | 513 mm |
| ELBOW REST HEIGHT (J) | 190-211 mm | 206 mm |
| SHOULDER-ELBOW LENGTH (I) | 330-345 mm | 335 mm |
| BACK OF ELBOW TO WRIST PIVOT (G) | 290-305 mm | 292 mm |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 3/18/96

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 150 HEAD DROP CAL

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---------------------------------|----------------|--------------|
| TEMPERATURE | 19 - 25 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PEAK RESULTANT ACCELERATION | 225 - 275 G'S | 234 G'S |
| PEAK LATERAL ACCELERATION | 15 G'S MAX | 13.4 G'S |
| IS ACCELERATION CURVE UNIMODAL? | YES | YES |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
 TRANSPORTATION RESEARCH DEPARTMENT
NECK FLEXION TEST
 HYBRID III

DATE : 3/18/96

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER

HY3 SN: CAL NECK FLEXION

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|--|-------|-------------------|--------------|
| TEMPERATURE | | 20.5-22.2 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | | 10% - 70% | 30 % |
| IMPACT VELOCITY | | 24.8 - 25.7 KPH | 25.2 KPH |
| PENDULUM DECELERATION | 10 MS | 22.50 - 27.50 G'S | 23.6 G'S |
| | 20 MS | 17.60 - 22.60 G'S | 20.2 G'S |
| | 30 MS | 12.50 - 18.50 G'S | 16.34 G'S |
| MAX PENDULUM G'S ABOVE 30 MS | | 29 G'S MAX | 16.34 G'S |
| DECELERATION -TIME CURVE DECAY TIME TO 5 G'S | | 34 - 42 MS | 35.38 MS |
| D PLANE ROTATION | MAX | 64 - 78 DEG. | 72.52 DEG. |
| | TIME | 57 - 64 MS | 58.38 MS |
| MOMENT ABOUT OCCIPITAL CONDYLE | MAX | 88 - 108 N-M | 107 N-M |
| | TIME | 47 - 58 MS | 51.63 MS |
| ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO | | 113 - 128 MS | 123.5 MS |
| POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO | | 97 - 107 MS | 102.38 MS |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
 TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
 HYBRID III

DATE : 3/19/96

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 150 CAL NECK EXTENSION

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|--|-------|--------------------|--------------|
| TEMPERATURE | | 20.5 - 22.2 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | | 10% - 70% | 30 % |
| IMPACT VELOCITY | | 21.4 - 22.3 KPH | 21.6 KPH |
| PENDULUM DECELERATION | 10 MS | 17.20 - 21.20 G'S | 17.28 G'S |
| | 20 MS | 14.00 - 19.00 G'S | 16.92 G'S |
| | 30 MS | 11.00 - 16.00 G'S | 13.62 G'S |
| MAX PENDULUM G'S ABOVE 30 MS | | 22 G'S MAX | 13.62 G'S |
| DECELERATION -TIME CURVE DECAY TIME TO 5 G'S | | 38 - 46 MS | 40 MS |
| D PLANE ROTATION | MAX | 81 - 106 DEG. | 94.15 DEG. |
| | TIME | 72 - 82 MS | 73.88 MS |
| MOMENT ABOUT OCCIPITAL CONDYLE | MAX | -80.0/-52.9 N-M | -69.87 N-M |
| | TIME | 65 - 79 MS | 74.13 MS |
| ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO | | 147 - 174 MS | 154.5 MS |
| POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO | | 120 - 148 MS | 135 MS |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 3/19/96

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN 150 H.S. THORAX CAL

| TEST PARAMETER | HIGH SPEED TEST | TEST RESULTS |
|-------------------------|---------------------|--------------|
| | SPECIFICATION | |
| TEMPERATURE | 20.5 - 22.2 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PENDULUM VELOCITY | 23.7 - 24.6 KPH | 23.8 KPH |
| MAXIMUM DEFLECTION | 64 - 73 mm | 70.1 mm |
| MAXIMUM RESISTIVE FORCE | 5160 - 5894 NEWTONS | 5511 NEWTONS |
| INTERNAL HYSTERESIS | 69% - 85% | 69.7 % |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 3/19/96

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER

HY3 SN: KNEE 4.9 KGS CAL

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|------------------------|----------------|--------------|
| TEMPERATURE | 19 - 25 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PROBE VELOCITY | 7.5 - 7.7 KPH | 7.68 KPH |
| PEAK KNEE IMPACT FORCE | 4715 - 5782 N | 4999 N |
| PROBE WEIGHT | 4.9 KGS | |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 3/19/96

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 150 KNEE 4.9 KGS CAL

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|------------------------|----------------|--------------|
| TEMPERATURE | 19 - 25 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PROBE VELOCITY | 7.5 - 7.7 KPH | 7.68 KPH |
| PEAK KNEE IMPACT FORCE | 4715 - 5782 N | 4857 N |
| PROBE WEIGHT | 4.9 KGS | |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

HYBRID III EXTERNAL DIMENSIONS

S/N HUMANOID

DUMMY SERIAL NO. 064

DATE: 3/6/96

| | | |
|---------------------------------------|-------------|-----------|
| TEMPERATURE | | 21 DEG. C |
| RELATIVE HUMIDITY | | 30 % |
| LOCATION FOR CHEST CIRCUMFERENCE (AA) | 429-434 mm | 432 mm |
| LOCATION FOR WAIST CIRCUMFERENCE (BB) | 226-231 mm | 228 mm |
| CHEST CIRCUMFERENCE (Y) | 970-1001 mm | 985 mm |
| WAIST CIRCUMFERENCE (Z) | 836-866 mm | 846 mm |
| CHEST DEPTH (O) | 213-229 mm | 218 mm |
| H-POINT HEIGHT (C) | 84-89 mm | 86 mm |
| H-POINT FROM SEAT BACK (D) | 135-140 mm | 137 mm |
| SKULL CAP TO BACKLINE (H) | 41-46 mm | 43 mm |
| TOTAL SITTING HEIGHT (A) | 879-889 mm | 884 mm |
| THIGH CLEARANCE (F) | 140-155 mm | 152 mm |
| BUTTOCK KNEE LENGTH (K) | 580-605 mm | 599 mm |
| BUTTOCK POPLITAL LENGTH (N) | 452-477 mm | 467 mm |
| POPLITEAL LENGTH (L) | 430-455 mm | 439 mm |
| KNEE PIVOT HEIGHT (M) | 485-501 mm | 495 mm |
| FOOT LENGTH (P) | 252-267 mm | 257 mm |
| FOOT BREADTH (W) | 91-107 mm | 96 mm |
| SHOULDER PIVOT FROM BACKLINE (E) | 84-94 mm | 91 mm |
| SHOULDER BREADTH (V) | 422-437 mm | 427 mm |
| SHOULDER PIVOT HEIGHT (B) | 505-521 mm | 518 mm |
| ELBOW REST HEIGHT (J) | 190-211 mm | 203 mm |
| SHOULDER-ELBOW LENGTH (I) | 330-345 mm | 338 mm |
| BACK OF ELBOW TO WRIST PIVOT (G) | 290-305 mm | 295 mm |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 3/6/96

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 064 HEAD DROP CAL

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---------------------------------|----------------|--------------|
| TEMPERATURE | 19 - 25 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PEAK RESULTANT ACCELERATION | 225 - 275 G'S | 243 G'S |
| PEAK LATERAL ACCELERATION | 15 G'S MAX | 3.1 G'S |
| IS ACCELERATION CURVE UNIMODAL? | YES | YES |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
 TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 3/6/96

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 064 CAL NECK FLEXION

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|--|-------|-------------------|--------------|
| TEMPERATURE | | 20.5-22.2 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | | 10% - 70% | 30 % |
| IMPACT VELOCITY | | 24.8 - 25.7 KPH | 25.3 KPH |
| PENDULUM DECELERATION | 10 MS | 22.50 - 27.50 G'S | 22.69 G'S |
| | 20 MS | 17.60 - 22.60 G'S | 20.31 G'S |
| | 30 MS | 12.50 - 18.50 G'S | 16.32 G'S |
| MAX PENDULUM G'S ABOVE 30 MS | | 29 G'S MAX | 16.32 G'S |
| DECELERATION -TIME CURVE DECAY TIME TO 5 G'S | | 34 - 42 MS | 37.75 MS |
| D PLANE ROTATION | MAX | 64 - 78 DEG. | 69.11 DEG. |
| | TIME | 57 - 64 MS | 57 MS |
| MOMENT ABOUT OCCIPITAL CONDYLE | MAX | 88 - 108 N-M | 97.6 N-M |
| | TIME | 47 - 58 MS | 51.13 MS |
| ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO | | 113 - 128 MS | 116 MS |
| POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO | | 97 - 107 MS | 104.88 MS |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
 TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
 HYBRID III

DATE : 3/6/96

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 064 CAL NECK EXTENSION

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|--|-------|--------------------|--------------|
| TEMPERATURE | | 20.5 - 22.2 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | | 10% - 70% | 30 % |
| IMPACT VELOCITY | | 21.4 - 22.3 KPH | 21.6 KPH |
| PENDULUM DECELERATION | 10 MS | 17.20 - 21.20 G'S | 18.68 G'S |
| | 20 MS | 14.00 - 19.00 G'S | 15.71 G'S |
| | 30 MS | 11.00 - 16.00 G'S | 11.79 G'S |
| MAX PENDULUM G'S ABOVE 30 MS | | 22 G'S MAX | 11.79 G'S |
| DECELERATION -TIME CURVE DECAY TIME TO 5 G'S | | 38 - 46 MS | 39.75 MS |
| D PLANE ROTATION | MAX | 81 - 106 DEG. | 95.32 DEG. |
| | TIME | 72 - 82 MS | 75.25 MS |
| MOMENT ABOUT OCCIPITAL CONDYLE | MAX | -80.0/-52.9 N-M | -65.58 N-M |
| | TIME | 65 - 79 MS | 68.5 MS |
| ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO | | 147 - 174 MS | 151.38 MS |
| POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO | | 120 - 148 MS | 140.88 MS |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 3/6/96

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN 064 H.S. THORAX CAL

| TEST PARAMETER | HIGH SPEED TEST | TEST RESULTS |
|-------------------------|---------------------|--------------|
| | SPECIFICATION | |
| TEMPERATURE | 20.5 - 22.2 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PENDULUM VELOCITY | 23.7 - 24.6 KPH | 23.9 KPH |
| MAXIMUM DEFLECTION | 64 - 73 mm | 64.5 mm |
| MAXIMUM RESISTIVE FORCE | 5160 - 5894 NEWTONS | 5867 NEWTONS |
| INTERNAL HYSTERESIS | 69% - 85% | 75.5 % |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 3/6/96

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 064 KNEE 4.9 KGS CAL

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|------------------------|----------------|--------------|
| TEMPERATURE | 19 - 25 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PROBE VELOCITY | 7.5 - 7.7 KPH | 7.68 KPH |
| PEAK KNEE IMPACT FORCE | 4715 - 5782 N | 5280 N |
| PROBE WEIGHT | 4.9 KGS | |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 3/6/96

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 064 KNEE 4.9 KGS CAL

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|------------------------|----------------|--------------|
| TEMPERATURE | 19 - 25 DEG. C | 21 DEG. C |
| RELATIVE HUMIDITY | 10% - 70% | 30 % |
| PROBE VELOCITY | 7.5 - 7.7 KPH | 7.68 KPH |
| PEAK KNEE IMPACT FORCE | 4715 - 5782 N | 5551 N |
| PROBE WEIGHT | 4.9 KGS | |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

Appendix D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(6 Month Calibration Minimum)

| DRIVER DUMMY (S/N 150) | Serial # | Manufacturer | Calibration | |
|--------------------------|----------|--------------|-------------|------|
| | | | Last | Next |
| Head X | ADL98 | ENDEVCO | 10/95 | 4/96 |
| Y | AE8K0 | ENDEVCO | 10/95 | 4/96 |
| Z | ADMB6 | ENDEVCO | 10/95 | 4/96 |
| Chest X | A26A | ENDEVCO | 10/95 | 4/96 |
| Y | A27A | ENDEVCO | 10/95 | 4/96 |
| Z | A51A | ENDEVCO | 10/95 | 4/96 |
| Right Femur Load Cell | 952 | GSE | 1/96 | 7/96 |
| Left Femur Load Cell | 951 | GSE | 1/96 | 7/96 |
| Neck Load Cell X | 269 | DENTON | 11/95 | 5/96 |
| Y | 269 | DENTON | 11/95 | 5/96 |
| Z | 269 | DENTON | 11/95 | 5/96 |
| Neck Moment X | 269 | DENTON | 11/95 | 5/96 |
| Y | 269 | DENTON | 11/95 | 5/96 |
| Z | 269 | DENTON | 11/95 | 5/96 |
| Chest Deflection Gauge | 150 | HUMANOID | 1/96 | 7/96 |
| Hybrid III Use Only | | | | |
| Lap Belt Load Cells | 706 | LEBOW | 1/96 | 7/96 |
| Shoulder Belt Load Cells | 707 | LEBOW | 1/96 | 7/96 |
| Spool-Out Potentiometer | M5 | MAGNETEK | 3/96 | 9/96 |
| Belt Stretch Transducer | E6 | CALSPAN | 11/95 | 5/96 |

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

| DRIVER DUMMY | Serial # | Manufacturer | Calibration | |
|-------------------|----------|--------------|-------------|------|
| | | | Last | Next |
| Head | | | | |
| X (R) | AC827 | ENDEVCO | 3/96 | 9/96 |
| Y (R) | AC8F6 | ENDEVCO | 3/96 | 9/96 |
| Z (R) | ACCW0 | ENDEVCO | 3/96 | 9/96 |
| Chest | | | | |
| X (R) | AHRC9 | ENDEVCO | 3/96 | 9/96 |
| Y (R) | AC7W8 | ENDEVCO | 3/96 | 9/96 |
| Z (R) | ACC06 | ENDEVCO | 3/96 | 9/96 |
| Pelvic | | | | |
| X | AL6N5 | ENDEVCO | 1/96 | 7/96 |
| Y | AL6R7 | ENDEVCO | 1/96 | 7/96 |
| Z | A12C | ENDEVCO | 1/96 | 7/96 |
| Left Upper Tibia | | | | |
| Mx | 38 | DENTON | 10/95 | 4/96 |
| Left Upper Tibia | | | | |
| My | 38 | DENTON | 10/95 | 4/96 |
| Left Lower Tibia | | | | |
| Fy | 32 | DENTON | 10/95 | 4/96 |
| Left Lower Tibia | | | | |
| Fz | 32 | DENTON | 10/95 | 4/96 |
| Left Lower Tibia | | | | |
| Mx | 32 | DENTON | 10/95 | 4/96 |
| Right Upper Tibia | | | | |
| Mx | 45 | DENTON | 10/95 | 4/96 |
| Right Upper Tibia | | | | |
| My | 45 | DENTON | 10/95 | 4/96 |
| Right Lower Tibia | | | | |
| Fy | 41 | DENTON | 10/95 | 4/96 |
| Right Lower Tibia | | | | |
| Fz | 41 | DENTON | 10/95 | 4/96 |
| Right Lower Tibia | | | | |
| Mx | 41 | DENTON | 10/95 | 4/96 |

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(6 Month Calibration Minimum)

| DRIVER DUMMY | Serial # | Manufacture | Calibration | |
|--------------------|----------|-------------|-------------|------|
| | | | Last | Next |
| Left Foot Front Z | AET34 | ENDEVCO | 3/96 | 9/96 |
| Left Foot Rear X | AKD93 | ENDEVCO | 3/96 | 9/96 |
| Left Foot Rear Z | AEW70 | ENDEVCO | 3/96 | 9/96 |
| Right Foot Front Z | AET76 | ENDEVCO | 1/96 | 7/96 |
| Right Foot Rear X | AA4C5 | ENDEVCO | 1/96 | 7/96 |
| Right Foot Rear Z | AET22 | ENDEVCO | 1/96 | 7/96 |

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

| PASSENGER DUMMY (S/N 064) | Serial # | Manufacturer | Calibration | |
|---------------------------|----------|--------------|-------------|------|
| | | | Last | Next |
| Head | | | | |
| X | AD4A9 | ENDEVCO | 10/95 | 4/96 |
| Y | AE8T7 | ENDEVCO | 10/95 | 4/96 |
| Z | AF5R1 | ENDEVCO | 10/95 | 4/96 |
| Chest | | | | |
| X | AE8R7 | ENDEVCO | 3/96 | 9/96 |
| Y | AF5H9 | ENDEVCO | 3/96 | 9/96 |
| Z | AH5L8 | ENDEVCO | 3/96 | 9/96 |
| Right Femur Load Cell | 419 | GSE | 1/96 | 7/96 |
| Left Femur Load Cell | 418 | GSE | 1/96 | 7/96 |
| Neck Load Cell | 446 | DENTON | 11/95 | 5/96 |
| Y | 446 | DENTON | 11/95 | 5/96 |
| Z | 446 | DENTON | 11/95 | 5/96 |
| Neck Moment | 446 | DENTON | 11/95 | 5/96 |
| Y | 446 | DENTON | 11/95 | 5/96 |
| Z | 446 | DENTON | 11/95 | 5/96 |
| Chest Deflection Gauge | 064 | HUMANOID | 11/95 | 5/96 |
| Hybrid III Use Only | | | | |
| Lap Belt Load Cells | 710 | LEBOW | 1/96 | 7/96 |
| Shoulder Belt Load Cells | 711 | LEBOW | 1/96 | 7/96 |
| Spool-Out Potentiometer | M6 | MAGNETEK | 3/96 | 9/96 |
| Belt Stretch Transducer | E7 | CALSPAN | 11/95 | 5/96 |

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(6 Month Calibration Minimum)

| PASSENGER DUMMY | Serial # | Manufacturer | Calibration | |
|-------------------|----------|--------------|-------------|------|
| | | | Last | Next |
| Head | | | | |
| X (R) | AC7Y3 | ENDEVCO | 10/95 | 4/96 |
| Y (R) | AC824 | ENDEVCO | 10/95 | 4/96 |
| Z (R) | AC814 | ENDEVCO | 10/95 | 4/96 |
| Chest | | | | |
| X (R) | AP1E0 | ENDEVCO | 3/96 | 9/96 |
| Y (R) | AJ9F8 | ENDEVCO | 3/96 | 9/96 |
| Z (R) | AP1A2 | ENDEVCO | 3/96 | 9/96 |
| Pelvic | | | | |
| X | AH5F3 | ENDEVCO | 1/96 | 7/96 |
| Y | AL6H7 | ENDEVCO | 1/96 | 7/96 |
| Z | AL6C8 | ENDEVCO | 1/96 | 7/96 |
| Left Upper Tibia | | | | |
| Mx | 015 | DENTON | 10/95 | 4/96 |
| Left Upper Tibia | | | | |
| My | 015 | DENTON | 10/95 | 4/96 |
| Left Lower Tibia | | | | |
| Fy | 011 | DENTON | 10/95 | 4/96 |
| Left Lower Tibia | | | | |
| Fz | 011 | DENTON | 10/95 | 4/96 |
| Left Lower Tibia | | | | |
| Mx | 011 | DENTON | 10/95 | 4/96 |
| Right Upper Tibia | | | | |
| Mx | 016 | DENTON | 10/95 | 4/96 |
| Right Upper Tibia | | | | |
| My | 016 | DENTON | 10/95 | 4/96 |
| Right Lower Tibia | | | | |
| Fy | 012 | DENTON | 10/95 | 4/96 |
| Right Lower Tibia | | | | |
| Fz | 012 | DENTON | 10/95 | 4/96 |
| Right Lower Tibia | | | | |
| Mx | 012 | DENTON | 10/95 | 4/96 |

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

| PASSENGER DUMMY | Serial # | Manufacture | Calibration | |
|--------------------|----------|-------------|-------------|------|
| | | | Last | Next |
| Left Foot Front Z | AKEB3 | ENDEVCO | 3/96 | 9/96 |
| Left Foot Rear X | AEYW0 | ENDEVCO | 3/96 | 9/96 |
| Left Foot Rear Z | AEW71 | ENDEVCO | 3/96 | 9/96 |
| Right Foot Front Z | AEWE3 | ENDEVCO | 1/96 | 7/96 |
| Right Foot Rear X | AEWJ5 | ENDEVCO | 1/96 | 7/96 |
| Right Foot Rear Z | AEWK1 | ENDEVCO | 1/96 | 7/96 |

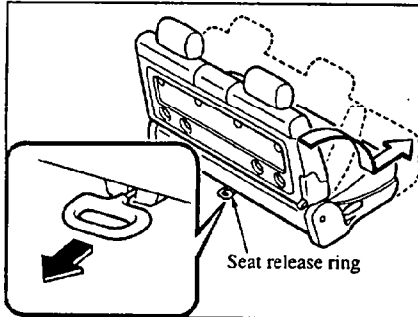
INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
 (6 Month Calibration Minimum)

| | Serial # | Manufacturer | Calibration | |
|---------------------------------|----------|--------------|-------------|------|
| | | | Last | Next |
| Left Seat Rear Crossmember | Y22 | ICS | 1/96 | 7/96 |
| Right Rear Seat Crossmember | Y15 | ICS | 12/95 | 6/96 |
| Top of Engine | X28 | ICS | 11/95 | 5/96 |
| Bottom of Engine | Y25 | ICS | 1/96 | 7/96 |
| Left Disc Brake Caliper | A56 | CEC | 9/95 | 3/96 |
| Right Disc Brake Caliper | A164 | CEC | 3/96 | 9/96 |
| Instrument Panel | A145 | CEC | 12/95 | 6/96 |
| Left Seat Rear Crossmember (R) | X83 | ICS | 10/95 | 4/96 |
| Right Seat Rear Crossmember (R) | Y171 | ICS | 1/96 | 7/96 |

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Seat Belt System



■ Leaving the Row 2 Rear Seat, 8-Passenger Model

Pull the seat release ring at the lower, rear center of rear seat, row 1. The seat will fold and automatically slide forward.

Seat belts help to decrease the possibility of severe injury during accidents and sudden stops. Mazda recommends that the driver and passengers always wear seat belts.

All of the door-side seat belt retractors are designed to keep the lap/shoulder belts out of the way when not in use.

The driver's seat belt has no provisions for child-restraint systems and has only an emergency locking mode. The driver may wear it comfortably, and it will lock during a collision.

However, the front passenger's seat and rear door-side lap/shoulder belt retractors operate in two modes, emergency locking mode and for child-restraint systems, automatic locking mode.

Emergency locking mode

If the belt has fully retracted, it will always be in the emergency locking mode until you move it into automatic mode by pulling the belt all the way out to its full length. In the emergency locking mode, the belt remains comfortable on the occupant and the retractor will lock in position during a collision.

If the belt feels tight and hinders comfortable movement while the vehicle is stopped or in motion, you may be in the automatic retractor mode because you have pulled the belt too far out and set it up for a child seat. To return to the more comfortable emergency locking mode, wait until you can stop the vehicle in a safe area, retract the belt fully and then again extend it around you.

Automatic locking mode

Always use the automatic locking mode to keep the child-restraint system from shifting to an unsafe position in the event of an accident. To get the seat belt into the automatic locking mode, pull it all the way out and connect it as instructed on the child-restraint system. It will retract down to the child restraint and stay locked on it. See the section on child-restraint systems for more information.

The rear center seat position has a lap belt with manual adjustment.

⚠ WARNING

Seat Belts:

Passengers not wearing seat belts during a collision can be injured much worse than those wearing seat belts. They can hit things inside the vehicle or even be thrown from it. They can be seriously injured or killed. In the same collision, passengers wearing seat belts might be much safer.

⚠ WARNING

Damaged Seat Belts:

An accident can damage a seat belt in use. The belt webbing can be weakened and retractors and anchors can be bent or broken. Therefore a damaged seat belt may not provide adequate protection in a collision. Have a professional inspect all seat belt systems in use during an accident before they are used again.

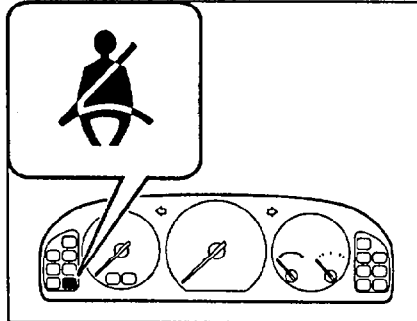
⚠ WARNING

Twisted Seat Belts:

Twisted seat belts can cause injury. In a collision, the full width of the belt isn't available to absorb the impact. This puts more force on the bones beneath the belt, which could break them or cause other serious injury. Don't wear twisted seat belts.

⚠ WARNING

One Belt, One Passenger:
Using one seat belt for more than one person at a time is dangerous. A seat belt used in this way can't spread the impact forces properly and the two passengers could be crushed together and seriously injured. Never use one belt for more than one person at a time.



■ **Seat Belt Warning Light/Beep**

If the driver's seat belt is not buckled when the ignition is at ON (II), a beep will sound for about 6 seconds and the seat belt warning light will remain on until the belt is buckled.

If the system does not operate correctly, consult an Authorized Mazda Dealer.



■ **Front Seat Belts**

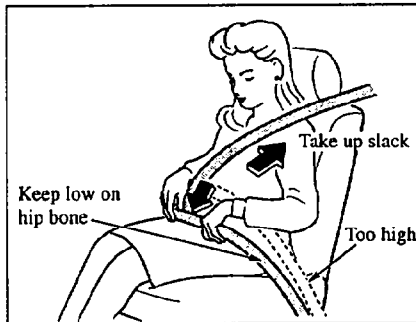
To fasten:

1. Grasp the buckle and tongue plate.
2. Slowly pull out the lap/shoulder belt.
3. Insert the plate into the buckle until you hear a click.

⚠ WARNING

Positioning the Shoulder Portion of the Seat Belt:

Failure to position the shoulder portion of the seat belt properly reduces the amount of protection in an accident and increases the chance of injury. Make sure the shoulder portion of the seat belt is positioned across your shoulder near your neck, not on your neck or upper arm.



To unfasten:

Depress the buckle release.

⚠ WARNING

Positioning the Lap Portion of the Seat Belt:

The lap portion of the seat belt worn too high can be dangerous. In a collision, this would concentrate the impact force directly on the abdominal area, causing serious injury. Wear the lap portion of the belt snugly and as low as possible.